

HDS REVISION NOTICE

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HDS Product: 5700E Disk Subsystem

Date: 5/99

Document Title: DF350 Disk Subsystem Maintenance Manual

DOCUMENT REVISION LEVEL

Instructions: Add revised sheets and dispose of superseded sheets as indicated by the most current revision level. (Please see Notes.)

DATE	HITACHI REVISION LEVEL	HDS REVISION LEVEL	DESCRIPTION OF REVISION
2/98	3	2S	All sheets are revised. This revision supersedes and replaces previous HDS editions. HDS Document Order #FE-97DF319-2S
6/98	4-5	2U1	See the Hitachi, Ltd. Revision Control sheet for details of this revision. This revision may be ordered as a separate package to be used as a base manual supplement. HDS Document Order #FE-97DF319-2U1
7/98	4-5	3	No changes have been created by Hitachi, Ltd. Previously printed revisions have been incorporated into a new base manual for reprinting purposes only. HDS Document Order #FE-97DF319-3
11/98	6	4S	All sheets are revised. This revision supersedes and replaces previous HDS editions. HDS Document Order #FE-97DF319-4S

NOTES:

2. Prior to disposal of superseded documents or sheets, please review applicable HDS policies and procedures on the disposal of proprietary or classified information.
2. To provide a historical revision record, please file this HDS Revision Notice sheet in the back of the revised manual.

HDS REVISION NOTICE CONTINUED

HDS Document Number: FE-98DF319

DATE	HITACHI REVISION LEVEL	HDS REVISION LEVEL	DESCRIPTION OF REVISION
1/99	7	4U1	See the Hitachi, Ltd. Revision Control sheet for details of this revision. This revision may be ordered as a separate package to be used as a base manual supplement. HDS Document Order #FE-97DF319-4U1
5/99	7	5	No changes have been created by Hitachi, Ltd. Previously printed revisions have been incorporated into a new base manual for reprinting purposes only. HDS Document Order #FE-97DF319-5

DF350 Disk Subsystem MAINTENANCE MANUAL

Rev.7.1

Read this manual carefully and keep it.

- Before starting operation, read the safety instructions carefully and fully understand them.
- After reading this manual, keep it at hand for your reference.

HITACHI

PREFACE

- This manual describes specifications and interface of the DF350 disk array subsystem.
- For the procedure for installing the subsystem, refer to the user's operation manual.
- For maintenance works such as replacement of maintenance parts and troubleshooting, refer to the maintenance manual.
- Keep this manual at hand so that you can use it at any time.
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REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Mar.10.'97	A.Yamanashi	M.Sato	M.Sato	All	Issued	
1	May.25.'97	A.Yamanashi	M.Sato	M.Sato	TRBL MK-REP MK-INST MK-OPT CK-REP CK-INST CK-OPT RH-REP RH-INST RH-OPT RW-REP RW-INST RW-OPT	Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1	CH CH CH CH CH CH CH CH CH CH CH CH CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	TRBL M-FC PANEL MK-REP MK-INST MK-OPT MK-PARTS CK-REP CK-INST CK-OPT CK-PARTS RH-REP RH-INST RH-OPT RH-PARTS RW-REP RW-INST	Rev.1 → Rev.2 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.1 → Rev.2 Rev.1 → Rev.2 Rev.1 → Rev.2 Rev.0 → Rev.1 Rev.1 → Rev.2 Rev.1 → Rev.2 Rev.1 → Rev.2 Rev.0 → Rev.1 Rev.1 → Rev.2 Rev.1 → Rev.2 Rev.1 → Rev.2 Rev.0 → Rev.1 Rev.1 → Rev.2 Rev.1 → Rev.2	CH CH CH CH CH CH CH CH CH CH CH CH CH CH CH CH CH CH
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	SAFETY ENTRY THEORY TRBL PERIOD M-FC PANEL DK-REP DK-INST DK-OPTION DK-PARTS MK-REP MK-INST MK-OPTION CK-REP CK-INST CK-OPTION RH-REP RH-INST RH-OPTION RH-FRAME	Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.0 → Rev.1 Rev.2 → Rev.3 Rev.0 → Rev.1 Rev.1 → Rev.2 Rev.1 → Rev.2 Issued (Rev.0) Issued (Rev.0) Issued (Rev.0) Issued (Rev.0) Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.2 → Rev.3 Rev.0 → Rev.1	CH CH CH CH CH CH CH AD AD AD AD CH CH CH CH CH CH CH CH CH CH

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REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
					RW-REP	Rev.2 → Rev.3	CH
					RW-INST	Rev.2 → Rev.3	CH
					RW-OPTION	Rev.1 → Rev.2	CH
					RW-FRAME	Issued (Rev.0)	AD
4	Feb.10.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	SAFETY	Rev.1 → Rev.2	CH
					ENTRY	Rev.1 → Rev.2	CH
					THEORY	Rev.1 → Rev.2	CH
					TRBL	Rev.3 → Rev.4	CH
					PERIOD	Rev.1 → Rev.2	CH
					M-FC	Rev.2 → Rev.3	CH
					PANEL	Rev.2 → Rev.3	CH
					DK-REP	Rev.0 → Rev.1	CH
					DK-INST	Rev.0 → Rev.1	CH
					DK-OPTION	Rev.0 → Rev.1	CH
					DH-REP	Issued (Rev.0)	AD
					DH-INST	Issued (Rev.0)	AD
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					DH-PARTS	Issued (Rev.0)	AD
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					MK-REP	Rev.3 → Rev.4	CH
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					RW-INST	Rev. 3 → Rev.4	CH
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5	Apr.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	ENTRY	Rev.2 → Rev.3	CH
					TRBL	Rev.4 → Rev.5	CH
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6	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	SAFETY	Rev.2 → Rev.3	CH
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					MK-REP	Rev.4 → Rev.5	CH
					MK-INST	Rev.4 → Rev.5	CH

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REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
					MK-OPTION	Rev.4 → Rev.5	CH
					MK-PARTS	Rev.2 → Rev.3	CH
					CK-REP	Rev.4 → Rev.5	CH
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					RW-PARTS	Rev.0 → Rev.1	CH
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7	Oct.15.'98	A.Yamanashi			TRBL	Rev.6 → Rev.7	CH
					M-FC	Rev.5 → Rev.6	CH
					DK-REP	Rev.2 → Rev.3	CH
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[DKH type]

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[Mk type]

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[RKWH type]

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Search Flowchart

Find the item you want to refer to in this DF350 Maintenance Manual.

To troubleshoot

→ See Chapter 3 "TROUBLESHOOTING" (TRBL0000).

To replace parts

→ See Chapter 7 "PARTS REPLACEMENT" for the type used (XX-REP0000).

To update the microprogram

→ See Chapter 5 "MICROPROGRAM-FC" (M-FC0000).

To perform periodic inspection

→ See Chapter 4 "PERIODIC" (PERIOD0000).

To install

→ See Chapter 8 "INSTALLATION" for the type used (XX-INST0000).

To add options

→ See Chapter 9 "OPTIONAL INSTALLATION" for the type used (XX-OPTION0000).

To mount in the rack frame of the rackmount type

→ See Chapter 11 "PROCEDURES FOR INSTALLING" for the type used (XX-FRAME0000).

• See SAFETY0000 for the precautions for safe handling.

• See ENTRY0000 for how to use this manual.

• See THEORY0000 for the description of this unit.

• See PANEL0000 for how to operate the panel.

• See XX-PARTS0000 for the list of parts for the type used.

DF350 Disk Subsystem
0. SAFETY SUMMARY

Rev.3

REV.3	Mar.1997	Dec.1997	Feb.1998	May.1998		

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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REV.1	Mar.1997	Feb.1998				

△ SAFETY SUMMARY

1. △ General Safety Guidelines

Read the following safety guidelines carefully and follow them when you conduct maintenance of the machine.

Before starting maintenance

- Maintenance of the machine must be done only by trained and qualified engineers.
- Read and follow the safety guidelines and procedures in this manuals.
- In this manual and on the machine, hazard warnings are provided to aid you in preventing or reducing the risk of death, personal injury, or product damage. Understand and follow these hazard warnings fully.
- The hazard warning which appear on the warning labels on the machine or in the manual have one of the following alert headings WARNING, or CAUTION.

 DANGER :	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING :	Indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.
 CAUTION :	Indicates a potentially hazardous situation which, if not avoided, will or can result in minor or moderate injury, or serious damage of product.
	The alert symbol shown left precedes every signal word for hazard warnings, and appears in safety related descriptions in the manual.

The signal word '**NOTICE**' is used to present warnings which are not directly related to personal injury hazards.

- When warning labels become dirty or start peeling off, replace them.
 - Keep in mind that the hazard warnings in this manual or on the machine cannot cover every possible case, as it is impossible to predict and evaluate all circumstances beforehand.
- Be alert and use your common sense.

 SAFETY SUMMARY (Continued)

During work

- For each procedure, follow the given sequence of steps.
- Use the spare, consumables and materials for maintenance which are specified in the manual; otherwise, personal injury or damage of the machine, as well as deterioration of the product's quality, may result.
- Use the special tools and instruments specified for the work in the manual or commercially available tools and instruments which fit the purpose.
- Use measurement instruments and powered tools which are properly calibrated or periodically inspected.
- Keep the maintenance area neat and tidy.
- Always put away parts, materials or tool when not in use.
- Wear an eye protector where liquid may splash or anything may fly about.
- When lifting anything heavy, hold it close to yourself and keep your back erect, to prevent injury to your back or spine.

When lifting anything, for the weight of which CAUTION is indicated, use a proper lifting tool or have somebody help you.

- Keep a soldering iron and its stand away from you to prevent accidental contact and burns.
- When using sharp objects or cutting tools, make sure that no part of your body lies in the path of the blade bid, or point.
- Before finishing your work, make sure that all parts removed during maintenance have been in stalled back in their original positions in the machine.

Make sure that no tool or foreign material left in the machine.

 SAFETY SUMMARY (Continued)

Prevention of electric shocks

- Before starting work, make sure that, unless otherwise specifically instructed, there is no potential electric hazard in the maintenance area such as insufficient grounding or a wet floor.
- Before starting work, note where the emergency power-off switches are located and make sure you know how to operate them.
- Unless otherwise specifically instructed, cut off all power sources to the machine before starting maintenance. Just switching off the machine power supplies is usually not enough.
When power is fed from a wall or floor outlet, unplug the power supply cord, or turn off the switch on the power distribution panel or board. Attach a notice on the panel or board prohibiting the use of the switch. If the machine power has been already turned off, make sure yourself that these conditions are satisfied.
- Do not touch any uninsured conductor or surface, where so instructed, which remains charged for a limited time after the external power supply to the machine is disconnected.
- When working on a machine which has a grounding terminal, make sure that the terminals properly connected to the facility's ground.
- When working close to a hazardously energized part, do not work alone; work with another person who can immediately turn off the power in an emergency.
- Do not wear any metallic item such as a wrist watch with a metallic surface, or metallic accessories.
If you wear eyeglasses with a metallic frame, take care not to let the frame touch an uninsured surface.
- Make sure that your hands and arms are dry.
- Unless otherwise specifically instructed, use only one hand when it is necessary to work near an exposed live electric circuit.
This prevents the completion of the circuit through both hands even if you accidentally touch the circuit.
- Do not use a dental mirror near an exposed live electric circuit.
The mirror surface is conductive and can become hazardous even if it is made of plastic.
- Unless otherwise specifically instructed, do not supply power to any subassembly such as a power supply unit or a motor while it is removed from the machine.

Preventing being caught by rotating or moving parts

- Tuck in your tie, scarf, shirt, or any other loose clothing so that it will not be caught by a rotating or moving part.
- Tie up long hair.
- Unless otherwise specifically instructed, do not supply power to any device with rotating or moving parts which are not properly covered.
- When instructed to supply power to any device with rotating or moving parts whose covers have been removed, work with another person who can immediately turn off the power in an emergency.

 SAFETY SUMMARY (Continued)

Procedure in an emergency

For electric shock

- Do not panic. Do not become another victim through contact with the injured person.
- First, shut off the electric current passing through the victim.
Use the emergency power-off switch, if there is one, or, otherwise, a normal power-off switch. If this cannot be done, push the victim away from the source of the electric current by using a nonconductor object such as a dry wooden stick.
- Then, call an ambulance.
- If the victim is unconscious, artificial respiration may be necessary.
A proper method for performing artificial respiration or resuscitation should be learned beforehand.
- If the victim's heart is not beating, cardio-pulmonary resuscitation should be performed by a trained and qualified person.

For outbreak of fire

- First shut off all the power from the machine using the emergency power-off switch.
- If the fire continues burning after the power is shut off, take suitable actions including the use of a fire extinguisher or a call for the fire department.

⚠ SAFETY SUMMARY (Continued)

2. ⚠ Hazard Warning Statements

The following are the hazard warning statements contained in this manual.

(1) ⚠ DANGER statement

No DANGER statement

(2) ⚠ WARNING statement

- **Power supply is turned on. Be careful not to touch the live parts to avoid an electric shock.**

(PERIOD0030, 0040, 0050, 0060)

- **The fan is rotating fast. Do not touch the fan.**

(PERIOD0070)

- **Only the maintenance personal can perform this replacement.**

The operation by the user is prohibited.

(DK-REP0270)

- **Do not touch inside of In Box ASSY. Electricity remains even if main switch is off.**

(DK-REP0450, CK-REP0400, MK-REP0400, RH-REP0430, RW-REP0410)

- **Do not touch inside the AC/DC power supply with your hand.**

When setting the main switch off, hazardous voltage is still present.

(DH-REP0370)

- **Do not touch inside the Power Unit (D) with your hand.**

When setting the main switch off, hazardous voltage is still present.

(DH-REP0390)

- **A large leak current flows when plural subsystems of DF350-RKH are installed.**

Be sure to ground them for preventing an electric shock accident.

(RH-FRAME0310)

- **A large leak current flows when plural subsystems of DF350-RKWH are installed.**

Be sure to ground them for preventing an electric shock accident.

(RW-FRAME0350)

(3) ⚠ CAUTION statement

- **The battery contains a poisonous substance. An electric shock may be caused by inappropriate handling. Be sure to follow the instructions below.**

(1) **Do not disassemble or remake the battery.**

(2) **Do not deform the battery.**

(3) **Do not connect (+) pole to (–) pole with metallic article such as a steel wire.**

(4) **Do not reverse (+) and (–) poles.**

(5) **Do not peel off the covering tube.**

(6) **Do not connect the battery directly to the outlet.**

(7) **Do not connect the battery to anything other than this subsystem for charging/discharging.**

(8) **Do not leave the battery at a hot place. Store the battery in a dark, cool place.**

(ENTRY0120)

⚠ SAFETY SUMMARY (Continued)

- **Do not place it on the unstable place, on the shaky table, or the inclined place, etc.**
Dropping or a fall of it may cause an injury.
 (THEORY0140)
- **If an LED which indicates the voltage error comes on, internal power supply may fail.**
When the internal power supply fails, an electric shock or fire may be caused. If you find the error, turn off the power, then call the service personnel.
 (TRBL0140)
- **This unit has more than one power supply cord. Disconnect two power supply cords before servicing to avoid electric shock.**
 (RW-REP0410)
- **Do not disintegrate removed Battery. It may cause burn or electric shock.**
 (PERIOD0110, DK-REP0400, DH-REP0400,)
 (CK-REP0290, MK-REP0290, RH-REP0310,)
 (RW-REP0310)
- **Make sure that AC cable is not damaged. It may cause electric shock or fire.**
 (PERIOD0120, DK-INST0140, DH-INST0180,)
 (CK-INST0190, MK-INST0170, RH-INST0180,)
 (RW-INST0180)
- **When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.**
Be careful not to touch the electrified parts with a screwdriver etc.
 (DK-REP0040, DH-REP0040, CK-REP0040, MK-REP0040,)
 (RH-REP0040, RW-REP0040)
- **Do not subject HDU ASSY to any impact or vibration since it is a precision component.**
 (DK-REP0220, 0230, DK-INST0120, DK-OPTION0170,)
 (DH-REP0310, 0320, DH-INST0140, DH-OPTION0200,)
 (DH-FRAME1010, 1040,)
 (CK-REP0245, 0250, CK-INST0140, CK-OPTION0210,)
 (MK-REP0245, 0250, MK-INST0120, MK-OPTION0210,)
 (RH-REP0265, 0270, RH-INST0130, RH-OPTION0230,)
 (RW-REP0265, 0270, RW-INST0140, RW-OPTION0220)
- **FAN is rotating with high speed, be careful not to be caught by the FAN.**
 (CK-REP0280, MK-REP0280, RH-REP0300, RW-REP0300)
- **The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.**
 (DK-INST0050, DH-INST0050, CK-INST0050, MK-INST0050,)
 (RH-INST0050, RW-INST0050)

⚠ SAFETY SUMMARY (Continued)

- **Do not block the ventilation. With the temperature rise, it may cause failure or fire.**
(DK-INST0100, DH-INST0100, CK-INST0130, MK-INST0110,)
(RH-INST0100, RW-INST0110)
- **The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.**
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- **Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).**
- **Be sure to perform the work with two or more persons. The weight of the DF350-DKH disk subsystem is approximately 25kg.**
- **Install subsystems to the rack starting from the bottom position, in order to prevent turning over.**
- **Do the work following other safety instructions concerning rack frame.**
(DH-FRAME0040, 0130, 0200)
- **The mass of the DF350-DKH is approximately 25kg. Be sure to hold it by its bottom with two or more persons when installing it in the rack frame.**
Make sure that the front panel of the DF350-DKH is secured tightly before installing the DF350-DKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.
(DH-FRAME0090, 0170, 0260)
- **The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.**
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- **Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).**
- **Be sure to perform the work with two or more persons. The weight of the DF350-RKH disk subsystem is approximately 60kg.**
- **Install subsystems to the rack starting from the bottom position, in order to prevent turning over.**
(RH-FRAME0050, 0130, 0230)
- **Do the work following other safety instructions concerning HP rack frame.**
(RH-FRAME0050)
- **Do the work following other safety instructions concerning IBM AS/400 (9309) rack frame.**
(RH-FRAME0130)
- **The mass of the DF350-RKH is approximately 60kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.**
Make sure that the front panel of the DF350-RKH is secured tightly before installing the DF350-RKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.
(RH-FRAME0100, RH-FRAME0190, RH-FRAME0280)

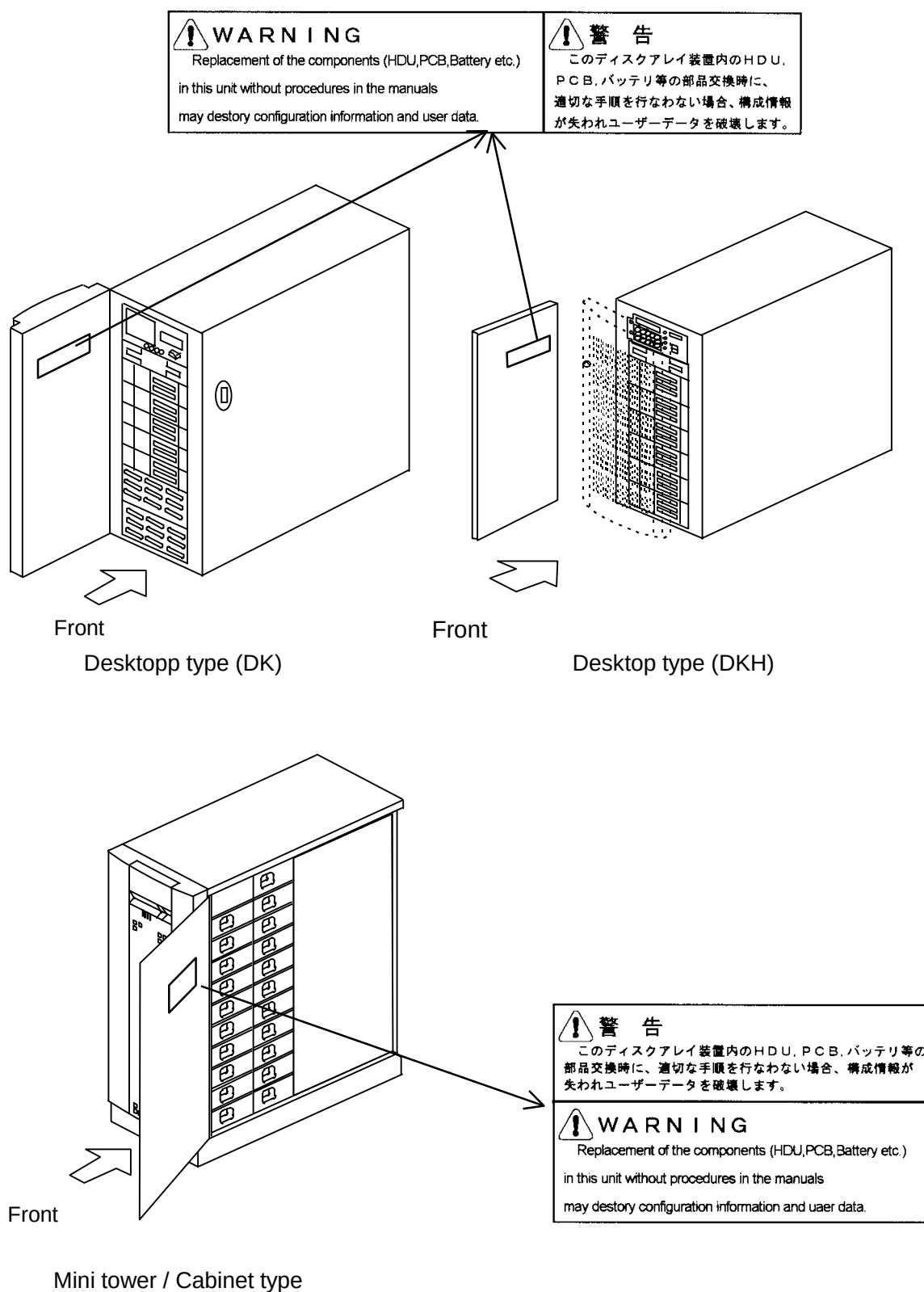
 SAFETY SUMMARY (Continued)

- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKWH disk subsystem is approximately 105kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
(RW-FRAME0050, 0150, 0260)
- Do the work following other safety instructions concerning HP rack frame.
(RW-FRAME0050)
- Do the work following other safety instructions concerning IBM AS/400 (9309) rack frame.
(RW-FRAME0150)
- The mass of the DF350-RKWH is approximately 105kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.
Make sure that the front panel of the DF350-RKWH is secured tightly before installing the DF350-RKWH in the rack frame. If not, the front panel may comes off during the installation causing a personal injury.
(RW-FRAME0110, RW-FRAME0220, RW-FRAME0310)

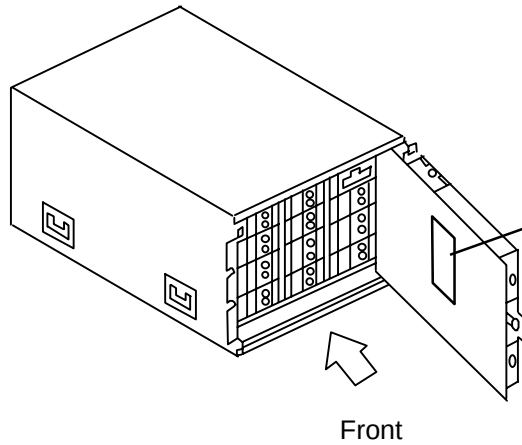
⚠ SAFETY SUMMARY (Continued)

3. ⚠ Locations Where Warning and Caution Labels Are Affixed

Locations where warning and caution labels are affixed are shown below.

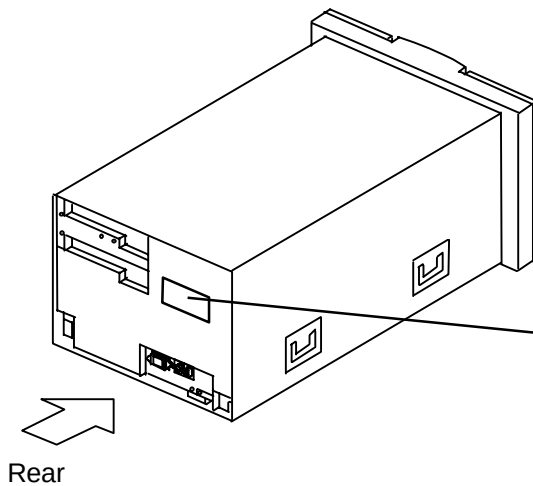


⚠ SAFETY SUMMARY (Continued)



⚠ 警告
このディスクアレイ装置内のHDU、PCB、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われユーザーデータを破壊します。

⚠ WARNING
Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and uaser data.

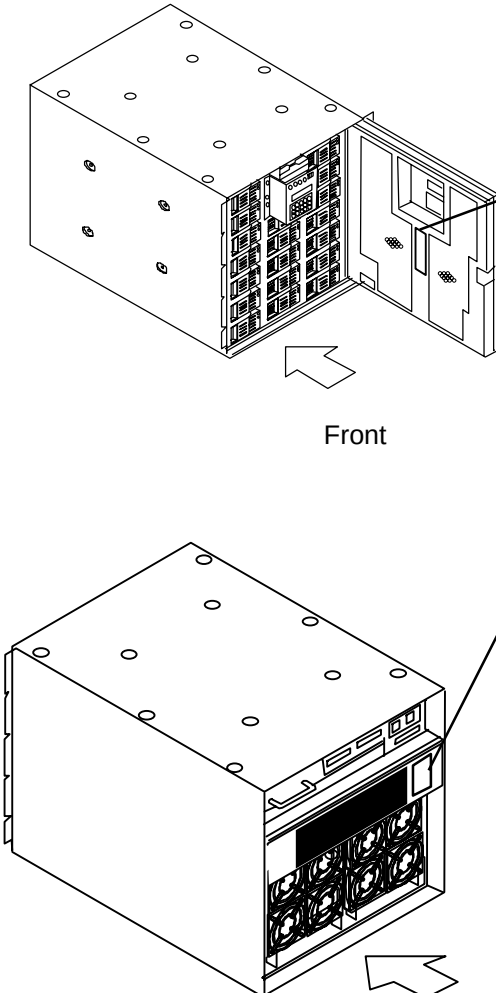


⚠ 警告
このディスクアレイ装置内のHDU、PCB、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われユーザーデータを破壊します。

⚠ WARNING
Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and uaser data.

Rack mount type (RKH)

⚠ SAFETY SUMMARY (Continued)



Front

Rear

Rack mount type (RKWH)

⚠ 警告

このディスクアレイ装置内のHDU、PCB、バッテリー等の部品交換時に、適切な手順を行わない場合、構成情報が失われユーザーデータを破壊します。

⚠ WARNING

Replacement of the components (HDU, PCB, Battery etc.) in this unit without procedures in the manuals may destroy configuration information and user data.

⚠ SAFETY SUMMARY (Continued)

⚠ Must not pick up the equipment to use handle(Fan) and handle(Battery). Follow the procedure described in the installation manual to move.

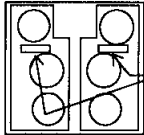


FIG.1 Front View

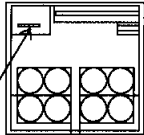


FIG.2 Rear View

Notice

(1) Handle (Fan) are used removing fan or opening front cover.

(2) Handle (Battery) is used removing battery only.

⚠ ファン及びバッテリーのハンドルを持って装置を移動もしくは持ち上げることを禁止します。装置の取扱い、インストールマニュアルの手順に従って行って下さい。

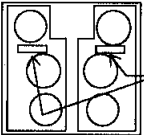


図 1. 装置前面

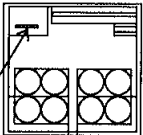
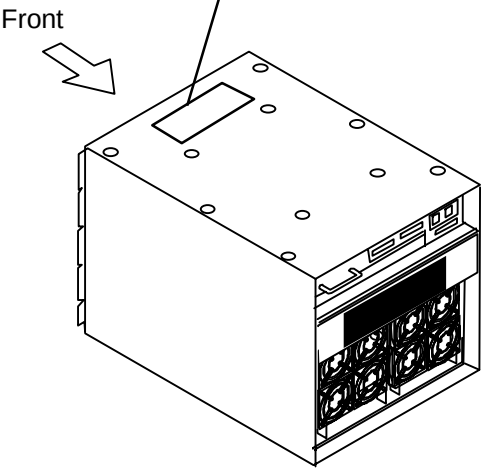


図 2. 装置後面

注意

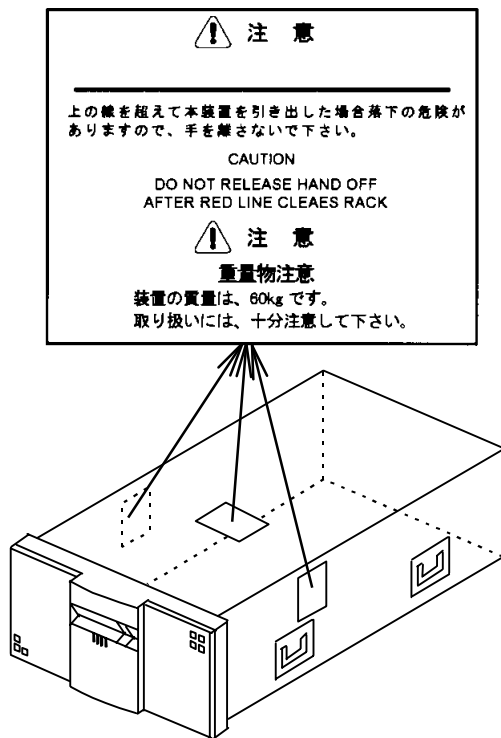
(1) ハンドル(ファン)はファンの取り外し及びフロントカバーの開閉にのみ使用します。

(2) ハンドル(バッテリー)はバッテリーの交換にのみ使用します。

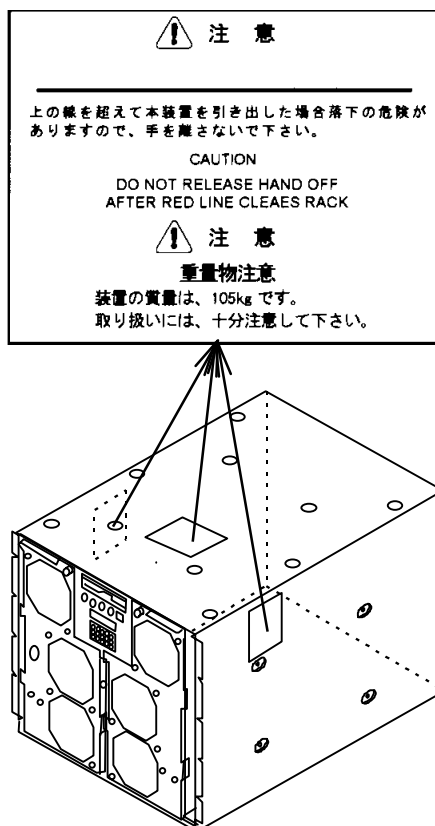


Rack mount type (RKWH)

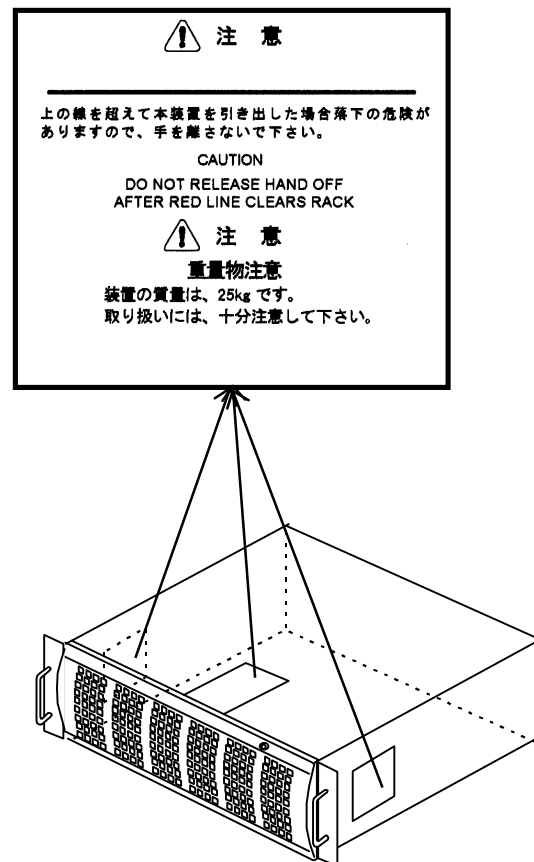
⚠ SAFETY SUMMARY (Continued)



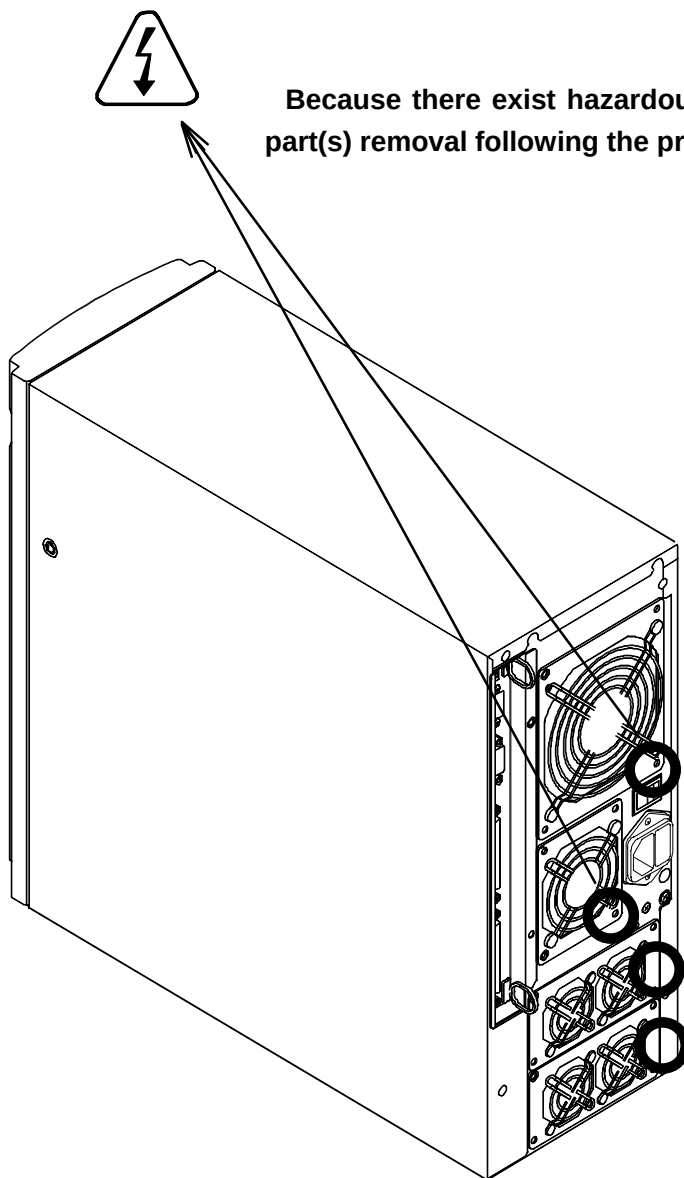
Rack mount type (RKH)



Rack mount type (RKWH)

Desk top type (DKH)
(Rack mount)

⚠ SAFETY SUMMARY (Continued)



Because there exist hazardous areas of electric shock, perform the part(s) removal following the procedures instructed in this manual.

Desktop type (DK)

DF350 Disk Subsystem

1. ENTRY

Rev.4

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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CONTENTS

1. Before Maintenance Work ENTRY0030

 1.1 Precautions for Replacing the Parts ENTRY0040

 1.1.1 Precautions for updating the microprogram ENTRY0040

 1.2 Prohibited Actions during Maintenance of the Unit
 to Prevent Customer Data from Being Erased..... ENTRY0060

 1.3 Precautions for the Recovery Method..... ENTRY0070

 1.4 Precautions for Replacing the HDU ASSY ENTRY0080

 1.5 Note on Completing Maintenance Work..... ENTRY0080

 1.6 Notes on Microprogram Revision ENTRY0085

2. How to Use This Manual ENTRY0090

3. Glossary..... ENTRY0110

4. Recycling..... ENTRY0120

Start all maintenance work from this section.

1. Before Maintenance Work

Always confirm the contents of the following sections 1.1 to 1.6 before starting maintenance of this unit.

- 1.1 Precautions for Replacing the Parts
- 1.2 Prohibited Actions during Maintenance of the Unit to Prevent Customer Data from Being Erased
- 1.3 Precautions for the Recovery Method
- 1.4 Precautions for Replacing the HDU ASSY
- 1.5 Note on Completing Maintenance Work
- 1.6 Notes on Microprogram Revision

1.1 Precautions for Replacing the Parts

- (1) Do not subject the unit to any vibration or shock.

Notice : The hard disk drive mounted in this unit is a precision component. Be careful not to subject this unit to any vibration or shock during maintenance. Take care especially when you handle the HDU ASSY.

- (2) Check the back-up state of the CACHE memory.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

Notice : If installation/de-installation of the mounted component (HDU ASSY, AC/DC power supply, CTL ASSY, Battery ASSY, or I/F ADAPTER ASSY (DK/DKH type only)) is executed while keeping the subsystem in the backup mode, the battery may be powered off causing user's data to be lost.

When handling the component with the subsystem power off, be sure to check if data in the cache memory has been backed up, and execute the maintenance in the state that the subsystem is released from the backup mode.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to “|” (ON) with the power switch (POWER SW) set to “○” (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicates the back-up mode.

CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

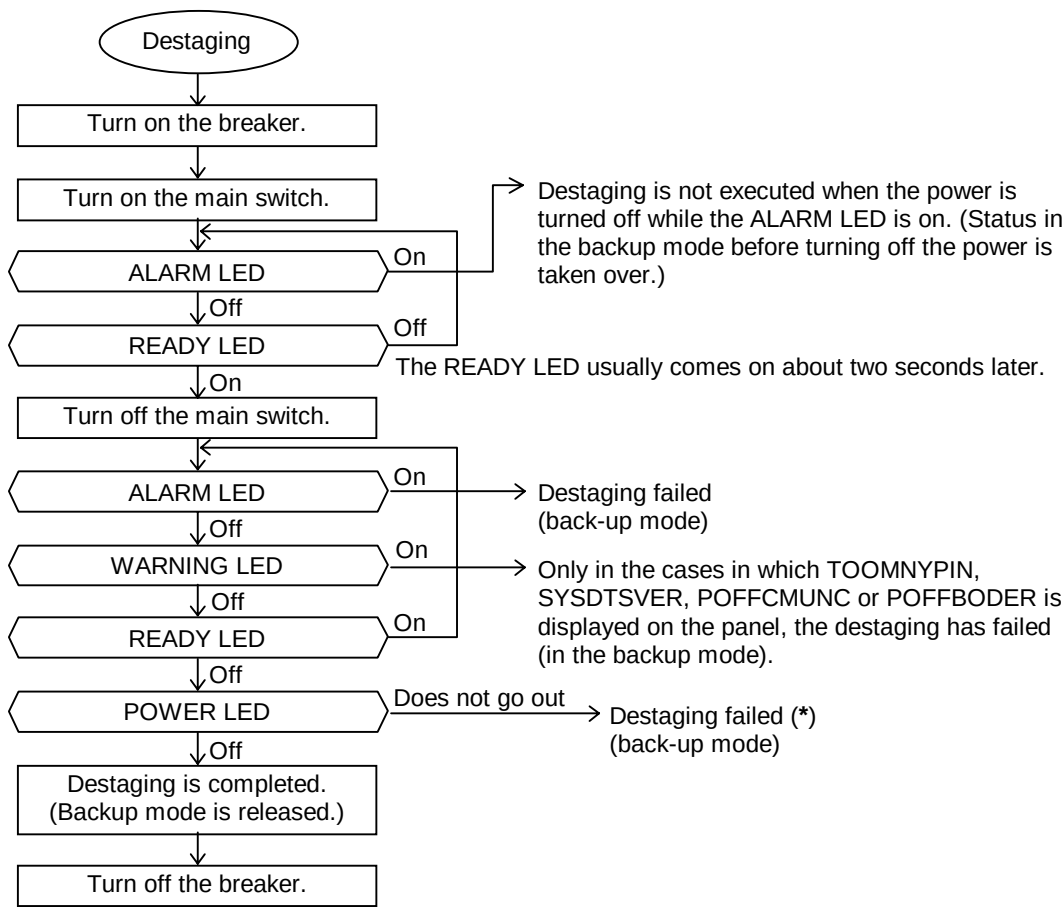
- Canceling the back-up mode of the CACHE memory

Perform the following procedure (ENTRY0050) to cancel the back-up state of the CACHE memory. After canceling the back-up state according to this procedure, make sure that the back-up state is canceled before starting maintenance work.

- (3) When you are replacing parts such as the CTL ASSY or SVP ASSY, insert them straight along the rails of the unit. If you fail in insertion, check the connectors of the parts and the pins of the unit for deformation, and then reinsert the parts.

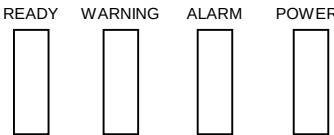
1.1.1 Precautions for updating the microprogram

Make sure that no drive failure is present when you update the microprogram.



* : If destaging failed, retry the above processing several times. If all retrials fail, see Chapter 3, "Troubleshooting," to complete destaging before starting maintenance work.

Note : All LEDs mentioned in the flowchart above are those on the front of the subsystem.



1.2 Prohibited Actions during Maintenance of the Unit to Prevent Customer Data from Being Erased

- Do not start up delete the RAID group.
- Do not start up delete LU.
- Do not start up format LU.
- Do not start up with the DIP switches 5 and 7 on.

• **Do not delete the RAID group. It would result in all user data being lost.**

Pressing the key when the panel display is

R	A	I	D		C	O	N	F	I	G									
D	E	L	E	T	E														

displays the following RAID group deletion confirmation message :

D	E	L	E	T	E														
A	L	L		R	A	I	D												

Press the key, and 'QUIT' is displayed. Then press the key to cancel deleting the RAID group.

Pressing the key with the RAID group deletion confirmation message displayed would delete the RAID group, resulting in the user data being lost.

• **Do not delete LU. It would result in all user data being lost.**

Pressing the key when the panel display is

L	U		C	O	N	F	I	G											
D	E	L	E	T	E														

displays the following LU deletion confirmation message :

D	E	L	E	T	E														
A	L	L		L	U														

Press the key, and 'QUIT' is displayed. Then press the key to cancel deleting LU.

Pressing the key with the LU deletion confirmation message displayed would LU, resulting in the user data being lost.

• **Do not format LU.**

Formatting LU would result in the data on the disk being lost.

• **Do not start up with the DIP switches 5 and 7 on.**

Doing so would initialize the configuration information.

1.3 Precautions for the Recovery Method

- (1) If any of the following errors is displayed on the panel screen, perform recovery surely according to the procedure described in Subsection 2.2.3, "Details of the Recovery Method" (TRBL0830) in Chapter 3, "Troubleshooting".

- * RZ0800 DLOADFAIL ----- Drive load error
- * W01300 USRDATLST ----- User data lost because of volatile cache
- * W00F00 TOOMNPIN----- Scheduled shutdown impossible because of an excessive amount of PIN data
- * W01000 POFFBODER ----- PIN data could not be stored on the disk during scheduled shutdown because a hardware failure occurred
- * W01100 SYSDTSVER----- Scheduled shutdown impossible because there is no drive to save inherited information
- * W01200 POFFCMUNC----- Scheduled shutdown impossible because PIN data cannot be saved due to a cache failure
- * W01400 PINOVER----- PIN segment number was over PIN threshold
- * W202XY, LUALM-XY ----- LU blocked, or drive blocked in blocked LU
- * I016XY DRVERR-XY ----- An error that would cause the drive to be blocked occurred but the drive was not blocked because there was no redundancy.
- * I017XY RCVWNG-XY----- Data recovery ended on the condition with write-unfinished registration
- * I012XY PCVRT-XY ----- Data recovery failed
- * W60AXY DMAALM-XY ----- DMA error occurred at DMA#0, DMA#1, DMA#2, or DMA#3
- * W622XY LAERR1-XY ----- LA (LUN) error occurred at DMA#1
- * W623XY LRCERR1-XY ----- LRC (LUN) error occurred at DMA#1
- * W624XY LAERR2-XY ----- LA (LUN) error occurred at DMA#2
- * W625XY LRCERR2-XY ----- LRC (LUN) error occurred at DMA#2
- * W626XY LAERR3-XY ----- LA (LUN) error occurred at DMA#3
- * W627XY LRCERR3-XY ----- LRC (LUN) error occurred at DMA#3
- * H***** ----- SYSTEM Error occurred
- * H60419 LANPERR----- Parity error of data bus on LSI for LANCTL

etc...

1.4 Precautions for Replacing the HDU ASSY

- (1) If the unit uses the RAID5 level, an error on one of the five built-in disks in one row would not result in data being lost.

If a disk failure occurs, determine the port number and row number of the faulty disk from the error code displayed on the SVP panel and then replace the disk with the unit power on. (Data recovery is also possible for RAID1/A.)

Notice : If a normal HDU ASSY is replaced by mistake, the customer data is erased.

(HDU swapping to determine the HDU at the RAID5 level erases the customer data.) Follow Section 4.3 in Chapter 7 to determine the port number and row number of the HDU ASSY to be replaced.

1.5 Note on Completing Maintenance Work

Close all the external covers when the maintenance work is completed.

It is required to keep all the external covers closed to operate the subsystem properly.

(Be sure to close all the external covers during operation because it is indispensable to maintain the performance of the subsystem including prevention of adverse effects caused by radio frequency energy.)

1.6 Notes on Microprogram Revision

In some cases maintenance works vary depending on the microprogram revision. After confirming the revision, perform the maintenance works corresponding to it.

The microprograms are roughly classified into three types as shown below.

No.	Microprogram type	Microprogram contents	Revision No. determination rule
1	NON-SNMP	Microprogram not supporting SNMP function.	03xx/xx ("x" is optional)
2	SNMP	Microprogram supporting SNMP function.	43xx/xx ("x" is optional)
3	AS/400	Microprogram for AS/400 connection.	13xx/xx ("x" is optional)

This manual explains the maintenance operation in the case of the NON-SNMP microprogram as an representative. Therefore, when the SNMP or AS/400 microprograms is used, change its revision No. to that of the NON-SNMP microprogram to determine the maintenanceworks.

2. How to Use This Manual

This maintenance manual consists of this and ten other chapters listed below. Each chapter has a table of contents to allow quick reference to the desired page.

① ENTRY -----	ENTRY	Common to all types
② THEORY OF OPERATION-----	THEORY	
③ TROUBLESHOOTING -----	TRBL	
④ PERIODIC -----	PERIOD	
⑤ MICROPROGRAM-FC -----	M-FC	
⑥ PANEL -----	PANEL	Specific to each type
⑦ PARTS REPLACEMENT -----	REP	
⑧ INSTALLATION-----	INST	
⑨ OPTIONAL INSTALLATION-----	OPTION	
⑩ PARTS CATALOG -----	PARTS	
⑪ PROCEDURES FOR INSTALLING - FRAME		

Chapters ① to ⑥ are common to all types (desktop, mini tower, cabinet and rackmount types).
Chapters ⑦ to ⑩ are specific to each type. Chapter ⑪ is for the desktop (DKH) and rackmount types only.

- ① ENTRY
This Chapter describes the precautions for maintenance of the DF350, and the use of the maintenance manual. The chapter name is described as ENTRYxxxx at the bottom of each page.
- ② THEORY OF OPERATION
This chapter describes the specifications for the DF350 and shows its appearance. The chapter name is described as THEORYxxxx at the bottom of each page.
- ③ TROUBLESHOOTING
This chapter covers troubleshooting the DF350. The chapter name is described as TRBLxxxx at the bottom of each page.
- ④ PERIODIC
This chapter covers the periodic inspection of the DF350. The chapter name is described as PERIODxxxx at the bottom of each page.
- ⑤ MICROPROGRAM-FC
This chapter covers field changes of the microprogram of the DF350. The chapter name is described as M-FCxxxx at the bottom of each page.
- ⑥ PANEL
This chapter describes the functions of the panel of the DF350 and how to operate the panel. The chapter name is described as PANELxxxx at the bottom of each page.

⑦ PARTS REPLACEMENT

This chapter covers replacing the parts of the DF350. The chapter name is described as shown below at the bottom of each page, where REP, the abbreviation for the chapter name, is preceded by the symbol indicating the type of the DF350.

Desktop type (DK)----- DK-REPxxxx

Desktop type (DKH) ----- DH-REPxxxx

Mini tower type ----- MK-REPxxxx

Cabinet type----- CK-REPxxxx

Rackmount (RKH) type----- RH-REPxxxx

Rackmount (RKWH) type----- RW-REPxxxx

⑧ INSTALLATION

This chapter describes how to install the DF350. The chapter name is described as shown below at the bottom of each page, where INST, the abbreviation for the chapter name, is preceded by the symbol indicating the type of the DF350.

Desktop type (DK)----- DK-INSTxxxx

Desktop type (DKH) ----- DH-INSTxxxx

Mini tower type ----- MK-INSTxxxx

Cabinet type----- CK-INSTxxxx

Rackmount (RKH) type----- RH-INSTxxxx

Rackmount (RKWH) type----- RW-INSTxxxx

⑨ OPTIONAL INSTALLATION

This chapter covers adding options to the DF350. The chapter name is described as shown below at the bottom of each page, where OPTION, the abbreviation for the chapter name, is preceded by the symbol indicating the type of the DF350.

Desktop type (DK)----- DK-OPTIONxxxx

Desktop type (DKH) ----- DH-OPTIONxxxx

Mini tower type ----- MK-OPTIONxxxx

Cabinet type----- CK-OPTIONxxxx

Rackmount (RKH) type----- RH-OPTIONxxxx

Rackmount (RKWH) type----- RW-OPTIONxxxx

⑩ PARTS CATALOG

This chapter covers the parts catalog of the DF350. The chapter name is described as shown below at the bottom of each page, where PARTS, the abbreviation for the chapter name, is preceded by the symbol indicating the type of the DF350.

Desktop type (DK)----- DK-PARTSxxxx

Desktop type (DKH) ----- DH-PARTSxxxx

Mini tower type ----- MK-PARTSxxxx

Cabinet type----- CK-PARTSxxxx

Rackmount (RKH) type----- RH-PARTSxxxx

Rackmount (RKWH) type----- RW-PARTSxxxx

⑪ PROCEDURES FOR INSTALLING

This chapter covers rack mounting of the DF350. The chapter name is described as shown below at the bottom of each page, where FRAME, the abbreviation for the chapter name, is preceded by the symbol indicating the type of the DF350.

Desktop (DKH) type ----- DH-FRAMExxxx

Rackmount (RKH) type----- RH-FRAMExxxx

Rackmount (RKWH) type----- RW-FRAMExxxx

3. GLOSSARY

ALM-----	Alarm
CDB -----	Command Descriptor Block
CTL-----	Control
CTLWD-----	Control-Word
DBUF -----	Data Buffer
D-CTL-----	Data Control
DMA -----	Direct Memory Access
DRR -----	Data Recovery and Reconstruction
ECC-----	Error Checking and Correcting
ECLKERR-----	External Clock Error
FDD -----	Floppy Disk Drive
HDU -----	Hard Disk Unit
I/F -----	Interface
ID -----	Identifier
LCD -----	Liquid Crystal Display
ICLKERR -----	Internal Clock Error
LED-----	Light Emitting Diode
MPU-----	Micro Processor Unit
NVS -----	Non-Volatile Storage
PCI-----	Power Control Interface
PIC-----	Peripheral Interface Controller
PS -----	Power Supply
PSALM -----	Power Supply Alarm
PTYERR-----	Parity Error
PWR-----	Power
RDY -----	Ready
REM-----	Remote
RST-----	Reset
R/W-----	Read/Write
SCSI -----	Small Computer System Interface
SPC -----	Sub-Processor
SW-----	Switch
TERMPWR -----	Terminator Power
THALM-----	Thermal Alarm

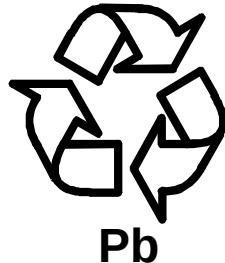
4. Recycling

(1) Parts to be recycled

This unit uses a lead battery, which is a valuable and recyclable resource. When you replace parts or dispose of used products, remove the lead battery for recycling.

(2) Recycle mark

The following three-arrow recycle mark indicates that the lead battery can be recycled. This mark is pasted on the rear of the unit.



(3) Position of the lead battery and how to remove it

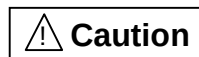
For the position of the lead battery and how to remove it, see “Replacing the battery” in Chapter 7 (for the type used).

(4) Specifications for the lead battery

No.	Specifications	Mini tower (MK), Cabinet (CK) and Rackmount (RKWH) type	Rackmount (RKH) type	Desktop (DK) and Desktop (DKH) type
1	Manufacturer	Hitachi, Ltd.		
2	Model	HP10-6 (6M10.0)	HP6-6 (6M6.0)	HP1.2-6 (6M1.2)
3	Voltage [V]	6		
4	Capacity [Ahr]	10	6	1.2

(5) Disposing of the battery and its safe keeping

To prevent the removed lead battery from short-circuiting, place insulation tape on its terminals or take other proper countermeasures. Do not store the battery with dry batteries or other batteries.



The battery contains a poisonous substance. An electric shock may be caused by inappropriate handling. Be sure to follow the instructions below.

- (1) Do not disassemble or remake the battery.**
- (2) Do not deform the battery.**
- (3) Do not connect (+) pole to (–) pole with metallic article such as a steel wire.**
- (4) Do not reverse (+) and (–) poles.**
- (5) Do not peel off the covering tube.**
- (6) Do not connect the battery directly to the outlet.**
- (7) Do not connect the battery to anything other than this subsystem for charging/discharging.**
- (8) Do not leave the battery at a hot place. Store the battery in a dark, cool place.**

DF350 Disk Subsystem

2. THEORY

Rev.3

Read this manual carefully and keep it.

- Before starting operation, read the safety instructions carefully and fully understand them.
- After reading this manual, keep it at hand for your reference.

HITACHI

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Mar.10.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	All	All pages were reviewed corresponding to addition of RAID A and DK type. (Section 1, 2 and 9 through 11 were added.)	CH/ AD
2	Feb.10.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0070 0080 0090 0100 0110 0140 0170 0210 0260 0435	Added DKH type. Added DKH type. Added DKH type. Added *10. Added DKH type. Moved *3-*6 to next page. Added *3-*6, *10. Added DKH type. Added DKH type. Added DKH type. Added DKH type. Added DKH type. Added DKH type. This page was newly added.	AD AD AD AD/ DL AD AD AD AD AD AD AD
3	May.20.'98	A.Yamanashi			All 0080 0090 0410 0460	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.) Changed Subsystem data capacity in the table. Changed Input voltage in the table. Added 'When the A1E18 is installed...'. Added DF-F350-DRUSS. Added DF-F350-DRUSS.	AD CH CH/ AD AD AD

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1. Outline of RAID Architecture

The purposes of the RAID technology are to reduce the cost of disk subsystem, improve the reliability, and increase the I/O performance. DF350 supports RAID0, RAID1, RAID5 and RAID 0+1 (called RAIDA later) to meet these purposes. The characteristics of each RAID level are explained briefly hereunder.

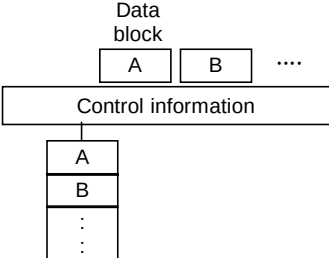
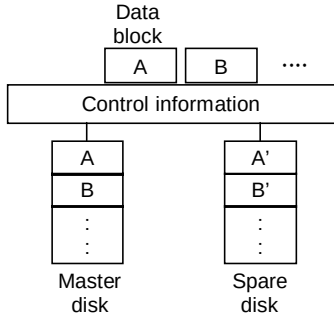
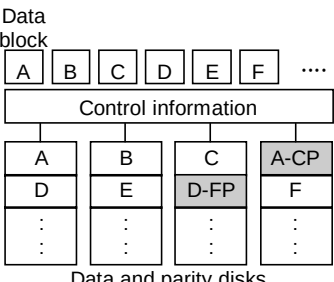
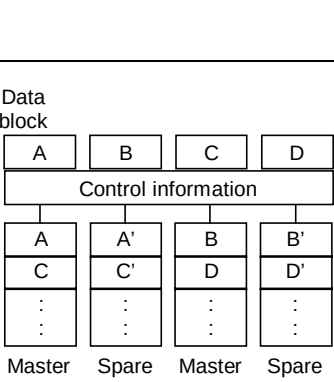
1.1 Outline of the Disk Array

The concept on the disk array was announced by the research group of the University of California, Berkeley in 1987. The group called the disk array a RAID (Redundant Array of Inexpensive Disks : a disk subsystem consisting of multiple inexpensive compact disks to provide redundancy) and classified its family into 5 levels ; RAID1 to RAID5. RAID1 to RAID5 are generally used as classification terms of the disk array systems at present.

1.2 Outline of RAID Systems

Table 1.2.1 shows advantages and disadvantages of the RAID1, RAID5 and RAID0 systems and the conventional disk system (called RAID0).

Table 1.2.1 Outline of RAID System

Level	Configuration	Characteristics	
RAID 0		Outline	Each data block is written on one disk.
		Advantages	Redundant disks are unnecessary. Parity processing is unnecessary.
		Disadvantage	Since there is no data redundancy, the usability is low.
RAID 1		Outline	Mirror disks are used (double writing is performed). The same data is written on both master and spare disks.
		Advantages	Since data is duplicated, the usability and reliability are high.
		Disadvantage	A disk capacity which is double the user data capacity is necessary.
RAID 5		Outline	Data is written on multiple disks one by one in units of a block (or blocks). Parity data is generated from data in multiple of blocks and written on an optional disk.
		Advantages	Since each disk can receive input and output instructions independently, this level is suited to transaction processings consisting of mainly small-capacity random accesses. Parity data provides high reliability and high usability at a comparatively lower cost.
		Disadvantage	Since parity data is updated when data is updated, an internal reading operation of the data before updating and the parity data before updating is necessary so that another input and output operations are adversely affected.
RAID 0+1 (RAIDA) *1		Outline	Decentralizes data to two disks and write the identical data on the master and spare disks.
		Advantages	Since data is duplicated, the usability and reliability are high. It is fitter than the RAID1 for transaction processings mainly consist of small sized random accesses since each disk in it can accept I/Os independently by virtue of the data decentralization.
		Disadvantage	A disk capacity which is double the user data capacity is necessary.

*1 : Striped RAID0.

1.3 Application of RAID Technology

When one I/O processing spans multiple disk drives (when the stripe size is too small) during transaction processing in RAID5, the performance cannot be fulfilled sufficiently.

Therefore, thorough examination is required on the stripe size.

In DF350, three stripe sizes of 16k, 32k and 64k can be selected and the default value is set at 64k by making good use of the experience obtained through uses of the DF300s.

Lump writing of data to the drive and prereading of old data are performed by using the cache memory so as to prevent occurrence of write penalty as far as possible.

- **Write penalty**

In the DF350 (RAID5), 5 disk drives constitute one parity group (4D + 1P). Since parity data is generated from 4 data disks in the group, when partial writing of one stripe in the group occurs in the transaction processing, it is necessary to generate the corresponding parity data in the group once again. Since parity data is calculated by the following calculation formula, to create “data before updating”, “parity before updating” and “data after updating” are necessary the parity. Extra processing of reading “data before updating” at this time is called write penalty.

[New parity] = ([Data before updating] EOR [Data after updating]) EOR [Parity before updating]

2. Differences between DF350 and DF300

Differences from the conventional DF300 which are characteristics of the DF350 are explained below.

- **Use of high-speed RISC processor**

The microprocessor was changed from the conventional RISC processor i960CA (20MHz) to i960CF (33MHz) which is faster.

- **Increase in cache capacity**

The maximum cache capacity was increased from 256MB (for the DF300) to 1GB (for the DF350) so as to realize high-speed Read/Write processing.

- **Use of flash memory**

Since the conventional EEPROMs were changed to the flash memories (fixed portion plus variable portion), configuration information can be upgraded by means of a FD concerning to the variable portion.

- **Remarkable increase in performance of internal bus**

The bus performance between the cache and the DMA was increased from conventional 71MB (for the DF300) to 106MB (for the DF350).

- **Use of ultra SCSI for host interface**

With respect to the host interface, the DF350 uses SCSI-3 (ultra SCSI) though the DF300 uses only SCSI-2.

- **Use of ultra SCSI for drive interface**

The drive interface was changed from the conventional SCSI-2 to SCSI-3 (ultra SCSI)

3. Overview

The DF350 series disk array subsystem connects small hard disk drives to provide a large storage capacity. This subsystem uses an Ultra SCSI as a host interface and it features a large storage capacity, high-speed data transfer and high reliability. There are five types disk array subsystems: a desktop (DK, DKH), mini tower (MK), cabinet (CK) and two types of rackmount types (RKH, RKWH). The rackmount type can be mounted on a dedicated rack chassis; up to six RKH types can be mounted on a dedicated U1 rack, and up to four RKWH types can be mounted on a dedicated U2 rack.

(1) High performance

- The subsystem uses a non-volatile and large storage cache memory that ranges from 16 Mbytes (MB) to 1 Gbytes (GB) per controller to perform high-speed command processing when hitting the read/write data.
- It will issues a completion report to the host when the write data is written in the cache. Write operations to the disk are performed asynchronously to the host.
- It identifies a sequential read and performs a pre-read.

(2) Large capacity

- This subsystem can connect and control up to 21 small disk drives to support up to 174 GB of disk capacity using RAID0 technology.
- The rackmount type using a dedicated chassis supports up to 696.8 GB of disk capacity using RAID0 technology.

(3) Reduction of data loss due to a disk failure

- Disk data where a failure has occurred is recoverable with parity data.
- Data on a disk where a failure has occurred is restored to an optional spare disk and the spare disk then can be used as an original data disk.

(4) Multi-RAID configuration

- The subsystem supports the RAID0/1/5/A configuration according to the usage.

(5) Reliability

- Non-volatile caching prevents data from being lost if the power is turned off or interrupted momentarily.

(6) Maintainability

- Maintenance is possible without turning off the subsystem.

4. Basic Specifications

Item			Type	Desktop type		Mini tower type (MK)	Cabinet type (CK)	Rack mount type (*6)				
			(DK)	(DKH)	(DKH)			Standard type (RKH)		Large-capacity type (RKWH)		
					Rack mountable (per subsystem)			Single unit	Mounted on U1 rack	Single unit	Mounted on U2 rack	
Host interface	Interface type		Ultra-Wide SCSI Single end/Differential					Ultra Wide SCSI Differential				
	Data transfer speed (i.e. maximum speed for transfer to the host) (*7)		40MB/s (Ultra SCSI)									
	Transferred block size		512Bytes									
Disk drive used	Drive name		1"H 3.5" HDD	1"H/1.6"H 3.5"HDD								
	Data capacity		2.0/4.1/8.7GB	2.0/4.1/8.7/17.8GB								
	Data transfer speed		9.37 - 15MB/s									
	Revolution speed		7,200rpm									
RAID specifications	RAID level (*1)		0/1/5(4D+1P, 3D+1P, 2D+1P)/A									
	RAID configuration	RAID0 (nD)	n=2 - 5			n=2 - 20	n=2 - 5	n=2 - 10	n= (2 - 10)×6	n=5 - 20	n= (5 - 20)×4	
		RAID1 (nD+nD)	n=1 - 2			n=1 - 8	n=1 - 2	n=1 - 4	n= (1 - 4)×6	n=2 - 8	n= (2 - 8)×4	
		RAID5 (4nD+nP)	n=1			n=1 - 4	n=1	n=1 - 2	n= (1 - 2)×6	n=1 - 4	n= (1 - 4)×4	
		RAID5 (3nD+nP)										
		RAID5 (2nD+nP)										
		RAIDA (2nD+2nP)										
	Row configuration		1 row			1 - 4 rows	1 row	1 - 2 rows		1 - 4 rows		
	Sub-system data capacity (*2)	Minimum (GB)	RAID0	4.1	1 row			4.1		1 - 2 rows		10.3
RAID1			2.0				2.0				4.1	
RAID5(4D)			8.2				8.2				8.2	
RAID5(3D)			6.5				6.2				6.2	
RAID5(2D)			4.1				4.1				4.1	
RAIDA			4.1				4.1				4.1	
Maximum (GB)		RAID0	43.5	89.4			357.7	89.4	178.8	1073.2	357.7	1430.9
		RAID1	17.4	35.7			143.0	35.7	71.5	429.2	143.0	572.3
		RAID5(4D)	34.8	71.5			286.1	71.5	143.0	858.5	286.1	1144.7
		RAID5(3D)	26.1	53.6			214.6	53.6	107.3	643.9	214.6	858.5
		RAID5(2D)	17.4	35.7			143.0	35.7	71.5	429.2	143.0	572.3
		RAIDA	17.4	35.7			143.0	35.7	71.5	429.2 (@17.8GB DRV)	143.0	572.3 (@17.8GB DRV)
Unit of expansion (GB)		RAID0	—			2.0/4.1/8.7/17.8	—	2.0/4.1/8.7/17.8				
		RAID1				2.0/4.1/8.7/17.8		2.0/4.1/8.7/17.8				
		RAID5(4D)				8.2/16.6/34.8/71.5		8.2/16.6/34.8/71.5				
		RAID5(3D)				6.2/12.4/26.1/53.6		6.2/12.4/26.1/53.6				
		RAID5(2D)				4.1/8.3/17.4/35.7		4.1/8.3/17.4/35.7				
		RAIDA				4.1/8.3/17.4/35.7		4.1/8.3/17.4/35.7				
Cache specifications		Capacity		16MB/controller	16 -256 MB/controller	16 - 1,024MB/controller		16 -256 MB/controller	16 - 1,024 MB controller	Up to 12,288MB/ dual controller ×6	16 - 1,024 MB controller	Up to 8,192MB/ dual controller ×4
		Control system		Read LRU/Write After								
		Battery back up		Provided								
	Back up time (*3)		48h (@16MB)	48h (@256MB)	48h (@256MB/controller/ single unit/subsystem)		48h (@256MB)	48h (@256MB/controller/single unit/subsystem)				
Internal logic specifications	Control CPU		intel 80960CF (@33MHz)									
	Control OS		VxWorks									
	Control memory		Flash 1MB/SRAM 512MB/DRAM 4MB									
	Data bus performance		Cache:106MB/s									
	Data assurance method		Data bus :Through-parity Cache :ECC (1 bit for correction, 2 bits for detection) Drive :Data assurance code									
Redun-dancy	Hot-replaceable part (*10)		Drive/Power supply		Controller/Drive/ Fan/Power supply		Drive/ Power supply	Controller/Drive/ Fan/Power supply		Controller/Drive/Fan/ Power supply/In Box (Dual AC power supply is used)		

Type		Desktop type		Mini tower type (MK)	Cabinet type (CK)	Rack mount type (*6)					
						(DKH)	Standard type (RKH)		Large-capacity type (RKWH)		
		(DK)	(DKH)			Rack mountable (per subsystem)	Single unit	Mounted on U1 rack	Single unit	Mounted on U2 rack	
Item											
Maintenance specifications	Micro-loading system	Flash memory/Disk drive (resident)									
	SVP (built-in dedicated tool) panel	• Failure information logging/Power control • Controlling microprogram patch • Drive controlling micro-program D/L • Configuration information change • Drive recovery initiating process (This process is automatic when drive replace)									
	FDD	• Failure and statistics information logging • Controlling program patch/Drive D/L									
	Operator panel	• Power ON/OFF switch and LEDs • Failure message indication									
Physical specifications	Startup time	Standard 40sec. (Max. 2min) (*9)									
	Chassis size (mm) (W×D×H)	150×400×350	170×420×435	230×465×409	300×600×700	483×420×170	484×656×263	800×850×1,790	480×632×442	700×800×1,980	
	Weight (kg) (*4)	19 approx.	25 approx.	33/37 approx.	50/85 approx.	25 approx.	45/60 approx.	—/580 approx.	84/105 approx.	—/590 approx.	
	Noise (dB)	55			57		55		65	60	65
Input power specification	Input voltage (*5)		89 - 127V AC or 178 - 254V AC					178 - 254V AC			
	Frequency		50/60Hz ± 1Hz								
	Number of phases, cabling		With single-phase protective grounding								
	Nominal current		2.2A (100V) 1.2A (200V)	3.7A (100V) 1.9A (200V)	4.0A (100V) 2.0A (200V)	9.0A (100V) 4.5A (200V)	3.7A (100V) 1.9A (200V)	5.0A (100V) 2.5A (200V)	— 15.0A (200V)	— 5.5A (200V)	— 22.0A (200V)
	Breaking current (A)		6.3			15.0	6.3	7.5	—	15.0	—
	Required power (*8)	(steady)	240VA	350VA	300VA	800VA	350VA	500VA	3,100VA	900VA	3,600VA
		(starting)	360VA	450VA		1100VA	450VA	620VA	3,820VA	1,200VA	4,800VA
Operational and environmental specifications	Temperature		10 to 40°C (When the A1E18 is installed, it is recommended to use it within a range from 10°C to 35°C.)								
	Humidity		8 - 80%								
	Maximum wet bulb temperature		29°C (non-condensing)								
	Vibration		Operating : Less than 0.25G Non-operating : Less than 0.5G Transporting : Less than 0.5G								
	Insulation withstand voltage		1500V (1min)								
	Insulation resitance		DC500V, 10MΩ or more								
	Energy saving	Capacity	43.5GB	89.4GB		357.7GB	89.4GB	178.8GB	1073.2GB	357.7GB	1430.9GB
Energy consumption		240W	350W	300W	800W	350W	500W	3,100W	900W	3,600W	
Energy consumption efficiency		0.0055 W/MB	0.0039 W/MB	0.0034 W/MB	0.0022 W/MB	0.0039 W/MB	0.0028 W/MB	0.0029 W/MB	0.0025W/MB		

- *1 • RAID0 is the unit that connects single disk drives and it has no redundancy. Also, it does not support the data striping function.

Notice : RAID5, RAID1 and RAID A have redundancy to increase data reliability, but data may be erased by an accidental hardware or software failure occurring in the array subsystem. To prevent data from being erased, the customer should make complete backups for restoring the erased data.

- *2 • The RAID levels are not intermixed.
 • The management area on each disk is excluded.
 • The calculation is performed with 1 kbytes = 1,000 bytes.

- *3 • The back-up time indicates the data back-up duration of the cache memory.
- The batteries are fully charged.
- If a sudden power failure occurs, non-volatile data on the cache memory is assured. When the power is turned off normally, the battery power is not wasted since the data is reflected from the cache to the disk.
- There may be the case that, when the subsystem enters the cash backup mode, an alarm warning a low battery voltage (indicated by a yellow LED) at the startup of the subsystem. This shows that the remaining battery capacity is insufficient, and the subsystem automatically disables the write cache and runs. When the battery is recharged up, this yellow indicator goes out. The subsystem automatically enables the write cache and continues the operation. This alarm indication disappears within 24 hours (at most). While the alarm indicator is on, the performance of the subsystem may be reduced a little but the functional operations will not be affected.
- If the unit is not energized for more than a month, the over discharging of the battery occurs and it may be cause an unrecoverable damage. In this case, the battery must be energized more than 24 hours at least once a month, or store the unit with the switch of the battery off. Even when the switch is off, the battery discharges naturally. Therefore, turn on the switch of the battery and energize it for 24 hours every three months to charge it.
- *4 • The basic minimum configuration consists of five disks (one row), a spare disk, and a redundant controller not including a redundant power supply. The desktop and rackmount types are provided with a redundant power supply as a standard.
- The maximum configuration consists of mountable disks, a redundant controller and a redundant power supply.
- *5 • Use of an Uninterruptible Power System (UPS) is recommended for mitigating the affects of a sudden power interruption.
- *6 • The desktop type (DKH), rack mount type (RKH) and (RKWH) are mountable on a 19" rack that is being sold in the market. In this case, dedicated rack rails corresponding to the number of rack mount type units to be mounted are required.

Notice : Also, there is a limitation on the weight. Contact us before mounting the desktop type (DKH), rack mount type (RKH) and (RKWH) on rack other than the U1 rack and U2 rack made by Hitachi.

- All the rackmount types installed on a rack are displayed by the LEDs on the concentration panel.
- Since the U1 and U2 racks are provided with a 200-volt power distribution panel and combined power switches, you can turn the power on or off for the entire rack. • Standard cables with a single-phase 200-volt receptacle are attached to the rack. If you want directly to connect the rackmount types to the power distribution panel, power cable installation will be required.
- For the plug and receptacle shapes of each rack, see the following table.

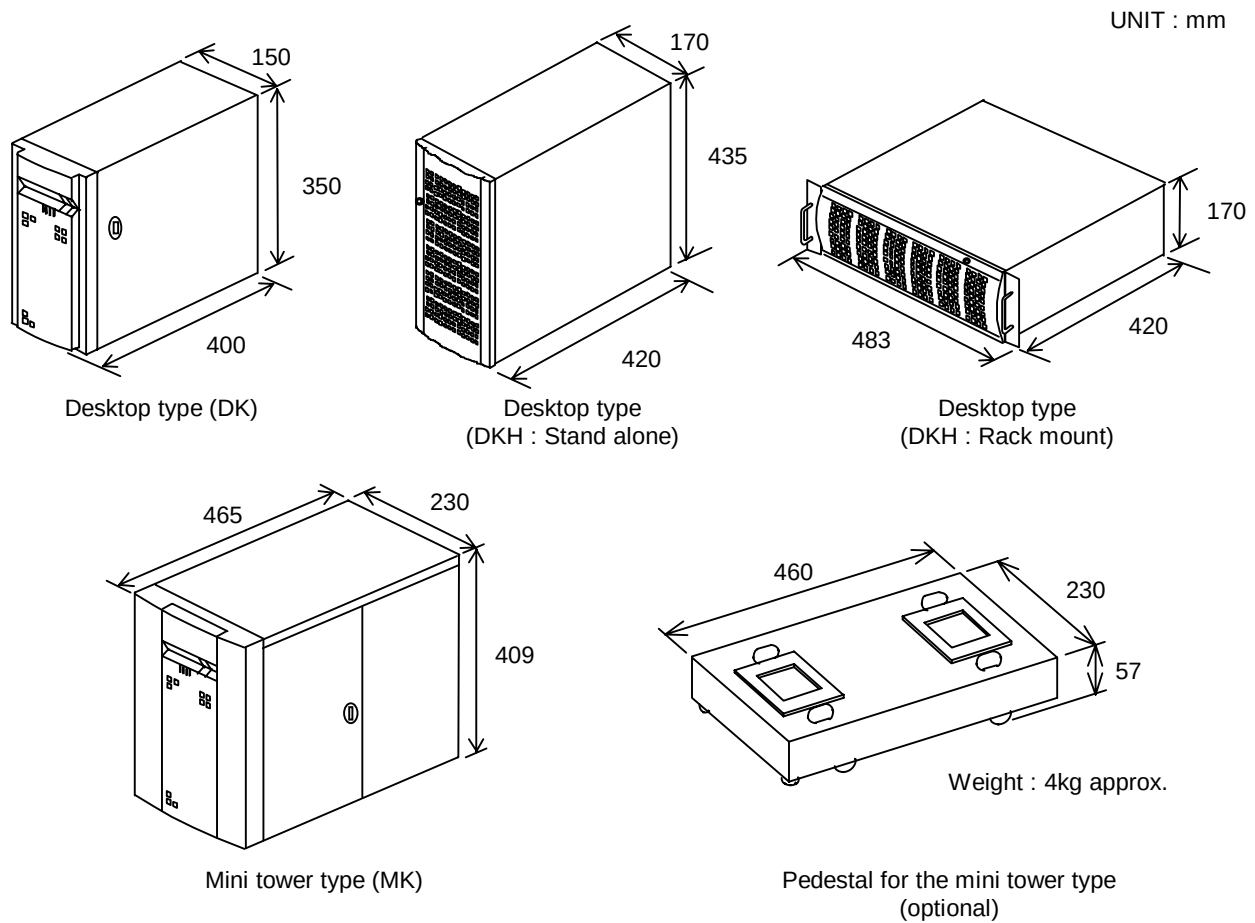
	U1 rack	U2 rack
Plug shape	NEMA standard L6-20P 	NEMA standard L6-30P 
Receptacle	L6-20R	L6-30R

- Provide two receptacles because the U2 rack provides the dual AC lines. When each of the lines is connected to the individual AC system, power duplication will be possible.
 - *7 • When the interface type is single-ended, the maximum transfer rate will be restricted to 20 MB/s.
 - *8 • Powers required for the maximum configurations are shown.
- When planning a facility such as an uninterrupted power supply (UPS), assume the power factor to be 100% (300W=300VA for example). The values shown are those for 100/200 volts. In case the tolerance is included, the values may be exceeded.
- *9 • It may take 2 minutes or more for starting up the subsystem when it is powered on within 30 seconds after it is powered off. It is because the starting up immediately after powering off is restricted in order to protect the drive system.
- It may also take 2 minutes or more for starting up the subsystem if a failure occurs in it.
- *10 • Hot replacement must be done by trained service personnel only (expect the drive).

5. Appearance

5.1 Dimensions

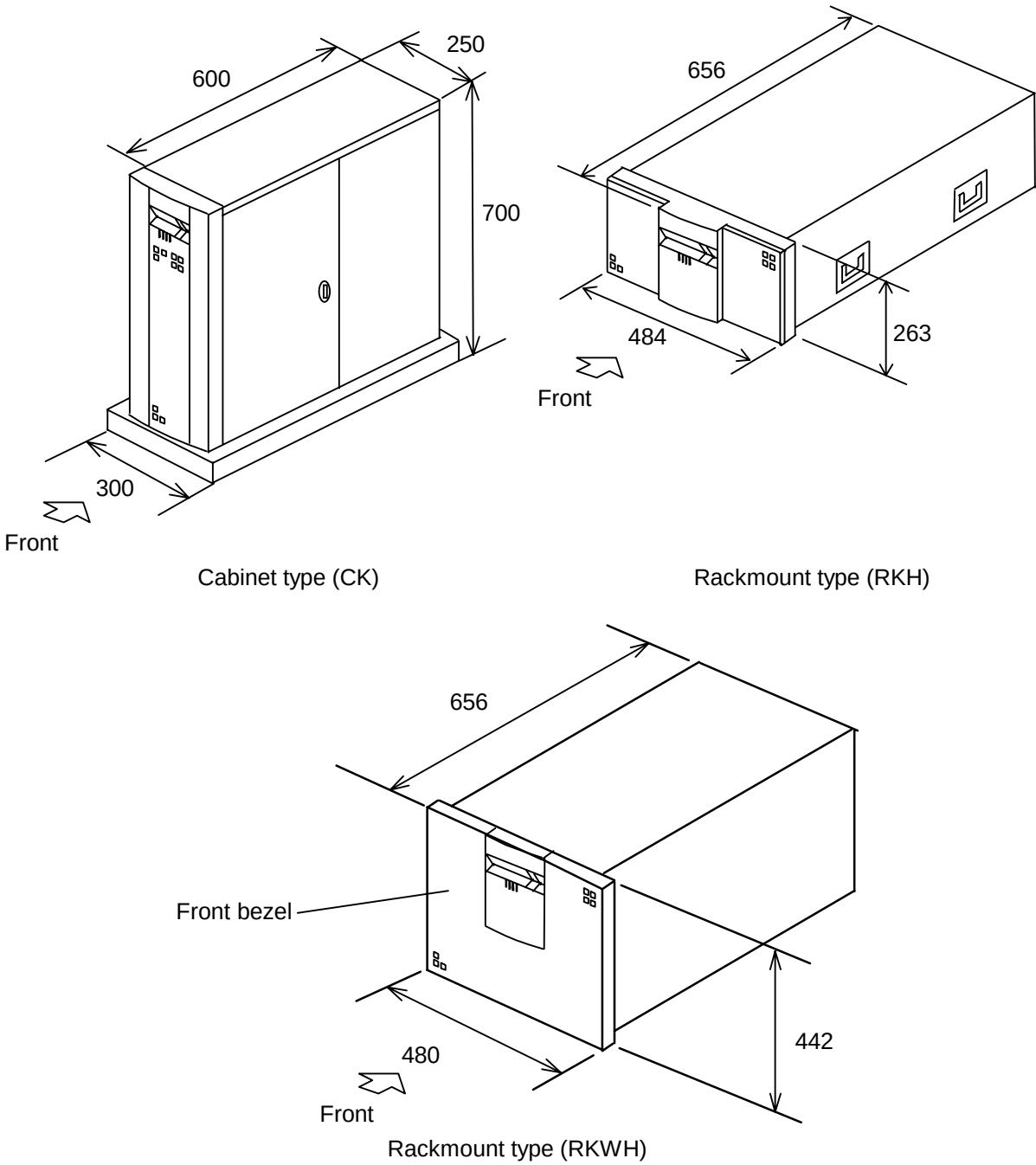
Figure 5.1.1 to 5.1.3 show the dimensions for the DF350 subsystem.



Name	Paint color		
	Desktop		Mini tower
	(DK)	(DKH)	
Front cover	Light sandstone (10Y 7.3/0.4)	Light limestone (10YR 7.3/0.2)	Light sandstone (10Y 7.3/0.4)
Side cover	—		Same as above.
Main body	Light sandstone (10Y 7.3/0.4)		Same as above.
Pedestal for the mini tower type	—	—	Dark sandstone (10Y 5.3/0.4)

Figure 5.1.1 Appearance of DF350 Subsystem (Desktop and mini tower types)

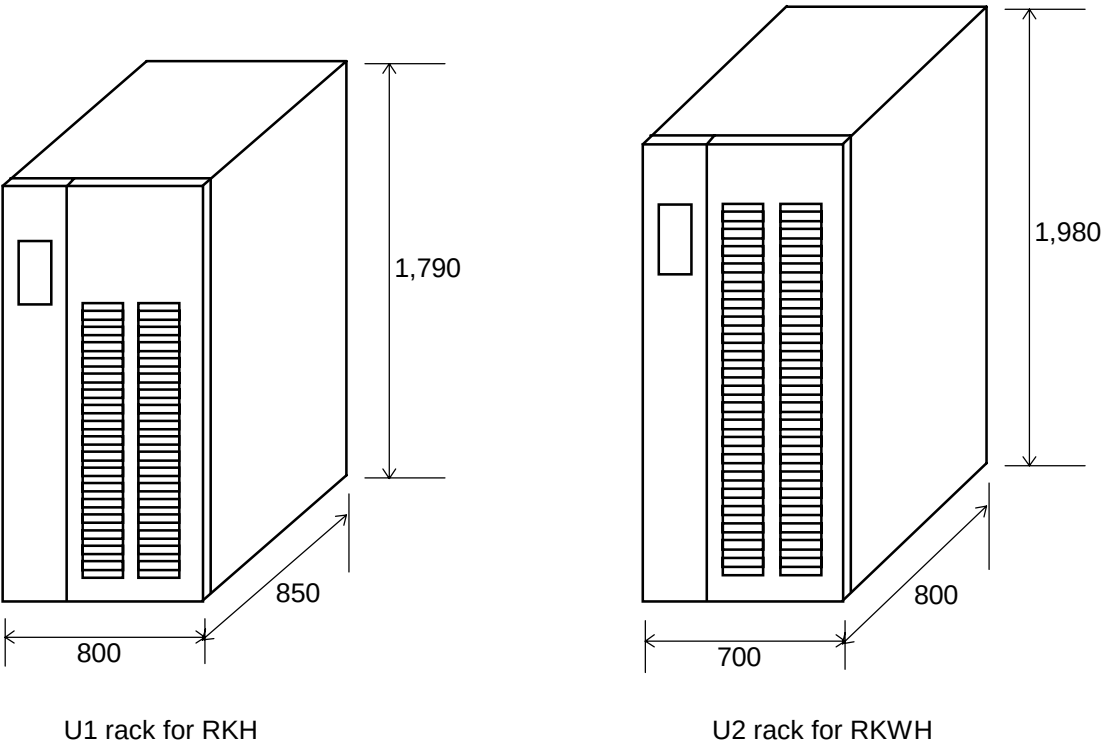
UNIT : mm



Name	Paint color		
	Cabinet	Rackmount (RKH)	Rackmount (RKWH)
Front cover	Light sandstone (10Y 7.3/0.4)	Light sandstone (10Y 7.3/0.4)	Light sandstone (10Y 7.3/0.4)
Side cover	Same as above.	Silver	Gray
Main body	Same as above.	Silver	Gray
Kickplate	Dark sandstone (10Y 5.3/0.4)	—	—

Figure 5.1.2 Appearance of DF350 Subsystem (Cabinet and rackmount types)

UNIT : mm



External color : Light limestone (10YR 7.3/0.2)

Figure 5.1.3 Appearance of DF350 Subsystem (U1 and U2 racks)

5.2 Maintenance Area

Figure 5.2.1 to 5.2.3 show the maintenance areas of the DF350 subsystem. For the installation of the DF350 subsystem, secure the maintenance area.



Do not place it on the unstable place, on the shaky table, or the inclined place, etc.

Dropping or a fall of it may cause an injury.

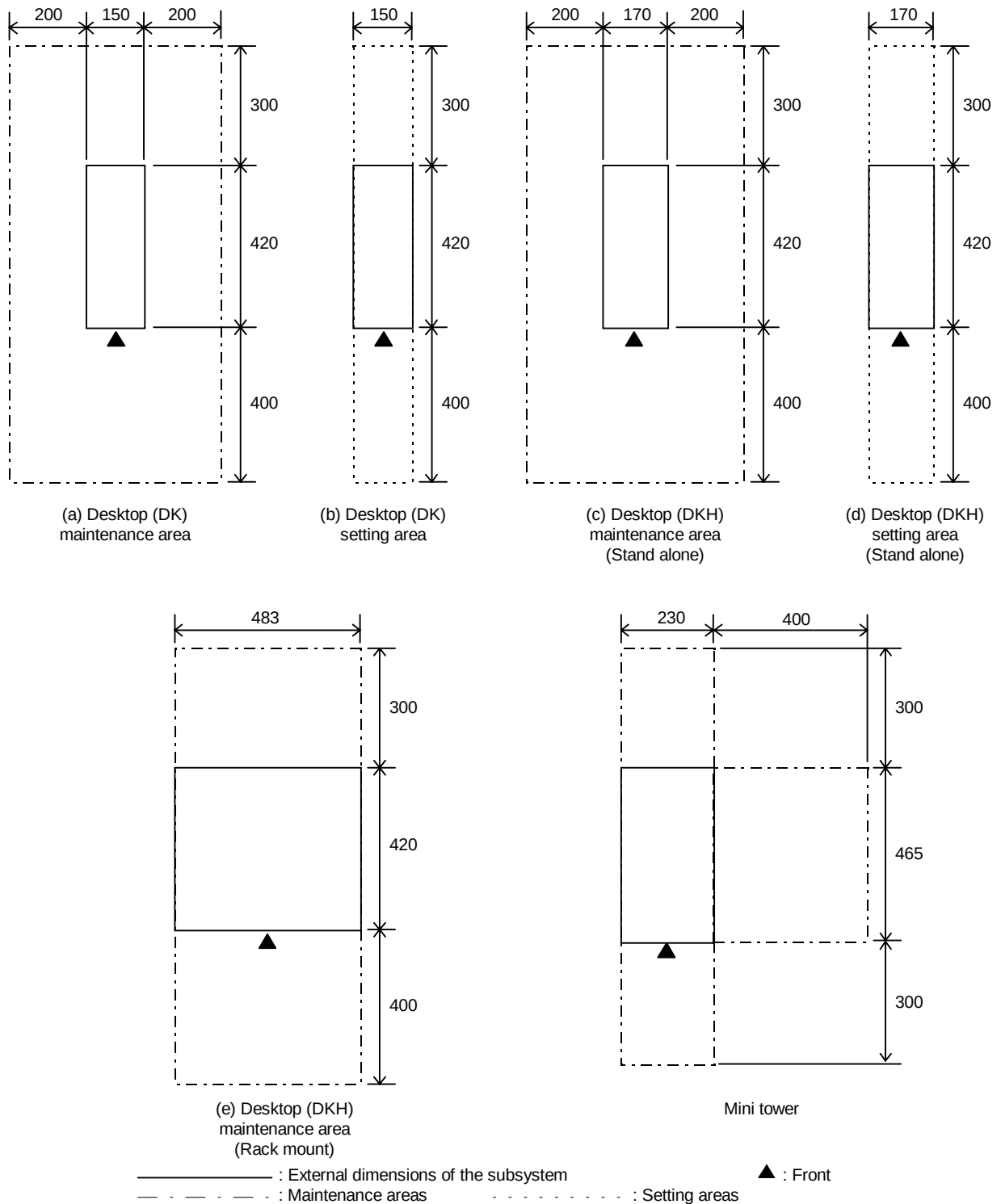
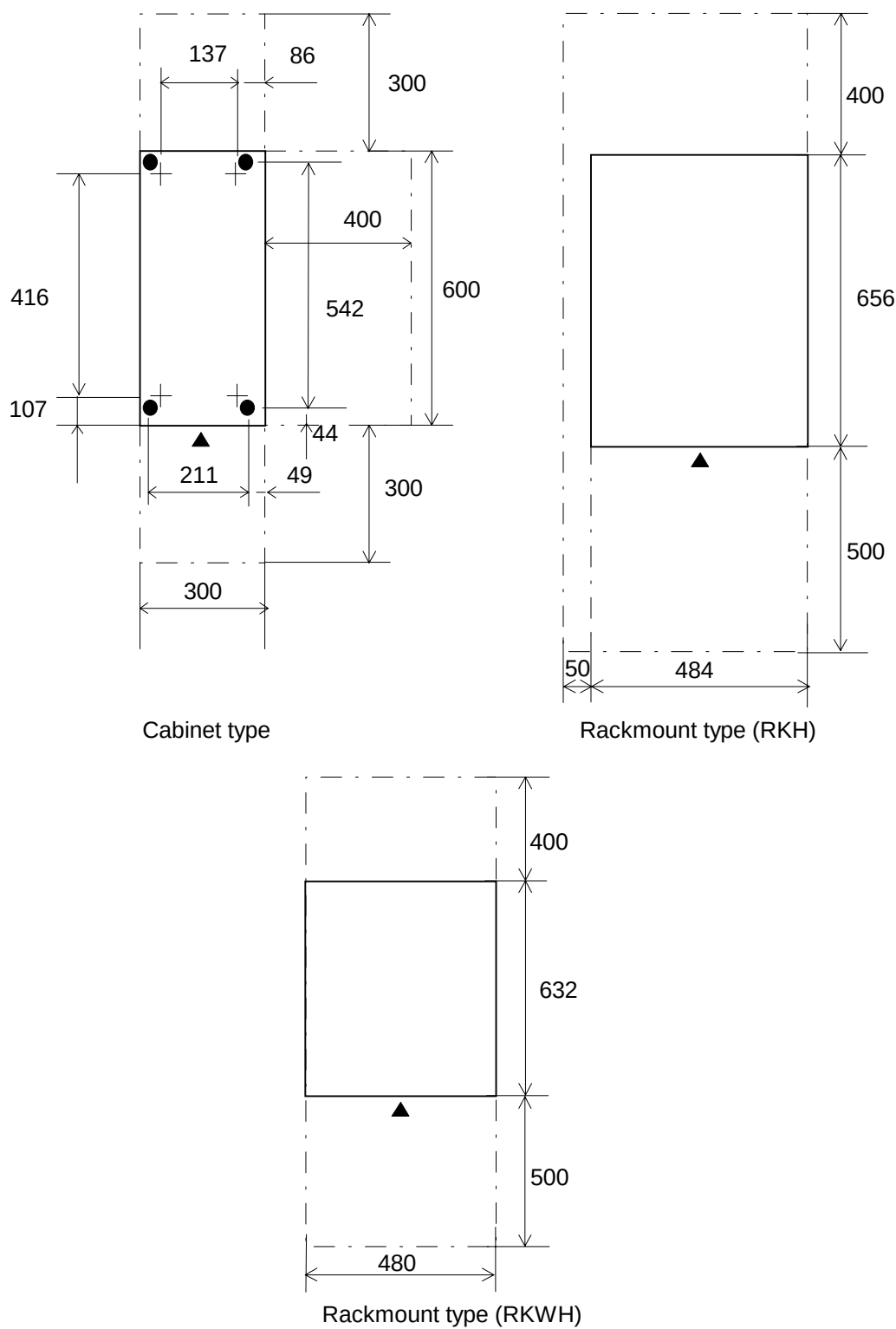


Figure 5.2.1 Maintenance Areas of the DF350 Subsystem (Desktop and Mini tower types)

UNIT :mm



- : External dimensions of the subsystem
- - - - : Maintenance areas
- ▲ : Front
● : Leveling bolts
+ : Casters

Figure 5.2.2 Maintenance Areas of the DF350 Subsystem (Cabinet and Rackmount types)

UNIT : mm

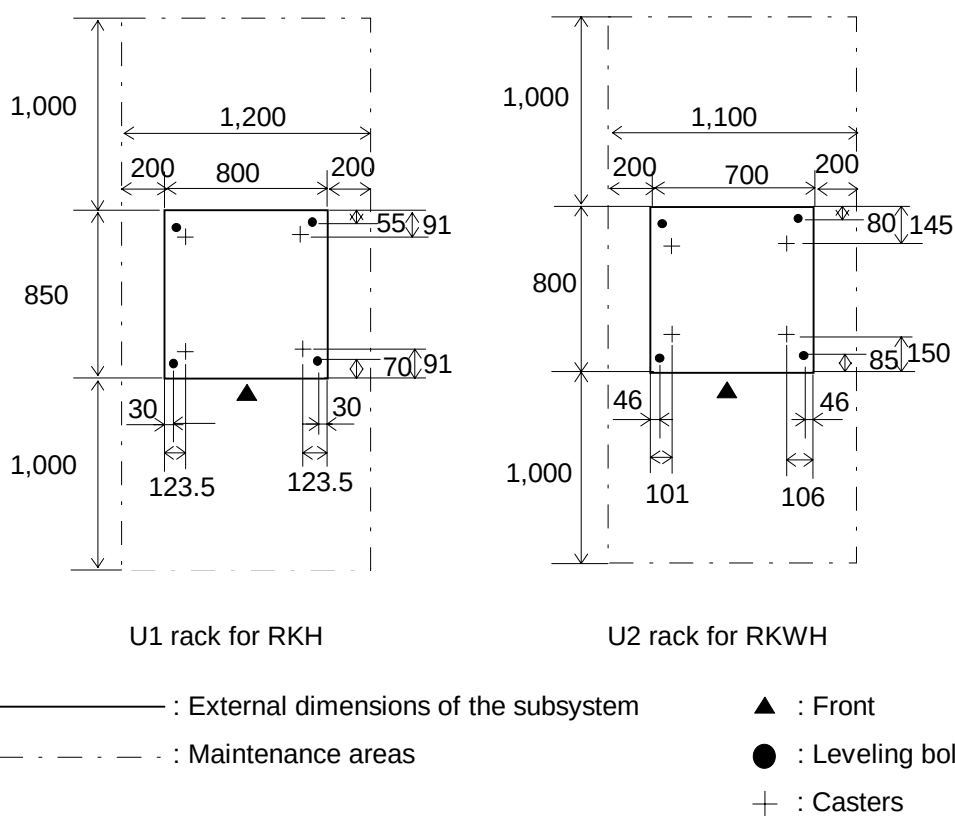
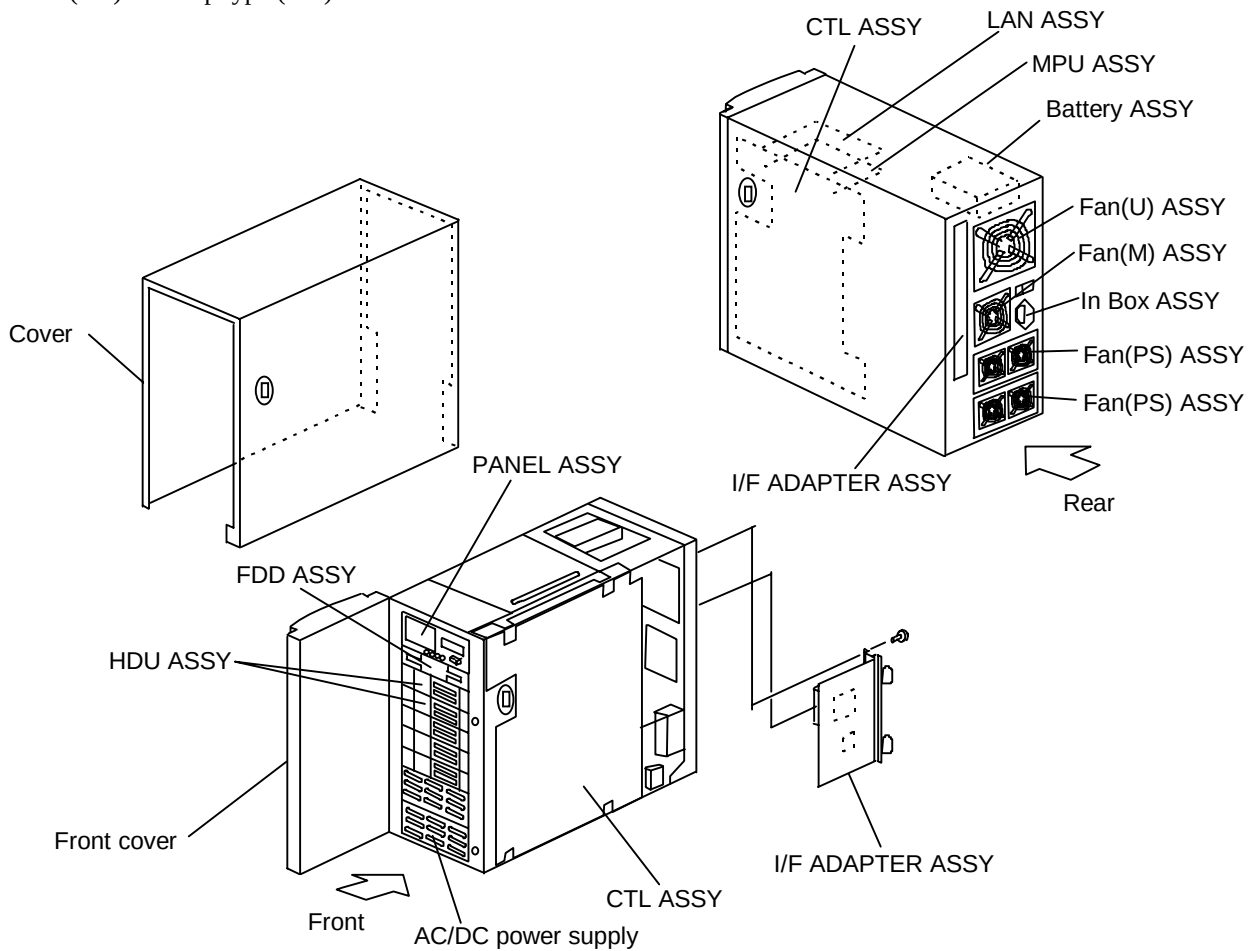


Figure 5.2.3 Maintenance Areas of the DF350 Subsystem (U1 and U2 racks)

6. Location of Components

Figure 6.1 to 6.5 show the location of components for each type.

(1-1) Desktop type (DK)



(1-2) Desktop type (DKH)

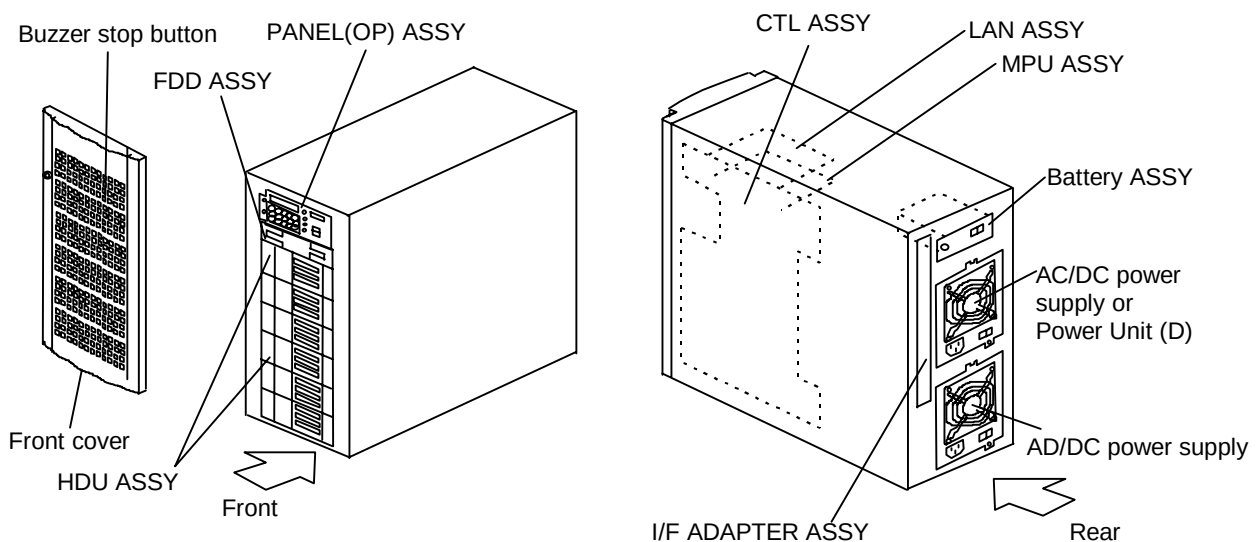
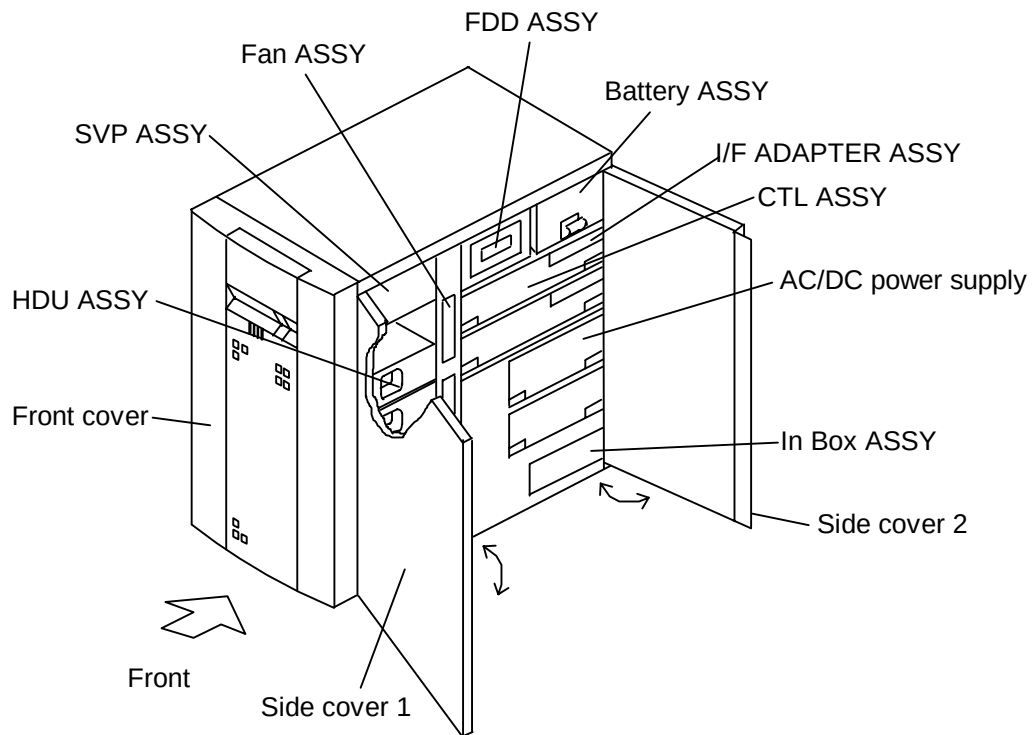
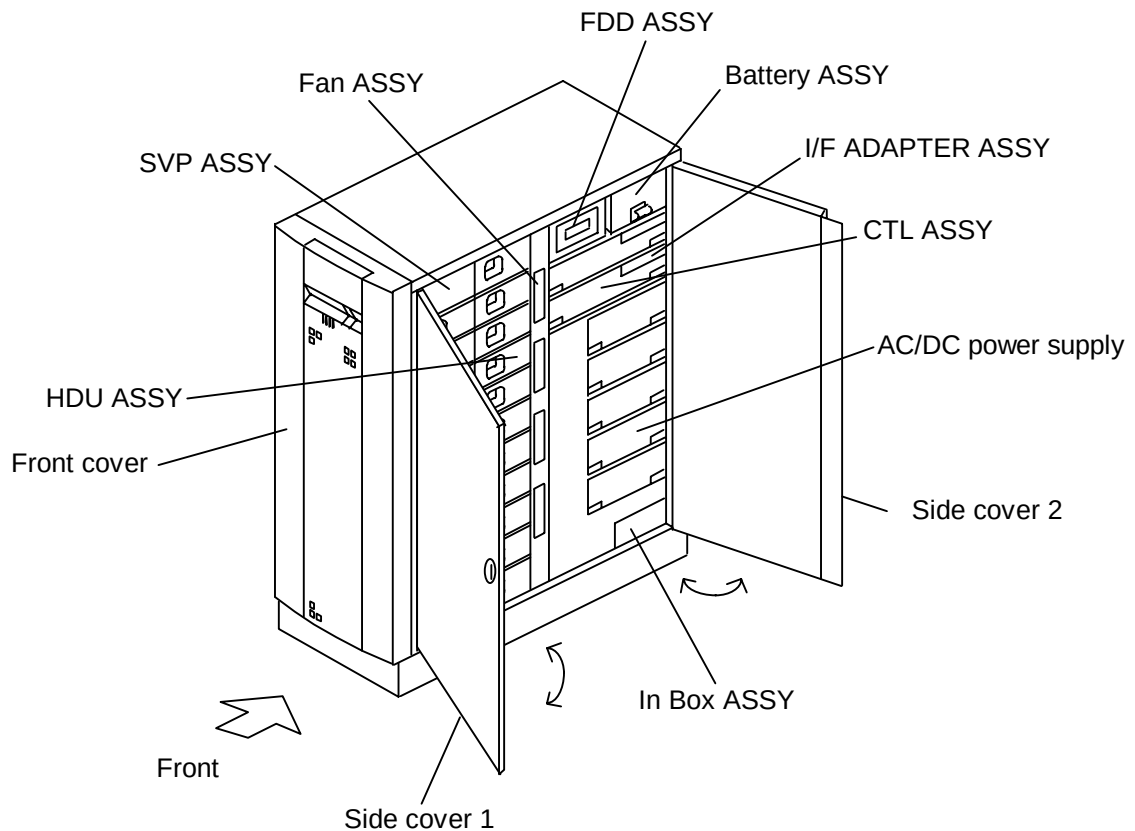


Figure 6.1 Location of Components (Desktop type)

(2) Mini tower type

**Figure 6.2 Location of Components (Mini tower type)**

(3) Cabinet type

**Figure 6.3 Location of Components (Cabinet type)**

(4) Rackmount (RKH) type

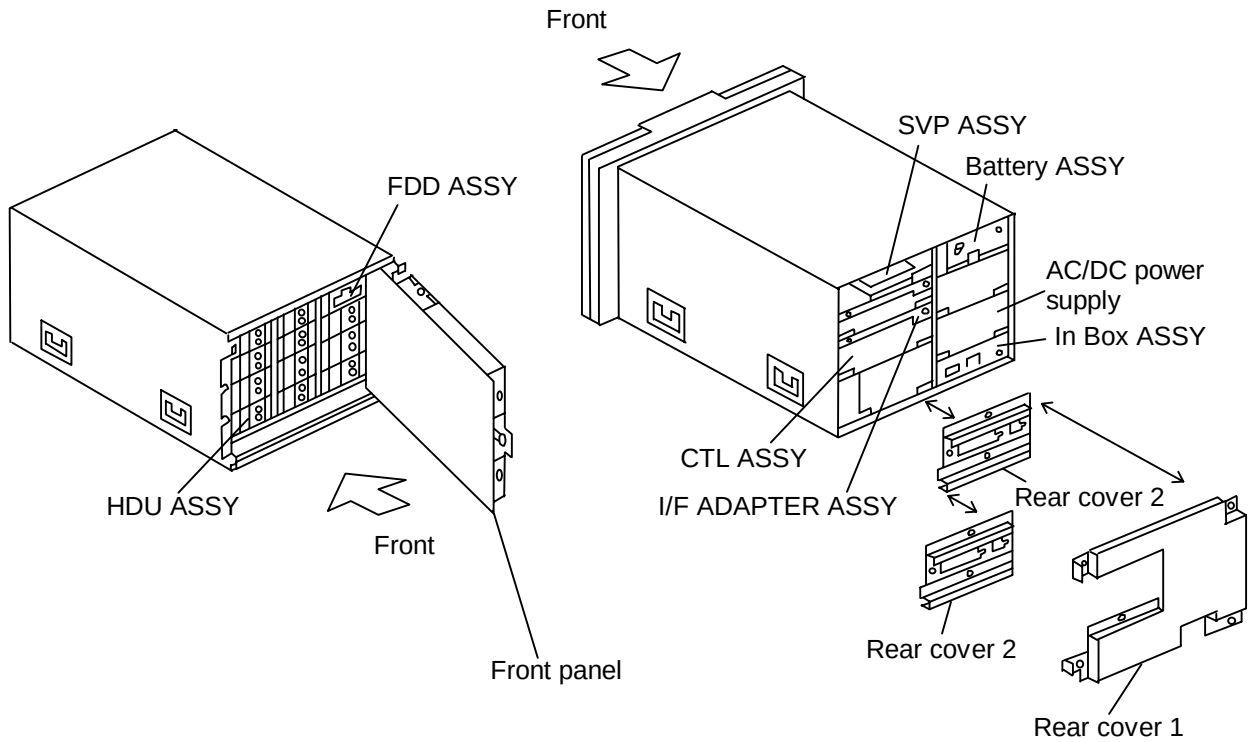
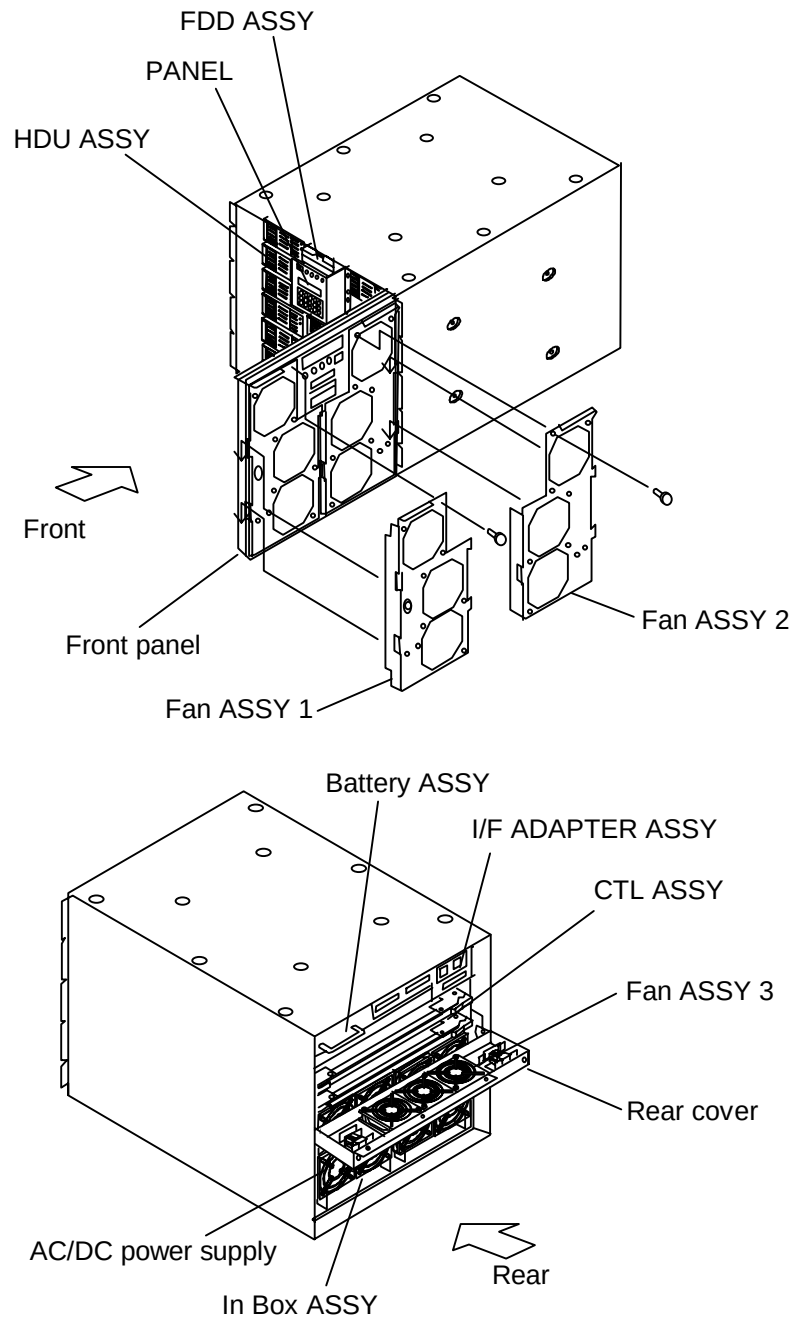


Figure 6.4 Location of Components (Rackmount (RKH) type)

(5) Rackmount (RKWH) type

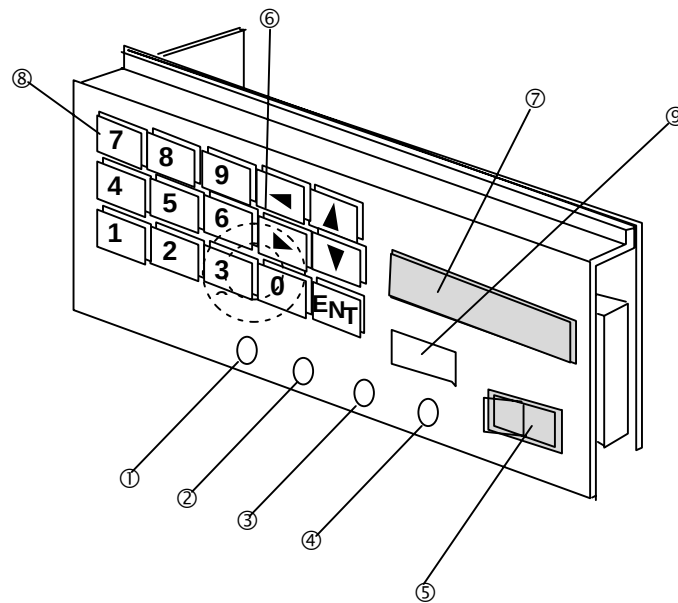
**Figure 6.5 Location of Components (Rackmount (RKWH) type)**

7. Location and Functions of Switches and LEDs

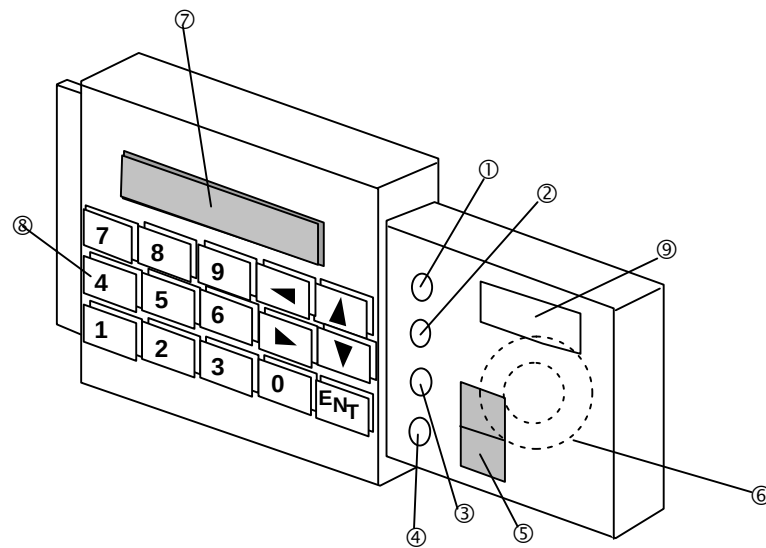
7.1 Desktop Type

(1) PANEL ASSY

Figure 7.1.1 shows the PANEL ASSY.



Desktop type (DK)



Desktop type (DKH)

For the sections (numbers) and functions, see Table 7.1.1.

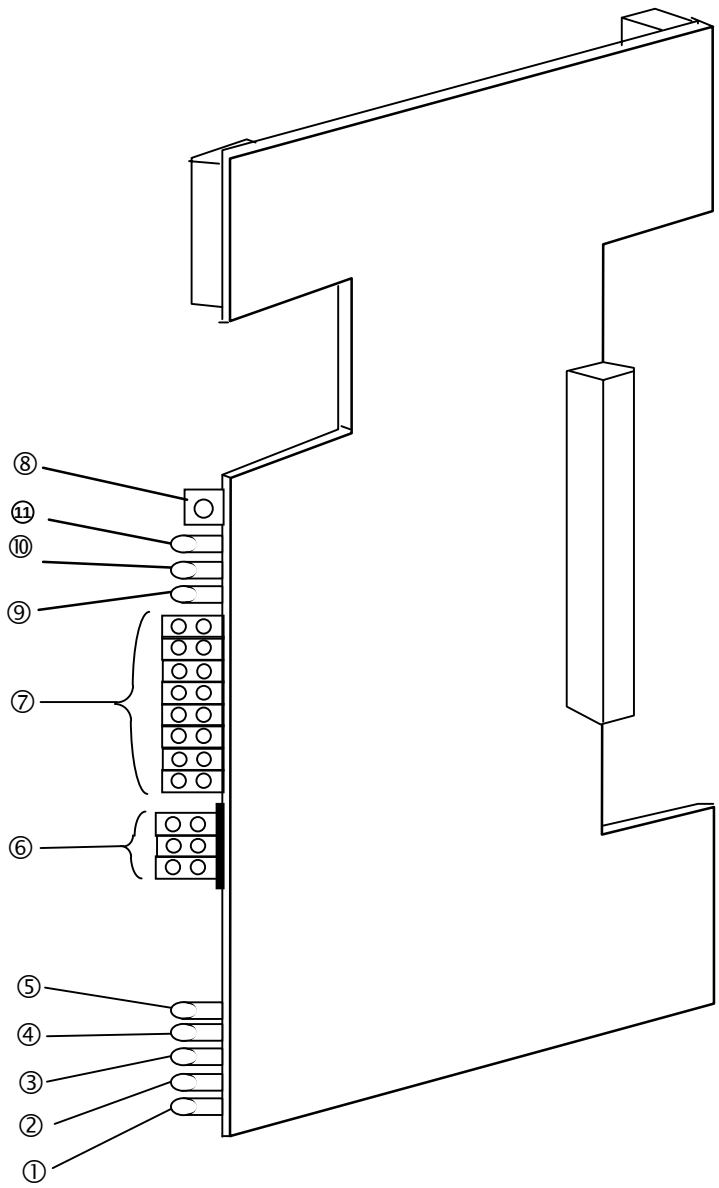
Figure 7.1.1 PANEL ASSY of Desktop Type

Table 7.1.1 Functions of the Desktop Type PANEL ASSY

No.	Name	Classification	Color	Function																		
1	READY	LED	Green	The power is turned on and the unit (DF350 subsystem) is operable.																		
2	WARNING	LED	Yellow	A failure has occurred inside although the unit remains operable.																		
3	ALARM	LED	Red	An inoperable failure has occurred in the unit.																		
4	POWER	LED	Green	The power is being supplied to the drives and packages.																		
5	Main switch	Switch	—	This switch turns the unit on or off. “I” indicates the power is on; “O” indicates the power is off.																		
6	Buzzer	Buzzer	—	If a failure occurs, an alarm sound is emitted.																		
7	Display	LCD	—	This displays the unit status and the error codes.																		
8	Numerical key pad	Switch	—	This makes the settings on the unit.																		
9	DIP switch	Switch	—	ON 1 2 3 4 5 6 7 8 ↓ Setting <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td>Installs a micro-program.</td></tr><tr><td>2</td><td>Dumps the contents of memory.</td></tr><tr><td>3</td><td>Clears a system parameter.</td></tr><tr><td>4</td><td>Sets a system parameter.</td></tr><tr><td>5</td><td>Initializes a unit parameter.*</td></tr><tr><td>6</td><td>Skips CUDG.</td></tr><tr><td>7</td><td>Initializes a unit parameter.*</td></tr><tr><td>8</td><td>Blocks the controller.</td></tr></table> * The initialization of the unit parameters in Nos. 5 and 7 is valid only when both switches are set to ON.	#	Meaning	1	Installs a micro-program.	2	Dumps the contents of memory.	3	Clears a system parameter.	4	Sets a system parameter.	5	Initializes a unit parameter.*	6	Skips CUDG.	7	Initializes a unit parameter.*	8	Blocks the controller.
#	Meaning																					
1	Installs a micro-program.																					
2	Dumps the contents of memory.																					
3	Clears a system parameter.																					
4	Sets a system parameter.																					
5	Initializes a unit parameter.*																					
6	Skips CUDG.																					
7	Initializes a unit parameter.*																					
8	Blocks the controller.																					

(2) CTL ASSY

Figure 7.1.2 shows the CTL ASSY.



For the sections (numbers) and functions, see Table 7.1.2.

Figure 7.1.2 CTL ASSY of Desktop (DK/DKH) Type

Table 7.1.2 Functions of the Desktop Type CTL ASSY

No.	Name	Classification	Color	Function																		
1	SVP CHECK 1	LED	Red	This LED indicates whether the cause of the abnormal voltage is being displayed (lit) or not (extinguished).																		
2	SVP ALARM	LED	Red	The LED indicates that the cause of abnormal voltage is displayed by the flashing count.																		
3	CHARGE	LED	Yellow	The LED indicates that the battery is being charged (lit) or the voltage level is being checked (flashing for 30 min.)																		
4	BATTERY OK	LED	Green	The LED indicates that the battery has been charged.																		
5	SVP READY	LED	Green	The LED indicates that the SVP is operable.																		
6	SW3	Jumper socket	—	1 2 3 <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td> Provided : RESET</td></tr><tr><td>2</td><td> DC FAILE detection level Provided : 4.2V Not provided : 4.6V</td></tr><tr><td>3</td><td> BUZZER Provided : Keeps sounding. Not provided : The host controls.</td></tr></table> Note : Remove all the sockets during the normal operation.	#	Meaning	1	Provided : RESET	2	DC FAILE detection level Provided : 4.2V Not provided : 4.6V	3	BUZZER Provided : Keeps sounding. Not provided : The host controls.										
#	Meaning																					
1	Provided : RESET																					
2	DC FAILE detection level Provided : 4.2V Not provided : 4.6V																					
3	BUZZER Provided : Keeps sounding. Not provided : The host controls.																					
7	SW2	Jumper socket	Black	1 2 3 4 5 6 7 8 <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td>Not provided : LED TEST</td></tr><tr><td>2</td><td>Not provided : LCD TEST</td></tr><tr><td>3</td><td>Not provided : BUZZER TEST</td></tr><tr><td>4</td><td>Not provided : BATTERY CHARGE</td></tr><tr><td>5</td><td>Not provided : BATTERY DISCHARGE</td></tr><tr><td>6</td><td>Not used</td></tr><tr><td>7</td><td>Not used</td></tr><tr><td>8</td><td>Not used</td></tr></table> Note : Insert all the sockets during the normal operation.	#	Meaning	1	Not provided : LED TEST	2	Not provided : LCD TEST	3	Not provided : BUZZER TEST	4	Not provided : BATTERY CHARGE	5	Not provided : BATTERY DISCHARGE	6	Not used	7	Not used	8	Not used
#	Meaning																					
1	Not provided : LED TEST																					
2	Not provided : LCD TEST																					
3	Not provided : BUZZER TEST																					
4	Not provided : BATTERY CHARGE																					
5	Not provided : BATTERY DISCHARGE																					
6	Not used																					
7	Not used																					
8	Not used																					
8	RESET switch	Switch	—	This switch collects a memory dump.																		
9	CACHE PWR	LED	Green	Confirmation of this LED display status checks whether or not the cache memory is in the back-up mode. ① Set the circuit breaker on the back of the unit to “ ” with the main switch set to “○”. ② You can check the following status with this LED display status. Lit : Indicates that the cache is in the back-up mode. (The power is supplied from the battery to the cache.) Extinguished : The cache does not perform a back-up. For canceling the back-up mode of the cache memory, see “1. Before Maintenance Work” in the Entry Chapter.																		

(Continued)

No.	Name	Classification	Color	Function
10	FAIL	LED	Red	The LED indicates that an inoperable failure occurs in the CTL ASSY.
11	RESET	LED	Yellow	The CTL ASSY is being reset.

LED TEST

Lights all the LEDs installed on the panel.

LCD TEST

Tests the LCD module display and displays the characters to be tested. When a key is pressed in this mode, the pressed key is displayed on the LCD.

BUZZER TEST

Sounds the buzzer by setting buzzer (bit 6) of CTL Reg. (0X02).

BATTERY CHARGE

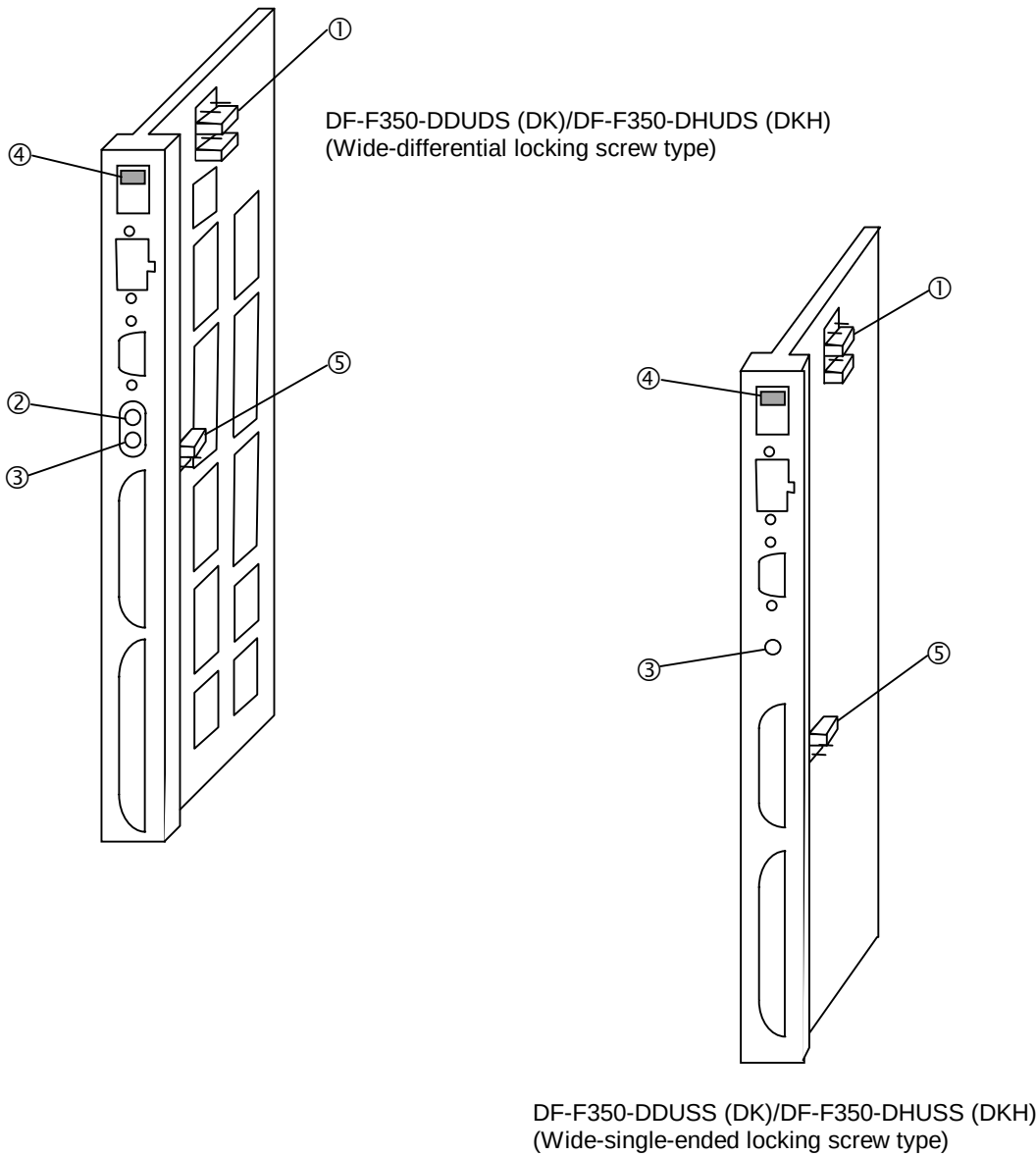
Charges the battery regardless of the battery voltage.

BATTERY DISCHARGE

Discharges the battery regardless of the battery voltage.

(3) I/F ADAPTER ASSY

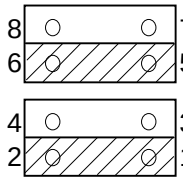
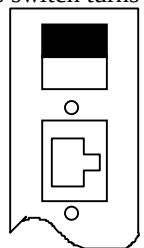
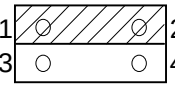
Figure 7.1.3 shows the I/F ADAPTER ASSY.



For the sections (numbers) and functions, see Table 7.1.3.
There is no Battery switch ④ in DKH type.

Figure 7.1.3 I/F ADAPTER ASSY of Desktop (DK/DKH) Type

Table 7.1.3 Functions for I/F ADAPTER ASSY of the Desktop Type

No.	Name	Classification	Color	Function
1	JP1	Jumper socket	Green	This sets the terminator power and LOCAL/REMOTE. 
2	FAIL	LED	Red	The LED indicates that the differential unit is connected to the single-ended unit. (This LED is not installed on package SZ672 for the single-ended SCSI I/F.)*
3	TERMPWR	LED	Green	The LED indicates that the terminator power is being supplied.
4	S1	Switch	Black	This switch turns on or off the cache back-up battery.  Note : Normally set this switch to ON.
5	JP2	Jumper socket	Black	 Always set this jumper with pins 1 and 2 shorted.

* This FAIL LED may light if the host is turned off.

LOCAL mode

This mode can control the power supply by turning on or off the main switch of the unit regardless of setting jumper JP1 for the terminator power.

REMOTE mode

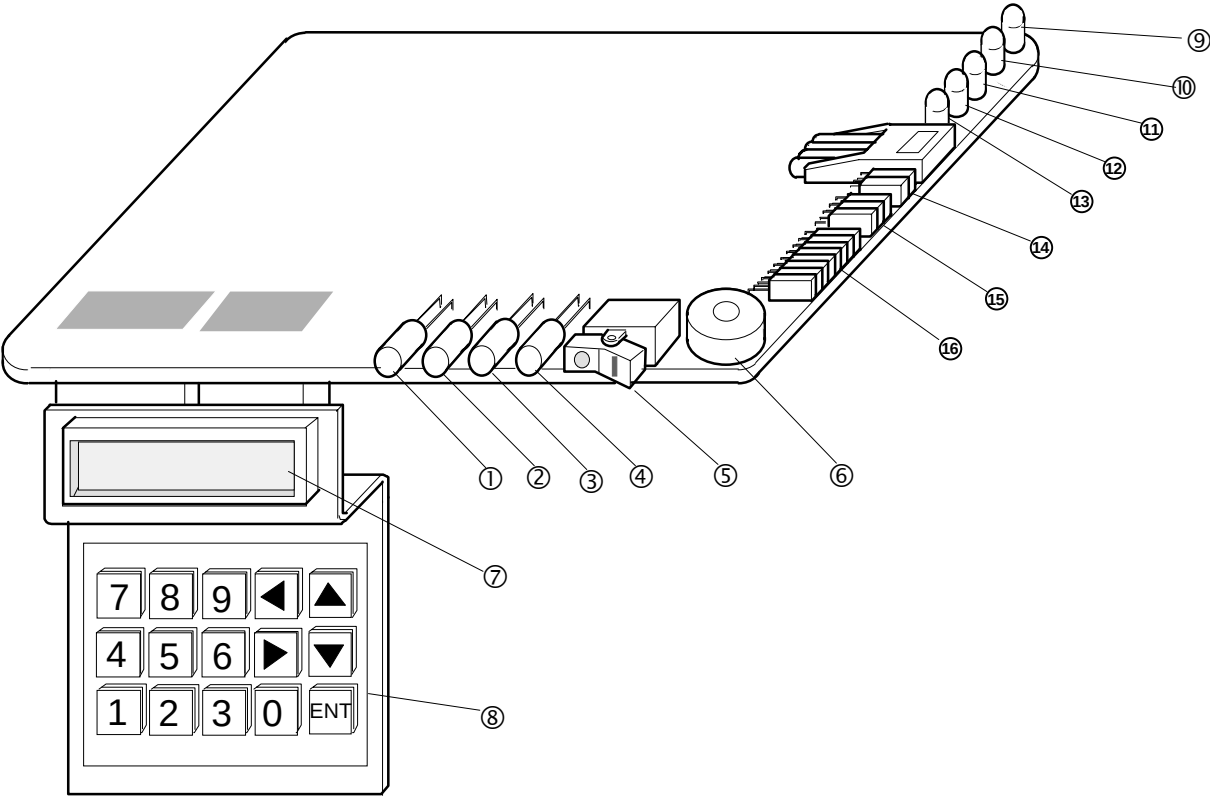
This mode can turn on the unit remotely from the host if the terminator power is set to the SCSI bus power supply. (Use this mode with the main switch of the unit turned on.)

If you change the LOCAL/REMOTE mode, turn off the main switch and the circuit breaker installed on the back of the unit. Then turn the switch back on after the power is completely off.

7.2 Mini Tower and Cabinet Types

(1) SVP ASSY

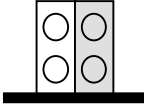
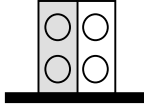
Figure 7.2.1 shows the SVP ASSY.



For the sections (numbers) and functions, see Table 7.2.1.

Figure 7.2.1 SVP ASSY of Mini Tower and Cabinet Types

Table 7.2.1 Functions for the PANEL ASSY of Mini Tower and Cabinet Types

No.	Name	Classification	Color	Function
1	READY	LED	Green	The power is turned on and the unit (DF350 subsystem) is operable.
2	WARNING	LED	Yellow	A failure has occurred inside although the unit remains operable.
3	ALARM	LED	Red	An inoperable failure has occurred in the unit.
4	POWER	LED	Green	The power is supplied to the drives and packages.
5	Main switch	Switch	—	This switch turns on or off the unit. “I” indicates the power is on; “O” indicates the power is off.
6	Buzzer	Buzzer	—	If a failure occurs, an alarm sound is emitted.
7	Display	LCD	—	This displays the unit status and the error codes.
8	Numerical key pad	Switch	—	This switch makes the settings on the unit.
9	SVP CHECK1	LED	Red	This LED indicates whether the cause of the abnormal voltage is being displayed (lit) or not (extinguished).
10	SVP ALARM	LED	Red	The LED indicates that the cause of abnormal voltage is displayed by the flashing count.
11	CHARGE	LED	Yellow	The LED indicates that the battery is being charged (lit) or the voltage level is being checked (flashing for 30 min.)
12	BATTERY OK	LED	Green	The LED indicates that the battery has been charged.
13	SVP READY	LED	Green	The LED indicates that the SVP ASSY is operable.
14	SW2	Jumper socket	Green	The jumper socket sets LOCAL mode or REMOTE mode.*  Local mode  Remote mode

(Continued)

* If you change the LOCAL/REMOTE mode, turn off the main switch and the circuit breaker installed on the back of the unit, then turn the switch back on after the power is completely off.

LOCAL mode

This mode can control the power supply by turning on or off the main switch of the unit regardless of setting jumper JP1 of the I/F ADAPTER ASSY for the terminator power.

REMOTE mode

This mode can turn on the unit remotely from the host if the terminator power is set to the SCSI bus power supply. (Use this mode with the main switch of the unit turned on.)

No.	Name	Classification	Color	Function																		
15	SW3 *	Jumper socket	Black	3 2 1 <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1 </td><td>Provided : RESET</td></tr><tr><td>2 </td><td>DC FAILE detection level Provided : 4.2V Not provided : 4.6V</td></tr><tr><td>3 </td><td>BUZZER Provided : Keeps sounding. Not provided : The host controls.</td></tr></table>	#	Meaning	1	Provided : RESET	2	DC FAILE detection level Provided : 4.2V Not provided : 4.6V	3	BUZZER Provided : Keeps sounding. Not provided : The host controls.										
#	Meaning																					
1	Provided : RESET																					
2	DC FAILE detection level Provided : 4.2V Not provided : 4.6V																					
3	BUZZER Provided : Keeps sounding. Not provided : The host controls.																					
16	SW4 *	Jumper socket	Black	8 7 6 5 4 3 2 1 <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td>Not provided : LED TEST</td></tr><tr><td>2</td><td>Not provided : LCD TEST</td></tr><tr><td>3</td><td>Not provided : BUZZER TEST</td></tr><tr><td>4</td><td>Not provided : BATTERY CHARGE</td></tr><tr><td>5</td><td>Not provided : BATTERY DISCHARGE</td></tr><tr><td>6</td><td>Not used</td></tr><tr><td>7</td><td>Not used</td></tr><tr><td>8</td><td>Not used</td></tr></table>	#	Meaning	1	Not provided : LED TEST	2	Not provided : LCD TEST	3	Not provided : BUZZER TEST	4	Not provided : BATTERY CHARGE	5	Not provided : BATTERY DISCHARGE	6	Not used	7	Not used	8	Not used
#	Meaning																					
1	Not provided : LED TEST																					
2	Not provided : LCD TEST																					
3	Not provided : BUZZER TEST																					
4	Not provided : BATTERY CHARGE																					
5	Not provided : BATTERY DISCHARGE																					
6	Not used																					
7	Not used																					
8	Not used																					

* Do not change the SW3 and SW4 settings that have been set at the factory.

LED TEST

Lights all the LEDs installed on the panel.

LCD TEST

Tests the LCD module display and displays the characters to be tested. When a key is pressed in this mode, the pressed key is displayed on the LCD.

BUZZER TEST

Sounds the buzzer by setting buzzer (bit 6) of CTL Reg. (0X02).

BATTERY CHARGE

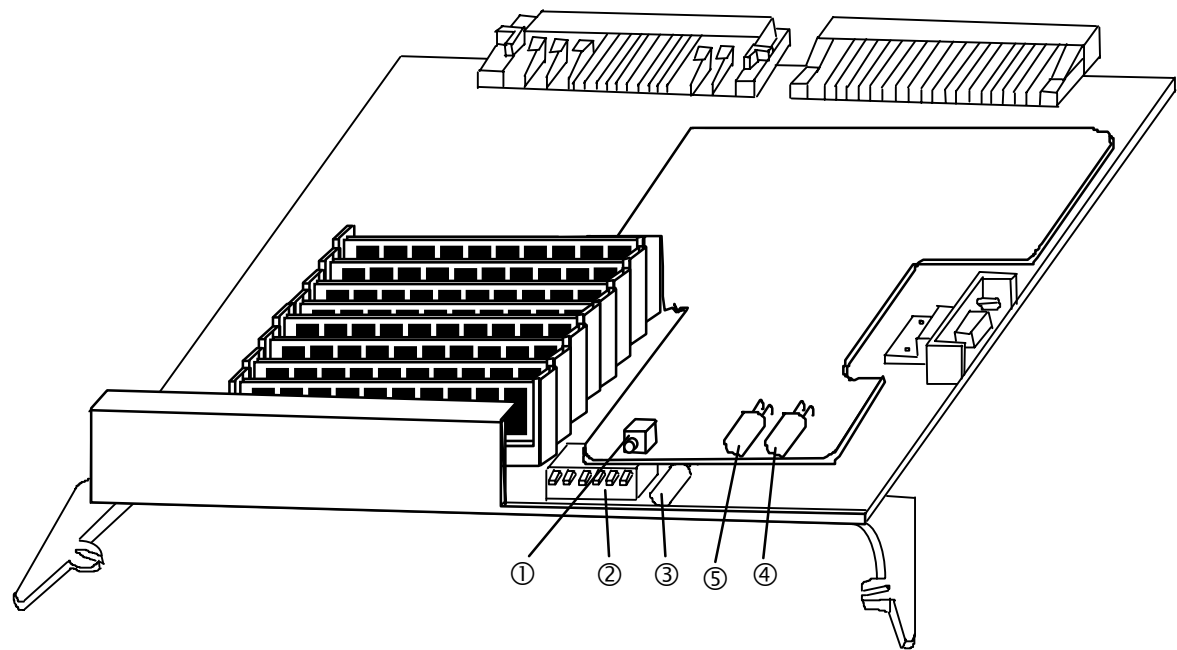
Charges the battery regardless of the battery voltage.

BATTERY DISCHARGE

Discharges the battery regardless of the battery voltage.

(2) CTL ASSY

Figure 7.2.2 shows the CTL ASSY.



For the sections (numbers) and functions, see Table 7.2.2.

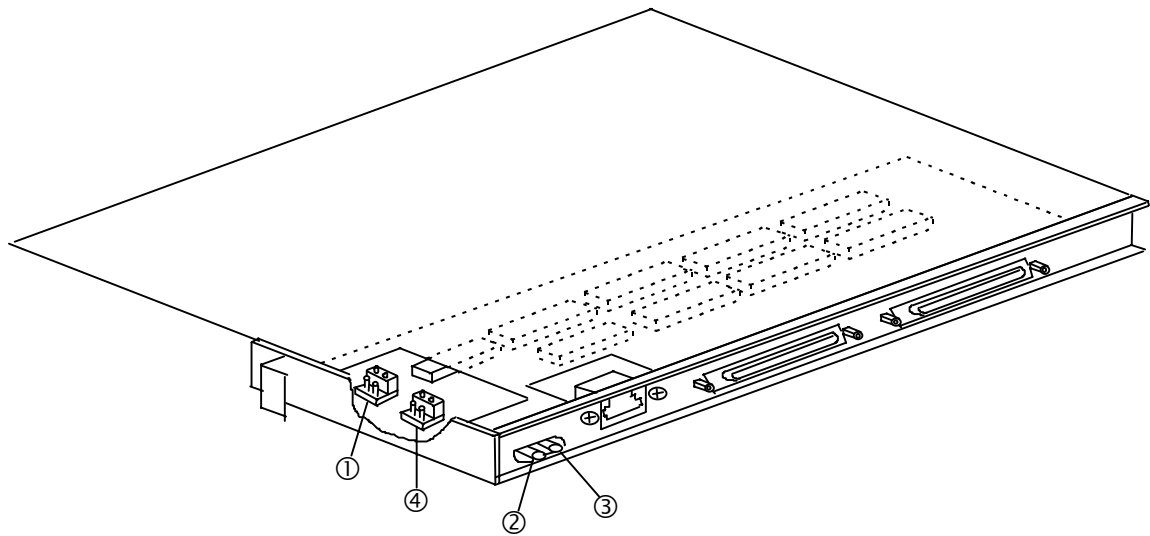
Figure 7.2.2 CTL ASSY of Mini Tower and Cabinet Types

Table 7.2.2 Functions for the Type PANEL ASSY of Mini Tower and Cabinet Types

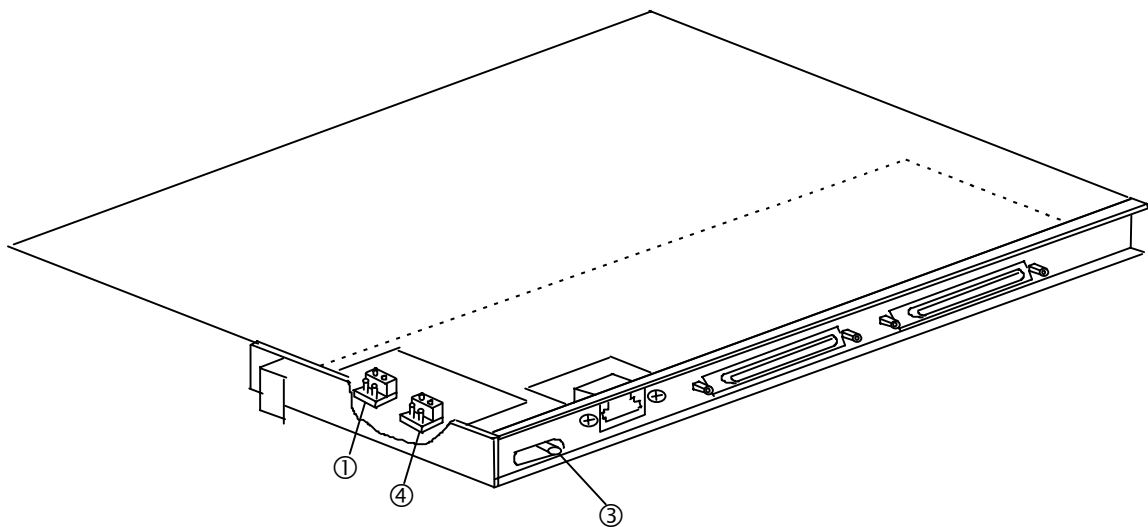
No.	Name	Classification	Color	Function																		
1	RESET switch	Switch	—	This switch collects a memory dump.																		
2	DIP switch	Switch	—	↓ ON 1 2 3 4 5 6 7 8 ↓ Setting <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td>Installs a micro-program.</td></tr><tr><td>2</td><td>Dumps the contents of memory.</td></tr><tr><td>3</td><td>Clears a system parameter.</td></tr><tr><td>4</td><td>Sets a system parameter.</td></tr><tr><td>5</td><td>Initializes a unit parameter.*</td></tr><tr><td>6</td><td>Skips CUDG.</td></tr><tr><td>7</td><td>Initializes a unit parameter.*</td></tr><tr><td>8</td><td>Blocks the controller.</td></tr></table> * The initialization of the unit parameters in Nos. 5 and 7 is valid only when both switches are set to ON.	#	Meaning	1	Installs a micro-program.	2	Dumps the contents of memory.	3	Clears a system parameter.	4	Sets a system parameter.	5	Initializes a unit parameter.*	6	Skips CUDG.	7	Initializes a unit parameter.*	8	Blocks the controller.
#	Meaning																					
1	Installs a micro-program.																					
2	Dumps the contents of memory.																					
3	Clears a system parameter.																					
4	Sets a system parameter.																					
5	Initializes a unit parameter.*																					
6	Skips CUDG.																					
7	Initializes a unit parameter.*																					
8	Blocks the controller.																					
3	CACHE PWR	LED	Green	Confirmation of this LED display status checks whether or not the cache memory is in the back-up mode. ① Set the circuit breaker on the back of the unit to “I” with the main switch set to “O”. ② You can check the following status with this LED display status. Lit : Indicates that the cache is in the back-up mode. (The power is supplied from the battery to the cache.) Extinguished : The cache does not perform a back-up. For canceling the back-up mode of the cache memory, see “1. Before Maintenance Work” in the Entry Chapter.																		
4	FAIL	LED	Red	The LED indicates that an inoperable failure occurs in the CTL ASSY.																		
5	RESET	LED	Yellow	The CTL ASSY is being reset.																		

(3) I/F ADAPTER ASSY

Figure 7.2.3 shows the I/F ADAPTER ASSY.



DF-F350-DMUDS
(Wide-differential locking screw type)



DF-F350-DMUSS
(Wide-single-ended locking screw type)

For the sections (numbers) and functions, see Table 7.2.3.

Figure 7.2.3 I/F ADAPTER ASSY of Mini Tower and Cabinet Types

Table 7.2.3 Functions for I/F ADAPTER ASSY of the Mini Tower and Cabinet Types

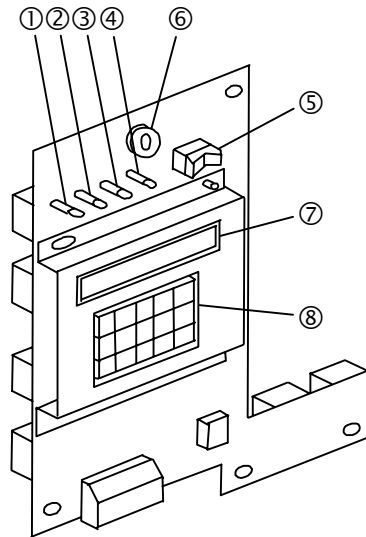
No.	Name	Classification	Color	Function
1	JP1	Jumper socket	Green	This sets the terminator power. Local feeding Remote feeding
2	FAIL	LED	Red	The LED indicates that the differential unit is connected to the single-ended unit. (This LED is not installed on package SZ643 for the single-ended SCSI I/F.)*
3	TERMPWR	LED	Green	The LED indicates that the terminator power is being supplied.
4	JP2	Jumper socket	Black	Always set this jumper with pins 1 and 2 shorted.

* This FAIL LED may light if the host is turned off.

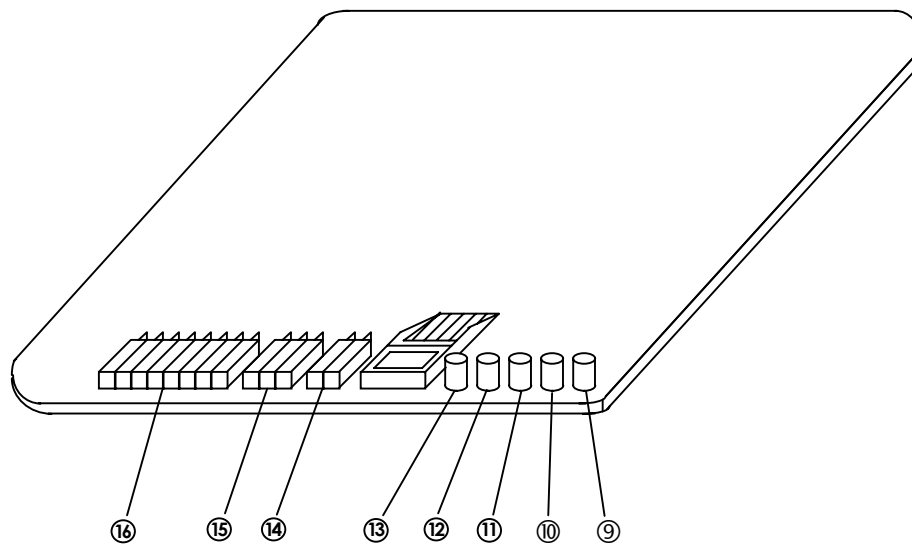
7.3 Rackmount Type

(1) SVP ASSY

Figure 7.3.1 shows the SVP ASSY of the rackmount (RKH) type and Figure 7.3.2 shows the SVP ASSY of the rackmount (RKWH) type.



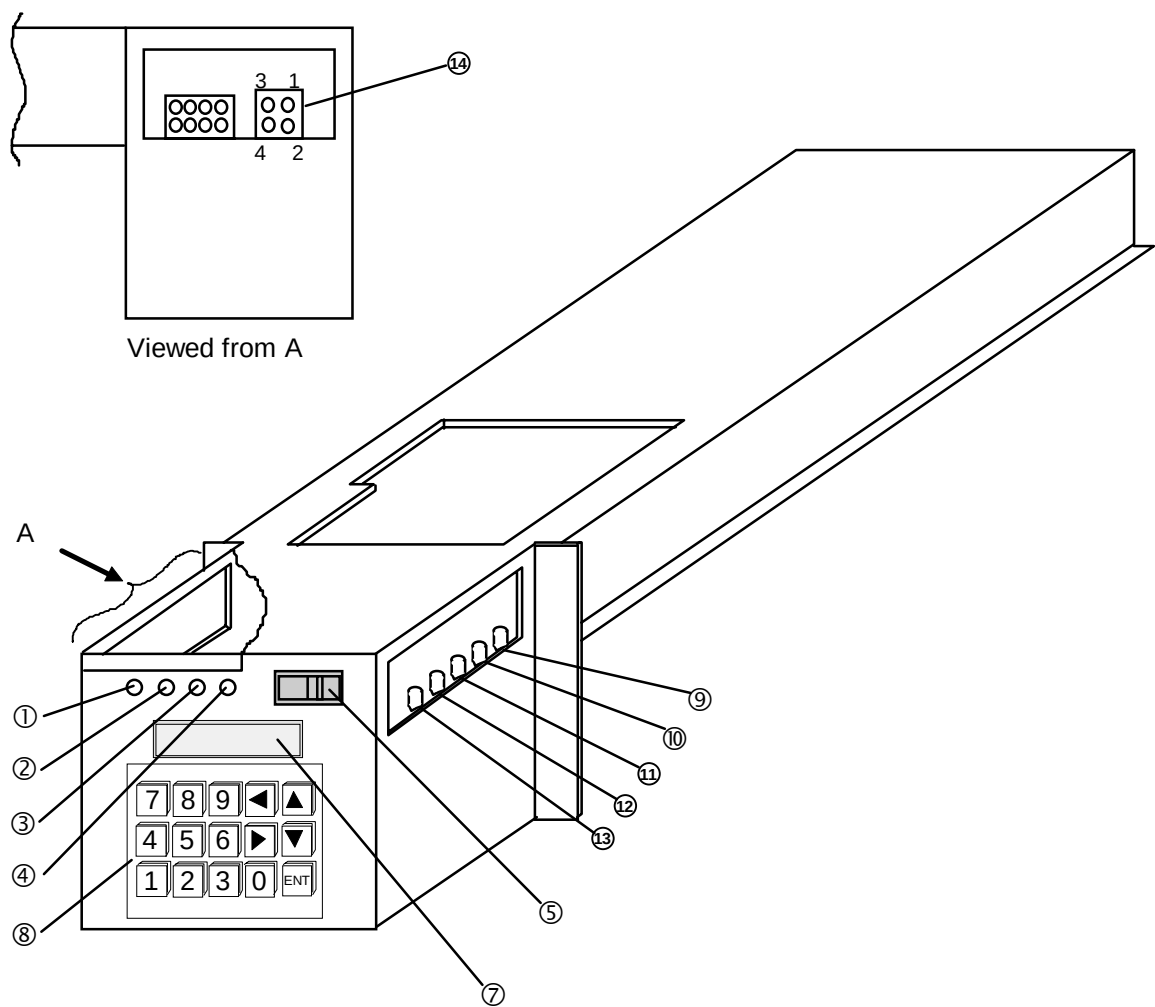
(a) RKH PANEL



(b) RKH SVP

For the sections (numbers) and functions, see Table 7.3.1.

Figure 7.3.1 SVP ASSY of Rackmount (RKH) Type



For the sections (numbers) and functions, see Table 7.3.1.

Figure 7.3.2 SVP ASSY of Rackmount (RKWH) Type

Table 7.3.1 Functions for the SVP ASSY of the Rackmount Type

No.	Name	Classification	Color	Function								
1	READY	LED	Green	The power is turned on and the unit (DF350 subsystem) is operable.								
2	WARNING	LED	Yellow	A failure occurs inside although the unit is operable.								
3	ALARM	LED	Red	An inoperable failure occurs in the unit.								
4	POWER	LED	Green	The power is supplied to the drives and packages.								
5	Main switch	Switch	—	This switch turns on or off the unit. “I” indicates the power is on; “O” indicates the power is off.								
6	Buzzer	Buzzer	—	If a failure occurs, an alarm sound is emitted.								
7	Display	LCD	—	This displays the unit status and the error codes.								
8	Numerical key pad	Switch	—	This switch makes the settings on the unit.								
9	SVP CHECK1	LED	Red	This LED indicates whether the cause of the abnormal voltage is being displayed (lit) or not (extinguished).								
10	SVP ALARM	LED	Red	The LED indicates that the cause of abnormal voltage is displayed by the flashing count.								
11	CHARGE	LED	Yellow	The LED indicates that the battery is being charged (lit) or the voltage level is being checked (flashing for 30 min.)								
12	BATTERY OK	LED	Green	The LED indicates that the battery has been charged.								
13	SVP READY	LED	Green	The LED indicates that the SVP ASSY is operable.								
14	SW2	Jumper socket	Green	The jumper socket sets LOCAL mode or REMOTE mode.* Local mode Remote mode								
15	SW3 **	Jumper socket	Black	3 2 1 <table><tr><th>#</th><th>Meaning</th></tr><tr><td> 1 </td><td>Provided : RESET</td></tr><tr><td> 2 </td><td>DC FAILE detection level Provided : 4.2V Not provided : 4.6V</td></tr><tr><td> 3 </td><td>BUZZER Provided : Keeps sounding. Not provided : The host controls.</td></tr></table>	#	Meaning	1	Provided : RESET	2	DC FAILE detection level Provided : 4.2V Not provided : 4.6V	3	BUZZER Provided : Keeps sounding. Not provided : The host controls.
#	Meaning											
1	Provided : RESET											
2	DC FAILE detection level Provided : 4.2V Not provided : 4.6V											
3	BUZZER Provided : Keeps sounding. Not provided : The host controls.											

(Continued)

No.	Name	Classification	Color	Function																		
16	SW4**	Jumper socket	Black	87654321 <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td>Not provided : LED TEST</td></tr><tr><td>2</td><td>Not provided : LCD TEST</td></tr><tr><td>3</td><td>Not provided : BUZZER TEST</td></tr><tr><td>4</td><td>Not provided : BATTERY CHARGE</td></tr><tr><td>5</td><td>Not provided : BATTERY DISCHARGE</td></tr><tr><td>6</td><td>Not used</td></tr><tr><td>7</td><td>Not used</td></tr><tr><td>8</td><td>Not used</td></tr></table>	#	Meaning	1	Not provided : LED TEST	2	Not provided : LCD TEST	3	Not provided : BUZZER TEST	4	Not provided : BATTERY CHARGE	5	Not provided : BATTERY DISCHARGE	6	Not used	7	Not used	8	Not used
#	Meaning																					
1	Not provided : LED TEST																					
2	Not provided : LCD TEST																					
3	Not provided : BUZZER TEST																					
4	Not provided : BATTERY CHARGE																					
5	Not provided : BATTERY DISCHARGE																					
6	Not used																					
7	Not used																					
8	Not used																					

* If you change the LOCAL/REMOTE mode, turn off the main switch and the circuit breaker installed on the back of the unit. Then turn the switch back on after the power is completely off.

** Do not change the SW3 and SW4 settings that have been set at the factory.

LOCAL mode

This mode can control the power supply by turning on or off the main switch of the unit regardless of setting jumper JP1 of the I/F ADAPTER ASSY for the terminator power.

REMOTE mode

This mode can turn on the unit remotely from the host if the terminator power is set to the SCSI bus power supply. (Use this mode with the main switch of the unit turned on.)

LED TEST

Lights all the LEDs installed on the panel.

LCD TEST

Tests the LCD module display and displays the characters to be tested. When a key is pressed in this mode, the pressed key is displayed on the LCD.

BUZZER TEST

Sounds the buzzer by setting buzzer (bit 6) of CTL Reg. (0X02).

BATTERY CHARGE

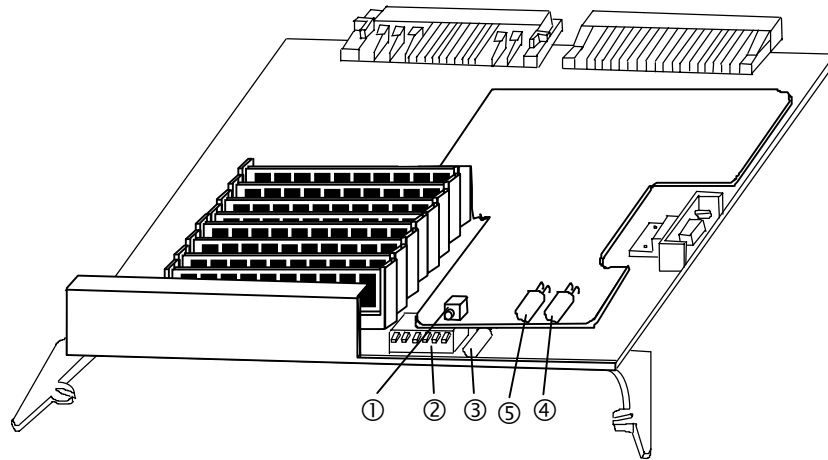
Charges the battery regardless of the battery voltage.

BATTERY DISCHARGE

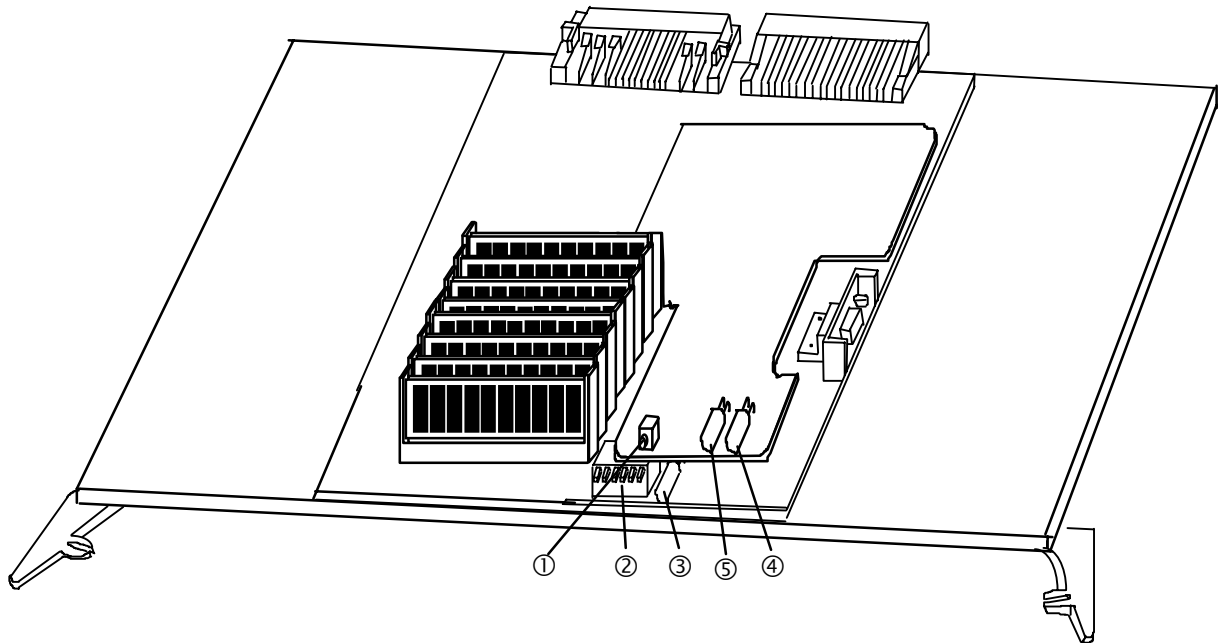
Discharges the battery regardless of the battery voltage.

(2) CTL ASSY

Figure 7.3.3 shows the CTL ASSY.



(a) Rackmount (RKH) Type



(b) Rackmount (RKWH) Type

For the sections (numbers) and functions, see Table 7.3.2.

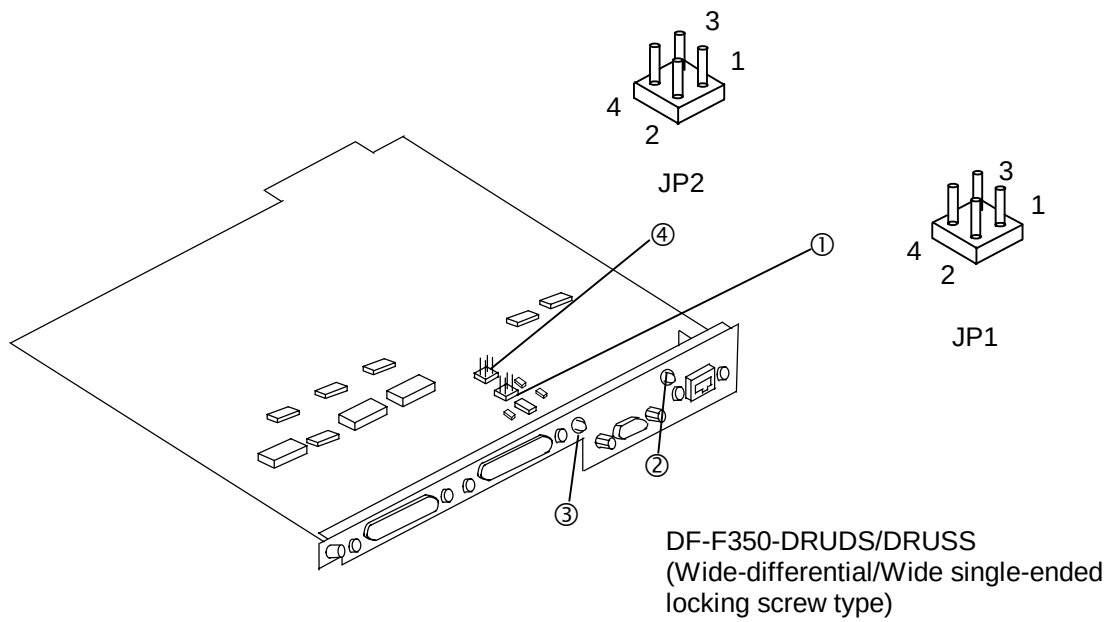
Figure 7.3.3 CTL ASSY of the Rackmount Type

Table 7.3.2 Functions of the Rackmount Type

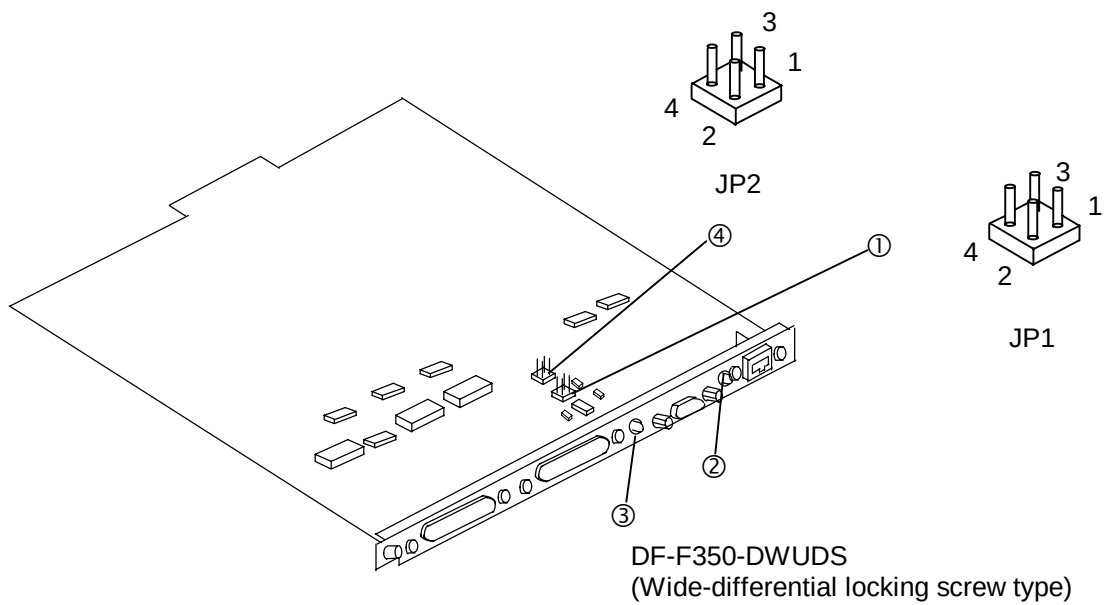
No.	Name	Classification	Color	Function																		
1	READY switch	Switch	—	This switch collects a memory dump.																		
2	DIP switch	Switch	—	ON 1 2 3 4 5 6 7 8 ↓ Setting <table><tr><th>#</th><th>Meaning</th></tr><tr><td>1</td><td>Installs a micro-program.</td></tr><tr><td>2</td><td>Dumps the contents of memory.</td></tr><tr><td>3</td><td>Clears a system parameter.</td></tr><tr><td>4</td><td>Sets a system parameter.</td></tr><tr><td>5</td><td>Initializes a unit parameter.*</td></tr><tr><td>6</td><td>Skips CUDG.</td></tr><tr><td>7</td><td>Initializes a unit parameter.*</td></tr><tr><td>8</td><td>Blocks the controller.</td></tr></table> * The initialization of the unit parameters in Nos. 5 and 7 is valid only when both switches are set to ON.	#	Meaning	1	Installs a micro-program.	2	Dumps the contents of memory.	3	Clears a system parameter.	4	Sets a system parameter.	5	Initializes a unit parameter.*	6	Skips CUDG.	7	Initializes a unit parameter.*	8	Blocks the controller.
#	Meaning																					
1	Installs a micro-program.																					
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3	Clears a system parameter.																					
4	Sets a system parameter.																					
5	Initializes a unit parameter.*																					
6	Skips CUDG.																					
7	Initializes a unit parameter.*																					
8	Blocks the controller.																					
3	CACHE PWR	LED	Green	Confirmation of this LED display status checks whether or not the cache memory is in the back-up mode. ① Set the circuit breaker on the back of the unit to “I” with the main switch set to “O”. ② You can check the following status with this LED display status. Lit : Indicates that the cache is in the back-up mode. (The power is supplied from the battery to the cache.) Extinguished : The cache does not perform a back-up. For canceling the back-up mode of the cache memory, see “1. Before Maintenance Work” in the Entry Chapter.																		
4	FAIL	LED	Red	The LED indicates that an inoperable failure occurs in the CTL ASSY.																		
5	RESET	LED	Yellow	The CTL ASSY is being reset.																		

(3) I/F ADAPTER ASSY

Figure 7.3.4 shows the I/F ADAPTER ASSY.



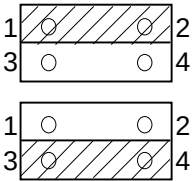
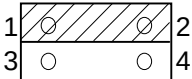
(a) Rackmount (RKH) type



(b) Rackmount (RKWH) type

Figure 7.3.4 I/F ADAPTER ASSY

Table 7.3.3 Functions for I/F ADAPTER ASSY of the Rackmount Type

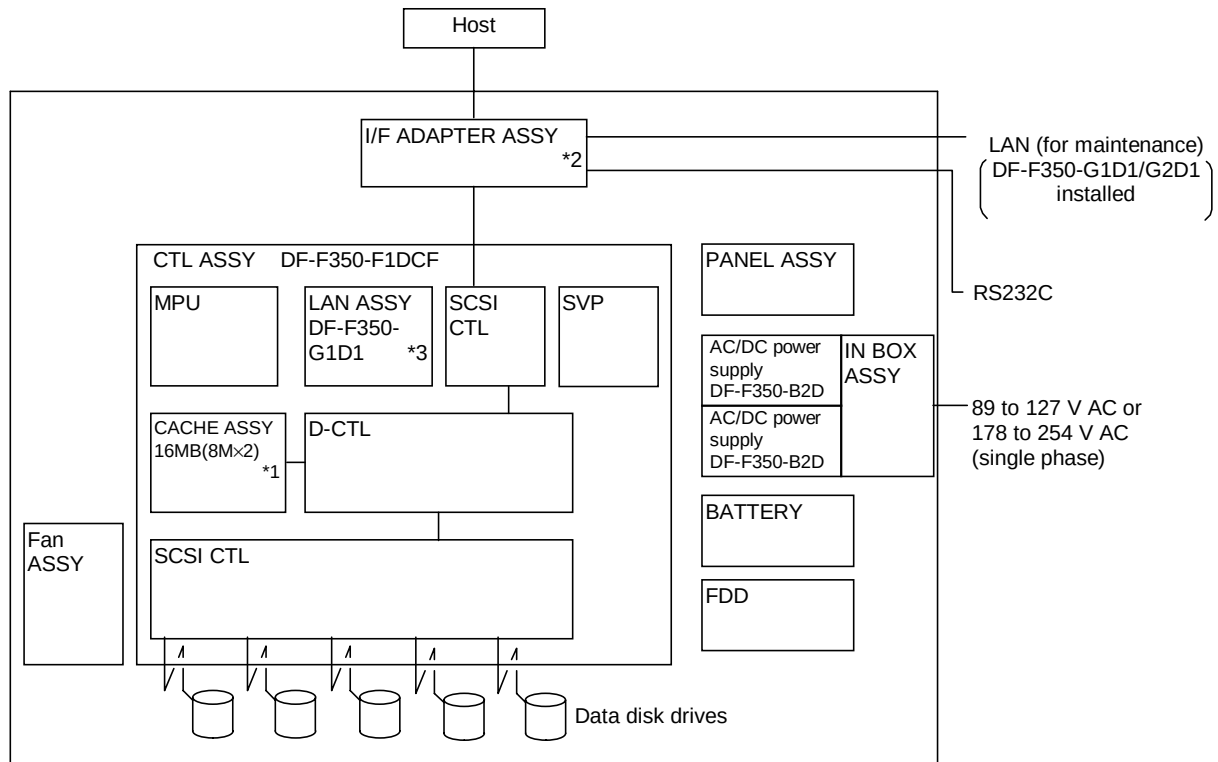
No.	Name	Classification	Color	Function
1	JP1	Jumper socket	Green	This sets the terminator power.  Local feeding Remote feeding
2	FAIL	LED	Red	The LED indicates that the differential unit is connected to the single-ended unit.*
3	TERMPWR	LED	Green	The LED indicates that the terminator power is being supplied.
4	JP2	Jumper socket	Black	 Always set this jumper with pins 1 and 2 shorted.

* This FAIL LED may light if the host is turned off.

8. Subsystem Configuration

8.1 Configuration of Desktop (DK) Type

The basic configuration of the DF350 desktop (DK) type disk array subsystem consists of rows of disk drives (one row contains 4 data disk drives and 1 parity data disk drive (totally 5 disk drives)) and the controller used to control these disk drives. The desktop type has the power supply, redundant power supply, fan, and cache memory (8MB $\times$ 2) as the standard components. (See Figure 8.1.)



*1 CACHE ASSY

DF-F350-C8E : 8MB $\times$ 2

A pair of cache memories of the same model make one set. (standard components)

*2 I/F ADAPTER ASSY

DF-F350-DDUDS : Wide-differential, 68-pin, locking screw

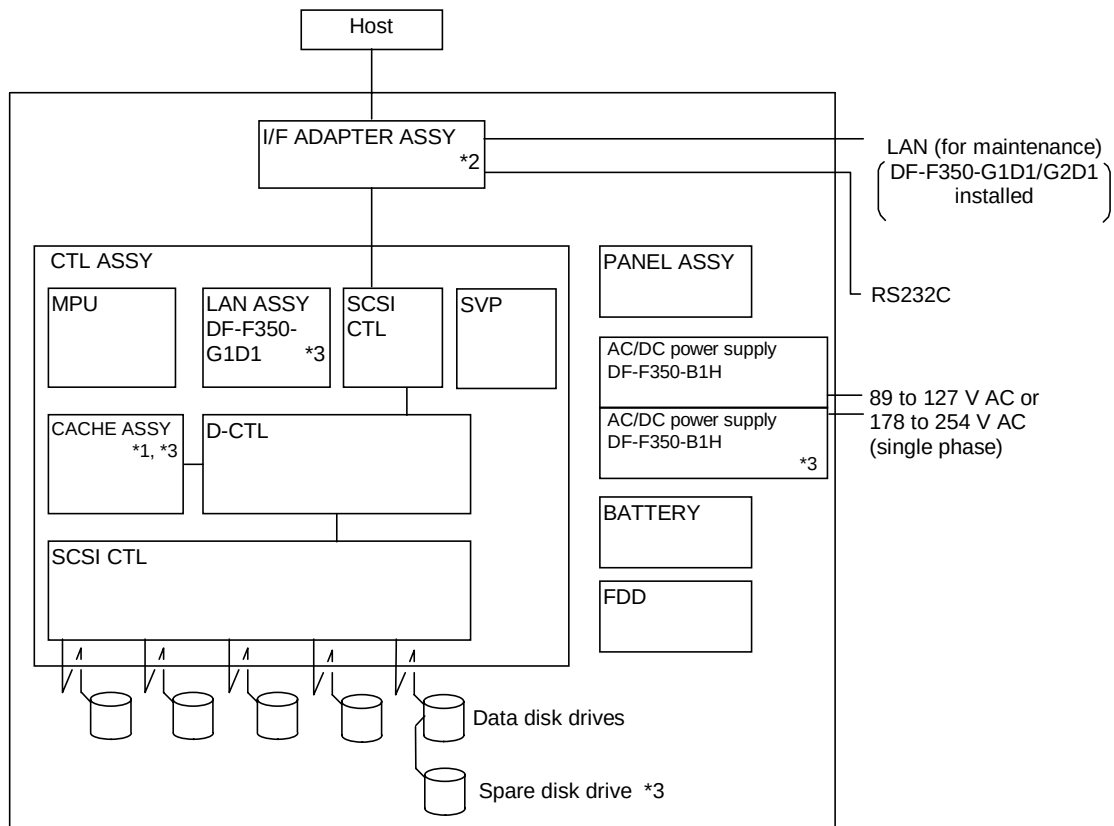
DF-F350-DDUSS : Wide-single-ended, 68-pin, locking screw

*3 A LAN ASSY is optional.

Figure 8.1 Configuration of Desktop (DK) Type

8.2 Configuration of Desktop (DKH) Type

The DF350 disk array subsystem of the desktop (DKH) type consists of one row of six disk drives (four data disk drives plus one parity data disk drive plus one optional spare disk drive) and a controller that controls these disk drives. (see Figure 8.2.)



***1 CACHE ASSY**

DF-F350-C8E : 8 MB

DF-F350-C32E : 32 MB

DF-F350-C128E : 128 MB

Caches must be installed in identical pairs and up to four pairs can be installed. (Intermixed identical pairs are possible.)

***2 I/F ADAPTER ASSY**

DF-F350-DHUDS : Wide-differential, 68-pin, locking screw

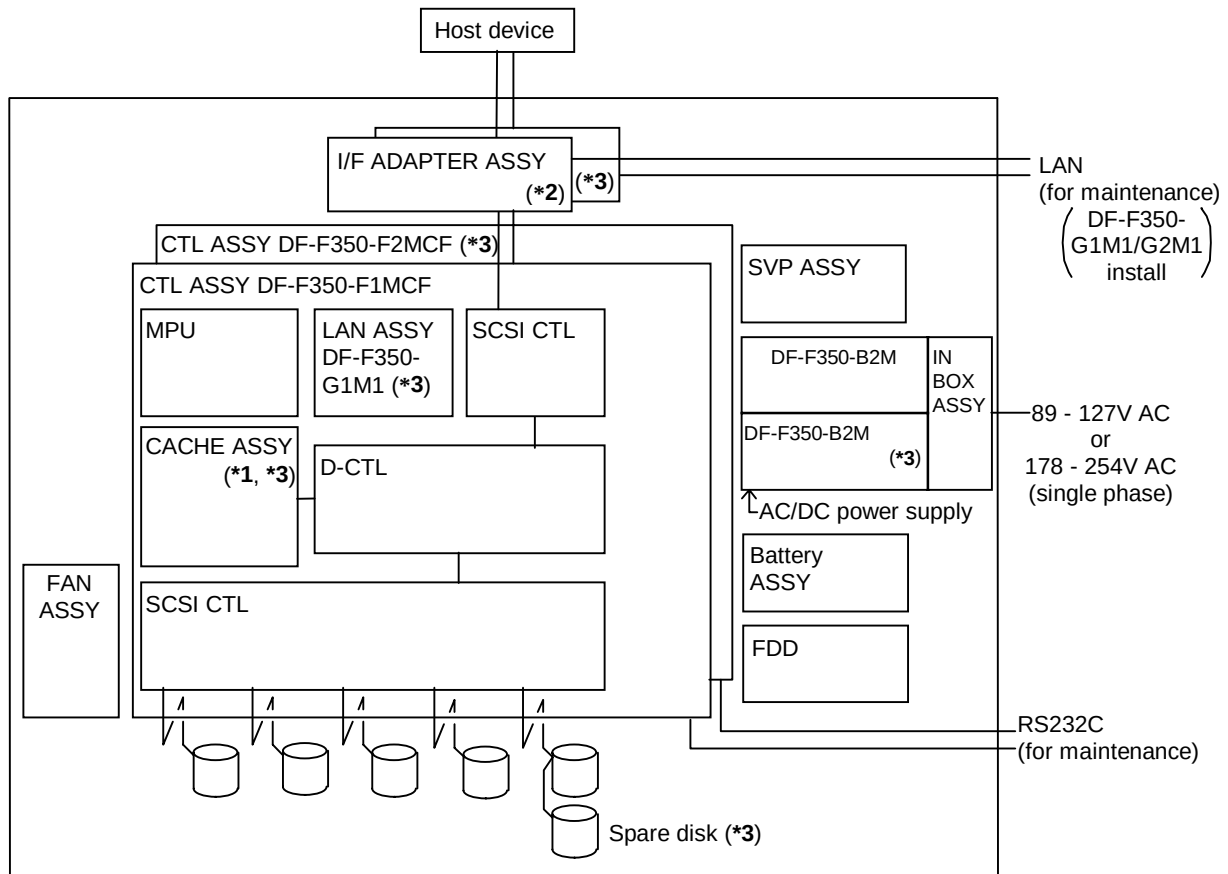
DF-F350-DHUSS : Wide-single-ended, 68-pin, locking screw

***3** A redundant AC/DC power supply, a spare disk drive, CACHE ASSY and a LAN ASSY are optional.

Figure 8.2 Configuration of Desktop (DKH) Type

8.3 Configuration of Mini Tower Type

The DF350 disk array subsystem of the mini tower type consists of one row of six disk drives (four data disk drives plus one parity data disk drive plus one optional spare disk drive) and a controller that controls these disk drives. (see Figure 8.3.)



***1 CACHE ASSY**

DF-F350-C8E : 8 MB

DF-F350-C32E : 32 MB

DF-F350-C128E : 128 MB

Caches must be installed in identical pairs and up to four pairs can be installed. (Intermixed identical pairs are possible.)

***2 I/F ADAPTER ASSY**

DF-F350-DMUDS : Wide-differential, 68-pin, locking screw

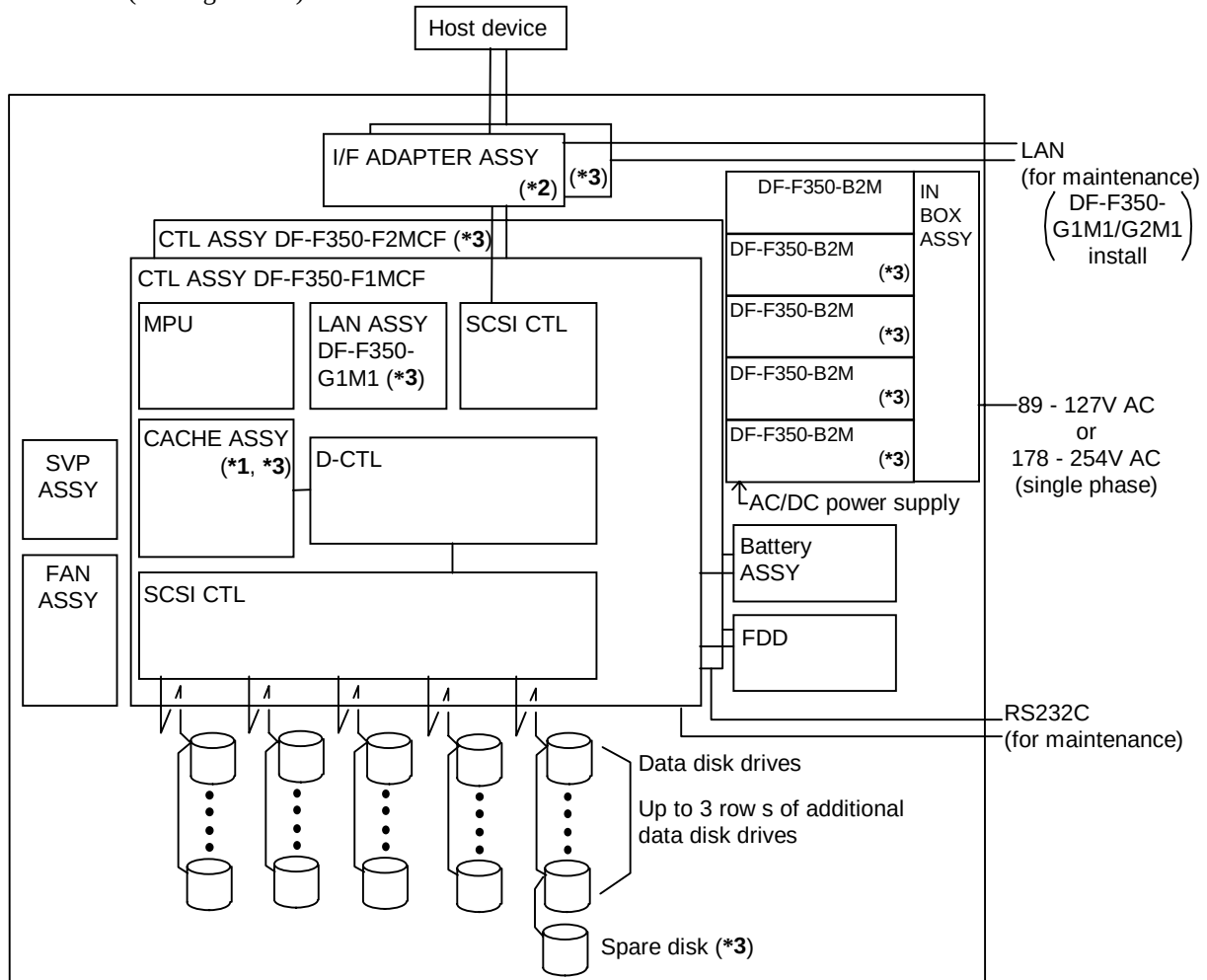
DF-F350-DMUSS : Wide-single-ended, 68-pin, locking screw

***3** A redundant AC/DC power supply, a spare disk drive, a redundant CTL ASSY, an I/F ADAPTER ASSY for the redundant CTL ASSY, CACHE ASSY and a LAN ASSY are optional.

Figure 8.3 Configuration of Mini Tower Type

8.4 Configuration of Cabinet Type

The DF350 disk array subsystem of the cabinet type consists of up to four rows (the basic row, plus additional three rows). One row contains five disk drives (four data disk drives plus one parity data disk drive) and one optional spare disk drive. Up to 21 disk drives can be installed including a controller that controls these disk drives. (See Figure 8.4.)



***1 CACHE ASSY**

DF-F350-C8E : 8 MB

DF-F350-C32E : 32 MB

DF-F350-C128E : 128 MB

Cache must be installed in identical pairs and up to four pairs can be installed. (Intermixed identical pairs are possible.)

***2 I/F ADAPTER ASSY**

DF-F350-DMUDS : Wide-differential, 68-pin, locking screw

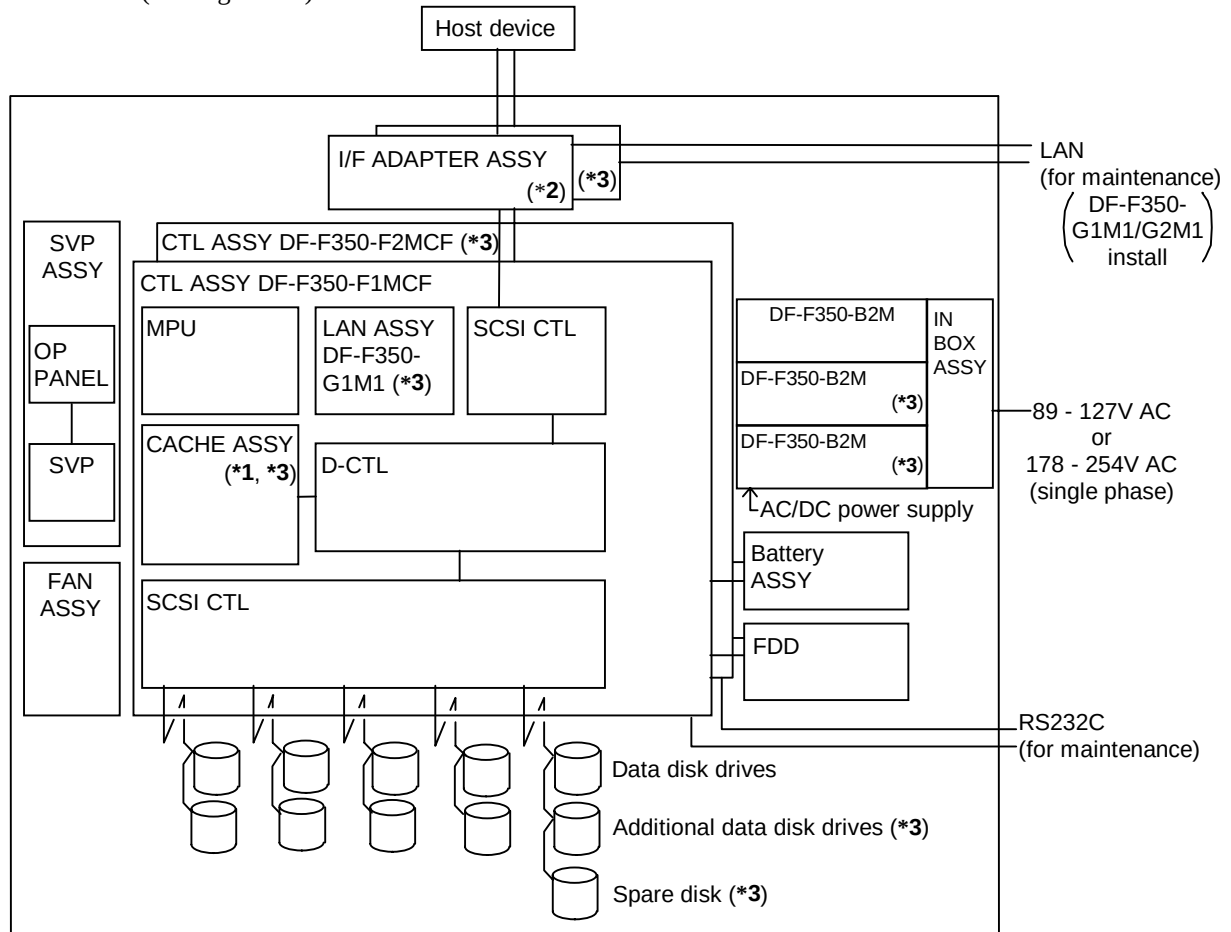
DF-F350-DMUSS : Wide-single-ended, 68-pin, locking screw

***3 A redundant AC/DC power supply, a spare disk drive, a CTL ASSY, an I/F ADAPTER ASSY for the redundant CTL ASSY, CACHE ASSY and a LAN ASSY are optional.**

Figure 8.4 Configuration of Cabinet Type

8.5 Configuration of Rackmount (RKH) Type

The DF350 disk array subsystem of the rackmount (RKH) type consists of up to two rows (the basic row, plus optional one row). One row contains five disk drives (four data disk drives plus one parity data disk drive) and one optional spare disk drive. Up to 11 disk drives can be installed including a controller that controls these disk drives. (See Figure 8.5)



***1 CACHE ASSY**

DF-F350-C8E : 8 MB

DF-F350-C32E : 32 MB

DF-F350-C128E : 128 MB

Caches must be installed identical pairs and up to four pairs can be installed. (Intermixed identical pairs are possible.)

***2 I/F ADAPTER ASSY**

DF-F350-DRUDS : Wide-differential, 68-pin, locking screw

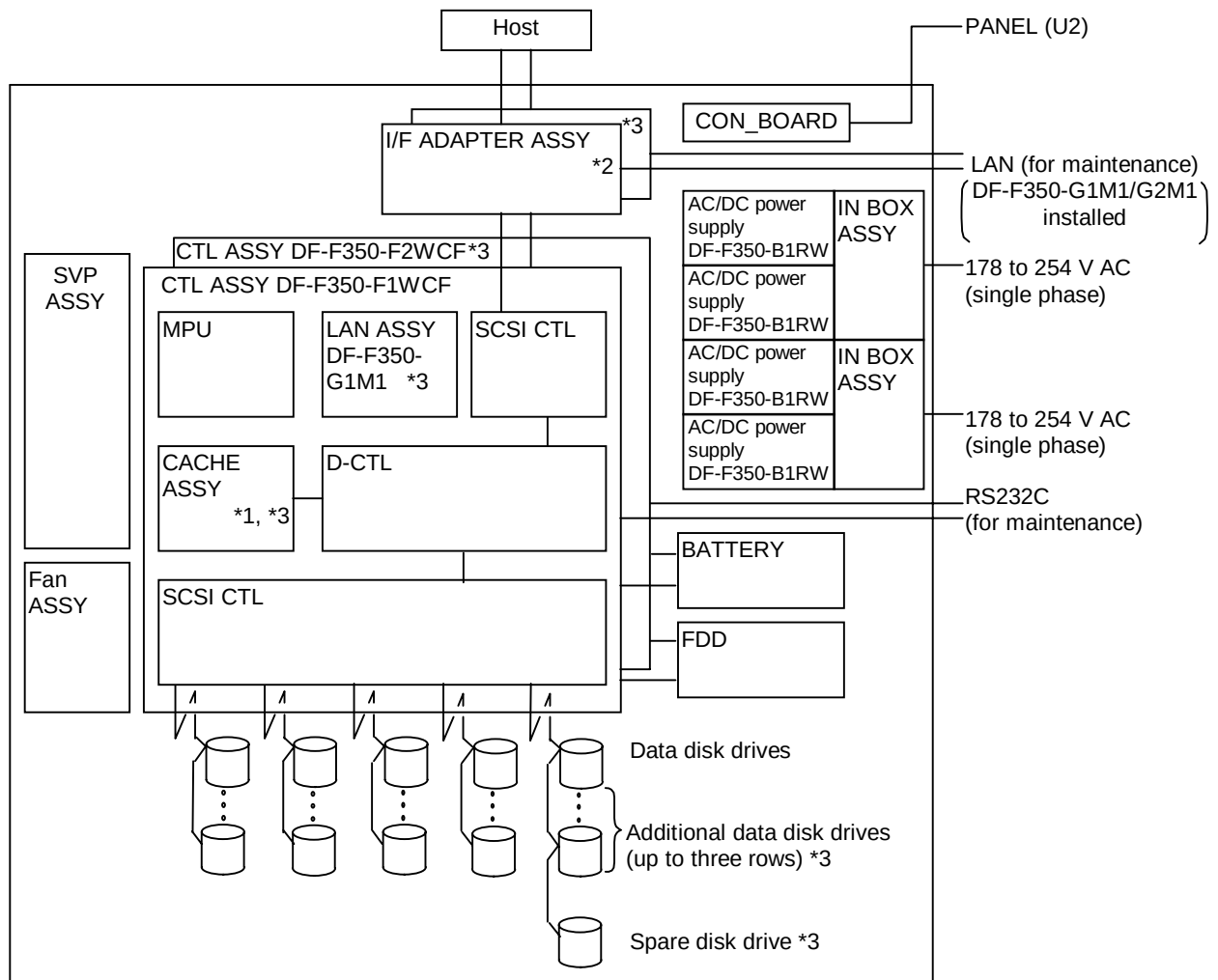
DF-F350-DRUSS : Wide-single-ended, 68-pin, locking screw

***3** A redundant AC/DC power supply, a spare disk drive, an additional data disk drive, a redundant CTL ASSY, CACHE ASSY and an I/F ADAPTER ASSY for the redundant CTL ASSY are optional.

Figure 8.5 Configuration of Rackmount (RKH) Type

8.6 Configuration of Rackmount Type (RKWH)

The DF350 disk array subsystem of the rackmount (RKWH) type consists of up to four rows (the basic row, plus additional three rows). One row contains five disk drives (four data disk drives plus one parity data disk drive) and one optional spare disk drive. Up to 21 disk drives can be installed including a controller that controls these disk drives. (See Figure 8.6)



***1 CACHE ASSY**

DF-F350-C8E : 8 MB

DF-F350-C32E : 32 MB

DF-F350-C128E : 128 MB

Caches must be installed in identical pairs and up to four pairs can be installed.

***2 I/F ADAPTER ASSY**

DF-F350-DWUDS : Wide-differential, 68-pin, locking screw

***3** A spare disk drive, an additional data disk drive, a LAN ASSY, a redundant CTL ASSY, CACHE ASSY and an I/F ADAPTER ASSY for the redundant CTL ASSY are optional.

Figure 8.6 Configuration of Rackmount (RKWH) Type

8.7 Configuration of Rack Frame

8.7.1 U1 Rack frame

The DF-F350-U1 is a rack frame where up to six DF350 rackmounts (type RKH) can be installed. This frame consists of a Power Distribution Box (PDB) that supplies the AC power and a panel that combines and controls the operation display and start/stop of RKH and a cooling fan. (See Figure 8.7.1.)

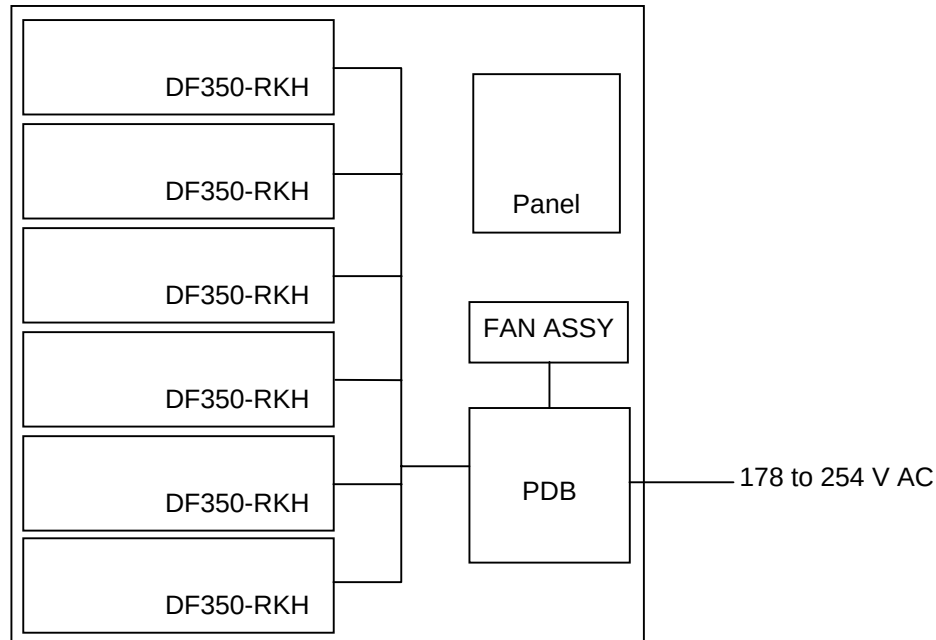
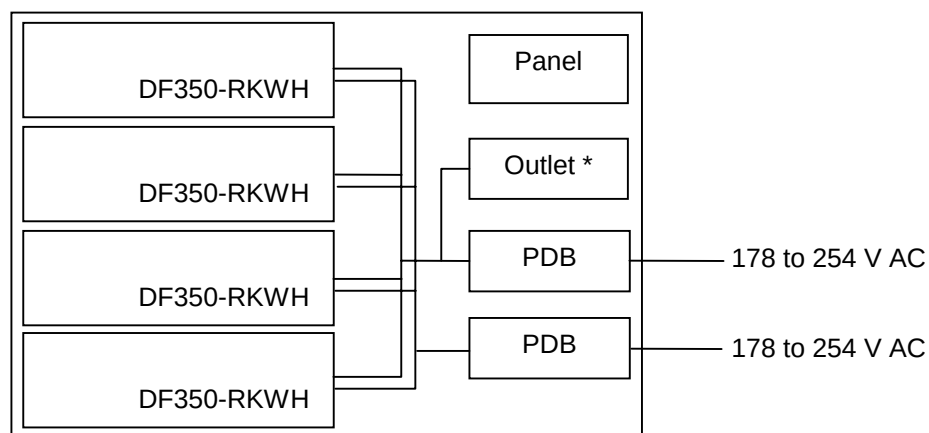


Figure 8.7.1 System Configuration of U1 Rack Frame

8.7.2 U2 Rack frame

The DF-F350-U2 is a rack frame where up to four DF350 rackmounts (type RKWH). This frame consists of two PDBs that duplicate the power system and a panel that combines and controls the operation display and start/stop of type RKWH. (See Figure 8.7.2.)



* This outlet is optional.

Figure 8.7.2 System Configuration of U2 Rack Frame

9. Software Configuration

The software configuration of the DF350 is shown in Figure 9.1.

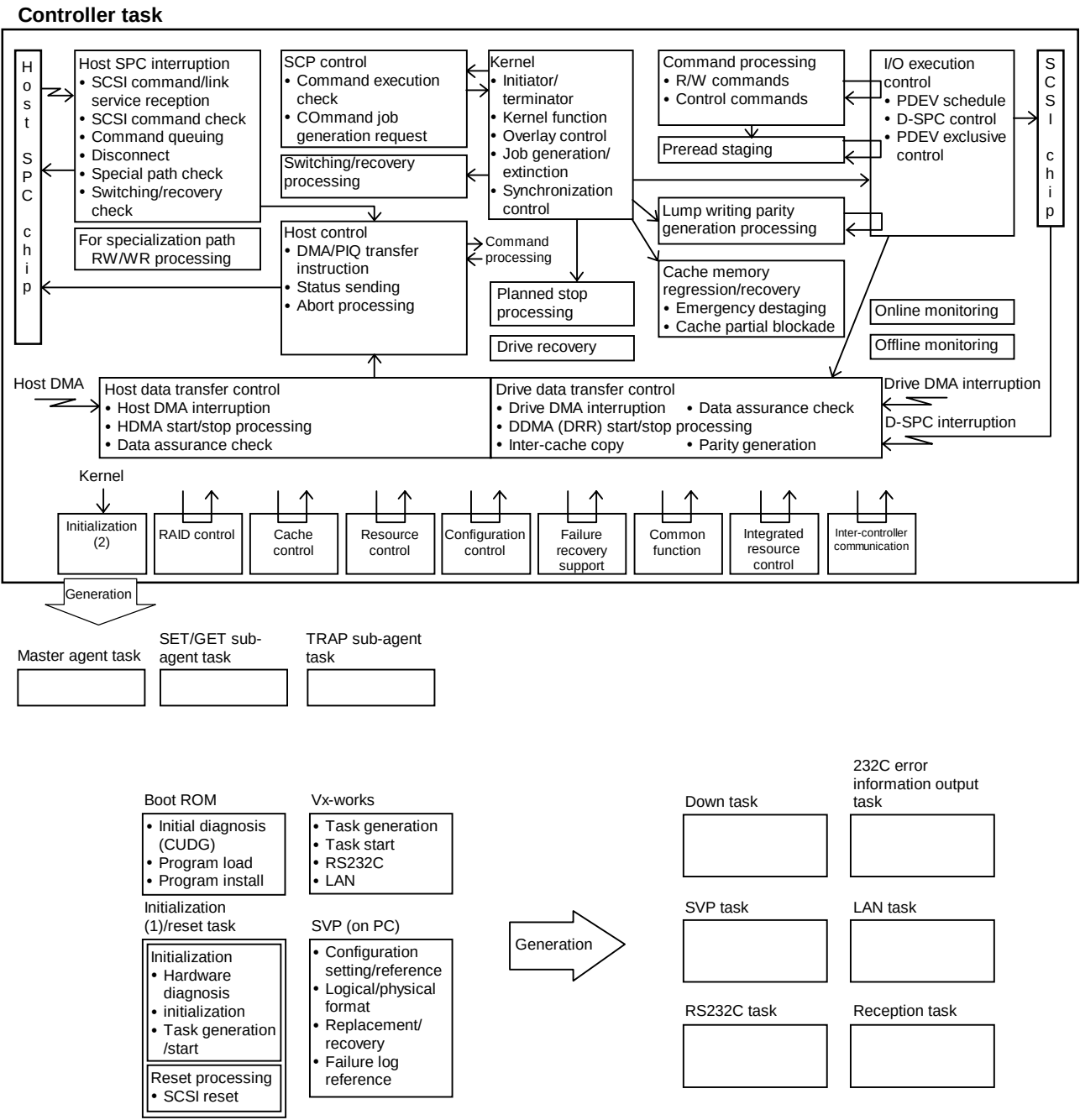


Figure 9.1 Software Configuration

10. Power On/Off Sequence

10.1 IMPL Flow

An IMPL processing procedure when power is turned on is explained below. The IMPL sequence is broadly divided into four processes and they are executed sequentially.

(1) Boot loader

After the flash memory is booted, minimum hardware initialization is executed. Thereafter, the local memory loader is expanded to the local memory from the flash memory and control is transferred to it.

(2) Local memory loader

The physical drives in the first row are spun up.

The Vx-works load module is loaded onto the local memory. Thereafter, control is transferred to Vx-works.

(3) Vx-works

The table in the local memory for communication between the tasks is initialized by the root task of Vx-works and the hardware resource (LAN, RS232C) is tested.

(4) DF task

The DF table and hardware are initialized and then a DF task is generated. CUDG taking-over information is loaded by the DF task and when disks are installed in the second and subsequent rows, they are spun up.

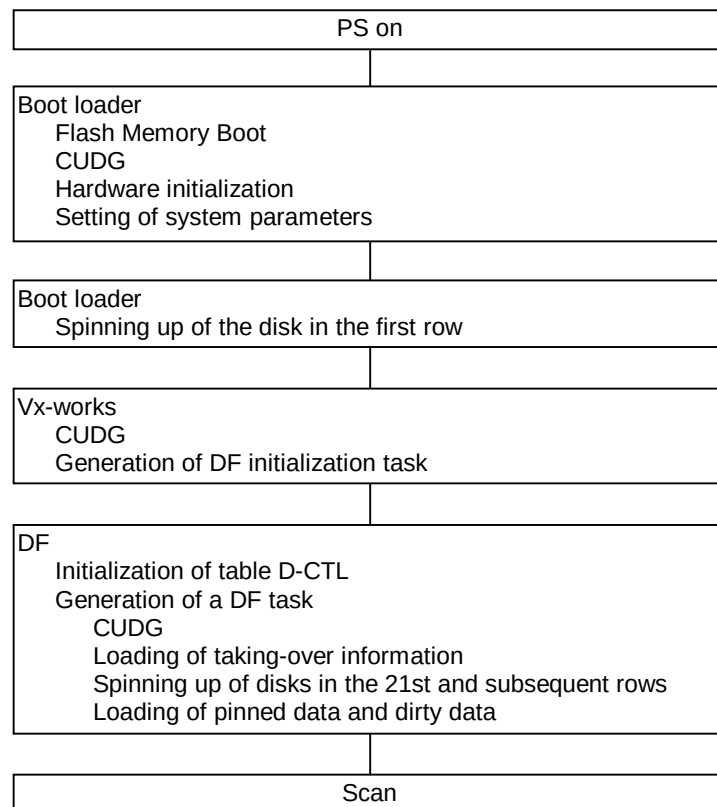
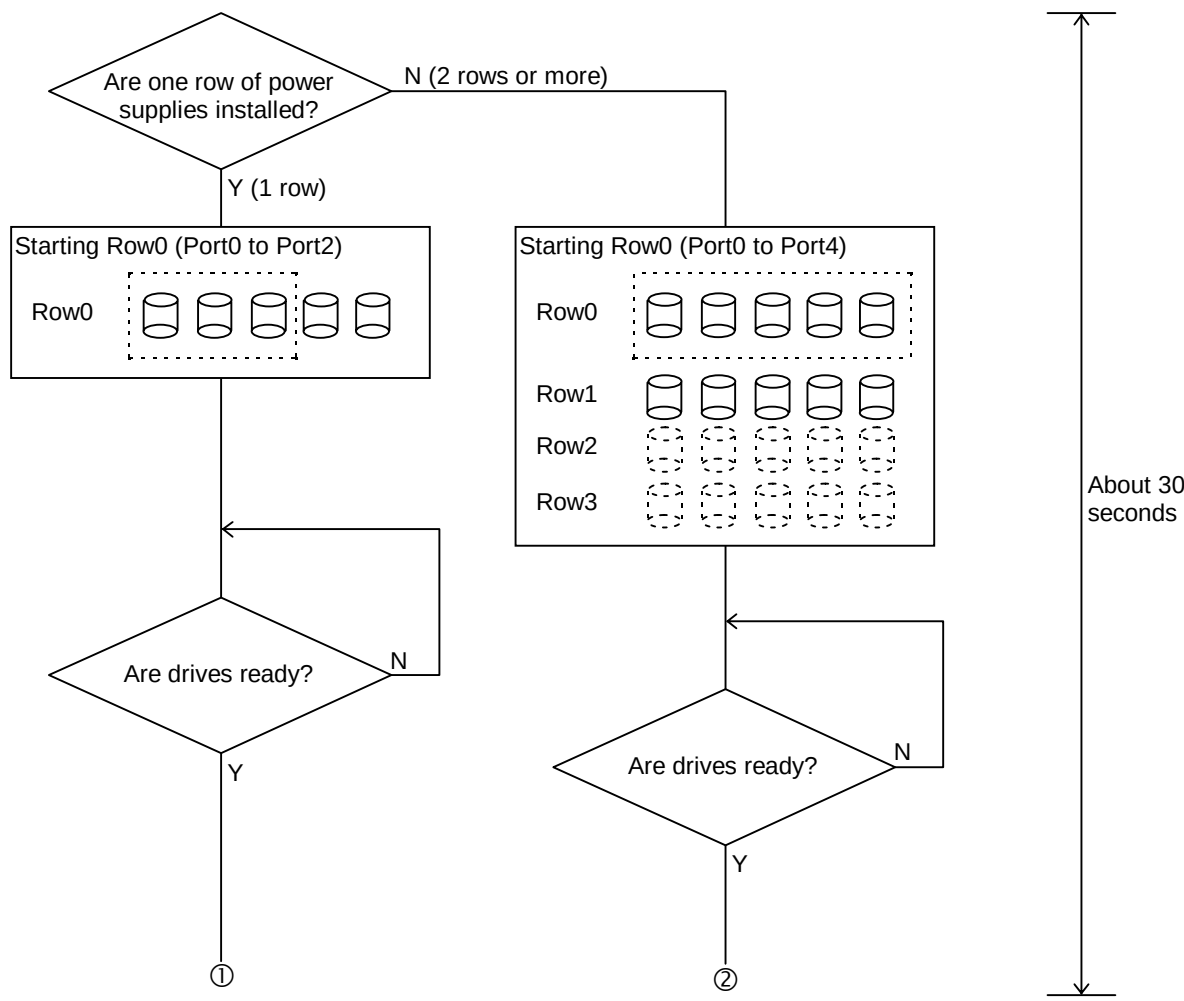


Figure 10.1.1 Planned Stop of IMPL Sequence

10.2 Drive Power On Sequence

If multiple drive motors are rotated at the same time an overcurrent is caused. To avoid it, the sequence is changed as shown below according to the number of installed power supplies.



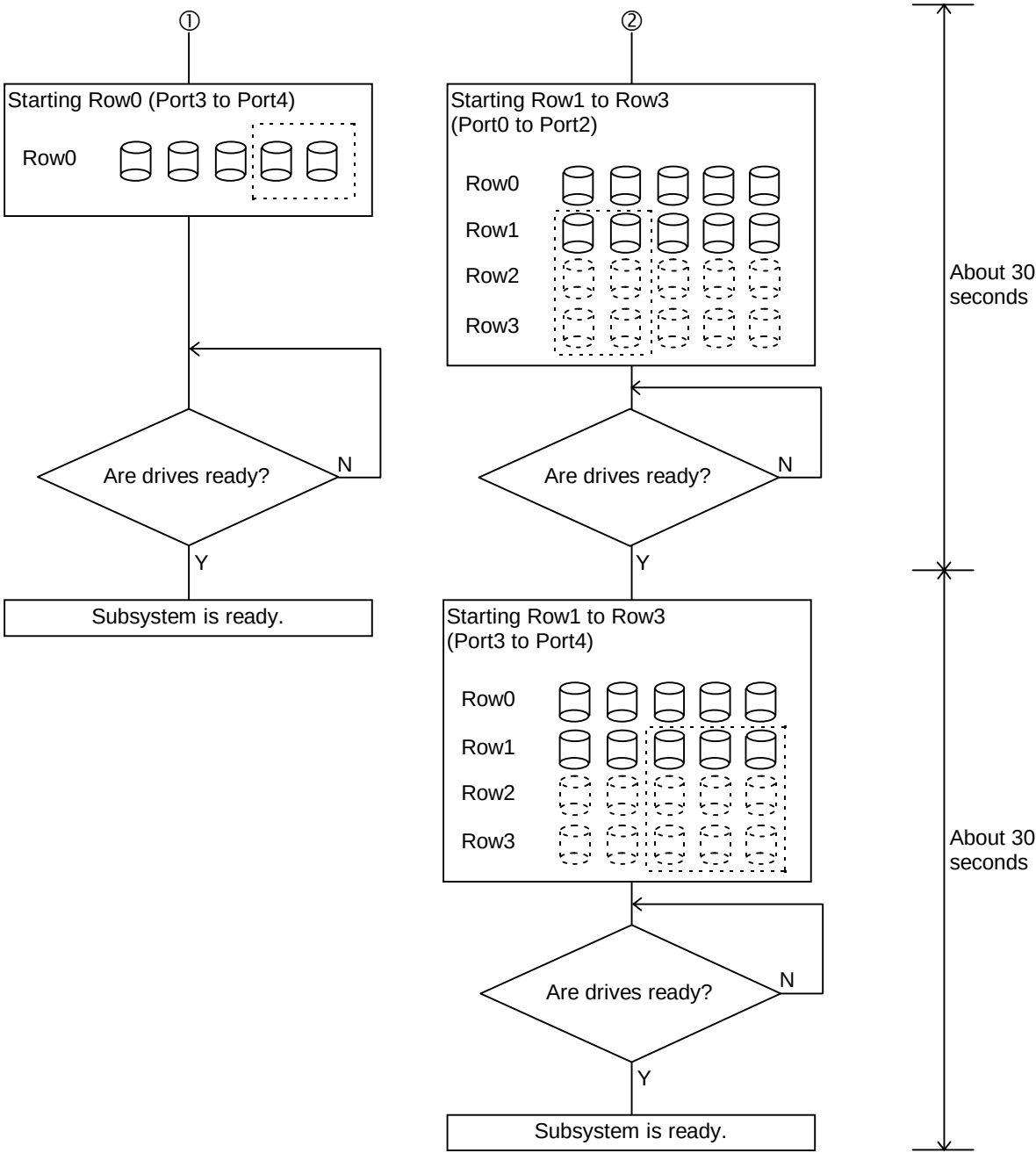


Figure 10.2.1 Starting the Drives

10.3 Planned Stop

When the PS is turned off because of the host computer power off or PS off is instructed by a service person, the subsystem monitors the ending status of the processings being executed or not executed for all the logical devices and when everything ends, the destaging is executed.

When a track (pinned data) fails to be destaged occurs in this case, the Pin information is stored in the system area of the system disk.

Thereafter, the taking-over information is stored in the system area of the system disk, and the power of the drive is turned off, and the power of the cache battery is turned off, and then permission of power off is notified to the hardware.

The hardware turns the power off after receiving the permission.

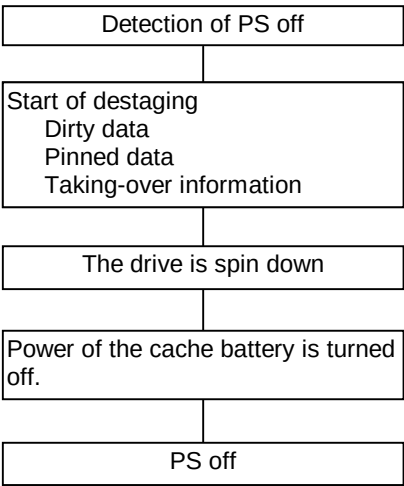


Figure 10.3.1 Planned Stop

11. Explanation on Operations

11.1 Data Format

Figure 11.1 shows the data format.
In the sub-block, the address assurance code (LA) and data assurance code (LRC) are added. The physical format of the physical drive is recorded in the data field in units of 516bytes.

Cache data

Data	LA	LRC	Empty	Data	LA	LRC	Empty
512B	2B	2B	8B				
SUB BLOCK(524byte)				SUB BLOCK(524byte)			

Drive data

Data				LA	LRC	ECC			Data				LA	LRC	ECC

Figure 11.1 Data Format

11.2 R/W processing

Every Read/Write processing is performed via the cache. Figure 11.2.1 shows the flow of data.

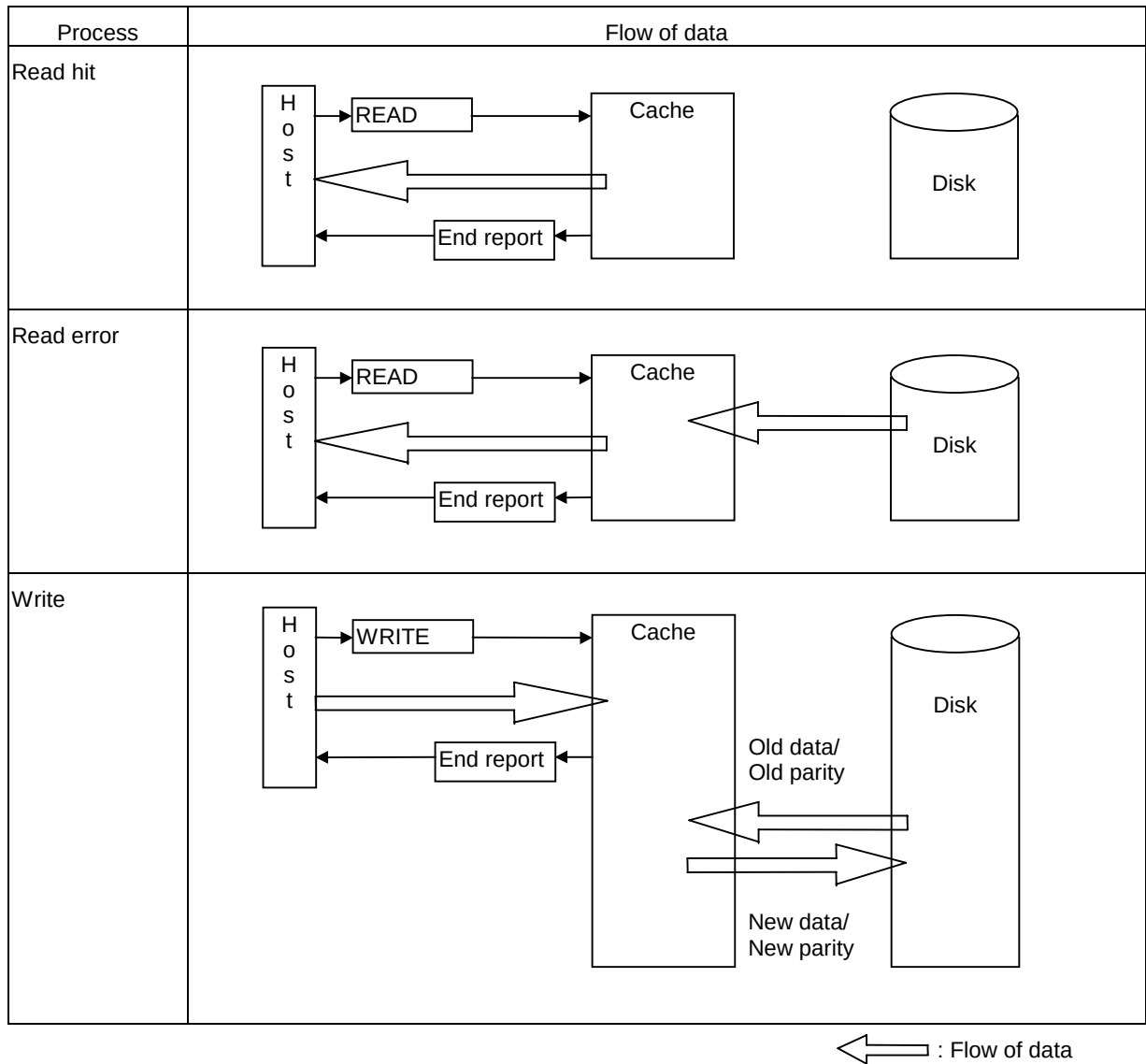


Figure 11.2.1 Flow of Data

To improve the responding performance of the writing process the write-after process of returning an end report to the host is executed at the time when writing of data into the cache ends. Thereafter, the controller generates parity asynchronously and writes data on the disk.

Figure 11.2.2 shows the flow of access to a disk in the dual system configuration.

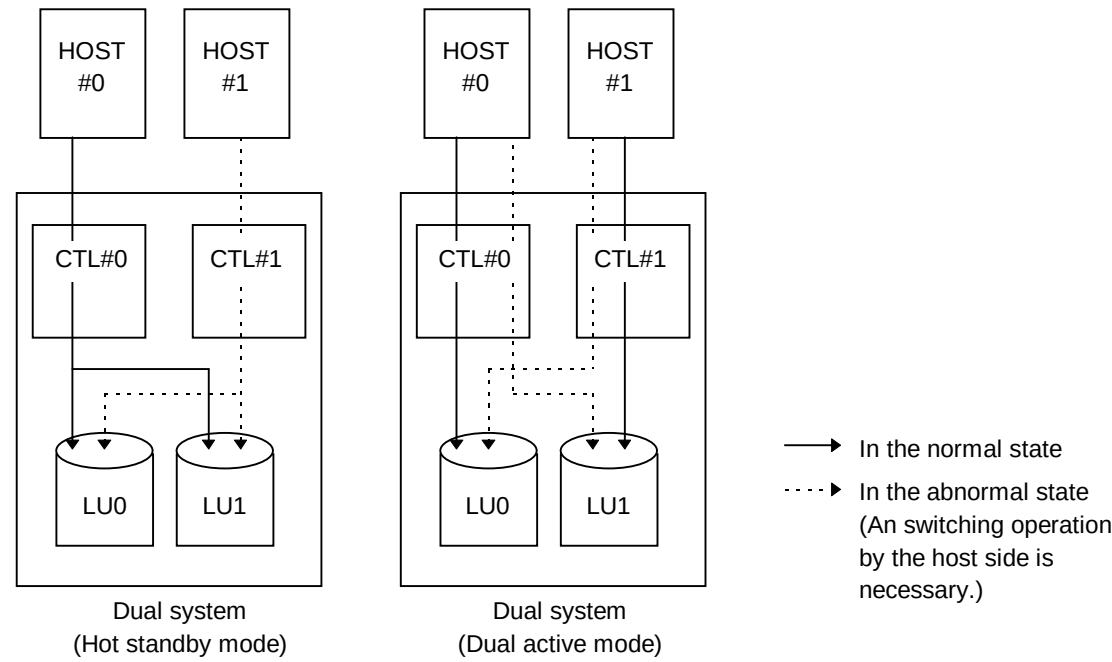


Figure 11.2.2 Flow of Access to Disks

In the dual active mode, the LU to be under the charge of by each controller is determined as shown in Figure 11.2.2. In the normal state, access by the controller on the other side is possible, However, the switching operation takes a short period and when access from other than the controller in charge is executed, the performance will be lowered.

11.3 Cache Control

(1) Cache structure

The cache consists of a directory section for controlling data and a data section for storing user data.

(2) Data

With respect to data in the cache, a 16kB segments are controlled by the SGCB. The minimum unit of data is a sub-block (LBA) and one segment is equal to 32 sub-blocks (LBA). Data in the cache consists of staging data from the drive and dirty data which is not reflected to the drive. There are two types of dirty data ; data without parity generated and data with parity generated. Data has surface attributes of the R and W surfaces so that the write penalty occurs at the time of the parity updating which is peculiar to the RAID can be reduced. To prevent data loss occurs when the power fails, it is made non-volatile by means of the battery.

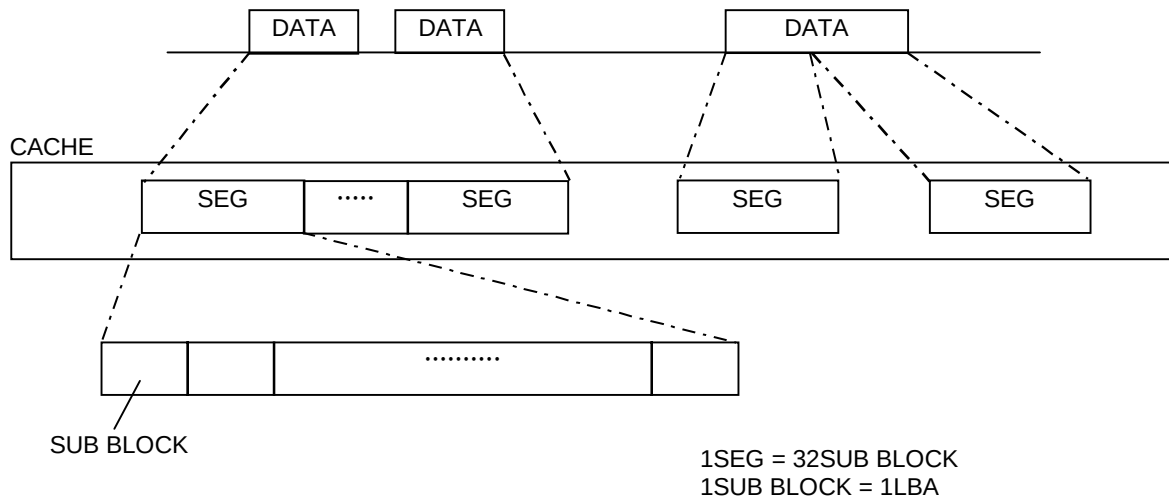


Figure 11.3.1 Data Structure in Cache

(3) Hit/miss determination

A hash table is used to increase the speed of data retrieval in the cache. SGCB is entered in the hash table and hit or miss is determined by using VDEV# and VSEG# as entry positions.

(4) Queue control

Data in the cache is controlled by queues classified according to attributes. An SGCB is queued for each queue. The queues are controlled so as to perform processings according to the attributes such as segment assignment and sweeping out of dirty data.

(5) Dual configuration

When the subsystem operates in the dual configuration, write data in the directory is double-written into the caches in both CTL boards, so that even if one CTL board is blocked, no user data will be lost.

11.4 Destaging

Write data from the host is stored in the cache once and swept out to the disk asynchronously.

There are two types of destaging methods available such as destaging of random data and destaging of sequential data.

(1) Destaging of random data

Data is processed in units of LBAs. The old data and old parity of data to be destaged are staged from the disk. New parity is generated from the new data, old data and old parity and the new data and new parity are destaged in units of LBAs.

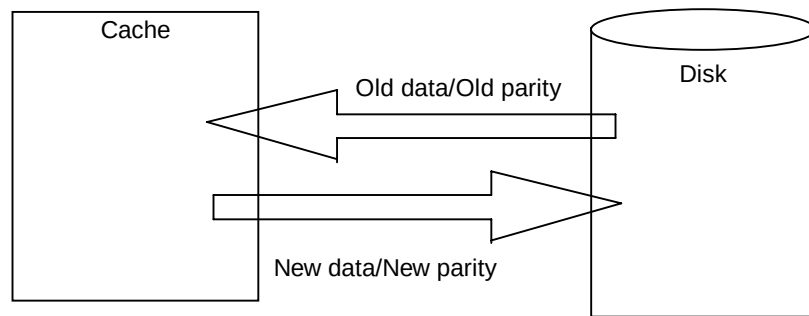


Figure 11.4.1 Destaging of Random Data

(2) Destaging of sequential data

Data is processed in units of stripes. New parity is generated from the write data and the new data and new parity are destaged in units of stripes.

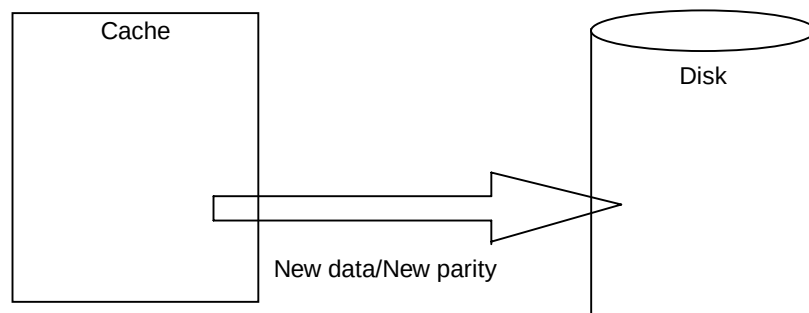


Figure 11.4.2 Destaging of Sequential Data

11.5 Operation when a Drive Failure Occurs

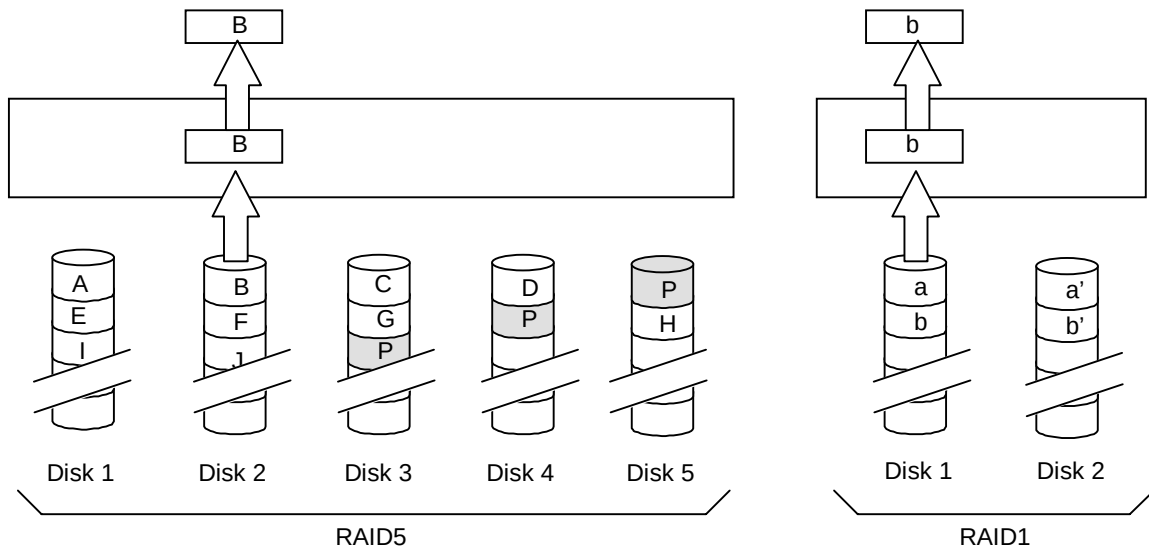
(1) I/O operation against drive failures

Even if the physical drive of this subsystem (RAID1, RAID5) fails and data cannot be read, the target data can be recovered by using data on normal disks. In RAID1, another disk is used and in RAID5, data on the other disks on the same stripe is used. By doing this, even when a failure occurs in the drive, the work can be continued as it is. Even in the case of write request, the processing can be continued in the same way.

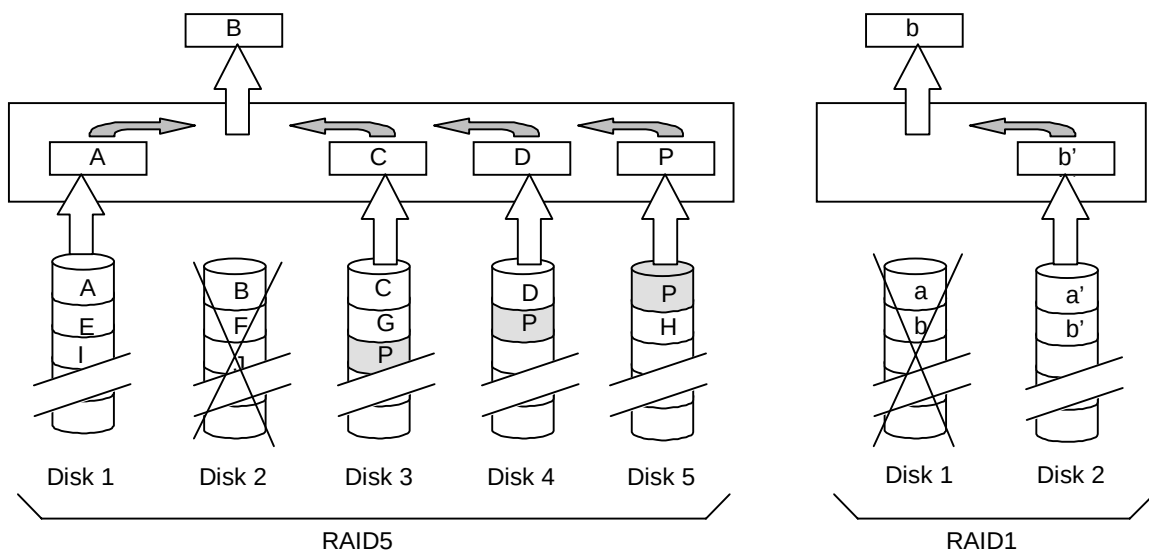
Figure 11.5.1 shows the outline of the data reading operation when a failure occurs in the drive.

Data B reading request

(a) In the normal state



(b) In the case of disk failure



A, B, C, a', b'... ; data

P ; parity

Figure 11.5.1 Operation when a Disk Failure Occurs

(2) Data assurance when a drive failure occurs

This subsystem has an optional spare disk and data of a drive which fails and is blocked or whose failure occurrence count exceeds a specified value is automatically reconstructed on the spare disk.

This processing is performed on the background of the host side, so that an I/O request can be received continuously. Data saved on the spare disk is copied into the original position again after the faulty drive is replaced.

(a) Dynamic sparing

Errors which occur during normal read/write processings are controlled for each drive. When the error count of a drive exceeds a specified value, it is judged that there exists a risk that a failure (an unrecoverable error) occurs in the drive and the data is automatically copied onto the spare disk. This function is called a dynamic sparing function.

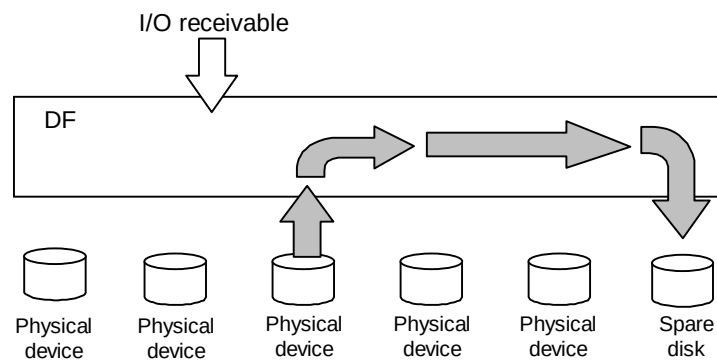


Figure 11.5.2 Outline of Dynamic Sparing

(b) Collection copy

If an failure occurs in a drive and data cannot be read and written when RAID5 is used, the data of the faulty drive is reconstructed by using data of the other drives and parity data, then copied onto the spare disk.

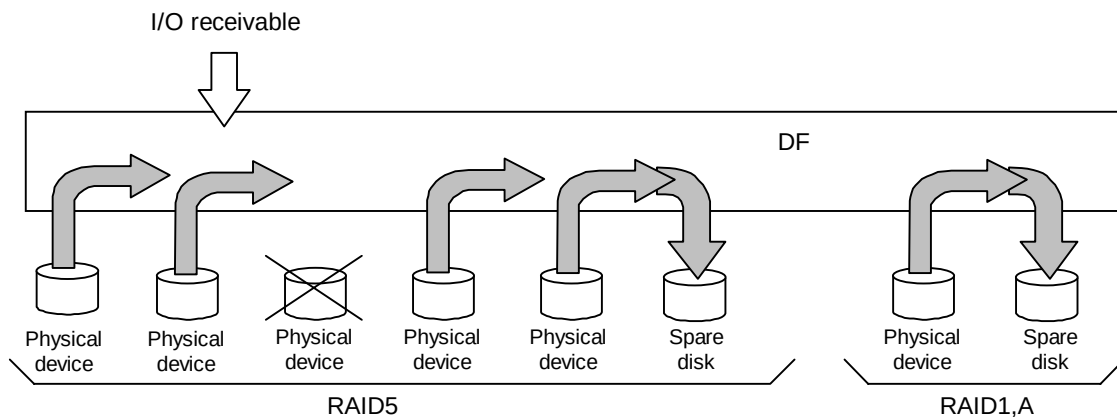


Figure 11.5.3 Outline of Collection Copy

12. Maintenance

12.1 Maintenance tools

There are three maintenance tools available ; Disk array utility, Failure notification program, and SNMP. Table 12.1.1 lists functions of the maintenance tools.

Table 12.1.1 Maintenance Tool Function List

	Failure Alert						Configuration reference and setting	Statistical information reference
	Disk	Fan	Battery	Power supply	Cache	Contro-ller		
Disk Array Utility	○	○	○	○	○	○	• Definition of RAID • Definition of LU • Setting of system option	• Operating state of controller • Number of host command receptions • Operating state of commands • State of cache load
Failure notification program	○	○	○	○	×	○	None	None
SNMP	△	○	○	○	○	×	None	None

○ : Supported

× : Not supported

△ : Supported without drive position display

Figure 12.1.1 shows the connecting configuration of maintenance tools.

DF350 User

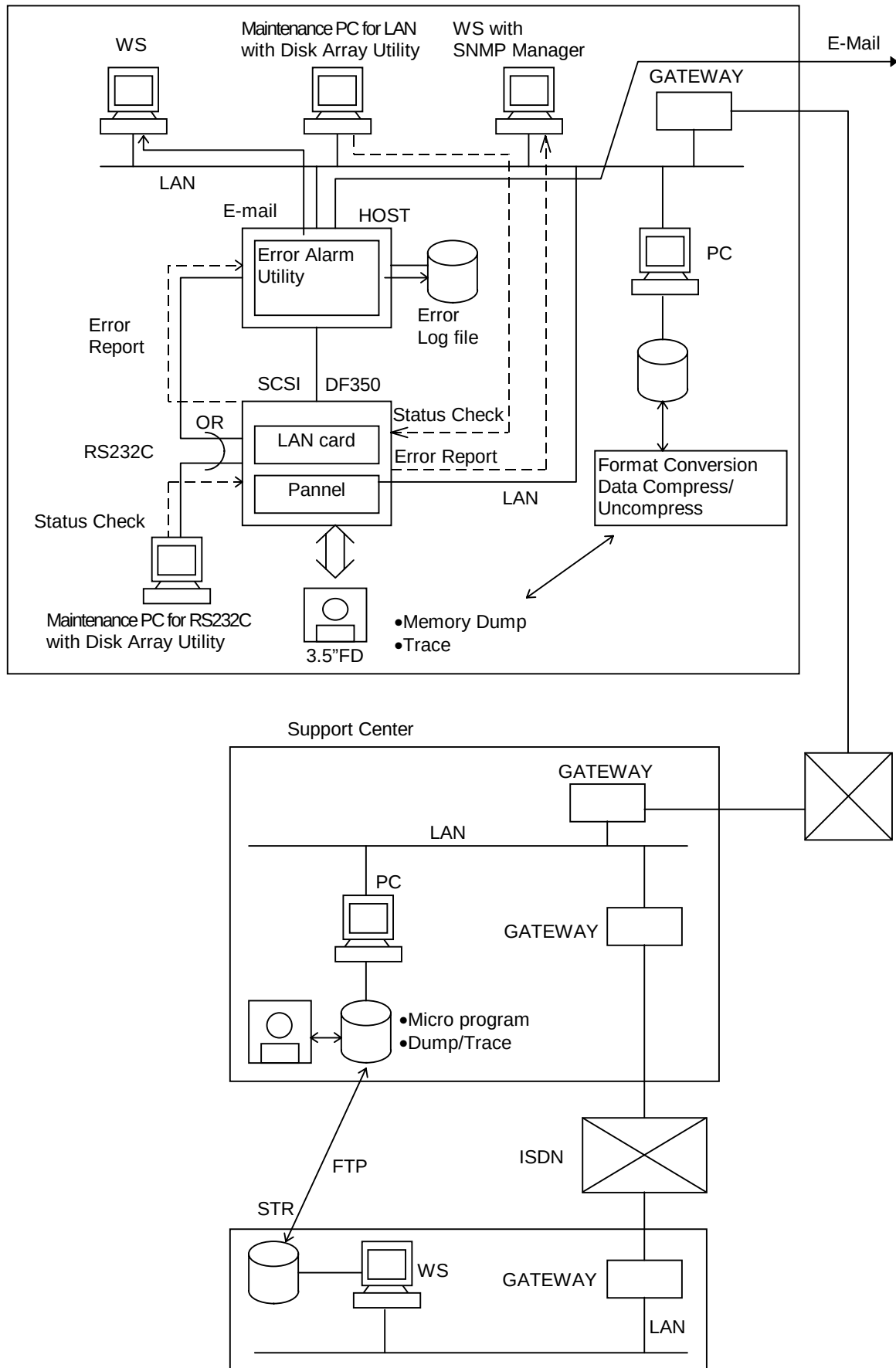


Figure 12.1.1 Maintenance Tools Connecting Configuration

DF350 Disk Subsystem

3. TROUBLE SHOOTING

Rev.7

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Mar.10.'97	A.yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.10.'97	A.yamanashi	M.Sato	M.Sato	1260-1280	Addition	AD
2	Jul.20.'97	A.yamanashi	Y.Morishita	M.Sato	0240	R60201 “YYYYZZZZ” was added.	AD
					0250	Note 1 was added. R70102 SUMCHEKERR was moved from page 0240 to page 0250. The content of CHECKSUM ERR was changed.	CH
					0480	HZ62XY and HZ6300 were added.	AD
					0490	Changed by shifting from the front sheet.	CH
					0500	Changed by shifting from the front sheet.	CH
					0510	Changed by shifting from the front sheet.	CH
3	Dec.10.'97	A.yamanashi	Y.Morishita	H.Iwasaki	0040	Added “*1” at the table.	AD
					0050	Added explanation. (Pages 0060, 0070, 0080were changed by the same reason.)	AD
					0090	Changed the flowchart.	CH
					0140	Added “*1” and Caution.	AD
					0150	Added “*3”.	AD
					0180	Changed the refer page. (Pages 0190 - 0220, 0240 - 0260, 0280 - 0320, and 0340 - 0810 were changed by the same reason.)	CH
					0250	Added was “R70101” and “RF0701”.	AD
					0273	This page was newly added.	AD
					0275	This page was newly added.	
					0278	This page was newly added.	
					0410	Added was “H66000” and “H66100”.	AD
					0840	Added explanation at the Flowchart.	AD
					0850	Changed the Flowchart.	CH
					0860	Changed the Flowchart. (Pages 0900 - 0940 were changed by the same reason.)	CH
					4	Feb.10.'98	A.yamanashi
1040	Added was “F6 10 - F6 71”.	AD					
1045	This page was newly added.	AD					
1190	Added 5.	AD					
0020	Added section 9.	AD					
					0050	Added DKH type in *6.	AD
					0060	Added DKH type in *5.	AD
					0070	Added DKH type in *2.	AD
					0080	Added DKH type in *2.	AD
					0090	Changed flow chart.	CH
					0095	This page was newly added.	AD
					0130	Added “*” in Figure.	AD
					0150	Added DKH type in *2.	AD
					0180 - 0220	Added DKH type in Recovery measure.	AD
					0240 - 0250	Added DKH type in Recovery measure.	AD
					0255	This page was newly added.	AD

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
					0260	Added DKH type in Recovery measure.	AD
					0310	Added W202XY, W203XY.	AD
					0275 - 0810	Added DKH type in Recovery measure.	AD
					0820	Added DKH type.	AD
					0840	Added DKH type.	AD
					0850	Added DKH type.	AD
					0865	Added DKH type.	AD
					0910	Added DKH type.	AD
					0930	Added DKH type.	AD
					0960	Added DKH type.	AD
					1020	Added "5D 00".	AD
					1080	Added (C).	AD
					1100	Added "Example of displaying drive failure information".	AD
					1290 - 1360	These page were newly added.	AD
5	Apr.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0280	Added "BLOCK LEN UNMUCH AT CDEV ON".	AD
					0440	Changed HZ0601/HZ0602.	CH
					0445	This page was newly added.	AD
					1080	Added Note.	AD
					1100	Changed "Example of displaying drive failure information".	CH
					1260	Changed Note.	CH
					1270	Delete "Remarks".	DL
					1280	Delete "Remarks".	DL
6	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0140	"THEORY0160" was changed to "THEORY0210".	CR
					0290	Added *2, *3.	AD
					0310	Recovery procedures of the W202XY and the W203XY were changed.	CH
					0315	This page was newly added.	AD
					0480	Added "HZ65XX".	AD
					0830	Added No.16.	AD
					0930	Changed flowchart.	CH
					0993-0996	These page were newly added.	AD
					1340	RAID0 host mirroring were added.	AD
					1370-1400	These page were newly added.	AD
7	Oct.15.'98	A.Yamanashi			0020	Added 4.2.	AD
					0030	Added "No indication is displayed on the panel...". (Pages 0160 added by the same reason.)	AD
					0240	Deleted R60201, R60401, R70501.	DL
					0241-0245	These page were newly added.	AD
					0460	Changed HZ14XY recovery procedure./Deleted HZ1500.	CH/DL
					0461-0463	These page were newly added.	AD
					0470	Added HZ1500.	AD
					0830	Added No.17, 18.	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

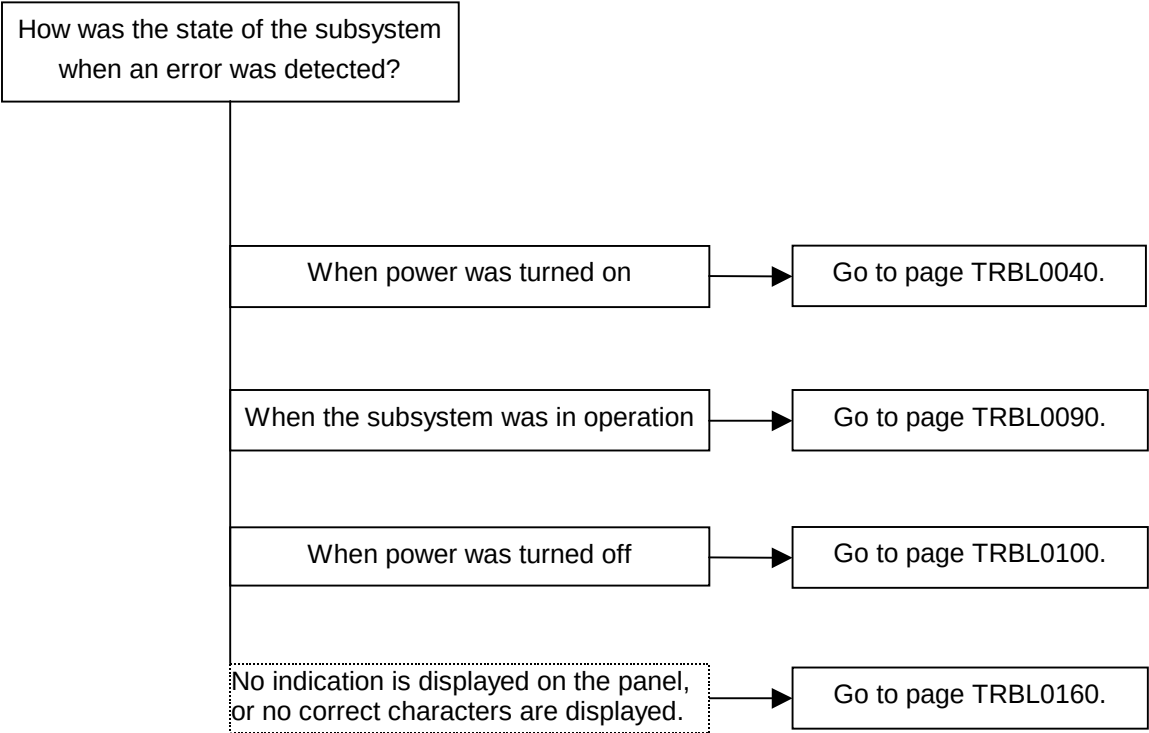
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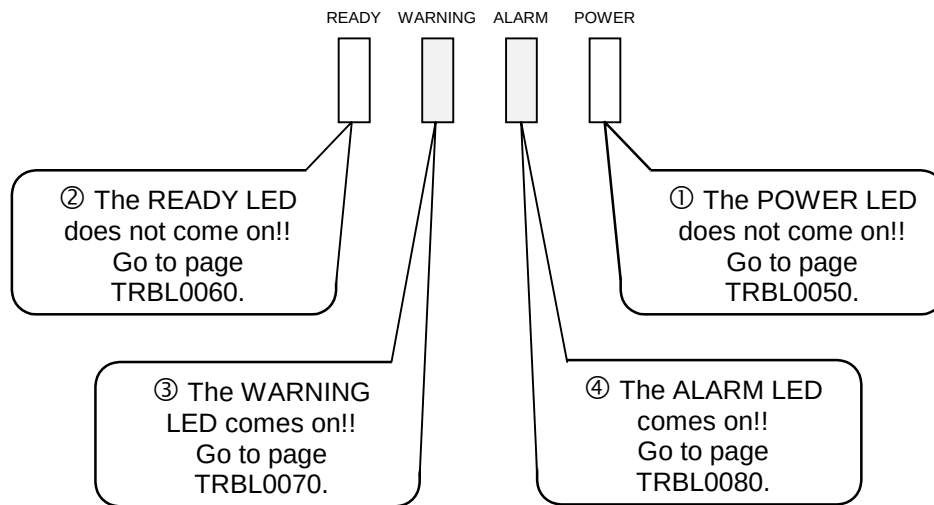
1. Errors and Recovery Measures

If an error occurs during a power-on sequence, troubleshoot it according to Section 1.1 “Errors Occur during Power-On Sequence and Recovery Measures”. If an error occurs after the power-on, troubleshoot it according to Section 1.2 “Errors Occur during Subsystem Operation and Recovery Measures”.



1.1 Errors Occur during Power-On Sequence and Recovery Measures

This section describes the errors that may occur when subsystem power is turned on and actions to be taken against them.

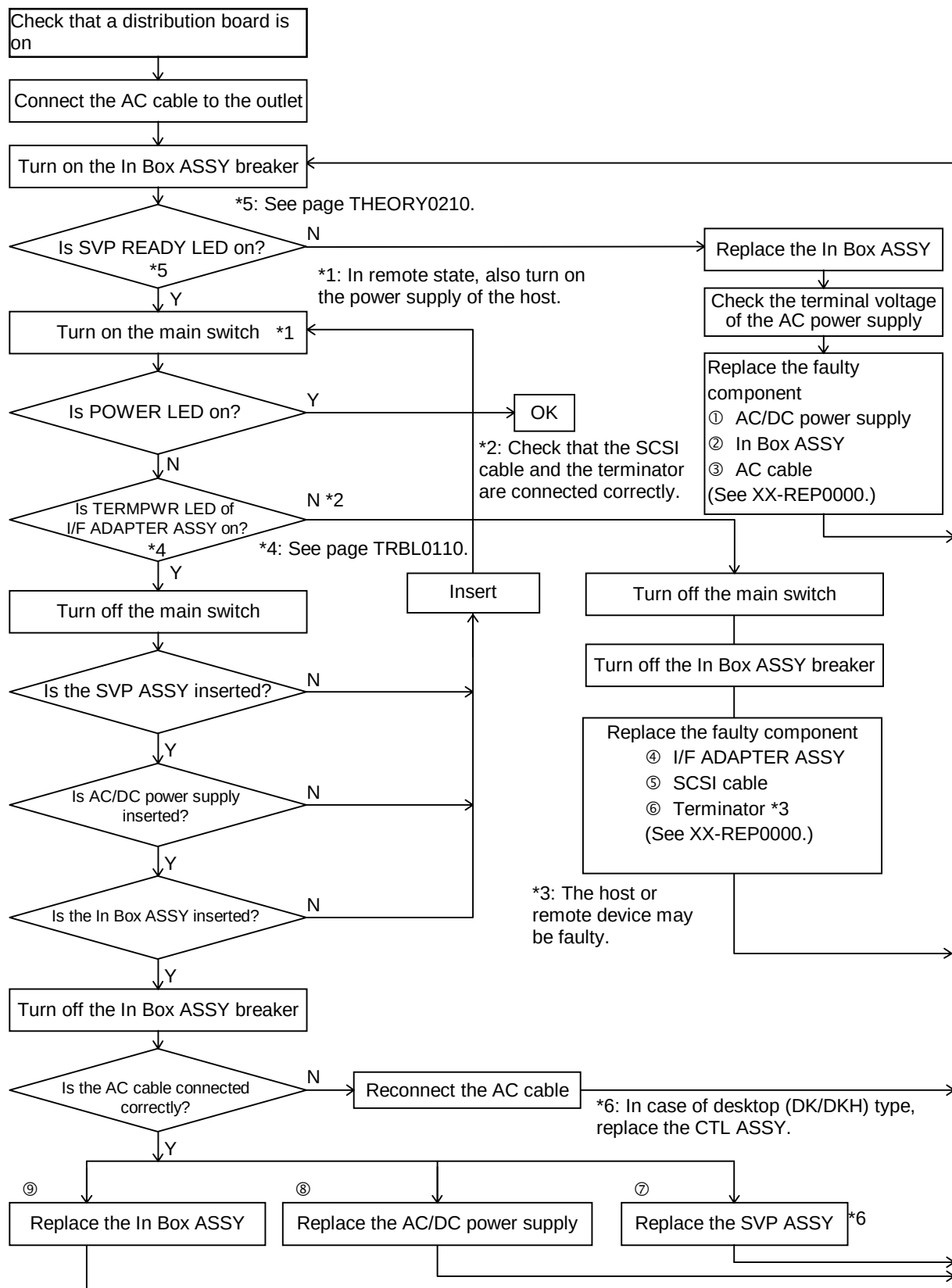


	Error	Action to be taken
①	The POWER LED on the front of the subsystem does not come on.	The SVP ASSY ① (*1), AC/DC power supply ②, or IN BOX ASSY ③ may be faulty. Troubleshoot the error according to “POWER LED error troubleshooting” on page TRBL0050, then replace the faulty component.
②	The READY LED on the front of the subsystem does not come on.	The SVP ASSY ① (*1) may be faulty, or a failure causing an alarm or warning ② may have occurred. Troubleshoot the error according to “READY LED error troubleshooting” on page TRBL0060, then replace the faulty component.
③	The WARNING LED on the front of the subsystem came on.	The AC/DC power supply ①, Fan ASSY ②, SVP ASSY ③ (*1), or drive ④ may be faulty. Troubleshoot the error according to “WARNING LED error troubleshooting” on page TRBL0070, then replace the faulty component.
④	The ALARM LED on the front of the subsystem came on.	The AC/DC power supply ①, FAN ASSY ②, SVP ASSY ③ (*1), or CUDG ④ may be faulty. Troubleshoot the error according to “ALARM LED error troubleshooting” on page TRBL0080, then replace the faulty component.

*1 : In case of desktop type, replace the CTL ASSY.

(1) POWER LED error troubleshooting

Troubleshoot the POWER LED error according to the flowchart shown below.

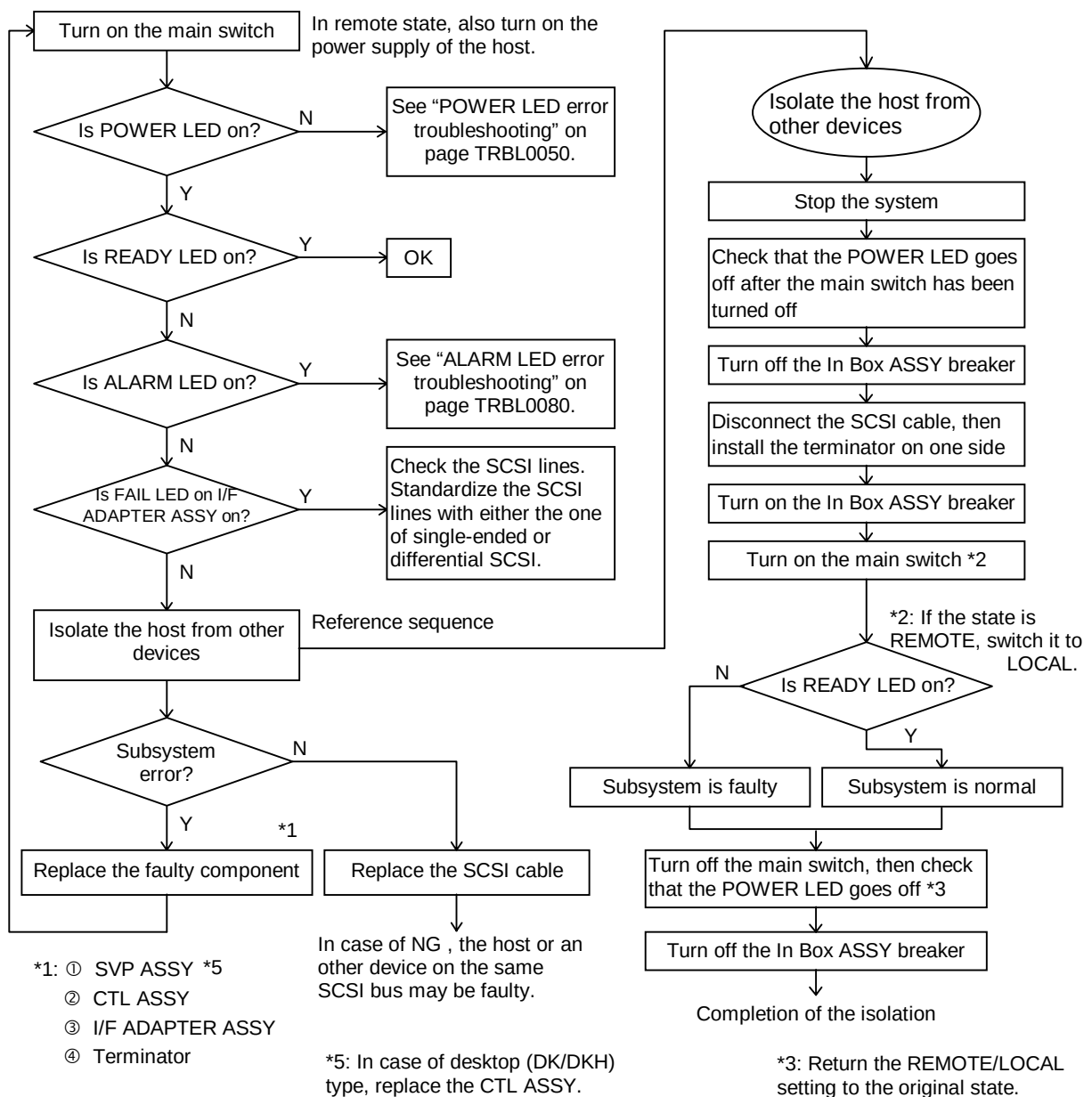


Replace the components ①②④⑦⑧ and ⑨ according to the replacement procedures in "Parts Replacement Chapter" (XX-REP0000).

Replace the components ③⑤ and ⑥ according to the replacement procedures in "Installation Chapter" (INST0000).

(2) READY LED error troubleshooting

Troubleshoot the READY LED error according to the flowchart shown below.



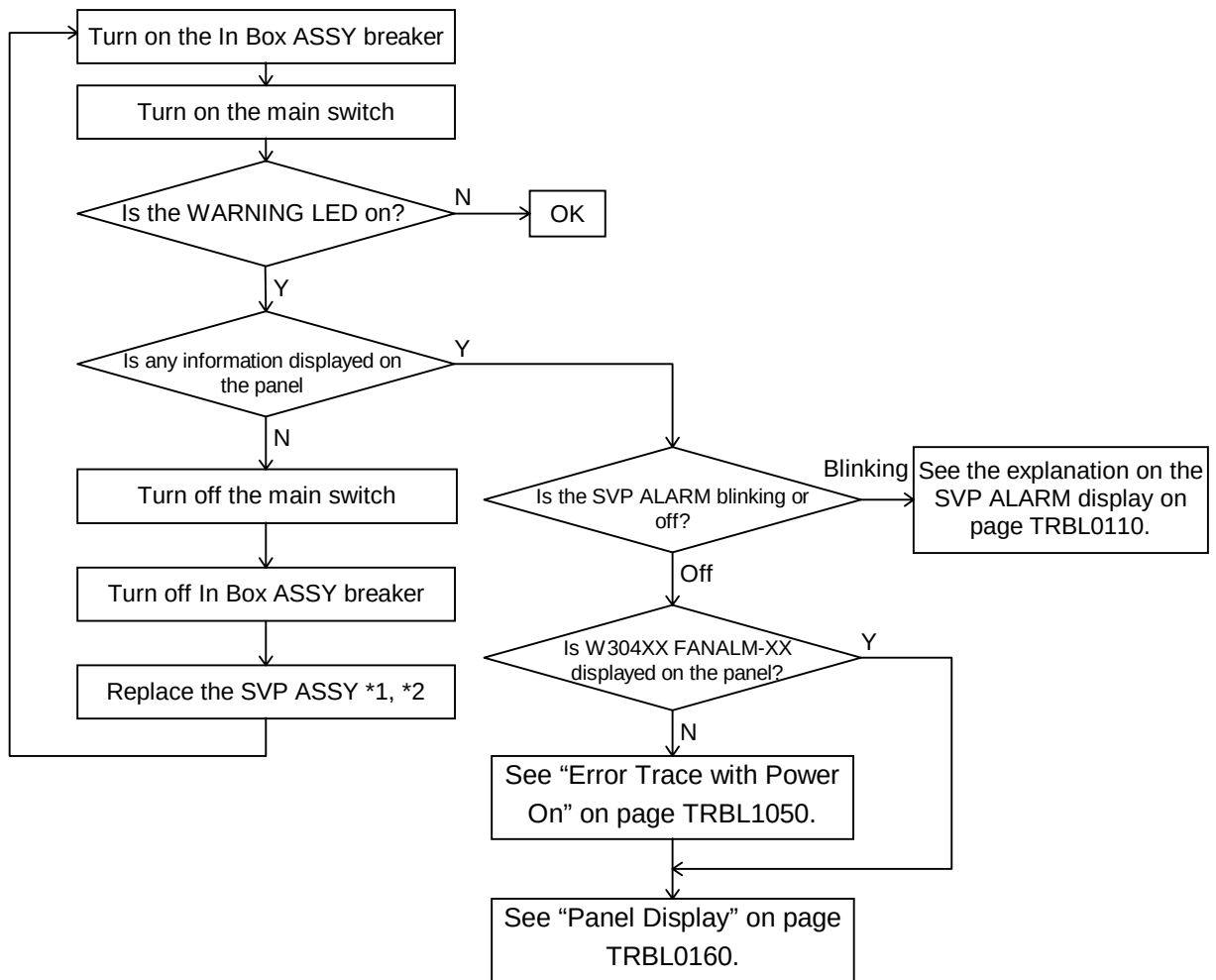
Note: It may take two minutes (max.) till the READY LED comes on after the main switch has been turned on. For the REMOTE/LOCAL setting, see THEORY0210, "Location and Function of Switches and LEDs".

Replace the components ① to ③ according to the replacement procedures in "Parts Replacement Chapter" (XX-REP0000).

Replace the component ④ according to the replacement procedures in "Installation Chapter" (INST0000).

(3) WARNING LED error troubleshooting

Troubleshoot the WARNING LED error according to the flowchart shown below.

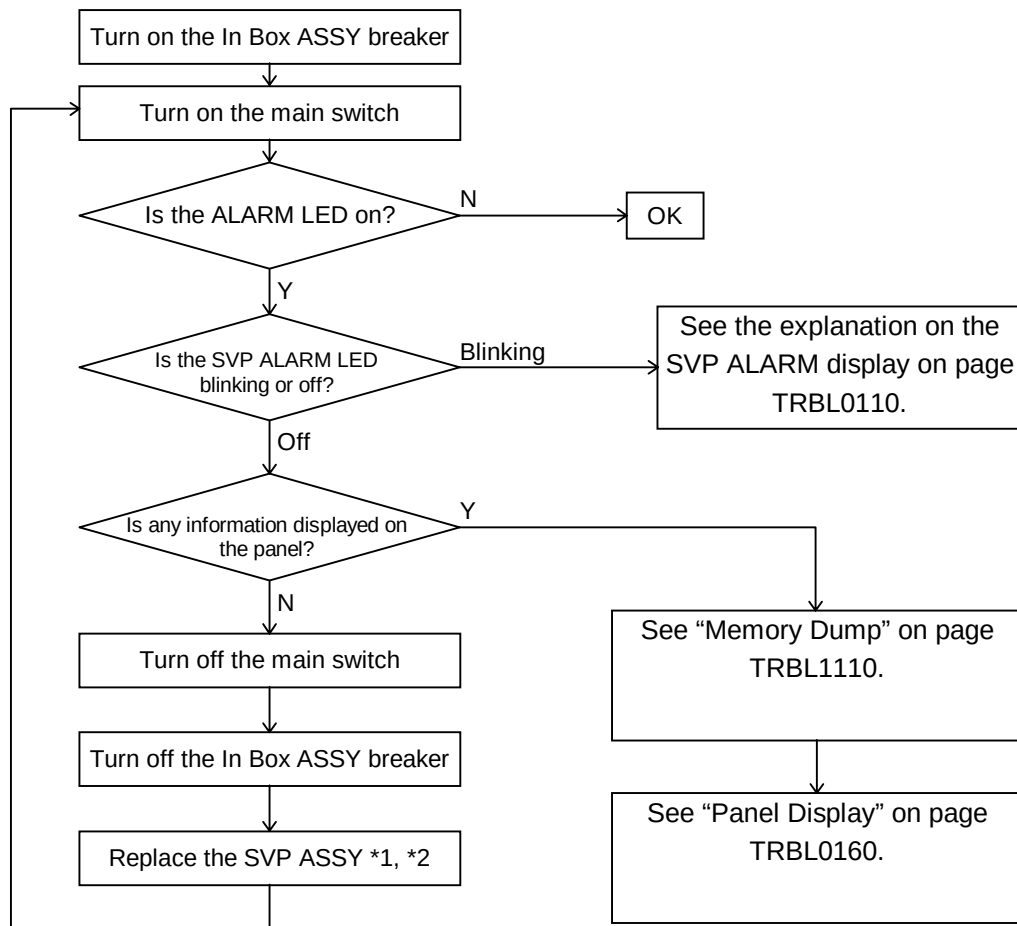


*1: Replace the faulty component according to the replacement procedure in "Parts Replacement Chapter" (XX-REP0000).

*2: In case of desktop (DK/DKH) type, replace the CTL ASSY.

(4) ALARM LED error troubleshooting

Troubleshoot the ALARM LED error according to the flowchart shown below.

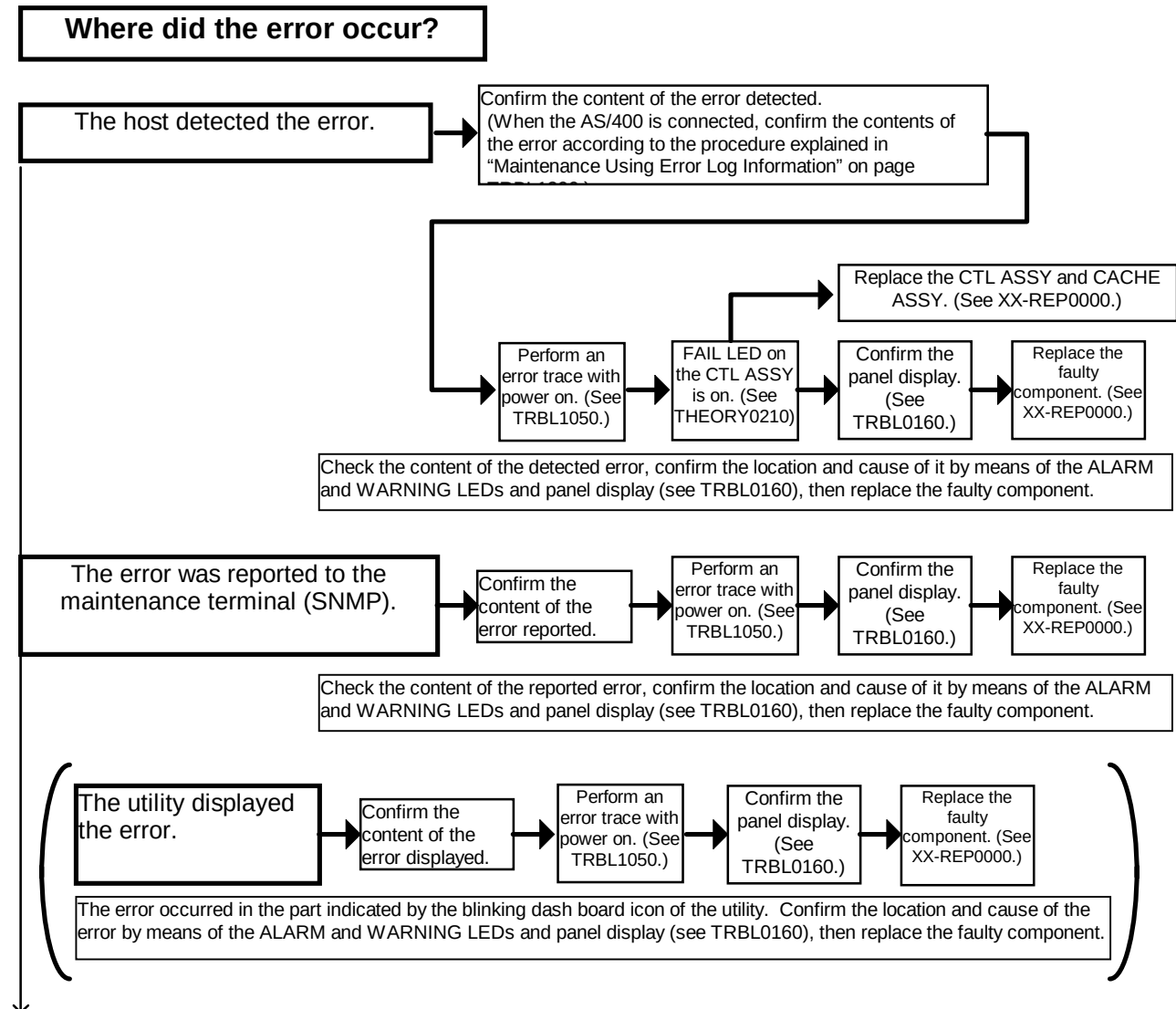


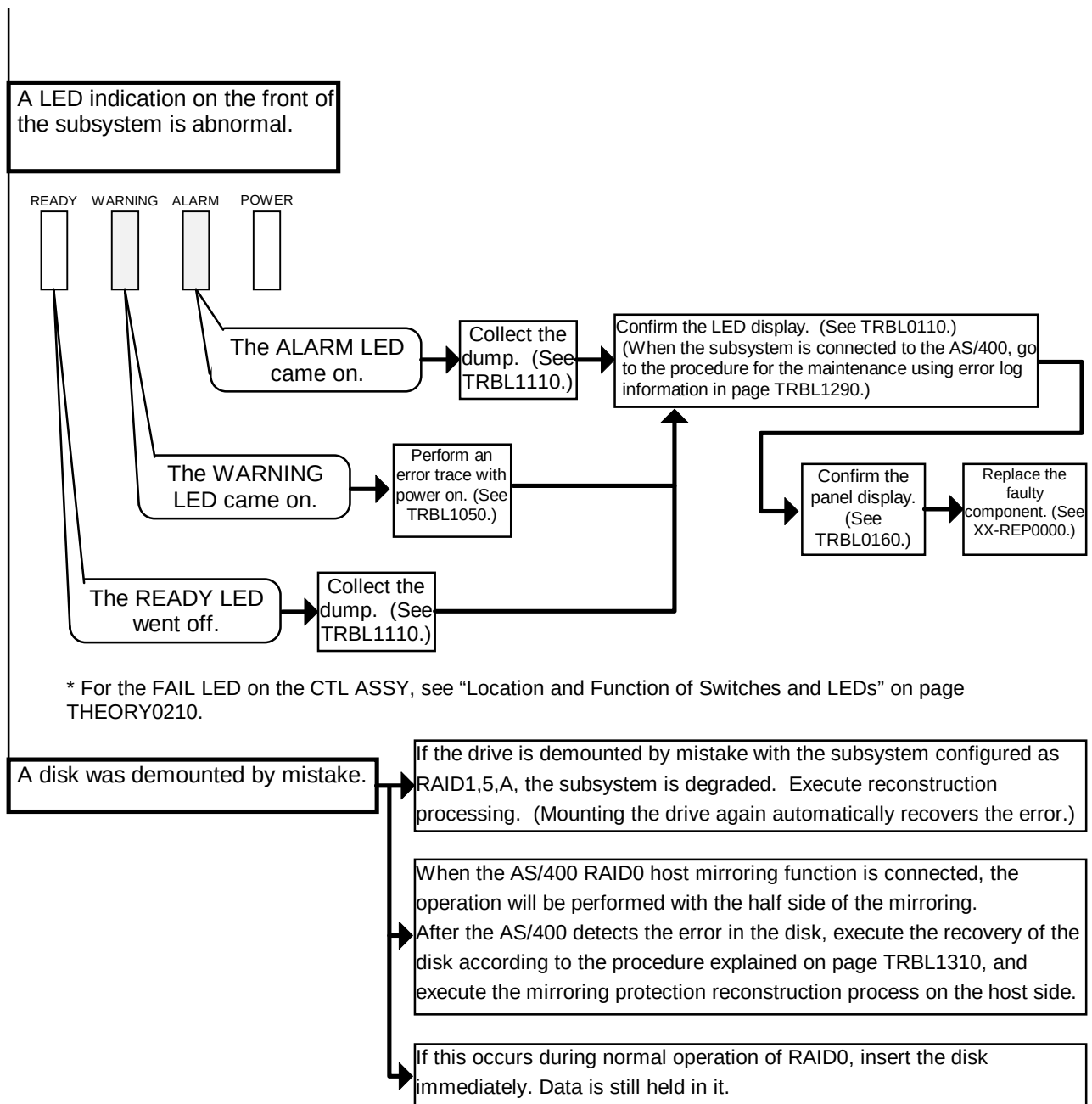
*1: Replace the faulty component according to the replacement procedure in "Parts Replacement Chapter" (XX-REP0000).

*2: In case of desktop (DK/DKH) type, replace the CTL ASSY.

1.2 Errors Occur during Subsystem Operation and Recovery Measures

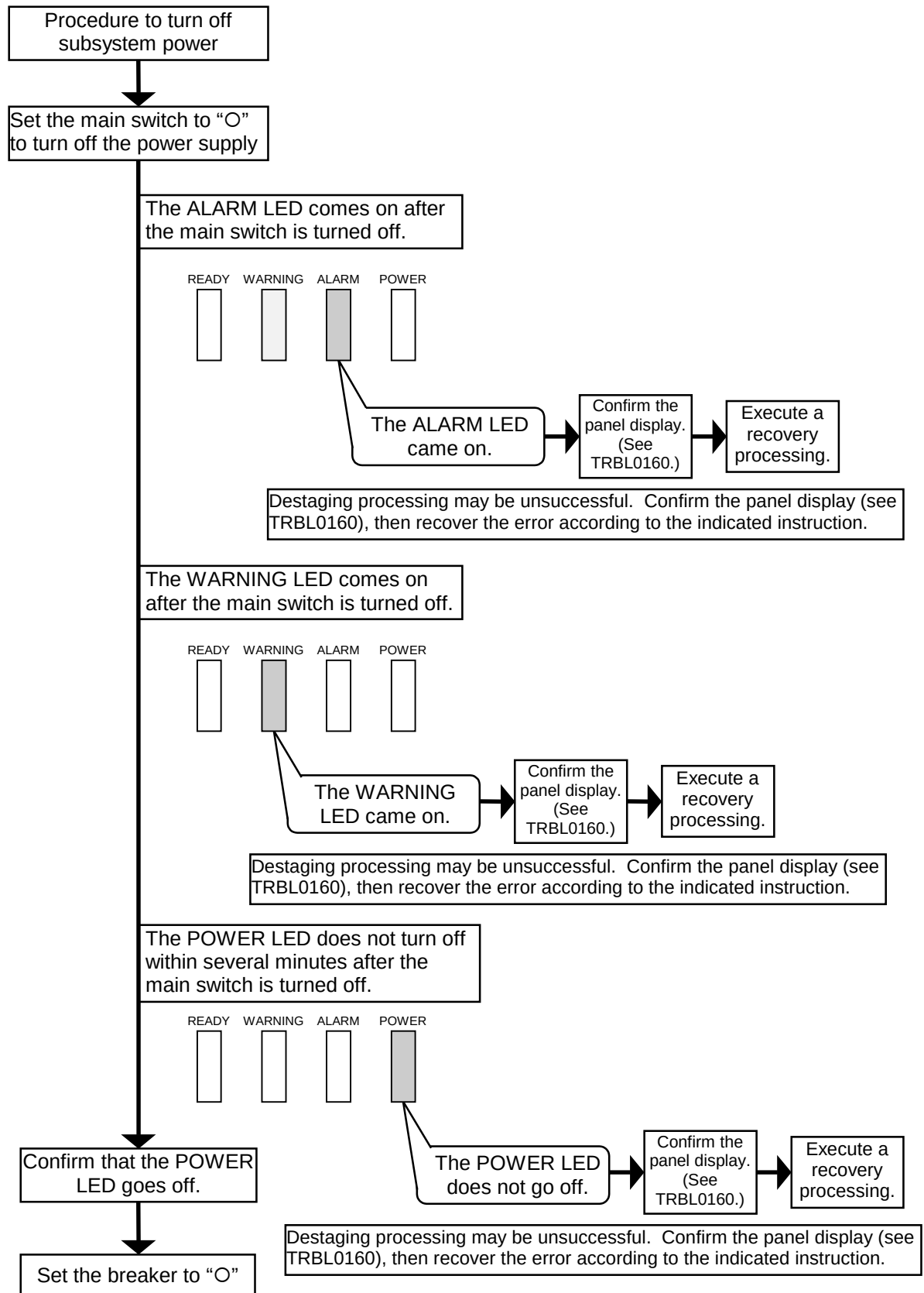
If an error occurs during use of the disk array subsystem, locate the faulty component and replace it according to the following procedure:





1.3 Errors Occur during Power-Off Sequence and Recovery Measures

This section describes the errors that may occur when the subsystem power is turned off and actions to be taken against them.



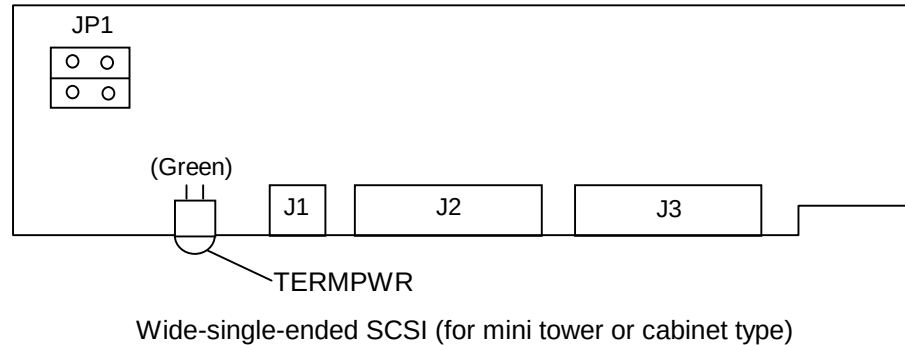
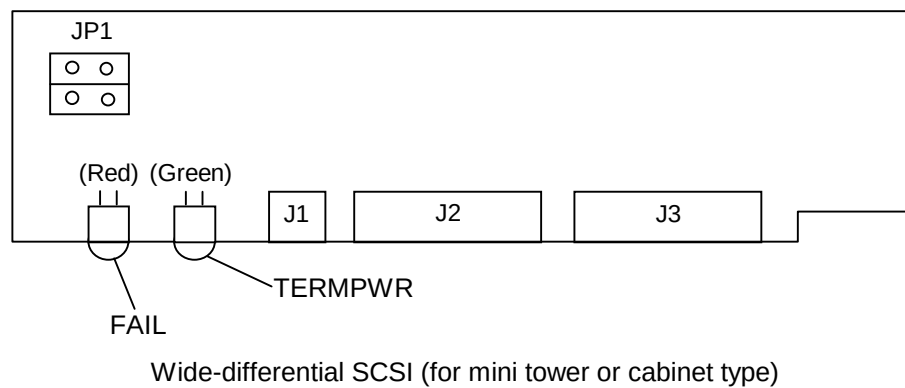
2. Error Displays

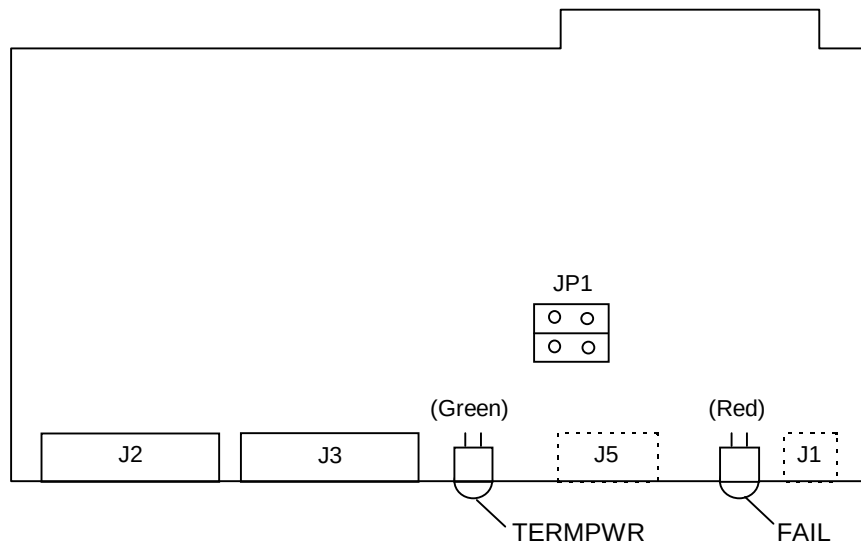
When the subsystem detects an error, it reports the error using the LEDs or the display panel.

LEDs indicate the subsystem status, etc. The panel displays the contents of the errors detected when the subsystem is in operation.

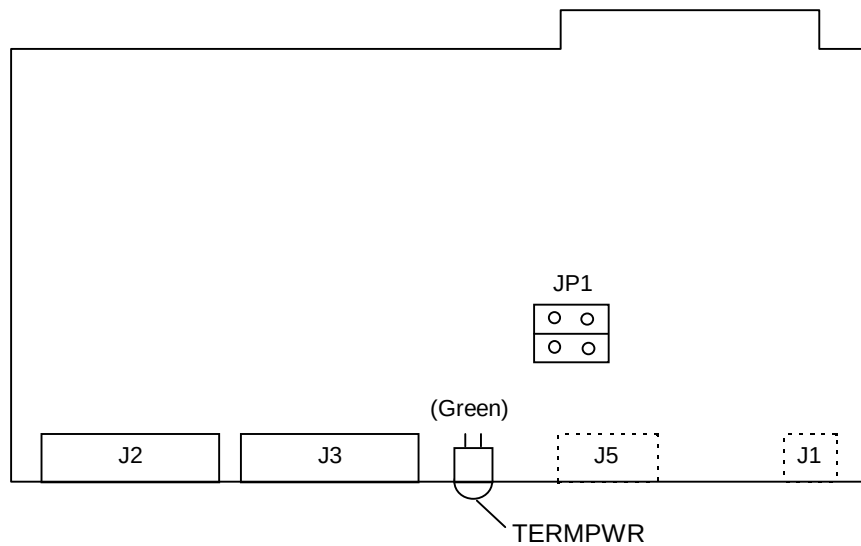
2.1 Displays by Means of LEDs

- (1) LEDs on the I/F ADAPTER ASSY of the mini tower type, cabinet type, or rackmount (RKH/RKWH) type are located as follows:





Wide-differential SCSI (rackmount (RKH/RKWH) type)

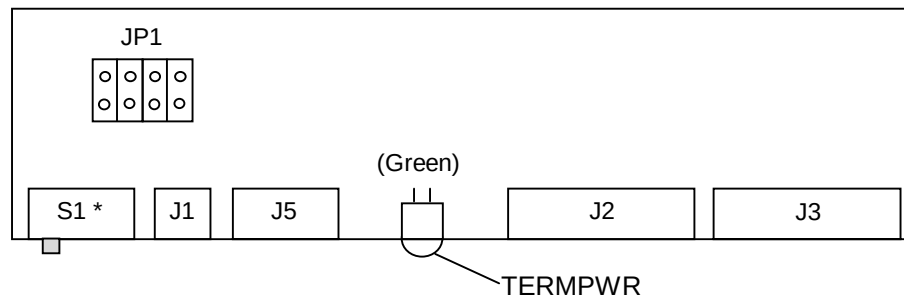


Wide-single-ended SCSI (rackmount (RKH) type)

No.	LED status	Description	Recovery measures
1	TERMPWR LED is off.	Indicates that terminator power is not supplied.	When JP1 is : 1. Check the SCSI cable. 2. Check whether terminator power is being output from the host. 3. Replace the I/F ADAPTER ASSY. When JP1 is : 1. Replace the I/F ADAPTER ASSY.
2	FAIL LED is on*.	Indicates that a single-ended host device or a SCSI device other than single-ended devices is connected to the differential I/F ADAPTER ASSY.	Check the SCSI lines, then standardize them with either the one of single-ended or differential.

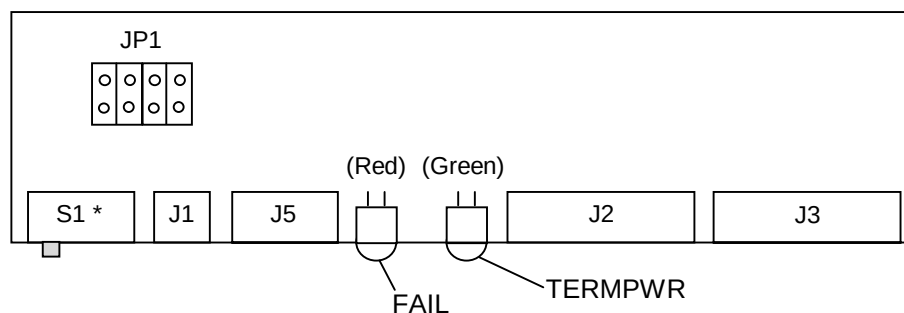
* FAIL LED may also come on when the host is powered off.

(2) LEDs on the I/F ADAPTER ASSY of the desktop (DK/DKH) type are located as follows:



* : There is no "S1" in DKH type.

Single-ended/wide-single-ended SCSI



* : There is no "S1" in DKH type.

Wide-differential SCSI

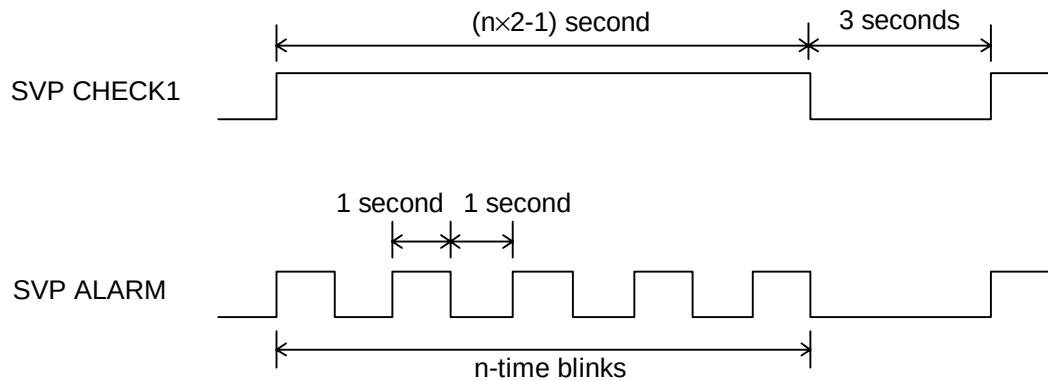
No.	LED status	Description	Recovery measures
1	TERMPWR LED is off.	Indicates that terminator power is not supplied.	When JP1 is : 1. Check the SCSI cable. 2. Check whether terminator power is being output from the host. 3. Replace the I/F ADAPTER ASSY. When JP1 is : 1. Replace the I/F ADAPTER ASSY.
2	FAIL LED is on*.	Indicates that a single-ended host device or a SCSI device other than single-ended devices is connected to the differential I/F ADAPTER ASSY.	Check the SCSI lines, then standardize them with either the one of single-ended or differential.

* FAIL LED may also come on when the host is powered off.

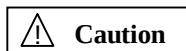
(3) Status indication by means of LEDs

If a voltage error occurs, the subsystem turns on the SVP ALARM and CHECK1 LEDs in the SVP ASSY (*1) to indicate the cause (status). The cause (status) is indicated by the number of times SVP ALARM LED blinks while the CHECK1 LED is on.

*1: In case of desktop type, replace the CTL ASSY.



For the mounting locations of the SVP CHECK1 and SVP ALARM LEDs, see "Location and Function of Switches and LEDs" on page THEORY0210.



Caution

If a LED which indicates the voltage error comes on, internal power supply may fails.

When the internal power supply fails, an electric shock or fire may be caused. If you find the error, turn off the power, then call the service personnel.

No.	LED status	Description	Component to be replaced	Remarks
1	SVP ALARM LED blinks once. ALARM LED is on.	Logic + 5V voltage error	AC/DC power supply	
2	SVP ALARM LED blinks twice. ALARM LED is on.	Logic + 12V voltage error	AC/DC power supply	
3	SVP ALARM LED blinks three times. ALARM LED is on.	BS + 12V voltage error	AC/DC power supply	
4	SVP ALARM LED blinks four times. WARNING LED is on.	Charged voltage error	SVP ASSY *1 CTL ASSY *2	
5	SVP ALARM LED blinks five times. WARNING LED is on.	The battery is not inserted. The battery switch is off. Battery voltage error	Battery or SVP ASSY *1 CTL ASSY *2	Note
6	SVP ALARM LED blinks six times. ALARM LED is on.	Cache voltage error When PS is turned on: $V > 4.40$, $V < 3.52$	SVP ASSY *1 CTL ASSY *1 CACHE CTL ASSY *2	
7	SVP ALARM LED blinks seven times. WARNING LED is on.	Cache voltage error When PS is turned on: $3.52 \leq V \leq 4.40$ After PS is turned off: $V < 3.52$	SVP ASSY *1 CTL ASSY *2	
8	SVP ALARM LED blinks seven times. ALARM LED is on.	Cache voltage error When PS is turned on: $3.52 \leq V \leq 4.40$ After PS is turned off: $V > 4.40$	SVP ASSY *1 CTL ASSY *2	
9	SVP ALARM LED blinks eight times. ALARM LED is on.	SVP thermal error alarm	Fan ASSY	
10	BATTERY OK LED is on. CHARGE LED is on.	Battery voltage error $3.714 \leq V < 3.962$	—	The battery is being charged.
11	BATTERY OK LED is on. CHARGE LED is on. WARNING LED is on.	Battery voltage error $3.529 \leq V < 3.714$	—	The battery is being charged.
12	CHARGE LED is on. SVP ALARM LED blinks five times. WARNING LED is on.	Battery voltage error $V < 3.529$	—	The battery is being charged.

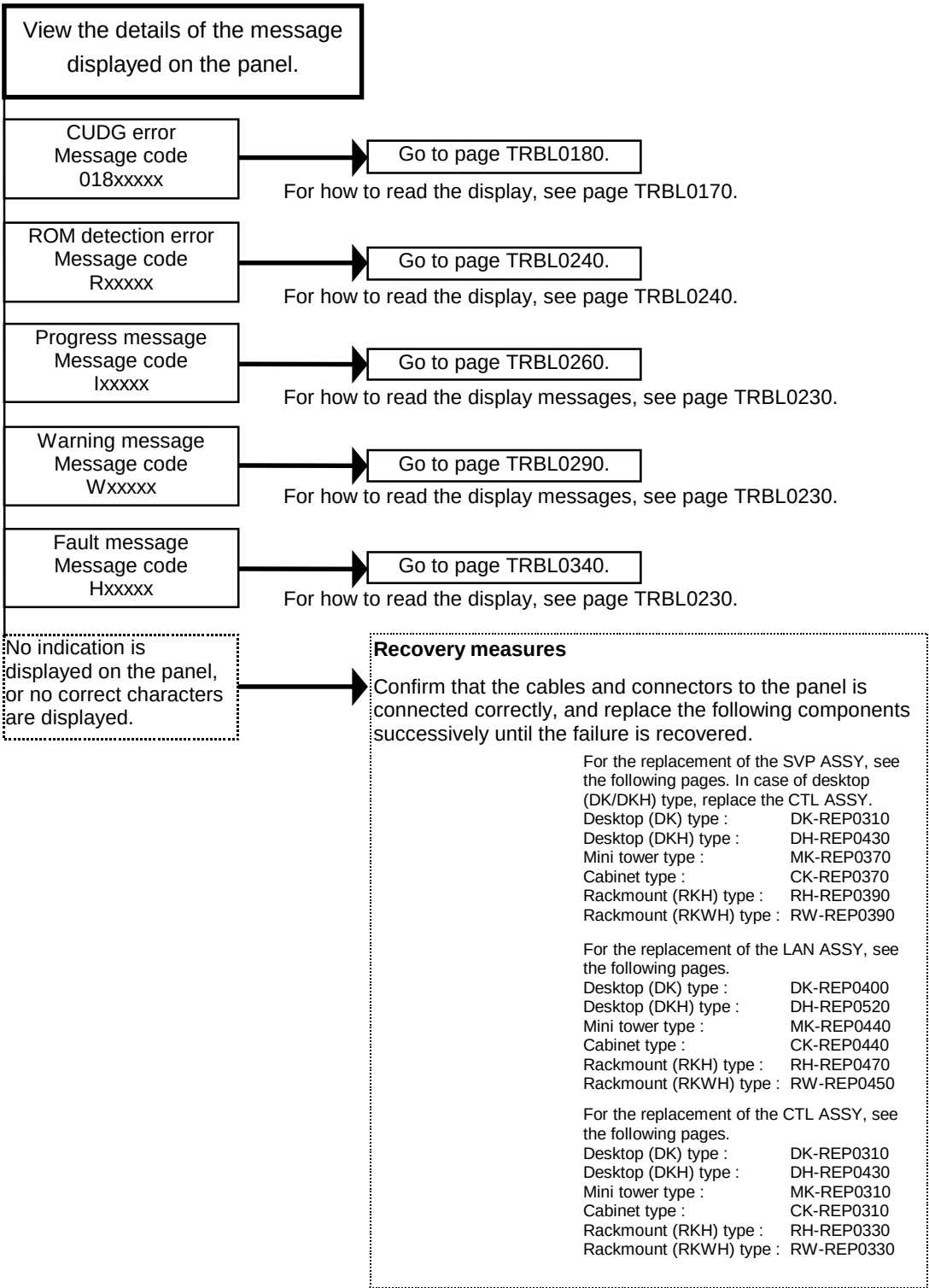
*1 Mini-tower type, cabinet type, and rackmount (RKH/RKWH) type

*2 Desktop (DK/DKH) type

Note: Replace the battery or SVP ASSY (in case of desktop type, replace the CTL ASSY) after confirming that the battery is inserted and the battery switch is on.

2.2 Panel Display

On panel display, the subsystem reports the errors detected during operation after the main switch is turned on and status information.



For the mounting location, operation procedure, and functions of the panel, see Panel Chapter on page PANEL0000.

2.2.1 Display of errors detected by CUDG

Errors detected by CUDG and displayed on the panel are classified as follows:

Note: Determine the types of the errors detected by the CUDG according to the status of the ALARM LED on the CTL ASSY that detected the failures.

(1) Initial CUDG

Screen 1

0	1	8	○	○	○	○	○								
△	△	△	△	△	△	△	△	△							

018○○○○○ indicates an error code.
△△ . . △△ indicates the meaning of the error in alphabetic characters.

Screen 2

□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□

□□ . . □□ indicates a 16-byte detailed error code.

Screens 1 and 2 are alternately displayed at intervals of 5 seconds.

(2) RAM CUDG

Screen 1

C	U	D	G		E	R	R	O	R						
R	E	S	U	L	T	=	0	1	8	○	○	○	○	○	○

Screen 2

D	E	T	A	I	L	1	=	□	□	□	□	□	□	□	□
D	E	T	A	I	L	2	=	□	□	□	□	□	□	□	□
D	E	T	A	I	L	3	=	□	□	□	□	□	□	□	□
D	E	T	A	I	L	4	=	□	□	□	□	□	□	□	□

Screen 1 is displayed first. Use the  and  keys to scroll the screen 2.

Note: Write down the information on the screen 2.

(1) Errors detected by CUDG

Table 2.2.1 Errors Detected by CUDG

Message code	Message text	Description	Recovery measures
01824100	BOOT ROM ERR	Checksum calculation error	Replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
01824110	BOOT ROM ERR	Checksum	
01824120	HARD ERR	Boot ROM error (hardware error)	
01834400	PANEL R/W ERR	Register R/W	
01834410	HARD ERR	Hardware error	Replace the SVP ASSY. For the replacement of the SVP ASSY, see the following pages. Mini tower type : MK-REP0370 Cabinet type : CK-REP0370 Rackmount (RKH) type : RH-REP0390 Rackmount (RKWH) type : RW-REP0390 Replace the PANEL OP ASSY for the desktop type. (See page DK-REP0290/DH-REP0360.) If the error is not recovered, replace the CTL ASSY. (See DK-REP0300/DH-REP0430.)
01844300	SPC R/W ERR	Register R/W	
01844310	SPC COMMAND ERR	SPC command error	
01844320	SPC I/F ERR	Uninstalled interface component, etc.	Replace the CTL ASSY. Check if the I/F ADAPTER ASSY is installed, replace it, or replace the CTL ASSY. For the check and replacement of the I/F ADAPTER ASSY, see the following pages. Desktop (DK) type : DK-REP0280 Desktop (DKH) type : DH-REP0410 Mini tower type : MK-REP0350 Cabinet type : CK-REP0350 Rackmount (RKH) type : RH-REP0370 Rackmount (RKWH) type : RW-REP0370 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
0184C800	—	SPC command error	Replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
0184C600	—	SPC command error	
0184C610	—	SPC REQ/ACK error	
0184C620	—	SPC abnormal termination	
0184C810	—	SPC REQ/ACK error	
0184C820	—	SPC abnormal termination	
01854200	CS/DS ERR	Register R/W	
01854210	HARD ERR	Hardware error	

Message code	Message text	Description	Recovery measures
01858000	—	Register R/W	Replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
01858010	—	No parity generation	
01858020	—	Hardware error	
01858400	—	Register R/W	
01868200	M-CTL R/W ERR	Register R/W	
01868210	HARD ERR	Hardware error	
01868300	M-CTL FORCE ERR	No parity generation (upper)	
01868310		No parity generation (lower)	
01868320		Watchdog timer	
01868330		Write-only register R/W	
01868340		Read-only register R/W	
01868350		EPROM write	
01868360	HARD ERR	Hardware error	
01888100	TIMER ERR	Timer operation	
01888110	TIMER ERR	Hardware error	
018AC200	D-CTL R/W ERR	Register R/W	
018AC210	HARD ERR	Hardware error	
018AC530	D-CTL FORCE ERR	DMA transfer termination	
018AC540	ECC ERR	ECC error	
018AC570	HARD ERR	Hardware error	
018AC630	—	Abnormal termination of DMA transfer	
018AC640	—	D-CTL INT clear	
018AC650	—	Write data comparison	
018AC660	—	Write data DRR comparison	
018AC670	—	Read data comparison	
018AC680	—	Read data DRR comparison	
018AC6B0	—	Hardware error	
018AC700	—	Register R/W (D-CTL)	
018AC710	—	Hardware error (D-CTL)	
018AC830	—	Error code error (D-CTL)	
018AC840	—	ECC error (D-CTL)	
018AC870	—	Hardware error (D-CTL)	

Message code	Message text	Description	Recovery measures
018B4500	CACHE INF ERR	Undefined value check	Check if the CACHE ASSY is installed, replace it, or replace the CTL ASSY. For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
018B4510	CACHE INF ERR	Cache information check	
018B4520	CACHE SIZE ERR1	Size check 1	Change the CACHE size or mounting information. For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420
018B4530	CACHE SIZE ERR2	Size check 2	
018B4540	CACHE SIZE ERR3	Size check 3	
018B4550	CACHEACCESS ERR	Access check	Replace the CACHE or CTL ASSY. For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
018B4560	CACHE ECC ERR	ECC circuit check 1	
018B4570	CACHE ECC ERR	ECC circuit check 2	
018B4580	HARD ERR	Hardware error	
018B4590	REG READ ERR	Register read error	
018BC300	—	Undefined value check	
018BC310	—	Access check	
018BC320	—	Hardware error	
018BC330	—	Register read error	

Message code	Message text	Description	Recovery measures
018BC550	Cache R/W ERR	Cache R/W test	Replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
018BC560	Cache ECC ERR	ECC error occurrence	
018BC690	—	Cache R/W test	Replace the CACHE or CTL ASSY. For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
018BC6A0	—	ECC error occurrence	
018BC850	—	Cache R/W test	
018BC860	—	ECC error occurrence	

Message code	Message text	Description	Recovery measures
018D8410	—	Self test	Replace the LAN or CTL ASSY. For the replacement of the LAN ASSY, see the following pages. Desktop (DK) type : DK-REP0400 Desktop (DKH) type : DH-REP0520 Mini tower type : MK-REP0440 Cabinet type : CK-REP0440 Rackmount (RKH) type : RH-REP0470 Rackmount (RKWH) type : RW-REP0450 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
018D8420	—	Initial setting error	
018D8430	—	82596 termination INT	
018D8440	—	Command error	
018D8450	—	Parity error	
018D8460	—	Send data comparison	
018D8470	—	Hardware error	

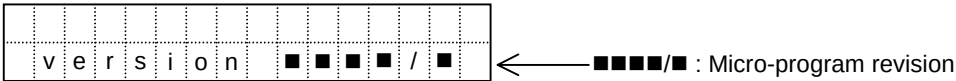
2.2.2 ROM messages

The ROM messages displayed on the panel are classified into the four types shown in Table 2.2.2.

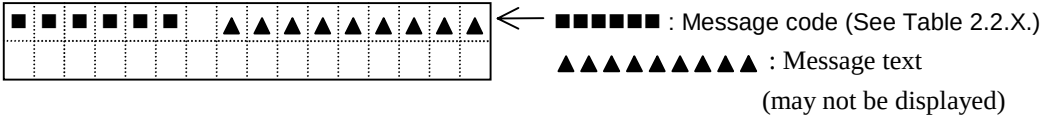
Table 2.2.2 Message Code Classification

No.	Message code	ROM message and description
1	Rxxxxx	Information detected till the subsystem is made ready when power is turned on.
2	Ixxxxx	Progress message:
3	Wxxxxx	Warning message:
4	Hxxxxx	Failure message:

① Display after normal startup (No error has occurred so far.)



② Display when the status changes or an error occurs



The latest information is displayed. Pressing the  key enables old information to be referenced.

Single controller: 10 pieces of information

Dual controller: 30 pieces of information

The above information is stored in advance. If ① is displayed by pressing the  key, it indicates that there is no more information. When ① is not displayed, it indicates that more than maximum pieces of information has been already collected.

Note: The dual controller consists of two controllers but is equipped with only one SVP panel. For this reason, judge which controller displays the message from the following:

First character of message text — Uppercase letter: Controller 0
Lowercase letter: Controller 1

Example: Controller #0

ROM RESP MODE

Controller #1

rOM RESP MODE

Note: For the origin of the errors detected by the CUDG, determine it by means of the ALARM LED on the CTL ASSY that detected the failures.

Both controllers may report errors concerning shared units such as fans, power supplies, and batteries.

(1) ROM detection messages

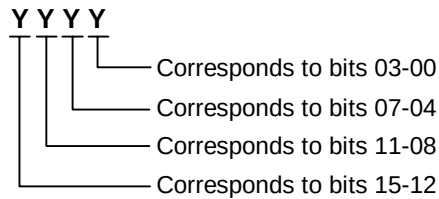
Message code	Message text	Description	Recovery measures
R20801	DGDRVERR	The microprogram of version 0304 or later has been installed in the system area of the disk, however, it cannot be loaded because the system parameter (SYS REV) on the CTL ASSY is specified as 0303.	Change the SYS REV of the system parameter to 0304. For the setting of the system parameters, see the following pages. Desktop (DK) type : DK-INST0230 Desktop (DKH) type : DH-INST0270 Mini tower type : MK-INST0270 Cabinet type : CK-INST0290 Rackmount (RKH) type : RH-INST0290 Rackmount (RKWH) type : RW-INST0290
R40201	ACFAIL	An abnormality of AC power supply was detected.	Turn the power off, then turn it on again. For the turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
R40202	DCVALARM	DC power supply failure	Replace the AC/DC power supply. For the replacement of the AC/DC power supply, see the following pages. Desktop (DK) type : DK-REP0260 Desktop (DKH) type : DH-REP0370 Mini tower type : MK-REP0380 Cabinet type : CK-REP0380 Rackmount (RKH) type : RH-REP0410 Rackmount (RKWH) type : RW-REP0400
R501XX	SIMM UMCH	The cache memory capacities of slot XX does not match between two controllers in dual configuration.	Replace the CACHE ASSY. For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420
R60101	BOARD ERR	The number of Cache ASSYs installed in the CTL ASSY cannot be recognized.	Check if the CACHE ASSYs are installed correctly. When they are installed correctly, replace them or the CTL ASSY.
R60102	SIZE ERR	The cache memory capacity in the CTL ASSY cannot be recognized.	For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330

Message code	Message text	Description	Recovery measures
R60201 (*1)	HARDERROR	A hardware failure occurred.	When the message shown on the left is displayed, it is suspected that a failure has occurred in one (or more) of the CTL ASSY, LAN ASSY, I/F ADAPTER ASSY, CACHE ASSY, HDU ASSY, and back board. Identify the failed part by means of the error code (YYYYZZZZ) and replace it. In the case of the flash changeable part (revision PB22), the error code is not displayed. Replace parts one by one until the failure is recovered. If the failure cannot be recovered after all the following parts are replaced, the failure is considered to have occurred in the back board. In this case, replace the entire subsystem. For details of the error codes, see the next page. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330 For the replacement of the LAN ASSY, see the following pages. Desktop (DK) type : DK-REP0400 Desktop (DKH) type : DH-REP0520 Mini tower type : MK-REP0440 Cabinet type : CK-REP0440 Rackmount (RKH) type : RH-REP0470 Rackmount (RKWH) type : RW-REP0450 For the check and replacement of the I/F ADAPTER ASSY, see the following pages. Desktop (DK) type : DK-REP0280 Desktop (DKH) type : DH-REP0410 Mini tower type : MK-REP0350 Cabinet type : CK-REP0350 Rackmount (RKH) type : RH-REP0370 Rackmount (RKWH) type : RW-REP0370 For the installation check and replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420 For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260
	YYYYZZZZ	A hardware error occurred. YYYY : Content of MPINT1 register ZZZZ : Content of MPUERR register	

*1 Message text differs by the revision of variable part in flash memory.
When the revision of variable part in flash memory is PB22 : R60201 HARDERROR
When the revision of variable part in flash memory is PB24 or later : R60201 YYYYYZZZ

Details of error codes

Details of the upper 2 bytes of the 4 bytes error codes (YYYYZZZZ) are shown below. The upper 2 bytes show contents of the register MPINT1 for detecting hardware internal failures. (They are given in hexadecimal.)



Example : When the error code is “80000000”

The following error occurred :

YYYY=8000, ZZZZ=0000 MPINT1 bit 15 DP1ERR

The failed part is one of the CTL ASSY, LAN ASSY, and HDU ASSY. Replace the parts concerned one by one until the error ceases to occur.

YYYY=MPINT1

bit	Register	Description	Failure part
15	DP1ERR	This bit shows that a parity error has occurred in data bits 08-15 in the register inside the M-CTL. The bit is interlocked with the interrupting INT4. When the bit is “1”, it shows that the error has occurred. • CS/DS memory • R/W register in the M-CTL • R/W register in the D-CTL • LAN local SRAM • SPC	• CTL ASSY • LAN ASSY • HDU ASSY
14	DP0ERR	This bit shows that a parity error has occurred in data bits 00-07 in the register inside the M-CTL. The bit is interlocked with the interrupting INT4. When the bit is “1”, it shows that the error has occurred.	• CTL ASSY • LAN ASSY • HDU ASSY
13	SQCNTERR	This bit shows that an error has occurred in the sequence counter. The bit is interlocked with the INT4. When the bit is “1”, it shows that the error has occurred.	• CTL ASSY
12	DP3ERR	This bit shows that a parity error has occurred in data bits 24-31 in the register inside the M-CTL. The bit is interlocked with the interrupting INT4. When the bit is “1”, it shows that the error has occurred.	• CTL ASSY • LAN ASSY
11	DP2ERR	This bit shows that a parity error has occurred in data bit 16-23 in the register inside the M-CTL. The bit is interlocked with the interrupting INT4. When the bit is “1”, it shows that the error has occurred.	• CTL ASSY • LAN ASSY
10	FC ERR	This bit shows that a hardware error has occurred in the FC-CTL (FC controller). The bit is interlocked with the interrupting INT4.	• CTL ASSY • I/F ADAPTER ASSY
09	CAC_2BWRERR	This bit shows that a 2 byte writing has been performed in an access to the cache. The bit is interlocked with the interrupting INT4. When the bit is “1”, it shows that the error has occurred.	• CTL ASSY
08	WCDGCNT1PERR	This bit shows that a parity error has occurred in bits 00-07 in the counter for the watchdog timer. The bit is interlocked with the interrupting INT4. When the bit is “1”, it shows that the error has occurred.	• CTL ASSY

bit	Register	Description	Failure part
07	RDRGWRERR	This bit shows that a writing has been performed in the read-only register contained in the external register of the MP. The bit is interlocked with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY
06	WRRGRDERR	This bit shows that a writing has been performed in the write-only register contained in the external register of the MP. The bit is interlocked with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY
05	FLASH WR ERR	This bit shows that a writing has been performed in the Boot ROM area. The bit is interrupted with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY
04	RDYTMOUT	This bit shows that the "READY" signal has not been received within the specified time (1ms). The bit is interlocked with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY
03	DCTLERR	This bit shows that a hardware error has occurred in the C-CTL (DMA controller). The bit is interlocked with the interrupting INT4. The bit shows the hardware error in the D-CTL transparently. The bit is cleared when all the error causes are cleared in the D-CTL.	• CTL ASSY • HDU ASSY • Back board failure
02	CTCCH0PERR	This bit shows that a parity error has been detected in the timer CH0 in the M-CTLLSI. The bit is interlocked with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY
01	CTCCH1PERR	This bit shows that a parity error has been detected in the timer CH1 in the M-CTLLSI. The bit is interlocked with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY
00	LANCTLPERR	This bit shows that a parity error of the data path has occurred in the LSI (82596) for the LANCTL. The bit is interlocked with the interrupting INT4. When the bit is "1", it shows that the error has occurred.	• CTL ASSY • LAN ASSY

Details of the lower 2 bytes of the 4 bytes error codes (YYYYZZZZ) are shown below. The lower 2 bytes show contents of the register MPUERR for detecting hardware internal failures. (They are given in hexadecimal.)

ZZZZ=MPU ERR

bit	Register	Description	Failure part
15	PTYERR0	This bit shows a parity error in one of the upper bytes on the MPU bus.	• CTL ASSY
14	PTYERR1	This bit shows a parity error in one of the lower bytes on the MPU bus.	• CTL ASSY
13	ECCWRITEPTYERR	This bit shows a parity error occurs when writing data in the DRAM after adding the ECC.	• CTL ASSY • CACHE ASSY
12	ECCGENERATIONERR	This bit shows that a failure has occurred in the ECC generation.	• CTL ASSY
11	ECCUNCORRECTERR	When this bit is "1", it shows that an error has occurred in 2 or more bits and the error correction by means of the ECC is impossible.	• CTL ASSY • CACHE ASSY
10	ECCCORRECTERR	This bit shows that the result of an error correction by means of the ECC is incorrect.	• CTL ASSY
09	MPDBF2ByteWRITE	When this bit is "1", it shows that only 2 bytes has been written in the DBF of 4 bytes boundary.	• CTL ASSY
08	ECCCORRECTION	This bit shows that an error correction by means of the ECC has been performed.	• CTL ASSY • CACHE ASSY
07	SELFLOCKOVTM	When this bit is "1", it shows that a time out of a memory locking from the own MPU has occurred. (BUSABTERR)	• CTL ASSY

bit	Register	Description	Failure part
06	EXOVTM	When this bit is "1", it shows that a time out of a memory locking from another controller has occurred. (BUSABTERR)	• CTL ASSY • Back board failure
05	ACKOFF	When this bit is "1", it shows that the DBFACK signal from another controller has been turned off during an assertion.	• CTL ASSY • Back board failure
04	reserved	This bit is always "0" at the time of reading and writing.	—
03	reserved		—
02	reserved		—
01	reserved		—
00	reserved		—

Message code	Message text	Description	Recovery measures
R60401	FMWT ERR	A write operation onto the flash memory failed.	Replace the CTL ASSY For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
R70501	S-ID UMCH	The SCSI IDs set for controllers differ each other in the SCSI ID inherit mode.	

Message code	Message text	Description	Recovery measures
R70101	SUMCHKERR	A checksum error occurred in the updating counter of the flash memory upper section.	Replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
R70102	SUMCHKERR	A checksum error occurred in the program area of the flash memory variable section.	
R70103	SUMCHKERR	A checksum error occurred in the updating counter of flash memory lower section.	
RF0701	DGCHKERR	Downgrade of the microprogram was detected.	The revision No. of the microprogram cannot be changed from the current one to the specified one. Use the microprogram with the current revision No. (To operate the subsystem using the microprogram with the specified revision No., the initializing installation is needed.)
RZ0800	DLOADFAIL	Loading of data or a program from the drive failed.	For detailed recovery procedure, see page TRBL0840.
RZ0801	B-NUM ERR	Two CTL ASSYs are installed although "single" is specified for the system parameter.	For single configuration, use one CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330 For dual configuration, change the system parameter. For the setting of the system parameters, see the following pages. Mini tower type : MK-INST0270 Cabinet type : CK-INST0290 Rackmount (RKH) type : RH-INST0290 Rackmount (RKWH) type : RW-INST0290
RZ0802	B-REV ERR	"Dual" is specified for the system parameter but the controller of this revision does not support the dual configuration.	Replace the CTL ASSY with the one which can support the dual configuration. For the replacement of the CTL ASSY, see the following pages. Desktop type : DK-REP0310 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
RZ0803	S-VER ERR	An attempt was made to load the micro-program for the dual system although "single" was specified for the system parameter.	Download the single system. For downloading the system, see M-FC0030.
RZ0804	S-VER ERR	An attempt was made to load the micro-program for the single system although "dual" was specified for the system parameter.	Download the dual system. For downloading the system, see M-FC0030.
RZ0805	SYS U-MCH	The micro-program revision loaded by the controller 0 differs from that loaded by the controller 1.	Download the system again. For downloading the system, see M-FC0030.
—	CHECKSUM ERR OR INIT? (HIT ENTER)	An error occurred in system information in the flash memory.	Make the setting in the EEPROM again. For downloading the system, see M-FC0030.

Message code	Message text	Description	Recovery measures
—	PERTIALLY COMPLT CONT(0), RETRY(1)	The microprogram could not be installed in all (five) drives of Row 0.	Press the  key on the panel and continue the processing. Because a drive failure may have occurred, isolate the problem and take actions against in referring to page M- FC0090 when the subsystem enters the Ready status.

(2) Progress message

Table 2.2.4 Progress Messages

Message code	Message text	Description	Recovery measures
I00100	BATRCV	The battery voltage became normal.	—
I002XX	FANRCV-XX	The fan failure was recovered. XX: Fan number	—
I003XX	PSRCV-XX	The DC power voltage became normal. XX: Power supply number	—
I005XY	DRVRCV-XY	The drive was recovered. X: Port number Y: Row number	—
I006XY *1	SPDRCN-XY	Data was recovered to the spare disk. X: Port number Y: Row number	—
I007XY	LUFMT-XY	LU formatting was completed. X: Target ID Y: LUN	—
I00800	RGINIT	All RAID groups and LUs were deleted.	—
I00900	LUINIT	All LUs were deleted.	—
I00A00	PRTYRCSTR	Forced parity recovery was started.	—
I00B00	PRTYRCEND	Forced parity recovery was terminated.	—
I00CXY	LURCV-XY	The degraded LU was recovered normally. X: Target ID Y: LUN	—
I00DXY	SYS-CP-XY	System copy was started. X: Port number Y: Row number	—
I00EXY	SYSRCV-XY	System copy terminated normally. X: Port number Y: Row number	—
I00FXY	SYSFLT-XY	System copy failed. X: Port number Y: Row number	Replace the HDU ASSY in the location indicated by the port and row numbers. However, if there is a shutdown HDU ASSY in the same row, replace it first. For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260

*1 Desktop (DKH) type, mini tower type, cabinet type, or rackmount (RKH/RKWH) type.

Message code	Message text	Description	Recovery measures
I010 <u>XY</u>	RCV-ST- <u>XY</u>	Data recovery was started. X: Port number Y: Row number	—
I011 <u>XY</u>	RCVEND- <u>XY</u>	Data recovery terminated normally. X: Port number Y: Row number	—
I012 <u>XY</u>	RCVFLT- <u>XY</u>	Data recovery failed. X: Port number Y: Row number	For detailed recovery procedures, see pages TRBL0930 and TRBL0940.
I01300	PINUNDER	The number of PIN segments was recovered to its threshold or lower.	—
I01400	SYSDRVNG	When the system was started, an unusable drive was found in the system area.	—
I01500	PINSEGOV	The drive for the parity unmatching area was shut down because there are too many PIN data segments.	Follow the instruction of “W202XY DRVALM-XY” displayed at the same time.
I016 <u>XY</u>	DRVERR- <u>XY</u>	An error eligible to cause a drive shutdown occurred but the drive was not shut down due to shortage of redundancy. X: Port number Y: Row number	For detailed recovery procedures, see pages TRBL0920, TRBL0930, and TRBL0940.
I017 <u>XY</u>	RCVWNG- <u>XY</u>	Data recovery was terminated with the condition “incomplete write registration”. X: Port number Y: Row number	For detailed recovery procedure, see page TRBL0920.
I01B <u>XX</u>	RGDEL- <u>XX</u>	The RAID group was deleted. XX: RAID group	—
I01C <u>XY</u>	LUDEL- <u>XY</u>	The LU was deleted. X: Target ID Y: LUN number	—
I01D <u>XY</u>	DYNMSP- <u>XY</u>	The Dynamic Sparing was started. X: PORT No. Y: ROW No.	—
I01E <u>YY</u>	CHNG PB- <u>YY</u>	Version up of the flash changeable part program occurred. YY: Version of the flash changeable part after the version up.	When the message shown below is displayed on the panel following this message, execute the recovery according to the procedure below. (If no message is displayed, continue the use leaving it as it is.) HZ62 <u>XY</u> FLSREV <u>XY</u> HZ60422 CTLFAIL W015 <u>XX</u> CTLALM- <u>XX</u> Recovery procedure • When the CTL ASSY is not redundant : Power off the subsystem once, then power it on again. • When the CTL ASSY is redundant (to recover with power on) : Perform the re-insertion of the same CTL ASSY in the regressed. • When the CTL ASSY is redundant (to recover with power off) : Power off the subsystem once, then power it on again.
I01F00	FDCHNG	The flash changeable part program was saved to the backup FD.	—

Message code	Message text	Description	Recovery measures
I02000	FDDEVICE	The flash changeable part program was saved to FD or read from FD, hardware error was occurred.	—
I02100	FDFILE	When the flash changeable part program was read from the FD, fail is abnormal.	—

Message code	Message text	Description	Recovery measures
I030 <u>XY</u>	HDRCV- <u>XY</u>	The number of recovered mechanical system errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	Replace with the HDU ASSY to be supported. For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260
I031 <u>XY</u>	HDUNR- <u>XY</u>	The number of unrecovered mechanical system errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	
I032 <u>XY</u>	MDRCV- <u>XY</u>	The number of recovered media errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	
I033 <u>XY</u>	MDUNR- <u>XY</u>	The number of unrecovered media errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	
I034 <u>XY</u>	RWRCV- <u>XY</u>	The number of recovered R/W errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	
I035 <u>XY</u>	RWUNR- <u>XY</u>	The number of unrecovered R/W errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	
I036 <u>XY</u>	IFRCV- <u>XY</u>	The number of recovered I/F errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	
I037 <u>XY</u>	IFUNR- <u>XY</u>	The number of unrecovered I/F errors in the drive whose position is indicated as "XY" exceeded the threshold value. X: Port number Y: Row number	

Message code	Message text	Description	Recovery measures
I038 <u>XY</u>	CHRCV- <u>XY</u>	The number of recovered hardware errors in the drive whose position is indicated as “XY” exceeded the threshold value. X: Port number Y: Row number	Replace with the HDU ASSY to be supported. For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260
I039 <u>XY</u>	CHUNR- <u>XY</u>	The number of unrecovered hardware errors in the drive whose position is indicated as “XY” exceeded the threshold value. X: Port number Y: Row number	
I03A <u>XY</u>	SCRCV- <u>XY</u>	The number of recovered SCSI I/F errors in the drive whose position is indicated as “XY” exceeded the threshold value. X: Port number Y: Row number	
I03B <u>XY</u>	SCUNR- <u>XY</u>	The number of unrecovered SCSI I/F errors in the drive whose position is indicated as “XY” exceeded the threshold value. X: Port number Y: Row number	
I03C <u>XY</u>	ONVCOR- <u>XY</u>	The drive occurred in which the number of collectable errors in online verify exceeded whose position is indicated as “XY” exceeded the threshold value. X: Port number Y: Row number	
I03D <u>XY</u>	ONVUCR- <u>XY</u>	The drive occurred in which the number of uncollectable errors in online verify exceeded whose position is indicated as “XY” exceeded the threshold value. X: Port number Y: Row number	

Message code	Message text	Description	Recovery measures
I619XX	CTLRCV-XX	The controller degradation status was dissolved because the CTL ASSY was replaced. XX (00 or 01): Number of recovered controller	—
I61AXX	CMRCV-XX	The partial cache shutdown status was dissolved because the CTL ASSY was replaced. XX (00, 01, 02, or 03): Number of recovered cache slot XX = 00: Cache slots 0 and 4 were recovered. XX = 01: Cache slots 1 and 5 were recovered. XX = 02: Cache slots 2 and 6 were recovered. XX = 03: Cache slots 3 and 7 were recovered.	—
IZ1801	NOLUCHGPN	The system was started without the change of LU in charge because the PIN segment exists.	Turn the power off, then turn it on again. If the error is not recovered nevertheless, replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
IZ1802	NOLUCHGCS	The system was started without the change of LU in charge because the planned shutdown was not performed last time.	
IZ1803	NOLUCHGHS	The system was started without the change of LU in charge because the system type was "hot standby."	
IZ1804	NOLUCHGLU	The system was started without the change of LU in charge because the LU is not defined.	
—	REPLACE 0304 AFT	The microprogram of specified version cannot be installed for an update.	Install a microprogram of version 0304 or later for the update. For updating installation, refer to page M-FC0030.
—	BLOCK LEN UNMUCH AT CDEV OX	"HOST BLOCK SIZE" of the system parameter menu differs from the physical format size of the drive. X = 0 - 4 : Indicates the location of the drive whose physical format size is different.	Check the "HOST BLOCK SIZE" and the physical format size, and set them so that they have the following relation between each other. Physical format size of the drive : 516 →HOST BLOCK SIZE : 512 Physical format size of the drive : 524 →HOST BLOCK SIZE : 520

(3) Warning messages

Table 2.2.5 Warning Messages

Message code	Message text	Description	Recovery measures
W00F00	TOOMNYPIN	Planned shutdown could not be performed because the amount of PIN data was too large.	For detailed recovery procedure, see page TRBL0860.
W01000	POFFBODER	An attempt was made to store PIN data in the disk but failed because a hardware error occurred.	For detailed recovery procedure, see page TRBL0870.
W01100	SYSDTSVER	Planned shutdown could not be performed because there was no drive to which inherited information can be saved.	For detailed recovery procedure, see page TRBL0880.
W01200	POFFCMUNC	Planned shutdown could not be performed because PIN data could not be saved due to a cache error.	For detailed recovery procedure, see page TRBL0890.
W01300	USRDATLST	User data was lost because cache memory was volatile.	For detailed recovery procedure, see page TRBL0850.
W01400	PINOVER	The number of PIN segments exceeded its threshold.	For detailed recovery procedure, see page TRBL0900.
W015XX	CTLALM-XX	A controller degradation (due to a failure or unconnection) occurred. XX: Controller number (00 or 01)	Collect a cause of the regression from the panel and execute the recovery procedure concerned according to the table shown by “*1”. The regression cause can be collected by scrolling up the panel display (by pressing the  key).
W01600	SNMP INVL	The SNMP function is not started because SNMP information is not set.	Set SNMP information. For the setting of SNMP, see page TRBL1200.
W01601	FD ERR	The FD for setting SNMP information cannot be mounted.	Insert a correct FD for SNMP. For the setting of SNMP, see page TRBL1200.

*1 : Causes and recovery procedures of CTLALM-XX.

Display pattern	Cause	Recovery procedure
HZ65XX SYSCTLREV ↑ HZ60420 CTLFAIL (*3) ↑ W015XX CTLALM-XX	CTL ASSY revision is incorrect.	Go to the recovery procedure of HZ65XX SYSCTLREV on page TRBL0470.
HZ62XY FLSHREVXY ↑ HZ60420 CTLFAIL (*3) ↑ W015XX CTLALM-XX	Boot program revision on the CTL ASSY is incorrect.	Go to the recovery procedure of HZ62XY FLSHREVXY on page TRBL0470.
(Message other than SYSCTLREV and FLSHREVXY above.) ↑ HZ60420 CTLFAIL (*3) ↑ W015XX CTLALM-XX	Hardware failure of the CTL ASSY.	Replace the CTL ASSY in the regressed status. (*1).

*2 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

*3 : This message is not displayed in the case of the single controller configuration.

Message code	Message text	Description	Recovery measures
W01602	FOPN ERR	No setting file exists in the FD for setting SNMP information.	Insert a correct FD for setting SNMP information. For the setting of SNMP, see page TRBL1200.
W01603	FDR ERR	A read error occurred with the FD for setting SNMP information.	Insert a correct FD for setting SNMP information. For the setting of SNMP, see page TRBL1200.
W01604	FSIZE OV	The capacity of the file for setting SNMP information exceeded the specified size.	Insert a correct FD for setting SNMP information. For the setting of SNMP, see page TRBL1200.
W01605	RDEV MKER	A creation of a RAM device failed.	Retry. If the error is not recovered, replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
W01606	RDEV IER	An initialization of a RAM device failed.	
W01607	RDEV CER	A creation of a RAM device file failed.	
W01608	RDEV WER	A write operation to a RAM device file failed.	
W01609	SNMP ERR	The SNMP function was lost because OPTIMA detected an error	
W01700	GWAD ERR	The set gateway address is incorrect.	Set a correct gateway address.
W01800	SHTDWNWAR	Planned shutdown was not performed when the power was turned off the last time.	When the ENTER key is pressed, WARNING LED goes off and READY LED comes on. * If planned shutdown is not performed correctly when the power is turned off, data may be lost.

Message code	Message text	Description	Recovery measures
W10100	BATALM	A battery voltage error occurred.	Charge the battery for 24 hours or more and turn the breaker off, then turn it on again. If the message code disappears, use the battery as it is. If the error is not recovered, perform the replacements in the following order. ①Battery ASSY ②SVP ASSY (*1) For the replacement of the Battery ASSY, see the following pages. Desktop (DK) type : DK-REP0330 Desktop (DKH) type : DH-REP0400 Mini tower type : MK-REP0290 Cabinet type : CK-REP0290 Rackmount (RKH) type : RH-REP0310 Rackmount (RKWH) type : RW-REP0310 For the replacement of the SVP ASSY, see the following pages. *1: In case of desktop (DK/DKH) type, replace the CTL ASSY. Desktop type : DK-REP0310 Mini tower type : MK-REP0370 Cabinet type : CK-REP0370 Rackmount (RKH) type : RH-REP0390 Rackmount (RKWH) type : RW-REP0390
W202 ~~XY~~	DRVALM- ~~XY~~	A drive shutdown occurred. X: Port number Y: Row number	When this failure occurs, check whether W203~~XY~~ LUALM-~~XY~~ occurs and then recover the failure. (1) When W203~~XY~~ LUALM-~~XY~~ does not occur. Refer to “Detailed recovery procedure” on pages TRBL0890, TRBL0900, TRBL0910, and TRBL0920. When the subsystem is used with the AS/400 RAID0 host mirroring, refer to page TRBL0920. (2) When W203~~XY~~ LUALM-~~XY~~ occurs When the subsystem is used in the configuration or the mode shown below, W203~~XY~~ LUALM-~~XY~~ may occur. • When being used with the AS/400 RAID0 host mirroring. • When a blockade (W203~~XY~~ LUALM-~~XY~~) of an LU included in the drive indicated by XY is displayed during the use in the drive blockade mode (Option bit11=ON), follow the recovery procedure as W203~~XY~~ LUALM-~~XY~~.
W203 ~~XY~~	LUALM- ~~XY~~	A LU shutdown occurred. X: Target ID number Y: LU number	Reset the LU and execute a user data recovery by means of the backup (user backup) data. Refer to “Recovery procedure” on page TRBL1310. When the subsystem is used with the AS/400 RAID0 host mirroring or the AS/400 RAID0 host mirroring, refer to page TRBL1320.

Message code	Message text	Description	Recovery measures
W20C <u>XY</u>	SPINUP- <u>XY</u>	A spin up of the HDU ASSY inserted when the power supply was on failed. X: Port number Y: Row number	Insert the HDU ASSY again. If the same message is still displayed, replace the HDU ASSY. For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260
W20E <u>XY</u>	RDCAPA- <u>XY</u>	Read capacity data (sector length or last LBA) in the HDU ASSY inserted while the power was on is incorrect. X: Port number Y: Row number	Replace this HDU ASSY with the one supported. For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260
W304 <u>XX</u>	FANALM- <u>XX</u>	A fan error occurred. XX: Fan number	Replace the Fan ASSY For the replacement of the Fan ASSY, see the following pages. Desktop (DK) type : DK-REP0350,0370 Desktop (DKH) type : DH-REP0390 Mini tower type : MK-REP0280 Cabinet type : CK-REP0280 Rackmount (RKH) type : RH-REP0300 Rackmount (RKWH) type : RW-REP0300

Message code	Message text	Description	Recovery measures						
W405XX	PSALM-XX	A DC power error occurred. XX: Power supply number If a double failureof the power supplies occurs in the case of the rack mount type, it is assumed to be caused by a failure in the IN BOX ASSY. <table><tr><td>AC/DC #1</td><td>AC/DC #3</td></tr><tr><td>AC/DC #0</td><td>AC/DC #2</td></tr><tr><td>IN BOX #0</td><td>IN BOX #1</td></tr></table> When the AC/DC #1 and the AC/DC #0 fail, the IN BOX #0 is assumed to have failed. When the AC/DC #3 and the AC/DC #2 fail, the IN BOX #1 is assumed to have failed. Regarding the desktop type (DKH) subsystem, if XX=01 is displayed when the Power Unit (D) is installed, a failure occurred in the Power Unit (D). Replace the Power Unit (D).	AC/DC #1	AC/DC #3	AC/DC #0	AC/DC #2	IN BOX #0	IN BOX #1	Replace the AC/DC power supply. For the replacement of the AC/DC power supply, see the following pages. Desktop type : DK-REP0260 Mini tower type : MK-REP0380 Cabinet type : CK-REP0380 Rackmount (RKH) type : RH-REP0410 Rackmount (RKWH) type : RW-REP0410 Replace the IN BOX ASSY. For the replacement of the IN BOX ASSY, see the following pages. Rackmount (RKWH) type : RW-REP0450 Replace the Power Unit (D). For the replacement of the Power Unit (D), see the following pages. Desktop (DKH) type : DH-REP0370
AC/DC #1	AC/DC #3								
AC/DC #0	AC/DC #2								
IN BOX #0	IN BOX #1								
W508XY	CMALMX-YY	An unrecoverable cache access error occurred in P/K 0, P/K 1, P/K 2, or P/K 3. X: X indicates a controller number. X = 0: Controller number 0 X = 1: Controller number 1 X = 2: Controller numbers 0 and 1 Y: Y indicates a cache package number. Y = 0: Cache package numbers 0 and 4 Y = 1: Cache package numbers 1 and 5 Y = 2: Cache package numbers 2 and 6 Y = 3: Cache package numbers 3 and 7 YY: Cache package number YY=00: Cache package numbers 0 and 4 YY=01: Cache package number 1 and 5 YY=02: Cache package numbers 2 and 6 YY=03: Cache package numbers 3 and 7	Replace CACHE ASSY 0, 1, 2, or 3. For the replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420						
W60AXX	DMAALM-XX	An error occurred in DMA#0 or DMA#1. XX: DMA number	For detailed recovery procedure, see page TRBL0950.						
W619XX	FLSWAR-XX	The flash memory updating count exceeded the specified value.	Replace the CTL ASSY displayed. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0370 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330						

Message code	Message text	Description	Recovery measures
W622 <u>XY</u>	LAERR1- <u>XY</u>	An LA error occurred in DMA#1 (including LUN errors). X: Controller number Y: Transfer direction R: Read direction W: Write direction	For detailed recovery procedure, see page TRBL0960.
W623 <u>XY</u>	LRCER1- <u>XY</u>	An LRC error occurred in DMA#1 (including LUN errors). X: Controller number Y: Transfer direction R: Read direction W: Write direction	For detailed recovery procedure, see page TRBL0960.
W624 <u>XY</u>	LAERR2- <u>XY</u>	An LA error occurred in DMA#2 (including LUN errors). X: Controller number Y: Transfer direction R: Read direction W: Write direction	For detailed recovery procedure, see page TRBL0960.
W625 <u>XY</u>	LRCER2- <u>XY</u>	An LRC error occurred in DMA#2 (including LUN errors). X: Controller number Y: Transfer direction R: Read direction W: Write direction	For detailed recovery procedure, see page TRBL0960.
W626 <u>XY</u>	LAERR3- <u>XY</u>	An LA error occurred in DMA#3 (including LUN errors). X: Controller number Y: Transfer direction R: Read direction W: Write direction	For detailed recovery procedure, see page TRBL0960.
W627 <u>XY</u>	LRCER3- <u>XY</u>	An LRC error occurred in DMA#3 (including LUN errors). X: Controller number Y: Transfer direction R: Read direction W: Write direction	For detailed recovery procedure, see page TRBL0960.

(4) Failure messages

Table 2.2.5 Failure Messages

Message code	Message text	Description	Recovery measures
H00D00	DTLSTDWN	The user-specified system down was directed when data was lost.	Turn the power off, then turn it on again. For how to turn off/on the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
H00E00	POFSYSDWN	The user-specified system down was directed when planned shutdown was impermissible.	
H00FXX	POFCMER-XX	The system went down because an unrecoverable cache access error occurred during planned shutdown. This made PIN data inheritance impossible. XX = 00: Cache package number 0 or 4 XX = 01: Cache package number 1 or 5 XX = 02: Cache package number 2 or 6 XX = 03: Cache package number 3 or 7 XX = **: Cache package numbers cannot be identified.	Replace CACHE ASSY 0, 1, 2, or 3. For the replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420
H40200	DCVALM	A DC power voltage error occurred.	Replace the AC/DC power supply. For the replacement of the AC/DC power supply, see the following pages. Desktop (DK) type : DK-REP0260 Desktop (DKH) type : DH-REP370 Mini tower type : MK-REP0380 Cabinet type : CK-REP0380 Rackmount (RKH) type : RH-REP0410 Rackmount (RKWH) type : RW-REP0400
H50BXX	PONCMERXX	An unrecoverable cache access error occurred when the P/S is on. XX = 00: Cache package number 0 or 4 XX = 01: Cache package number 1 or 5 XX = 02: Cache package number 2 or 6 XX = 03: Cache package number 3 or 7 XX = **: Cache package numbers cannot be identified.	Replace CACHE ASSY 0, 1, 2, or 3. For the replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420

Message code	Message text	Description	Recovery measures
H540XX	ECCW-XX	A parity error was detected when data was being written to cache memory. XX = 00: Cache package number 0 or 4 XX = 01: Cache package number 1 or 5 XX = 02: Cache package number 2 or 6 XX = 03: Cache package number 3 or 7 XX = **: Cache package numbers cannot be identified.	Replace CACHE ASSY 0, 1, 2, or 3. For the replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420
H541XX	ECCG-XX	An ECC generation error was detected when data was being written to cache memory. XX = 00: Cache package number 0 or 4 XX = 01: Cache package number 1 or 5 XX = 02: Cache package number 2 or 6 XX = 03: Cache package number 3 or 7 XX = **: Cache package numbers cannot be identified.	
H542XX	ECCU-XX	An uncorrectable error was detected when data was being read into cache memory. XX = 00: Cache package number 0 or 4 XX = 01: Cache package number 1 or 5 XX = 02: Cache package number 2 or 6 XX = 03: Cache package number 3 or 7 XX = **: Cache package numbers cannot be identified.	
H543XX	ECCC-XX	An ECC correction error occurred when data was being written to cache memory. XX = 00: Cache package number 0 or 4 XX = 01: Cache package number 1 or 5 XX = 02: Cache package number 2 or 6 XX = 03: Cache package number 3 or 7 XX = **: Cache package numbers cannot be identified.	

Message code	Message text	Description	Recovery measures
H544YY	ECCULP-YY	Processing cannot be continued because an unrecoverable ECC error occurred. YY = 00: Controller 0 cannot continue the processing. YY = 01: Controller 1 cannot continue the processing.	Replaced the CTL ASSY indicated by YY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H60401	RGDP1ERR	A parity error occurred in one of data bits 08 to 15.	Replace the CTL ASSY in which the error was detected. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H60402	RGDP0ERR	A parity error occurred in one of data bits 00 to 07.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H60403	SQCNTERR	A sequence counter error occurred.	
H60404	WCDG1PERR	A parity error occurred in one of counter bits 00 to 07 for watchdog timers.	
H60405	RDRGWRERR	A write operation was instructed to the read-only register.	
H60419	LANPERR	A data bus parity error occurred in an LSI for LANCTL.	For detailed recovery procedure, see page TRBL0980.
H60420	RGDP3ERR	A parity error occurred in one of data bits 24 to 31.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H60421	RGDP2ERR	A parity error occurred in one of data bits 16 to 23.	
H60422 (*1)	CTLFAIL	A CTL FAIL failure of other system was detected.	
H60428	CTCCHOPER	A parity error occurred in timer CH0.	
H60429	CTCPH1PER	A parity error occurred in timer CH1.	
H6042A	REG2BWR	2-byte data was written to the 4-byte register.	
H61101	PROTOUT	A reception waiting timeout occurred. (Communication)	
H61102	RSMTOUT	A release waiting timeout occurred. (Integrated resource management)	
H61104	LUCTOUT	A timeout occurred during LU switching.	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
H61105	OFWTOUT	A timeout of waiting communication with another system occurred during offline monitoring.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H61200	PONDMAERR	A DMA hardware error occurred when the P/S is on.	
H61501 (*1)	IMPTY1	A parity error occurred in another system during MPU processing. (owning controller recognized the error.)	
H61502 (*1)	IMRDTY	A ready timeout (RDYTIMEOUT) was detected in another system during MPU processing. (owning controller recognized the error.)	
H61503 (*1)	IMPTY0	A parity error occurred in own system during MPU processing. (The controller of own system detected it.)	
H61504 (*1)	IMSEQ	A sequencer error was detected in own system during MPU processing. (The controller of own system detected it.)	
H61505 (*1)	ICLKERR	A clock error of another system was detected on the dual I/F.	
H61506 (*1)	DMPERR	A bus failure occurred when the MPU was accessing the controller of another system.	
H61507 (*1)	DMPCOR	An ECC error occurred when the MPU was accessing the controller of another system.	
H61508 (*1)	DMPARB	An arbitration error occurred when the MPU was accessing the controller of another system.	
H61509 (*1)	EADRPERR2	An address parity error occurred in another system when DMA2 was in use.	
H6150A (*1)	EADRPERR1	An address parity error occurred in another system when DMA0 was in use.	
H6150B (*1)	EADRPERR0	An address parity error occurred in another system when the MPU was in use.	
H6150C (*1)	EMPTY1	A parity error occurred in another system during MPU processing. (non-owning controller recognized the error.)	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
H6150D (*1)	EMRDYT	A ready timeout (RDYTIMEOUT) occurred in another system during MPU processing. (The controller of another system detected it.)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H6150E (*1)	EMPTY0	A parity error occurred in own system during MPU processing. (The controller of another system detected it.)	
H6150F (*1)	EMSEQ	A sequencer error occurred in own system during MPU processing. (The controller of another system detected it.)	
H61510 (*1)	ECLKERR	A clock error occurred in the controller of another system.	
H61511 (*1)	ID2PTY1	A parity error occurred in another system when DMA#2 was in used.	
H61512 (*1)	ID2RDYT	A ready timeout (RDYTIMEOUT) was detected in another system when DMA#2 was in use. (The controller of own system detected it.)	
H61513 (*1)	ID2PTY0	A parity error was detected in own system when DMA#2 was in use. (The controller of own system detected it.)	
H61514 (*1)	ID2SEQ	A sequencer error was detected in own system when DMA#2 was in use. (The controller of own system detected it.)	
H61515 (*1)	ED2PTY1	A parity error of another system was detected when DMA#2 was in use.	
H61516 (*1)	ED2RDYT	A ready timeout (RDYTIMEOUT) was detected in another system when DMA#2 was in use. (The controller of own system detected it.)	
H61517 (*1)	ED2PTY0	A parity error was detected in own system when DMA#2 was in use. (The controller of own system detected it.)	
H61518 (*1)	ED2SEQ	A sequence error was detected in own system when DMA#2 was in use. (The controller of own system detected it.)	
H61519 (*1)	ID0PTY1	A parity error was detected in another system when DMA#0 was in used. (The controller of another system detected it.)	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
H6151A (*1)	ID0RDYT	A ready timeout (RDYTIMEOUT) was detected in another system when DMA#0 was in use. (The controller of another system detected it.)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H6151B (*1)	IDPTY0	A parity error was detected in own system when DMA#0 was in use. (The controller of another system detected it.)	
H6151C (*1)	ID0SEQ	A sequencer error was detected in own system when DMA#0 was in use. (The controller of another system detected it.)	
H6151D (*1)	ED0PTY1	A parity error was detected in another system when DMA#0 was in use. (The controller of own system detected it.)	
H6151E (*1)	ED0RDYT	A ready timeout (RDYTIMEOUT) was detected in another system when DMA#0 was in use. (The controller of own system detected it.)	
H6151F (*1)	ED0PTY0	A parity error was detected in own system when DMA#0 was in use. (The controller of own system detected it.)	
H61520 (*1)	ED0SEQ	A sequence error was detected in own system when DMA#0 was in use. (The controller of own system detected it.)	
H61521 (*1)	ID1BPTY1	A parity error (PTYERR) of own system was detected in DUAL when DMA1B was in use. (The controller of own system detected it.)	
H61522 (*1)	ID1BRDYT	A ready timeout (RDYTIMEOUT) of another system was detected in DUAL when DMA1B was in use. (The controller of own system detected it.)	
H61523 (*1)	ID1BPTY0	A parity error (PTYERR) of another system was detected in DUAL when DMA1B was in use. (The controller of own system detected it.)	
H61524 (*1)	ID1BSEQ	A sequencer error (SEQERR) of own system was detected in DUAL when DMA1B was in use. (The controller of own system detected it.)	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
H61525 (*1)	ED1BPTY1	A parity error (PTYERR) of own system was detected in DUAL when DMA1B was in use. (The controller of another system detected it.)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H61526 (*1)	ED1BRDYT	A ready timeout (RDYTIMEOUT) of another system was detected in DUAL when DMA1B was in use. (The controller of another system detected it.)	
H61527 (*1)	ED1BPTY0	A parity error (PTYERR) of another system was detected in DUAL when DMA1B was in use. (The controller of another system detected it.)	
H61528 (*1)	ED1BSEQ	A sequencer error (SEQERR) of own system was detected in DUAL when DMA1B was in use. (The controller of another system detected it.)	
H61529 (*1)	D1BICKERR	An ICLHERR was detected in DUAL when DMA1B was in use. (The controller of own system detected it.)	
H6152A (*1)	D1BECLKERR	An ECLHERR was detected in DUAL when DMA1B was in use. (The controller of another system detected it.)	
H6152B (*1)	DDM1BDTE	A data transfer error was detected during access to DMA1B.	
H61531 (*1)	ID1PTY1	A parity error (PTYERR) of own system was detected in DUAL when DMA1 was in use. (The controller of own system detected it.)	
H61532 (*1)	ID1RDYT	A read timeout (RDYTIMEOUT) of another system was detected in DUAL when DMA1 was in use. (The controller of own system detected it.)	
H61533 (*1)	ID1PTY0	A parity error (PTYERR) of own system was detected in DUAL when DMA1 was in use. (The controller of own system detected it.)	
H61534 (*1)	ID1SEQ	A sequencer error (SEQERR) of own system was detected in DUAL when DMA1 was in use. (The controller of own system detected it.)	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
H61535 (*1)	ED1PTY1	A parity error (PTYERR) of own system was detected in DUAL when DMA1 was in use. (The controller of another system detected it.)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
H61536 (*1)	ED1RDYT	A ready timeout (RDYTIMEOUT) of another system was detected in DUAL when DMA1 was in use. (The controller of another system detected it.)	
H61537 (*1)	ED1PTY0	A parity error (PTYERR) of another system was detected in DUAL when DMA1 was in use. (The controller of another system detected it.)	
H61538 (*1)	ED1SEQ	A sequencer error (SEQERR) of own system was detected in DUAL when DMA1 was in use. (The controller of another system detected it.)	
H61539 (*1)	D1ICLKERR	An ICLHERR was detected in DUAL when DMA1 was in use. (The controller of own system detected it.)	
H6153A (*1)	D1ECLKERR	An ECLKERR was detected in DUAL when DMA1 was in use. (The controller of another system detected it.)	
H6153B (*1)	DDM1DTE	A data transfer failure was detected during access to DMA1.	
H61900	CMCPYERR	A failure was detected during a cache recovery in an online recovery.	
H61B00 (*1)	DDM2DTE	A data failure was detected during DMA#2 access.	
H61C00 (*1)	DDM0DTE	A data failure was detected during DMA#0 access.	
H61D00	DMAFRSTNG	DMA forcible shutdown failed.	
H61E00	POFMTEWAR	A destaging hangup of another system was detected during planned shutdown.	
H61F00	DRRRSTNG	DRR hardware error end reset failed.	
H61F01	DMA3RSTNG	DMA1B hardware error end reset failed.	
H66000	LRCGENERR	An LRC generation error occurred.	
H66100	SHRTOUT	A shared communication time out occurred.	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
HZ0100	ACFAIL	An AC power error occurred.	Turn the power off, then turn it on again. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ0406	WRRGRDERR	A read operation was instructed to the write-only register.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0407	ROMWRERR	A write operation occurred in the BOOT ROM area.	
HZ0408	RDYTMOUT	The ready signal could not be received within 1 millisecond.	
HZ0409	PTYERR0	A parity error occurred in one of data bits 8 to 15.	
HZ0410	PTYERR1	1 A parity error occurred in one of data bits 0 to 7.	
HZ0415	DBF2BWR	A 2-byte write operation occurred in the 4-byte boundary DBF.	
HZ0501	SEGPOSERR	An incorrect cache write segment location was detected.	
HZ0502	WRNODTYBK	An attempt was made to write a block that is not dirty to the drive.	
HZ0503	WRNODTYSG	An attempt was made to write a segment that is not dirty to the drive.	Retry. If the error is not recovered, replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0504	RDDTYBLK	An attempt was made to read data into a dirty block.	
HZ0505	RDSEGERR	Check of the segment to be read	
HZ0506	WSGQATERR	A conflict of the write segment queue attribute occurred.	

Message code	Message text	Description	Recovery measures
HZ0507	WSEGPDEV	A conflict occurred between the write segment and corresponding PDEV.	Retry. If the error is not recovered, replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0508	WSEGLOCK	A segment lock conflict occurred when data was being written.	
HZ0509	CCPLUNERR	An invalid LUN was detected when data was being copied between caches.	
HZ0510	CCPLBAERR	An invalid LBA was detected when data was being copied between caches.	
HZ0511	PARLAERR	An invalid LA was detected during parity generation.	
HZ0512	PARLUNERR	An invalid LUN was detected during parity generation.	
HZ0513	PARLBAERR	An invalid LBA was detected during parity generation.	
HZ0514	QUEUEEERR	A queue transition conflict occurred.	
HZ0515	COWDRVERR	Data to be written collectively is dispersed to several PDEVs.	
HZ0516	LACHEKMOD	A conflict occurred in a LA check.	
HZ0517	DSTPOSERR	An invalid write location was detected during destaging.	
HZ0518	DSTLAERR	An invalid LA was detected during destaging.	
HZ0519	SEGDOSOTH	An invalid cache write segment location was detected.	
HZ051A	PARLAOTH	An invalid LA was detected during parity generation.	
HZ051B (*1)	CMPNGHC	A compare error occurred in the double-written SGCB. (Unspecialized cache write)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ051C (*1)	CMPNGSP	A compare error occurred in the double-written SGCB. (Specialized cache write)	
HZ051D (*1)	CMPNGPA	A compare error occurred in the double-written SGCB. (Parity generation)	
HZ051E (*1)	CMPNGCP	A compare error occurred in the double-written SGCB. (Copy between caches)	

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

Message code	Message text	Description	Recovery measures
HZ051F (*1)	CMPNGCTL	A compare error occurred in the double-written SGCB. (Copy between CTLs)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0520 (*1)	CMPNGDC	A compare error occurred in the double-written SGCB. (Data transfer from drive to cache)	
HZ0521 (*1)	CMPNGCD	A compare error occurred in the double-written SGCB. (Data transfer from cache to drive)	
HZ0522 (*1)	CCPLAERR	An invalid LA was detected when data was being copied between caches.	
HZ0601	STRSIZECHG	The message shown on the left is issued for the following two causes. - The stripe size was changed after installation. - In a microprogram replacement, installation to update the Ver.0305/B or later to the Ver.0305 or earlier was executed.	The message is issued when the “STRIPE SIZE” on the system parameter is changed after the LU definition. Reset the “STRIPE SIZE” of the system parameter to the value same as that at the time of the LU definition. For the procedure for setting the system parameter, see page PANEL0080. The installation to update the microprogram to the Ver.0305 or earlier cannot be executed in the state Micro-Disk Ver.0305/B or later is used. Reexecute the updating installation of Micro-Disk Ver.0305/B or later.
HZ0602	LBASIZECHG	The host LBA size of the LU was changed after installation.	The message is issued when the “HOST BLK SIZE” on the system parameter is changed after the LU definition. Reset the “HOST BLK SIZE” of the system parameter to the value same as that at the time of the LU definition. For the procedure for setting the system parameter, see page PANEL0080.
HZ0603	SPDUSED	“No spare disk” was set while a spare disk was in use.	Re-specify the system parameter correctly. For the setting of the system parameters, see the following pages. Desktop (DK) type : DK-INST0240 Desktop (DKH) type : DH-INST0270 Mini tower type : MK-INST0270 Cabinet type : CK-INST0290 Rackmount (RKH) type : RH-INST0290 Rackmount (RKWH) type : RW-INST0290

*1 : If the same error message is issued after the replacement, replace another CTL ASSY. (i.e. if CTL0 fails again, replace CTL1.)

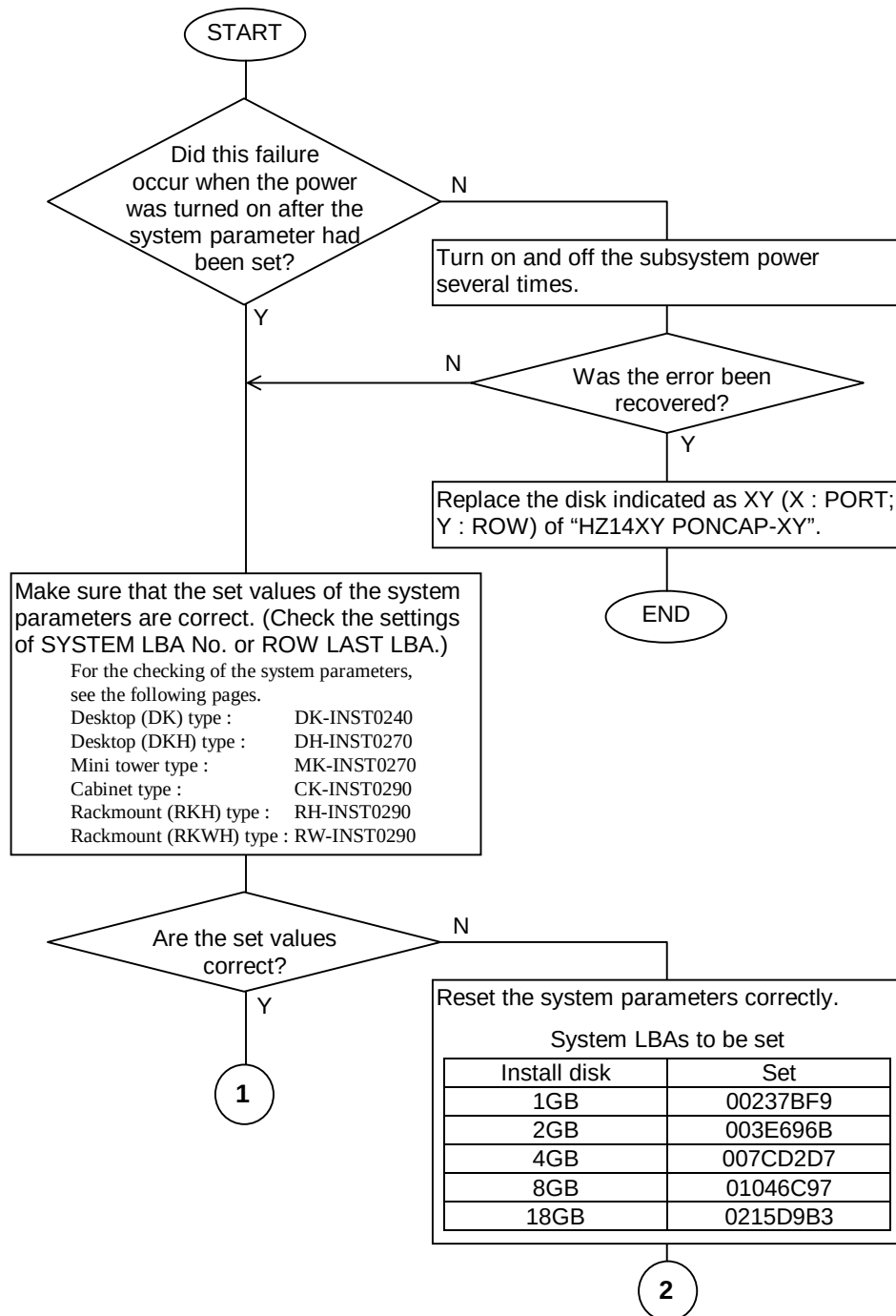
Message code	Message text	Description	Recovery measures
HZ0701	NOSYSTDRV	The system areas of all drives became unusable.	Retry. If the error is not recovered, replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH- REP0430 Mini tower type : MK- REP0310 Cabinet type : CK- REP0310 Rackmount (RKH) type : RH- REP0330 Rackmount (RKWH) type : RW- REP0330
HZ0702	NOSYSTDAT	Inheritance information in the system area is determined for none of the drives.	

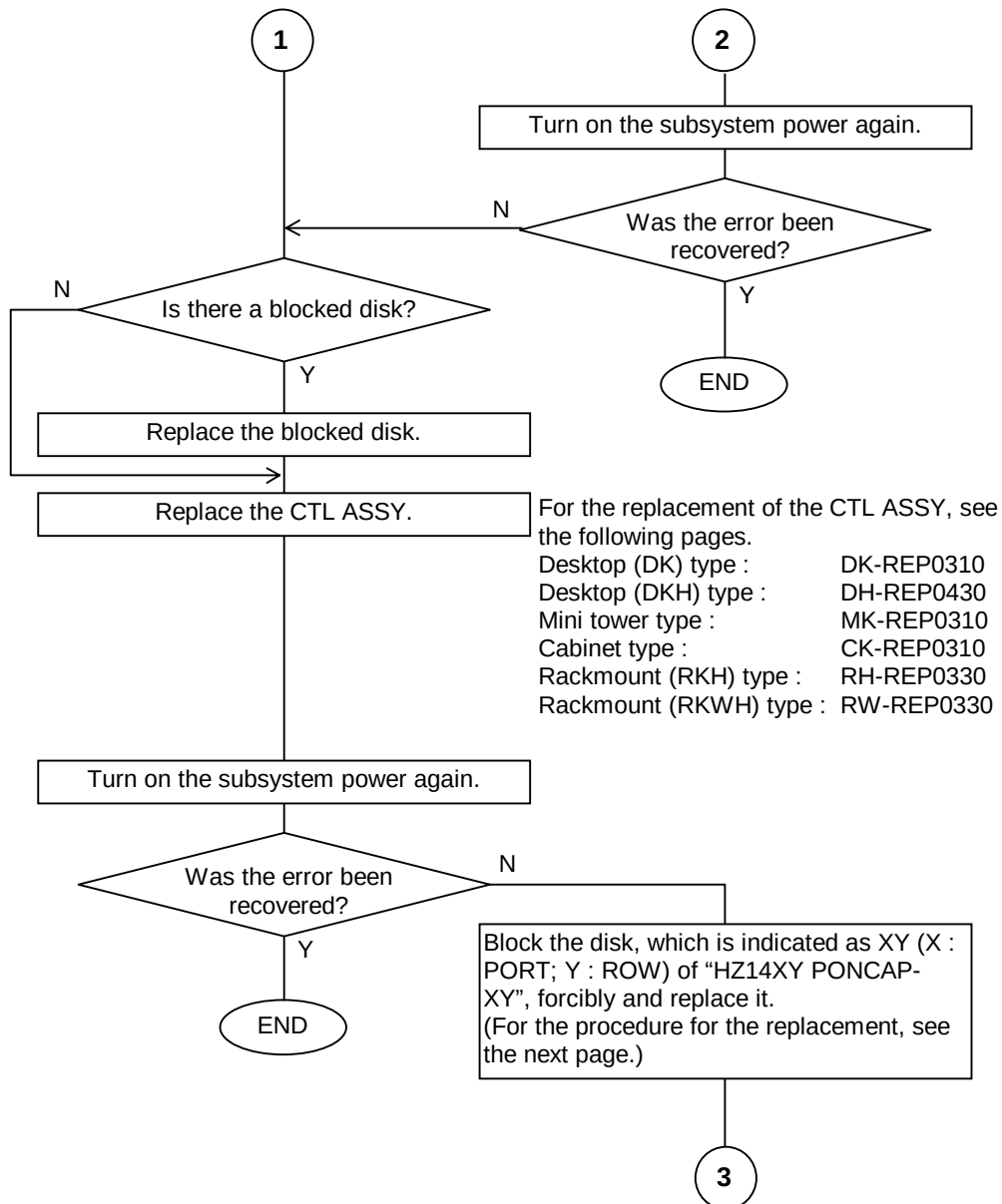
Message code	Message text	Description	Recovery measures
HZ0801	CACHE4MB	No directory can be created because the cache capacity is 4Mbytes.	Check the installed CACHE ASSY.
HZ0802	PINSEGOV	Segments on a cache are not enough to recover PIN data of inheritance information.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0902	UNSPTDRV	An unsupported drive was mounted when the P/S was turned on.	Replace the HDU ASSY with a supported one. For the replacement of the HDU ASSY, see the following pages. Desktop (DK) type : DK-REP0210 Desktop (DKH) type : DH-REP0200 Mini tower type : MK-REP0240 Cabinet type : CK-REP0240 Rackmount (RKH) type : RH-REP0260 Rackmount (RKWH) type : RW-REP0260
HZ0A00	JOBMKERR	Job generation when the system was started failed. (A kind of logical error)	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0A01	TASKMKERR	Task generation when the system was started failed. (A kind of logical error)	Check if the CACHE ASSY #0 is installed. If it is installed, replace the CTL ASSY. For the replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420 For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ0C00	WCDGTOUT	A watchdog timeout occurred.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ1001	RSOPENERR	An RS232 open error occurred.	Replace the RS232C cable or the I/F ADAPTER ASSY. For the replacement of the I/F ADAPTER ASSY, see the following pages. Desktop (DK) type : DK-REP0280 Desktop (DKH) type : DH-REP0410 Mini tower type : MK-REP0350 Cabinet type : CK-REP0350 Rackmount (RKH) type : RH-REP0370 Rackmount (RKWH) type : RW-REP0370

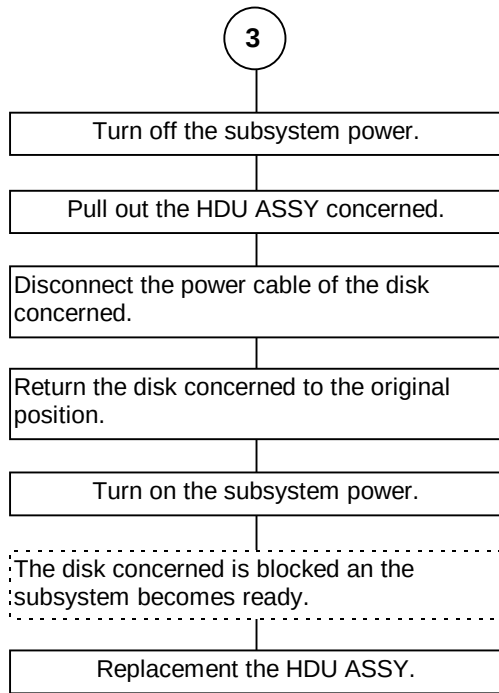
Message code	Message text	Description	Recovery measures
HZ1002	SOOPENERR	A socket open error occurred.	Replace the cable or the I/F ADAPTER ASSY. For the replacement of the I/F ADAPTER ASSY, see the following pages. Desktop (DK) type : DK-REP0280 Desktop (DKH) type : DH-REP0410 Mini tower type : MK-REP0350 Cabinet type : CK-REP0350 Rackmount (RKH) type : RH-REP0370 Rackmount (RKWH) type : RW-REP0370
HZ1003	ACOPENERR	An accept open error occurred.	
HZ1100	PSONTOUT	A timeout occurred during forcible parity recovery when the P/S was on.	Replace the HDU or CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ1103	POFTOUT	A waiting timeout of the communication with another system occurred during planned shutdown.	Replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ1301	POFNONCLD	An attempt was made to turn off the PS when inheritance information is not COLD.	Press the PS OFF switch, turn the PS on, then turn it off again. For turning off/on of the power, see the following pages. Desktop type : DK-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ1302	POFSEQERR	A sequencer error was detected during PS-off processing.	
HZ14XY	PONCAP-XY	A disk whose capacity is less than the specified value was connected when the P/S was on. X: Port number Y: Row number	Perform the recovery operation following the PONCAP recovery procedure shown on the next page.

PONCAP recovery procedure

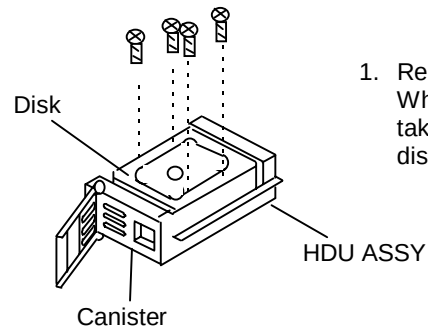
Note : Perform the recovery in the state that a host I/O is not instructed.



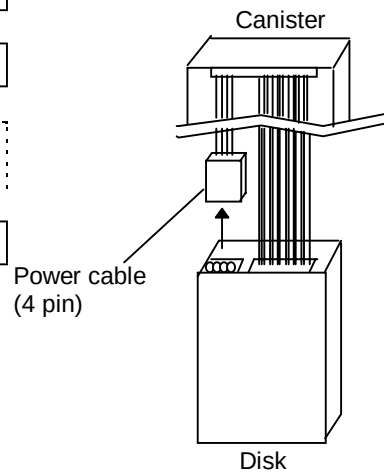




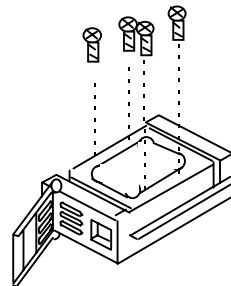
How to disconnect the power cable



1. Remove the screws. When removing the screws, take care not to drop the disk.



2. Disconnect the power cable (with the 4 pin connector) of the disk.



3. Reinstall the screws on the disk with the power cable removed, and then install the disk in the canister.

Message code	Message text	Description	Recovery measures
HZ1500	DRVSTERR	The disk used the last time was not mounted when the P/S was on.	Check the disk mounting location.
HZ1601	SYSCHGPIN	The system transition cannot be performed because a PIN segment exists.	Retry. If the error is not recovered, replace the CTL ASSY whose FAIL LED is on. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ1602	SYSCHGPOF	The system transition cannot be performed because the last planned shutdown was not executed.	
HZ1603	SYSCHGCTL	The system transition cannot be performed because the controller is degraded.	
HZ1604	SYSCHGNG	The system transition cannot be performed because the system from which the transition is to be performed is not supported.	
HZ1701	CMPKGCNS	A system down occurred because the cache package configuration differs between controllers.	
HZ21YY	EEPROM-YY	The system parameter is not set. XX: Number of the controller for which the system parameter is not set	Make the CACHE ASSY configurations of the CTL ASSYs same. For the replacement of the CACHE ASSY, see the following pages. Desktop (DK) type : DK-REP0390 Desktop (DKH) type : DH-REP0510 Mini tower type : MK-REP0410 Cabinet type : CK-REP0410 Rackmount (RKH) type : RH-REP0440 Rackmount (RKWH) type : RW-REP0420
HZ2200	ROWLBACHG	ROW LAST LBA for the LU-defined disk was changed.	
HZ2400	M-CADROV	A cache address over occurred during access to the MPU.	
HZ2401	D0-CADROV	A cache address over occurred during access to the DMA0.	Set the system parameter. For the setting of the system parameters, see the following pages. Desktop (DK) type : DK-INST0240 Desktop (DKH) type : DH-INST0270 Mini tower type : MK-INST0270 Cabinet type : CK-INST0290 Rackmount (RKH) type : RH-INST0290 Rackmount (RKWH) type : RW-INST0290
HZ2402	D1-CADROV	A cache address over occurred during access to the DMA1.	
HZ2403	D2-CADROV	A cache address over occurred during access to the DMA2.	
HZ2404	D1B-CADROV	A cache address over occurred during access to the DMA1B.	
HZ51YY	ROMINF-YY	An invalid interface between the boot program and RAM program occurred. YY = 00: Controller number 0 YY = 01: Controller number 1	
			Retry. If the error is not recovered, replace the CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
			Turn the power off, then turn it on again. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050

Message code	Message text	Description	Recovery measures
HZ5500	SYSACCERR	When NOSYSDRV error occurs by a current system area access error, the last system DRV is not blocked and only the CTL is blocked.	Replace blocked CTL ASSY. For the replacement of the CTL ASSY, see the following pages. Desktop (DK) type : DK-REP0310 Desktop (DKH) type : DH-REP0430 Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ62XY	FLSHREVXY	The CTL ASSY which currently installed micro-program could not operate was detected. X : CTL# which output this message Y : Inoperable CTL# (When "Y" is "*", it indicates both CTLs.)	If "I01EYY CHNG PBY Y" is displayed immediately preceding this message, follow the recovery procedure for the message "I01EYY CHNG PB-YY" shown on page TRBL0270. If the above message is not displayed immediately preceding this message, execute the recovery following the procedure below. Replace the CTL ASSY with the one having the following revision number. Microprogram Ver.0303xx (xx is optional) →PB.24 and later Microprogram Ver.0304xx (xx is optional) →PB.26 and later
HZ6300	SYSPRMREV	A function which the system does not support is set.	A function which the system does not support in system parameters is set to valid. Verify the system parameter setting.
HZ65XX	SYSCTLREV	This is a revision in which the controller does not support WolfPack in the dual configuration. XX : No. of the CTL which does not support WolfPack.	Replace the CTL ASSY with the one which supports WolfPack. For the replacement of the CTL ASSY, see the following pages. Mini tower type : MK-REP0310 Cabinet type : CK-REP0310 Rackmount (RKH) type : RH-REP0330 Rackmount (RKWH) type : RW-REP0330
HZ9100	MICROINM	An internal error (invalid setting of the system operation status flag) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9200	MICROPOF	An internal error (invalid internal processing code) occurred in the subsystem.	
HZ9201		An internal error (invalid start factor from kernel) occurred in the subsystem.	
HZ9202		An internal error (invalid POST code) occurred in the subsystem.	
HZ9203		An internal error (block size over of the trace area) occurred in the subsystem.	
HZ9300	MICRORST	An internal error (invalid startup of communication reception processing) occurred in the subsystem.	
HZ9400	MICROSCK	An internal error (invalid system operation flag) occurred in the subsystem.	
HZ9410		An internal error (parameter error occurs "when a job is generated") occurred in the subsystem.	
HZ9411		An internal error (parameter error occurs "when a job is canceled") occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9412	MICROSCK	An internal error (parameter error occurs “when the overlay load status is checked”) in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9413		An internal error (parameter error occurs “during overlay load waiting”) occurred in the subsystem.	
HZ9414		An internal error (parameter error occurs “when a region is deallocated”) occurred in the subsystem	
HZ9420		An internal error (an error occurs “when the job is started with an invalid job address” occurred in the subsystem.	
HZ9430		An internal error (occurrence of “event waiting” when a job timeout error without a factor is detected) occurred in the subsystem.	
HZ9431		An internal error (occurrence of “resource waiting” when a job timeout error without a factor is detected) occurred in the subsystem.	
HZ9432		An internal error (occurrence of “unclear wait factor” when a job timeout error without a factor is detected) occurred in the subsystem.	
HZ94Z0		An internal error (invalid interrupt disabled status occurs “before the monitoring job is started”) occurred in the subsystem.	
HZ94Z1		An internal error (invalid interrupt disabled status occurs “after the monitoring job is started”) occurred in the subsystem.	
HZ9600	MICRORMS	An internal error (invalid startup of communication reception processing) occurred in the subsystem.	
HZ9610		An internal error (parameter error “extent resource allocation”) occurred in the subsystem.	
HZ9611		An internal error (parameter error “extent resource deallocation”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9612	MICRORMS	An internal error (parameter error “registration of an extent resource queue”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9613		An internal error (parameter error “forcible deallocation of extent resource waiting”) occurred in the subsystem.	
HZ9620		An internal error (parameter error “job resource deallocation”) occurred in the subsystem.	
HZ9621		An internal error (segment resource deallocation omission “allocated SEG or free area waiting”) occurred in the subsystem.	
HZ9622		An internal error (segment resource deallocation omission “allocation of a physically dirty section”) occurred in the subsystem.	
HZ9623		An internal error (segment resource deallocation omission “specific SGCB”) occurred in the subsystem.	
HZ9624		An internal error (extent resource deallocation omission) occurred in the subsystem.	
HZ9630		An internal error (invalid value of integrated resource management lock counter) occurred in the subsystem.	
HZ9A00	MICROCMD	An internal error (invalid command main starting factor “NON_REQ”) occurred in the subsystem.	
HZ9A01		An internal error (invalid command main starting factor “WAT_TOV”) occurred in the subsystem.	
HZ9A02		An internal error (invalid command main starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9A03		An internal error (invalid command main starting factor “0”) occurred in the subsystem.	
HZ9A10		An internal error (invalid processing code in JCB work area) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9A11	MICROCMD	An internal error (posting of “PDEV” with an invalid POST code) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9A12		An internal error (posting of “HDMA” with an invalid POST code) occurred in the subsystem.	
HZ9A13		An internal error occurred (start with an unexisting factor when restarted after interruption) occurred in the subsystem.	
HZ9A21		An internal error (invalid start factor “ABORT”) occurred in the subsystem.	
HZ9A22		An internal error (invalid starting factor “timeout error”) occurred in the subsystem.	
HZ9A23		An internal error (invalid host code “host data transfer”) occurred in the subsystem.	
HZ9A24		An internal error (invalid host code “SKIPMASK copy”) occurred in the subsystem.	
HZ9A25		An internal error (invalid host code “read error check”) occurred in the subsystem.	
HZ9A26		An internal error (invalid host code “parity generation”) occurred in the subsystem.	
HZ9A27		An internal error (invalid host code “destaging”) occurred in the subsystem.	
HZ9A28		An internal error (invalid host code “copy between caches”) occurred in the subsystem.	
HZ9A29		An internal error (invalid host code “data generation”) occurred in the subsystem.	
HZ9A40		An internal error (invalid reconnection during ReqSense PIO transfer) occurred in the subsystem.	
HZ9A41		An internal error (invalid reconnection during PIO transfer for ReqSense reconnection restart) occurred in the device.	
HZ9A42		An internal error (invalid ReqSense starting factor) occurred in the subsystem.	
HZ9A43		An internal error (invalid starting factor when ReqSense is restarted after interruption) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9A51	MICROCMD	An internal error (invalid starting factor "MAIN") occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9A52		An internal error (invalid starting factor "timeout") occurred in the subsystem.	
HZ9A53		An internal error (invalid starting factor "P/S OFF & ABORT") occurred in the subsystem.	
HZ9A54		An internal error (invalid starting factor "timeout & P/S OFF & ABORT") occurred in the subsystem.	
HZ9A55		An internal error (invalid start factor "interruption request") occurred in the subsystem.	
HZ9A56		An internal error (invalid detail code "event restart") occurred in the subsystem.	
HZ9A57		An internal error (invalid waiting factor code "timeout restart") occurred in the subsystem.	
HZ9A58		An internal error (invalid waiting factor code "ABORT restart") occurred in the subsystem.	
HZ9A59		An internal error (invalid waiting factor code "timeout, ABORT restart") occurred in the subsystem.	
HZ9A5A		An internal error (extent lock disabled "format check") occurred in the subsystem.	
HZ9A5B		An internal error (invalid RAID level "PDEV check") occurred in the subsystem.	
HZ9A5C		An internal error (invalid RAID level "PDEV check at expansion") occurred in the subsystem.	
HZ9A5D		An internal error (invalid internal status "DRR termination waiting") occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9A5E	MICROCMD	An internal error (invalid loop counter “PDEV termination waiting”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9A5F		An internal error (invalid RAID level “dirty map deletion”) occurred in the subsystem.	
HZ9A5G		An internal error (invalid loop counter “I/O list creation”) occurred in the subsystem.	
HZ9A60		An internal error (“event” started according to invalid starting factor) occurred in the subsystem.	
HZ9A61		An internal error (“starting factor 1” started according to invalid starting factor) occurred in the subsystem.	
HZ9A70		An internal error (“starting factor 1” started according to invalid starting factor) occurred in the subsystem.	
HZ9A71		An internal error (“resource” started according to invalid starting factor) occurred in the subsystem.	
HZ9A72		An internal error (“event” started according to invalid starting factor) occurred in the subsystem.	
HZ9A73		An internal error (invalid processing code in JCB work area “at initial startup”) occurred in the subsystem.	
HZ9A74		An internal error (invalid processing code in JCB work area “extent resource”) occurred in the subsystem.	
HZ9A75		An internal error (invalid processing code in JCB work area “segment resource”) occurred in the subsystem.	
HZ9A76		An internal error (invalid processing code in JCB work area “event”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9A90	MICROCMD	An internal error (invalid Read With Skip Mask starting factor “in normal processing”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9A91		An internal error (invalid Read With Skip Mask starting factor “at processing interruption”) occurred in the subsystem.	
HZ9AA0		An internal error (invalid Write With Skip Mask starting factor “at normal processing”) occurred in the subsystem.	
HZ9AA1		An internal error (invalid Write With Skip Mask starting factor “at processing interruption”) occurred in the subsystem.	
HZ9AB0		An internal error (invalid inquiry starting factor) occurred in the subsystem.	
HZ9AB1		An internal error (invalid starting factor when inquiry interruption is requested) occurred in the subsystem.	
HZ9AC0		An internal error (invalid starting factor for ModeSel job elimination waiting) occurred in the subsystem.	
HZ9AC1		An internal error (invalid starting factor for ModeSel PDEV termination waiting) occurred in the subsystem.	
HZ9AC2		An internal error (reception of ModeSel unknown starting factor) occurred in the subsystem.	
HZ9AC3		An internal error (ModeSel conflict recovery, invalid page execution) occurred in the subsystem.	
HZ9AC4		An internal error (ModeSel conflict recovery, invalid updating flag) occurred in the subsystem.	
HZ9AC5		An internal error (ModeSel shutdown processing, invalid page execution) occurred in the subsystem.	
HZ9AC6		An internal error (ModeSel shutdown processing, invalid updating flag) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9AD0	MICROCMD	An internal error (invalid ModeSense starting factor “NON_REQ”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9AD1		An internal error (invalid ModeSense startup factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AE0		An internal error (invalid ReadCap starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AE1		An internal error (invalid ReadCap starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AF0		An internal error (invalid Reserve starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AF1		An internal error (invalid Reserve starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AG0		An internal error (invalid Release starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AG1		An internal error (invalid Release starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AH0		An internal error (invalid SendDiag starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AH1		An internal error (invalid SendDiag event waiting status) occurred in the subsystem.	
HZ9AH2		An internal error (invalid POST code for SendDiag pass through) occurred in the subsystem.	
HZ9AI0		An internal error (invalid ReceiveDiag starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AI1		An internal error (invalid ReceiveDiag starting factor “ABT, OFF_REQ”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9AJ0	MICROCMD	An internal error (invalid ReadDefectDt starting factor “NON_REQ”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9AJ1		An internal error (invalid ReadDefectDt starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AK0		An internal error (invalid WriteBufwrbuf starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AK1		An internal error (invalid WriteBufwrbuf starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AL0		An internal error (invalid ReadBuf starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AL1		An internal error (invalid ReadBuf starting factor “ABT, OFF_REQ”) occurred in the subsystem.	
HZ9AQ0		An internal error (“starting factor 1” started according to invalid starting factor) occurred in the subsystem.	
HZ9AQ1		An internal error (invalid starting factor for restart after interruption) occurred in the subsystem.	
HZ9AR0		An internal error (invalid TestUnitReady starting factor “NON_REQ”) occurred in the subsystem.	
HZ9AR1		An internal error (invalid TestUnitReady starting factor “ABT, OFF_REQ”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9B01	MICROPRS	An internal error (invalid value of starting factor 0) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9B02		An internal error (invalid value of starting factor 1 “at initial start”) occurred in the subsystem.	
HZ9B03		An internal error (subsystem start according to invalid starting factor) occurred in the subsystem.	
HZ9B04		An internal error (invalid return value of vseg acquisition function) occurred in the subsystem.	
HZ9B05		An internal error (invalid return value of staging range determination function (internal)) occurred in the subsystem.	
HZ9B06		An internal error (invalid return value 1 of hit judgment function (internal)) occurred in the subsystem.	
HZ9B07		An internal error (invalid return value 2 of hit judgment function (internal)) occurred in the subsystem.	
HZ9B08		An internal error (subsystem start according to other starting factor during PDEV waiting) occurred in the subsystem.	
HZ9B09		An internal error (subsystem start according to other starting factor during DRR waiting) occurred in the subsystem.	
HZ9B10		An internal error (invalid pre-read waiting) occurred in the subsystem.	
HZ9B11		An internal error (invalid internal factor information “in normal processing”) occurred in the subsystem.	
HZ9B12		An internal error (invalid internal factor information “at timeout”) occurred in the subsystem.	
HZ9B13		An internal error (invalid internal factor information “at restart after interruption”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9B14	MICROPRS	An internal error (invalid internal factor information “at interruption or timeout”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9B15		An internal error (invalid internal code) occurred in the subsystem.	
HZ9B16		An internal error (invalid POST code) occurred in the subsystem.	
HZ9B17		An internal error (invalid return value of vseg acquisition function “correction”) occurred in the subsystem.	
HZ9B18		An internal error (invalid internal processing code “correction”) occurred in the subsystem.	
HZ9B19		An internal error (invalid return value of staging range determination function “correction”) occurred in the subsystem.	
HZ9B20		An internal error (invalid return value of hit judgment function “correction”) occurred in the subsystem.	
HZ9B21		An internal error (invalid return value of hit judgment function “parity correction”) occurred in the subsystem.	
HZ9C00	MICROCOW	An internal error (invalid internal processing code detected during intermediate error recovery) occurred in the subsystem.	
HZ9DQ0	MICRORCH	An internal error (impossible queue transition in map and queue matching recovery) occurred in the subsystem.	
HZ9DQ1		An internal error (impossible queue transition in physically dirty section deallocation) occurred in the subsystem.	
HZ9DQ2		An internal error (impossible queue transition in segment deallocation) occurred in the subsystem.	
HZ9DJ0		An internal error (invalid JCB acquisition list format in segment recovery during reset) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9DJ1	MICRORCH	An internal error (invalid JCB acquisition list format in JCB recovery during reset) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9DM0		An internal error (rado_ptdkdt error in intermediate DTY processing of map and queue matching recovery) occurred in the subsystem.	
HZ9DM1		An internal error (rado_simchg error in intermediate DTY processing of map and queue matching recovery) occurred in the subsystem.	
HZ9DF0		An internal error (rado_simchg error in incomplete writing free processing of dirty discard RG initialization) occurred in the subsystem.	
HZ9DF1		An internal error (rado_simchg error in incomplete write free processing of dirty discard RG initialization 2) occurred in the subsystem.	
HZ9DV0		An internal error (rado_simchg error in incomplete writing free processing of spare VDEV deletion recovery source) occurred in the subsystem.	
HZ9DV1		An internal error (rado_simchg error in clean free processing of spare VDEV deletion) occurred in the subsystem.	
HZ9DV2		An internal error (rado_simchg error in incomplete writing free processing of spare VDEV deletion recovery destination) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9E01	MICRORAD	An internal error (excessive number of registrations in I/O request list) "RAID5") occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9E02		An internal error (excessive number of registrations in I/O request list) "RAID1") occurred in the subsystem.	
HZ9E03		An internal error (excessive number of registrations in I/O request list) "no RAID5 parity") occurred in the subsystem.	
HZ9E04		An internal error (excessive number of registrations in I/O request list) "RAID5 data") occurred in the subsystem.	
HZ9E05		An internal error (excessive number of registrations in I/O request list) "RAID5 parity") occurred in the subsystem.	
HZ9E06		An internal error (invalid RAID level "other than RAID0, RAID1, and RAID5") occurred in the subsystem.	
HZ9E07		An internal error (invalid RAID level "other than RAID0, RAID1, and RAID5") occurred in the subsystem.	
HZ9E08		An internal error (no LUN belongs to PDEV) occurred in the subsystem.	
HZ9E09		An internal error (LU straddle "RAID0") occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9E0A	MICRORAD	An internal error (LU straddle “RAID1”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9E0B		An internal error (stripe straddle “no RAID5 parity”) occurred in the subsystem.	
HZ9E0C		An internal error (stripe straddle “RAID5 data”) occurred in the subsystem.	
HZ9E0D		An internal error (stripe straddle “RAID5 parity”) occurred in the subsystem.	
HZ9E0E		An internal error (invalid RAID level “other than RAID0, RAID1, and RAID5”) occurred in the subsystem.	
HZ9E0F		An internal error (invalid RAID level “other than RAID0, RAID1, and RAID5”) occurred in the subsystem.	
HZ9E0G		An internal error (invalid RAID level “other than RAID1, and RAID5 (with a parity)”) occurred in the subsystem.	
HZ9E0H		An internal error (PDEV in I/O request list conflicting with PDEV input) occurred in the subsystem.	
HZ9E0I		An internal error (invalid RAID level “other than RAID5”) occurred in the subsystem.	
HZ9E0J		An internal error (invalid RAID level “RAID5 (with a parity)”) occurred in the subsystem.	
HZ9E0K		An internal error (invalid RAID level “other than RAID5”) occurred in the subsystem.	
HZ9E0L		An internal error (invalid RAID level “other than RAID0, RAID1, and RAID5”) occurred in the subsystem.	
HZ9E0M		An internal error (invalid RAID level “other than RAID0, RAID1, and RAID5”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9E0N	MICRODSC	An internal error (invalid RAID level "other than RAID0, RAID1, and RAID5") occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9F00		An internal error (invalid input CDB detected during simplified I/O execution) occurred in the subsystem.	
HZ9F10		An internal error (uncreated DMA list detected in the data interface when an I/O error occurred) occurred in the subsystem.	
HZ9F11		An internal error (uncreated DMA list detected in the data interface when an I/O error occurred) occurred in the subsystem.	
HZ9F20		An internal error (DMA READ command DMA was transferred when an SPC response timeout occurred) occurred in the subsystem.	
HZ9F21		An internal error (READ command DMA was not transferred when an SPC response timeout occurred) occurred in the subsystem.	
HZ9F22		An internal error (SPC response timeout with non-READ command) occurred in the subsystem.	
HZ9F30		An internal error (invalid setting of I/O list SPC end interruption detected when a D-SPC interruption occurred) occurred in the subsystem.	
HZ9F40		An internal error (system down when an I/O execution interruption function was started) occurred in the subsystem.	
HZ9F41		An internal error (no I/O list found in the DMA queue during I/O execution interruption processing (DMA transfer end waiting status)) occurred in the subsystem.	
HZ9F50		An internal error (I/O list found in the PDEV queue when the I/O execution function was started) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9F60	MICRODSC	An internal error (I/O list found in the PDEV queue when the PDEV allocation/deallocation function was started) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9F70		An internal error (invalid SCSI status detected in the I/O list during processing of an I/O execution control matrix) occurred in the subsystem.	
HZ9F80		An internal error (I/O list found in the PDEV queue when the leading queue of the I/O list for I/O execution control was being processed) occurred in the subsystem.	
HZ9F90		An internal error (invalid SCSI command flag detected in the I/O list during CDB creation) occurred in the subsystem.	
HZ9F91		An internal error (I/O list internal information already transferred to DMA when the READ command was issued) occurred in the subsystem.	
HZ9F92		An internal error (invalid I/O list command type detected when a command was issued) occurred in the subsystem.	
HZ9FA0		An internal error (invalid SCSI command flag detected in the I/O list during collection of disk command trace acquisition) occurred in the subsystem.	
HZ9FA1		An internal error (invalid I/O command type detected during acquisition of disk command trace) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G01	MICRODMA	An internal error (DMA transfer length 0 detected during copy between CTLs) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G02		An internal error (invalid double write mode of DRR list) occurred in the subsystem.	
HZ9G03		An internal error (invalid double write mode of DRR list) occurred in the subsystem.	
HZ9G04		An internal error (invalid double write mode of DRR list) occurred in the subsystem.	
HZ9G05		An internal error (invalid cache WT specification detected during copy between CTLs) occurred in the subsystem.	
HZ9G06		An internal error (invalid dual I/O error factor “failure of own system detected by own CTL” detected during host data transfer) occurred in the subsystem.	
HZ9G07		An internal error (invalid dual I/O error factor “failure of another system detected by own CTL” detected during host data transfer) occurred in the subsystem.	
HZ9G08		An internal error (invalid dual I/O error factor “failure detected by own CTL” detected during host data transfer) occurred in the subsystem.	
HZ9G09		An internal error (invalid dual I/O error factor “failure of another system detected by another CTL” detected during host data transfer) occurred in the subsystem.	
HZ9G0A		An internal error (invalid dual I/O error factor “failure of own system detected by another CTL” detected during host data transfer) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G0C	MICRODMA	An internal error (invalid dual I/O error factor “failure detected by another CTL” detected during host data transfer) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G0D		An internal error (system down caused by a dual I/F error detected during host data transfer) occurred in the subsystem.	
HZ9G0E		An internal error (invalid dual I/F error factor “failure of own system detected by own CTL” detected during format data generation) occurred in the subsystem.	
HZ9G0F		An internal error (invalid dual I/F error factor “failure of another system detected by own CTL” detected during format data generation) occurred in the subsystem.	
HZ9G0G		An internal error (invalid dual I/F error factor “failure detected by own CTL” detected during format data generation) occurred in the subsystem.	
HZ9G0H		An internal error (invalid dual I/F error factor “failure of another system detected by another CTL” detected during format data generation) occurred in the subsystem.	
HZ9G0I		An internal error (invalid dual I/F error factor “failure of own system detected by another CTL” detected during format data generation) occurred in the subsystem.	
HZ9G0J		An internal error (invalid dual I/F error factor “failure detected by another CTL” detected during format data generation) occurred in the subsystem.	
HZ9G0K		An internal error (system down caused by a dual I/F error detected during format data generation) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G0L	MICRODMA	An internal error (invalid dual I/F error factor “failure of own system detected by own CTL” detected during DRR execution) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G0M		An internal error (invalid dual I/F error factor “failure of another system detected by own CTL” detected during DRR execution) occurred in the subsystem.	
HG9G0N		An internal error (invalid dual I/F error factor “failure detected by own CTL” detected during DRR execution) occurred in the subsystem.	
HZ9G0O		An internal error (invalid dual I/F error factor detected during DRR execution “failure of another system detected by another CTL”) occurred in the subsystem.	
HZ9G0P		An internal error (invalid dual I/F error factor “failure of own system detected by another CTL” detected during DRR execution) occurred in the subsystem.	
HZ9G0Q		An internal error (invalid dual I/F error factor “failure detected by another CTL” detected during DRR execution) occurred in the subsystem.	
HZ9G0R		An internal error (system down caused by a dual I/F error detected during DRR execution) occurred in the subsystem.	
HZ9G0S		An internal error (system down caused by a collectable error detected during DRR execution) occurred in the subsystem.	
HZ9G0T		An internal error (invalid map updating detected during DRR execution) occurred in the subsystem.	
HZ9G0U		An internal error (system down caused by a dual I/F error detected during DRR execution) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G0V	MICRODMA	An internal error (invalid retry flag caused by a dual I/F error detected during DRR execution) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G0W		An internal error (system down caused by HDER or DTER detected during DRR execution) occurred in the subsystem.	
HZ9G0X		An internal error (system down caused by a collectable error detected during DRR execution) occurred in the subsystem.	
HZ9G0Y		An internal error (system down caused by a collectable error detected during DMA1B execution) occurred in the subsystem.	
HZ9G0Z		An internal error (invalid DMA start type detected during DRR queue updating) occurred in the subsystem.	
HZ9G10		An internal error (system down caused by a collectable error detected during DMA1 execution) occurred in the subsystem.	
HZ9G11		An internal error (system down caused by a collectable error detected during DMA1 execution) occurred in the subsystem.	
HZ9G12		An internal error (invalid number of started DMA detected during D-DMA interrupt termination) occurred in the subsystem.	
HZ9G13		An internal error (invalid number of started DMA detected during D-DMA forced stop) occurred in the subsystem.	
HZ9G14		An internal error (DMA transfer length 0 detected during copy between caches) occurred in the subsystem.	
HZ9G15		An internal error (DMA transfer length 0 detected during parity generation) occurred in the subsystem.	
HZ9G16		An internal error (DMA transfer length 0 detected during verification start) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G17	MICRODMA	An internal error (DMA transfer length 0 detected during DMA1 start) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G18		An internal error (DMA transfer length 0 detected during DMA1B start) occurred in the subsystem.	
HZ9G19		An internal error (no HDER or DTER error factor detected during unspecialized path execution) occurred in the subsystem.	
HZ9G1A		An internal error (system failure caused by HDER or DTER detected during unspecialized path execution) occurred in the subsystem.	
HZ9G1B		An internal error (no HDER or DTER error factor detected during specialized path execution) occurred in the subsystem.	
HZ9G1C		An internal error (system down caused by HDER or DTER detected during specialized path execution) occurred in the subsystem.	
HG9G1D		An internal error (no HDER or DTER error factor detected during DMA1 execution) occurred in the subsystem.	
HZ9G1E		An internal error (system down caused by HDER or DTER detected during DMA1 execution) occurred in the subsystem.	
HZ9G1F		An internal error (no HDER or DTER error factor detected during DMA1B execution) occurred in the subsystem.	
HZ9G1G		An internal error (system down caused by HDER or DTER detected during DMA1B execution) occurred in the subsystem.	
HZ9G1H		An internal error (no HDER or DTER error factor detected during DRR execution) occurred in the subsystem.	
HZ9G1I		An internal error (system down caused by HDER or DTER detected during DRR execution) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G1J	MICRODMA	An internal error (DMA transfer length 0 detected during format data generation) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G1K		An internal error (system down caused by a collectable error detected during format data generation) occurred in the subsystem.	
HZ9G1L		An internal error (system down caused by a dual I/F error detected during format data generation) occurred in the subsystem.	
HZ9G1M		An internal error (invalid map updating detected during format data generation) occurred in the subsystem.	
HZ9G1N		An internal error (invalid retry flag caused by a dual I/F error detected during format data generation) occurred in the subsystem.	
HZ9G1O		An internal error (no HDER or DTER error factor detected during format data generation) occurred in the subsystem.	
HZ9G1P		An internal error (system down caused by HDER or DTER detected during format data generation) occurred in the subsystem.	
HZ9G1Q		An internal error (system down caused by collectable error detected during unspecialized path execution) occurred in the subsystem.	
HZ9G1R		An internal error (system down caused by collectable error detected during specialized path execution) occurred in the subsystem.	
HZ9G1S		An internal error (system down caused by collectable error detected during unspecialized path execution) occurred in the subsystem.	
HZ9G1T		An internal error (system down caused by collectable error detected during specialized path execution) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G1U	MICRODMA	An internal error (invalid DMA start type detected during H-DMA queue updating) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G1V		An internal error (DMA length 0 detected during unspecialized path start) occurred in the subsystem.	
HZ9G1W		An internal error (system down detected during unspecialized path interruption processing) occurred in the subsystem.	
HZ9G1X		An internal error (system down detected during specialized path interruption processing) occurred in the subsystem.	
HZ9G1Y		An internal error (system down detected during DRR interruption processing start) occurred in the subsystem.	
HZ9G1Z		An internal error (system down detected during start of format data generation interruption processing) occurred in the subsystem.	
HZ9G20		An internal error (DMA length 0 “read” detected during specialized path start) occurred in the subsystem.	
HZ9G21		An internal error (DMA length 0 “write” detected during specialized path start) occurred in the subsystem.	
HZ9G22		An internal error (invalid transfer port detected during DMA1 staging (data section)) occurred in the subsystem.	
HZ9G23		An internal error (invalid transfer port “RAID5” detected during DMA1 staging (parity section)) occurred in the subsystem.	
HZ9G25		An internal error (invalid transfer port detected during DMA1 staging (no LA check)) occurred in the subsystem.	
HZ9G26		An internal error (invalid transfer port detected during DMA1 destaging (data section)) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G27	MICRODMA	An internal error (invalid transfer port “RAID5” detected during DMA1 destaging (parity section)) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G29		An internal error (invalid transfer port detected during DMA1 destaging (no LA check)) occurred in the subsystem.	
HZ9G2A		An internal error (invalid transfer port detected during DMA1B staging (data section)) occurred in the subsystem.	
HZ9G2B		An internal error (invalid transfer port “RAID5” detected during DMA1B staging (parity section)) occurred in the subsystem.	
HZ9G2D		An internal error (invalid transfer port detected during DMA1B staging (no LA check)) occurred in the subsystem.	
HZ9G2E		An internal error (invalid transfer port detected during DMA1B destaging (data section)) occurred in the subsystem.	
HZ9G2F		An internal error (invalid transfer port “RAID5” detected during DMA1B destaging (parity section)) occurred in the subsystem.	
HZ9G2H		An internal error (invalid transfer port detected during DMA1B destaging (no LA check)) occurred in the subsystem.	
HZ9G2I		An internal error (invalid dual I/F error factor “failure of own system detected by own CTL” detected during DMA1 data transfer) occurred in the subsystem.	
HZ9G2J		An internal error (invalid dual I/F error factor “failure of another system detected by own CTL” detected during DMA1 data transfer) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G2K	MICRODMA	An internal error (invalid dual I/F error factor “failure detected by own CTL” detected during DMA1 data transfer) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G2L		An internal error (invalid dual I/F error factor “failure of another system detected by another CTL” detected during DMA1 data transfer) occurred in the subsystem.	
HZ9G2M		An internal error (invalid dual I/F error factor “failure of own system detected by another CTL” detected during DMA1 data transfer) occurred in the subsystem.	
HZ9G2N		An internal error (invalid dual I/F error factor “failure detected by another CTL” detected during DMA1 data transfer) occurred in the subsystem.	
HZ9G2O		An internal error (system down caused by dual I/O error during DMA1 data transfer) occurred in the subsystem.	
HZ9G2P		An internal error (invalid dual I/F error factor “failure of own system detected by own CTL” detected during DMA1B data transfer) occurred in the subsystem.	
HZ9G2Q		An internal error (invalid dual I/F error factor “failure of another system detected by own CTL” detected during DMA1B data transfer) occurred in the subsystem.	
HZ9G2R		An internal error (invalid dual I/F error factor “failure detected by own CTL” detected during DMA1B data transfer) occurred in the subsystem.	
HZ9G2S		An internal error (invalid dual I/F error factor “failure of another system detected by another CTL” detected during DMA1B data transfer) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9G2T	MICRODMA	An internal error (invalid dual I/F error factor “failure of own system detected by another CTL” detected during DMA1B data transfer) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9G2U		An internal error (invalid dual I/F error factor “failure detected by another CTL” detected during DMA1B data transfer) occurred in the subsystem.	
HZ9G2V		An internal error (system down caused by dual I/O error during DMA1B data transfer) occurred in the subsystem.	
HZ9G2W		An internal error (invalid DMA start type detected during H-DMA interrupt assignment) occurred in the subsystem.	
HZ9G2X		An internal error (invalid staging map updating information “invalid transfer synchronization” output in data share mode) occurred in the subsystem.	
HZ9G2Y		An internal error (invalid transfer direction at unspecialized path LA/LRC error) occurred in the subsystem.	
HZ9G2Z		An internal error (invalid transfer direction at specialized path LA/LRC error) occurred in the subsystem.	
HZ9G30		An internal error (invalid transfer direction at DMA1LA/LRC error) occurred in the subsystem.	
HZ9G31		An internal error (invalid transfer direction at DMA1B LA/LRC error) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9H00	MICROERR	An internal error (fault table retrieval error “index section”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9H01		An internal error (fault table retrieval error “data section”) occurred in the subsystem.	
HZ9J00	MICRODRC	An internal error (invalid start factor code 1 “when reconnection waiting is restarted”) occurred in the subsystem.	
HZ9J01		An internal error (invalid starting factor code 0 “when event completion is restarted”) occurred in the subsystem.	
HZ9J02		An internal error (invalid start detail code “when event completion is restarted”) occurred in the subsystem.	
HZ9J03		An internal error (invalid start detail code “when resource wait is restarted”) occurred in the subsystem.	
HZ9J04		An internal error (invalid startup factor code 1 “unused code”) occurred in the subsystem.	
HZ9J10		An internal error (invalid processing mode “internal information”) occurred in the subsystem.	
HZ9J20		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	
HZ9J21		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J22		An internal error (invalid POST code “when PDEV is completed”) occurred in the subsystem.	
HZ9J23		An internal error (invalid start detail code “other than PDEV completion/timeout”) occurred in the subsystem.	
HZ9J24		An internal error (invalid start detail code 1 “other than remote job elimination waiting”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9J30	MICRODRC	An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9J31		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J32		An internal error (invalid POST code “when PDEV is completed”) occurred in the subsystem.	
HZ9J33		An internal error (invalid start detail code 1 “other than PDEV completion/timeout”) occurred in the subsystem.	
HZ9J34		An internal error (invalid starting factor code 1 “other than resource waiting restart”) occurred in the subsystem.	
HZ9J35		An internal error (invalid start detail code 1 “other than remote job elimination waiting”) occurred in the subsystem.	
HZ9J40		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	
HZ9J41		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J42		An internal error (invalid LU status) occurred in the subsystem.	
HZ9J50		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	
HZ9J51		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J52		An internal error (invalid LU status) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9J60	MICRODRC	An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9J61		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J62		An internal error (invalid LU status) occurred in the subsystem.	
HZ9J70		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	
HZ9J71		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J72		An internal error (invalid LU status) occurred in the subsystem.	
HZ9J80		An internal error (invalid POST code “when PDEV is completed”) occurred in the subsystem.	
HZ9J81		An internal error (invalid start detail code “other than PDEV completion/timeout”) occurred in the subsystem.	
HZ9J82		An internal error (invalid POST code “when PDEV is completed”) occurred in the subsystem.	
HZ9J83		An internal error (invalid start detail code “other than PDEV completion/timeout”) occurred in the subsystem.	
HZ9J84		An internal error (invalid POST code “when DRR is completed”) occurred in the subsystem.	
HZ9J85		An internal error (invalid start detail code “other than DRR completion/timeout”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9J90	MICRODRC	An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9J91		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9J92		An internal error (invalid start detail code 1 “other than remote job elimination waiting”) occurred in the subsystem.	
HZ9J93		An internal error (invalid abnormal termination information “internal information”) occurred in the subsystem.	
HZ9JA0		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	
HZ9JA1		An internal error (invalid function return value “unused return value”) occurred in the subsystem.	
HZ9JA2		An internal error (invalid start detail code “other than PDEV completion/timeout”) occurred in the subsystem.	
HZ9K00	MICROOFW	An internal error (invalid job start parameter) occurred in the subsystem.	
HZ9K10		An internal error (invalid starting factor code 1) occurred in the subsystem.	
HZ9K11		An internal error (invalid starting factor code 0 “at initial startup”) occurred in the subsystem.	
HZ9K12		An internal error (invalid starting factor code 0 “when event completion is restarted”) occurred in the subsystem.	
HZ9K13		An internal error (invalid starting factor code 0 “when the sleep timer is restarted”) occurred in the subsystem.	
HZ9K14		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9K15	MICROOFW	An internal error (invalid starting factor code 0 “when other job elimination is restarted”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9K16		An internal error (invalid execution function ID “internal information”) occurred in the subsystem.	
HZ9K20		An internal error (invalid starting factor code 1) occurred in the subsystem.	
HZ9K21		An internal error (invalid starting factor code 0 “at initial startup”) occurred in the subsystem.	
HZ9K22		An internal error (invalid starting factor code 0 “when event completion is restarted”) occurred in the subsystem.	
HZ9K30		An internal error (invalid starting factor code 1) occurred in the subsystem.	
HZ9K40		An internal error (invalid POST code “loading of PIN data header section”) occurred in the subsystem.	
HZ9K50		An internal error (invalid POST code “loading with SGCB and segment”) occurred in the subsystem.	
HZ9K60		An internal error (invalid POST code “segment loading”) occurred in the subsystem.	
HZ9K70		An internal error (invalid POST code “loading without SGCB and segment”) occurred in the subsystem.	
HZ9K80		An internal error (invalid POST code “device WARM writing”) occurred in the subsystem.	
HZ9K90		An internal error (invalid starting factor code 0 “when event completion is restarted”) occurred in the subsystem.	
HZ9K91		An internal error (invalid start detail code “other than other communication reception”) occurred in the subsystem.	
HZ9KA0		An internal error (invalid starting factor code 0 “when event completion is restarted”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9KA1	MICROOFW	An internal error (invalid start detail code “other than DRR completion”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9KA2		An internal error (invalid POST code “cache copy between CTLs”) occurred in the subsystem.	
HZ9KB0		An internal error (invalid parameter “at initial start synchronization”) occurred in the subsystem.	
HZ9L00	MICROONW	An internal error (invalid start parameter) occurred in the subsystem.	
HZ9L01		An internal error (invalid start parameter) occurred in the subsystem.	
HZ9L02		An internal error (invalid start parameter) occurred in the subsystem.	
HZ9L10		An internal error (invalid start of communication reception processing) occurred in the subsystem.	
HZ9M00	MICRODST	An internal error (invalid start factor from kernel) occurred in the subsystem.	
HZ9M01		An internal error (unsuccessful physical dirty sweepout) occurred in the subsystem.	
HZ9N00	MICROCPR	An internal error (logical micro-program conflict “forced parity recovery”) occurred in the subsystem.	
HZ9NA0		An internal error (invalid start parameter) occurred in the subsystem.	
HZ9NB0		An internal error (unassignable segment “parity”) occurred in the subsystem.	
HZ9NB1		An internal error (unassignable segment “data”) occurred in the subsystem.	
HZ9NB2		An internal error (unassignable segment “spare disk”) occurred in the subsystem.	
HZ9NC0		An internal error (invalid hit error judgment “invalid internal processing in RAID0”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9NC1	MICROCPR	An internal error (invalid hit error judgment “invalid RAID0 judgment”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9NC2		An internal error (invalid hit error judgment “invalid RAID1 judgment”) occurred in the subsystem.	
HZ9NC3		An internal error (invalid hit error judgment “invalid RAID5 judgment”) occurred in the subsystem.	
HZ9ND0		An internal error (invalid POST code “staging”) occurred in the subsystem.	
HZ9ND1		An internal error (invalid POST code “parity generation”) occurred in the subsystem.	
HZ9ND2		An internal error (invalid POST code “format data generation”) occurred in the subsystem.	
HZ9ND3		An internal error (invalid POST code “format write”) occurred in the subsystem.	
HZ9ND4		An internal error (invalid POST code “copy between caches”) occurred in the subsystem.	
HZ9ND5		An internal error (invalid POST code “PIN data writing”) occurred in the subsystem.	
HZ9ND6		An internal error (invalid POST code “destaging”) occurred in the subsystem.	
HZ9ND7		An internal error (invalid POST code “reassignment”) occurred in the subsystem.	
HZ9ND8		An internal error (invalid POST code “RAID1 copy”) occurred in the subsystem.	
HZ9NE0		An internal error (invalid POST code “verification”) occurred in the subsystem.	
HZ9NE1		An internal error (invalid POST code “collection”) occurred in the subsystem.	

Message code	Message text	Description	Recovery measures
HZ9NE2	MICROCPR	An internal error (invalid POST code “collection destaging”) occurred in the subsystem.	Acquire memory dump and turn the power off, then turn it on again. For how to acquire the memory dump, see page TRBL1110. For turning off/on of the power, see the following pages. Desktop (DK) type : DK-REP0050 Desktop (DKH) type : DH-REP0050 Mini tower type : MK-REP0050 Cabinet type : CK-REP0050 Rackmount (RKH) type : RH-REP0050 Rackmount (RKWH) type : RW-REP0050
HZ9O00	MICROCOM	An internal error (logical micro-program conflict “common function”) occurred in the subsystem.	
HZ9Q00	MICROLUC	An internal error (logical micro-program conflict “LU switching”) occurred in the subsystem.	
HZ9Q01		An internal error (invalid starting factor) occurred in the subsystem.	
HZ9Q02		An internal error (invalid starting factor) occurred in the subsystem.	
HZ9Q03		An internal error (invalid starting factor) occurred in the subsystem.	
HZ9Q04		An internal error (invalid starting factor) occurred in the subsystem.	
HZ9R00	MICROPRO	An internal error (logical micro-program conflict “communication between controllers”) occurred in the subsystem.	
HZ9R01		An internal error (current pointer overflow “reception processing”) occurred in the subsystem.	
HZ9R02		An internal error (invalid message issuance section) occurred in the subsystem.	
HZ9R03		An internal error (invalid return value from reception processing function) occurred in the subsystem.	
HZ9R10		An internal error (current pointer overflow “reception processing”) occurred in the subsystem.	
HZ9R20		An internal error (current pointer overflow “on insertion processing”) occurred in the subsystem.	
HZ9ND8		An internal error (invalid POST code “RAID1 copy”) occurred in the subsystem.	

The port and row numbers displayed in messages when a disk drive error occurs differ for each type. The correspondence between the disk drive mounting locations, port numbers, and row numbers for each type is shown below.

Desktop (DK) Type

PORT = 4	ROW = 0
PORT = 3	ROW = 0
PORT = 2	ROW = 0
PORT = 1	ROW = 0
PORT = 0	ROW = 0

**Desktop (DKH) Type/
Mini Tower Type**

PORT = 4	ROW = 4
PORT = 4	ROW = 0
PORT = 3	ROW = 0
PORT = 2	ROW = 0
PORT = 1	ROW = 0
PORT = 0	ROW = 0

Cabinet Type

PORT = 4	→ ROW = 4	
PORT = 4	→ ROW = 2	ROW = 3
	ROW = 0	ROW = 1
PORT = 3	→ ROW = 2	ROW = 3
	ROW = 0	ROW = 1
PORT = 2	→ ROW = 2	ROW = 3
	ROW = 0	ROW = 1
PORT = 1	→ ROW = 2	ROW = 3
	ROW = 0	ROW = 1
PORT = 0	→ ROW = 2	ROW = 3
	ROW = 0	ROW = 1

Rack Mount (RKH) Type

PORT = 1	PORT = 3	PORT = 4
ROW = 1	ROW = 1	ROW = 4
ROW = 0	ROW = 0	Not used
ROW = 1	ROW = 1	ROW = 1
ROW = 0	ROW = 0	ROW = 0
PORT = 0	PORT = 2	PORT = 4

Rack Mount (RKWH) Type

PORT = 1		PORT = 4
ROW = 3	Not used	ROW = 3
ROW = 2	Not used	ROW = 2
ROW = 1	Not used	ROW = 1
ROW = 0	ROW = 4	ROW = 0
ROW = 3	ROW = 3	ROW = 3
ROW = 2	ROW = 2	ROW = 2
ROW = 1	ROW = 1	ROW = 1
ROW = 0	ROW = 0	ROW = 0
PORT = 0	PORT = 2	PORT = 3

2.2.3 Details of recovery procedures

Table 2.2.3 shows error recovery methods. Errors are classified into power-on errors, operation errors, data recovery errors, and power-off errors.

Table 2.2.3 Error Recovery Methods for Each Error

No.	Classification	Description	Item No. for reference
1	The power cannot be turned on.	A loading of information from a disk failed.	(1)
2		User data was lost because cache memory was volatile. (Forced parity recovery)	(2)
3	The power cannot be turned off.	Planned shutdown cannot be performed because the number of PIN data is too large (due to disk controller error).	(3)
4		An attempt was made to save PIN data to the disk during planned shutdown but failed because a hardware error occurred.	(4)
5		Planned shutdown cannot be performed because all the disks to which inheritance information is to be saved disappeared due to a DMA double error or a disk quintuple error.	(5)
6		Planned shutdown cannot be performed because PIN data cannot be saved due to a cache error, etc.	(6)
7		The number of PIN segments exceeded its threshold value.	(7)
8			
8	Data recovery or copyback does not terminate normally.	A drive shutdown occurred. Isolation of the error location.	(8)
9		Forced recovery was performed because an RD error occurred in the copy source during a correction copy.	(9)
10		Data recovery terminated abnormally because a disk error occurred in the copy source during a correction copy.	(10)
11		Data recovery terminated abnormally because a spare disk error occurred during a copyback.	(11)
12	An error occurred during operation.	A DMA parity error occurred.	(12)
13		Data containing an LA/LRC error was detected.	(13)
14		A system down occurred.	(14)
15		A LAN error occurred.	(15)
16		A LU blockade error occurred.	(16)
17		Failures occur in the two or more disks in the same ROW. (When user backup data exists)	(17)
18		Failures occur in the tow or more disks in the same ROW. (When no user backup data exists)	(18)

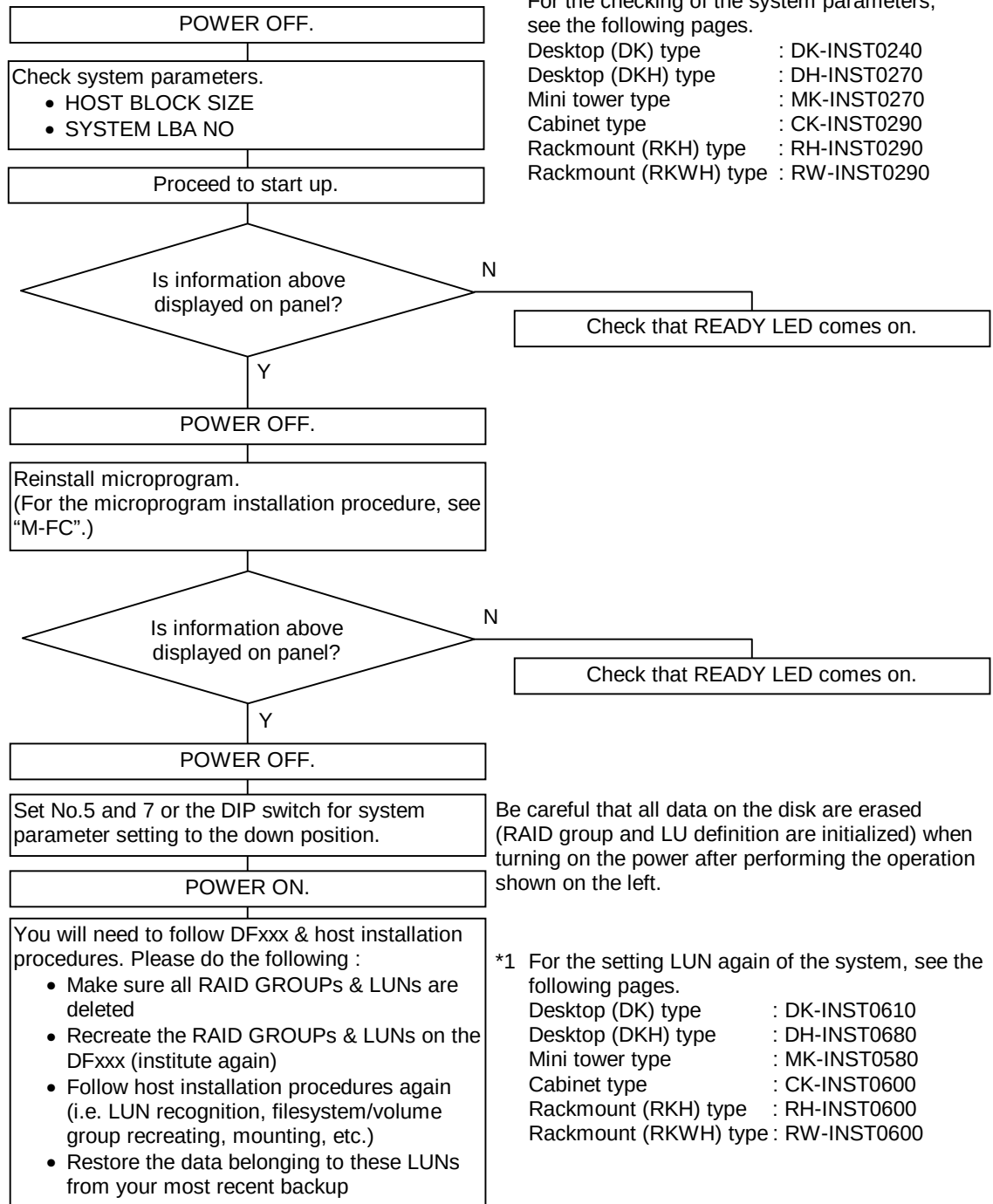
(1) The PS cannot be turned on : Case 1

(Information could not be loaded from the disk.)

- Incorrect program·none·loading failed
- No passing information·load failed
- Pinned data loading failed

[Panel display for factor determination]

R	O	M	F	A	T	A	L	E	R	R	O	R		
R	Z	0	8	0	0	D	L	O	A	D	F	A	I	L

[Recovery procedure]

(2) The PS cannot be turned on : Case 2 (forced parity recovery)

(User data was lost because cache memory was volatile.)

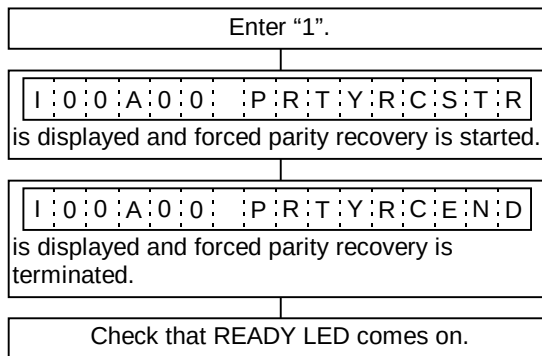
[Panel display for factor determination]

After the PS is turned on, the panel is displayed as follows : The WARNING LED also comes on.

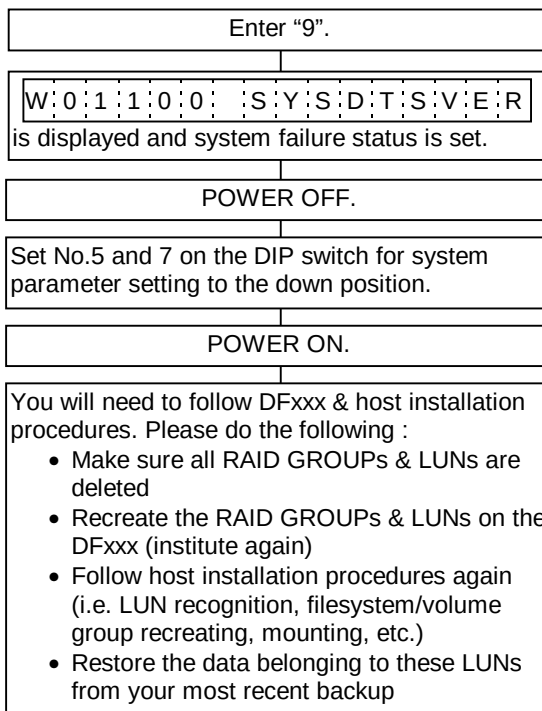
W	0	1	3	0	0	U	S	R	D	A	T	L	S	T	
C	O	N	T	(	1	)	S	T	O	P	(	9	)		

[Recovery procedure]

Executing forced parity recovery.



Executing no forced parity recovery.



Be careful that all data on the disk are erased (RAID group and LU definition are initialized) when turning on the power after performing the operation shown on the left.

*1 For the setting LUN again of the system, see the following pages.

Desktop (DK) type	: DK-INST0610
Desktop (DKH) type	: DH-INST0680
Mini tower type	: MK-INST0580
Cabinet type	: CK-INST0600
Rackmount (RKH) type	: RH-INST0600
Rackmount (RKWH) type	: RW-INST0600

[Remark]

The purpose of forced parity recovery is to match user data, not to restore data.

Depending on the factor, user data may be able to be used as it is. When there is back-up data, however, user data should be restored after execution of forced parity recovery.

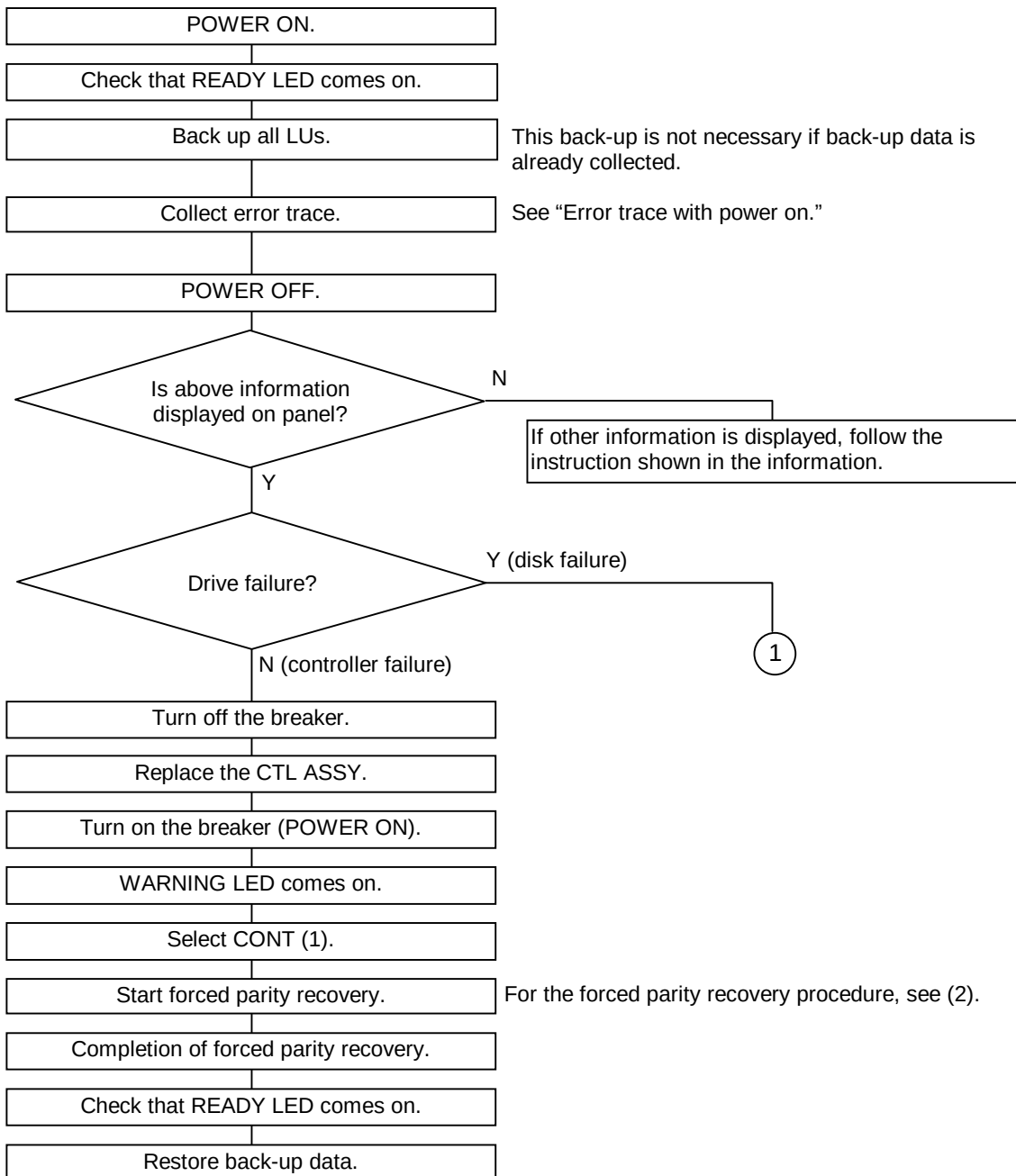
(3) When the PS cannot be turned off : Case 1

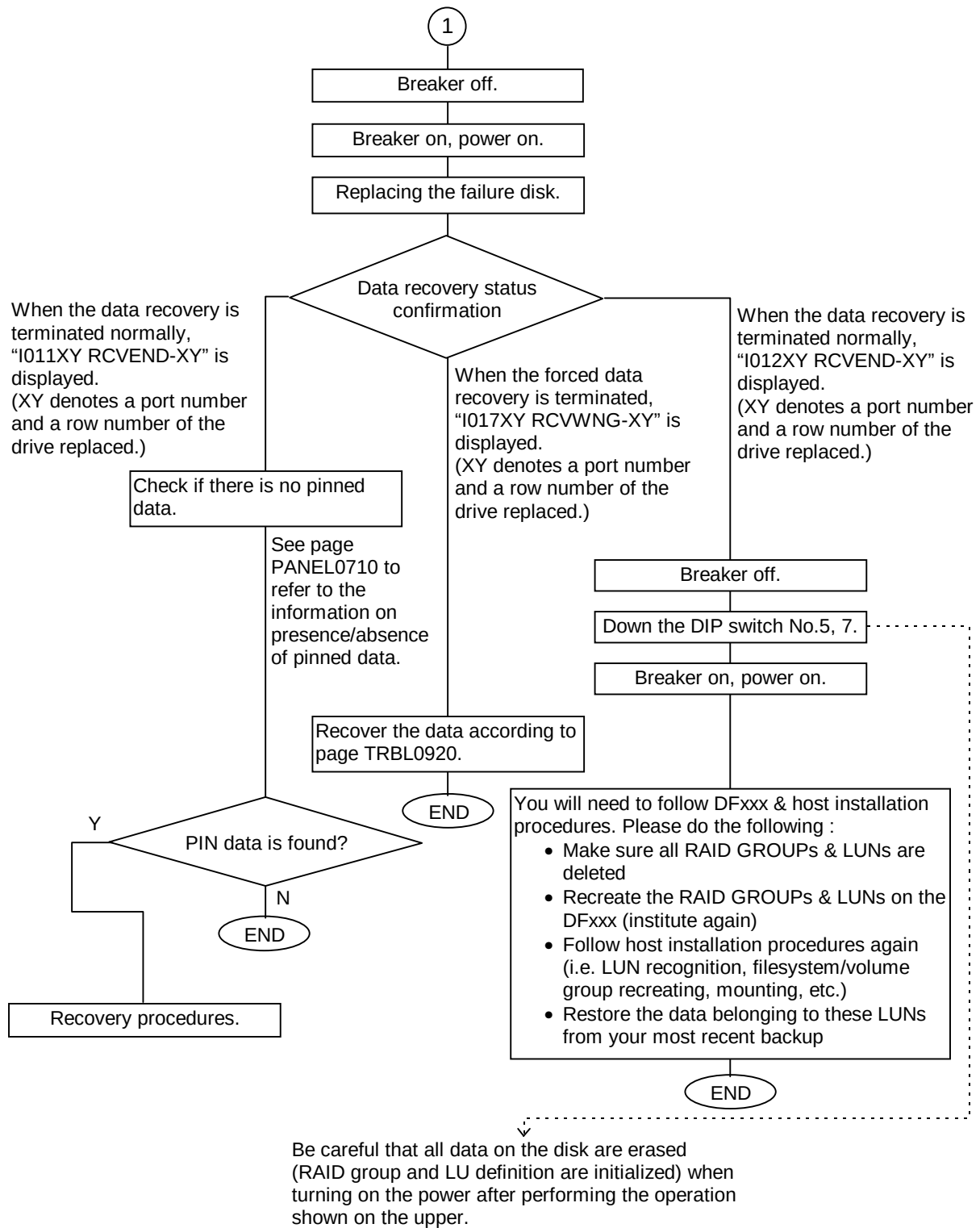
(Planned shutdown cannot be performed because the number of PIN data is too large (due to disk controller error).)

[Panel display for factor determination]

W	0	0	F	0	0	T	0	0	M	N	Y	P	I	N
P	U	S	H	A	N	Y	K	E	Y					

↓ (Press any key to turn off the PS.)

[Recovery procedure]



*1 For the setting LUN again of the system, see the following pages.

Desktop (DK) type	: DK-INST0610
Desktop (DKH) type	: DH-INST0680
Mini tower type	: MK-INST0580
Cabinet type	: CK-INST0600
Rackmount (RKH) type	: RH-INST0600
Rackmount (RKWH) type	: RW-INST0600

(4) When the PS cannot be turned off : Case 2

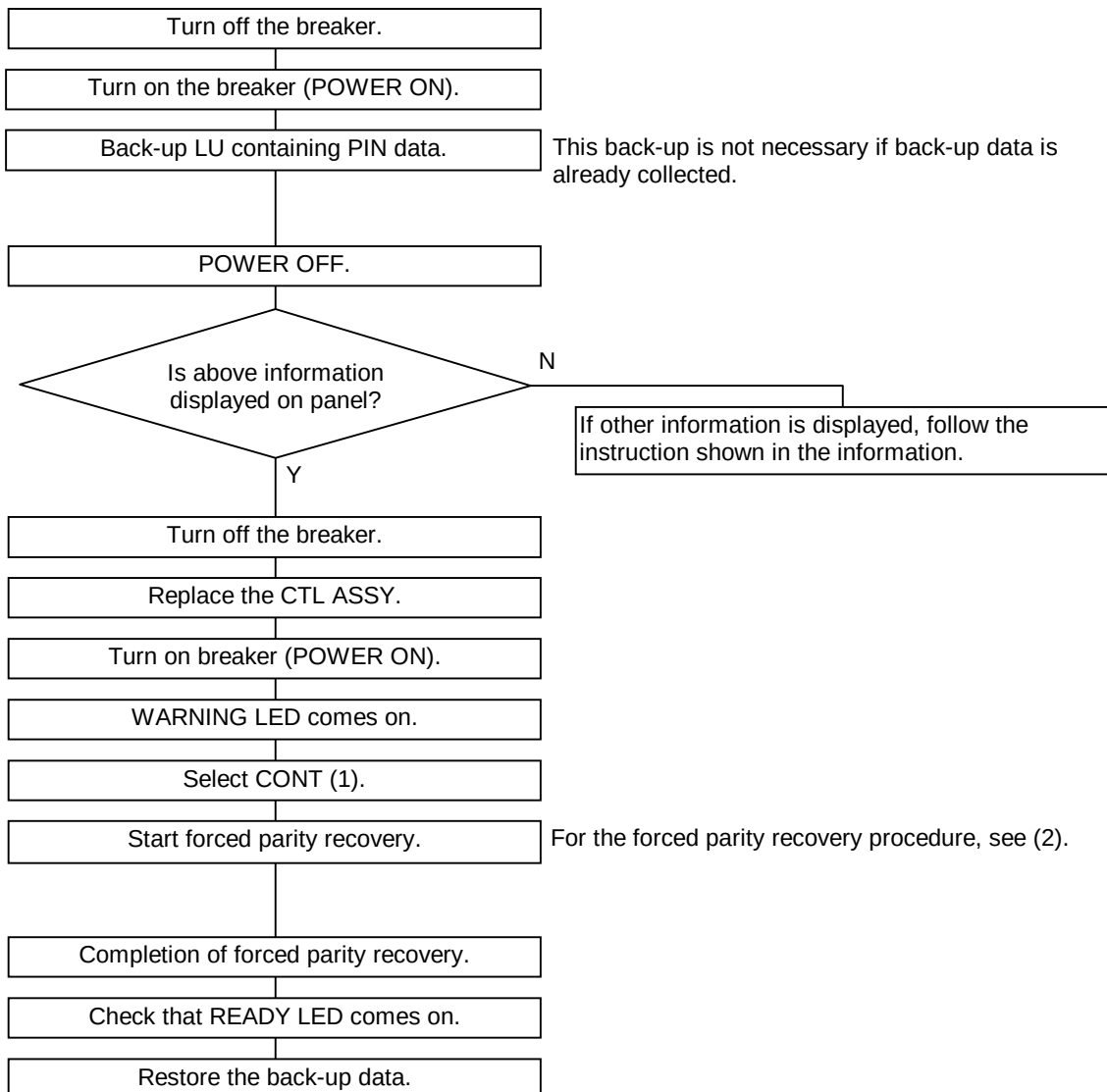
(An attempt was made to save PIN data to the disk during planned shutdown but failed because a hardware error occurred.)

[Panel display for factor determination]

W	0	1	0	0	0	P	O	F	F	B	O	D	E	R
P	U	S	H	A	N	Y	K	E	Y					

↓ (Press any key to turn off the PS.)

W	0	1	0	0	0	P	O	F	F	B	O	D	E	R
H	0	0	E	0	0	P	O	F	S	Y	S	D	W	N

[Recovery procedure]

(5) When the PS cannot be turned off : Case 3

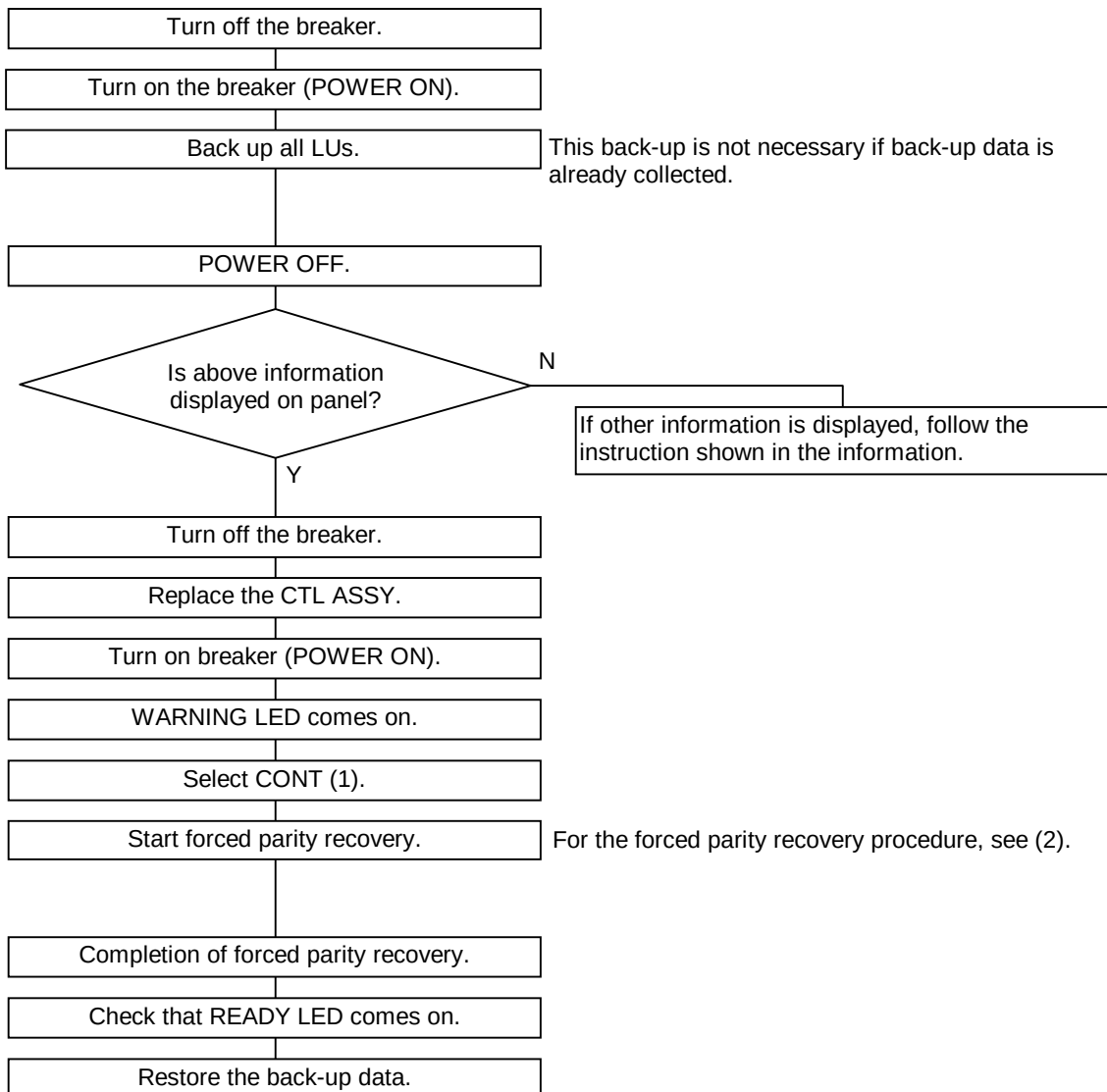
(Planned shutdown cannot be performed because all the disks to which inheritance information is to be saved disappeared due to a DMA double error or a disk quintuple error.)

[Panel display for factor determination]

W	0	1	1	0	0	S	Y	S	D	T	S	V	E	R
P	U	S	H	A	N	Y	K	E	Y					

↓ (Press any key to turn off the PS.)

W	0	1	1	0	0	S	Y	S	D	T	S	V	E	R
H	0	0	E	0	0	P	O	F	S	Y	S	D	W	N

[Recovery procedure]

(6) When the PS cannot be turned off : Case 4

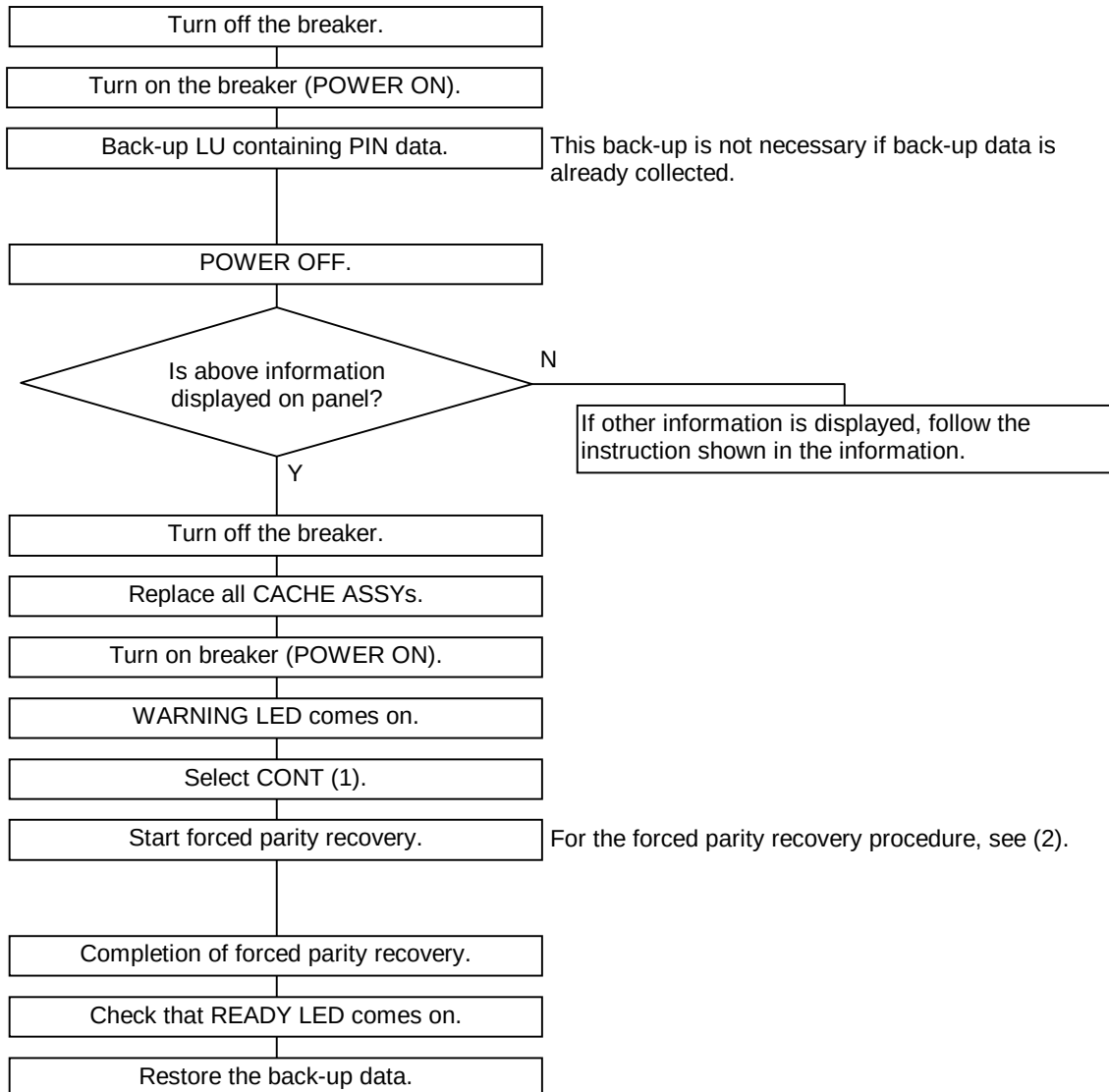
(Planned shutdown cannot be performed because PIN data cannot be saved due to a cache error, etc.)

[Panel display for factor determination]

W	0	1	2	0	0	P	O	F	F	C	M	U	N	C
P	U	S	H	A	N	Y	K	E	Y					

↓ (Press any key to turn off the PS.)

W	0	1	2	0	0	P	O	F	F	C	M	U	N	C
H	0	0	F	0	X	P	O	F	C	M	E	R	-	X

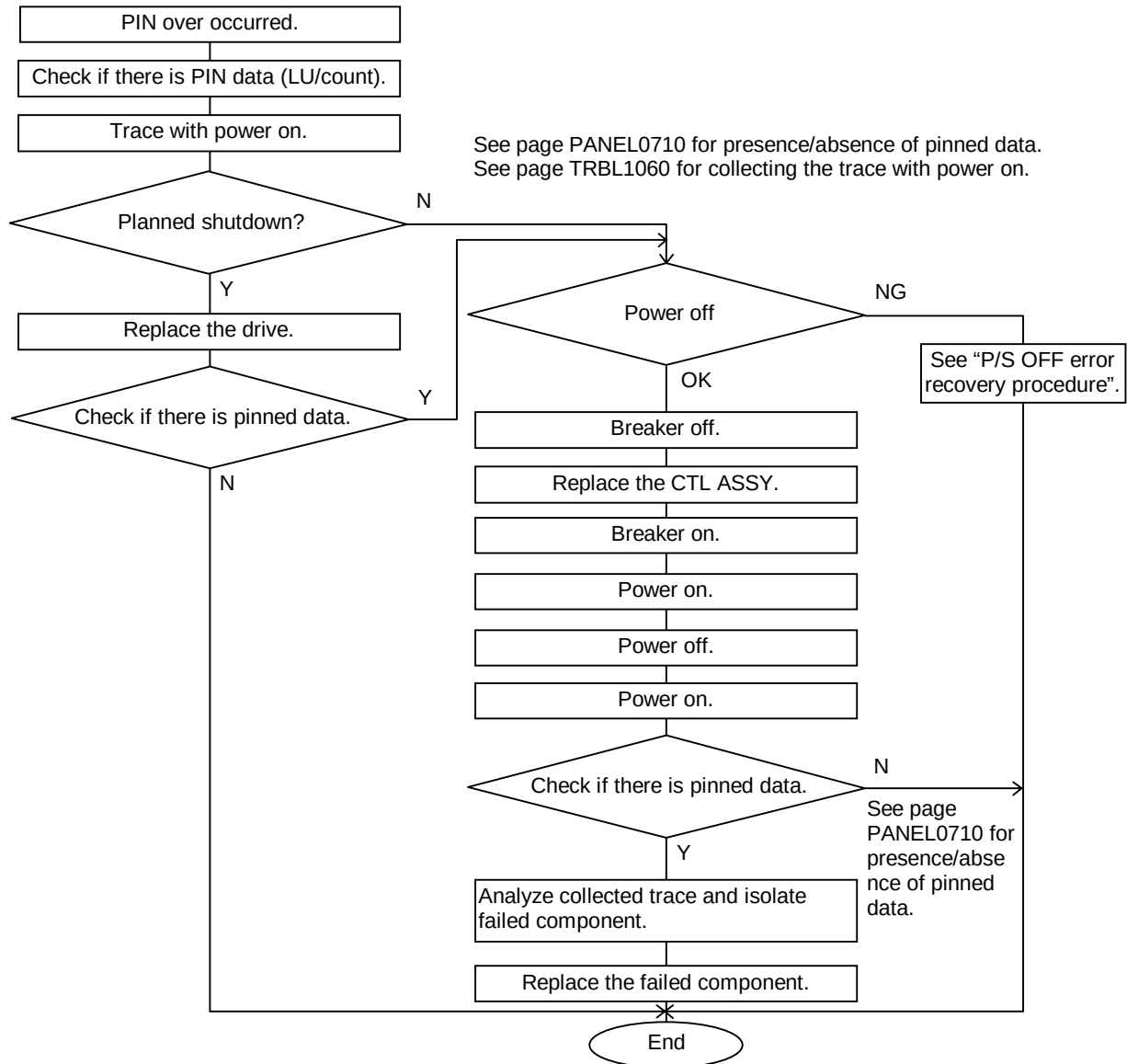
[Recovery procedure]

(7) Recovery procedure for PIN OVER.

[Panel display for factor determination]

- WARNING LED is on
- Panel display

W	0	1	4	0	0	P	I	N	O	V	E	R

[Recovery procedure]

- (8) Isolating a cause when a SCSI bus error due to a faulty drive occurs.

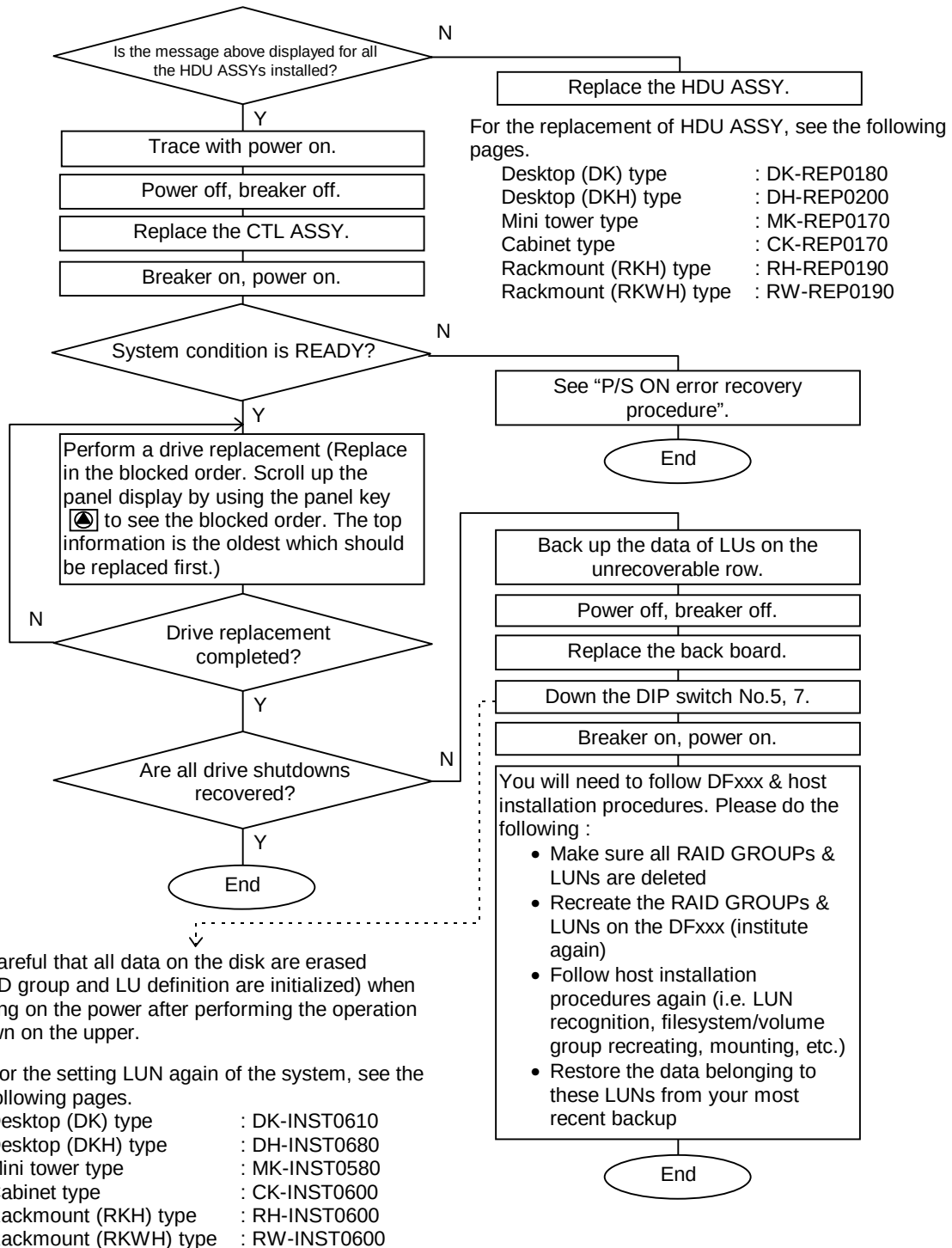
[Panel display for factor determination]

- WARNING LED is on
- Panel display

W	2	0	2	X	0		D	R	V	A	L	M	-	X	0
W	2	0	2	X	1		D	R	V	A	L	M	-	X	1
W	2	0	2	X	2		D	R	V	A	L	M	-	X	2
W	2	0	2	X	3		D	R	V	A	L	M	-	X	3

X denotes a port number. An example of the CK model with four-row configuration (maximum) is shown above.

[Recovery procedure]



- (9) Data restoration and correction copy do not terminate normally : Case 1
(Forced recovery was performed because an RD error occurred in the copy source during a correction copy.)
Forced recovery ----- Execute the correction copy skipping the part in which the RD error occurred. When attempting to read the data which was recovered forcibly, it is reported as a read error.

[Panel display for factor determination]

I	0	1	7	X	Y		R	C	V	W	N	G	-	X	Y

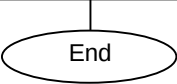
X : Port number Y : Row number

[Recovery procedure]

Check the LU which was recovered forcibly by using the menu for referring to the information on presence/absence of the pinned data.

See page PANEL0710 for presence/absence of pinned data.

Restore the backup data for the LU which was recovered forcibly.



(10) Data restoration and correction copy do not terminate normally : Case 2

(Recovery was terminated abnormally because a disk error occurred in the copy source during a correction copy.)

[Panel display for factor determination]

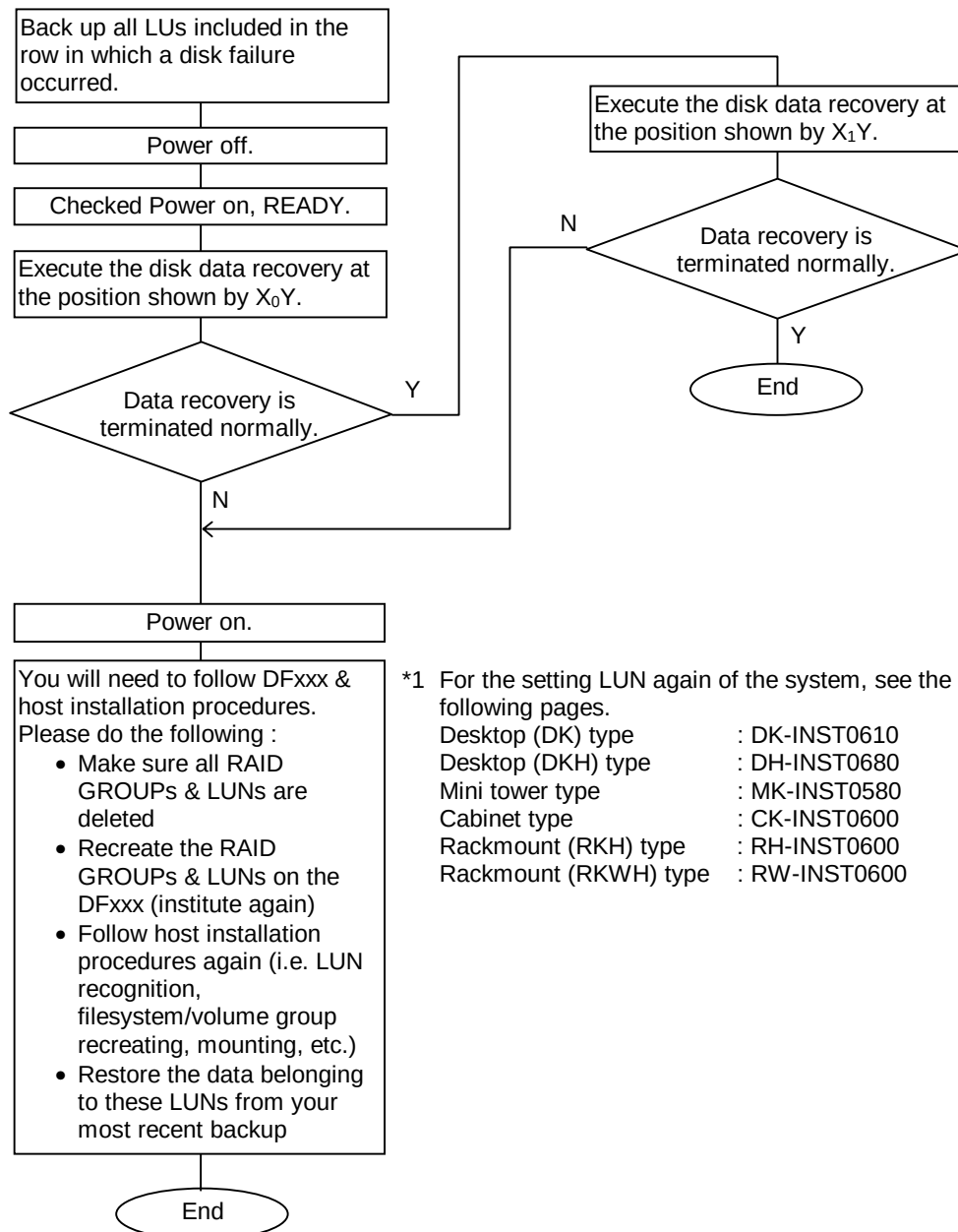
W	2	0	2	X ₀	Y	D	R	V	A	L	M	-	X ₀	Y
I	0	1	6	X ₁	Y	R	C	V	F	L	T	-	X ₁	Y

Occurrence of a disk failure is displayed.

Indicate that a failure occurs in the drive in the same row containing the failed disk above, and the processing for the copy disk is terminated abnormally.

X₀Y : Denotes a port number and a row number of the failed disk.

X₁Y : Denotes a port number and a row number of the disk to be recovered.

[Recovery procedure]

(11) Data restoration and correction copy do not terminate normally : Case 3

(Data recovery terminated abnormally because a spare disk error occurred during correction copy.)

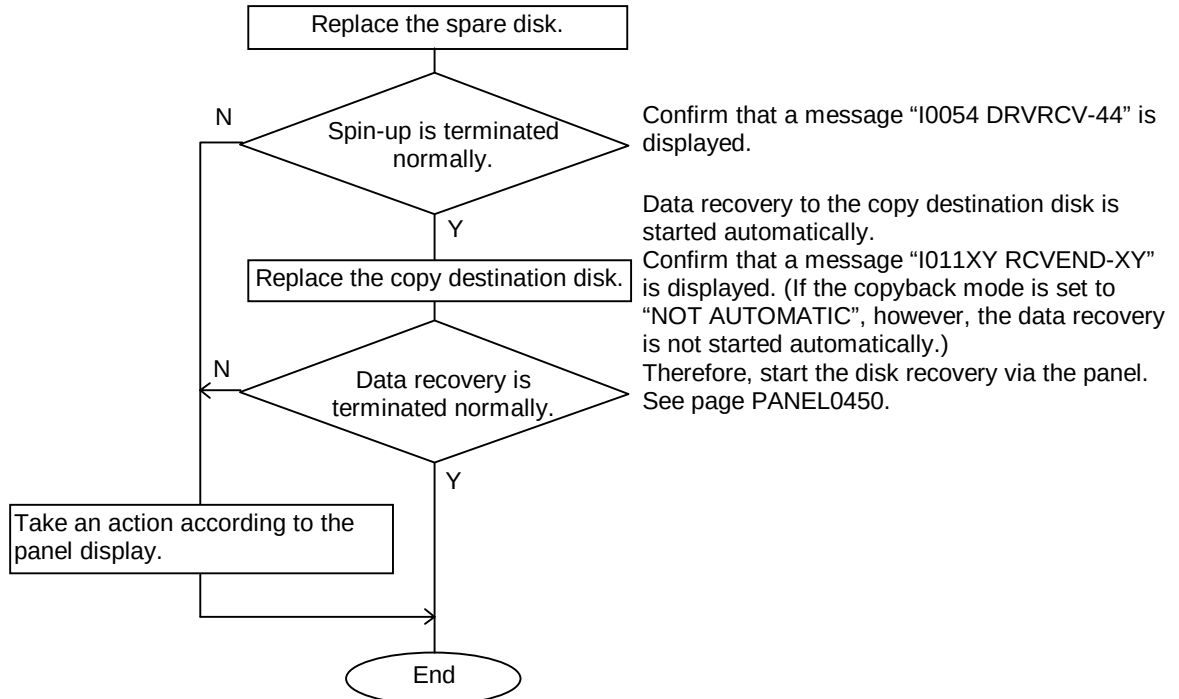
[Panel display for factor determination]

W	2	0	2	4	4	D	R	V	A	L	M	-	4	4
I	0	1	2	X	Y	R	C	V	F	L	T	-	X	Y

X : Port number Y : Row number

← When a spare disk error occurs.

← Occurrence of the copy destination disk failure is displayed.

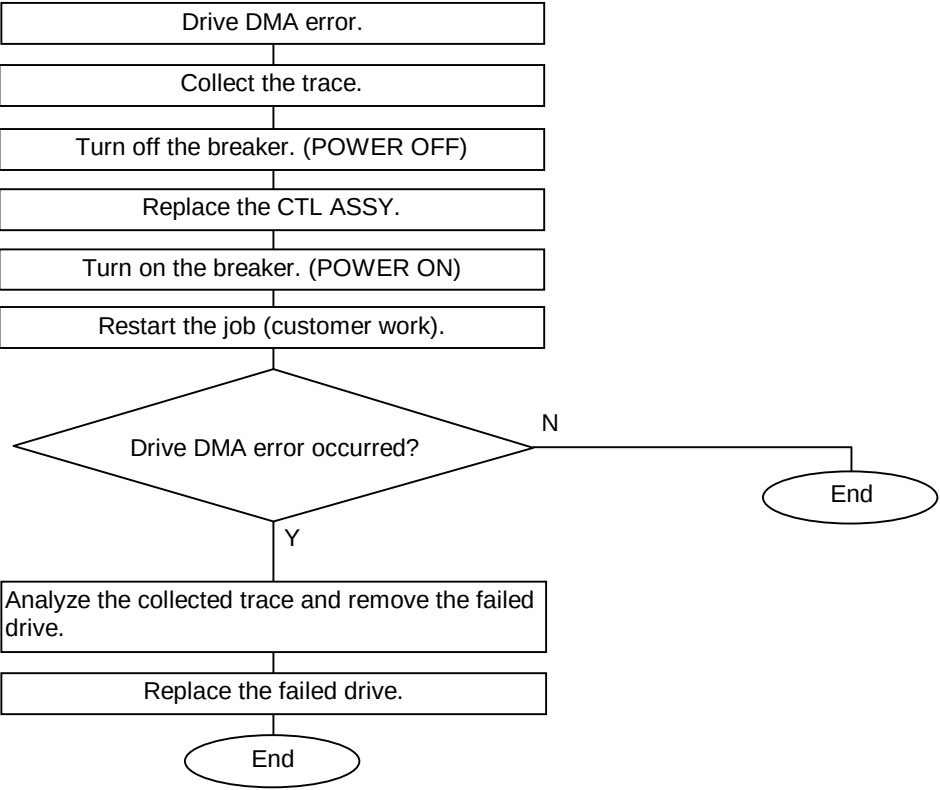
[Recovery procedure]

(12) Isolating a cause when a D-DMA parity error occurs.

[Panel display for factor determination]

W	6	0	A	X	X	D	M	A	A	L	M	-	X	X

[Recovery procedure]



- (13) An error occurred during operation : Case 1
(Data containing an LA/LRC error was detected.)

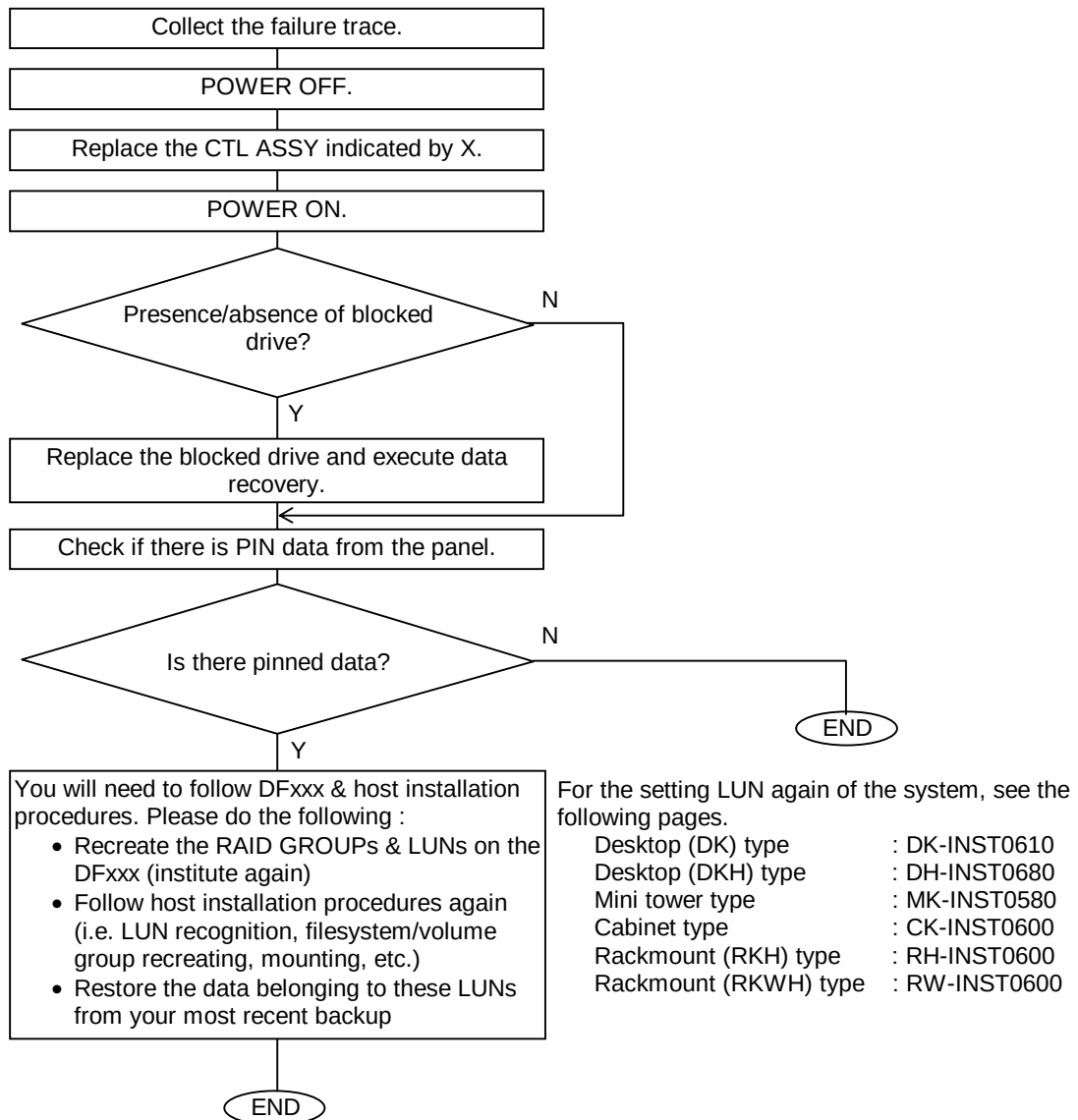
[Panel display for factor determination]

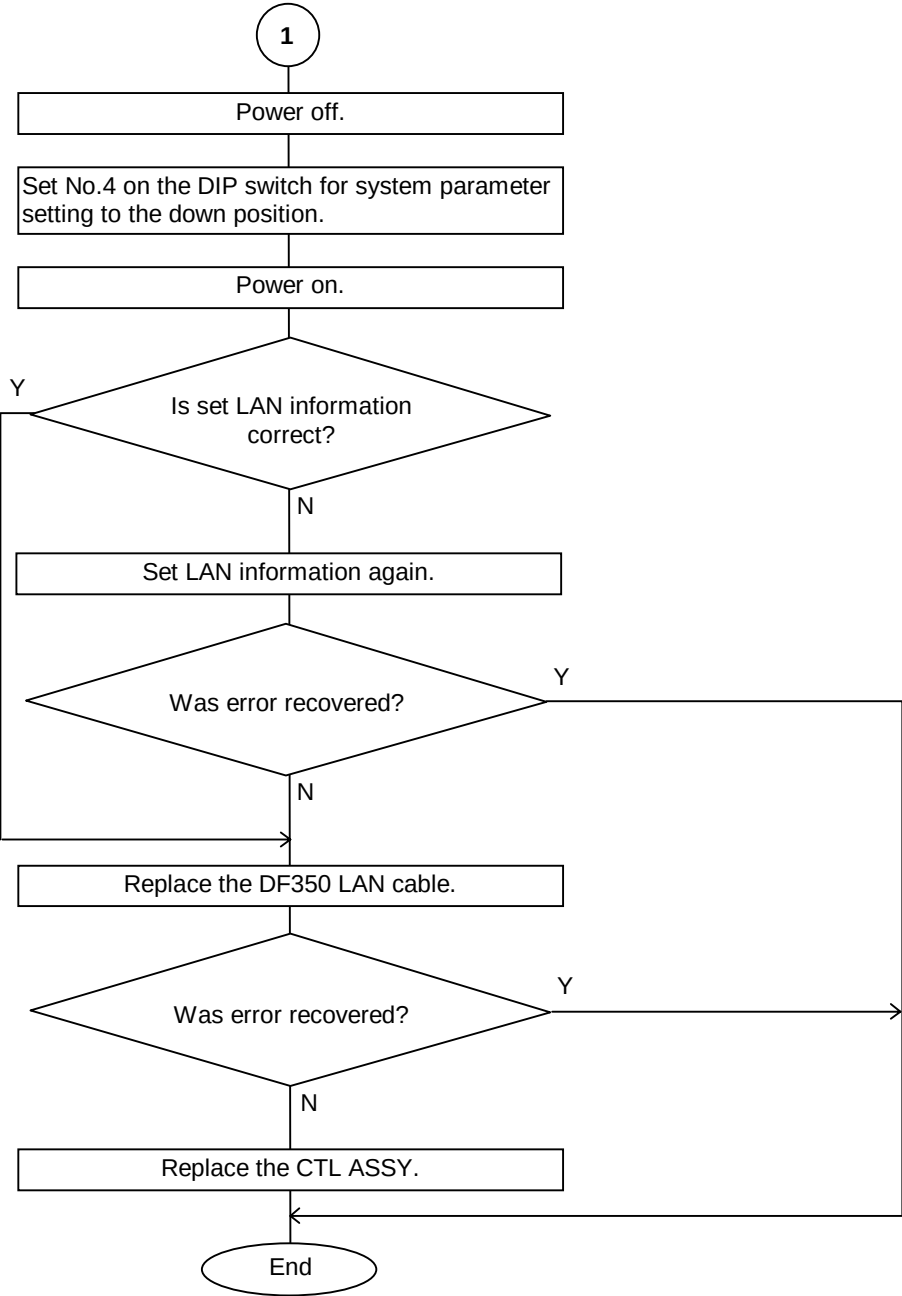
W:6:2:7:X:Y	L:R:C:E:R:3:-X:Y
W:6:2:6:X:Y	L:A:E:R:R:3:-X:Y
W:6:2:5:X:Y	L:R:C:E:R:2:-X:Y
W:6:2:4:X:Y	L:A:E:R:R:2:-X:Y
W:6:2:3:X:Y	L:R:C:E:R:1:-X:Y
W:6:2:2:X:Y	L:A:E:R:R:1:-X:Y

One of the indications shown on the left is displayed according to the failed component.

X : Controller number
Y : Transfer direction
(R : Read, W : Write)

[Recovery procedure]





(16) Action to be taken when an LU blockade occurs

[Panel display for factor determination]

- WARNING LED is on
- Panel display

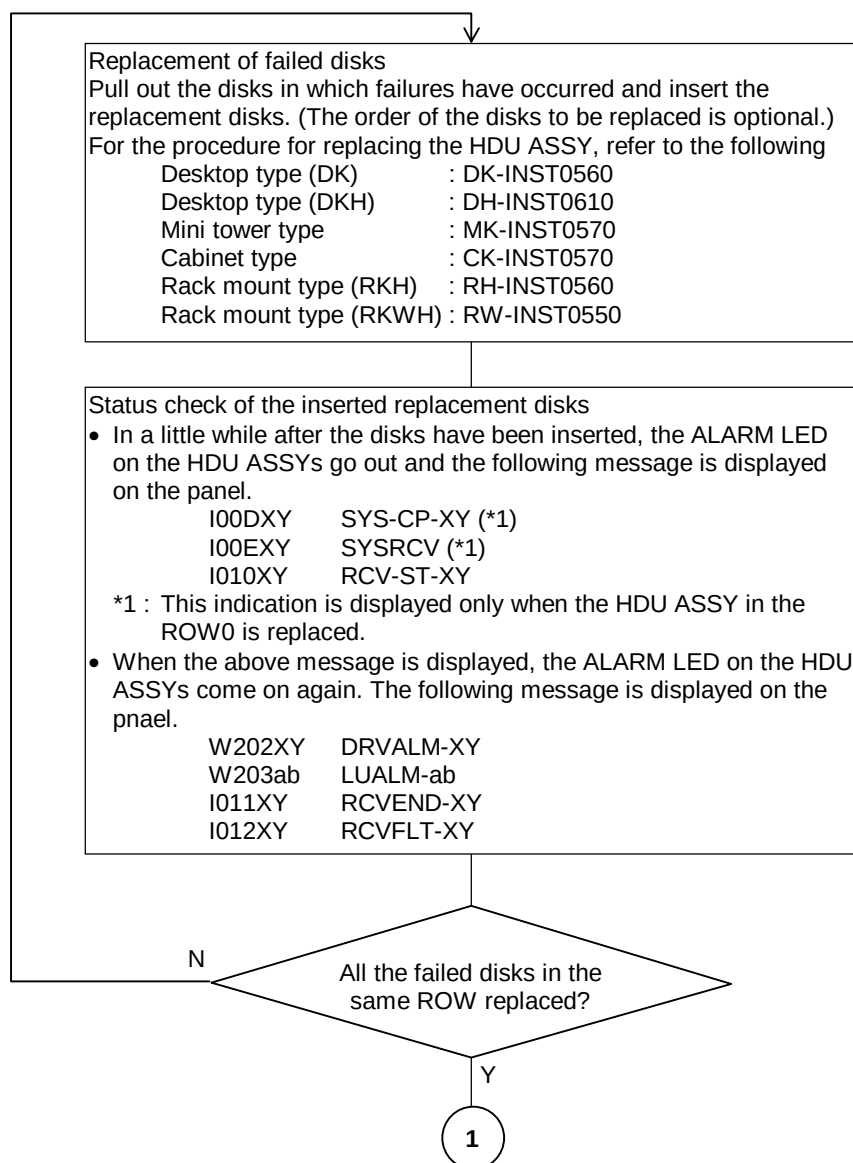
W	2	0	2	X ₀	Y	:	D	R	V	A	L	M	-	X ₀	Y
W	2	0	2	X ₁	Y	:	D	R	V	A	L	M	-	X ₁	Y
W	2	0	3	a	b	:	L	U	A	L	M	-	a	b	

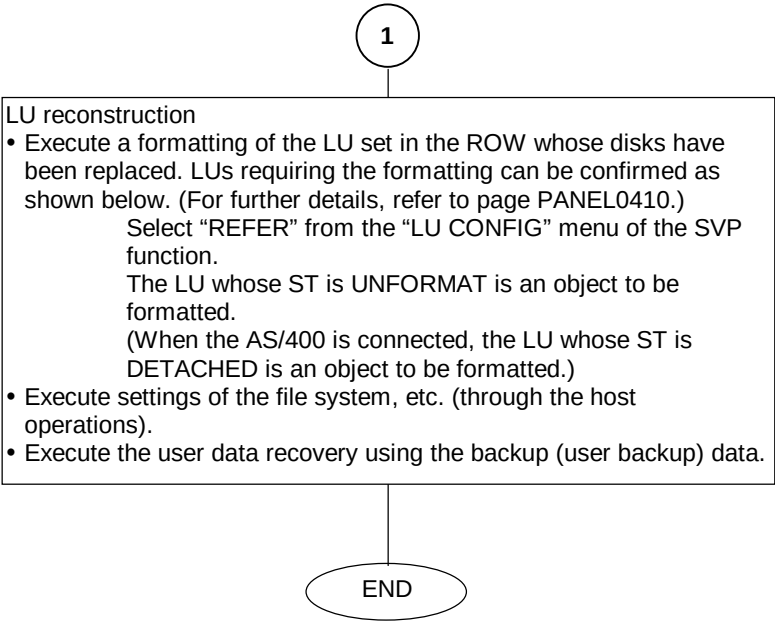
X₀Y and X₁Y indicate the PORT number and the ROW number of the failed disk respectively. (The above is an example when two disks in the same ROW rail.)

"ab" indicates the target of the failed LU.

[Recovery procedure]

Be sure to perform the recovery operation in the state that the subsystem power is on.





- (17) Action to be taken when failures occur in the tow or more disks in the same ROW : Case 1
(when user backup data exists)

[Panel display for factor determination]

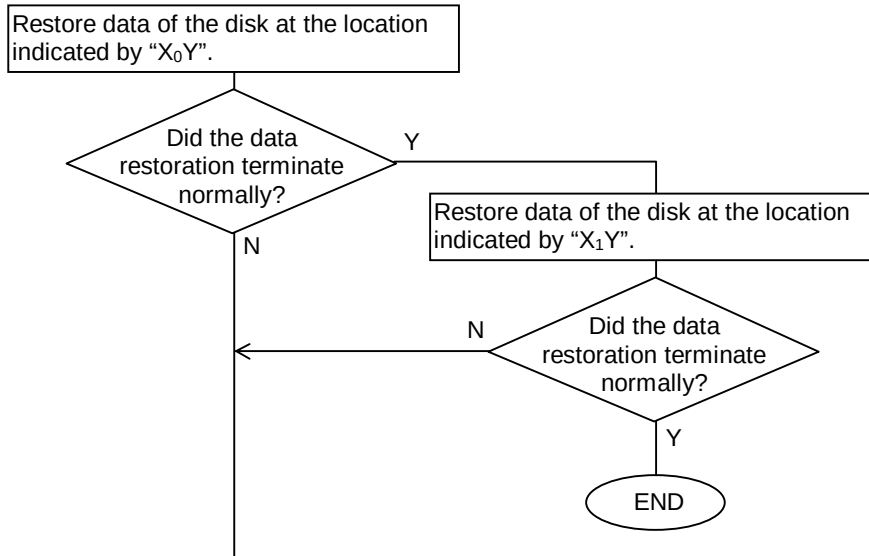
- WARNING LED is on
- Panel display

W	2	0	2	X ₀	Y	D	R	V	A	L	M	-	X ₀	Y
I	0	1	6	X ₁	Y	D	R	V	E	R	R	-	X ₁	Y

X₀Y and X₁Y indicate the PORT number and the ROW number of the failed disk respectively. (The above is an example when two disks in the same ROW rail.)

[Recovery procedure]

Be sure to perform the recovery operation in the state that the subsystem power is on.



LU reconstruction

- Execute the LU formatting for the ROW the disks in which were replaced. The LU set for the ROW the disks in which were replaced can be confirmed as shown below. (For details see page PANEL0430.)

Select "REFER" from "LU CONFIG" menu in the SVP function.

START P=■, R=■

↑
ROW number

Notice : Do not execute the LU formatting for the ROW in which the disk was not replaced. If format the LU in the ROW in which the disk was not replaced by mistake, user data will be lost.

- Execute the settings of the file system, etc. (by the host operation).
- Execute a restoration of the user data using the backup data (user backup data).

END

- (18) Action to be taken when failures occur in the tow or more disks in the same ROW : Case 2
(when no user backup data exists)

[Panel display for factor determination]

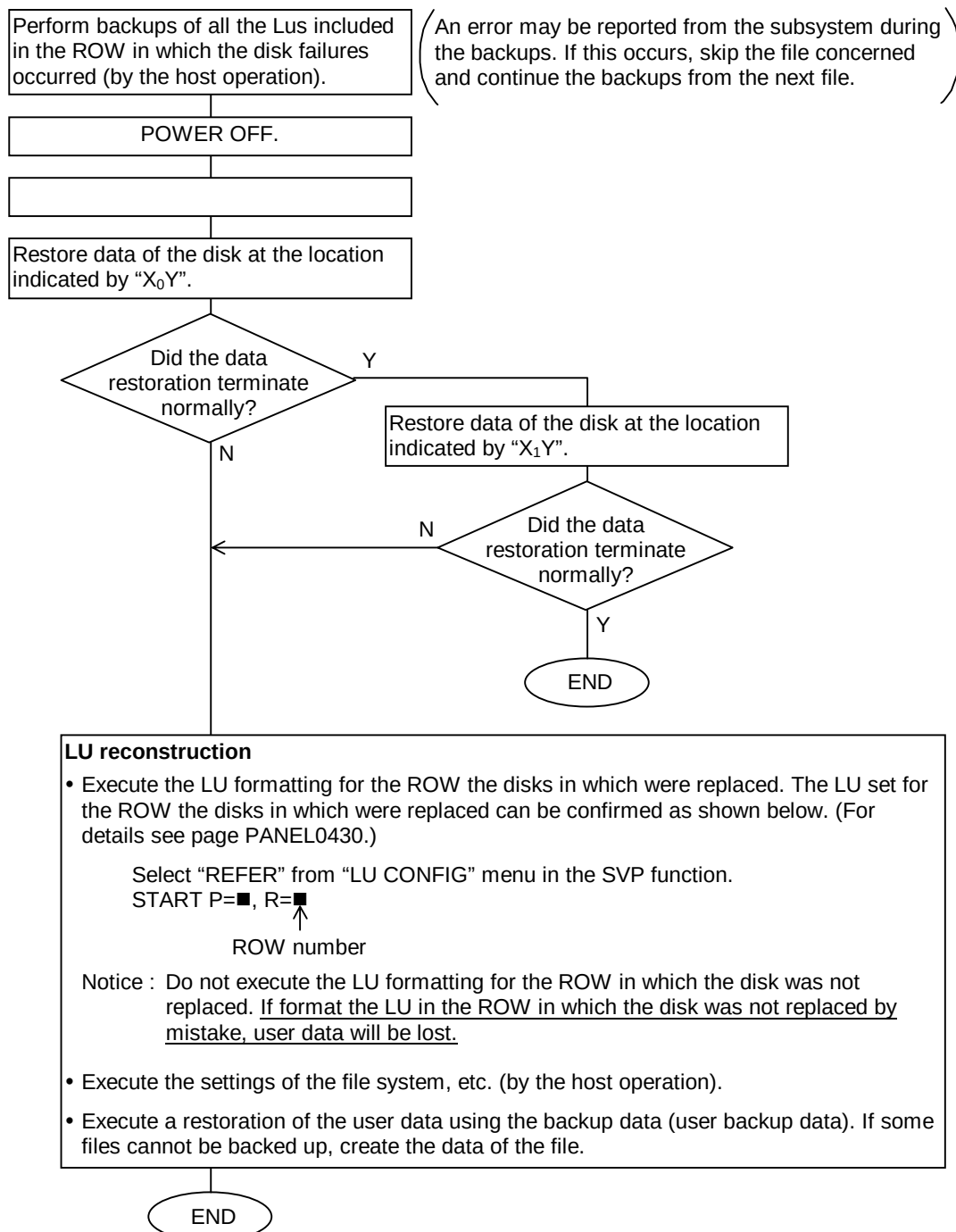
- WARNING LED is on
- Panel display

W	2	0	2	X ₀	Y	D	R	V	A	L	M	-	X ₀	Y
I	0	1	6	X ₁	Y	D	R	V	E	R	R	-	X ₁	Y

X₀Y and X₁Y indicate the PORT number and the ROW number of the failed disk respectively. (The above is an example when two disks in the same ROW rail.)

[Recovery procedure]

Be sure to perform the recovery operation in the state that the subsystem power is on.



3. Sense Data

Sense data is transferred to the host by the REQUEST SENSE command.

3.1 Details of Sense Codes

Table 3.1.1 list the sense codes.

Table 3.1.1 Sense Codes (1/6)

Sense key	Sense code	Error name	Description
0/5	00 00	NO ADDITIONAL SENSE INFORMATION	There is no valid additional sense information.
4	01 00	NO INDEX/SECTOR SIGNAL	- The INDEX signal cannot be detected. - The SECTOR signal cannot be detected.
1/4	02 00	NO SEEK COMPLETE	Seek operation cannot be executed correctly in the drive.
4	03 00	PERIPHERAL DEVICE WRITE FAULT	A write fault was detected in the drive.
2	04 00	LOGICAL UNIT NOT READY, CAUSE NOT REPORTABLE	- The READY signal of the drive cannot be detected. - The drive cannot be accessed.
2	04 01	LOGICAL UNIT IS IN PROCESS OF BECOMING READY	The drive is made ready soon although it is currently not ready.
2	04 02	LOGICAL UNIT NOT READY, INITIALIZING COMMAND REQUIRED	The drive is currently not ready ; it is not started by spinup.
2	04 04	LOGICAL UNIT NOT READY, FORMAT IN PROGRESS	The logical unit is currently not ready. (The format command is being executed.)
2	04 84	POWER OFF IN PROCESS	Planned shutdown is in progress.
2	05 00	LOGICAL UNIT DOES NOT RESPOND TO SELECTION	The logical unit has not responded to the drive interface.
1/4	06 00	NO REFERENCE POSITION FOUND	The head cannot be positioned at track 0.
4	07 00	MULTIPLE PERIPHERAL DEVICES SELECTED	Two or more drives were simultaneously selected.
4	08 00	LOGICAL UNIT COMMUNICATION FAILURE	A drive interface error occurred in the logical unit.
4	08 01	LOGICAL UNIT COMMUNICATION TIME-OUT	A drive interface timeout error occurred in the logical unit.
1/4	08 02	LOGICAL UNIT COMMUNICATION PARITY ERROR	A drive interface parity error occurred in the logical unit.
1/4	09 00	TRACK FOLLOWING ERROR	The track position has come off.
3	0C 02	WRITE ERROR-AUTO REALLOCATION FAILED	Automatic reallocation was executed against a write error but failed.
3	10 00	ID CRC OR ECC ERROR	A CRC error occurred in the ID field.
3	11 02	ERROR TOO LONG TO CORRECT	The read error in the DATA field cannot be corrected by means of ECC.
3	11 04	UNRECOVERED READ ERROR : AUTO REALLOCATION FAILED	Automatic reallocation was executed against an uncorrectable error but failed.
3	12 00	ADDRESS MARK NOT FOUND FOR ID FIELD	The address mark of the ID field cannot be detected.
1/3	13 00	ADDRESS MARK NOT FOUND FOR DATA FIELD	The address mark of the DATA field cannot be detected.
1/3	14 01	RECORD NOT FOUND	A block that matches cannot be detected in the ID field.
1/3	15 01	MECHANICAL POSITIONING ERROR	A seek error occurred.
1/3	15 02	POSITIONING ERROR DETECTED BY READ OF MEDIUM	Seek operation terminated normally but the head was positioned at an invalid address.
1	17 00	RECOVERED DATA WITH NO ERROR CORRECTION APPLIED	The error was recovered by means of a retry.
1	17 01	RECOVERED DATA WITH RETRIES	The error was recovered by means of a retry. (Without head offset)
1	17 02	RECOVERED DATA WITH POSITIVE HEAD OFFSET	The error was recovered by means of a retry with a positive head offset.

Table 3.1.1 Sense Codes (2/6)

Sense key	Sense code	Error name	Description
1	17 03	RECOVERED DATA WITH NEGATIVE HEAD OFFSET	The error was recovered by means of a retry with a negative head offset.
1	18 00	RECOVERED DATA WITH ERROR CORRECTION APPLIED	The error was recovered by means of ECC without retry.
1	18 01	RECOVERED DATA WITH ERROR CORRECTION AND RETRIES APPLIED	The error was recovered by means of ECC with retry.
1	18 02	RECOVERED DATA-DATA AUTO-REALLOCATED	Data was recovered by means of an automatic reallocation.
1/3	19 02	DEFECT LIST ERROR IN PRIMARY LIST	An error occurred during an access to the PRIMARY (P) list.
1/3	19 03	DEFECT LIST ERROR IN GROWN LIST	An error occurred during an access to the GROWN (G) list.
5	1A 00	PARAMETER LIST LENGTH ERROR	The length of the parameter list is incorrect.
4	1B 00	SYNCHRONOUS DATA TRANSFER ERROR	An synchronous transfer error occurred in a data transfer.
3	1C 01	PRIMARY DEFECT LIST NOT FOUND	A positioning to the PRIMARY (P) list failed.
3	1C 02	GROWN DEFECT LIST NOT FOUND	A positioning to the GROWN (G) list failed.
E	1D 00	MISCOMPARE DURING VERIFY OPERATION	A data compare error occurred during write or read buffer verify processing.
5	20 00	INVALID COMMAND OPERATION CODE	The operation code is incorrect.
5	21 00	LOGICAL BLOCK ADDRESS OUT OF RANGE	An attempt was made to access beyond the logical block address reported by means of READ CAPACITY (PMI bit = 0).
5	24 00	INVALID FIELD IN CDB	The CDB contains an invalid field. ex. RESERVED Bit/VALUE ≠ ZERO
5	25 00	LOGICAL UNIT NOT SUPPORTED	The LUN indicated by the CDB or IDENTIFY message is not supported.
5	25 80	LOGICAL UNIT ALLOCATE ERROR	The logical unit allocation failed.
5	25 81	RAID GROUP NOT DEFINE	The RAID GROUP (RG) is not defined.
5	26 00	INVALID FIELD IN PARAMETER LIST	The parameter list contains a invalid field.
5	26 01	PARAMETER NOT SUPPORTED	An unsupported parameter was received.
5	26 02	PARAMETER VALUE INVALID	The parameter value is invalid.
6	29 00	POWER ON RESET, RESET OR BUS DEVICE RESET OCCURRED	- A POWER ON RESET occurred. - A BUS DEVICE RESET occurred. - A SCSI BUS RESET occurred.
6	2A 00	PARAMETERS CHANGED	A MODE SELECT parameter was changed. ex. A parameter was changed by the MODE SELECT command.
6	2F 00	COMMANDS CLEARED BY ANOTHER INITIATOR	The command was cleared according to the CLEAR QUEUE message from another initiator or because the CA status occurred in the initiator.
3	31 00	MEDIUM FORMAT CORRUPTED	The data medium is not formatted correctly ; it must be reformatted by the FORMAT UNIT command.
3	31 01	FORMAT COMMAND FAILED	The FORMAT command terminated abnormally ; it must be reformatted by the FORMAT UNIT command.
3	31 80	DATA FORMAT CORRUPTED	The data format for arrays is not established.
3	31 81	FORMAT COMMAND NOT EXECUTE	- The format command cannot be executed because the disk configuration is incomplete (i.e., the data or parity drive is detached). - An attempt was made to execute the format command beyond the actual mounting capacity.
1/4	32 00	NO DEFECT SPARE LOCATION AVAILABLE	Reallocation cannot be applied because the alternate area is insufficient.

Table 3.1.1 Sense Codes (3/6)

Sense key	Sense code	Error name	Description
1/3	32 01	DEFECT LIST UPDATE FAILURE	The GROWN (G) list could not be updated.
B	3D 00	INVALID BITS IN IDENTIFY MESSAGE	An invalid bit was found in the IDENTIFY message.
2	3E 00	LOGICAL UNIT HAS NOT SELF-CONFIGURED YET	The drive self-configuration is not yet established.
6	3F 01	MICROCODE HAS BEEN CHANGED	The microprogram was downloaded.
B	43 00	MESSAGE ERROR	Operation cannot be continued because the message was rejected or an error occurred in the message phase.
4	44 00	INTERNAL TARGET FAILURE	A hardware or firmware error was detected in the controller during command execution.
4	44 A0	NO REASSIGN SECTOR	No sector to be reassigned cannot be detected.
B	45 00	SELECT OR RESELECT FAILURE	- SELECT TIME OVER or RESELECT TIME OVER was detected. - An invalid SELECTION was detected.
B	47 00	SCSI PARITY ERROR	A SCSI bus parity error occurred.
B	48 00	INITIATOR DETECTED ERROR MESSAGE RECEIVED	The INITIATOR DETECTED ERROR message was received from the initiator.
B	49 00	INVALID MESSAGE ERROR	An invalid message was received.
B	4A 00	COMMAND PHASE ERROR	An error occurred in the command phase.
B	4B 00	DATA PHASE ERROR	An error occurred in the data phase.
4	4C 00	LOGICAL UNIT FAILED SELF-CONFIGURATION	A loading of a microcode or parameter failed during controller startup.
B	4E 00	OVERLAPPED COMMANDS ATTEMPTED	- Two commands without tags were issued to the same I-T-L. - A command with a tag and a command without it were issued to the same I-T-L. (When this code is reported, all the commands queued at the I-T-L are cleared.)
1	5B 00	LOG EXCEPTION	A log exception was detected in the drive.
1	5B 02	LOG COUNTER AT MAXIMUM	The log counter in the drive reached the maximum value.
1	5B 03	LOG LIST CODES EXHAUSTED	All log list codes in the drive were used up.
1	5D 00	DETACH ERROR	A failure causing blockade occurred. (This sense code is reported only when the AS/400 is connected.)
6	82 00	DRIVE RECOVER COMPLETE	Disk recovery by means of drive recovery terminated normally. (Note)
6	82 01	DRIVE RECOVER ERROR FOR UNCORRECTABLE DATA ERROR	Disk recovery by means of drive recovery terminated normally but unrecoverable data occurred. (Note)
6	82 02	DRIVE RECOVER COMPLETE (EXIST UNCORRECTABLE DATA ERROR)	Disk recovery by means of drive recovery terminated normally but the configuration status did not change to the recovery completion status because unrecoverable data occurred. (Note)
6	82 10	DRIVE RECOVER FORCIBLY TERMINATE	Drive restoration was forcibly terminated by an operator instruction. (Note)
6	82 11	DRIVE RECOVER FORCIBLY TERMINATE (MEDIA ERR DETECT : FROM)	Drive restoration was forcibly terminated because a media error was detected in the drive restoration source disk. (Note)
6	82 12	DRIVE RECOVER FORCIBLY TERMINATE (MEDIA ERR DETECT : TO)	Drive recovery was forcibly terminated because a media error was detected in the drive restoration destination disk. (Note)
6	82 13	DRIVE RECOVER FORCIBLY TERMINATE (HARD ERR DETECT : FROM)	Drive restoration was forcibly terminated because a hardware error was detected in the drive restoration source disk. (Note)
6	82 14	DRIVE RECOVER FORCIBLY TERMINATE (HARD ERR DETECT : TO)	Drive restoration was forcibly terminated because a hardware error was detected in the drive restoration destination disk. (Note)

Note : This sense code is not reported to the host. (This code is reported in sense information on MODE SENSE page 34H.)

Table 3.1.1 Sense Codes (4/6)

Sense key	Sense code	Error name	Description
6	82 15	DRIVE RECOVER FORCIBLY TERMINATE (DISK BLOCKED : FROM)	• Drive restoration was forcibly terminated because the drive restoration source disk was shut down. (Note)
6	82 16	DRIVE RECOVER FORCIBLY TERMINATE (DISK BLOCKED : TO)	• Drive restoration was forcibly terminated because the drive restoration destination disk was shut down. (Note)
6	82 17	DRIVE RECOVER FORCIBLY TERMINATE (CACHE HARD ERRDETECT)	• Drive restoration was forcibly terminated because a hardware error was detected in cache control for drive restoration. (Note)
6	82 18	DRIVE RECOVER FORCIBLY TERMINATE (CONFIGURATION CHANGE)	• Drive restoration was forcibly terminated because the configuration information status was changed. (Note)
6	82 19	DRIVE RECOVER FAIL (WRITE AFTER DATA REMAIN)	• The drive could not be started because write-after data remains in the restoration destination spare disk. (Note)
6	82 1A	TIME OUT DETECTED IN CONTROLLER	• Drive restoration was forcibly terminated because a timeout error occurred during internal processing. (Note)
B	83 00	DRIVE DUMP INFORMATION CHANGE	• The dump was changed because another controller was shut down during collection of SEND DIAG drive dump.
4	8A 01	PARITY ERROR DETECTED DURING MEDIUM PARITY CERTIFICATION	• A parity error was detected during medium parity matching check.
4	8A 02	CHECK CODE ERROR DETECTED DURING MEDIUM LA CERTIFICATION	• A check code error was detected during medium LA matching check.
1	8A 03	DIRTY DATA EXIST DURING MEDIUM PARITY CERTIFICATION	• Intermediate pinned dirty data was found during parity matching check.
1	8A 04	DIRTY DATA EXIST DURING MEDIUM LA CERTIFICATION	• Intermediate or physical pinned dirty data was found during medium LA matching check.
1	8B 01	COMMAND ATTEMPTED TO BLOCKED LOGICAL UNIT	• An inoperable command was issued to the shut down logical unit.
5	8C 01	PARITY CHECK REQUESTED DURING REGRESSION MODE	• Parity check was requested in the degraded (regression) mode.
3	8E 01	READ ATTEMPTED TO WRITE-UNCOMPLETED BLOCK	• READ or VERIFY was directed for the block for which WRITE is not completed.
4	90 00	UNRECOVERED DATA ERROR WITH PARITY DISK DATA	• An unrecoverable data error occurred during data recovery with parity disk data.
4	90 01	UNRECOVERED DATA ERROR WITH PARITY DISK DATA IN REGRESSION MODE	• An unrecoverable data error occurred during degradation (regression).
4	91 00	AUTO-REALLOCATION NOT COMPLETE FOR UNCORRECTABLE ERROR	• Data cannot be reconstructed because an unrecoverable error was detected during automatic reallocation.
4	91 01	AUTO-REALLOCATION NOT COMPLETE FOR UNCORRECTABLE ERROR	• An alternate block could not be reallocated during automatic reallocation.
3	93 00	PARITY ADJUSTMENT ERROR ON CACHE MEMORY	• A parity adjustment error occurred in the cache.
4	99 00	DATA WRITE ERROR ON SYNCHRONIZE CACHE	• Data on synchronized cache cannot be written to the drive.
4	A0 00	CACHE MEMORY HARDWARE ERROR	• An error occurred in the cache circuit.
B	C0 00	TIME OUT DETECTED IN CONTROLLER	• A timeout occurred during internal processing.
B	C0 01	TIME OUT DETECTED IN HOST DATA TRANSFER	• A timeout occurred during host data transfer.
B	C1 00	CACHE MEMORY UNASSIGNED FOR FORMAT	Cache necessary for formatting cannot be assigned.
B	C2 00	SYSTEM DRIVE CHANGED	The system current drive was changed.

Note : This sense code is not reported to the host. (This code is reported in sense information on MODE SENSE page 34H.)

Table 3.1.1 Sense Codes (5/6)

Sense key	Sense code	Error name	Description
5	DA 00	DRIVE RECOVERY REQUEST IS REJECTED, SINCE ANOTHER DRIVE RECOVERY IN PROCESS	A new data recovery request cannot be accepted because another drive is being recovered.
4	E4 00	NVS INTERNAL TABLE OVERFLOW, WRITE INCOMPLETE MANAGEMENT AREA	The system area overflowed. (PIN data management area) (Note 1)
4	EA 01	PROGRAM SIZE OUT OF RANGE	The program size received in the write buffer exceeds the program area size of the system.
4	EA 02	CONTROL INFORMATION SIZE OUT OF RANGE	The inheritance information size received in the write buffer exceeds the inheritance information size of the system.
3	F0 00	R/W BUFFER ERROR	A loading of a microcode or parameter failed when the controller was started.
3	F1 00	ERROR IN CONTROLLER INITIALIZATION	
4	F2 00	ERROR IN CONTROLLER INITIALIZATION	
4	F3 00	ERROR IN CONTROLLER INITIALIZATION	
4	F4 00	CACHE MEMORY FAILURE	The cache module was shut down because a cache memory error occurred.
4	F6 10	DRIVE SEEK RECOVERED ERROR WARNING	A drive occurred in which the number of recovered mechanical system errors exceeded the threshold value. (Note 2)
4	F6 11	DRIVE SEEK UNRECOVERED ERROR WARNING	A drive occurred in which the number of unrecovered mechanical system errors exceeded the threshold value. (Note 2)
4	F6 20	DRIVE MEDIUM RECOVERED ERROR WARNING	A drive occurred in which the number of recovered medium errors exceeded the threshold value.
4	F6 21	DRIVE MEDIUM UNRECOVERED ERROR WARNING	A drive occurred in which the number of unrecovered medium errors exceeded the threshold value.
4	F6 30	DRIVE R/W RECOVERED ERROR WARNING	A drive occurred in which the number of recovered R/W errors exceeded the threshold value.
4	F6 31	DRIVE R/W UNRECOVERED ERROR WARNING	A drive occurred in which the number of unrecovered R/W errors exceeded the threshold value.
4	F6 40	DRIVE I/F RECOVERED ERROR WARNING	A drive occurred in which the number of recovered I/F errors exceeded the threshold value.
4	F6 41	DRIVE I/F UNRECOVERED ERROR WARNING	A drive occurred in which the number of unrecovered I/F errors exceeded the threshold value.
4	F6 50	DRIVE CONTROLLER HARD RECOVERED ERROR WARNING	A drive occurred in which the number of recovered Hardware errors exceeded the threshold value.
4	F6 51	DRIVE CONTROLLER HARD UNRECOVERED ERROR WARNING	A drive occurred in which the number of unrecovered Hardware errors exceeded the threshold value.
4	F6 60	SCSI I/F RECOVERED ERROR WARNING	A drive occurred in which the number of recovered SCSI I/F errors exceeded the threshold value.

Note 1 : If WAR is 1 in the MODE SELECT command (page 35H) when this sense code is reported to the host, "sense key : 4/code : F804" is also reported.

Table 3.1.1 Sense Codes (6/6)

Sense key	Sense code	Error name	Description
4	F6 61	SCSI I/F UNRECOVERED ERROR WARNING	A drive occurred in which the number of unrecovered SCSI I/F errors exceeded the threshold value.
4	F6 70	ONLINE VERIFY CORRECTABLE ERROR WARNING	A drive occurred in which the number of collectable errors in online verify exceeded the threshold value.
4	F6 71	ONLINE VERIFY UNCORRECTABLE ERROR WARNING	A drive occurred in which the number of uncollectable errors in online verify exceeded the threshold value.
4	F8 00	BATTERY ALARM	A battery failure occurred. (Note 1)
4	F8 01	FAN ALARM	A fan failure occurred. (Note 1)
4	F8 02	DC POWER SUPPLY FAILURE	A DC failure occurred. (Note 1)
4	F8 03	DRIVE FAILURE	A drive failure (degradation) occurred. (Note 1)
4	F8 04	PIN DATA OVER	A PIN data over occurred. (Note 1)
4	F8 05	CACHE MEMORY FAILURE	The module was shut down. (Note 1)
4	F8 F0	ANOTHER CONTROLLER NOT READY	Another controller was shut down. (Note 1)
4	F9 00	BATTERY RECOVERY	The battery failure was recovered. (Note 2)
4	F9 01	FAN RECOVERY	The fan failure was recovered. (Note 2)
4	F9 02	DC POWER SUPPLY RECOVERY	The DC failure was recovered. (Note 2)
4	F9 03	DRIVE RECOVERY	The drive failure (degradation) was recovered. (Note 2)
4	F9 04	PIN DATA RECOVERY	The PIN data over was recovered. (Note 2)
4	F9 05	CACHE MEMORY RECOVERY	Module shut down was released. (Note 2)
4	F9 06	OWN CONTROLLER RECOVERY	The own controller was recovered. (Note 2)
4	F9 F0	ANOTHER CONTROLLER RECOVERY	Another controller was recovered. (Note 2)
B	FD 00	COMMAND NOT EXECUTED BY CHANGING LOGICAL UNIT	Command execution was disabled because the LU was switched. (This code is reported only to the SVP panel.)
B	FD 01	DOMMAND PAUSE BY CHANGING LOCICAOL UNIT	LU switch command was stopped. (This code is reported only to the SVP panel.)

Note 1 : This sense code is reported to the host only when WAR is 1 in the MODE SELECT command (page 35H).

Note 2 : This sense code is reported to the host only when RCVRY is 1 in the MODE SELECT command (page 35H).

4. Error Trace with Power On

Error trace with power on is used when an error occurs. Of information stored in the controller, error trace and SSB trace are written onto a 3.5" floppy disk (1.44M bytes). Error trace with power on is collected during operation. The collected information is used for error trace analyses (Section 4.3).

4.1 When to Collect Error Trace with Power On

Collect the error trace with power on in the following cases :

- (1) An error is reported in the workstation server, maintenance client, and utility.
- (2) The ALARM and WARNING LEDs come on.

4.2 Notes on the Online Failure Trace Collection Before it is Executed

Concerning some versions of the DF300/DF350, a waiting hang-up of the host or a controller blockade (in the case of the dual controller configuration) may occur when the online trace is executed after specifying the default condition to collect all items automatically. Execute the operation following the procedure for the online trace correction.

Be sure to check the microprogram version of the subsystem before the operation referring to the table below. (To know the microprogram version, open the front panel (bezel) of the subsystem and see the SVP display panel. Since the SVP display screen is scrolled upward when a failure occurs, search for it using the direction keys ( and ).)

Table 4.2.1 DF350(SCSI) Microprogram Version that Allows Online Trace that Corrects All Items

No.	Subsystem	Controller	Microprogram Ver.
1	DF350-DK/DKH/MK/CK/RKH/RKWH	Single controller/ Dual controller	0304/D or later

Table 4.2.2 DF300 Microprogram Version that Allows Online Trace that Corrects All Items

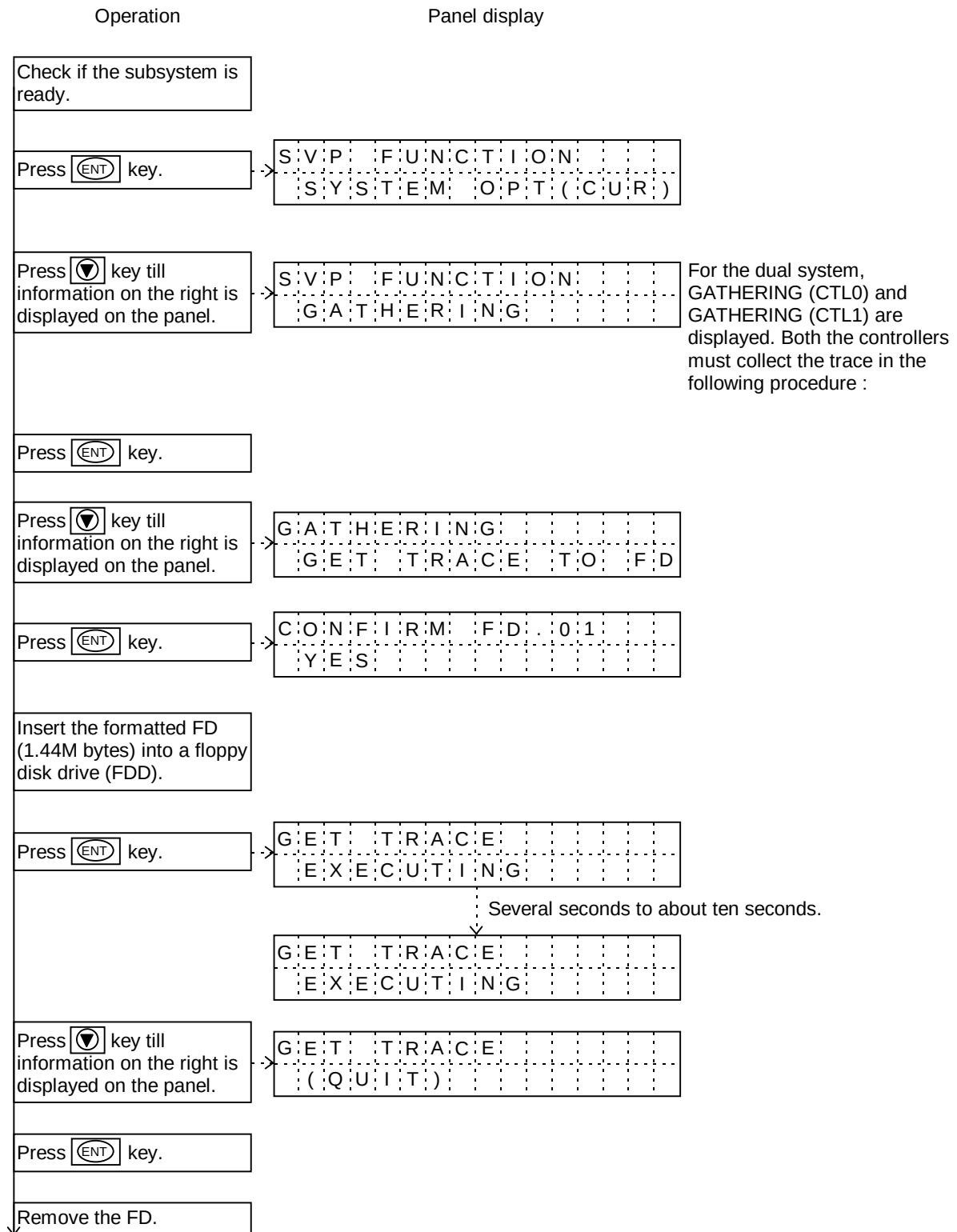
No.	Subsystem	Controller	Microprogram Ver.
1	DF300-DK	Single controller	8103/A or later
2	DF300-MK/CK/RK/RKH	Single controller	0103/C or later
3	DF300-MK/CK/RK/RKH	Dual controller	All version

Note : Concerning the DF350F disk array subsystem (Using the Fibre Channel connection), all the microprogram Versions allow to specify the automatic collection of all items (default) for the online trace collection.

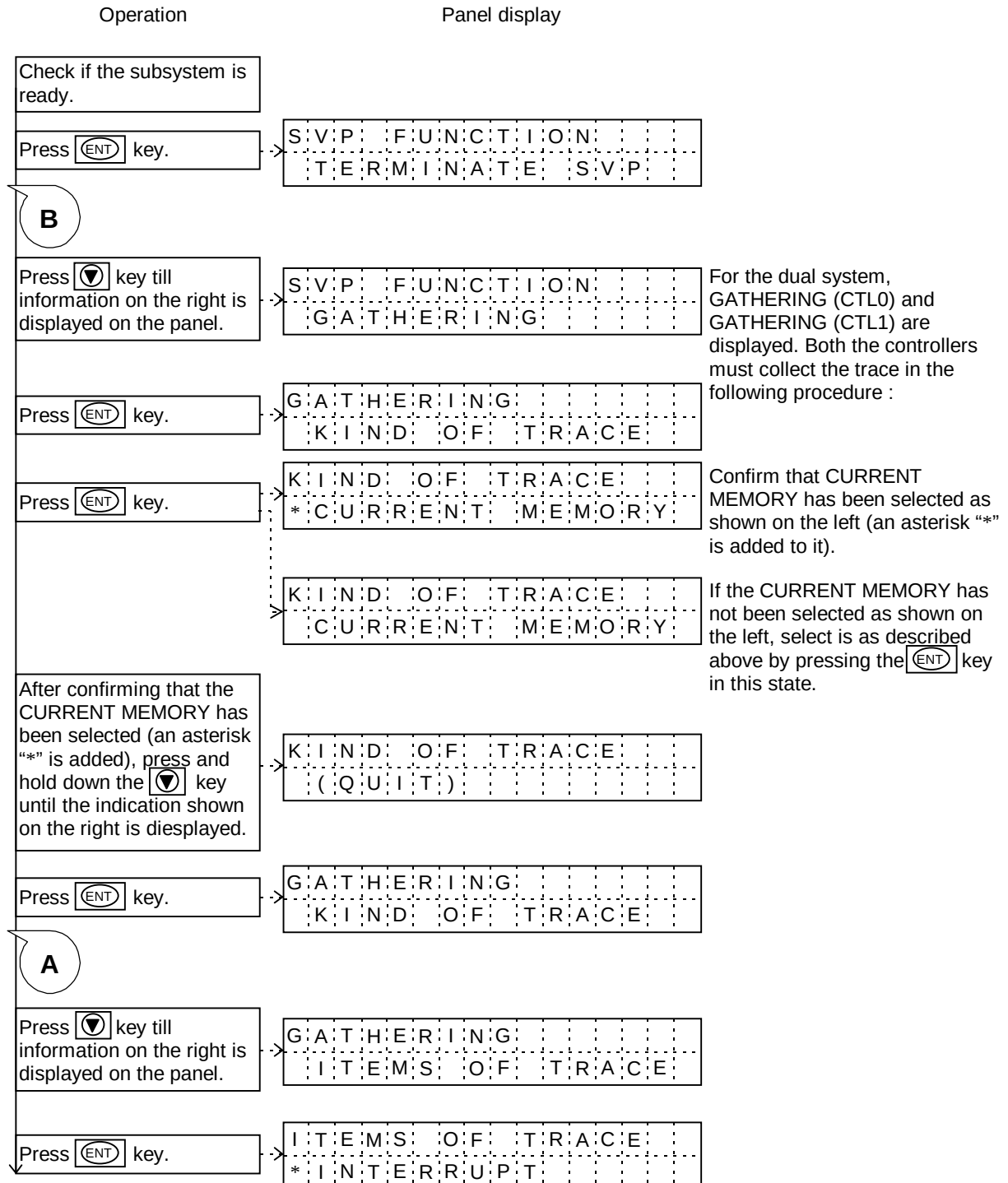
4.3 Collecting Error Trace with Power On

Use the 1.44M byte 3.5" floppy disk (FD) formatted in MS-DOS to collect error trace with power on. Prepare one 3.5" FD per controller.

(1) In case of microprogram Ver.0304/D or later.



(2) In case of microprogram Ver.0304/C or earlier.



(3) Selecting items to be traced.

Concerning some versions of the DF300/DF350, a failure may occur when the trace is collected on the default condition (automatic collection of all items). Therefore, collect trace information of each item separately.

The procedure for collecting the trace of each item is shown below.

Select the items to be traced from the default items as shown in the following settings 1 to 10 using the  and  keys. (The item with an asterisk "*" is not an object to be traced.) Each time the  key is pressed, presence an absence of the asterisk "*" are alternated. (A multiple selection is allowed.)

Collect the trace information ten times (on item at a time) using the following settings of ten types (settings 1 to 10).

(Default)

ITEM OF TRACE
* INTERRUPT
* HOST COMMAND
* DRIVE COMMAND
* MODULE
* JOB
* SSB
* ERROR
* FAILURE
* DOWN
* DRIVE DETACH

(Setting 1)

ITEM OF TRACE
* INTERRUPT
HOST COMMAND
DRIVE COMMAND
MODULE
JOB
SSB
ERROR
FAILURE
DOWN
DRIVE DETACH

(Setting 2)

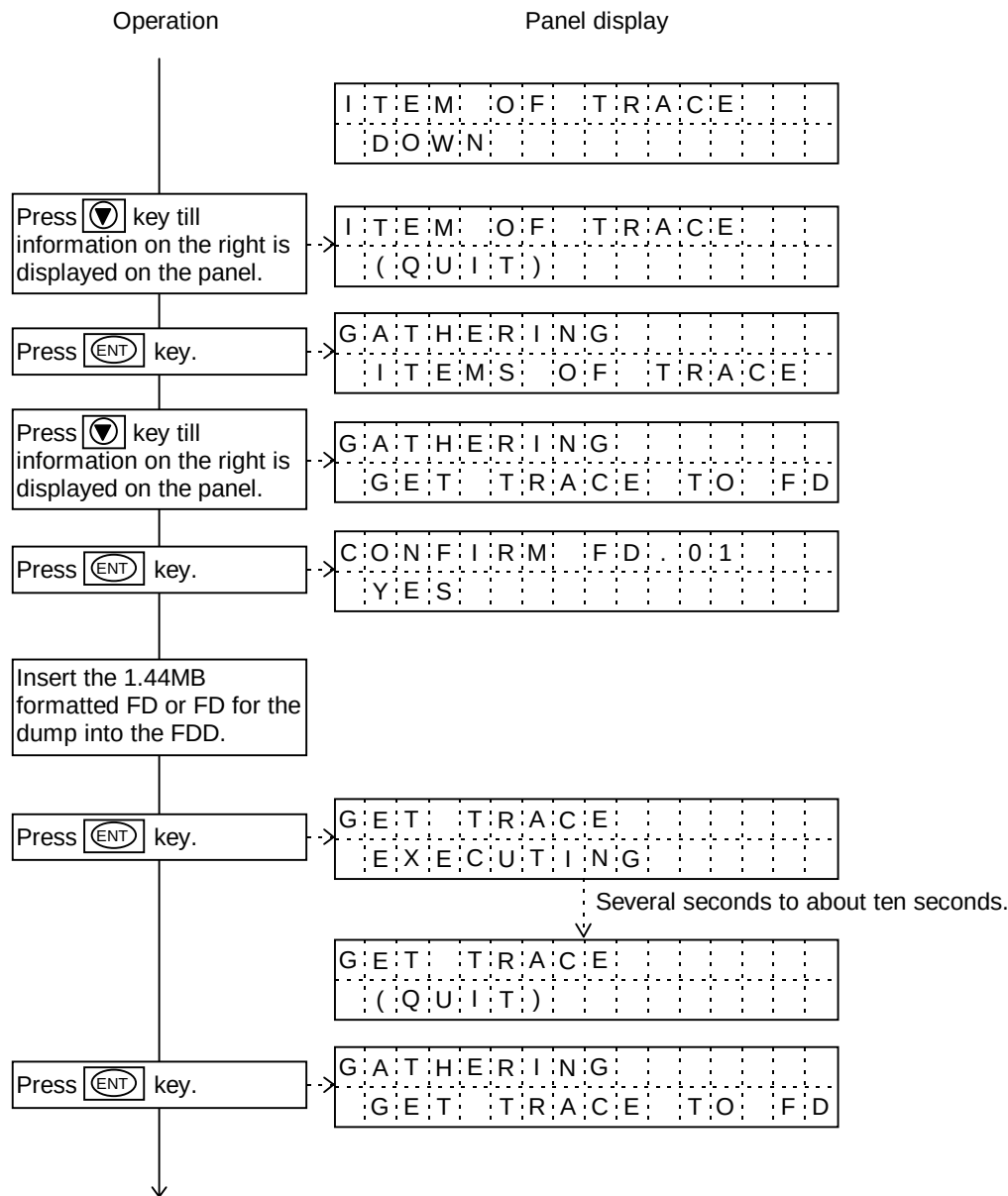
ITEM OF TRACE
INTERRUPT
* HOST COMMAND
DRIVE COMMAND
MODULE
JOB
SSB
ERROR
FAILURE
DOWN
DRIVE DETACH

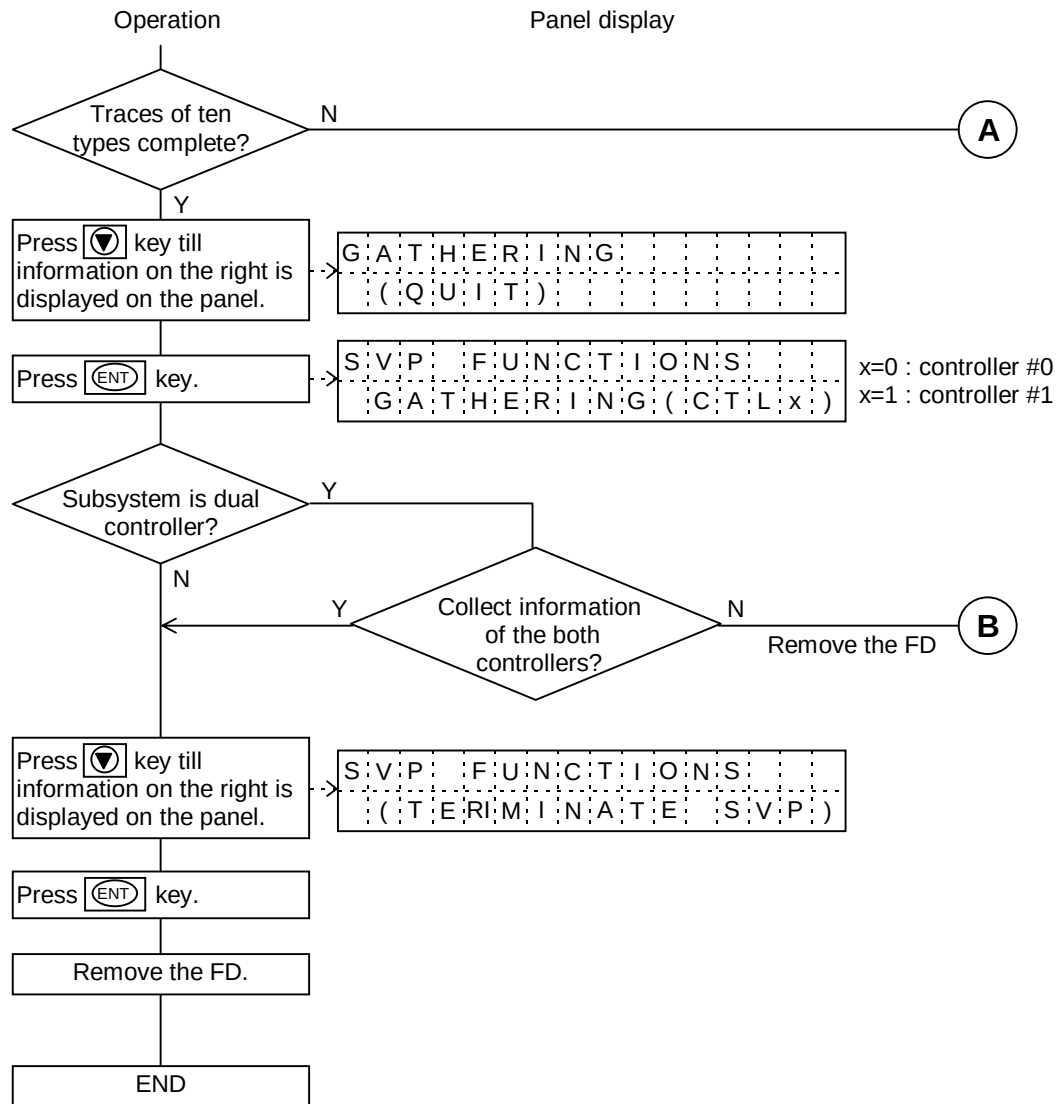
• • • •

(Setting 10)

ITEM OF TRACE
INTERRUPT
HOST COMMAND
DRIVE COMMAND
MODULE
JOB
SSB
ERROR
FAILURE
DOWN
* DRIVE DETACH

Perform the following operations after completion of the settings on the previous page.





4.4 Analyzing Error Trace with Power On

Use a trace analysis tool to locate the failed component according to the error trace with power on information collected in Section 4.3.

(1) Preparation

Analyzing error trace with power on requires ① personal computer, ② FD containing the trace analysis tool, and ③ FD containing the trace information collected in Section 4.3.

① Personal computer that can be used

- IBM compatible machine.
- MS-DOS Ver.5.0 or later.
- Programs can run on the Windows 3.1 or Windows 95/98 DOS prompt.
- A hard disk drive (HDD) with a free capacity or at least 3M bytes is required.
- A 3.5" FDD is required.

② FD containing the trace analysis tool

The following four files (six files for the tool of revision 0403 or later) are contained in the FD. Files required for the trace analysis of the DF300/DF350/DF350F are the following a) to d). (Files e) and f) are not required because they are used for the DF400 only.)

a) TDCONV.EXE -----	Analysis execution file	}	Tools of revisions 0301 and earlier.
b) TDCONV.REV -----	REV file		
c) TDCONFJ.*(four files)-----	Data file in Japanese	}	For the DF300/DF350/ DF350F trace analyses.
d) TDCONVE.*(four files) -----	Data file in English		
e) TDCV400J.*(four files) -----	Data file in Japanese	}	For the DF400 trace analyses.
f) TDCV400E.*(four files)-----	Data file in English		
			Tools of revisions 0403 and later.

(2) Installation method

① Creating a directory

Create a suitable directory on the HDD of the personal computer prepared according to (1)-①.

C:\>MKDIR TDCONV

↑
(Directory name)

Copy the files.

C:\>CD TDCONV

C:\TDCONV>COPY A:*. * ----- Copy all files from the FD containing the trace analysis tool to the directory created in the HDD.

Note : If two or more TDCONV files exist in the directory, the trace analysis tool may not operate.

C:\TDCONV>dir

Enter the above command to check the files under the directory. If there are two or more files under the directory, enter the following command to delete the analysis execution file, then recopy the files

C:\TDCONV>del TDCONV*. *

- ② Confirm the revision number of the trace analyzing tool.

To confirm the number, type the following.

C:\TDCONV>TDCONV

TDCONV REVs and corresponding support functions are shown in Table 4.4.1.

Table 4.4.1 TDCONV REVs and Corresponding Support Functions

No.	TDCONV REV	Support function
1	0101	Supports functions for analyzing the failure trace, SSB trace of the DF300/DF350.
2	0201	Supports functions for analyzing the failure trace, SSB trace of the DF350F.
3	0301	Supports functions for drive failure information (C-DRVDTC.TRC) of the DF350/DF350F. (*1)
4	0403	Supports functions for analyzing the failure trace, SSB trace, and drive failure information of the DF400.

*1 : The trace of the drive failure information (C-DRVDTC.TRC) cannot be collected from the DF350 with the microprogram of version 0305 or earlier.

This function is available with the DF350 microprogram of version 0305 or earlier.

- (3) Procedure for analysis of error trace with power on

Execute the analysis execution file (TDCONV.EXE) to create a text file. Refer to the text file to find the failed component.

- ① Insert the FD containing the trace collected online into the FDD.
 ② Change to the directory where you installed the analysis execution file.

C:\>CD TDCONV

- Editing the SSB trace

C:\TDCONV>TDCONV A:\C-SSB.TRC /T

- Editing the failure trace

C:\TDCONV>TDCONV A:\C-FAIL.TRC /T

- Editing the drive failure information trace

C:\TDCONV>TDCONV A:\C-DRVDTC.TRC /T

Note : The drive failure information trace (C-DRVDTC.TRC) is a piece of trace information supported by the DF350 microprogram of version 0305 or later.

This command edits only the FD containing the trace collected with the microprogram of version 0305 or later.

When the /T option is specified, logs are edited in descending order of time (that is, the latest log is edited first). When this option is not specified, logs are edited in ascending order of time (that is, the oldest log is edited first).

- ③ Change to the directory where you installed the analysis execution file.

If an error occurs, repeat the following operation.

- (a) Insert another formatted 1.44M byte FD into the FDD, not the FD containing collected trace information. (File is not required.)
- (b) C:\>DIR A:
- (c) Remove the FD from the FDD.

Then, return to ①.

If the same error reoccurs, trace information may be unable to be collected because the FD is faulty.

Prepare another FD, then collect error trace with power on again.

- ④ Executing conversion in ② creates text files (C-SSB.TXT, C-FAIL.TXT and C-DRVDTC.TXT) in the directory.

C-SSB.TXT, C-FAIL.TXT, and C-DRVDTC.TXT can refer to information of the SSB trace, the failure trace, and the drive blockade factor respectively.

If a file having the same name exists, the old text file name is changed to C-SSB.B_1 and the file is saved.

(Up to nine back-up files (from B_2 to B_9) are subsequently created. Files with larger numbers are old files.)

- ⑤ Open the above text file with an appropriate editor.

The following information is displayed in the text file.

- Time (time relative to power-on)
- Error information
- Failed component
- Error information

- (a) SSB trace (C-SSB.TXT)

SSB trace can be referred to for the SSB information reported to the host (see page TRBL1090 for an example of displaying SSB information) and power-on information. (See page TRBL1090 for an example of displaying power-on information.) Up to 150 units of information is stored. (If information is stored beyond 150 units of information, the oldest information is discarded and the latest information is stored.)

- (b) Error trace (C-FAIL.TXT)

Error trace can be referred to for the error information detected in the controller. Up to 300 units of information is stored. (If information is stored beyond 300 units of information, the oldest information is discarded and the latest information is stored.) An example of displaying error information is shown on page TRBL1110.

- (c) Drive failure information (C-DRVDTC.TXT)

Drive failure information can be referred to. Since the latest failure information of each drive is stored, the drive blockingfactor information which has been overwritten by failure trace (C-FAIL.TXT) can be referred to.

An example of displayed drive failure information is shown on page TRBL1110.

Note : To surely collect the drive blocking factor information, collect this information before replacing the blocked drive.

Example of displaying SSB information

```

[No.00B8]    (136/150)
TIME      :    38:40:20'892"621"' [ 84CD49C-026D] ----- Time relative to power-on
P/S Cnt   : 16                               38 hours and 40 minutes have elapsed.
Sense     : [0B/4700]
           : [ABORTED CMD] A SCSI bus parity error was detected.
Type      : [1010xx17] An error detected by the host I/F controller
           : [The host is faulty] A parity error occurred during DMA transfer write.
Notes     : 1. Check the I/F ADAPTER ASSY, I/F cable, and terminator, then replace the faulty component (s).
           : 2. Replace the control ASSY.
           : 3. Check the host on the SCSI bus and other devices.
Dump      :
000 : B8  00  50  0A  9C  D4  4C  08  -  6D  02  00  10  3B  6D  C0  1D
016 : 70  00  0B  00  00  00  00  38  -  00  00  00  00  47  00  00  00
032 : 00  00  10  00  00  00  00  00  -  00  00  00  00  10  17  00  00
048 : 11  00  00  00  01  00  00  00  -  01  02  02  00  00  00  00  00
064 : 00  00  00  00  01  46  01  25  -  08  6E  00  00  12  F4  12  00

```

Example of displaying power-on information

(By obtaining the power-on time and the error occurrence time (power-on time + relative time) can be calculated.)

```

[No.00AE]    (126/150)
TIME      :    0:01::41'374"824"' [ 18BFE-0338]
P/S Cnt   : 16
RTClock   : 96-04-14 19:18:01-----power-on time
SYSTEM    : COLD                               CACHE : Nonvolatile
DISK#0    : COLD / COLD Usable                 P/K#0   : Nonvolatile
DISK#1    : COLD / COLD Usable                 P/K#1   : Nonvolatile
DISK#2    : COLD / COLD Usable                 P/K#2   : Nonvolatile
DISK#3    : COLD / COLD Usable                 P/K#3   : Nonvolatile
DISK#4    : COLD / COLD Usable
Dump      :
000 : AE  00  30  07  FE  8B  01  00  -  38  03  00  10  00  00  00  00
016 : 70  00  00  00  00  00  00  38  -  00  00  00  00  00  00  00  00
032 : 00  00  40  00  00  00  00  00  -  96  04  17  19  18  01  00  00
048 : 10  01  01  01  01  80  00  02  -  03  00  30  33  30  35  2F  41
064 : 11  11  11  11  11  00  00  00  -  00  00  FF  C8  50  53  4F  4E

```

Example of displaying SSB information

[No.03FC] (42/300)
 TIME : 0:37:28'991"134" [22511F-0086] ----- Time relative to power-on
 P/S Cnt : 16 0 hours and 37 minutes have elapsed.
 Sense : [04/4400]
 : [HARDWARE] A hardware or firmware error was detected in the controller during command execution.
 Type : [100F0105] An error detected by the host I/F controller
 : [H-SPC error] Invalid interrupt of TERMINATE command
 Notes : Replacement of the control ASSY.
 Dump :
 000 : FC 03 A0 2C 1F 51 22 00 - 86 00 00 10 00 00 00 00
 016 : 70 00 04 00 00 00 00 00 - 38 00 00 00 00 00 00 00
 032 : 44 00 00 00 00 00 10 00 - 00 00 00 00 00 00 00 00
 048 : 0F 05 00 00 00 00 00 00 - 00 00 00 00 01 01 80 02
 064 : FF A8 71 D8 FA 7E FF FF 41 00 02 60 00 00 20 20
 080 : 00 00 00 00 10 0F 01 05 - 00 00 00 00 00 00 00 00

Example of displaying drive failure information

(Display when a failure occurs)

Port#0 Row#0 Position of the drive in which the failure occurred
 TIME : 97.12.25 14:24:46 Time when the error occurred
 P/S Cnt : 1 Number of P/S ONs
 Sense : [FF/FFFF] Sense key/Sense code received from the drive
 Unregistered code (FF/FFFF shows invalidity.)
 OP Code [FF] Command code sent to the drive when a failure occurred
 Type : [40111003] Error detected by MPU (FF shows invalidity.)
 : [D-SPC failure] [Microprogram failure (I/O execution control)] invalid phase error
 Notes : HDU ASSY replacement
 Dump :
 000 : 30 02 01 FF 97 12 25 FF - 14 24 46 FF 84 2C 03 00
 016 : FF FF FF FF 40 11 10 03 - FF FF FF FF FF FF FF

(Display when a no failure occurs)

Port#0 Row#0
 [No failure]

5. Memory Dump

It appears to be necessary to include a BIG WARNING that specifies that the DF350 power NOT BE TURNED OFF PRIOR to a MEMORY DUMP procedure.

Memory dump sweeps out the information stored in the controller to a 3.5" FD (1.44M bytes); it is used when an error occurs. The purpose of memory dump is to facilitate tracing the cause of the error and shorten the analysis time. The swept out information cannot be analyzed in the job site.

The following explain when to collect memory dump and how to collect and transfer it.

5.1 When to Collect Memory Dump

Collect a memory dump in the following cases. During the system operation, collect the memory dump when the system can be stopped.

- (1) An error is reported to the workstation server, maintenance client, or utility.
- (2) The ALARM and WARNING LEDs come on.

5.2 Collecting Memory Dump

Memory dump is used to collect information of the controller with power turned on.

Use the 1.44M byte 3.5" floppy disk (FD) formatted in MS-DOS to collect the memory dump. Up to seven FDs can be used. (The number of FDs to be used depends on a compression rate because memory dump data is compressed and written to 3.5" FDs.) If dump is being gathered for a dual CTL system, you will need to get a dump from each controller. Prepare two sets of FDs, one set of 7 FDs per controller.

Affix labels to the prepared FDs to make the order in which memory dump data was collected clear.

Note : Delete all files from the FD to be used in advance. If the FD contains a file, memory dump may be unable to be collected.

5.2.1 Collecting memory dump (single CTL system)

- ① Set DIP switch No.2, as shown in Figure 5.2.1.

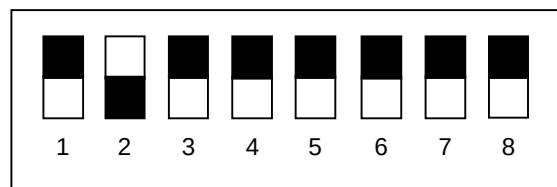
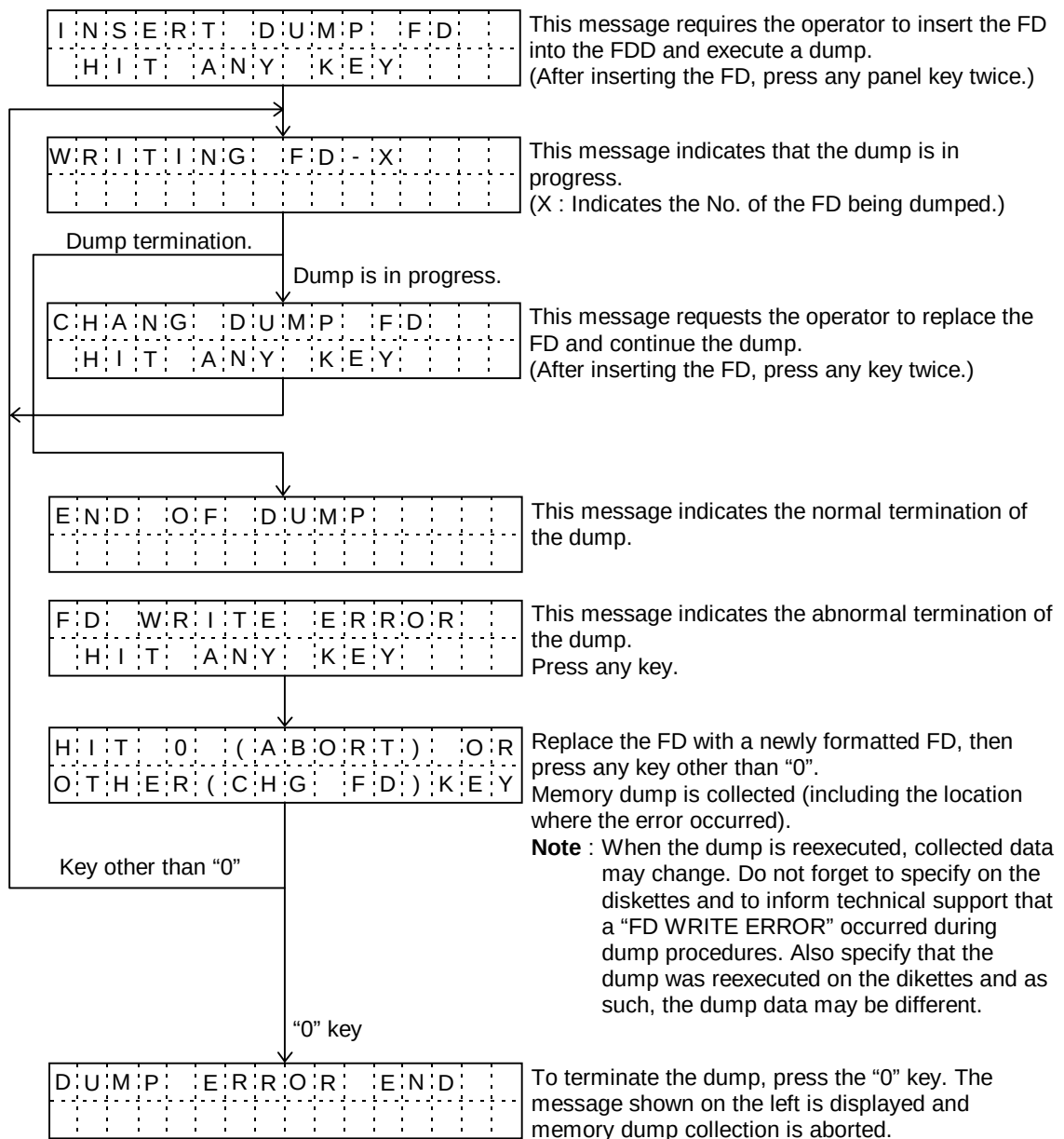


Figure 5.2.1 DIP Switch Setting for Memory Dump

- ② Press the reset switch on the CTL ASSY.

- ③ Perform operation according to the panel display.

Panel display



- ④ Set DIP switch No.2, as shown in Figure 5.2.2.

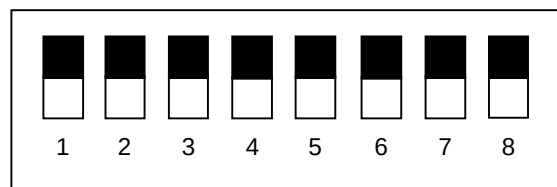


Figure 5.2.2 Standard DIP Switch Setting

- ⑤ Turn off the power of the subsystem.

5.2.2 Collecting memory dump (dual CTL system)

To collect memory dump when both the CTL ASSYs are normal, shut down one of the CTL ASSYs, then execute memory dump. This prevents incorrect panel display.

- ① Set DIP switch No.8 of the CTL ASSY whose board is to be shut down, as shown in Figure 5.2.3.

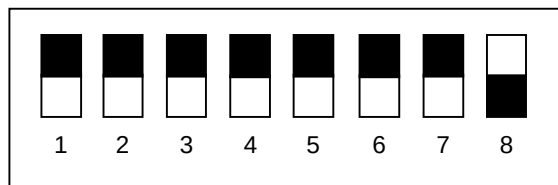


Figure 5.2.3 DIP Switch Setting for Shutting Down CTL ASSY

- ② Press the reset switch of the CTL ASSY to be shut down.

Ten seconds later, the red LED on the CTL ASSY comes on, indicating that the CTL ASSY was shut down.

In this case, the following message is displayed on the panel :

H	6	0	4	2	2	C	T	L	F	A	I	L		XX indicates a controller number. (00 : CTL0, 01 : CTL1)
W	0	1	5	0	0	C	T	L	A	L	M	-	X	

As a result of the operations ① and ②, one of the CTL ASSYs is shut down. (If one of them has been already shut down before memory dump collection, the operations ① and ② are not necessary.) After checking that the ASSY has been shut down, set the DIP switch No.8 as shown in Figure 5.2.6.

Turning off the power of the subsystem releases controller shutdown.

- ③ Set DIP switch No.2 of the CTL ASSY for which memory dump is to be executed, as shown in Figure 5.2.4. The DIP switches of the CTL ASSYs for which memory dump is not to be executed need not be set.



Figure 5.2.4 DIP Switch Setting for Memory Dump

- ④ Press the reset switch of the CTL ASSY for which memory dump is to be executed.

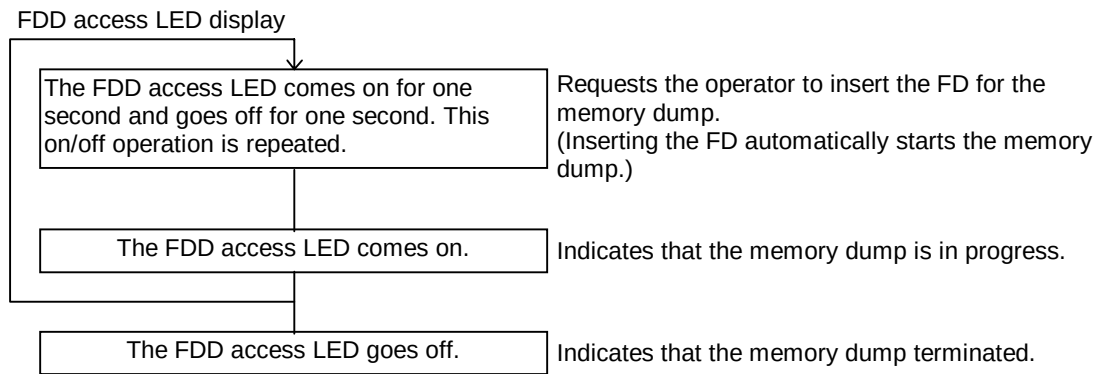
Perform the following operations depending on the status of the controller (being shut down or not) for which memory dump is to be collected :

- When the controller is not shut down

Perform operations according to panel display (in the same manner as memory dump for single system).

- When the controller is shut down

Perform operations according to the FDD access LED because no information is displayed on the panel.



Note 1 : If writing on the FD failed because an error was detected during memory dump execution, the FDD access LED comes on for 0.5 second and goes off for 0.5 second.

This on/off operation is repeated. The FD may be faulty. Replace it with another FD. The FDD access LED comes on and memory dump is reexecuted for the new FD.

Note 2 : To abort the memory dump, set the DIP switch No.2, as shown in Figure 5.2.5, then press the reset switch on the CTL ASSY.

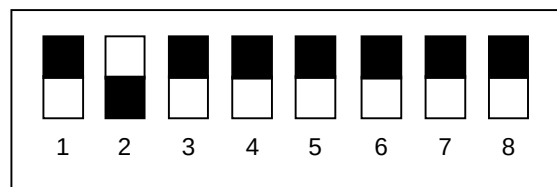


Figure 5.2.5 DIP Switch Setting for Canceling Memory Dump

- ⑤ To collect a memory dump from the next controller, do the following:
- Gather the 2nd set of 7 FDs that were previously prepared as mentioned in section 5.2.
 - To collect the memory dump for this remaining controller, execute steps ③ and ④ again.
- ⑥ Set the DIP switch No.2, as shown in Figure 5.2.6.

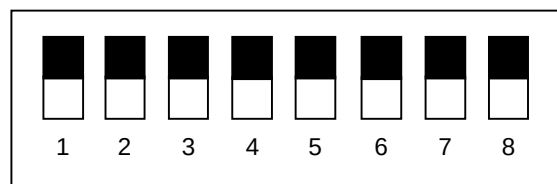


Figure 5.2.6 Standard DIP Switch Setting

- ⑦ Turn off the power of the subsystem.

Collected information is compressed in the DOS format.

5.2.3 Prepare information to send to Technical Support

(3) Compression of collected information

Collected information is stored in files shown in Table 5.2.1 on any FD. When compressible, information is stored in the ○○○_X.lzh format. When not compressible, information is stored in the ○○○_X.cmp format. When files are split, “X” of ○○○_X.lzh indicates a sequence number (i.e., 1, 2...). When they are not split, “X” is set to “1”.

Table 5.2.1 Files in Which Collected Information is Stored

No.	File name	Description	Size
1	MPU-R_1.lzh	M-CTL control register	98 [B]
2	DBUF-R_1.lzh	D-CTL control register	404 [B]
3	CACHE_1.lzh	DBUF/CACHE	(*1)
4	DRAM_1.lzh	CS/DS (DRAM)	4 [MB]
5	FLASH_1.lzh	Flash memory	1 [MB]
6	SRAM_1.lzh	DS (SRAM)	512 [KB]
7	LAN-SR_1.lzh	LAN LocalSRAM	256 [KB]
8	LANEEP_1.lzh	LAN EEPROM section	1 [KB]
9	OP-PNL_1.lzh	OP PANEL	128 [B]
10	RTC_1.lzh	RTC	128 [B]
11	HSCSI_1.lzh	HOST SCSI	32 [B]
12	DSCSI0_1.lzh	DRV SCSI PORT0	32 [B]
13	DSCSI1_1.lzh	DRV SCSI PORT1	32 [B]
14	DSCSI2_1.lzh	DRV SCSI PORT2	32 [B]
15	DSCSI3_1.lzh	DRV SCSI PORT3	32 [B]
16	DSCSI4_1.lzh	DRV SCSI PORT4	32 [B]
17	DSCSI5_1.lzh	DRV SCSI PORT5	32 [B]
18	SERIAL_1.lzh	Serial I/O Controller	16 [B]
19	DIPCAS_1.lzh	DIP switch port/cache slot port	16 [B]

*1 The DBUF/CACHE size depends on the size of a cache installed :

When cache is installed -----512K bytes

When a 128M byte cache is installed -----About 1.5M bytes

Use a PC that can handle text files to store collected information in one file in the following procedure.

- ① Create a new directory.
- ② Copy all the collected files to the directory (○○○_X.lzh and ○○○_X.cmp are not distinguished).
- ③ Move the files to the directory created (current directory “r”) and enter the following :

lha a : output file name

The file specified by the output file name is created.

6. Troubleshooting by Means of Error Notification Program

Error Notification Utility is a utility program uses the log file output function or E-mail information function to notify the error when an error occurs. This program runs on a workstation or server. Users select the log file output function or E-mail information function. This chapter explains the correspondence between the information output by these functions and maintenance method.

You will need an RS232C or LAN connection between the host and the DF350.

6.1 Maintenance by Means of Log File Output Function

(1) Confirming error information

Log file output information is output in the format shown in Figure 6.1.1. Use the error information in the format to confirm the contents of the error. Figure 6.1.2 is an example of log file output information output when a power error occurs. Figure 6.1.3 is an example of log file output information output when the failed disk is shut down.

Day Mon dd hh:mm:ss yyyy/device ID/error information

Figure 6.1.1 Format of Information Output to Log File Output Information

Mon Mar 25 15:35:22 1996/UNIT001/DF350SET Power Supply failure

Figure 6.1.2 Example of Log File Output Information Output when Power Error Occurs

Tue Mar 26 19:10:12 1996/UNIT002/DF350SNT Drive Detached
Tue Mar 26 19:10:12 1996/UNIT002/DF350NER Detached Drive Position Port No.3 Row No.0

Figure 6.1.3 Example of Log File Output Information Output when a Failed Disk is Shut Down

The meanings of the log file output information shown in Figure 6.1.1 are explained in Table 6.1.1.

Table 6.1.1 Meanings of Log File Output Information

No.	Item	Meaning
1	Day Mon dd hh:mm:ss yyyy	Date when the error occurred
2	Device ID	ID of the device in which the error occurred
3	Error information	Type of the error occurred

(2) Troubleshooting method

Refer to the error information shown in Figure 6.1.1, confirm the message code according to Table 6.3.1, then recover the error following the instructions displayed on the panel. (See TRBL section 2.2.)

6.2 Maintenance by Means of E-Mail Information Function

(1) Confirming error information

E-Mail information is output in the format shown in Figure 6.2.1. Use the error information in the format to confirm the contents of the error.

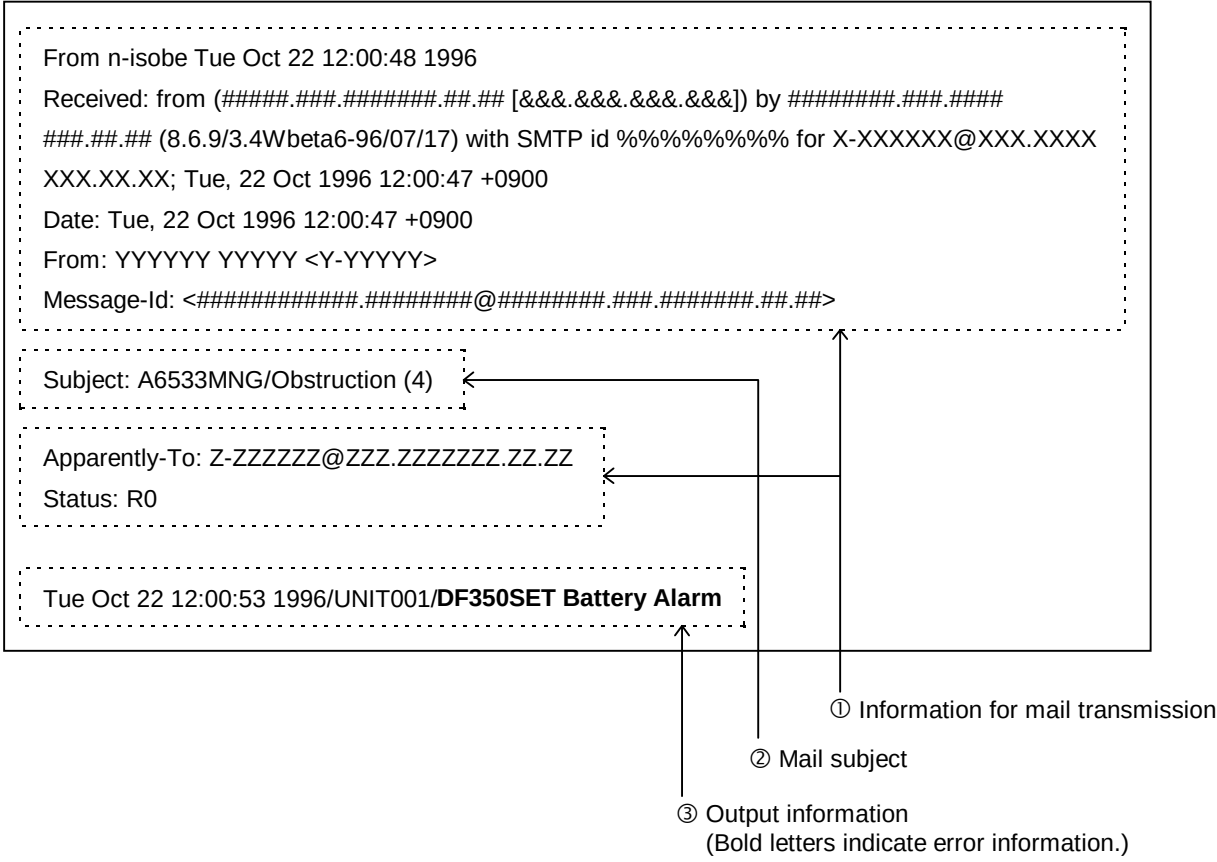


Figure 6.2.1 Example of Output E-Mail Information (Battery Error)

The meaning meaning of the output information shown in Figure 6.2.1 are explained below.

① Information for mail transmission

Information for mail transmission (in Figure 6.2.1, transmission source address and transmission destination address, etc., indicated by #, &, %, X, Y, and Z) is not required for maintenance. This information varies depends on the mail environment, etc.

② Mail subject

The mail subject indicates the type of mail. The meanings of mail subjects are explained in Table 6.2.1.

Table 6.2.1 Meanings of Mail Subjects

No.	Subject	Meaning
1	Subject: DF350MNG/Obstruction (xx)	When the E-Mail of this subject is issued, maintenance is required. Numbers enclosed in parentheses do not have any special meaning.
2	Subject: DF350MNG/Buffer full !!	Indicates that communication with the disk array subsystem is abnormal. Use the panel of the main body at the site to check whether an error occurred, then perform maintenance according to the information displayed on the main body panel.

③ Output information

E-Mail information is output in the format shown in Figure 6.2.2. Use the error information in the format to confirm the contents of the error.

Day Mon dd hh:mm:ss yyyy/device ID/error information

Figure 6.2.2 Format of E-Mail Information

E-Mail information shown in Figure 6.2.2 may not be transmitted when the mail subject is not the one listed as No.1 in Figure 6.2.1 (Subject : A6533MNG/Obstruction (xx)). If E-Mail information is not transmitted, use the main body panel of the disk array subsystem at the site to check whether an error occurred, then perform maintenance according to the information displayed on the main body panel.

The meanings of the E-Mail information shown in Figure 6.2.2 are explained in Table 6.2.2.

Table 6.2.2 Meanings of E-Mail Information

No.	Item	Meaning
1	Day Mon dd hh:mm:ss yyyy	Date when the error occurred
2	Device ID	ID of the device in which the error occurred
3	Error information	Type of the error occurred

(2) Troubleshooting method

Refer to the error information shown in Figure 6.2.2, confirm the message code according to Table 6.3.1, then recover the error following the instructions displayed on the panel. (See TRBL section 2.2.)

6.3 List of Error Information

Table 6.3.1 shows the messages corresponding to error information and maintenance.

Table 6.3.1 Message Corresponding t Error Information and Maintenance

No.	Error information	Meaning of message	Reference section
		Standard maintenance	
1	DF350SNT Drive Detached DF350NER Detached Drive Position Port No.X Row No.Y	The drive was shut down.	Section 2.2 “Panel Displays.”
		Perform the maintenance instructed for message code W202XY and message text DRVALM-XY.	
2	DF350SET Power Supply Failure	An AC/DC power supply failure occurred.	
		Perform the maintenance instructed for message code W405XY and message text PSALM-XY. Data corresponding to XX in the manual is not notified included in RS232C error information output. Refer to the panel display at the site.	
3	DF350SET Battery Alarm	A Battery ASSY voltage error occurred.	
		Perform the maintenance instructed for message code W10100 and message text BATALM.	
4	DF350SET Fan Alarm	A FAN ASSY failure occurred.	
		Perform the maintenance instructed for message code W304XX and message text FANALM-XX. Data corresponding to XX in the manual is not notified included in RS232C error information output. Refer to the panel display at the site.	
5	DF350SET Controller Detached	A Controller failure occurred.	
		Perform the maintenance instructed for message code W015XX and message text CTLALM-XX. Data corresponding to XX in the manual is not notified included in RS232C error information output. Refer to the panel display at the site.	
6	DF350SEW OFF (*1)	No WARNING is given.	
		No correspondance exists.	
7	DF350SEW ON (*1)	WARNING is given.	
		This shows that a failure indicated with a message code initialed with “W” has occurred. Perform the maintenance described in the message “W#####”.	

(*1) : When this information is needed, options of the subsystem must be set. For how to set them, refer to the explanation of the setting for the case using the subsystem in the special mode contained in the Installation section.

(In the default setting, this information is not outputted.)

When the optional setting is made, this information is outputted every ten minutes.

7. Troubleshooting by Means of SNMP Agent Support Function

The SNMP agent support function notifies subsystem errors to the workstation for network monitoring, in which the SNMP manager is installed, via simple network management protocol (SNMP). This chapter explains how to troubleshoot subsystem errors by means of the SNMP agent support function.

7.1 Maintenance with Trap Codes

(1) Confirming error information

Examples of output caused by a trap issued by the subsystem are shown below. ① is an example of output by HP Open View/NetM*COMET. ② is an example of output by SunNet Manager.

① Example of trapped output by HP Open View/NetM*COMET

If an error occurs, the following screen is popped up.

fan Failure event		Trap name	
May 10 (Friday), 1996 4p.m. 21 minutes 15 seconds			
fan	OK		

“Error event” in the “Event Category” box changes to “■”. Double-clicking this box displays an Error Event Brouser. For detailed information refer to the brouser.

Event Category	
☒ Error event ☐ Threshold event ☐ Status event ☐ Setting event ☐ Application warning event ☐ All events	
[Read only]	

Error Event Brouser				IP address or registered host model name		Generic Trap Code		Specific Trap Code	
File	Action	View						Help	
Significance	Date	Source	Message						
Important warning area	1996/05/10 16:21:15	DF350	Trap:generic 6 specific:3 args (0):						
1 Event - Dangerous:0 Serious warning:1 Warning:0 Caution:0 Normal:0									

② Example of trapped output by SunNet Manager

Event/Trap Report-DF350

Save Device name: _____

Remarks 6 1 _____ 6

Fri Apr 12 13:29:06 1996 [DF350] : Trap :

sequence=1
 receive-time=Fri Apr 12 13:29:06 1996
 version=0
 community=public
 enterprise=Hitach,Ltd..system. storage. dfraid. dfraid
 Lan
 source-time=00:00:00.00
 trap-type=Fan_Failure

Trap name

(2) Troubleshooting method

Perform maintenance referring to the output examples in (1) and according to Table 7.1.1, “Recovery Procedure for Each Trap Code”.

Table 7.1.1 Recovery Procedure for Each Trap Code (1/2)

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery procedure	Remarks
1	0	0	coldStart	Power-on	This is not an error. Recovery operation is not necessary.	
2	4	0	authentication-Failure	Invalid SNMP access (The community name set for the subsystem differs from the community name accessed by the SNMP manager.)	Change the community name set for the subsystem or the community name accessed by the SNMP manager so that they match. When changing the community name set for the subsystem, refer to “A-6533/DF350 Hitachi Disk Array Subsystem SNMP Support Function Operation Manual.” When changing the community name accessed by the SNMP manager, refer to the manual of each manager.	
3	6	1	systemDown	Controller down	Issuance of this trap indicates that an error beginning with message code H occurred. For detailed error information, see the panel display of the subsystem. Perform the maintenance instructed for message code H#####. “#####” is optional.	Refer to TRBL section 2.2 “Panel Displays”.
4	6	2	driveFailure	Driver shutdown	Perform the maintenance instructed for message code W202XY and message text DRVALM-XY. The information corresponding to XY in the manual is not notified regarding the trap. See the panel display of the subsystem.	

Table 7.1.1 Recovery Procedure for Each Trap Code (2/2)

No.	Generic Trap Code	Specific Trap Code	Trap name	Description	Recovery procedure	Remarks
5	6	3	fanFailure	Fan failure	Perform the maintenance instructed for message code W304XX and message text FANALM-XX. The information corresponding to XX in the manual is not notified regarding the trap. See the panel display of the subsystem.	Refer to TRBL section 2.2 "Panel Displays".
6	6	4	powerSupply-Failure	Power supply failure	Perform the maintenance instructed for message code W405XX and message text PSALM-XX. The information corresponding to XX in the manual is not notified regarding the trap. See the panel display of the subsystem.	
7	6	5	batteryFailure	Battery voltage error	Perform the maintenance instructed for message code W10100 and message text BATALM.	
8	6	6	cacheFailure	Cache access error occurred	Perform the maintenance written in message code W508XX and message text CACHE-XX or message code W508XY and message text CMALMX-NP. The information corresponding to XX, XY, X, and NP in the manual is not notified regarding the trap. See the panel display of the subsystem.	
9	6	10	Other Controller Failure	Mate controller blockade	Perform the maintenance instructed for message code W015XX and message text CTLALM-XX. The information corresponding to XX in the manual is not notified regarding the trap. See the panel display of the subsystem.	
10	6	11	Warning	WARNING occurred	Issuance of this trap indicates that an error beginning with message code W occurred. For detailed error information, see the panel display of the subsystem. Perform the maintenance instructed for message code W#####. "#####" is optional.	
11	6	12	Spare Drive Failure	Spare disk blockade	Perform the maintenance instructed for message code W202XY and message text DRVALM-XY. The information corresponding to XY in the manual is not notified regarding the trap. See the panel display of the subsystem.	

7.2 Maintenance with MIB (df Regression) Values

(1) Confirming error information

Examples of output caused by a trap issued by the subsystem are shown below. ① is an example of output by HP OpenViw/NetN*COMET. ② is an example of output by SunNet Manager. For MIB values, see Table 7.2.1 “dfRegresiionStatus Values and Failed Components”.

① Example of MIB value output by HP OpenView/NetN*COMET

MIB Browse

Node name or IP address

hsp1FSsw

Community name

MIB object ID

terprises.hitachi.systemExMib.storageExMib.dfraidExMib.dfraidLanExMib.dfWarningCondition

dfRegressionStatus

dfPreventiveMaintenanceInformation

dfWarningReserve1

dfWarningReserve2

Move tree upward

Move tree downward

Details

Inquiry start

Inquiry quit

Graph

MIB interface

SNMP set value

Setting (Set)

MIB value

0:1048576

Message

Note : Community "public" is used for node DF350.

Close

Reselect

Save...

Help

dfRegressionstatus value

IP address or registered host model name

② Example of MIB value output by SunNet Manager

Event/Trap Report-DF350

Save

Device name:

Remarks 19

1

19

Tue Jul 12 16:42:07 1996 [DF350] : Event : Hitachi-DF-RAID-LAN-MTB

dfRegressionStatus=1048576 (Grater Than 0 Priority Low)

dfPreventiveMaintenanceInformationn=0

dfWarningReserve1=0

dfWarningReserve2=0

dfRegressionStatus value

IP address or registered host model name

4-byte integer type object**Table 7.2.1 Format of df Regression Status**

Byte \ Bit	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	Cache
1	0	0	0	Fan	0	0	PS	Battery
2	0	0	0	0	0	0	0	0
3	CTL	Warning	0	0	0	D-Drive	S-Drive	Drive

When a regression is applied to the part concerned, turn on the corresponding bit.

Value of the object corresponding to each failure status is shown in Table 7.2.2.

Table 7.2.2 Refression Status Value Corresponding to Each Failure

No.	Bit location		Object value (in decimal)	Description
	Byte	Bit		
1	—	—	0	The disk array is normal.
2	3	0	1	Drive (data disk or spare disk) blockade.
3	3	1	2	Drive (spare disk) blockade.
4	3	2	4	Drive (data disk) blockade.
5	3	6	64	Warning is arised in the disk array.
6	3	7	128	Mate controller blockade.
7	1	0	65536	Battery alarm.
8	1	1	131072	PS power supply failure.
9	1	4	1048576	Fan alarm.
10	0	0	16777216	Cache partial blockade.

When two or more failed parts exist, the object value is the sum of each object value.

Example : When failures occur in the battery and the fan, the object value is “1114112
(65536+1048576)”.

The object value converted into binary form corresponds to the format shown in Table 7.2.1.

The object value may be fixed as “0” depending on the type of the disk array and the microprogram revision.

(2) Troubleshooting procedure

Perform maintenance referring to the output examples in (1) and according to Table 7.2.2, “Maintenance Procedure for Each Failed Component”.

Table 7.2.2 Maintenance Procedure for Each Failed Component

No.	Failed component	Maintenance procedure	Remarks
1	HDU ASSY	Perform the maintenance instructed for message code W202 <u>XY</u> and message text DRVLM- <u>XY</u> . The information corresponding to <u>XY</u> in the manual is not found in the MIB. See the panel display of the subsystem.	Refer to TRBL section 2.2 “Panel Displays”.
2	Fan ASSY	Perform the maintenance instructed for message code W304 <u>XX</u> and message text FANALM- <u>XX</u> . The information corresponding to <u>XX</u> in the manual is not found in the MIB. See the panel display of the subsystem.	
3	AC/DC power supply	Perform the maintenance instructed for message code W405 <u>XX</u> and message text PSALM- <u>XX</u> . The information corresponding to <u>XX</u> in the manual is not found in the MIB. See the panel display of the subsystem.	
4	Battery ASSY	Perform the maintenance instructed for message code W10100 and message text BATLM.	
5	CACHE ASSY	Perform the maintenance instructed for message code W508 <u>XX</u> and message text CACHE- <u>XX</u> or message code W508 <u>XY</u> and message text CMALMX- <u>NP</u> . The information corresponding to <u>XX</u> , <u>XY</u> , <u>X</u> , and <u>NP</u> in the manual is not found in the MIB. See the panel display of the subsystem.	

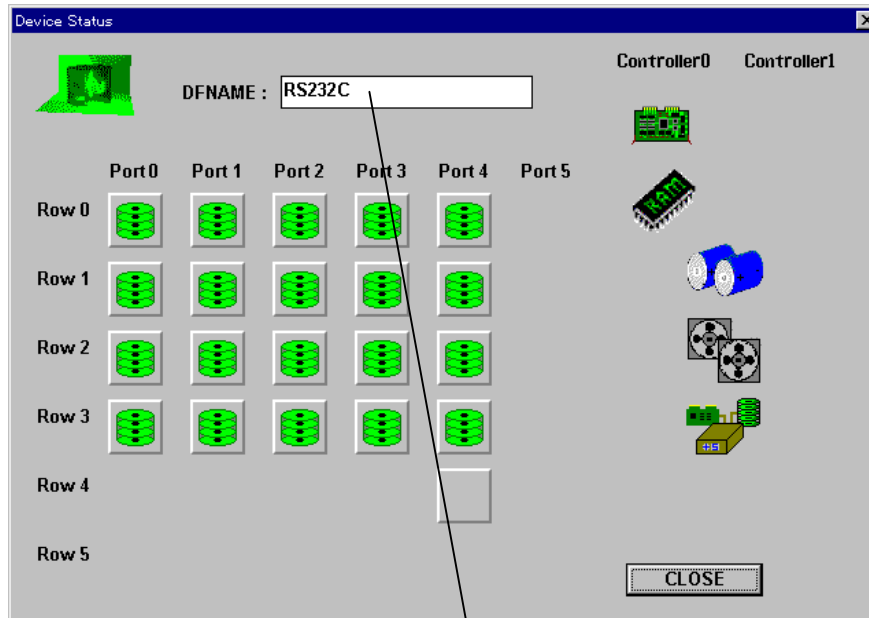
8. Troubleshooting by Means of Disk Array Utility Program

Error Alert function in Disk Array Utility notifies subsystem error. This chapter explains how to troubleshoot subsystem error by means of the Disk Array Utility.

8.1 Maintenance with Device Status Display

(1) Device Status Display

“Device Status” window of Disk Array Utility shows below.



The connection indication of RAID device.

“RS232C”: This window shows the status of RAID device that is connected with an RS232C.

“LAN : host name”: This window shows the status of RAID device that is connected with a LAN. (host_name --- A name of RAID device described in HOSTS file.)

When a failure occurs on the disk drives, the controller, the battery, the fans, the power supply and the cache in the disk array, the corresponding icon in the window is blinking red.

Note : When connected to the disk array subsystem of the dual system, both the CTL0 and the CTL1 are connected. Therefore, when a failure occurs in the common parts (disk, battery, fan, or power supply) of the disk array subsystem, two “A”s (Abnormals) are displayed in the “Error Alert” window in the case of LAN connection or two “Device Status” windows are displayed in the case of RS232C connection.

(2) Troubleshooting method

Perform maintenance referring to the display examples in (1) and according to Table 8.1.1, "Recovery Procedure for Each Error Display."

Table 8.1.1 Recovery Procedure for Each Error Display (1/2)

No.	Error Display	Description	Recovery procedure
1	 ↔  Red Yellow	• The disk drive that is busy, being restored, or waiting for restore was blocked. • The inserted disk drive did not spin-up. (The RAID group has been defined or the spare disk has been defined.)	Perform the maintenance instructed for message code W202XY and message text DRVALM-XY
	 ↔  Red Gray	• The inserted disk drive did not spin-up. (The RAID group has not been defined.)	
	 ↔  Red No indication	• The disk drive was removed. (The RAID group has been defined or the spare disk has been defined.)	

Table 8.1.1 Recovery Procedure for Each Error Display (2/2)

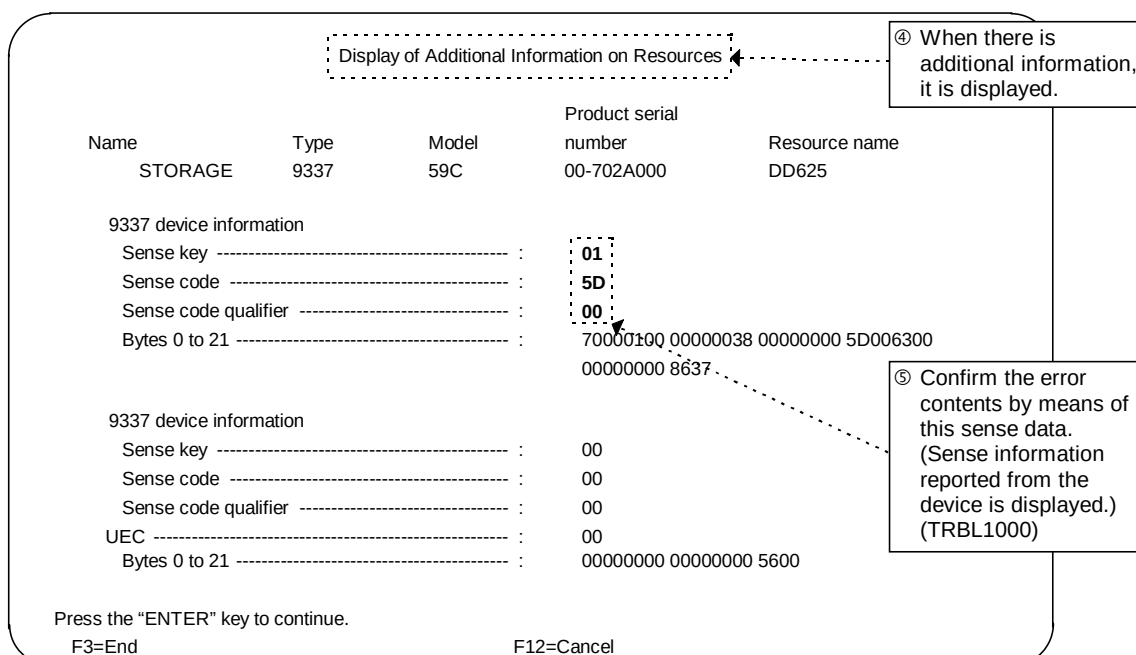
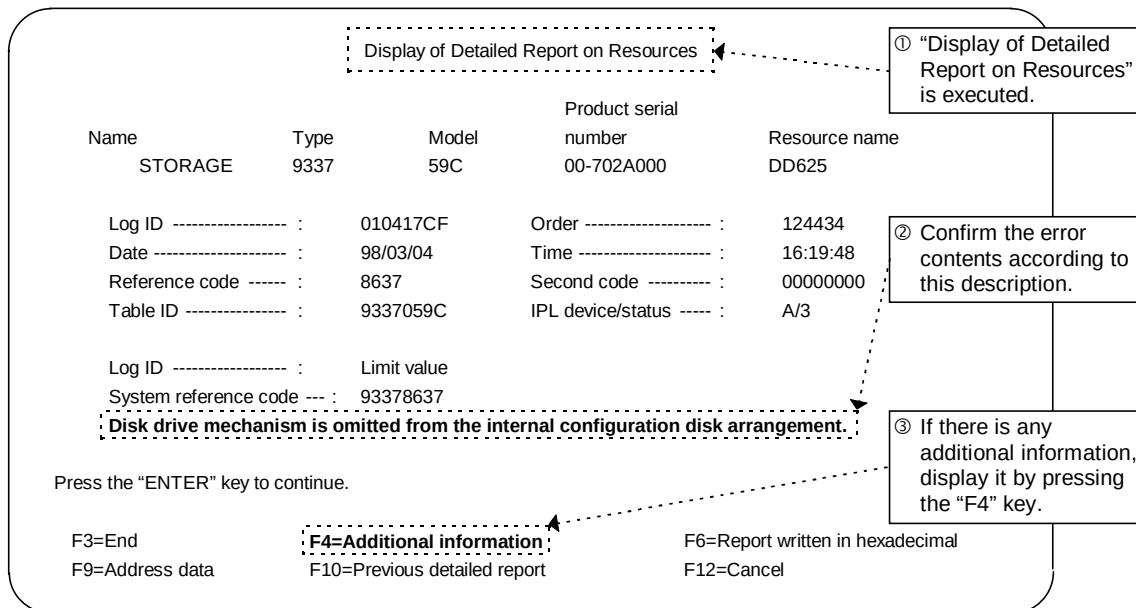
No.	Error Display	Description	Recovery procedure
2	 Dual Controller Blinking red	Controller down	Perform the maintenance instructed for message code H#####. "#####" is optional.
3	 Fans Blinking red	Fan error	Perform the maintenance instructed for message code W304XX and message text FANALM-XX.
4	 D.C.Power Blinking red	DC power error	Perform the maintenance instructed for message code W405XX and message text PSALM-XX.
5	 Battery Blinking red	Battery voltage error	Perform the maintenance instructed for message code W10100 and message text BATALM.
6	 Cache Blinking red	Cache access error	Perform the maintenance instructed for message code W508XX and message text CACHE-XX or message code W508XY and message text CMALMX-NP.
7	 Blinking yellow	Warning is arise in the disk array.	Perform the maintenance instructed for message code W#####. "#####" is optional.

9. Troubleshooting when Being Connected to AS/400

The procedure for the troubleshooting when the subsystem is connected to the AS/400 is explained below. In the condition above, error information of the subsystem can be collected by using the System Service Tool provided by the AS/400. When the subsystem is installed in the host mirroring structure, recovery operation performed by the host may be required. Since those operations must be done by the host, ask a system administrator for performing the operations.

(1) Confirming error information on AS/400

Activate the “System Service Tool” on the AS/400 side, and display the “Display of Detailed Report on Resources” window by executing “Log Analysis” to “Log Analysis Report” in the “Product Activity Log” menu.



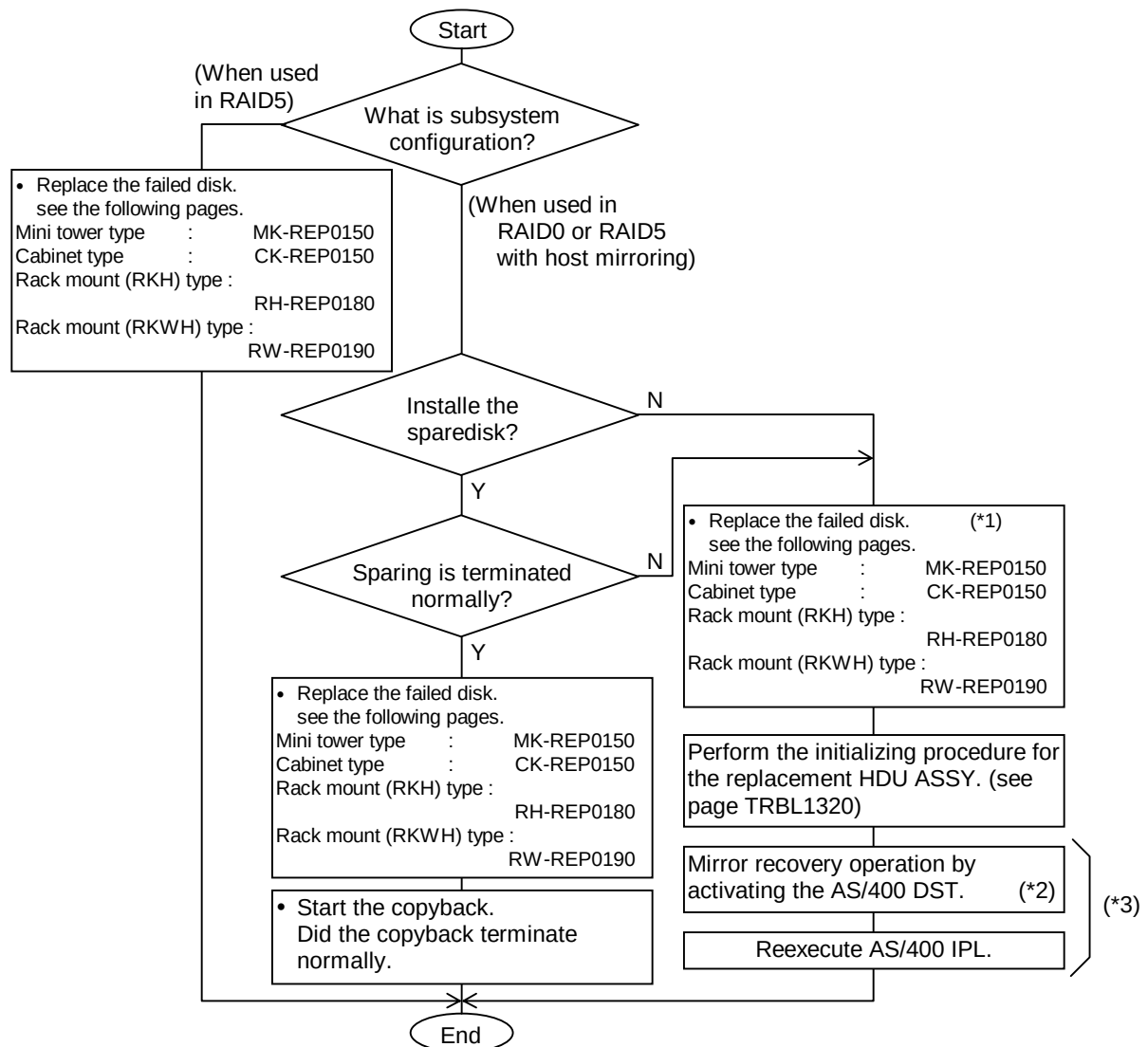
(2) Troubleshooting procedure

Examine the error contents through contents of the “Display of Detailed Report on Resources” (②) and sense information of “Display of Additional Information on Resources” (⑤), and identify the part and cause of the failure through the ALARM and WARNING LEDs and the panel indication of the subsystem (see page TRBL1050) in the case the sense key is “01” and the sense code is “5D”. In other cases, identify the portion and cause of the failure by executing the online error trace (see page TRBL1050).

Disk failure

When the failure is turned out to have occurred in the disk, the recovery operation differs depending on whether the subsystem configuration is RAID5 or RAID0.

Recover the failure following the procedure below.



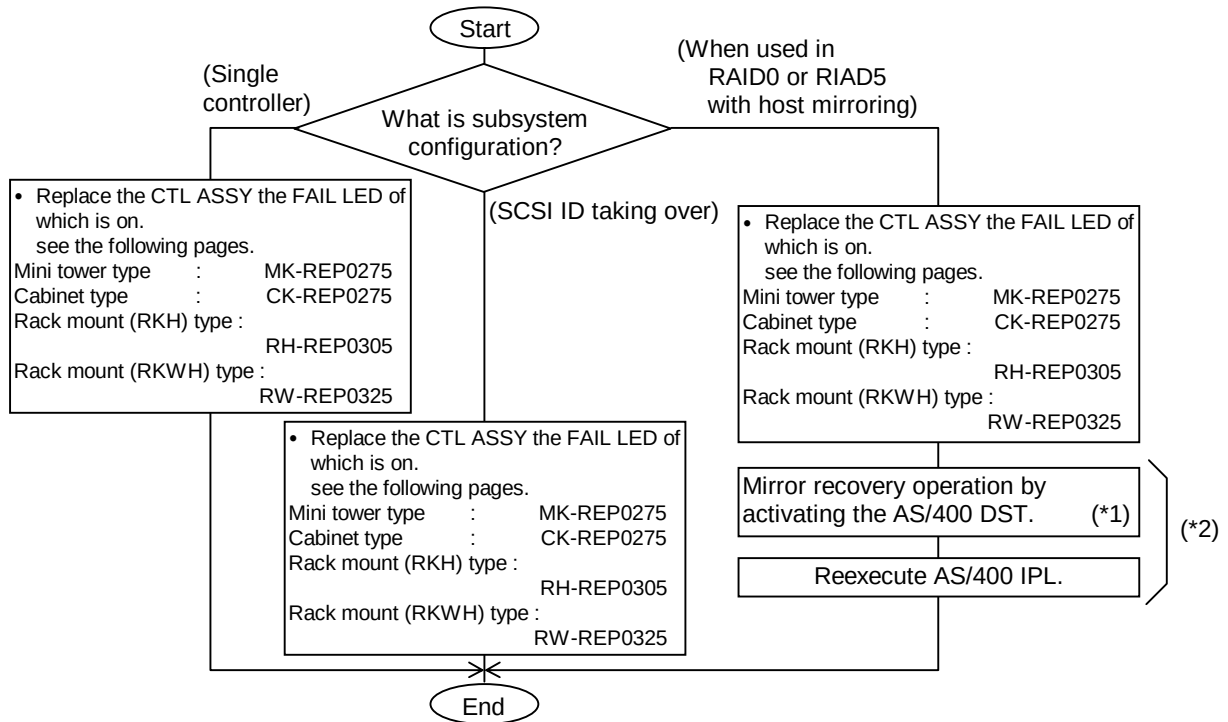
*1 : In case of RAID0, the WARNING LED goes out when the failed drive is pulled out.

*2 : Perform this operation when the drive is being held.

*3 : Operating by host side.

Controller failure

When the failure is turned out to have occurred in the controller, recover the failure following the procedure below.



*1 : Perform this operation when the drive is being held.

*2 : Operating by host side.

Others - failure of redundant component

Replace the failed component.

Mini tower type : MK-REP0275
 Cabinet type : CK-REP0275
 Rack mount (RKH) type : RH-REP0305
 Rack mount (RKWH) type : RW-REP0325

(3) Procedure for initializing replacement HDU ASSY

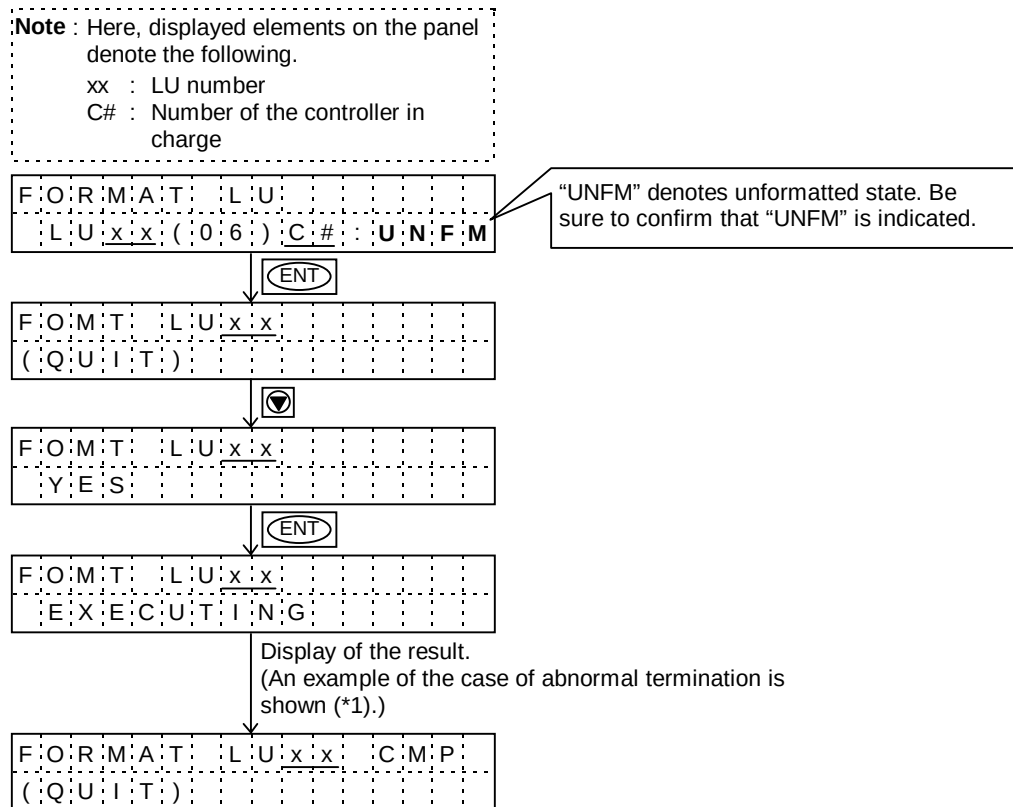
A procedure for initializing the replacement HDU ASSY is shown below.

(a) Operation

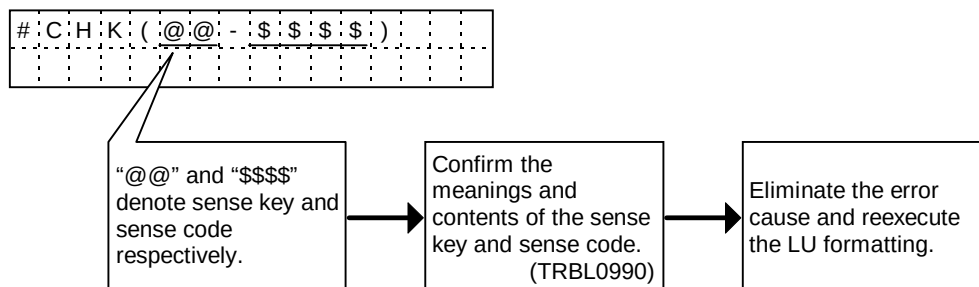
- Select "LU FORMAT" from the "LU CONFIG" menu on the panel and execute the LU formatting.
- When the drive is replaced, the LU concerned is put in the unformatted state. Be sure to execute the LU formatting for the unformatted LU.

(b) Panel operation

- Panel operation to execute LU formatting for the unformatted LU is explained below. For detailed operation, see page PANEL0450.



*1 : The panel display and recovery procedure when the LU formatting terminates abnormally are shown below.



(c) Notes

- Execution of the LU formatting is enabled only for the unformatted by mistake.
 If the LU formatting is attempted to the LU for which the LU formatting has been completed normally, the LU formatting causes an error and “#CHK(05-2602)” (sense key=05 ; sense code=2602) is displayed.
- To format the LU for which the LU formatting has been completed normally, the procedure must be executed from the initialization of the subsystem.

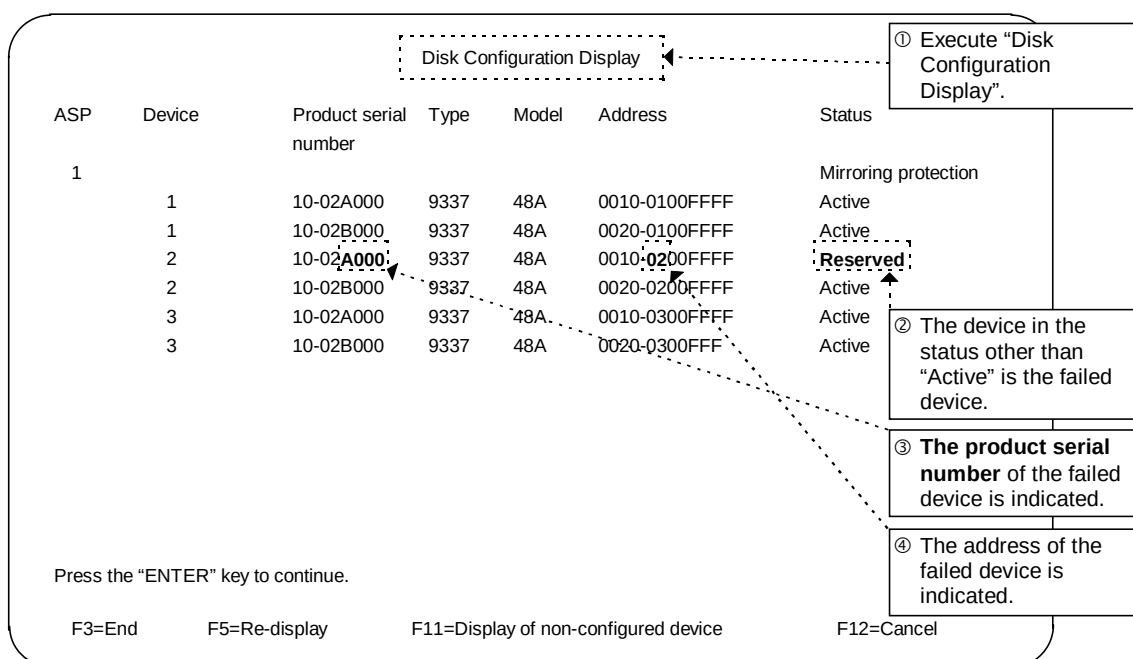
Reference

If a device failure is reported to the host while the subsystem is being used in the condition that it is connected to the host mirroring function in the RAID0 or RAID5 configuration, it is needed to locate the failed disk in the subsystem and to replace it. It is necessary to confirm the correspondence between the failed disk address reported to the host and the disk address in the subsystem.

This section explains the procedures for from the identification of failed disk in the subsystem using the “Disk Configuration Display” to the recovery of the disk.

(1) Displaying disk configuration

Activate the “System Service Tool” and execute the “Disk Configuration Display” in the “Disk Subsystem Processings” menu. An example of screen displays when executing the “Disk Configuration Display” is shown below.



Use **the product serial number** of the failed device (③ in the figure above) as the data to identify the failed subsystem. Use the address of the failed device (④ in the figure above) as the data to locate the failed drive in the subsystem.

(2) How to identify the failed disk in the subsystem

To identify the failed disk in the subsystem, identify the subsystem first, then identify the disk in the subsystem.

(a) Identifying the subsystem

The product serial number in the “Disk Configuration Display” is that set as the “SERIAL NO” is given for each CTL ASSY. Identify the CTL ASSY according to this data.

(The system parameter cannot be confirmed while the subsystem is operating. It is recommended to indicate the SERIAL NO on the subsystem by means of labeling or the like when it is determined so that it can be confirmed by viewing the subsystem.)

(b) How to identify the disk in the subsystem

Locate the disk in the subsystem following the procedure shown below according to the subsystem (CTL ASSY) number identified in step (a) and the device address in the “Disk Configuration Display”.

(Be careful that the disk installation location differs depending on the subsystem type.)

Procedure 1 : Identify the physical LU according to the CTL ASSY number and device address. (Refer to the table for identifying the physical LU according to the CTL ASSY number and device address.)

Procedure 2 : Identify the ROW and PORT numbers according to the physical LU. (Refer to the figure showing the relations between the physical LUs and the ROW and PORT numbers.)

■ When use in RAID0 host mirroring

In the case of mini tower (MK) type

Table 9.1 Identification of Physical LU according to CTL ASSY Number and Device Address

CTL ASSY number	Device address								Physical LU number
	1	2	—	—	—	—	—	—	
0	0	2	—	—	—	—	—	—	
1	1	3	—	—	—	—	—	—	

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

	(Spare)	Physical LU#
ROW0 PORT3	3	
ROW0 PORT2	2	
ROW0 PORT1	1	
ROW0 PORT0	0	

(The following figure shows the disk location in the front view of MK type.)

Figure 9.1 Relations between Physical LUs and ROW and PORT Nubmers

In the case of cabinet (CK) type**Table 9.2 Identification of Physical LU according to CTL ASSY Number and Device Address**

CTL ASSY number	Device address							
	1	2	3	4	5	6	7	8
0	0	2	4	6	8	A	C	E
1	1	3	5	7	9	B	D	F

Physical LU
number

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

		(Spare)	
		F	ROW3 PORT4
		7	ROW1 PORT4
ROW2 PORT3	E	D	ROW3 PORT3
ROW0 PORT3	6	5	ROW1 PORT3
ROW2 PORT2	C	B	ROW3 PORT2
ROW0 PORT2	4	3	ROW1 PORT2
ROW2 PORT1	A	9	ROW3 PORT1
ROW0 PORT1	2	1	ROW1 PORT1
ROW2 PORT0	8		
ROW0 PORT0	0		
		Physical LU#	

(The following figure shows the disk location in the front view of CK type.)

Figure 9.2 Relations between Physical LUs and ROW and PORT Nubmers

In the case of rack mount (RKH) type**Table 9.3 Identification of Physical LU according to CTL ASSY Number and Device Address**

CTL ASSY number	Device address							
	1	2	3	4	—	—	—	—
0	0	2	4	6	—	—	—	—
1	1	3	5	7	—	—	—	—

Physical LU number

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

1	5	
2	6	(Spare)
	3	7
0	4	

(a) Physical LU number

ROW1 PORT1	ROW1 PORT3	
ROW0 PORT1	ROW0 PORT3	(Spare)
	ROW1 PORT2	ROW1 PORT4
ROW0 PORT0	ROW0 PORT2	

(b) Disk location (ROW#, PORT#)

(The following figure shows the disk location in the front view of RKH type.)

Figure 9.3 Relations between Physical LUs and ROW and PORT Numbrs

In the case of rack mount (RKWH) type**Table 9.4 Identification of Physical LU according to CTL ASSY Number and Device Address**

CTL ASSY number	Device address							
	1	2	3	4	5	6	7	8
0	0	2	4	6	8	A	C	E
1	1	3	5	7	9	B	D	F

Physical LU
number

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

9		F
A		
1		7
2	(Spare)	
	B	D
8	C	E
	3	5
0	4	6

(a) Physical LU number

ROW3 PORT1		ROW3 PORT4
ROW2 PORT1		
ROW1 PORT1		ROW1 PORT4
ROW0 PORT1	(Spare)	
	ROW3 PORT2	ROW3 PORT3
ROW2 PORT0	ROW2 PORT2	ROW2 PORT3
	ROW1 PORT2	ROW1 PORT3
ROW0 PORT0	ROW0 PORT2	ROW0 PORT3

(b) Disk location (ROW#, PORT#)

(The following figure shows the disk location in the front view of RKWH type.)

Figure 9.4 Relations between Physical LUs and ROW and PORT Nubmers

■ When use in RAID5 host mirroring

In the case of cabinet (CK) type

Table 9.5 Identification of Physical LU according to CTL ASSY Number and Device Address

CTL ASSY number	Device address							
	1	2	3	4	5	6	7	8
0	0	1	2	3	8	9	A	B
1	4	5	6	7	C	D	E	F

Physical LU number

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

		(Spare)	
ROW2 PORT4	8 - B	C - F	ROW3 PORT4
ROW0 PORT4	0 - 3	4 - 7	ROW1 PORT4
ROW2 PORT3	8 - B	C - F	ROW3 PORT3
ROW0 PORT3	0 - 3	4 - 7	ROW1 PORT3
ROW2 PORT2	8 - B	C - F	ROW3 PORT2
ROW0 PORT2	0 - 3	4 - 7	ROW1 PORT2
ROW2 PORT1	8 - B	C - F	ROW3 PORT1
ROW0 PORT1	0 - 3	4 - 7	ROW1 PORT1
ROW2 PORT0	8 - B	C - F	ROW3 PORT0
ROW0 PORT0	0 - 3	4 - 7	ROW1 PORT0

Physical LU#

(The following figure shows the disk location in the front view of CK type.)

Figure 9.5 Relations between Physical LUs and ROW and PORT Nubmers

In the case of rack mount (RKH) type**Table 9.6 Identification of Physical LU according to CTL ASSY Number and Device Address**

CTL ASSY number	Device address							
	1	2	3	4	—	—	—	—
0	0	1	2	3	—	—	—	—
1	4	5	6	7	—	—	—	—

Physical LU number

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

4 - 7	4 - 7	
0 - 3	0 - 3	(Spare)
4 - 7	4 - 7	4 - 7
0 - 3	0 - 3	0 - 3

(a) Physical LU number

ROW1 PORT1	ROW1 PORT3	
ROW0 PORT1	ROW0 PORT3	(Spare)
ROW1 PORT0	ROW1 PORT2	ROW1 PORT4
ROW0 PORT0	ROW0 PORT2	ROW0 PORT4

(b) Disk location (ROW#, PORT#)

(The following figure shows the disk location in the front view of RKH type.)

Figure 9.6 Relations between Physical LUs and ROW and PORT Numbrs

In the case of rack mount (RKWH) type**Table 9.7 Identification of Physical LU according to CTL ASSY Number and Device Address**

CTL ASSY number	Device address							
	1	2	3	4	5	6	7	8
0	0	1	2	3	8	9	A	B
1	4	5	6	7	C	D	E	F

Physical LU
number

CTL ASSY number=0 : Means the CTL ASSY installed in the lower part of the subsystem.

CTL ASSY number=1 : Means the CTL ASSY installed in the upper part of the subsystem.

C - F		C - F
8 - B		8 - B
4 - 7		4 - 7
0 - 3	(Spare)	0 - 3
C - F	C - F	C - F
8 - B	8 - B	8 - B
4 - 7	4 - 7	4 - 7
0 - 3	0 - 3	0 - 3

(a) Physical LU number

ROW3 PORT1		ROW3 PORT4
ROW2 PORT1		ROW2 PORT4
ROW1 PORT1		ROW1 PORT4
ROW0 PORT1	(Spare)	ROW0 PORT4
ROW3 PORT0	ROW3 PORT2	ROW3 PORT3
ROW2 PORT0	ROW2 PORT2	ROW2 PORT3
ROW1 PORT0	ROW1 PORT2	ROW1 PORT3
ROW0 PORT0	ROW0 PORT2	ROW0 PORT3

(b) Disk location (ROW#, PORT#)

(The following figure shows the disk location in the front view of RKWH type.)

Figure 9.7 Relations between Physical LUs and ROW and PORT Nubmers

DF350 Disk Subsystem
4. PERIODIC

Rev.3

REV.3	Mar.1997	Dec.1997	Feb.1998	May.1998		

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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1. Periodic Maintenance

Table 1 lists the periodic maintenance items of the unit.

Table 1 Periodic Maintenance Items

No.	Item	Period	Standard time required	See
1	Checking the fans	Y1	5 min (*2, 3) 10 min (*4)	Section 2
2	Cleaning the front cover and rear panel	Y1 (*1)	5 min	Section 3
3	Replacing the battery	Y2	10 min (*2) 20 min (*3)	Section 4
4	Checking the operation of the unit alone	Y1	5 min	Section 5

*1 Periodically clean according to the customer's environment conditions

*2 Desktop type (DKH), Mini tower, cabinet, and rackmount (RKH and RKWH) types

*3 Desktop type (DK)

*4 U1 frame

2. Checking the Fans

2.1 Checking the Fans of the Desktop Type



Warning

Power supply is turned on. Be careful not to touch the live parts to avoid an electric shock.

2.1.1 Checking the fans of the desktop (DK) type

(Checking the Fan ASSY)

(1) Check that the Fan ASSY on the rear of the unit is rotating.

(Checking the Power Fan)

(1) Check that the Power Fan on the rear of the unit is rotating.

(Checking the In Box Fan)

(1) Check that the In Box Fan on the rear of the unit is rotating.

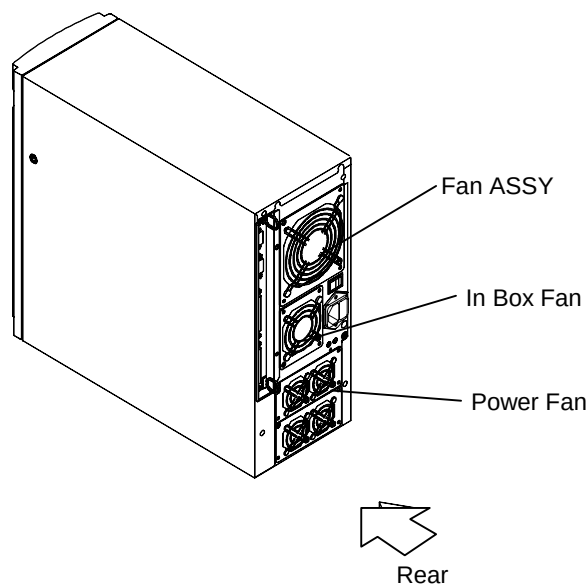


Figure 2.1.1 Rear of Unit (DK)

2.1.2 Checking the fans of the desktop (DKH) type

- (1) Check that the fan on the rear of the unit is rotating. (AC/DC power supply and Power Unit (D))

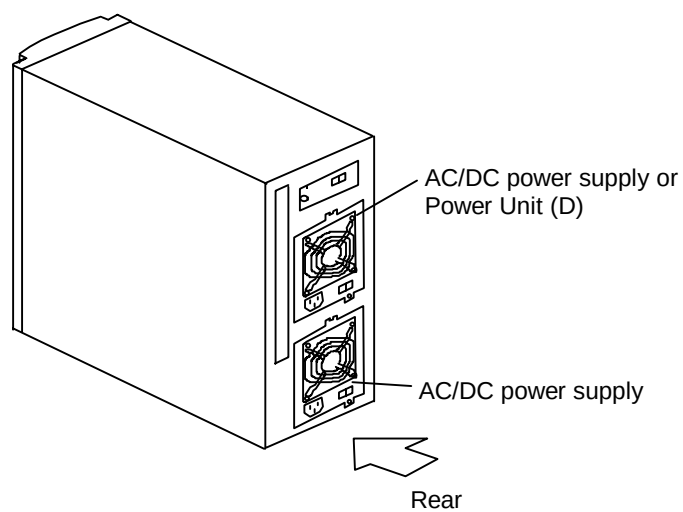


Figure 2.2.1 Rear of Unit (DKH)

2.2 Checking the Fans of the Mini tower/Cabinet Type



Warning

Power supply is turned on. Be careful not to touch the live parts to avoid an electric shock.

(Checking the Fan ASSY)

- (1) Open the side covers 1 and 2.
- (2) Loosen the thumbscrew of the Fan ASSY and then pull out the Fan ASSY towards you holding the handle.
After being pulled out, the fan will rotate by inertia for a while before stopping. Check the rotation of the fan. Also the warning lamp (yellow) turns on and the buzzer sounds. Open the front cover and then confirm that FANALM-XX (XX : mounting position) is displayed on the panel.
- (3) Press the **ENT** key on the panel to stop the buzzer.
- (4) Insert the Fan ASSY and then tighten the thumbscrew.
The fan starts rotating and FANRCV-XX (XX : mounting position) is displayed on the panel, while the warning lamp (yellow) turns off.
- (5) Perform (2) to (4) above for all the Fan ASSYs.
- (6) Close the side covers 1 and 2.

(Checking the Power Fan)

- (1) Check that the Power Fan on the rear of the unit is rotating.

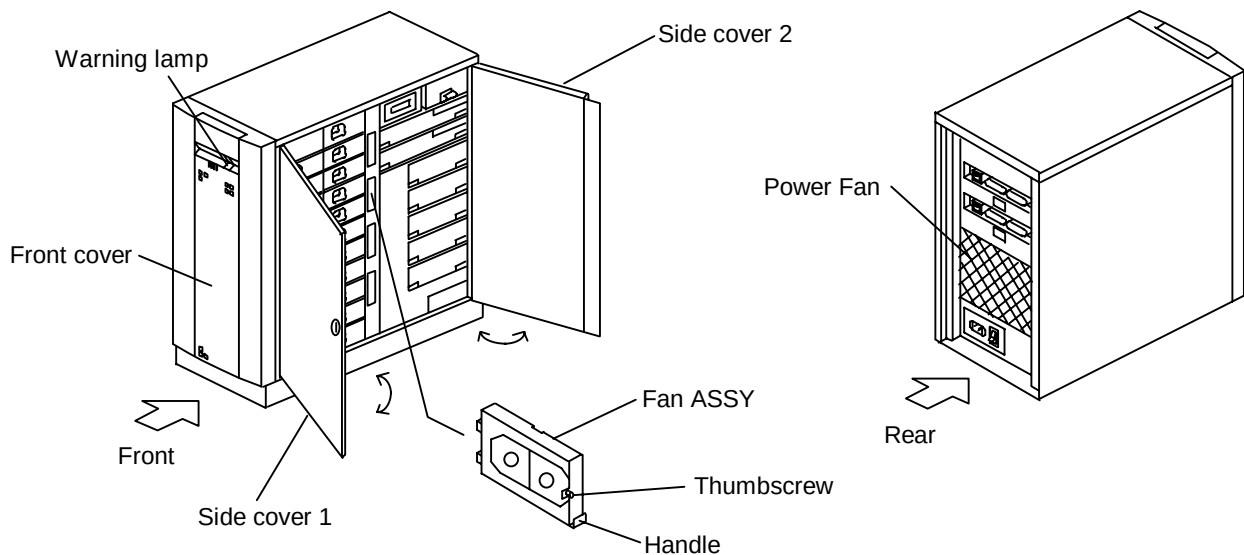


Figure 2.2 Checking the Fans of the Mini Tower/Cabinet Type

2.3 Checking the Fans of the Rackmount Type (RKH)



Warning

Power supply is turned on. Be careful not to touch the live parts to avoid an electric shock.

(Checking the Fan ASSY)

- (1) Remove the front cover and then open the front panel.
- (2) Loosen the thumbscrew of the Fan ASSY and then pull out the Fan ASSY towards you holding the handle.
After being pulled out, the fan will rotate by inertia for a while before stopping. Check the rotation of the fan. Also the warning lamp (yellow) turns on and the buzzer sounds. Open the front cover and then confirm that FANALM-XX (XX : mounting position) is displayed on the panel.
- (3) Press the **ENT** key on the panel to stop the buzzer.
- (4) Insert the Fan ASSY and then tighten the thumbscrew.
The fan starts rotating and FANRCV-XX (XX : mounting position) is displayed on the panel, while the warning lamp (yellow) turns off.
- (5) Perform (2) to (4) above for all the Fan ASSYs.
- (6) Close the front panel and then attach the front cover.

(Checking the Power Fan)

- (1) Check that the Power Fan on the rear of the unit is rotating.

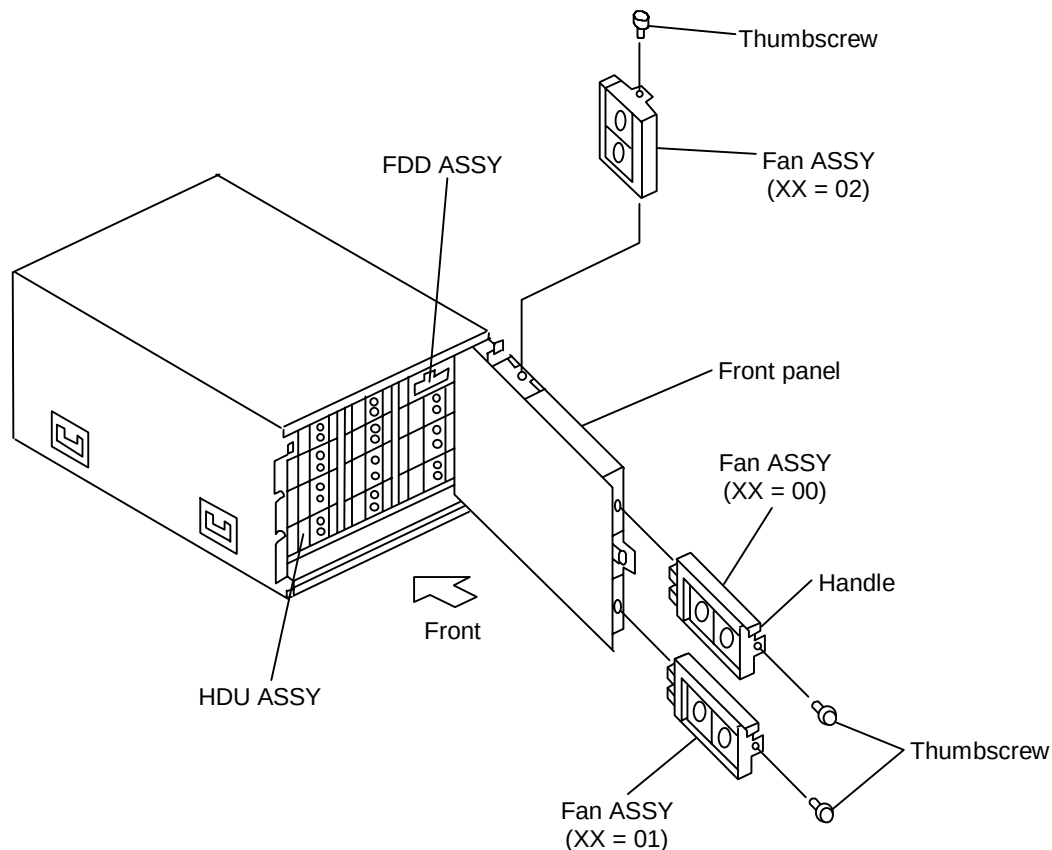


Figure 2.3 Checking the Fans of the Rackmount Type (RKH)

2.4 Checking the Fans of the Rackmount Type (RKWH)

**Warning**

Power supply is turned on. Be careful not to touch the live parts to avoid an electric shock.

(Checking the Fan ASSY)

- (1) Check that the Fan ASSYs on the front and rear of the unit are rotating.

If the front bezel is attached on the front of the unit, remove it to check the ASSY.

Open the rear cover for checking the Fan ASSY on the rear of the unit.

(Checking the Power Fan)

- (1) Check that the Power Fan on the rear of the unit is rotating.

(Checking the In Box Fan)

- (1) Check that the In Box Fan on the rear of the unit is rotating.

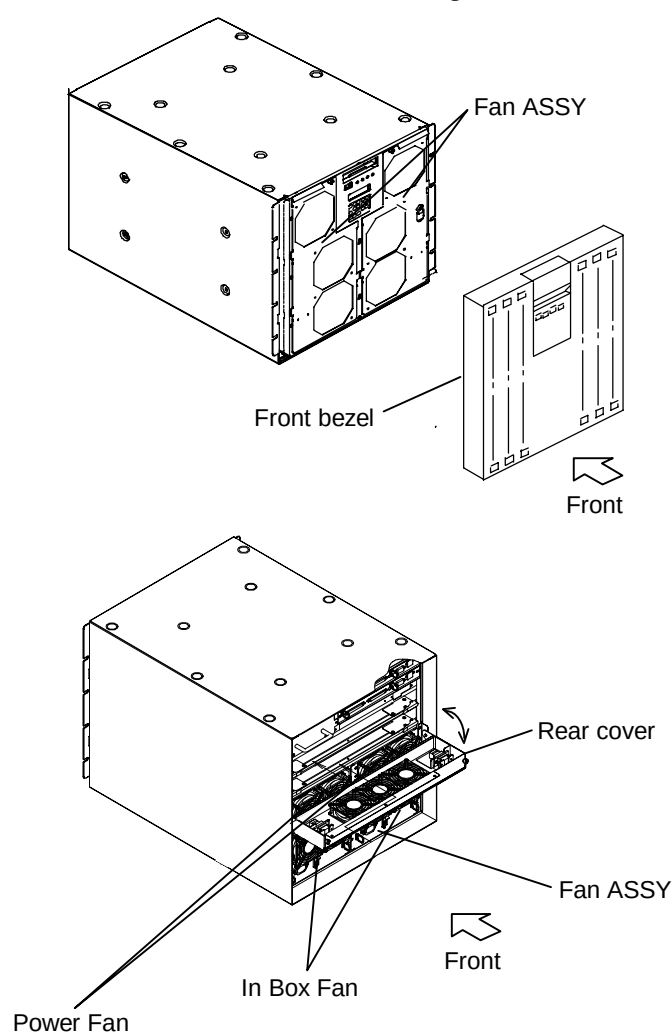


Figure 2.4 Checking the Fans of the Rackmount Type (RKWH)

2.5 Checking the Fans of the U1 Rack Frame

(Checking the Fan ASSY)

- (1) Confirm that air blows from each fan in the direction of the arrow shown in Figure 2.5. Also check each fan for any abnormal sounds.
- (2) If there is no air blowing, or an abnormal sound is heard, replace the fan with the spare.
For replacement, see RH-REP.



The fan is rotating fast. Do not touch the fan.

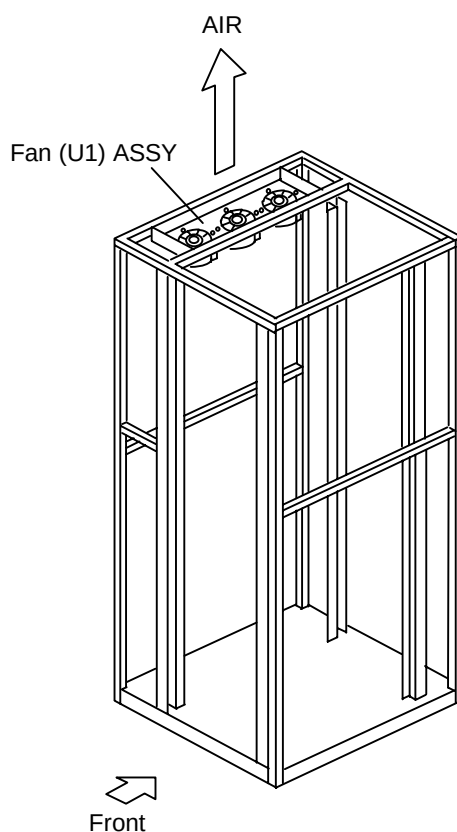


Figure 2.5 Checking the Fans of the U1 Frame

3. Cleaning the Front Cover and Rear Panel

Cleaning is a work to confirm if no clogging exists in the route of the cooling air and to remove it when it is found.

Notice : Be sure to keep front cover and rear covers clean. Or else, the ventilation is deteriorated and the temperature inside the unit may rise or even catch fire.

Be careful not to move the subsystem violently nor to touch the live parts during cleaning.

- (1) Clean the outside of the front cover.
- (2) For the mini tower or cabinet type, pull the front cover from the right side towards you to open it. For the desktop (DK) type, unlock the cover using the key, and then pull the cover from the right side towards you to open it. For the desktop (DKH) type, unlock the cover using the key, and remove it. For the rackmount type, remove the front cover.
- (3) Clean the inside of the front cover.
- (4) For the mini tower or cabinet type, slowly push the front cover to close it. For the desktop (DK) type, lock the cover using the key. For the desktop (DKH) type, mounted the front cover, and lock the cover using the key. For the rackmount type, attach the front cover.
- (5) Clean the rear of the unit.

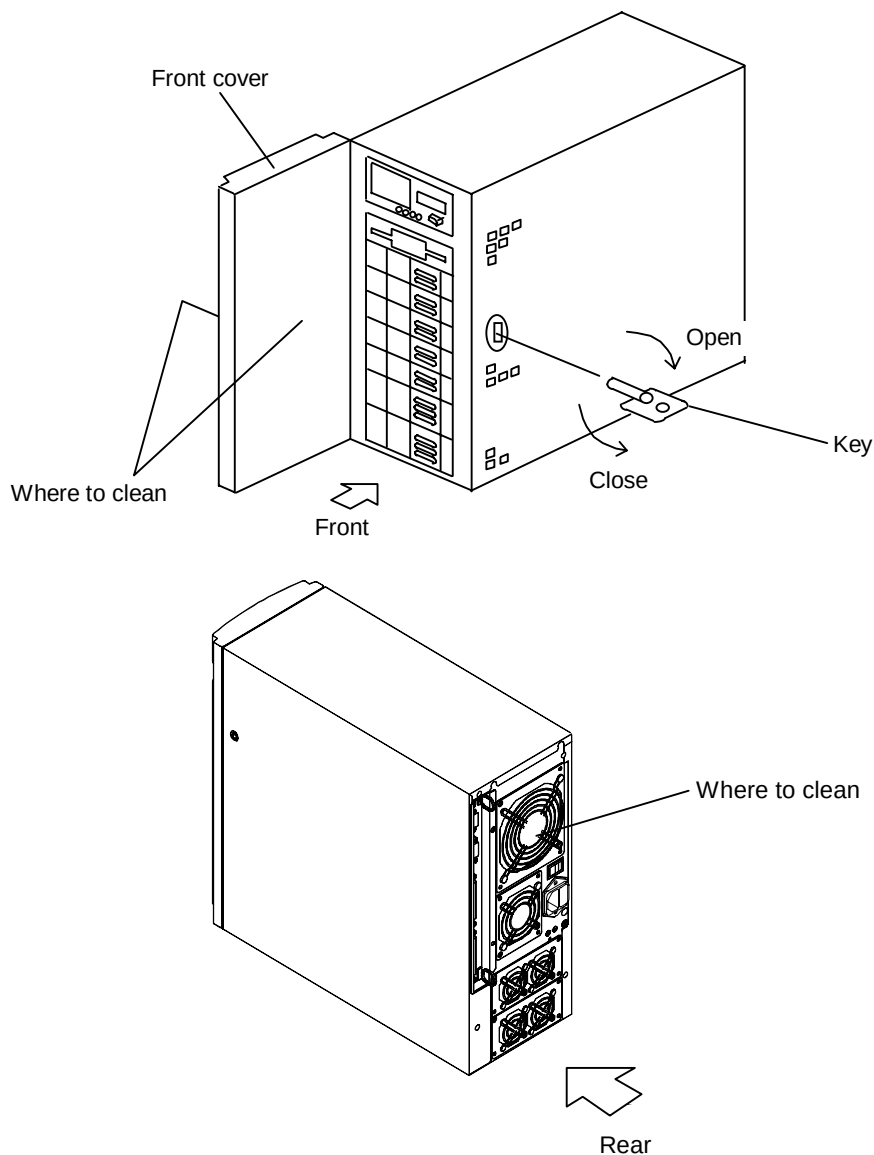


Figure 3.1 For the Desktop (DK) Type

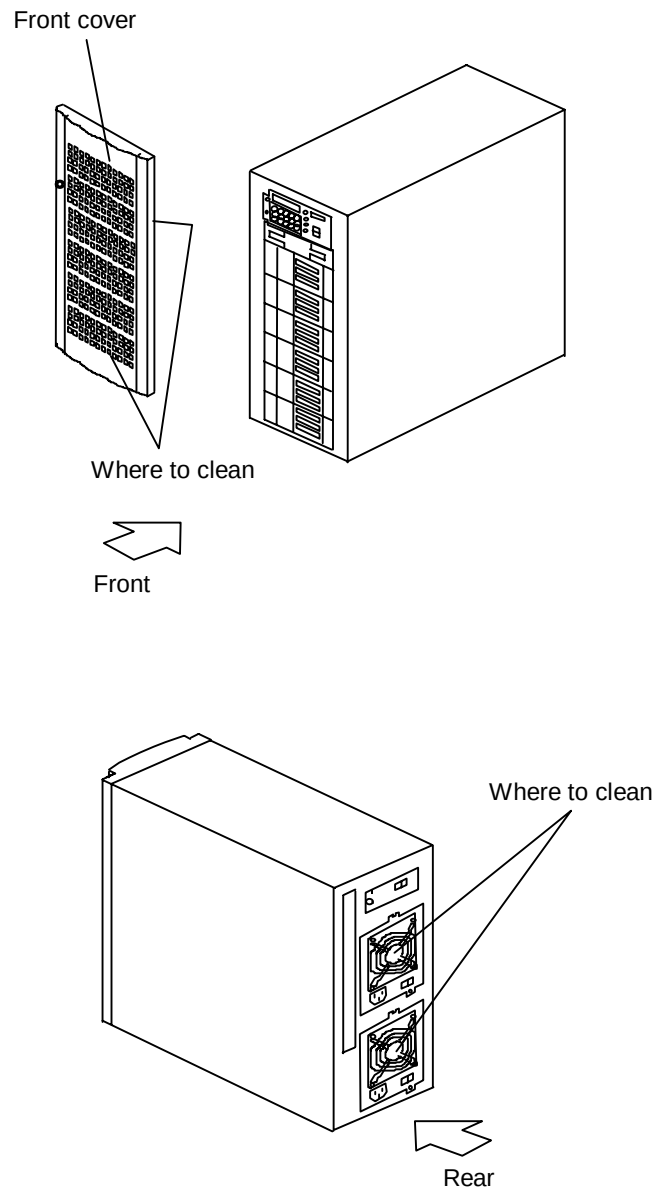


Figure 3.2 For the Desktop (DKH) Type

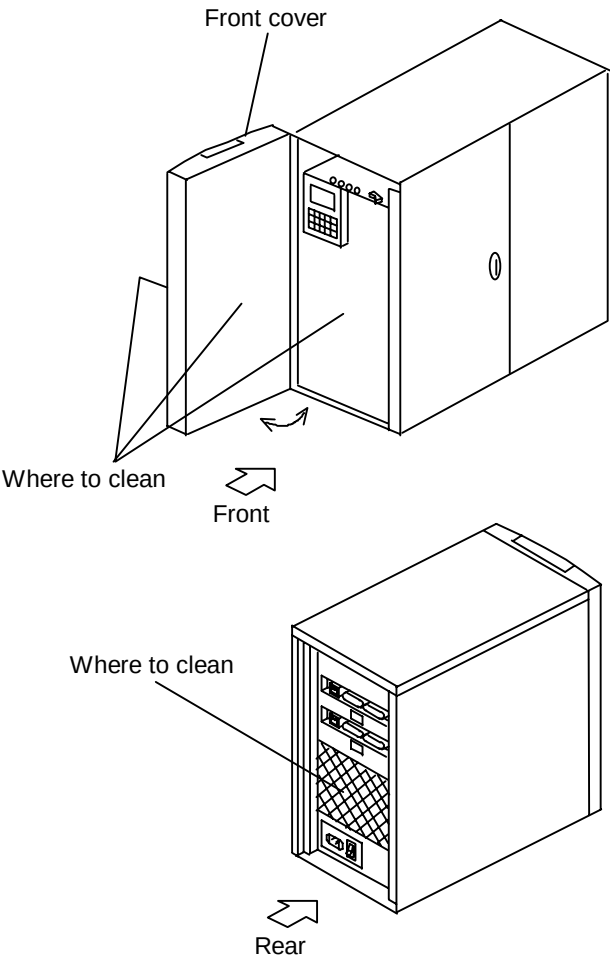
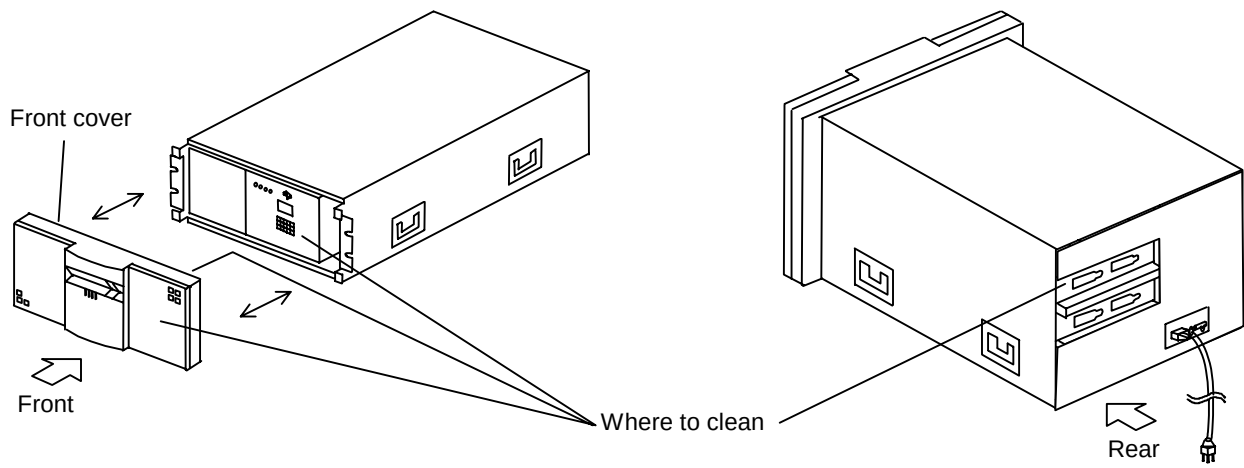
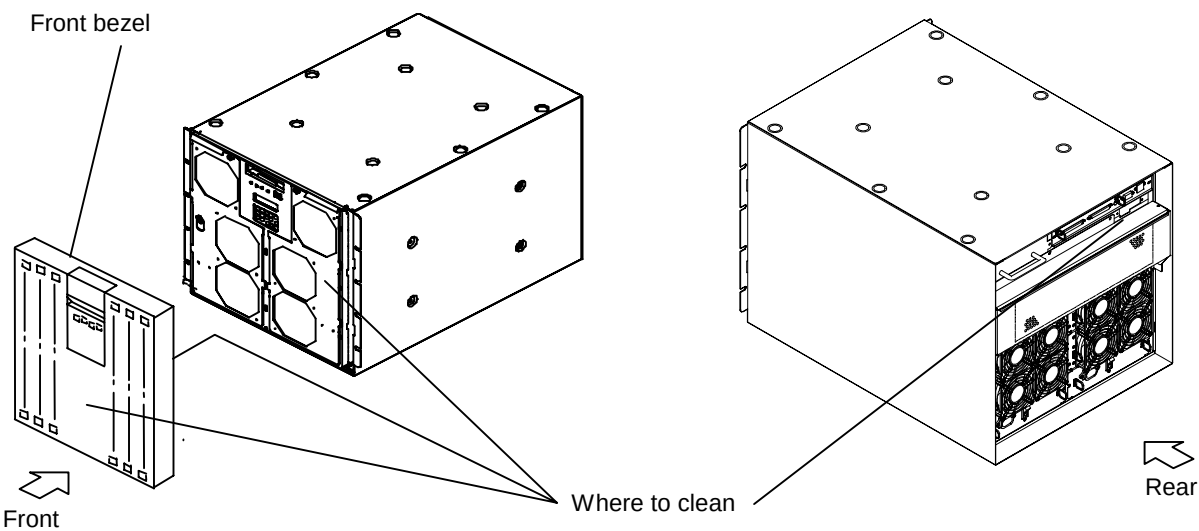


Figure 3.3 For the Mini Tower or Cabinet Type



Rackmount Type (RKH)



Rackmount Type (RKWH)

Figure 3.4 For the Rackmount Type

4. Replacing the Battery



Do not disintegrate removed Battery. It may cause burn or electric shock.

For how to replace the battery, see “Replacing the Battery” in Chapter 7 for each type.

For the battery of the desktop type, turn off the power according to the power off procedure before replacement.

The battery of the mini tower, cabinet or rackmount type can be replaced with the power on. This battery replacement must be performed swiftly. If power trouble such as a momentary interruption occurs while replacing the battery, the user data will be lost. Alternatively, you can turn off the power to replace the battery. In this case, turn off the power according to the power off procedure and then replace the battery.

Note : The lead battery is a valuable and recyclable resource. When you replace parts or dispose of used products, remove the lead battery for recycling.

See page ENTRY0120 for the safety of depositing and storing the battery.

5. Checking the Operation of the Unit Alone



Caution

Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Confirm that the circuit breaker (switch on the rear) is off and then connect the AC cable.
- (2) Connect the AC cable to the outlet.

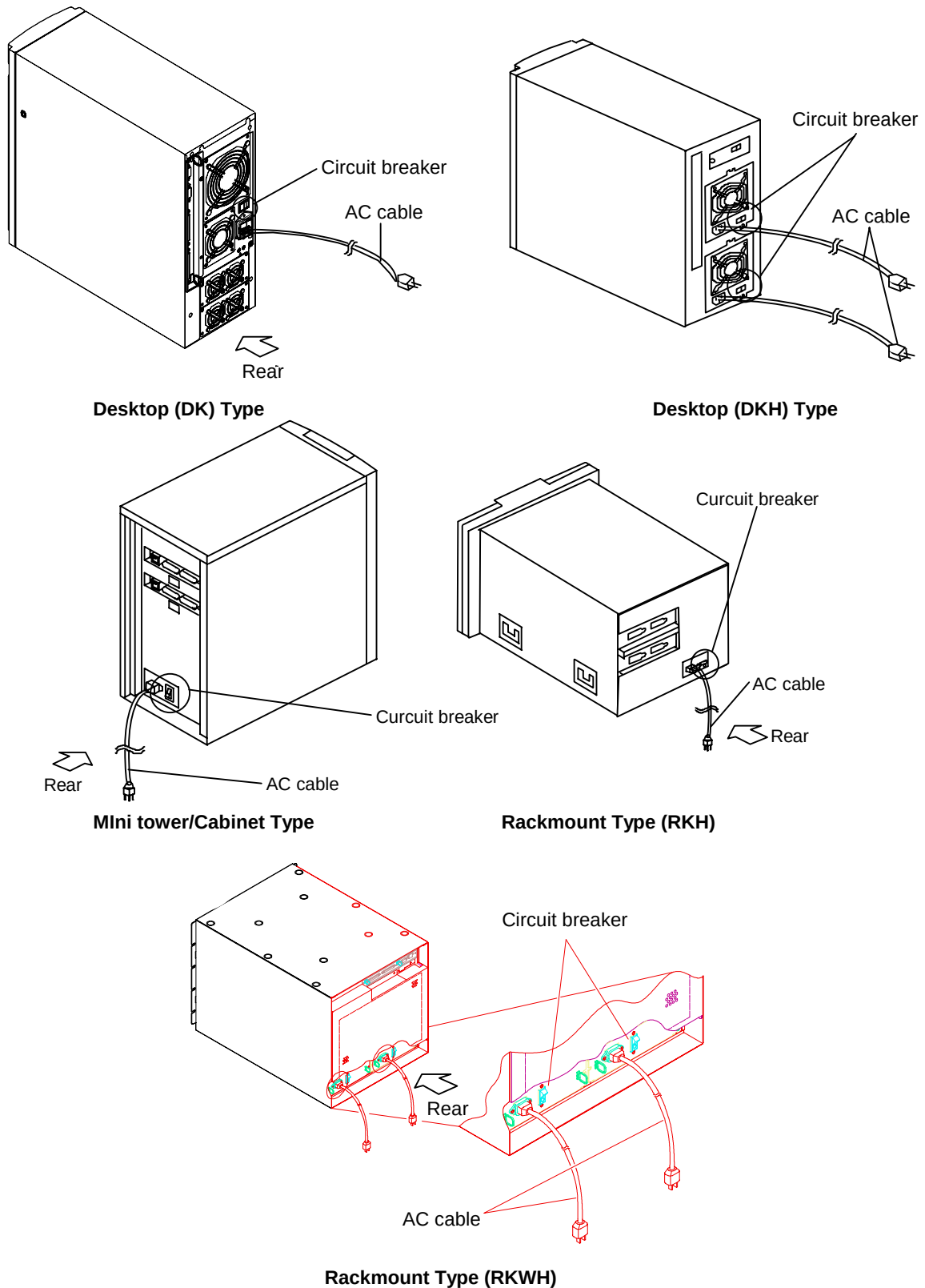


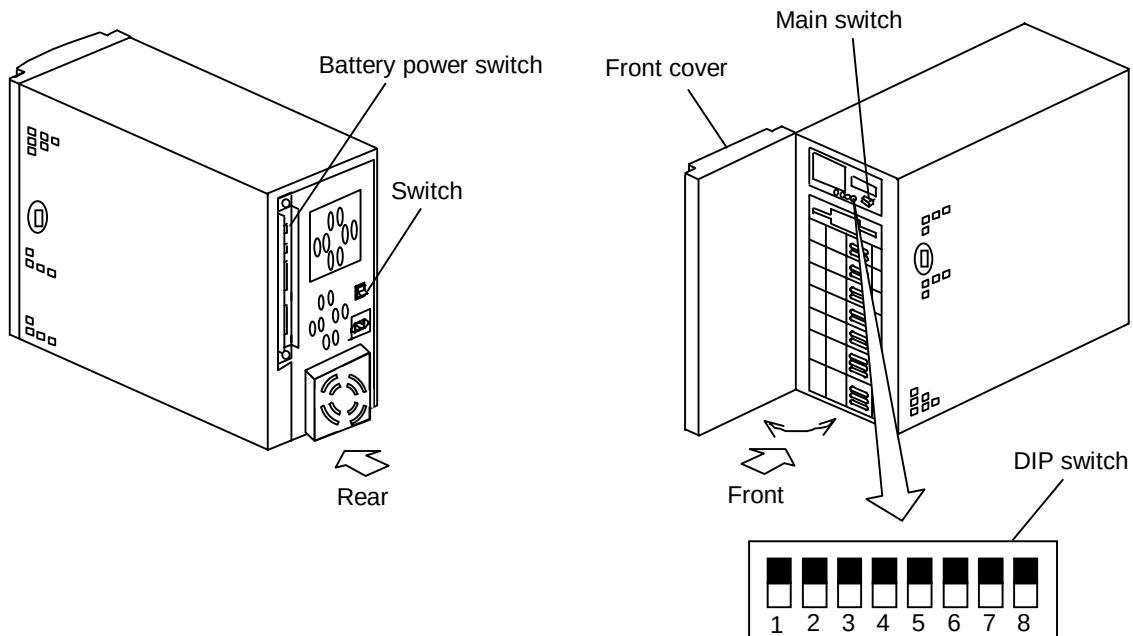
Figure 5.1 Connecting the AC cable(s)

- (3) For the desktop type (DK/DKH), confirm that the battery power switch on the rear of the unit is on and that the main switch is off, and then turn on the circuit breaker.

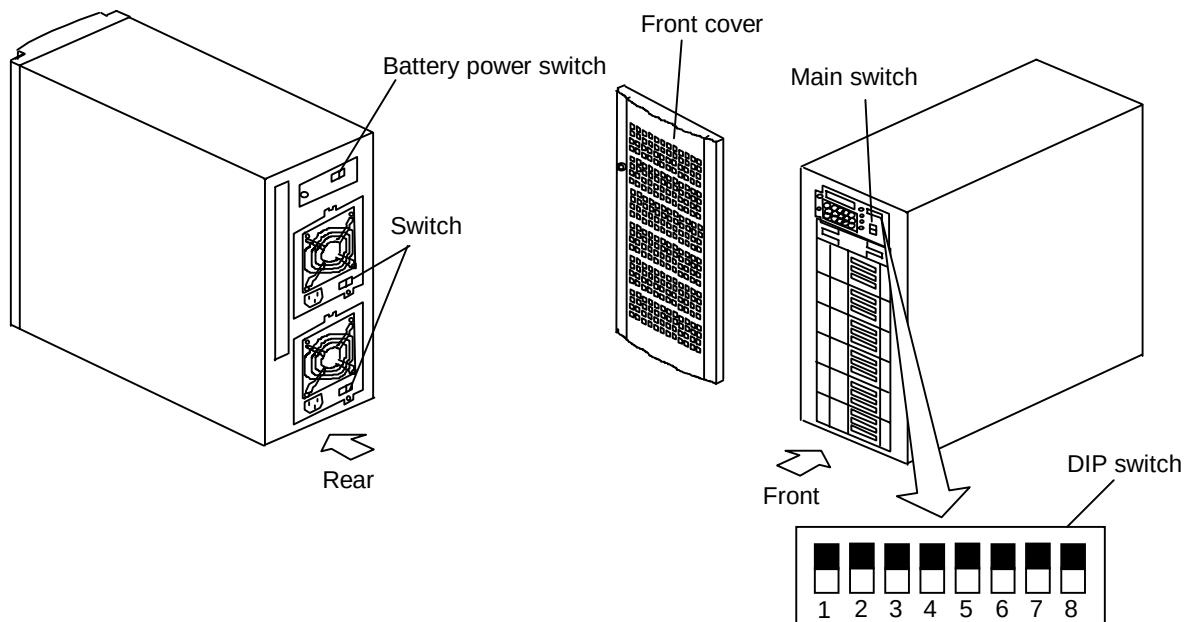
For the mini tower or cabinet type, open the side covers 1 and 2, confirm that the battery power switch is on and that the main switch is off, and then turn on the circuit breaker.

Open the rear covers 1 and 2 for the rack mount type (RKH), or open the rear cover for the rack mount type (RKWH). Make sure that the battery power switch is on and the main switch is off, then turn on the breaker.

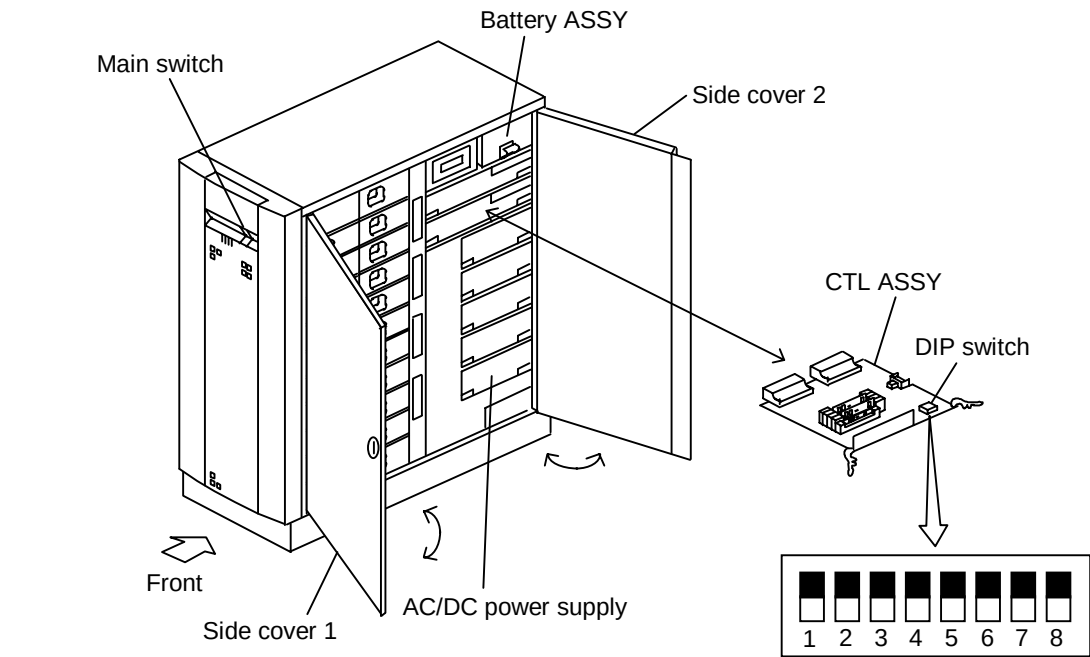
- (4) Check that all DIP switch settings are off (i.e., in the upper positions). For the desktop type (DK/DKH), open the front cover to check the DIP switches.



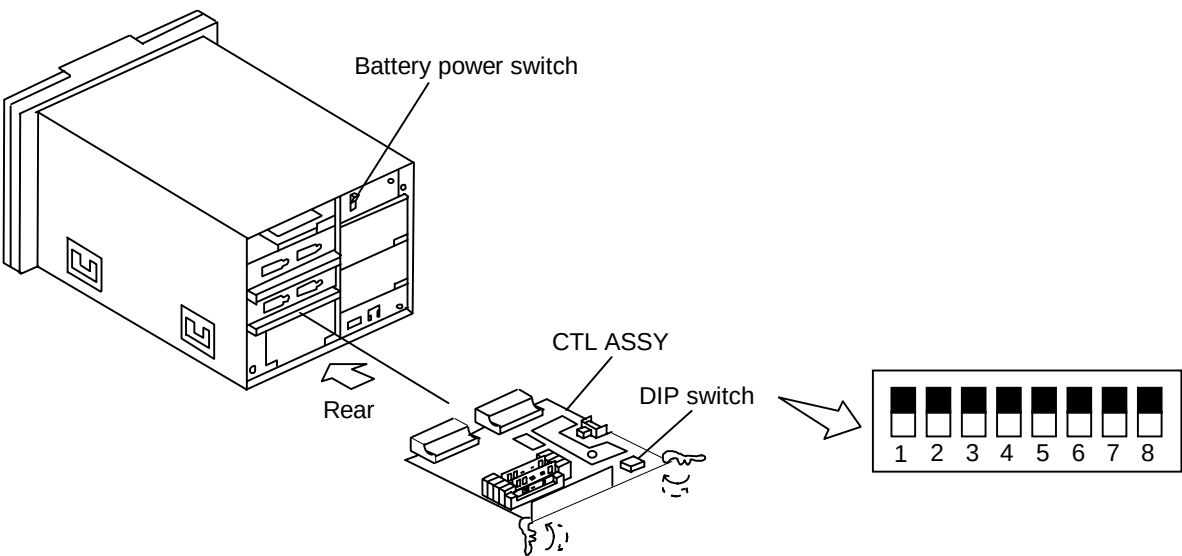
Desktop Type (DK)



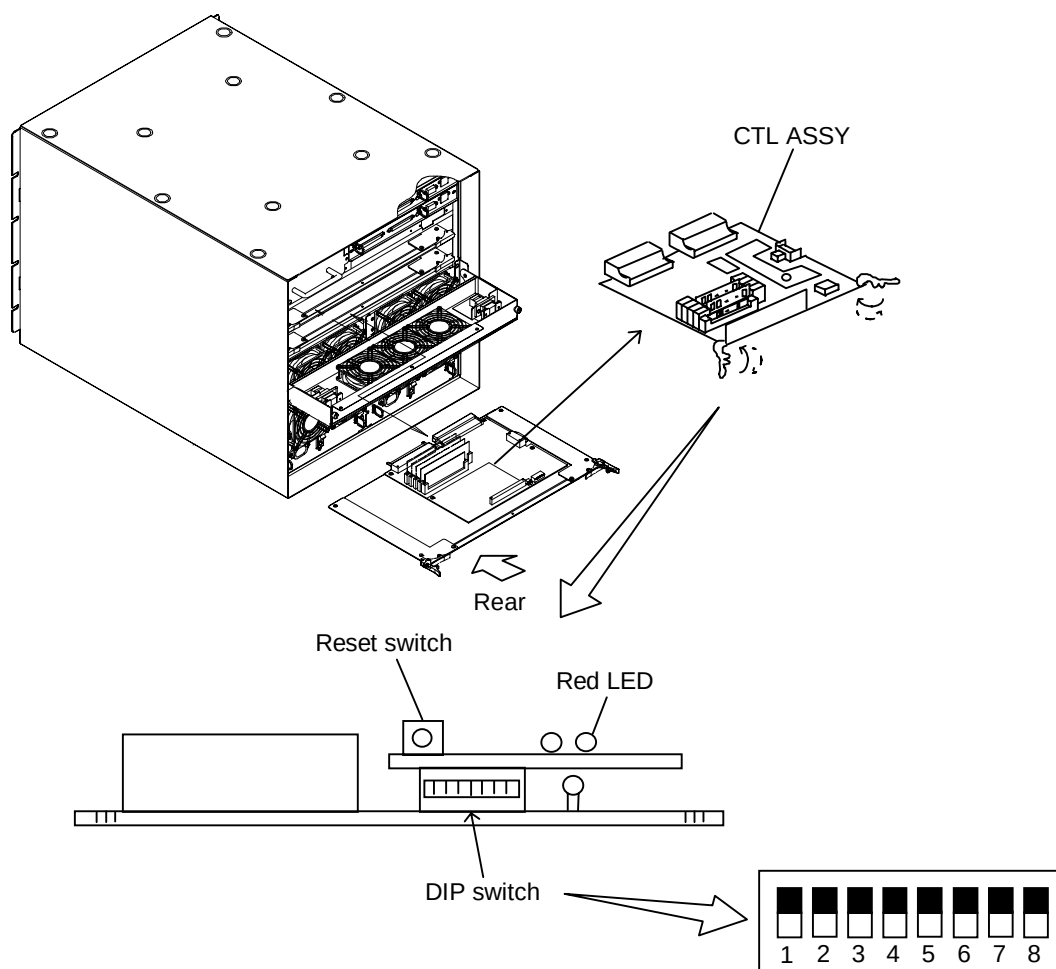
Desktop Type (DKH)



Mini tower/Cabinet Type



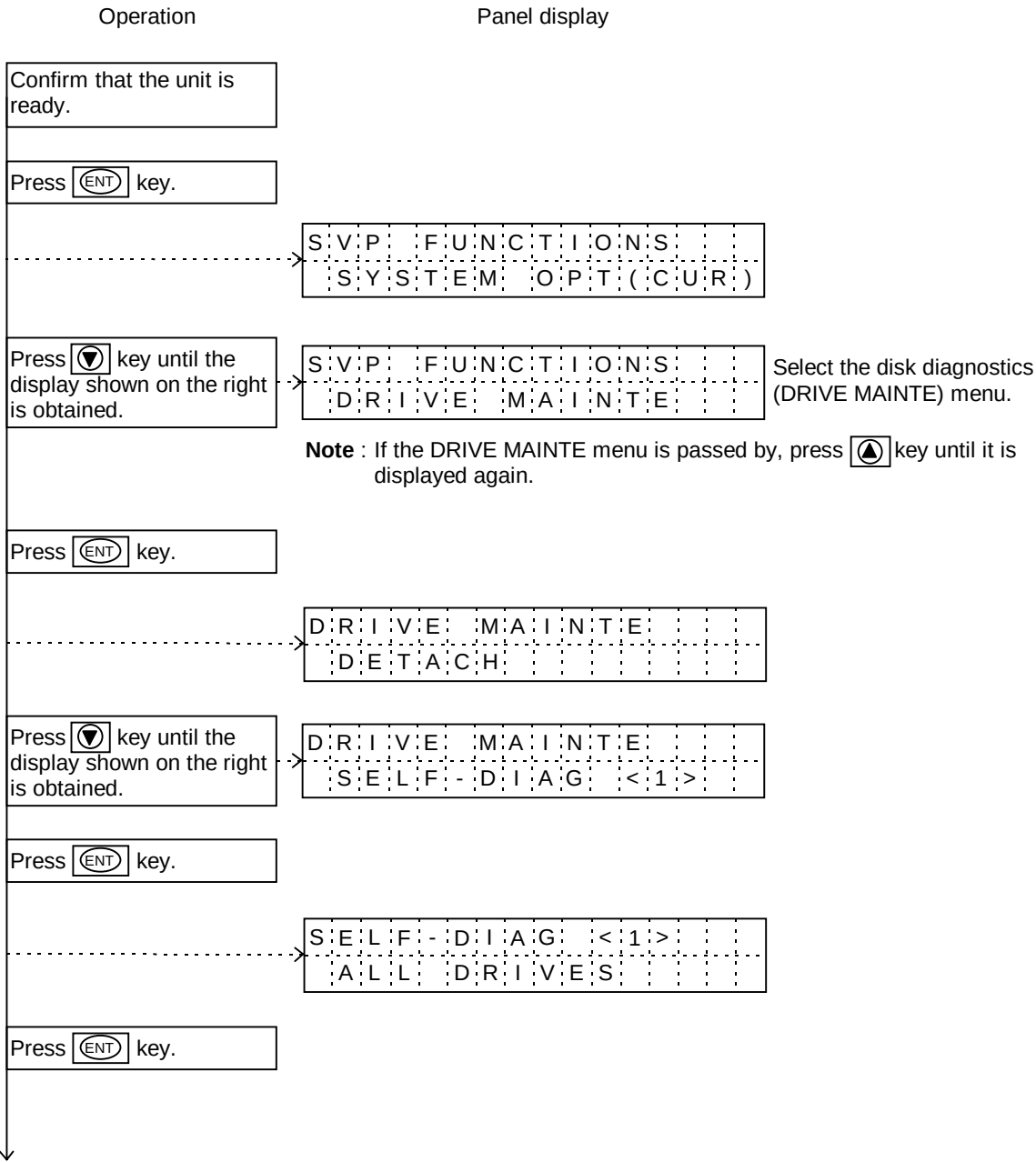
Rackmount Type (RKH)



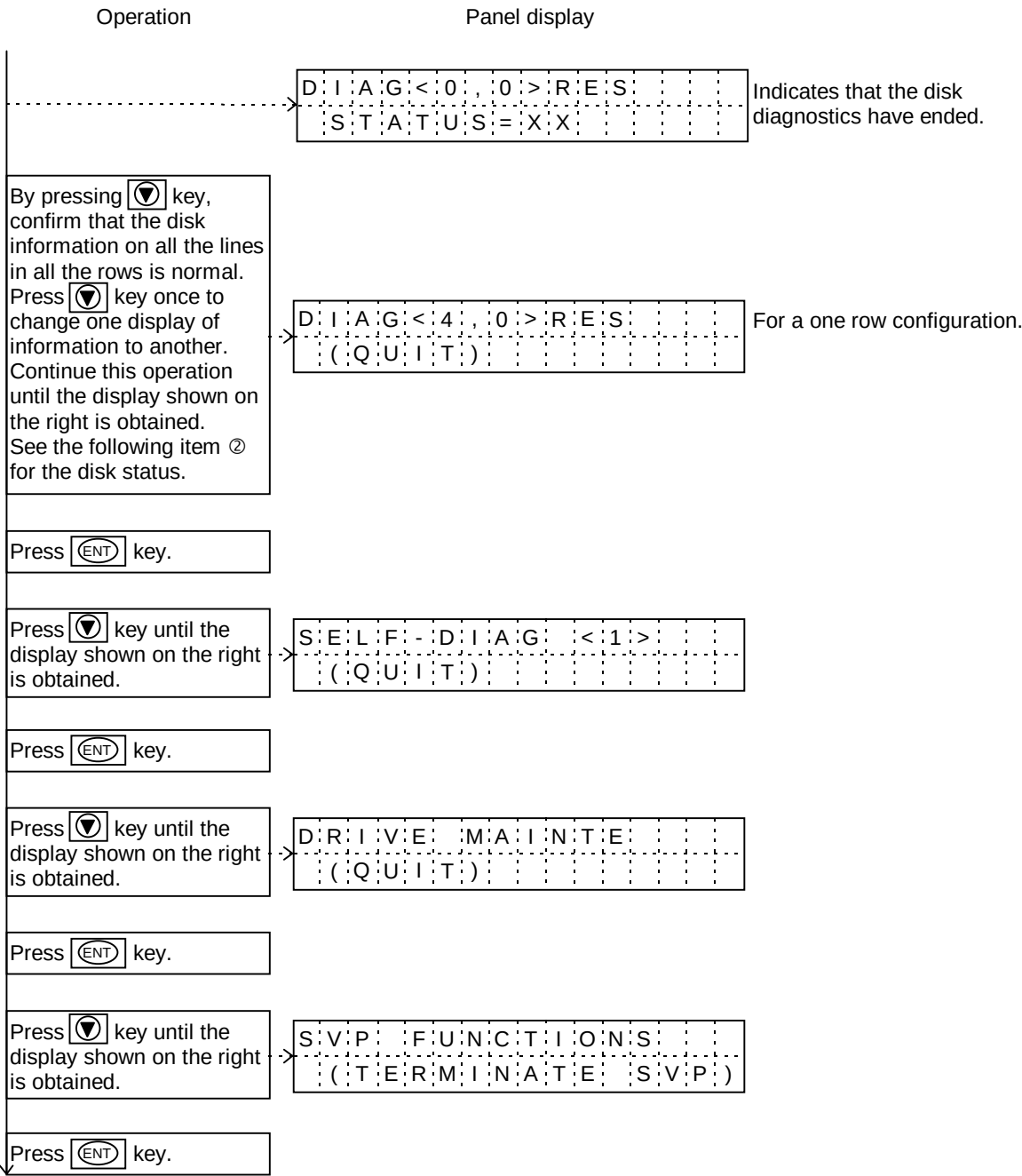
Rackmount Type (RKWH)
Figure 5.2 DIP Switch Settings

- (5) Turn on the main switch.
- (6) Confirm that the unit becomes ready within one or two minutes. If alarm or warning is lit, see the error display.

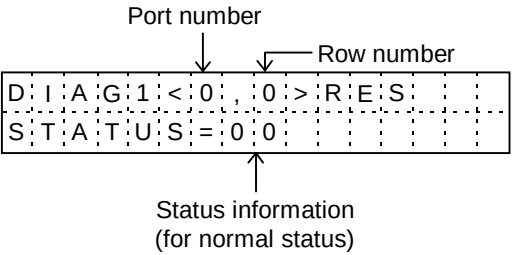
- (7) Perform diagnostics on the disks according to the following procedure and confirm that the diagnostics end normally for all the disks.
- ① Perform the following procedure.



[Disk diagnostics on the run]



② Disk status information.



	Status display	Description
Normal	STATUS = 00	
Abnormal	STATUS = 02	Drive check condition Reinsert the HDU ASSY. If the same status is displayed, replace the HDU ASSY.
	STATUS = 22	Drive I/F time out Reinsert the HDU ASSY. If the same status is displayed, replace the HDU ASSY.
	STATUS = 80	Hardware error Reinsert the HDU ASSY. If the same status is displayed, replace the HDU ASSY.

(8) Turn off the main switch and confirm that the power is turned off normally.

DF350 Disk Subsystem

5. MICROPROGRAM-FC

Rev.6

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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2. Update of Microprogram M-FC0030

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5. Disk Failures Isolation Procedure when “PERTIALLY COMPLT” Message Is Output M-FC0100

REV.3	Mar.1997	Dec.1997	Feb.1998	Oct.1998		

1. Flow of Microprogram Update Operations

When updating either the microprogram or the flash program, it is required to update both of them at the same time depending on their revision numbers. Determine the updating procedure according to the following flowchart, then execute the download.

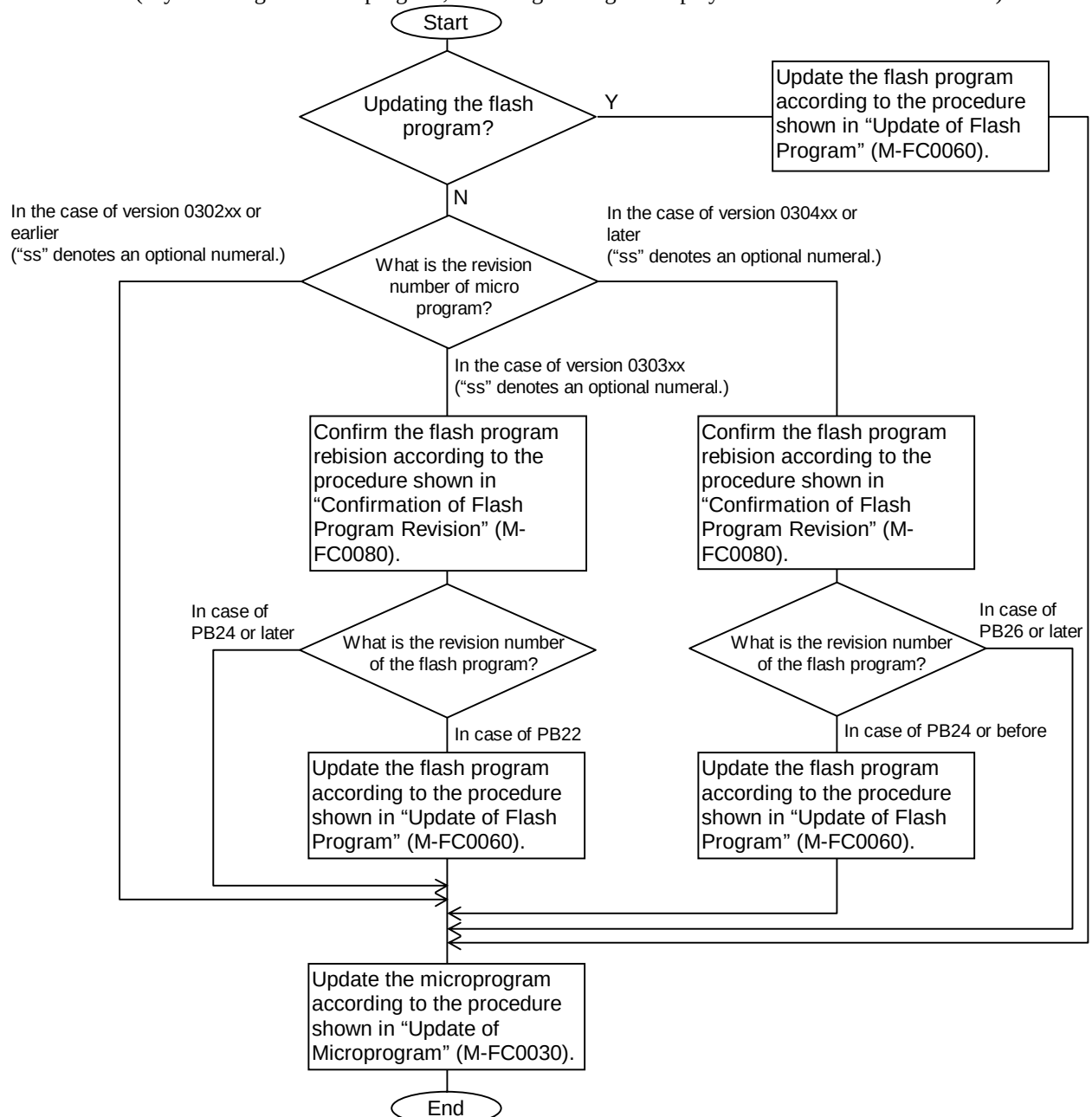
But you can not downgrade microprogram following case.

Case 1 : Downgrade microprogram from version 0304 to version 0303xx (xx are any characters) or earlier.

(If you downgrade microprogram, following message is displayed "RF0701 DGCHKERR".)

Case 2 : Downgrade microprogram from version 0305/B to version 0305 or earlier.

(If you downgrade microprogram, following message is displayed "HZ0601 STRSIZECHG".)



2. Update of Microprogram

Update of Microprogram is used to update the microprogram stored in the disk (ROW0). That is, the download is performed using three Fds (in the case of SNMP microprogram version 4304/L or later, four FDs).

Note : Be sure that no disk failure is present before updating the microprogram.

- (1) Turn off the power for the unit.
- (2) Set DIP switch No.1 of the CTL ASSY as shown in Figure 2.1. For the location of the DIP switch, see page to THEORY0210.

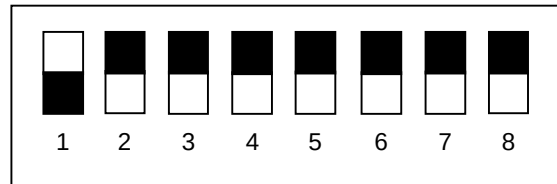
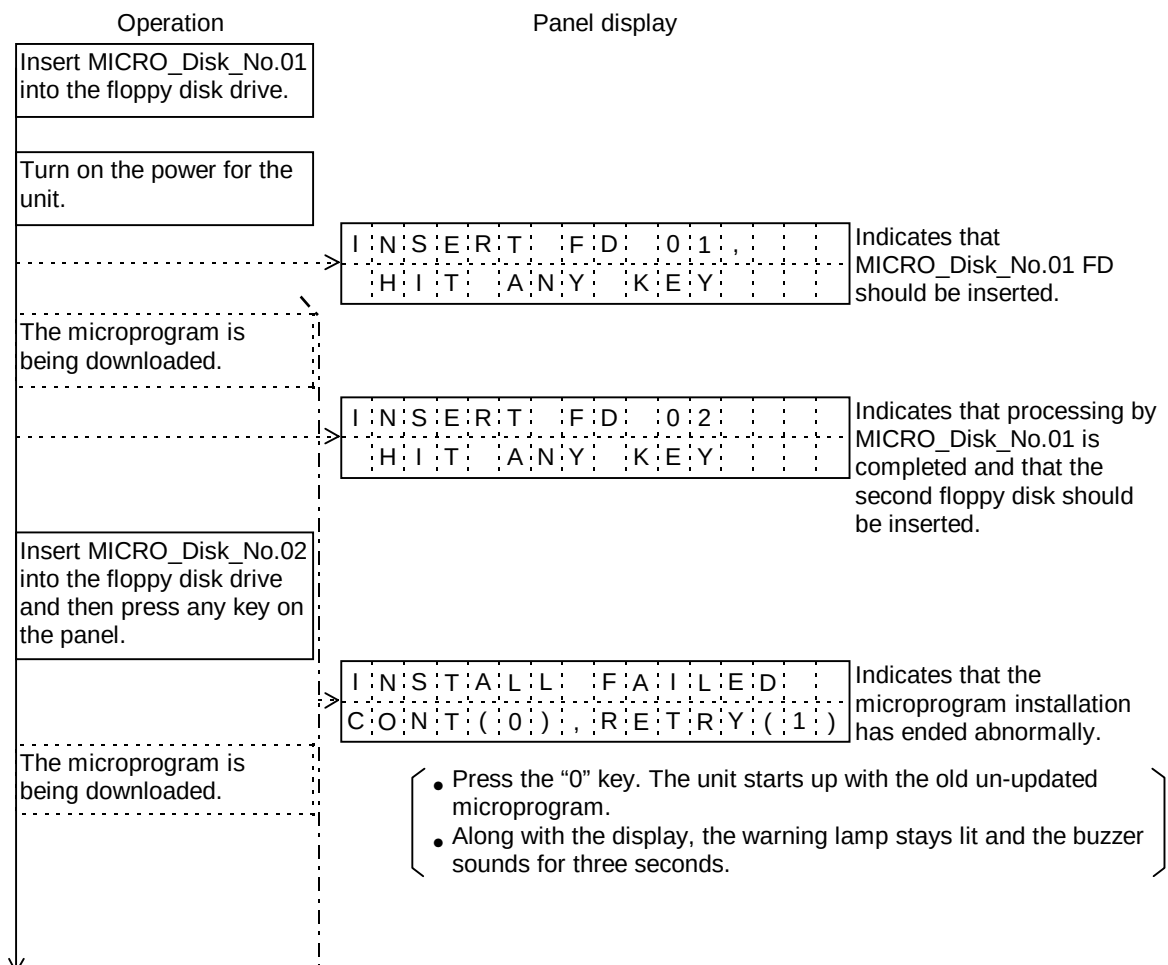
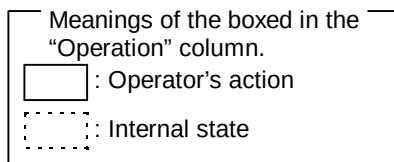
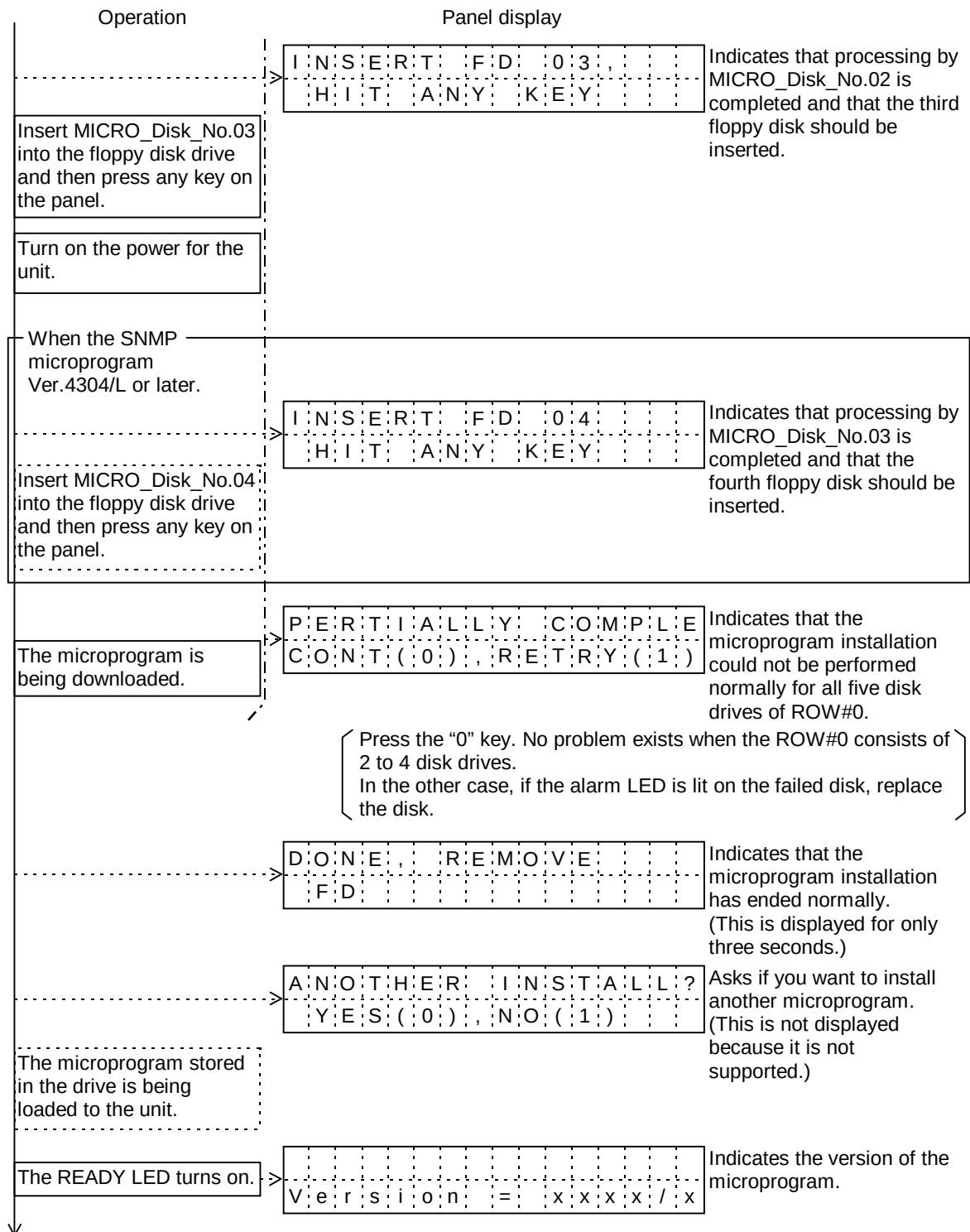


Figure 2.1 DIP Switch Setting

Note : If the dual controller option (DF-F350-F2MCF/DF-F350-F2WCF) is installed, use the same settings for both controllers.

- (3) Perform the following procedure.





(4) Set DIP switch No.1 as shown in Figure 2.2.

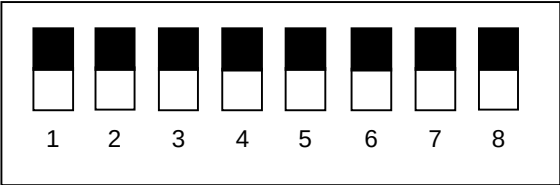


Figure 2.2 Standard DIP Switch Settings

Note : If the dual controller option (DF-F350-F2MCF/DF-F350-F2WCF) is installed, use the same settings for both controllers.

3. Update of Flash Program

Update of flash program is used to update the firmwear stored in the FLASH Memory. One floppy disk is used for downloading.

- (1) Turn off the power for the unit.
- (2) For the dual system, one procedure takes effect for only one system. Remove the CTL ASSY in the other system. (CTL does not need to be blocked.)
- (3) Set DIP switch No.1 of the CTL ASSY as shown in Figure 3.1. For the location of the DIP switch, see Chapter 2 (THEORY).

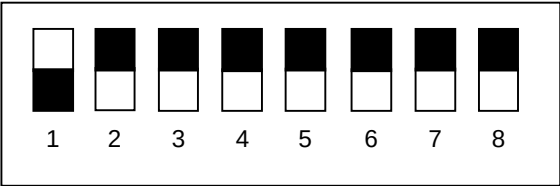
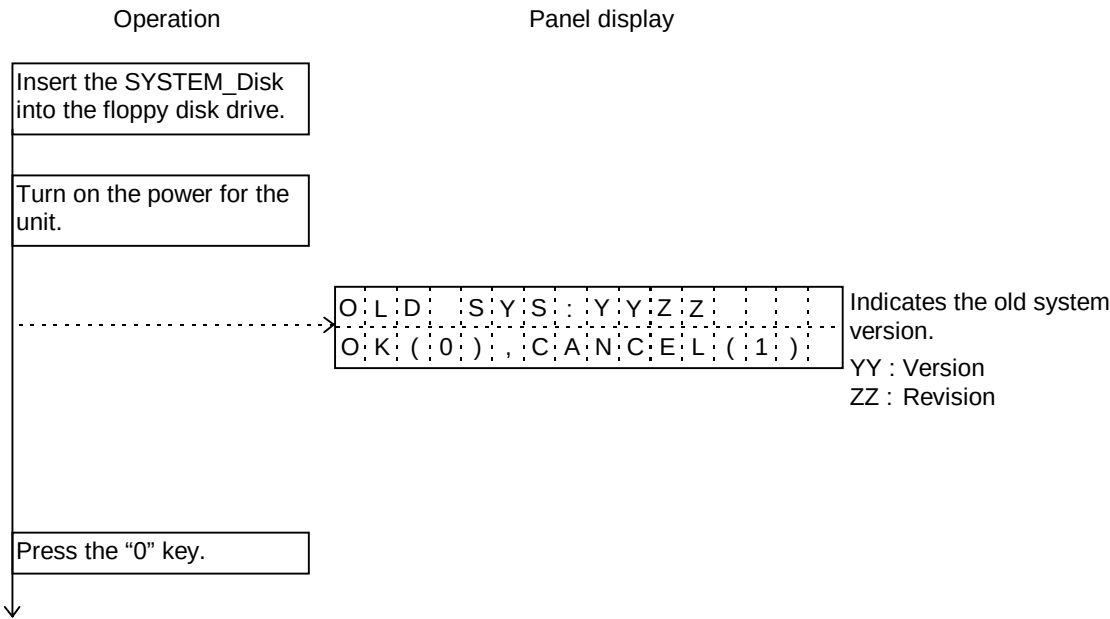
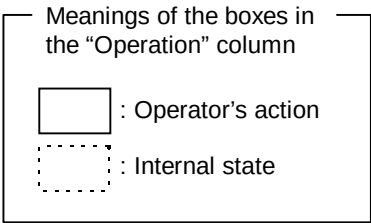
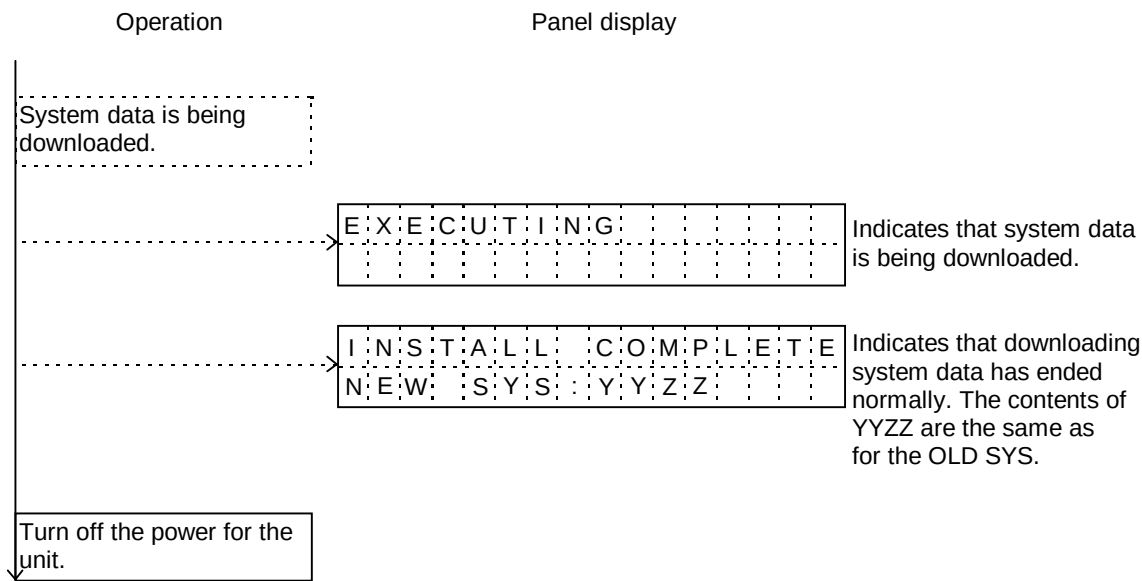


Figure 3.1 DIP Switch Setting

- (4) Perform the following procedure.





Note : To cancel downloading system data, press “1” (QUIT) with the screen displaying OLD SYS.
The following is displayed.

C	A	N	C	E	L	E	D										
R	E	M	O	V	E	D		F	D								

Remove the SYSTEM_Disk from the floppy disk drive and then turn off the power for the unit.

(5) Set DIP switch No.1 as shown in Figure 3.2.

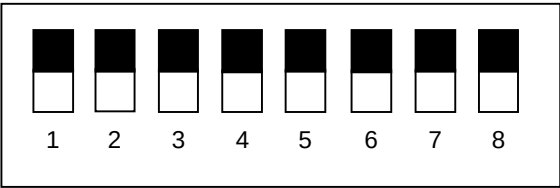


Figure 3.2 Standard DIP Switch Settings

- (6) Mount the removed CTL ASSY in the original location.
- (7) For the dual system, mount the removed CTL ASSY, remove the CTL ASSY that has the system data already downloaded, and then repeat steps (3), (4), (5) and (6) in order.

4. Conformation of Flash Program Revision

Perform the following procedure.

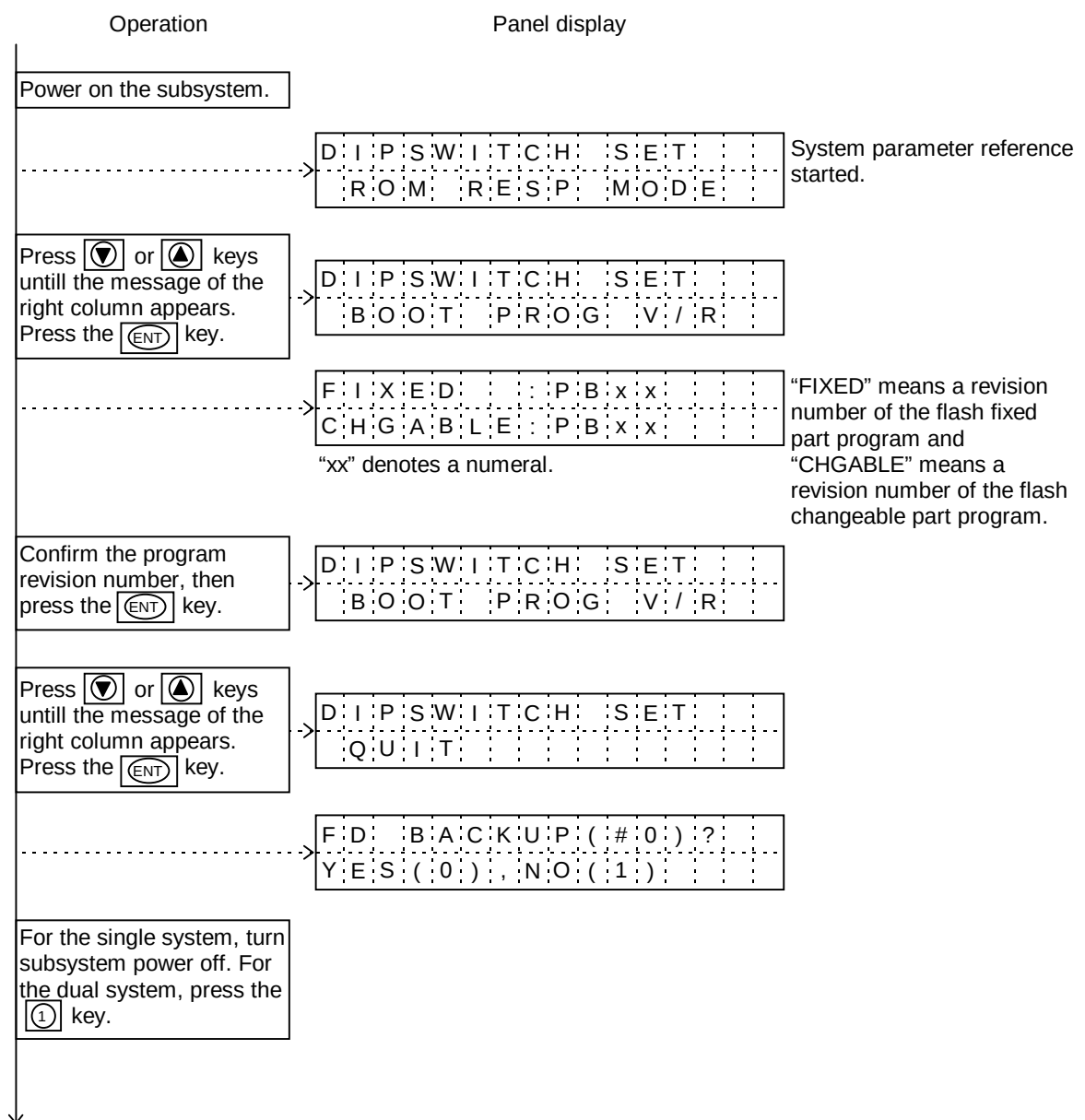
- (1) Turn off the power for the unit.
- (2) Set DIP switch No.4 of the CTL ASSY as shown in Figure 4.1. For the location of the DIP switch, see Chapter 2 (THEORY).

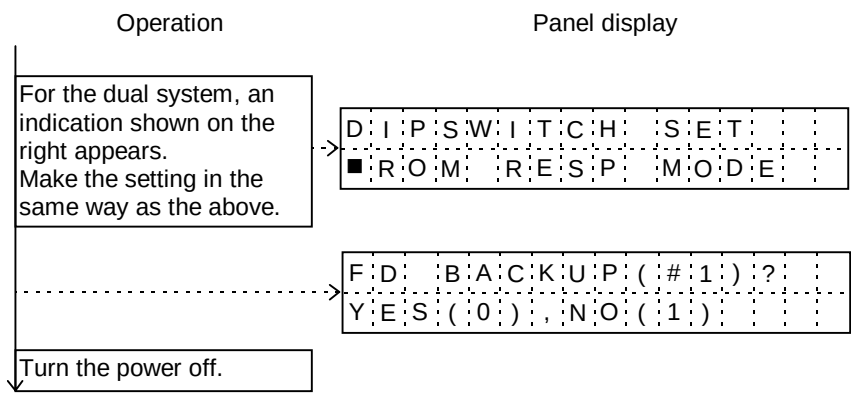


Figure 4.1 DIP Switch Settings for Download Program

Note : If the dual controller option (DF-F350-F2MCF/DF-F350-F2WCF) is installed, use the same settings for both controllers.

- (3) Perform the following procedure.





(4) Set DIP switch No.4 as shown in Figure 4.2.

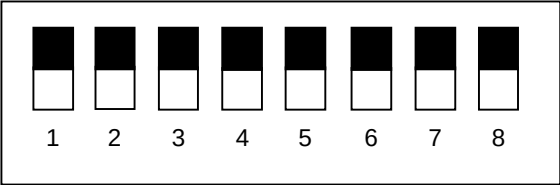


Figure 4.2 Standard DIP Switch Settings

Note : If the dual controller option (DF-F350-F2MCF/DF-F350-F2WCF) is installed, use the same settings for both controllers.

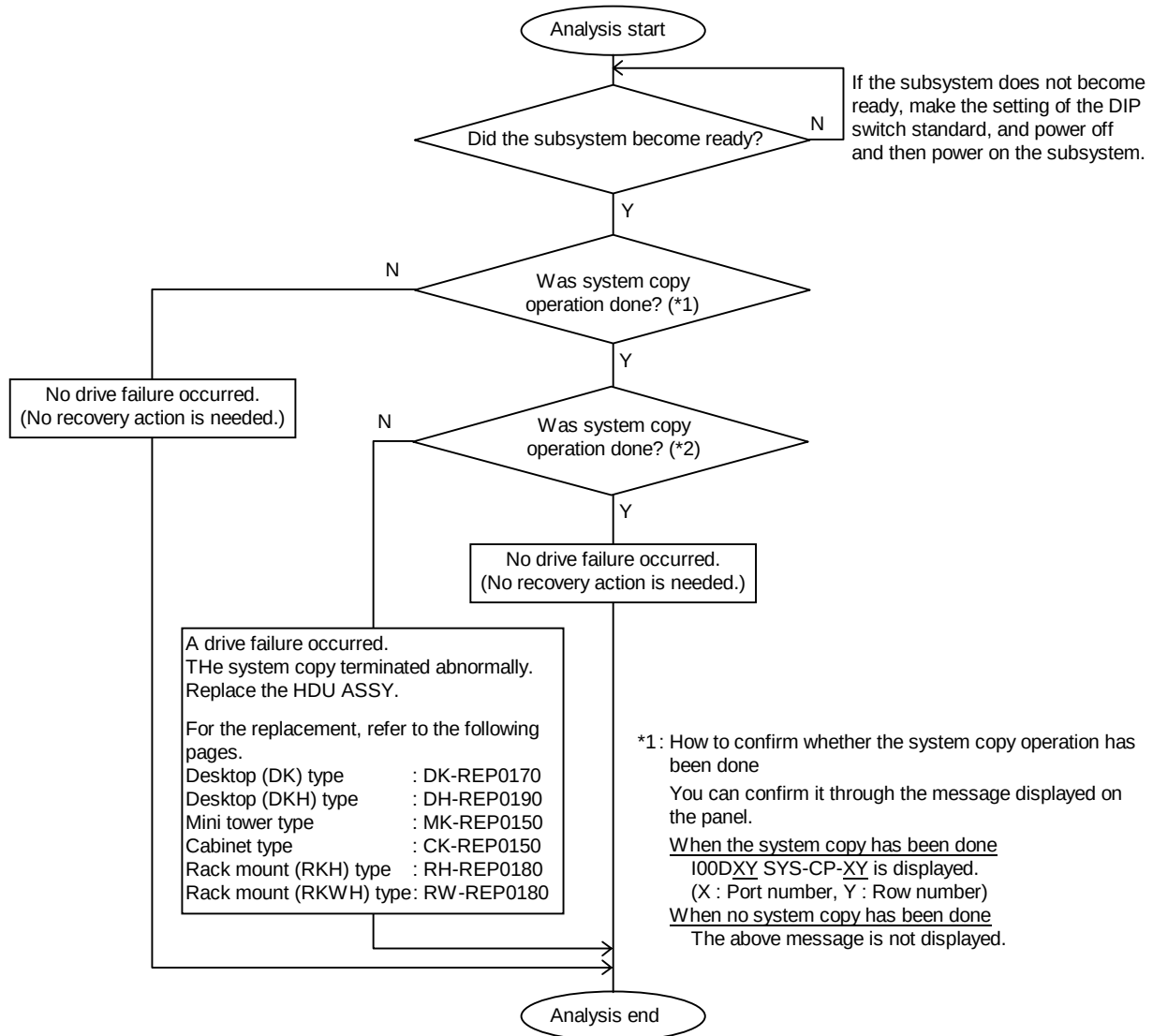
5. Disk Failures Isolation Procedure when “PERTIALLY COMPLT” Message Is Output

The subsystem outputs “PERTIALLY COMPLT” message on the panel when one of the following states are detected.

① 5 disks are not installed in the Row 0.

② There in one or more disk which failed the program installation.

Since the case ① is not a failure, no recovery action is needed. In the case ②, a drive failure may have occurred. Therefore, analyze the problem in the following procedure and take necessary actions.



DF350 Disk Subsystem

6. PANEL

Rev.4

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Mar.20.'97	A.Yamanashi	M.Sato	M.Sato	All	Issued	
1	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0080	SPACIAL CONNECT menu was added.	AD
					0090	CONTROLLER NAME menu was added.	AD
					0100	LU SIZE menu was added. INQUIRY INF PRODUCT TYPE=HITACHI→DF350	AD
					0255	A procedure to set the emulation mode was added.	AD
					0260	Item numbers were changed. (After (8)) (Pages 0270, 0280, 0290, 0300, 0310, 0320, 0330, 0340 and 0350 were changed by the same reason.)	CH
					0290	No.18 was moved.	CH
					0295	Newly created. (Pages 0296, 0335, 0735, 0795 and 0815 were changed by the same reason.)	AD
					0360	TRESPASS MODE menu was added. (Pages 0390 and 0880 were changed by the same reason.)	AD
					0570	1024B was menu was added.	AD
					0790	SPECIAL CONNECT was added.	AD
					0810	CONTROLLER NAME was added.	AD
					0820	Sequence numbers were changed. (Pages 0860, 0870 and 0880 were changed by the same reason.)	CH
					0850	LU SIZE was added.	AD
2	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0090	Added “*.”.	AD
					0100	Added Item No.21, 26, 27.	AD
					0120	Changed the Display.	CH
					0340	Deleted “BOOT PROG V/R”.	DL
					0345	This page was newly added.	AD
					0350	Added “BOOT PROG V/R”.	AD
					0360	Added “DYNAMIC SPARING”, “STATISTICS CNT”.	AD
					0370	Added “THRESHOLD”.	AD
					0380	Changed “Procedure 5”.	CH
					0390- 0600	Changed Item No order.	CH
					0525	This page was newly added.	AD
					0530	Added “STATISTICS CNT”.	AD
					0605	This page was newly added.	AD
					0735	Added “THRESHOLD”.	AD
					0738	This page was newly added.	AD
					0870	Added “DYNAMIC SPARE”.	AD
					0880	Added “STATISTICS CNT”.	AD
					0900	Added “THRESHOLD”.	AD
3	Feb.10.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0090	Added DKH type in Item No.12.	AD
					0270	Added DKH type in (12).	AD
					0400	Explanation on the W□□ (2D+1P, 3D+1P and 4D+1P) function was added.	AD
					0405	This page was newly added.	AD
					0620	Added DRIVE DETACH in Table.	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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 3.3.2 Configuration information (SVP) setting PANEL0390

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1. Panel Configuration

Figure 1.1 shows the panel configuration.

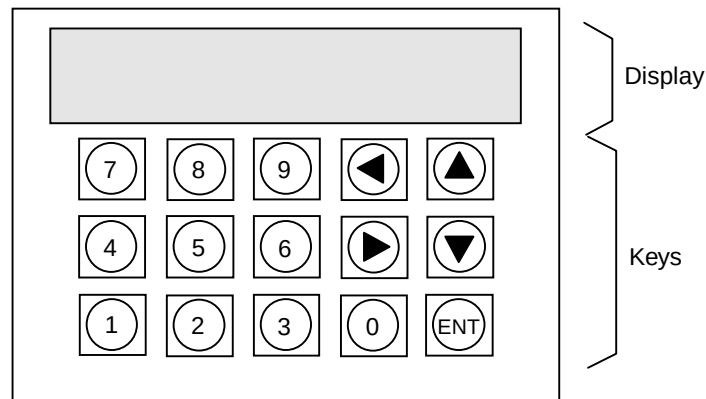
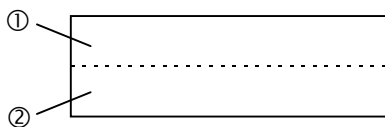


Figure 1.1 Panel Configuration

(1) Display

There are two types of display format: display formats 1 and 2. The display format 1 is used for progress, warning, or fault messages. The other messages use the display format 2.

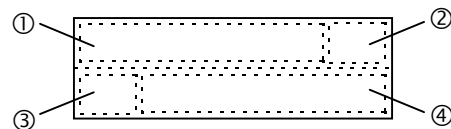
Display format 1



A variety of messages may be displayed with this format. One message may use one or two lines.

- For the message displayed with one line
“①” the message just before the latest message
“②” latest message

Display format 2



① Menu title

There are two kinds of menu title described below.

[DIPSWITCH SET]

For setting the target ID, buzzer, etc.

[SVP FUNCTION]

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

(2) Keys

Use the following keys for panel operation.

-  -  : Used for entering the parameter values.
 : Used for determining the menu or the input parameter.
  : Used for determining the parameter input position.
  : Used for selecting the menu.

There are three methods of entering parameters using the ten keys from  to . The first method is entering the decimal numbers; the second is entering the hexadecimal numbers; and the third is entering the characters. The following are examples of these methods.

① Entering the decimal numbers

For entering the IP address : 012.345.678.901.

I	P	A	D	D	R	E	S	S											
a	a	a	.	b	b	b	.	c	c	c	.	d	d	d	.				

Enter “012” into “aaa”, “345” into “bbb”, “678” into “ccc”, and “901” into “ddd”.

② Entering the hexadecimal numbers

For setting the last LBA information : (3E696B)16

R	O	L	A	S	T	L	B	A	a	a									
						0	0	3	E	6	9	6	B						

 Cursor position

“aa” represents the decimal value for the hexadecimal number on the cursor position. When “00” is entered into “aa”, the two digits of the input decimal number on the second line is converted into the hexadecimal value, then “0” is displayed.

For entering (003E696B)16, enter “00”, “00”, “03”, “14”, “06”, “09”, “06”, and “11” in decimal numbers into “aa”. Then “003E696B” is displayed on the second line to confirm the hexadecimal value.

③ Entering the characters

For VENDOR : HITACHI

V	E	N	D	O	R				a	a	b	b							
						H	I	T	A	C	H	I							

 Cursor position

“aa” represents the decimal value for the higher order hexadecimal digit of the character code on the cursor position. “bb” represents the decimal value for the lower order hexadecimal digit of the character code on the cursor position. When entering “04” into “aa” and “08” into “bb”, these values are converted into “48” in hexadecimal numbers. Further, “48” is converted into the ASCII code to display “H” on the second line.

When entering HITACHI, enter “0408”, “0409”, “0504”, “0401”, “0403”, “0408”, and finally “0409” into “aabb”. These decimal numbers are converted into a hexadecimal value, and then converted into the ASCII codes, so that “HITACHI” is displayed on the second line for confirming the input characters.

Table 1.1 ASCII Codes

		Higher order							
		0	1	2	3	4	5	6	7
Lower order	0	NUL	DLE	SP	0	@	P	\	p
	1	SOH	DC1	!	1	A	Q	a	q
	2	STX	DC2	“	2	B	R	b	r
	3	ETX	DC3	#	3	C	S	c	s
	4	EOT	DC4	\$	4	D	T	d	t
	5	ENQ	NAK	%	5	E	U	e	u
	6	ACK	SYN	&	6	F	V	f	v
	7	BEL	ETB	‘	7	G	W	g	w
	8	BS	CAN	(	8	H	X	h	x
	9	HT	EM	)	9	I	Y	i	y
	A	NL	SUB	*	:	J	Z	j	z
	B	VT	ESC	+	;	K	[	k	{
	C	FF	FS	,	<	L	\	l	
	D	CR	GS	-	=	M	]	m	}
	E	SO	RS	.	>	N	^	n	~
	F	SI	US	/	?	O	_	o	DEL

(3) Message display

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Example 1)

Message from the controller No.0 : The first (left most) character is in uppercase.

Message from the controller No.1 : The first (left most) character is in lowercase.

Controller No.0 : DIPSWITCH SET

Controller No.1 : dIPSWITCH SET

For the dual controllers, the menu title with the display format 2 is displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

Example 2)

“■” appears on the panel when the CTL1 system parameter is to be set.

“■” not displayed : CTL0 system parameter is set.

“■” displayed : CTL1 system parameter is set.

D	I	P	S	W	I	T	C	H	S	E	T	.	.	.
R	O	M	R	E	S	P	M	O	D	E	.	.	.	.



This indicates CTL0 system parameter setting.

D	I	P	S	W	I	T	C	H	S	E	T	.	.	.
■	R	O	M	R	E	S	P	M	O	D	E	.	.	.



This indicates CTL1 system parameter setting.

2. Panel Feature

The panel feature has the following three broad functions.

- (1) Message display
- (2) System parameter (DIP SWITCH) setting
- (3) Configuration information (SVP) setting

The following describes an overview of each of these three functions.

No.	Name	Function	Remarks
1	Message display	(1) Unit status message There are following four kinds of messages which are automatically displayed by the unit. ① Progress message : Reports the completion of recovery operation. ② Warning message : Reports a hardware failure which does not cause the unit to be inoperable. ③ Fault message : Reports a fatal failure which causes the unit to be inoperable. ④ CUDG message : Reports a failure detected by the diagnostic processing of the unit. (2) Panel operation message The operation and error messages are displayed on the panel during panel operation.	
2	System parameter (DIP SWITCH) setting	Sets the system parameters including the IP address, target (this unit) ID, and other system parameters, etc. Upon installation and sets to make back-up of the system parameters on a floppy disk or restore them.	See Section 3.2.
3	Configuration information (SVP) setting	Sets the RAID group, LU, LU format, and disk recovery, etc.	See Section 3.3.

3. Panel Operation

3.1 Message Display

(1) Unit status message

Upon detection, the progress, warning, fault, or CUDG message is automatically displayed on the panel by the unit.

The unit stores up to 10 messages to allow viewing of earlier messages. To view these messages, press  key on the panel.

Each time  key is pressed, a previous message is displayed. (To return to the latest message, press  key.)

(2) Panel operation message

The operation and error messages during panel operation are displayed on the panel.

See the “Installation” or “Extended Option” section for details about the operation messages.

Table 3.1 shows error messages displayed when using the panel feature. These messages are displayed on the menu title column. To recover an error, see the “Troubleshooting” section.

Table 3.1 Error Message

No.	Message	Description												
1	#REENTER	Reenter the value because the entered value has an invalid specification.												
2	#NO EFFECT	The processing has been executed but no data specified can be found. Example) An attempt was made to display the defined logical unit but no logical unit has been defined.												
3	#RESERV. CONF.	The logical unit #0 is reserved for the other host so that the processing has been suspended.												
4	#CHK (@@ - ¥¥¥¥)	An error has occurred during processing so that the processing has been suspended. @@ : Sense key (error classification) ¥¥¥¥ : Sense code (error in detail) The values indicated with @@ and their contents are as follows. <table><tr><th>Value</th><th>Contents</th></tr><tr><td>NR</td><td>NOT READY</td></tr><tr><td>ME</td><td>MEDIUM ERROR</td></tr><tr><td>HE</td><td>HARDWARE ERROR</td></tr><tr><td>IR</td><td>ILLEGAL REQUEST</td></tr><tr><td>AC</td><td>ABORTED COMMAND</td></tr></table>	Value	Contents	NR	NOT READY	ME	MEDIUM ERROR	HE	HARDWARE ERROR	IR	ILLEGAL REQUEST	AC	ABORTED COMMAND
Value	Contents													
NR	NOT READY													
ME	MEDIUM ERROR													
HE	HARDWARE ERROR													
IR	ILLEGAL REQUEST													
AC	ABORTED COMMAND													
5	#FD : NOT READY	The floppy disk is incorrectly inserted.												
6	#FD : FORMAT ERR	The floppy disk inserted is incorrectly formatted.												
7	#FD : WRITE-PTD	The floppy disk inserted is write protected.												
8	#FD : □□□□□□□□	An error has occurred during input/output to the floppy disk so that the processing has been suspended. “□□□□□□□□” indicates details about the error.												
9	#FD : DESCRI.ERR	The file in the floppy disk contains a wrong description, or no file exists on the floppy disk.												
10	#INTERRUPT	The slave CTL processing has been suspended. (The CTL has been reset or blocked.)												

3.2 System Parameter Setting

Set the parameter for the controller configuration and controller processing mode. Execute this function by setting the DIP switch No.4 on the CTL ASSY to "ON" to turn on the controller.

For the dual controller configuration, use of the system parameter setup menu selects the same setup for the both controllers or the setup for each controller. (When the "same setup for both controller" menu is selected, setup for one controller is reflected to the other controller.)

The menu items and their usage are as follows.

(The item No.s 1, 2, 4, 5, 8, 10, 13, 20, and 22 in the following table must be set for each controller.)

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	???????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	Select	NOT CONNECT
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT (*2)	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : WolfPack mode	Select	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	Select	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per block. (*4)	Select	512B
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inhibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) RACK MOUNT : Rackmount (RK) (*5) HIGH RACK MOUNT : Rackmount (RKH) CABINET, RACK : Cabinet (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	Select	Depending on the configuration from the factory
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Enter	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
17	CONTROLLER NAME (*3)	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid. CTL NAME : Controller identifier.	Select	DISABLE
18	ROW LAST LBA (*4)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET

*3 This menu can be used in the Flash Program Ver.PB24 and later.

*4 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

*5 Not supported in DF350.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
21	GENERATE SYS (*6)	Specifies the loading method for the new/old microprogram.	NEW SYSTEM : Loads the new microprogram. OLD SYSTEM : Loads the old microprogram.	Select	NEW SYSTEM
22	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL TYPE : Dual system attribute DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute (*8) OFF : Not used in the Data share mode ON : Used in the Data share mode	Select	Depending on the configuration from the factory
24	LU SIZE (*7)	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
25	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
26	SYS REV	Limit the revision No.s of installing system.	Displays the micro program revision.	—	“0304”
27	OPTION	Specifies the optional function when using it.	Enter using the panel keypad.	Enter	“0000”
28	BOOT PROG V/R	Displays the startup program revision.	Displays the flash program revision.	—	
29	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
30	QUIT	Terminates the parameter input.	Quit : Terminates the parameter input.	Select	

*6 This menu can be used in the Flash Program Ver.PB24 and before.

*7 This menu can be used in the Flush Program Ver.PB24 and later.

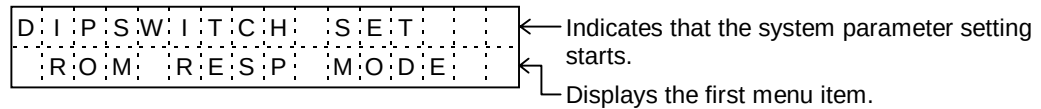
*8 This function can be used in Micro_Disk_Ver.0304 or later.

3.2.1 System parameter setting procedure (basic)

Procedure 1 : Starts the system parameter setting

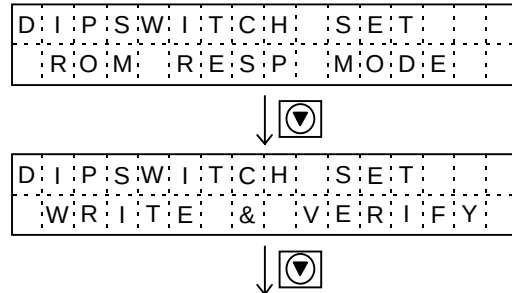
Setting the DIP switch No.s 4 and 6 to "ON" turns on the controller.

The following message is displayed on the panel.



Procedure 2 : Selects the menu item

Press  key once to display the next menu item. Continue pressing this key until you get to the menu item desired.

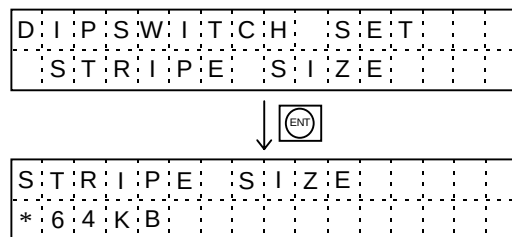


The menu items are displayed in the order described in Section 3.2.

Procedure 3 : Determines the menu item

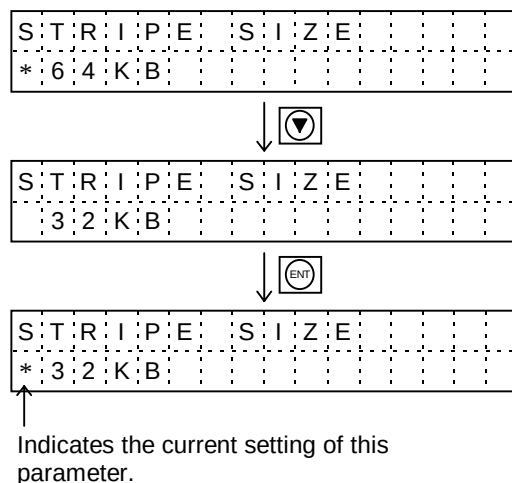
When the desired menu item is displayed, press the  key.

Now, you can set the parameter for this menu item.



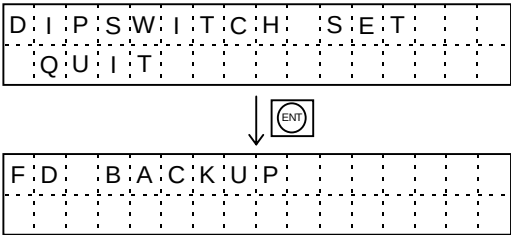
Procedure 4 : Sets the parameter

Press  key to display the next parameter. When the desired parameter is displayed, press the  key. Now, the parameter is selected.



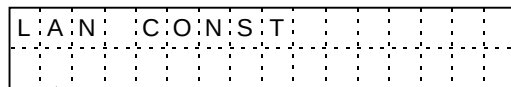
Procedure 5 : Terminates the system parameter setting

The following message is displayed by repeatedly pressing the  key. Now, press the  key to terminate the EEPROM setting.



(4) Sets the LAN configuration.

① Panel display



← Pressing the and keys scrolls the items.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Contents of display

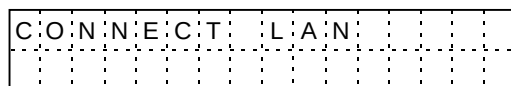
No.	Message displayed	Description
1	CONNECT LAN	Sets whether or not the LAN is connected.
2	IP ADDRESS	Sets the IP address.
3	SUB NET MASK	Sets the sub-net mask value.
4	DEFAULT GATEWAY	Sets the default gateway address.
5	ETHER ADDRESS	Sets the Ethernet address.
6	QUIT	Returns to the initial menu.

③ Key and other operations

(a) The "ETHER ADDRESS" is displayed only when the LAN board is mounted.

(4-1) Sets whether or not the LAN is connected.

① Panel display



← Pressing the and keys scrolls the items.

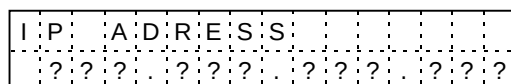
Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Contents of display

No.	Message displayed	Description
1	CONNECT	LAN connected
2	NOT CONNECT (default)	LAN not connected

(4-2) Sets the IP address.

① Panel display



← "???" indicates the current value (000 - 255).

② Key and other operations

- (a) Using the and keys changes the cursor position.
- (b) Skip the period "." when moving the cursor or entering the value.
- (c) Left justify the input value next to each period ".".
- (d) Press the key to define the entered value.
- (e) If the entered value is invalid, the previous value is displayed again.
- (f) Setting the value entered returns to the LAN configuration setup menu.

(4-3) Sets the sub-net mask value.

① Panel display

S	U	B	.	N	E	T	.	M	A	S	K	.	.	.
?	?	?	.	?	?	?	.	?	?	?	.	?	?	?

← "???" indicates the current value (000 - 255).

② Key and other operations

- (a) Using the  and  keys changes the cursor position.
- (b) Skip the period "." when moving the cursor or entering the value.
- (c) Left justify the input value next to each period ".".
- (d) Press the  key to define the entered value.
- (e) If the entered value is invalid, the previous value is displayed again.
- (f) Setting the value entered returns to the LAN configuration setup menu.

(4-4) Sets the default gateway address.

① Panel display

D	E	F	U	L	T	.	G	A	T	W	A	Y	.	.	.
?	?	?	.	?	?	?	.	?	?	?	.	?	?	?	

← "???" indicates the current value (000 - 255).

② Key and other operations

- (a) Using the  and  keys changes the cursor position.
- (b) Skip the period "." when moving the cursor or entering the value.
- (c) Left justify the input value next to each period ".".
- (d) Press the  key to define the entered value.
- (e) If the entered value is invalid, the previous value is displayed again.
- (f) Setting the value entered returns to the LAN configuration setup menu.

(4-5) Ethernet address.

① Panel display

E	T	.	A	D	D	R	E	S	S	.	.	.	.	.
?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

← "?????????????" indicates the current value (000000000000 - FFFFFFFF).

(5) Sets the target ID.

① Panel display

TARGET ID

← Pressing the  and  keys scrolls the items.

↑

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Contents of display

No.	Message displayed	Description
1	SINGLE TARGET (default)	Sets the single target ID.
2	MULTI TARGET	Sets the multiple target IDs.

(5-1) Sets the single target ID.

① Panel display

S I N G L E T A R G E T

← "??" indicates the current value (00 - 15).

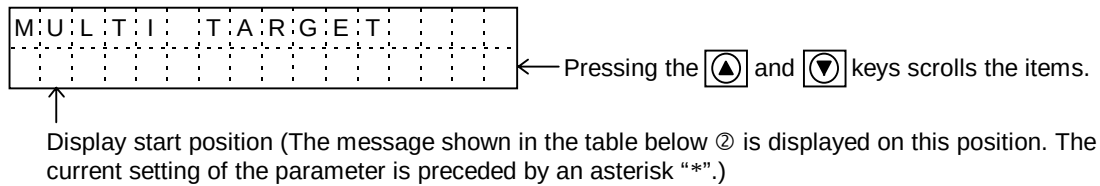
??

② Key and other operations

- (a) Using the  and  keys changes the cursor position.
- (b) Left justify the input value.
- (c) Press the  key to define the entered value.
- (d) If the entered value is invalid, the previous value is displayed again.
- (e) Setting the value entered returns to the target ID setup menu.
- (f) If the target ID is not set internally, the default "00" is displayed.

(5-2) Sets the multiple target IDs.

① Panel display



② Contents of display

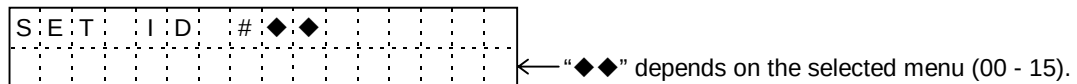
No.	Message displayed	Description
1	SET ID #00	Sets the LUN for the target #00.
2	SET ID #01	Sets the LUN for the target #01.
3	SET ID #02	Sets the LUN for the target #02.
4	SET ID #03	Sets the LUN for the target #03.
5	SET ID #04	Sets the LUN for the target #04.
6	SET ID #05	Sets the LUN for the target #05.
7	SET ID #06	Sets the LUN for the target #06.
8	SET ID #07	Sets the LUN for the target #07.
9	SET ID #08	Sets the LUN for the target #08.
10	SET ID #09	Sets the LUN for the target #09.
11	SET ID #10	Sets the LUN for the target #10.
12	SET ID #11	Sets the LUN for the target #11.
13	SET ID #12	Sets the LUN for the target #12.
14	SET ID #13	Sets the LUN for the target #13.
15	SET ID #14	Sets the LUN for the target #14.
16	SET ID #15	Sets the LUN for the target #15.
17	QUIT	Returns to the target ID setup menu.

③ Key and other operations

- (a) Selecting the "SET ID #xx" proceeds to the target LUN setup menu.
- (b) Multiple "SET ID #xx" selections can be made, but the target LUN must be set for each selection.
- (c) When changing without using the target ID, select "NOT USE" from the target LUN setup menu after selecting the target ID.
- (d) Selecting the "QUIT" returns to the target ID setup menu.

(5-3) Sets the multiple target IDs.

① Panel display



Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”.)

② Contents of display

No.	Message displayed	Description
1	LUN #00	Assign the LUN #00 to the selected target ID.
2	LUN #01	Assign the LUN #01 to the selected target ID.
3	LUN #02	Assign the LUN #02 to the selected target ID.
4	LUN #03	Assign the LUN #03 to the selected target ID.
5	LUN #04	Assign the LUN #04 to the selected target ID.
6	LUN #05	Assign the LUN #05 to the selected target ID.
7	LUN #06	Assign the LUN #06 to the selected target ID.
8	LUN #07	Assign the LUN #07 to the selected target ID.
9	LUN #08	Assign the LUN #08 to the selected target ID.
10	LUN #09	Assign the LUN #09 to the selected target ID.
11	LUN #10	Assign the LUN #10 to the selected target ID.
12	LUN #11	Assign the LUN #11 to the selected target ID.
13	LUN #12	Assign the LUN #12 to the selected target ID.
14	LUN #13	Assign the LUN #13 to the selected target ID.
15	LUN #14	Assign the LUN #14 to the selected target ID.
16	LUN #15	Assign the LUN #15 to the selected target ID.
17	NOT USE	The selected target ID is not used.

③ Key and other operations

- (a) Selecting the setting returns to the multiple target IDs setup menu.
- (b) The LUN selected by the other target ID is not displayed.
- (c) The default of the target ID selected first time is “NOT USE”.
- (d) Selecting “NOT USE” releases the LUN assigned to the target ID.

(6) Sets the AS/400 connection configuration.

① Panel display

C O N N E C T

← Pressing the  and  keys scrolls the items.

↑

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Contents of display

No.	Message displayed	Description
1	CONNECT	AS/400 connected.
2	NOT CONNECT (default)	AS/400 not connected.

③ Key and other operations

- (a) Selecting the “CONNECT” proceeds to the AS/400 connection information setup menu.
- (b) Selecting the “NOT CONNECT” returns to the initial menu.

(6-1) Sets the AS/400 connection information.

① Panel display

A S / 4 0 0

← Pressing the  and  keys scrolls the items.

↑

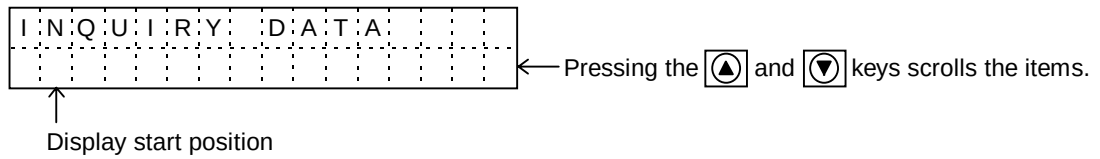
Display start position

② Contents of display

No.	Message displayed	Description
1	INQUIRY DATA	Sets the INQUIRY data.
2	QUIT	Returns to the initial menu.

(6-2) Sets the INQUIRY data.

① Panel display

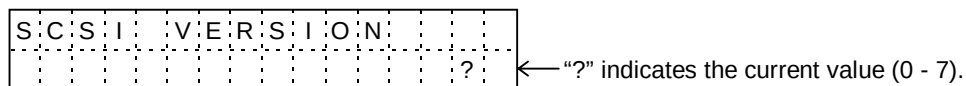


② Contents of display

No.	Message displayed	Description
1	SCSI VERSION	Sets the SCSI version.
2	UNKNOWN1	Sets the unknown information 1.
3	UNKNOWN2	Sets the unknown information 2.
4	PRODUCTID	Sets the product ID.
5	VENDOR1-1	Sets the vendor specified information 1 (first).
6	VENDOR1-2	Sets the vendor specified information 1 (middle).
7	VENDOR1-3	Sets the vendor specified information 1 (last).
8	VENDOR2-1	Sets the vendor specified information 2 (first).
9	VENDOR2-2	Sets the vendor specified information 2 (middle).
10	VENDOR2-3	Sets the vendor specified information 2 (last).
11	QUIT	Returns to the AS/400 connection information setup menu.

(6-3) Sets the SCSI version.

① Panel display

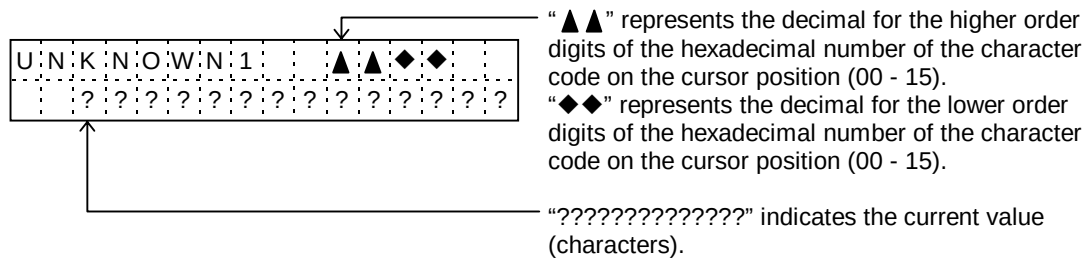


② Key and other operations

- Enter one digit between 0 and 7. The input result is immediately reflected.
- Pressing the  key defines the input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-4) Sets the unknown information 1.

① Panel display

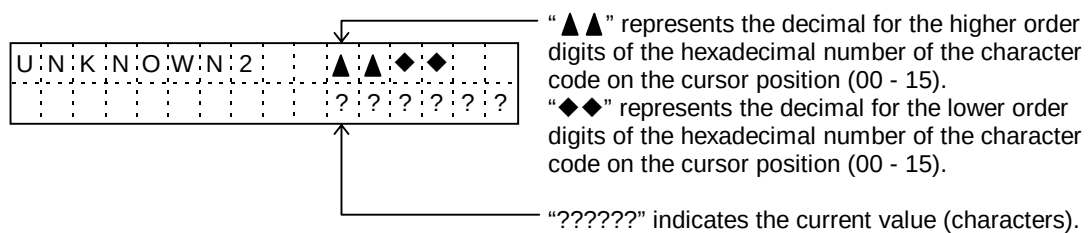


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-5) Sets the unknown information 2.

① Panel display

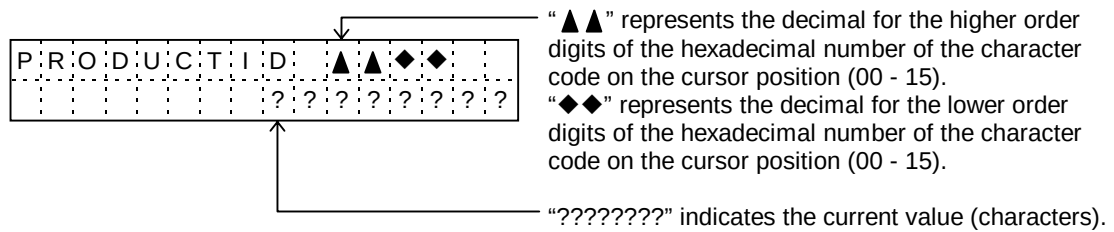


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-6) Sets the product ID.

① Panel display

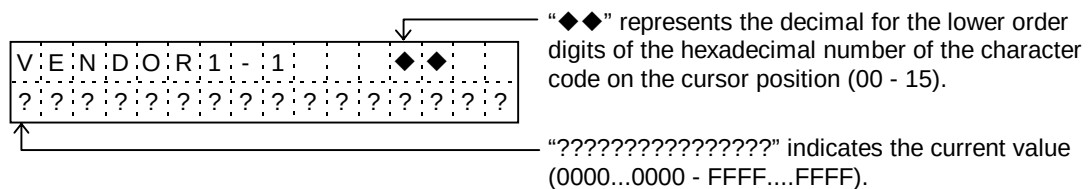


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-7) Sets the vendor specified information 1 (first).

① Panel display

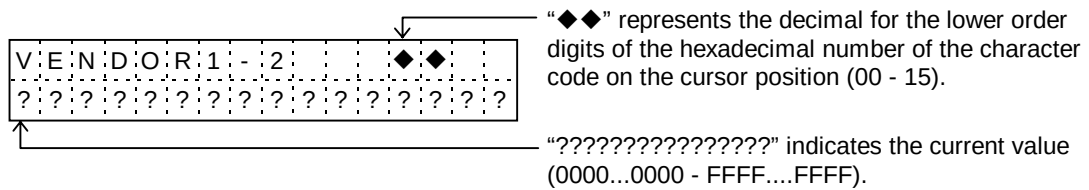


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-8) Sets the vendor specified information 1 (middle).

① Panel display

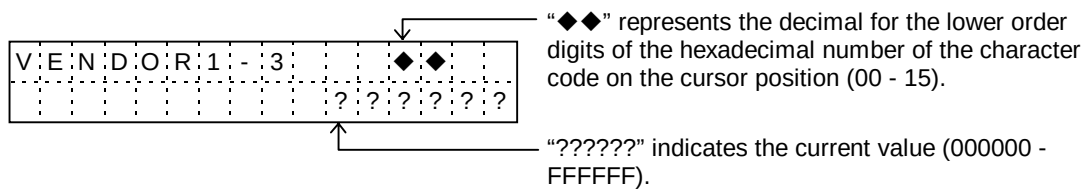


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-9) Sets the vendor specified information 1 (last).

① Panel display

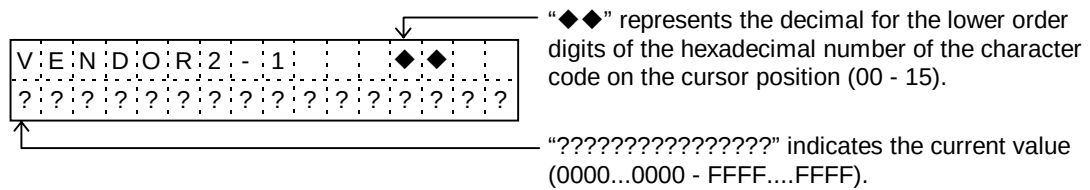


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-10) Sets the vendor specified information 2 (first).

① Panel display

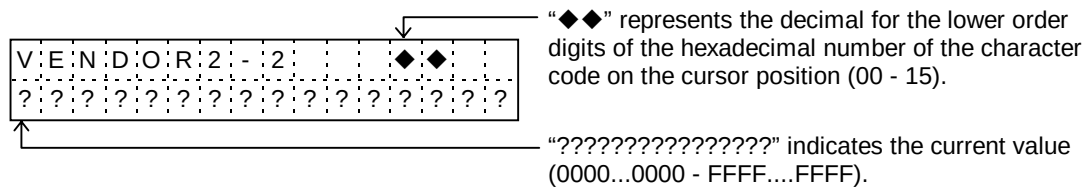


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-11) Sets the vendor specified information 2 (middle).

① Panel display

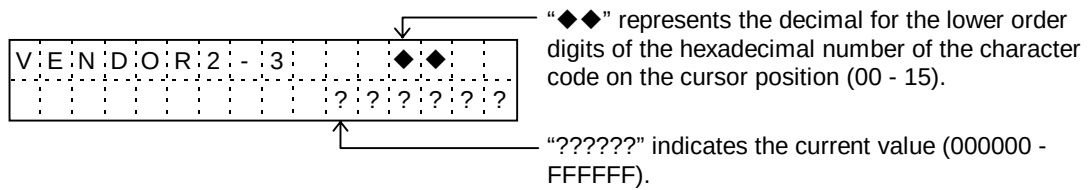


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(6-12) Sets the vendor specified information 2 (last).

① Panel display

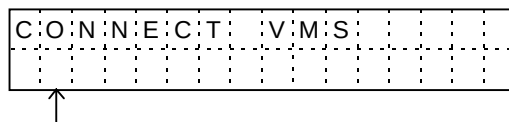


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the AS/400 connection information setup menu.

(7) ② Sets the VMS connection.

① Panel display



Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”).

② Contents of display

No.	Message displayed	Description
1	CONNECT	VMS connected
2	NOT CONNECT (default)	VMS not connected

(8) Sets the emulation mode.

① Panel display

S	P	E	C	I	A	L	C	O	N	N	E	C	T



Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”.)

② Contents of display

No.	Message displayed	Description
1	OPEN SYSTEM (DEFAULT)	Operates in the open system mode.
2	ALTERNATE PATH1	Operates in IBM7135 I/O path switch emulation mode.
3	ALTERNATE PATH2	Operates in NCR I/O path switch emulation mode.
4	ALTERNATE PATH3	Operates in the TRESPASS mode.
5	TGET SHARE MODE	Operates in WolfPack mode.

(9) Sets the save data pointer response.

① Panel display

S	A	V	E		D	A	T	A		P	T	R							

← Pressing the  and  keys scrolls the items.

↑
Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Contents of display

No.	Message displayed	Description
1	NOTHING (default)	The save data pointer does not respond to anything.
2	AFTER DATA & CMD	The save data pointer responds after the data and command phases.
3	ONLY AFTER DATA	The save data pointer responds only after the data phase.
4	ONLY AFTER CMD	The save data pointer responds only after the command phase.

(10) Sets the host block size.

① Panel display

H	O	S	T		B	L	K		S	I	Z	E						

← Pressing the  and  keys scrolls the items.

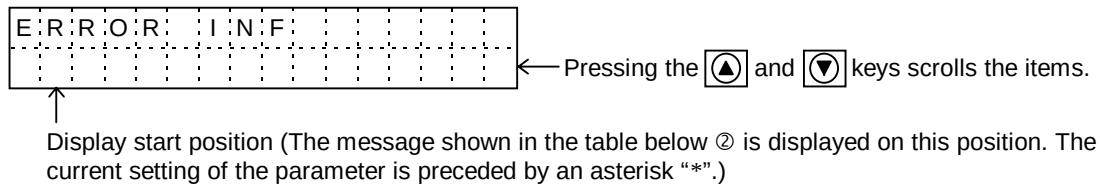
↑
Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Contents of display

No.	Message displayed	Description
1	512BYTES (default)	512 bytes per block
2	520BYTES	520 bytes per block
3	1024BYTES	1024 bytes per block

(11)Sets the RS232C error information outflow mode.

① Panel display

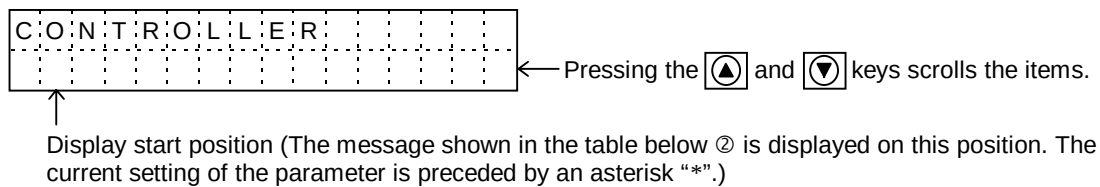


② Contents of display

No.	Message displayed	Description
1	ON (NORMAL)	Does not inhibit outflow of information. Outputs only the fault messages.
2	ON (HITRACK)	Does not inhibit outflow of information. Displays the fault messages and the normal status of the unit.
3	OFF (default)	Inhibits outflow of information.

(12)Sets the controller type.

① Panel display

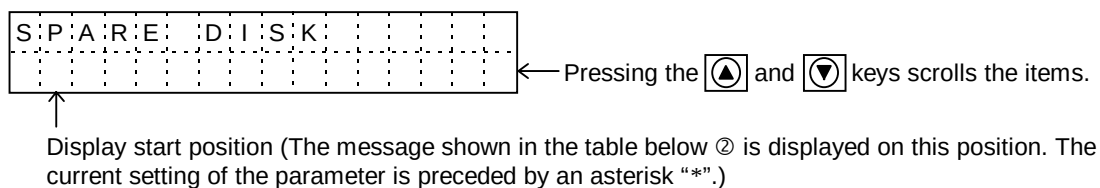


② Contents of display

No.	Message displayed	Description
1	DESKTOP	Desktop (DK) type.
2	MINI TOWER	Mini tower (MK) type.
3	DKH	Desktop (DKH) type.
4	RACK MOUNT	Rack mount (RK) type.
5	HIGH RACK MOUNT	Rack mount (RKH) type.
6	CABINET, WRACK	Cabinet (CK) type, Rack mount (RKWH) type.

(13)Sets whether or not the spare disk is mounted.

① Panel display

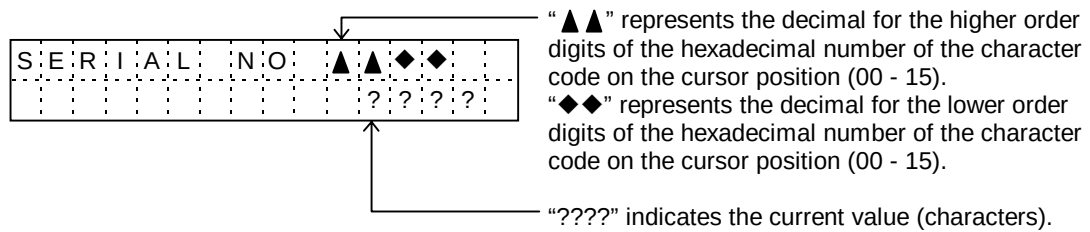


② Contents of display

No.	Message displayed	Description
1	EXISTENCE (default)	Spare disk is mounted.
2	NOTHING	Spare disk is not mounted.

(14) Sets the controller serial No.

① Panel display

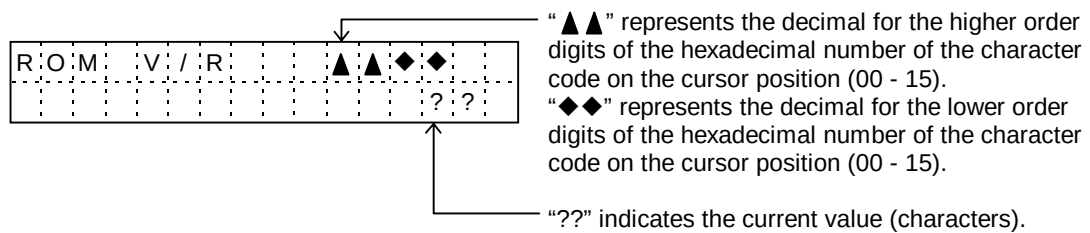


② Key and other operations

- Using the and keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the initial menu.

(15) Sets the version of the ROM microprogram.

① Panel display

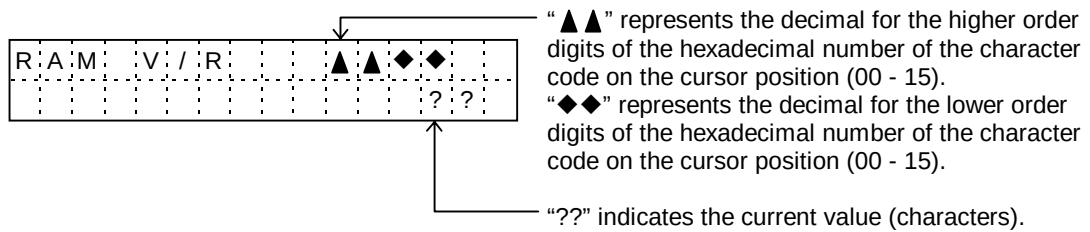


② Key and other operations

- Using the and keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the initial menu.

(16) Sets the version of the RAM microprogram.

① Panel display

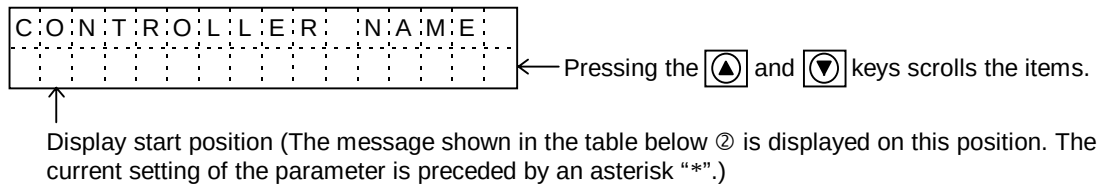


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the initial menu.

(17) Sets the controller identifier

① Panel display

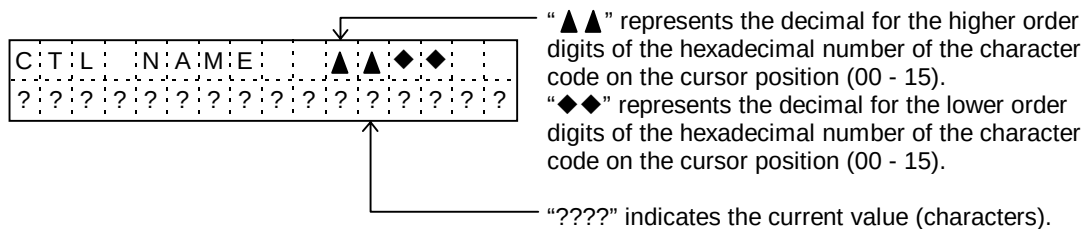


② Contents of display

No.	Message displayed	Description
1	DISABLE	Does not set the controller identifier.
2	ENABLE	Sets the controller identifier.

When selecting the “ENABLE”, the panel display changes to the one shown below and then the controller identifier setting operation starts.

③ Panel display



④ Key and other operations

- Using the and keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the initial menu.

(18)Sets the last LBA information.

① Panel display

R	O	W	L	A	S	T	L	B	A						

← Pressing the  and  keys scrolls the items.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”).

② Contents of display

No.	Message displayed	Description
1	ROW#0	Sets the last LBA of the ROW0.
2	ROW#1	Sets the last LBA of the ROW1.
3	ROW#2	Sets the last LBA of the ROW2.
4	ROW#3	Sets the last LBA of the ROW3.
5	QUIT	Returns to the initial menu.

③ The range that can be set depends on the controller type setting.

Desktop : Only the ROW0

Mini tower : Only the ROW0

Rackmount (small) : ROW0 - 1

Rackmount (standard) : ROW0 - 1

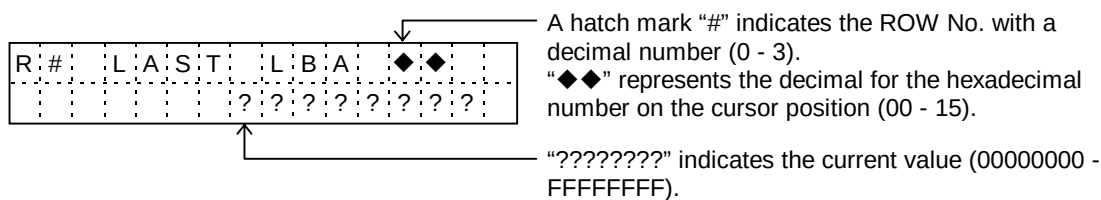
Cabinet : ROW0 - 3

Rackmount (large capacity) : ROW0 - 3

No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A2E8	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

(18-1) Sets the last LBA for each ROW.

① Panel display

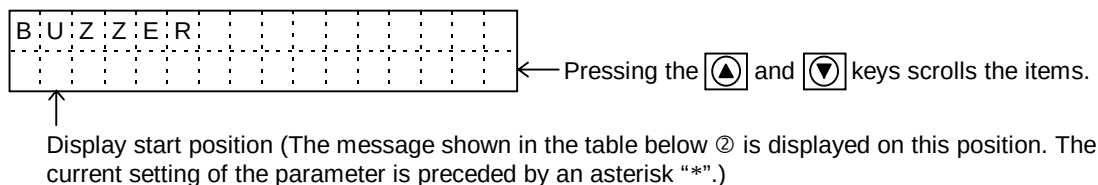


② Key and other operations

- Using the and keys changes the cursor position.
- Enter the two decimal digits into “◆◆”. The input result is immediately reflected on the cursor position as a hexadecimal number.
- Press the key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the last LBA information setup menu.

(19) Sets whether or not the buzzer sounds.

① Panel display

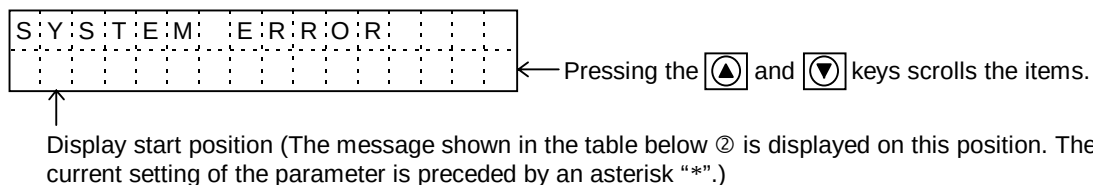


② Contents of display

No.	Message displayed	Description
1	ENABLE (default)	The buzzer sounds if a failure occurs.
2	DISABLE	The buzzer does not sound even if a failure occurs.

(20) Shutdown the system if a system error (CHK1) occurs.

① Panel display

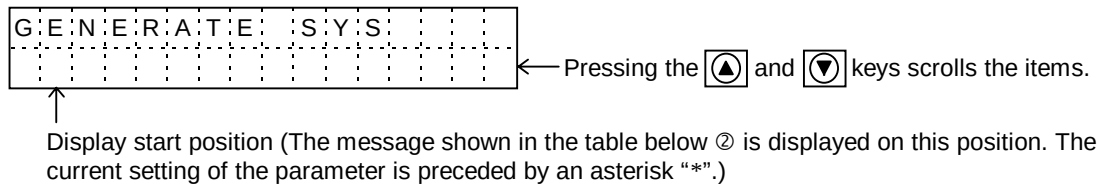


② Contents of display

No.	Message displayed	Description
1	SYSTEM DOWN	Shutdown the system.
2	AUTO RESET (default)	Automatically resets the system.

(21) Sets the startup subsystem generation.

① Panel display

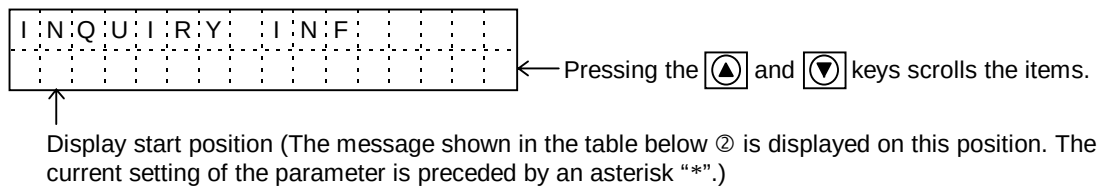


② Contents of display

No.	Message displayed	Description
1	NEW SYSTEM (default)	Starts up the new subsystem.
2	OLD SYSTEM	Starts up the old subsystem.

(22) Sets the INQUIRY response information.

① Panel display

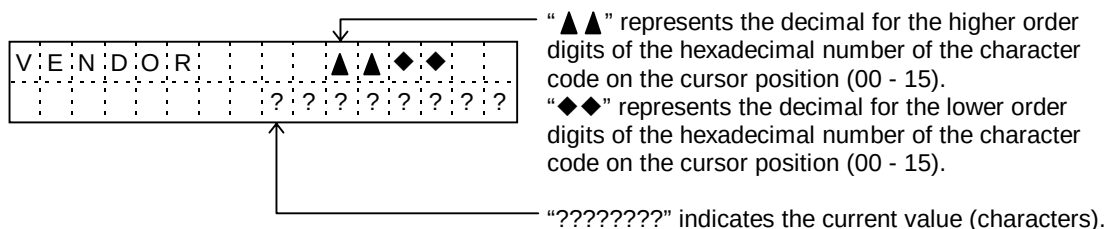


② Contents of display

No.	Message displayed	Description
1	VENDOR TYPE	Sets the vendor type information.
2	PRODUCT TYPE	Sets the product type information.
3	COMMAND QUEUING	Sets the command queuing mode.
4	QUIT	Returns to the initial menu.

(22-1) Sets the vendor type information.

① Panel display

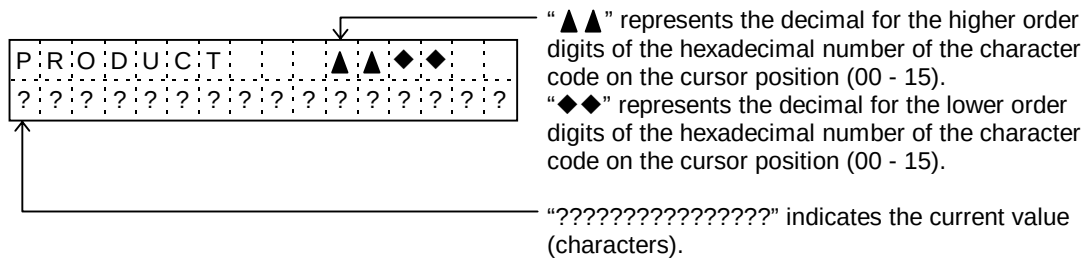


② Key and other operations

- Using the [Left] and [Right] keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into “▲▲◆◆”. The input result is immediately reflected on the cursor position in characters.
- Press the [ENT] key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the INQUIRY response information setup.
- Setting the “0x00” (NULL) or “0x20” (space) for the first character returns to the default.

(22-2) Sets the product type information.

① Panel display

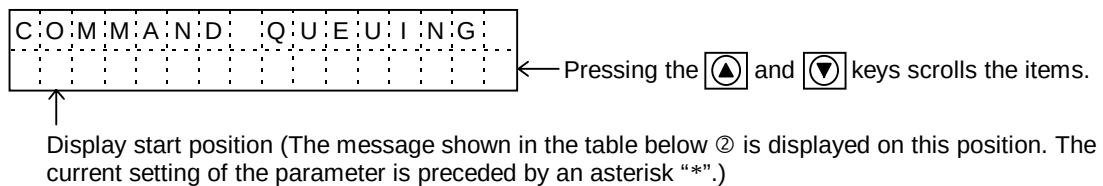


② Key and other operations

- Using the and keys changes the cursor position.
- Enter the two decimal digits representing the two-digit hexadecimal number into "▲▲◆◆". The input result is immediately reflected on the cursor position in characters.
- Press the key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the INQUIRY response information setup.
- Setting the "0x00" (NULL) or "0x20" (space) for the first character returns to the default.

(22-3) Sets the command queuing mode.

① Panel display



② Contents of display

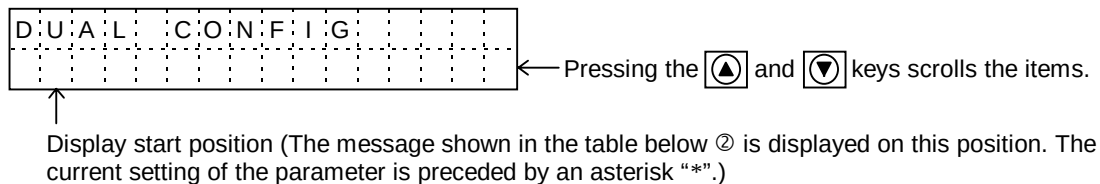
No.	Message displayed	Description
1	ON (default)	Standard INQUIRY data CmdQue = 1
2	OFF	Standard INQUIRY data CmeQue = 0

③ Key and other operations

- Setting the input value returns to the INQUIRY response information setup.

(23) Sets the dual operation attribute.

① Panel display

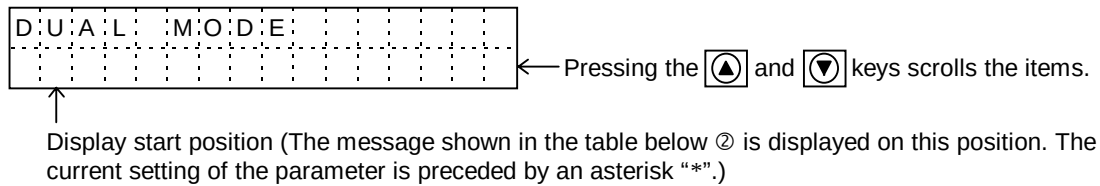


② Contents of display

No.	Message displayed	Description
1	SINGLE MODE (default)	Operates in the single mode.
2	DUAL MODE	Sets the dual type individual attribute.

(23-1) Sets the dual type individual attribute.

① Panel display

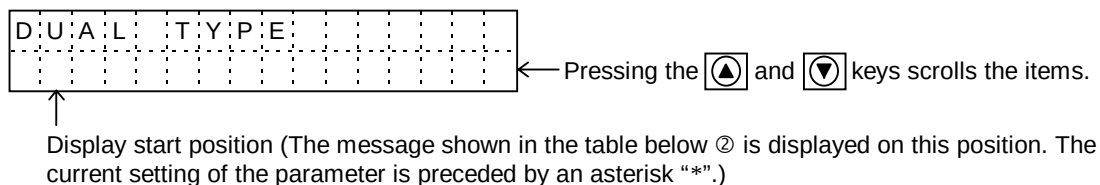


② Contents of display

No.	Message displayed	Description
1	DUAL TYPE (default)	Sets the dual type attribute.
2	DATA SHARE	Sets the data share operation attribute.
3	QUIT	Returns to the initial menu.

(23-2) Sets the dual type attribute.

① Panel display

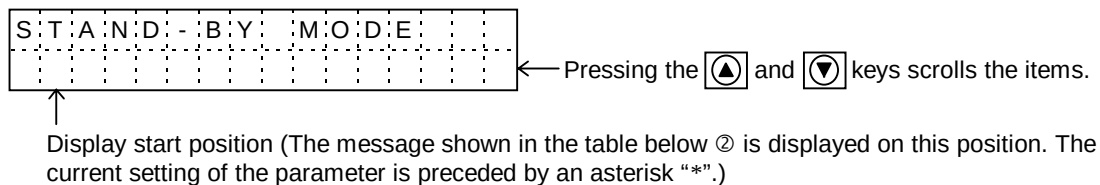


② Contents of display

No.	Message displayed	Description
1	DUAL ACTIVE (default)	Operates in the dual active mode.
2	HOT STAND-BY	Operates in the hot standby mode. Sets the standby mode.

(23-3) Sets the standby mode.

① Panel display

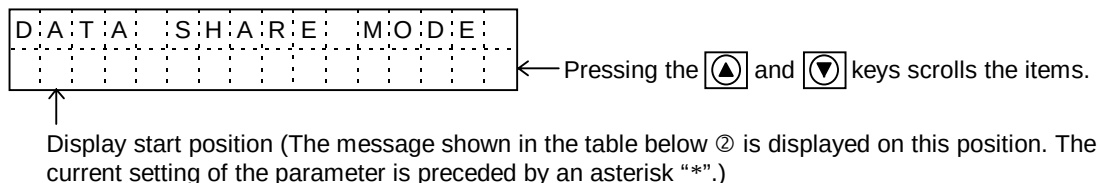


② Contents of display

No.	Message displayed	Description
1	CONNECT HOST (default)	The standby controller responds to the standby selection.
2	NOT CONNECT	The standby controller does not respond to the standby selection.

(23-4) Sets the data share operation attribute.

① Panel display



② Contents of display

No.	Message displayed	Description
1	OFF (default)	Data share feature is disabled.
2	ON	Data share feature is enabled.

(24)Sets the LU size reported to the host.

① Panel display

L	U		S	I	Z	E													



Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”.)

② Contents of display

No.	Message displayed	Description
1	AUTO ADJUST (default)	The LU size reported to the host is automatically determined by the subsystem.
2	NON ADJUST	Make the LU size reported to the host be the same value as that input to the panel.

(25)Sets the transfer rate control information.

① Panel display

S	Y	N	C	C	O	N	T	R	O	L						

← Pressing the  and  keys scrolls the items.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”).

② Contents of display

No.	Message displayed	Description
1	STANDARD	Automatically determines the transfer rate.
2	MANUAL	Sets the upper limit of the transfer rate manually. Sets the transfer rate manually.

(25-1) Sets the transfer rate manually.

① Panel display

[illegible]

← Pressing the  and  keys scrolls the items.

② Contents of display

No.	Message displayed	Description
1	ASYNCR	Transfers asynchronously.
2	5 (10) MB/S	The upper limit is 5 (10) MB per second.
3	10 (20) MB/S (default (*1))	The upper limit is 10 (20) MB per second.
4	13 (26) MB/S (*3)	The upper limit is 13.3 (26.6) MB per second.
5	20 (40) MB/S (default (*2)) (*3)	The upper limit is 20 (40) MB per second.

***1** When the single-ended board is mounted.

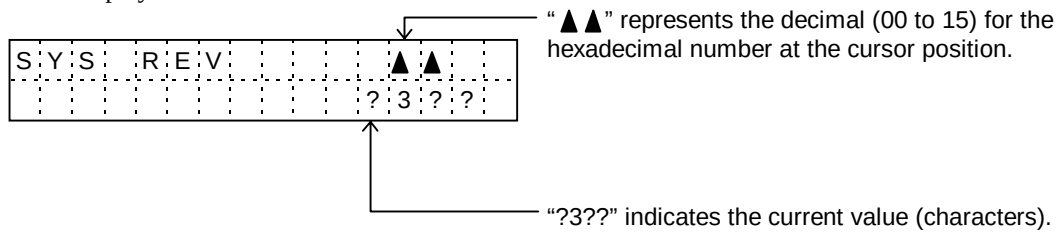
***2** When the differential board is mounted.

*3 This is not displayed when the single-ended board is mounted.

*4 The values in parenthesis are for transferring data of 16 bit width.

(26)Sets the system revision.

① Panel display

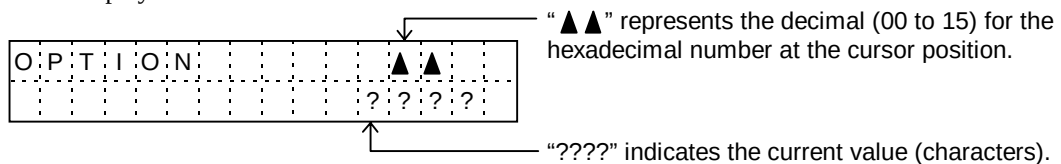


② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter a number of two decimal digits in place of “▲▲”. The input result is immediately reflected at the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the initial menu.
- The second character from the head, that is, “3” is unchangable.

(27)Sets the option code.

① Panel display



② Key and other operations

- Using the  and  keys changes the cursor position.
- Enter a number of two decimal digits in place of “▲▲”. The input result is immediately reflected at the cursor position as a hexadecimal number.
- Press the  key to defines the entire input value.
- If the entered value is invalid, the previous value is displayed again.
- Setting the input value returns to the initial menu.

(28) Displays the boot program version.

① Panel display

F	I	X	E	D				▲	▲	▲	▲	▲	▲
C	H	G	A	B	L	E		◆	◆	◆	◆	◆	◆

② Key and other operations

- ▲▲▲▲▲▲ : Indicates the fixed program version.
◆◆◆◆◆◆ : Indicates the variable program version.

(a) Pressing the  key returns to the initial menu.

(29) Sets the internal clock.

① Panel display

D	A	T	A		Y	Y	-	M	M	-	D	D	(	W	)
T	I	M	E		H	H	:	m	m	:	S	S			

← Pressing the  and  keys scrolls the items.

② Contents of display

No.	Message displayed	Description
1	DATA YY-MM-DD (W)	YY : Year (No limitation), MM : Month (01 - 12), DD : Date (01 - 31), W : Day of the week (1 - 7) ^{*1}
2	TIME HH:mm-SS	HH : Hour (00 - 23), mm ; Minute (00 - 59), SS : Second (00 - 59)
3	SET	Defaines the input value
4	QUIT	Cancel the input value.

- (a) Using the  and  keys changes the cursor position.
(b) “SET” defines the input value. “QUIT” cancel the input value.

^{*1} The setting of the day of the week is as follows:
1 : Sunday 2 : Monday 3 : Tuseday 4 : Wednesday 5 : Thursday
6 : Friday 7 : Saturday

3.3 Configuration Information (SVP) Setting

The configuration information (SVP) function can be executed from the panel when the controller is in the ready status.

The menu items and their usage are as follows.

No.	Menu item	Usage	Description	Factory setting
1	RAID CONFIG	References/sets the RAID configuration information.	① References the RAID. ② Defines the RAID group. ③ Deletes the RAID group.	
2	LU CONFIG	References/sets the LU configuration information.	① References the LU configuration information. ② Defines the LU. ③ Deletes the LU. ④ Formats the LU. ⑤ Changes the controller for the LU.	
3	SYSTEM OPT (CUR)	Sets the system option. (current value only)	① Disk restore execution mode. ② Copy back restore mode. ③ Correction copy restore mode. ④ Setting of the dynamic sparing starting mode. ⑤ Sets the interval for restoring. ⑥ Sets the amount of data per disk recovery processing. ⑦ Sets the online verify. ⑧ Sets the idling time.	
	SYSTEM OPT (SVD)	Sets the system option. (saved value and current value)	① Disk restore execution mode. ② Copy back restore mode. ③ Correction copy restore mode. ④ Setting of the dynamic sparing starting mode. ⑤ Sets the interval for restoring. ⑥ Sets the amount of data per disk recovery processing. ⑦ Sets the online verify. ⑧ Sets the idling time. ⑨ Sets the job timeout. ⑩ Sets the number of detection during reselection timeout execution. ⑪ Sets the trespass mode. (*1)	
4	DRIVE MAINT	Maintains the disk.	① Specifies to lock the disk. ② Specifies to restore the disk. ③ References the disk restore condition. ④ Disk self-diagnostic. ⑤ Checks the parity compatibility. ⑥ ECC check. ⑦ LA check. ⑧ Formats the disk. ⑨ Restores the system information. ⑩ Reference of the disk failure statistical information.	
5	MICRO VER/REV	References the microprogram version/revision No.	① References the microprogram version/revision.	
6	GATHERING (CTL0)	Collects the information of the controller No.0 in the dual system configuration to the floppy disk.	① Outputs the dump data stored in the disk to the floppy disk. ② Outputs the trace information stored in the disk to the floppy disk. ③ Outputs the trace information in the memory to the floppy disk.	
7	GATHERING (CTL1)	Collects the information of the controller No.1 in the dual system configuration to the floppy disk.	① Outputs the dump data stored in the disk to the floppy disk. ② Outputs the trace information stored in the disk to the floppy disk. ③ Outputs the trace information in the memory to the floppy disk.	
8	MEMORY MAINT	References/updates the memory contents.	① References/updates the memory contents.	

*1 This menu is displayed only when ALTERNATE PATH3 has been set for SPECIAL CONNECT of the system parameter.

No.	Menu item	Usage	Description	Factory setting
9	RECV ERR INFO	Displays a failure during online recovery.	Displays a failure during online recovery.	
10	PIN INFO	Displays whether or not the PIN data exists for each LU.	Displays whether or not the PIN data exists.	
11	WARNING INFO	Displays the warning message which is not yet recovered.	Displays only the warning information at the moment.	
12	CLEAR LOG (CT0) CLEAR LOG (CT1)	Clears the statistics.	Clears the statistics related to the controller and the host.	
13	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

3.3.1 SVP operation procedure

Procedure 1 : Starts the SVP operation

Press  key when the controller is in the ready status.

The following message is displayed on the panel.

S	V	P		F	U	N	C	T	I	O	N				
(	T	E	R	M	I	N	A	T	E	(	S	V	P	)	

← Indicates that the SVP operation is started.
← The first menu item is displayed.

Procedure 2 : Selects the menu item

Press  key once to display the next menu item. Continue pressing this key until you get to the menu item desired.

S	V	P		F	U	N	C	T	I	O	N				
S	Y	S	T	E	M		O	P	T	(	C	U	R	)	

↓ 

S	V	P		F	U	N	C	T	I	O	N				
S	Y	S	T	E	M		O	P	T	(	S	V	D	)	

↓ 

The menu items is displayed in the order described in Section 2.2.

Procedure 3 : Determines the menu item

When the desired menu item is displayed, press the  key.

Now, you can set the parameter for this menu item.

S	V	P		F	U	N	C	T	I	O	N				
S	Y	S	T	E	M		O	P	T	(	S	V	D	)	

↓ 

Procedure 4 : Operation for the menu item

Perform the operation described in Subsection 3.3.2 and after.

Procedure 5 : Terminates the SVP operation

The following message is displayed by repeatedly pressing the  key on the menu item selection. Now, press the  key to terminate the SVP operation.

S	V	P		F	U	N	C	T	I	O	N				
(	T	E	R	M	I	N	A	T	E		S	V	P	)	

↓ 

V	E	R	/	R	E	V		X	X	X	X	X	X		
(	Q	U	I	T	)										

3.3.2 Configuration information (SVP) setting

(1) RAID configuration information reference/setup menu.

① Panel display

[illegible]

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	REFER	References the RAID configuration information.
2	INSTITUTE	Adds the RAID group.
3	DELETE	Deletes the RAID group.
4	(QUIT)	Returns to the previous menu (SVP function selection menu).

(1-1) References the RAID configuration information.

① Panel display (RAID definition information)

[illegible]

← “■” : RAID group No.

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line (If the RAID is defined)

No.	Message displayed	Description
1	RAID0	RAID level.
	RAID1	
	RAID5	
	RAIDA	
2	PORT = ■, WIDTH = ■	Port No., width.
3	ROW = ■, DEPTH = ■	Row No., depth.

③ Contents of display on the second line (If the RAID is defined)

No.	Message displayed	Description
1	NOT DEFINED	Indicates that the RAID is not defined.

④ Panel display (spare disk information).

S	P	A	R	E	D	I	S	K

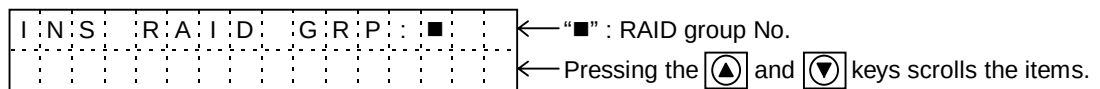
← Pressing the  and  keys scrolls the items.

⑤ Contents of display on the second line

No.	Message displayed	Description
1		Indicates whether or not the spare disk is mounted.
	PORT = ■, ROW = ■	Port and row No.s when the spare disk is mounted.
	NOT EXIST	Message indicating whether or not the spare disk is mounted.
2		Condition when the spare disk is mounted.
	NOT USED	Unused status (the recovered data is not maintained.)
	USED BY P■, R■	The recovered data is maintained for the disk which is indicated with the port and row No.s.
3	(QUIT)	Returns to the previous menu (RAID function selection menu).

(1-2) Adds the RAID group.

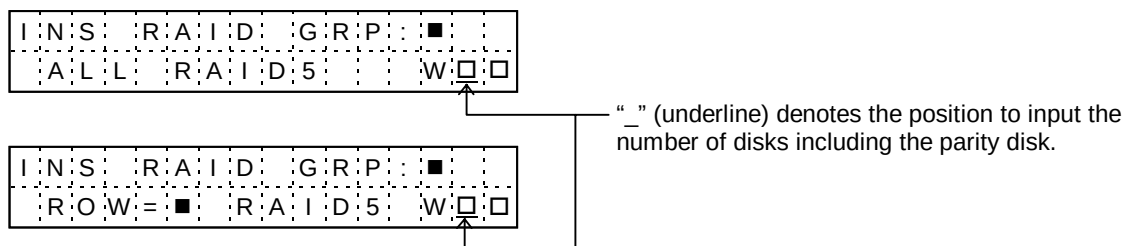
① Panel display



② Contents of display on the second line

No.	Message displayed	Description
1	ALL RAID5 W□□	Defines the maximum configuration range (ports and rows) for the units being used as the RAID5, RAID1, RAID0 or RAID A group.
2	ALL RAID1	
3	ALL RAID0	
4	ALL RAID A	
5	ROW = ■ RAID5 W□□	Defines the row “■” as the RAID5, RAID1, RAID0 or RAID A group.
6	ROW = ■ RAID1	
7	ROW = ■ RAID0	
8	ROW = ■ RAID A	
9	(QUIT)	Returns to the previous menu (RAID function selection menu).

When RAID5 is selected, a number of disks including the parity disk must be input. (This operation is required when the version of Micro_Disk is 0305 or later. When the version is 0304** (** is optional) or earlier, the following operation is not required and the disks are configured as 4 data disks and 1 parity disk irrespective of the operation.)



Relations between the input values and the RAID configurations are shown below.

Input value	RAID configuration	Remarks
00	Input rejection	When the value on the left is input and the key is pressed, “#REENTER” is displayed.
01		
02		
03	2 data disks + 1 parity disk	
04	3 data disks + 1 parity disk	
05	4 data disks + 1 parity disk	
06 or more	Input rejection	When the value on the left is input and the key is pressed, “#REENTER” is displayed.

If “REENTER” is displayed, input the number of the disks again.

③ Key and other operations

Selecting the pattern to be added (by displaying the desired pattern on the second line and pressing the  key) switches to the following display for confirming the contents before actually adding the RAID group.

I N S ■ ■ ■ R A I D n ?

← “■■■” = “ALL” or “R = m” (m : Row No.)

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	YES	Adds the RAID group.
2	(QUIT)	Returns to the previous menu (pattern selection menu) without adding the RAID group.

Accepting the acknowledgment switches to the following display to notify that the RAID group is being added.

I N S ■ ■ ■ R A I D n

← “■■■” = “ALL” or “R = m” (m : Row No.)

E X E C U T I N G

Completion of adding the RAID switches to the following display.

I N S R A I D n C M P #

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the RAID function selection menu.

- (1-3) Deletes the RAID group.

① Panel display

[illegible]

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	ALL RAID	Deletes all the RAID groups.
	RG■ (RAID■)	Deletes the specified RAID group. RAID group No. (RG■) and RAID level (RAID■).
	#NO EFFECT	The RAID group that can be deleted does not exist.
2	(QUIT)	Returns to the previous menu (RAID function selection menu).

- (1-3.1) Deletes all the RAID groups.

① Panel display

[illegible]

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (RAID function selection menu).
2	YES	Deletes all the RAID groups.

Accepting the deleting all the RAID groups switches to the following display to notify that all the RAID groups are being deleted.

D	E	L	A	L	L	R	A	I	D				
E	X	E	C	U	T	I	N	G					

Completion of deletion switches to the following display.

D	E	L	R	A	I	D	C	M	P		#

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (RAID function selection menu).

(1-3.2) Deletes the specified RAID group.

① Panel display

[illegible]

← “■” : RAID group No.

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (RAID function selection menu).
2	YES	Deletes the specified RAID group.

Accepting the deleting all the RAID groups switches to the following display to notify that all the RAID groups are being deleted.

[illegible]

← Pressing the  and  keys scrolls the items.

Completion of deletion switches to the following display.

[illegible]

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (RAID function selection menu).

(2) LU configuration information reference/setup menu.

(For the dual system)

① Panel display

[illegible]

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	REFER	References the LU configuration information.
2	INSTITUTE	Adds the LU for the single system or dual system (hot standby).
3	INSTITUTE (CTL0)	Adds the LU as the controller No.0 for the dual system (dual active).
4	INSTITUTE (CTL1)	Adds the LU as the controller No.1 for the dual system (dual active).
5	DELETE	Deletes the LU.
6	FORMAT	Formats the LU.
7	CTLCHG	Changes the default controller for the LU.
8	(QUIT)	Returns to the previous menu (SVP function selection menu).

Note : For the single system and dual system (hot standby), No.2 is displayed. For the dual system (dual active), No.s 3 and 4 are displayed.

No.7 “CTLCHG” is only displayed for the dual system (dual active).

For adding the LU in No.2 or 3, see the “LU Setup” (CK-INST0600) and select the correct controller No.

(2-1) References the LU configuration information.

① Panel display

L	U		(		)	C	D

-“■ ■” : LU No., “▲ ▲” : Target ID
 (If the target ID is not defined, “XX” is displayed.)
 “C◆” : Current controller No.
 “D◆” : Default controller No.

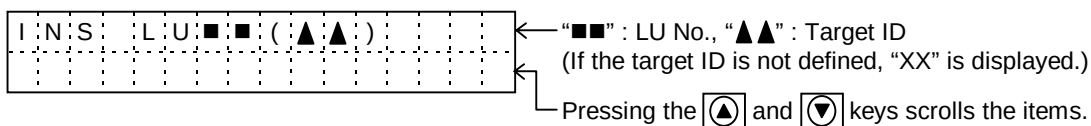
- Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	RAID (GP = ■, LV = ■)	RAID group No. and RAID level.
2	START P = ■, R = ■	Port No. and row No. of the disk to be started.
3	CAPA = ■■■■■■■■■■	Capacity.
4	STAGING = ■■■■■	Amount of pre-read staging.
5		LU status.
	ST-UNFORMAT	Not formatted.
	ST = NORMAL	Normal.
	ST = DETACHED	Detached.
	ST = REGRESSED	Regressed.
6	(QUIT)	Returns to the previous menu (LU function selection menu).

(2-2) Adds the LU.

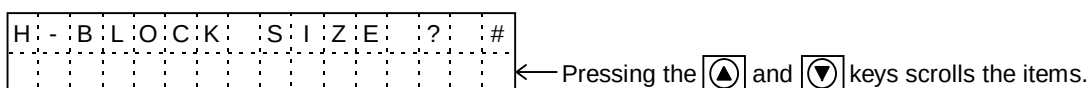
① Panel display



② Contents of display on the second line

No.	Message displayed	Description
1	G = 0 ALL CAPA.	Defines all the free capacities in the RAID group as the target LU (displayed on the first line). Or, defines the LU having the specified capacity in the RAID group. Specifies the capacity in a decimal.
	G = 0 C = □□□□□□□□	
	G = 1 ALL CAPA.	
	G = 1 C = □□□□□□□□	
	G = 2 ALL CAPA.	
	G = 2 C = □□□□□□□□	
	G = 3 ALL CAPA.	
2	G = 3 C = □□□□□□□□	Returns to the previous menu (LU function selection menu).
	(QUIT)	

③ Panel display (Specifies the host block length.)



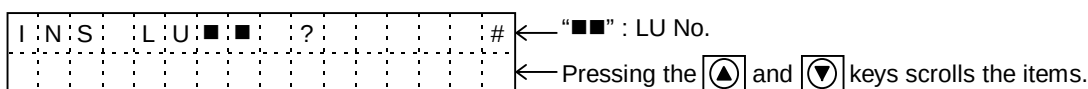
④ Contents of display on the second line

No.	Message displayed	Description
1	512B	Selects the host block length.
	520B	
	1024B (*1)	
2	(QUIT)	Returns to the previous menu (LU function selection menu).

*1 This function can be used in Micro_Disk_Ver.0304 or later.

⑤ Key and other operations

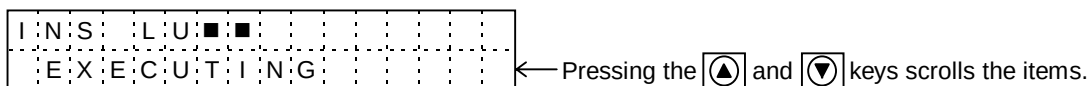
Selecting the host block length switches to the following display for confirming the contents before actually adding the LU.



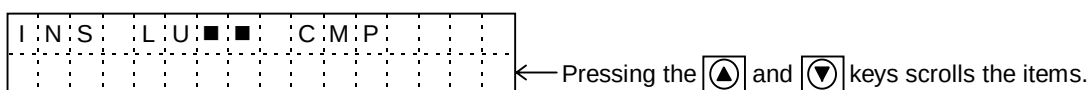
Contents of display on the second line

No.	Message displayed	Description
1	YES	Adds the LU.
2	(QUIT)	Returns to the pattern selection menu.

Accepting the acknowledgment switches to the following display to notify that the LU is being added.



Completion of adding the LU switches to the following display.



Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the LU function selection menu.

(2-3) Deletes the LU.

① Panel display

D	E	L	E	T	E														

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	ALL LU	Deletes all the LUs.
	LAST LU■■ (▲▲)	Deletes the last LU. LU No., target ID.
	#NO EFFECT	The LU to be deleted does not exist.
2	(QUIT)	Returns to the previous menu (LU function selection menu).

(2-3.1) Deletes all the LUs.

① Panel display

D	E	L		A	L	L		L	U		?								

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (LU function selection menu).
2	YES	Deletes all the LUs.

③ Key and other operations

Accepting the acknowledgment switches to the following display to notify that all the LUs are being deleted.

D	E	L		A	L	L		L	U										
				E	X	E	C	U	T	I	N	G							

Completion of deletion switches to the following display.

D	E	L		L	U		C	M	P										

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (LU function selection menu).

(2-3.2) Deletes the last LU.

① Panel display

D	E	L		L	U		■	■		?									

← "■" : LU No.

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (LU function selection menu).
2	YES	Deletes the last LU.

③ Key and other operations

Accepting the acknowledgment switches to the following display to notify that the last LU is being deleted.

D	E	L		L	U	■	■										
E	X	E	C	U	T	I	N	G									

Completion of deletion switches to the following display.

D	E	L		L	U	■	■		C	M	P						

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (LU function selection menu).

(2-4) Formats the LU.

① Panel display

F	O	R	M	A	T		L	U									

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	LU■■ (▲▲) C◆ : FORM	The LUN defined and format status (FORM : Formatted, UNFM : Not formatted). “■■” indicates the LU No. and “▲▲” the target ID. (Displays “XX” if the target ID is not defined.) “C◆” : Controller No.
	LU■■ (▲▲) C◆ : UNFM	
2	(QUIT)	Returns to the previous menu (LU function selection menu).

③ Key and other operations

Selecting the LU to be formatted switches to the following display for confirming the contents before actually formatting the LU.

F	O	M	T		L	U	■	■									

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (LU function selection menu) without formatting the LU.
2	YES	Formats the LU.

Accepting the acknowledgment switches to the following display to notify that the LU is being formatted.

F	O	M	T		L	U	■	■									
E	X	E	C	U	T	I	N	G									

Completion of formatting the LU switches to the following display.

F	O	R	M	A	T		A	B	O	R	T	E	D					

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(RETRY)	Reexecution of the interchanged LU formatting is started. (However, reexecution is started from the head of the regarding LU.)
2	(QUIT)	Returns to the previous menu (LU function selection menu).

(2-5) Changes the default controller for the LU.

① Panel display

[illegible]

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	LU■■ (▲▲) C#	Changes the default controller for the LU. Controller #0 ----Controller #1 Controller #1 ----Controller #0 C# : Default controller “■■” : LU No., “▲▲” : Target ID (Displays “XX” if the target ID is not defined.)
2	(QUIT)	Returns to the previous menu (LU function selection menu).

③ Key and other operations

Selecting the LU and its controller (by displaying them on the second line) switches to the following display for confirming the contents before changing.

[illegible]

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	YES	Changes the default controller for the LU.
2	(QUIT)	Returns to the previous menu (LU function selection menu) without changing the default controller for the LU.

Accepting the changing the default controller for the LU switches to the following display to notify that the controller is being changed.

[illegible]

Completion of changing the default controller for the LU switches to the following display.

[illegible]

← Pressing the  and  keys scrolls the items.

Note : Power on/off operation is needed to validate the change of the controller for the LU.

(3) System option setup menu.

① Panel display

①-1 Setting only the current value

S	Y	S	T	E	M	O	P	T	(	C	U	)

← Pressing the  and  keys scrolls the items.

①-2 Setting the saved value and the current value

S	Y	S	T	E	M	O	P	T	(	S	V	)

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	RECOVERY MODE	Sets the disk recovery execution mode.
2	COPYBACK MODE	Sets the copy-back is automatically started.
3	CORRECTION MODE	Sets the correction copy is automatically started.
4	DYNAMIC SPARE	Sets the dynamic sparing starting mode.
5	INTERVAL TIME	Sets the interval time.
6	RECOVERY UNIT	Sets the amount of data per disk recovery processing.
7	ONLINE VERIFY	Sets the online verify.
8	IDLING TIME	Sets the idling time.
9	JOB TIMEOUT (*1)	Sets the job timeout.
10	RESEL TIMEOUT (*1)	Sets the number of detection during reselection timeout execution.
11	TRESPASS MODE (*2)	Sets the trespass mode.
12	(QUIT)	Returns to the previous menu (SVP function selection menu).

*1 : For the item No.8 “JOB TIMEOUT” and item No.9 “RESEL TIMEOUT”, only the “SYSTEM OPT (SV)” is displayed.

*2 : Item No. “TRESPASS” is displayed only when ALTERNATE PATH3 has been set for SPECIAL CONNECT of the system parameter.

(3-1) Sets the disk recovery execution mode.

① Panel display

RECOVERY MODE

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	BACK. (ONLINE)	Sets the background mode for online recovery. (*1)
2	BACK. (FORCED)	Sets the background mode for forced recovery.
3	INTER. (ONLINE)	Sets the interleave mode for online recovery. (*1)
4	INTER. (FORCED)	Sets the interleave mode for forced recovery.
5	(QUIT)	Returns to the previous menu (system option setup menu).

*1 Even when selecting “ONLINE”, the same operation as selecting “FORCED” is performed.

③ Key and other operations

Operation	Panel display
Selecting the “RECOVERY MODE” from the system option menu switches to the following display.	RECOVERY MODE * BACK. (ONLINE) Indicates that the default is the “background mode for online recovery”.
For changing the mode to the “background mode for forced recovery”, use the  key to display an item.	RECOVERY MODE BACK. (FORCED)
Pressing the  key changes the mode. When the mode is changed successfully, “#COMPLETE” is displayed.	# COMPLETE * BACK. (FORCED) An asterisk “*” is also displayed because the default is set to the “background mode for forced recovery”.
Press the  key to terminate the processing (to select “QUIT”). Pressing any key displays the menu title again.	RECOVERY MODE (QUIT) Pressing the  key returns to the system option menu.

(3-2) Sets the copy-back is automatically started.

① Panel display

C	O	P	Y	B	A	C	K		M	O	D	E					

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	AUTOMATICALLY	Copy-back is automatically started.
2	NOT AUTOMATIC.	Copy-back is not automatically started.
3	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Same as the item (3-1).

(3-3) Sets the correction copy is automatically started.

① Panel display

C	O	R	R	E	C	T			M	O	D	E					

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	AUTOMATICALLY	Correction copy is automatically started.
2	NOT AUTOMATIC.	Correction copy is not automatically started.
3	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Same as the item (3-1).

(3-4) Sets the dynamic sparing starting mode.

① Panel display

D	Y	N	A	M	I	C			S	P	A	R	E				

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	R/W ONV EXECUTE	Ordinarily starts the dynamic sparing by Read/Write and the online verify.
2	R/W EXECUTE	Ordinarily starts the dynamic sparing by Read/Write only.
3	NOT EXECUTE	Does not start the dynamic sparing.
4	(QUIT)	Returns to the previous menu screen.

③ Key and other operations

Same as the item (3-1).

(3-5) Sets the interval time.

① Panel display

I	N	T	E	R	V	A	L	T	I	M	E

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	□□□ × 10ms	Specifies the interval time in the interleave mode or the startup determination time in the background mode using a number between 0 and 255. "□□□" indicates the current value.
2	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Use the , , and number keys to specify the numerical value while the data in the item No.1 is being displayed. (The cursor wraps around within the range of "□□□".) Then, press the  key to define the input value. (If the input value is invalid, prompts to reenter a value.)

(3-6) Sets the amount of data per disk recovery processing.

① Panel display

R	E	C	O	V	E	R	Y	U	N	I	T

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	□□□□ Blocks	Specifies the value regarding 512bytes as 1 for the amount of data per disk recovery processing. The value shall be a multiple of 32 within the range from 32 to 65504. "□□□□" indicates the current value.
2	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Same as the item (3-5) ③.

(3-7) Sets the online verify.

① Panel display

O	N	L	I	N	E	V	E	R	I	F	Y

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	EXECUTE	The online verify is done.
2	NOT EXECUTE	The online verify is not done.
3	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Press the  or  key to select an item. Then, press the  key.
The current selection is preceded by an asterisk "※".

(3-8) Sets the idling time.

① Panel display

[illegible]

② Contents of display on the second line

No.	Message displayed	Description
1	DEFAULT (10sec)	Sets the default time (10 seconds).
2	□□ seconds	Specifies a time other than the default within the range from 1 (01) to 30. “□□” indicates the current value. “00” is indicated in “□□” for the default.
3	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Same as the item (3-5) ③.

(3-9) Sets the job timeout.

① Panel display

[illegible]

② Contents of display on the second line

No.	Message displayed	Description
1	STANDARD (9s)	Sets 9 seconds for the job timeout.
2	EXTENSION (28s)	Sets 28 seconds for the job timeout.
3	SPECIAL (60s)	Sets 60 seconds for the job timeout.
4	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Press the  or  key to select an item. Then, press the  key.

The current selection is preceded by an asterisk “*”.

(3-10) Sets the number of detection during reselection timeout execution.

① Panel display

R	E	S	E	L
T	I	M	E	O
U	T			

② Contents of display on the second line

No.	Message displayed	Description
1	TWICE	Detaches the disk if reselection timeout is detected twice consecutively.
2	ONCE	Detaches the disk if reselection timeout is detected once.
3	(QUIT)	Returns to the previous menu (system option setup menu).

③ Key and other operations

Press the  or  key to select an item. Then, press the  key.

The current selection is preceded by an asterisk “*”.

(3-11) Sets the TRESPASS MODE.

① Panel display

TRESPASS MODE

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	AUTO TRSPAS	Executes the command ignoring the ownership field.
2	NON AUTO TRSPAS	Determines whether or not to execute the command according to the ownership field.
3	(QUIT)	Returns to the previous menu (debug support menu) screen.

③ Key and other operations

Operation	Panel display
Selecting the "TRESPASS MODE" from the trespass mode setting menu switches the display to the following.	TRESPASS MODE *AUTO TRSPAS Indicates that the default mode is the "Executes the command ignoring the ownership field".
To change the mode to "Determines whether or not to execute the command according to the ownership field", use the  or  key to display the item.	TRESPASS MODE NON AUTO TRSPAS
Pressing the  key changes the item to be selected.	#COMPLETE *NON AUTO TRSPAS An asterisk "*" is displayed because the mode "Determine whether or not to execute the command according to the ownership field" was selected.
Press the  key to terminate the processing. This operation displays "(QUIT)".	TRESPASS MODE (QUIT)
Press the  key.	

(4) Disk maintenance menu.

① Panel display

D	R	I	V	E		M	A	I	N	T	E								

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	DETACH	Specifies to detach the disk.
2	DATA RECOVER	Specifies to start disk recovery.
3	RECOVER STATUS	References the disk recovery condition.
4	SELF-DIAG<0>	Runs self-diagnostics on the disk (mainly, for the controller).
5	SELF-DIAG<1>	Runs self-diagnostics on the disk (for the controller and the disk).
6	PARITY CHECK	Executes the parity check.
7	ECC CHECK	Executes the ECC check.
8	LA CHECK	Executes the LA check.
9	FORMAT (516B)	Formats the 516 bytes of the sector length.
10	FORMAT (524B)	Formats the 524 bytes of the sector length.
11	SYSTEM RECOVER	Recovers the system information.
12	STATISTICS CNT	Reference of the disk failure statistical information.
13	(QUIT)	Returns to the previous menu (SVP function selection menu).

(4-1) Specifies to detach the disk.

① Panel display

D	E	T	A	C	H		D	R	I	V	E							

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	P = ① R = ② : BUSY	The disk that is able to be detached (① : port, ② : row) and its status (BUSY : In use, STDBY : Not used).
	P = ① R = ② : STDBY	
2	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

③ Key and other operations

Selecting the disk you want to detach (by displaying the desired disk on the second line and pressing the  key) switches to the following display for confirming the contents before actually detaching the disk.

D	E	T	A	C	H	(	①	,	②	)		?						

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	YES	Detaches the disk.
2	(QUIT)	Returns to the previous menu (disk maintenance selection menu) without detaching the disk.

Accepting the acknowledgment switches to the following display to notify that the disk is being detached.

D	E	T	A	C	H	(	①	,	②	)								

Completion of detaching the disk switches to the following display.

```
D T C H ( ① , ② ) C M P
```

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the disk maintenance selection menu.

(4-2) Specifies to start disk recovery.

① Panel display

```
D A T A R E C O V E R
```

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	P = ① R = ② : CORREC	The disk to be recovered (① : port, ② : row) and its recovery method (CORREC : Recovery by correction copy, COPY : Recovery by copy-back).
	P = ① R = ② : COPY	
2	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

③ Key and other operations

Selecting the disk you want to detach (by displaying the desired disk on the second line and pressing the  key) switches to the following display for confirming the contents before actually detaching the disk.

```
R C V R ( ① , ② ) ?
```

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	YES	Starts recovering the disk.
2	(QUIT)	Returns to the previous menu (disk maintenance selection menu) without starting to recover the disk.

Accepting the starting disk recovery switches to the following display.

```
R C V R ( ① , ② ) A P T
```

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the disk maintenance selection menu.

(4-3) References the disk recovery condition.

① Panel display

R	E	C	O	V	E	R		S	T	A	T	U	S	

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	DRIVE (①, ②) #####	① : Port No., ② : Row No., ##### : Recovery condition COMP : Recovery completed (Normal) nnn% : Percentage of recovery ABORT : Recovery completed (Abnormal) FORCE : Forced termination of recovery
2	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

(4-4) Runs self-diagnostics on the disk (inhibiting to change the media positioning).

① Panel display

S	E	L	F	-	D	I	A	G	<	0	>			

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	ALL DRIVES	Runs diagnostics on all the disks mounted.
2	P = ① R = ②	Runs diagnostics on the specified disk (① : Port, ② : Row).
3	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

③ Key and other operations

Selecting the disk (menu item) to be diagnosed switches to the following display to notify that the disk is being diagnosed.

D	I	G	O	(	①	,	②	)						
E	X	E	C	U	T	I	N	G						

Completion of diagnostics switches to the following display to indicate the result.

D	I	G	O	(	①	,	②	)	R	E	S			

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	STATUS = 00	The diagnostic result is good.
2	STATUS = rr xxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxx	If the diagnostic result is "Drive Check Condition", displays the code (rr = 02) and the Extended Sense Byte (xx...x) which is sent from the disk. If the diagnostic result is other than "Drive Check Condition", displays the code (rr) and the internal error information (xx...x).
3	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

(4-5) Runs self-diagnostics on the disk (with changing the media positioning).

Same as the item (4-4) for the operation and display format.

(4-6) Parity check.

To execute this operation, LU formatting must be completed. If LU formatting is not completed, this operation cannot be done.

(4-6.1) For the single system.

① Panel display

P	A	R	I	T	Y	C	H	E	C	K										

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	ALL LU	Performs a parity check on all the LUs.
2	LU ■■ (▲▲)	Performs a parity check on the specified LU. (Displays only the LUN defined.) “■■” indicates the LU No. and “▲▲” the target ID in decimal. (Displays “XX” for the target ID not defined.)
3	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

③ Key and other operations

Selecting the LU to be checked switches to the following display to notify that the LU is being checked.

P	R	T	Y	(	L	U	■	■	)											
E	X	E	C	U	T	I	N	G												

Completion of check switches to the following display.

P	R	T	Y	(	L	U	■	■	)	R	E	S								

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	STATUS = NORMAL	All the check results are normal.
2	ERR = ■■■■■■■■	The number of errors indicated by “■■■■■■■■” has been detected. The details about the errors have been output to the floppy disk. If the number of errors exceeds “99999999”, “ERR = *****” is displayed.
3	(QUIT)	Returns to the previous menu (LU selection menu).

(4-9) Formats the disk.

① Panel display

F	O	R	M	A	T	(	■	■	■	B	)

■■■ = "516" or "524"

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	ALL DRIVES	Formats all the disks mounted except the current disk.
2	P = ① R = ② : UNDEF	The disk mounted (① : Port, ② : Row) and its status (UNDEF : Not defined in the RAID configuration, BUSY : In use, STDBY : Not used, DETCH : Detached).
	P = ① R = ② : BUSY	
	P = ① R = ② : STDBY	
	P = ① R = ② : DETCH	
3	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

③ Key and other operations

Selecting the disk (menu item) to be formatted switches to the following display for confirming the disk before actually formatting the disk.

[For all the disks mounted]

F	O	R	M	A	T	(	A	L	L	)	?

← Pressing the  and  keys scrolls the items.**[For the disk specified]**

F	O	R	M	A	T	(	①	,	②	)	?

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	YES	Starts formatting the disk.
2	(QUIT)	Returns to the previous menu (disk maintenance selection menu) without formatting the disk.

Accepting the acknowledgment switches to the following display to notify that the disk is being formatted.

[For all the disks mounted]

F	O	R	M	A	T		(	A	L	L	)			
E	X	E	C	U	T	I	N	G						

[For the disk specified]

F	O	R	M	A	T		(	①	,	②	)			
E	X	E	C	U	T	I	N	G						

Completion of formatting the disk switches to the following display.

F	O	R	M	A	T		(	①	,	②	)			

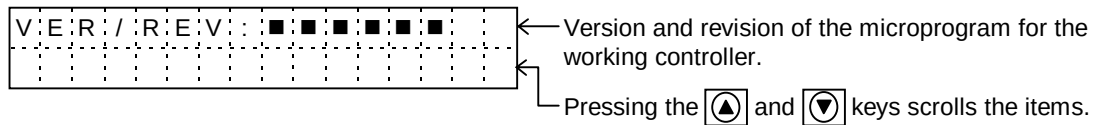
← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	COMPLETE	The disk is successfully formatted.
2	F-CHK (@@ – ¥¥¥¥)	Check-Condition occurred during formatting the disk (the sense key and sense code are displayed).
3	F-ST (\$\$)	The status code is \$\$ for the disk formatted.
4	R-CHK (@@ – ¥¥¥¥)	Check-Condition occurred with the Request-sense command (the sense key and sense code are displayed).
5	R-ST (\$\$)	The status code is \$\$ for the Request-sense command.
6	(QUIT)	Returns to the previous menu (disk maintenance selection menu).

(5) Microprogram version/revision reference menu.

① Panel display

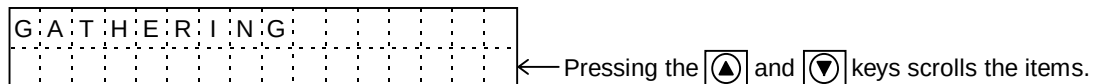


② Contents of display

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (SVP function selection menu).

(6) Debug support menu.

① Panel display



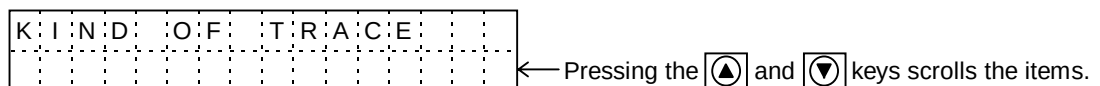
Perform the same operation for “GATHERING (CTL0)” and “GATHERING (CTL1)”.

② Contents of display on the second line

No.	Message displayed	Description
1	KIND OF TRACE	To output the trace information to the floppy disk, selects the data in the memory or the data saved in the system disk.
2	ITEMS OF TRACE	Selects the item of the trace information to be output to the floppy disk. This function must be executed to set the information before activating the floppy disk output function.
3	GET TRACE TO FD	Outputs the trace information to the floppy disk.
4	KIND OF STATi	To output the statistics to the floppy disk, selects the data in the memory or the data saved in the system disk.
5	GET STATi TO FD	Outputs the statistics to the floppy disk.
6	(QUIT)	Returns to the previous menu (SVP function selection menu).

(6-1) Sets the location of the trace information.

① Panel display



② Contents of display on the second line

No.	Message displayed	Description
1	CURRENT MEMORY	Acquires the trace information in the memory.
2	SAVED ON DRIVE	Acquires the trace information saved in the system disk.
3	(QUIT)	Returns to the previous menu (debug support menu).

③ Key and other operations

Operation	Panel display
Selecting the "KIND OF TRACE" from the debug support menu switches to the following display.	K I N D O F T R A C E * C U R R E N T M E M O R Y Indicates that the default is to "acquire the trace information in the current memory".
To change to "acquire the trace information saved in the system disk", use the  key to display the item.	K I N D O F T R A C E S A V E D O N D R I V E
Pressing the  key changes the item to be selected.	K I N D O F T R A C E * S A V E D O N D R I V E An asterisk "*" is displayed to indicate that the default is to "acquire the trace information saved in the system disk".
Press the  key to terminate the processing (to select "QUIT").	K I N D O F T R A C E (Q U I T) Pressing the  key returns to the debug support menu.

(6-2) Selects the trace information to be acquired.

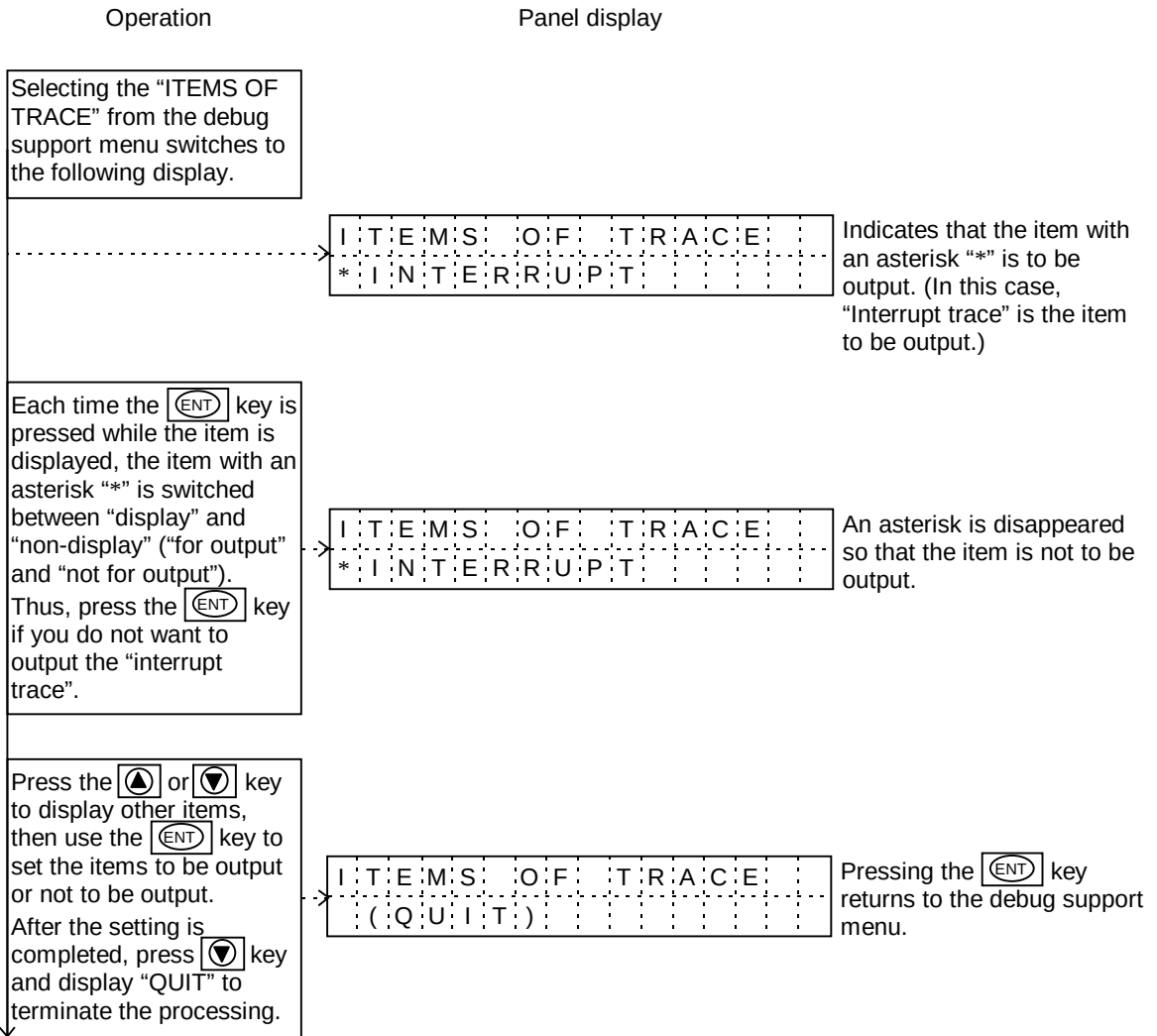
① Panel display

I T E M S O F T R A C E	← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	INTERRUPT	Acquires the interrupt trace information.
2	HOST COMMAND	Acquires the host command trace information.
3	DRIVE COMMAND	Acquires the disk command trace information.
4	MODULE	Acquires the module trace information.
5	JOB	Acquires the job trace information.
6	SSB	Acquires the SSB trace information.
7	ERROR	Acquires the error trace information.
8	FAILURE	Acquires the failure trace information.
9	DOWN	Acquires the down trace information.
10	DRIVE DETACH	Acquires the latest drive failure information.
11	(QUIT)	Returns to the previous menu (debug support menu).

③ Key and other operations



(6-3) Outputs the trace information to the floppy disk.

① Panel display



Contents of display on the second line

No.	Message displayed	Description
1	YES	Starts to output the trace information to the floppy disk mounted.
2	(QUIT)	Returns to the previous menu (debug support menu) without outputting the trace information.

Accepting the confirmation that the floppy disk is mounted switches to the following display to notify that the trace information is being output.

G	E	T		T	R	A	C	E							
	E	X	E	C	U	T	I	N	G						

If all the data cannot be output to the floppy disk mounted, returns to the previous status (“CONFIRM FD.##?”) to mount another floppy disk.

Completion of output of all the data switches to the following display.

G	E	T		T	R	A	C	E		C	M	P			

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returns to the previous menu (debug support menu).

(6-4) Sets the location of the statistics.

① Panel display

K	I	N	D		O	F		S	T	A	T	I			

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	CURRENT MEMORY	Acquires the statistics in the memory.
2	SAVED ON DRIVE	Acquires the statistics saved in the system disk (statistics saved immediately before power-off).
3	(QUIT)	Returns to the previous menu (debug support menu).

③ Key and other operations

Operation	Panel display
Selecting the "KIND OF STATI." from the debug support menu switches to the following display.	K I N D O F S T A T I . * C U R R E N T M E M O R Y Indicates that the default is to "acquire the statistics in the current memory".
To change to "acquire the statistics saved in the system disk", use the  key to display the item.	K I N D O F S T A T I . S A V E D O N D R I V E
Pressing the  key changes the item to be selected.	K I N D O F S T A T I . * S A V E D O N D R I V E An asterisk "*" is displayed to indicate that the default is to "acquire the statistics saved in the system disk".
Press the  key to terminate the processing (to select "QUIT").	K I N D O F S T A T I . (Q U I T) Pressing the  key returns to the debug support menu.

(6-5) Outputs the statistics to the floppy disk.

① Key and other operations

Selecting the floppy disk output function for the statistics switches to the following display for confirming that the floppy disk is mounted.

C O N F I R M F D ■ ■

← “■■” : Floppy disk No.

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	YES	Starts to output the statistics to the floppy disk mounted.
2	(QUIT)	Returns to the previous menu (debug support menu) without outputting the statistics.

Accepting the confirmation that the floppy disk is mounted switches to the following display to notify that the statistics is being output.

G	E	T	S	T	A	T	I	C	S			#
	E	X	E	C	U	T	I	N	G			

If all the data cannot be output to the floppy disk mounted, returns to the previous status (“CONFIRM FD.##?”) to mount another floppy disk.

GET STATI CMP #

← Pressing the  and  keys scrolls the items.

Contents of display on the second line

No.	Message displayed	Description
1	(QUIT)	Returnsto the previous menu (debug support menu).

(7) Memory contents reference/update menu.

① Function

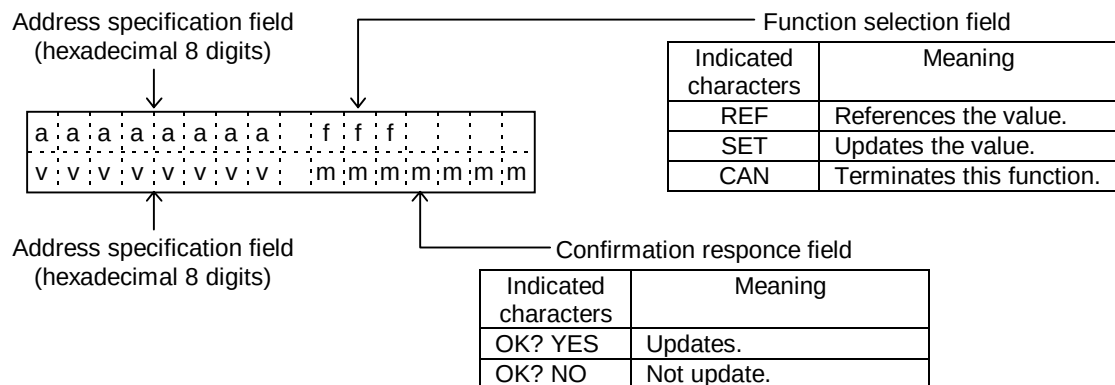
References/updates the contents of an arbitrary address (4 bytes) under the control of MPU. The contents can only be updated after referencing them.

If you attempt to reference an invalid address, an error message is reported.

② User interface

The user interface is dedicated for this function differing from the one for the other SVP functions. (The details about this user interface is described in the following item ④.)

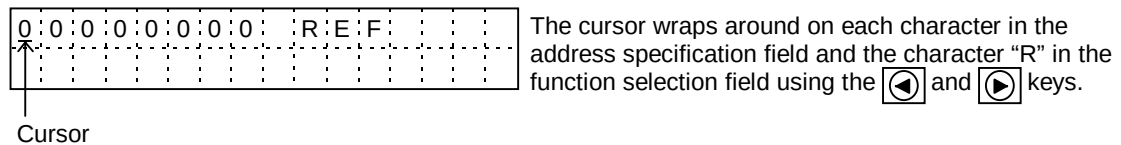
③ Configuration of the window (LCD)

**Configuration of the Window (LCD) for Referencing/Updating the Memory Contents**

④ Operations

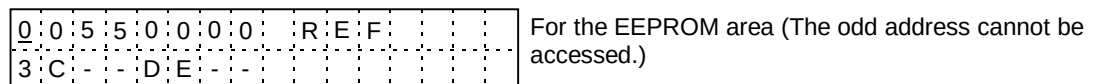
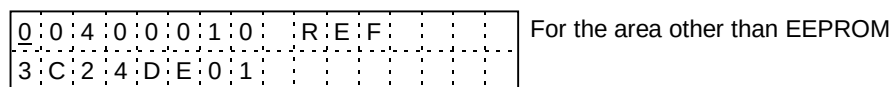
④-1 How to activate this function

Selecting the "MEMORY MAINTENANCE" from the SVP function selection menu switches to the following display and the reference function can be used.



④-2 How to reference the contents of the specified address (4 bytes)

Specifies the desired address in hexadecimal number in the address specification field and press the key. Now, the contents of 4 bytes following the specified address are displayed on the value reference/specification field. (See the figure below.)



[How to specify the address]

Positions the cursor on the desired column in the address specification field. Then, specify the address using one of the following ways; direct specification or wraparound specification.

(a) Direct specification

Pressing one of the number keys between 0 and 9 displays the value of that key on the current cursor position. The cursor position remains as before.

(b) Wraparound specification

Each time the  or  key is pressed, a hexadecimal number is wrapped around one by one on the current cursor position. The  key is used for forward wraparound (0 → 1 → ... → 9 → A → B → ... → F → 0 → 1 → ...), and the  key is used for backward wraparound (F → E → ... → A → 9 → 8 → ... → 0 → F → E).

The cursor position remains as before.

Specifying an invalid address (access inhibited area) displays the following error message to notify it.

0	0	0	0	0	0	0	0	R	E	F				
								I	N	V	A	L	I	D
								A	D	D	R	E	S	S

Pressing any key deletes the error message displayed. Then, the value reference/specification field becomes blank. (See the figure below.)

0	0	0	0	0	0	0	0	R	E	F				

Indicates the cursor position after the error message displayed disappears by pressing the  key.

Note : To specify the address in the cache area, the 4 byte boundary value needs to be specified.

To specify the address in the EEPROM area, the 2 byte boundary value needs to be specified.

④-3 How to change the contents of the specified address (4 bytes)

The contents can only be changed after referencing the value. Move the cursor to the function selection field using the  or  key. Then, press  or  key to display "SET".

Pressing the  key now enables the contents in the value reference/specification field to be changed. The address specification field enters into the protection (address change inhibited) status.

0	0	4	0	0	0	1	0	S	E	T				
3	C	2	4	D	E	0	1							

The cursor wraps around on each character in the value reference/specification field and the character "S" in the function selection field using the  and  keys.

Cursor

Change the contents in the value reference/specification field to the desired value using the same way described in the previous item "(a) Direct specification" and "(b) Wraparound specification". The changes being made here is only affected to the display. The contents in the actual memory has not yet been changed.

Press the  key after completion of changing the contents in the value reference/specification field. Now, the value reference/specification field enters into the protection (specification change inhibited) status and the message confirming to change the contents in the actual memory is displayed. (See the figure below.)

0	0	4	0	0	0	1	0	S	E	T				
3	C	2	4	F	F	0	0	O	K	?	Y	E	S	

The cursor is fixed on this position in the confirmation message displayed.

If you may change the contents, press the  key. Now, the contents in the actual memory is updated to the specified value. Then, returns to the previous reference status.

To cancel the changes, press the  or  key to switch the display to “NO”, then press the  key. The confirmation messages disappears and returns to the status where the contents in the value reference/specification field can be changed.

To return to the previous address contents reference function, use the  or  key to move the cursor to the function selection field, press the  or  key to display “REF”, and press the  key.

[Update inhibited area]

This function handles the three areas; the read/write area, read-only area, and access inhibited area.

The read-only area is the area which can only be referenced and cannot be updated. If you attempt to update (by displaying “SET” in the function selection field and pressing the  key) after referencing the value of this area, the error message is displayed to notify that this area is inhibited to update. (See the figure below.)

1	0	1	0	0	0	0	0	S	E	T				
3	C	2	4	D	E	0	1	N	O	T	U	P	D	

Pressing any key deletes the error message displayed. (See the figure below.)

1	0	1	0	0	0	0	0	R	E	F				
3	C	2	4	D	E	0	1							

The display is switched to “REF” using the  key to reference the contents of the other address.

④-4 How to terminate the reference/update function

To return to the SVP function selection menu after terminating the memory contents reference/update function, use the  or  key to move the cursor to the function selection field, and press the  or  key to display “CAN”. Then, press the  key.

⑤ Reference/update range

Table 3.6.1 shows the memory range which can be accessed by this function.

**Table 3.6.1 Memory Range Which can be Accessed by
Memory Contents Reference/Update Function (1/2)**

No.	Item	Accessible Range (Address)	Access Type
1	DEBUG part Reg	0x7000 0000 - 0x7000 008D	Only for reference
		0x7000 0090 - 0x7000 00AD	Only for reference
		0x7000 00B0 - 0x7000 00B5	Only for reference
		0x7000 00B8 - 0x7000 00BD	Only for reference
		0x7000 00C0 - 0x7000 00C5	Only for reference
		0x7000 00C8 - 0x7000 00E3	Only for reference
		0x7000 00F4 - 0x7000 00F7	Only for reference
		0x7000 0100 - 0x7000 011D	Only for reference
		0x7000 0120 - 0x7000 012B	Only for reference
		0x7000 0130 - 0x7000 013F	Only for reference
		0x7000 0164 - 0x7000 0169	Only for reference
		0x7000 0180 - 0x7000 0183	Only for reference
		0x7000 0188 - 0x7000 019B	Only for reference

**Table 3.6.1 Memory Range Which can be Accessed by
Memory Contents Reference/Update Function (2/2)**

No.	Item	Accessible Range (Address)	Access Type
2	CS/DS	0x90000000 - 0x903FFFFF	Reference/update
3	OP PANEL	0xA0000000 - 0xA000007C	Only for reference
4	CACHE	0xB0000400 - 0xB0FFFFFF	Reference/update
		0xB4000400 - 0xB4FFFFFF	Reference/update
		0xB8000400 - 0xB8FFFFFF	Reference/update
		0xBC000400 - 0xBCFFFFFF	Reference/update
5	Flash	0xF0000000 - 0xF0003FFD	Only for reference
		0xF0003FFE - 0xF00FFFFF	Only for reference

(8) PIN data existence reference menu

① Panel display

P	I	N	:	L	U	■	■	(	▲	▲	)

“▲▲” : Target ID, “■■” : LU No.

When the target ID is not defined, “XX” is displayed.

Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	NUM = #####	Displays the number of PINs for the LU.
2	(QUIT)	Returns to the previous menu (PIN data existence reference menu).

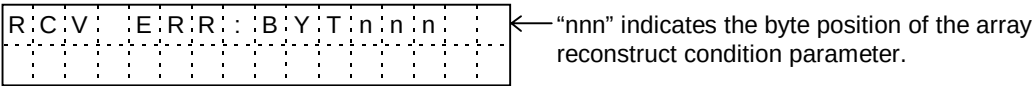
③ How to display the next LU information

Press the  key after confirming the following display to confirm whether or not the PIN data for the next LU exists.

P	I	N	:	I	N	F	O				

(9) Online failure recovery display menu.

① Panel display

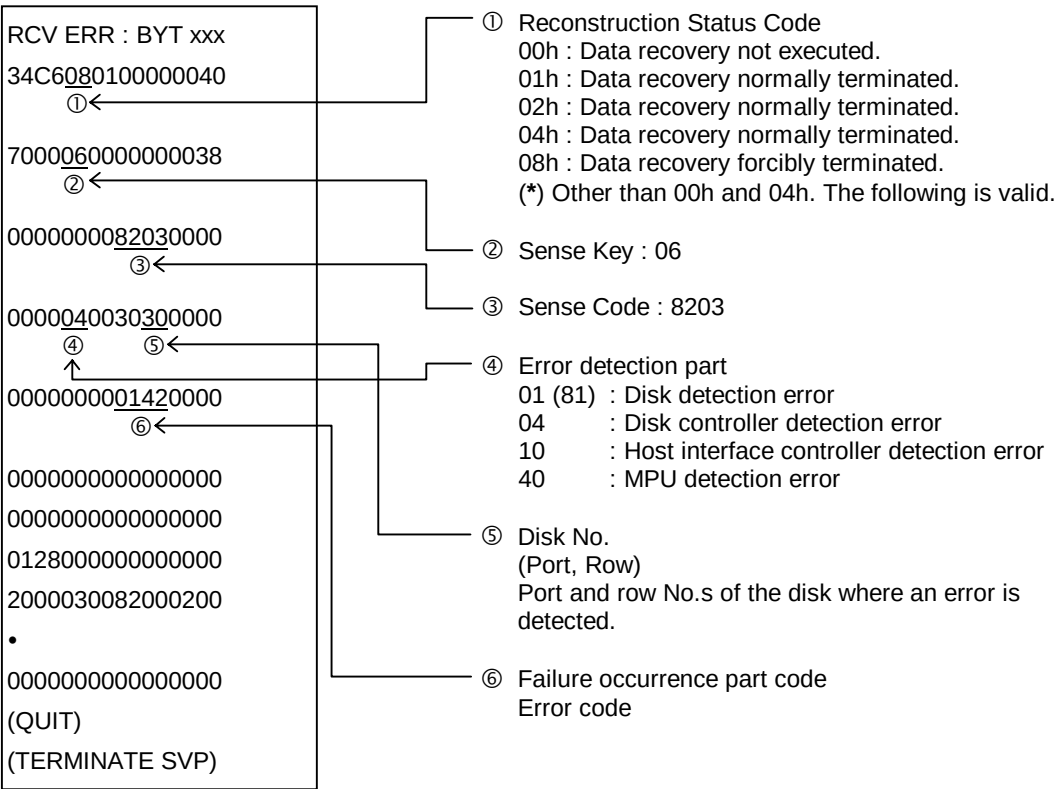


② Contents of display on the second line

No.	Message displayed	Description
1	34C6XXXXXXXXXXXX	Array reconstruct condition parameter (0 - 7 bytes).
2	.	
3	XXXXXXXXXXXXXXXXXX	Array reconstruct condition parameter (192 - 199 bytes).
4	(QUIT)	Returns to the previous menu (online failure recovery display menu).

③ The failure information consists of 200 bytes per information.

The 200 byte failure  key displays the next failure information.



(10)Warning information dispaly menu.

① Panel display

W	A	R	N	I	N	G	I	N	F	O										

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	Warning message code and message text Example) W20201 DRVALM-01	Displays the warning information during execution.
2	(QUIT)	Returns to the previous menu (warning information display menu).

(11) Statistics clear menu.

① Panel display

C	L	E	A	R	L	O	G	(	C	T	0	)

← Pressing the  and  keys scrolls the items.

“CL0” can be “CT1”.

② Contents of display on the second line

No.	Message displayed	Description
1	ALL DATA	Initializes the statistics counter completely.
2	CONTROLLER	Initializes the statistics counter related to the controller.
3	HOST	Initializes the statistics counter related to the host.
4	(QUIT)	Returns to the previous menu (statistics clear menu).

③ Key and otehr operations

Selecting the item to be coeared (by displaying the desired item on the second line and pressing the  key) switches to the following display for confirming the contents before actually clearing the statistics.

C	L	R	L	O	G	(	▲	▲	▲	▲	)

← ▲▲▲▲ = ALL : For selecting ALL DATA
 CTRL : For selecting CONTROLLER
 HOST : For selecting HOST

Contents of display on the second line

No.	Message displayed	Description
1	YES	Starts to clear the statistics.
2	(QUIT)	Returns to the previous menu (clear menu selection) without clearing the statistics.

Starting to clear the statistics switches to the following display to notify that the statistics is being cleared.

C	L	E	A	R	L	O	G						
					E	X	E	C	U	T	I	N	G

← Pressing the  and  keys scrolls the items.

Completion of clearing the statistics switches to the following display.

C	L	E	A	R	L	O	G	C	M	P		
					(	Q	U	I	T	)		

← Pressing the  key while “QUIT” is displayed returns to the previous menu (statistics clear menu).
 Displaying “TERMINATE SVP” using the  or  key and pressing the  key terminates the SVP operation using the maintenance panel.

(12)Threshold reference/setting menu.

① Panel display

T	H	R	E	S	H	O	L	D

← Pressing the  and  keys scrolls the items.

② Contents of display on the second line

No.	Message displayed	Description
1	DRIVE	Selects the threshold value for the drive.
2	(QUIT)	Returns to the previous menu (SVP function selecting menu) screen.

③ Key and other operations

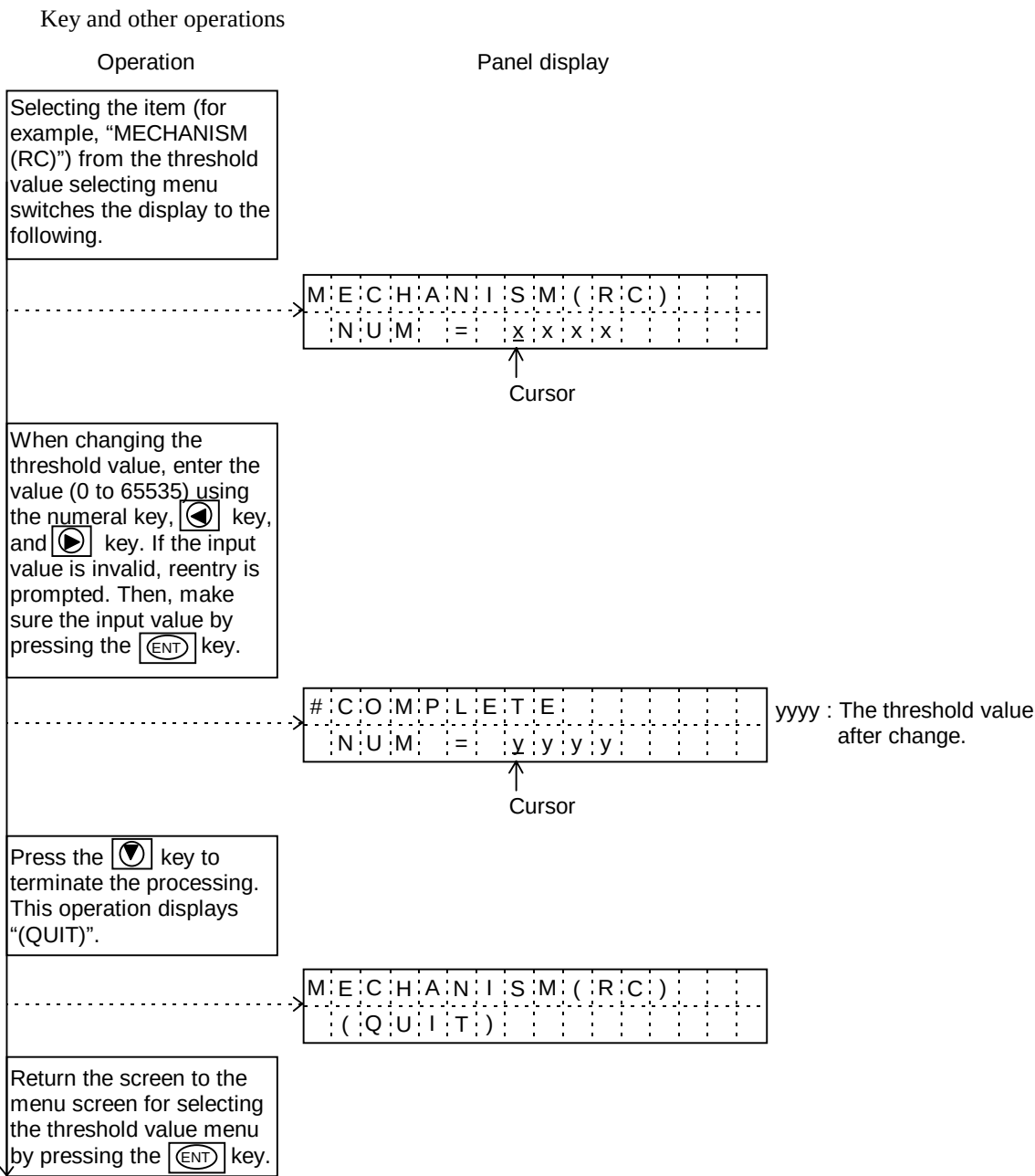
Panel display

[illegible]

← Pressing the and keys scrolls the items.

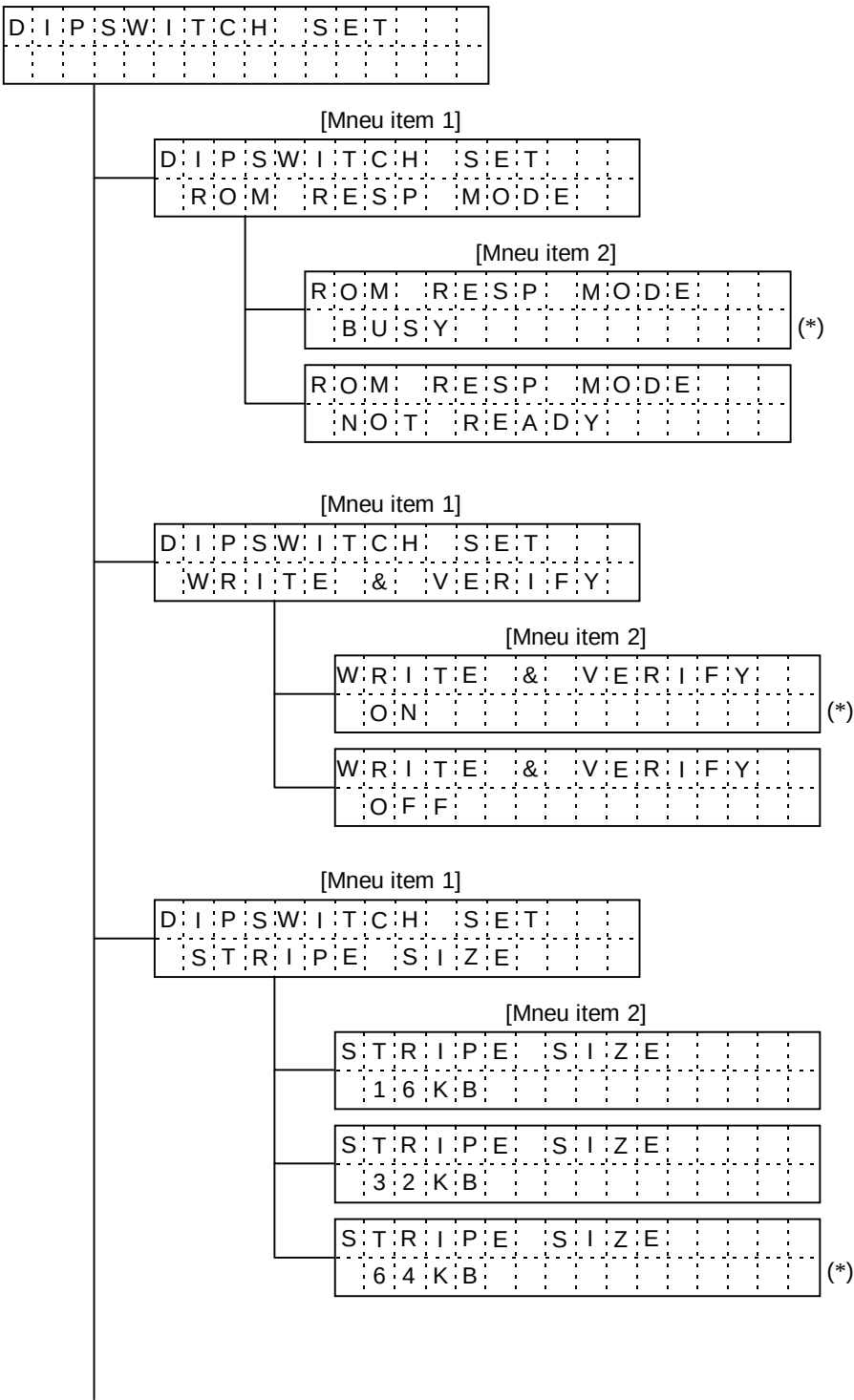
Contents of display on the second line

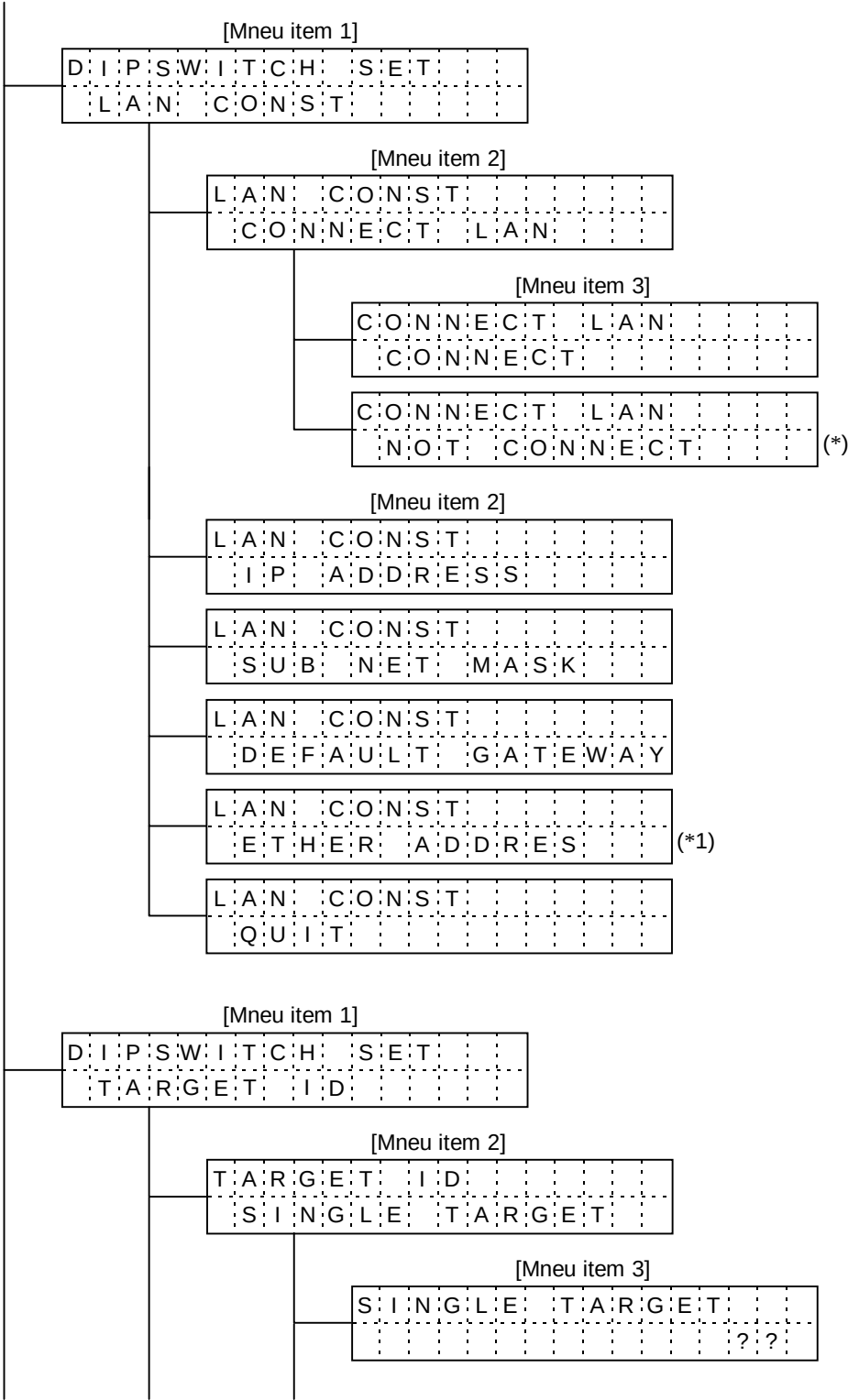
No.	Message displayed	Description
1	MECHANISM (RC)	Number of errors (recovered) of the drive mechanical system.
2	MECHANISM (UR)	Number of errors (unrecovered) of the drive mechanical system.
3	MEDIUM (RC)	Number of drive media errors. (recovered)
4	MEDIUM (UR)	Number of drive media errors. (unrecovered)
5	READ/WRITE (RC)	Number of errors (recovered) of the drive reading/writing system.
6	READ/WRITE (UR)	Number of errors (unrecovered) of the drive reading/writing system.
7	DRIVE I/F (RC)	Number of errors (recovered) of the drive I/F system.
8	DRIVE I/F (UR)	Number of errors (unrecovered) of the drive I/F system.
9	HARDWARE (RC)	Number of errors (recovered) of the drive hardware.
10	HARDWARE (UR)	Number of errors (unrecovered) of the drive hardware.
11	SCSI I/F (RC)	Number of errors (recovered) of the drive SCSI I/F system.
12	SCSI I/F (UR)	Number of errors (unrecovered) of the drive SCSI I/F system.
13	ONL VERIFY (CE)	Number of drive online verify collectable errors.
14	ONL VERIFY (UR)	Number of drive online verify uncollectable errors.
15	(QUIT)	Returns to the previous menu.



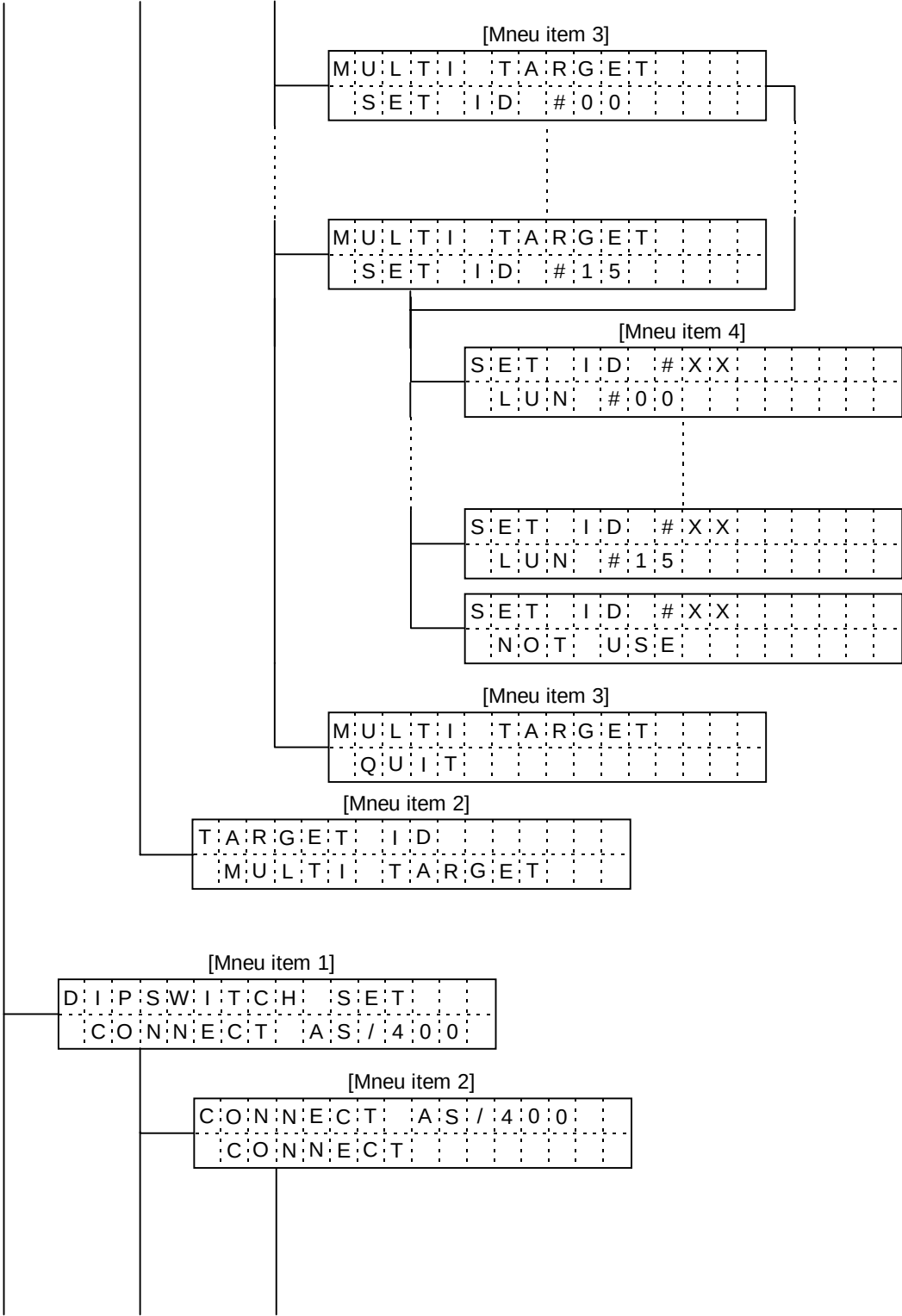
3.4 Panel Tree Structure

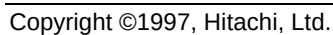
- (1) Frame list for system parameter setup function.
The default value is preceded by an asterisk (*) (on the right side of the frame).

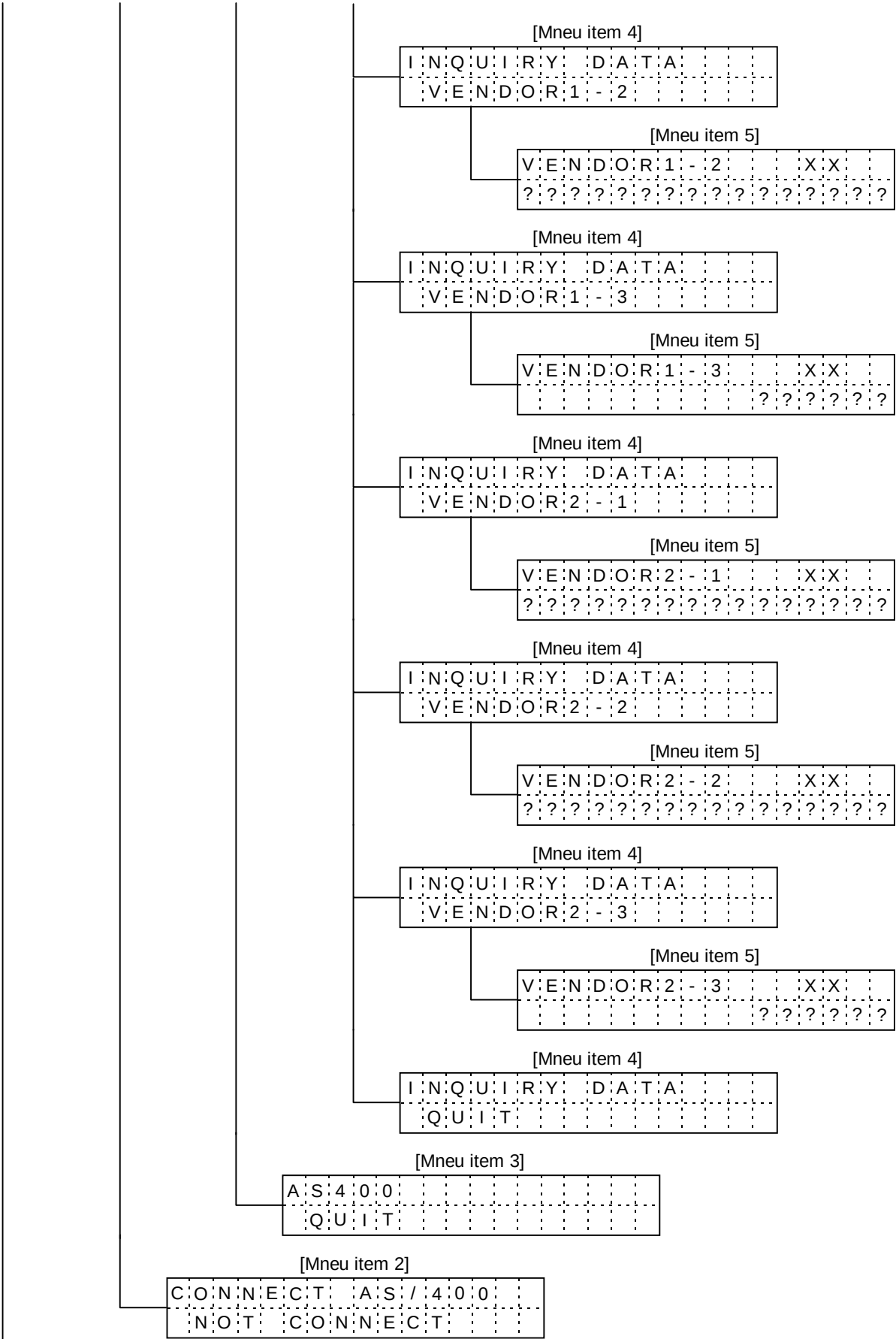


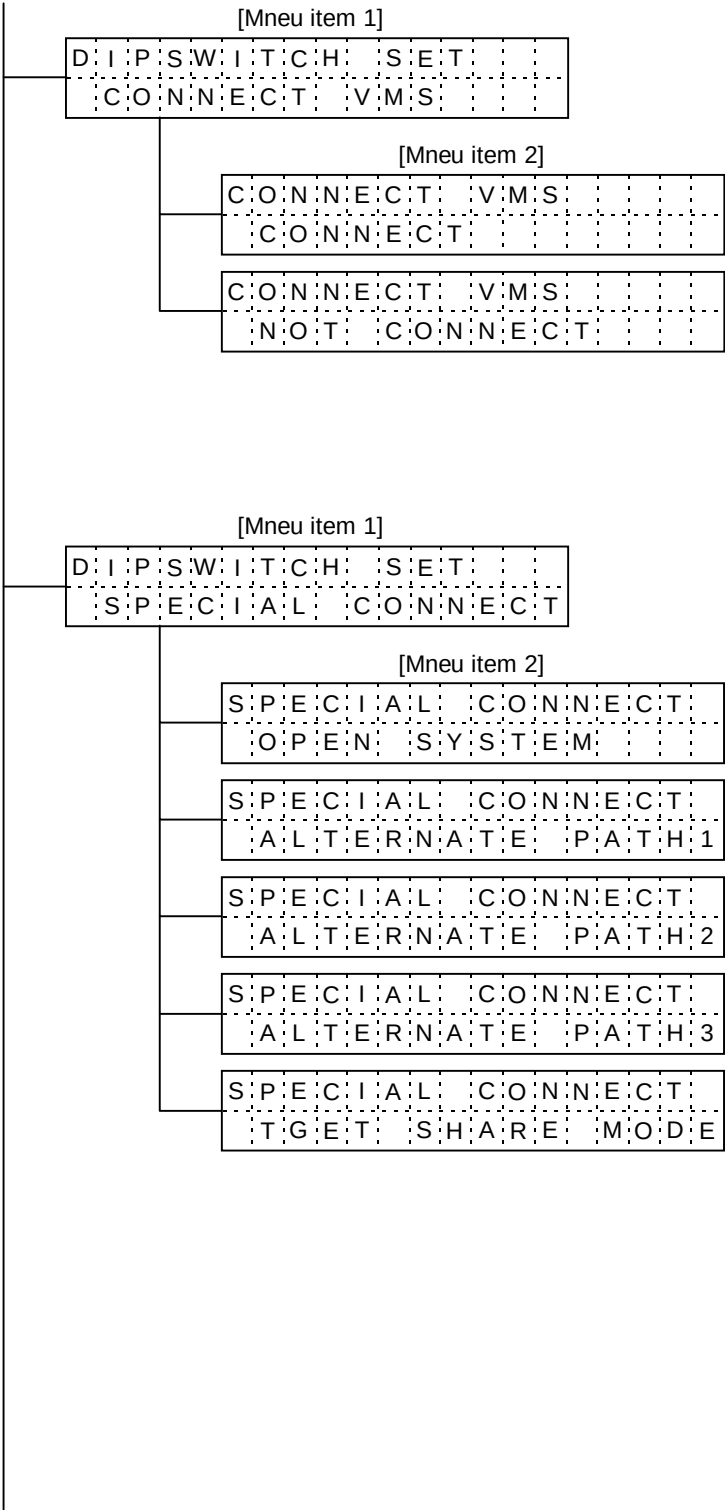


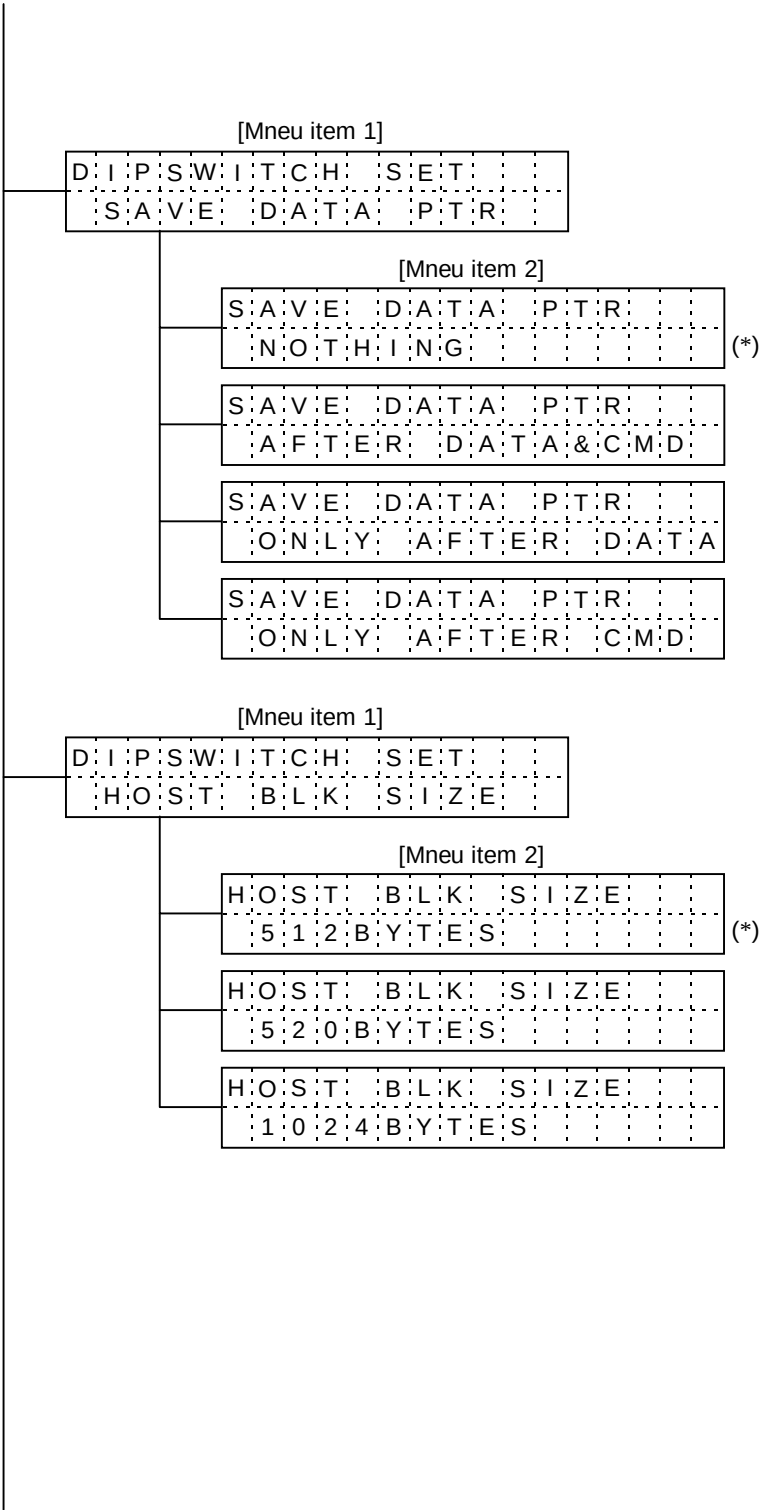
*1 This display is LAN additional feature only.

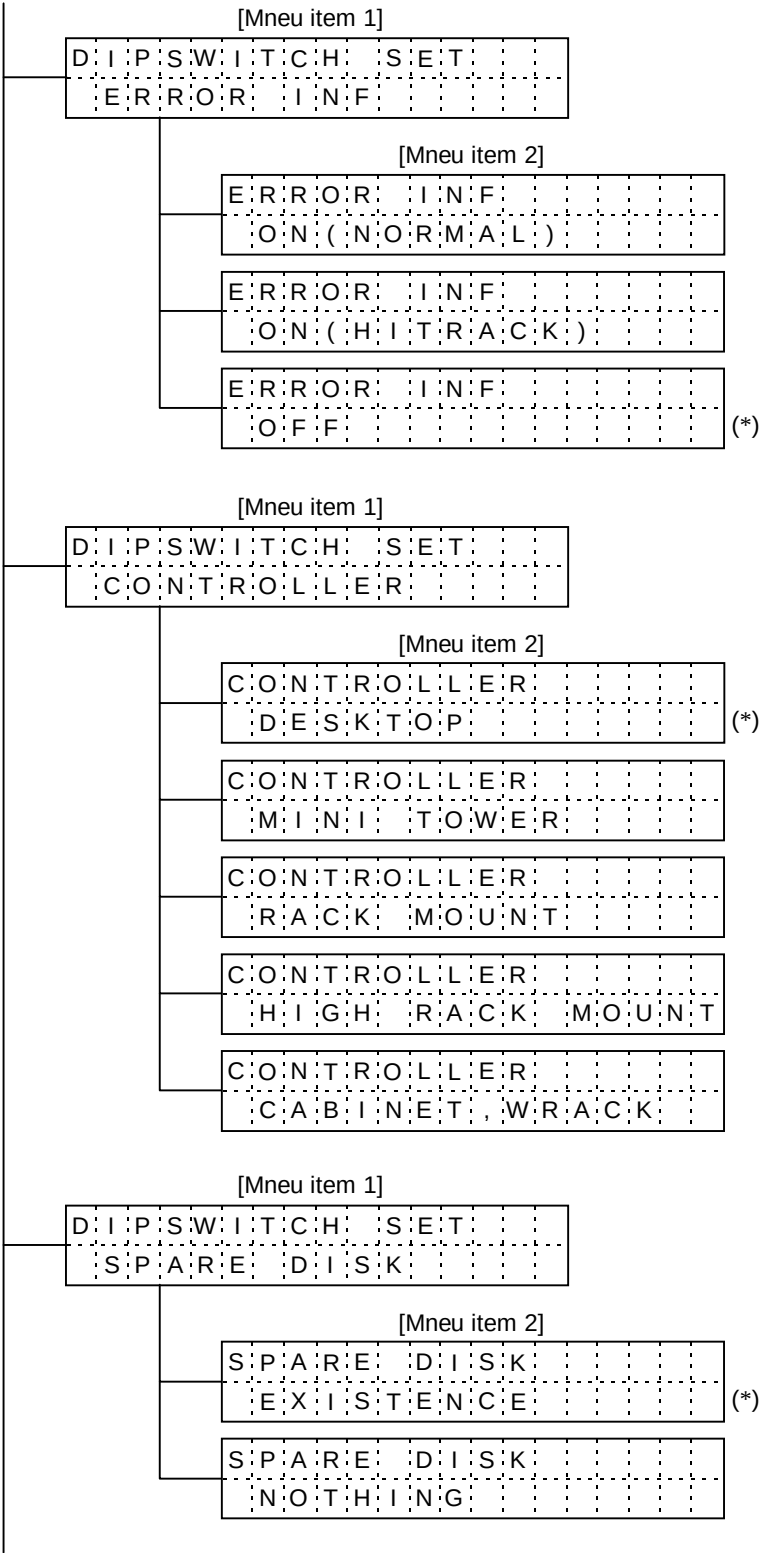


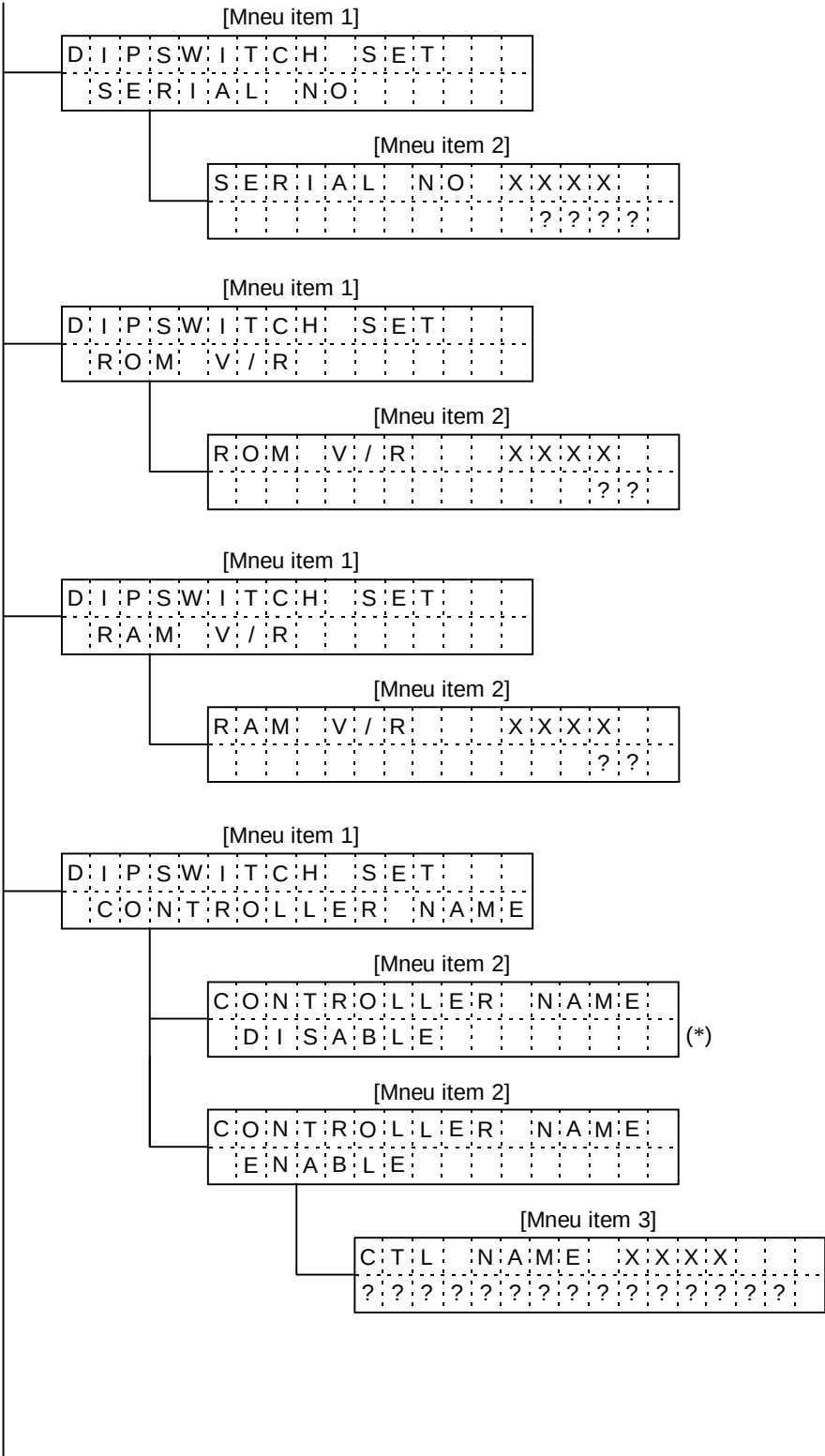


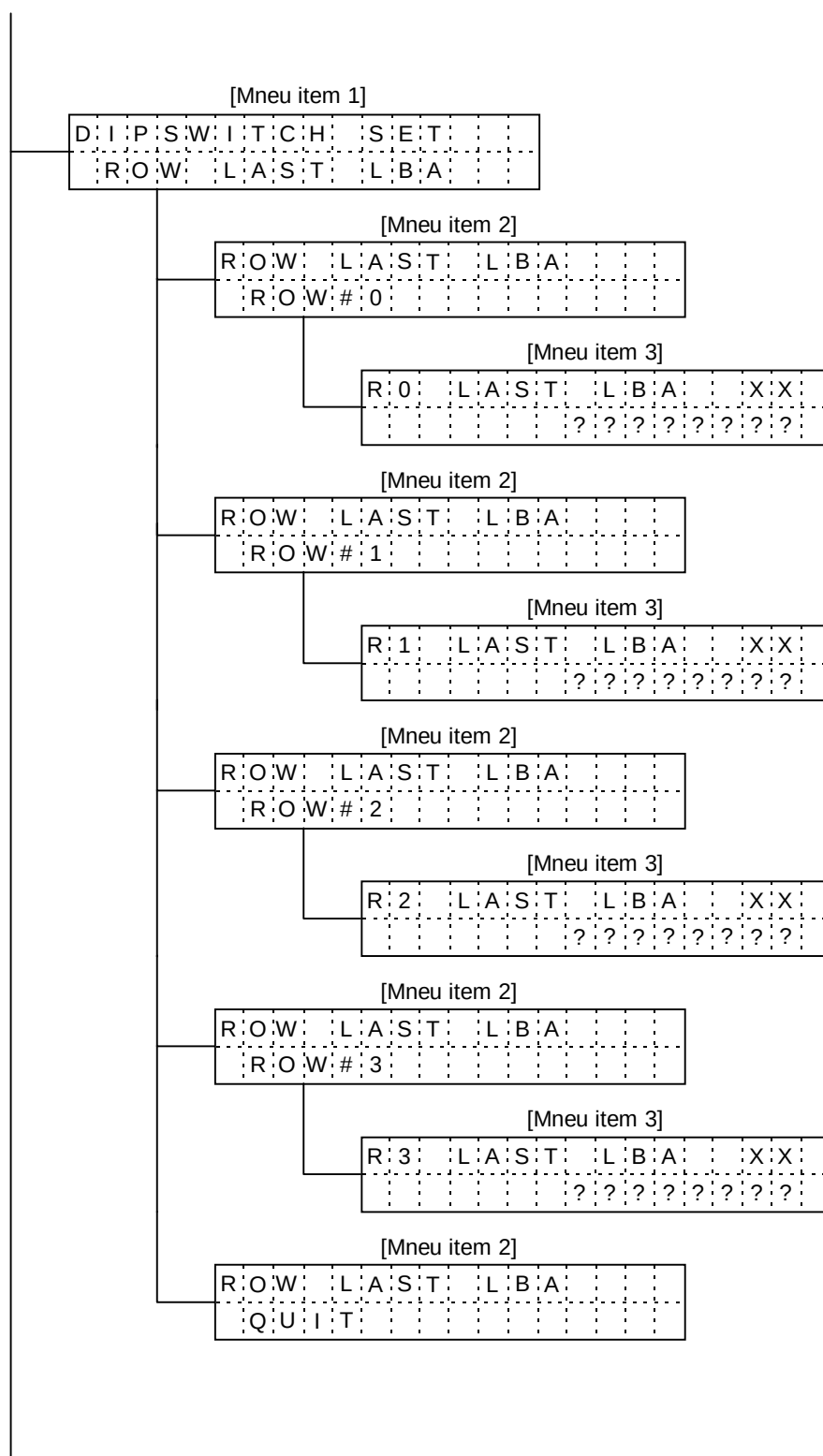


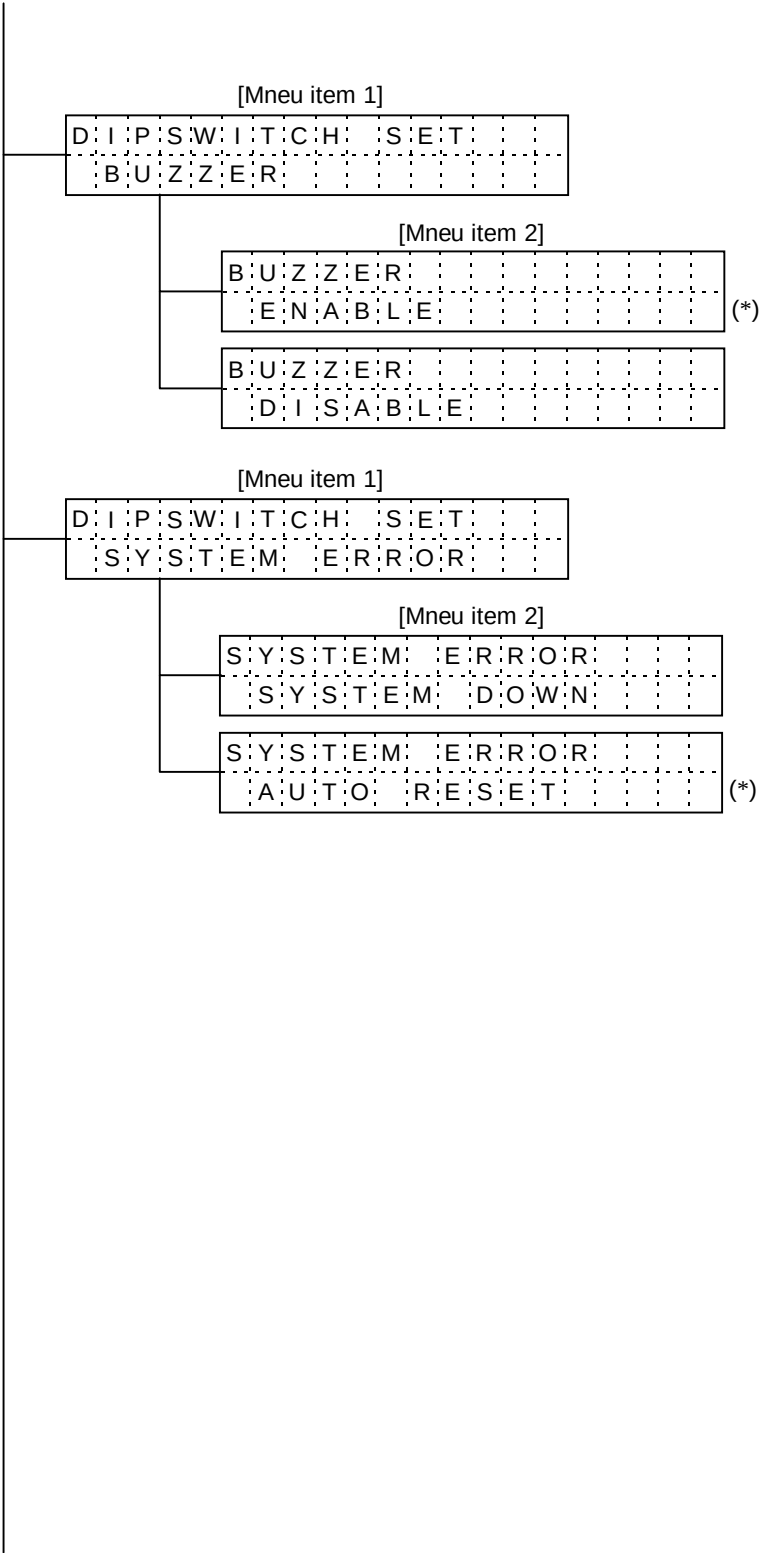


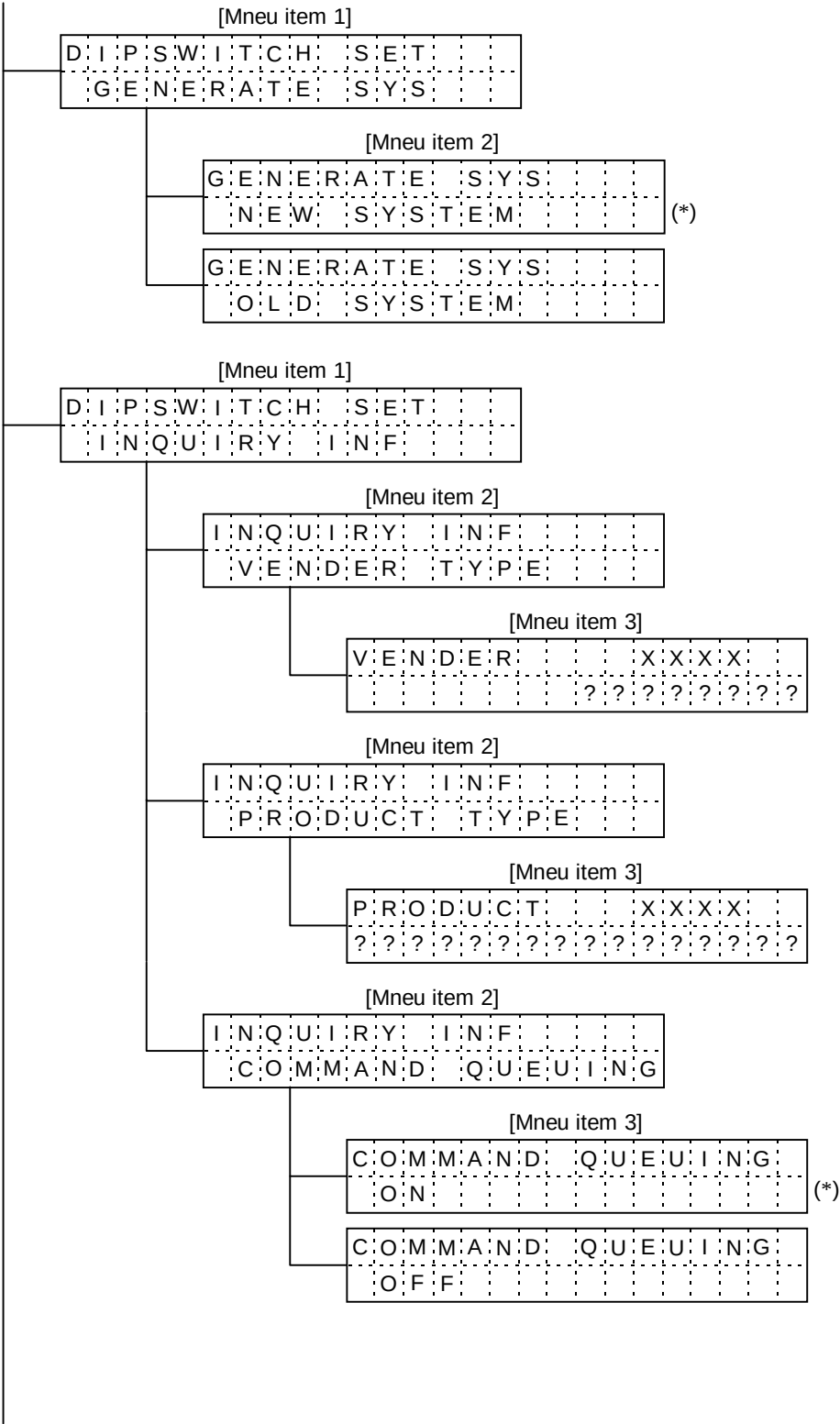


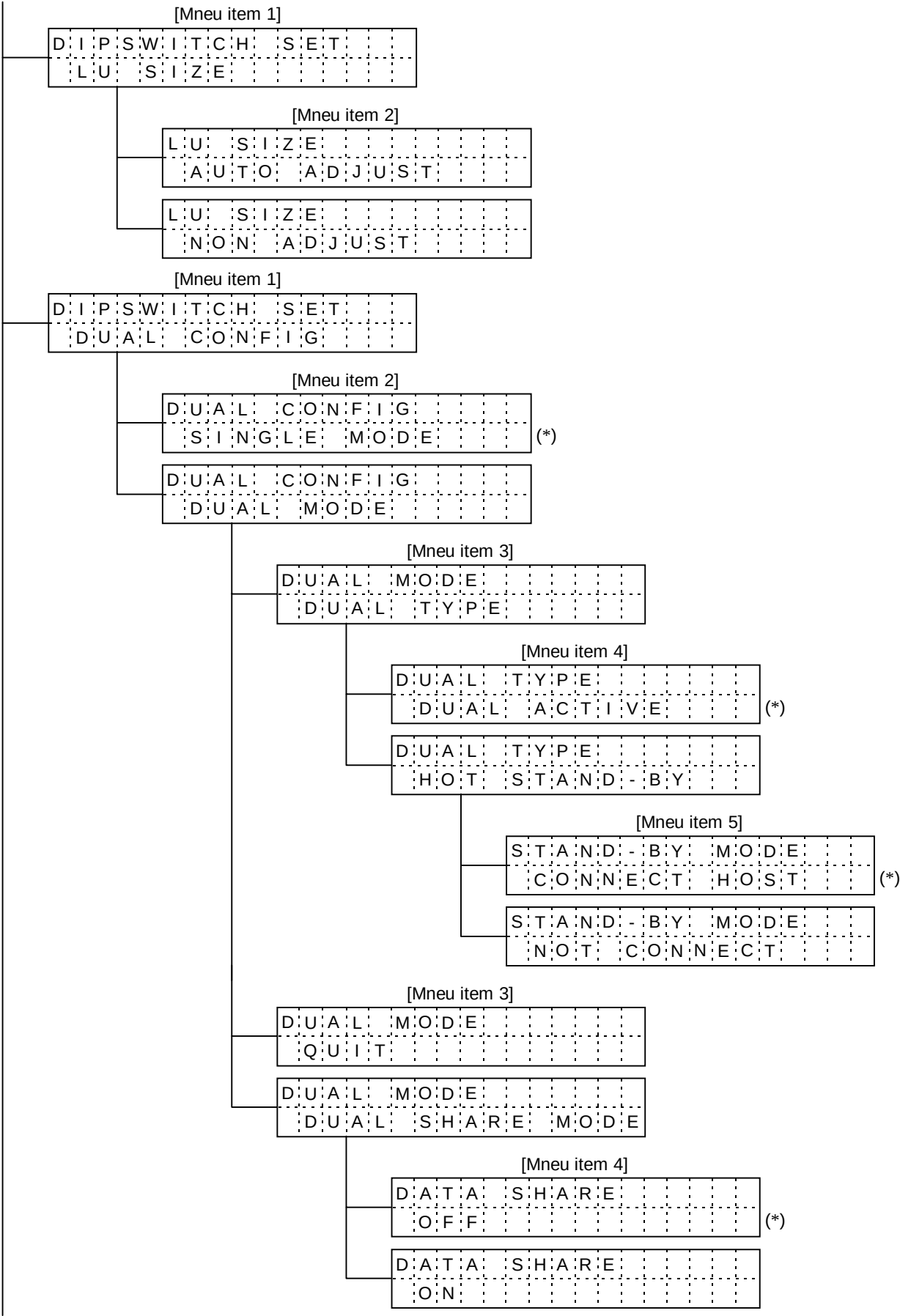


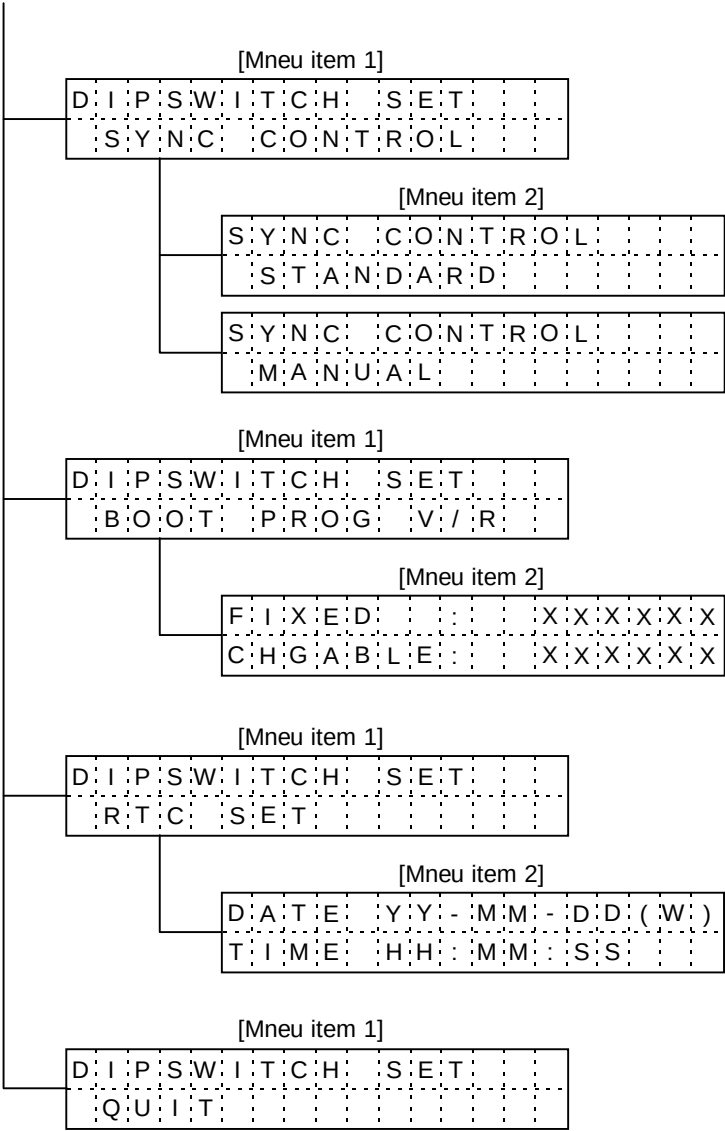




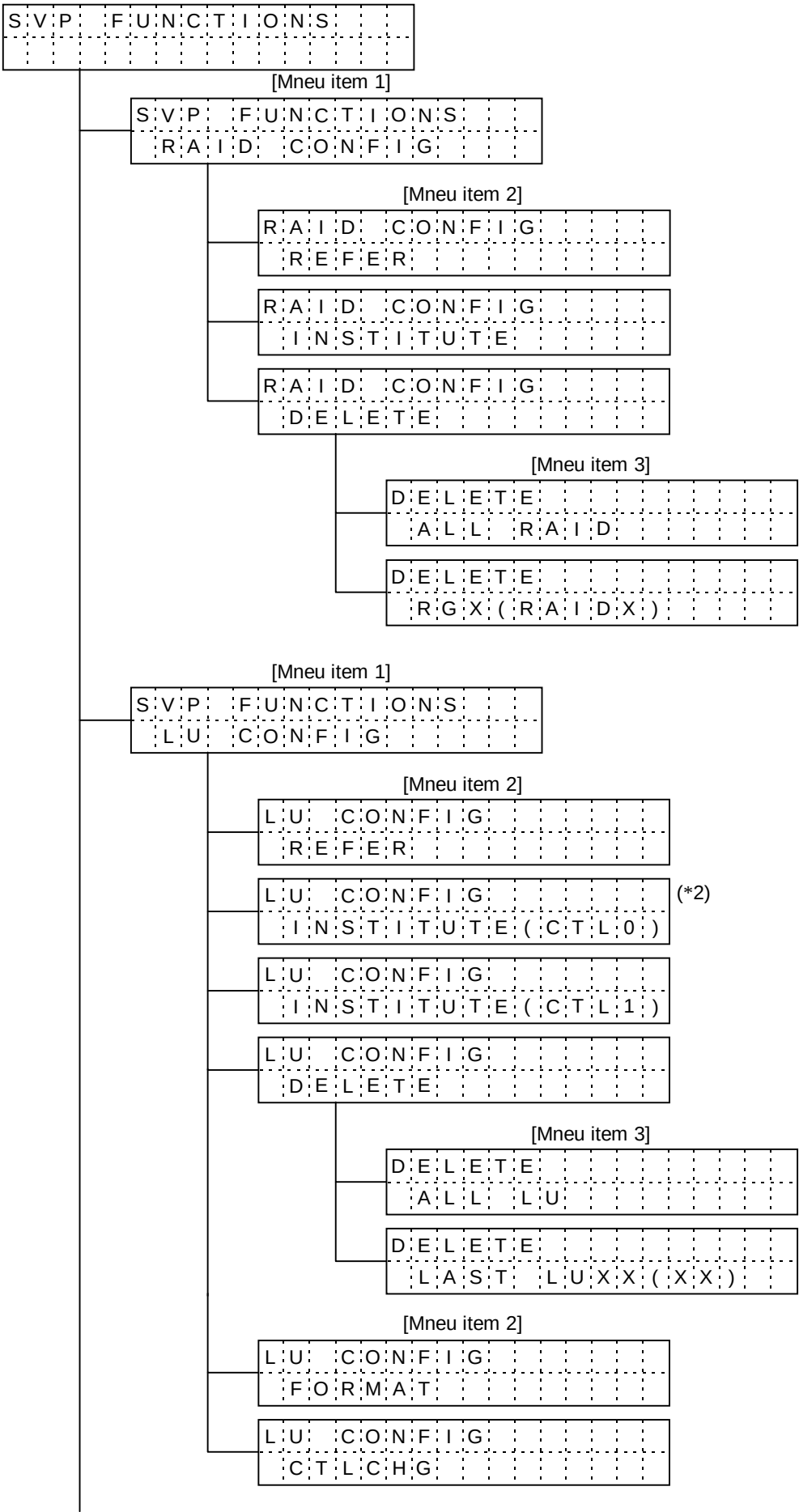


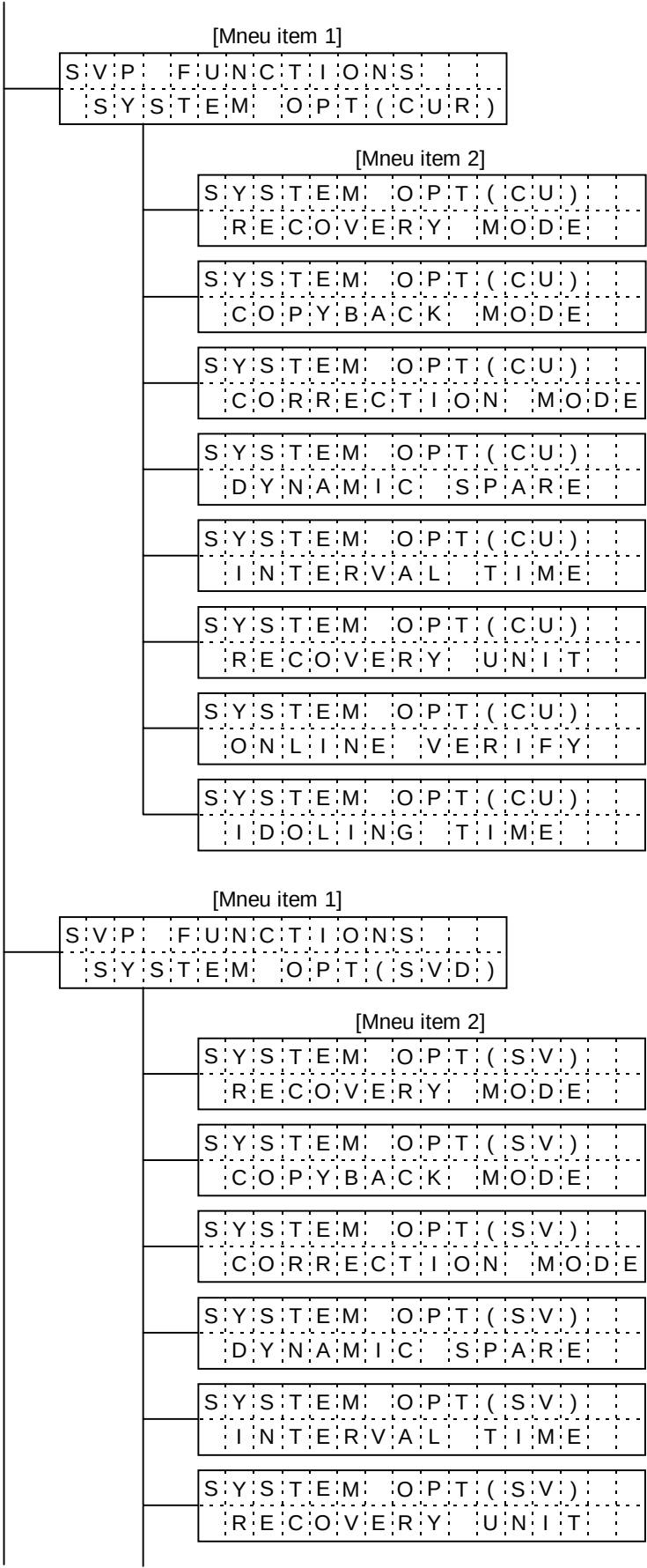


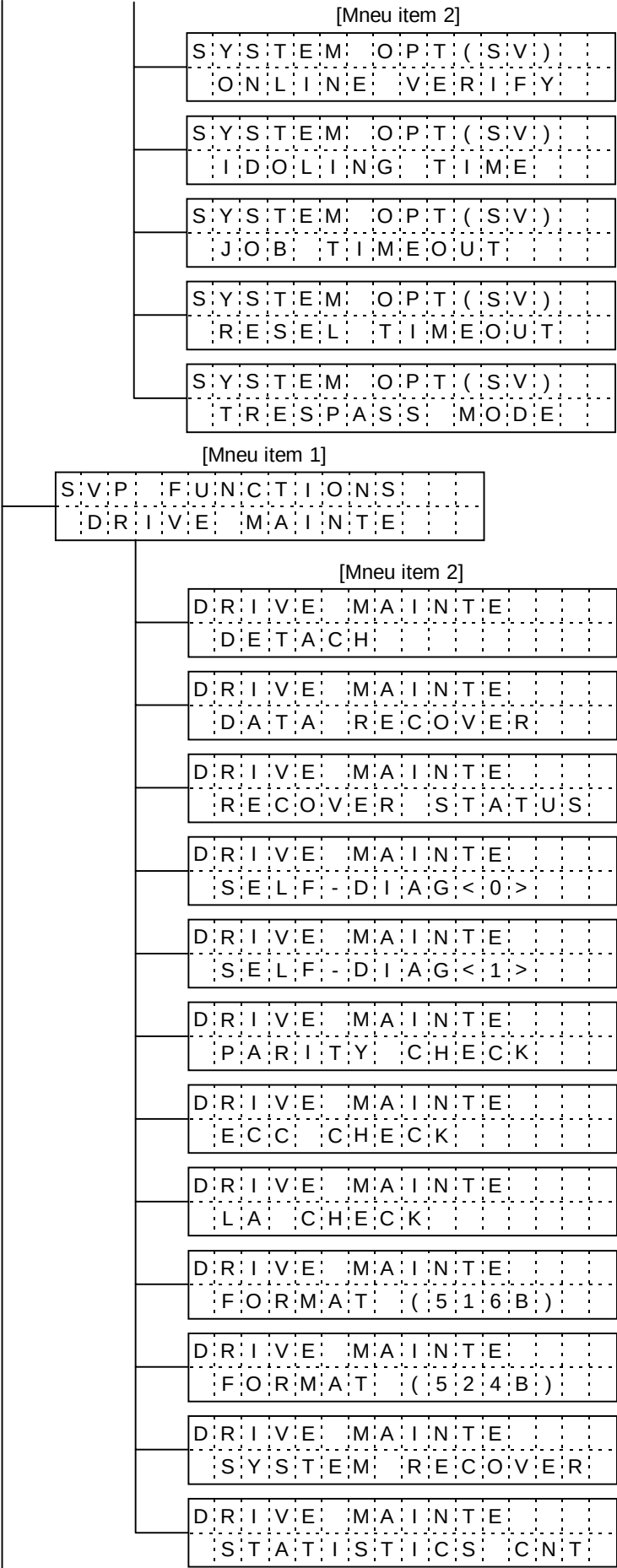


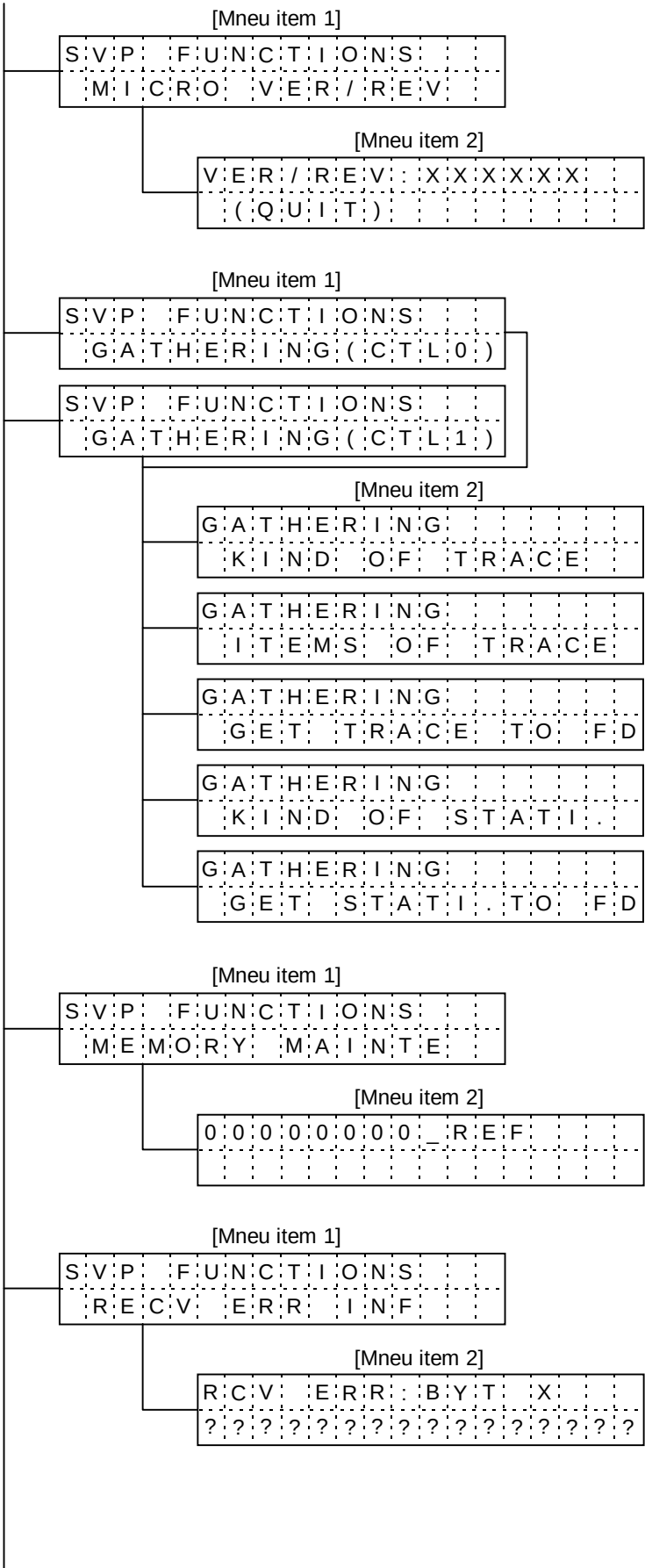


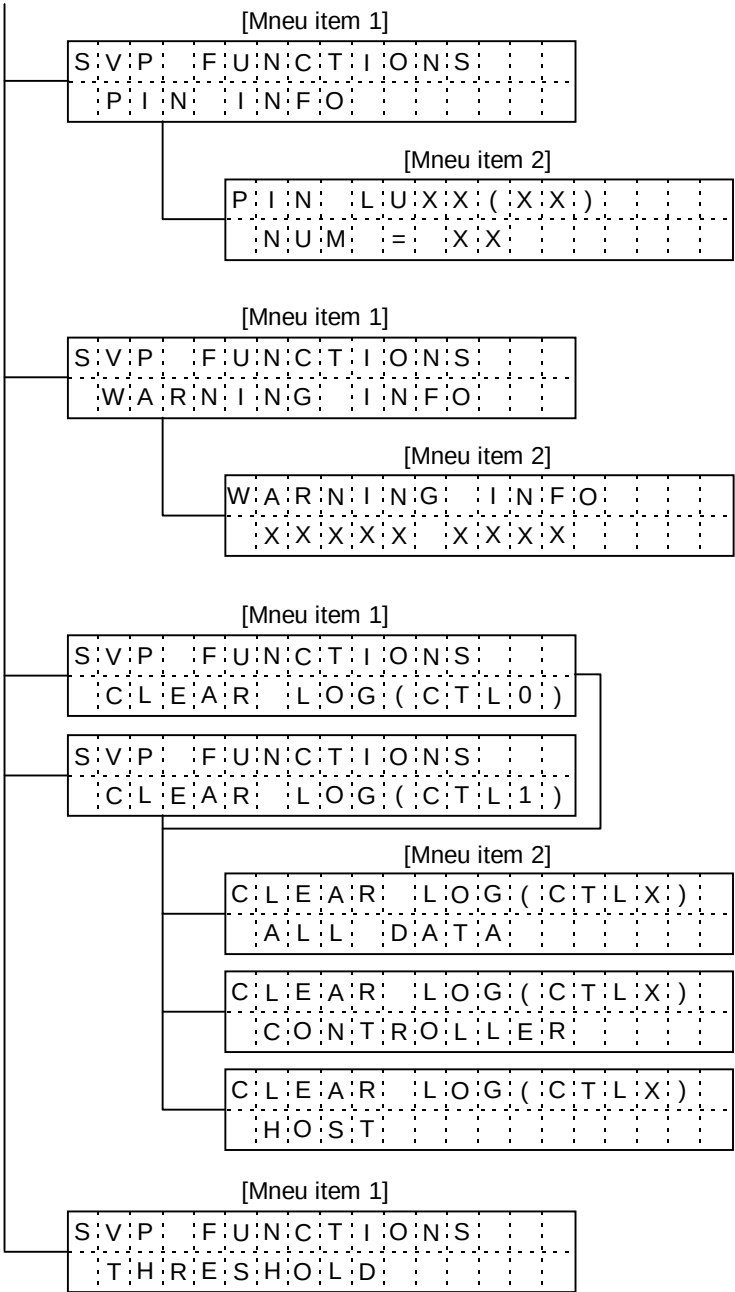
(2) Frame list for SVP function.



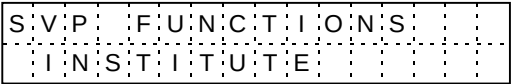








*2 For the single system and dual system (host standby mode), the controller No. is not displayed as shown below.



DF350 Disk Subsystem
7. PARTS REPLACEMENT
(Desktop (DK) Type)

Rev.3

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: A / AD / Addition / CH / Change / CR / Correction / DE / Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	All	Issued	
1	Feb.10. '98	A.Yamanashi	Y.Morishita	H.Iwasaki	0270 0280	Descriptions of replacement wiht power on were added. Delete (3).	AD DL
2	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0040	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.) Added A2E8.	AD AD
3	Oct.15.'98	A.Yamanashi			0040	Added A3E4.	AD

CONTENTS

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2.1 Turning the Power On/Off for Each String	DK-REP0050
2.2 Part Replacement Procedures.....	DK-REP0070
2.3 Back-up Procedure of System Parameter	DK-REP0090
2.3.1 Back-up procedure to FD	DK-REP0090
2.3.2 Restoring procedures from FD	DK-REP0130
3. Opening/Closing the Front Cover and Removing/Installing the Cover	DK-REP0160
3.1 Opening/Closing the Front Cover	DK-REP0160
3.2 Removing/Installing the Cover	DK-REP0170
4. Replacing HDU ASSY	DK-REP0180
4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration.....	DK-REP0180
4.1.1 Procedure of data recovery and HDU Replacement Under RAID0 Configuration	DK-REP0180
4.2 Procedure of Data Recovery and HDU Replacement Under RAID1,5,A Configuration	DK-REP0200
4.2.1 Transition of panel display	DK-REP0210
4.2.2 Confirming completion of data recovery	DK-REP0210
4.2.3 When the data recovery failes	DK-REP0210
4.3 HDU ASSY Replacement Procedure.....	DK-REP0220
4.4 Manual Instruction of Data Recovery.....	DK-REP0240
5. Replacing FDD ASSY	DK-REP0260
6. Replacing AC/DC Power Supply	DK-REP0270
7. Replacing I/F ADAPTER ASSY	DK-REP0290
8. Replacing PANEL(OP) ASSY	DK-REP0310
9. Replacing CTL ASSY	DK-REP0320
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9.2 CTL ASSY Replacement when Version is 0304** or later	DK-REP0350
10. Replacing Battery ASSY	DK-REP0400
11. Replacing Fan ASSY	DK-REP0420
12. Replacing Fan(PS) ASSY	DK-REP0440
13. Replacing In Box ASSY	DK-REP0450
14. Replacing CACHE ASSY	DK-REP0460
15. Replacing LAN ASSY.....	DK-REP0470

1. Mechanical Configuration

Figures 1.1 and 1.2 show mechanical configuration and parts location of this subsystem.

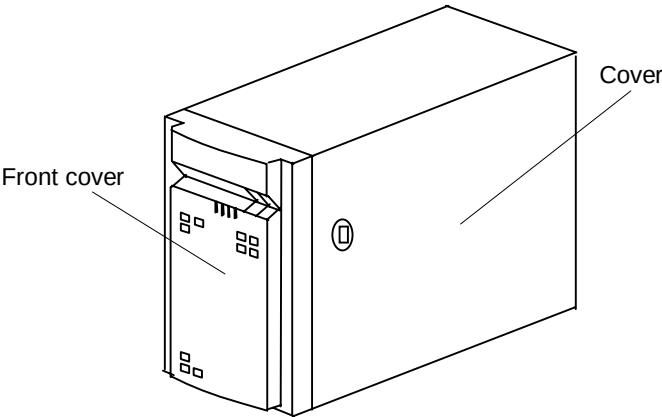


Figure 1.1 Appearance of DF350 Disk Subsystem (Desktop (DK) Type)

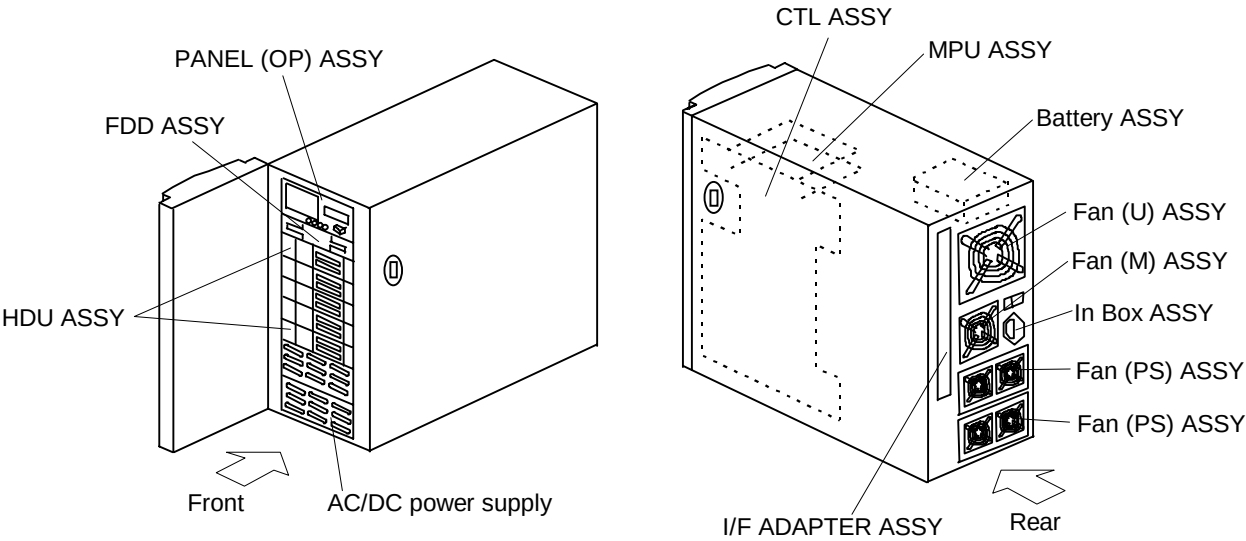


Figure 1.2 Parts Location

2. Maintenance Procedure

(1) Turning power on/off when replacing parts

Turning on/off procedure varies depending on the parts to be replaced.

Follow the procedures described in the table below for replacing each part.

No	Product name	Drawing No.	Model	Turning on/off power	
				Option not provided	Option provided
1	HDU ASSY (2GB1"H)	3243084-E	DF-F350-A2E2	④	—
2	HDU ASSY (4GB1"H)	3243084-F	DF-F350-A2E4	④	—
3	HDU ASSY (4GB1"H) (*1)	3252929-E	DF-F350-A3E4	④	—
4	HDU ASSY (8GB1"H)	3252929-B	DF-F350-A2E8	④	—
5	Fan (U) ASSY	5497379-N	DF-F350-P5D	②	—
6	Fan (M) ASSY	5497379-M	DF-F350-P4D	②	—
7	Fan (PS) ASSY	5497379-K	DF-F350-P2D	②	—
8	Fan (PS) ASSY	5497379-L	DF-F350-P3D	②	—
9	Battery ASSY	5497379-G	DF-F350-N2D	②	—
10	FDD ASSY	5497379-J	DF-F350-M2D	②	—
11	CTL ASSY	5497379-E	DF-F350-F1DCF	①	—
12	I/F ADAPTER ASSY (WS_pin_lock screw type)	5497379-B	DF-F350-DDWSS	①	—
13	I/F ADAPTER ASSY (WD_pin_lock screw type)	5497379-A	DF-F350-DDWDS	①	—
14	PANEL (OP) ASSY	5497379-H	DF-F350-L2D	②	—
15	AC/DC power supply	5497379-F	DF-F350-B2D	③	—
16	In Box ASSY	5497379-P	DF-F350-Q2D	②	—
17	CACHE ASSY	3247121-A	DF-F350-C8E	②	—
18	LAN ASSY	5497379-C	DF-F350-G1D1	②	—
19	LAN ASSY (SNMP)	5497379-D	DF-F350-G2D1	②	—

① Turning the power off DF350 Disk Subsystem and Host System.

② Turning the power off DF350 Disk Subsystem.

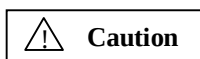
③ Turning the power off is unnecessary.

④ Turning the power on DF350 Disk subsystem.

(*1): It is necessary to use it with the Micro_Disk Ver.0307 or later.

Notice : When a part which requires to turn the power off or on for replacement (marked with ① and ②) is to be replaced, turn the power off correctly according to the instruction in DK-REP0050 beforehand.

Otherwise, there is a risk that the user data is destroyed.

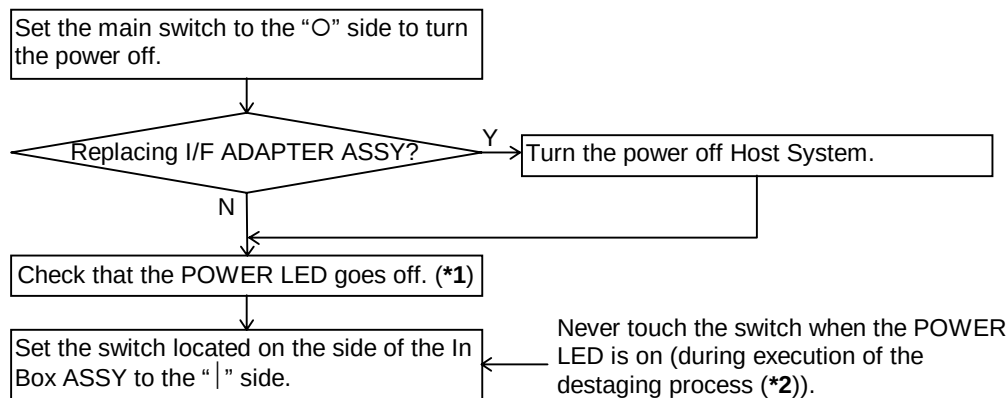


When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.

Be careful not to touch the electrified parts with a screwdriver etc.

2.1 Turning the Power On/Off for Each String

(1) Turning the power off



*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

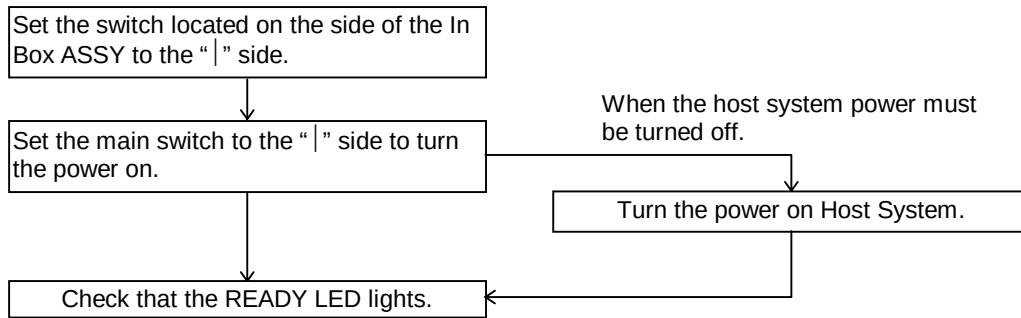
CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

Notice : In case the data is not properly backed up, the user's data will be lost.

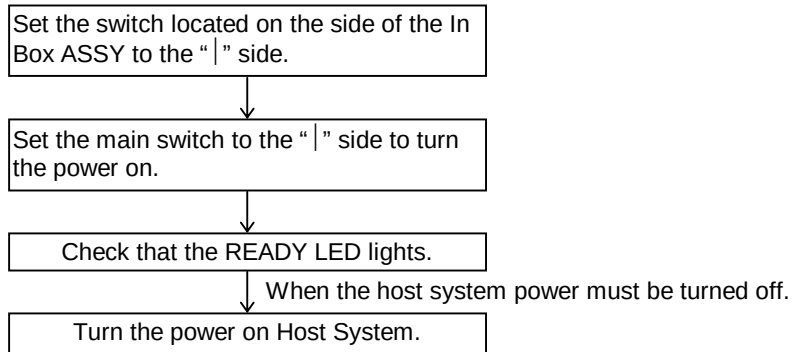
*2 The cache memory installed in this subsystem is controlled with a write-after method. When turning off the power, the subsystem automatically writes all the data left on the cache memory unwritten to the hard disk drive. (This operation is called a destaging.) The subsystem turns off the power when this process is completed. When the power is turned off according to the power failure or by the operation of the breaker, the destaging can not be performed. In this case, the subsystem enters the mode of battery back-up. If the system is kept in this state, the battery may be discharged and the user data might be lost. Therefore, be sure to follow the power-off procedure explained above.

If the breaker is turned off due to power failure or by mistake before the POWER LED goes off, turn the power on again according to Item (2), "Turning the power on" promptly and then execute the power-off procedure explained above.

(2-1) Powering on procedure (When the power control is set to REMOTE)



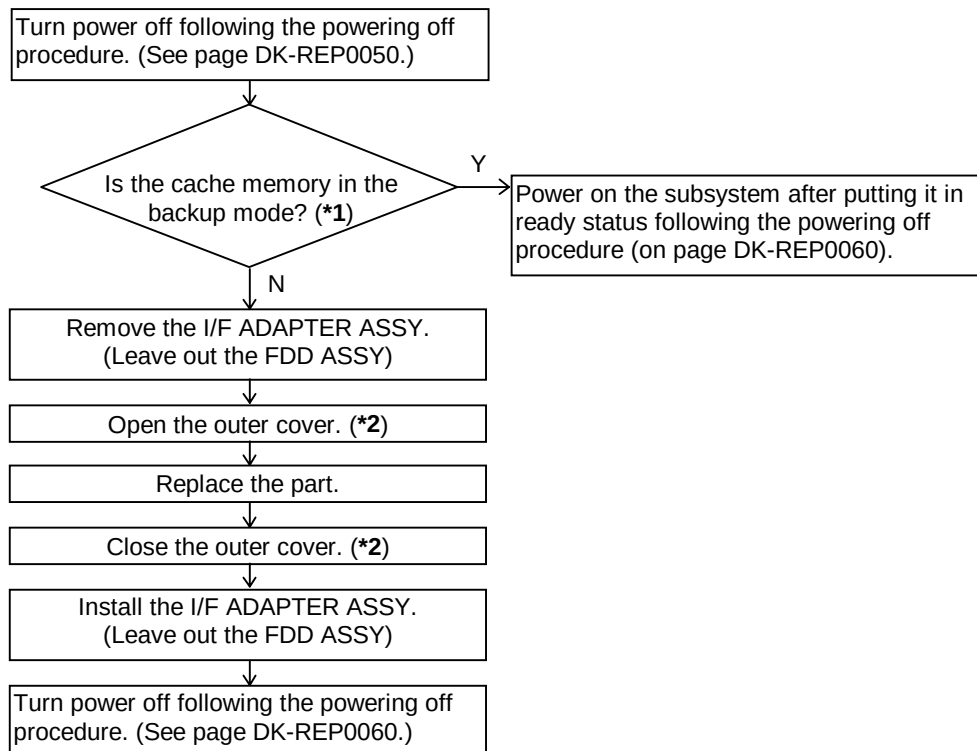
(2-2) Powering on procedure (When the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.2 Part Replacement Procedures

- (1) When power of both the subsystem and the host system must be turned off or the subsystem power must be turned off.



Notice: In case the power is not normally turned off, the configuration data will be lost and the user's data will be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

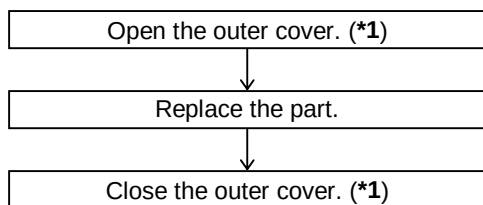
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

- *2** Outer cover : Because the handling of outer covers varies by a part to be replaced, remove or install the cover according to the replacement procedure of each part.

- (2) Procedure for the case of turning the power off DF350 is either not necessary or prohibited.



*1 Outer cover : Front cover.

2.3 Back-up Procedure of System Parameter

There are cases where system parameters (Target ID, buzzer setting, drive recovery mode, etc.) are copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters for following “2.3.1 Back-up procedure of system parameter” (DK-REP0090) or “2.3.2 Restore procedure of system parameter” (DK-REP0130).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to DK-REP0050.

Notice: In case the power is not normally turned off, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 2.3.1.

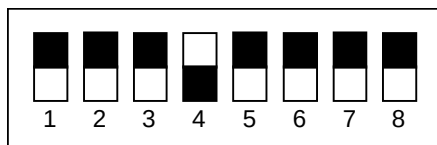
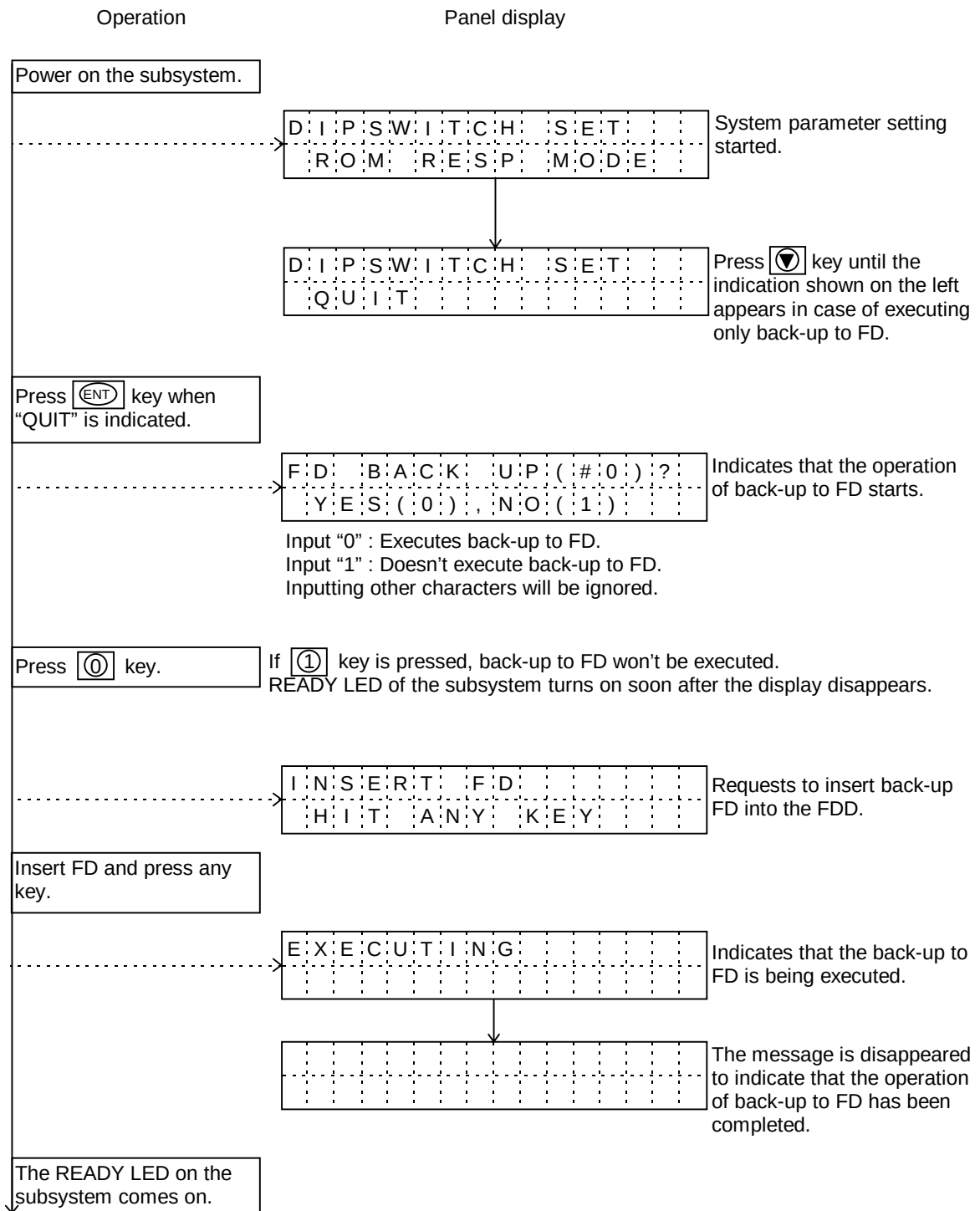


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

(3) Operate as described below.



(4) Set DIP switch No.4 to setting as shown in Figure 2.3.2.

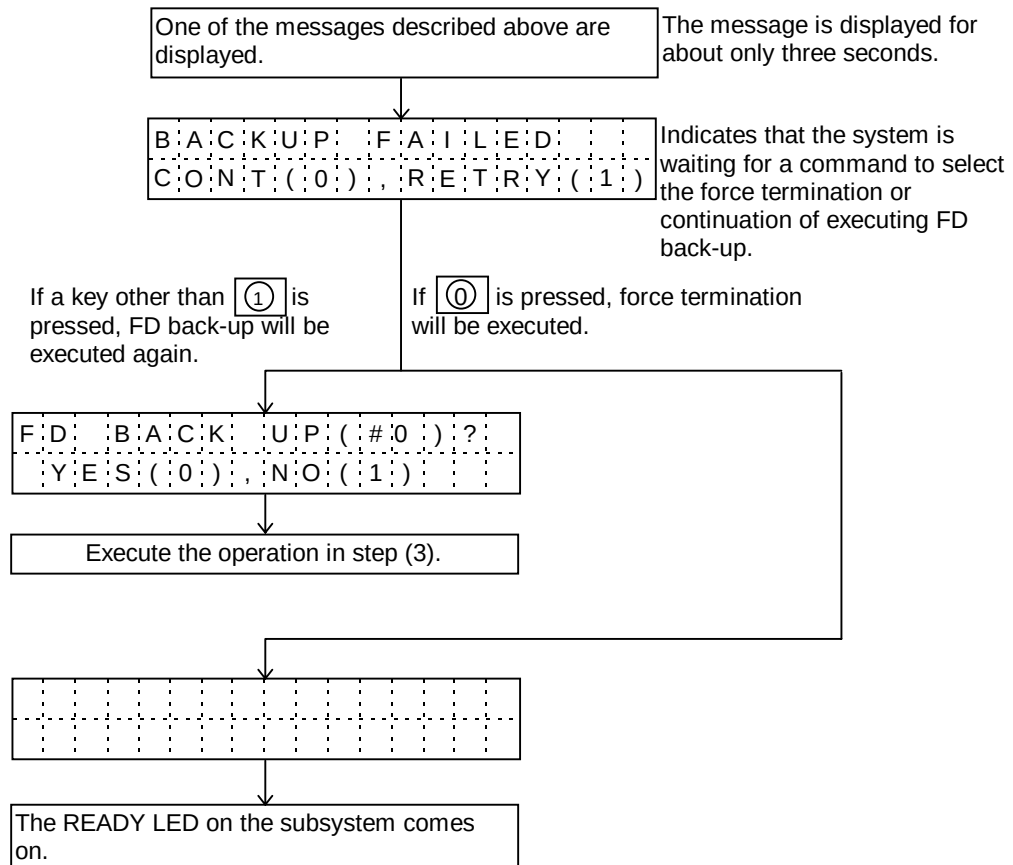


Figure 2.3.2 DIP Switches

Note 1 : While executing the back-up to FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute..
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

Note 4 : "SYSPRM0.DAT" or "SYSPRM1.DAT" file is stored in system parameter backed up FD. The case of optional SNMP system, SNMP configuration environment files ("Config.TXT" and "NAME.TXT") are stored with system parameter file.

Note 5 : In case with optional SNMP system and system parameter is restored without SNMP configuration environment files, Subsystem becomes ready without SNMP function. In this case, the warning lamp on the panel comes on and one of messages below is shown on PANEL.

W	0	1	6	0	1	F	D	E	R	R		
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	2	F	O	P	N	E	R	R
V	E	R	S	I	O	N	=	X	X	X	X	/X

This case, re-restore the subsystem with a FD in which SNMP configuration environment files is stored.

2.3.2 Restoring procedures from FD

(1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.

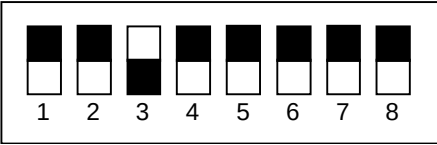
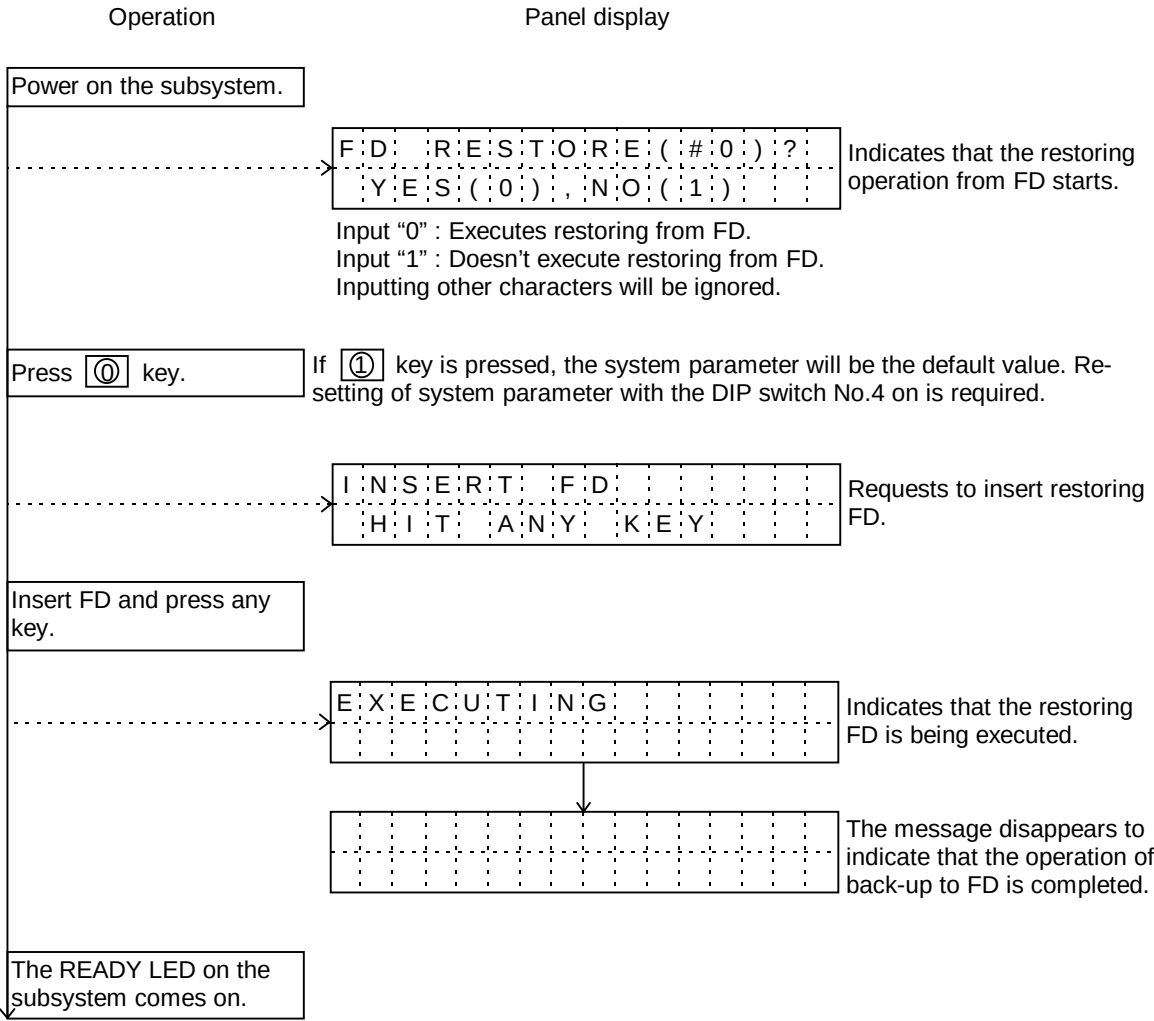


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

(2) Operate as described below.



(3) Set DIP switch No.3 as shown in Figure 2.3.4.

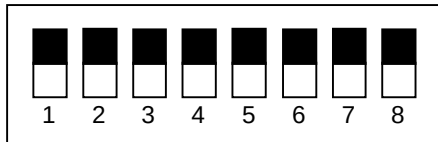
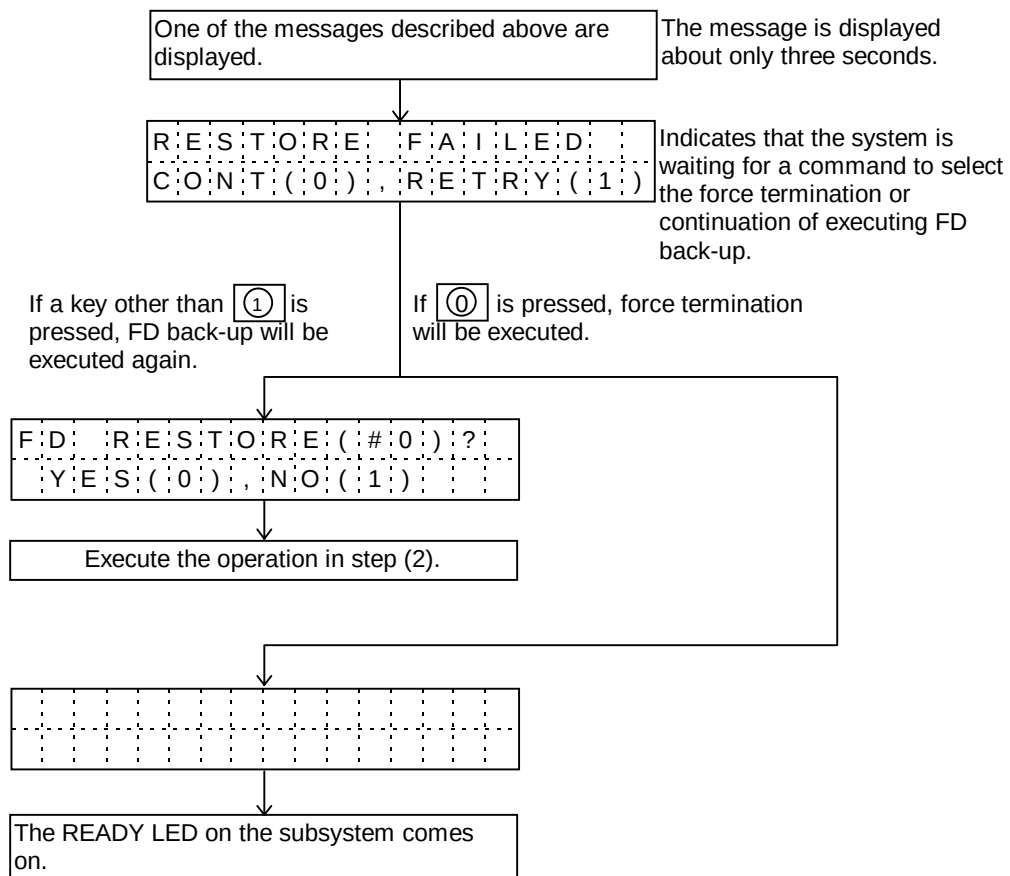


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-restore the system following the operation described below.



Note 2 : In case that restoring operation ended in failure and force terminated, setting of system parameter will be with default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

3. Opening/Closing the Front Cover and Removing/Installing the Cover

3.1 Opening/Closing the Front Cover (See Figure 3.1.)

- (1) Insert the key attached to the subsystem into the keyhole and turn it clockwise. Pull the left of the front cover to your side to open it.
- (2) Gently close the cover. Insert the key attached to the subsystem into the keyhole and turn it counterclockwise.

Note : Open/Close the front cover gently to avoid a shock. Precision components are installed.

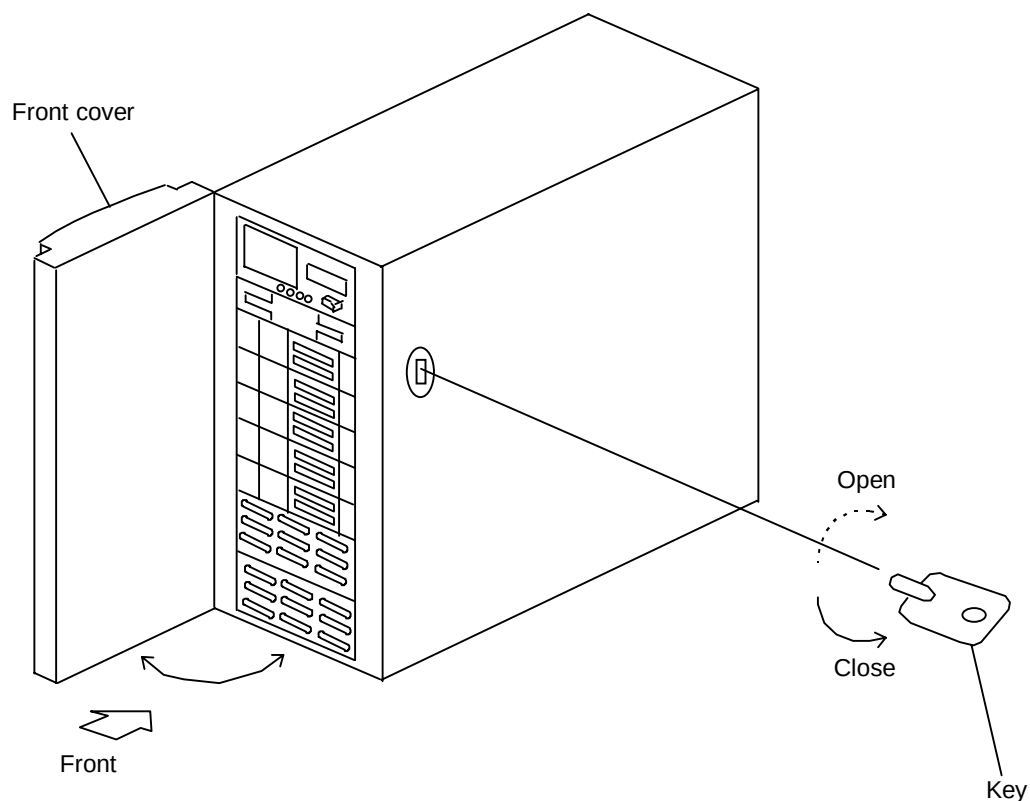


Figure 3.1 Opening/Closing Front Cover

3.2 Removing/Installing the Cover. (See Figure 3.2.)

(1) Removing procedure

- ① Open the front cover. (See DK-REP0160.)
- ② Removing the I/F ADAPTER ASSY. (See DK-REP0280.)
- ③ Loosen 6 screws (a).
- ④ Pull the cover up.

(2) Installing procedure

- ① Attach the cover in the reverse order step (1).

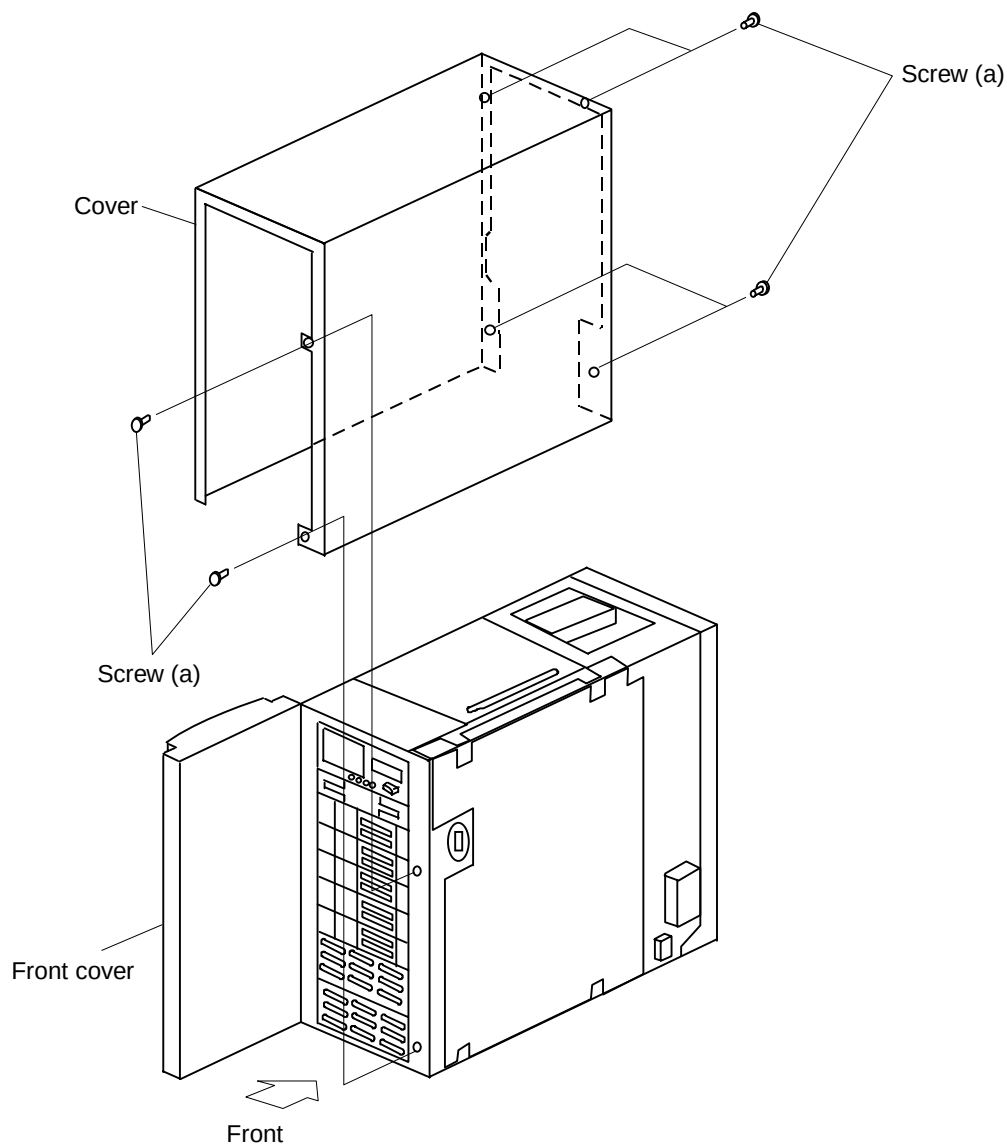


Figure 3.2 Removing/Installing the Cover

4. Replacing HDU ASSY

The method of replacing HDU varies depending on the RAID configuration.

When replacing the HDU ASSY, confirm the RAID configuration of the subsystem beforehand, and follow the procedure below according to the configuration.

To confirm the RAID configuration, refer to page PANEL0390 (3.3.2 (1) Reference/setting menu of RAID configuration information.)

Notice : Be sure to replace the HDU ASSY with the power kept on. (This procedure is except for when the Micro-Disk version is 0303 or earlier.)**

Proceed the replacement and the data recovery following the procedure below. RAID Specification of replacing HDU can be seen on the panel display. (See PANEL0390.)

Notice : If you delete or re-format the set-up RAID group or LU, user's data in that will be deleted. Be sure to back-up copy the user's data before these operation.

4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration

4.1.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

The replacement procedure differs depending on whether the Micro_Disk version is 0303** (** is optional) or earlier, or 0304** (** is optional) or later. Confirm the version first, then execute the replacement following the procedure determined according to the version.

When the Micro_Disk version is 0303** (** is optional) or earlier

- (1) Turn the subsystem power off according to the powering off procedure (see page DK-REP0050).
- (2) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY (Disk) Replacement Procedure" on page DK-REP0220.
- (3) Turn the subsystem power on according to the powering on procedure (see page DK-REP0050). Following messages will be displayed on the panel when a disk of row 0 is replaced.

I00DXY SYS-CP-XY----- Starting system area recovery

I00EXY SYSRCV-XY----- Completing system area recovery

X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)

If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (4) Execute an LU formatting. For the LU formatting procedure, see page DK-INST0690.
- (5) Restore the data using the backed up data.

When the Micro_Disk version is 0304** (** is optional) or later

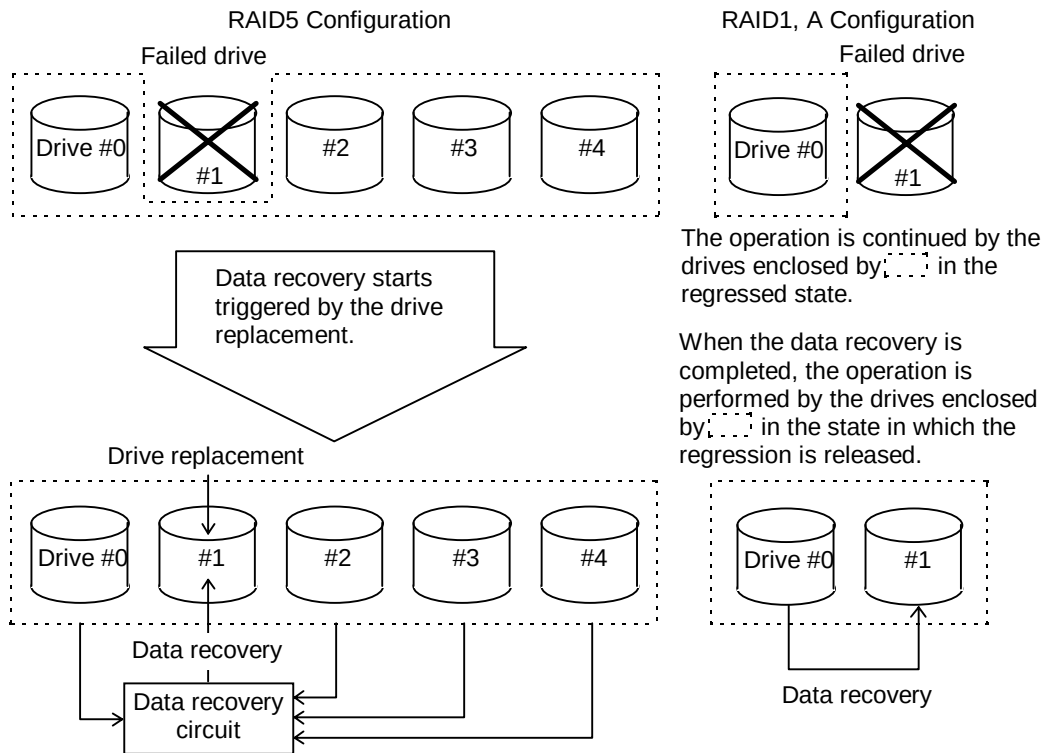
- (1) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY Replacement Procedure" on page DK-REP0220.
- (2) In a short time after the disk is inserted, the ALARM lamp on the HDU ASSY goes out and the READY lamp comes on. If the inserted disk is that of row 0, following messages will be displayed on the panel.
I00DXY SYS-CP-XY----- Starting system area recovery
I00EXY SYSRCV-XY----- Completing system area recovery
X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)
If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (3) Execute an LU formatting. For the LU formatting procedure, see page DK-INST0690.
- (4) Restore the data using the backed up data.

4.2 Procedure of Data Recovery and HDU Replacement Under RAID1, 5, A Configuration

When a failure occurred at a HDU ASSY, replace the failed HDU with a spare HDU.

To replace a HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See DK-REP0220.) With the replacement, data in the failed HDU will be automatically recovered. The panel display is described at “① Transition of panel display”. (See DK-REP0210.)

Note : When DRIVE MAINT (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINT again).



In the following cases, the recovery will not start automatically. Operation to start the recovery is required.

- (1) When the drive recovery mode is set to “NOT AUOTMATIC MODE”, the data recovery will not start automatically when the drive is replaced.

In this case, it is necessary to instruct recovery from the panel. (For further details, refer to the Hitachi Disk Array Subsystem Panel Operation Manual.)

4.2.1 Transition of panel display

I00DXY SYS-CP-XY : Start of system area recovery (*)
I00EXY SYSRCV-XY : Completion of system area recovery (*)
I010XY RCV-ST-XY : Start of data area recovery
I011XY RCVEND-XY : Completion of data area recovery
I005XY DRVRCV-XY : Completion of drive recovery

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the drive under recovery.

* : Only with the replacement of HDU in Row = 0.

4.2.2 Confirming completion of data recovery

Select DRIVE MAINT (RECOVER STATUS) with the panel and check to see that the data recovery is completed normally (COMP).

4.2.3 When the data recovery fails (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(1) Data recovery onto the replacement drive

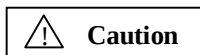
(a) When the faulty portion is the replaced drive (PORT X, ROW Y)

- Replace the drive again.
- Make sure that the data recovery is completed normally (COMP).

(b) When the faulty portion is other than the replaced drive

- Remove and insert the replaced drive and start data recovery again.
- Check to see that the data recovery is completed normally (COMP). When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. Ask for an instruction. When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive.

4.3 HDU ASSY Replacement Procedure (See Figure 4.3.1.)



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

(1) Removing procedure

- ① Open the front cover. (See DK-REP0160.)
- ② Check to see the drive installing location of the message text DRVALM-XY (XY indicates the installing location) on the panel is correct and the ALARM LED of the HDU ASSY is on.

W	2	0	2	X	Y	D	R	V	A	L	M	-	X	Y

X : Port number

Y : Row number

- ③ Open the handle in the direction of the arrow (···➤) and pull it out and remove the HDU ASSY.

(2) Installing procedure

- ① Open the handle fully, insert the HDU ASSY in place, and rotate the handle in the direction of the arrow (→).

 **Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

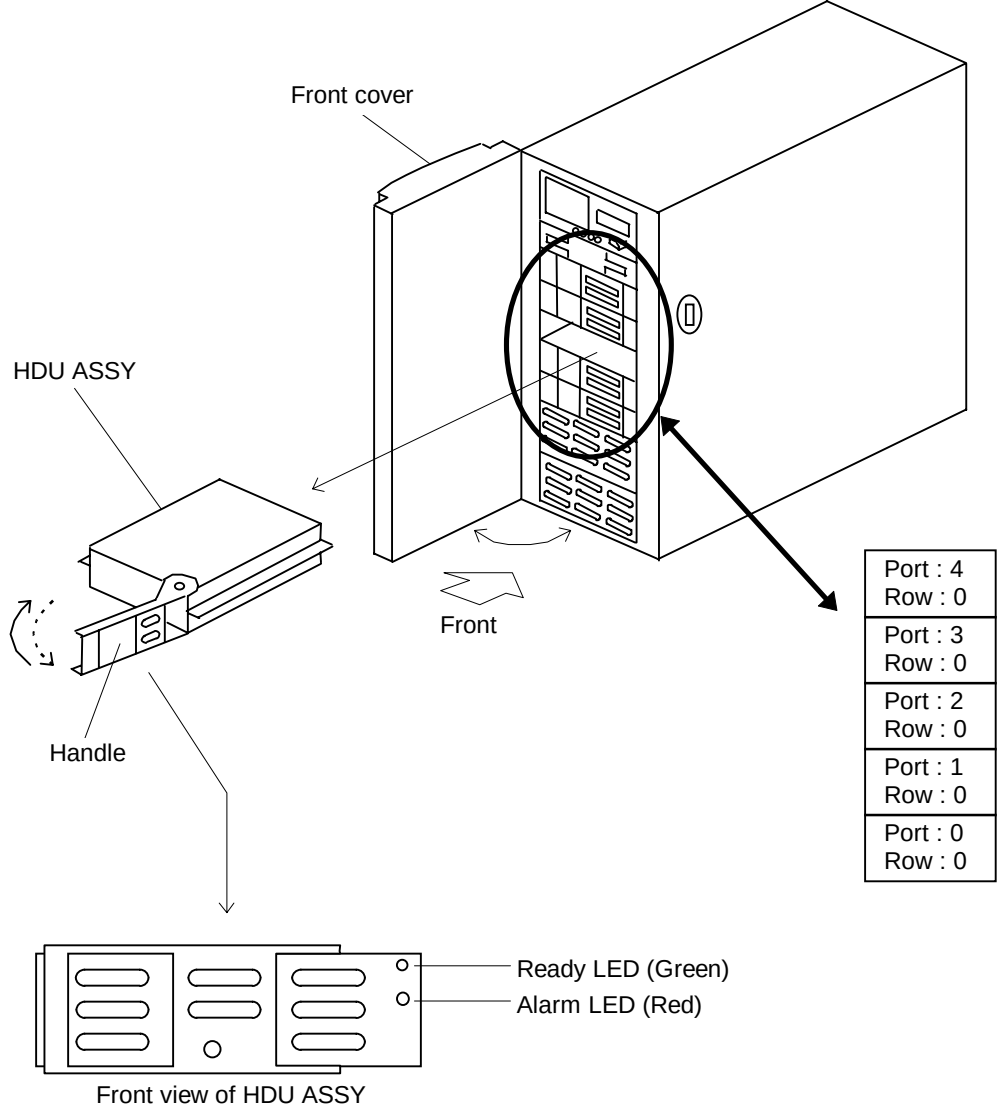
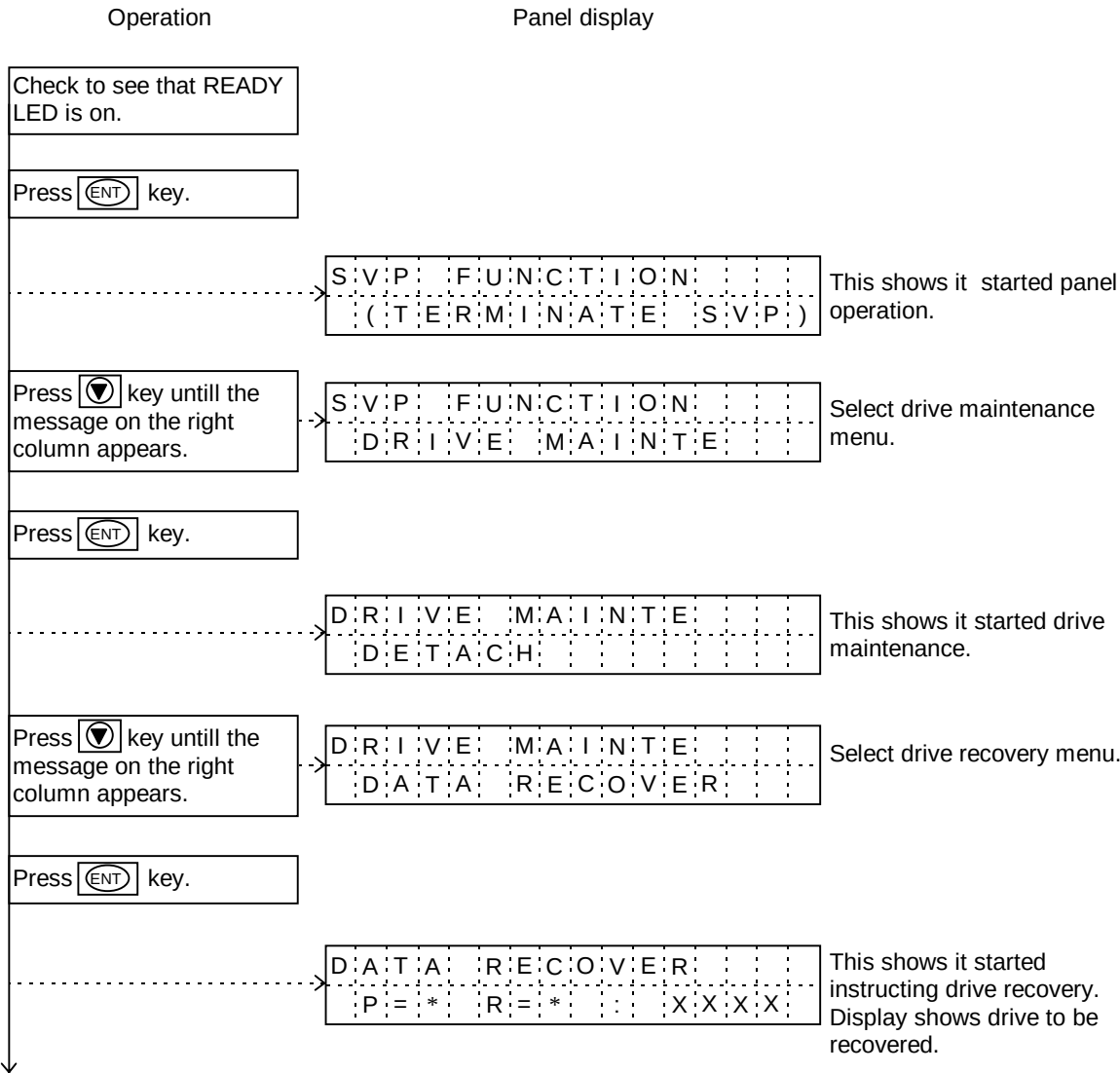


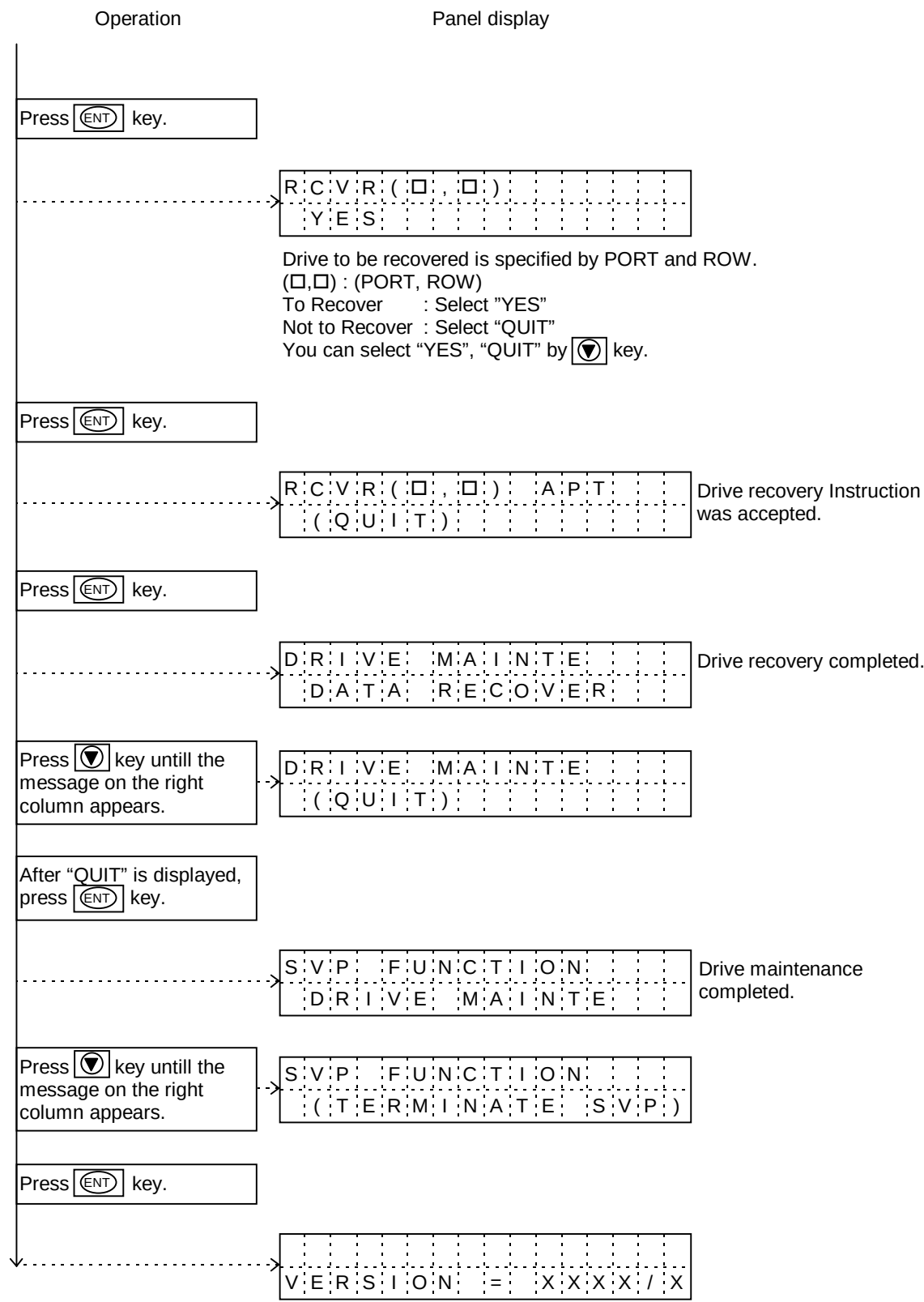
Figure 4.3.1 Replacing HDU ASSY

4.4 Manual Instruction of Data Recovery

This is for manually instructing data recovery. You can operate this function under device ready and LU#0 instituted (LU can be not formatted yet).



- P=* : Port# of Drive to be recovered.
R=* : Row# of Drive to be recovered.
XXXX : Status of Drive to be recovered. Status is one of below.
- STDBY (not used)
 - DETACH (blocked)
 - NO : (RAID, LU not set yet)



5. Replacing FDD ASSY (See Figure 5.1.)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Open the front cover. (See DK-REP0160.)
- ② Loosen the screw (a), and pull the FDD ASSY to your side.

(2) Installing procedure

- ① Insert the FDD ASSY into the right place and tighten the screw (a).
- ② Close the front cover. (See DK-REP0160.)

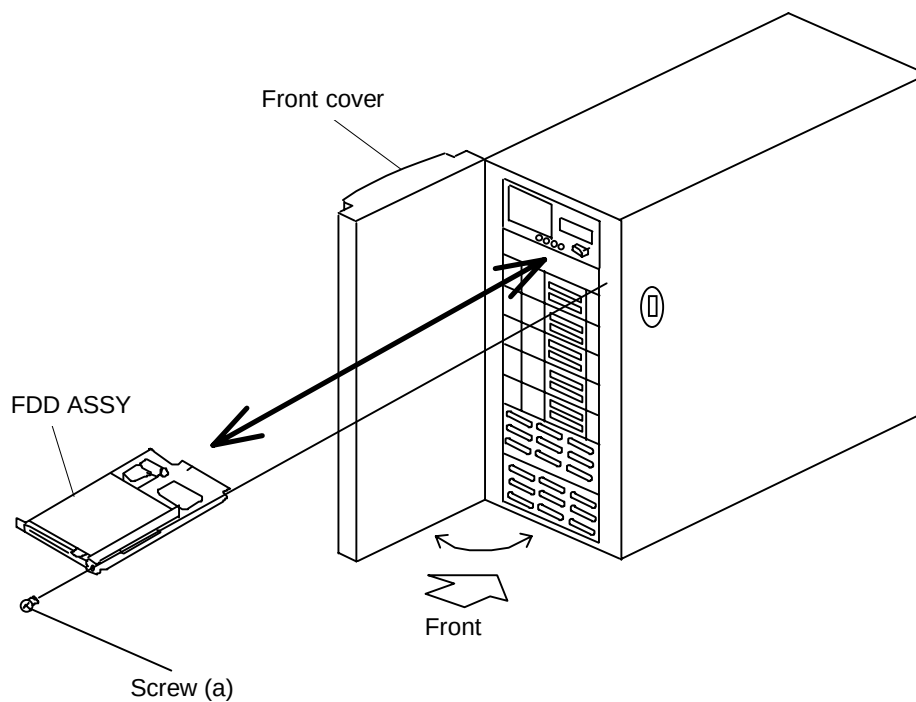
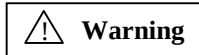


Figure 5.1 Replacing FDD ASSY

6. Replacing AC/DC Power Supply (See Figure 6.1.)



**Only the maintenance personnel can perform this replacement.
The operation by the user is prohibited.**

Tool : Phillips screwdriver (No.2)

Because the desk top (DK) type is equipped with a redundant power supply as a standard, a hot replacement of the power supply is possible.

(1) Removing

- ① Open the front cover. (See DK-REP0160.)
- ② Loosen the screw (a). (See Figure 6.1.)
- ③ Pull the AC/DC power supply to your side.

(2) Installing

- ① Insert the AC/DC power supply into the right place.
- ② Tighten the screw (a).
- ③ Close the front cover. (See DK-REP0160.)

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Open the front cover. (See DK-REP0160.)
- ③ Loosen the screw (a). (See Figure 6.1.)
- ④ Pull the AC/DC power supply to your side.

(5) Installing

- ① Insert the AC/DC power supply into the right place.
- ② Tighten the screw (a).
- ③ Close the front cover. (See DK-REP0160.)

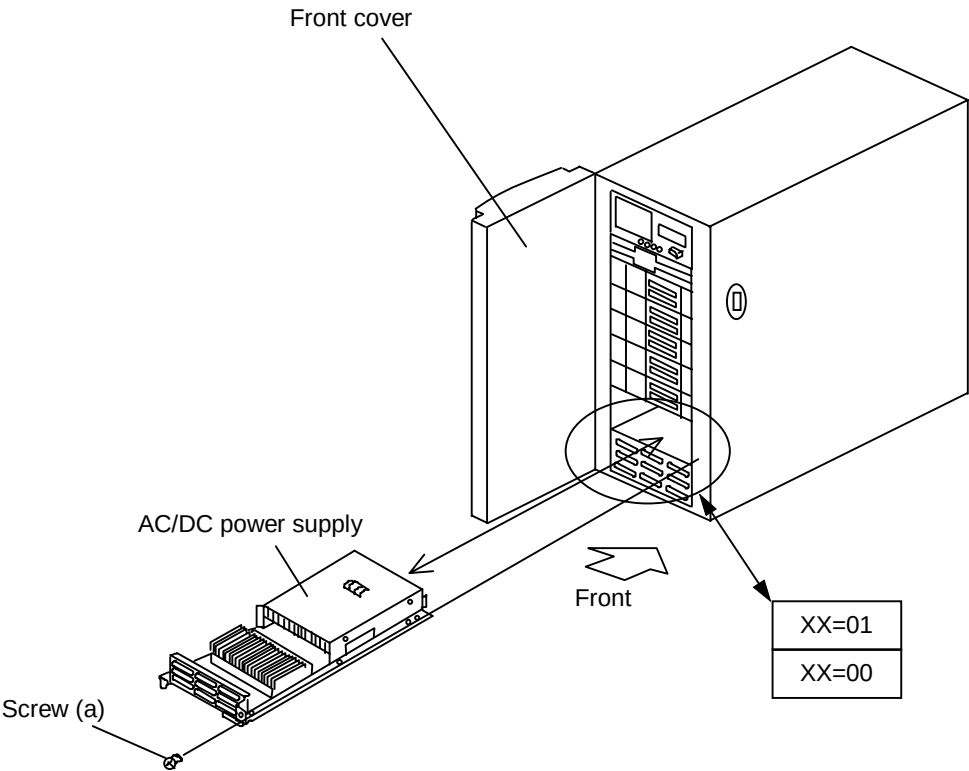


Figure 6.1 Replacing AC/DC Power Supply

7. Replacing I/F ADAPTER ASSY (See Figure 7.1 and Table 7.1)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- ③ Disconnect the SCSI cable, the terminator, LAN cable (option) and the RS232C cable.
- ④ Loosen the 2 screws (a).
- ⑤ Pull the I/F ADAPTER ASSY toward you to remove it by its handle.

(2) Installing procedure

- ① Make the setting of the terminator power, (JP1, JP2) as the setting of removed I/F ADAPTER ASSY.
- ② Turn the switch on the Battery ASSY to ON (Up position).
- ③ Attach the I/F ADAPTER ASSY in the reverse order step (1).

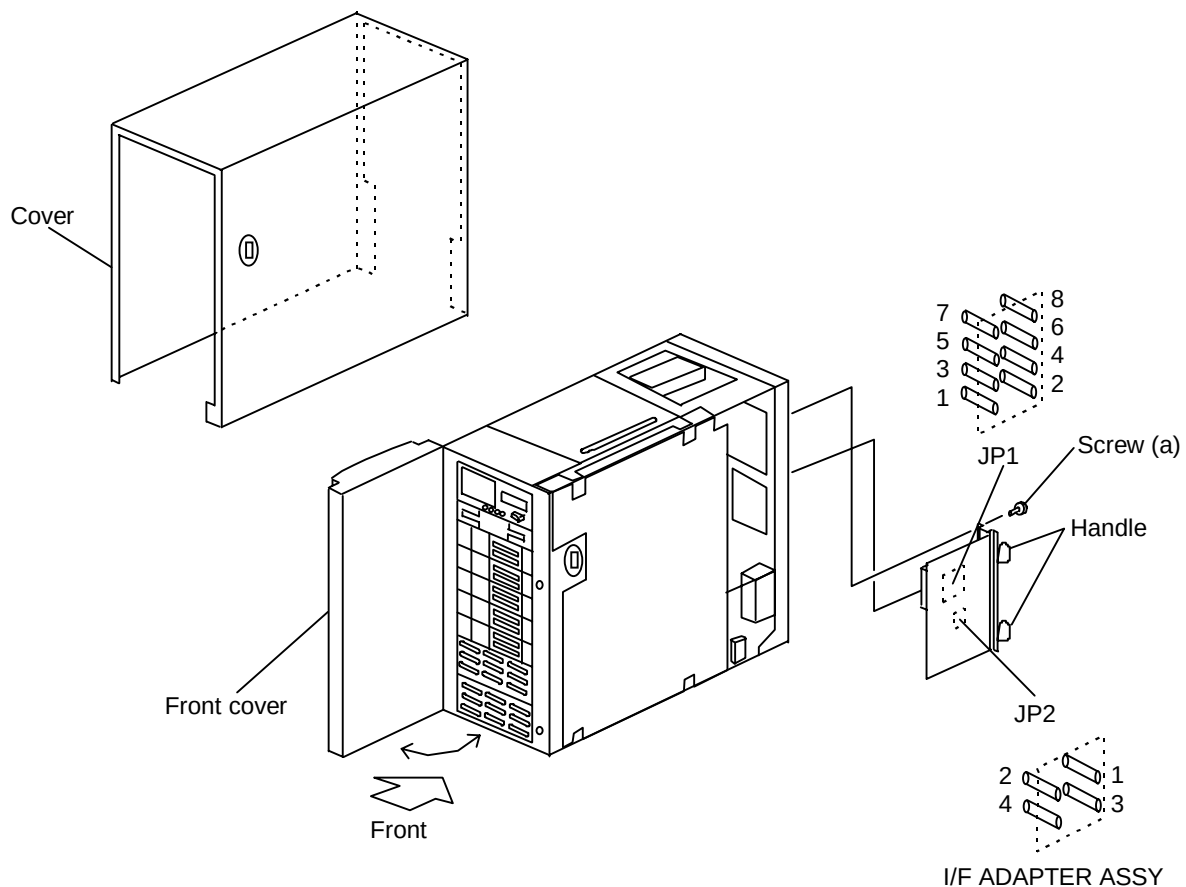
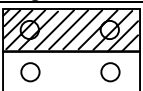
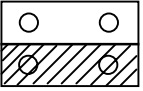
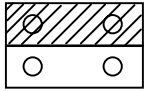
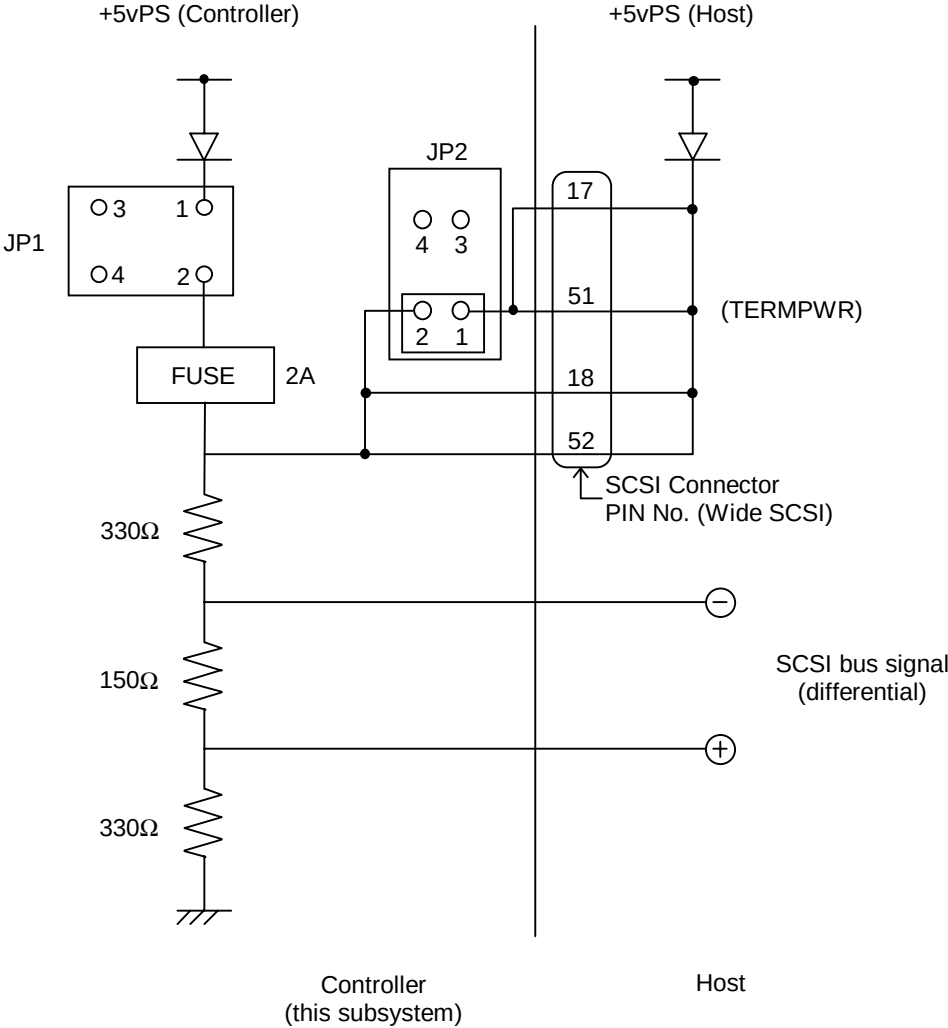


Figure 7.1 Replacing I/F ADAPTER ASSY

Table 7.1 Setting the Terminator Power

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2	JP2		Be sure to set this jumper with the pins 1 and 2 short-circuited.



8. Replacing PANEL(OP) ASSY (See Figure 8.1.)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, tuen on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
 - ③ Open the front cover. (See DK-REP0160.)
 - ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
 - ⑤ Remove the cover. (See DK-REP0170.)
 - ⑥ Loosen the screw (a).
 - ⑦ Pull the PANEL(OP) ASSY to your side.
- ### (2) Installing procedure
- ① Attach the cover in the reverse order step (1).

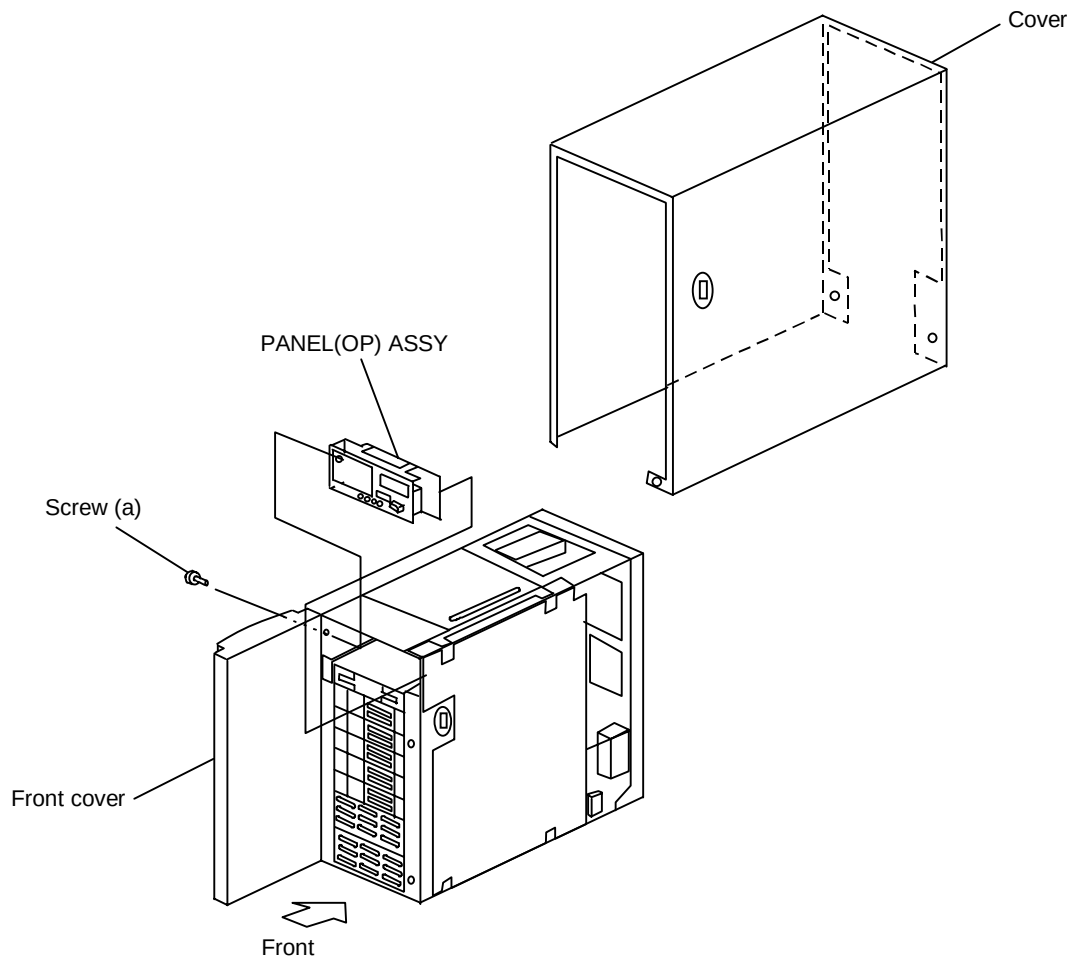


Figure 8.1 Replacing PANEL(OP) ASSY

9. Replacing CTL ASSY

The replacement procedure differs depending on the Micro_Disk version. Confirm the version first, then execute the replacement following the procedure determined according to the version.

- (1) When the Micro_Disk version is 0303** (** is optional) or earlier
Go to section 9.1 “CTL ASSY Replacement when Version is 0303** (** is optional) or earlier” on page DK-REP0330.
- (2) When the Micro_Disk version is 0304** (** is optional) or later
Go to section 9.2 “CTL ASSY Replacement when Version is 0304** (** is optional) or later” on page DK-REP0350.

9.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See DK-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

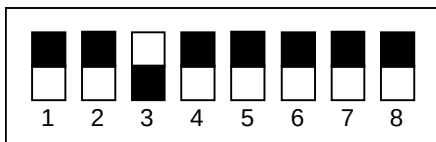
Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ③ Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- ④ Open the front cover. (See DK-REP0160.)
- ⑤ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
- ⑥ Remove the cover. (See DK-REP0170.)
- ⑦ Remove the PANEL(OP) ASSY. (See DK-REP0310.)
- ⑧ Remove the MPU Board, CACHE ASSY and LAN ASSY(option). (See DK-REP0460, 0470.)
- ⑨ Disconnect the connector (P130).
- ⑩ Remove the Power connector (P150, P160).
- ⑪ Loosen the 5 screws, and remove the SHIELD PLATE.
- ⑫ Remove the CTL ASSY.

(2) Installing procedure

- ① Attach the CTL ASSY in the reverse order step (1).
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Turn on the subsystem following the power-on procedure explained in DK-REP0050.
- ④ Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ⑤ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑥ Turn off the according to the power off procedure in DK-REP0050.
- ⑦ Turn on the power according to the power on procedure in DK-REP0050. (Soon, the ASSY will enter the ready status.)

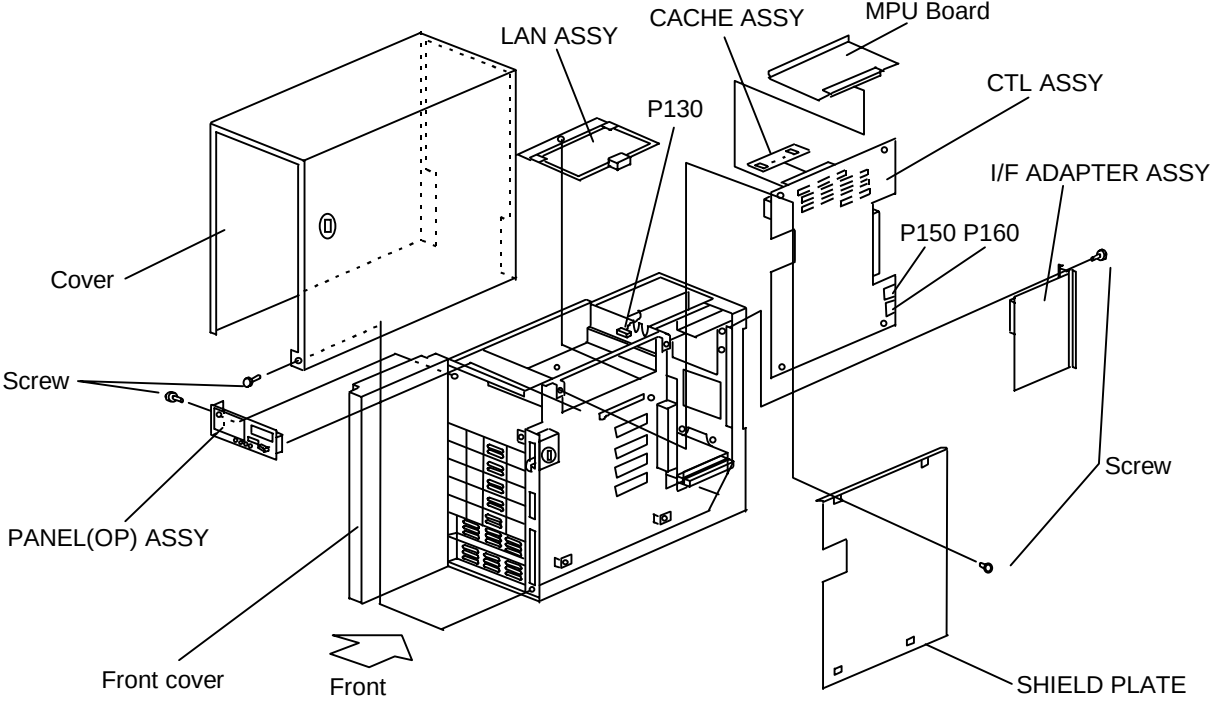


Figure 9.1.1 Replacing CTL ASSY

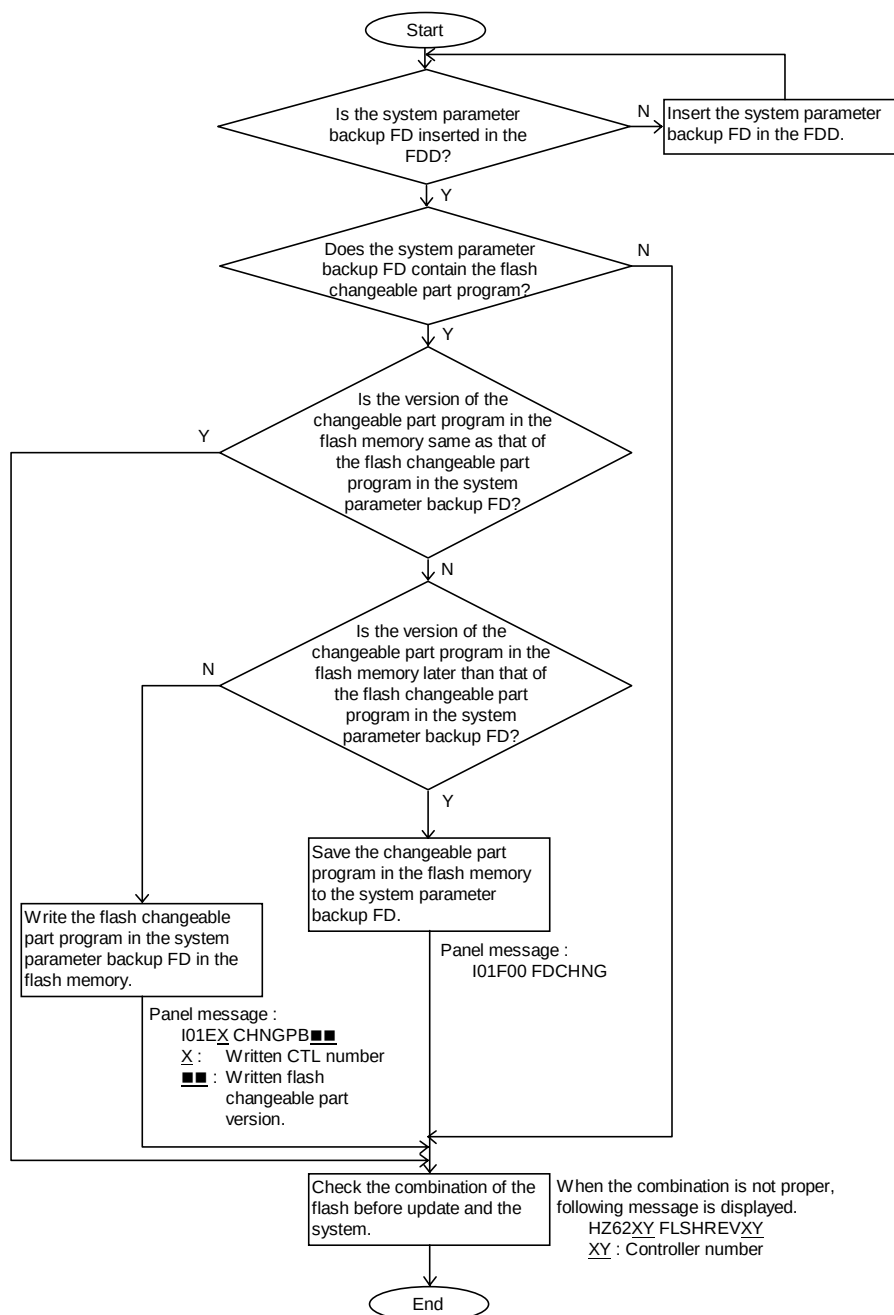
9.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later

The automatic updating function of the flash changeable part is added to the subsystem whose Micro_Disk version is 0304** (** is optional) or later. To use the function the system parameter backup FD must be inserted. By using the function, service person can replace the CTL ASSY without giving care to the combination of the Micro_Disk version and the flash changeable part version of the CTL ASSY.

(If the system parameter backup FD is not inserted when replacing the CTL ASSY, prepare the CTL ASSY whose flash changeable version is the same as that of the CTL ASSY to be replaced, or PB26 or later, and execute the replacement following the procedure explained in Section 9.1 "CTL ASSY Replacement when Version is 0304** (** is optional) or earlier".)

Outline of flash changeable part automatic updating function

The following is a processing flow of the flash changeable part automatic updating function. This processing is performed by the Micro_Disk of version 0304** (** is optional) or later.



(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.

(See DK-REP0090.)

- ② Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

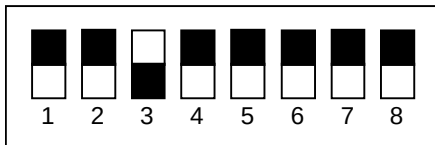
Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ③ Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- ④ Open the front cover. (See DK-REP0160.)
- ⑤ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
- ⑥ Remove the cover. (See DK-REP0170.)
- ⑦ Remove the PANEL(OP) ASSY. (See DK-REP0310.)
- ⑧ Remove the MPU Board, CACHE ASSY and LAN ASSY(option). (See DK-REP0460, 0470.)
- ⑨ Disconnect the connector (P130).
- ⑩ Remove the Power connector (P150, P160).
- ⑪ Loosen the 5 screws, and remove the SHIELD PLATE.
- ⑫ Remove the CTL ASSY.

(2) Installing procedure

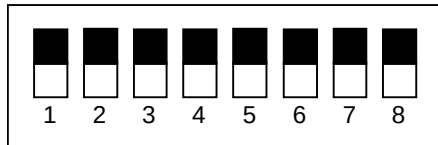
- ① Attach the CTL ASSY in the reverse order step (1).
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Turn on the subsystem following the power-on procedure explained in DK-REP0050.
- ④ Prepare the FD in which the system parameter was copied in (1) ①.
- ⑤ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
Version = XXXX/X	Subsystem READY LED comes on.	Go to step ⑥
I01EX CHNGPB■■■ HZ62XY FLSHREVXY X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	Subsystem ALARM LED comes on. (Version of flash changeable part was updated to PB■■■. Current system cannot operate with the flash changeable part whose version is not updated.)	Operation1 : Return the DIP switch of the CTL ASSY. Operation2 : Turn off the power following the powering off procedure shown on page DK-REP0050. Operation3 : Turn on the power following the powering on procedure shown on page DK-REP0050. Check if the following message is displayed on the panel. Version = XXXX/X Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see DK-REP0390), then go to step ⑥.
I01EX CHNGPB■■■ Version = XXXX/X X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed.	Subsystem READY LED comes on. (Version of flash changeable part was updated to PB■■■. Current system can operate with the flash changeable part whose version is not updated.)	Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see DK-REP0390), then go to step ⑥.

- ⑥ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑦ Turn off the according to the power off procedure in DK-REP0050.
 ⑧ Turn on the power according to the power on procedure in DK-REP0050. (Soon, the ASSY will enter the ready status.)
 ⑨ Attach the cover and close the front cover.

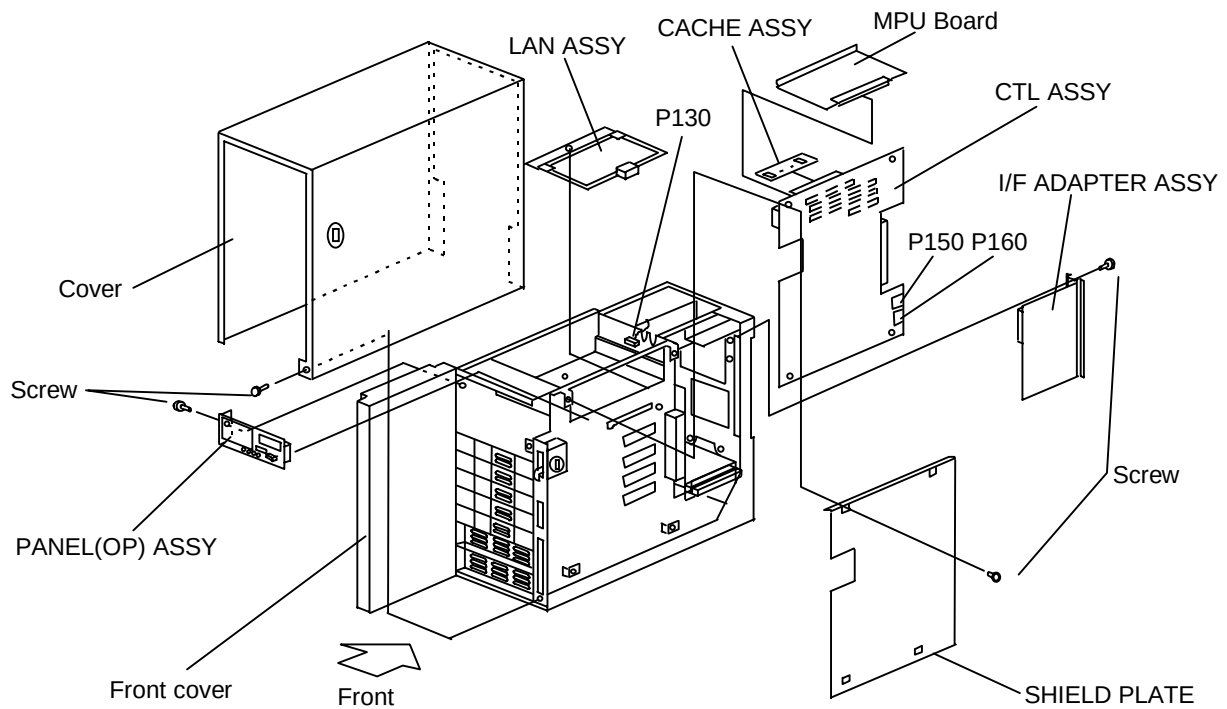


Figure 9.2.1 Replacing CTL ASSY

Painting flash revision label

Figure 9.2.2 shows how to paint the flash revision label. (It shows a case to paint the boxes up to PB26.)
Location of the label is shown in Figure 9.2.3.

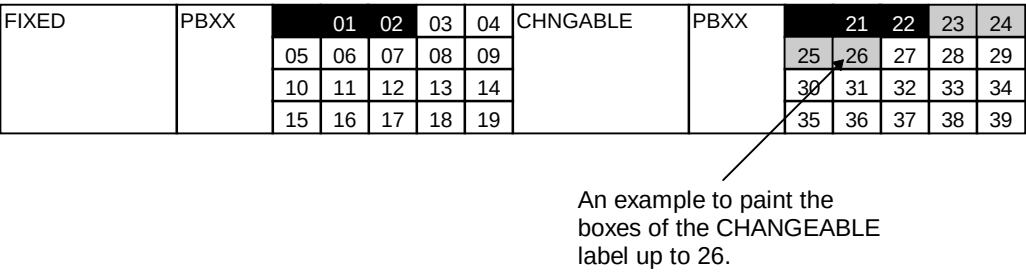


Figure 9.2.2 Revision Label Layout and Numbers to be Painted

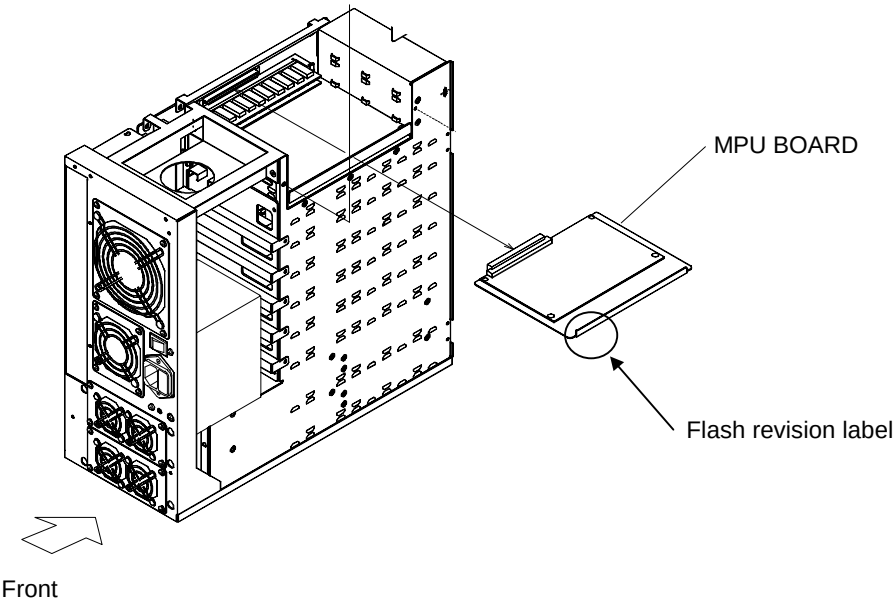


Figure 9.2.3 Location of Revision Label on CTL ASSY

10. Replacing Battery ASSY (See Figure 10.1.)

When the battery is to be replaced, read DK-REP0050, "Turning the power off" and "Turning-ON procedure" thoroughly and follow DK-REP0060, "Part Replacement Procedures".

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

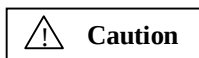
Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, tuen on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- ③ Open the front cover. (See DK-REP0160.)
- ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
- ⑤ Remove the cover. (See DK-REP0170.)
- ⑥ Disconnect the connector (P130).
- ⑦ Pull the Battery ASSY up.



Do not disintegrate removed Battery. It may cause burn or electric shock.

(2) Installing procedure

- ① Attach the Battery ASSY in the reverse order step (1).

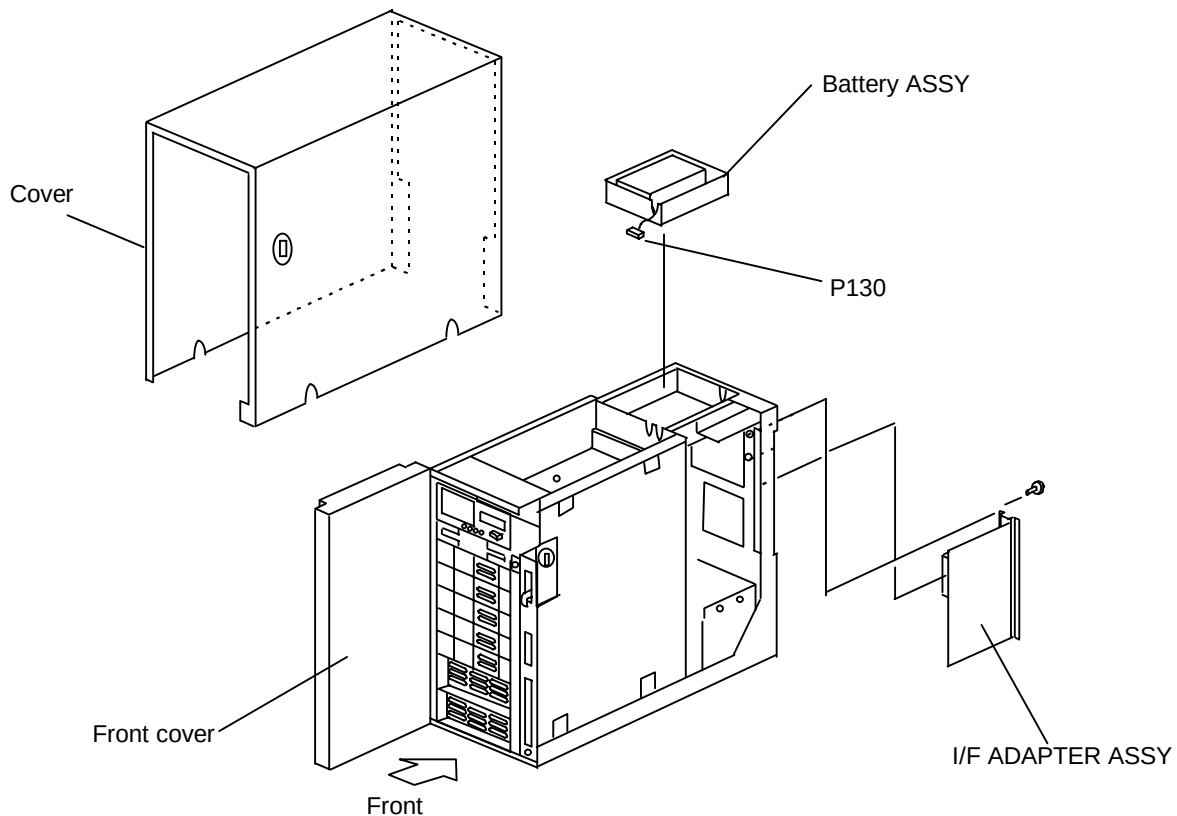


Figure 10.1 Replacing Battery ASSY

Note : The lead-acid battery is a precious resource which can be recycled.

The battery uses lead which is a heavy metal and sulfuric acid which is a deleterious substance. Therefore, never case it off at the place where the replacement of it is done.

When a part is to be replaced or a used product is to be discarded, take out the lead-acid battery to get it recycled.

See page "ENTRY0120" for the safety of depositing and storing the battery.

When the battery ASSY is replaced, power on the subsystem and charge the battery for more than two hours before returning the subsystem to the customer.

11. Replacing Fan ASSY (See Figure 11.1.)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure (FAN(U) ASSY)

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.

- ③ Open the front cover. (See DK-REP0160.)
 ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
 ⑤ Remove the cover. (See DK-REP0170.)
 ⑥ Disconnect the connector (P201/J201).
 ⑦ Loosen the 4 screws (a), and remove the Fan(U) ASSY.

(2) Removing procedure (FAN(M) ASSY)

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.

- ③ Open the front cover. (See DK-REP0160.)
 ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
 ⑤ Remove the cover. (See DK-REP0170.)
 ⑥ Disconnect the connector (P200/J200).
 ⑦ Loosen the 4 screws (b), and remove the Fan(M) ASSY.

(3) Installing procedure

- ① Attach the Fan ASSY in reverse order step (1).

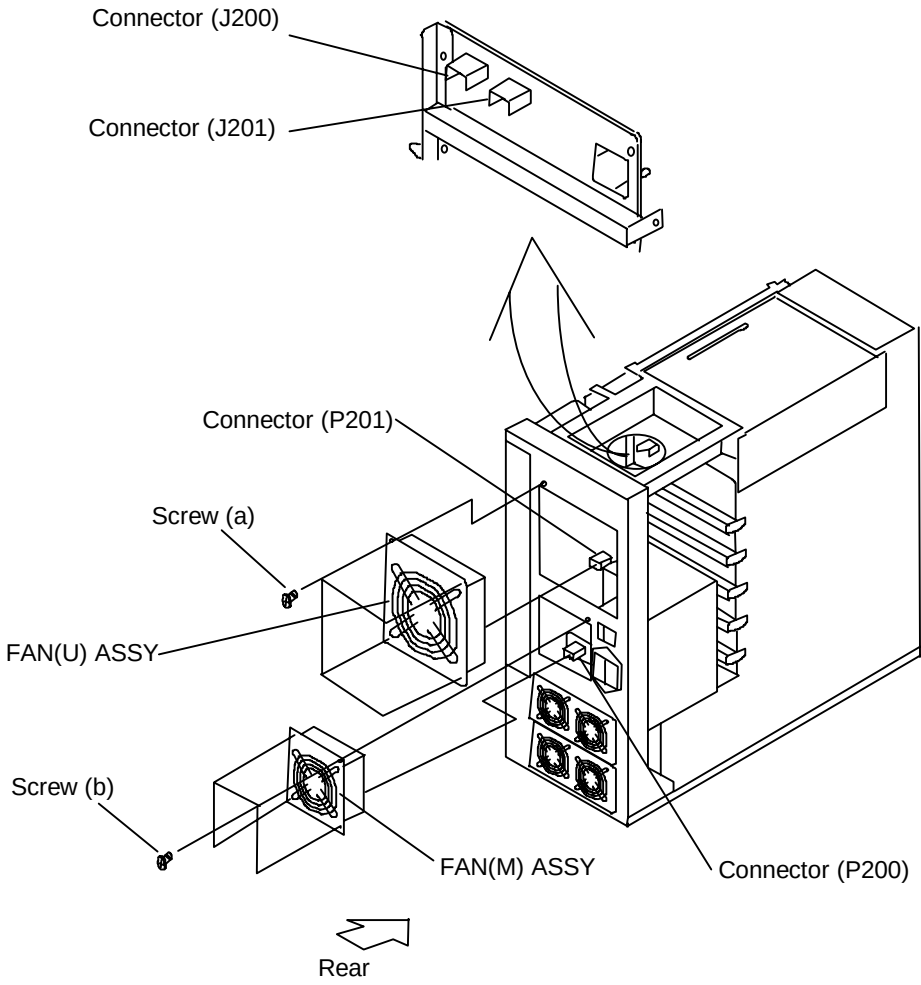


Figure 11.1 Replacing Fan ASSY

12. Replacing Fan(PS) ASSY (See Figure 12.1.)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure (FAN(U) ASSY)

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- ③ Open the front cover. (See DK-REP0160.)
- ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
- ⑤ Remove the cover. (See DK-REP0170.)
- ⑥ Loosen the 2 screws (a), and remove the BRACKET (PS-PK).
- ⑦ Disconnect the connector (FAN#00=J1/P1, FAN#01=J2/P2).
- ⑧ Loosen the 4 screws (b), and remove the FAN(PS) ASSY.

(2) Installing procedure

- ① Attach the FAN(PS) ASSY in reverse order step (1).

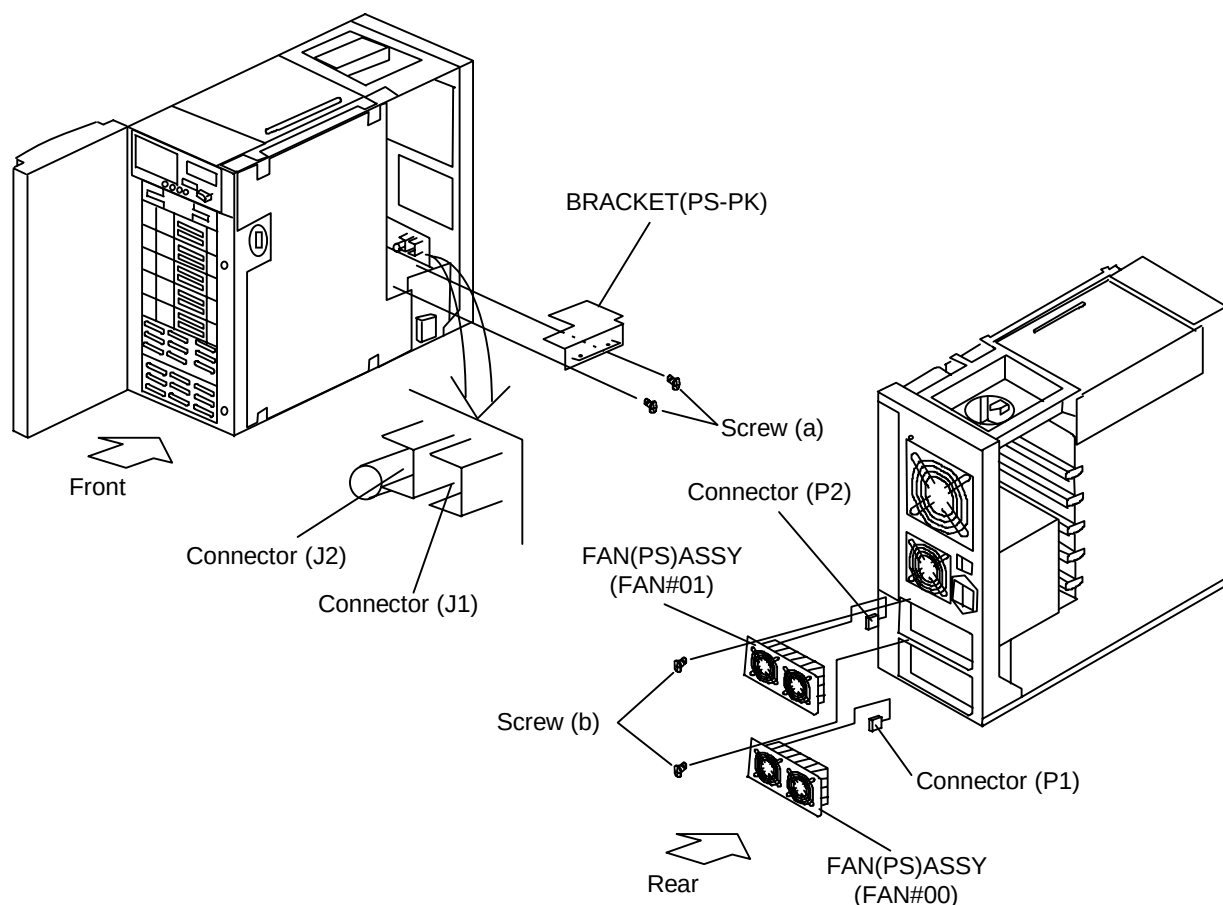


Figure 12.1 Replacing Fan(PS) ASSY

13. Replacing In Box ASSY (See Figure 13.1 and Figure 13.2.)



Warning

Do not touch inside of In Box ASSY.

Electricity remains even if main switch is off.

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- ③ Disconnect the power supply cable.
- ④ Open the front cover. (See DK-REP0160.)
- ⑤ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
- ⑥ Remove the cover. (See DK-REP0170.)
- ⑦ Remove the FAN(U) ASSY. (See DK-REP0420.)
- ⑧ Remove the FAN (M) ASSY. (See DK-REP0420.)
- ⑨ Loosen the 2 screws (a), and remove the In Box ASSY.
- ⑩ Disconnect the connector (JAC, PAC).
- ⑪ Remove the In Box ASSY.

(2) Installing procedure

- ① Attach the In Box ASSY in reverse order step (1).

Note : When performing the installation/removal of the In Box ASSY, move it as shown by the arrow in Figure 13.2.

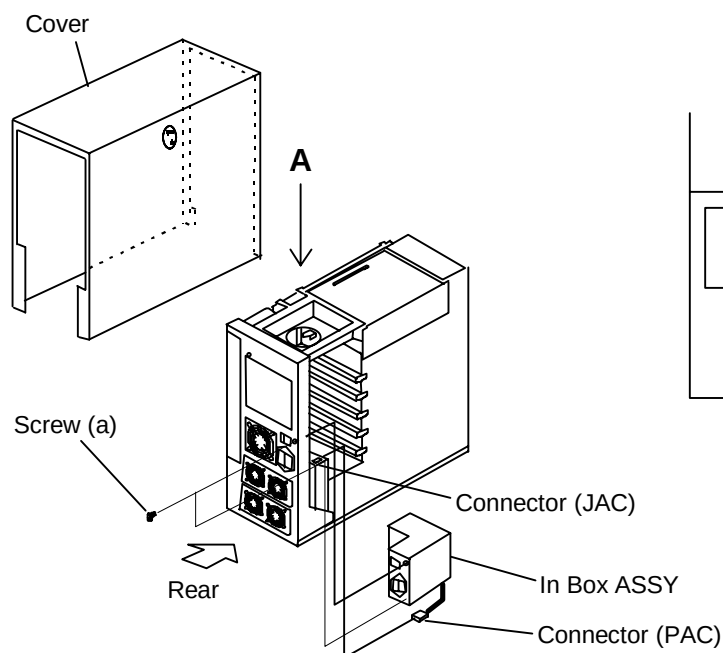


Figure 13.1 Replacing In Box ASSY

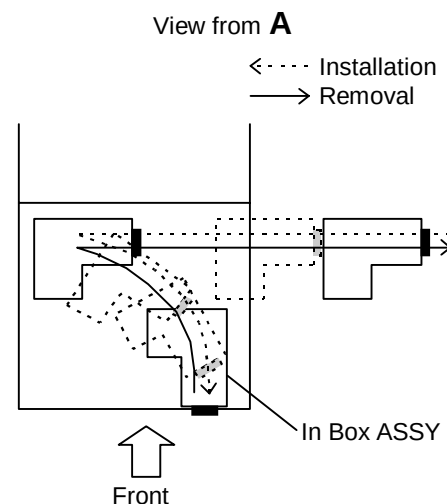


Figure 13.2 Procedure to Install/Remove In Box ASSY

14. Replacing CACHE ASSY (See Figure 14.1.)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
 ③ Open the front cover. (See DK-REP0160.)
 ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
 ⑤ Remove the cover. (See DK-REP0170.)
 ⑥ Remove the CACHE ASSY.

Notice : Slots #0 and #1 are pairs respectively. Install the cache having the same capacity for these each pair slots

(2) Installing procedure

- ① Attach the cover in the reverse order step (1).

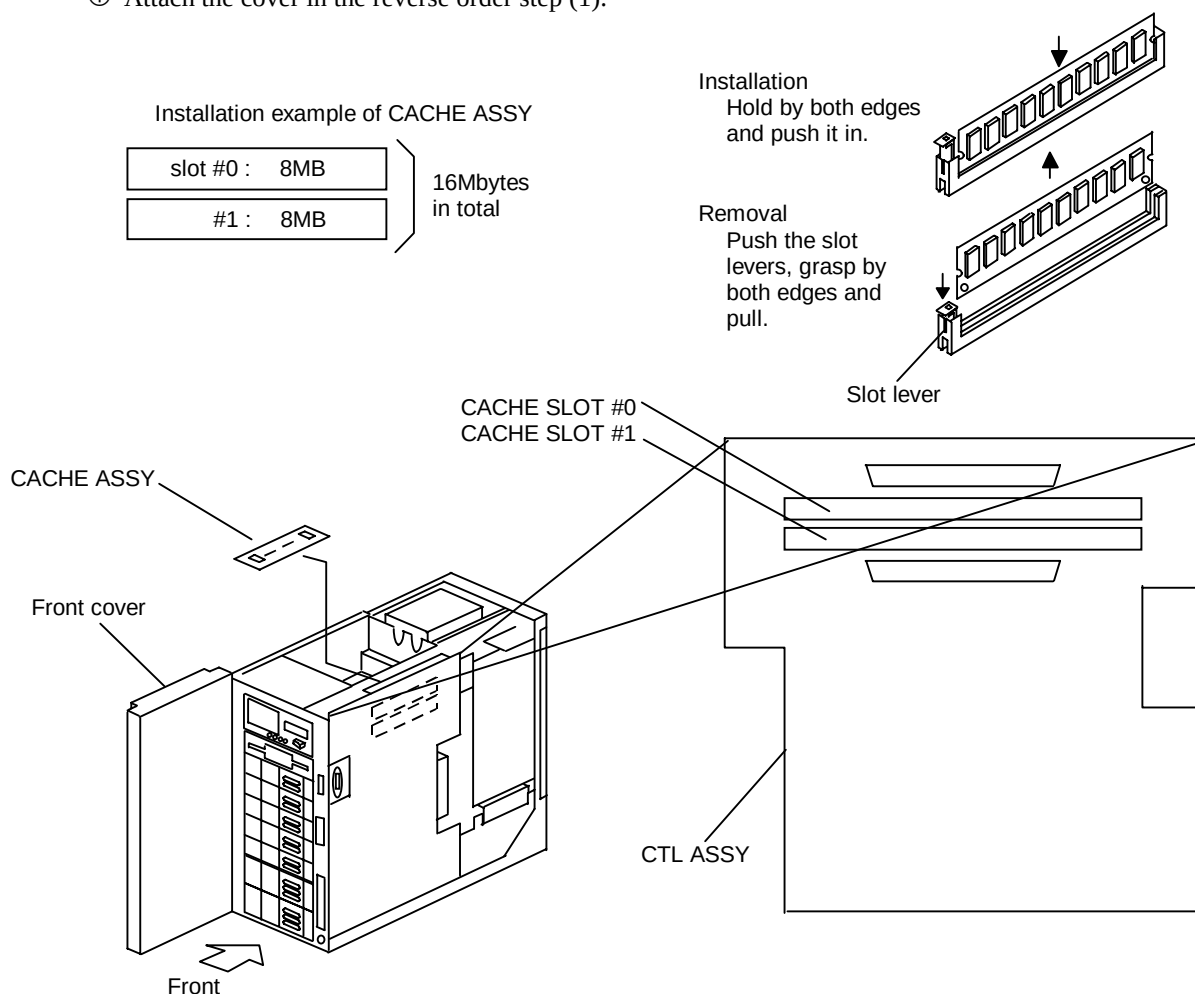


Figure 14.1 Replacing CACHE ASSY

15. Replacing LAN ASSY (See Figure 15.1.)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DK-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
 - ③ Open the front cover. (See DK-REP0160.)
 - ④ Remove the I/F ADAPTER ASSY. (See DK-REP0290.)
 - ⑤ Remove the cover. (See DK-REP0170.)
 - ⑥ Replacing the LAN ASSY.
- ### (2) Installing procedure
- ① Attach the LAN ASSY in the reverse order step (1).

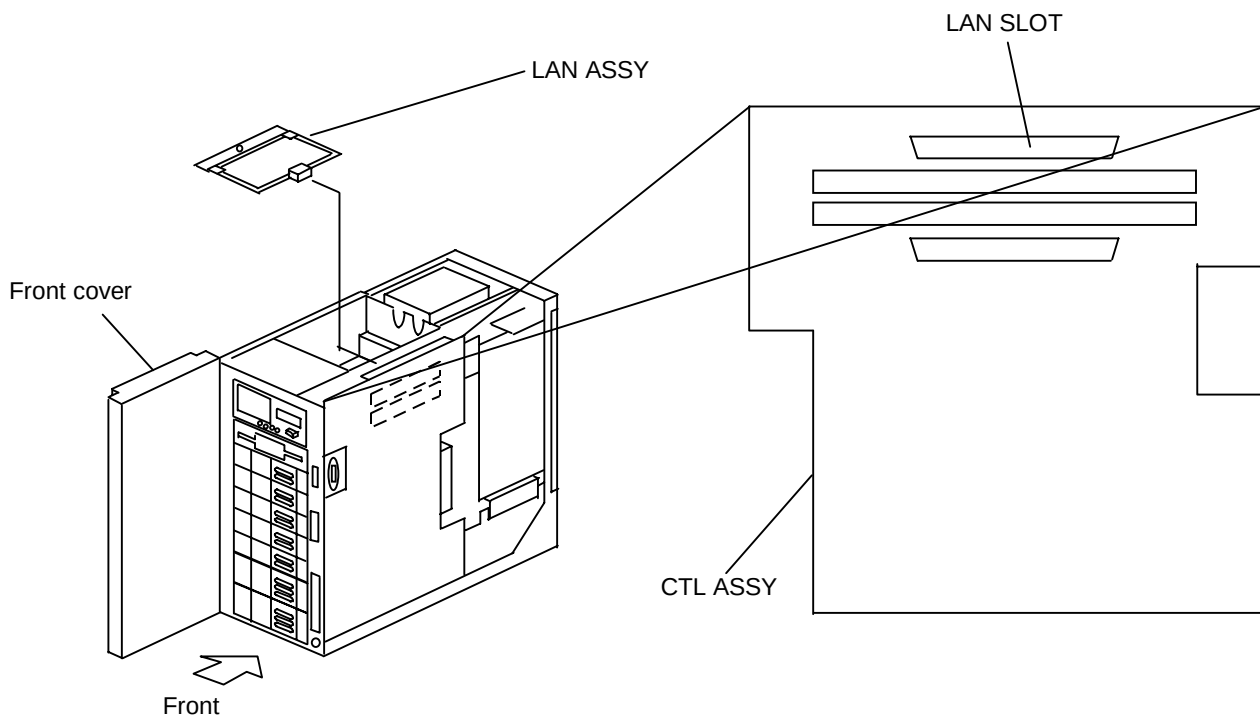


Figure 15.1 Replacing LAN ASSY

DF350 Disk Subsystem

8. INSTALLATION

(Desktop (DK) Type)

Rev.3

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	All	Issued	
1	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0505 0550 0562 0564 0650	This page was newly added. Added "Operation for defining...". This page was newly added. This page was newly added. Split RAID5.	AD AD AD AD CH
2	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0070 0080 0250 0320 0562 0650	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.) Added A2E8/E2E8. Added A2E8/E2E8. Changed Flowchart. Added A2E8 in table. Delete No.5 - 8 in table. Added A2E8.	AD AD AD CH AD DL AD
3	Oct.15.'98	A.Yamanashi			0020 0070 0080 0320 0650 0750- 0770	Added 6. Added E3E4/A3E4. Added E3E4/A3E4. Added A3E4. Added A3E4. These page were newly added.	AD AD AD AD AD AD

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1.2 Maintenance Area.....	DK-INST0030
2. Installation.....	DK-INST0040
3. Installation Procedure	DK-INST0050
3.1 Inspecting all the Components	DK-INST0050
3.1.1 Unpacking.....	DK-INST0050
3.1.2 Inspecting all the components visually	DK-INST0070
3.1.3 Inspecting the subsystem components and addendum	DK-INST0090
3.2 Install the Subsystem.....	DK-INST0100
3.2.1 Opening/Closing the Front Cover	DK-INST0100
3.2.2 Removing/Attaching the Cover.....	DK-INST0110
3.3 Setting the Power Supply.....	DK-INST0140
3.4 Setting the Subsystem Parameter	DK-INST0150
3.5 Checking the Offline Operation.....	DK-INST0160
3.6 Setting the Terminator Power and Remote/Local Mode	DK-INST0190
3.7 Connecting the SCSI Cable	DK-INST0220
4. Setting the Subsystem Parameter	DK-INST0230
4.1 Setting the System Parameter	DK-INST0230
4.2 Setting the Subsystem Configuration Information	DK-INST0470
4.2.1 Preparing of setting RAID/LU	DK-INST0480
4.2.2 Setting the RAID group.....	DK-INST0490
4.2.3 Setting LU.....	DK-INST0600
4.2.4 Setting other parameter.....	DK-INST0720
5. Returning Procedure in System Parameter Setting Menu	DK-INST0740
6. Subsystem Settings for Use in Special Modes	DK-INST0750
6.1 When outputting information whether a warning is given in the subsystem via RS232C	DK-INST0750

1. Appearance and Maintenance Area

1.1 Appearance

Figure 1.1.1 shows appearance of the DF350 disk subsystems. (Desktop (DK) type)

UNIT : mm

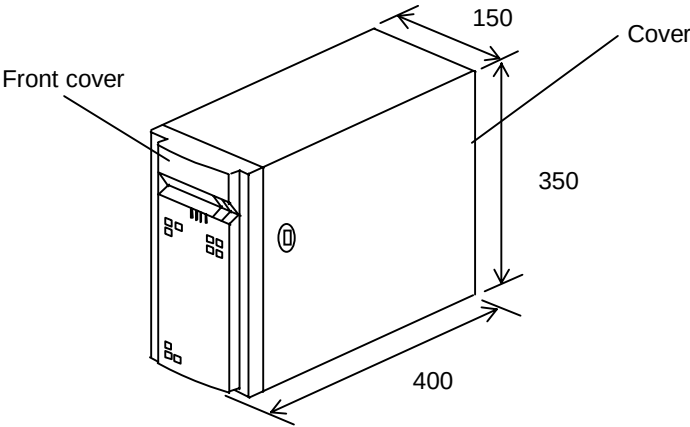


Figure 1.1.1 Appearance

1.2 Maintenance Area

Figure 1.2.1 shows maintenance area for the DF350 disk subsystems. (Desktop (DK) type)

UNIT : mm

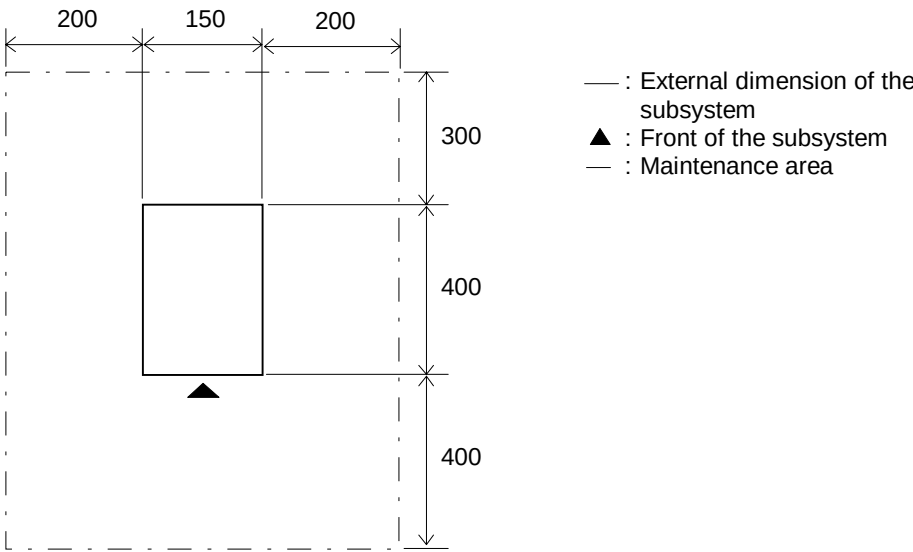


Figure 1.2.1 Maintenance Area

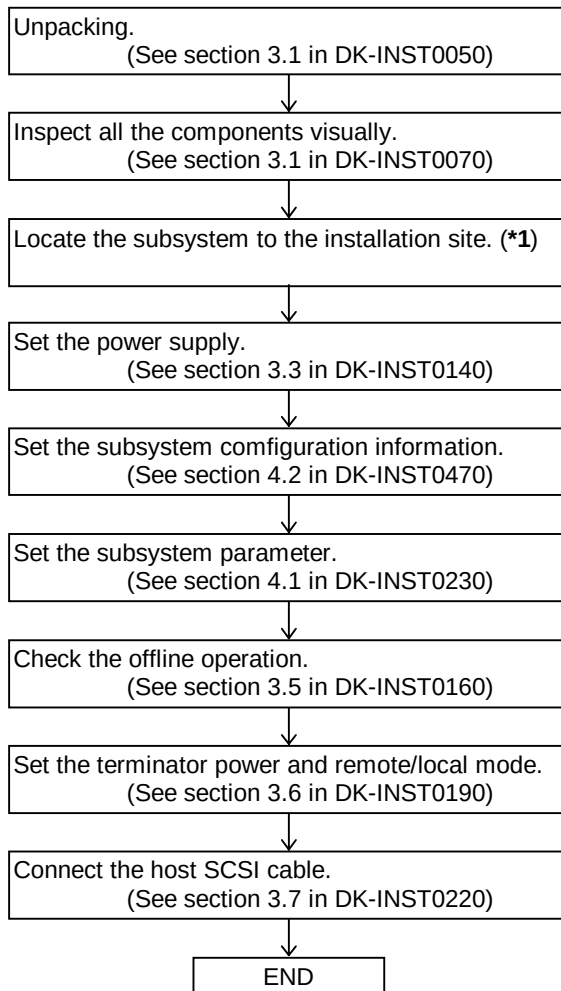
2. Installation

- (1) Tool needed for installation

Phillips screwdriver (No.2).

- (2) How to install

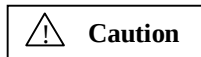
The following flow chart describes how to install the subsystem.



***1 : Place the subsystem with 30cm or more apart from the wall for both the front and the rear because of the ventilation.**

3. Installation Procedure

3.1 Inspecting all the Components



The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.

3.1.1 Unpacking

- (1) Figure 3.1.1 shows how the subsystem has been packed.
- (2) Figures 3.1.2, 3.1.3 show the subsystem without external packaging.
- (3) Unpacking
 - ① Loosen the polyester bands.
 - ② Pull out the Tri-wall nails.
 - ③ Remove the external packaging and packing materials.
 - ④ Take the subsystem out of the polyethylene bag.
 - ⑤ Keep two keys in the attached box carefully.
(These keys are used for opening/closing front covers.)
 - ⑥ Remove the cushioning materials, tape, desiccators, etc attached to the subsystem.

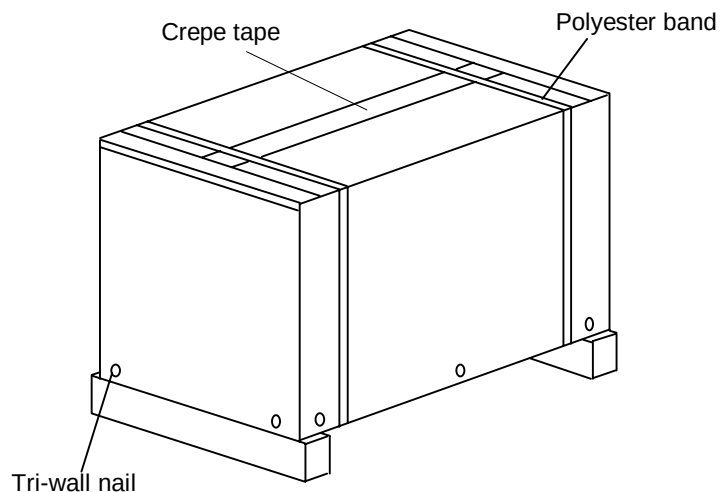


Figure 3.1.1 Subsystem being Packed

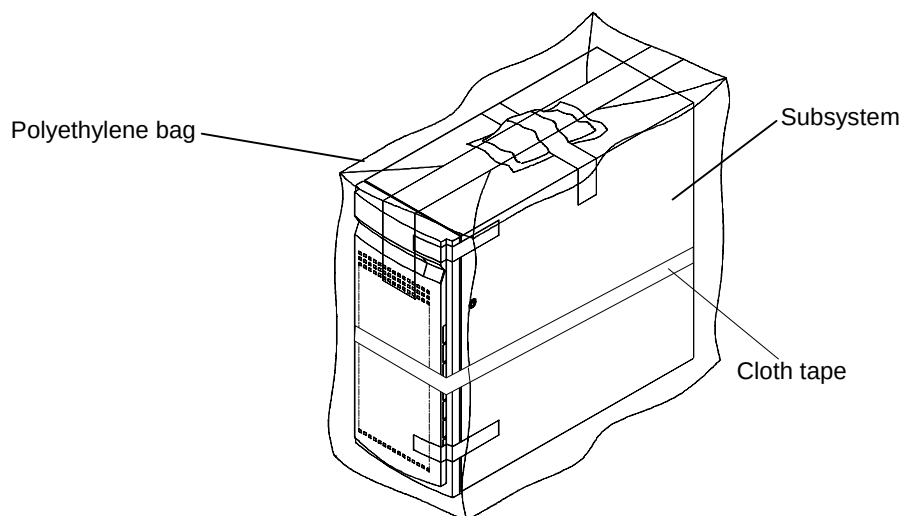


Figure 3.1.2 Subsystem without Packaging

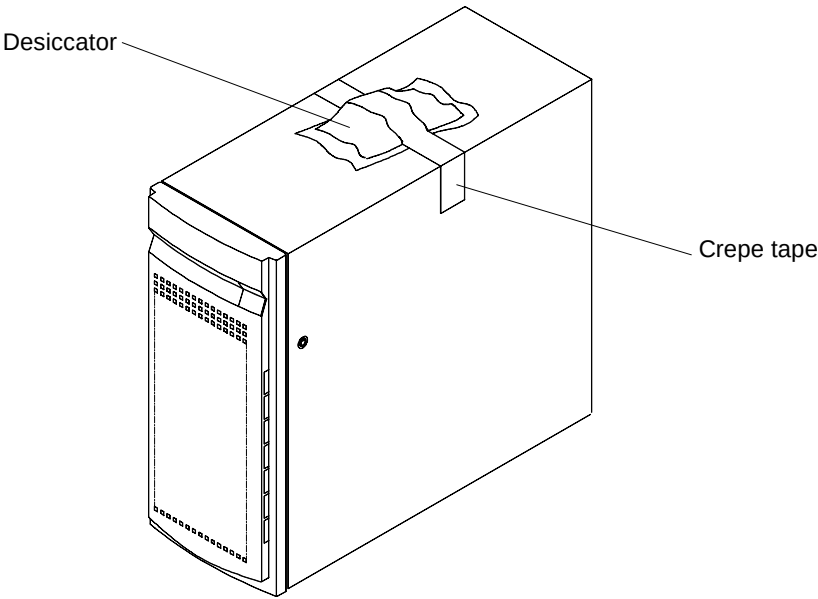


Figure 3.1.3 Location of Desiccantor

3.1.2 Inspecting all the components visually

Check the following components before installation according to a customer's configuration.

Table 3.1.1 Mandatory Features

Model Name	Specification	Quantity	Comment
DF350-DK	Desktop	1	
DF-F350-E2E2 -E2E4 -E3E4 -E2E8	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (516B Format, 8.7GB × 5)	1 (RAID 5)	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E8	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (516B Format, 8.7GB × 1)	4 (RAIDA, RAID5:3D+ 1P) 3 (RAID5 :2D+1P) 2 RAID0/1	HDU ASSY
DF-F350-DDUDS -DDUSS	Interface board (*1) for wide differential SCSI interface wide single ended SCSI interface	1	I/F ADAPTER ASSY

*1 This includes a terminator.

Table 3.1.2 Optional Features

Model Name	Specification	Quantity	Comment
DF-F350-E2E2 -E2E4 -E3E4 -E2E8	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (516B Format, 8.7GB × 5)	0 - 1	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E8	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (516B Format, 8.7GB × 1)	0 - 5	HDU ASSY
DF-F350-G1D1 -G2D1	LAN board LAN board (SNMP)	0 - 1	LAN ASSY

Table 3.1.3 Accessories

Model Name	Specification	Quantity	Comment
DF-F350-J1 -J2	Power supply cable (Connector attached to two poles with earth) (Inlet type connector, EN60320 STANDARD SHEET C14)	0 or 1	
DF-F350-K050L -K150L -K068S -K268S -K168S -K350L	Interface cable (50PL, 1.5m) (50PL, 3m) (68PS, 1.5m) (68PS, 3m) (68PS, 5m) (50PL, 5m)	0 -	
DF-F350-S1	RS232C cable	0 -	

3.1.3 Inspecting the subsystem components and addendum

This subsection describes how to install the basic components into the subsystem.
Figures 3.1.5 and 3.1.6 show mechanical configuration and parts location of this subsystem.

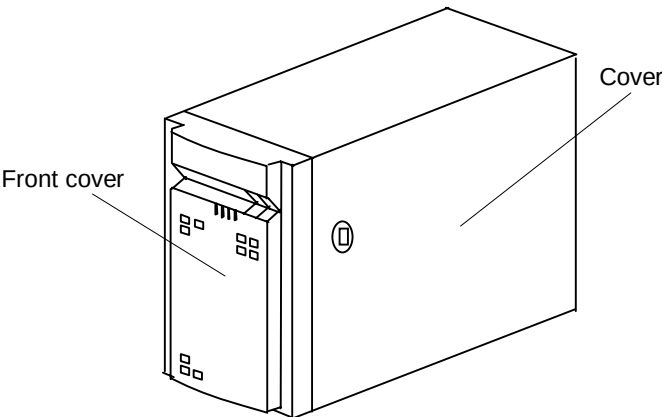


Figure 3.1.5 Appearance of DF350 Disk Subsystem (Desktop (DK) type)

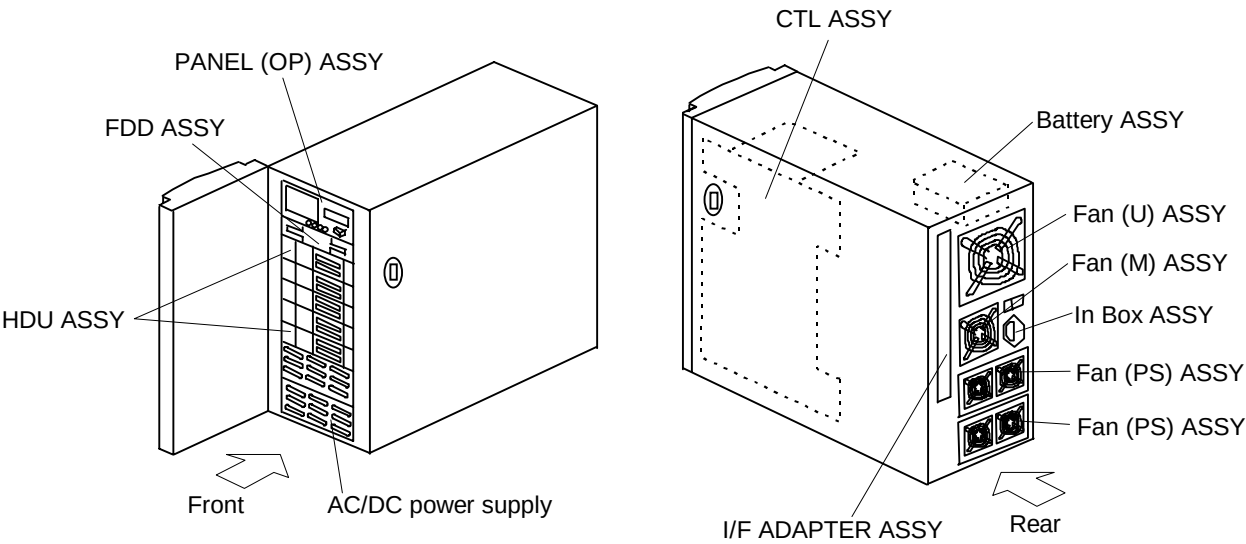
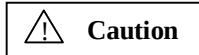


Figure 3.1.6 Parts Location

3.2 Install the Subsystem

Place the subsystem so that the front and rear is 30cm or more apart from the wall in order not to block the ventilation.



Do not block the ventilation. With the temperature rise, it may cause failure or fire.

3.2.1 Opening/Closing the Front Cover

- (1) Insert the key attached to the subsystem into the keyhole and turn it clockwise. Pull the left of the front cover to your side to open it.
- (2) Gently close the cover. Insert the key attached to the subsystem into the keyhole and turn it counterclockwise.

Note : Open/Close the front cover gently to avoid a shock. Precision components are installed.

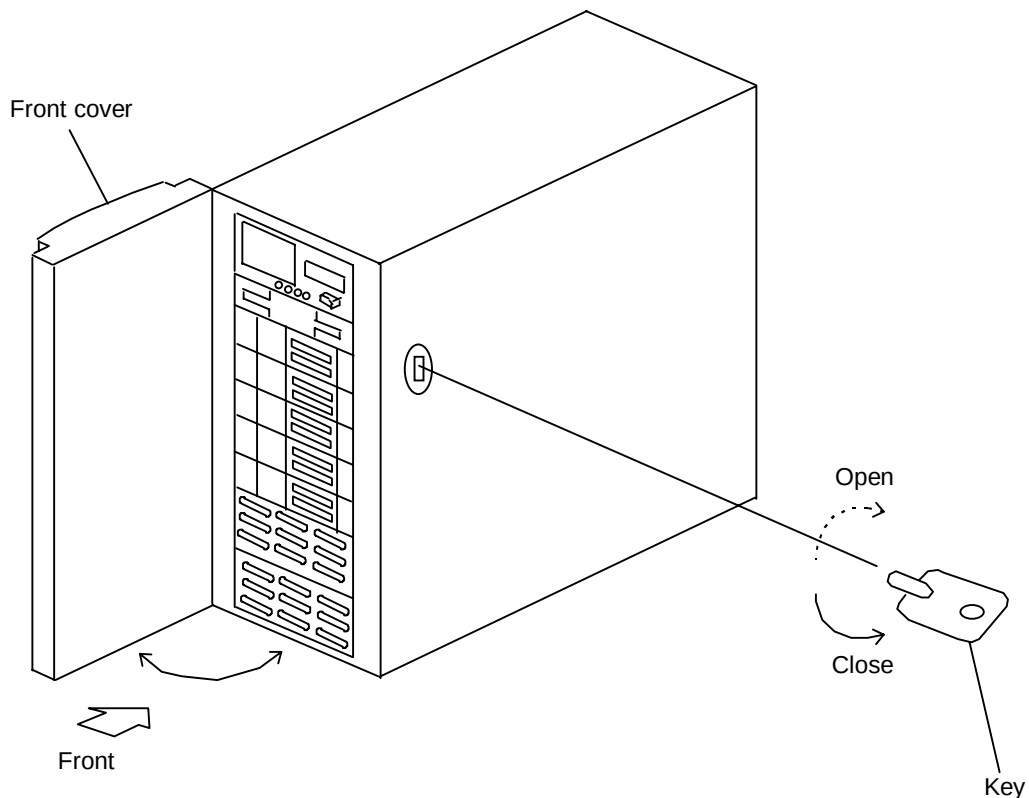


Figure 3.2.1 Opening/Closing Front Cover

3.2.2 Removing/Attaching the Cover

(1) Removing procedure

- ① Open the front cover.
- ② Removing the I/F ADAPTER ASSY.
- ③ Loosen 6 screws (a).
- ④ Pull the cover up.

(2) Installing procedure

- ① Attach the cover in the reverse order step (1).

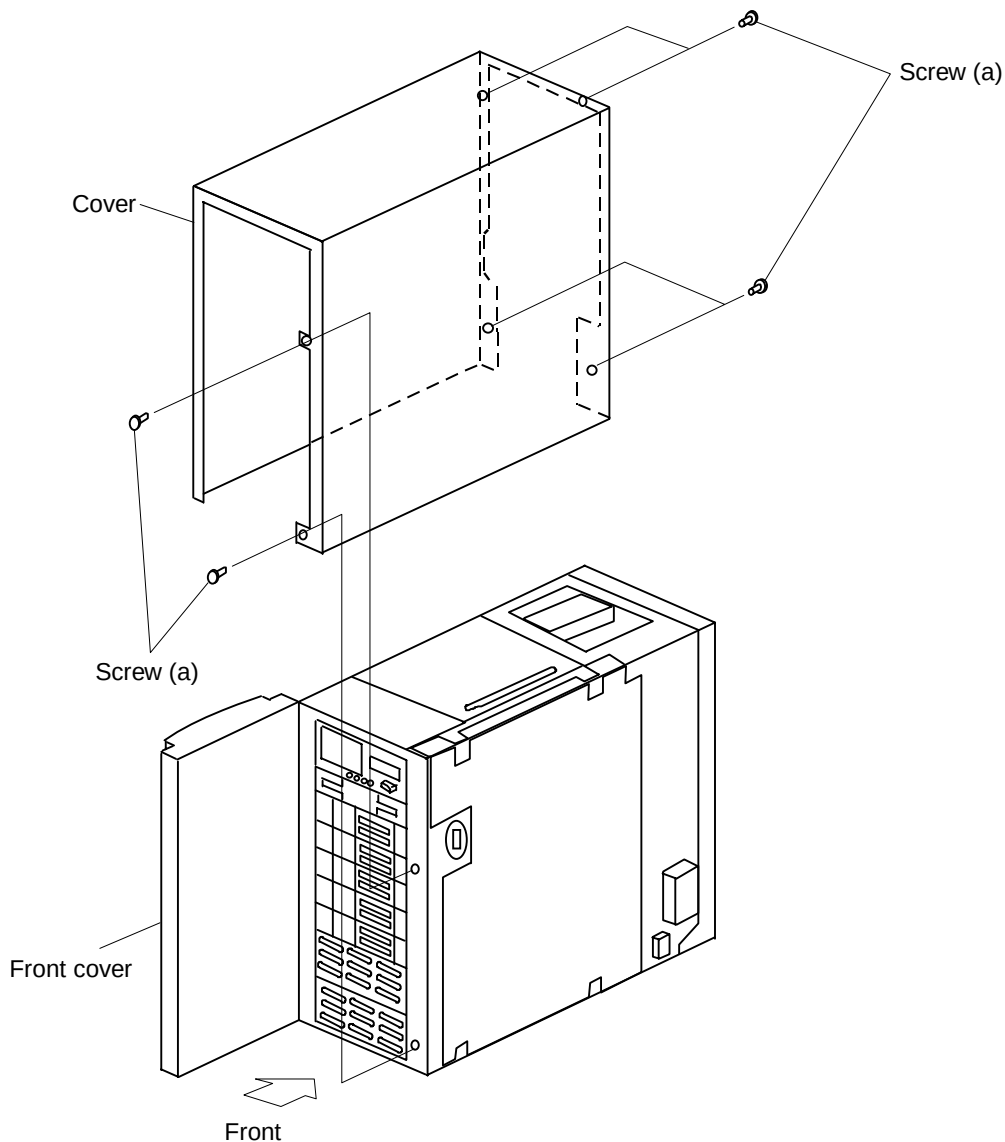


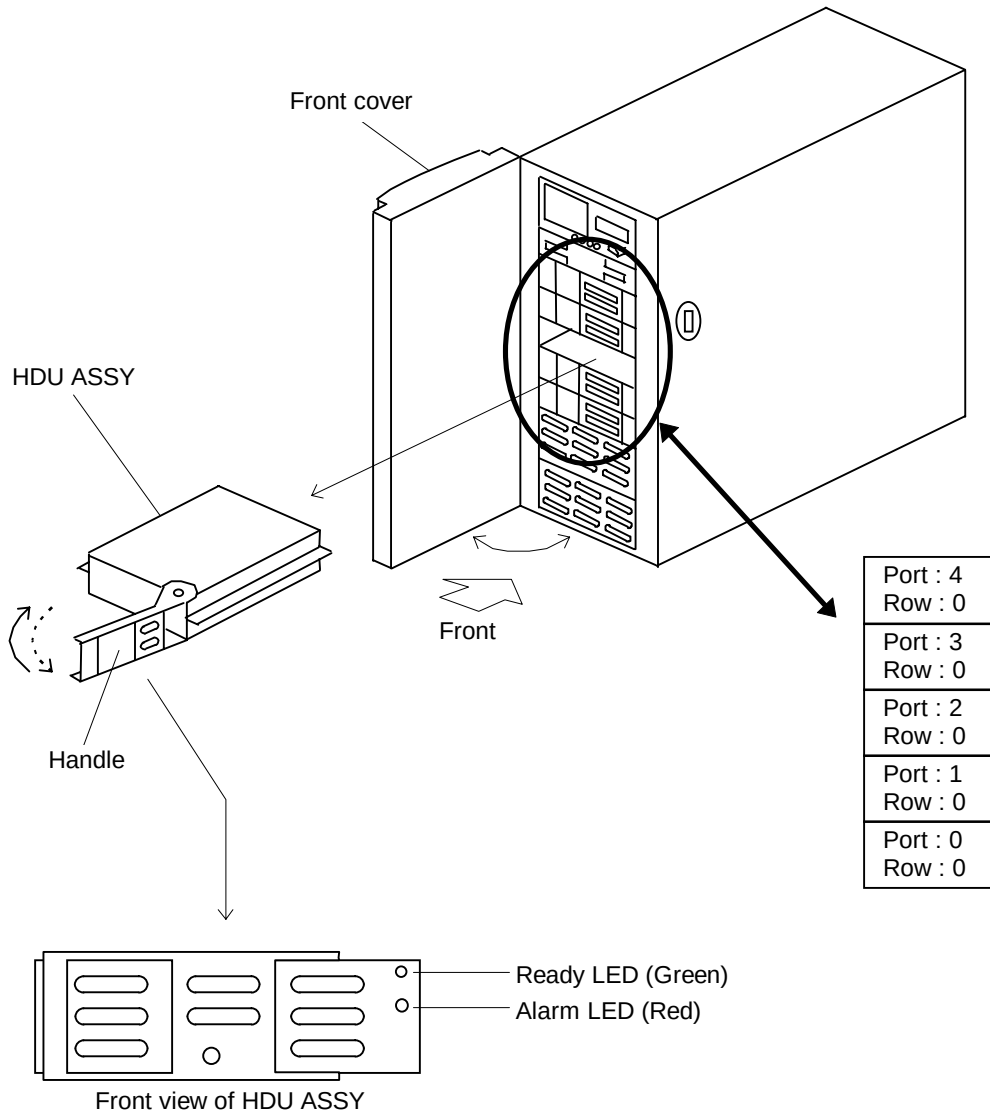
Figure 3.2.2 Removing/Attaching the Cover

(3) Installing HDU ASSY (See Figure 3.2.3.)

- ① Open the handle in the direction of an arrow (···→) completely and insert the HDU ASSY into the right place.
- ② Close the handle in the direction of an arrow (—→).

**Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

**Figure 3.2.3 Installing HDU ASSY**

(4) Setting I/F ADAPTER ASSY (See Figure 3.2.4.)

- ① Insert the I/F ADAPTER ASSY into the right place and tighten the screw.

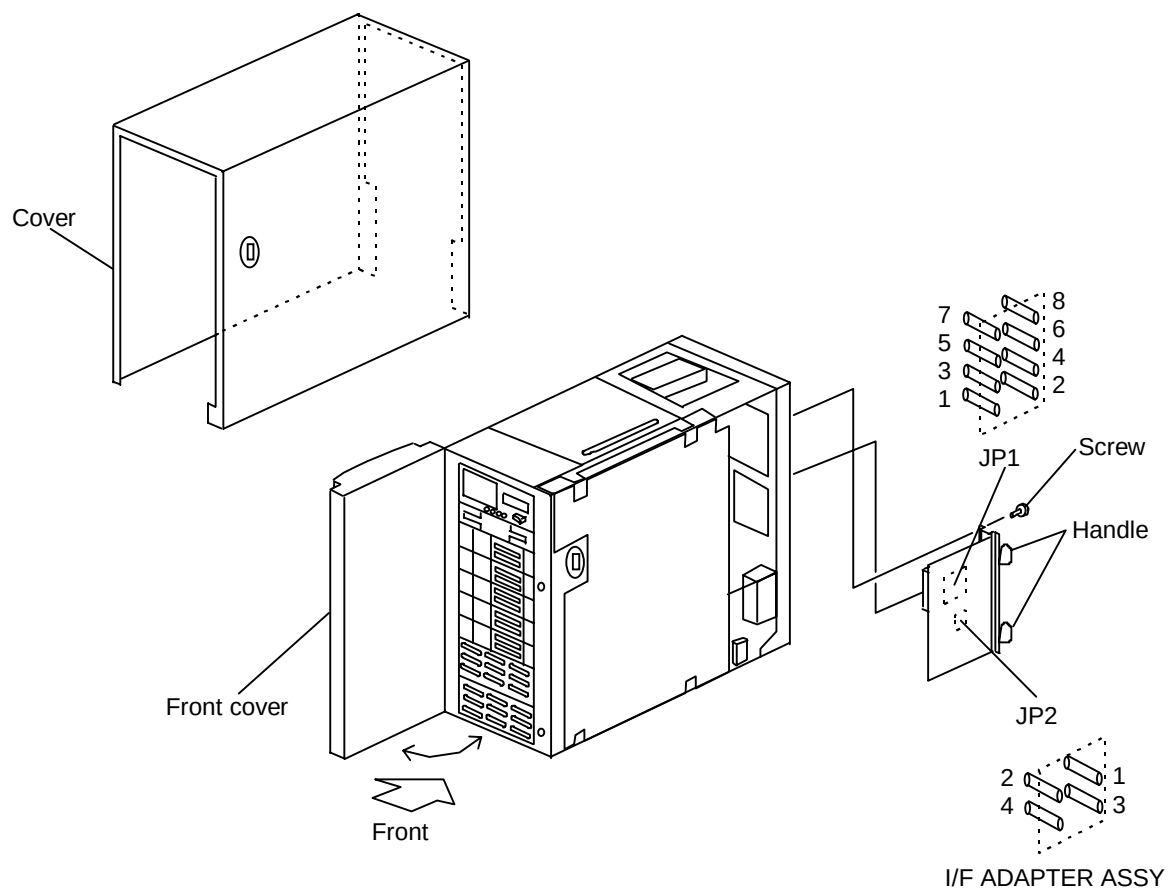
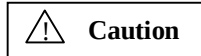


Figure 3.2.4 Setting I/F ADAPTER ASSY

3.3 Setting the Power Supply

The power for the boards, drives, and fans of the DF350 disk subsystem is supplied by the In Box ASSY and AC/DC power supply converting AC to the DC power.

Turn the power on according to procedures (1) to (6) described below.



Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Make sure that the circuit breaker (a switch on the rear panel) is "O" (OFF), then connect the AC cable.
(See Figure 3.3.1.)
- (2) Supply AC power.
- (3) Open the side cover and make sure that the battery power switch is turned to "ON". Then turn on the circuit breaker.
- (4) Make sure that all of DIP switches are set to "OFF". (upper positions) Note that no need to remove CTL ASSY.
- (5) Close the side cover and set the circuit breaker to "I" (ON). Then turn the power switch "ON".
- (6) Make sure that the subsystem becomes ready a few minutes later.

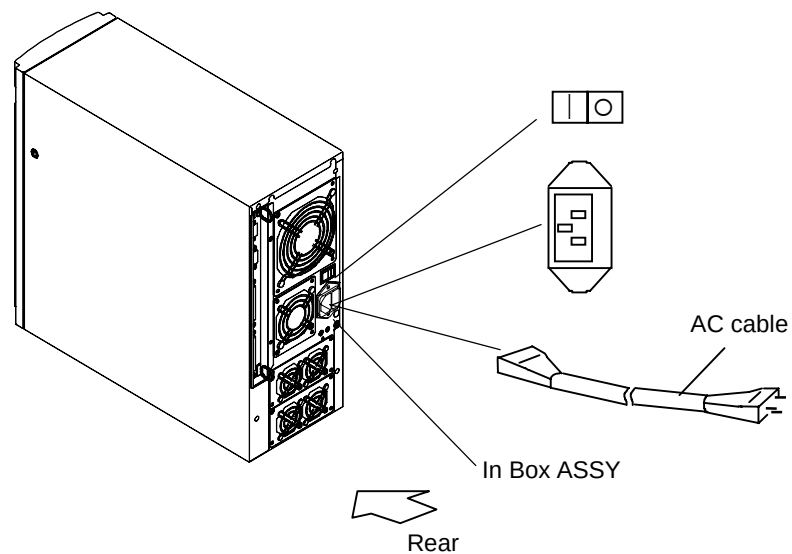


Figure 3.3.1 AC Cable Connection

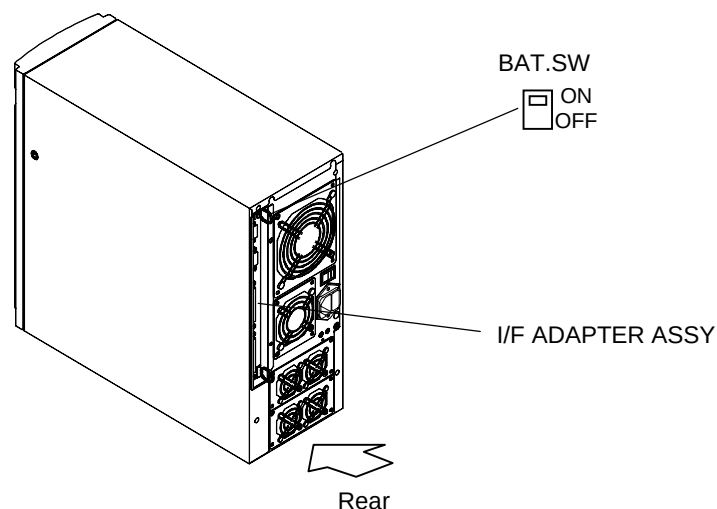


Figure 3.3.2 Inside Construction of the Subsystem

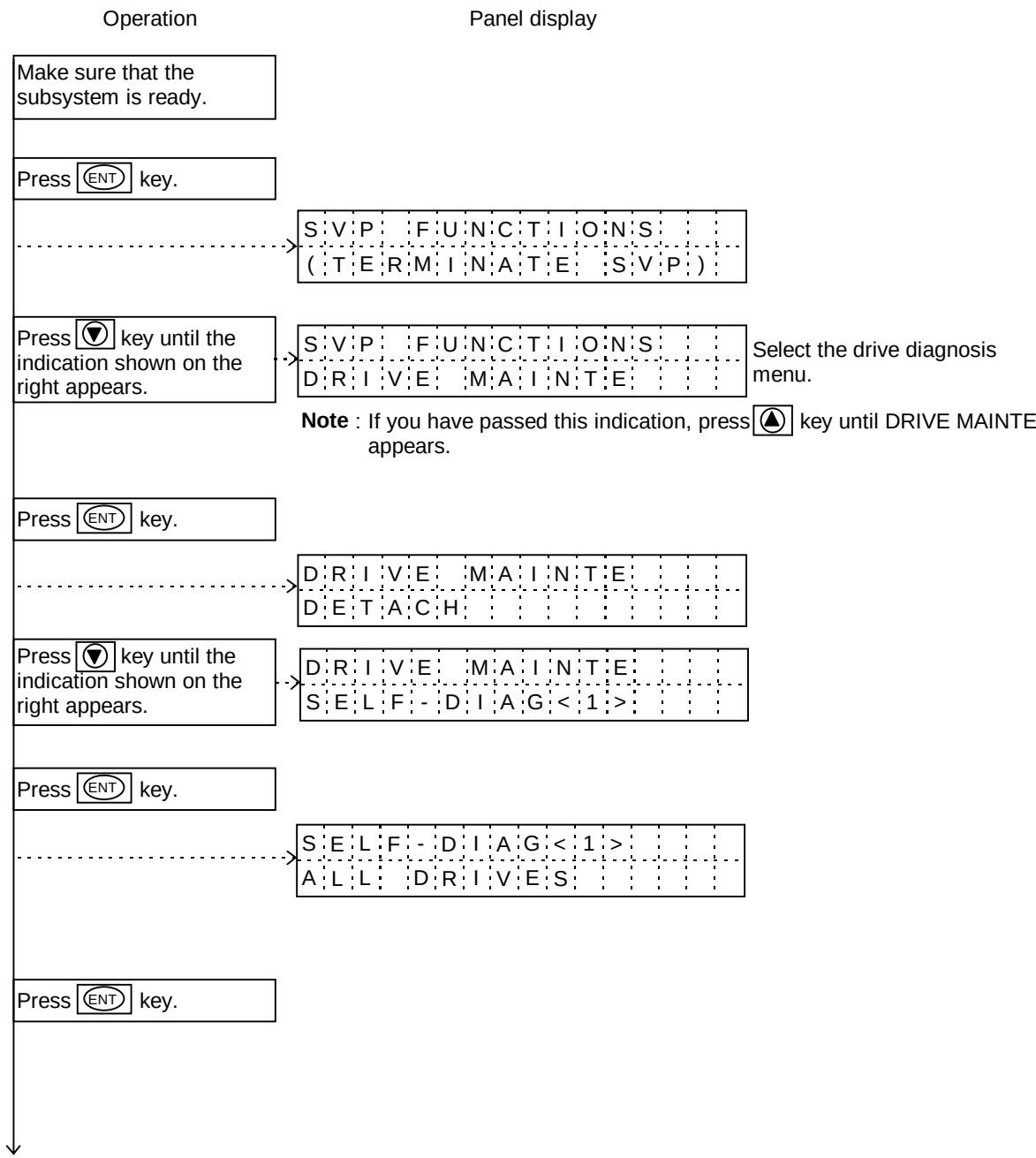
3.4 Setting the Subsystem Parameter

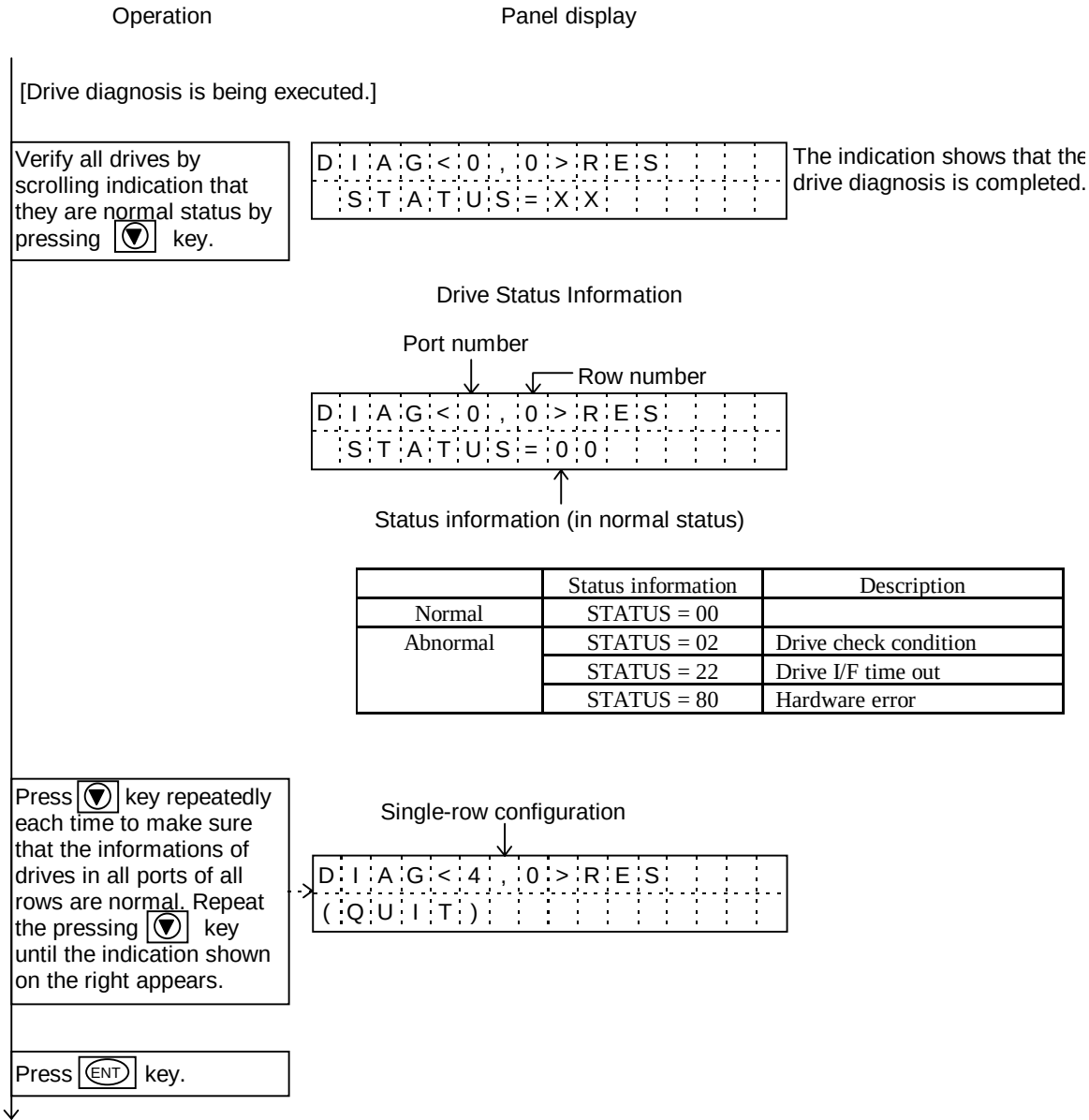
See Chapter “Setting the Subsystem Parameter” in DK-INST0230.

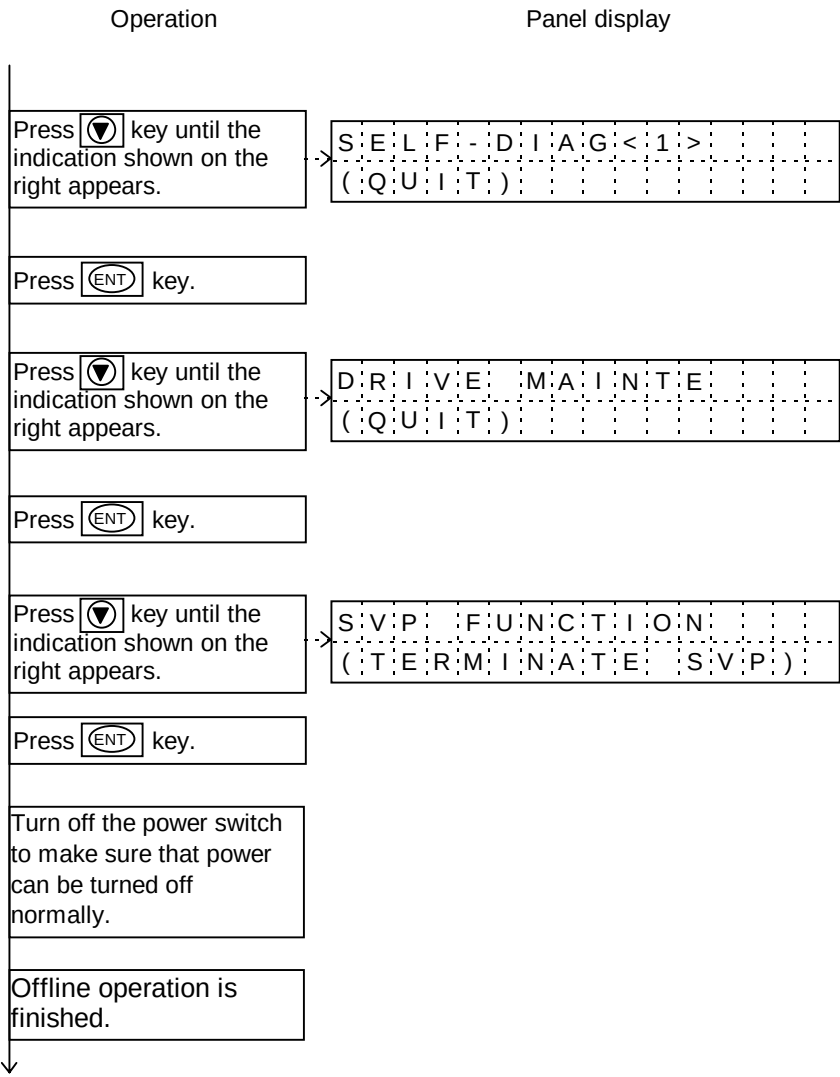
3.5 Checking the Offline Operation

After opening the front cover, execute the drive diagnosis using the Panel display and the ten key as instructed below, and make sure that the diagnosis is completed normally on each of all drives.

① Operate as described below.







3.6 Setting the Terminator Power and Remote/Local Mode

Switching the power of DF350 can be controlled by Host system (Remote Control) under the mode of terminator power is supplied by SCSI bus. Switching the mode of Remote/Local is carried out by jumper setting of SW4 on SVP panel and JP1 of terminator power setting.

Note : While connecting to RS6000 model 220/230, terminator power should be supplied from outside (Local mode). Switching the power by the host system cannot be carried out. When the host is not connected or powered off, the data recovery with the maintenance panel, nor the formatting the array cannot be carried out.

- (1) Perform destaging (See ENTRY0040) and make sure that it is not in the cache back-up state. Turn off both main switch on the panel and the breaker at the rear side of the unit.
- (2) Remove terminator resistor from I/F ADAPTER ASSY.
- (3) Open the front cover.
- (4) Set the JP1 and SW4 according to Figure 3.6.1 and Table 3.6.1. (Set JP2 (equipped on I/F ADAPTER ASSY for only Wide SCSI like DDUDS or DDUSS) with the pins 1 and 2 short-circuited.)
- (5) After setting the terminator power, insert the I/F ADAPTER ASSY and tighten the bind screw. And insert the SVP ASSY.
- (6) Fix terminator resistor to I/F ADAPTER ASSY.
- (7) Close the front cover. Turn on the breaker.

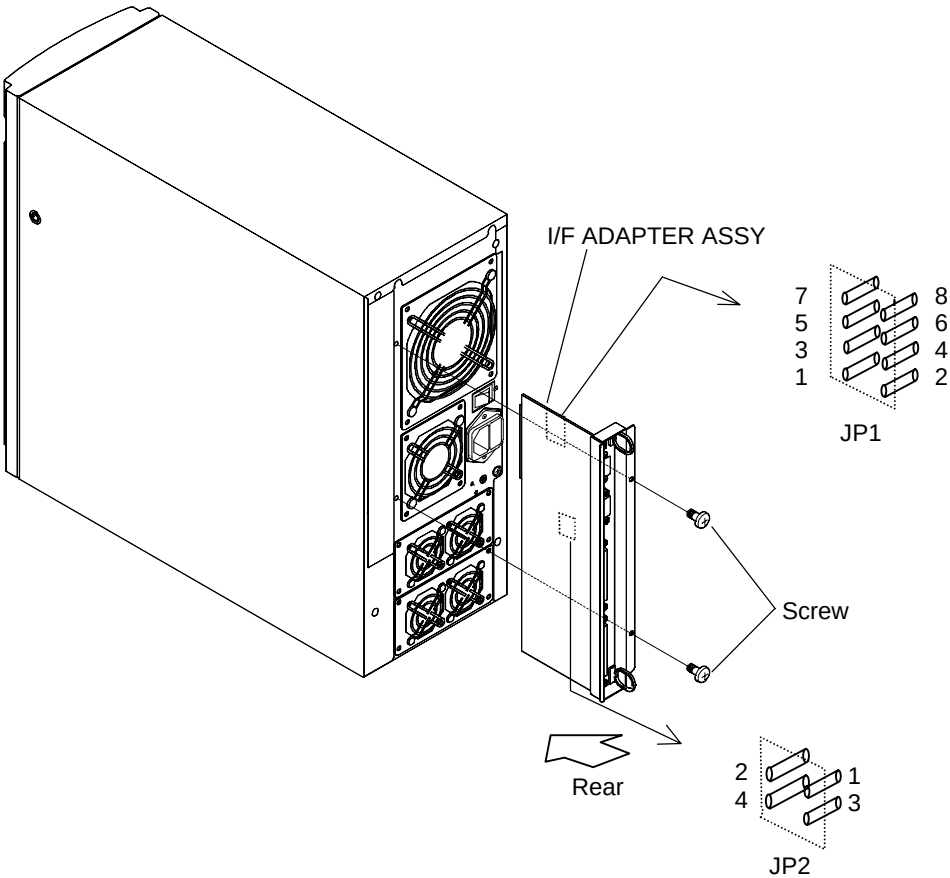
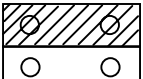
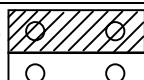
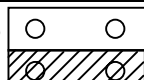
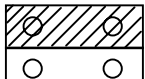


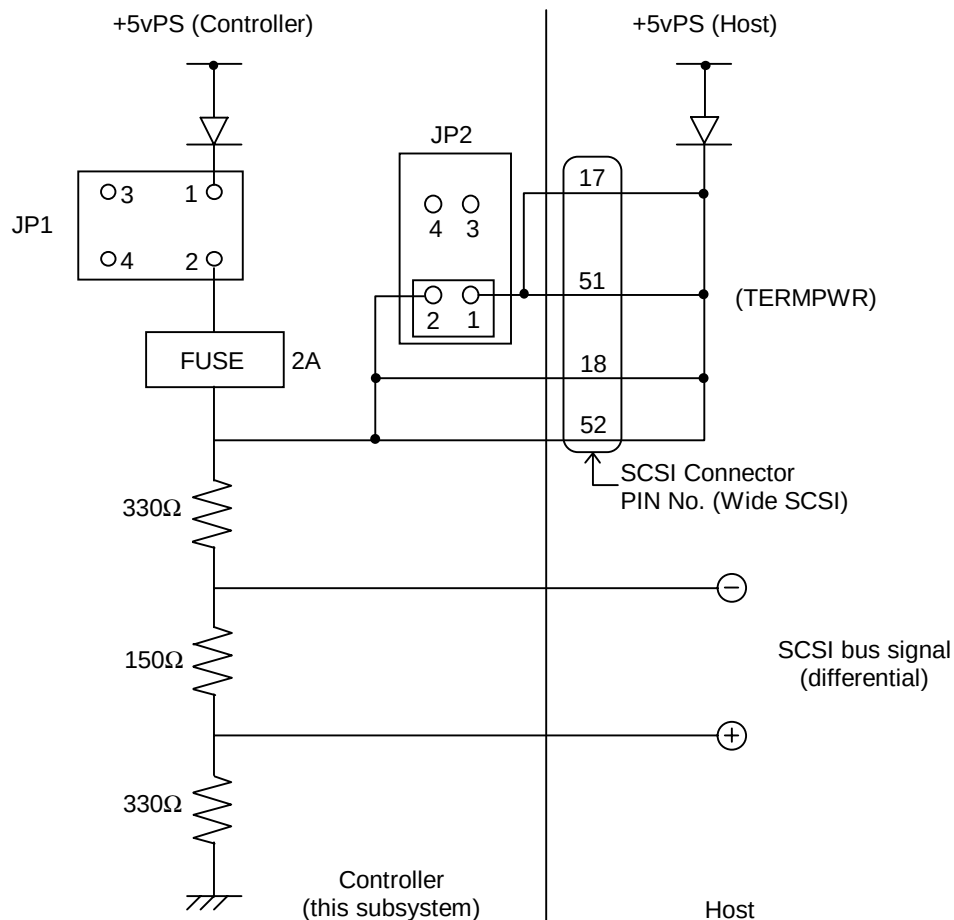
Figure 3.6.1 Setting the Terminator Power and Remote/Local Mode

Table 3.6.1 Setting the Terminator Power and Remote/Local Mode (*1)

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2		LOCAL 	Turn on/off the power on the subsystem side. (Set at factory before shipment)
		REMOTE 	Turn on/off the power on the host side.
3	JP2 (*2)		Be sure to set this jumper with the pins 1 and 2 short-circuited.

*1 The terminator power means that the power for the terminator is supplied from the host so that the SCSI bus is not shut down by a power failure of the subsystem.

*2 Set this jumper (JP2) with the pins 1 and 2 short circuited.



3.7 Connecting the SCSI Cable

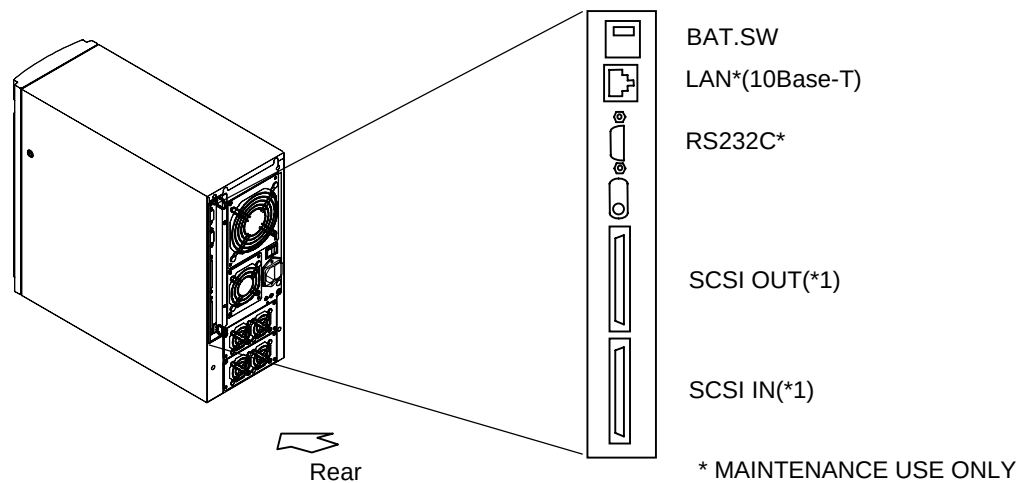


Figure 3.7.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

***1 :** The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

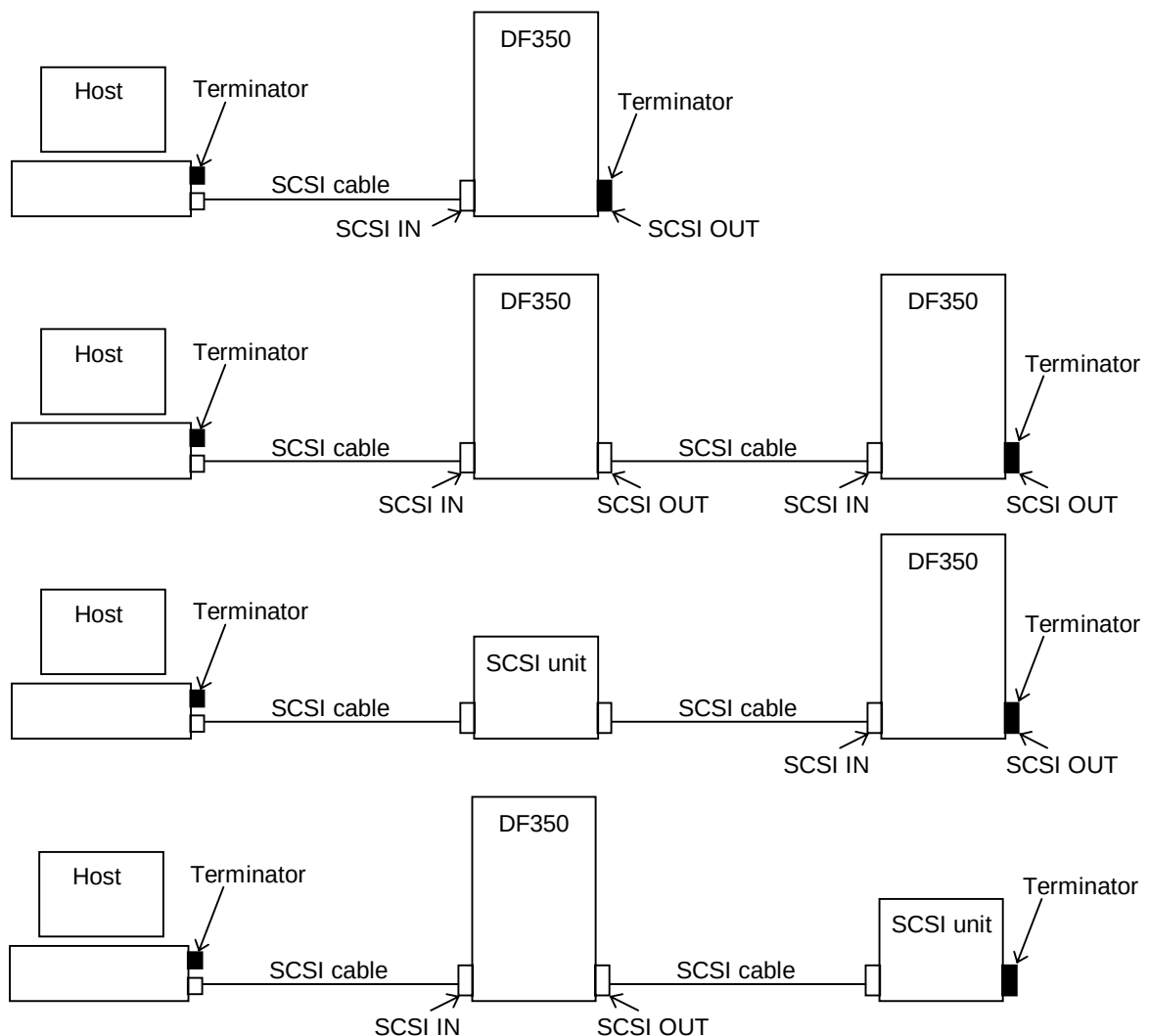


Figure 3.7.2 SCSI Connections

4. Setting the Subsystem Parameter

4.1 Setting the System Parameter

(1) Setting the system parameters and downloading

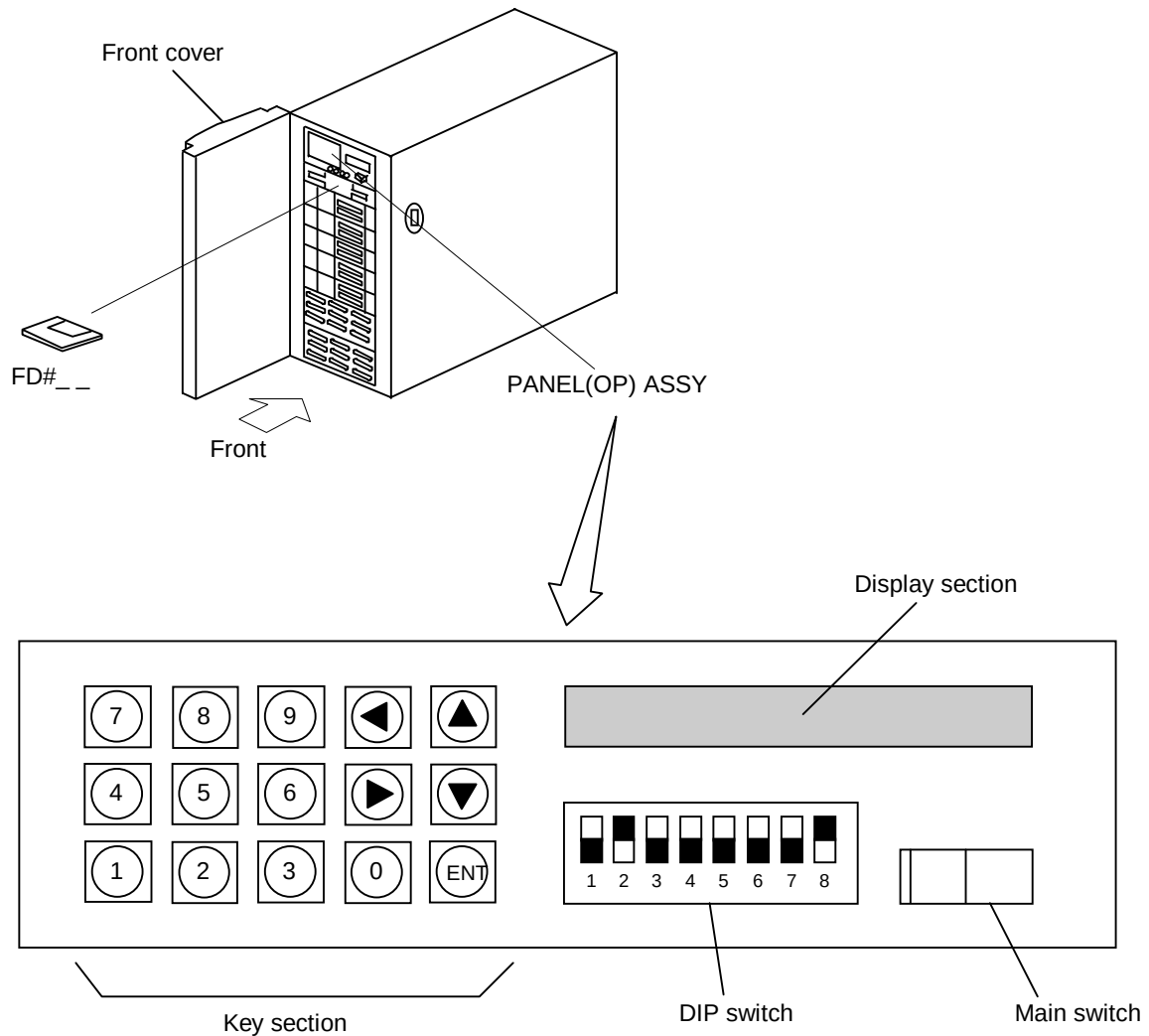
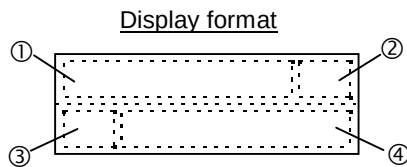


Figure 4.1.1 DIP Switches (System parameter is Set)

(1) Display

While setting up DIPSWITCH or SVP FUNCTION, menu etc. are displayed at panel display in the following display format .



① Menu title

There are two kinds of menu title described below.

DIPSWITCH SET:

For setting the target ID, buzzer, etc.

SVP FUNCTION:

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Message from the controller No. 0: The first (left most) character is in uppercase.

Message from the controller No. 1: The first (left most) character is in lowercase.

Example) Controller No. 0: DIPSWITCH SET

Controller No. 1: dIPSWITCH SET

For the dual controllers, the message with the display format 1 and the menu title with the display format 2 are displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

(2) Keys

Use the - keys for panel operation.



Used for entering the parameter values.



Used for determining the menu or the input parameter.

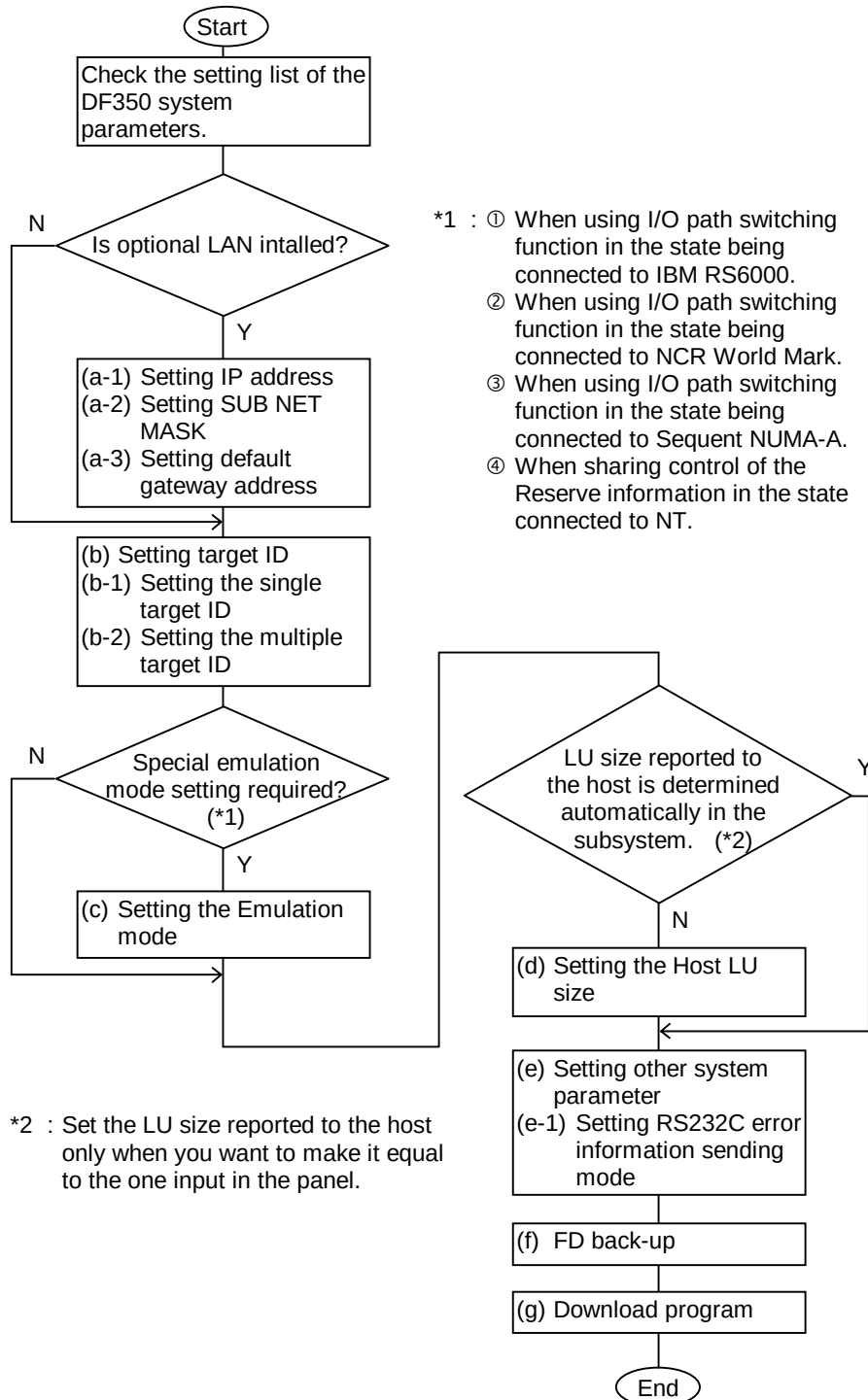


Used for determining the parameter input position.



Used for selecting the menu.

Operate as the flow described below.



Operate as described below.

(1) Before powering on the subsystem, set DIP switches No. 1, 3, 4, 5, 6 and 7 as shown in Figure 4.1.1 .

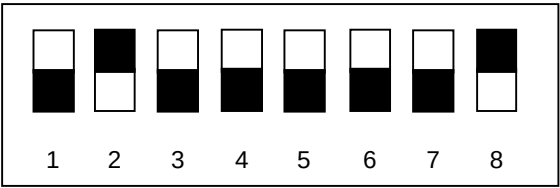
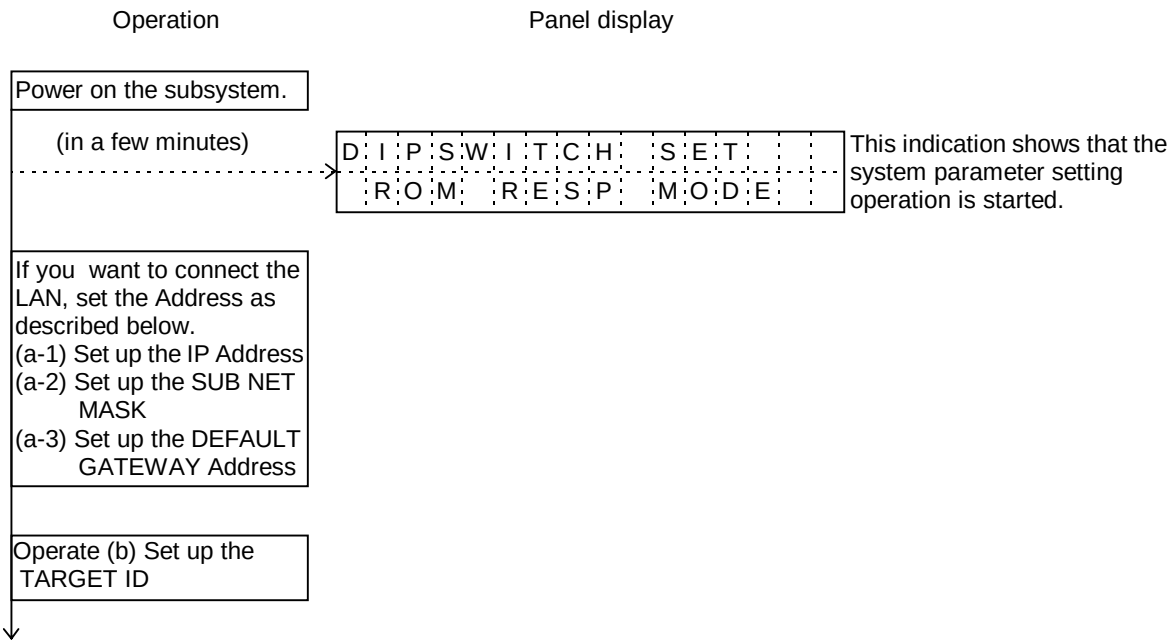
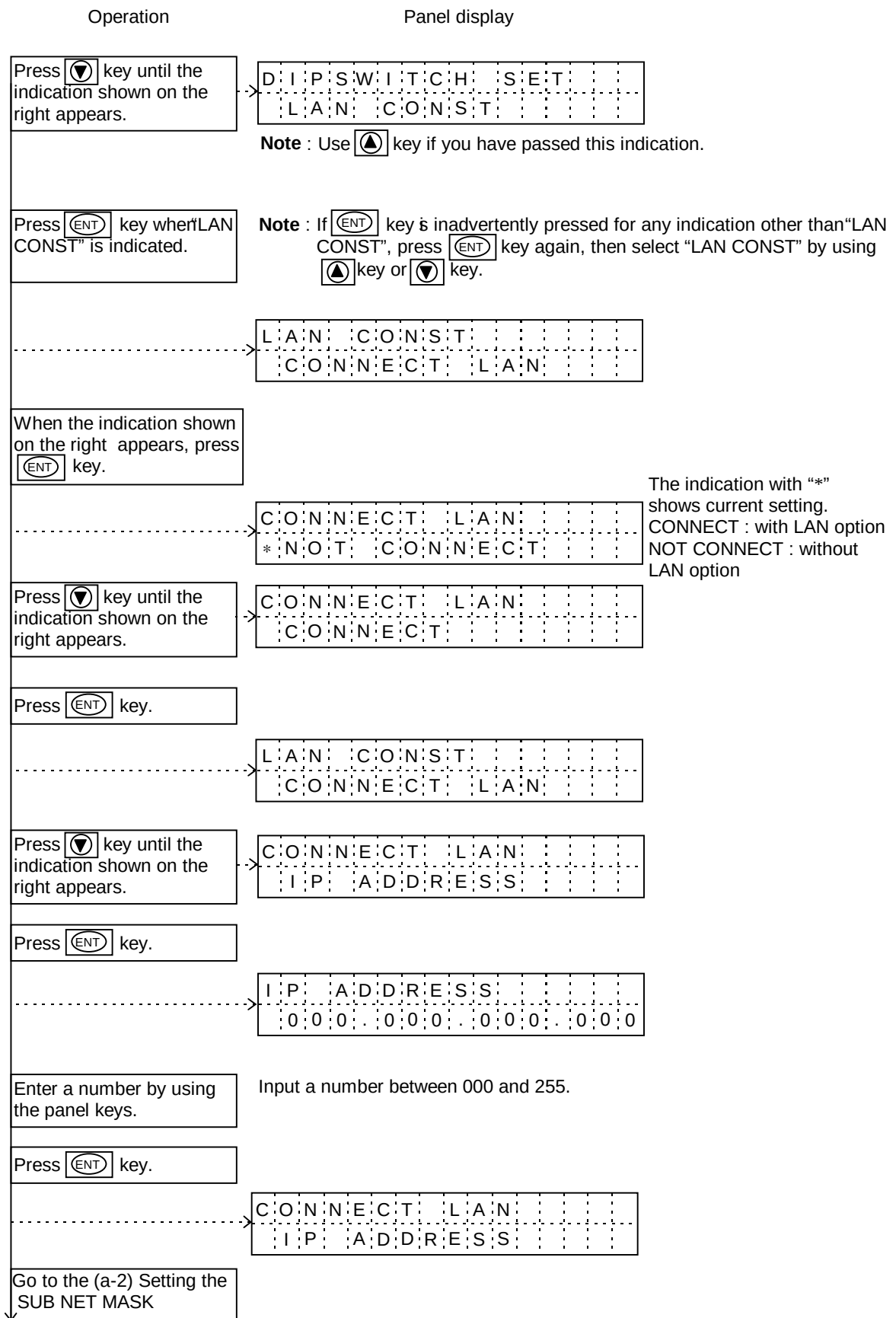


Figure 4.1.1 DIP switches (For setting the system parameter)

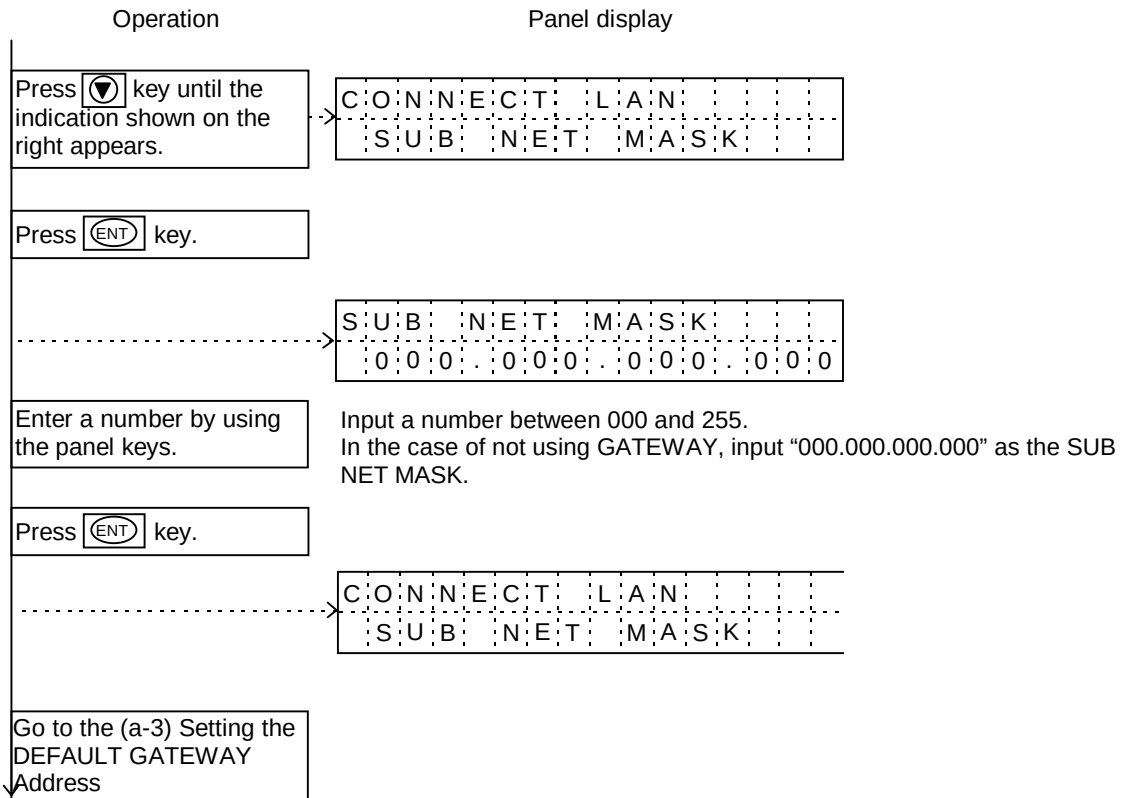
(2) Operate panel's keys as described below.



(a-1) Setting the IP address.



(a-2) Setting the SUB NET MASK

***Note**

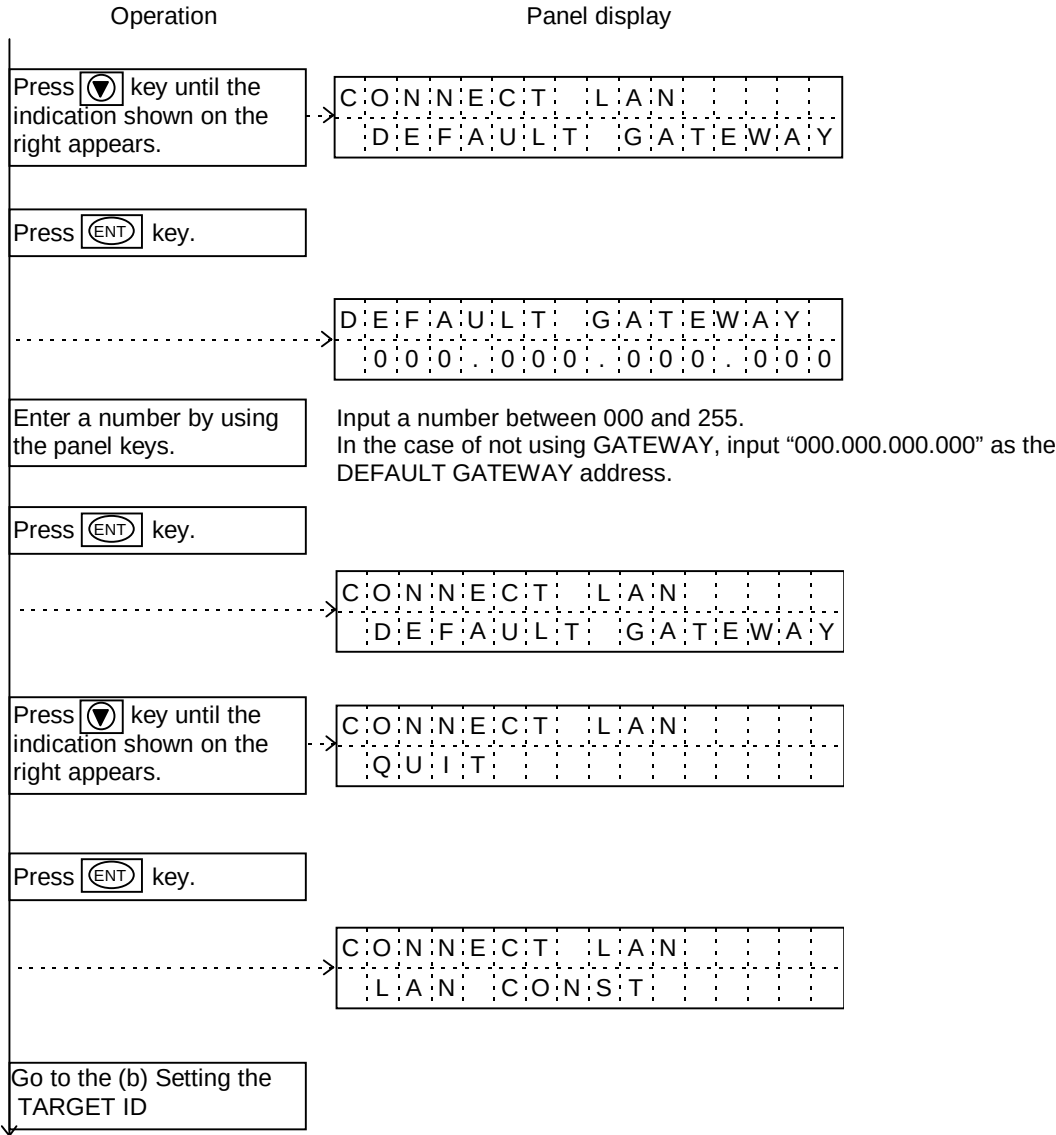
If "000.000.000.000" as the SUB NET MASK is set, this subsystem automatically adopts default SUB NET MASK for each IP address as described in the table 4.1.1.

Table 4.1.1 Default SUB NET MASK related with IP address

No.	IP Address of the subsystem	DEFAULT SUB NET MASK
1	from 000.000.000.000 to 127.255.255.255	255.000.000.000
2	from 128.000.000.000 to 191.255.255.255	255.255.000.000
3	others	255.255.255.000

If a smaller SUB NET MASK than default number is entered, this subsystem adopts default number.

(a-3) Setting the DEFAULT GATEWAY address



***Note**

If an invalid GATEWAY address is set (the IP address of the device is different from network address.), either of warning messages as shown below is displayed until the READY LED of the subsystem lights on.

Power off the subsystem and set IP address and default GATEWAY address correctly.

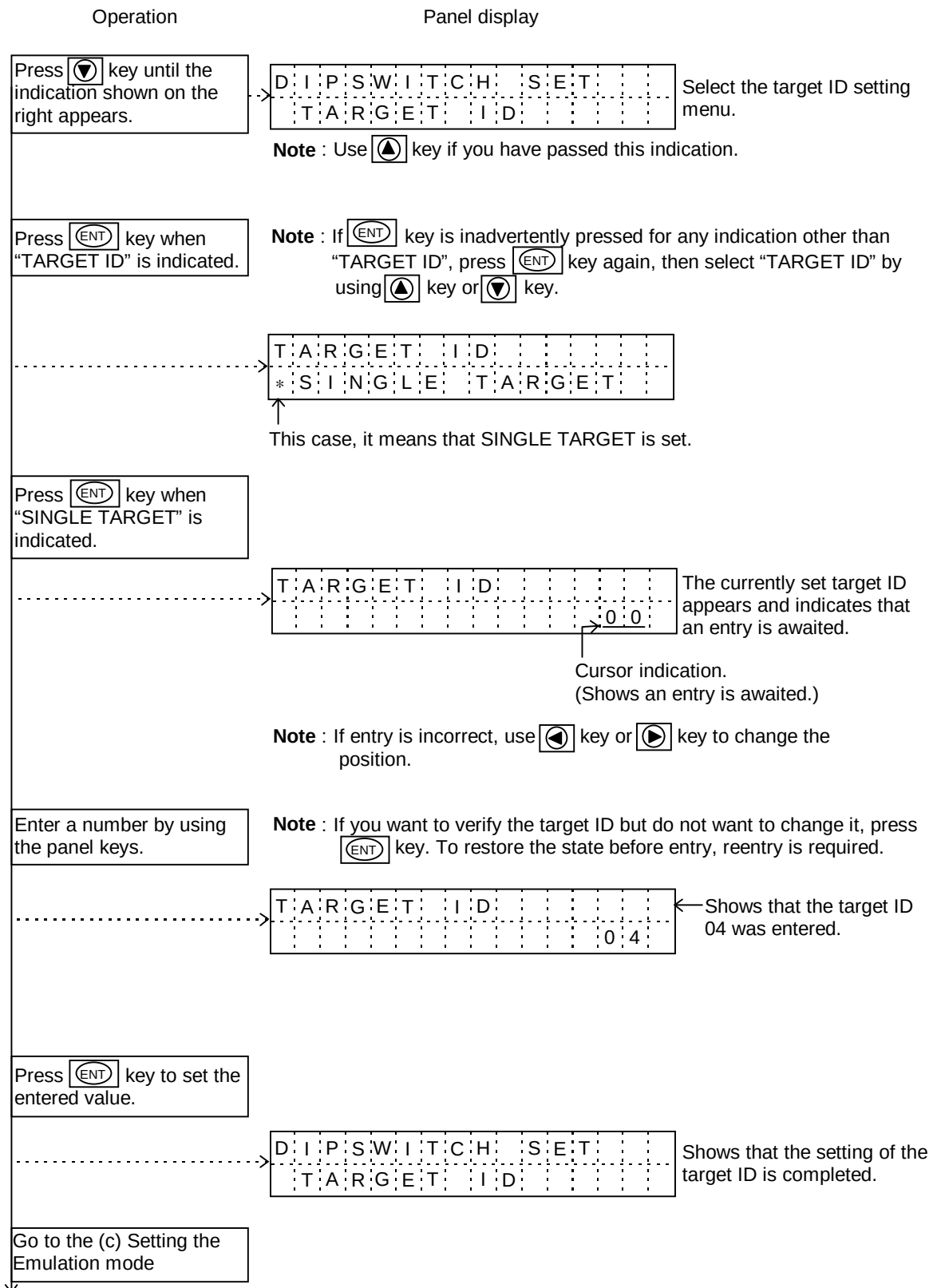
W	0	1	7	0	0	G	A	D	E	R	R		
				.		.		.					

W	0	1	7	0	0	G	A	D	E	R	R	-	X
				.		.		.					

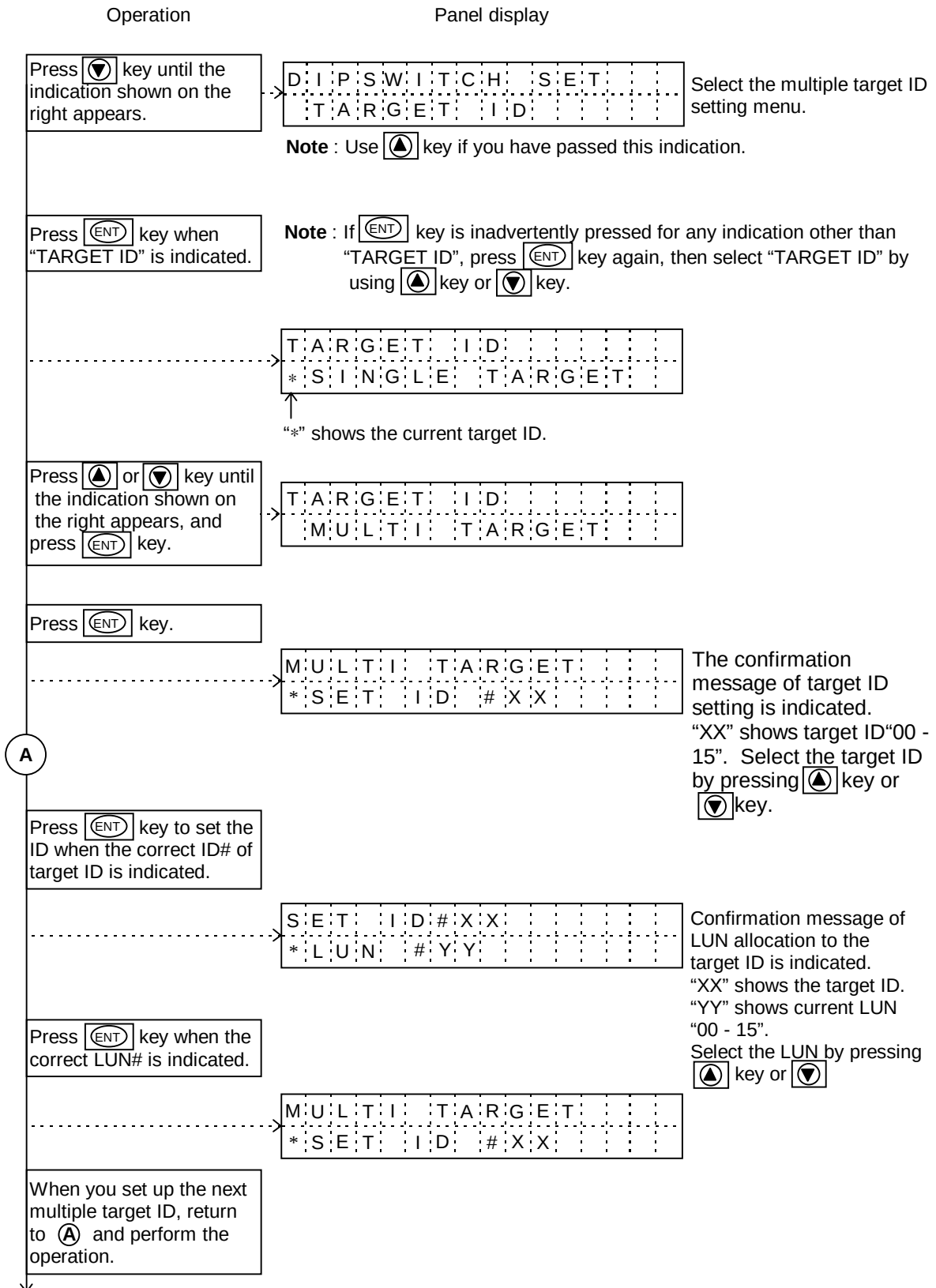
X : controllers No.

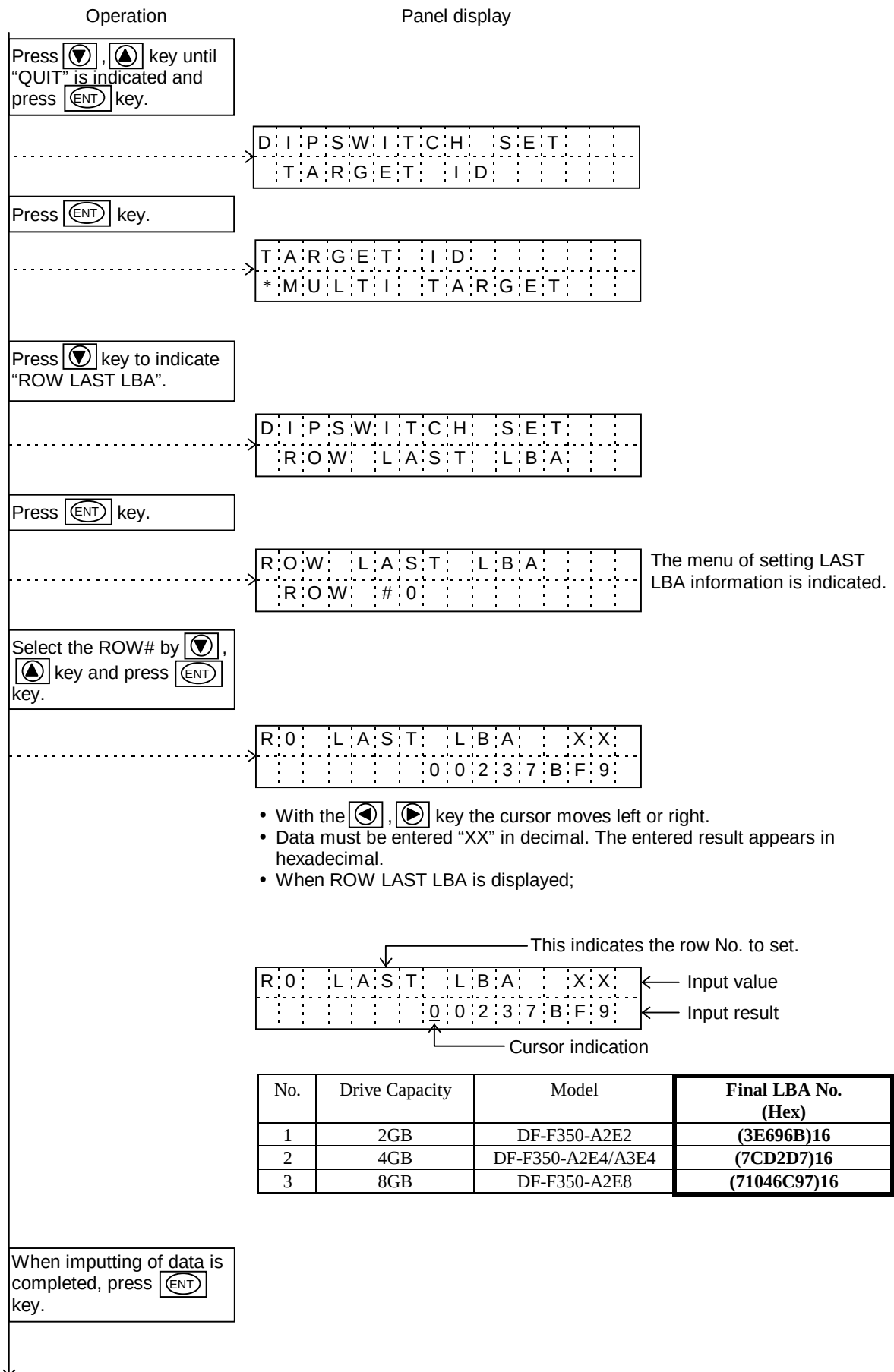
(b) Setting the TARGET ID.

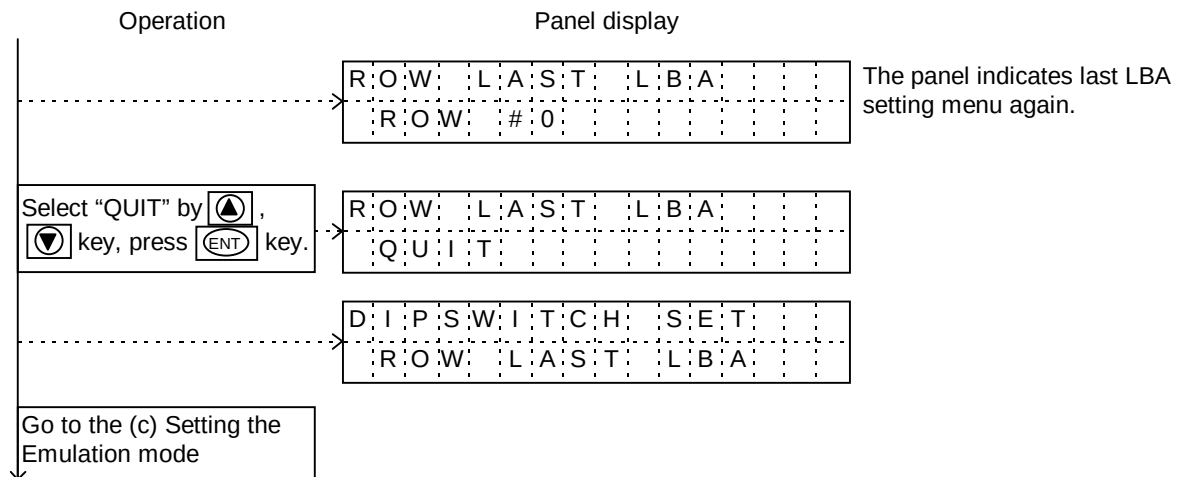
(b-1) Setting the single target ID.



(b-2) Setting the multiple target ID.

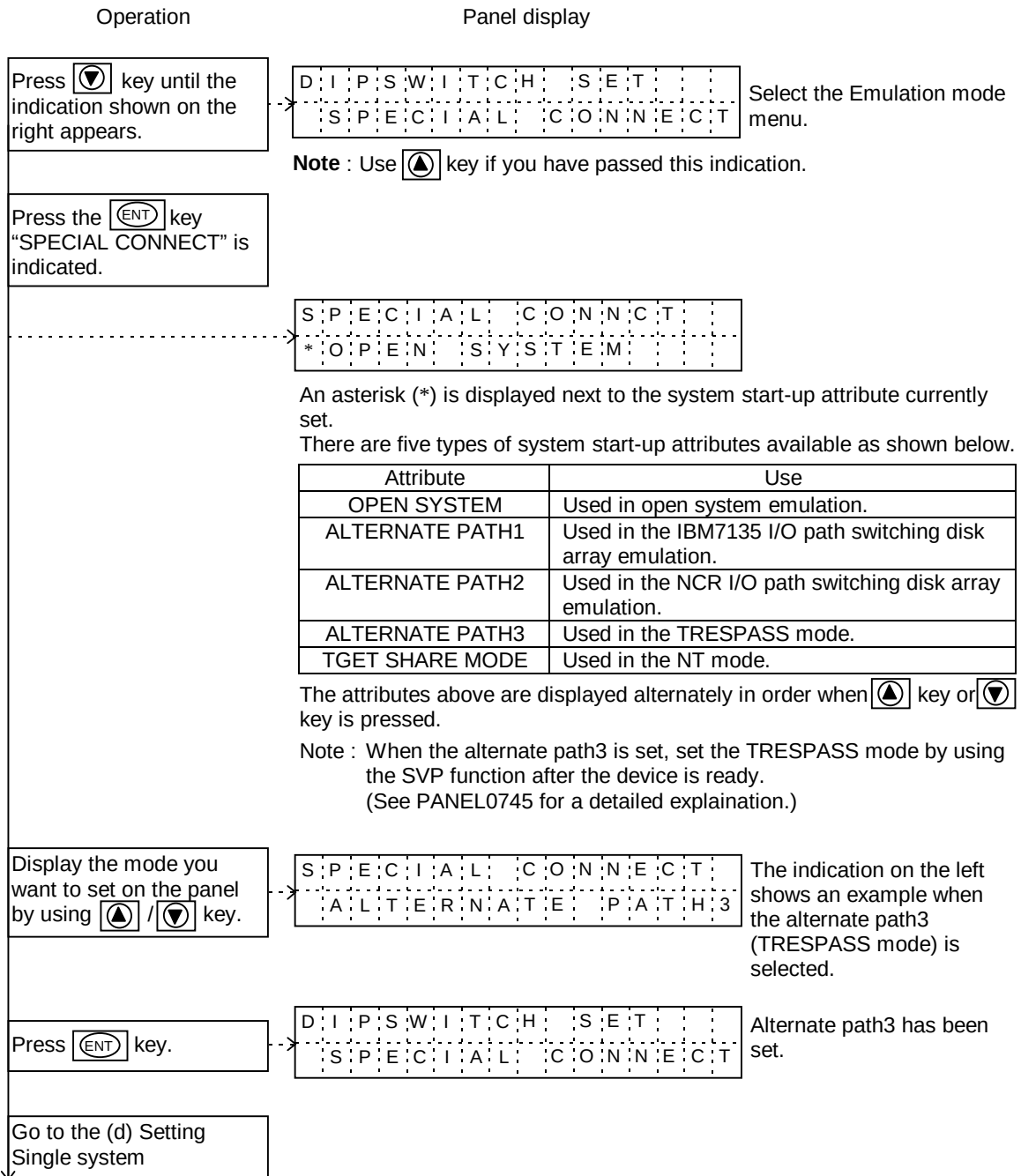






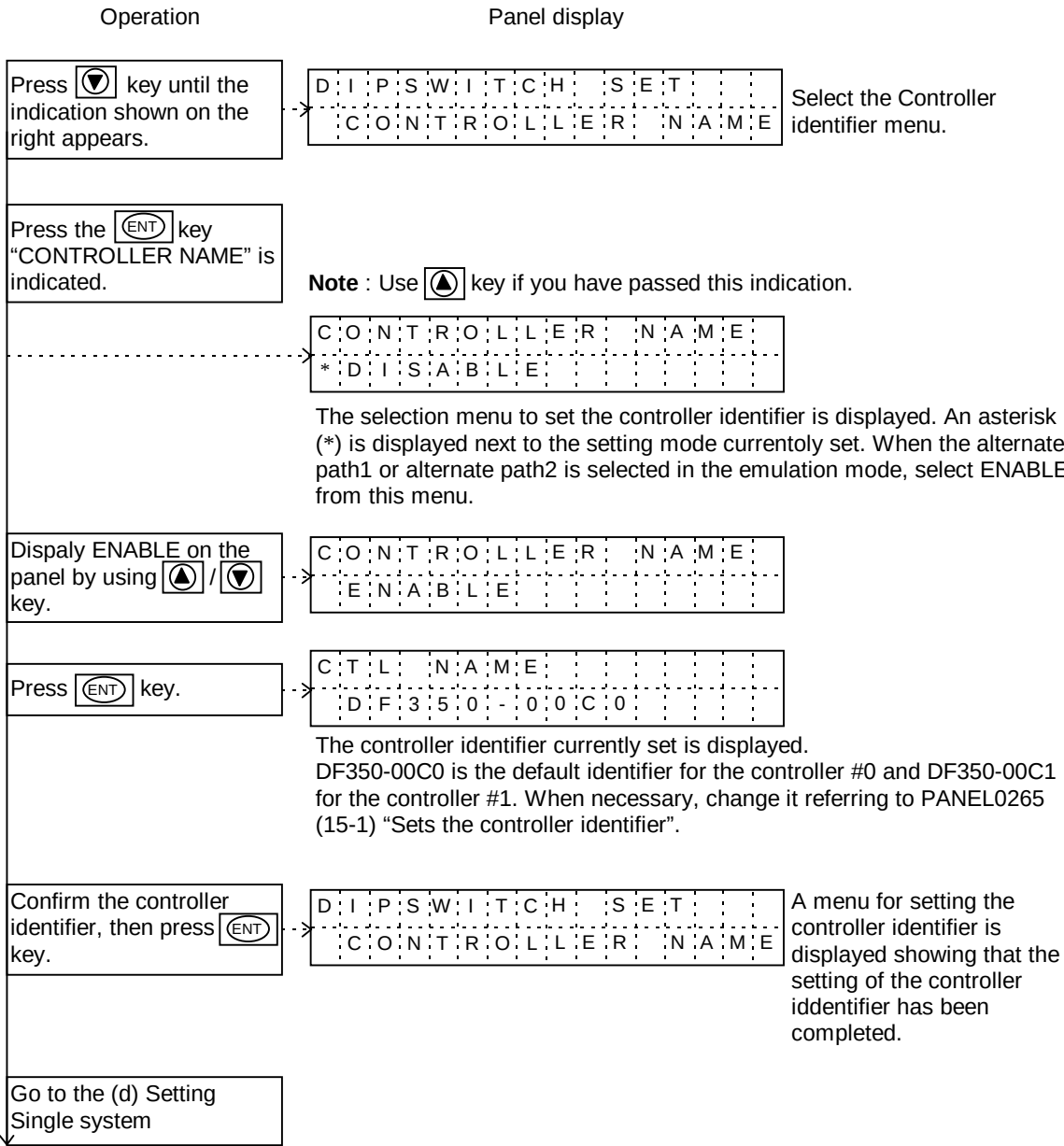
- Note)** * Setting and changing of multi target ID make the relation between the target ID and the LUN only.
 The defining and formatting LU can be executed both after and before this operation.
- * If this operation is finished , turn off the power and turn on the power again.
 - * Resetting of SINGLE TARGET ID is required when returning to SINGLE TARGET function after switching to MULTI TARGET function from previous SINGLE TARGET function.
 - * If you want to set the multi target ID when the LU is already set, the LUN can be set to any number from #00 to #07. If you want to set any number from #00 to #15 to LUN, set the multi target ID after deleting the LU.
 - * The multi target ID must be set for each controller. In case of dual controller system and MULTI TARGET IDs are set for the both controller, set MULTI TARGET ID for each controller.

(c) Setting the Emulation mode

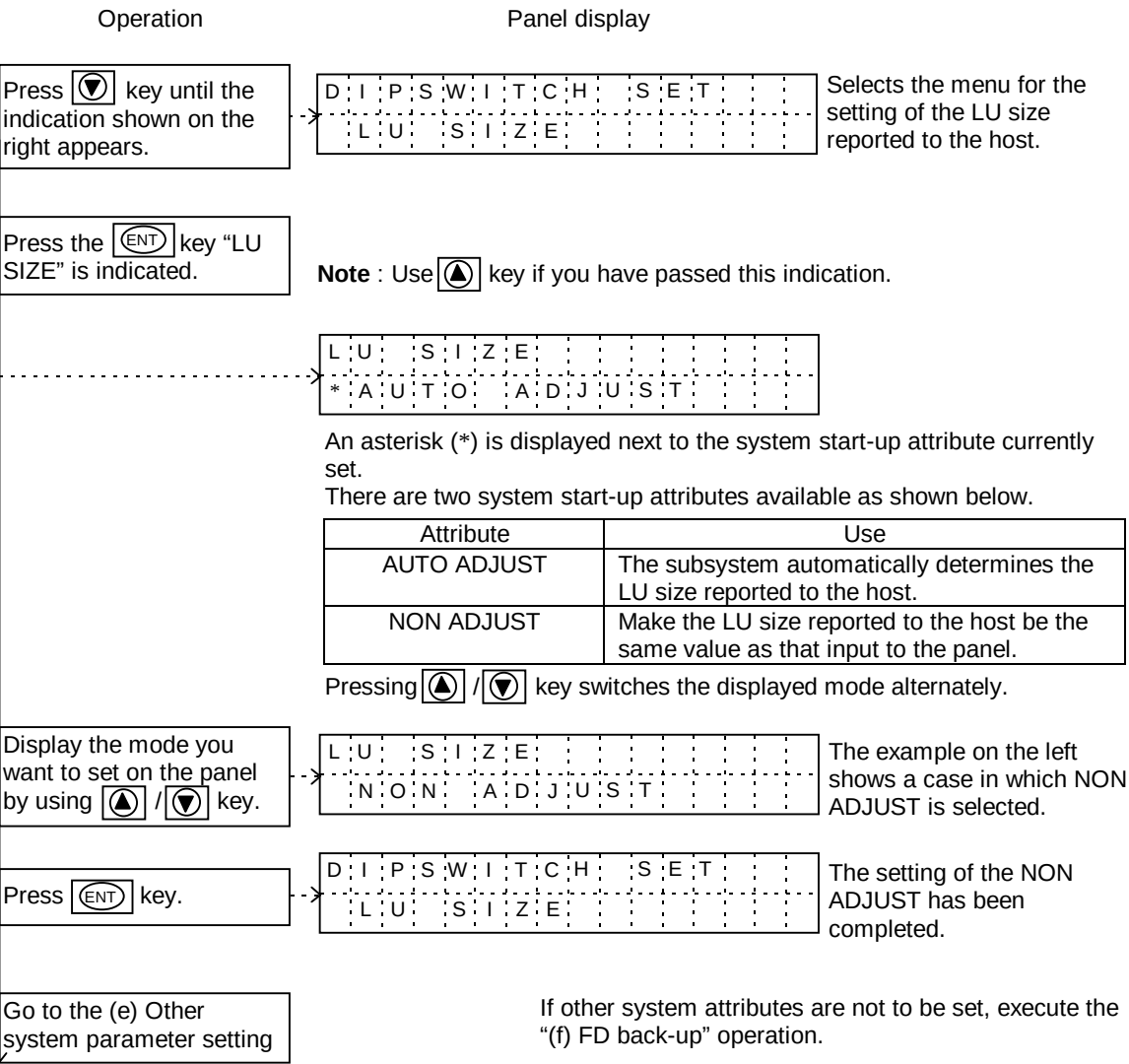


When the alternate path1 or alternate path2 is selected, set the controller name, product type. (See DK-INST0367.)

When the alternate path3 is selected, go to the single/dual system setting.



(d) Setting the LU size reported to the host



(e) Other System Parameter Setting

Besides (a) Setting the IP address, (b) Setting the TARGET ID, there are several setting functions as below. The setting at the factory shipment is shown on the table in the addendum to the device.

To change the setting, see "PANEL0080".

The menu items and their usage are as follows.

(The item Nos. 1, 2, 4, 5, 8, 10, 13, 20, and 22 in the following table must be set for each controller.)

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	??????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	DK is not supported	NOT CONNECT (fixed)
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT (*2)	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : NT mode	DK is supported only in the open system mode	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	DK is not supported	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per block.	Select	512B DK is not supported in 520B.
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inhibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) RACK MOUNT : Rackmount (RK) HIGH RACK MOUNT : Rackmount (RKH) CABINET, WRACK : Cabinet type (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	DK is not supported	Nothing (fixed)
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Not used	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Display only	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Display only	Revision from the factory
17	CONTROLLER NAME	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid. CTL NAME : Controller identifier.	DISABLE (fixed)	DISABLE (fixed)
18	ROW LAST LBA (*1)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET
21	GENERATE SYS (*2)	Specifies the loading method for the new/old microprogram.	NEW SYSTEM : Loads the new microprogram. OLD SYSTEM : Loads the old microprogram.	Select	NEW SYSTEM

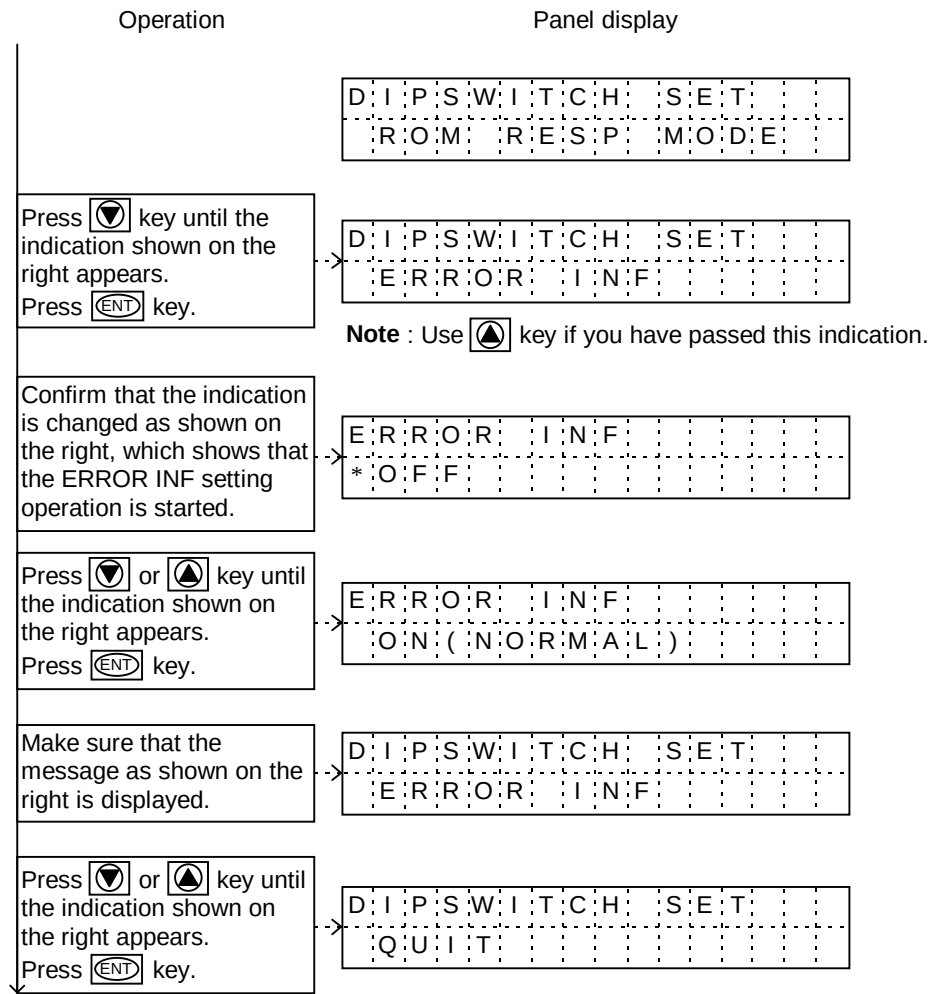
*1 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
22	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute OFF : Not used in the Data share mode ON : Used in the Data share mode	DK is supported only in the single mode	Depending on the configuration from the factory
24	LU SIZE	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
25	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
26	SYS REV	Limit the revision Nos. of installing system.	Displays the startup program revision.	—	“0304”
27	OPTION	Specifies the optional function when using it.	Enters the option code using the panel keypad.	Enter	“0000”
28	BOOT PROG V/R	Displays the startup program revision.	Displays the startup program revision.	—	
30	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
31	QUIT	Terminates the parameter input.	Enters using the panel keypad.	Enter	

(e-1) Setting RS232C error information sending mode

In order to use the failure notification program, the setting for the “ERROR INF” of the system parameter must be changed to “ON (NORMAL)”.

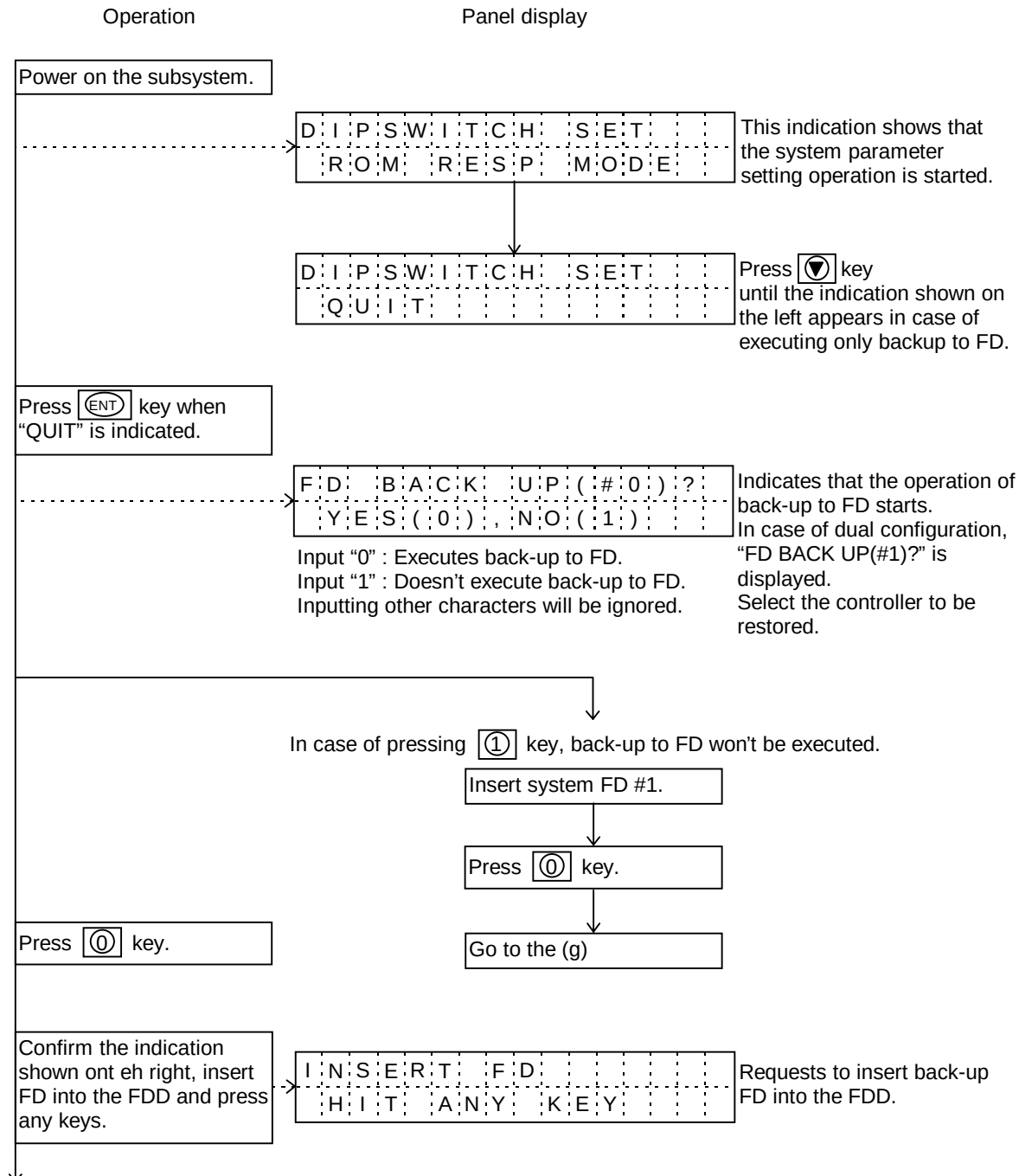


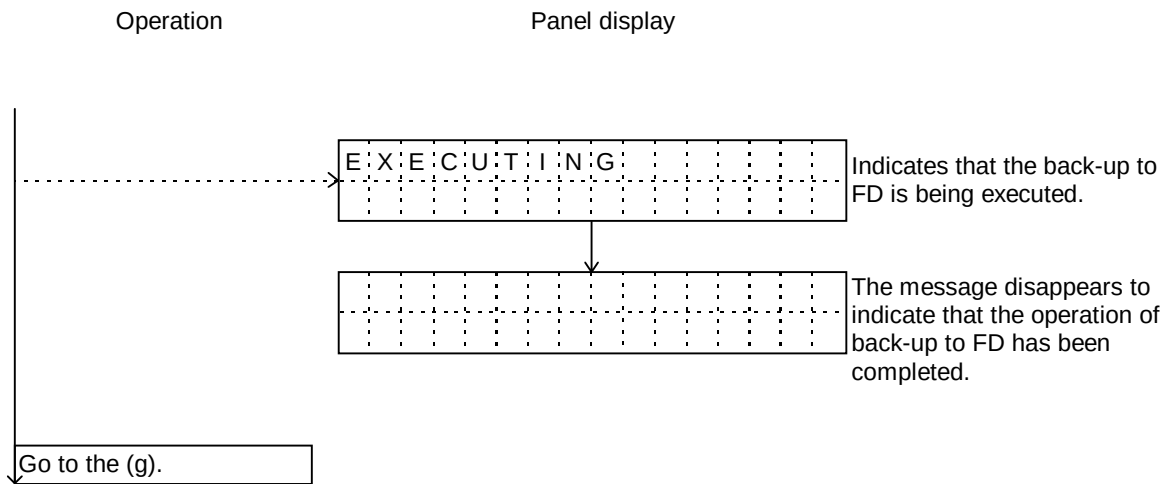
(f) FD back-up.

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) needs to be backed up to FD or restored from FD when installing optional parts or replacing parts. This case, perform back-up to FD or restore from FD according to "2.3.1 Back-up procedure to FD (DK-OPTION0050.)" or "2.3.2 Restoring procedures to FD (DK-OPTION0080.)".

(Raid configuration setting, LU configuration setting, etc are not contained in system parameter.)

Back-up procedure to FD

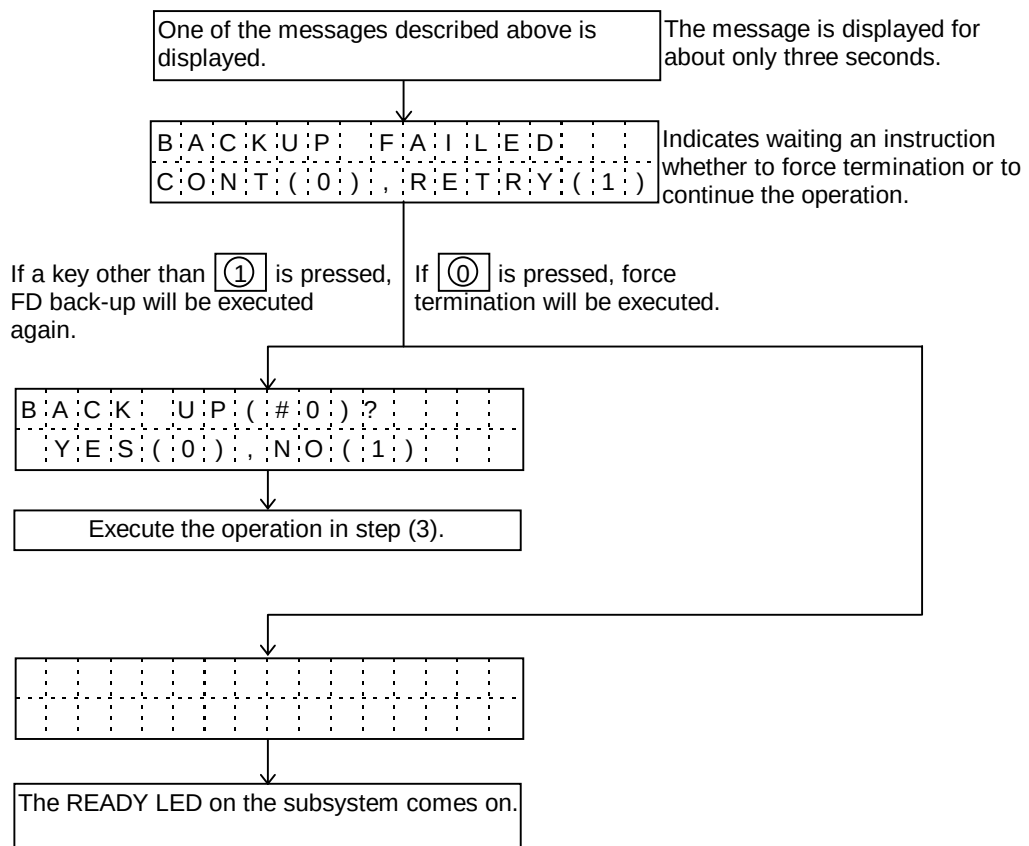




Note 1 : While the back-up to FD is being executed, the following messages may be displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting failure of the FD drive motor occurred. Try again.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or is the condition of write-protected. Format or release write-protection.
Write error occurred in FD which was inserted. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So try again following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Note that the FD will be overwritten in back-up.

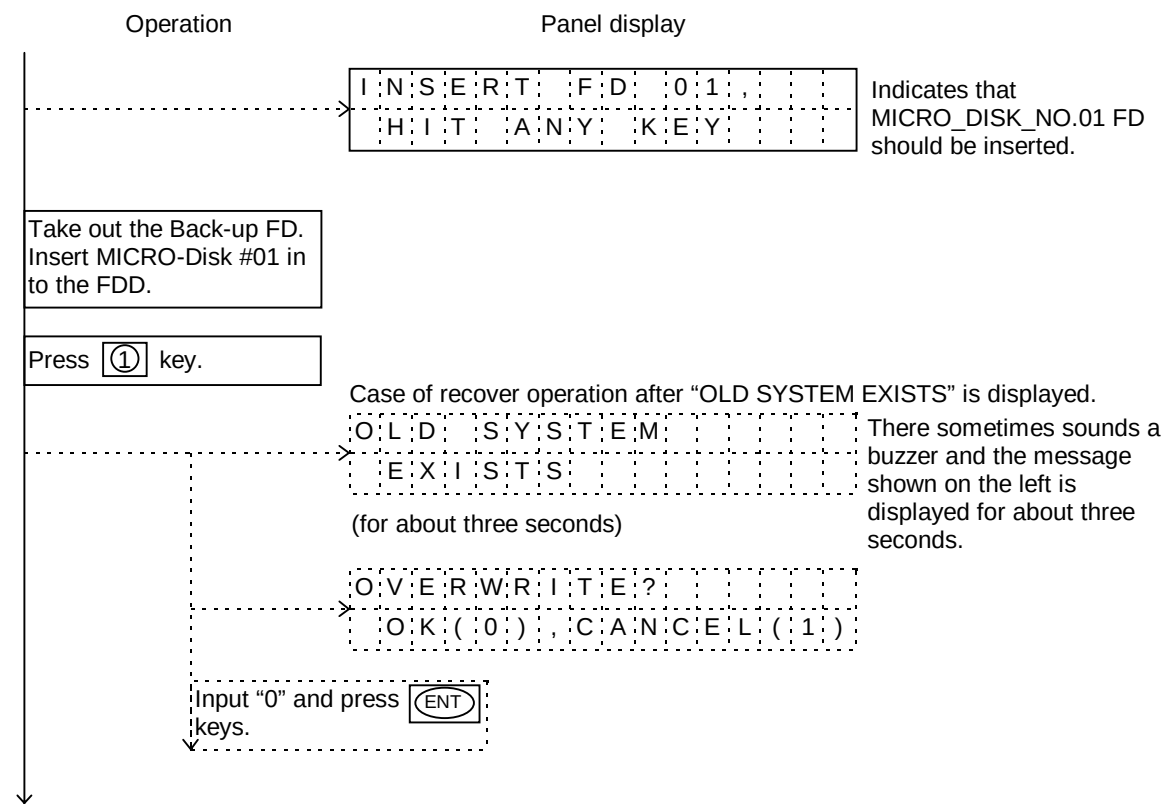
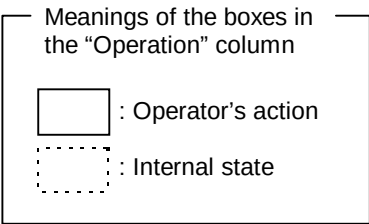
Note 3 : Even if back-up FD is left at FDD after back-up operation, no error will occur on the subsystem.

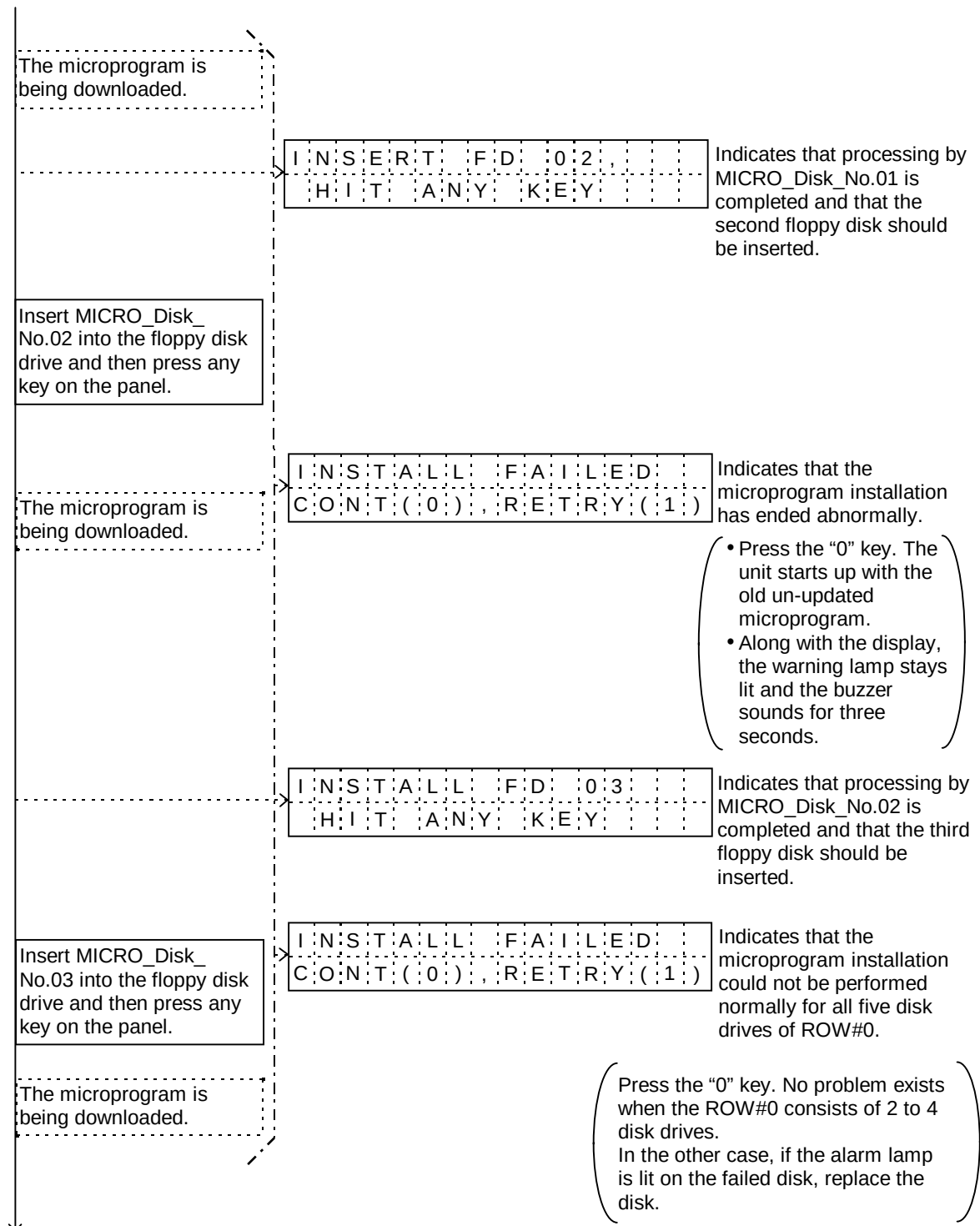
Note 4 : "EEPROM.DAT" or "EEPROM0.DAT" file is backed up in system parameter backed up FD. In the case of optional SNMP system, SNMP configuration environment files ("Config.TXT" and "NAME.TXT") are backed up with system parameter file in it.

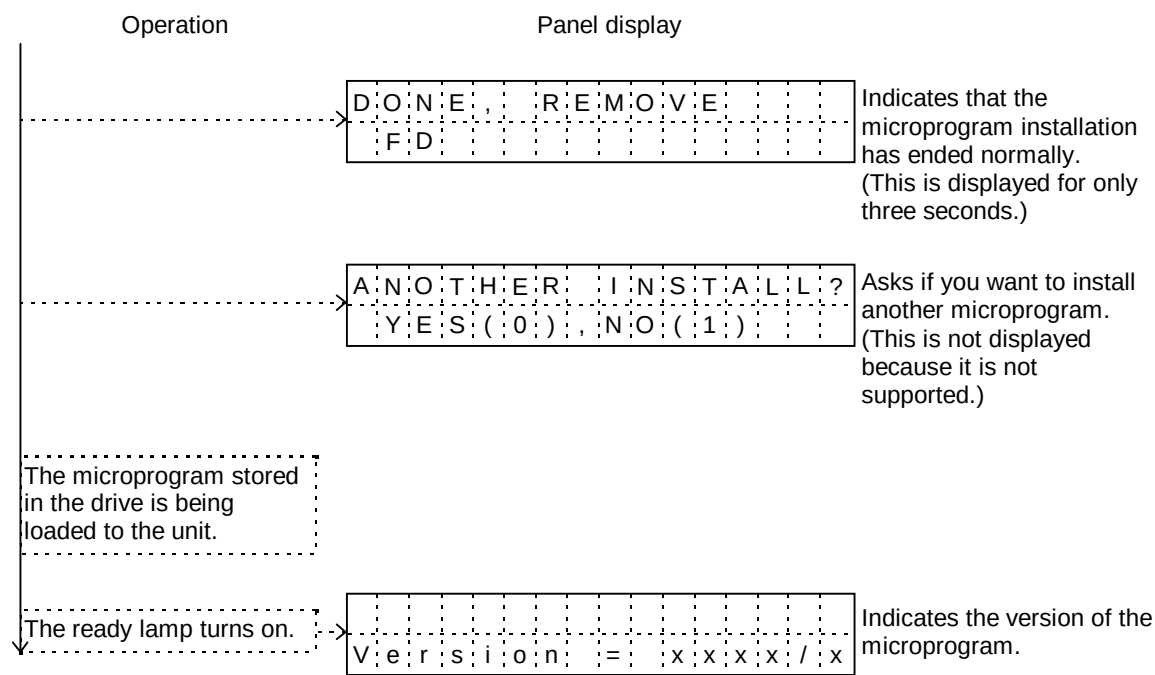
Note 5 : In the case of optional SNMP system, the subsystem is restored without SNMP configuration environment file back-up FD, and the subsystem is READY without SNMP function. In this case, the warning lamp on the subsystem comes on and any message below is shown on PANEL.

(g) Download Program
Download program is used to update the microprogram stored in the drive. Three floppy disks are used for downloading.

Note : Be sure that no drive failure is present before updating the microprogram.







(1) Set DIP switch No.1 as shown in Figure 4.1.2.

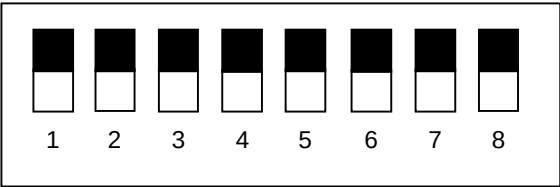
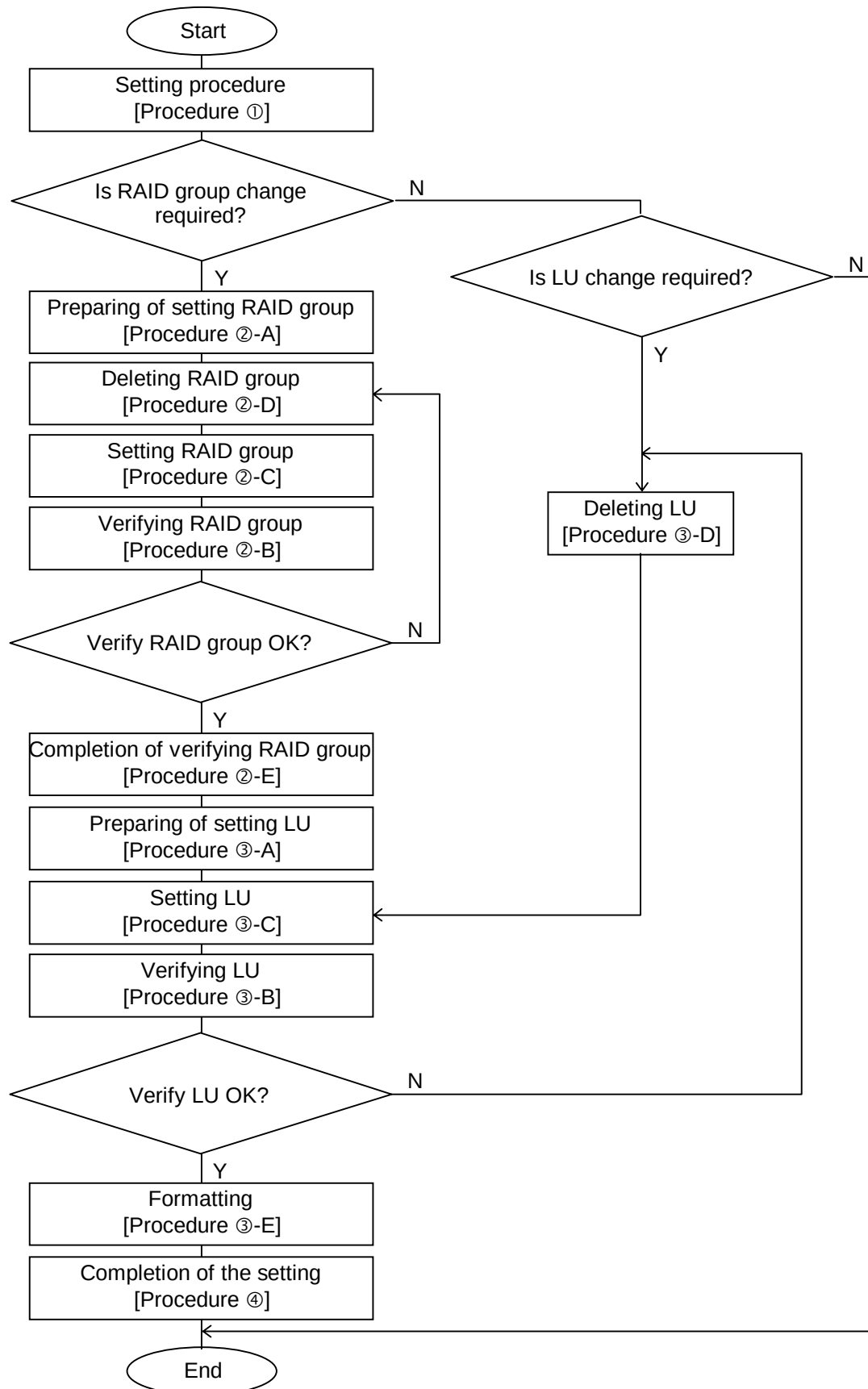


Figure 4.1.2 Standard DIP Switch Settings

4.2 Setting the Subsystem Configuration Information

This function can be used when the subsystem is ready.

(During this operation, READ/WRITE command issued from the host cannot be executed. When the host command is received, Not Ready is reported to the host.)



4.2.1 Preparing of setting RAID/LU

[Procedure①]

Operation

Panel display

Make sure that the subsystem is ready.

Press  key.

S	V	P	F	U	N	C	T	I	O	N	S		
(	T	E	R	M	I	N	A	T	E	S	V	P	)

The indication shows that the RAID/LU setting operation is started.

When changing RAID group, go to procedure ②-A “Preparing of setting RAID group”.
When changing no RAID group but LU, go to procedure ③-A “Preparing of setting LU”.
When changing no RAID group and LU, go to quit.

4.2.2 Setting the RAID group

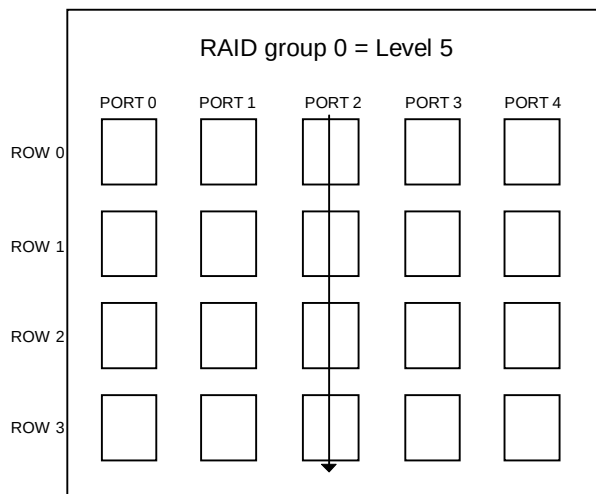
This function is used for setting, deleting and referring the RAID group. This function can be used when the subsystem is ready.

(Setting the DIP switch and turning off/on the subsystem are not required. Read/Write operation from the host can not be executed during this function. When the host command is received, Not Ready is reported to the host.)

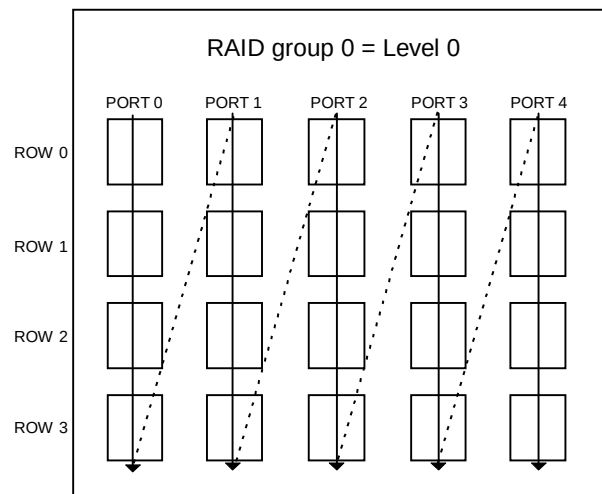
Notice : By deleting the RAID group all user data of the deleted RAID group is lost. Back up user data before deleting the RAID group.

RAID group and RAID level can be set as shown below by using this setting function.

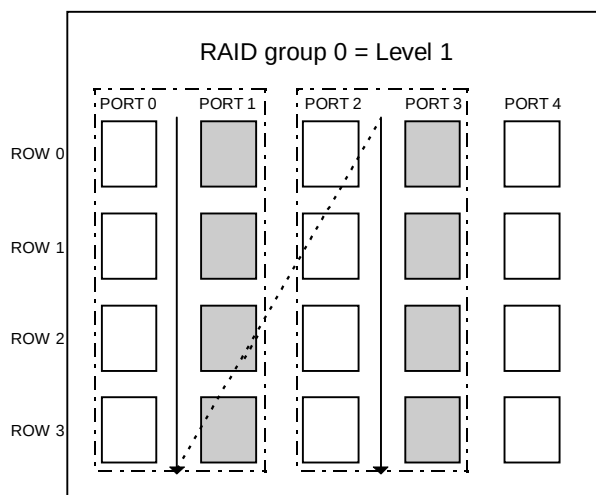
Setting one RAID group with the entire subsystem. (Arrows “↓” indicate the direction of storing data.)



The function stores data in the way executing the data striping over four disks and generating parity data on one disk.

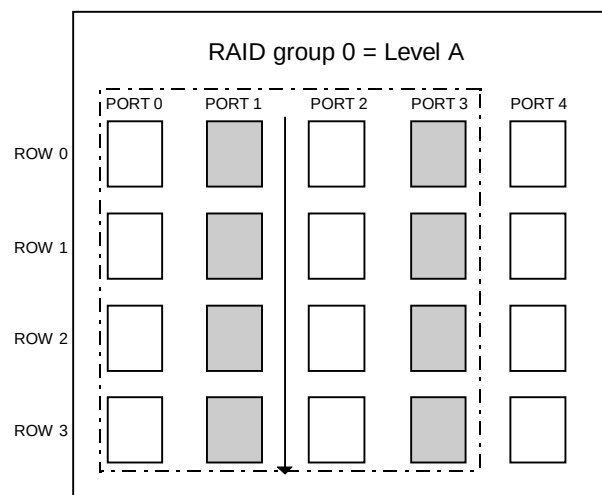


The function stores data without executing neither the data striping nor parity data generation.



The function stores data in the way doubly writing it on the main disk and sub-disk without executing the data striping.

□ : indicates a main disk
 ■ : indicates a sub-disk



The function stores data in the way doubly writing it on the main disk and sub-disk and executing the data striping over two disks of port 0 and port 2.

□ : indicates a main disk
 ■ : indicates a sub-disk

Setting one RAID group with each row of disks (Arrows “↓” indicates the direction of storing data.)

Data cannot be stored extending over two or more RAID groups even if RAID levels of them are the same. The following are examples having set RAID groups of the same RAID level, however, each row has its own RAID level.



Setting the number of data disks when setting RAID level 5

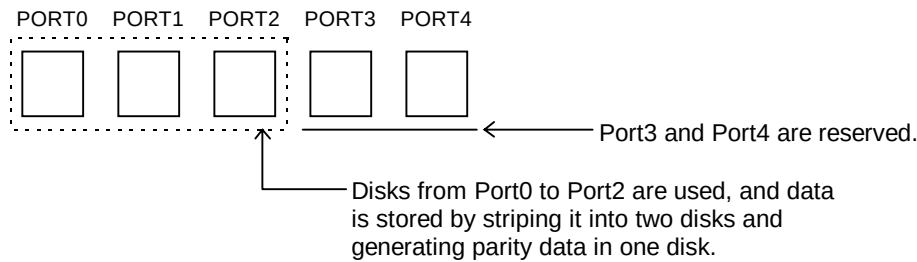
When Micro_Disk Ver.0305** (** is optional) or later is used, number of data disks can be selected from 2, 3 and 4 in the definition of RAID5.

(4 for the number of data disks and 1 for the number of parity disks are automatically set when 5 is set for RAID level in the case Micro_Disk Ver.0304** (** is optional) or earlier is used.)

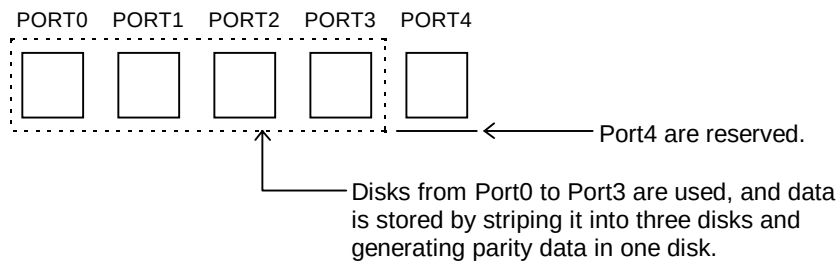
For the of setting procedure, see pages PANEL0380 or DK-INST0534.

The direction of data storage is the same as the conventional case in which the RAID level is 5. Setting is also same as before; the entire subsystem or each row can be set to one group. The following explains the overview of data storage using the example of setting each row to one group.

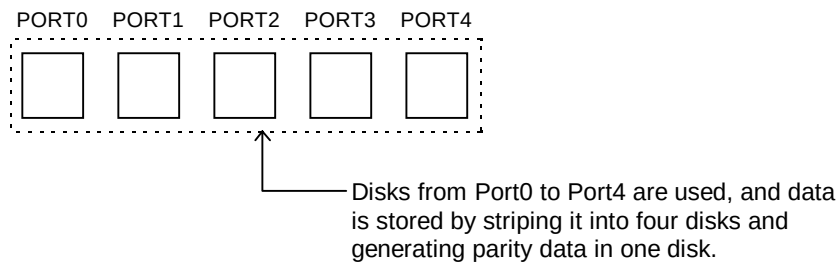
- (1) For the configuration of 2 data disks + 1 parity disk



- (2) For the configuration of 3 data disks + 1 parity disk

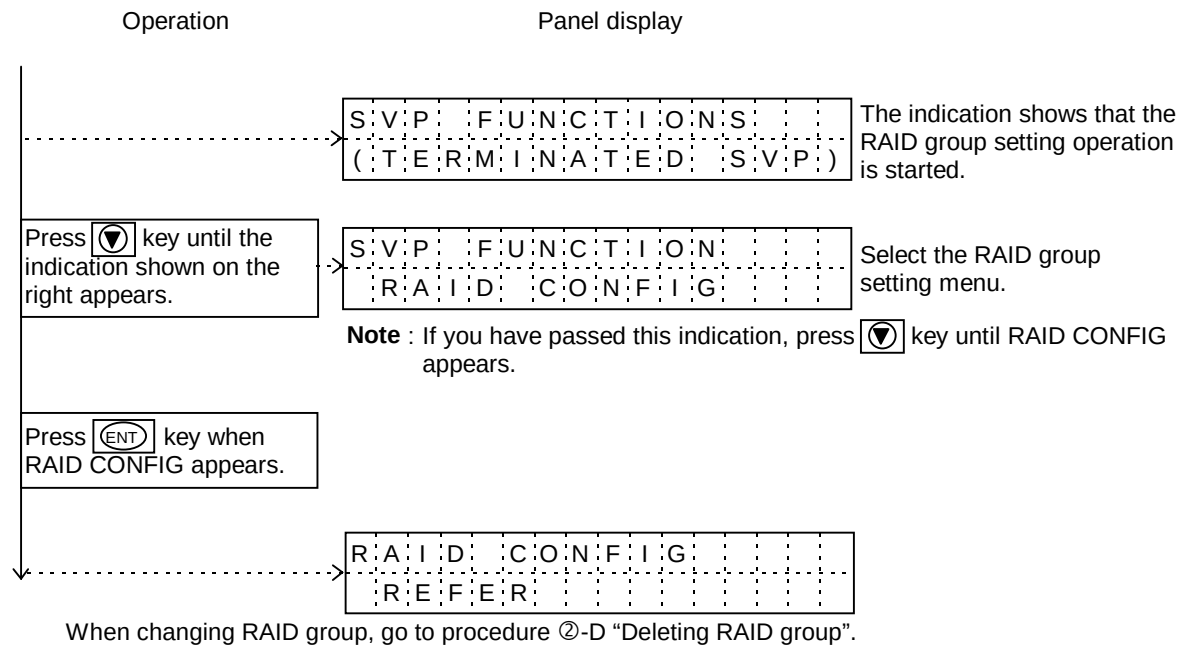


- (3) For the configuration of 4 data disks + 1 parity disk (same configuration as when RAID5 is defined using Micro_Disk Ver.0304** or earlier)

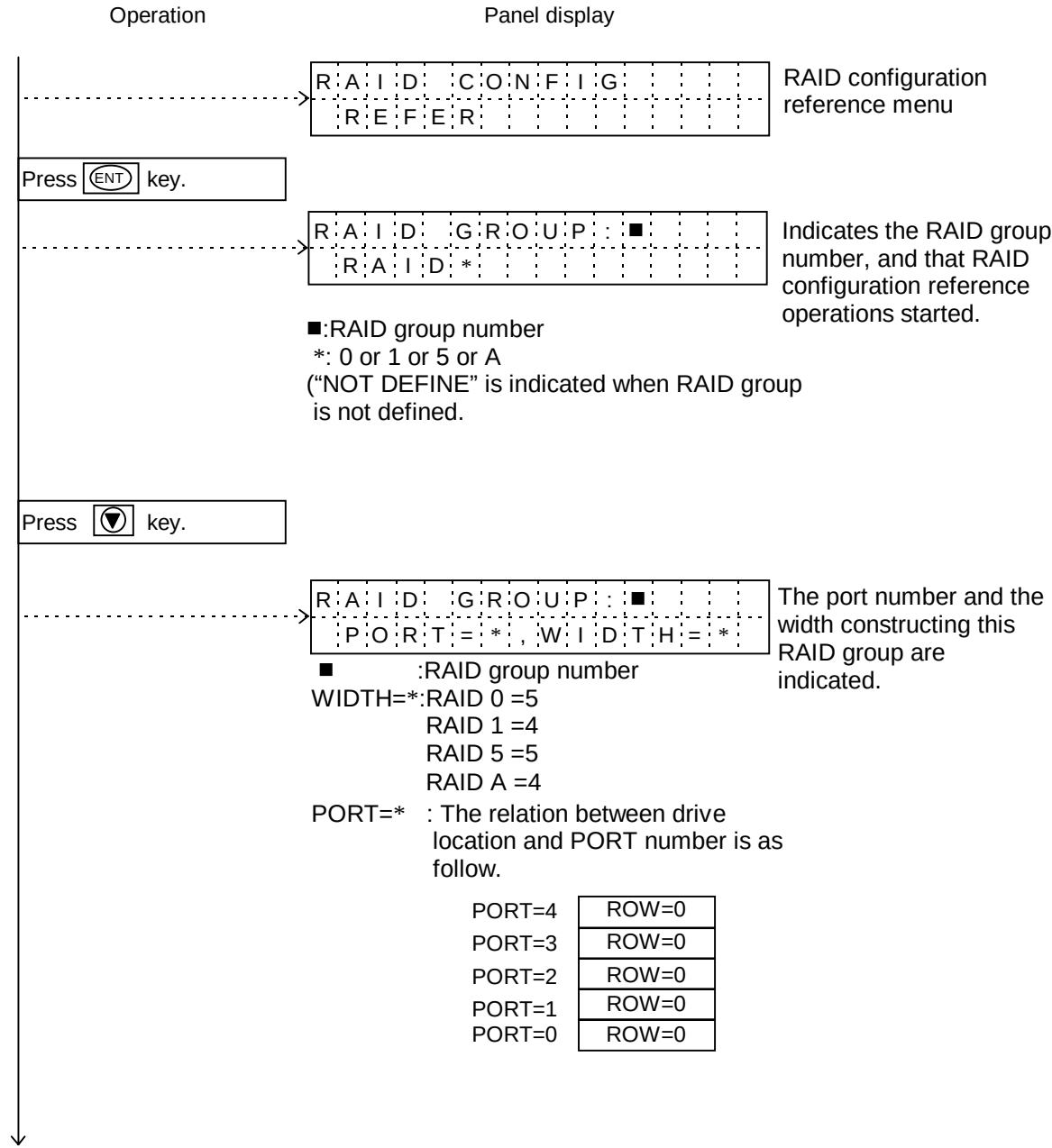


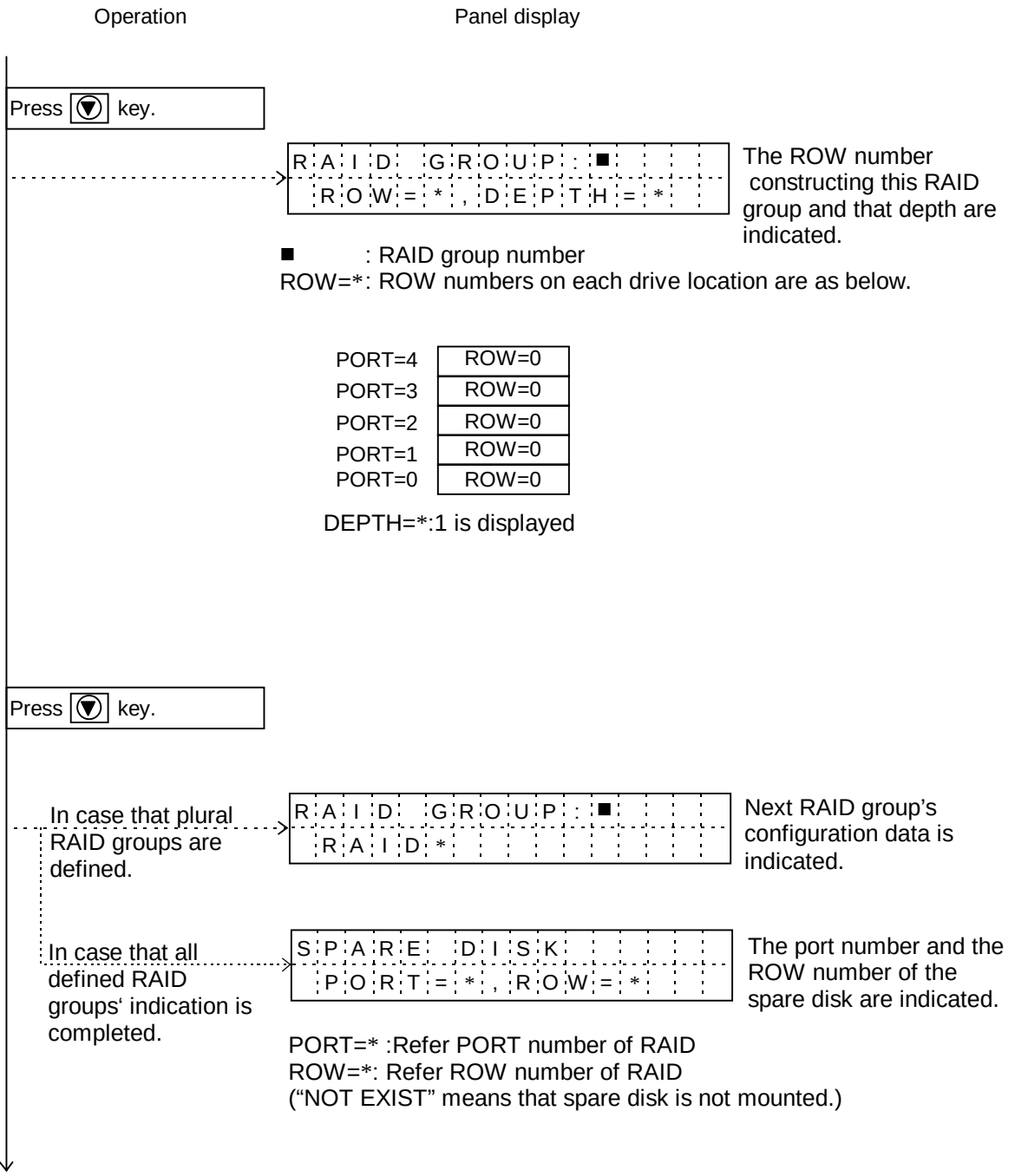
Notice : When changing the data disk configuration, be sure to start from re-definition of the RAID group. Accordingly, the stored data will be lost. So be sure to create a back up copy of the data when the configuration is changed.

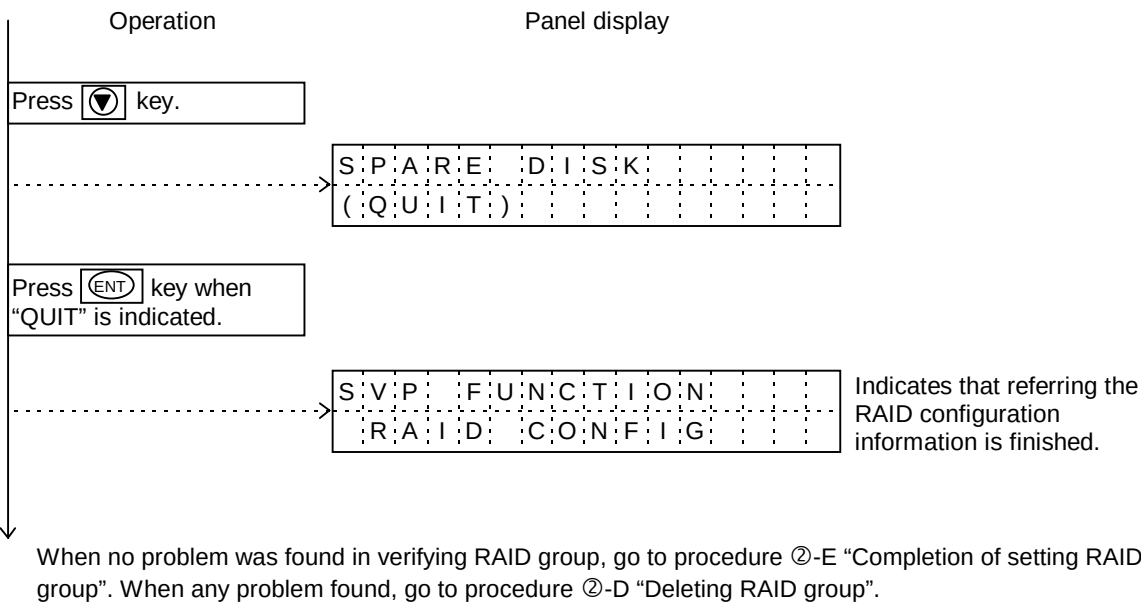
[Procedure②-A] Preparing of setting RAID group



[Procedure②-B] Verifying RAID group





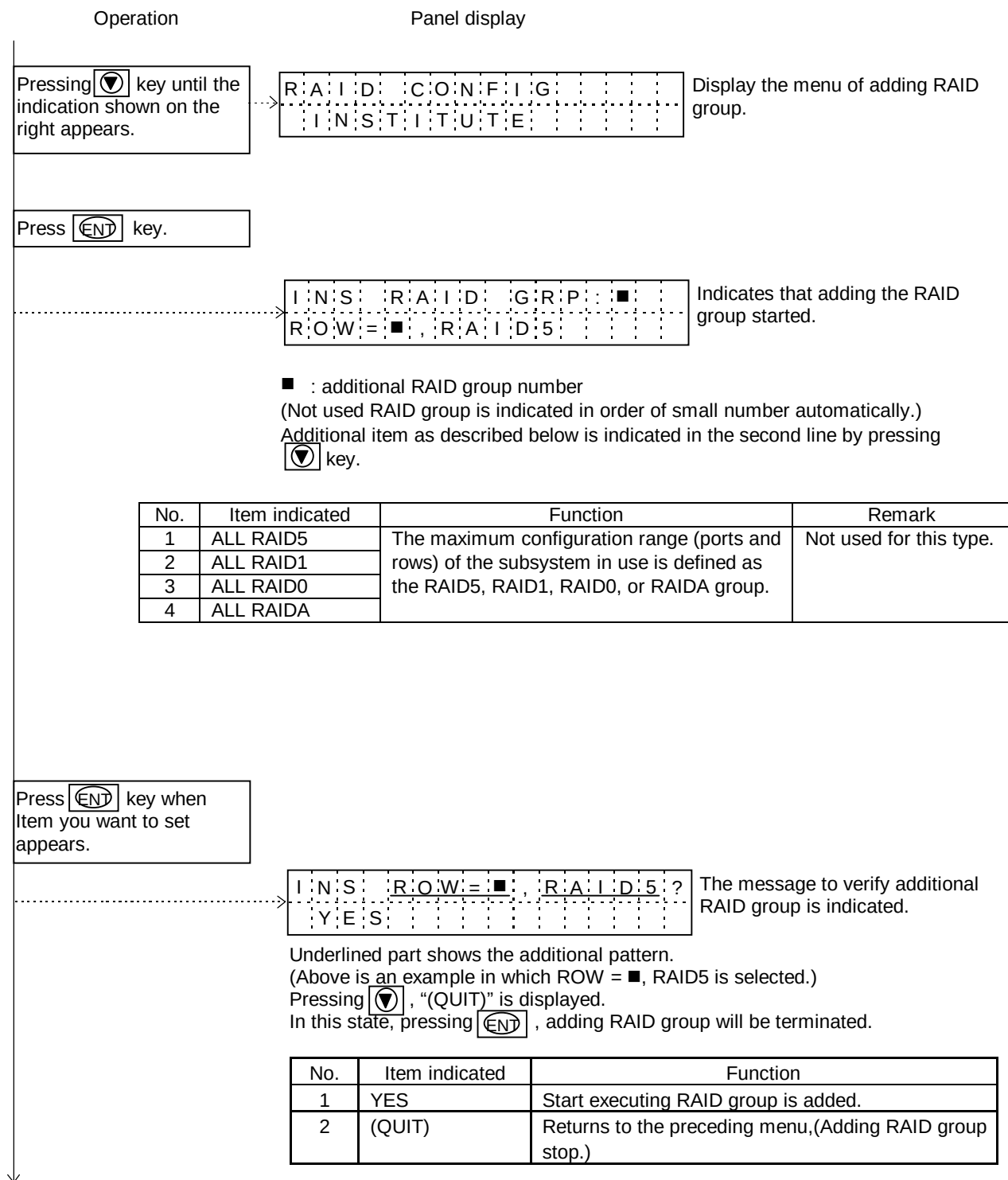


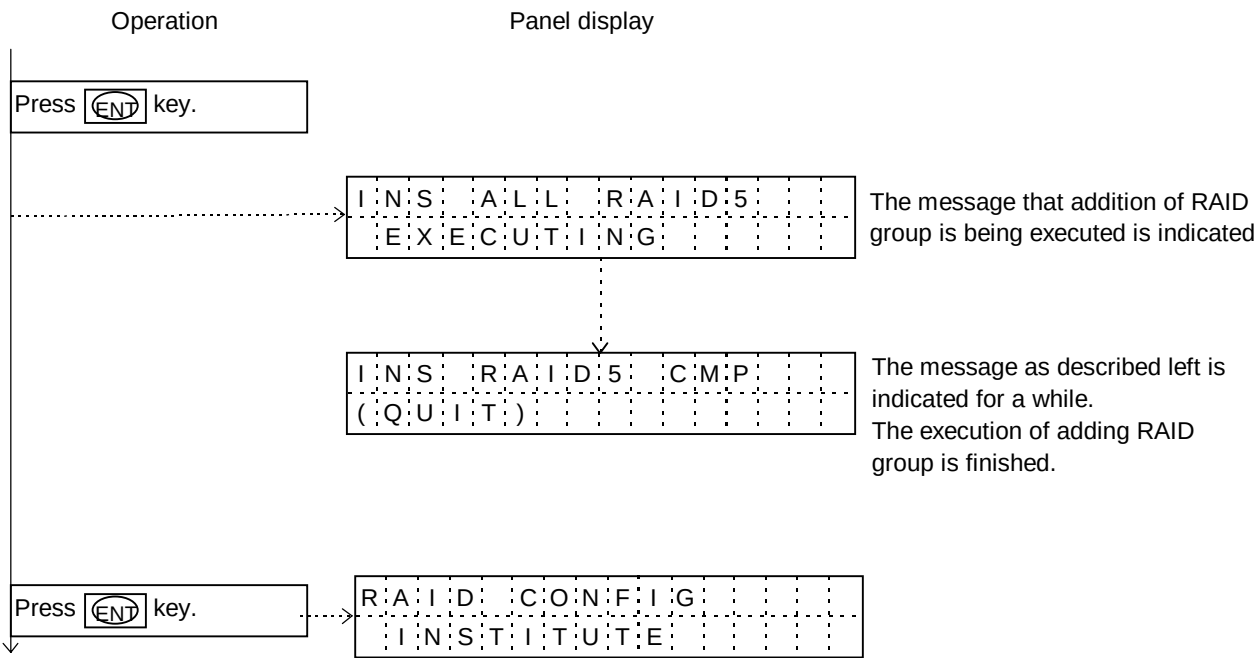
Operation for defining the RAID5 differs depending on whether the version of Micro_Disk is 0304** (** is optional) or earlier, or 0305** (** is optional) or later.

Confirm the version of Micro_Disk and operate in the way corresponds to it. (In the case of RAID0, RAID1 and RAIDA the operation is the same irrespective of the version of Micro_Disk.)

[Procedure②-C] Setting RAID group

(1) RAID group setting when the version is 0304** (**is optional) or earlier

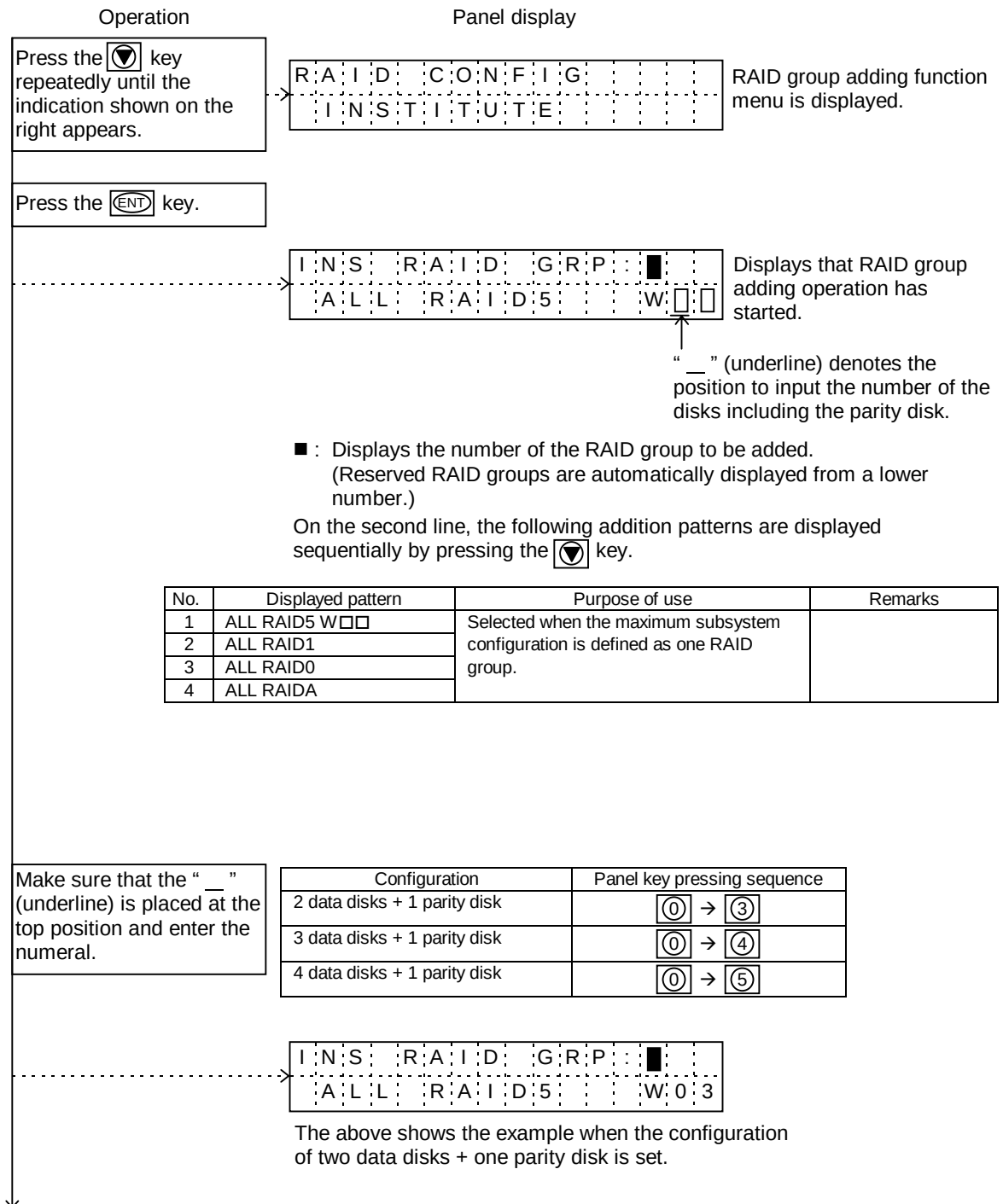


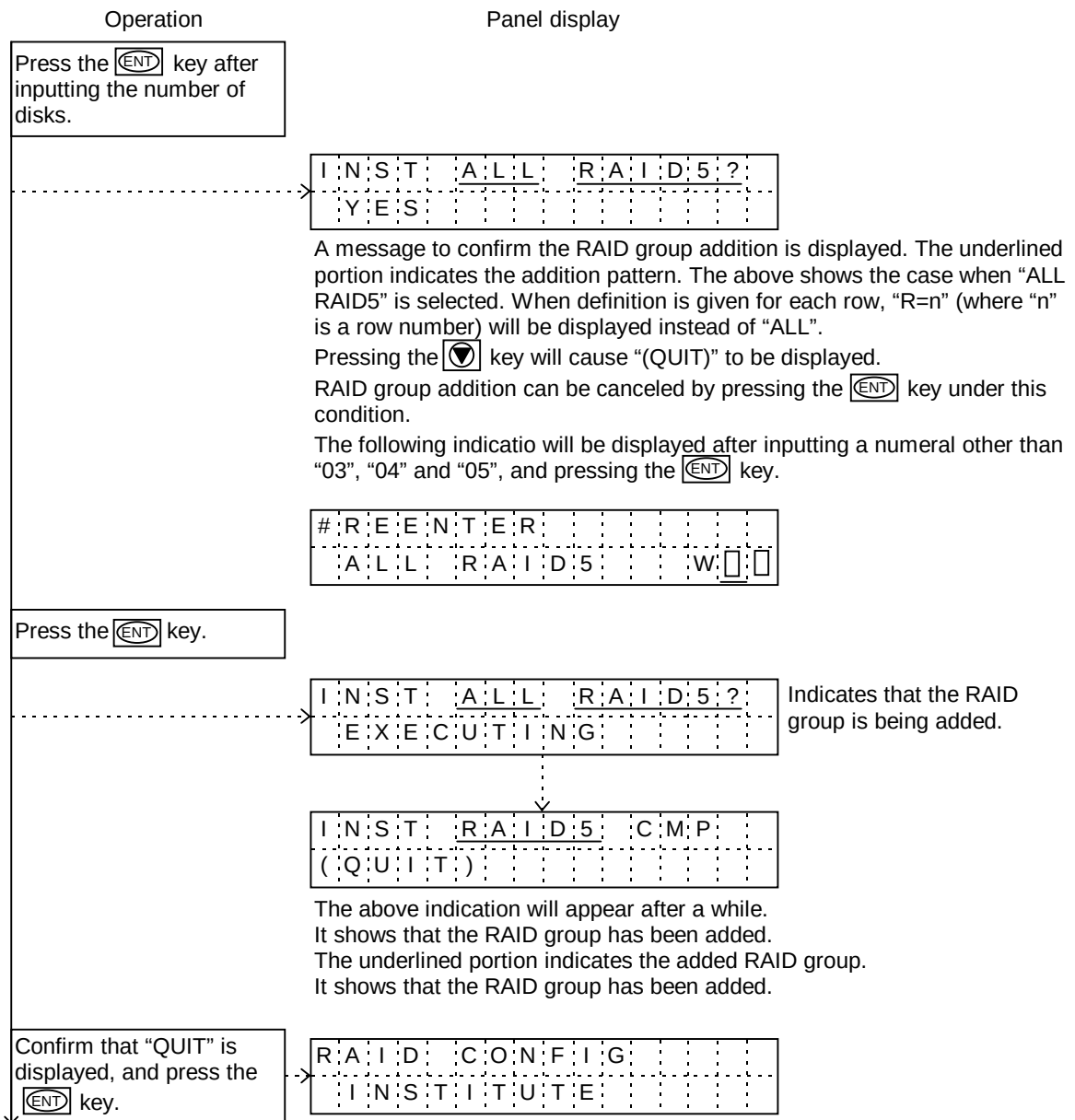


Go to procedure ②-B “Verifying RAID group”
Note : Set RAID group for each ROW when you want to set it for each ROW.

(2) RAID group setting when the version is 0305** (** is optional) or later

When Micro_Disk Ver.0305** (** is optional) or later is used, the number of disks including the parity disk must be input when defining RAID5. (This is not necessary for RAID0, 1 and A.)





Go to procedure ②-B "Verifying RAID group"

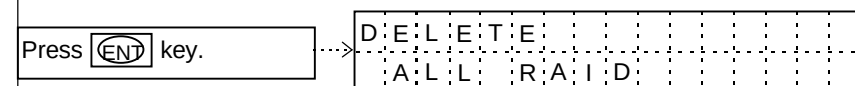
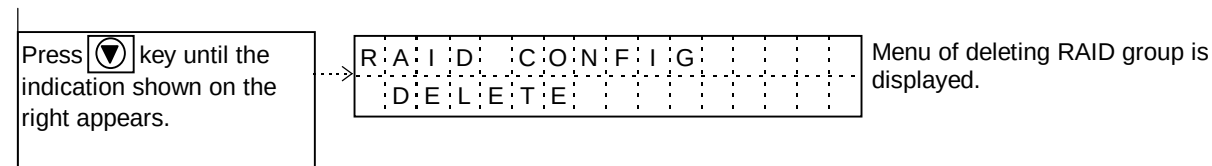
Note : Set RAID group for each ROW when you want to set it for each ROW.

[Procedure②-D] Deleting RAID group

Notice : With this operation, Logical Units are deleted, and the user's data will be lost. Be sure to make back up copy before this operation.

Operation

Panel display



Contents of the second-line indication

No.	Item indicated	Function
1	All RAID	Deletes all RAID group
2	RG■ (RAID*)	Deletes appointed RAID group (■:RAID group No. *:RAID level)
3	(QUIT)	Returns to the preceding menu.

Note) "NO EFFECT" is indicated when no deletable RAID group exists.

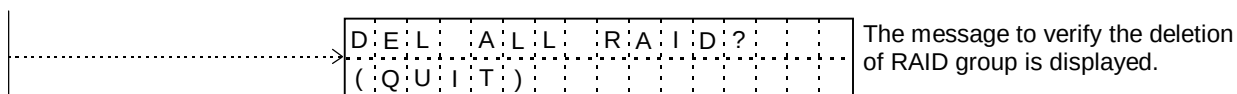
Select item as described right you want to set by  /  key and press  key .

Go to ① when you want to delete all RAID groups , Go to ② when you want to delete appointed RAID group.

①Deleting all RAID groups

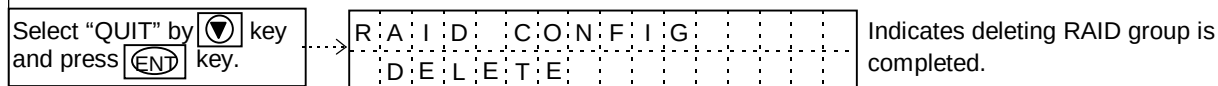
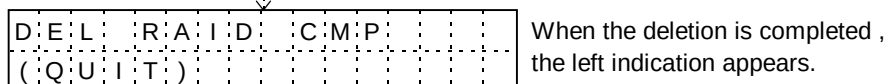
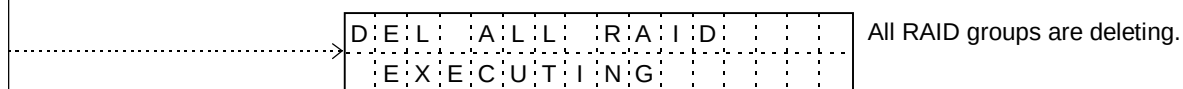
Operation

Panel display



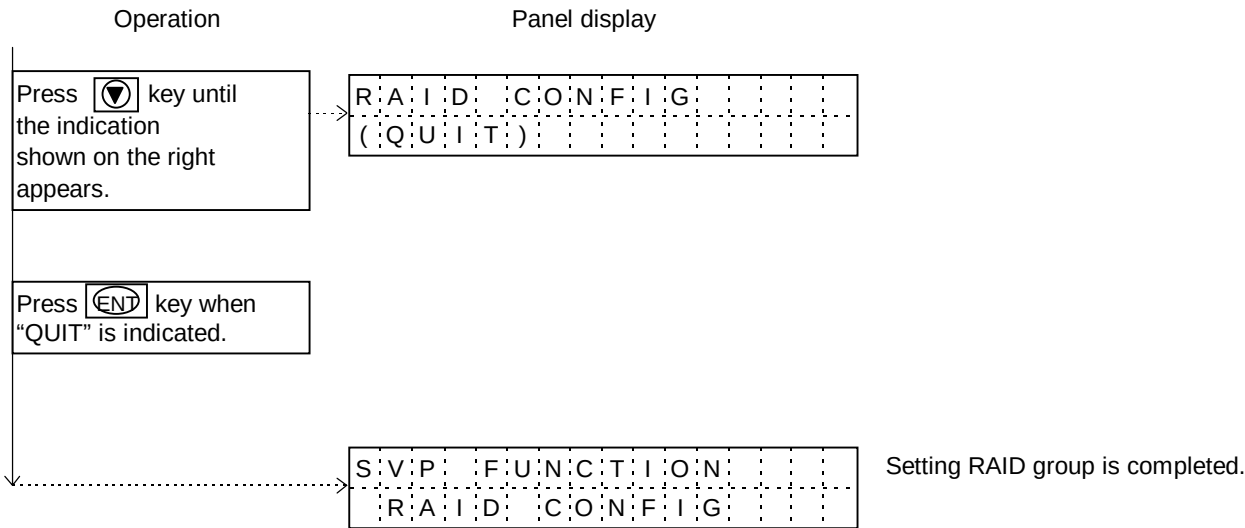
Contents of the second-line indication

No.	Item indicated	Function
1	(QUIT)	Returns to the preceding menu.
2	YES	Deletes all RAID groups.



Go to procedure ②-C "Setting RAID group".

[Procedure②-E] Completion of setting RAID group



4.2.3 Setting LU

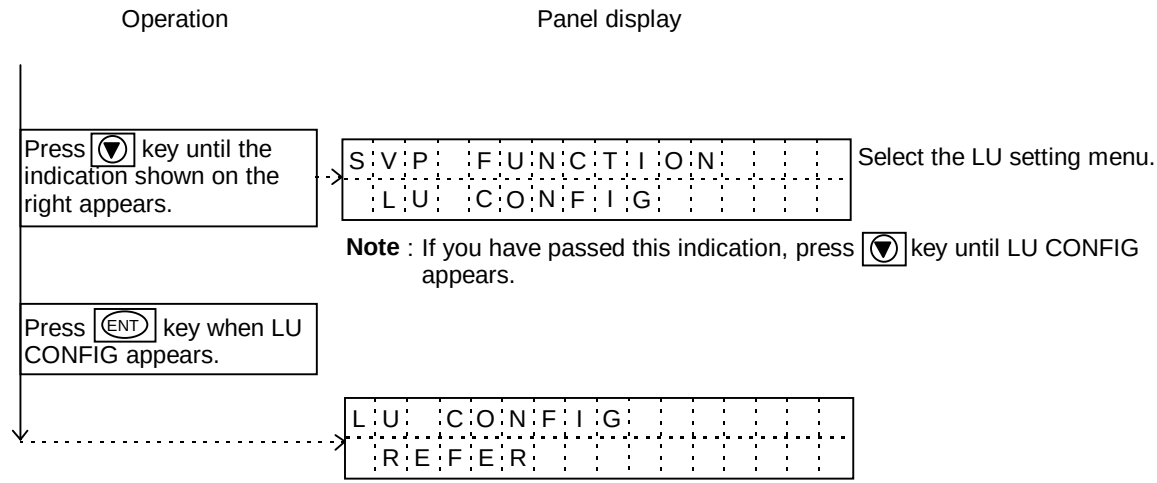
Following procedures are used to set, delete, refer, or format the LU.

This function can be used when the subsystem is ready.

Notice : All user data is lost by deleting the LU.

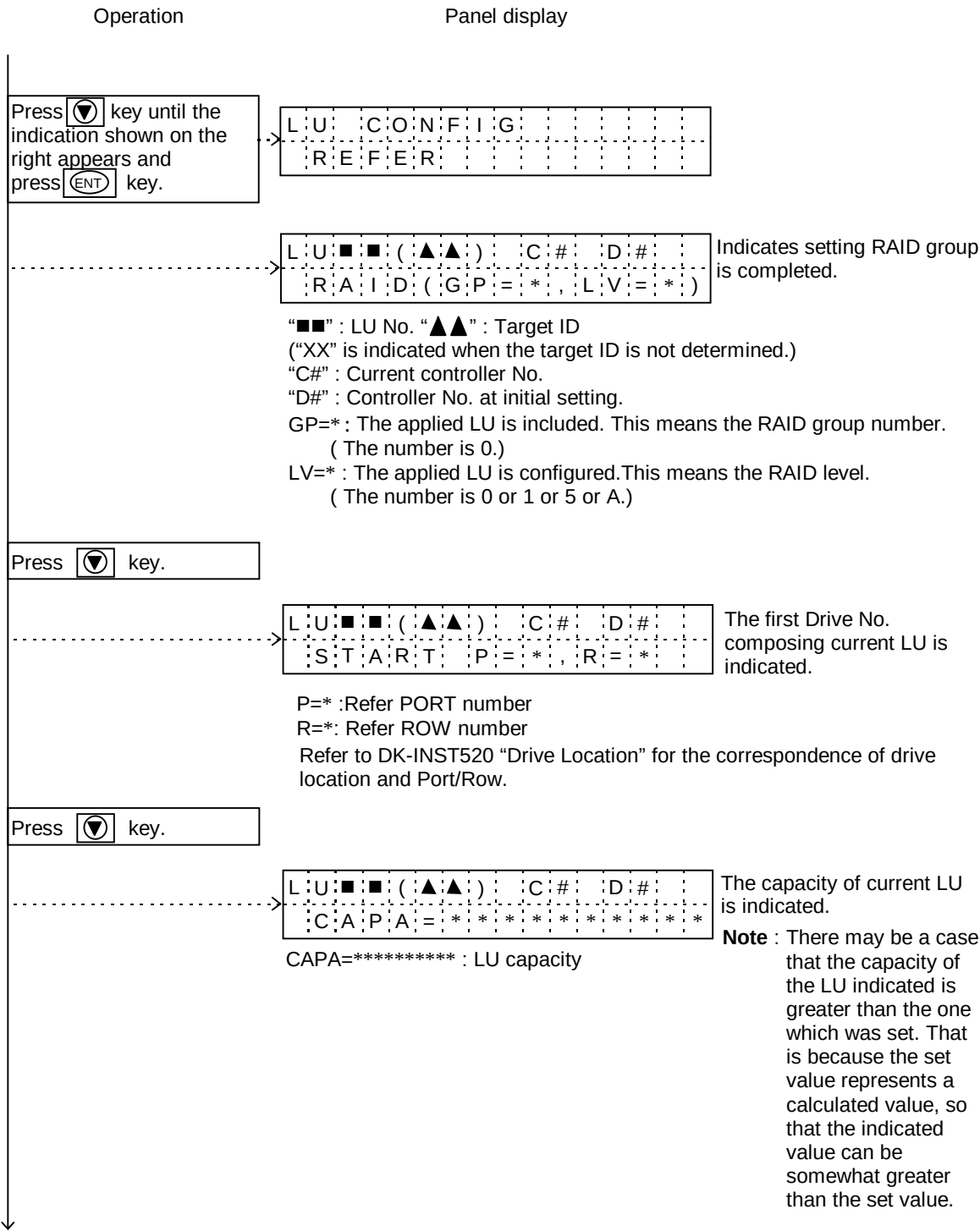
Be sure to back-up the user data before deleting the LU.

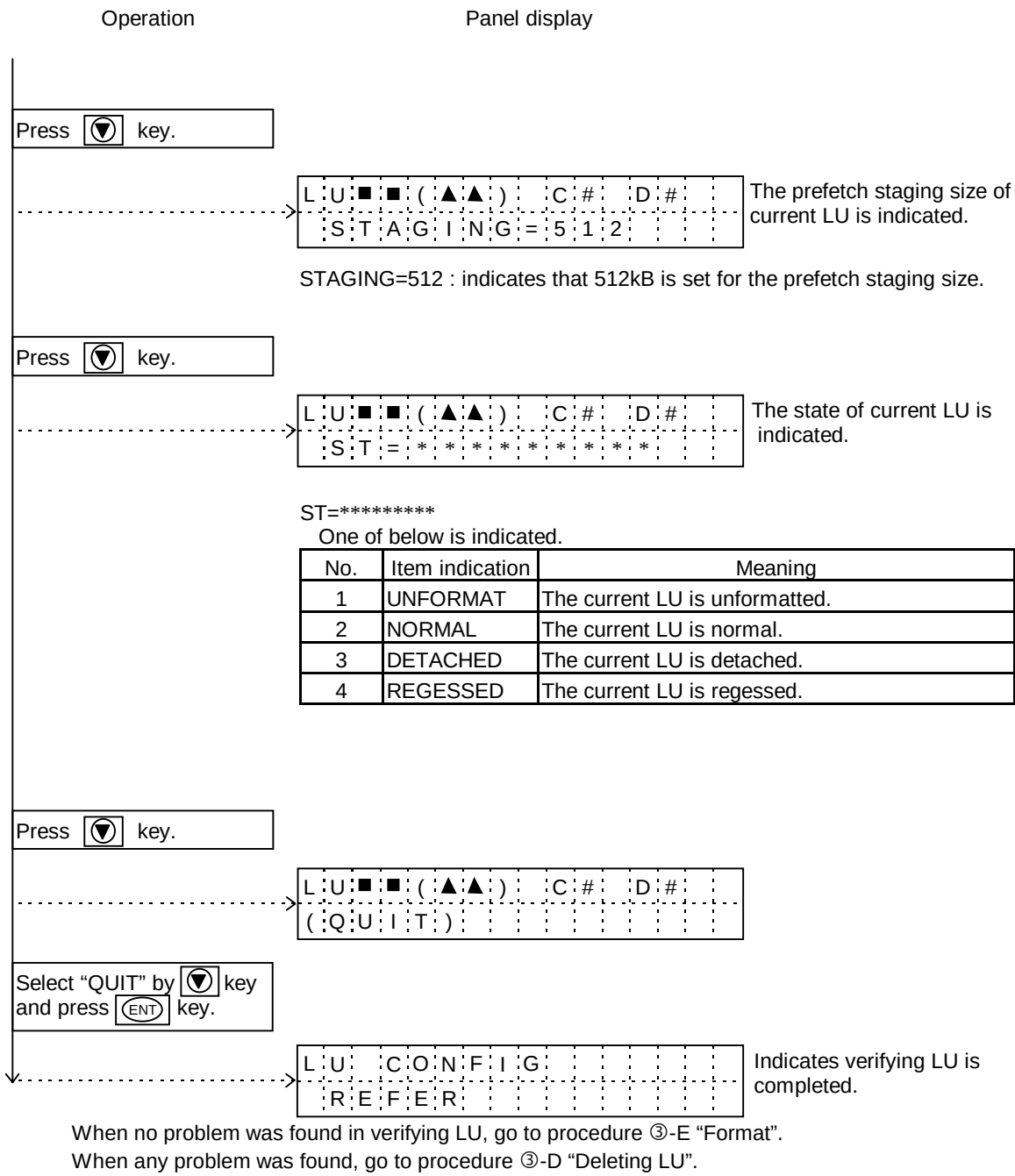
[Procedure③-A] Preparing of setting LU



When RAID group is already set, go to procedure ③-C “Setting LU”.
When changing no RAID group, go to procedure ③-D “Deleting LU”.

[Procedure③-B] Verifying LU





[Procedure③-C] Setting LU

Operation

Panel display

Press  key until the indication shown on the right appears.

```

LU  CONFIG
INSTITUTE
  
```

Display the menu of adding LU.

The second line indicates
INSTITUTE(CTL0) , INSTITUTE(CTL1).
Select the item conforming to the subsystem configuration.

Press  key.

```

INS  LU ■■ (▲▲)
G=0  ALL CAPA
  
```

Indicates that adding the LU started.

■■ : LU No.

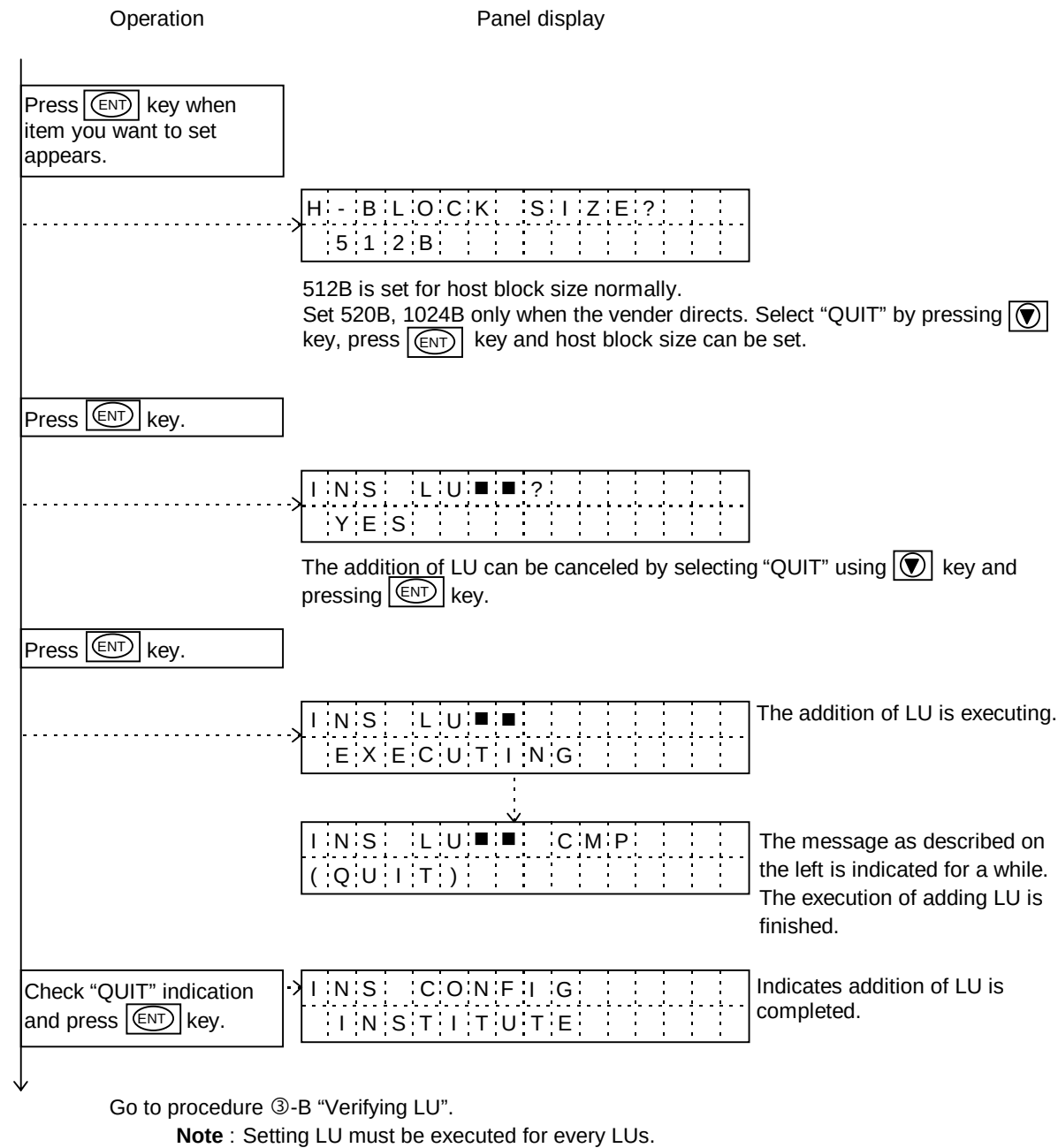
(Not used LU number is displayed in smaller number.)

▲▲: Target ID.

The second line is indicated below by pressing  key.

No.	Item indicated	Function
1	G=0 ALL CAPA	All of the free area in the RAID group 0 is defined as the object LU.
2	G=0 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 0. The capacity is defined by logical block number.
3	G=1 ALL CAPA	All of the free area in the RAID group 1 is defined as the object LU.
4	G=1 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 1. The capacity is defined by logical block number.
5	G=2 ALL CAPA	All of the free area in the RAID group 2 is defined as the object LU.
6	G=2 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 2. The capacity is defined by logical block number.
7	G=3 ALL CAPA	All of the free area in the RAID group 3 is defined as the object LU.
8	G=3 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 3. The capacity is defined by logical block number.
9	(QUIT)	Returns to the preceding menu.

See DK-INST0650 "How to Set Number of Logical Blocks".



Supplement / How to Set Number of Logical Blocks

G=*

C=*****



Enter a value (number of logical blocks) here.

- (1) All RAID groups can be divided into up to 8 logical units.
- (2) Set the number of logical blocks to be set for each logical unit to multiples of the following values according to the RAID level.

RAID0	128
RAID1	128
RAIDA	256
RAID5(4D+1P)	512
RAID5(3D+1P)	384
RAID5(2D+1P)	256

- (3) When dividing each RAID group into multiple logical units, the total number of blocks in each logical units must be set to the number of logical blocks per row as shown below or less.
- (4) The following lists the number of logical blocks per row.

① When five drives are mounted on a row;

(4disks in the case of RAID1, RAIDA and RAID5 (3D+1P); 3disks in the case of RAID5 (2D+1P))

RAID configuration \ Model (Capacity)	DF-F350-A2E2 (2.0GB)	DF-F350-A2E4/DF-F350-A3E4 (4.1GB)	DF-F350-A2E8 (8.7GB)
RAID0	20,200,960	40,652,160	85,085,440
RAID1/RAIDA	8,080,384	16,260,864	34,034,176
RAID5(4D+1P)	16,160,768	32,521,728	68,068,352
RAID5(3D+1P)	12,120,576	24,391,296	51,051,264
RAID5(2D+1P)	8,080,384	16,260,864	34,034,176

② When n drives are mounted on a row (n < 5);

- RAID0

Number of logical blocks = $m^{(*1)} \times n^{(*2)}$

- RAID1

Number of logical blocks = $m^{(*1)} \times \text{int}(n/2)^{(*3)}$

*1: Refer to the table below for m.

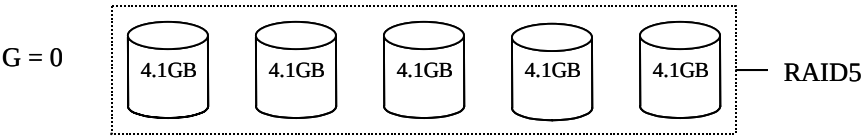
*2: n is 2 or larger in this case.

*3: int means "rounding down".

	DF-F350-A2E2	DF-F350-A2E4/DF-F350-A3E4	DF-F350-A2E8
Capacity	(2.0GB)	(4.1GB)	(8.7GB)
m	4,040,192	8,130,432	17,017,088

(5) Examples of the number of logical blocks set are shown below.

Example ① An example of a logical unit of disks (4.1GB 5units) is divided into 8 LUs.



An example is shown where all G=0 is RAID5 and the LU is divided into 8 LUs of similar capacity. So each group is divided into 2 LUs.

- Group 0

According to (4) ① the logical block number of RAID5 is 32,521,728 ($512 \times 63,519$). An example is shown where LU of G=0 is divided into 2.

Thus, enter the following.

LU0: G=0
C=16,261,120 ($512 \times 31,760$)
LU1: C=16,260,608 ($512 \times (63,519-31,760)$)

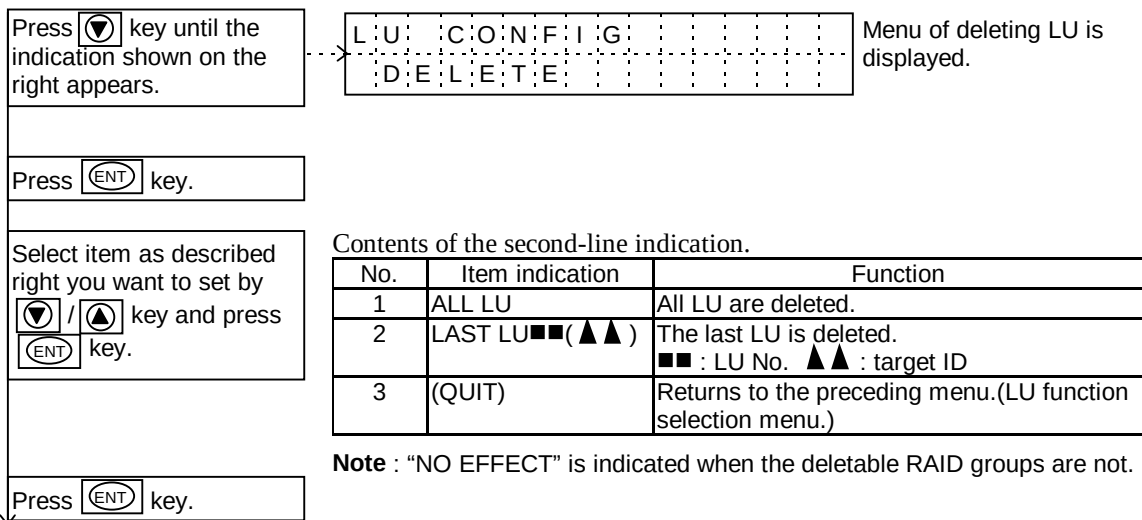
[Procedure③-D] Deleting LU

Note : All user data is lost by deleting the LU.

Be sure to back-up the user data before deleting the LU.

Operation

Panel display



In case of deletion of all LU, go to ①.

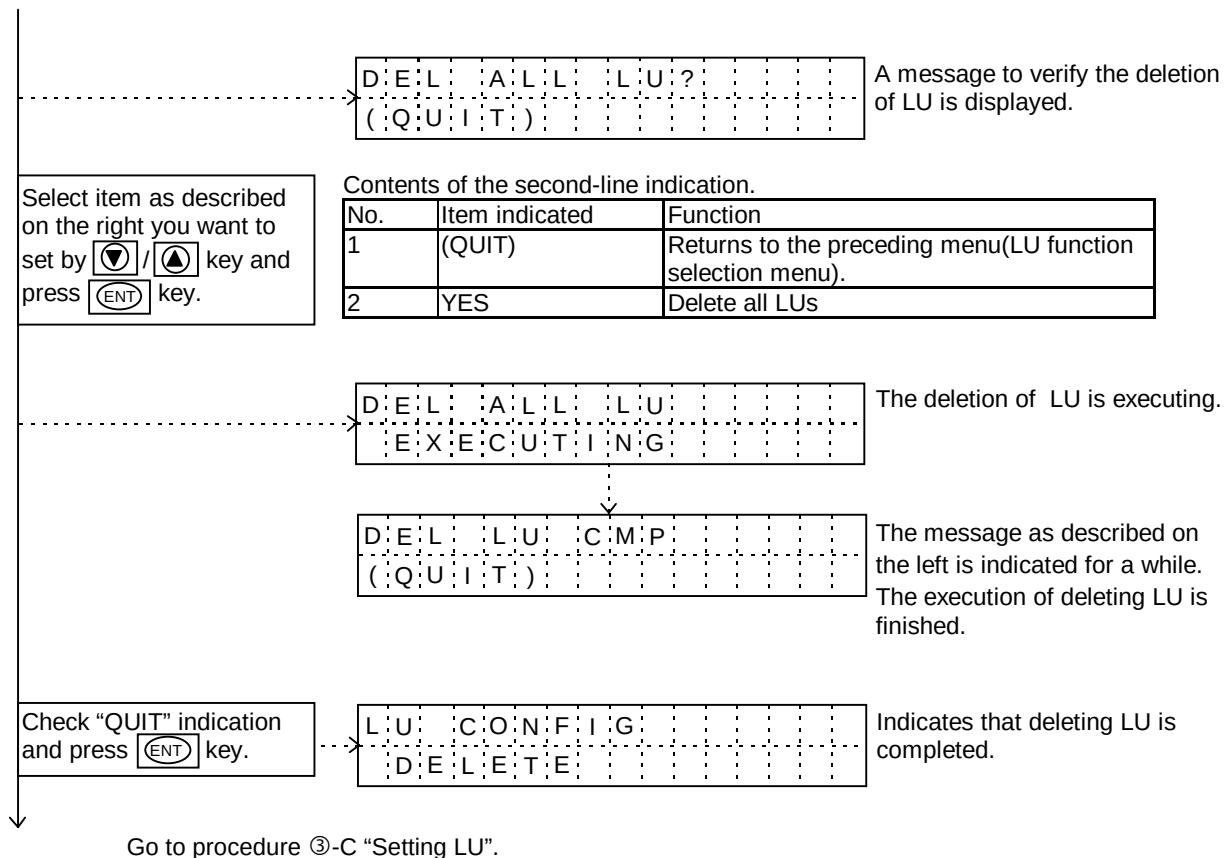
In case of deletion of the last LU, go to ②.

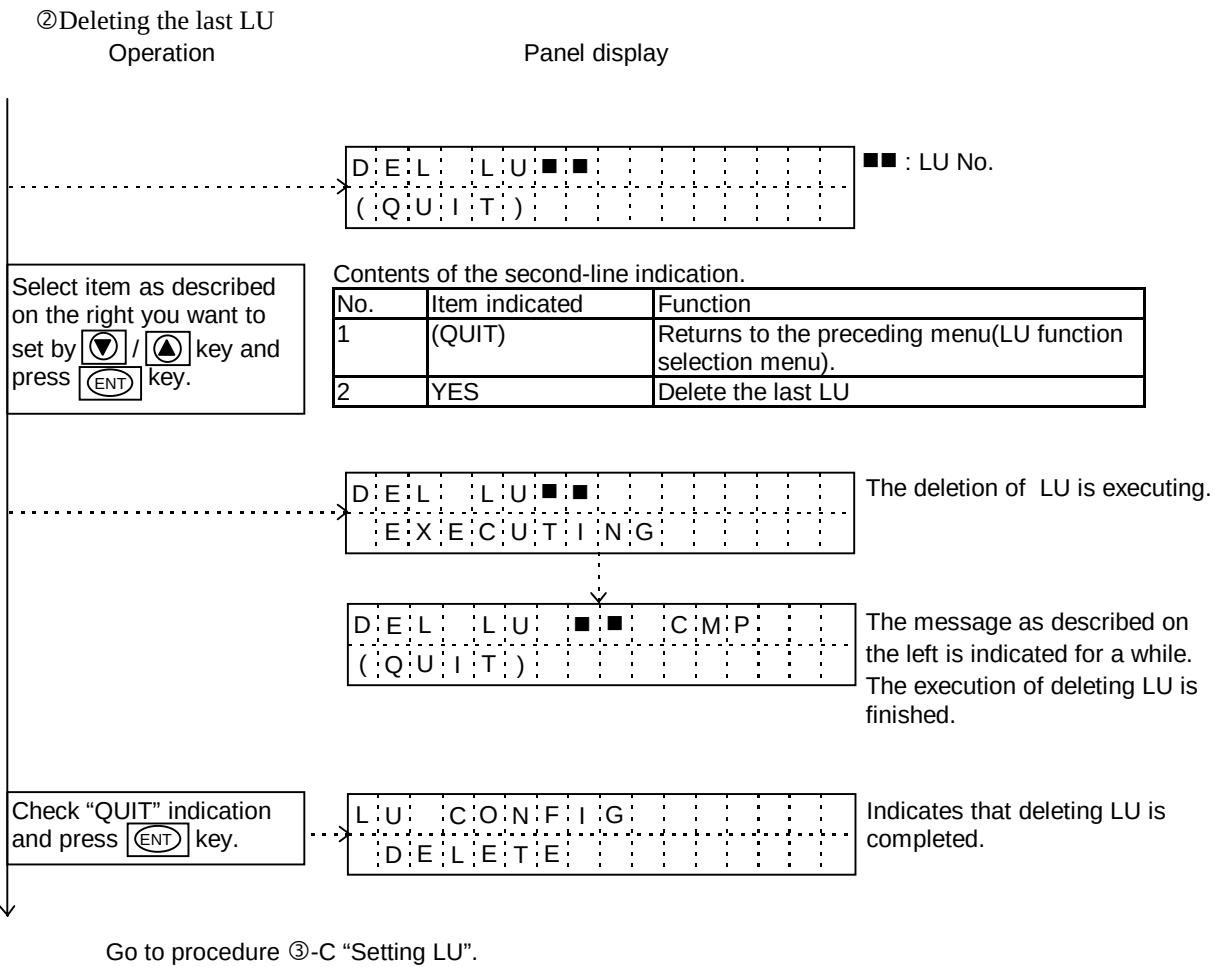
To cancel this operation menu, choose QUIT.

①Deleting all LU

Operation

Panel display



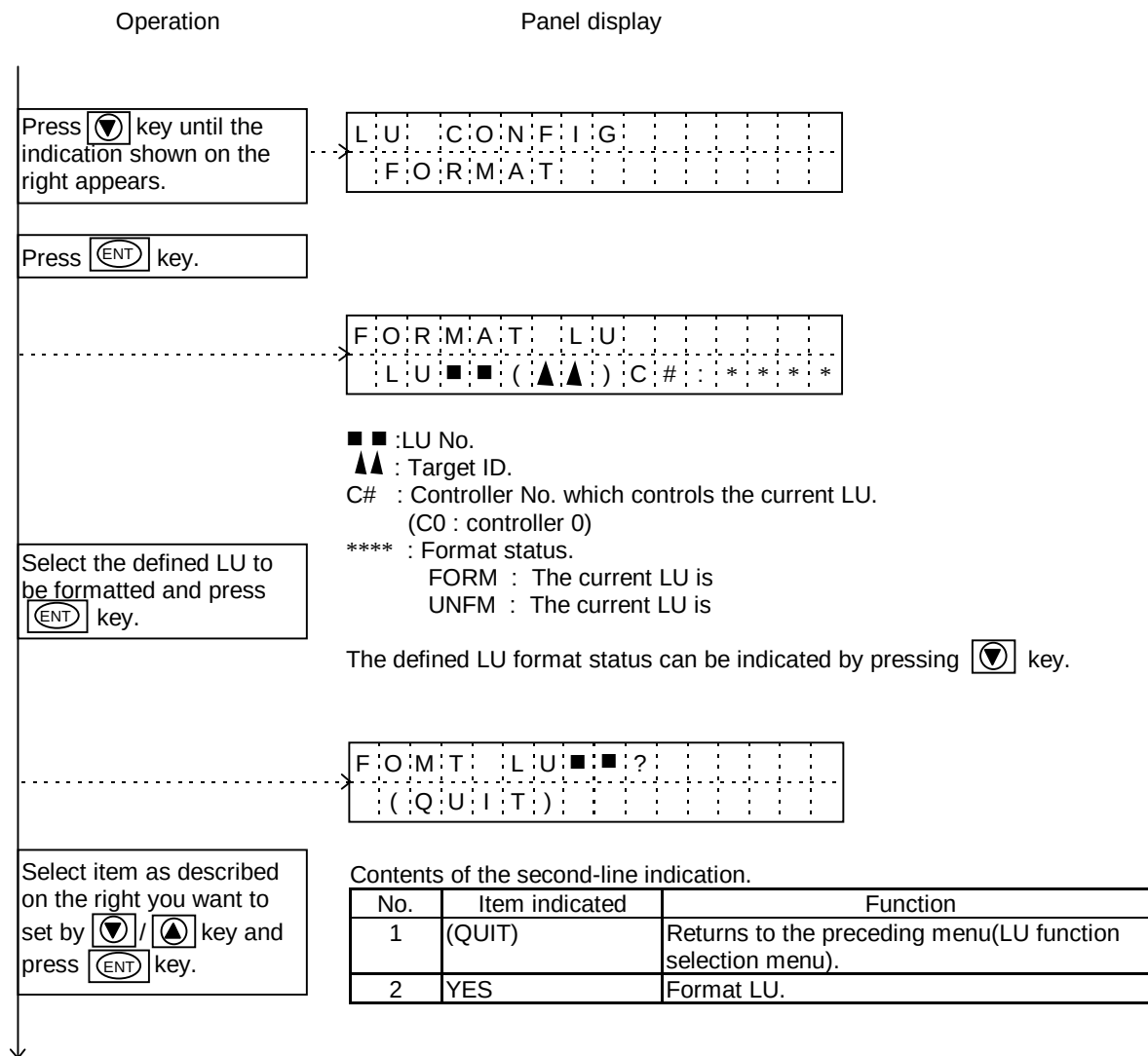


[Procedure③-E] Formatting

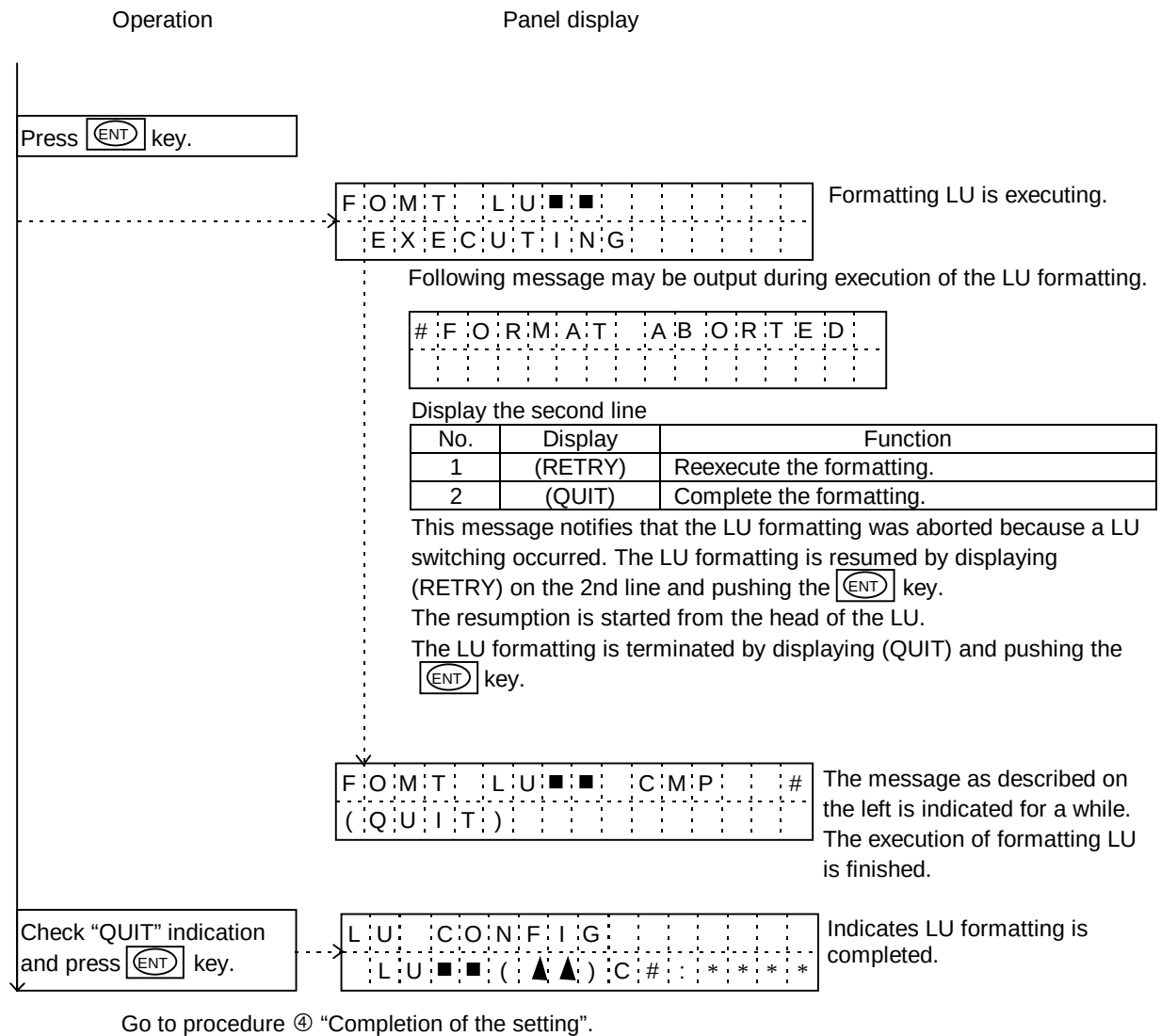
Notice : Note that user data will be lost by formatting the formatted LU.

Besides, be sure to execute the LU formatting for each set LU. When the microprogram of version 0304 or later is used, read/write access from the upper device is possible to the LUs other than that being formatted. Accordingly, the formatting for the LU newly added can be executed while executing usual jobs after the addition of the row(s) following the procedures explained on pages DK-OPTION0170 - 0210.

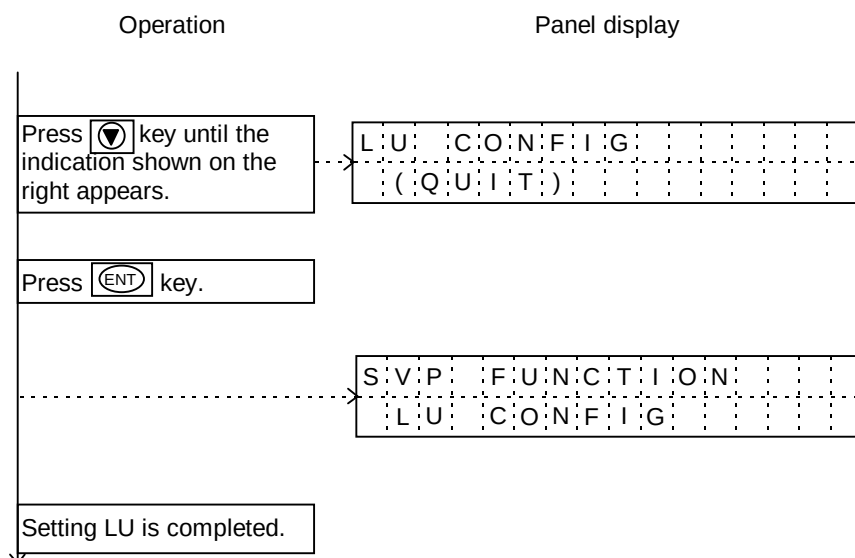
However, a reexecution is needed because the LU format is canceled when the subsystem receives a SCSI reset from the upper device.



Note : LU format must be executed every set LUs.



[Procedure④] Completion of the setting



4.2.4 Setting other parameter

The menu items and the use are shown below. Refer to PANEL chapter (PANEL0340) to change the parameter shown below. The function shown below can be used when the subsystem is ready and the LU#0 is already defined.

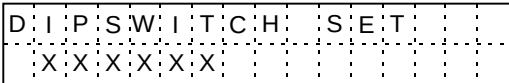
No.	Menu item	Use	Description	Setting before shipment
1	RAID CONFIG	RAID configuration information reference/setting menu	① Reference to RAID configuration information ② Definition of RAID group ③ Deletion of RAID group	
2	LU CONFIG	LU configuration information reference/setting menu	① Reference to LU configuration information ② Definition of LU ③ Deletion of LU ④ Formatting of LU ⑤ Switching LU service controller	
3	SYSTEM OPT (CUR)	System option setting (Only a current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time	
	SYSTEM OPT (SVD)	System option setting (A saved value and current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time ⑨ Setting of the job time-out limit ⑩ Setting of the number of detections in the execution of the reselection time-out ⑪ Setting of the TRESPASS mode (*1)	
4	DRIVE MAINTEN	Drive maintenance menu	① Instruction of drive detaching ② Instruction of drive recovery ③ Reference to drive data recovery status ④ Drive self diagnosis ⑤ Parity matching check ⑥ ECC check ⑦ LA check ⑧ Drive format ⑨ Recovery of system information ⑩ Reference of the disk failure statistical information.	

*1 : This menu is displayed only when ALTERNATE PATH3 has been set by SPECIAL CONNECT of the system parameter.

No.	Menu item	Use	Description	Setting before shipment
5	MICRO VER/REV	Microprogram version/revision numbers reference menu	① Reference to microprogram version/revision	
6	GATHERING (CTL0)	Gathers information of the controller #0 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
7	MEMORY MAINT	Memory content reference/update menu	① Reference/update of memory content	
8	RECV ERR INFO	Error display of recovery when the power is on	① Displays the errors occur during recovery operation performed while power is on	
9	PIN INFO	Display of PIN existence of every LU	① Display of PIN data existence	
10	WARNING INFO	Display of unrecovered warning information	The current warning information is indicated	
11	CLEAR LOG(CT0)	Clearing log information of controller #0	Log information related controller and host I/F is cleared	
12	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

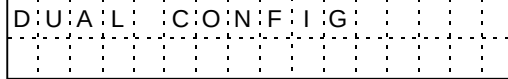
5. Returning Procedure in System Parameter Setting Menu

During system parameter setting menu when wrong menu is selected ( key is pressed), the method of returning for each menu is shown below.

After the operation below  is displayed.

(XXXXXX : Wrongly selected menu)

Then select desired menu by pressing  or  key.

No.	Menu	Procedure to return
1	ROM RESP MODE	Press  key.
2	WRITE&VERIFY	Press  key.
3	STRIPE SIZE	Press  key.
4	LAN CONST	Press  key to display "QUIT" and press  key.
5	TARGET ID	Press  key.
6	CONNECT AS/400	When NOT CONNECT : Press  key. When CONNECT AS/400 : Press  key, and after displaying "QUIT", press  key.
7	CONNECT VMS	Press  key.
8	SPECIAL CONNECT	Press  key.
9	SAVE DATA PTR	Press  key.
10	HOST BLK SIZE	Press  key.
11	ERROR INF	Press  key.
12	CONTROLLER	Press  key.
13	SPARE DISK	Press  key.
14	SERIAL NO	Press  key.
15	ROM V/R	Press  key.
16	RAM V/R	Press  key.
17	CONTROLLER NAME	Press  key.
18	ROW LAST LBA	When Menu is ROW LAST LBA : Press  key to display "QUIT", then press  key.
19	BUZZER	Press  key.
20	SYSTEM ERROR	Press  key.
21	GENERATE SYS	Press  key.
22	INQUIRY INF	Press  key to display "QUIT" and press  key.
23	DUAL CONFIG	Press  key until  is displayed.
24	LU SIZE	Press  key.
25	SYNC CONTROL	Press  key.
26	SYS REV	Press  key.
27	OPTION	Press  key.
28	BOOT PROG V/R	Press  key.
29	RTC SET	Press  key to display "QUIT(ENT KEY)" and press  key.

6. Subsystem Settings for Use in Special Modes

6.1 When outputting information whether a warning is given in the subsystem via RS232C

When outputting information whether a warning is given in the subsystem via RS232C, the microprogram version 0307/F or later is required to be used. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.1.1.

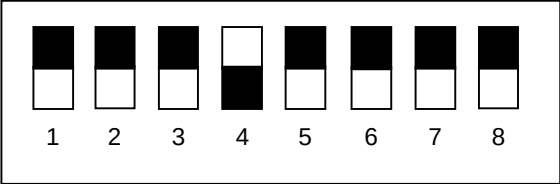
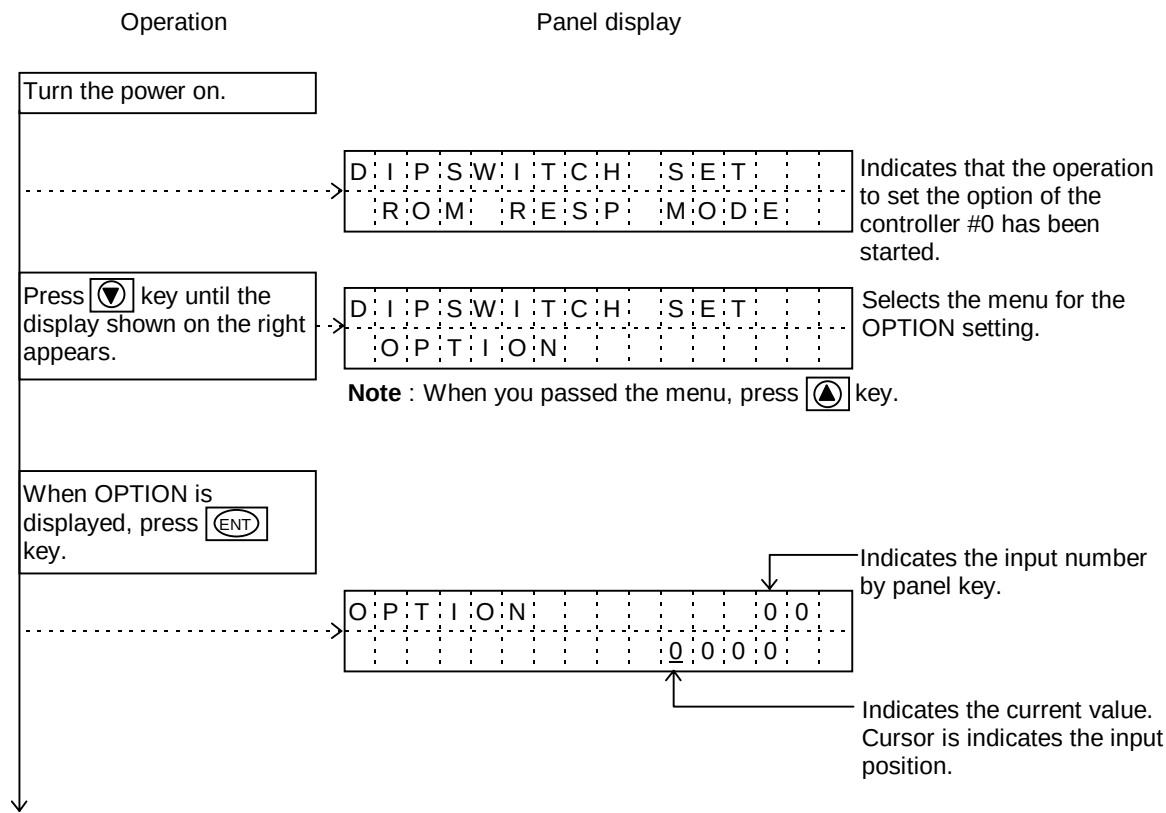
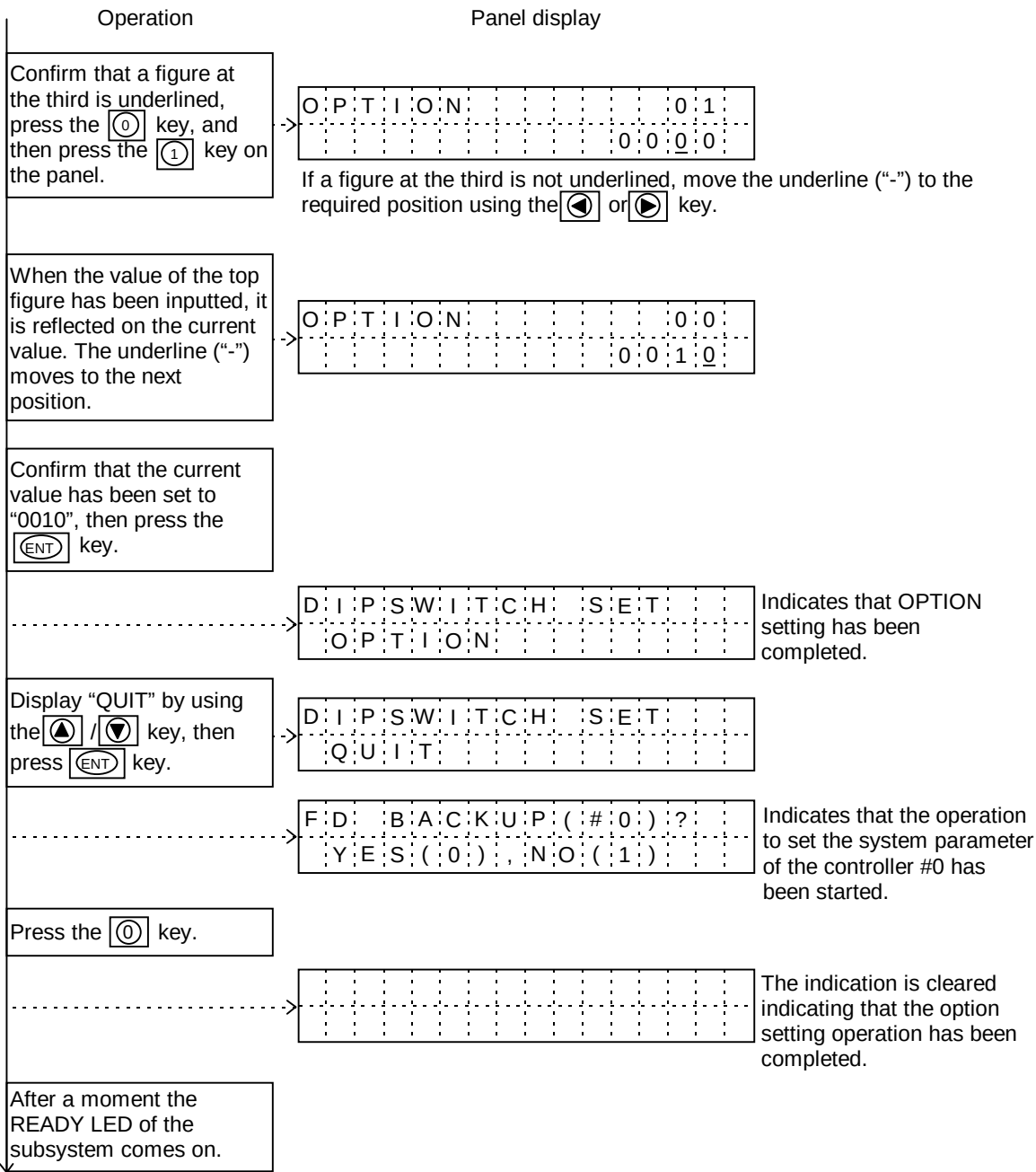


Figure 6.1.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.1.2.

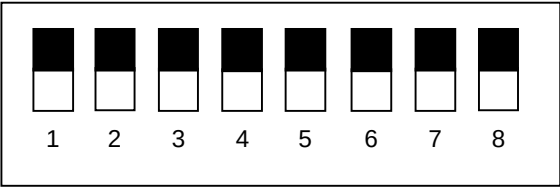


Figure 6.1.2 DIP switches (Being set for Standard setting)

DF350 Disk Subsystem
9. OPTIONAL INSTALLATION
(Desktop (DK) Type)

Rev.3

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: A: Addition, CH: Change, CR: Correction, DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	All	Issued	
1	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0150	Change Flowchart.	CH
2	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0180	Added A2E8.	AD
3	Oct.15.'98	A.Yamanashi			0180	Added A3E4.	AD

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2.3	Back-up Procedure of System Parameter	DK-OPTION0050
2.3.1	Back-up procedure to FD	DK-OPTION0050
2.3.2	Restoring procedure from FD.....	DK-OPTION0080
2.4	Power OFF.....	DK-OPTION0110
2.5	Installing the LAN ASSY	DK-OPTION0130
2.6	Installing the HDU ASSY	DK-OPTION0170

1. Note when Installing the Optional Features

- (1) Be sure to back-up copy user data before installing the optional features. A mis-operation might cause the loss of user's data.
- (2) Back-up the system parameter according to "Back-up Procedure of System Parameter". (See DK-OPTION0050.)
- (3) Power off the subsystem according to power off procedure before installing the optional features. If not, user's data might be lost.

2. Installing the Optional Features

2.1 Unit Appearance Check

Check visually the unit appearance for distortion or damage during the transportation.

2.2 Checking Items of System Components and the Other Items Shipped with the Unit

Check items and quantities of system components (model, serial number, and quantity) and other items shipped together with the unit. Cross-check with the packing list.

2.3 Back-up Procedure of System Parameter

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) are need to be copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters following “Back-up procedure to FD” (See DK-OPTION0050) or “Restoring procedures from FD” (See DK-OPTION0080).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to DK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 as shown in Figure 2.3.1.

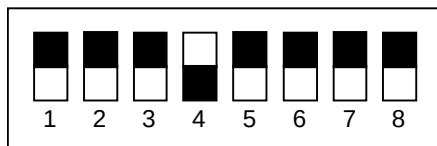
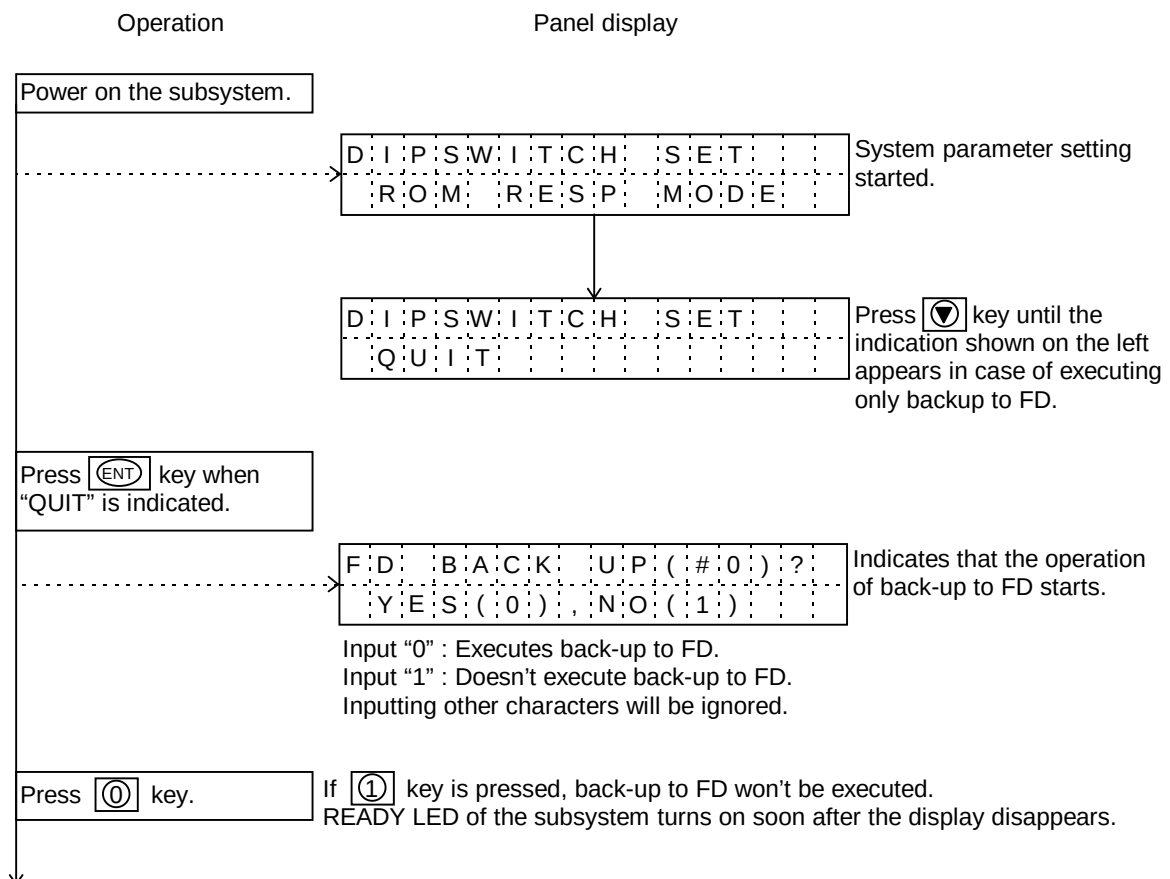
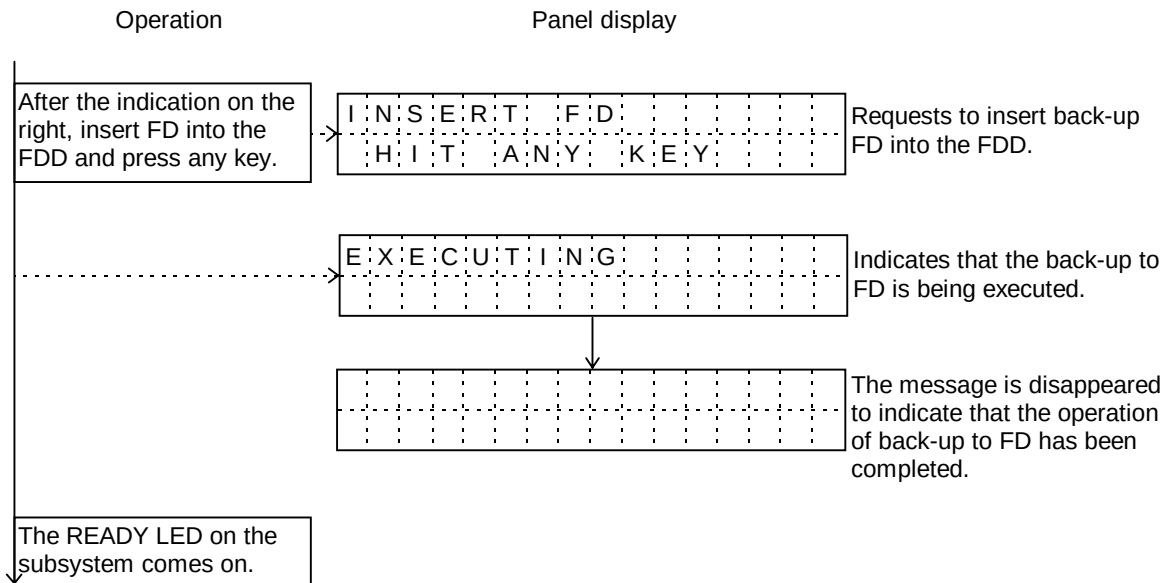


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

- (3) Operate as described below.





(4) Set DIP switch No.4 as shown in Figure 2.3.2.

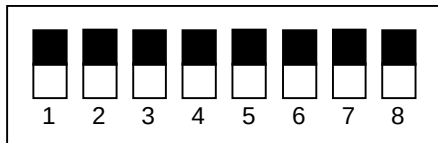
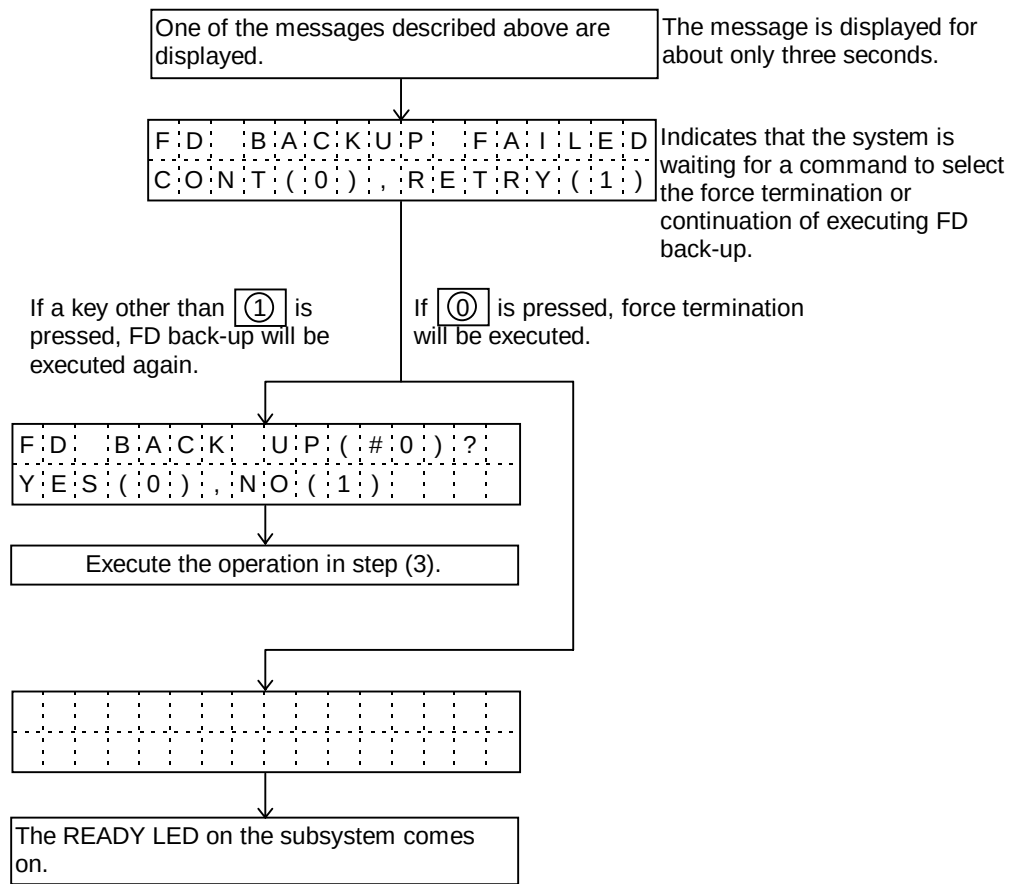


Figure 2.3.2 DIP Switches

Note 1 : While the back-up to FD is being executed, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

2.3.2 Restoring procedures from FD

(1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.

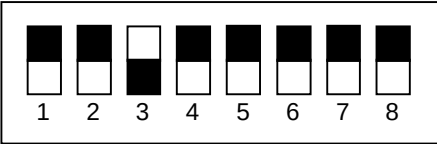
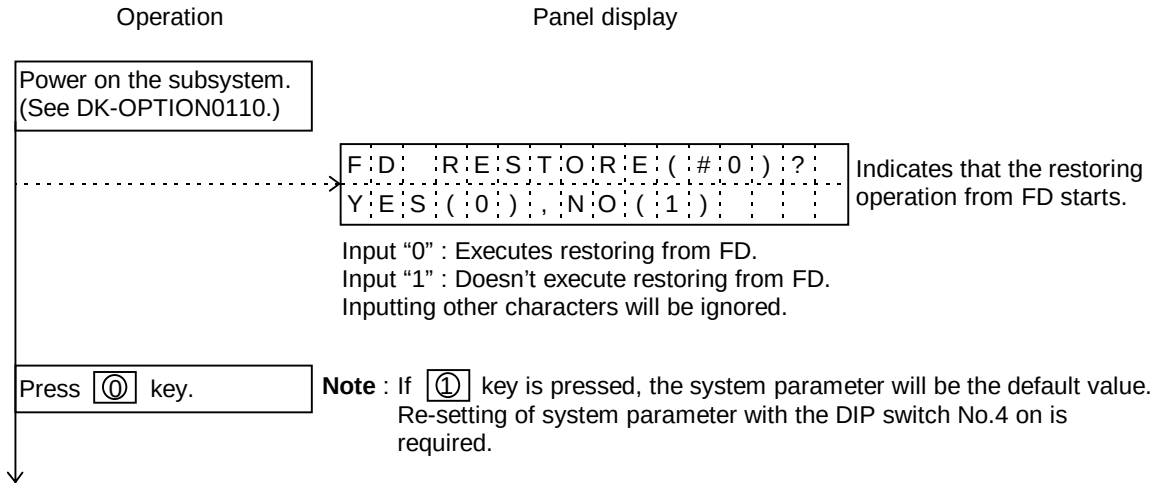
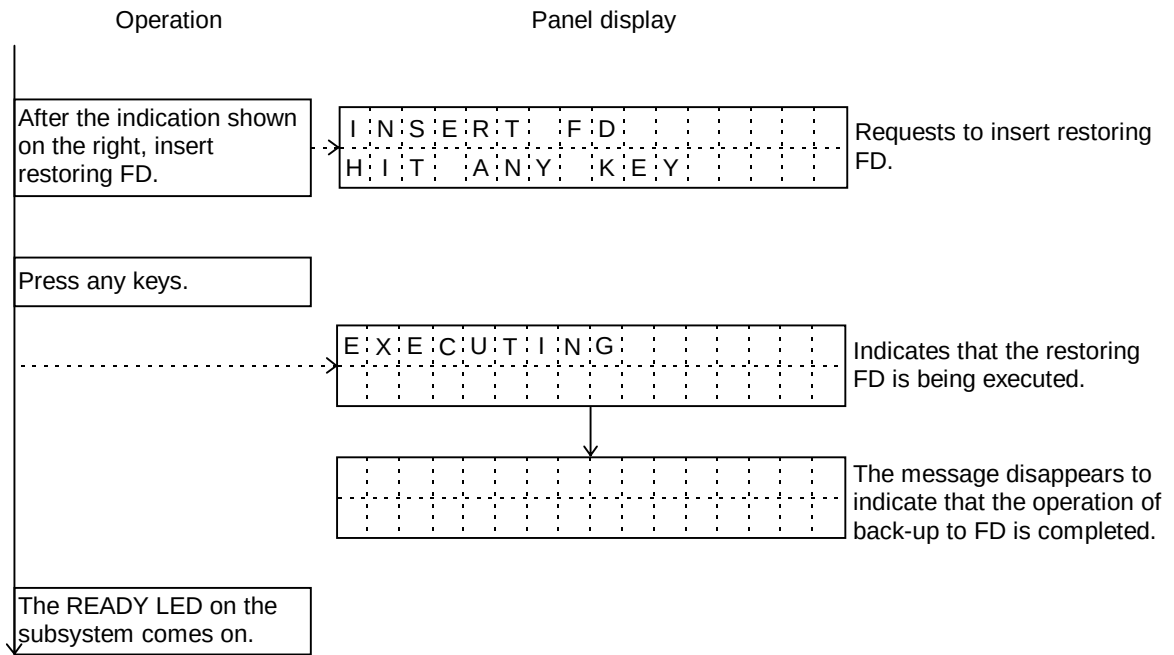


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

(2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

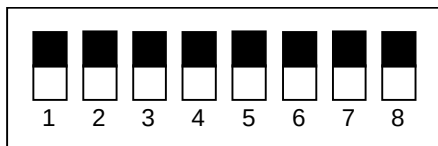
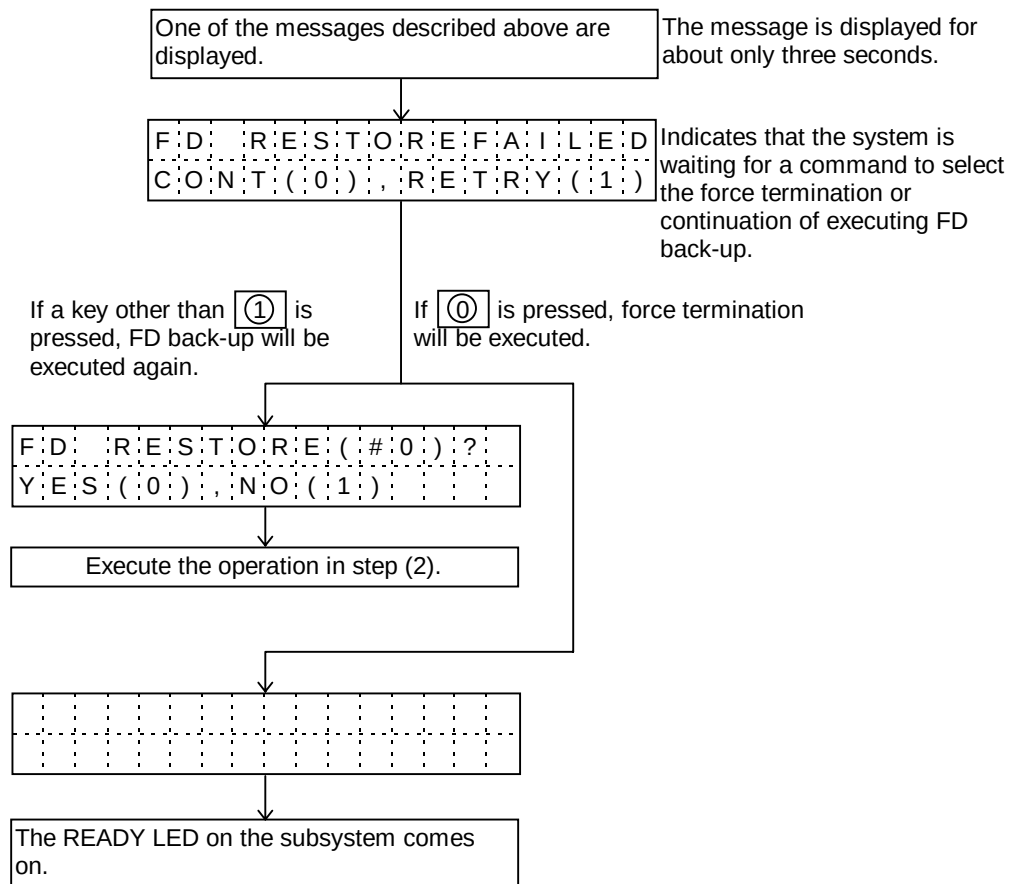


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-execute following the operation described below.



Note 2 : In case that restoring operation ended in failure and was force terminated, setting of EEPROM will be default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

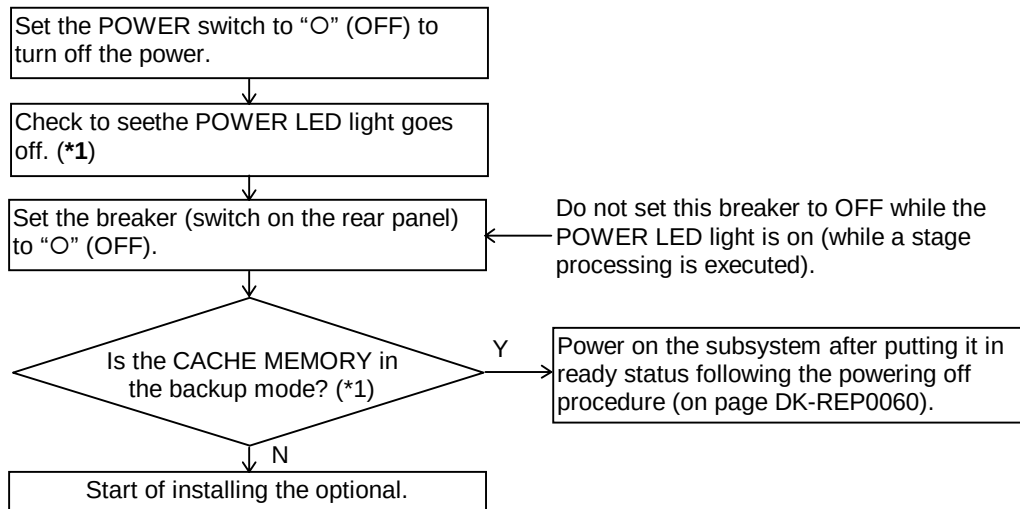
Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

2.4 Power OFF

Turn off the power correctly according to the Power OFF Procedure (1) shown below.

Notice : If optional features are not installed to the system correctly, user data may be lost.

(1) Power OFF procedure



If a power down occurs or the breaker is set to OFF by mistake before the POWER LED goes off, turn on the power right away according to the "(2) Power ON procedure" below, then execute the power off procedure above.

*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

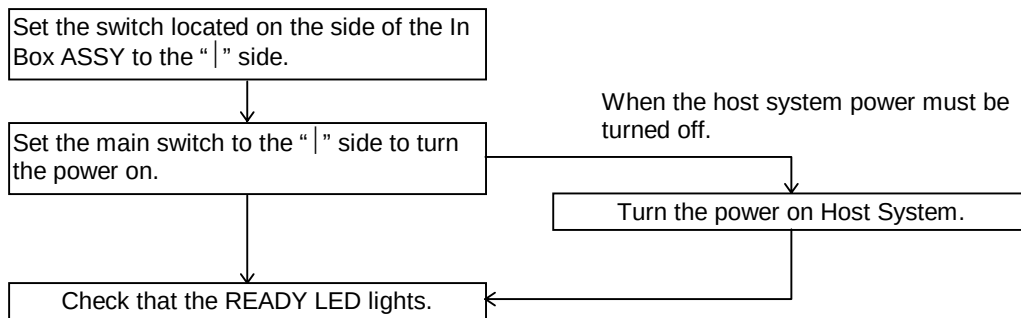
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicates the back-up mode.

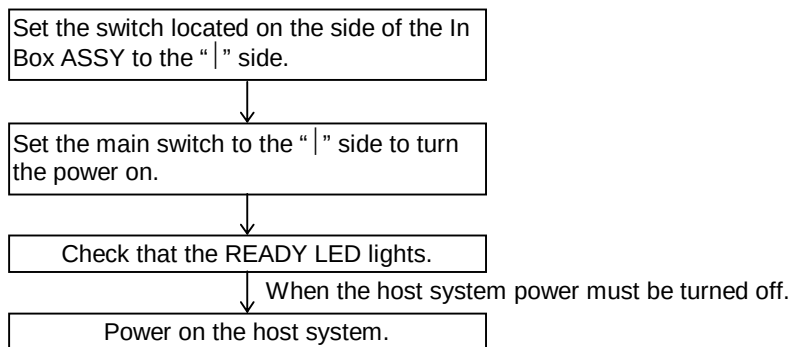
CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.5 Installing the LAN ASSY

The adding procedure differs depending on the case of G1D1 or G2D1.

Perform steps (1) to (5) in the case of G1D1 or steps (1) to (17) in the case of G2D1.

Adding procedure

(1) Power off the subsystem following the powering off procedure (instructed on page DK-OPTION0120).

Notice1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the CACHE backup is not being performed. If the CACHE backup is being performed, turn on and off the power (see page DK-REP0050), then perform the replacement after the power is turned off normally.

When powering off the subsystem, there may be the case that the following message is displayed on the panel and the subsystem power cannot be turned on even when turn the main switch to the "O" position. If this occurs, turn the power off referring to "Errors and Recovery Measures" (on page TRBL0030) in "Troubleshooting section".

When the power cannot be turned off, "TOOMNYPIN", "SYSDTSVER" or "POFFCMUNC" is displayed on the panel.

- (2) Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DK-REP0070.
- (3) Remove the cover. (See DK-INST0090, 0100.)
- (4) Install a LAN ASSY.
- (5) Attach the cover. (See DK-INST0090, 0100.)

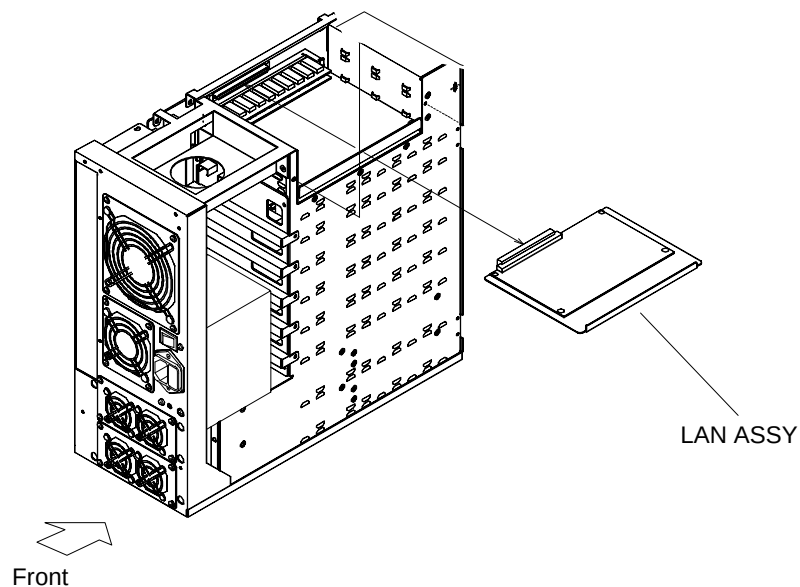
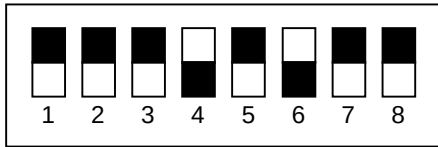


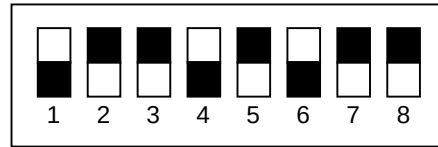
Figure 2.5.1 Installing a LAN ASSY

- (6) Open the front cover.
 (7) Set the DIP switches on the CTL ASSY as described below. Depending on the LAN ASSY to be used.

[DF-F350-G1D1]



[DF-F350-G2D1 (SNMP)]



- (8) Turn on the power according to the power-on procedure in DK-OPTION0110.
 (9) Set LAN connection state on the panel.

① Panel display



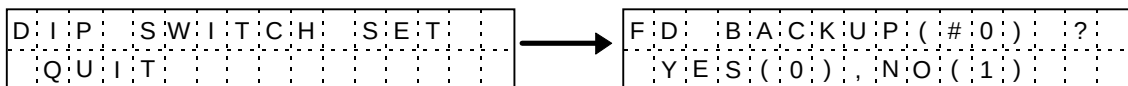
← Pressing , key, items are scrolled.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Displayed Item

No.	Message display	Description
1	CONNECT	LAN connected
2	NOT CONNECT	LAN not connected

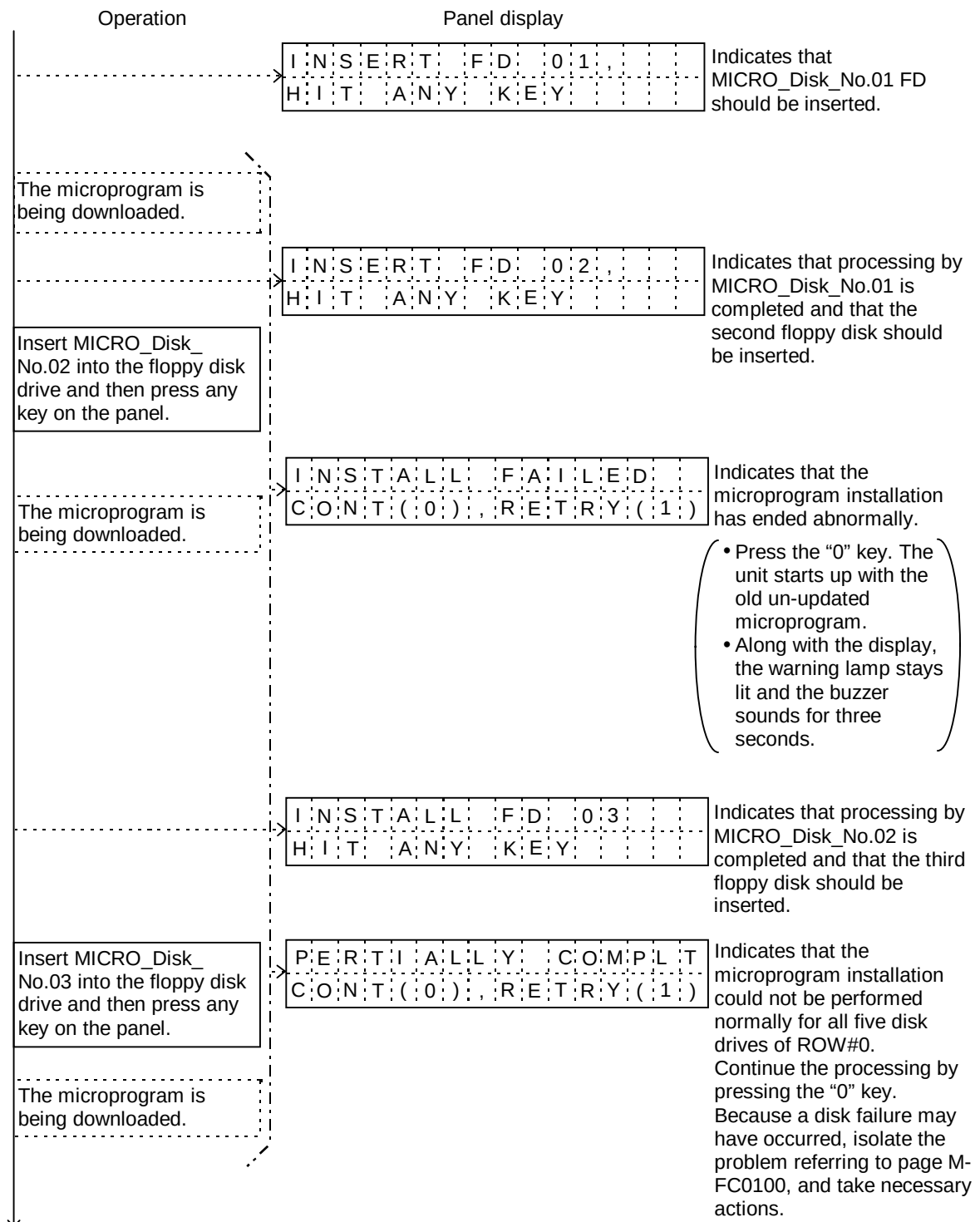
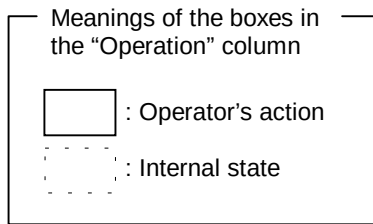
- (10) Set IP address. (See DK-INST0290.)
 (11) Set SUB NET MASK. (See DK-INST0280.)
 (12) Set DEFAULT GATEWAY address. (See DK-INST0290.)
 (13) Set System parameter on the panel. (See DK-INST0230.)
 (14) After setting ② in Chapter 5 and selecting "QUIT" on the panel, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of the system parameter.

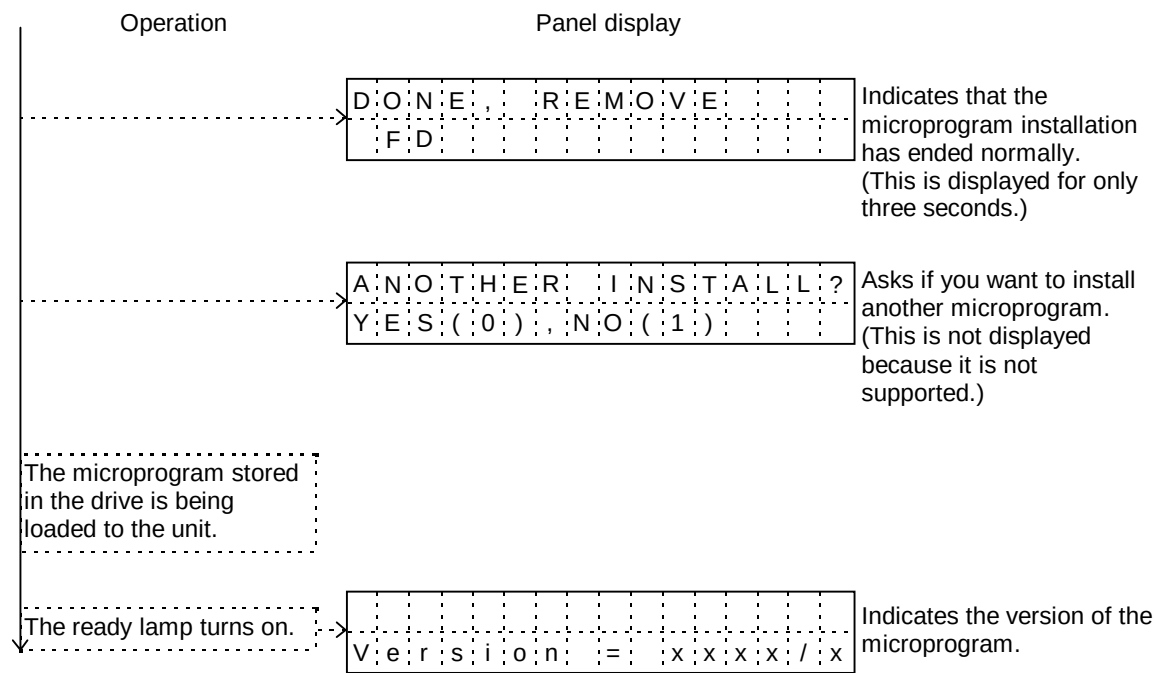


If this message appears, make a back-up copy of the data in the EEPROM into the BACKUP floppy disk.

(15) Perform the following procedure.

Note : Use a set of three FDs (containing a microprogram corresponding to the SNMP) supplied with the DF-F350-G2D1 when it is shipped from the factory.





- (16) Reset the DIP switches (4, 6 or 1, 4, 6) to the original positions after the system is ready.
- (17) Close the front cover.

2.6 Installing the HDU ASSY

 **Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

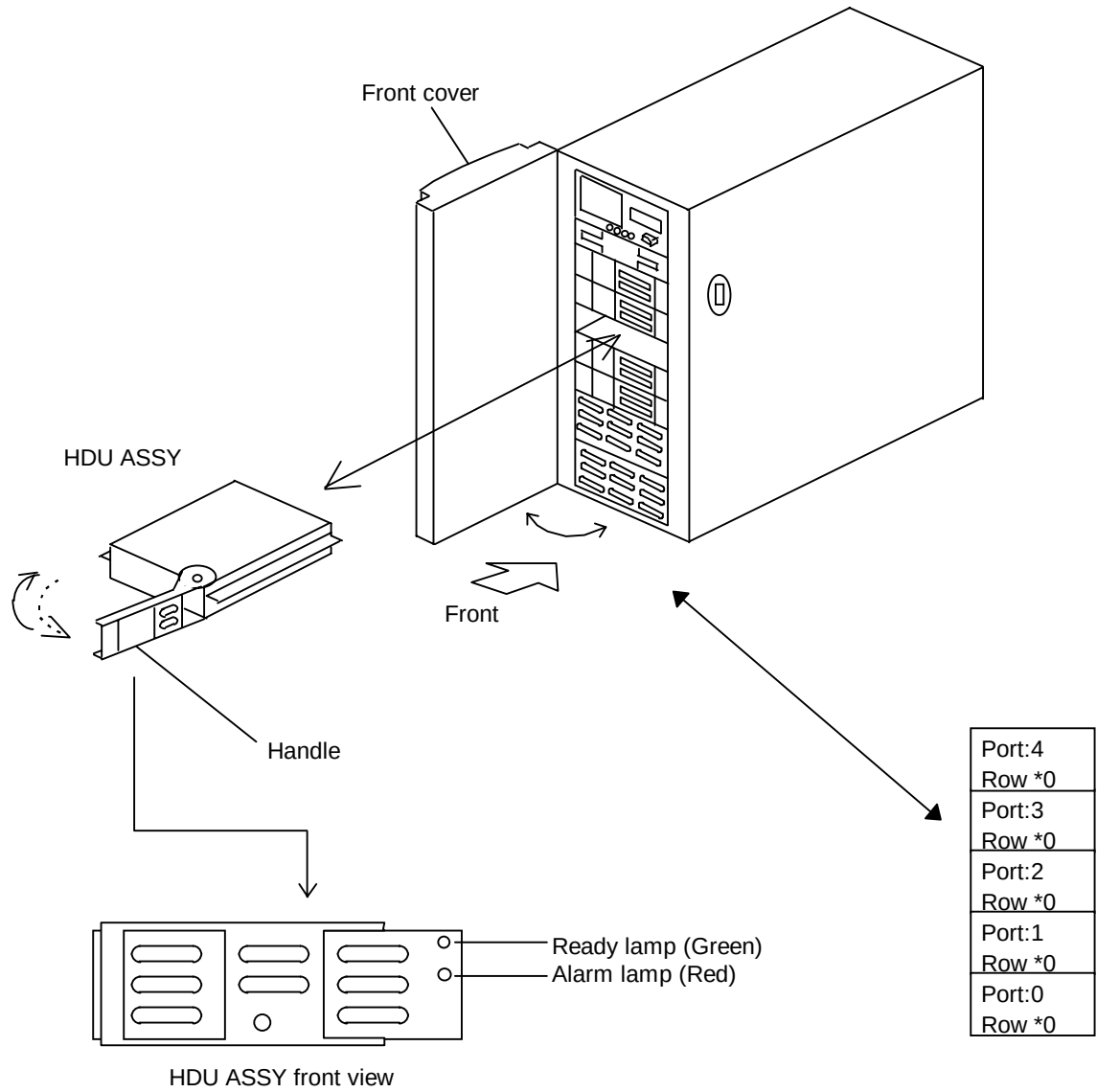


Figure 2.6.1 Installing the HDU ASSY

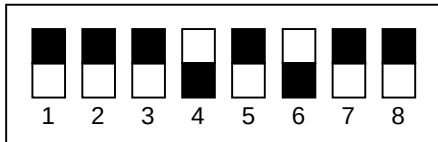
[1] Capacity expansion with HDU ASSY exchange

After this operation all the user's data will be lost. Be sure to make a back-up copy of data before beginning this operation. (See DK-OPTION0050.)

- (1) Turn off the power according to the power-off procedure in DK-OPTION0110.

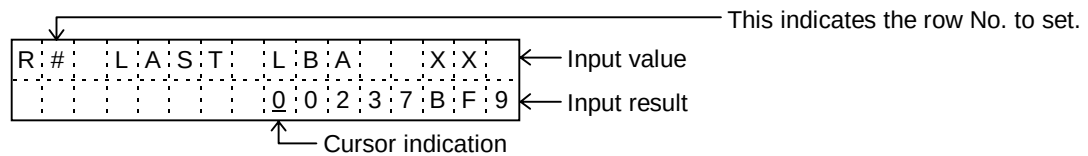
Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side covers.
 (3) Remove the old HDU ASSY and set the new HDU ASSY. (See Figure 2.6.1 in DK-OPTION0160.)
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.



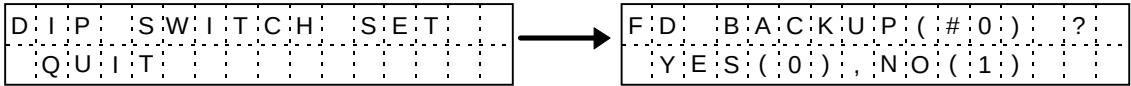
- (5) Turn on the power according to the power-on procedure DK-OPTION0110.
 (6) Set LBA on the panel following the table below. Set the capacity of each drive following the display. (See DK-OPTION0190.)

- When ROW LAST LBA is displayed;



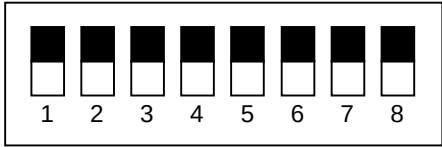
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A2E8	(71046C97)16

- (7) After selecting “QUIT” on the panel, when “FD BACK UP” appears on the screen, insert a back-up FD and make a back-up copy of the system parameter. The “FD BACK UP” message may not appear for some unit types, so ignore this step in that case.



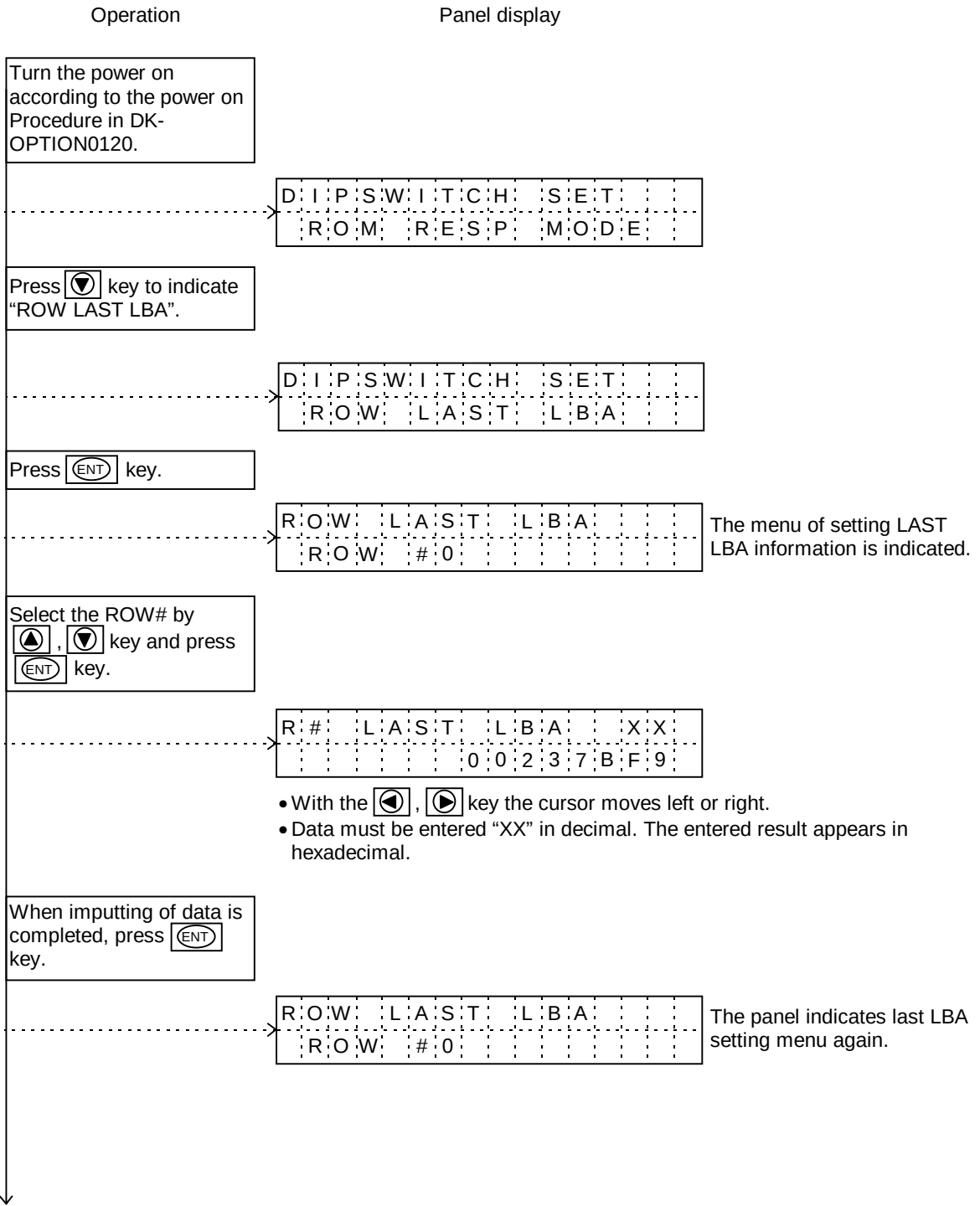
If this message appears, make a back-up copy of the data in the EEPROM into the back-up floppy disk.

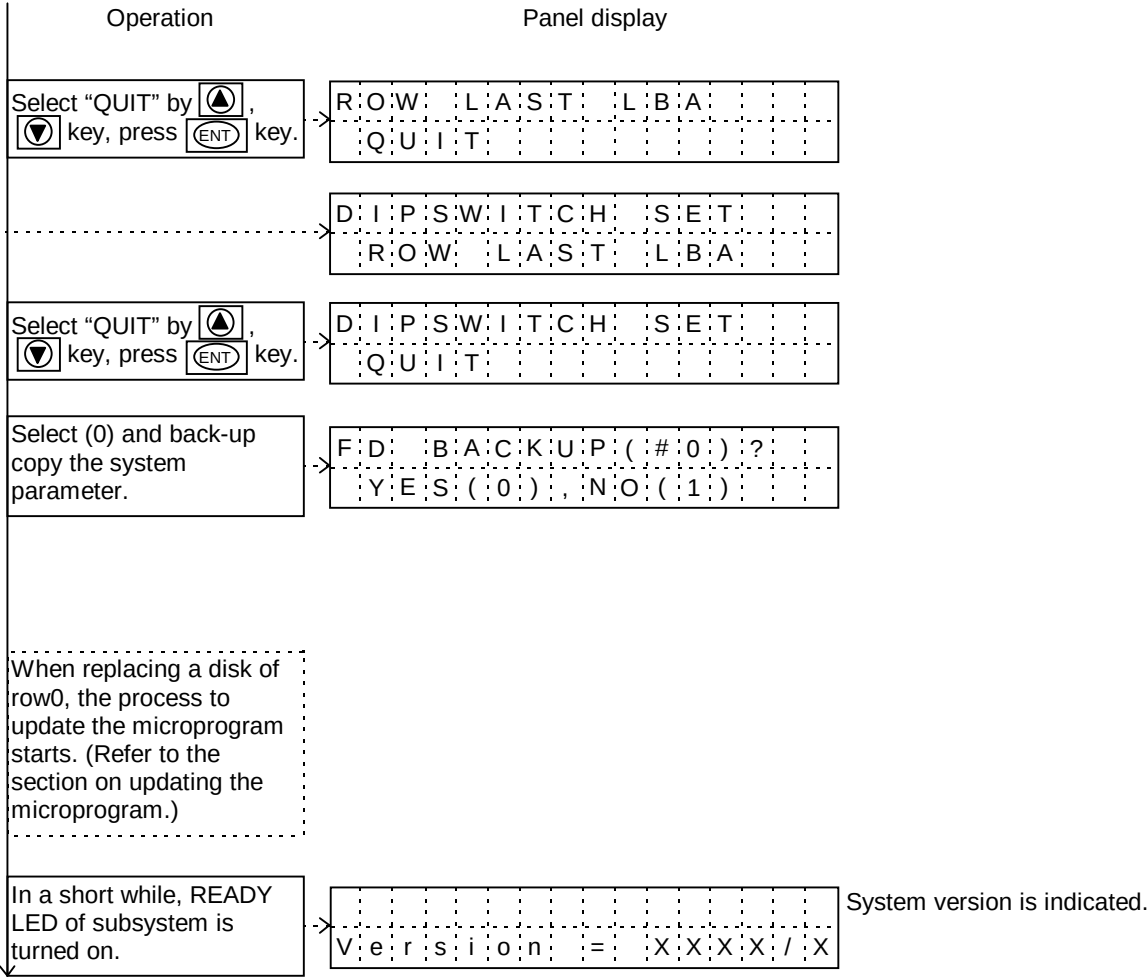
- (8) Reset the DIP switch 4 and 6 to the original positions after the system is ready.



- (9) Revise the microprogram. (See section “MICROPROGRAM-FC”)
(10) Set up the RAID group and the LU. (See Installation Chapter.)

Set the LAST LBA number on the panel according to the flow below.





DF350 Disk Subsystem

10. PARTS CATALOG

(Desktop (DK) Type)

Rev.2

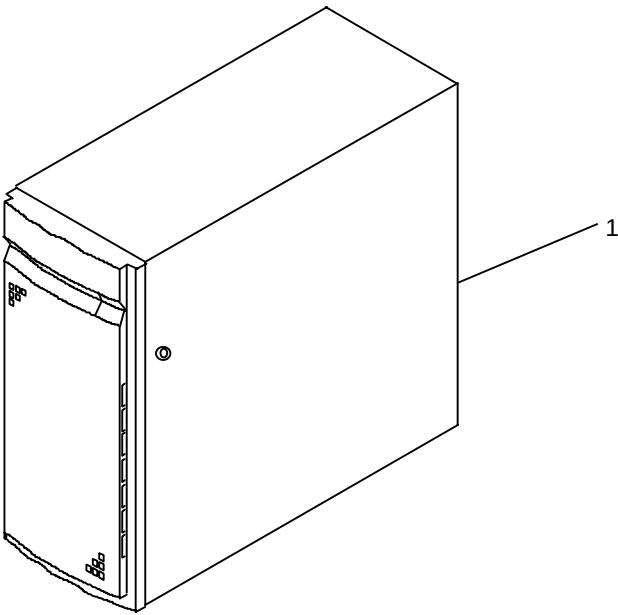
Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: A: Addition, C: Change, CR: Correction, DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Dec.3.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	All	Issued	
1	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0040	Added A2E8.	AD
2	Oct.15.'98	A.Yamanashi			0040	Added A3E4.	AD

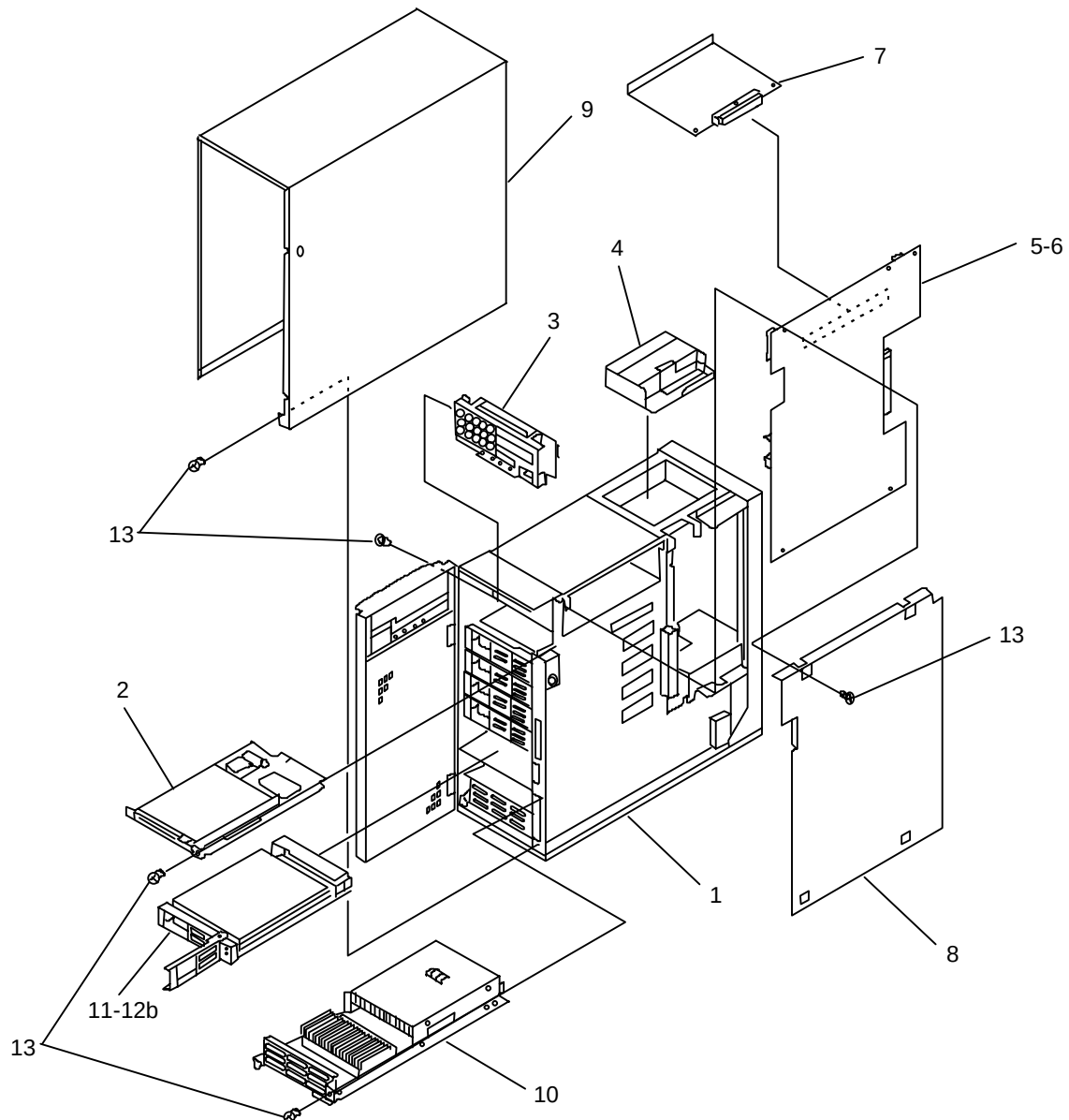
HOW TO USE THIS PARTS CATALOG

LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2102004-A	• FRAME(BASIC-DK)ASSY	1	
2	5497379-J	• FDD ASSY	1	S.P.
3	5497379-H	• PANEL(OP)ASSY	1	S.P.
4	5497379-G	• BATTERY ASSY	1	S.P.
5	5497379-E	• CTL ASSY	1	S.P.
6	1505486-A	•• SH105-A PK ASSY	1	
7	3250759-A	•• MPU ASSY	1	
8	2100553-1	• BRACKET(SHIELD)	1	
9	2100554-A	• COVER(OUTSIDE)ASM	1	
10	5497379-F	• AC/DC ASSY	2	S.P.

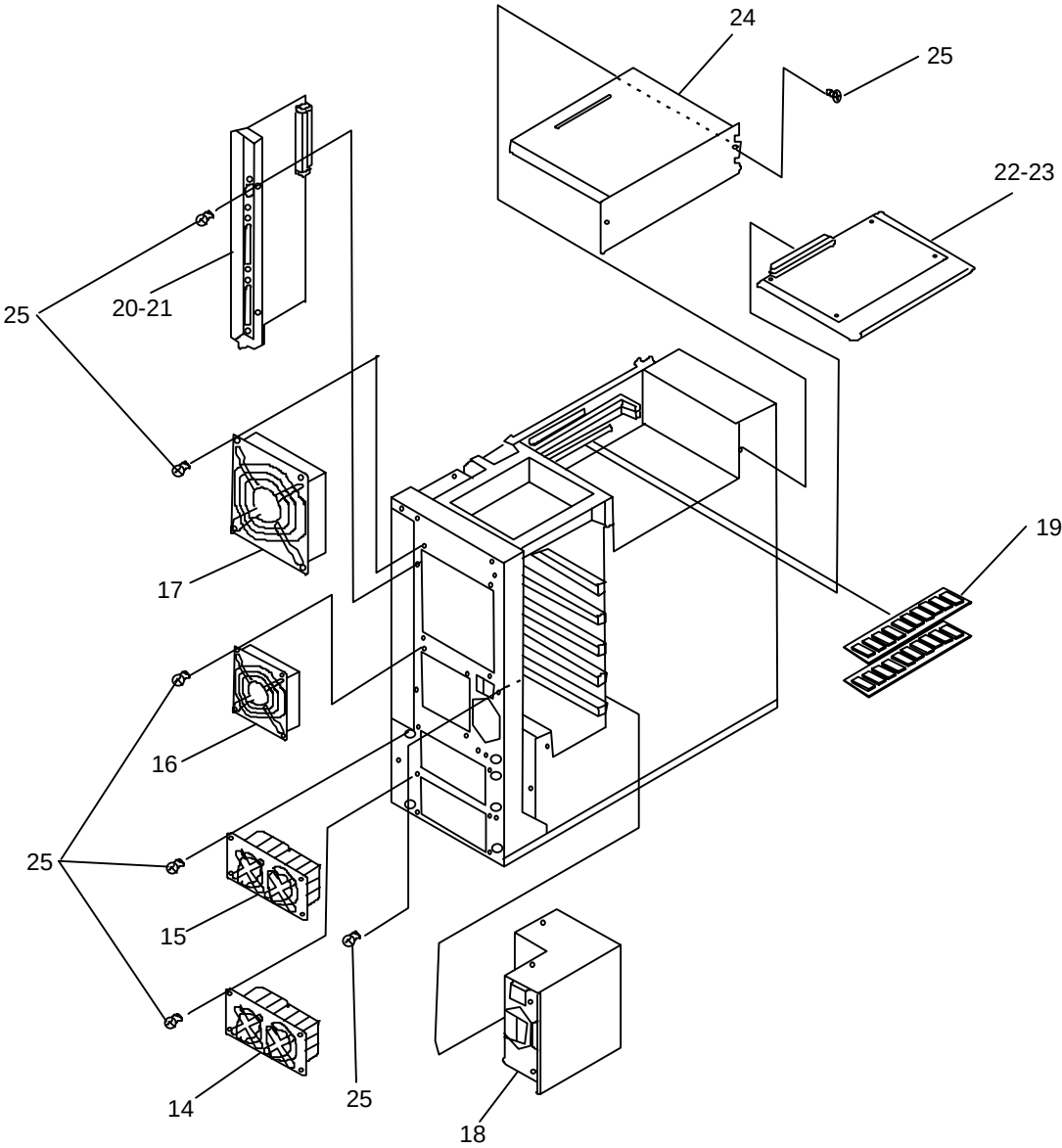
- ① indicates the list number of the assembly given on the visual index.
- ② indicates the item number given on the drawing in the catalog section.
- ③ indicates the part number.
- ④ has the following meaning.
- indicates an assembly or equivalent part.
 - indicates a subassembly or equivalent part included in an assembly indicated by....
- ⑤ indicates the unit type.
- ⑥ indicates the possible number of the subsystem.
- ⑦ indicates S.P.
- If S.P. is written in Remarks, the part or the assembly is spare parts.



LIST NO.	NAME OF PARTS	SHEET NO.
1	FINAL ASSY	DK-PARTS0040



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2102004-A	FRAME(BASIC-DK)ASSY	1	
2	5497379-J	• FDD ASSY	1	S.P.
3	5497379-H	• PANEL(OP)ASSY	1	S.P.
4	5497379-G	• BATTERY ASSY	1	S.P.
5	5497379-E	• CTL ASSY	1	S.P.
6	1505486-A	• SH105-A PK ASSY	1	
7	3250759-A	• MPU ASSY	1	
8	2100553-1	• BRACKET(SHIELD)	1	
9	2100554-A	• COVER(OUTSIDE)ASM	1	
10	5497379-F	• AC/DC ASSY	2	S.P.
11	3243084-E	• HDU ASSY(DF350-A2E2)	2-5	S.P.
12	3243084-F	• HDU ASSY(DF350-A2E4)	2-5	S.P.
12a	3252929-E	• HDU ASSY(DF350-A3E4)	2-5	S.P.
12b	3252929-B	• HDU ASSY(DF350-A2E8)	2-5	S.P.
13	SB306	• BIND SCREW(M3×6.3)	15	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
14	5497379-K	• FAN(PS)ASSY	1	S.P.
15	5497379-L	• FAN(PS)ASSY	1	S.P.
16	5497379-M	• FAN(M)ASSY	1	S.P.
17	5497379-N	• FAN(U)ASSY	1	S.P.
18	5497379-P	• IN BOX ASSY	1	S.P.
19	3247121-A	• CACHE(DF350)ASSY	2	
20	5497379-A	• SCSI(I/F)ASSY(DDUDS)	1	S.P.
21	5497379-B	• SCSI(I/F)ASSY(DDUSS)	1	S.P.
22	5497379-C	• LAN ASSY(G1D1)	1	S.P.
23	5497379-D	• LAN ASSY(G2D1)	1	S.P.
24	3250692-1	• COVER(PK)	1	
25	SB306	• BIND SCREW(M3 ×6.3)	22	

DF350 Disk Subsystem
7. PARTS REPLACEMENT
(Desktop (DKH) Type)

Rev.2

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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2.3 Back-up Procedure of System Parameter	DH-REP0090
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2.3.2 Restoring procedures from FD	DH-REP0130
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4.2.1 Procedure of data recovery and HDU ASSY replacement	
when no spare disk is installed.....	DH-REP0220
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6. Replacing PANEL (OP) ASSY	DH-REP0360
7. Replacing AC/DC Power Supply	DH-REP0370
8. Replacing Power Unit (D).....	DH-REP0390
9. Replacing Battery ASSY	DH-REP0400
10. Replacing I/F ADAPTER ASSY	DH-REP0410
11. Replacing CTL ASSY	DH-REP0430
11.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier	DH-REP0440
11.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later	DH-REP0460
12. Replacing CACHE ASSY	DH-REP0510
13. Replacing LAN ASSY.....	DH-REP0520

1. Mechanical Configuration

Figures 1.1 and 1.2 show mechanical configuration and parts location of this subsystem.

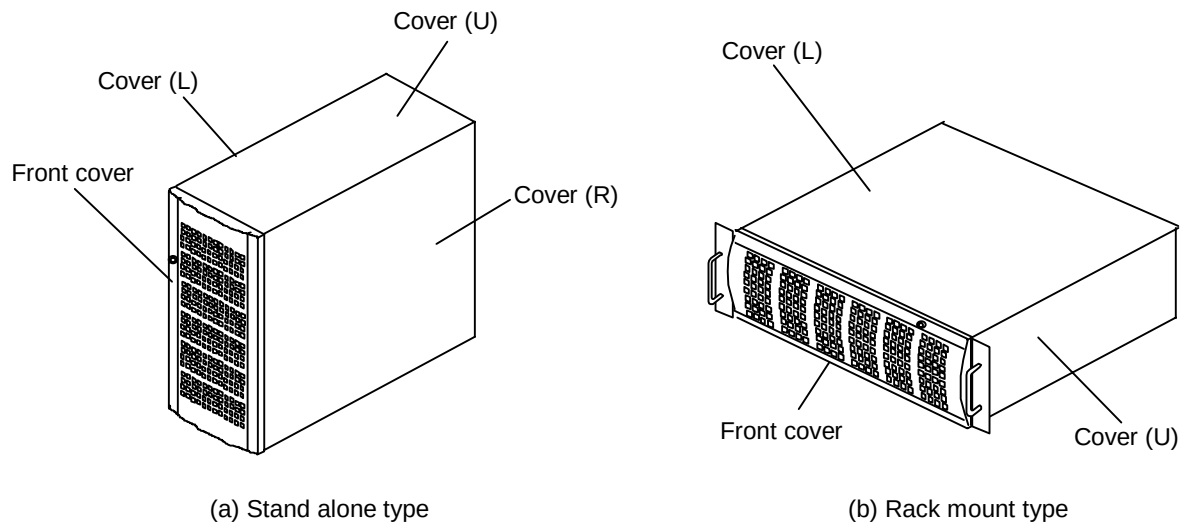


Figure 1.1 Appearance of DF350 Disk Subsystem (Desktop (DKH) Type)

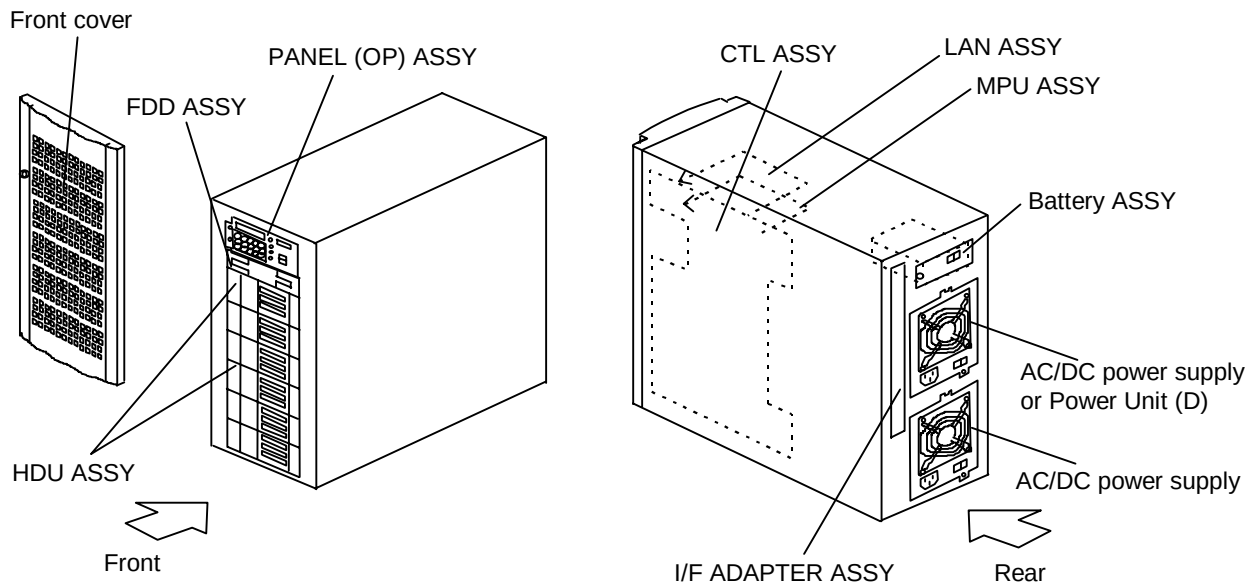


Figure 1.2 Parts Location

2. Maintenance Procedure

(1) Turning power on/off when replacing parts

Turning on/off procedure varies depending on the parts to be replaced.

Follow the procedures described in the table below for replacing each part.

No	Product name	Drawing No.	Model	Turning on/off power	
				Option not provided	Option provided
1	HDU ASSY (2GB1"H)	3243084-E	DF-F350-A2E2	④	④
2	HDU ASSY (4GB1"H)	3243084-F	DF-F350-A2E4	④	④
3	HDU ASSY (4GB1"H) (*1)	3252929-E	DF-F350-A3E4	④	④
4	HDU ASSY (8GB1"H)	3252929-B	DF-F350-A2E8	④	④
5	HDU ASSY (8GBH"H)	3243084-G	DF-F350-A1E8	④	④
6	HDU ASSY (18GBH"H)	3252929-A	DF-F350-A1E18	④	④
7	Power Unit (D)	5500260-D	DF-F350-P1H	②	—
8	AC/DC Power Supply	5500260-C	DF-F350-B1H	②	③
9	Battery ASSY	5500260-F	DF-F350-N1H	③	—
10	FDD ASSY	5497379-J	DF-F350-M2D	②	—
11	CTL ASSY	5500260-E	DF-F350-F1HCF	①	—
12	I/F ADAPTER ASSY (WS-pin-lock-screw type)	5500260-B	DF-F350-DHUSS	①	—
13	I/F ADAPTER ASSY (WD-pin-lock-screw type)	5500260-A	DF-F350-DHUDS	①	—
14	PANEL (OP) ASSY	5500260-G	DF-F350-LIH	②	—
15	CACHE ASSY	3247121-A	DF-F350-C8E	②	—
16	CACHE ASSY	3247121-B	DF-F-350-C32E	②	—
17	CACHE ASSY	3247121-C	DF-F350-C128E	②	—
18	LAN ASSY	5497379-C	DF-F350-G1D1	②	—
19	LAN ASSY (SNMP)	5497379-D	DF-F350-G2D1	②	—

① Turning the power off DF350 Disk Subsystem and Host System.

② Turning the power off DF350 Disk Subsystem.

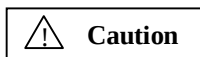
③ Turning the power off is unnecessary.

④ Turning the power on DF350 Disk Subsystem.

(*1) : It is necessary to use it with the Micro_Disk Ver.0307 or later.

Notice : When a part which requires to turn the power off or on for replacement (marked with ① and ②) is to be replaced, turn the power off correctly according to the instruction in DH-REP0050 beforehand.

Otherwise, there is a risk that the user data is destroyed.

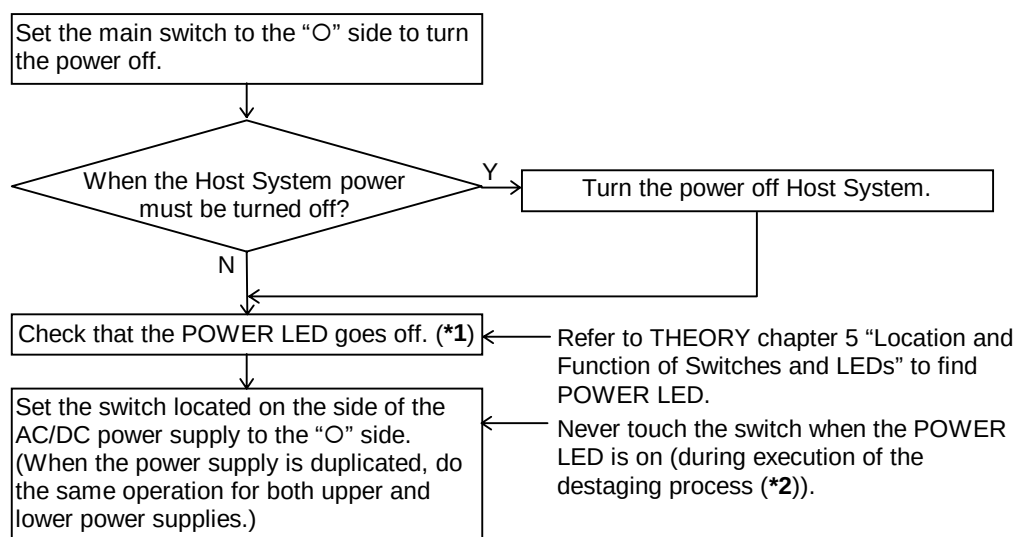


When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.

Be careful not to touch the electrified parts with a screwdriver etc.

2.1 Turning the Power On/Off for Each String

(1) Turning the power off



*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

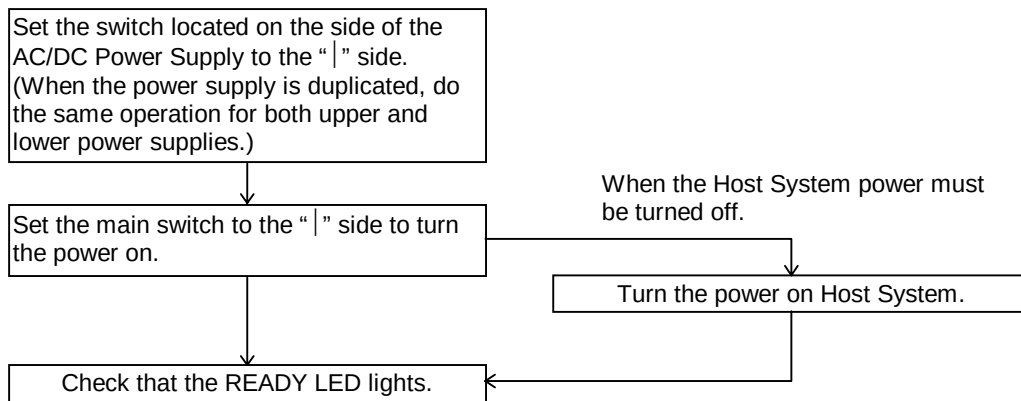
Notice : In case the data is not properly backed up, the user's data will be lost.

***2** The cache memory installed in this subsystem is controlled with a write-after method. When turning off the power, the subsystem automatically writes all the data left on the cache memory unwritten to the hard disk drive. (This operation is called a destaging.) The subsystem turns off the power when this process is completed. When the power is turned off according to the power failure or by the operation of the breaker, the destaging can not be performed. In this case, the subsystem enters the mode of battery back-up. If the system is kept in this state, the battery may be discharged and the user data might be lost. Therefore, be sure to follow the power-off procedure explained above.

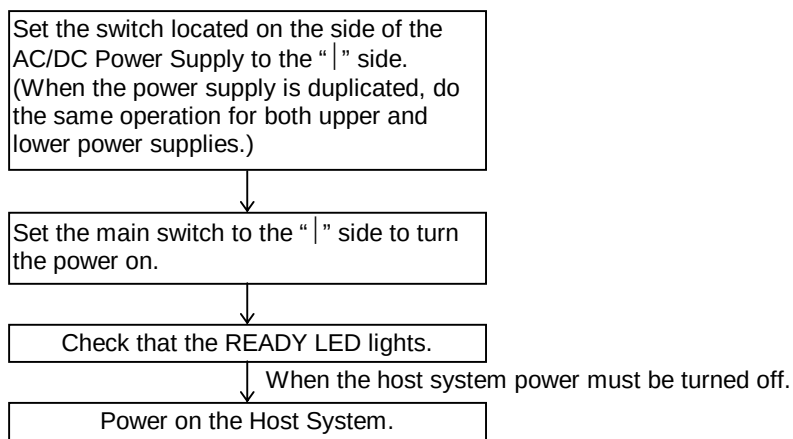
If the breaker is turned off due to power failure or by mistake before the POWER LED goes off, turn the power on again according to Item (2), "Turning the power on" promptly and then execute the power-off procedure explained above.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



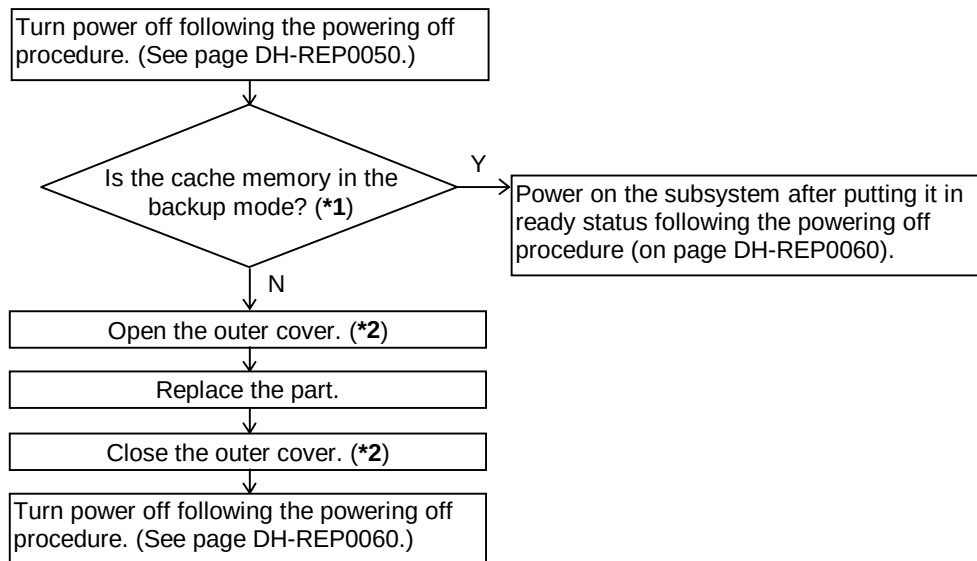
(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.2 Part Replacement Procedures

- (1) When power of both the subsystem and the host system must be turned off or the subsystem power must be turned off.



Notice: In case the power is not normally turned off, the configuration data will be lost and the user's data will be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

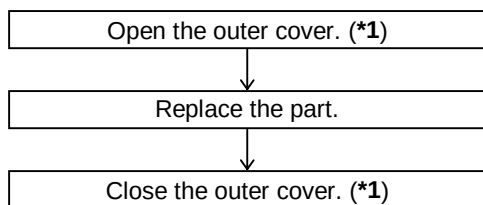
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

- *2** Outer cover : Because the handling of outer covers varies by a part to be replaced, remove or install the cover according to the replacement procedure of each part.

- (2) Procedure for the case of turning the power off DF350 is either not necessary or prohibited.



*1 Outer cover : Front cover.

Cover (L)

Cover (R)

Cover (U)

2.3 Back-up Procedure of System Parameter

There are cases where system parameters (Target ID, buzzer setting, drive recovery mode, etc.) are copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters for following “2.3.1 Back-up procedure of system parameter” (DH-REP0090) or “2.3.2 Restore procedure of system parameter” (DH-REP0130).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to DH-REP0050.

Notice: In case the power is not normally turned off, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 2.3.1.

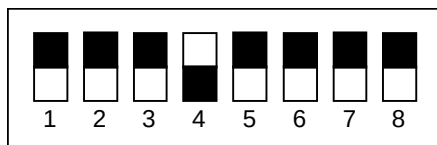
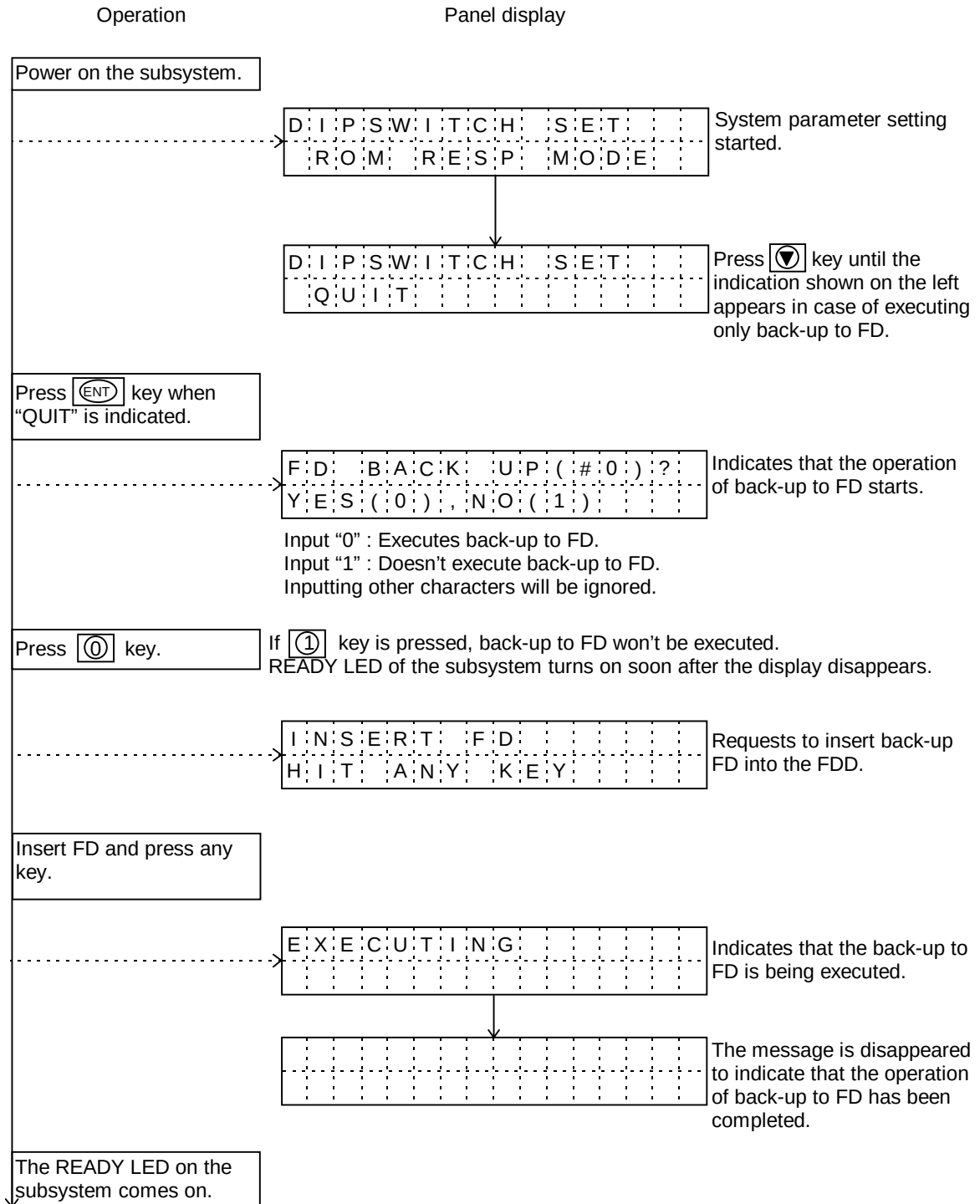


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

(3) Operate as described below.



(4) Set DIP switch No.4 to setting as shown in Figure 2.3.2.

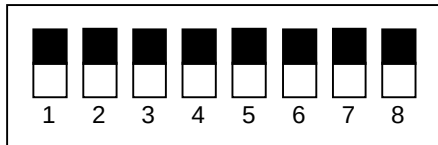
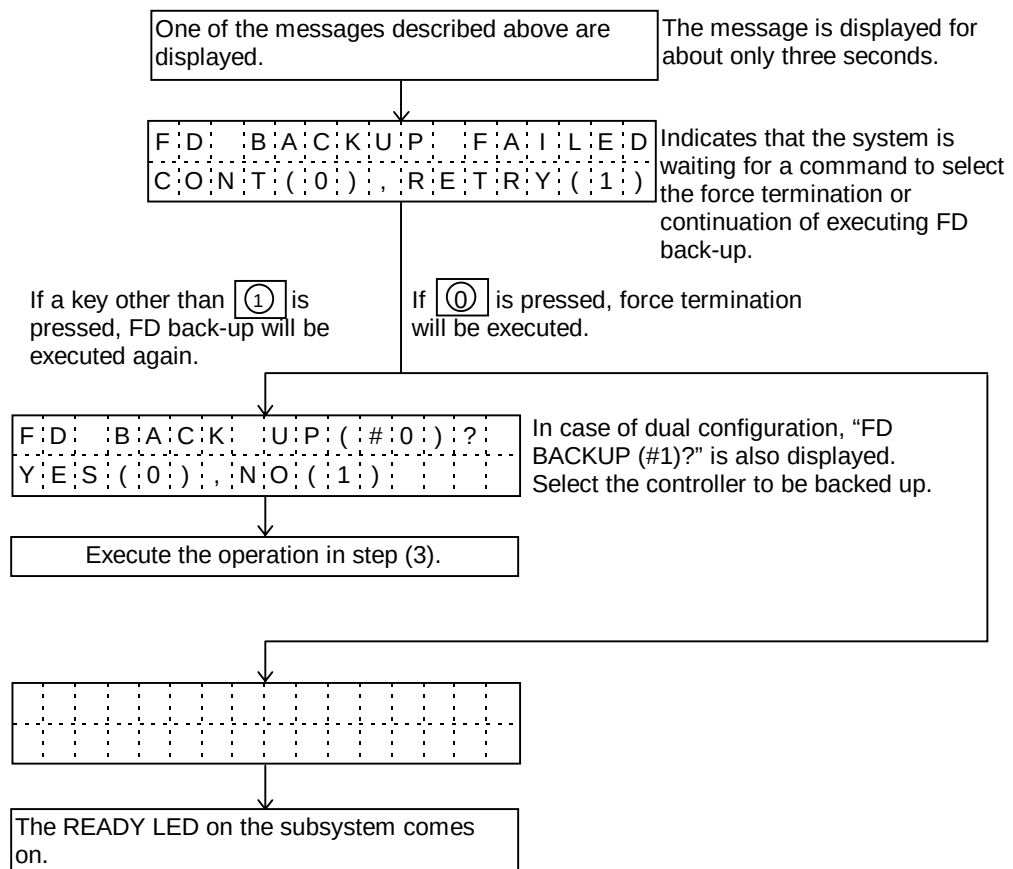


Figure 2.3.2 DIP Switches

Note 1 : While executing the back-up to FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute..
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

Note 4 : "SYSPROM0.DAT" or "SYSPROM1.DAT" file is stored in system parameter backed up FD. The case of optional SNMP system, SNMP configuration environment files ("CONFIG.TXT" and "NAME.TXT") are stored with system parameter file.

Note 5 : In case with optional SNMP system and system parameter is restored without SNMP configuration environment files, Subsystem becomes ready without SNMP function. In this case, the warning lamp on the panel comes on and one of messages below is shown on PANEL.

W	0	1	6	0	1	F	D	E	R	R		
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	2	F	O	P	N	E	R	R
V	E	R	S	I	O	N	=	X	X	X	X	/X

This case, re-restore the subsystem with a FD in which SNMP configuration environment files is stored.

2.3.2 Restoring procedures from FD

(1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.

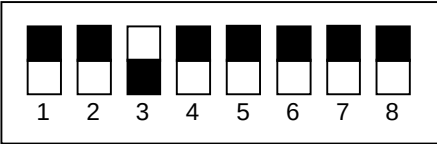
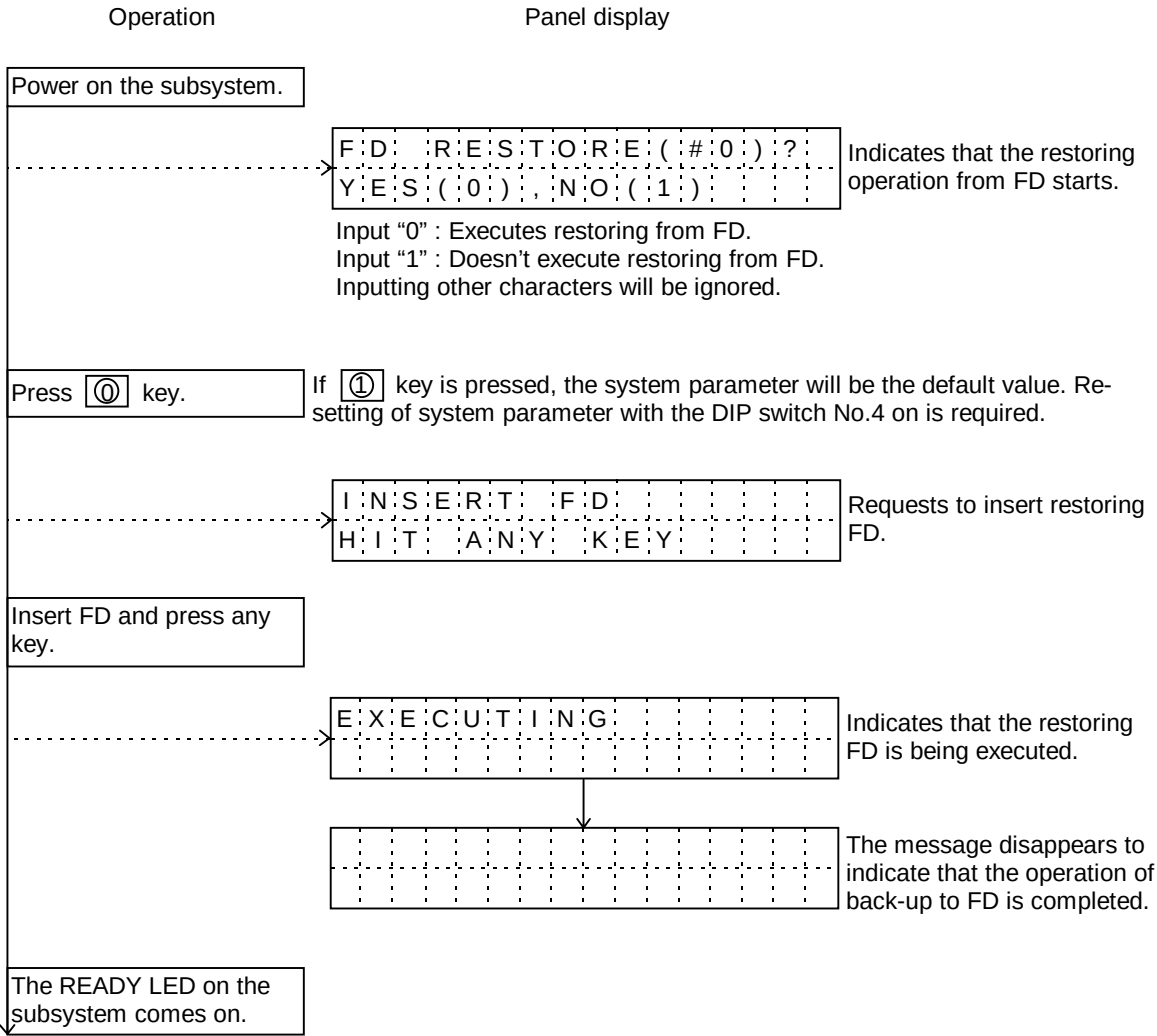


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

(2) Operate as described below.



(3) Set DIP switch No.3 as shown in Figure 2.3.4.

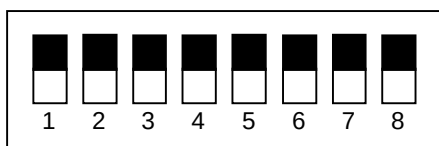
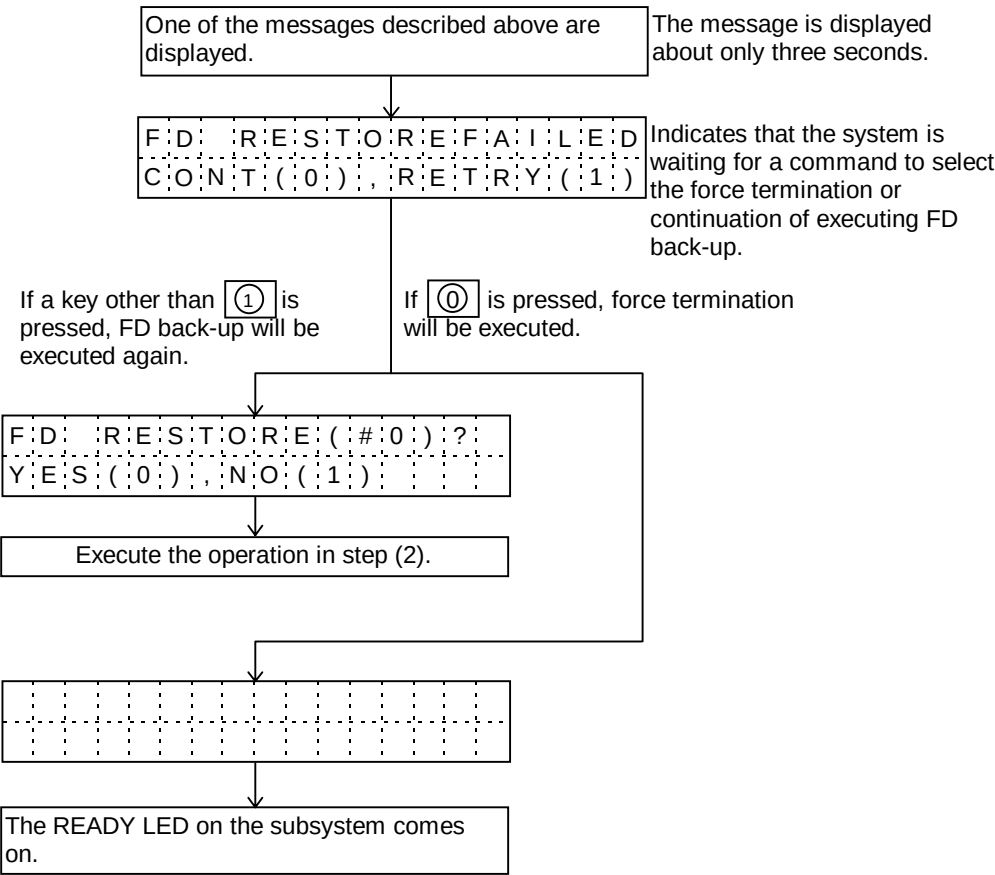


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-restore the system following the operation described below.



Note 2 : In case that restoring operation ended in failure and force terminated, setting of system parameter will be with default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

3. Removing/Attaching Front Cover and Cover (L, R, U)

3.1 Removing/Attaching Front Cover

Tool : Key

(1) Removing the front cover.

① Insert the key attached to the subsystem into the keyhole and turn it clockwise. (See Figure 3.1 (a).)

② Turn the left of the front cover to your side to open it. (See Figure 3.1 (b).)

Notice : Operate slowly lest a strong force should be applied to the hook. (See Figure 3.1 (d).)

③ Remove the front cover to (···→). (See Figure 3.1 (c).)

(2) Attaching the front cover.

① Attaching the front cover in the reverse order step (1).

Notice : Open/Close the front cover gently to avoid a shock. Precision components are installed.

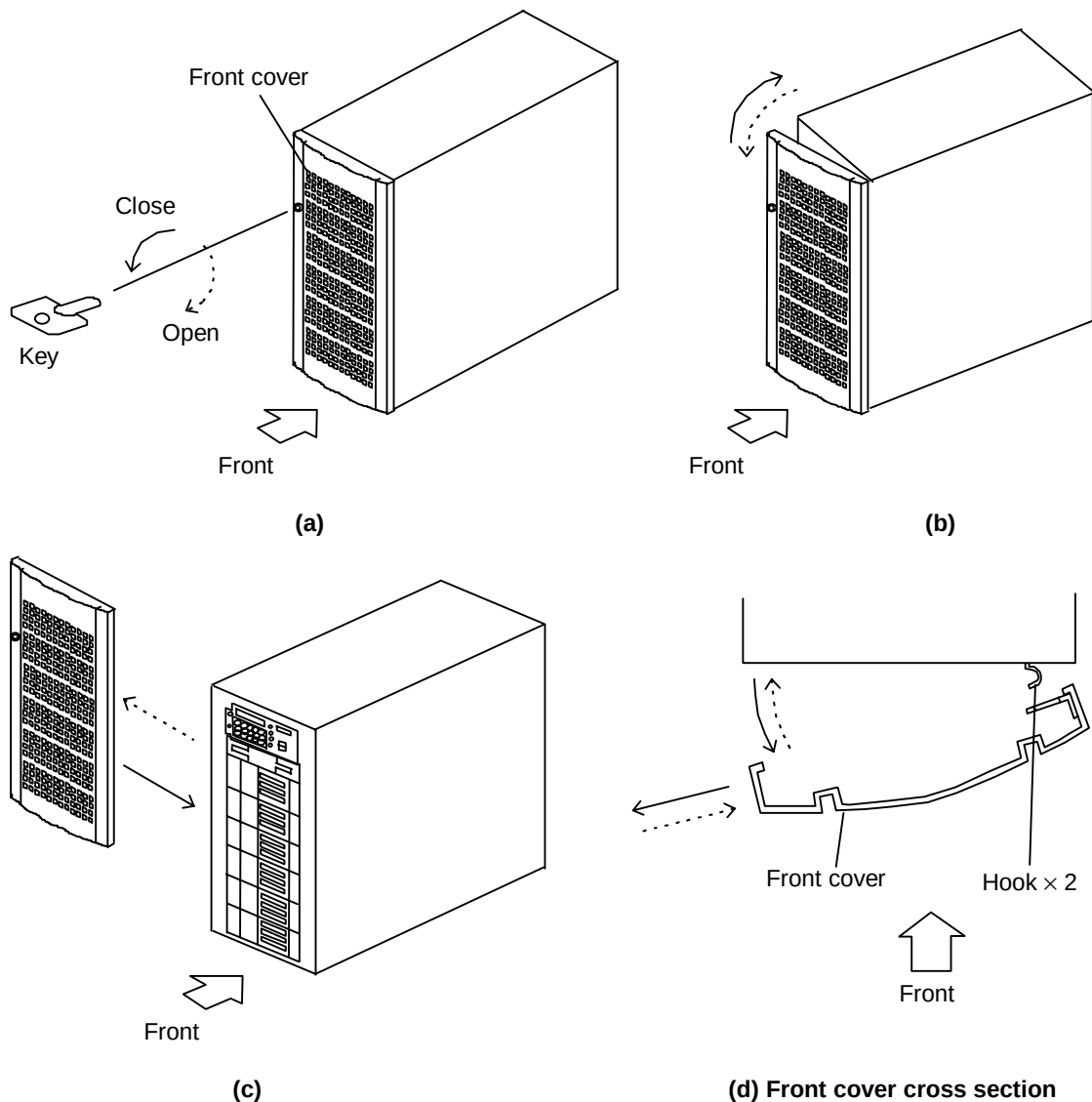


Figure 3.1 Removing/Attaching the Front Cover

3.2 Removing/Attaching Covers

3.2.1 Removing/Attaching the cover (L)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Remove the front cover. (See DH-INST0100.) ❶
- ② Loosen the four screws (a).
- ③ Slide the bottom of the cover (L) downward and pull it out. ❷
- ④ Pull up the cover (L) to removing. ❸

(2) Attaching procedure

- ① Attaching the cover (L) in the reverse order step (1).

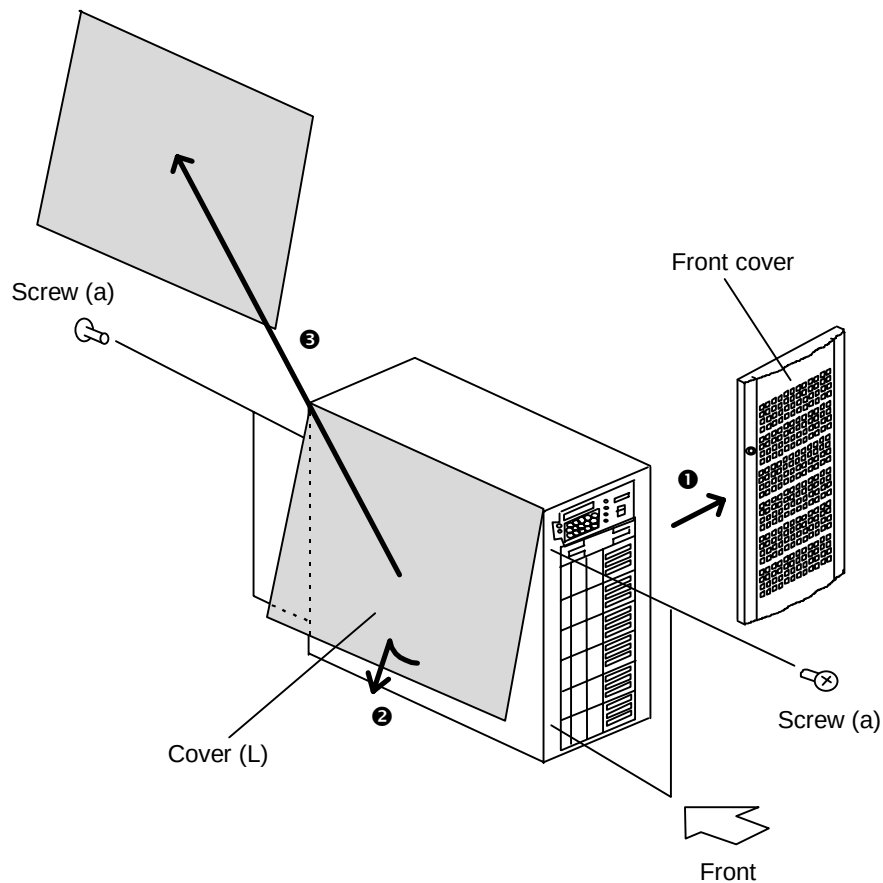


Figure 3.2.1 Removing/Attaching the Cover (L)

3.2.2 Removing/Attaching the cover (R)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Remove the front cover. (See DH-INST100.) ❶
- ② Loosen the three screws (a).
- ③ Slide the bottom of the cover (L) downward and pull it out. ❷
- ④ Pull up the cover (R) to remove. ❸

(2) Attaching procedure

- ① Attaching the cover (R) in the reverse order step (1).

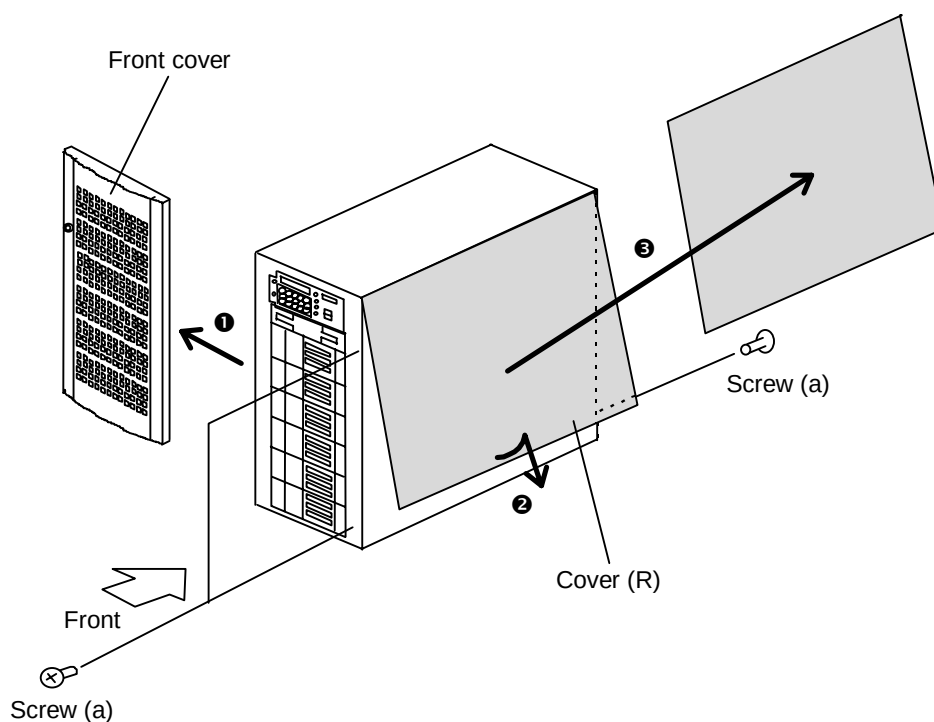


Figure 3.2.2 Removing/Attaching the Cover (R)

3.2.3 Removing/Attaching the cover (U)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Remove the front cover. (See DH-REP0160.) ❶
- ② Loosen the four screws (a).
- ③ Pull up the cover (U) to removing. ❷

(2) Attaching procedure

- ① Attaching the cover (U) in the reverse order step (1).

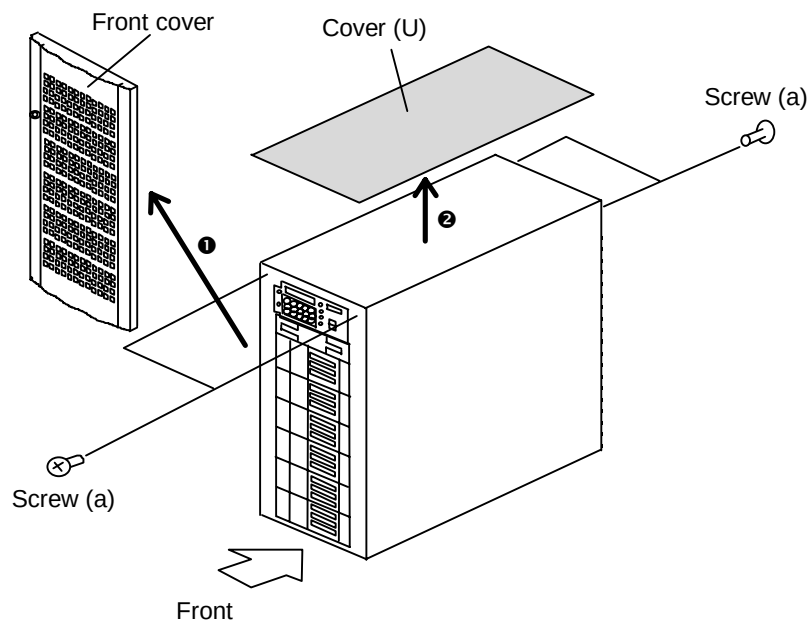


Figure 3.2.3 Removing/Attaching the Cover (U)

4. Replacing HDU ASSY

The method of replacing HDU varies depending on the RAID configuration.

When replacing the HDU ASSY, confirm the RAID configuration of the subsystem beforehand, and follow the procedure below according to the configuration.

To confirm the RAID configuration, refer to page PANEL0390 (3.3.2 (1) Reference/setting menu of RAID configuration information.)

Notice : Be sure to replace the HDU ASSY with the power kept on. (This procedure is except for when the Micro-Disk version is 0303 or earlier.)**

Proceed the replacement and the data recovery following the procedure below. RAID Specification of replacing HDU can be seen on the panel display. (See PANEL0390.)

Notice : If you delete or re-format the set-up RAID group or LU, user's data in that will be deleted. Be sure to back-up copy the user's data before these operation.

4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration

4.1.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

The replacement procedure differs depending on whether the Micro_Disk version is 0303** (** is optional) or earlier, or 0304** (** is optional) or later. Confirm the version first, then execute the replacement following the procedure determined according to the version.

When the Micro_Disk version is 0303** (** is optional) or earlier

- (1) Turn the subsystem power off according to the powering off procedure (see page DH-REP0050).
- (2) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY (Disk) Replacement Procedure" on page DH-REP0245.
- (3) Turn the subsystem power on according to the powering on procedure (see page DH-REP0050). Following messages will be displayed on the panel when a disk of row 0 is replaced.

I00DXY SYS-CP-XY----- Starting system area recovery

I00EXY SYSRCV-XY----- Completing system area recovery

X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)

If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.

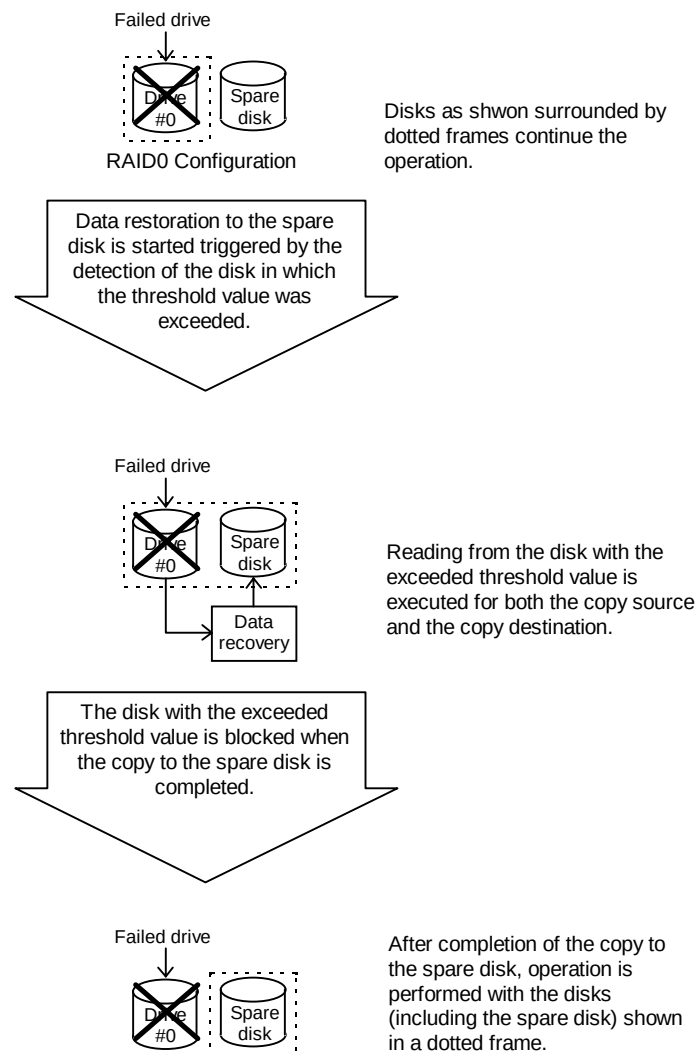
- (4) Execute an LU formatting. For the LU formatting procedure, see page DH-INST0710.
- (5) Restore the data using the backed up data.

When the Micro_Disk version is 0304** (** is optional) or later

- (1) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY Replacement Procedure" on page DH-REP0245.
- (2) In a short time after the disk is inserted, the ALARM lamp on the HDU ASSY goes out and the READY lamp comes on. If the inserted disk is that of row 0, following messages will be displayed on the panel.
 I00DXY SYS-CP-XY----- Starting system area recovery
 I00EXY SYSRCV-XY----- Completing system area recovery
 X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)
 If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (3) Execute an LU formatting. For the LU formatting procedure, see page DH-INST0680.
- (4) Restore the data using the backed up data.

4.1.2 When a spare disk is installed

When the Micro_Disk version is 0304** (** is optional) or later, data restoration to the spare disk is executed by the dynamic sparing function. Conditions for restoration to the spare disk and messages, etc. are the same as those to the RAID1, 5 and A. See pages DH-REP0215 through 0218.



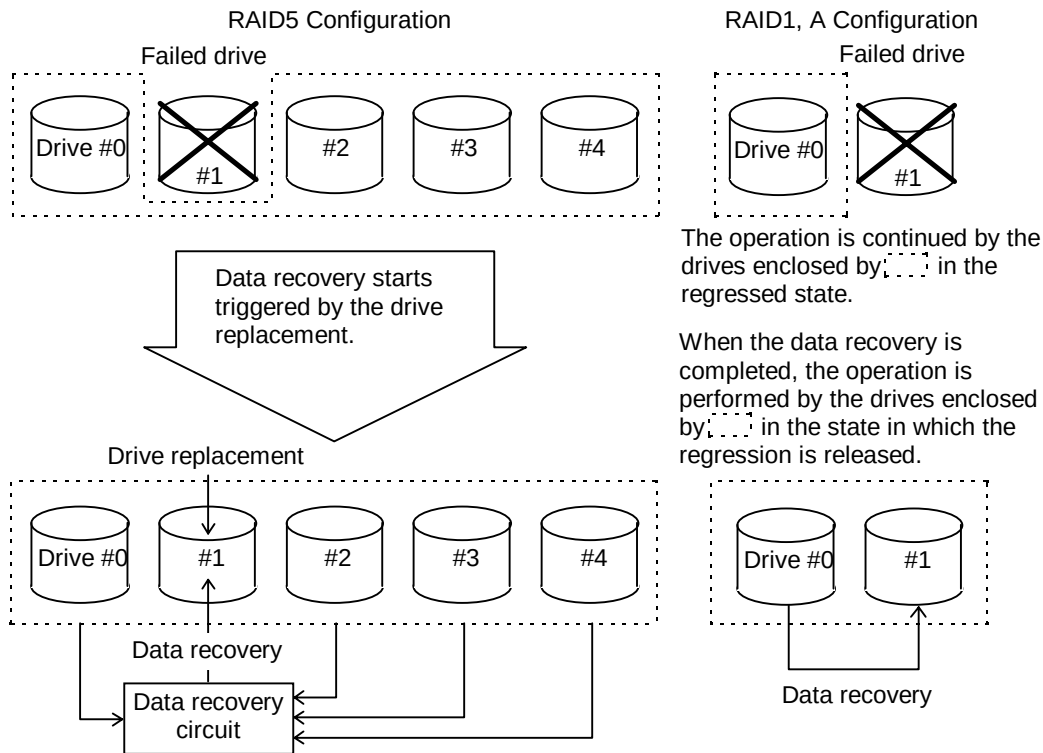
4.2 Procedure of Data Recovery and HDU Replacement Under RAID1, 5, A Configuration

4.2.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

When a failure occurred at a HDU ASSY, replace the failed HDU with a spare HDU.

To replace a HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See DH-REP0245.) With the replacement, data in the failed HDU will be automatically recovered. The panel display is described at “① Transition of panel display”. (See DH-REP0190.)

Note : When DRIVE MAINTENANCE (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINTENANCE again).



In the following cases, the recovery will not start automatically. Operation to start the recovery is required.

- (1) When the drive recovery mode is set to “NOT AUTOMATIC MODE”, the data recovery will not start automatically when the drive is replaced.

In this case, it is necessary to instruct recovery from the panel. (For further details, refer to the Hitachi Disk Array Subsystem Panel Operation Manual.)

- (2) When failures occurred in plural drives, if the second faulty drive is replaced during data recovery of the first drive, the data recovery of the second drive will not start automatically.

In this case, it is necessary to remove and insert the second drive again after the data recovery for the first drive is completed. Or, it is necessary to instruct recovery from the panel. Select “DRIVE MAINTENANCE (RECOVER STATUS)” and make sure that data recovery is completed normally.

① Transition of panel display

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of drive recovery

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the drive under recovery.

* : Only with the replacement of HDU in Row = 0.

② Confirming completion of data recovery

Select DRIVE MAINT (RECOVER STATUS) with the panel and check to see that the data recovery is completed normally (COMP).

③ When the data recovery fails (1012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(a) Data recovery onto the replacement drive

(i) When the faulty portion is the replaced drive (PORT X, ROW Y)

- Replace the drive again.
- Make sure that the data recovery is completed normally (COMP).

(ii) When the faulty portion is other than the replaced drive

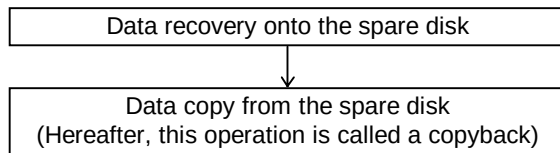
- Remove and insert the replaced drive and start data recovery again.
- Check to see that the data recovery is completed normally (COMP). When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. Ask for an instruction. When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive.

4.2.2 Procedures of data recovery and HDU ASSY replacement when a spare disk is installed

When a failure occurred in a HDU at a system with a spare drive, the data in the failed HDU is automatically recovered to the spare drive. After replacement of the failed HDU, the data in the spare drive will be copied back to the replaced HDU.

To replace HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See DH-REP0245.) The panel display is described “Transition of Panel Display”. (See DH-REP0230.)

Note : When DRIVE MAINT (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINT again).



(1) Data recovery onto the spare disk

There are two types of data recovery onto the spare disk depending on the incentive.

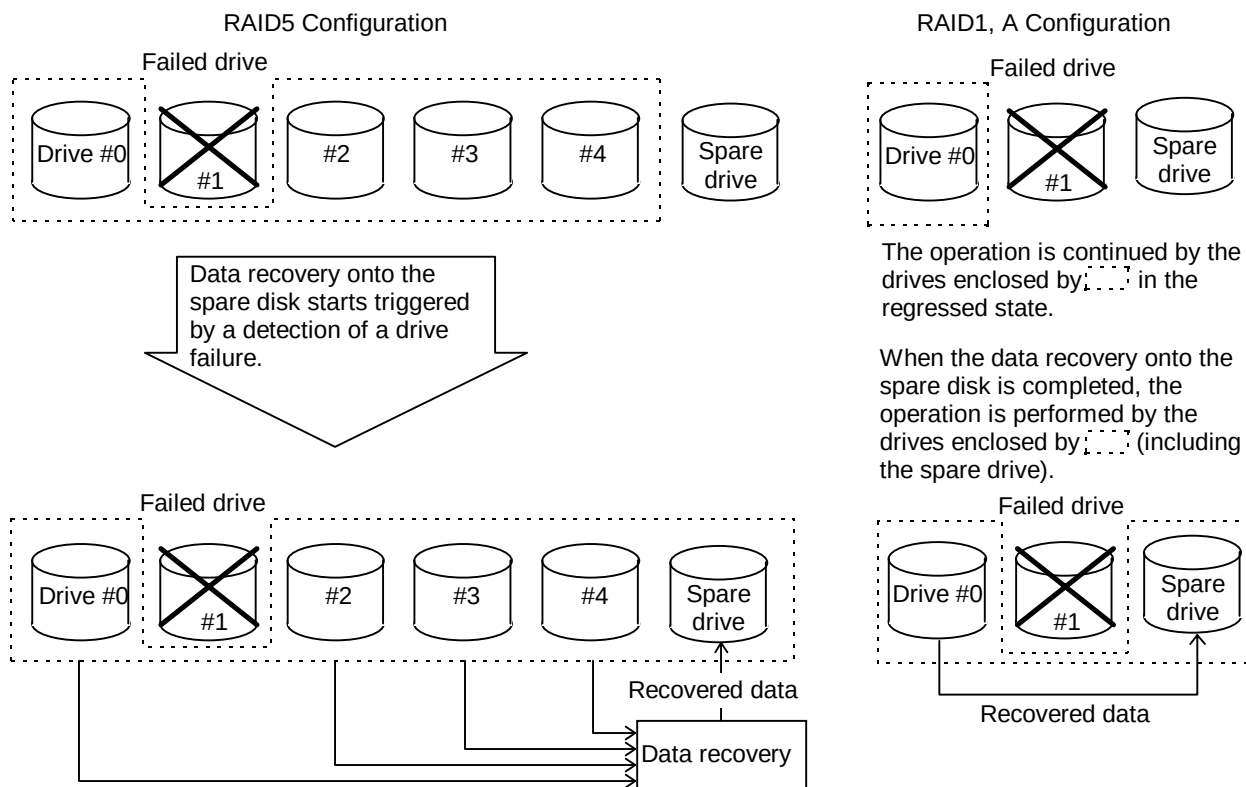
- Data recovery onto the spare disk when a failure in the disk is detected.
- Data copy onto the spare disk when a disk is detected in which the error count has exceeded its threshold value. (This operation will be called “dynamic sparing” hereafter. Note that some microprograms of certain version do not support the operation.)

(1-1) Data recovery onto the spare disk when a disk failure is detected.

As to data recovery onto the spare disk, as shown in the drawing on the following page, when a drive failure occurs, the data of the failed drive is recovered automatically onto the spare disk.

Automatic recovery onto the spare disk is executed only under the following condition.

Condition : “When a drive failure is detected, the spare disk is an unused disk.”



In the following cases, the data recovery onto the spare disk will not start automatically. An action to start the data recovery is required.

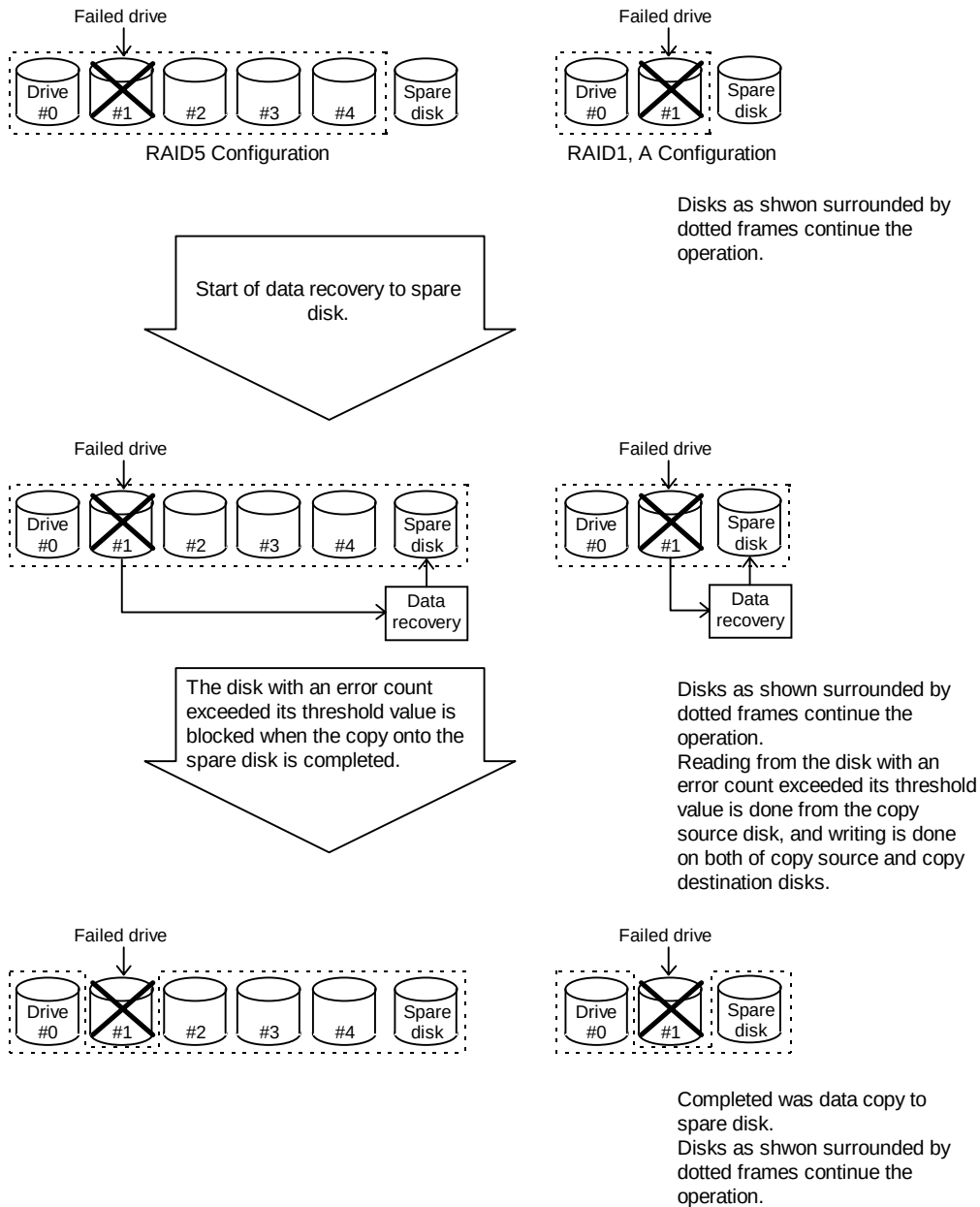
- ① When the drive recovery mode is set to "NOT AUTOMATIC MODE", the data recovery onto the spare disk will not start automatically.
In this case, it is necessary to instruct recovery onto the spare disk with the panel. (See DH-REP0260)
- ② If a further drive failure occurs while the spare disk is used already (data of a drive has been already recovered onto the spare disk), the data of the nearly failed drive will not be recovered onto the spare disk.
Even after the copyback is completed in the above state and the spare disk enters the unused state, the data of the second failed drive will not be recovered onto the spare disk.
- ③ If a disk of no failure (a drive which is not blocked) is removed, no data recovery onto the spare disk will be executed. In this case, to recover data onto the spare disk, it is necessary to instruct a recovery from the panel. (See DH-REP0260)
- ④ When the spare disk is replaced because a spare disk failure occurred during data recovery to the spare disk, the data recovery to the replaced spare disk will not start automatically. In this case, it is necessary to instruct recovery to the spare disk with the panel. (See DH-REP0260)
- ⑤ If a faulty drive is replaced during data recovery to the spare disk, the data copy back the replaced drive will not start automatically even after the data recovery to the spare disk is completed.
In this case, it is necessary to remove and insert the replaced drive again after the data recovery onto the spare disk is completed.

(1-2) Data recovery onto the spare disk by means of the dynamic sparing

Data recovery onto the spare disk is performed as shown below. When a disk is detected in which the error count has exceeded its threshold value, data stored in the disk is copied automatically onto the spare disk.

The automatic data recovery onto the spare disk is performed only when the following condition is met.

Condition : The spare disk is not in use when a disk is detected in which the error count has exceeded its threshold value.



The subsystem displays the following message on the panel when detecting a disk in which the error count has exceeded its threshold value.

I03■XY ■:0 - D
 ▲▲▲▲▲ -XY ▲▲▲▲▲ : Message text } See TRBL0275, 0278.

At the time when an error count exceeded its threshold value is detected, only a message display on the panel is done without blocking the concerning disk, and the dynamic sparing is started.

The disk with an error count exceeded its threshold value is blocked after the dynamic sparing is completed.

Refer to page DH-REP0290 for panel display transition when the dynamic sparing is performed.

In the following cases in which a disk with an error count exceeded its threshold value is detected, the disk is blocked without an execution of the dynamic sparing.

- When the dynamic sparing mode is set not to execute the dynamic sparing.
- When a disk with an error count exceeded its threshold value is detected after the data has been recovered or while the sparing disk is being used for the data recovery.
- Another disk with an error count exceeded its threshold value is detected during the dynamic sparing operation.

In each case above, the disk with an error count exceeded its threshold value is blocked.

Procedures for data recovery and disk replacement are the same as those for the installation of the spare disk (refer to pages DH-REP0220 through DH-REP0300).

Errors counted in the subsystem and default threshold values for them are listed below.

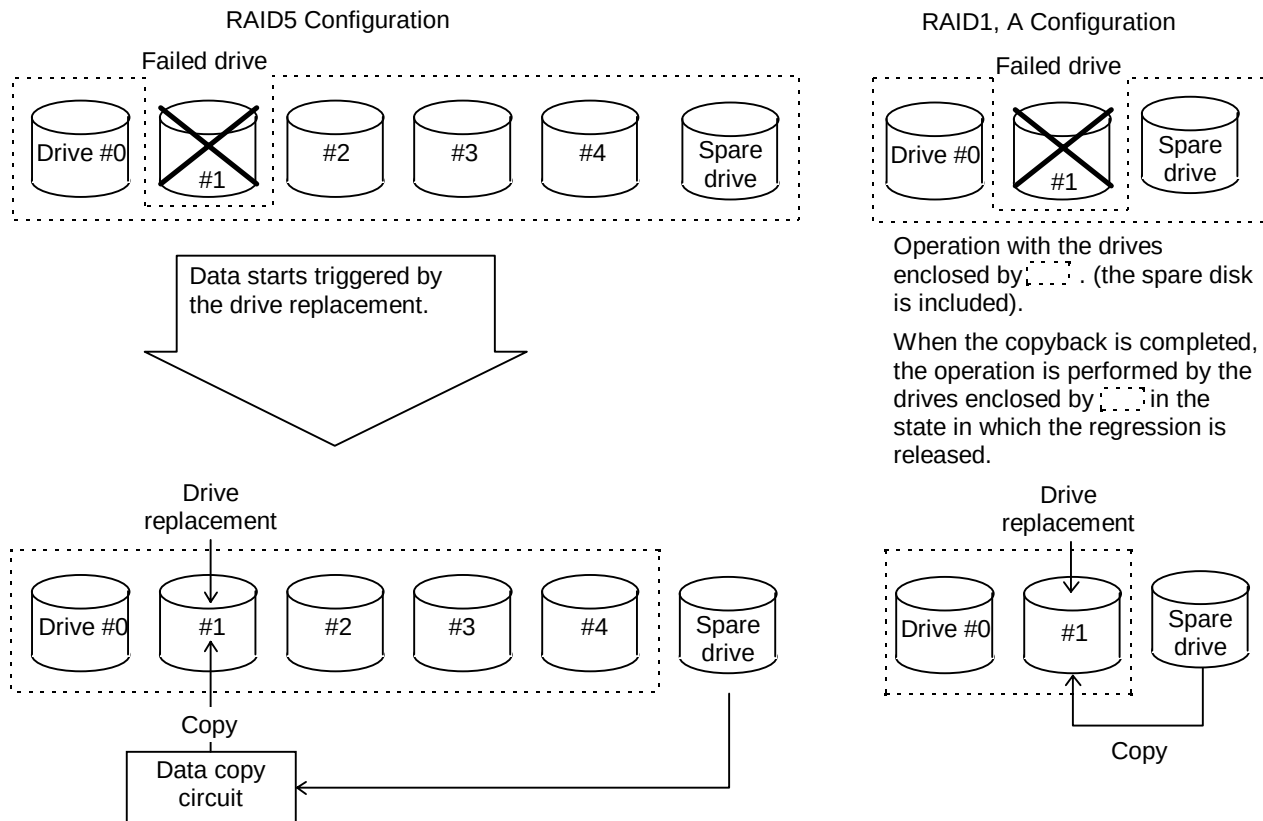
Item No.	Kind of error	Threshold (Default)
1	Drive mechanical error. (Recovered)	50
2	Drive mechanical error. (Unrecovered)	2
3	Drive medium error. (Recovered)	100
4	Drive medium error. (Unrecovered)	50
5	Drive R/W error. (Recovered)	10
6	Drive R/W error. (Unrecovered)	2
7	Drive I/F error. (Recovered)	50
8	Drive I/F error. (Unrecovered)	2
9	Drive hardware error. (Recovered)	50
10	Drive hardware error. (Unrecovered)	2
11	Drive SCSI I/F error. (Recovered)	50
12	Drive SCSI I/F error. (Unrecovered)	2
13	Collectable errors in online verify.	100
14	Uncollectable errors in online verify.	50

The threshold values above can be referred to and updated from the maintenance panel.

Besides, the then error count can be referred to concerning the recovered or unrecovered drive media errors, correctable errors in online verify operations, correctable errors, and uncorrectable errors.

(2) Copyback

When a new drive is inserted to where a failure occurred as shown in the drawing below, the copyback will be executed automatically.



In the following cases, the copyback will not start automatically. Operation to start the copyback is required.

- ① When the copyback mode is set to "NOT AUTOMATIC MODE", the copyback will not start automatically after the drive replacement.

In this case, it is necessary to instruct copyback with the panel. (See DH-REP0260)

- ② If a faulty drive is replaced during data recovery to the spare disk, the data copy back to the replaced drive will not start automatically even after the data recovery to the spare disk is completed.

In this case, it is necessary to remove and insert the replacement drive again after the data recovery onto the spare disk is completed.

(a) Transition of panel display.

(i) Data recover (Data recovery onto the spare disk when a disk failure is detected.)

W202XY DRVALM-XY: Drive blocked

I01044 RCV-ST-44 : Start of data area recovery

I01144 RCVEND-44 : Completion of data area recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(ii) Data recover (Dynamic sparing)

I01DXY DYNMSP-XY : Start of Dynamic sparing

I01044 RCV-ST-44 : Start of HDU ASSY recover

I01144 RCVEND-44 : Completion of data recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

W202XY DRVALM-XY: Drive X, Y were blocked

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(iii) Copyback

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of recovery onto the drive to which the data has been copied.

Note : Symbols X and Y indicated above represent the following.

X indicates port No., and Y indicates row No., and XY indicates the location of the drive to which the data is copied.

* : This message is displayed only when replacing HDU ASSY.

(b) Confirming completion of data recovery or copyback

Select DRIVE MAINT (RECOVER STATUS) from the panel and make sure that the data recovery is completed normally (COMP).

(c) When the data recovery fails (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(i) Data recovery to the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery to the spare disk will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive. (When the failed drive is removed, the data recovery to the spare disk will not start, where as when the drive is replaced, the data recovery to the replaced drive starts.)

(ii) When the dynamic sparing

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the dynamic sparing will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

(iii) Copyback to the replaced drive from the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery onto the spare disk will not start.
- ➋ Replace the drive in the regressed location. In this case, the data recovery onto the replacement drive starts.

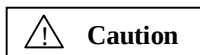
- ➌ Make sure that the data recovery is completed normally (COMP).

- When the faulty portion is other than the spare disk

- ➊ Replace the drive which failed during data recovery and make sure that the data recovery is completed normally (COMP).

- ➋ Replace the drive which is regressed first and make sure that the copyback is completed normally (COMP).

4.3 HDU ASSY Replacement Procedure (See Figure 4.3.1.)



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

(1) Removing procedure

- ① Open the front cover. (See DH-REP0160.)
- ② Check to see the drive installing location of the message text DRVALM-XY (XY indicates the installing location) on the panel is correct and the ALARM LED of the HDU ASSY is on.

W	2	0	2	X	Y	D	R	V	A	L	M	-	X	Y

X : Port number

Y : Row number

- ③ Open the handle in the direction of the arrow (···➤) and pull it out and remove the HDU ASSY.

(2) Installing procedure

- ① Open the handle fully, insert the HDU ASSY in place, and rotate the handle in the direction of the arrow (→).

 **Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

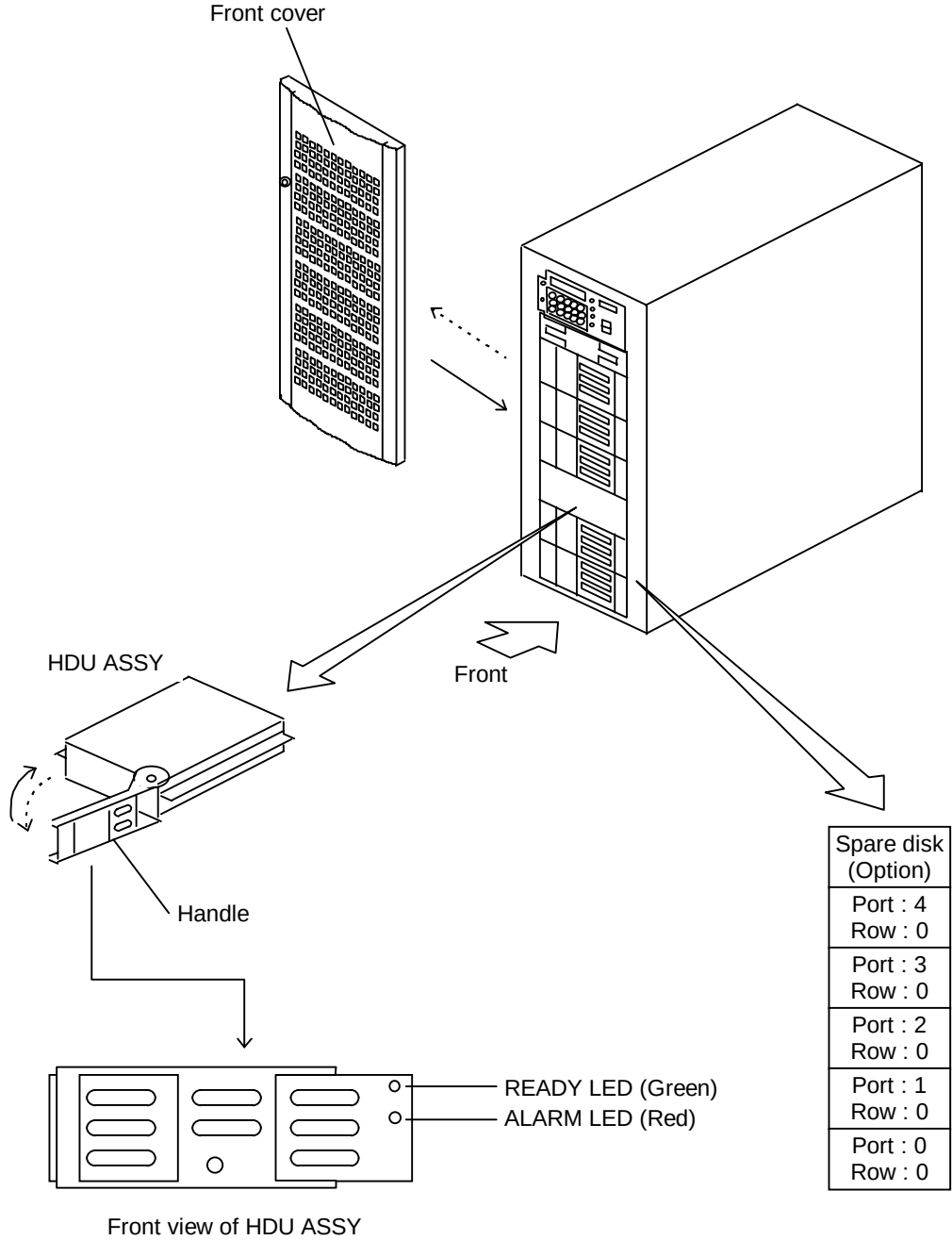
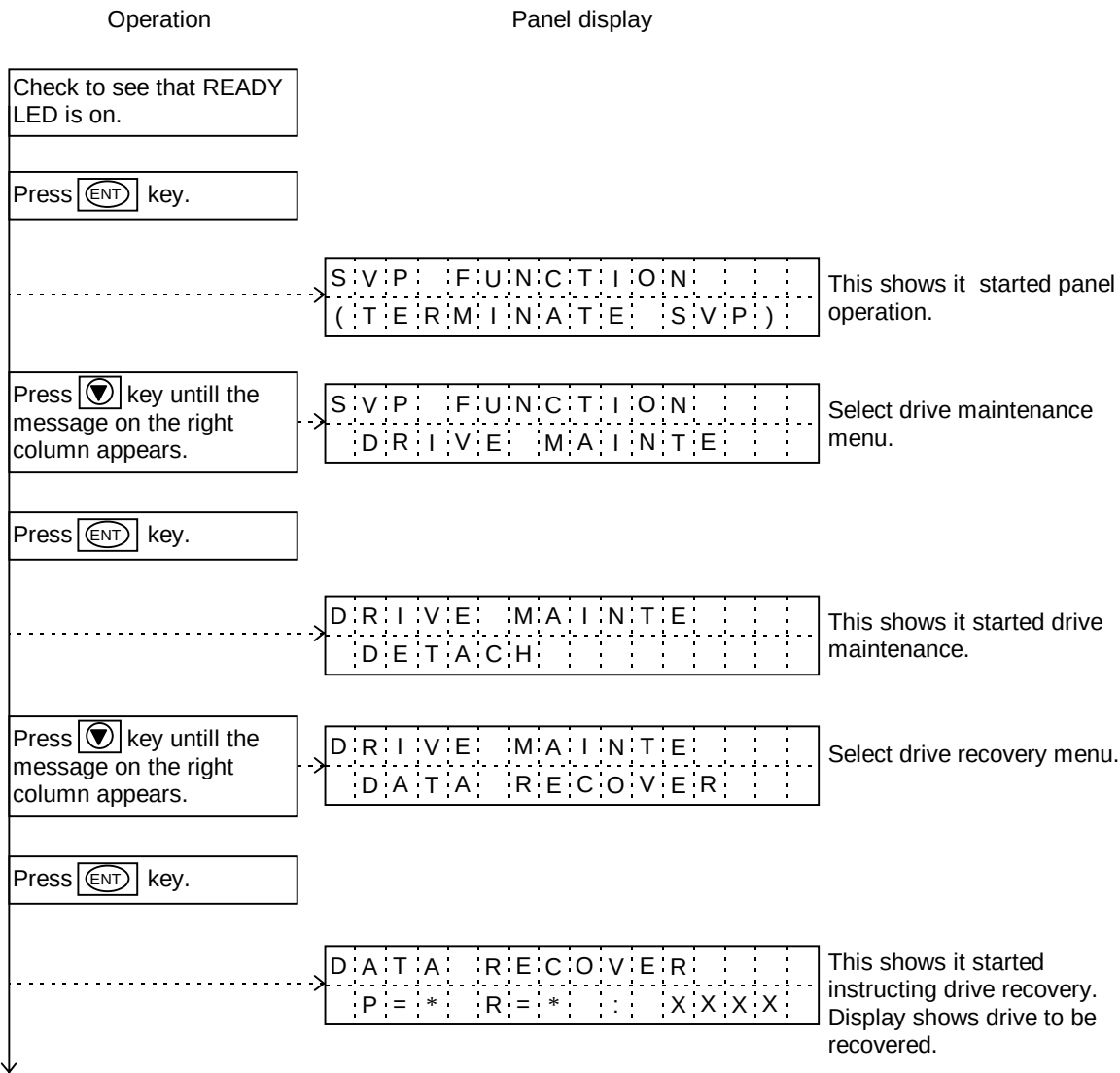


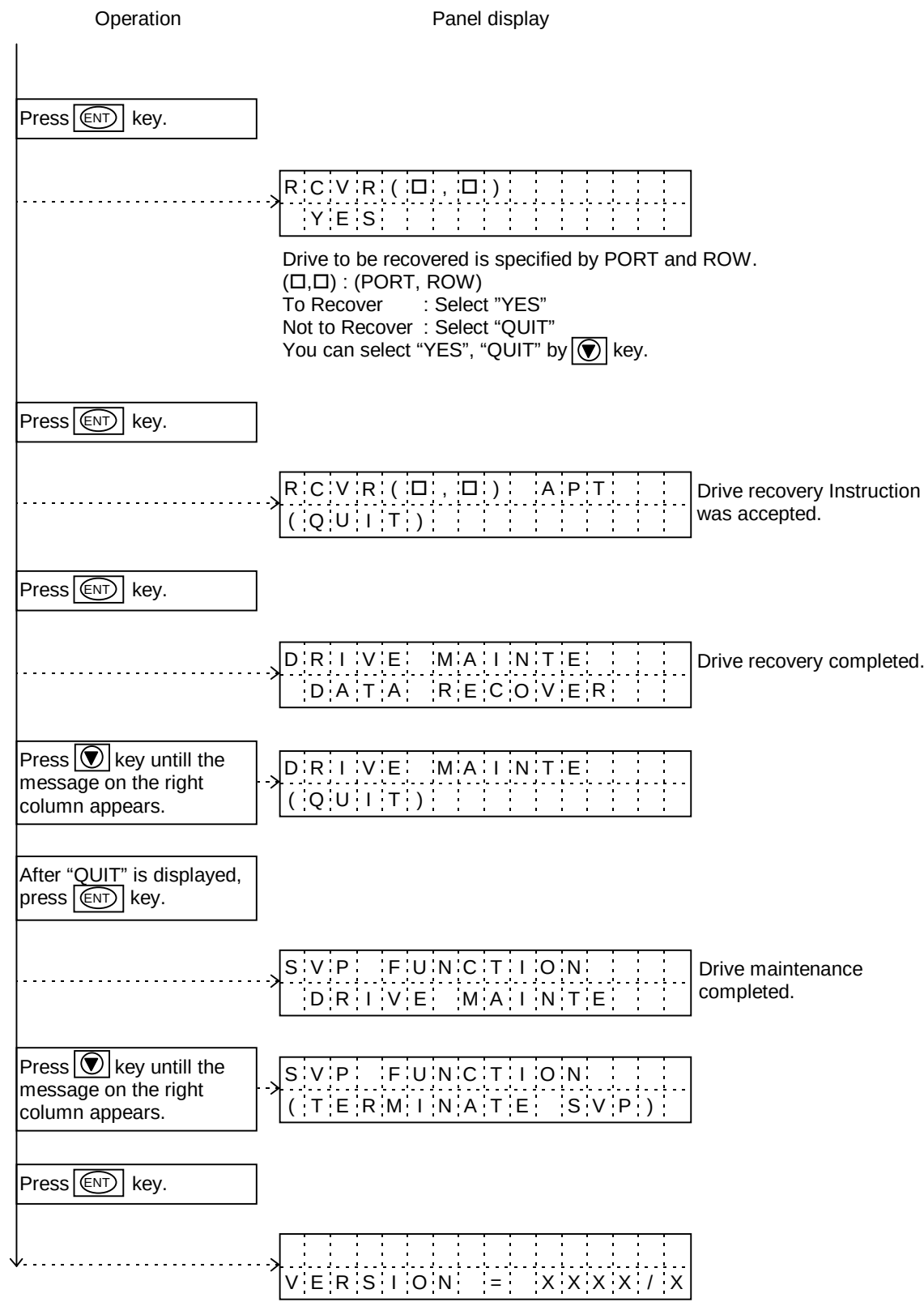
Figure 4.3.1 Replacing HDU ASSY

4.4 Manual Instruction of Data Recovery

This is for manually instructing data recovery. (In a case of dual controller system, which controller to process is automatically specified. No instruction of controller is required.) You can operate this function under device ready and LU#0 instituted (LU can be not formatted yet).



- P=* : Port# of Drive to be recovered.
R=* : Row# of Drive to be recovered.
XXXX : Status of Drive to be recovered. Status is one of below.
- STDBY (not used)
 - DETACH (blocked)
 - NO : (RAID, LU not set yet)



5. Replacing FDD ASSY (See Figure 5.1.)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DH-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Remove the front cover. (See DH-REP0160.)
- ③ Loosen the screw (a), and pull the FDD ASSY to your side.

(2) Installing procedure

- ① Attach the FDD ASSY in the reverse order step (1).

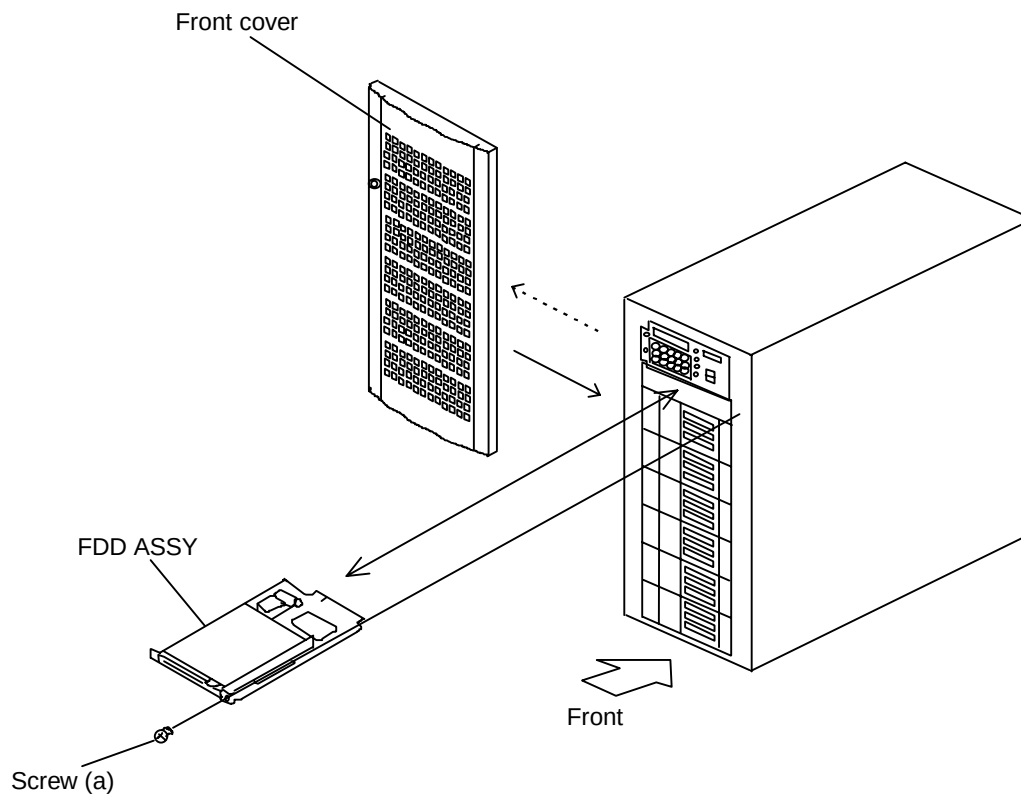


Figure 5.1 Replacing FDD ASSY

6. Replacing PANEL(OP) ASSY (See Figure 6.1.)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DH-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Removing the front cover. (See DH-REP0160.)
 - ③ Loosen the screw (a).
 - ④ Pull the PANEL(OP) ASSY to your side.
- ### (2) Installing procedure
- ① Attach the PANEL (OP) ASSY in the reverse order step (1).
 - ② Plug the connector of the PANEL (OP) ASSY in the connector of the main board.

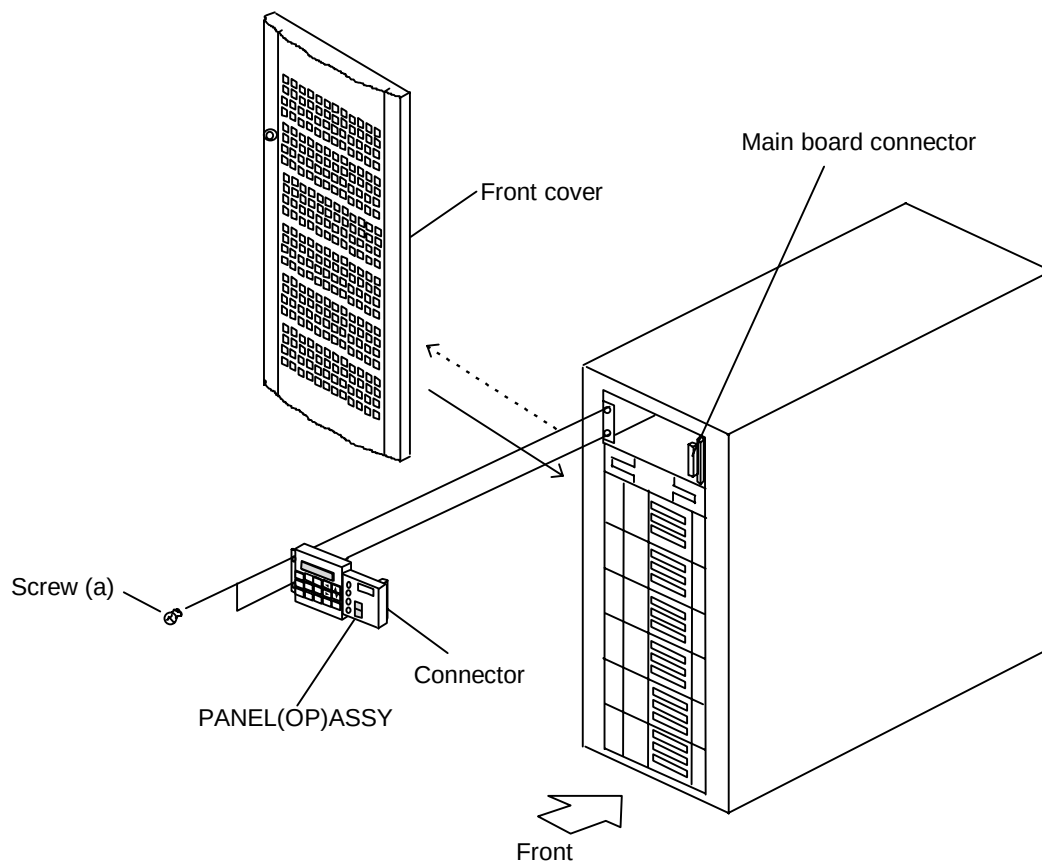
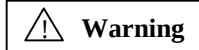


Figure 6.1 Replacing PANEL (OP) ASSY

7. Replacing AC/DC Power Supply (See Figure 7.1.)



Do not touch inside the AC/DC power supply with your hand.
When setting the main switch off, hazardous voltage is still present.

Tool : Phillips screwdriver (No.2), Key

Concerning the desktop (DKH) type, a hot replacement of the power supply is possible when a redundant AC/DC power supply is installed. (This applies the case that not the power unit (D) but the AC/DC power supply is installed in the position for the upper power supply.)

When the redundant AC/DC power supply is not installed, follow the procedure from step (4).

(1) Removing procedure.

- ① Remove the power supply cable from the AC/DC power supply to be replaced.

Notice : Never perform the work with the power cable connected.

- ② Loosen the screws ❶, ❷ of the corresponding AC/DC power supply.
- ③ Pull the corresponding AC/DC power supply to your side.

(2) Mounting procedure.

- ① Insert the AC/DC power supply into the right place.

Notice : When replacing the power supply in the lower position in the case the power supply is duplicated, insert the power supply while raising the cable clamp in the upper position.

- ② Tighten the screws ❶, ❷.
- ③ Connect the power cable.
- ④ Turn on the subsystem following the power-on procedure explained in DH-REP0050.

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing procedure.

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVR" or "POFFCMUNC".

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the power cable.

Notice : Never perform the work with the power cable connected.

- ③ Loosen the screws ❶, ❷ of the corresponding AC/DC power supply.
- ④ Pull the corresponding AC/DC power supply to your side.

(5) Mounting procedure.

- ① Insert the AC/DC power supply into the right place.

Notice : When replacing the power supply in the lower position in the case the power supply is duplicated, insert the power supply while raising the cable clamp in the upper position.

- ② Tighten the screws ❶, ❷.
- ③ Connect the power cable.
- ④ Turn on the subsystem following the power-on procedure explained in DH-REP0050.

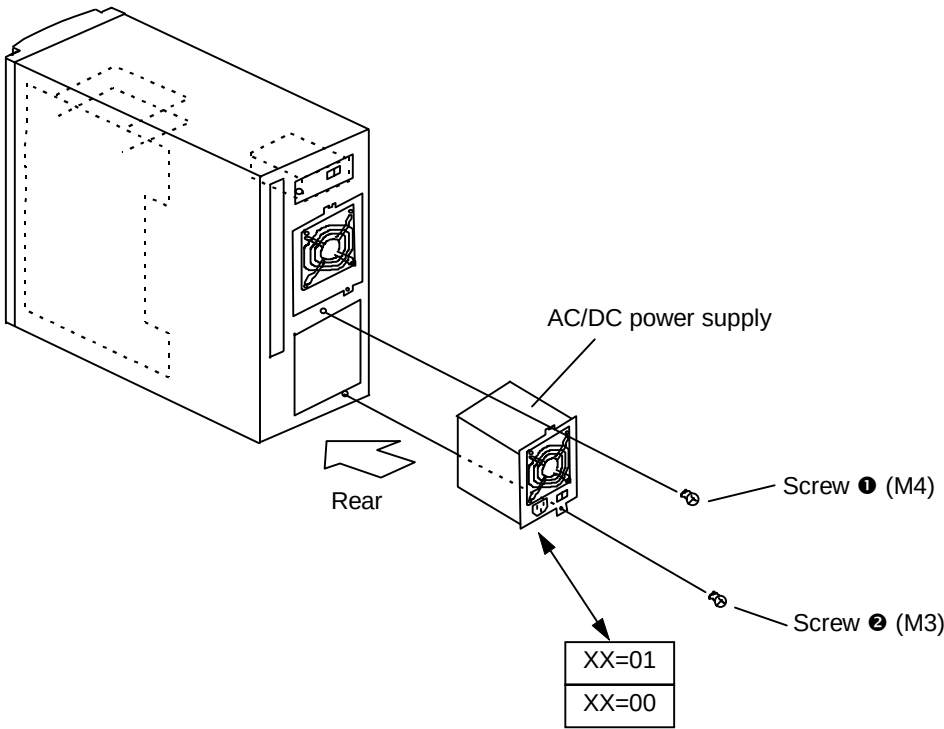
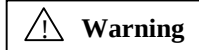


Figure 7.1 Replacing AC/DC Power Supply

8. Replacing Power Unit (D)



Warning

Do not touch inside the Power Unit (D) with your hand.

When setting the main switch off, hazardous voltage is still present.

Tool : Phillips screwdriver (No.2)

The desk top (DKH) type is hot replacement of the power supply is possible.

(1) Removing procedure.

- ① Loosen the screws ❶, ❷ of the corresponding Power Unit (D).
- ② Pull the corresponding Power Unit (D) to your side.

(2) Mounting procedure.

- ① Insert the Power Unit (D) into the right place.
- ② Tighten the screws ❶, ❷.

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing procedure.

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVR" or "POFFCMUNC".

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the power cable.

Notice : Never perform the work with the power cable connected.

- ③ Loosen the screws ❶, ❷ of the corresponding Power Unit (D).
- ④ Pull the corresponding Power Unit (D) to your side.

(5) Mounting procedure.

- ① Insert the Power Unit (D) into the right place.

Notice : When replacing the power supply in the lower position in the case the power supply is duplicated, insert the power supply while raising the cable clamp in the upper position.

- ② Tighten the screws ❶, ❷.
- ③ Connect the power cable.
- ④ Turn on the subsystem following the power-on procedure explained in DH-REP0050.

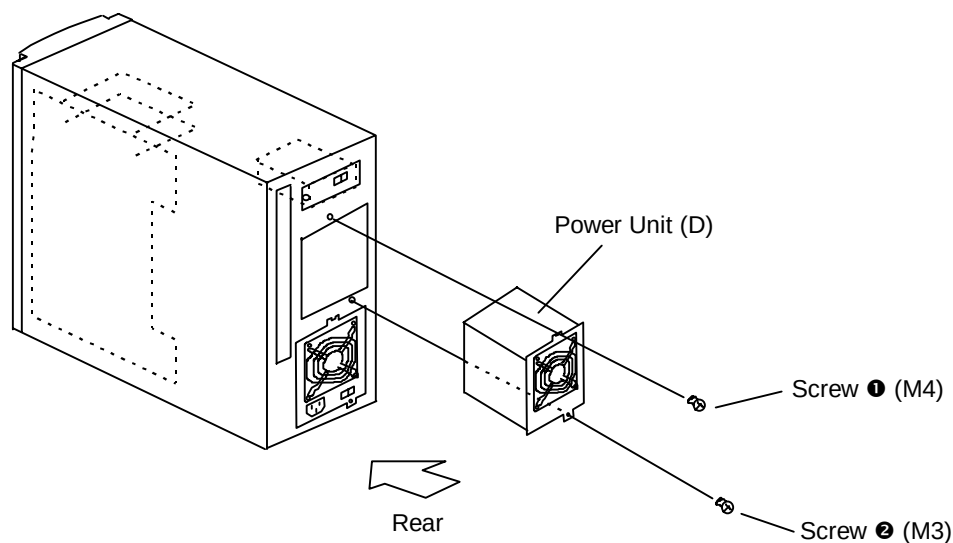


Figure 8.1 Replacing Power Unit (D)

9. Replacing Battery ASSY (See Figure 9.1.)

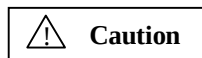
Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

When the battery is to be replaced with power turned off, read DH-REP0050, "Turning the power off." and "Turning-ON procedure." thoroughly and follow DH-REP0060, "Part Replacement Procedures".

(1) Removing procedure

- ① Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- ② Loosen the screw ❶.
- ③ Pull the Battery ASSY to your side.



Do not disintegrate removed Battery. It may cause burn or electric shock.

(2) Installing procedure

- ① Insert the Battery ASSY into the right place.
- ② Tighten the screw ❶.
- ③ Turn the switch on the Battery ASSY to "I" side.
- ④ Make sure that the WARNING LED goes off and the following panel display appears.

Note : When removing/mounting the Battery ASSY, turn the switch to "O" side.

(3) Transition of panel display

I00100 BATRCV ----- Termination of battery recovery

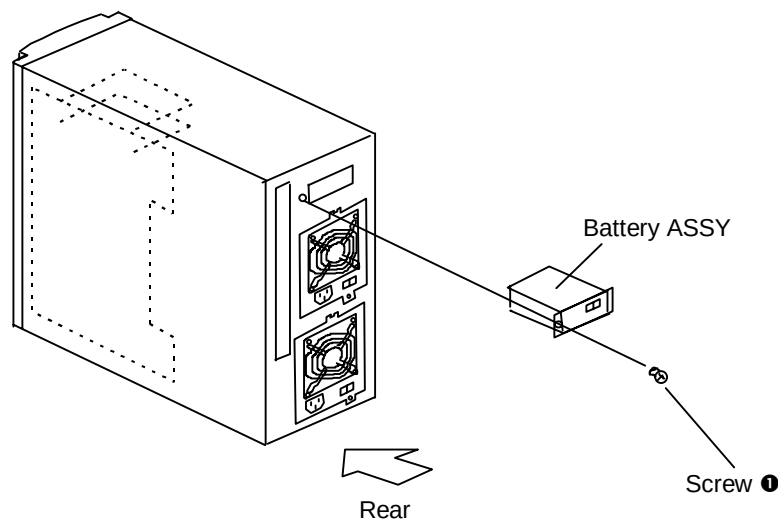


Figure 9.1 Replacing Battery ASSY

Note : The lead-acid battery is a precious resource which can be recycled.

The battery uses lead which is a heavy metal and sulfuric acid which is a deleterious substance. Therefore, never case it off at the place where the replacement of it is done.

When a part is to be replaced or a used product is to be discarded, take out the lead-acid battery to get it recycled.

See page "ENTRY0120" for the safety of depositing and storing the battery.

When the battery ASSY is replaced, power on the subsystem and charge the battery for more than two hours before returning the subsystem to the customer.

10. Replacing I/F ADAPTER ASSY (See Figure 10.1 and Table 10.1)

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DH-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
 - ③ Disconnect the SCSI cable, the terminator, LAN cable (option) and the RS232C cable.
 - ④ Loosen the 2 screws ❶.
 - ⑤ Pull the I/F ADAPTER ASSY toward you to remove it by its handle.
- ### (2) Installing procedure
- ① Make the setting of the terminator power, (JP1, JP2) as the setting of removed I/F ADAPTER ASSY.
 - ② Attach the I/F ADAPTER ASSY in the reverse order step ❶.

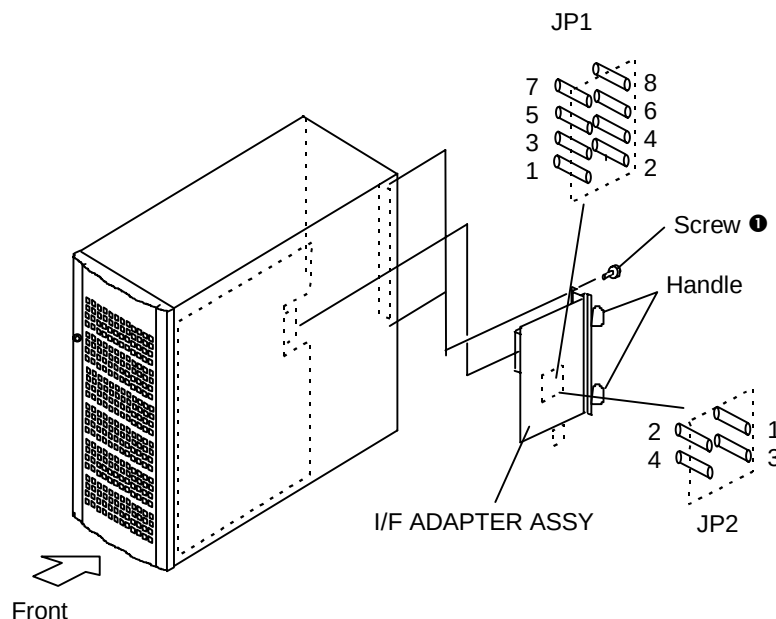
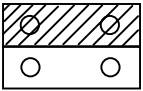
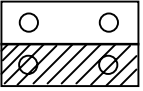
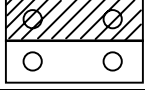
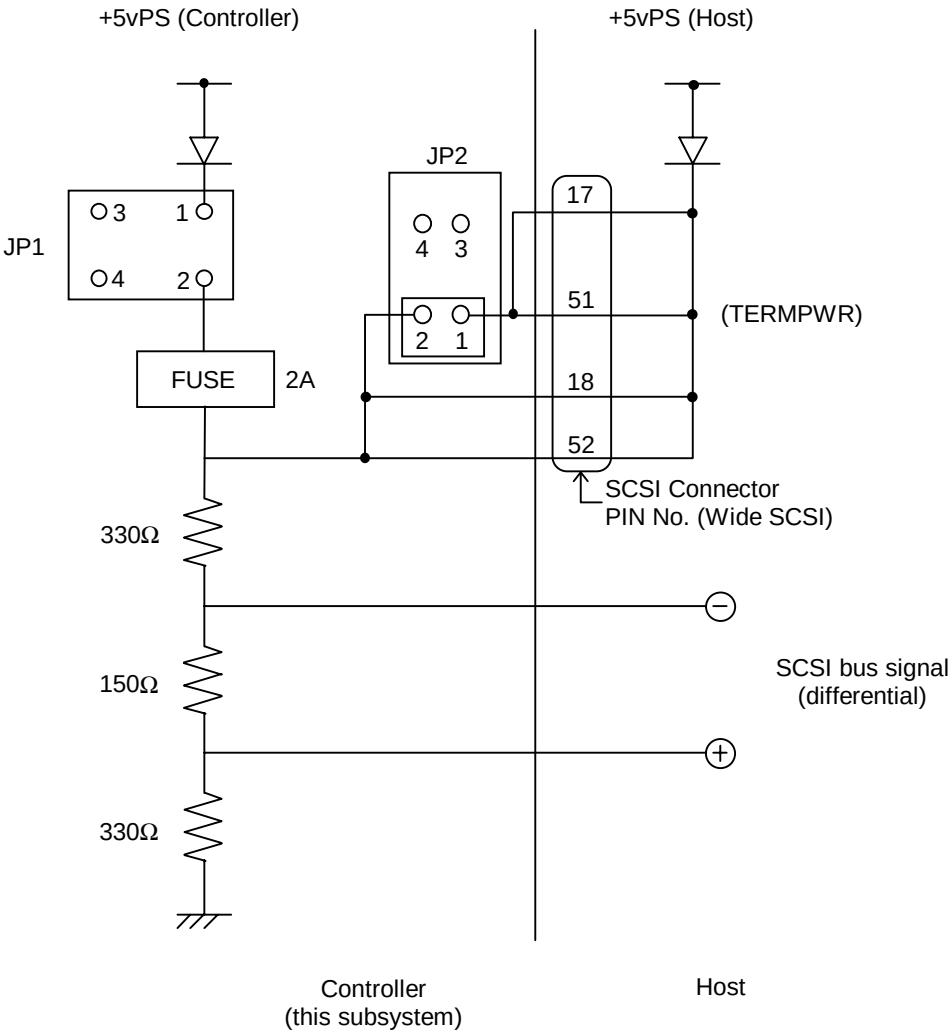


Figure 10.1 Replacing I/F ADAPTER ASSY

Table 10.1 Setting the Terminator Power

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2	JP2		Be sure to set this jumper with the pins 1 and 2 short-circuited.



11. Replacing CTL ASSY

The replacement procedure differs depending on the Micro_Disk version. Confirm the version first, then execute the replacement following the procedure determined according to the version.

- (1) When the Micro_Disk version is 0303** (** is optional) or earlier

Go to section 11.1 “CTL ASSY Replacement when Version is 0303** (** is optional) or earlier” on page DH-REP0440.

- (2) When the Micro_Disk version is 0304** (** is optional) or later

Go to section 11.2 “CTL ASSY Replacement when Version is 0304** (** is optional) or later” on page DH-REP0460.

11.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See DH-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

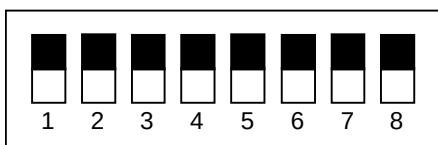
- ③ Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- ④ When the subsystem is mounted on the rack frame, take it down from the rack frame.
- ⑤ Remove the front cover. (See DH-REP0160.)
- ⑥ Remove the I/F ADAPTER ASSY. (See DH-REP0290.)
- ⑦ Remove the cover (U). (See DH-REP0180.)
- ⑧ Remove the cover (L). (See DH-REP0160.)
- ⑨ Remove the cover (R). (See DH-REP0170.)
- ⑩ Remove the PANEL(OP) ASSY. (See DH-REP0310.)
- ⑪ Remove the MPU Board, CACHE ASSY and LAN ASSY(option). (See DH-REP0460, 0470.)
- ⑫ Loosen the screws, remove the SHIELD PLATE.
- ⑬ Remove the CTL ASSY.

(2) Installing procedure

- ① Attach the CTL ASSY in the reverse order step (1).
- ② When the subsystem is mounted on the rack frame, take it mount for the rack frame.
- ③ Set No.3 of the DIP switch of the CTL ASSY.



- ④ Turn on the subsystem following the power-on procedure explained in DH-REP0050.
- ⑤ Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ⑥ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑦ Turn off the according to the power off procedure in DH-REP0050.
- ⑧ Turn on the power according to the power on procedure in DH-REP0050. (Soon, the ASSY will enter the ready status.)

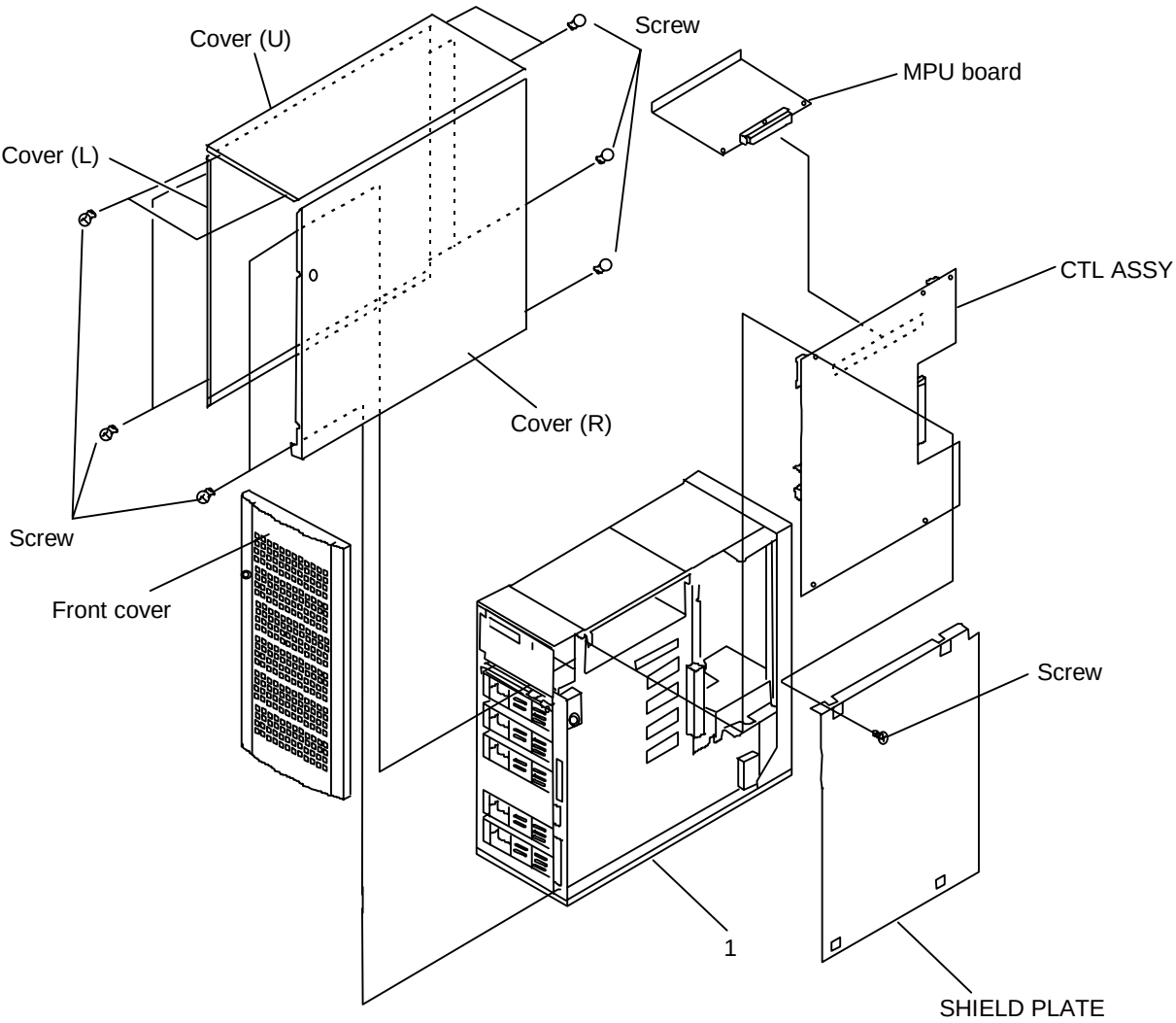


Figure 11.1.1 Replacing CTL ASSY

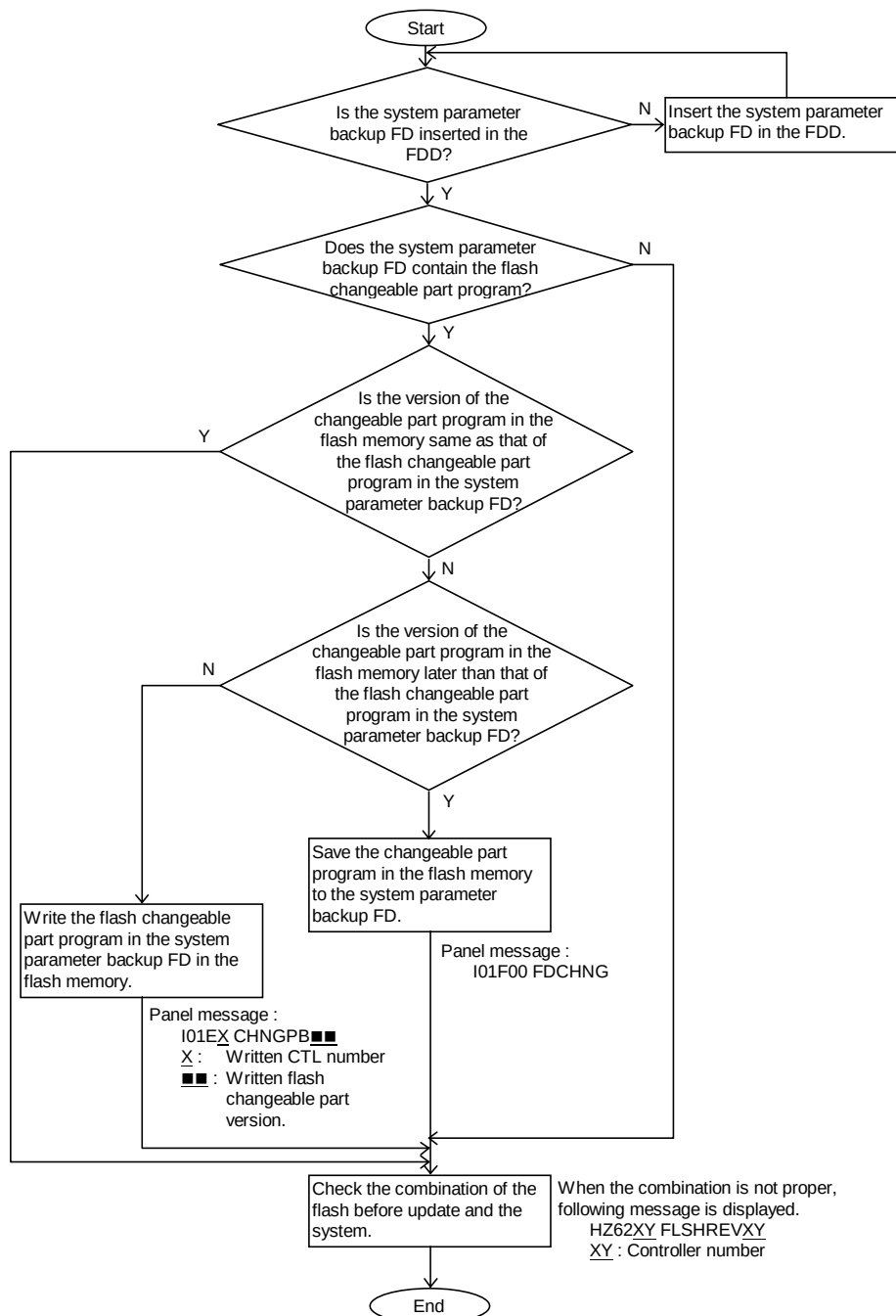
11.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later

The automatic updating function of the flash changeable part is added to the subsystem whose Micro_Disk version is 0304** (** is optional) or later. To use the function the system parameter backup FD must be inserted. By using the function, service person can replace the CTL ASSY without giving care to the combination of the Micro_Disk version and the flash changeable part version of the CTL ASSY.

(If the system parameter backup FD is not inserted when replacing the CTL ASSY, prepare the CTL ASSY whose flash changeable version is the same as that of the CTL ASSY to be replaced, or PB26 or later, and execute the replacement following the procedure explained in Section 8.1 “CTL ASSY Replacement when Version is 0304** (** is optional) or earlier”.)

Outline of flash changeable part automatic updating function

The following is a processing flow of the flash changeable part automatic updating function. This processing is performed by the Micro_Disk of version 0304** (** is optional) or later.



Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See DH-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- ④ When the subsystem is mounted on the rack frame, take it down from the rack frame.
- ⑤ Remove the front cover. (See DH-REP0160.)
- ⑥ Remove the I/F ADAPTER ASSY. (See DH-REP0290.)
- ⑦ Remove the cover (U). (See DH-REP0180.)
- ⑧ Remove the cover (L). (See DH-REP0160.)
- ⑨ Remove the cover (R). (See DH-REP0170.)
- ⑩ Remove the PANEL(OP) ASSY. (See DH-REP0310.)
- ⑪ Remove the MPU Board, CACHE ASSY and LAN ASSY(option). (See DH-REP0460, 0470.)
- ⑫ Loosen the screws, remove the SHIELD PLATE.
- ⑬ Remove the CTL ASSY.

(2) Installing procedure

- ① Attach the CTL ASSY in the reverse order step (1).
- ② When the subsystem is mounted on the rack frame, take it mount for the rack frame.
- ③ Set No.3 of the DIP switch of the CTL ASSY.

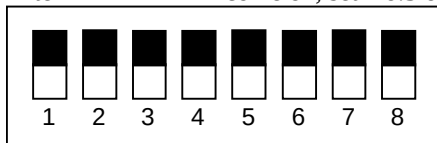


- ④ Turn on the subsystem following the power-on procedure explained in DH-REP0050.
- ⑤ Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.

- ⑥ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
Version = XXXX/X	Subsystem READY LED comes on.	Go to step ⑨
I01EX CHNGPB■■■ HZ62XY FLSHREVXY X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	Subsystem ALARM LED comes on. (Version of flash changeable part was updated to PB■■■. Current system cannot operate with the flash changeable part whose version is not updated.)	Operation1 : Return the DIP switch of the CTL ASSY. Operation2 : Turn off the power following the powering off procedure shown on page DH-REP0050. Operation3 : Turn on the power following the powering on procedure shown on page DH-REP0050. Check if the following message is displayed on the panel. Version = XXXX/X Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see DH-REP0500), then go to step ⑦.
I01EX CHNGPB■■■ Version = XXXX/X X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed.	Subsystem READY LED comes on. (Version of flash changeable part was updated to PB■■■. Current system can operate with the flash changeable part whose version is not updated.)	Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see DH-REP0500), then go to step ⑦.

- ⑦ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑧ Turn off the power according to the power off procedure in DH-REP0050.
⑨ Turn on the power according to the power on procedure in DH-REP0050. (Soon, the ASSY will enter the ready status.)

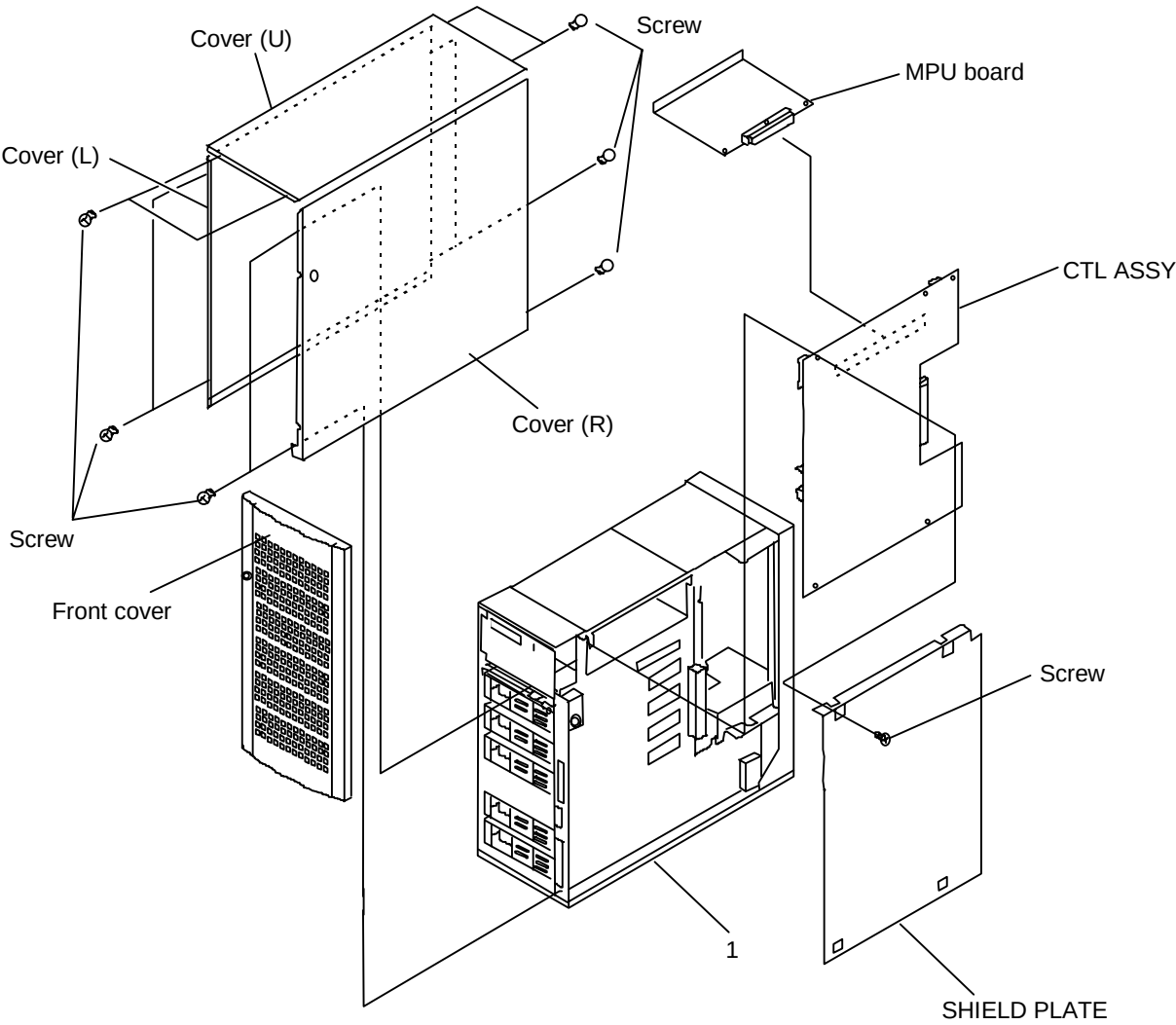


Figure 11.2.1 Replacing CTL ASSY

Painting flash revision label

Figure 11.2.2 shows how to paint the flash revision label. (It shows a case to paint the boxes up to PB26.)
Location of the label is shown in Figure 11.2.3.

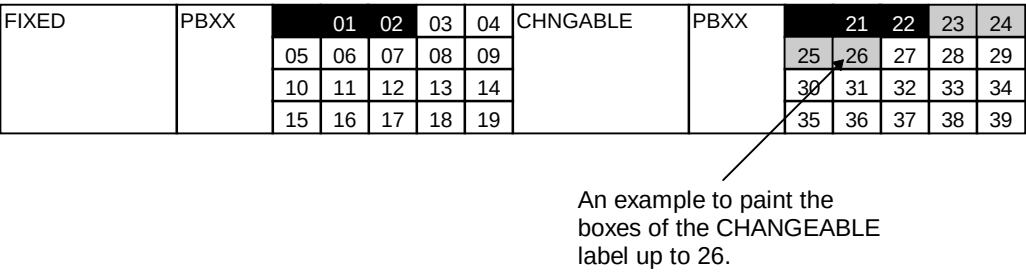


Figure 11.2.2 Revision Label Layout and Numbers to be Painted

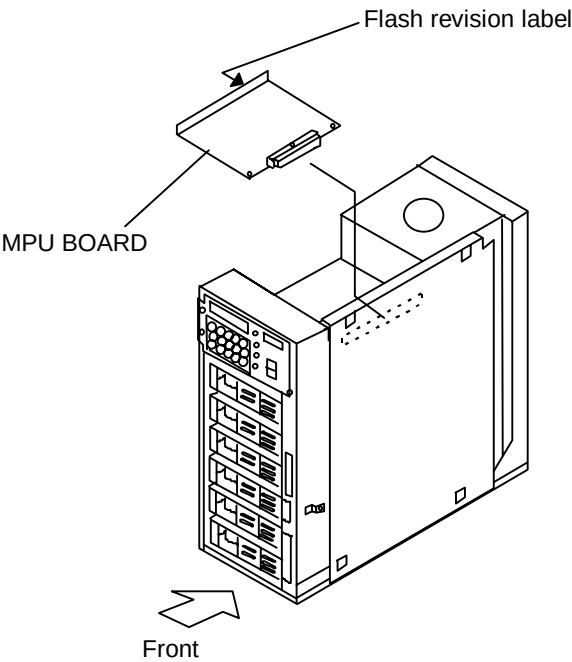


Figure 11.2.3 Location of Revision Label on CTL ASSY

12. Replacing CACHE ASSY (See Figure 12.1.)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- ③ When the subsystem is mounted on the rack frame, take it down from the rack frame.
- ④ Remove the cover (U). (See DH-REP0180.)
- ⑤ Remove the cover (L). (See DH-REP0160.)
- ⑥ Remove the LAN ASSY (option).
- ⑦ Replace the CACHE ASSY.

Notice : Slots #0 and #1 are pairs respectively. Install the cache having the same capacity for these each pair slots

(2) Installing procedure

- ① Attach the cover in the reverse order step (1).
- ② When the subsystem is mounted on the rack frame, take it mount for the rack frame.

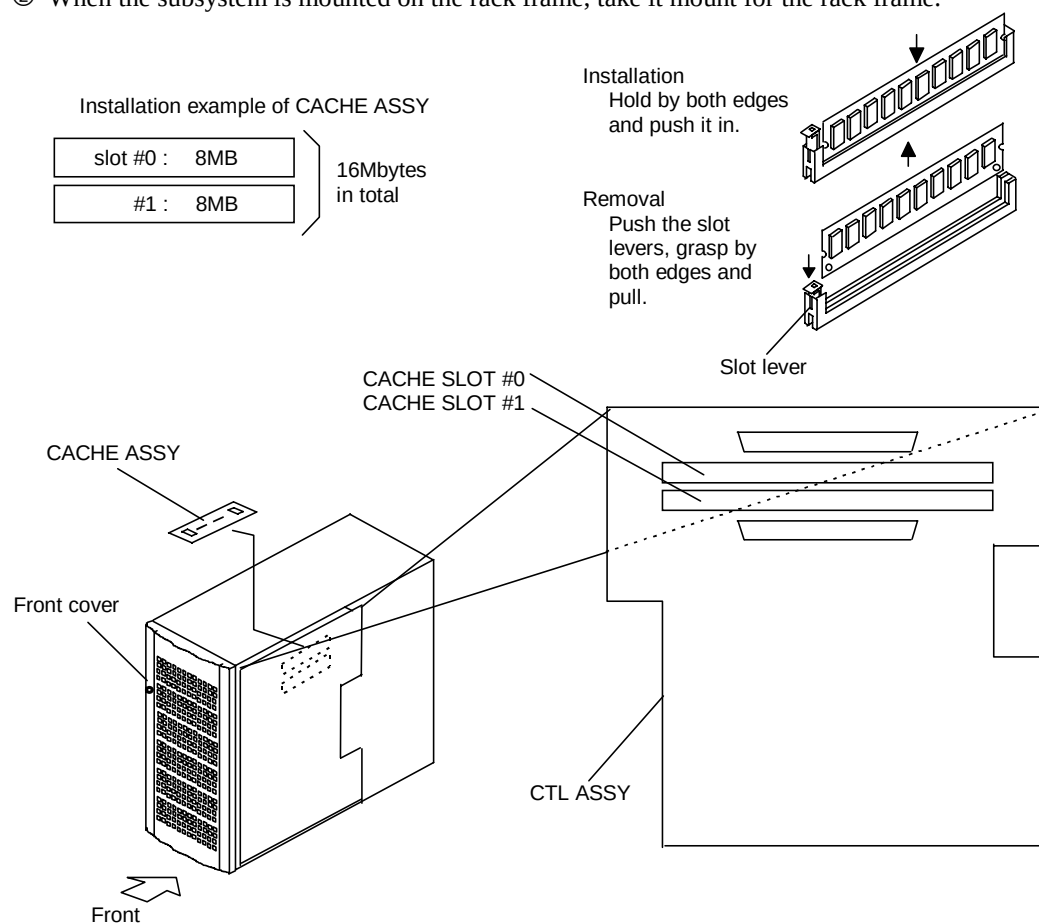


Figure 12.1 Replacing CACHE ASSY

13. Replacing LAN ASSY (See Figure 13.1.)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice 1 : In case the power is not normally turned off, the user's data might be lost.

Notice 2 : If the power is already turned off, check the CACHE PWR LED (see page THEORY0210) to confirm that the cache back up is not being executed. In the case the cache back up is being executed, turn on and off the power (see page DK-REP0050).

Make sure that the power is turned off normally, then replace the Battery ASSY.

Sometimes the subsystem does not go poweroff after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030.) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- ③ When the subsystem is mounted on the rack frame, take it down from the rack frame.
- ④ Remove the cover (L). (See DH-REP0160.)
- ⑤ Replacing the LAN ASSY.
- (2) Installing procedure
- ① Attach the LAN ASSY in the reverse order step (1).
- ② When the subsystem is mounted on the rack frame, take it mount for the rack frame.

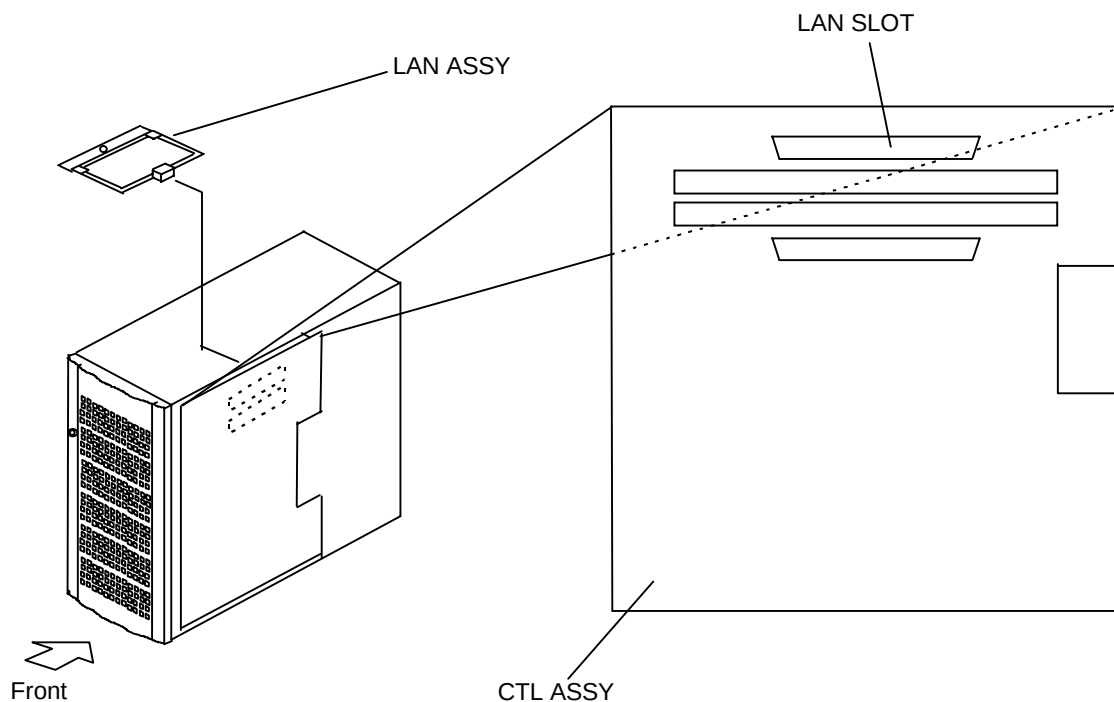


Figure 13.1 Replacing LAN ASSY

DF350 Disk Subsystem

8. INSTALLATION

(Desktop (DKH) Type)

Rev.2

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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1. Appearance and Maintenance Area

1.1 Appearance

Figure 1.1.1 shows appearance of the DF350 disk subsystems. (Desktop (DKH) type)

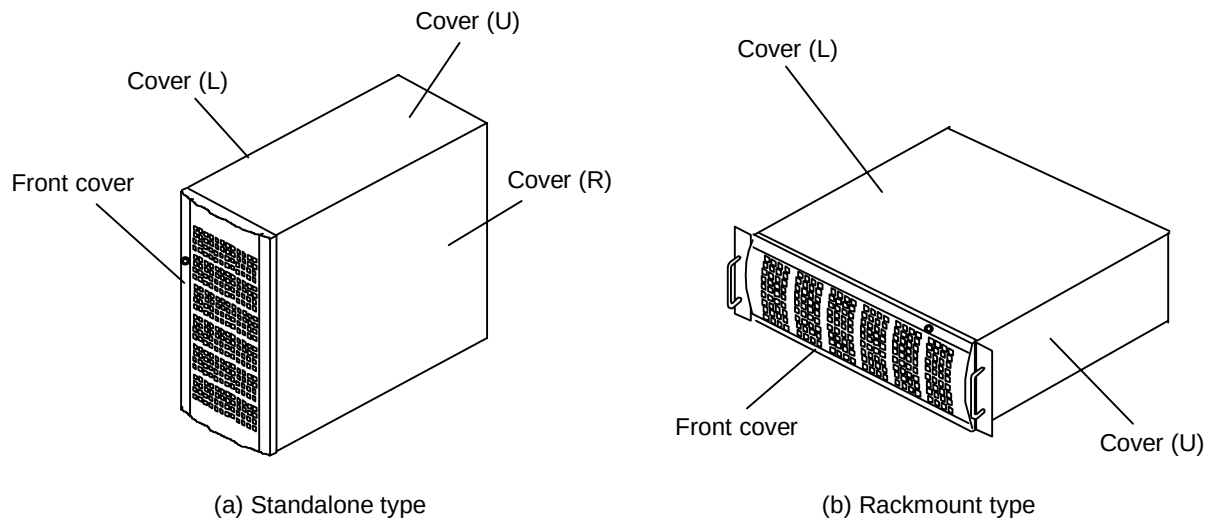
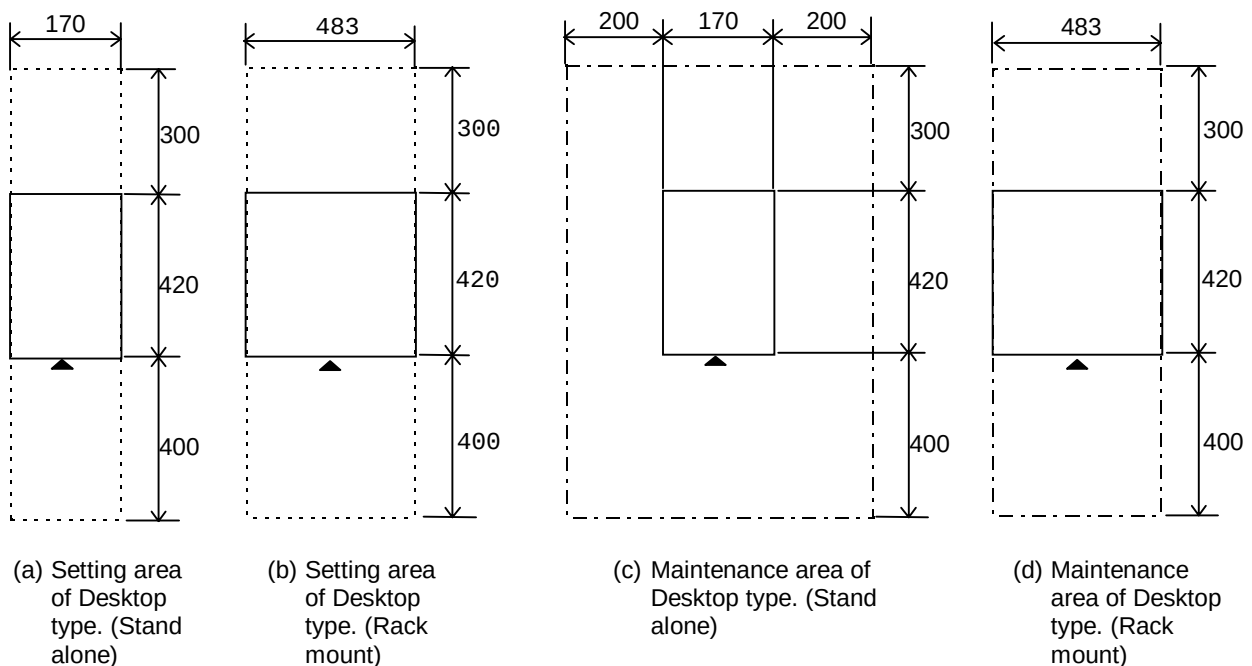


Figure 1.1.1 Appearance

1.2 Setting/Maintenance Area

Figure 1.2.1 shows setting/maintenance area for the DF350 disk subsystems. (Desktop (DKH) type)

UNIT : mm



— : External dimension of the subsystem
 ▲ : Front of the subsystem
 — — : Maintenance area
 - - - : Setting area

Figure 1.2.1 Maintenance Area

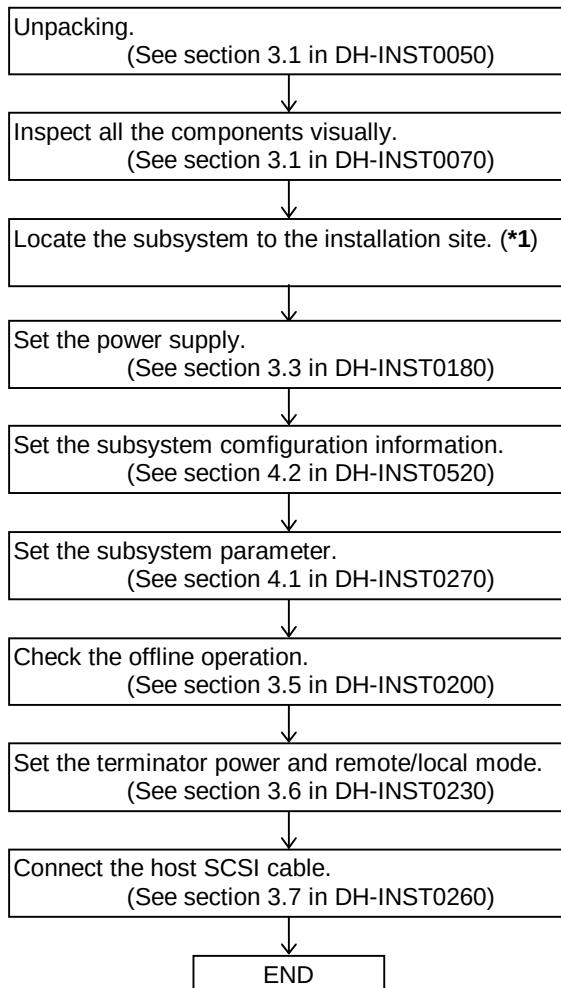
2. Installation

- (1) Tool needed for installation

Phillips screwdriver (No.2).

- (2) How to install

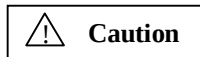
The following flow chart describes how to install the subsystem.



***1 : Place the subsystem with 30cm or more apart from the wall for both the front and the rear because of the ventilation.**

3. Installation Procedure

3.1 Inspecting all the Components



The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.

3.1.1 Unpacking

- (1) Figure 3.1.1 shows how the subsystem has been packed.
- (2) Figures 3.1.2 to 3.1.3 show the subsystem without external packaging.
- (3) Unpacking
 - ① Loosen the polyester bands.
 - ② Pull out the Tri-wall nails.
 - ③ Remove the external packaging and packing materials.
 - ④ Take the subsystem out of the polyethylene bag.
 - ⑤ Keep two keys in the attached box carefully.
(These keys are used for opening/closing front cover.)
 - ⑥ Remove the cushioning materials, tape, desiccators, etc attached to the subsystem.

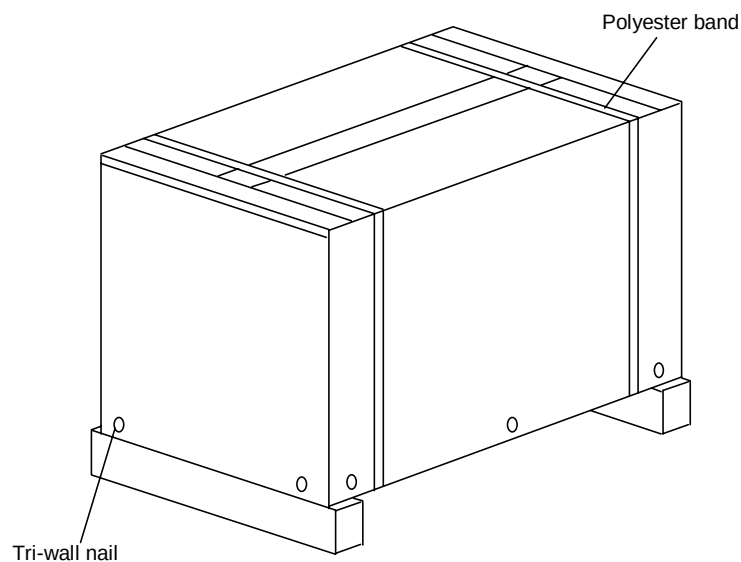


Figure 3.1.1 Subsystem being Packed

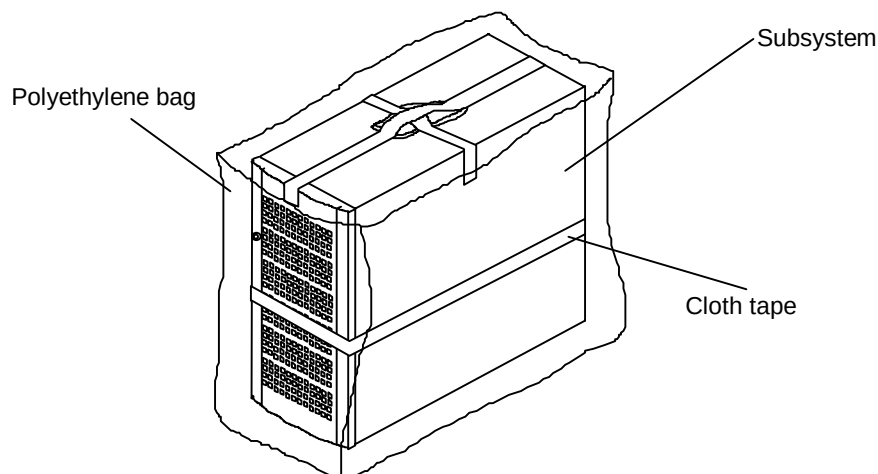


Figure 3.1.2 Subsystem without External Packaging

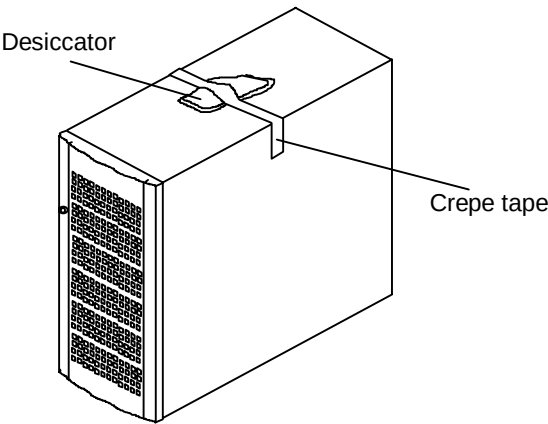


Figure 3.1.3 Location of Desiccantor

3.1.2 Inspecting all the components visually

Check the following components before installation according to a customer's configuration.

Table 3.1.1 Mandatory Features

Model Name	Specification	Quantity	Comment
DF350-DH	Desktop (DKH)	1	
DF-F350-E2E2 -E2E4 -E3E4 -E2E8 -E1E8 -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	1 (RAID5 :4D+1P)	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E8 -A1E8 -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	4 (RAIDA, RAID5: 3D+1P) 3 (RAID5 :2D+1P) 2 RAID0/1	HDU ASSY
DF-F350-B1H	Power supply	1	AC/DC power supply
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	2	CACHE ASSY
DF-F350-DHUDS -DHUSS	Interface board (*1) for wide differential SCSI interface wide single ended SCSI interface	1	I/F ADAPTER ASSY

*1 This includes a terminator.

Table 3.1.2 Optional Features

Model Name	Specification	Quantity	Comment
DF-F350-E2E2 -E2E4 -E3E4 -E2E8 -E1E8 -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	0 - 3	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E8 -A1E8 -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	0 - 21	HDU ASSY
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	0, 2, 4, 6 or 8	CACHE ASSY
DF-F350-B1H	Spare power supply	0 - 4	AC/DC power supply
DF-F350-G1D1 -G2D1	LAN board LAN board (SNMP)	0 - 2	LAN ASSY

*1 This includes a terminator.

Table 3.1.3 Accessories

Model Name	Specification	Quantity	Comment
DF-F350-J1 -J2	Power supply cable (Connector attached to two poles with earth) (Inlet type connector, EN60320 STANDARD SHEET C14)	0 or 1	
DF-F350-K050L -K150L -K068S -K268S -K168S -K350L	Interface cable (50PL, 1.5m) (50PL, 3m) (68PS, 1.5m) (68PS, 3m) (68PS, 5m) (50PL, 5m)	0 -	
DF-F350-S1	RS232C cable	0 -	

3.1.3 Inspecting the subsystem components and addendum

This subsection describes how to install the basic components into the subsystem.

Figures 3.1.4 and 3.1.5 show mechanical configuration and parts location of this subsystem.

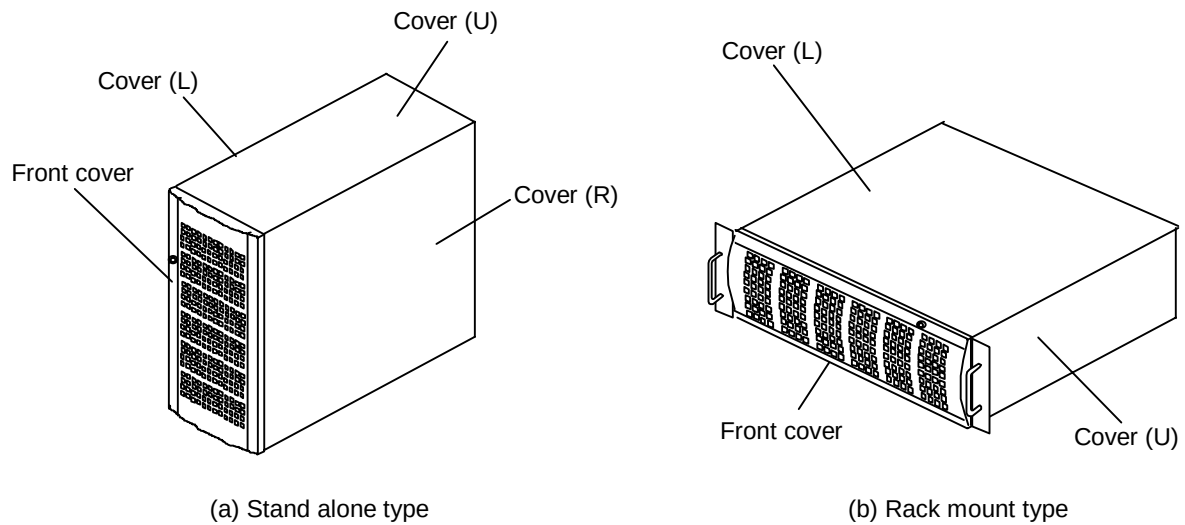


Figure 3.1.4 Appearance of DF350 Disk Subsystem (Desktop (DKH) type)

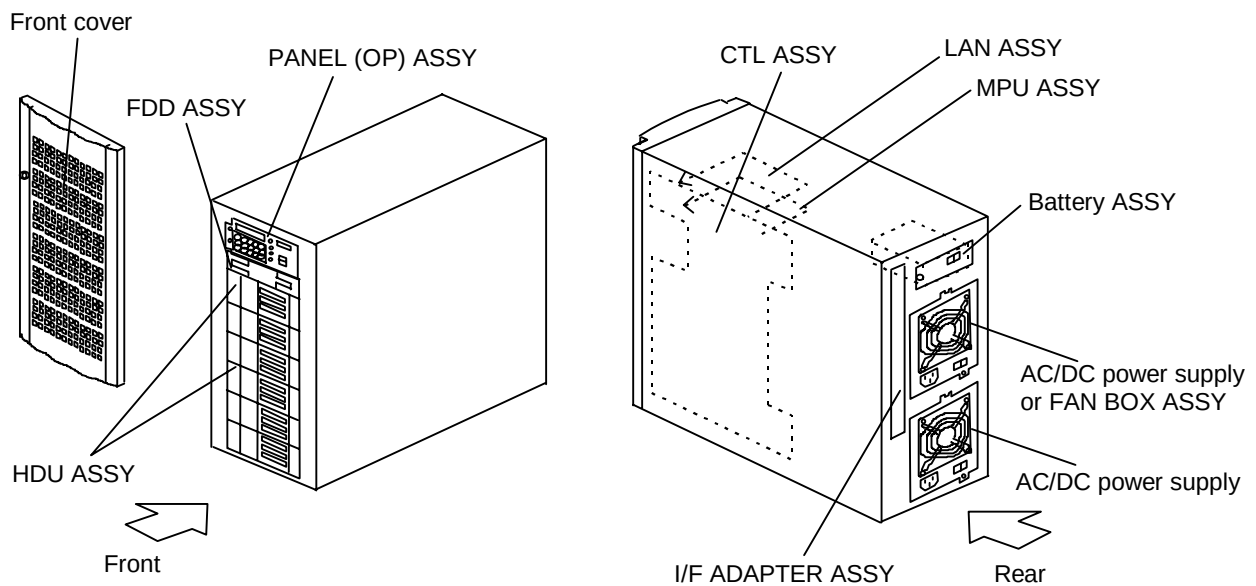
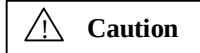


Figure 3.1.5 Parts Location

3.2 Install the Subsystem

Place the subsystem so that the front and rear is 30cm or more apart from the wall in order not to block the ventilation.



Do not block the ventilation. With the temperature rise, it may cause failure or fire.

3.2.1 Removing/Mounting the Front Cover

Tool : Key

(1) Removing the front cover.

- ① Insert the key attached to the subsystem into the keyhole and turn it clockwise. (See Figure 3.2.1 (a).)
- ② Turn the left of the front cover to your side to open it. (See Figure 3.2.1 (b).)
- ③ Remove the front cover to (···→). (See Figure 3.2.1 (c).)

(2) Attaching the front cover.

- ① Attaching the front cover in the reverse order step (1).

Note : Open/Close the front cover gently to avoid a shock. Precision components are installed.

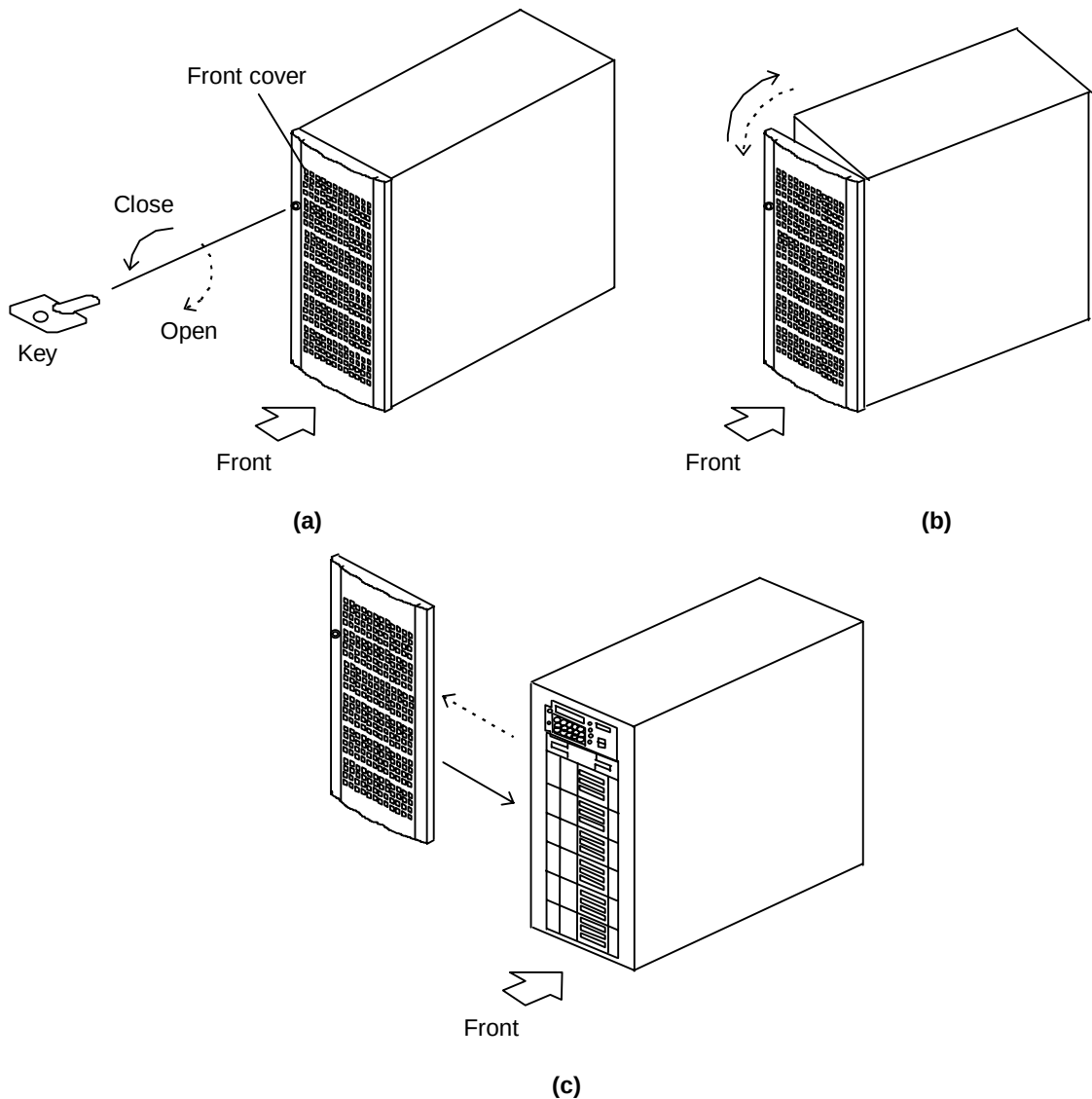


Figure 3.2.1 Removing/Mounting Front Cover

3.2.2 Removing/Attaching the cover (L)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Remove the front cover. (See DH-INST0100.) ①
- ② Loosen the four screws (a).
- ③ Side the bottom of the cover (L) downward and pull it out. ②
- ④ Pull up the cover (L) to removing. ③

(2) Attaching procedure

- ① Attaching the cover (L) in the reverse order step (1).

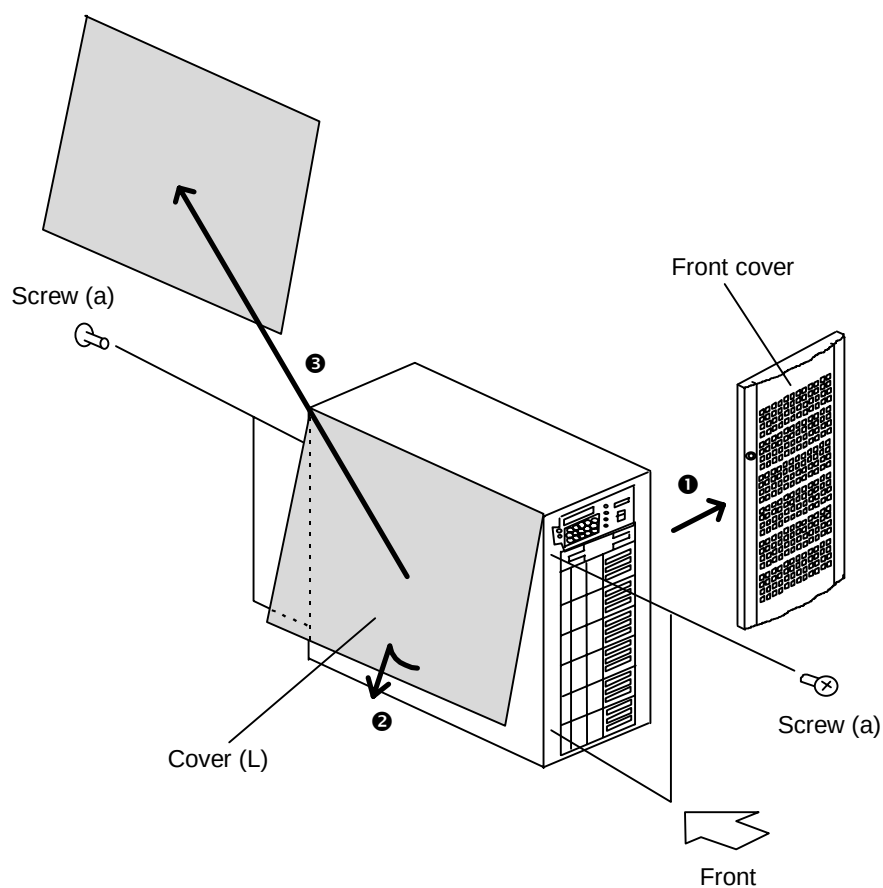


Figure 3.2.2 Removing/Attaching the Cover (L)

3.2.3 Removing/Attaching the cover (R)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Remove the front cover. (See DH-INST100.) ❶
- ② Loosen the three screws (a).
- ③ Side the bottom of the cover (L) downward and pull it out. ❷
- ④ Pull up the cover (R) to removing. ❸

(2) Attaching procedure

- ① Attaching the cover (R) in the reverse order step (1).

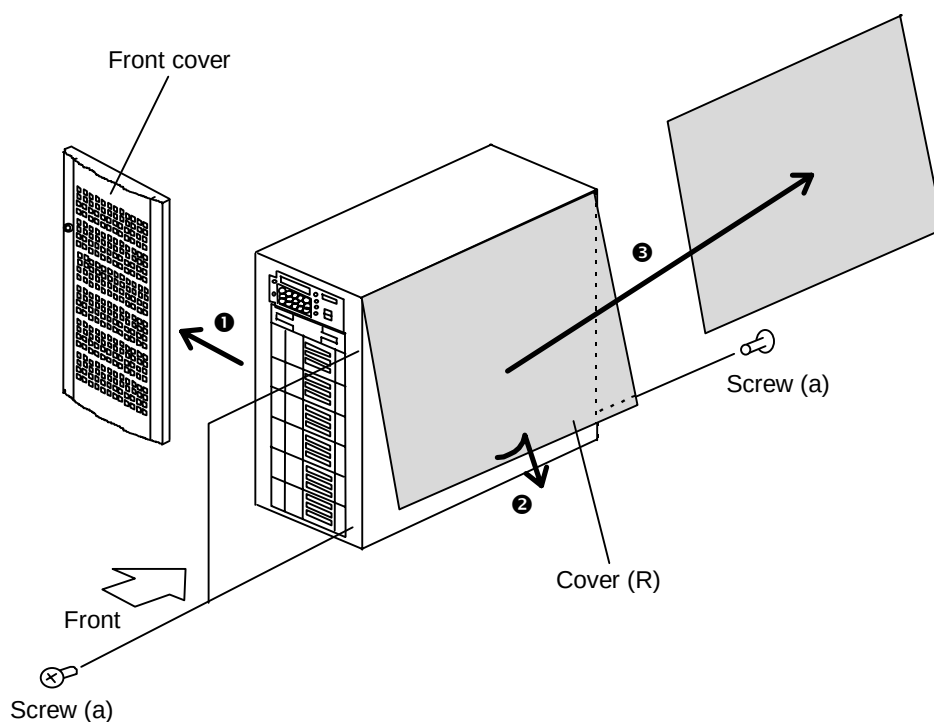


Figure 3.2.3 Removing/Attaching the Cover (R)

3.2.4 Removing/Attaching the cover (U)

Tool : Phillips screwdriver (No.2), Key

(1) Removing procedure

- ① Remove the front cover. (See DH-INST100.) ❶
- ② Loosen the four screws (a).
- ③ Pull up the cover (U) to removing. ❷

(2) Attaching procedure

- ① Attaching the cover (U) in the reverse order step (1).

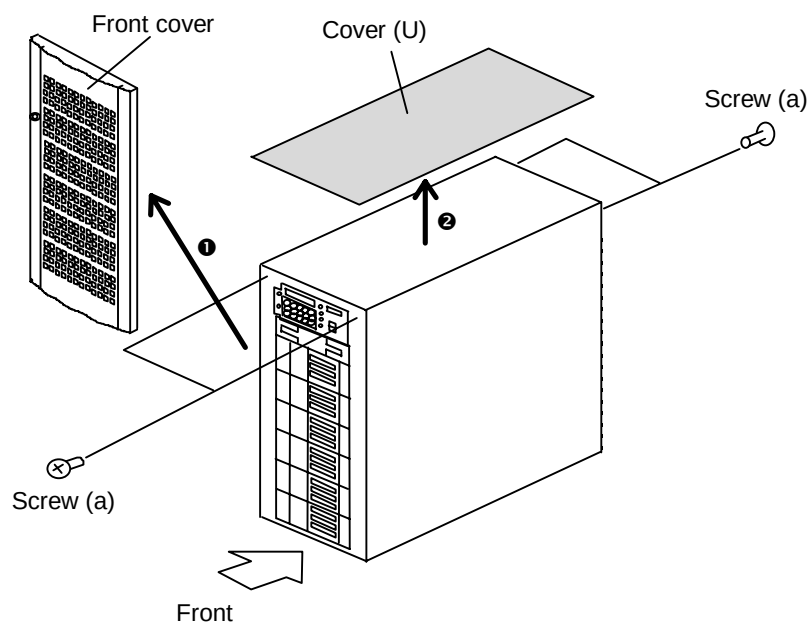
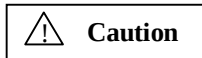


Figure 3.2.4 Removing/Attaching the Cover (U)

3.2.5 Installing HDU ASSY (See Figure 3.2.5.)

- (1) Open the handle in the direction of an arrow (···➤) completely and insert the HDU ASSY into the right place.
- (2) Close the handle in the direction of an arrow (➡).



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

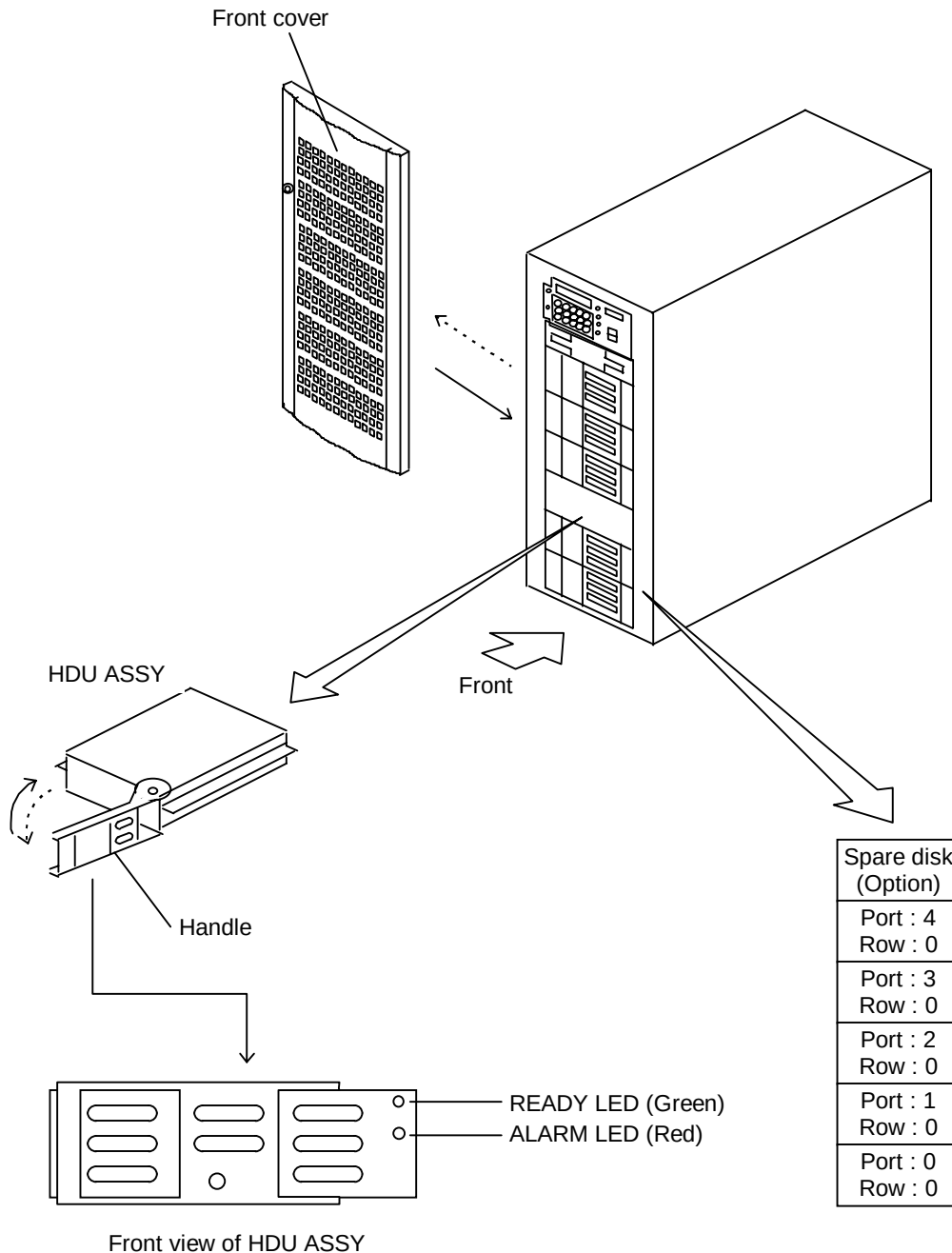


Figure 3.2.5 Installing HDU ASSY

3.2.6 Setting AC/DC power supply/Power Unit (D) (See Figure 3.2.6 (a), 3.2.6 (b).)

- (1) Insert the AC/DC power supply into the right place. And tighten the screw ❶, ❷.

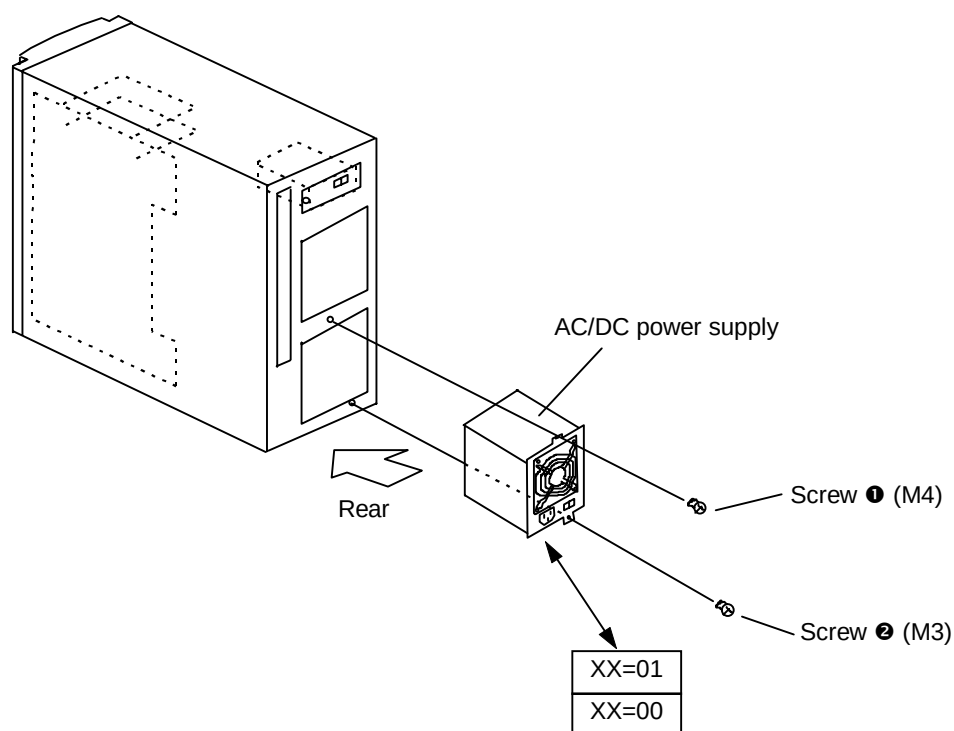


Figure 3.2.6 (a) Setting AC/DC Power Supply

- (2) Insert the Power Unit (D) into the right place. And tighten the screw ❶, ❷.

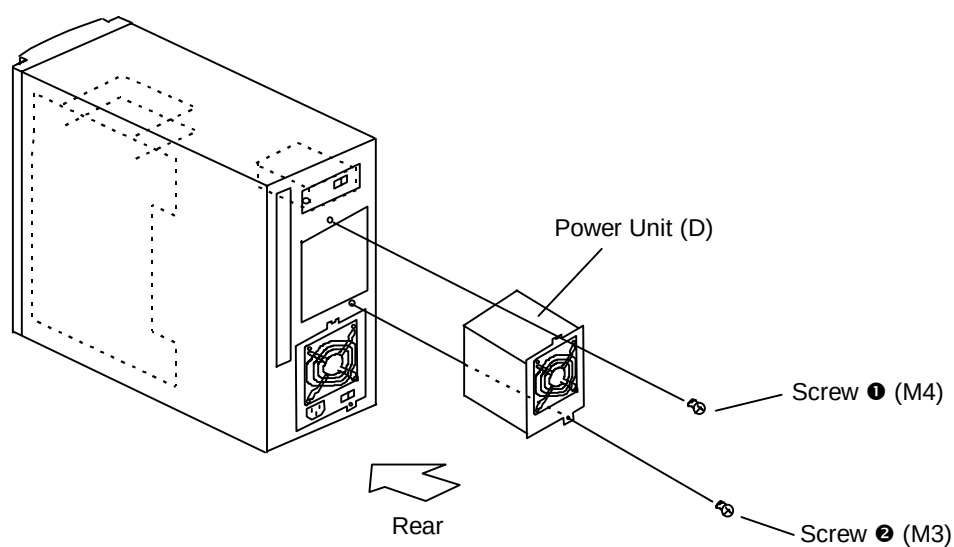


Figure 3.2.6 (b) Setting Power Unit (D)

3.2.7 Setting I/F ADAPTER ASSY (See Figure 3.2.7.)

- (1) Insert the I/F ADAPTER ASSY into the right place and tighten the screw.

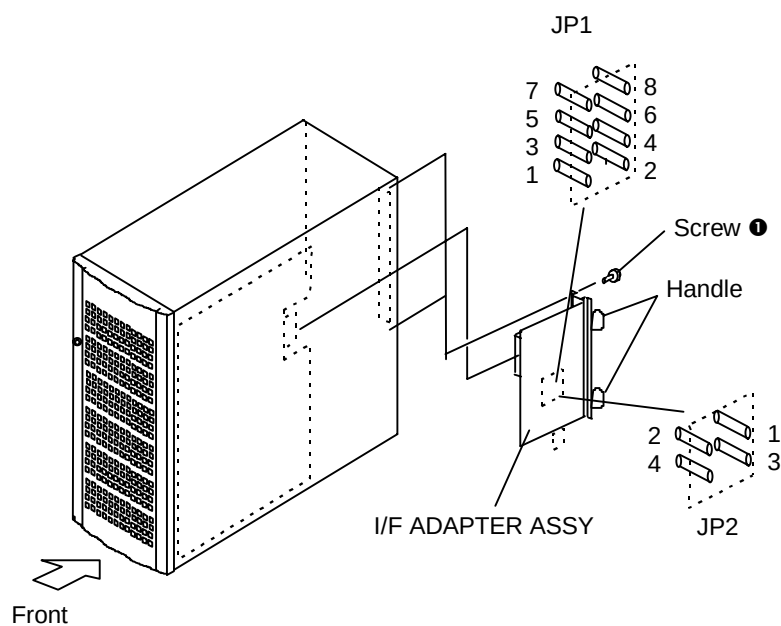


Figure 3.2.7 Setting I/F ADAPTER ASSY

3.2.8 Setting CACHE ASSY (See Figure 3.2.8.)

Notice : Slots #0 and #1 are pairs respectively. Install the cache having the same capacity for these each pair slots

- (1) Remove the front cover. (See DH-INST0100.)
- (2) Remove the cover (U). (See DH-INST0130.)
- (3) Remove the cover (L). (See DH-INST0110.)
- (4) Remove the LAN ASSY (option).
- (5) Install the CACHE ASSY.

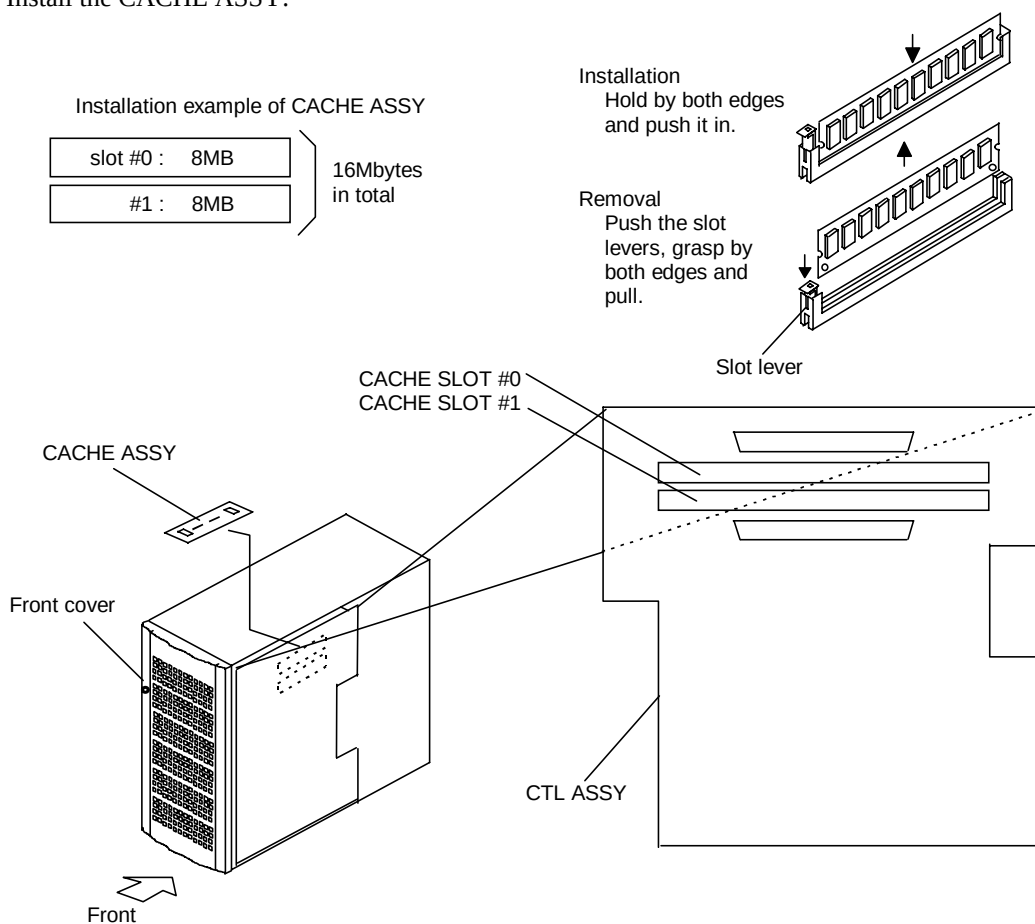


Figure 3.2.8 Setting CACHE ASSY

3.3 Setting the Power Supply

The power for the boards, drives, and fans of the DF350 disk subsystem is supplied by AC/DC power supply converting AC to the DC power.

Turn the power on according to procedures (1) to (8) described below.



Caution

Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Make sure that the circuit breaker (a switch on the rear panel) is "O" (OFF), then connect the AC cable. (See Figure 3.3.1.) When installing the AC power cable, raise the cable clamp as shown in (b), connect the cable as shown in (c), and secure the cable with the cable clamp as shown (d). When the power supply is duplicated, do the same operation for both upper and lower power supplies. (When the FAN BOX ASSY is installed, do the operation above for the power supply in the lower position only.)
- (2) Supply AC power.
- (3) Make sure that the battery power switch is turned to "ON". Then turn on the circuit breaker. (See Figure 3.3.2.)
- (4) Remove the front cover. (See Figure 3.3.3.)
- (5) Make sure that all of DIP switches are set to "OFF". (upper positions)
- (6) Set the circuit breaker to "I" (ON). Then turn the power switch "ON".
- (7) Make sure that the subsystem becomes ready a few minutes later.
- (8) Attach the front cover.

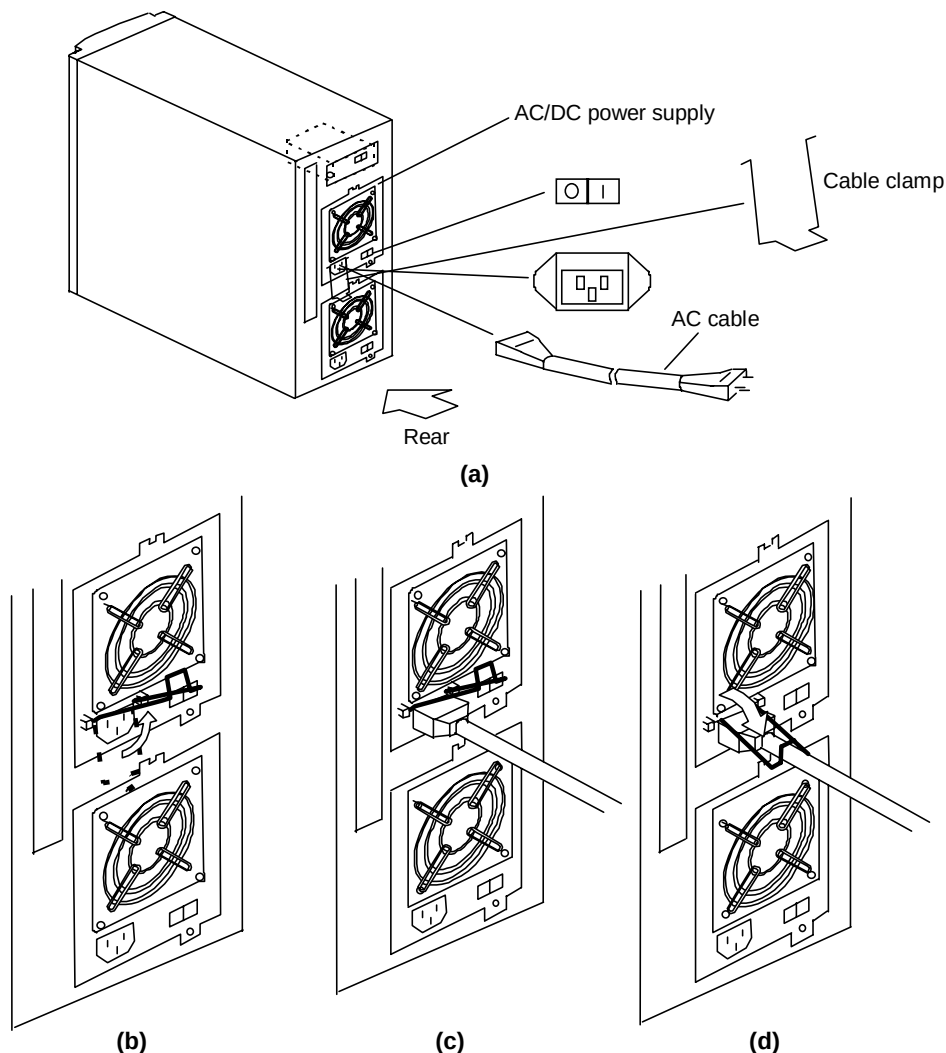


Figure 3.3.1 AC Cable Connection

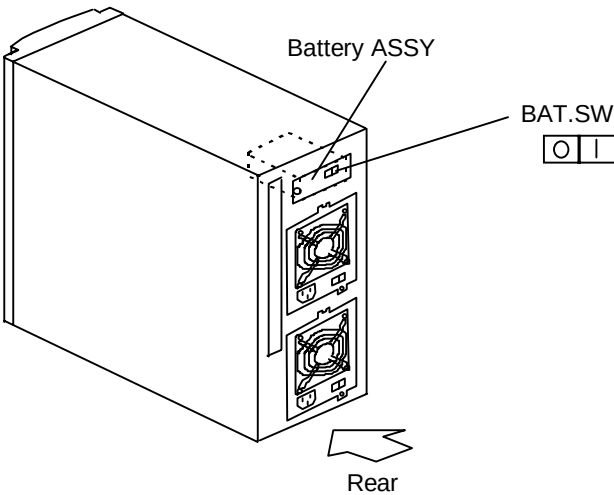


Figure 3.3.2 Inside Construction of the Subsystem

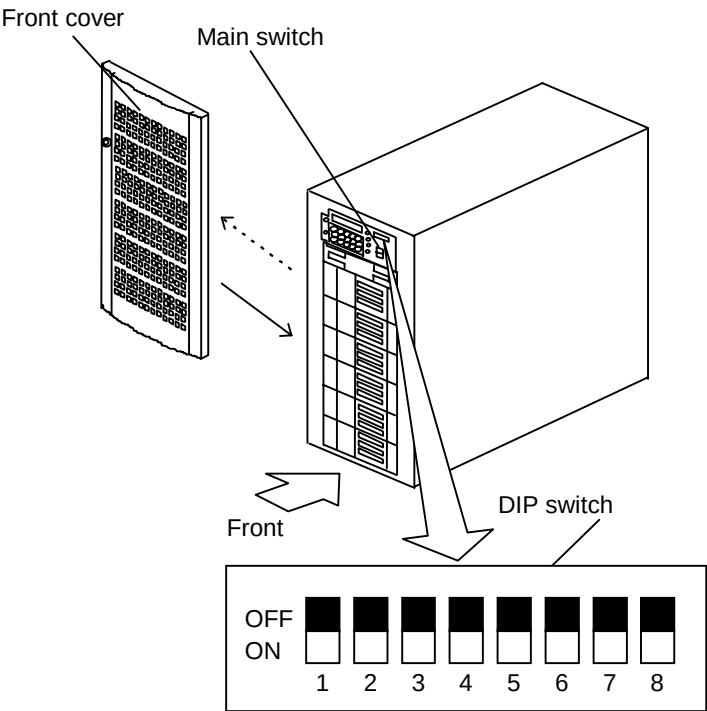


Figure 3.3.3 Front Construction of the Subsystem

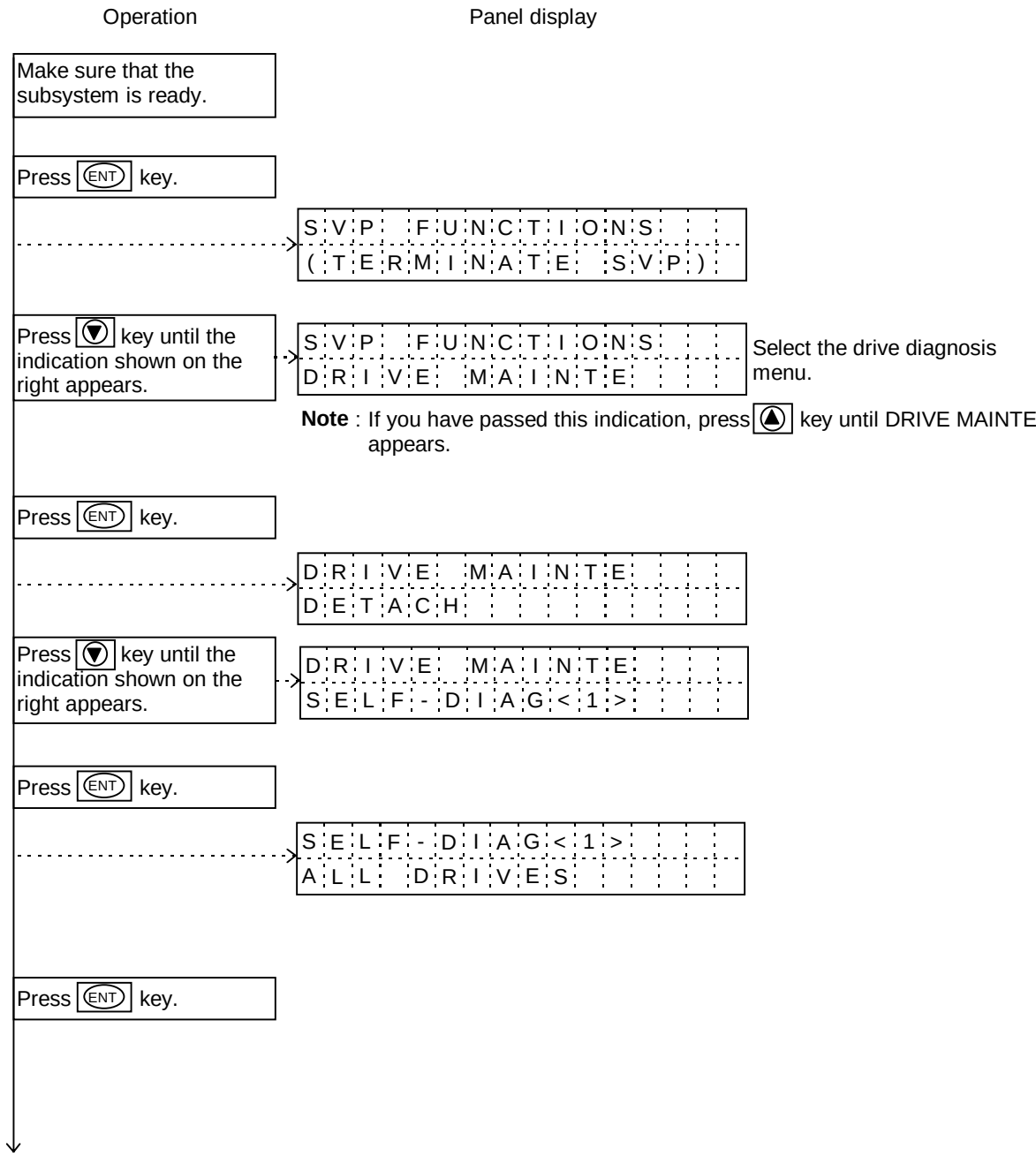
3.4 Setting the Subsystem Parameter

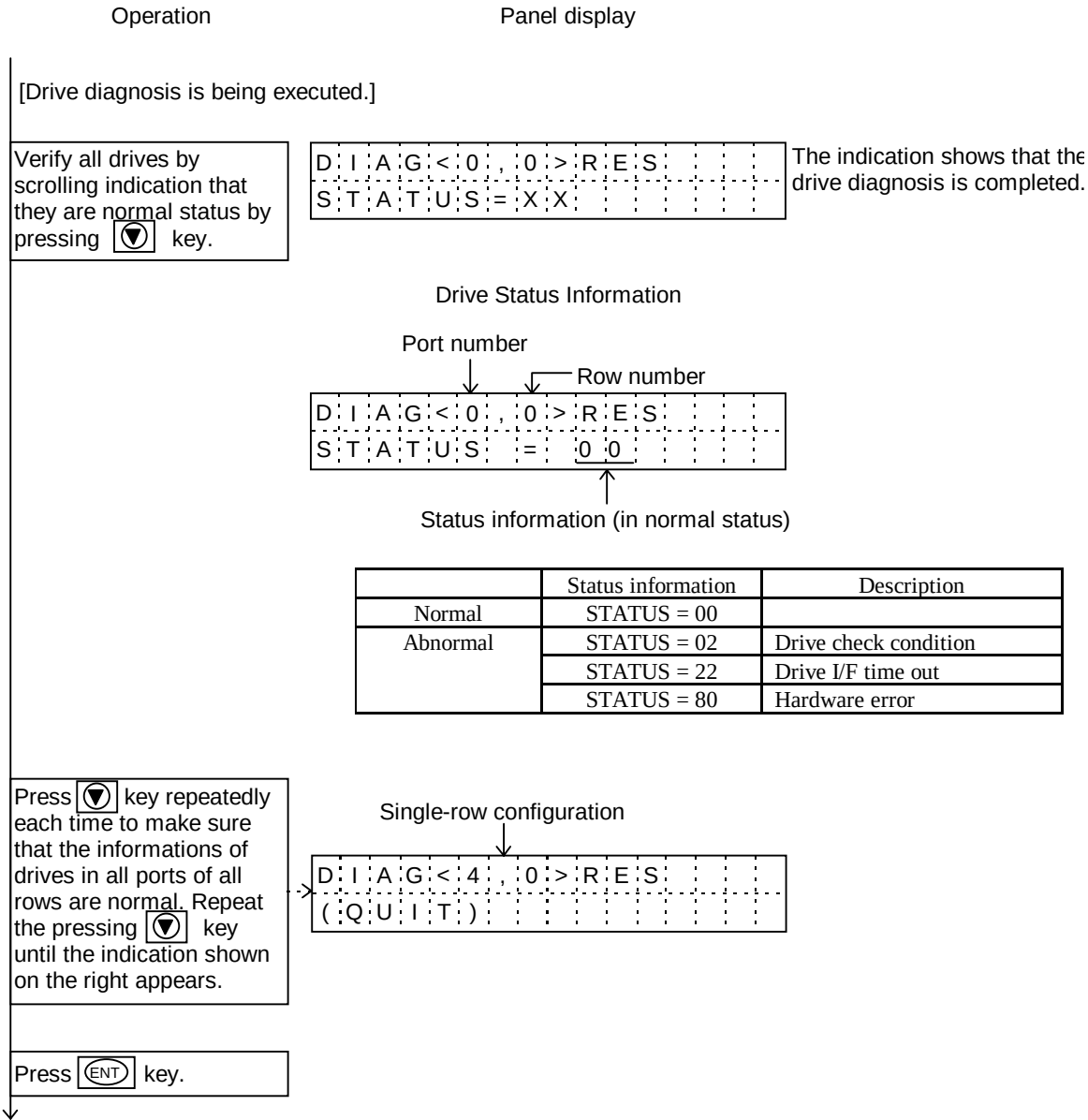
See Chapter “Setting the Subsystem Parameter” in DH-INST0270.

3.5 Checking the Offline Operation

After removing the front cover, execute the drive diagnosis using the Panel display and the ten key as instructed below, and make sure that the diagnosis is completed normally on each of all drives.

① Operate as described below.





Operation	Panel display
Press  key until the indication shown on the right appears.	S E L F - D I A G < 1 > (Q U I T)
Press  key.	
Press  key until the indication shown on the right appears.	D R I V E M A I N T E (Q U I T)
Press  key.	
Press  key until the indication shown on the right appears.	S V P F U N C T I O N (T E R M I N A T E S V P)
Press  key.	
Turn off the power switch to make sure that power can be turned off normally.	
Offline operation is finished.	

3.6 Setting the Terminator Power and Remote/Local Mode

Switching the power of DF350 can be controlled by Host system (Remote Control) under the mode of terminator power is supplied by SCSI bus. Switching the mode of Remote/Local is carried out by jumper setting of SW4 on SVP panel and JP1 of terminator power setting.

Note : While connecting to RS6000 model 220/230, terminator power should be supplied from outside (Local mode). Switching the power by the host system cannot be carried out. When the host is not connected or powered off, the data recovery with the maintenance panel, nor the formatting the array cannot be carried out.

- (1) Perform destaging (See ENTRY0040) and make sure that it is not in the cache back-up state. Turn off both main switch on the panel and the breaker at the rear side of the unit.
- (2) Remove terminator resistor from I/F ADAPTER ASSY.
- (3) Open the front cover and side covers.
- (4) Pull out the SVP ASSY and I/F ADAPTER ASSY.
- (5) Set the JP1 and SW4 according to Figure 3.6.1 and Table 3.6.1. (Set JP2 (equipped on I/F ADAPTER ASSY for only Wide SCSI like DHUUDS or DHUSS) with the pins 1 and 2 short-circuited.)
- (6) After setting the terminator power, insert the I/F ADAPTER ASSY and tighten the bind screw. And insert the SVP ASSY.
- (7) Fix terminator resistor to I/F ADAPTER ASSY.
- (8) Close the front cover and side covers. Turn on the breaker.

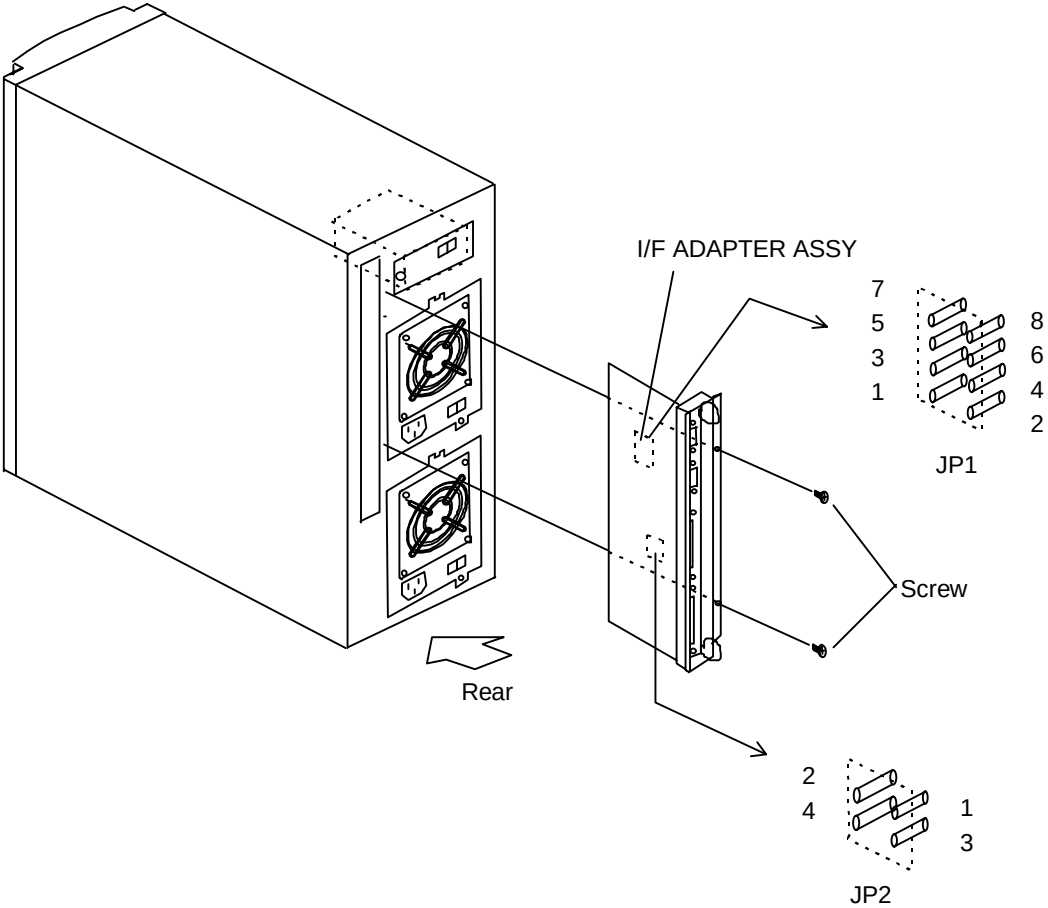
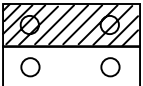
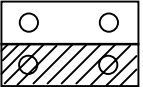
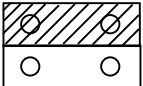
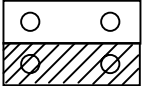
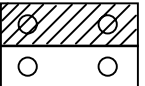


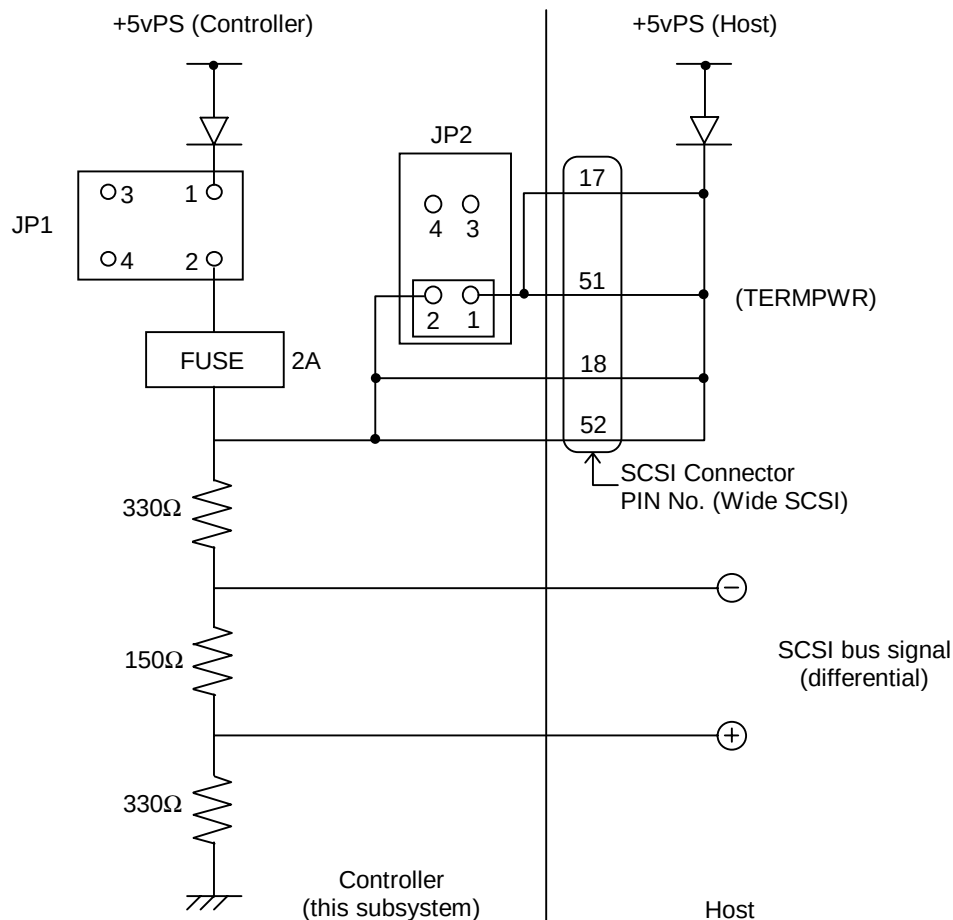
Figure 3.6.1 Setting the Terminator Power and Remote/Local Mode

Table 3.6.1 Setting the Terminator Power and Remote/Local Mode (*1)

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2		LOCAL 	Turn on/off the power on the subsystem side. (Set at factory before shipment)
		REMOTE 	Turn on/off the power on the host side.
3	JP2 (*2)		Be sure to set this jumper with the pins 1 and 2 short-circuited.

*1 The terminator power means that the power for the terminator is supplied from the host so that the SCSI bus is not shut down by a power failure of the subsystem.

*2 Set this jumper (JP2) with the pins 1 and 2 short circuited.



3.7 Connecting the SCSI Cable

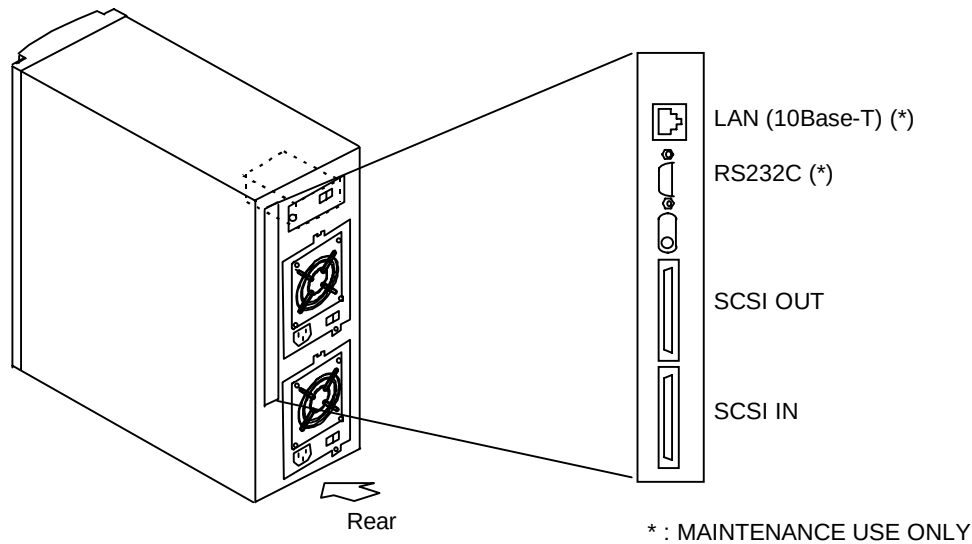


Figure 3.7.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 1 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

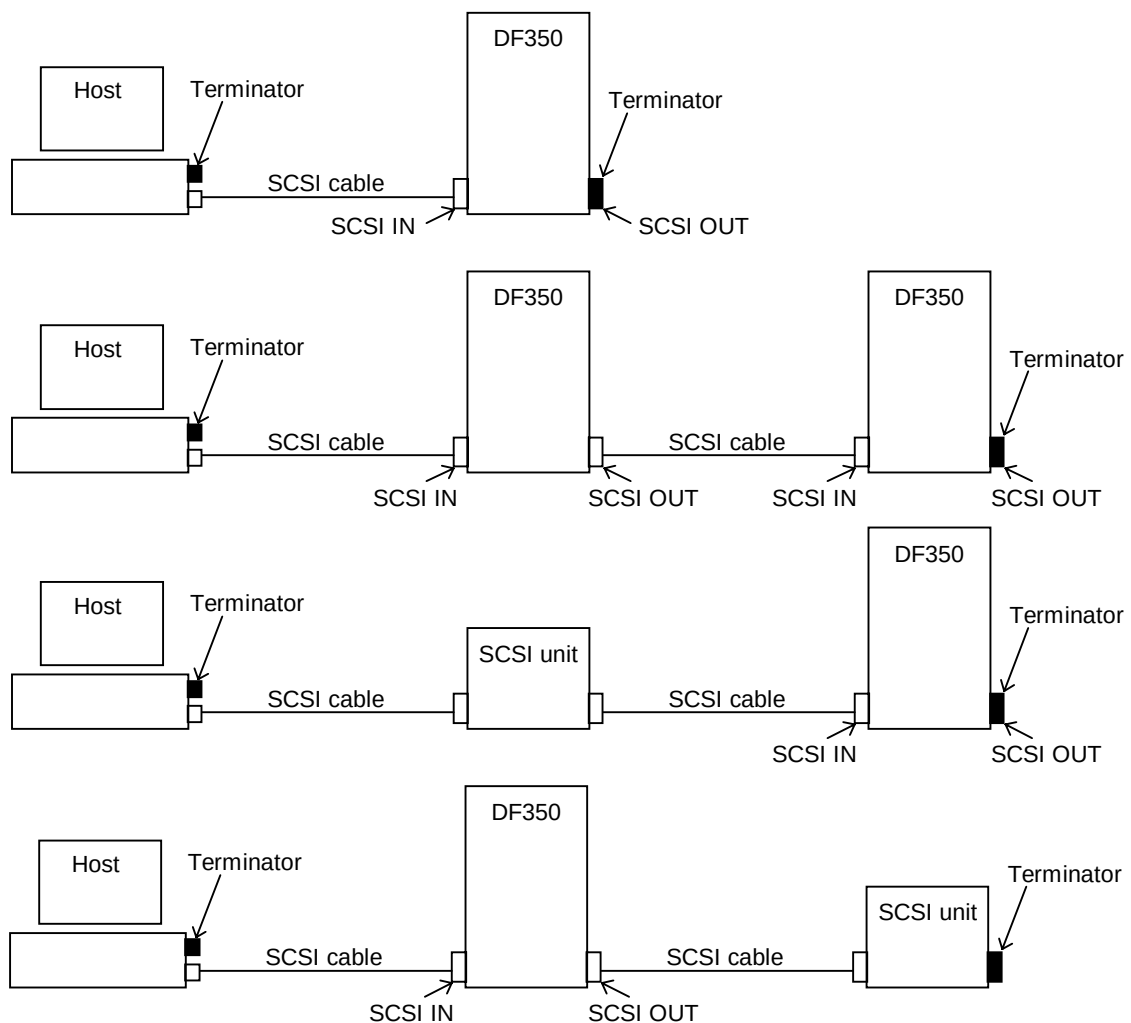


Figure 3.7.2 SCSI Connections

4. Setting the Subsystem Parameter

4.1 Setting the System Parameter

- (1) Setting the system parameters and downloading

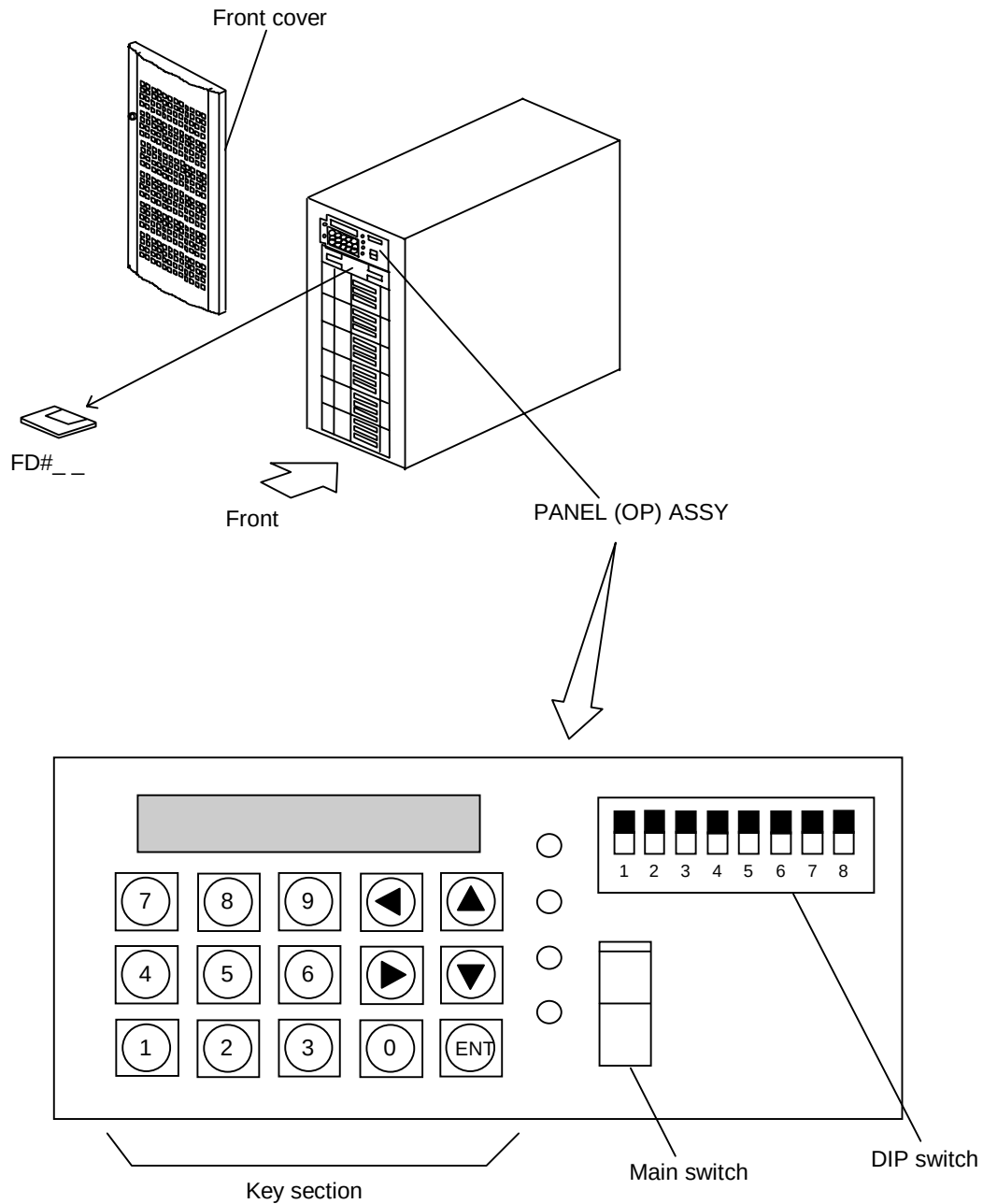
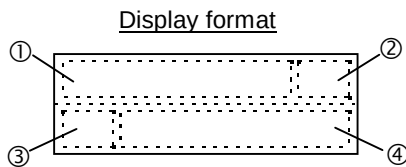


Figure 4.1.1 DIP Switches (System parameter is Set)

(1) Display

While setting up DIPSWITCH or SVP FUNCTION, menu etc. are displayed at panel display in the following display format .



① Menu title

There are two kinds of menu title described below.

DIPSWITCH SET:

For setting the target ID, buzzer, etc.

SVP FUNCTION:

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Message from the controller No. 0: The first (left most) character is in uppercase.

Message from the controller No. 1: The first (left most) character is in lowercase.

Example) Controller No. 0: DIPSWITCH SET

Controller No. 1: dIPSWITCH SET

For the dual controllers, the message with the display format 1 and the menu title with the display format 2 are displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

(2) Keys

Use the - keys for panel operation.



Used for entering the parameter values.



Used for determining the menu or the input parameter.

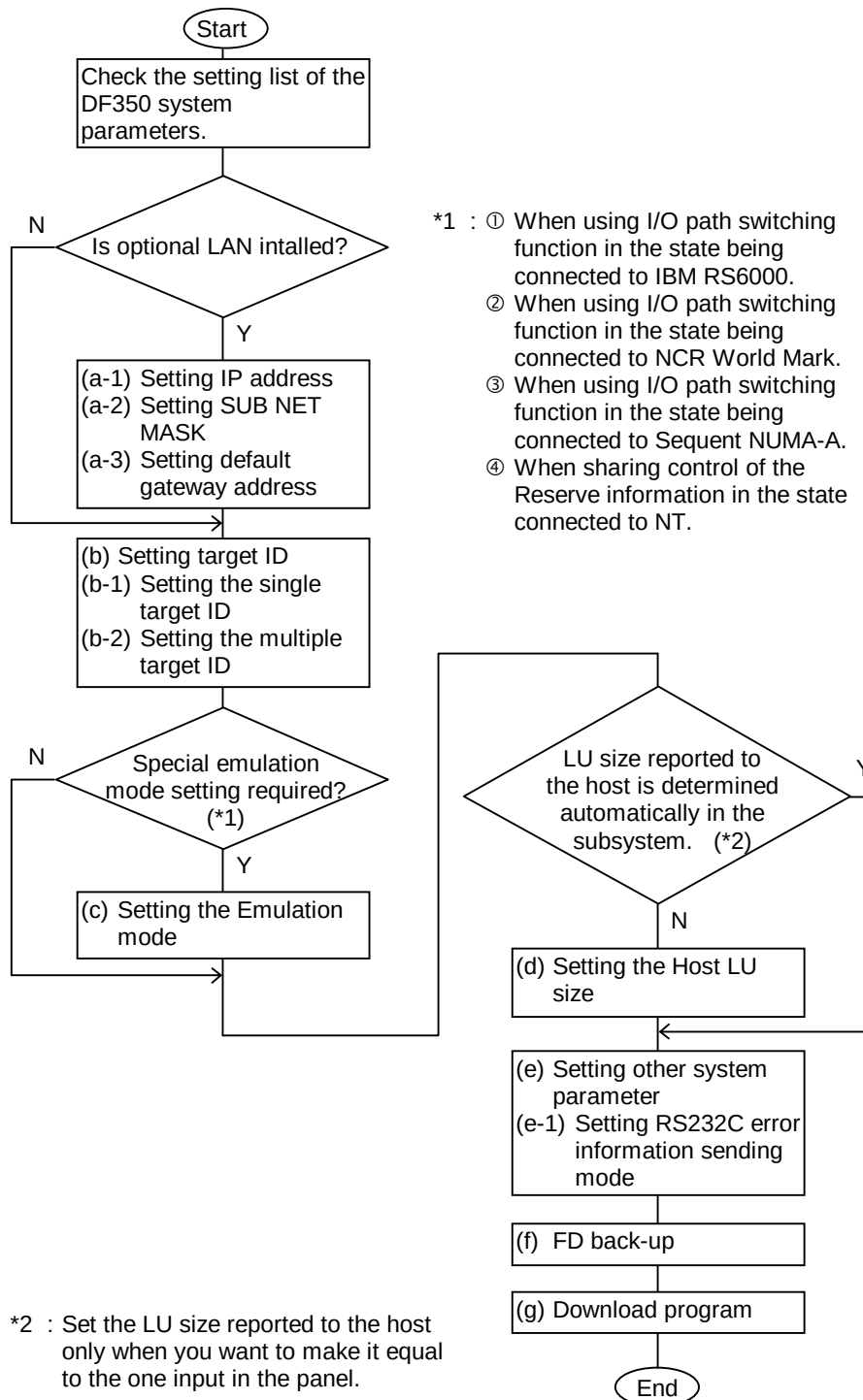


Used for determining the parameter input position.



Used for selecting the menu.

Operate as the flow described below.



Operate as described below.

(1) Before powering on the subsystem, set DIP switches shown in Figure 4.1.2.

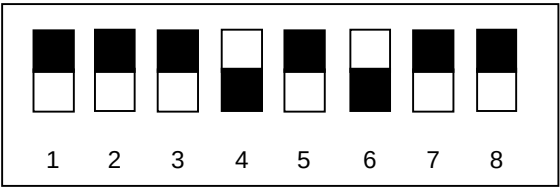
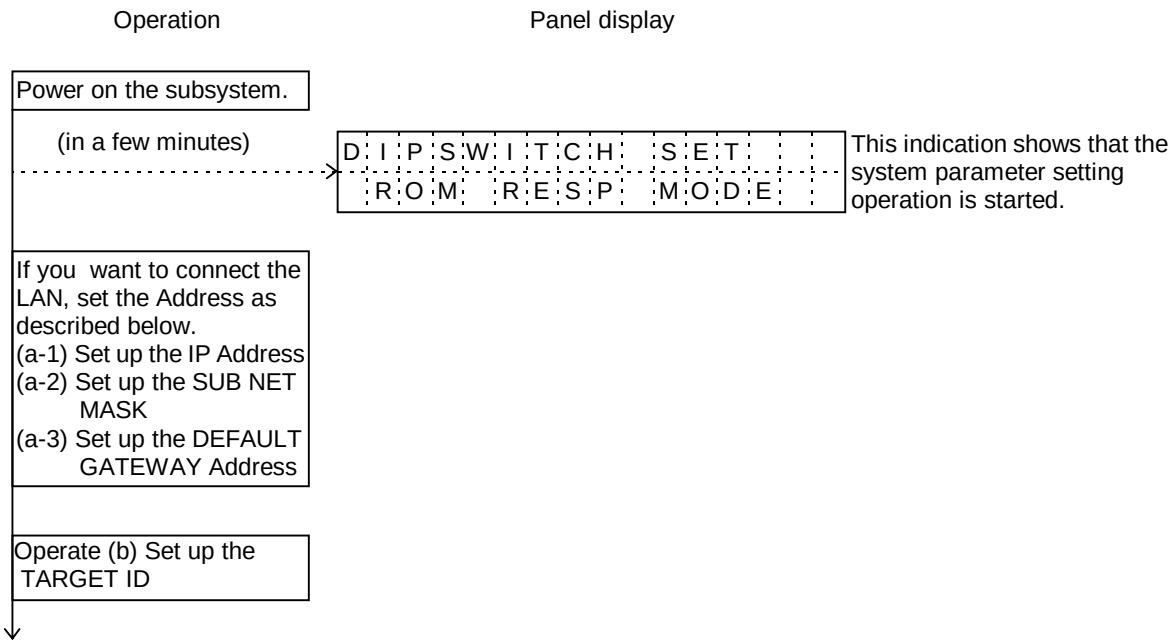
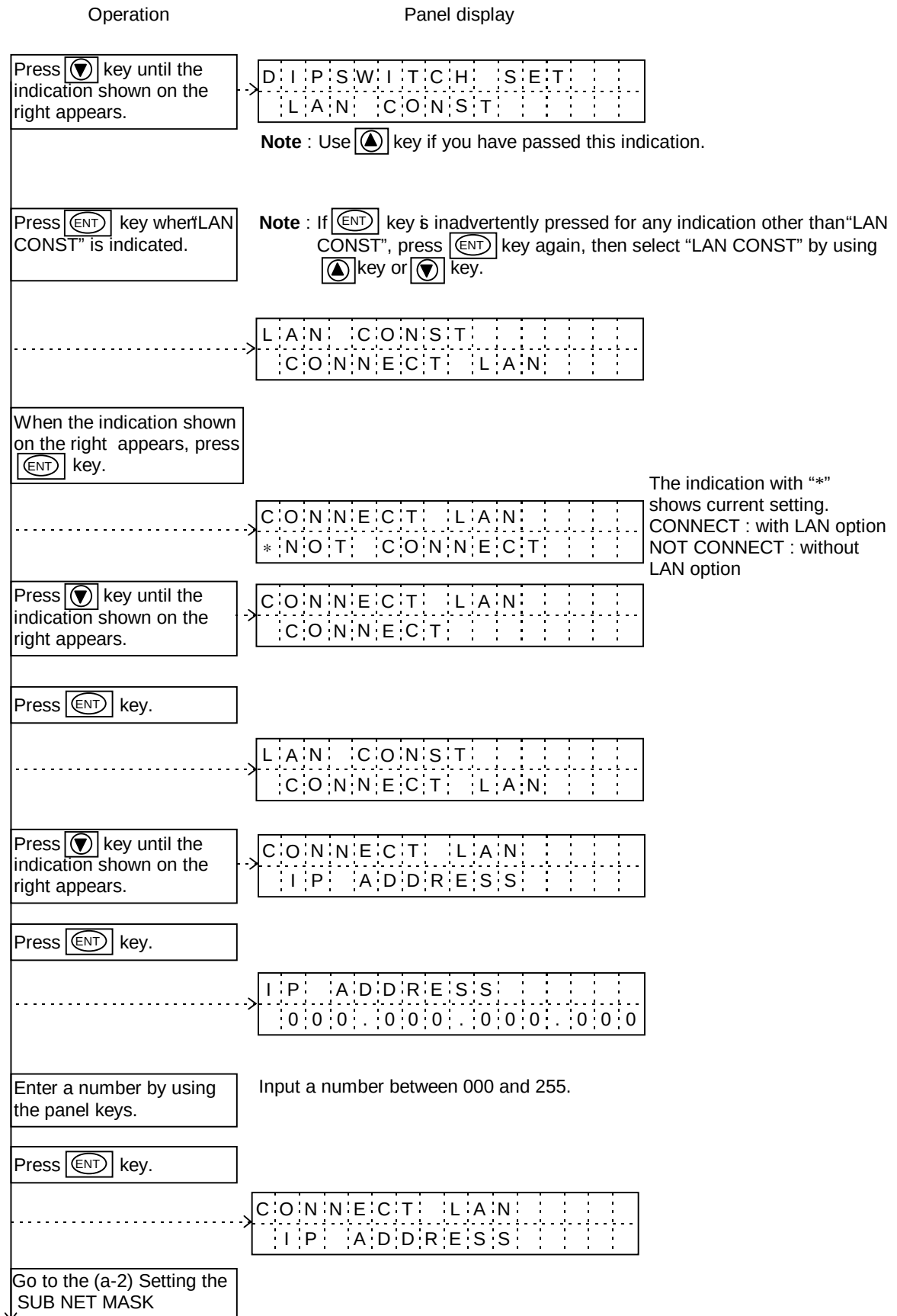


Figure 4.1.1 DIP switches (For setting the system parameter)

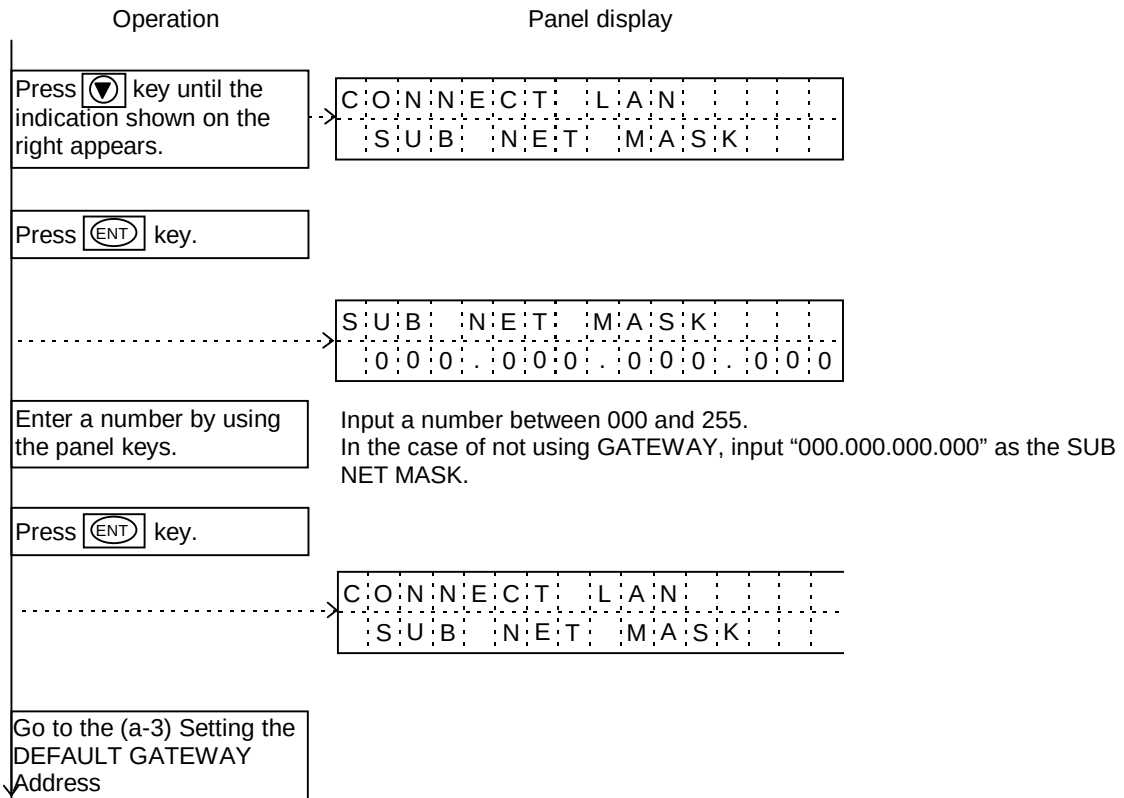
(2) Operate panel's keys as described below.



(a-1) Setting the IP address.



(a-2) Setting the SUB NET MASK

***Note**

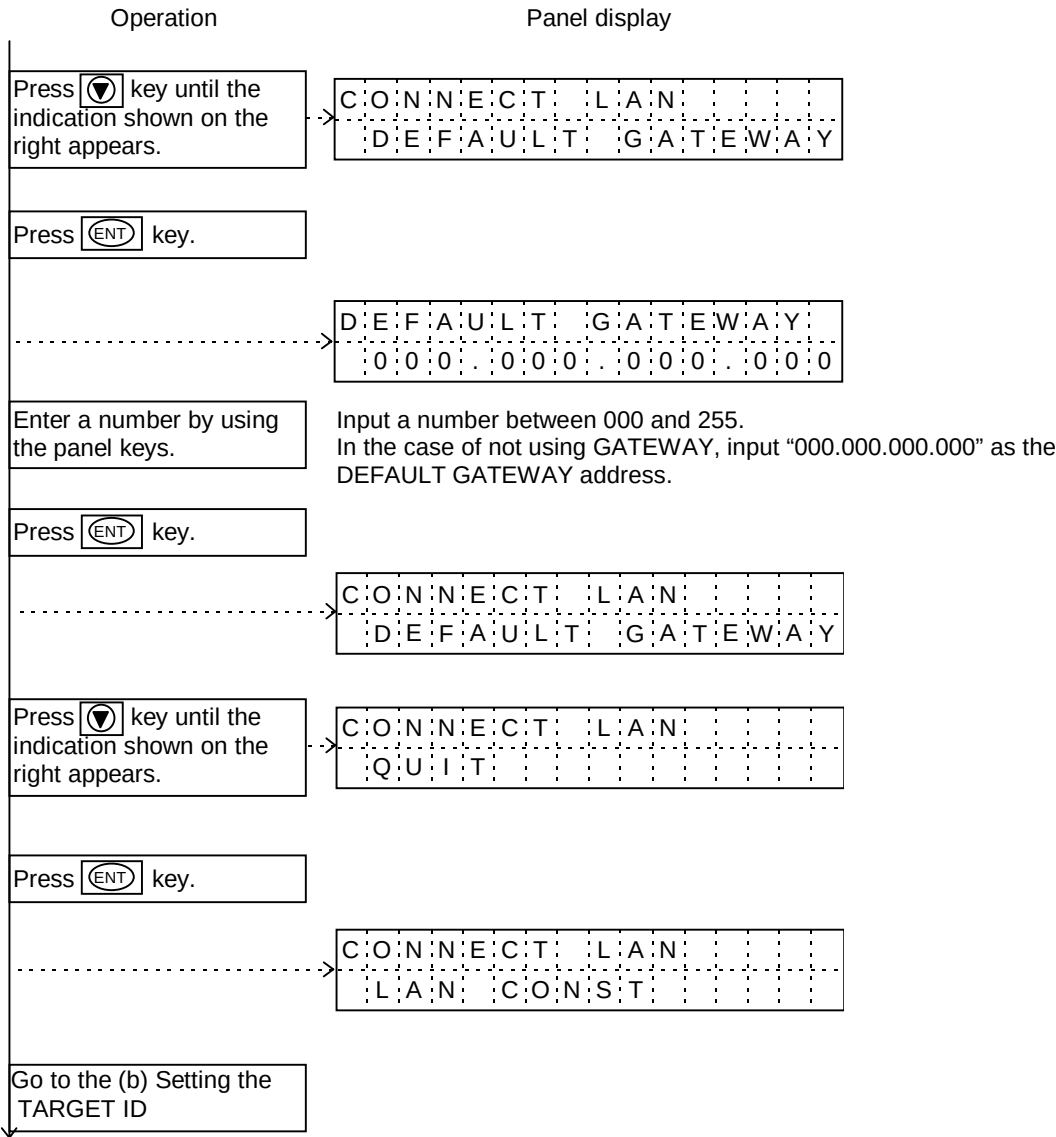
If "000.000.000.000" as the SUB NET MASK is set, this subsystem automatically adopts default SUB NET MASK for each IP address as described in the table 4.1.1.

Table 4.1.1 Default SUB NET MASK related with IP address

No.	IP Address of the subsystem	DEFAULT SUB NET MASK
1	from 000.000.000.000 to 127.255.255.255	255.000.000.000
2	from 128.000.000.000 to 191.255.255.255	255.255.000.000
3	others	255.255.255.000

If a smaller SUB NET MASK than default number is entered, this subsystem adopts default number.

(a-3) Setting the DEFAULT GATEWAY address



***Note**

If an invalid GATEWAY address is set (the IP address of the device is different from network address.), either of warning messages as shown below is displayed until the READY LED of the subsystem lights on.

Power off the subsystem and set IP address and default GATEWAY address correctly.

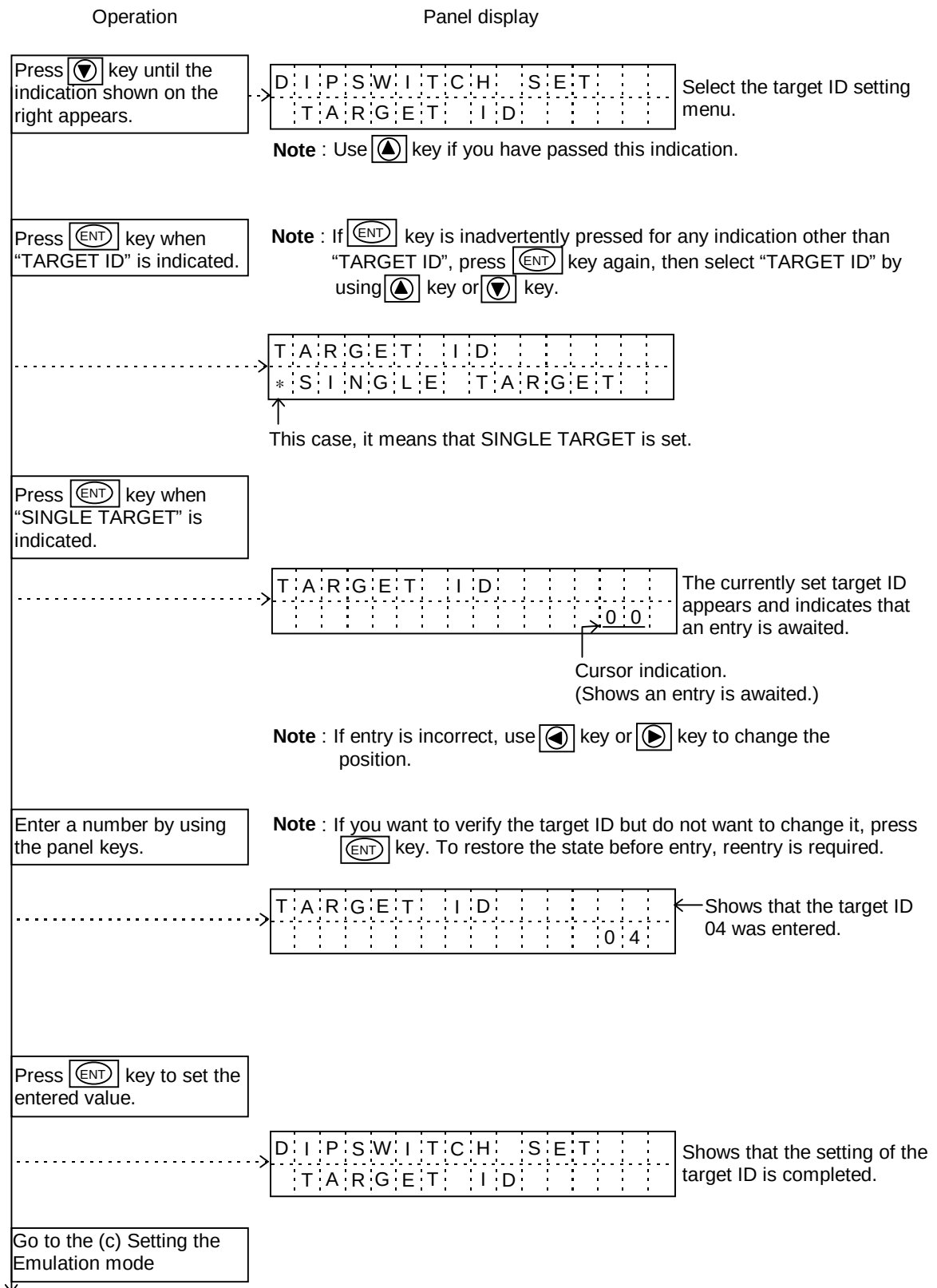
W	0	1	7	0	0	G	A	D	E	R	R		
				.		.		.					

W	0	1	7	0	0	G	A	D	E	R	R	-	X
				.		.		.					

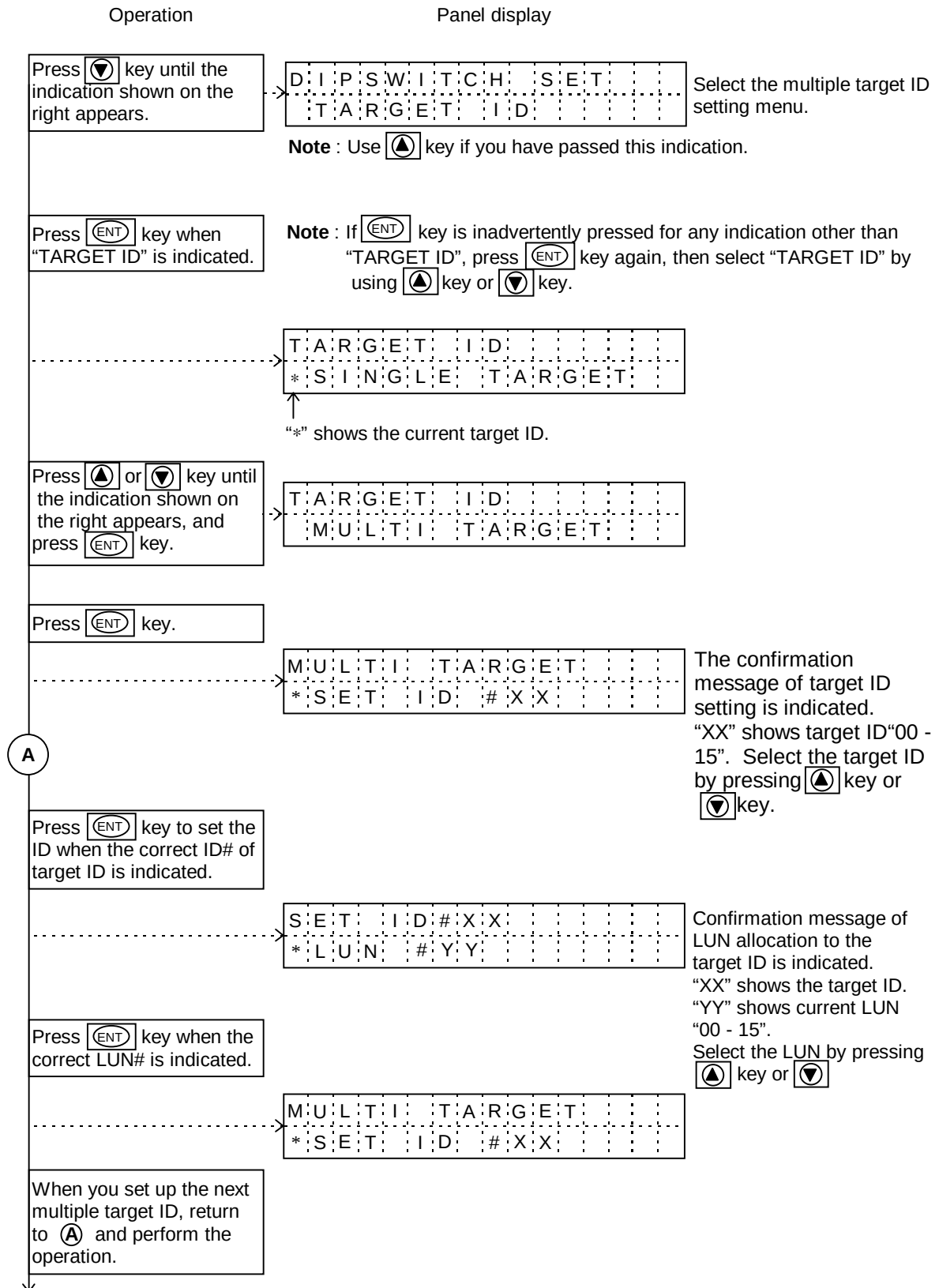
X : controllers No.

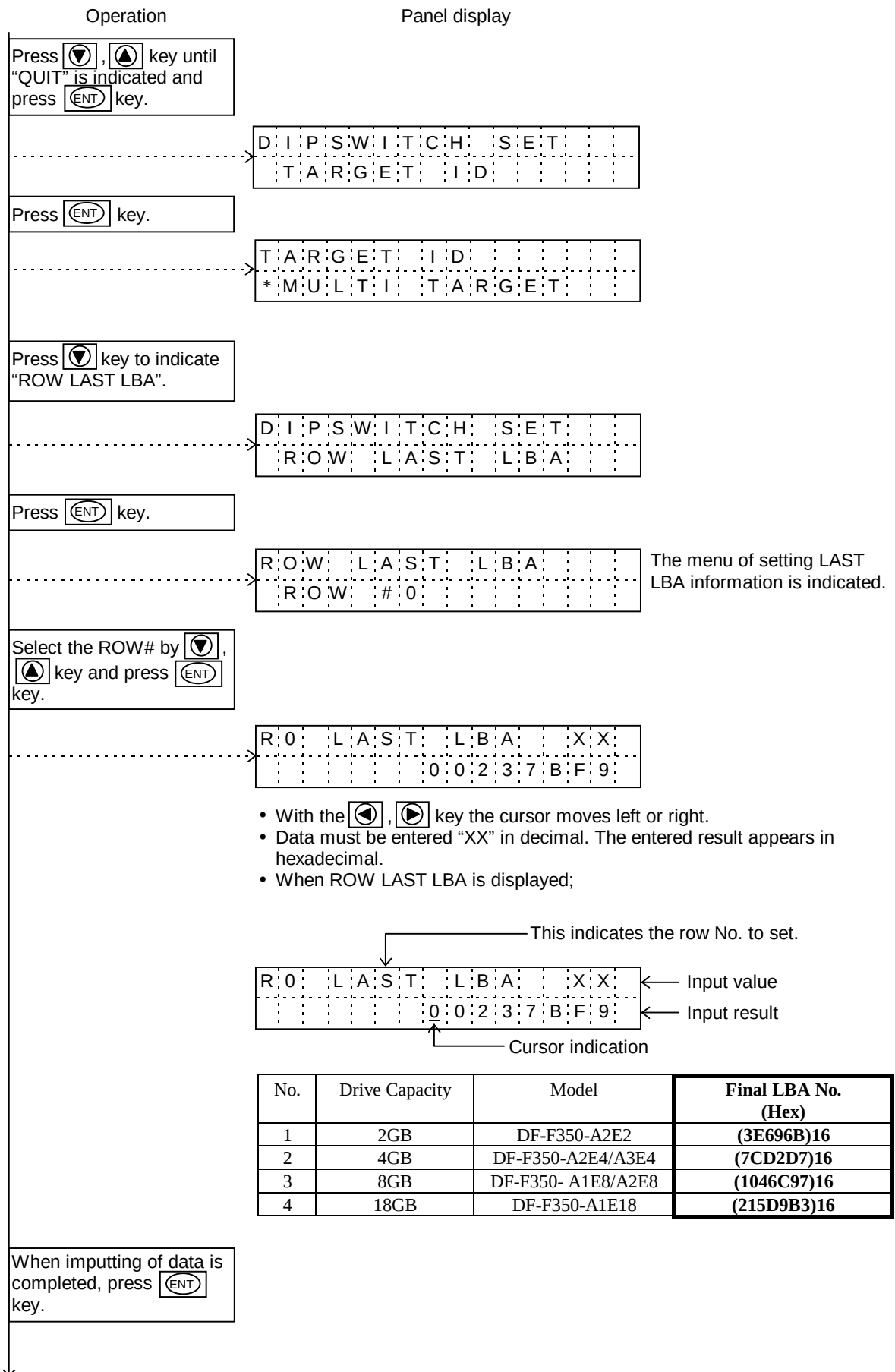
(b) Setting the TARGET ID.

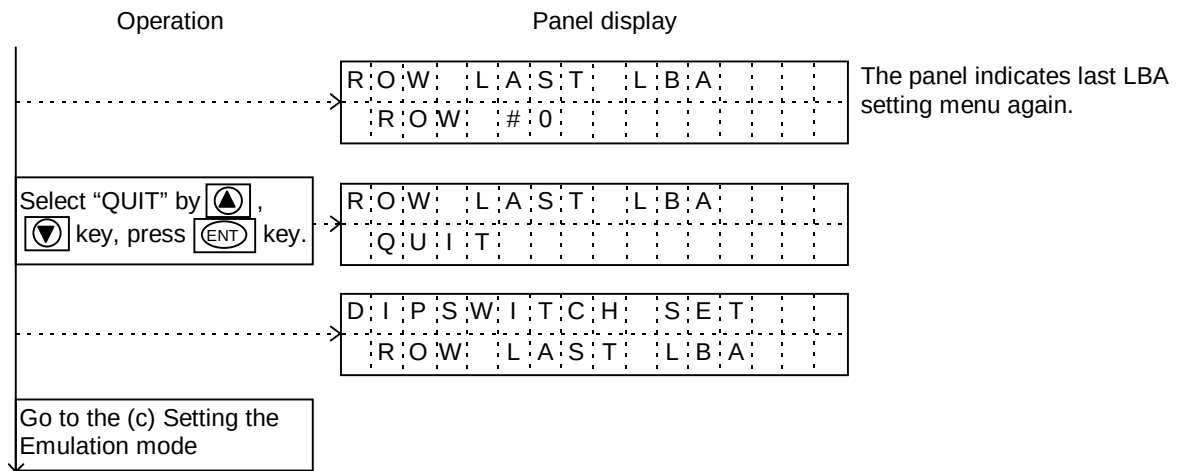
(b-1) Setting the single target ID.



(b-2) Setting the multiple target ID.

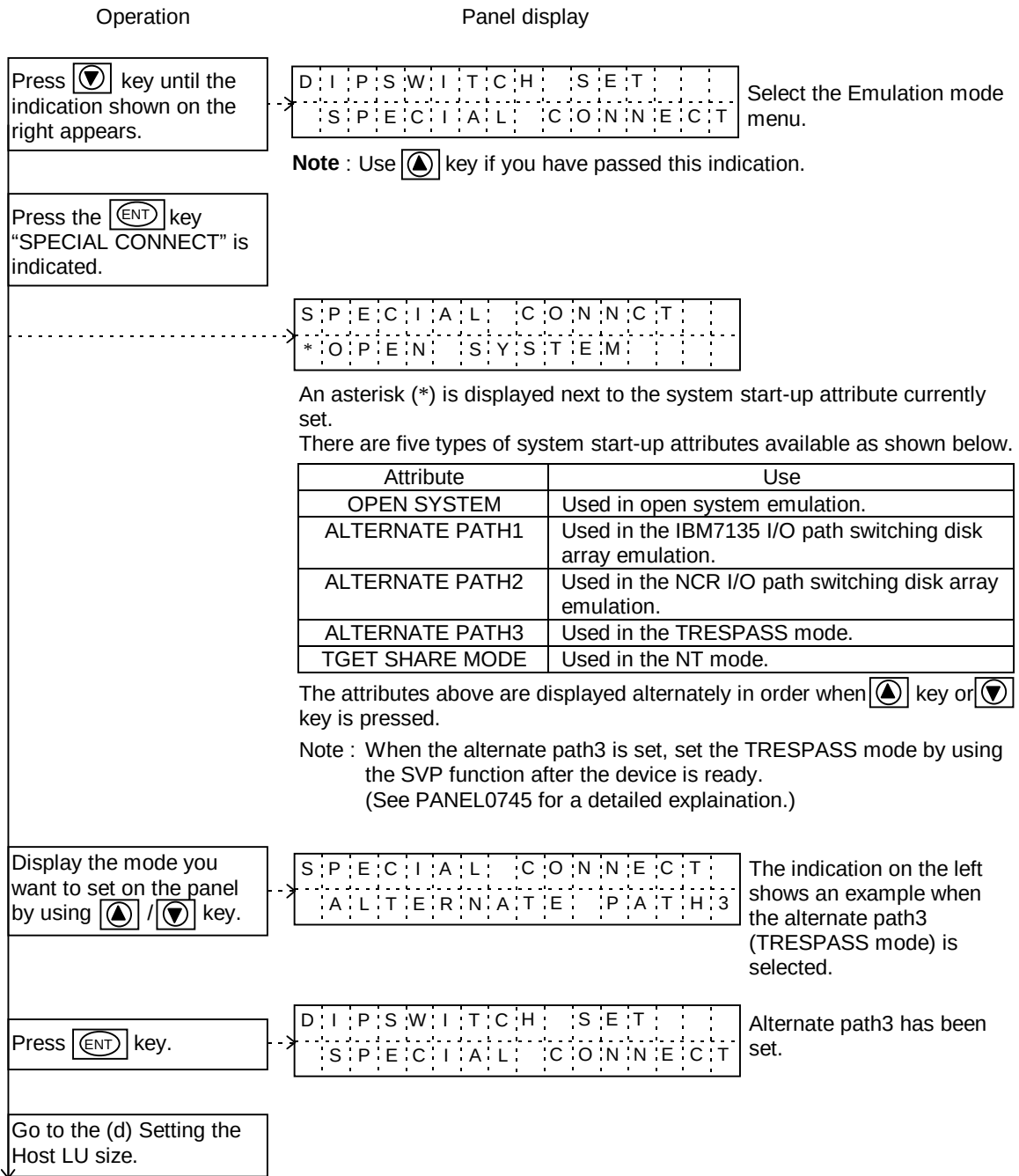






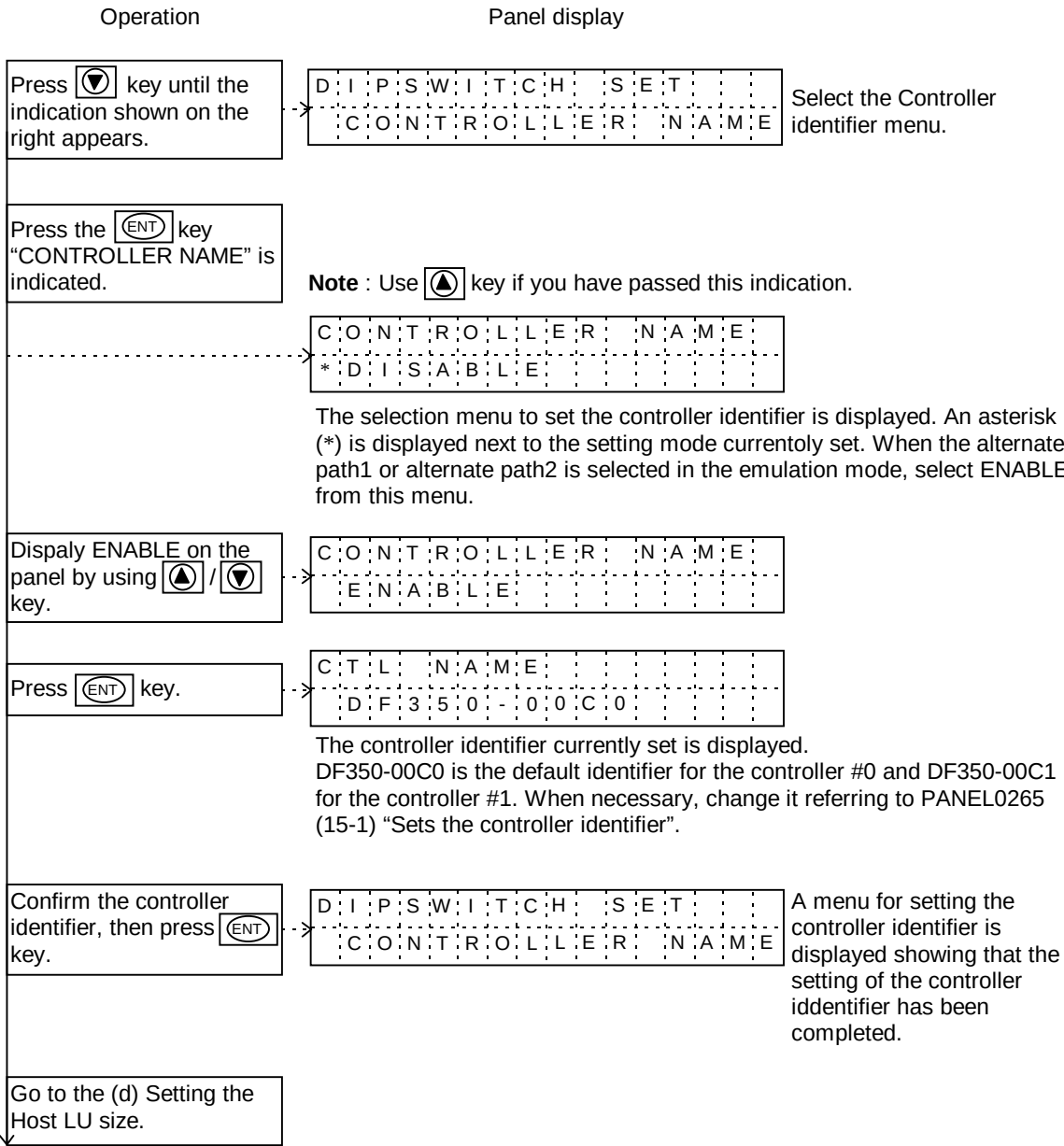
- Note)** * Setting and changing of multi target ID make the relation between the target ID and the LUN only.
 The defining and formatting LU can be executed both after and before this operation.
- * If this operation is finished , turn off the power and turn on the power again.
 - * Resetting of SINGLE TARGET ID is required when returning to SINGLE TARGET function after switching to MULTI TARGET function from previous SINGLE TARGET function.
 - * If you want to set the multi target ID when the LU is already set, the LUN can be set to any number from #00 to #07. If you want to set any number from #00 to #15 to LUN, set the multi target ID after deleting the LU.
 - * The multi target ID must be set for each controller. In case of dual controller system and MULTI TARGET IDs are set for the both controller, set MULTI TARGET ID for each controller.

(c) Setting the Emulation mode

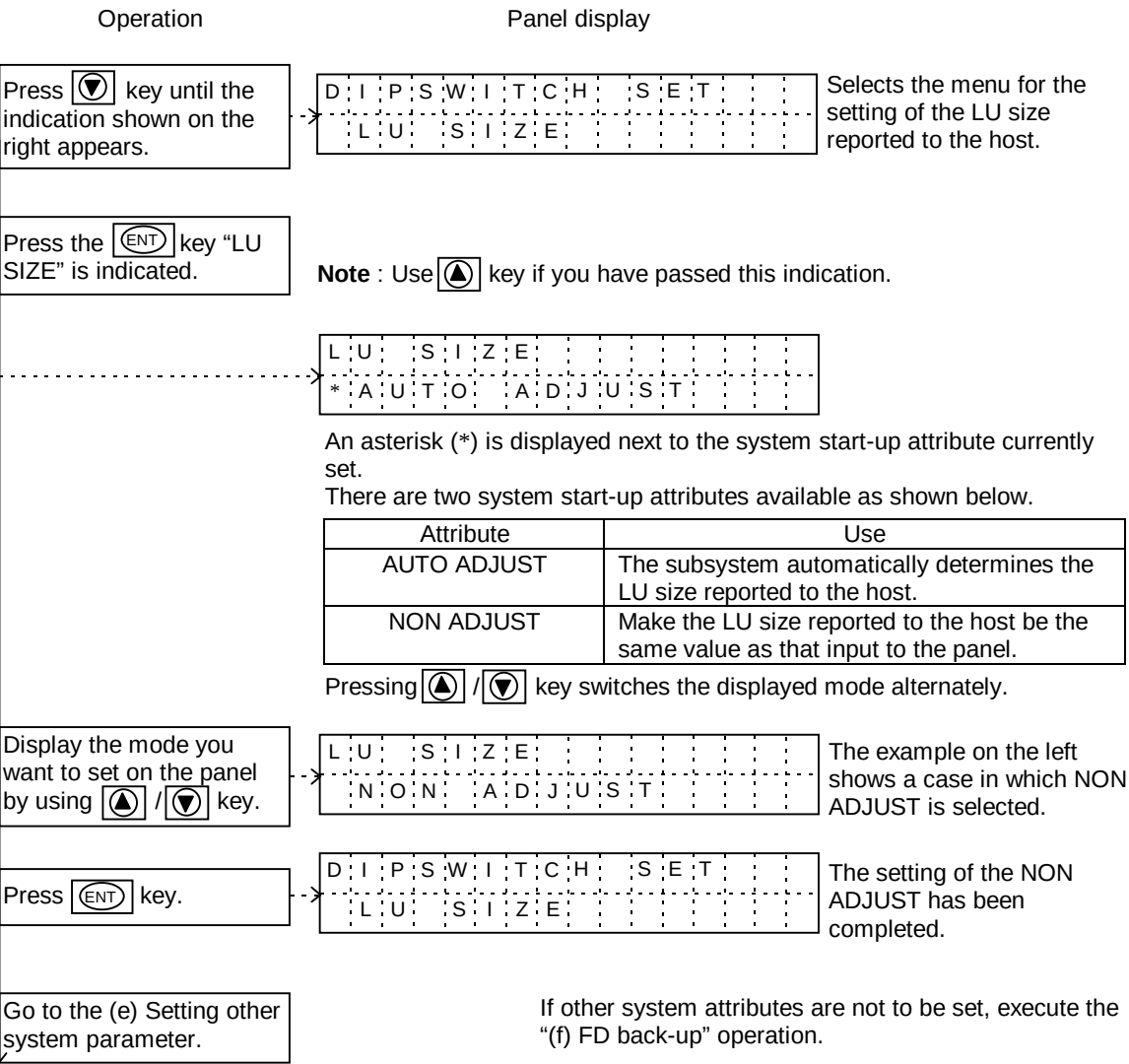


When the alternate path1 or alternate path2 is selected, set the controller name, product type. (See DH-INST0390.)

When the alternate path3 is selected, go to the single/dual system setting.



(d) Setting the LU size reported to the host



(e) Other System Parameter Setting

Besides (a) Setting the IP address, (b) Setting the TARGET ID there are several setting functions as below. The setting at the factory shipment is shown on the table in the addendum to the device.

To change the setting, see "PANEL0080".

The menu items and their usage are as follows.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	??????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	DKH is not supported	NOT CONNECT
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : NT mode	DKH is supported only in the open system mode	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

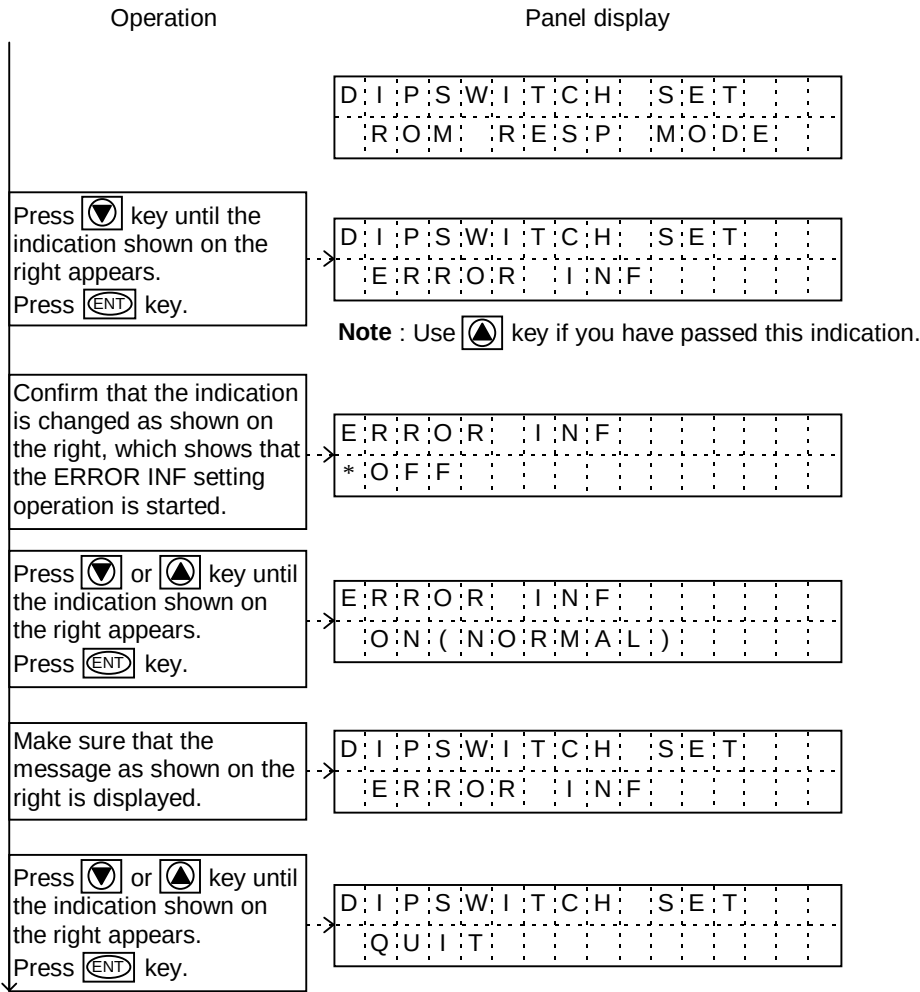
No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	DK is not supported	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per block.	DKH is supported only in the 512B.	512B
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inghibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) HIGH RACK MOUNT : Rackmount (RKH) CABINET, WRACK : Cabinet type (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	Select	Depending on the configuration from the factory
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Enter	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
17	CONTROLLER NAME	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid.	Fixed	DISABLE
18	ROW LAST LBA (*2)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET

*2 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
21	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
22	LU SIZE	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute OFF : Not used in the Data share mode ON : Used in the Data share mode	Select	Depending on the configuration from the factory
24	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
25	SYS REV	Limit the revision Nos. of installing system.	Displays the startup program revision.	—	“0304”
26	OPTION	Specifies the optional function when using it.	Enters the option code using the panel keypad.	Enter	“0000”
27	BOOT PROG V/R	Displays the startup program revision.	Displays the startup program revision.	—	
28	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
29	QUIT	Terminates the parameter input.	Enters using the panel keypad.	Enter	

(e-1) Setting RS232C error information sending mode

In order to use the failure notification program, the setting for the “ERROR INF” of the system parameter must be changed to “ON (NORMAL)”.



(f) FD back-up.

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) needs to be backed up to FD or restored from FD when installing optional parts or replacing parts. This case, perform back-up to FD or restore from FD according to “2.3.1 Back-up procedure to FD (DH-OPTION0050.)” or “2.3.2 Restoring procedures to FD (DH-OPTION0080.)”.

(Raid configuration setting, LU configuration setting, etc are not contained in system parameter.)

Back-up procedure to FD

- (1) Turn the power off according to DH-OPTION0120.

Notice: In case the power is not normally turned off, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 4.1.2.

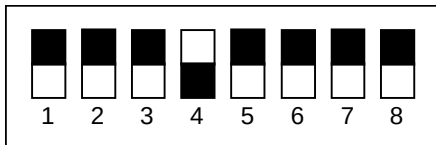
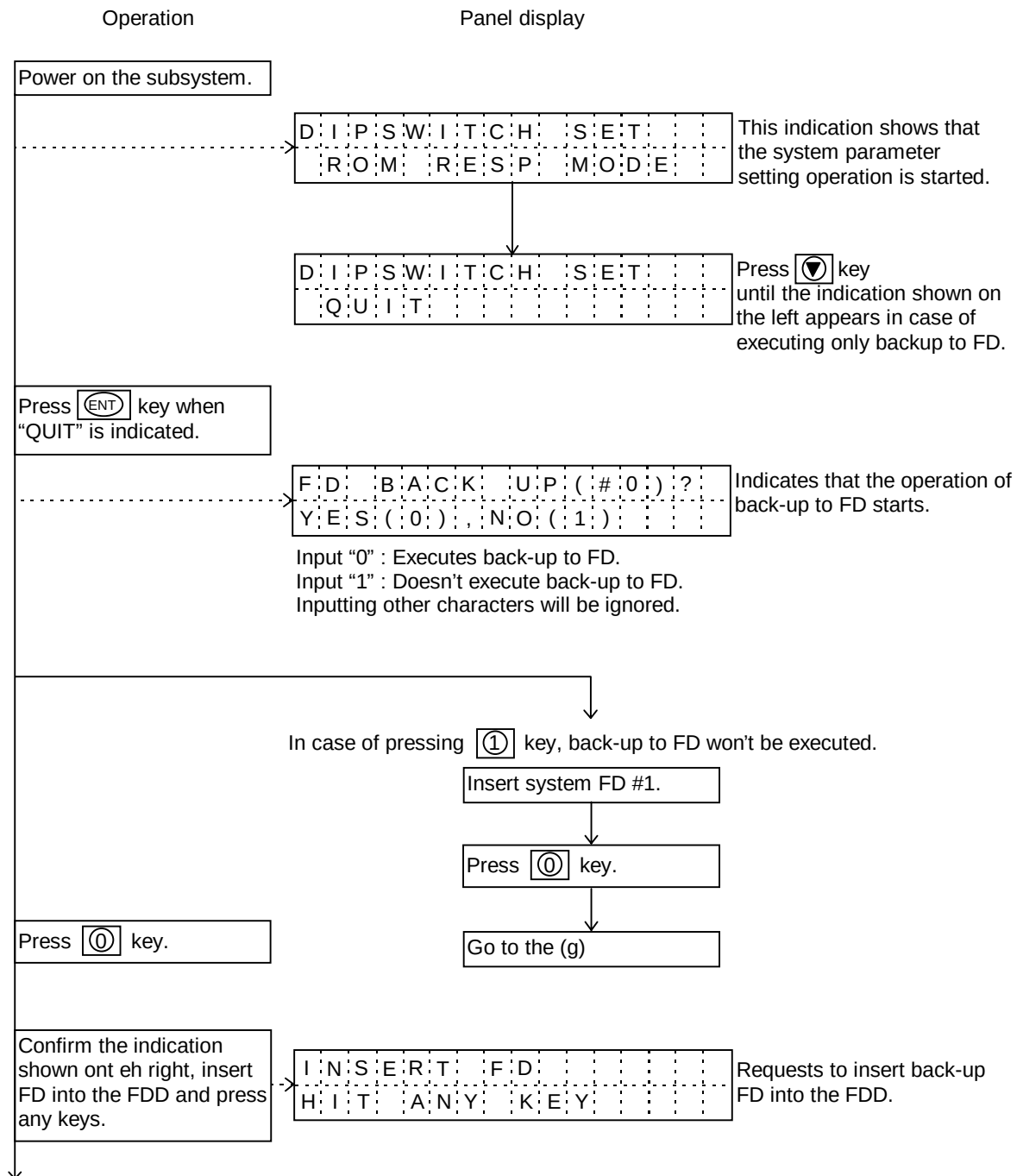
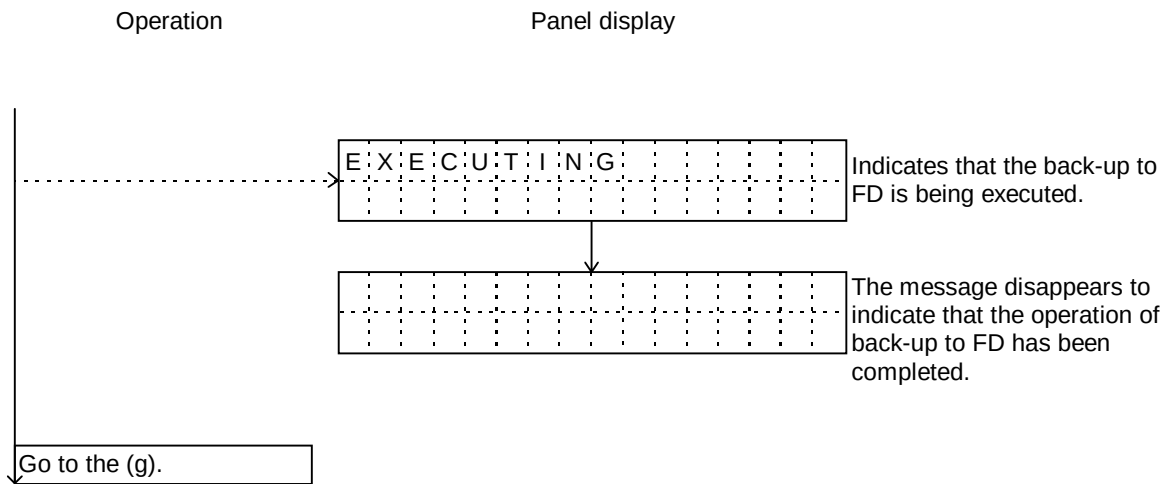


Figure 4.1.2 DIP Switches

(3) Operate panel's keys as described below.





(4) Set DIP switch No.4 as shown in Figure 4.1.3.

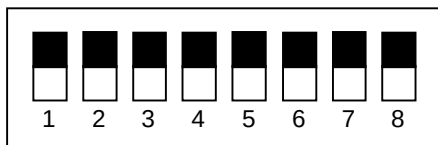
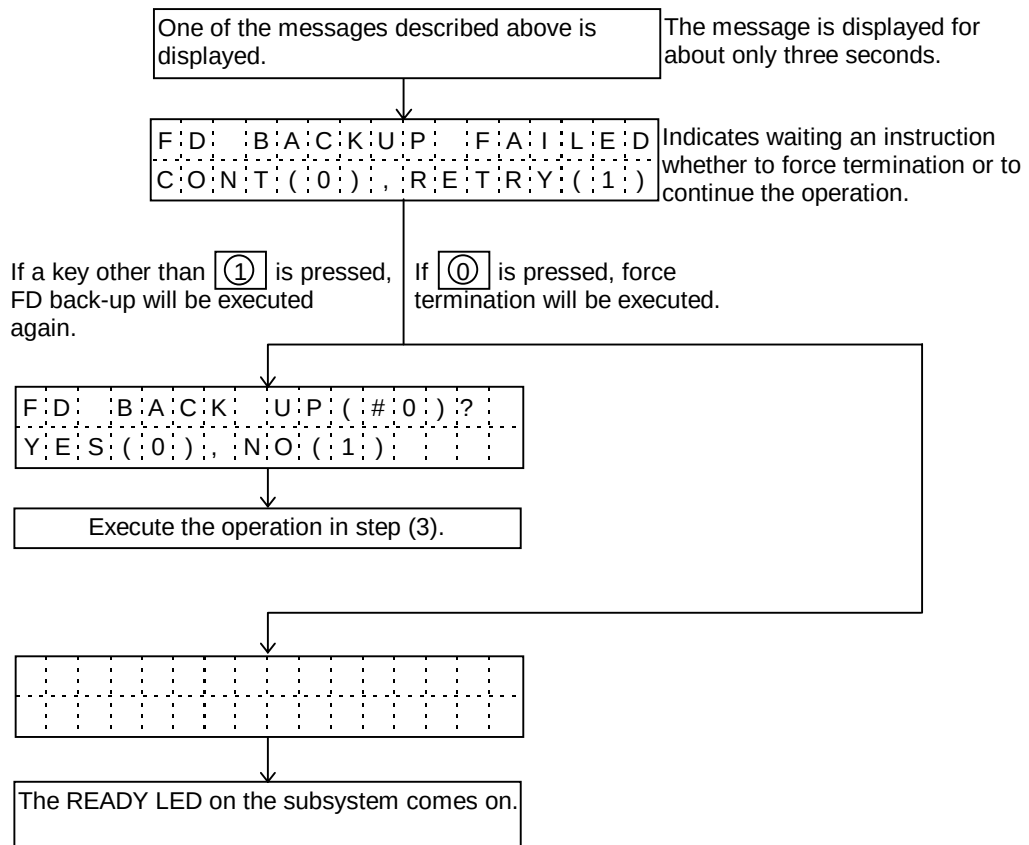


Figure 4.1.3 DIP Switches

Note 1 : While the back-up to FD is being executed, the following messages may be displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting failure of the FD drive motor occurred. Try again.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or is the condition of write-protected. Format or release write-protection.
Write error occurred in FD which was inserted. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So try again following the operation described below.

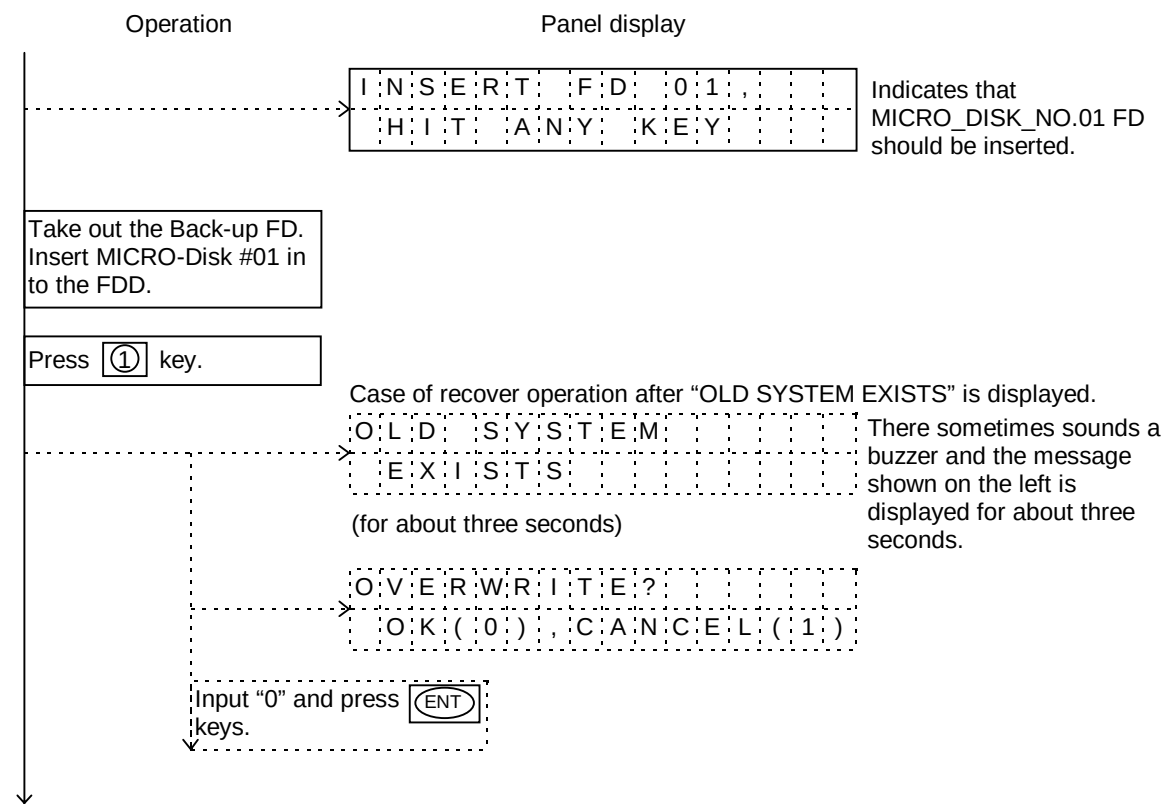
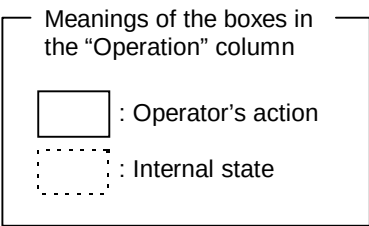


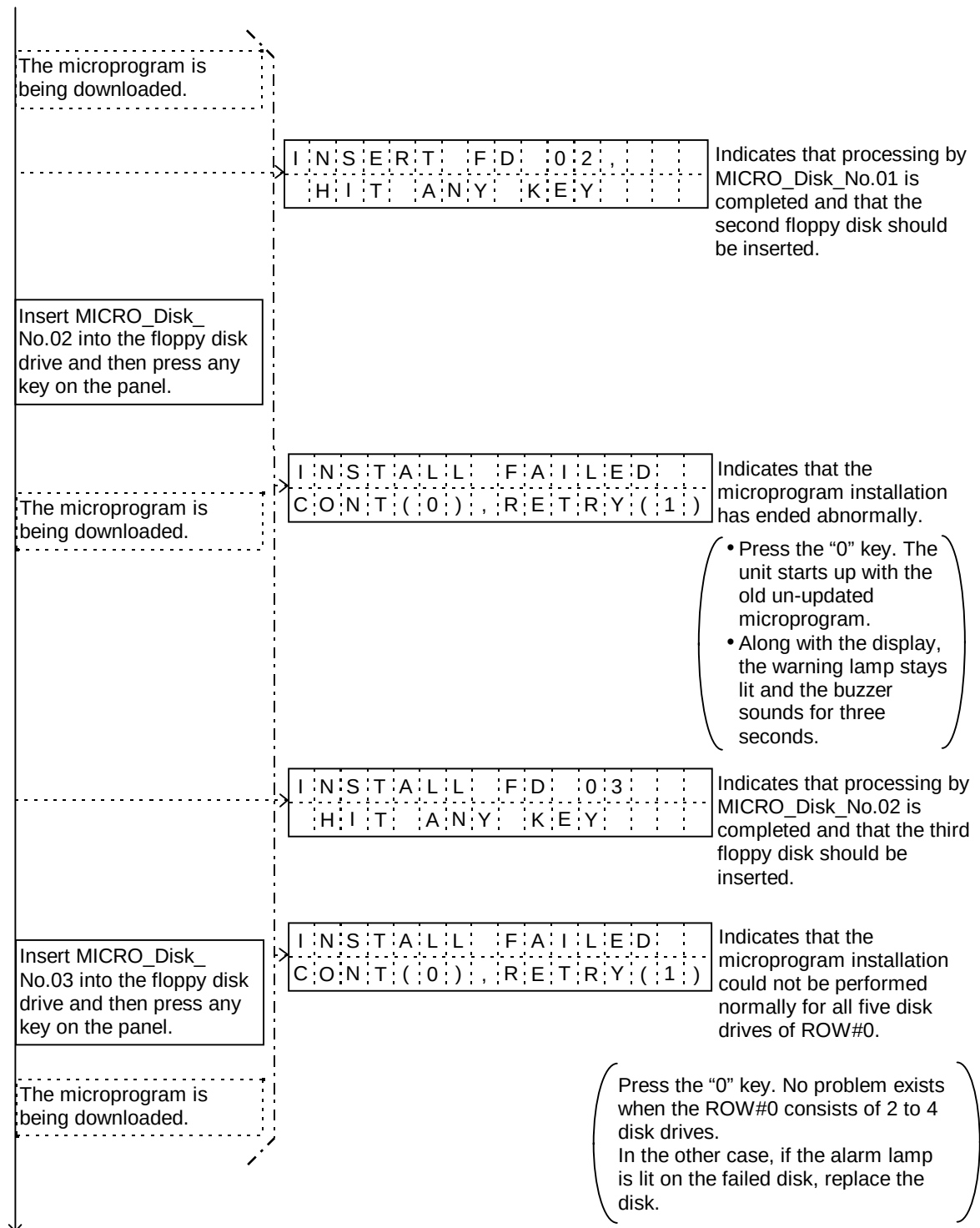
Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Note that the FD will be overwritten in back-up.

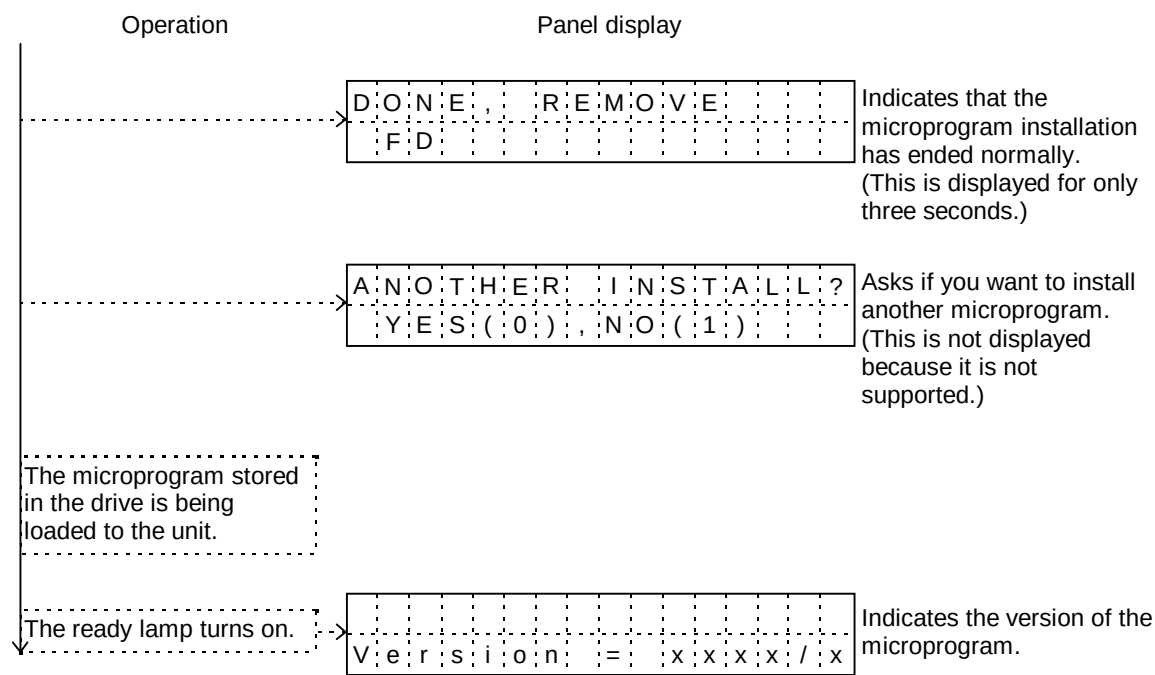
Note 3 : Even if back-up FD is left at FDD after back-up operation, no error will occur on the subsystem.

(g) Download Program
Download program is used to update the microprogram stored in the drive. Three floppy disks are used for downloading.

Note : Be sure that no drive failure is present before updating the microprogram.







(1) Set DIP switch No.1 as shown in Figure 4.1.4.

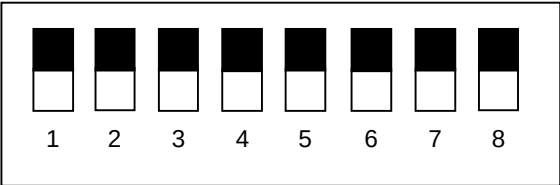
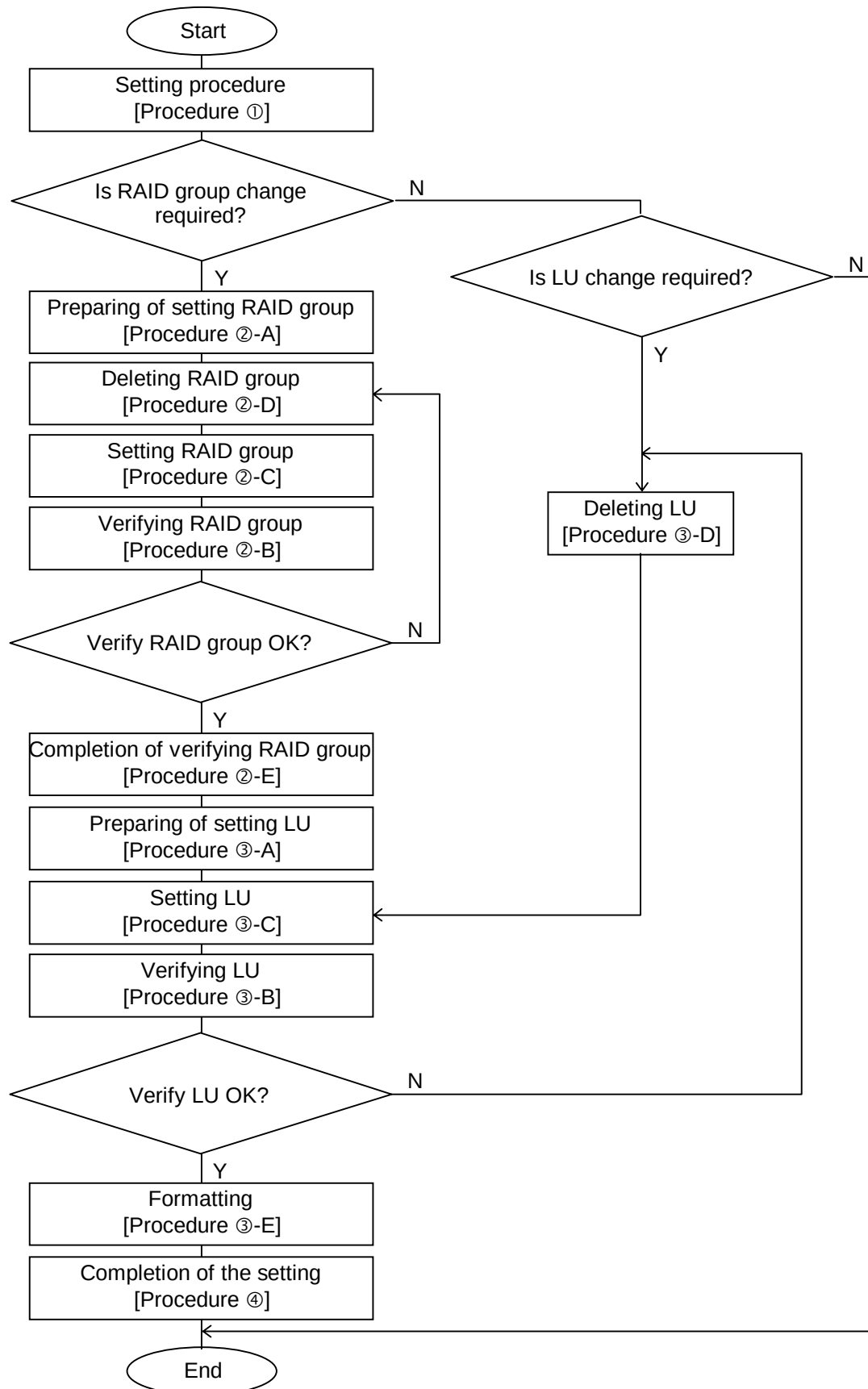


Figure 4.1.4 Standard DIP Switch Settings

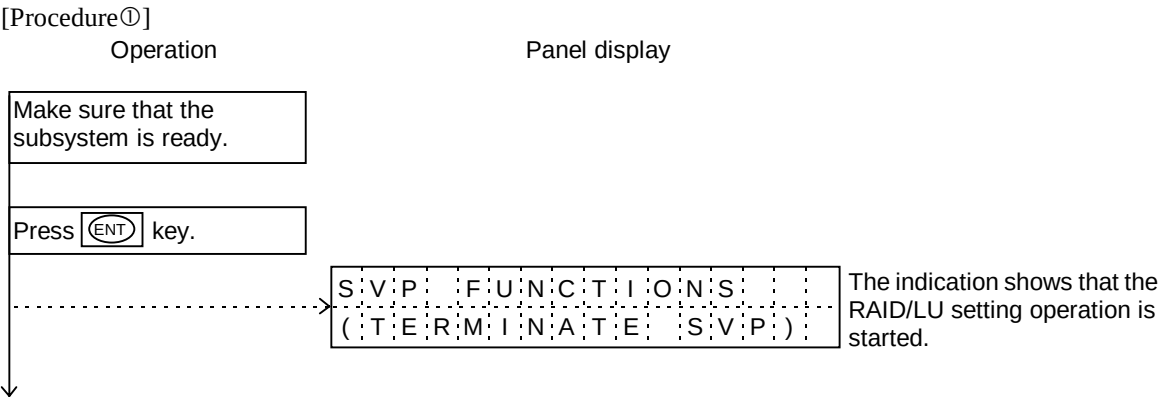
4.2 Setting the Subsystem Configuration Information

This function can be used when the subsystem is ready.

(During this operation, READ/WRITE command issued from the host cannot be executed. When the host command is received, Not Ready is reported to the host.)



4.2.1 Preparing of setting RAID/LU



When changing RAID group, go to procedure ②-A “Preparing of setting RAID group”.
When changing no RAID group but LU, go to procedure ③-A “Preparing of setting LU”.
When changing no RAID group and LU, go to quit.

4.2.2 Setting the RAID group

This function is used for setting, deleting and referring the RAID group. This function can be used when the subsystem is ready.

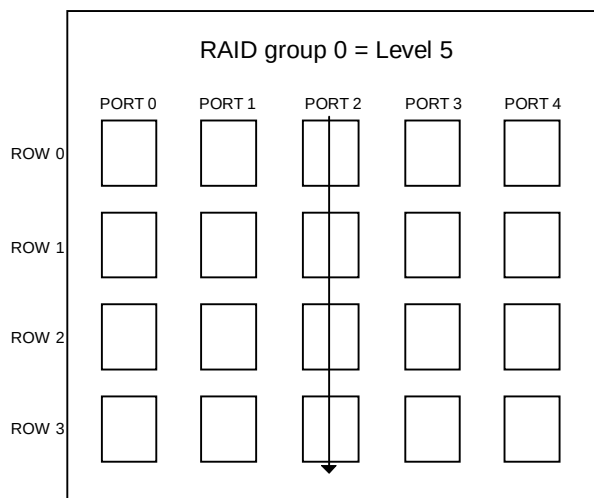
(Setting the DIP switch and turning off/on the subsystem are not required. Read/Write operation from the host can not be executed during this function. When the host command is received, Not Ready is reported to the host.)

Notice : By deleting the RAID group all user data of the deleted RAID group is lost. Back up user data before deleting the RAID group.

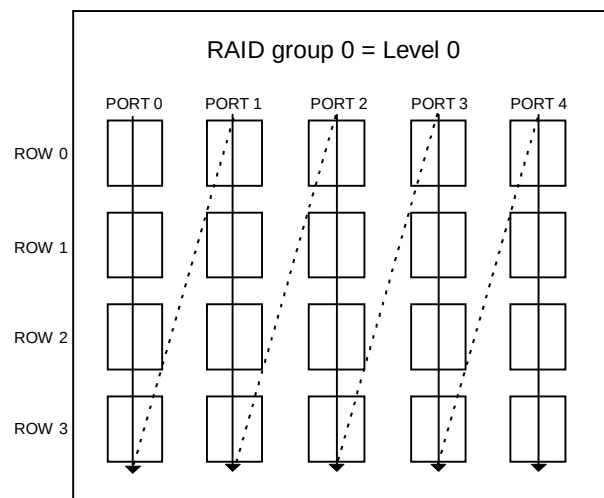
RAID group and RAID level can be set as shown below by using this setting function.

When Micro_Disk Ver.0305** (** is optional) is used, the number of the striping disks can be selected from 2, 3, and 4 when setting RAID level 5.

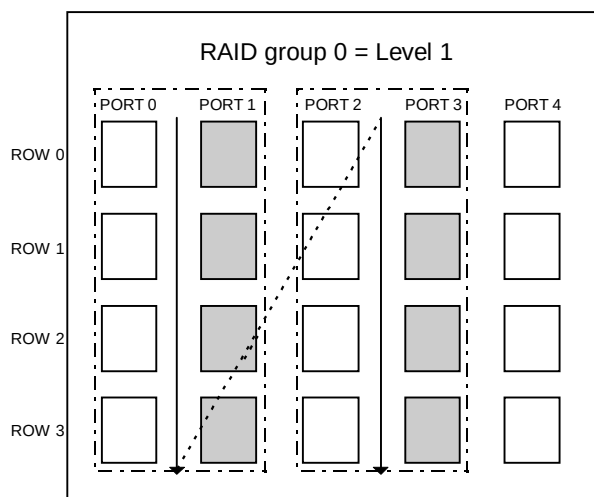
Setting one RAID group with the entire subsystem. (Arrows “↓” indicate the direction of storing data.)



The function stores data in the way executing the data striping over four disks and generating parity data on one disk.

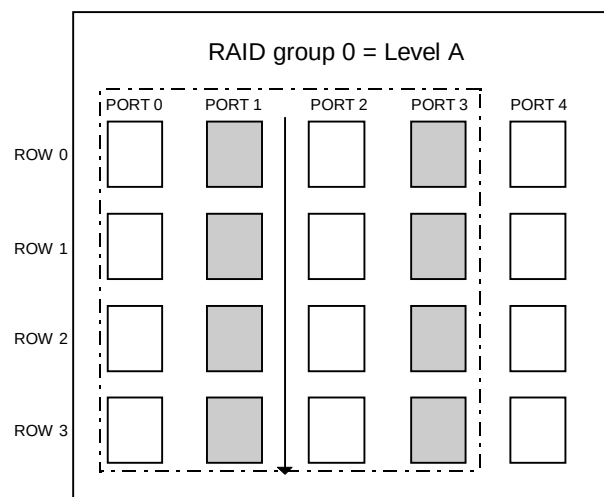


The function stores data without executing neither the data striping nor parity data generation.



The function stores data in the way doubly writing it on the main disk and sub-disk without executing the data striping.

□ : indicates a main disk
 ■ : indicates a sub-disk



The function stores data in the way doubly writing it on the main disk and sub-disk and executing the data striping over two disks of port 0 and port 2.

□ : indicates a main disk
 ■ : indicates a sub-disk

Setting one RAID group with each row of disks (Arrows “↓” indicates the direction of storing data.)

Data cannot be stored extending over two or more RAID groups even if RAID levels of them are the same. The following are examples having set RAID groups of the same RAID level, however, each row has its own RAID level.



Setting the number of data disks when setting RAID level 5

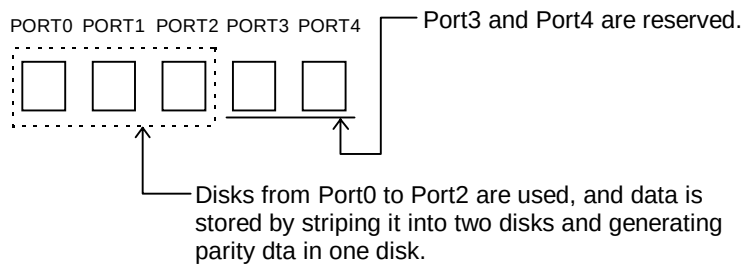
When Micro_Disk Ver.0305** (** is optional) or later is used, number of data disks can be selected from 2, 3 and 4 in the definition of RAID5.

(4 for the number of data disks and 1 for the number of parity disks are automatically set when 5 is set for RAID level in the case Micro_Disk Ver.0304** (** is optional) or earlier is used.)

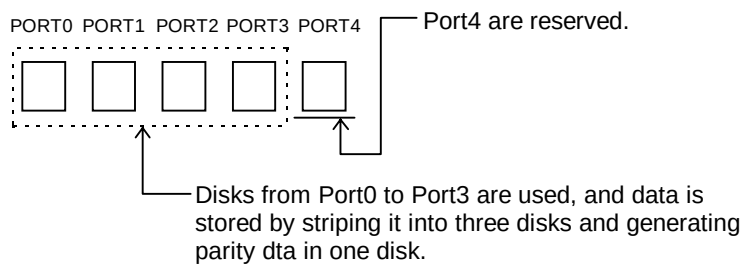
For the of setting procedure, see pages PANEL0380 or DH-INST0610.

The direction of data storage is the same as the conventional case in which the RAID level is 5. Setting is also same as before; the entire subsystem or each row can be set to one group. The following explains the overview of data storage using the example of setting each row to one group.

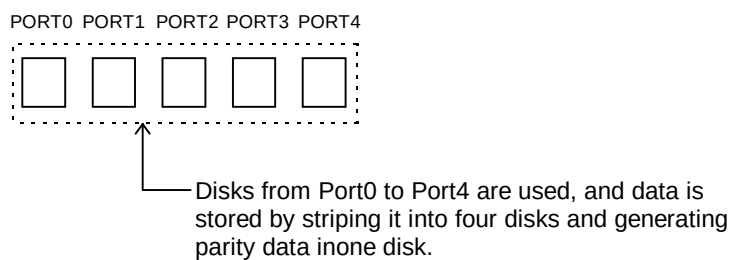
- (1) For the configuration of 2 data disks + 1 parity disk



- (2) For the configuration of 3 data disks + 1 parity disk

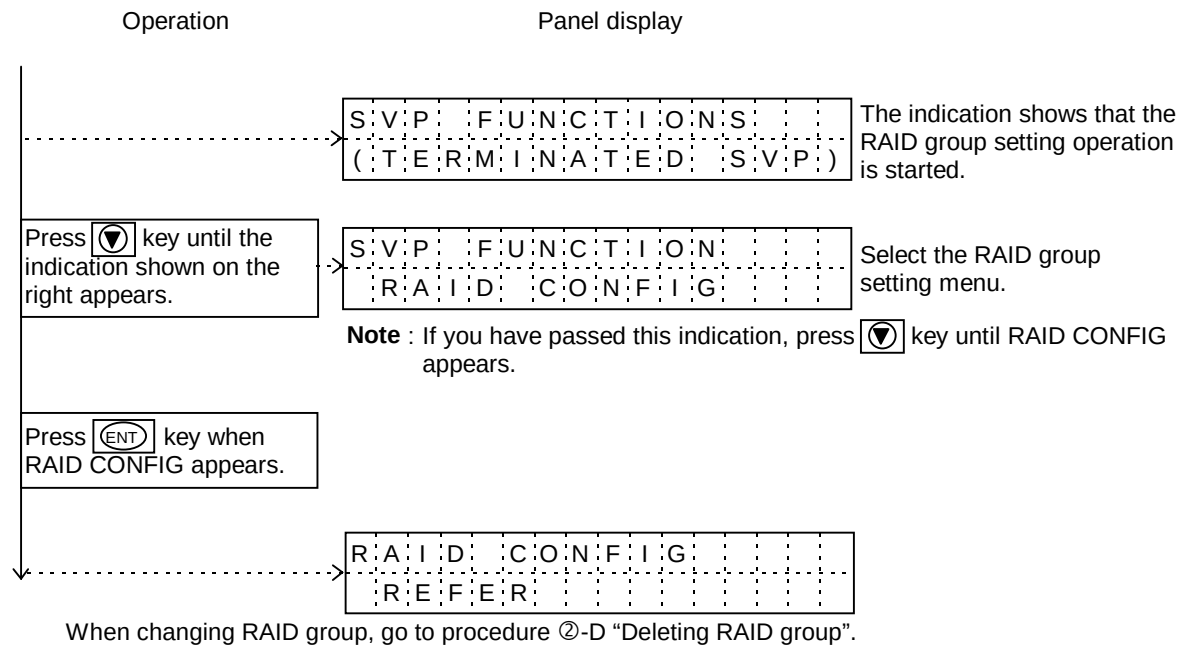


- (3) For the configuration of 4 data disks + 1 parity disk (same configuration as when RAID5 is defined using Micro_Disk Ver.0304** or earlier)

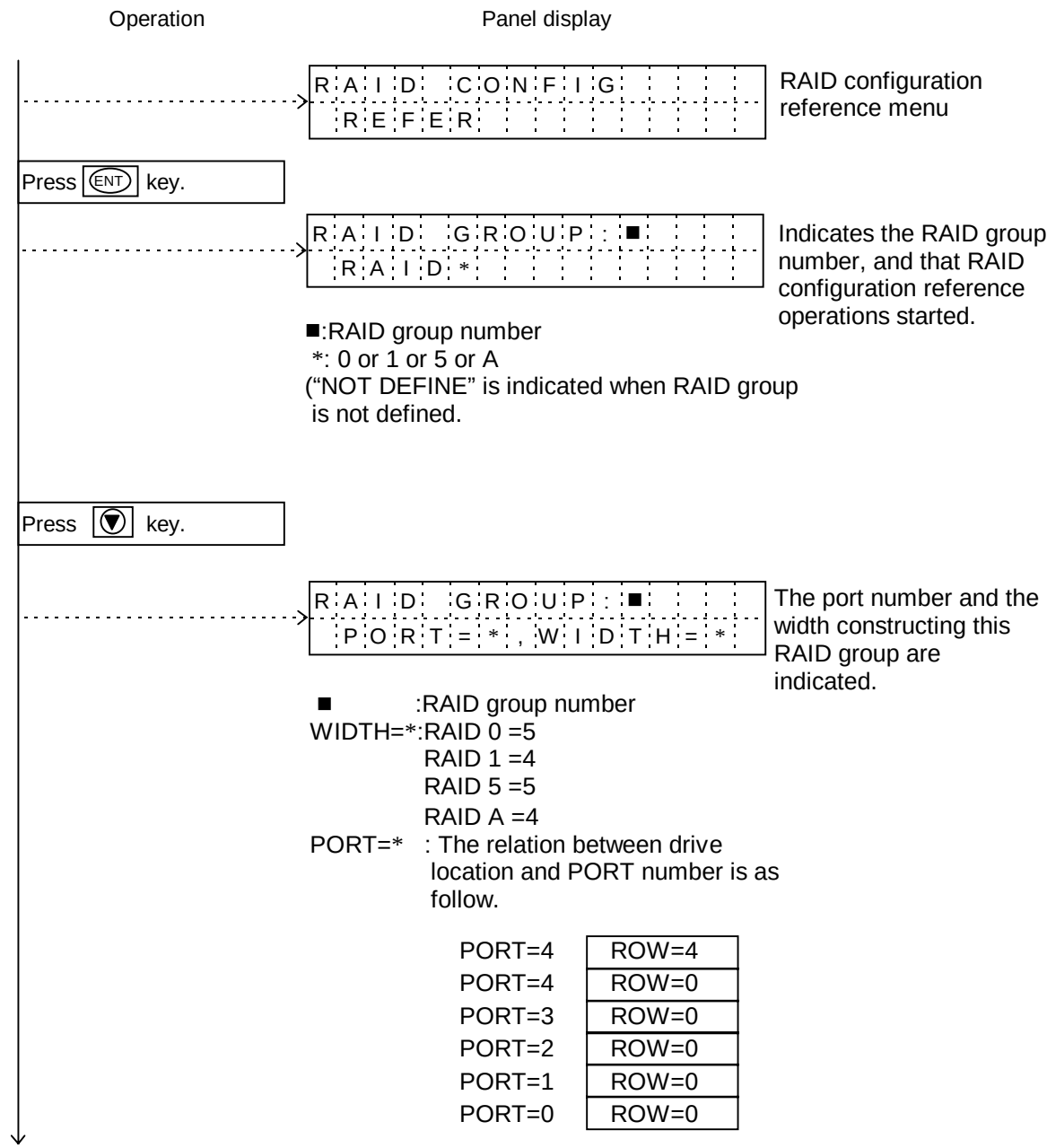


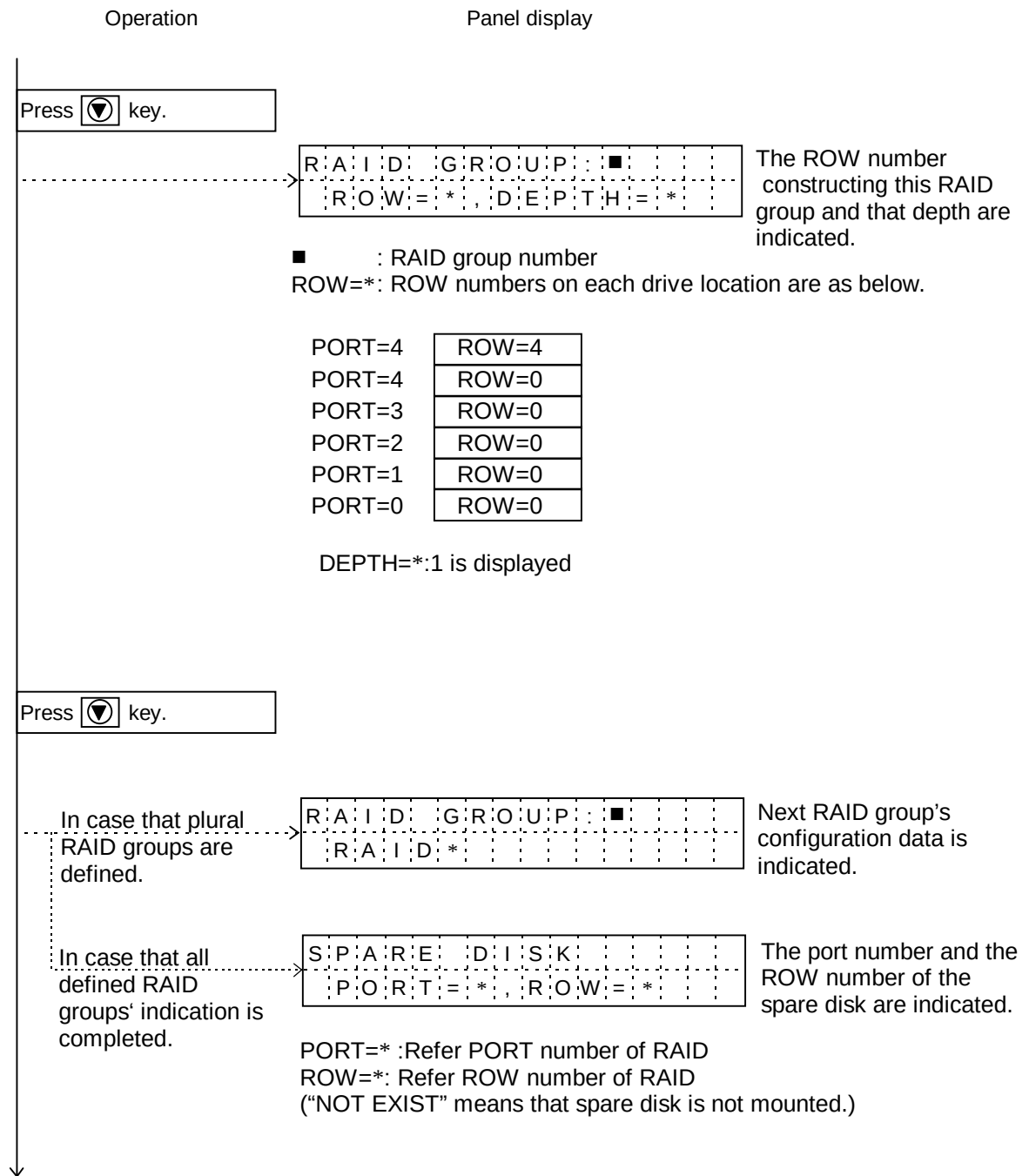
Notice : When changing the data disk configuration, be sure to start from re-definition of the RAID group. Accordingly, the stored data will be lost. So be sure to create a back-up copy of the data when the configuration is changed.

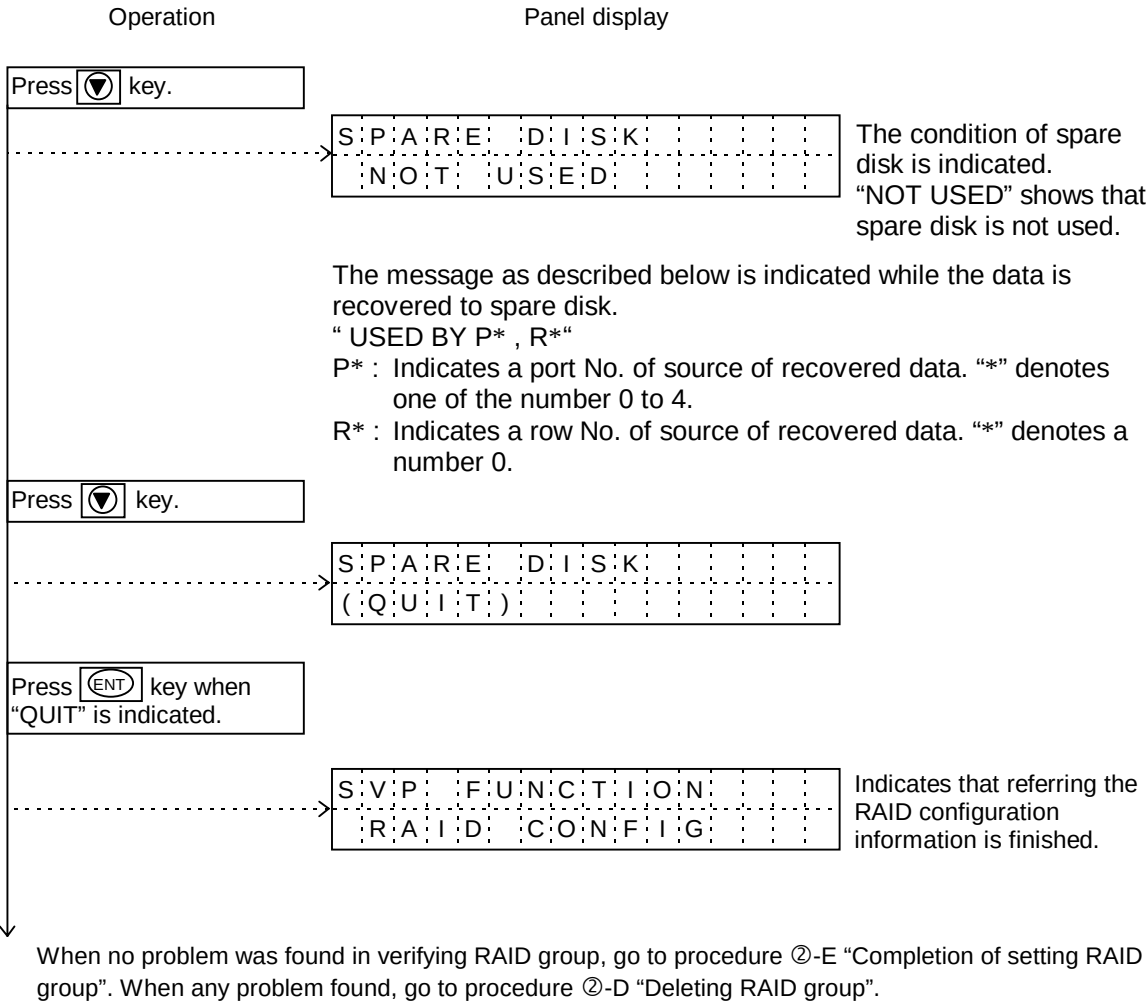
[Procedure②-A] Preparing of setting RAID group



[Procedure②-B] Verifying RAID group





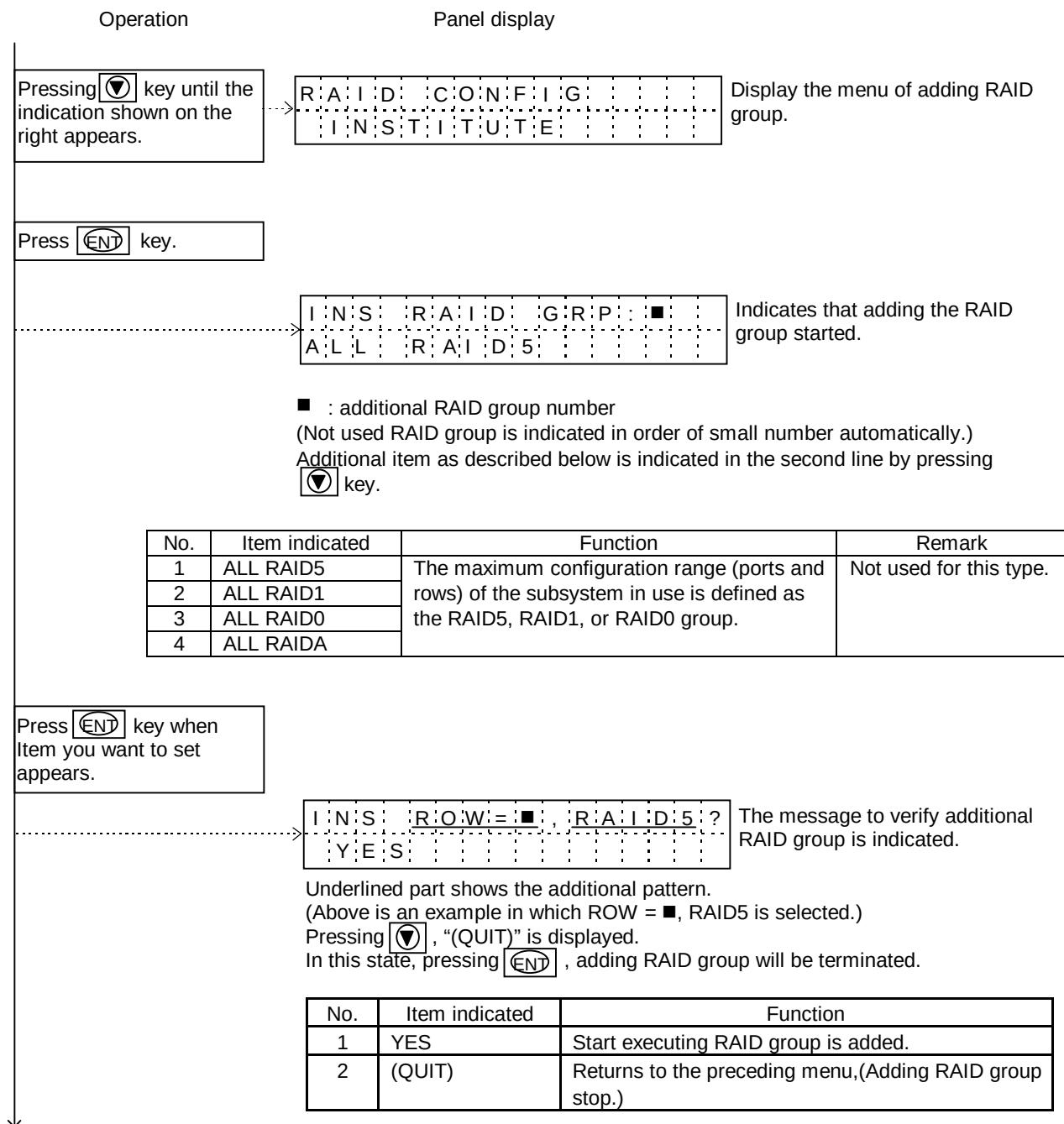


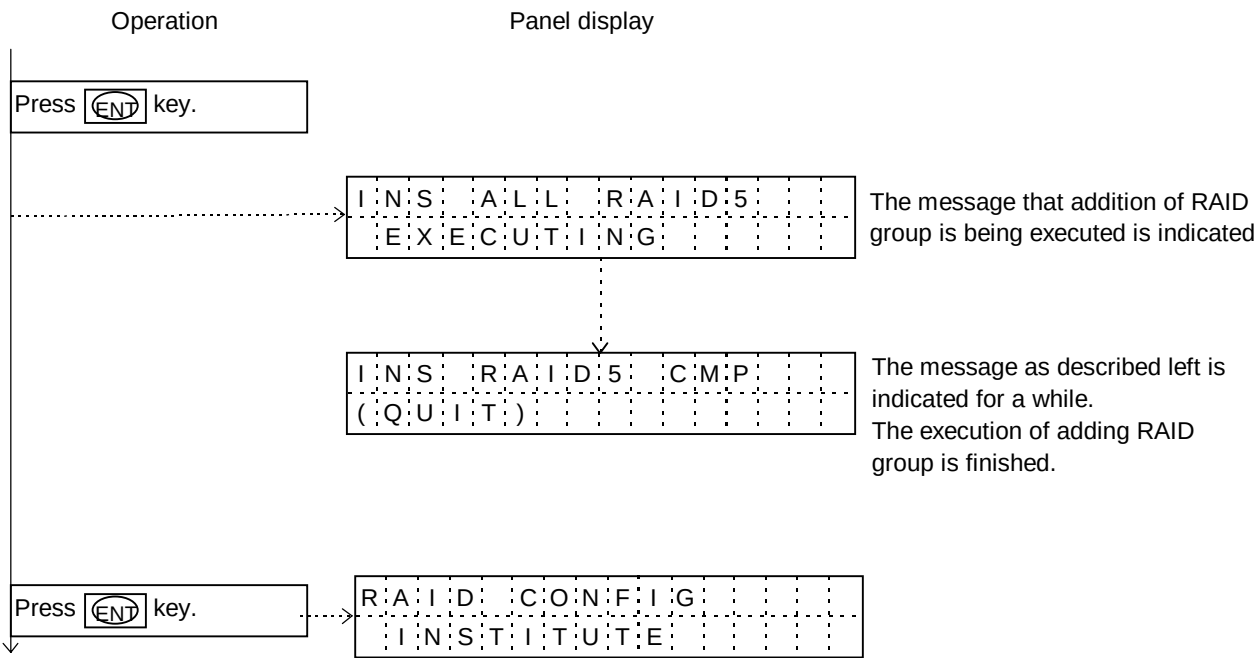
Operation for defining the RAID5 differs depending on whether the version of Micro_Disk is 0304** (** is optional) or earlier, or 0305** (** is optional) or later.

Confirm the version of Micro_Disk and operate in the way corresponds to it. (In the case of RAID0, RAID1 and RAIDA the operation is the same irrespective of the version of Micro_Disk.)

[Procedure②-C] Setting RAID group

(1) RAID group setting when the version is 0304** (** is optional) or earlier





Go to procedure ②-B “Verifying RAID group”
Note : Set RAID group for each ROW when you want to set it for each ROW.

(2) RAID group setting when the version is 0305** (** is optional) or later

When Micro_Disk Ver.0305** (** is optional) or later is used, the number of disks including the parity disk must be input when defining RAID5. (This is not necessary for RAID0, 1 and A.)

Operation

Panel display

Press the  key repeatedly until the indicatio shwn on the right appears.

R A I D C O N F I G
I N S T I T U T E

RAID group adding function menu is displayed.

Press the  key.

I N S R A I D G R P : █
A L L R A I D 5 W █ █

Displays that RAID group adding operation has started.

“ ” (underline) denotes the position to input the number of the disks including the parity disk.

█ : Displays the number of the RAID group to be added.
(Reserved RAID groups are automatically displayed from a lower number.)

On the second line, the following addition patterns are displayed aequentially by pressing the  key.

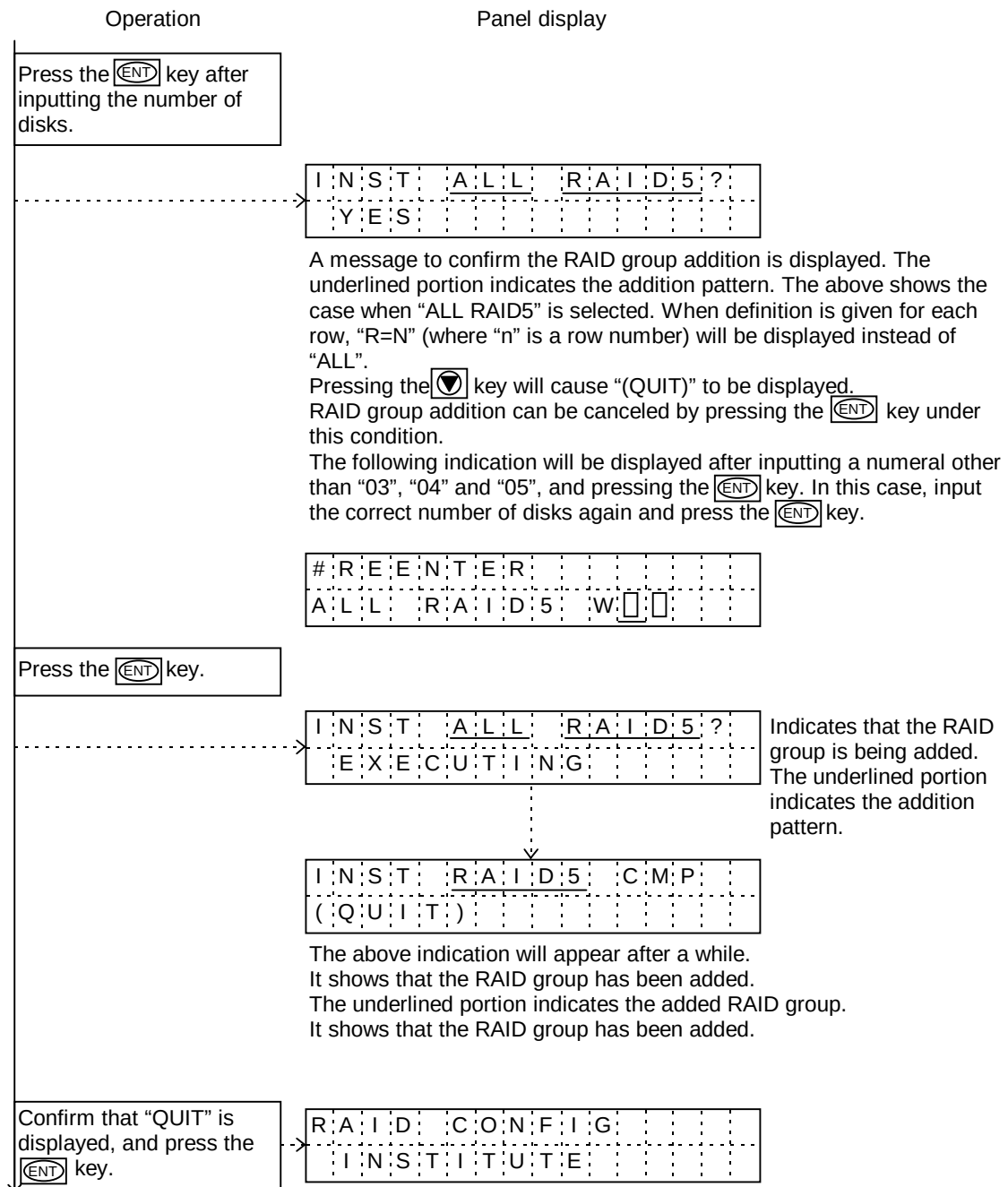
No.	Displayed pattern	Purpose of use	Remarks
1	ALL RAID5 W █ █	Selected when the maximum subsystem configuration is defined as one RAID group.	
2	ALL RAID1		
3	ALL RAID0		
4	ALL RAID A		

Make sure that the “ ” (underline) is placed at the top position and enter the numeral.

Configuration	Panel key pressing sequence
2 data disks + 1 parity disk	 → 
3 data disks + 1 parity disk	 → 
4 data disks + 1 parity disk	 → 

I N S R A I D G R P : █
A L L R A I D 5 W : 0 3

The above shows the example when the configuration of two data disks plus one parity disk is set.



Go to procedure ②-B "Verifying RAID group"

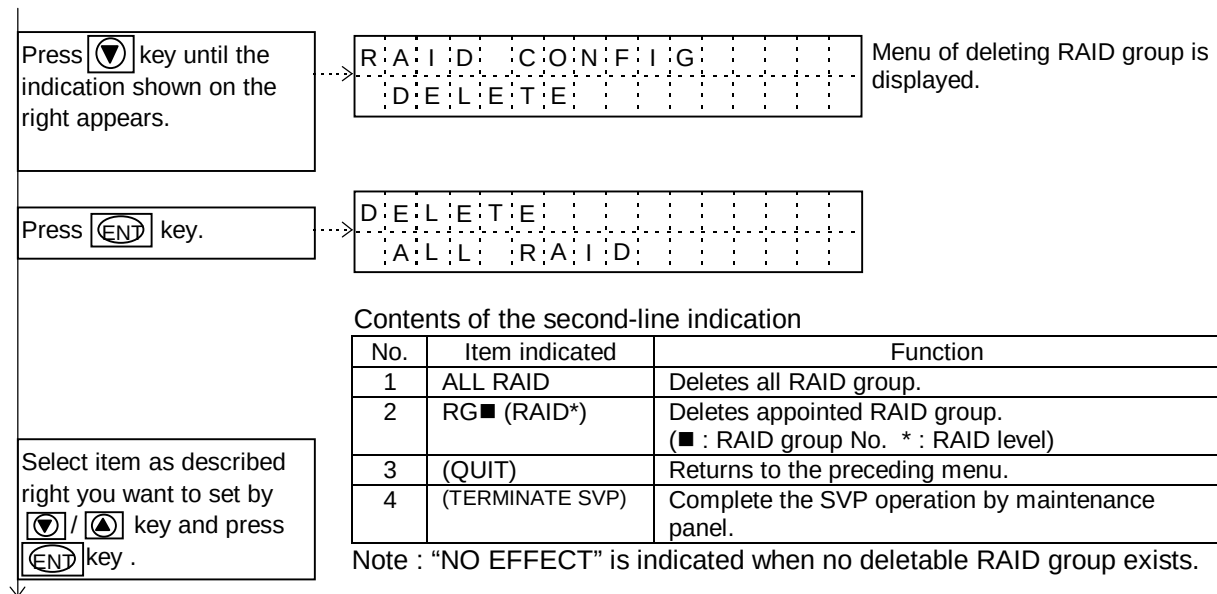
Note : Set RAID group for each ROW when you want to set it for each ROW.

[Procedure②-D] Deleting RAID group

Notice : With this operation, Logical Units are deleted, and the user's data will be lost. Be sure to make back up copy before this operation.

Operation

Panel display

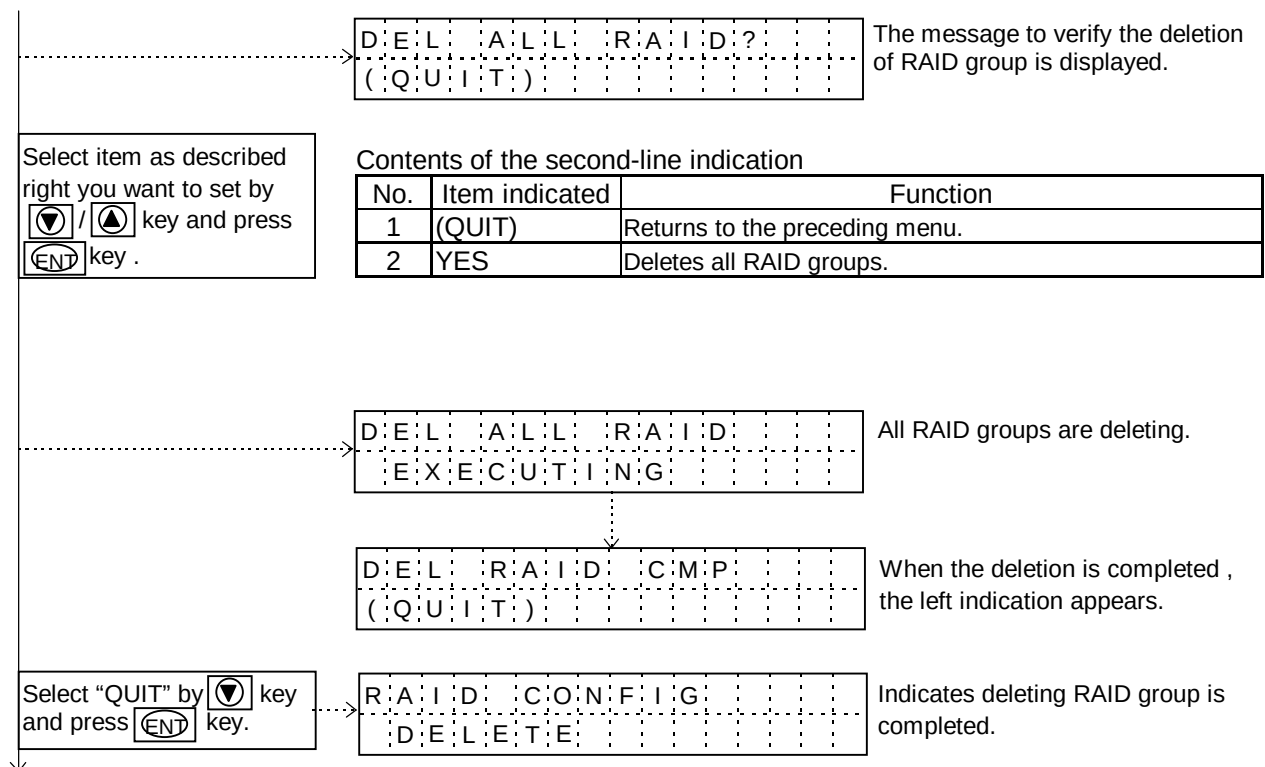


Go to ① when you want to delete all RAID groups , Go to ② when you want to delete appointed RAID group.

①Deleting all RAID groups

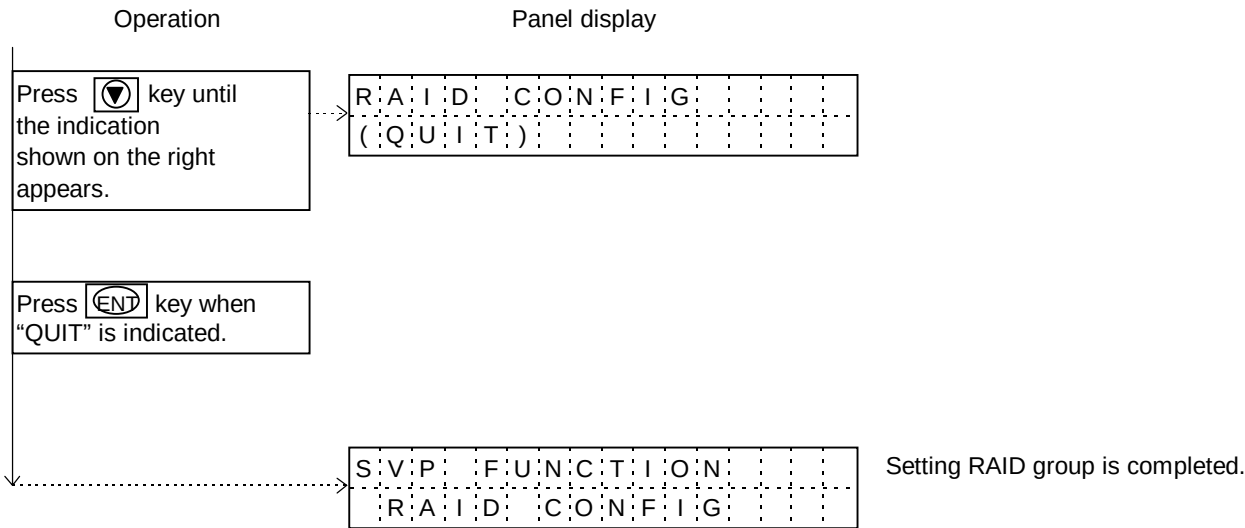
Operation

Panel display



Go to procedure ②-C "Setting RAID group".

[Procedure②-E] Completion of setting RAID group



4.2.3 Setting LU

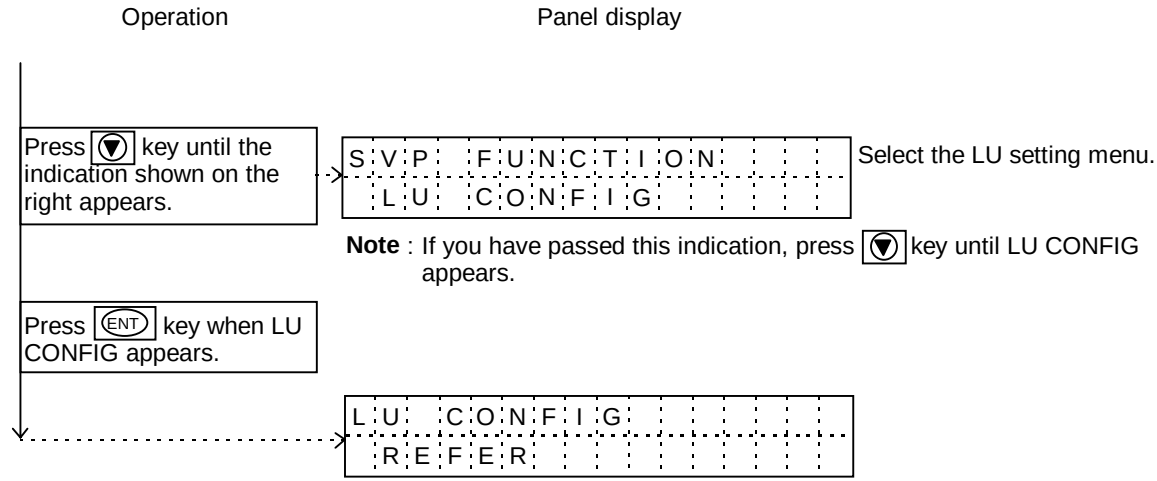
Following procedures are used to set, delete, refer, or format the LU.

This function can be used when the subsystem is ready.

Notice : All user data is lost by deleting the LU.

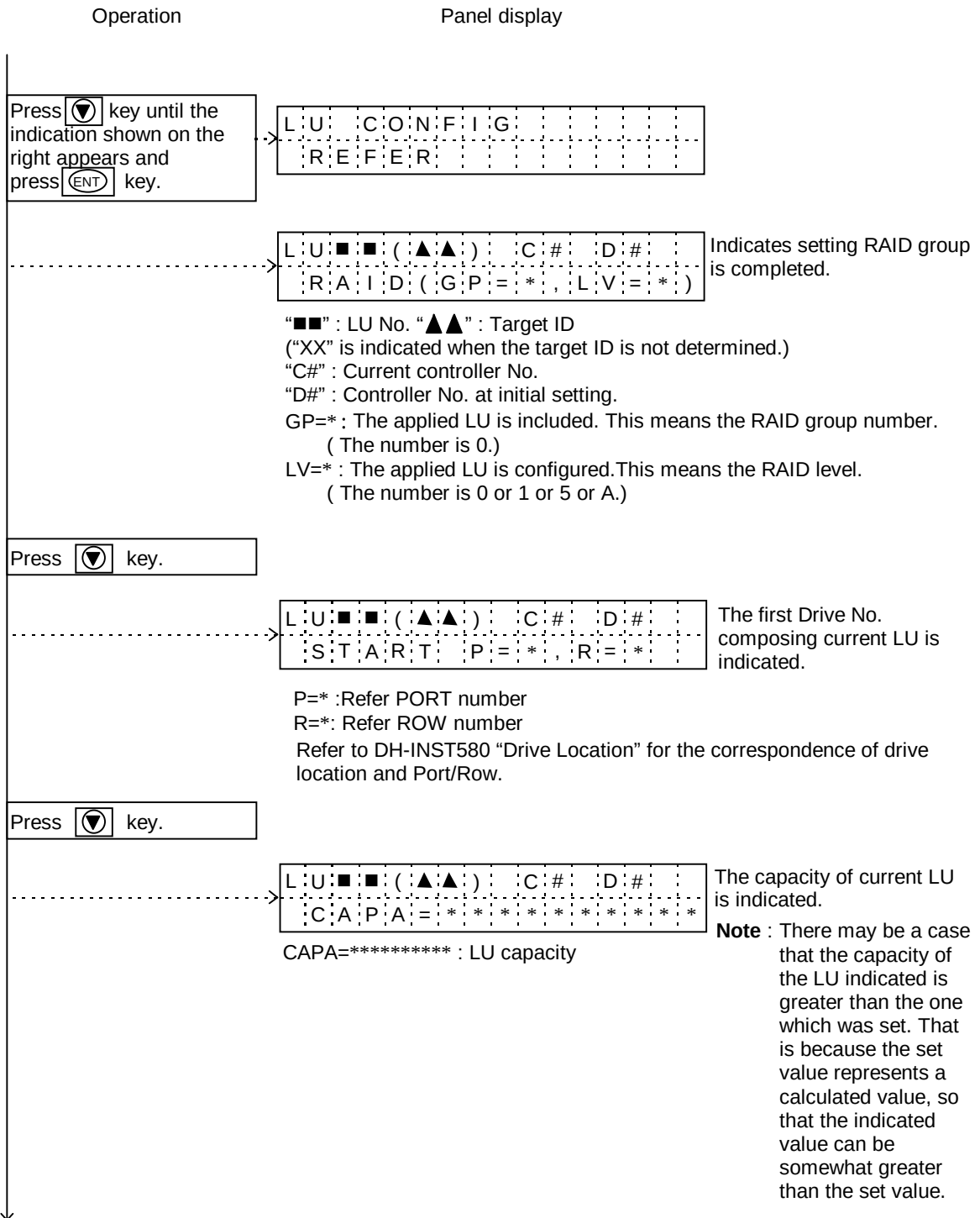
Be sure to back-up the user data before deleting the LU.

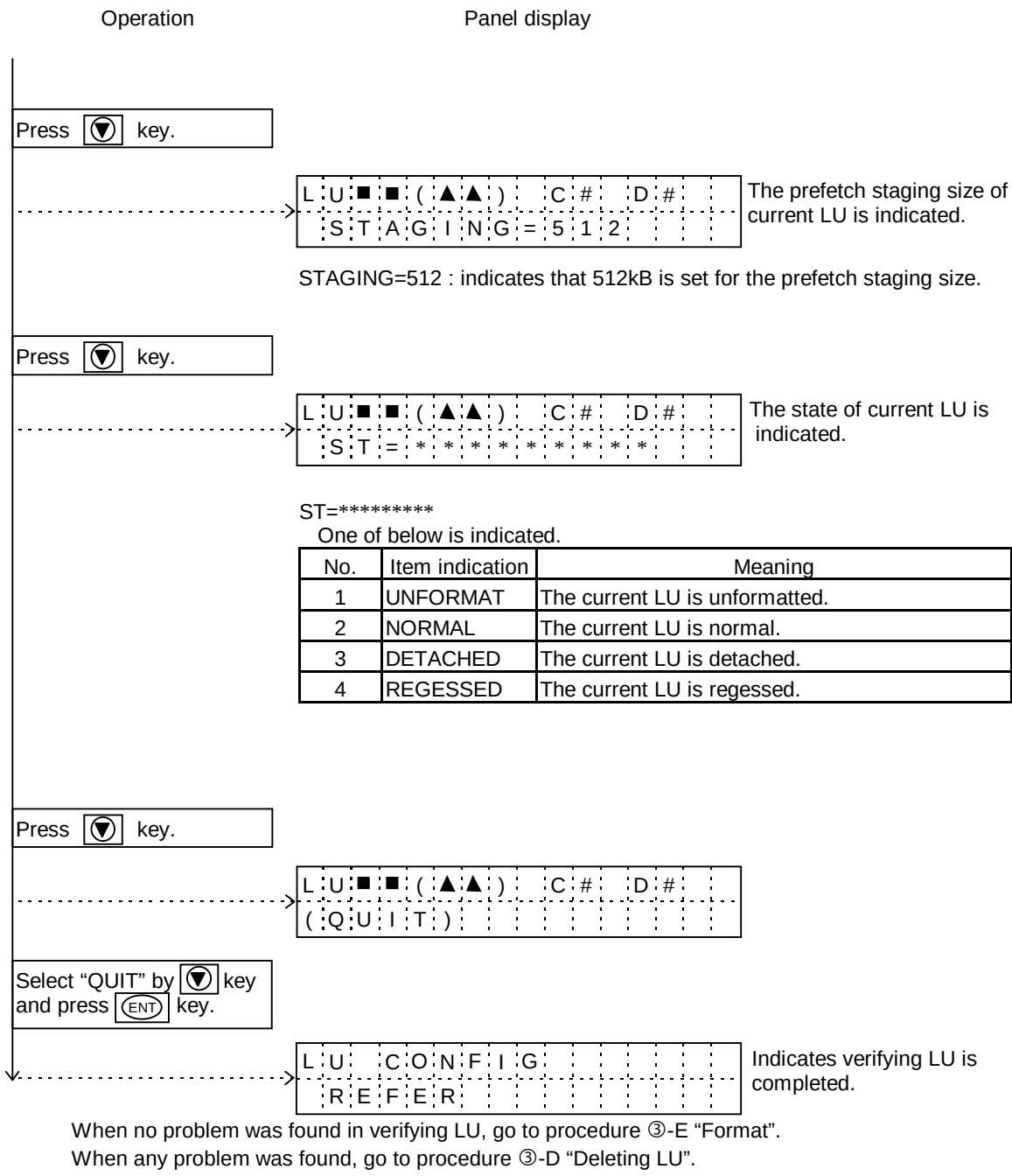
[Procedure③-A] Preparing of setting LU



When RAID group is already set, go to procedure ③-C “Setting LU”.
When changing no RAID group, go to procedure ③-D “Deleting LU”.

[Procedure③-B] Verifying LU





[Procedure③-C] Setting LU

Operation

Panel display

Press  key until the indication shown on the right appears.

LU CONFIG
INSTITUTE (CTL0)

Display the menu of adding LU.

Press  key.

INS LU ■■ (▲▲)
G=0 ALL CAPA

Indicates that adding the LU started.

■■ : LU No.

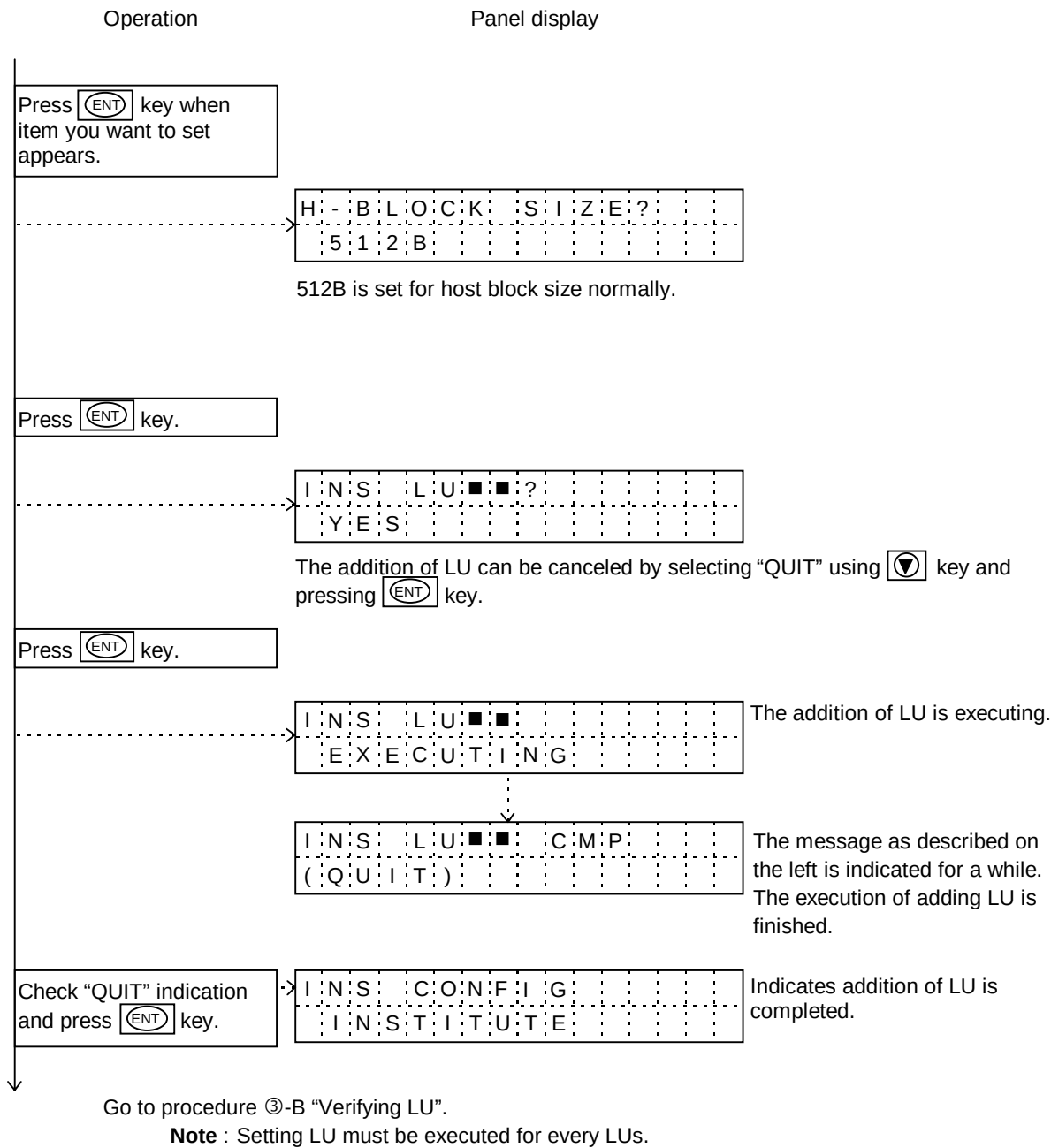
(Not used LU number is displayed in smaller number.)

▲▲ : Target ID.

The second line is indicated below by pressing  key.

No.	Item indicated	Function
1	G=0 ALL CAPA	All of the free area in the RAID group 0 is defined as the object LU.
2	G=0 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 0. The capacity is defined by logical block number.
3	G=1 ALL CAPA	All of the free area in the RAID group 1 is defined as the object LU.
4	G=1 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 1. The capacity is defined by logical block number.
5	G=2 ALL CAPA	All of the free area in the RAID group 2 is defined as the object LU.
6	G=2 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 2. The capacity is defined by logical block number.
7	G=3 ALL CAPA	All of the free area in the RAID group 3 is defined as the object LU.
8	G=3 C=*****	LU with specified capacity (specified by C=) is defined in RAID group 3. The capacity is defined by logical block number.
9	(QUIT)	Returns to the preceding menu.

See DH-INST0730 "How to Set Number of Logical Blocks".



Supplement / How to Set Number of Logical Blocks

G=*

C=*****



Enter a value (number of logical blocks) here.

- (1) All RAID groups can be divided into up to 8 logical units.
- (2) Set the number of logical blocks to be set for each logical unit to multiples of the following values according to the RAID level.

RAID0	128
RAID1	128
RAIDA	256
RAID5(4D+1P)	512
RAID5(3D+1P)	384
RAID5(2D+1P)	256

- (3) When dividing each RAID group into multiple logical units, the total number of blocks in each logical units must be set to the number of logical blocks per row as shown below or less.
- (4) The following lists the number of logical blocks per row.

① When five drives are mounted on a row;

(4disks in the case of RAID1, RAIDA and RAID5 (3D+1P); 3disks in the case of RAID5 (2D+1P))

RAID configuration \ Model (Capacity)	DF-F350-A2E2 (2.0GB)	DF-F350-A2E4/ DF-F350-A3E4 (4.1GB)	DF-F350-A1E8/ DF-F350-A2E8 (8.7GB)	DF-F350-A1E18 (17.8GB)
RAID0	20,200,960	40,652,160	85,085,440	174,681,600
RAID1/RAIDA	8,080,384	16,260,864	34,034,176	69,872,640
RAID5(4D+1P)	16,160,768	32,521,728	68,068,352	139,745,280
RAID5(3D+1P)	12,120,576	24,391,296	51,051,264	104,808,960
RAID5(2D+1P)	8,080,384	16,260,864	34,034,176	69,872,640

② When n drives are mounted on a row (n < 5);

- RAID0

Number of logical blocks = $m^{(*1)} \times n^{(*2)}$

- RAID1

Number of logical blocks = $m^{(*1)} \times \text{int}(n/2)^{(*3)}$

*1: Refer to the table below for m.

*2: n is 2 or larger in this case.

*3: int means "rounding down".

	DF-F350-A2E2	DF-F350-A2E4/ DF-F350-A3E4	DF-F350-A1E8/ DF-F350-A2E8	DF-F350-A1E18
Capacity	(2.0GB)	(4.1GB)	(8.7GB)	(17.8GB)
m	4,040,192	8,130,432	17,017,088	34,936,320

(5) Examples of the number of logical blocks set are shown below.

Example ① An example of a logical unit of disks (4.1GB 5units) is divided into 8 LUs.



An example is shown where all G=0 is RAID5 and the LU is divided into 8 LUs of similar capacity. So each group is divided into 2 LUs.

• Group 0

According to (4) ① the logical block number of RAID5 is 32,521,728 ($512 \times 63,519$). An example is shown where LU of G=0 is divided into 2.

Thus, enter the following.

LU0: G=0

C=16,261,120 ($512 \times 31,760$)

LU1: C=16,260,608 ($512 \times (63,519-31,760)$)

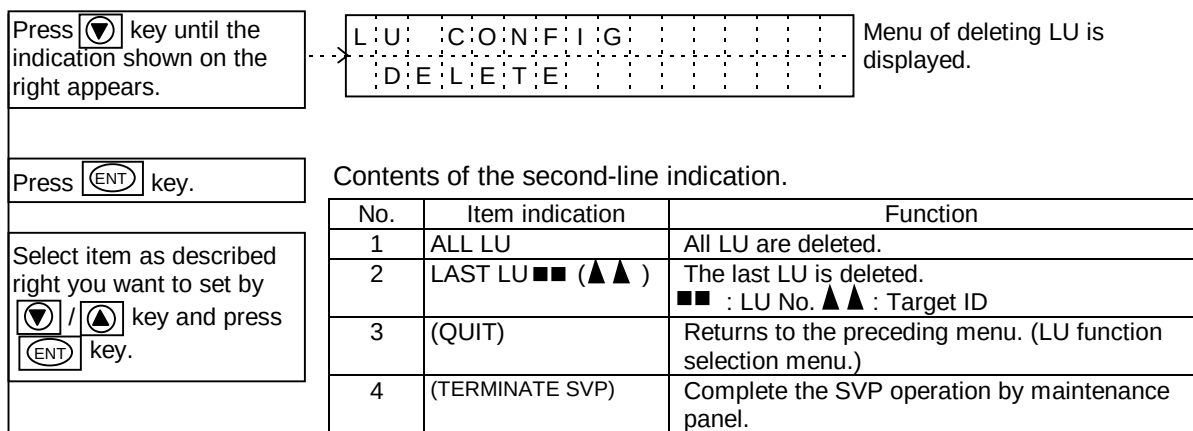
[Procedure③-D] Deleting LU

Note : All user data is lost by deleting the LU.

Be sure to back-up the user data before deleting the LU.

Operation

Panel display



In case of deletion of all LU, go to ①.

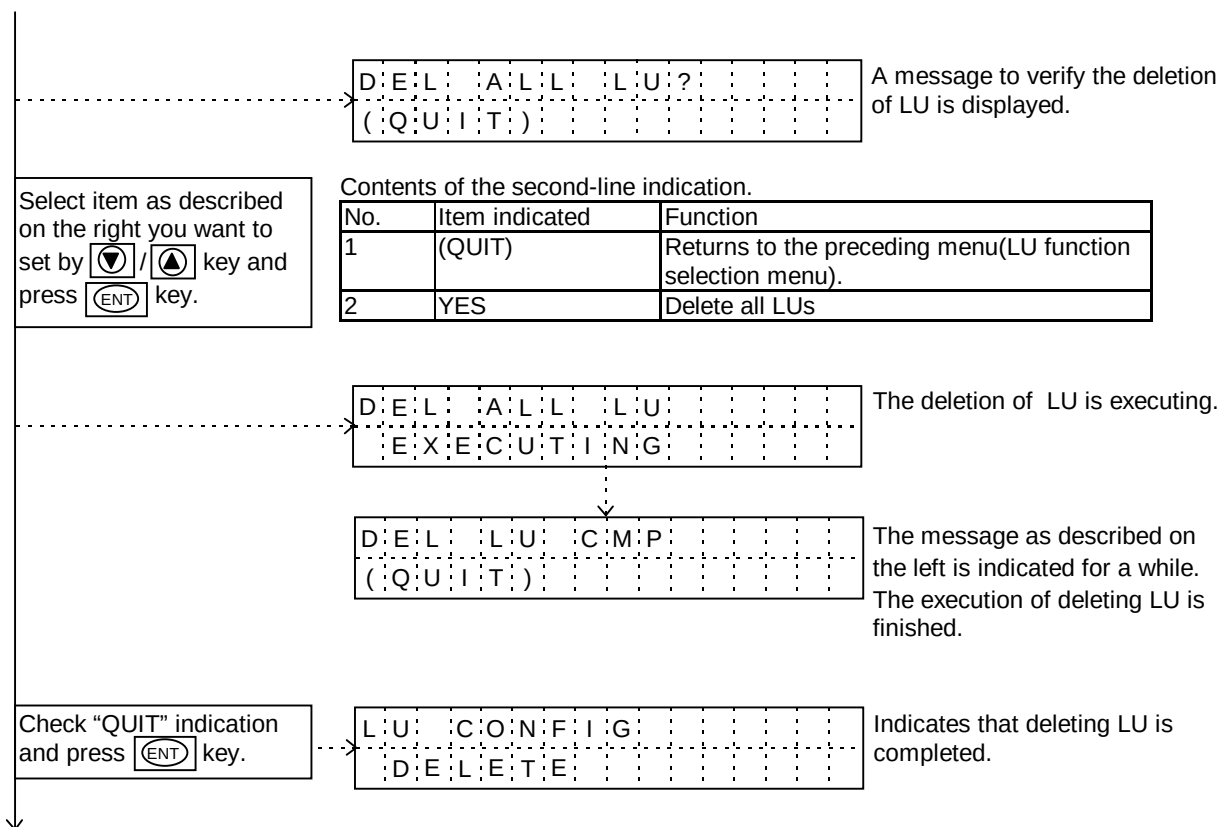
In case of deletion of the last LU, go to ②.

To cancel this operation menu, choose QUIT.

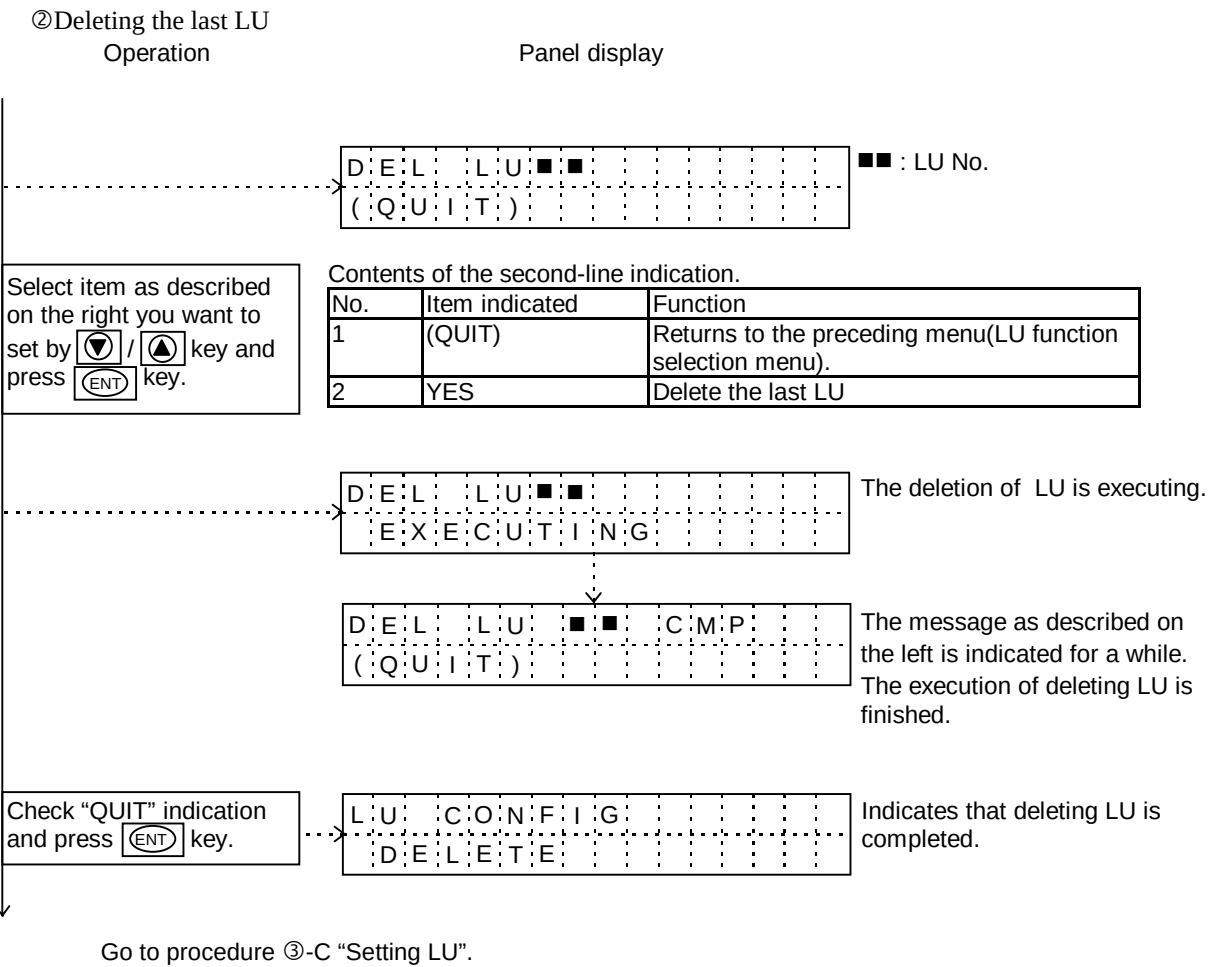
①Deleting all LU

Operation

Panel display



Go to procedure ③-C "Setting LU".

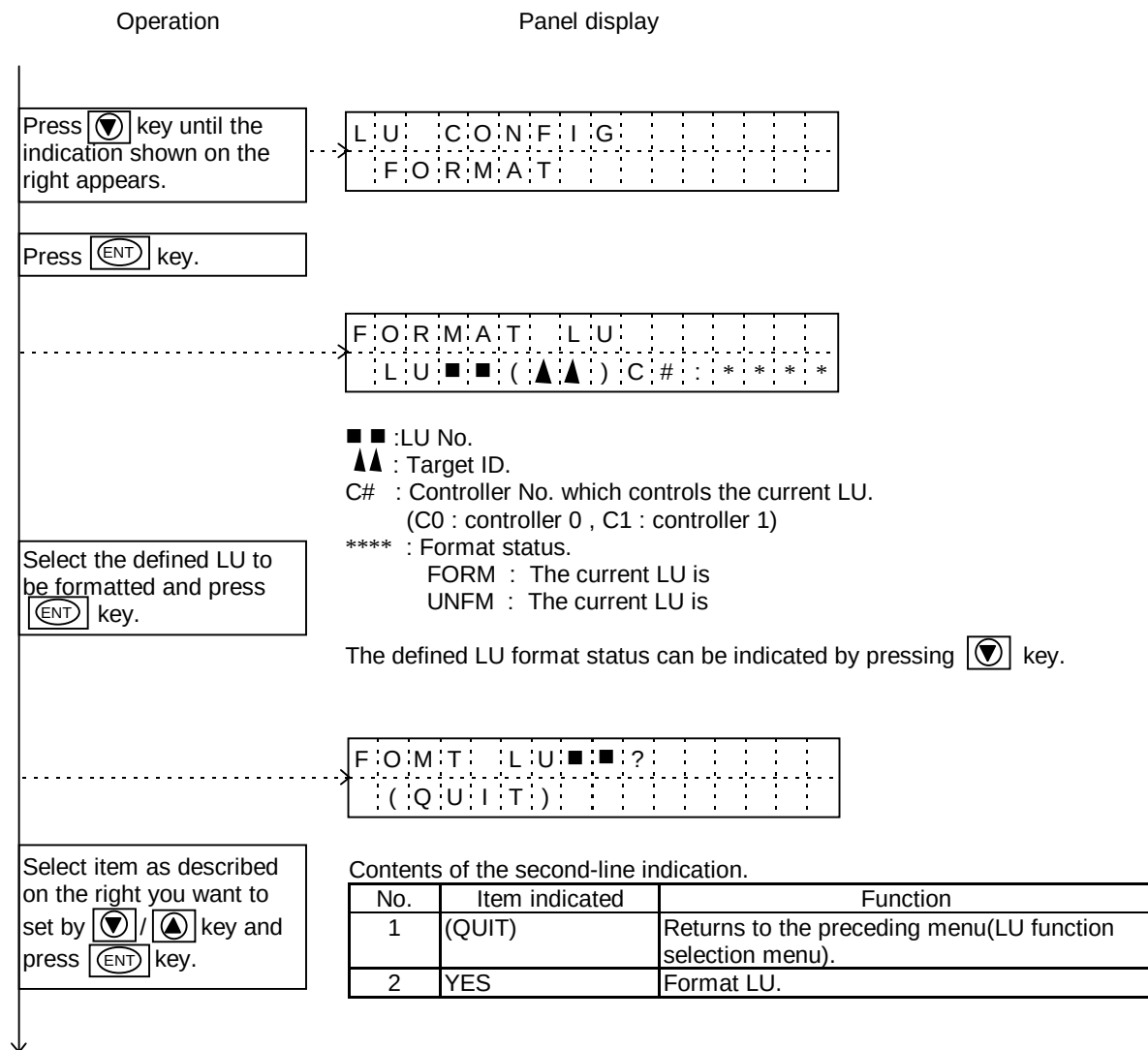


[Procedure③-E] Formatting

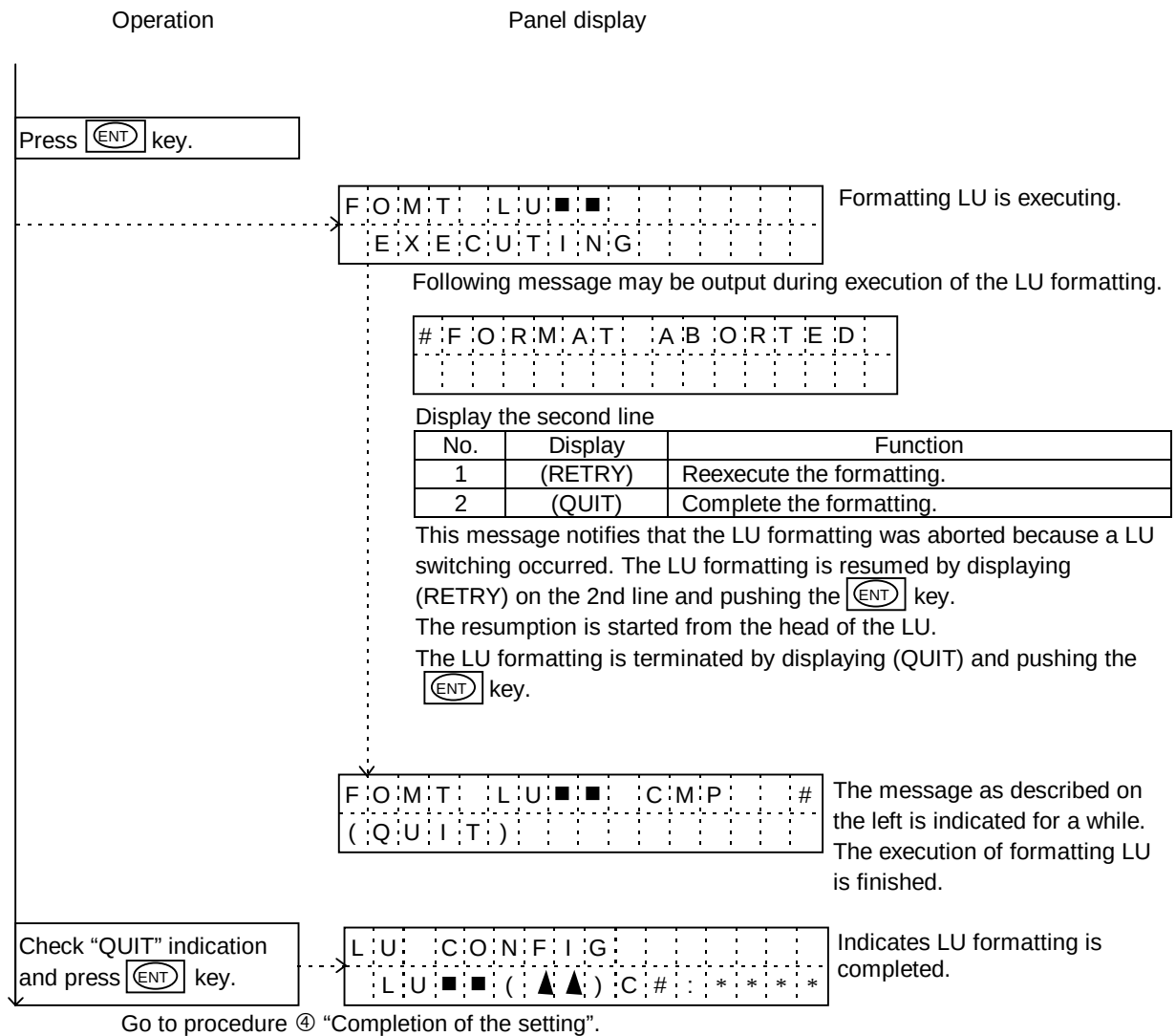
Notice : Note that user data will be lost by formatting the formatted LU.

Besides, be sure to execute the LU formatting for each set LU. When the microprogram of version 0304 or later is used, read/write access from the upper device is possible to the LUs other than that being formatted. Accordingly, the formatting for the LU newly added can be executed while executing usual jobs after the addition of the row(s) following the procedures explained on pages DH-OPTION0200 - 0270.

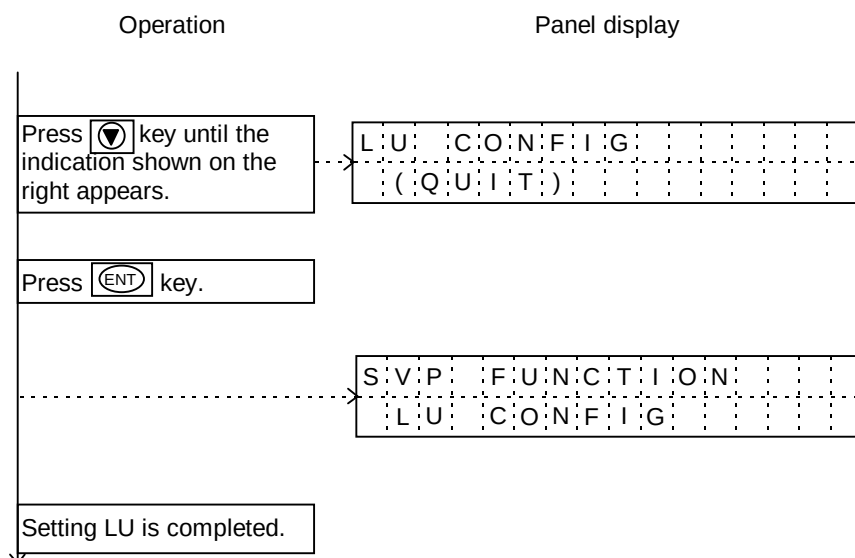
However, a reexecution is needed because the LU format is canceled when the subsystem receives a SCSI reset from the upper device.



Note : LU format must be excuted every set LUs.



[Procedure④] Completion of the setting



4.2.4 Setting other parameter

The menu items and the use are shown below. Refer to PANEL chapter (PANEL0340) to change the parameter shown below. The function shown below can be used when the subsystem is ready and the LU#0 is already defined.

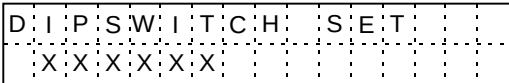
No.	Menu item	Use	Description	Setting before shipment
1	RAID CONFIG	RAID configuration information reference/setting menu	① Reference to RAID configuration information ② Definition of RAID group ③ Deletion of RAID group	
2	LU CONFIG	LU configuration information reference/setting menu	① Reference to LU configuration information ② Definition of LU ③ Deletion of LU ④ Formatting of LU ⑤ Switching LU service controller	
3	SYSTEM OPT (CUR)	System option setting (Only a current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time	
	SYSTEM OPT (SVD)	System option setting (A saved value and current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time ⑨ Setting of the job time-out limit ⑩ Setting of the number of detections in the execution of the reselection time-out ⑪ Setting of the TRESPASS mode (*1)	
4	DRIVE MAINTEN	Drive maintenance menu	① Instruction of drive detaching ② Instruction of drive recovery ③ Reference to drive data recovery status ④ Drive self diagnosis ⑤ Parity matching check ⑥ ECC check ⑦ LA check ⑧ Drive format ⑨ Recovery of system information ⑩ Reference of the disk failure statistical information.	

*1 : This menu is displayed only when ALTERNATE PATH3 has been set by SPECIAL CONNECT of the system parameter.

No.	Menu item	Use	Description	Setting before shipment
5	MICRO VER/REV	Microprogram version/revision numbers reference menu	① Reference to microprogram version/revision	
6	GATHERING (CTL0)	Gathers information of the controller #0 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
7	MEMORY MAINT	Memory content reference/update menu	① Reference/update of memory content	
8	RECV ERR INFO	Error display of recovery when the power is on	① Displays the errors occur during recovery operation performed while power is on	
9	PIN INFO	Display of PIN existence of every LU	① Display of PIN data existence	
10	WARNING INFO	Display of unrecovered warning information	The current warning information is indicated	
11	CLEAR LOG(CT0)	Clearing log information of controller #0	Log information related controller and host I/F is cleared	
12	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

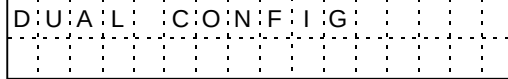
5. Returning procedure in system parameter setting menu

During system parameter setting menu when wrong menu is selected ( key is pressed), the method of returning for each menu is shown below.

After the operation below  is displayed.

(XXXXXX : Wrongly selected menu)

Then select desired menu by pressing  or  key.

No.	Menu	Procedure to return
1	ROM RESP MODE	Press  key.
2	WRITE&VERIFY	Press  key.
3	STRIPE SIZE	Press  key.
4	LAN CONST	Press  key to display “QUIT” and press  key.
5	TARGET ID	Press  key.
6	CONNECT AS/400	When NOT CONNECT : Press  key. When CONNECT AS/400 : Press  key, and after displaying “QUIT”, press  key.
7	CONNECT VMS	Press  key.
8	SPECIAL CONNECT	Press  key.
9	SAVE DATA PTR	Press  key.
10	HOST BLK SIZE	Press  key.
11	ERROR INF	Press  key.
12	CONTROLLER	Press  key.
13	SPARE DISK	Press  key.
14	SERIAL NO	Press  key.
15	ROM V/R	Press  key.
16	RAM V/R	Press  key.
17	CONTROLLER NAME	Press  key.
18	ROW LAST LBA	When Menu is ROW LAST LBA : Press  key to display “QUIT”, then press  key.
19	BUZZER	Press  key.
20	SYSTEM ERROR	Press  key.
21	GENERATE SYS	Press  key.
22	INQUIRY INF	Press  key to display “QUIT” and press  key.
23	DUAL CONFIG	Press  key until  is displayed.
24	LU SIZE	Press  key.
25	SYNC CONTROL	Press  key.
26	SYS REV	Press  key.
27	OPTION	Press  key.
28	BOOT PROG V/R	Press  key.
29	RTC SET	Press  key to display “QUIT(ENT KEY)” and press  key.

6. Subsystem Settings for Use in Special Modes

6.1 When Sun OS Solaris 2.5.1 or later is used by the host side

If the following message is displayed on the console screen while executing SUN Format command, use the subsystem with its mode changed to this one.

[Computing capacity exceeds actual disk capacity.]

To use the subsystem in this mode, its microprogram version must be 0304/L, 0305/B or later.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.1.1.

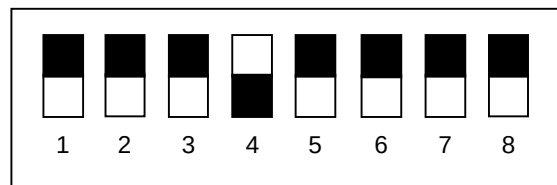
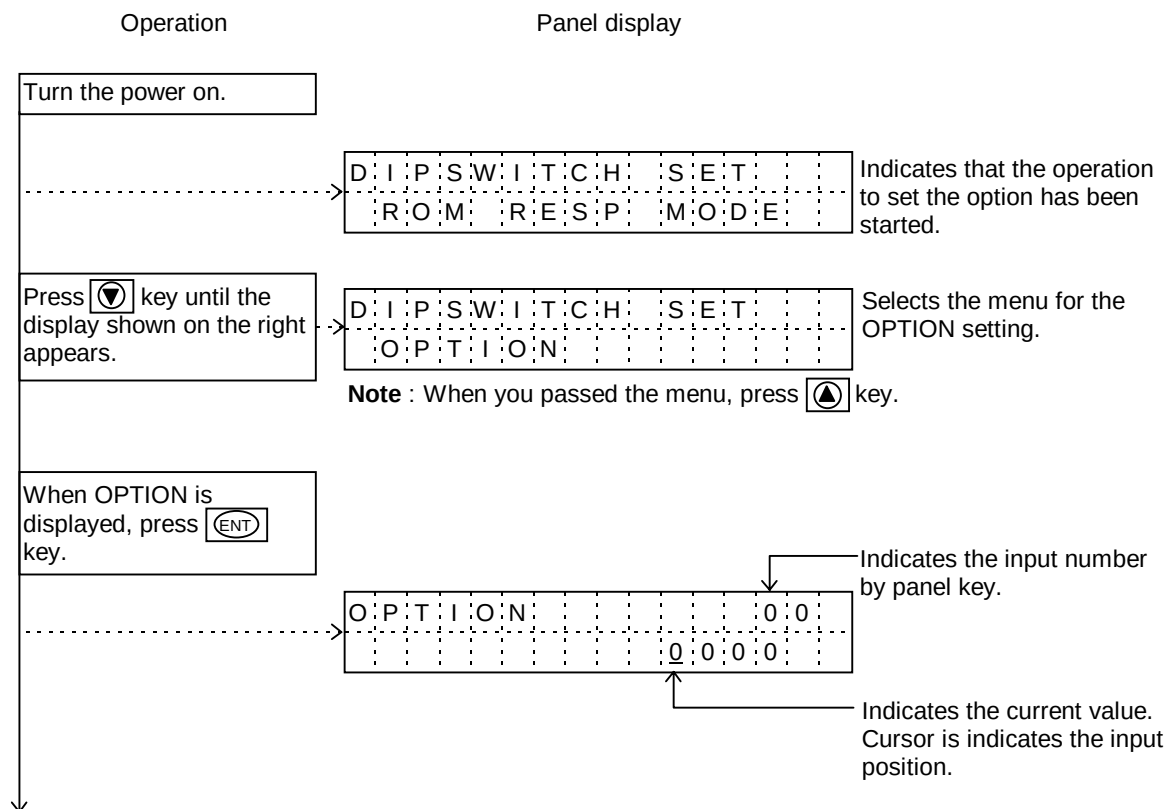
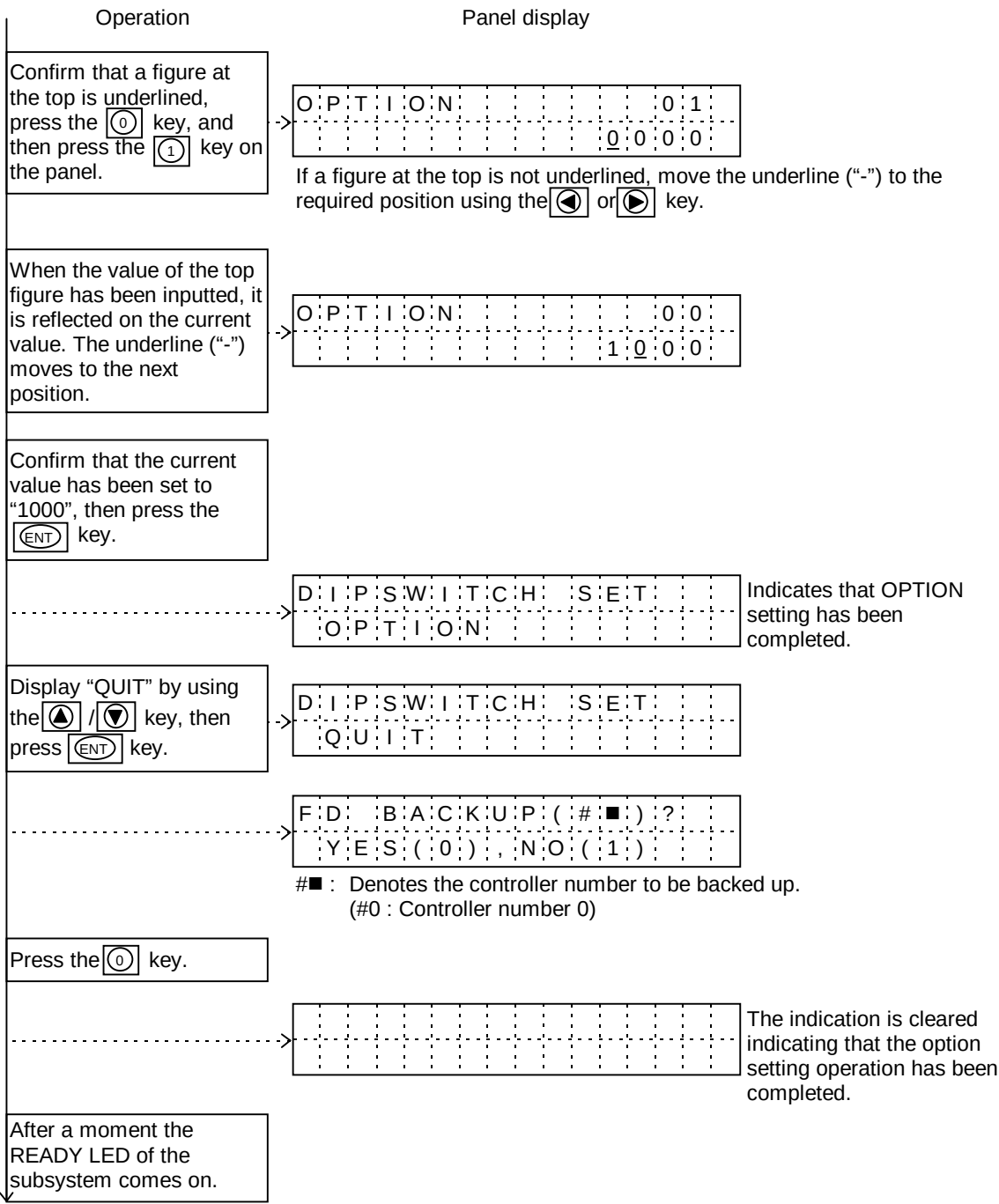


Figure 6.1.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.1.2.

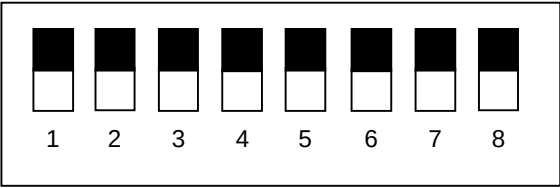


Figure 6.1.2 DIP switches (Being set for Standard setting)

6.2 When Using the Subsystem in Connection with MP5400

When using the subsystem in the state connected with the MP5400, it is necessary to use it with the microprogram Ver.0305/A or later. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.2.1.

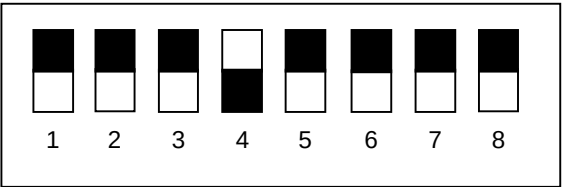
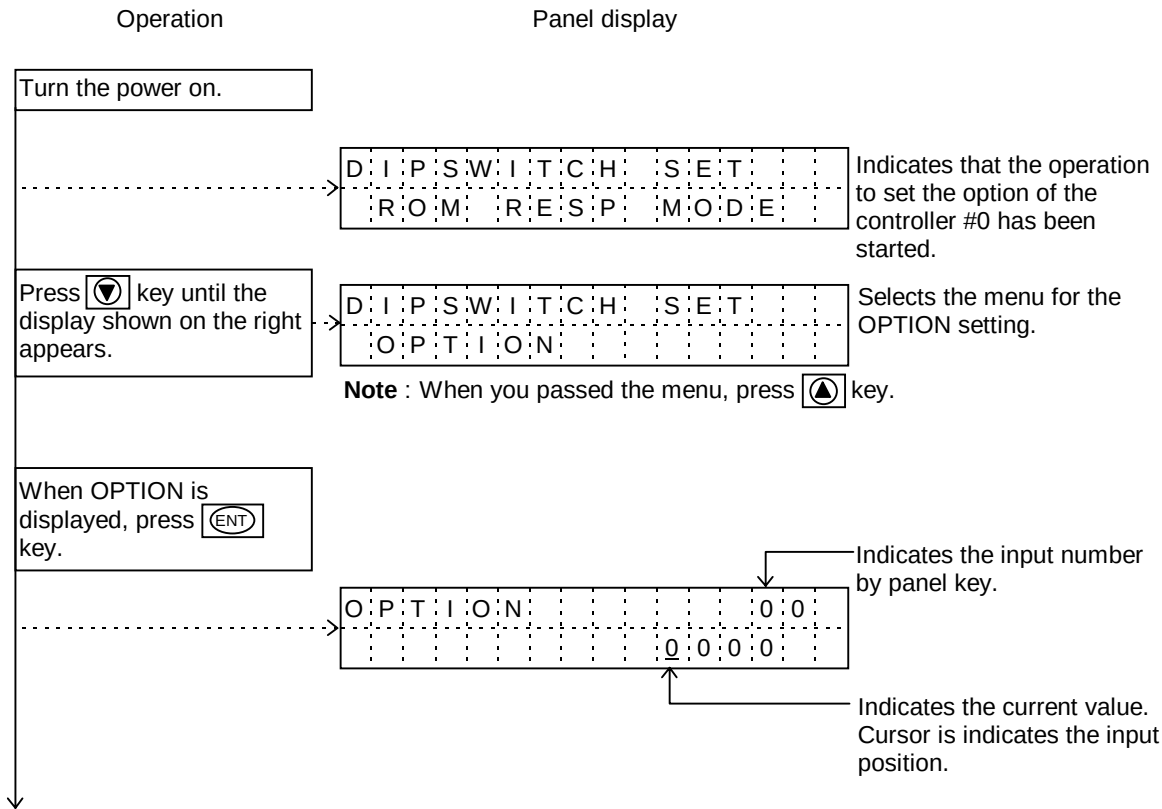
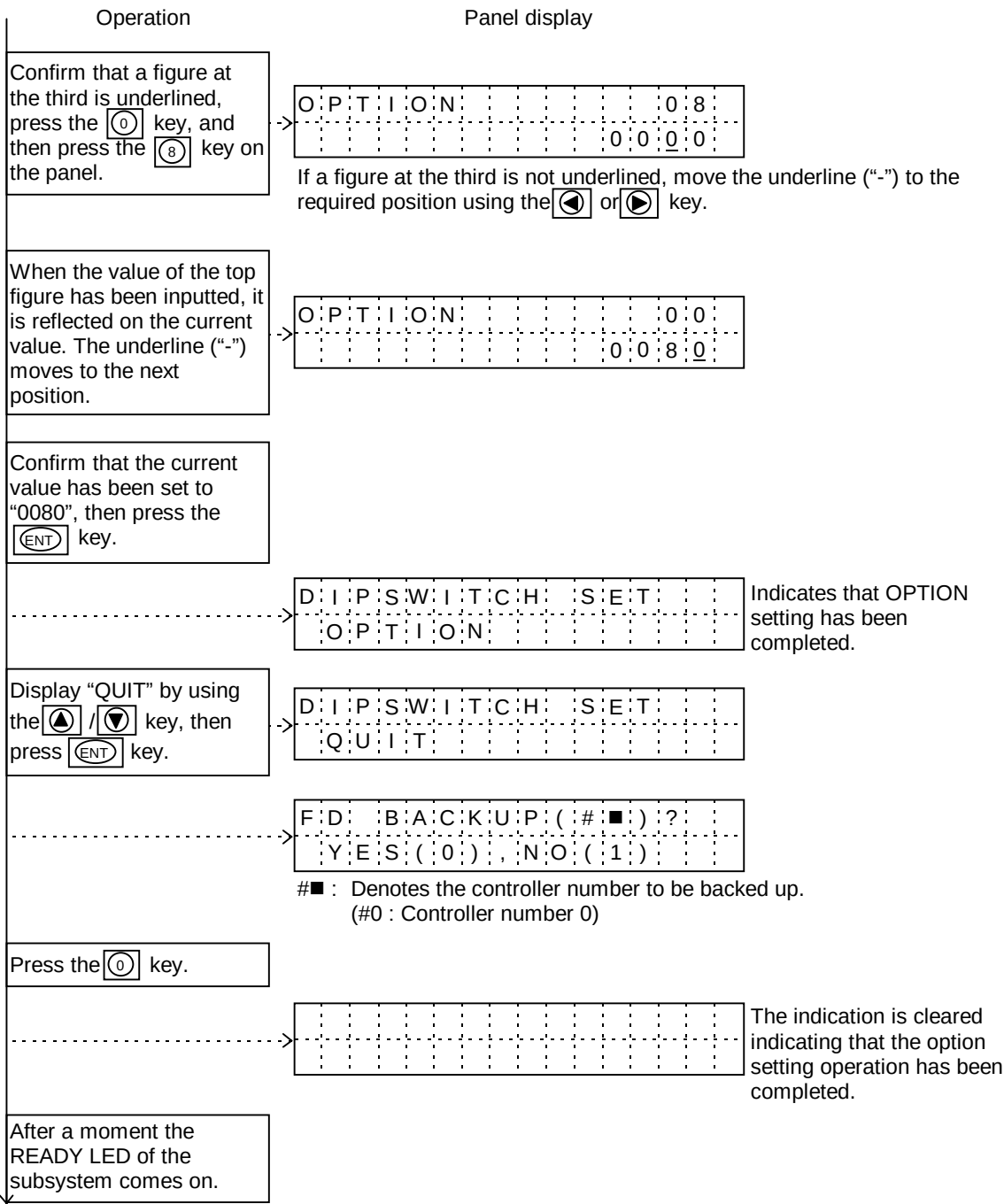


Figure 6.2.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.2.2.

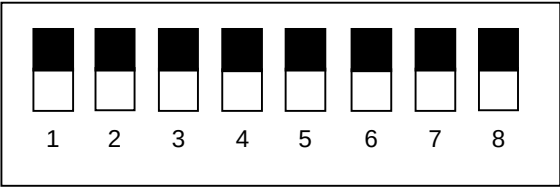


Figure 6.2.2 DIP switches (Being set for Standard setting)

6.3 When Using the Subsystem in LU Blockade Mode

When the subsystem is used in this mode, if a blockade failure occurs on the second disk in the same ROW, the disk concerned is blocked and the LU in which the disk concerned is included is blocked.

When the LU is blocked, data cannot be read from or written onto the LU concerned. If the blocked LU is accessed, a sense key/sense code=0313180 is reported.

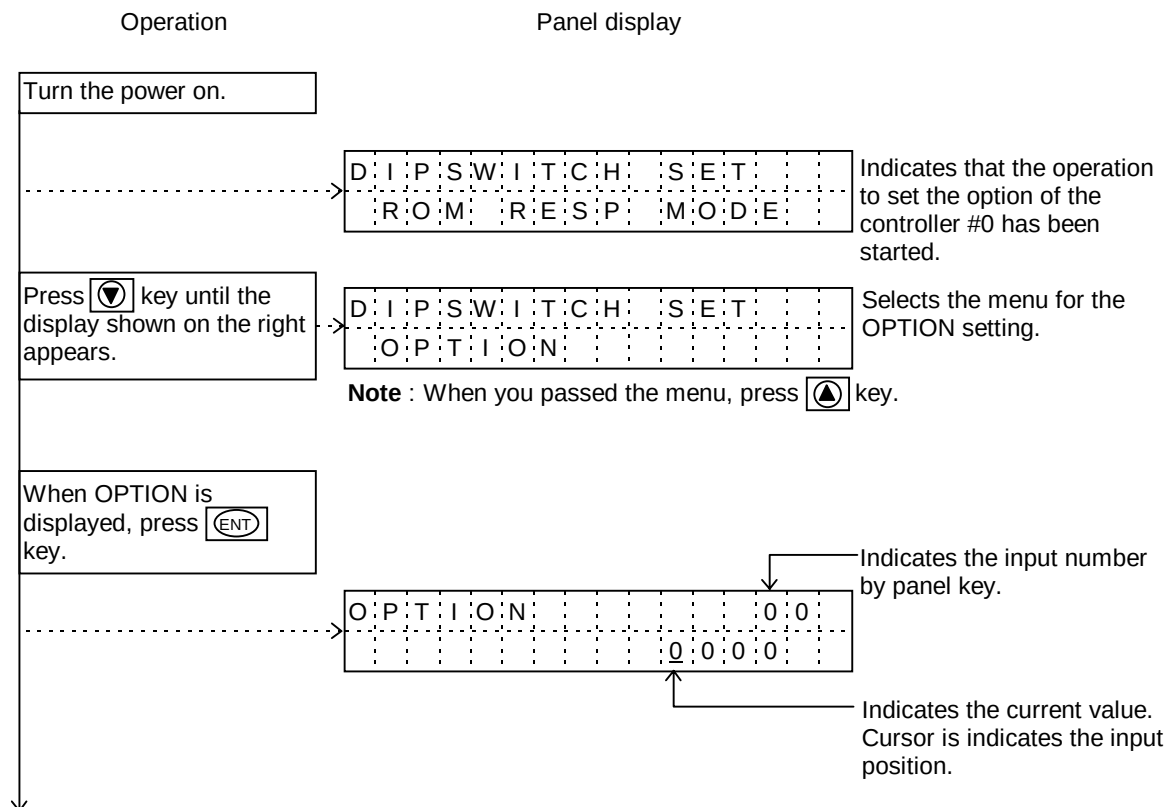
To use the subsystem in this mode, the microprogram must be Ver.0305/B or later.

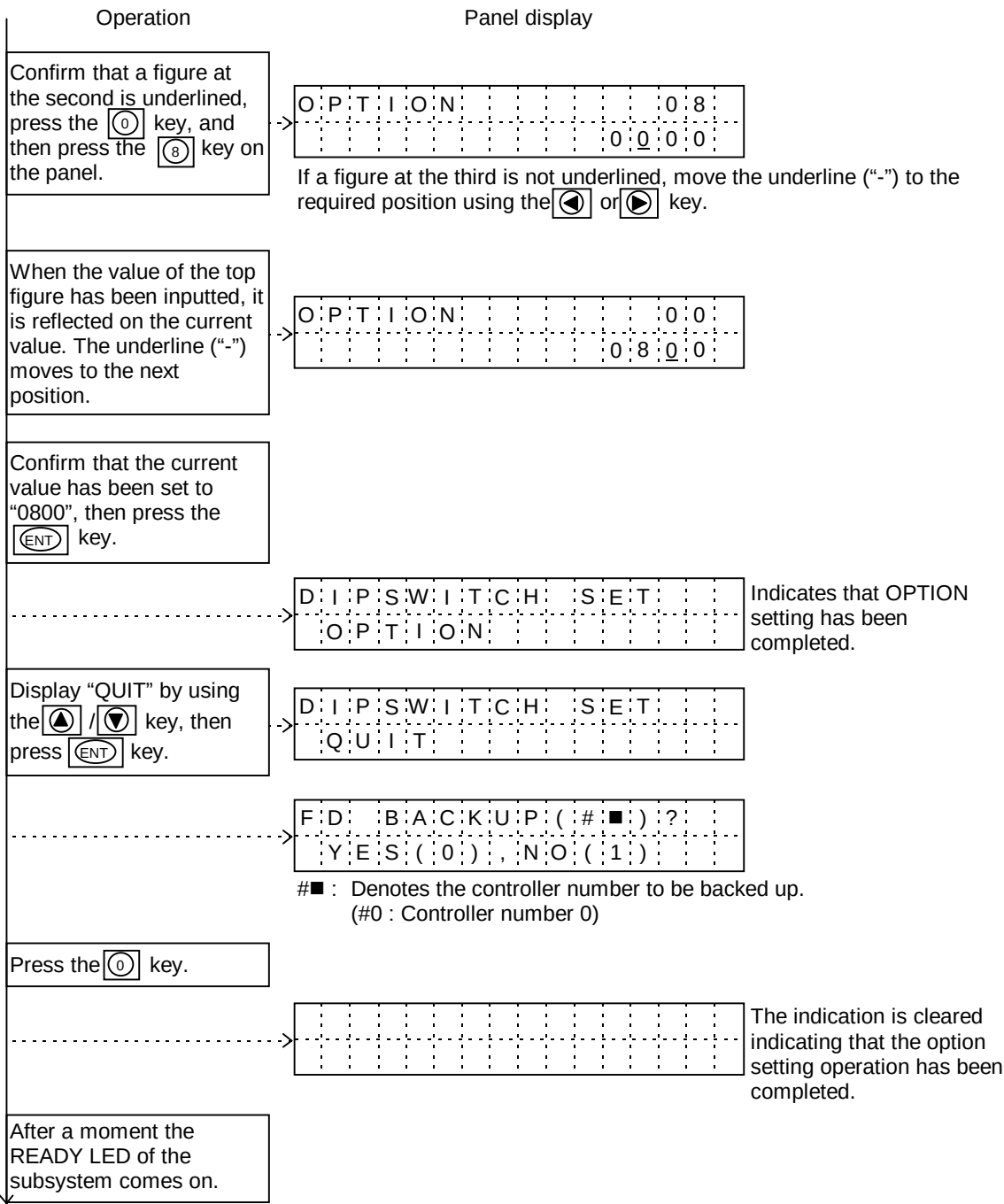
- (1) Before turning the power on, set DIP switch No.4 as Figure 6.3.1.



Figure 6.3.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.3.2.

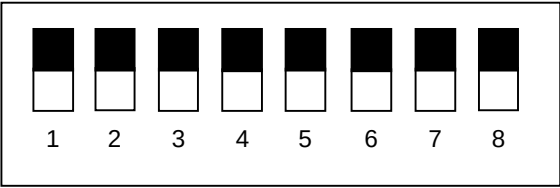


Figure 6.3.2 DIP switches (Being set for Standard setting)

6.4 When outputting information whether a warning is given in the subsystem via RS232C

When outputting information whether a warning is given in the subsystem via RS232C, the microprogram version 0307/F or later is required to be used. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.4.1.

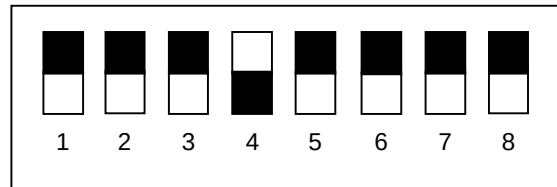
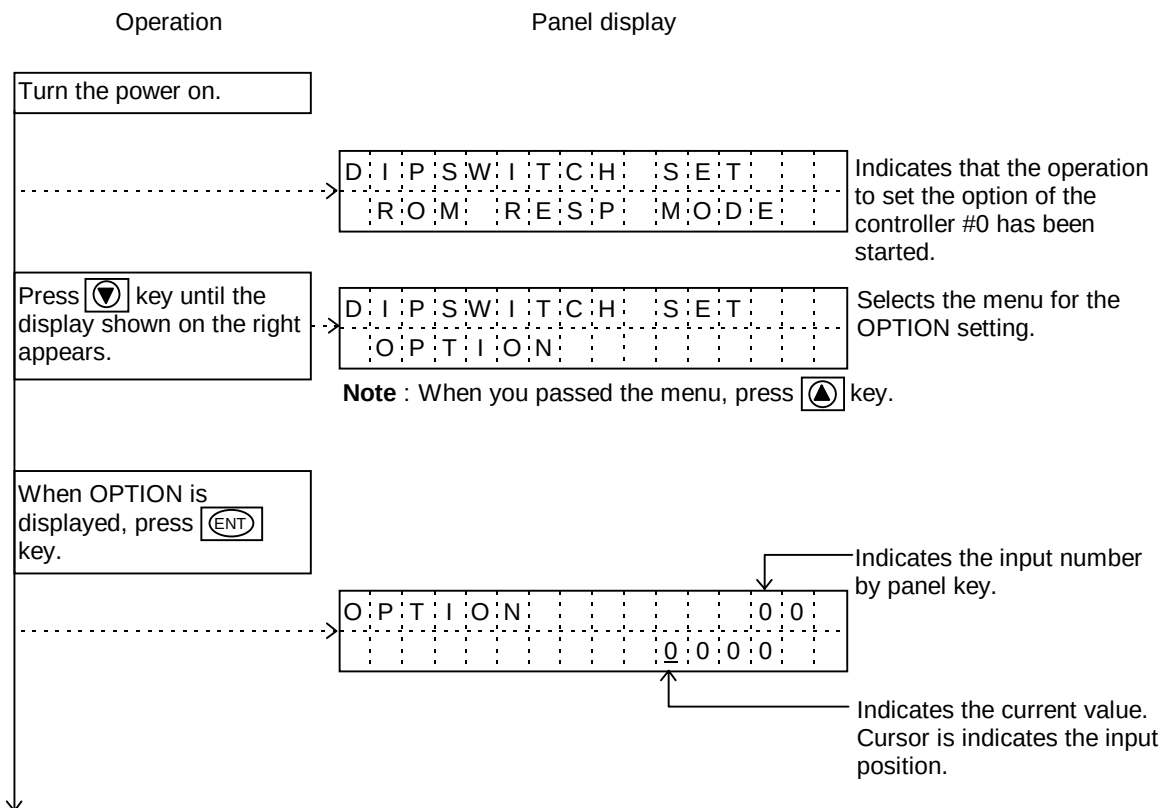
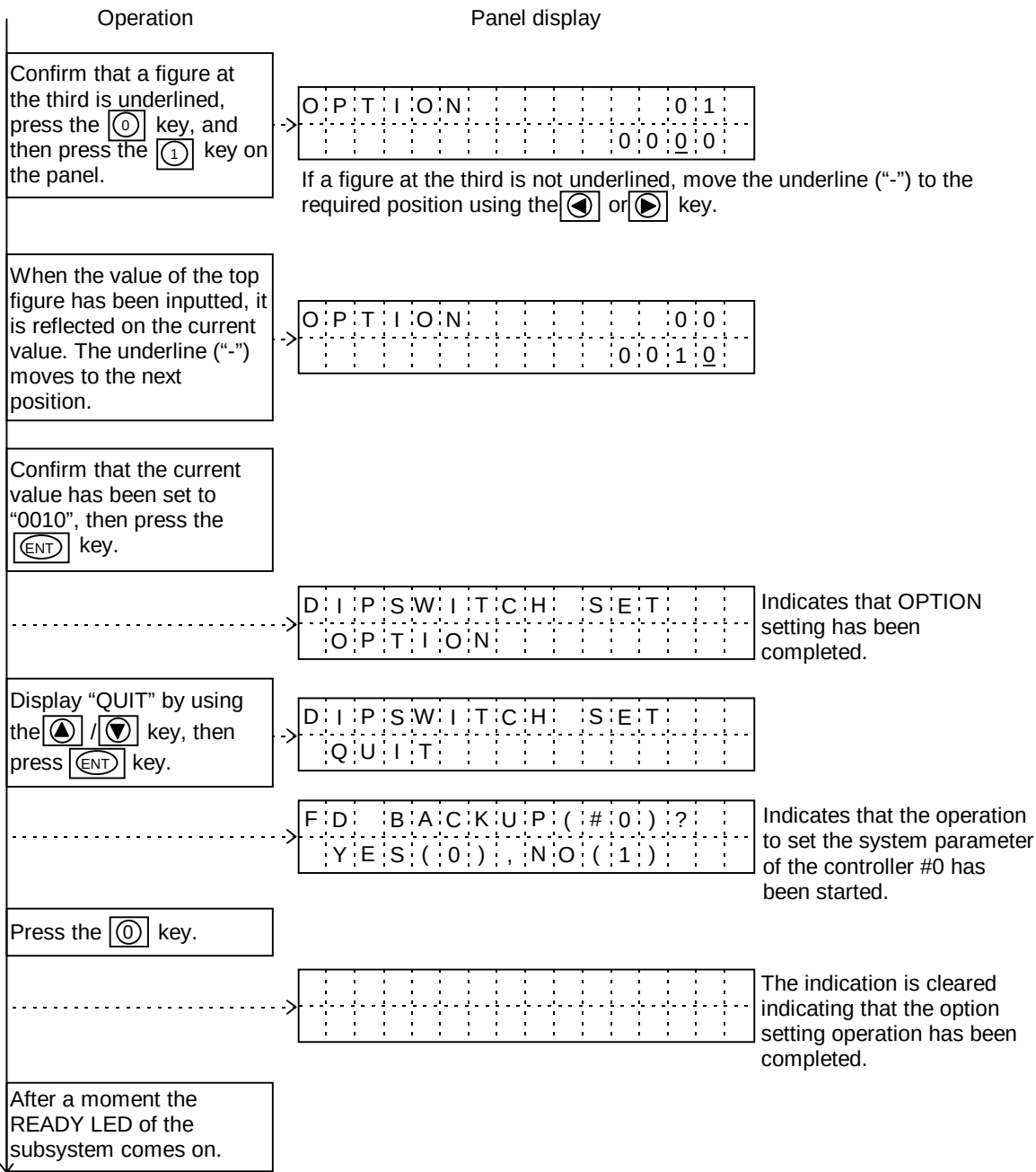


Figure 6.4.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.4.2.

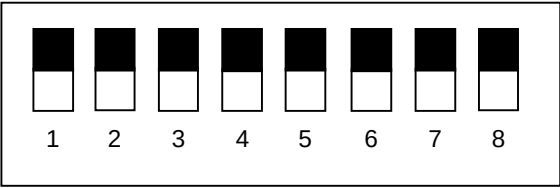


Figure 6.4.2 DIP switches (Being set for Standard setting)

DF350 Disk Subsystem

9. OPTIONAL INSTALLATION (Desktop (DKH) Type)

Rev.2

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: A: Addition, C: Change, CR: Correction, DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.10.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	Issued	
1	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0210	Added A2E8/A1E18.	AD
2	Oct.15.'98	A.Yamanashi			0210	Added A3E4.	AD

1.	Note when Installing the Optional Features	DH-OPTION0030
2.	Installing the Optional Features	DH-OPTION0040
2.1	Unit Appearance Check.....	DH-OPTION0040
2.2	Checking Items of System Components and the Other Items Shipped with the Unit.....	DH-OPTION0040
2.3	Back-up Procedure of System Parameter	DH-OPTION0050
2.3.1	Back-up procedure to FD	DH-OPTION0050
2.3.2	Restoring procedure from FD	DH-OPTION0080
2.4	Power OFF.....	DH-OPTION0110
2.5	Installing the CACHE ASSY.....	DH-OPTION0130
2.6	Installing the LAN ASSY	DH-OPTION0140
2.7	Installing the AC/DC Power Supply.....	DH-OPTION0180
2.8	Installing the HDU ASSY	DH-OPTION0200

1. Note when Installing the Optional Features

- (1) Be sure to back-up copy user data before installing the optional features. A mis-operation might cause the loss of user's data.
- (2) Back-up the system parameter according to "Back-up Procedure of System Parameter". (See DH-OPTION0050.)
- (3) Power off the subsystem according to power off procedure before installing the optional features. If not, user's data might be lost.

2. Installing the Optional Features

2.1 Unit Appearance Check

Check visually the unit appearance for distortion or damage during the transportation.

2.2 Checking Items of System Components and the Other Items Shipped with the Unit

Check items and quantities of system components (model, serial number, and quantity) and other items shipped together with the unit. Cross-check with the packing list.

2.3 Back-up Procedure of System Parameter

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) are need to be copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters following “Back-up procedure to FD” (See DH-OPTION0050) or “Restoring procedures from FD” (See DH-OPTION0080).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to DH-OPTION0110.

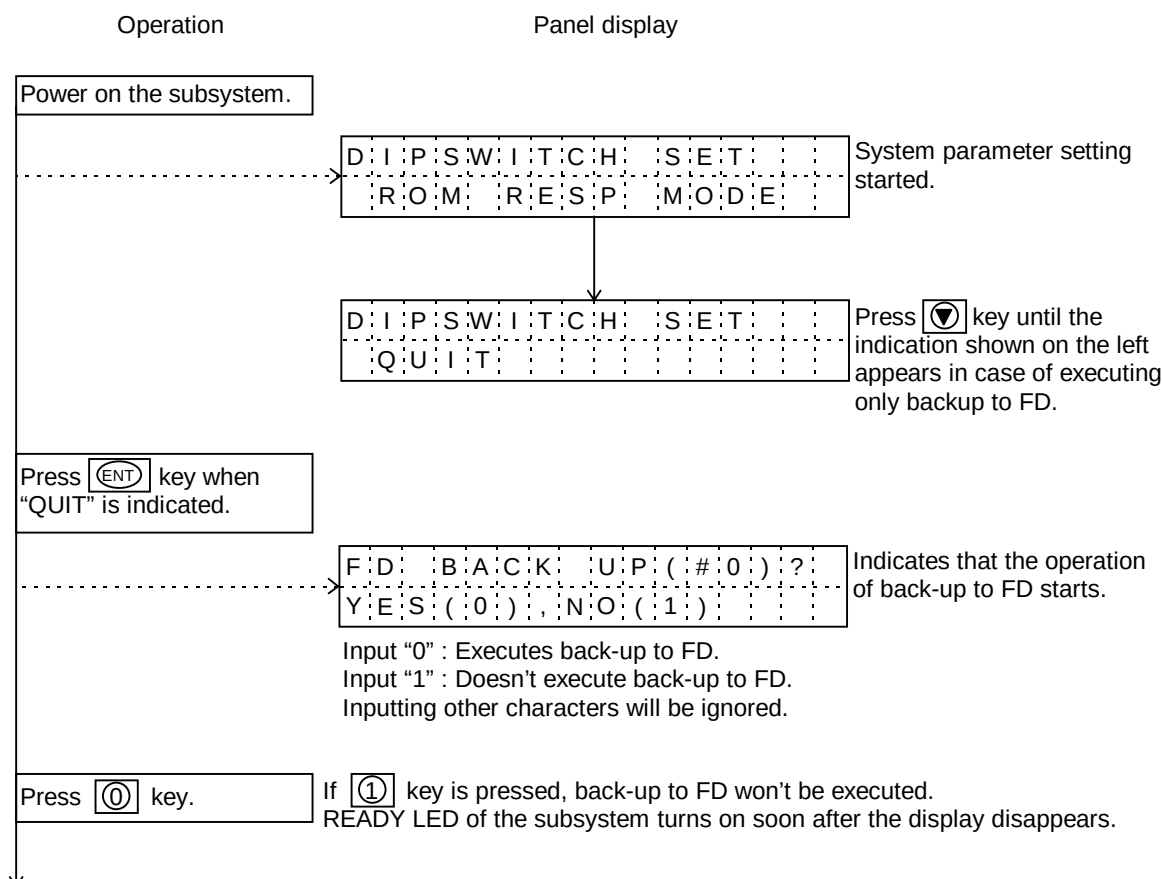
Notice : If the power is not turned off normally, the user's data might be lost.

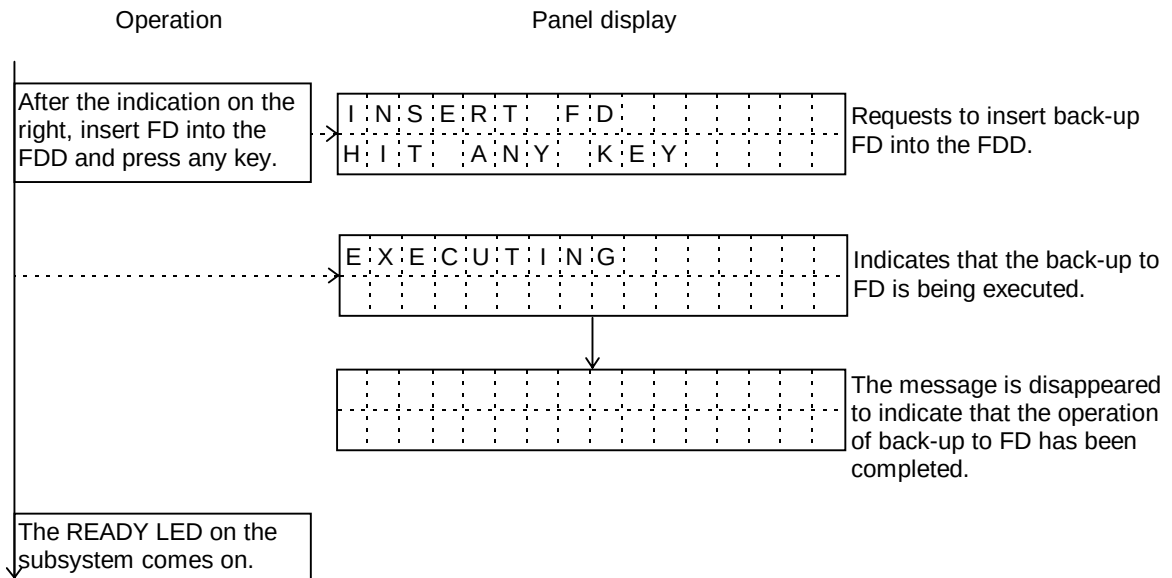
- (2) Before power on the subsystem, set DIP switch No.4 as shown in Figure 2.3.1.



Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

- (3) Operate as described below.





(4) Set DIP switch No.4 as shown in Figure 2.3.2.

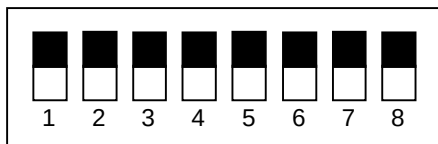
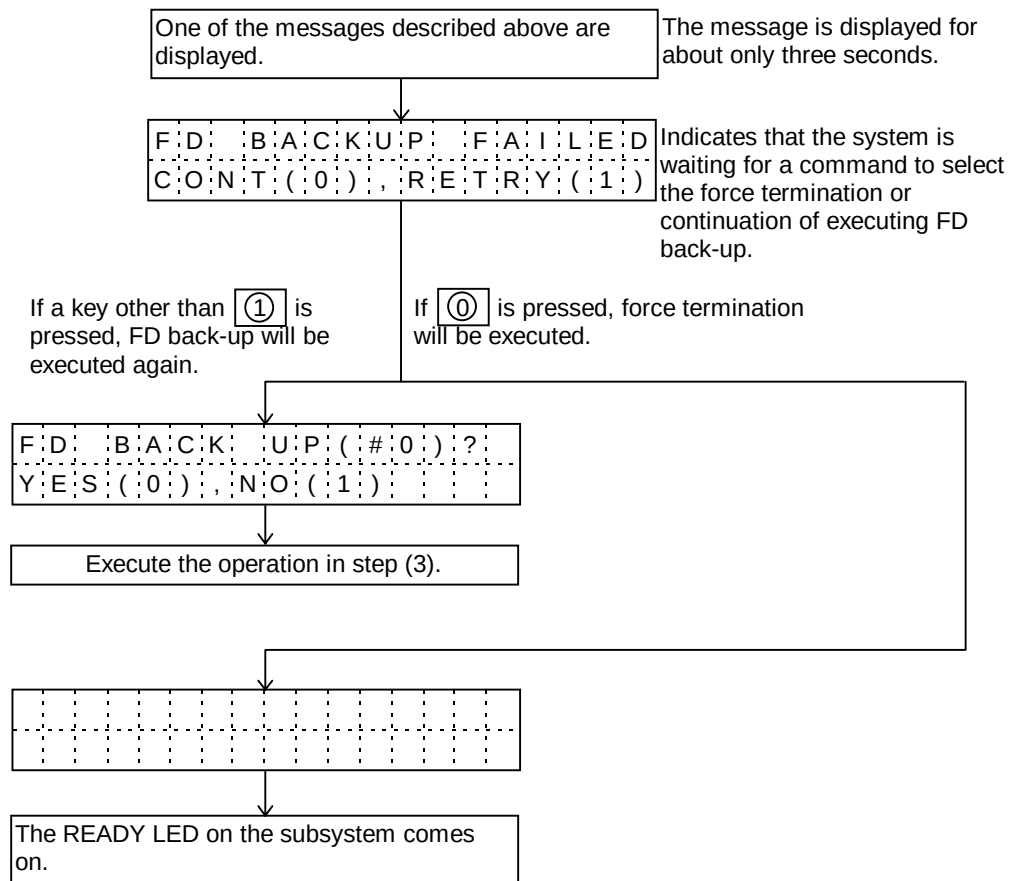


Figure 2.3.2 DIP Switches

Note 1 : While the back-up to FD is being executed, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

2.3.2 Restoring procedures from FD

(1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.

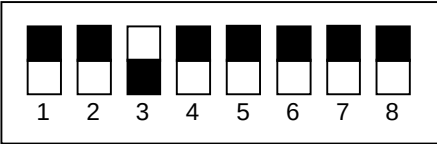
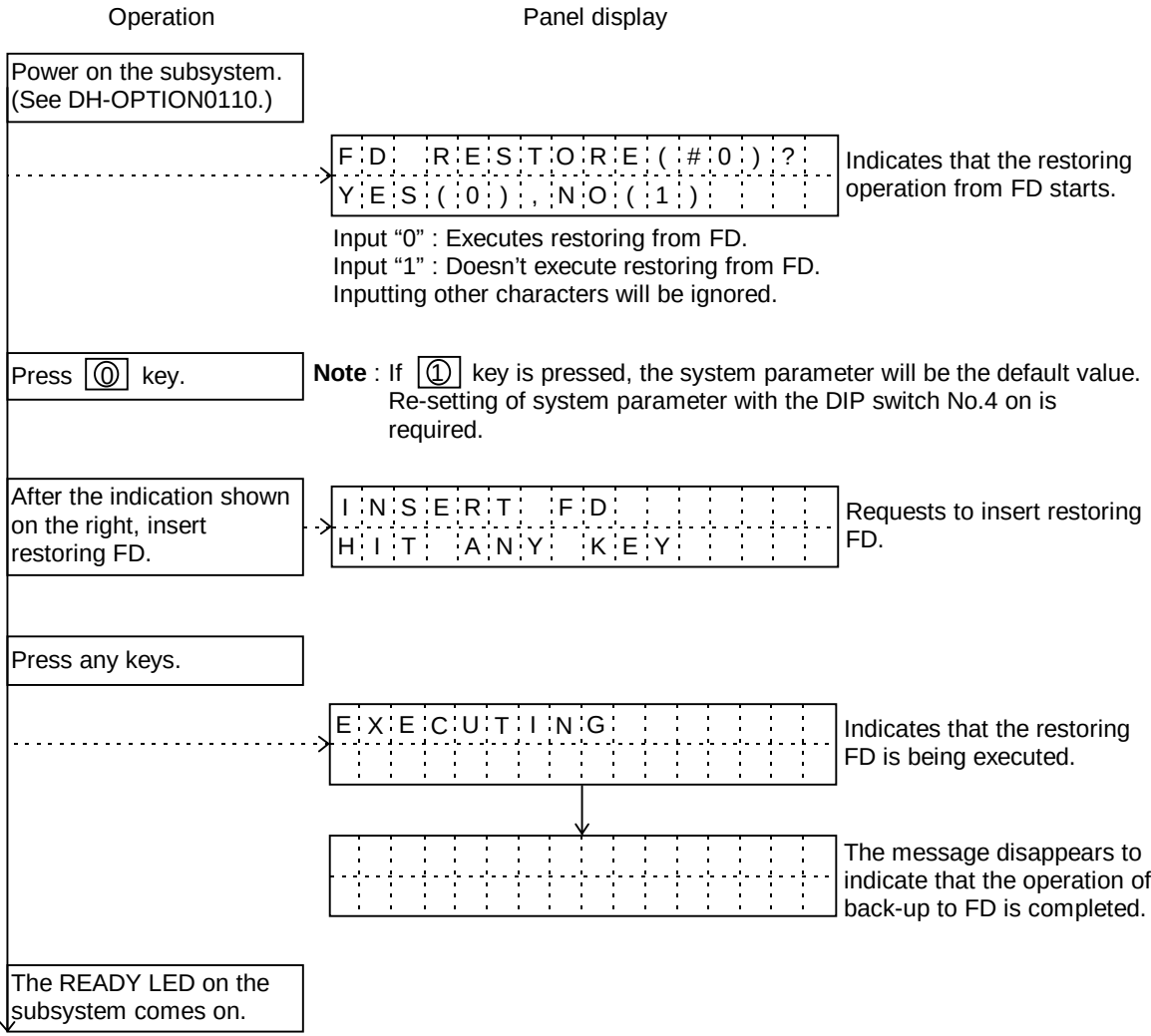


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

(2) Operate as described below.



(3) Set DIP switch No.3 as shown in Figure 2.3.4.

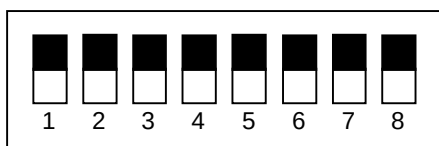
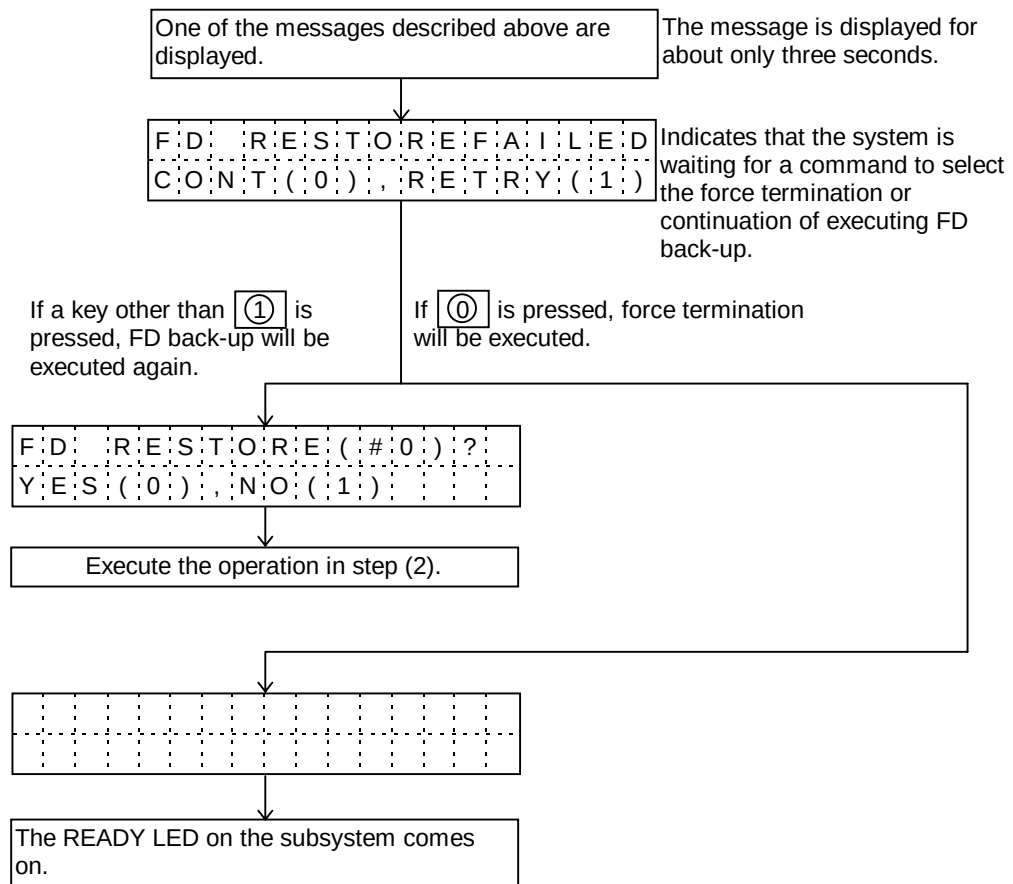


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-execute following the operation described below.



Note 2 : In case that restoring operation ended in failure and was force terminated, setting of EEPROM will be default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

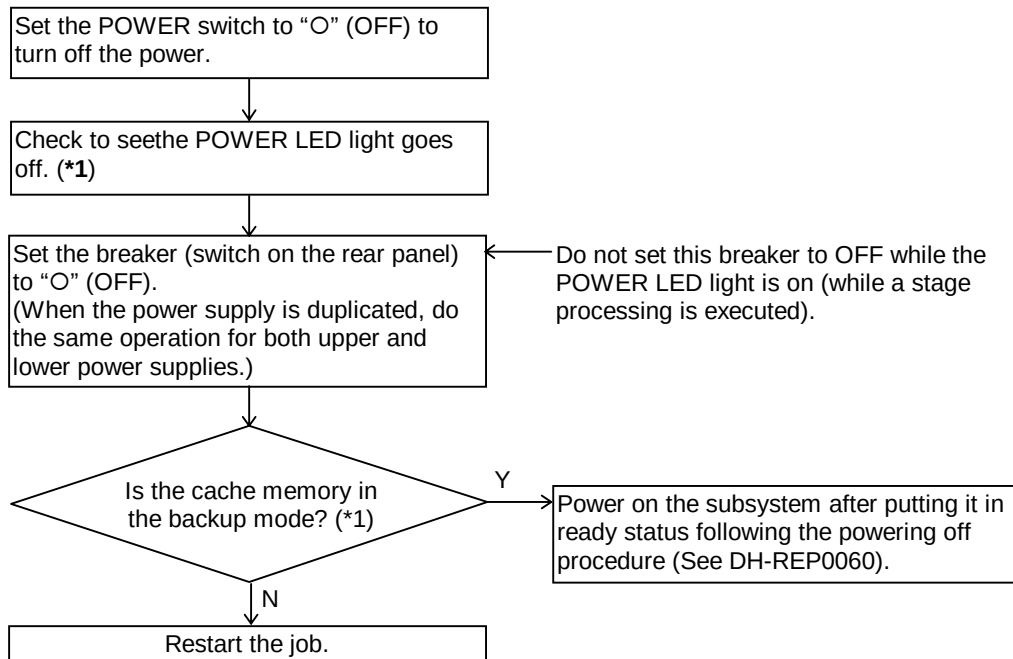
Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

2.4 Power OFF

Turn off the power correctly according to the Power OFF Procedure (1) shown below.

Notice : If optional features are not installed to the system correctly, user data may be lost.

(1) Power OFF procedure



If a power down occurs or the breaker is set to OFF by mistake before the POWER LED goes off, turn on the power right away according to the “(2) Power ON procedure” below, then execute the power off procedure above.

*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to “|” (ON) with the power switch (POWER SW) set to “O” (OFF).

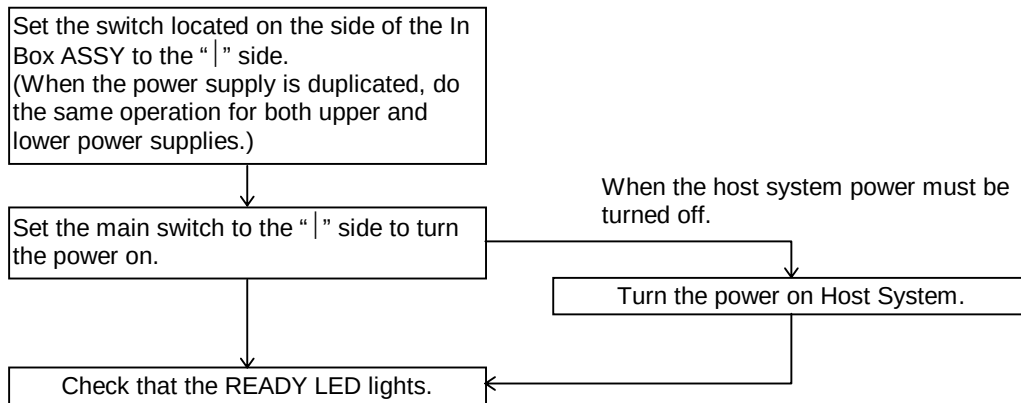
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicates the back-up mode.

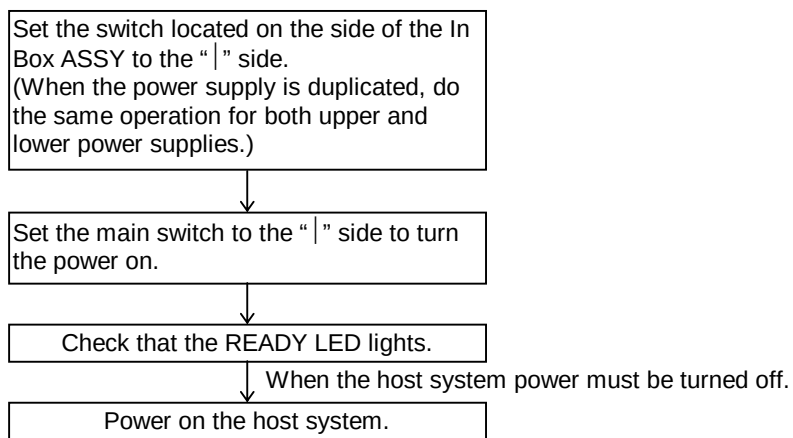
CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.5 Installing the CACHE ASSY

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the power according to the power-off procedure in DH-OPTION0110.

Notice1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the CACHE backup is not being performed. If the CACHE backup is being performed, turn on and off the power (see page DH-REP0050), then perform the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- ③ Remove the cover (L). (See DH-REP0170.)
- ④ Remove the cover (U). (See DH-REP0190.)
- ⑤ If the LAN ASSY is installed, also remove it. (See DH-OPTION0140.)
- ⑥ Install a CACHE ASSY.

Note 1 : The capacity of the CACHE ASSYs to be mounted in cache slots #0 and #1 must be the same.

(2) Installing procedure

- ① Install the CACHE ASSY in the reverse order step (1).

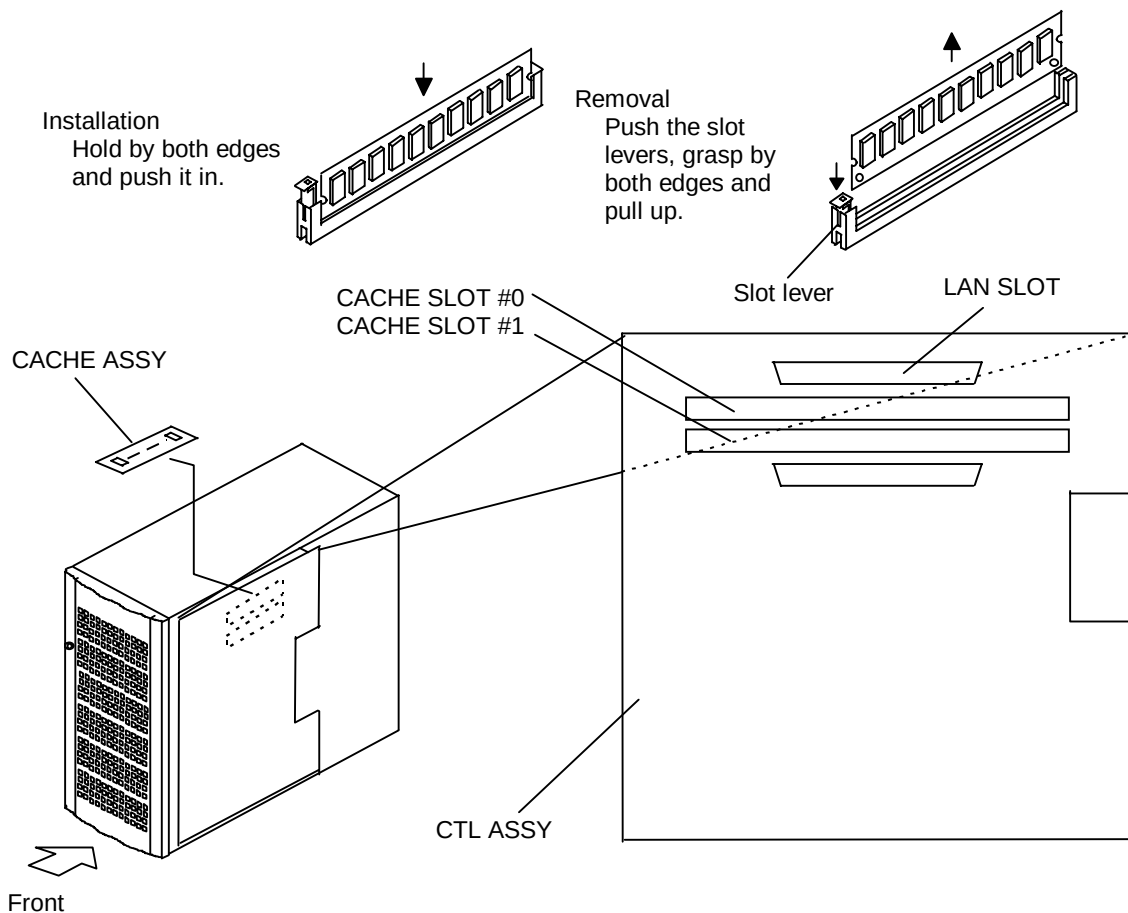


Figure 2.5.1 Installing a CACHE ASSY

2.6 Installing the LAN ASSY

The adding procedure differs depending on the case of G1D1 or G2D1.

Perform steps (1) to (5) in the case of G1D1 or steps (1) to (17) in the case of G2D1.

Adding procedure

- (1) Power off the subsystem following the powering off procedure (instructed on page DH-OPTION0110).

Notice1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the CACHE backup is not being performed. If the CACHE backup is being performed, turn on and off the power (see page DH-REP0050), then perform the replacement after the power is turned off normally.

When powering off the subsystem, there may be the case that the following message is displayed on the panel and the subsystem power cannot be turned on even when turn the main switch to the "O" position. If this occurs, turn the power off referring to "Errors and Recovery Measures" (on page TRBL0030) in "Troubleshooting section".

When the power cannot be turned off, "TOOMNYPIN", "SYSDTSVER" or "POFFCMUNC" is displayed on the panel.

- (2) Check if the subsystem is not in the battery backup mode following the part replacement procedure on page DH-REP0070.
- (3) When the subsystem is mounted on the rack frame, take it down from the rack frame.
- (4) Remove the front cover, cover (L) and cover (U). (DH-INST0100, 0110, 0130.)
- (5) Install a LAN ASSY.
- (6) Attach the cover.

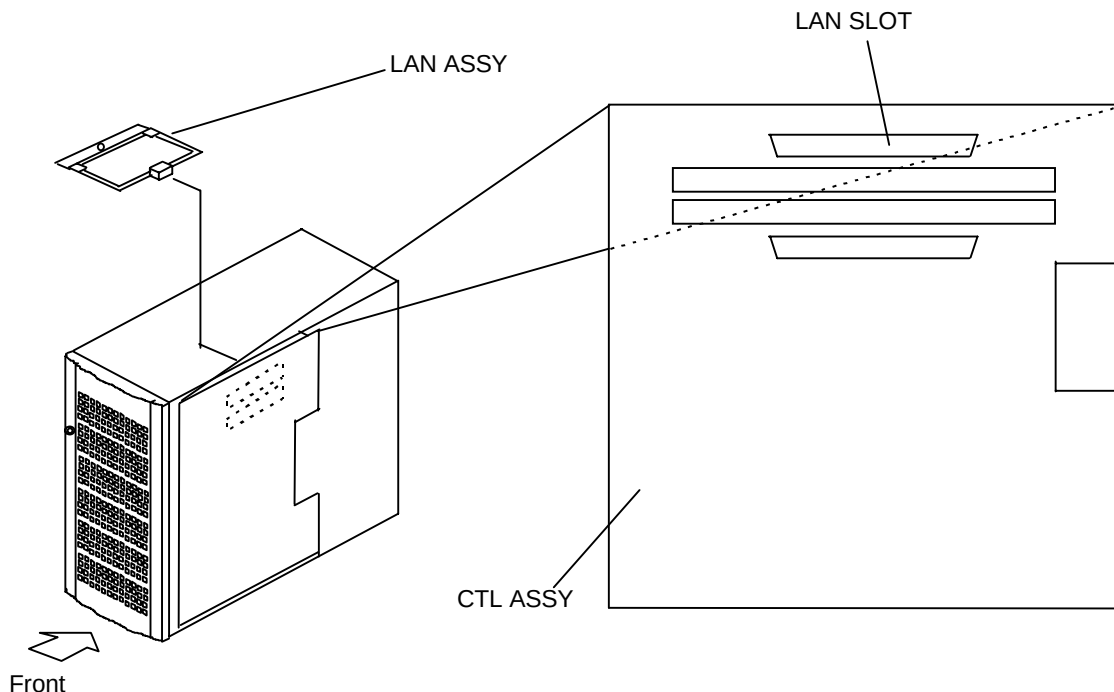
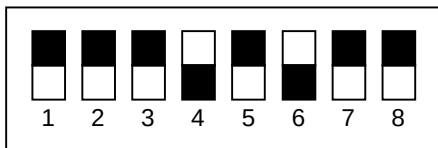


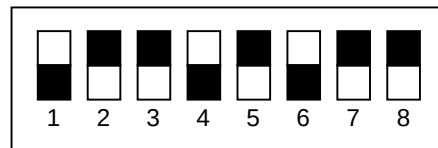
Figure 2.6.1 Installing a LAN ASSY

- (7) Open the front cover.
 (8) Set the DIP switches on the CTL ASSY as described below. Depending on the LAN ASSY to be used.

[DF-F350-G1D1]



[DF-F350-G2D1 (SNMP)]



- (9) Turn on the power according to the power-on procedure in DH-OPTION0110.
 (10) Set LAN connection state on the panel.

① Panel display



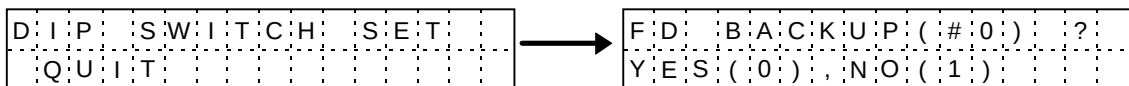
← Pressing , key, items are scrolled.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Displayed Item

No.	Message display	Description
1	CONNECT	LAN connected
2	NOT CONNECT	LAN not connected

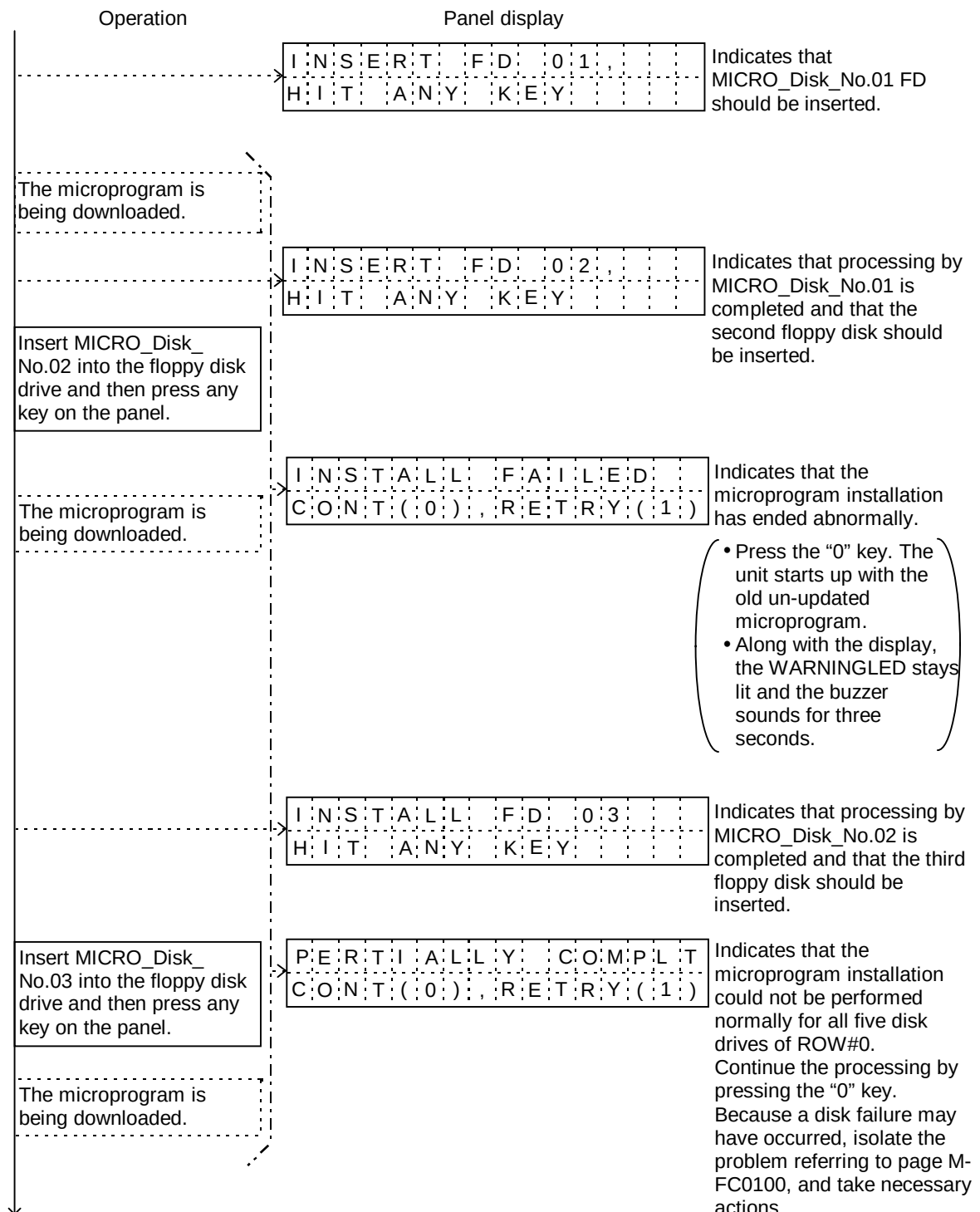
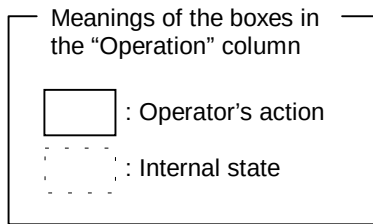
- (11) Set IP address. (See DH-INST0310.)
 (12) Set SUB NET MASK. (See DH-INST0320.)
 (13) Set DEFAULT GATEWAY address. (See DH-INST0330.)
 (14) Set System parameter on the panel. (See DH-INST0290.)
 (15) After setting ② in Chapter 5 and selecting "QUIT" on the panel, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of the system parameter.

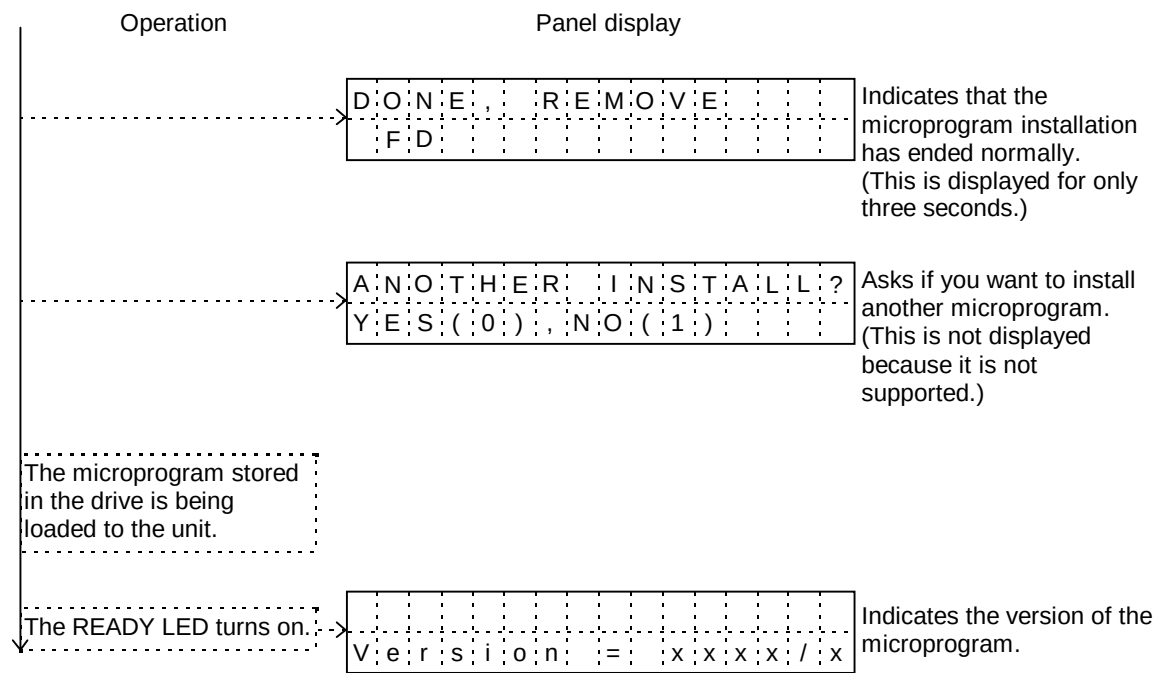


If this message appears, make a back-up copy of the data in the EEPROM into the BACKUP floppy disk.

(16) Perform the following procedure.

Note : Use a set of three FDs (containing a microprogram corresponding to the SNMP) supplied with the DF-F350-G2D1 when it is shipped from the factory.





- (17) Reset the DIP switches (4, 6 or 1, 4, 6) to the original positions after the system is ready.
- (18) Close the front cover.

2.7 Installing the AC/DC Power Supply

By installing the redundant AC/DC power supply, the subsystem can operate using another AC/DC power supply in case the AC/DC power supply fails. When installing the redundant AC/DC power supply, remove the Power Unit (D) installed in the upper position, and then install the power supply instead.

The redundant AC/DC power supply can be installed during the subsystem power is on.

(1) Removing procedure

- ① Loosen the screws ①, ②. (See Figure 2.7.1.)
- ② Disconnect the power cable.
- ③ Removeing the Power Unit (D).

(2) Installing the AC/DC power supply

- ① Insert the AC/DC power supply into the right place.
- ② Tighten the screw ①, ②. (See Figure 2.7.2.)
- ③ Connect the power cable.

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(3) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in DH-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

- ② Loosen the screws ①, ②. (See Figure 2.7.1.)
- ③ Disconnect the power cable.
- ④ Removeing the Power Unit (D).

(4) Installing the AC/DC power supply

- ① Insert the AC/DC power supply into the right place.
- ② Tighten the screw ①, ②. (See Figure 2.7.2.)
- ③ Connect the power cable.
- ④ Turn on the subsystem following the power-on procedure explained in DH-REP0050.

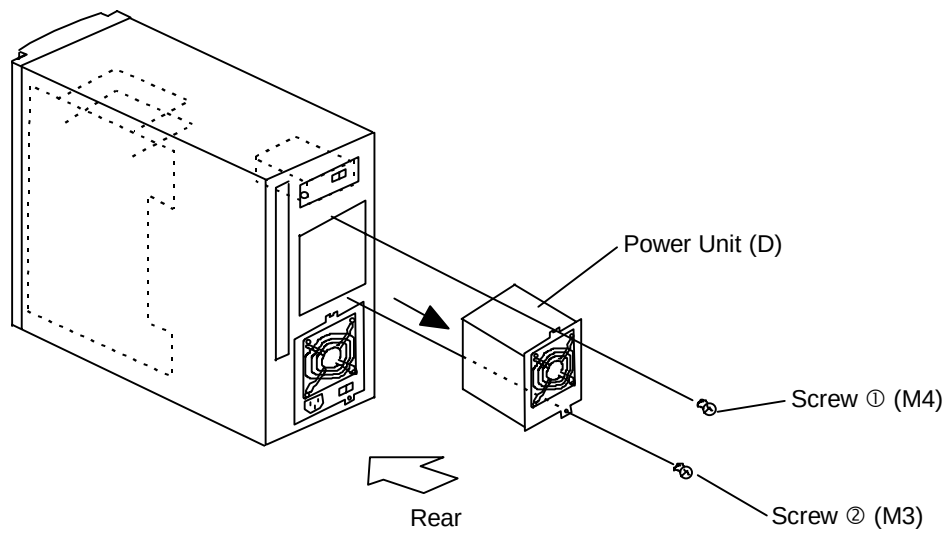


Figure 2.7.1 Removing the Power Unit (D)

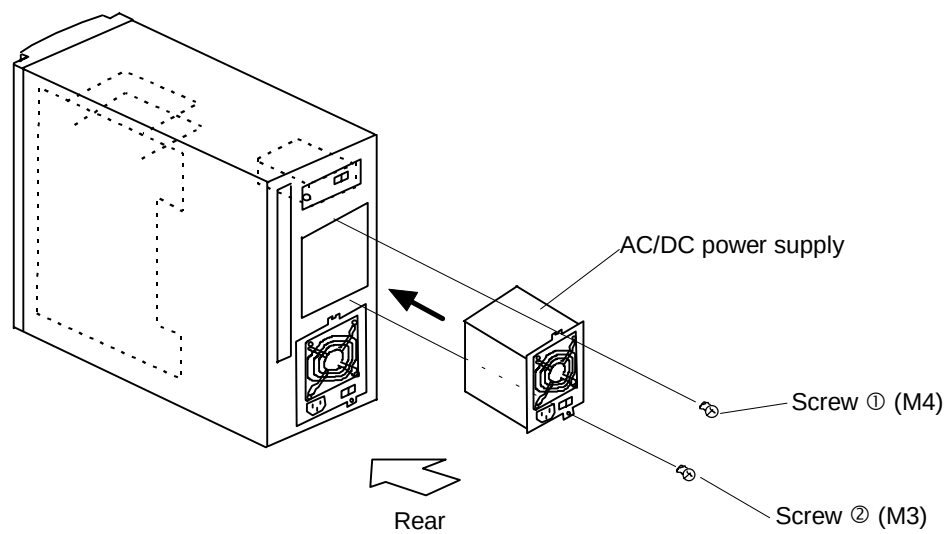


Figure 2.7.2 Removing the AC/DC Power Supply

2.8 Installing the HDU ASSY

Since the procedure differs depending on the cases below, be careful in installing the HDU ASSY.

- [1] Capacity expansion with HDU ASSY exchange
- [2] Installing a spare HDU ASSY



Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

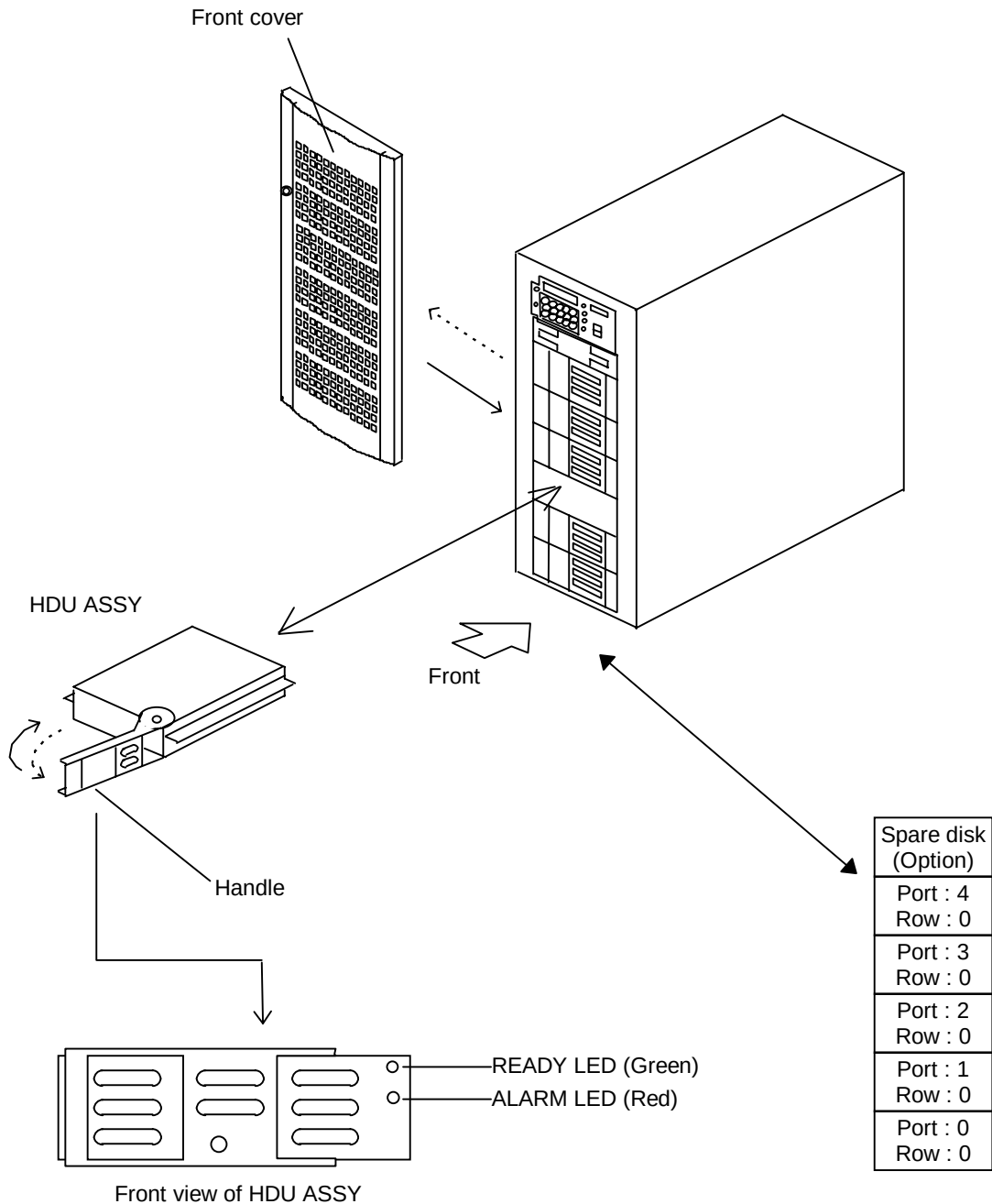


Figure 2.8.1 Installing the HDU ASSY

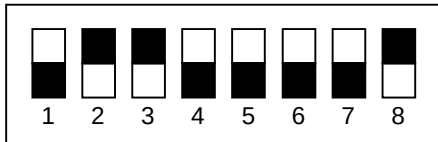
[1] Capacity expansion with HDU ASSY exchange

After this operation all the user's data will be lost. Be sure to make a back-up copy of data before beginning this operation. (See DH-OPTION0050.)

- (1) Turn off the power according to the power-off procedure in DH-OPTION0110.

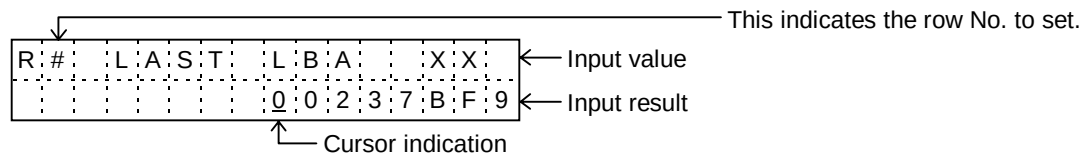
Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover.
 (3) Remove the old HDU ASSY and set the new HDU ASSY. (See Figure 2.8.1 in DH-OPTION0200.)
 (4) Set the DIP switches 1, 4, 5, 6 and 7 on the CTL ASSY to down.



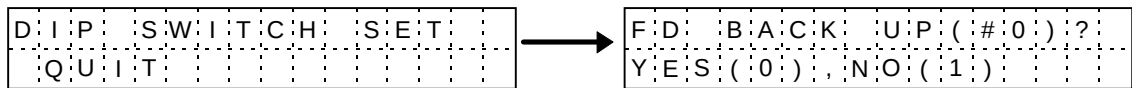
- (5) Turn on the power according to the power-on procedure DH-OPTION0110.
 (6) Set LBA on the panel following the table below. Set the capacity of each drive following the display. (See DH-OPTION0230.)

- When ROW LAST LBA is displayed;



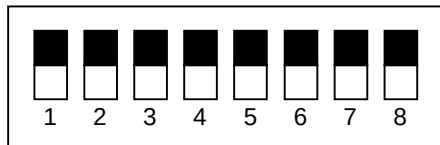
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A2E8	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting “QUIT” on the panel, when “FD BACK UP” appears on the screen, insert a back-up FD and make a back-up copy of the system parameter. The “FD BACK UP” message may not appear for some unit types, so ignore this step in that case.



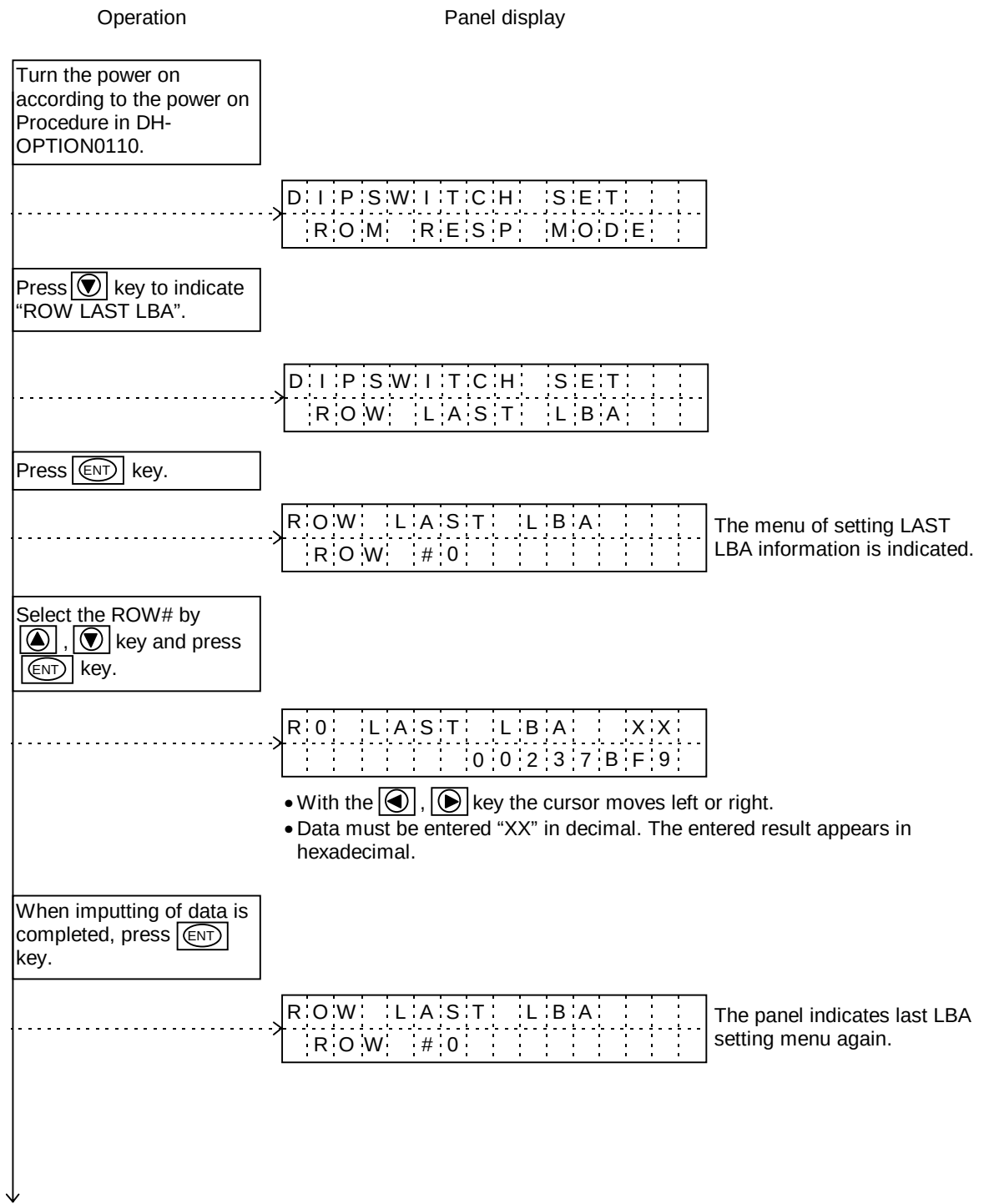
If this message appears, make a back-up copy of the data in the EEPROM into the back-up floppy disk.

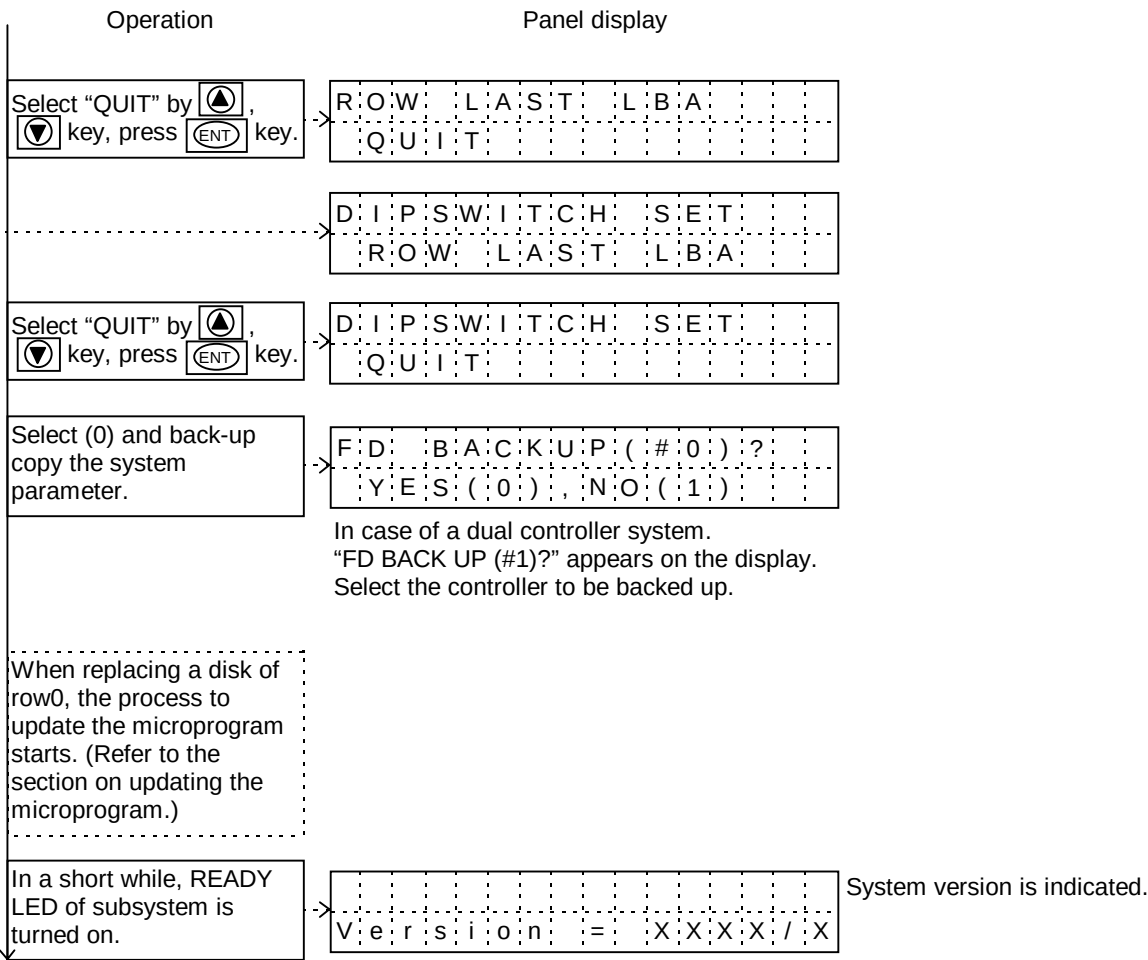
- (8) Reset the DIP switch 1, 4, 5, 6 and 7 to the original positions after the system is ready.



- (9) Only in case of exchanging ROW0 disk, revise the microprogram. (See section “MICROPROGRAM-FC”)
- (10) Set up the RAID group and the LU. (See Installation Chapter.)

Set the LAST LBA number on the panel according to the flow below.





[2] Installing a spare HDU ASSY

(1) Turn off the power according to the power-off procedure in DH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

(2) Open the front cover.

(3) Install a spare HDU ASSY.

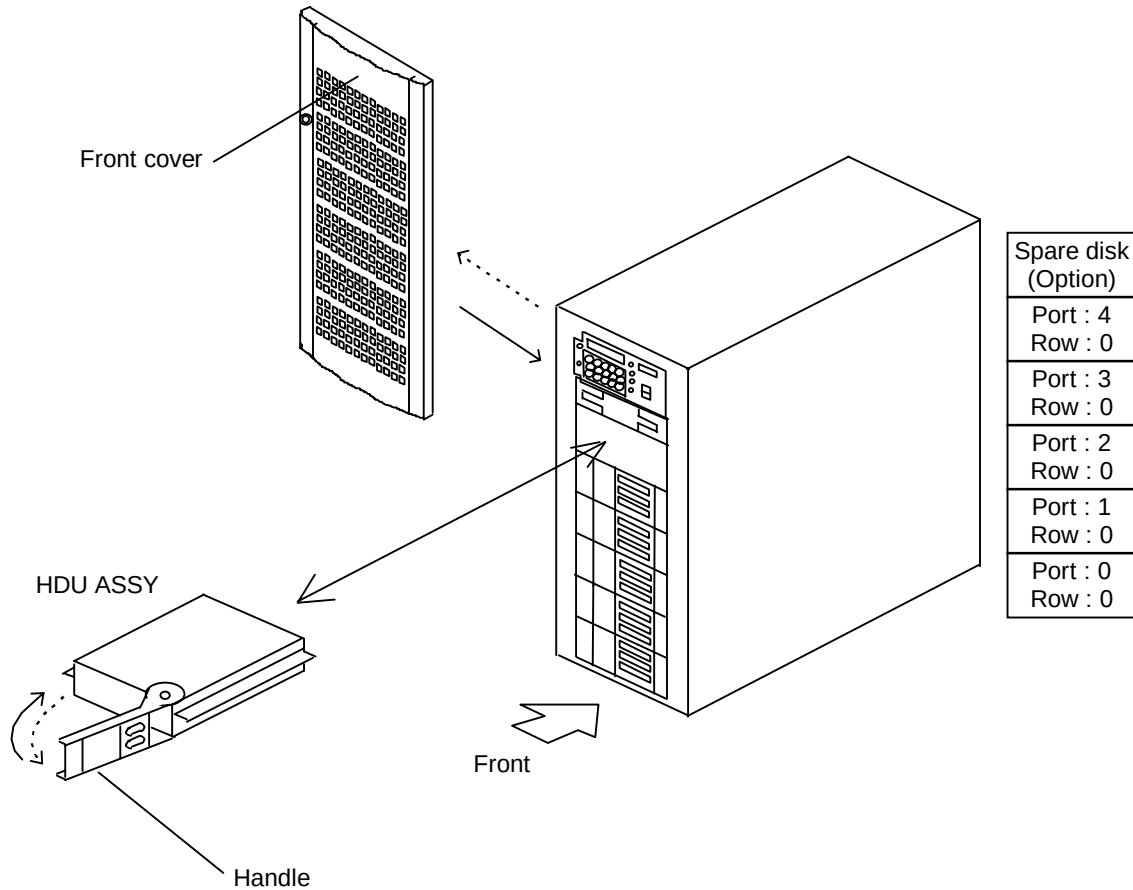
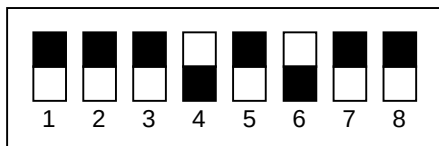


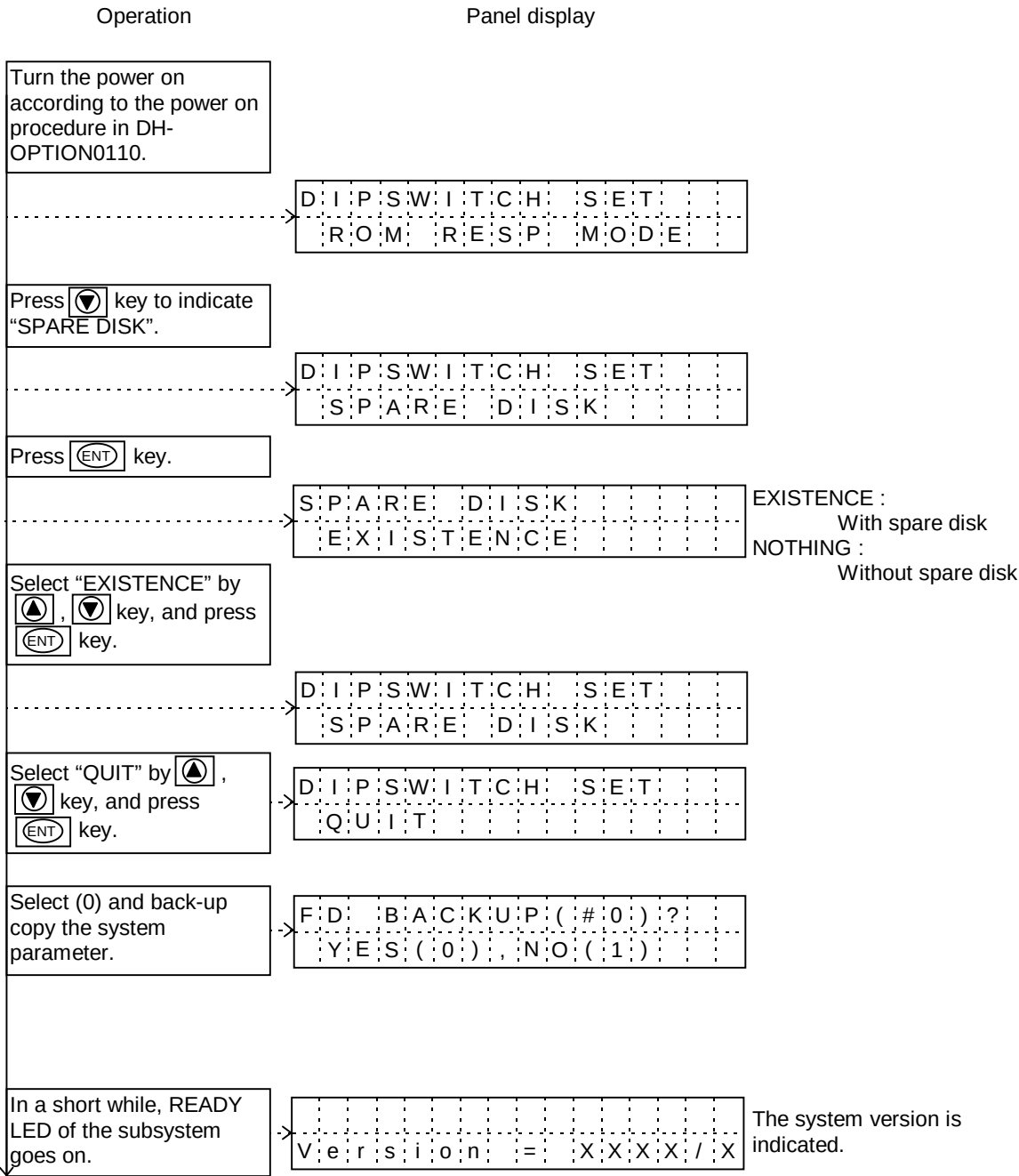
Figure 2.8.2 Installation of Spare Disk

(4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

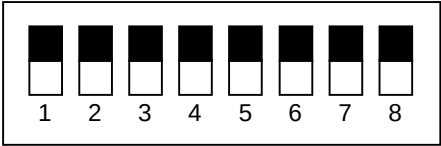


(5) Turn on the power according to the power-on procedure in DH-OPTION0110.

(6) Set the spare disk from the PANEL according to the flow below.



(7) Reset the DIP switches 4 and 6 to the original positions, after READY LED lit up.



(8) Close front cover.

DF350 Disk Subsystem
10. PARTS CATALOG
(Desktop (DKH) Type)

Rev.2

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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REV.2	Feb.1998	May.1998	Oct.1998			

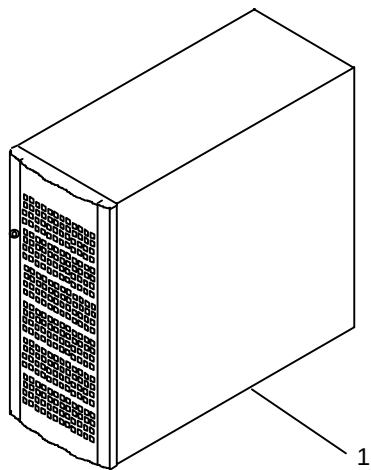
DH-PARTS0010

HOW TO USE THIS PARTS CATALOG

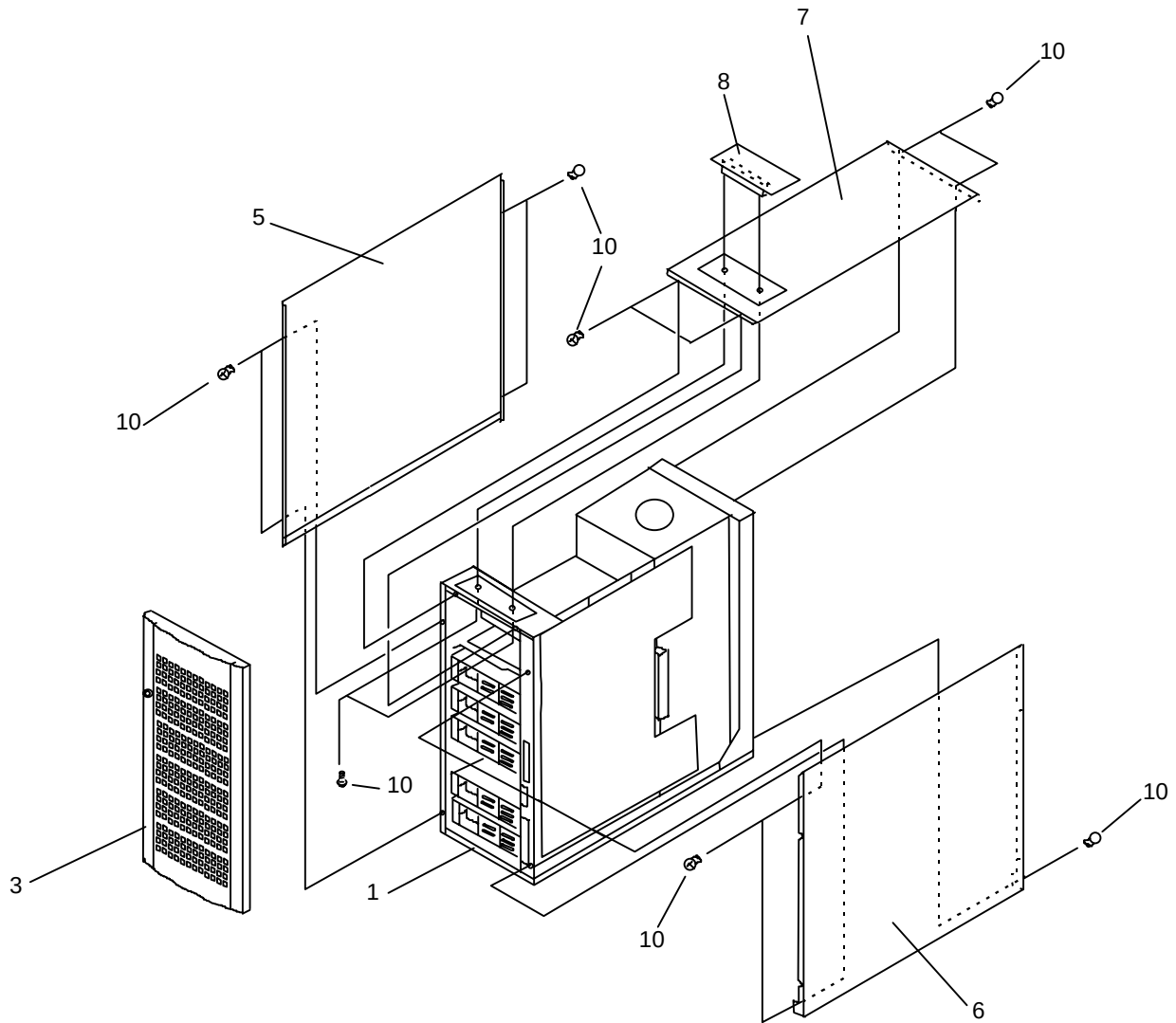
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
11	5497379-J	• FDD ASSY	1	S.P.
12	5500260-G	• PANEL (OP) ASSY	1	S.P.
13	5500260-E	• CTL ASSY	1	S.P.
14	1505586-A	•• SH141-A PK ASSY	1	
15	3250759-A	•• MPU ASSY	1	
16	2102127-1	• BRACKET (SHIELD)	1	
17				
18	3243084-E	• HDU ASSY (DF-F350-A2E2)	2 - 6	S.P.

- ① indicates the list number of the assembly given on the visual index.
- ② indicates the item number given on the drawing in the catalog section.
- ③ indicates the part number.
- ④ has the following meaning.
- indicates an assembly or equivalent part.
 - indicates a subassembly or equivalent part included in an assembly indicated by....
- ⑤ indicates the unit type.
- ⑥ indicates the possible number of the subsystem.
- ⑦ indicates S.P.

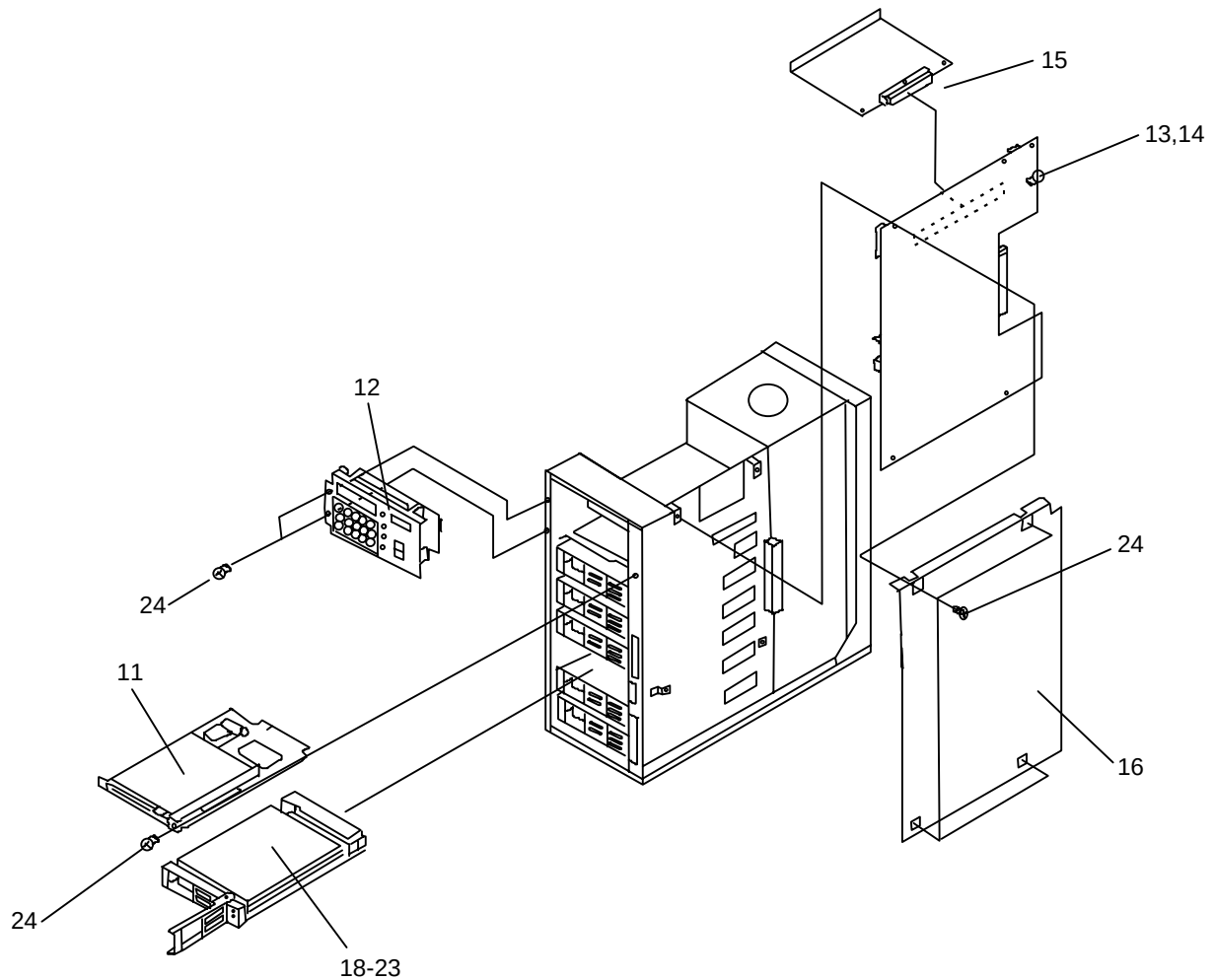
If S.P. is written in Remarks, the part or the assembly is spare parts.



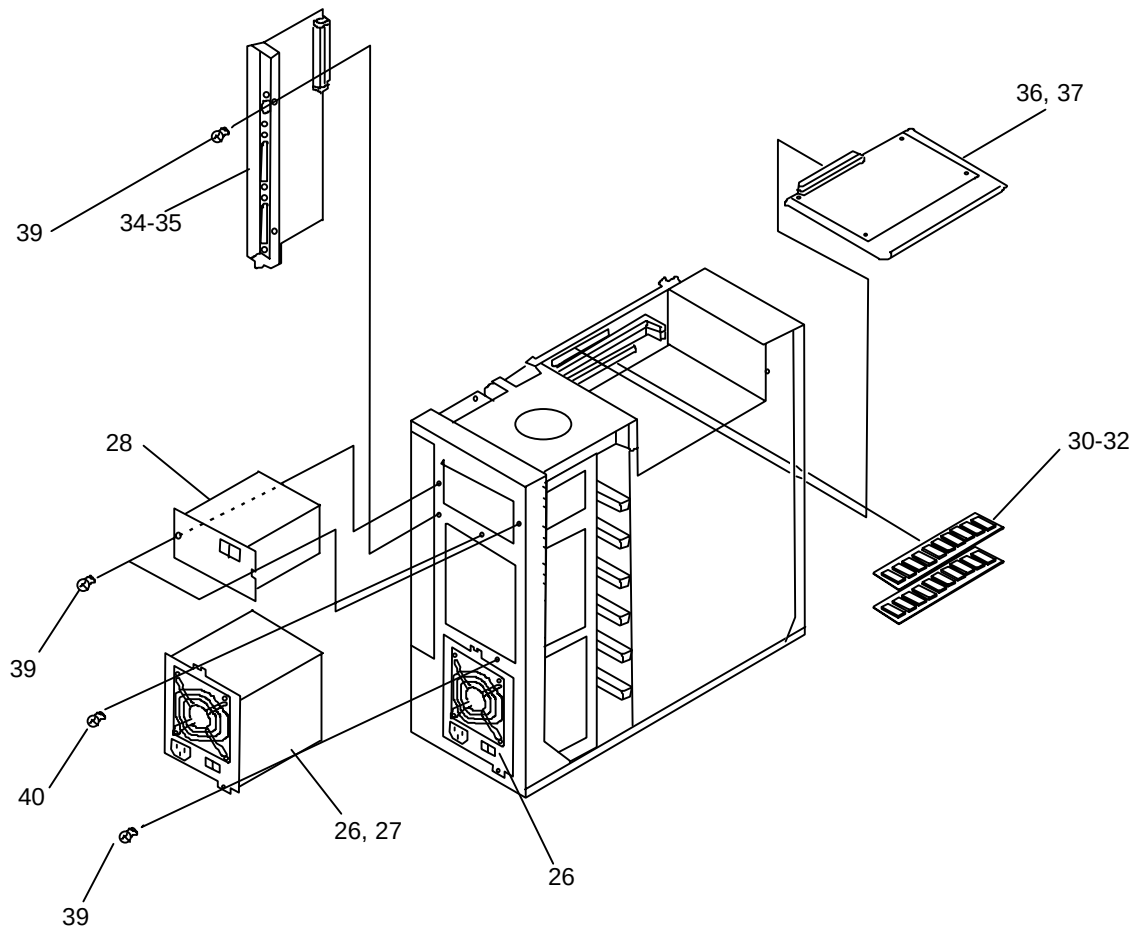
LIST NO.	NAME OF PARTS	SHEET NO.
1	FINAL ASSY	DH-PARTS0040



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2102136-A	BASIC_ASSY (DF350-DKH)	1	
2				
3	2102167-A	• FRONT COVER_ASSY	1	
4				
5	2102130-A	• COVER (L) ASM	1	
6	2102129-A	• COVER (R) ASM	1	
7	2102128-A	• COVER (U) ASM	1	
8	3252722-A	• PLATE (COVER)_ASM	1	
9				
10	SB306	• BIND SCREW (M3 × 6.3)	13	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
11	5497379-J	• FDD ASSY (DF-F350-M2D)	1	S.P.
12	5500260-G	• PANEL (OP) ASSY (DF-F350-L1H)	1	S.P.
13	5500260-E	• CTL ASSY (DF-F350-F1HCF)	1	S.P.
14	1505586-A	• SH141-A PK ASSY	1	
15	3250759-A	• MPU ASSY	1	
16	2102127-1	• BRACKET (SHIELD)	1	
17				
18	3243084-E	• HDU ASSY (DF-F350-A2E2)	2 - 6	S.P.
19	3243084-F	• HDU ASSY (DF-F350-A2E4)	2 - 6	S.P.
20	3252929-E	• HDU ASSY (DF-F350-A3E4)	2 - 6	S.P.
21	3243084-G	• HDU ASSY (DF-F350-A1E8)	2 - 6	S.P.
22	3252929-B	• HDU ASSY (DF-F350-A2E8)	2 - 6	S.P.
23	3252929-A	• HDU ASSY (DF-F350-A1E18)	2 - 6	S.P.
24	SB306	• BIND SCREW (M3 × 6.3)	7	
25				



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
26	5500260-C	• AC/DC ASSY (DF-F350-B1H)	1	S.P.
27	5500260-D	• Power Unit (D) (DF-F350-P1H)	1	S.P.
28	5500260-F	• BATTERY ASSY (DF-F350-N1H)	1	S.P.
29				
30	3247121-A	• CACHE MEMORY (DF-F350-C8E)	2	S.P.
31	3247121-B	• CACHE MEMORY (DF-F350-C32E)	2	S.P.
32	3247121-C	• CACHE MEMORY (DF-F350-C128E)	2	S.P.
33				
34	5500260-A	• SCSI (I/F) ASSY (DF-F350-DHUDS)	1	S.P.
35	5500260-B	• SCSI (I/F) ASSY (DF-F350-DHUSS)	1	S.P.
36	5497379-C	• LAN ASSY (DF-F350-G1D1)	1	S.P.
37	5497379-D	• LAN ASSY (DF-F350-G2D1)	1	S.P.
38				
39	SB306	• BIND SCREW (M3 × 6.3)	4	
40	SB408	• BIND SCREW (M4 × 8)	2	

DF350 Disk Subsystem

11. INSTALLING IN RACK FRAME (Desktop (DKH) Type)

Rev.2

Read this manual carefully and keep it.

- Before starting operation, read the safety instructions carefully and fully understand them.
- After reading this manual, keep it at hand for your reference.

HITACHI

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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REV.2	Feb.1998	May.1998	Oct.1998			

DH-FRAME0010

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1. Installing the Subsystem on FLORA S Server Rack Frame

Desktop type (DKH) subsystem which can be installed on arack frame is that of the rack mount type.

1.1 Space (Height Inside the Rack) Required for Installation

The space of 4 units height (EIA standard) is required to install DF350-DKH into the SR2R (19 inch) cabinet.

1.2 Optional Parts Required for Installation

Table 1.2.1 shows optional parts required to install one DF350-DKH disk subsystem.

Table 1.2.1 Parts Required for Installation of SR2R (19 inch)

No.	Part No.	Part Name	Qty.	Remarks
①	3252551-1	Rail (L)	1	
②	3252551-2	Rail (R)	1	
③	5500032-1	Stopper (L) (*1)	1	
④	5500032-2	Stopper (R) (*1)	1	
⑤	5490841-7	Cagenut (GND)	3	For securing the subsystem/rails (1 spare is included)
⑥	5490841-5	Cagenut	12	For securing the subsystem/rails (2 spares are included)
⑦	5490841-13	Washer (GND)	6	For securing the subsystem (2 spares are included)
⑧	BS620	Hexagon socket head bolt M6 × 20	14	For securing the subsystem/rails (2 spares are included)
⑨	WP006	Washer M6	10	For securing the subsystem/rails (2 spares are included)
⑩	BS510	Hexagon socket head bolt M5 × 10 (*1)	4	For securing the stopper
⑪	2051001-513	LL washer (*1)	4	For securing the stopper
⑫	5409042-3	Repeat binder	3	For binding the excessive cable
⑬	5490846-1	Wire rope	1	The DKH type subsystem uses only one wire rope.
⑭	SB408	Bind screw (M4×8)	2	Used to fix the wire rope. Only one screw is used by the DKH type subsystem.

*1 : Fixed to the part No.1 or No.2.

1.3 Tools Required

- Socket wrench (4mm)
- Spanner (10mm)
- Philips screwdriver (No.2)

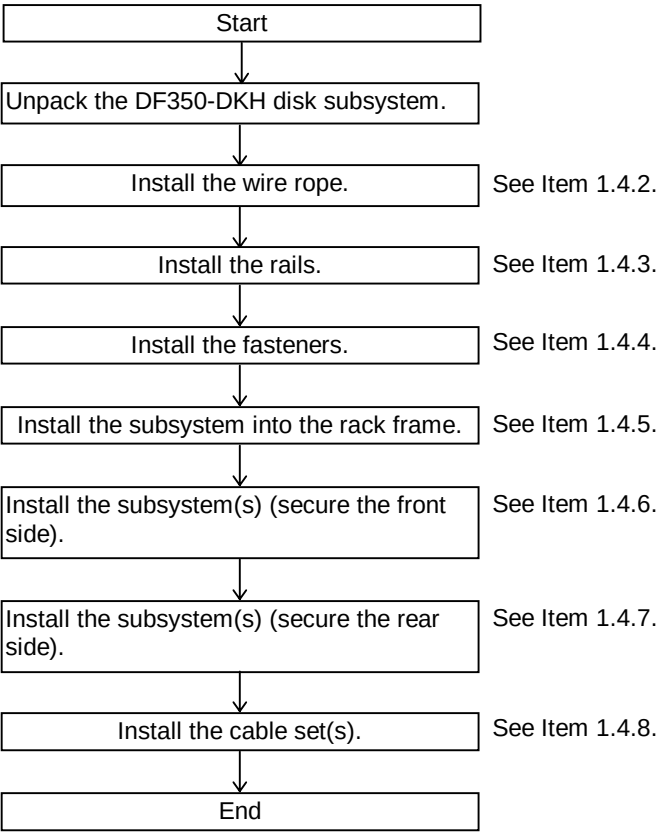
1.4 Installing the Subsystem into the Rack



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-DKH disk subsystem is approximately 25kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning rack frame.

1.4.1 Procedures for installation

Install the unit following the procedure below.



1.4.2 Installing the wire rope

- (1) Insert the wire rope by bind screws (M4×8).

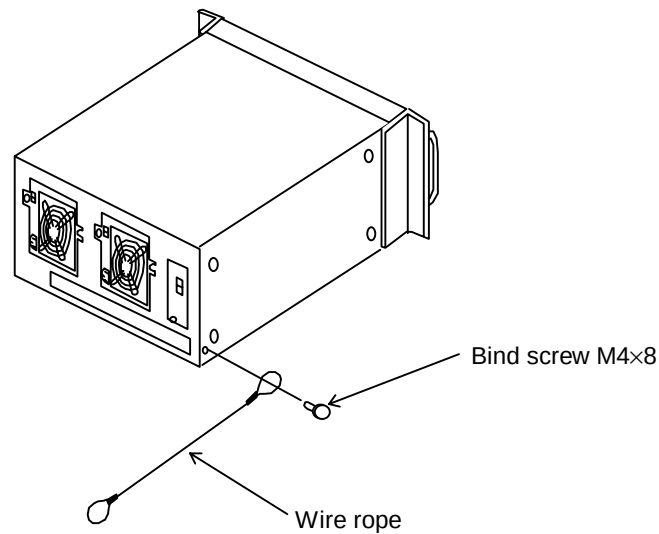


Figure 1.4.1 Installing the Wire Rope

1.4.3 Installing the rails

- (1) Insert the cage nuts into the square holes to be used for fixing the rail(L).
- (2) Remove the stopper fixed on the rail(L) and temporarily fix it again using the screw holes in front with the sets of hexagon socket head bolt and LL washer.
- (3) Insert a protrusion of the rail(L) into the upper one of the neighboring square holes at the position where the subsystem is to be mounted on one of the pillars on one side of the rack frame.
- (4) Secure the rail(L) to the rack frame with four sets of a hexagon socket head bolt (M6 × 20) and a washer (M6) (on both front and rear sides, two sets for each side).
- (5) In the same way as above, install rail(R) on another side of the rack frame.

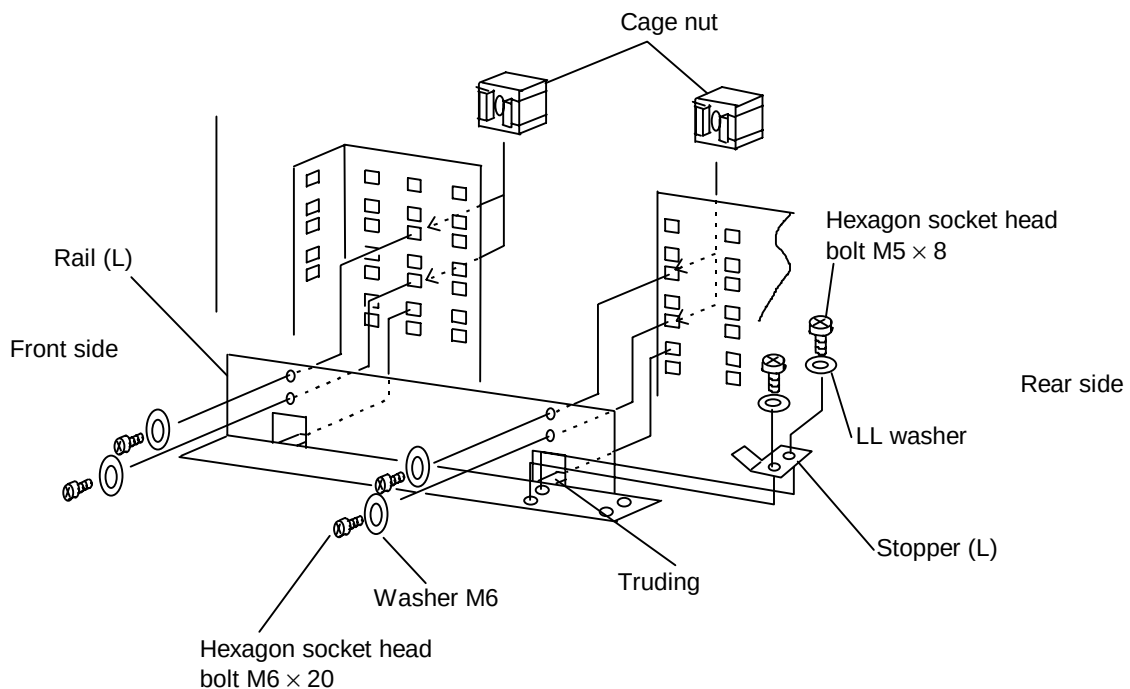


Figure 1.4.2 Installing the Rails

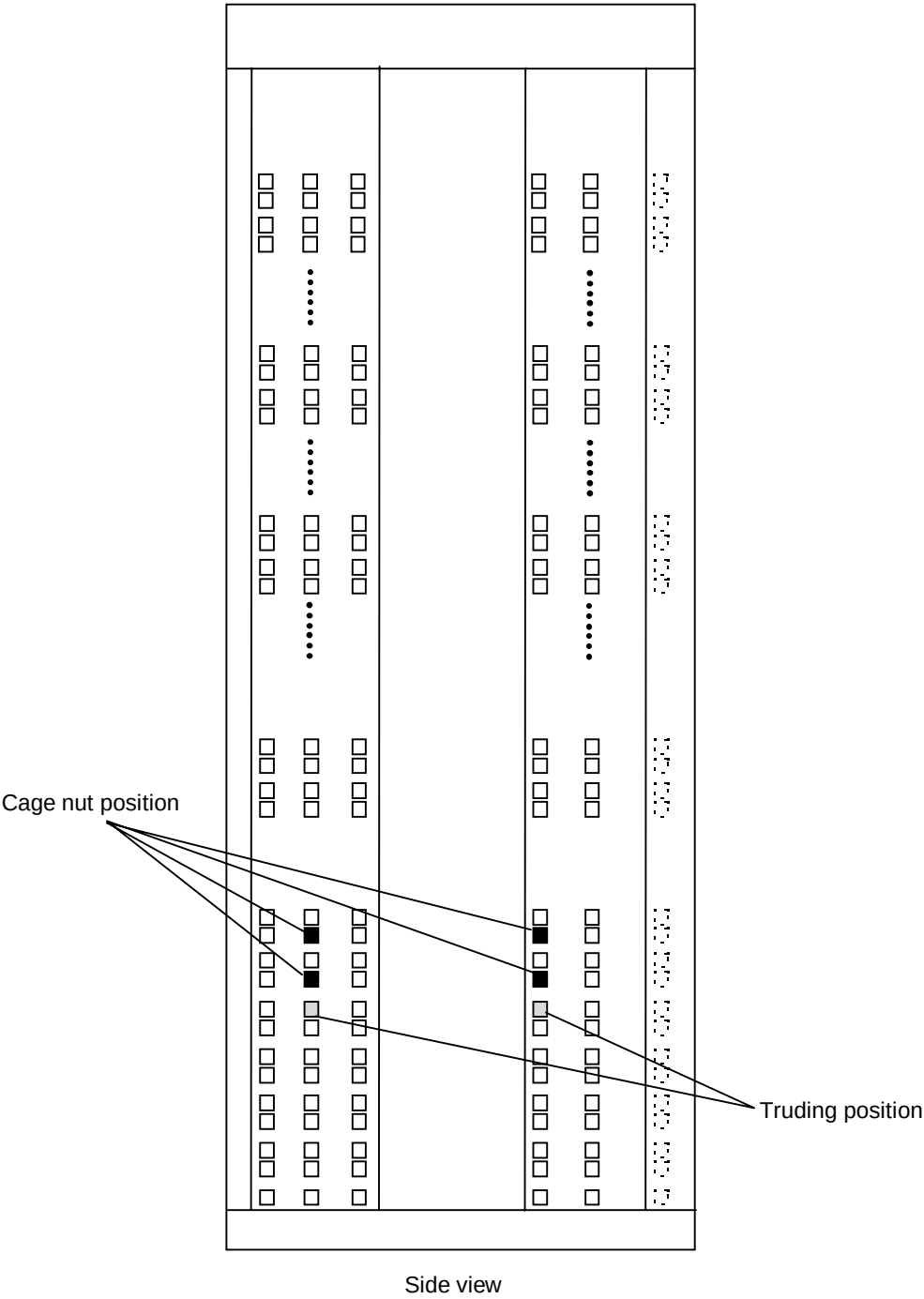


Figure 1.4.3 Installing the Cage Nut

1.4.4 Installing the Fastener

- (1) Install the two cage nuts for grounding and the two cage nuts on the front side of the rack frame (on both sides, at tow positions per each side).
- (2) Insert the fasteners into 2nd and 7th holes counted from the upper surface of the rail.

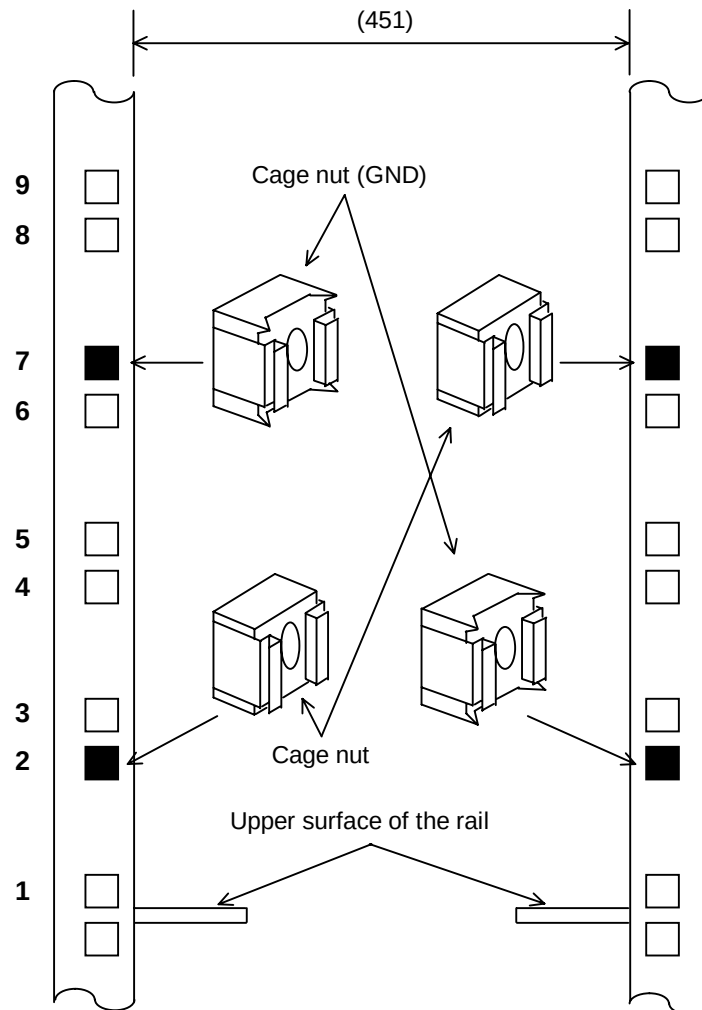


Figure 1.4.4 Installing the Fastener

1.4.5 Installing the subsystem into the rack (See Figure 1.4.5.)



The mass of the DF350-DKH is approximately 25kg. Be sure to hold it by its bottom with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-DKH is secured tightly before installing the DF350-DKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Place the subsystem on the rails. Then, push it all the way into the rack.

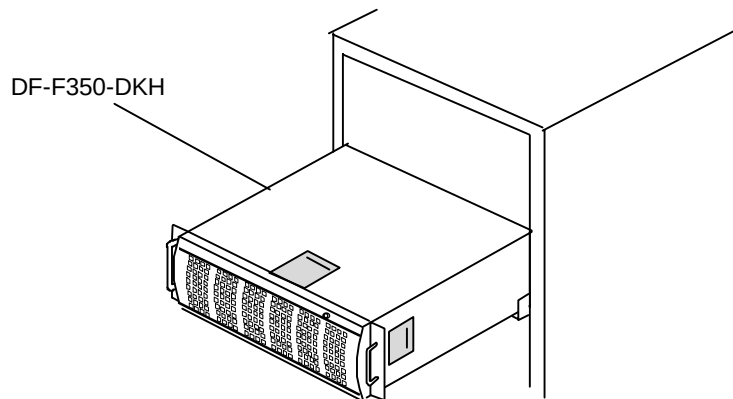


Figure 1.4.5 Installing the Subsystem in the Rack

1.4.6 Securing the front side of the subsystem (See Figure 1.4.6.)

- (1) Secure the subsystem at four places using the Hexagon socket head bolt M6 × 20 and washer (GND).

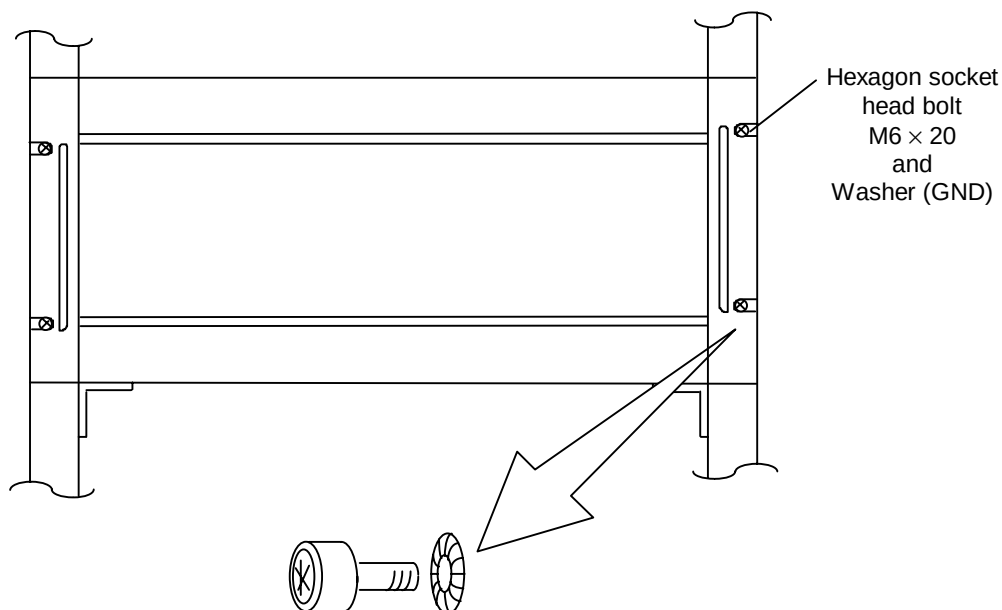
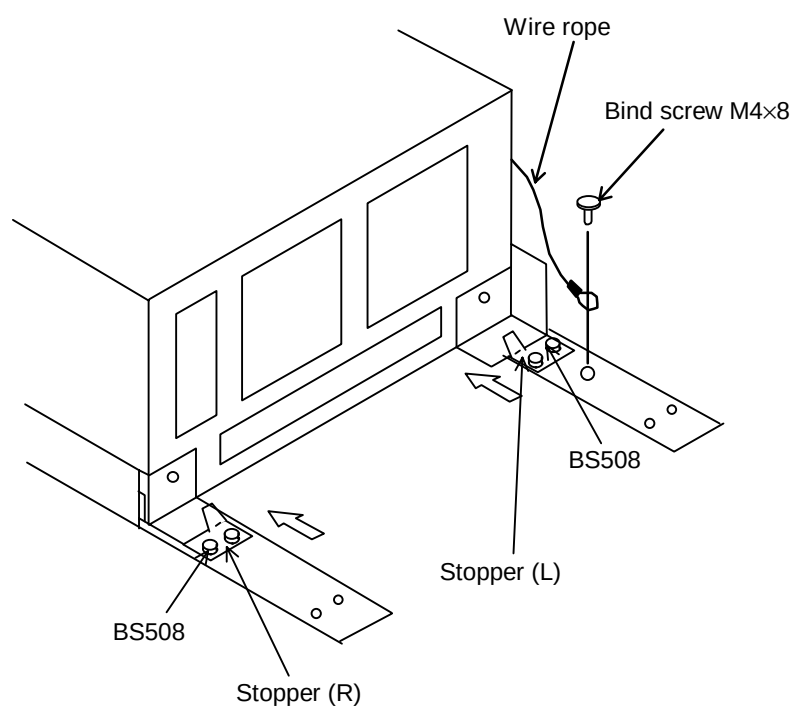


Figure 1.4.6 Securing the Front Side of the Subsystem

1.4.7 Securing the rear side of the subsystem (See Figure 1.4.7.)

- (1) Move the stopper (L) which has been temporarily installed in the direction shown by an arrow.
- (2) Tighten the two bolts (BS508) which temporarily secure the stopper (L).
- (3) Also secure the stopper (R) in the same way as the above.
- (4) Tighten the wire rope for the rail by bind screw M4×8.

**Figure 1.4.7 Securing the Rear Side of the Subsystem**

1.4.8 Cable routing (See Figure 1.4.8.)

Notice : Be careful in performing the cable routing because component replacement may be obstructed by an inappropriate routing.

- (1) Route the AC cable along the rear bottom edge of the DKH, and connect it to the AC MAIN CONSENT (upper power outlet) of the rack frame. Fasten excessive portion of the cable to the cable holders provided on the side of the rack frame with cable binders or the like.

The above procedure may not be used however, if the customer require the power to be supplied from the system other than the rack frame.

- (2) Fasten excessive portion of the I/F cable after connecting it to another device on the side of the rack frame using cable binders or the like.

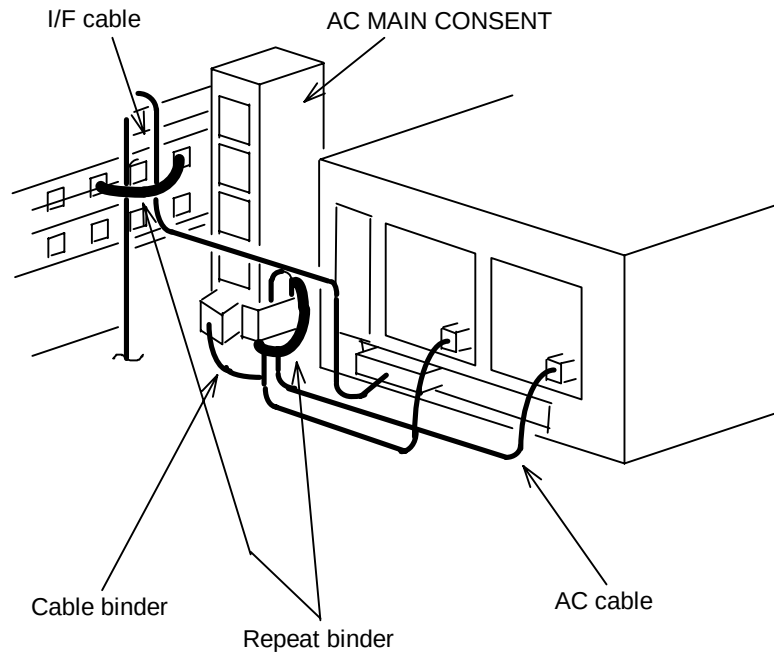


Figure 1.4.8 Cable routing

2. Installing Into HP Rack Frame

2.1 Space (Height Inside the Rack) Required for Installation

The space of 4 units height (EIA standard) is required to install DF350-DKH into the HP rack.

2.2 Optional Parts Required for Installation (Model names : DF-F350-URHPD)

Table 2.2.1 shows optional parts required to install one DF350-DKH disk subsystem.

Table 2.2.1 Parts Required for Installation of DF-F350-URHPD

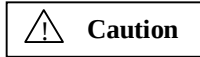
No.	Part No.	Part Name	Qty.	Remarks
①	3253753-1	Rail	1	For right hand side
②	3253753-2	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (R)
④	5490710-2	Stopper	1	For the rail (L)
⑤	5500746-1	Spacer (HP)-DKH	2	
⑥	5486485-1	Fastener	14	For securing the subsystem/rails (2 spares are included)
⑦	BH612	Bolt (M6 × 12.5)	4	For securing the spacer (HP)-DKH (2 spares are included)
⑧	SB516	Binding screw (M5 × 16)	10	For securing the rail (2 spares are included)
⑨	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stoppers (2 spares are included)
⑩	SB532	Binding screw (M5 × 32)	6	For securing the subsystem (2 spares are included)
⑪	2051001-513	LL washer	6	For the hexagon socket head bolt (2 spares are included)
⑫	3243319-206	Nameplate (parts)	1	Already affixed to the rail
⑬	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem
⑭	5503204-1	Spacer (UPS)	2	(Not used)
⑮	BS406	Hexagon socket head bolt (M4 × 6.3)	4	(Not used)
⑯	2051001-413	LL washer	4	(Not used)

2.3 Tools Required

- Socket wrench (4mm)
- Spanner (10mm)
- Philips screwdriver (No.2)
- Torque wrench (T25) (*1)

*1 : Used to remove parts previously installed in the HP frame.

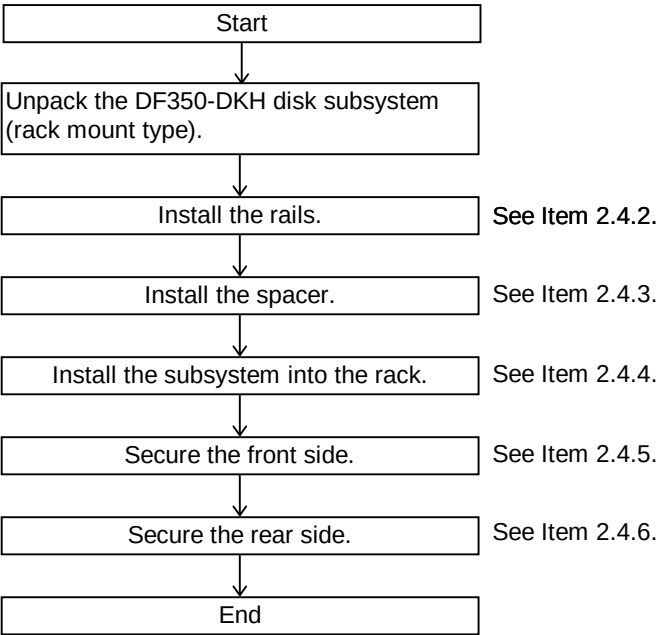
2.4 Installing the Subsystem into the Rack



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-DKH disk subsystem is approximately 25kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning rack frame.

2.4.1 Procedures for installation

Install the unit following the procedure below.



2.4.2 Installing the rails (See Figure 2.4.1 and 2.4.2.)

- (1) Temporarily secure the Stopper (R) to the Rail (R) using Hexagon socket head bolts (M5 × 8) and Washer (M5) (at two places). (See Figure 2.4.1.)
- (2) Insert the protruded portions of the Rail (R) into the rectangular holes on both the front and rear sides of the rack frame at right hand side of the desired installing position. (See Figure 2.4.2.)
- (3) Install the fasteners aligning their holes with the holes of the rail and the rack frame (at two places each on the front and rear sides). (See Figure 2.4.2.)
- (4) Secure the Rail (R) using the Binding screws (M5 × 16) (at two places each on the front and rear sides).
- (5) Temporarily attach the Stopper (L) to the Rail (L), and secure the Rail (L) to the rack frame in the same way.

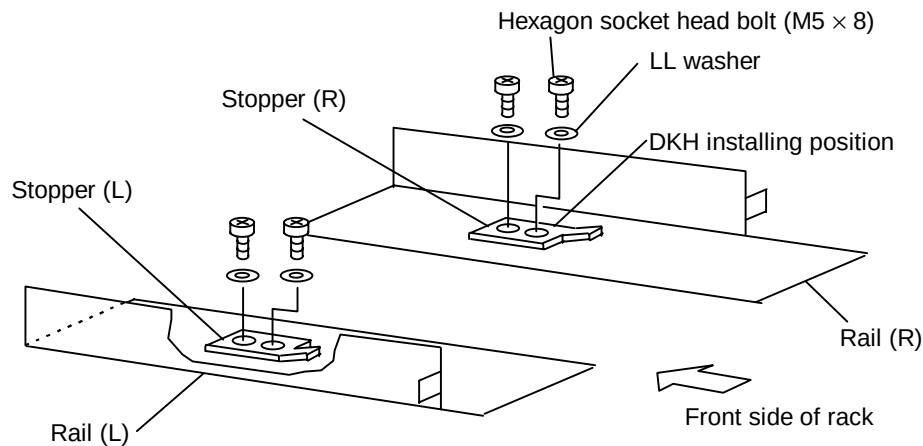


Figure 2.4.1 Temporary Attachment of the Stopper

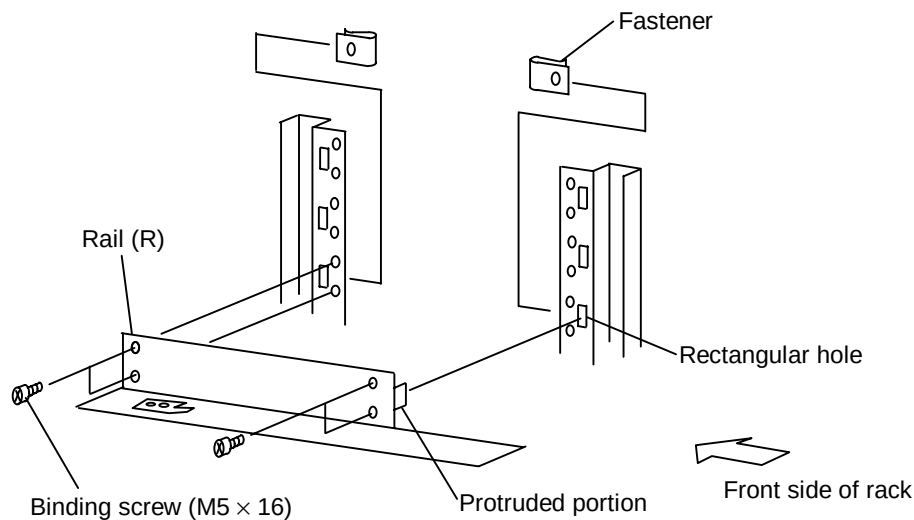


Figure 2.4.2 Securing the Rail to the Rack Frame

2.4.3 Installing the spacer (See Figures 2.4.3 and 2.4.4.)

- (1) Insert the Bolt (M6 × 12.5) into the hole in the face of the rack frame from the inner side, place the indented side of the Spacer (HP) against the rack, and secure the spacer so that it becomes parallel with the rack frame (two places, on the right and left sides).
- (2) Install the fasteners to the rack frame at the positions where the spacer is indented at 1st and 2nd indentations.

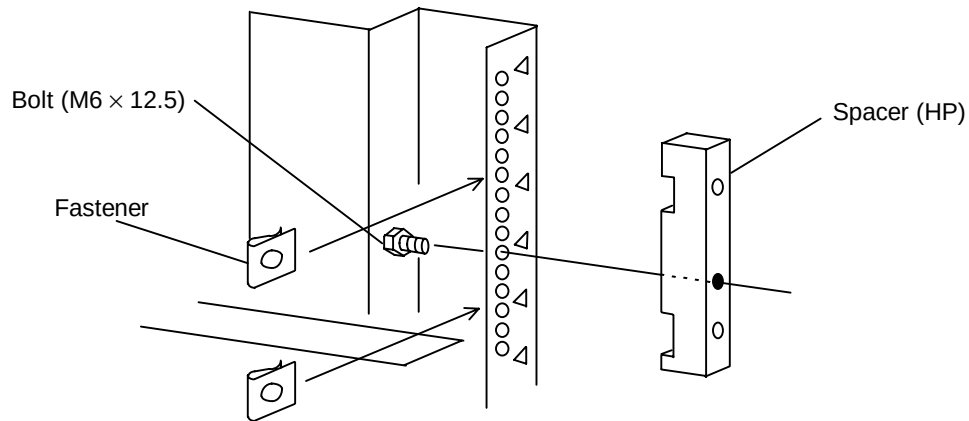


Figure 2.4.3 Installing the Spacer and Fasteners

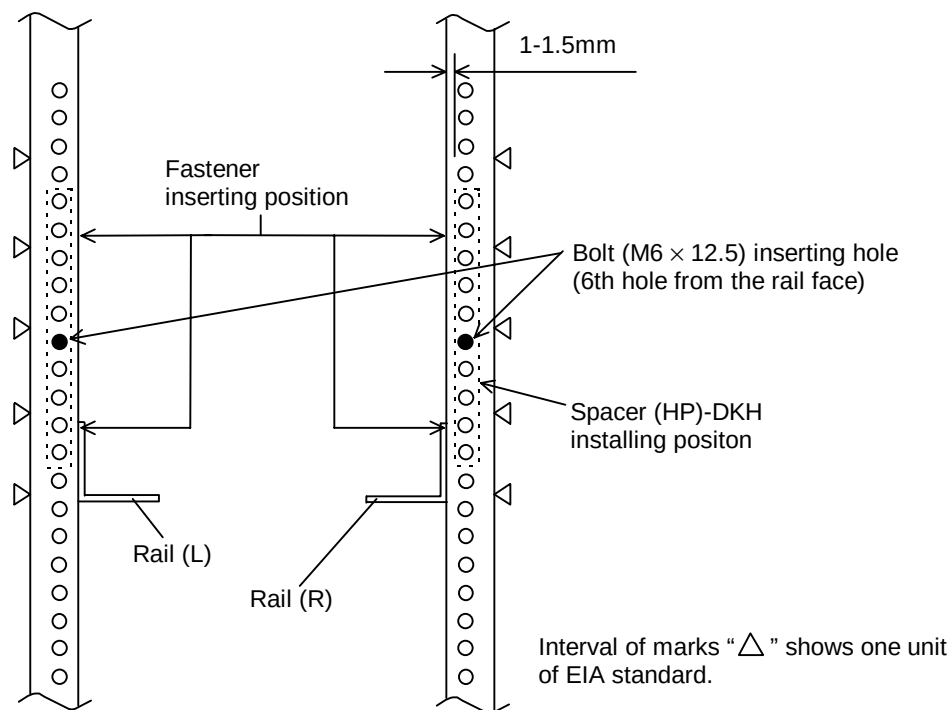


Figure 2.4.4 Relationship between the Installing Positions of the Rail and the Spacer (HP)-DKH

2.4.4 Installing the subsystem into the rack (See Figure 2.4.5.)



The mass of the DF350-DKH is approximately 25kg. Be sure to hold it by its bottom with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-DKH is secured tightly before installing the DF350-DKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Place the subsystem by holding its bottom. Then push it gently all the way in the rack frame.

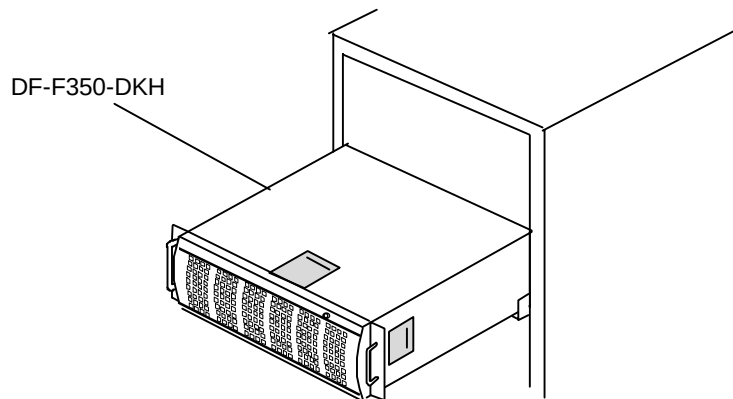


Figure 2.4.5 Installing the Subsystem in the Rack

2.4.5 Securing the front side of the subsystem (See Figure 2.4.6.)

- (1) Secure the subsystem at four places using the Binding screws (M5 × 32).

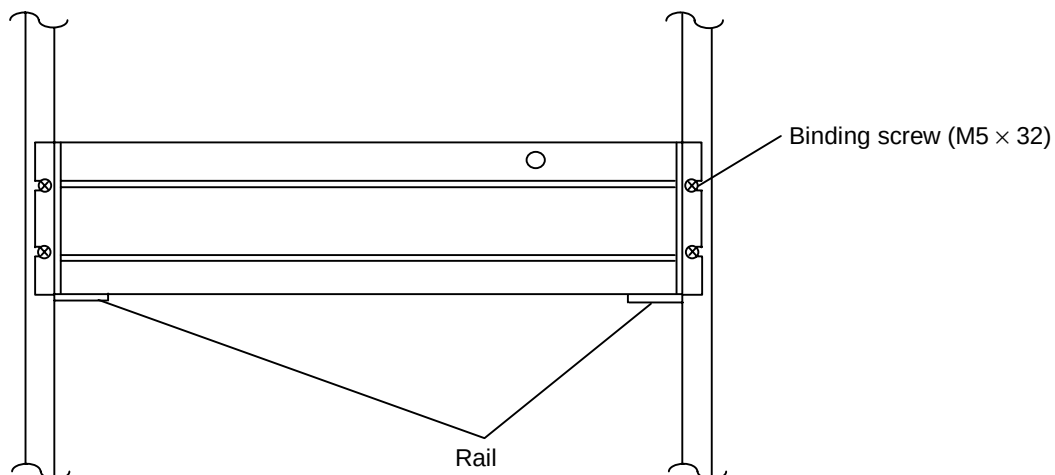


Figure 2.4.6 Securing the Front Side of the Subsystem

2.4.6 Securing the rear side of the subsystem (See Figure 2.4.7.)

- (1) Slide the Stopper (1) and Stopper (2) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

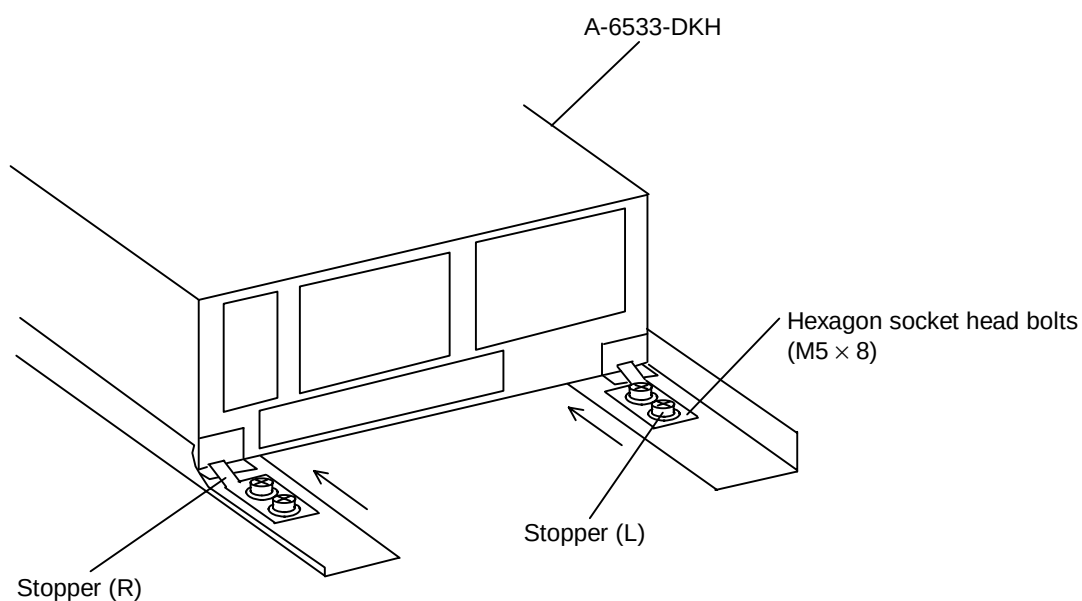


Figure 2.4.7 Securing the Rear Side of the Subsystem

3. Installing Into IBM AS/400 (9309) Rack Frame

3.1 Space (Height Inside the Rack) Required for Installation

The space of 4 units height (EIA standard) is required to install DF350-DKH into the IBM AS/400 (9309) rack.

3.2 Optional Parts Required for Installation (Model names : DF-F350-URASD)

Table 3.2.1 shows optional parts required to install one DF350-DKH disk subsystem.

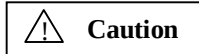
Table 3.2.1 Parts Required for Installation of DF-F350-URASD

No.	Part No.	Part Name	Qty.	Remarks
①	2102429-A	Rail	1	For right hand side
②	2102429-B	Rail	1	For left hand side
③	5486419-1	Fastener (M5)	10	For securing the subsystem/rails (4 spares are included)
④	SB516	Bind screw (M5 × 16)	12	For securing the rail/subsystem (4 spares are included)
⑤	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stopper (2 spares are included)
⑥	2051001-513	LL washer	6	For the hexagon socket head bolt (2 spares are included)
⑦	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem
⑧	SB416	Bind screw (M4 × 16)	4	For securing the rail(DKH) (2 spares are included)
⑨	3243319-205	Nameplate (parts)	1	Already affixed to the rail
⑩	5486321-1	Stopper (R)	1	For DF300-RK
⑪	5486321-2	Stopper (L)	1	For DF300-RK
⑫	BS406	Hexagon socket head bolt (M4 × 6.3)	4	(Not used)
⑬	2051001-413	LL washer	4	(Not used)

3.3 Tools Required

- Philips screwdriver (No.2)
- Socket wrench (4mm)

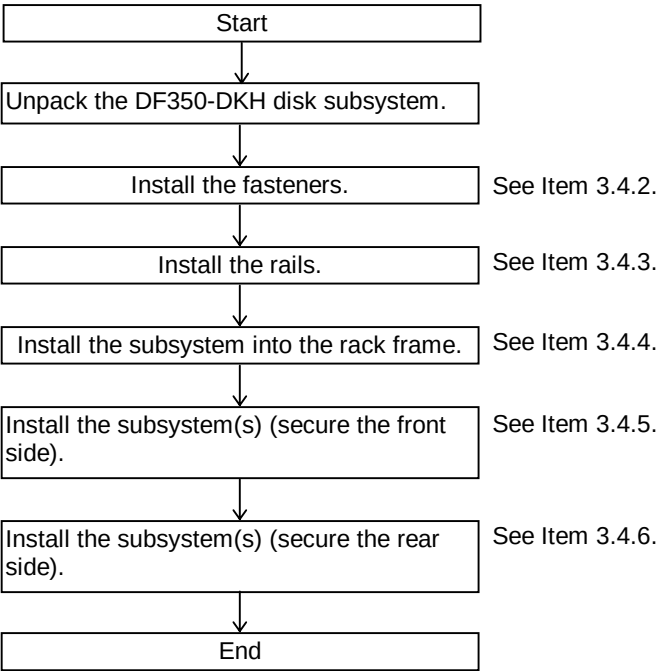
3.4 Installing the Subsystem into the Rack Frame



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-DKH disk subsystem is approximately 25kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning rack frame.

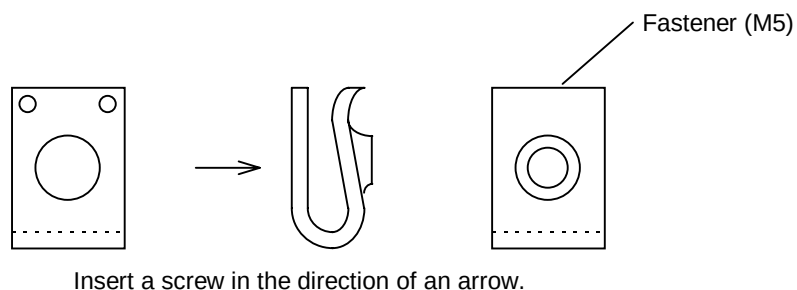
3.4.1 Procedures for installation

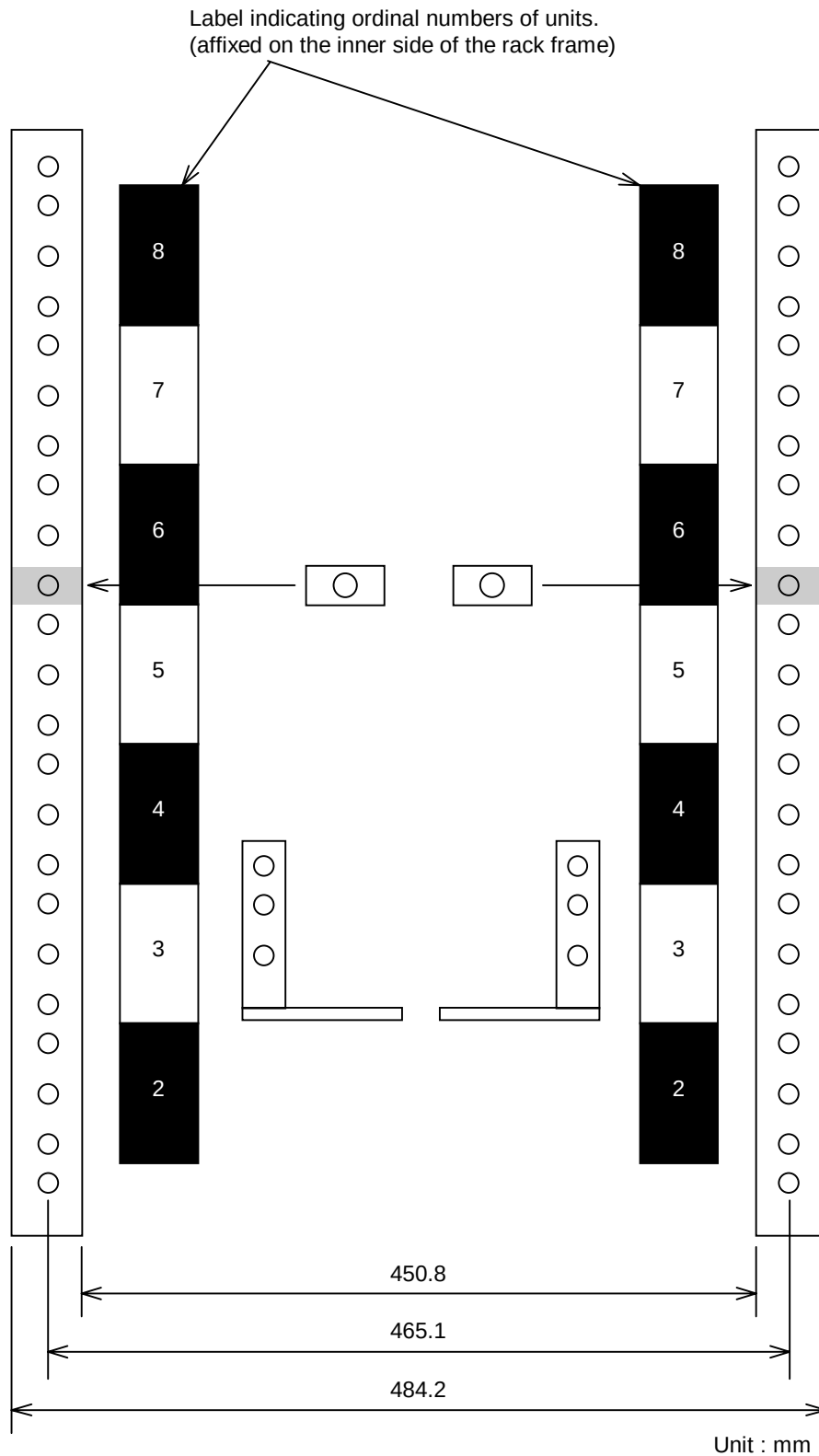
Install the unit following the procedure below.



3.4.2 Installing the fasteners (See Figure 3.4.1 to 3.4.3.)

- (1) Insert the fasteners on the front side of the rack frame with their flat sides facing toward you.
- (2) Insert the fasteners to the top holes of 3rd unit s from the unit where the rail is to be installed.
- (3) Insert the fasteners on the rear side of the rack frame with their flat sides facing toward you.
- (4) Insert the fasteners to the top hole of the unit where the rail is to be installed an the middle hole of upper 1st unit.

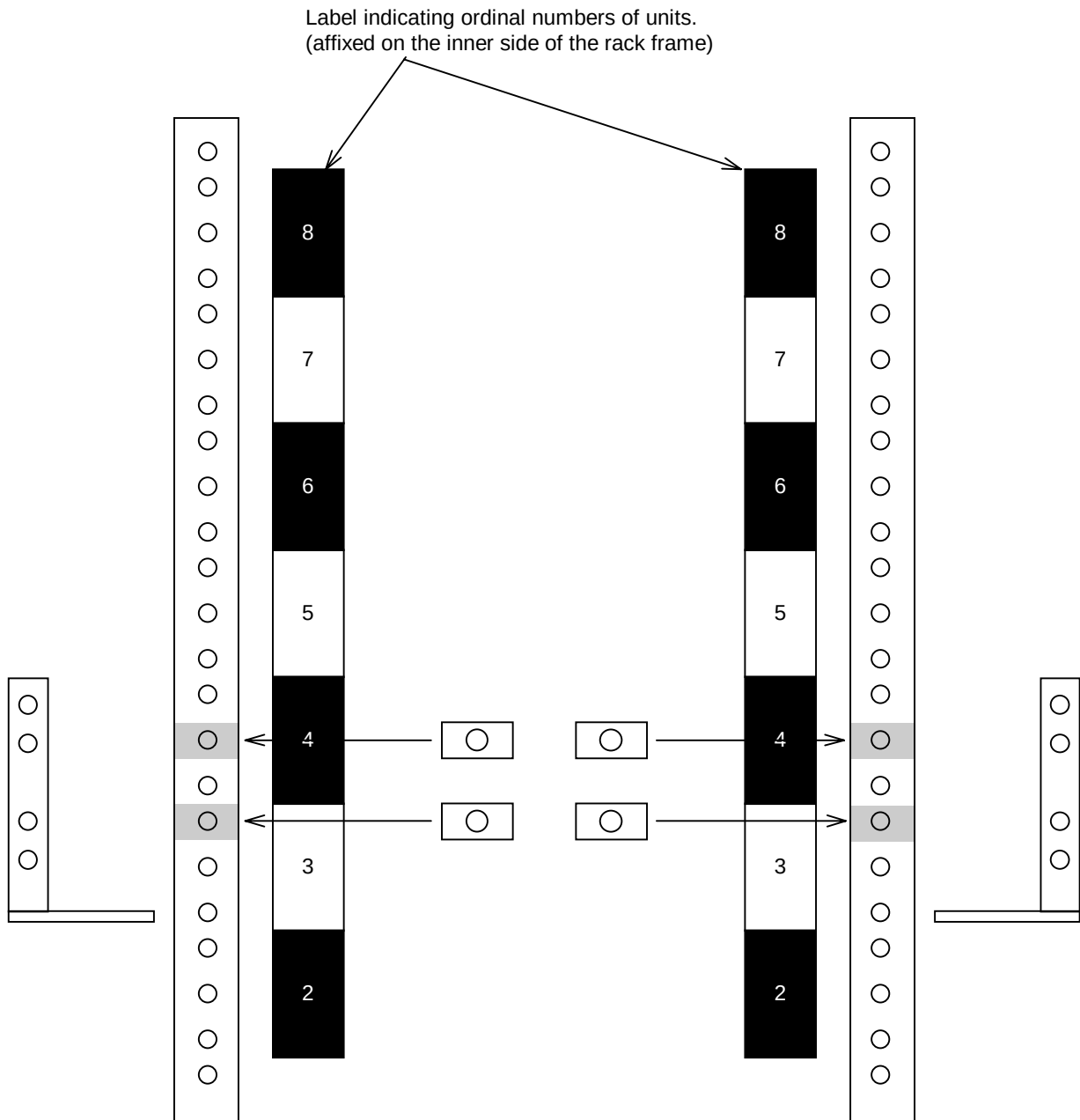
**Figure 3.4.1 Fastener**



Note 1 : A figure “” indicates the fastener.

Note 2 : Above diagram shows the composition when the rails are installed at the 3rd unit.

Figure 3.4.2 Fastener Installing Locations in the Front of the Rack Frame



Note 1 : A figure “” indicates the fastener.

Note 2 : Above diagram shows the composition when the rails are installed at the 3rd unit.

Figure 3.4.3 Fastener Installing Locations in the Rear of the Rack Frame

3.4.3 Installing the rails (See Figure 3.4.4.)

- (1) Fix the Stopper (R) to the Rail (R) temporarily with Hexagon socket head bolts ($M5 \times 8$) and Washers (M5).
- (2) Position the rail (R) inside the rack frame and fasten its front and rear ends with an M4 $\times$ 16 and two M5 $\times$ 16 binding screws respectively.
- (3) Fix the Stopper (L) temporarily to the Rail (L), insert the Rail (L) into the rack frame and secure it in the same way.

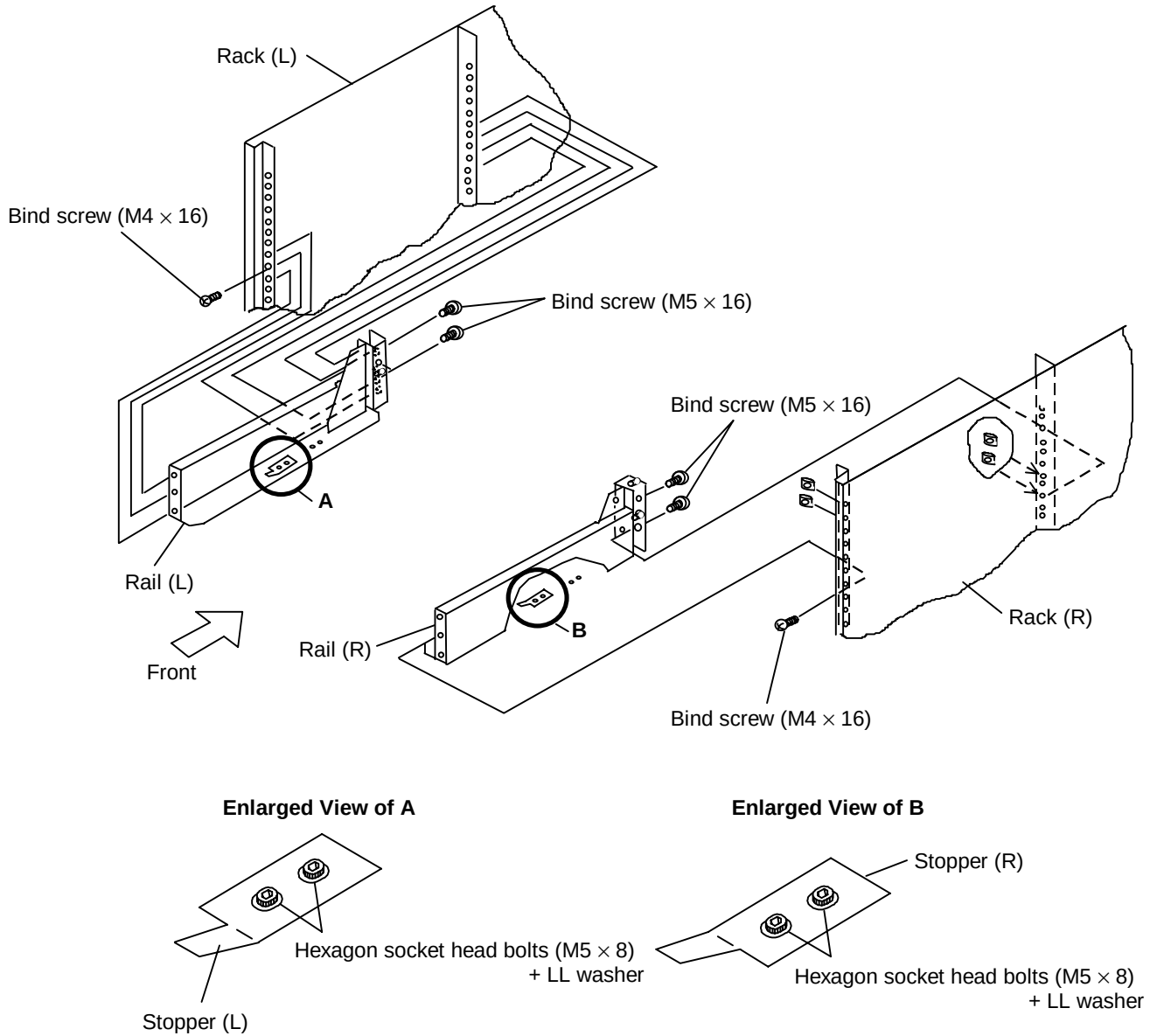
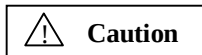


Figure 3.4.4 Installing the Rails

3.4.4 Installing the subsystem into the rack (See Figure 3.4.5.)



The mass of the DF350-DKH is approximately 25kg. Be sure to hold it by its bottom with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-DKH is secured tightly before installing the DF350-DKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Place the subsystem by holding its bottom. Then push it gently all the way in the rack frame.

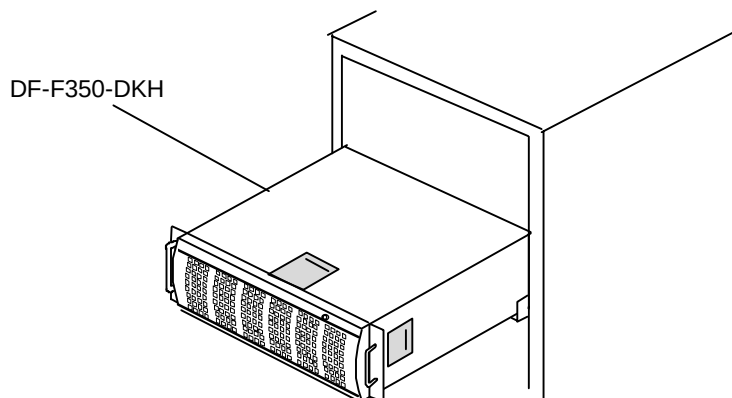


Figure 3.4.5 Installing the Subsystem in the Rack

3.4.5 Securing the front side of the subsystem (See Figure 3.4.6.)

- (1) Secure the subsystem at four places using the Binding screws (M5 × 16).

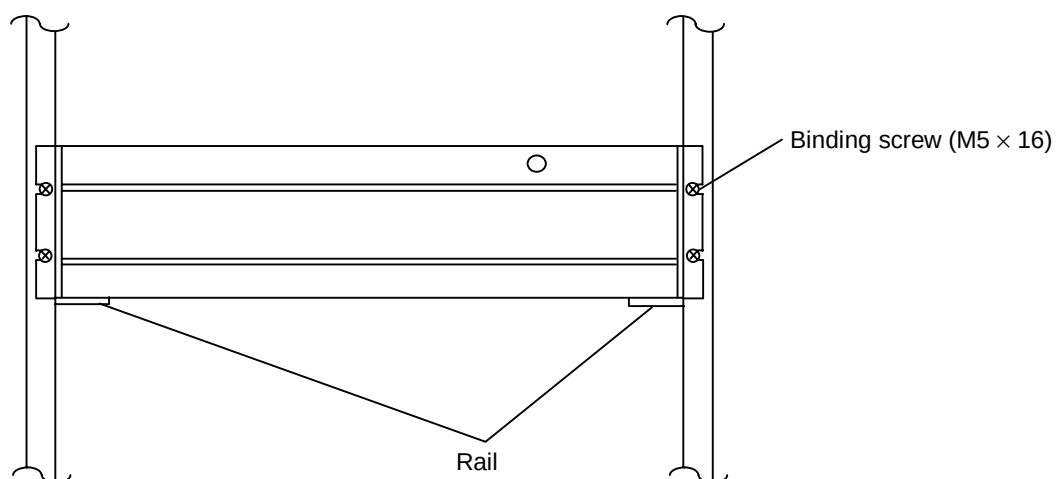


Figure 3.4.6 Securing the Front Side of the Subsystem

3.4.6 Securing the rear side (See Figure 3.4.7.)

- (1) Slide the Stopper (1) and Stopper (2) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

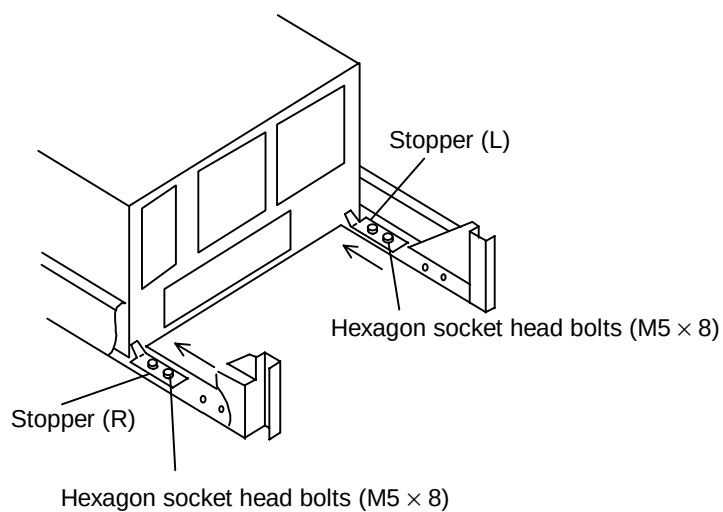


Figure 3.4.7 Securing the Rear Side

Supplement

• Remodeling to Rack Mount Type

The desktop type (DKH) subsystem can be installed on the rack frame by remodeling it using the special kit. The remodeling procedure is shown below.

Table 1 Parts Required for Installation of DF-F350-H1H

No.	Part No.	Part Name	Qty.	Remarks
①	2102166-6	Panel	1	
②	5500686-A	Handle	2	Right and left a pair.
③	5500294-1	Spacer	1	
④	SB412	Bind screw (M4 × 12)	4	
⑤	5500598-A	Rack guide (R)	1	
⑥	5500600-1	Rack guide (L)	1	
⑦	3253519-1	Balance label 1	1	
⑧	3245056-1	Balance label 2	2	

•• Remodeling Procedure

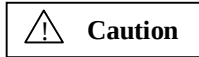
(1) Remove the front cover.

Tool : Key

- ① Insert the key supplied with the subsystem into the keyhole and release the lock of the front cover. (See Figure 1 (a).)
- ② Pull the left side of the front cover and turn it in the direction shown by an arrow (···➤). (See Figure 1 (b).)

Notice : (See Figure 1 (d).)

- ③ Hold the front cover by hands and remove it by moving it in the direction shown by an arrow (···➤). (See Figure 1 (c).)



Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

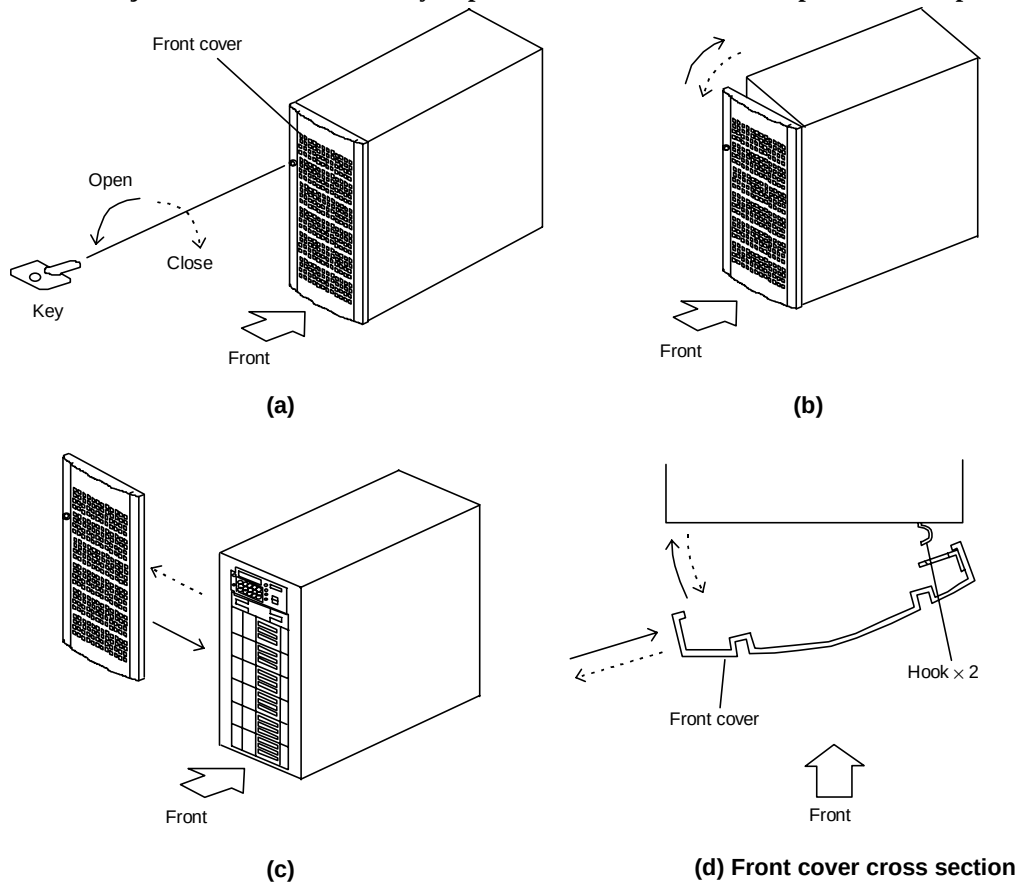


Figure 1 Remove the Front Cover

(2) Remove the cover (U).

Tool : Phillips screwdriver (No.2)

- ① Loosen the four screws ❶.
- ② Pull up the cover (U) to removing.

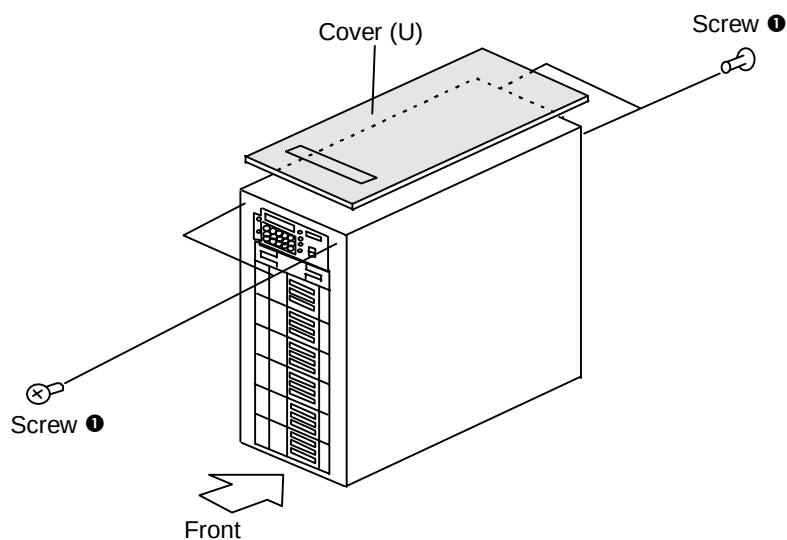


Figure 2 Remove the Cover (U)

(3) Remove the plate of the cover (U)

Tool : Phillips screwdriver (No.2)

- ① Loosen the two screws ❷.
- ② Remove the plate of the cover (U).
- ③ Save the plate and two screws ❷ which have been removed because they will be needed when remodeling the subsystem from the rack mount type to the stand alone type.

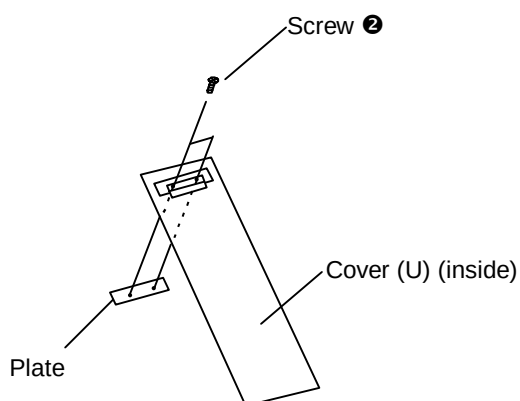


Figure 3 Remove the Plate of the Cover (U)

(4) Attach the cover (U).

Tool : Phillips screwdriver (No.2)

① Attaching the cover (U) by the three screws ❶.

The screw ❶ (×1) on the rear left of the subsystem will be used in step (6).

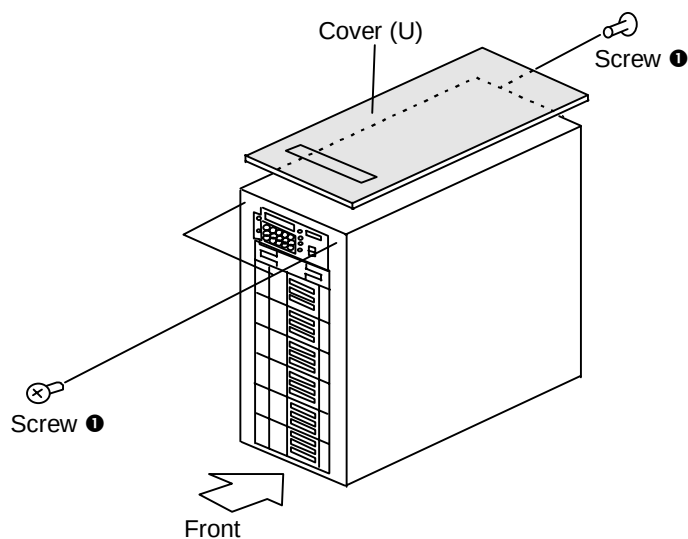


Figure 4 Attach the Cover (U)

(5) Attach the right handle.

Tool : Phillips screwdriver (No.2)

① Place the spacer at the position from where the cover (U) has been removed. Place it so that it does not cover the screw holes near the front end of the subsystem.

② Install the right handle with two screws ❸ (Bind screw M4×12).

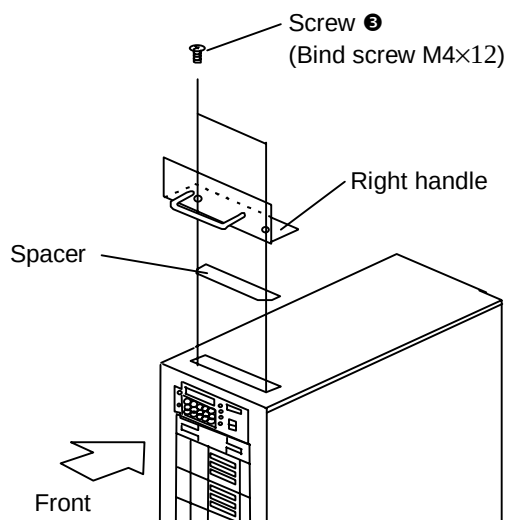
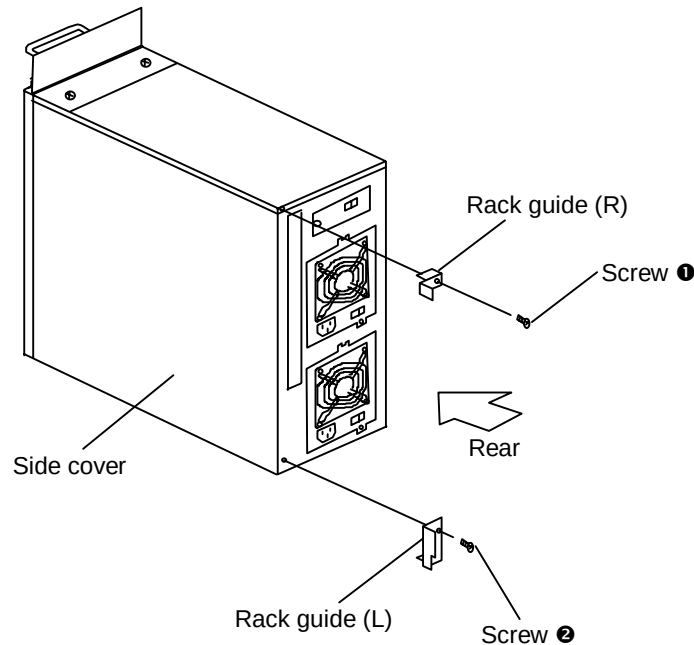


Figure 5 Attach the Right Handle

(6) Attach the rack guide

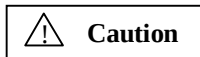
Tool : Phillips screwdriver (No.2)

- ① Secure the rack guide (R) with screw ❶. The screw ❶ used in this step is that which has been removed in step (2).
- ② Secure the rack guide (L) with screw ❷. Remove the screw ❷ from the position on the side cover where the rack guide (L) is to be installed, and use it to fasten the rack guide together with the side cover.

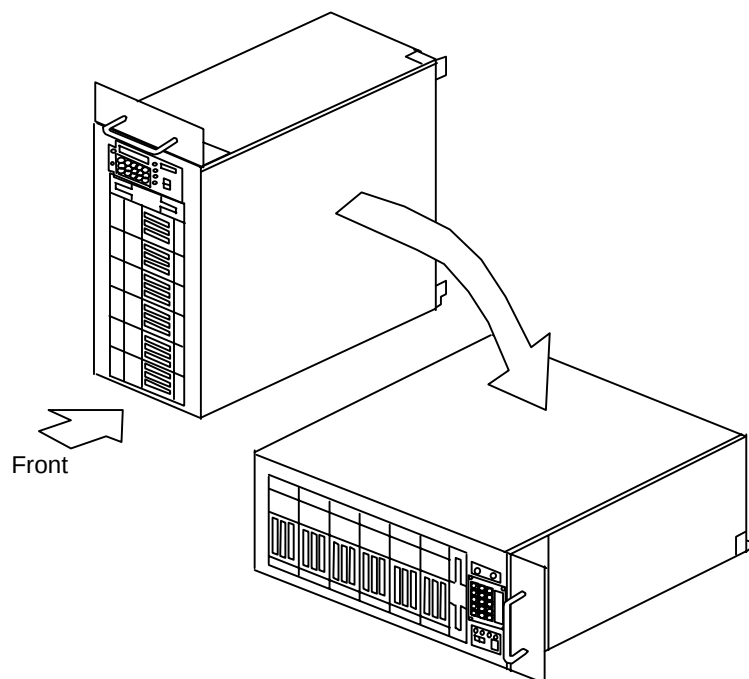
**Figure 6 Attach the Rack Guide**

(7) Lay the subsystem on the side

- ① Lay down the subsystem gently so that its top faces the right side.



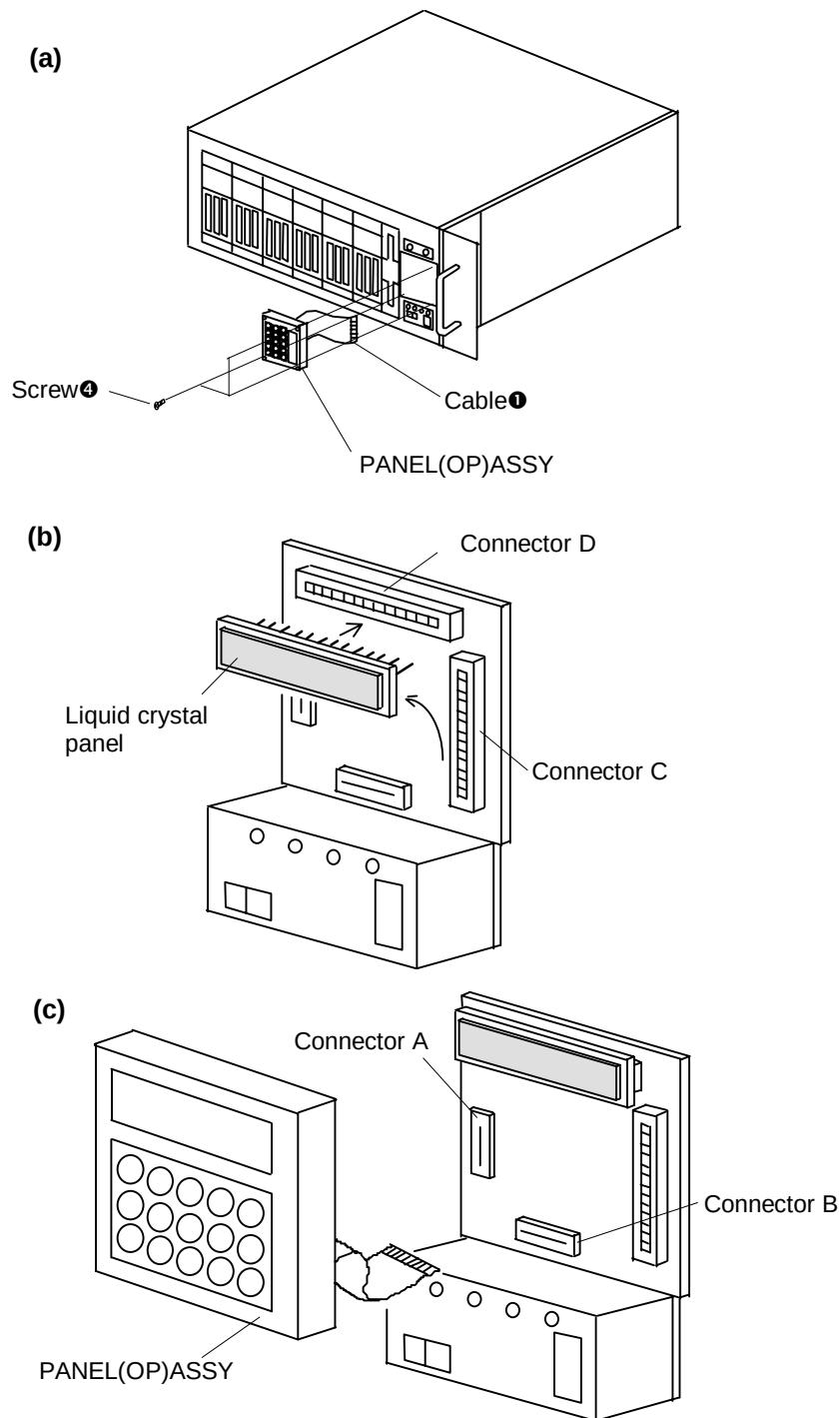
Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

**Figure 7 Work to Lay the Subsystem on the Side**

(8) Change the orientation of the PANEL (OP) ASSY

Tool : Phillips screwdriver (No.2)

- ① Remove the three screws ❹, pull out the PANEL (OP) ASSY from the subsystem, disconnect the cable ❶ from the connector "A", and then remove the PANEL (OP) ASSY from the subsystem. (See Figure 8 (a).)
- ② Pull off the liquid crystal panel from the connector C and reinstall it by inserting its pins into the connector D. (See Figure 8 (b).)
- ③ Connect the cable ❶ to the connector B, turn the PANEL (OP) ASSY by 90 degrees so that the liquid crystal panel is visible through it, and fasten the PANEL (OP) ASSY to the subsystem with the three screws ❹. (See Figure 8 (c).)

**Figure 8 Procedure to Change Orientation of PANEL (OP) ASSY**

(9) Attach the left handle.

Tool : Phillips screwdriver (No.2)

- ① Install the handle on the left side of the subsystem with the two screws ❸ (Bind screw M4×12).

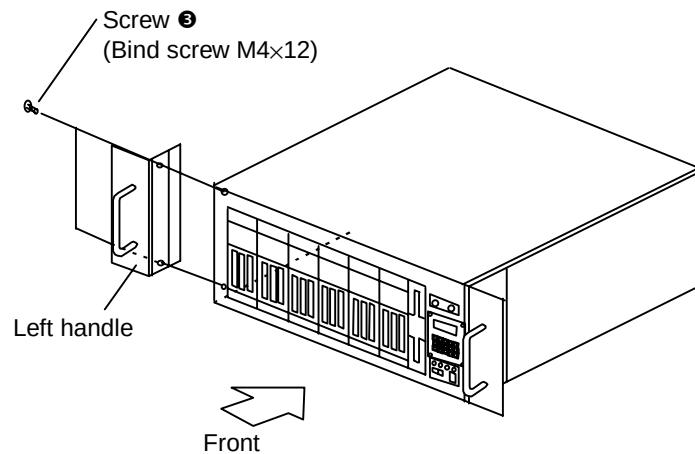


Figure 9 Attach the Left Handle

(10) Attach the panel on the front cover.

Tool : Key

- ① Open the panel and remove it by pulling it off from the front cover.
- ② Install the panel ❶ for the rack mount type included in the kit by inserting it into the front cover.
- ③ Fit a key in the lock of the front cover for the rack mount type, and release the lock of the front cover.
- ④ Install the front cover by fitting it to the guide at the bottom of the subsystem and then closing it.
- ⑤ Lock up the front cover.
- ⑥ Keep the original panel in custody.

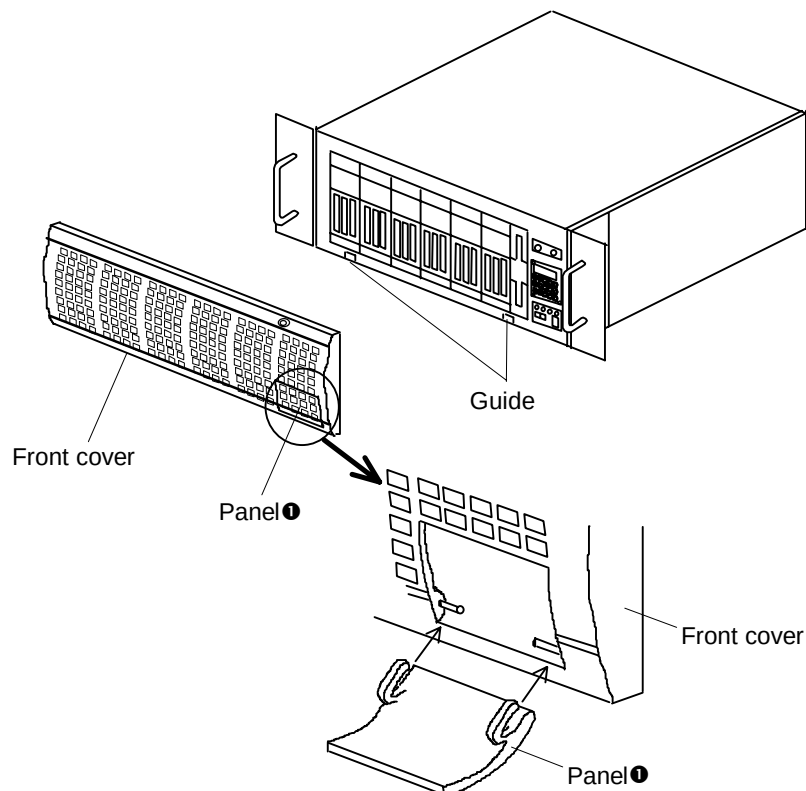


Figure 10 Attach the Front Cover

(11) Affixment of balance label

- ① Affix the balance labels at the positions shown in the figure.

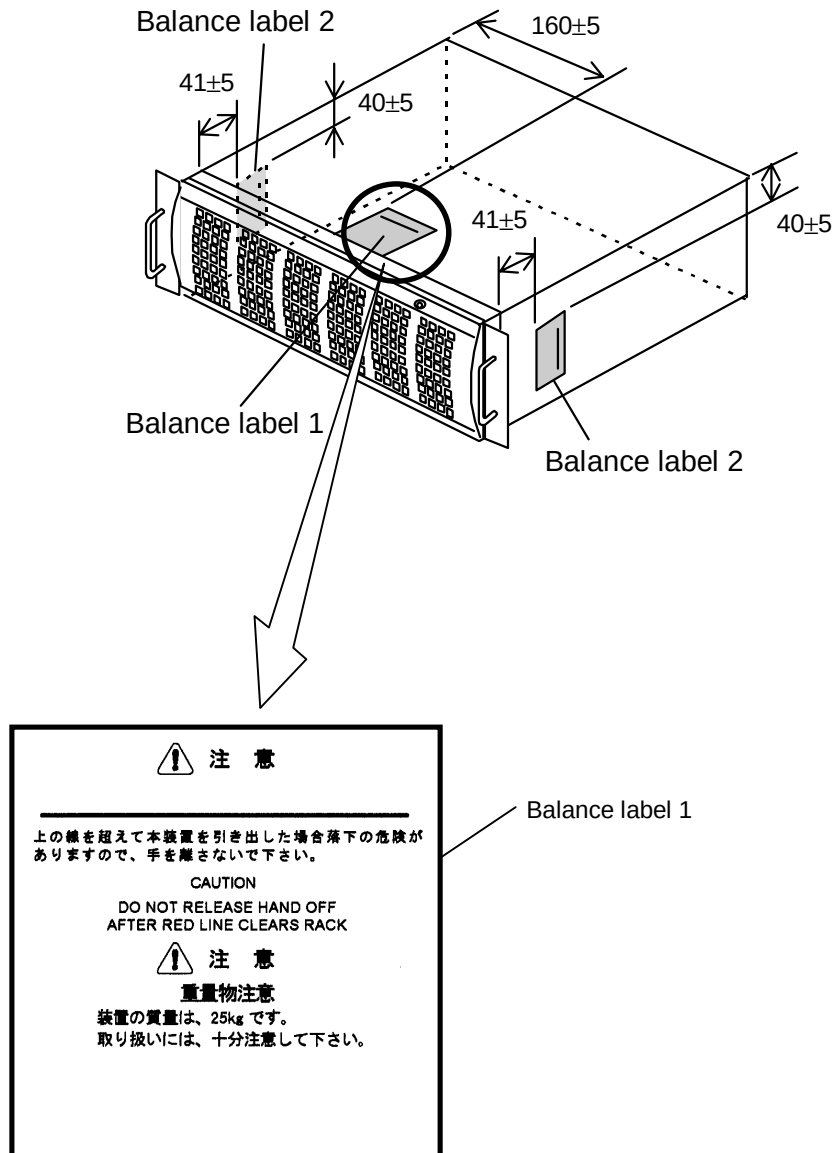


Figure 11 Position of Balance Label

DF350 Disk Subsystem
7. PARTS REPLACEMENT
(Mini Tower Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.13.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0040	The description of HDU ASSY for AS/400 was added in No.4 of the table.	AD
					0170	A sentence was added.	AD
					0210	“RAID0” was changed to “RAID1” in the figure.	CR
					0310	“STSDTSVER” was changed to “SYSDTSVER”. (Pages 0350, 0370, 0410 and 0440 were changed by the same reason.)	CR
					0350	Figure 9.1 was changed.	CH
					0355	Newly created by inserting a figure of the label layout.	AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0380	An explanation in the case there exist the redundancy was added.	AD
					0040	Added CACHE ASSY and ④.	AD/
						Deleted *1, 2.	DL
					0050	Added “Refer to THEORY...” in Figure.	AD/
						Deleted (2).	DL
					0055	This page was newly added.	AD
					0100	Added “The READY LED on...”.	AD
					0110	Deleted “DIPSWITCH SET”.	DL/
						Shifting from 0120.	AD
					0120	Shifting from 0130.	AD
					0130	Flow was shifting to 0120.	DL
					0170	Added 4.1.1.	AD
					0175	This page was newly added.	AD
					0180	Added RAID A.	AD
					0200	Added (1). ((1)→(1-1)).	AD
					0210	Added RAID A.	AD
					0215	This page was newly added.	AD
					0218	This page was newly added.	AD
					0220	Added RAID A.	AD
					0230	Deleted (C) - (i).	DL/
						Added DYNAMIC SPARE.	AD
					0240	Added (C) - (i).	AD/
						Shifting the section 4.3 to 0265.	DL
					0245	This page was newly added.	AD
					0290	Added Notice 1, 2.	AD
					0305	This page was newly added.	AD
					0310	Added Notice 1, 2.	AD
					0341 - 0347	These page were newly added.	AD
0400	Added Notice 1, 2.	AD					
0410	Added Notice 1, 2.	AD					
0420	Added “Redundant CTL option”.	AD					
0440	Added Notice 1, 2.	AD					
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0320	Added Notice 1.	AD
					0344	Added Notice 1.	AD
					0380	Added WARNING.	AD
					0390	Delete (5).	DL
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0040	Added A2E8/A1E18.	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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11. Replacing AC/DC power supply.....	MK-REP0380
12. Replacing In Box ASSY	MK-REP0400
13. Replacing CACHE ASSY	MK-REP0410
14. Replacing LAN ASSY.....	MK-REP0440

1. Mechanical Configuration

Figures 1.1 and 1.2 show mechanical configuration and parts location of this subsystem.

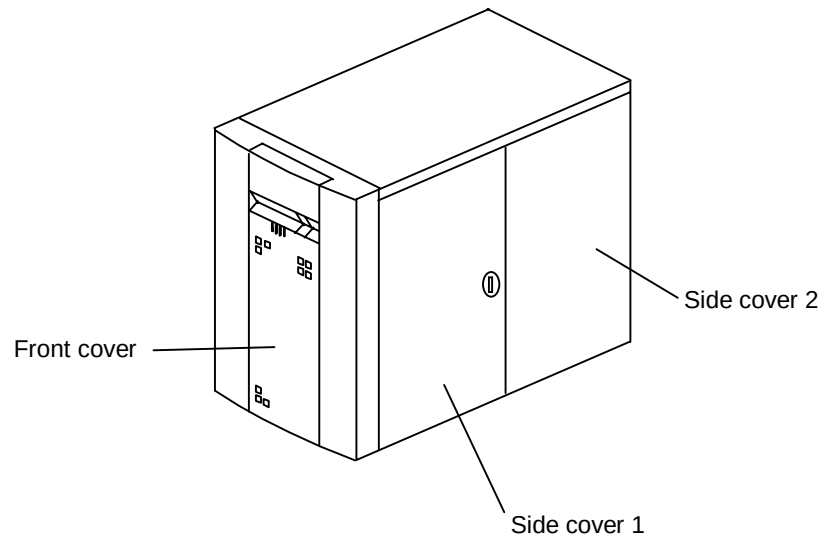


Figure 1.1 Appearance of DF350 Disk Subsystem (Cabinet Type)

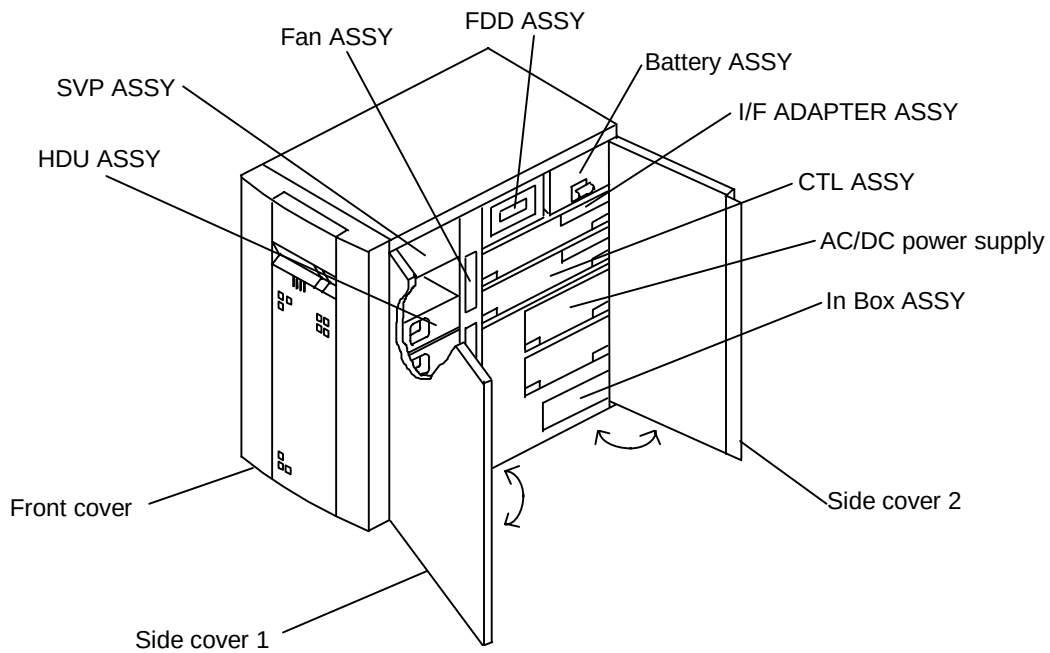


Figure 1.2 Parts Location

2. Maintenance Procedure

(1) Turning power on/off when replacing parts

Turning on/off procedure varies depending on the parts to be replaced.

Follow the procedures described in the table below for replacing each part.

No	Product name	Drawing No.	Model	Turning on/off power	
				Option not provided	Option provided
1	HDU ASSY (2GB1"H)	3243084-E	DF-F350-A2E2	④	④
2	HDU ASSY (4GB1"H) (*1)	3252929-E	DF-F350-A3E4	④	④
3	HDU ASSY (4GB1"H)	3243084-F	DF-F350-A2E4	④	④
4	HDU ASSY (4GB1"H)	3243084-Q	DF-F350-A2E4A (For AS/400)	④	④
5	HDU ASSY (8GB1"H)	3252929-B	DF-F350-A2E8	④	④
6	HDU ASSY (8GB1"H)	3252929-D	DF-F350-A2E8A (For AS/400)	④	④
7	HDU ASSY (8GBH"H)	3243084-G	DF-F350-A1E8	④	④
8	HDU ASSY (8GBH"H)	3243084-R	DF-F350-A1E8A (For AS/400)	④	④
9	HDU ASSY (18GBH"H)	3252929-A	DF-F350-A1E18	④	④
10	Fan ASSY	3237448-C	DF-F350-P1M	③	—
11	Battery ASSY	3247182-A	DF-F350-N1M10	③	—
12	FDD ASSY	3237444-A	DF-F350-M1M	②	—
13	CTL ASSY	3247188-A /B	DF-F350-F1MCF /F2MCF	②	③
14	I/F ADAPTER ASSY (WS-pin-lock screw type)	3247189-A	DF-F350DMUSS	①	①
15	I/F ADAPTER ASSY (WD-pin-lock-screw type)	3247189-B	DF-F350-DMUDS	①	①
16	SVP ASSY	3237450-B	DF-F350-L1ML	②	—
17	AC/DC power supply	5486141-303	DF-F350-B2M	②	③
18	In Box ASSY	5486142-301	DF-F350-Q1M	②	—
19	CACHE ASSY	3247121-A	DF-F350-C8E	②	—
20	CACHE ASSY	3247121-B	DF-F350-C32E	②	—
21	CACHE ASSY	3247121-C	DF-F350-C128E	②	—
22	LAN ASSY	5493862-A	DF-F350-G1M1	②	③
23	LAN ASSY (SNMP)	5493862-B	DF-F350-G2M1	②	③

① Turning the power off DF350 Disk Subsystem and Host System.

② Turning the power off DF350 Disk Subsystem.

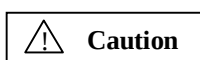
③ Turning the power off is unnecessary.

④ Turning the power on DF350 Disk Subsystem.

(*1): It is necessary to use it with the Micro_Disk Ver.0307 or later.

Notice : When a part which requires to turn the power off or on for replacement (marked with ① and ②) is to be replaced, turn the power off correctly according to the instruction in MK-REP0050 beforehand.

Otherwise, there is a risk that the user data is destroyed.

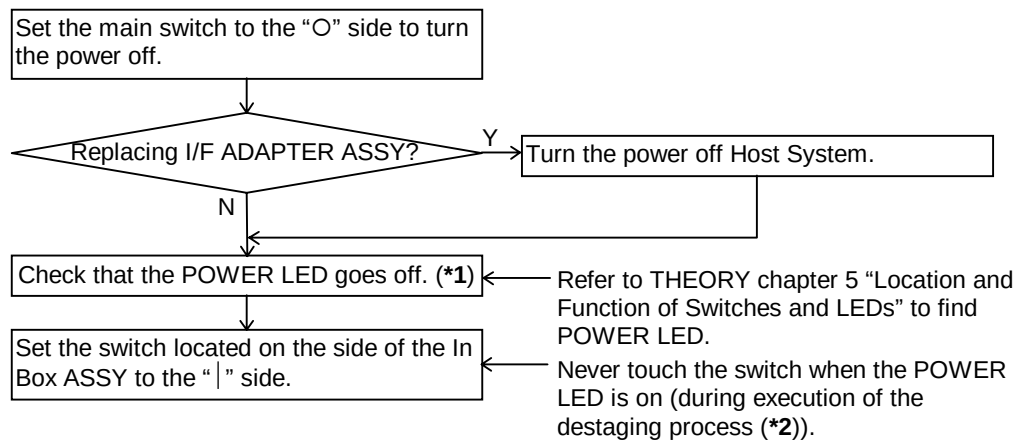


When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.

Be careful not to touch the electrified parts with a screwdriver etc.

2.1 Turning the Power On/Off for Each String

(1) Turning the power off



*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

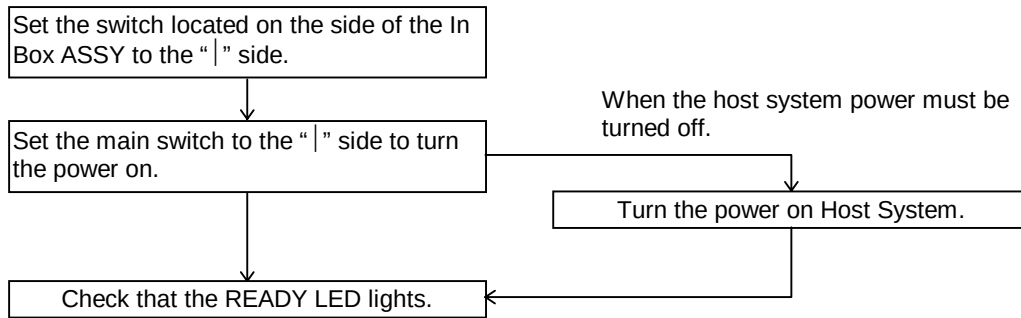
Notice : In case the data is not properly backed up, the user's data will be lost.

***2** The cache memory installed in this subsystem is controlled with a write-after method. When turning off the power, the subsystem automatically writes all the data left on the cache memory unwritten to the hard disk drive. (This operation is called a destaging.) The subsystem turns off the power when this process is completed. When the power is turned off according to the power failure or by the operation of the breaker, the destaging can not be performed. In this case, the subsystem enters the mode of battery back-up. If the system is kept in this state, the battery may be discharged and the user data might be lost. Therefore, be sure to follow the power-off procedure explained above.

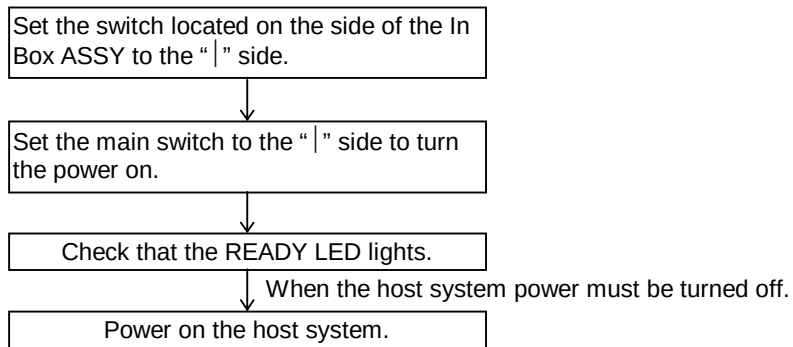
If the breaker is turned off due to power failure or by mistake before the POWER LED goes off, turn the power on again according to Item (2), "Turning the power on" promptly and then execute the power-off procedure explained above.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



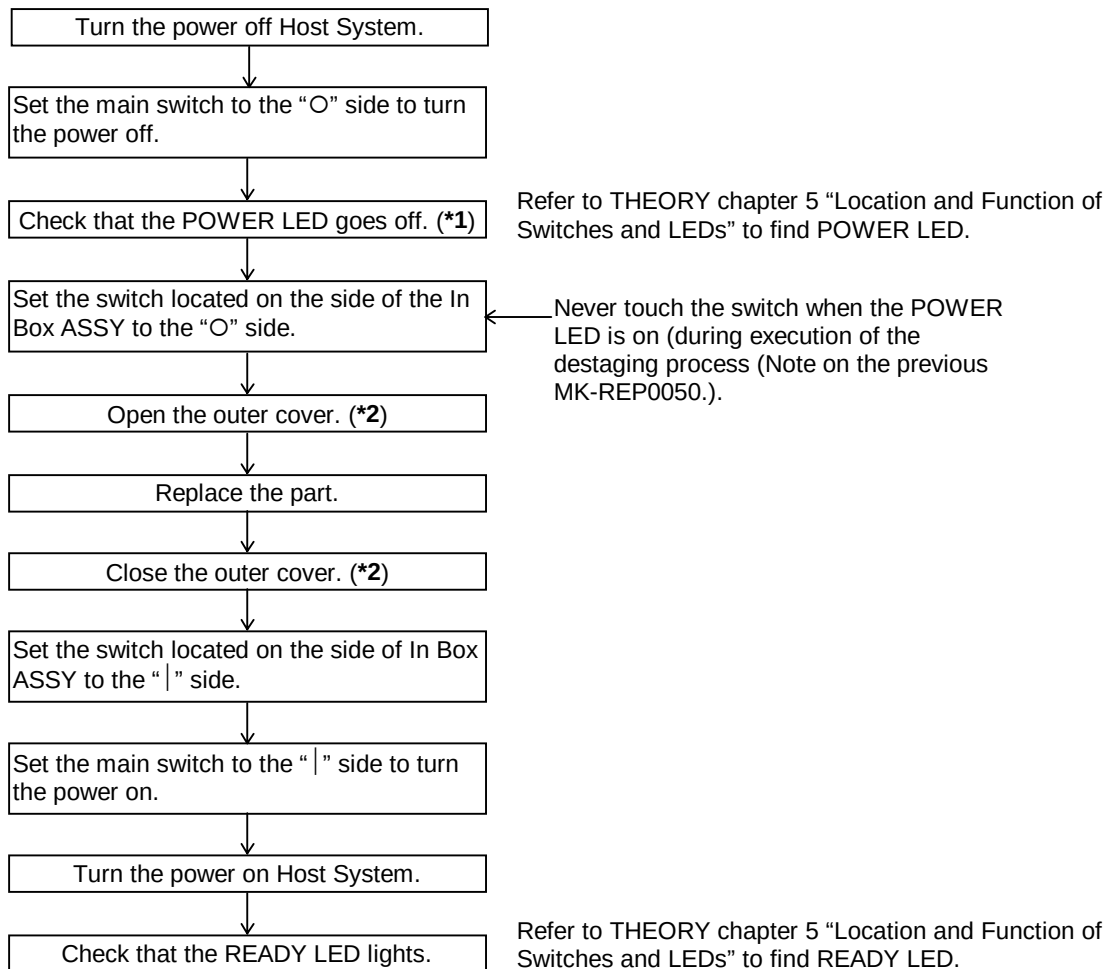
(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.2 Part Replacement Procedures

- (1) Procedure for the case of turning the power off both DF350 Disk Subsystem and Host System is inevitable.



Notice: In case the power is not normally turned off, the configuration data will be lost and the user's data will be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

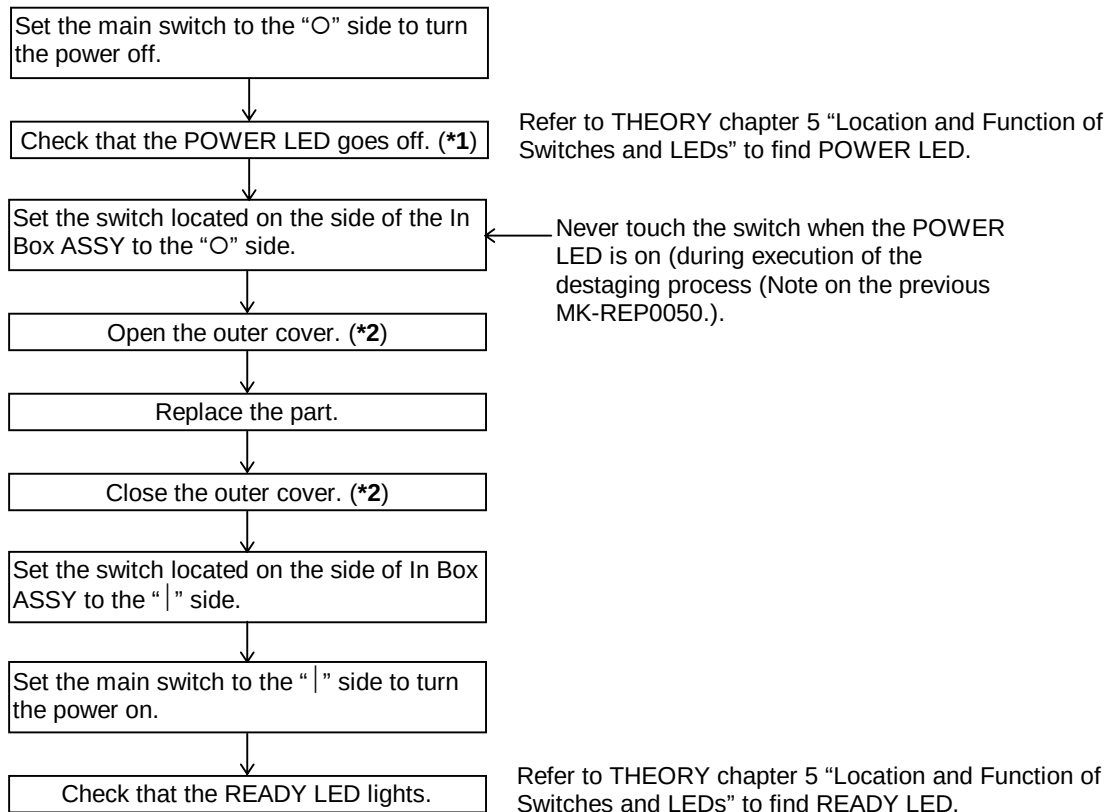
CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

***2** Outer cover : Front cover

Side cover 1

Side cover 2

- (2) Procedure for the case of turning the power off DF350 Disk Subsystem is inevitable.



Notice: In case the power is not normally turned off, the user's data might be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

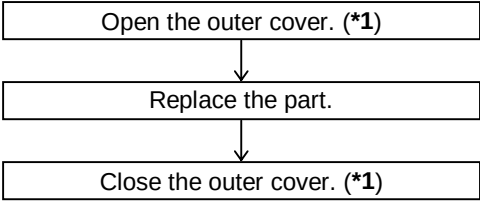
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

- *2** Outer cover : Front cover
Side cover 1
Side cover 2

(3) Procedure for the case of turning the power off DF350 is either not necessary or prohibited.



*1 Outer cover : Front cover
Side cover 1
Side cover 2

2.3 Back-up Procedure of System Parameter

There are cases where system parameters (Target ID, buzzer setting, drive recovery mode, etc.) are copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters forllowing “2.3.1 Back-up procedure of system parameter” (MK-REP0090) or “2.3.2 Restore procedure of system parameter” (MK-REP0130).
(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to MK-REP0050.

Notice: In case the power is not normally turned off, the user’s data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

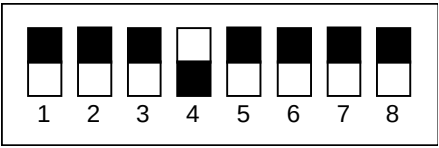
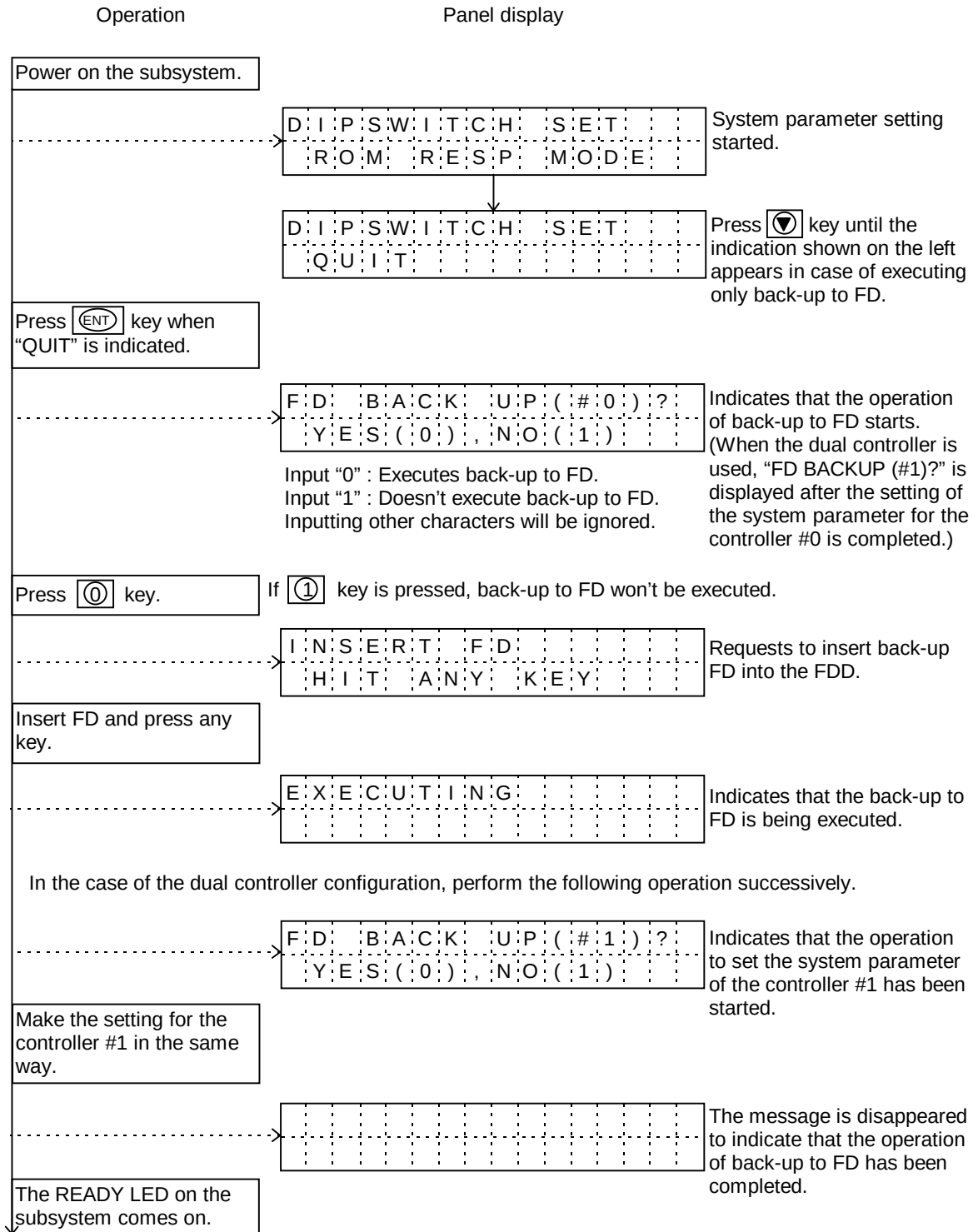


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

(3) Operate as described below.



(4) Set DIP switch No.4 to setting as shown in Figure 2.3.2.

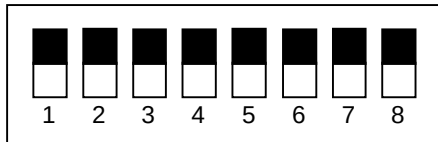
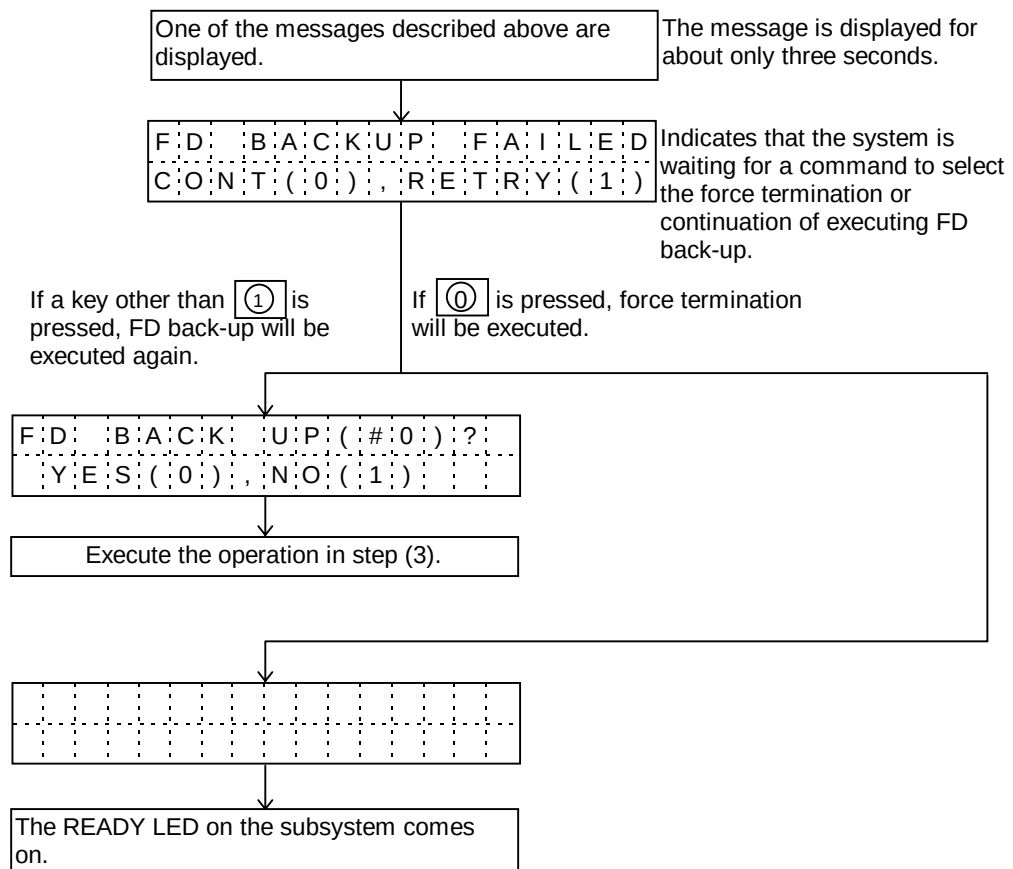


Figure 2.3.2 DIP Switches

Note 1 : While executing the back-up to FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute..
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

Note 4 : "EEPROM.DAT" or "EEPROM0.DAT" file is stored in system parameter backed up FD. The case of optional SNMP system, SNMP configuration environment files ("Config.TXT" and "NAME.TXT") are stored with system parameter file.

Note 5 : In case with optional SNMP system and system parameter is restored without SNMP configuration environment files, Subsystem becomes ready without SNMP function. In this case, the warning lamp on the panel comes on and one of messages below is shown on PANEL.

W	0	1	6	0	1	F	D	E	R	R		
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	2	F	O	P	N	E	R	R
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	0	S	N	M	P	I	N	V	1
V	E	R	S	I	O	N	=	X	X	X	X	/X	

Only Dual controller system.

This case, re-restore the subsystem with a FD in which SNMP configuration environment files is stored.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP swithces as shown in Figure 2.3.3.

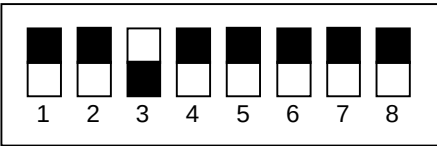
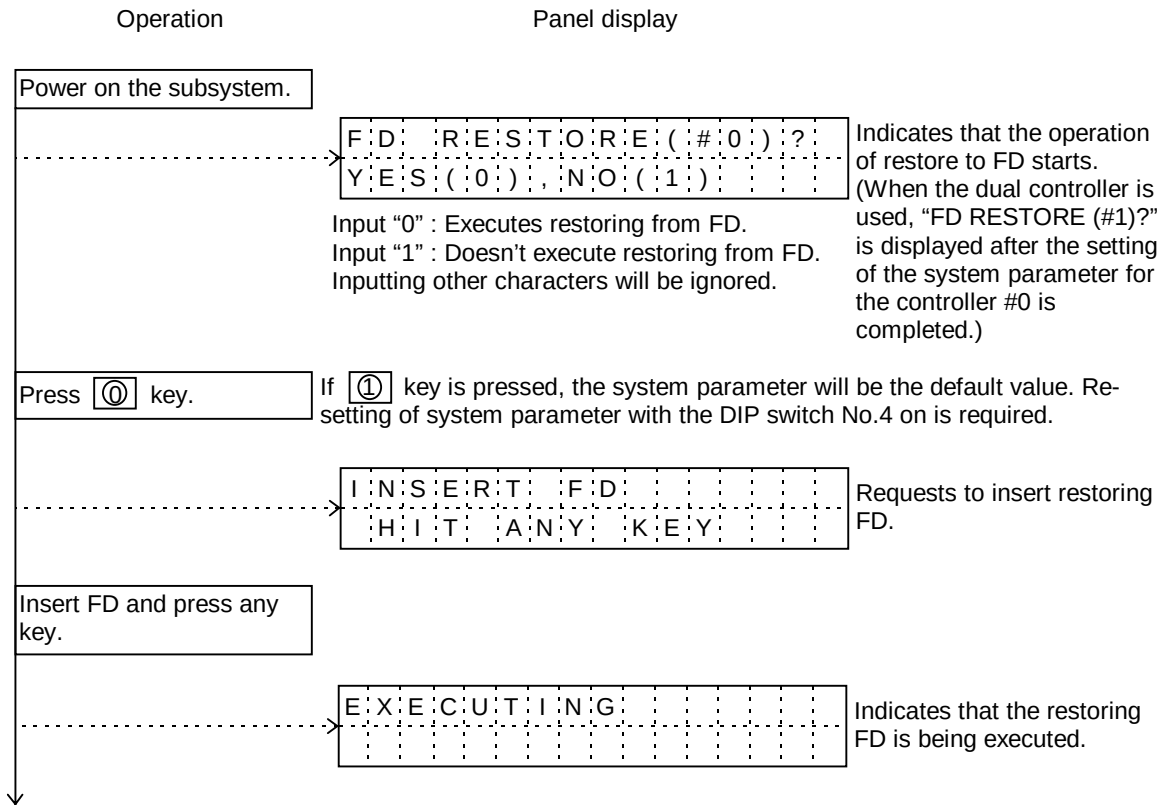
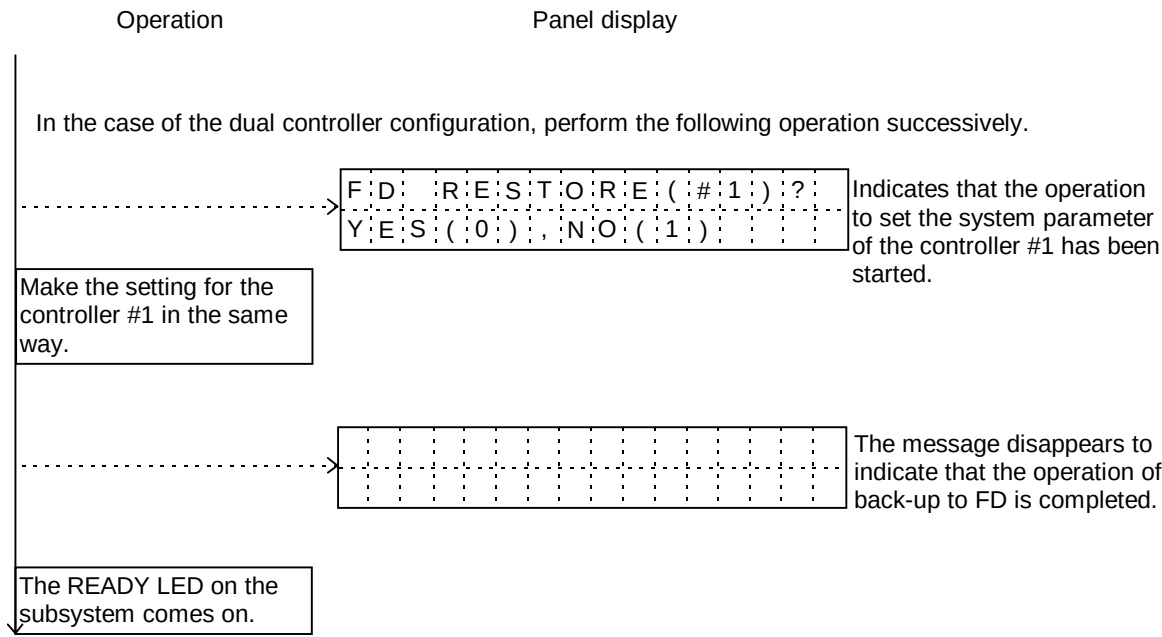


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

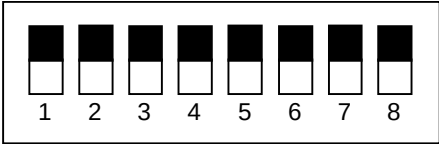
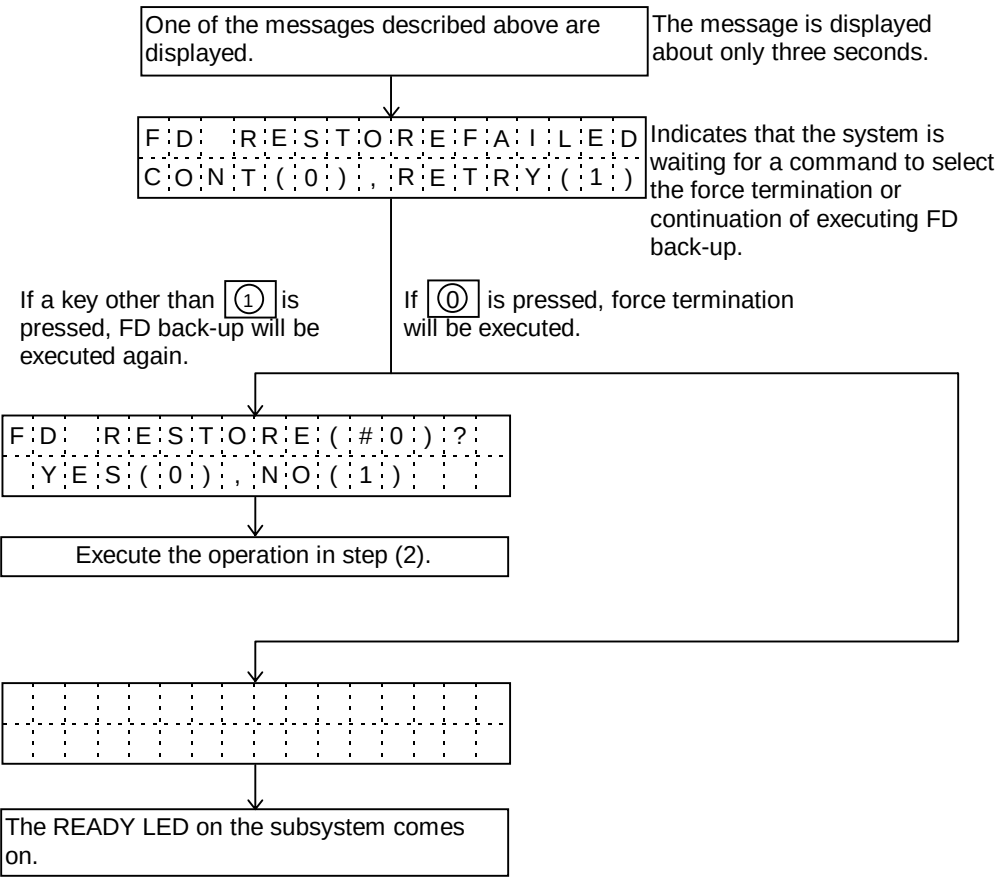


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-restore the system following the operation described below.



Note 2 : In case that restoring operation ended in failure and force terminated, setting of system parameter will be with default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

3. Opening/Closing Front and Side Covers

(1) Opening/Closing the front cover (See Figure 3.1.)

- ① Pull the right side of the front cover to your side to open it.
- ② Push it back slowly to close it.

Note : Open/Close the front cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Opening/Closing the side covers (See Figure 3.1.)

- ① Insert the key attached to the subsystem into the keyhole and turn it clockwise. Then, open the side cover 1 gently, and then open the side cover 2.
- ② Gently close the side cover 2 first, and then close the side cover 1. Then, turn the key counterclockwise.

Note : Open/Close the side covers gently to avoid a shock. Precision components are installed.

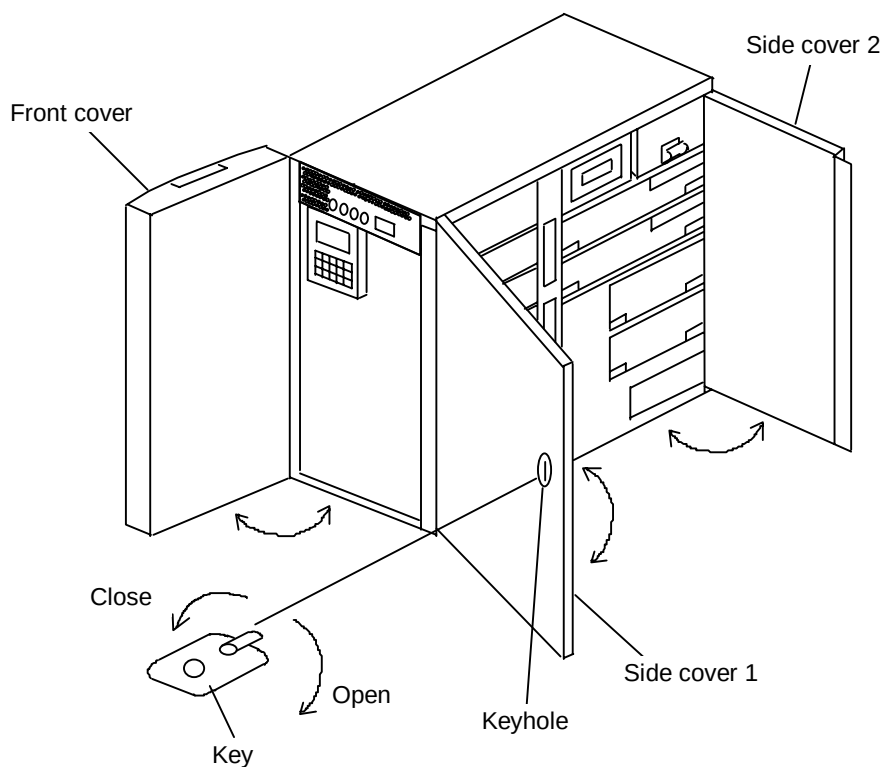


Figure 3.1 Opening/Closing Front and Side Covers

4. Replacing HDU ASSY

The method of replacing HDU varies depending on the RAID configuration.

When replacing the HDU ASSY, confirm the RAID configuration of the subsystem beforehand, and follow the procedure below according to the configuration.

To confirm the RAID configuration, refer to page PANEL0390 (3.3.2 (1) Reference/setting menu of RAID configuration information.)

Notice : Be sure to replace the HDU ASSY with the power kept on. (This procedure is except for when the Micro-Disk version is 0303 or earlier.)**

Proceed the replacement and the data recovery following the procedure below. RAID Specification of replacing HDU can be seen on the panel display. (See PANEL0390.)

Notice : If you delete or re-format the set-up RAID group or LU, user's data in that will be deleted. Be sure to back-up copy the user's data before these operation.

4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration

4.1.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

The replacement procedure differs depending on whether the Micro_Disk version is 0303** (** is optional) or earlier, or 0304** (** is optional) or later. Confirm the version first, then execute the replacement following the procedure determined according to the version.

When the Micro_Disk version is 0303** (** is optional) or earlier

- (1) Turn the subsystem power off according to the powering off procedure (see page MK-REP0050).
- (2) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY (Disk) Replacement Procedure" on page MK-REP0245.
- (3) Turn the subsystem power on according to the powering on procedure (see page MK-REP0050). Following messages will be displayed on the panel when a disk of row 0 is replaced.

I00DXY SYS-CP-XY----- Starting system area recovery

I00EXY SYSRCV-XY----- Completing system area recovery

X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)

If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.

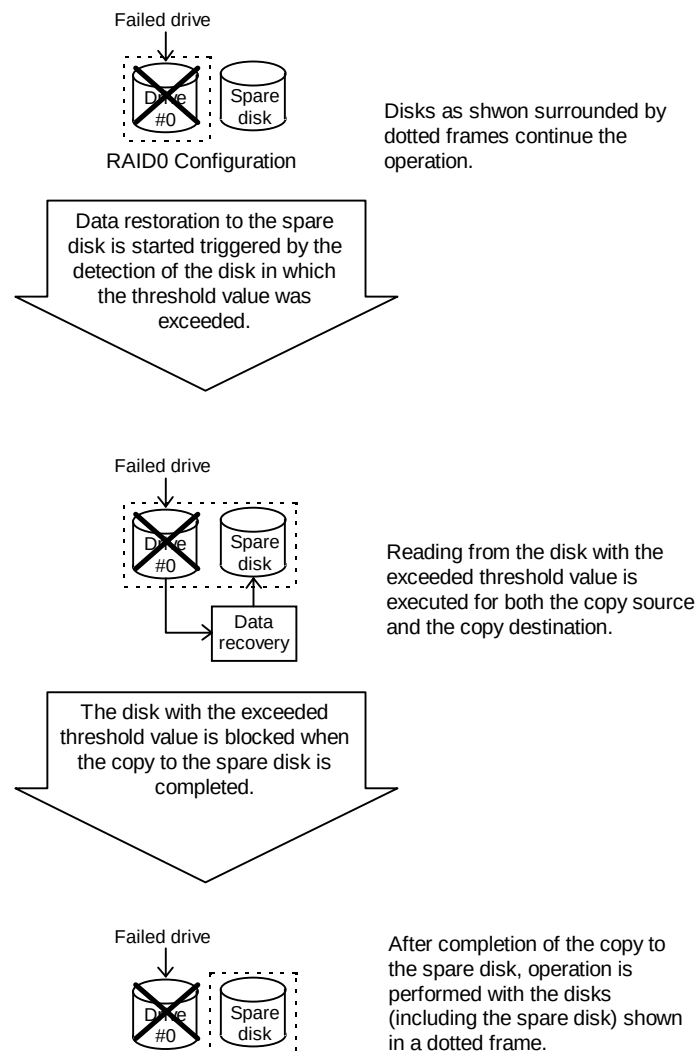
- (4) Execute an LU formatting. For the LU formatting procedure, see page MK-INST0710.
- (5) Restore the data using the backed up data.

When the Micro_Disk version is 0304** (** is optional) or later

- (1) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY Replacement Procedure" on page MK-REP0245.
- (2) In a short time after the disk is inserted, the ALARM lamp on the HDU ASSY goes out and the READY lamp comes on. If the inserted disk is that of row 0, following messages will be displayed on the panel.
 I00DXY SYS-CP-XY----- Starting system area recovery
 I00EXY SYSRCV-XY----- Completing system area recovery
 X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)
 If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (3) Execute an LU formatting. For the LU formatting procedure, see page MK-INST0680.
- (4) Restore the data using the backed up data.

4.1.2 When a spare disk is installed

When the Micro_Disk version is 0304** (** is optional) or later, data restoration to the spare disk is executed by the dynamic sparing function. Conditions for restoration to the spare disk and messages, etc. are the same as those to the RAID1, 5 and A. See pages MK-REP0215 through 0218.



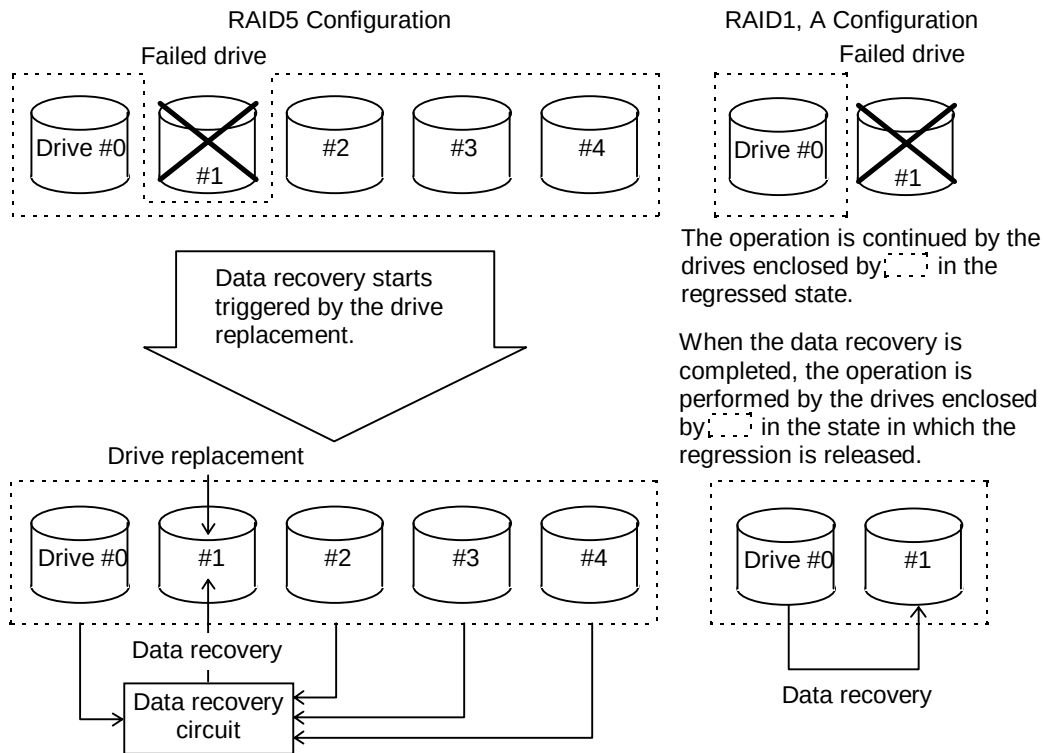
4.2 Procedure of Data Recovery and HDU Replacement Under RAID1, 5, A Configuration

4.2.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

When a failure occurred at a HDU ASSY, replace the failed HDU with a spare HDU.

To replace a HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See MK-REP0245.) With the replacement, data in the failed HDU will be automatically recovered. The panel display is described at “① Transition of panel display”. (See MK-REP0190.)

Note : When DRIVE MAINTN (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINTN again).



In the following cases, the recovery will not start automatically. Operation to start the recovery is required.

- (1) When the drive recovery mode is set to “NOT AUTOMATIC MODE”, the data recovery will not start automatically when the drive is replaced.

In this case, it is necessary to instruct recovery from the panel. (For further details, refer to the Hitachi Disk Array Subsystem Panel Operation Manual.)

- (2) When failures occurred in plural drives, if the second faulty drive is replaced during data recovery of the first drive, the data recovery of the second drive will not start automatically.

In this case, it is necessary to remove and insert the second drive again after the data recovery for the first drive is completed. Or, it is necessary to instruct recovery from the panel. Select “DRIVE MAINTN (RECOVER STATUS)” and make sure that data recovery is completed normally.

① Transition of panel display

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of drive recovery

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the drive under recovery.

* : Only with the replacement of HDU in Row = 0.

② Confirming completion of data recovery

Select DRIVE MAINTEN (RECOVER STATUS) with the panel and check to see that the data recovery is completed normally (COMP).

③ When the data recovery fails (1012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(a) Data recovery onto the replacement drive

(i) When the faulty portion is the replaced drive (PORT X, ROW Y)

- Replace the drive again.
- Make sure that the data recovery is completed normally (COMP).

(ii) When the faulty portion is other than the replaced drive

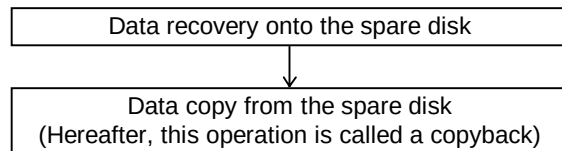
- Remove and insert the replaced drive and start data recovery again.
- Check to see that the data recovery is completed normally (COMP). When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. Ask for an instruction. When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive.

4.2.2 Procedures of data recovery and HDU ASSY replacement when a spare disk is installed

When a failure occurred in a HDU at a system with a spare drive, the data in the failed HDU is automatically recovered to the spare drive. After replacement of the failed HDU, the data in the spare drive will be copied back to the replaced HDU.

To replace HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See MK-REP0245.) The panel display is described “Transition of Panel Display”. (See MK-REP0230.)

Note : When DRIVE MAINT (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINT again).



(1) Data recovery onto the spare disk

There are two types of data recovery onto the spare disk depending on the incentive.

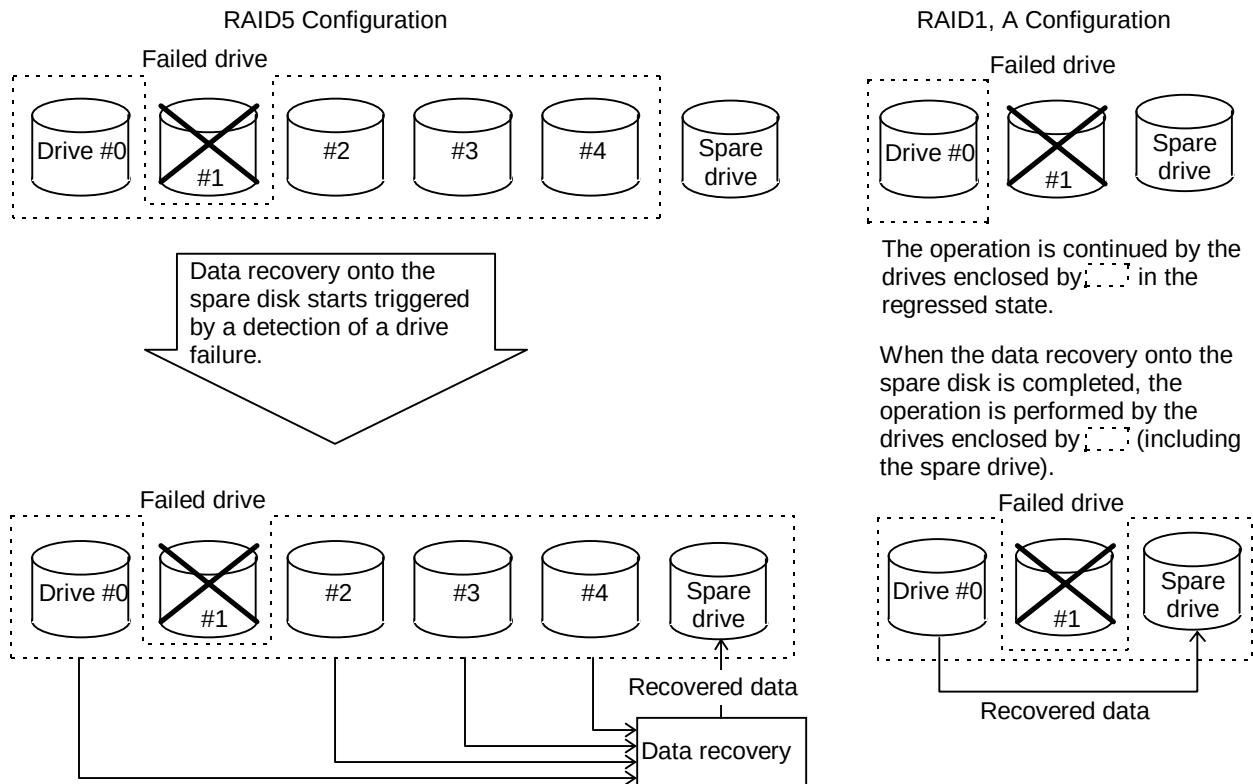
- Data recovery onto the spare disk when a failure in the disk is detected.
- Data copy onto the spare disk when a disk is detected in which the error count has exceeded its threshold value. (This operation will be called “dynamic sparing” hereafter. Note that some microprograms of certain version do not support the operation.)

(1-1) Data recovery onto the spare disk when a disk failure is detected.

As to data recovery onto the spare disk, as shown in the drawing on the following page, when a drive failure occurs, the data of the failed drive is recovered automatically onto the spare disk.

Automatic recovery onto the spare disk is executed only under the following condition.

Condition : “When a drive failure is detected, the spare disk is an unused disk.”



In the following cases, the data recovery onto the spare disk will not start automatically. An action to start the data recovery is required.

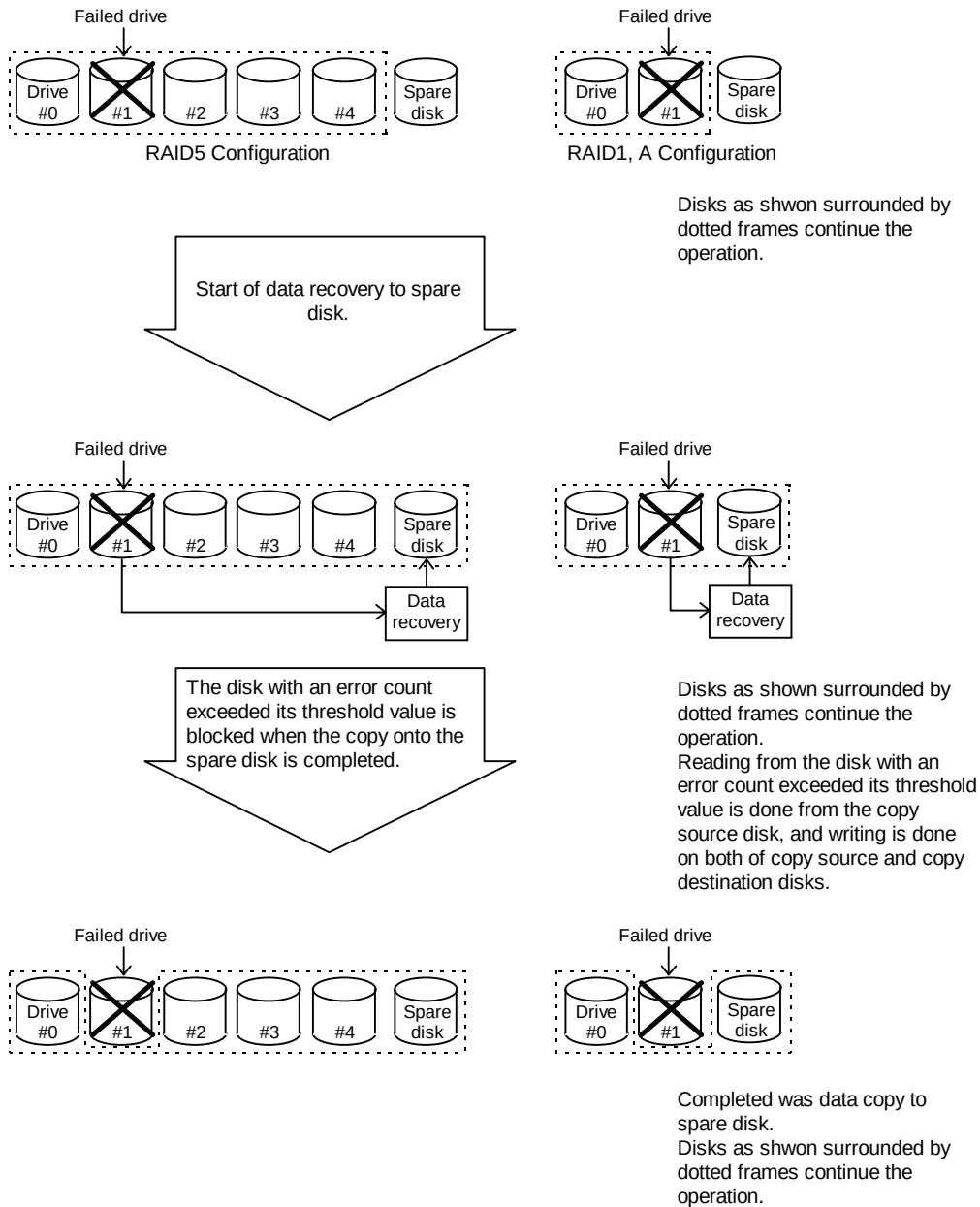
- ① When the drive recovery mode is set to "NOT AUTOMATIC MODE", the data recovery onto the spare disk will not start automatically.
In this case, it is necessary to instruct recovery onto the spare disk with the panel. (See MK-REP0260)
- ② If a further drive failure occurs while the spare disk is used already (data of a drive has been already recovered onto the spare disk), the data of the nearly failed drive will not be recovered onto the spare disk.
Even after the copyback is completed in the above state and the spare disk enters the unused state, the data of the second failed drive will not be recovered onto the spare disk.
- ③ If a disk of no failure (a drive which is not blocked) is removed, no data recovery onto the spare disk will be executed. In this case, to recover data onto the spare disk, it is necessary to instruct a recovery from the panel. (See MK-REP0260)
- ④ When the spare disk is replaced because a spare disk failure occurred during data recovery to the spare disk, the data recovery to the replaced spare disk will not start automatically. In this case, it is necessary to instruct recovery to the spare disk with the panel. (See MK-REP0260)
- ⑤ If a faulty drive is replaced during data recovery to the spare disk, the data copy back the replaced drive will not start automatically even after the data recovery to the spare disk is completed.
In this case, it is necessary to remove and insert the replaced drive again after the data recovery onto the spare disk is completed.

(1-2) Data recovery onto the spare disk by means of the dynamic sparing

Data recovery onto the spare disk is performed as shown below. When a disk is detected in which the error count has exceeded its threshold value, data stored in the disk is copied automatically onto the spare disk.

The automatic data recovery onto the spare disk is performed only when the following condition is met.

Condition : The spare disk is not in use when a disk is detected in which the error count has exceeded its threshold value.



The subsystem displays the following message on the panel when detecting a disk in which the error count has exceeded its threshold value.

I03■XY ■:0 - D
 ▲▲▲▲▲ -XY ▲▲▲▲▲ : Message text } See TRBL0275, 0278.

At the time when an error count exceeded its threshold value is detected, only a message display on the panel is done without blocking the concerning disk, and the dynamic sparing is started.

The disk with an error count exceeded its threshold value is blocked after the dynamic sparing is completed.

Refer to page MK-REP0230 for panel display transition when the dynamic sparing is performed.

In the following cases in which a disk with an error count exceeded its threshold value is detected, the disk is blocked without an execution of the dynamic sparing.

- When the dynamic sparing mode is set not to execute the dynamic sparing.
- When a disk with an error count exceeded its threshold value is detected after the data has been recovered or while the sparing disk is being used for the data recovery.
- Another disk with an error count exceeded its threshold value is detected during the dynamic sparing operation.

In each case above, the disk with an error count exceeded its threshold value is blocked.

Procedures for data recovery and disk replacement are the same as those for the installation of the spare disk (refer to pages MK-REP0180 through MK-REP0240).

Errors counted in the subsystem and default threshold values for them are listed below.

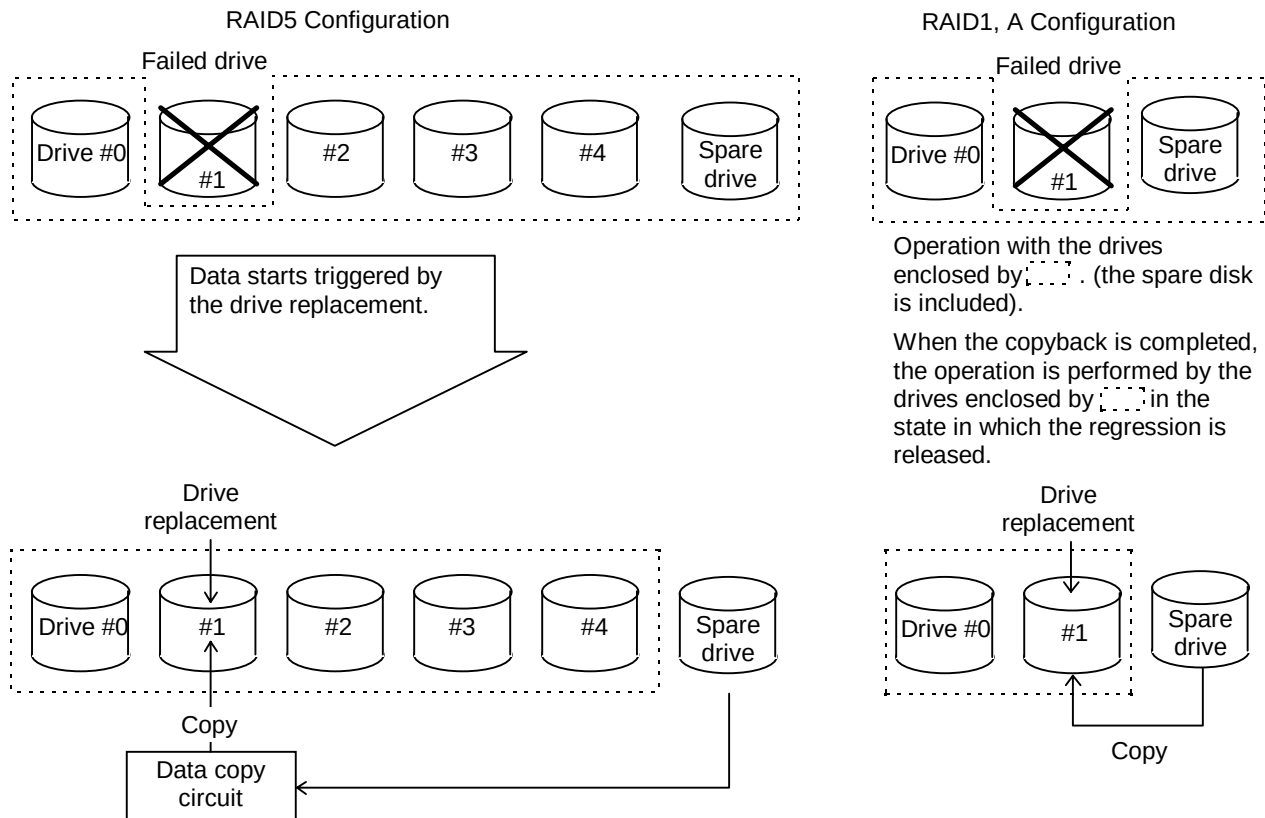
Item No.	Kind of error	Threshold (Default)
1	Drive mechanical error. (Recovered)	50
2	Drive mechanical error. (Unrecovered)	2
3	Drive medium error. (Recovered)	100
4	Drive medium error. (Unrecovered)	50
5	Drive R/W error. (Recovered)	10
6	Drive R/W error. (Unrecovered)	2
7	Drive I/F error. (Recovered)	50
8	Drive I/F error. (Unrecovered)	2
9	Drive hardware error. (Recovered)	50
10	Drive hardware error. (Unrecovered)	2
11	Drive SCSI I/F error. (Recovered)	50
12	Drive SCSI I/F error. (Unrecovered)	2
13	Collectable errors in online verify.	100
14	Uncollectable errors in online verify.	50

The threshold values above can be referred to and updated from the maintenance panel. (See page PANEL0745.)

Besides, the then error count can be referred to concerning the recovered or unrecovered drive media errors, correctable errors in online verify operations, correctable errors, and uncorrectable errors.

(2) Copyback

When a new drive is inserted to where a failure occurred as shown in the drawing below, the copyback will be executed automatically.



In the following cases, the copyback will not start automatically. Operation to start the copyback is required.

- ① When the copyback mode is set to "NOT AUTOMATIC MODE", the copyback will not start automatically after the drive replacement.

In this case, it is necessary to instruct copyback with the panel. (See MK-REP0260)

- ② If a faulty drive is replaced during data recovery to the spare disk, the data copy back to the replaced drive will not start automatically even after the data recovery to the spare disk is completed.

In this case, it is necessary to remove and insert the replacement drive again after the data recovery onto the spare disk is completed.

(a) Transition of panel display.

(i) Data recover (Data recovery onto the spare disk when a disk failure is detected.)

W202XY DRVALM-XY: Drive blocked

I01044 RCV-ST-44 : Start of data area recovery

I01144 RCVEND-44 : Completion of data area recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(ii) Data recover (Dynamic sparing)

I01DXY DYNMSP-XY : Start of Dynamic sparing

I01044 RCV-ST-44 : Start of HDU ASSY recover

I01144 RCVEND-44 : Completion of data recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

W202XY DRVALM-XY: Drive X, Y were blocked

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(iii) Copyback

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of recovery onto the drive to which the data has been copied.

Note : Symbols X and Y indicated above represent the following.

X indicates port No., and Y indicates row No., and XY indicates the location of the drive to which the data is copied.

* : This message is displayed only when replacing HDU ASSY.

(b) Confirming completion of data recovery or copyback

Select DRIVE MAINTEN (RECOVER STATUS) from the panel and make sure that the data recovery is completed normally (COMP).

(c) When the data recovery failes (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(i) Data recovery to the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery to the spare disk will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive. (When the failed drive is removed, the data recovery to the spare disk will not start, where as when the drive is replaced, the data recovery to the replaced drive starts.)

(ii) When the dynamic sparing

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the dynamic sparing will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

(iii) Copyback to the replaced drive from the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery onto the spare disk will not start.
- ➋ Replace the drive in the regressed location. In this case, the data recovery onto the replacement drive starts.

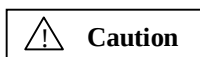
- ➌ Make sure that the data recovery is completed normally (COMP).

- When the faulty portion is other than the spare disk

- ➊ Replace the drive which failed during data recovery and make sure that the data recovery is completed normally (COMP).

- ➋ Replace the drive which is regressed first and make sure that the copyback is completed normally (COMP).

4.3 HDU ASSY Replacement Procedure (See Figure 4.3.1.)



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

(1) Removing procedure

- ① Open the front cover and the side covers. (See MK-REP0160.)
- ② Check to see the drive installing location of the message text DRVALM-XY (XY indicates the installing location) on the panel is correct and the ALARM LED of the HDU ASSY is on.

W	2	0	2	X	Y	D	R	V	A	L	M	-	X	Y

X : Port number

Y : Row number

- ③ Open the handle in the direction of the arrow (···➤) and pull it out and remove the HDU ASSY.

Note : Be sure to replace the HDU ASSY when the subsystem is in the ready state. (If the HDU assembly is replaced when the power of the subsystem is off, the data recovery operation will not start.)

(2) Installing procedure

- ① Open the handle fully, insert the HDU ASSY in place, and rotate the handle in the direction of the arrow (→).

⚠

Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

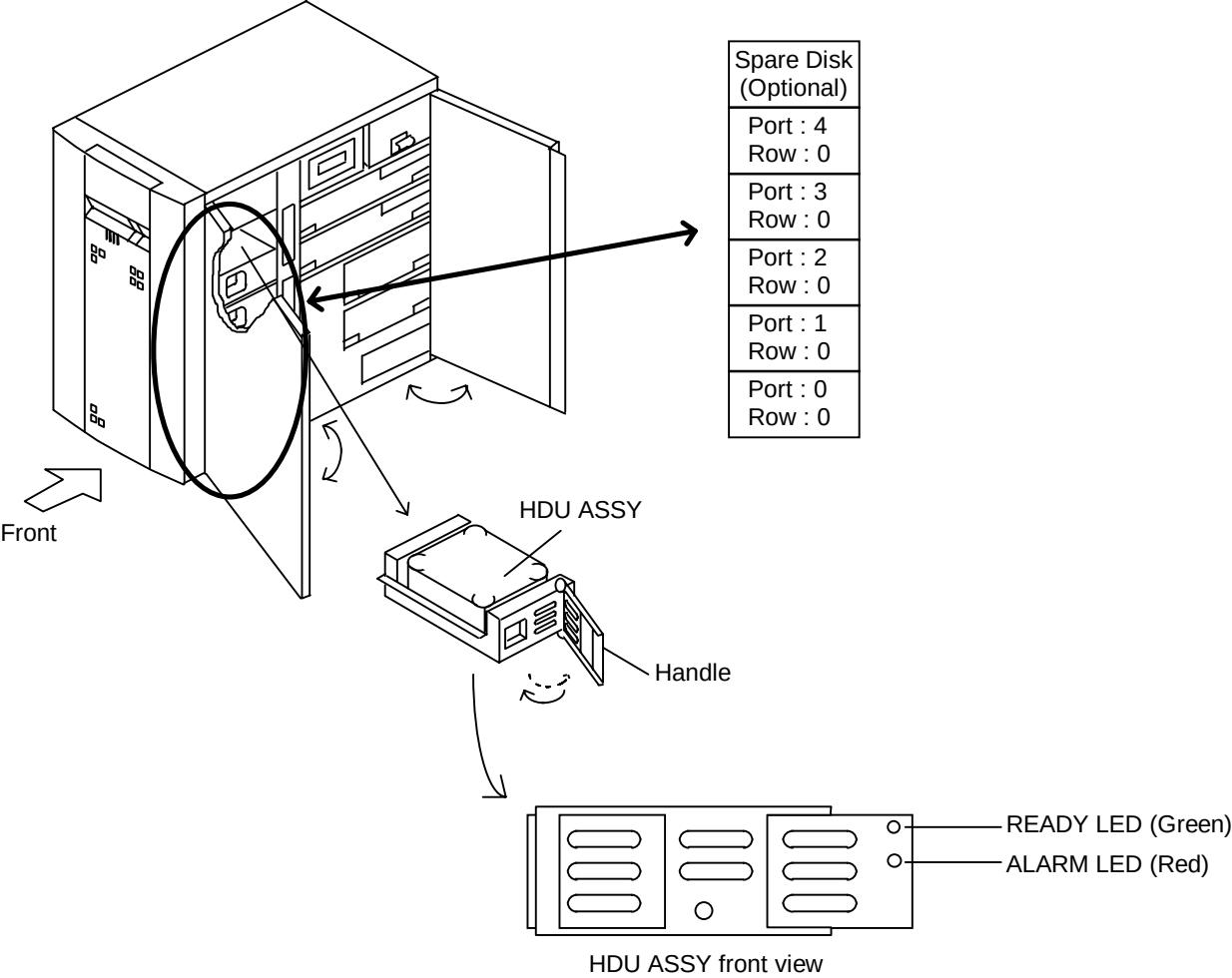
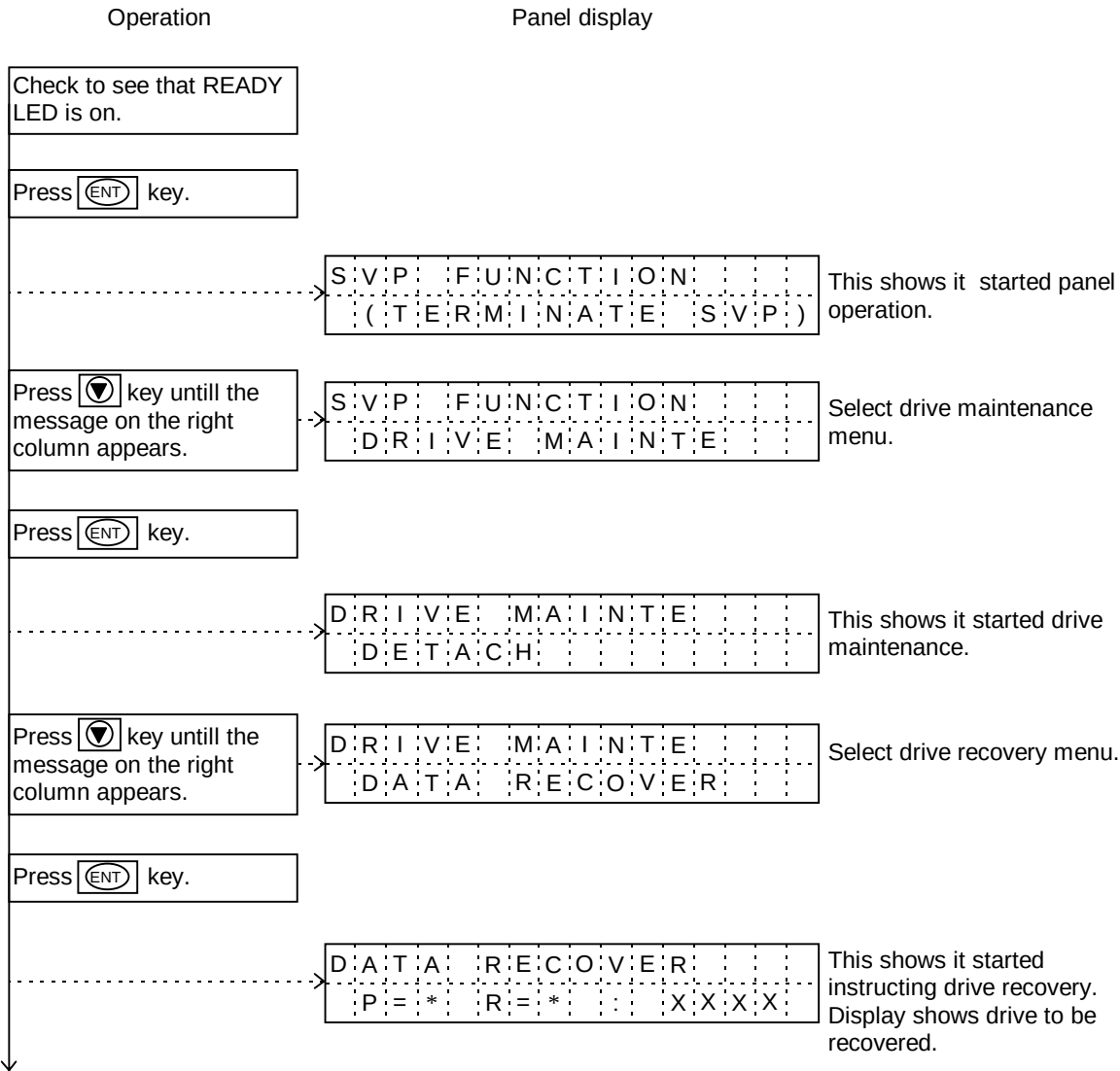


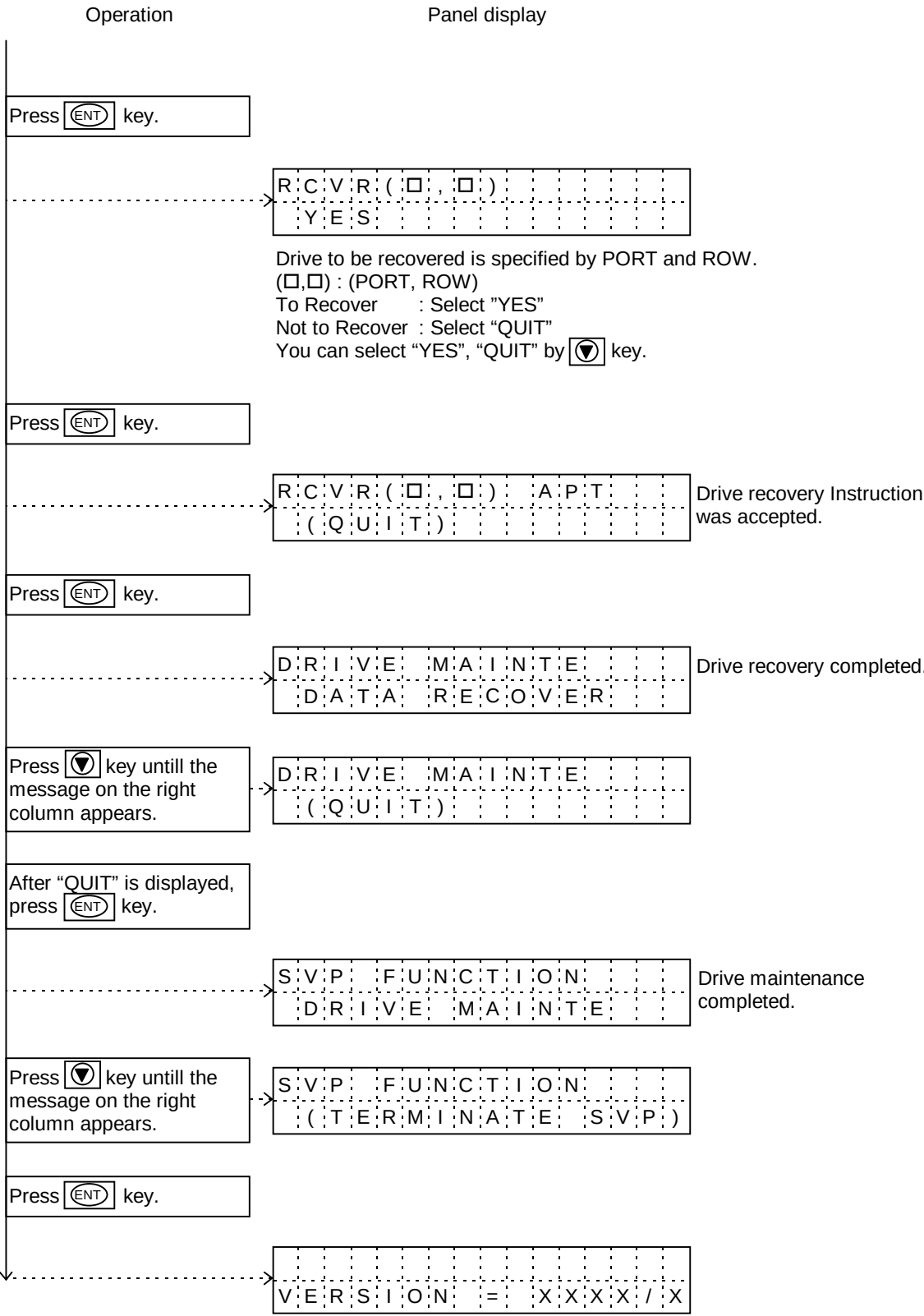
Figure 4.3.1 Replacing HDU ASSY

4.4 Manual Instruction of Data Recovery

This is for manually instructing data recovery. (In a case of dual controller system, which controller to process is automatically specified. No instruction of controller is required.) You can operate this function under device ready and LU#0 instituted (LU can be not formatted yet).



- P=* : Port# of Drive to be recovered.
R=* : Row# of Drive to be recovered.
XXXX : Status of Drive to be recovered. Status is one of below.
- STDBY (not used)
 - DETACH (blocked)
 - NO : (RAID, LU not set yet)



5. Replacing Fan ASSY (See Figure 5.1.)

When replacing FAN ASSY, turning off the power is not required.



Caution

FAN is rotating with high speed, be careful not to be caught by the FAN.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ② Remove the thumbscrew and pull the Fan ASSY to your side grasping it by its handle.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)

(2) Installing procedure

- ① Insert the Fan ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Make sure that the WARNING LED goes off and the following panel display appears.

(3) Transition of panel display

I002XX FANRCV-XX----- Termination of fan failure recovery
(XX indicates the installing location)

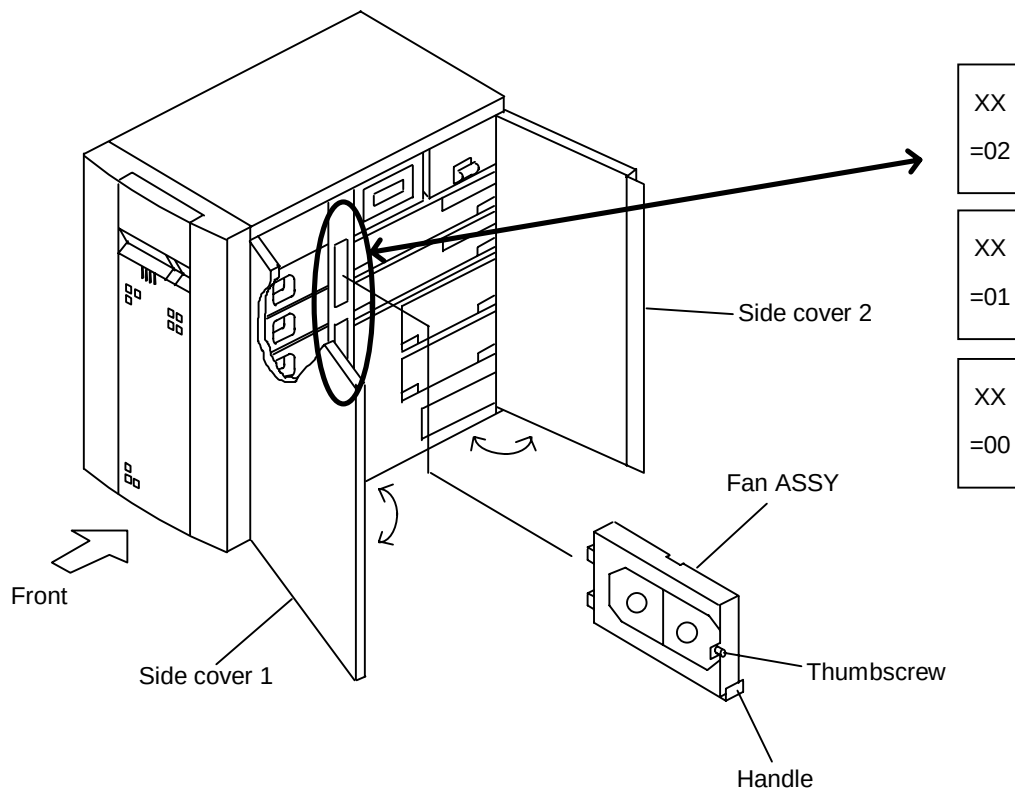


Figure 5.1 Replacing Fan ASSY

6. Replacing Battery ASSY (See Figure 6.1.)

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

When the battery is to be replaced with power turned off, read MK-REP0050, "Turning the power off." and "Turning-ON procedure." thoroughly and follow MK-REP0060, "Part Replacement Procedures".

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ② Turn the switch on the Battery ASSY to "O" side.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)
- ③ Remove the thumbscrews and pull the Battery ASSY to your side by grasping it by its handle.



Caution

Do not disintegrate removed Battery. It may cause burn or electric shock.

(2) Installing procedure

- ① Insert the Battery ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Turn the switch on the Battery ASSY to "I" side.
- ③ Make sure that the WARNING LED goes off and the following panel display appears.

Note : When removing/mounting the Battery ASSY, turn the switch to "O" side.

(3) Transition of panel display

I00100 BATRCV ----- Termination of battery recovery

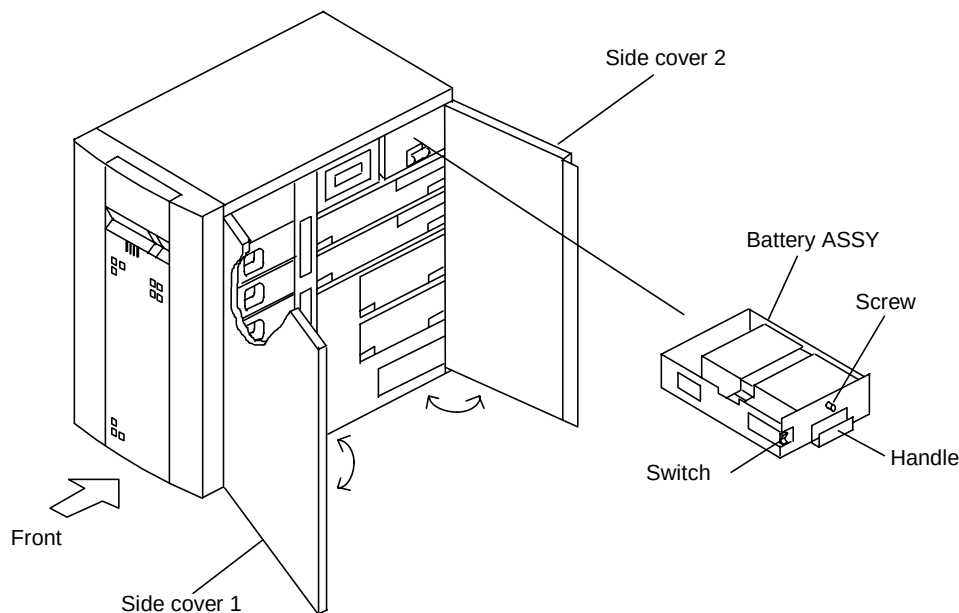


Figure 6.1 Replacing Battery ASSY

Note : The lead-acid battery is a precious resource which can be recycled.

The battery uses lead which is a heavy metal and sulfuric acid which is a deleterious substance. Therefore, never case it off at the place where the replacement of it is done.

When a part is to be replaced or a used product is to be discarded, take out the lead-acid battery to get it recycled.

See page "ENTRY0120" for the safety of depositing and storing the battery.

When the battery ASSY is replaced, power on the subsystem and charge the battery for more than two hours before returning the subsystem to the customer.

7. Replacing FDD ASSY (See Figure 7.1.)

When replacing FDD ASSY, turning off the power is not required.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ② Remove the thumbscrew and pull the FDD ASSY to your side grasping it by its handle.

(2) Installing procedure

- ① Insert the FDD ASSY into the right place holding it by its handle and tighten the thumbscrew.

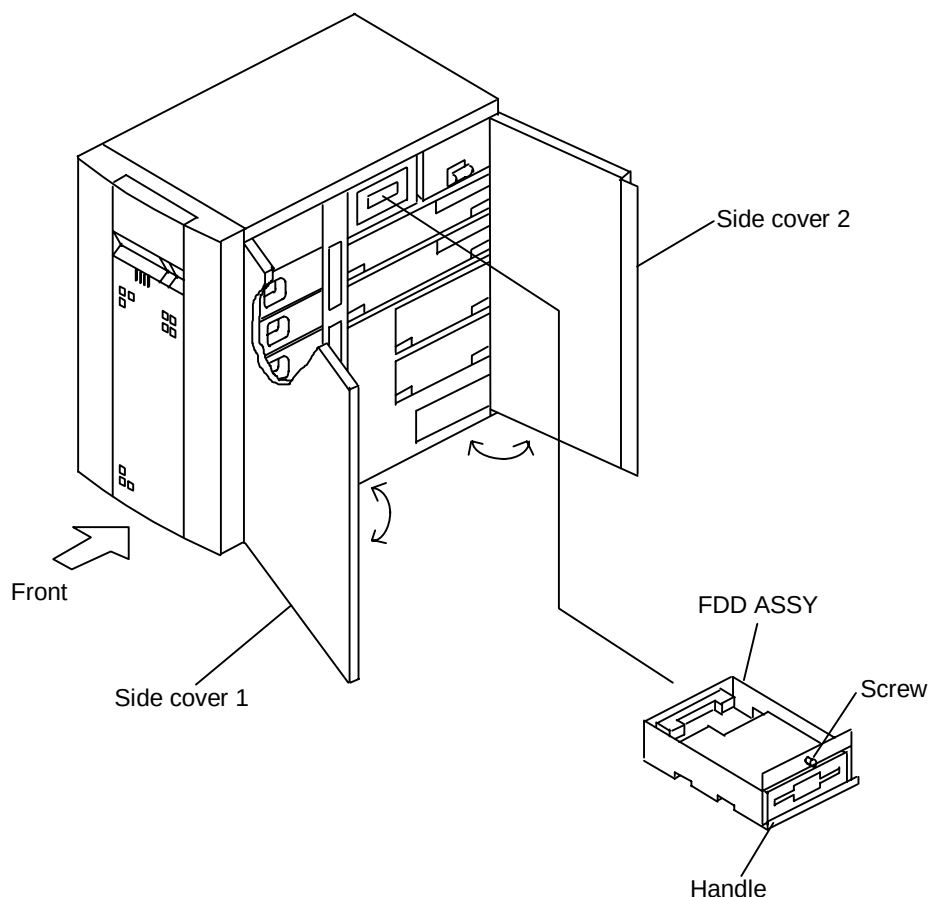


Figure 7.1 Replacing FDD ASSY

8. Replacing CTL ASSY

The replacement procedure differs depending on the Micro_Disk version. Confirm the version first, then execute the replacement following the procedure determined according to the version.

- (1) When the Micro_Disk version is 0303** (** is optional) or earlier

Go to section 8.1 “CTL ASSY Replacement when Version is 0303** (** is optional) or earlier” on page MK-REP0310.

- (2) When the Micro_Disk version is 0304** (** is optional) or later

Go to section 8.2 “CTL ASSY Replacement when Version is 0304** (** is optional) or later” on page MK-REP0341.

8.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier

In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.

(See MK-REP0090.)

- ② Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ⑤ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

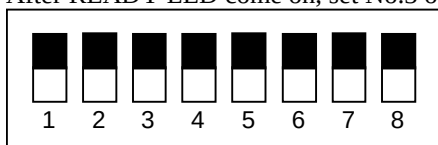
- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.



- ⑥ Turn on the subsystem according to the power-on procedure explained in MK-REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See MK-REP0130.) If no system parameter FD, proceed the setting the panel with the table prepared in ①. (Refer to PANEL Chapter.)
- ⑧ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑨ Turn off the power according to the power off procedure in MK-REP0050.
- ⑩ Turn on the power according to the power on procedure in MK-REP0050. (Soon, the ASSY will enter the ready status.)
- ⑪ Close the side covers 1 and 2. (See MK-REP0160.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED is on).

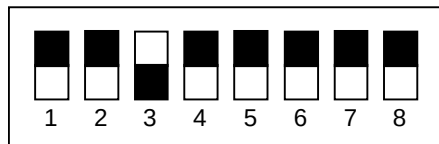
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ② Disconnect the cables (RS232C).
- ③ Check to see which CTL ASSY is blocked (FAIL LED is lit up).
- ④ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑤ Remove the CACHE ASSY and the LAN ASSY. (option)

(2) Installing procedure

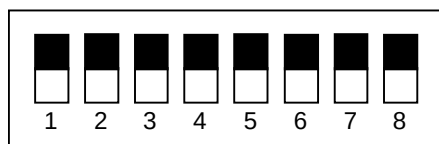
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ When the WARNING LED on PANEL goes off and the message below appears on the PANEL, set No.3 DIP switch to as shown.



The message on the PANEL "I619XX CTL RCU-XX". (XX : Indicates the installing location < 00 or 01 >.)

- ⑤ Connect the disconnected cables (RS232C).

⑥ Close the side covers 1 and 2. (See MK-REP0160.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option) , replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

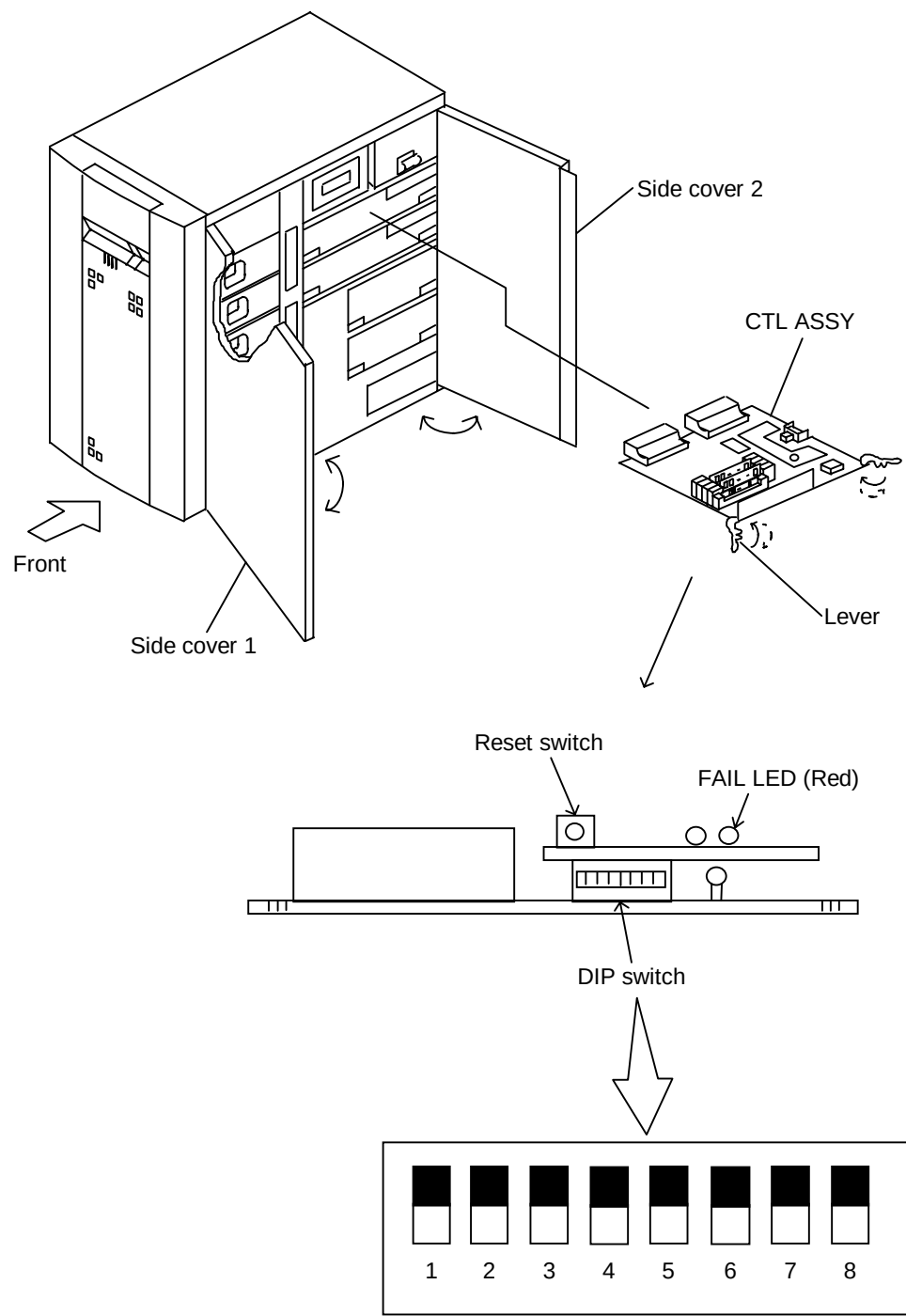


Figure 8.1.1 Replacing CTL ASSY

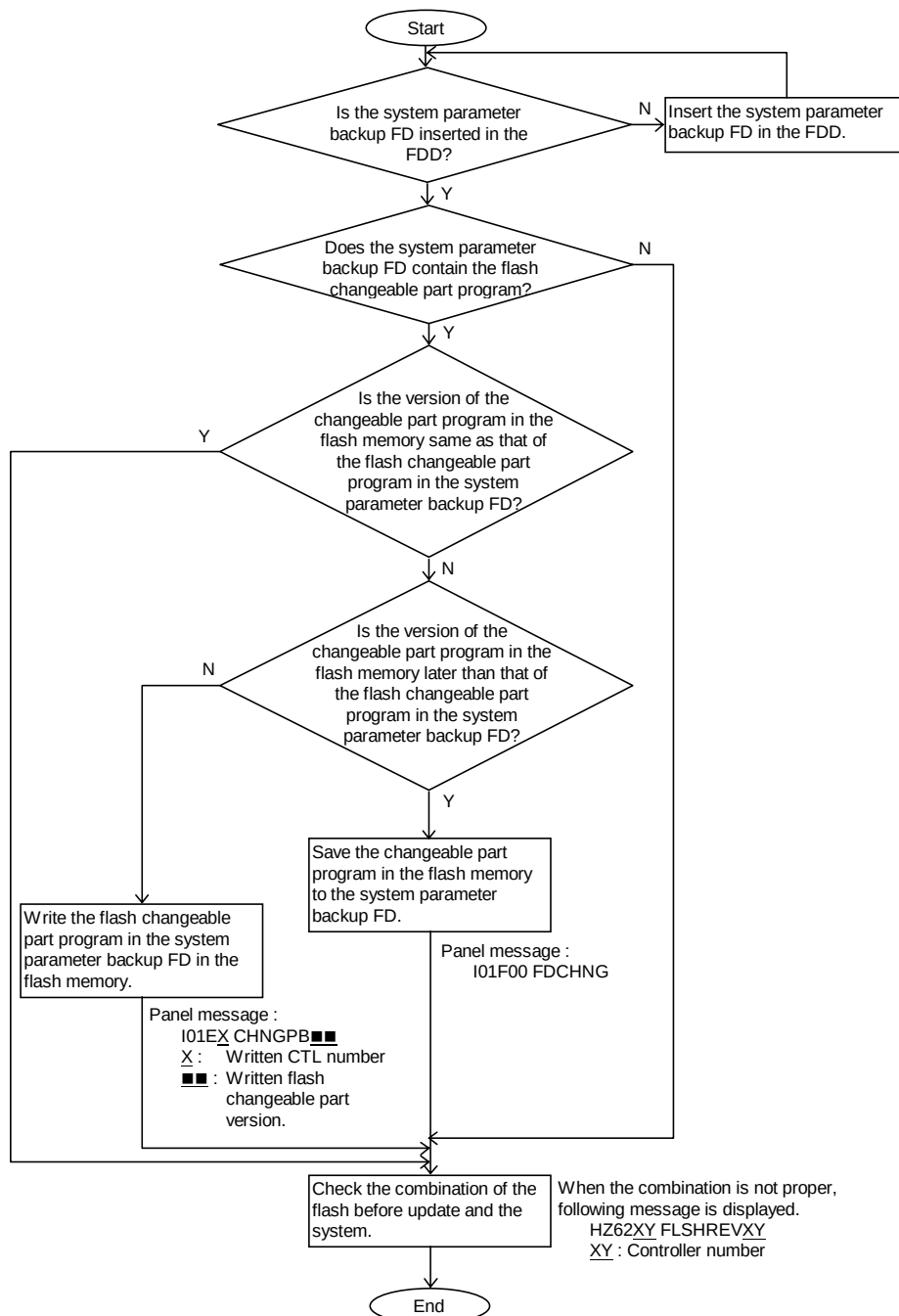
8.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later

The automatic updating function of the flash changeable part is added to the subsystem whose Micro_Disk version is 0304** (** is optional) or later. To use the function the system parameter backup FD must be inserted. By using the function, service person can replace the CTL ASSY without giving care to the combination of the Micro_Disk version and the flash changeable part version of the CTL ASSY.

(If the system parameter backup FD is not inserted when replacing the CTL ASSY, prepare the CTL ASSY whose flash changeable version is the same as that of the CTL ASSY to be replaced, or PB26 or later, and execute the replacement following the procedure explained in Section 8.1 "CTL ASSY Replacement when Version is 0304** (** is optional) or earlier".)

Outline of flash changeable part automatic updating function

The following is a processing flow of the flash changeable part automatic updating function. This processing is performed by the Micro_Disk of version 0304** (** is optional) or later.



In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See MK-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

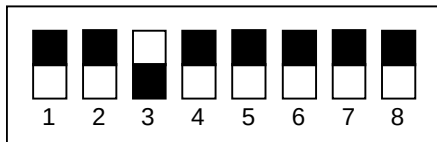
Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ⑤ Open the right and left levers to the direction of arrows (···→) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.
Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.
- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.

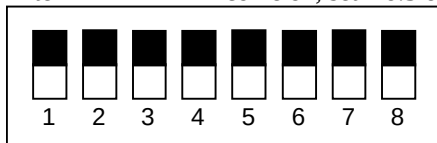


- ⑥ Turn on the subsystem according to the power-on procedure explained in MK-REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See MK-REP0130.)

- ⑧ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
Version = XXXX/X	Subsystem READY LED comes on.	Go to step ⑨
I01EX CHNGPB■■ HZ62XY FLSHREVXY X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	Subsystem ALARM LED comes on. (Version of flash changeable part was updated to PB■■. Current system cannot operate with the flash changeable part whose version is not updated.)	Operation1 : Return the DIP switch of the CTL ASSY. Operation2 : Turn off the power following the powering off procedure shown on page MK-REP0050. Operation3 : Turn on the power following the powering on procedure shown on page MK-REP0050. Check if the following message is displayed on the panel. Version = XXXX/X Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see MK-REP0347), then go to step ⑨.
I01EX CHNGPB■■ Version = XXXX/X X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed.	Subsystem READY LED comes on. (Version of flash changeable part was updated to PB■■. Current system can operate with the flash changeable part whose version is not updated.)	Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see MK-REP0347), then go to step ⑨.

- ⑨ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑩ Turn off the power according to the power off procedure in MK-REP0050.
 ⑪ Turn on the power according to the power on procedure in MK-REP0050. (Soon, the ASSY will enter the ready status.)
 ⑫ Close the side covers 1 and 2. (See MK-REP0160.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED in on).

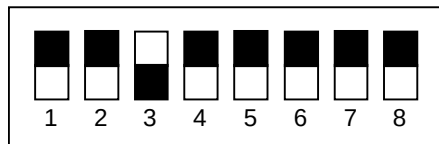
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ② Disconnect the cables (RS232C).
- ③ Confirm the blocked CTL ASSY (with the FAIL LED turned on). (See Figure 8.2.1.)
- ④ Take out the CTL ASSY by pulling both levers on left and right side at the same time toward the directions shown by allows (·····➤)
- ⑤ Remove the CACHE ASSY. If the LAN ASSY is installed, also remove it.

(2) Installing procedure

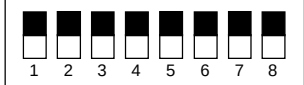
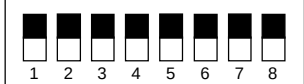
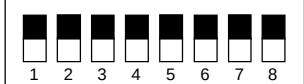
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
I619XX CTLRCV-XX XX : Controller number (00 or 01) is displayed.	The WARNING LED goes out and the READY LED of the subsystem comes on.	Return the DIP switch No.3 as shown below, then go to step ⑤ 
I01EX CHNGPB■■ HZ62XY FLSHREVXY H60422 CTLFAIL W015XX CTLALM-XX XX : Controller number (00 or 01) is displayed. X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	The WARNING LED comes on, and the READY LED of the subsystem comes on in the state that one of the CTL ASSYs is blocked. (The flash changeable part has been updated to the version PB■■. Current system cannot operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Pull out the inserted CTL ASSY (with the FAIL LED turned on). Operation2 : Insert the CTL ASSY again. (Leave the DIP switch No.3 as set to on.) Operation3 : Return the DIP switch No.3 as shown in the Figure below when the WARNING lamp on the panel goes out and the following message is displayed on the panel.  Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see MK-REP0347), then go to step ⑤. I619XX CTLRCV-XX
I01EX CHNGPB■■ I619XX CTLRCV-XX	The WARNING LED goes out and the READY LED of the subsystem comes on. (The flash changeable part has been updated to the version PB■■. However, the current system can operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Return the DIP switch No.3 as shown below.  Operation2 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see MK-REP0347), then go to step ⑤.

- ⑤ Connect the disconnected cables (RS232C).
- ⑥ Close the side covers 1 and 2. (See MK-REP0160.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option), replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

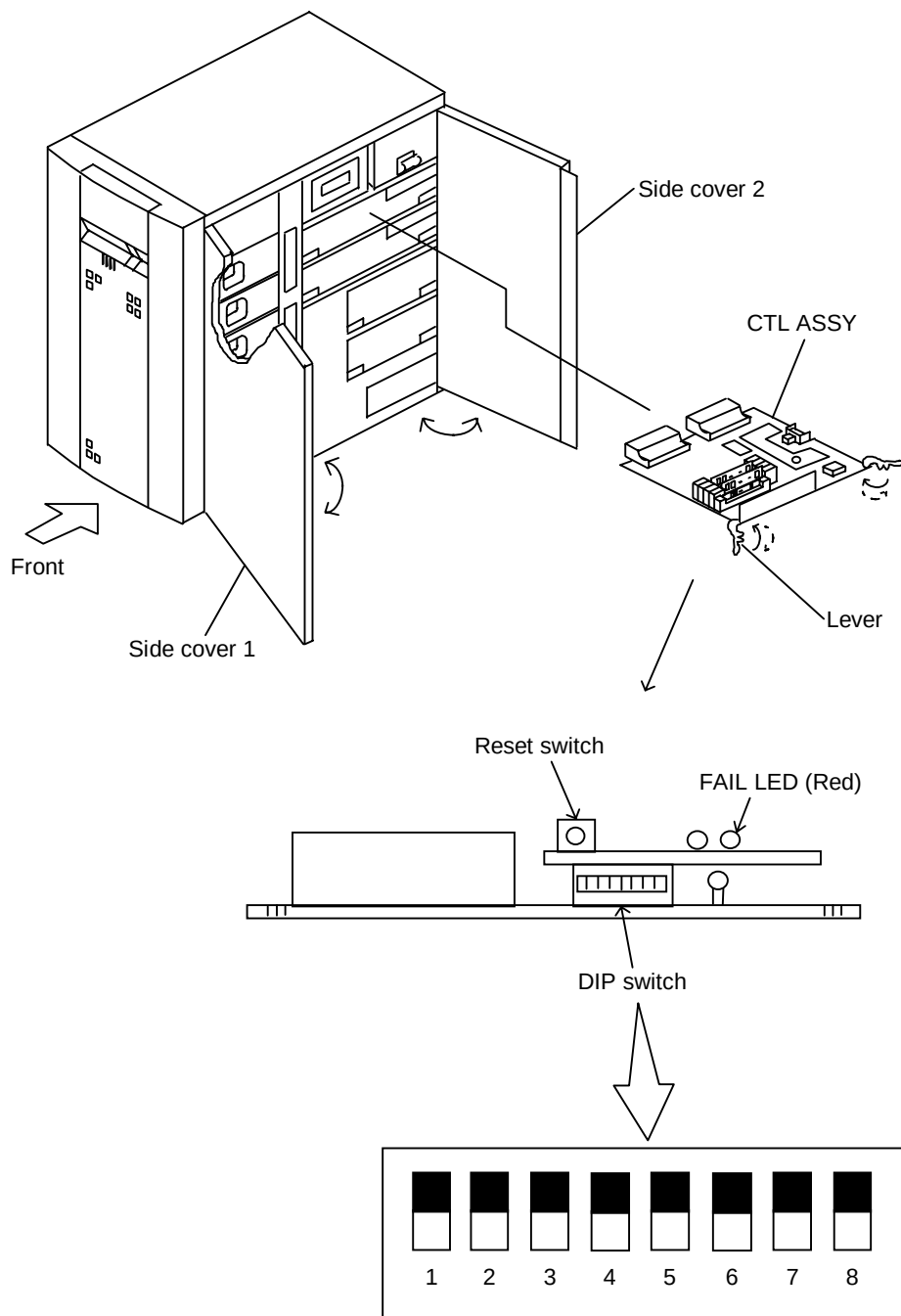


Figure 8.2.1 Replacing CTL ASSY

Painting flash revision label

Figure 8.2.2 shows how to paint the flash revision label. (It shows a case to paint the boxes up to PB26.)
Location of the label is shown in Figure 8.2.3.

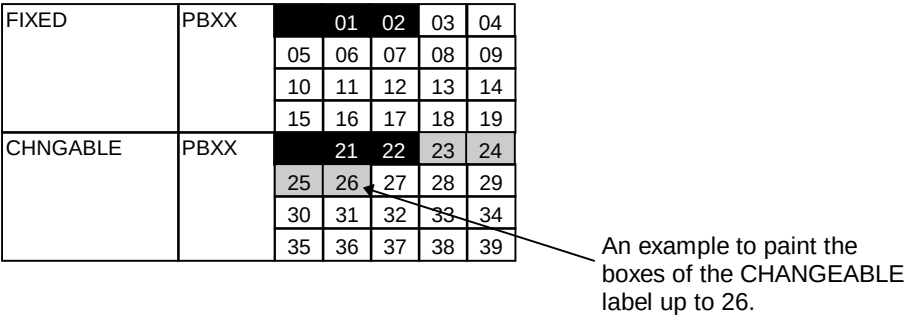


Figure 8.2.2 Revision Label Layout and Numbers to be Painted

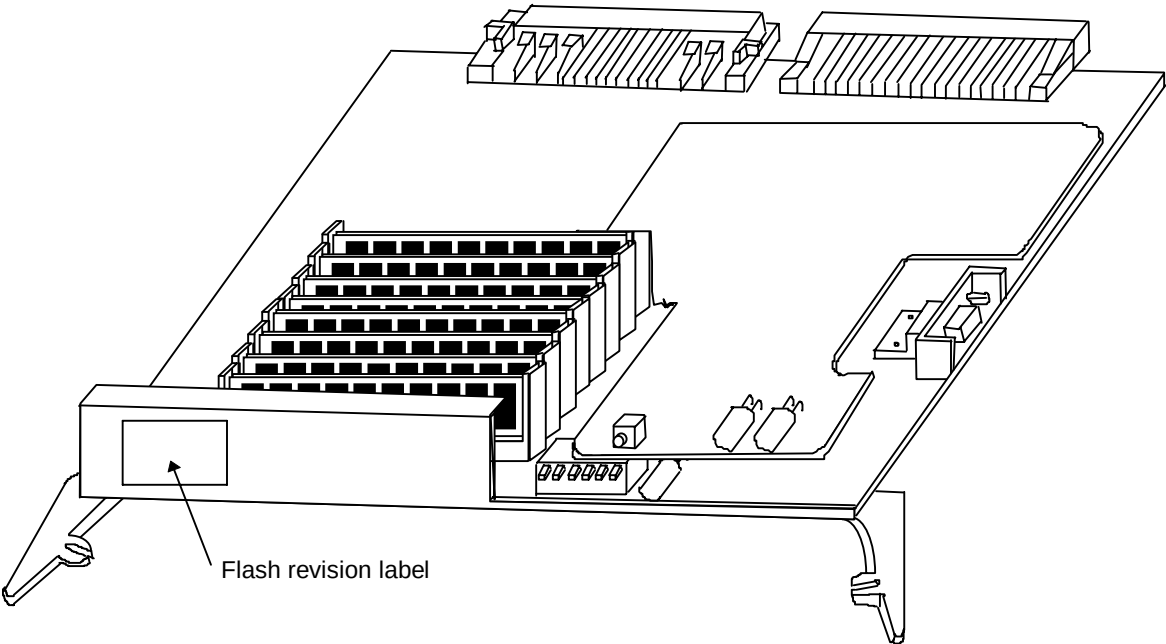


Figure 8.2.3 Location of Revision Label on CTL ASSY

9. Replacing I/F ADAPTER ASSY (See Figure 9.1, 9.2, 9.3 and Table 9.1.)

Be sure to turn the power off DF350 subsystem and host system before disconnecting the SCSI cable.
(That other SCSI devices makes an error and acted, if not or DF350 subsystem only.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in MK-REP0050 and turn off the host system.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC".

In this case refer to "Trouble shooting chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the SCSI cable, the terminator, and the LAN cable (option).
- ③ First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ④ Remove the bind screw and pull the I/F ADAPTER ASSY toward you to remove it.

(2) Mounting procedure

- ① Make the setting of the terminator power, (JP1, JP2) as the setting of the removed I/F ADAPTER ASSY.
- ② Insert the I/F ASSY into the right place and tighten the bind screw.
- ③ Connect the disconnected cables etc.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 9.2.)

Controller 01

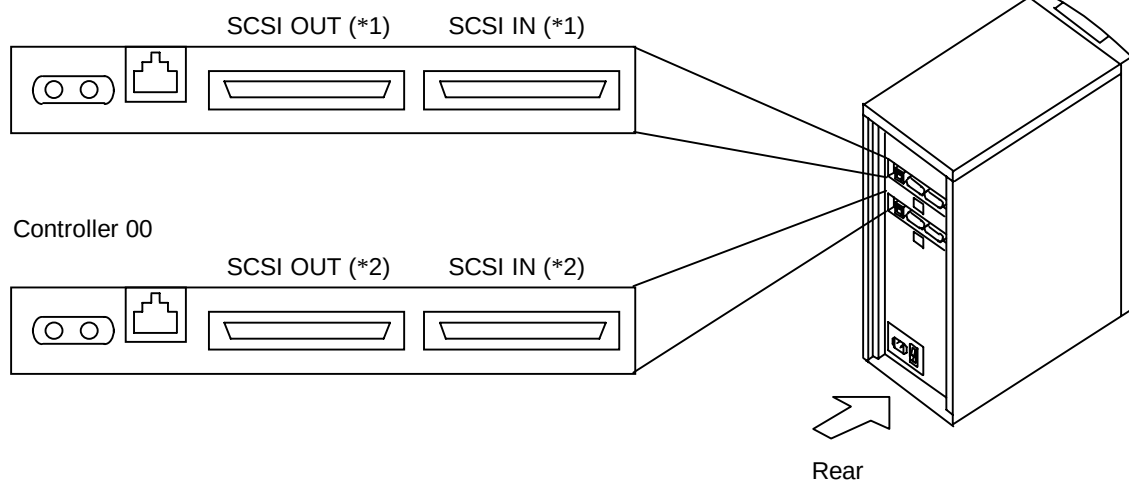


Figure 9.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.
SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

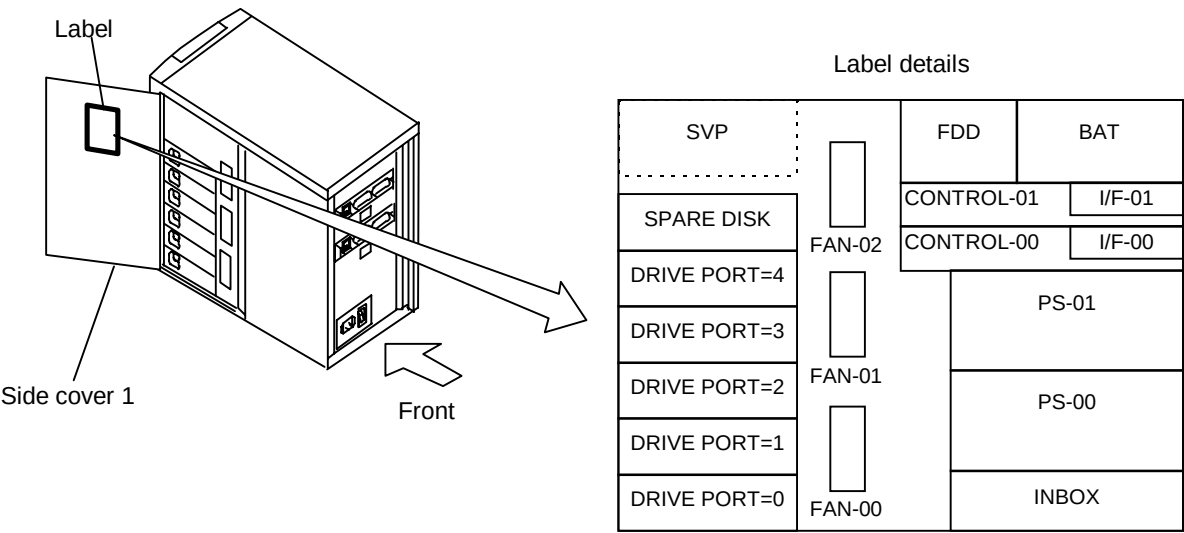


Figure 9.2 Label Layout

④ Close the side covers 1 and 2. (See MK-REP0160.)

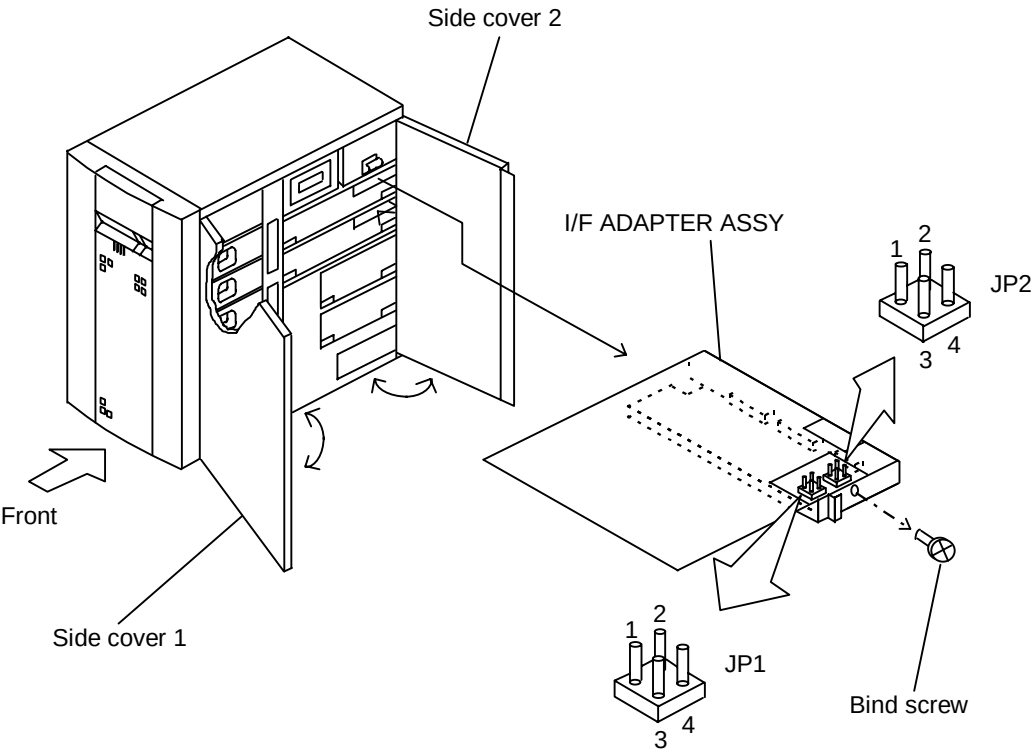
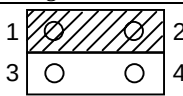
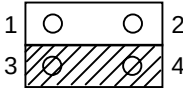
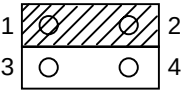
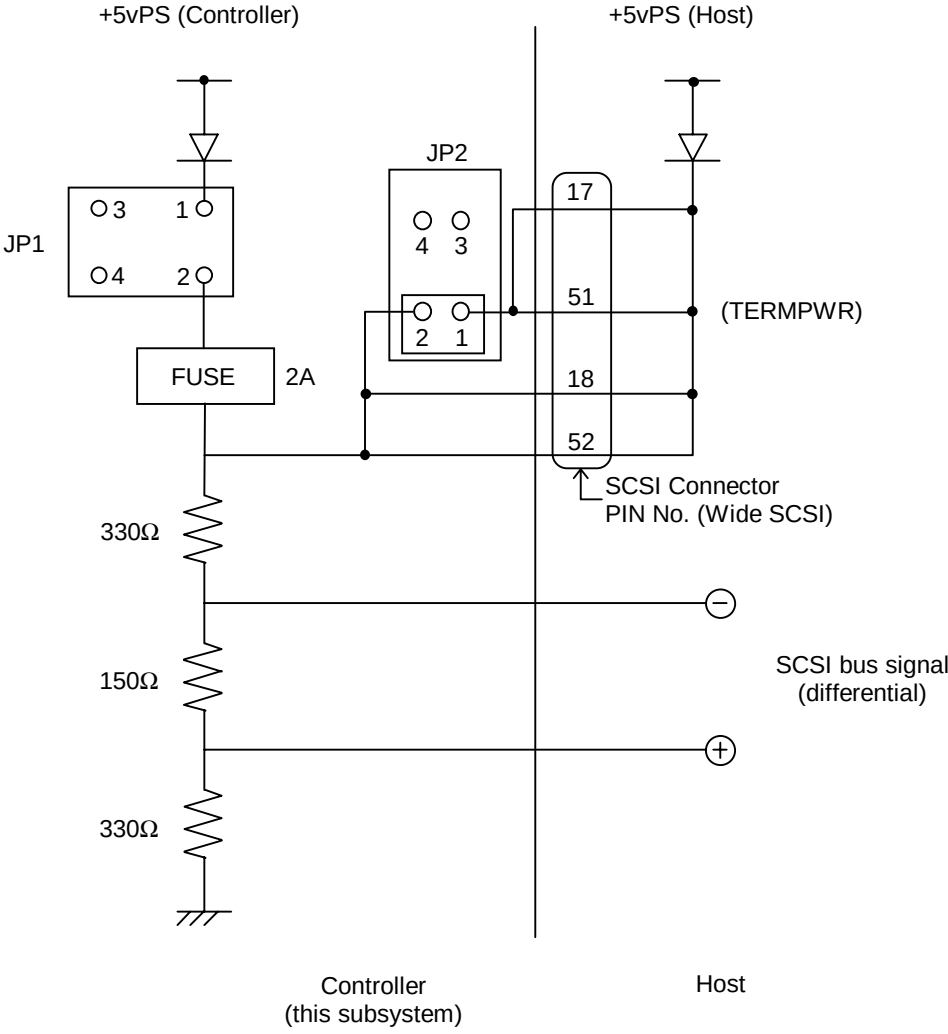


Figure 9.3 Replacing I/F ADAPTER ASSY

Table 9.1 Setting the Terminator Power

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2	JP2		Be sure to set this jumper with the pins 1 and 2 short-circuited.



10. Replacing SVP ASSY (See Figures 10.1 and 10.2.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in MK-REP0050. (Be sure to read and understand the procedure because if the power is turned off improperly, user data might be destroyed.)

Sometimes the subsystem does not go power off after the main switch turned to “O” side with panel display “TOOMNYPIN” or “SYSDTSVER” or “POFFCMUNC”.

In this case refer to “Trouble shooting chapter” (See TRBL0030) and turn off the power.

- ② Check to see that POWER LED goes off.

Notice : In case the power is not normally turned off, the user’s data might be lost.

- ③ Turn the breaker at the rear to “O” side.
- ④ Open the front cover. (See MK-REP0160.)
- ⑤ Open the side cover 1. (See MK-REP0160.)
- ⑥ Remove 4 screws and remove shield bracket.
- ⑦ Turn the lever to the direction of an arrow (↶) and pull the SVP ASSY toward you. Then, remove the SVP ASSY to the left following arrow A.

(2) Mounting procedure

- ① Make the setting of Remote/Local as the setting of the removed SVP ASSY.
(For setting of the jumper, see “THEORY Chapter, 5. Location and Function of Switches and LEDs”.)
- ② Insert the SVP ASSY from the right front of the subsystem following the opposite direction of arrow A with its rail engaging with the guide and fix the projection into the cutout.
Then, turn the lever to the direction of an arrow (→) to mount the SVP ASSY.
- ③ Fix shield bracket with 4 screws.

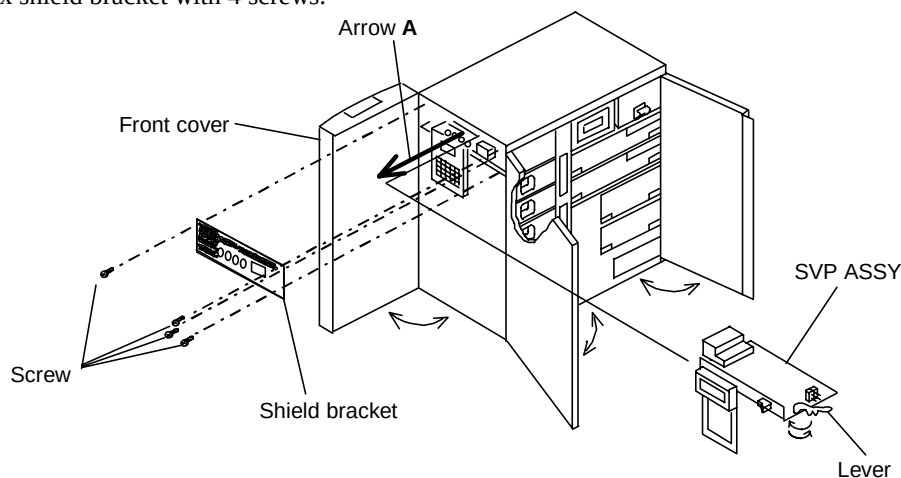


Figure 10.1 Replacing SVP ASSY

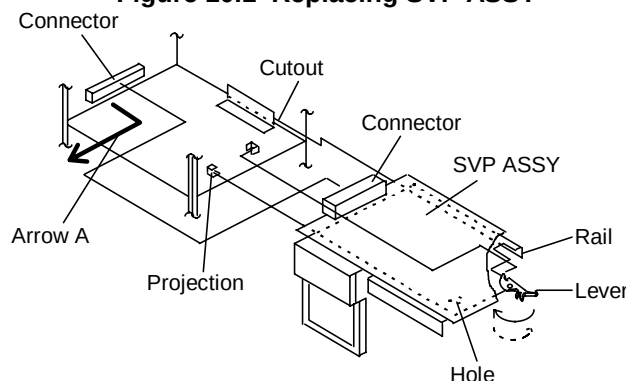
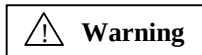


Figure 10.2 Detailed Figure of SVP ASSY Replacement

11. Replacing AC/DC power supply (See Figure 11.1.)



Warning

Only the maintenance personnel can perform this replacement.

The operation by the user is prohibited.

Tool : Phillips screwdriver (No.2)

Confirm presence/absence of the redundant power supply. If there is a redundant power supply, a hot replacement is possible. When the two AC/DC power supplies are installed in the mini tower type subsystem, it means that the subsystem has the redundant power supply.

When the redundant AC/DC power supply is not installed, follow the procedure from step (4).

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ② Disconnect the FG cable connected with the AC/DC power supply.
- ③ Open the right and left levers to the direction of arrows (···➤) at the same time, then remove the AC/DC power supply .

(2) Mounting procedure

- ① Insert the AC/DC power supply into the right place with its right and left levers open, then close the both levers to the direction of arrows (➡) at the same time.
- ② Connect the FG cable with the AC/DC power supply.

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC".

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ③ Disconnect the FG cable connected with the AC/DC power supply.
- ④ Open the right and left levers to the direction of arrows (···➤) at the same time, then remove the AC/DC power supply .

(5) Mounting procedure

- ① Insert the AC/DC power supply into the right place with its right and left levers open, then close the both levers to the direction of arrows (➡) at the same time.
- ② Connect the FG cable with the AC/DC power supply.
- ③ Turn the power on following "2.1 Turning the Power on/off for Each String". (See MK-REP0050.)

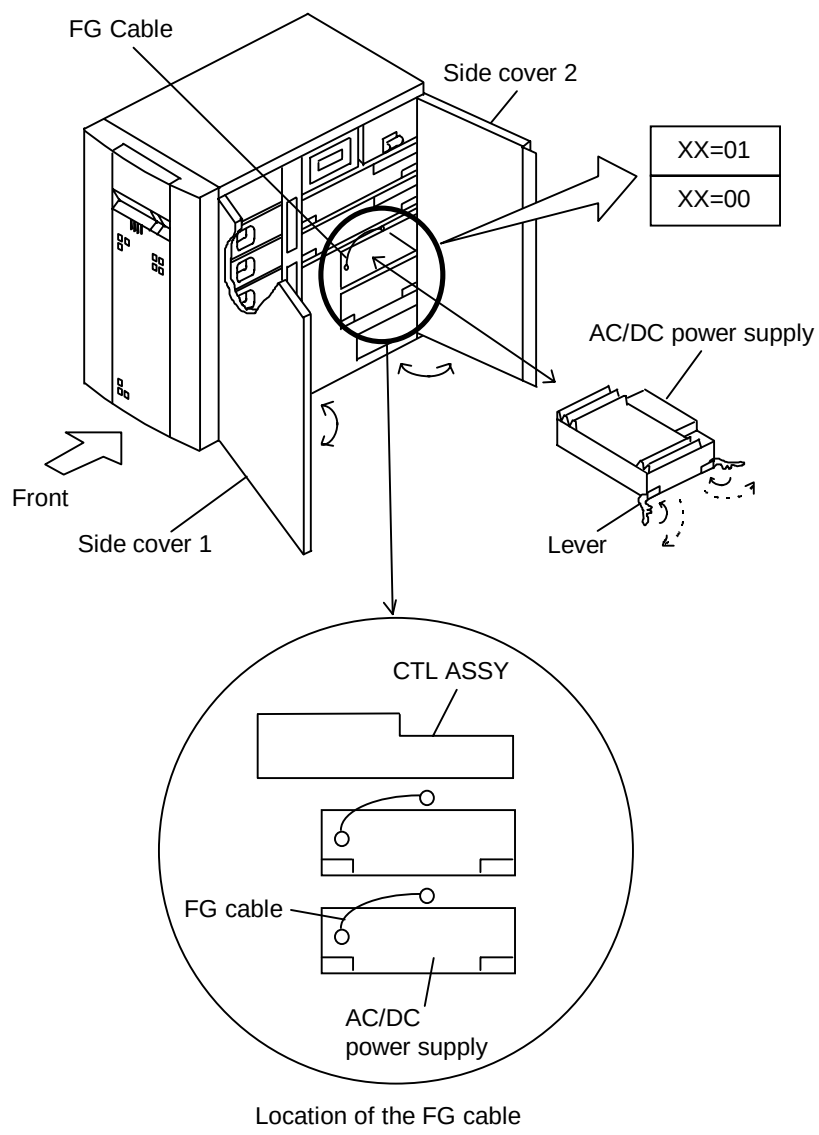


Figure 11.1 Replacing AC/DC power supply

12. Replacing In Box ASSY (See Figure 12.1.)



Do not touch inside of In Box ASSY. Electricity remains even if main switch is off.

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

In this case refer to "Trouble shooting chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the power supply cable.
- ③ First open the side cover 1 and then the side cover 2. (See MK-REP0160.)
- ④ Remove the screw and move the In Box ASSY to the left following the arrow A. Then, pull it toward you to remove it.

(2) Installing procedure

- ① Insert the In Box ASSY into the right place and move it to the opposite direction of arrow A (to the right). Then, push it inward and tighten the screw.
- ② Connect the disconnected cables.
- ③ Close side cover 1, then side cover 2. (See MK-REP0160.)
- ④ Turn the power on following the power-on procedure in MK-REP0050.

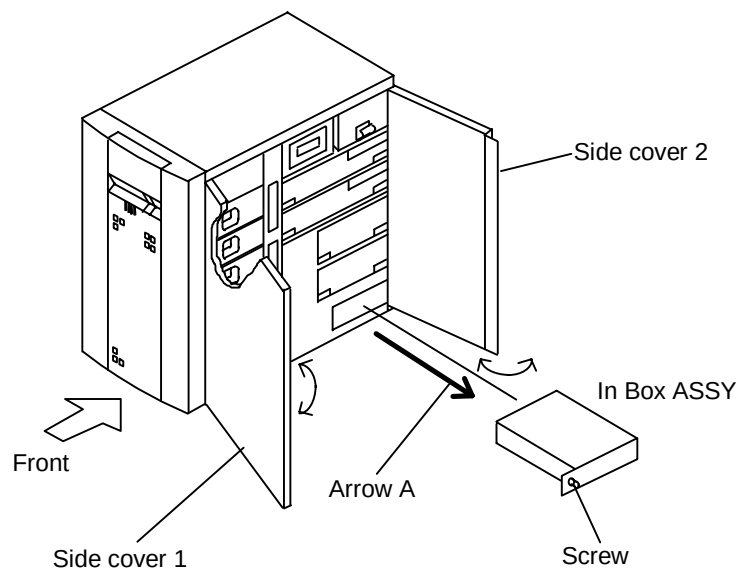


Figure 12.1 Replacing In Box ASSY

13. Replacing CACHE ASSY

In case no optional redundant CTL installed

(1) Procedures

- ① Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Open the side cover to remove CTL ASSY. (See MK-REP0305.)

- ③ Replace CACHE ASSY.

Note 1 : Slots #0 and #4, #1 and #5, #2 and #6, #3 and #7 are pairs respectively. Install the cache having the same capacity for these each pair slots..

Note 2 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- ④ Install the CTL ASSY.

- ⑤ Turn power on following the procedure explained in MK-REP0050.

- ⑥ Close the side covers.

- ⑦ Close the front cover.

Installation example of CACHE ASSY

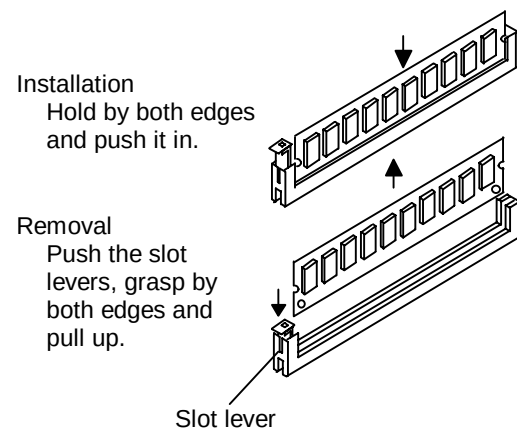
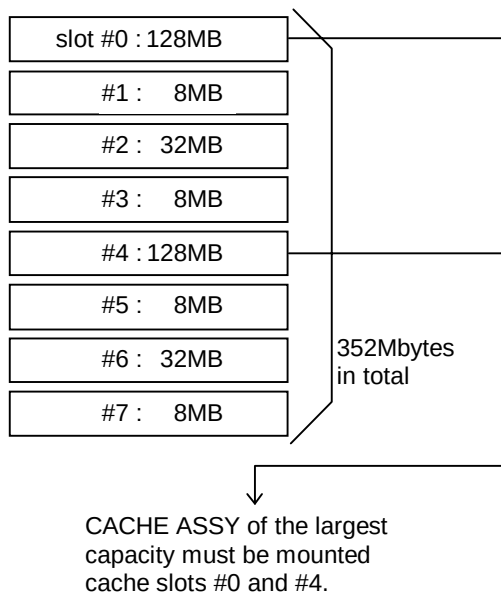


Figure 13.1 Replacing CACHE ASSY

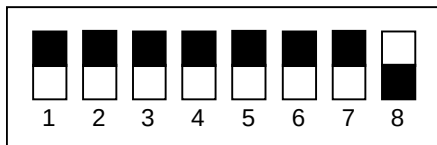
In case optional redundant CTL is installed

When the subsystem are dual controller system, CACHE ASSY can be replaced while the power on.

Note : In this case, the CACHE ASSY must be replaced one controller at one time. In case CACHE ASSY for both CTL ASSY are replaced at the same time, turn the power off before replacement.

(1) Procedure

- ① First open the side cover 1 and the side cover 2. (See MK-REP0160.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.

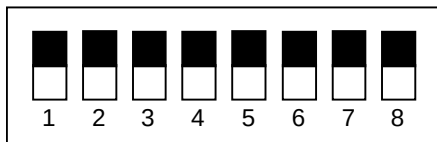


- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that FAIL LED on the CTL comes on and it enters into the blocked state. (See MK-REP0430.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Replace the CACHE ASSY.

Note 1 : When replacing a cache, install the cache having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : CACHE ASSY for the same slot of both CTL ASSY should have the same capacity.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Insert the CTL ASSY.
- ⑩ Connect the disconnected cable (RS232C).
- ⑪ Close the side covers 1 and 2. (See MK-REP0160.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

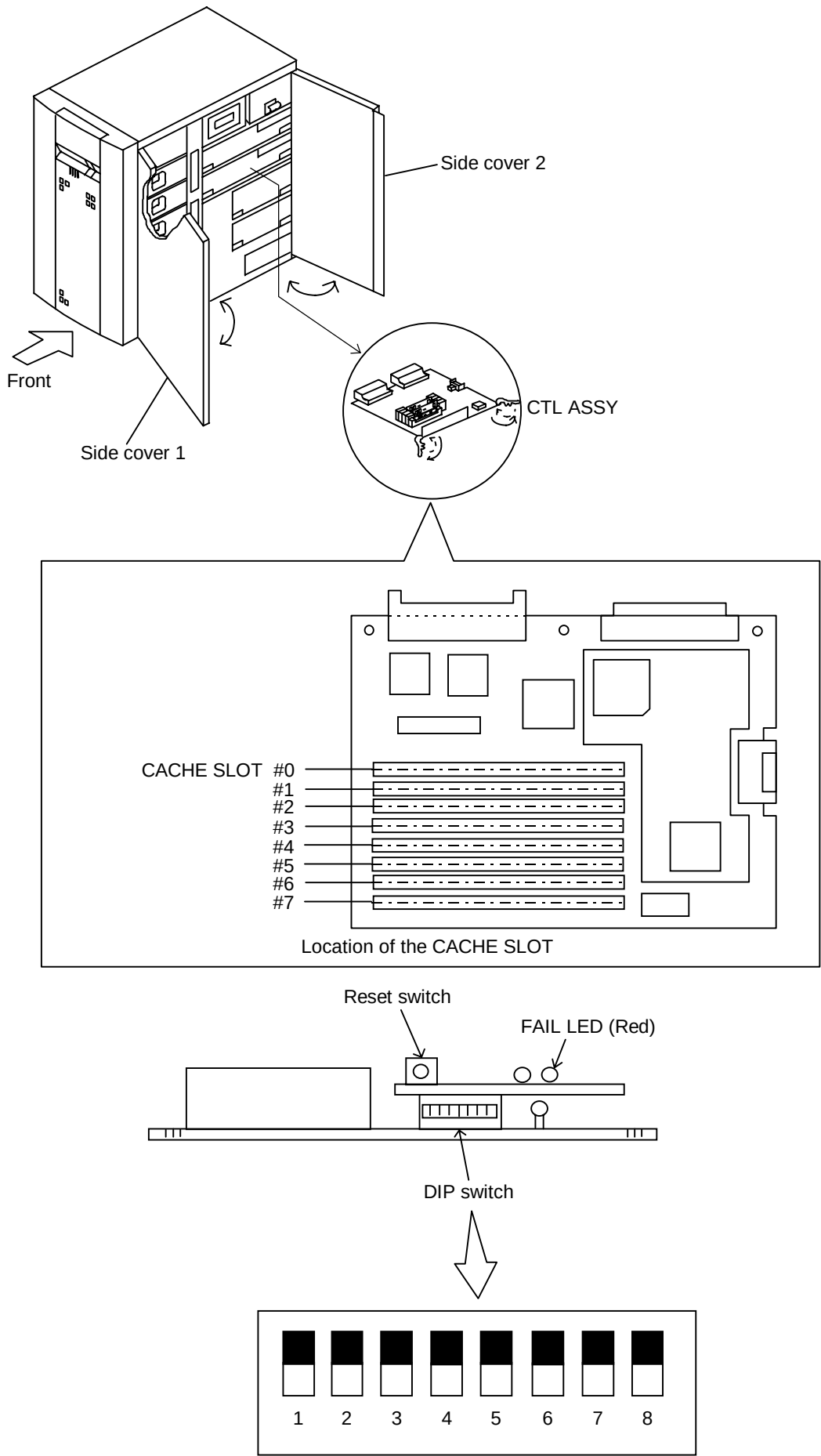


Figure 13.2 CTL ASSY

14. Replacing LAN ASSY

When no optional redundant CTL installed

Note : Configuration setting change is sometimes required because Mac Address is changed after replacing LAN ASSY.

(1) Procedures

① Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

② Open the side covers and remove the CTL ASSY. (See MK-REP0305.)

③ Pinch the latching heads of card spacers with needle-nose pliers etc. , then pull the LAN ASSY up with care not to touch with surrounding parts. (See Figure 14.1.)

Notice : If your hand or a tool touches with CTL ASSY, touched part may be damaged.

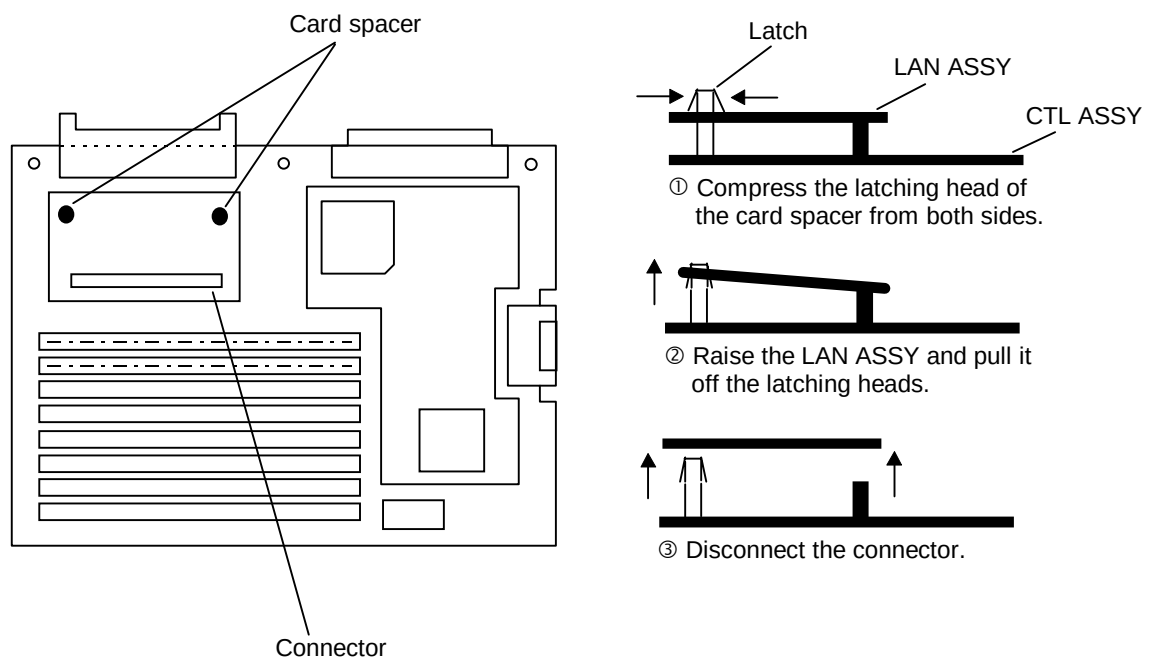
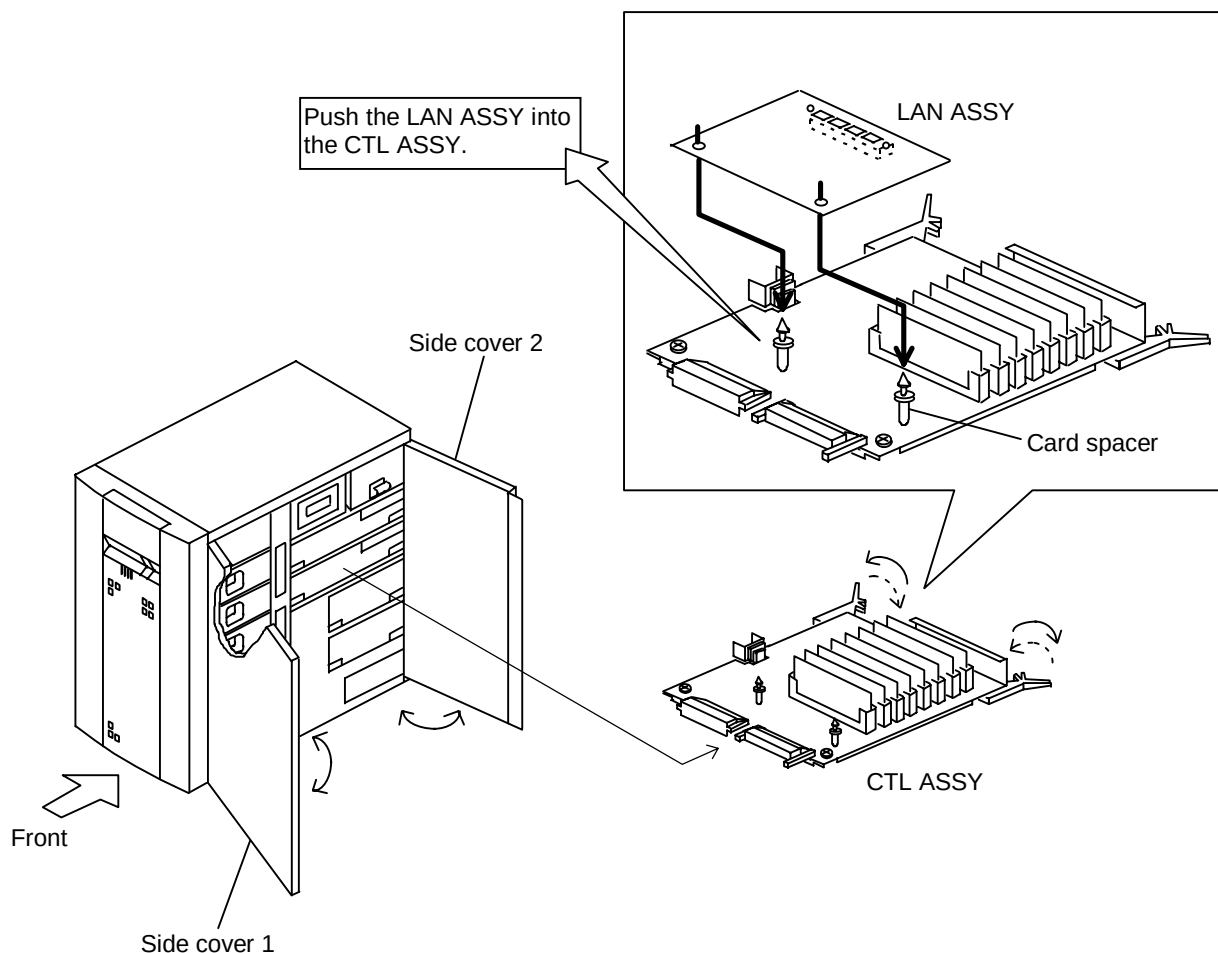


Figure 14.1 Replacing LAN ASSY (1)

- ④ Mount a LAN ASSY for replacement by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑤ Reinstall the CTL ASSY.
- ⑥ Close side covers 1 and 2. (See MK-REP0160.)
- ⑦ Turn on the power. (See MK-REP0050.)

**Figure 14.2 Replacing LAN ASSY (2)**

When optional redundant CTL installed

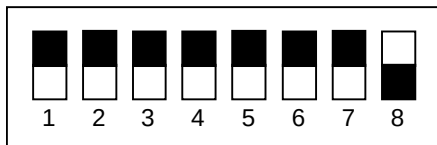
When the subsystem are dual controller system, LAN ASSY can be replaced while the power on.

Note : When replacing LAN ASSY, perform the replacement for each CTL ASSY one after another.

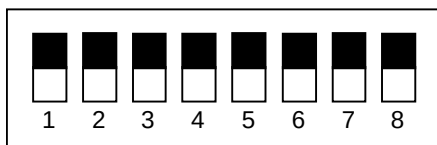
When replacing both LAN ASSY at a time, turn off the power like the case of single configuration.

(1) Procedure

- ① Open side cover 1 side cover 2. (See MK-REP0160.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.



- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that the FAIL LED on the CTL ASSY comes on and it enters the blocked state. (See Figure 14.3.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Remove the LAN ASSY by pulling it upward. Then mount a new LAN ASSY by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Reinstall the CTL ASSY.
- ⑩ Close the side covers 1 and 2. (See MK-REP0160.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

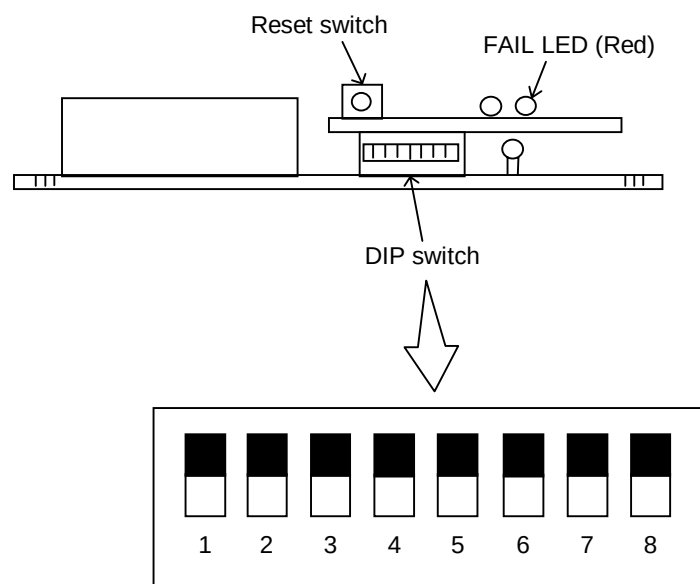


Figure 14.3 Replacing LAN ASSY (3)

DF350 Disk Subsystem

8. INSTALLATION

(Mini Tower Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.28.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	May.8.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.30.'97	A.Yamanashi	Y.Morishita	M.Sato	0020 0040 0070 0250 0260 0270 0290 0300 0365	Chapter 6 was added to the table. 4.2 was added. Table was changed. (Pages 0080, 0400, 0410 and 0420 were changed by the same reason.) Figure 3.7.2 was added. Figure 3.7.3 was changed. Dipswitch was changed. Flowchart were changed. (Pages 0340, 0360, 0370, 0380, 0390, 0430, 0440, 0450, 0460 and 0590 were changed by the same reason.) Dipswitch was changed. This page was newly added. (Pages 0366, 0367, 0395, 0396, 0425, 0462, 0464, 0790-0900 were added by the same reason.)	AD AD CH AD CH CH CH CH AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0300 0410 0420 0430 0435 0440 0450 0470 0490 0492 0494 0500 0530 0550 0590 0630 0640 0680 0690 0720 0730 0750 0780 0910-1010	Added 6.7, 6.8. Changed setting of DIP switch. Added *4/Deleted Item No.21. Added *5, SYS REV and OPTION. Added setting the DIP switch. This page was newly added. Added setting the DIP switch. Changed flow chart. Changed flow chart. Added Figure. This page was newly added. This page was newly added. Added RAID A. Added RAID A. Added TERMINATE SVP. Added RAID A. Added "1024B". Added RAID A. Changed Notice. Added FORMAT ABORD. Changed the table. Changed the table. Added DUAL TYPE. Added 7, 8, 12, 17, 24, 25 and 26 in the table. These page were newly added.	AD CH AD/ DL AD AD AD AD CH CH AD AD AD AD AD AD AD AD CH AD CH CH AD AD AD
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0493 0530 0542 0544 0640 1020-1070	Added 6.9, 6.10. This page was newly added. Added "Operation for defining...". This page was newly added. This page was newly added. Split RAID5. There page were newly added.	AD AD AD AD CH AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.)	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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REV.1	May.1998	Oct.1998				

MK-INST0011

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1. Appearance and Maintenance Area

1.1 Appearance

Figure 1.1.1 shows appearance of the DF350 disk subsystems. (Mini Tower type)

Figure (a) shows an example placed on a desk top. Figure (b) shows an example placed on the floor. Stand is an optional feature.

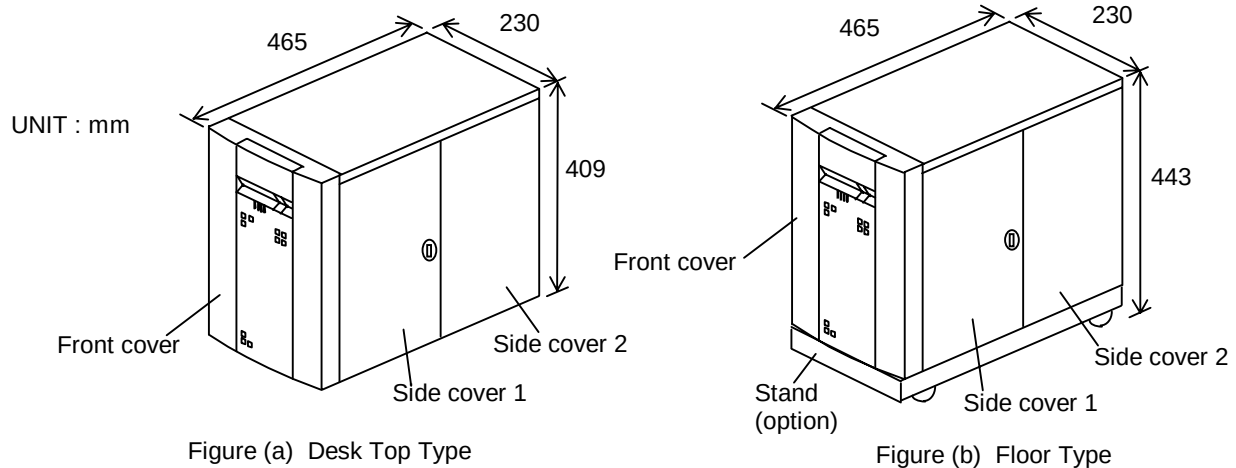


Figure 1.1.1 Appearance

1.2 Maintenance Area

Figure 1.2.1 shows maintenance area for the DF350 disk subsystems. (Mini Tower type)

Figure (a) shows the space required for maintenance of desk top model. Figure (b) shows the space required for maintenance of on the floor model.

UNIT : mm

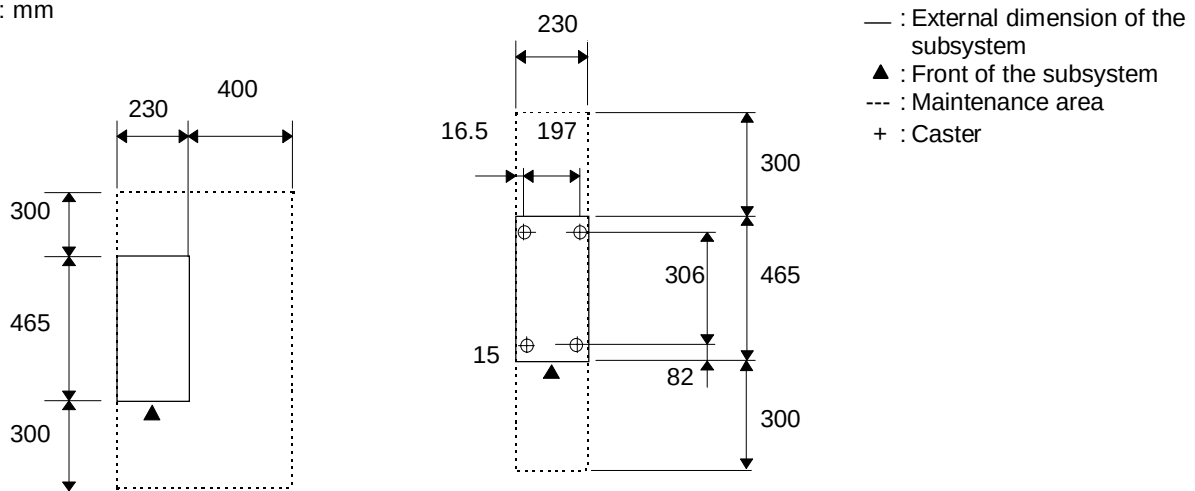


Figure (a) Desk Top Type

Figure (b) Floor Type

Figure 1.2.1 Maintenance Area

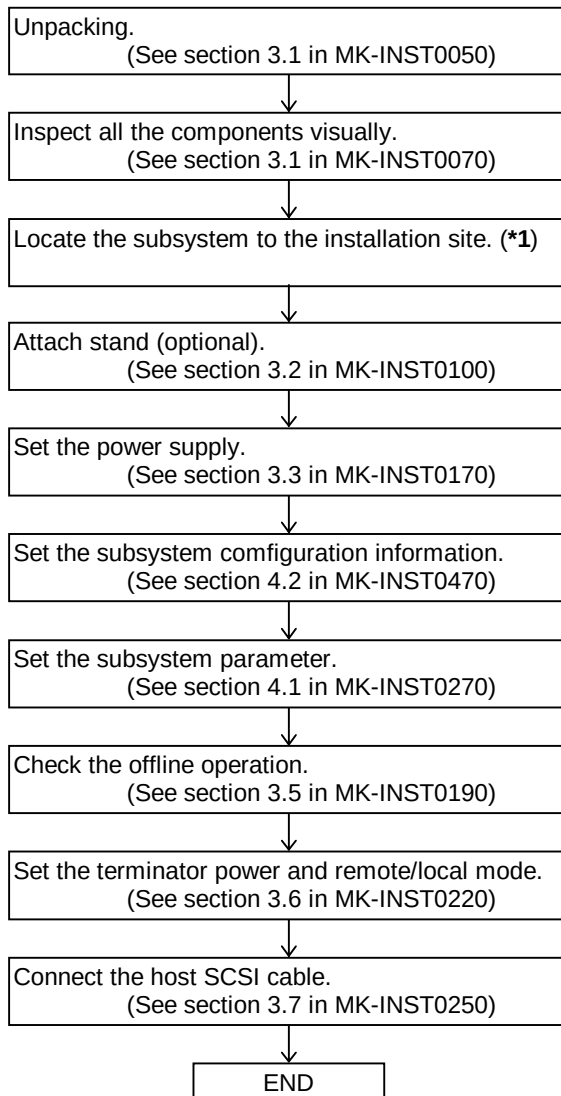
2. Installation

(1) Tool needed for installation

Phillips screwdriver (No.2).

(2) How to install

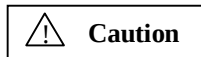
The following flow chart describes how to install the subsystem.



***1 : Place the subsystem with 30cm or more apart from the wall for both the front and the rear because of the ventilation.**

3. Installation Procedure

3.1 Inspecting all the Components



The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.

3.1.1 Unpacking

- (1) Figure 3.1.1 shows how the subsystem has been packed.
- (2) Figures 3.1.2 to 3.1.4 show the subsystem without external packaging.
- (3) Unpacking
 - ① Loosen the polyester bands.
 - ② Pull out the Tri-wall nails.
 - ③ Remove the external packaging and packing materials.
 - ④ Take the subsystem out of the polyethylene bag.
 - ⑤ Keep two keys in the attached box carefully.
(These keys are used for opening/closing side covers 1 and 2.)
 - ⑥ Remove the cushioning materials, tape, desiccators, etc attached to the subsystem.

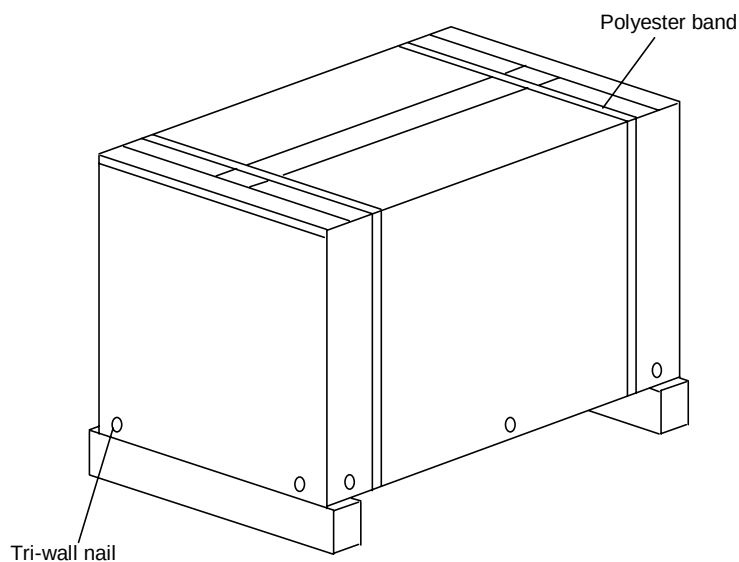


Figure 3.1.1 Subsystem being Packed

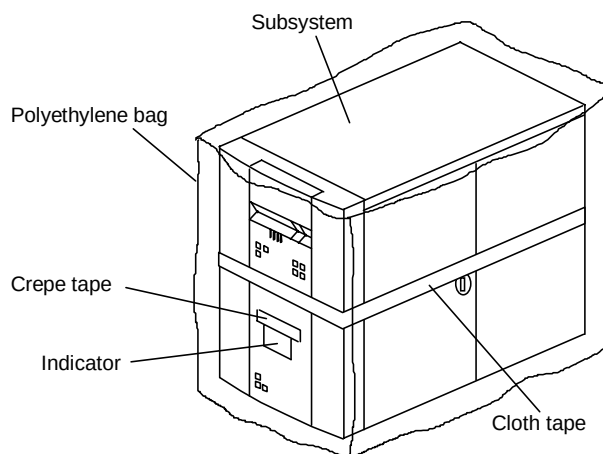


Figure 3.1.2 Subsystem without External Packaging

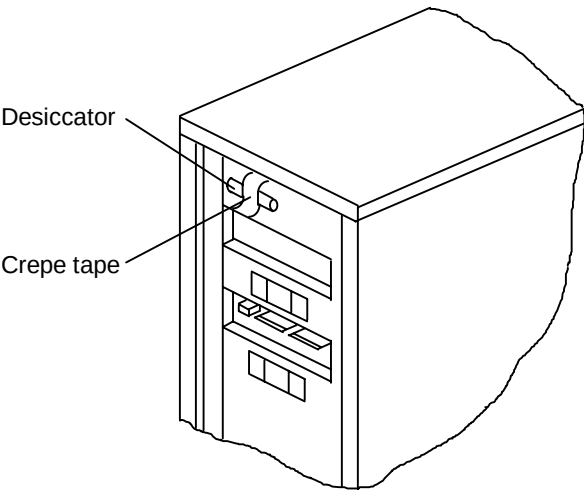


Figure 3.1.3 Location of Desiccantor

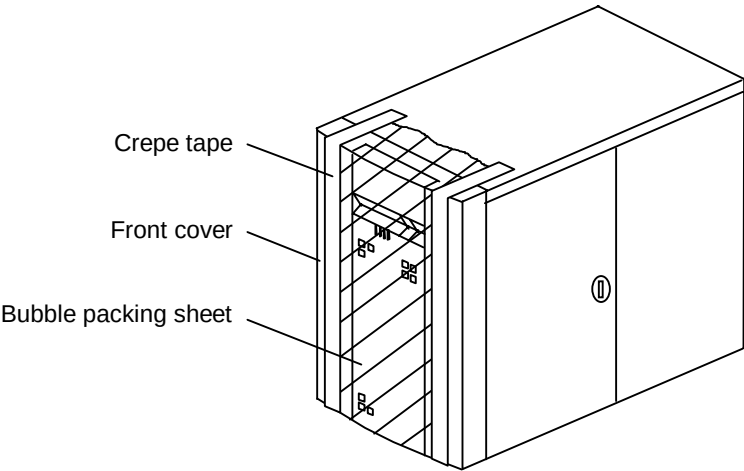


Figure 3.1.4 Front Cover Protection

3.1.2 Inspecting all the components visually

Check the following components before installation according to a customer's configuration.

Table 3.1.1 Mandatory Features

Model Name	Specification	Quantity	Comment
DF350-MK	Mini tower	1	
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	1 (RAID5 :4D+1P)	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	4 (RAIDA, RAID5: 3D+1P) 3 (RAID5 :2D+1P) 2 RAID0/1	HDU ASSY
DF-F350-B2M	Power supply	1	AC/DC power supply
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	2	CACHE ASSY
DF-F350-DMUDS -DMUSS	Interface board (*2) for wide differential SCSI interface wide single ended SCSI interface	1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.2 Optional Features

Model Name	Specification	Quantity	Comment
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	0 - 3	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	0 - 6	HDU ASSY
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	0, 2, 4, 6 or 8	CACHE ASSY
DF-F350-B2M	Spare power supply	0 - 2	AC/DC power supply
DF-F350-G1M1 -G2M1	LAN board LAN board (SNMP)	0 - 2	LAN ASSY
DF-F350-F2MCF	Controller for dual composition	0 or 1	CTL ASSY
DF-F350-DMUDS -DMUSS	Interface board (*2) for wide differential SCSI interface wide single ended SCSI interface	0 or 1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.3 Accessories

Model Name	Specification	Quantity	Comment
DF-F350-J1 -J2	Power supply cable (Connector attached to two poles with earth) (Inlet type connector, EN60320 STANDARD SHEET C14)	0 or 1	
DF-F350-K050L -K150L -K068S -K268S -K168S -K168A (*1) -K350L	Interface cable (50PL, 1.5m) (50PL, 3m) (68PS, 1.5m) (68PS, 3m) (68PS, 5m) (68PS, 5m) (50PL, 5m)	0 -	
DF-F350-S1	RS232C cable	0 -	

*1 DF-F350-K168A is the SCSI cable for AS/400 of IBM.

3.1.3 Inspecting the subsystem components and addendum

This subsection describes how to install the basic components into the subsystem.

Figures 3.1.5 and 3.1.6 show mechanical configuration and parts location of this subsystem.

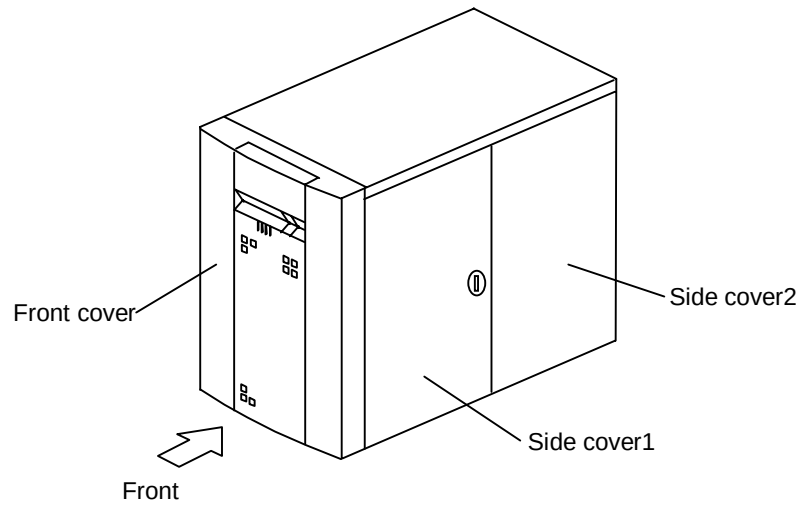


Figure 3.1.5 Appearance of DF350 Disk Subsystem (Mini tower type)

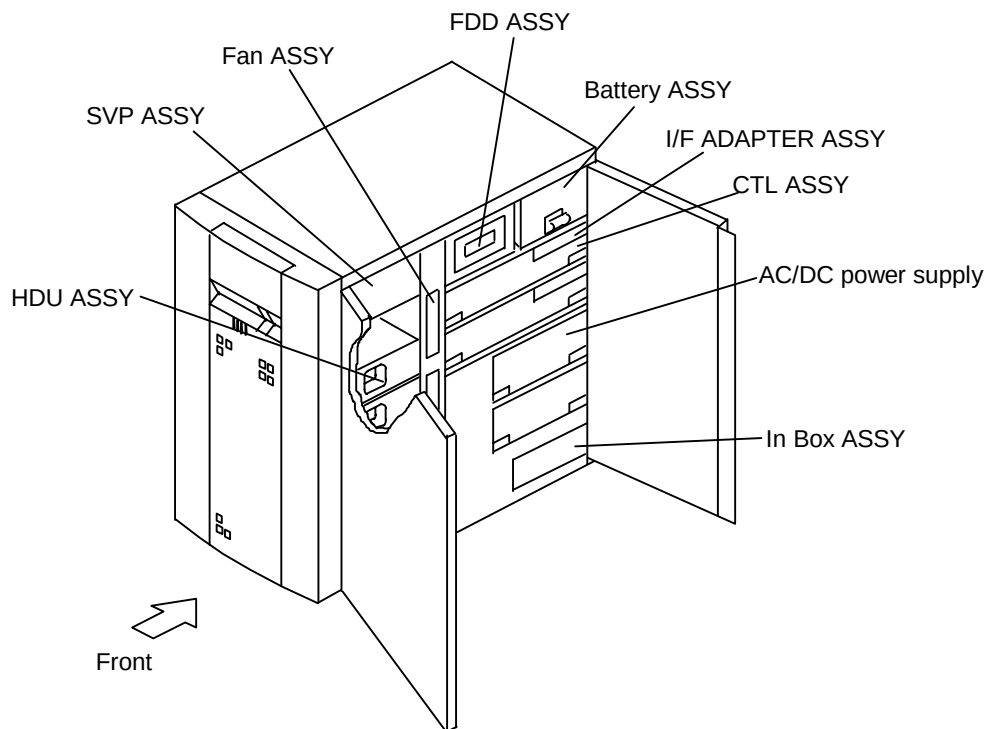


Figure 3.1.6 Parts Location

3.2 Install the Subsystem

3.2.1 Attaching stands (Optional)

(1) Attaching stands

This subsection describes how to attach the stand (optional) to the DF350 disk subsystem, the floor type.

① Tool needed for installation

Hexagon screw key (Nominal 3). (Attached on the back surface of the stand.)

② Mounting screws

Five M4 × 8 hex socket bolts. (Attached on the back surface of the stand.)

③ Attaching the stand

(a) Place the subsystem with its side or rear surface facing down on the rest.

(b) Remove the four screws and take out the four Foot. (See Figure 3.2.1.)

(c) Tighten the four screws. (See Figure 3.2.2.)

(d) Remove the subsystem from the rest and put it on the floor.

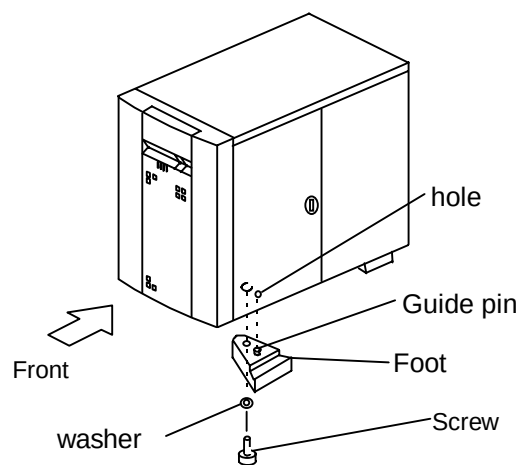


Figure 3.2.1 Remove the Foot

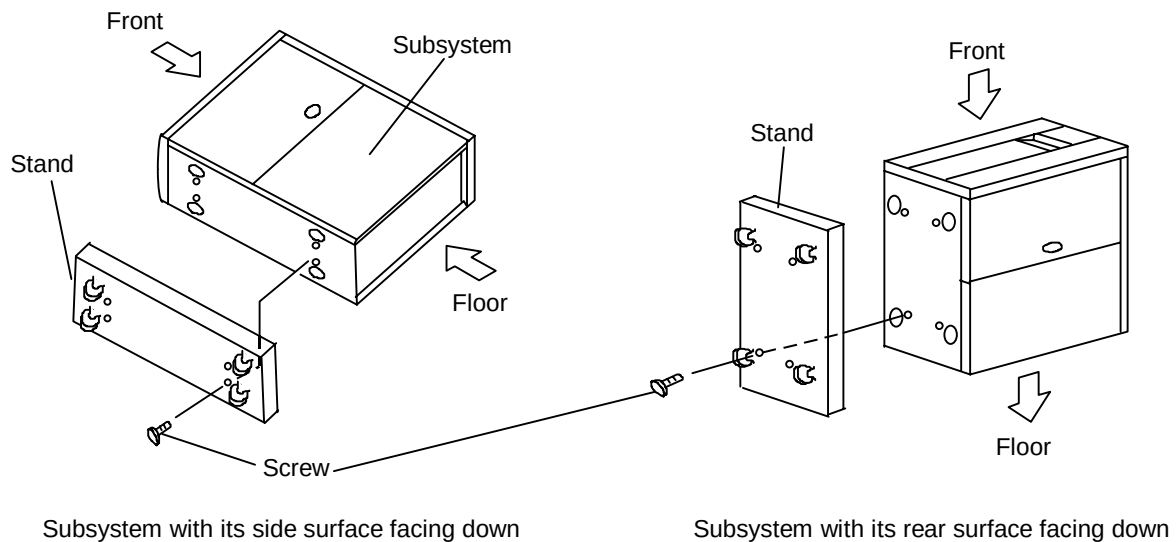
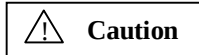


Figure 3.2.2 Attaching the Stand

3.2.2 Install the subsystem

Place the subsystem so that the front and rear is 30cm or more apart from the wall in order not to block the ventilation.



Caution

Do not block the ventilation. With the temperature rise, it may cause failure or fire.

(1) Opening/Closing the front cover (See Figure 3.2.3.)

- ① Pull the right side of the front cover toward you to open it.
- ② Push it back slowly to close it.

Note : Open/Close the front cover gently to avoid subjecting the subsystem to any impact since it has precision components.

(2) Opening/Closing the side covers (See Figure 3.2.3.)

- ① Insert the key attached to the subsystem into the keyhole and turn it to the direction of an arrow (clockwise). Carefully open side cover 1 first, then open side cover 2.
- ② Carefully close side cover 2 first, and then close side cover 1. Finally, turn the key to the direction of an arrow (counterclockwise).

Note : Open/Close the side covers gently to avoid subjecting the subsystem to any impact since it has precision components.

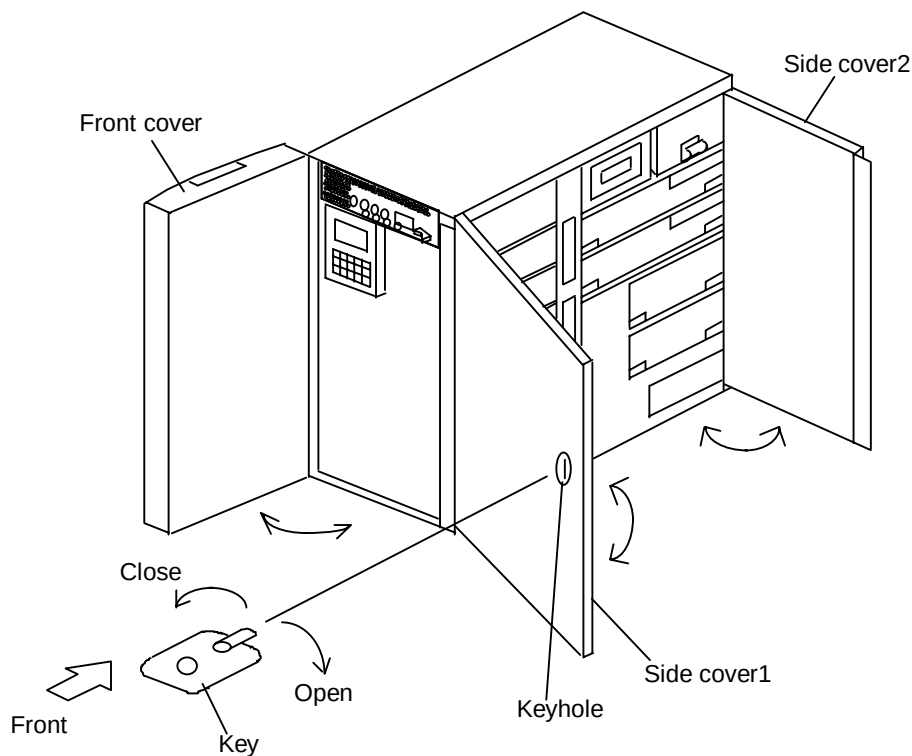


Figure 3.2.3 Opening/Closing Front and Side Covers

(3) Installing HDU ASSY (See Figure 3.2.4.)

- ① Open the handle in the direction of an arrow (···→) completely and insert the HDU ASSY into the right place.
- ② Close the handle in the direction of an arrow (—→).

**Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

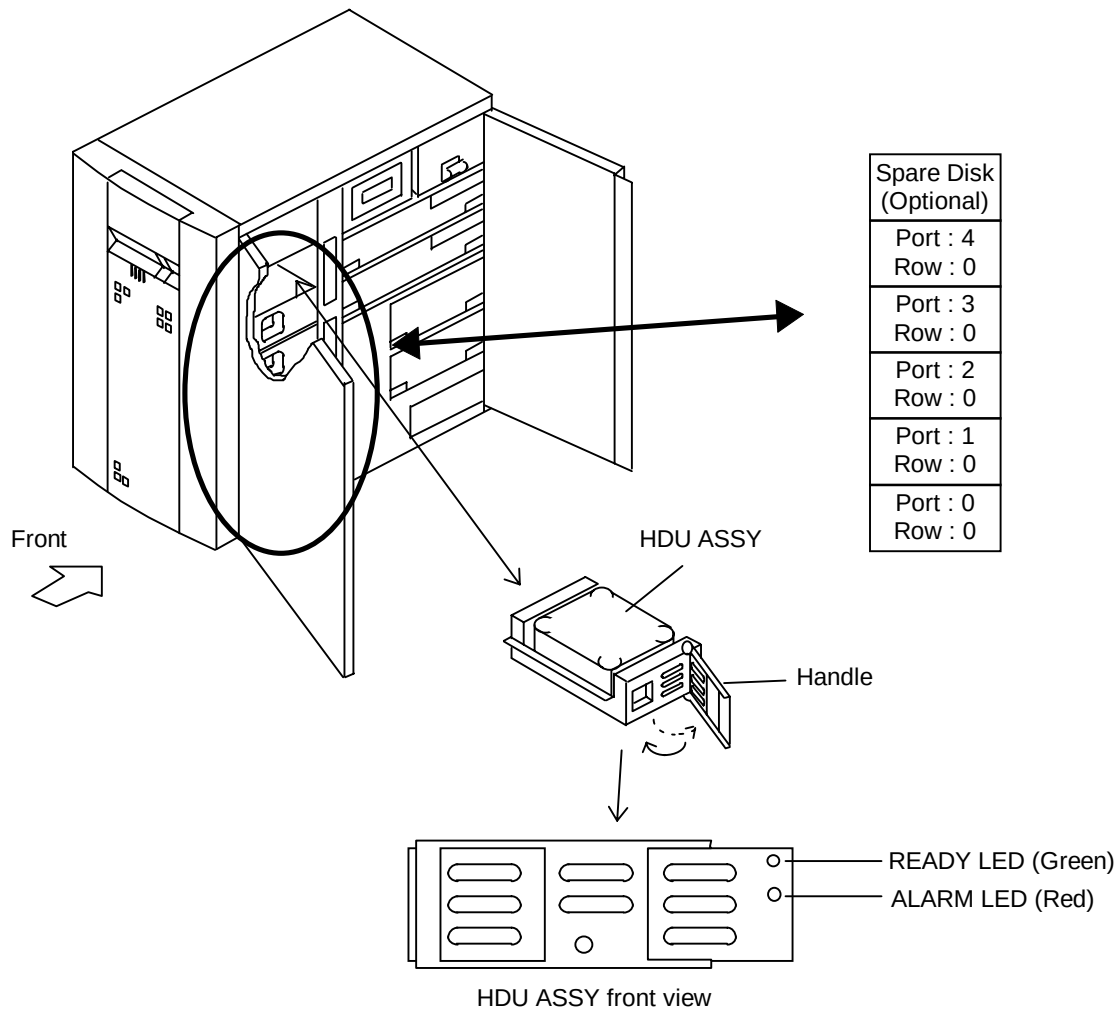
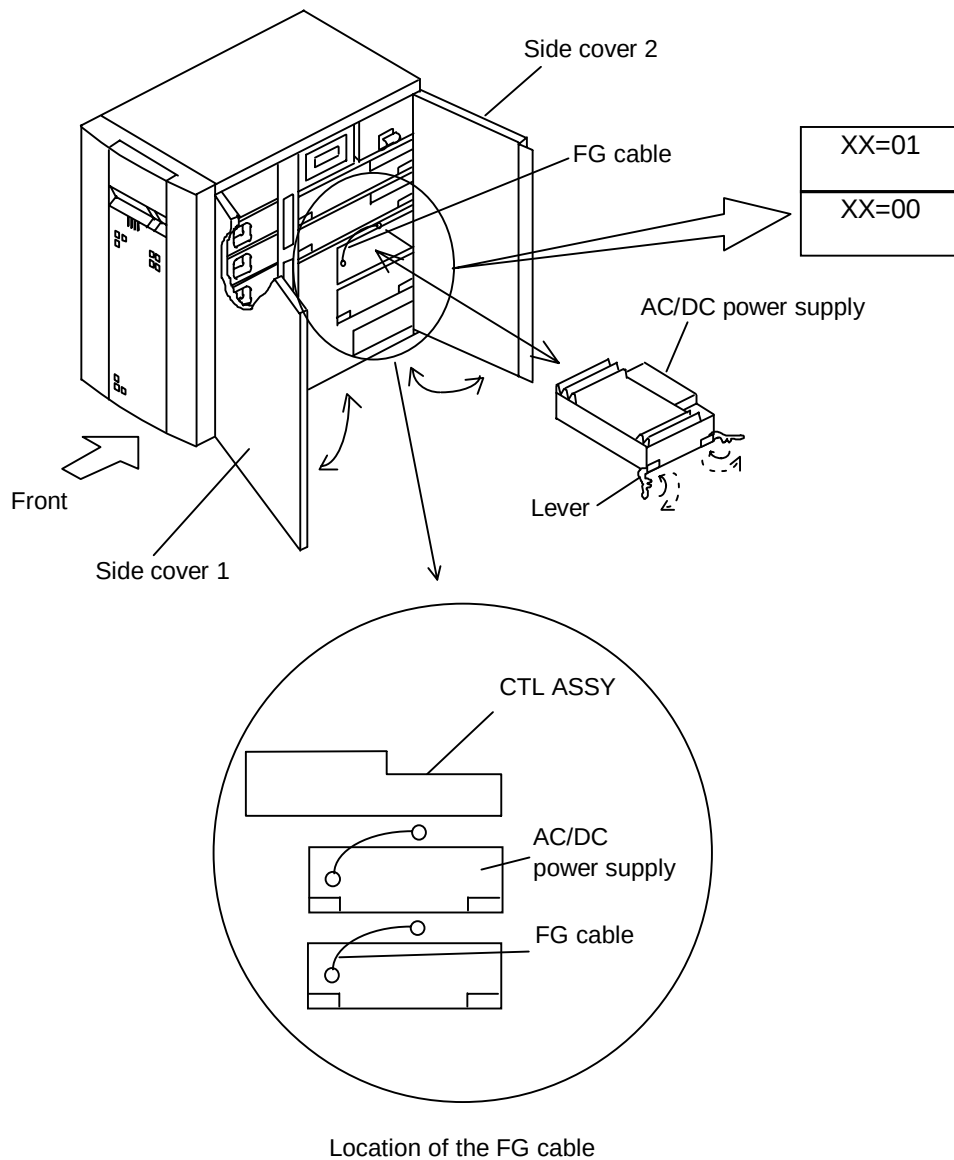


Figure 3.2.4 Installing HDU ASSY

(4) Setting AC/DC power supply (See Figure 3.2.5.)

- ① Insert the AC/DC power supply into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (→) at the same time.
- ② Connect the FG cable with the AC/DC power supply.

**Figure 3.2.5 Setting AC/DC Power Supply**

(5) Setting I/F ADAPTER ASSY (See Figure 3.2.6.)

- ① Insert the I/F ADAPTER ASSY into the right place and tighten the bind screw.

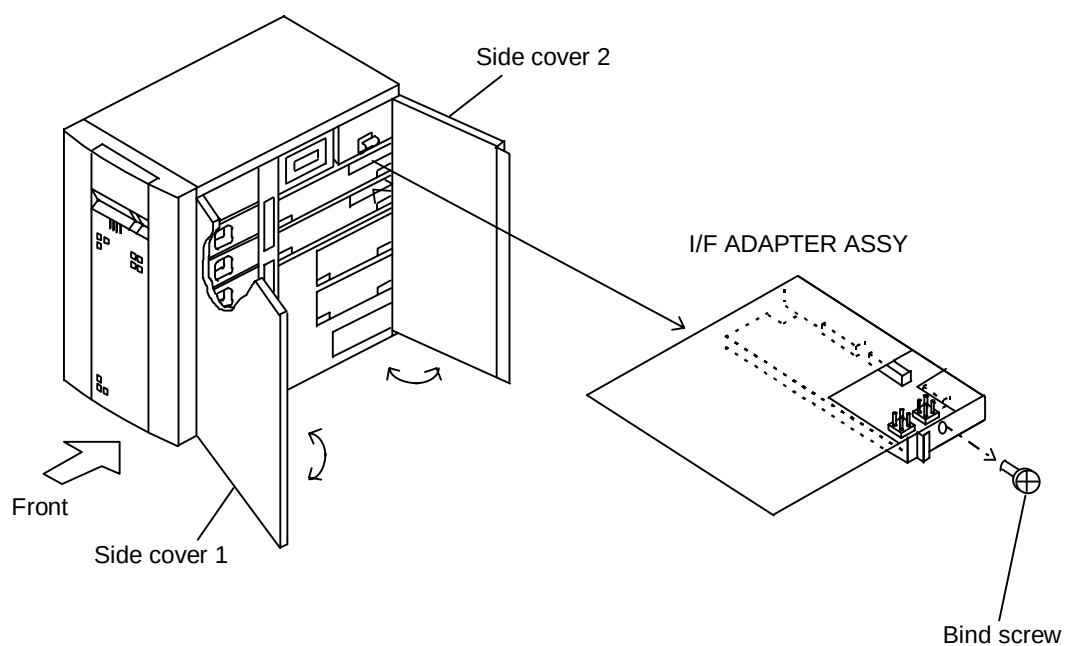


Figure 3.2.6 Setting I/F ADAPTER ASSY

(6) Installing CACHE ASSY (See Figure 3.2.7.)

Note 1 : Be sure to install the cache assemblies having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : When the cache assemblies are to be inserted into the cache slots, insert them in the order of cache slots #0 and #4, cache slots #1 and #5, cache slots #2 and #6 and then cache slots #3 and #7.

Note 3 : Be sure to install the cache assembly having the maximum capacity in slot #0 and #4.

Note 4 : If the redundant CTL ASSY has been installed, install the cache assembly having the same capacity into the same slot.

- ① Open the side covers. (See MK-INST0110.)
- ② Pull out the CTL ASSY. Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY. (See Figure 3.2.8.)
- ③ Install the CACHE ASSY. (See Figure 3.2.7.)
- ④ Insert the CTL ASSY into the former place. Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same times. (See Figure 3.2.8.)
- ⑤ Close the side covers. (See MK-INST0110.)

Installation example of CACHE ASSY

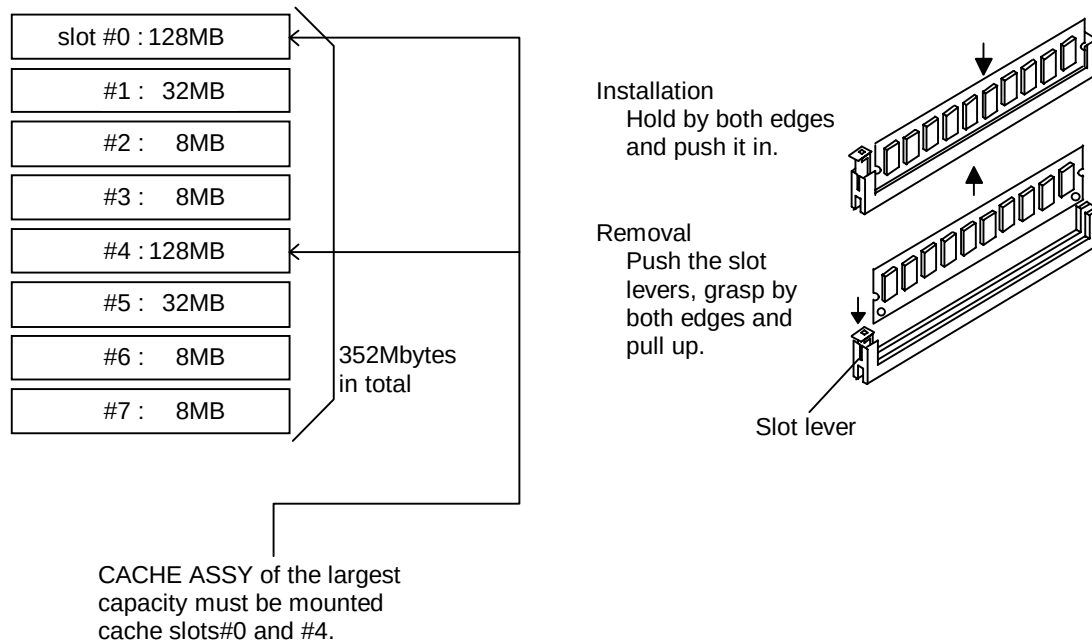


Figure 3.2.7 Installing CACHE ASSY

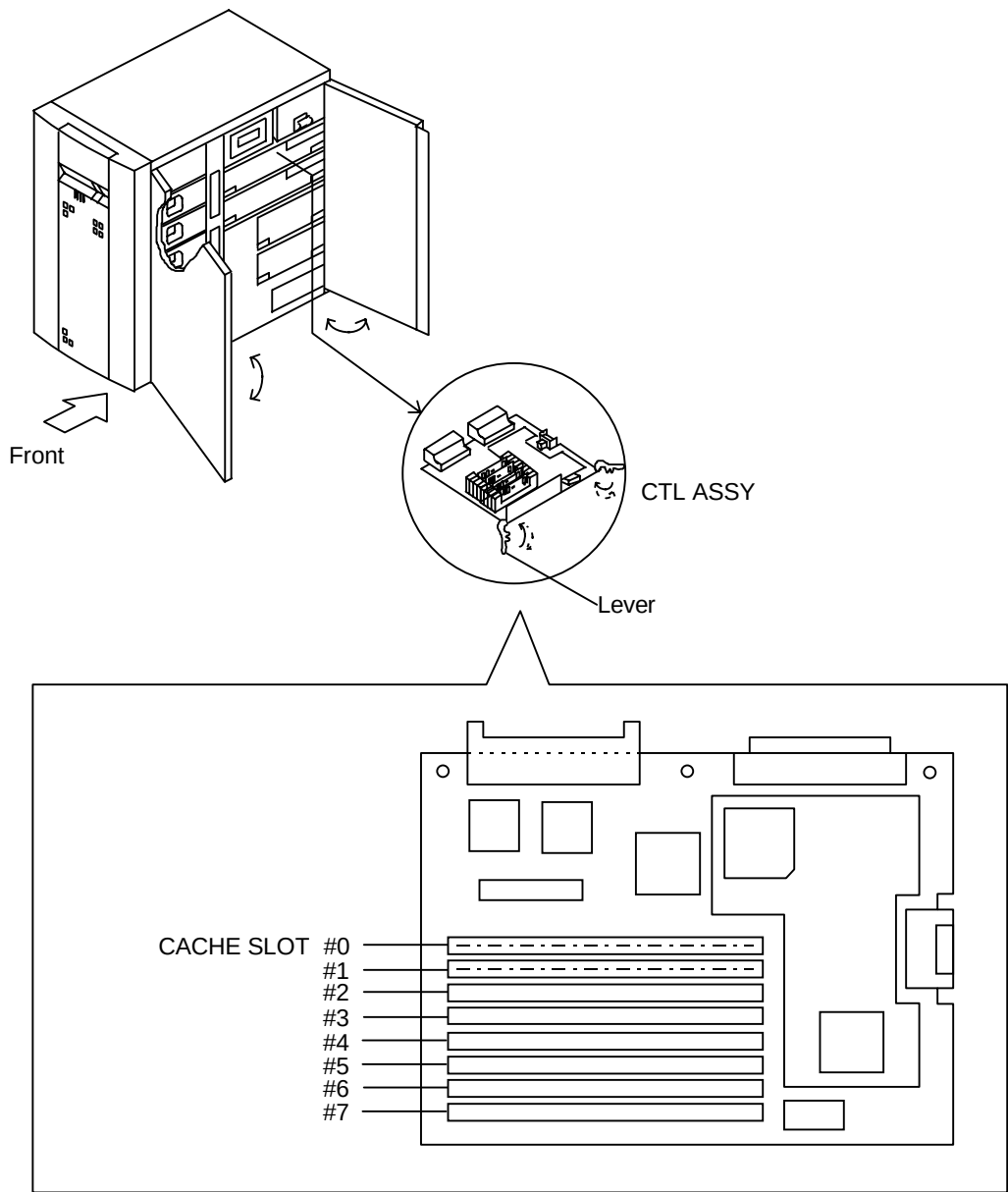
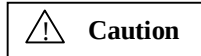


Figure 3.2.8 Installing CACHE ASSY

3.3 Setting the Power Supply

The power for the boards, drives, and fans of the DF350 disk subsystem is supplied by the In Box ASSY and AC/DC power supply converting AC to the DC power.

Turn the power on according to procedures (1) to (6) described below.



Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Make sure that the circuit breaker (a switch on the rear panel) is "O" (OFF), then connect the AC cable.
(See Figure 3.3.1.)
- (2) Supply AC power.
- (3) Open the side cover and make sure that the battery power switch is turned to "ON". Then turn on the circuit breaker.
- (4) Make sure that all of DIP switches are set to "OFF". (upper positions) Note that no need to remove CTL ASSY.
- (5) Close the side cover and set the circuit breaker to "I" (ON). Then turn the power switch "ON".
- (6) Make sure that the subsystem becomes ready a few minutes later.

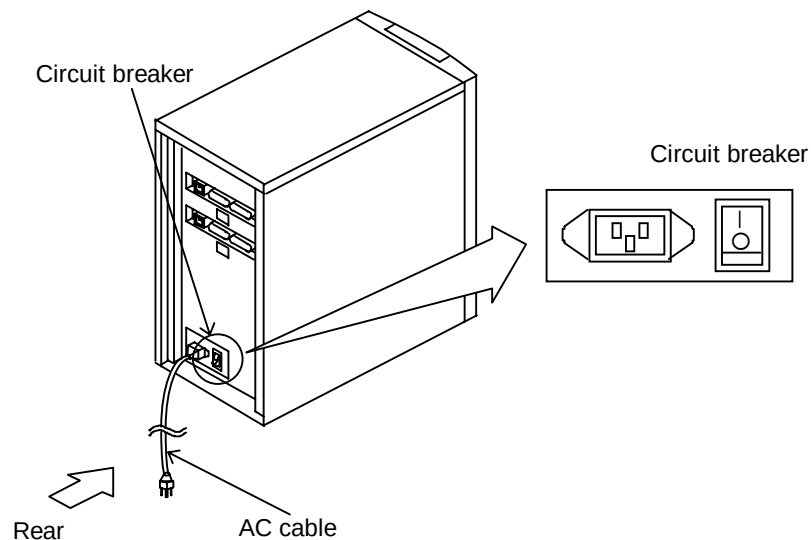


Figure 3.3.1 AC Cable Connection

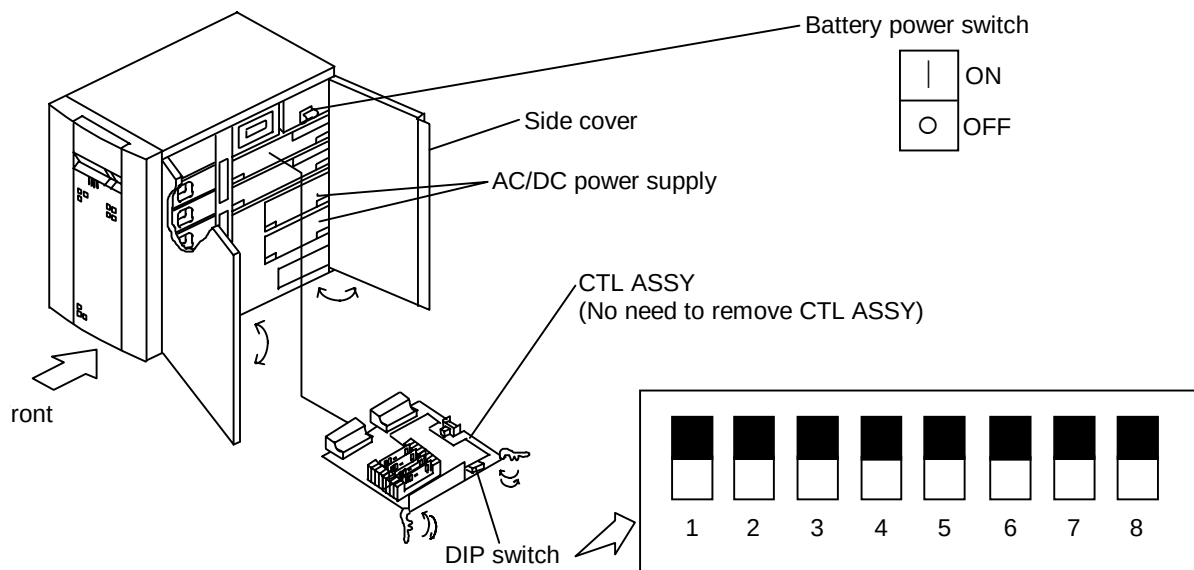


Figure 3.3.2 Inside Construction of the Subsystem

3.4 Setting the Subsystem Parameter

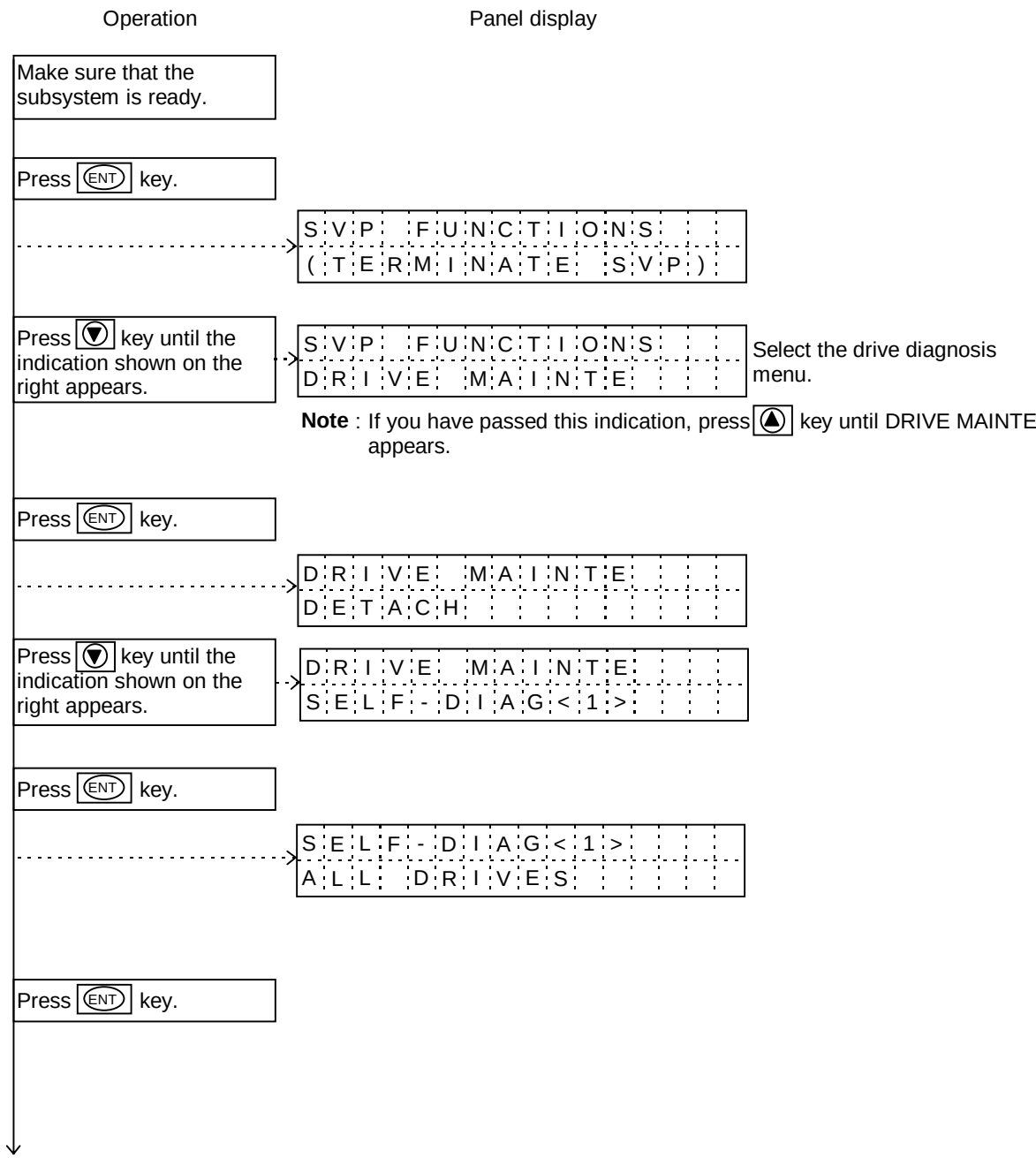
See Chapter “Setting the Subsystem Parameter” in MK-INST0270.

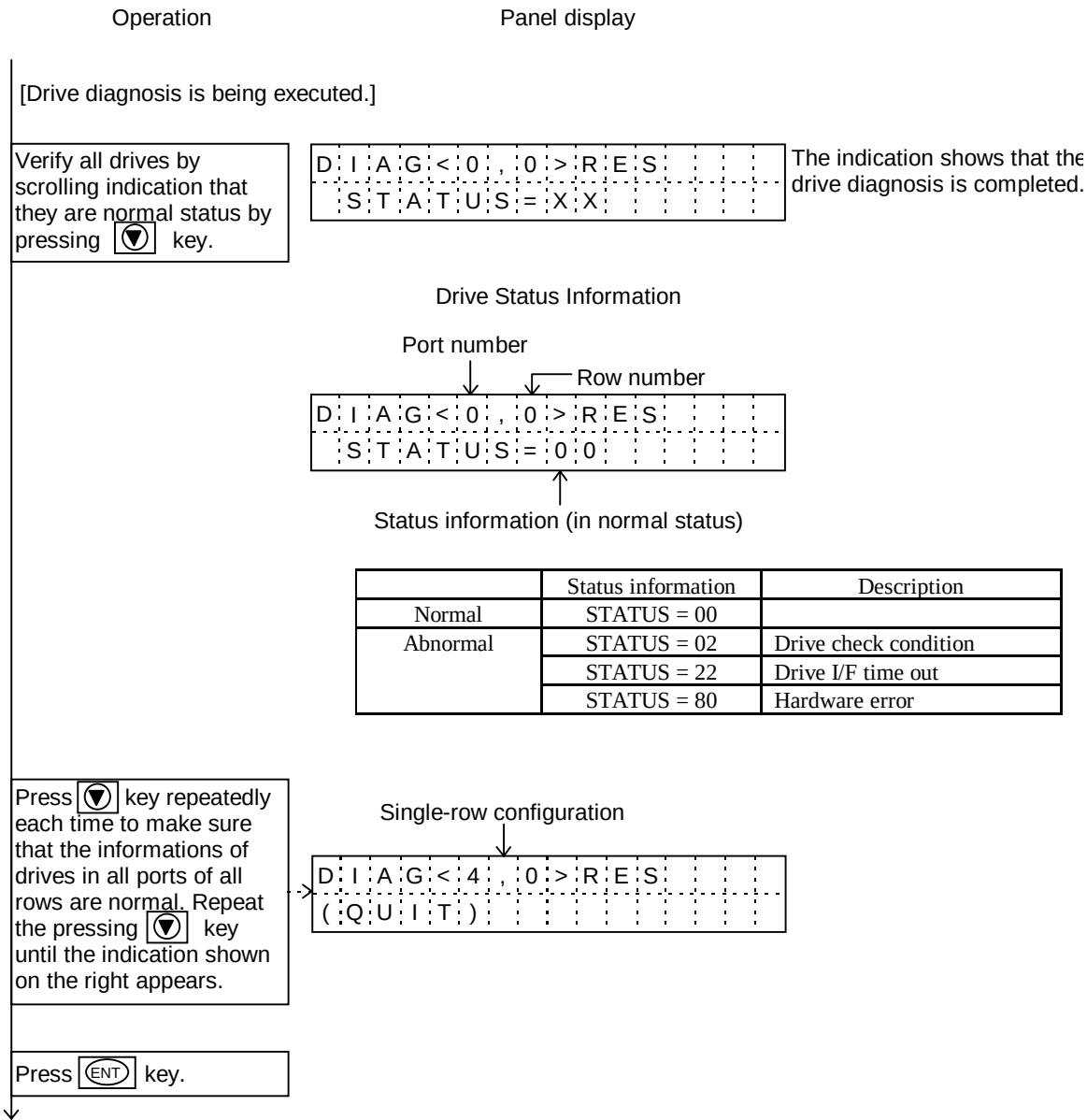
REV.1	Feb.1997	May.1997				

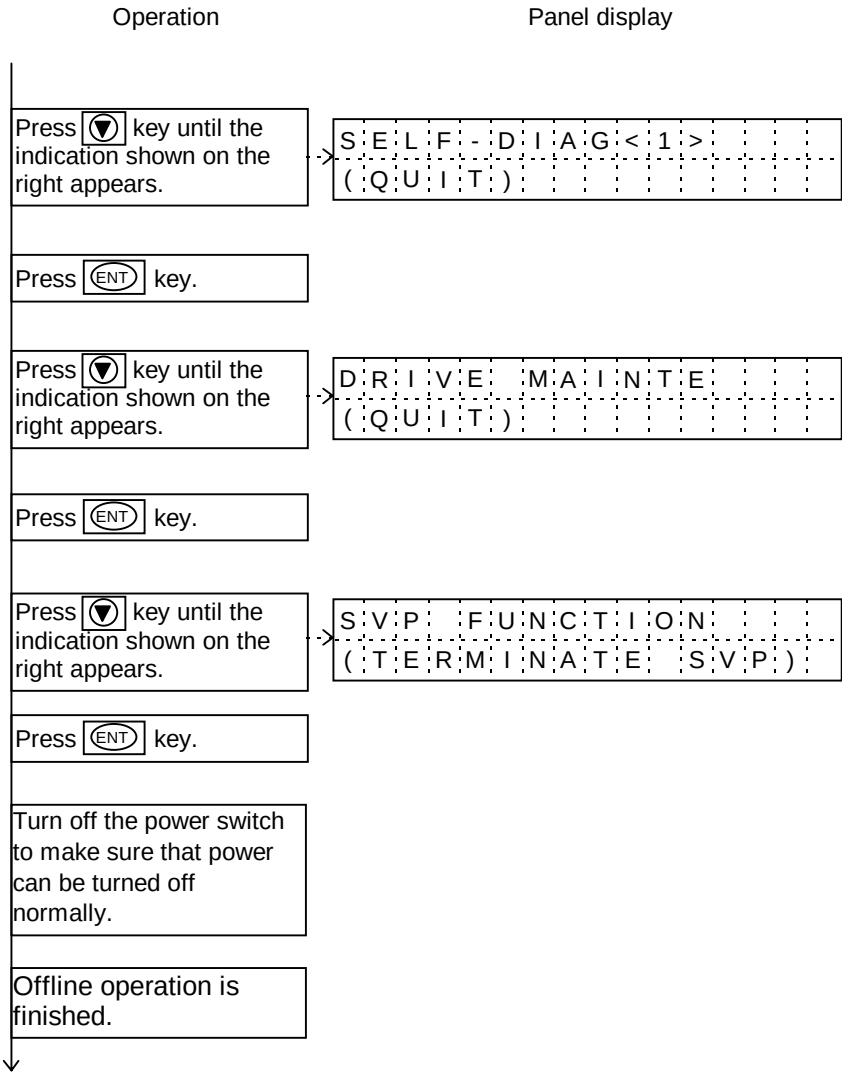
3.5 Checking the Offline Operation

After opening the front cover, execute the drive diagnosis using the Panel display and the ten key as instructed below, and make sure that the diagnosis is completed normally on each of all drives.

① Operate as described below.





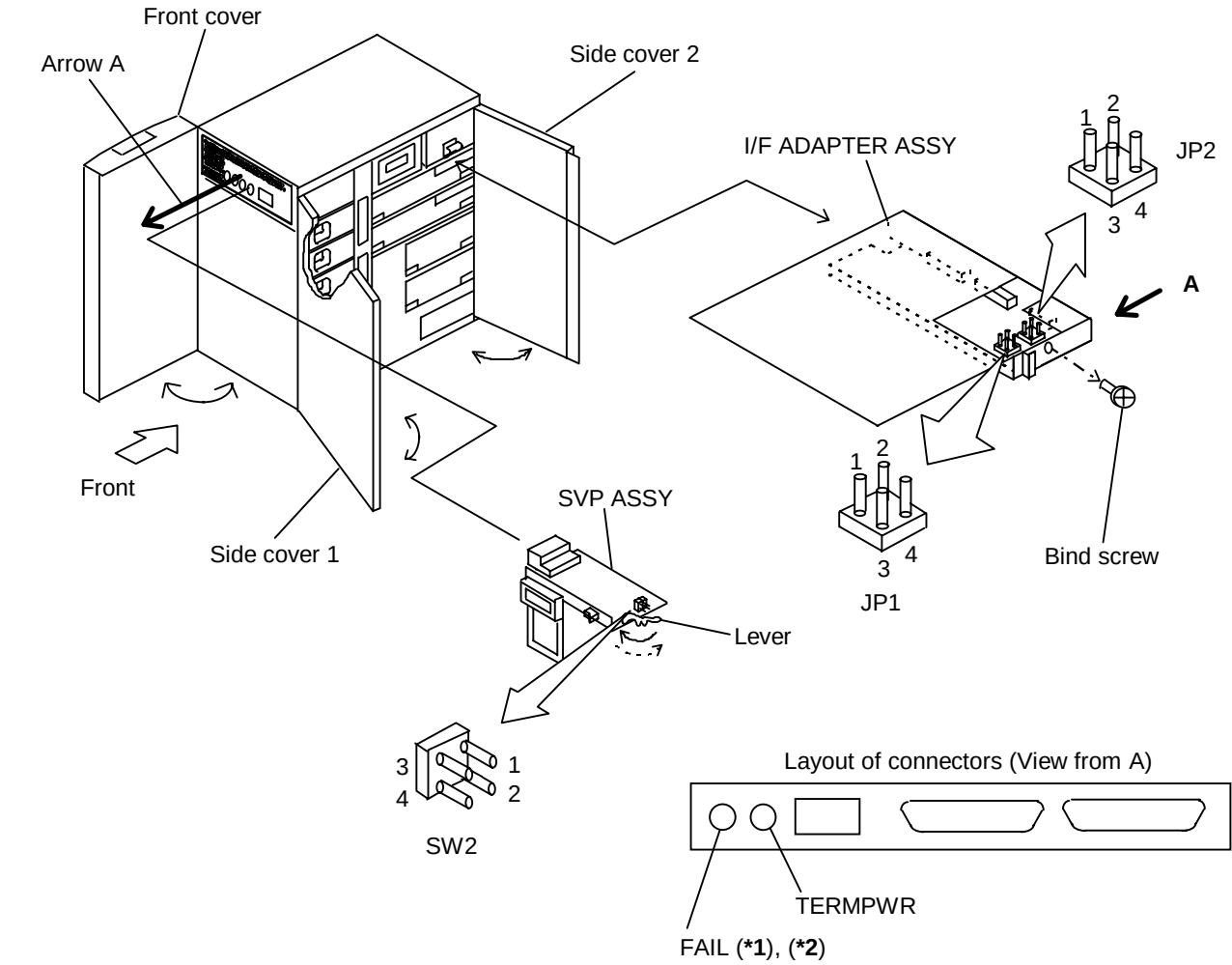


3.6 Setting the Terminator Power and Remote/Local Mode

Switching the power of DF350 can be controlled by Host system (Remote Control) under the mode of terminator power is supplied by SCSI bus. Switching the mode of Remote/Local is carried out by jumper setting of SW4 on SVP panel and JP1 of terminator power setting.

Note : While connecting to RS6000 model 220/230, terminator power should be supplied from outside (Local mode). Switching the power by the host system cannot be carried out. When the host is not connected or powered off, the data recovery with the maintenance panel, nor the formatting the array cannot be carried out.

- (1) Perform destaging (See ENTRY0040) and make sure that it is not in the cache back-up state. Turn off both main switch on the panel and the breaker at the rear side of the unit.
- (2) Remove terminator resistor from I/F ADAPTER ASSY.
- (3) Open the front cover and side covers.
- (4) Pull out the SVP ASSY and I/F ADAPTER ASSY.
- (5) Set the JP1 and SW2 according to Figure 3.6.1 and Table 3.6.1. (Set JP2 (equipped on I/F ADAPTER ASSY for only Wide SCSI like DMUDS or DMUSS) with the pins 1 and 2 short-circuited.)
- (6) After setting the terminator power, insert the I/F ADAPTER ASSY and tighten the bind screw. And insert the SVP ASSY.
- (7) Fix terminator resistor to I/F ADAPTER ASSY.
- (8) Close the front cover and side covers. Turn on the breaker.

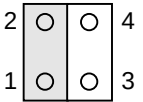
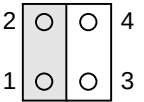
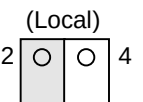
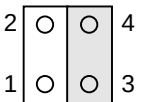
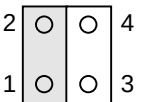
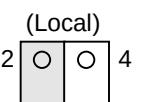
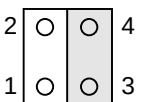
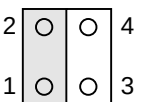
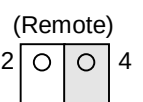
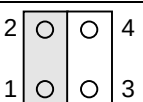
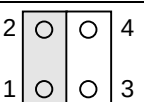
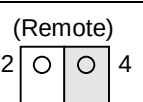


LED Name	Color	ON	OFF	Remark
TERMPWR	Green	Terminator power supplied.	Terminator power is not supplied.	—
FAIL	Red	Single ended signal is connected to Differential I/F card. (Failure)	Differential signal is connected.	(*1) Only mounted on Differential I/F card.

*2 This LED is valid only when all the devices connected to SCSI I/F are powered on. When one of the devices is not powered on, sometimes this LED is lit up.

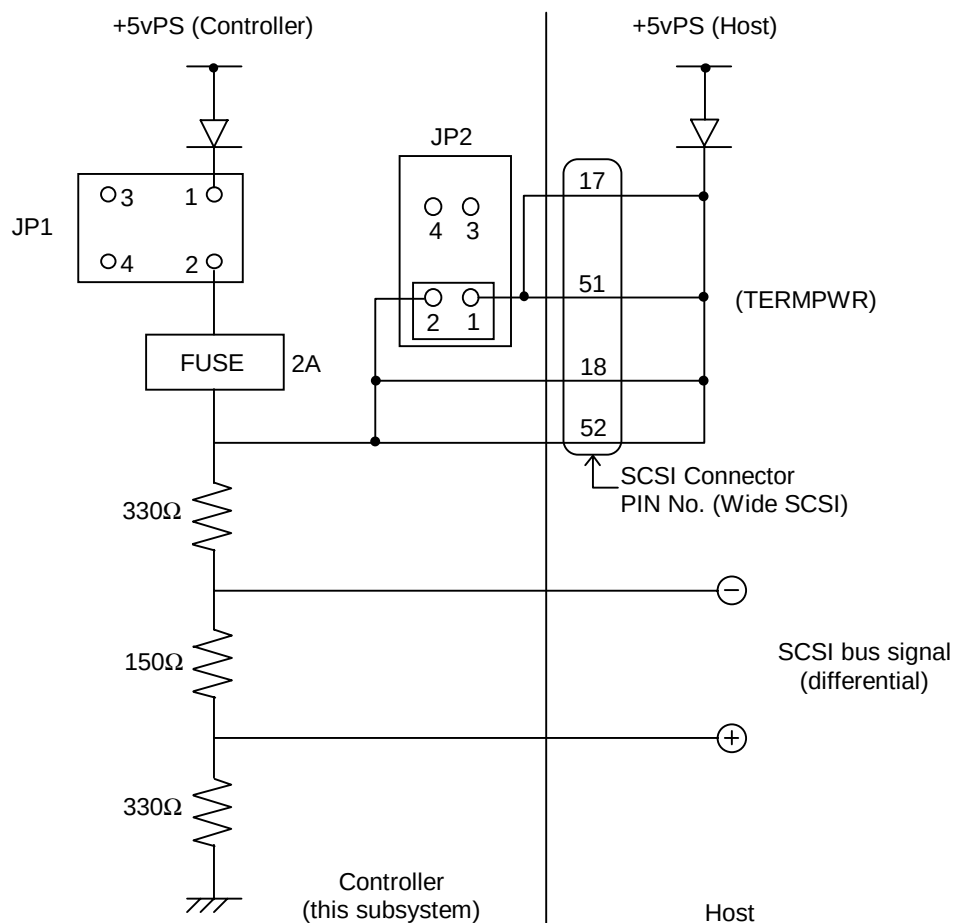
Figure 3.6.1 Setting the Terminator Power and Remote/Local Mode

Table 3.6.1 Setting the Terminator Power and Remote/Local Mode (*1)

No.	Jumper Setting			Function
	JP1 Terminator Power	JP2 (*2)	SW2 Remote/Local Mode	
1			(Local) 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
2			(Local) 	The combination can not be set.
3			(Remote) 	Terminator power +5VPS is supplied only from the power source of the host computer.
4			(Remote) 	The combination can not be set.

*1 The terminator power means that the power for the terminator is supplied from the host so that the SCSI bus is not shut down by a power failure of the subsystem.

*2 Set this jumper (JP2) with the pins 1 and 2 short circuited.



3.7 Connecting the SCSI Cable

Connect the SCSI cables after confirming the controller number indicated on the label.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 3.7.2.)

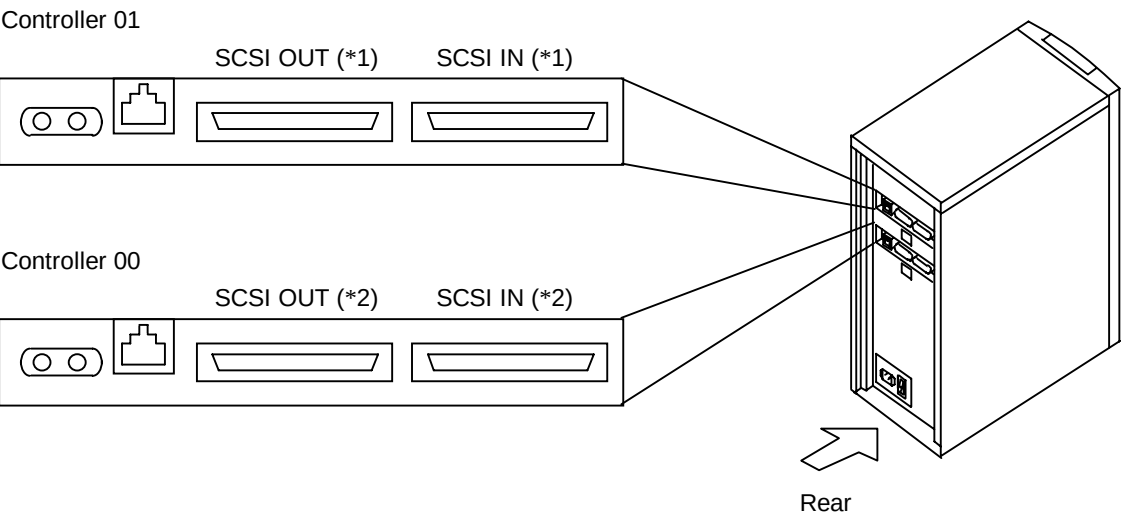


Figure 3.7.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.
SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

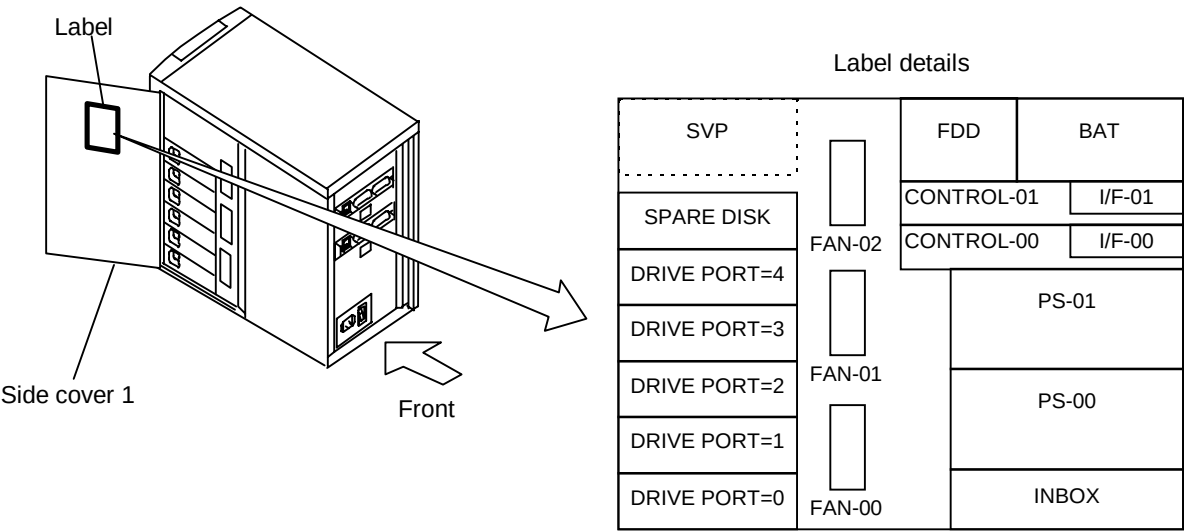


Figure 3.7.2 Label Layout

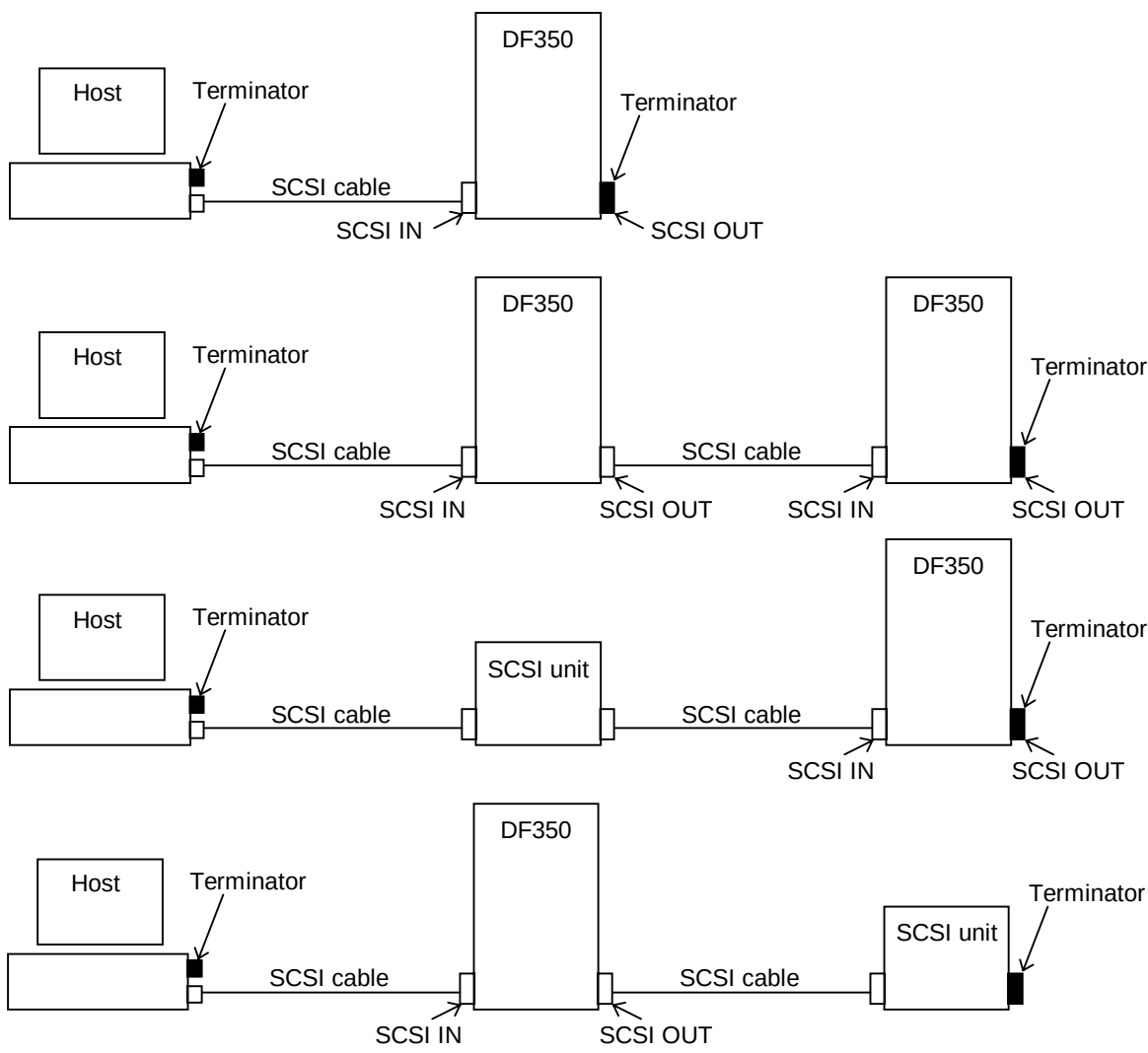


Figure 3.7.3 SCSI Connections

4. Setting the Subsystem Parameter

4.1 Setting the System Parameter

(1) Setting the system parameters and downloading

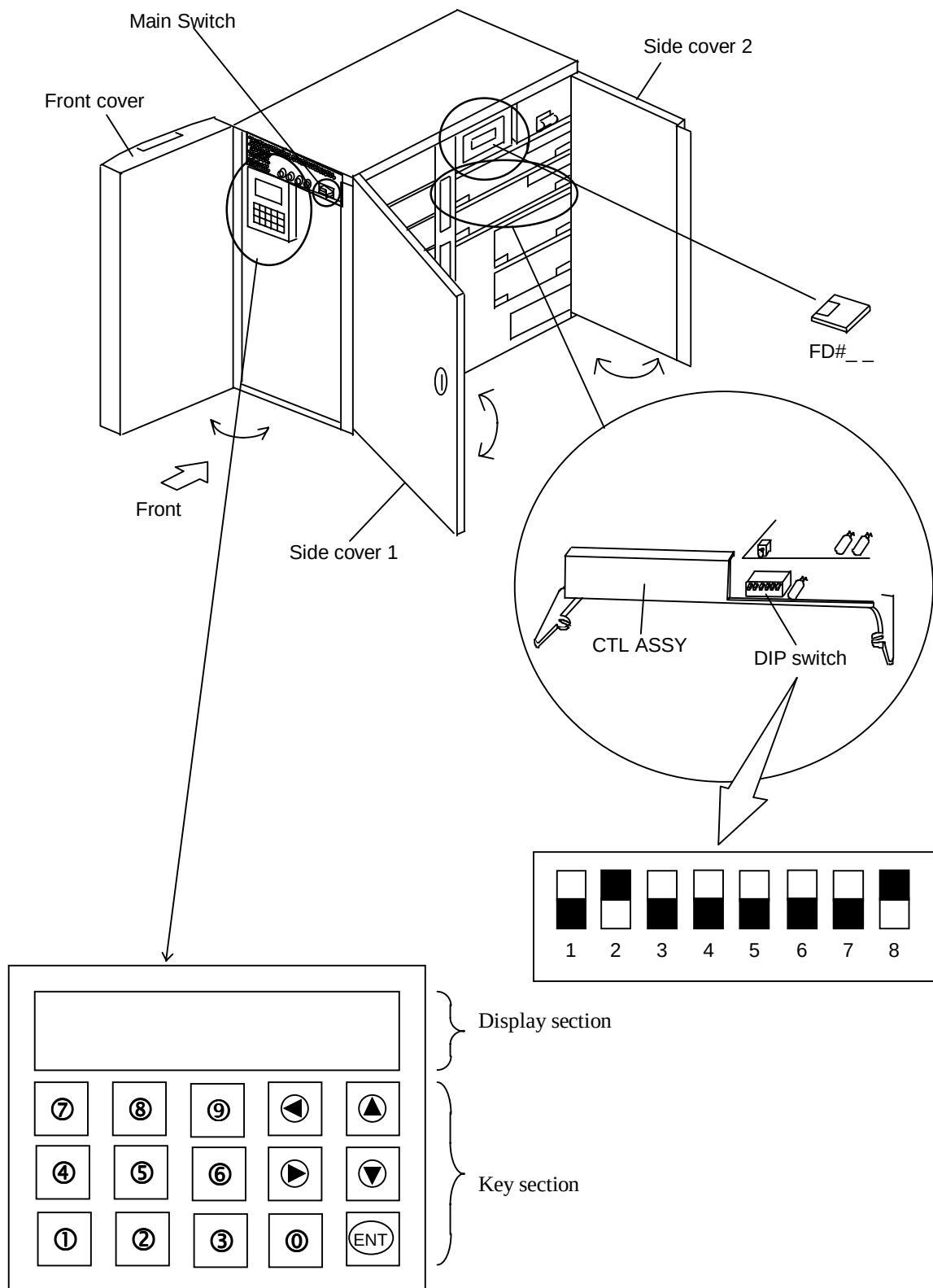
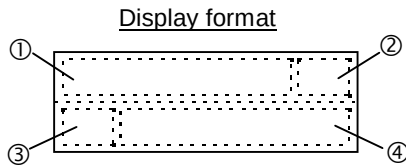


Figure 4.1.1 DIP Switches (System parameter is Set)

(1) Display

While setting up DIPSWITCH or SVP FUNCTION, menu etc. are displayed at panel display in the following display format .



① Menu title

There are two kinds of menu title described below.

DIPSWITCH SET:

For setting the target ID, buzzer, etc.

SVP FUNCTION:

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Message from the controller No. 0: The first (left most) character is in uppercase.

Message from the controller No. 1: The first (left most) character is in lowercase.

Example) Controller No. 0: DIPSWITCH SET

Controller No. 1: dIPSWITCH SET

For the dual controllers, the message with the display format 1 and the menu title with the display format 2 are displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

(2) Keys

Use the - keys for panel operation.



Used for entering the parameter values.



Used for determining the menu or the input parameter.

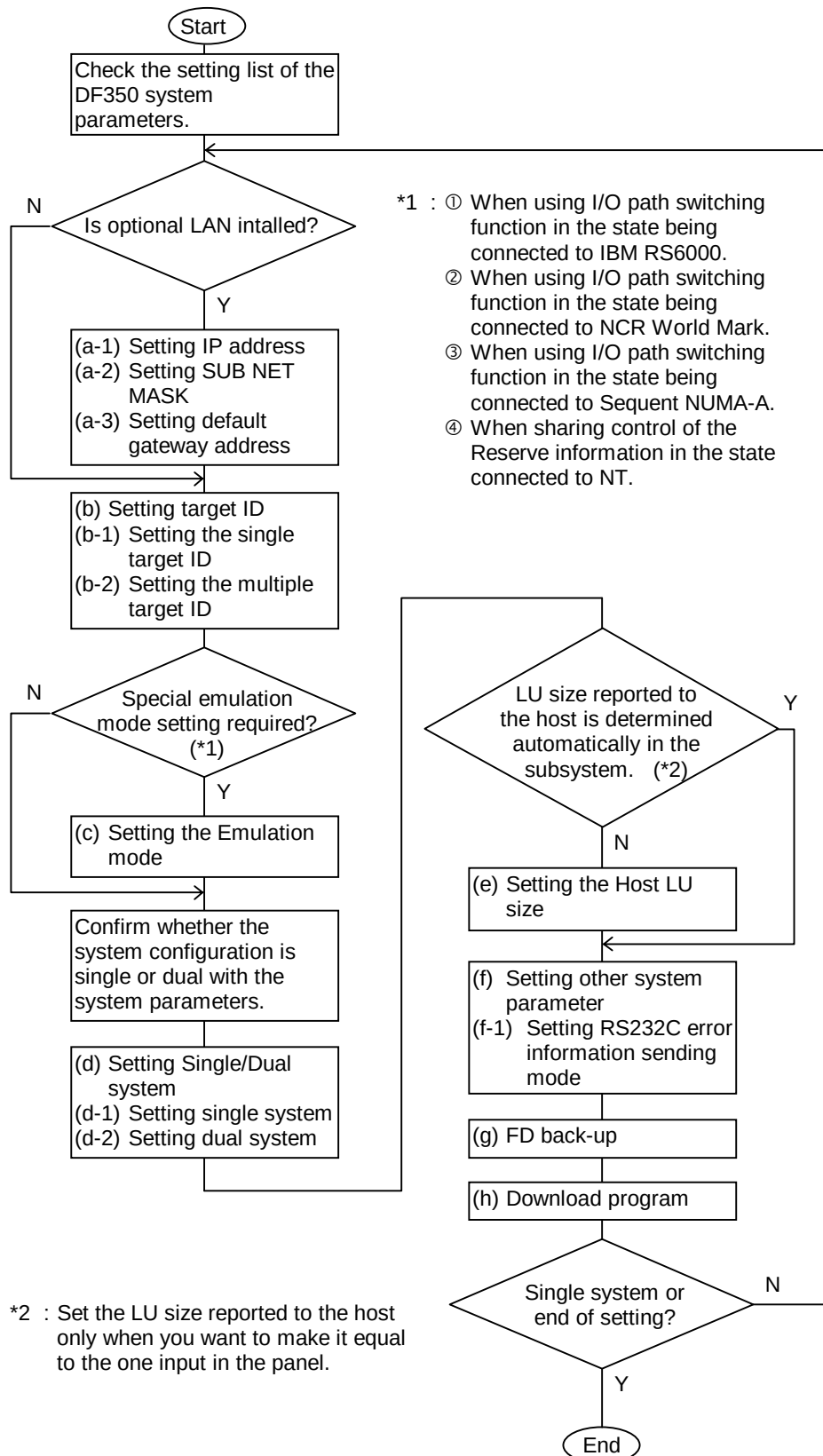


Used for determining the parameter input position.



Used for selecting the menu.

Operate as the flow described below.



Operate as described below.

- (1) Before powering on the subsystem, set DIP switches shown in Figure 4.1.2.
In case of Dual Contoroller system (installed DF-F350-F2MCF) , set DIP switches of both contorollers.

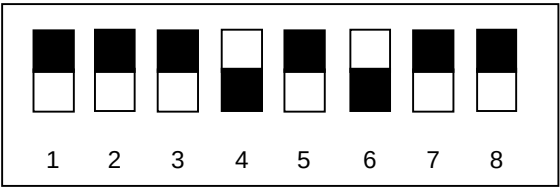
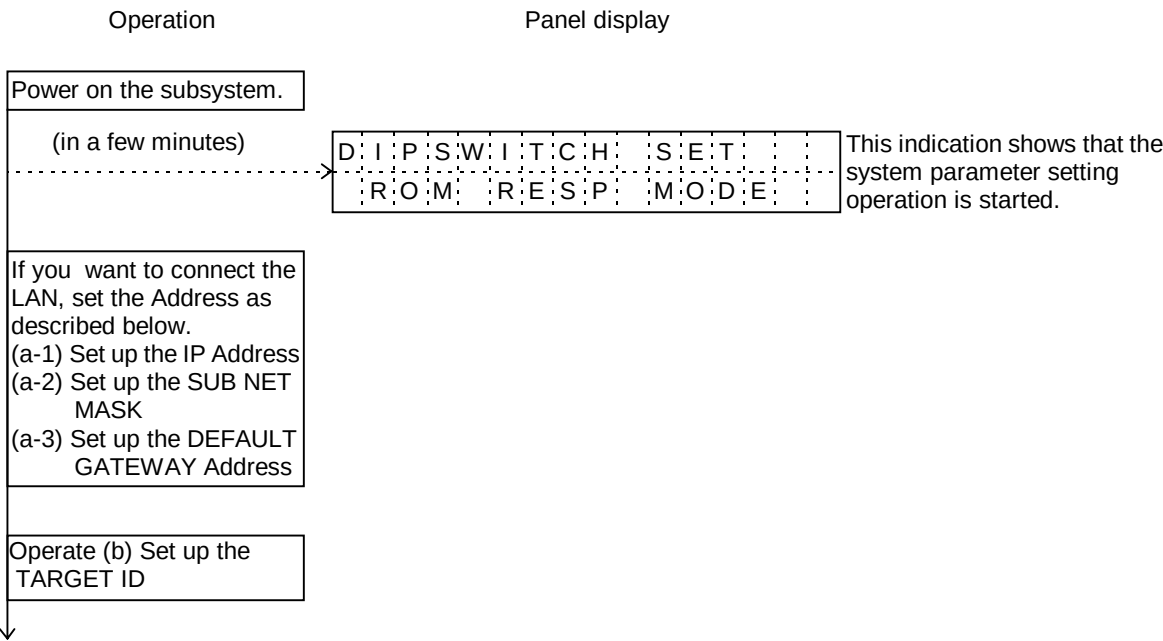
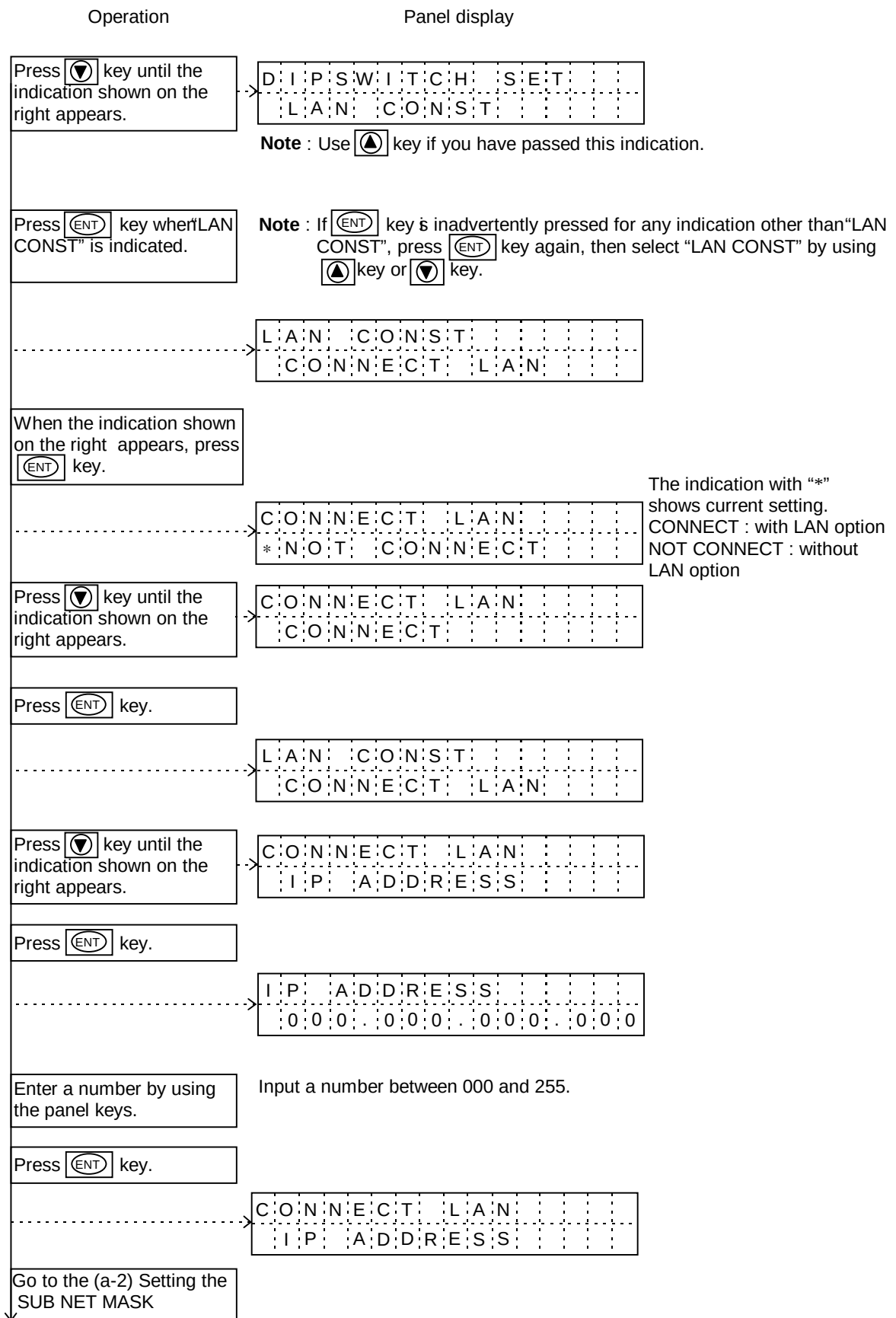


Figure 4.1.1 DIP switches (For setting the system parameter)

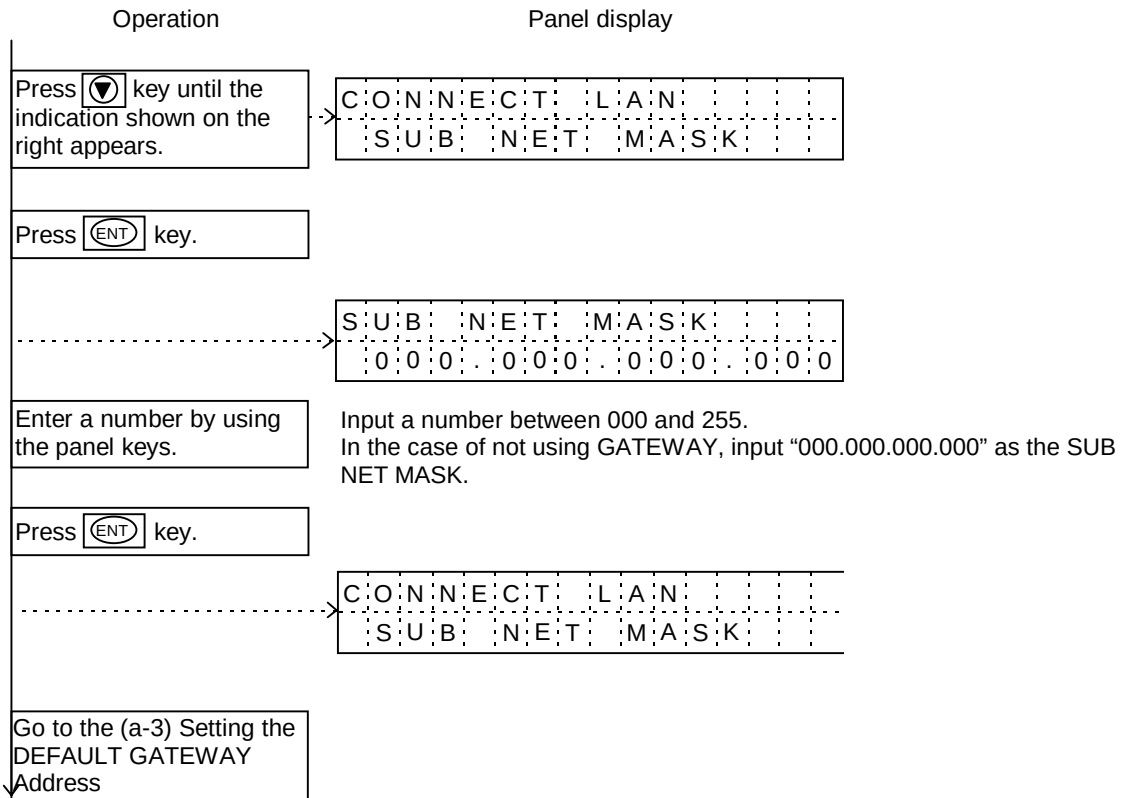
- (2) Operate panel's keys as described below.



(a-1) Setting the IP address.



(a-2) Setting the SUB NET MASK

***Note**

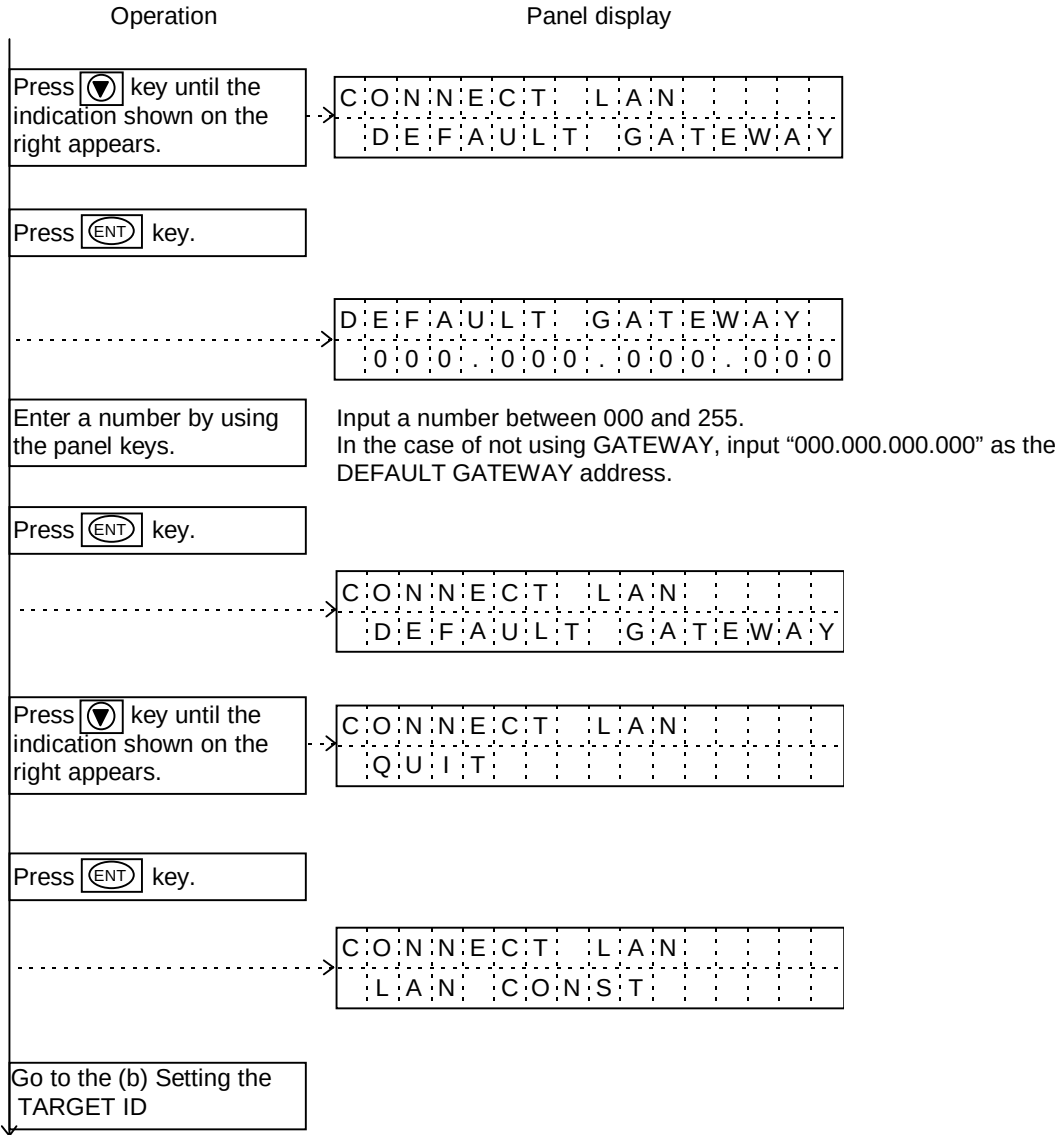
If "000.000.000.000" as the SUB NET MASK is set, this subsystem automatically adopts default SUB NET MASK for each IP address as described in the table 4.1.1.

Table 4.1.1 Default SUB NET MASK related with IP address

No.	IP Address of the subsystem	DEFAULT SUB NET MASK
1	from 000.000.000.000 to 127.255.255.255	255.000.000.000
2	from 128.000.000.000 to 191.255.255.255	255.255.000.000
3	others	255.255.255.000

If a smaller SUB NET MASK than default number is entered, this subsystem adopts default number.

(a-3) Setting the DEFAULT GATEWAY address



***Note**

If an invalid GATEWAY address is set (the IP address of the device is different from network address.), either of warning messages as shown below is displayed until the READY LED of the subsystem lights on.

Power off the subsystem and set IP address and default GATEWAY address correctly.

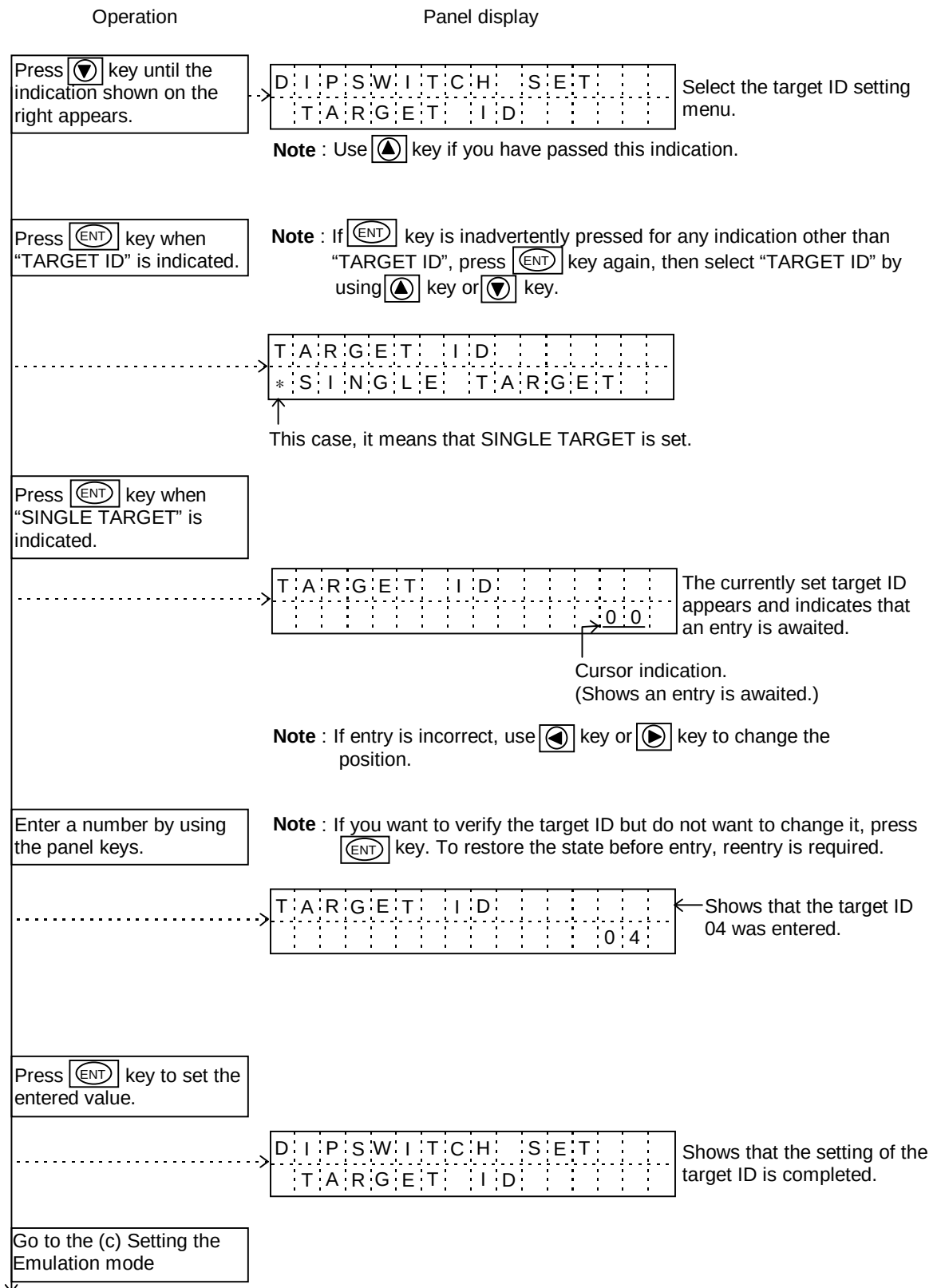
W	0	1	7	0	0	G	A	D	E	R	R		
				.		.		.					

W	0	1	7	0	0	G	A	D	E	R	R	-	X
				.		.		.					

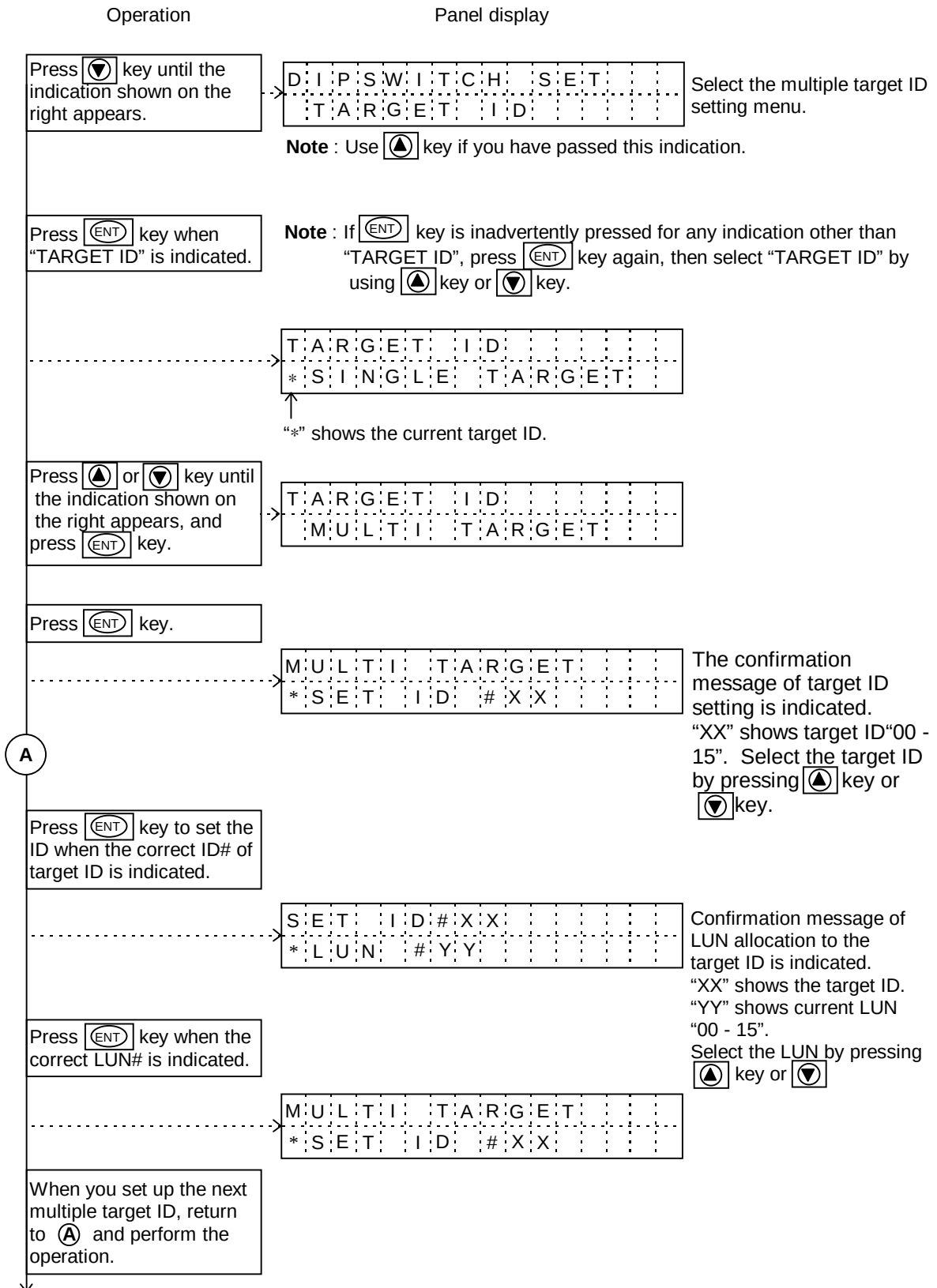
X : controllers No.

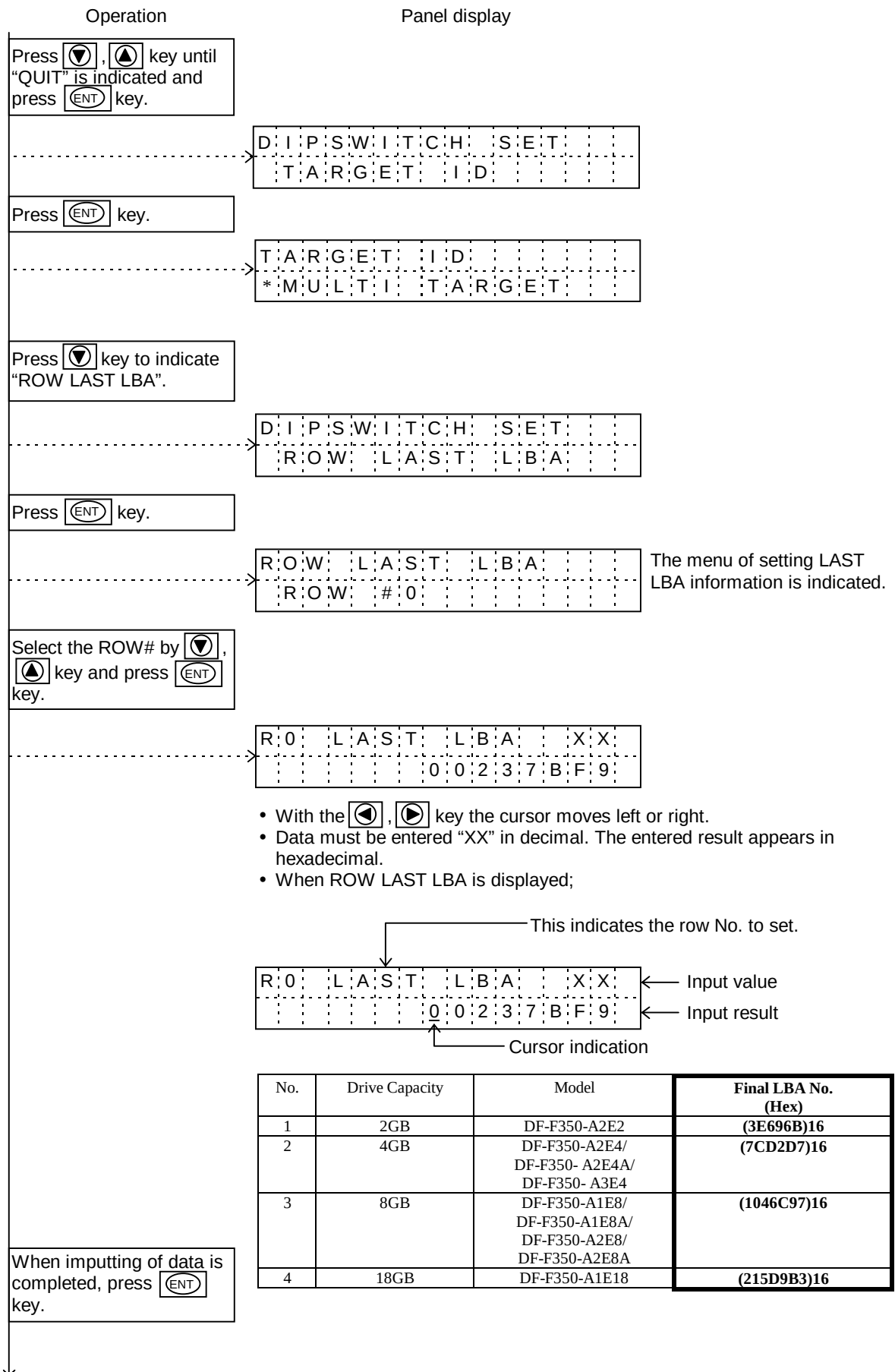
(b) Setting the TARGET ID.

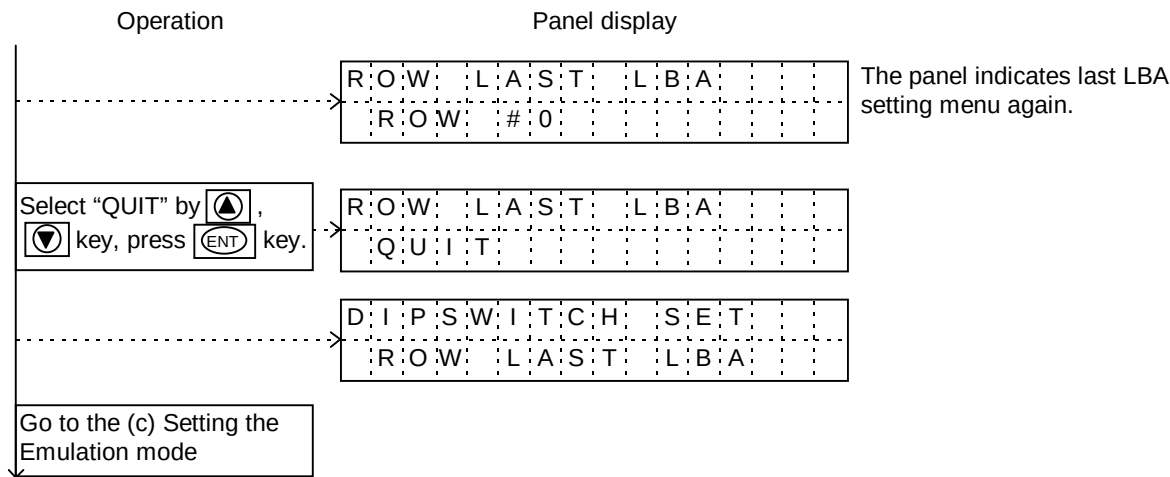
(b-1) Setting the single target ID.



(b-2) Setting the multiple target ID.

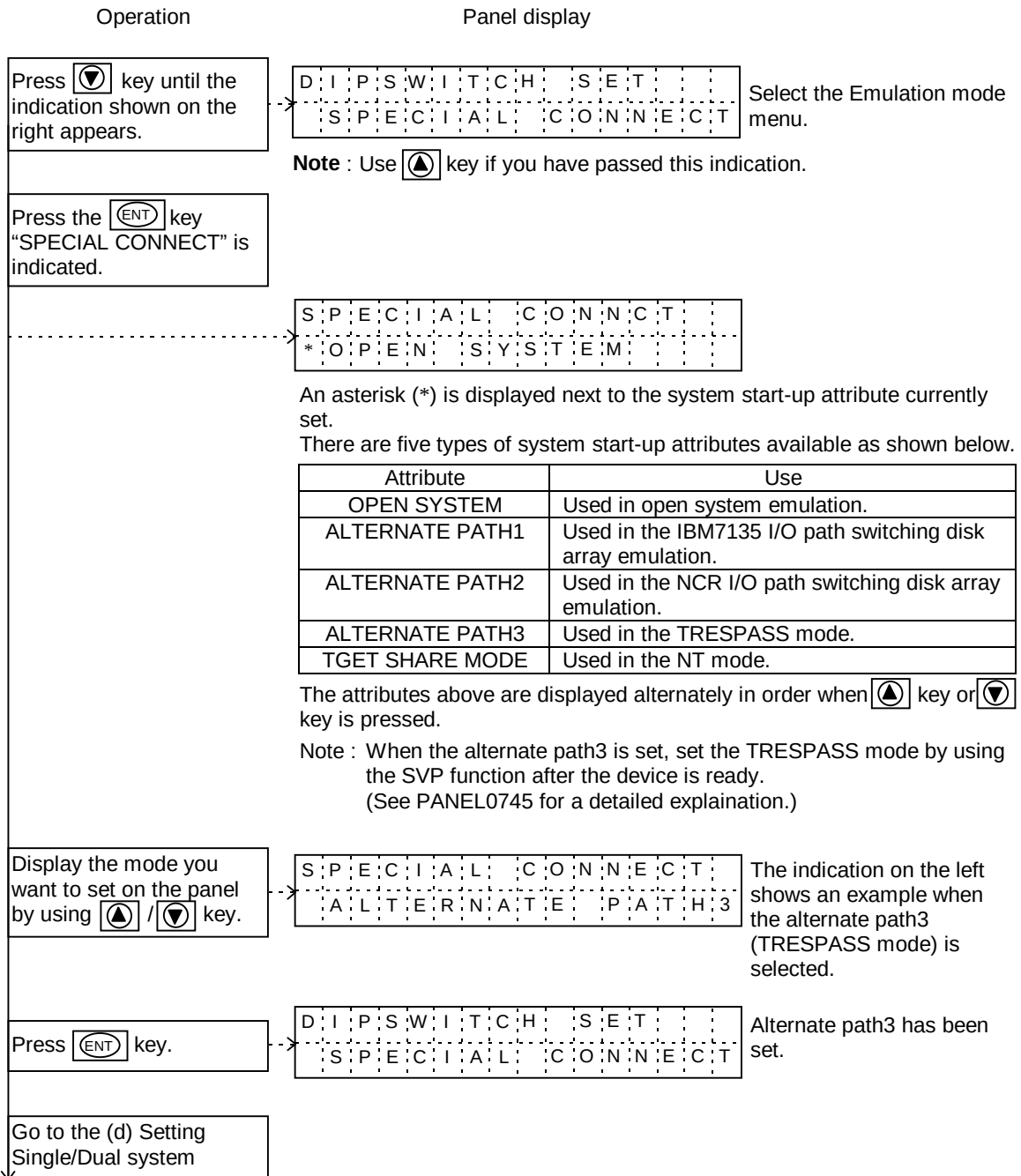






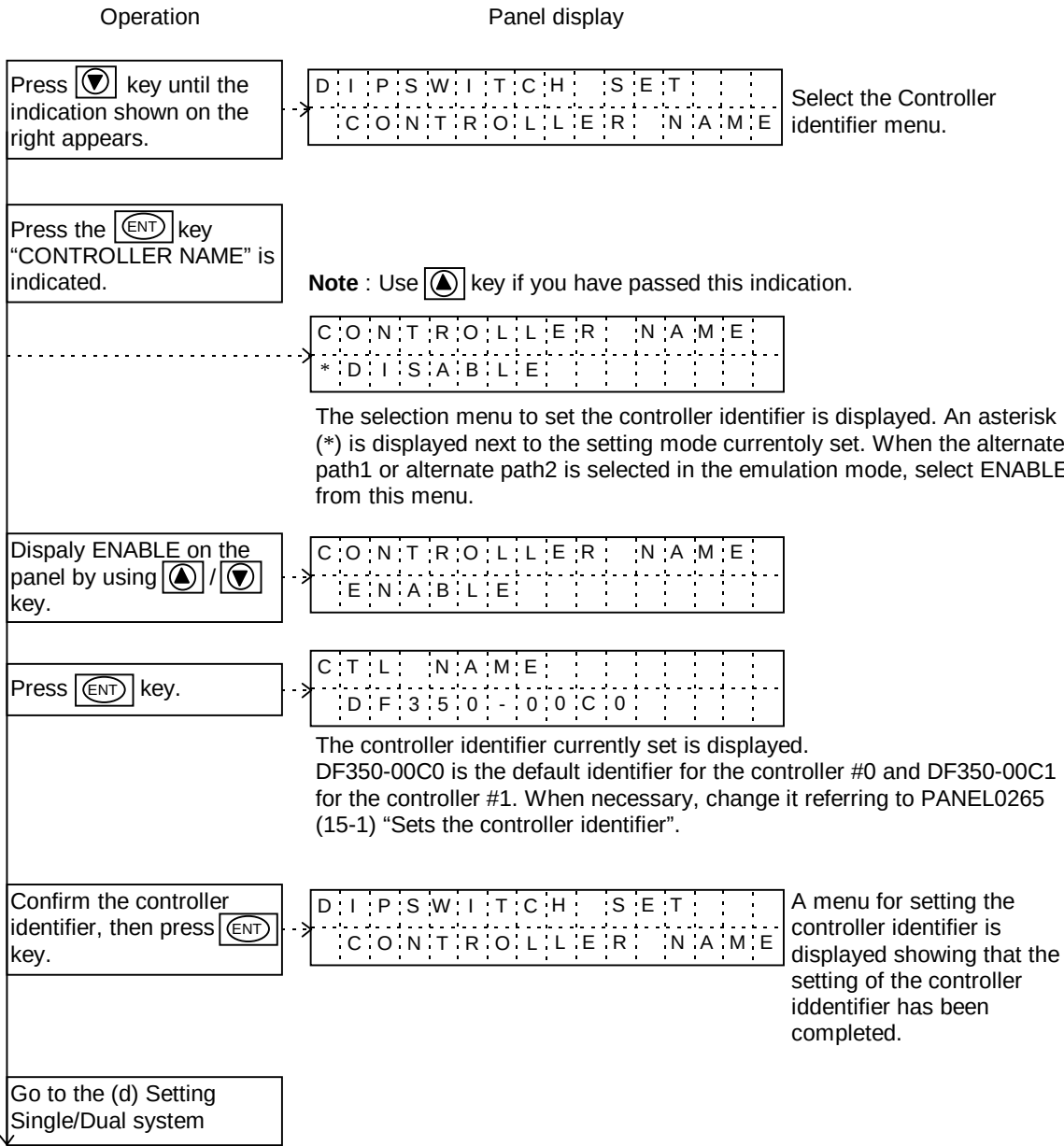
- Note)** * Setting and changing of multi target ID make the relation between the target ID and the LUN only.
The defining and formatting LU can be executed both after and before this operation.
- * If this operation is finished , turn off the power and turn on the power again.
 - * Resetting of SINGLE TARGET ID is required when returning to SINGLE TARGET function after switching to MULTI TARGET function from previous SINGLE TARGET function.
 - * If you want to set the multi target ID when the LU is already set, the LUN can be set to any number from #00 to #07. If you want to set any number from #00 to #15 to LUN, set the multi target ID after deleting the LU.
 - * The multi target ID must be set for each controller. In case of dual controller system and MULTI TARGET IDs are set for the both controller, set MULTI TARGET ID for each controller.

(c) Setting the Emulation mode

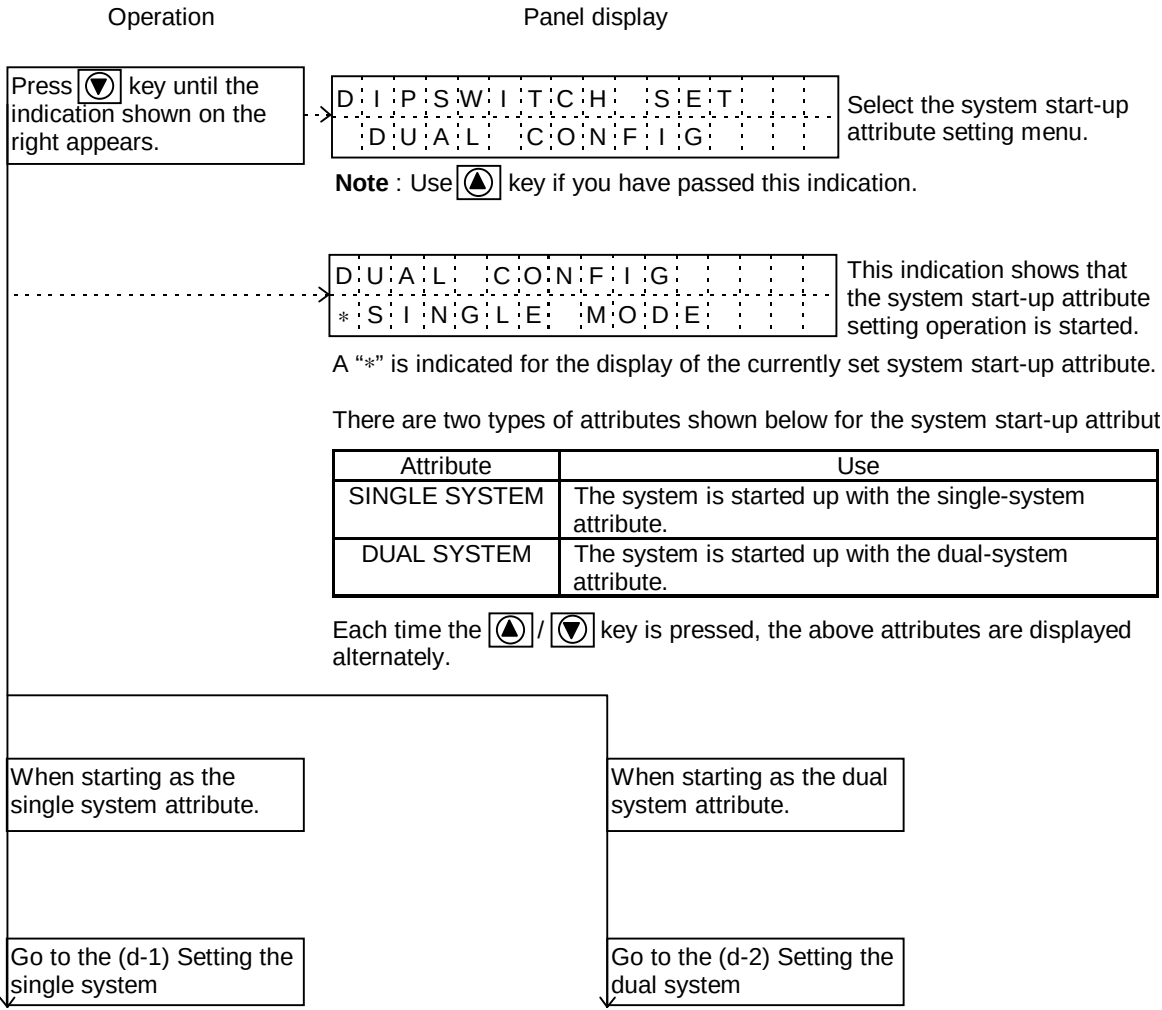


When the alternate path1 or alternate path2 is selected, set the controller name, product type. (See MK-INST0367.)

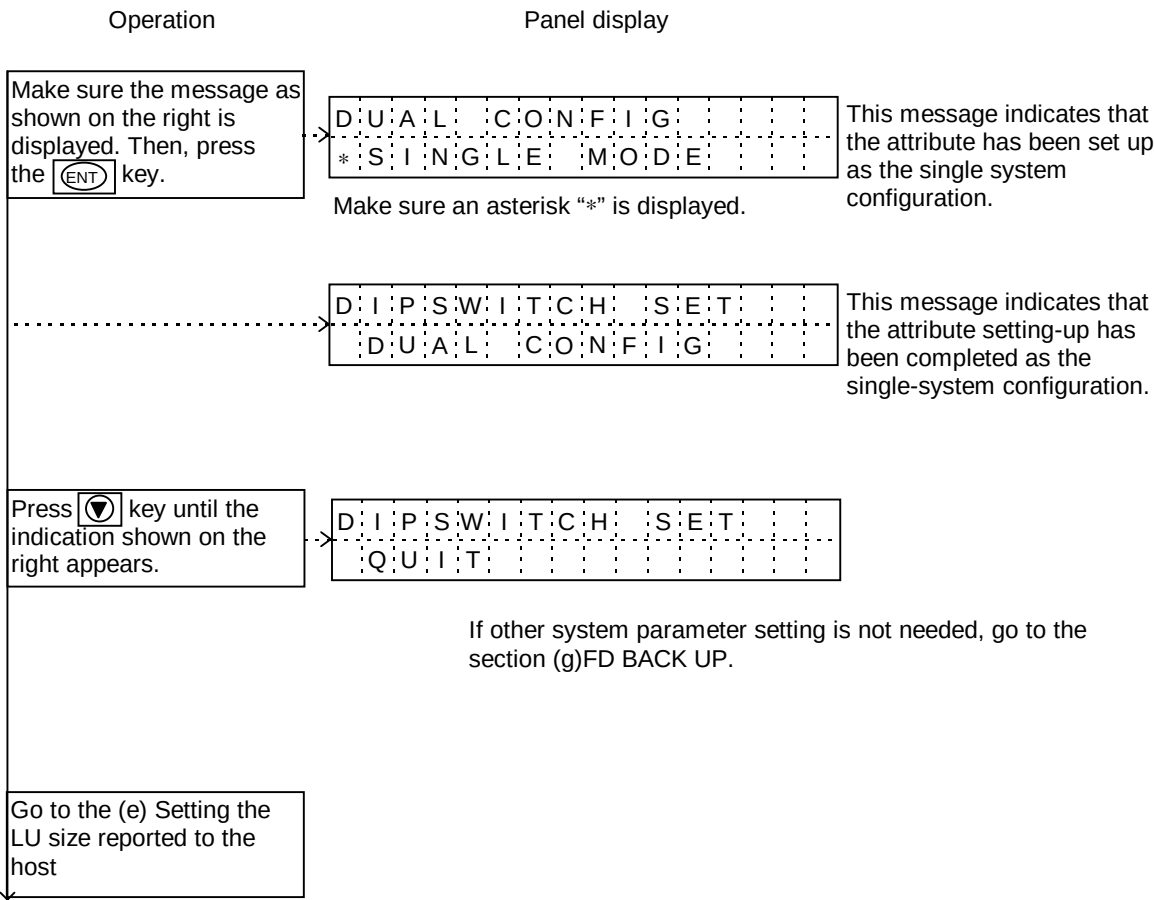
When the alternate path3 is selected, go to the single/dual system setting.



(d) Setting Single/Dual system



(d-1) Setting the single system



(d-2) Setting the dual system

There are five operating modes available as shown in Table 4.1.2.

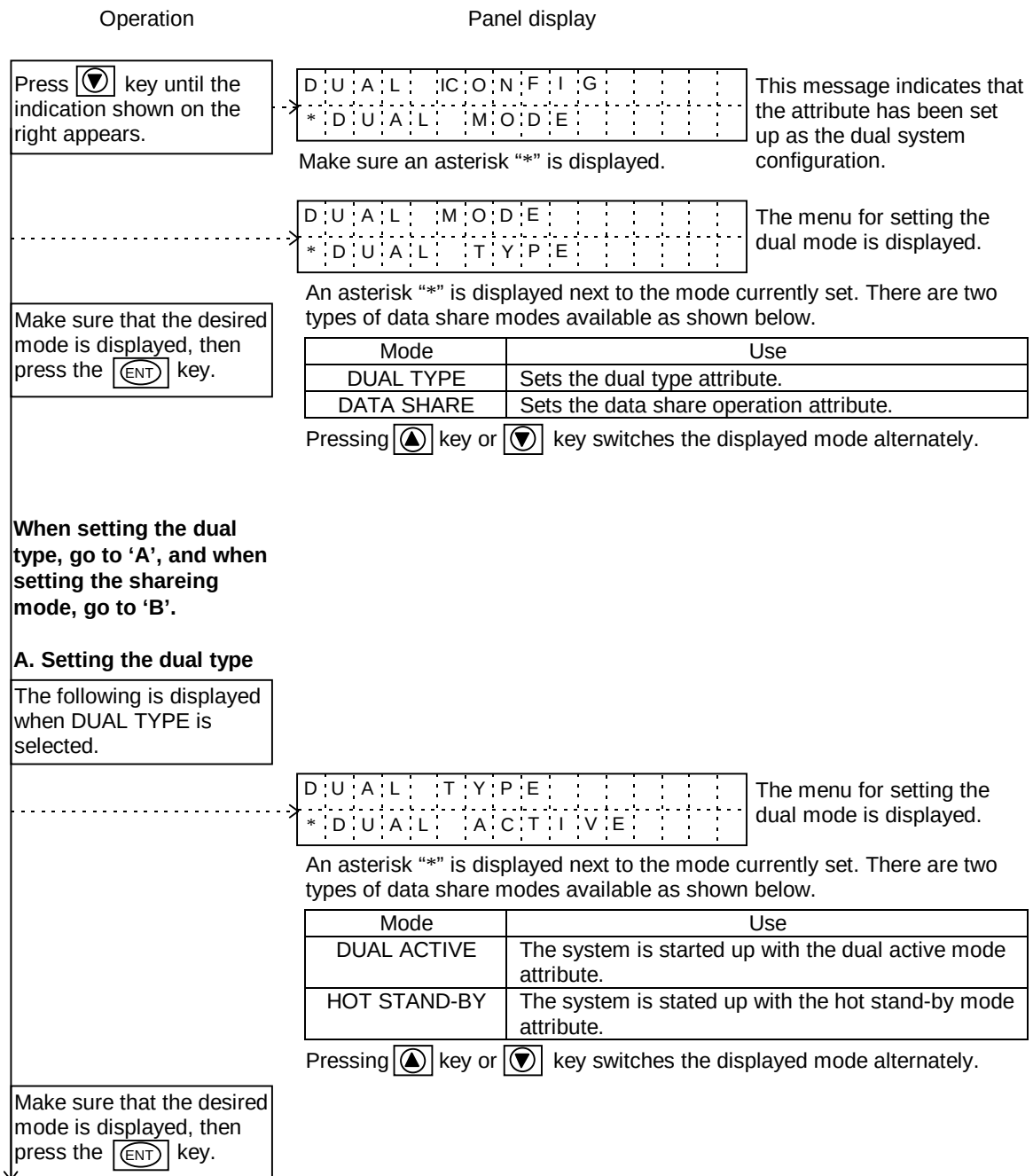
To validate each mode, panel setting shown in the Table 4.1.2 is required.

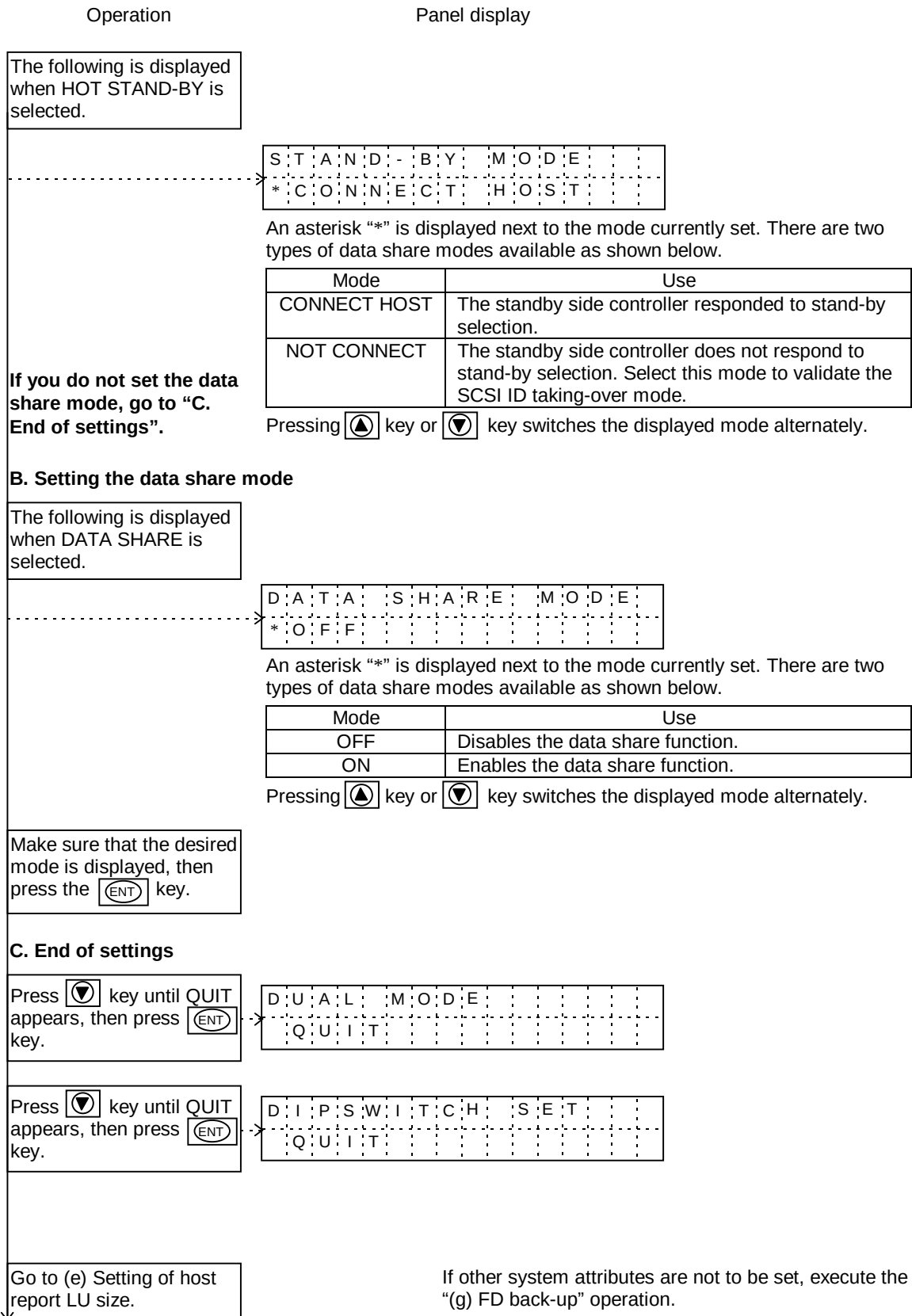
Perform the operations instructed in item (C-2) and succeeding items referring to the Table 4.1.2.

Table 4.1.2 Active mode and panel setting (Dual system configuration)

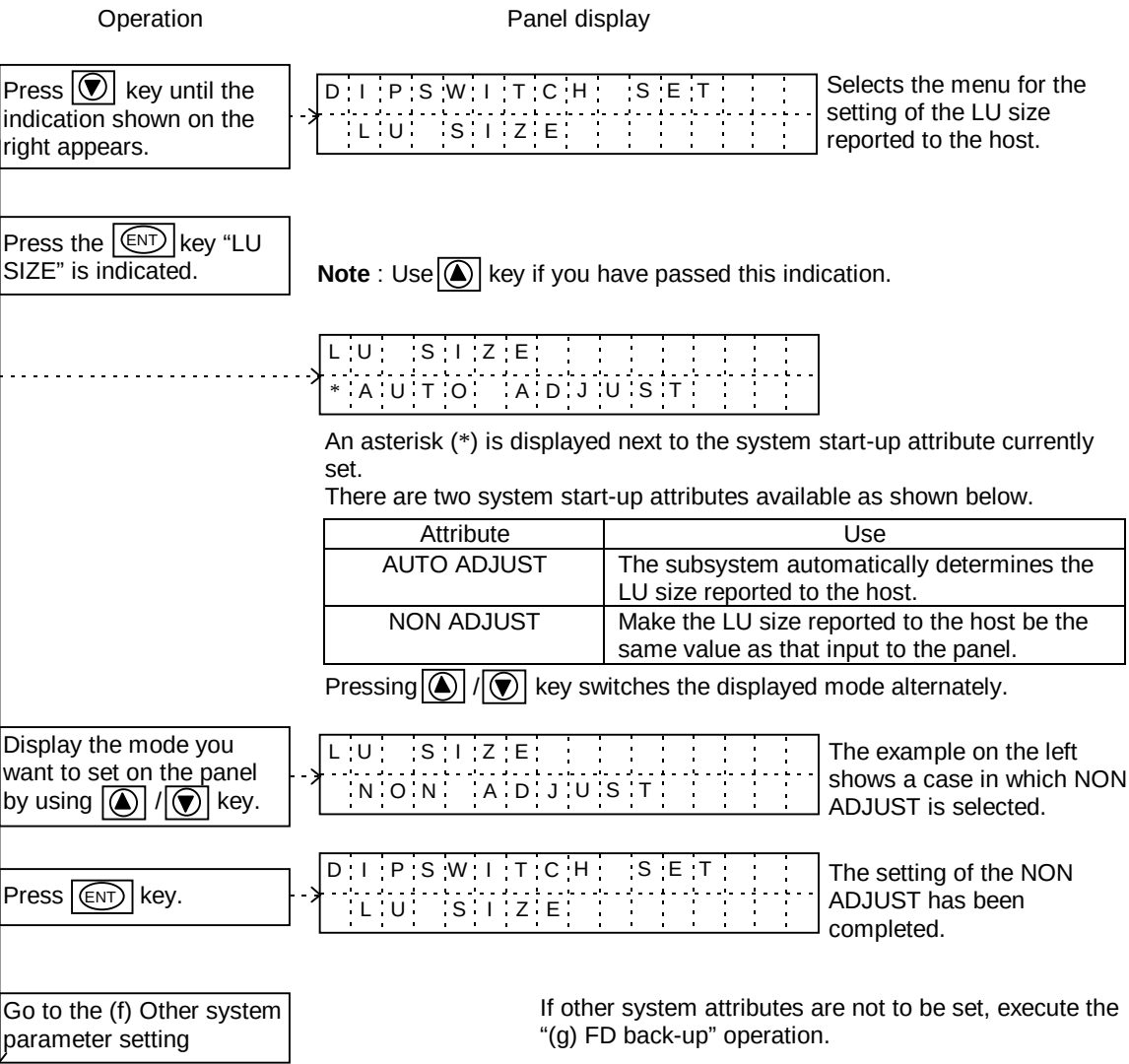
Active mode		Panel set		
		DUAL TYPE	STAND-BY MODE	DATA SHARE MODE
HOT STAND-BY	Normal	HOT STAND-BY	CONNECT HOST	OFF
	Data share *1			ON
	SCSI ID taking over		NOT CONNECT	OFF
DUAL ACTIVE	Normal	DUAL ACTIVE	Invalid	OFF
	Data share *1			ON

*1 : This function can be used in Micro_Disk_Ver.0304 or later.





(e) Setting the LU size reported to the host



(f) Other System Parameter Setting

Besides (a) Setting the IP address, (b) Setting the TARGET ID, and (c) Setting SINGLE/DUAL system, there are several setting functions as below. The setting at the factory shipment is shown on the table in the addendum to the device.

To change the setting, see "PANEL0080".

The menu items and their usage are as follows.

(The item Nos. 1, 2, 4, 5, 8, 10, 13, 20, and 22 in the following table must be set for each controller.)

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	???????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	Select	NOT CONNECT
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT (*2)	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : NT mode	Select	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	Select	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per block.	Select	512B
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inhibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) RACK MOUNT : Rackmount (RK) HIGH RACK MOUNT : Rackmount (RKH) CABINET, WRACK : Cabinet type (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	Select	Depending on the configuration from the factory
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Enter	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
17	CONTROLLER NAME (*4)	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid. CTL NAME : Controller identifier.	Select	DISABLE
18	ROW LAST LBA (*3)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET

*3 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

*4 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
21	GENERATE SYS (*5)	Specifies the loading method for the new/old microprogram.	NEW SYSTEM : Loads the new microprogram. OLD SYSTEM : Loads the old microprogram.	Select	NEW SYSTEM
22	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL TYPE : Dual system attribute DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute (*7) OFF : Not used in the Data share mode ON : Used in the Data share mode	Select	Depending on the configuration from the factory
24	LU SIZE (*6)	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
25	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
26	SYS REV	Limit the revision Nos. of installing system.	Displays the startup program revision.	—	“0304”
27	OPTION	Specifies the optional function when using it.	Enters the option code using the panel keypad.	Enter	“0000”
28	BOOT PROG V/R	Displays the startup program revision.	Displays the startup program revision.	—	
29	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
30	QUIT	Terminates the parameter input.	Enters using the panel keypad.	Enter	

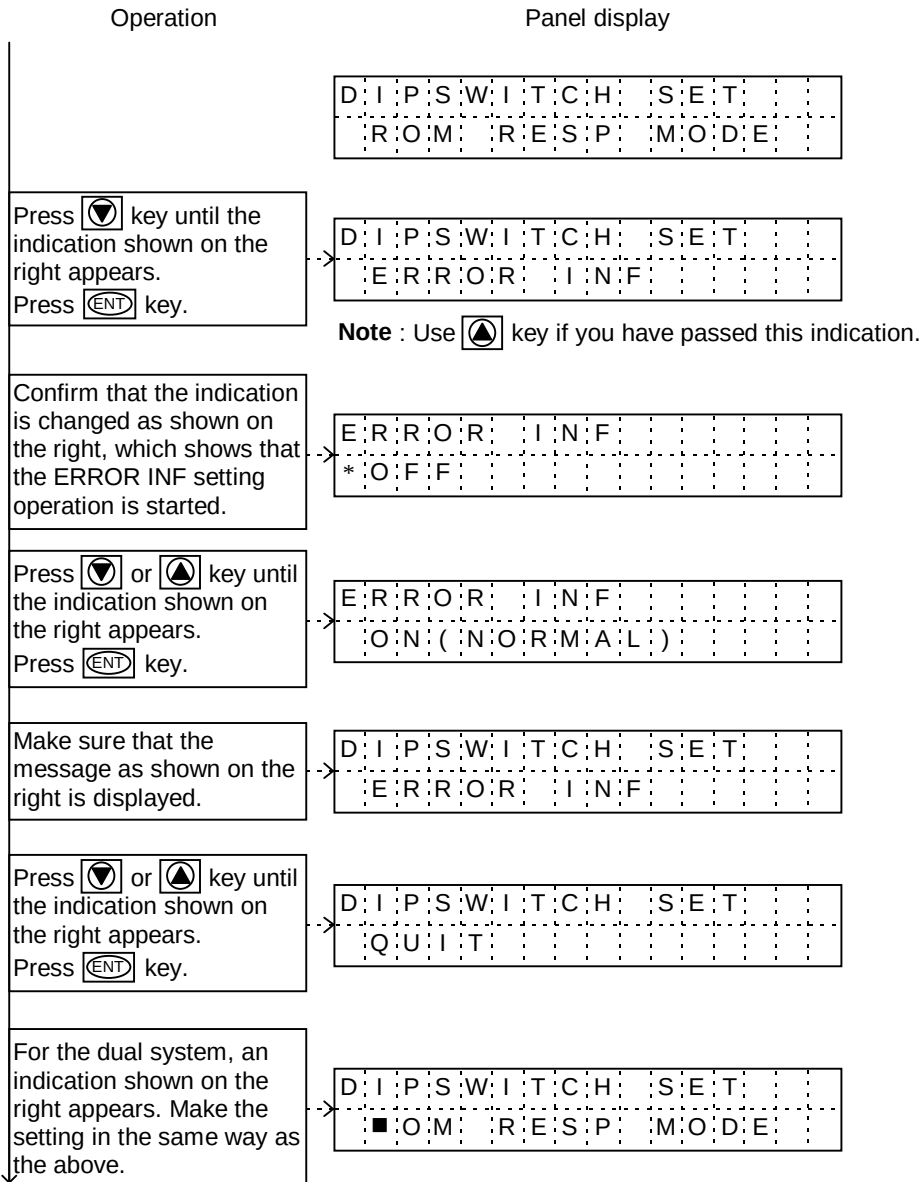
*5 This menu can be used in the Flush Program Ver.PB24 and before.

*6 This menu can be used in the Flush Program Ver.PB24 and later.

*7 This function can be used in Micro_Disk_Ver.0304 or later.

(f-1) Setting RS232C error information sending mode

In order to use the failure notification program, the setting for the “ERROR INF” of the system parameter must be changed to “ON (NORMAL)”.



(g) FD back-up.
There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) needs to be backed up to FD or restored from FD when installing optional parts or replacing parts. This case, perform back-up to FD or restore from FD according to “2.3.1 Back-up procedure to FD (MK-OPTION0050.)” or “2.3.2 Restoring procedures to FD (MK-OPTION0080.)”.
(Raid configuration setting, LU configuration setting, etc are not contained in system parameter.)

Back-up procedure to FD

- (1) Turn the power off according to MK-OPTION0120.

Notice: In case the power is not normally turned off, the user’s data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 4.1.3.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

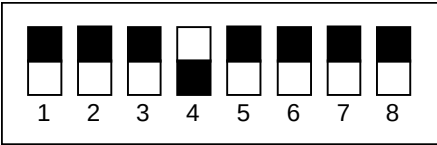
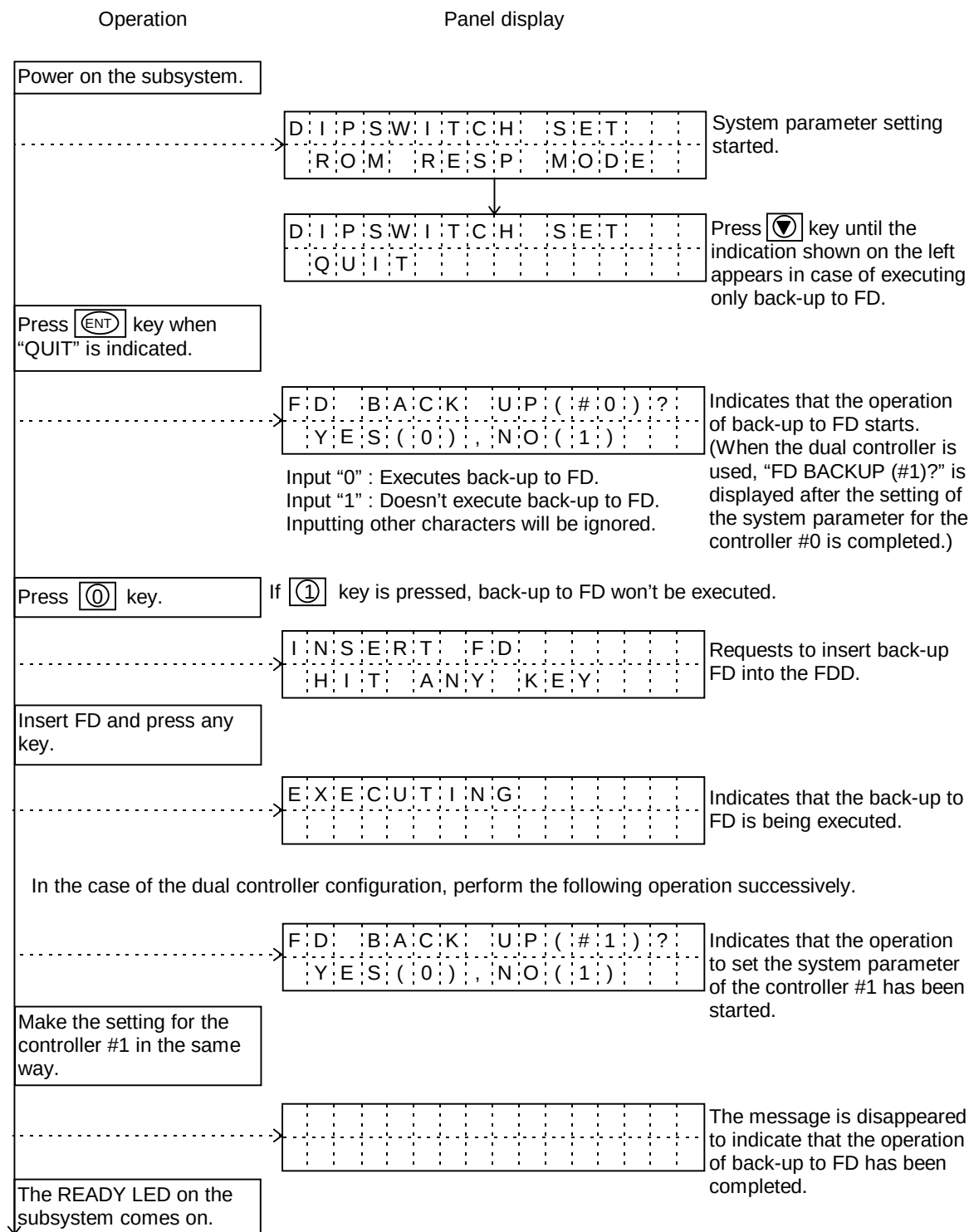


Figure 4.1.3 DIP Switches

(3) Operate panel's keys as described below.



(4) Set DIP switch No.4 as shown in Figure 4.1.4.

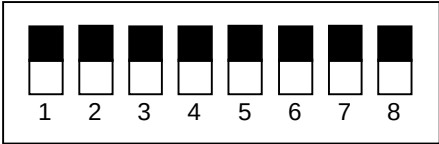
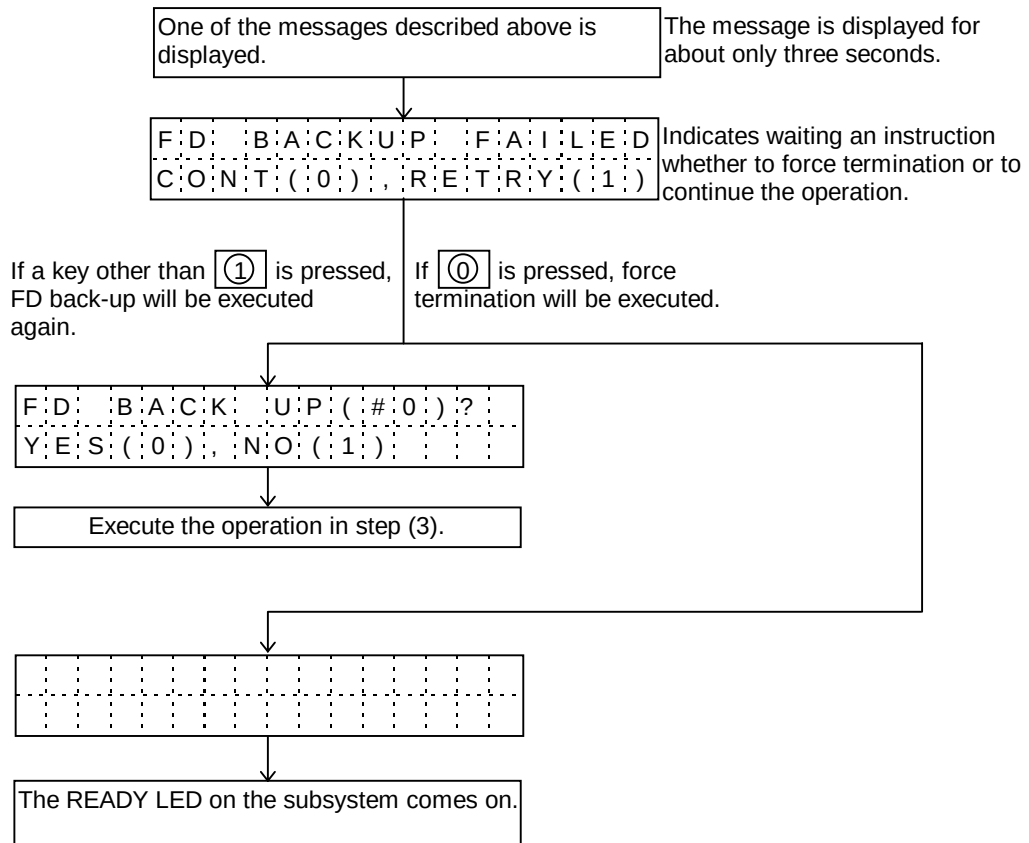


Figure 4.1.4 DIP Switches

- Note 1 :** While the back-up to FD is being executed, the following messages may be displayed.
- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
 - **FD MOTOR NOT STARTED**
Starting failure of the FD drive motor occurred. Try again.
 - **FILE WRITE ERROR**
FD which was inserted is not formatted, or is the condition of write-protected. Format or release write-protection.
Write error occurred in FD which was inserted. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So try again following the operation described below.

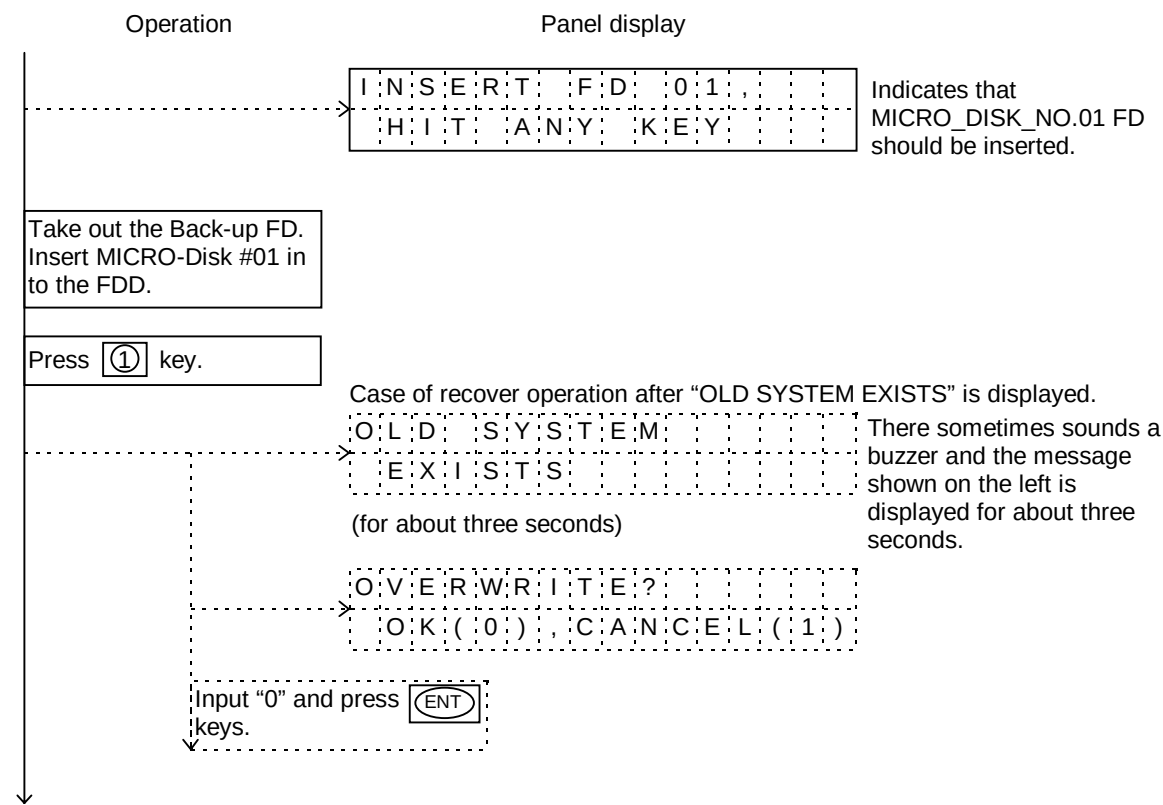
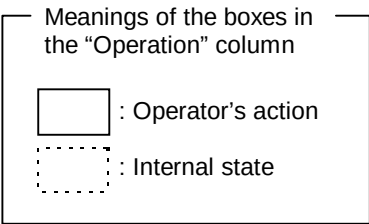


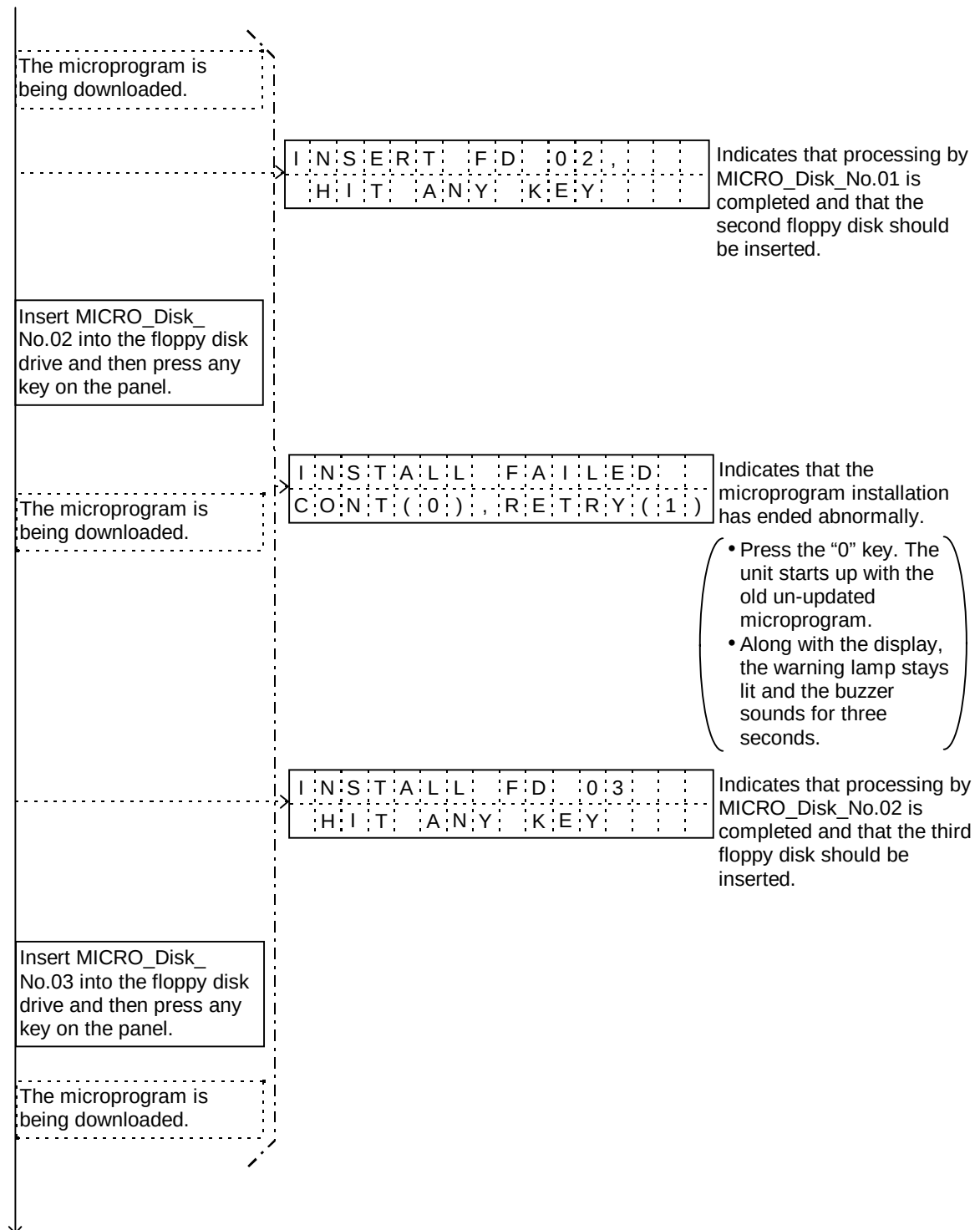
Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Note that the FD will be overwritten in back-up.

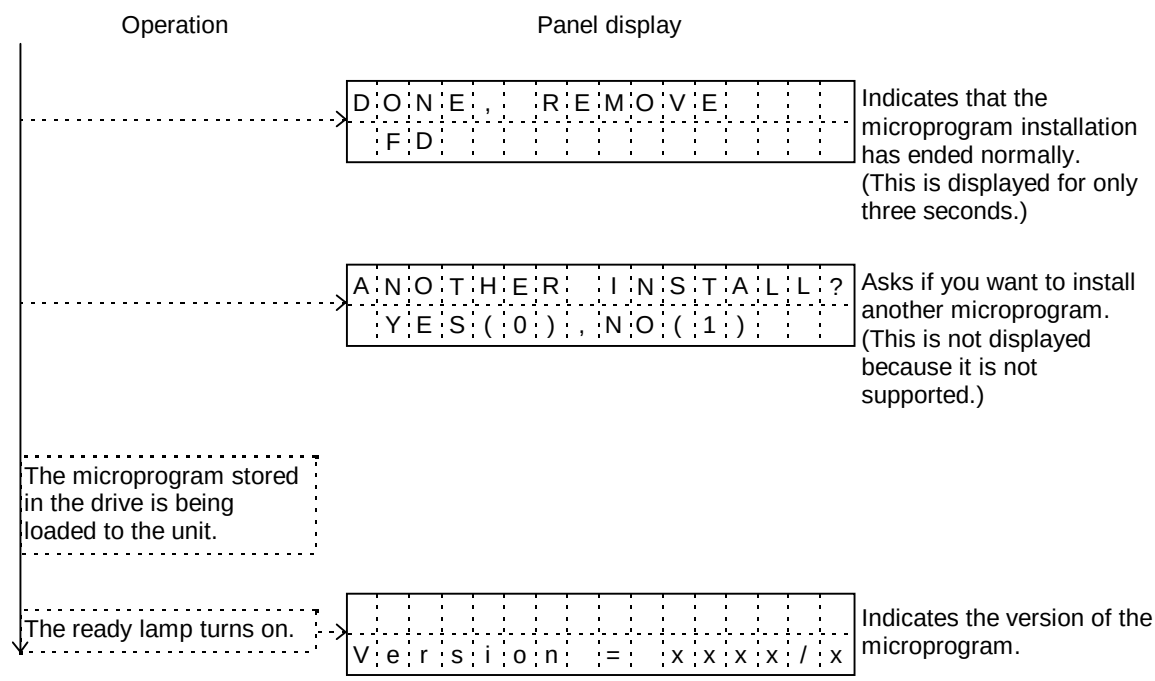
Note 3 : Even if back-up FD is left at FDD after back-up operation, no error will occur on the subsystem.

(h) Download Program
Download program is used to update the microprogram stored in the drive. Three floppy disks are used for downloading.

Note : Be sure that no drive failure is present before updating the microprogram.







(1) Set DIP switch No.1 as shown in Figure 4.1.2.

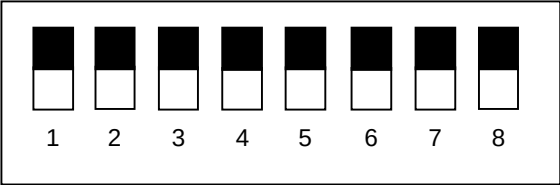


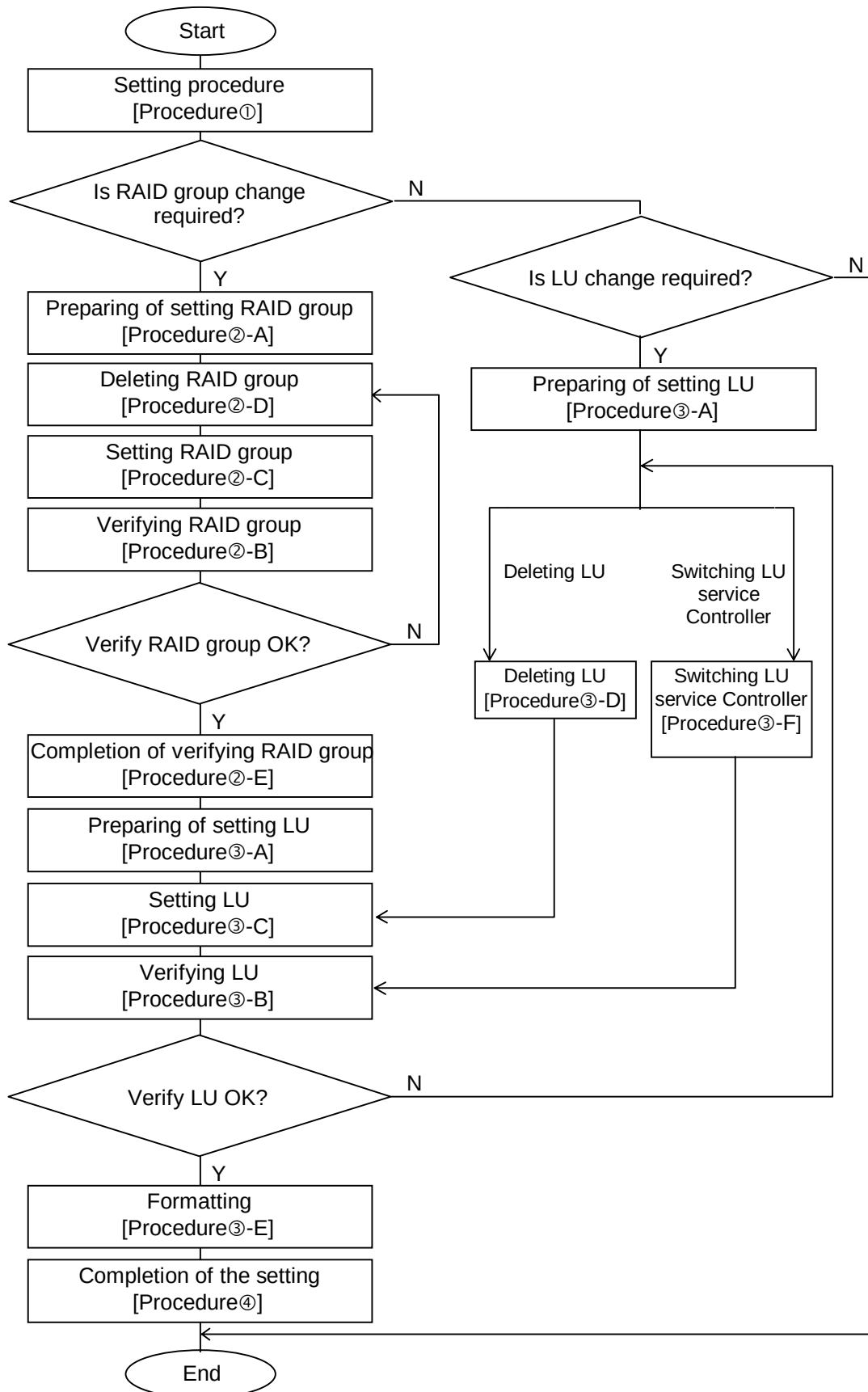
Figure 4.1.2 Standard DIP Switch Settings

Note : If the dual controller option (DF-F350-F2MCF) is installed, use the same settings for both controllers.

4.2 Setting the Subsystem Configuration Information

This function can be used when the subsystem is ready.

(During this operation, READ/WRITE command issued from the host cannot be executed. When the host command is received, Not Ready is reported to the host.)



4.2.1 Preparing of setting RAID/LU

[Procedure①]

Operation

Panel display

Make sure that the subsystem is ready.

Press  key.

S	V	P	F	U	N	C	T	I	O	N	S		
(	T	E	R	M	I	N	A	T	E	S	V	P	)

The indication shows that the RAID/LU setting operation is started.

When changing RAID group, go to procedure ②-A “Preparing of setting RAID group”.
When changing no RAID group but LU, go to procedure ③-A “Preparing of setting LU”.
When changing no RAID group and LU, go to quit.

4.2.2 Setting the RAID group

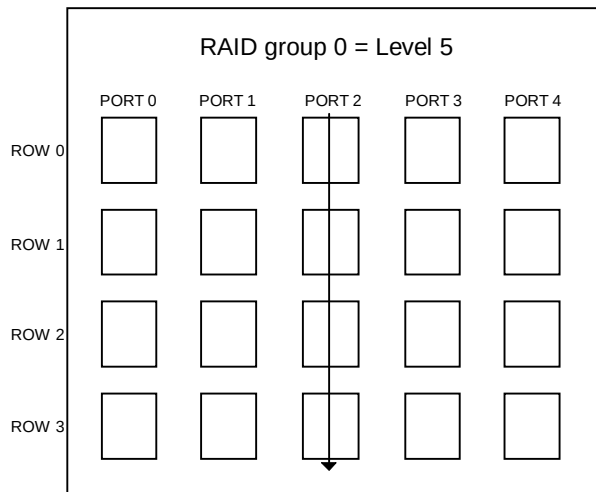
This function is used for setting, deleting and referring the RAID group. This function can be used when the subsystem is ready.

(Setting the DIP switch and turning off/on the subsystem are not required. Read/Write operation from the host can not be executed during this function. When the host command is received, Not Ready is reported to the host.)

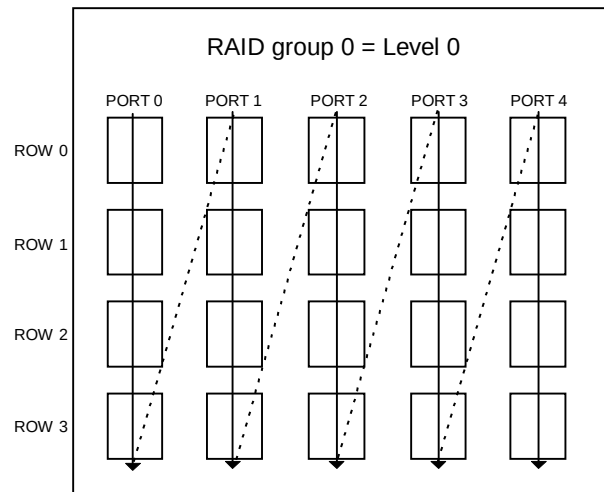
Notice : By deleting the RAID group all user data of the deleted RAID group is lost. Back up user data before deleting the RAID group.

RAID group and RAID level can be set as shown below by using this setting function.

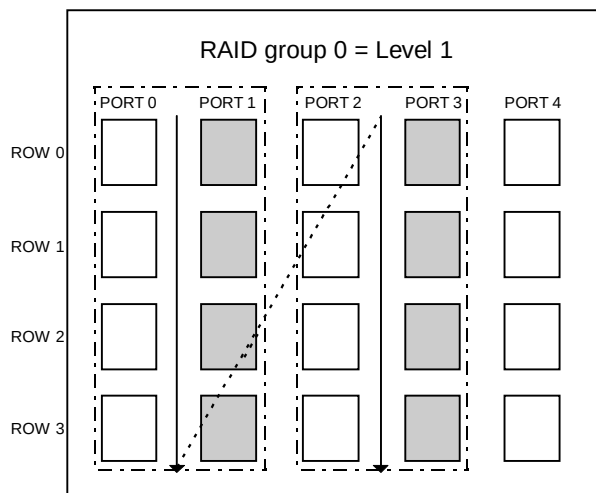
Setting one RAID group with the entire subsystem. (Arrows "↓" indicate the direction of storing data.)



The function stores data in the way executing the data striping over four disks and generating parity data on one disk.

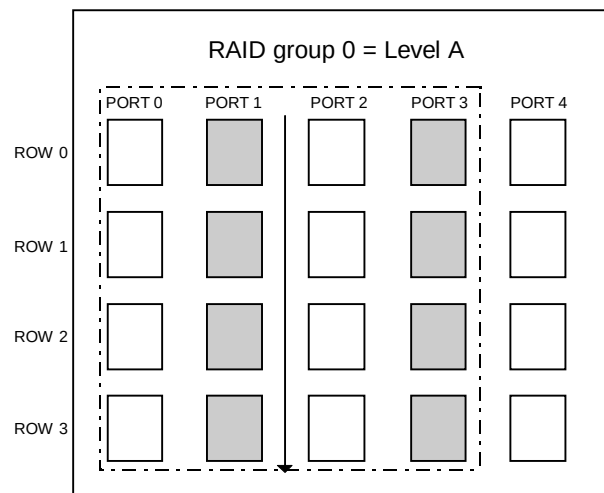


The function stores data without executing neither the data striping nor parity data generation.



The function stores data in the way doubly writing it on the main disk and sub-disk without executing the data striping.

□ : indicates a main disk
 ■ : indicates a sub-disk



The function stores data in the way doubly writing it on the main disk and sub-disk and executing the data striping over two disks of port 0 and port 2.

□ : indicates a main disk
 ■ : indicates a sub-disk

Setting one RAID group with each row of disks (Arrows “↓” indicates the direction of storing data.)

Data cannot be stored extending over two or more RAID groups even if RAID levels of them are the same. The following are examples having set RAID groups of the same RAID level, however, each row has its own RAID level.



Setting the number of data disks when setting RAID level 5

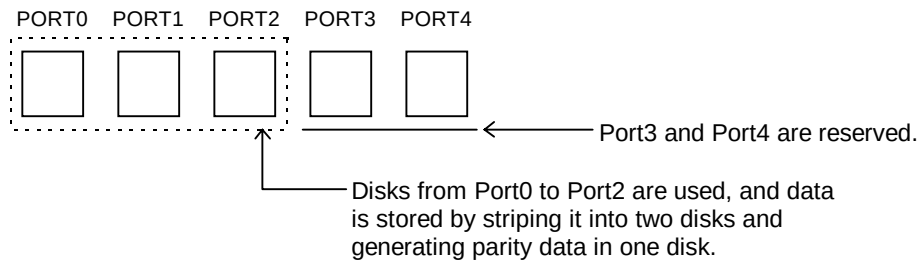
When Micro_Disk Ver.0305** (** is optional) or later is used, number of data disks can be selected from 2, 3 and 4 in the definition of RAID5.

(4 for the number of data disks and 1 for the number of parity disks are automatically set when 5 is set for RAID level in the case Micro_Disk Ver.0304** (** is optional) or earlier is used.)

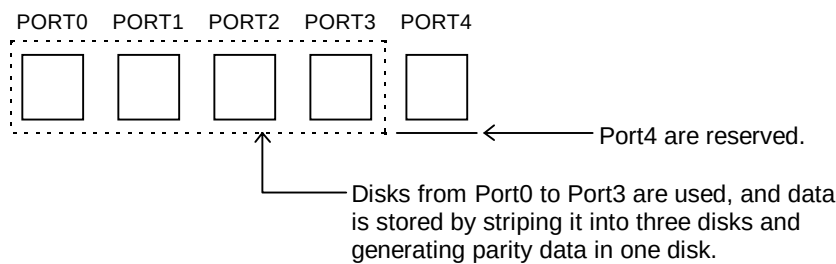
For the of setting procedure, see pages PANEL0380 or MK-INST0534.

The direction of data storage is the same as the conventional case in which the RAID level is 5. Setting is also same as before; the entire subsystem or each row can be set to one group. The following explains the overview of data storage using the example of setting each row to one group.

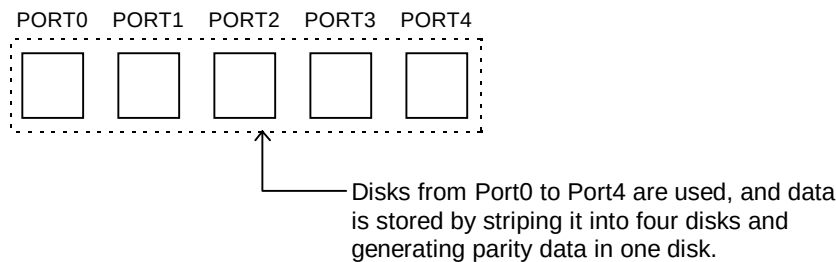
- (1) For the configuration of 2 data disks + 1 parity disk



- (2) For the configuration of 3 data disks + 1 parity disk

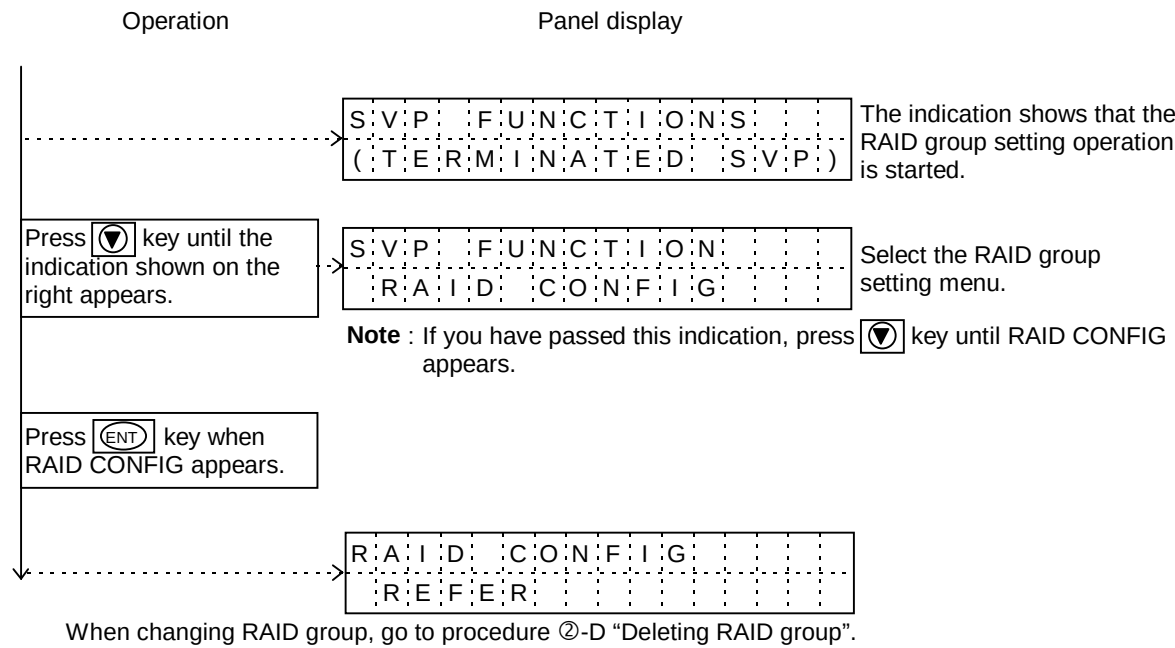


- (3) For the configuration of 4 data disks + 1 parity disk (same configuration as when RAID5 is defined using Micro_Disk Ver.0304** or earlier)

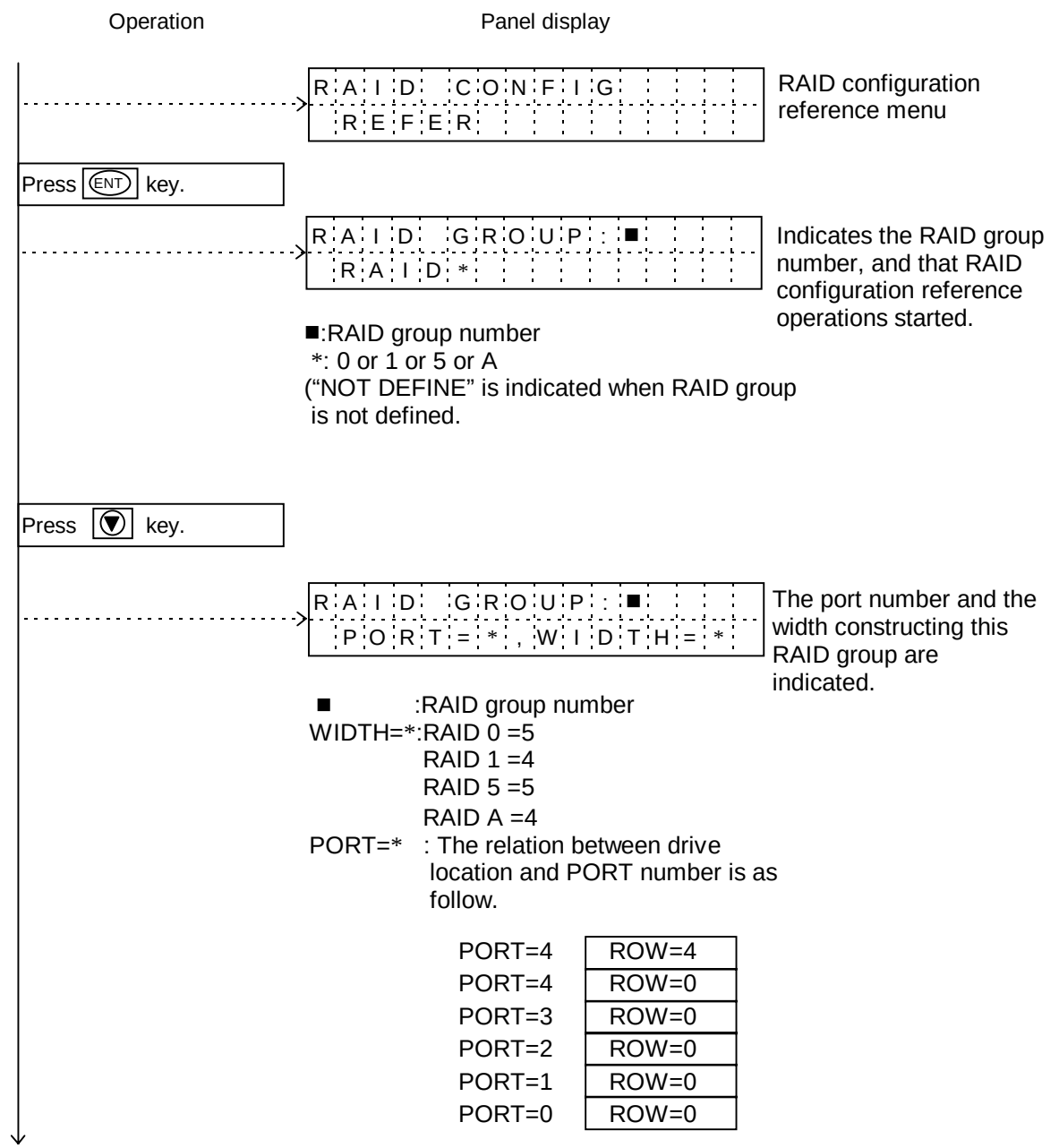


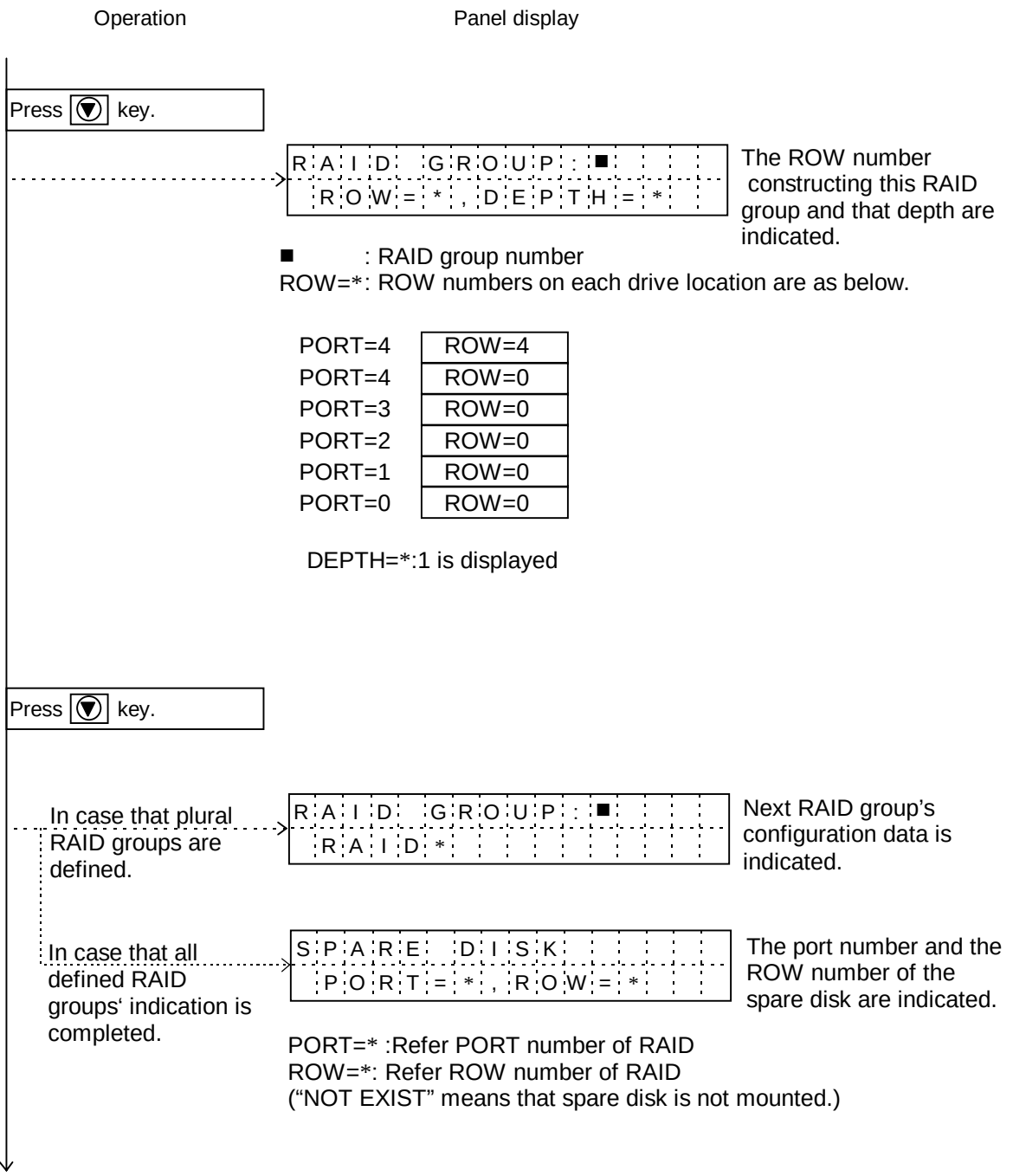
Notice : When changing the data disk configuration, be sure to start from re-definition of the RAID group. Accordingly, the stored data will be lost. So be sure to create a back up copy of the data when the configuration is changed.

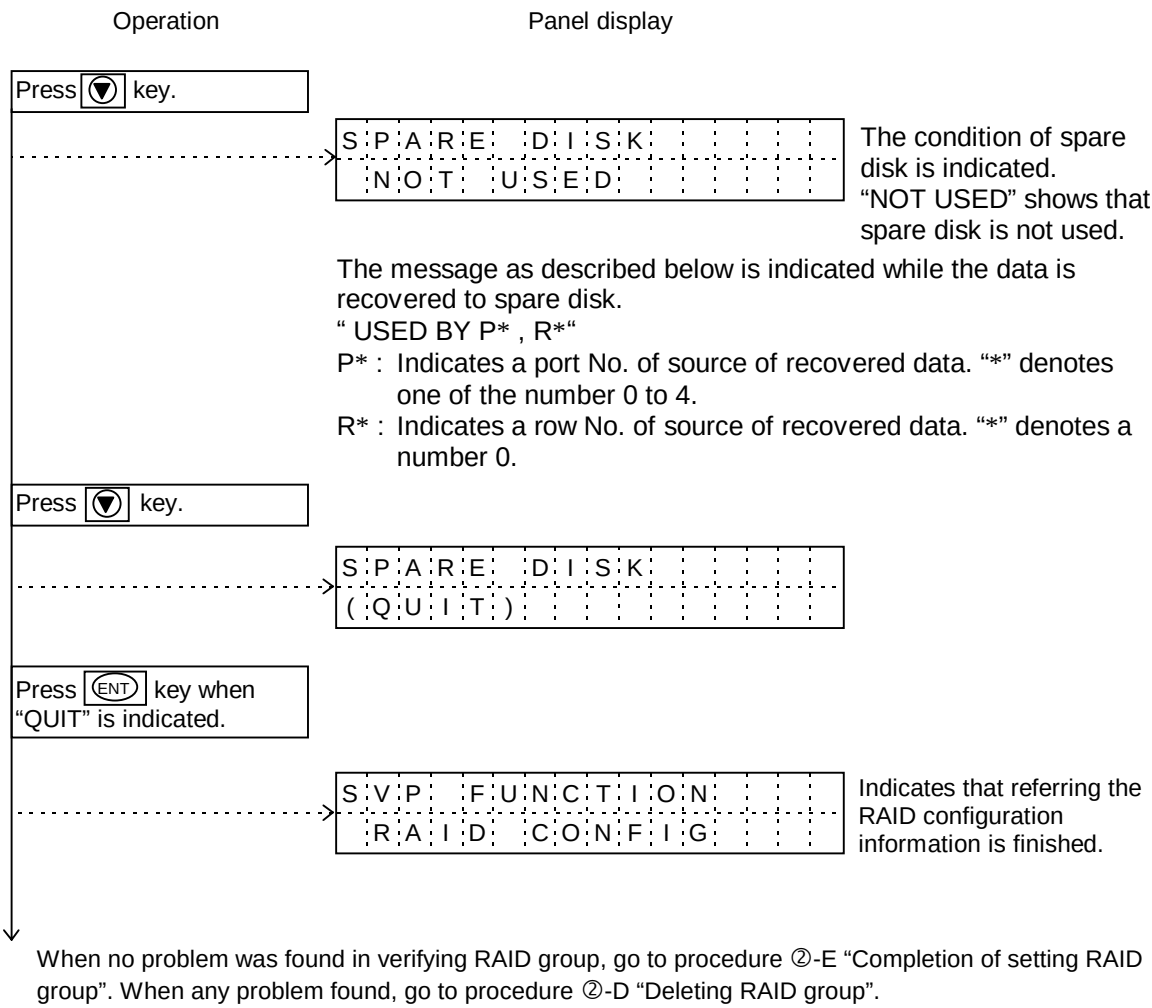
[Procedure②-A] Preparing of setting RAID group



[Procedure②-B] Verifying RAID group





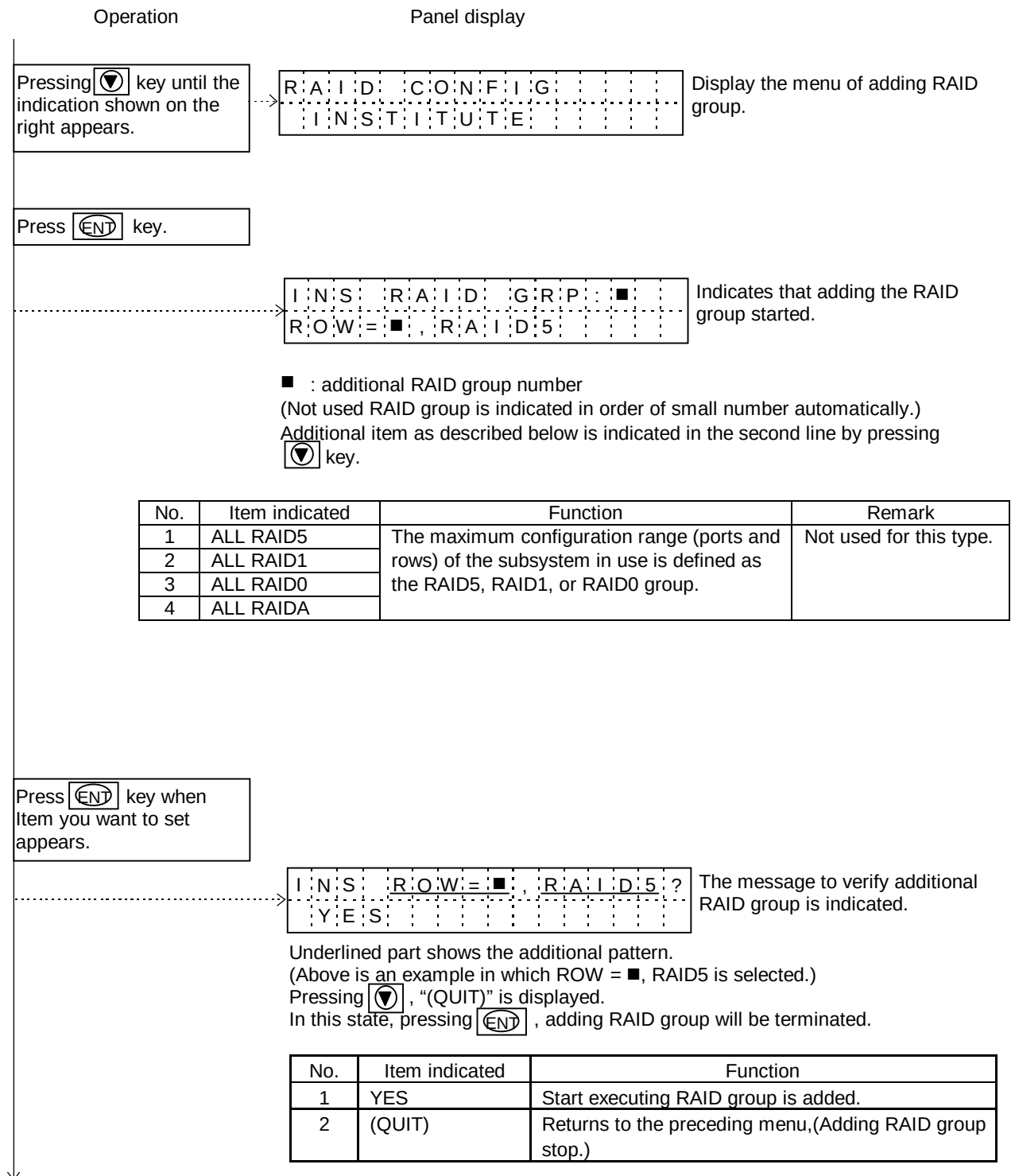


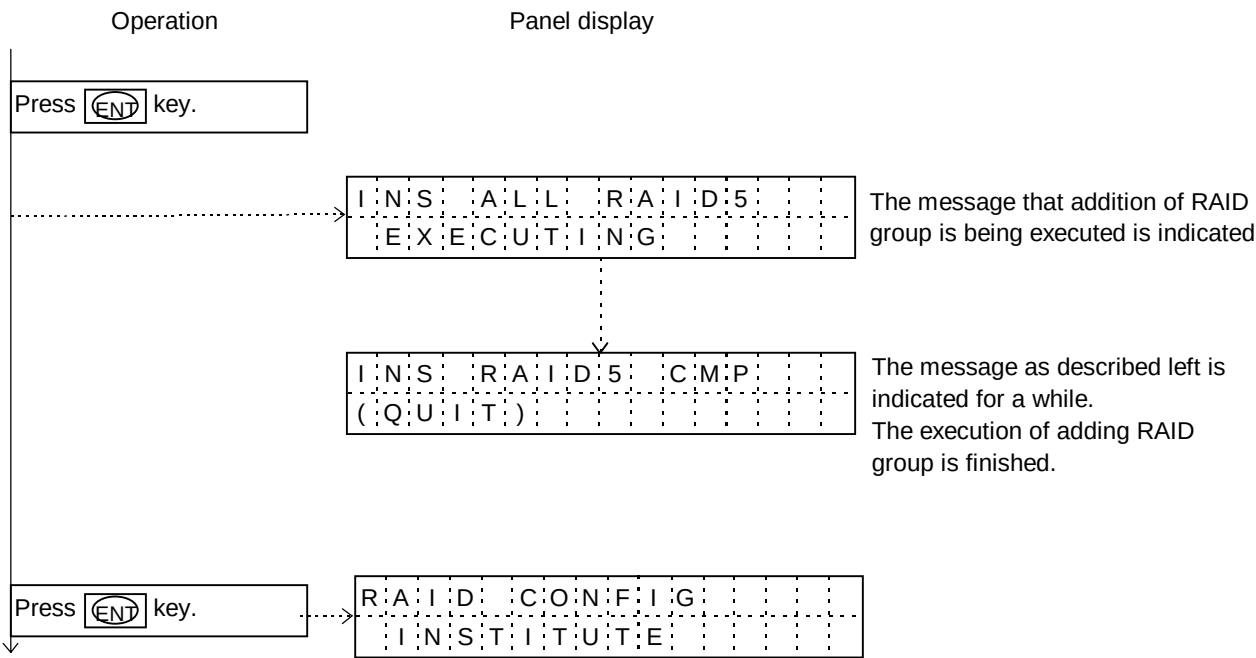
Operation for defining the RAID5 differs depending on whether the version of Micro_Disk is 0304** (** is optional) or earlier, or 0305** (** is optional) or later.

Confirm the version of Micro_Disk and operate in the way corresponds to it. (In the case of RAID0, RAID1 and RAIDA the operation is the same irrespective of the version of Micro_Disk.)

[Procedure②-C] Setting RAID group

(1) RAID group setting when the version is 0304** (**is optional) or earlier

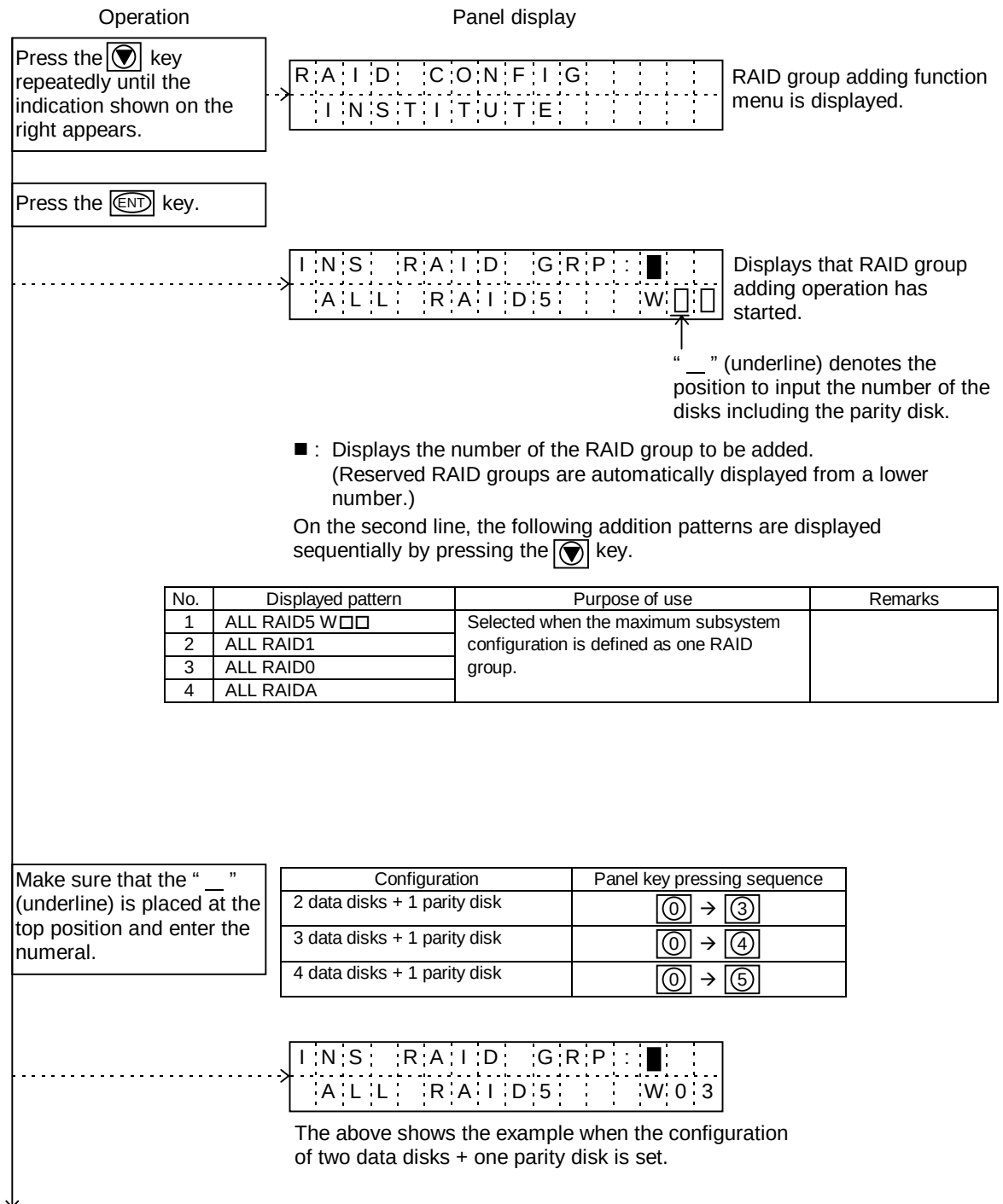


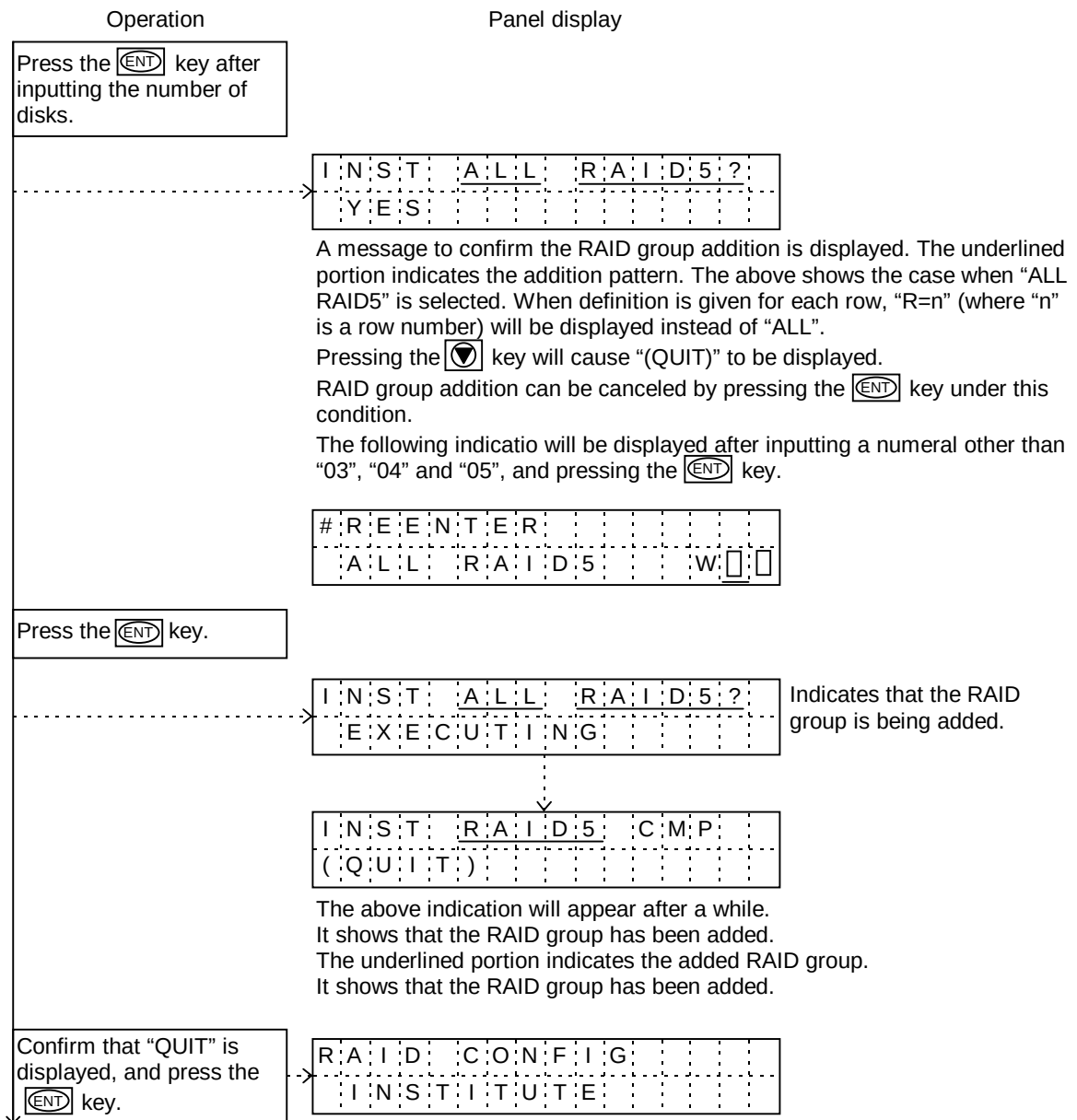


Go to procedure ②-B “Verifying RAID group”
Note : Set RAID group for each ROW when you want to set it for each ROW.

(2) RAID group setting when the version is 0305** (** is optional) or later

When Micro_Disk Ver.0305** (** is optional) or later is used, the number of disks including the parity disk must be input when defining RAID5. (This is not necessary for RAID0, 1 and A.)



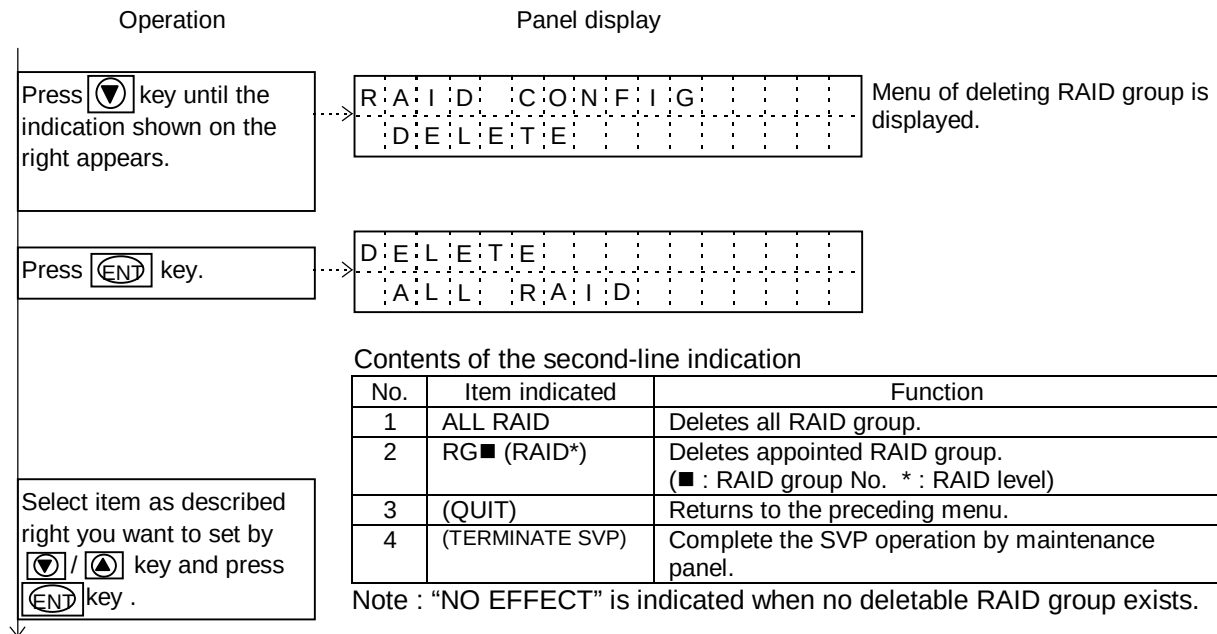


Go to procedure ②-B "Verifying RAID group"

Note : Set RAID group for each ROW when you want to set it for each ROW.

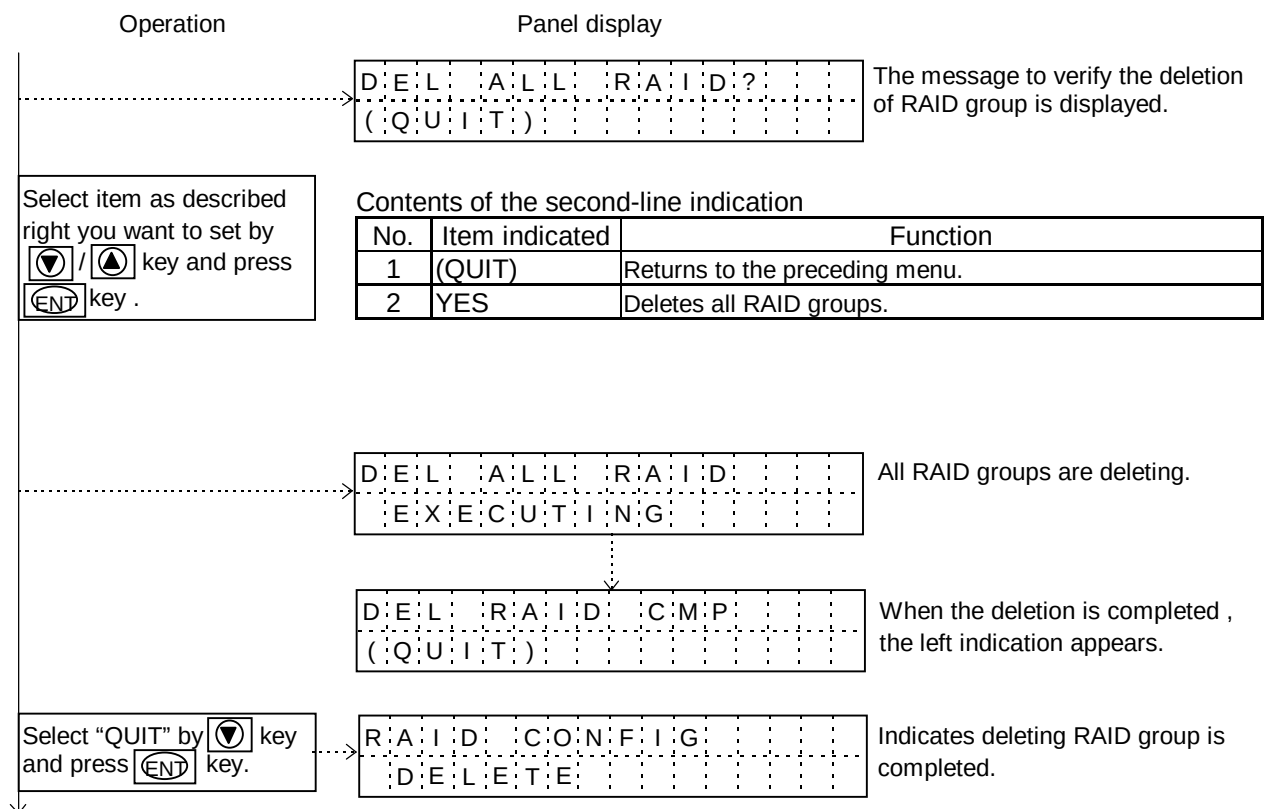
[Procedure②-D] Deleting RAID group

Notice : With this operation, Logical Units are deleted, and the user's data will be lost. Be sure to make back up copy before this operation.



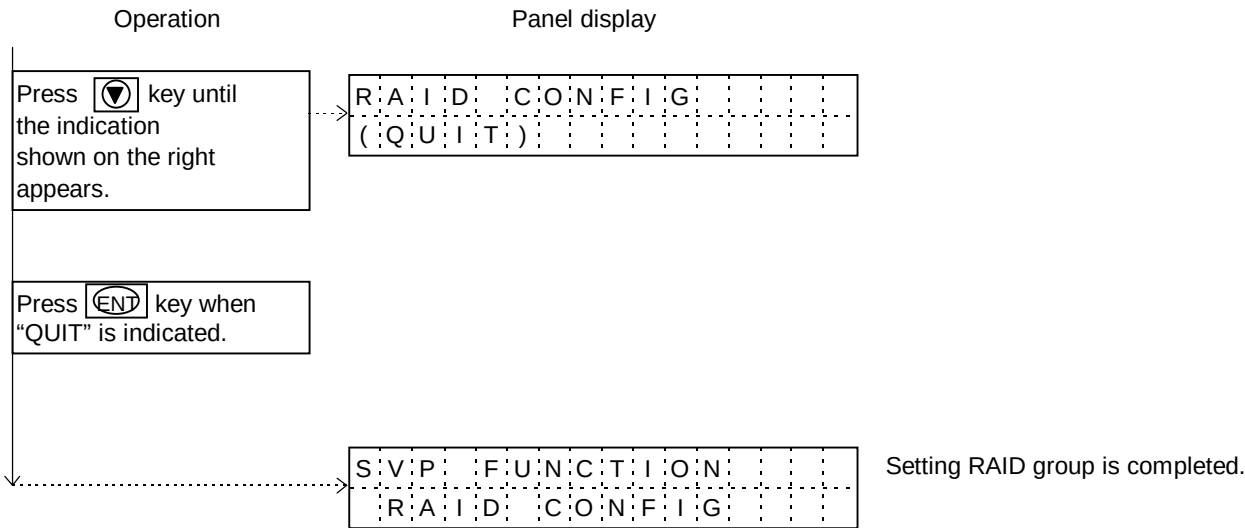
Go to ① when you want to delete all RAID groups , Go to ② when you want to delete appointed RAID group.

①Deleting all RAID groups



Go to procedure ②-C "Setting RAID group".

[Procedure②-E] Completion of setting RAID group

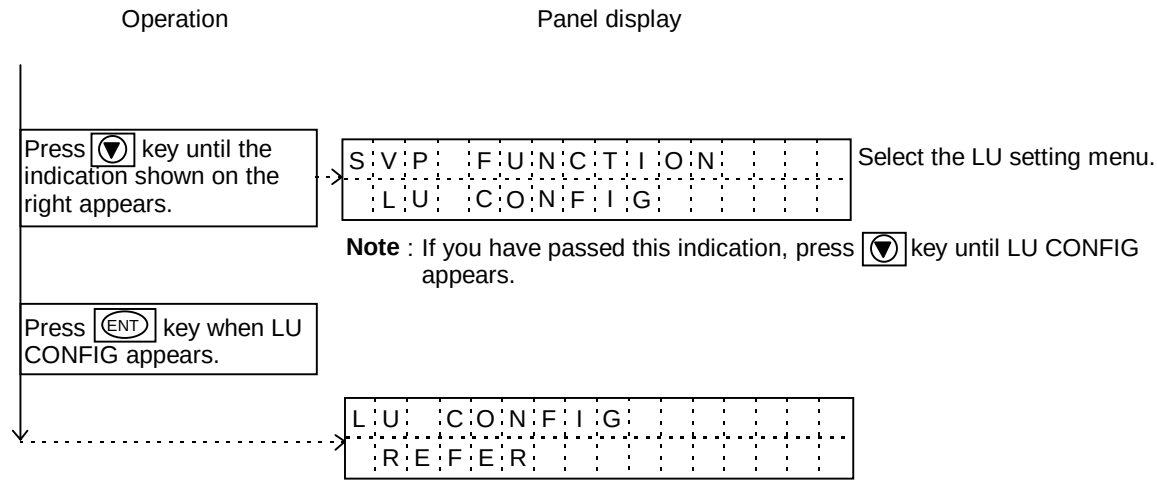


4.2.3 Setting LU

Following procedures are used to set, delete, refer, or format the LU.
This function can be used when the subsystem is ready.

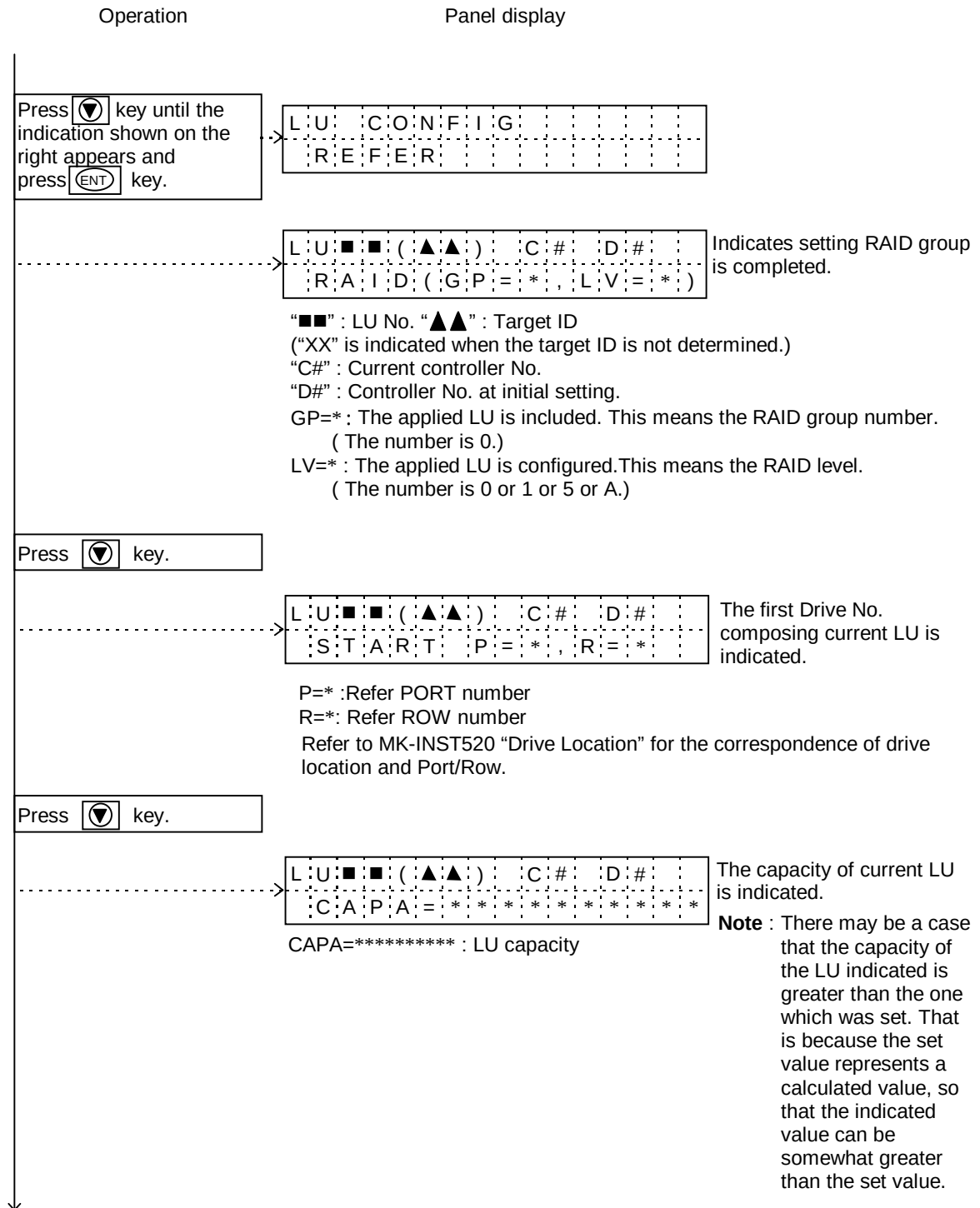
Notice : All user data is lost by deleting the LU.
Be sure to back-up the user data before deleting the LU.

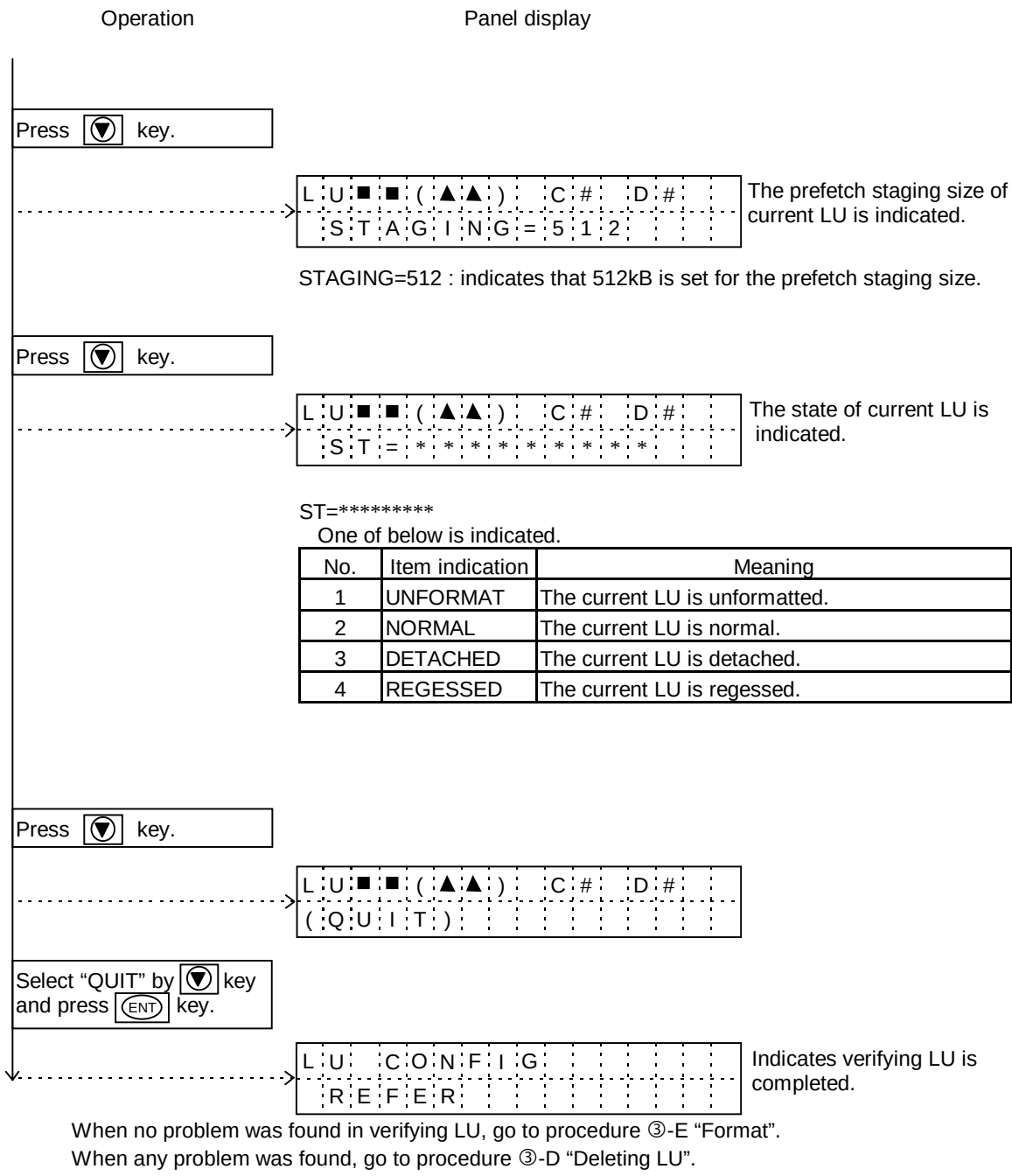
[Procedure③-A] Preparing of setting LU



When RAID group is already set, go to procedure ③-C “Setting LU”.
When changing no RAID group, go to procedure ③-D “Deleting LU”.

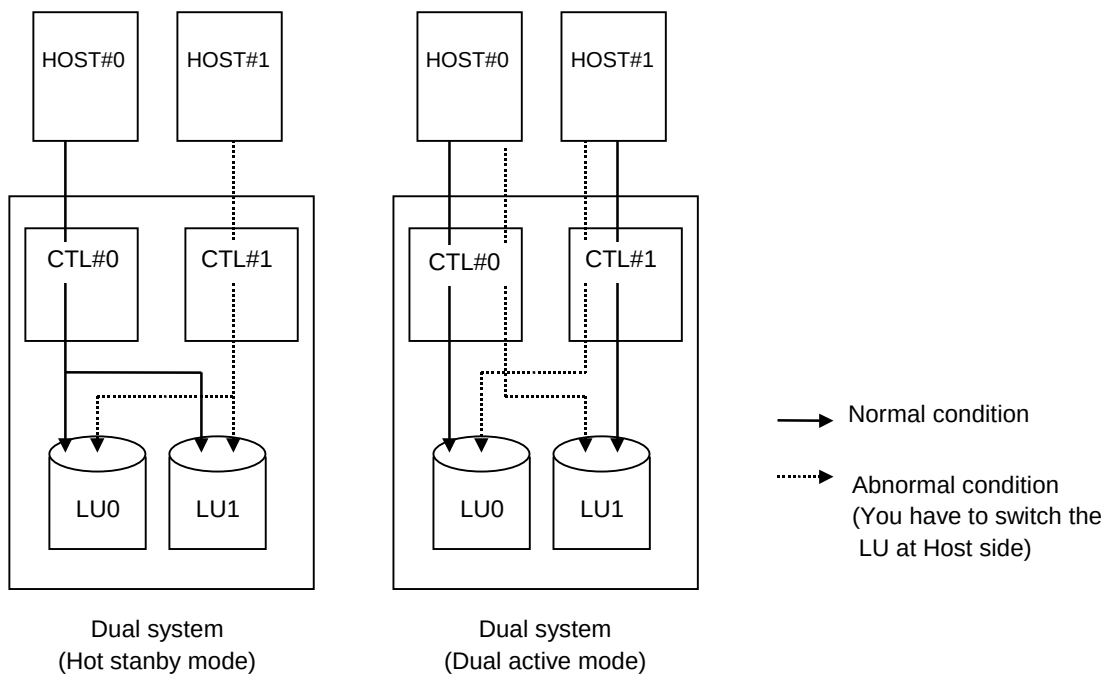
[Procedure③-B] Verifying LU





[Procedure③-C] Setting LU

Note) You have to assign service controller to set the LU when dual active mode is selected in the dual system.
Refer to the figure as described below to set the LU assigned service controller.



* The function of “Hot standby mode”.

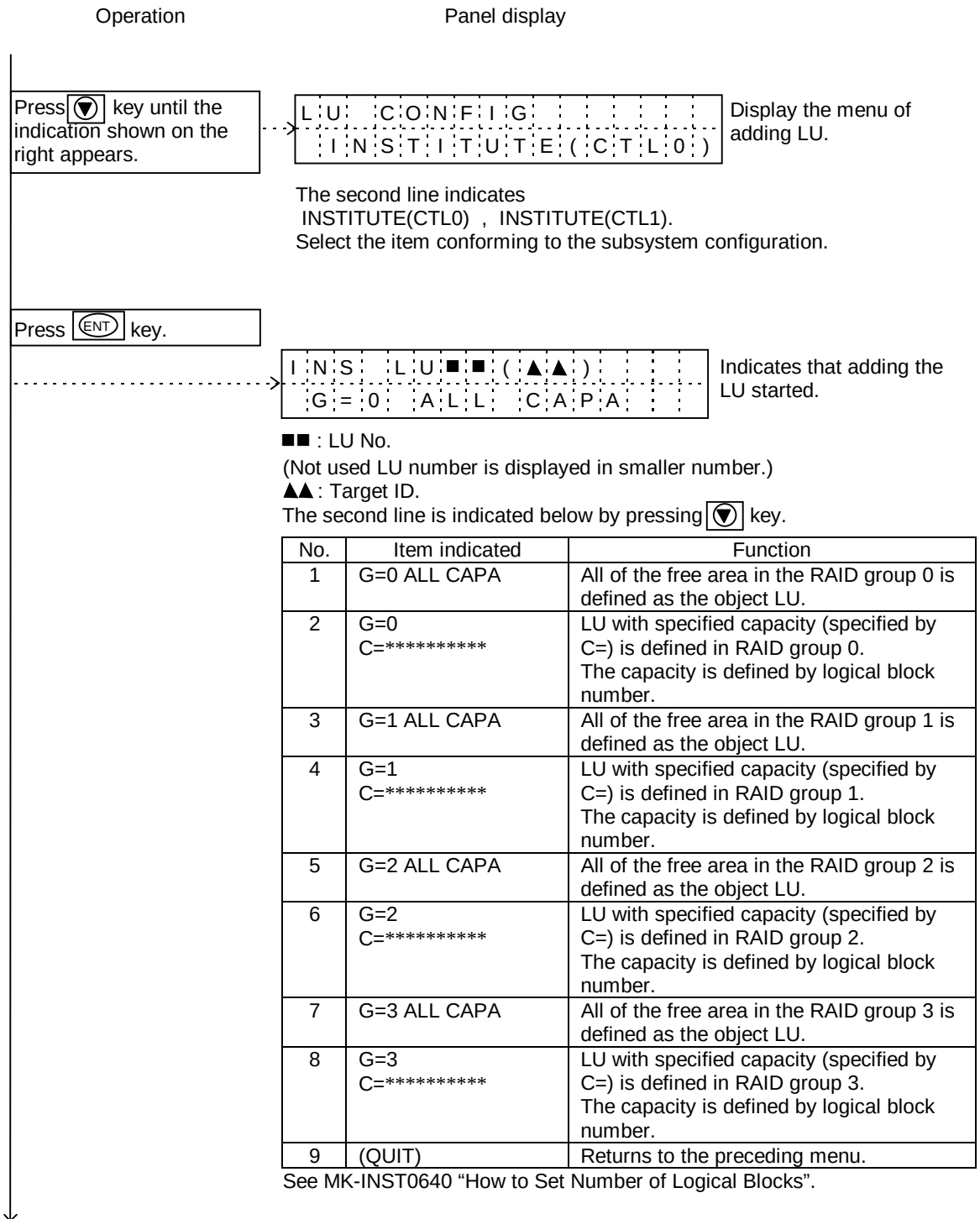
It is possible that the system is continued to execute commands by switching the direction of the commands from Host system to the other controller , if the Host system or the controller failure occurs.

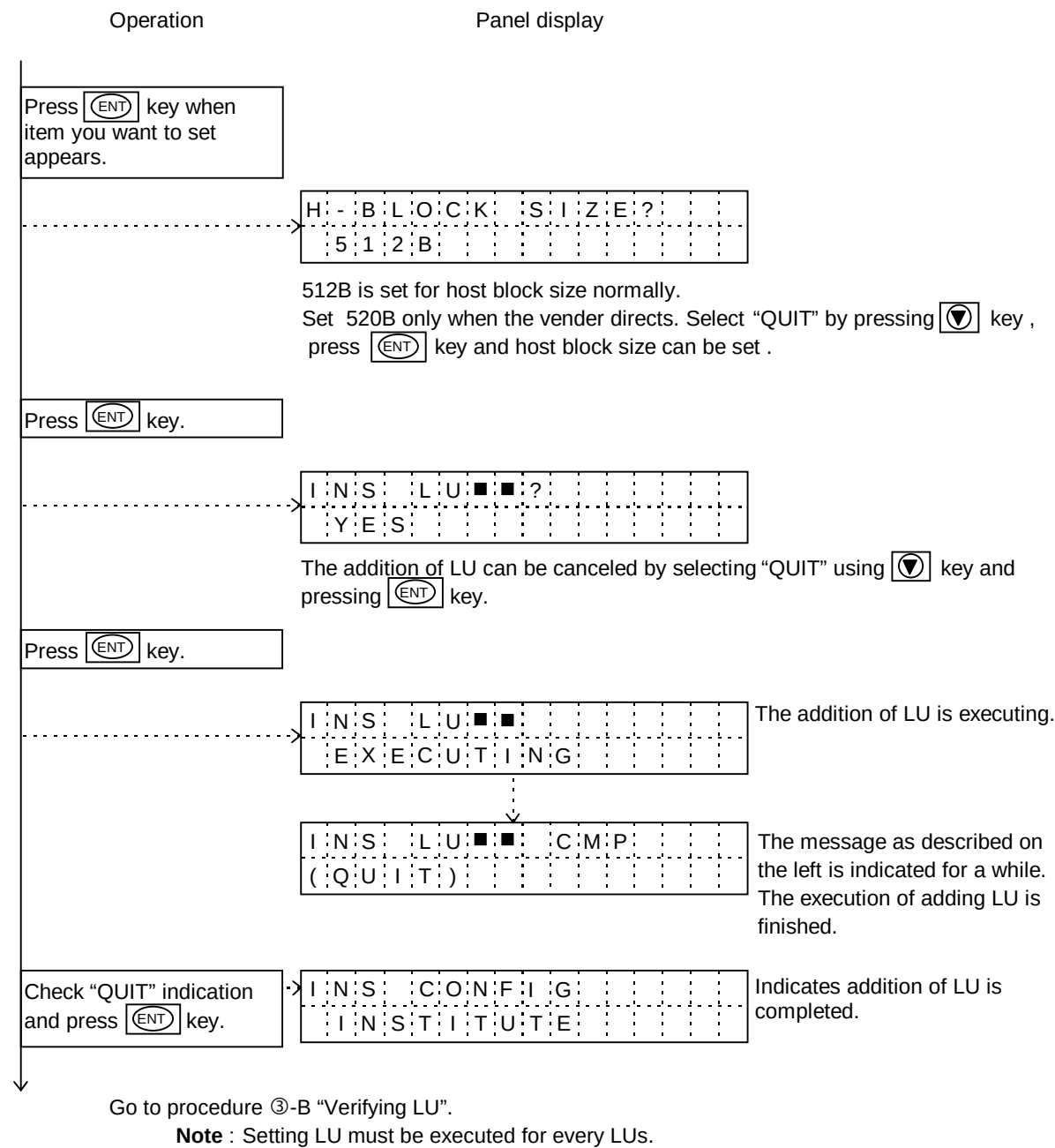
* The function of “Dual active mode”

Controller #0 and #1 are the service controller of LU#0 and #1 respectively.

In the case of example as described above, select “INSTITUTE (CTL0)” when you set LU0 and “INSTITUTE (CTL1)” when set LU1.

In case a service controller is assigned to LU#0 and #1, it is possible to access from HOST#0 and #1, however the data transmitting performance is lowered because of switching LU.





Supplement / How to Set Number of Logical Blocks

G=*

C=*****



Enter a value (number of logical blocks) here.

- (1) All RAID groups can be divided into up to 8 logical units.
- (2) Set the number of logical blocks to be set for each logical unit to multiples of the following values according to the RAID level.

RAID0	128
RAID1	128
RAIDA	256
RAID5(4D+1P)	512
RAID5(3D+1P)	384
RAID5(2D+1P)	256

- (3) When dividing each RAID group into multiple logical units, the total number of blocks in each logical units must be set to the number of logical blocks per row as shown below or less.
- (4) The following lists the number of logical blocks per row.

① When five drives are mounted on a row;

(4disks in the case of RAID1, RAIDA and RAID5 (3D+1P); 3disks in the case of RAID5 (2D+1P))

RAID configuration \ Model (Capacity)	DF-F350-A2E2 (2.0GB)	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4 (4.1GB)	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A (8.7GB)	DF-F350-A1E18 (17.8GB)
RAID0	20,200,960	40,652,160	85,085,440	174,681,600
RAID1/RAIDA	8,080,384	16,260,864	34,034,176	69,872,640
RAID5(4D+1P)	16,160,768	32,521,728	68,068,352	139,745,280
RAID5(3D+1P)	12,120,576	24,391,296	51,051,264	104,808,960
RAID5(2D+1P)	8,080,384	16,260,864	34,034,176	69,872,640

②When n drives are mounted on a row (n < 5);

- RAID0

Number of logical blocks = $m^{(*)1} \times n^{(*)2}$

- RAID1

Number of logical blocks = $m^{(*)1} \times \text{int}(n/2)^{(*)3}$

*1: Refer to the table below for m.

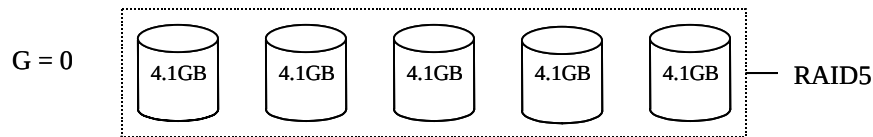
*2: n is 2 or larger in this case.

*3: int means "rounding down".

	DF-F350-A2E2	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	DF-F350-A1E18
Capacity	(2.0GB)	(4.1GB)	(8.7GB)	(17.8GB)
m	4,040,192	8,130,432	17,017,088	34,936,320

(5) Examples of the number of logical blocks set are shown below.

Example ① An example of a logical unit of disks (4.1GB 5units) is divided into 8 LUs.



An example is shown where all G=0 is RAID5 and the LU is divided into 8 LUs of similar capacity. So each group is divided into 2 LUs.

- Group 0

According to (4) ① the logical block number of RAID5 is 32,521,728 ($512 \times 63,519$). An example is shown where LU of G=0 is divided into 2.

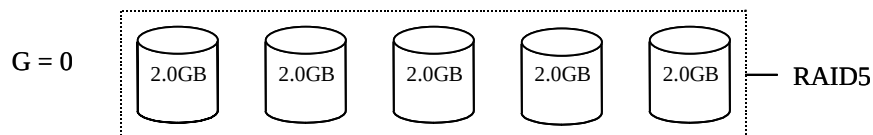
Thus, enter the following.

LU0: G=0

C=16,261,120 ($512 \times 31,760$)

LU1: C=16,260,608 ($512 \times (63,519 - 31,760)$)

Example ② An example of a logical unit of disks (2.0GB 5units) is divided into 8 LUs.



An example is shown where all G=0 is RAID5 and the LU is divided into 8 LUs of similar capacity. So each group is divided into 3 LUs.

- Group 0

According to (4) ① the logical block number of RAID5 is 16,160,768 ($512 \times 31,564$). An example is shown where LU of G=0 is divided into 3.

Thus, enter the following.

LU0: G=0

C=800,768 ($512 \times 1,564$)

LU1: C=5,120,000 ($512 \times 10,000$)

LU2: C=10,240,000 ($512 \times (31,564 - 1,564 - 10,000)$)

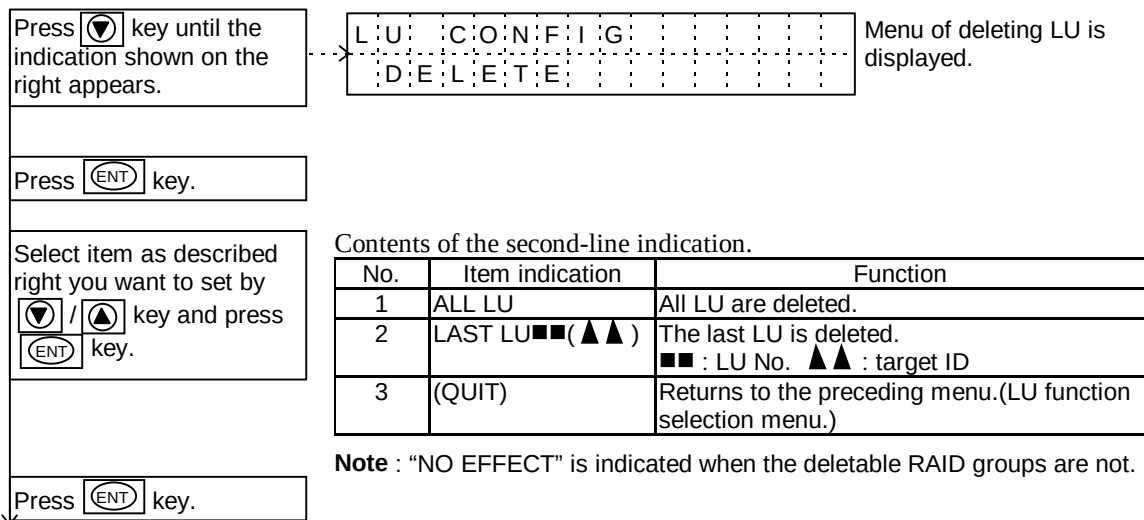
[Procedure③-D] Deleting LU

Note : All user data is lost by deleting the LU.

Be sure to back-up the user data before deleting the LU.

Operation

Panel display



In case of deletion of all LU, go to ①.

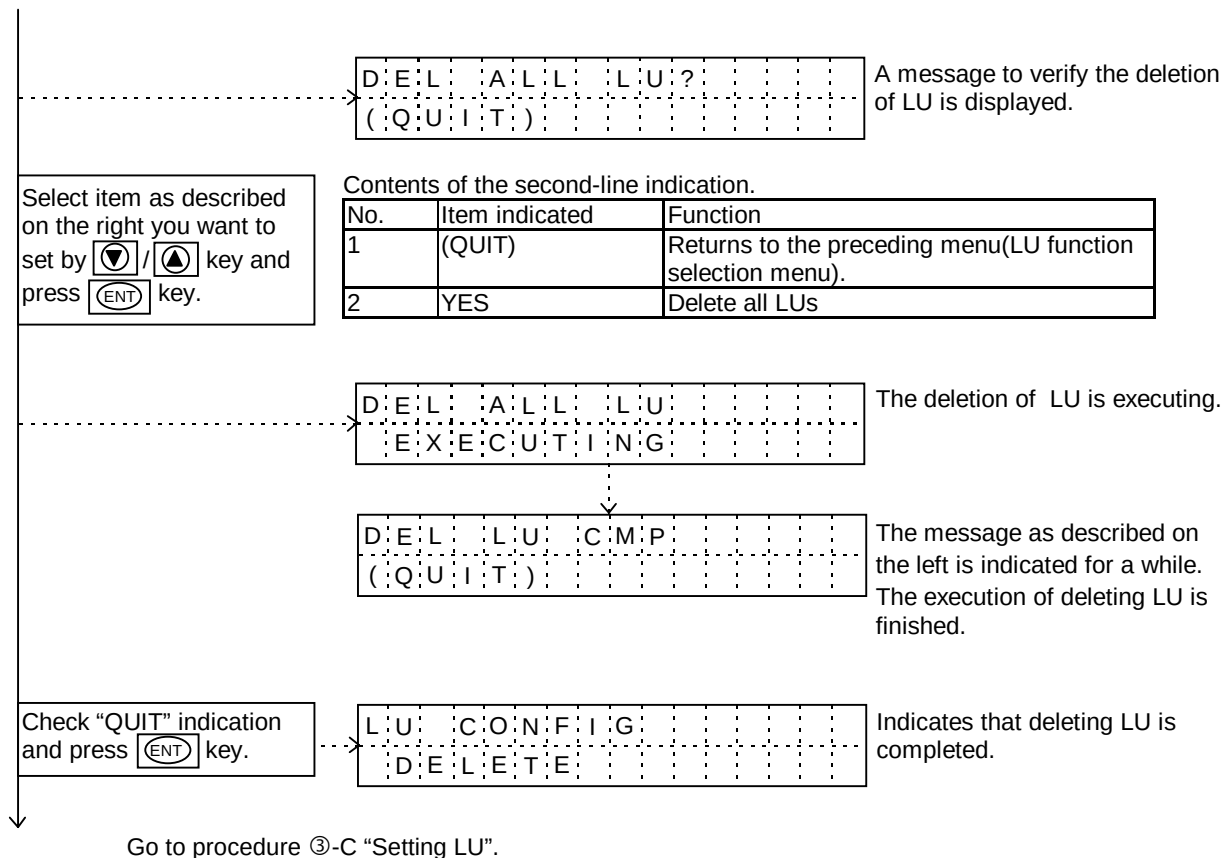
In case of deletion of the last LU, go to ②.

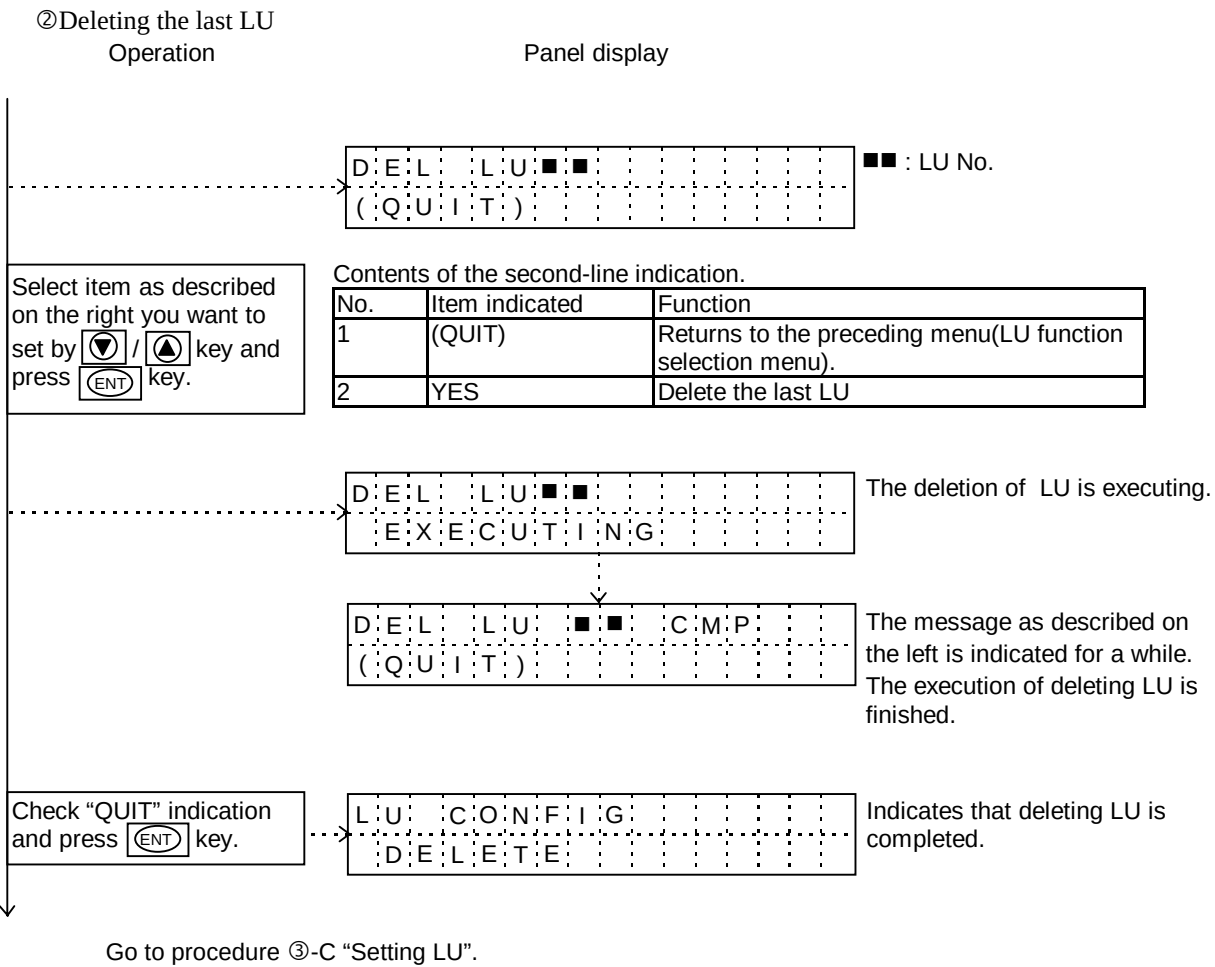
To cancel this operation menu, choose QUIT.

①Deleting all LU

Operation

Panel display



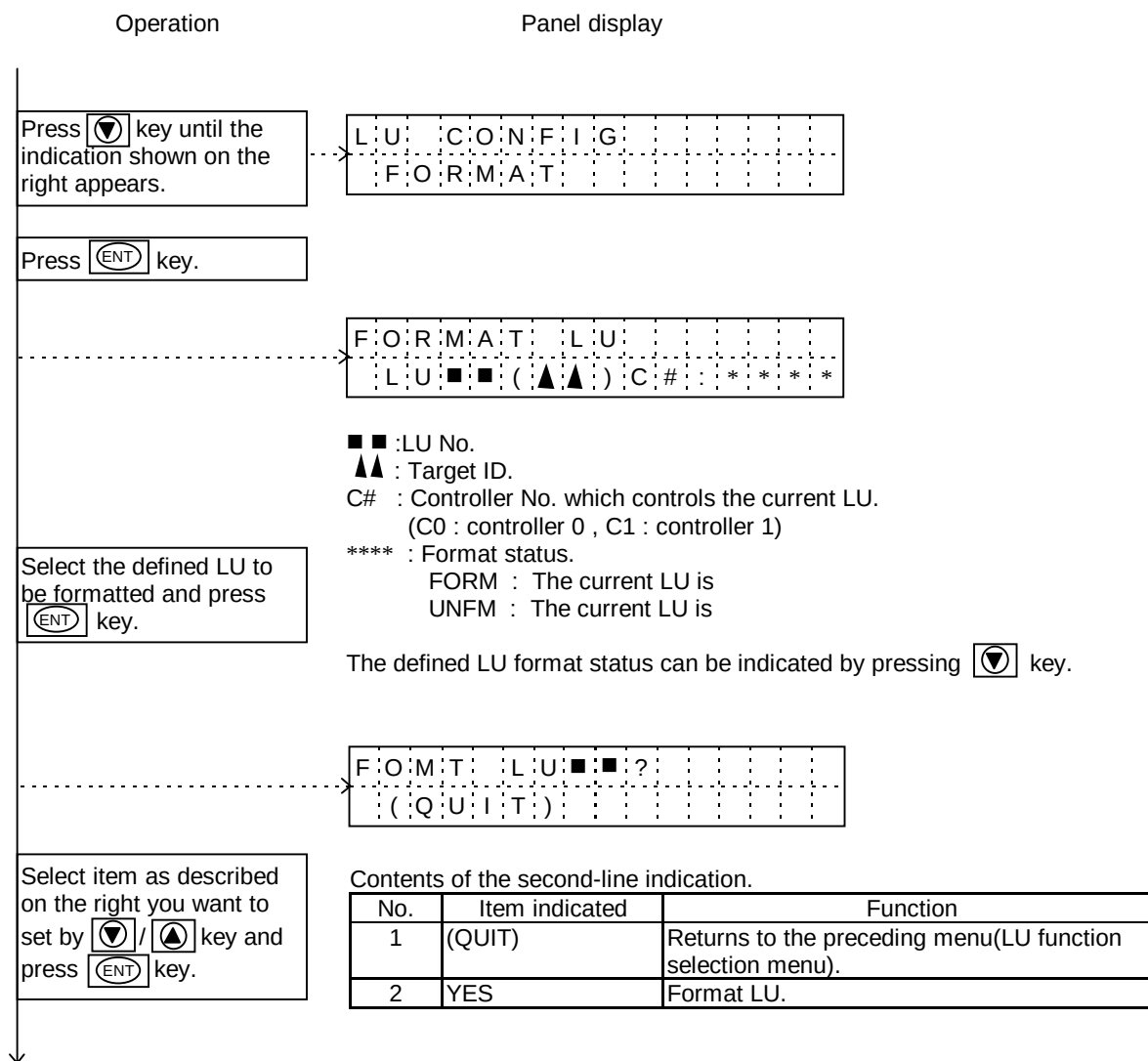


[Procedure③-E] Formatting

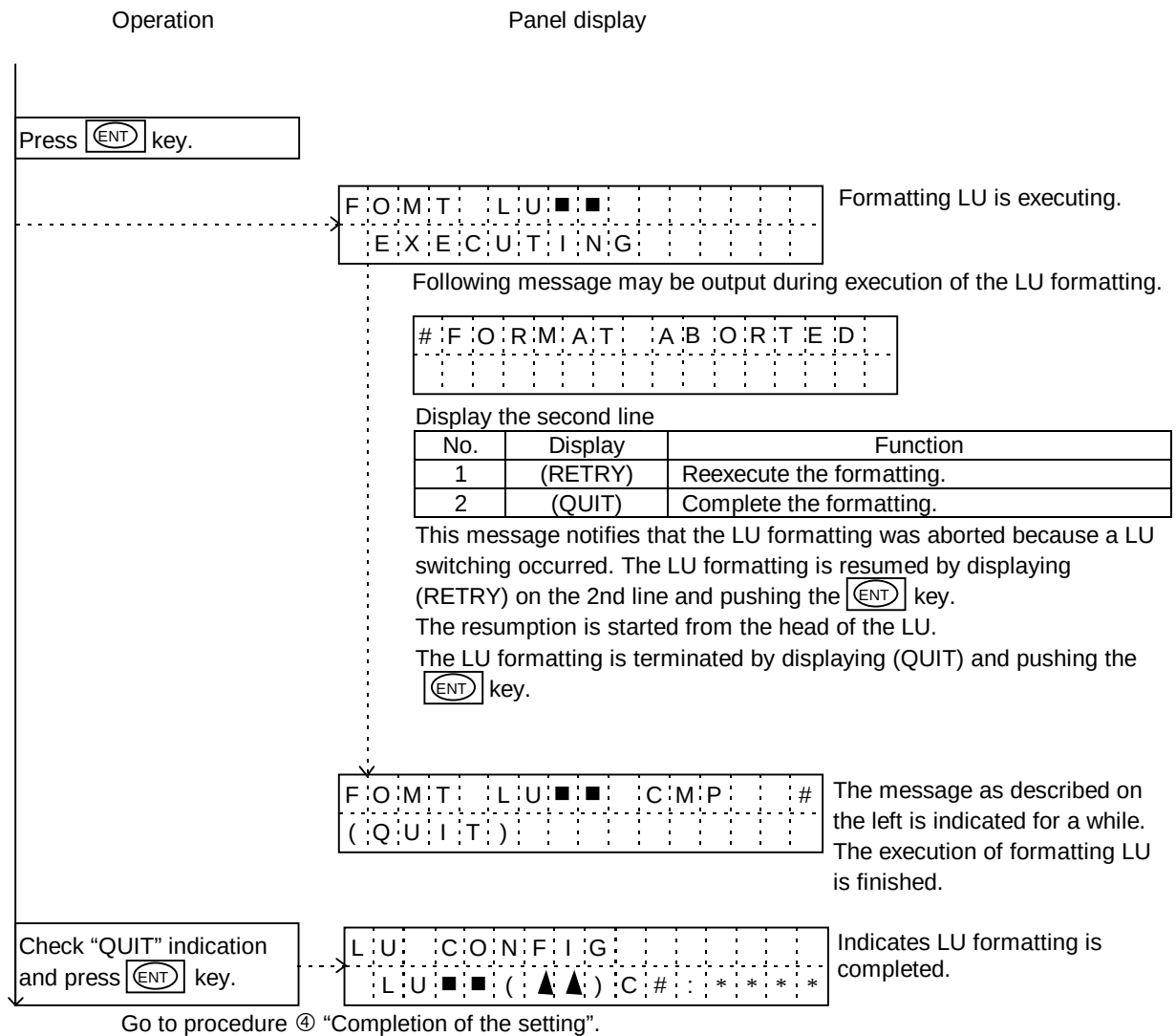
Notice : Note that user data will be lost by formatting the formatted LU.

Besides, be sure to execute the LU formatting for each set LU. When the microprogram of version 0304 or later is used, read/write access from the upper device is possible to the LUs other than that being formatted. Accordingly, the formatting for the LU newly added can be executed while executing usual jobs after the addition of the row(s) following the procedures explained on pages MK-OPTION0210 - 0300.

However, a reexecution is needed because the LU format is canceled when the subsystem receives a SCSI reset from the upper device.

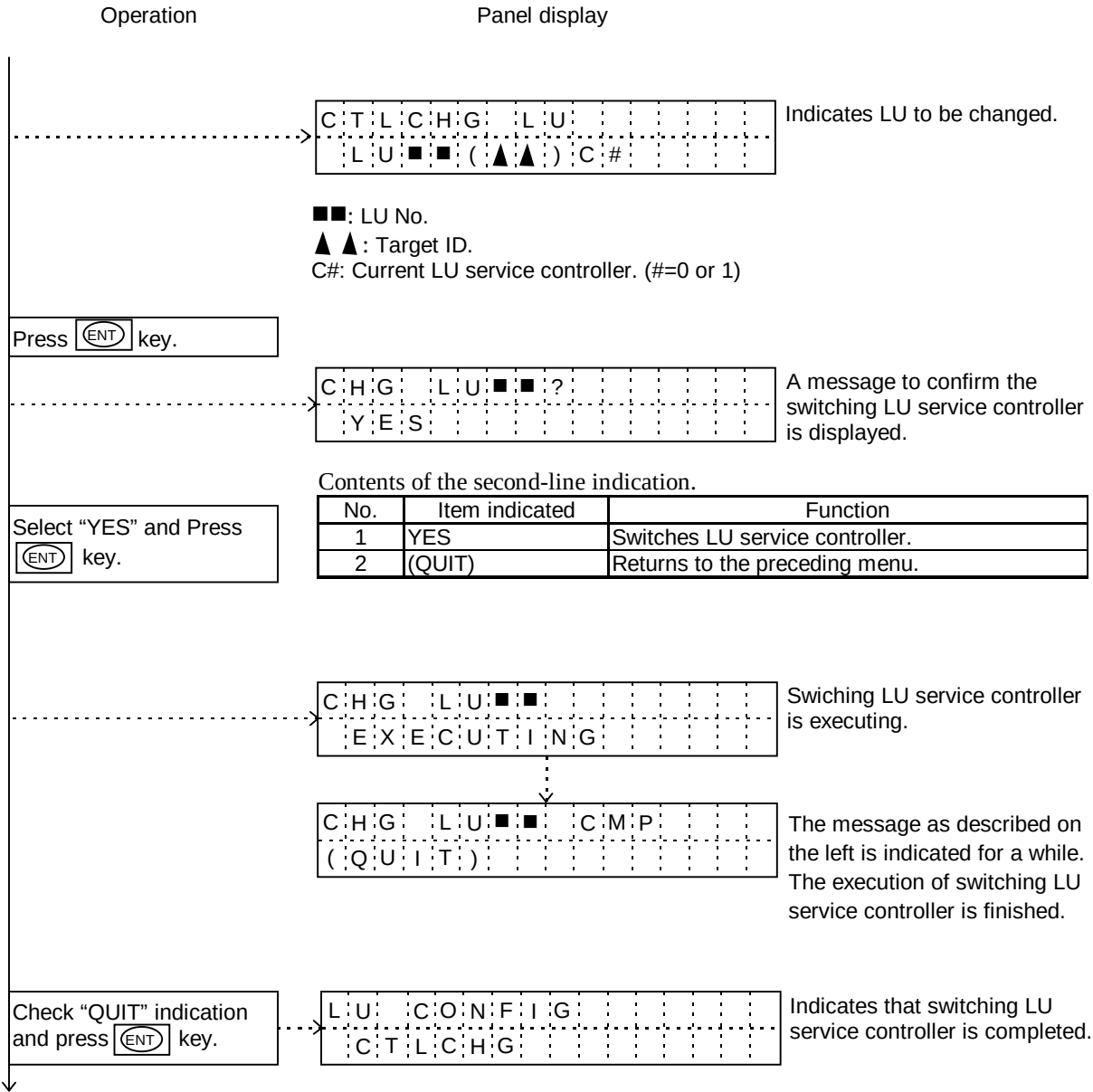


Note : LU format must be executed every set LUs.



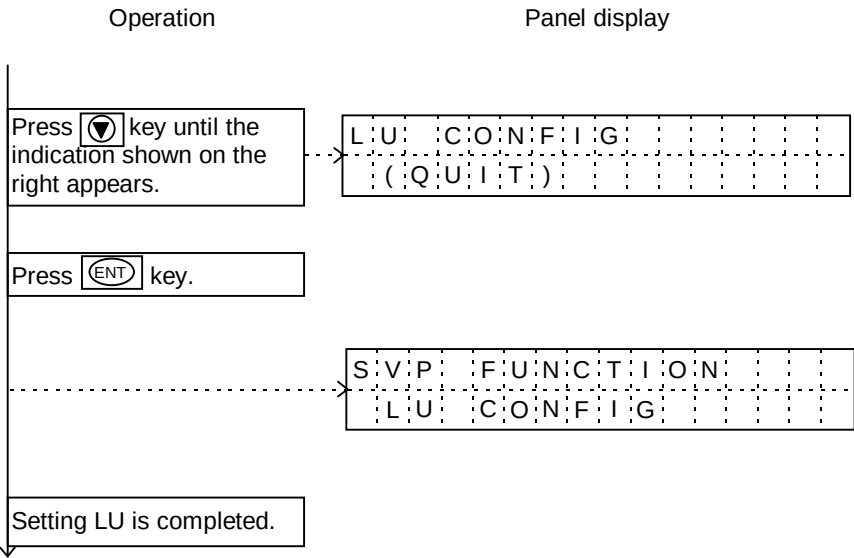
[Procedure③-F] Switching LU service Controller

Note : This function can be used when dual active mode in the dual system is set.



Note : Turn on the power of the subsystem again to make valid switching LU service controller.

[Procedure④] Completion of the setting



LU setting for dual controller configuration

In the case of dual controller configuration(Dual active mode), each LU has to be allocated to a controller which controls that LU in the LU setting operation.

But in the case of dual controller configuration(Hot standby mode), all LU are automatically allocated to the controller #0. (When one of the controllers is blocked, all LU are automatically allocated to the other controller.)

4.2.4 Setting other parameter

The menu items and the use are shown below. Refer to PANEL chapter (PANEL0340) to change the parameter shown below. The function shown below can be used when the subsystem is ready and the LU#0 is already defined.

No.	Menu item	Use	Description	Setting before shipment
1	RAID CONFIG	RAID configuration information reference/setting menu	① Reference to RAID configuration information ② Definition of RAID group ③ Deletion of RAID group	
2	LU CONFIG	LU configuration information reference/setting menu	① Reference to LU configuration information ② Definition of LU ③ Deletion of LU ④ Formatting of LU ⑤ Switching LU service controller	
3	SYSTEM OPT (CUR)	System option setting (Only a current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time	
	SYSTEM OPT (SVD)	System option setting (A saved value and current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time ⑨ Setting of the job time-out limit ⑩ Setting of the number of detections in the execution of the reselection time-out ⑪ Setting of the TRESPASS mode (*1)	
4	DRIVE MAINTEN	Drive maintenance menu	① Instruction of drive detaching ② Instruction of drive recovery ③ Reference to drive data recovery status ④ Drive self diagnosis ⑤ Parity matching check ⑥ ECC check ⑦ LA check ⑧ Drive format ⑨ Recovery of system information ⑩ Reference of the disk failure statistical information.	

*1 : This menu is displayed only when ALTERNATE PATH3 has been set by SPECIAL CONNECT of the system parameter.

No.	Menu item	Use	Description	Setting before shipment
5	MICRO VER/REV	Microprogram version/revision numbers reference menu	① Reference to microprogram version/revision	
6	GATHERING (CTL0)	Gathers information of the controller #0 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
7	GATHERING (CTL1)	Gathers information of the controller #1 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
8	MEMORY MAINT	Memory content reference/update menu	① Reference/update of memory content	
9	RECV ERR INFO	Error display of recovery when the power is on	① Displays the errors occur during recovery operation performed while power is on	
10	PIN INFO	Display of PIN existence of every LU	① Display of PIN data existence	
11	WARNING INFO	Display of unrecovered warning information	The current warning information is indicated	
12	CLEAR LOG(CT0)	Clearing log information of controller #0	Log information related controller and host I/F is cleared	
13	CLEAR LOG(CT1)	Clearing log information of controller #1	Log information related controller and host I/F is cleared	
14	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

5. Changing the Configuration

5.1 Shifting to Hot Standby from Dual Active

Shifting to Hot Standby from Dual Active while the controller is blocked cannot be performed. Perform the shifting after the blockage is recovered. If PIN segment exists, shifting cannot be performed. Perform the shifting after the PIN segment is recovered.

To see if PIN segment exists, refer to PANEL chapter (PANEL0690 (8)).

- (1) Before turning the power on, set DIP switch No.4 as Figure 5.1.1.

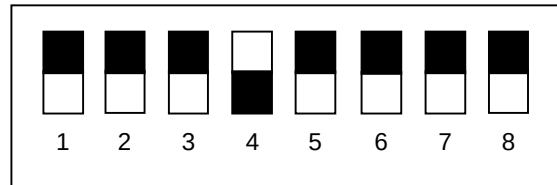
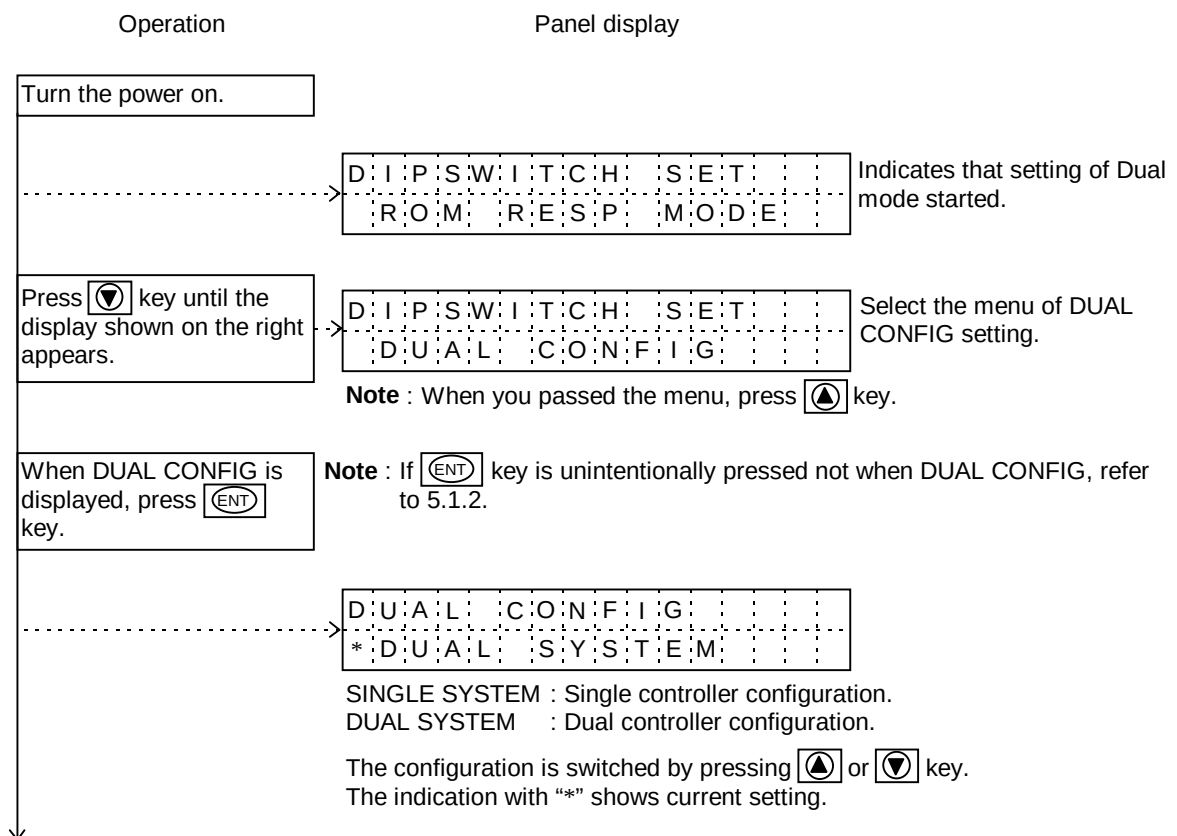
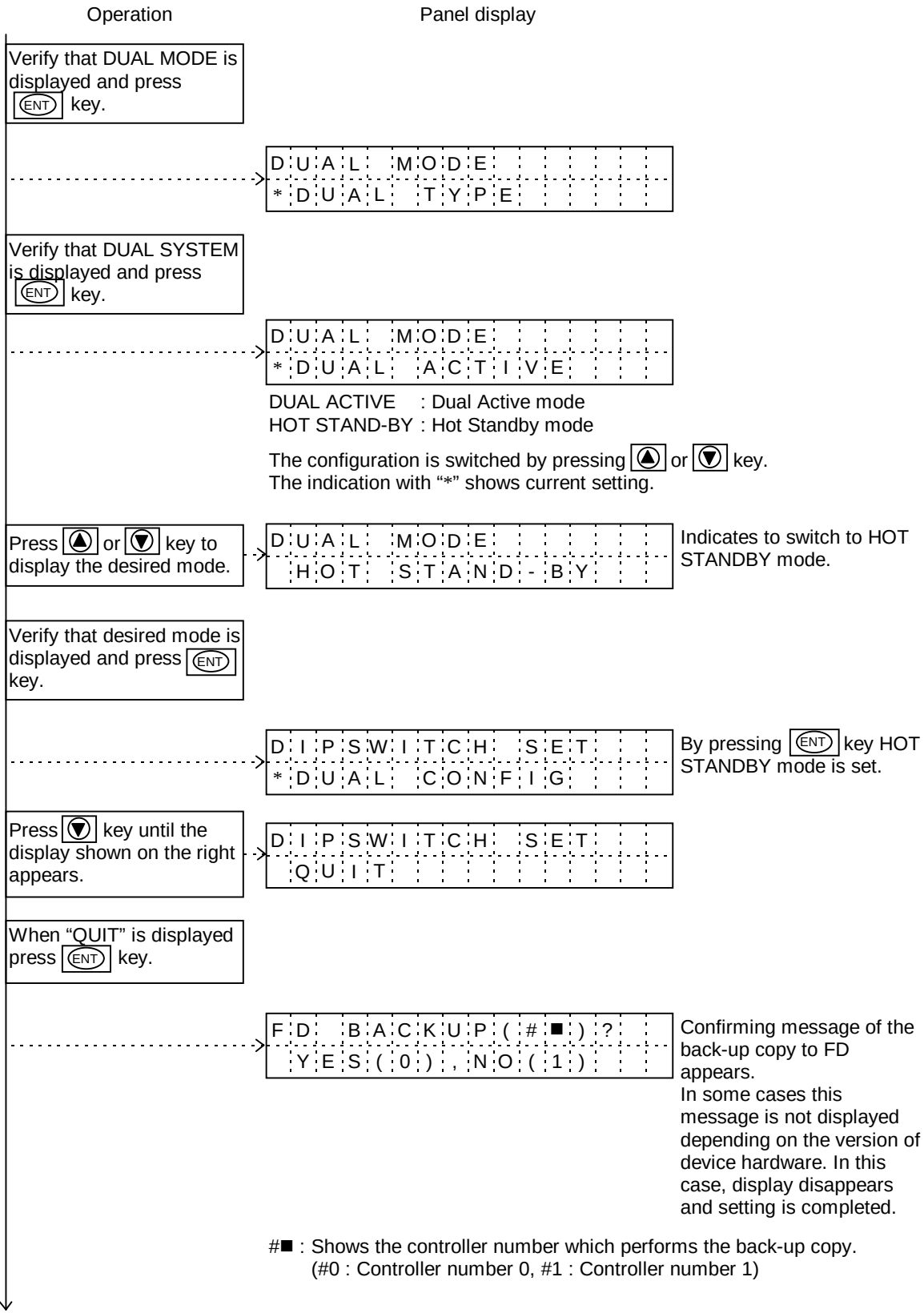
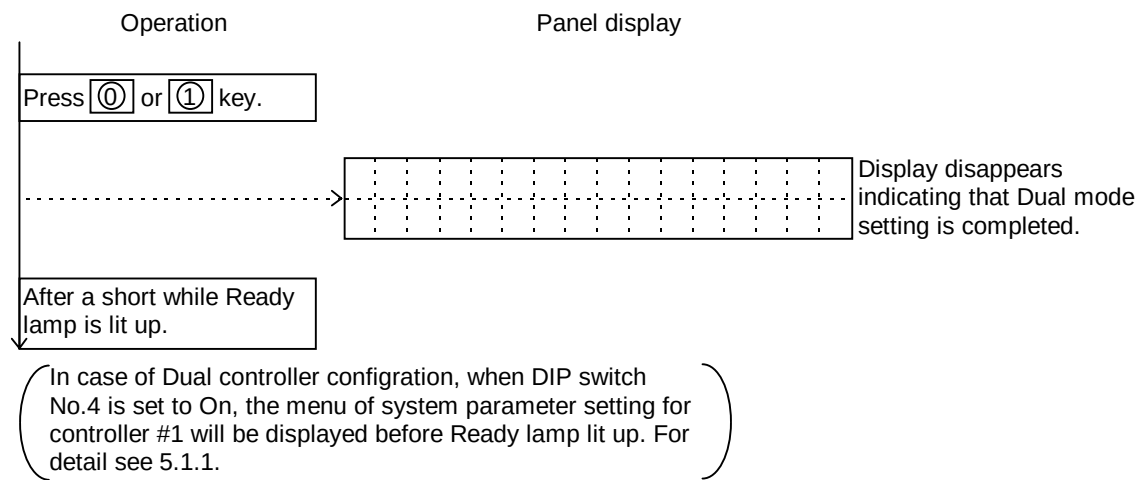


Figure 5.1.1 DIP switch for shifting to Dual system

- (2) Perform as the procedure shown below.







(3) Set DIP switch No.4 as Figure 5.1.2. (Shifting to Dual System has not started yet.)

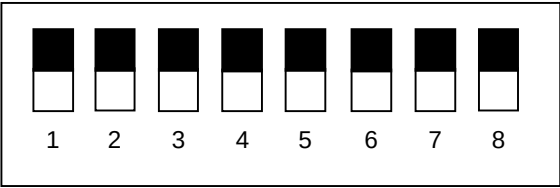
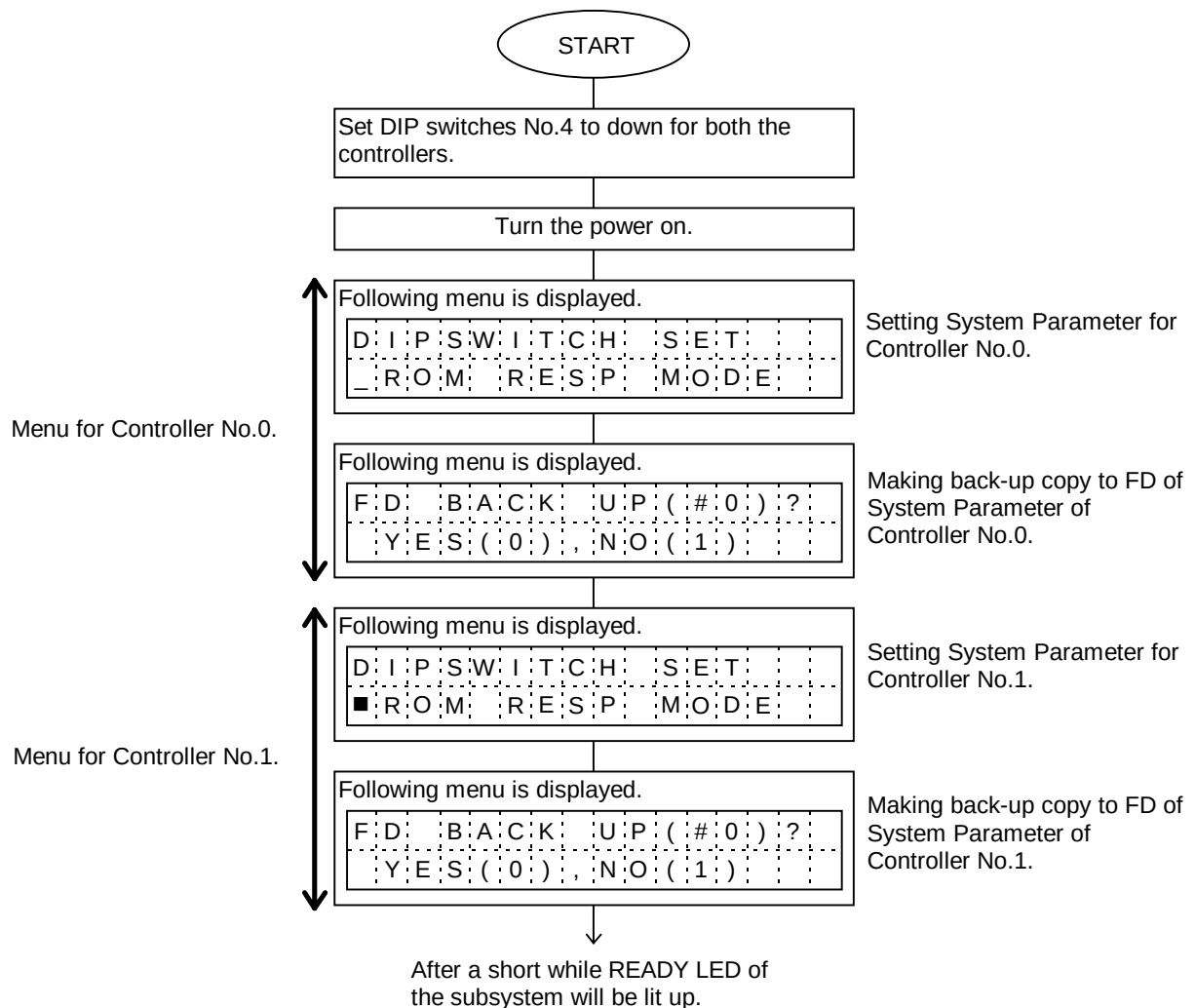


Figure 5.1.2 DIP Switch, shifting to Dual System has not started yet.

- Note 1 :** When setting Dual mode under dual controller, the setting of controller No.0 will be valid. The setting of controller No.1 will be ignored.
- Note 2 :** After switching to Dual Active configuration from Hot Standby configuration, Controller No.0 will be the LU Service Controller for previously set LU. To switch LU Service Controller No.1, see “6 PANEL Chapter” (PANEL0570 (4-5)).

5.1.1 Operation of system parameter setting menu under dual controller configuration

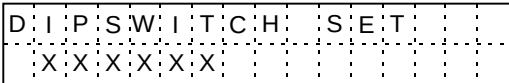
Set DIP switches No.4 to down for both controllers under dual controller configuration, and turn the power off to set the information on EEPROMs of both the controllers.



Note : In case one of DIP switches No.4 is set to down under dual controller configuration, after completion of menu setting for the corresponding controller, READY LED of the subsystem will be lit up.

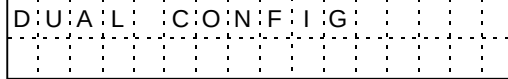
5.1.2 Returning procedure in system parameter setting menu

During system parameter setting menu when wrong menu is selected ( key is pressed), the method of returning for each menu is shown below.

After the operation below  is displayed.

(XXXXXX : Wrongly selected menu)

Then select desired menu by pressing  or  key.

No.	Menu	Procedure to return
1	ROM RESP MODE	Press  key.
2	WRITE&VERIFY	Press  key.
3	STRIPE SIZE	Press  key.
4	LAN CONST	Press  key to display “QUIT” and press  key.
5	TARGET ID	Press  key.
6	CONNECT AS/400	When NOT CONNECT : Press  key. When CONNECT AS/400 : Press  key, and after displaying “QUIT”, press  key.
7	CONNECT VMS	Press  key.
8	SPECIAL CONNECT	Press  key.
9	SAVE DATA PTR	Press  key.
10	HOST BLK SIZE	Press  key.
11	ERROR INF	Press  key.
12	CONTROLLER	Press  key.
13	SPARE DISK	Press  key.
14	SERIAL NO	Press  key.
15	ROM V/R	Press  key.
16	RAM V/R	Press  key.
17	CONTROLLER NAME	Press  key.
18	ROW LAST LBA	When Menu is ROW LAST LBA : Press  key to display “QUIT”, then press  key.
19	BUZZER	Press  key.
20	SYSTEM ERROR	Press  key.
21	GENERATE SYS	Press  key.
22	INQUIRY INF	Press  key to display “QUIT” and press  key.
23	DUAL CONFIG	Press  key until  is displayed.
24	LU SIZE	Press  key.
25	SYNC CONTROL	Press  key.
26	SYS REV	Press  key.
27	OPTION	Press  key.
28	BOOT PROG V/R	Press  key.
29	RTC SET	Press  key to display “QUIT(ENT KEY)” and press  key.

6. Subsystem Settings for Use in Special Modes

6.1 When Using I/O Path Switching Function in the State Being Connected to IBM RS6000

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to IBM RS6000, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.1.1.

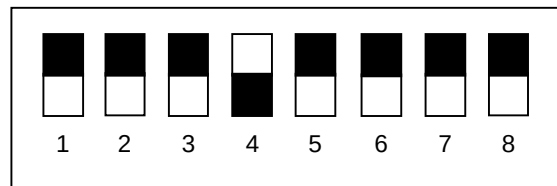
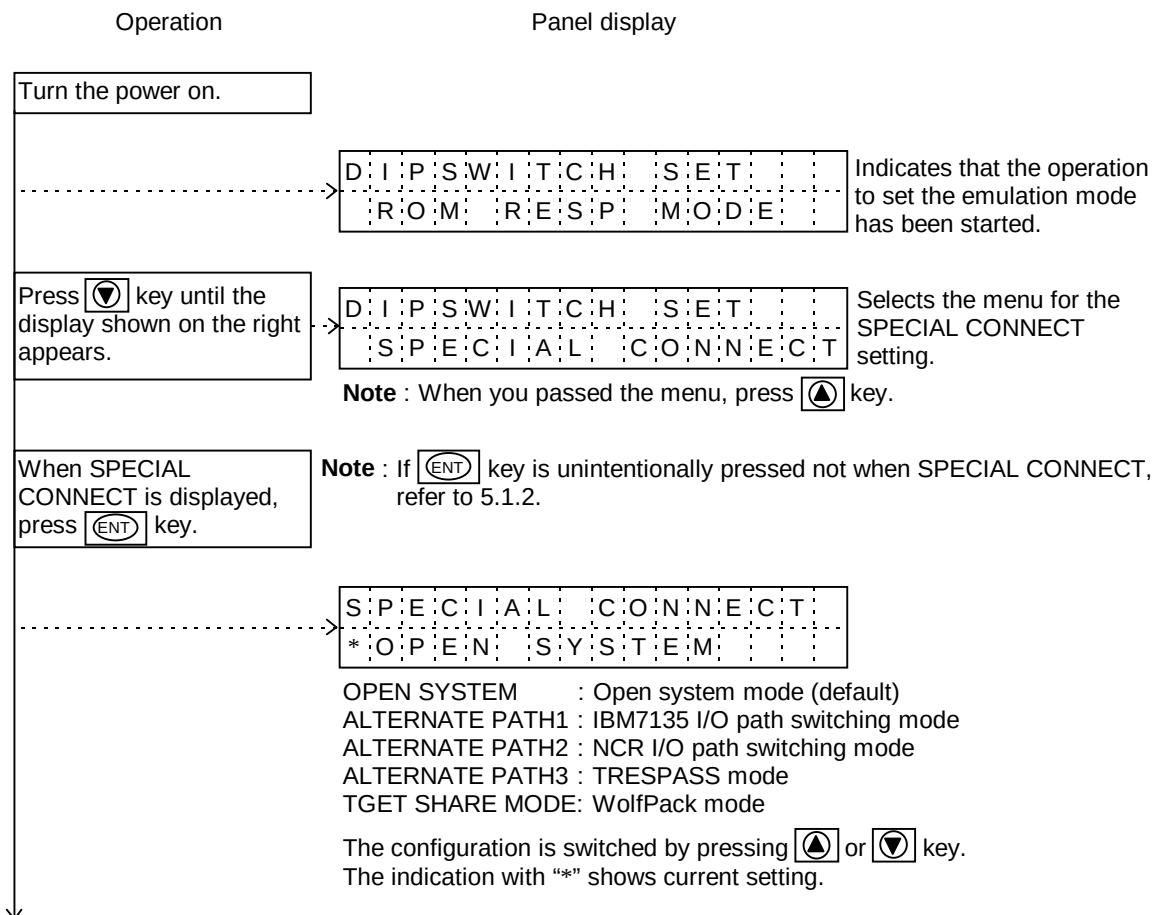
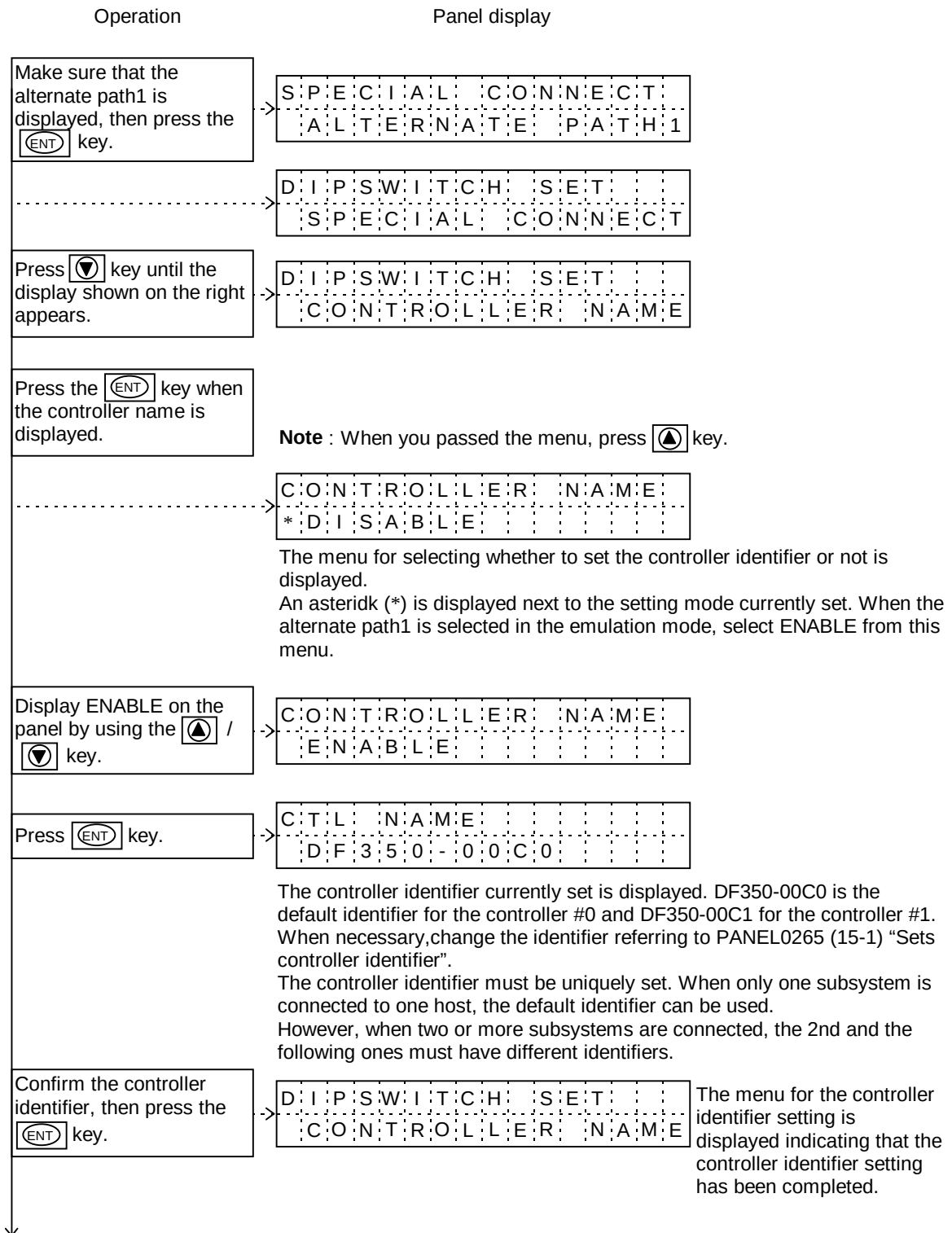
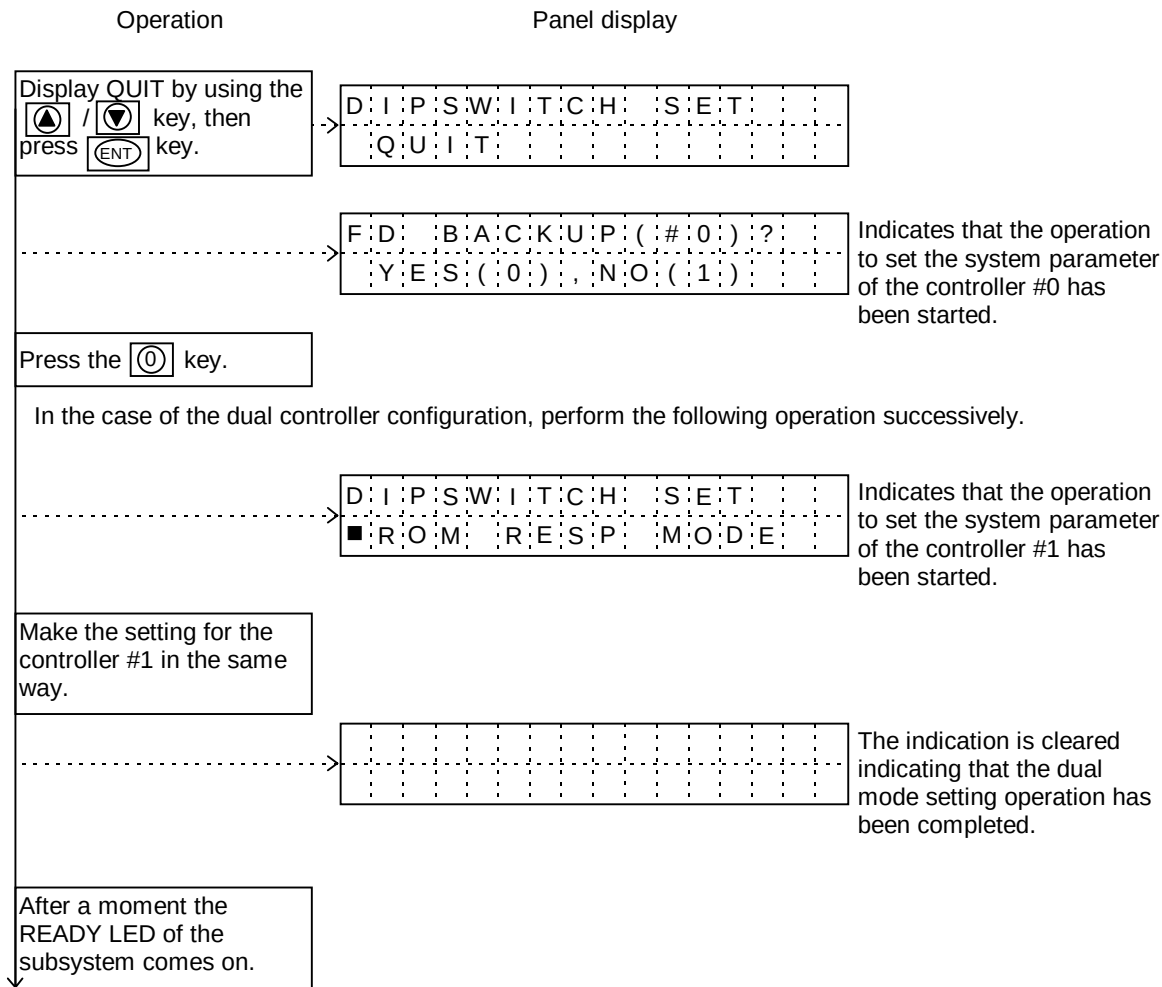


Figure 6.1.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.1.2.

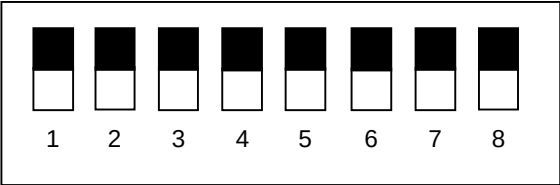


Figure 6.1.2 DIP switches (Being set for Standard setting)

6.2 When Using I/O Path Switching Function in the State Being Connected to NCR World Mark

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to NCR World Mark, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.2.1.

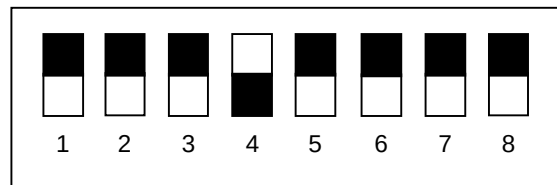
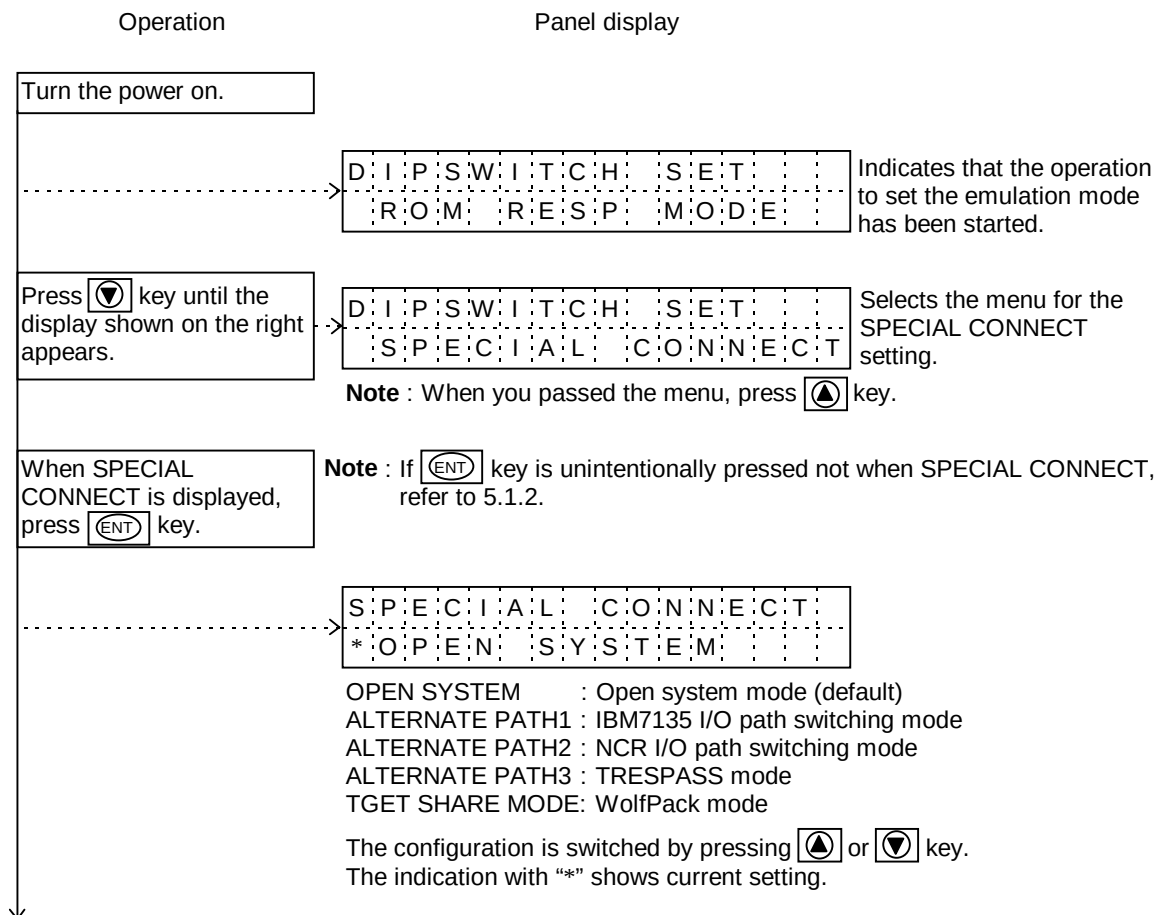
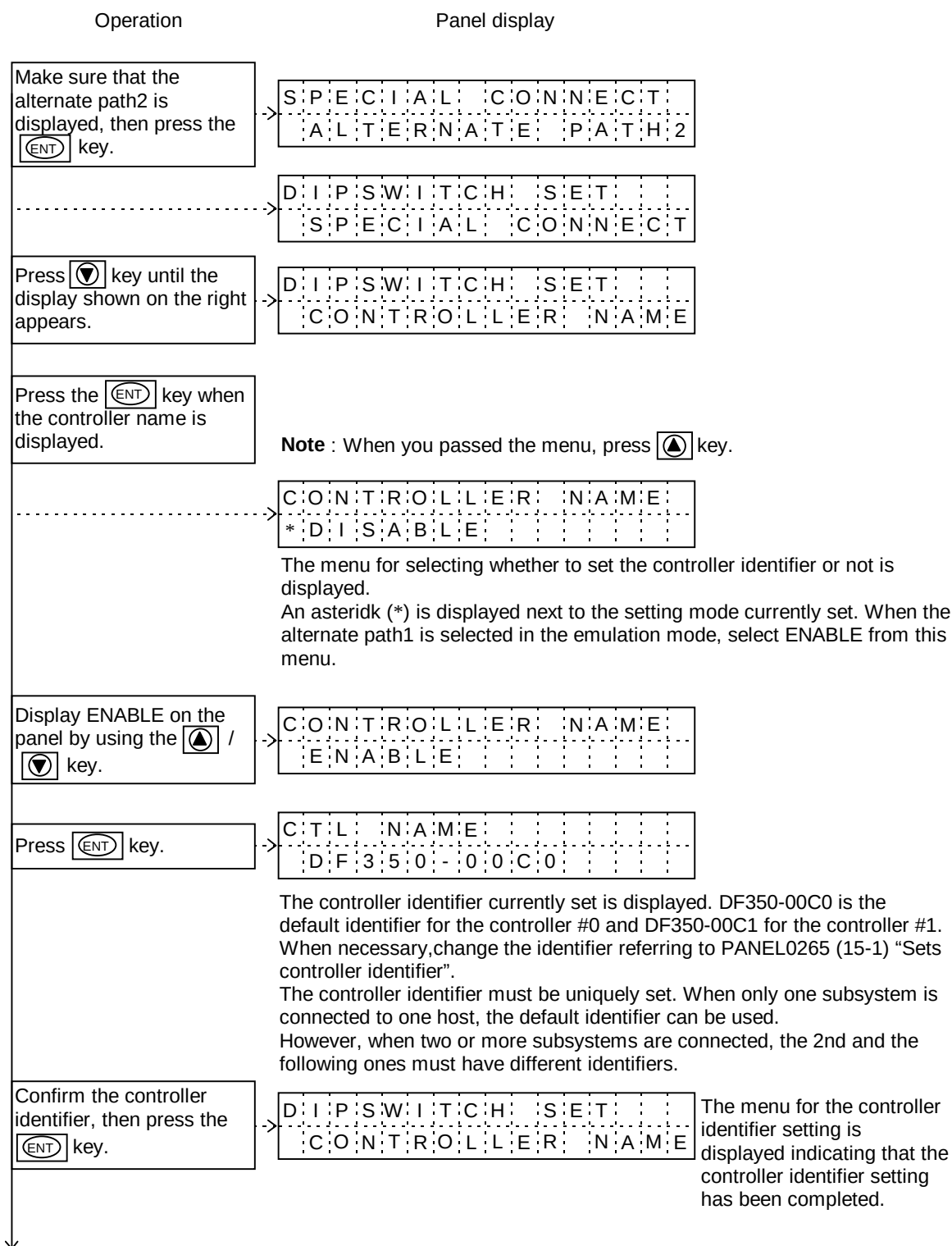
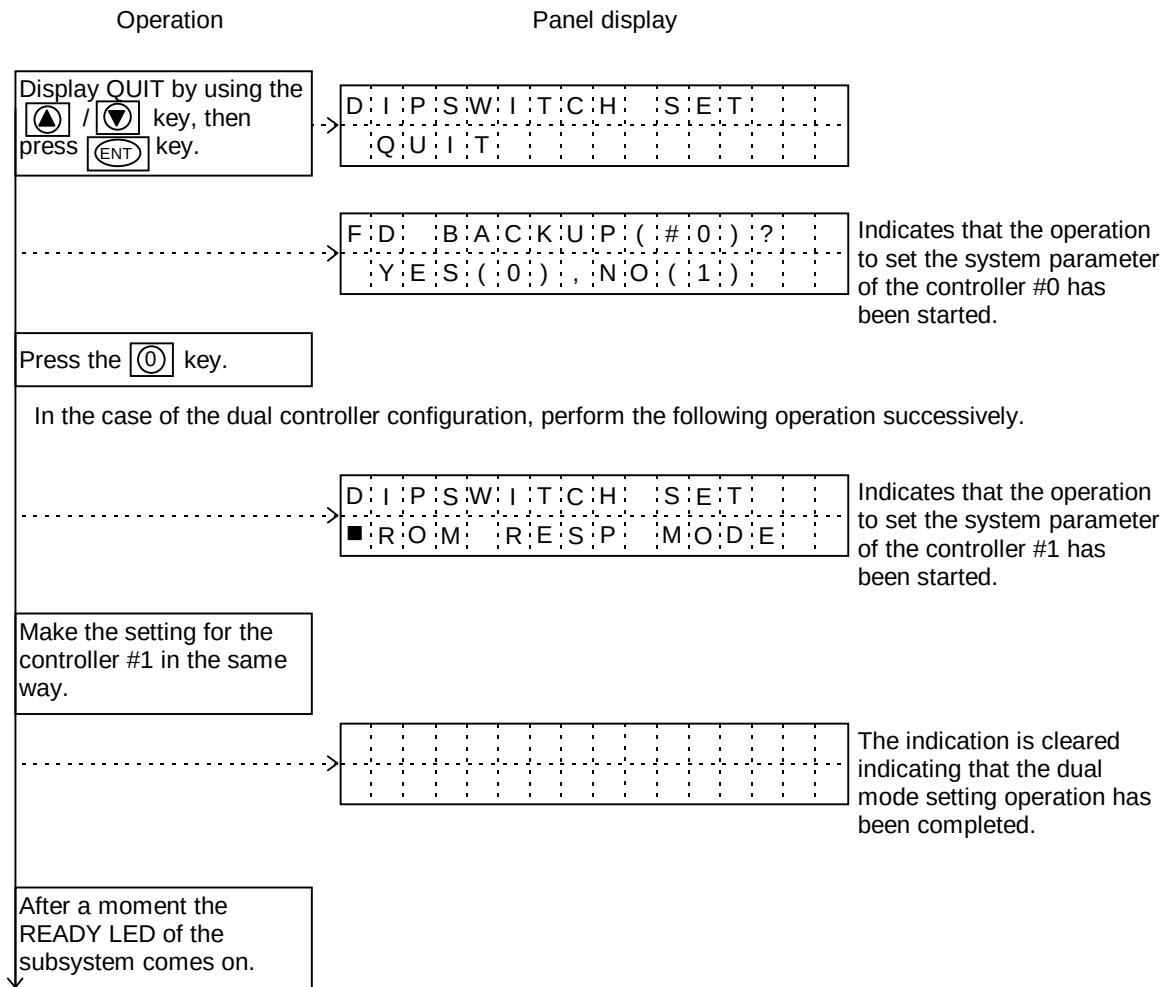


Figure 6.2.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.2.2.

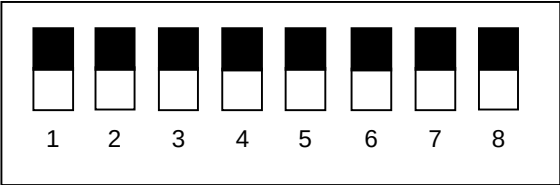


Figure 6.2.2 DIP switches (Being set for Standard setting)

6.3 When Using I/O Path Switching Function in the State Being Connected to Sequent NUMA-A

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to Sequent NUMA-A, setting of the emulation mode and the setting of the TRESPASS mode from the SVP function is needed.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.3.1.

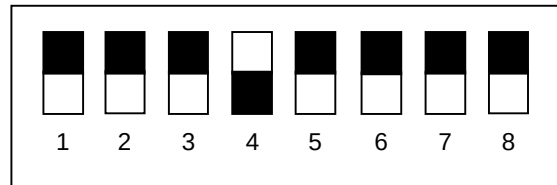
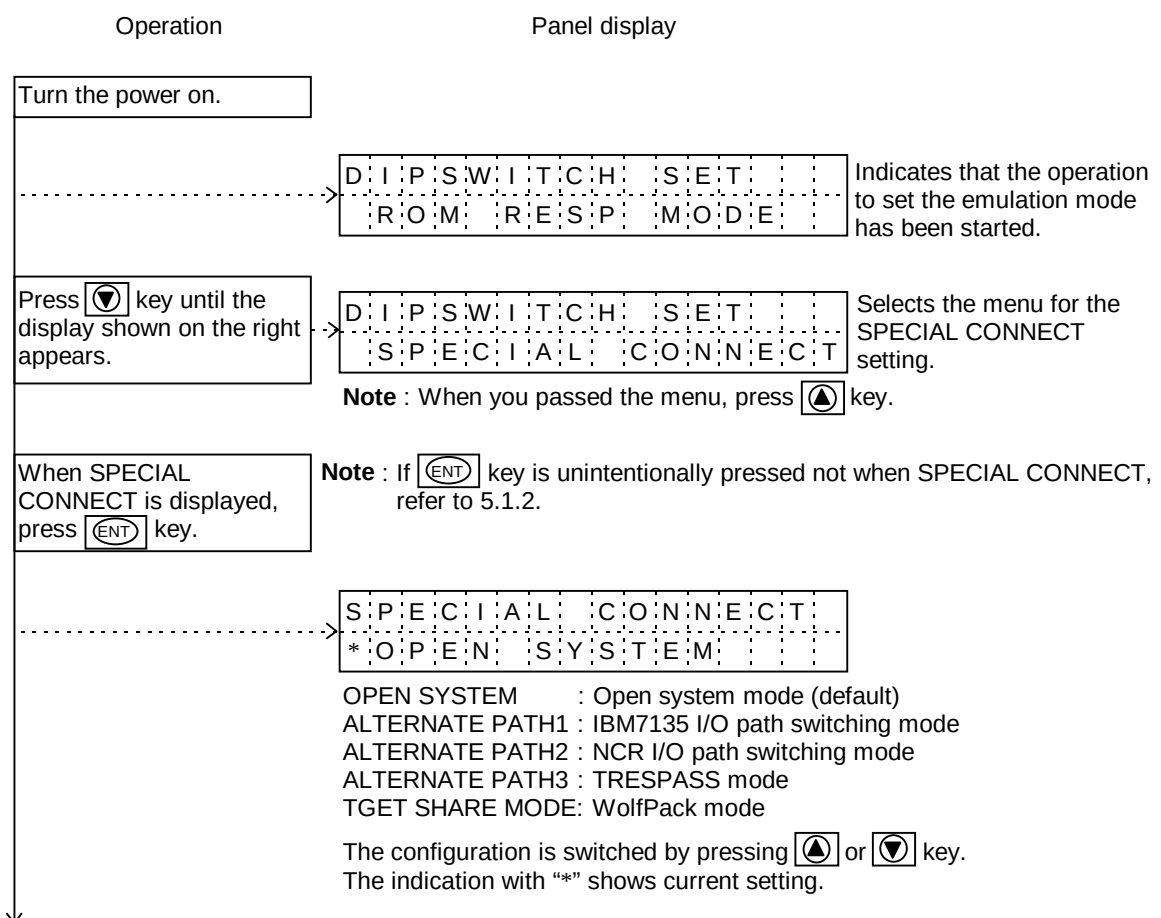
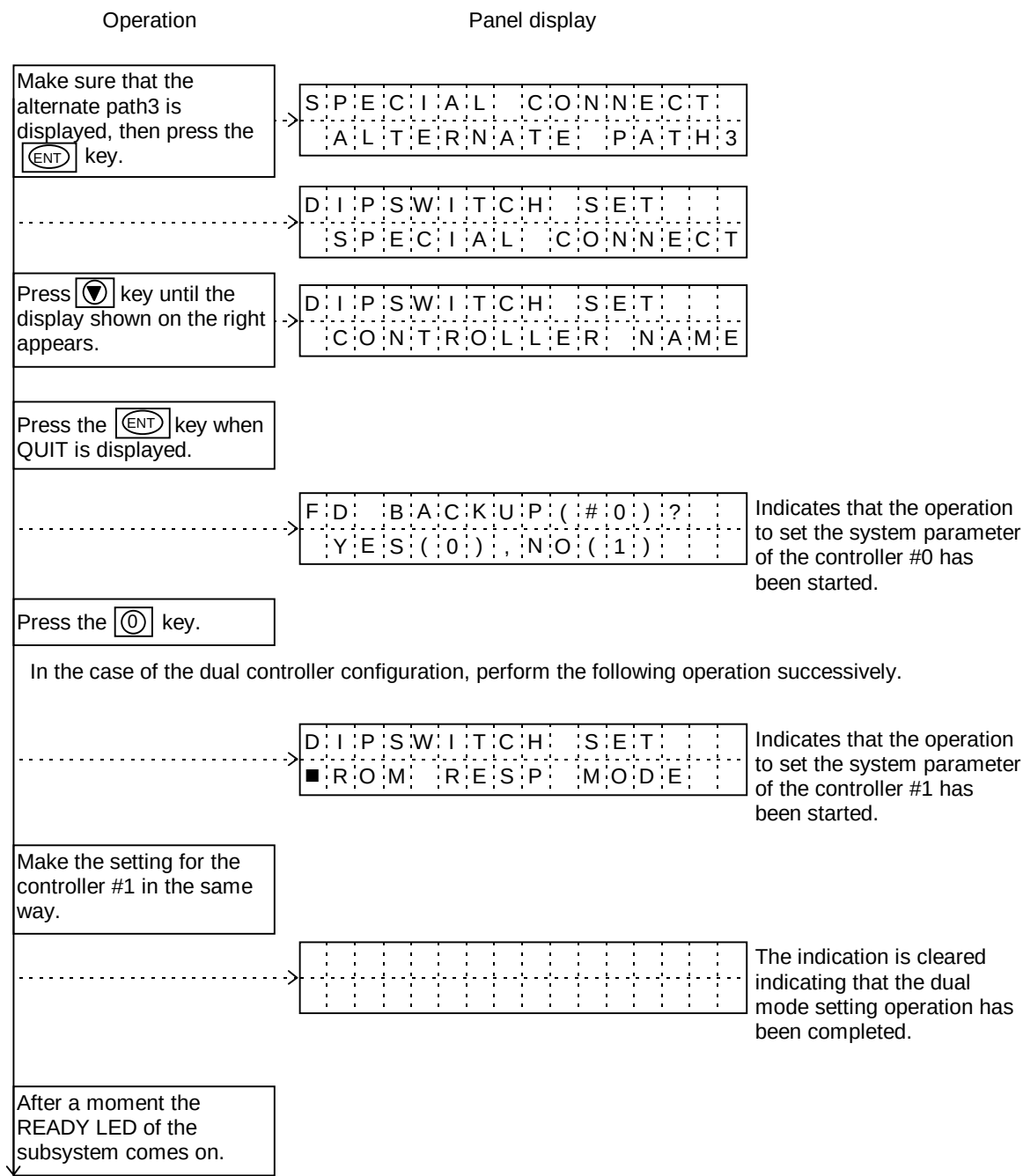


Figure 6.3.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.3.2.

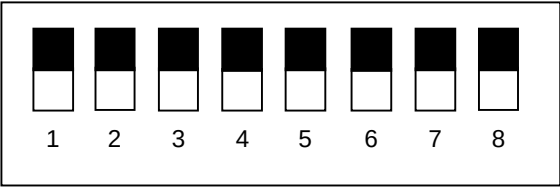
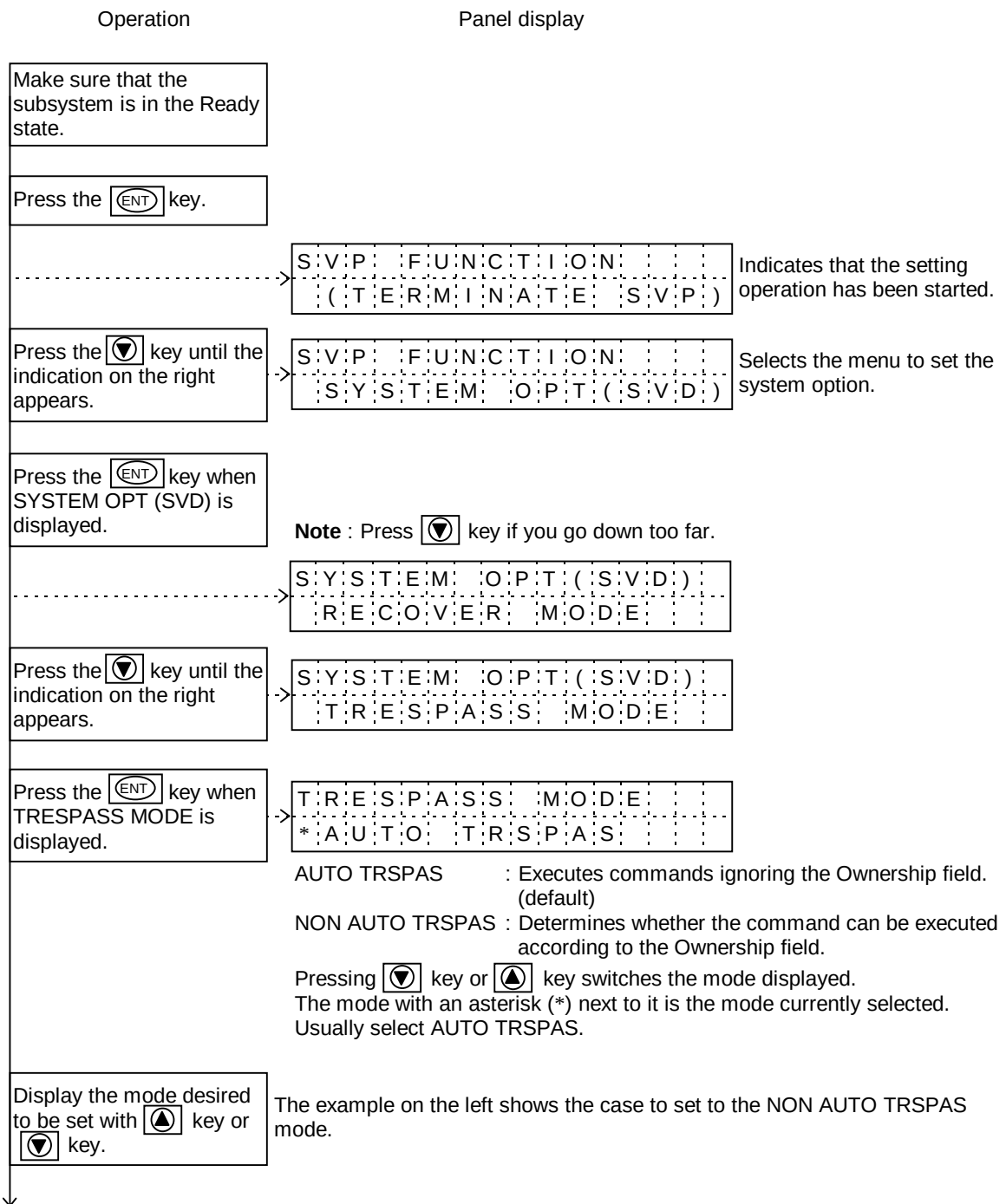
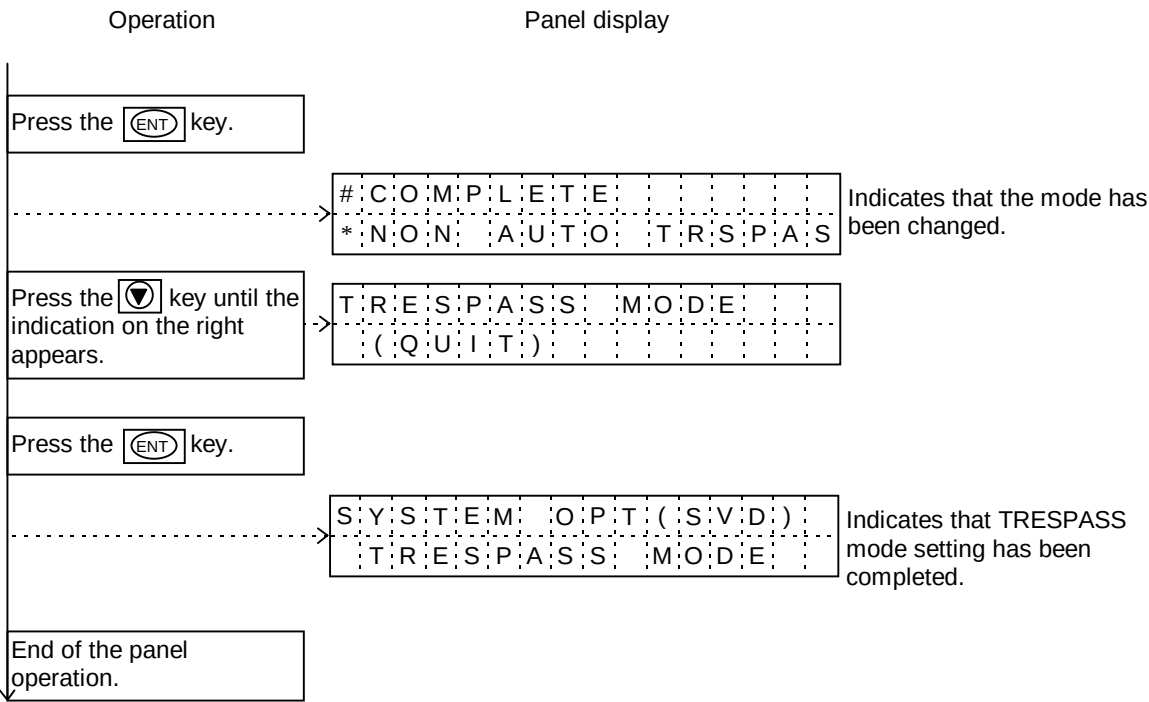


Figure 6.3.2 DIP switches (Being set for Standard setting)

(4) Setting the TRESPASS mode.

This function can be used when the subsystem is in the Ready state. (There is no need to set the DIP switch or reset the power. Ready/write operation cannot be executed from the host while this operation is being performed. When the host command is received, "Not Ready" is returned to the host.)





6.4 Using in the 1024-byte Host Block Size Mode

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

In order to use the subsystem with a host block size of 1024 byte, the host block size must be set to 1024 bytes when defining the LU. Accordingly, the LU used with a host block size of 512 bytes cannot be used in the 1024 byte host block size mode. In this case, it is necessary to redefine the LU.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.4.1.

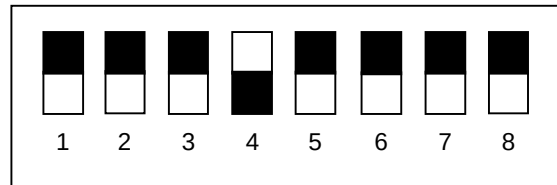
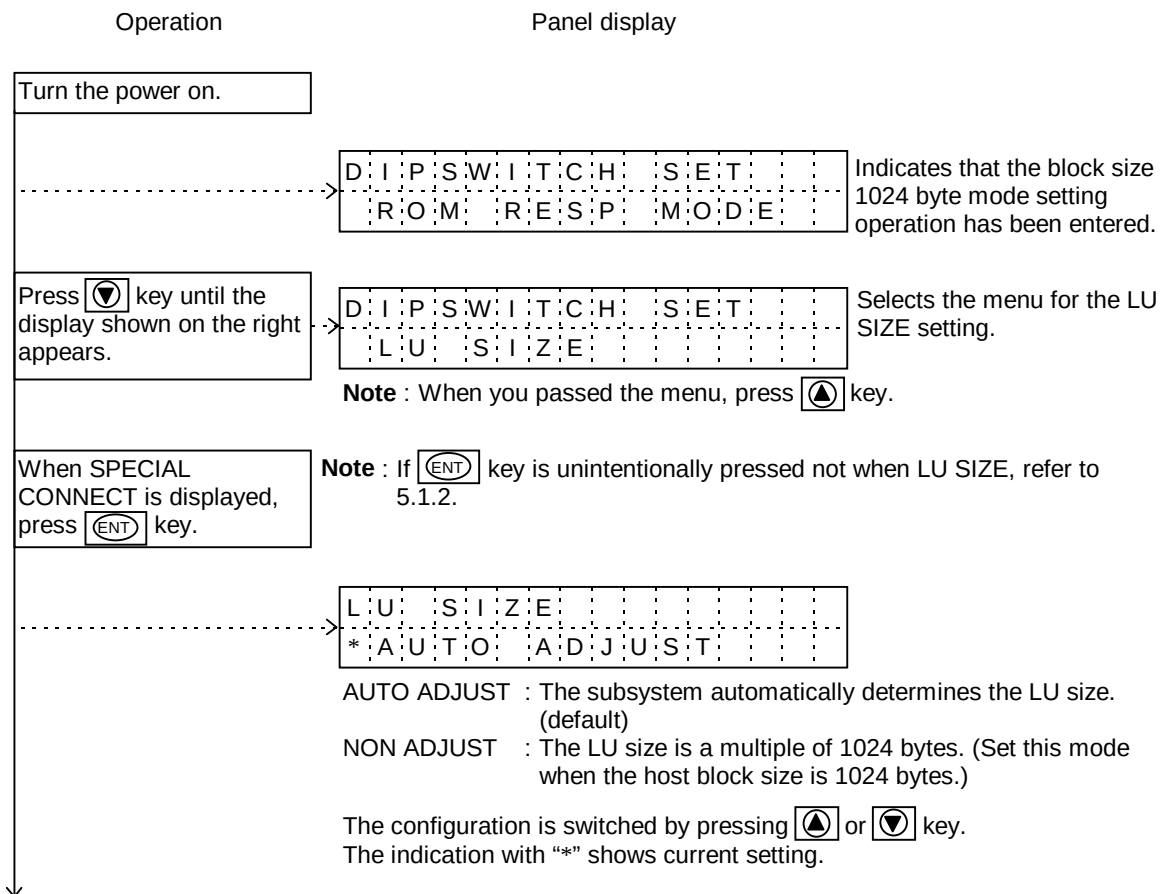
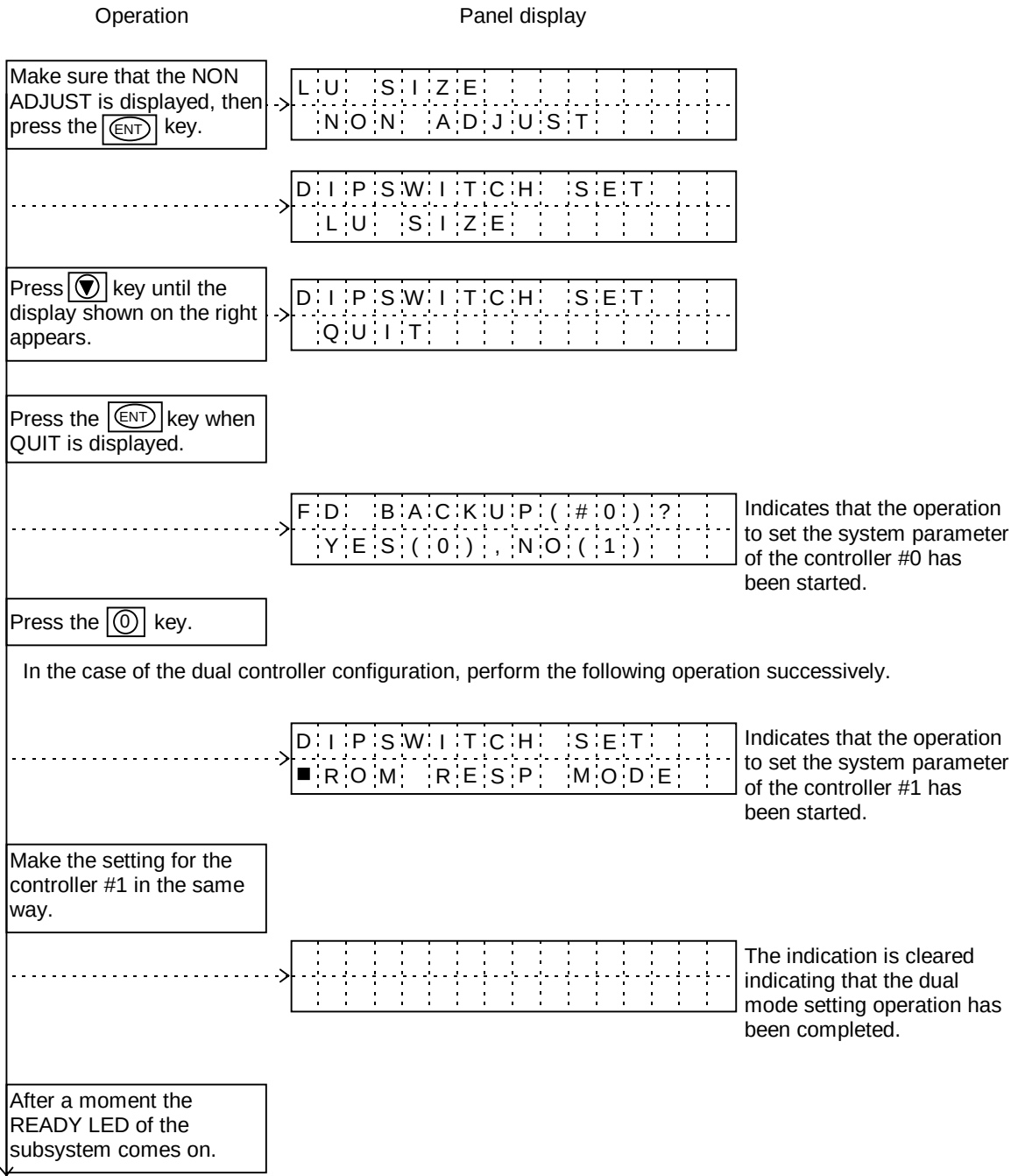


Figure 6.4.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.4.2.

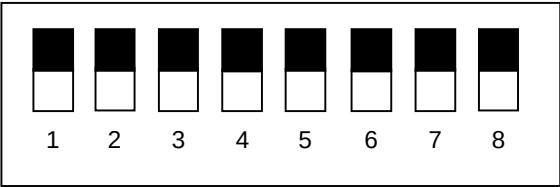


Figure 6.4.2 DIP switches (Being set for Standard setting)

(4) Setting of the host block length when setting the LU.
When setting the LU, define the host block size as 1024 bytes. (See PANEL0570 “Adds the LU” for a detailed explanation.)

6.5 Using in the WolfPack Mode

6.5.1 When the WolfPack is used in the single configuration

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.5.1.

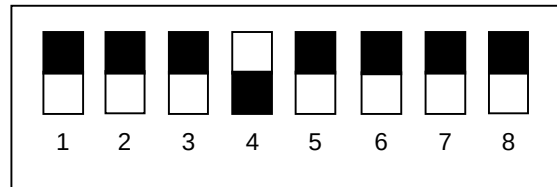
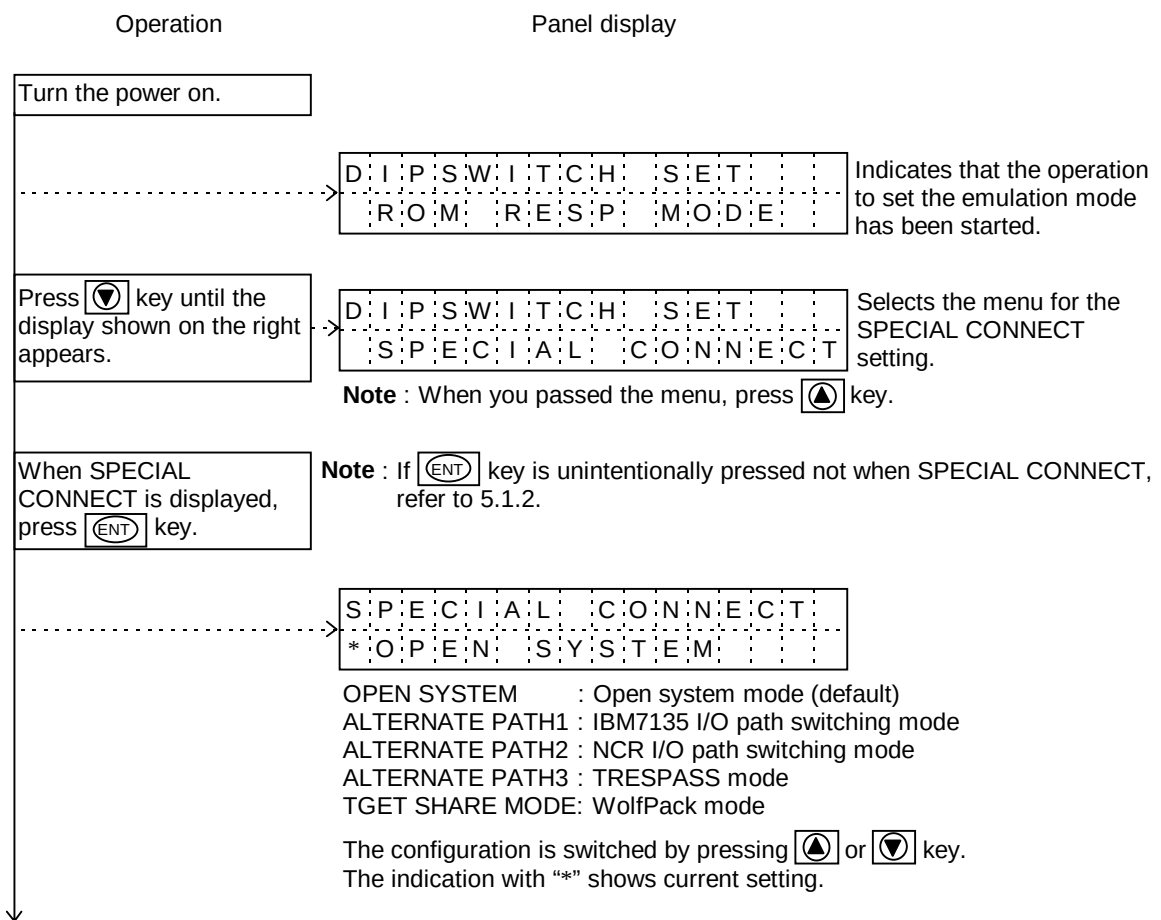
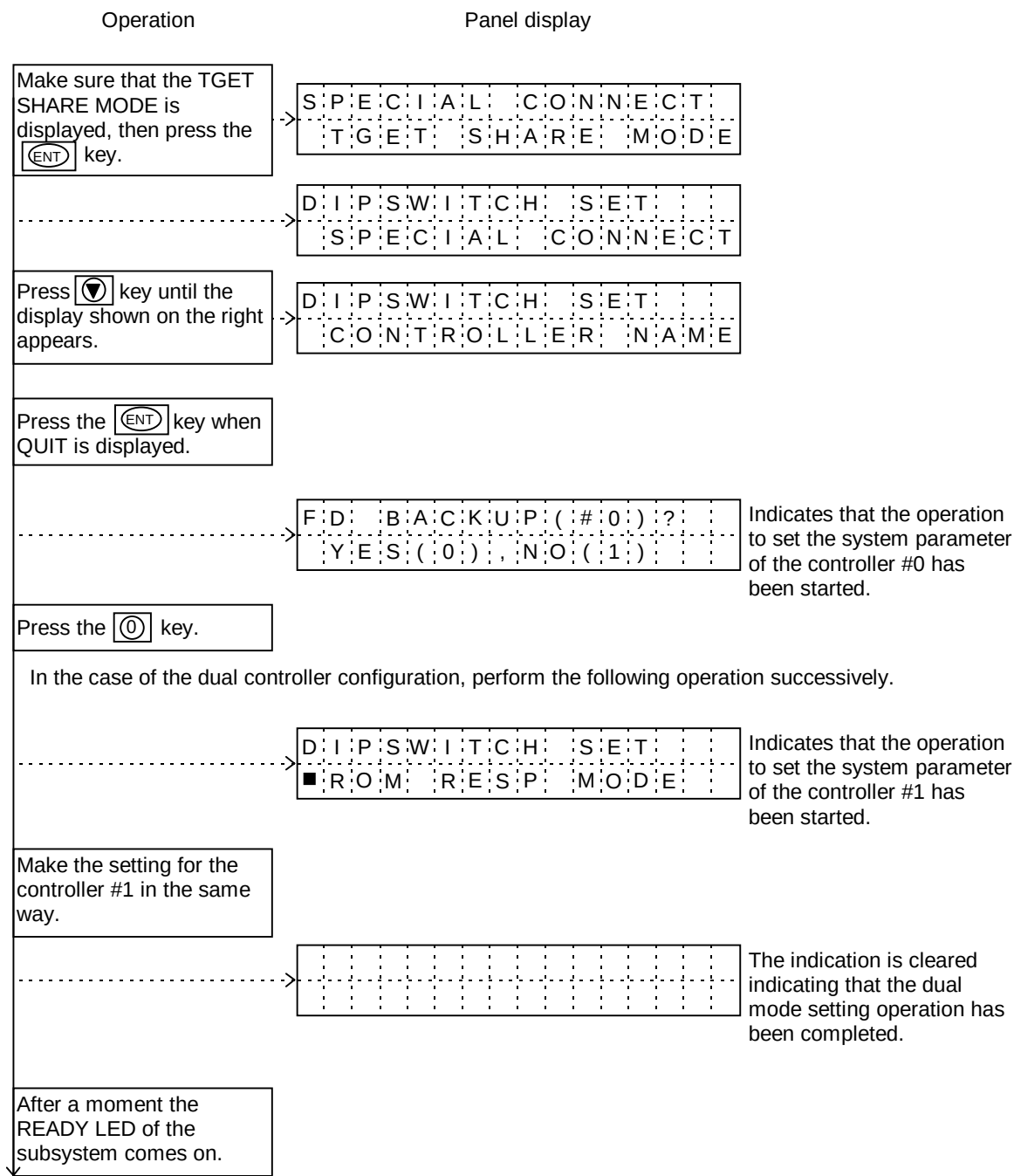


Figure 6.5.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.5.2.

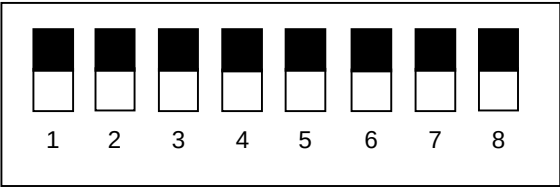


Figure 6.5.2 DIP switches (Being set for Standard setting)

6.5.2 When the WolfPack is used in the dual configuration

When using the subsystem in WolfPack mode in the dual configuration, execute the following setting and use it.

- Setting WolfPack mode
- Setting OPTION mode

To use the subsystem in this mode, the microprogram must be Ver.0306/B or later.

- Setting WolfPack mode

Set the mode by referring to page MK-INST0880.

- Setting DATA SHARE mode

Set the mode by referring to page MK-INST0900.

- Setting OPTION mode

(1) Before turning the power on, set DIP switch No.4 as Figure 6.5.3.

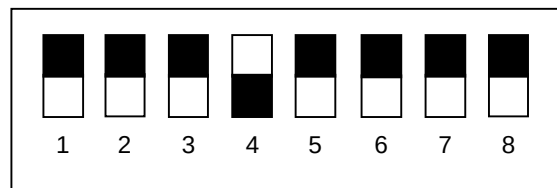
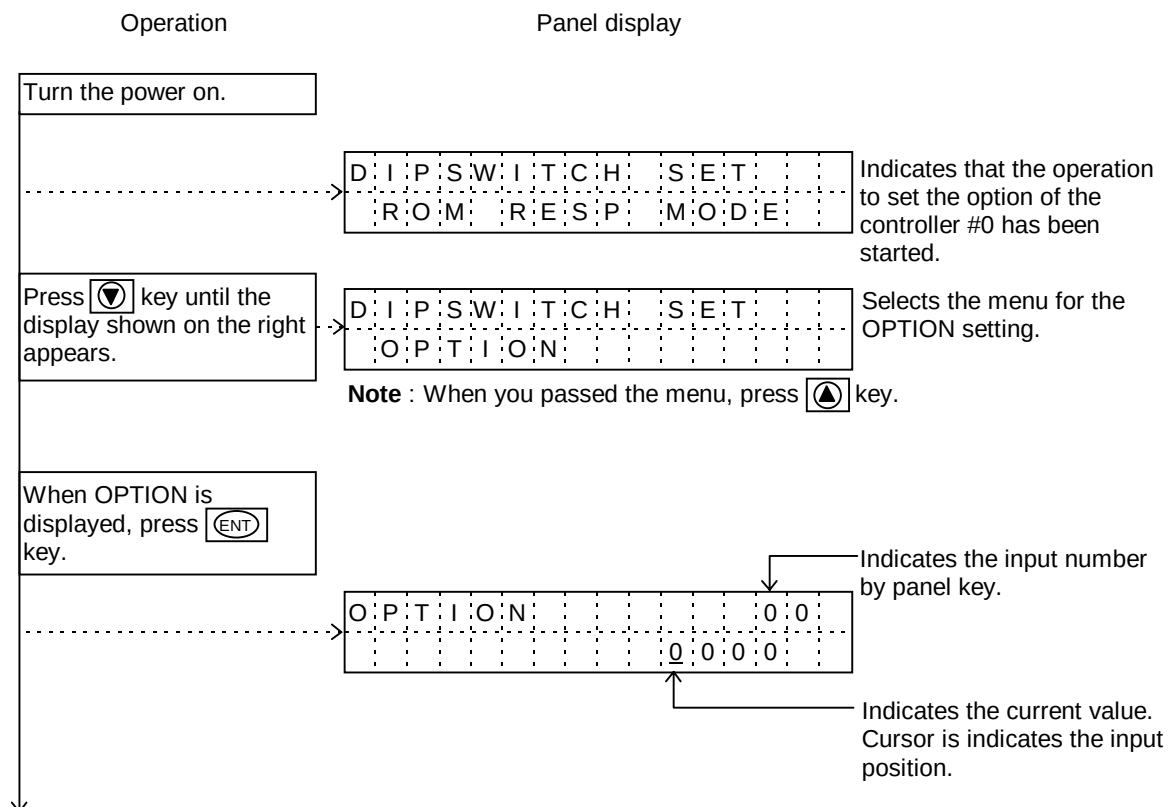
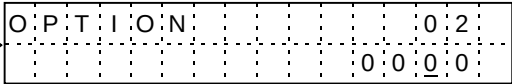
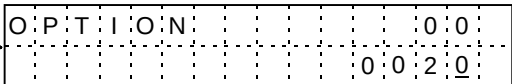
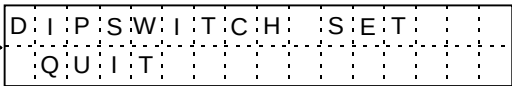
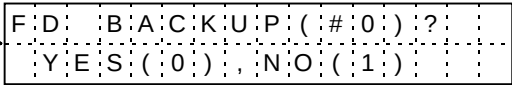
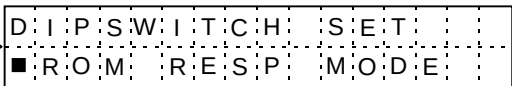
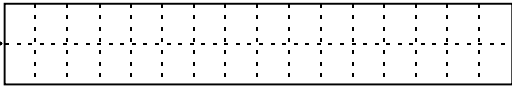


Figure 6.5.3 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the third is underlined, press the  key, and then press the  key on the panel.	 If a figure at the top is not underlined, move the underline ("_") to the required position using the  or  key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("_") moves to the next position.	
Confirm that the current value has been set to "0020", then press the  key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the  /  key, then press  key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	
	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the dual mode setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.5.4.

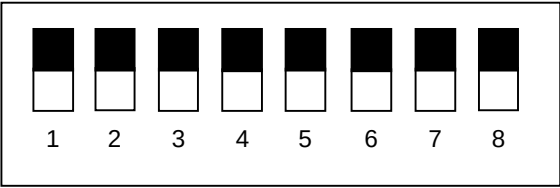


Figure 6.5.4 DIP switches (Being set for Standard setting)

6.6 Using in the DATA SHARE MODE

Use a combination of the microprogram version 0304 or later and Flash Program version PB26 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.6.1.

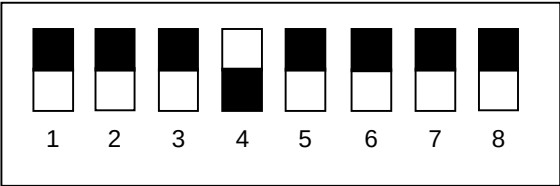
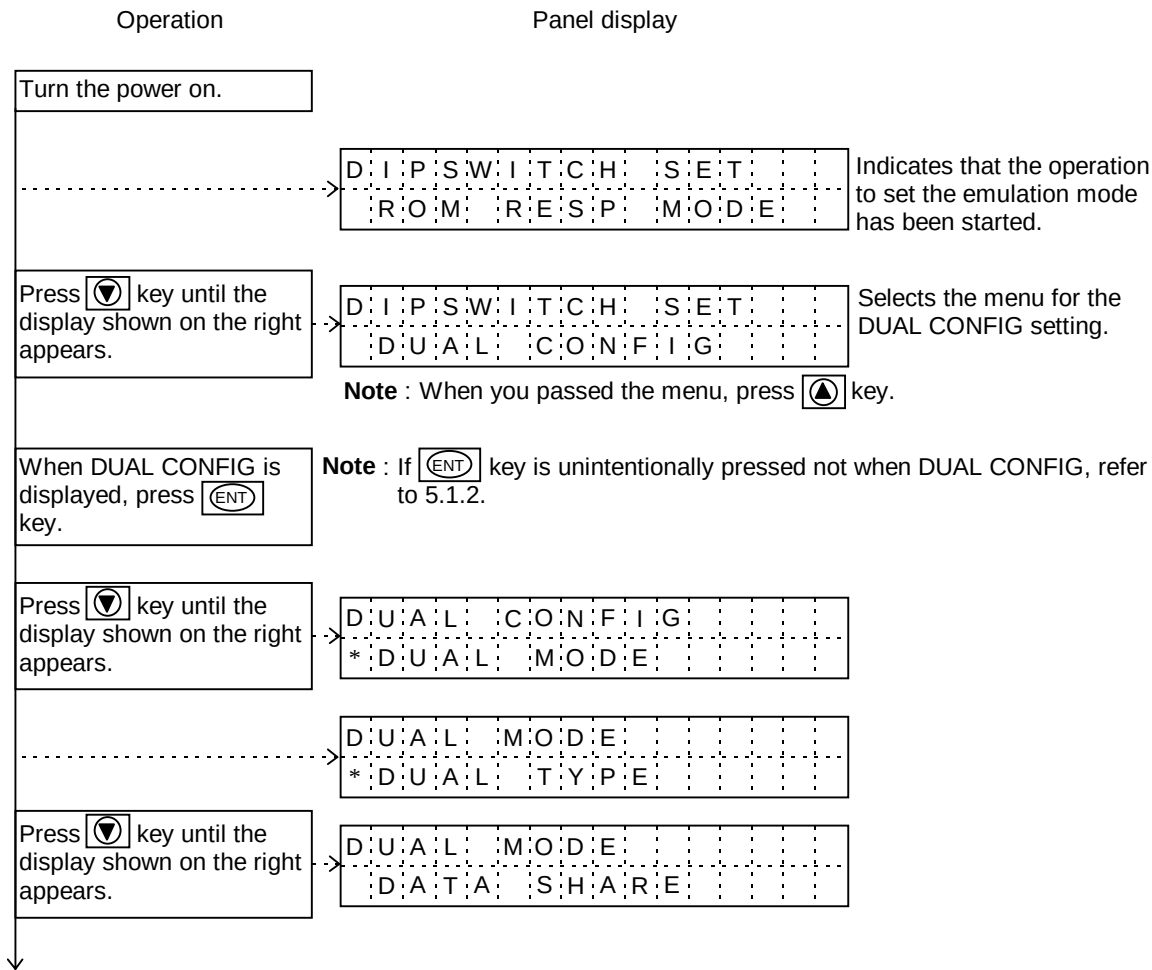
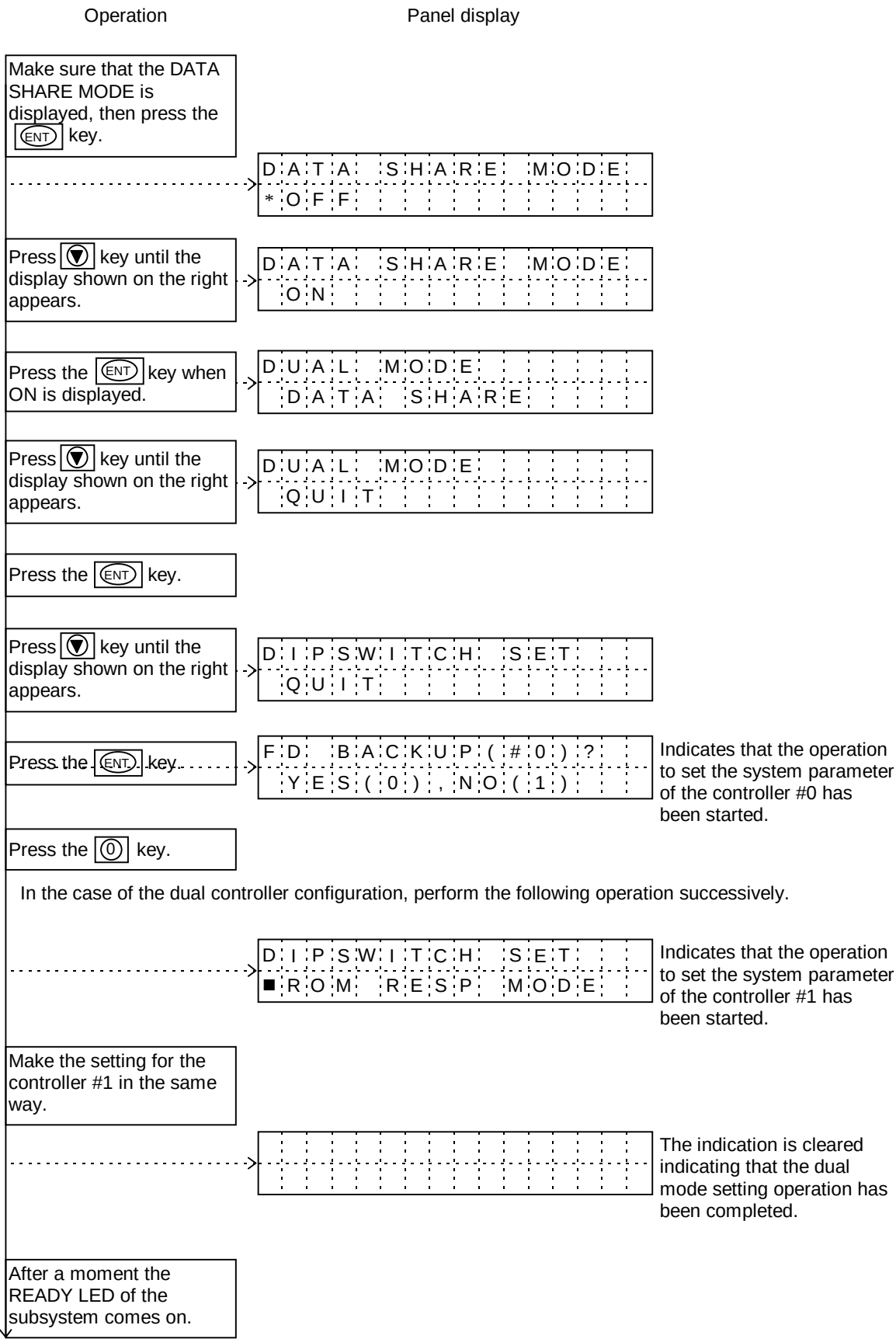


Figure 6.6.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.6.2.

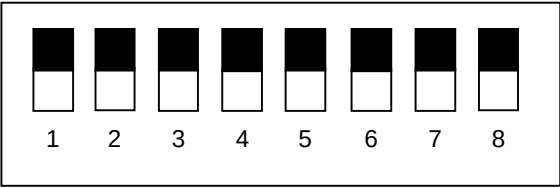


Figure 6.6.2 DIP switches (Being set for Standard setting)

6.7 When the VxVM Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.7.1.

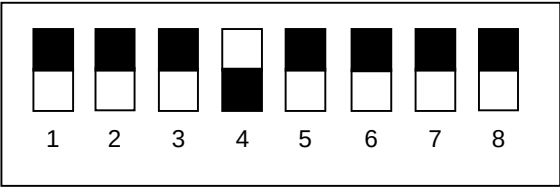
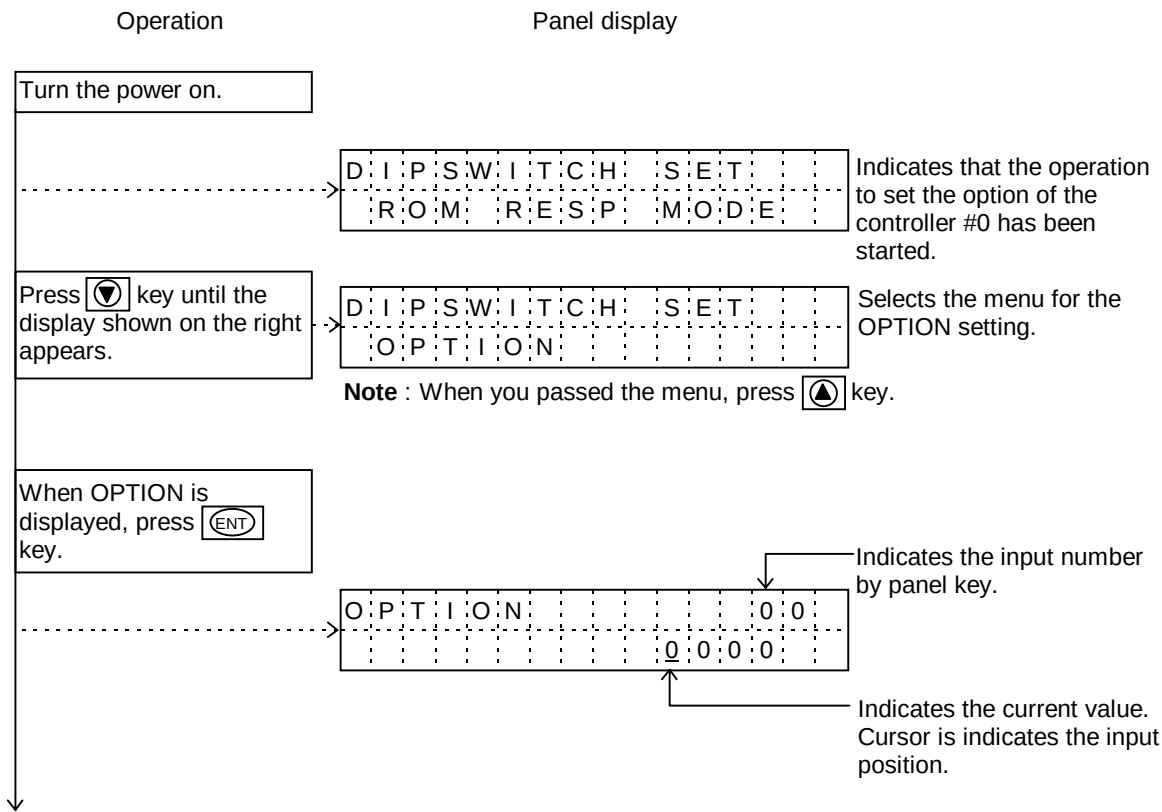
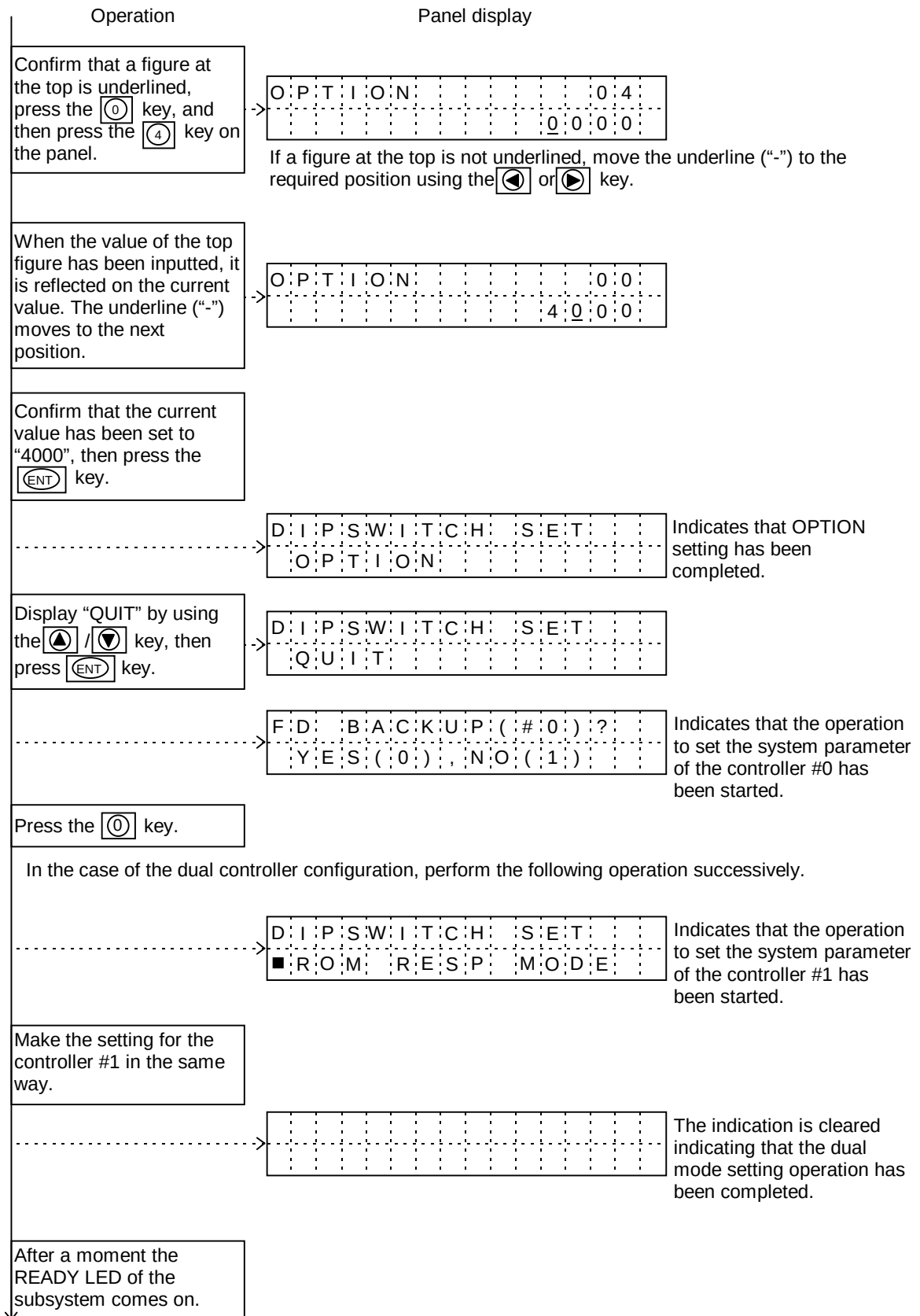


Figure 6.7.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.7.2.

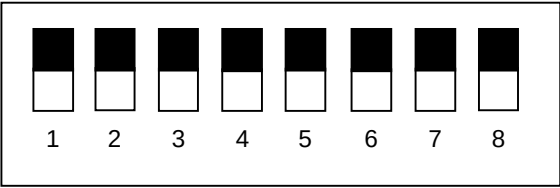


Figure 6.7.2 DIP switches (Being set for Standard setting)

6.8 When the HACMP Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(By using this option, a combination of HACMP and 7135 emulation becomes usable. To use the combination, settings of both this option and 7135 emulation are needed. (For the setting procedure, see Section 6.1.))

(1) Before turning the power on, set DIP switch No.4 as Figure 6.8.1.

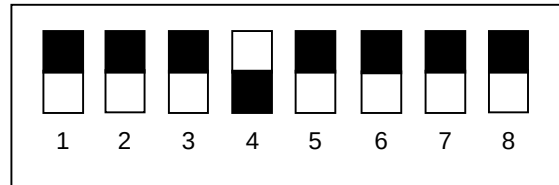
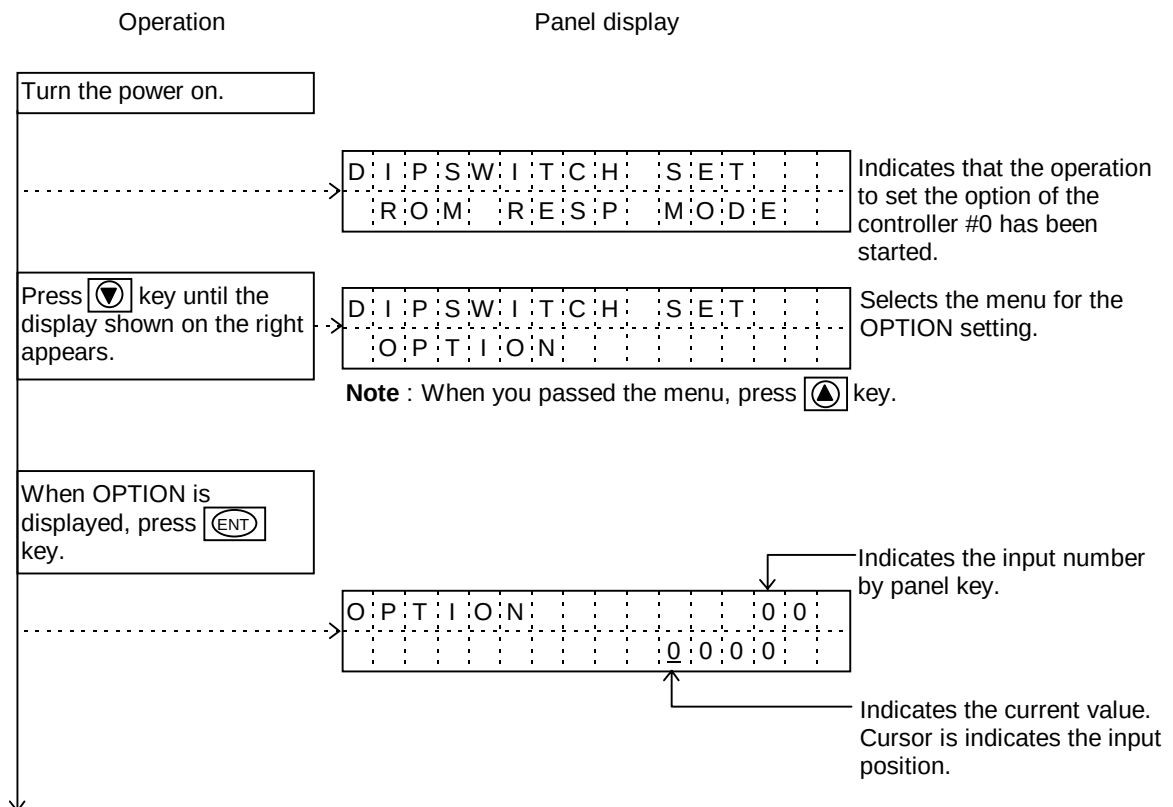
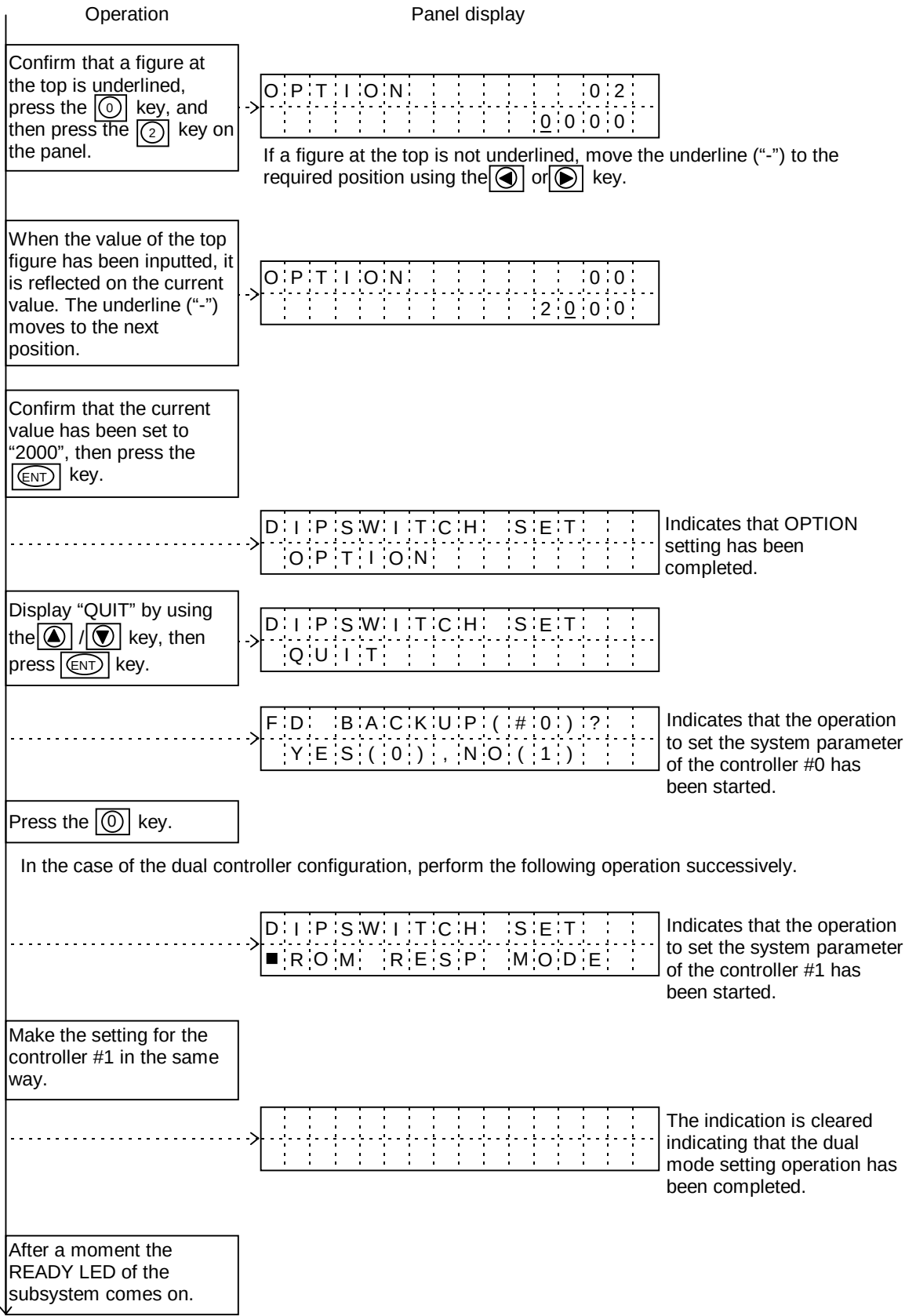


Figure 6.8.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.8.2.

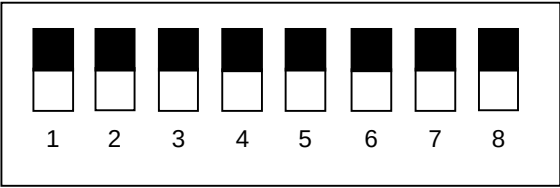


Figure 6.8.2 DIP switches (Being set for Standard setting)

6.9 When Sun OS Solaris 2.5.1 or later is used by the host side

If the following message is displayed on the console screen while executing SUN Format command, use the subsystem with its mode changed to this one.

[Computing capacity exceeds actual disk capacity.]

To use the subsystem in this mode, its microprogram version must be 0304/L, 0305/B or later.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.9.1.

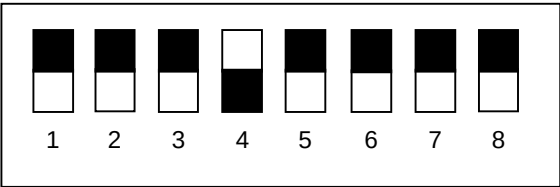
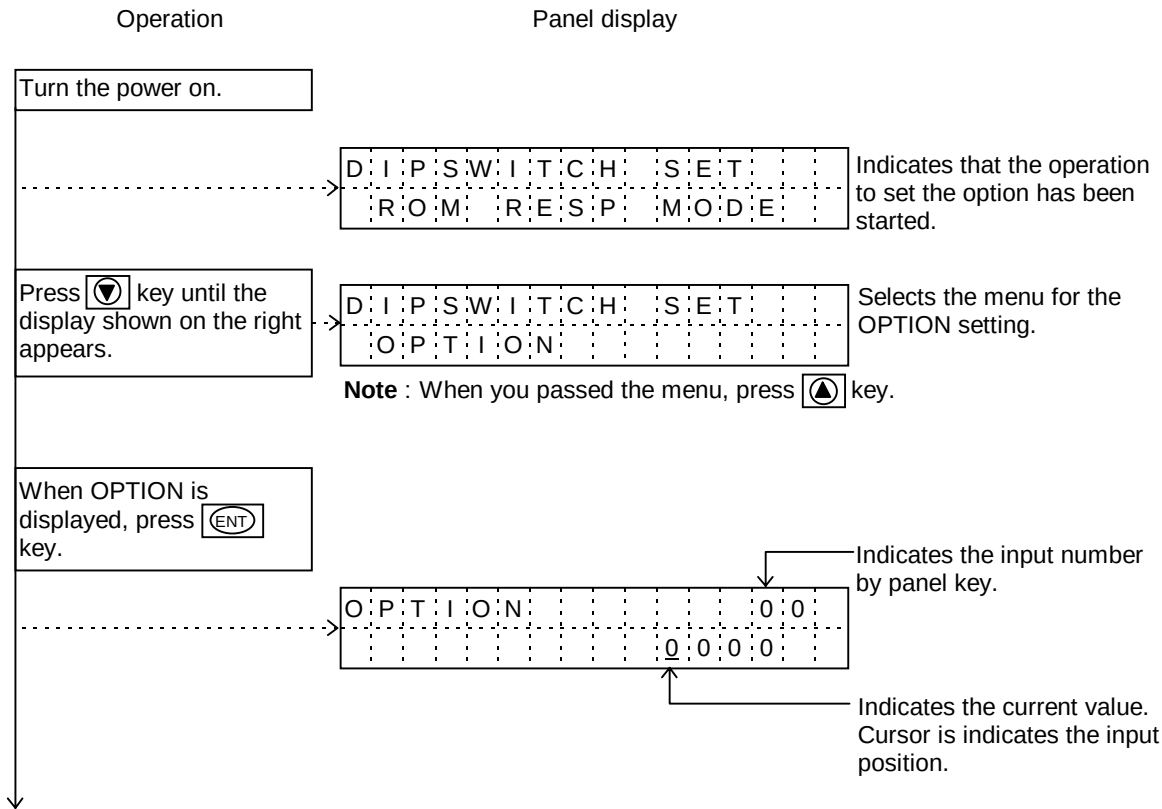
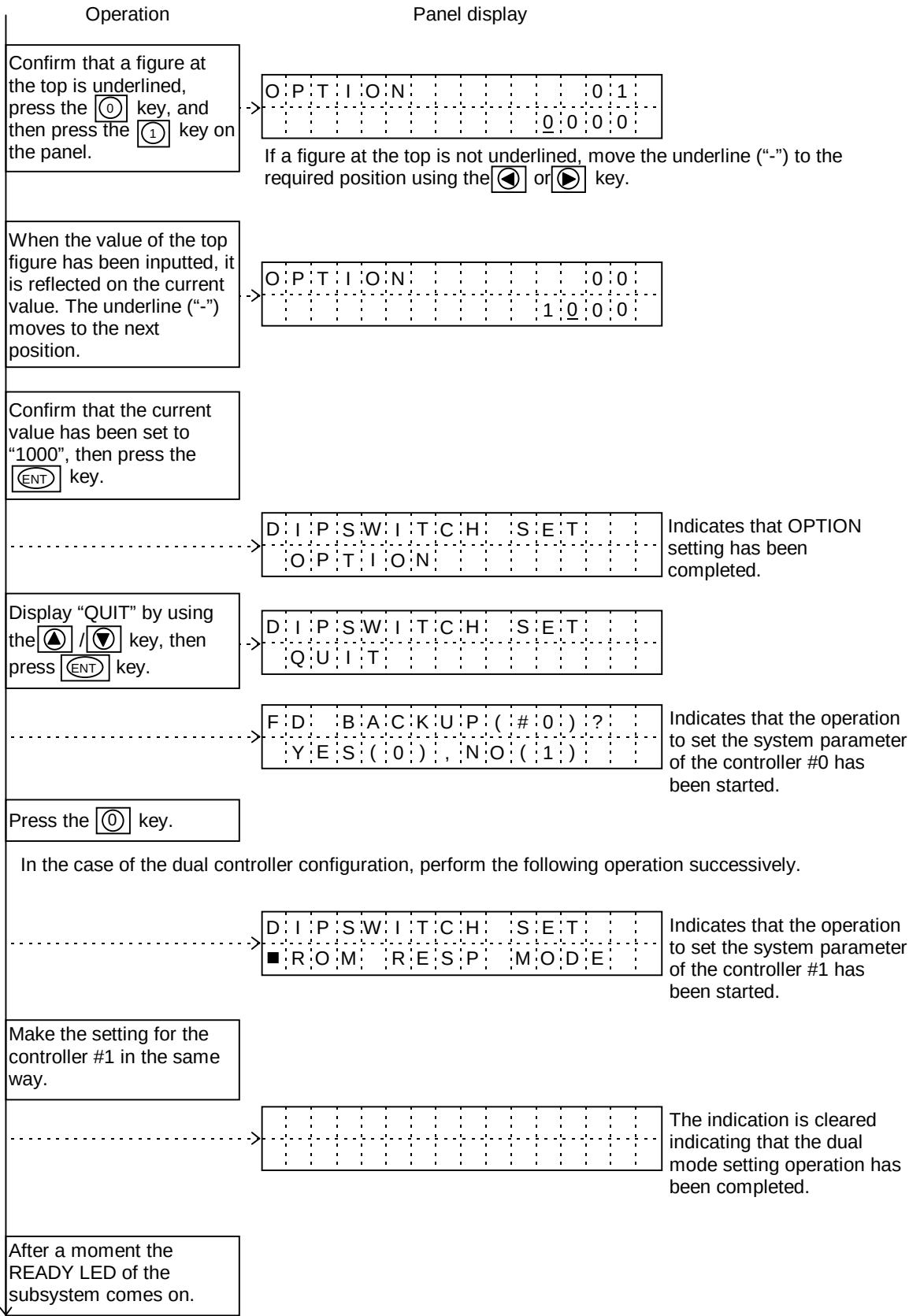


Figure 6.9.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.9.2.

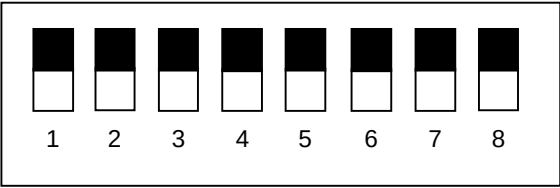


Figure 6.9.2 DIP switches (Being set for Standard setting)

6.10 When Using the Subsystem in Connection with MP5400

When using the subsystem in the state connected with the MP5400, it is necessary to use it with the microprogram Ver.0305/A or later. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.10.1.

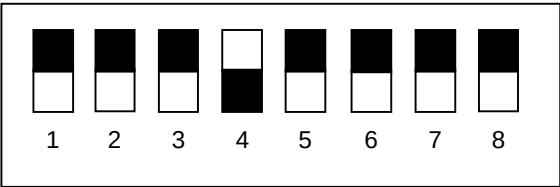
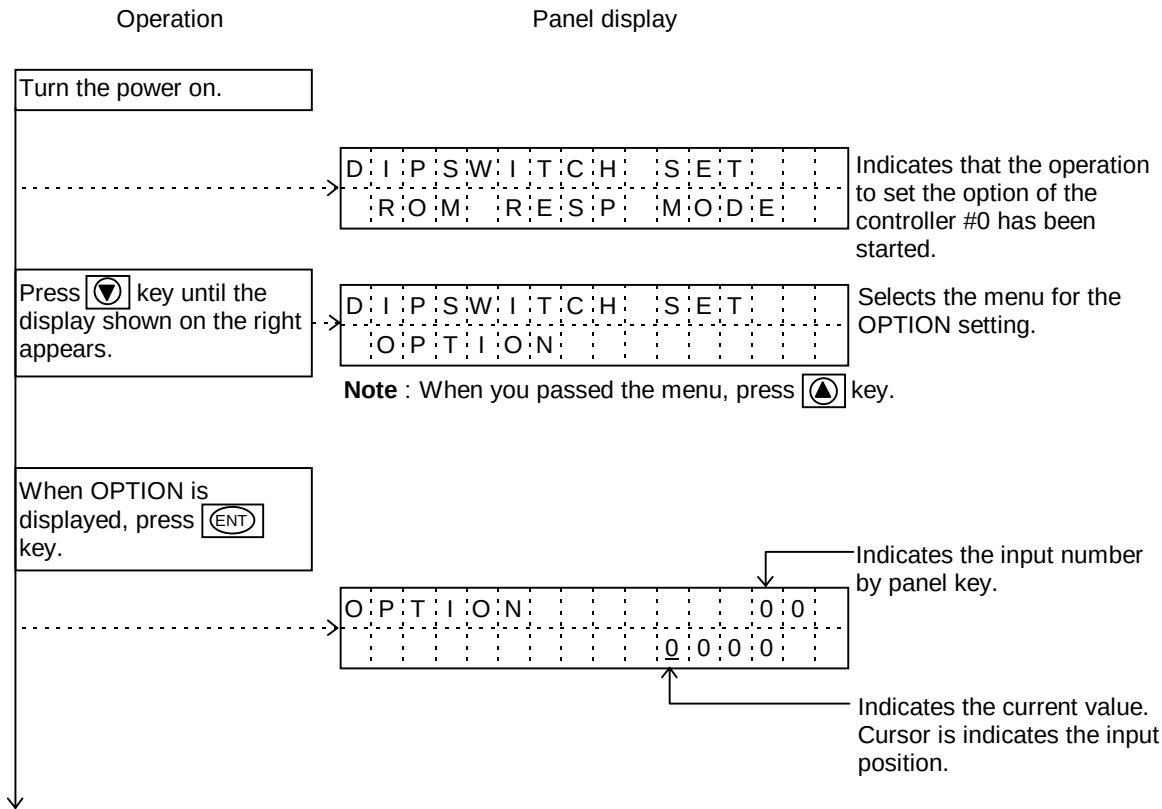
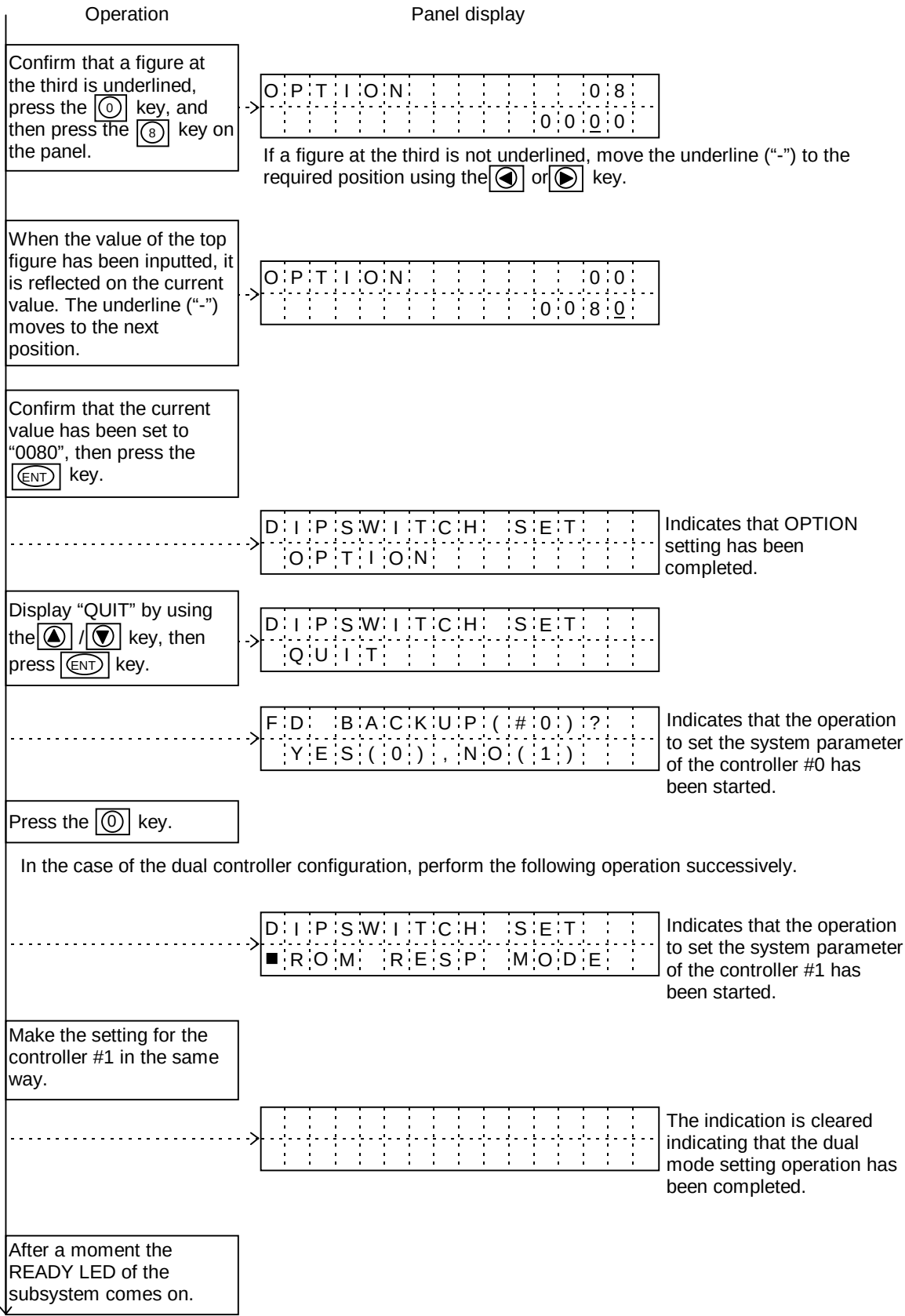


Figure 6.10.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.10.2.

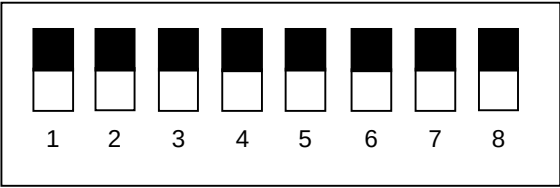


Figure 6.10.2 DIP switches (Being set for Standard setting)

6.11 When Using the Subsystem in LU Blockade Mode

When the subsystem is used in this mode, if a blockade failure occurs on the second disk in the same ROW, the disk concerned is blocked and the LU in which the disk concerned is included is blocked.

When the LU is blocked, data cannot be read from or written onto the LU concerned. If the blocked LU is accessed, a sense key/sense code=0313180 is reported.

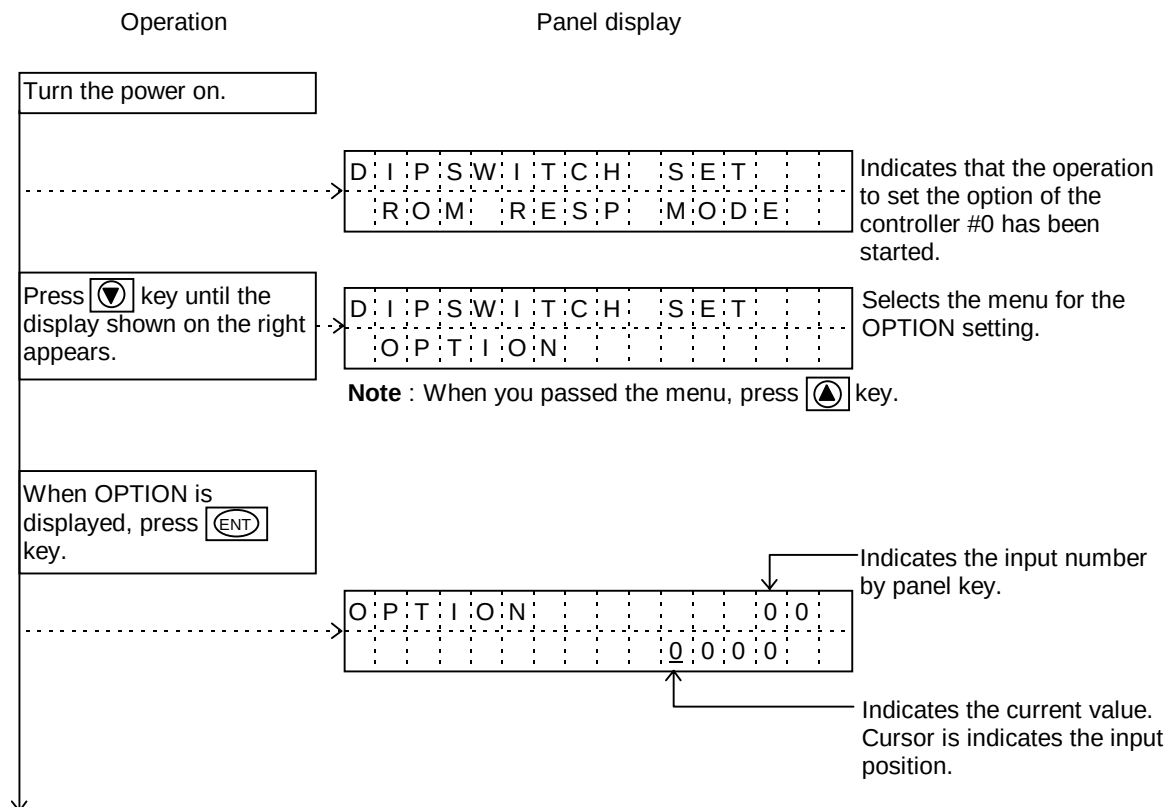
To use the subsystem in this mode, the microprogram must be Ver.0305/B or later.

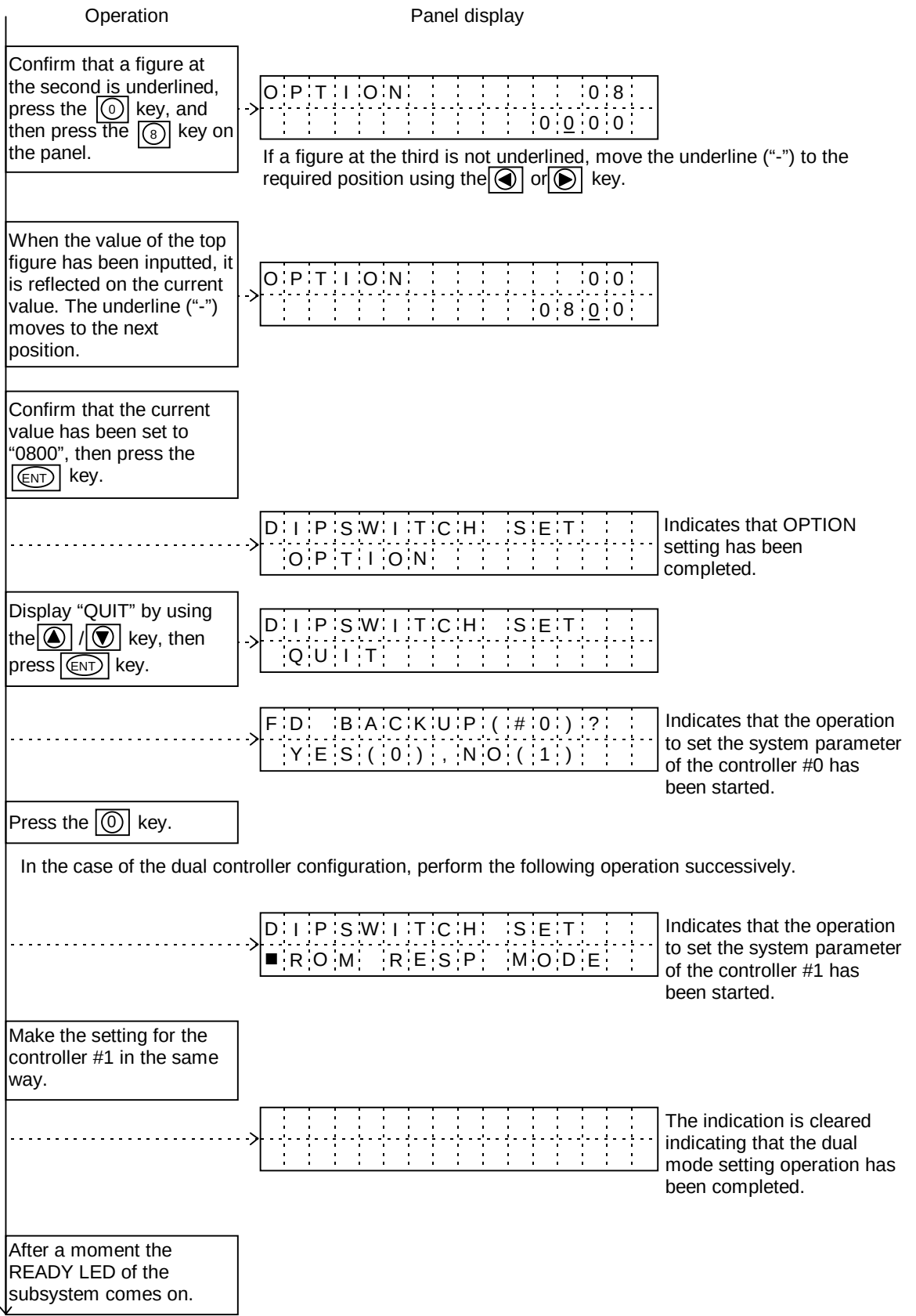
- (1) Before turning the power on, set DIP switch No.4 as Figure 6.11.1.



Figure 6.11.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.11.2.

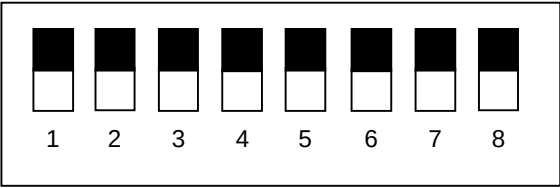


Figure 6.11.2 DIP switches (Being set for Standard setting)

6.12 When outputting information whether a warning is given in the subsystem via RS232C

When outputting information whether a warning is given in the subsystem via RS232C, the microprogram version 0307/F or later is required to be used. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.12.1.

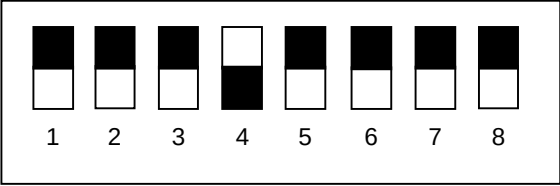
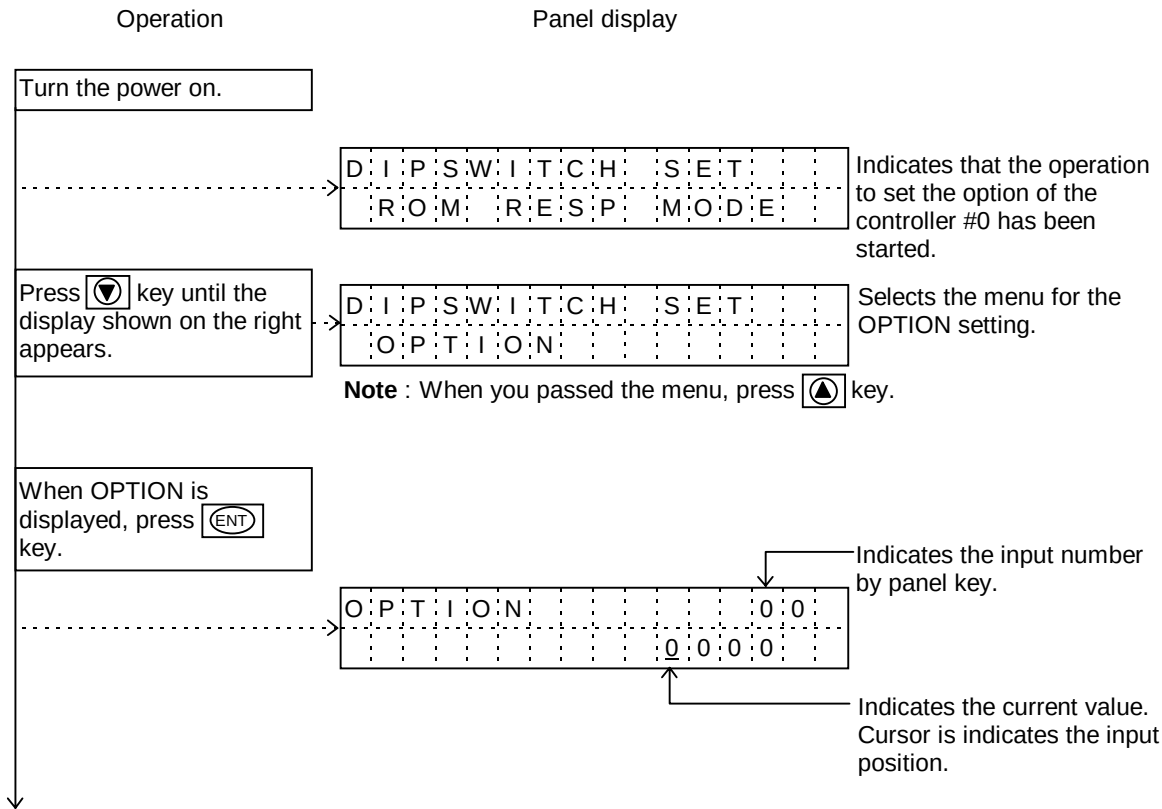
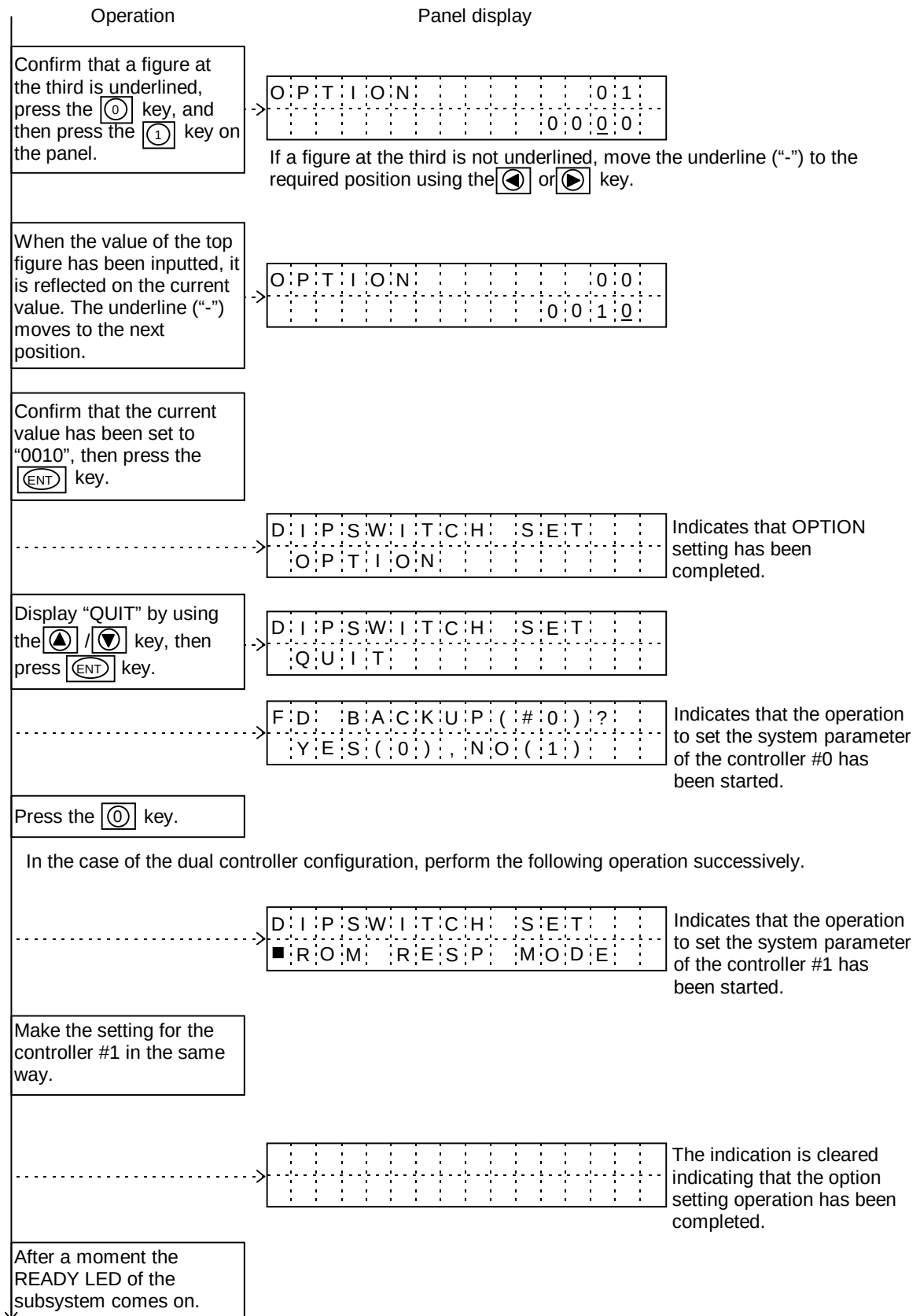


Figure 6.12.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.12.2.

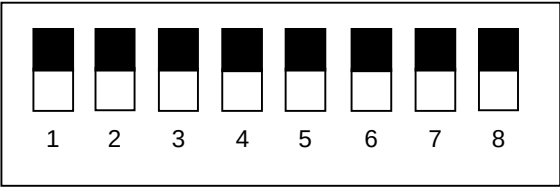


Figure 6.12.2 DIP switches (Being set for Standard setting)

DF350 Disk Subsystem
9. OPTIONAL INSTALLATION
(Mini Tower Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Jan.31.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0220 0260	The description of DF-F350-A2E4A was added in the table. The description of DF-F350-A2E4A was added in the table.	AD AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0060 0070 0100 0110 0115 0180 0182 0184 0190 0200 0220 0230 0260	Changed the flow. Changed the flow. Changed the flow. (2) was deleted. This page was newly added. Changed. This page was newly added. This page was newly added. Figure added. Figure was deleted. Changed the Figure. (DIP switch) Changed the Figure. Changed the Figure.	CH CH CH DL AD CH AD AD AD DL CH CH CH
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0110 0182 0190	Delete Note. Change Flowchart. Added power off.	DL CH AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0020 0120 0140 0142- 0146 0220 0260	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.) Added 2.5.1, 2.5.2. Added 2.5.1. Changed item # in (10). These page were newly added. Added A2E8/A1E18. Added A2E8/A1E18.	AD AD AD CH AD AD AD
6	Oct.15.'98	A.Yamanashi			0050 0060 0080 0090 0220 0260	Added case of the dual controller. Added case of the dual controller. Added case of the dual controller. Added case of the dual controller. Added A3E4/A2E8A. Added A3E4/A2E8A.	AD AD AD AD AD AD

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1. Note when Installing the Optional Features

- (1) Be sure to back-up copy user data before installing the optional features. A mis-operation might cause the loss of user's data.
- (2) Back-up the system parameter according to "Back-up Procedure of System Parameter". (See MK-OPTION0050.)
- (3) Power off the subsystem according to power off procedure before installing the optional features. If not, user's data might be lost.

2. Installing the Optional Features

2.1 Unit Appearance Check

Check visually the unit appearance for distortion or damage during the transportation.

2.2 Checking Items of System Components and the Other Items Shipped with the Unit

Check items and quantities of system components (model, serial number, and quantity) and other items shipped together with the unit. Cross-check with the packing list.

2.3 Back-up Procedure of System Parameter

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) are need to be copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters following “Back-up procedure to FD” (See MK-OPTION0050) or “Restoring procedures from FD” (See MK-OPTION0080).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

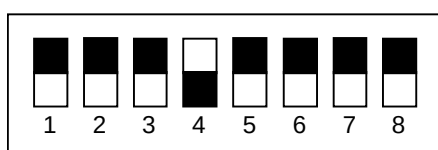
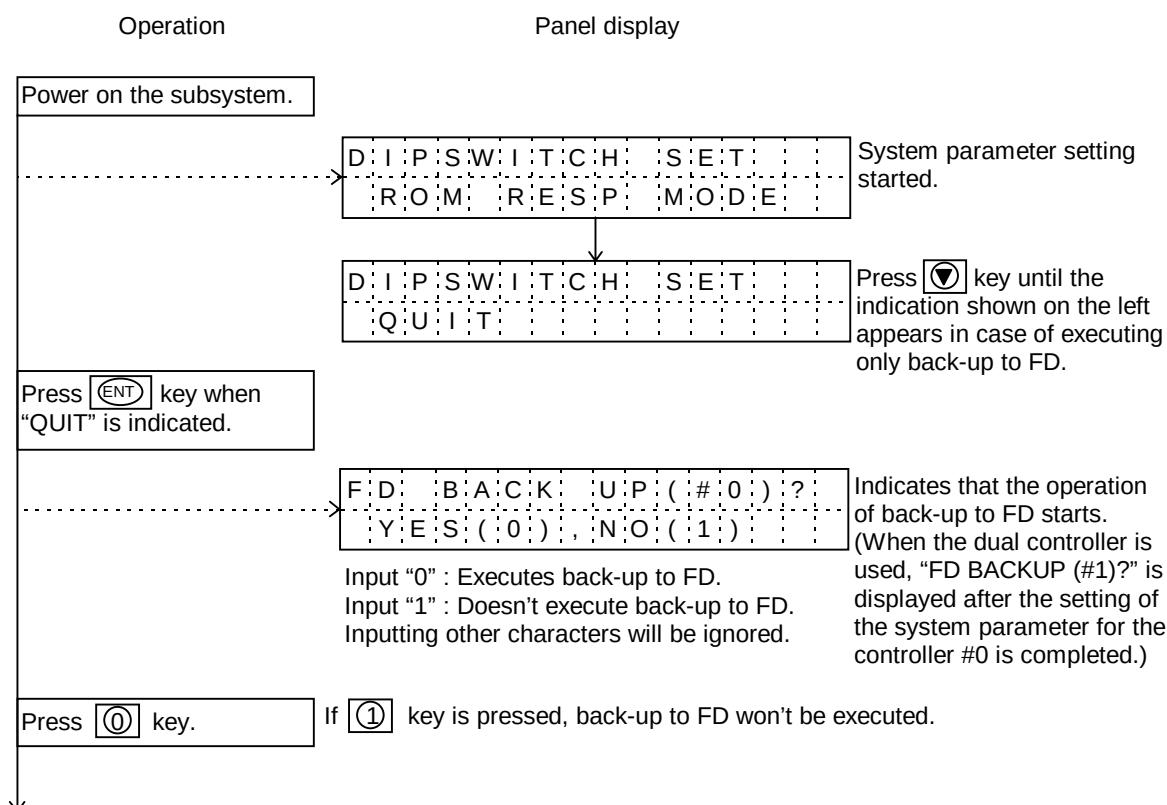
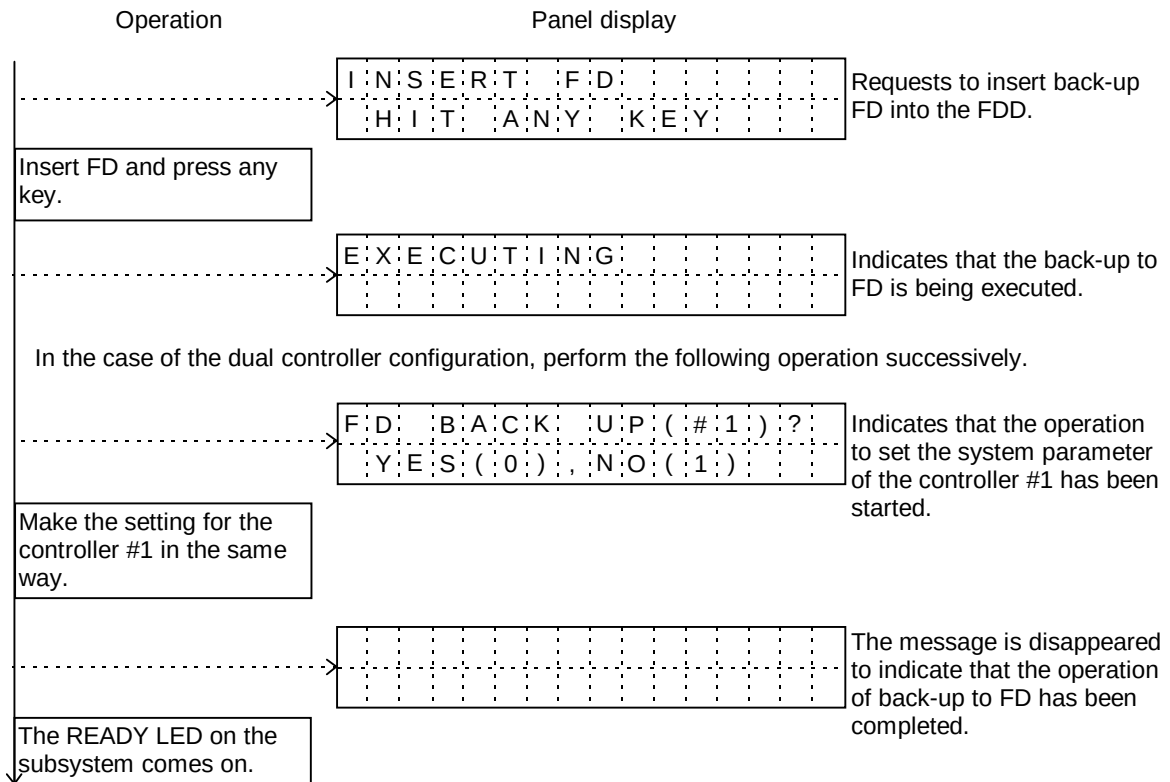


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

- (3) Operate as described below.





(4) Set DIP switch No.4 as shown in Figure 2.3.2.

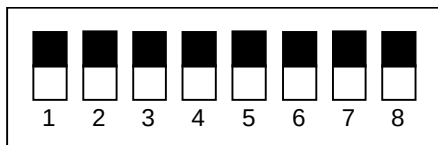
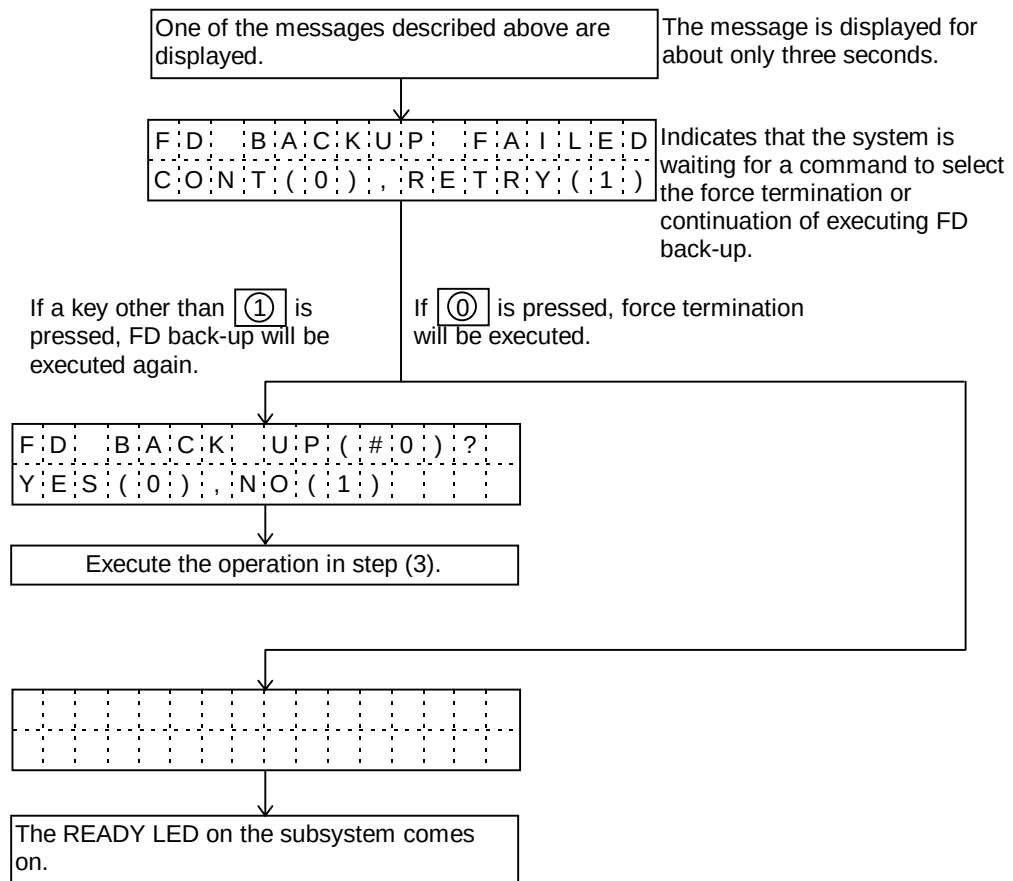


Figure 2.3.2 DIP Switches

Note 1 : While the back-up to FD is being executed, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP switches as shown in Figure 2.3.3.

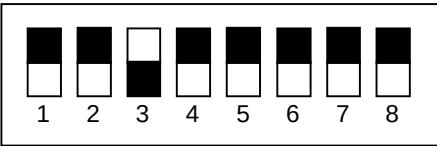
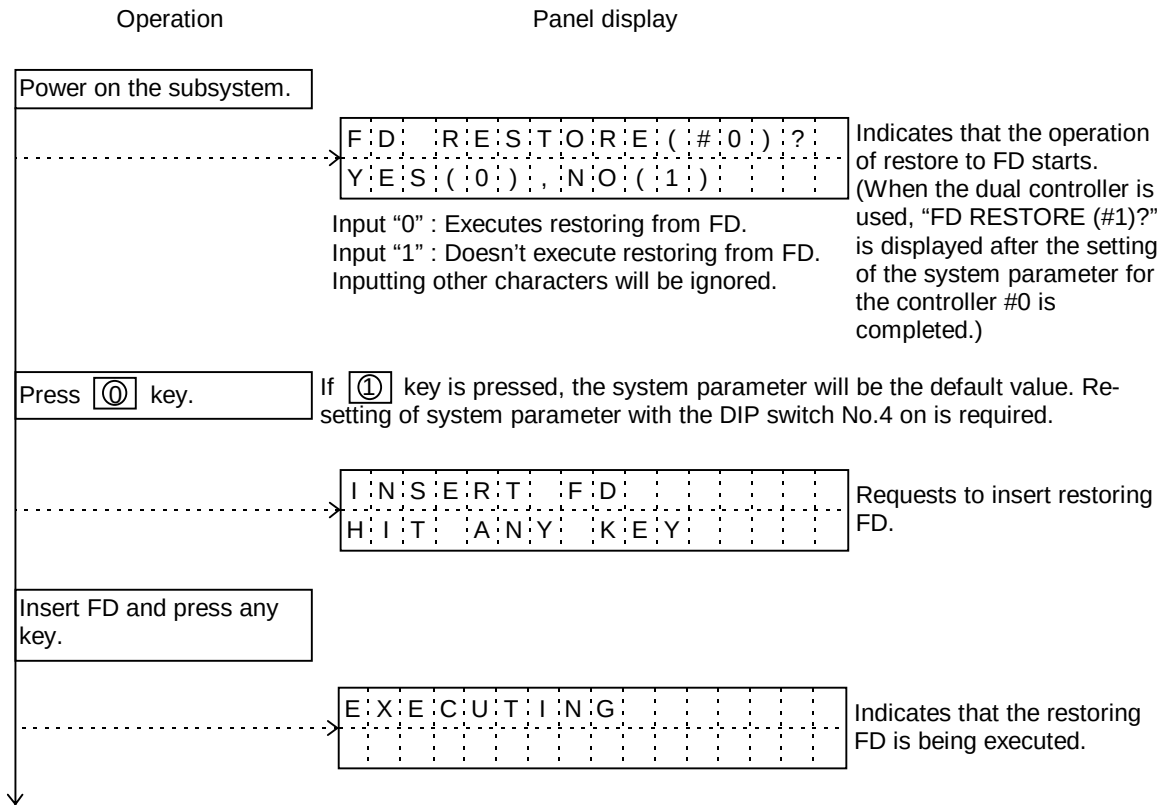
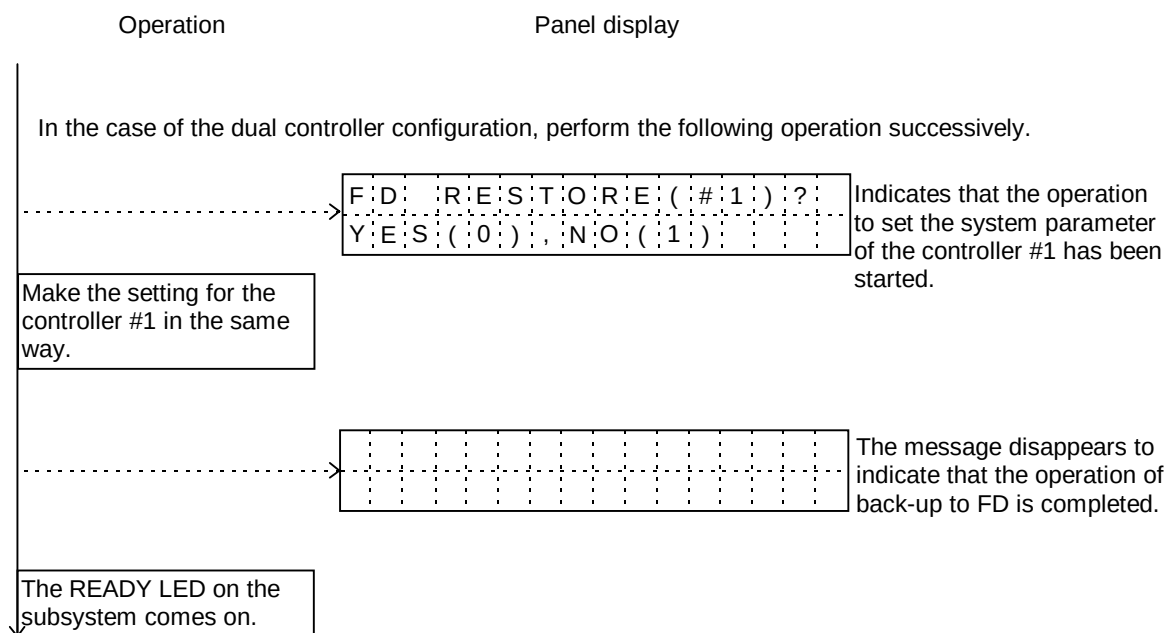


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

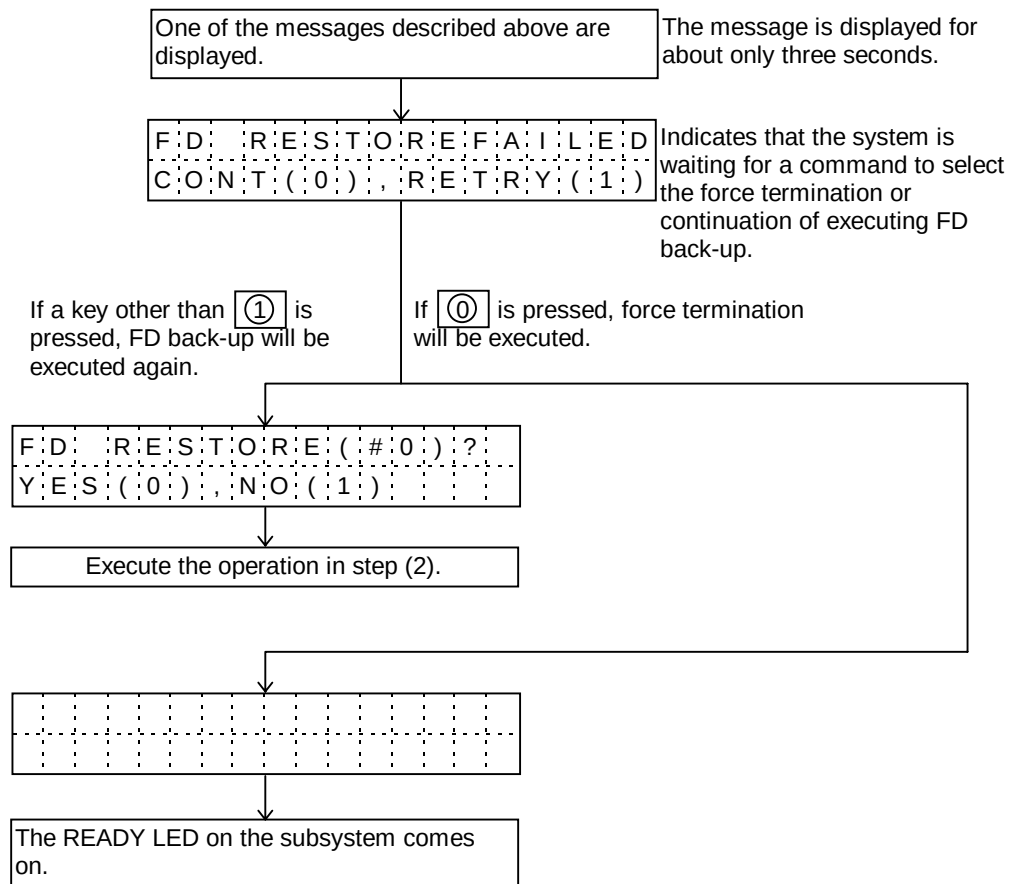


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-execute following the operation described below.



Note 2 : In case that restoring operation ended in failure and was force terminated, setting of EEPROM will be default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

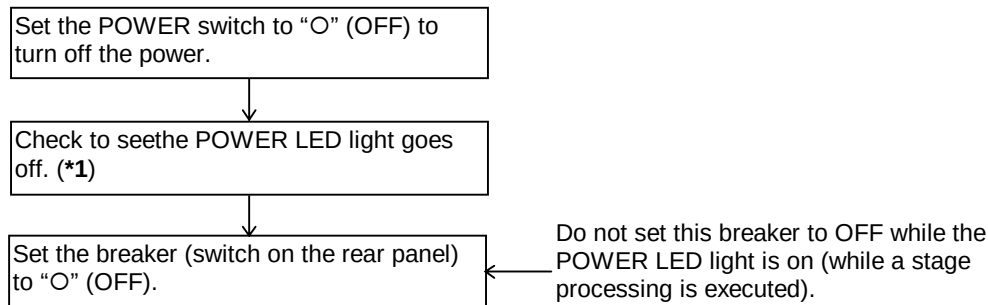
Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

2.4 Power OFF

Turn off the power correctly according to the Power OFF Procedure (1) shown below.

Notice : If optional features are not installed to the system correctly, user data may be lost.

(1) Power OFF procedure



If a power down occurs or the breaker is set to OFF by mistake before the POWER LED goes off, turn on the power right away according to the "(2) Power ON procedure" below, then execute the power off procedure above.

*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

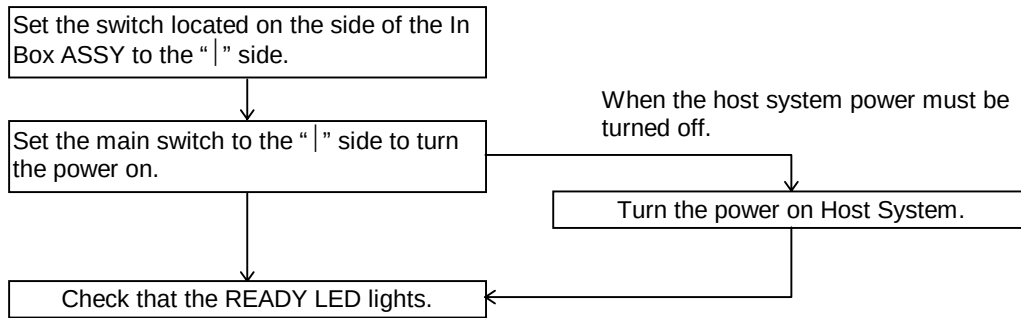
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on----- Indicates the back-up mode.

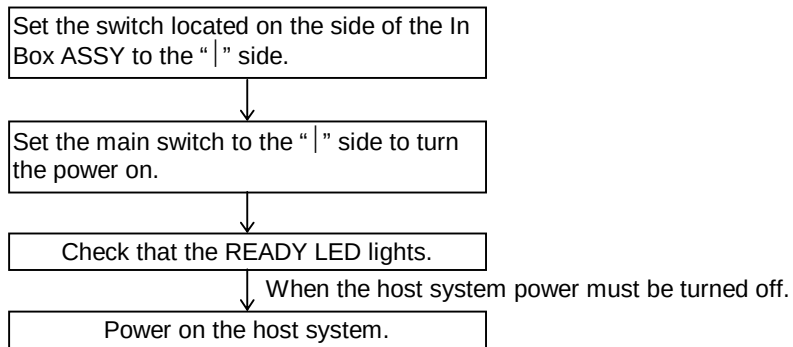
CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.5 Installing the CTL ASSY and I/F ADAPTER ASSY

2.5.1 When changing the single controller configuration to the dual controller configuration

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See MK-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Open the side covers.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on MK-OPTION0160.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked ierection (→) at the same time. (See Figure 2.5.1.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.5.1.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

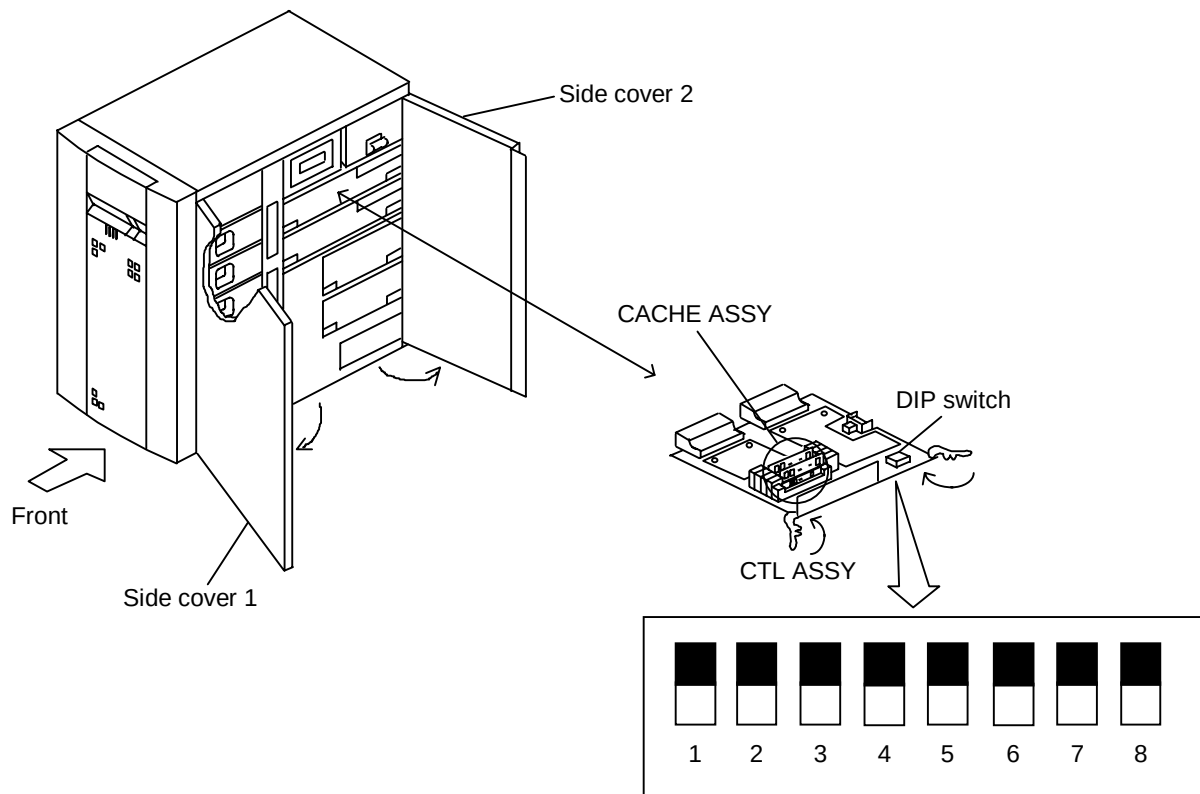


Figure 2.5.1 Installing the CTL ASSY

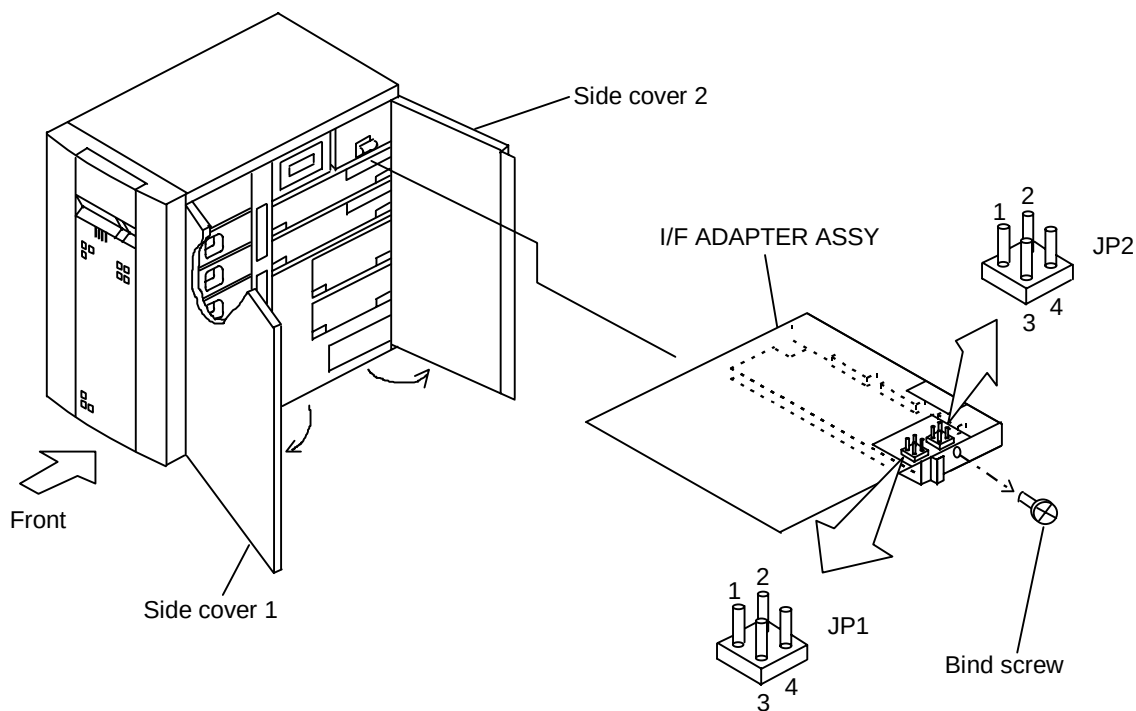
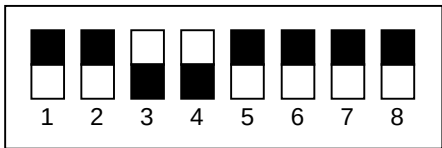


Figure 2.5.2 Installing the I/F ADAPTER ASSY

Table 2.5.1 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. Then, power on the unit. (See MK-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

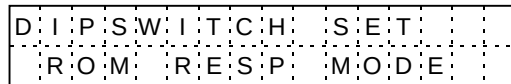
- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See MK-OPTION0090.)

- (10) When system parameter set up menu appears as below, select "DUAL MODE" in "DUAL CONFIG" (setting of Dual operation attribute) menu. (See PANEL0080.)

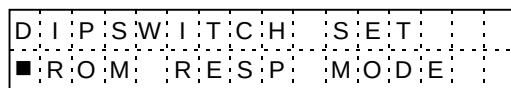
Set target ID for each CTL ASSY individually in "TARGET ID" (setting Target ID) menu.

Set the items #1, 2, 4, 5, 9, 11, 14, 17, 22, 25 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. "■" appears on the panel when the CTL1 system parameter is to be set.
 "■" not displayed : CTL0 system parameter is set.
 "■" displayed : CTL1 system parameter is set.

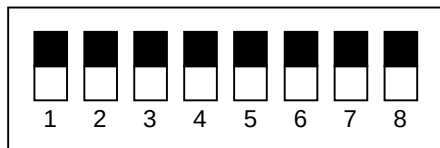


This indicates CTL0 system parameter setting.



This indicates CTL1 system parameter setting.

- (11) After the setting is ended, make a copy of the data into the back-up FD again. (See MK-OPTION0050.)
- (12) Check to see that READY LED is on.
- (13) Turn off the unit (by setting the POWER switch on the front panel to off).
- (14) Set the DIP SW on both boards as shown below.



- (15) Turn on the unit (by setting the POWER switch on the front panel to on). (See MK-OPTION0110.)

- (16) In a short while, the READY LED on the unit comes on.

Check to see "Version XXXX/X" is displayed on the PANEL, and that corresponds to see system floppy disk version.

- (17) Close the side covers.

2.5.2 When changing the single controller configuration using in WolfPack connection to the dual controller configuration

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See MK-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Open the side covers.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on MK-OPTION0160.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked ierection (→) at the same time. (See Figure 2.5.3.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.5.4.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

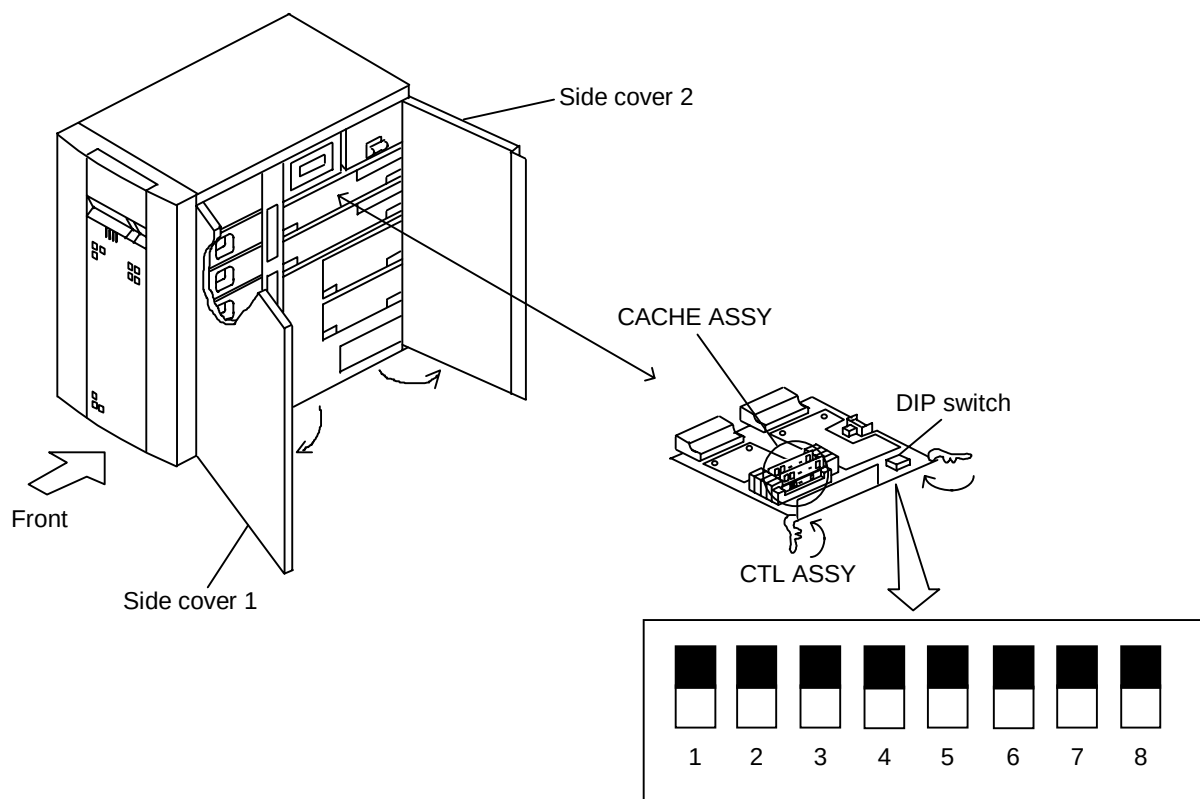


Figure 2.5.3 Installing the CTL ASSY

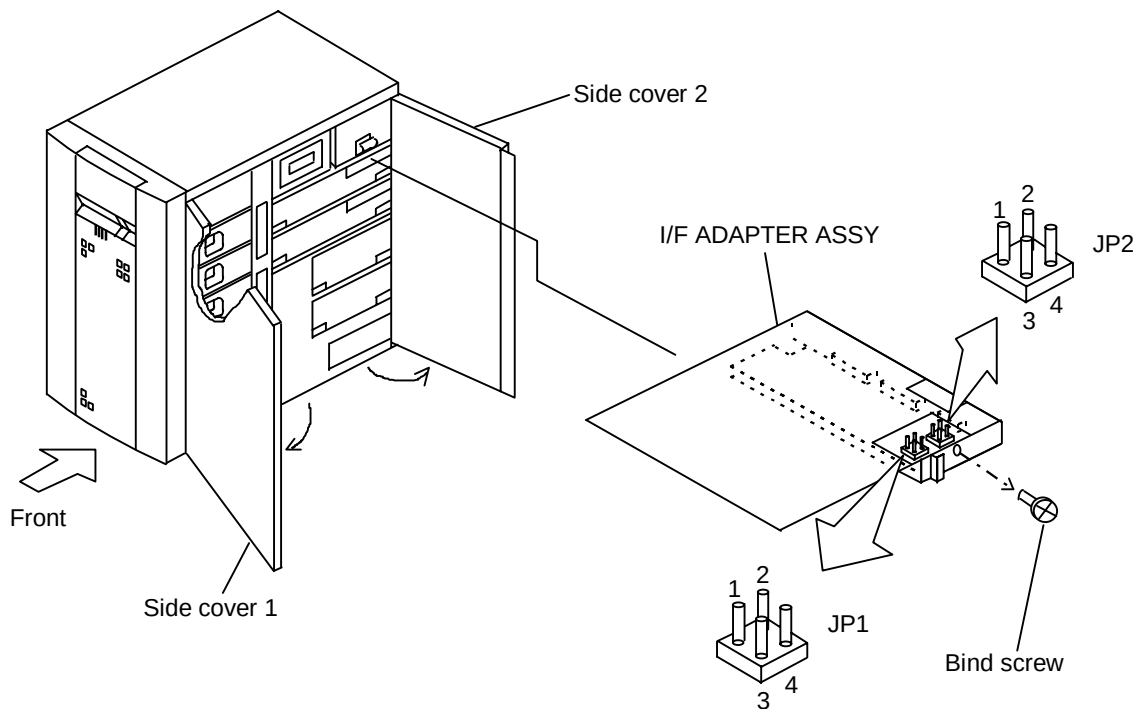
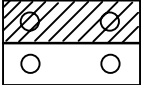
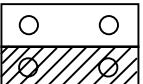
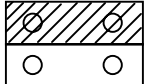
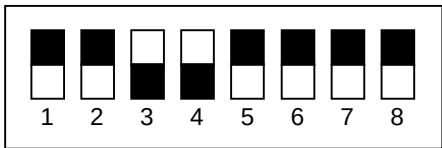


Figure 2.5.4 Installing the I/F ADAPTER ASSY

Table 2.5.2 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. Then, power on the unit. (See MK-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See MK-OPTION0090.)

(10) Set the following system parameters.

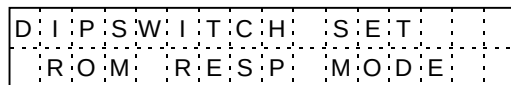
- Set the attribute to “DUAL ACTIVE” and “DATA SHARE MODE” in the DUAL CONFIG (dual operation attribute setting) menu window.
- Set the code “0020” in the OPTION (option code setting) menu window.
- Set the target ID separately for the both CTL ASSYs in the TARGET ID (target ID setting) menu window.

Set the items #1, 2, 4, 5, 9, 11, 14, 17, 22, 25 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

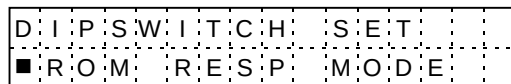
- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. “■” appears on the panel when the CTL1 system parameter is to be set.

“■” not displayed : CTL0 system parameter is set.

“■” displayed : CTL1 system parameter is set.



This indicates CTL0 system parameter setting.



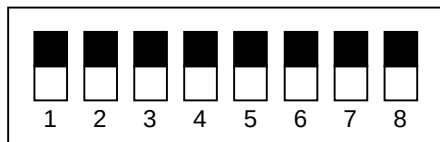
This indicates CTL1 system parameter setting.

(11) After the setting is ended, make a copy of the data into the back-up FD again. (See MK-OPTION0050.)

(12) Check to see that READY LED is on.

(13) Turn off the unit (by setting the POWER switch on the front panel to off).

(14) Set the DIP SW on both boards as shown below.



(15) Turn on the unit (by setting the POWER switch on the front panel to on). (See MK-OPTION0110.)

(16) In a short while, the READY LED on the unit comes on.

Check to see “Version XXXX/X” is displayed on the PANEL, and that corresponds to see system floppy disk version.

(17) Close the side covers.

2.6 Installing the CACHE ASSY

- (1) Turn off the power according to the power-off procedure in MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- (2) Open the side covers.

- (3) Remove the CTL ASSY. (See MK-OPTION0120.)

(When a DF-F350-F2MCF has been installed already, remove both boards, and here after in the same way.)

- (4) Install a CACHE ASSY.

Note 1 : The capacity of the CACHE ASSYs to be mounted in cache slots #0 and #4, slots #1 and #5, slots #2 and #6, and slots #3 and #7 must be the same.

Note 2 : If a DF-F350-F2MCF has been installed already, mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- (5) Mount the CTL ASSY.

- (6) Turn on the power according to the power-on procedure in MK-OPTION0110.

- (7) Close the side covers, and turn the power on. (See MK-OPTION0110.)

Installation example of CACHE ASSY

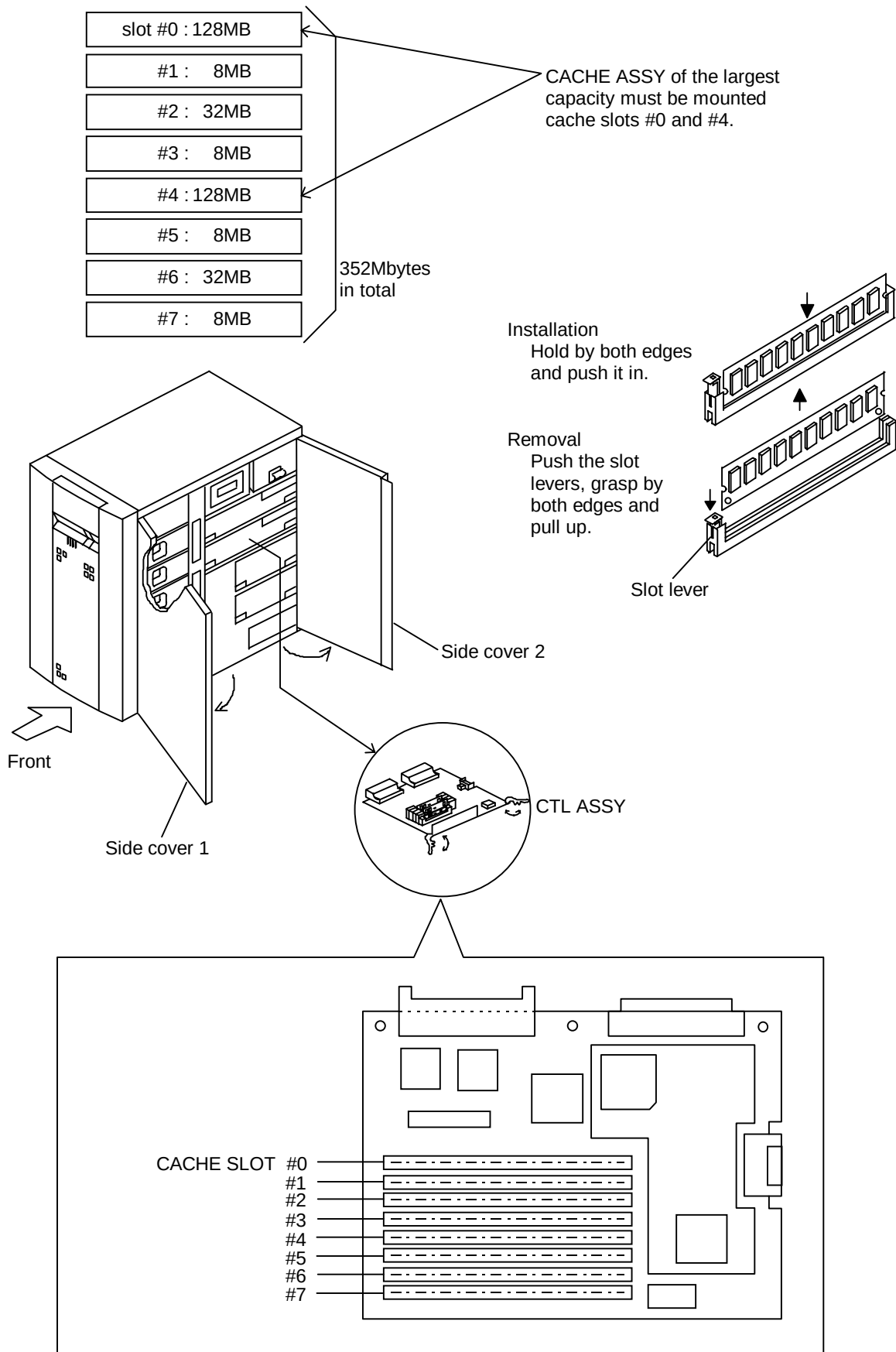


Figure 2.6.1 Installing a CACHE ASSY

2.7 Installing the LAN ASSY

- (1) Turn off the power according to the power-off procedure in MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the side covers.
- (3) Remove the CTL ASSY. (See MK-OPTION0120.)
- (4) Install a LAN ASSY. (See Figure 2.7.1.)

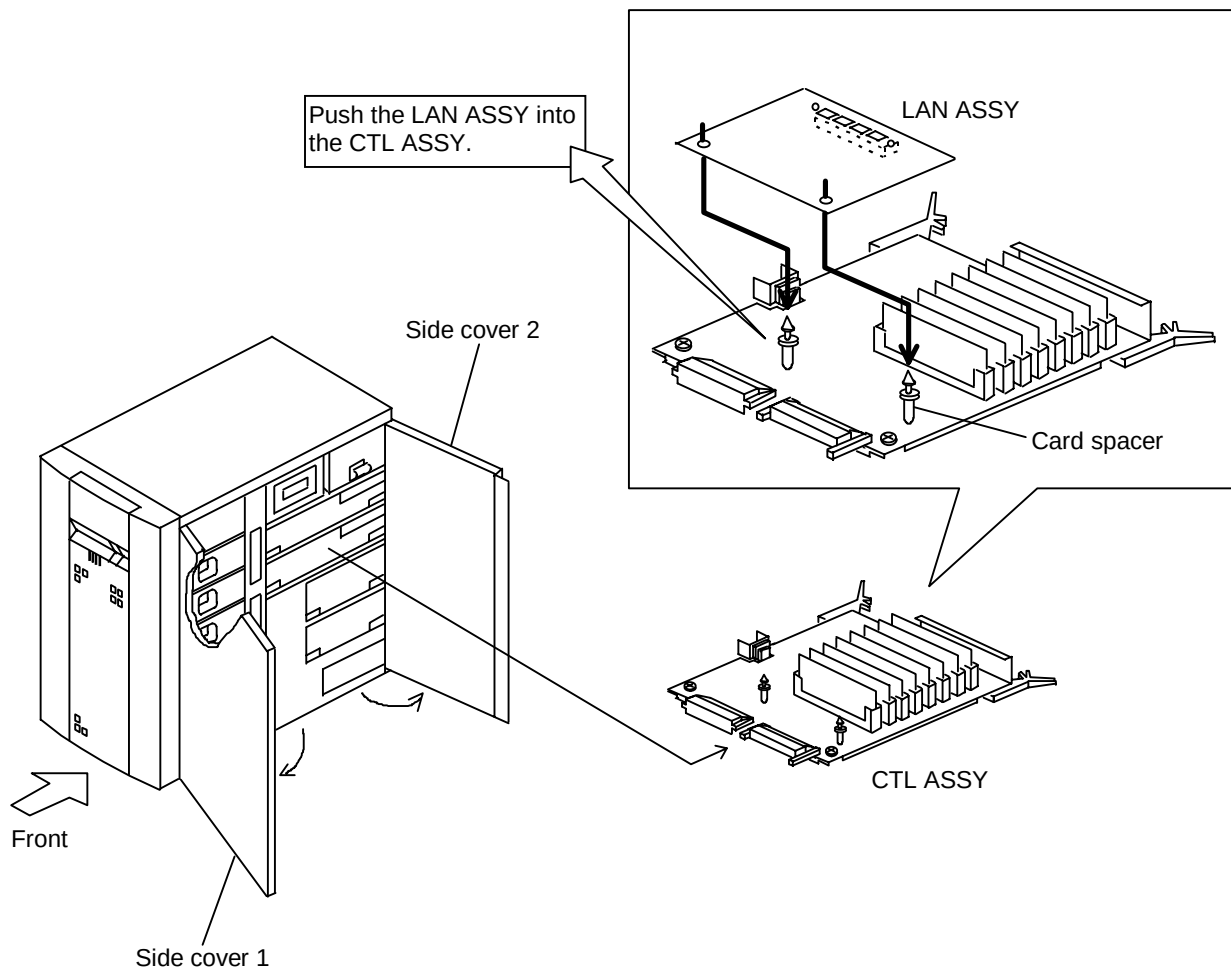
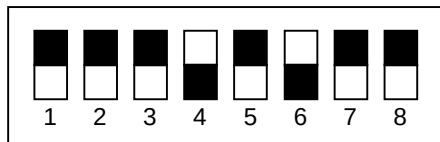


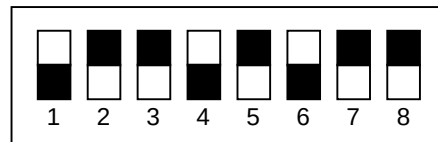
Figure 2.7.1 Installing a LAN ASSY

- (5) Mount the CTL ASSY.
 - (6) Set the DIP switches on the CTL ASSY as described below. (See MK-OPTION0120.) depending on the LAN ASSY to be used.
- (When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

[DF-F350-G1M1]



[DF-F350-G2M1 (SNMP)]



- (7) Turn on the power according to the power-on procedure in MK-OPTION0110.
- (8) Open the front cover.
- (9) Set LAN connection state on the panel.

① Panel display

C	O	N	N	E	C	T
L	A	N				

← Pressing , key, items are scrolled.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”.)

② Displayed Item

No.	Message display	Description
1	CONNECT	LAN connected
2	NOT CONNECT	LAN not connected

- (10) Set IP address on the panel. (See MK-INST0330)
- (11) Set SUB NET MASK. (See MK-INST0340)
- (12) Set DEFAULT GATEWAY address. (See MK-INST0350.)
- (13) Set System parameter on the panel. (See MK-INST0290.)
- (14) After setting ② in Chapter 5 and selecting “QUIT” on the panel, when “FD BACK UP” appears on the screen, insert a back-up FD and make a back-up copy of the system parameter.

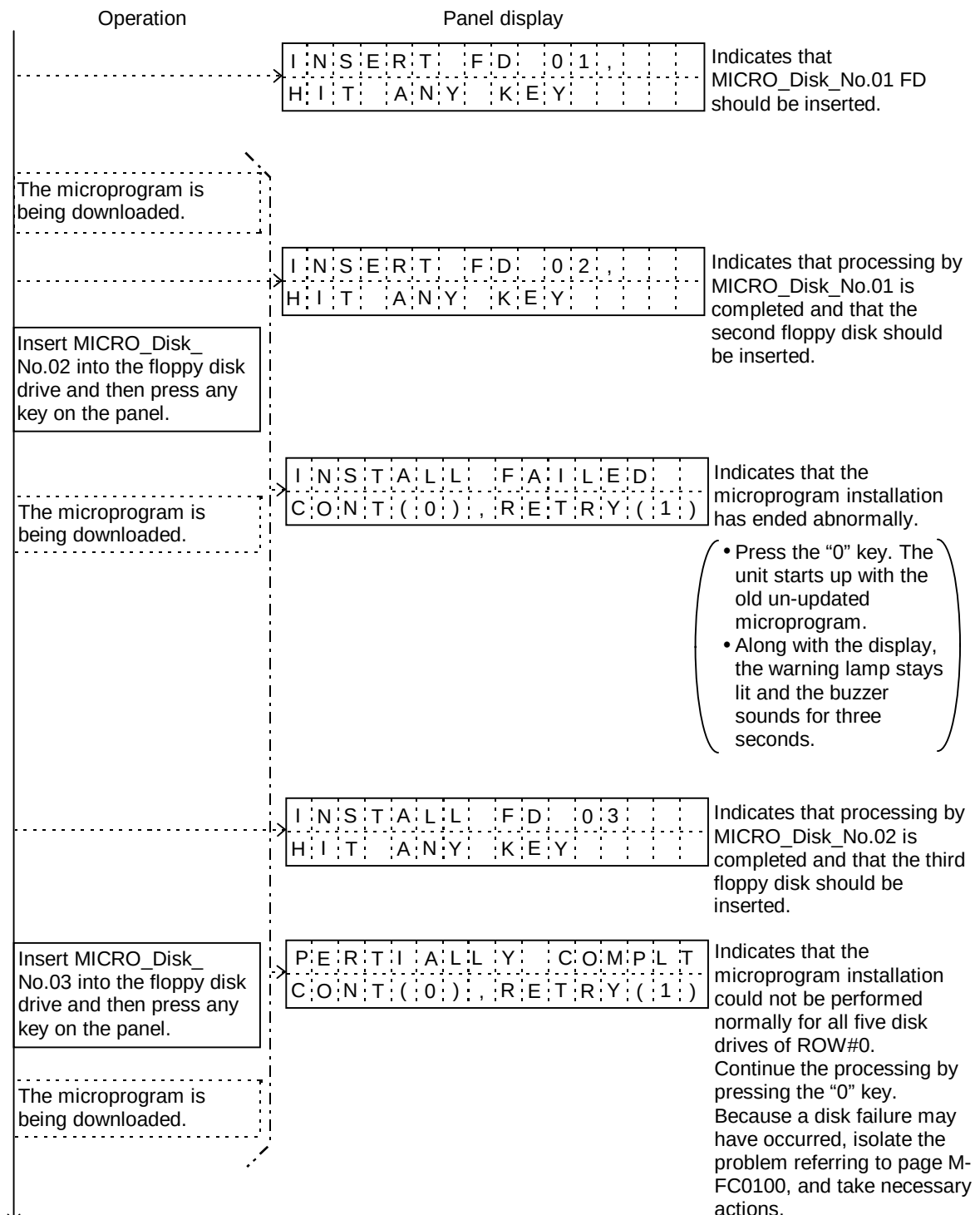
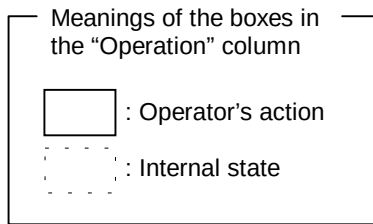
D	I	P	S	W	I	T	C	H	S	E	T	➔	F	D	B	A	C	K	U	P	(	#	0	)	?
Q	U	I	T										Y	E	S	(	0	)	,	N	O	(	1	)	

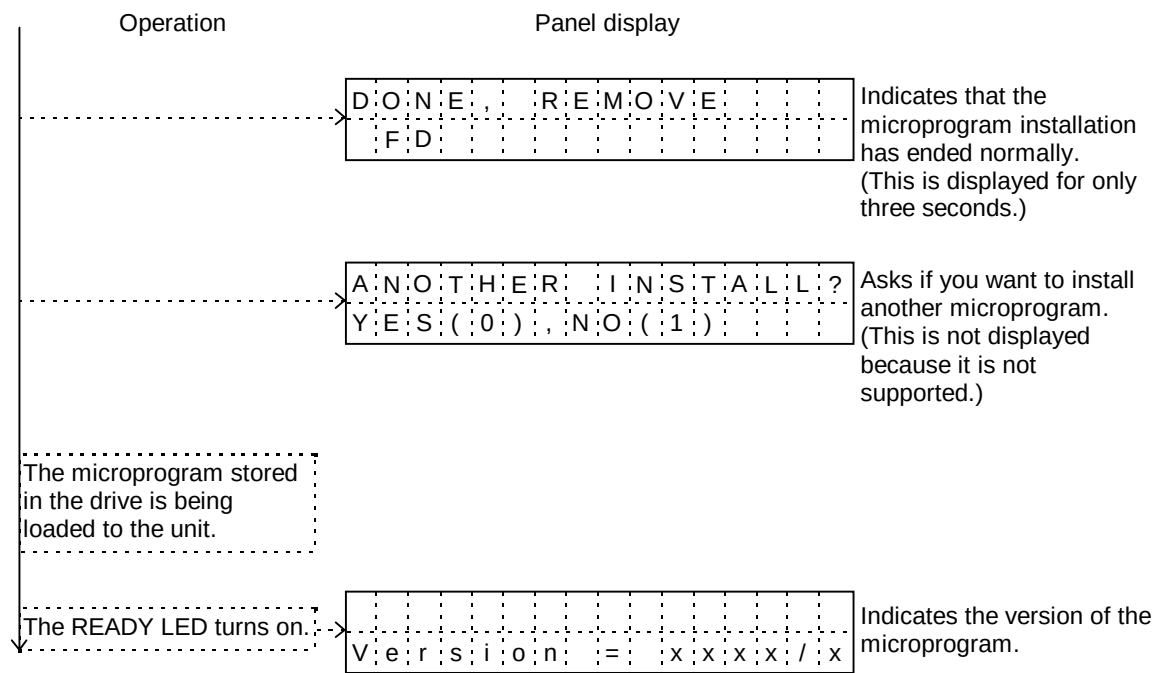
If this message appears, make a back-up copy of the data in the EEPROM into the BACKUP floppy disk.

In case of dual configuration, “FD BACK UP (#1)?” is displayed. Select the controller to be restored.

(15) Perform the following procedure.

Note : Use a set of three FDs (containing a microprogram corresponding to the SNMP) supplied with the DF-F350-G2M1 when it is shipped from the factory.





- (16) Reset the DIP switches (4, 6 or 1, 4, 6) to the original positions after the system is ready.
(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)
- (17) Close the front cover.
- (18) Close the side covers.

2.8 Installing the AC/DC Power Supply

Perform the following procedure

(1) Installing procedure

- ① Turn off the subsystem following the power-off procedure explained in MK-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

- ② Open the side covers.
- ③ Loosen the screw ① on the safety cover and disconnect one end of the FG cable.
- ④ Loosen the screws ② on the safety cover and remove the safety cover with moving the plates in the arrow-marked direction (→).
- ⑤ Insert the redundant AC/DC power supply in a predetermined position and push the handle in the arrow-marked direction (→).
- ⑥ Fix the FG Cable detached in (2) with screw ①.
- ⑦ Close the side covers.
- ⑧ Turn on the subsystem following the power-on procedure explained in MK-REP0050.

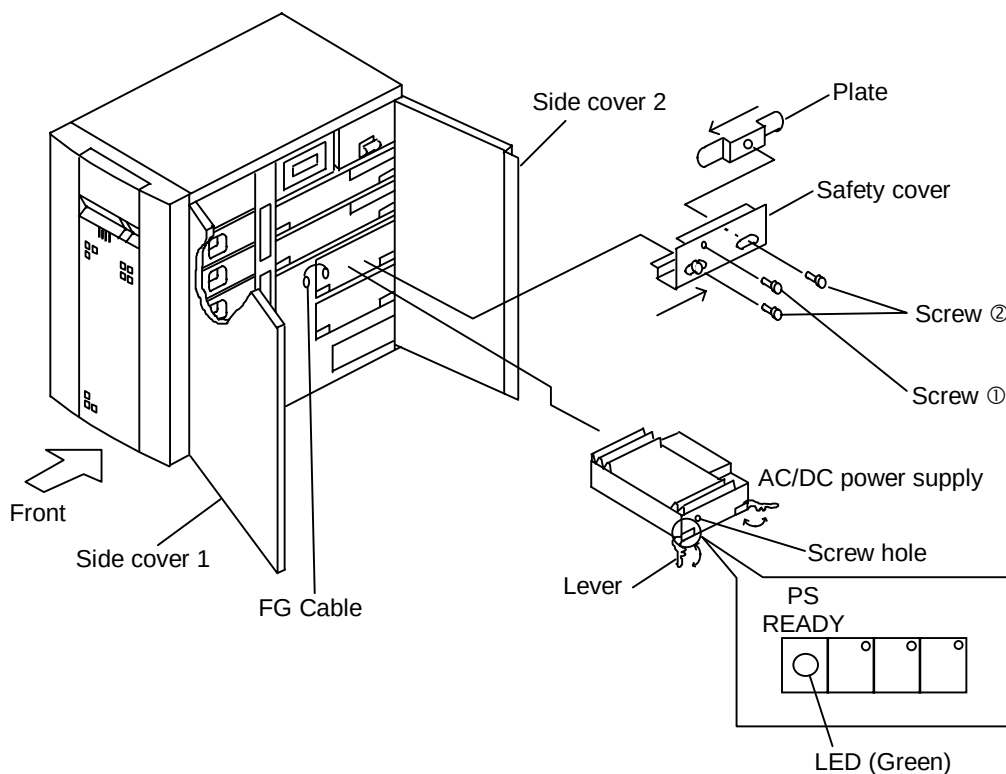


Figure 2.8.1 Installing the AC/DC Power Supply

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REV.2	Jan.1997	Apr.1997	Dec.1997			

2.9 Installing the HDU ASSY

Since the procedure differs depending on the cases below, be careful in installing the HDU ASSY.

- [1] Capacity expansion with HDU ASSY exchange
- [2] Capacity expansion with additional HDU ASSY installation
- [3] Installing a spare HDU ASSY

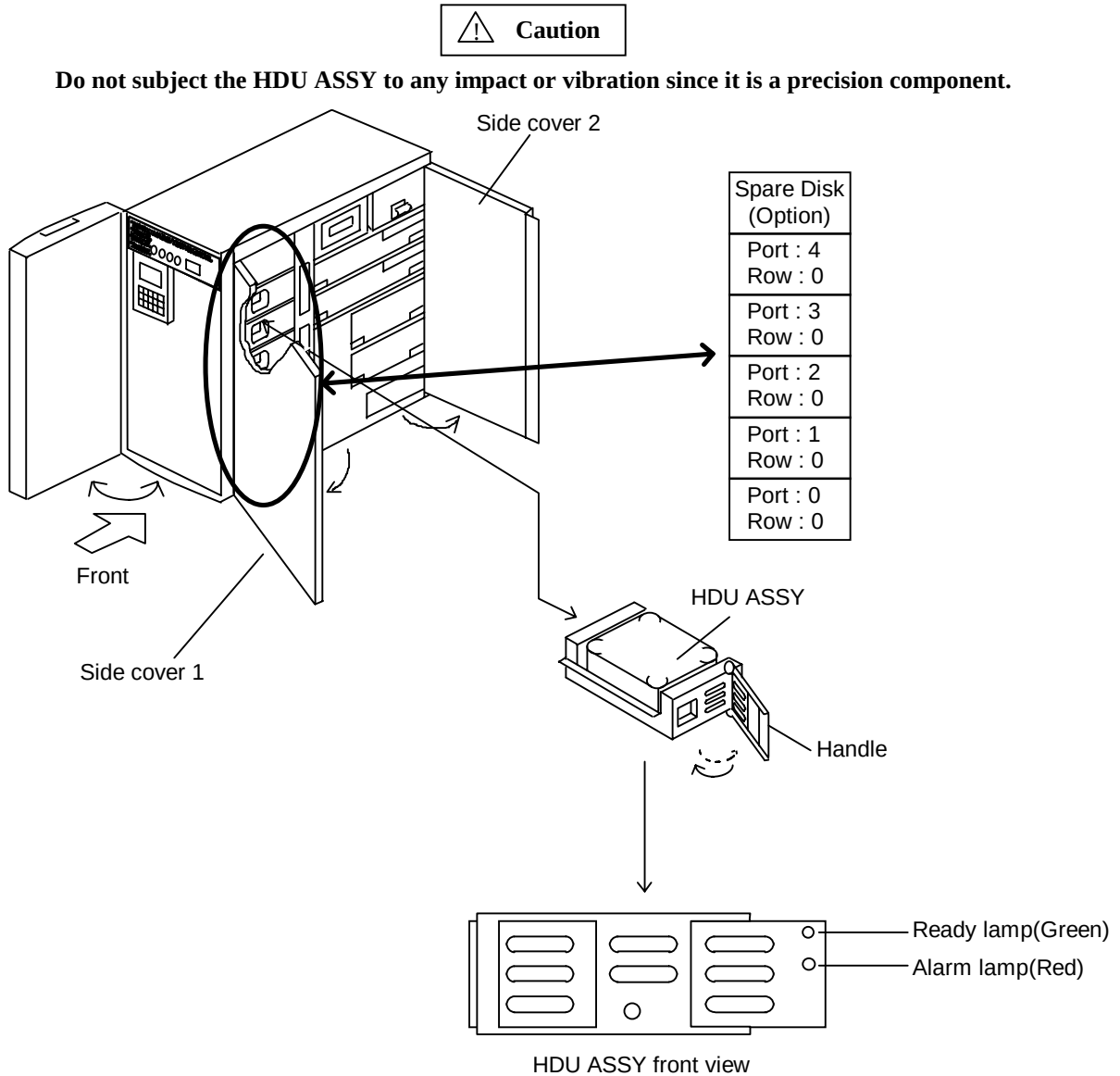


Figure 2.9.1 Installing the HDU ASSY

[1] Capacity expansion with HDU ASSY exchange

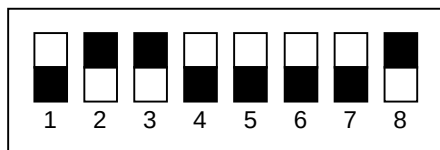
After this operation all the user's data will be lost. Be sure to make a back-up copy of data before beginning this operation. (See MK-OPTION0050.)

- (1) Turn off the power according to the power-off procedure in MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side covers.
 (3) Remove the old HDU ASSY and set the new HDU ASSY. (See Figure 2.9.1 in MK-OPTION0210.)
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

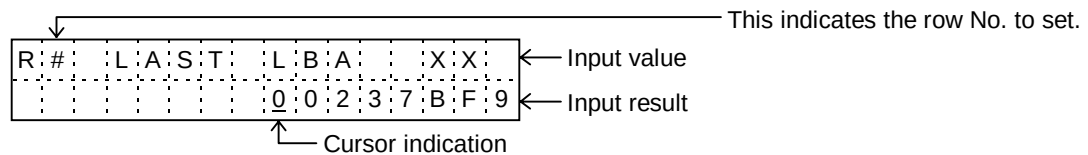
(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



For ROW=0

- (5) Turn on the power according to the power-on procedure MK-OPTION0110.
 (6) Set LBA on the panel following the table below. Set the capacity of each drive following the display. (See MK-OPTION0240.)

- When ROW LAST LBA is displayed;



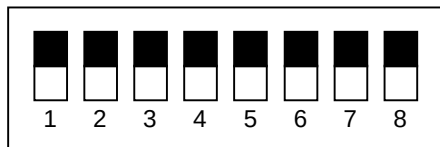
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting "QUIT" on the panel, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of the system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.



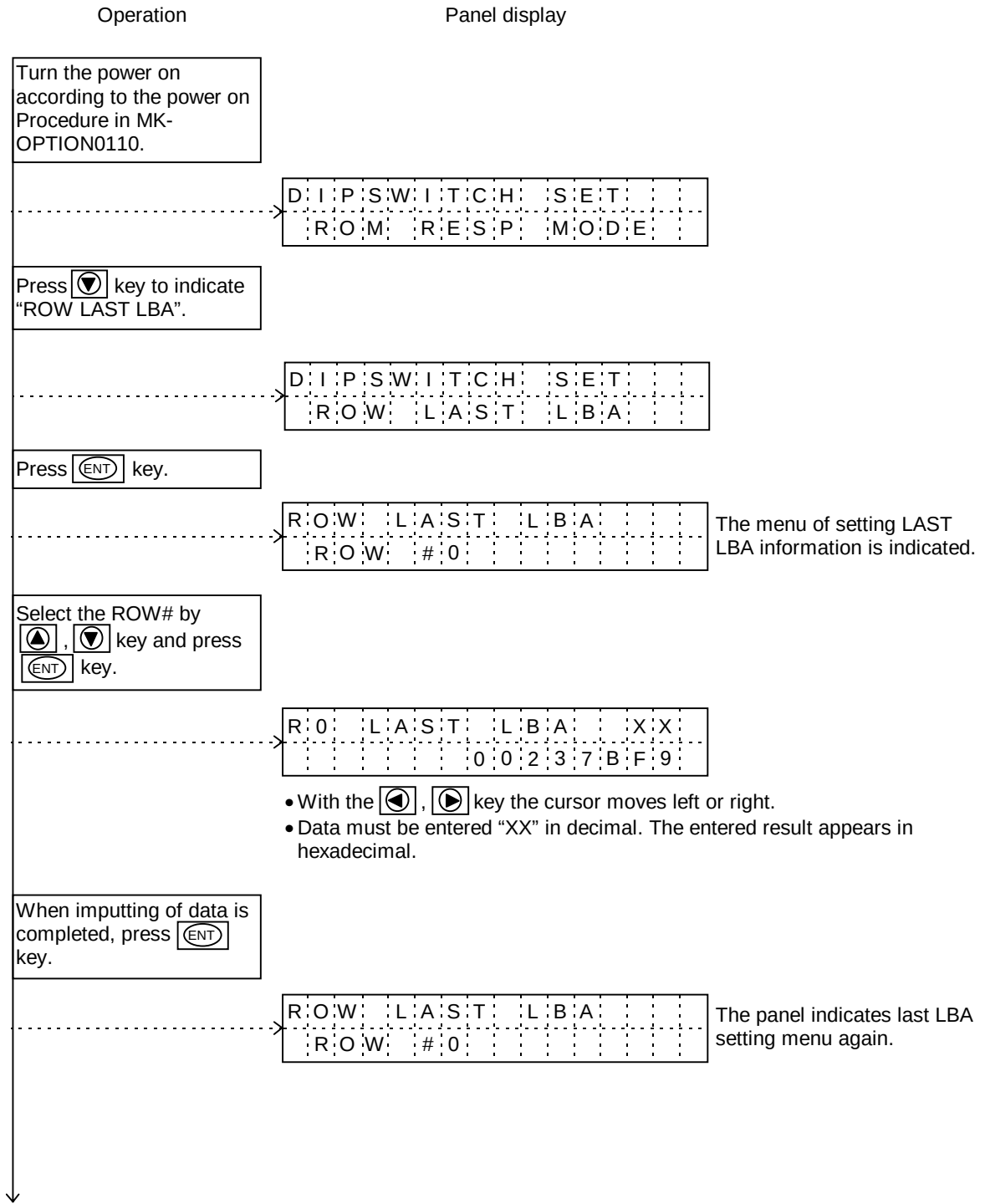
If this message appears, make a back-up copy of the data in the EEPROM into the back-up floppy disk.
In case of dual configuration, "FD BACK UP (#1)?" is displayed.
Select the controller to be restored.

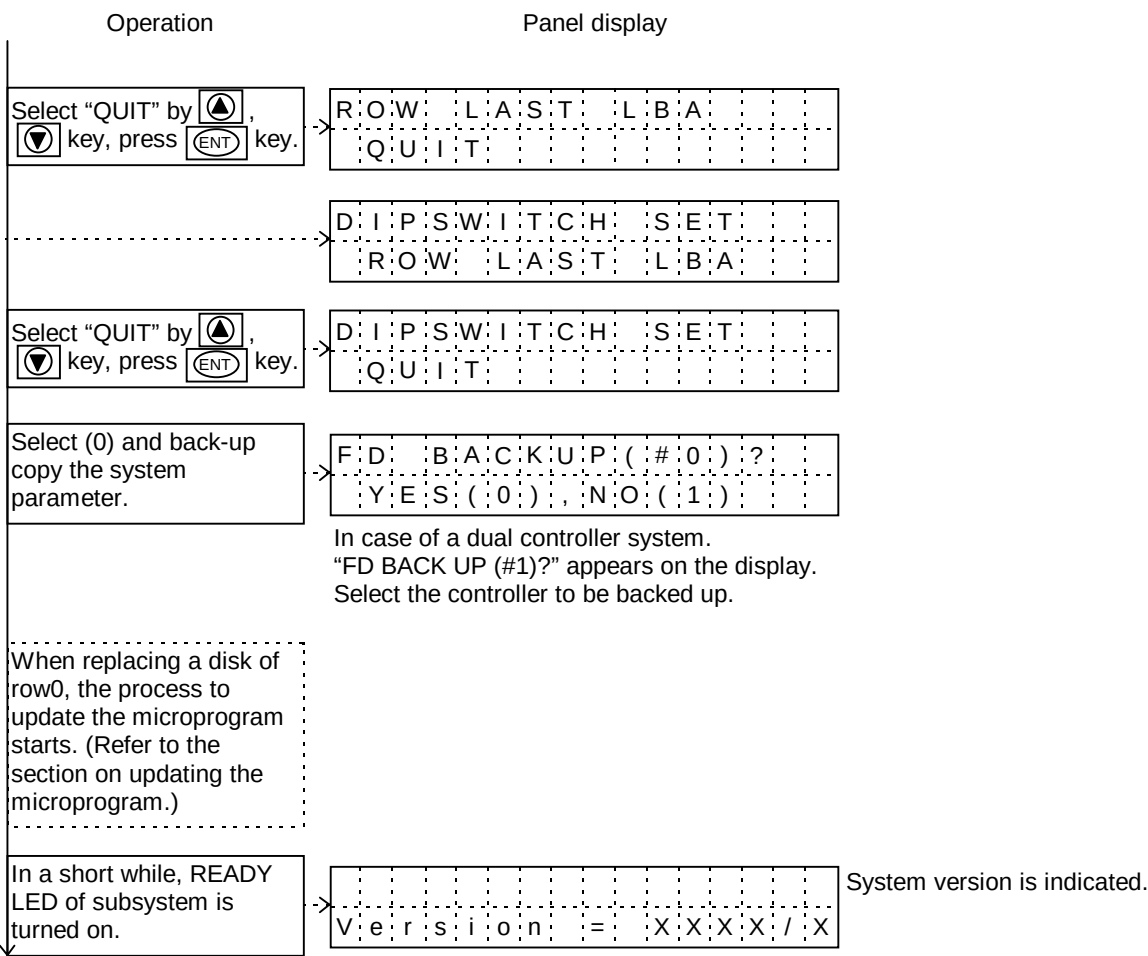
- (8) Reset the DIP switch 4 and 6 to the original positions after the system is ready.



- (9) Only in case of exchanging ROW0 disk, revise the microprogram. (See section "MICROPROGRAM-FC")
- (10) Set up the RAID group and the LU. (See Installation Chapter.)

Set the LAST LBA number on the panel according to the flow below.





[2] Capacity expansion with additional HDU ASSY installation

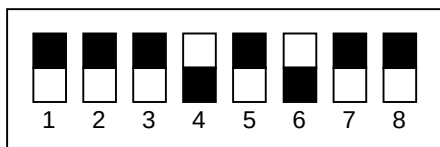
Additional HDU installation to a new ROW.

- (1) Turn off the power according to the power-off procedure in MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

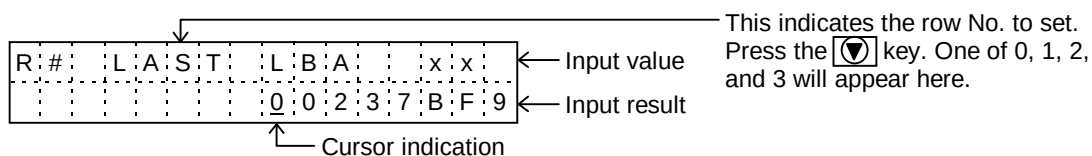
- (2) Open the front cover and the side cover.
 (3) Install an additional HDU ASSY.
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



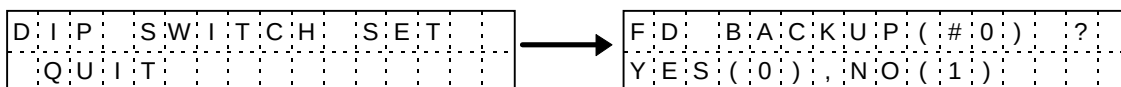
- (5) Turn on the power according to the power-on procedure in MK-OPTION0110.
 (6) Set the system LBA number with the panel according to the table below. In setting the available capacity of each drive follow ROW LAST LBA menu. Set the capacity following the displayed menu. (See MK-OPTION0240.)

- When ROW LAST LBA is displayed;



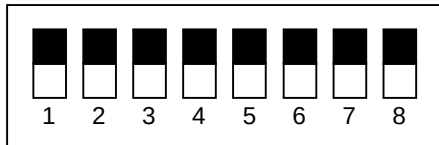
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting "QUIT" on the panel screen, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.



If this message appears, select (0) and make a back-up copy of the data in the EEPROM into the back-up floppy disk.
 In case of a dual system, it is displayed "FD BACK UP (#1)?". Select the controller to be backed up.

- (8) Reset the DIP switch 4, 6 to the original positions after the system is ready.



- (9) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

Additional HDU installation to existing ROW.

- (1) Turn off the power according to the power-off procedure in MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side covers.

- (3) Install additional HDU.

Be sure to install an HDU of capacity no less than pre-installed HDUs. When an HDU of less capacity is installed, after power on (5), warning LED will light up and display shown in Figure 2.9.1 will appear.

Prepare an HDU of appropriate capacity and re-install from (1).

Set the capacity referring to the system parameter setting table.

H	Z	1	4	X	Y	P	O	N	C	A	P	-	X	Y

X : Port number

Y : Row number

Figure 2.9.1 Panel Display when Inproper Capacity

- (4) Turn the power on following the power on procedure. (See MK-OPTION0110.)

- (5) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

[3] Installing a spare HDU ASSY

- (1) Turn off the power according to the power-off procedure in MK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side cover.
- (3) Install a spare HDU ASSY.

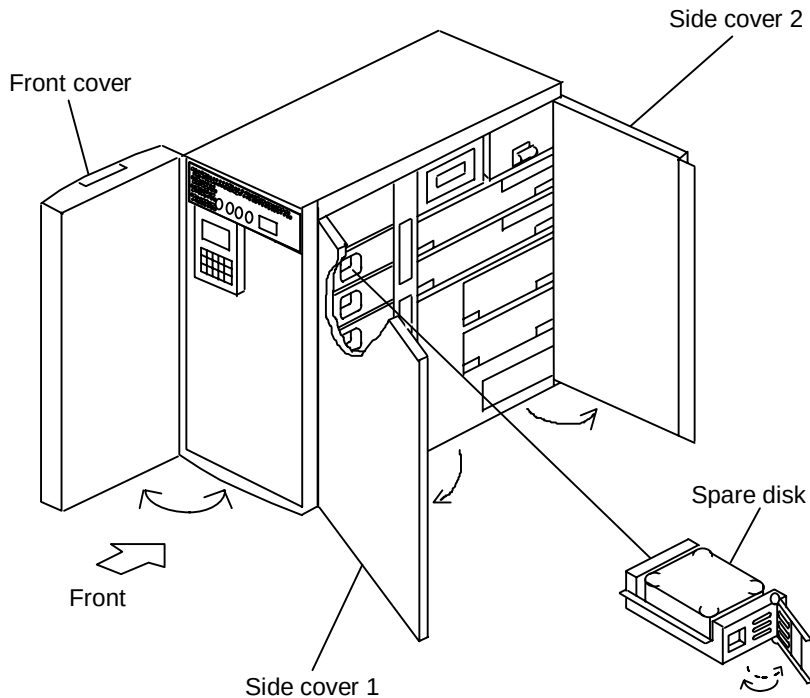
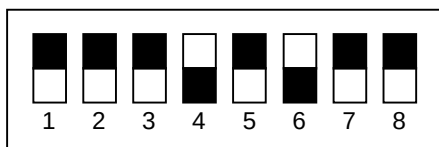


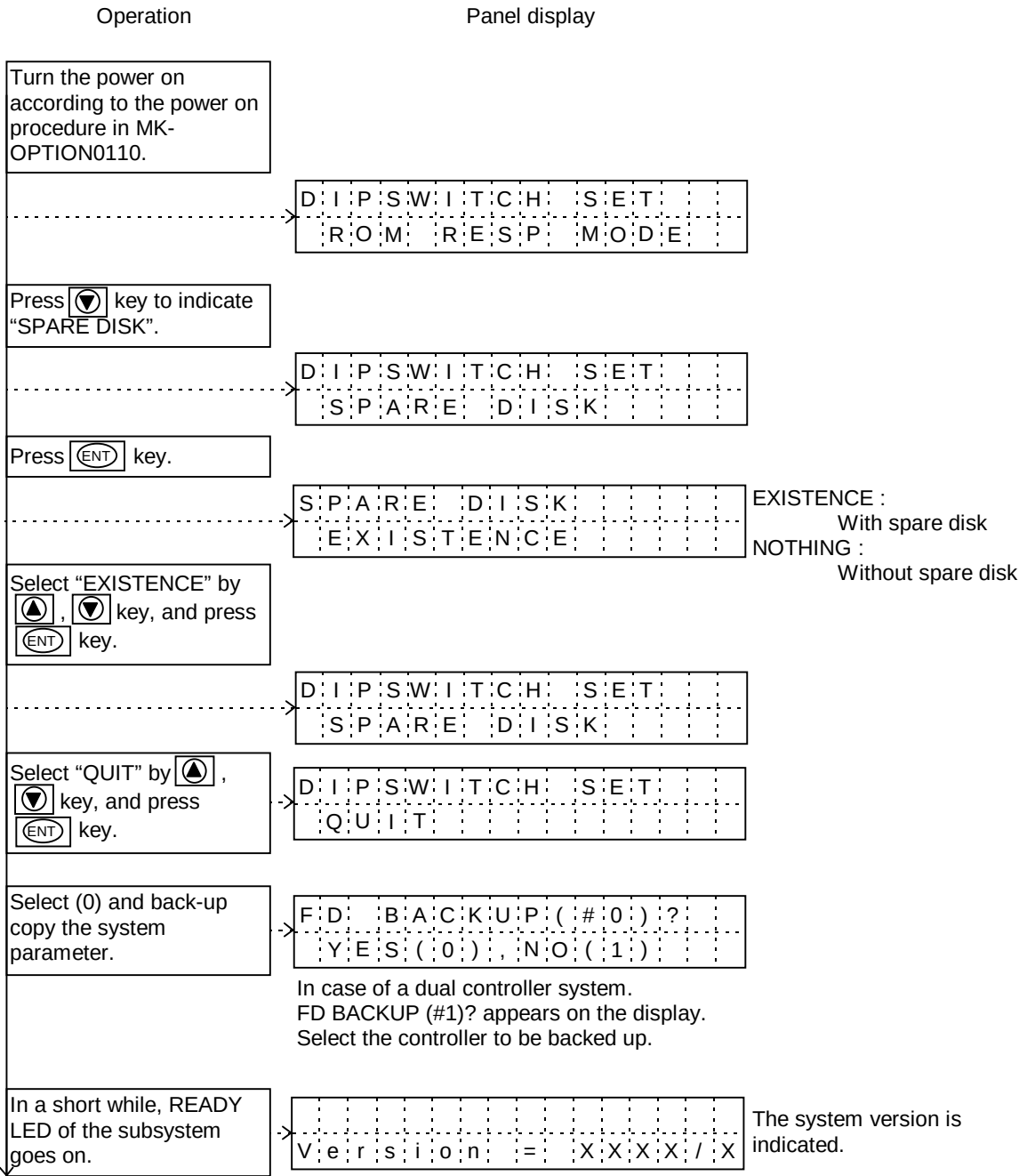
Figure 2.9.2 Installation of Spare Disk

- (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.
(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

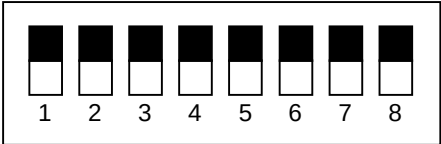


- (5) Turn on the power according to the power-on procedure in MK-OPTION0110.

(6) Set the spare disk from the PANEL according to the flow below.



(7) Reset the DIP switches 4 and 6 to the original positions, after READY LED lit up.



(8) Close front cover and side covers.

DF350 Disk Subsystem
10. PARTS CATALOG
(Mini Tower Type)

Rev.4

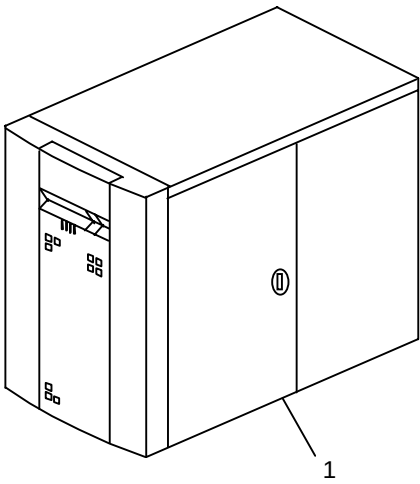
Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Copyright ©1997, 1998, Hitachi, Ltd.

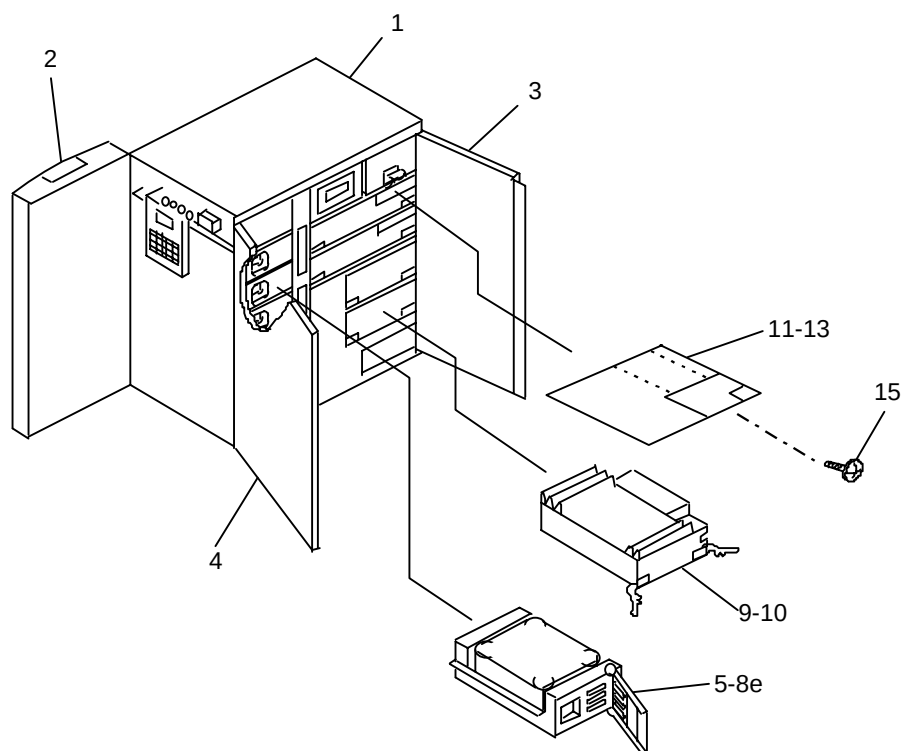
HOW TO USE THIS PARTS CATALOG

LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2100453-A	FINAL ASSY (SEE LIST 1)	1	
2	2100478-A	• FRONT COVER ASSY	1	
3	3243073-A	• SIDE COVER (R1) ASSY	1	
4	3243074-A	• SIDE COVER (R2) ASSY	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-6	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-6	S.P.
7	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-6	S.P.
8	3243084-Q	• HDU ASSY (DF-F350-A2E4A)	2-6	S.P.

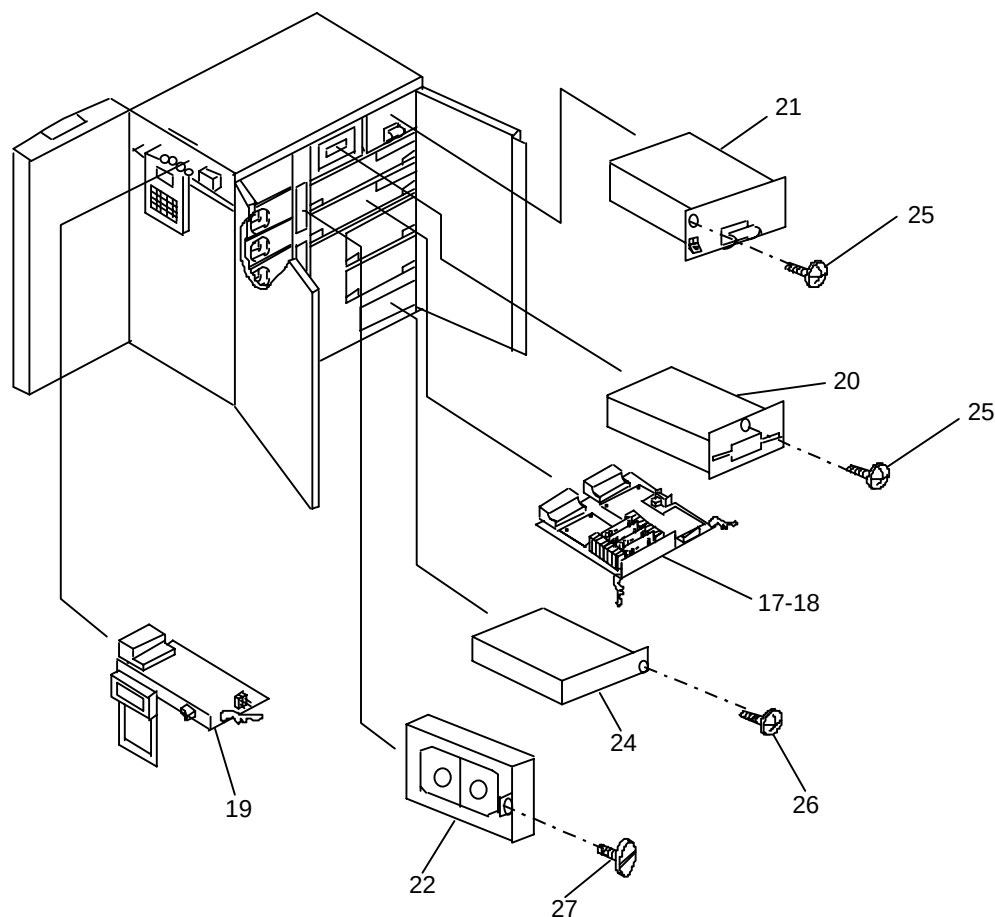
- ① indicates the list number of the assembly given on the visual index.
- ② indicates the item number given on the drawing in the catalog section.
- ③ indicates the part number.
- ④ has the following meaning.
- indicates an assembly or equivalent part.
 - indicates a subassembly or equivalent part included in an assembly indicated by....
- ⑤ indicates the unit type.
- ⑥ indicates the possible number of the subsystem.
- ⑦ indicates S.P.
- If S.P. is written in Remarks, the part or the assembly is spare parts.



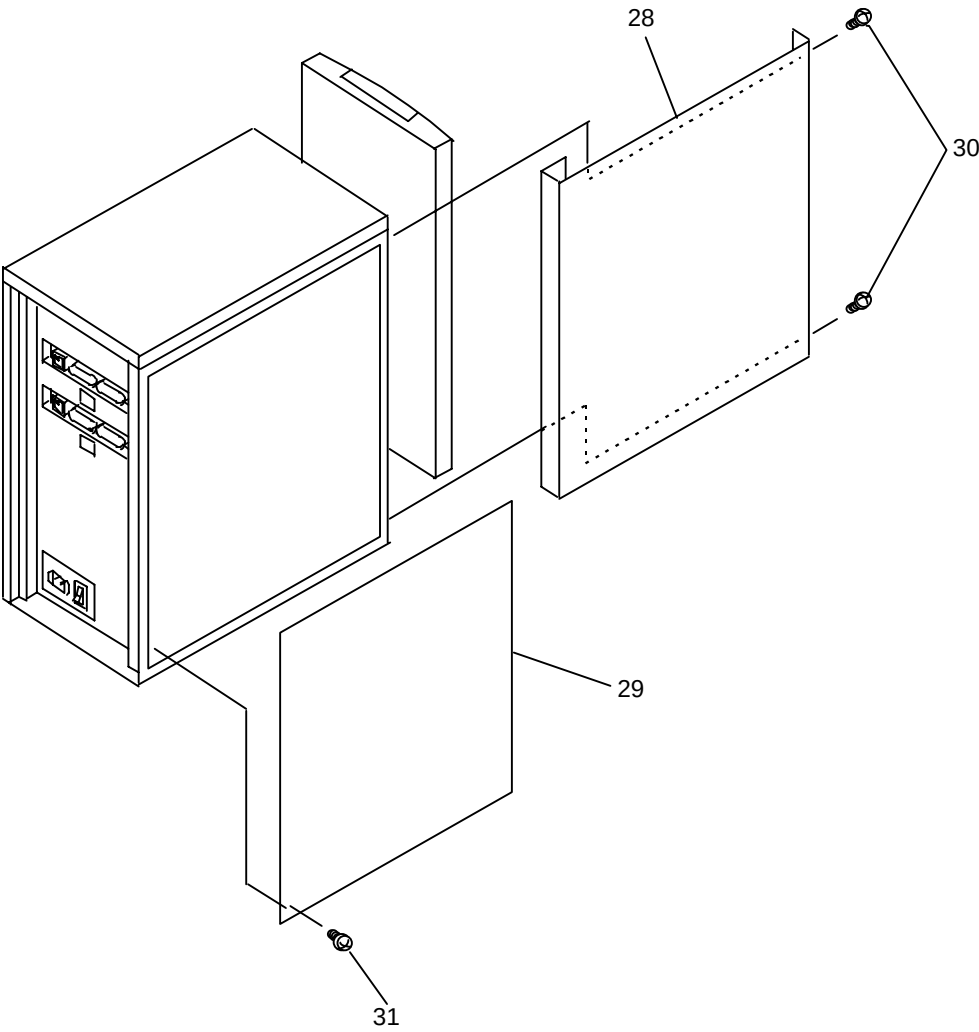
LIST NO.	NAME OF PARTS	SHEET NO.
1	FINAL ASSY	MK-PARTS0040



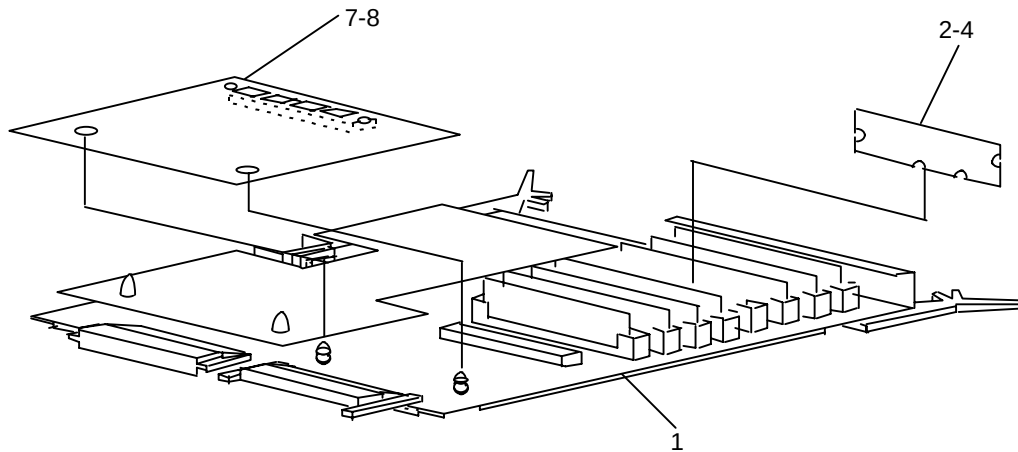
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2100453-A	FINAL ASSY (SEE LIST 1)	1	
2	2100478-A	• FRONT COVER ASSY	1	
3	3243073-A	• SIDE COVER (R1) ASSY	1	
4	3243074-A	• SIDE COVER (R2) ASSY	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-6	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-6	S.P.
7	3252929-E	• HDU ASSY (DF-F350-A3E4)	2-6	S.P.
8	3252929-B	• HDU ASSY (DF-F350-A2E8)	2-6	S.P.
8a	3252929-D	• HDU ASSY (DF-F350-A2E8A)	2-6	S.P.
8b	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-6	S.P.
8c	3243084-Q	• HDU ASSY (DF-F350-A2E4A)	2-6	S.P.
8d	3243084-R	• HDU ASSY (DF-F350-A1E8A)	2-6	S.P.
8e	3252929-A	• HDU ASSY (DF-F350-A1E18)	2-6	S.P.
9	5486141-303	• AC/DC ASSY (DF-F350-B2M)	1-2	S.P.
10	3243406-A	• AC/DC ASSY (BLIND)	0-1	
11	3247189-B	• I/F ADAPTER ASSY (DF-F350-DMUDS)	1-2	S.P.
12	3247189-A	• I/F ADAPTER ASSY (DF-F350-DMUSS)	1-2	S.P.
13	3247183-1	• I/F ADAPTER ASSY (DUMMY)	1	
14				
15	SB706	• BIND SCREW (M2.5 × 6)	2	
16				



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
17	3247188-A	• CTL ASSY (DF-F350-F1MCF)	1	S.P.
18	3247188-B	• CTL ASSY (DF-F350-F2MCF)	1	S.P.
19	3237450-B	• SVP ASSY	1	S.P.
20	3237444-A	• FDD ASSY	1	S.P.
21	3247182-A	• BATTERY ASSY	1	S.P.
22	3237448-C	• FAN ASSY	3	S.P.
23				
24	5486142-301	• IN BOX ASSY (Q1M)	1	S.P.
25	SB306	• BIND SCREW (M3 × 6)	2	
26	3183101-2	• HWA BIND SCREW	1	
27	5483798-1	• THUMB SCREW	3	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
28	3240338-A	• SIDE COVER L ASSY	1	S.P.
29	1503500-C	• SZ611 PK ASSY	1	
30	SB306	• BIND SCREW (M3 × 6.3)	2	
31	SB308	• BIND SCREW (M3 × 8)	16	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-17-		CTL ASSY		
1	3247188-A	• CTL ASSY (DF-F350-F1MCF)	1	S.P.
2	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
3	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
4	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
5				
6				
7	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
8	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.
1-18-		CTL ASSY		
1	3247188-B	• CTL ASSY (DF-F350-F2MCF)	1	S.P.
2	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
3	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
4	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
5				
6				
7	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
8	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.

DF350 Disk Subsystem
7. PARTS REPLACEMENT
(Cabinet Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Jan.31.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0040	The description of HDU ASSY for AS/400 was added in No.4 of the table.	AD
					0170	A sentence was added.	AD
					0210	“RAID0” was changed to “RAID1” in the firgure.	CR
					0310	“STSDTSVER” was changed to “SYSDTSVER”. (Pages 0350, 0370, 0410 and 0440 were changed by the same reason.)	CR
					0350	Figure 9.1 was changed.	CH
					0355	Newly created by inserting a figure of the label layout.	AD
				0380	An explanation in the case there exist the redundancy was added.	AD	
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0040	Added CACHE ASSY and ④.	AD/
						Deleted *1, 2.	DL
					0050	Added “Refer to THEORY...” in Figure.	AD/
						Deleted (2).	DL
					0055	This page was newly added.	AD
					0100	Added “The READY LED on...”.	AD
					0110	Deleted “DIPSWITCH SET”.	DL/
						Shifting from 0120.	AD
					0120	Shifting from 0130.	AD
					0130	Flow was shifting to 0120.	DL
					0170	Added 4.1.1.	AD
					0175	This page was newly added.	AD
					0180	Added RAID A.	AD
					0200	Added (1). ((1)→(1-1)).	AD
					0210	Added RAID A.	AD
					0215	This page was newly added.	AD
					0218	This page was newly added.	AD
					0220	Added RAID A.	AD
					0230	Deleted (C) - (i).	DL/
						Added DYNAMIC SPARE.	AD
					0240	Added (C) - (i).	AD/
						Shifting the section 4.3 to 0265.	DL
					0245	This page was newly added.	AD
					0290	Added Notice 1, 2.	AD
					0305	This page was newly added.	AD
					0310	Added Notice 1, 2.	AD
0341 - 0347	These page were newly added.	AD					
				0400	Added Notice 1, 2.	AD	
				0410	Added Notice 1, 2.	AD	
				0420	Added “Redundant CTL option”.	AD	
				0440	Added Notice 1, 2.	AD	
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0320	Added Notice 1.	AD
					0344	Added Notice 1.	AD
					0380	Added WARNING.	AD
					0390	Delete (3).	DL
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0040	Added A2E8/A1E8A/A1E18.	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: AD: Addition, CH: Change, CR: Correction, DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
6	Oct.15.'98	A.Yamanashi			0040	Added DF-F350-A3E4/A2E8A.	AD
					0100	Added case of the dual controller.	AD
					0130	Added case of the dual controller.	AD

CONTENTS

1. Mechanical Configuration.....	CK-REP0030
2. Maintenance Procedure	CK-REP0040
2.1 Turning the Power On/Off for Each String	CK-REP0050
2.2 Part Replacement Procedures.....	CK-REP0060
2.3 Back-up Procedure of System Parameter	CK-REP0090
2.3.1 Back-up procedure to FD	CK-REP0090
2.3.2 Restoring procedures from FD	CK-REP0130
3. Opening/Closing Front and Side Covers.....	CK-REP0160
4. Replacing HDU ASSY	CK-REP0170
4.1 Procedures of Data Recovery and HDU Replacement	
Under RAID0 Configuration.....	CK-REP0170
4.1.1 Procedure of data recovery and HDU ASSY replacement	
when no spare disk is installed.....	CK-REP0170
4.1.2 When a spare disk is installed	CK-REP0175
4.2 Procedures of Data Recovery and HDU Replacement	
Under RAID1, 5, A Configuration	CK-REP0180
4.2.1 Procedure of data recovery and HDU ASSY replacement	
when no spare disk is installed.....	CK-REP0180
4.2.2 Procedures of data recovery and HDU ASSY replacement	
when a spare disk is installed.....	CK-REP0200
4.3 HDU ASSY Replacement Procedure.....	CK-REP0245
4.4 Manual Instruction of Data Recovery.....	CK-REP0260
5. Replacing Fan ASSY	CK-REP0280
6. Replacing Battery ASSY	CK-REP0290
7. Replacing FDD ASSY	CK-REP0300
8. Replacing CTL ASSY	CK-REP0310
8.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier	CK-REP0310
8.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later.....	CK-REP0341
9. Replacing I/F ADAPTER ASSY	CK-REP0350
10. Replacing SVP ASSY	CK-REP0370
11. Replacing AC/DC power supply.....	CK-REP0380
12. Replacing In Box ASSY	CK-REP0400
13. Replacing CACHE ASSY	CK-REP0410
14. Replacing LAN ASSY.....	CK-REP0440

1. Mechanical Configuration

Figures 1.1 and 1.2 show mechanical configuration and parts location of this subsystem.

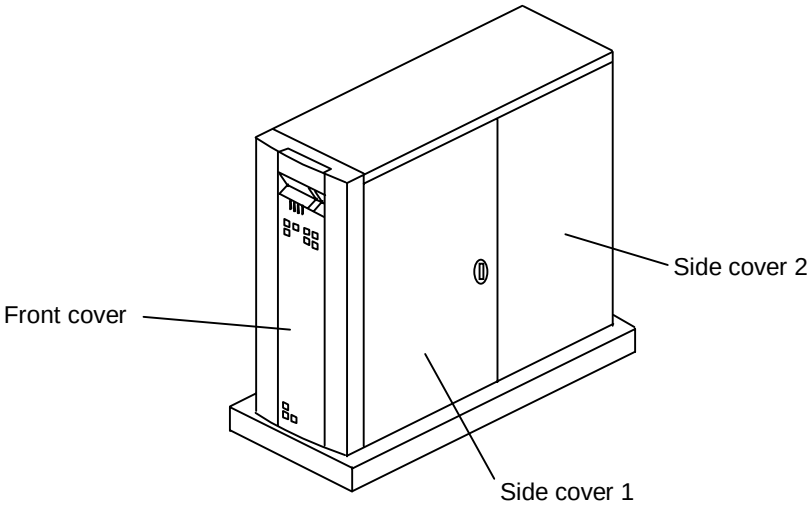


Figure 1.1 Appearance of DF350 Disk Subsystem (Cabinet Type)

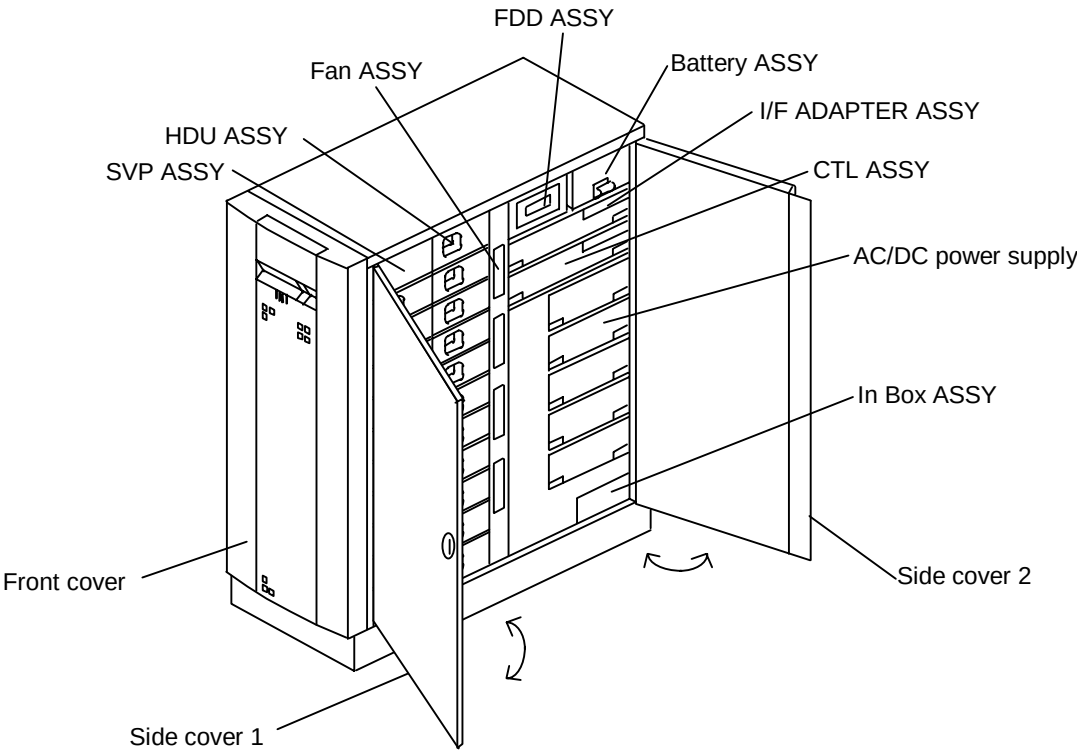


Figure 1.2 Parts Location

2. Maintenance Procedure

(1) Turning power on/off when replacing parts

Turning on/off procedure varies depending on the parts to be replaced.

Follow the procedures described in the table below for replacing each part.

No	Product name	Drawing No.	Model	Turning on/off power	
				Option not provided	Option provided
1	HDU ASSY (2GB1"H)	3243084-E	DF-F350-A2E2	④	④
2	HDU ASSY (4GB1"H) (*1)	3252929-E	DF-F350-A3E4	④	④
3	HDU ASSY (4GB1"H)	3243084-F	DF-F350-A2E4	④	④
4	HDU ASSY (4GB1"H)	3243084-Q	DF-F350-A2E4A (For AS/400)	④	④
5	HDU ASSY (8GB1"H)	3252929-B	DF-F350-A2E8	④	④
6	HDU ASSY (8GB1"H)	3252929-D	DF-F350-A2E8A (For AS/400)	④	④
7	HDU ASSY (8GBH"H)	3243084-G	DF-F350-A1E8	④	④
8	HDU ASSY (8GBH"H)	3243084-R	DF-F350-A1E8A (For AS/400)	④	④
9	HDU ASSY (18GBH"H)	3252929-A	DF-F350-A1E18	④	④
10	Fan ASSY	3237448-C	DF-F350-P1M	③	—
11	Battery ASSY	3247182-A	DF-F350-N1M10	③	—
12	FDD ASSY	3237444-A	DF-F350-M1M	②	—
13	CTL ASSY	3247188-A /B	DF-F350-F1MCF /F2MCF	②	③
14	I/F ADAPTER ASSY (WS-pin-lock screw type)	3247189-A	DF-F350DMUSS	①	①
15	I/F ADAPTER ASSY (WD-pin-lock-screw type)	3247189-B	DF-F350-DMUDS	①	①
16	SVP ASSY	3237450-B	DF-F350-L1ML	②	—
17	AC/DC power supply	5486141-303	DF-F350-B2M	②	③
18	In Box ASSY	5486142-303	DF-F350-Q1C	②	—
19	CACHE ASSY	3247121-A	DF-F350-C8E	②	—
20	CACHE ASSY	3247121-B	DF-F350-C32E	②	—
21	CACHE ASSY	3247121-C	DF-F350-C128E	②	—
22	LAN ASSY	5493862-A	DF-F350-G1M1	②	③
23	LAN ASSY (SNMP)	5493862-B	DF-F350-G2M1	②	③

① Turning the power off DF350 Disk Subsystem and Host System.

② Turning the power off DF350 Disk Subsystem.

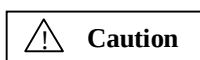
③ Turning the power off is unnecessary.

④ Turning the power on DF350 Disk Subsystem.

(*1): It is necessary to use it with the Micro_Disk Ver.0307 or later.

Notice : When a part which requires to turn the power off or on for replacement (marked with ① and ②) is to be replaced, turn the power off correctly according to the instruction in CK-REP0050 beforehand.

Otherwise, there is a risk that the user data is destroyed.

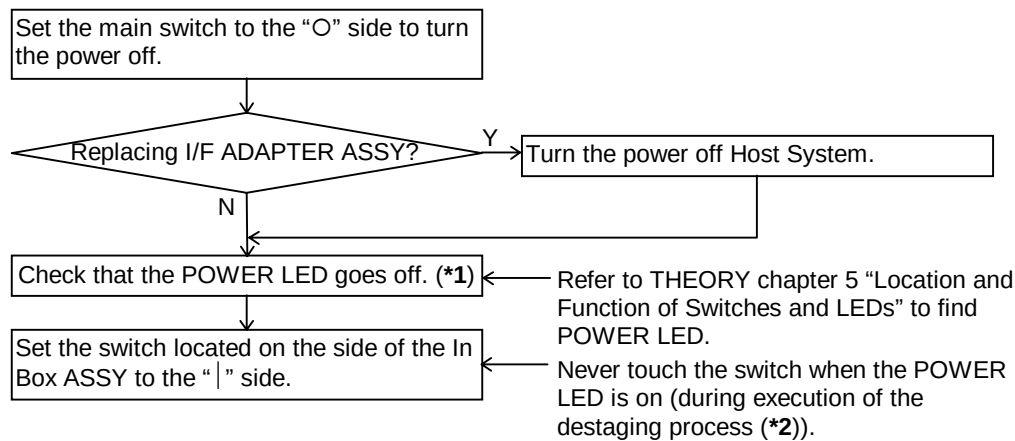


When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.

Be careful not to touch the electrified parts with a screwdriver etc.

2.1 Turning the Power On/Off for Each String

(1) Turning the power off



*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

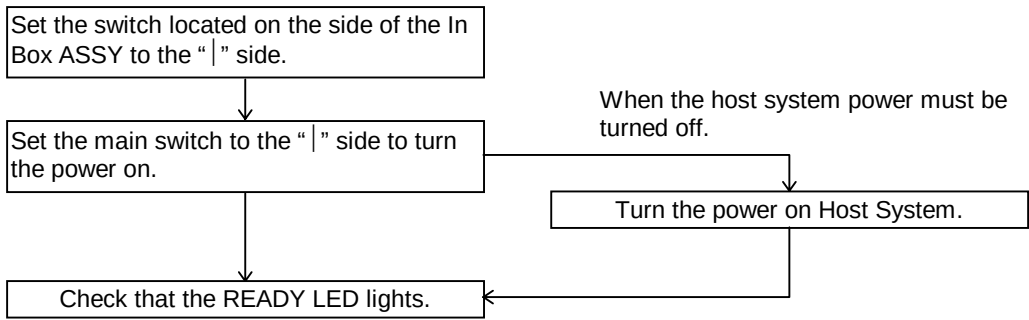
Notice : In case the data is not properly backed up, the user's data will be lost.

***2** The cache memory installed in this subsystem is controlled with a write-after method. When turning off the power, the subsystem automatically writes all the data left on the cache memory unwritten to the hard disk drive. (This operation is called a destaging.) The subsystem turns off the power when this process is completed. When the power is turned off according to the power failure or by the operation of the breaker, the destaging can not be performed. In this case, the subsystem enters the mode of battery back-up. If the system is kept in this state, the battery may be discharged and the user data might be lost. Therefore, be sure to follow the power-off procedure explained above.

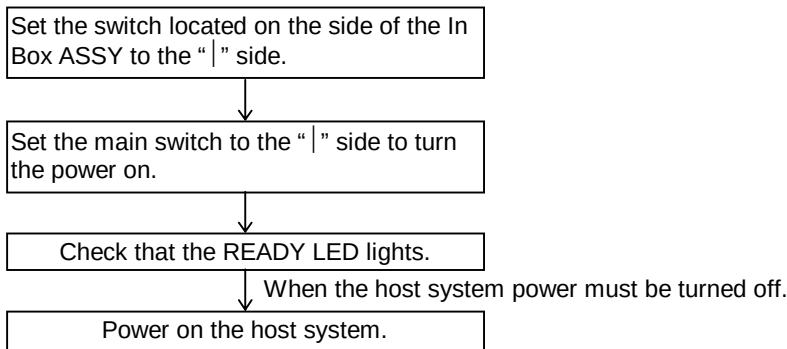
If the breaker is turned off due to power failure or by mistake before the POWER LED goes off, turn the power on again according to Item (2), "Turning the power on" promptly and then execute the power-off procedure explained above.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



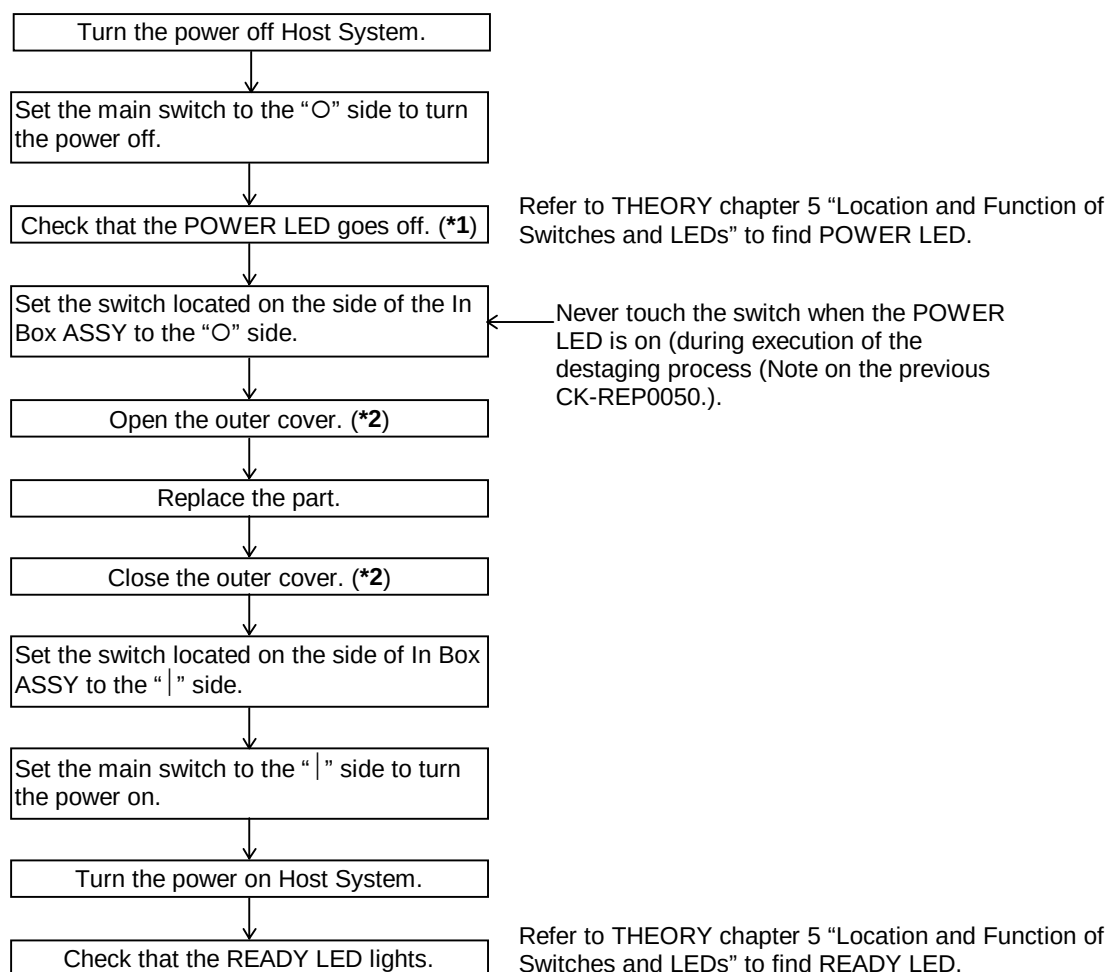
(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.2 Part Replacement Procedures

- (1) Procedure for the case of turning the power off both DF350 Disk Subsystem and Host System is inevitable.



Notice: In case the power is not normally turned off, the configuration data will be lost and the user's data will be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

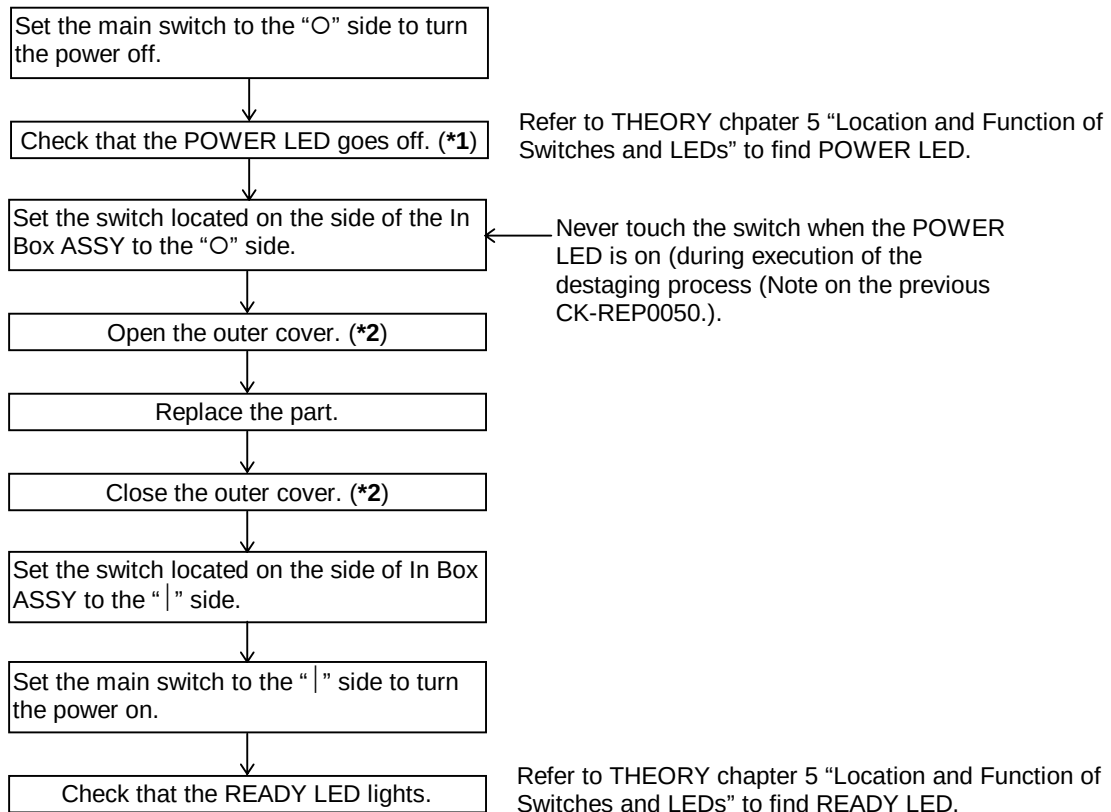
CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

***2** Outer cover : Front cover

Side cover 1

Side cover 2

- (2) Procedure for the case of turning the power off DF350 Disk Subsystem is inevitable.



Notice: In case the power is not normally turned off, the user's data might be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

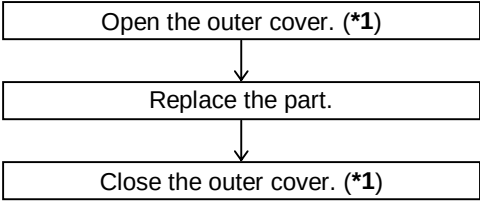
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

- *2** Outer cover : Front cover
Side cover 1
Side cover 2

(3) Procedure for the case of turning the power off DF350 is either not necessary or prohibited.



*1 Outer cover : Front cover
Side cover 1
Side cover 2

2.3 Back-up Procedure of System Parameter

There are cases where system parameters (Target ID, buzzer setting, drive recovery mode, etc.) are copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters for following “2.3.1 Back-up procedure of system parameter” (CK-REP0090) or “2.3.2 Restore procedure of system parameter” (CK-REP0130).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to CK-REP0050.

Notice: In case the power is not normally turned off, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

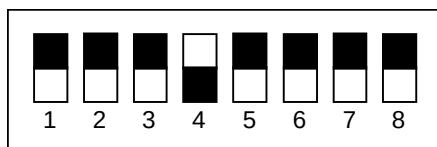
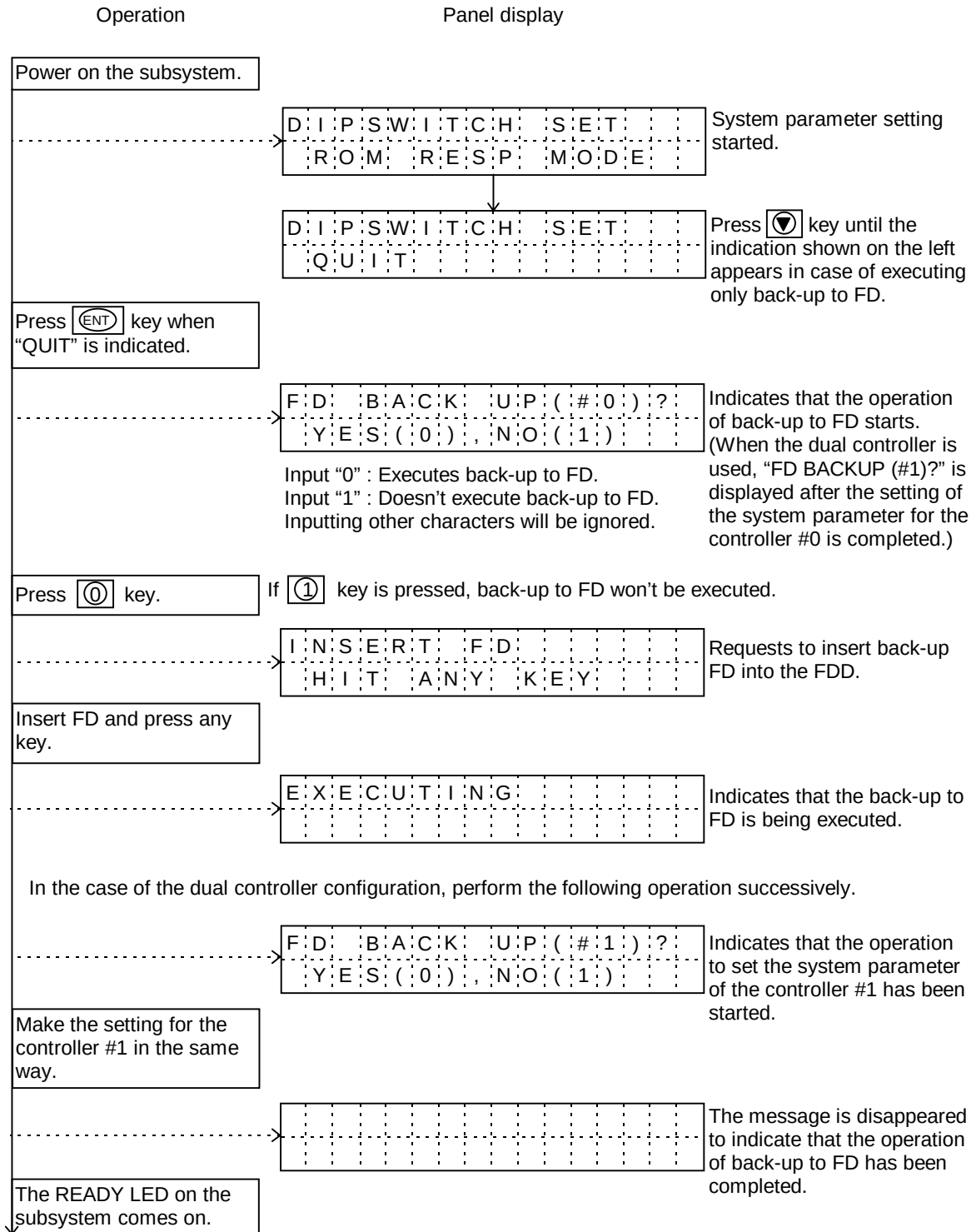


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

(3) Operate as described below.



(4) Set DIP switch No.4 to setting as shown in Figure 2.3.2.

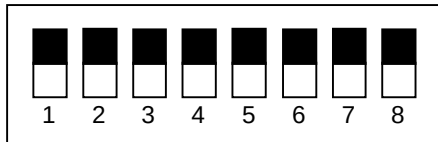
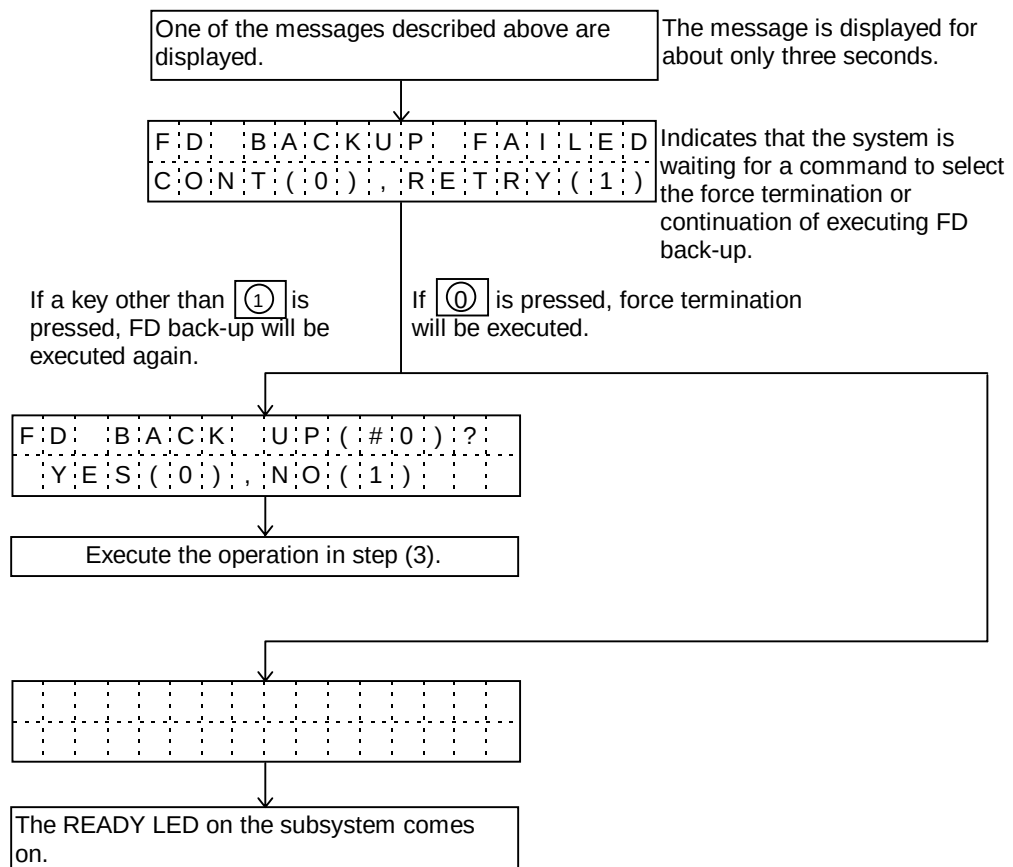


Figure 2.3.2 DIP Switches

Note 1 : While executing the back-up to FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute..
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

Note 4 : "SYSPRM0.DAT" or "SYSPRM1.DAT" file is stored in system parameter backed up FD. The case of optional SNMP system, SNMP configuration environment files ("Config.TXT" and "NAME.TXT") are stored with system parameter file.

Note 5 : In case with optional SNMP system and system parameter is restored without SNMP configuration environment files, Subsystem becomes ready without SNMP function. In this case, the warning lamp on the panel comes on and one of messages below is shown on PANEL.

W	0	1	6	0	1	F	D	E	R	R		
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	2	F	O	P	N	E	R	R
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	0	S	N	M	P	I	N	V	1
V	E	R	S	I	O	N	=	X	X	X	X	/X	

Only Dual controller system.

This case, re-restore the subsystem with a FD in which SNMP configuration environment files is stored.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP swithces as shown in Figure 2.3.3.

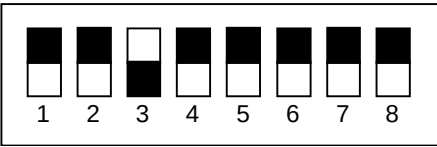
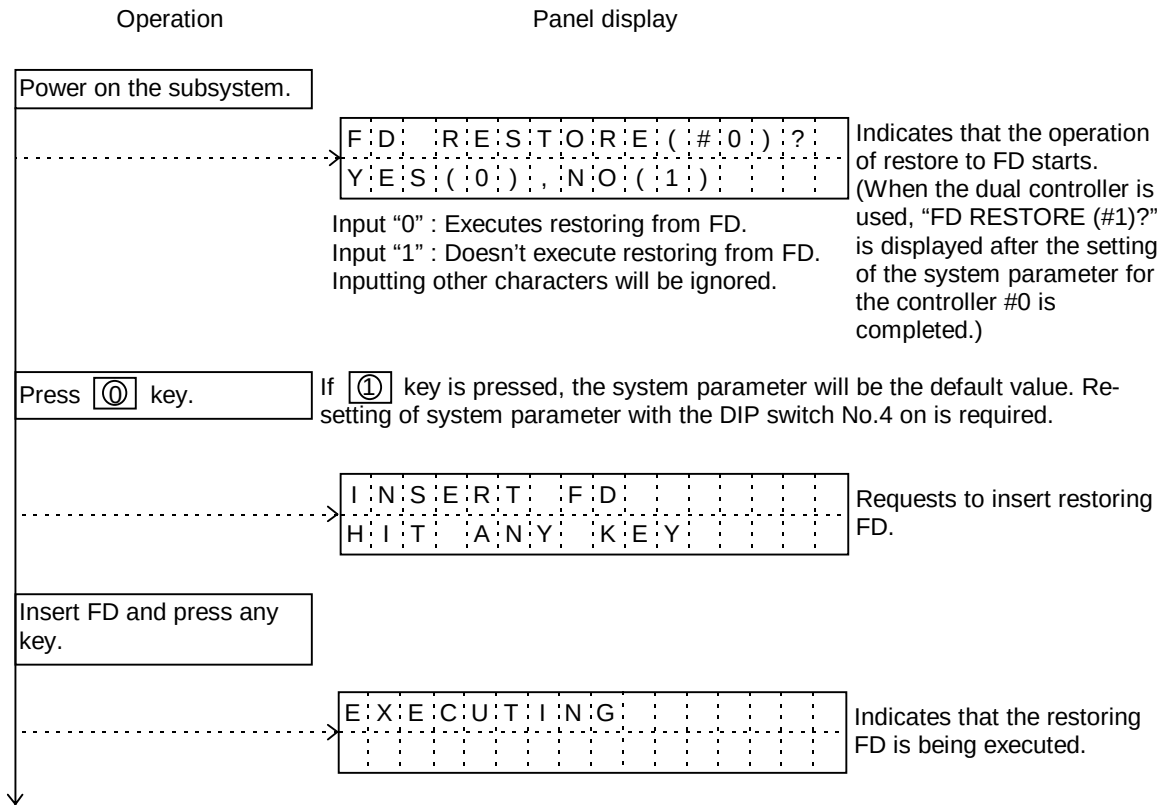
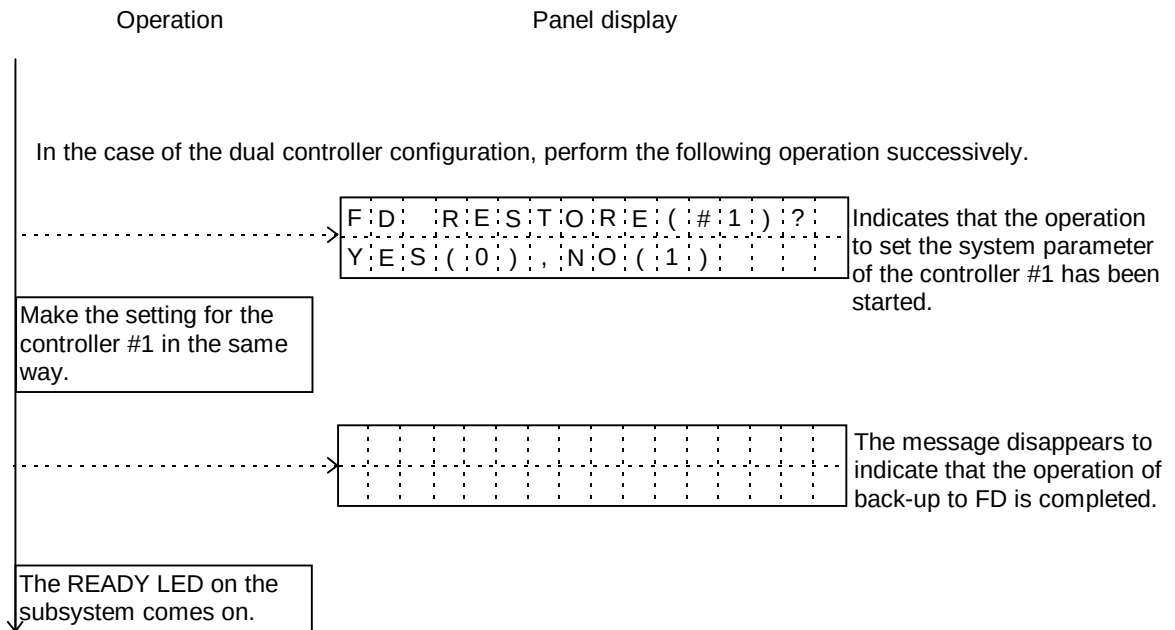


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

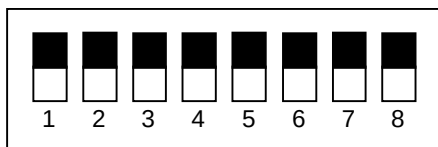
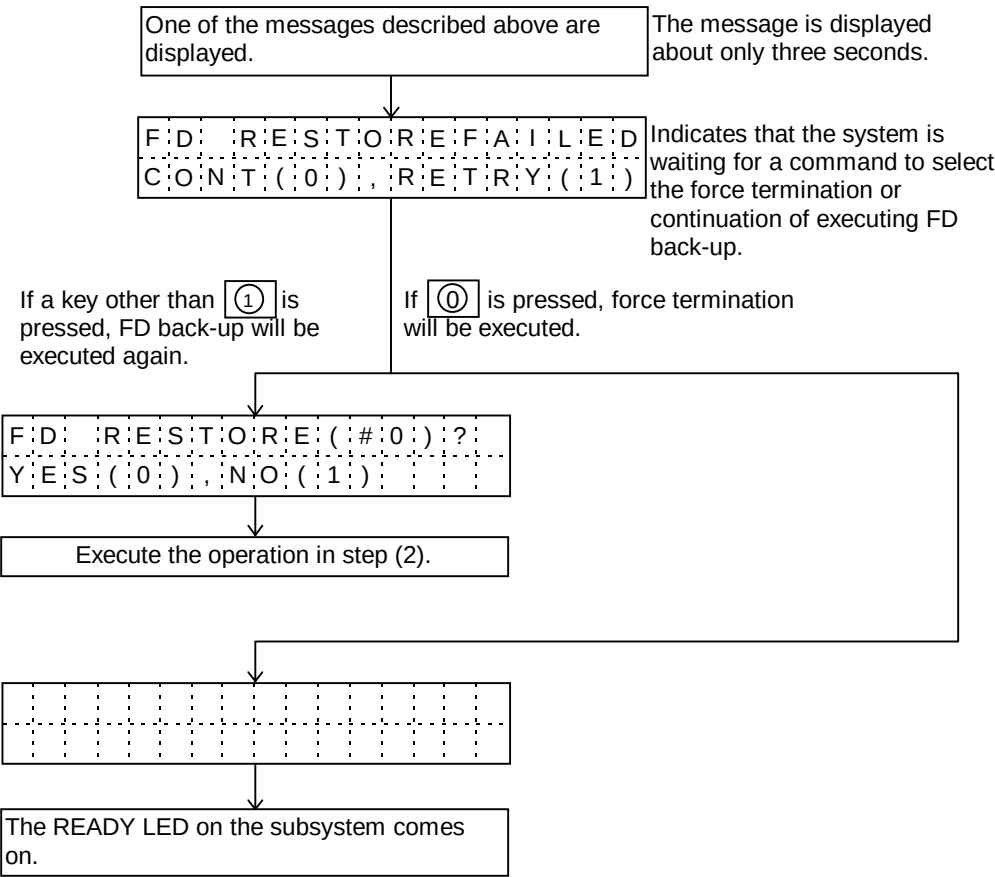


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-restore the system following the operation described below.



Note 2 : In case that restoring operation ended in failure and force terminated, setting of system parameter will be with default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

3. Opening/Closing Front and Side Covers

(1) Opening/Closing the front cover (See Figure 3.1.)

- ① Pull the right side of the front cover to your side to open it.
- ② Push it back slowly to close it.

Note : Open/Close the front cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Opening/Closing the side covers (See Figure 3.1.)

- ① Insert the key attached to the subsystem into the keyhole and turn it clockwise. Then, open the side cover 1 gently, and then open the side cover 2.
- ② Gently close the side cover 2 first, and then close the side cover 1. Then, turn the key counterclockwise.

Note : Open/Close the side covers gently to avoid a shock. Precision components are installed.

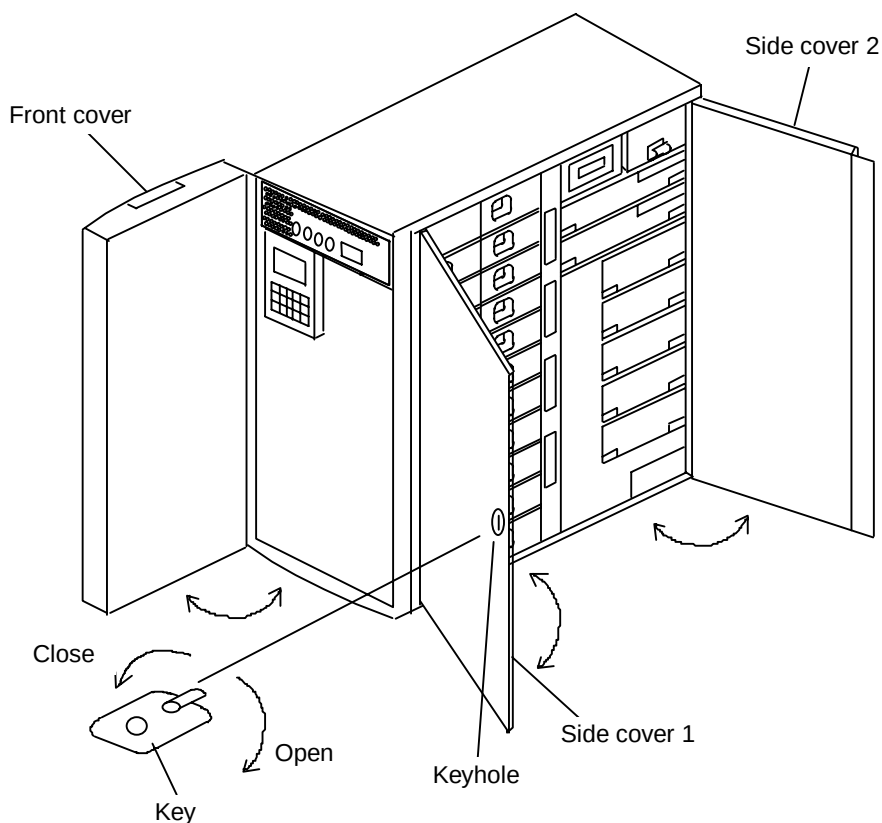


Figure 3.1 Opening/Closing Front and Side Covers

4. Replacing HDU ASSY

The method of replacing HDU varies depending on the RAID configuration.

When replacing the HDU ASSY, confirm the RAID configuration of the subsystem beforehand, and follow the procedure below according to the configuration.

To confirm the RAID configuration, refer to page PANEL0390 (3.3.2 (1) Reference/setting menu of RAID configuration information.)

Notice : Be sure to replace the HDU ASSY with the power kept on. (This procedure is except for when the Micro-Disk version is 0303 or earlier.)**

Proceed the replacement and the data recovery following the procedure below. RAID Specification of replacing HDU can be seen on the panel display. (See PANEL0390.)

Notice : If you delete or re-format the set-up RAID group or LU, user's data in that will be deleted. Be sure to back-up copy the user's data before these operation.

4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration

4.1.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

The replacement procedure differs depending on whether the Micro_Disk version is 0303** (** is optional) or earlier, or 0304** (** is optional) or later. Confirm the version first, then execute the replacement following the procedure determined according to the version.

When the Micro_Disk version is 0303** (** is optional) or earlier

- (1) Turn the subsystem power off according to the powering off procedure (see page CK-REP0050).
- (2) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY (Disk) Replacement Procedure" on page CK-REP0245.
- (3) Turn the subsystem power on according to the powering on procedure (see page CK-REP0050). Following messages will be displayed on the panel when a disk of row 0 is replaced.

I00DXY SYS-CP-XY----- Starting system area recovery

I00EXY SYSRCV-XY----- Completing system area recovery

X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)

If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.

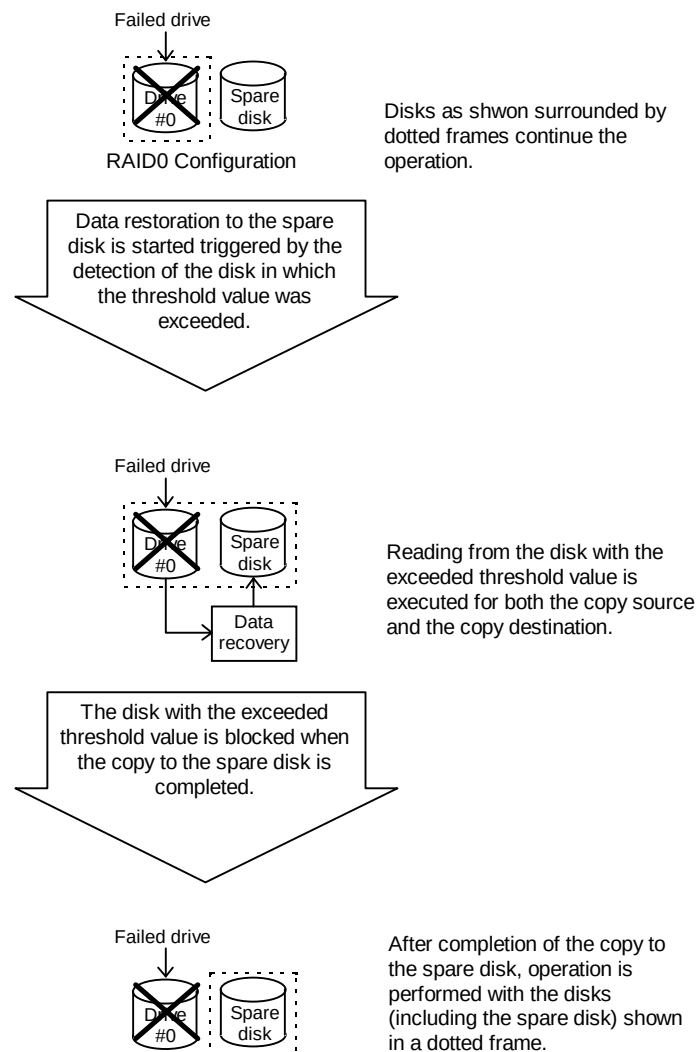
- (4) Execute an LU formatting. For the LU formatting procedure, see page CK-INST0710.
- (5) Restore the data using the backed up data.

When the Micro_Disk version is 0304** (** is optional) or later

- (1) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY Replacement Procedure" on page CK-REP0245.
- (2) In a short time after the disk is inserted, the ALARM lamp on the HDU ASSY goes out and the READY lamp comes on. If the inserted disk is that of row 0, following messages will be displayed on the panel.
 I00DXY SYS-CP-XY----- Starting system area recovery
 I00EXY SYSRCV-XY----- Completing system area recovery
 X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)
 If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (3) Execute an LU formatting. For the LU formatting procedure, see page CK-INST0710.
- (4) Restore the data using the backed up data.

4.1.2 When a spare disk is installed

When the Micro_Disk version is 0304** (** is optional) or later, data restoration to the spare disk is executed by the dynamic sparing function. Conditions for restoration to the spare disk and messages, etc. are the same as those to the RAID1, 5 and A. See pages CK-REP0215 through 0218.



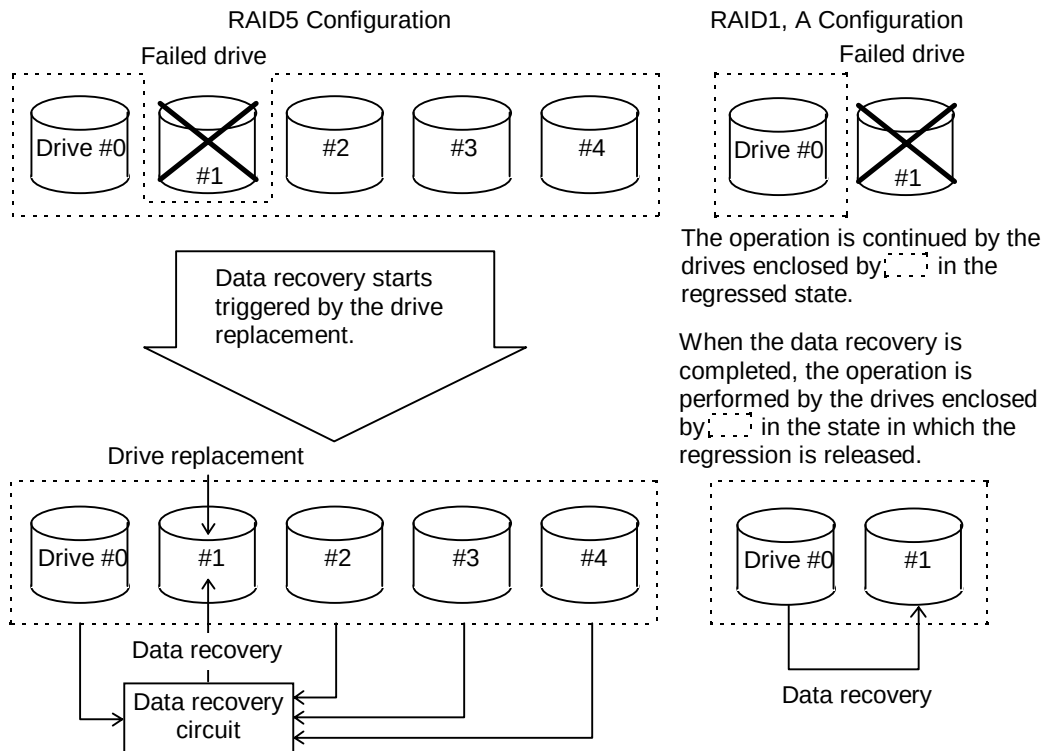
4.2 Procedure of Data Recovery and HDU Replacement Under RAID1, 5, A Configuration

4.2.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

When a failure occurred at a HDU ASSY, replace the failed HDU with a spare HDU.

To replace a HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See CK-REP0245.) With the replacement, data in the failed HDU will be automatically recovered. The panel display is described at “① Transition of panel display”. (See CK-REP0190.)

Note : When DRIVE MAINTN (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINTN again).



In the following cases, the recovery will not start automatically. Operation to start the recovery is required.

- (1) When the drive recovery mode is set to “NOT AUTOMATIC MODE”, the data recovery will not start automatically when the drive is replaced.

In this case, it is necessary to instruct recovery from the panel. (For further details, refer to the Hitachi Disk Array Subsystem Panel Operation Manual.)

- (2) When failures occurred in plural drives, if the second faulty drive is replaced during data recovery of the first drive, the data recovery of the second drive will not start automatically.

In this case, it is necessary to remove and insert the second drive again after the data recovery for the first drive is completed. Or, it is necessary to instruct recovery from the panel. Select “DRIVE MAINTN (RECOVER STATUS)” and make sure that data recovery is completed normally.

① Transition of panel display

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of drive recovery

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the drive under recovery.

* : Only with the replacement of HDU in Row = 0.

② Confirming completion of data recovery

Select DRIVE MAINT (RECOVER STATUS) with the panel and check to see that the data recovery is completed normally (COMP).

③ When the data recovery fails (1012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(a) Data recovery onto the replacement drive

(i) When the faulty portion is the replaced drive (PORT X, ROW Y)

- Replace the drive again.
- Make sure that the data recovery is completed normally (COMP).

(ii) When the faulty portion is other than the replaced drive

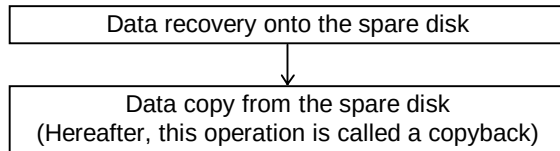
- Remove and insert the replaced drive and start data recovery again.
- Check to see that the data recovery is completed normally (COMP). When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. Ask for an instruction. When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive.

4.2.2 Procedures of data recovery and HDU ASSY replacement when a spare disk is installed

When a failure occurred in a HDU at a system with a spare drive, the data in the failed HDU is automatically recovered to the spare drive. After replacement of the failed HDU, the data in the spare drive will be copied back to the replaced HDU.

To replace HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See CK-REP0245.) The panel display is described “Transition of Panel Display”. (See CK-REP0230.)

Note : When DRIVE MAINT (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINT again).



(1) Data recovery onto the spare disk

There are two types of data recovery onto the spare disk depending on the incentive.

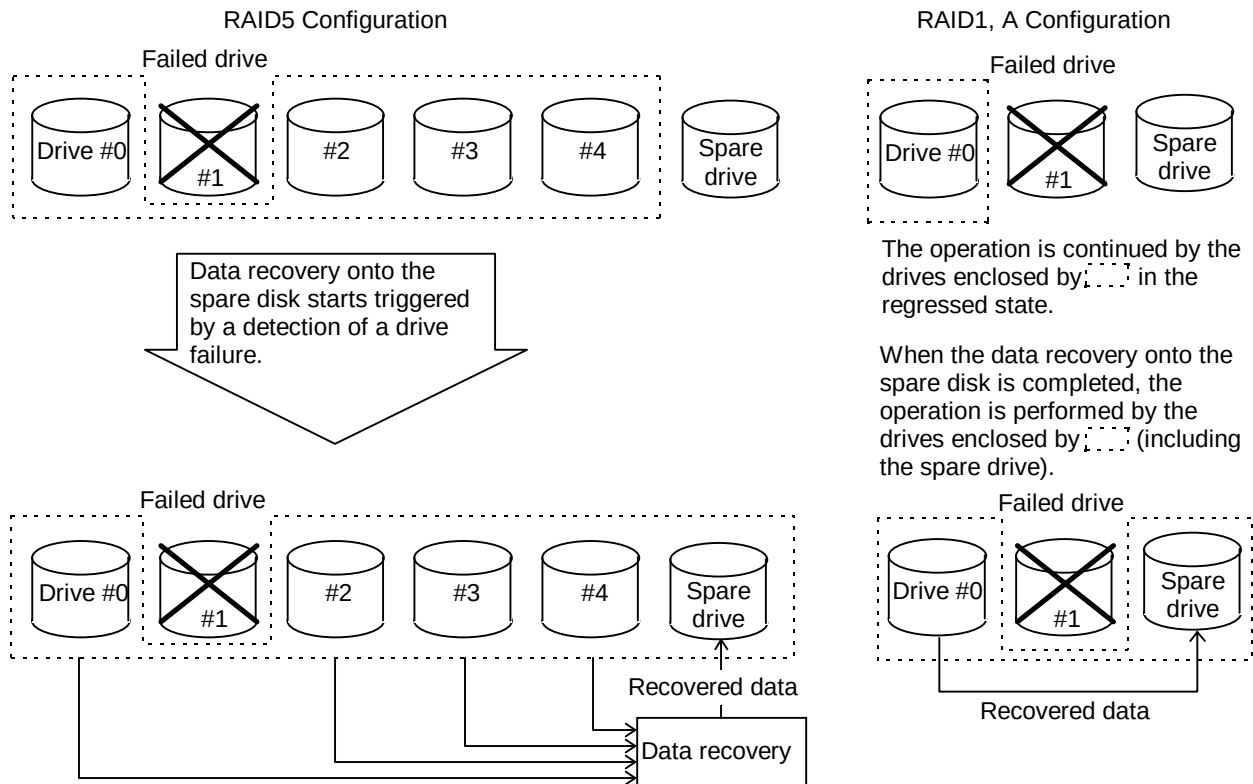
- Data recovery onto the spare disk when a failure in the disk is detected.
- Data copy onto the spare disk when a disk is detected in which the error count has exceeded its threshold value. (This operation will be called “dynamic sparing” hereafter. Note that some microprograms of certain version do not support the operation.)

(1-1) Data recovery onto the spare disk when a disk failure is detected.

As to data recovery onto the spare disk, as shown in the drawing on the following page, when a drive failure occurs, the data of the failed drive is recovered automatically onto the spare disk.

Automatic recovery onto the spare disk is executed only under the following condition.

Condition : “When a drive failure is detected, the spare disk is an unused disk.”



In the following cases, the data recovery onto the spare disk will not start automatically. An action to start the data recovery is required.

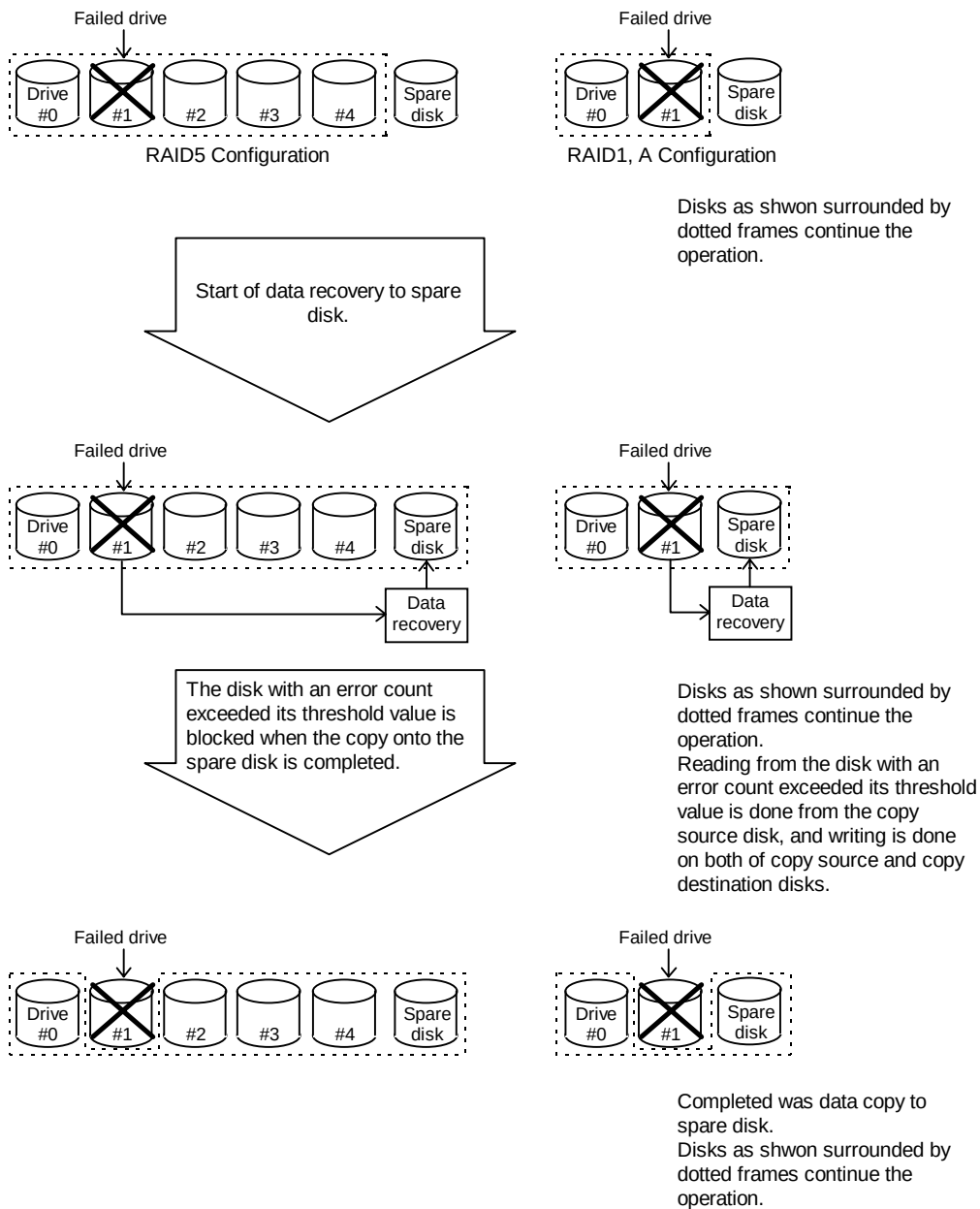
- ① When the drive recovery mode is set to "NOT AUTOMATIC MODE", the data recovery onto the spare disk will not start automatically.
In this case, it is necessary to instruct recovery onto the spare disk with the panel. (See CK-REP0260)
- ② If a further drive failure occurs while the spare disk is used already (data of a drive has been already recovered onto the spare disk), the data of the nearly failed drive will not be recovered onto the spare disk.
Even after the copyback is completed in the above state and the spare disk enters the unused state, the data of the second failed drive will not be recovered onto the spare disk.
- ③ If a disk of no failure (a drive which is not blocked) is removed, no data recovery onto the spare disk will be executed. In this case, to recover data onto the spare disk, it is necessary to instruct a recovery from the panel. (See CK-REP0260)
- ④ When the spare disk is replaced because a spare disk failure occurred during data recovery to the spare disk, the data recovery to the replaced spare disk will not start automatically. In this case, it is necessary to instruct recovery to the spare disk with the panel. (See CK-REP0260)
- ⑤ If a faulty drive is replaced during data recovery to the spare disk, the data copy back the replaced drive will not start automatically even after the data recovery to the spare disk is completed.
In this case, it is necessary to remove and insert the replaced drive again after the data recovery onto the spare disk is completed.

(1-2) Data recovery onto the spare disk by means of the dynamic sparing

Data recovery onto the spare disk is performed as shown below. When a disk is detected in which the error count has exceeded its threshold value, data stored in the disk is copied automatically onto the spare disk.

The automatic data recovery onto the spare disk is performed only when the following condition is met.

Condition : The spare disk is not in use when a disk is detected in which the error count has exceeded its threshold value.



The subsystem displays the following message on the panel when detecting a disk in which the error count has exceeded its threshold value.

I03■XY ■:0 - D
 ▲▲▲▲▲ -XY ▲▲▲▲▲ : Message text } See TRBL0275, 0278.

At the time when an error count exceeded its threshold value is detected, only a message display on the panel is done without blocking the concerning disk, and the dynamic sparing is started.

The disk with an error count exceeded its threshold value is blocked after the dynamic sparing is completed.

Refer to page CK-REP0230 for panel display transition when the dynamic sparing is performed.

In the following cases in which a disk with an error count exceeded its threshold value is detected, the disk is blocked without an execution of the dynamic sparing.

- When the dynamic sparing mode is set not to execute the dynamic sparing.
- When a disk with an error count exceeded its threshold value is detected after the data has been recovered or while the sparing disk is being used for the data recovery.
- Another disk with an error count exceeded its threshold value is detected during the dynamic sparing operation.

In each case above, the disk with an error count exceeded its threshold value is blocked.

Procedures for data recovery and disk replacement are the same as those for the installation of the spare disk (refer to pages CK-REP0180 through CK-REP0240).

Errors counted in the subsystem and default threshold values for them are listed below.

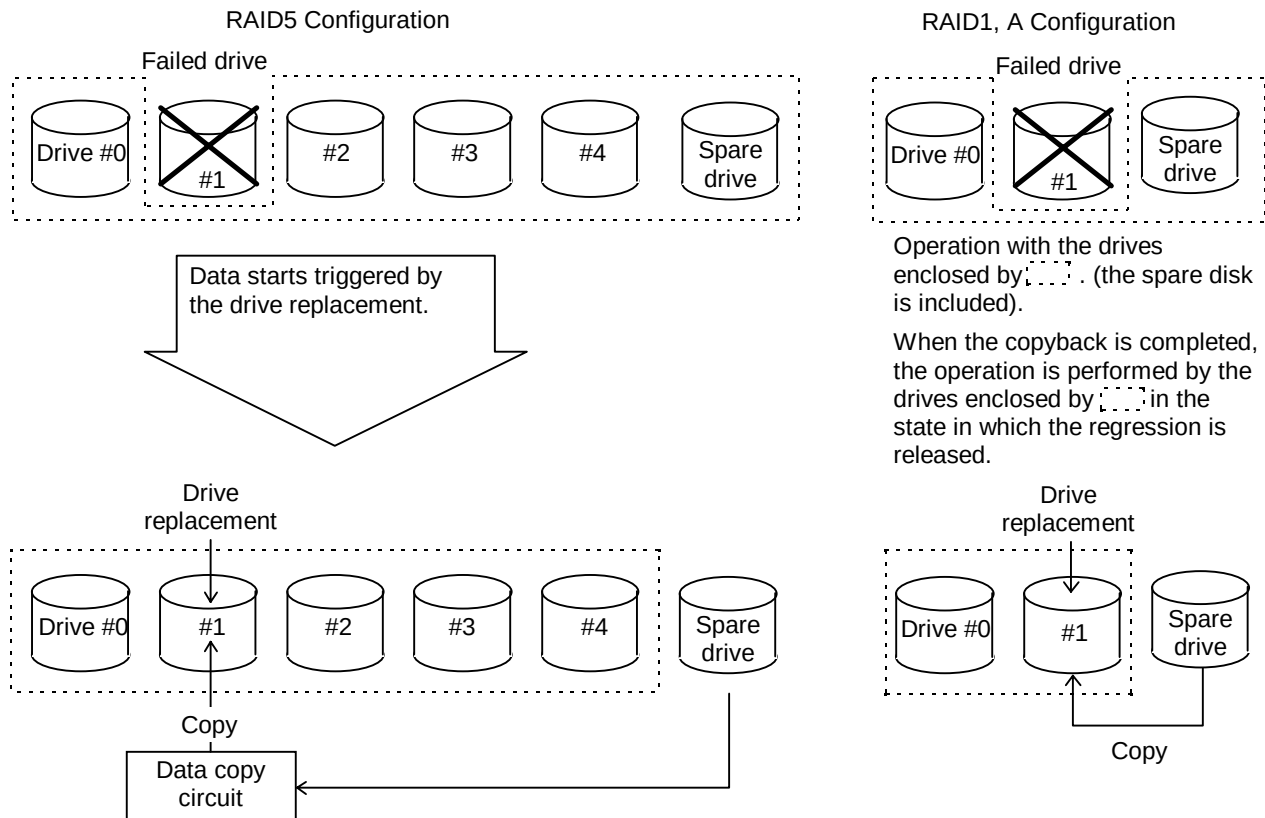
Item No.	Kind of error	Threshold (Default)
1	Drive mechanical error. (Recovered)	50
2	Drive mechanical error. (Unrecovered)	2
3	Drive medium error. (Recovered)	100
4	Drive medium error. (Unrecovered)	50
5	Drive R/W error. (Recovered)	10
6	Drive R/W error. (Unrecovered)	2
7	Drive I/F error. (Recovered)	50
8	Drive I/F error. (Unrecovered)	2
9	Drive hardware error. (Recovered)	50
10	Drive hardware error. (Unrecovered)	2
11	Drive SCSI I/F error. (Recovered)	50
12	Drive SCSI I/F error. (Unrecovered)	2
13	Collectable errors in online verify.	100
14	Uncollectable errors in online verify.	50

The threshold values above can be referred to and updated from the maintenance panel. (See page PANEL0745.)

Besides, the then error count can be referred to concerning the recovered or unrecovered drive media errors, correctable errors in online verify operations, correctable errors, and uncorrectable errors.

(2) Copyback

When a new drive is inserted to where a failure occurred as shown in the drawing below, the copyback will be executed automatically.



In the following cases, the copyback will not start automatically. Operation to start the copyback is required.

- ① When the copyback mode is set to "NOT AUTOMATIC MODE", the copyback will not start automatically after the drive replacement.

In this case, it is necessary to instruct copyback with the panel. (See CK-REP0260)

- ② If a faulty drive is replaced during data recovery to the spare disk, the data copy back to the replaced drive will not start automatically even after the data recovery to the spare disk is completed.

In this case, it is necessary to remove and insert the replacement drive again after the data recovery onto the spare disk is completed.

(a) Transition of panel display.

(i) Data recover (Data recovery onto the spare disk when a disk failure is detected.)

W202XY DRVALM-XY: Drive blocked

I01044 RCV-ST-44 : Start of data area recovery

I01144 RCVEND-44 : Completion of data area recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(ii) Data recover ()

I01DXY DYNMSP-XY : Start of Dynamic sparing

I01044 RCV-ST-44 : Start of HDU ASSY recover

I01144 RCVEND-44 : Completion of data recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

W202XY DRVALM-XY: Drive X, Y were blocked

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(iii) Copyback

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of recovery onto the drive to which the data has been copied.

Note : Symbols X and Y indicated above represent the following.

X indicates port No., and Y indicates row No., and XY indicates the location of the drive to which the data is copied.

* : This message is displayed only when replacing HDU ASSY.

(b) Confirming completion of data recovery or copyback

Select DRIVE MAINTENANCE (RECOVER STATUS) from the panel and make sure that the data recovery is completed normally (COMP).

(c) When the data recovery failes (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(i) Data recovery to the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery to the spare disk will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive. (When the failed drive is removed, the data recovery to the spare disk will not start, where as when the drive is replaced, the data recovery to the replaced drive starts.)

(ii) When the dynamic sparing

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the dynamic sparing will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

(iii) Copyback to the replaced drive from the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery onto the spare disk will not start.
- ➋ Replace the drive in the regressed location. In this case, the data recovery onto the replacement drive starts.

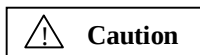
- ➌ Make sure that the data recovery is completed normally (COMP).

- When the faulty portion is other than the spare disk

- ➊ Replace the drive which failed during data recovery and make sure that the data recovery is completed normally (COMP).

- ➋ Replace the drive which is regressed first and make sure that the copyback is completed normally (COMP).

4.3 HDU ASSY Replacement Procedure (See Figure 4.3.1.)



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

(1) Removing procedure

- ① Open the front cover and the side covers. (See CK-REP0160.)
- ② Check to see the drive installing location of the message text DRVALM-XY (XY indicates the installing location) on the panel is correct and the ALARM LED of the HDU ASSY is on.

W	2	0	2	X	Y	D	R	V	A	L	M	-	X	Y

X : Port number

Y : Row number

- ③ Open the handle in the direction of the arrow (···➤) and pull it out and remove the HDU ASSY.

(2) Installing procedure

- ① Open the handle fully, insert the HDU ASSY in place, and rotate the handle in the direction of the arrow (→).

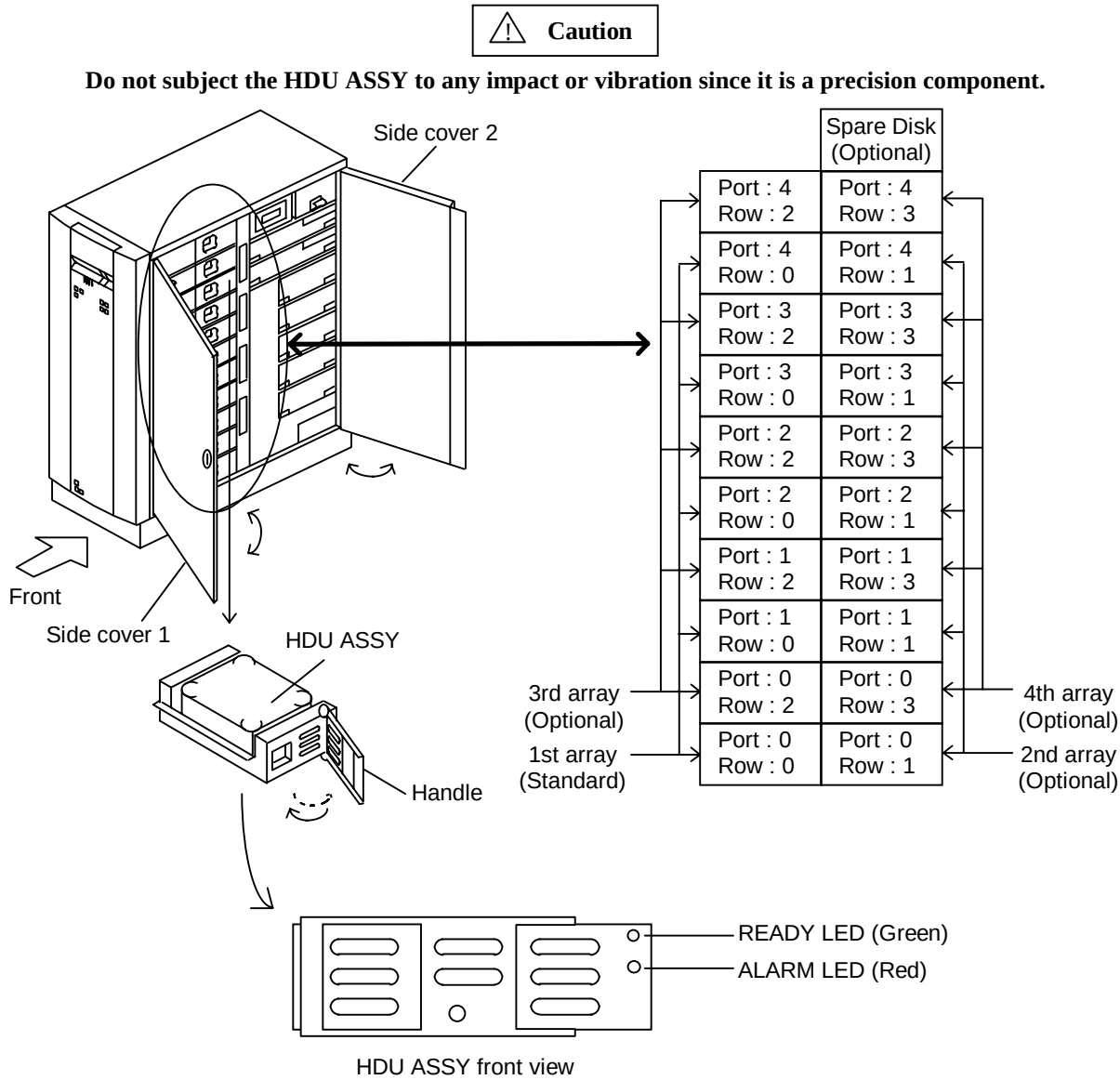
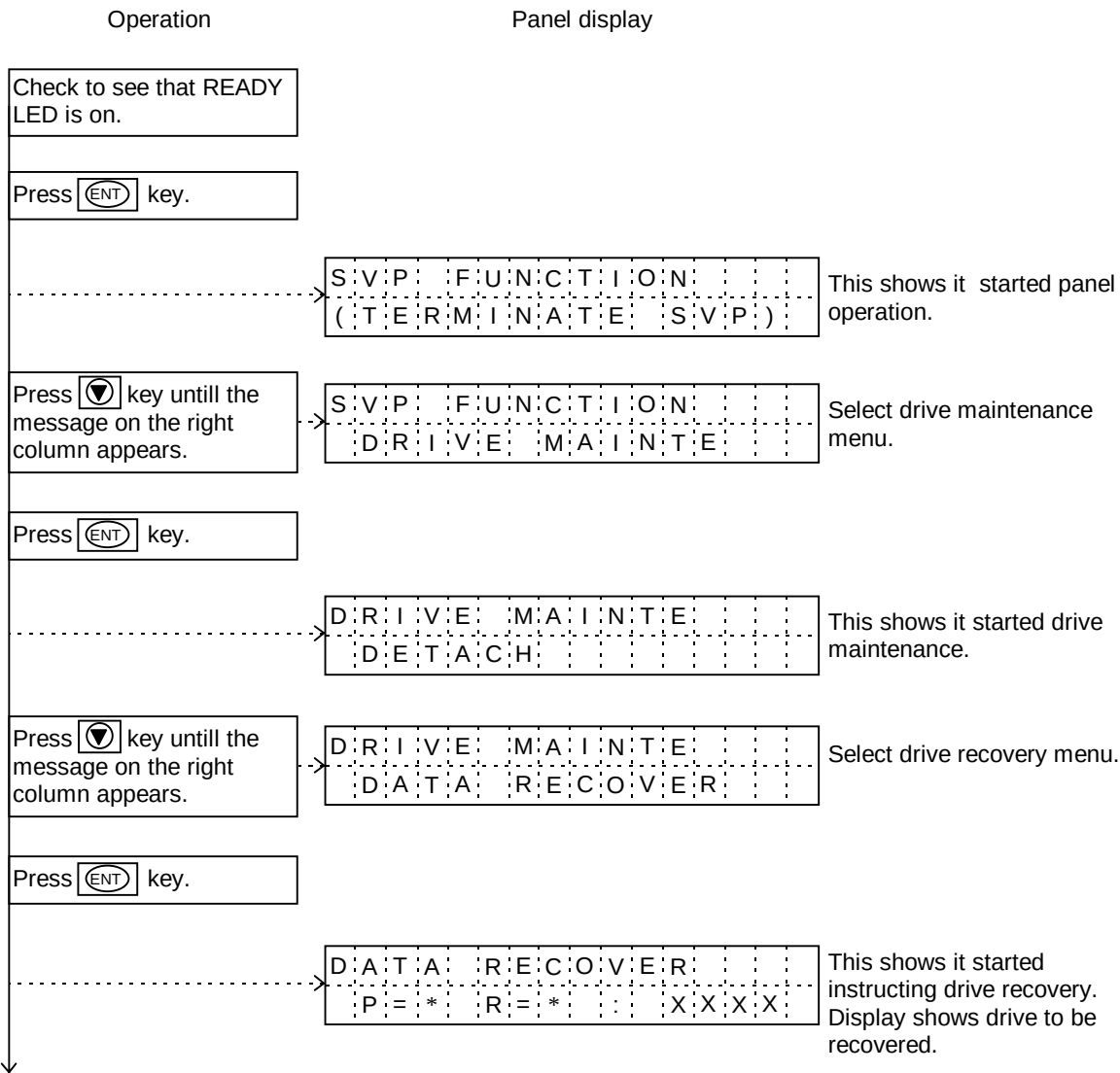


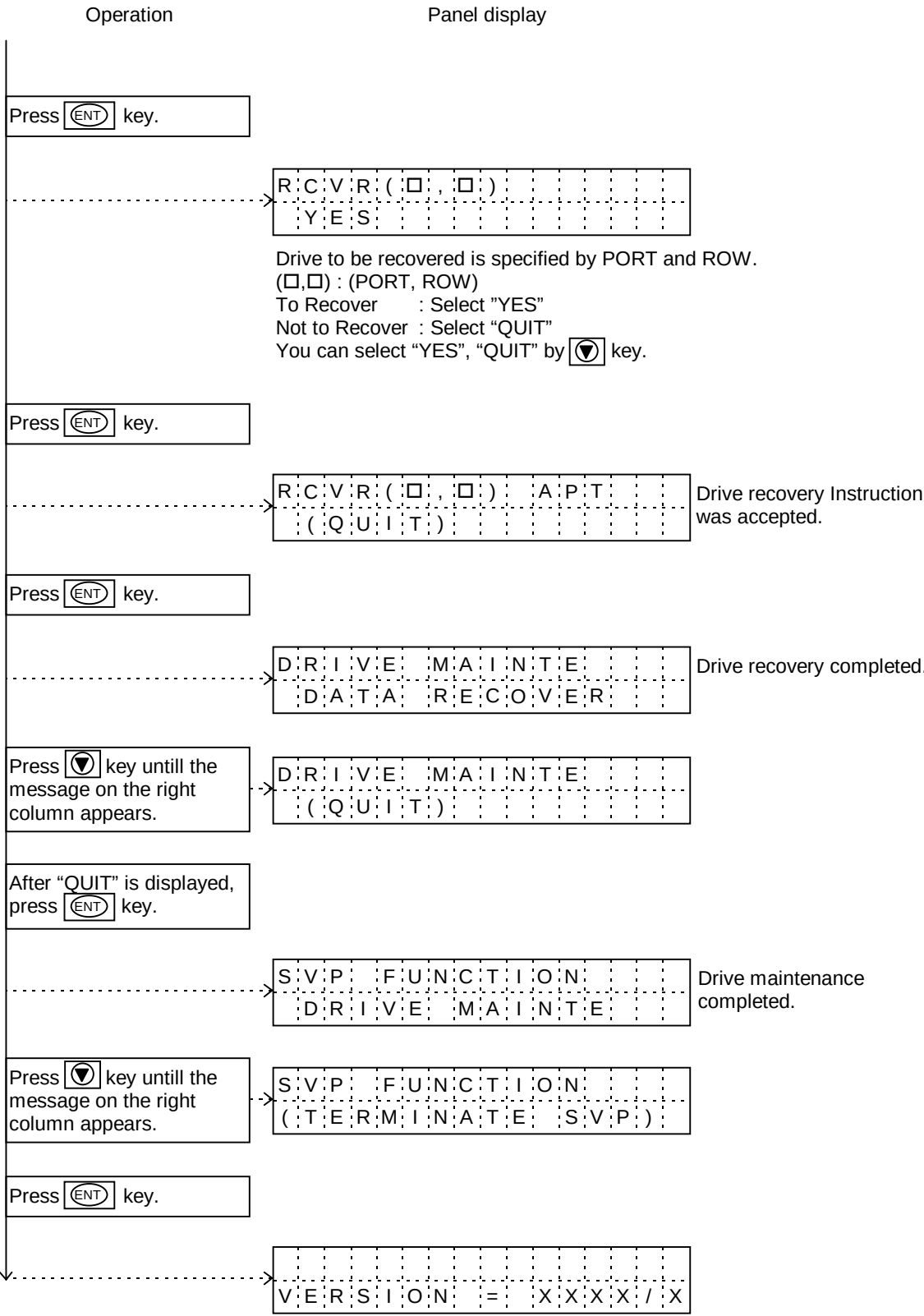
Figure 4.3.1 Replacing HDU ASSY

4.4 Manual Instruction of Data Recovery

This is for manually instructing data recovery. (In a case of dual controller system, which controller to process is automatically specified. No instruction of controller is required.) You can operate this function under device ready and LU#0 instituted (LU can be not formatted yet).



- P=* : Port# of Drive to be recovered.
R=* : Row# of Drive to be recovered.
XXXX : Status of Drive to be recovered. Status is one of below.
- STDBY (not used)
 - DETACH (blocked)
 - NO : (RAID, LU not set yet)



5. Replacing Fan ASSY (See Figure 5.1.)

When replacing FAN ASSY, turning off the power is not required.



Caution

FAN is rotating with high speed, be careful not to be caught by the FAN.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ② Remove the thumbscrew and pull the Fan ASSY to your side grasping it by its handle.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)

(2) Installing procedure

- ① Insert the Fan ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Make sure that the WARNING LED goes off and the following panel display appears.

(3) Transition of panel display

I002XX FANRCV-XX----- Termination of fan failure recovery

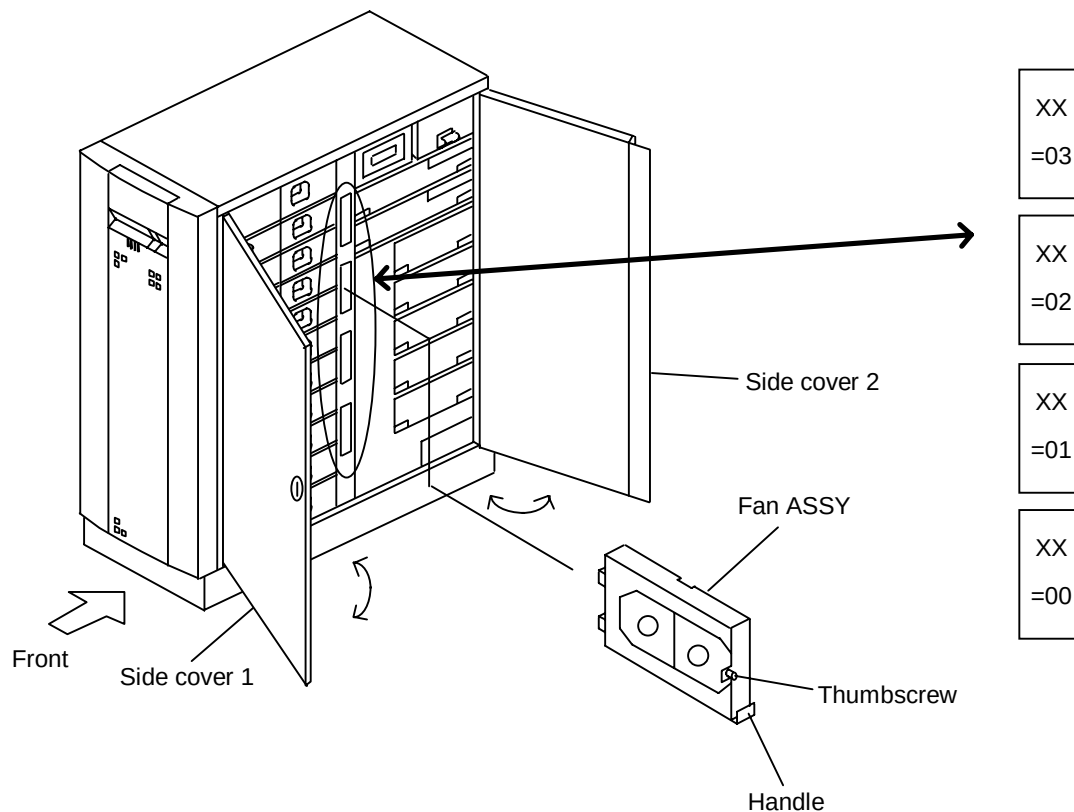


Figure 5.1 Replacing Fan ASSY

6. Replacing Battery ASSY (See Figure 6.1.)

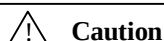
Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

When the battery is to be replaced with power turned off, read CK-REP0050, "Turning the power off." and "Turning-ON procedure." thoroughly and follow CK-REP0060, "Part Replacement Procedures".

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ② Turn the switch on the Battery ASSY to "O" side.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)
- ③ Remove the thumbscrews and pull the Battery ASSY to your side by grasping it by its handle.



Caution

Do not disintegrate removed Battery. It may cause burn or electric shock.

(2) Installing procedure

- ① Insert the Battery ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Turn the switch on the Battery ASSY to "I" side.
- ③ Make sure that the WARNING LED goes off and the following panel display appears.

Note : When removing/mounting the Battery ASSY, turn the switch to "O" side.

(3) Transition of panel display

I00100 BATRCV ----- Termination of battery recovery

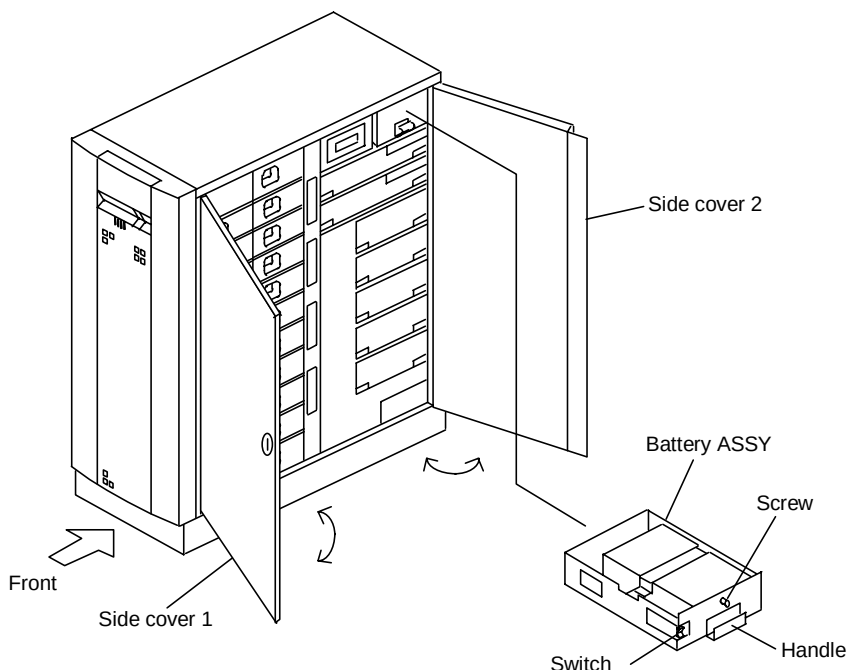


Figure 6.1 Replacing Battery ASSY

Note : The lead-acid battery is a precious resource which can be recycled.

The battery uses lead which is a heavy metal and sulfuric acid which is a deleterious substance. Therefore, never case it off at the place where the replacement of it is done.

When a part is to be replaced or a used product is to be discarded, take out the lead-acid battery to get it recycled.

See page "ENTRY0120" for the safety of depositing and storing the battery.

When the battery ASSY is replaced, power on the subsystem and charge the battery for more than two hours before returning the subsystem to the customer.

7. Replacing FDD ASSY (See Figure 7.1.)

When replacing FDD ASSY, turning off the power is not required.

Tool : Phillips screwdriver (No.2)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ② Disconnect the power cable. When the power supply is duplicated, disconnect two cables.
- ③ Open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ④ Remove the thumbscrew and pull the FDD ASSY to your side grasping it by its handle.

(2) Installing procedure

- ① Insert the FDD ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Connect the power cable.

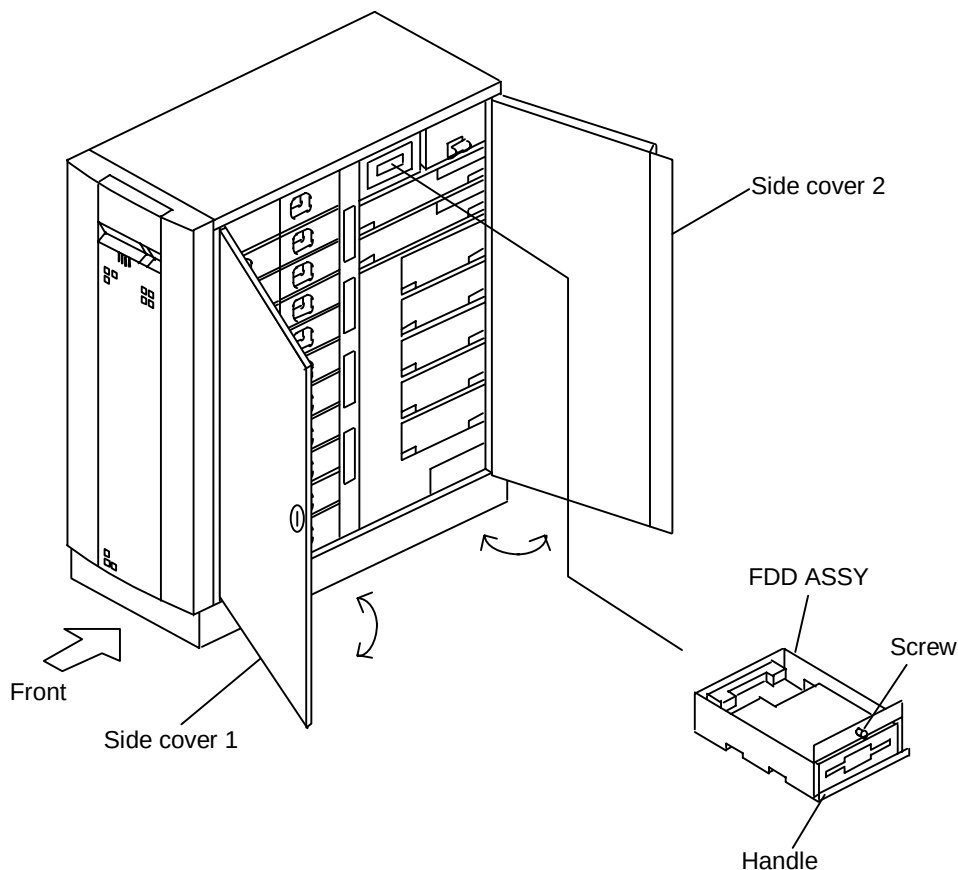


Figure 7.1 Replacing FDD ASSY

8. Replacing CTL ASSY

The replacement procedure differs depending on the Micro_Disk version. Confirm the version first, then execute the replacement following the procedure determined according to the version.

- (1) When the Micro_Disk version is 0303** (** is optional) or earlier
Go to section 8.1 “CTL ASSY Replacement when Version is 0303** (** is optional) or earlier” on page CK-REP0310.
- (2) When the Micro_Disk version is 0304** (** is optional) or later
Go to section 8.2 “CTL ASSY Replacement when Version is 0304** (** is optional) or later” on page CK-REP0341.

8.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier

In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See CK-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ⑤ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.



- ⑥ Turn on the subsystem according to the power-on procedure explained in CK-REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See CK-REP0130.) If no system parameter FD, proceed the setting the panel with the table prepared in ①. (Refer to PANEL Chapter.)
- ⑧ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑨ Turn off the power according to the power off procedure in CK-REP0050.
- ⑩ Turn on the power according to the power on procedure in CK-REP0050. (Soon, the ASSY will enter the ready status.)
- ⑪ Close the side covers 1 and 2. (See CK-REP0160.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED is lit on).

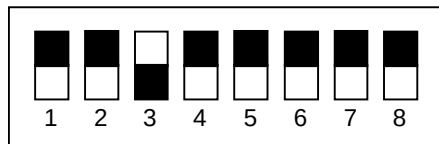
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ② Disconnect the cables (RS232C).
- ③ Check to see which CTL ASSY is blocked (FAIL LED is lit up).
- ④ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑤ Remove the CACHE ASSY and the LAN ASSY. (option)

(2) Installing procedure

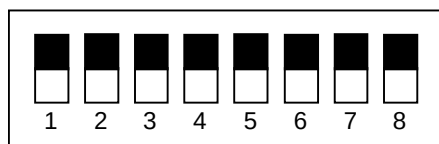
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ When the WARNING LED on PANEL goes off and the message below appears on the PANEL, set No.3 of DIP switch to as shown.



The message on the PANEL "I619XX CTL RCU-XX". (XX : Indicates the installing location < 00 or 01 >.)

- ⑤ Connect the disconnected cables (RS232C).

⑥ Close the side covers 1 and 2. (See CK-REP0160.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option) , replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

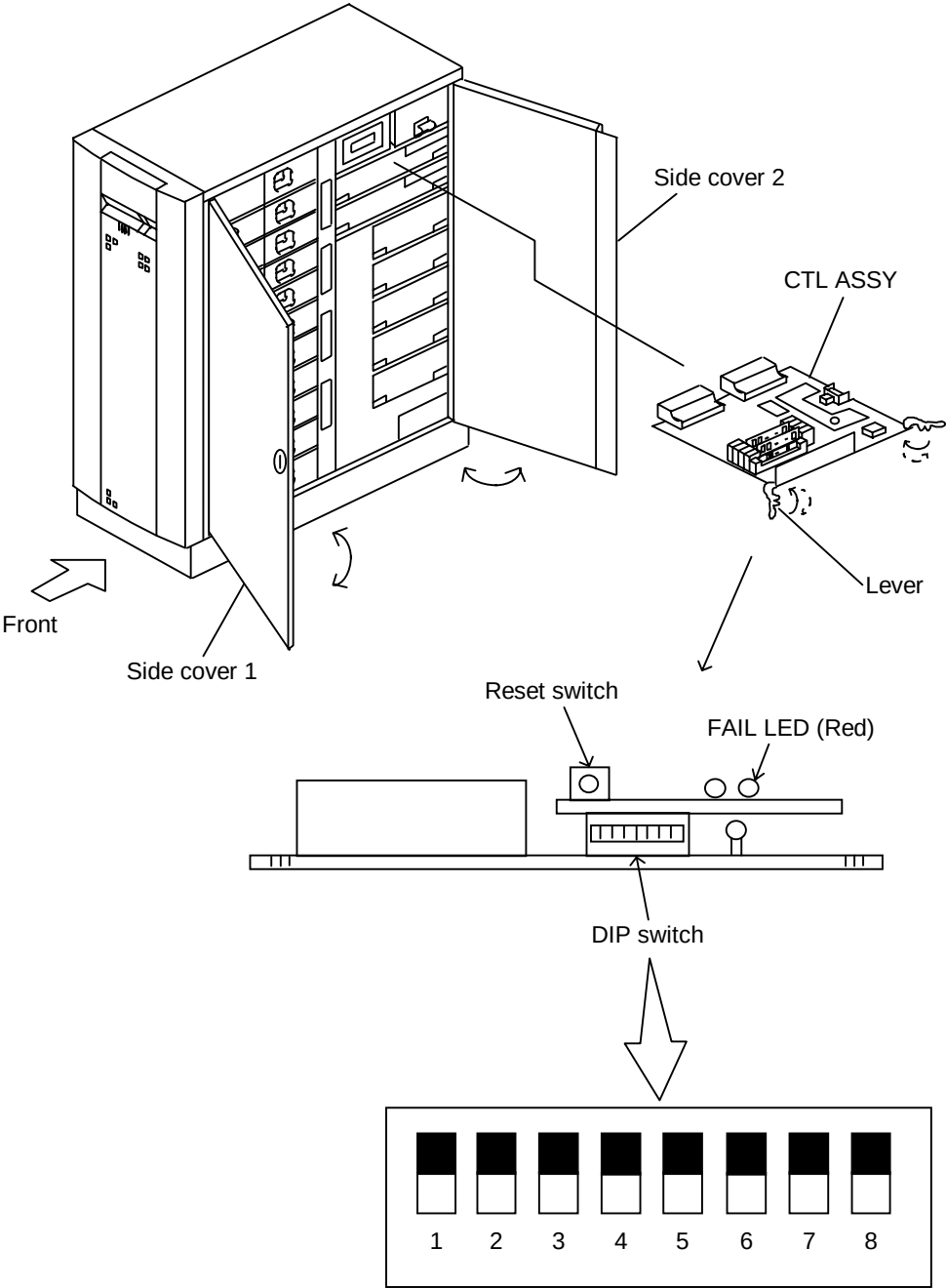


Figure 8.1.1 Replacing CTL ASSY

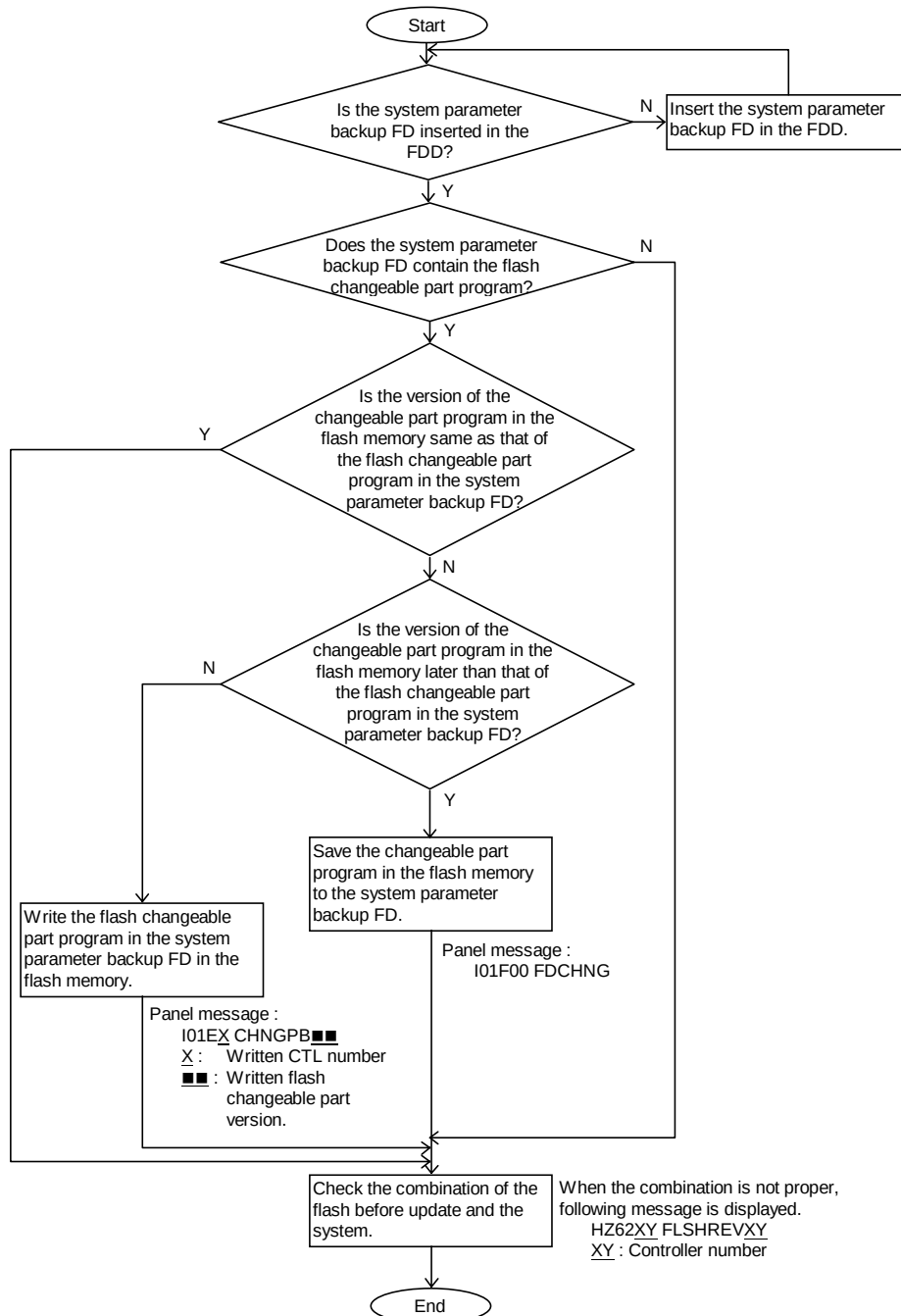
8.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later

The automatic updating function of the flash changeable part is added to the subsystem whose Micro_Disk version is 0304** (** is optional) or later. To use the function the system parameter backup FD must be inserted. By using the function, service person can replace the CTL ASSY without giving care to the combination of the Micro_Disk version and the flash changeable part version of the CTL ASSY.

(If the system parameter backup FD is not inserted when replacing the CTL ASSY, prepare the CTL ASSY whose flash changeable version is the same as that of the CTL ASSY to be replaced, or PB26 or later, and execute the replacement following the procedure explained in Section 8.1 "CTL ASSY Replacement when Version is 0304** (** is optional) or earlier".)

Outline of flash changeable part automatic updating function

The following is a processing flow of the flash changeable part automatic updating function. This processing is performed by the Micro_Disk of version 0304** (** is optional) or later.



In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See CK-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

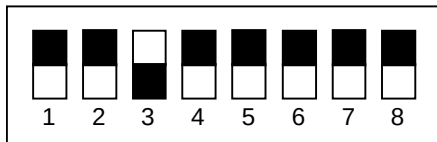
Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ⑤ Open the right and left levers to the direction of arrows (···→) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.
Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.
- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.

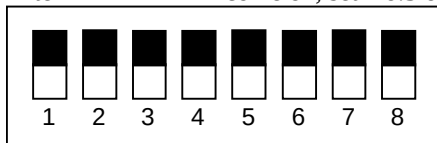


- ⑥ Turn on the subsystem according to the power-on procedure explained in CK-REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See CK-REP0130.)

- ⑧ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
Version = XXXX/X	Subsystem READY lamp comes on.	Go to step ⑨
I01EX CHNGPB■■ HZ62XY FLSHREVXY X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	Subsystem ALARM lamp comes on. (Version of flash changeable part was updated to PB■■. Current system cannot operate with the flash changeable part whose version is not updated.)	Operation1 : Return the DIP switch of the CTL ASSY. Operation2 : Turn off the power following the powering off procedure shown on page CK-REP0050. Operation3 : Turn on the power following the powering on procedure shown on page CK-REP0050. Check if the following message is displayed on the panel. Version = XXXX/X Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see CK-REP0347), then go to step ⑨.
I01EX CHNGPB■■ Version = XXXX/X X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed.	Subsystem READY lamp comes on. (Version of flash changeable part was updated to PB■■. Current system can operate with the flash changeable part whose version is not updated.)	Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see CK-REP0347), then go to step ⑨.

- ⑨ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑩ Turn off the power according to the power off procedure in CK-REP0050.
 ⑪ Turn on the power according to the power on procedure in CK-REP0050. (Soon, the ASSY will enter the ready status.)
 ⑫ Close the side covers 1 and 2. (See CK-REP0160.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED in on).

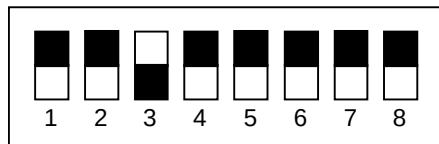
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ② Disconnect the cables (RS232C).
- ③ Confirm the blocked CTL ASSY (with the FAIL LED turned on). (See Figure 8.2.1.)
- ④ Take out the CTL ASSY by pulling both levers on left and right side at the same time toward the directions shown by allows (·····➤)
- ⑤ Remove the CACHE ASSY. If the LAN ASSY is installed, also remove it.

(2) Installing procedure

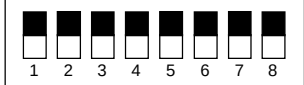
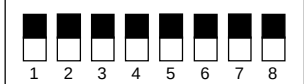
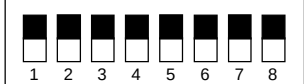
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
I619XX CTLRCV-XX XX : Controller number (00 or 01) is displayed.	The WARNING LED goes out and the READY LED of the subsystem comes on.	Return the DIP switch No.3 as shown below, then go to step ⑤ 
I01EX CHNGPB■■ HZ62XY FLSHREVXY H60422 CTLFAIL W015XX CTLALM-XX XX : Controller number (00 or 01) is displayed. X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	The WARNING LED comes on, and the READY LED of the subsystem comes on in the state that one of the CTL ASSYs is blocked. (The flash changeable part has been updated to the version PB■■. Current system cannot operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Pull out the inserted CTL ASSY (with the FAIL LED turned on). Operation2 : Insert the CTL ASSY again. (Leave the DIP switch No.3 as set to on.) Operation3 : Return the DIP switch No.3 as shown in the Figure below when the WARNING lamp on the panel goes out and the following message is displayed on the panel.  Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see CK-REP0347), then go to step ⑤. I619XX CTLRCV-XX
I01EX CHNGPB■■ I619XX CTLRCV-XX	The WARNING LED goes out and the READY LED of the subsystem comes on. (The flash changeable part has been updated to the version PB■■. However, the current system can operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Return the DIP switch No.3 as shown below.  Operation2 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see CK-REP0347), then go to step ⑤.

- ⑤ Connect the disconnected cables (RS232C).
- ⑥ Close the side covers 1 and 2. (See CK-REP0160.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option), replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

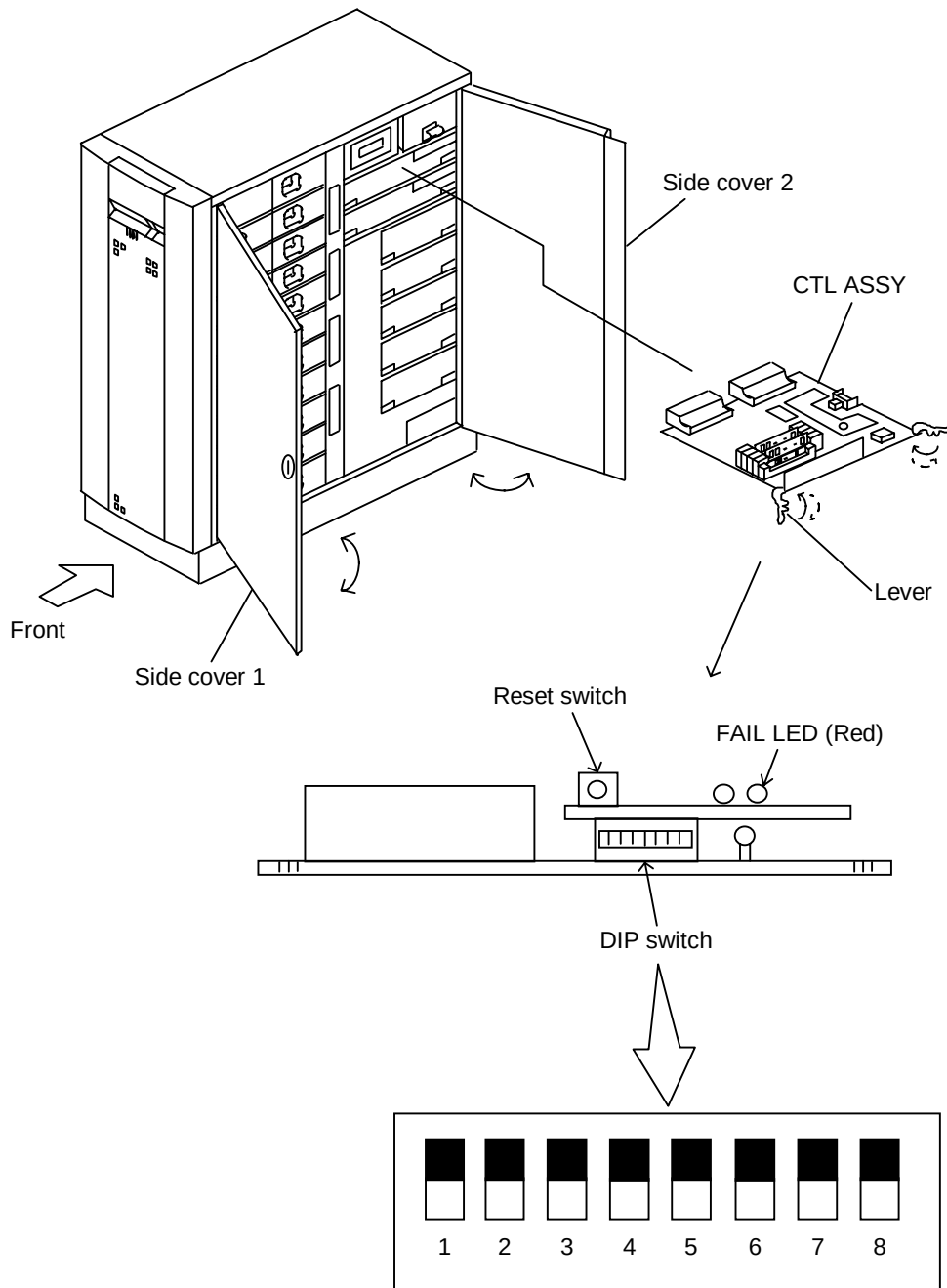


Figure 8.2.1 Replacing CTL ASSY

Painting flash revision label

Figure 8.2.2 shows how to paint the flash revision label. (It shows a case to paint the boxes up to PB26.)
Location of the label is shown in Figure 8.2.3.

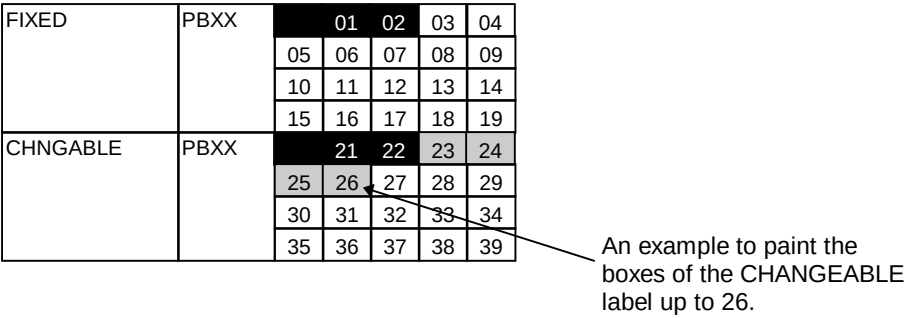


Figure 8.2.2 Revision Label Layout and Numbers to be Painted

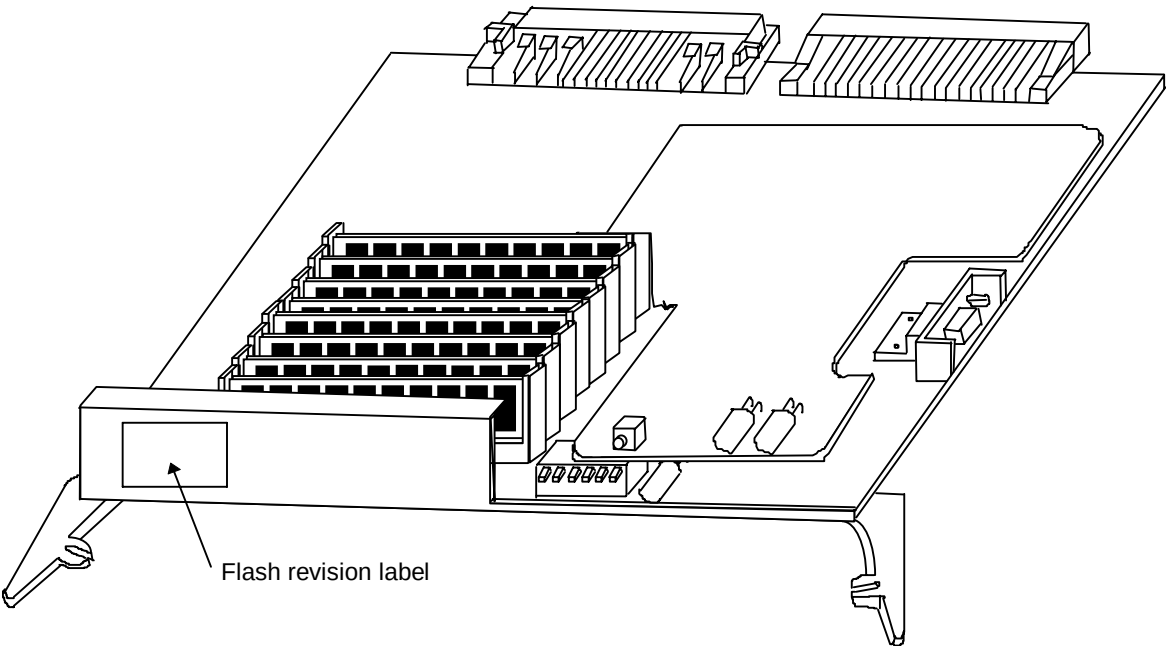


Figure 8.2.3 Location of Revision Label on CTL ASSY

9. Replacing I/F ADAPTER ASSY (See Figure 9.1, 9.2, 9.3 and Table 9.1.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050 and turn off the host system.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC".

In this case refer to "Trouble shooting chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the SCSI cable, the terminator, and the LAN cable (option).
- ③ First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ④ Remove the bind screw and pull the I/F ADAPTER ASSY toward you to remove it.

(2) Mounting procedure

- ① Make the setting of the terminator power, (JP1, JP2) as the setting of the removed I/F ADAPTER ASSY.
- ② Insert the I/F ASSY into the right place and tighten the bind screw.
- ③ Connect the disconnected cables etc.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 9.2.)

Controller 01

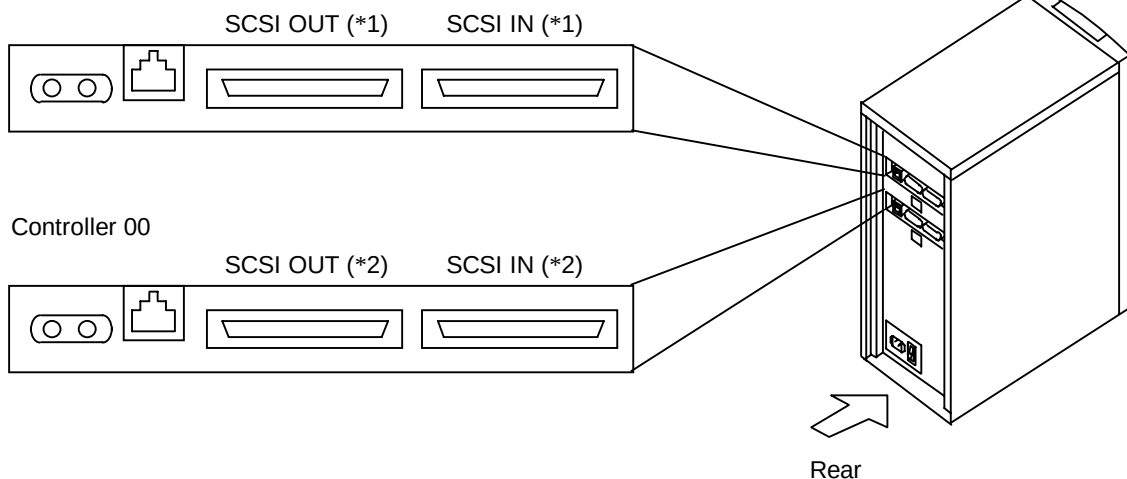


Figure 9.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

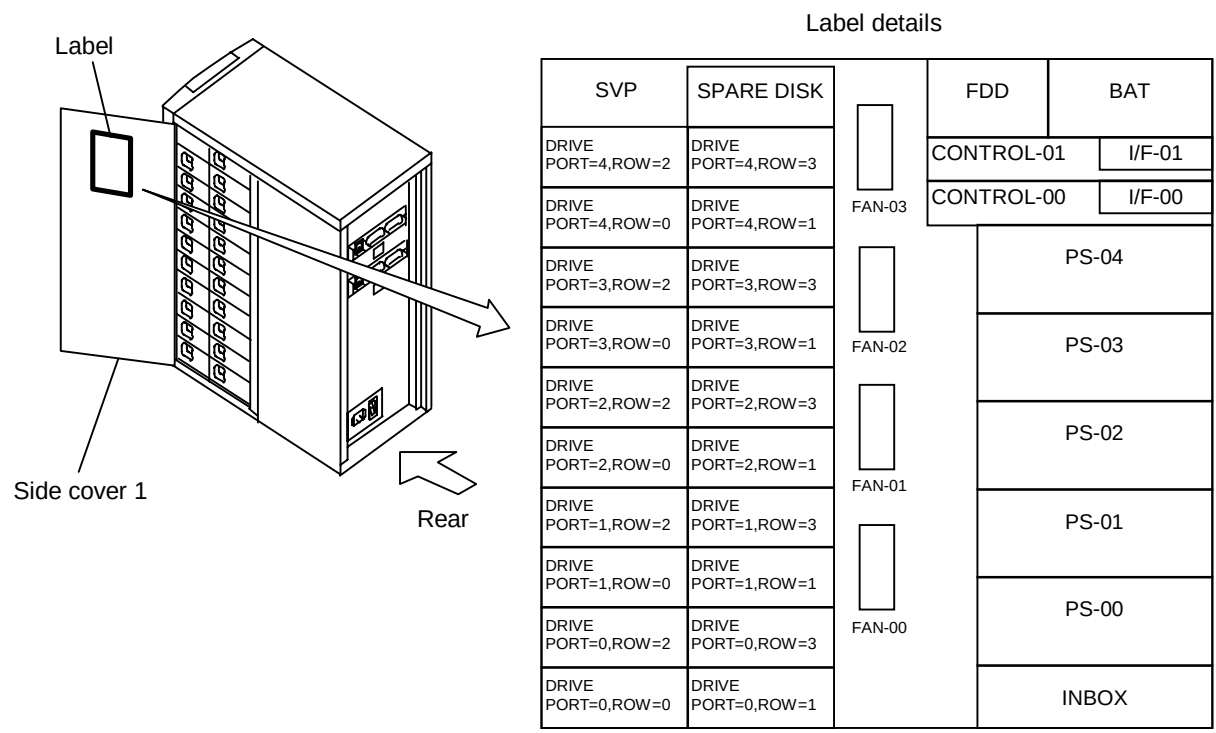


Figure 9.2 Label Layout

④ Close the side covers 1 and 2. (See CK-REP0160.)

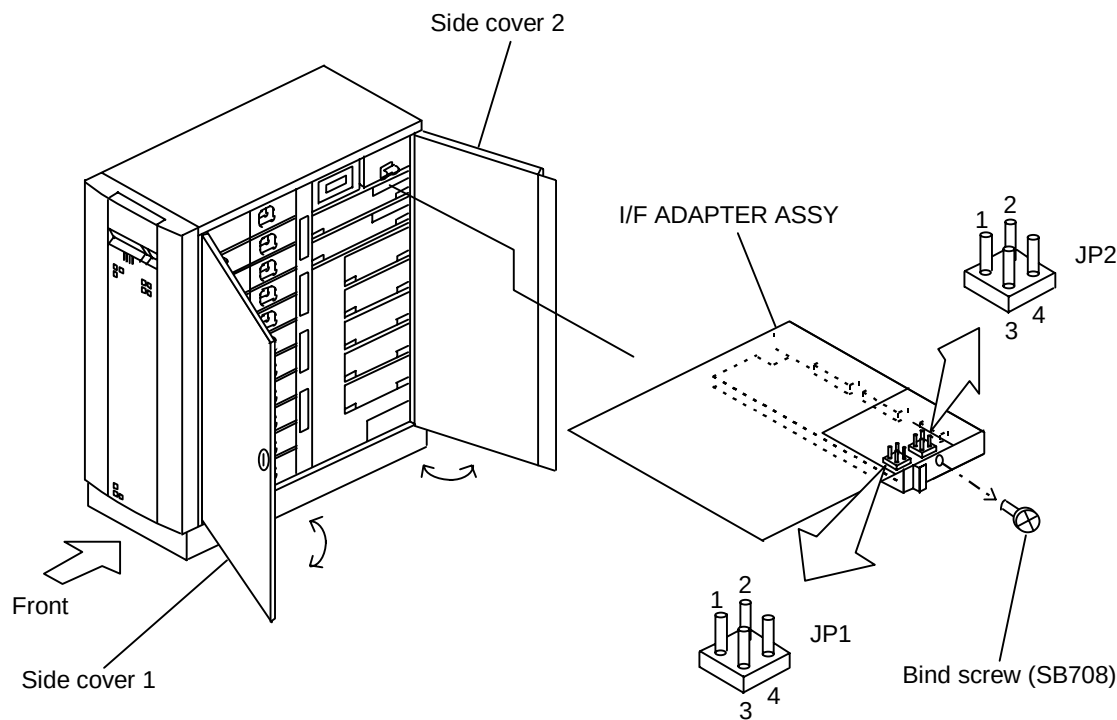
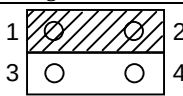
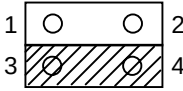
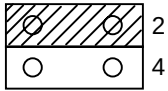
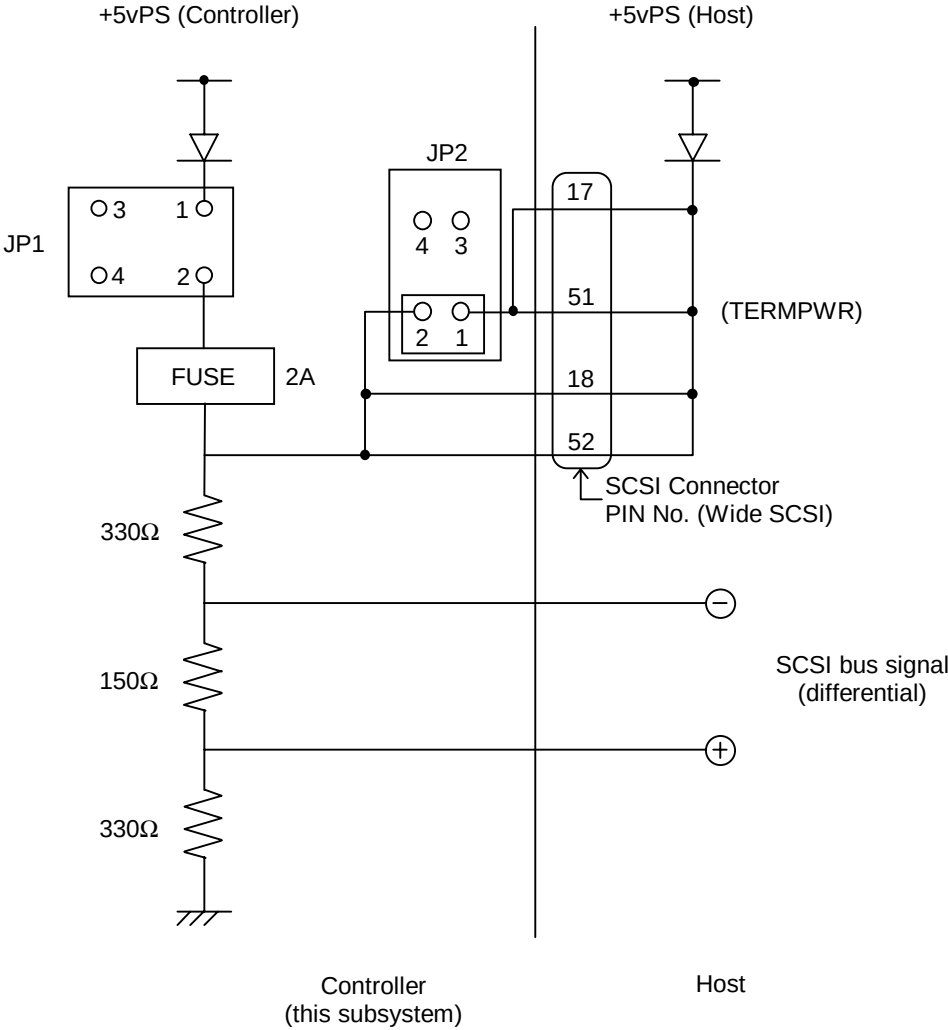


Figure 9.3 Replacing I/F ADAPTER ASSY

Table 9.1 Setting the Terminator Power

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2	JP2		Be sure to set this jumper with the pins 1 and 2 short-circuited.



10. Replacing SVP ASSY (See Figures 10.1 and 10.2.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050. (Be sure to read and understand the procedure because if the power is turned off improperly, user data might be destroyed.)

Sometimes the subsystem does not go power off after the main switch turned to “O” side with panel display “TOOMNYPIN” or “SYSDTSVER” or “POFFCMUNC”.

In this case refer to “Trouble shooting chapter” (See TRBL0030) and turn off the power.

- ② Check to see that POWER LED goes off.

Notice : In case the power is not normally turned off, the user’s data might be lost.

- ③ Turn the breaker at the rear to “O” side.
- ④ Open the front cover. (See CK-REP0160.)
- ⑤ Open the side cover 1. (See CK-REP0160.)
- ⑥ Remove 4 screws and remove shield bracket.
- ⑦ Turn the lever to the direction of an arrow (↗) and pull the SVP ASSY toward you. Then, remove the SVP ASSY to the left following arrow A.

(2) Mounting procedure

- ① Make the setting of Remote/Local as the setting of the removed SVP ASSY.
(For setting of the jumper, see “THEORY Chapter, 5. Location and Function of Switches and LEDs”.)
- ② Insert the SVP ASSY from the right front of the subsystem following the opposite direction of arrow A with its rail engaging with the guide and fix the projection into the cutout.
Then, turn the lever to the direction of an arrow (→) to mount the SVP ASSY.
- ③ Fix shield bracket with 4 screws.

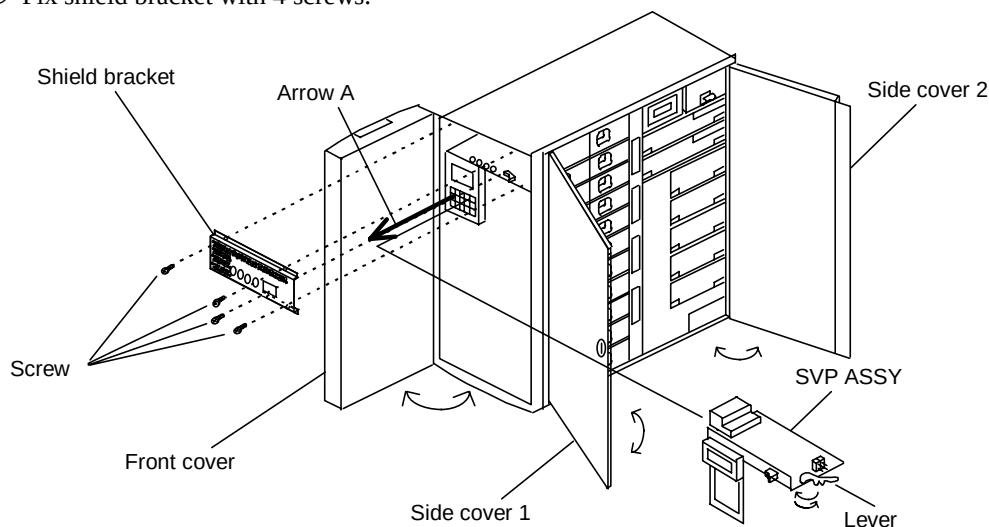


Figure 10.1 Replacing SVP ASSY

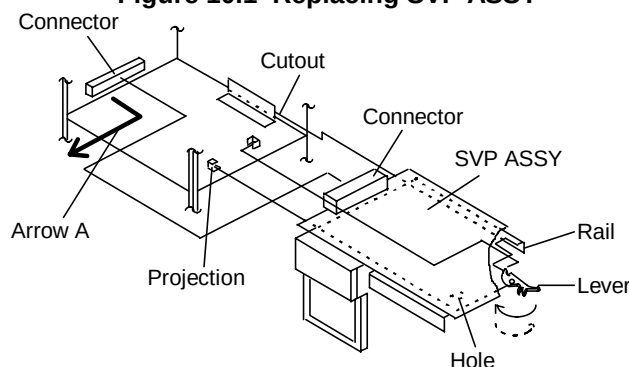
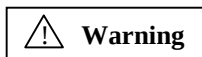


Figure 10.2 Detailed Figure of SVP ASSY Replacement

11. Replacing AC/DC power supply (See Figure 11.1.)



Only the maintenance personnel can perform this replacement.

The operation by the user is prohibited.

Tool : Phillips screwdriver (No.2)

Confirm presence/absence of the redundant power supply. If there is a redundant power supply, a hot replacement is possible. Concerning the cabinet type, when the number of the installed AC/DC power supplies is more than that of ROWs of the disk drives, it means that the subsystem has redundant power supply.

When the redundant AC/DC power supply is not installed, follow the procedure from step (4).

Cases of redundant power supply installation

Number of ROWs of installed disk drive	Number of installed AC/DC power supplies
1(1 to 5 drives)	2 or more
2(6 to 10 drives)	3 or more
3(11 to 15 drives)	4 or more
4(16 to 20 drives)	5

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ② Disconnect the FG cable connected with the AC/DC power supply.
- ③ Open the right and left levers to the direction of arrows (···➤) at the same time, then remove the AC/DC power supply .

(2) Mounting procedure

- ① Insert the AC/DC power supply into the right place with its right and left levers open, then close the both levers to the direction of arrows (➡) at the same time.
- ② Connect the FG cable with the AC/DC power supply.

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC".

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ③ Disconnect the FG cable connected with the AC/DC power supply.
- ④ Open the right and left levers to the direction of arrows (···➤) at the same time, then remove the AC/DC power supply .

(5) Mounting procedure

- ① Insert the AC/DC power supply into the right place with its right and left levers open, then close the both levers to the direction of arrows (➡) at the same time.
- ② Connect the FG cable with the AC/DC power supply.
- ③ Turn the power on following "2.1 Turning the Power on/off for Each String". (See CK-REP0050.)

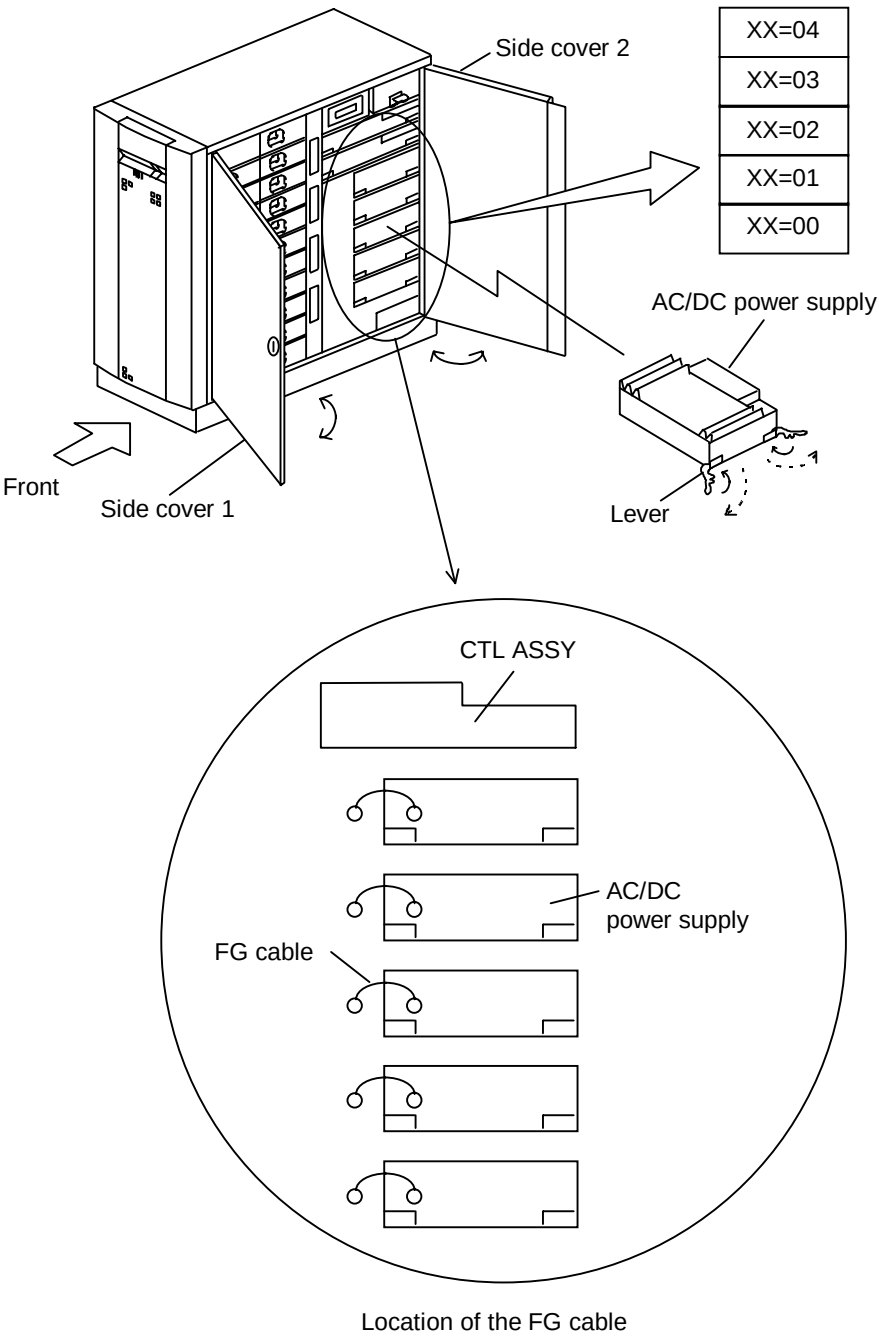


Figure 11.1 Replacing AC/DC power supply

12. Replacing In Box ASSY (See Figure 12.1.)

**Warning**

Do not touch inside of In Box ASSY. Electricity remains even if main switch is off.

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

In this case refer to "Trouble shooting chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the power supply cable.
- ③ First open the side cover 1 and then the side cover 2. (See CK-REP0160.)
- ④ Remove the screw and move the In Box ASSY to the left following the arrow A. Then, pull it toward you to remove it.

(2) Installing procedure

- ① Insert the In Box ASSY into the right place and move it to the opposite direction of arrow A (to the right). Then, push it inward and tighten the screw.
- ② Connect the disconnected cables.
- ③ Close side cover 1, then side cover 2. (See CK-REP0160.)
- ④ Turn the power on following the power-on procedure in CK-REP0050.

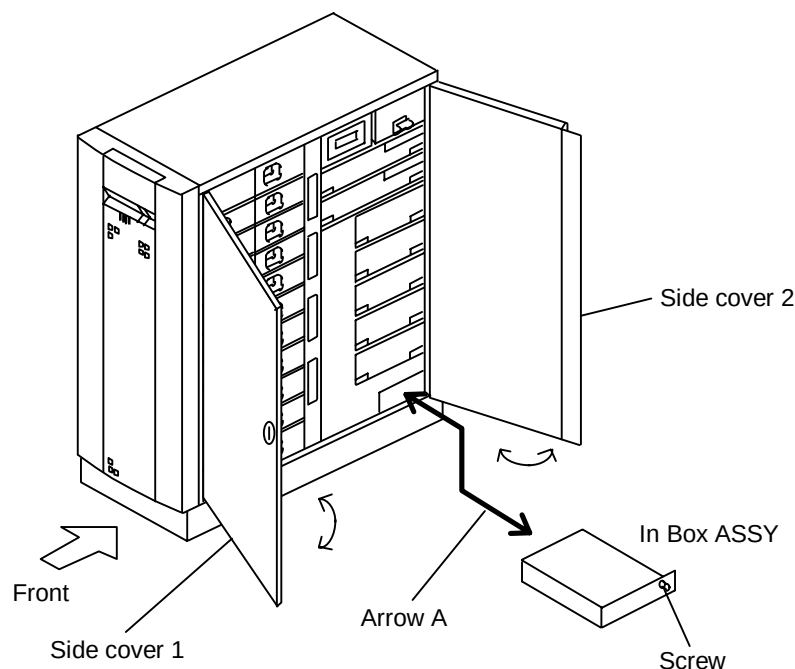


Figure 12.1 Replacing In Box ASSY

13. Replacing CACHE ASSY

In case no optional redundant CTL installed

(1) Procedures

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Open the side cover to remove CTL ASSY. (See CK-REP0305.)

- ③ Replace CACHE ASSY.

Note 1 : Slots #0 and #4, #1 and #5, #2 and #6, #3 and #7 are pairs respectively. Install the cache having the same capacity for these each pair slots..

Note 2 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- ④ Install the CTL ASSY.

- ⑤ Turn power on following the procedure explained in CK-REP0050.

- ⑥ Close the side covers.

- ⑦ Close the front cover.

Installation example of CACHE ASSY

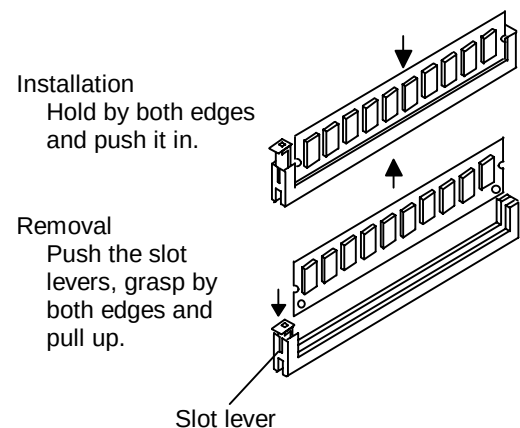
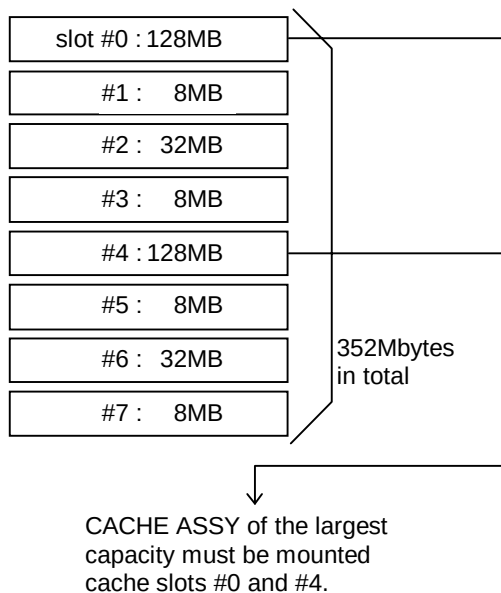


Figure 13.1 Replacing CACHE ASSY

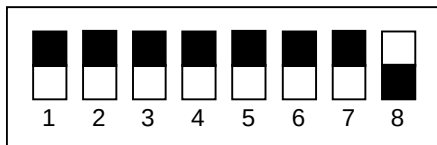
In case optional redundant CTL is installed

When the subsystem are dual controller system, CACHE ASSY can be replaced while the power on.

Note : In this case, the CACHE ASSY must be replaced one controller at one time. In case CACHE ASSY for both CTL ASSY are replaced at the same time, turn the power off before replacement.

(1) Procedure

- ① First open the side cover 1 and the side cover 2. (See CK-REP0160.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.

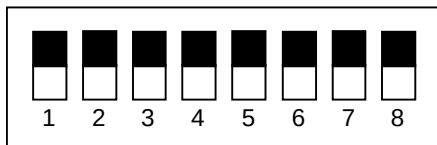


- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that FAIL LED on the CTL comes on and it enters into the blocked state. (See CK-REP0430.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Replace the CACHE ASSY.

Note 1 : When replacing a cache, install the cache having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : CACHE ASSY for the same slot of both CTL ASSY should have the same capacity.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Insert the CTL ASSY.
- ⑩ Connect the disconnected cable (RS232C).
- ⑪ Close the side covers 1 and 2. (See CK-REP0160.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

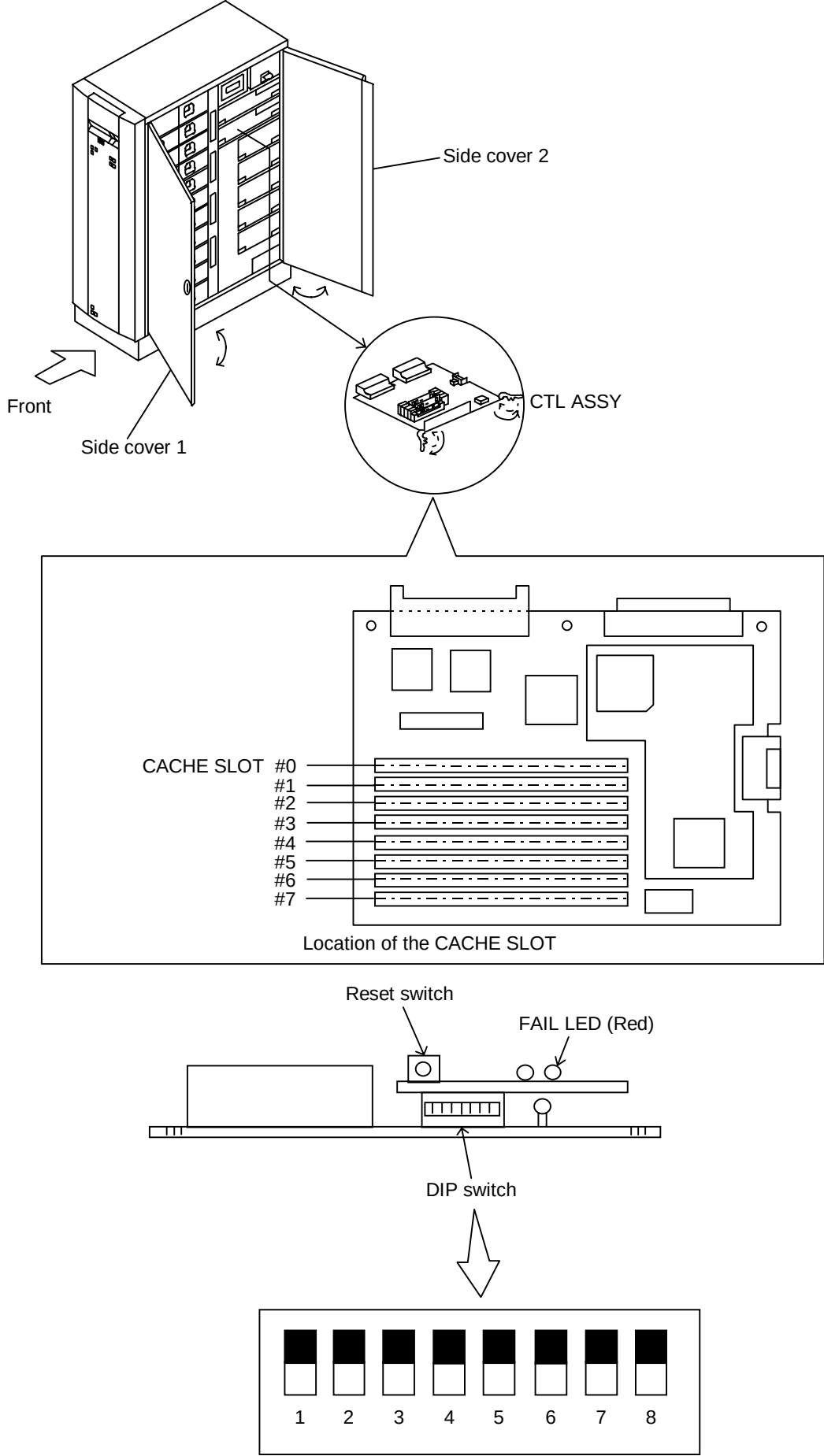


Figure 13.2 CTL ASSY

14. Replacing LAN ASSY

When no optional redundant CTL installed

Note : Configuration setting change is sometimes required because Mac Address is changed after replacing LAN ASSY.

(1) Procedures

① Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

② Open the side covers and remove the CTL ASSY. (See CK-REP0305.)

③ Pinch the latching heads of card spacers with needle-nose pliers etc. , then pull the LAN ASSY up with care not to touch with surrounding parts. (See Figure 14.1.)

Notice : If your hand or a tool touches with CTL ASSY, touched part may be damaged.

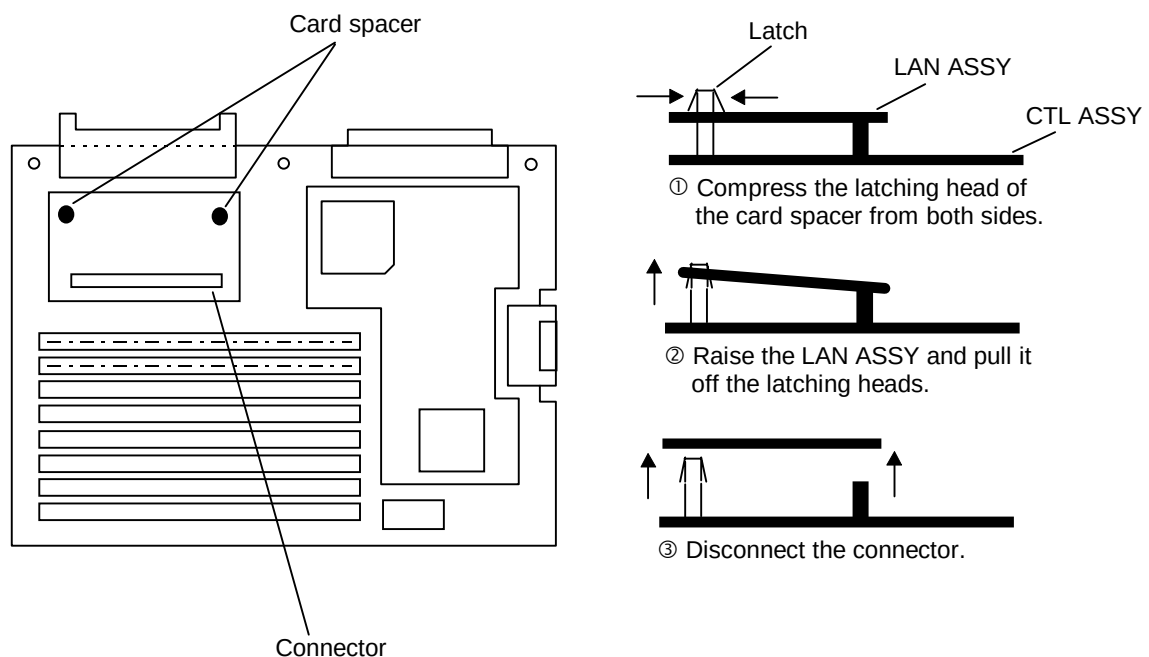
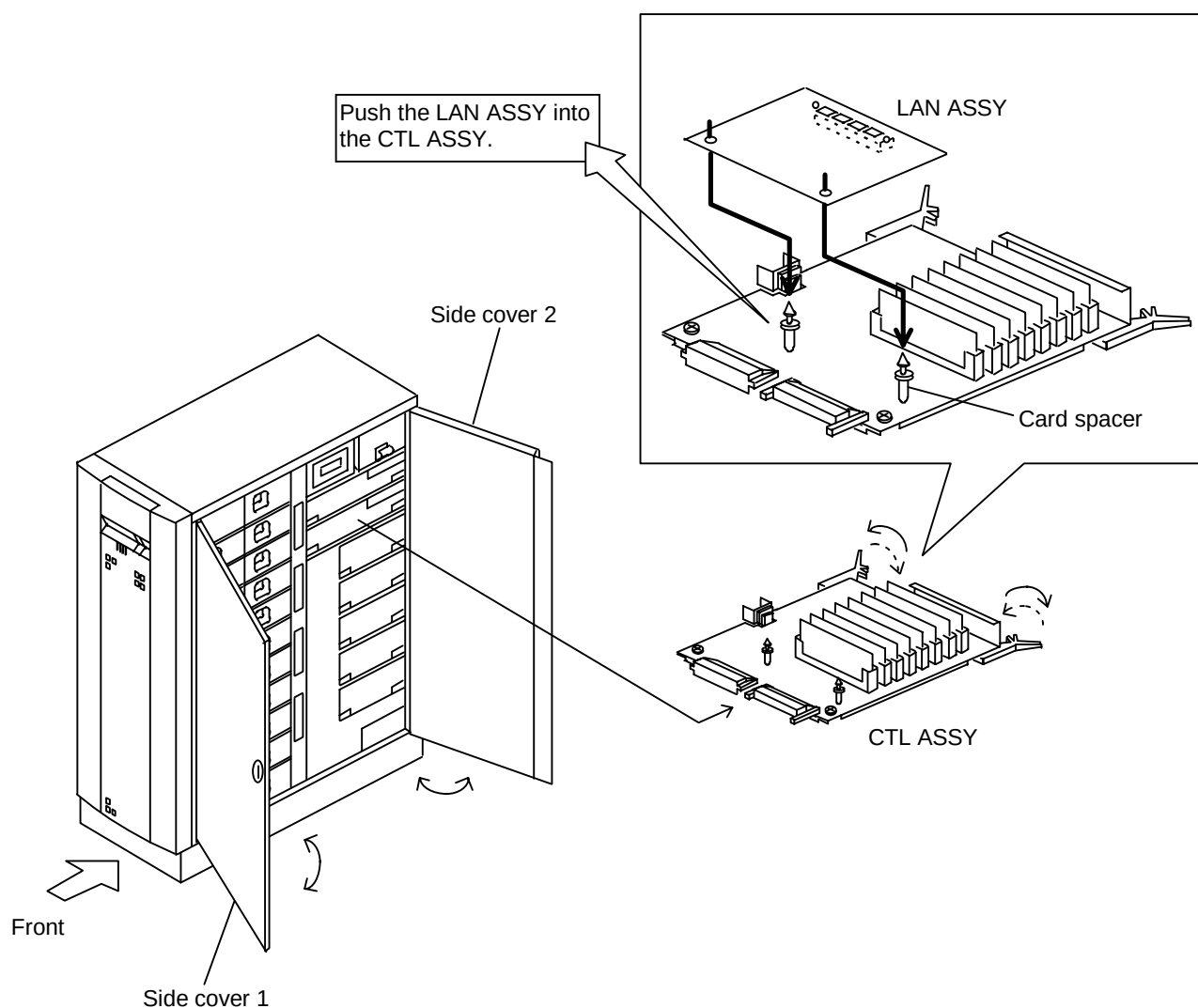


Figure 14.1 Replacing LAN ASSY (1)

- ④ Mount a LAN ASSY for replacement by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑤ Reinstall the CTL ASSY.
- ⑥ Close side covers 1 and 2. (See CK-REP0160.)
- ⑦ Turn on the power. (See CK-REP0050.)

**Figure 14.2 Replacing LAN ASSY (2)**

When optional redundant CTL installed

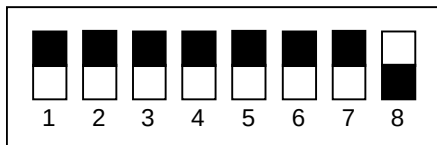
When the subsystem are dual controller system, LAN ASSY can be replaced while the power on.

Note : When replacing LAN ASSY, perform the replacement for each CTL ASSY one after another.

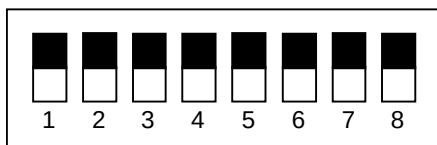
When replacing both LAN ASSY at a time, turn off the power like the case of single configuration.

(1) Procedure

- ① Open side cover 1 side cover 2. (See CK-REP0160.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.



- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that the FAIL LED on the CTL ASSY comes on and it enters the blocked state. (See Figure 14.3.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Remove the LAN ASSY by pulling it upward. Then mount a new LAN ASSY by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Reinstall the CTL ASSY.
- ⑩ Close the side covers 1 and 2. (See CK-REP0160.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

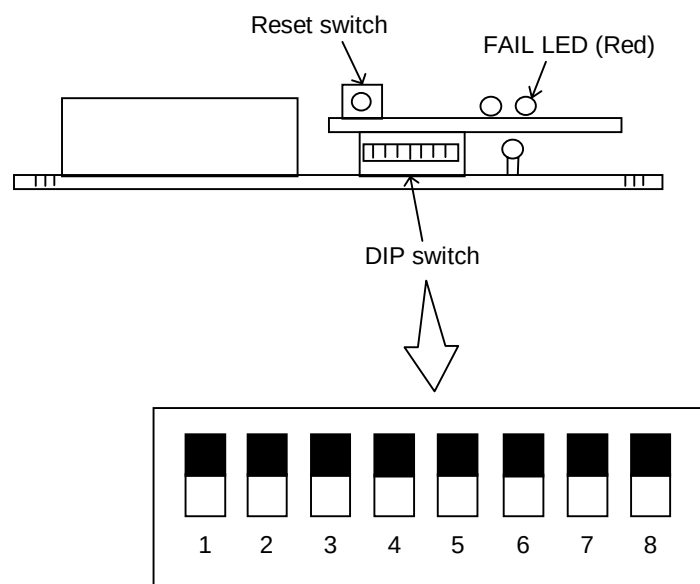


Figure 14.3 Replacing LAN ASSY (3)

DF350 Disk Subsystem

8. INSTALLATION

(Cabinet Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.28.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued.	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised.	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0020 0040 0070 0270 0280 0290 0310 0320 0385	Chapter 6 was added to the table. 4.2 was added. Table was changed. (Pages 0080, 0420, 0430 and 0440 were changed by the same reason.) Figure 3.7.2 was added. Figure 3.7.3 was changed. Dipswitch was changed. Flowchart were changed. (Pages 0360, 0380, 0390, 0400, 0410, 0450, 0460, 0470, 0480 and 0610 were changed by the same reason.) Dipswitch was changed. This page was newly added. (Pages 0386, 0387, 0415, 0416, 0445, 0482, 0484, 0820-0930 were added by the same reason.)	AD AD CH AD CH CH CH CH AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0320 0410 0430 0440 0450 0455 0460 0470 0490 0510 0512 0514 0520 0550 0570 0610 0650 0660 0710 0720 0750 0760 0780 0810 0940-1040	Added 6.7, 6.8. Changed setting of DIP switch. Added “*1”. Added *4/Deleted Item No.21. Added *5, SYS REV and OPTION. Added setting the DIP switch. This page was newly added. Added setting the DIP switch. Changed flow chart. Changed flow chart. Added Figure. This page was newly added. This page was newly added. Added RAID A. Added RAID A. Added TERMINATE SVP. Added RAID A. Added “1024B”. Added RAID A. Changed Note. Added FORMAT ABORD. Changed the table. Changed the table. Added DUAL TYPE. Added 7, 8, 12, 17, 24, 25 and 26 in the table. These page were newly added.	AD CH AD AD/DL AD AD AD AD CH CH AD AD AD AD AD AD AD AD CH AD CH CH AD AD AD
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0513 0550 0562 0564 0660 1050-1100	Added 6.9, 6.10. This page was newly added. Added “Operation for defining...”. This page was newly added. The page was newly added. Split RAID5. There page were newly added.	AD AD AD AD CH AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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REV.1	May.1998	Oct.1998				

CK-INST0011

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1. Appearance and Maintenance Area

1.1 Appearance

Figure 1.1.1 shows appearance of the DF350 disk subsystems. (Cabinet type)

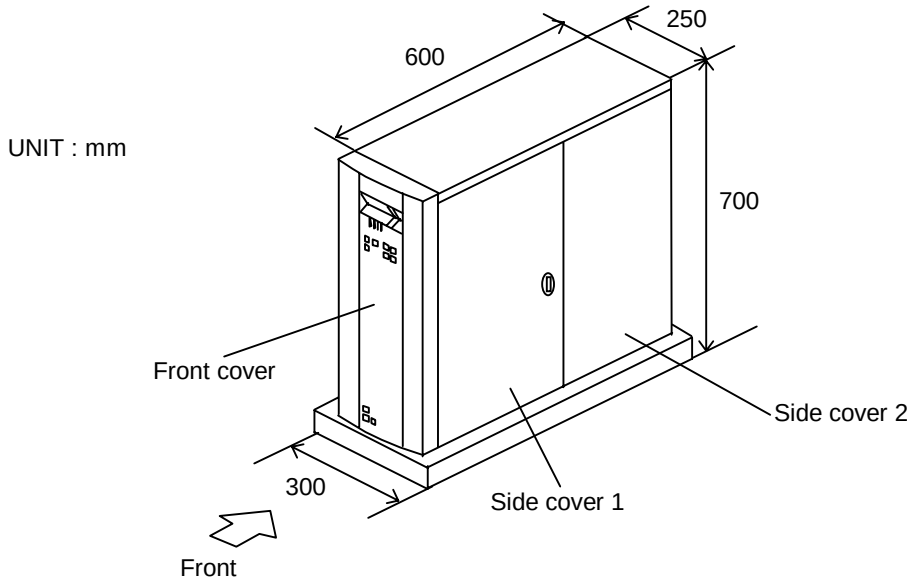


Figure 1.1.1 Appearance

1.2 Maintenance Area

Figure 1.2.1 shows maintenance area for the DF350 disk subsystems. (Cabinet type)

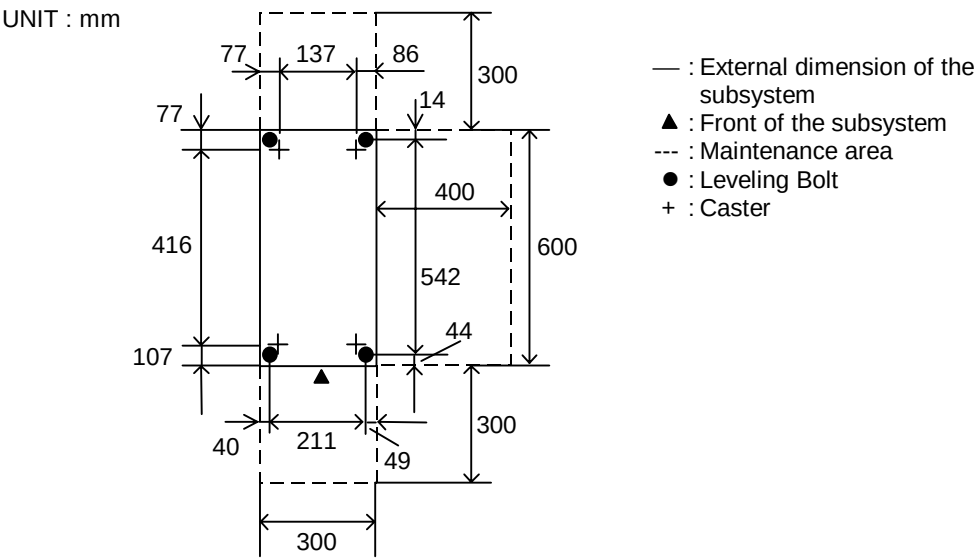


Figure 1.2.1 Maintenance Area

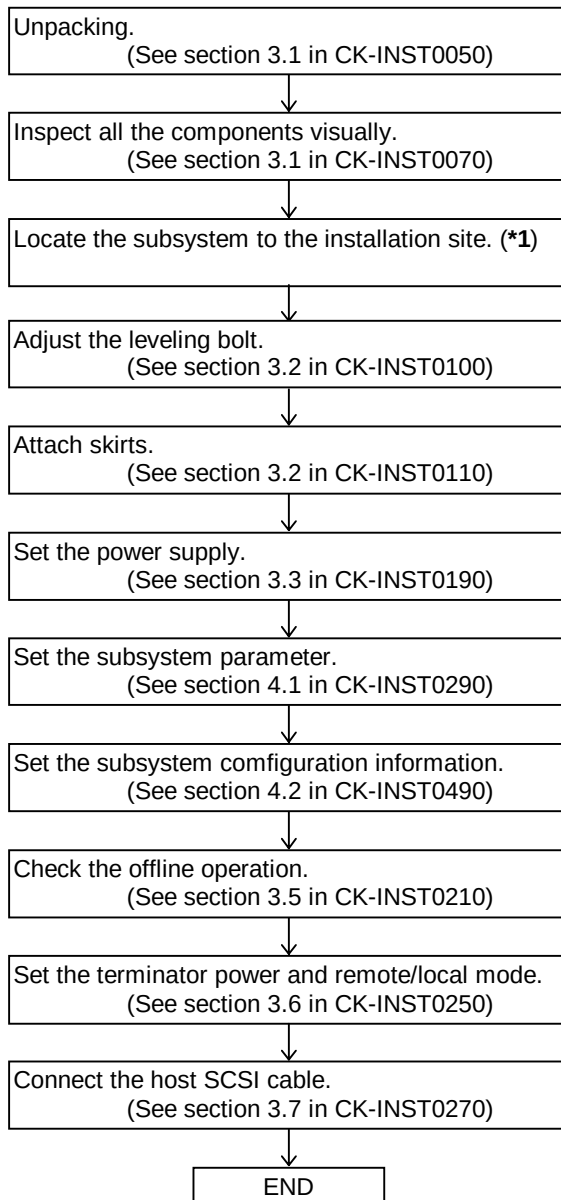
2. Installation

- (1) Tool needed for installation

Phillips screwdriver (No.2).

- (2) How to install

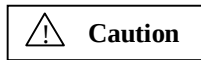
The following flow chart describes how to install the subsystem.



***1 : Place the subsystem with 30cm or more apart from the wall for both the front and the rear because of the ventilation.**

3. Installation Procedure

3.1 Inspecting all the Components



The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.

3.1.1 Unpacking

- (1) Figure 3.1.1 shows how the subsystem has been packed.
- (2) Figures 3.1.2 to 3.1.4 show the subsystem without external packaging.
- (3) Unpacking
 - ① Loosen the polyester bands.
 - ② Pull out the Tri-wall nails.
 - ③ Remove the external packaging and packing materials.
 - ④ Take the subsystem out of the polyethylene bag.
 - ⑤ Keep two keys in the attached box carefully.
(These keys are used for opening/closing side covers 1 and 2.)
 - ⑥ Remove the cushioning materials, tape, desiccators, etc attached to the subsystem.

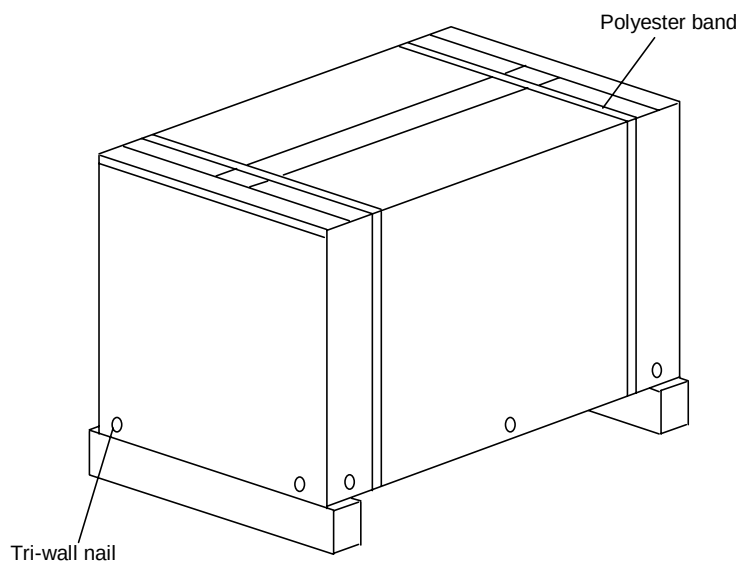


Figure 3.1.1 Subsystem being Packed

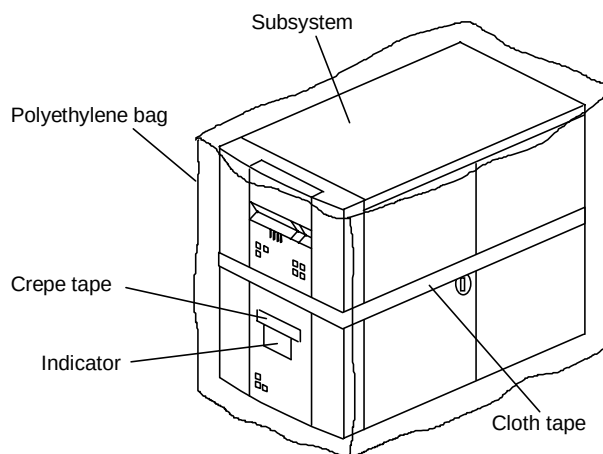


Figure 3.1.2 Subsystem without External Packaging

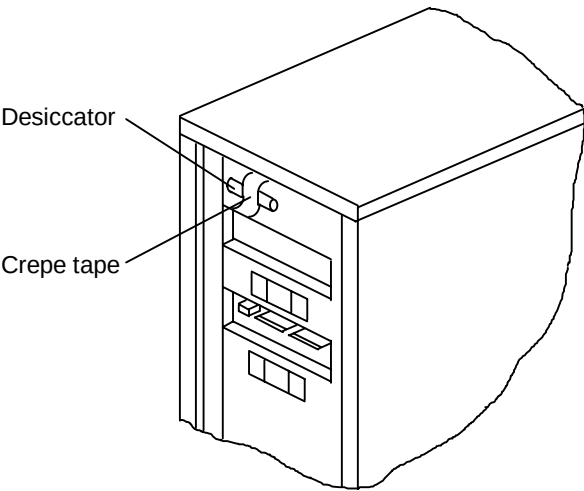


Figure 3.1.3 Location of Desiccantor

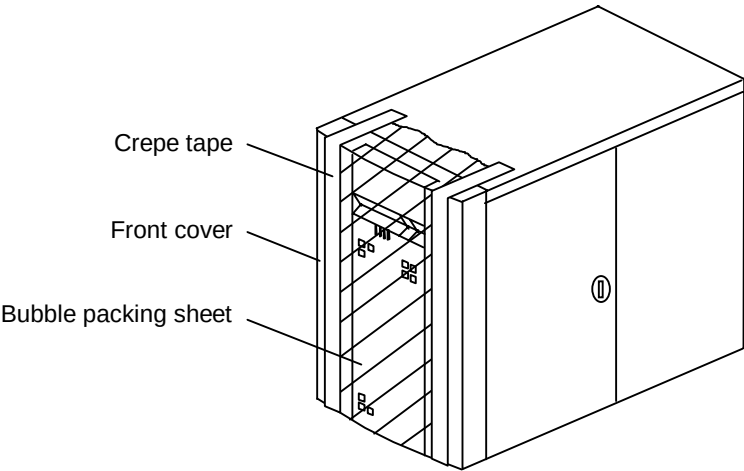


Figure 3.1.4 Front Cover Protection

3.1.2 Inspecting all the components visually

Check the following components before installation according to a customer's configuration.

Table 3.1.1 Mandatory Features

Model Name	Specification	Quantity	Comment
DF350-CK	Cabinet	1	
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	1 (RAID5 :4D+1P)	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	4 (RAIDA, RAID5: 3D+1P) 3 (RAID5 :2D+1P) 2 RAID0/1	HDU ASSY
DF-F350-B2M	Power supply	1	AC/DC power supply
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	2	CACHE ASSY
DF-F350-DMUDS -DMUSS	Interface board (*2) for wide differential SCSI interface wide single ended SCSI interface	1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.2 Optional Features

Model Name	Specification	Quantity	Comment
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	0 - 3	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	0 - 21	HDU ASSY
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	0, 2, 4, 6 or 8	CACHE ASSY
DF-F350-B2M	Spare power supply	0 - 4	AC/DC power supply
DF-F350-G1M1 -G2M1	LAN board LAN board (SNMP)	0 - 2	LAN ASSY
DF-F350-F2MCF	Controller for dual composition	0 or 1	CTL ASSY
DF-F350-DMUDS -DMUSS	Interface board (*1) for wide differential SCSI interface wide single ended SCSI interface	0 or 1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.3 Accessories

Model Name	Specification	Quantity	Comment
DF-F350-J1 -J2	Power supply cable (Connector attached to two poles with earth) (Inlet type connector, EN60320 STANDARD SHEET C14)	0 or 1	
DF-F350-K050L -K150L -K068S -K268S -K168S -K350L	Interface cable (50PL, 1.5m) (50PL, 3m) (68PS, 1.5m) (68PS, 3m) (68PS, 5m) (50PL, 5m)	0 -	
DF-F350-S1	RS232C cable	0 -	

3.1.3 Inspecting the subsystem components and addendum

This subsection describes how to install the basic components into the subsystem.

Figures 3.1.5 and 3.1.6 show mechanical configuration and parts location of this subsystem.

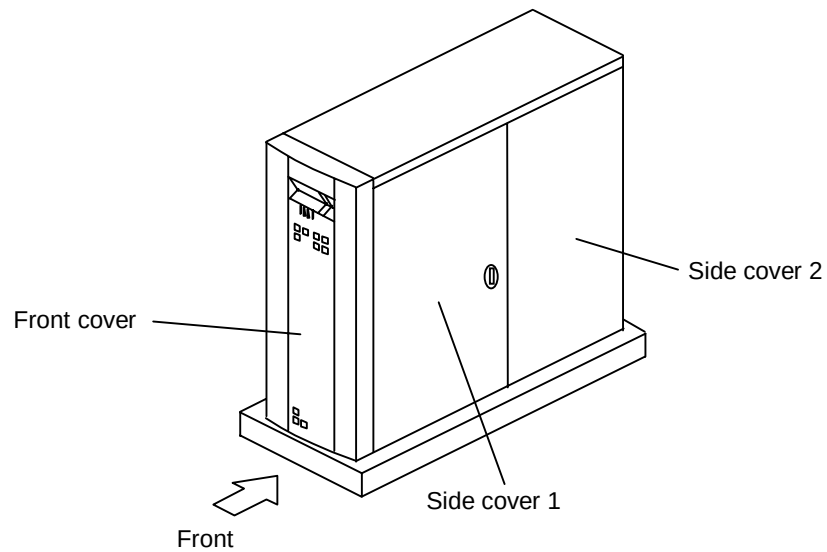


Figure 3.1.5 Appearance of DF350 Disk Subsystem (Cabinet type)

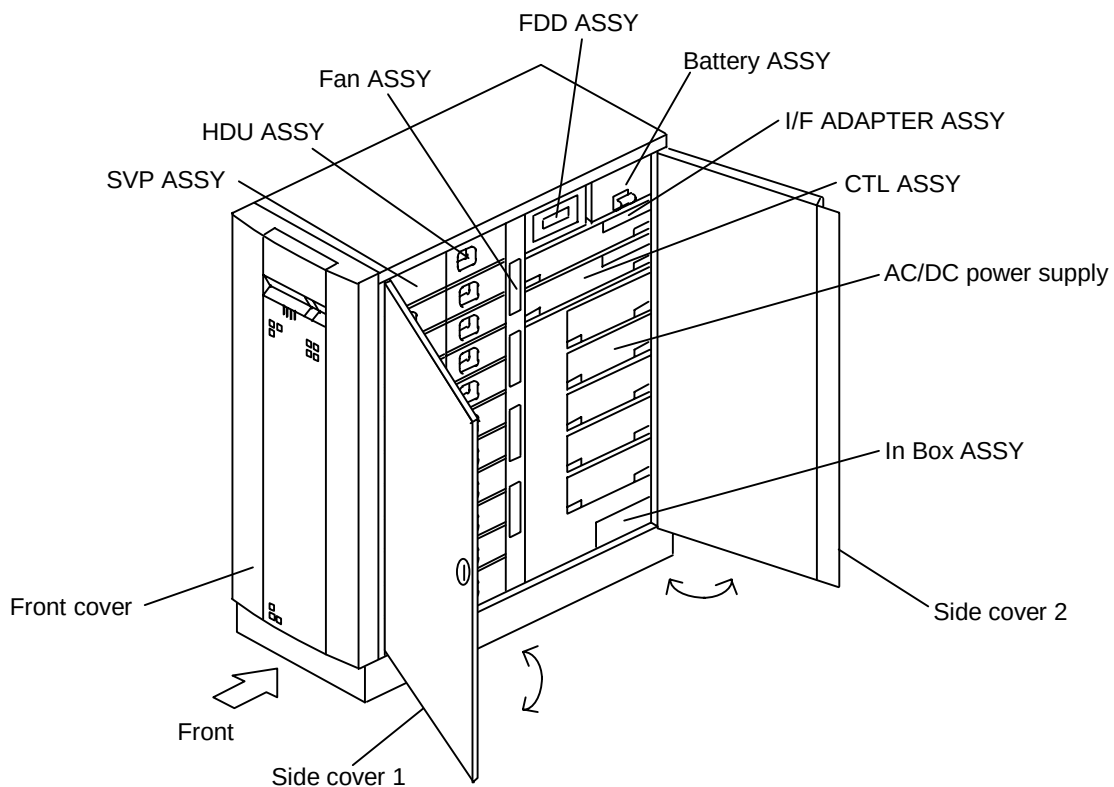


Figure 3.1.6 Parts Location

3.2 Install the Subsystem

3.2.1 Adjusting the leveling bolt

This subsection describes how to adjust the leveling bolt of the stand for the DF350 disk subsystem.

- (1) Remove the tape securing the leveling bolts.
- (2) Rotate the leveling bolt (as shown by an arrow) so that the space between the caster and the floor comes to be approximately 2.5mm.
- (3) Perform fine adjustment of the leveling bolt so that the subsystem is leveled as shown in Figure 3.2.2 .

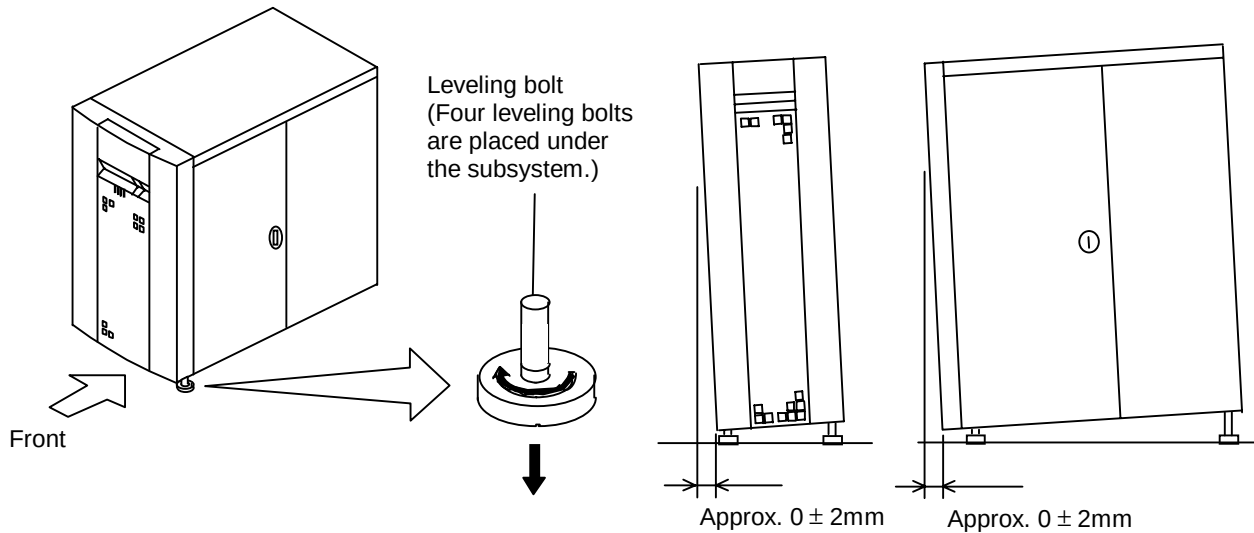


Figure 3.2.1 Turning Direction of Leveling Bolt

Figure 3.2.2 Inclination of Subsystem

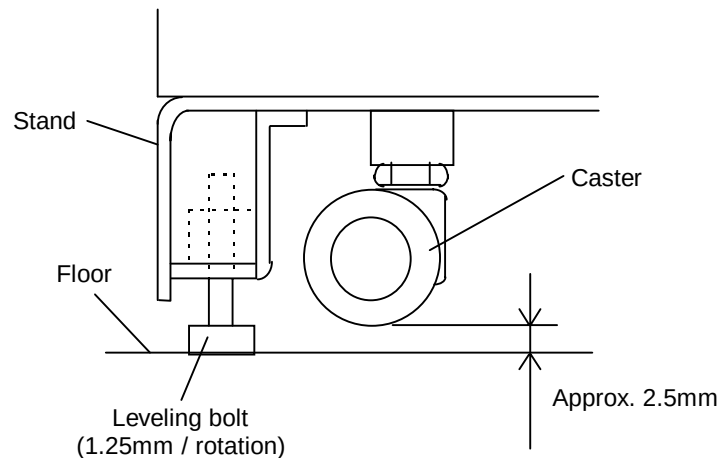


Figure 3.2.3 Space Between Caster and Floor

3.2.2 Attaching skirts

(1) Attachment procedure

- ① Move the leveling bolts downward and make the subsystem be supported by them if not done already.
(See CK-INST0100.)
- ② Remove the Bind screws ❷, remove the four L Metal Fittings* by loosening the Bind screws ❶.
(See Figure 3.2.4 , 3.2.5.)
*: Keep L Metal Fittings to use moving the subsystem.
- ③ Turn the Stabilizers downward and secure it with the Bind screws ❶ and ❷.
(See Figure 3.2.4 , 3.2.5.)

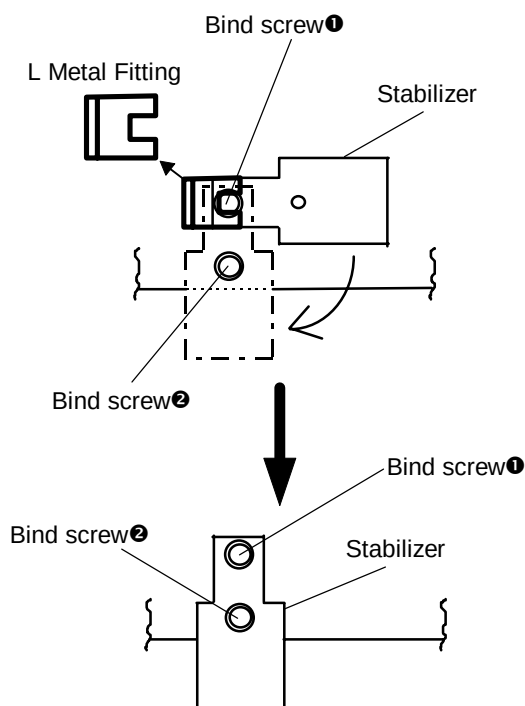


Figure 3.2.4 Securing procedure of Stabilizer

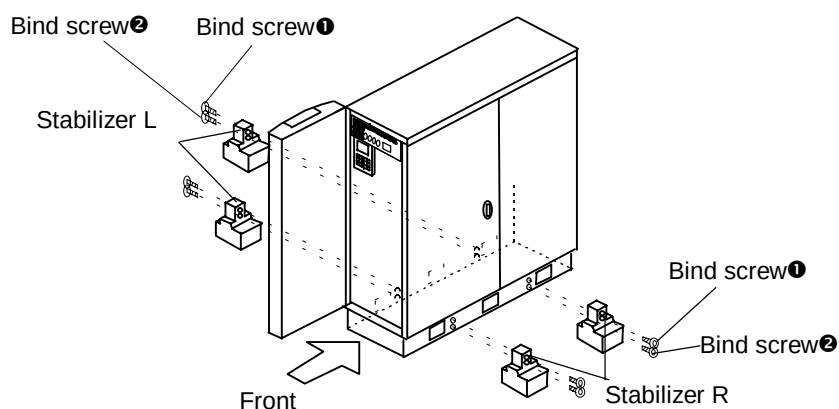


Figure 3.2.5 Securing position of Stabilizer

- ④ Insert latches **1** of skirts (R) and (L) into the slots **1** of skirt (F). (See Figure 3.2.6.)
- ⑤ Attach the combined skirts (F), (R) and (L) to the bottom of the unit by fitting them from the front of the unit (as shown by an arrow A) with the skirts (R) and (L) being spread out a little. Then make the latches **2** of the skirts (R) and (L) be engaged with the slots **2** of the unit frame. (See Figure 3.2.7.)
- ⑥ Press the both ends of the skirt (F) in the direction shown by arrow B, and make a plastic catch be engaged with that on the unit frame. (See Figure 3.2.8.)

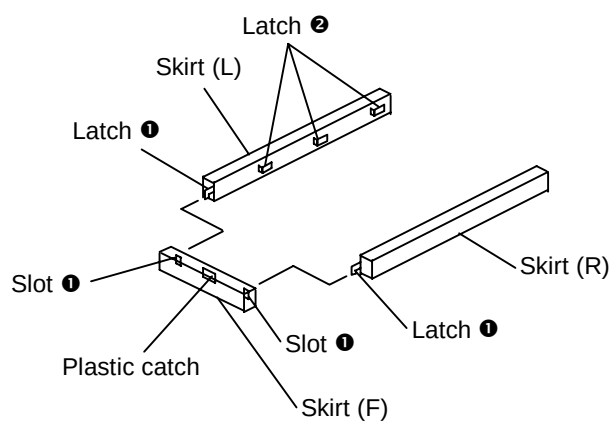


Figure 3.2.6 Assembly of Skirts

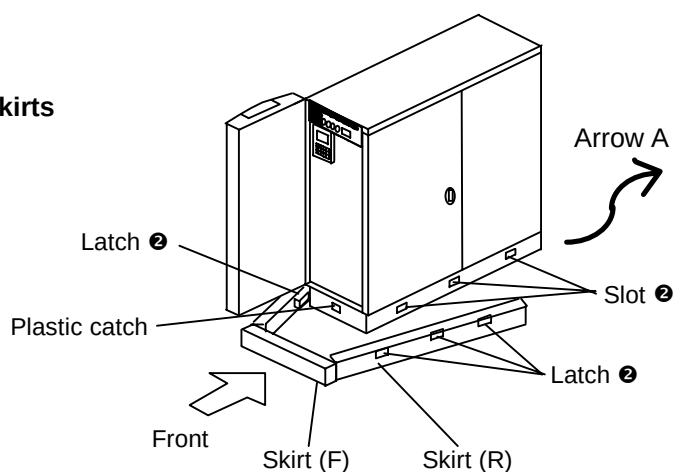


Figure 3.2.7 Fitting the Combined Skirts

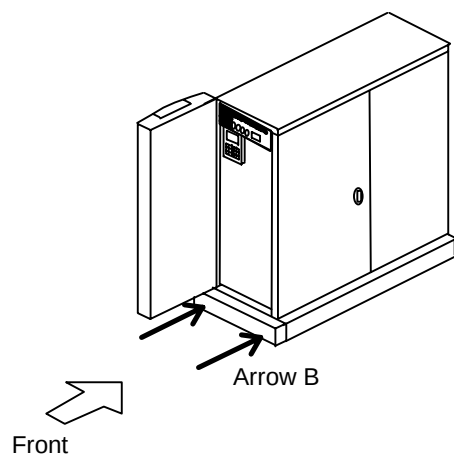
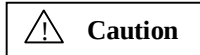


Figure 3.2.8 Securing the Skirts

3.2.3 Install the subsystem

Place the subsystem so that the front and rear is 30cm or more apart from the wall in order not to block the ventilation.



Caution

Do not block the ventilation. With the temperature rise, it may cause failure or fire.

(1) Opening/Closing the front cover (See Figure 3.2.9.)

- ① Pull the right side of the front cover toward you to open it.
- ② Push it back slowly to close it.

Note : Open/Close the front cover gently to avoid subjecting the subsystem to any impact since it has precision components.

(2) Opening/Closing the side covers (See Figure 3.2.9.)

- ① Insert the key attached to the subsystem into the keyhole and turn it to the direction of an arrow (clockwise). Carefully open side cover 1 first, then open side cover 2.
- ② Carefully close side cover 2 first, and then close side cover 1. Finally, turn the key to the direction of an arrow (counterclockwise).

Note : Open/Close the side covers gently to avoid subjecting the subsystem to any impact since it has precision components.

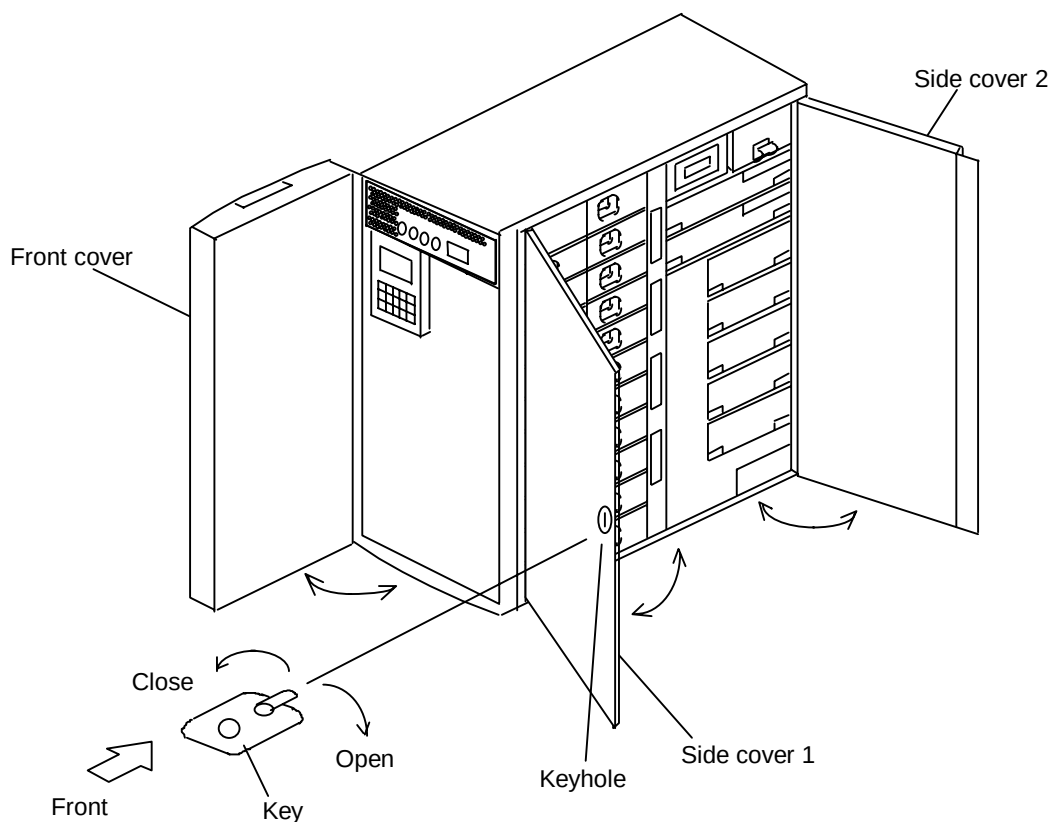


Figure 3.2.9 Opening/Closing Front and Side Covers

(3) Installing HDU ASSY (See Figure 3.2.10.)

- ① Open the handle in the direction of an arrow (···➤) completely and insert the HDU ASSY into the right place.
- ② Close the handle in the direction of an arrow (➡).

**Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

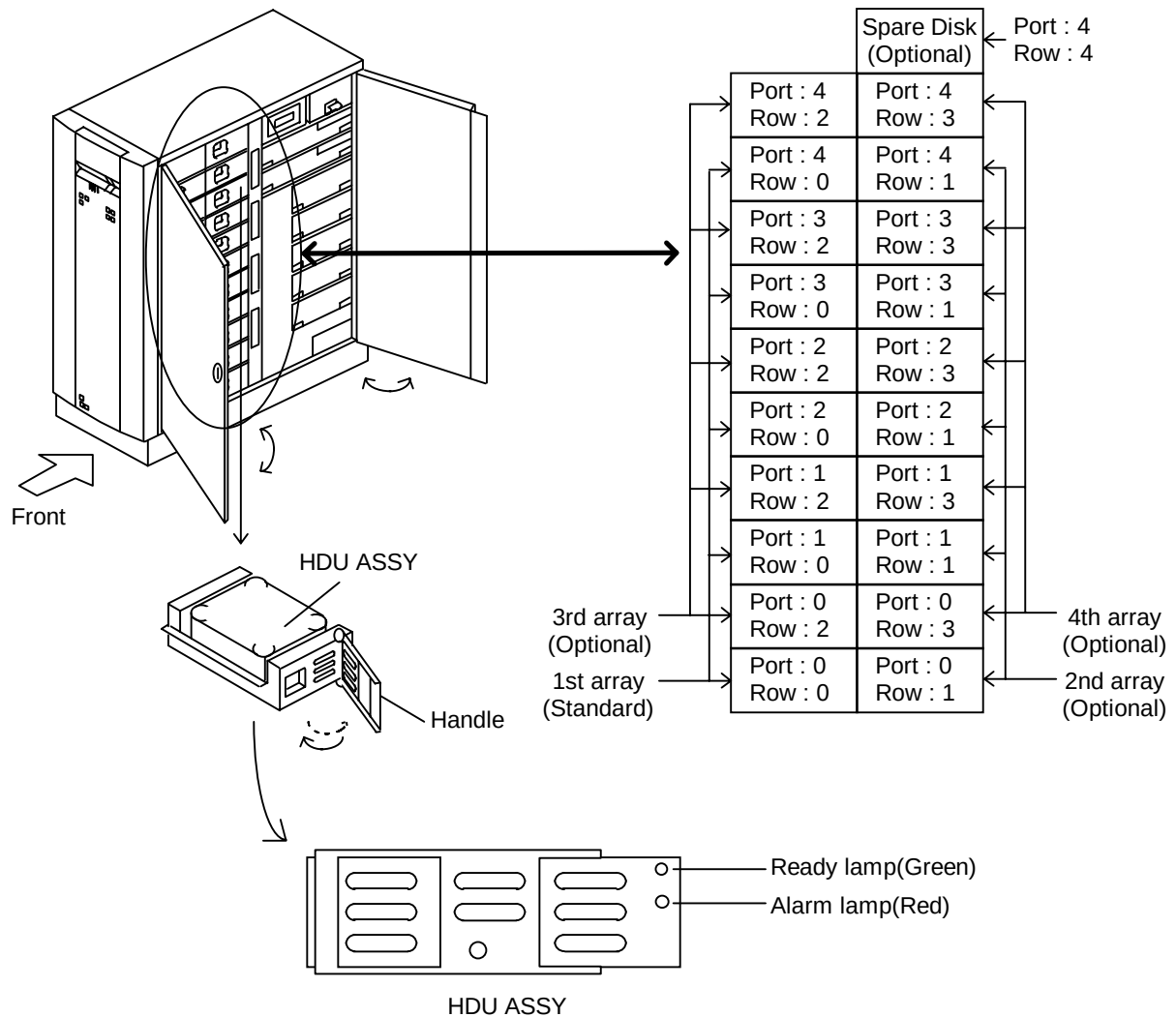
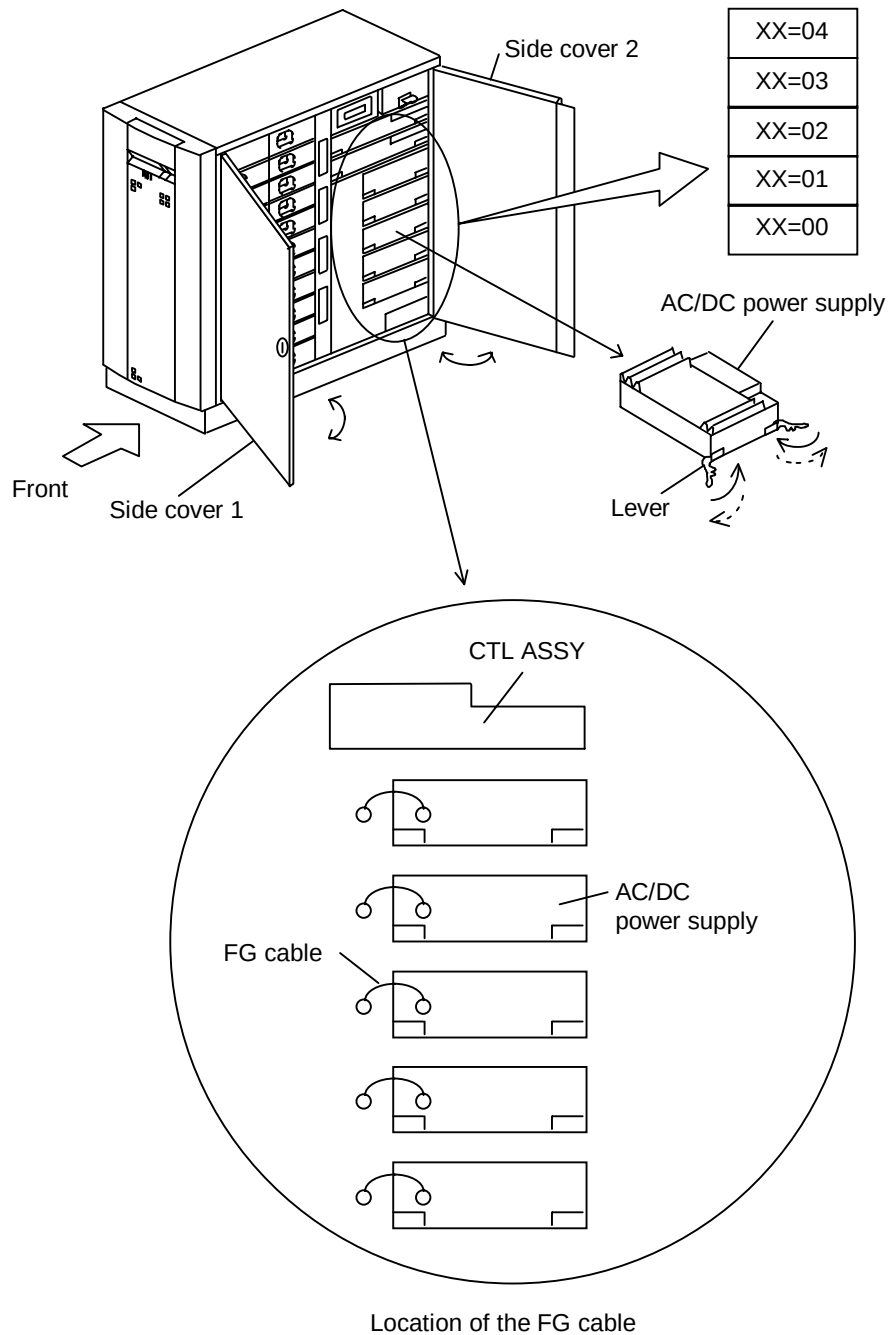


Figure 3.2.10 Installing HDU ASSY

(4) Setting AC/DC power supply (See Figure 3.2.11.)

- ① Insert the AC/DC power supply into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (→) at the same time.
- ② Connect the FG cable with the AC/DC power supply.

**Figure 3.2.11 Setting AC/DC Power Supply**

(5) Setting I/F ADAPTER ASSY (See Figure 3.2.12.)

- ① Insert the I/F ADAPTER ASSY into the right place and tighten the bind screw.

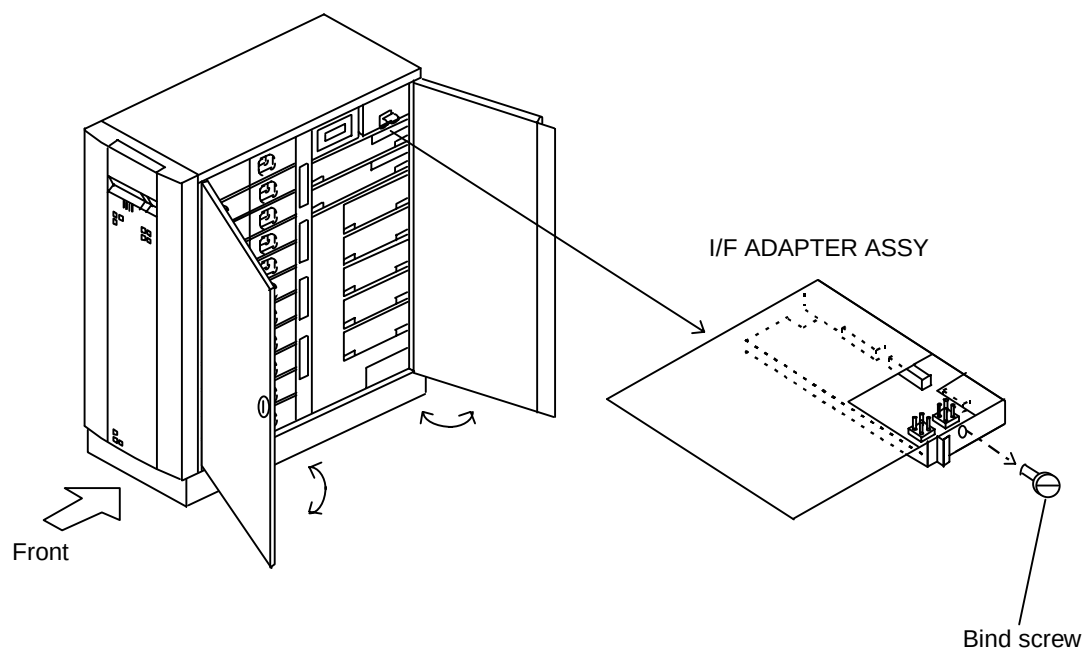


Figure 3.2.12 Setting I/F ADAPTER ASSY

(6) Installing CACHE ASSY (See Figure 3.2.13.)

Note 1 : Be sure to install the cache assemblies having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : When the cache assemblies are to be inserted into the cache slots, insert them in the order of cache slots #0 and #4, cache slots #1 and #5, cache slots #2 and #6 and then cache slots #3 and #7.

Note 3 : Be sure to install the cache assembly having the maximum capacity in slot #0 and #4.

Note 4 : If the redundant CTL ASSY has been installed, install the cache assembly having the same capacity into the same slot.

- ① Open the side covers. (See CK-INST0130.)
- ② Pull out the CTL ASSY. Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY. (See Figure 3.2.14.)
- ③ Install the CACHE ASSY. (See Figure 3.2.13.)
- ④ Insert the CTL ASSY into the former place. Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same times. (See Figure 3.2.14.)
- ⑤ Close the side covers. (See CK-INST0130.)

Installation example of CACHE ASSY

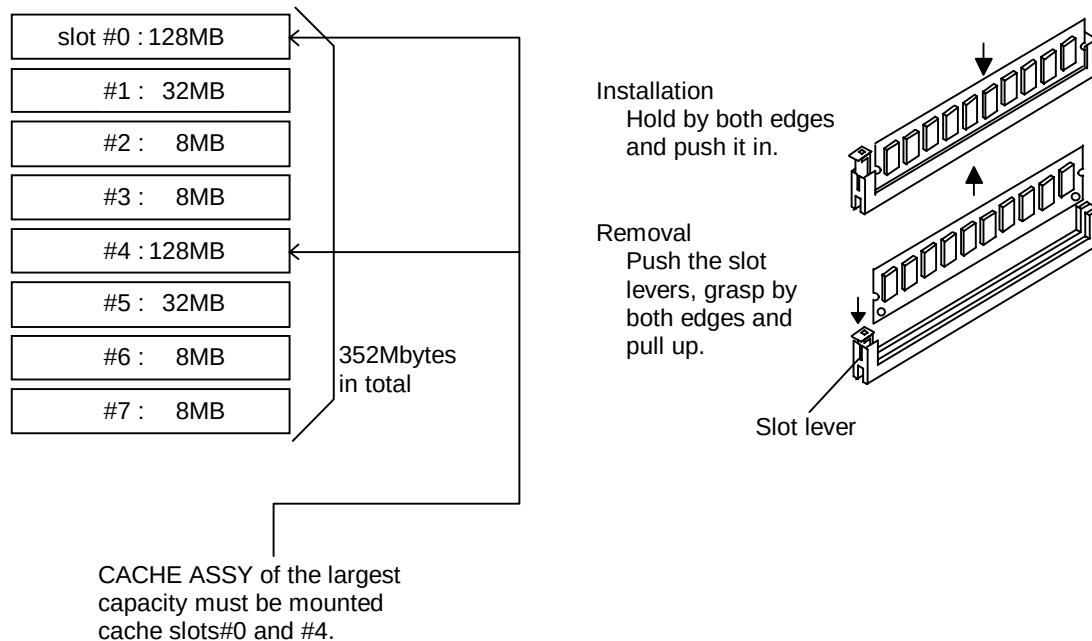


Figure 3.2.13 Installing CACHE ASSY

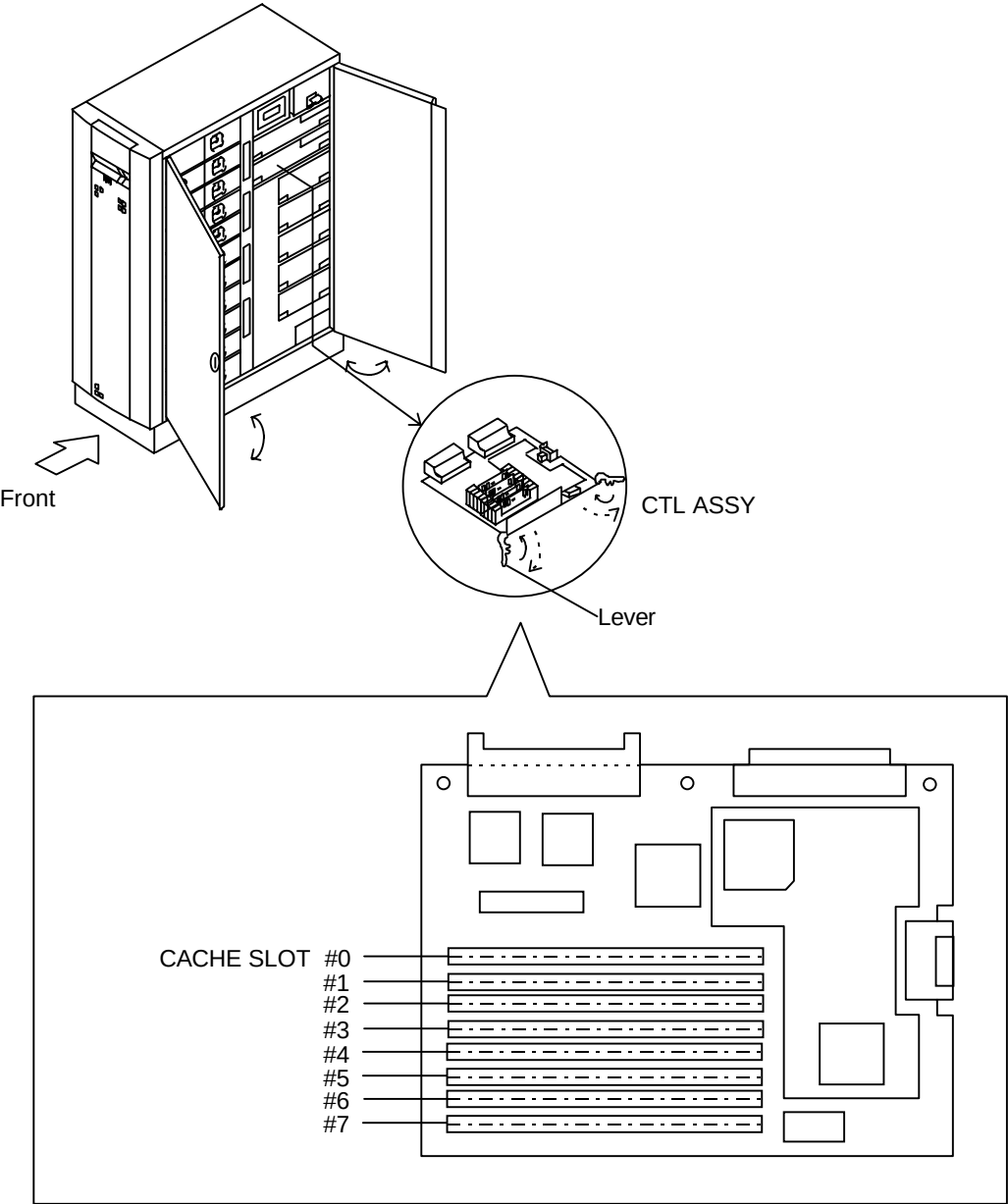


Figure 3.2.14 Installing CACHE ASSY

3.3 Setting the Power Supply

The power for the boards, drives, and fans of the DF350 disk subsystem is supplied by the In Box ASSY and AC/DC power supply converting AC to the DC power.

Turn the power on according to procedures (1) to (6) described below.



Caution

Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Make sure that the circuit breaker (a switch on the rear panel) is "O" (OFF), then connect the AC cable.
(See Figure 3.3.1.)
- (2) Supply AC power.
- (3) Open the side cover and make sure that the battery power switch is turned to "ON". Then turn on the circuit breaker.
- (4) Make sure that all of DIP switches are set to "OFF". (upper positions) Note that no need to remove CTL ASSY.
- (5) Close the side cover and set the circuit breaker to "I" (ON). Then turn the power switch "ON".
- (6) Make sure that the subsystem becomes ready a few minutes later.

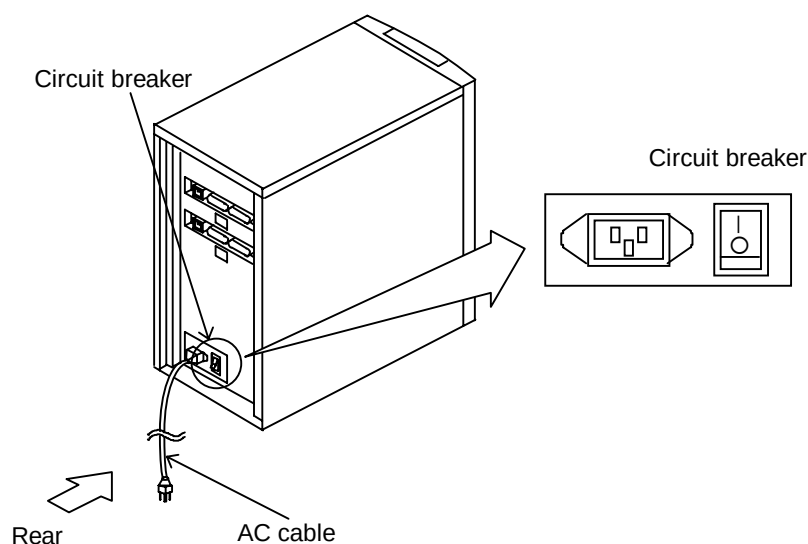


Figure 3.3.1 AC Cable Connection

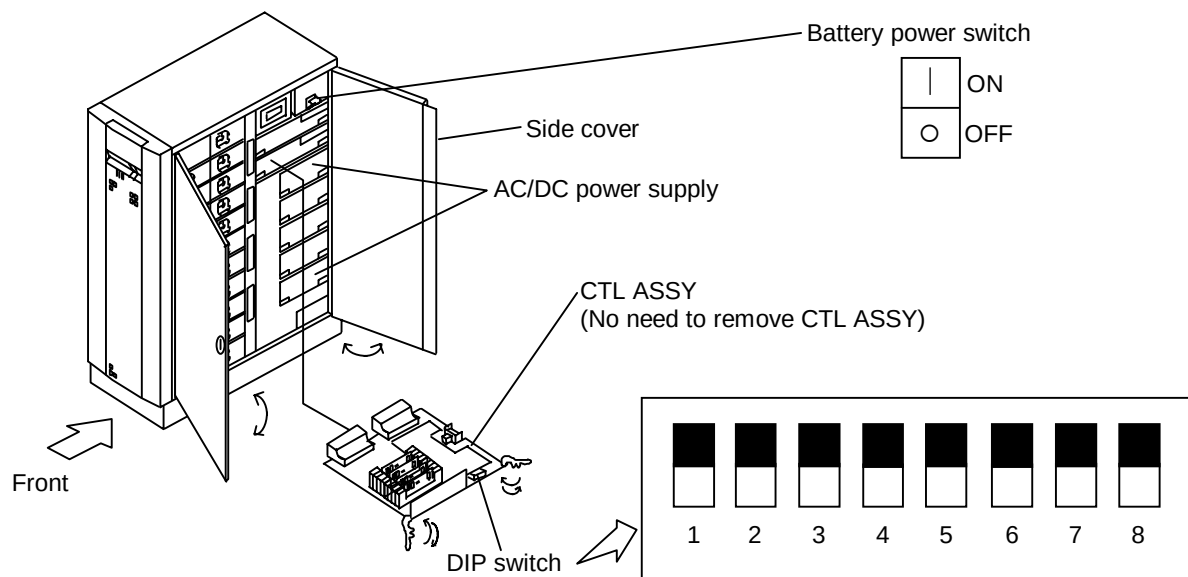


Figure 3.3.2 Inside Construction of the Subsystem

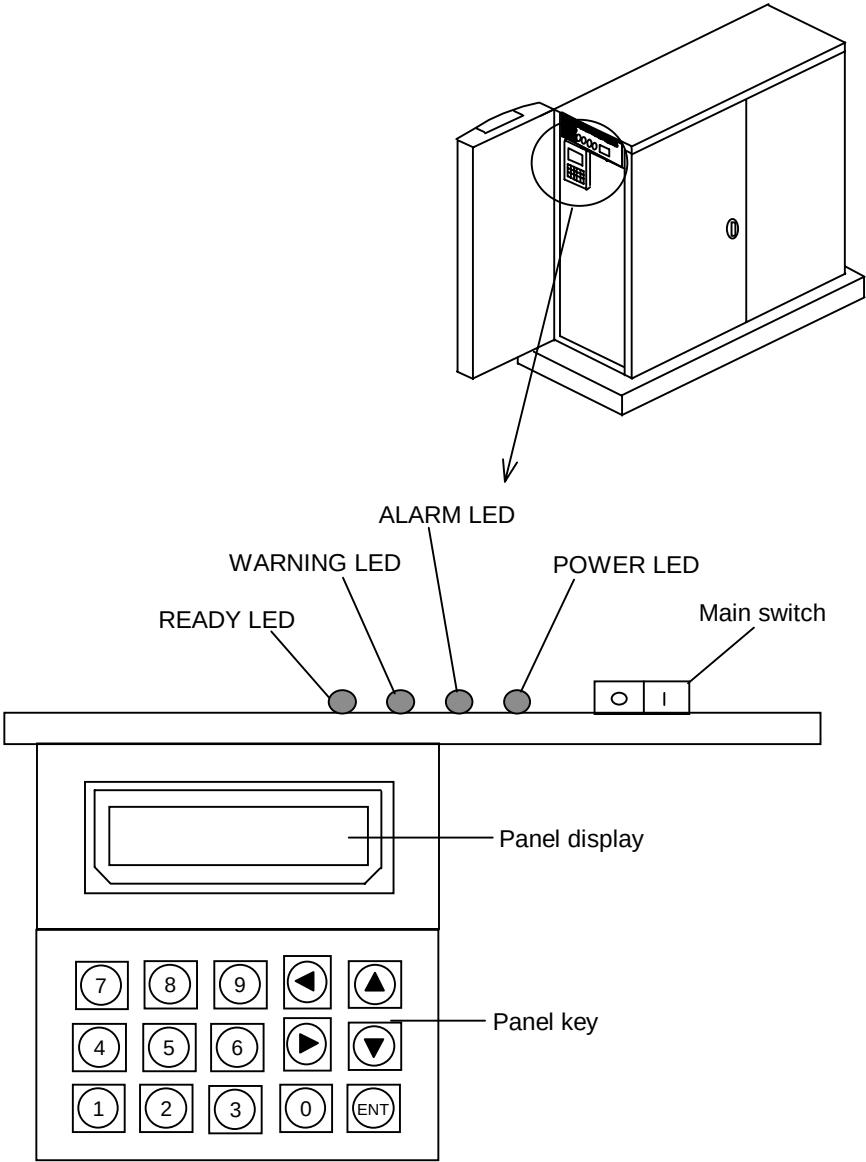


Figure 3.3.3 Panel Configuration

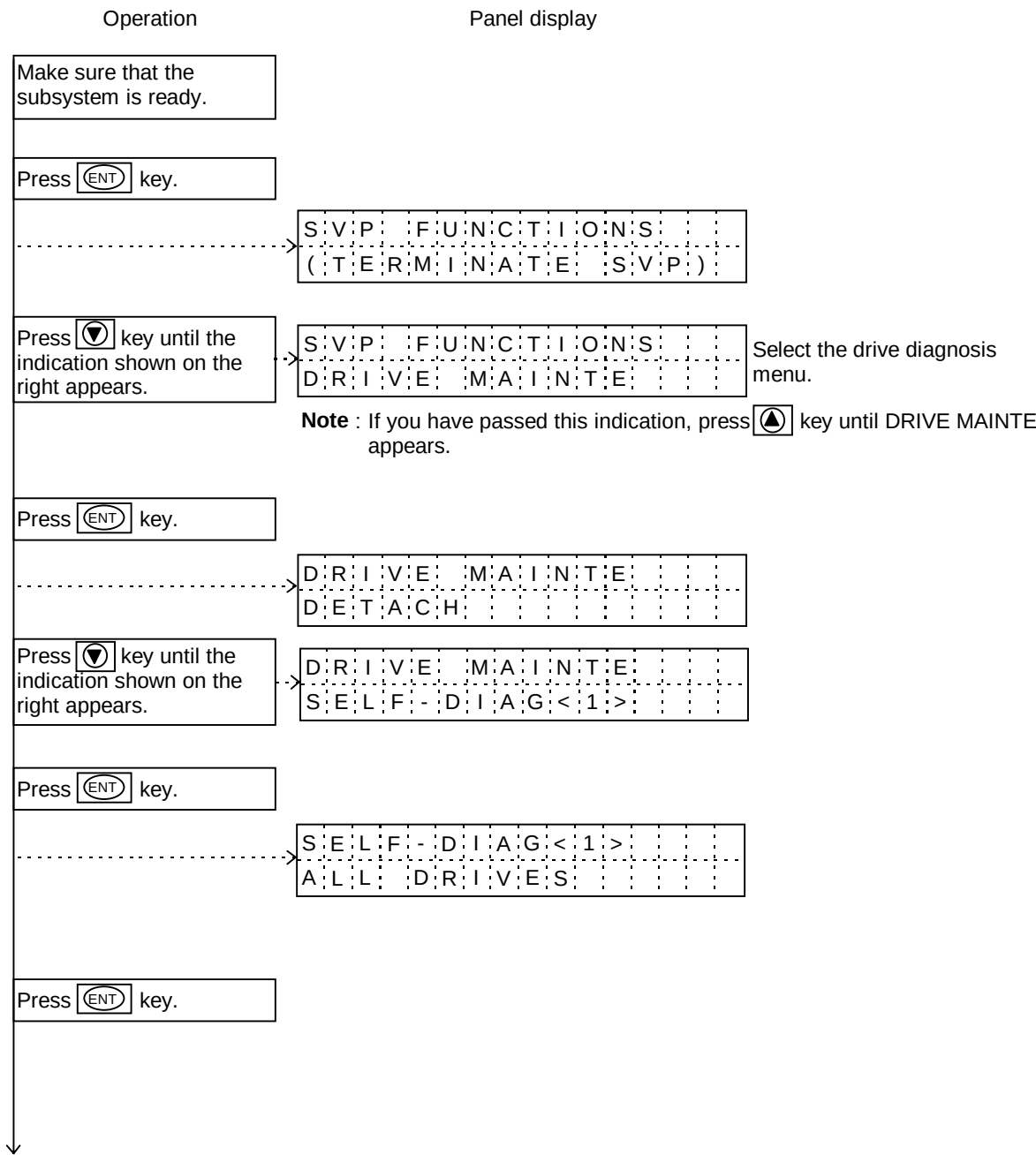
3.4 Setting the Subsystem Parameter

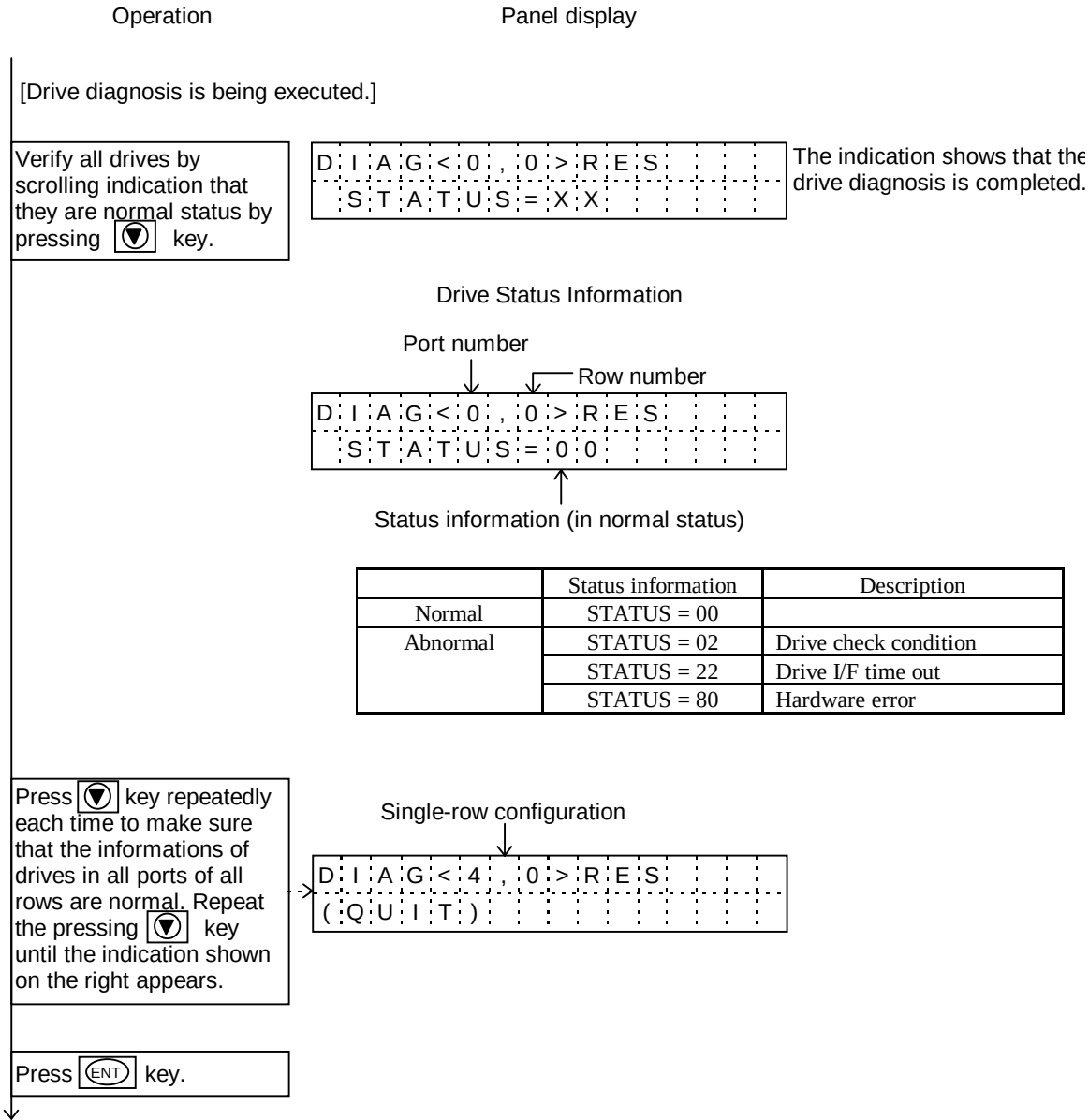
See Chapter “Setting the Subsystem Parameter” in CK-INST0290.

3.5 Checking the Offline Operation

After opening the front cover, execute the drive diagnosis using the Panel display and the ten key as instructed below, and make sure that the diagnosis is completed normally on each of all drives.

① Operate as described below.





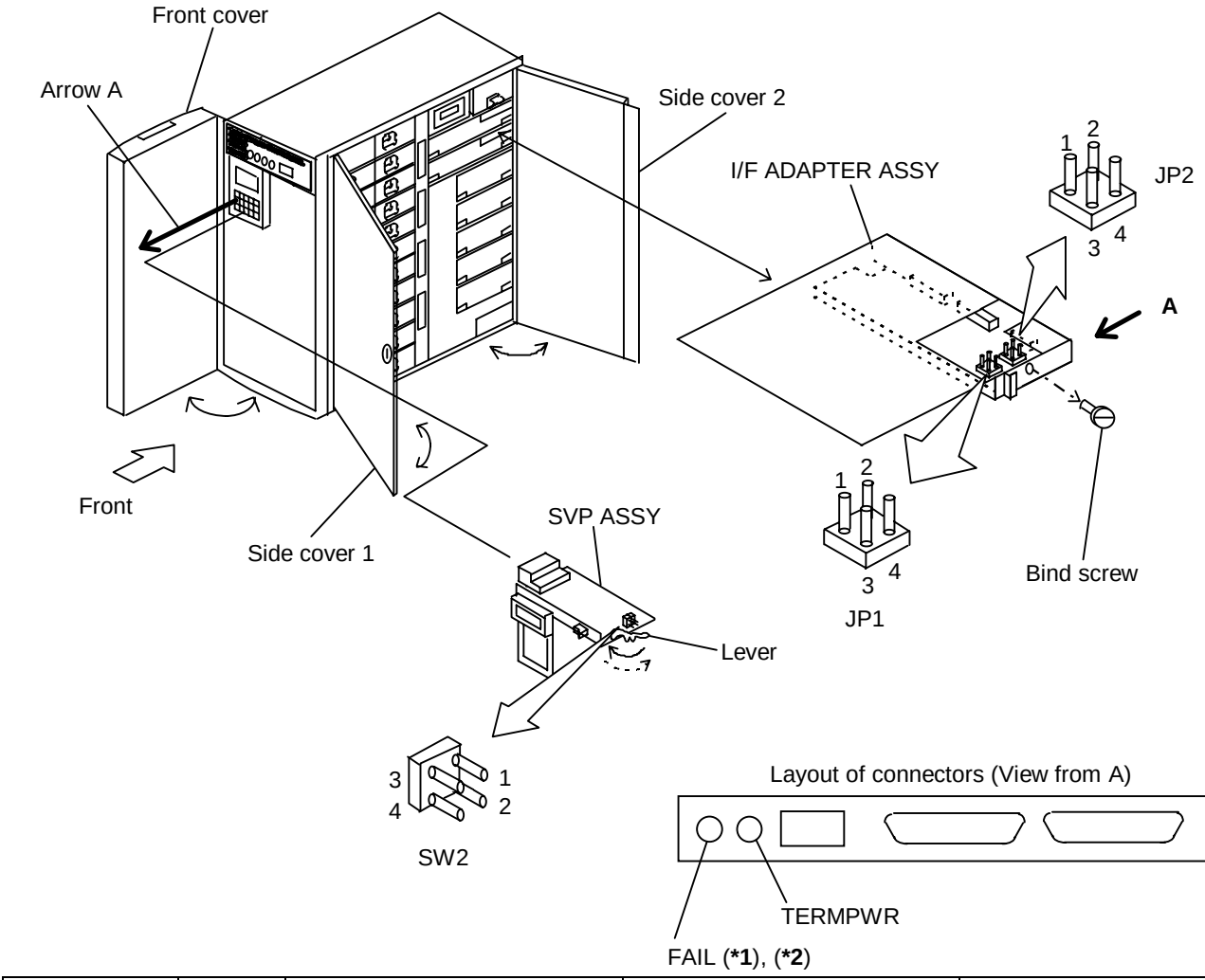
Operation	Panel display
Press  key until the indication shown on the right appears.	S E L F - D I A G < 1 > (Q U I T)
Press  key.	
Press  key until the indication shown on the right appears.	D R I V E M A I N T E (Q U I T)
Press  key.	
Press  key until the indication shown on the right appears.	S V P F U N C T I O N (T E R M I N A T E S V P)
Press  key.	
Turn off the power switch to make sure that power can be turned off normally.	
Offline operation is finished.	

3.6 Setting the Terminator Power and Remote/Local Mode

Switching the power of DF350 can be controlled by Host system (Remote Control) under the mode of terminator power is supplied by SCSI bus. Switching the mode of Remote/Local is carried out by jumper setting of JP3 on SVP panel and JP1 of terminator power setting.

Note : While connecting to RS6000 model 220/230, terminator power should be supplied from outside (Local mode). Switching the power by the host system cannot be carried out. When the host is not connected or powered off, the data recovery with the maintenance panel, nor the formatting the array cannot be carried out.

- (1) Perform destaging (See ENTRY0040) and make sure that it is not in the cache back-up state. Turn off both main switch on the panel and the breaker at the rear side of the unit.
- (2) Remove terminator resistor from I/F ADAPTER ASSY.
- (3) Open the front cover and side covers.
- (4) Pull out the SVP ASSY and I/F ADAPTER ASSY.
- (5) Set the JP1 and SW2 according to Figure 3.6.1 and Table 3.6.1. (Set JP2 (equipped on I/F ADAPTER ASSY for only Wide SCSI like DMUDS or DMUSS) with the pins 1 and 2 short-circuited.)
- (6) After setting the terminator power, insert the I/F ADAPTER ASSY and tighten the bind screw. And insert the SVP ASSY.
- (7) Fix terminator resistor to I/F ADAPTER ASSY.
- (8) Close the front cover and side covers. Turn on the breaker.

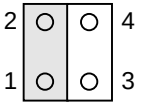
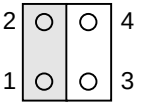
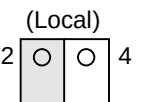
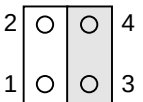
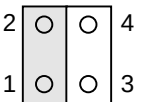
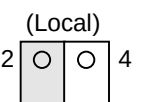
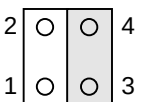
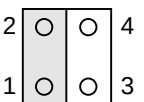
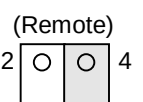
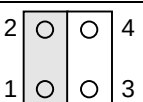
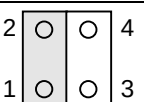
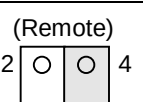


LED Name	Color	ON	OFF	Remark
TERMPWR	Green	Terminator power supplied.	Terminator power is not supplied.	—
FAIL	Red	Single ended signal is connected to Differential I/F card. (Failure)	Differential signal is connected.	(*1) Only mounted on Differential I/F card.

*2 This LED is valid only when all the devices connected to SCSI I/F are powered on. When one of the devices is not powered on, sometimes this LED is lit up.

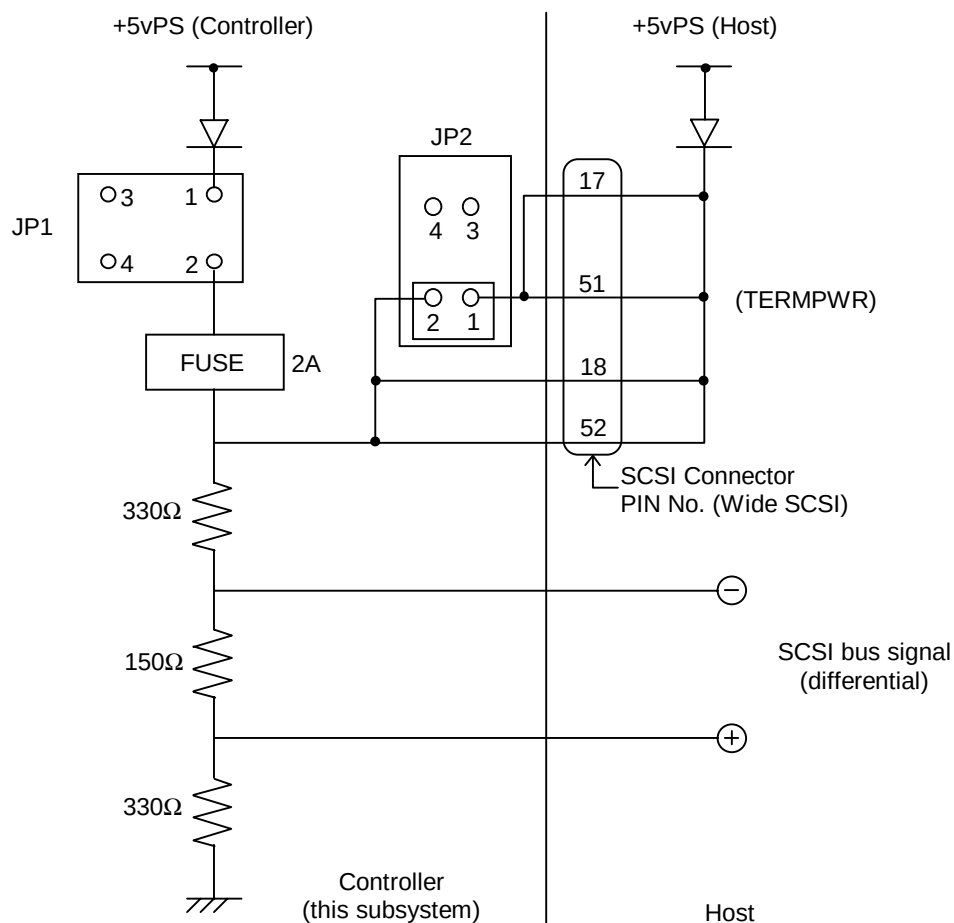
Figure 3.6.1 Setting the Terminator Power and Remote/Local Mode

Table 3.6.1 Setting the Terminator Power and Remote/Local Mode (*1)

No.	Jumper Setting			Function
	JP1 Terminator Power	JP2 (*2)	SW2 Remote/Local Mode	
1			(Local) 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
2			(Local) 	The combination can not be set.
3			(Remote) 	Terminator power +5VPS is supplied only from the power source of the host computer.
4			(Remote) 	The combination can not be set.

*1 The terminator power means that the power for the terminator is supplied from the host so that the SCSI bus is not shut down by a power failure of the subsystem.

*2 Set this jumper (JP2) with the pins 1 and 2 short circuited.

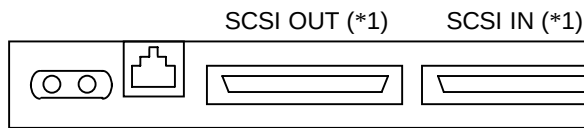


3.7 Connecting the SCSI Cable

Connect the SCSI cables after confirming the controller number indicated on the label.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 3.7.2.)

Controller 01



Controller 00

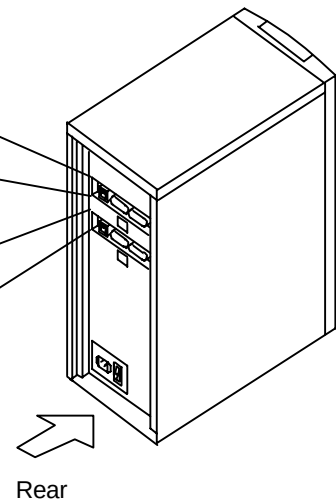
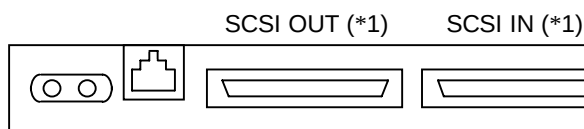
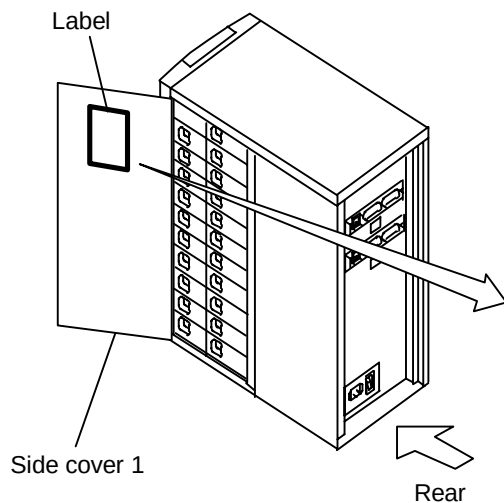


Figure 3.7.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

***1** : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.



Label details

SVP	SPARE DISK	FAN-03		FDD	BAT
DRIVE PORT=4,ROW=2	DRIVE PORT=4,ROW=3			CONTROL-01	I/F-01
DRIVE PORT=4,ROW=0	DRIVE PORT=4,ROW=1			CONTROL-00	I/F-00
DRIVE PORT=3,ROW=2	DRIVE PORT=3,ROW=3	FAN-02		PS-04	
DRIVE PORT=3,ROW=0	DRIVE PORT=3,ROW=1			PS-03	
DRIVE PORT=2,ROW=2	DRIVE PORT=2,ROW=3	FAN-01		PS-02	
DRIVE PORT=2,ROW=0	DRIVE PORT=2,ROW=1			PS-01	
DRIVE PORT=1,ROW=2	DRIVE PORT=1,ROW=3	FAN-00		PS-00	
DRIVE PORT=1,ROW=0	DRIVE PORT=1,ROW=1			INBOX	
DRIVE PORT=0,ROW=2	DRIVE PORT=0,ROW=3				
DRIVE PORT=0,ROW=0	DRIVE PORT=0,ROW=1				

Figure 3.7.2 Label Layout

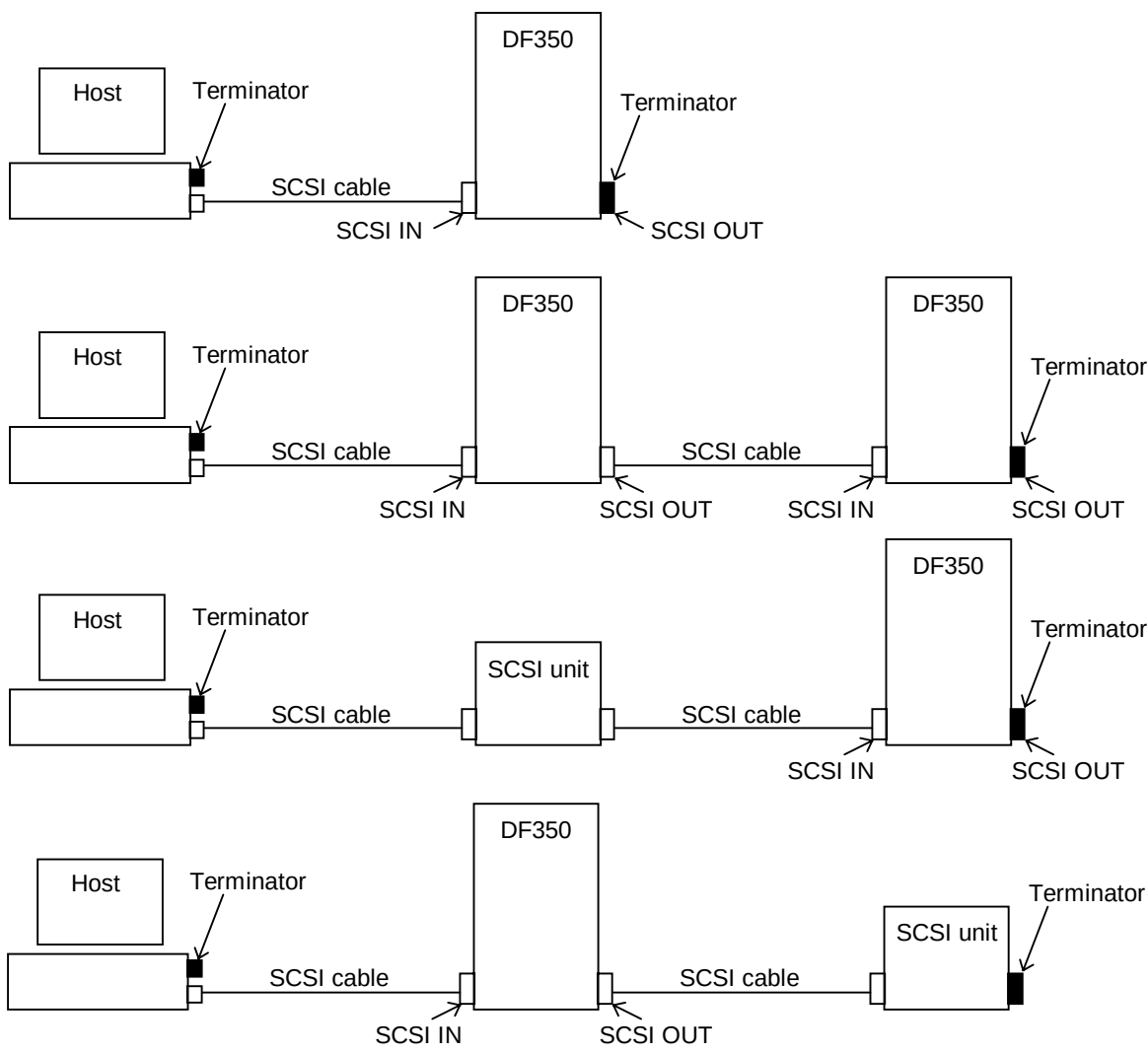


Figure 3.7.3 SCSI Connections

4. Setting the Subsystem Parameter

4.1 Setting the System Parameter

(1) Setting the system parameters and downloading

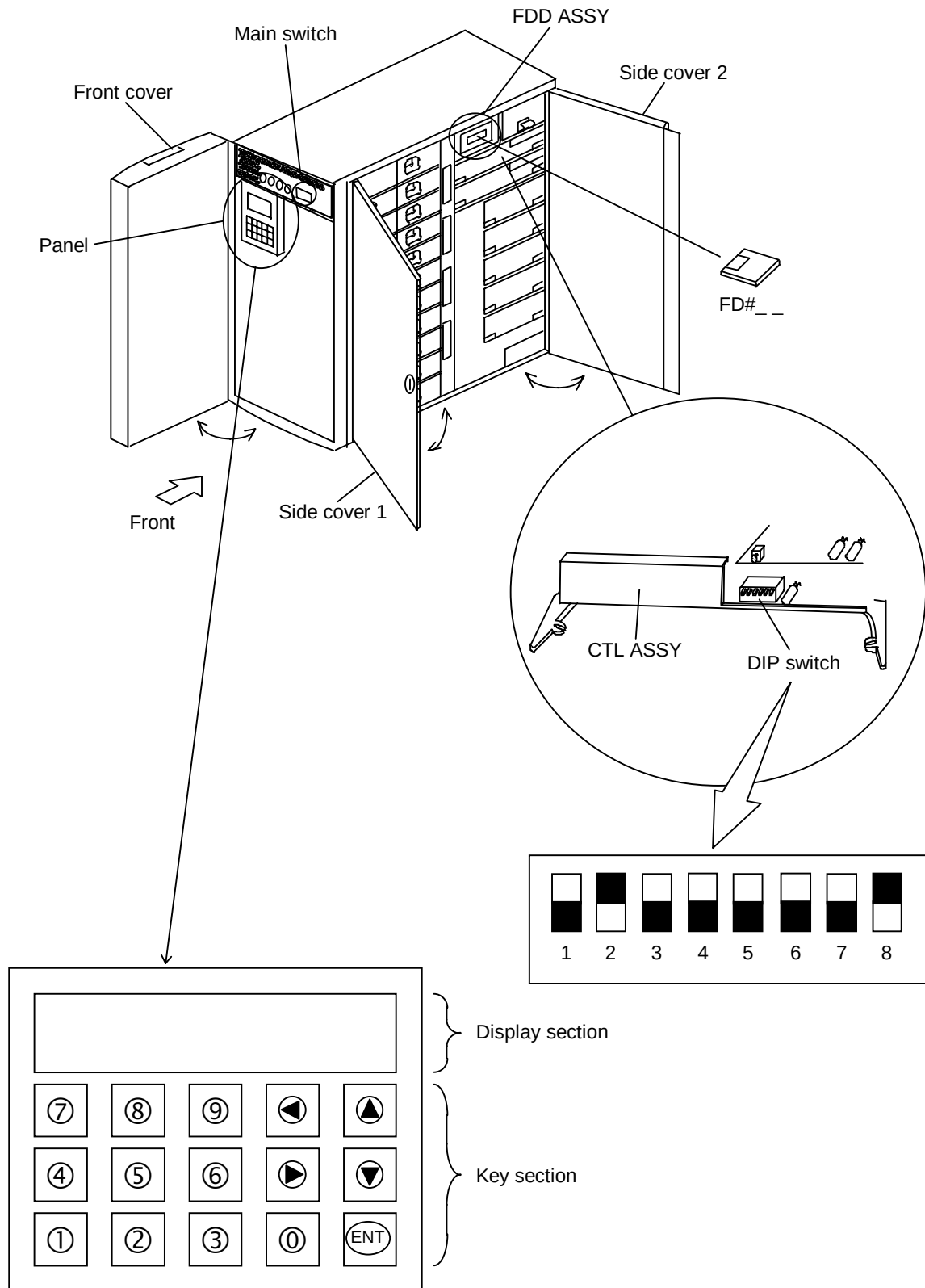
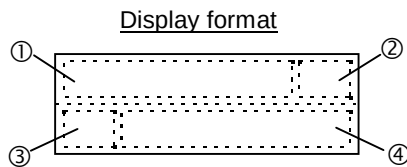


Figure 4.1.1 DIP Switches (System parameter is Set)

(1) Display

While setting up DIPSWITCH or SVP FUNCTION, menu etc. are displayed at panel display in the following display format .



① Menu title

There are two kinds of menu title described below.

DIPSWITCH SET:

For setting the target ID, buzzer, etc.

SVP FUNCTION:

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Message from the controller No. 0: The first (left most) character is in uppercase.

Message from the controller No. 1: The first (left most) character is in lowercase.

Example) Controller No. 0: DIPSWITCH SET

Controller No. 1: dIPSWITCH SET

For the dual controllers, the message with the display format 1 and the menu title with the display format 2 are displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

(2) Keys

Use the - keys for panel operation.



Used for entering the parameter values.



Used for determining the menu or the input parameter.

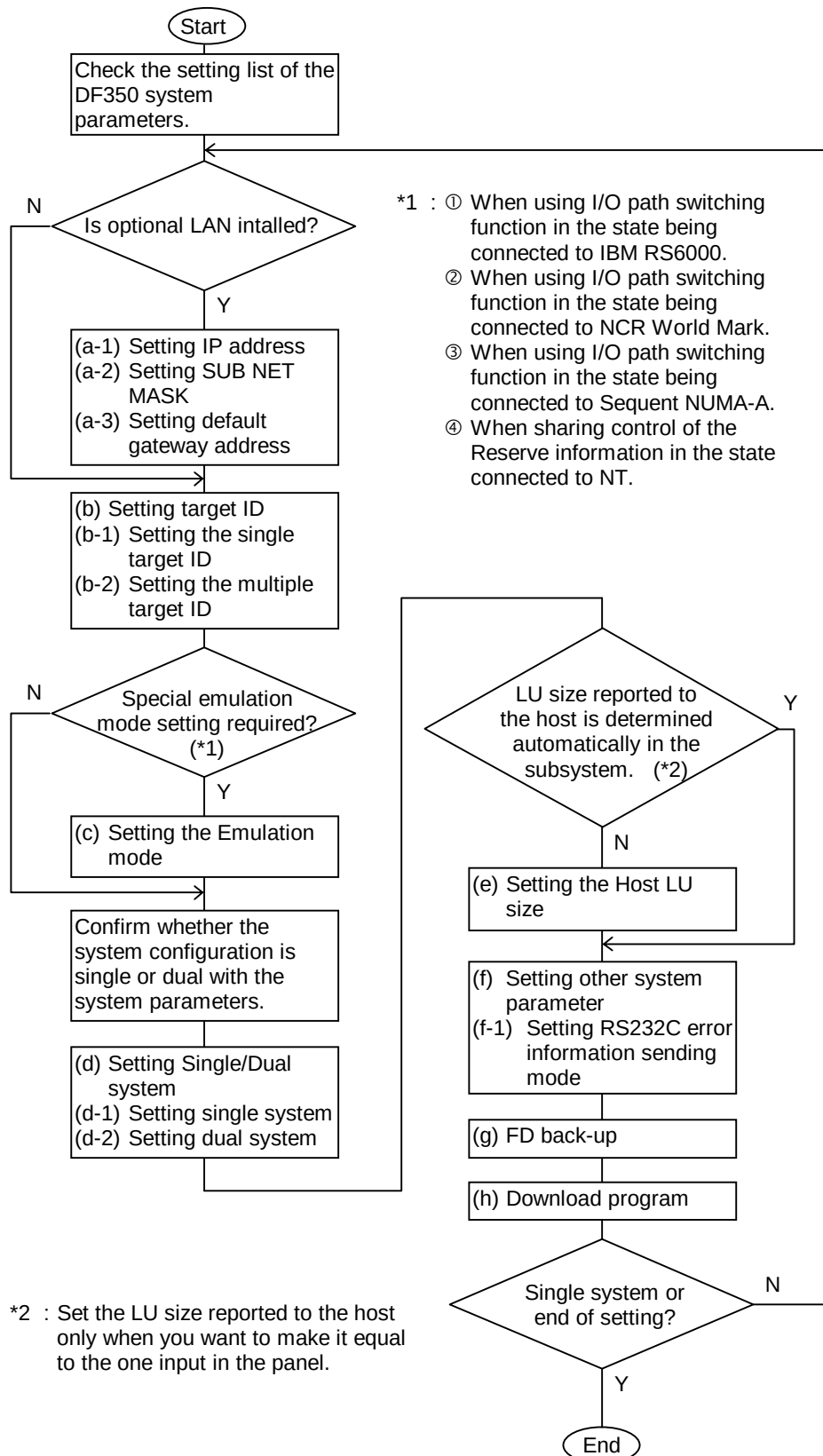


Used for determining the parameter input position.



Used for selecting the menu.

Operate as the flow described below.



Operate as described below.

(1) Before powering on the subsystem, set DIP switches shown in Figure 4.1.2.

In case of Dual Contoroller system (installed DF-F350-F2MCF) , set DIP switches of both contorollers.

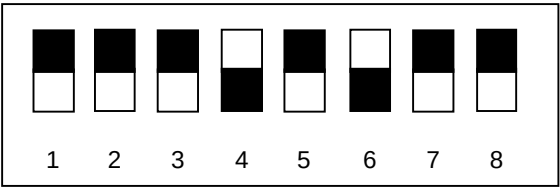
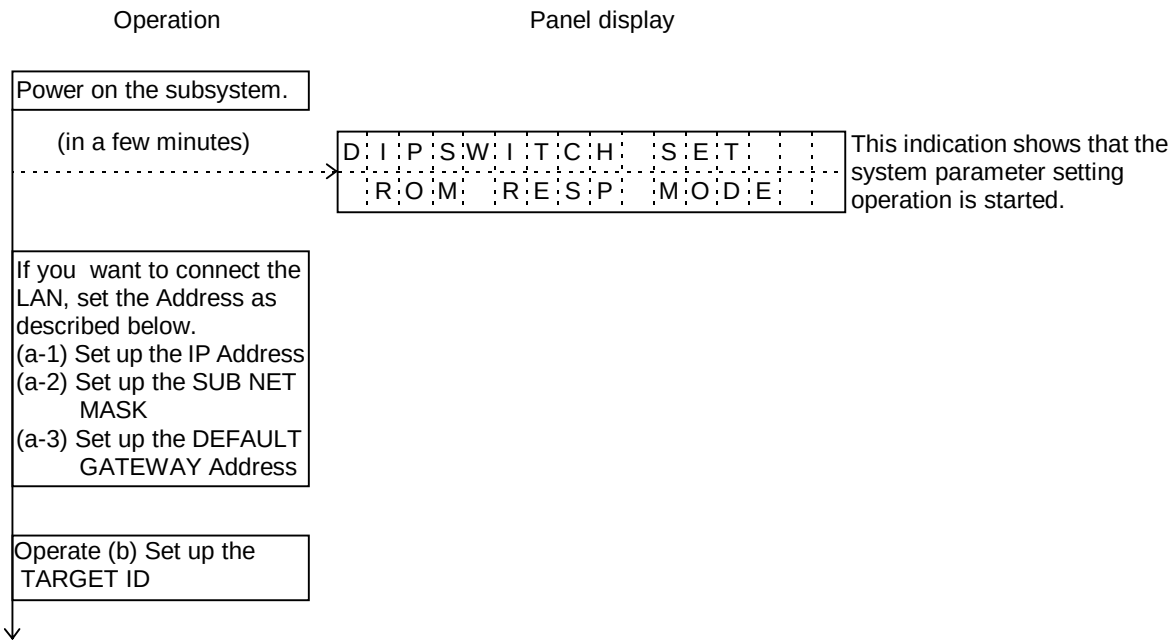
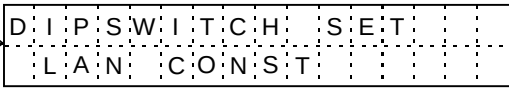
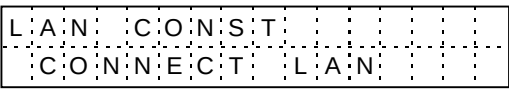
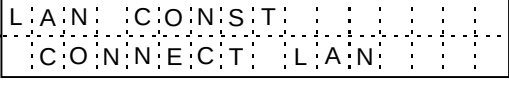
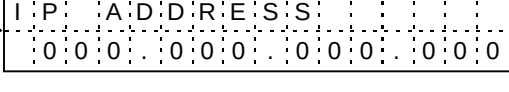


Figure 4.1.2 DIP switches (For setting the system parameter)

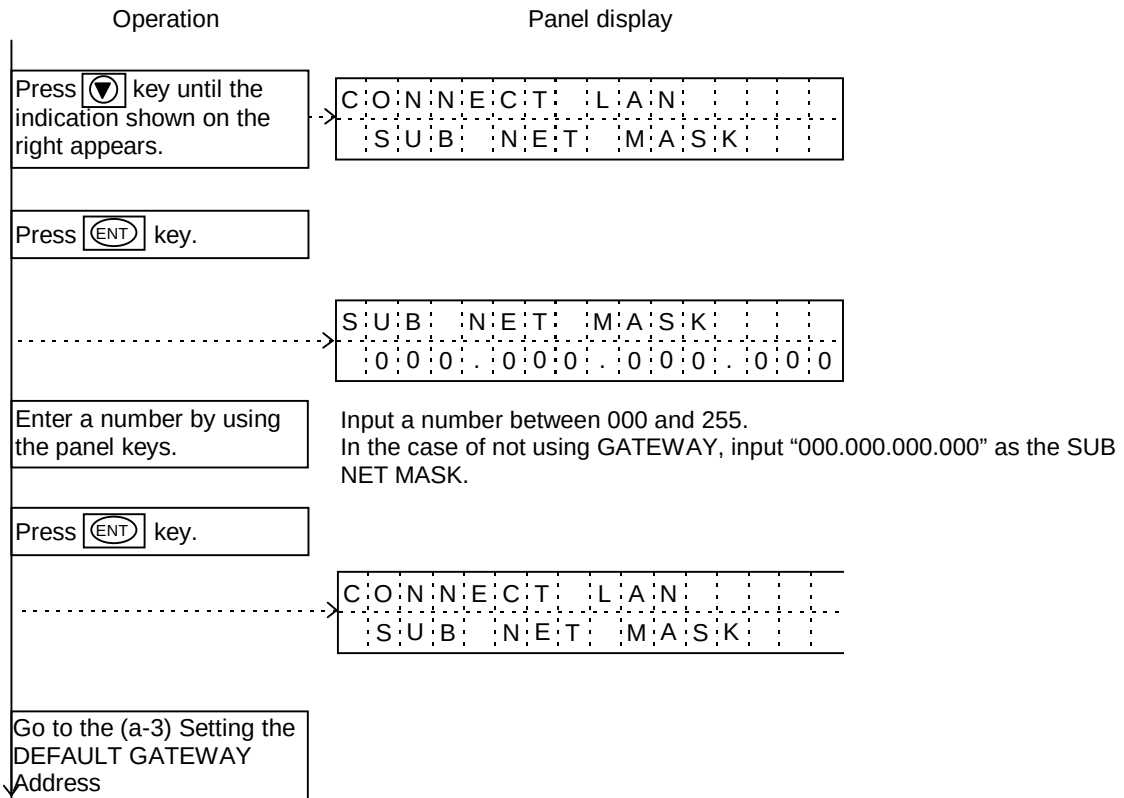
(2) Operate panel's keys as described below.



(a-1) Setting the IP address.

Operation	Panel display
Press  key until the indication shown on the right appears.	 Note : Use  key if you have passed this indication.
Press  key when "LAN CONST" is indicated.	Note : If  key is inadvertently pressed for any indication other than "LAN CONST", press  key again, then select "LAN CONST" by using  key or  key. 
When the indication shown on the right appears, press  key.	 The indication with "*" shows current setting. CONNECT : with LAN option NOT CONNECT : without LAN option
Press  key until the indication shown on the right appears.	
Press  key.	
Press  key until the indication shown on the right appears.	
Press  key.	
Enter a number by using the panel keys.	Input a number between 000 and 255.
Press  key.	
Go to the (a-2) Setting the SUB NET MASK	

(a-2) Setting the SUB NET MASK

***Note**

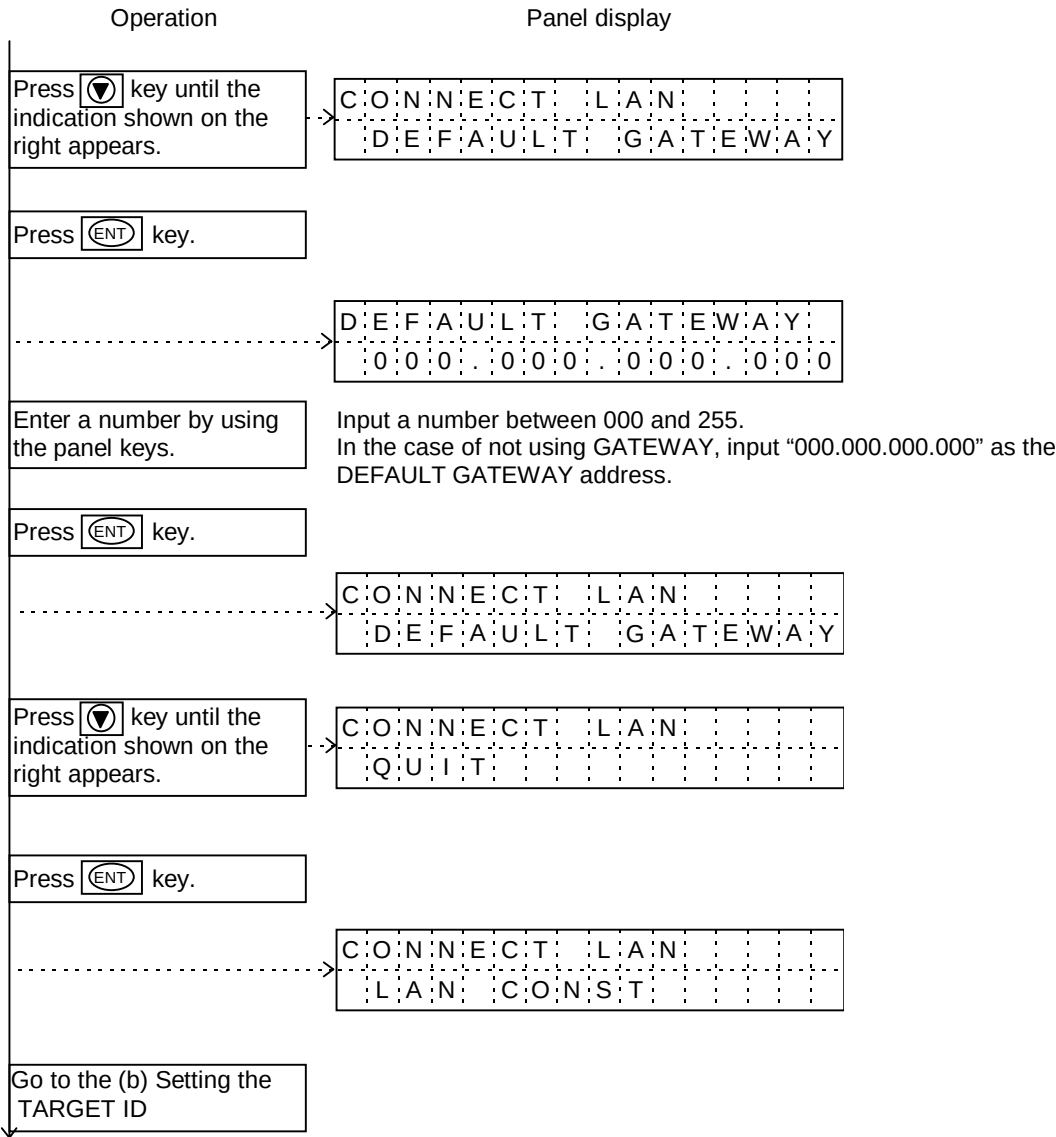
If "000.000.000.000" as the SUB NET MASK is set, this subsystem automatically adopts default SUB NET MASK for each IP address as described in the table 4.1.1.

Table 4.1.1 Default SUB NET MASK related with IP address

No.	IP Address of the subsystem	DEFAULT SUB NET MASK
1	from 000.000.000.000 to 127.255.255.255	255.000.000.000
2	from 128.000.000.000 to 191.255.255.255	255.255.000.000
3	others	255.255.255.000

If a smaller SUB NET MASK than default number is entered, this subsystem adopts default number.

(a-3) Setting the DEFAULT GATEWAY address



***Note**

If an invalid GATEWAY address is set (the IP address of the device is different from network address.), either of warning messages as shown below is displayed until the READY LED of the subsystem lights on.

Power off the subsystem and set IP address and default GATEWAY address correctly.

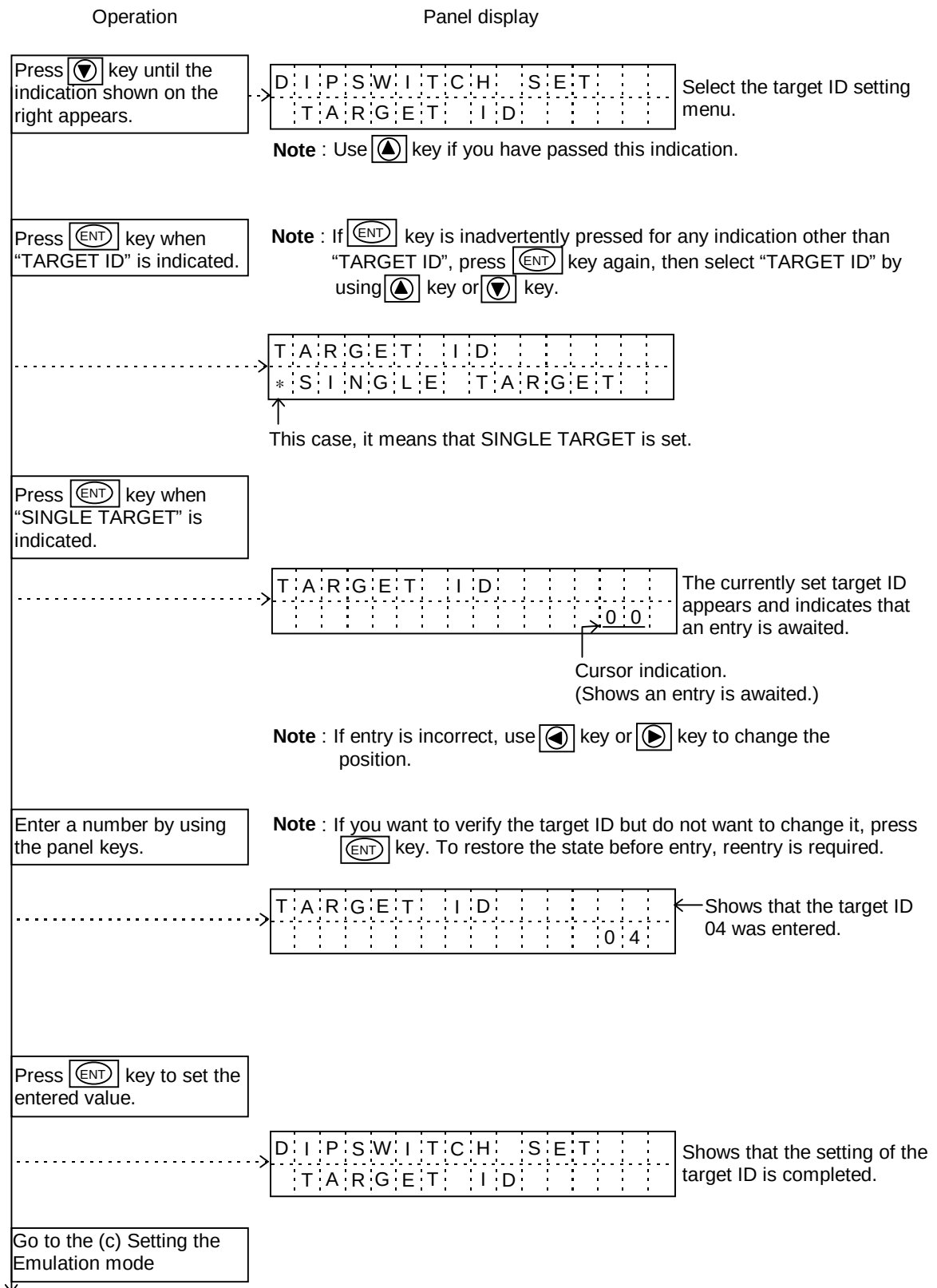
W	0	1	7	0	0	G	A	D	E	R	R		
				.		.		.					

W	0	1	7	0	0	G	A	D	E	R	R	-	X
				.		.		.					

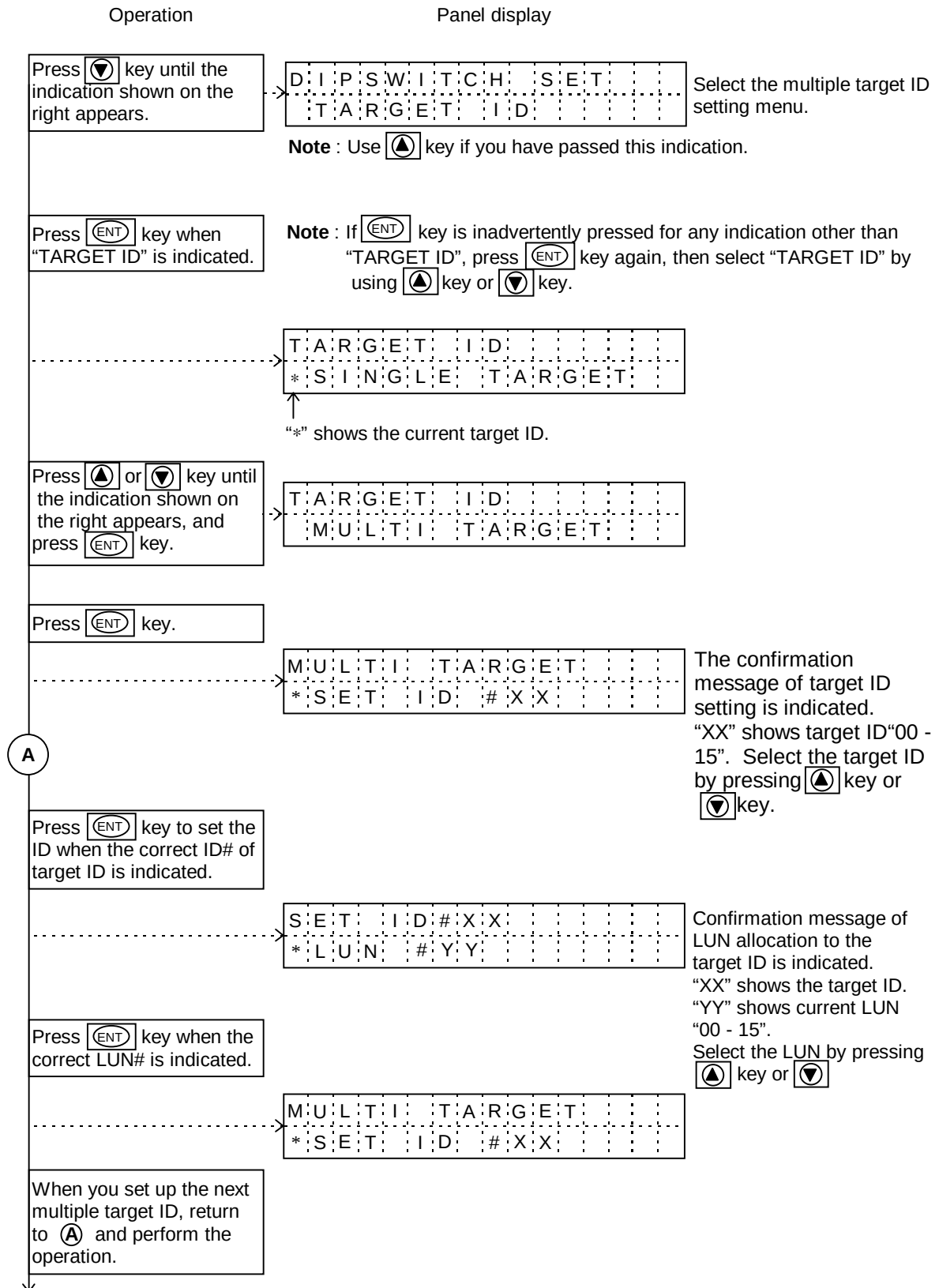
X : controllers No.

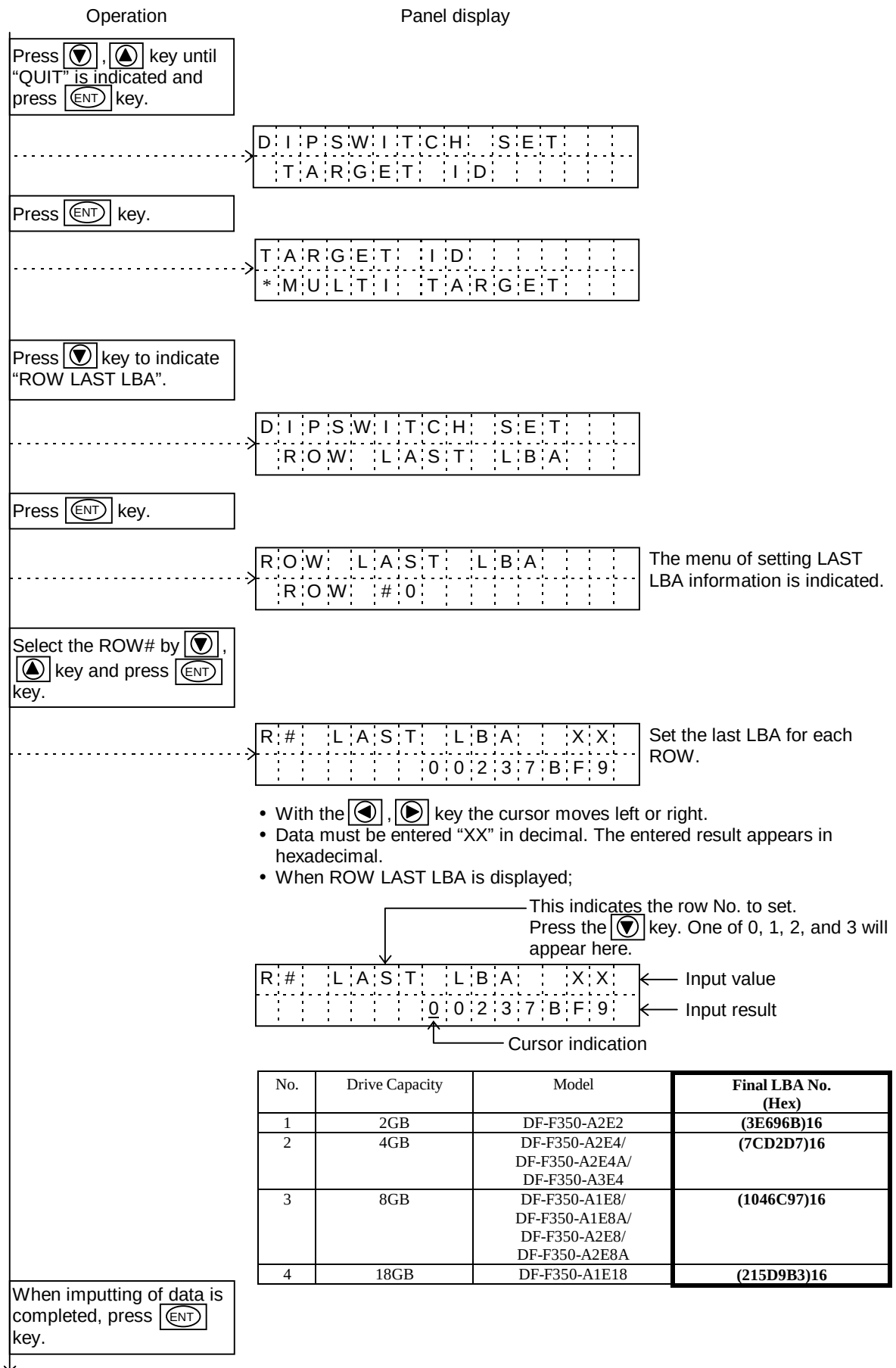
(b) Setting the TARGET ID.

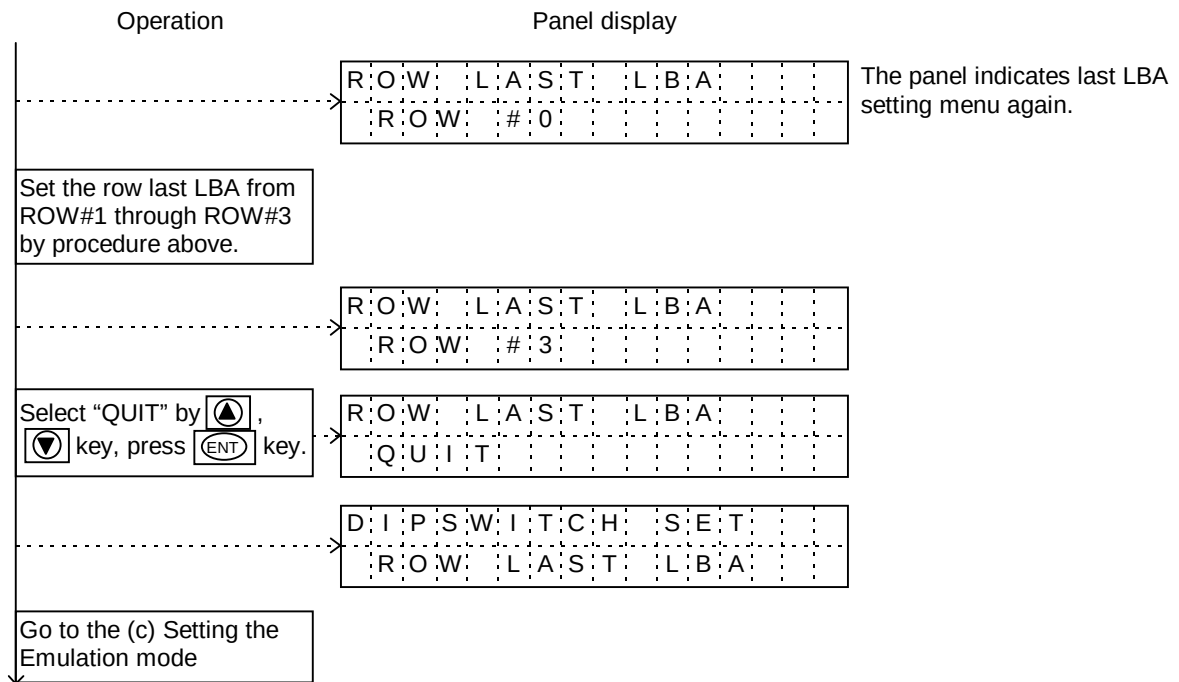
(b-1) Setting the single target ID.



(b-2) Setting the multiple target ID.

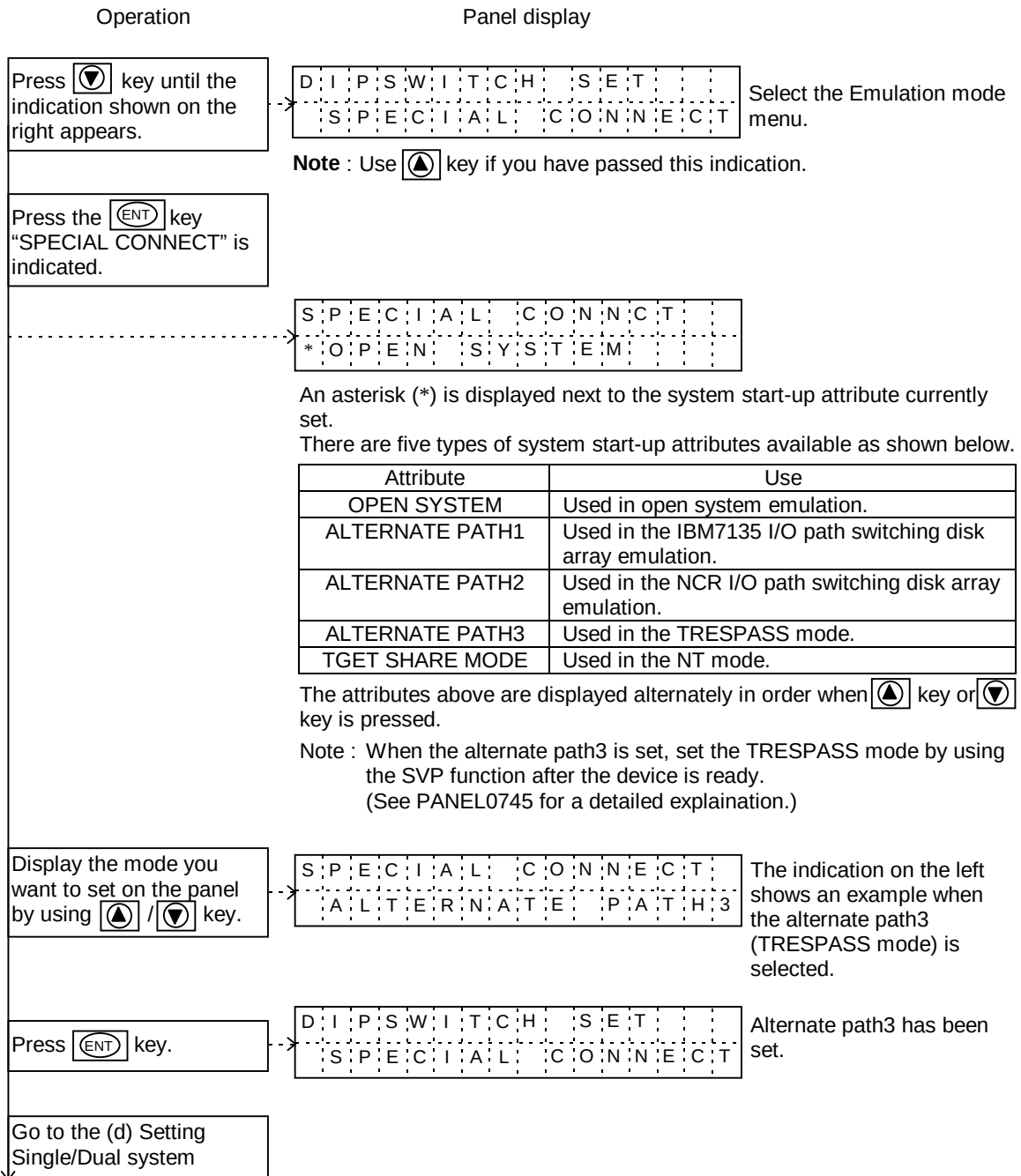






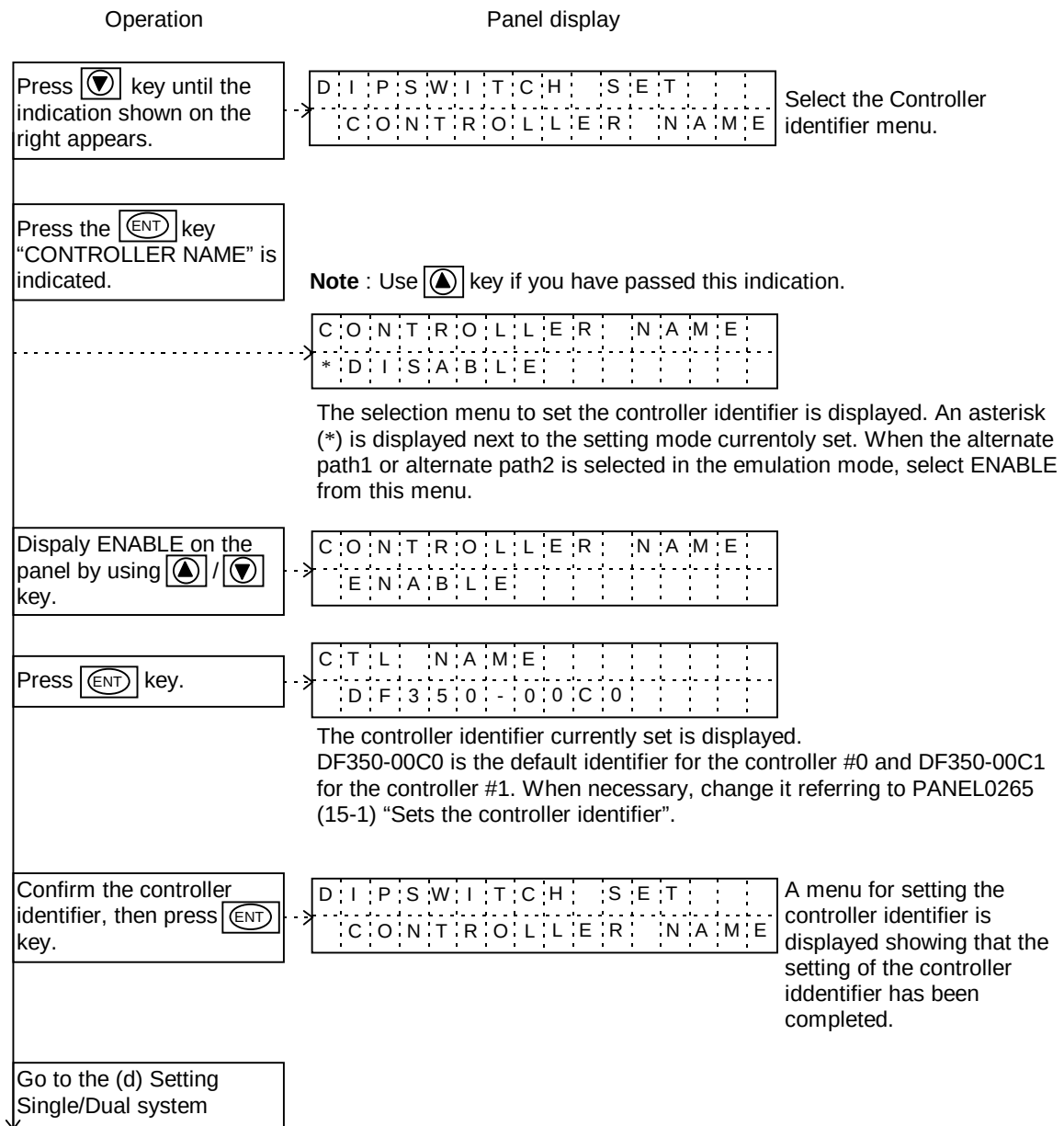
- Note)** * Setting and changing of multi target ID make the relation between the target ID and the LUN only.
 The defining and formatting LU can be executed both after and before this operation.
- * If this operation is finished , turn off the power and turn on the power again.
 - * Resetting of SINGLE TARGET ID is required when returning to SINGLE TARGET function after switching to MULTI TARGET function from previous SINGLE TARGET function.
 - * If you want to set the multi target ID when the LU is already set, the LUN can be set to any number from #00 to #07. If you want to set any number from #00 to #15 to LUN, set the multi target ID after deleting the LU.
 - * The multi target ID must be set for each controller. In case of dual controller system and MULTI TARGET IDs are set for the both controller, set MULTI TARGET ID for each controller.

(c) Setting the Emulation mode

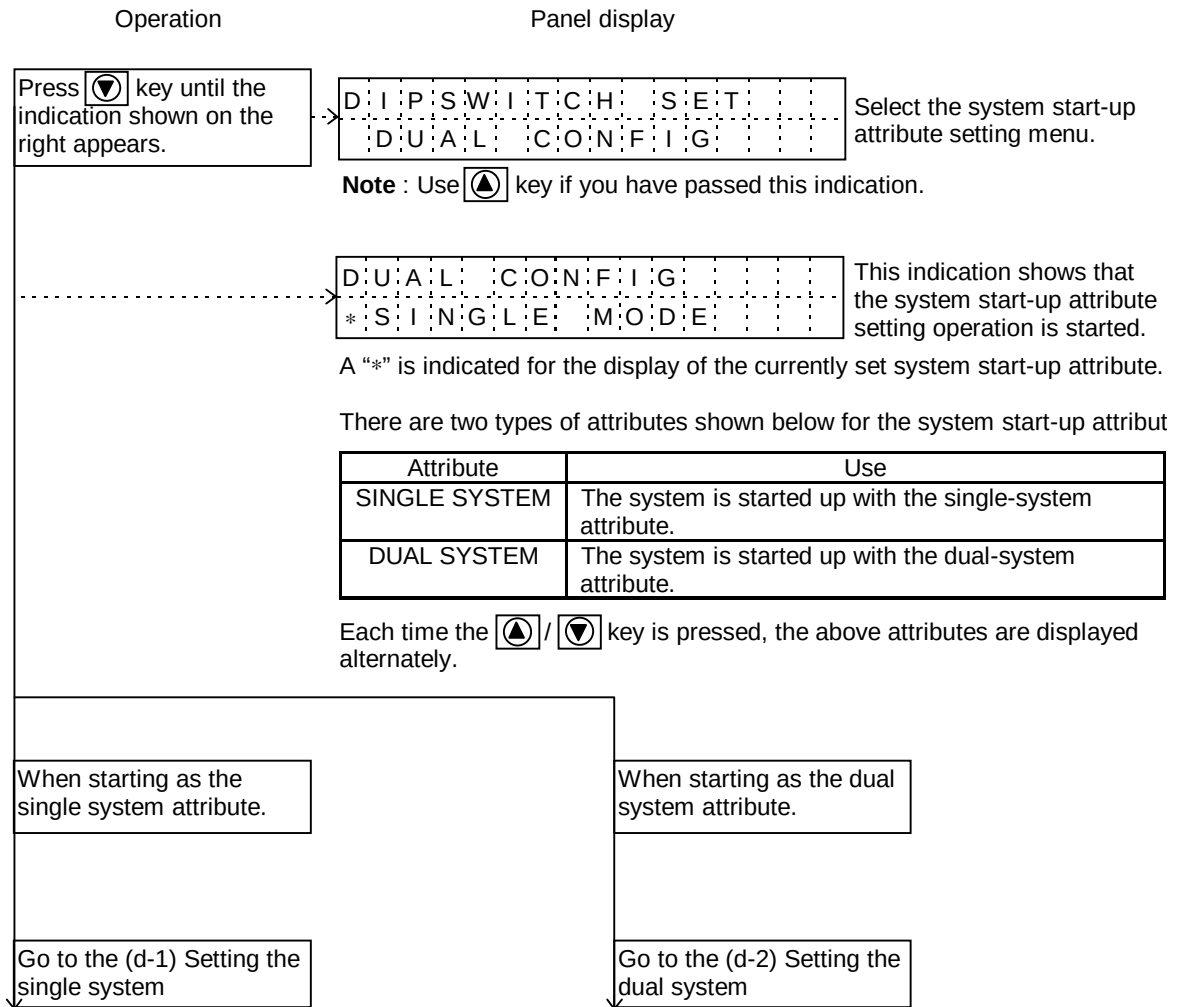


When the alternate path1 or alternate path2 is selected, set the controller name, product type. (See CK-INST0387.)

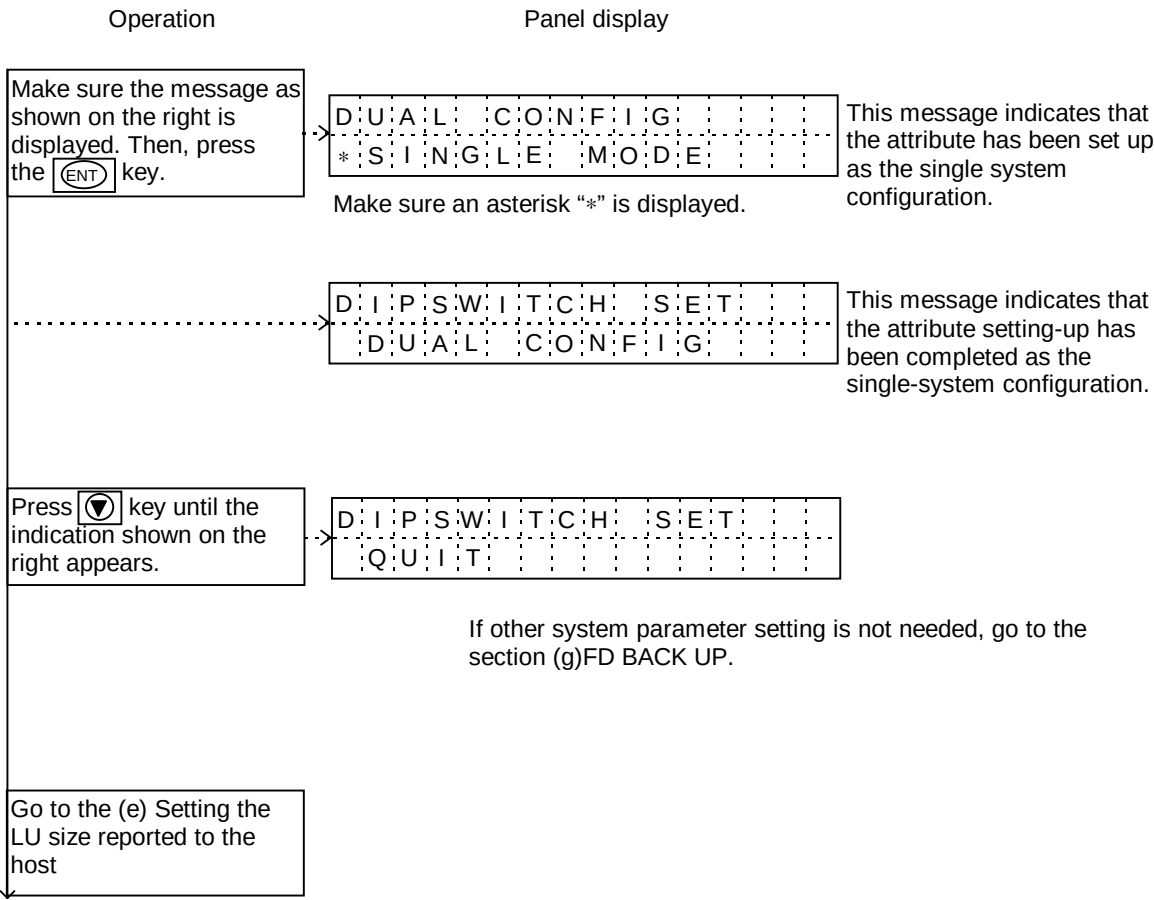
When the alternate path3 is selected, go to the single/dual system setting.



(d) Setting Single/Dual system



(d-1) Setting the single system



(d-2) Setting the dual system

There are five operating modes available as shown in Table 4.1.2.

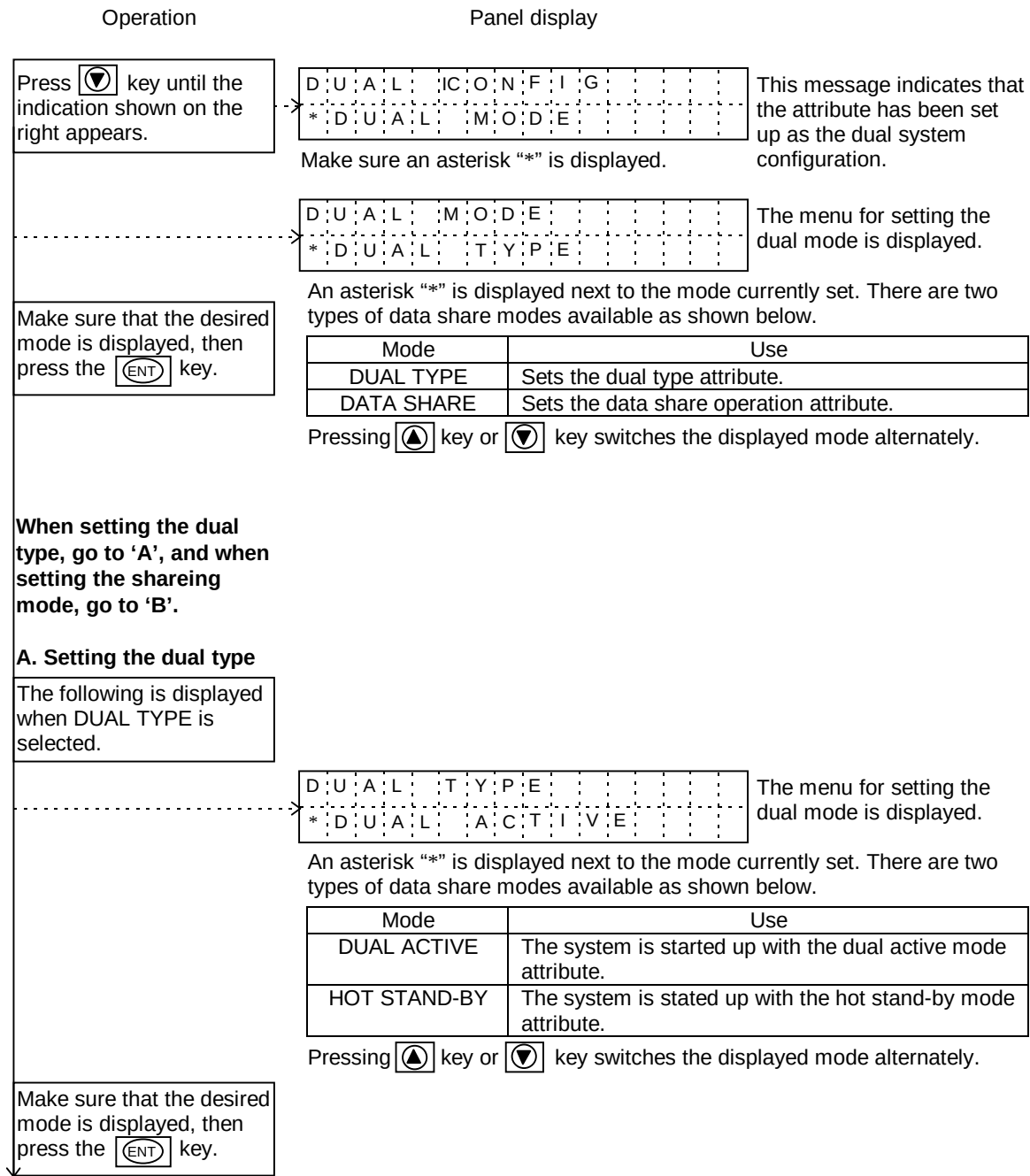
To validate each mode, panel setting shown in the Table 4.1.2 is required.

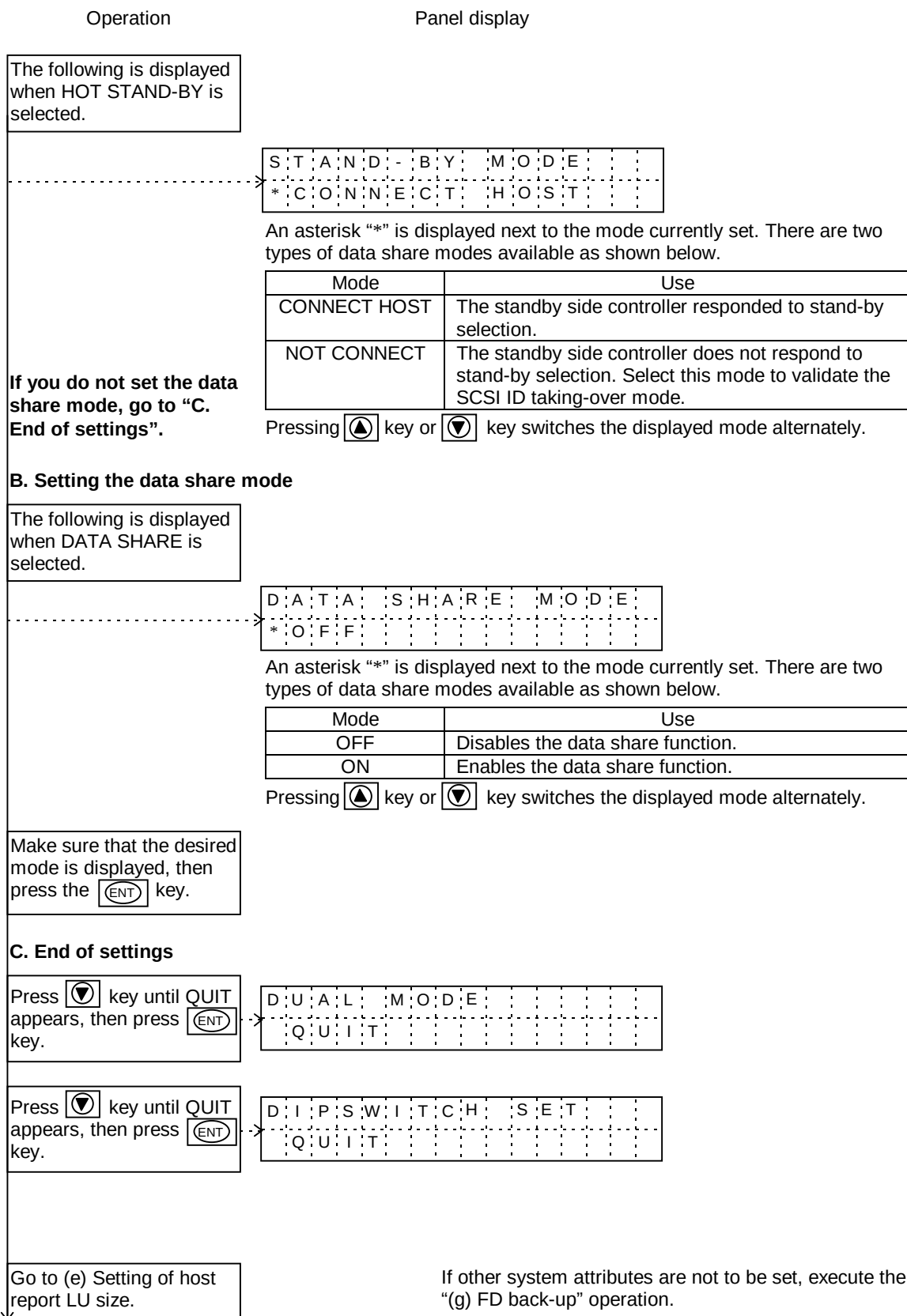
Perform the operations instructed in item (e) and succeeding items referring to the Table 4.1.2.

Table 4.1.2 Active mode and panel setting (Dual system configuration)

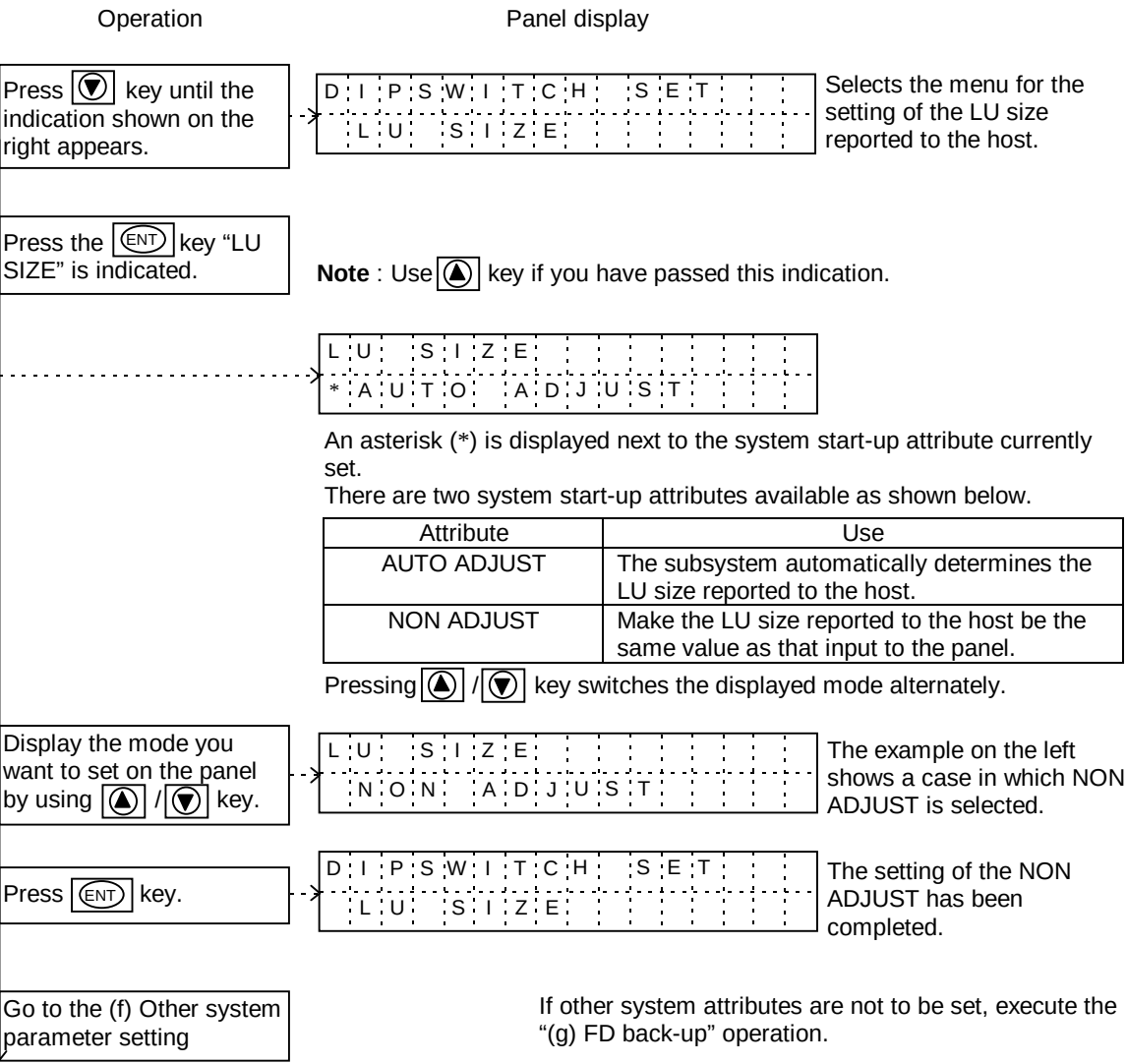
Active mode			Panel set		
			DUAL TYPE	STAND-BY MODE	DATA SHARE MODE
HOT STAND-BY	Normal		HOT STAND-BY	CONNECT HOST	OFF
	Data share (*1)				ON
	SCSI ID taking over			NOT CONNECT	OFF
DUAL ACTIVE	Normal		DUAL ACTIVE	Invalid	OFF
	Data share (*1)				ON

*1 : This function can be used in Micro_disk_Ver.304 or later.





(e) Setting the LU size reported to the host



(f) Other System Parameter Setting

Besides (a) Setting the IP address, (b) Setting the TARGET ID, and (c) Setting SINGLE/DUAL system, there are several setting functions as below. The setting at the factory shipment is shown on the table in the addendum to the device.

To change the setting, see "PANEL0080".

The menu items and their usage are as follows.

(The item Nos. 1, 2, 4, 5, 8, 10, 13, 20, and 22 in the following table must be set for each controller.)

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	???????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	Select	NOT CONNECT
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT (*2)	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : NT mode	Select	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	Select	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per (*3) block.	Select	512B
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inhibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) RACK MOUNT : Rackmount (RK) HIGH RACK MOUNT : Rackmount (RKH) CABINET, WRACK : Cabinet type (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	Select	Depending on the configuration from the factory
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Enter	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
17	CONTROLLER NAME (*4)	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid. CTL NAME : Controller identifier.	Select	DISABLE
18	ROW LAST LBA (*3)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET

*3 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

*4 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
21	GENERATE SYS (*5)	Specifies the loading method for the new/old microprogram.	NEW SYSTEM : Loads the new microprogram. OLD SYSTEM : Loads the old microprogram.	Select	NEW SYSTEM
22	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL TYPE : Dual system attribute DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute (*7) OFF : Not used in the Data share mode ON : Used in the Data share mode	Select	Depending on the configuration from the factory
24	LU SIZE (*6)	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
25	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
26	SYS REV	Limit the revision Nos. of installing system.	Displays the startup program revision.	—	“0304”
27	OPTION	Specifies the optional function when using it.	Enters the option code using the panel keypad.	Enter	“0000”
28	BOOT PROG V/R	Displays the startup program revision.	Displays the startup program revision.	—	
29	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
30	QUIT	Terminates the parameter input.	Enters using the panel keypad.	Enter	

*5 This menu can be used in the Flush Program Ver.PB24 and before.

*6 This menu can be used in the Flush Program Ver.PB24 and later.

*7 This function can be used in Micro_Disk_Ver.0304 or later.

(f-1) Setting RS232C error information sending mode

In order to use the failure notification program, the setting for the “ERROR INF” of the system parameter must be changed to “ON (NORMAL)”.

Operation	Panel display
	D I P S W I T C H S E T R O M R E S P M O D E
Press  key until the indication shown on the right appears. Press  key.	D I P S W I T C H S E T E R R O R I N F Note : Use  key if you have passed this indication.
Confirm that the indication is changed as shown on the right, which shows that the ERROR INF setting operation is started.	E R R O R I N F * O F F
Press  or  key until the indication shown on the right appears. Press  key.	E R R O R I N F O N (N O R M A L)
Make sure that the message as shown on the right is displayed.	D I P S W I T C H S E T E R R O R I N F
Press  or  key until the indication shown on the right appears. Press  key.	D I P S W I T C H S E T Q U I T
For the dual system, an indication shown on the right appears. Make the setting in the same way as the above.	D I P S W I T C H S E T ■ R O M R E S P M O D E

(g) FD back-up.

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) needs to be backed up to FD or restored from FD when installing optional parts or replacing parts. This case, perform back-up to FD or restore from FD according to “2.3.1 Back-up procedure to FD (CK-OPTION0050.)” or “2.3.2 Restoring procedures to FD (CK-OPTION0080.)”.

(Raid configuration setting, LU configuration setting, etc are not contained in system parameter.)

Back-up procedure to FD

- (1) Turn the power off according to CK-OPTION0120.

Notice: In case the power is not normally turned off, the user’s data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 4.1.3.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

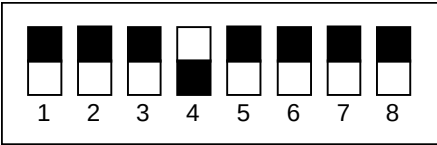
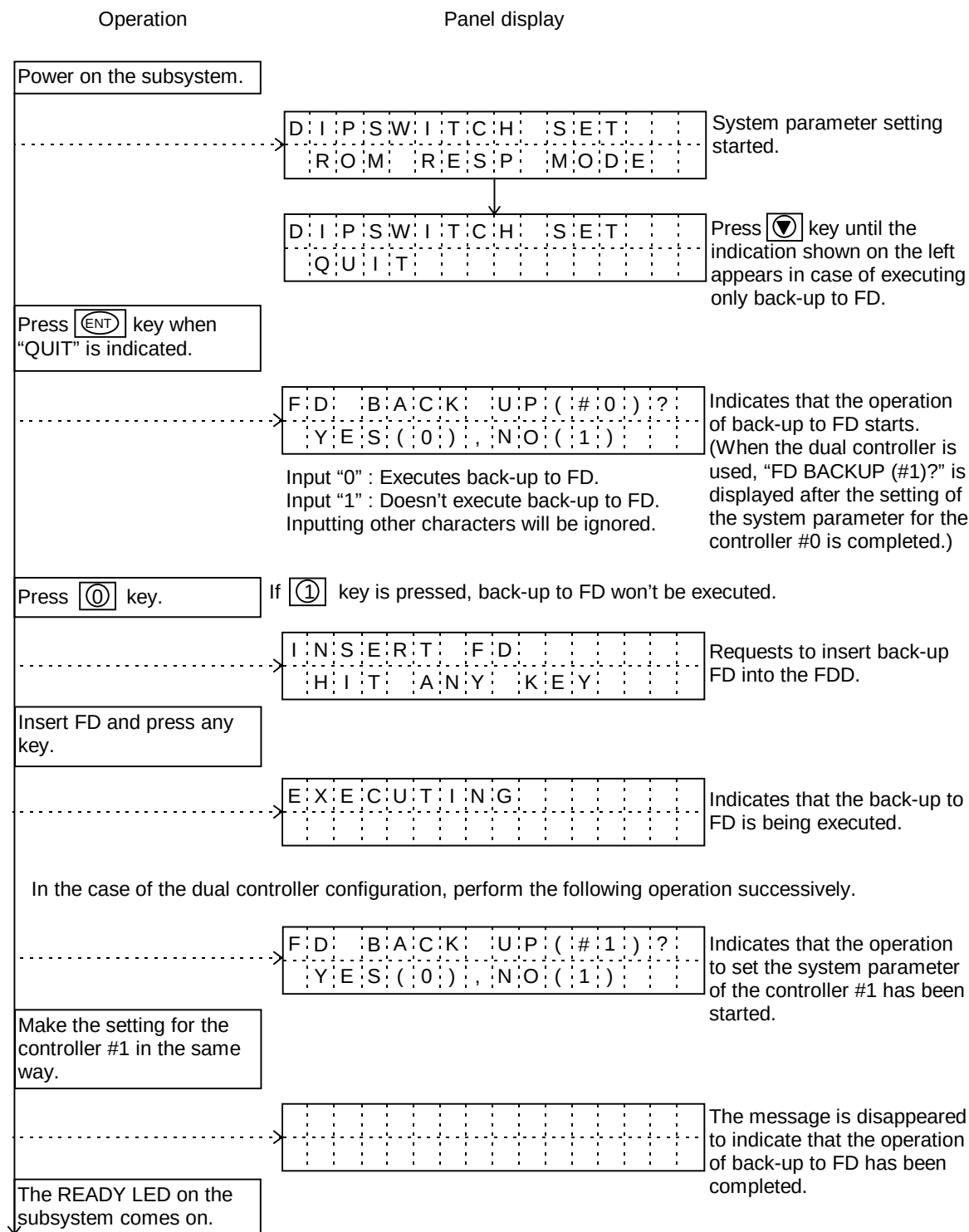


Figure 4.1.3 DIP Switches

(3) Operate panel's keys as described below.



(4) Set DIP switch No.4 as shown in Figure 4.1.4.

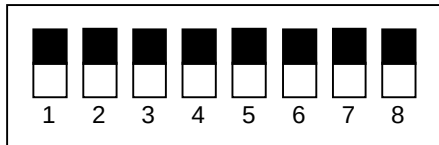
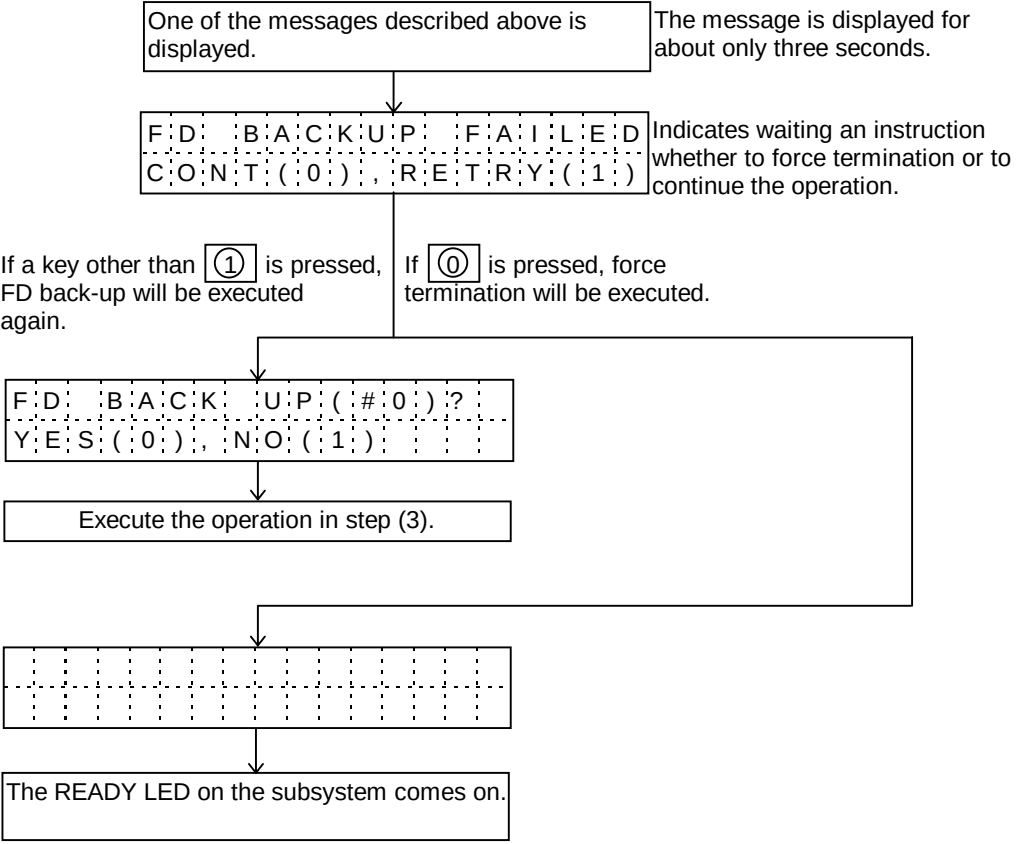


Figure 4.1.4 DIP Switches

Note 1 : While the back-up to FD is being executed, the following messages may be displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting failure of the FD drive motor occurred. Try again.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or is the condition of write-protected. Format or release write-protection.
Write error occurred in FD which was inserted. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So try again following the operation described below.

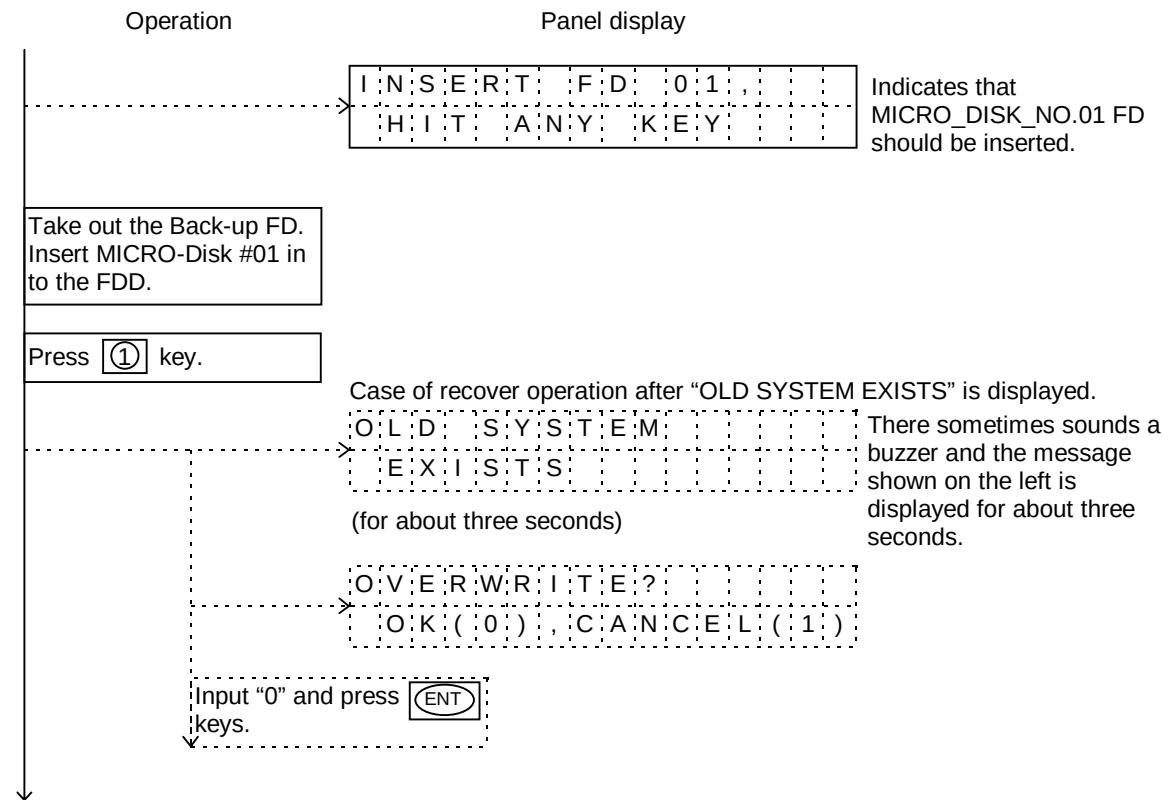
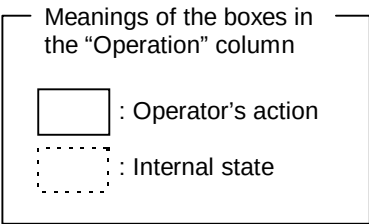


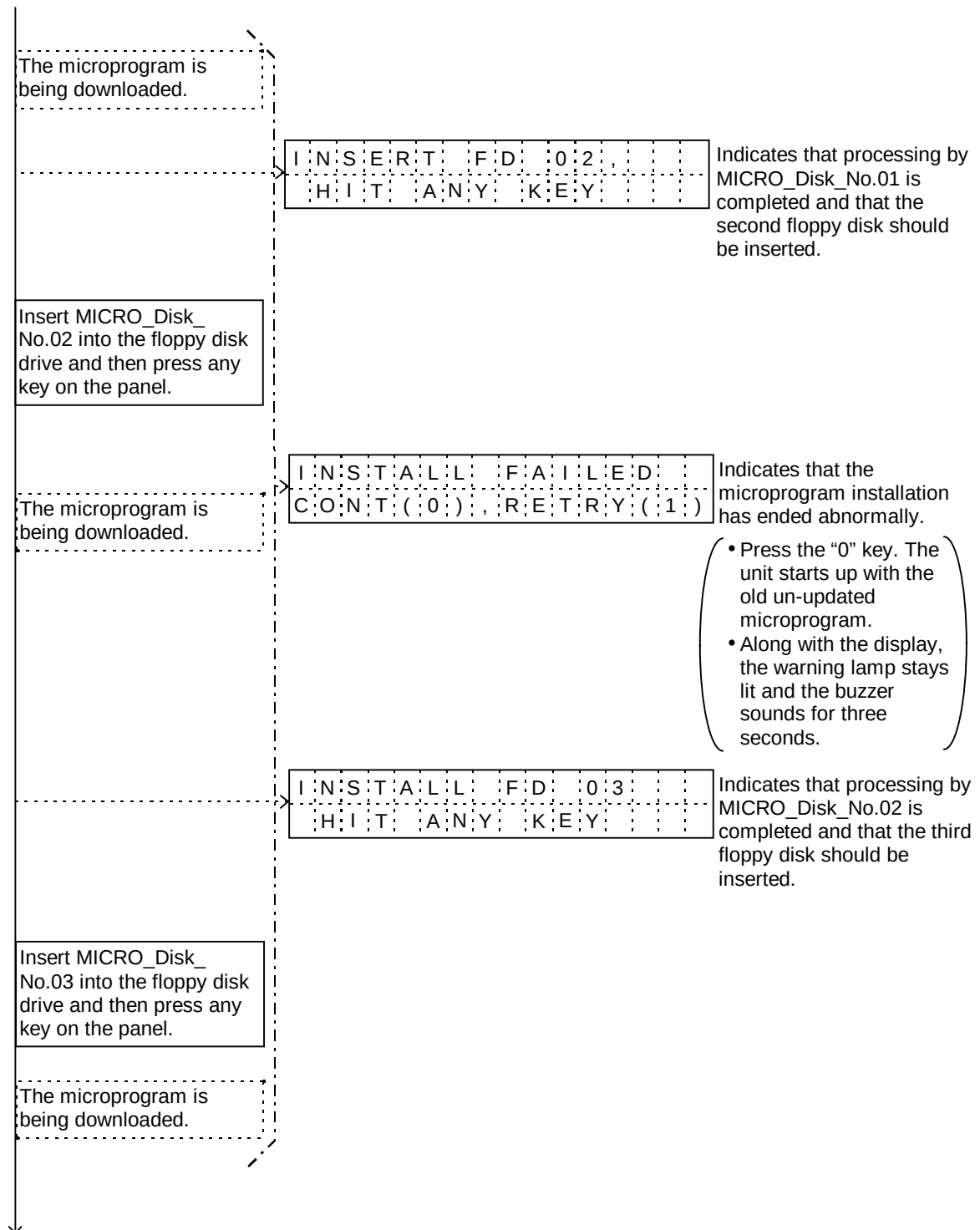
Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Note that the FD will be overwritten in back-up.

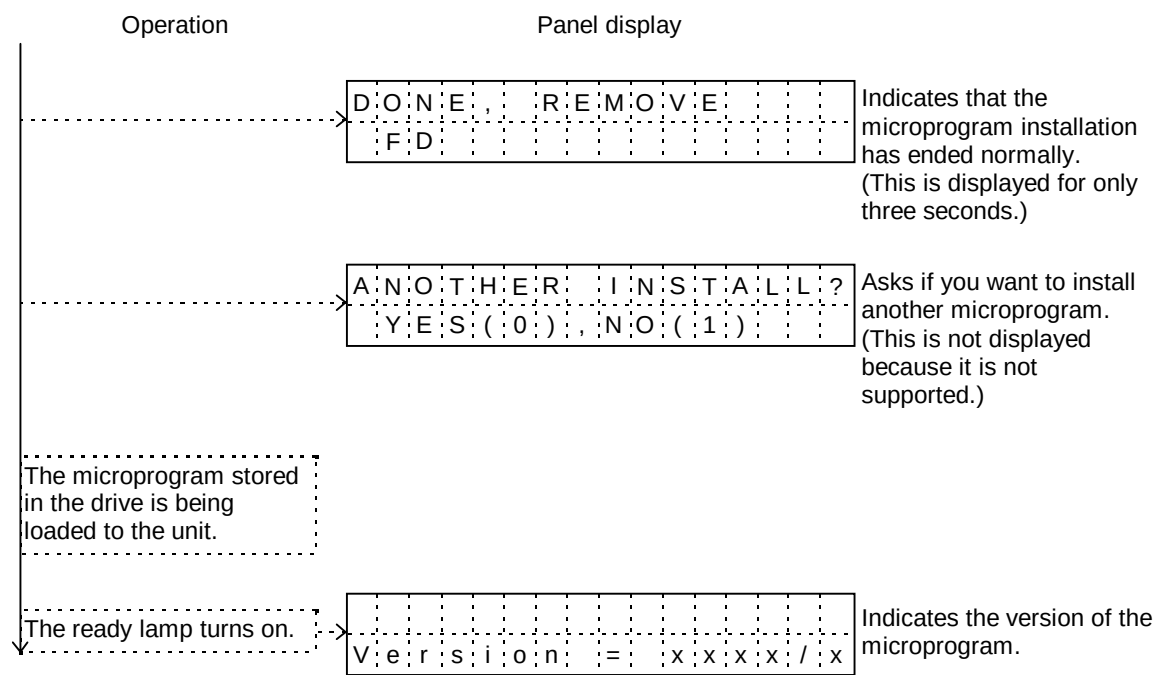
Note 3 : Even if back-up FD is left at FDD after back-up operation, no error will occur on the subsystem.

(h) Download Program
Download program is used to update the microprogram stored in the drive. Three floppy disks are used for downloading.

Note : Be sure that no drive failure is present before updating the microprogram.







(1) Set DIP switch No.1 as shown in Figure 4.1.5.

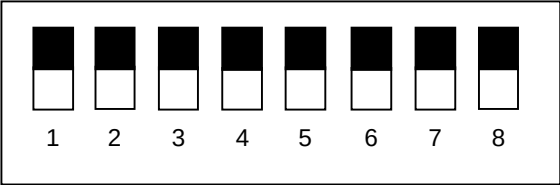


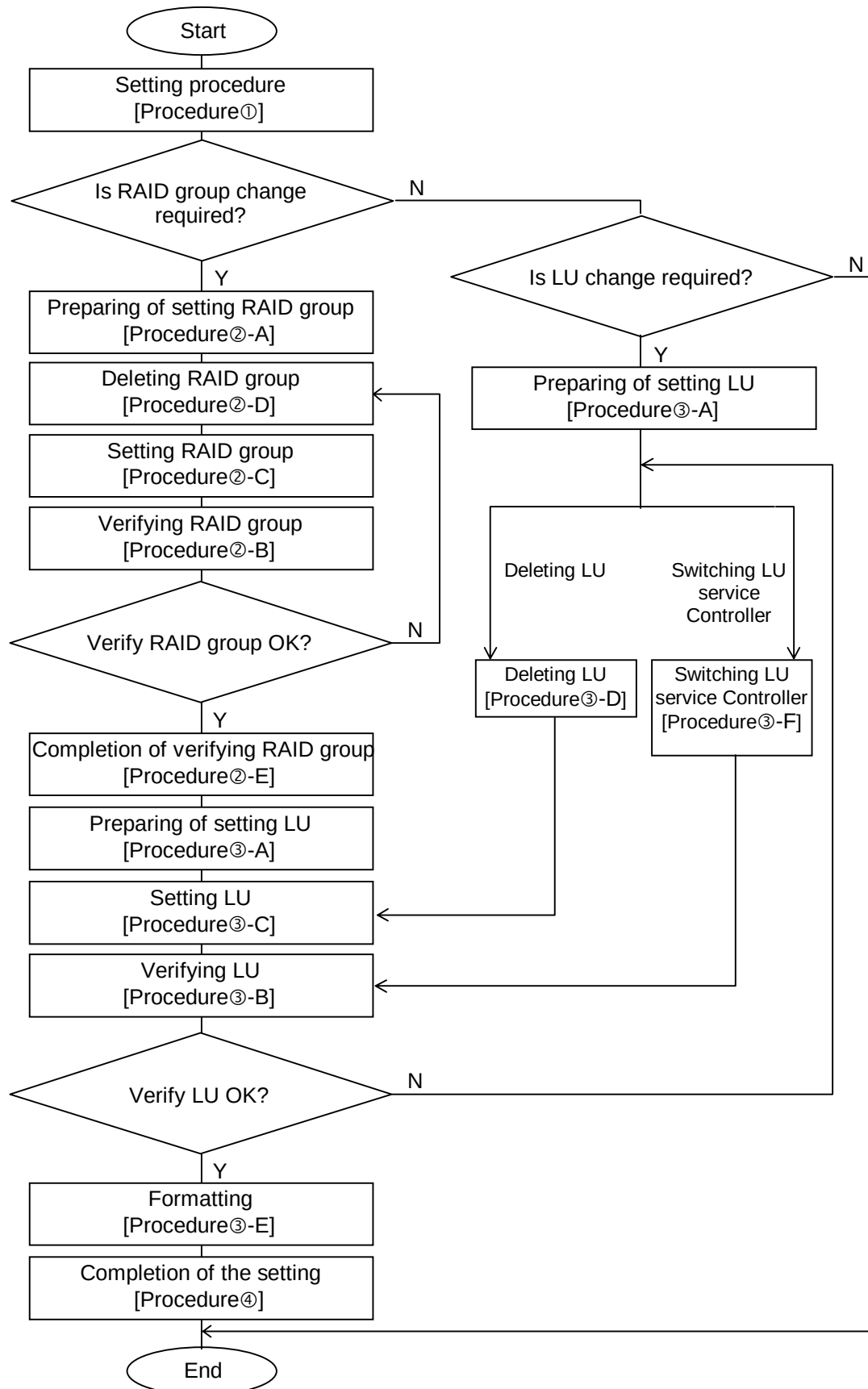
Figure 4.1.5 Standard DIP Switch Settings

Note : If the dual controller option (DF-F350-F2MCF) is installed, use the same settings for both controllers.

4.2 Setting the Subsystem Configuration Information

This function can be used when the subsystem is ready.

(During this operation, READ/WRITE command issued from the host cannot be executed. When the host command is received, Not Ready is reported to the host.)

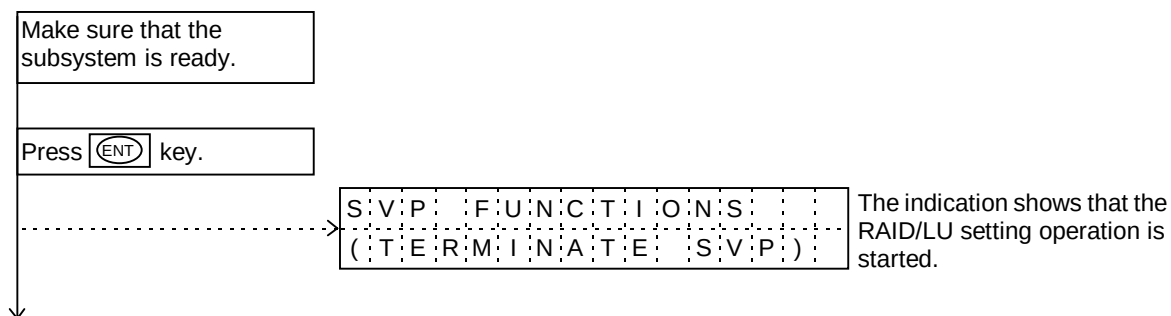


4.2.1 Preparing of setting RAID/LU

[Procedure①]

Operation

Panel display



When changing RAID group, go to procedure ②-A “Preparing of setting RAID group”.
When changing no RAID group but LU, go to procedure ③-A “Preparing of setting LU”.
When changing no RAID group and LU, go to quit.

4.2.2 Setting the RAID group

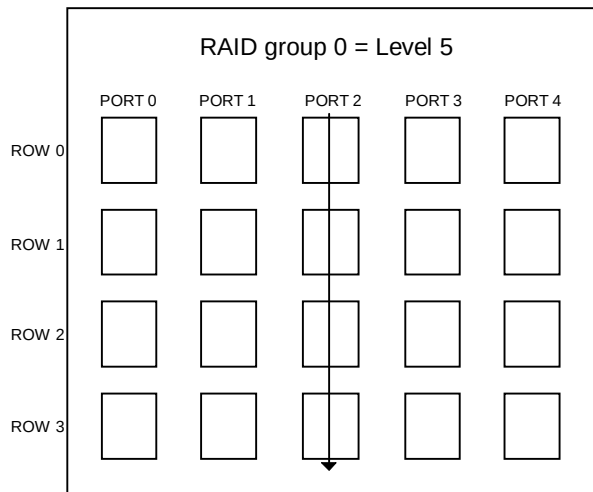
This function is used for setting, deleting and referring the RAID group. This function can be used when the subsystem is ready.

(Setting the DIP switch and turning off/on the subsystem are not required. Read/Write operation from the host can not be executed during this function. When the host command is received, Not Ready is reported to the host.)

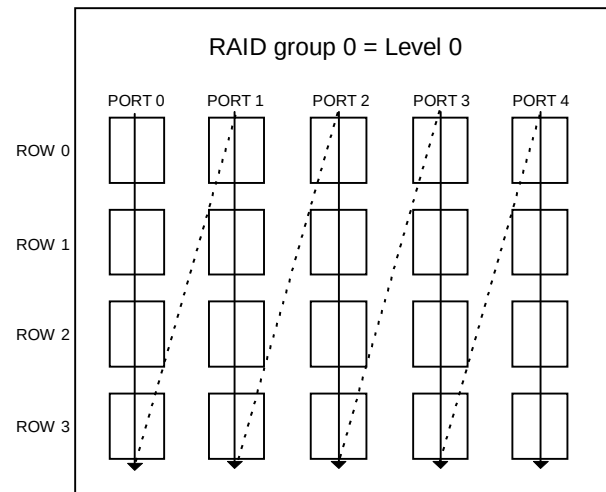
Notice : By deleting the RAID group all user data of the deleted RAID group is lost. Back up user data before deleting the RAID group.

RAID group and RAID level can be set as shown below by using this setting function.

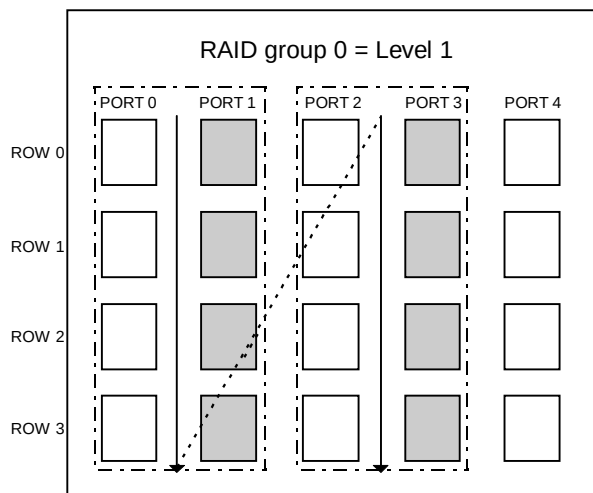
Setting one RAID group with the entire subsystem. (Arrows "↓" indicate the direction of storing data.)



The function stores data in the way executing the data striping over four disks and generating parity data on one disk.

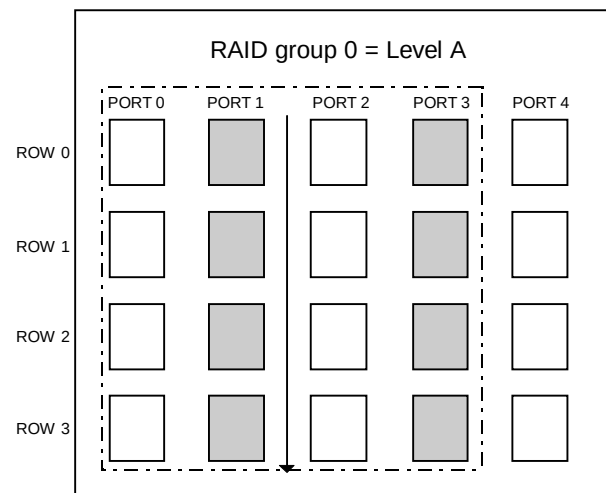


The function stores data without executing neither the data striping nor parity data generation.



The function stores data in the way doubly writing it on the main disk and sub-disk without executing the data striping.

□ : indicates a main disk
 ■ : indicates a sub-disk

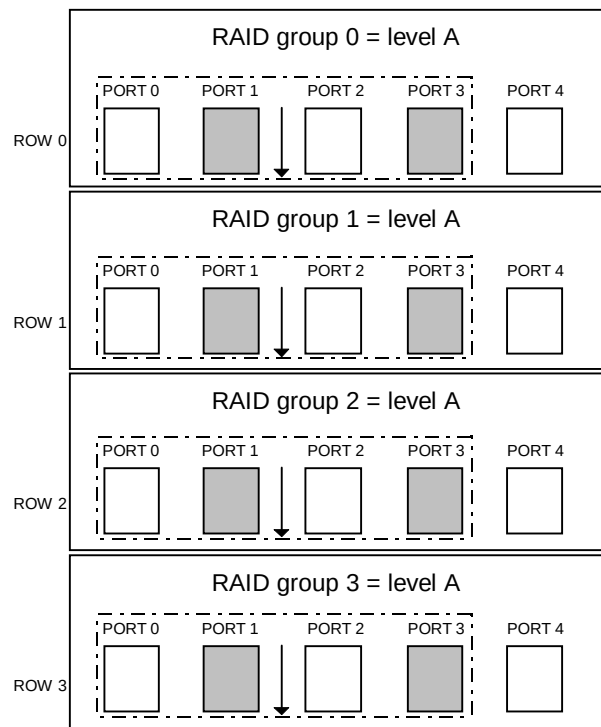
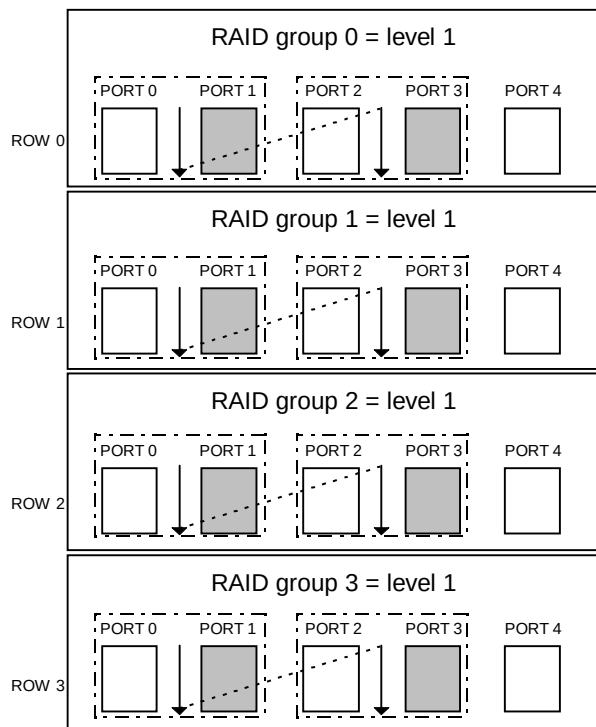
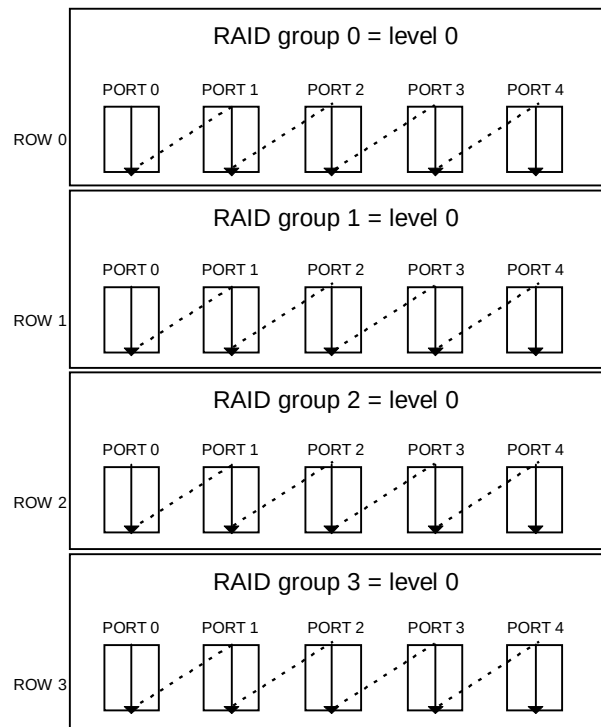
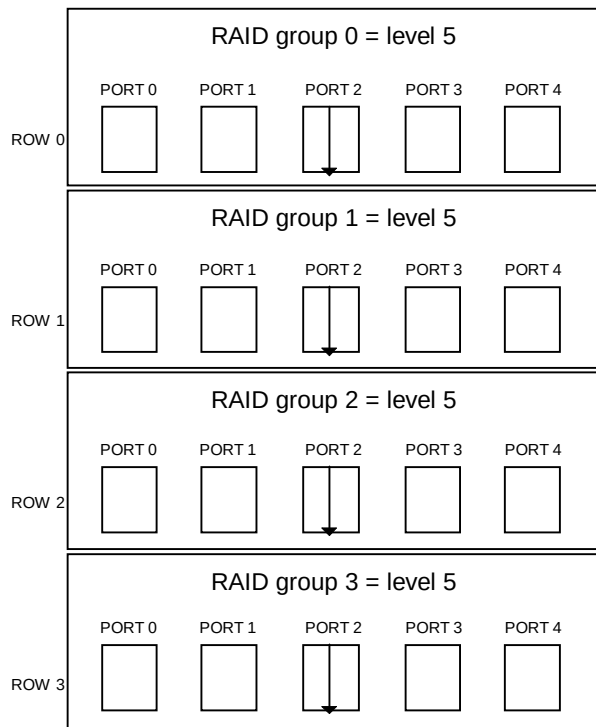


The function stores data in the way doubly writing it on the main disk and sub-disk and executing the data striping over two disks of port 0 and port 2.

□ : indicates a main disk
 ■ : indicates a sub-disk

Setting one RAID group with each row of disks (Arrows “↓” indicates the direction of storing data.)

Data cannot be stored extending over two or more RAID groups even if RAID levels of them are the same. The following are examples having set RAID groups of the same RAID level, however, each row has its own RAID level.



Setting the number of data disks when setting RAID level 5

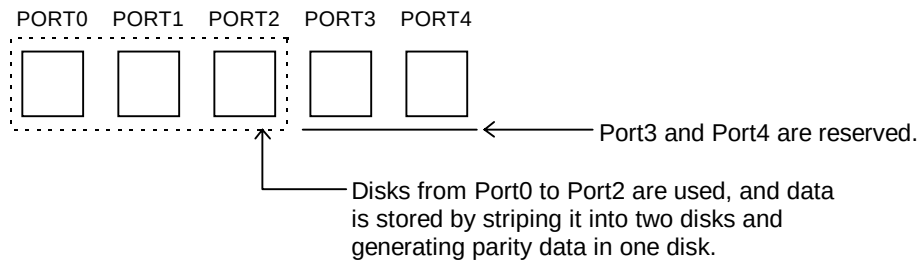
When Micro_Disk Ver.0305** (** is optional) or later is used, number of data disks can be selected from 2, 3 and 4 in the definition of RAID5.

(4 for the number of data disks and 1 for the number of parity disks are automatically set when 5 is set for RAID level in the case Micro_Disk Ver.0304** (** is optional) or earlier is used.)

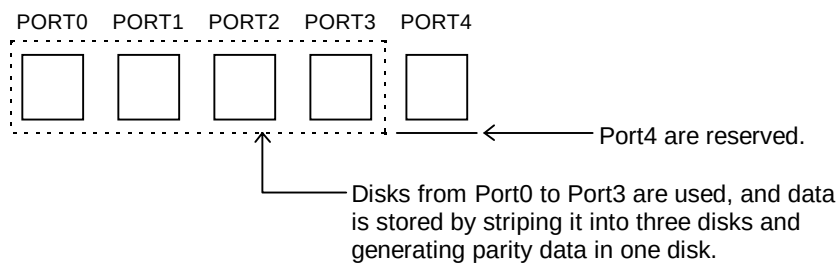
For the of setting procedure, see pages PANEL0380 or CK-INST0534.

The direction of data storage is the same as the conventional case in which the RAID level is 5. Setting is also same as before; the entire subsystem or each row can be set to one group. The following explains the overview of data storage using the example of setting each row to one group.

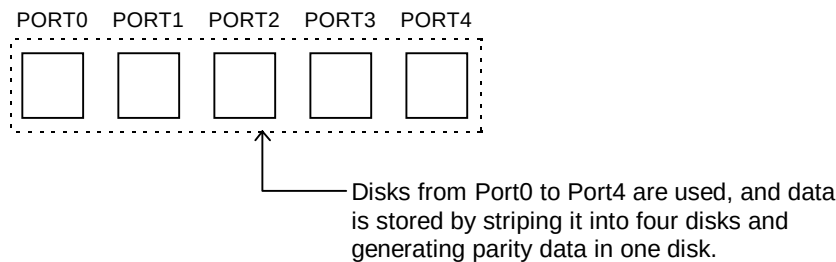
- (1) For the configuration of 2 data disks + 1 parity disk



- (2) For the configuration of 3 data disks + 1 parity disk

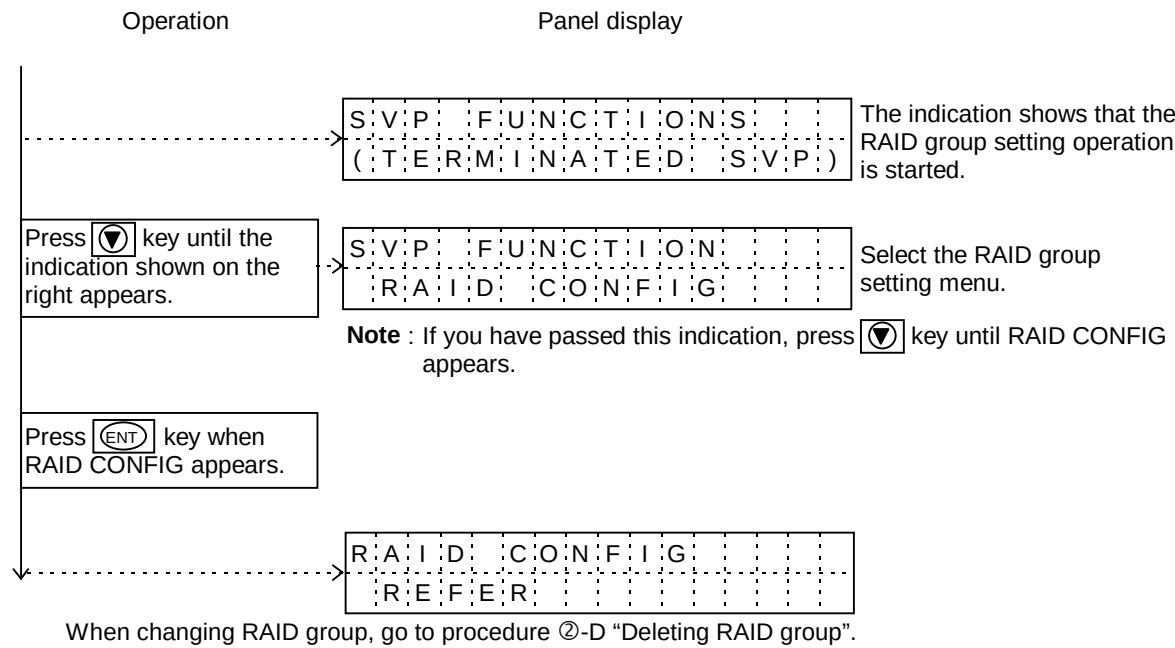


- (3) For the configuration of 4 data disks + 1 parity disk (same configuration as when RAID5 is defined using Micro_Disk Ver.0304** or earlier)

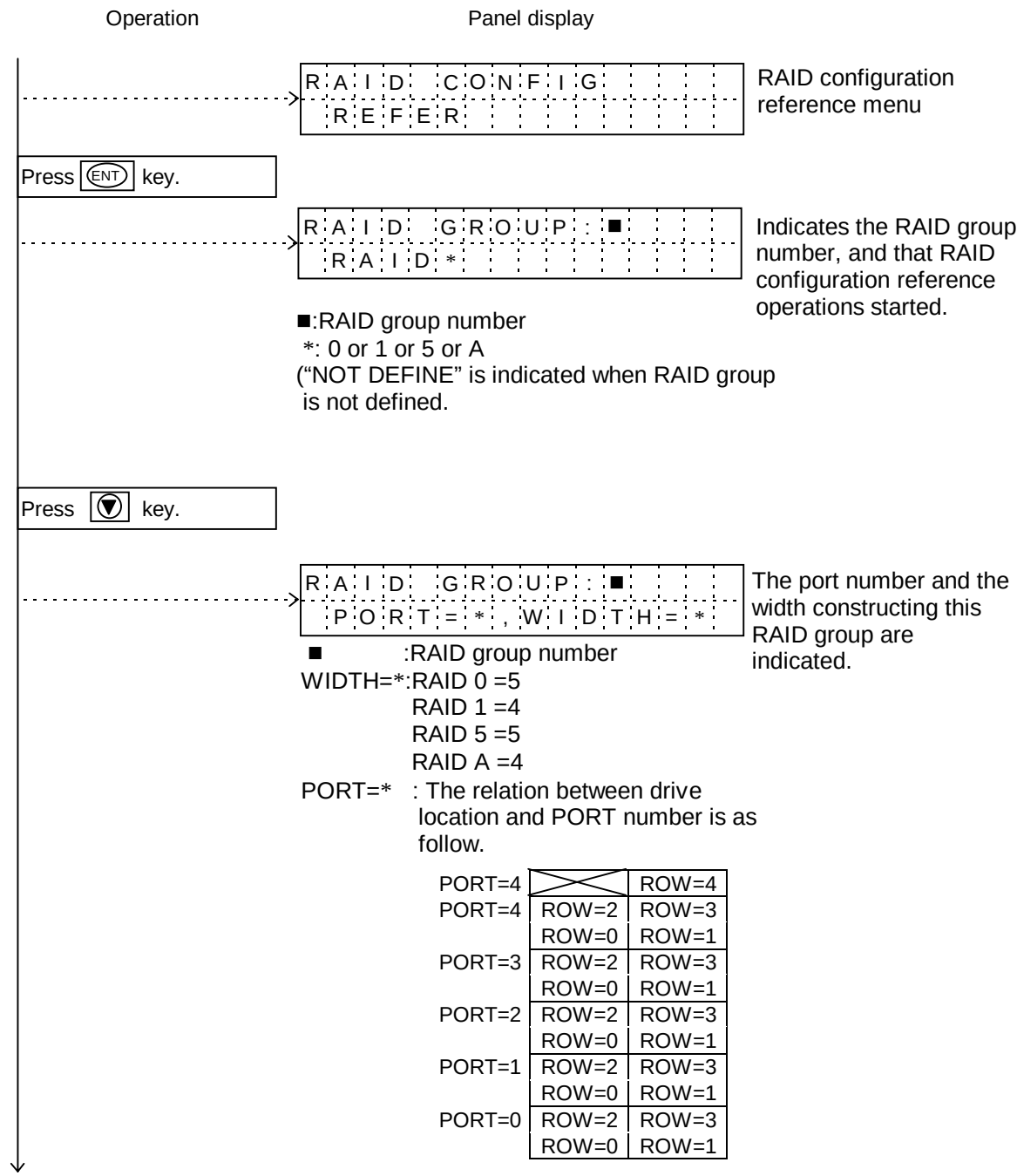


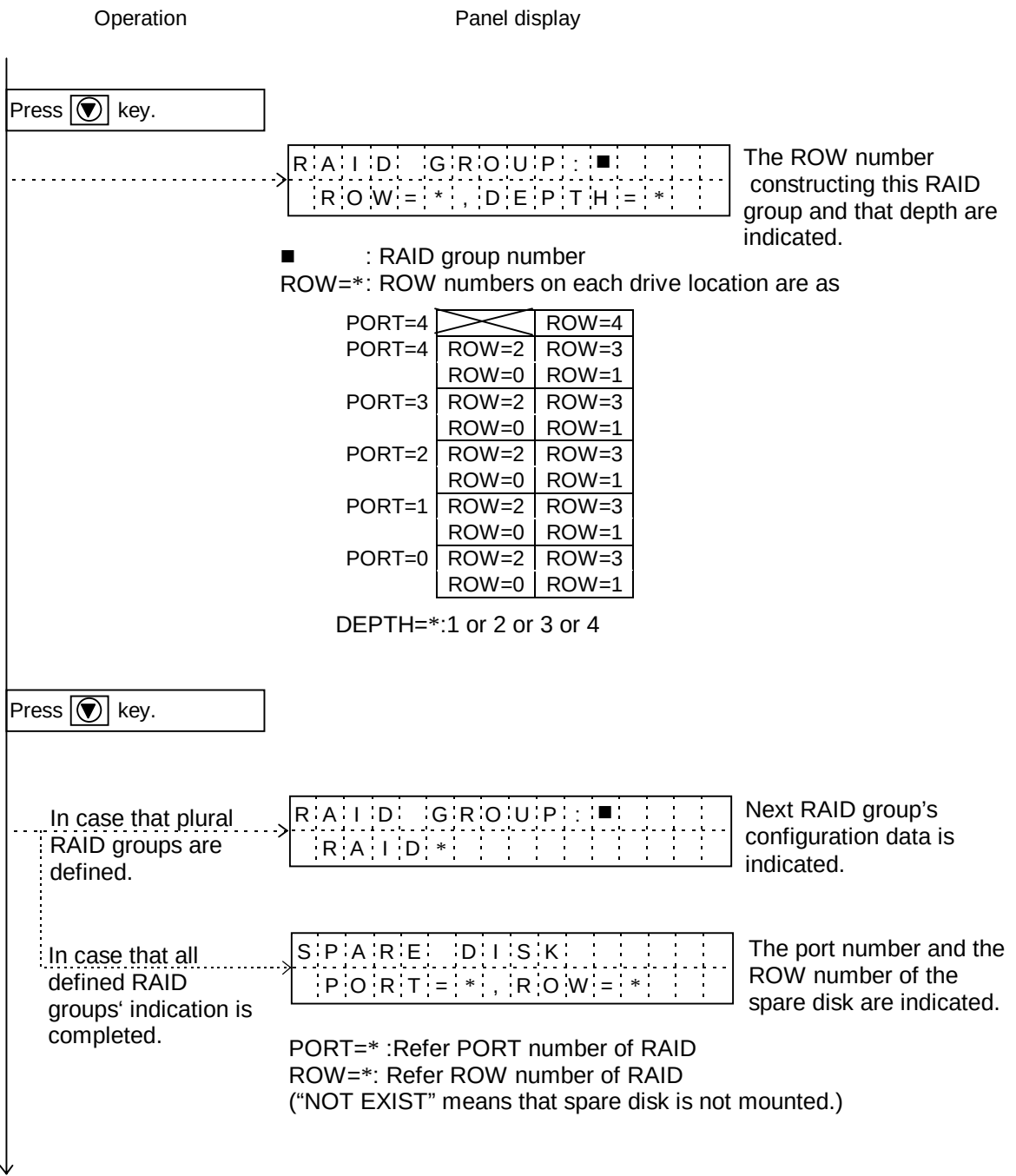
Notice : When changing the data disk configuration, be sure to start from re-definition of the RAID group. Accordingly, the stored data will be lost. So be sure to create a back up copy of the data when the configuration is changed.

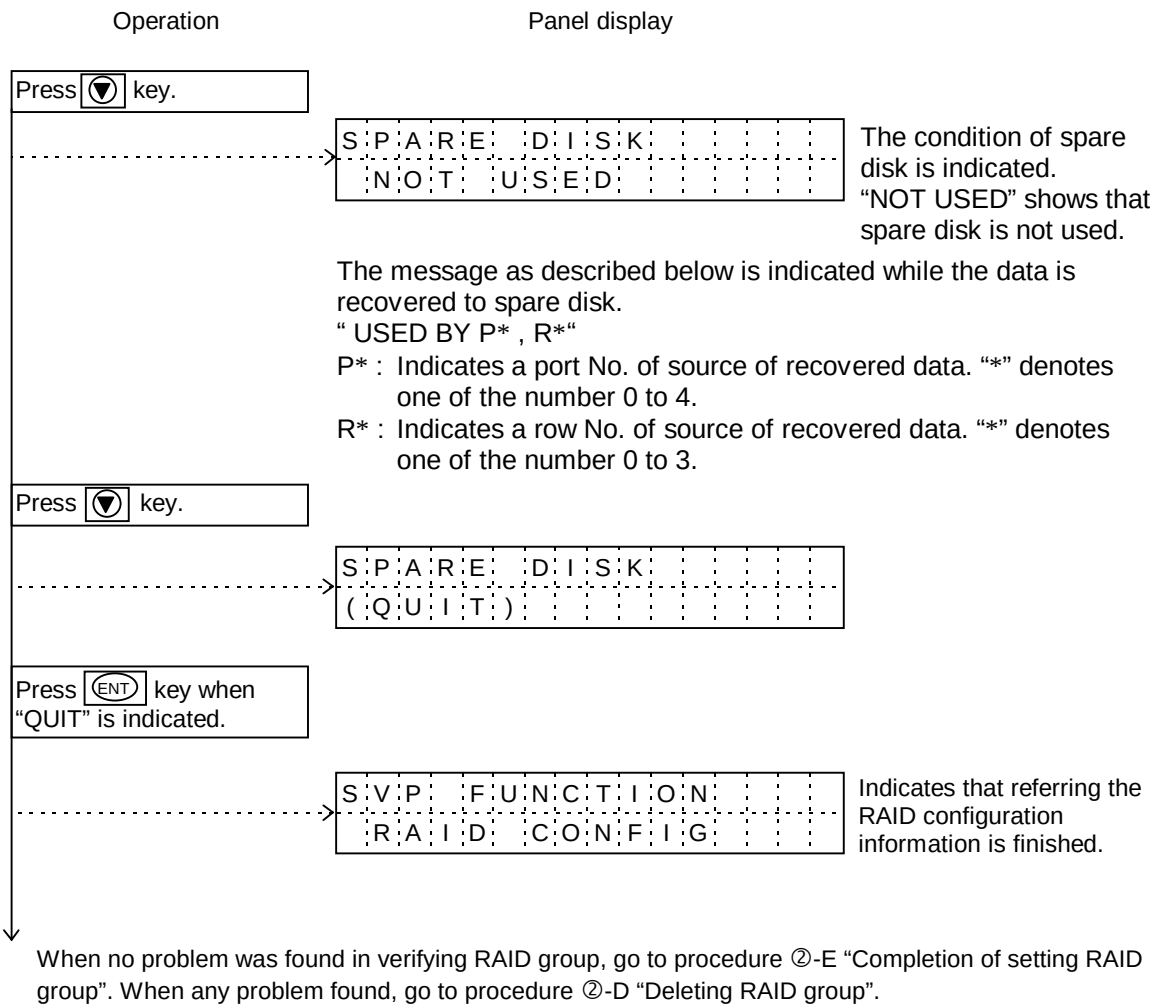
[Procedure②-A] Preparing of setting RAID group



[Procedure②-B] Verifying RAID group





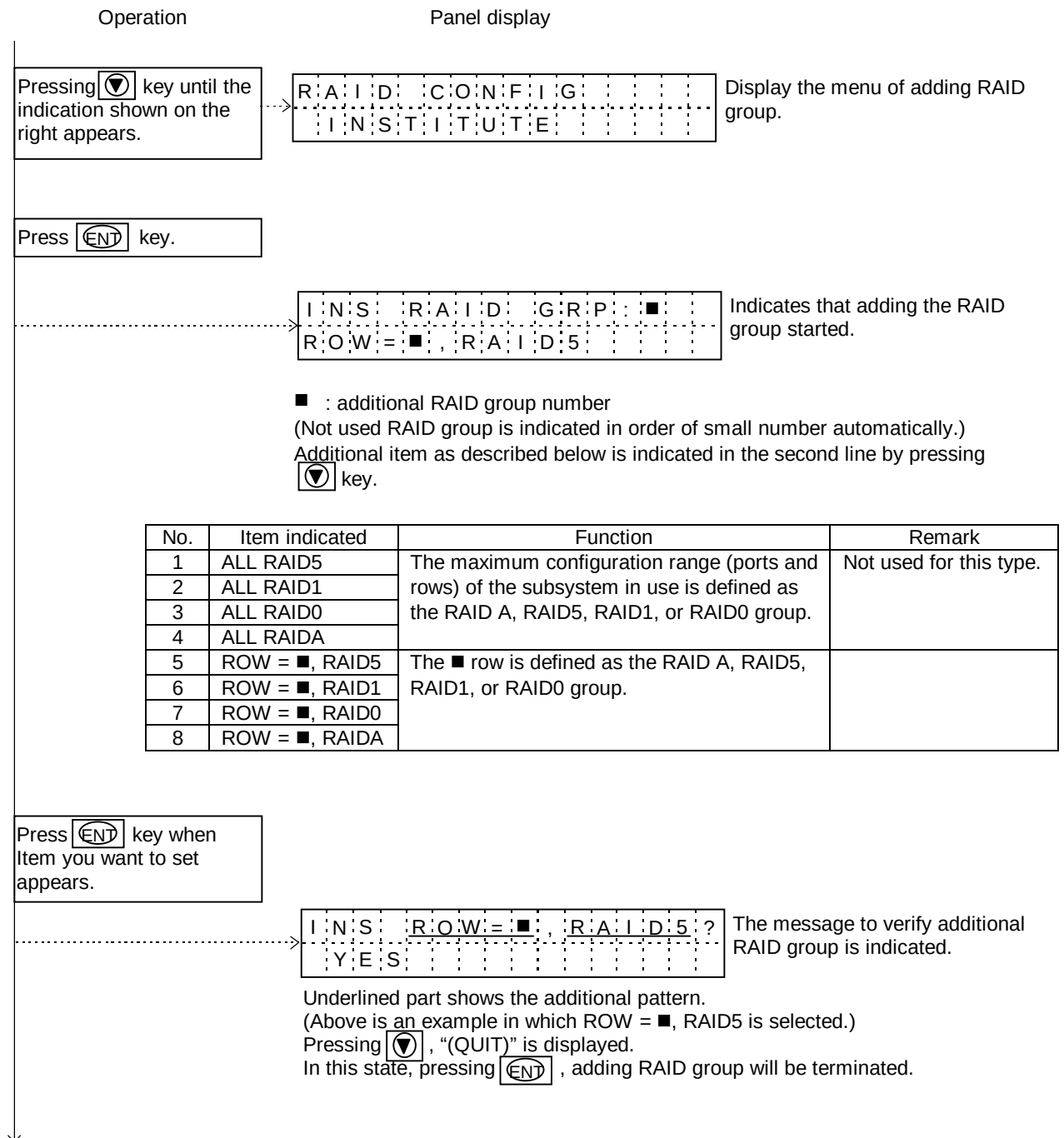


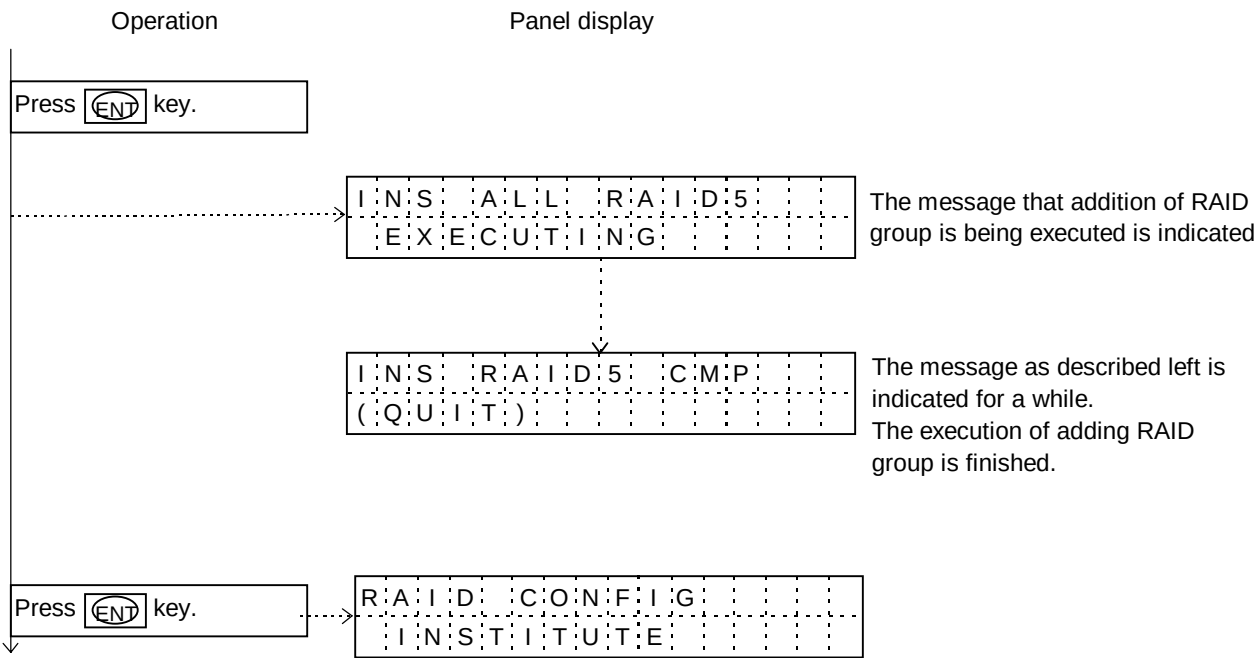
Operation for defining the RAID5 differs depending on whether the version of Micro_Disk is 0304** (** is optional) or earlier, or 0305** (** is optional) or later.

Confirm the version of Micro_Disk and operate in the way corresponds to it. (In the case of RAID0, RAID1 and RAIDA the operation is the same irrespective of the version of Micro_Disk.)

[Procedure②-C] Setting RAID group

(1) RAID group setting when the version is 0304** (**is optional) or earlier

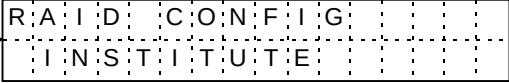
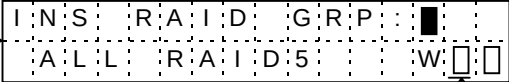
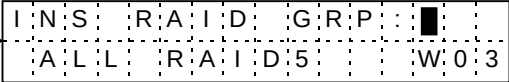


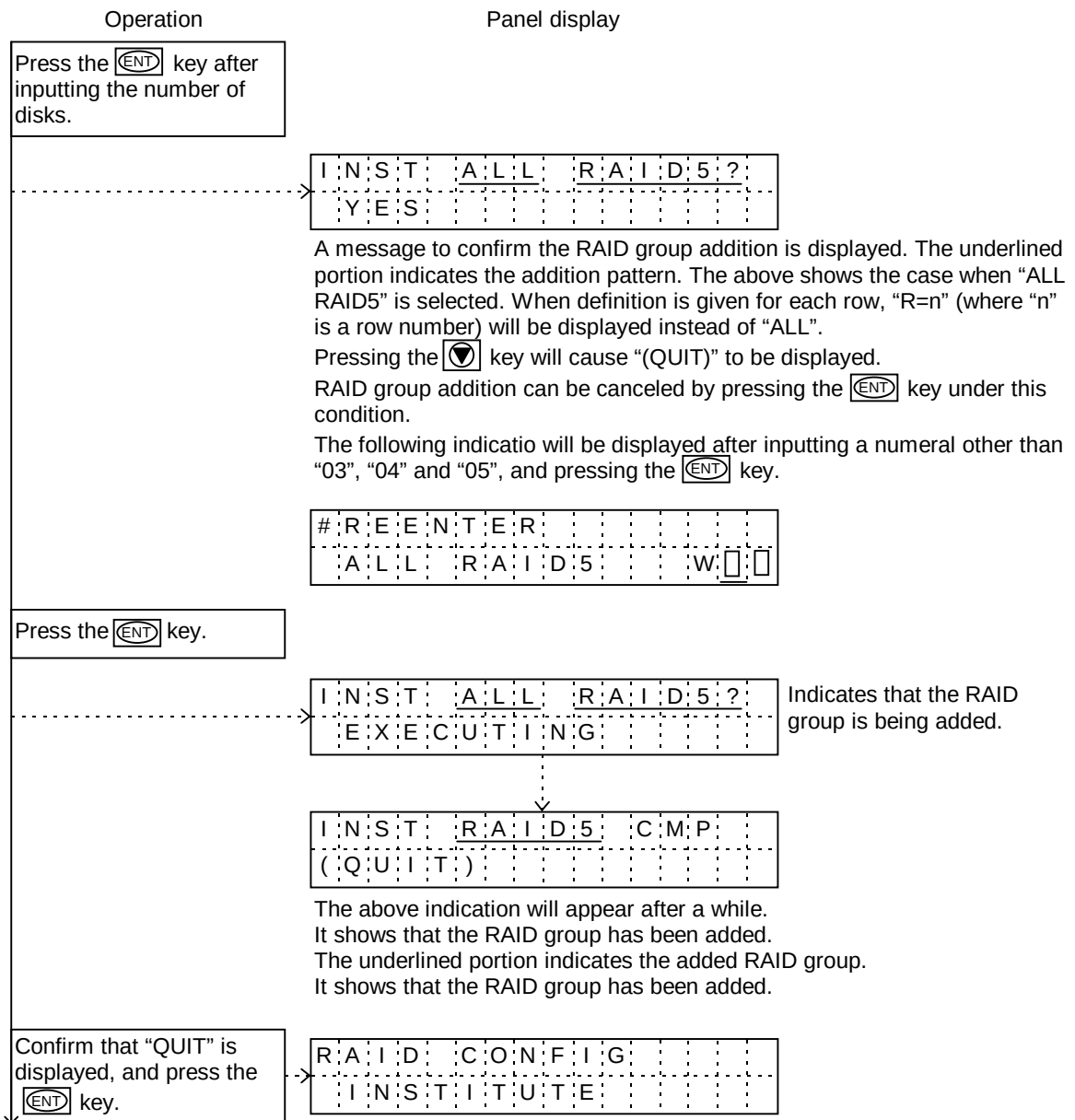


Go to procedure ②-B “Verifying RAID group”
Note : Set RAID group for each ROW when you want to set it for each ROW.

(2) RAID group setting when the version is 0305** (** is optional) or later

When Micro_Disk Ver.0305** (** is optional) or later is used, the number of disks including the parity disk must be input when defining RAID5. (This is not necessary for RAID0, 1 and A.)

Operation	Panel display																								
Press the  key repeatedly until the indication shown on the right appears.	 RAID group adding function menu is displayed.																								
Press the  key.	 Displays that RAID group adding operation has started. “<u> </u>” (underline) denotes the position to input the number of the disks including the parity disk. ■ : Displays the number of the RAID group to be added. (Reserved RAID groups are automatically displayed from a lower number.) On the second line, the following addition patterns are displayed sequentially by pressing the  key. <table border="1"> <thead> <tr> <th>No.</th> <th>Displayed pattern</th> <th>Purpose of use</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ALL RAID5 W□□</td> <td rowspan="4">Selected when the maximum subsystem configuration is defined as one RAID group.</td> <td rowspan="4"></td> </tr> <tr> <td>2</td> <td>ALL RAID1</td> </tr> <tr> <td>3</td> <td>ALL RAID0</td> </tr> <tr> <td>4</td> <td>ALL RAIDA</td> </tr> <tr> <td>5</td> <td>ROW=■, RAID5 W□□</td> <td rowspan="4">Selected when the RAID group is defined for each row. Replacing “■”, 0, 1, 2 and 3 are displayed sequentially.</td> <td rowspan="4"></td> </tr> <tr> <td>6</td> <td>ROW=■, RAID1</td> </tr> <tr> <td>7</td> <td>ROW=■, RAID0</td> </tr> <tr> <td>8</td> <td>ROW=■, RAIDA</td> </tr> </tbody> </table>	No.	Displayed pattern	Purpose of use	Remarks	1	ALL RAID5 W□□	Selected when the maximum subsystem configuration is defined as one RAID group.		2	ALL RAID1	3	ALL RAID0	4	ALL RAIDA	5	ROW=■, RAID5 W□□	Selected when the RAID group is defined for each row. Replacing “■”, 0, 1, 2 and 3 are displayed sequentially.		6	ROW=■, RAID1	7	ROW=■, RAID0	8	ROW=■, RAIDA
No.	Displayed pattern	Purpose of use	Remarks																						
1	ALL RAID5 W□□	Selected when the maximum subsystem configuration is defined as one RAID group.																							
2	ALL RAID1																								
3	ALL RAID0																								
4	ALL RAIDA																								
5	ROW=■, RAID5 W□□	Selected when the RAID group is defined for each row. Replacing “■”, 0, 1, 2 and 3 are displayed sequentially.																							
6	ROW=■, RAID1																								
7	ROW=■, RAID0																								
8	ROW=■, RAIDA																								
Make sure that the “ <u> </u> ” (underline) is placed at the top position and enter the numeral.	<table border="1"> <thead> <tr> <th>Configuration</th> <th>Panel key pressing sequence</th> </tr> </thead> <tbody> <tr> <td>2 data disks + 1 parity disk</td> <td> → </td> </tr> <tr> <td>3 data disks + 1 parity disk</td> <td> → </td> </tr> <tr> <td>4 data disks + 1 parity disk</td> <td> → </td> </tr> </tbody> </table>  The above shows the example when the configuration of two data disks + one parity disk is set.	Configuration	Panel key pressing sequence	2 data disks + 1 parity disk	 → 	3 data disks + 1 parity disk	 → 	4 data disks + 1 parity disk	 → 																
Configuration	Panel key pressing sequence																								
2 data disks + 1 parity disk	 → 																								
3 data disks + 1 parity disk	 → 																								
4 data disks + 1 parity disk	 → 																								



Go to procedure ②-B "Verifying RAID group"

Note : Set RAID group for each ROW when you want to set it for each ROW.

[Procedure②-D] Deleting RAID group

Notice : With this operation, Logical Units are deleted, and the user's data will be lost. Be sure to make back up copy before this operation.

Operation

Panel display

Press  key until the indication shown on the right appears.

RAID CONFIG
DELETE

Menu of deleting RAID group is displayed.

Press  key.

DELETE
ALL RAID

Contents of the second-line indication

No.	Item indicated	Function
1	ALL RAID	Deletes all RAID group.
2	RG■ (RAID■)	Deletes appointed RAID group. (■ : RAID group No. * : RAID level)
3	(QUIT)	Returns to the preceding menu.
4	(TERMINATE SVP)	Complete the SVP operation by maintenance panel.

Select item as described right you want to set by  /  key and press  key .

Note : "NO EFFECT" is indicated when no deletable RAID group exists.

Go to ① when you want to delete all RAID groups , Go to ② when you want to delete appointed RAID group.

①Deleting all RAID groups

Operation

Panel display

Select item as described right you want to set by  /  key and press  key .

Contents of the second-line indication

No.	Item indicated	Function
1	(QUIT)	Returns to the preceding menu.
2	YES	Deletes all RAID groups.

DEL ALL RAID?
(QUIT)

The message to verify the deletion of RAID group is displayed.

DEL ALL RAID
EXECUTING

All RAID groups are deleting.

DEL RAID CMP
(QUIT)

When the deletion is completed , the left indication appears.

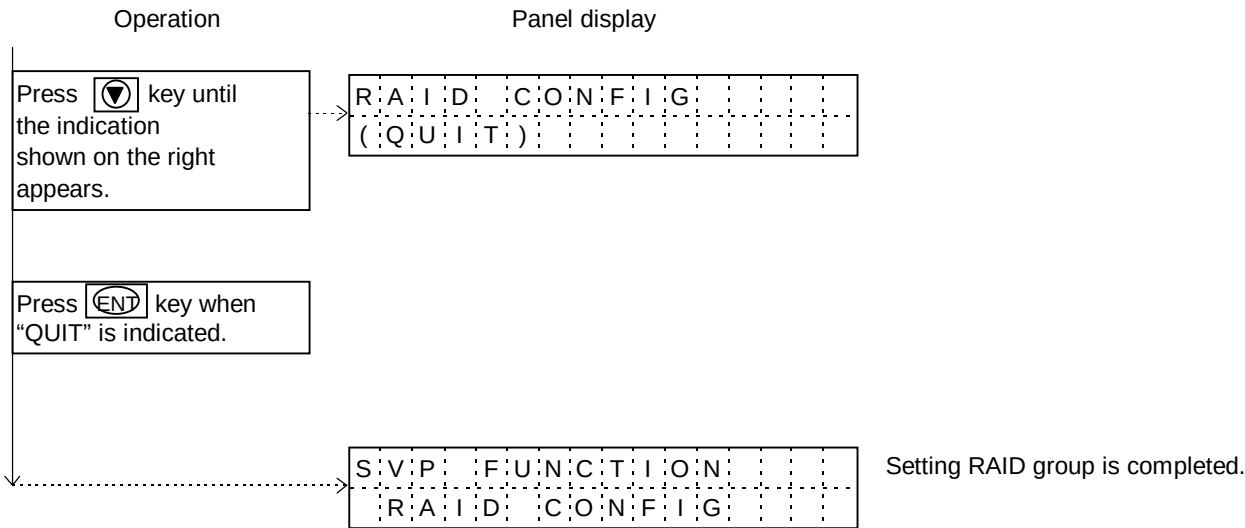
Select "QUIT" by  key and press  key.

RAID CONFIG
DELETE

Indicates deleting RAID group is completed.

Go to procedure ②-C "Setting RAID group".

Procedure②-E] Completion of setting RAID group

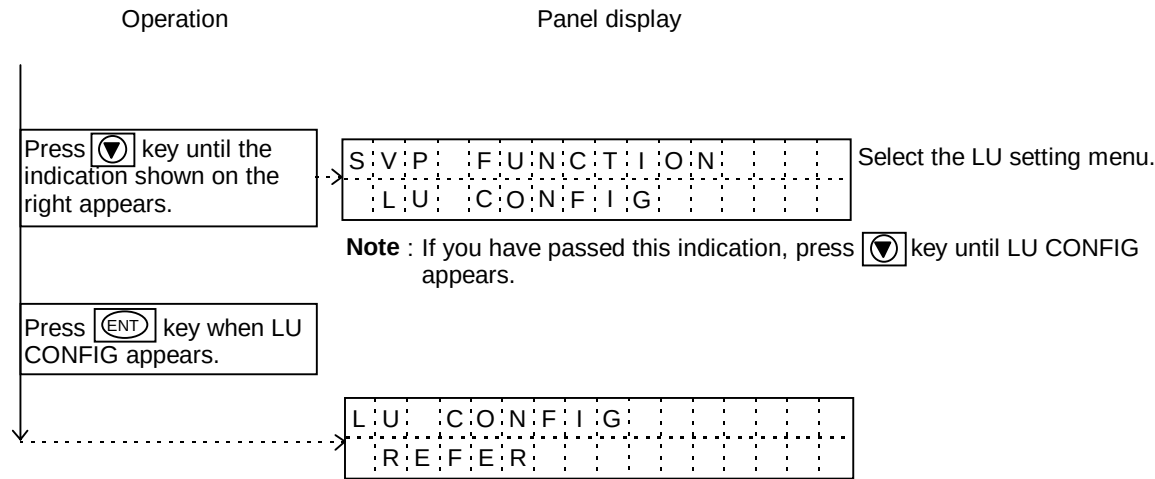


4.2.3 Setting LU

Following procedures are used to set, delete, refer, or format the LU.
This function can be used when the subsystem is ready.

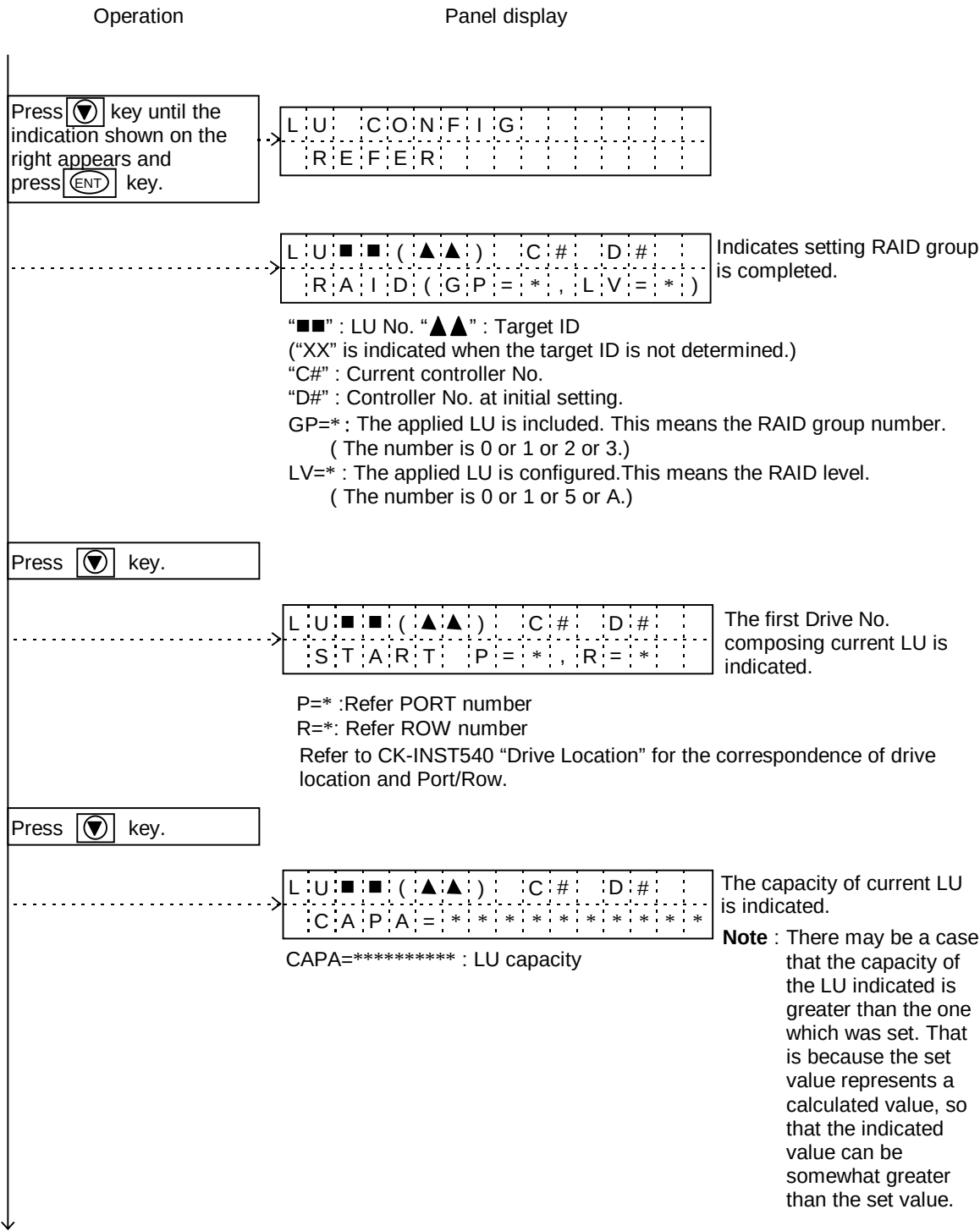
Notice : All user data is lost by deleting the LU.
Be sure to back-up the user data before deleting the LU.

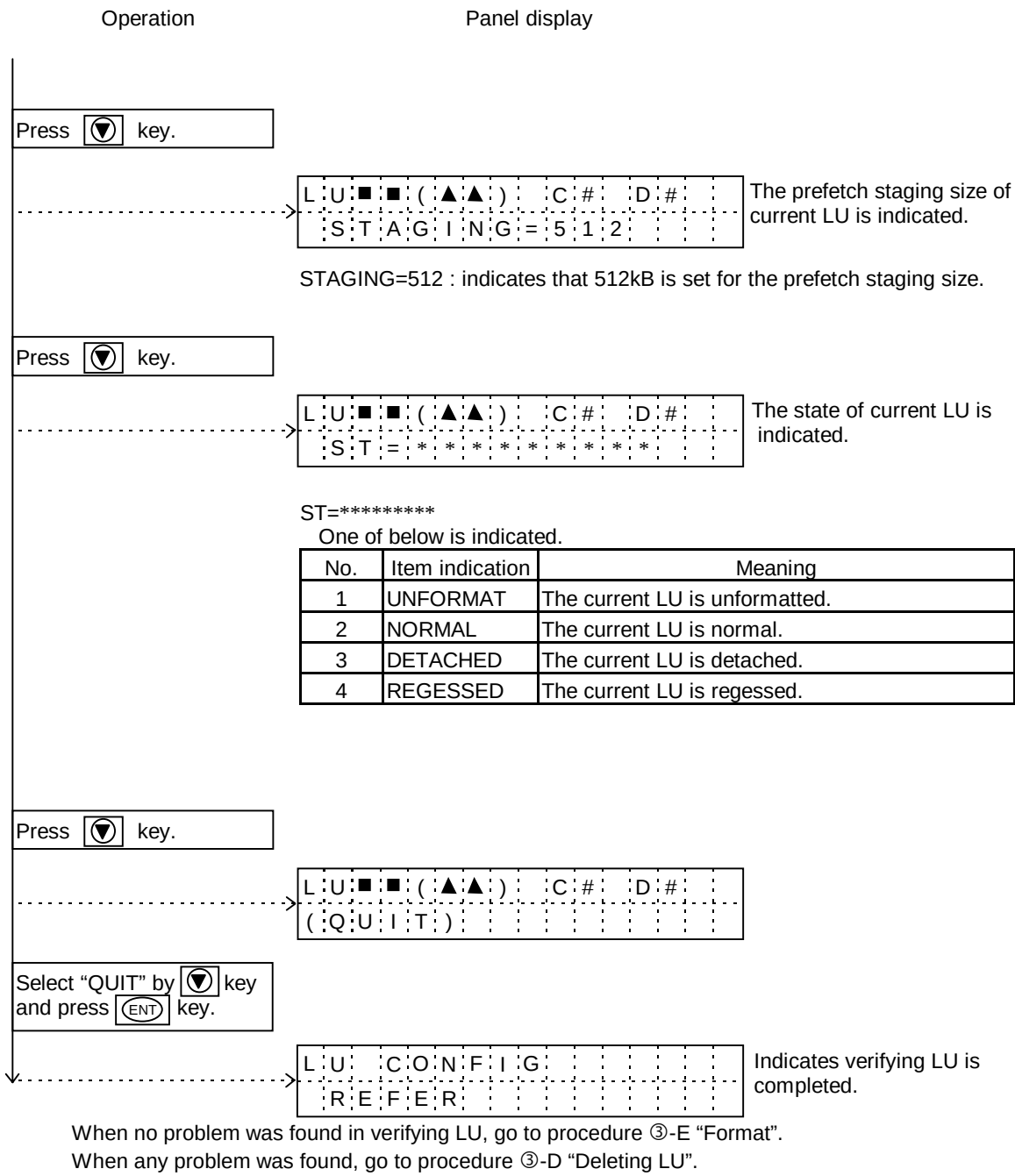
[Procedure③-A] Preparing of setting LU



When RAID group is already set, go to procedure ③-C “Setting LU”.
When changing no RAID group, go to procedure ③-D “Deleting LU”.

[Procedure③-B] Verifying LU





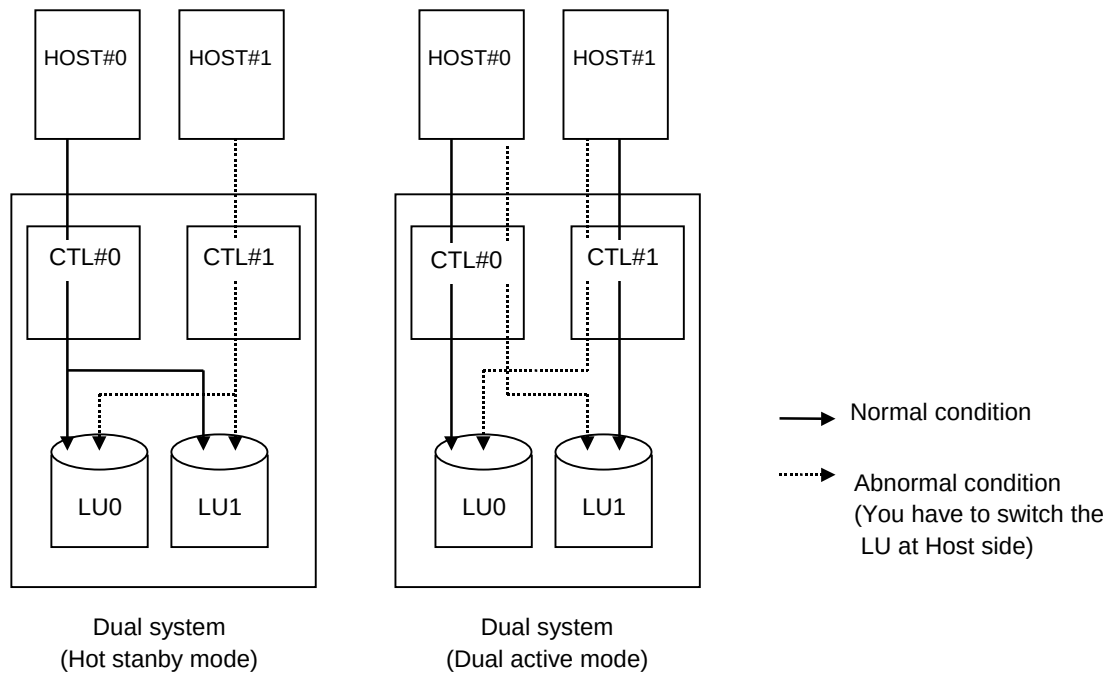
[Procedure③-C] Setting LU

In the case of example as described above, select “INSTITUTE (CTL0)” when you set LU0 and “INSTITUTE (CTL1)” when set LU1.

In case a service controller is assigned to LU#0 and #1, it is possible to access from HOST#0 and #1, however the data transmitting performance is lowered because of switching LU.

You have to assign service controller to set the LU when dual active mode is selected in the dual system.

Refer to the figure as described below to set the LU assigned service controller.

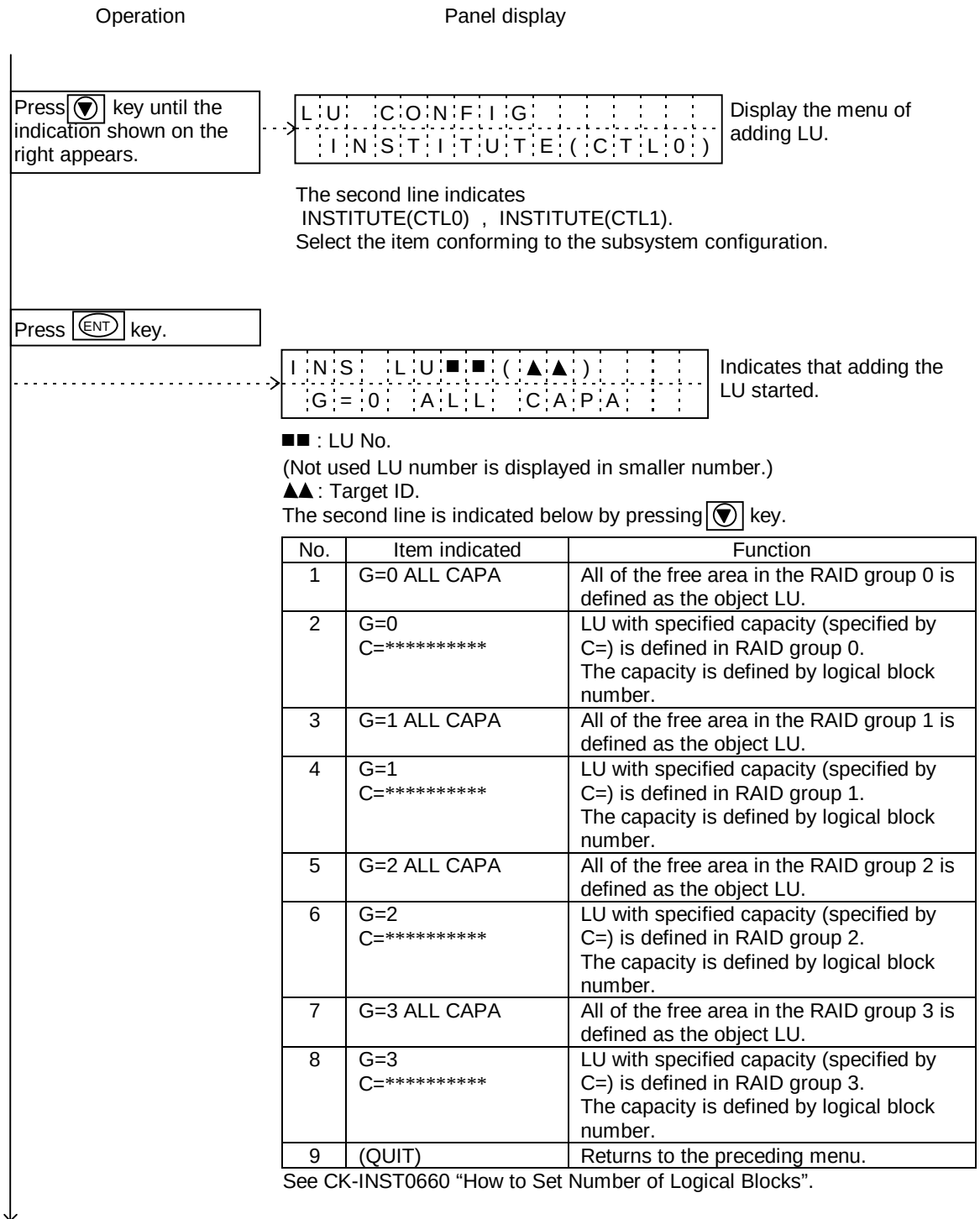


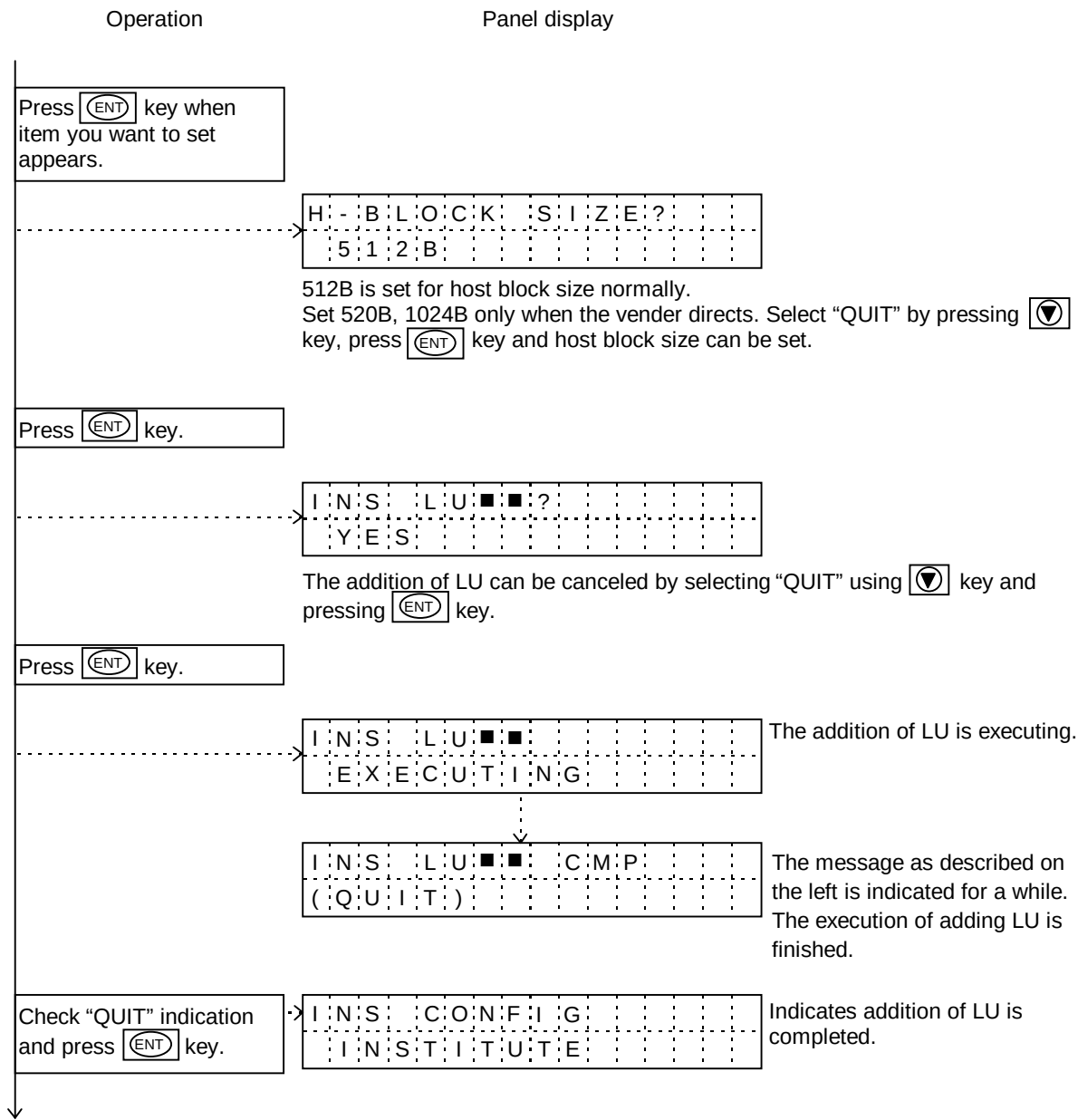
* The function of “Hot standby mode”.

It is possible that the system is continued to execute commands by switching the direction of the commands from Host system to the other controller, if the Host system or the controller failure occurs.

* The function of “Dual active mode”

Controller #0 and #1 are the service controller of LU#0 and #1 respectively.





Go to procedure ③-B "Verifying LU".
Note : Setting LU must be executed for every LUs.

Supplement / How to Set Number of Logical Blocks

G=*

C=*****



Enter a value (number of logical blocks) here.

- (1) All RAID groups can be divided into up to 8 logical units.
- (2) Set the number of logical blocks to be set for each logical unit to multiples of the following values according to the RAID level.

RAID0	128
RAID1	128
RAIDA	256
RAID5(4D+1P)	512
RAID5(3D+1P)	384
RAID5(2D+1P)	256

- (3) When dividing each RAID group into multiple logical units, the total number of blocks in each logical units must be set to the number of logical blocks per row as shown below or less.
- (4) The following lists the number of logical blocks per row.

① When five drives are mounted on a row;

(4disks in the case of RAID1, RAIDA and RAID5 (3D+1P); 3disks in the case of RAID5 (2D+1P))

Model (Capacity) RAID configuration	DF-F350-A2E2 (2.0GB)	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4 (4.1GB)	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A (8.7GB)	DF-F350-A1E18 (17.8GB)
RAID0	20,200,960	40,652,160	85,085,440	174,681,600
RAID1/RAIDA	8,080,384	16,260,864	34,034,176	69,872,640
RAID5(4D+1P)	16,160,768	32,521,728	68,068,352	139,745,280
RAID5(3D+1P)	12,120,576	24,391,296	51,051,264	104,808,960
RAID5(2D+1P)	8,080,384	16,260,864	34,034,176	69,872,640

②When n drives are mounted on a row (n < 5);

- RAID0

Number of logical blocks = $m^{(*1)} \times n^{(*2)}$

- RAID1

Number of logical blocks = $m^{(*1)} \times \text{int}(n/2)^{(*3)}$

*1: Refer to the table below for m.

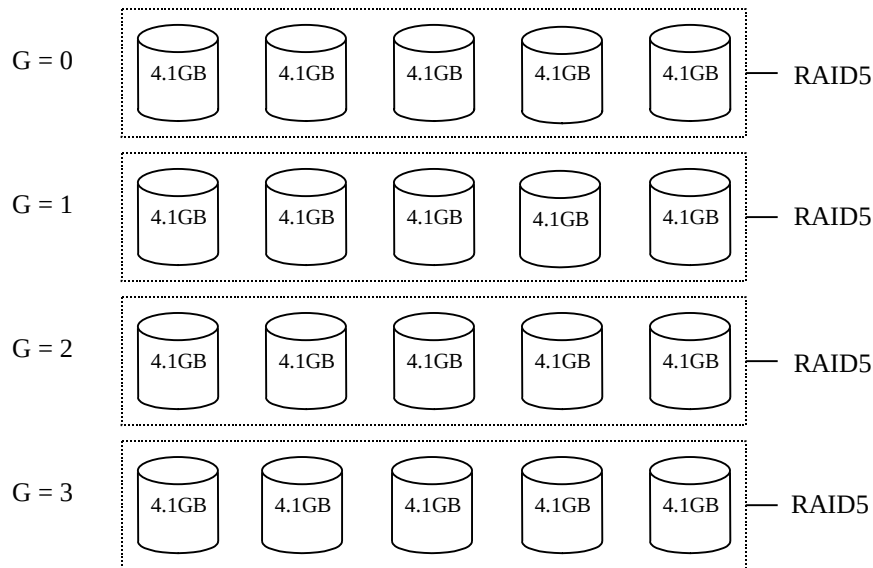
*2: n is 2 or larger in this case.

*3: int means "rounding down".

	DF-F350-A2E2	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	DF-F350-A1E18
Capacity	(2.0GB)	(4.1GB)	(8.7GB)	(17.8GB)
m	4,040,192	8,130,432	17,017,088	34,936,320

(5) Examples of the number of logical blocks set are shown below.

Example ① To divide a system of drives (4.1 GB × 20 units) into eight logical units;



Groups 0 to 3 are all defined as RAID5 and all the groups are divided into eight logical units each with almost the same capacity. Each group is thus divided into two logical units.

- Group 0

Since the number of logical blocks for RAID5 is taken as 32,521,728 ($512 \times 63,519$) from subsection ① of (4), the result becomes $63,519 \div 2 \approx 31,760$.

Thus, enter the following.

LU0: G=0

C=16,261,120 ($512 \times 31,760$)

LU1: C=16,260,608 ($512 \times (63,519 - 31,760)$)

- Groups 1 to 3

Enter LU2 to LU7 in the same way as for Group 0.

LU2 : G=1

C=16,261,120

LU3 : C=16,260,608

LU4 : G=2

C=16,261,120

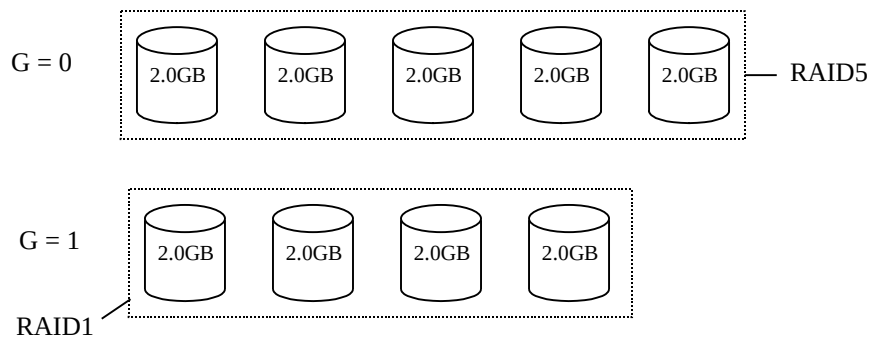
LU5 : C=16,260,608

LU6 : G=3

C=16,261,120

LU7 : C=16,260,608

Example ② To divide a system of drives (2.0 GB $\times$ 9 units) into five logical units;



The following shows an example in which a mixture of different RAID levels is used between Group 0 and 1, and each group is divided into logical units with a capacity different from each other.

- Group 0

Since the number of logical blocks for RAID5 is taken as 16,160,768 ($512 \times 31,564$) from subsection ① of (4), Group 0 is divided into three LUs as shown below.

Enter the following.

LU0 : G=0

C=800,768($512 \times 1,564$)

LU1 : C=5,120,000($512 \times 10,000$)

LU2 : C=10,240,000($512 \times (31,564 - 1,564 - 10,000)$)

- Group 1

Since the number of logical blocks for RAID1 is calculated as $4,040,192 \times \text{int}(4/2) = 8,080,384$ ($128 \times 63,128$) from subsection ② of (4), Group 1 can be divided into two LUs as shown below.

Enter the following.

LU3 : G=1

C=2,960,384($128 \times 23,128$)

LU4 : C=5,120,000($128 \times (63,128 - 23,128)$)

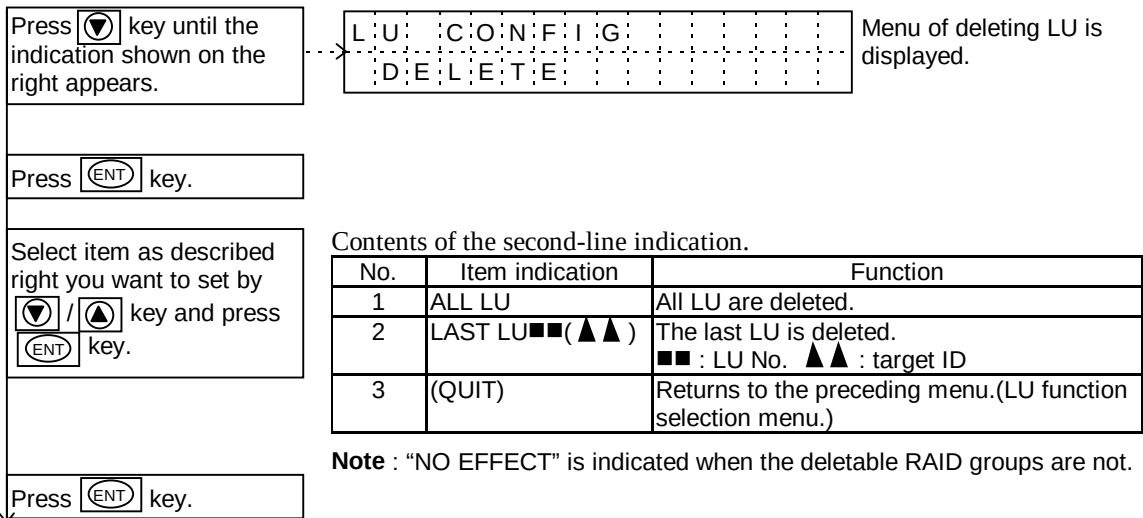
[Procedure③-D] Deleting LU

Note : All user data is lost by deleting the LU.

Be sure to back-up the user data before deleting the LU.

Operation

Panel display



In case of deletion of all LU, go to ①.

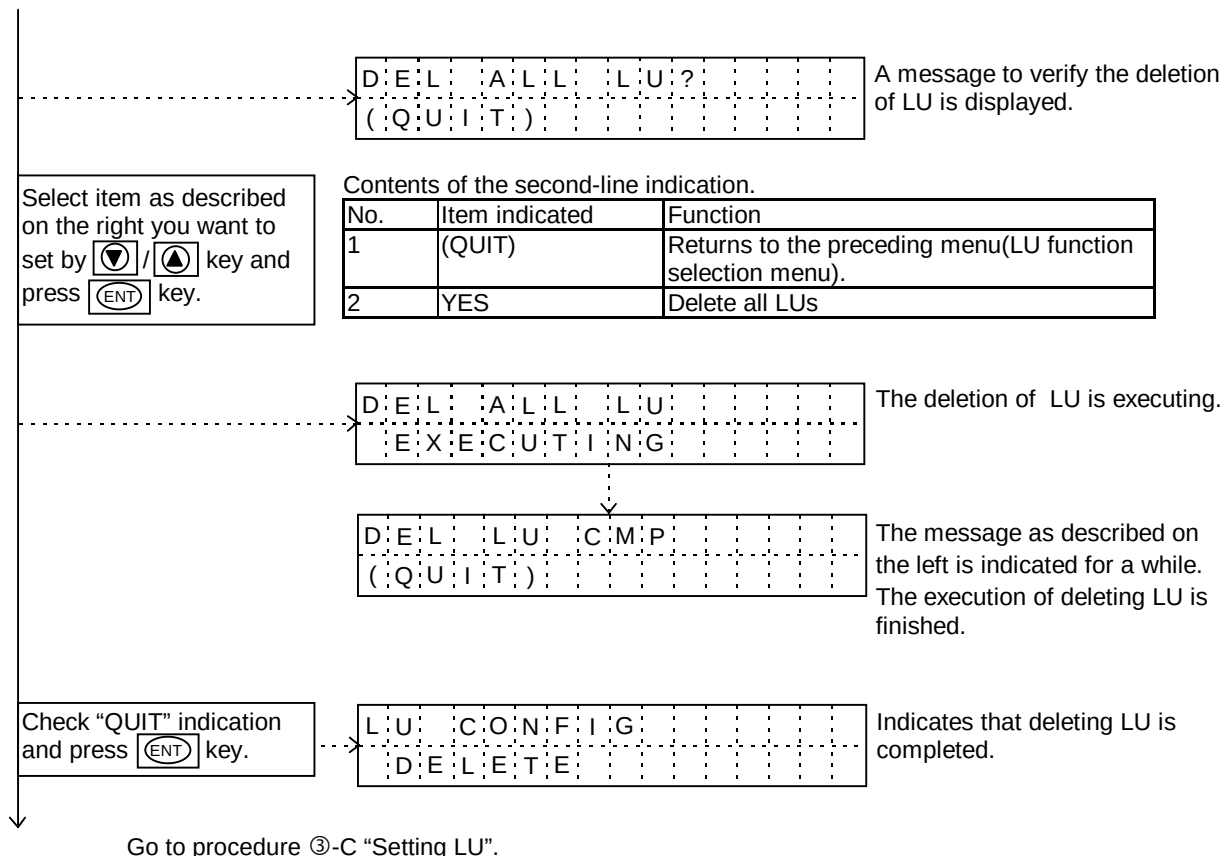
In case of deletion of the last LU, go to ②.

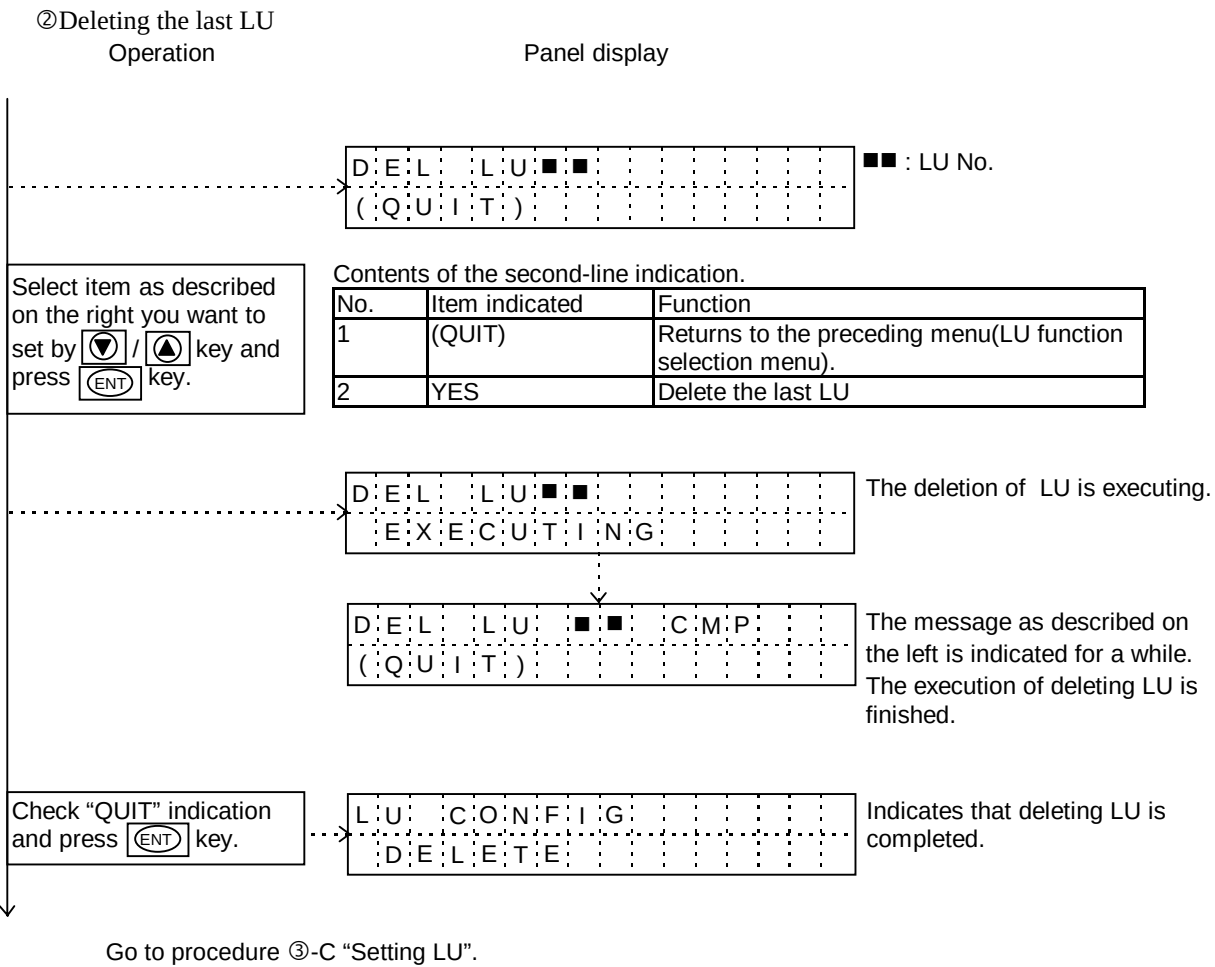
To cancel this operation menu, choose QUIT.

①Deleting all LU

Operation

Panel display



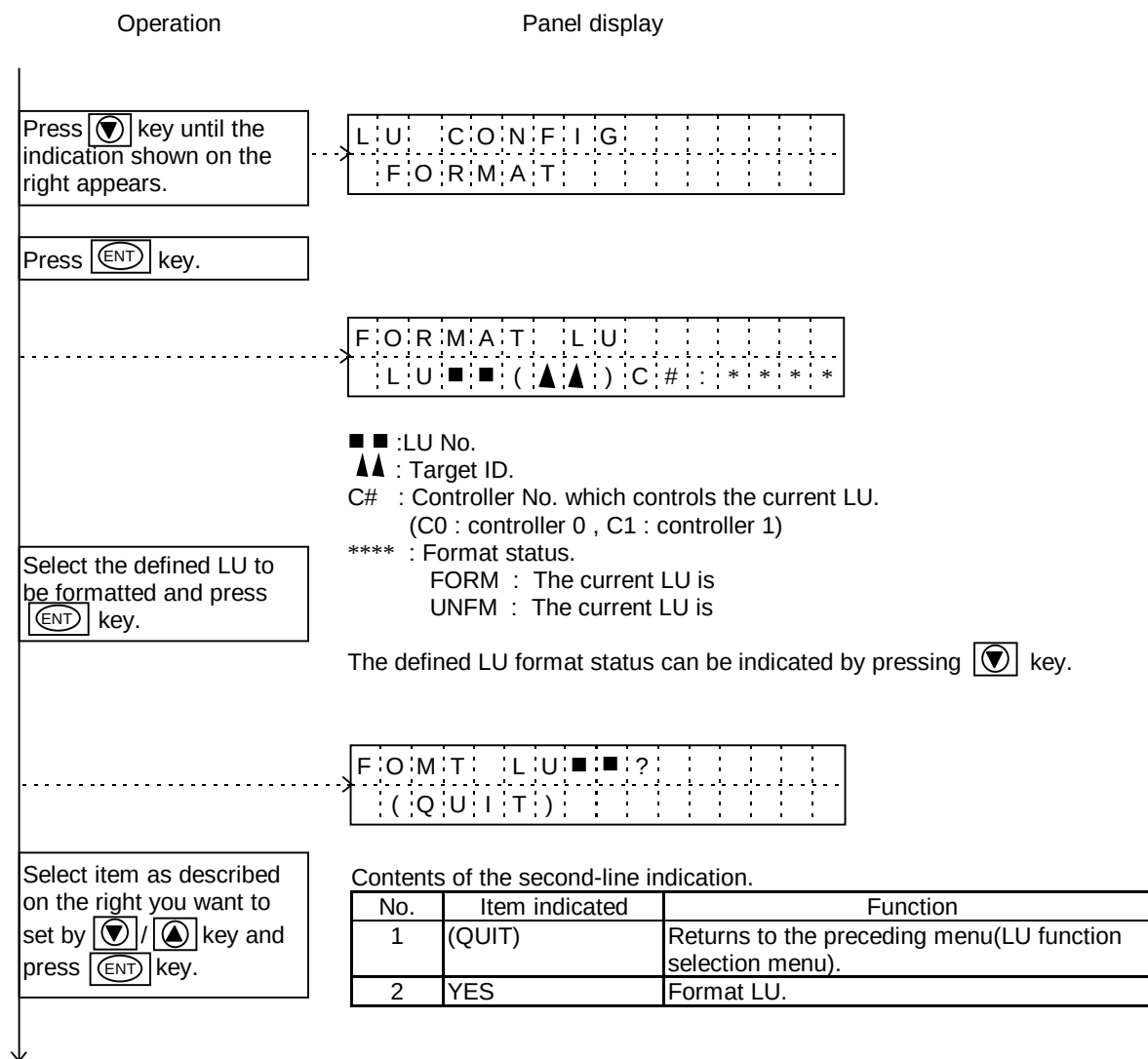


[Procedure③-E] Formatting

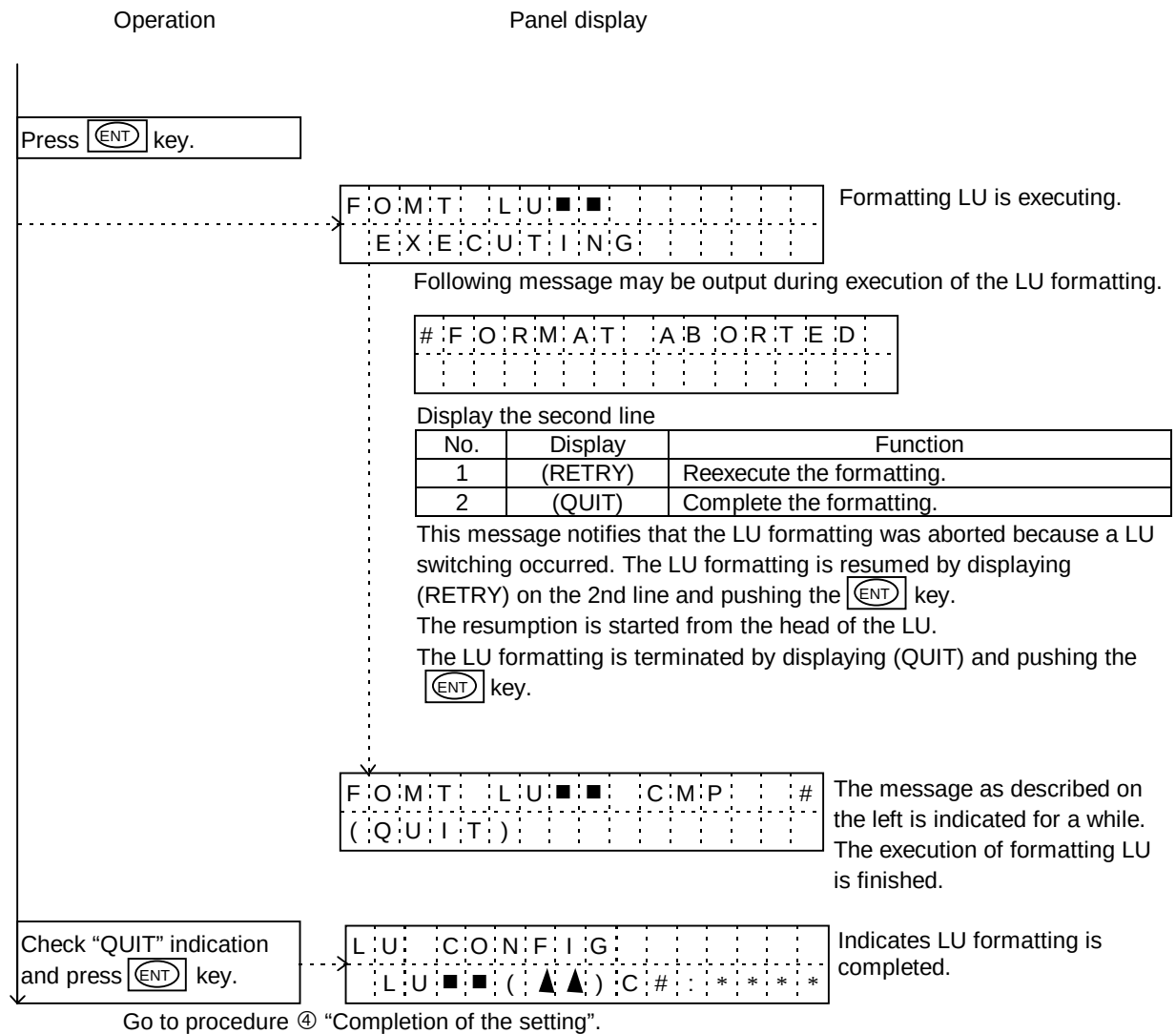
Notice : Note that user data will be lost by formatting the formatted LU.

Besides, be sure to execute the LU formatting for each set LU. When the microprogram of version 0304 or later is used, read/write access from the upper device is possible to the LUs other than that being formatted. Accordingly, the formatting for the LU newly added can be executed while executing usual jobs after the addition of the row(s) following the procedures explained on pages CK-OPTION0210 - 0300.

However, a reexecution is needed because the LU format is canceled when the subsystem receives a SCSI reset from the upper device.

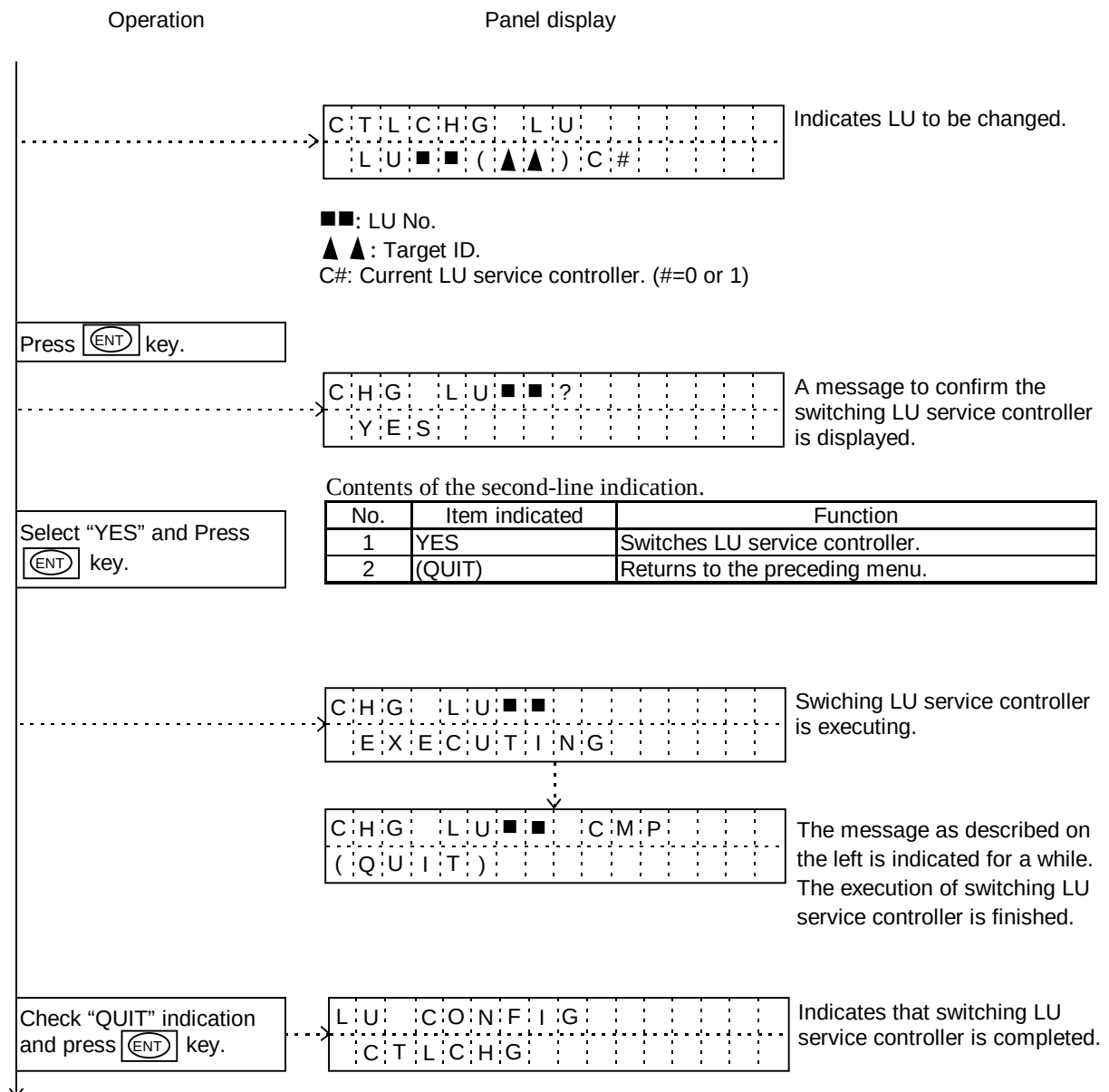


Note : LU format must be executed every set LUs.



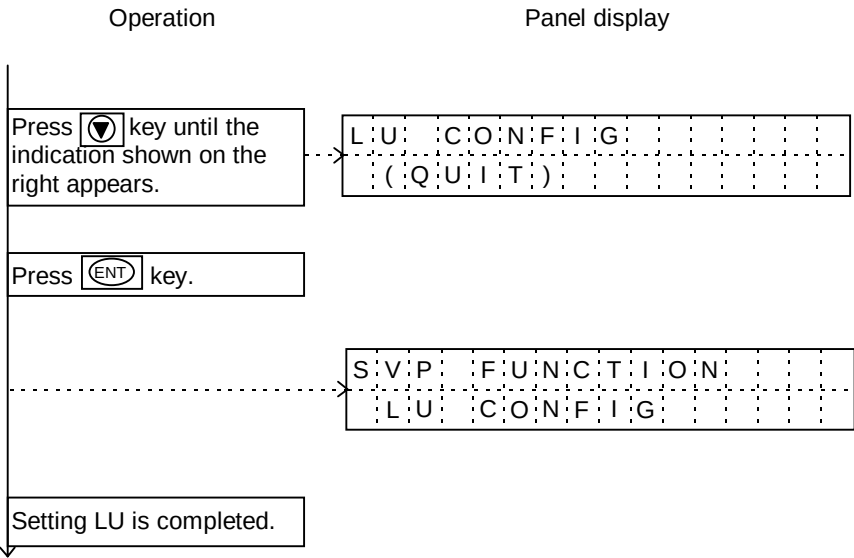
[Procedure③-F] Switching LU service Controller

Note : This function can be used when dual active mode in the dual system is set.



Note : Turn on the power of the subsystem again to make valid switching LU service controller.

[Procedure④] Completion of the setting



LU setting for dual controller configuration

In the case of dual controller configuration(Dual active mode), each LU has to be allocated to a controller which controls that LU in the LU setting operation.

But in the case of dual controller configuration(Hot standby mode), all LU are automatically allocated to the controller #0. (When one of the controllers is blocked, all LU are automatically allocated to the other controller.)

4.2.4 Setting other parameter

The menu items and the use are shown below. Refer to PANEL chapter (PANEL0340) to change the parameter shown below. The function shown below can be used when the subsystem is ready and the LU#0 is already defined.

No.	Menu item	Use	Description	Setting before shipment
1	RAID CONFIG	RAID configuration information reference/setting menu	① Reference to RAID configuration information ② Definition of RAID group ③ Deletion of RAID group	
2	LU CONFIG	LU configuration information reference/setting menu	① Reference to LU configuration information ② Definition of LU ③ Deletion of LU ④ Formatting of LU ⑤ Switching LU service controller	
3	SYSTEM OPT (CUR)	System option setting (Only a current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time	
	SYSTEM OPT (SVD)	System option setting (A saved value and current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time ⑨ Setting of the job time-out limit ⑩ Setting of the number of detections in the execution of the reselection time-out ⑪ Setting of the TRESPASS mode (*1)	
4	DRIVE MAINTEN	Drive maintenance menu	① Instruction of drive detaching ② Instruction of drive recovery ③ Reference to drive data recovery status ④ Drive self diagnosis ⑤ Parity matching check ⑥ ECC check ⑦ LA check ⑧ Drive format ⑨ Recovery of system information ⑩ Reference of the disk failure statistical information.	

*1 : This menu is displayed only when ALTERNATE PATH3 has been set by SPECIAL CONNECT of the system parameter.

No.	Menu item	Use	Description	Setting before shipment
5	MICRO VER/REV	Microprogram version/revision numbers reference menu	① Reference to microprogram version/revision	
6	GATHERING (CTL0)	Gathers information of the controller #0 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
7	GATHERING (CTL1)	Gathers information of the controller #1 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
8	MEMORY MAINT	Memory content reference/update menu	① Reference/update of memory content	
9	RECV ERR INFO	Error display of recovery when the power is on	① Displays the errors occur during recovery operation performed while power is on	
10	PIN INFO	Display of PIN existence of every LU	① Display of PIN data existence	
11	WARNING INFO	Display of unrecovered warning information	The current warning information is indicated	
12	CLEAR LOG(CT0)	Clearing log information of controller #0	Log information related controller and host I/F is cleared	
13	CLEAR LOG(CT1)	Clearing log information of controller #1	Log information related controller and host I/F is cleared	
14	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

5. Changing the Configuration

5.1 Shifting to Hot Standby from Dual Active

Shifting to Hot Standby from Dual Active while the controller is blocked cannot be performed. Perform the shifting after the blockage is recovered. If PIN segment exists, shifting cannot be performed. Perform the shifting after the PIN segment is recovered.

To see if PIN segment exists, refer to PANEL chapter (PANEL0700 (8)).

(1) Before turning the power on, set DIP switch No.4 as Figure 5.1.1.

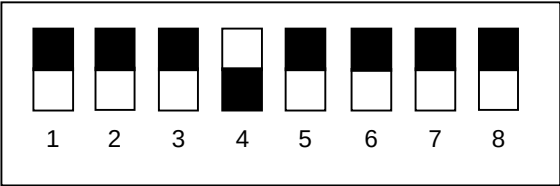
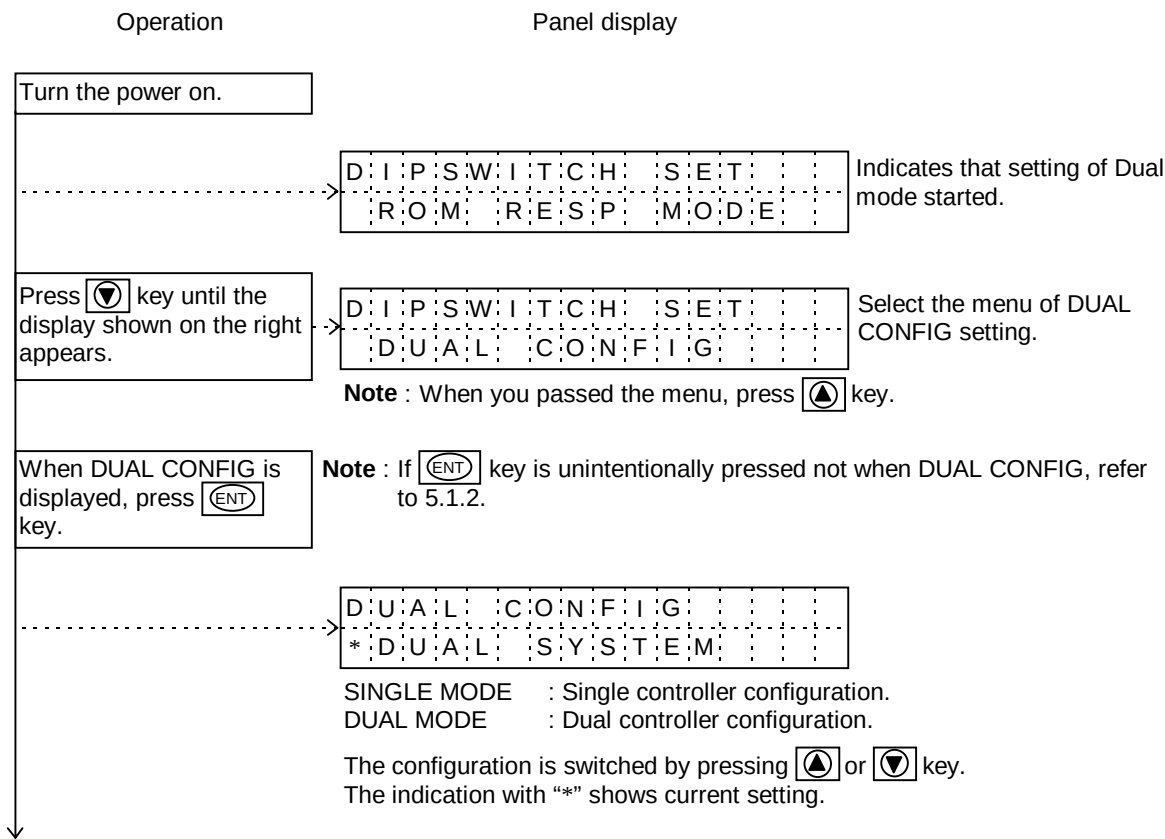
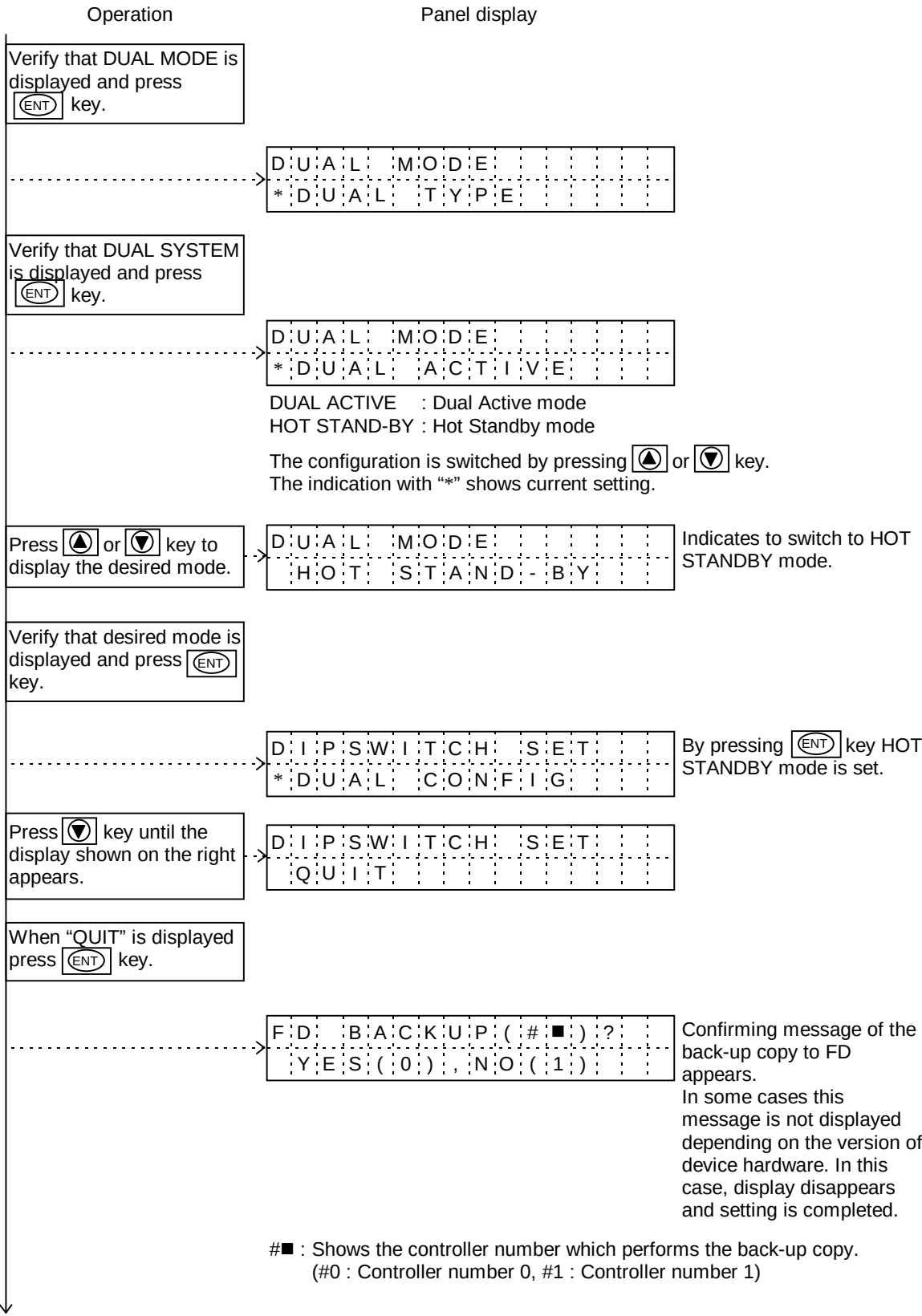
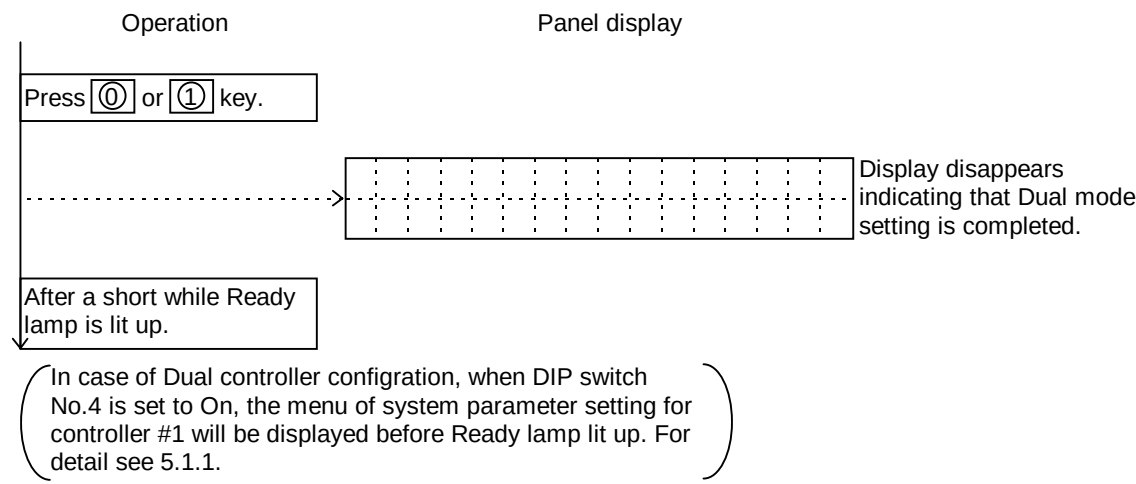


Figure 5.1.1 DIP switch for shifting to Dual system

(2) Perform as the procedure shown below.







(3) Set DIP switch No.4 as Figure 5.1.2. (Shifting to Dual System has not started yet.)

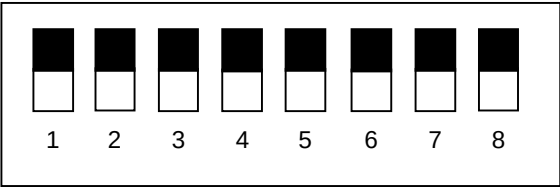
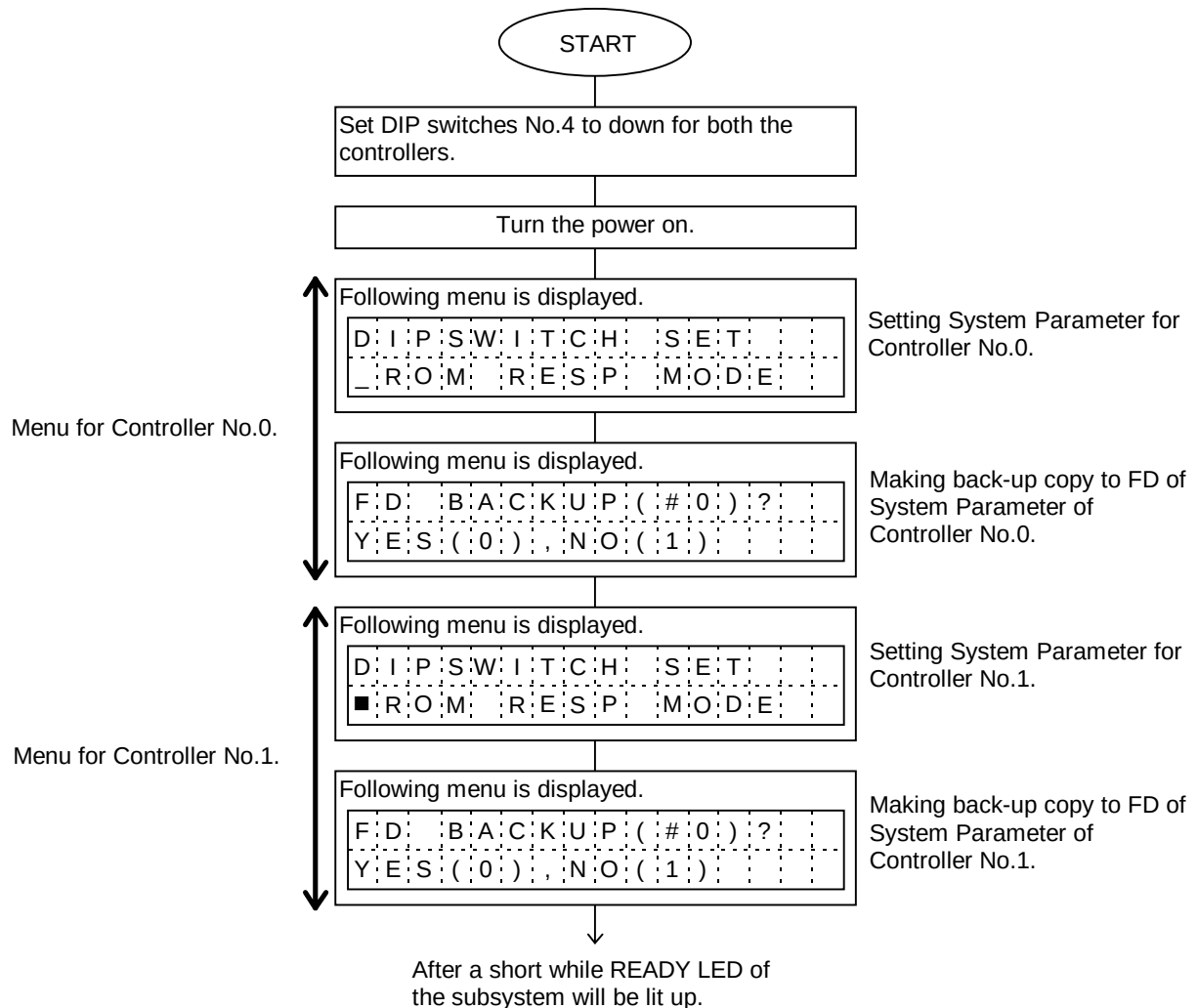


Figure 5.1.2 DIP Switch, shifting to Dual System has not started yet.

- Note 1 :** When setting Dual mode under dual controller, the setting of controller No.0 will be valid. The setting of controller No.1 will be ignored.
- Note 2 :** After switching to Dual Active configuration from Hot Standby configuration, Controller No.0 will be the LU Service Controller for previously set LU. To switch LU Service Controller No.1, see “6 PANEL Chapter” (PANEL0570 (4-5)).

5.1.1 Operation of system parameter setting menu under dual controller configuration

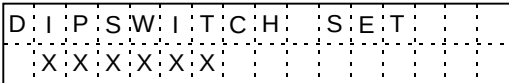
Set DIP switches No.4 to down for both controllers under dual controller configuration, and turn the power off to set the information on EEPROMs of both the controllers.



Note : In case one of DIP switches No.4 is set to down under dual controller configuration, after completion of menu setting for the corresponding controller, READY LED of the subsystem will be lit up.

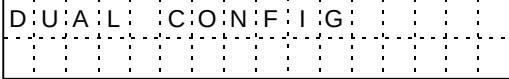
5.1.2 Returning procedure in system parameter setting menu

During system parameter setting menu when wrong menu is selected ( key is pressed), the method of returning for each menu is shown below.

After the operation below  is displayed.

(XXXXXX : Wrongly selected menu)

Then select desired menu by pressing  or  key.

No.	Menu	Procedure to return
1	ROM RESP MODE	Press  key.
2	WRITE&VERIFY	Press  key.
3	STRIPE SIZE	Press  key.
4	LAN CONST	Press  key to display “QUIT” and press  key.
5	TARGET ID	Press  key.
6	CONNECT AS/400	When NOT CONNECT : Press  key. When CONNECT AS/400 : Press  key, and after displaying “QUIT”, press  key.
7	CONNECT VMS	Press  key.
8	SPECIAL CONNECT	Press  key.
9	SAVE DATA PTR	Press  key.
10	HOST BLK SIZE	Press  key.
11	ERROR INF	Press  key.
12	CONTROLLER	Press  key.
13	SPARE DISK	Press  key.
14	SERIAL NO	Press  key.
15	ROM V/R	Press  key.
16	RAM V/R	Press  key.
17	CONTROLLER NAME	Press  key.
18	ROW LAST LBA	When Menu is ROW LAST LBA : Press  key to display “QUIT”, then press  key.
19	BUZZER	Press  key.
20	SYSTEM ERROR	Press  key.
21	GENERATE SYS	Press  key.
22	INQUIRY INF	Press  key to display “QUIT” and press  key.
23	DUAL CONFIG	Press  key until  is displayed.
24	LU SIZE	Press  key.
25	SYNC CONTROL	Press  key.
26	SYS REV	Press  key.
27	OPTION	Press  key.
28	BOOT PROG V/R	Press  key.
29	RTC SET	Press  key to display “QUIT(ENT KEY)” and press  key.

6. Subsystem Settings for Use in Special Modes

6.1 When Using I/O Path Switching Function in the State Being Connected to IBM RS6000

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to IBM RS6000, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.1.1.

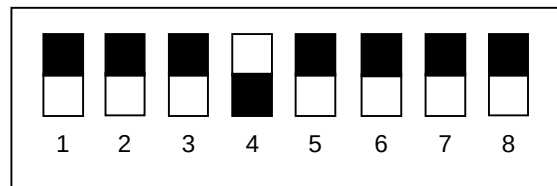
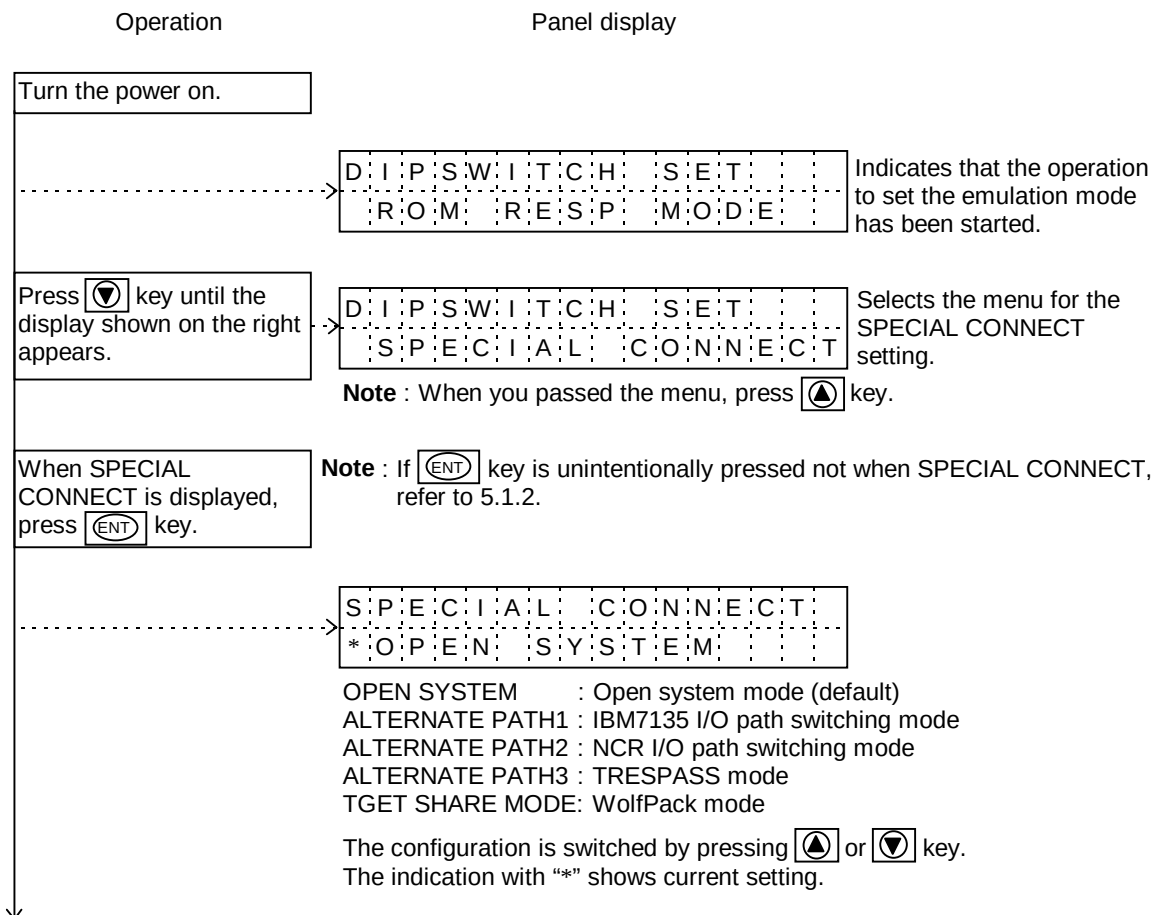
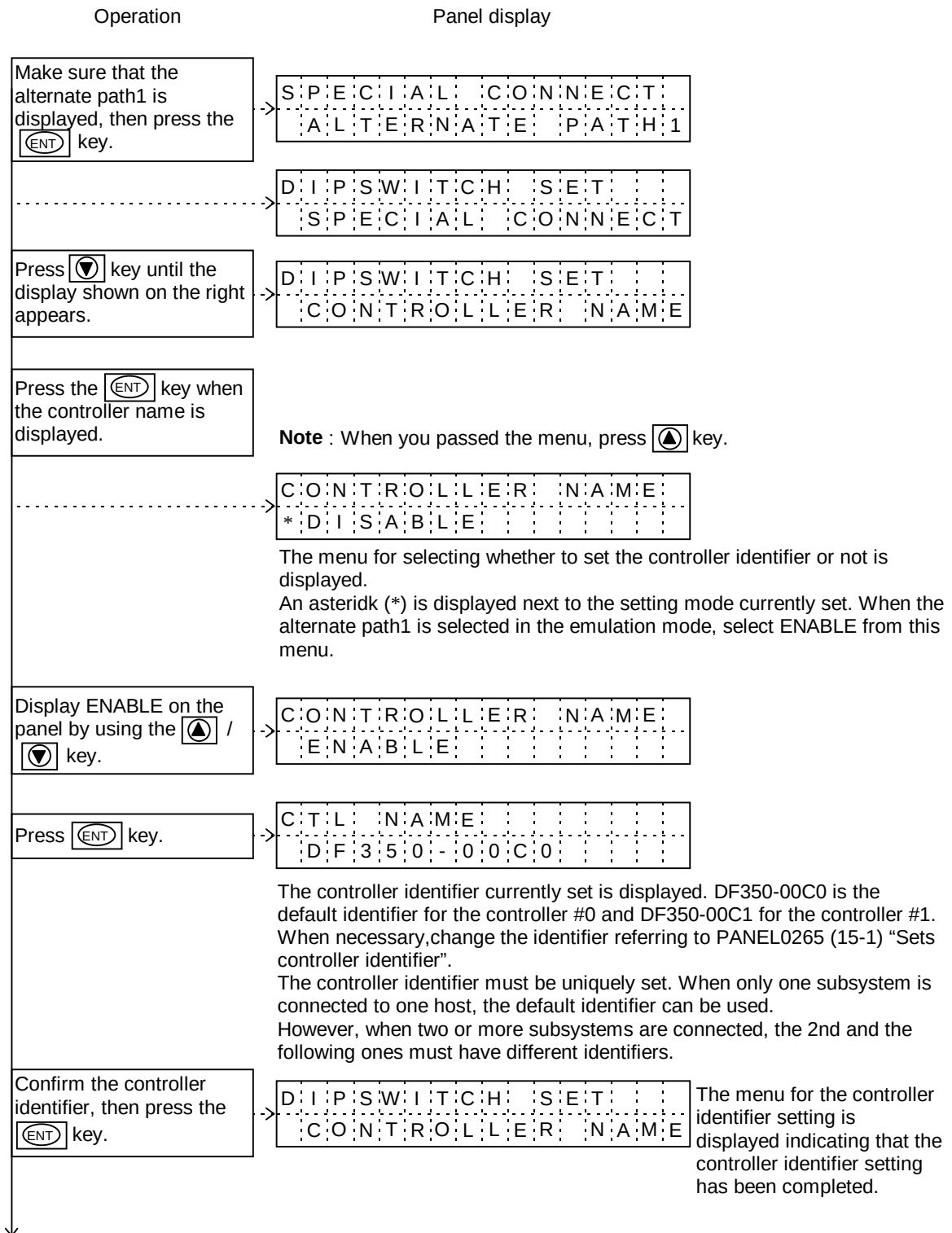
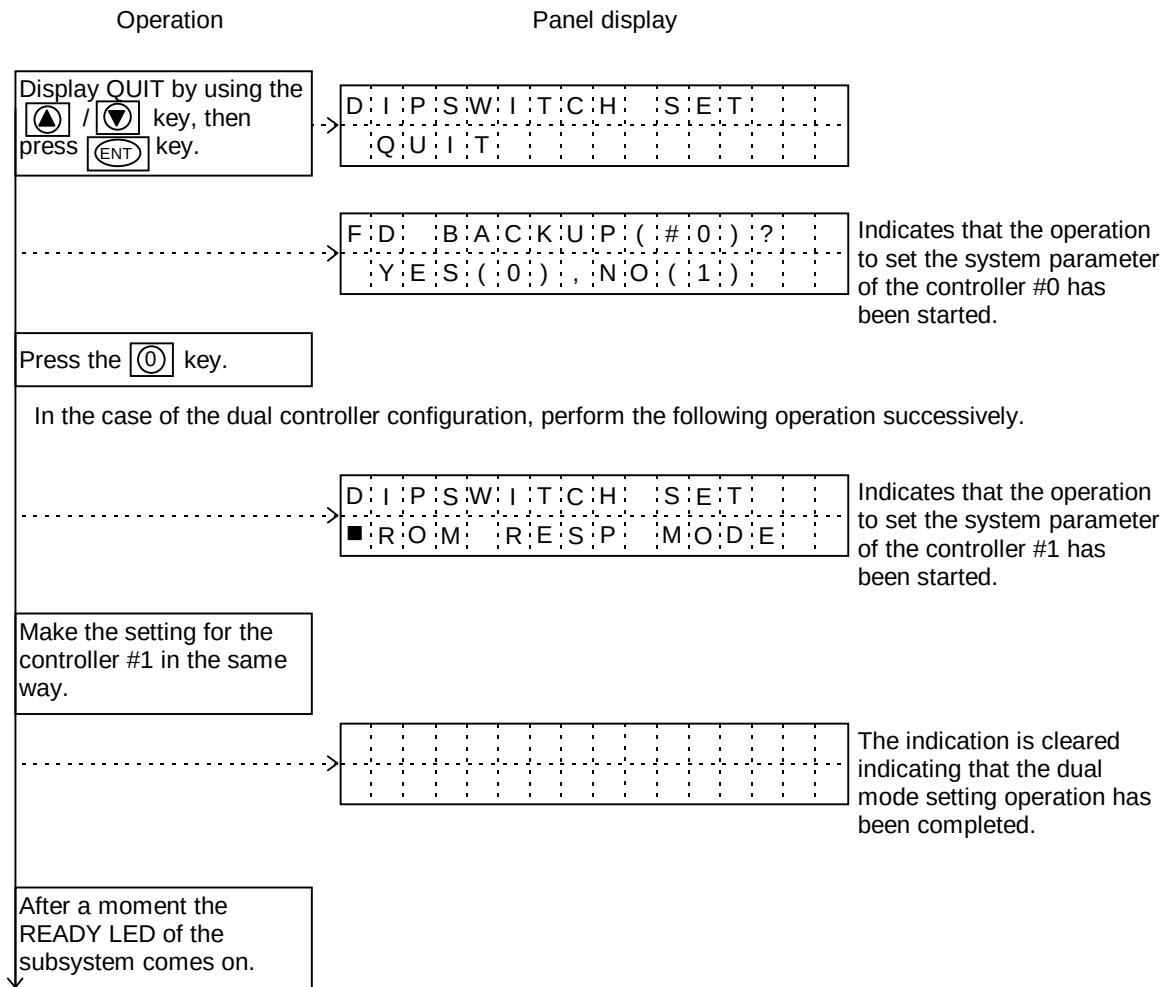


Figure 6.1.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.1.2.

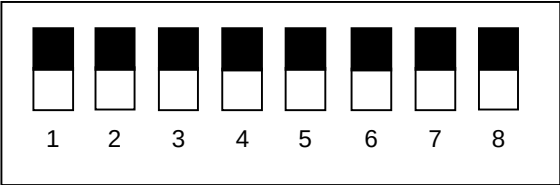


Figure 6.1.2 DIP switches (Being set for Standard setting)

6.2 When Using I/O Path Switching Function in the State Being Connected to NCR World Mark

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to NCR World Mark, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.2.1.

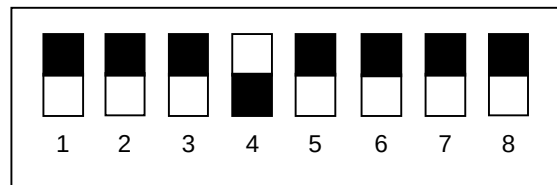
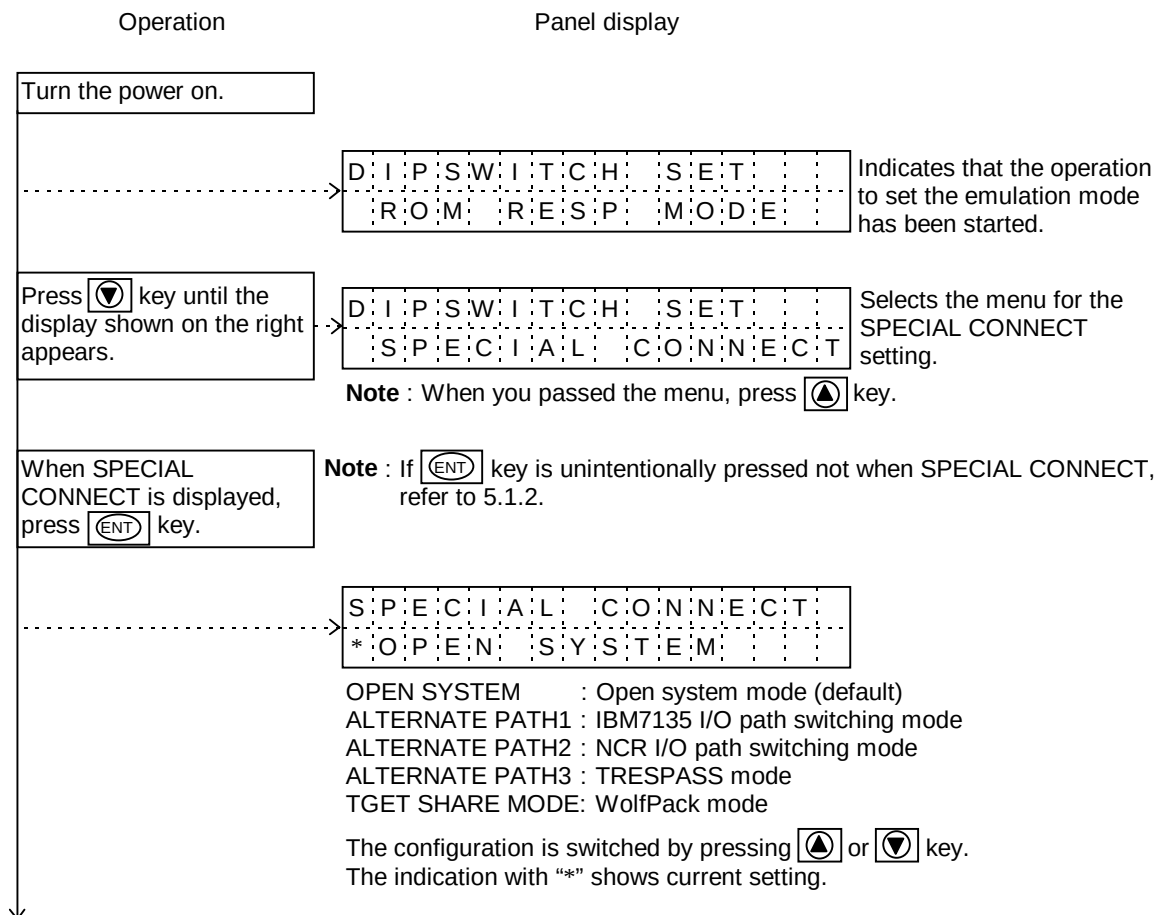
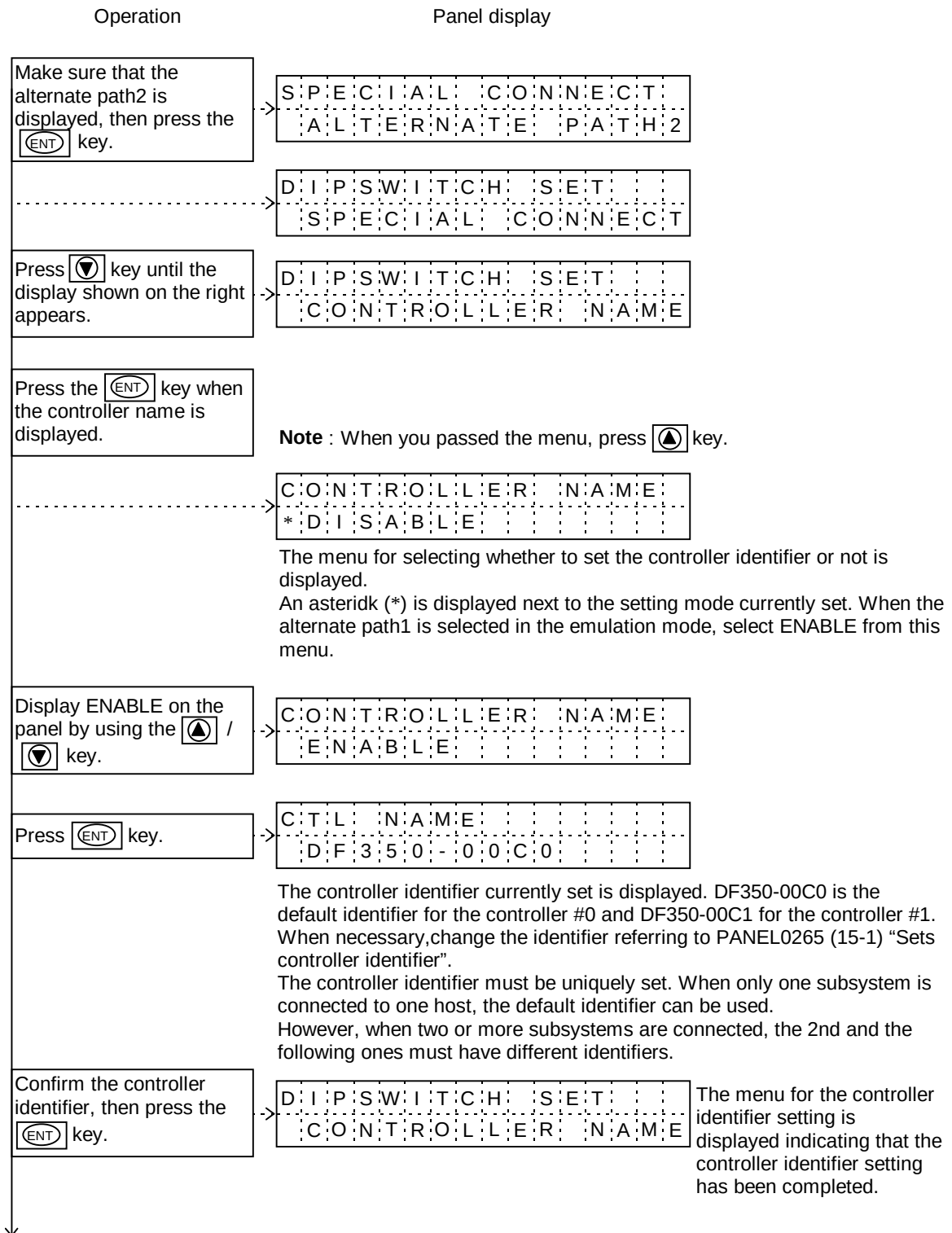
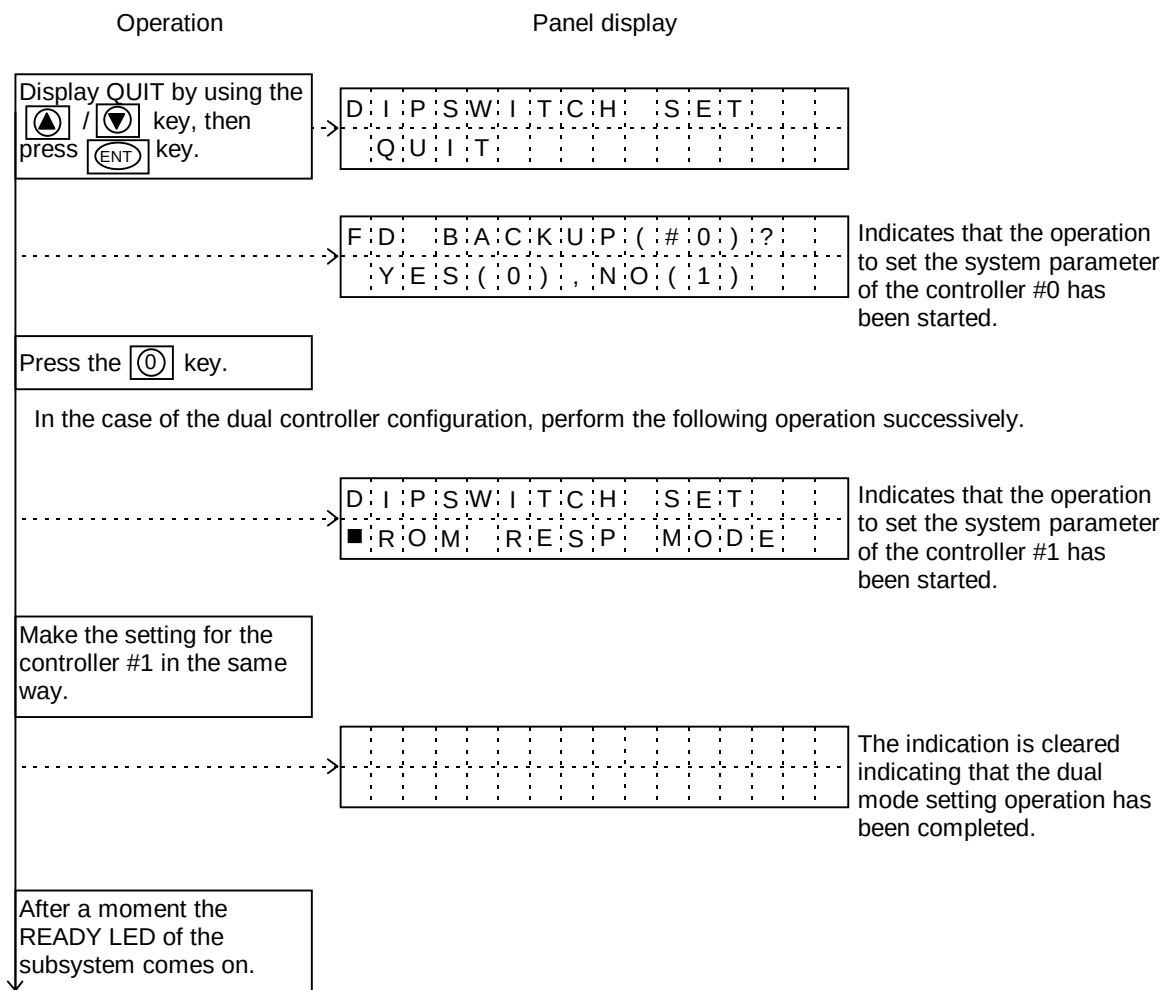


Figure 6.2.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.2.2.

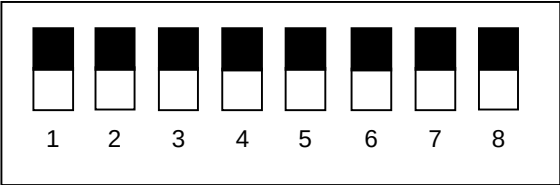


Figure 6.2.2 DIP switches (Being set for Standard setting)

6.3 When Using I/O Path Switching Function in the State Being Connected to Sequent NUMA-A

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to Sequent NUMA-A, setting of the emulation mode and the setting of the TRESPASS mode from the SVP function is needed.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.3.1.

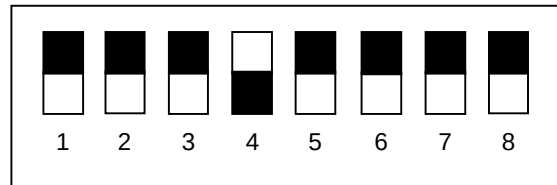
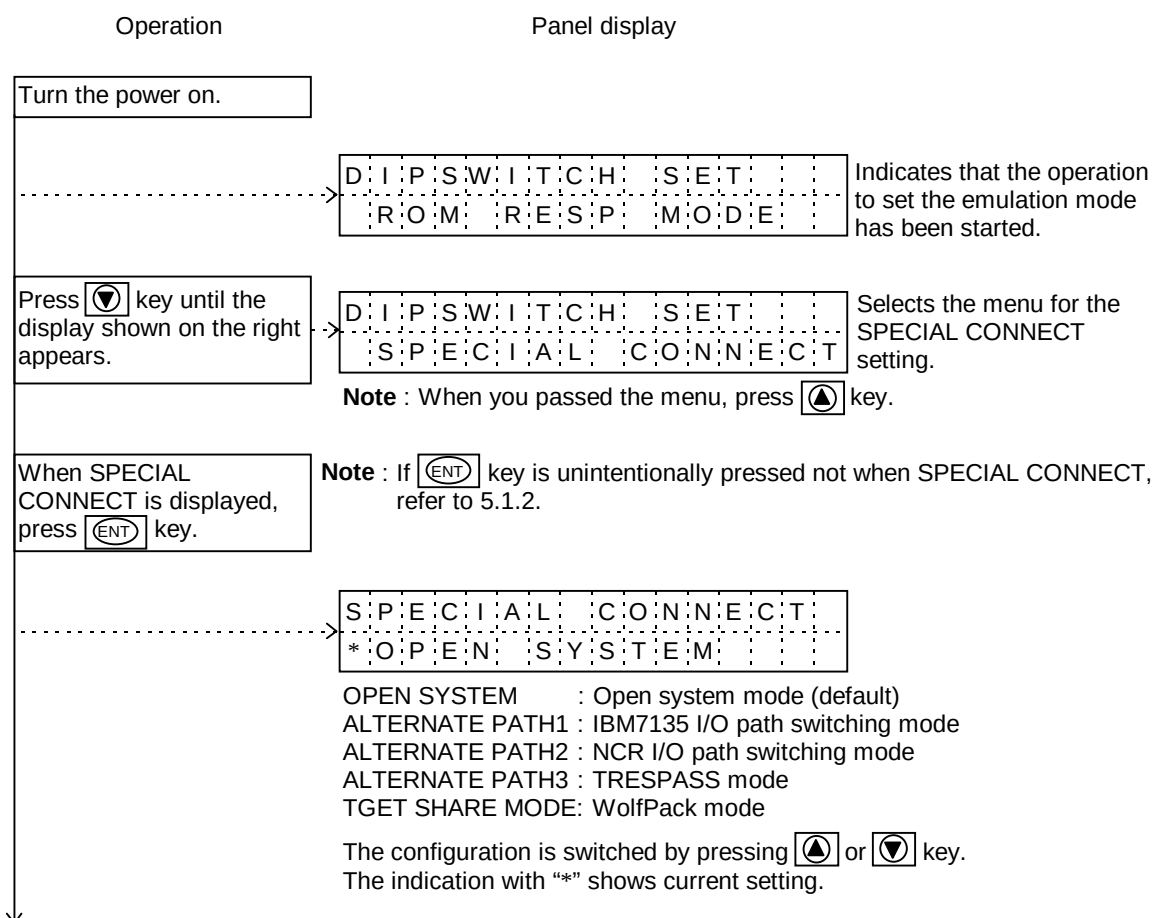
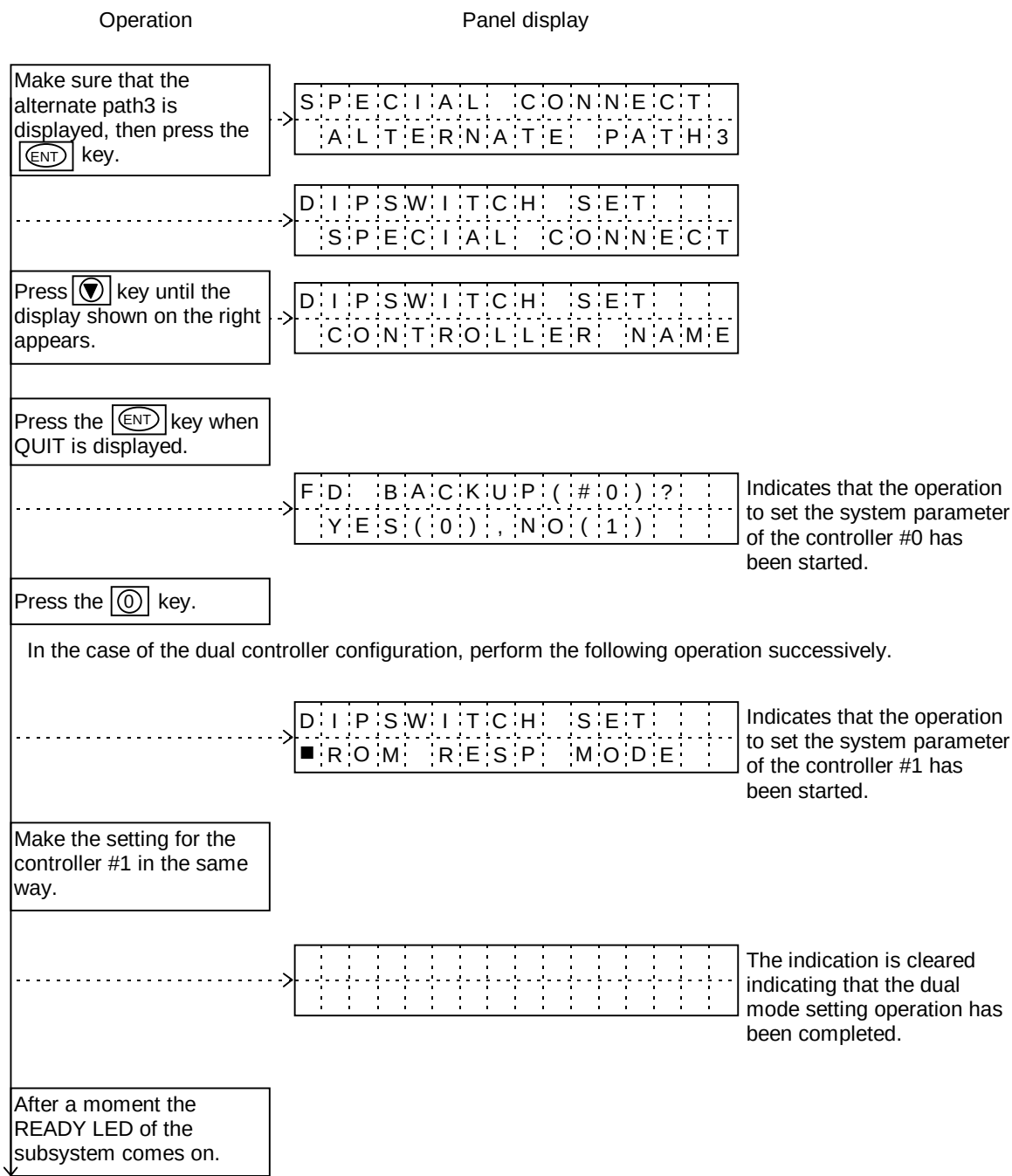


Figure 6.3.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.3.2.

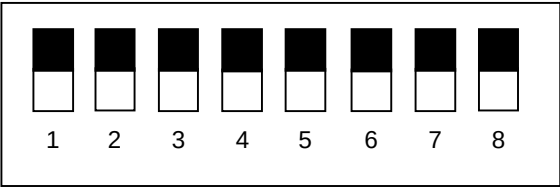
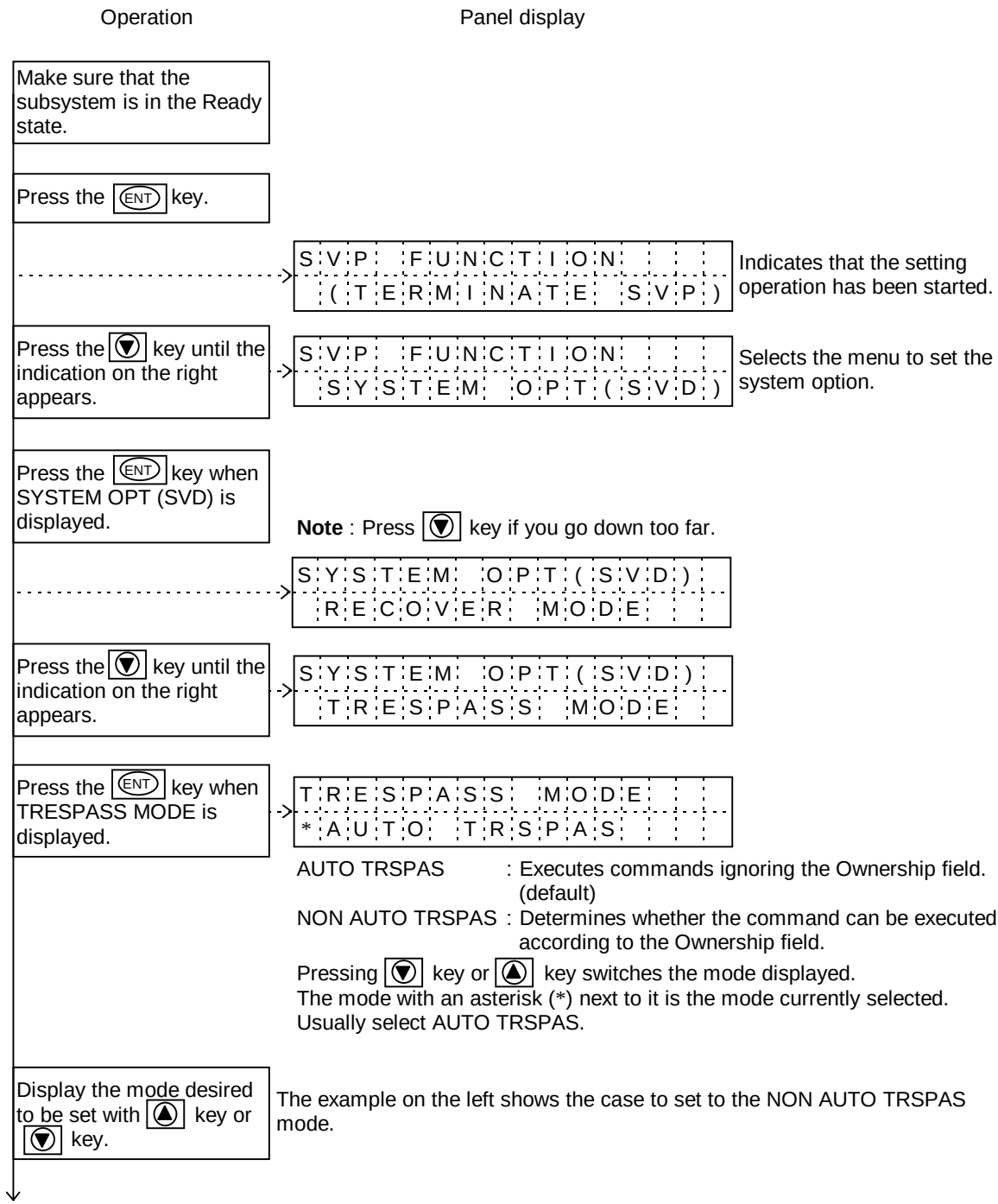
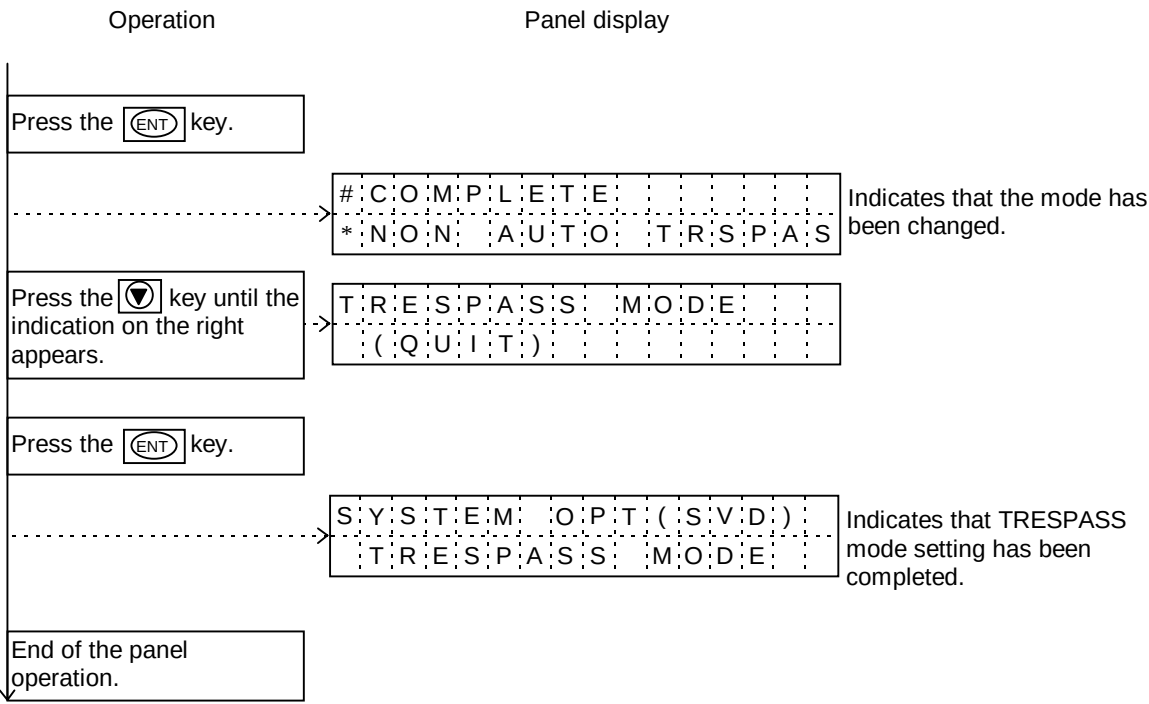


Figure 6.3.2 DIP switches (Being set for Standard setting)

(4) Setting the TRESPASS mode.

This function can be used when the subsystem is in the Ready state. (There is no need to set the DIP switch or reset the power. Ready/write operation cannot be executed from the host while this operation is being performed. When the host command is received, “Not Ready” is returned to the host.)





6.4 Using in the 1024-byte Host Block Size Mode

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

In order to use the subsystem with a host block size of 1024 byte, the host block size must be set to 1024 bytes when defining the LU. Accordingly, the LU used with a host block size of 512 bytes cannot be used in the 1024 byte host block size mode. In this case, it is necessary to redefine the LU.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.4.1.

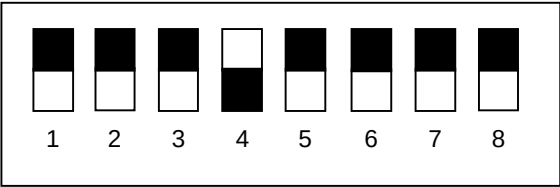
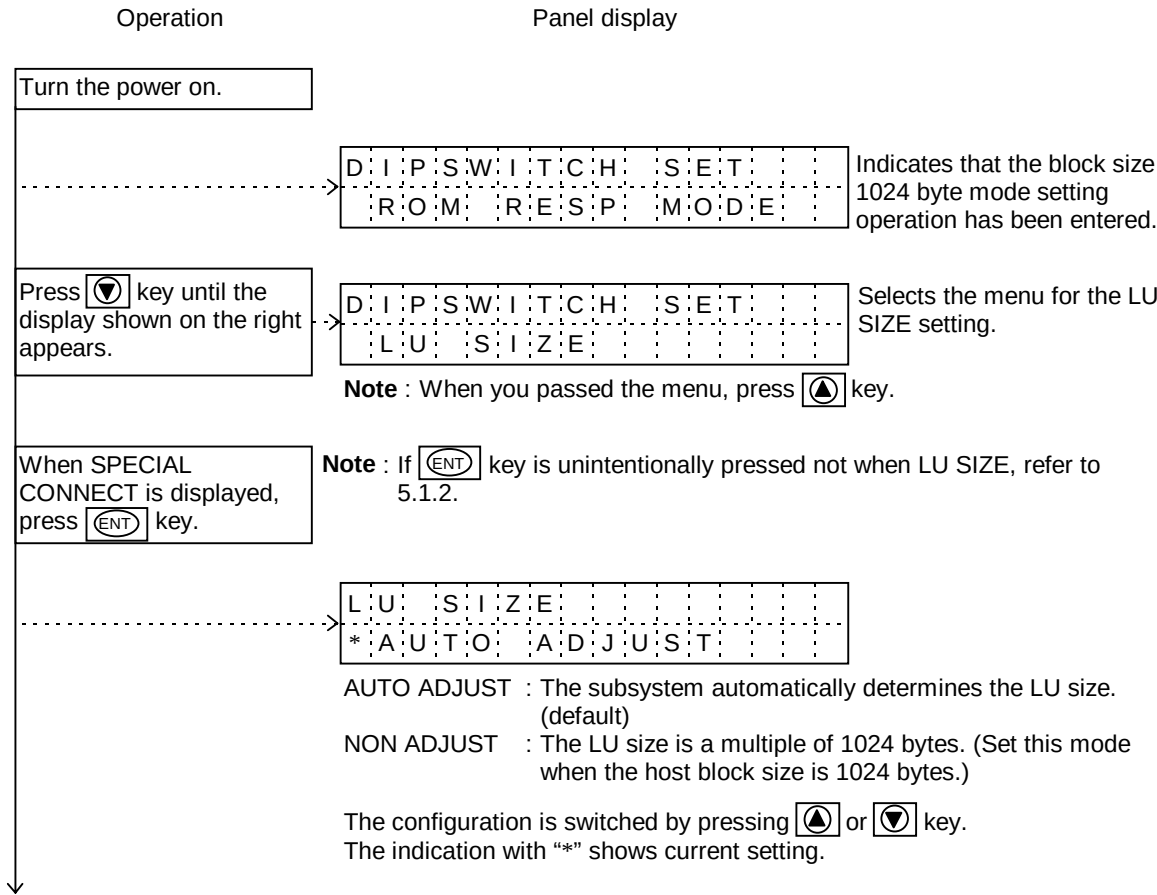
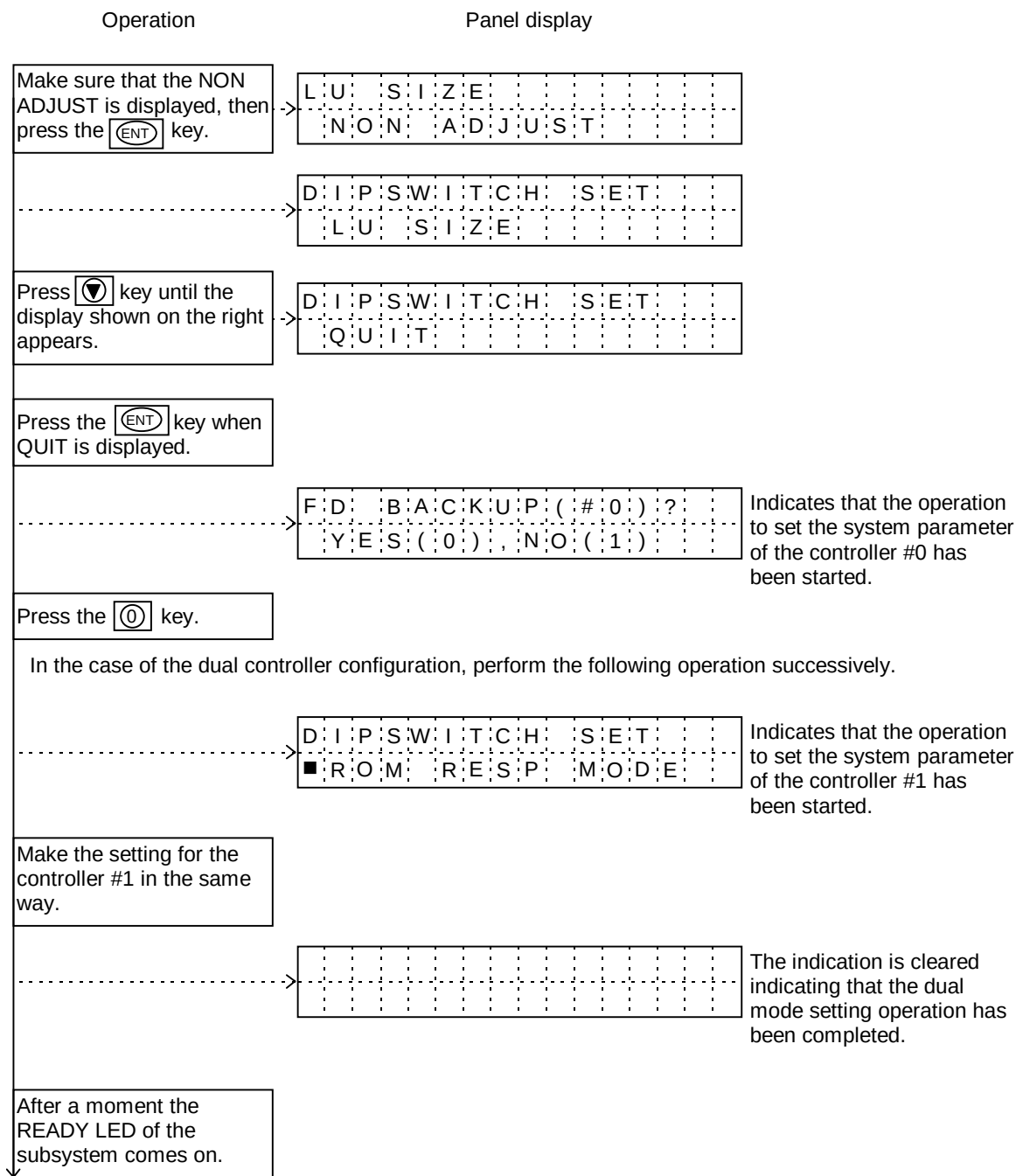


Figure 6.4.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.4.2.

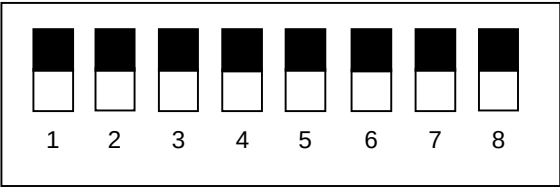


Figure 6.4.2 DIP switches (Being set for Standard setting)

(4) Setting of the host block length when setting the LU.
When setting the LU, define the host block size as 1024 bytes. (See PANEL0570 “Adds the LU” for a detailed explanation.)

6.5 Using in the WolfPack Mode

6.5.1 When the WolfPack is used in the single configuration

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.5.1.

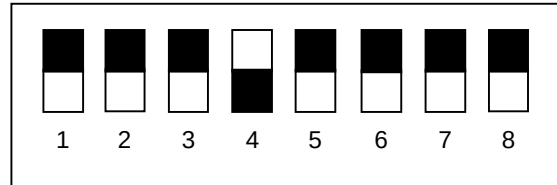
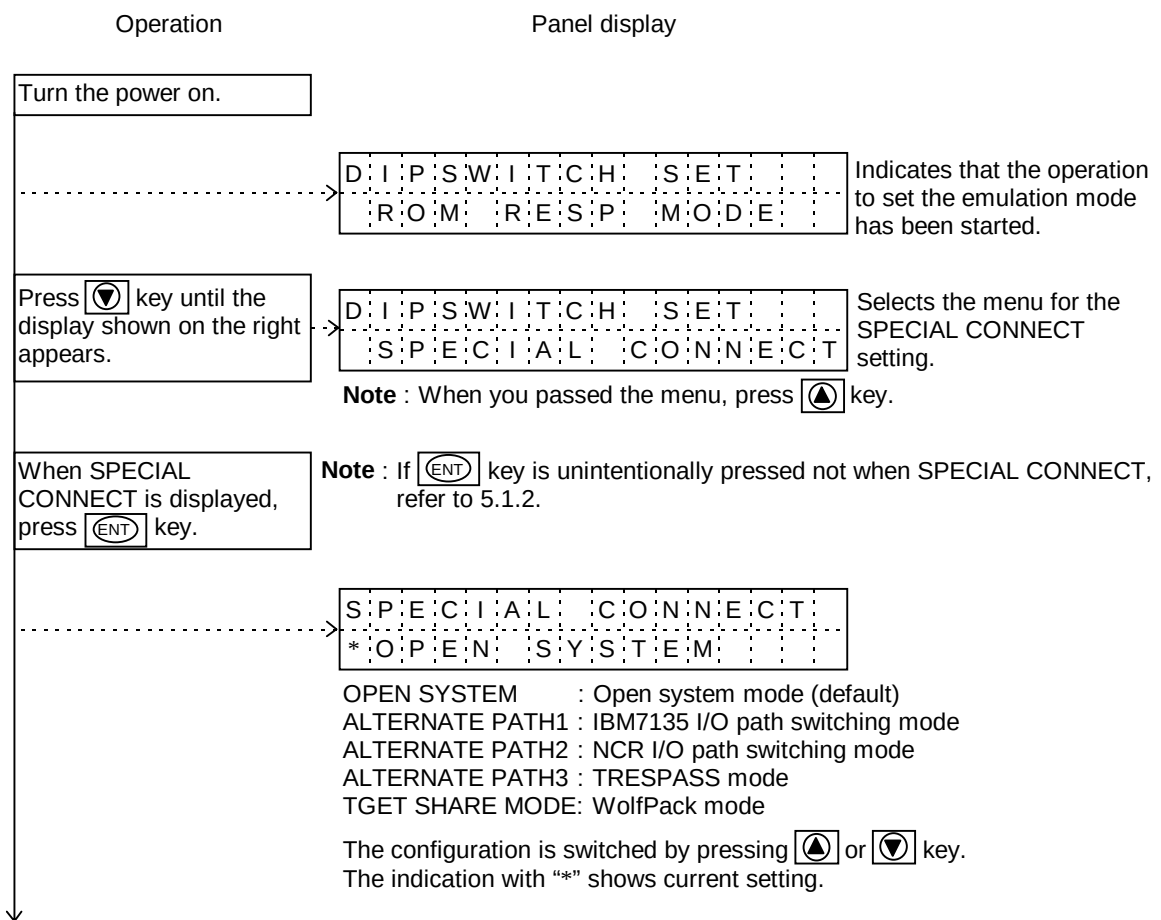
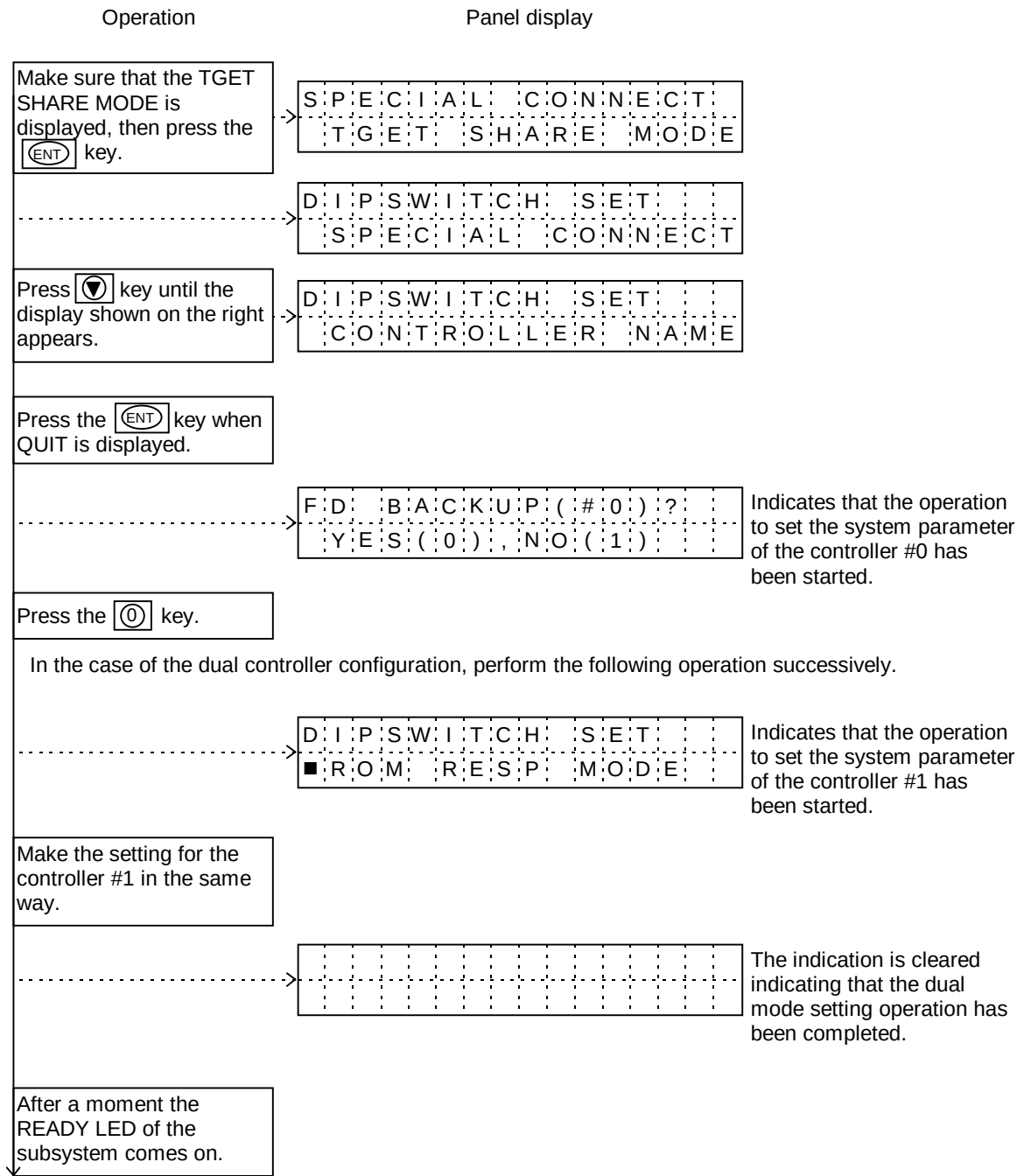


Figure 6.5.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.5.2.

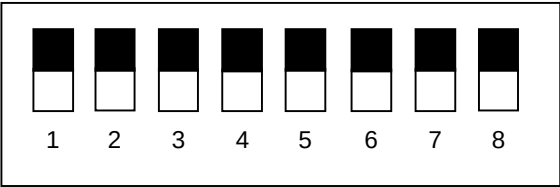


Figure 6.5.2 DIP switches (Being set for Standard setting)

6.5.2 When the WolfPack is used in the dual configuration

When using the subsystem in WolfPack mode in the dual configuration, execute the following setting and use it.

- Setting WolfPack mode
- Setting OPTION mode

To use the subsystem in this mode, the microprogram must be Ver.0306/B or later.

- Setting WolfPack mode

Set the mode by referring to page CK-INST0910.

- Setting DATA SHARE mode

Set the mode by referring to page CK-INST0930.

- Setting OPTION mode

(1) Before turning the power on, set DIP switch No.4 as Figure 6.5.3.

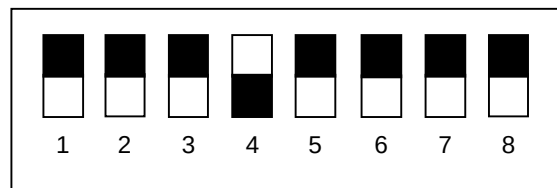
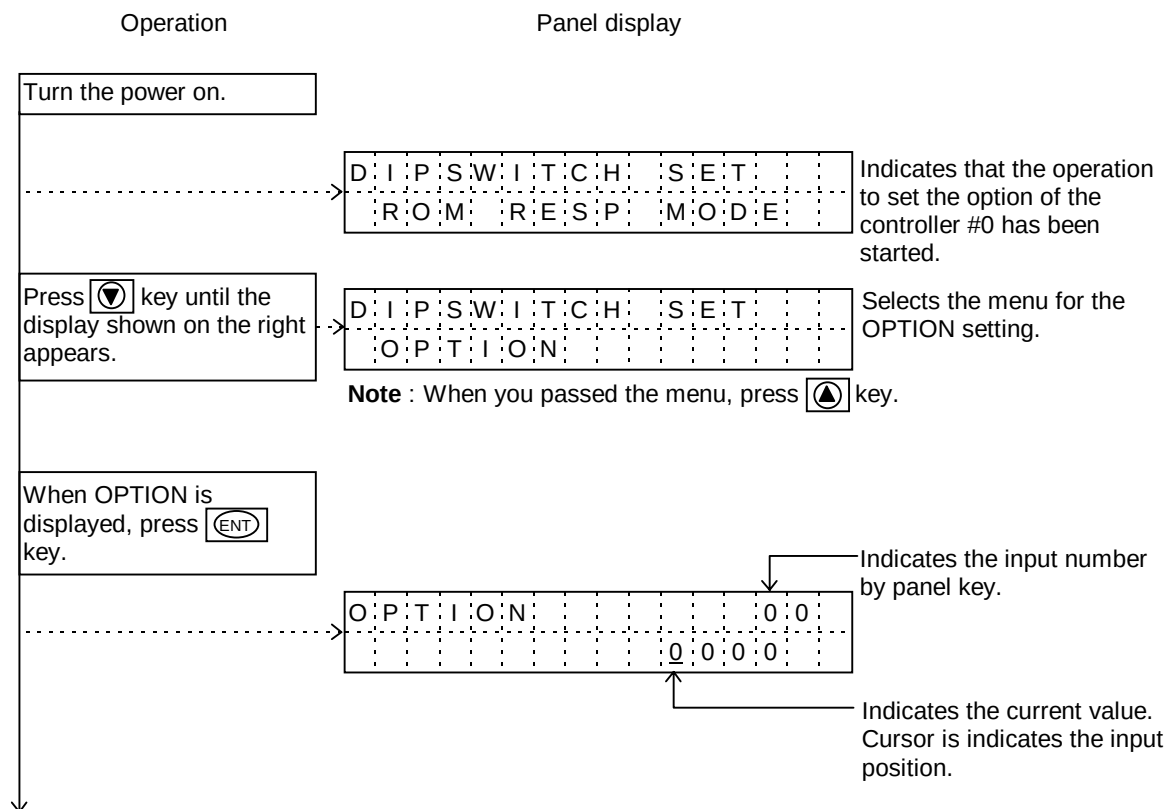
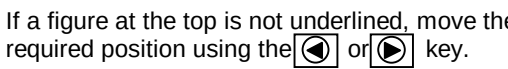
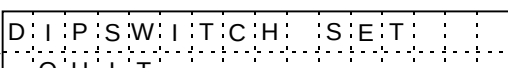
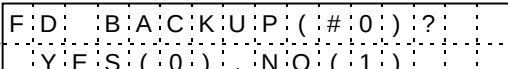
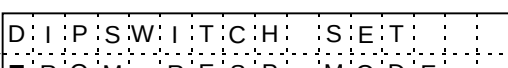


Figure 6.5.3 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the third is underlined, press the 0 key, and then press the 2 key on the panel.	 If a figure at the top is not underlined, move the underline ("—") to the required position using the ← or → key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("—") moves to the next position.	
Confirm that the current value has been set to "0020", then press the ENT key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the ▲ / ▼ key, then press ENT key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the 0 key.	
In the case of the dual controller configuration, perform the following operation successively.	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the option setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.5.4.

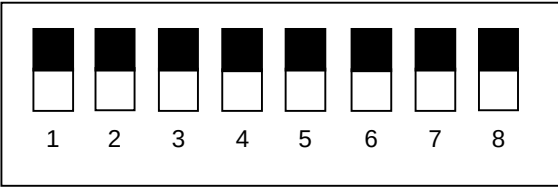


Figure 6.5.4 DIP switches (Being set for Standard setting)

6.6 Using in the DATA SHARE MODE

Use a combination of the microprogram version 0304 or later and Flash Program version PB26 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.6.1.

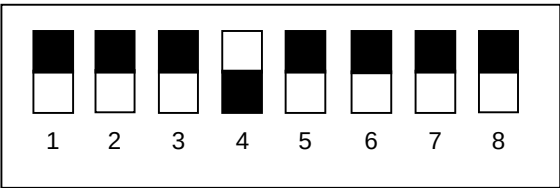
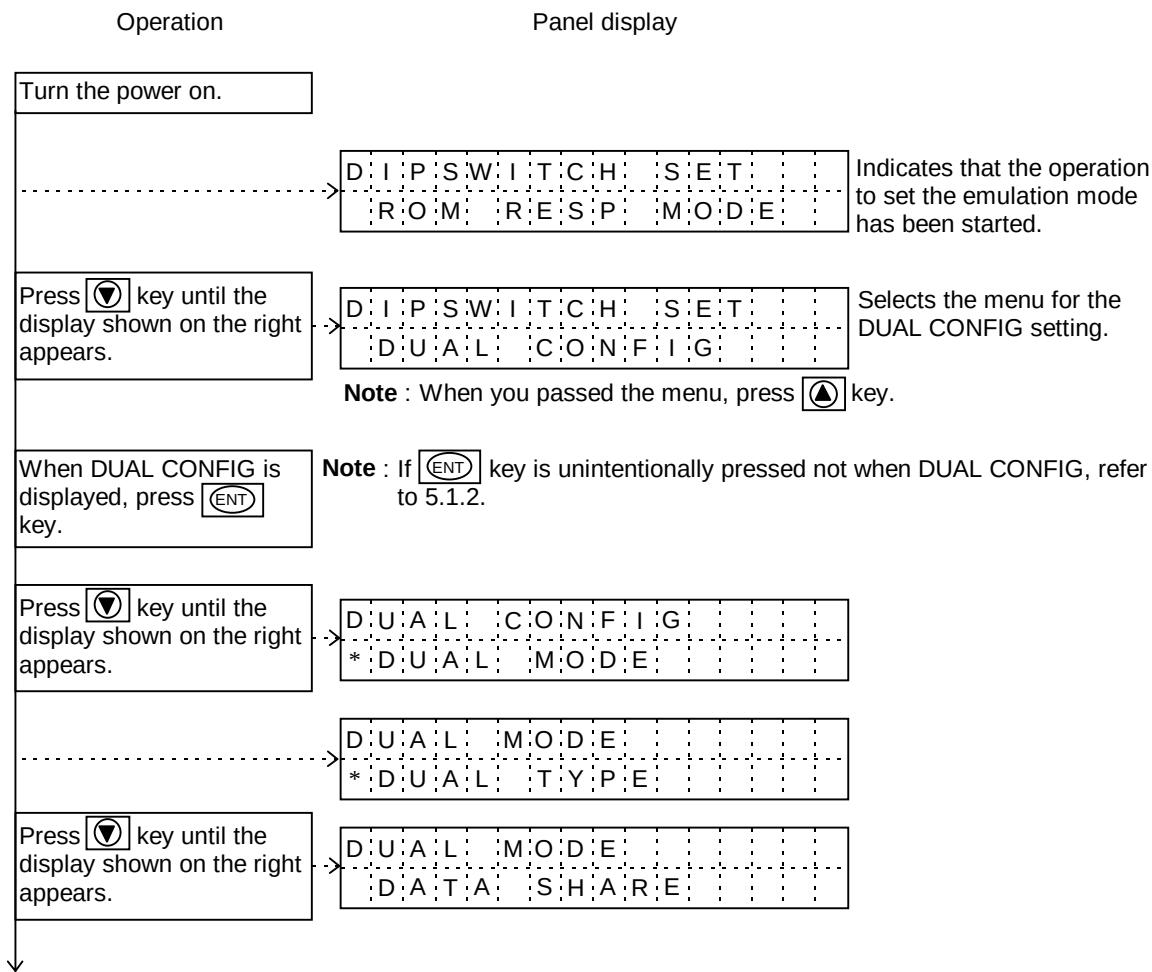


Figure 6.6.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.



Operation	Panel display
Make sure that the DATA SHARE MODE is displayed, then press the  key.	D A T A S H A R E M O D E * O F F
Press  key until the display shown on the right appears.	D A T A S H A R E M O D E O N
Press the  key when ON is displayed.	D U A L M O D E D A T A S H A R E
Press  key until the display shown on the right appears.	D U A L M O D E Q U I T
Press the  key.	
Press  key until the display shown on the right appears.	D I P S W I T C H S E T Q U I T
Press the  key.	
	F D B A C K U P (# 0) ? Y E S (0) , N O (1)
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	
	D I P S W I T C H S E T ■ R O M R E S P M O D E
Make the setting for the controller #1 in the same way.	
After a moment the READY LED of the subsystem comes on.	

Indicates that the operation to set the system parameter of the controller #0 has been started.

Indicates that the operation to set the system parameter of the controller #1 has been started.

The indication is cleared indicating that the dual mode setting operation has been completed.

(3) Set the DIP switch No.4 as shown in Figure 6.6.2.

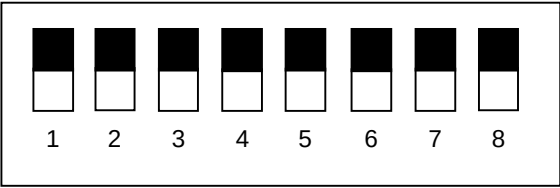


Figure 6.6.2 DIP switches (Being set for Standard setting)

6.7 When the VxVM Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.7.1.

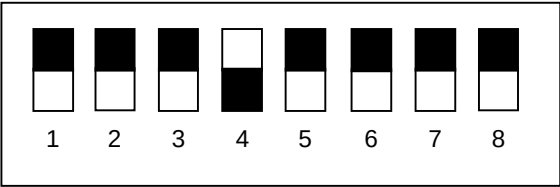
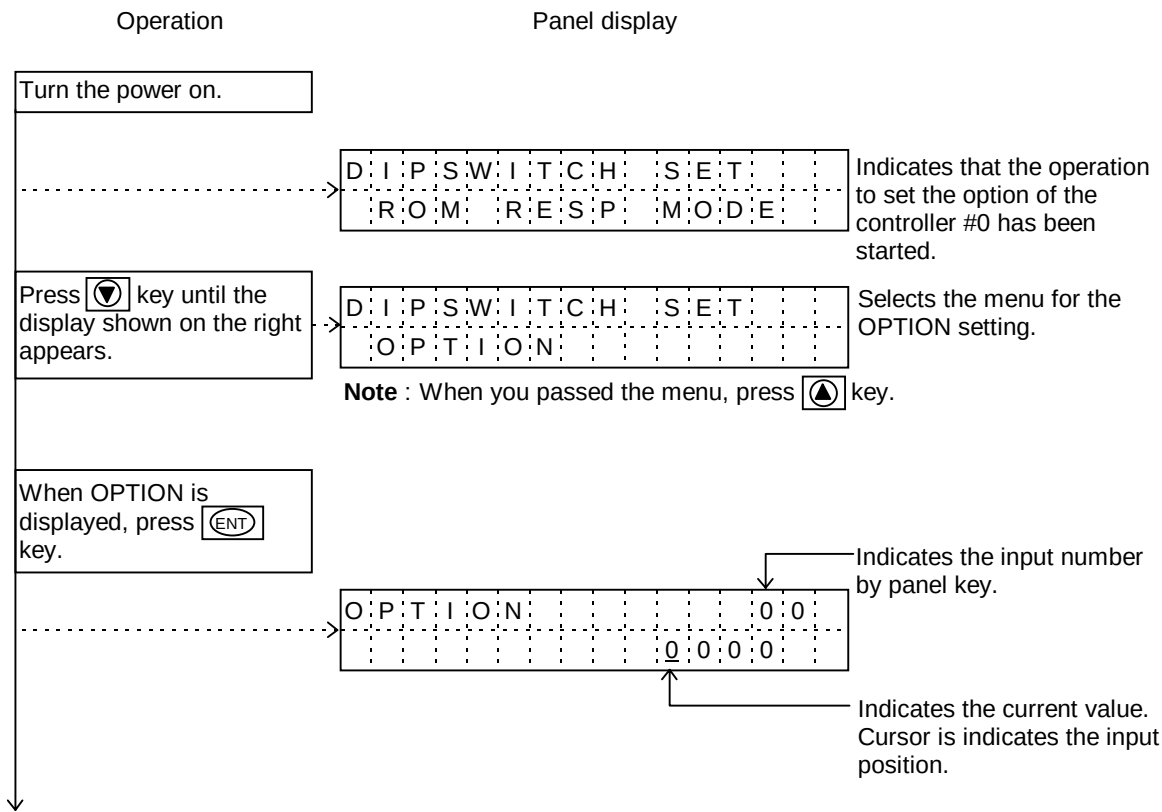
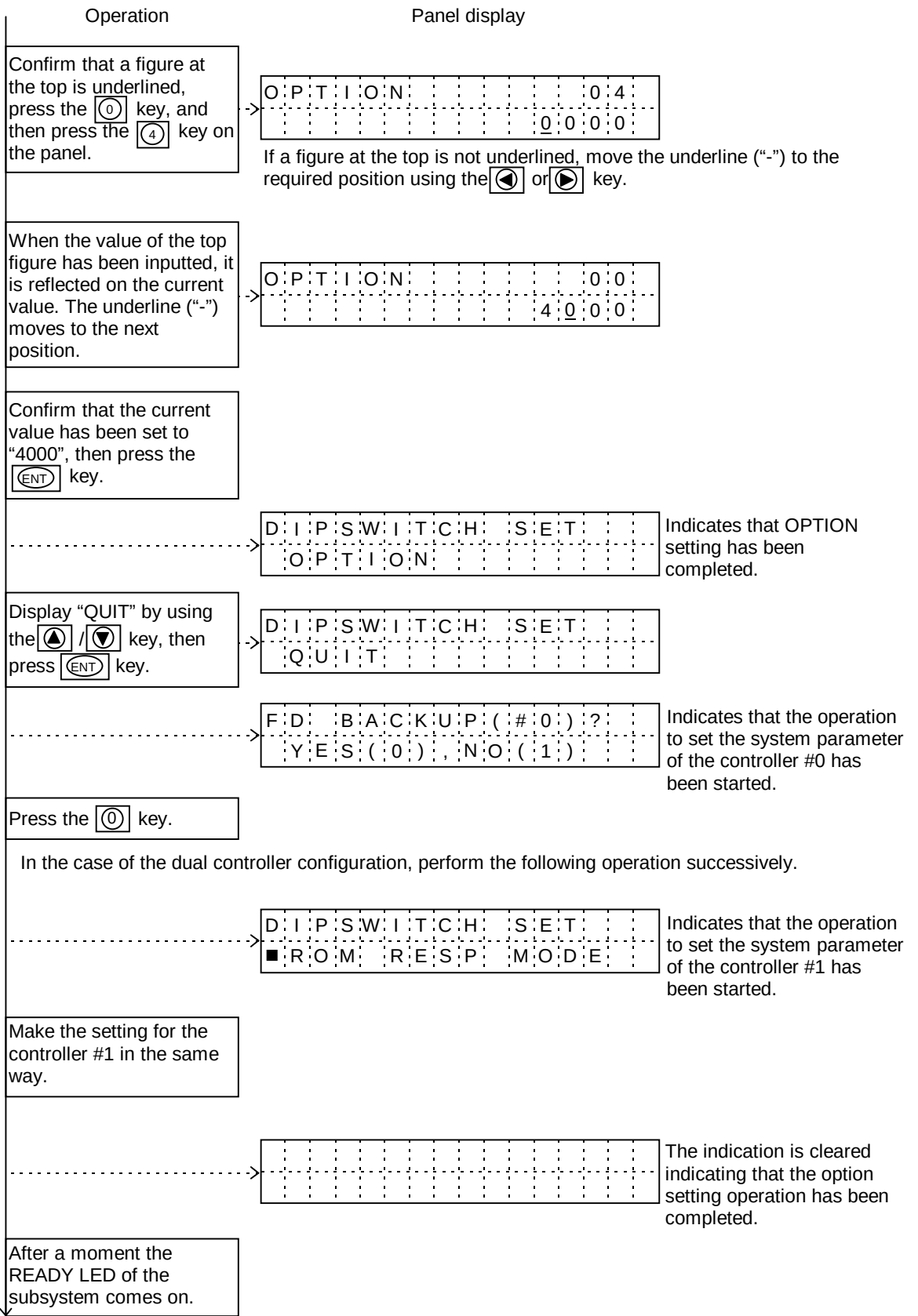


Figure 6.7.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.7.2.

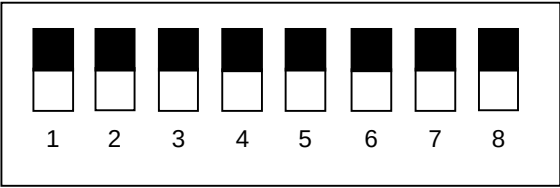


Figure 6.7.2 DIP switches (Being set for Standard setting)

6.8 When the HACMP Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(By using this option, a combination of HACMP and 7135 emulation becomes usable. To use the combination, settings of both this option and 7135 emulation are needed. (For the setting procedure, see Section 6.1.))

(1) Before turning the power on, set DIP switch No.4 as Figure 6.8.1.

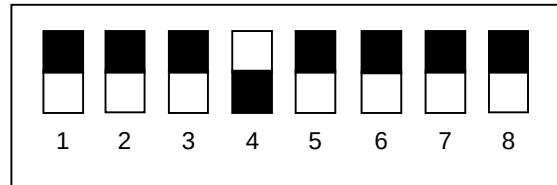
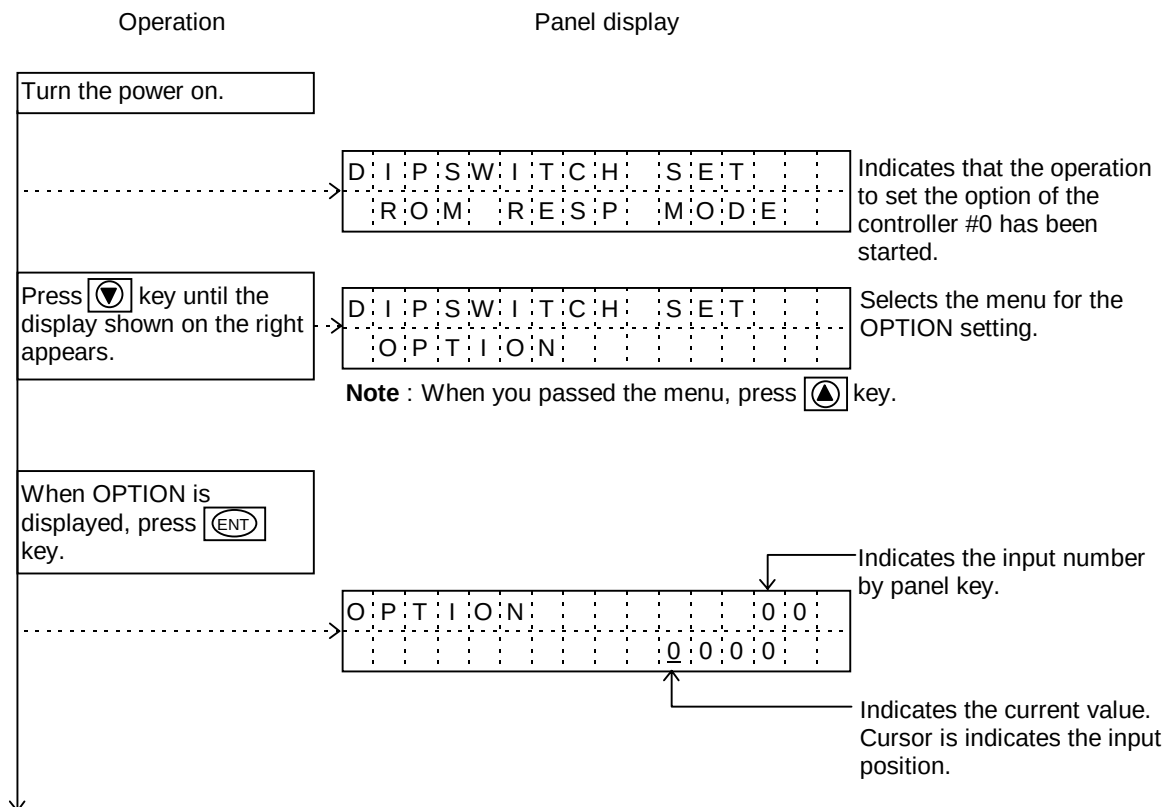
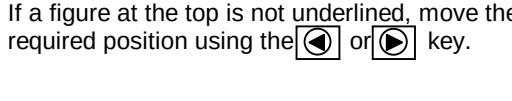
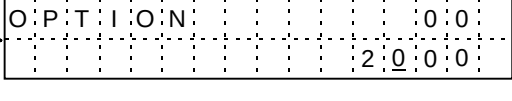
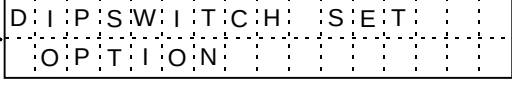
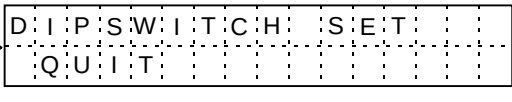
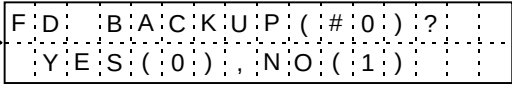
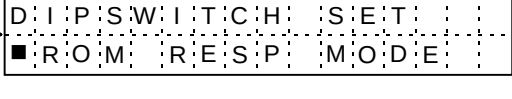
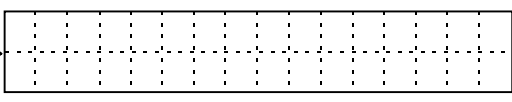


Figure 6.8.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the top is underlined, press the  key, and then press the  key on the panel.	 If a figure at the top is not underlined, move the underline ("—") to the required position using the  or  key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("—") moves to the next position.	
Confirm that the current value has been set to "2000", then press the  key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the  /  key, then press  key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	
	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the option setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.8.2.

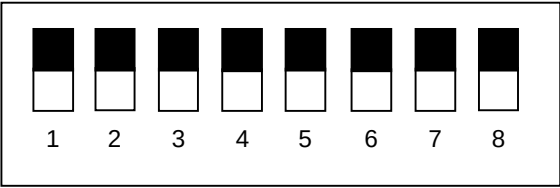


Figure 6.8.2 DIP switches (Being set for Standard setting)

6.9 When Sun OS Solaris 2.5.1 or later is used by the host side

If the following message is displayed on the console screen while executing SUN Format command, use the subsystem with its mode changed to this one.

[Computing capacity exceeds actual disk capacity.]

To use the subsystem in this mode, its microprogram version must be 0304/L, 0305/B or later.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.9.1.

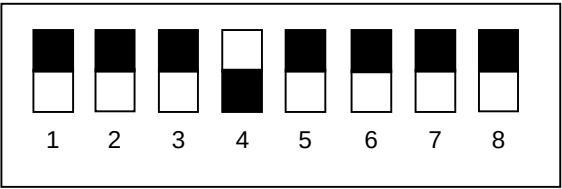
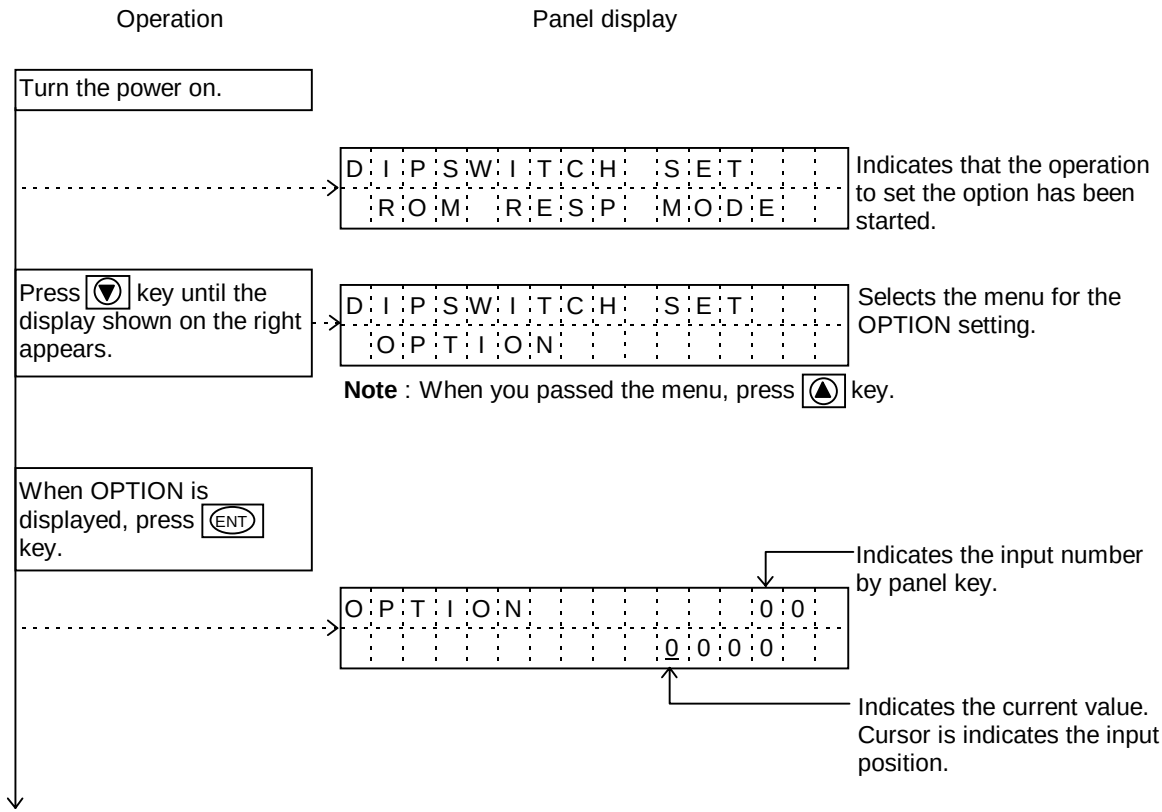
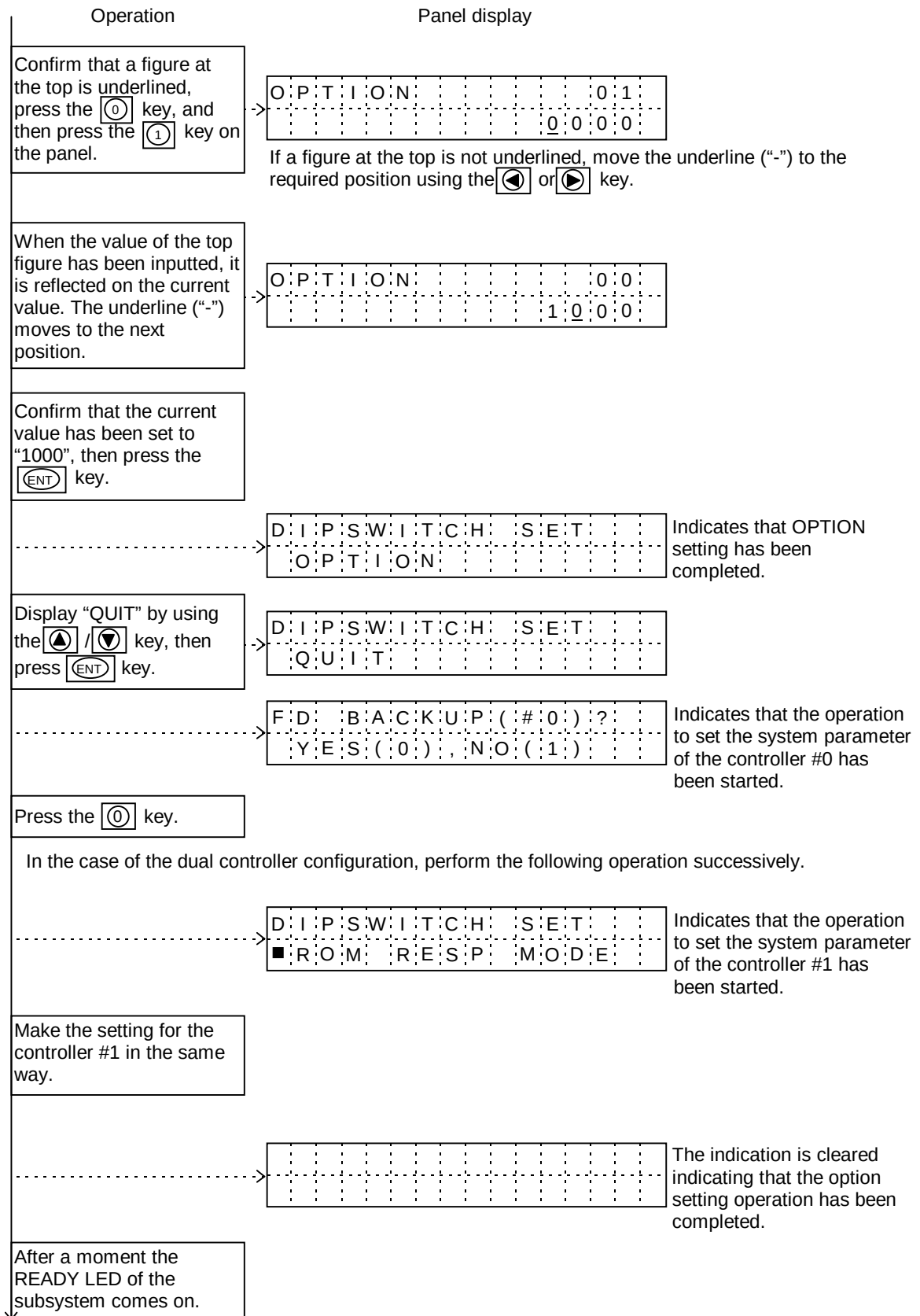


Figure 6.9.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.9.2.

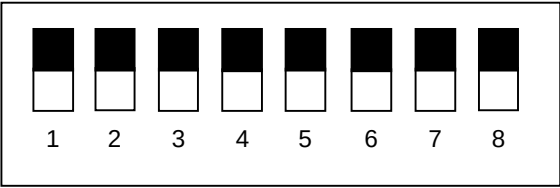


Figure 6.9.2 DIP switches (Being set for Standard setting)

6.10 When Using the Subsystem in Connection with MP5400

When using the subsystem in the state connected with the MP5400, it is necessary to use it with the microprogram Ver.0305/A or later. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.10.1.

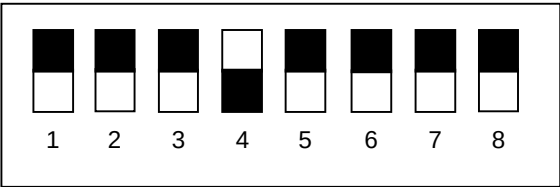
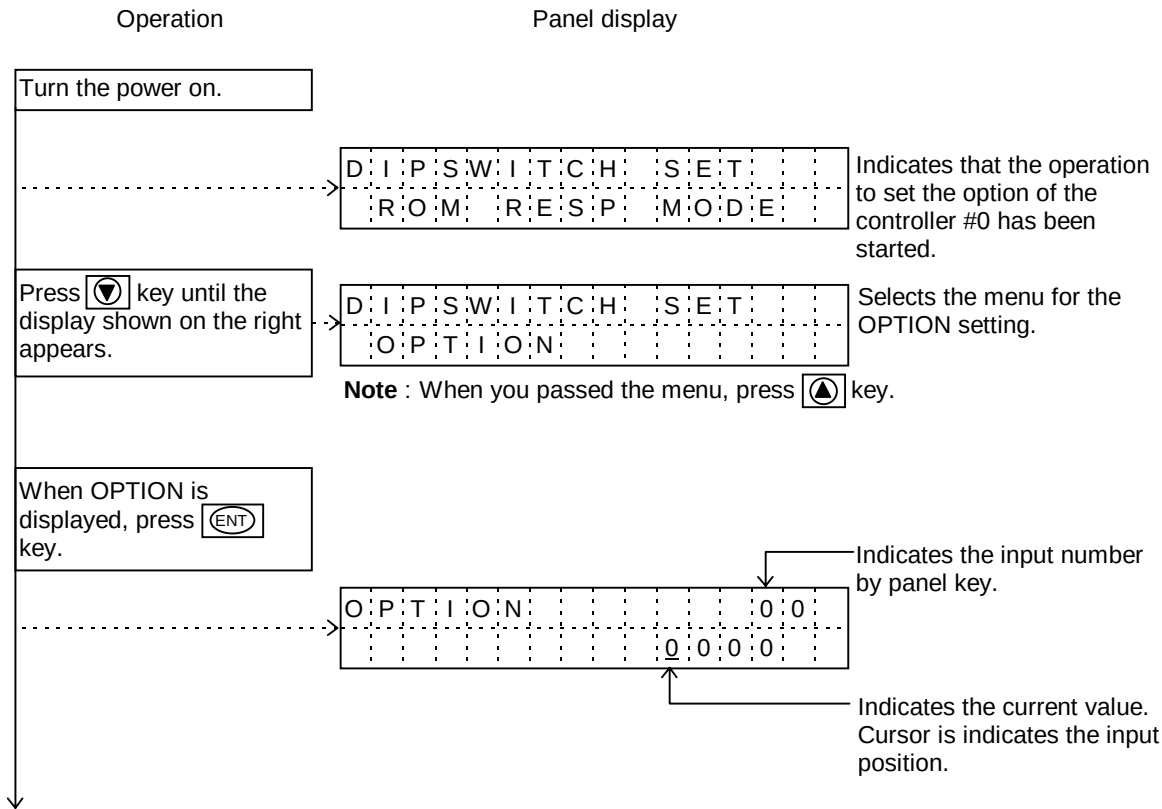
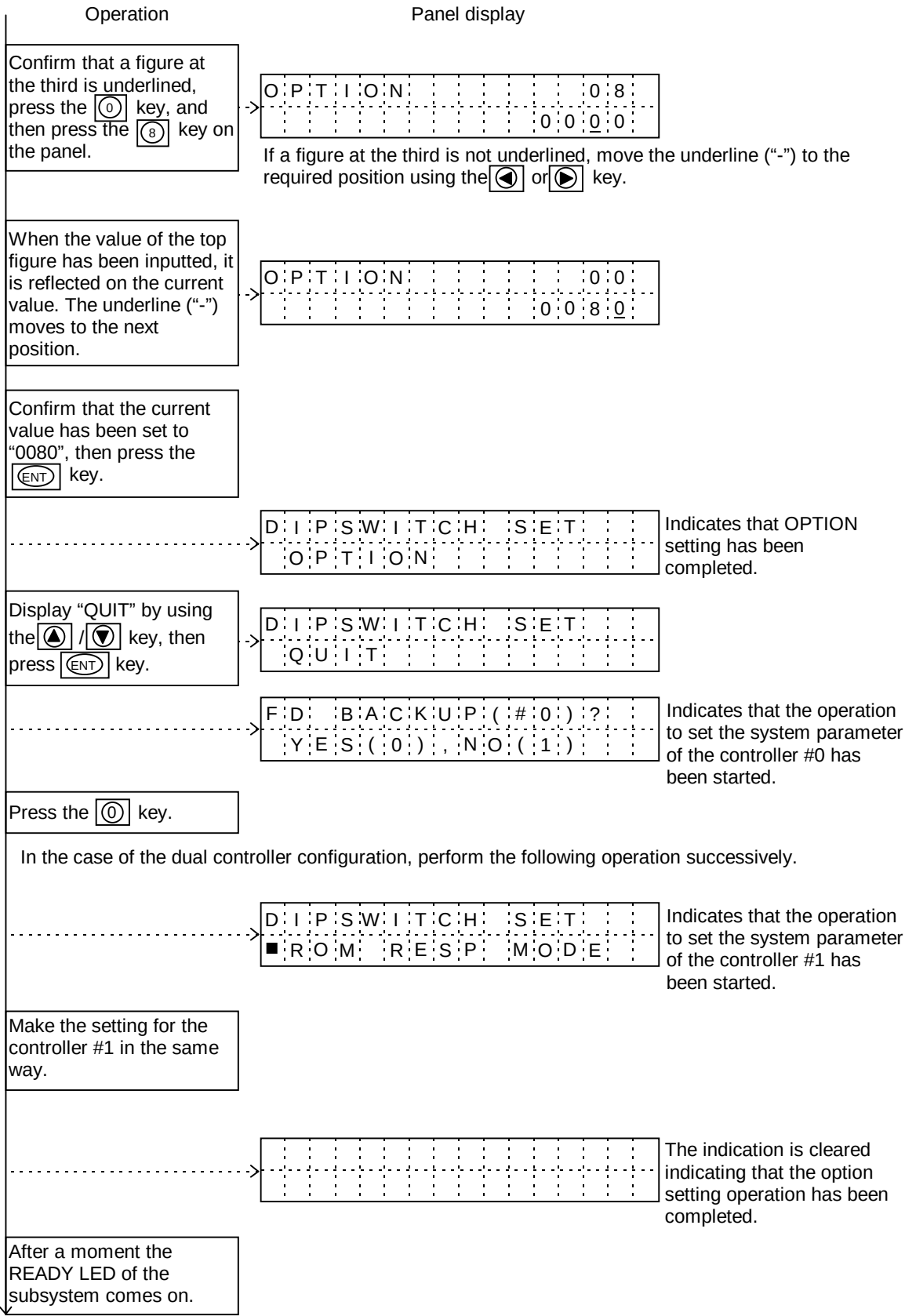


Figure 6.10.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.10.2.

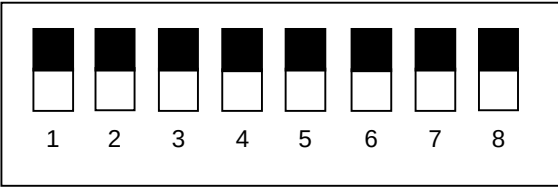


Figure 6.10.2 DIP switches (Being set for Standard setting)

6.11 When Using the Subsystem in LU Blockade Mode

When the subsystem is used in this mode, if a blockade failure occurs on the second disk in the same ROW, the disk concerned is blocked and the LU in which the disk concerned is included is blocked.

When the LU is blocked, data cannot be read from or written onto the LU concerned. If the blocked LU is accessed, a sense key/sense code=0313180 is reported.

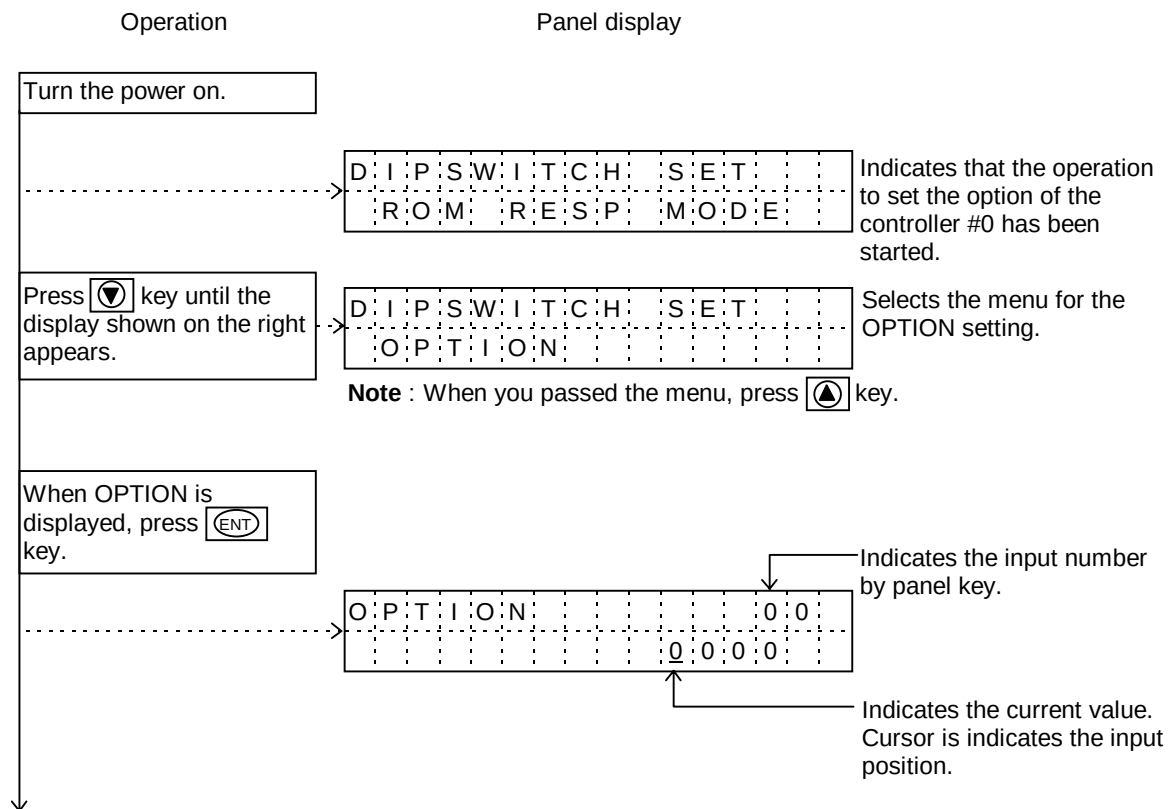
To use the subsystem in this mode, the microprogram must be Ver.0305/B or later.

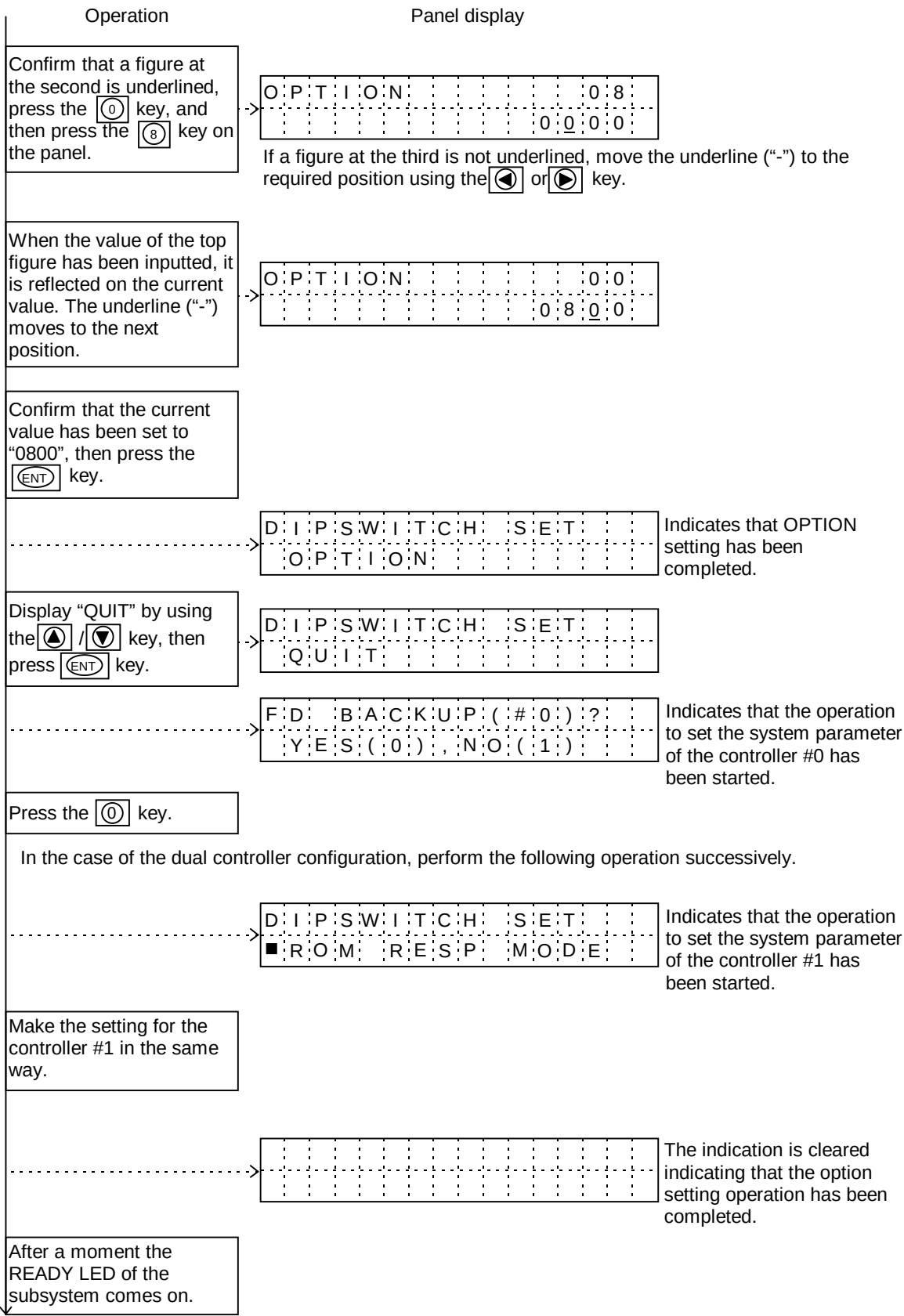
- (1) Before turning the power on, set DIP switch No.4 as Figure 6.11.1.



Figure 6.11.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.11.2.

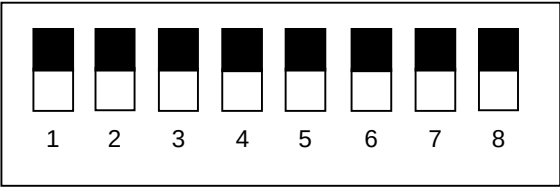


Figure 6.11.2 DIP switches (Being set for Standard setting)

6.12 When outputting information whether a warning is given in the subsystem via RS232C

When outputting information whether a warning is given in the subsystem via RS232C, the microprogram version 0307/F or later is required to be used. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.12.1.

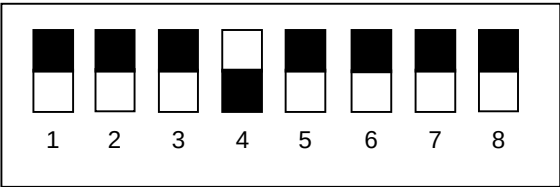
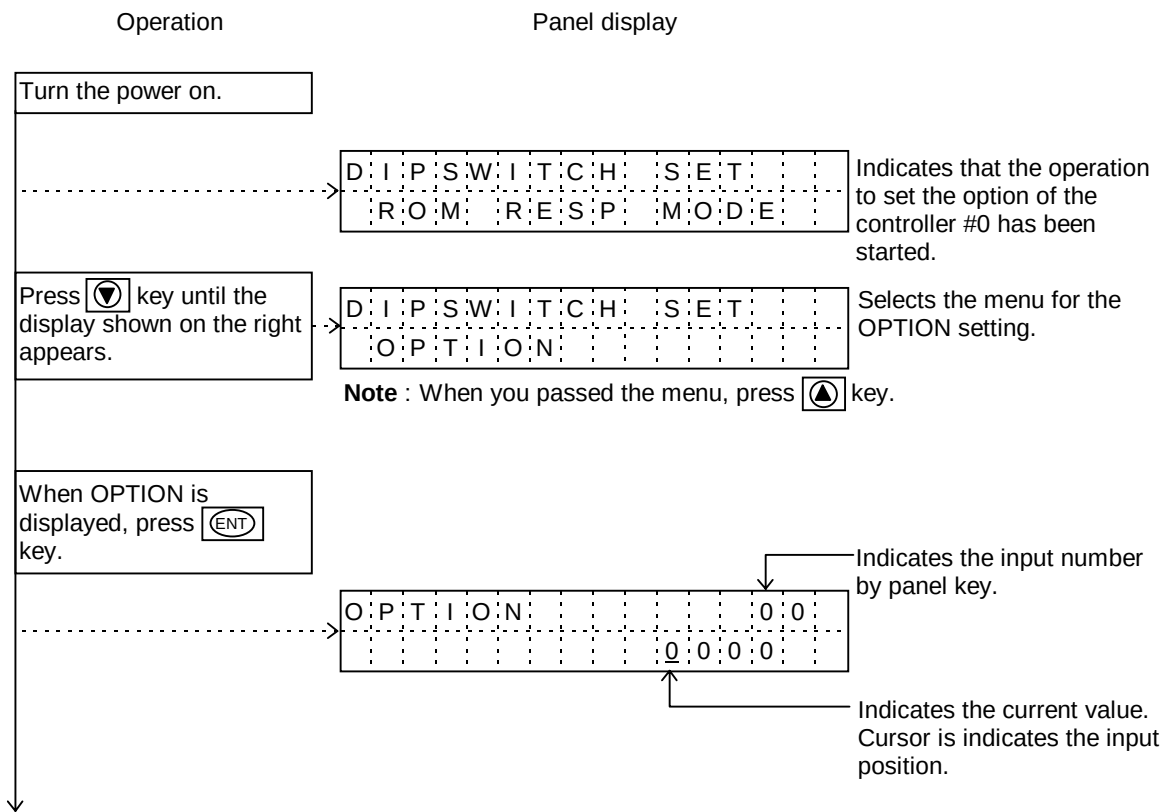
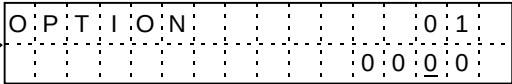
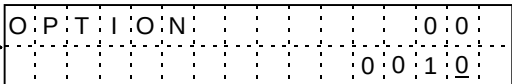
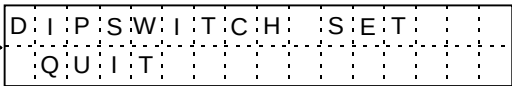
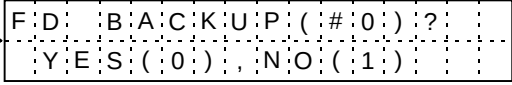
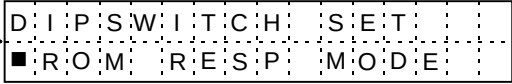
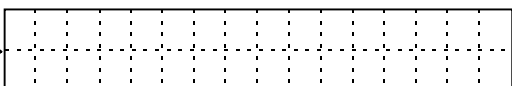


Figure 6.12.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the third is underlined, press the  key, and then press the  key on the panel.	 If a figure at the third is not underlined, move the underline ("—") to the required position using the  or  key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("—") moves to the next position.	
Confirm that the current value has been set to "0010", then press the  key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the  /  key, then press  key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	
	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the option setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.12.2.

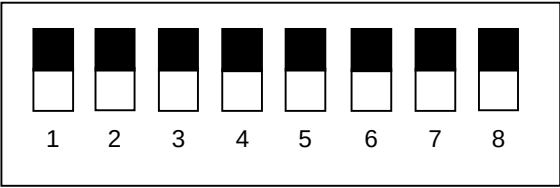


Figure 6.12.2 DIP switches (Being set for Standard setting)

DF350 Disk Subsystem

9. OPTIONAL INSTALLATION

(Cabinet Type)

Rev.6

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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1. Note when Installing the Optional Features

- (1) Be sure to back-up copy user data before installing the optional features. A mis-operation might cause the loss of user's data.
- (2) Back-up the system parameter according to "Back-up Procedure of System Parameter". (See CK-OPTION0050.)
- (3) Power off the subsystem according to power off procedure before installing the optional features. If not, user's data might be lost.

2. Installing the Optional Features

2.1 Unit Appearance Check

Check visually the unit appearance for distortion or damage during the transportation.

2.2 Checking Items of System Components and the Other Items Shipped with the Unit

Check items and quantities of system components (model, serial number, and quantity) and other items shipped together with the unit. Cross-check with the packing list.

2.3 Back-up Procedure of System Parameter

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) are need to be copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters following “Back-up procedure to FD” (See CK-OPTION0050) or “Restoring procedures from FD” (See CK-OPTION0080).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to CK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

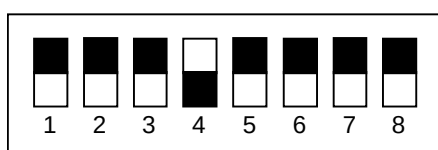
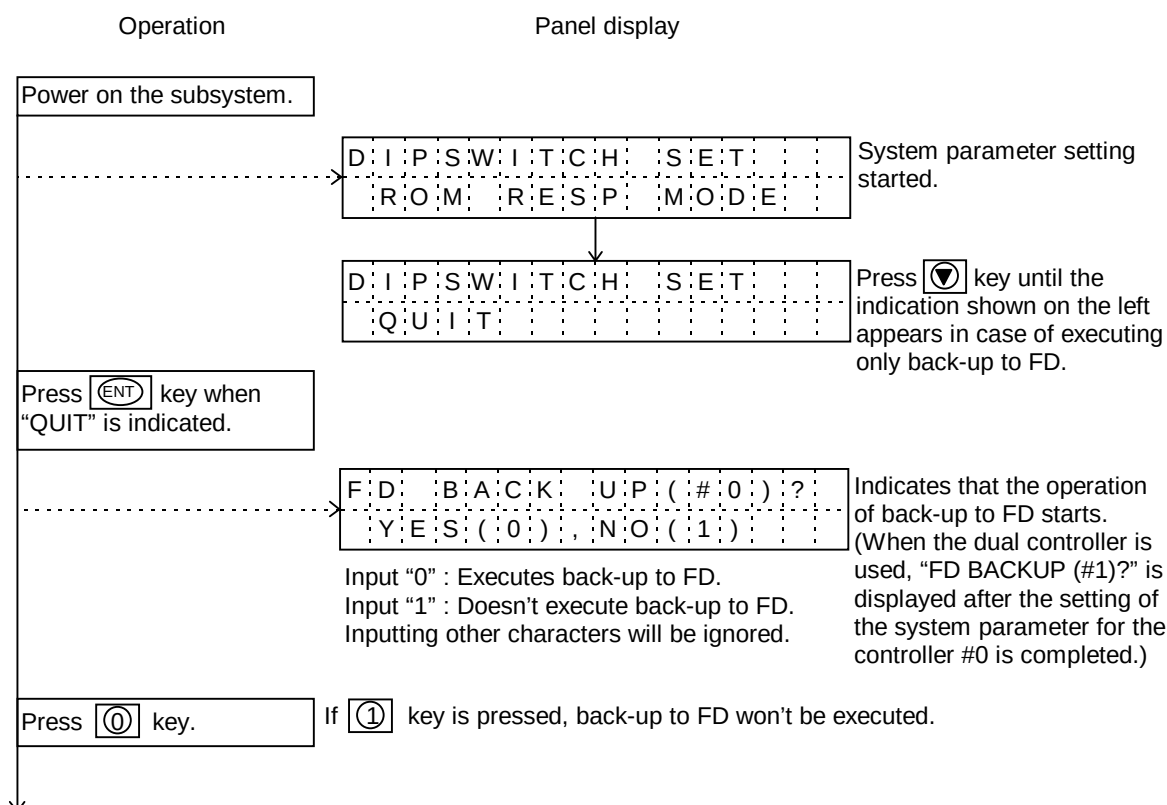
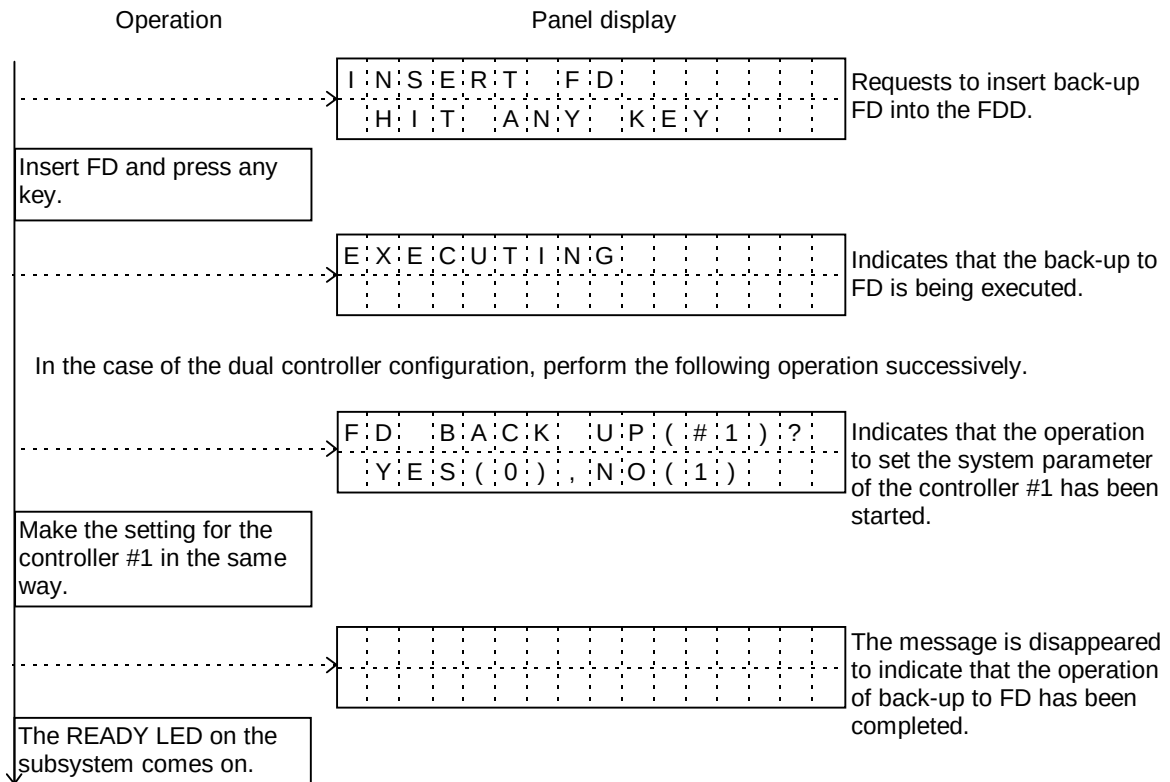


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

- (3) Operate as described below.





(4) Set DIP switch No.4 as shown in Figure 2.3.2.

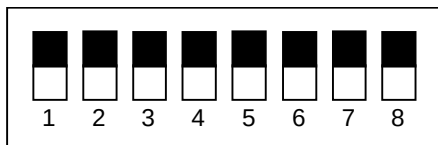
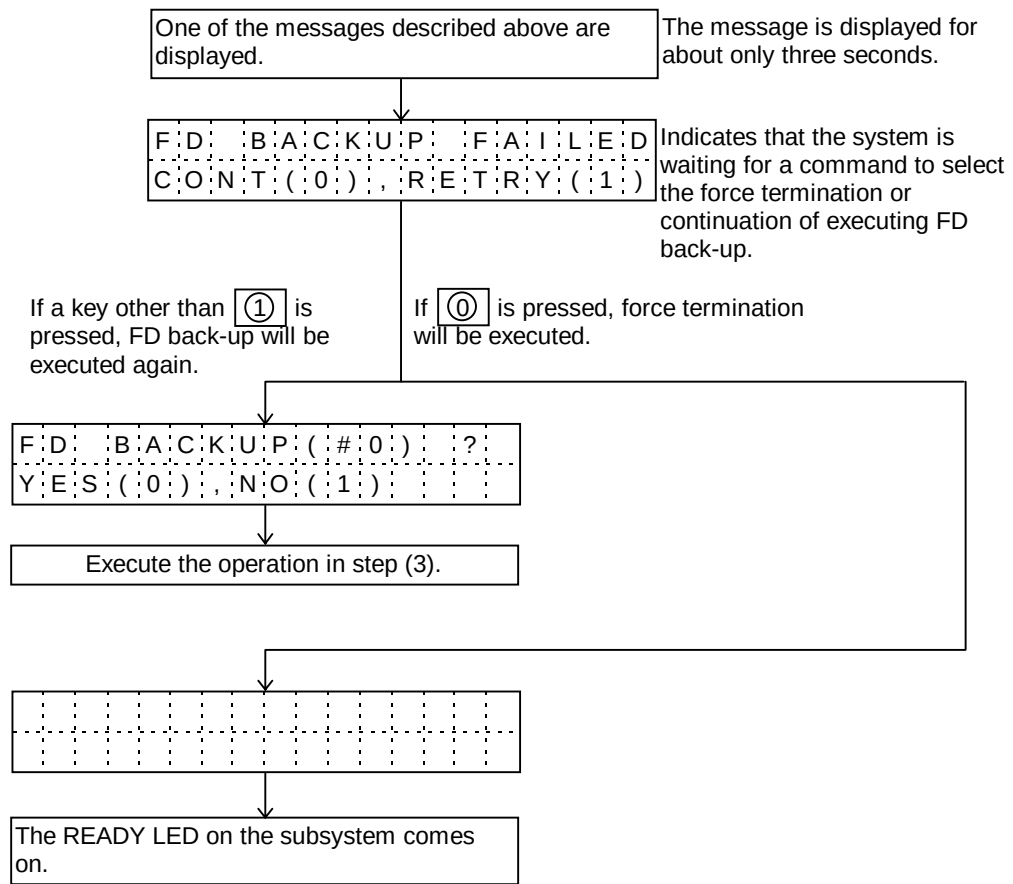


Figure 2.3.2 DIP Switches

Note 1 : While the back-up to FD is being executed, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP switches as shown in Figure 2.3.3.

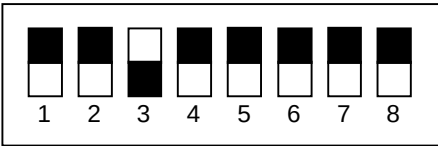
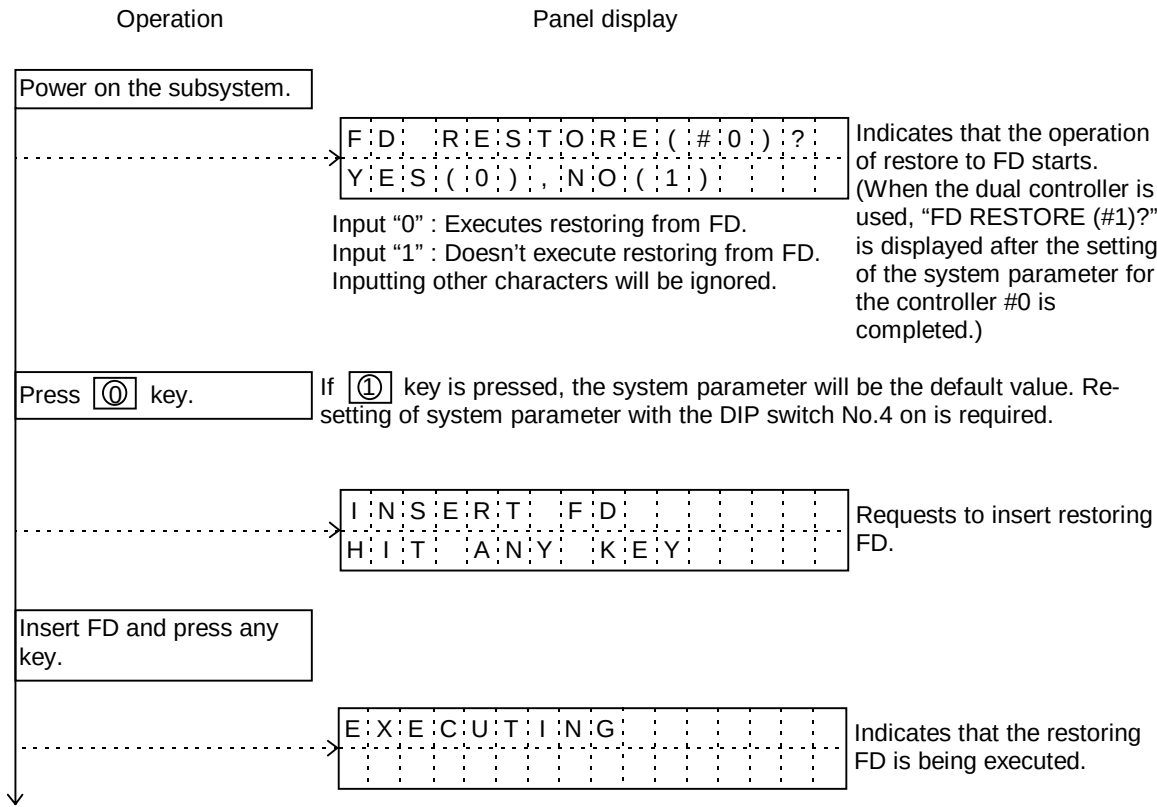
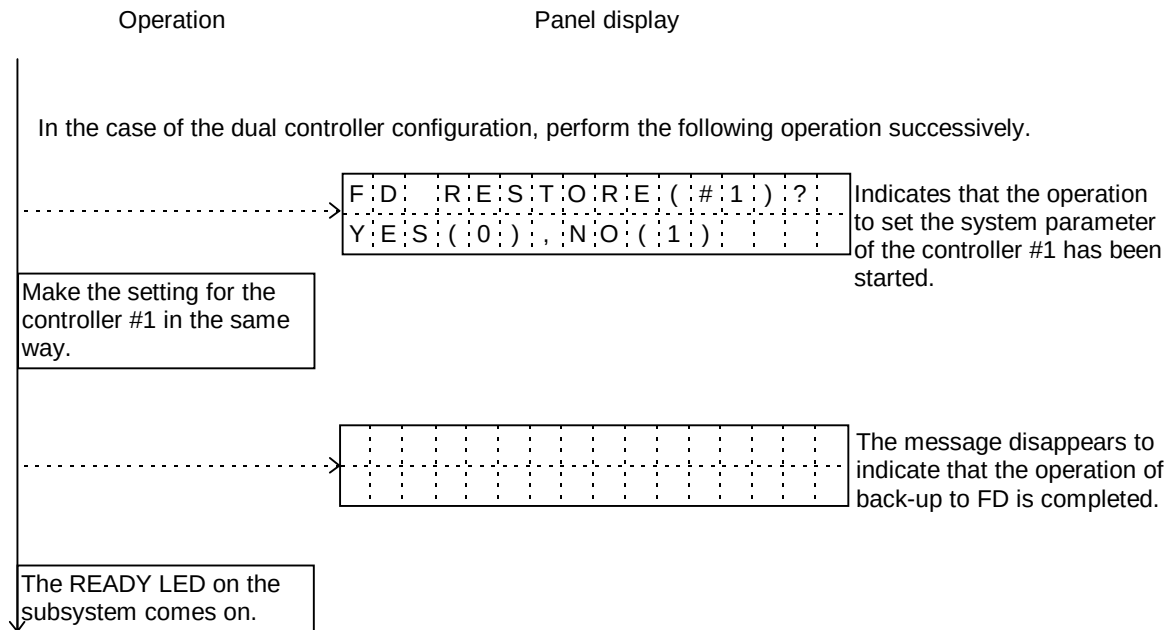


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

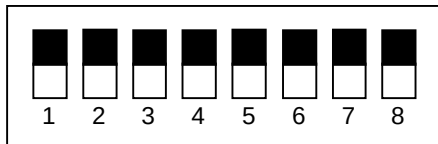
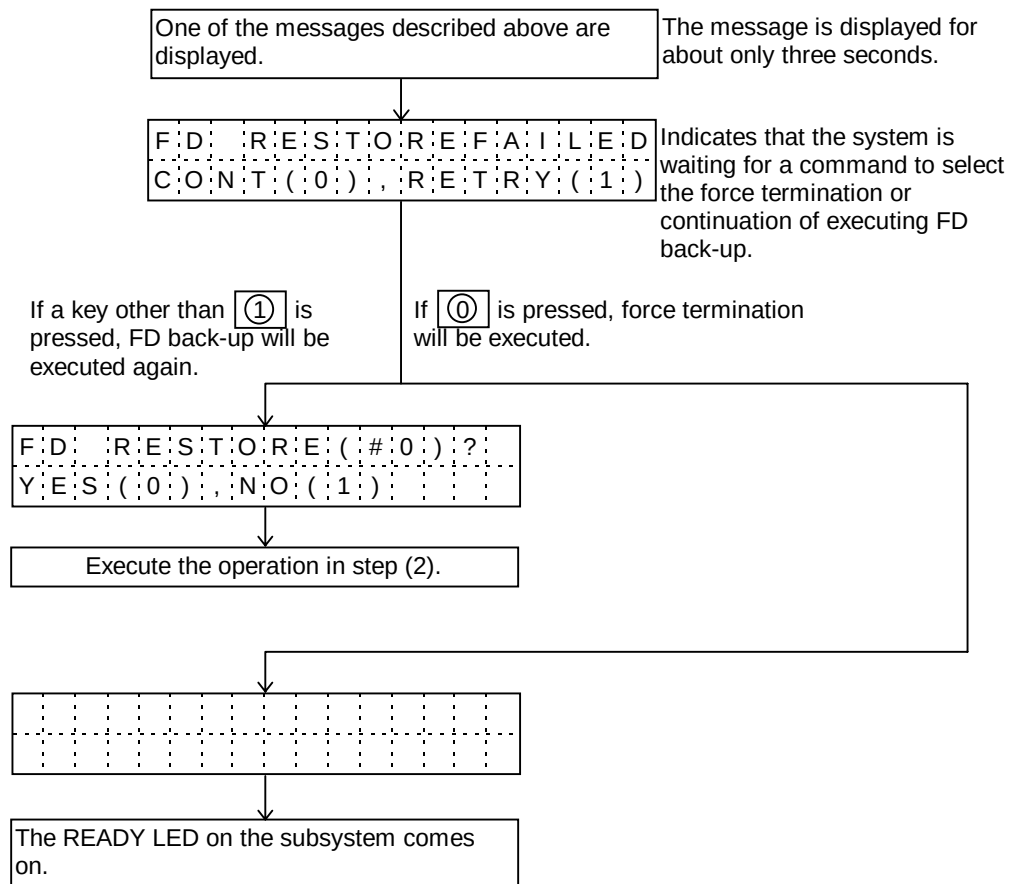


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-execute following the operation described below.



Note 2 : In case that restoring operation ended in failure and was force terminated, setting of EEPROM will be default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

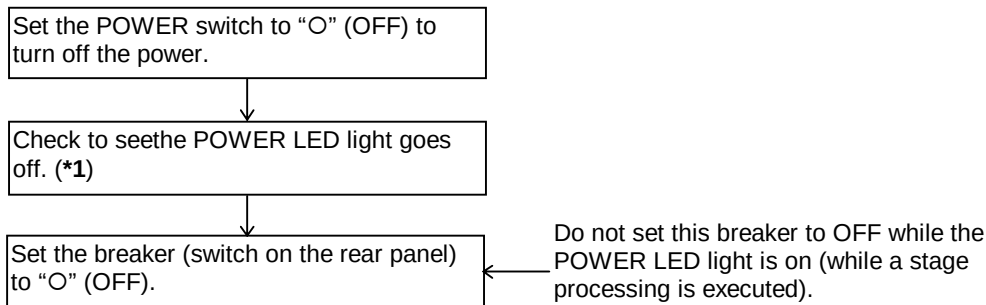
Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

2.4 Power OFF

Turn off the power correctly according to the Power OFF Procedure (1) shown below.

Notice : If optional features are not installed to the system correctly, user data may be lost.

(1) Power OFF procedure



If a power down occurs or the breaker is set to OFF by mistake before the POWER LED goes off, turn on the power right away according to the “(2) Power ON procedure” below, then execute the power off procedure above.

*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to “|” (ON) with the power switch (POWER SW) set to “O” (OFF).

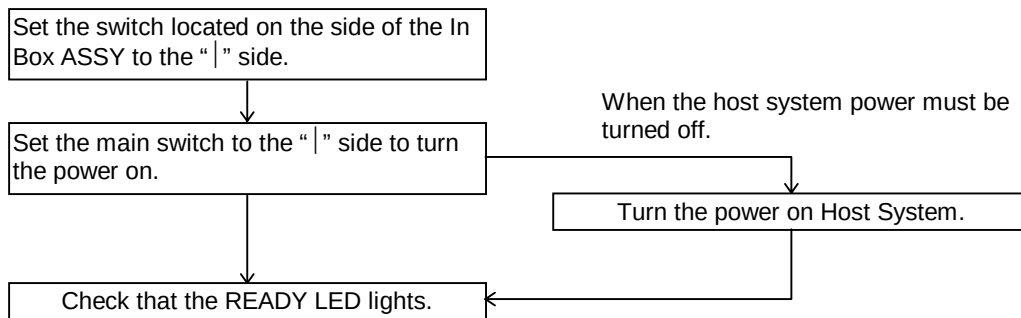
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on----- Indicates the back-up mode.

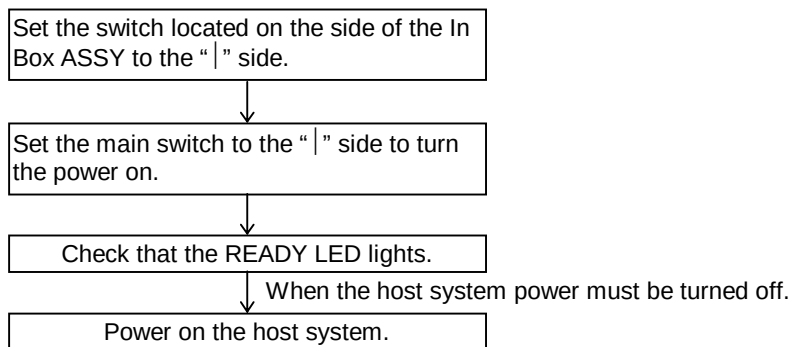
CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.5 Installing the CTL ASSY and I/F ADAPTER ASSY

2.5.1 When changing the single controller configuration to the dual controller configuration

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See CK-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Open the side covers.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on CK-OPTION0160.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked direction (→) at the same time. (See Figure 2.5.1.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.5.1.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

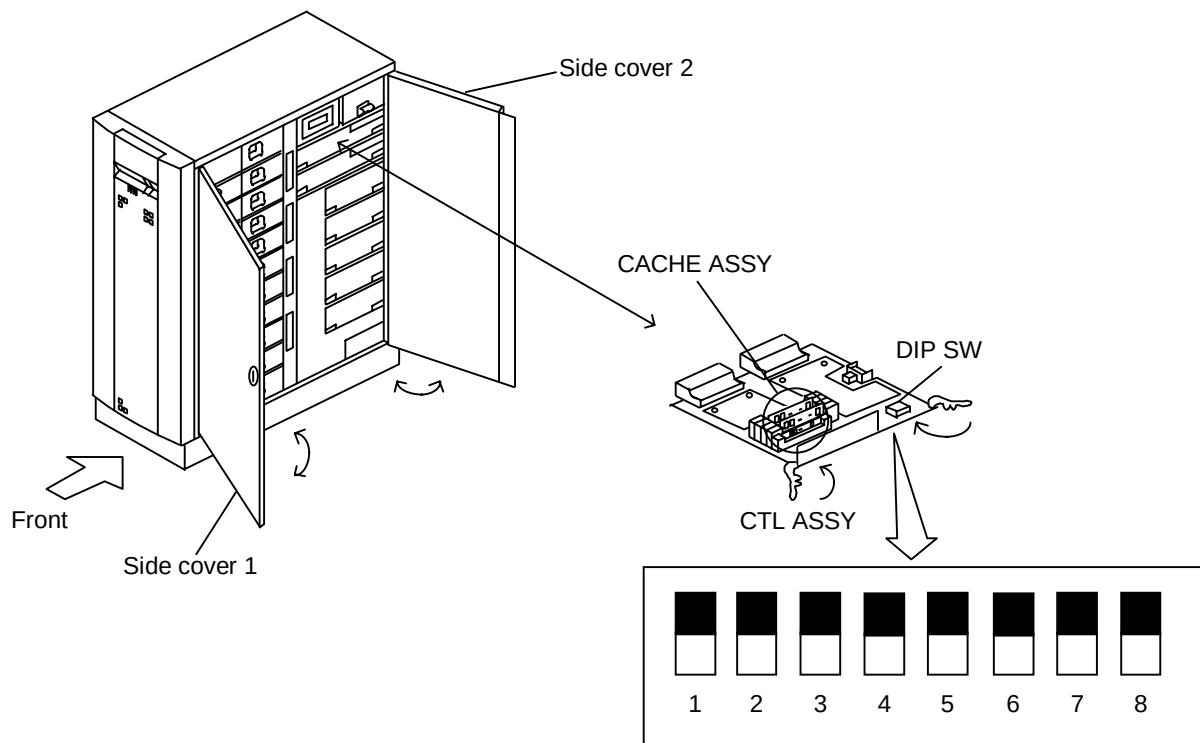


Figure 2.5.1 Installing the CTL ASSY

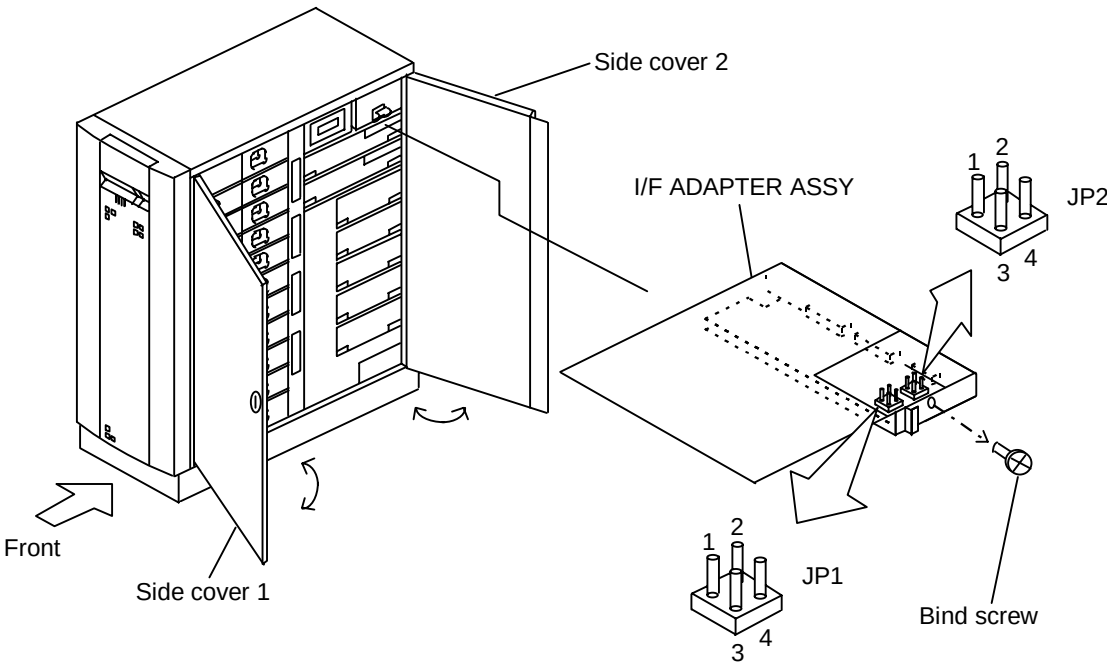
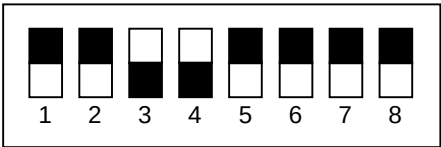


Figure 2.5.2 Installing the I/F ADAPTER ASSY

Table 2.5.1 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. (See CK-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

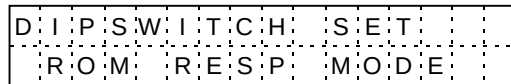
- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See CK-OPTION0090.)

- (10) When system parameter set up menu appears as below, select "DUAL MODE" in "DUAL CONFIG" (setting of Dual operation attribute) menu. (See PANEL0080.)

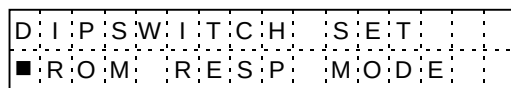
Set target ID for each CTL ASSY individually in "TARGET ID" (setting Target ID) menu.

Set the items #1, 2, 4, 5, 9, 11, 14, 17, 22, 25 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. "■" appears on the panel when the CTL1 system parameter is to be set.
 "■" not displayed : CTL0 system parameter is set.
 "■" displayed : CTL1 system parameter is set.

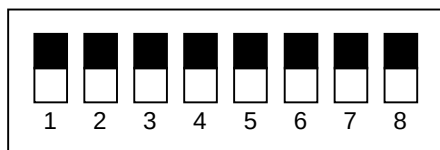


This indicates CTL0 system parameter setting.



This indicates CTL1 system parameter setting.

- (11) After the setting is ended, make a copy of the data into the back-up FD again. (See CK-OPTION0060.)
- (12) Check to see that READY LED is on.
- (13) Turn off the unit (by setting the POWER switch on the front panel to off).
- (14) Set the DIP SW on both boards as shown below.



- (15) Turn on the unit (by setting the POWER switch on the front panel to on). (See CK-OPTION0110.)
- (16) In a short while, the READY LED on the unit comes on.
 Check to see "Version XXXX/X" is displayed on the PANEL, and that corresponds to see system floppy disk version.
- (17) Close the side covers.

2.5.2 When changing the single controller configuration using in WolfPack connection to the dual controller configuration

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See CK-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Open the side covers.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on CK-OPTION0160.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked direction (→) at the same time. (See Figure 2.5.3.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.5.3.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

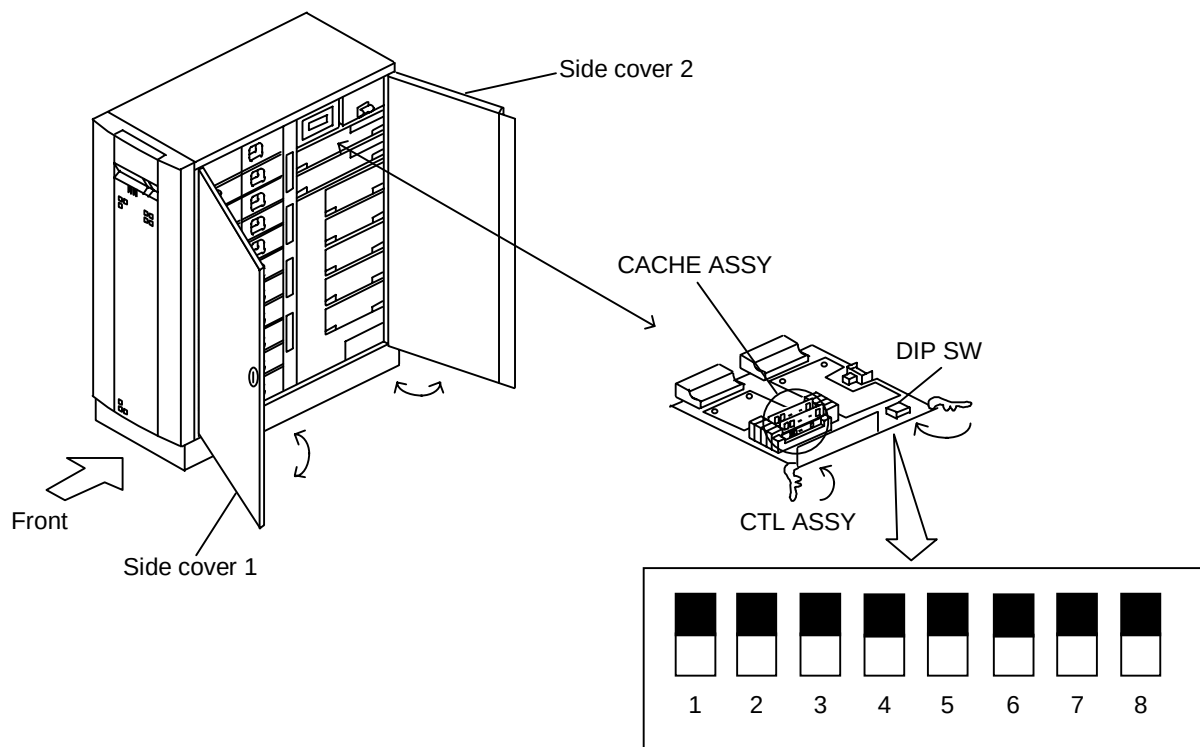


Figure 2.5.3 Installing the CTL ASSY

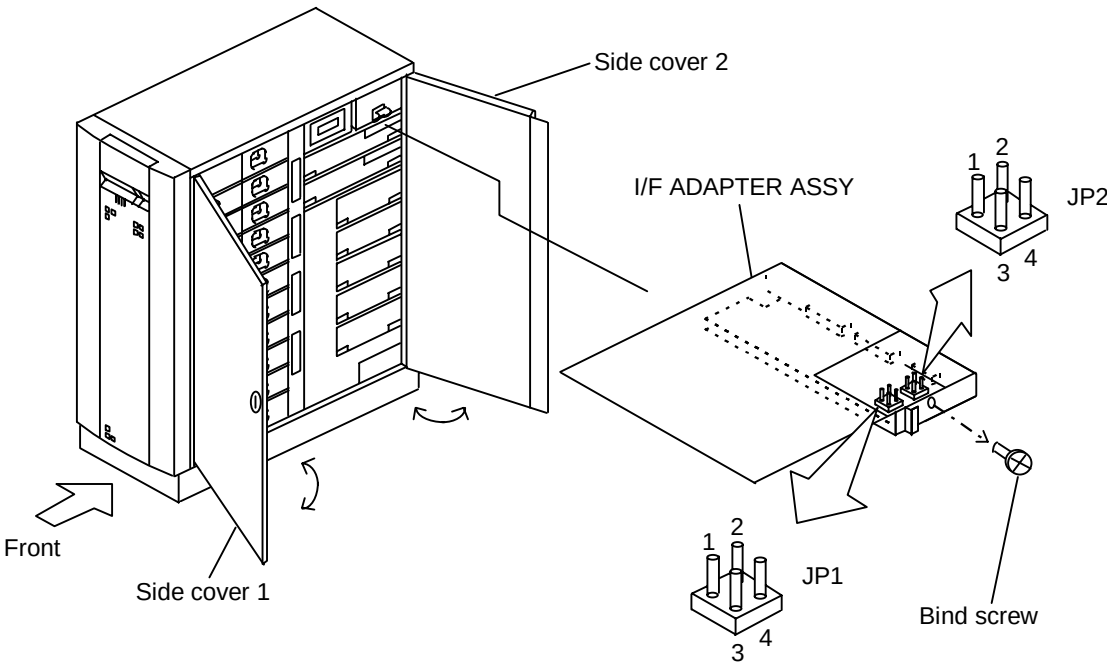
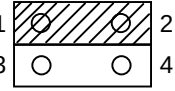
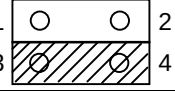
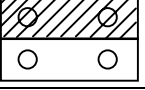
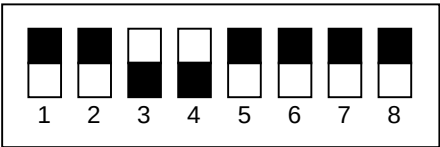


Figure 2.5.4 Installing the I/F ADAPTER ASSY

Table 2.5.2 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. (See CK-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See CK-OPTION0090.)

(10) Set the following system parameters.

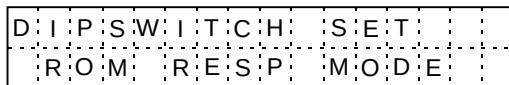
- Set the attribute to “DUAL ACTIVE” and “DATA SHARE MODE” in the DUAL CONFIG (dual operation attribute setting) menu window.
- Set the code “0020” in the OPTION (option code setting) menu window.
- Set the target ID separately for the both CTL ASSYs in the TARGET ID (target ID setting) menu window.

Set the items #1, 2, 4, 5, 9, 11, 14, 17, 22, 25 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

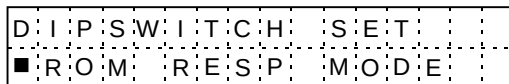
- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. “■” appears on the panel when the CTL1 system parameter is to be set.

“■” not displayed : CTL0 system parameter is set.

“■” displayed : CTL1 system parameter is set.



This indicates CTL0 system parameter setting.



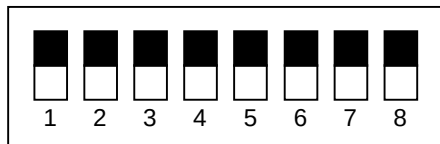
This indicates CTL1 system parameter setting.

(11) After the setting is ended, make a copy of the data into the back-up FD again. (See CK-OPTION0060.)

(12) Check to see that READY LED is on.

(13) Turn off the unit (by setting the POWER switch on the front panel to off).

(14) Set the DIP SW on both boards as shown below.



(15) Turn on the unit (by setting the POWER switch on the front panel to on). (See CK-OPTION0110.)

(16) In a short while, the READY LED on the unit comes on.

Check to see “Version XXXX/X” is displayed on the PANEL, and that corresponds to see system floppy disk version.

(17) Close the side covers.

2.6 Installing the CACHE ASSY

- (1) Turn off the power according to the power-off procedure in CK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- (2) Open the side covers.

- (3) Remove the CTL ASSY. (See CK-OPTION0120.)

(When a DF-F350-F2MCF has been installed already, remove both boards, and here after in the same way.)

- (4) Install a CACHE ASSY.

Note 1 : The capacity of the CACHE ASSYs to be mounted in cache slots #0 and #4, slots #1 and #5, slots #2 and #6, and slots #3 and #7 must be the same.

Note 2 : If a DF-F350-F2MCF has been installed already, mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- (5) Mount the CTL ASSY.

- (6) Turn on the power according to the power-on procedure in CK-OPTION0110.

- (7) Close the side covers, and turn the power on. (See CK-OPTION0110.)

Installation example of CACHE ASSY

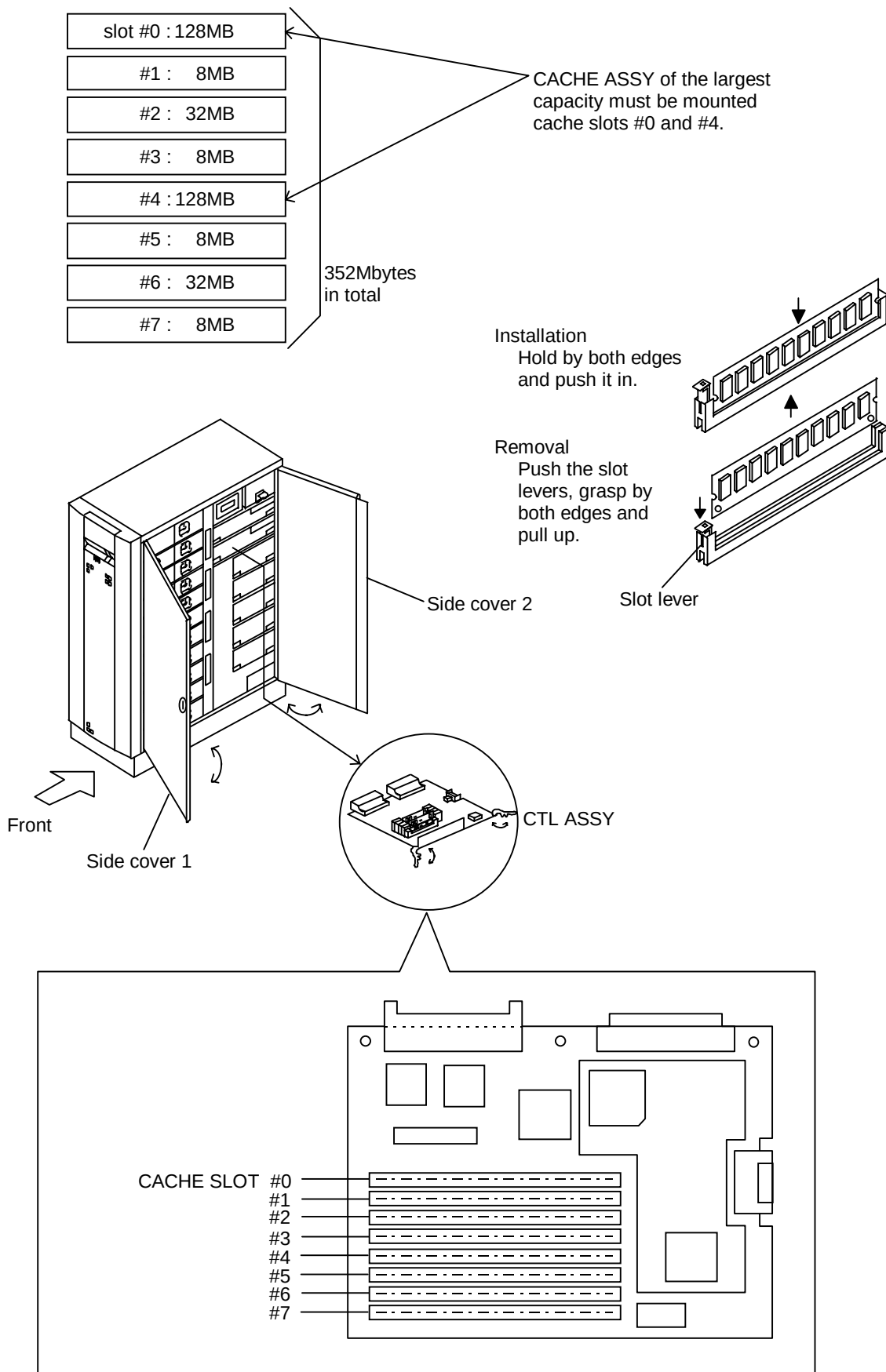


Figure 2.6.1 Installing a CACHE ASSY

2.7 Installing the LAN ASSY

- (1) Turn off the power according to the power-off procedure in CK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the side covers.
- (3) Remove the CTL ASSY. (See CK-OPTION0120.)
- (4) Install a LAN ASSY. (See Figure 2.7.1.)

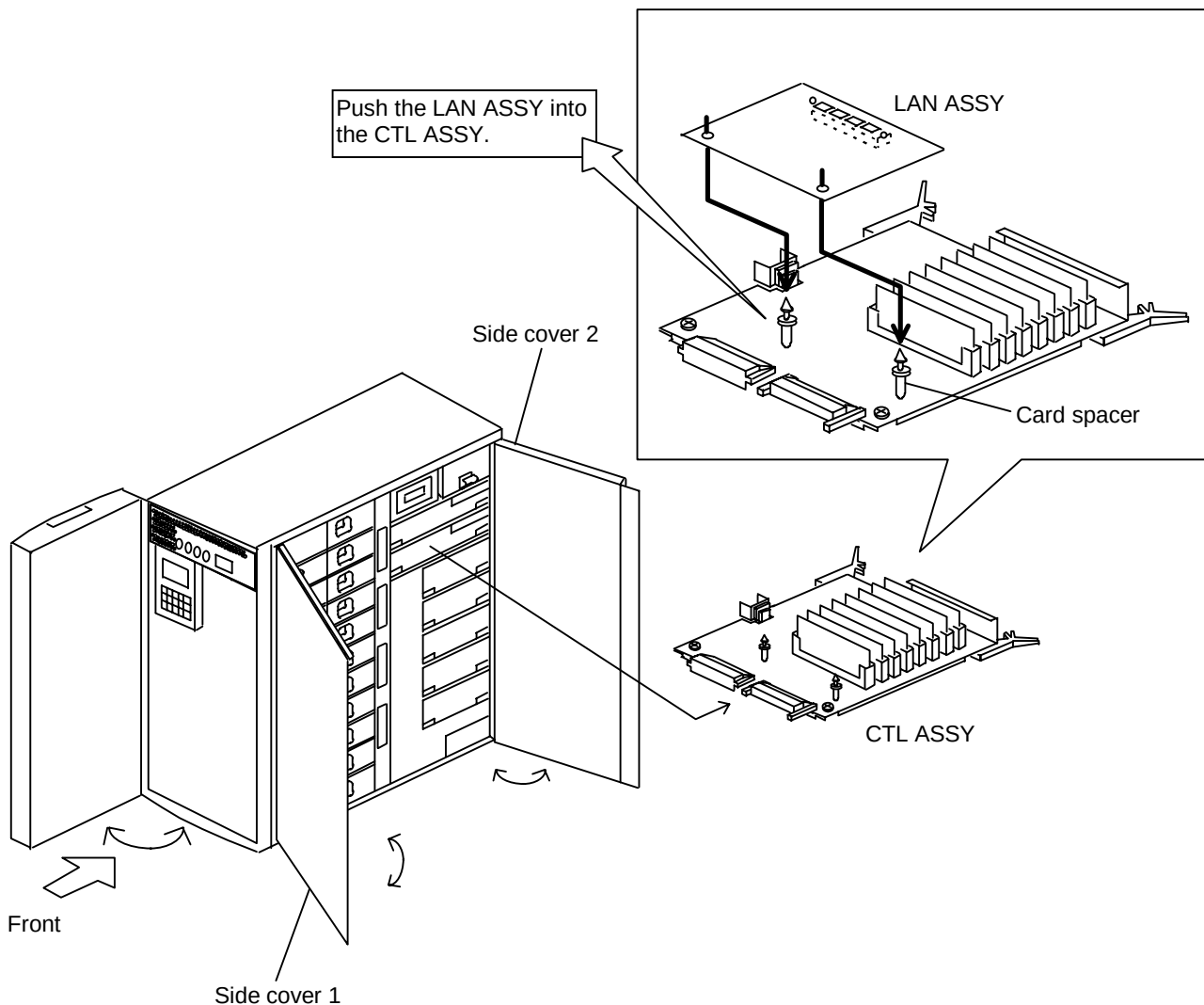
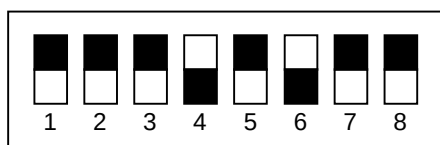


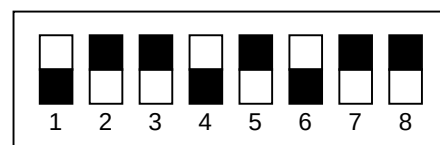
Figure 2.7.1 Installing a LAN ASSY

- (5) Mount the CTL ASSY.
 - (6) Set the DIP switches on the CTL ASSY as described below. (See CK-OPTION0120.) depending on the LAN ASSY to be used.
- (When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

[DF-F350-G1M1]



[DF-F350-G2M1 (SNMP)]



- (7) Turn on the power according to the power-on procedure in CK-OPTION0110.
- (8) Open the front cover.
- (9) Set LAN connection state on the panel.

① Panel display



← Pressing , key, items are scrolled.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk "*".)

② Displayed Item

No.	Message display	Description
1	CONNECT	LAN connected
2	NOT CONNECT	LAN not connected

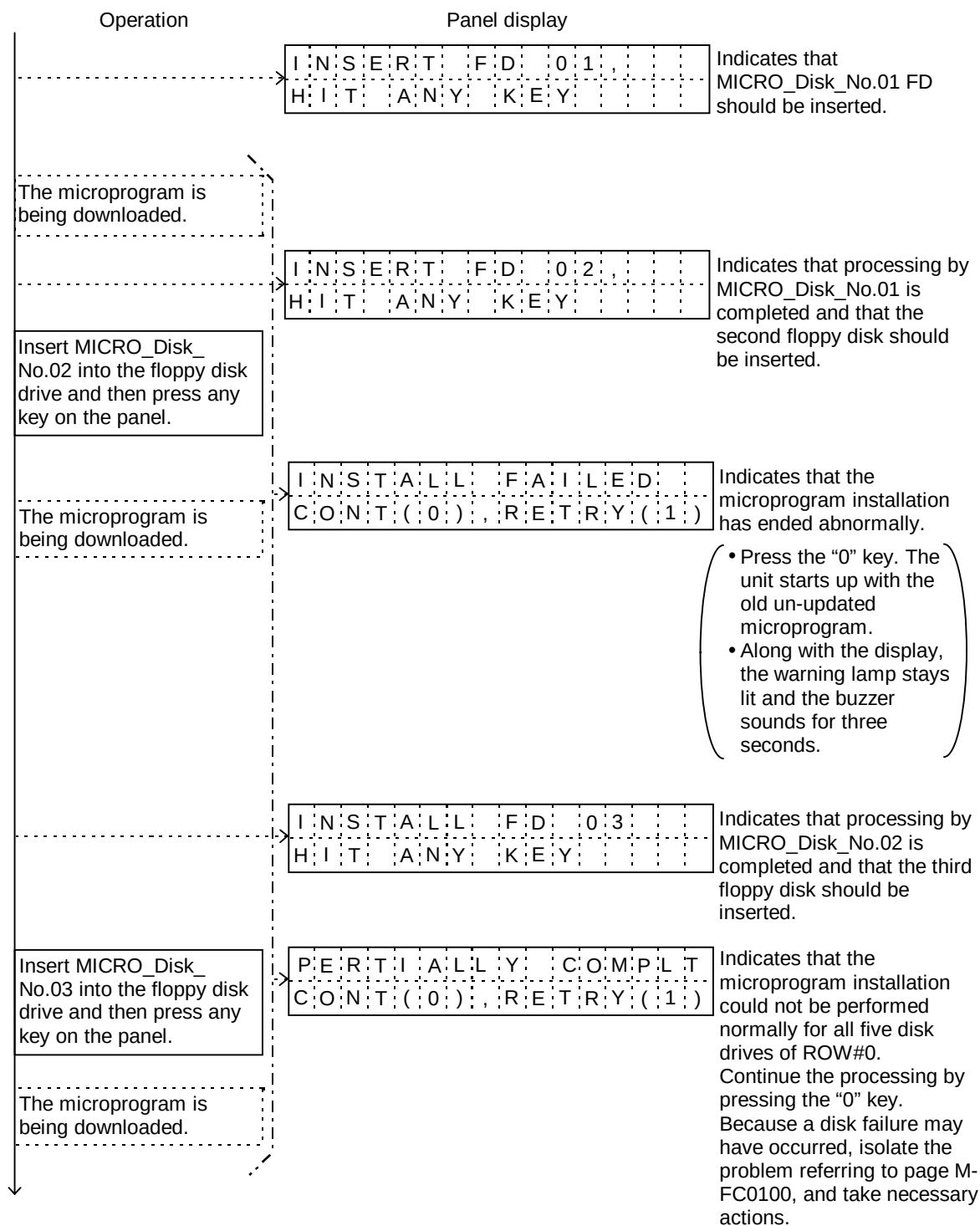
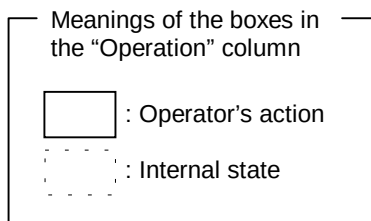
- (10) Set IP address on the panel. (See CK-INST0330)
- (11) Set SUB NET MASK. (See CK-INST0340)
- (12) Set DEFAULT GATEWAY address. (See CK-INST0350.)
- (13) Set System parameter on the panel. (See CK-INST0290.)
- (14) After setting ② in Chapter 5 and selecting "QUIT" on the panel, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of the system parameter.

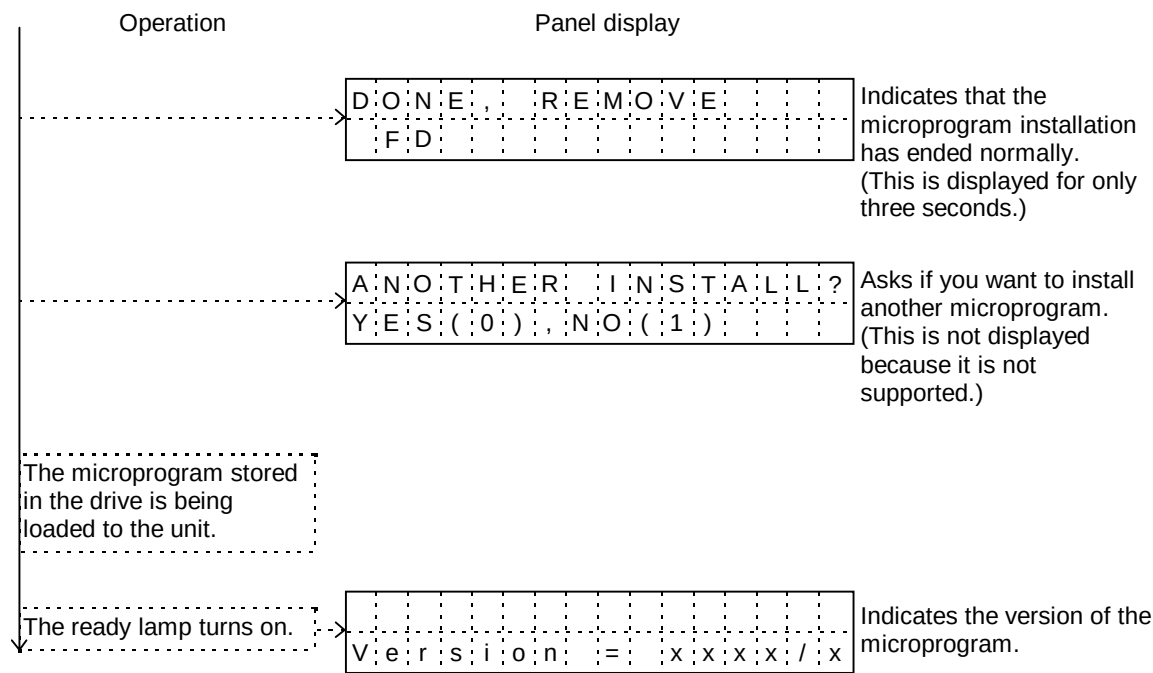


If this message appears, make a back-up copy of the data in the EEPROM into the BACKUP floppy disk.
In case of dual configuration, "FD BACK UP (#1)?" is displayed. Select the controller to be restored.

(15) Perform the following procedure.

Note : Use a set of three FDs (containing a microprogram corresponding to the SNMP) supplied with the DF-F350-G2M1 when it is shipped from the factory.





- (16) Reset the DIP switches (4, 6 or 1, 4, 6) to the original positions after the system is ready.
(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)
- (17) Close the front cover.
- (18) Close the side covers.

2.8 Installing the AC/DC Power Supply

Perform the following procedure

(1) Installing procedure

- ① Turn off the subsystem following the power-off procedure explained in CK-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

- ② Open the side covers.
- ③ Loosen the screw ① on the safety cover and disconnect one end of the FG cable.
- ④ Loosen the screws ② on the safety cover and remove the safety cover with moving the plates in the arrow-marked direction (→).
- ⑤ Insert the redundant AC/DC power supply in a predetermined position and push the handle in the arrow-marked direction (→).
- ⑥ Fix the FG Cable detached in ② with screw ①.
- ⑦ Close the side covers.
- ⑧ Turn on the subsystem following the power-on procedure explained in CK-REP0050.

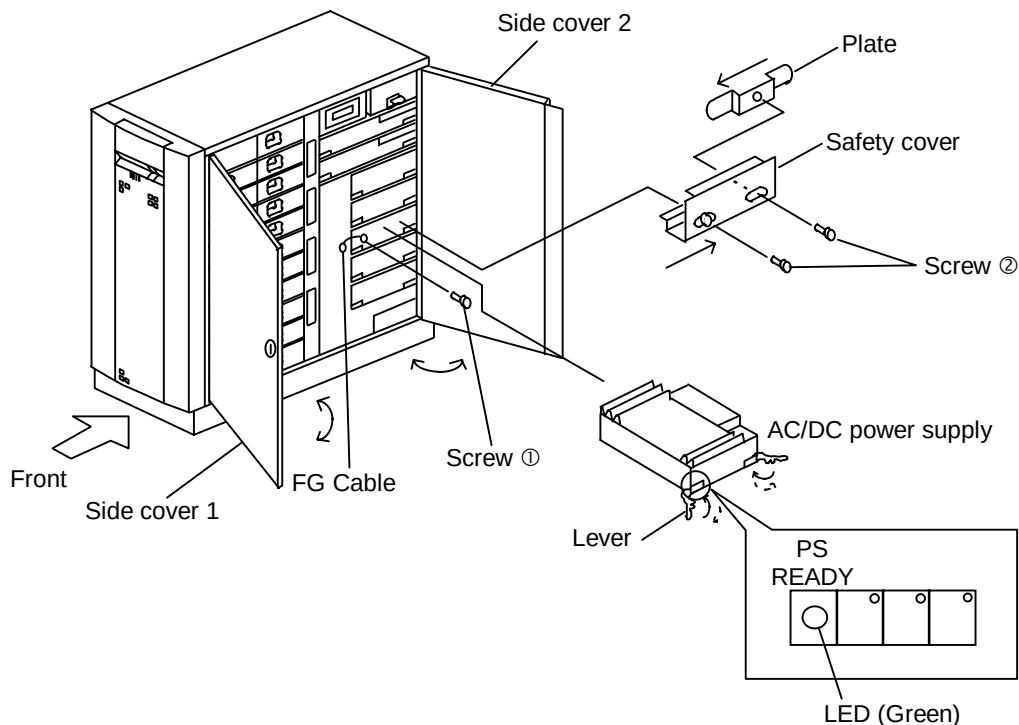


Figure 2.8.1 Installing the AC/DC Power Supply

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REV.2	Jan.1997	Apr.1997	Dec.1997			

2.9 Installing the HDU ASSY

Since the procedure differs depending on the cases below, be careful in installing the HDU ASSY.

- [1] Capacity expansion with HDU ASSY exchange
- [2] Capacity expansion with additional HDU ASSY installation
- [3] Installing a spare HDU ASSY



Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

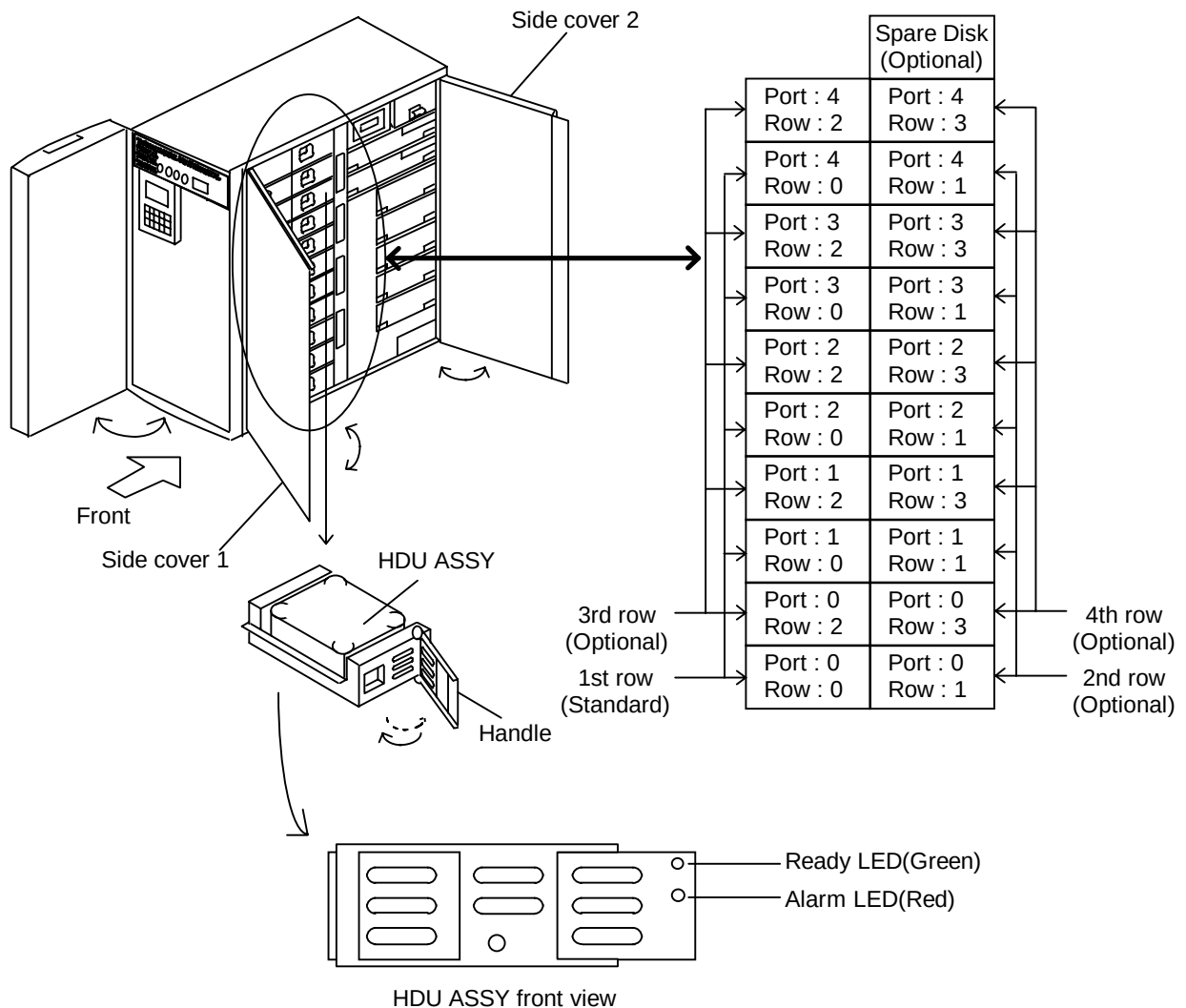


Figure 2.9.1 Installing the HDU ASSY

[1] Capacity expansion with HDU ASSY exchange

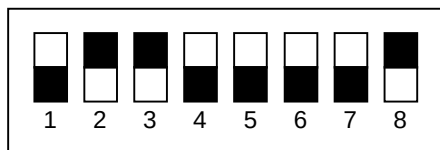
After this operation all the user's data will be lost. Be sure to make a back-up copy of data before beginning this operation. (See CK-OPTION0050.)

- (1) Turn off the power according to the power-off procedure in CK-OPTION0110.

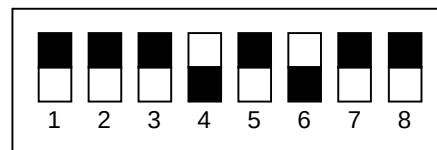
Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side covers.
 (3) Remove the old HDU ASSY and set the new HDU ASSY. (See Figure 2.9.1 in CK-OPTION0210.)
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



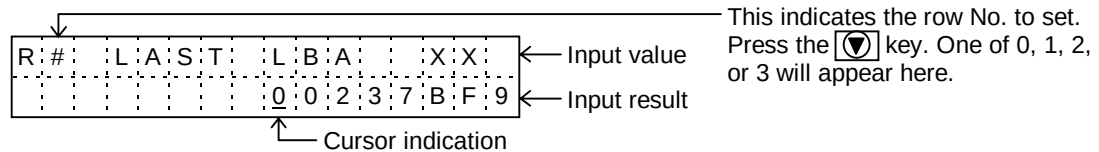
For ROW=0



For ROW≠0

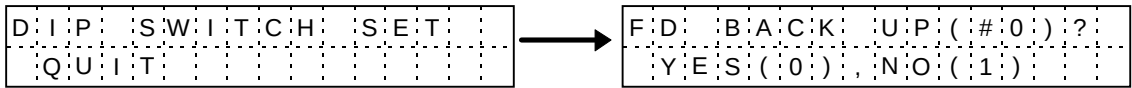
- (5) Turn on the power according to the power-on procedure CK-OPTION0110.
 (6) Set LBA on the panel following the table below. Set the capacity of each drive following the display. (See CK-OPTION0240.)

- When ROW LAST LBA is displayed;



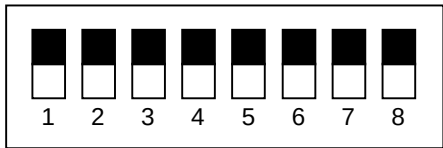
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting “QUIT” on the panel, when “FD BACK UP” appears on the screen, insert a back-up FD and make a back-up copy of the system parameter. The “FD BACK UP” message may not appear for some unit types, so ignore this step in that case.



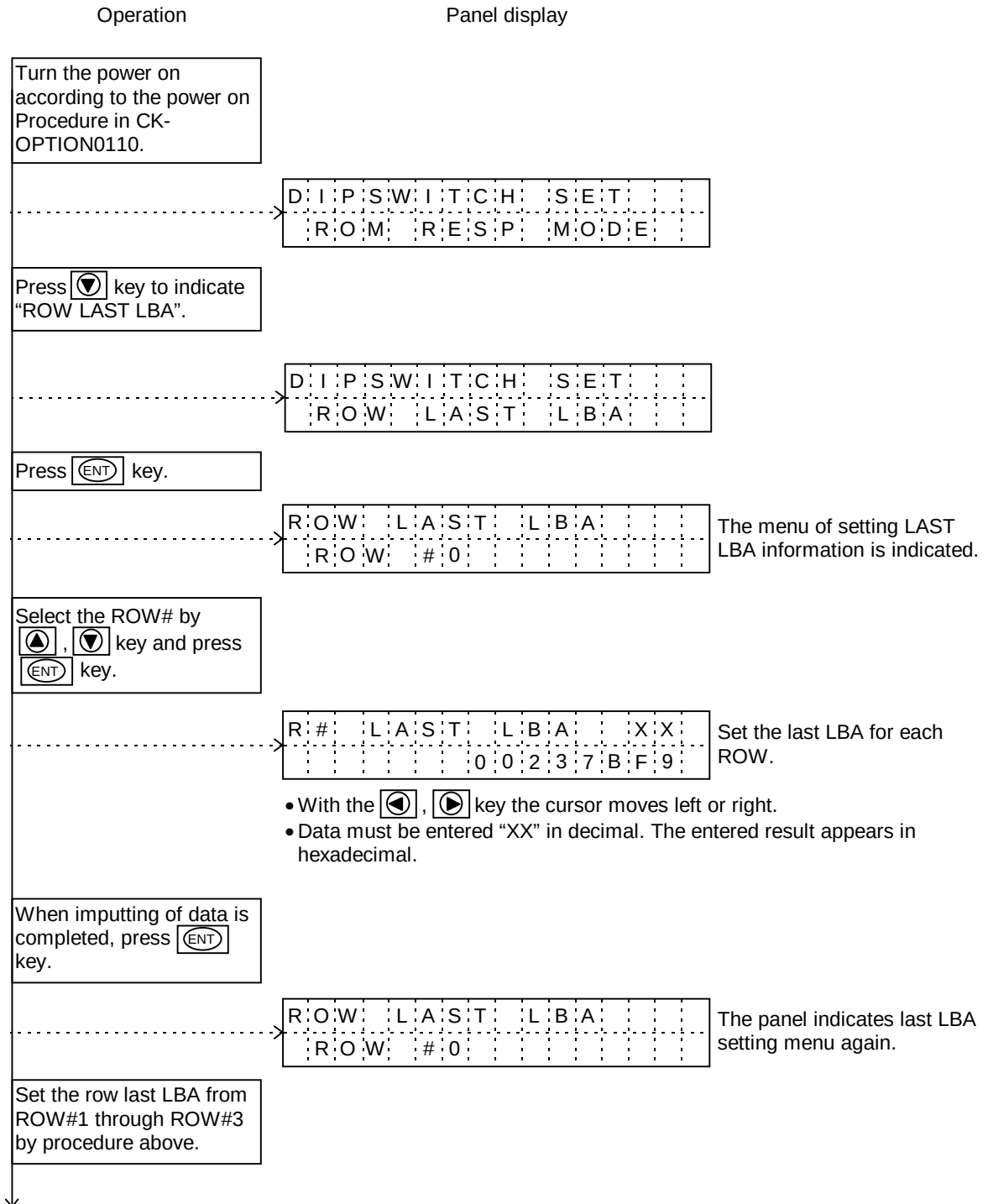
If this message appears, make a back-up copy of the data in the EEPROM into the back-up floppy disk.
In case of dual configuration, “FD BACK UP (#1)?” is displayed.
Select the controller to be restored.

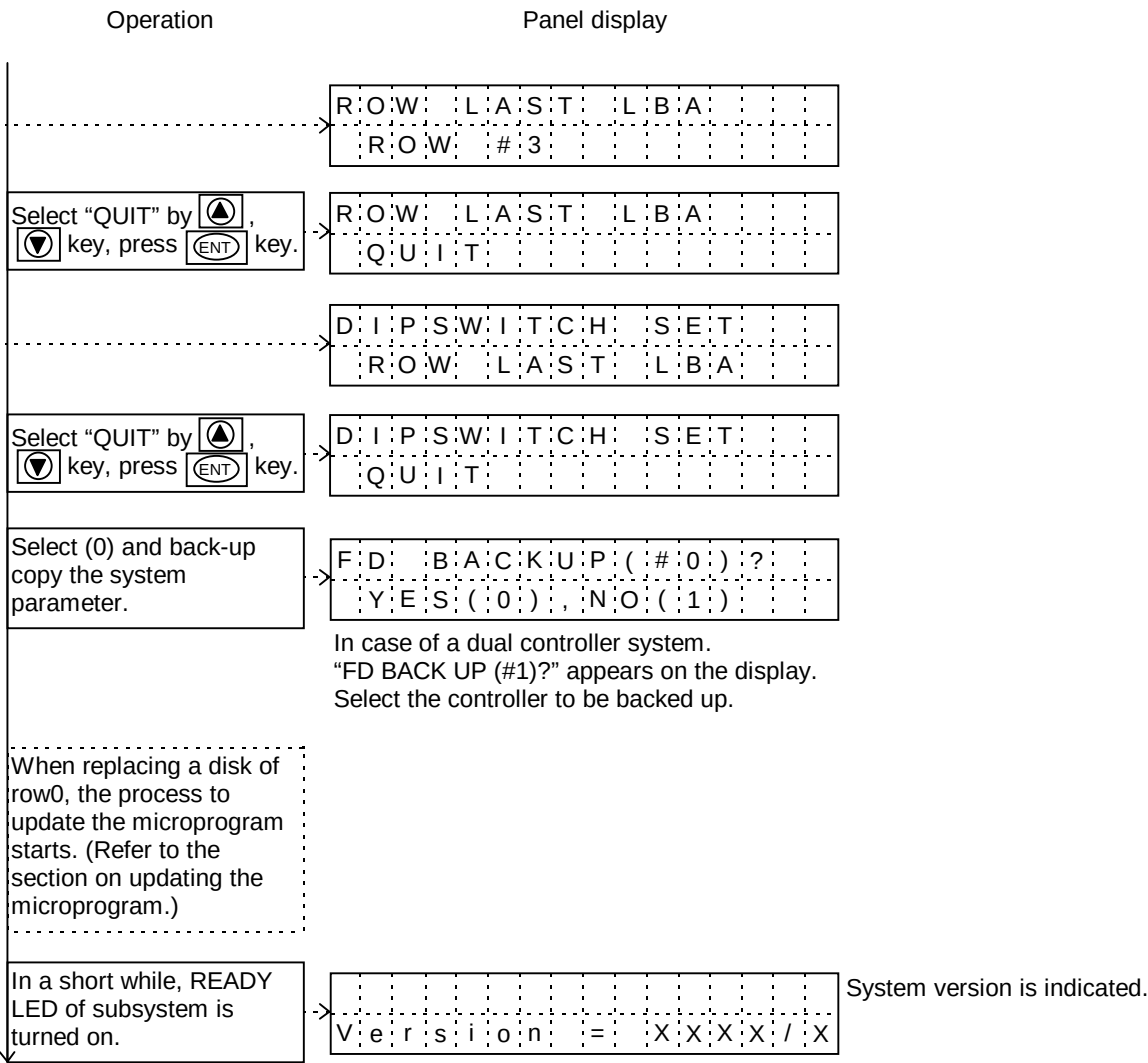
- (8) Reset the DIP switch 4 and 6 to the original positions after the system is ready.



- (9) Only in case of exchanging ROW0 disk, revise the microprogram. (See section “MICROPROGRAM-FC”)
- (10) Set up the RAID group and the LU. (See Installation Chapter.)

Set the LAST LBA number on the panel according to the flow below.





[2] Capacity expansion with additional HDU ASSY installation

Additional HDU installation to a new ROW.

- (1) Turn off the power according to the power-off procedure in CK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) When the capacity of the AC/DC power supply becomes short owing to the addition of the disk, add the AC/DC power supply. (see page CK-OPTION0190.)

Table 2.9.1 Number of Required AC/DC Power Supplies Corresponding the Number of Rows

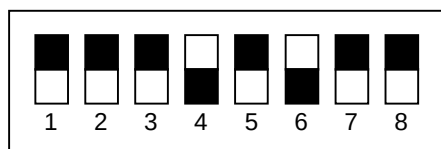
Number of Rows	Number of power supplies (without redundancy)	Number of power supplies (with redundancy)
1	1	2
2	2	3
3	3	4
4	4	5

- (3) Open the front cover and the side cover.

- (4) Install an additional HDU ASSY.

- (5) Set the DIP switches 4 and 6 on the CTL ASSY to down.

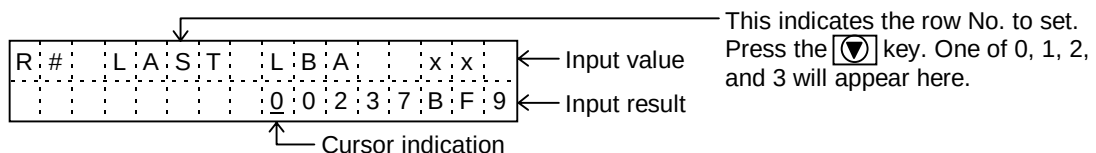
(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



- (6) Turn on the power according to the power-on procedure in CK-OPTION0110.

- (7) Set the system LBA number with the panel according to the table below. In setting the available capacity of each drive follow ROW LAST LBA menu. Set the capacity following the displayed menu. (See CK-OPTION0240.)

- When ROW LAST LBA is displayed;



No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (8) After selecting "QUIT" on the panel screen, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.

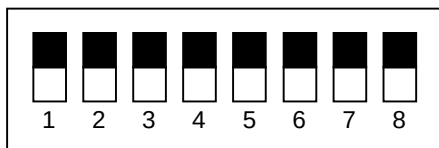
D	I	P	S	W	I	T	C	H	S	E	T
Q	U	I	T								



F	D	B	A	C	K	U	P	(	#	:	0	)	?
Y	E	S	(	:	0	)	N	O	(	:	1	)	

If this message appears, select (0) and make a back-up copy of the data in the EEPROM into the back-up floppy disk.
In case of a dual system, it is displayed "FD BACK UP (#1)?". Select the controller to be backed up.

- (9) Reset the DIP switch 4, 6 to the original positions after the system is ready.



- (10) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

Additional HDU installation to existing ROW.

- (1) Turn off the power according to the power-off procedure in CK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side covers.
(3) Install additional HDU.

Be sure to install an HDU of capacity no less than pre-installed HDUs. When an HDU of less capacity is installed, after power on (5), warning LED will light up and display shown in Figure 2.9.1 will appear.

Prepare an HDU of appropriate capacity and re-install from (1).

Set the capacity referring to the system parameter setting table.

H	Z	1	4	X	Y	P	O	N	C	A	P	-	X	Y

X : Port number

Y : Row number

Figure 2.9.1 Panel Display when Improper Capacity

- (4) Turn the power on following the power on procedure. (See CK-OPTION0110.)
(5) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

[3] Installing a spare HDU ASSY

- (1) Turn off the power according to the power-off procedure in CK-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open the front cover and the side cover.
 (3) Install a spare HDU ASSY.

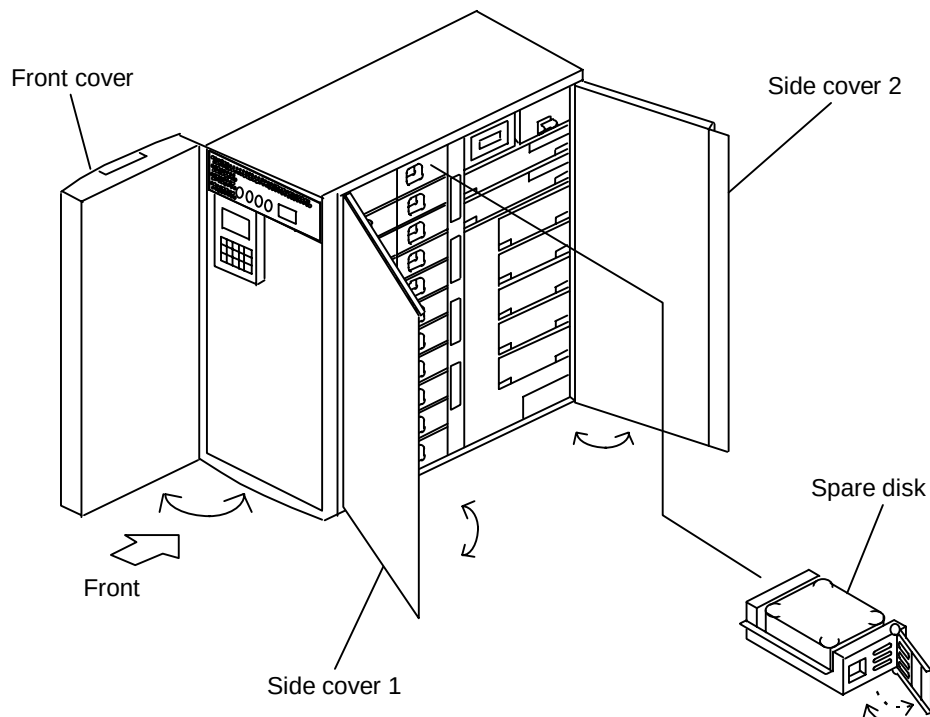
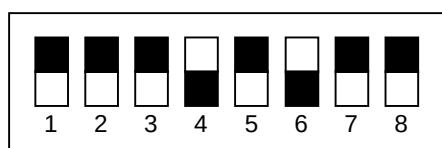


Figure 2.9.2 Installation of Spare Disk

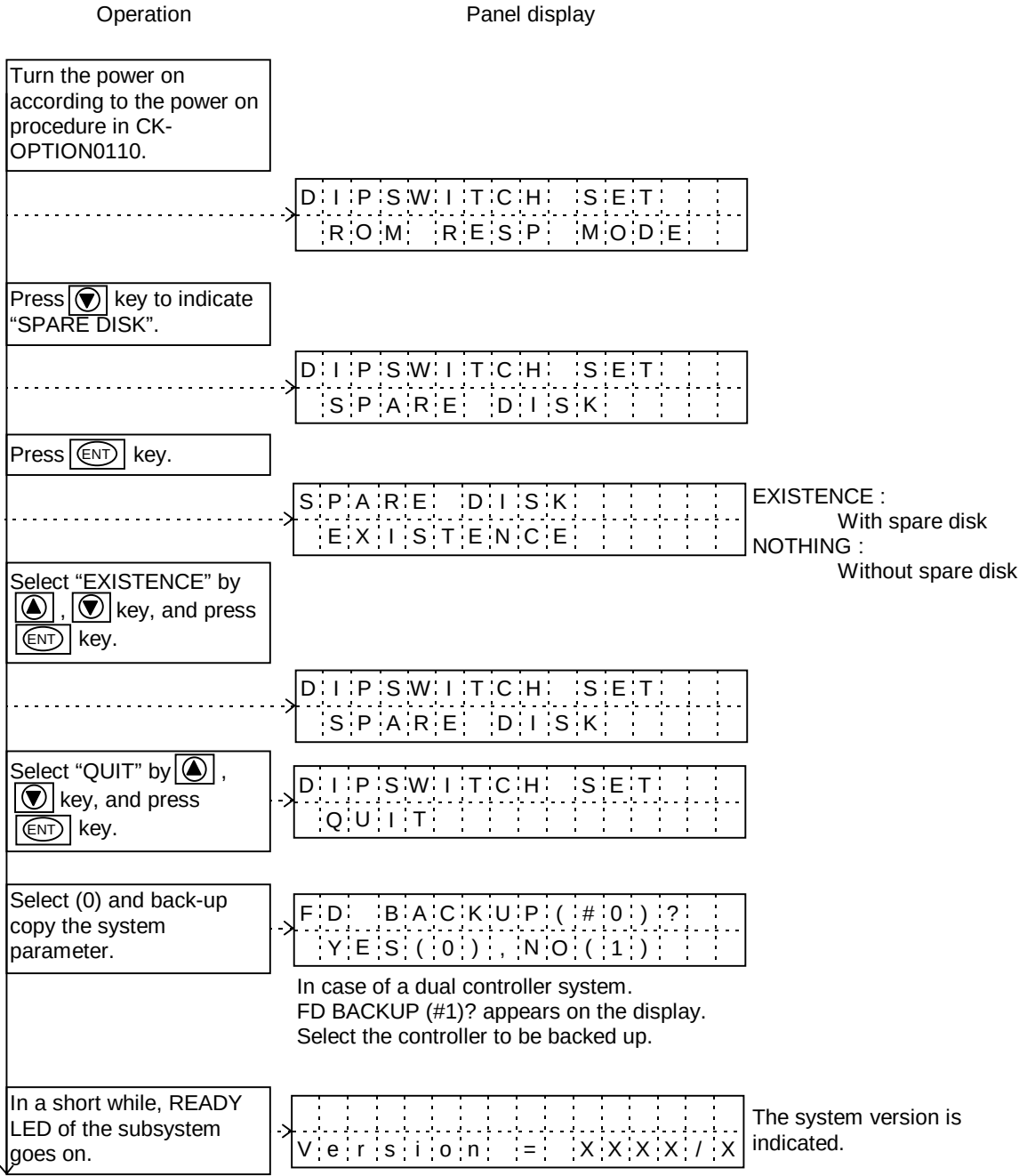
- (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

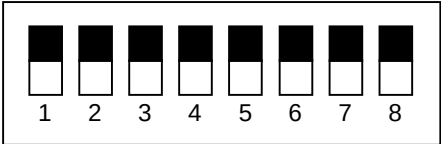


- (5) Turn on the power according to the power-on procedure in CK-OPTION0110.

(6) Set the spare disk from the PANEL according to the flow below.



(7) Reset the DIP switches 4 and 6 to the original positions, after READY LED lit up.



(8) Close front cover and side covers.

DF350 Disk Subsystem
10. PARTS CATALOG
(Cabinet Type)

Rev.4

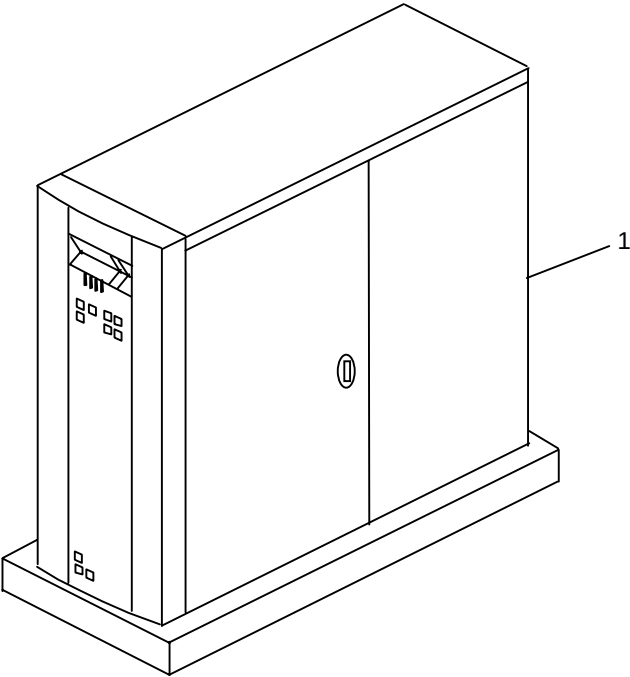
Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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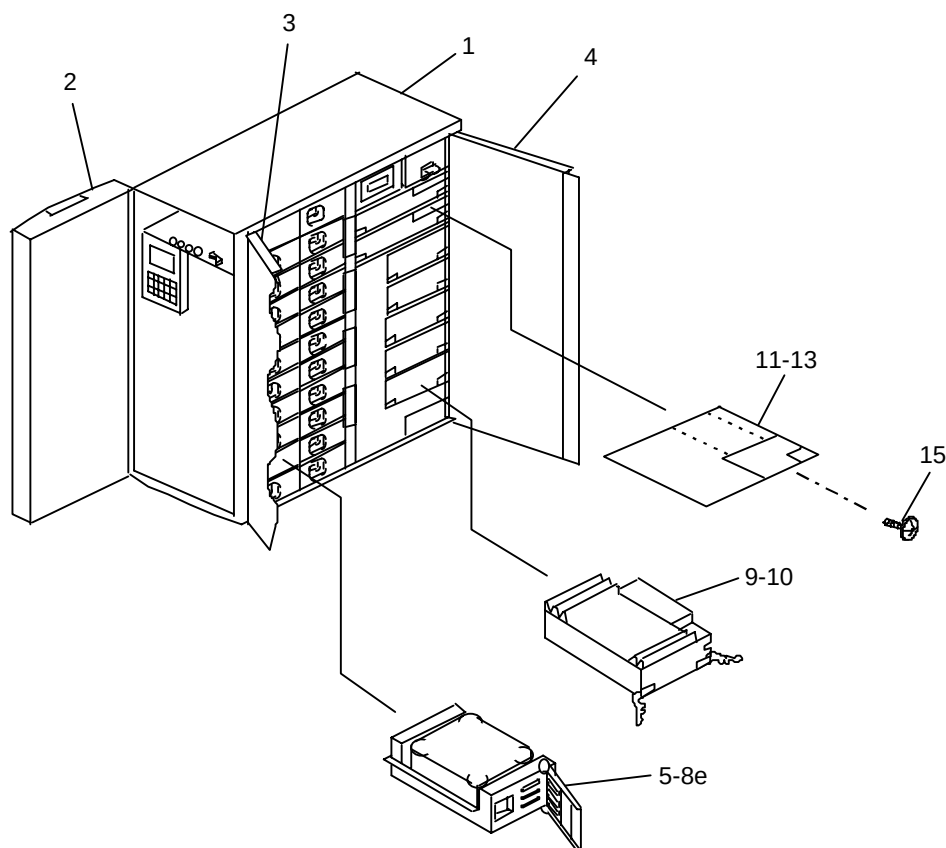
HOW TO USE THIS PARTS CATALOG

LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2100445-A	• FINAL ASSY (SEE LIST 1)	1	
2	2100451-A	• FRONT COVER ASSY	1	
3	3240336-A	• SIDE COVER (R1) ASSY	1	
4	3240337-A	• SIDE COVER (R2) ASSY	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-21	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-21	S.P.
7	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-21	S.P.
8	3243084-Q	• HDU ASSY (DF-F350-A2E4A)	2-21	S.P.

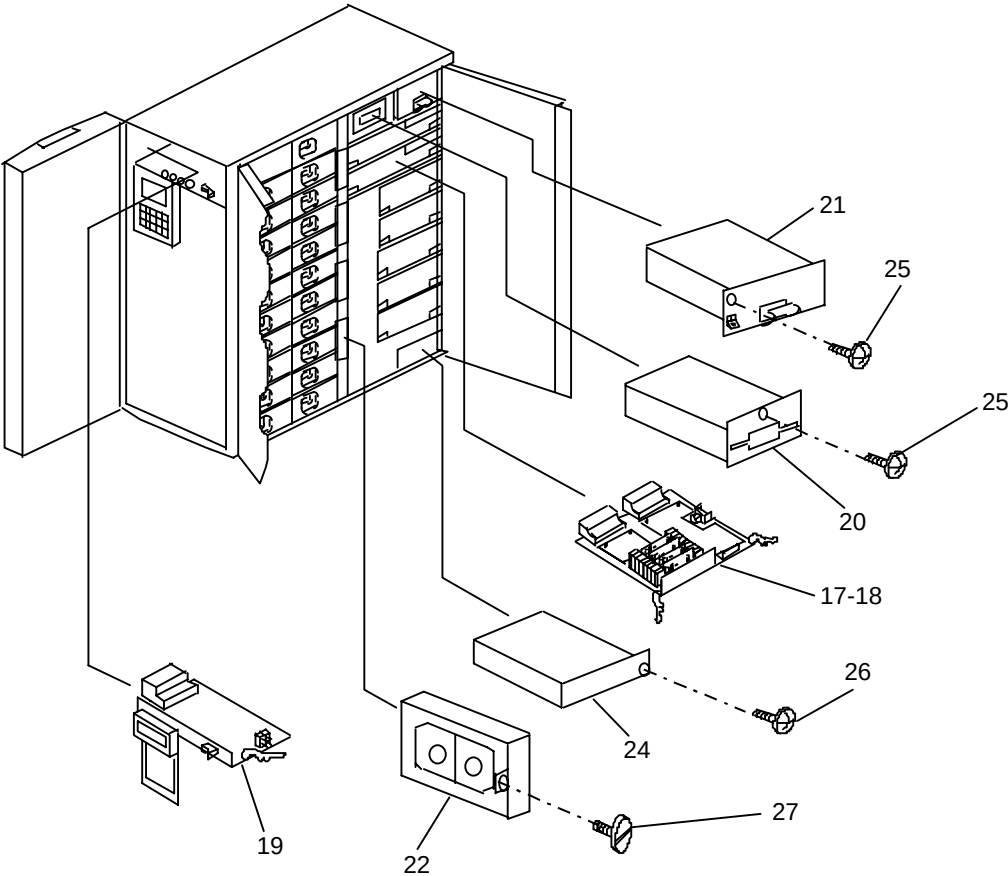
- ① indicates the list number of the assembly given on the visual index.
- ② indicates the item number given on the drawing in the catalog section.
- ③ indicates the part number.
- ④ has the following meaning.
- indicates an assembly or equivalent part.
 - indicates a subassembly or equivalent part included in an assembly indicated by....
- ⑤ indicates the unit type.
- ⑥ indicates the possible number of the subsystem.
- ⑦ indicates S.P.
- If S.P. is written in Remarks, the part or the assembly is spare parts.



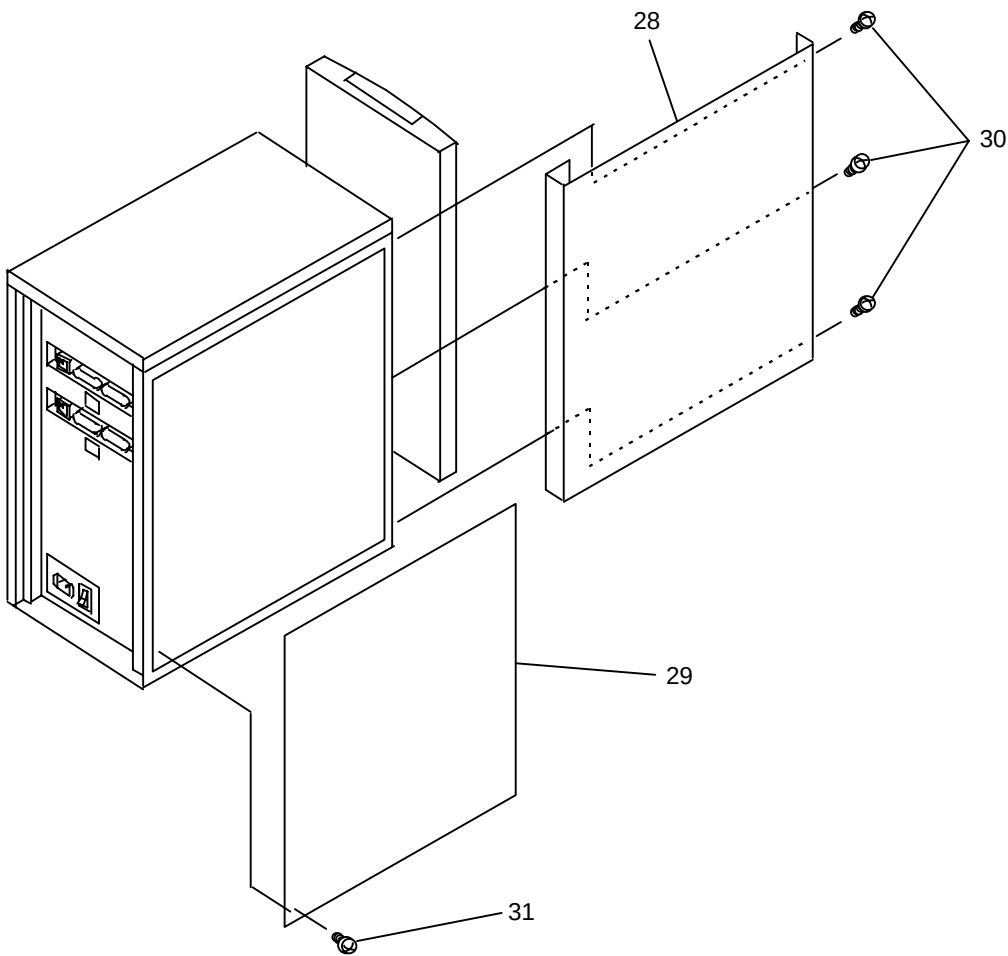
LIST NO.	NAME OF PARTS	SHEET NO.
1	FINAL ASSY	CK-PARTS0040



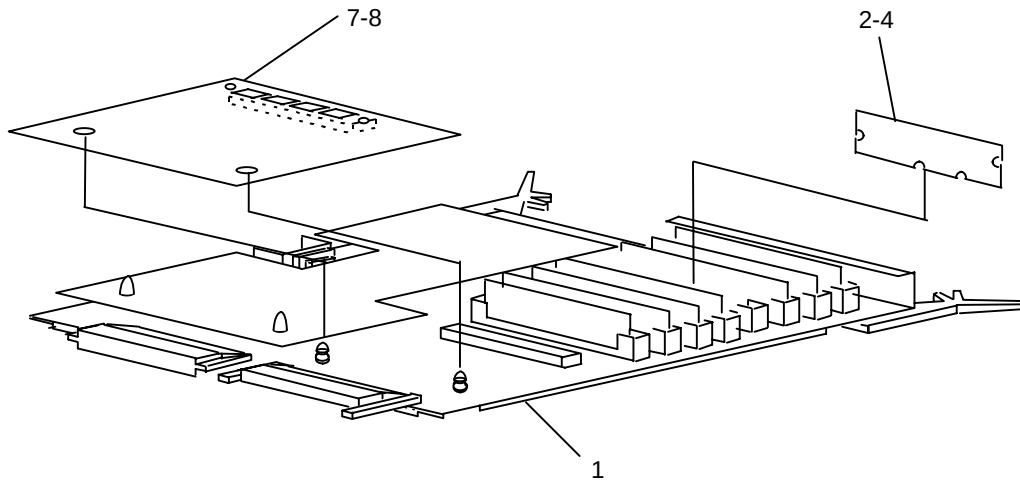
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	2100445-A	FINAL ASSY (SEE LIST 1)	1	
2	2100451-A	• FRONT COVER ASSY	1	
3	3240336-A	• SIDE COVER (R1) ASSY	1	
4	3240337-A	• SIDE COVER (R2) ASSY	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-21	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-21	S.P.
7	3252929-E	• HDU ASSY (DF-F350-A3E4)	2-21	S.P.
8	3252929-B	• HDU ASSY (DF-F350-A2E8)	2-21	S.P.
8a	3252929-D	• HDU ASSY (DF-F350-A2E8A)	2-21	S.P.
8b	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-21	S.P.
8c	3252929-A	• HDU ASSY (DF-F350-A1E18)	2-21	S.P.
8d	3243084-Q	• HDU ASSY (DF-F350-A2E4A)	2-21	S.P.
8e	3243084-R	• HDU ASSY (DF-F350-A1E8A)	2-21	S.P.
9	5486141-303	• AC/DC ASSY (DF-F350-B2M)	1-5	S.P.
10	3243406-A	• AC/DC ASSY (BLIND)	0-4	
11	3247189-B	• I/F ADAPTER ASSY (DF-F350-DMUDS)	1-2	S.P.
12	3247189-A	• I/F ADAPTER ASSY (DF-F350-DMUSS)	1-2	S.P.
13	3247183-1	• I/F ADAPTER ASSY (DUMMY)	1	
14				
15	SB706	• BIND SCREW (M2.5 × 6)	2	
16				



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
17	3247188-A	• CTL ASSY (DF-F350-F1MCF)	1	S.P.
18	3247188-B	• CTL ASSY (DF-F350-F2MCF)	1	S.P.
19	3237450-B	• SVP ASSY	1	S.P.
20	3237444-A	• FDD ASSY	1	S.P.
21	3247182-A	• BATTERY ASSY	1	S.P.
22	3237448-C	• FAN ASSY	4	S.P.
23				
24	5486142-303	• IN BOX ASSY	1	S.P.
25	SB306	• BIND SCREW (M3 × 6)	2	
26	3183101-2	• HWA BIND SCREW	1	
27	5483798-1	• THUMB SCREW	4	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
28	3240338-A	• SIDE COVER L ASSY	1	
29	1503500-C	• SZ612 PK ASSY	1	
30	SB306	• BIND SCREW (M3 × 6.3)	3	
31	SB308	• BIND SCREW (M3 × 8)	30	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-17-		CTL ASSY		
1	3247188-A	• CTL ASSY (DF-F350-F1MCF)	1	S.P.
2	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
3	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
4	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
5				
6				
7	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
8	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.
1-18-		CTL ASSY		
1	3247188-B	• CTL ASSY (DF-F350-F2MCF)	1	S.P.
2	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
3	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
4	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
5				
6				
7	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
8	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.

DF350 Disk Subsystem
7. PARTS REPLACEMENT
(Rack Mount (RKH/U1) Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.13.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	May.6.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0040	The description of HDU ASSY for AS/400 was added in No.4 of the table.	AD
					0190	A sentence was added.	AD
					0230	“RAID0” was changed to “RAID1” in the firgure.	CR
					0330	“STSDTSVER” was changed to “SYSDTSVER”. (Pages 0370, 0390, 0410, 0440 and 0470 were changed by the same reason.)	CR
					0370	Figure 9.1 was changed.	CH
					0375	Newly created by inserting a figure of the label layout.	AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0410	An explanation in the case there exist the redundancy was added.	AD
					0040	Added CACHE ASSY and ④.	AD/
					0050	Deleted *1, 2.	DL
						Added “Refer to THEORY...” in Figure.	AD/
						Deleted (2).	DL
					0055	This page was newly added.	AD
					0100	Added “The READY LED on...”.	AD
					0110	Deleted “DIPSWITCH SET”.	DL/
						Shifting from 0120.	AD
					0120	Shifting from 0130.	AD
					0130	Flow was shifting to 0120.	DL
					0190	Added 4.1.1.	AD
					0195	This page was newly added.	AD
					0200	Added RAID A.	AD
					0220	Added (1). ((1)→(1-1)).	AD
					0230	Added RAID A.	AD
					0235	This page was newly added.	AD
					0238	This page was newly added.	AD
					0240	Added RAID A.	AD
					0250	Deleted (C) - (i).	DL/
						Added DYNAMIC SPARE.	AD
					0260	Added (C) - (i).	AD/
						Shifting the section 4.3 to 0265.	DL
					0265	This page was newly added.	AD
					0310	Added Notice 1, 2.	AD
					0325	This page was newly added.	AD
					0330	Added Notice 1, 2.	AD
					0361 - 0367	These page were newly added.	AD
0430	Added Notice 1, 2.	AD					
0440	Added Notice 1, 2.	AD					
0450	Added “Redundant CTL option”.	AD					
0470	Added Notice 1, 2.	AD					
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0340	Added Notice 1.	AD
					0364	Added Notice 1.	AD
					0410	Added WARNING.	AD
					0420	Delete (5).	DL
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0040	Added A2E8/A1E8A/A1E18.	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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13. Replacing CACHE ASSY	RH-REP0440
14. Replacing LAN ASSY.....	RH-REP0470

1. Mechanical Configuration

Figures 1.1 show mechanical configuration and parts location of this subsystem.

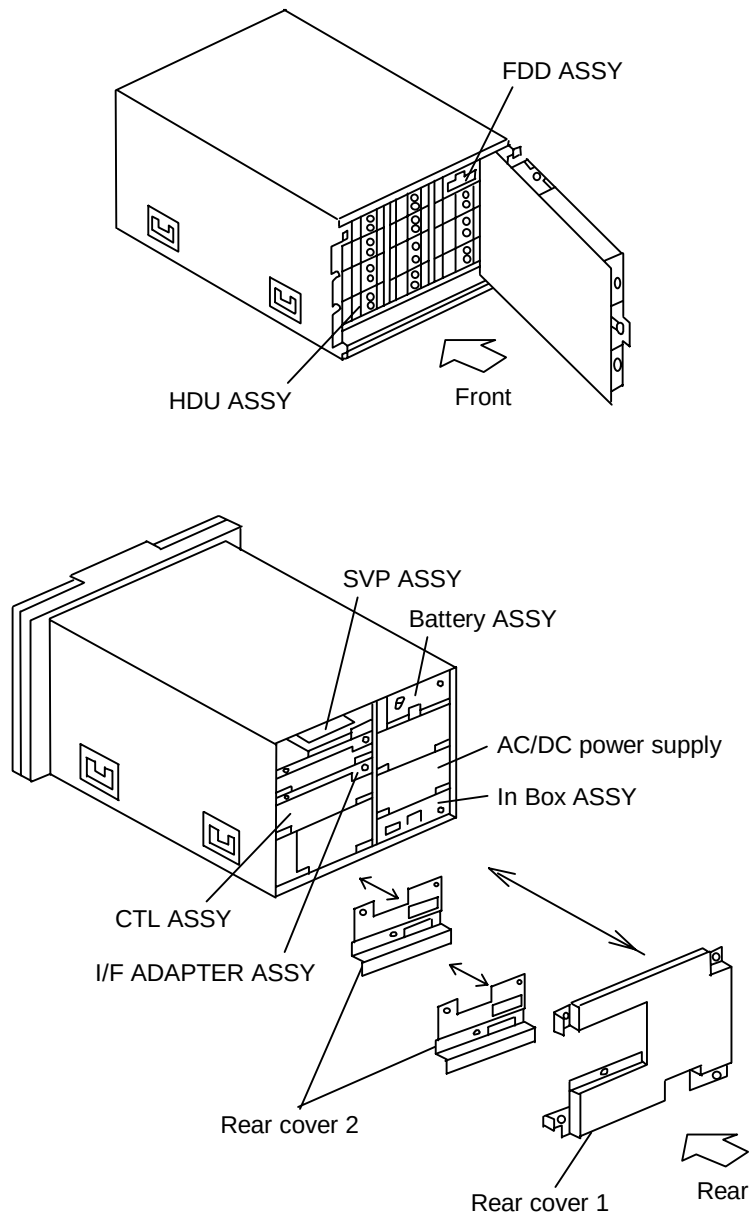


Figure 1.1 Appearance and Component Layout of DF350 (RKH)

2. Maintenance Procedure

(1) Turning power on/off when replacing parts

Turning on/off procedure varies depending on the parts to be replaced.

Follow the procedures described in the table below for replacing each part.

No	Product name	Drawing No.	Model	Turning on/off power	
				Option not provided	Option provided
1	HDU ASSY (2GB1"H)	3243084-E	DF-F350-A2E2	④	④
2	HDU ASSY (4GB1"H) (*1)	3252929-E	DF-F350-A3E4	④	④
3	HDU ASSY (4GB1"H)	3243084-F	DF-F350-A2E4	④	④
4	HDU ASSY (4GB1"H)	3243084-Q	DF-F350-A2E4A (For AS/400)	④	④
5	HDU ASSY (8GB1"H)	3252929-B	DF-F350-A2E8	④	④
6	HDU ASSY (8GB1"H)	3252929-D	DF-F350-A2E8A (For AS/400)	④	④
7	HDU ASSY (8GBH"H)	3243084-G	DF-F350-A1E8	④	④
8	HDU ASSY (8GBH"H)	3243084-R	DF-F350-A1E8A (For AS/400)	④	④
9	HDU ASSY (18GBH"H)	3252929-A	DF-F350-A1E18	④	④
10	Fan ASSY	3237448-C	DF-F350-P1M	③	—
11	Battery ASSY	3244611-A	DF-F350-N1RH	③	—
12	FDD ASSY	3244610-A	DF-F350-M1RH	②	—
13	CTL ASSY	3247188-A /B	DF-F350-F1MCF /F2MCF	②	③
14	I/F ADAPTER ASSY (WS-pin-lock screw type)	3247226-C	DF-F350-DRUSS	①	①
15	I/F ADAPTER ASSY (WD-pin-lock-screw type)	3247226-A	DF-F350-DRUDS	①	①
16	SVP ASSY (SVP)	3243079-B	DF-F350-L1RH	②	—
17	SVP ASSY (Panel)	3244612-B	DF-F350-L1RHL	②	—
18	AC/DC power supply	5486141-303	DF-F350-B2M	②	③
19	In Box ASSY	5486142-302	DF-F350-Q1R	②	—
20	CACHE ASSY	3247121-A	DF-F350-C8E	②	—
21	CACHE ASSY	3247121-B	DF-F350-C32E	②	—
22	CACHE ASSY	3247121-C	DF-F350-C128E	②	—
23	LAN ASSY	5493862-A	DF-F350-G1M1	②	③
24	LAN ASSY (SNMP)	5493862-B	DF-F350-G2M1	②	③

① Turning the power off DF350 Disk Subsystem and Host System.

② Turning the power off DF350 Disk Subsystem.

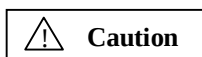
③ Turning the power off is unnecessary.

④ Turning the power on DF350 Disk Subsystem.

(*1) : It is necessary to use it with the Micro_Disk Ver.0307 or later.

Notice : When a part which requires to turn the power off or on for replacement (marked with ① and ②) is to be replaced, turn the power off correctly according to the instruction in RH-REP0050 beforehand.

Otherwise, there is a risk that the user data is destroyed.



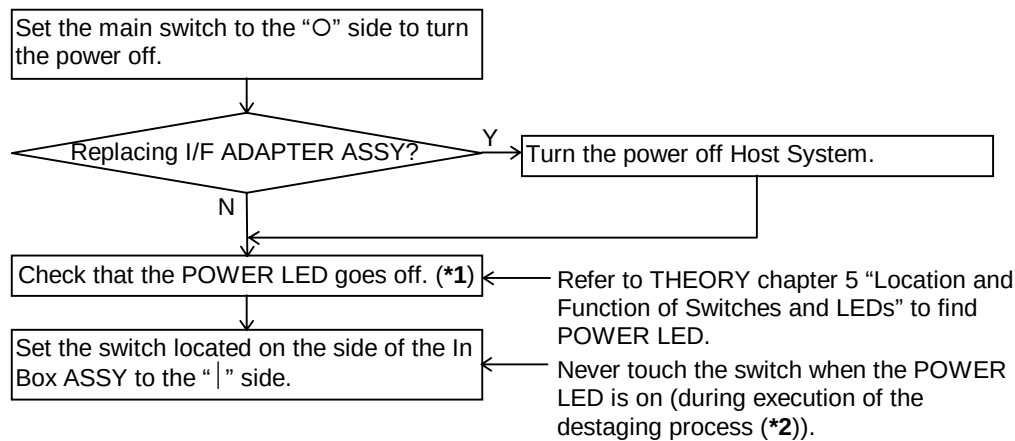
Caution

When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.

Be careful not to touch the electrified parts with a screwdriver etc.

2.1 Turning the Power On/Off for Each String

(1) Turning the power off



*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

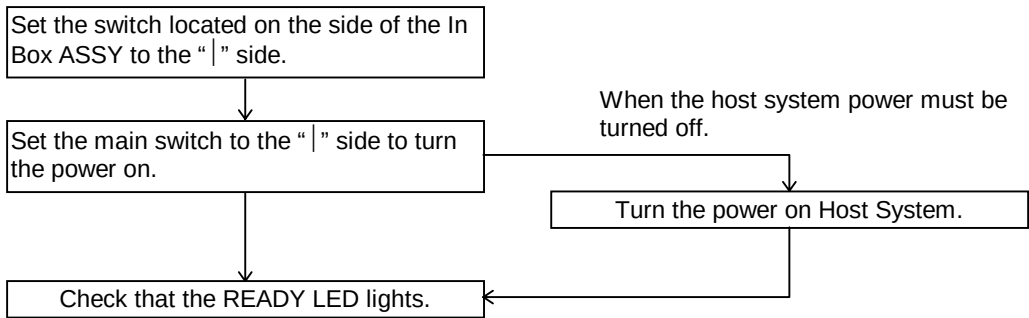
Notice : In case the data is not properly backed up, the user's data will be lost.

***2** The cache memory installed in this subsystem is controlled with a write-after method. When turning off the power, the subsystem automatically writes all the data left on the cache memory unwritten to the hard disk drive. (This operation is called a destaging.) The subsystem turns off the power when this process is completed. When the power is turned off according to the power failure or by the operation of the breaker, the destaging can not be performed. In this case, the subsystem enters the mode of battery back-up. If the system is kept in this state, the battery may be discharged and the user data might be lost. Therefore, be sure to follow the power-off procedure explained above.

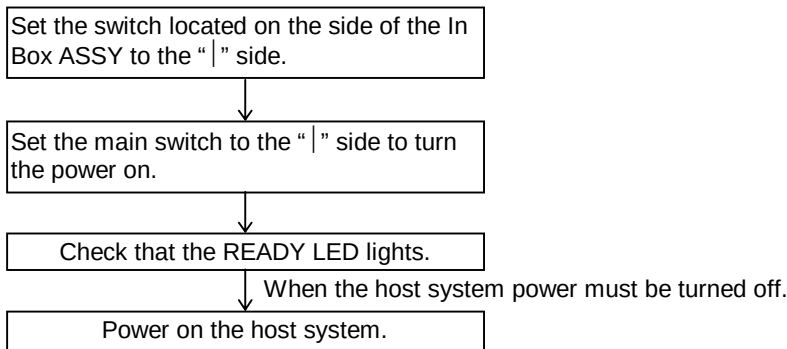
If the breaker is turned off due to power failure or by mistake before the POWER LED goes off, turn the power on again according to Item (2), "Turning the power on" promptly and then execute the power-off procedure explained above.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



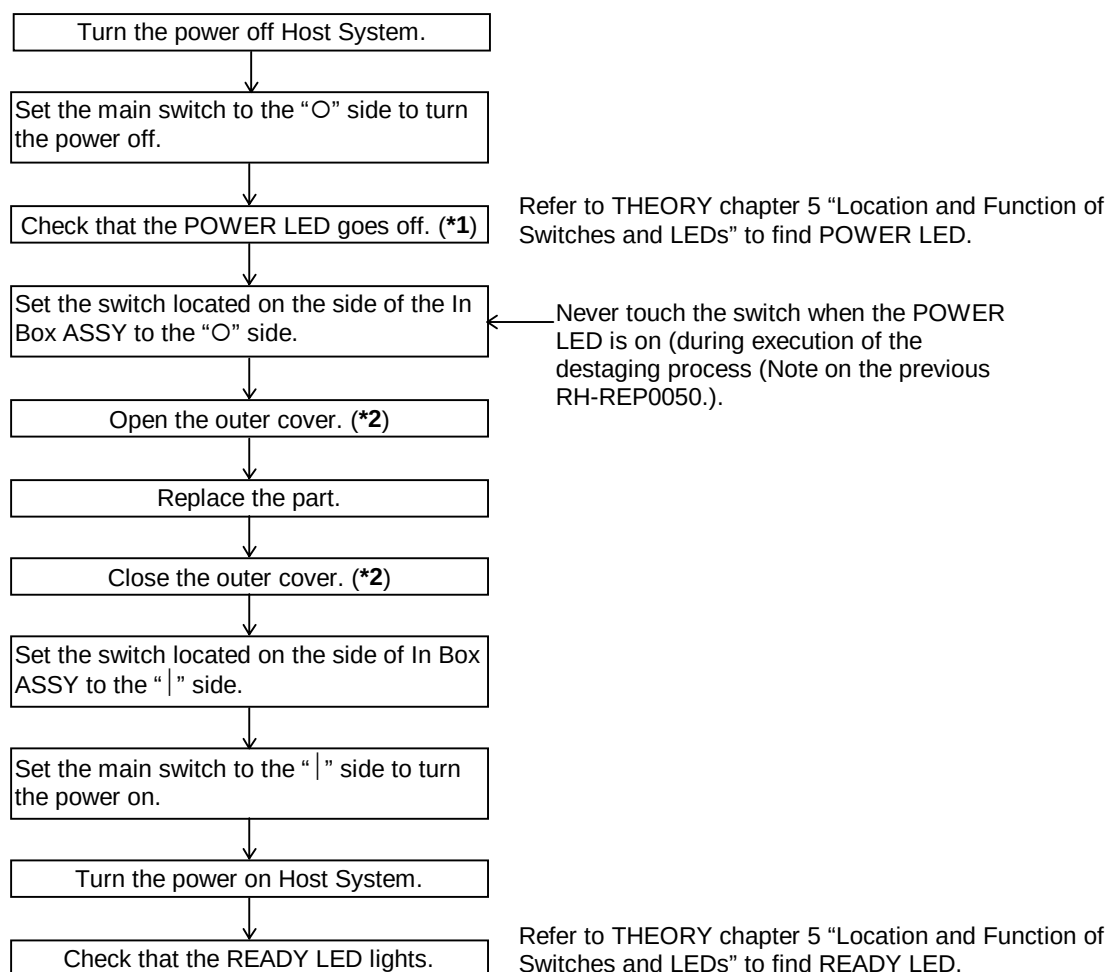
(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.2 Part Replacement Procedures

- (1) Procedure for the case of turning the power off both DF350 Disk Subsystem and Host System is inevitable.



Notice: In case the power is not normally turned off, the configuration data will be lost and the user's data will be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

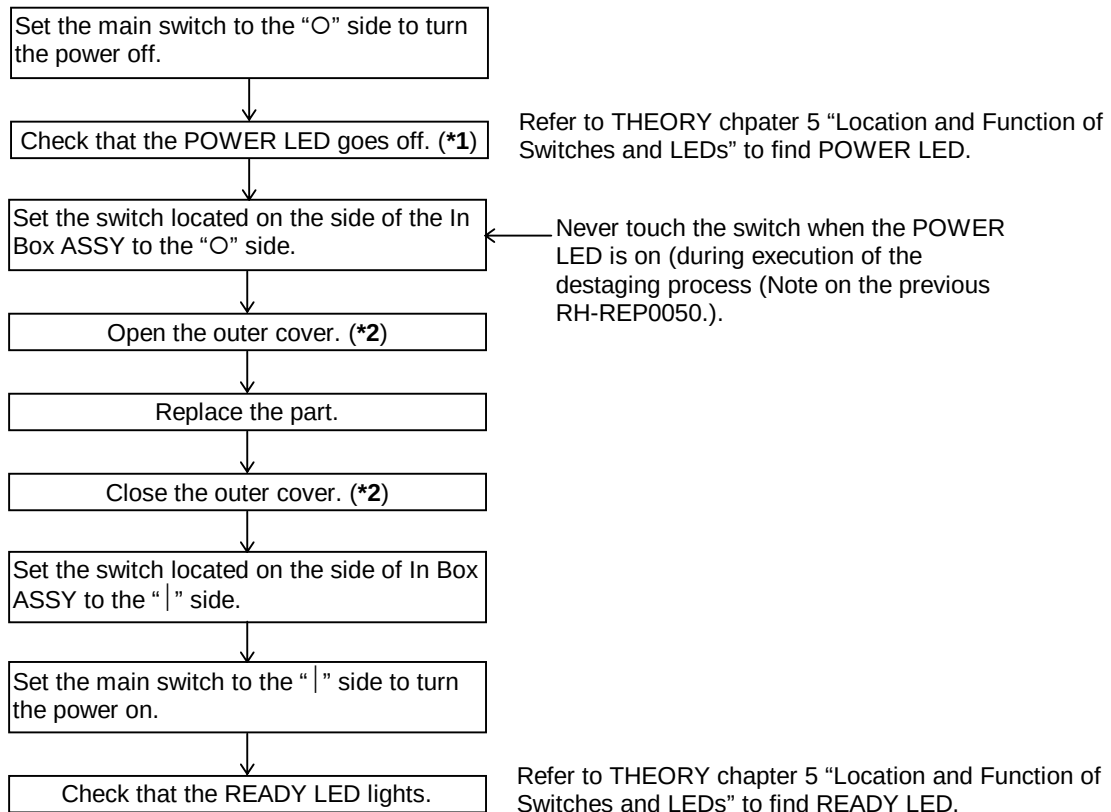
CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

***2** Outer cover : Front cover

Rear cover 1

Rear cover 2

- (2) Procedure for the case of turning the power off DF350 Disk Subsystem is inevitable.



Notice: In case the power is not normally turned off, the user's data might be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

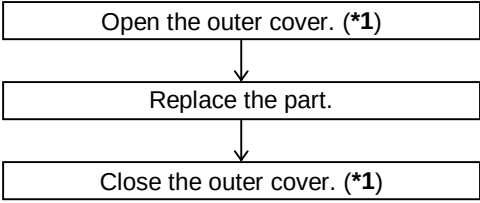
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

- *2** Outer cover : Front cover
Rear cover 1
Rear cover 2

(3) Procedure for the case of turning the power off DF350 is either not necessary or prohibited.



*1 Outer cover : Front cover
Rear cover 1
Rear cover 2

2.3 Back-up Procedure of System Parameter

There are cases where system parameters (Target ID, buzzer setting, drive recovery mode, etc.) are copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters forllowing “2.3.1 Back-up procedure of system parameter” (RH-REP0090) or “2.3.2 Restore procedure of system parameter” (RH-REP0130).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to RH-REP0050.

Notice: In case the power is not normally turned off, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

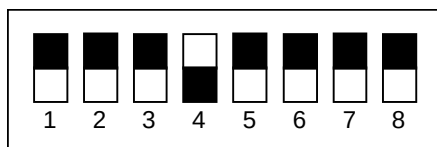
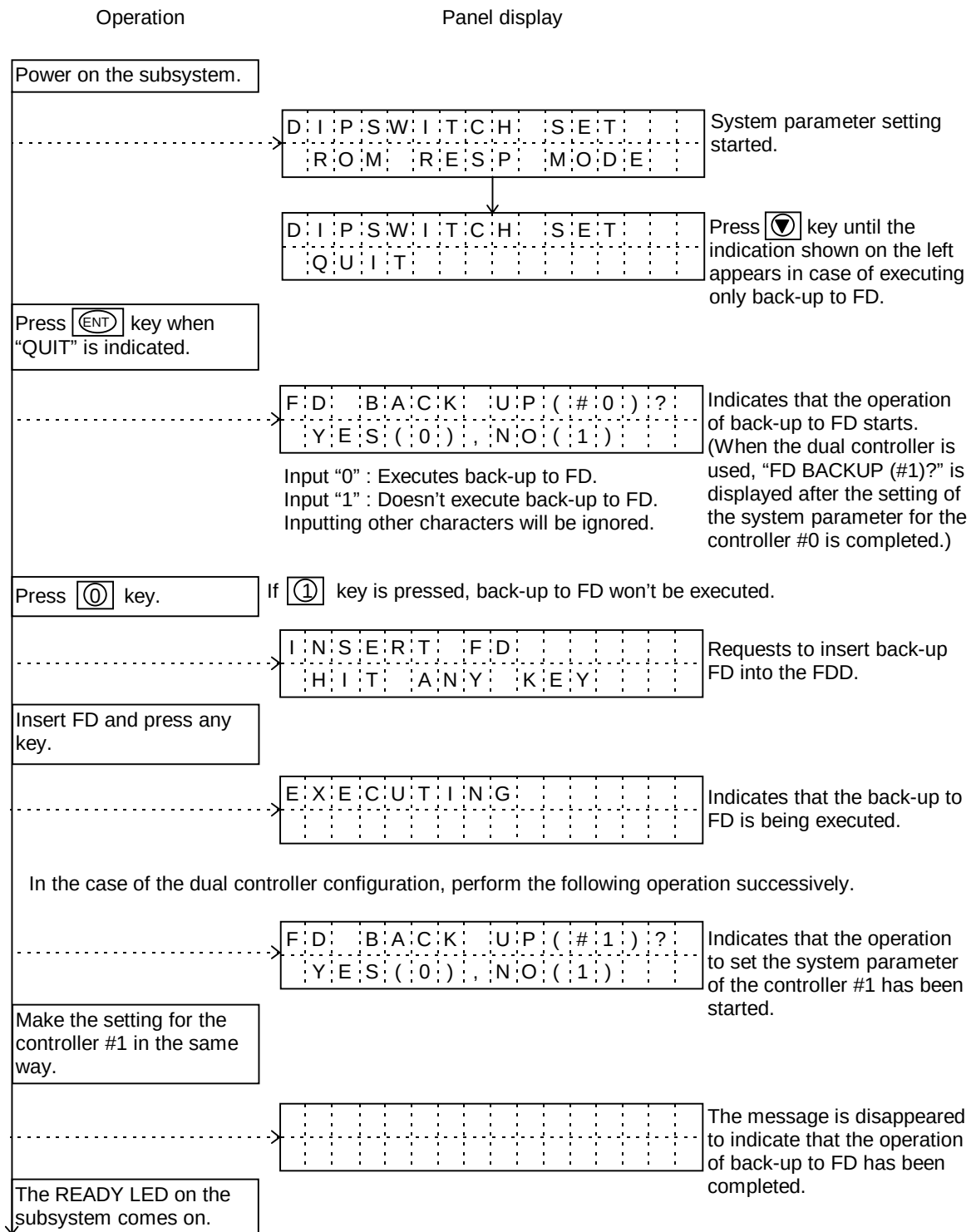


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

(3) Operate as described below.



(4) Set DIP switch No.4 to setting as shown in Figure 2.3.2.

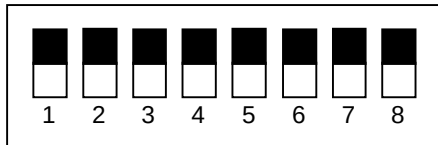
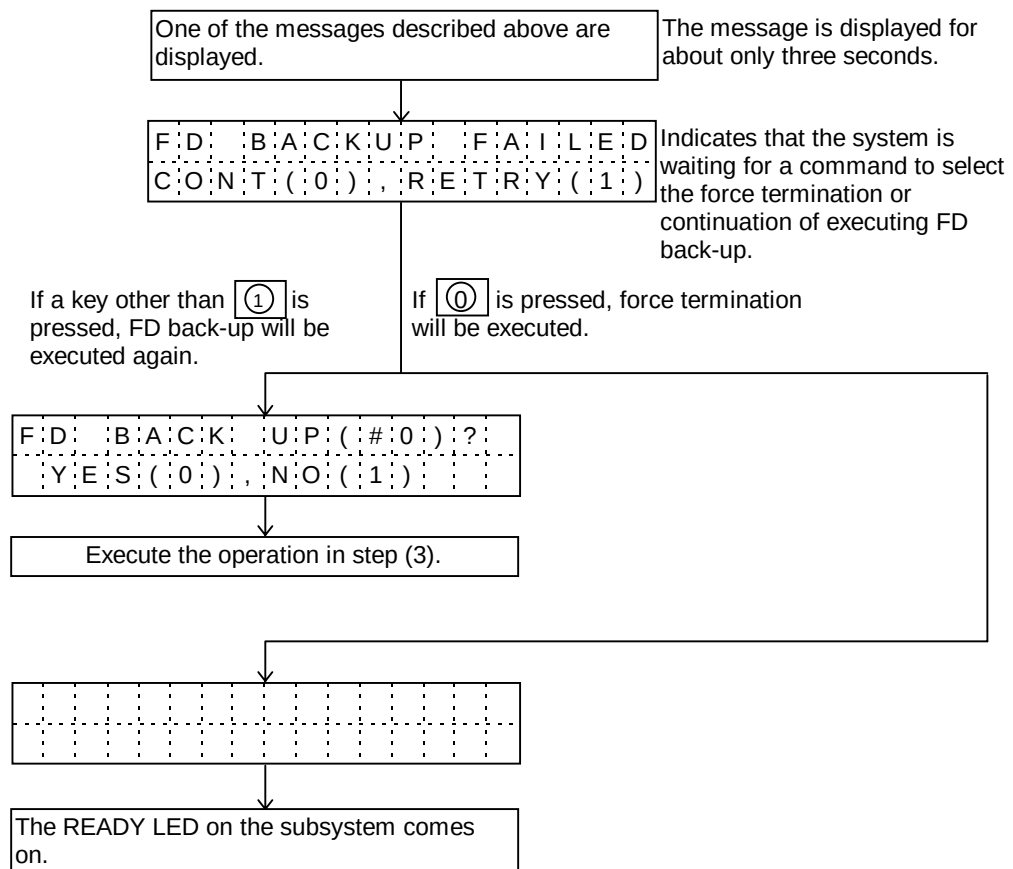


Figure 2.3.2 DIP Switches

Note 1 : While executing the back-up to FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute..
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

Note 4 : "SYSPRM0.DAT" or "SYSPRM1.DAT" file is stored in system parameter backed up FD. The case of optional SNMP system, SNMP configuration environment files ("Config.TXT" and "NAME.TXT") are stored with system parameter file.

Note 5 : In case with optional SNMP system and system parameter is restored without SNMP configuration environment files, Subsystem becomes ready without SNMP function. In this case, the warning lamp on the panel comes on and one of messages below is shown on PANEL.

W	0	1	6	0	1	F	D	E	R	R		
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	2	F	O	P	N	E	R	R
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	0	S	N	M	P	I	N	V	1
V	E	R	S	I	O	N	=	X	X	X	X	/X	

Only Dual controller system.

This case, re-restore the subsystem with a FD in which SNMP configuration environment files is stored.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP swithces as shown in Figure 2.3.3.

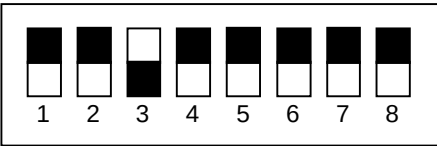
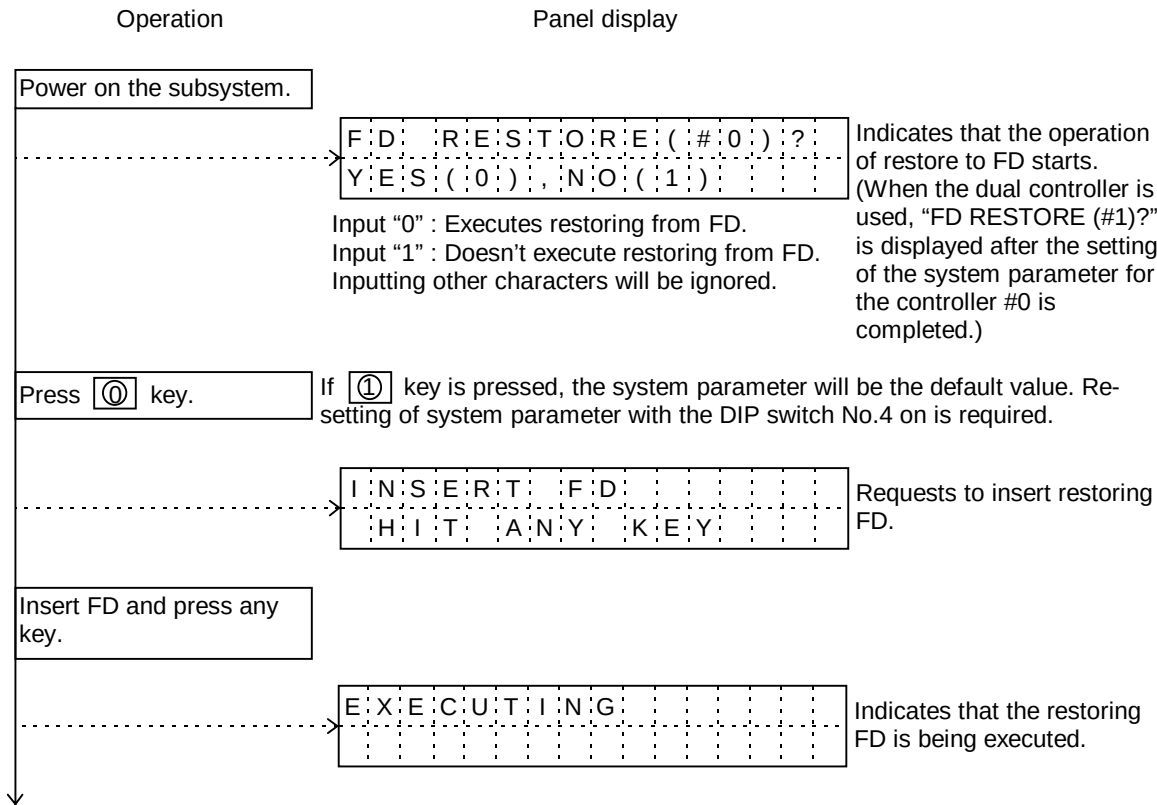
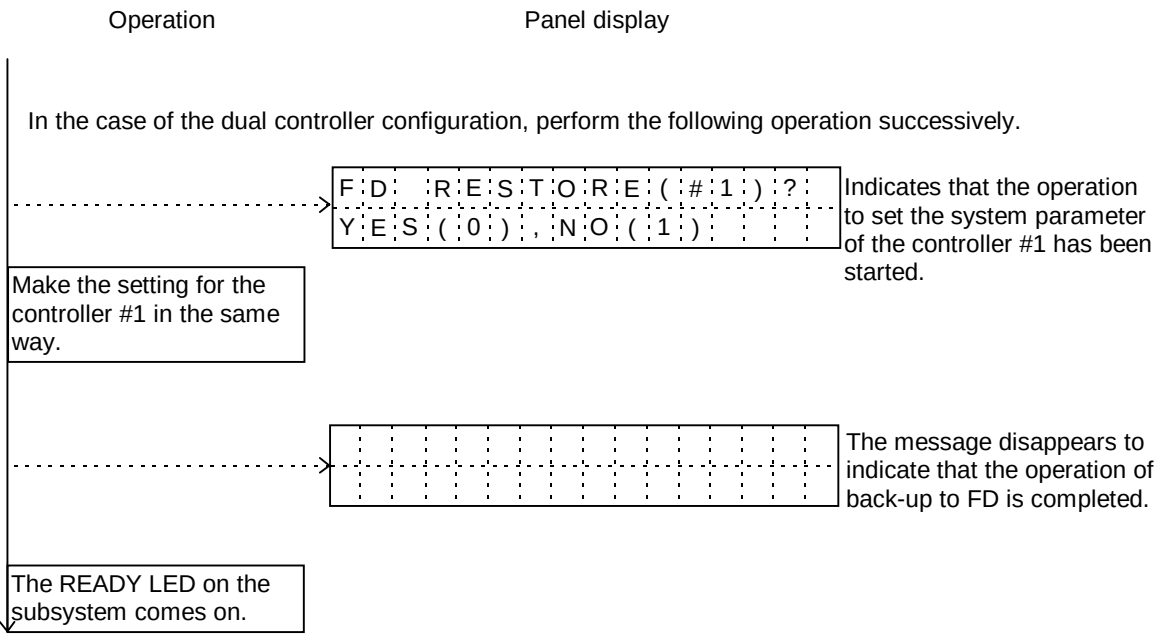


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

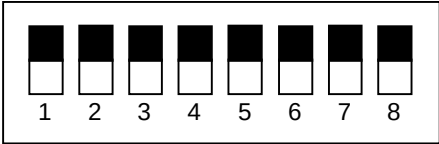
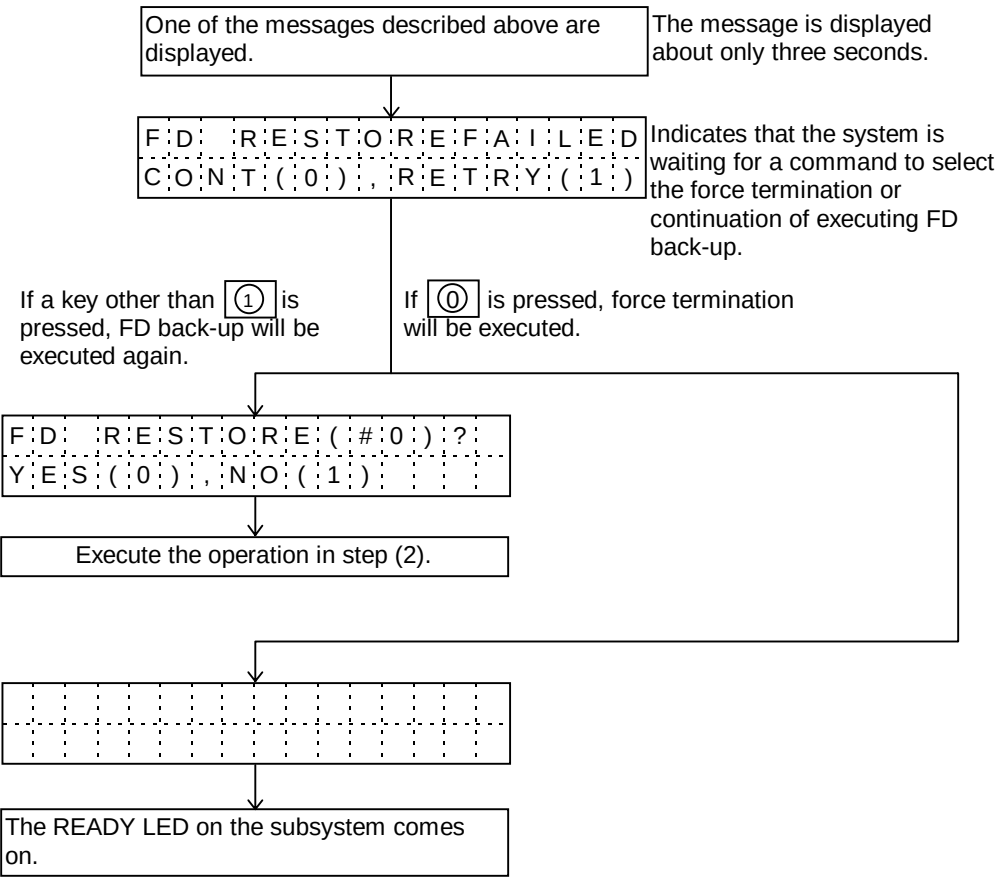


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-restore the system following the operation described below.



Note 2 : In case that restoring operation ended in failure and force terminated, setting of system parameter will be with default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

3. Attaching/Removing and Opening/Closing the Covers

3.1 Attaching/Removing the Front Cover

- (1) Removing the front cover. (See Figure 3.1.1.)

① Hold the grooves at both sides of the front cover and pull it toward you.

Note : Open/Close the front cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

- (2) Attaching the front cover. (See Figure 3.1.1.)

① Fit the guide plate of the main body with the slots of the front cover (four places), press the front cover against them.

Note : Open/Close the front cover gently to avoid a shock. Precision components are installed.

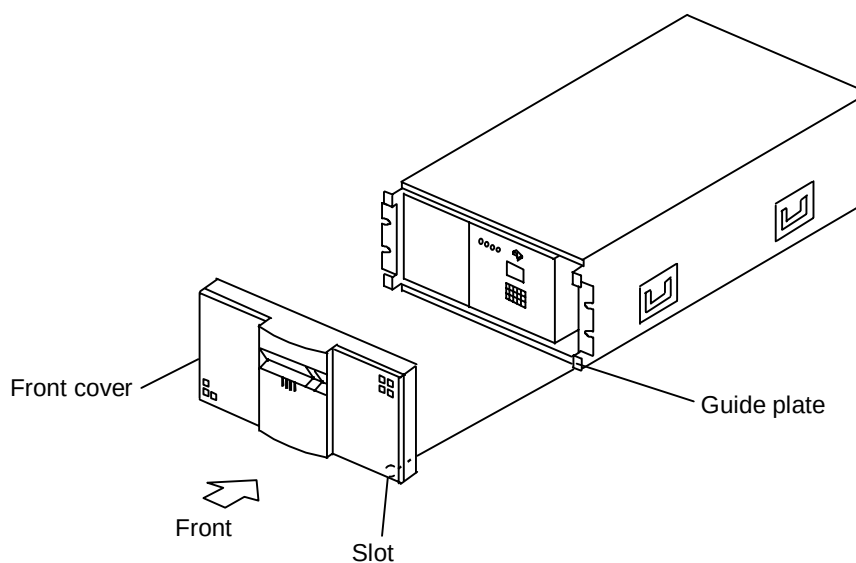


Figure 3.1.1 Attaching/Removing the Front Cover

3.2 Opening/Closing the Rear Cover

Tools : Philips screwdriver (No.2)

(1) Removing procedure (See Figure 3.2.1.)

- ① Remove (a) screw and 4 (b) screws, and remove rear cover 1.
- ② Remove 4 (a) screws of 2 rear cover 2s, and remove rear cover 2s.

Note : Open/Close the rear covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Installing procedure. (See Figure 3.2.1.)

- ① Fix rear cover 2 then rear cover 1 in the reversed order as removing procedure.

Note : Open/Close the rear covers gently to avoid a shock. Precision components are installed.

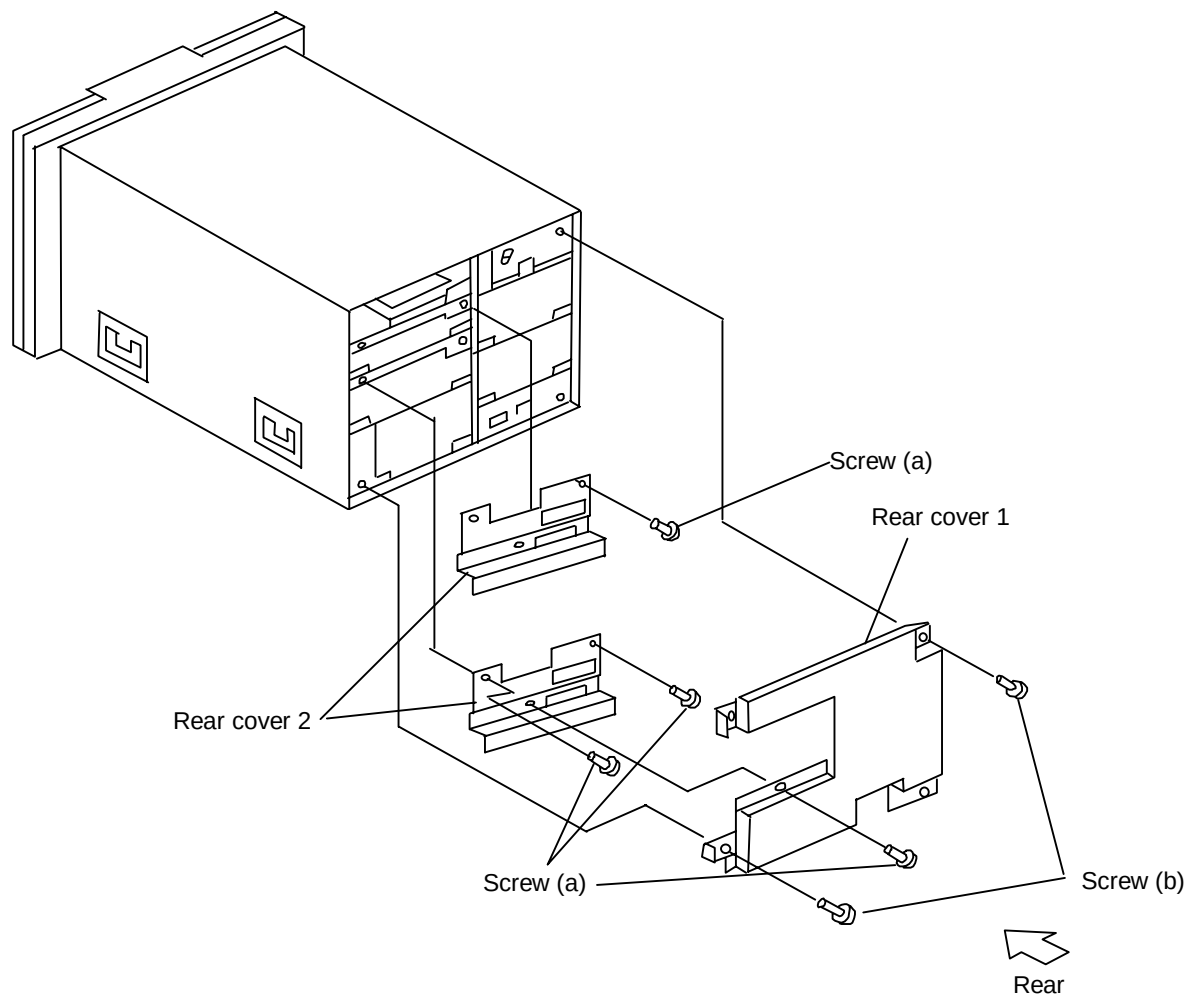


Figure 3.2.1 Opening/Closing the Rear Cover

3.3 Opening/Closing the Front Panel

(1) Opening the front panel. (See Figure 3.3.1.)

- ① Remove the front cover.
- ② Insert the key, turn it to the arrow direction (→) and hold the left of the front panel to open to the right.

Note : Open/Close the covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing the front panel. (See Figure 3.3.1.)

- ① Close the front panel.
- ② Turn the key to the arrow direction (↶) and secure the front panel.
- ③ Attach the front cover.

Note : Keep the key carefully lest it should be lost.

Note : Open/Close the covers gently to avoid a shock. Precision components are installed.

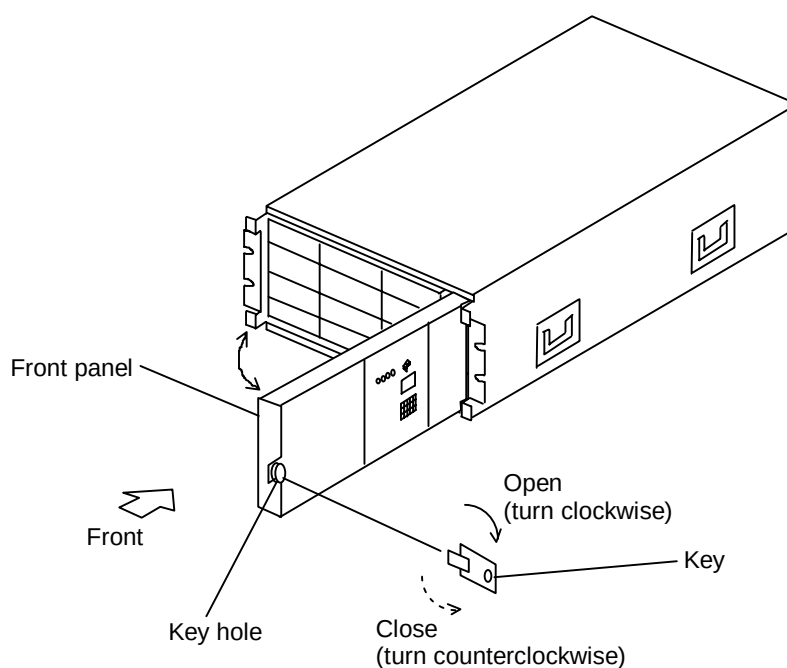


Figure 3.3.1 Opening/Closing the Front Panel

4. Replacing HDU ASSY

The method of replacing HDU varies depending on the RAID configuration.

When replacing the HDU ASSY, confirm the RAID configuration of the subsystem beforehand, and follow the procedure below according to the configuration.

To confirm the RAID configuration, refer to page PANEL0390 (3.3.2 (1) Reference/setting menu of RAID configuration information.)

Notice : Be sure to replace the HDU ASSY with the power kept on. (This procedure is except for when the Micro-Disk version is 0303 or earlier.)**

Proceed the replacement and the data recovery following the procedure below. RAID Specification of replacing HDU can be seen on the panel display. (See PANEL0390.)

Notice : If you delete or re-format the set-up RAID group or LU, user's data in that will be deleted. Be sure to back-up copy the user's data before these operation.

4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration

4.1.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

The replacement procedure differs depending on whether the Micro_Disk version is 0303** (** is optional) or earlier, or 0304** (** is optional) or later. Confirm the version first, then execute the replacement following the procedure determined according to the version.

When the Micro_Disk version is 0303** (** is optional) or earlier

- (1) Turn the subsystem power off according to the powering off procedure (see page RH-REP0050).
- (2) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY (Disk) Replacement Procedure" on page RH-REP0265.
- (3) Turn the subsystem power on according to the powering on procedure (see page RH-REP0050). Following messages will be displayed on the panel when a disk of row 0 is replaced.

I00DXY SYS-CP-XY----- Starting system area recovery

I00EXY SYSRCV-XY----- Completing system area recovery

X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)

If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.

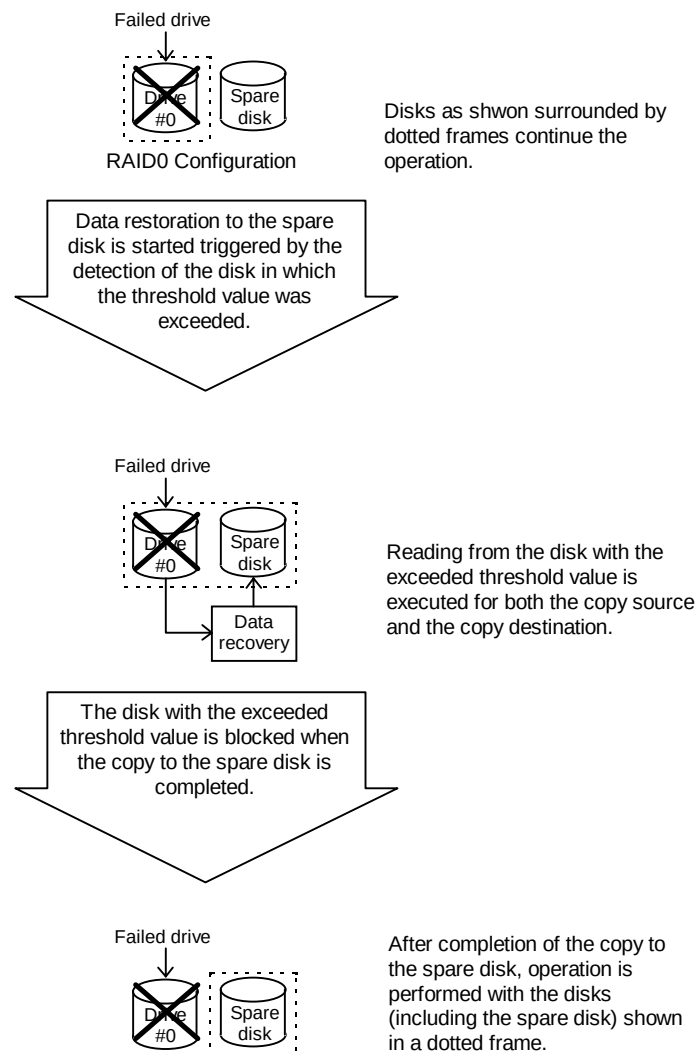
- (4) Execute an LU formatting. For the LU formatting procedure, see page RH-INST0710.
- (5) Restore the data using the backed up data.

When the Micro_Disk version is 0304** (** is optional) or later

- (1) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY Replacement Procedure" on page RH-REP0265.
- (2) In a short time after the disk is inserted, the ALARM lamp on the HDU ASSY goes out and the READY lamp comes on. If the inserted disk is that of row 0, following messages will be displayed on the panel.
 I00DXY SYS-CP-XY----- Starting system area recovery
 I00EXY SYSRCV-XY----- Completing system area recovery
 X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)
 If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (3) Execute an LU formatting. For the LU formatting procedure, see page RH-INST0710.
- (4) Restore the data using the backed up data.

4.1.2 When a spare disk is installed

When the Micro_Disk version is 0304** (** is optional) or later, data restoration to the spare disk is executed by the dynamic sparing function. Conditions for restoration to the spare disk and messages, etc. are the same as those to the RAID1, 5 and A. See pages RH-REP0235 through 0238.



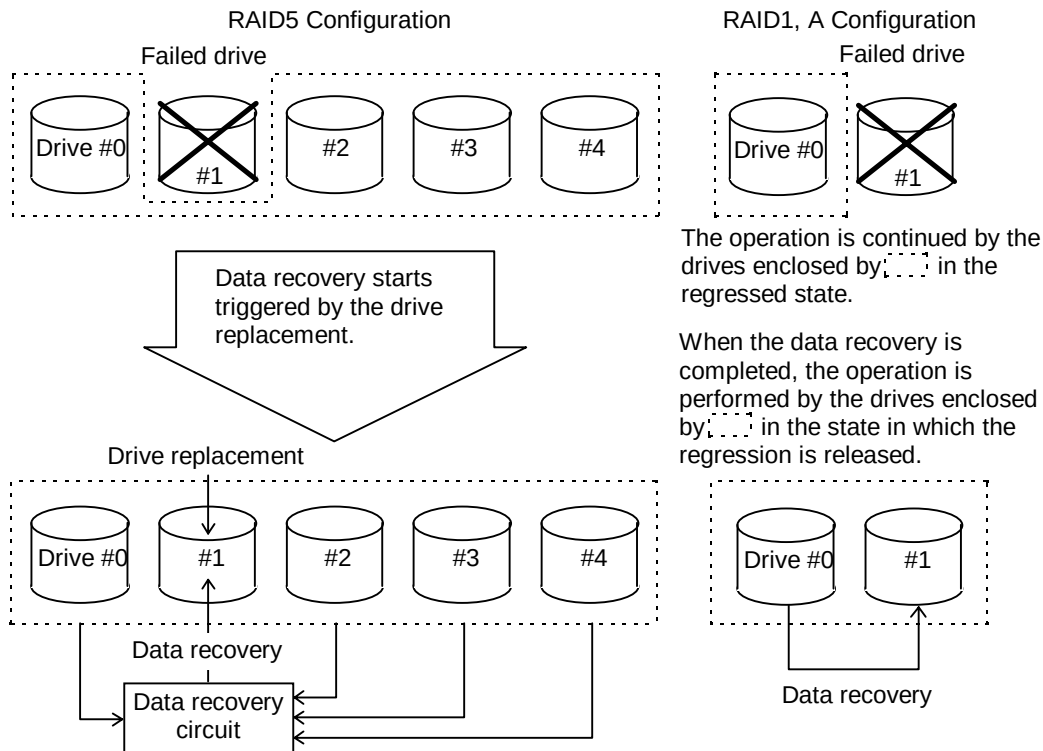
4.2 Procedure of Data Recovery and HDU Replacement Under RAID1, 5, A Configuration

4.2.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

When a failure occurred at a HDU ASSY, replace the failed HDU with a spare HDU.

To replace a HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See RH-REP0265.) With the replacement, data in the failed HDU will be automatically recovered. The panel display is described at “① Transition of panel display”. (See RH-REP0200.)

Note : When DRIVE MAINTENANCE (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINTENANCE again).



In the following cases, the recovery will not start automatically. Operation to start the recovery is required.

- (1) When the drive recovery mode is set to “NOT AUTOMATIC MODE”, the data recovery will not start automatically when the drive is replaced.

In this case, it is necessary to instruct recovery from the panel. (For further details, refer to the Hitachi Disk Array Subsystem Panel Operation Manual.)

- (2) When failures occurred in plural drives, if the second faulty drive is replaced during data recovery of the first drive, the data recovery of the second drive will not start automatically.

In this case, it is necessary to remove and insert the second drive again after the data recovery for the first drive is completed. Or, it is necessary to instruct recovery from the panel. Select “DRIVE MAINTENANCE (RECOVER STATUS)” and make sure that data recovery is completed normally.

① Transition of panel display

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of drive recovery

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the drive under recovery.

* : Only with the replacement of HDU in Row = 0.

② Confirming completion of data recovery

Select DRIVE MAINT (RECOVER STATUS) with the panel and check to see that the data recovery is completed normally (COMP).

③ When the data recovery fails (1012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(a) Data recovery onto the replacement drive

(i) When the faulty portion is the replaced drive (PORT X, ROW Y)

- Replace the drive again.
- Make sure that the data recovery is completed normally (COMP).

(ii) When the faulty portion is other than the replaced drive

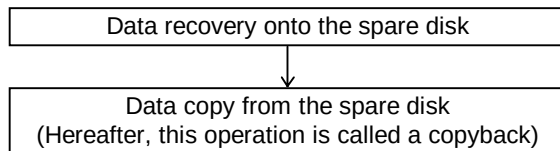
- Remove and insert the replaced drive and start data recovery again.
- Check to see that the data recovery is completed normally (COMP). When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. Ask for an instruction. When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive.

4.2.2 Procedures of data recovery and HDU ASSY replacement when a spare disk is installed

When a failure occurred in a HDU at a system with a spare drive, the data in the failed HDU is automatically recovered to the spare drive. After replacement of the failed HDU, the data in the spare drive will be copied back to the replaced HDU.

To replace HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See RH-REP0265.) The panel display is described “Transition of Panel Display”. (See RH-REP0250.)

Note : When DRIVE MAINT (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINT again).



(1) Data recovery onto the spare disk

There are two types of data recovery onto the spare disk depending on the incentive.

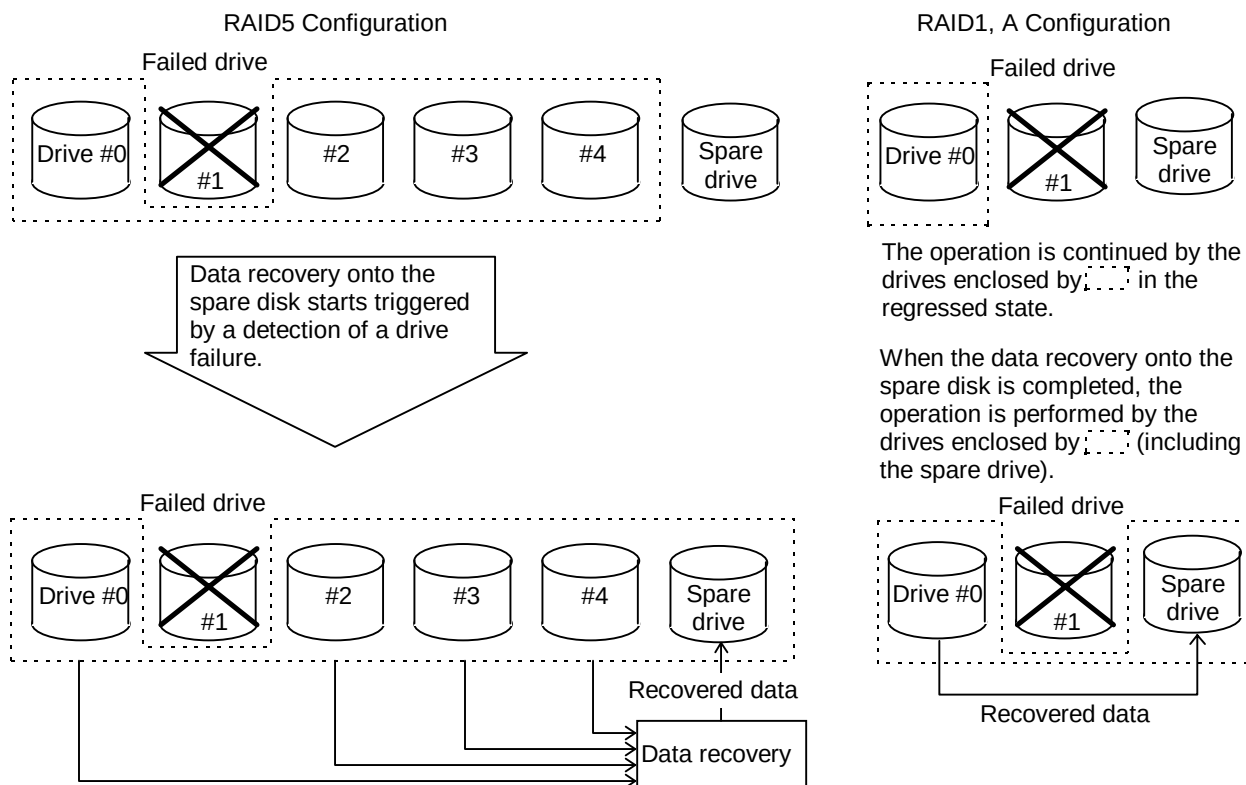
- Data recovery onto the spare disk when a failure in the disk is detected.
- Data copy onto the spare disk when a disk is detected in which the error count has exceeded its threshold value. (This operation will be called “dynamic sparing” hereafter. Note that some microprograms of certain version do not support the operation.)

(1-1) Data recovery onto the spare disk when a disk failure is detected.

As to data recovery onto the spare disk, as shown in the drawing on the following page, when a drive failure occurs, the data of the failed drive is recovered automatically onto the spare disk.

Automatic recovery onto the spare disk is executed only under the following condition.

Condition : “When a drive failure is detected, the spare disk is an unused disk.”



In the following cases, the data recovery onto the spare disk will not start automatically. An action to start the data recovery is required.

- ① When the drive recovery mode is set to "NOT AUTOMATIC MODE", the data recovery onto the spare disk will not start automatically.

In this case, it is necessary to instruct recovery onto the spare disk with the panel. (See RH-REP0280)

- ② If a further drive failure occurs while the spare disk is used already (data of a drive has been already recovered onto the spare disk), the data of the nearly failed drive will not be recovered onto the spare disk.

Even after the copyback is completed in the above state and the spare disk enters the unused state, the data of the second failed drive will not be recovered onto the spare disk.

- ③ If a disk of no failure (a drive which is not blocked) is removed, no data recovery onto the spare disk will be executed. In this case, to recover data onto the spare disk, it is necessary to instruct a recovery from the panel. (See RH-REP0280)
- ④ When the spare disk is replaced because a spare disk failure occurred during data recovery to the spare disk, the data recovery to the replaced spare disk will not start automatically. In this case, it is necessary to instruct recovery to the spare disk with the panel. (See RH-REP0280)
- ⑤ If a faulty drive is replaced during data recovery to the spare disk, the data copy back the replaced drive will not start automatically even after the data recovery to the spare disk is completed.

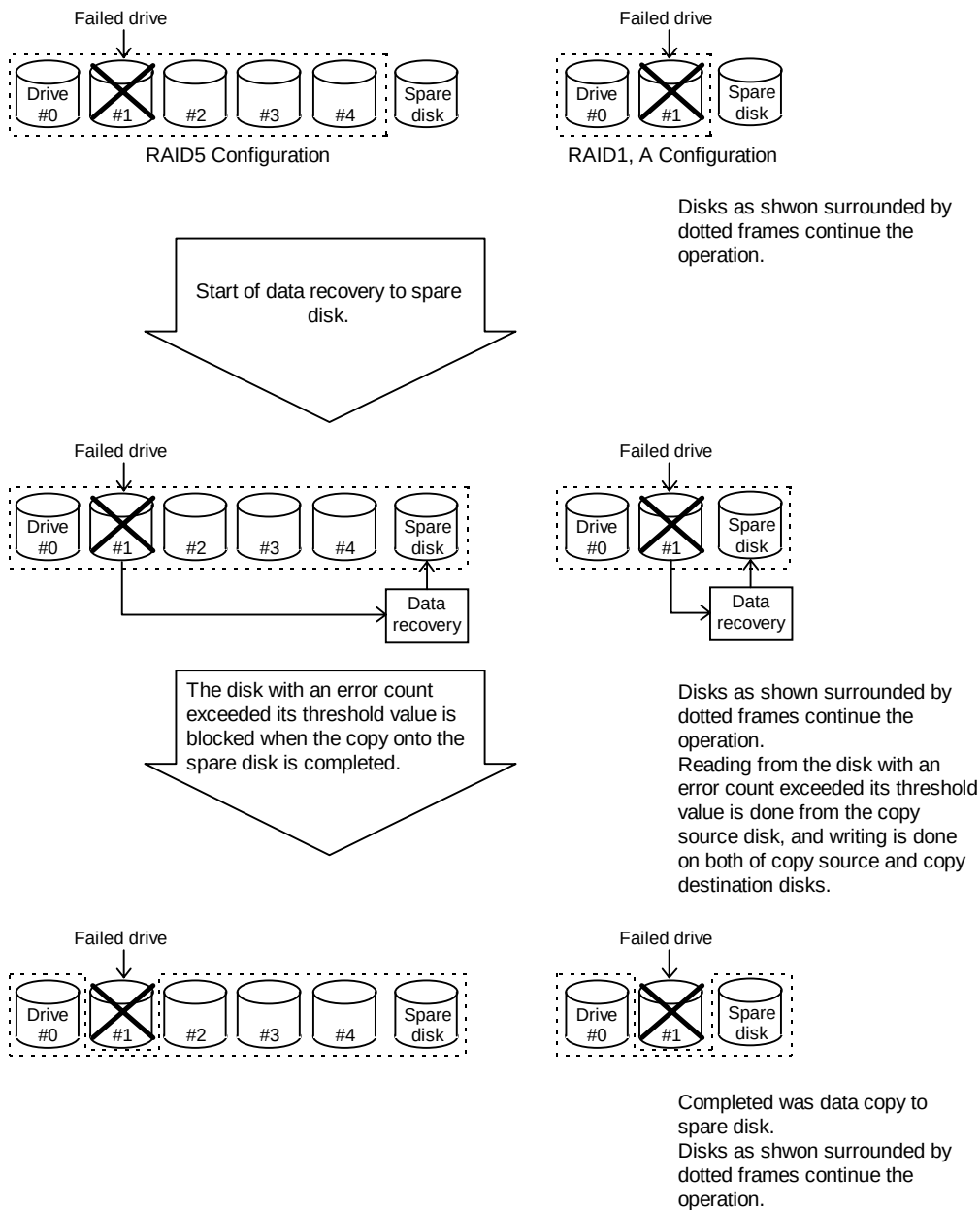
In this case, it is necessary to remove and insert the replaced drive again after the data recovery onto the spare disk is completed.

(1-2) Data recovery onto the spare disk by means of the dynamic sparing

Data recovery onto the spare disk is performed as shown below. When a disk is detected in which the error count has exceeded its threshold value, data stored in the disk is copied automatically onto the spare disk.

The automatic data recovery onto the spare disk is performed only when the following condition is met.

Condition : The spare disk is not in use when a disk is detected in which the error count has exceeded its threshold value.



The subsystem displays the following message on the panel when detecting a disk in which the error count has exceeded its threshold value.

I03■XY ■:0 - D
 ▲▲▲▲▲ -XY ▲▲▲▲▲ : Message text } See TRBL0275, 0278.

At the time when an error count exceeded its threshold value is detected, only a message display on the panel is done without blocking the concerning disk, and the dynamic sparing is started.

The disk with an error count exceeded its threshold value is blocked after the dynamic sparing is completed.

Refer to page RH-REP0250 for panel display transition when the dynamic sparing is performed.

In the following cases in which a disk with an error count exceeded its threshold value is detected, the disk is blocked without an execution of the dynamic sparing.

- When the dynamic sparing mode is set not to execute the dynamic sparing.
- When a disk with an error count exceeded its threshold value is detected after the data has been recovered or while the sparing disk is being used for the data recovery.
- Another disk with an error count exceeded its threshold value is detected during the dynamic sparing operation.

In each case above, the disk with an error count exceeded its threshold value is blocked.

Procedures for data recovery and disk replacement are the same as those for the installation of the spare disk (refer to pages RH-REP0200 through RH-REP0260).

Errors counted in the subsystem and default threshold values for them are listed below.

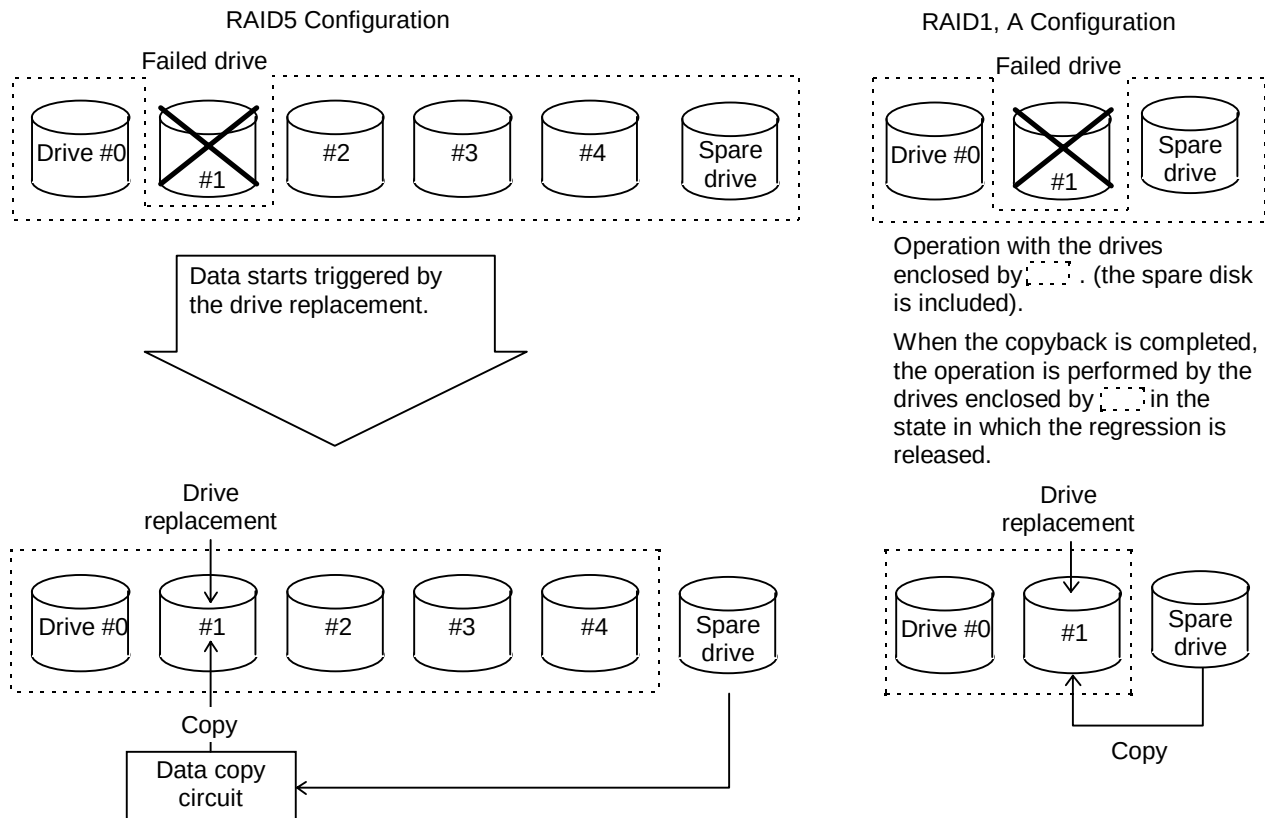
Item No.	Kind of error	Threshold (Default)
1	Drive mechanical error. (Recovered)	50
2	Drive mechanical error. (Unrecovered)	2
3	Drive medium error. (Recovered)	100
4	Drive medium error. (Unrecovered)	50
5	Drive R/W error. (Recovered)	10
6	Drive R/W error. (Unrecovered)	2
7	Drive I/F error. (Recovered)	50
8	Drive I/F error. (Unrecovered)	2
9	Drive hardware error. (Recovered)	50
10	Drive hardware error. (Unrecovered)	2
11	Drive SCSI I/F error. (Recovered)	50
12	Drive SCSI I/F error. (Unrecovered)	2
13	Collectable errors in online verify.	100
14	Uncollectable errors in online verify.	50

The threshold values above can be referred to and updated from the maintenance panel. (See page PANEL0745.)

Besides, the then error count can be referred to concerning the recovered or unrecovered drive media errors, correctable errors in online verify operations, correctable errors, and uncorrectable errors.

(2) Copyback

When a new drive is inserted to where a failure occurred as shown in the drawing below, the copyback will be executed automatically.



In the following cases, the copyback will not start automatically. Operation to start the copyback is required.

- ① When the copyback mode is set to "NOT AUTOMATIC MODE", the copyback will not start automatically after the drive replacement.

In this case, it is necessary to instruct copyback with the panel. (See RH-REP0280)

- ② If a faulty drive is replaced during data recovery to the spare disk, the data copy back to the replaced drive will not start automatically even after the data recovery to the spare disk is completed.

In this case, it is necessary to remove and insert the replacement drive again after the data recovery onto the spare disk is completed.

(a) Transition of panel display.

(i) Data recover (Data recovery onto the spare disk when a disk failure is detected.)

W202XY DRVALM-XY: Drive blocked

I01044 RCV-ST-44 : Start of data area recovery

I01144 RCVEND-44 : Completion of data area recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(ii) Data recover (Dynamic sparing)

I01DXY DYNMSP-XY : Start of Dynamic sparing

I01044 RCV-ST-44 : Start of HDU ASSY recover

I01144 RCVEND-44 : Completion of data recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

W202XY DRVALM-XY: Drive X, Y were blocked

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(iii) Copyback

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of recovery onto the drive to which the data has been copied.

Note : Symbols X and Y indicated above represent the following.

X indicates port No., and Y indicates row No., and XY indicates the location of the drive to which the data is copied.

* : This message is displayed only when replacing HDU ASSY.

(b) Confirming completion of data recovery or copyback

Select DRIVE MAINTEN (RECOVER STATUS) from the panel and make sure that the data recovery is completed normally (COMP).

(c) When the data recovery failes (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(i) Data recovery to the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery to the spare disk will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive. (When the failed drive is removed, the data recovery to the spare disk will not start, where as when the drive is replaced, the data recovery to the replaced drive starts.)

(ii) When the dynamic sparing

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the dynamic sparing will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

(iii) Copyback to the replaced drive from the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery onto the spare disk will not start.
- ➋ Replace the drive in the regressed location. In this case, the data recovery onto the replacement drive starts.

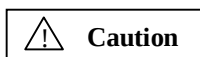
- ➌ Make sure that the data recovery is completed normally (COMP).

- When the faulty portion is other than the spare disk

- ➊ Replace the drive which failed during data recovery and make sure that the data recovery is completed normally (COMP).

- ➋ Replace the drive which is regressed first and make sure that the copyback is completed normally (COMP).

4.3 HDU ASSY Replacement Procedure (See Figure 4.3.1.)



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

(1) Removing procedure

- ① Remove the front cover and open the front panel. (See RH-REP0160, RH-REP0180.)
- ② Check to see the drive installing location of the message text DRVALM-XY (XY indicates the installing location) on the panel is correct and the ALARM LED of the HDU ASSY is on.

W	2	0	2	X	Y	D	R	V	A	L	M	-	X	Y

X : Port number

Y : Row number

- ③ Open the handle in the direction of the arrow (···➤) and pull it out and remove the HDU ASSY.

Note : Be sure to replace the HDU ASSY when the subsystem is in the ready state. (If the HDU assembly is replaced when the power of the subsystem is off, the data recovery operation will not start.)

(2) Installing procedure

- ① Open the handle fully, insert the HDU ASSY in place, and rotate the handle in the direction of the arrow (→).

 **Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

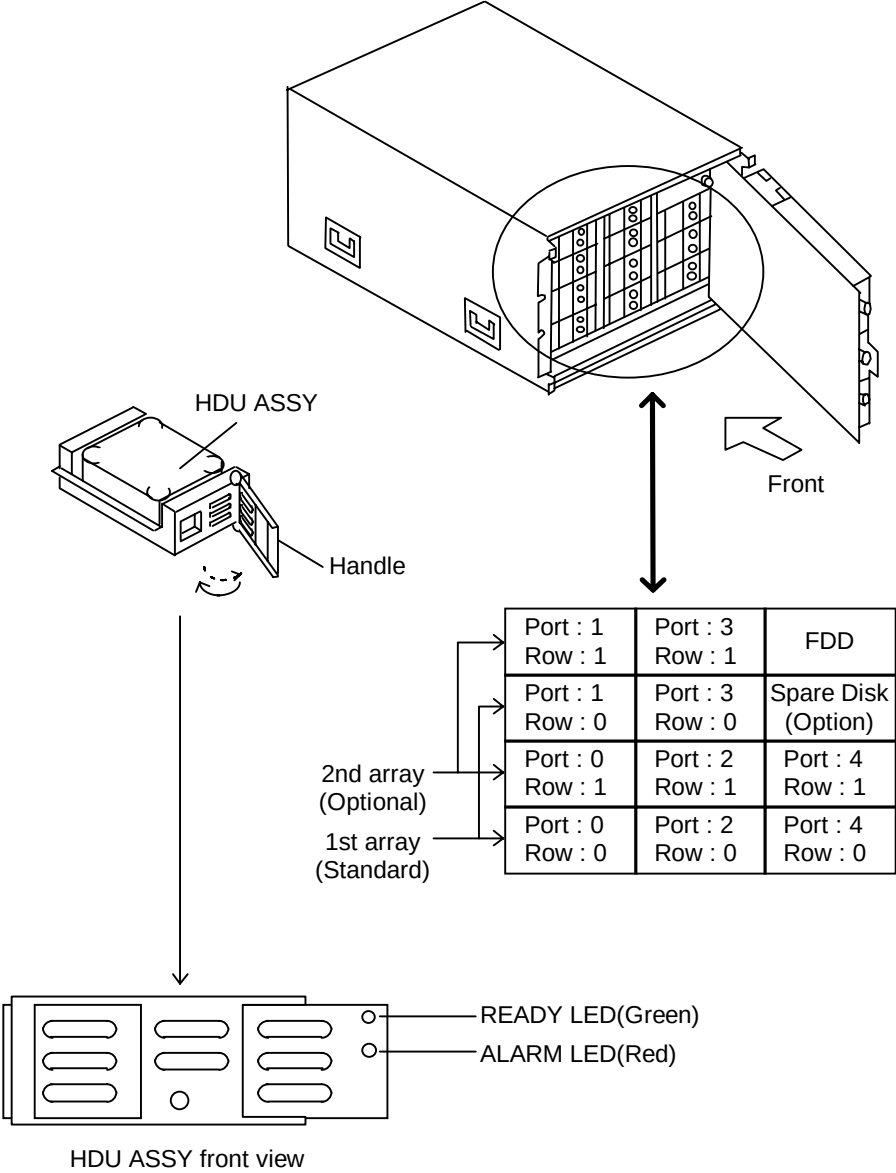
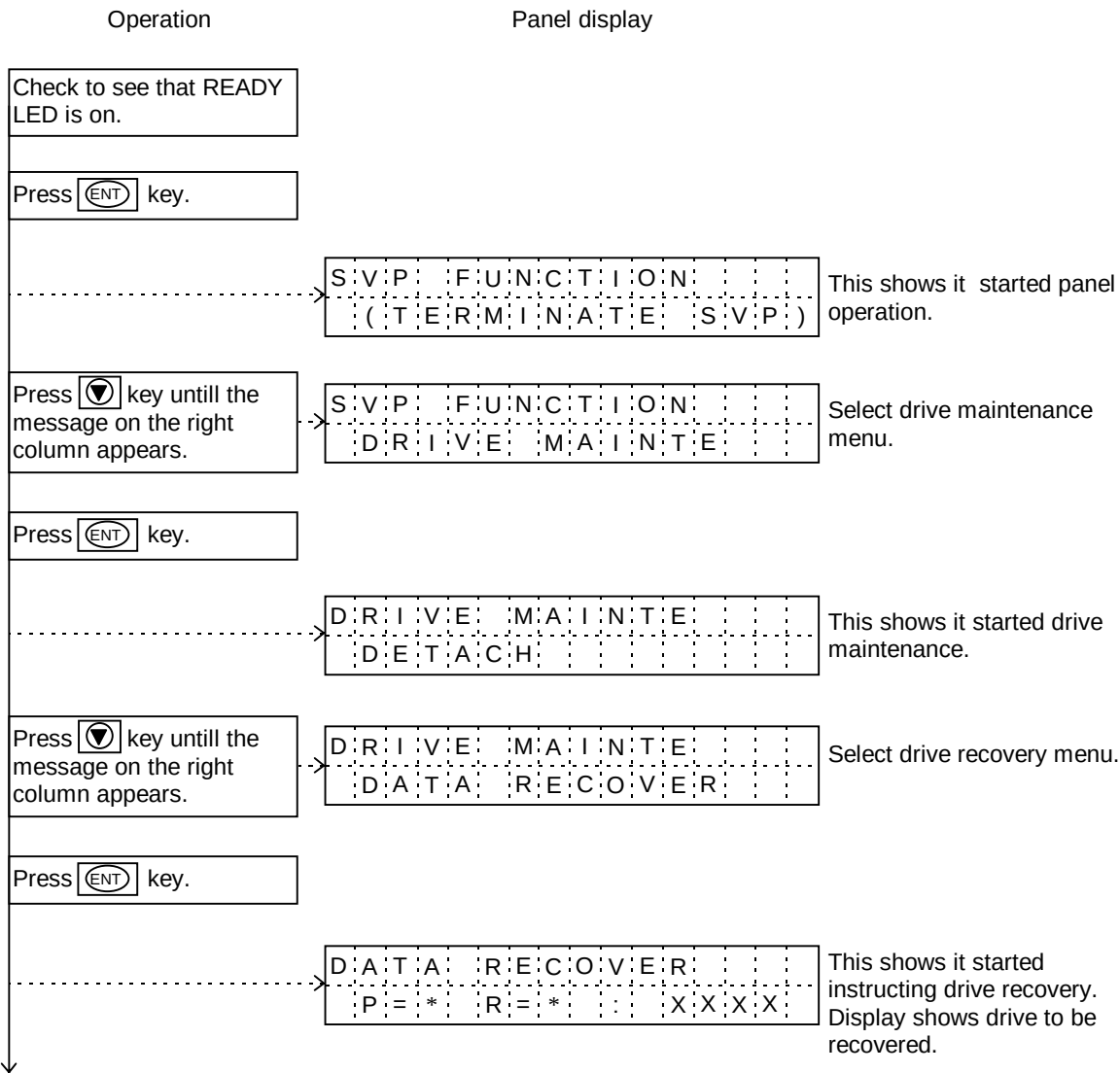


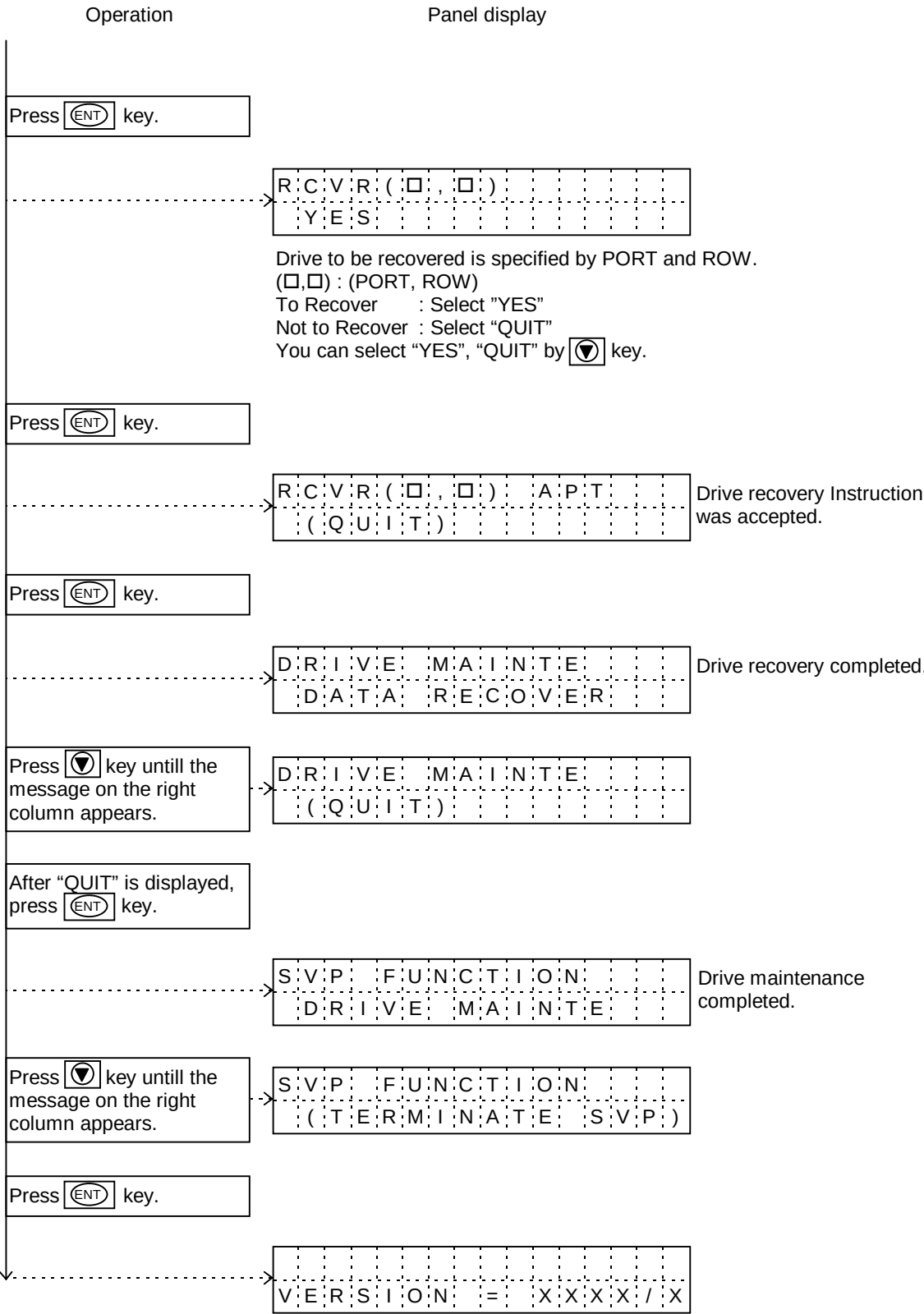
Figure 4.3.1 Replacing HDU ASSY

4.4 Manual Instruction of Data Recovery

This is for manually instructing data recovery. (In a case of dual controller system, which controller to process is automatically specified. No instruction of controller is required.) You can operate this function under device ready and LU#0 instituted (LU can be not formatted yet).



- P=* : Port# of Drive to be recovered.
R=* : Row# of Drive to be recovered.
XXXX : Status of Drive to be recovered. Status is one of below.
- STDBY (not used)
 - DETACH (blocked)
 - NO : (RAID, LU not set yet)



5. Replacing Fan ASSY (See Figure 5.1.)

When replacing FAN ASSY, turning off the power is not required.



Caution

FAN is rotating with high speed, be careful not to be caught by the FAN.

(1) Removing procedure

- ① Remove the front cover and open the front panel, or open the rear cover, depending on which Fan ASSY is going to be replaced. (See RH-REP0160, 0170, 0180.)
- ② Remove thumbscrew and pull out Fan ASSY holding the handle.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)

(2) Installing procedure

- ① Install Fan ASSY to the predetermined position and tighten the thumbscrew.
- ② Check to see that WARNING LED goes off and it displays as (3).
- ③ Close the front panel and attach the front cover or close the rear cover. (See RH-REP0160, 0170, 0180.)

(3) Transition of panel display

I002XX FANRCV-XX----- Termination of fan failure recovery

(XX indicates the installing location)

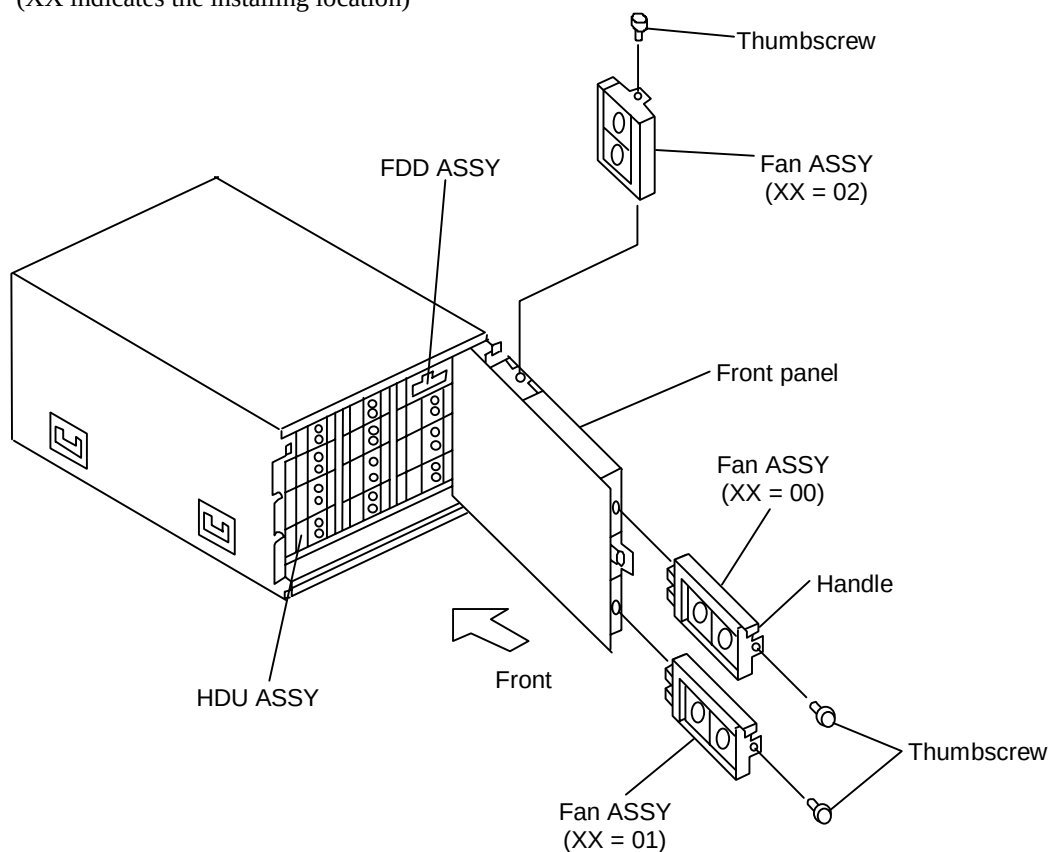


Figure 5.1 Replacing Fan ASSY

6. Replacing Battery ASSY (See Figure 6.1.)

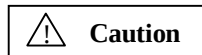
Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

When the battery is to be replaced with power turned off, read RH-REP0050, "Turning the power off." and "Turning-ON procedure." thoroughly and follow RH-REP0060, "Part Replacement Procedures".

(1) Removing procedure

- ① Turn the switch on the Battery ASSY to "O" side.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)
- ② Remove the thumbscrews and pull the Battery ASSY to your side by grasping it by its handle.



Caution

Do not disintegrate removed Battery. It may cause burn or electric shock.

(2) Installing procedure

- ① Insert the Battery ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Turn the switch on the Battery ASSY to "I" side.
- ③ Check to see that WARNING LED goes off and it displays as (3).

Note : When removing/mounting the Battery ASSY, turn the switch to "O" side.

(3) Transition of panel display

I00100 BATRCV ----- Termination of battery recovery

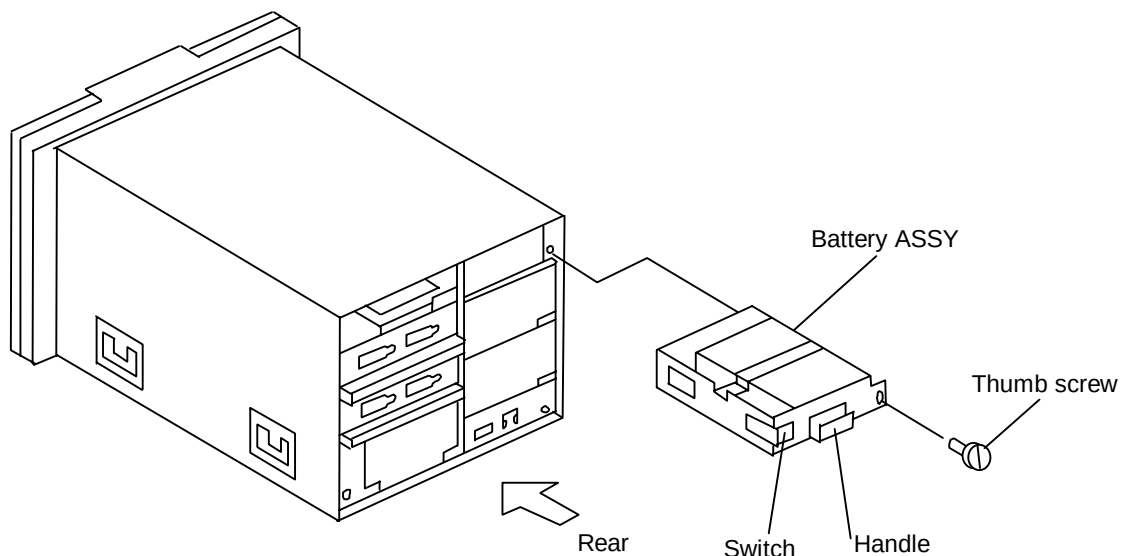


Figure 6.1 Replacing Battery ASSY

Note : The lead-acid battery is a precious resource which can be recycled.

The battery uses lead which is a heavy metal and sulfuric acid which is a deleterious substance. Therefore, never case it off at the place where the replacement of it is done.

When a part is to be replaced or a used product is to be discarded, take out the lead-acid battery to get it recycled.

See page "ENTRY0120" for the safety of depositing and storing the battery.

When the battery ASSY is replaced, power on the subsystem and charge the battery for more than two hours before returning the subsystem to the customer.

7. Replacing FDD ASSY (See Figure 7.1.)

When replacing FDD ASSY, turning off the power is not required.

(1) Removing procedure

- ① Remove the front cover and open the front panel. (RH-REP0160, RH-REP0180.)
- ② Remove the thumbscrew and pull the FDD ASSY to your side grasping it by its handle.

(2) Installing procedure

- ① Insert the FDD ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Close the front panel and attach the front cover. (See RH-REP0160, RH-REP0180.)

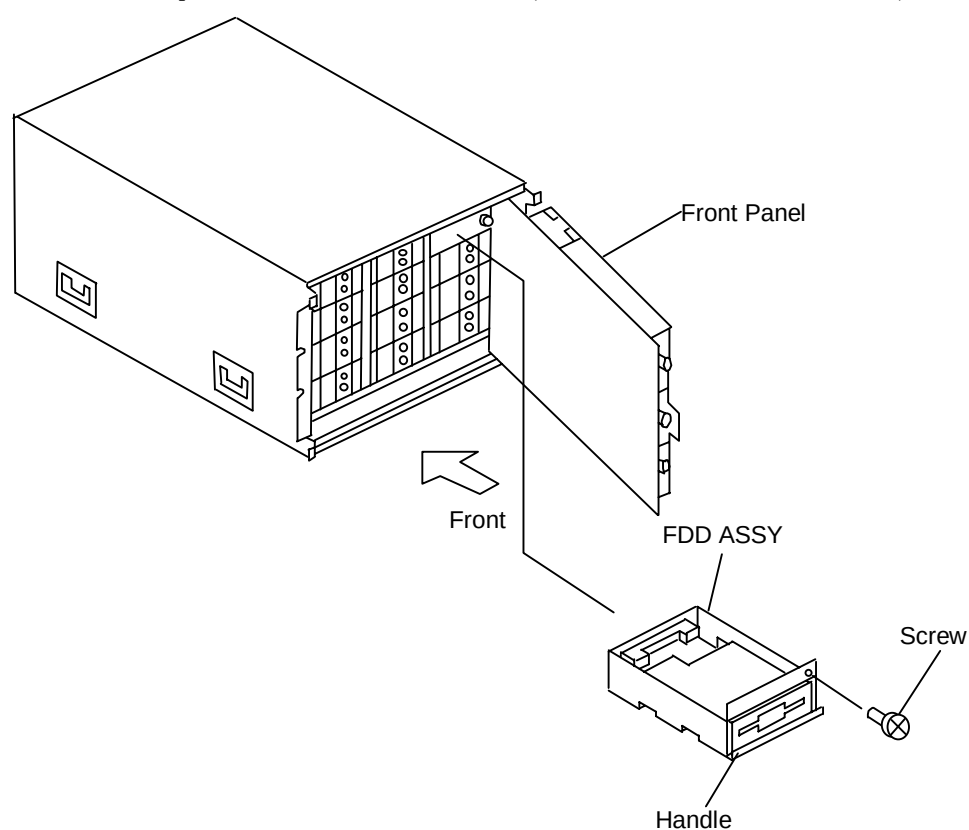


Figure 7.1 Replacing FDD ASSY

8. Replacing CTL ASSY

The replacement procedure differs depending on the Micro_Disk version. Confirm the version first, then execute the replacement following the procedure determined according to the version.

- (1) When the Micro_Disk version is 0303** (** is optional) or earlier
Go to section 8.1 “CTL ASSY Replacement when Version is 0303** (** is optional) or earlier” on page RH-REP0330.
- (2) When the Micro_Disk version is 0304** (** is optional) or later
Go to section 8.2 “CTL ASSY Replacement when Version is 0304** (** is optional) or later” on page RH-REP0361.

8.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier

In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See RH-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in RH -REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ Remove rear cover 1 and rear cover 2. (See RH-REP0170.)
- ⑤ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.



- ⑥ Turn on the subsystem according to the power-on procedure explained in RH -REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See RH -REP0130.) If no system parameter FD, proceed the setting the panel with the table prepared in ①. (Refer to PANEL Chapter.)
- ⑧ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑨ Turn off the power according to the power off procedure in RH -REP0050.
- ⑩ Turn on the power according to the power on procedure in RH -REP0050. (Soon, the ASSY will enter the ready status.)
- ⑪ Install rear cover 1 and rear cover 2. (See RH-REP0170.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED is on).

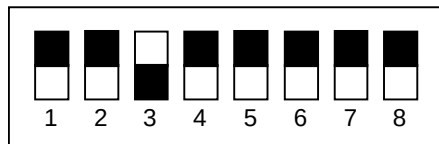
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① Remove rear cover1 and rear cover 2. (See RH-REP0170.)
- ② Disconnect the cables (RS232C).
- ③ Check to see which CTL ASSY is blocked (FAIL LED is lit up).
- ④ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑤ Remove the CACHE ASSY and the LAN ASSY. (option)

(2) Installing procedure

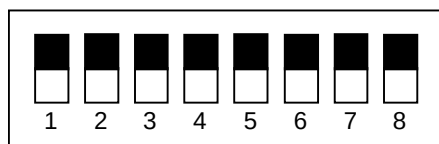
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ When the WARNING LED on PANEL goes off and the message below appears on the PANEL, set No.3 of DIP switch to as shown.



The message on the PANEL "I619XX CTL RCU-XX". (XX : Indicates the installing location < 00 or 01 >.)

- ⑤ Connect the disconnected cables (RS232C).

⑥ Install rear cover 1 and rear cover 2. (See RH-REP0170.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option) , replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

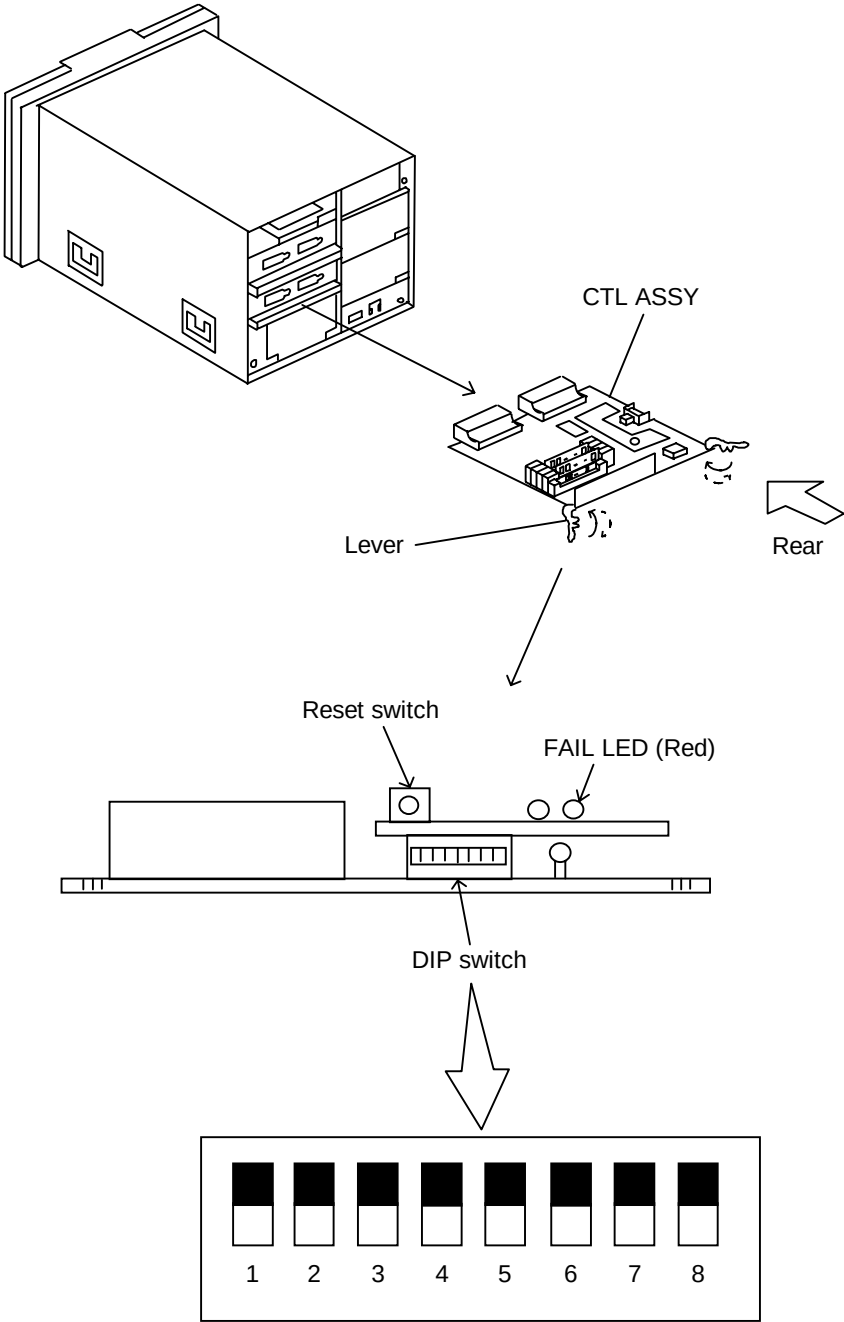


Figure 8.1 Replacing CTL ASSY

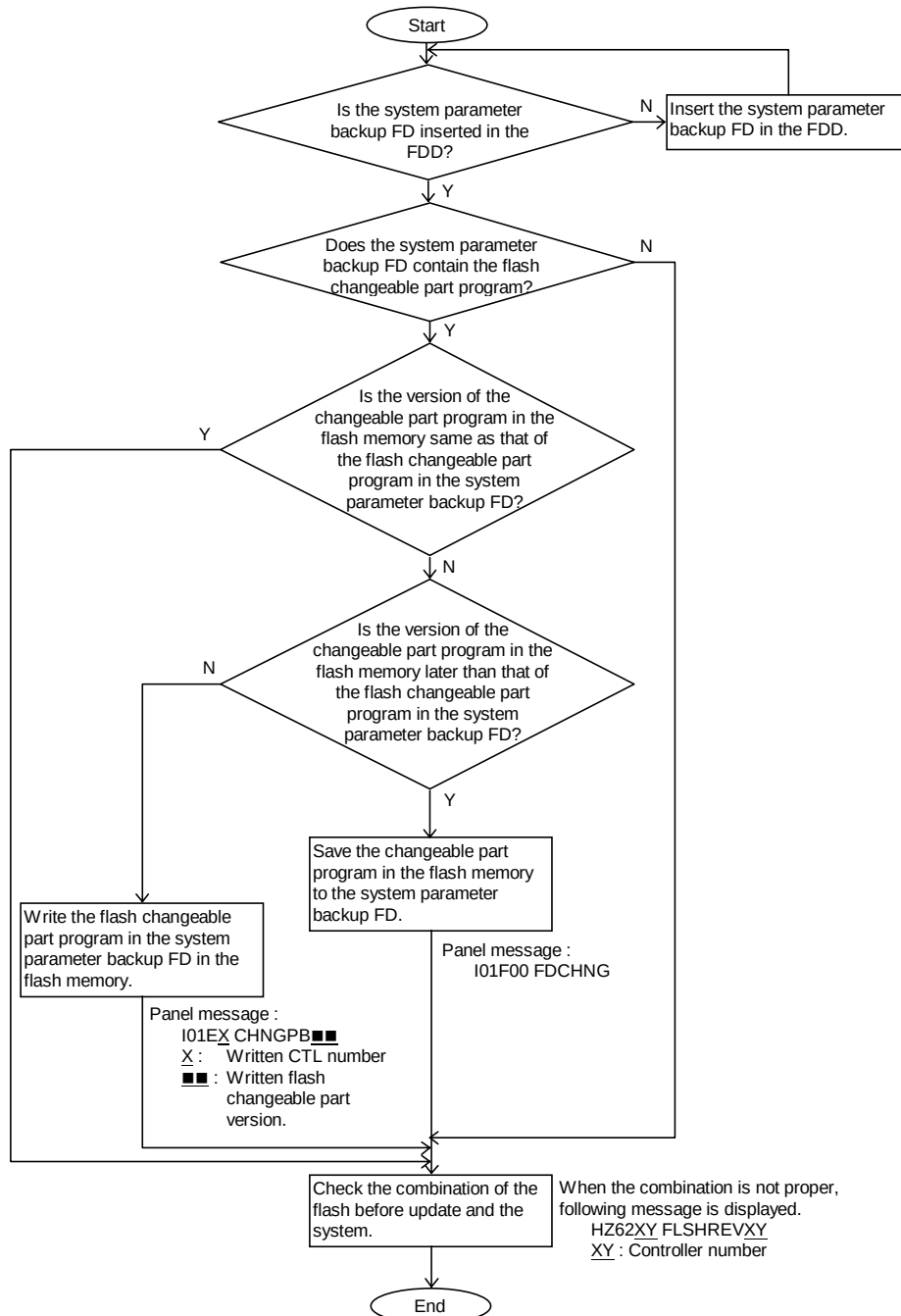
8.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later

The automatic updating function of the flash changeable part is added to the subsystem whose Micro_Disk version is 0304** (** is optional) or later. To use the function the system parameter backup FD must be inserted. By using the function, service person can replace the CTL ASSY without giving care to the combination of the Micro_Disk version and the flash changeable part version of the CTL ASSY.

(If the system parameter backup FD is not inserted when replacing the CTL ASSY, prepare the CTL ASSY whose flash changeable version is the same as that of the CTL ASSY to be replaced, or PB26 or later, and execute the replacement following the procedure explained in Section 8.1 "CTL ASSY Replacement when Version is 0304** (** is optional) or earlier".)

Outline of flash changeable part automatic updating function

The following is a processing flow of the flash changeable part automatic updating function. This processing is performed by the Micro_Disk of version 0304** (** is optional) or later.



In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See RH-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in RH-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

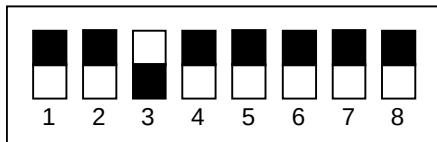
Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ First open the rear cover 1 and then the rear cover 2. (See RH-REP0170.)
- ⑤ Open the right and left levers to the direction of arrows (···→) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
 - ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
 - ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.
- Note :** If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.
- ④ Connect the disconnected cables (RS232C).
 - ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.

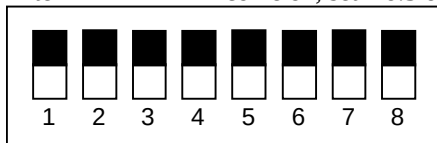


- ⑥ Turn on the subsystem according to the power-on procedure explained in RH-REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See RH-REP0130.)

- ⑧ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
Version = XXXX/X	Subsystem READY LED comes on.	Go to step ⑨
I01EX CHNGPB■■■ HZ62XY FLSHREVXY X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	Subsystem ALARM LED comes on. (Version of flash changeable part was updated to PB■■■. Current system cannot operate with the flash changeable part whose version is not updated.)	Operation1 : Return the DIP switch of the CTL ASSY. Operation2 : Turn off the power following the powering off procedure shown on page RH-REP0050. Operation3 : Turn on the power following the powering on procedure shown on page RH-REP0050. Check if the following message is displayed on the panel. Version = XXXX/X Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see RH-REP0367), then go to step ⑨.
I01EX CHNGPB■■■ Version = XXXX/X X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed.	Subsystem READY LED comes on. (Version of flash changeable part was updated to PB■■■. Current system can operate with the flash changeable part whose version is not updated.)	Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see RH-REP0367), then go to step ⑨.

- ⑨ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑩ Turn off the power according to the power off procedure in RH-REP0050.
 ⑪ Turn on the power according to the power on procedure in RH-REP0050. (Soon, the ASSY will enter the ready status.)
 ⑫ Close the rear covers 1 and 2. (See RH-REP0170.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED in on).

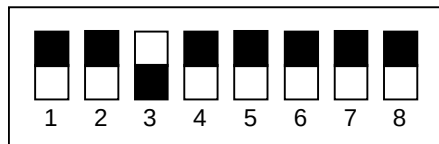
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① First open the rear cover 1 and then the rear cover 2. (See RH-REP0170.)
- ② Disconnect the cables (RS232C).
- ③ Confirm the blocked CTL ASSY (with the FAIL LED turned on). (See Figure 8.2.1.)
- ④ Take out the CTL ASSY by pulling both levers on left and right side at the same time toward the directions shown by allows (·····➤)
- ⑤ Remove the CACHE ASSY. If the LAN ASSY is installed, also remove it.

(2) Installing procedure

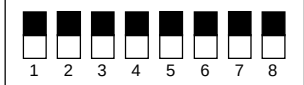
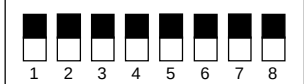
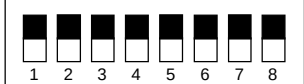
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
I619XX CTLRCV-XX XX : Controller number (00 or 01) is displayed.	The WARNING LED goes out and the READY LED of the subsystem comes on.	Return the DIP switch No.3 as shown below, then go to step ⑤ 
I01EX CHNGPB■■ HZ62XY FLSHREVXY H60422 CTLFAIL W015XX CTLALM-XX XX : Controller number (00 or 01) is displayed. X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	The WARNING LED comes on, and the READY LED of the subsystem comes on in the state that one of the CTL ASSYs is blocked. (The flash changeable part has been updated to the version PB■■. Current system cannot operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Pull out the inserted CTL ASSY (with the FAIL LED turned on). Operation2 : Insert the CTL ASSY again. (Leave the DIP switch No.3 as set to on.) Operation3 : Return the DIP switch No.3 as shown in the Figure below when the WARNING lamp on the panel goes out and the following message is displayed on the panel.  Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see RH-REP0367), then go to step ⑤. I619XX CTLRCV-XX
I01EX CHNGPB■■ I619XX CTLRCV-XX	The WARNING LED goes out and the READY LED of the subsystem comes on. (The flash changeable part has been updated to the version PB■■. However, the current system can operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Return the DIP switch No.3 as shown below.  Operation2 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see RH-REP0367), then go to step ⑤.

- ⑤ Connect the disconnected cables (RS232C).
- ⑥ Close the rear covers 1 and 2. (See RH-REP0170.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option), replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

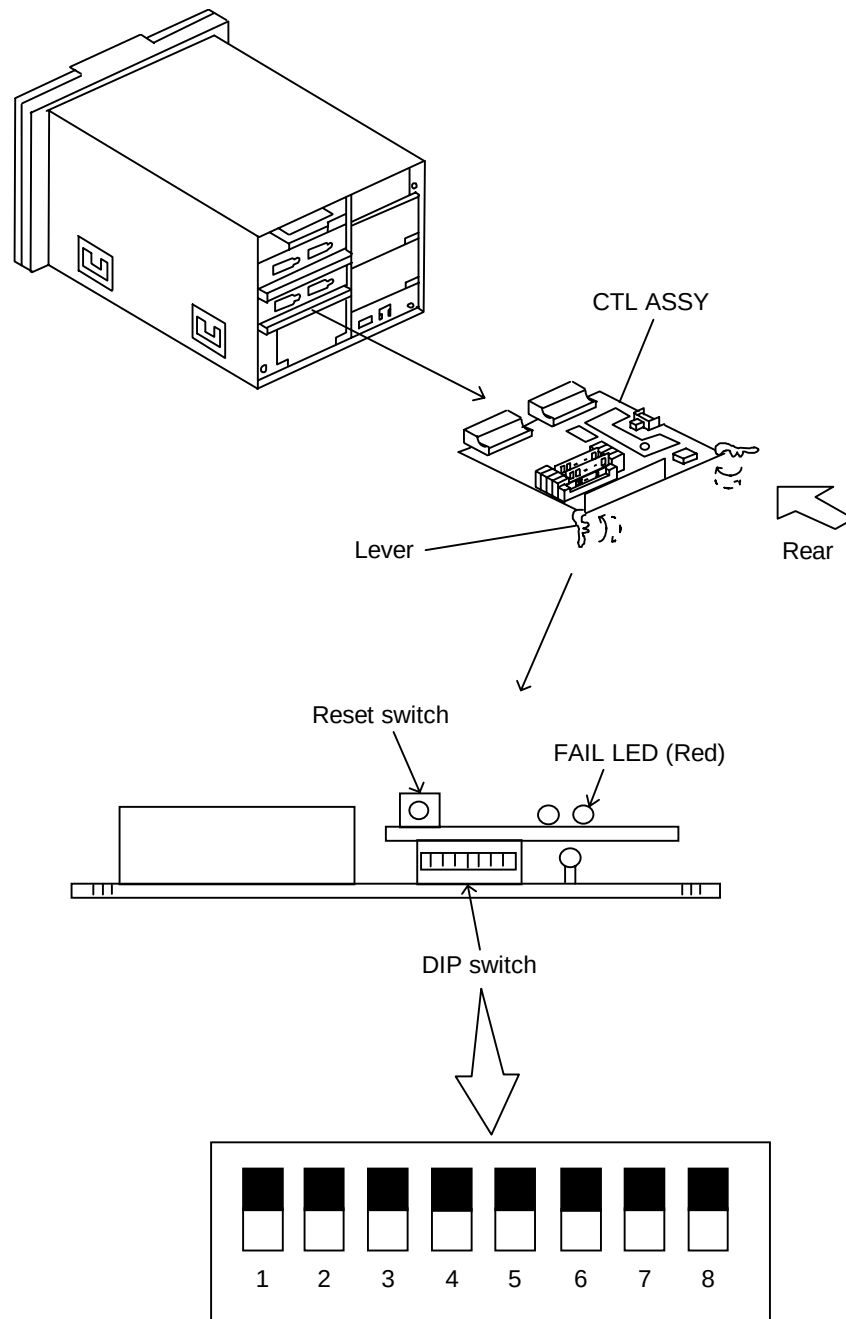


Figure 8.2.1 Replacing CTL ASSY

Painting flash revision label

Figure 8.2.2 shows how to paint the flash revision label. (It shows a case to paint the boxes up to PB26.)
Location of the label is shown in Figure 8.2.3.

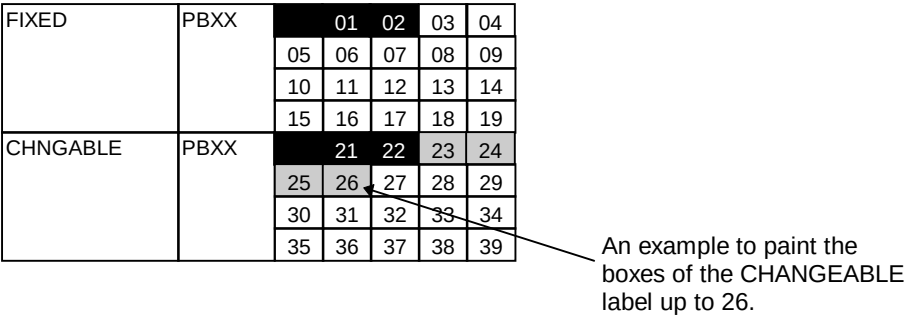


Figure 8.2.2 Revision Label Layout and Numbers to be Painted

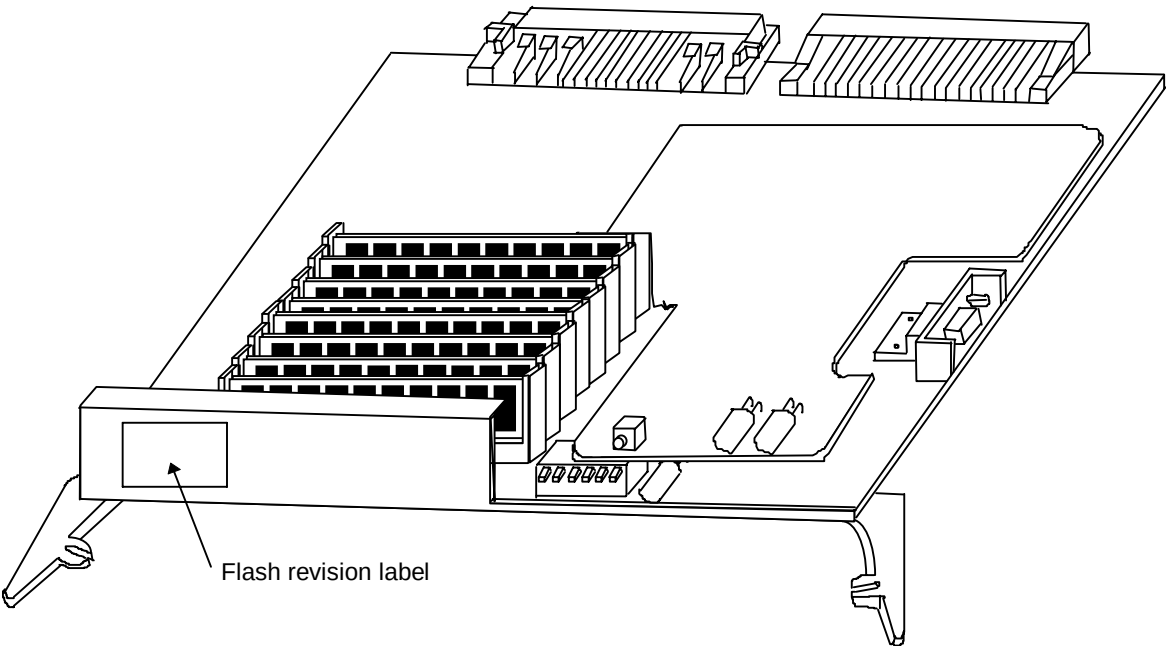


Figure 8.2.3 Location of Revision Label on CTL ASSY

9. Replacing I/F ADAPTER ASSY (See Figure 9.1, 9.2, 9.3 and Table 9.1.)

Be sure to turn the power off DF350 subsystem and host system before disconnecting the SCSI cable.
(That other SCSI devices makes an error and acted, if not or DF350 subsystem only.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RH-REP0050 and turn off the host system.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC".

In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ② Disconnect the SCSI cable, the terminator, and the LAN cable (option).
- ③ Remove rear cover 1 and rear cover 2. (See RH-REP0170.)
- ④ Remove the bind screw and pull the I/F ADAPTER ASSY toward you to remove it.

(2) Mounting procedure

- ① Make the setting of the terminator power, (JP1, JP2) as the setting of the removed I/F ADAPTER ASSY.
- ② Insert the I/F ASSY into the right place and tighten the bind screw.
- ③ Connect the disconnected cables etc.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 9.2.)

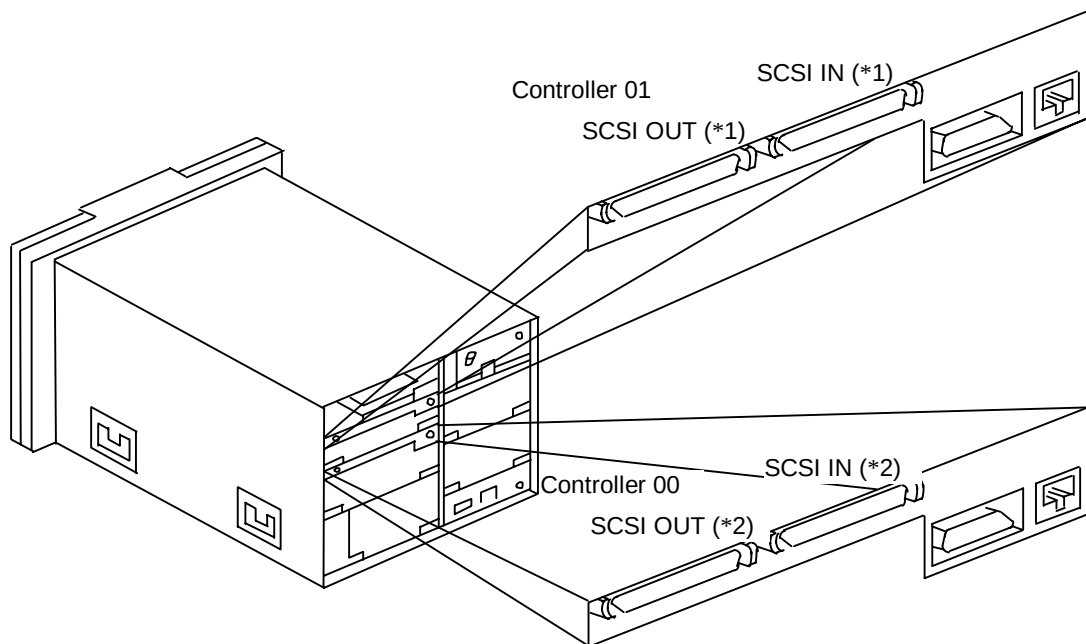


Figure 9.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT : Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

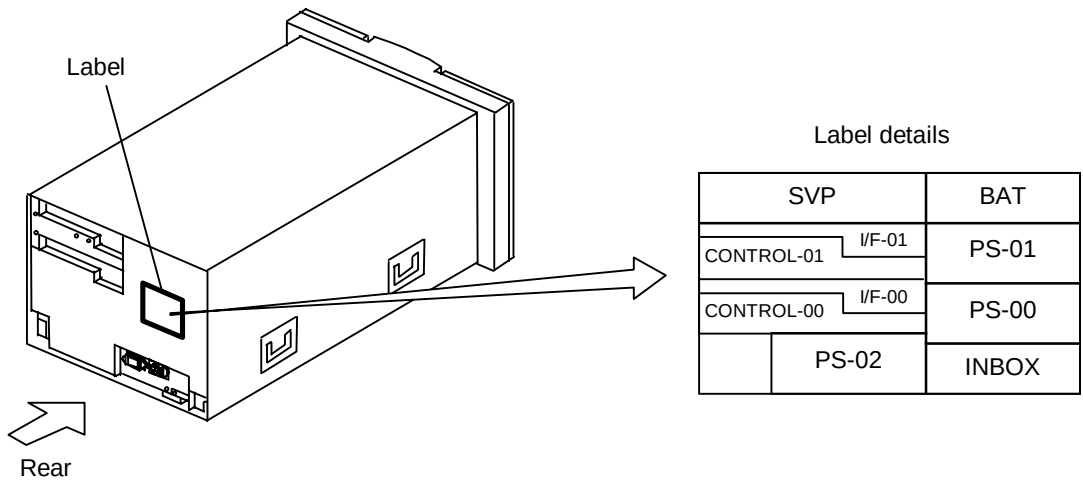


Figure 9.2 Label Layout

④ Install rear cover 1 and rear cover 2. (See RH-REP0170.)

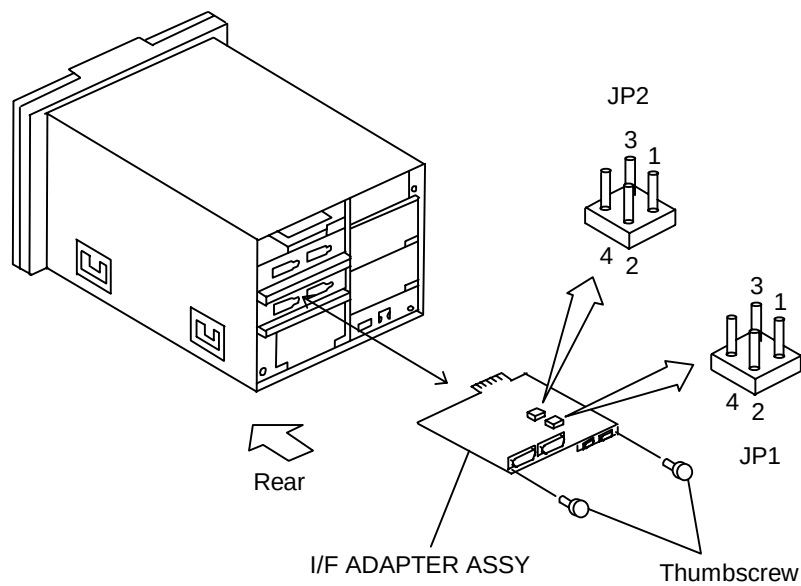
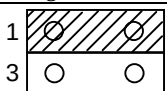
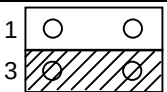
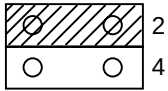
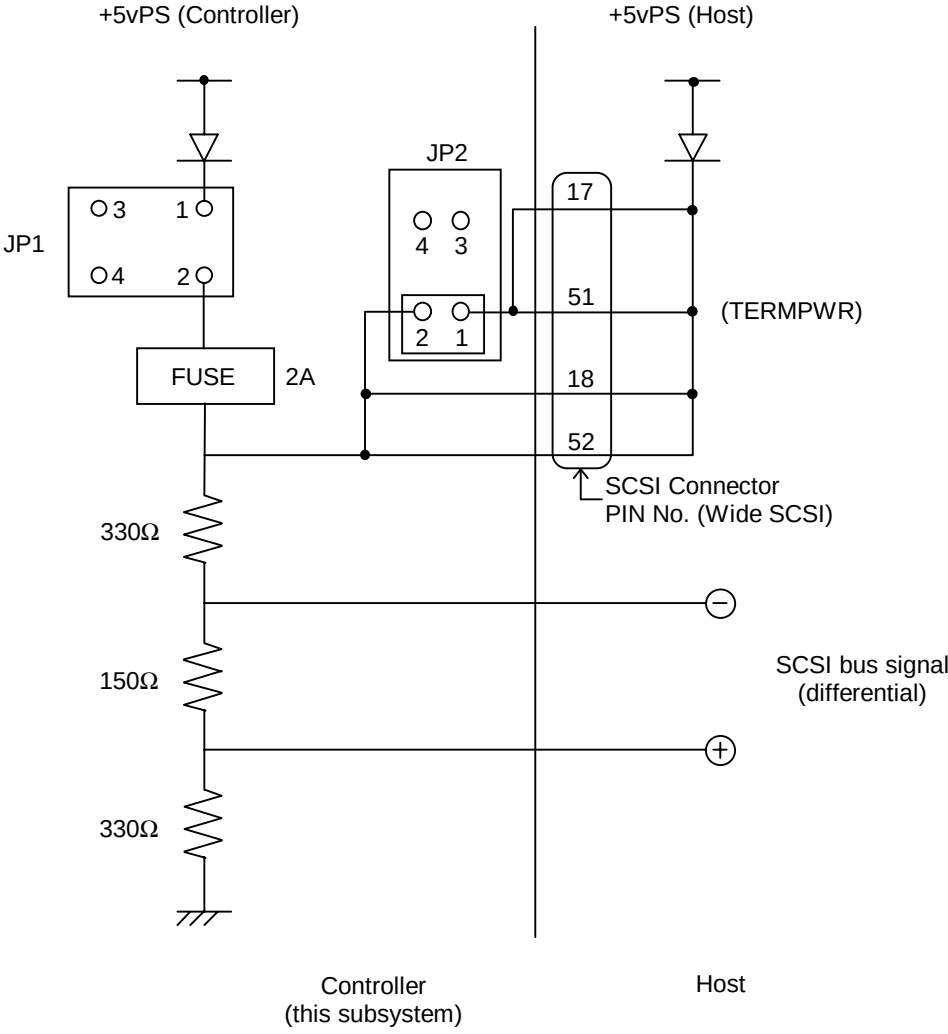


Figure 9.3 Replacing I/F ADAPTER ASSY

Table 9.1 Setting the Terminator Power

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2	JP2		Be sure to set this jumper with the pins 1 and 2 short-circuited.



10. Replacing SVP ASSY (See Figures 10.1 and 10.2.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RH-REP0050. (Be sure to read and understand the procedure because if the power is turned off improperly, user data might be destroyed.)

Sometimes the subsystem does not go power off after the main switch turned to “O” side with panel display “TOOMNYPIN” or “SYSDTSVER” or “POFFCMUNC”.

In this case refer to “Trouble shooting Chapter” (See TRBL0030) and turn off the power.

- ② Check to see that POWER LED goes off.

Notice : In case the power is not normally turned off, the user’s data might be lost.

- ③ Turn the breaker at the rear to “O” side.
- ④ Remove the front cover and open the front panel. (See RH-REP0160, RH-REP0180.)
- ⑤ Remove 3 (a) screws and remove the panel.
- ⑥ Remove thumb screw and remove 3 Fan ASSY.
- ⑦ Loosen 2 (b) and 2 (c) screws and remove the fan cover.
- ⑧ Remove the connectors P1 and P4.
- ⑨ Remove 6 (d) screws and remove SVP ASSY.

(2) Mounting procedure

- ① Make the setting of Remote/Local as the setting of the removed SVP ASSY.
(For setting of the jumper, see “THEORY Chapter, 5. Location and Function of Switches and LEDs”.)
- ② Install the SVP ASSY in the reverse order to the removing.

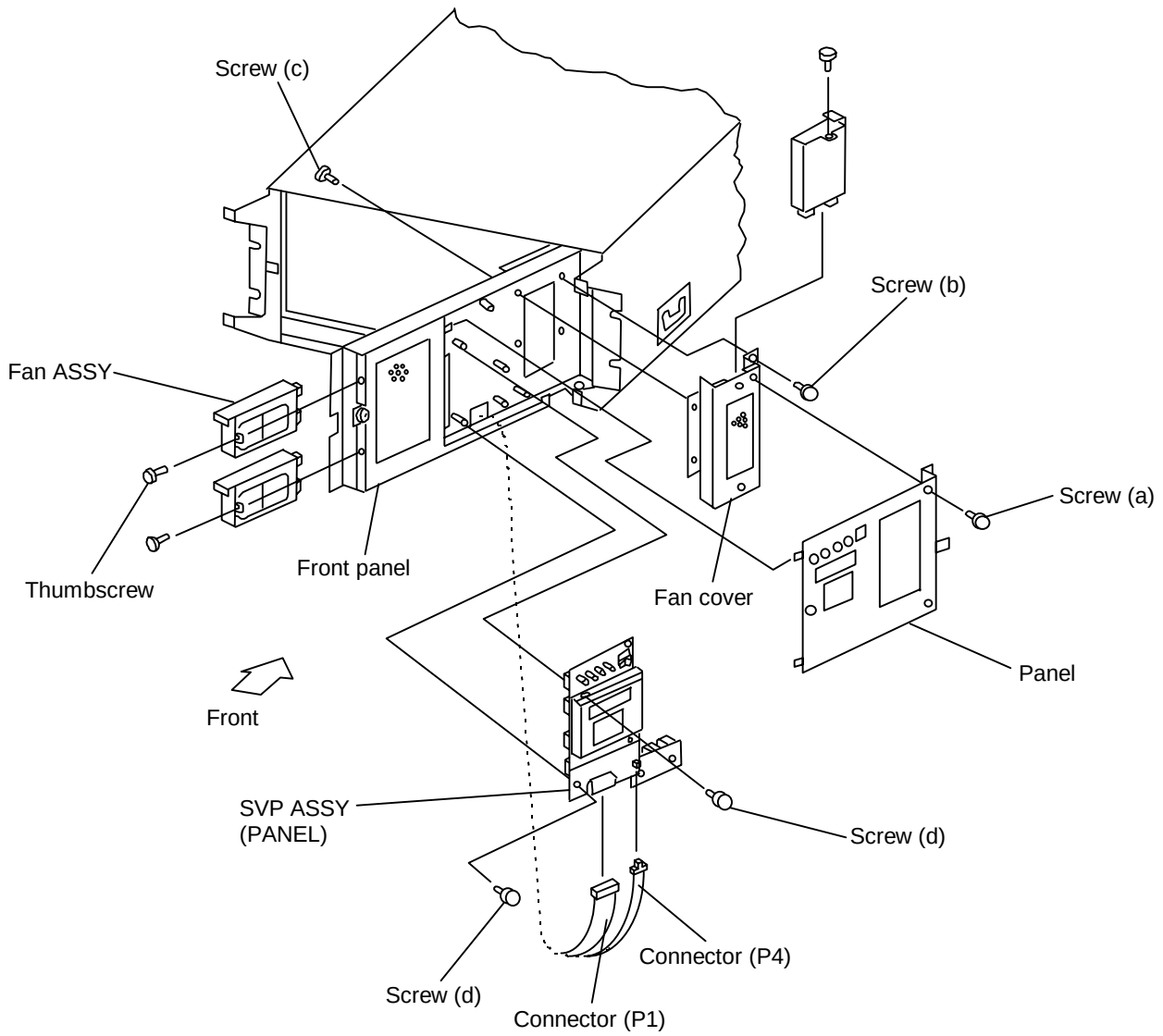


Figure 10.1 Replacing SVP ASSY (PANEL)

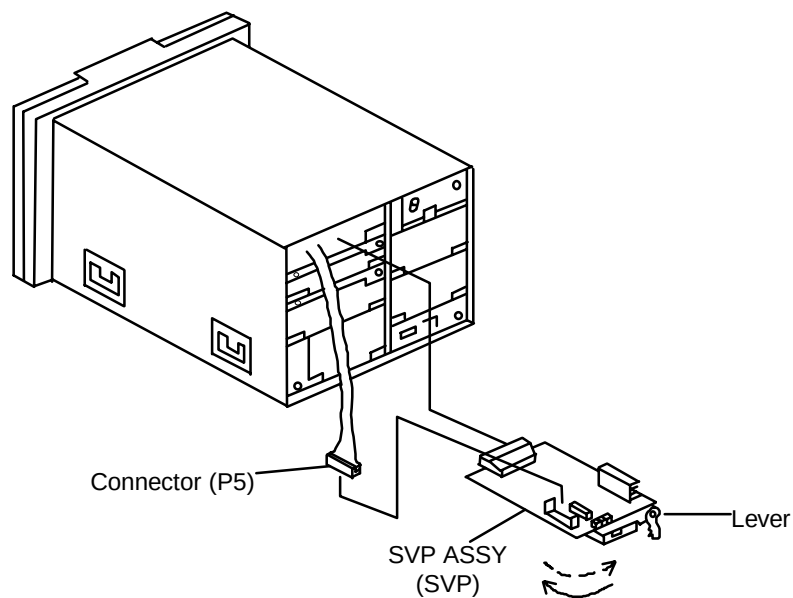
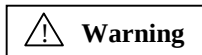


Figure 10.2 Replacing SVP ASSY (SVP)

11. Replacing AC/DC power supply (See Figure 11.1.)



Only the maintenance personnel can perform this replacement.

The operation by the user is prohibited.

Tool : Phillips screwdriver (No.2)

Confirm presence/absence of the redundant power supply. If there is a redundant power supply, a hot replacement is possible. Concerning the rack mount (RKH) type, when the number of the installed AC/DC power supplies is more than that of ROWs of the disk drives, it means that the subsystem has redundant power supply. When the redundant AC/DC power supply is not installed, follow the procedure from step (4).

Cases of redundant power supply installation

Number of ROWs of installed disk drive	Number of installed AC/DC power supplies
1(1 to 5 drives)	2 or more
2(6 to 10 drives)	3

(1) Removing procedure

- ① Remove the rear cover 1 and 2. (See RH-REP0160.)
- ② Disconnected the FG cable connected with the AC/DC power supply.
- ③ Pull the right and left levers at the same time to the direction of an arrow (···→) and remove the AC/DC power supply.

(2) Mounting procedure

- ① Press the “○” side of the In Box ASSY switch.
- ② Press the “○” side of the AC/DC power supply switch. Open the lever completely (in the direction of an arrow (···→)) and insert the AC/DC power supply to the right place. Then push the right and left levers at the same time to the direction of an arrow (—→).
- ③ Connect the FG cable with the AC/DC power supply.

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RH-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to “○” side with panel display “TOOMNYPIN” or “SYSDTSVER” or “POFFCMUNC”.

In this case refer to “Trouble shooting Chapter” (See TRBL0030) and turn off the power.

- ② Remove the rear cover 1 and 2. (See RH-REP0160.)
- ③ Disconnected the FG cable connected with the AC/DC power supply.
- ④ Pull the right and left levers at the same time to the direction of an arrow (···→) and remove the AC/DC power supply.

(5) Mounting procedure

- ① Press the “○” side of the In Box ASSY switch.
- ② Press the “○” side of the AC/DC power supply switch. Open the lever completely (in the direction of an arrow (···→)) and insert the AC/DC power supply to the right place. Then push the right and left levers at the same time to the direction of an arrow (—→).
- ③ Connect the FG cable with the AC/DC power supply.
- ④ Turn on the subsystem following the power-on procedure explained in RH-REP0050.

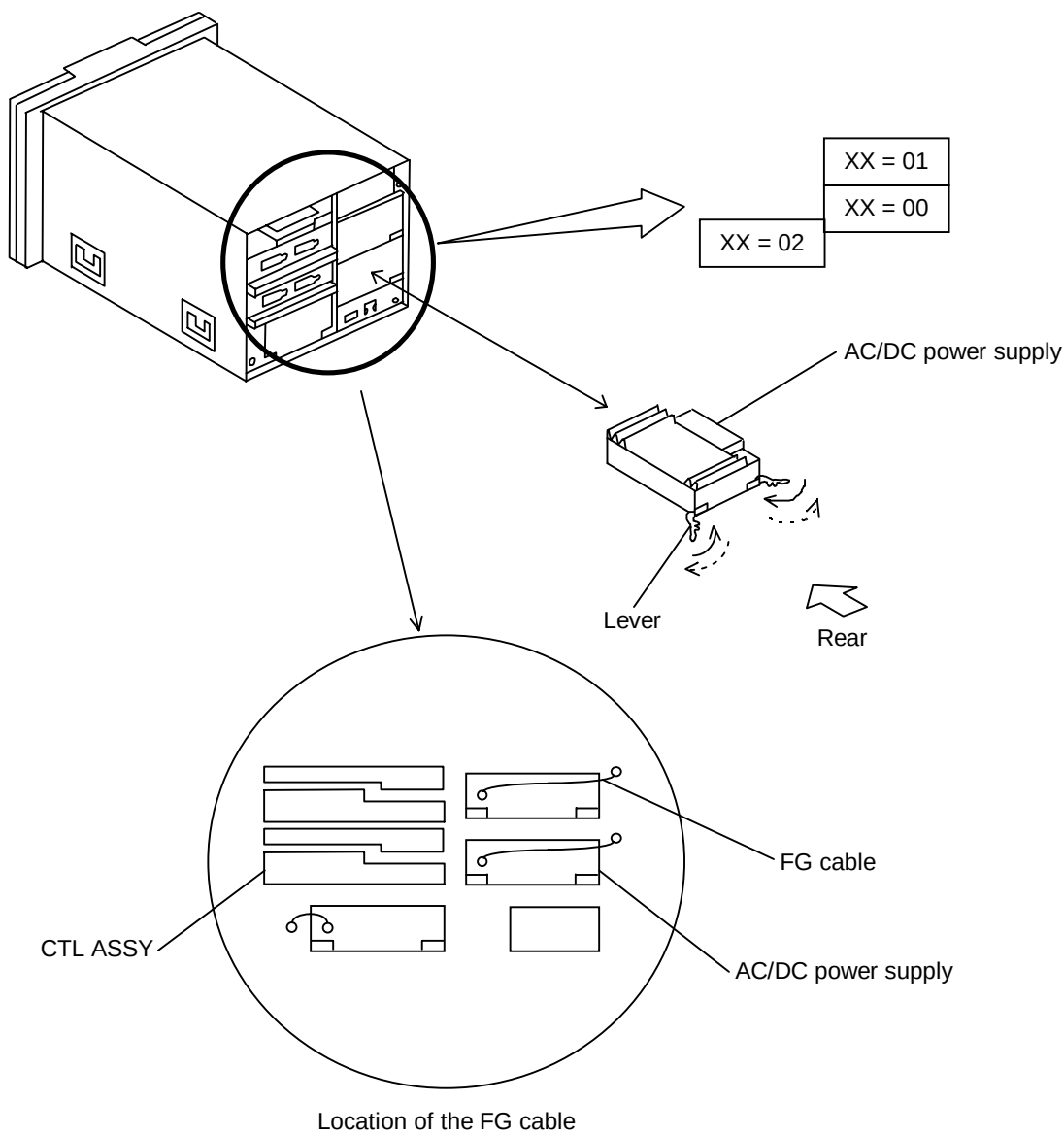
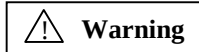


Figure 11.1 Replacing AC/DC power supply

12. Replacing In Box ASSY (See Figure 12.1.)



Do not touch inside of In Box ASSY. Electricity remains even if main switch is off.

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RH-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the power supply cable.
 - ③ Open rear cover 1 and rear cover 2. (See RH-REP0170.)
 - ④ Remove the screw and remove In Box ASSY.
- ### (2) Installing procedure
- ① Install In Box ASSY to the predetermined position and tighten the screw.
 - ② Connect the disconnected cables.
 - ③ Close rear cover 1 and rear cover 2. (See RH-REP0170.)
 - ④ Turn the power on following the power-on procedure in RH-REP0050.

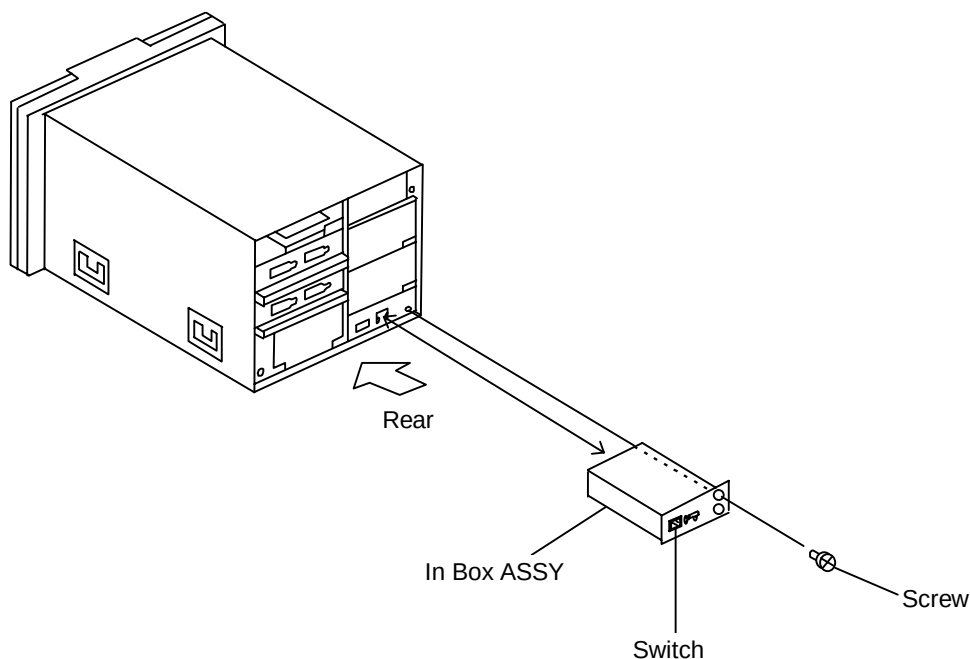


Figure 12.1 Replacing In Box ASSY

13. Replacing CACHE ASSY

In case no optional redundant CTL installed

(1) Procedures

- ① Turn off the subsystem following the power-off procedure explained in RH-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Open rear cover 1 and rear cover 2, and remove the CTL ASSY. (See RH-REP0325)
 ③ Replace CACHE ASSY.

Note 1 : Slots #0 and #4, #1 and #5, #2 and #6, #3 and #7 are pairs respectively. Install the cache having the same capacity for these each pair slots..

Note 2 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- ④ Install the CTL ASSY.
 ⑤ Turn power on following the procedure explained in RH-REP0050.
 ⑥ Close the rear cover 1 and rear cover 2. (See RH-REP0170.)
 ⑦ Close the front cover.

Installation example of CACHE ASSY

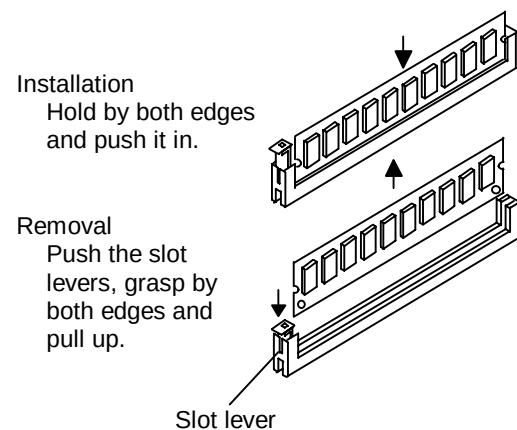
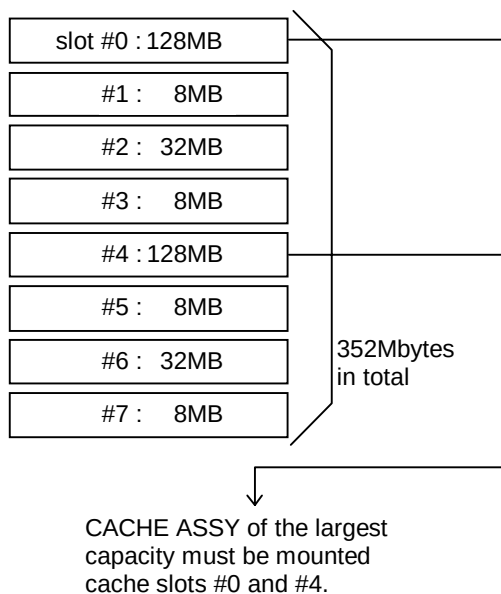


Figure 13.1 Replacing CACHE ASSY

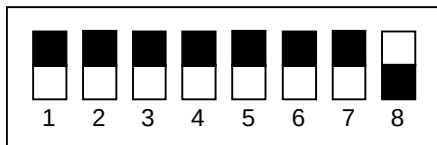
In case optional redundant CTL is installed

When the subsystem are dual controller system, CACHE ASSY can be replaced while the power on.

Note : In this case, the CACHE ASSY must be replaced one controller at one time. In case CACHE ASSY for both CTL ASSY are replaced at the same time, turn the power off before replacement.

(1) Procedure

- ① Open rear cover 1 and rear cover 2. (See RH-REP0170.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.

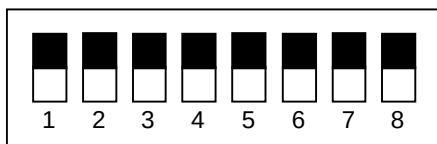


- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that FAIL LED on the CTL comes on and it enters into the blocked state. (See RH-REP0460.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Replace the CACHE ASSY.

Note 1 : When replacing a cache, install the cache having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : CACHE ASSY for the same slot of both CTL ASSY should have the same capacity.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Insert the CTL ASSY.
- ⑩ Connect the disconnected cable (RS232C).
- ⑪ Close rear cover 1 and rear cover 2. (See RH-REP0170.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

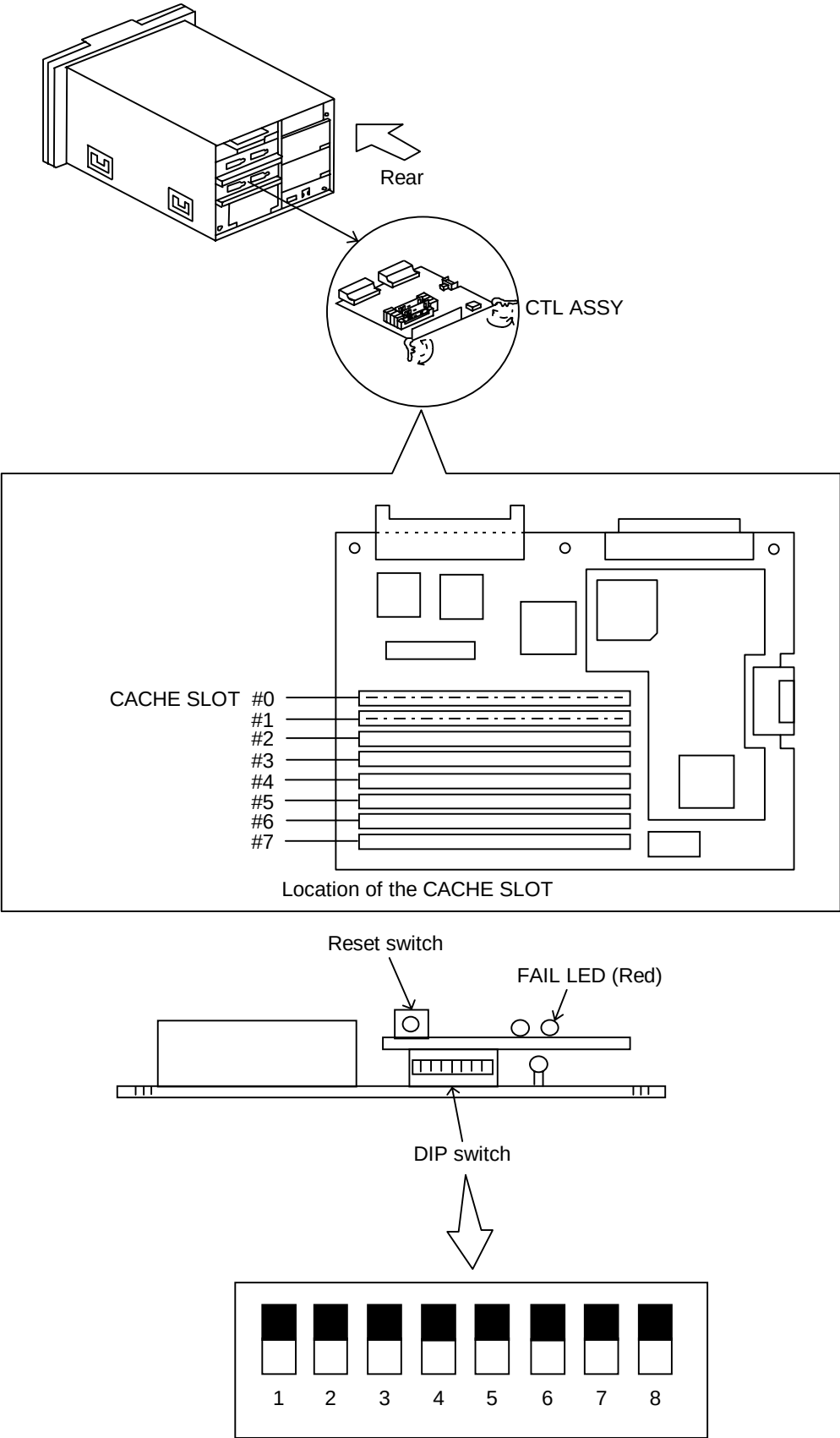


Figure 13.2 CTL ASSY

14. Replacing LAN ASSY

When no optional redundant CTL installed

Note : Configuration setting change is sometimes required because Mac Address is changed after replacing LAN ASSY.

(1) Procedures

① Turn off the subsystem following the power-off procedure explained in RH-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

② Open the rear cover 1 and rear cover 2, and remove CTL ASSY. (See RH-REP0325.)

③ Pinch the latching heads of card spacers with needle-nose pliers etc. , then pull the LAN ASSY up with care not to touch with surrounding parts. (See Figure 14.1.)

Notice : If your hand or a tool touches with CTL ASSY, touched part may be damaged.

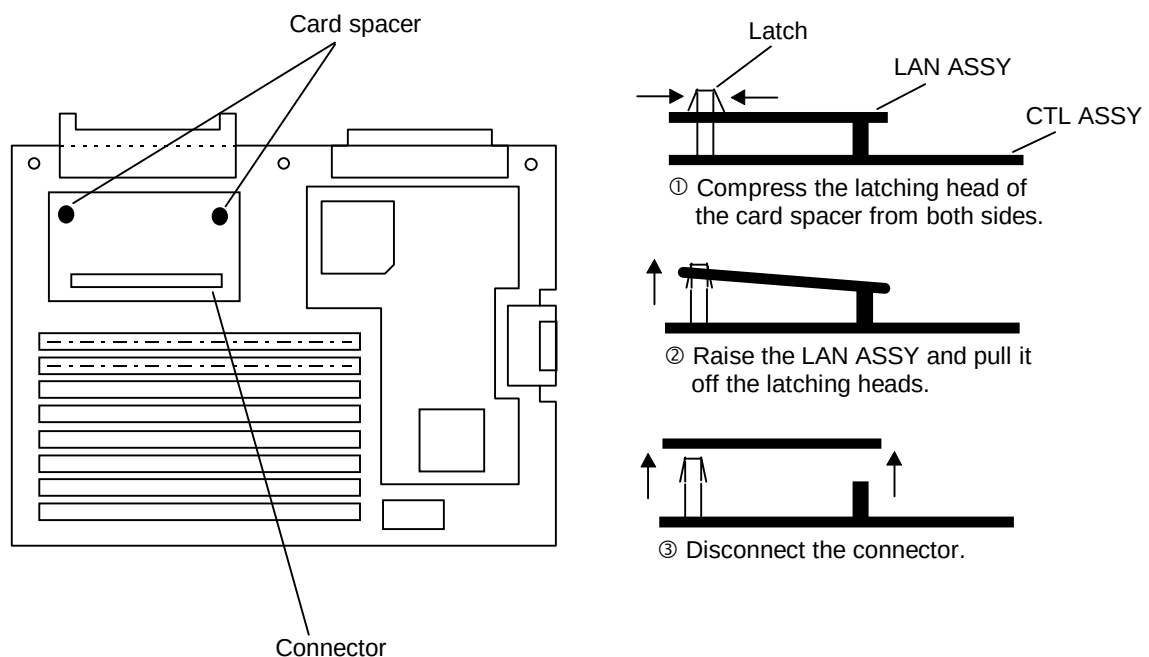


Figure 14.1 Replacing LAN ASSY (1)

- ④ Mount a LAN ASSY for replacement by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑤ Reinstall the CTL ASSY.
- ⑥ Close the rear cover. (See RH-REP0170.)
- ⑦ Turn on the power. (See RH-REP0050.)

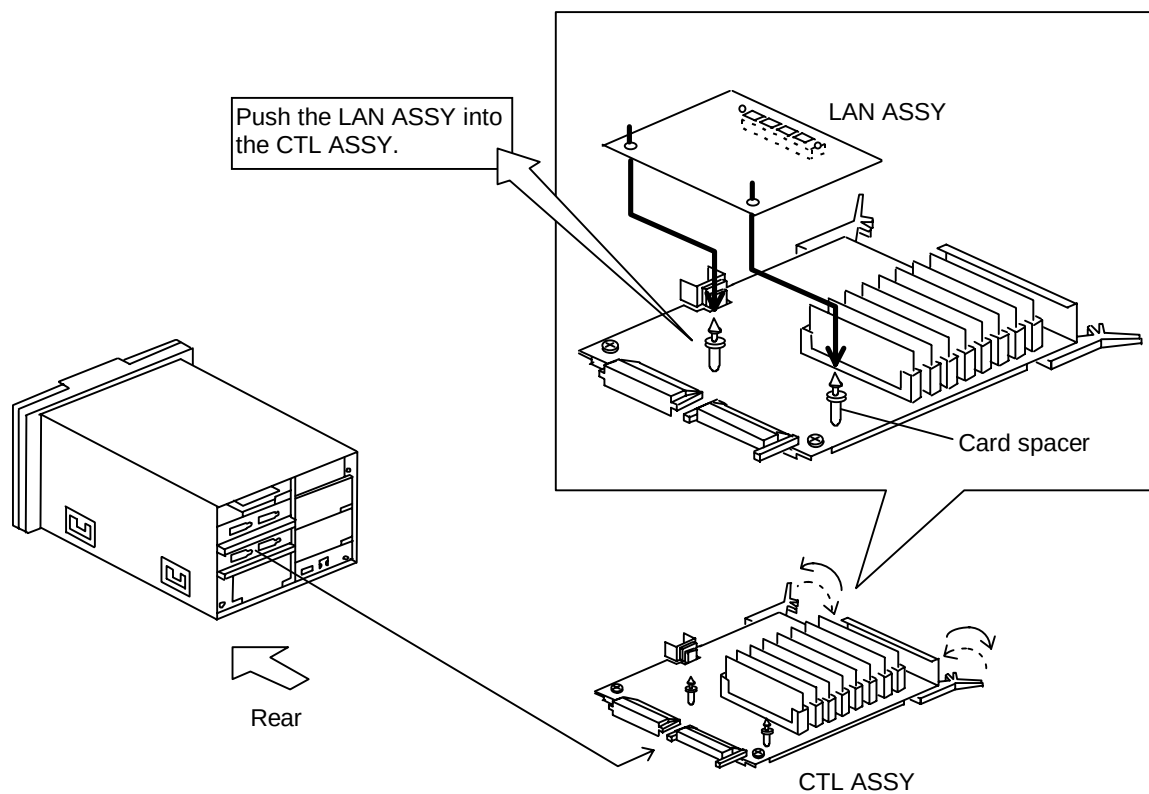


Figure 14.2 Replacing LAN ASSY (2)

When optional redundant CTL installed

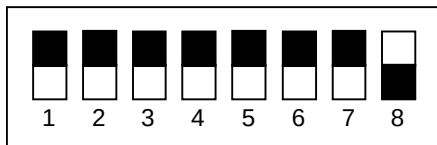
When the subsystem are dual controller system, LAN ASSY can be replaced while the power on.

Note : When replacing LAN ASSY, perform the replacement for each CTL ASSY one after another.

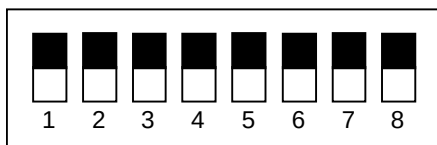
When replacing both LAN ASSY at a time, turn off the power like the case of single configuration.

(1) Procedure

- ① Open rear cover 1 and rear cover 2. (See RH-REP0170.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.



- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that the FAIL LED on the CTL ASSY comes on and it enters the blocked state. (See Figure 14.3.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Remove the LAN ASSY by pulling it upward. Then mount a new LAN ASSY by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Reinstall the CTL ASSY.
- ⑩ Close the rear cover 1 and rear cover 2. (See RH-REP0170.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

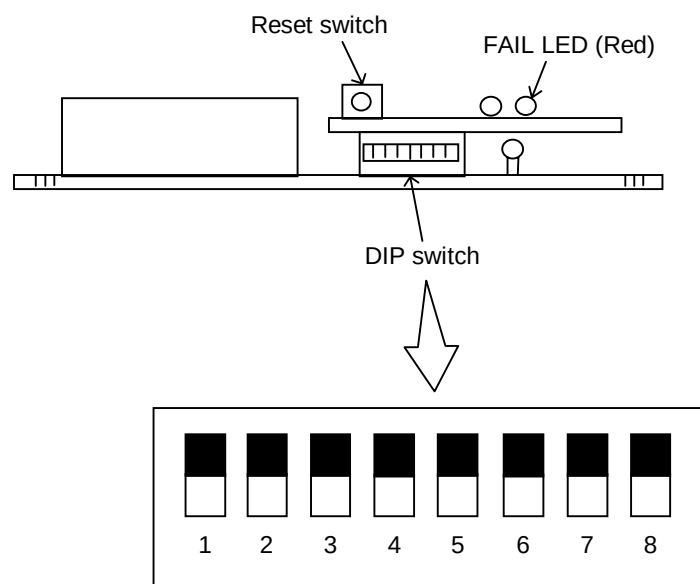


Figure 14.3 Replacing LAN ASSY (3)

DF350 Disk Subsystem

8. INSTALLATION

(Rack Mount (RKH/U1) Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.28.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	May.12.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.30.'97	A.Yamanashi	Y.Morishita	M.Sato	0020 0040 0070 0270 0280 0290 0310 0320 0385	Chapter 6 was added to the table. 4.2 was added. Table was changed. (Pages 0080, 0420, 0430 and 0440 were changed by the same reason.) Figure 3.7.2 was added. Figure 3.7.3 was changed. Dipswitch was changed. Flowchart were changed. (Pages 0360, 0380, 0390, 0400, 0410, 0450, 0460, 0470, 0480 and 0610 were changed by the same reason.) Dipswitch was changed. This page was newly added. (Pages 0386, 0387, 0415, 0416, 0445, 0482, 0484, 0820-0930 were added by the same reason.)	AD AD CH AD CH CH CH CH AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0320 0410 0430 0440 0450 0455 0460 0470 0490 0510 0512 0514 0520 0550 0570 0610 0650 0660 0710 0720 0750 0760 0780 0810 0940-1040	Added 6.7, 6.8. Changed setting of DIP switch. Added “*1”. Added *4/Deleted Item No.21. Added *5, SYS REV and OPTION. Added setting the DIP switch. This page was newly added. Added setting the DIP switch. Changed flow chart. Changed flow chart. Added Figure. This page was newly added. This page was newly added. Added RAID A. Added RAID A. Added TERMINATE SVP. Added RAID A. Added “1024B”. Added RAID A. Changed Notice. Added FORMAT ABORD. Changed the table. Changed the table. Added DUAL TYPE. Added 7, 8, 12, 17, 24, 25 and 26 in the table. These page were newly added.	AD CH AD AD/DL AD AD AD AD CH CH AD AD AD AD AD AD AD AD CH AD CH CH AD AD AD
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0513 0550 0562 0564 0660 1050-1100	Added 6.9, 6.10. This page was newly added. Added “Operation for defining...”. This page was newly added. This page was newly added. Split RAID5. There page were newly added.	AD AD AD AD CH AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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1. Appearance and Maintenance Area

1.1 Appearance

Figure 1.1.1 shows appearance of the DF350 disk subsystems. (Rack Mount (RKH) type)

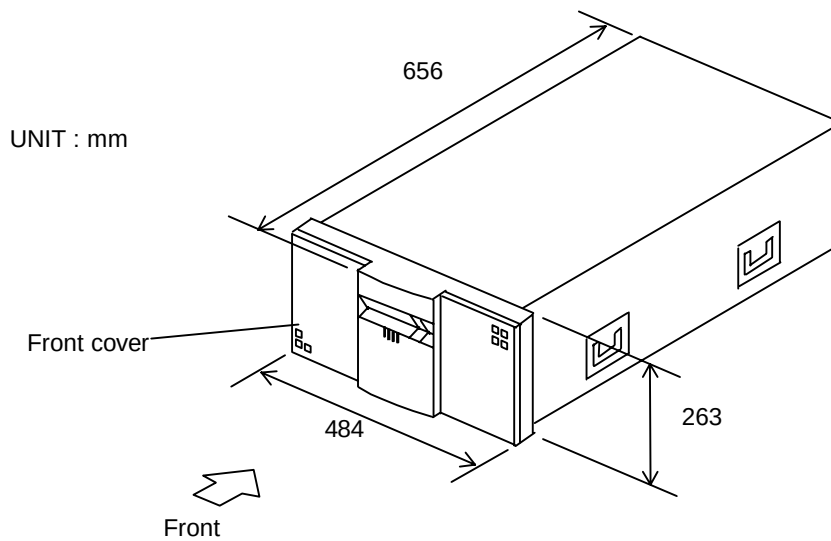


Figure 1.1.1 Appearance

1.2 Maintenance Area

Figure 1.2.1 shows maintenance area for the DF350 disk subsystems. (Rack Mount (RKH) type)

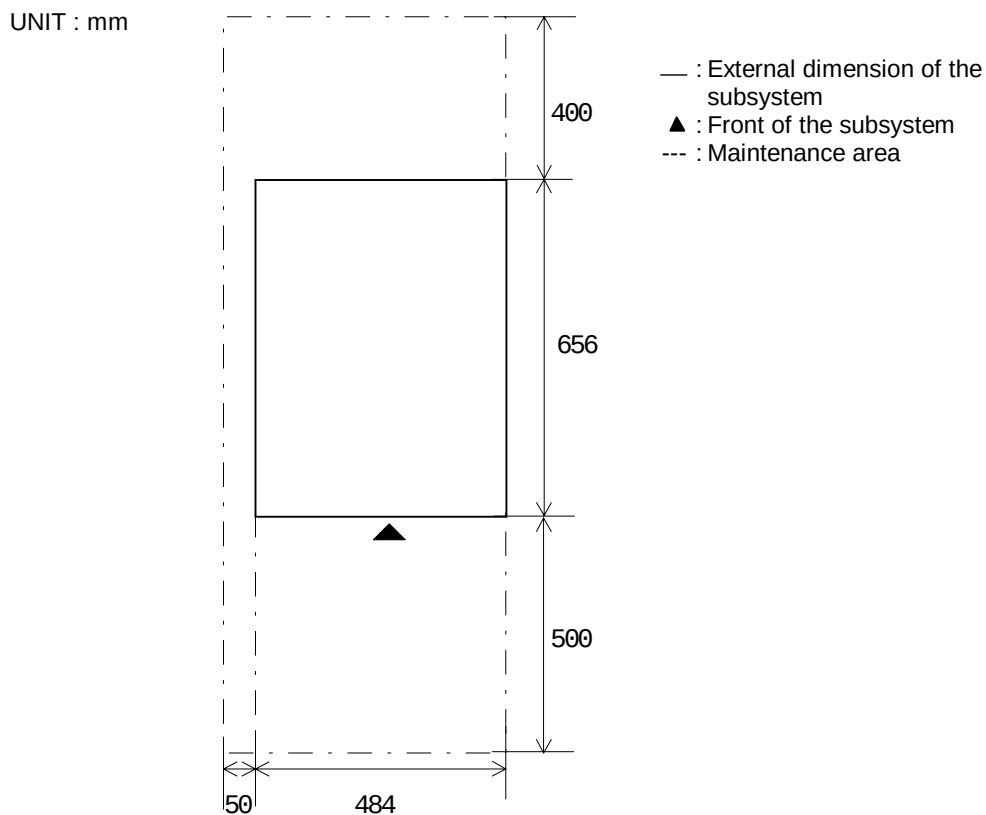


Figure 1.2.1 Maintenance Area

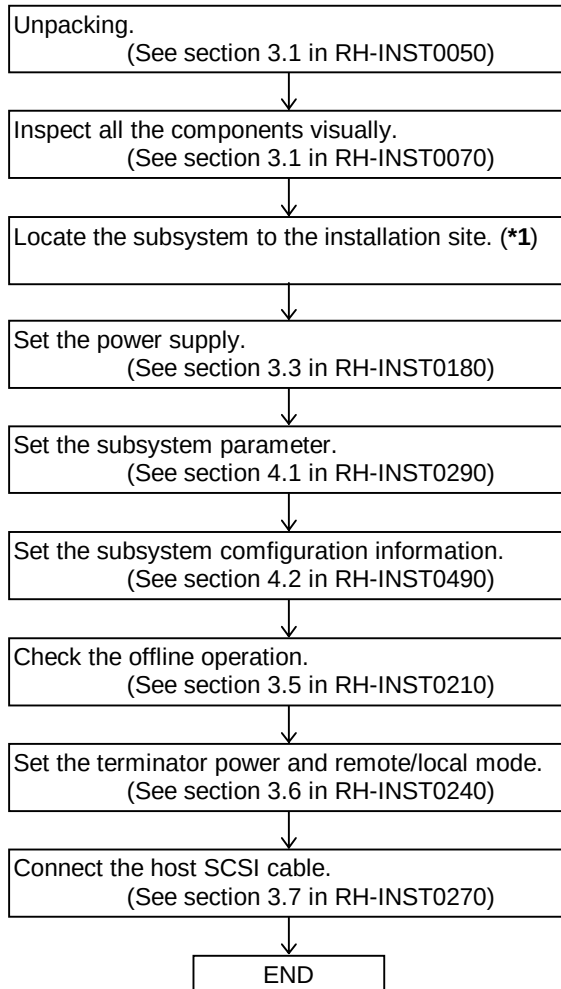
2. Installation

- (1) Tool needed for installation

Phillips screwdriver (No.2).

- (2) How to install

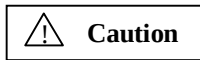
The following flow chart describes how to install the subsystem.



***1 : Place the subsystem with 30cm or more apart from the wall for both the front and the rear because of the ventilation.**

3. Installation Procedure

3.1 Inspecting all the Components



The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.

3.1.1 Unpacking

- (1) Figure 3.1.1 shows how the subsystem has been packed.
- (2) Figures 3.1.2 to 3.1.4 show the subsystem without external packaging.
- (3) Unpacking
 - ① Loosen the polyester bands.
 - ② Remove nails for T/W.
 - ③ Remove the external packaging and packing materials.
 - ④ Take the subsystem out of the polyethylene bag.
 - ⑤ Keep keys (2pcs) in the box attached to the unit. (This key is used to open the front panel, so be careful not to lose.)
 - ⑥ Remove shock absorbing material and tapes, etc. attached to the device.
 - ⑦ Remove desiccating agent on the top of the device. (See Figure 3.1.3.)

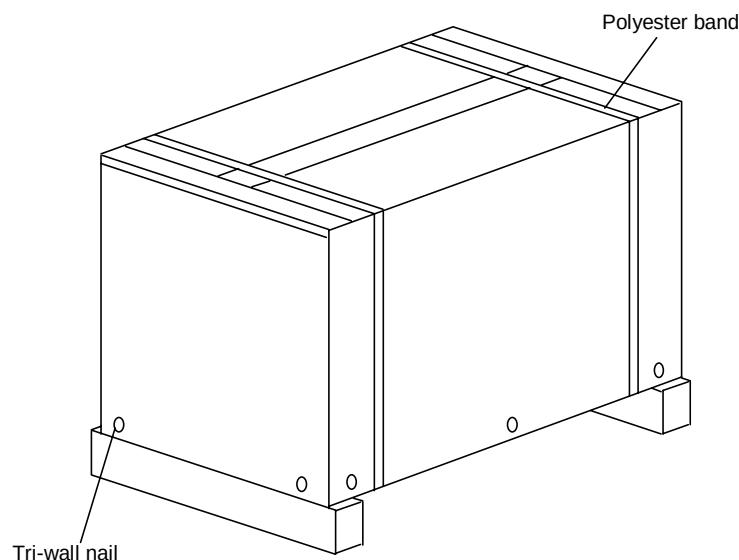


Figure 3.1.1 Subsystem being Packed

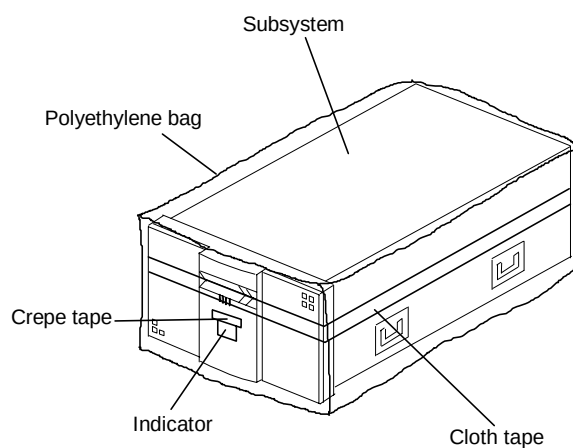


Figure 3.1.2 Subsystem without External Packaging

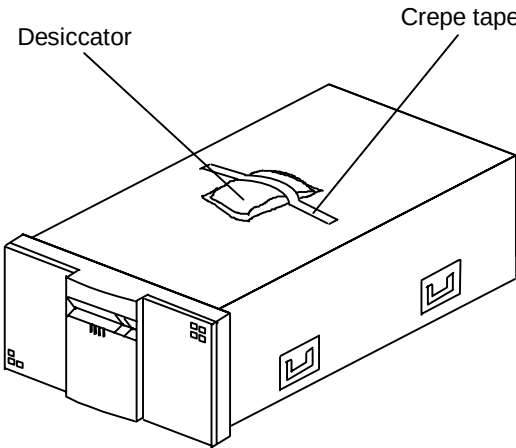


Figure 3.1.3 Location of Desiccantor

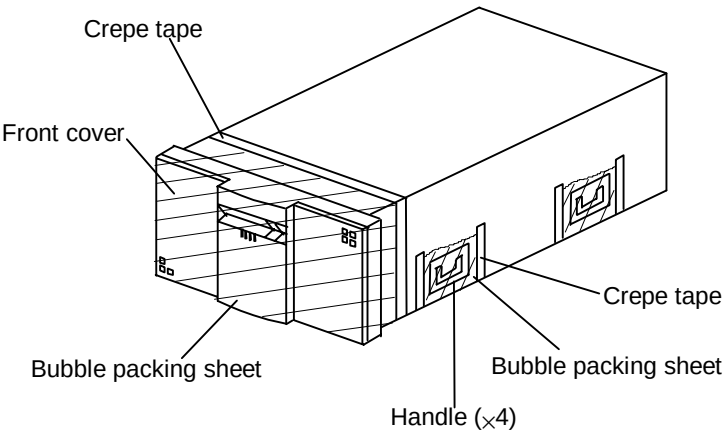


Figure 3.1.4 Front Cover Protection

3.1.2 Inspecting all the components visually

Check the following components before installation according to a customer's configuration.

Table 3.1.1 Mandatory Features

Model Name	Specification	Quantity	Comment
DF350-RH	Rack mount (RKH)	1	
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	1 (RAID5 :4D+1P)	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	4 (RAIDA, RAID5: 3D+1P) 3 (RAID5 :2D+1P) 2 RAID0/1	HDU ASSY
DF-F350-B2M	Power supply	1	AC/DC power supply
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	2	CACHE ASSY
DF-F350-DRUDS -DRUSS	Interface board (*2) for wide differential SCSI interface wide single ended SCSI interface	1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.2 Optional Features

Model Name	Specification	Quantity	Comment
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	0 - 2	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	0 - 11	HDU ASSY
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	0, 2, 4, 6 or 8	CACHE ASSY
DF-F350-B2M	Spare power supply	0 - 3	AC/DC power supply
DF-F350-G1M1 -G2M1	LAN board LAN board (SNMP)	0 - 2	LAN ASSY
DF-F350-F2MCF	Controller for dual composition	0 or 1	CTL ASSY
DF-F350-DRUDS -DRUSS	Interface board (*2) for wide differential SCSI interface wide single ended SCSI interface	0 or 1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.3 Accessories

Model Name	Specification	Quantity	Comment
DF-F350-J1 -J2	Power supply cable (Connector attached to two poles with earth) (Inlet type connector, EN60320 STANDARD SHEET C14)	0 or 1	
DF-F350-K050L -K150L -K068S -K268S -K168S -K168A (*1) -K350L	Interface cable (50PL, 1.5m) (50PL, 3m) (68PS, 1.5m) (68PS, 3m) (68PS, 5m) (68PS, 5m) (50PL, 5m)	0 -	
DF-F350-S1	RS232C cable	0 -	

*1 DF-F350-K168A is the SCSI cable for AS/400 of IBM.

3.1.3 Inspecting the subsystem components and addendum

This subsection describes how to install the basic components into the subsystem.

Figures 3.1.5 and 3.1.6 show mechanical configuration and parts location of this subsystem.

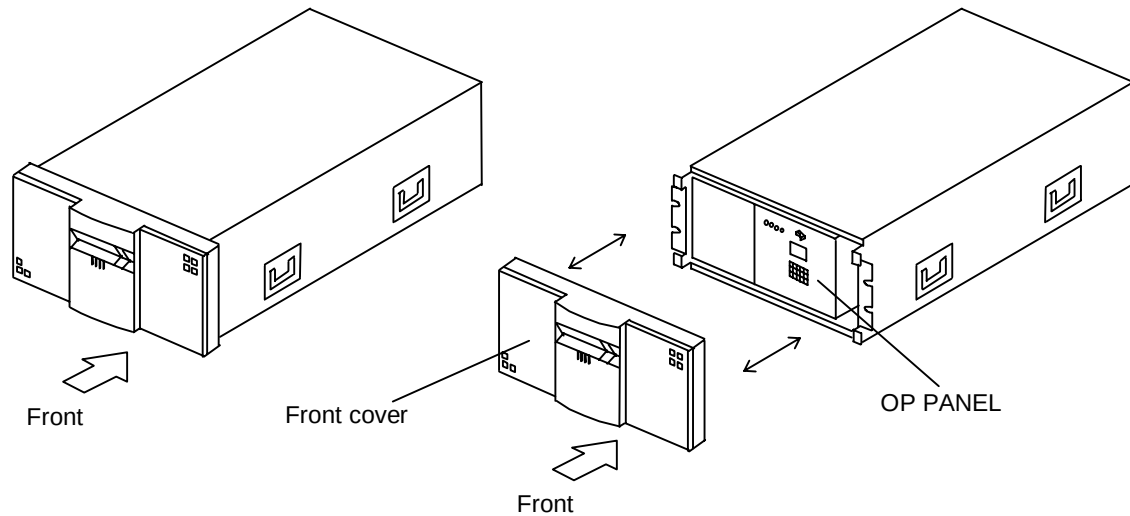


Figure 3.1.5 Appearance of DF350 Disk Subsystem (RACK MOUNT (RKH) type)

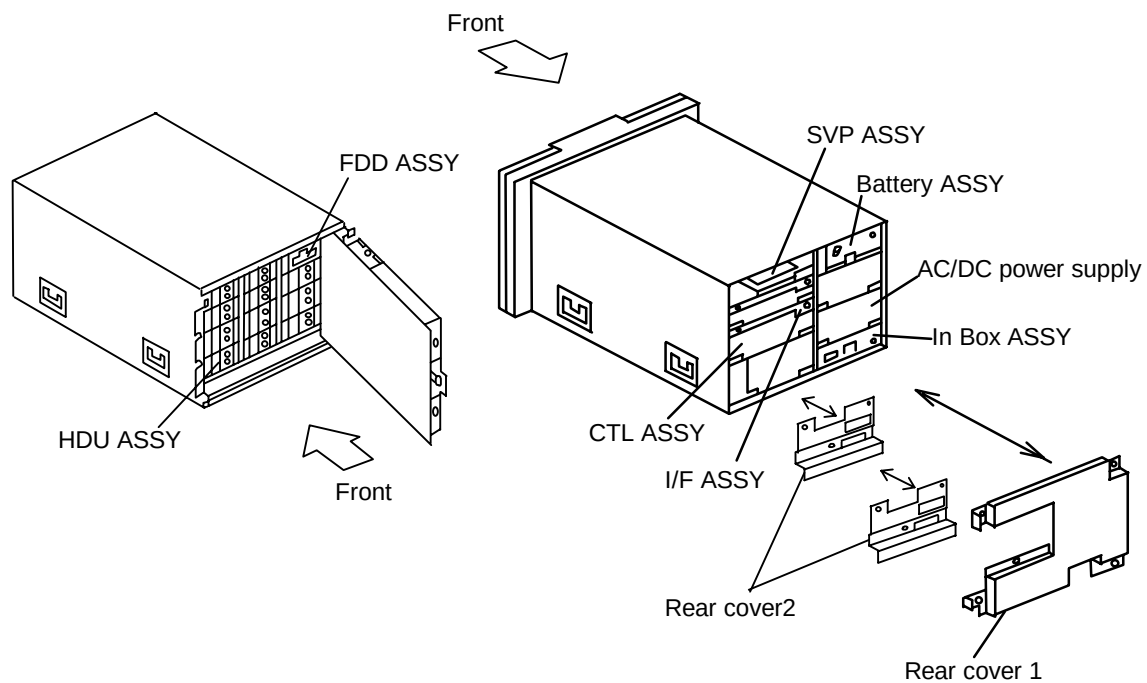
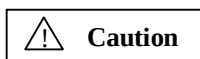


Figure 3.1.6 Parts Location

3.2 Install the Subsystem

3.2.1 Install the Subsystem



Do not block the ventilation. With the temperature rise, it may cause failure or fire.

Attaching and Removing the Front Cover

(1) Removing procedure (See Figure 3.2.1.)

① Hold the grooves on both sides of the front cover and pull it toward you.

(2) Attaching procedure (See Figure 3.2.1.)

① Fit the guide plates of the main body with the slots of the front cover (four places) and press the front cover against them.

Note : Attach/Remove the side covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

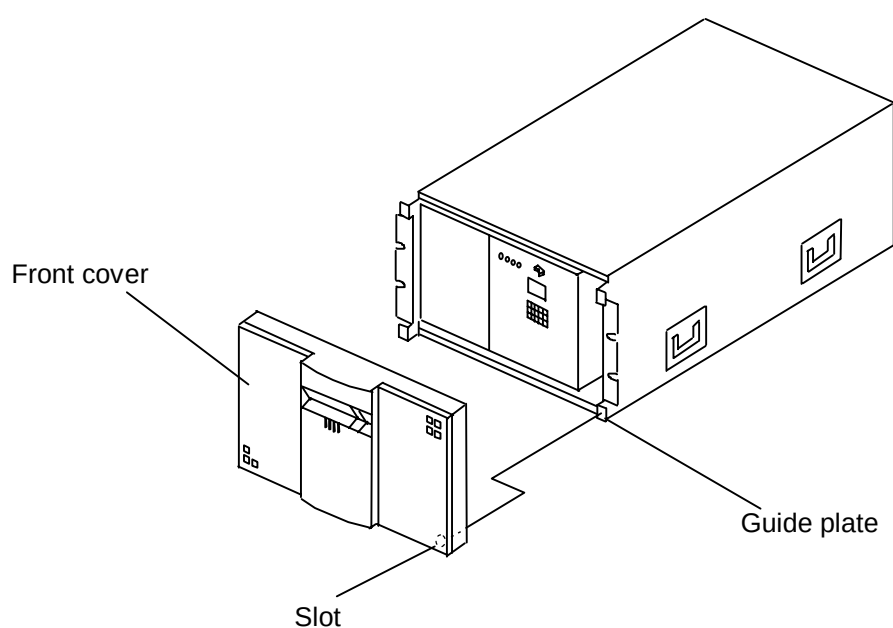


Figure 3.2.1 Attaching and Removing the Front Cover

Opening/Closing the Front Panel

(1) Opening procedure

- ① Remove the front cover. (See RH-INST0100.)
- ② Insert the key attached to the subsystem into the key hole and turn it to the direction of an arrow (→) and open the front panel to the right.

Note : Open/Close the covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing procedure

- ① Close the front panel.
- ② Turn the key to the direction of an arrow (↻) and secure the front panel.
- ③ Attach the front cover. (See RH-INST0100.)

Note : Keep the key carefully lest it should be lost.

Note : Open/Close the covers gently to avoid a shock. Precision components are installed.

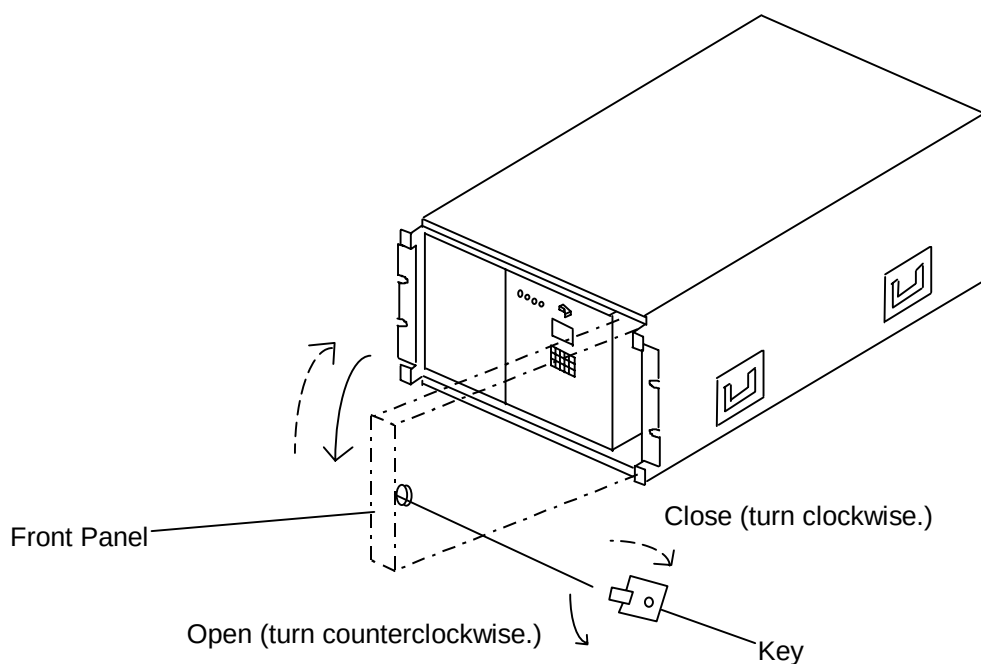


Figure 3.2.2 Opening/Closing the Front Panel

Attaching and Remove the Rear Cover

(1) Removing procedure (See Figure 3.2.3.)

① Remove four screws ② and one screw ① of the rear cover 1.

② Remove four screws ① of each the two rear covers 2.

Note : Attach/Remove the rear covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Attaching procedure (See Figure 3.2.3.)

① Install the rear covers 2 and 1 in this order, by reversing the procedures for removal.

Note : Attach/Remove the rear covers gently to avoid a shock. Precision components are in stalled.

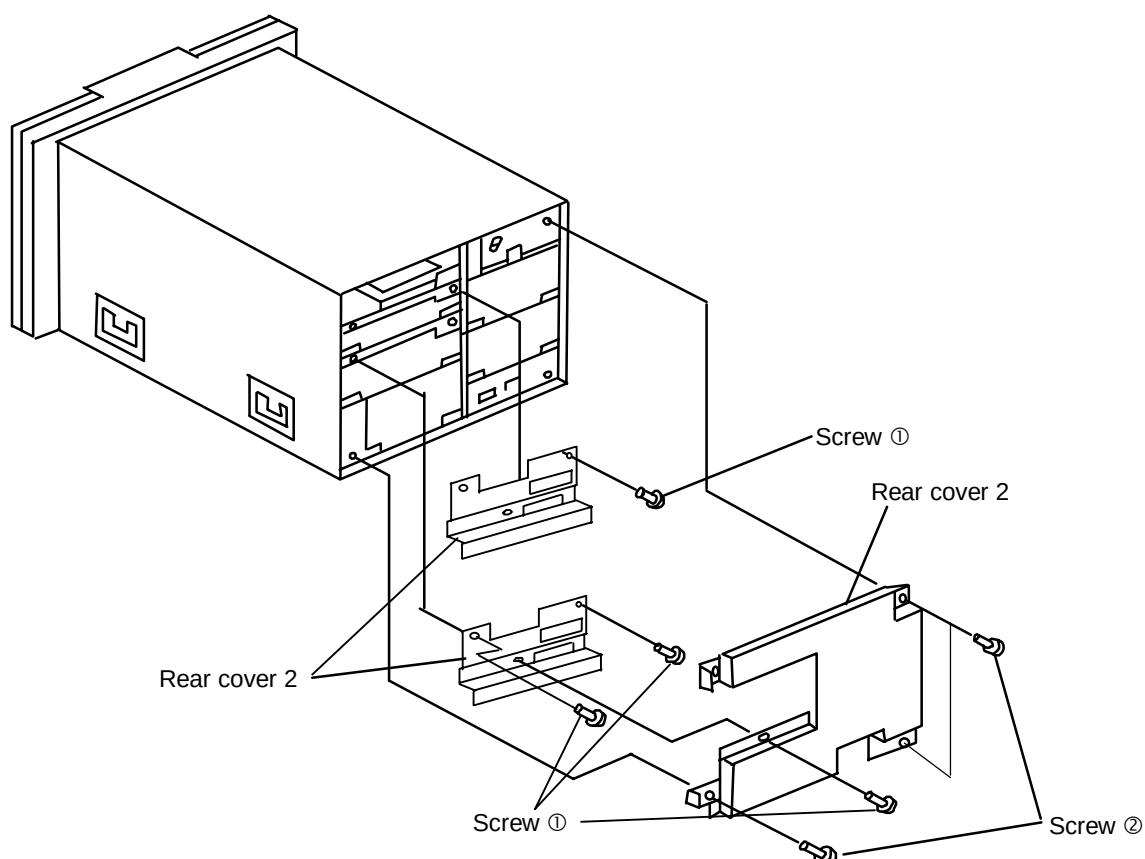


Figure 3.2.3 Attaching and Removing Rear Covers

3.2.2 Installing HDU ASSY (See Figure 3.2.4.)

- (1) Open the handle in the direction of an arrow (···→) completely and insert the HDU ASSY into the right place.
- (2) Close the handle in the direction of an arrow (→→).

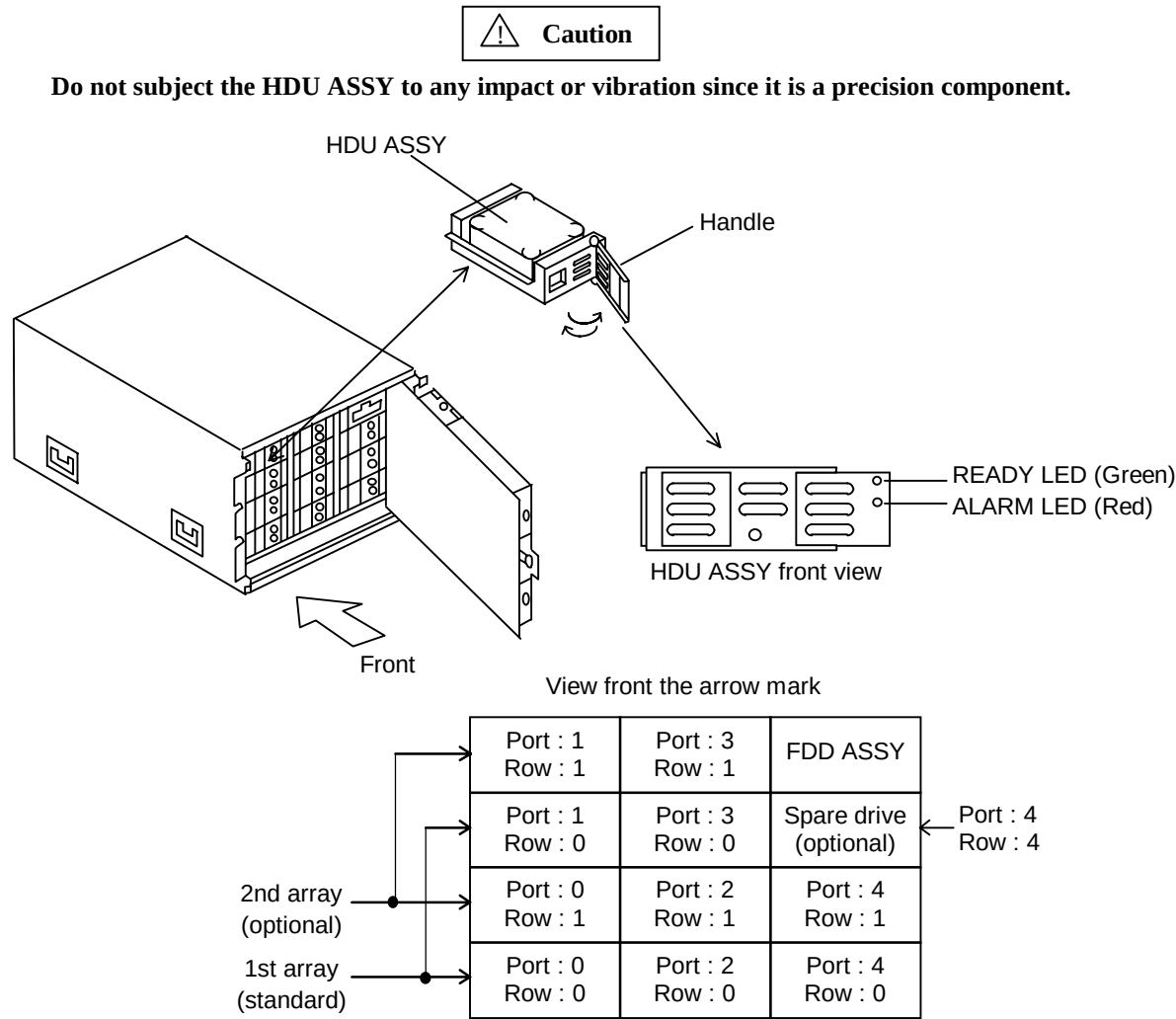


Figure 3.2.4 Installing HDU ASSY

3.2.3 Setting AC/DC Power Supply (See Figure 3.2.5.)

- (1) Insert the AC/DC power supply into the right place with its right and left levers being opened, then close the both levers to the direction of arrow (···➤) at the same time.
- (2) Connected the FG cable with the AC/DC power supply.

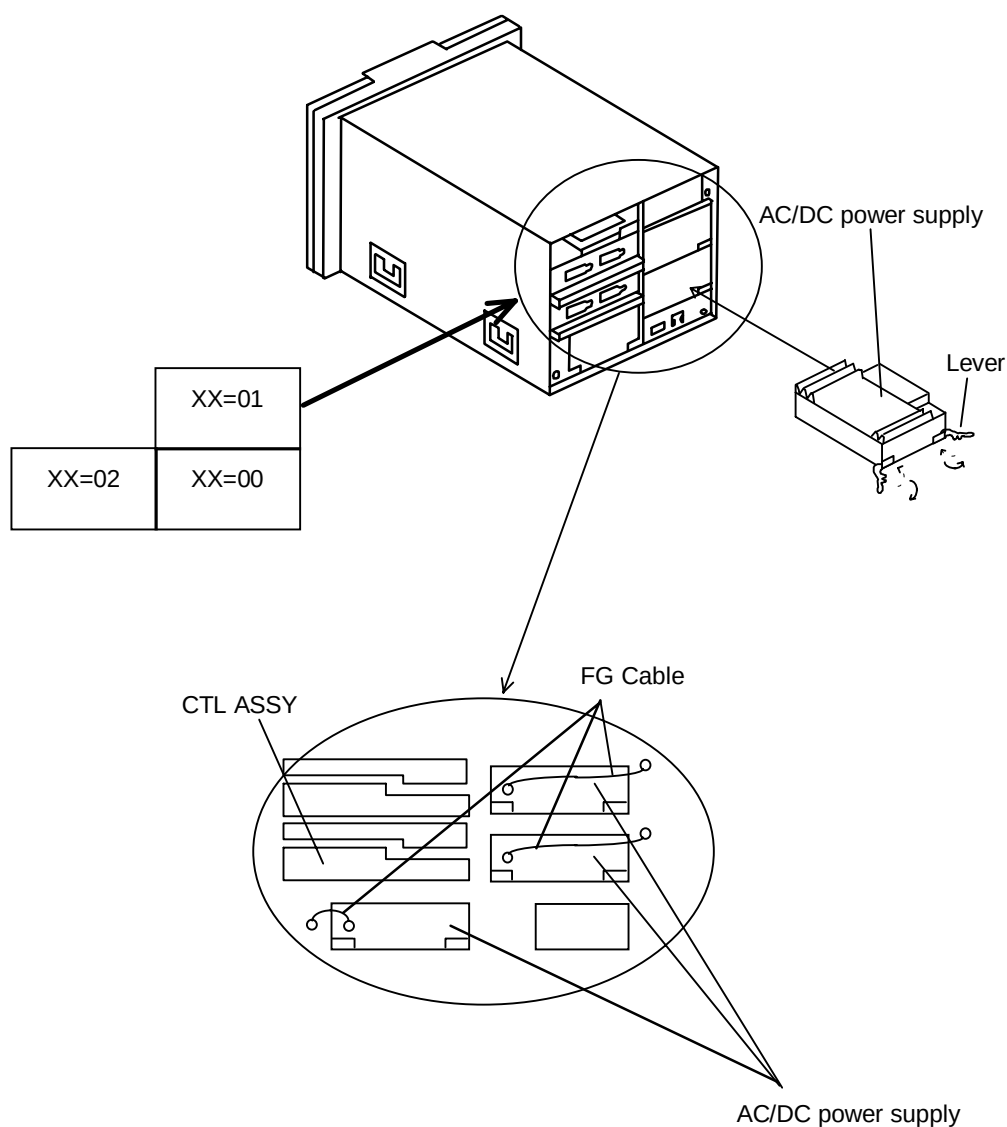


Figure 3.2.5 Setting AC/DC Power Supply

3.2.4 Setting I/F ADAPTER ASSY (See Figure 3.2.6.)

- (1) Insert the I/F ADAPTER ASSY into the right place and tighten the bind screw.

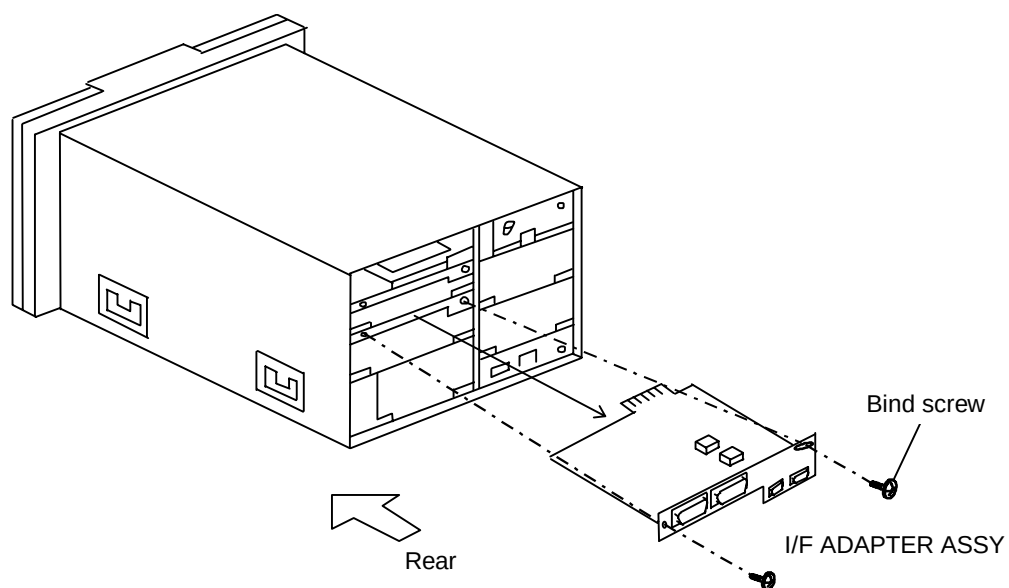


Figure 3.2.6 Setting I/F ADAPTER ASSY

3.2.5 Installing CACHE ASSY (See Figure 3.2.7 and Figure 3.2.8.)

Note 1 : Be sure to install the cache assemblies having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : When the cache assemblies are to be inserted into the cache slots, insert them in the order of cache slots #0 and #4, cache slots #1 and #5, cache slots #2 and #6 and then cache slots #3 and #7.

Note 3 : Be sure to install the cache assembly having the maximum capacity in slot #0 and #4.

Note 4 : If the redundant CTL ASSY has been installed, install the cache assembly having the same capacity into the same slot.

- ① Remove the rear covers. (See RH-INST0120.)
- ② Pull out the CTL ASSY. Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ③ Install the CACHE ASSY.
- ④ Insert the CTL ASSY into the former place. Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same times.
- ⑤ Attach the rear covers. (See RH-INST0120.)

Installation example of CACHE ASSY

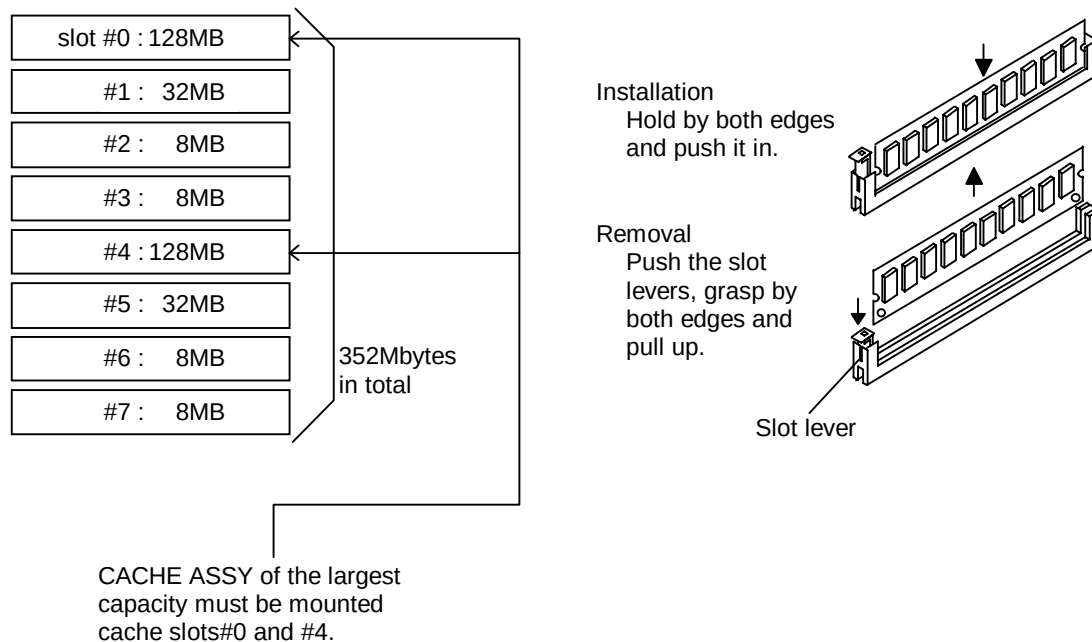


Figure 3.2.7 Installing CACHE ASSY

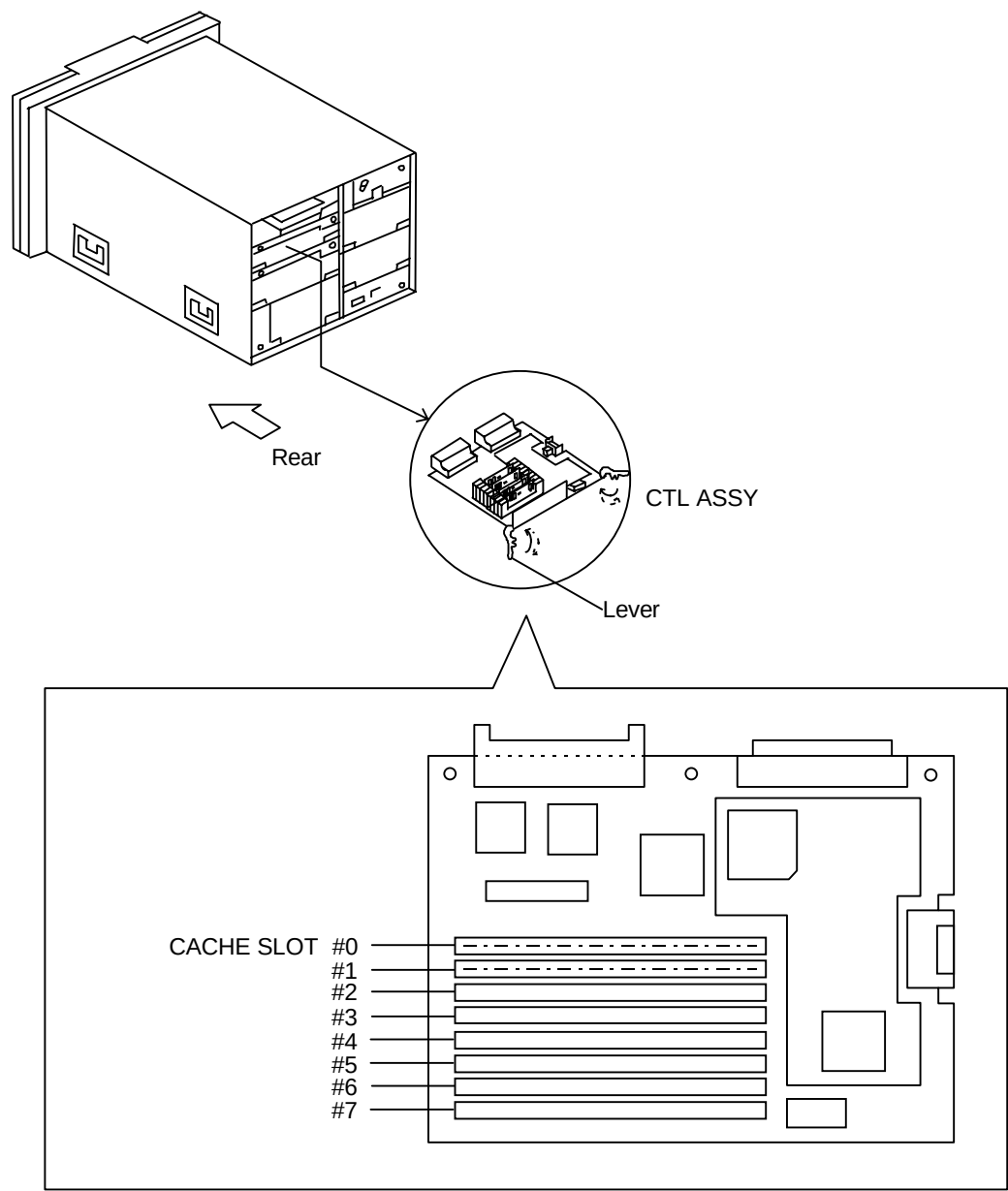
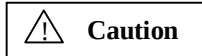


Figure 3.2.8 Installing CACHE ASSY

3.3 Setting the Power Supply

The power for the boards, drives, and fans of the DF350 disk subsystem is supplied by the In Box ASSY and AC/DC power supply converting AC to the DC power.

Turn the power on according to procedures (1) to (6) described below.



Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Verify that the breaker (switch at the rear side) is set to "O" (Off). Remove rear cover and turn on the power switch of the battery. (See Figure 3.3.1.)
- (2) Verify that all the DIP switches on the CTL ASSY are set to "Off" (upper position). Note, no need to remove CTL ASSY. (See Figure 3.3.2.)
- (3) Install rear cover. Then, attach AC cable. (See Figure 3.3.1.)
- (4) Turn on AC power.
- (5) Turn on the main switch. (See Figure 3.3.3.)
- (6) Make sure that the subsystem becomes ready a few minutes later.

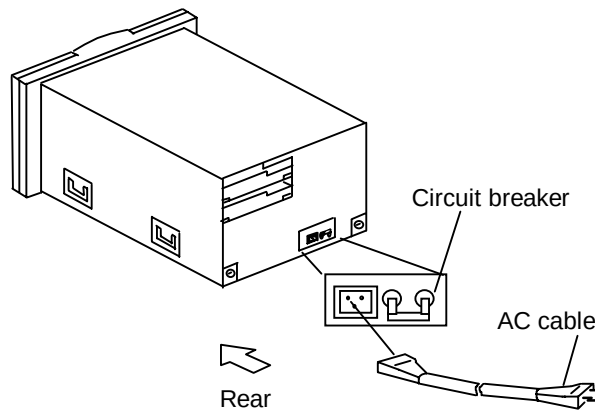


Figure 3.3.1 AC Cable Connection

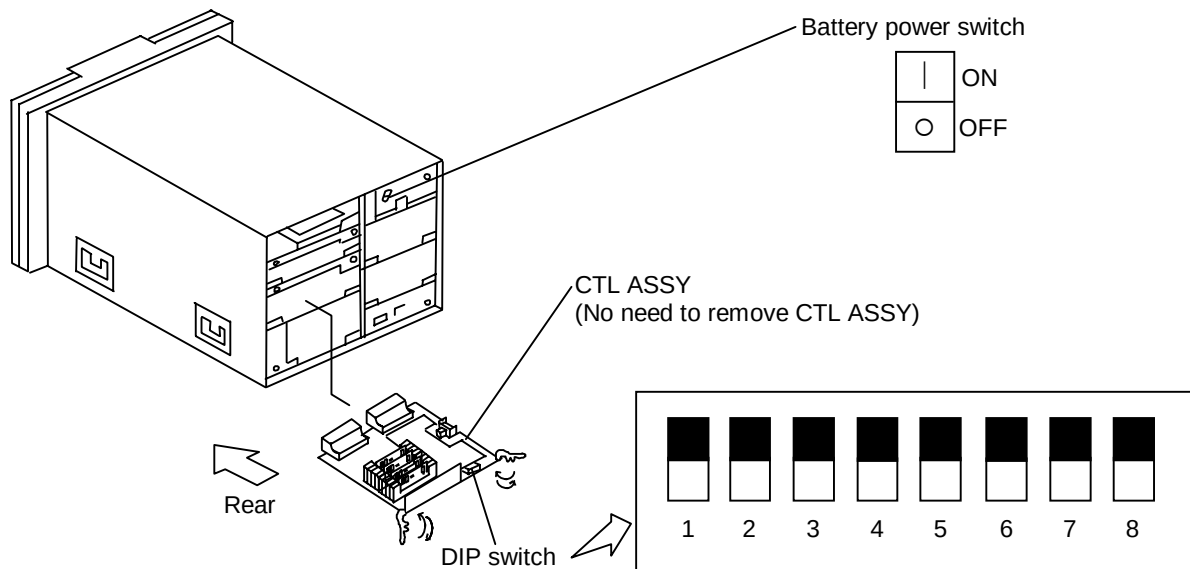


Figure 3.3.2 Inside Construction of the Subsystem

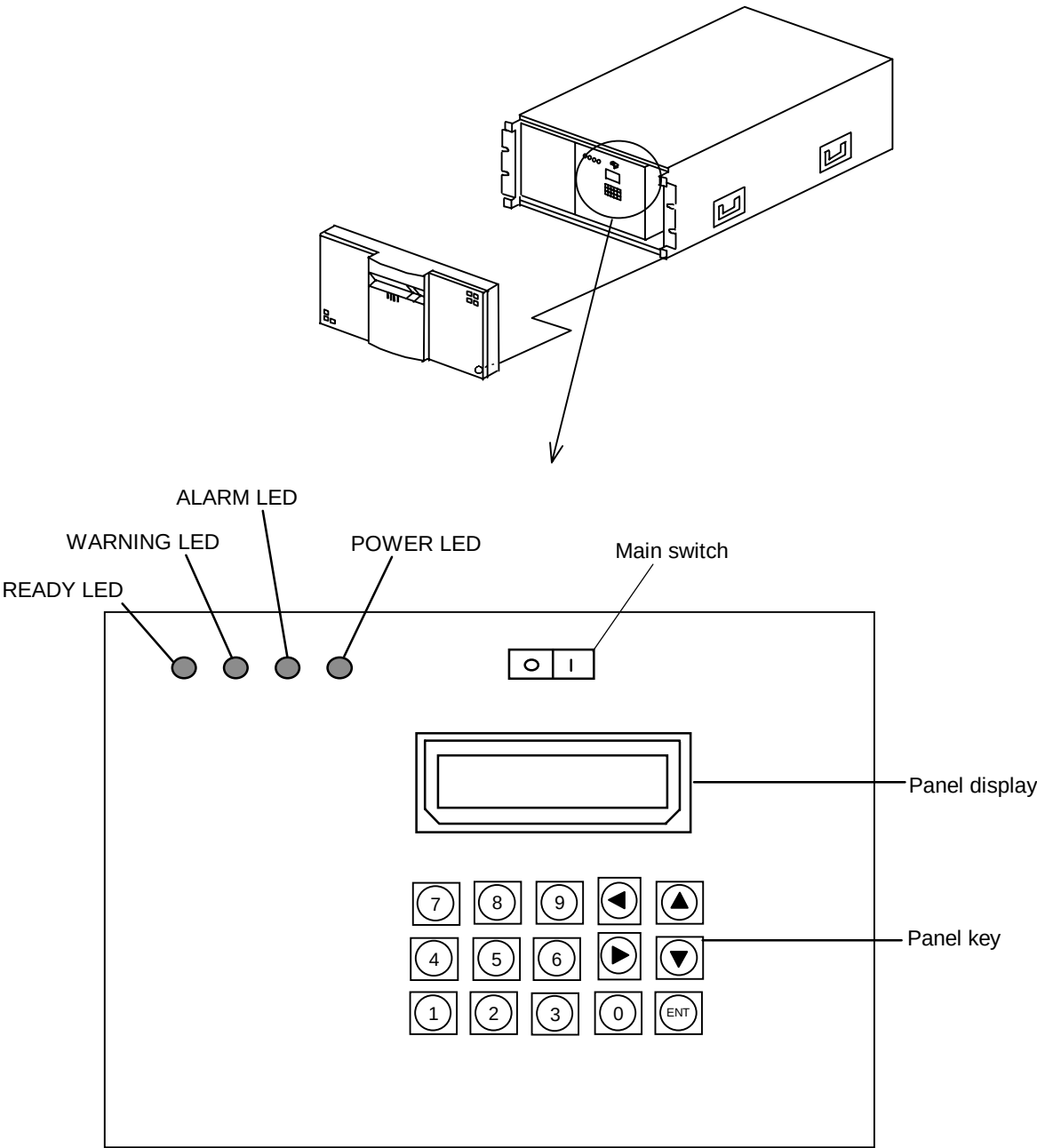


Figure 3.3.3 Panel

3.4 Setting the Subsystem Parameter

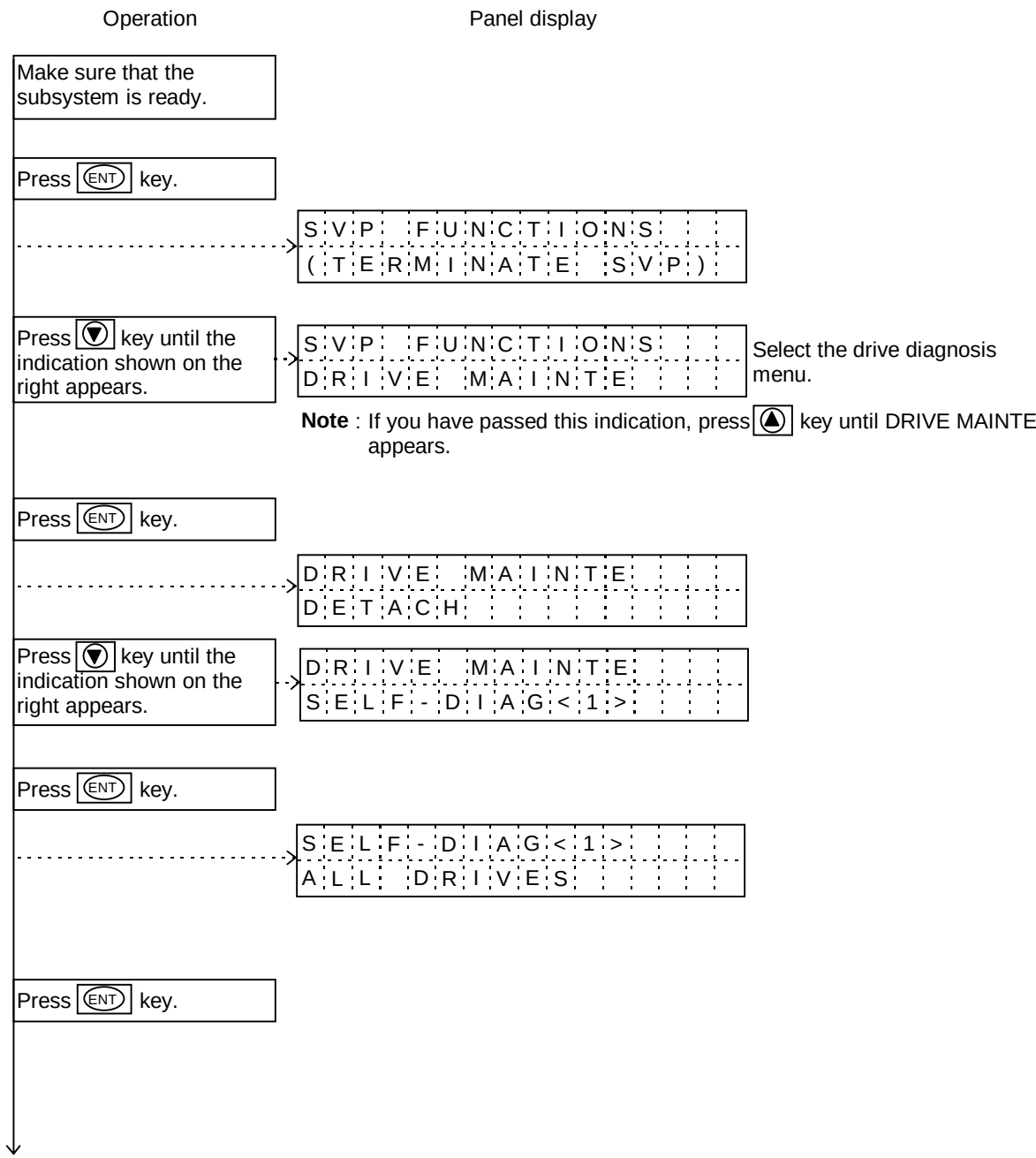
See Chapter “Setting the Subsystem Parameter” in RH-INST0290.

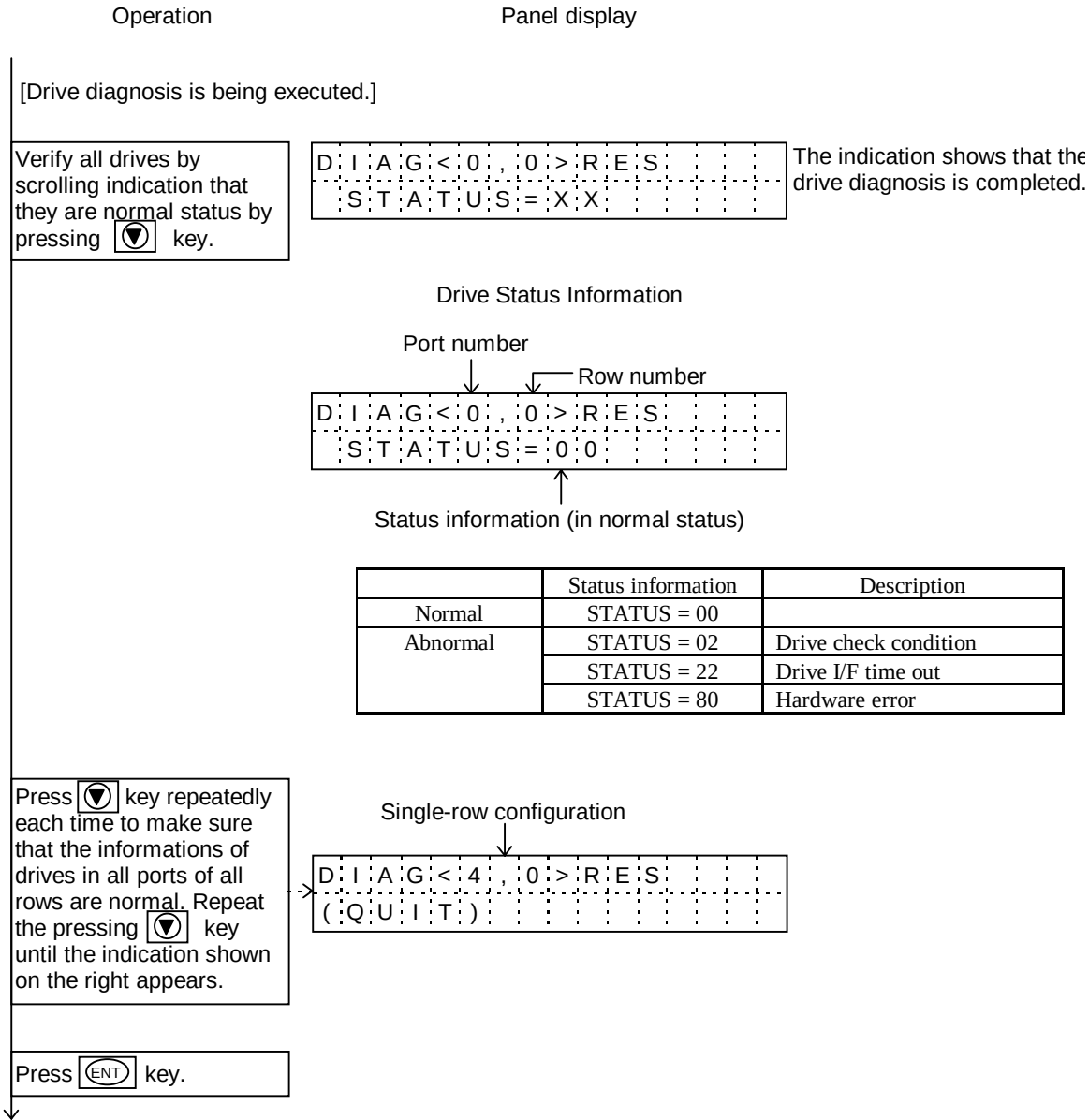
REV.1	Feb.1997	May.1997				

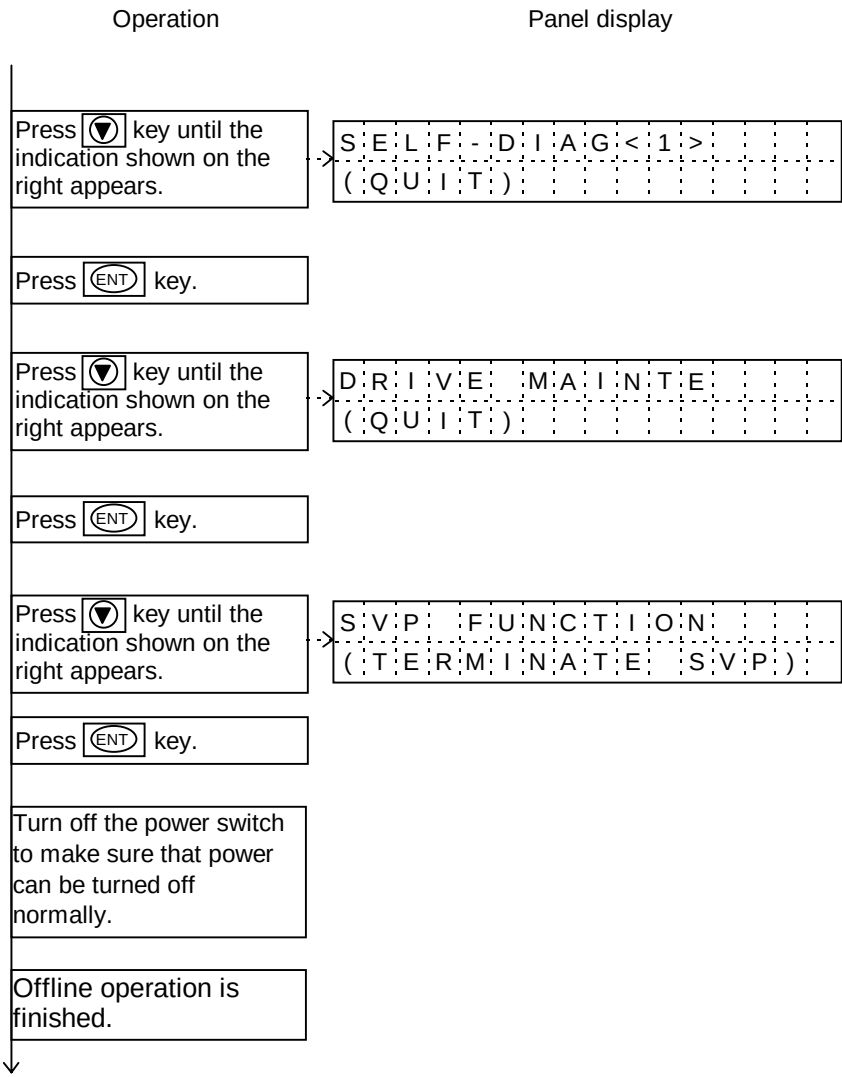
3.5 Checking the Offline Operation

After opening the front cover, execute the drive diagnosis using the Panel display and the ten key as instructed below, and make sure that the diagnosis is completed normally on each of all drives.

① Operate as described below.





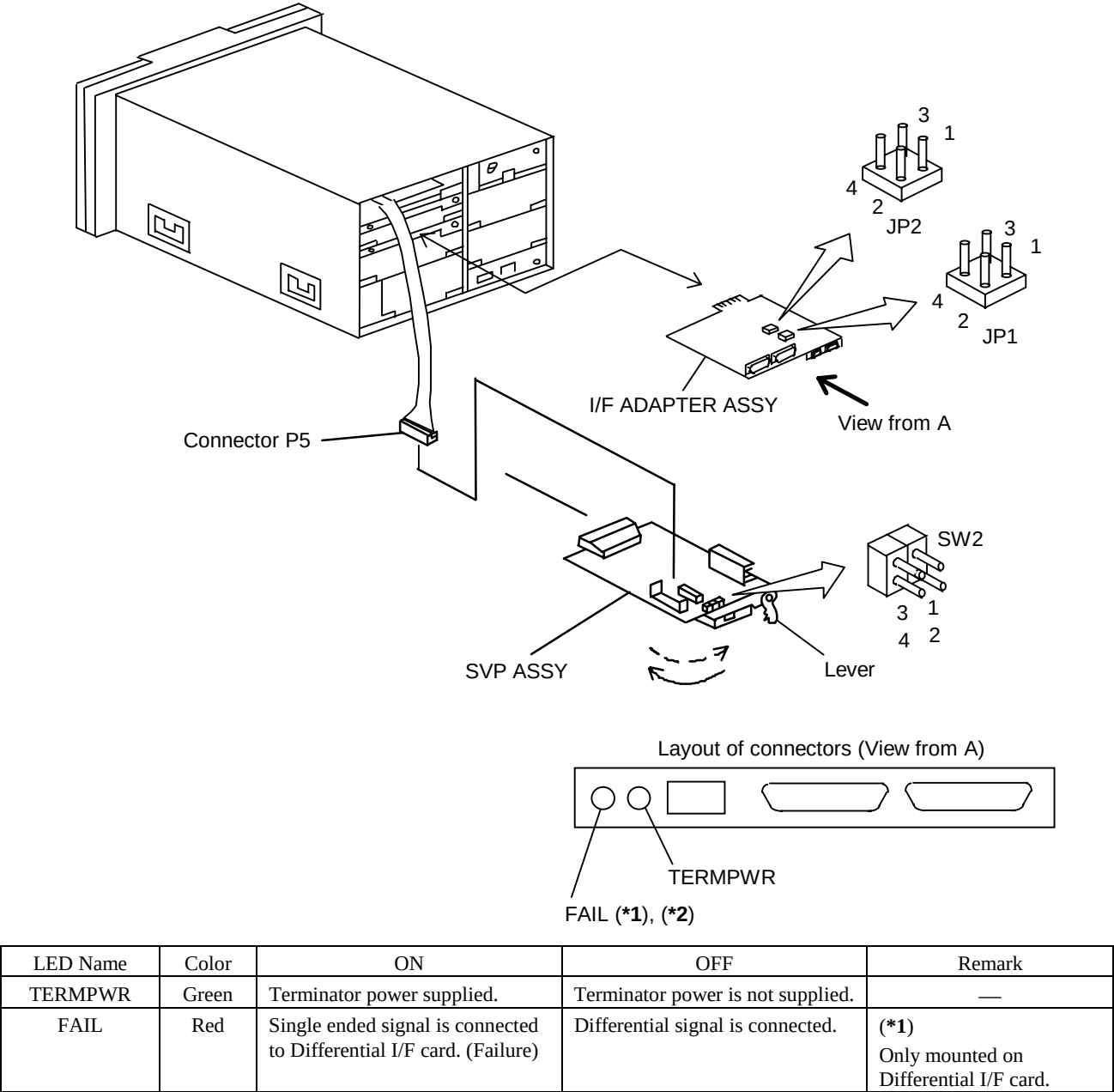


3.6 Setting the Terminator Power and Remote/Local Mode

Switching the power of DF350 can be controlled by Host system (Remote Control) under the mode of terminator power is supplied by SCSI bus. Switching the mode of Remote/Local is carried out by jumper setting of SW4 on SVP panel and JP1 of terminator power setting.

Note : While connecting to RS6000 model 220/230, terminator power should be supplied from outside (Local mode). Switching the power by the host system cannot be carried out. When the host is not connected or powered off, the data recovery with the maintenance panel, nor the formatting the array cannot be carried out.

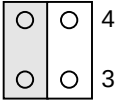
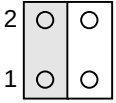
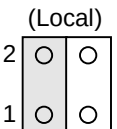
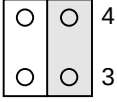
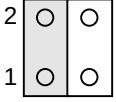
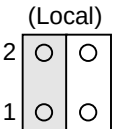
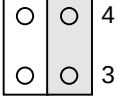
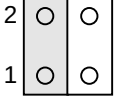
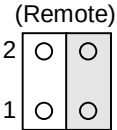
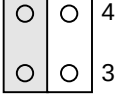
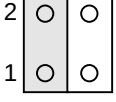
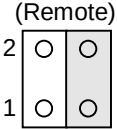
- (1) Perform destaging (See ENTRY0040) and make sure that it is not in the cache back-up state. Turn off both main switch on the panel and the breaker at the rear side of the unit.
- (2) Remove terminator resistor from I/F ADAPTER ASSY.
- (3) Detach AC cable, and open rear cover 1 and 2.
- (4) Pull out the SVP ASSY and I/F ADAPTER ASSY.
- (5) Set the JP1 and SW2 according to Figure 3.6.1 and Table 3.6.1. (Set JP2 (equipped on I/F ADAPTER ASSY for only Wide SCSI like DRUSS or DRUDS) with the pins 1 and 2 short-circuited.)
- (6) After setting the terminator power, insert the I/F ADAPTER ASSY and tighten the bind screw. And insert the SVP ASSY.
- (7) Fix terminator resistor to I/F ADAPTER ASSY.
- (8) Close rear cover 1 and 2, attach AC cable, and then turn the breaker "On".



*2 This LED is valid only when all the devices connected to SCSI I/F are powered on. When one of the devices is not powered on, sometimes this LED is lit up.

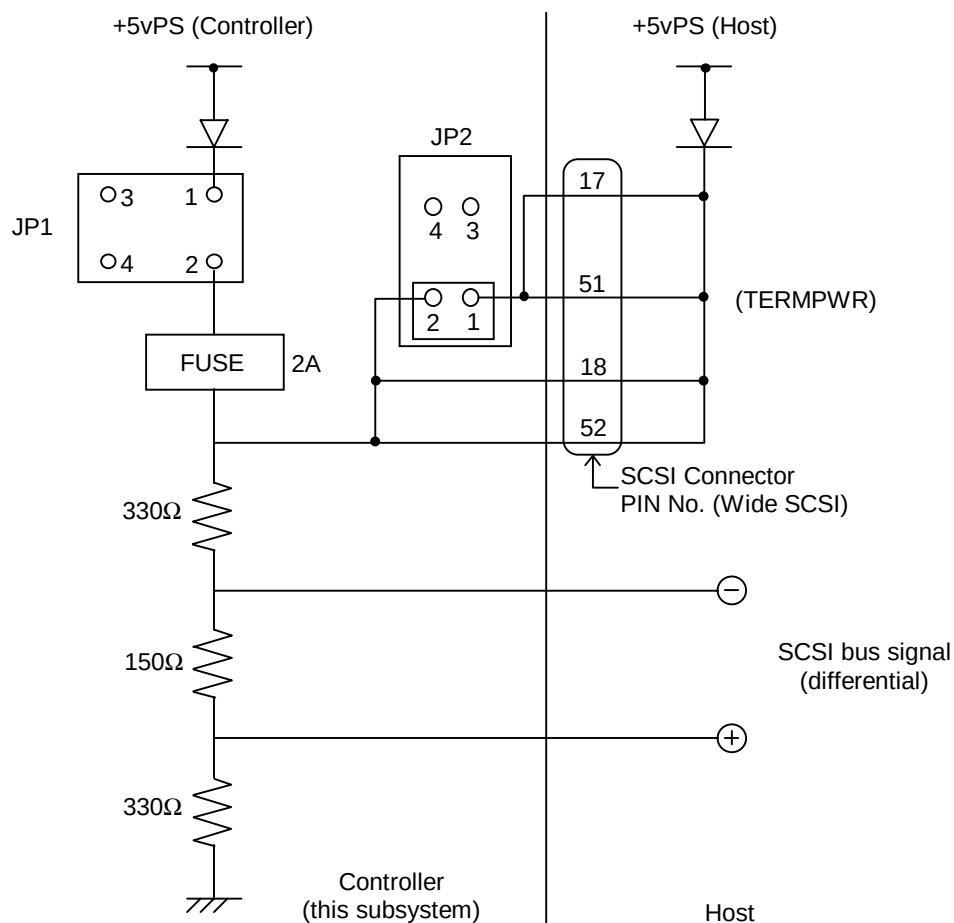
Figure 3.6.1 Setting the Terminator Power and Remote/Local Mode

Table 3.6.1 Setting the Terminator Power and Remote/Local Mode (*1)

No.	Jumper Setting			Function
	JP1 Terminator Power	JP2 (*2)	SW2 Remote/Local Mode	
1			(Local) 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
2			(Local) 	The combination can not be set.
3			(Remote) 	Terminator power +5VPS is supplied only from the power source of the host computer.
4			(Remote) 	The combination can not be set.

*1 The terminator power means that the power for the terminator is supplied from the host so that the SCSI bus is not shut down by a power failure of the subsystem.

*2 Set this jumper (JP2) with the pins 1 and 2 short circuited.



3.7 Connecting the SCSI Cable

Connect the SCSI cables after confirming the controller number indicated on the label.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 3.7.2.)

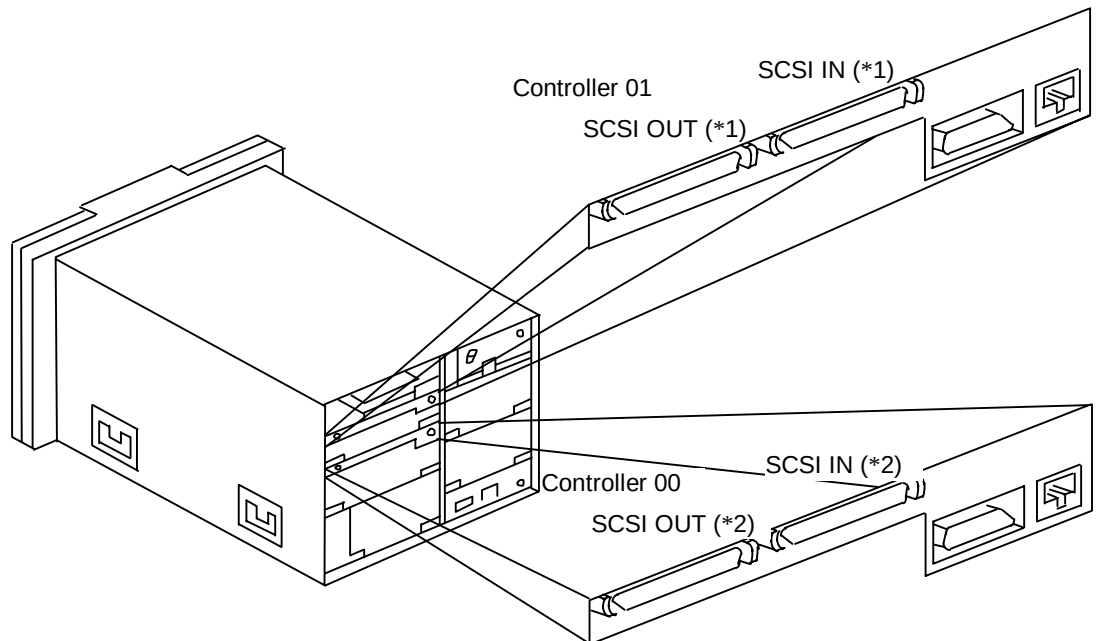


Figure 3.7.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.
SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

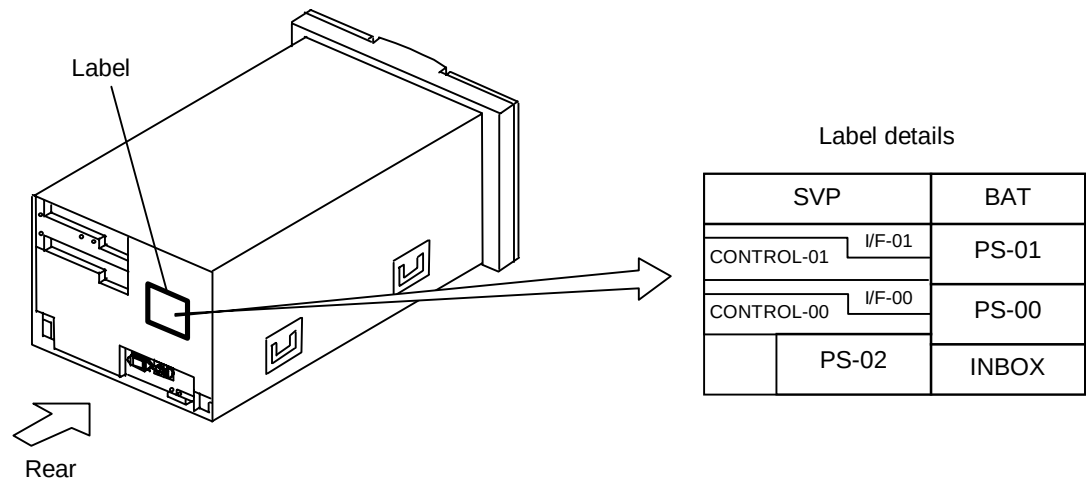


Figure 3.7.2 Label Layout

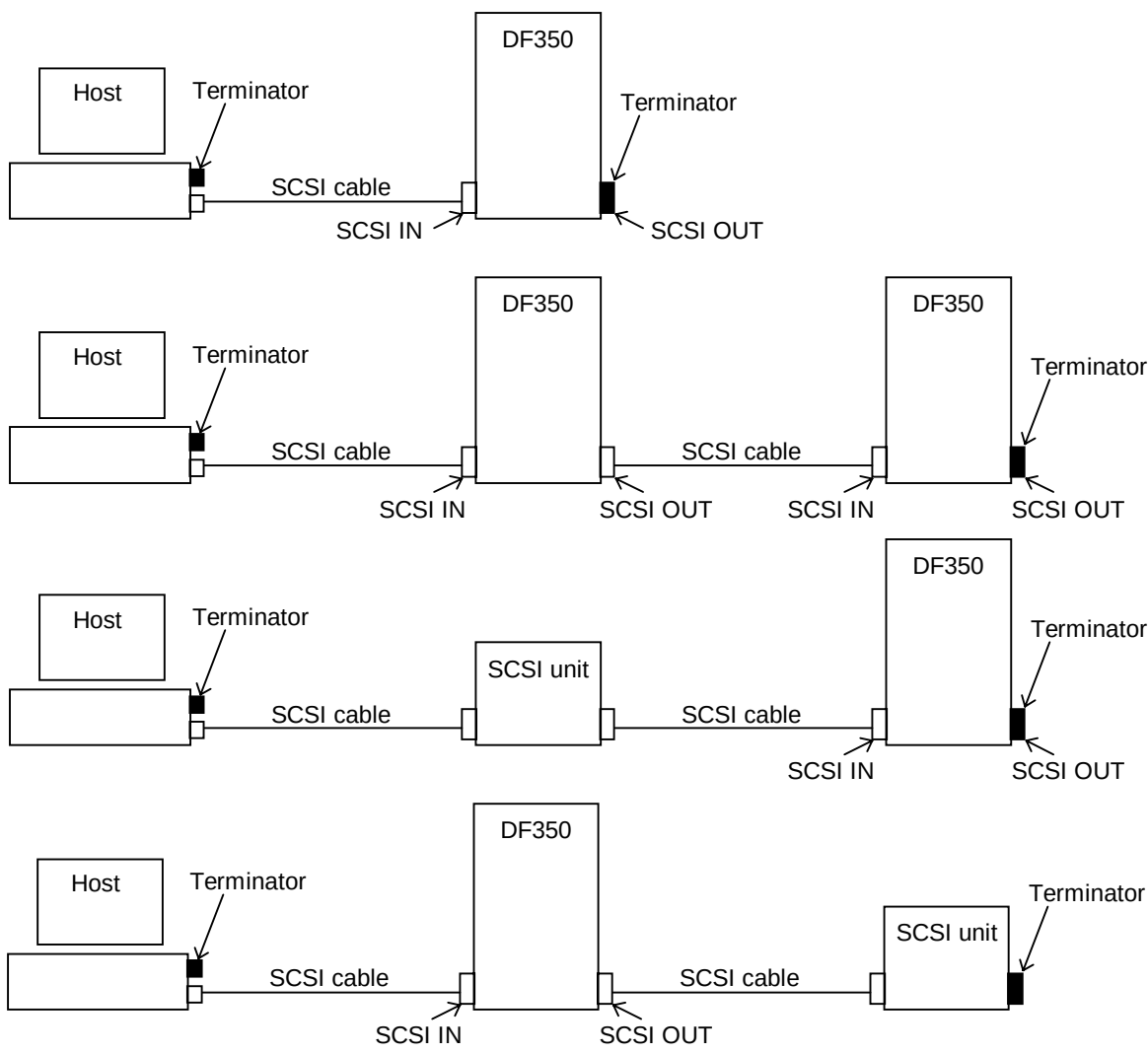


Figure 3.7.3 SCSI Connections

4. Setting the Subsystem Parameter

4.1 Setting the System Parameter

(1) Setting the system parameters and downloading

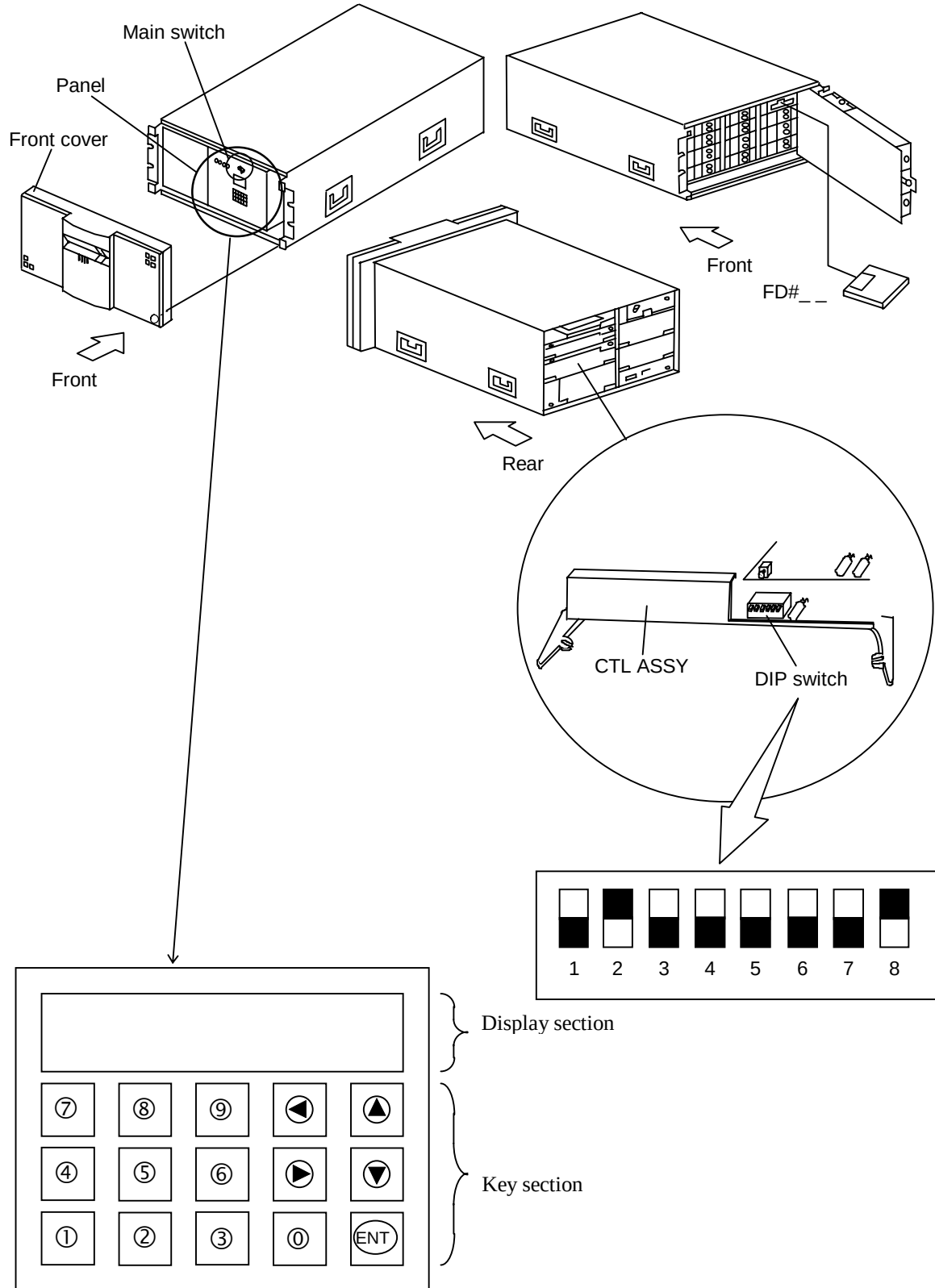
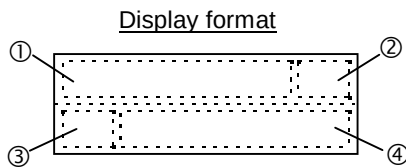


Figure 4.1.1 DIP Switches (System parameter is Set)

(1) Display

While setting up DIPSWITCH or SVP FUNCTION, menu etc. are displayed at panel display in the following display format .



① Menu title

There are two kinds of menu title described below.

DIPSWITCH SET:

For setting the target ID, buzzer, etc.

SVP FUNCTION:

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Message from the controller No. 0: The first (left most) character is in uppercase.

Message from the controller No. 1: The first (left most) character is in lowercase.

Example) Controller No. 0: DIPSWITCH SET

Controller No. 1: dIPSWITCH SET

For the dual controllers, the message with the display format 1 and the menu title with the display format 2 are displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

(2) Keys

Use the - keys for panel operation.



Used for entering the parameter values.



Used for determining the menu or the input parameter.

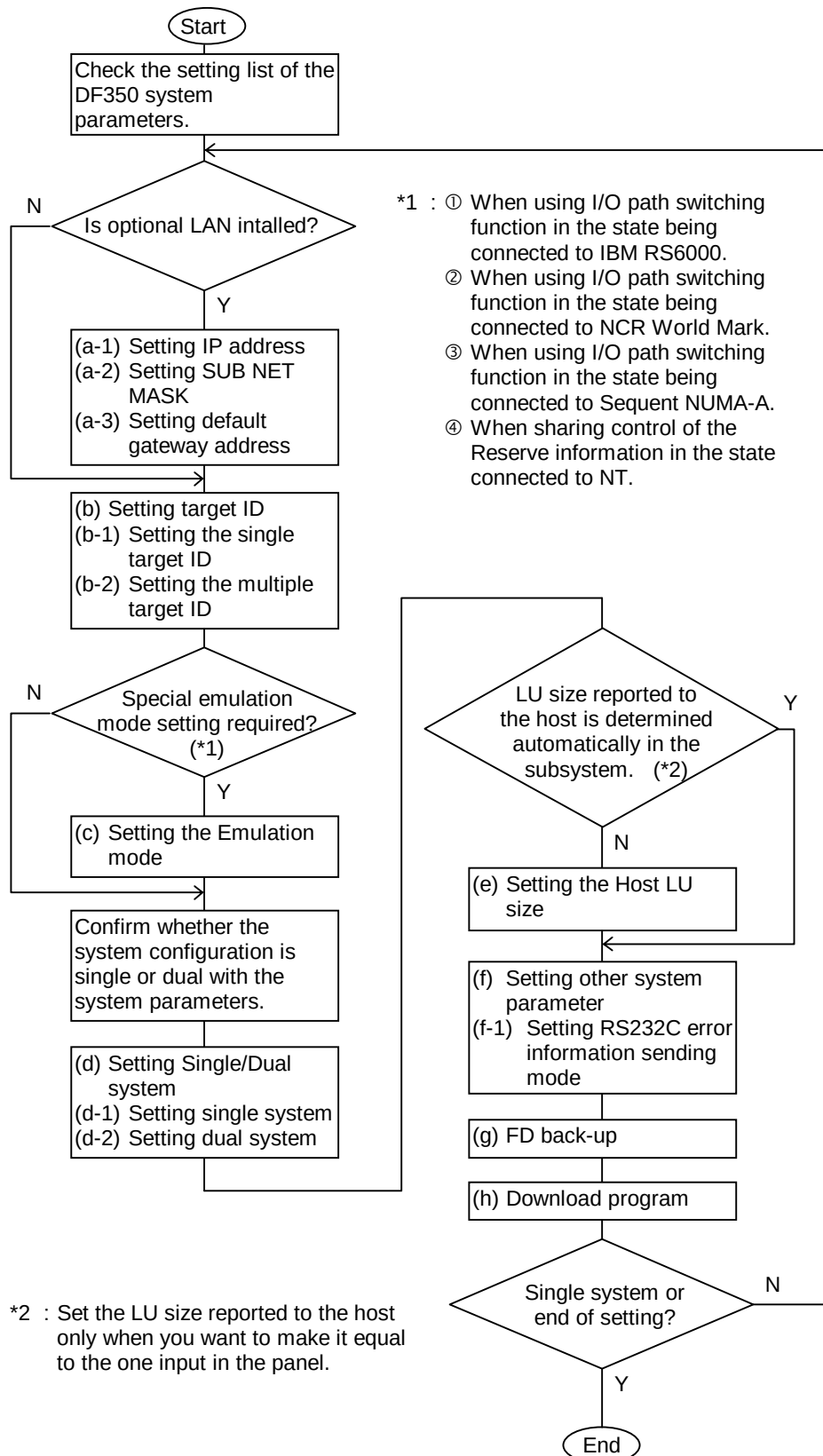


Used for determining the parameter input position.



Used for selecting the menu.

Operate as the flow described below.



Operate as described below.

(1) Before powering on the subsystem, set DIP switches shown in Figure 4.1.2.

In case of Dual Contoroller system (installed DF-F350-F2MCF) , set DIP switches of both contorollers.

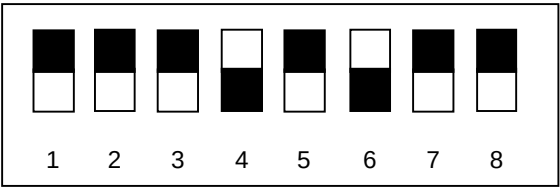
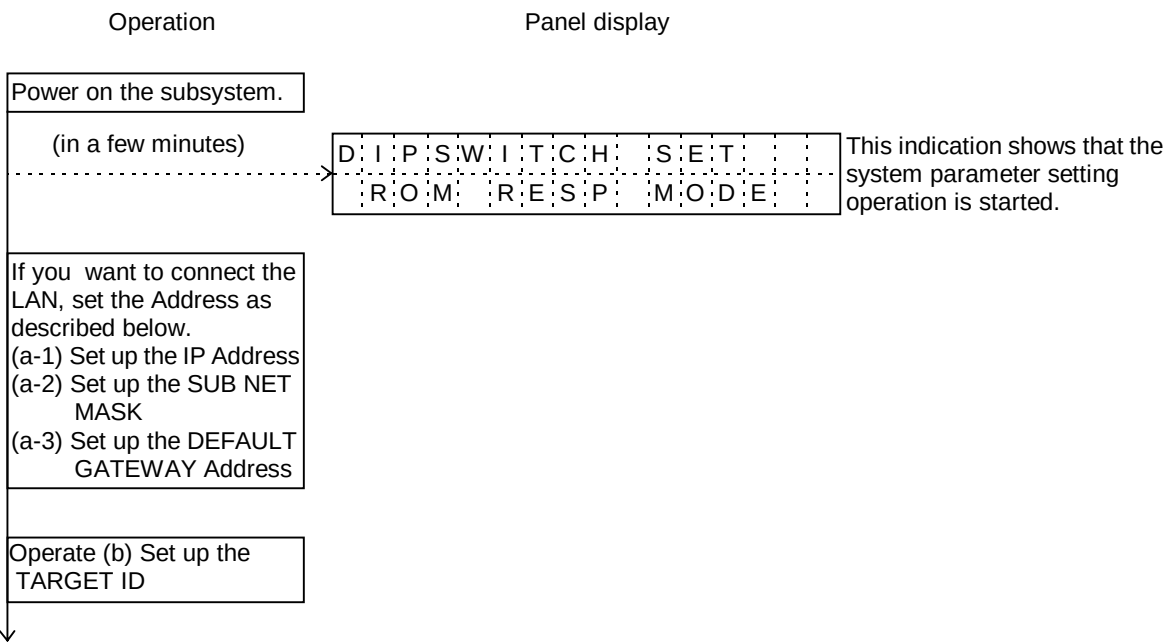
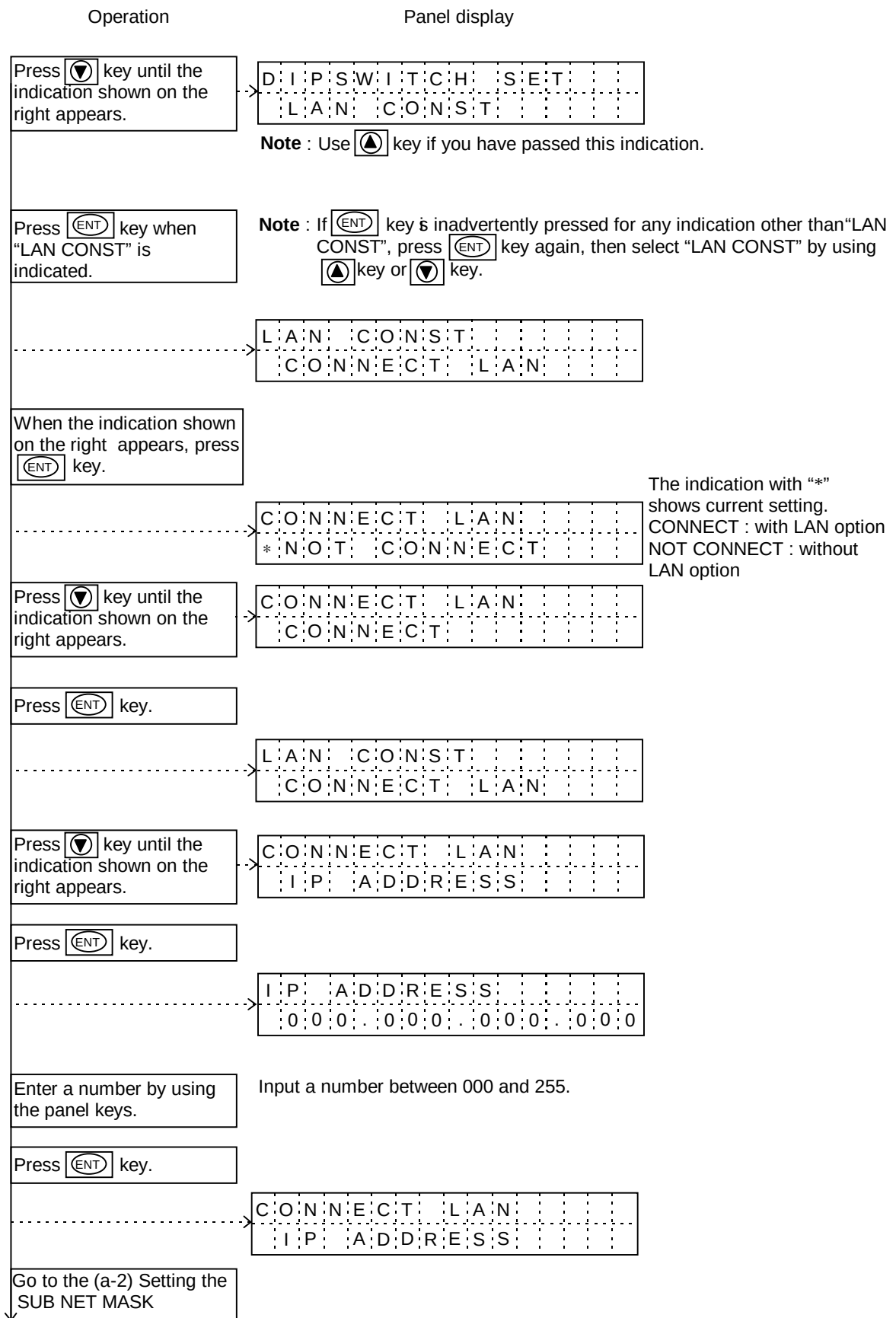


Figure 4.1.2 DIP switches (For setting the system parameter)

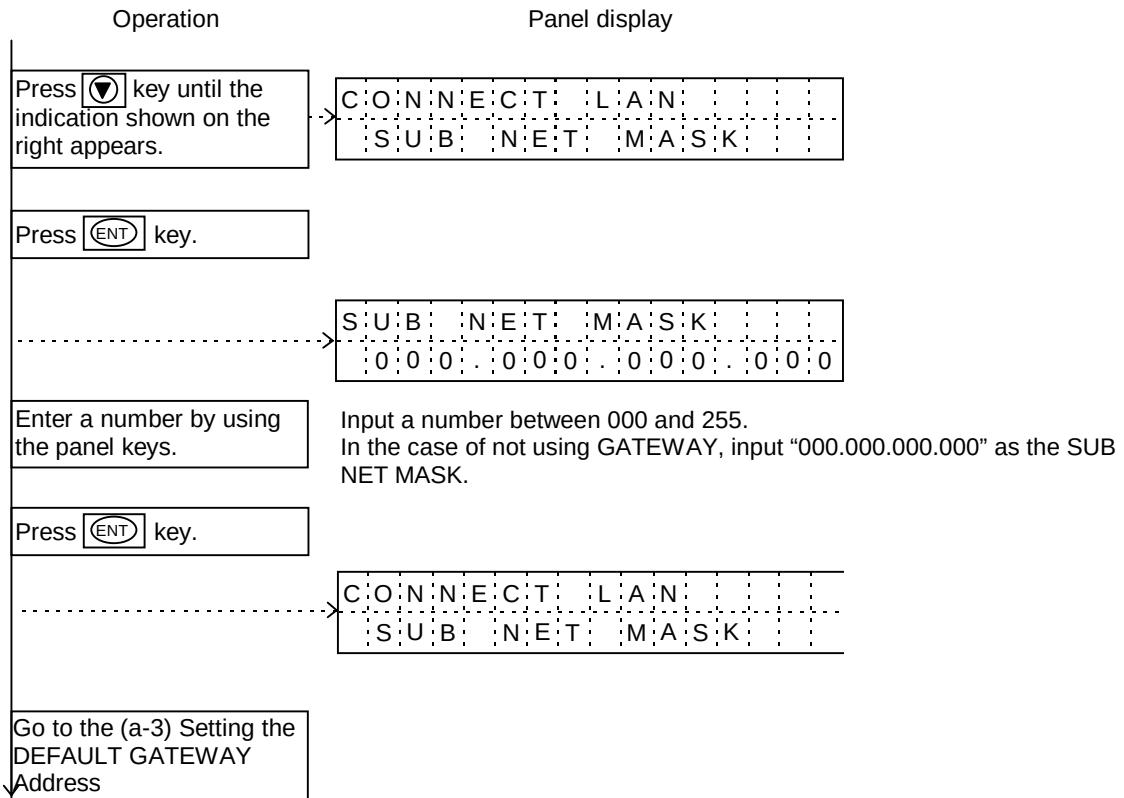
(2) Operate panel's keys as described below.



(a-1) Setting the IP address.



(a-2) Setting the SUB NET MASK

***Note**

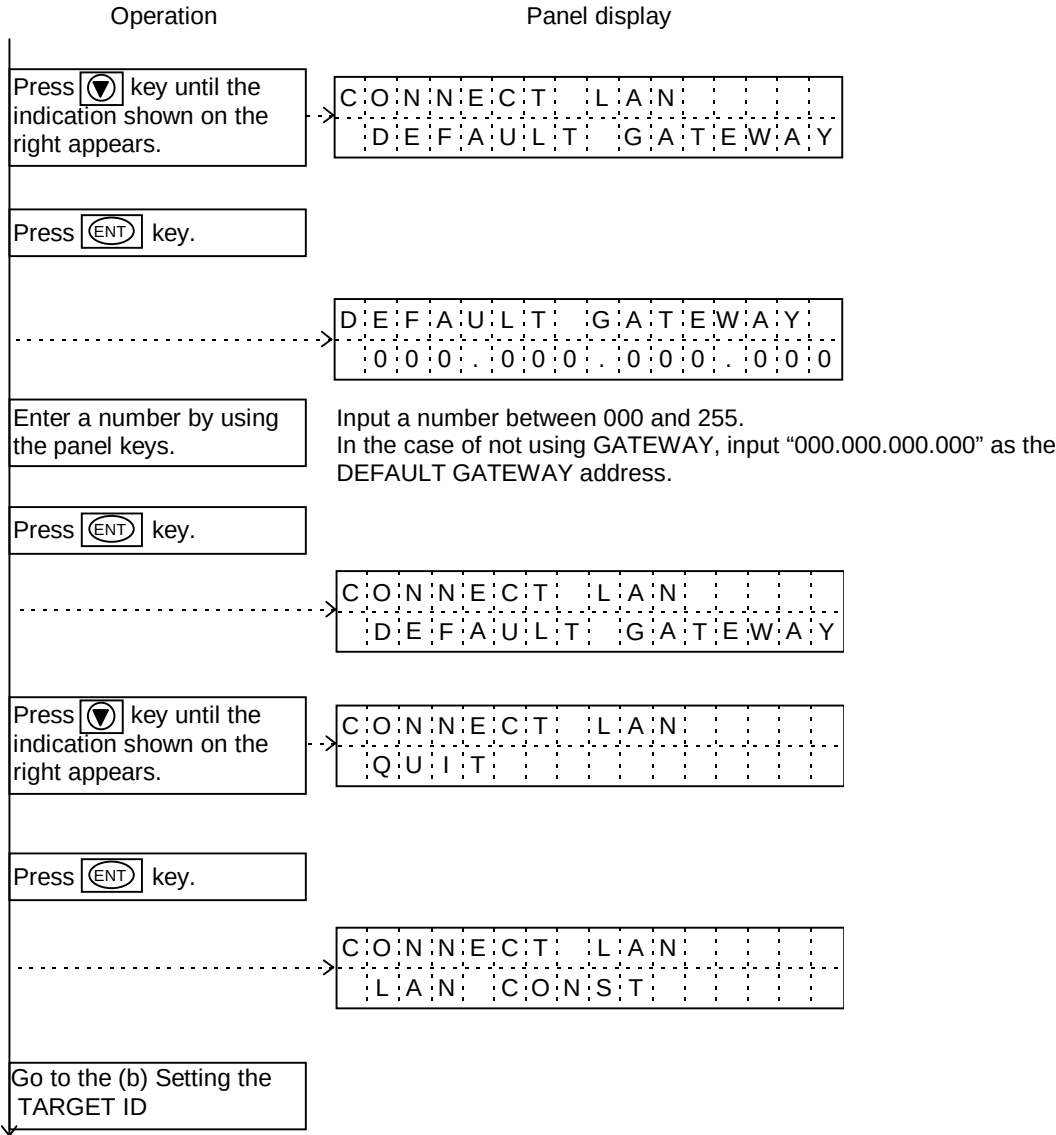
If "000.000.000.000" as the SUB NET MASK is set, this subsystem automatically adopts default SUB NET MASK for each IP address as described in the table 4.1.1.

Table 4.1.1 Default SUB NET MASK related with IP address

No.	IP Address of the subsystem	DEFAULT SUB NET MASK
1	from 000.000.000.000 to 127.255.255.255	255.000.000.000
2	from 128.000.000.000 to 191.255.255.255	255.255.000.000
3	others	255.255.255.000

If a smaller SUB NET MASK than default number is entered, this subsystem adopts default number.

(a-3) Setting the DEFAULT GATEWAY address



***Note**

If an invalid GATEWAY address is set (the IP address of the device is different from network address.), either of warning messages as shown below is displayed until the READY LED of the subsystem lights on.

Power off the subsystem and set IP address and default GATEWAY address correctly.

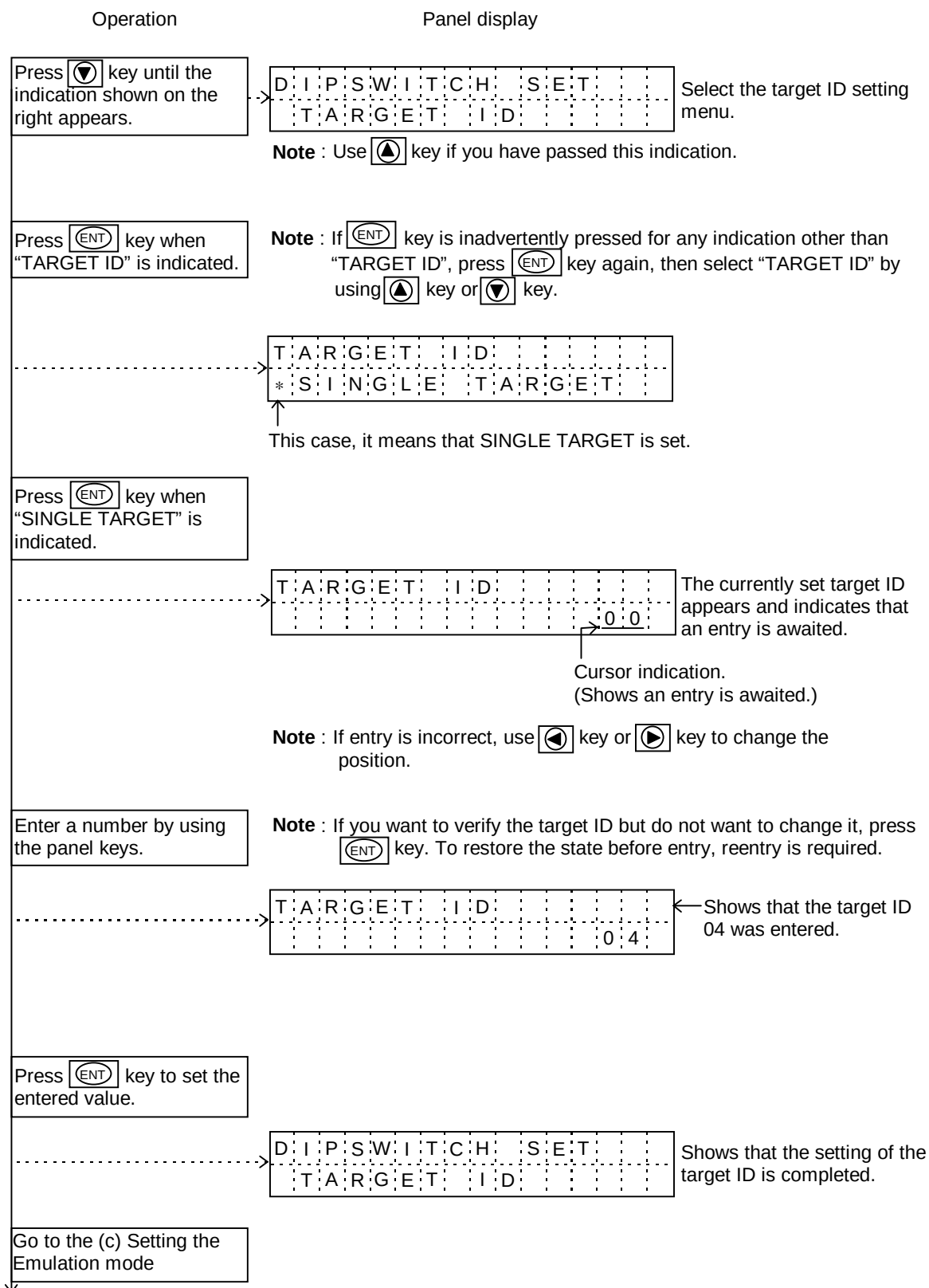
W	0	1	7	0	0	G	A	D	E	R	R		
				.		.		.					

W	0	1	7	0	0	G	A	D	E	R	R	-	X
				.		.		.					

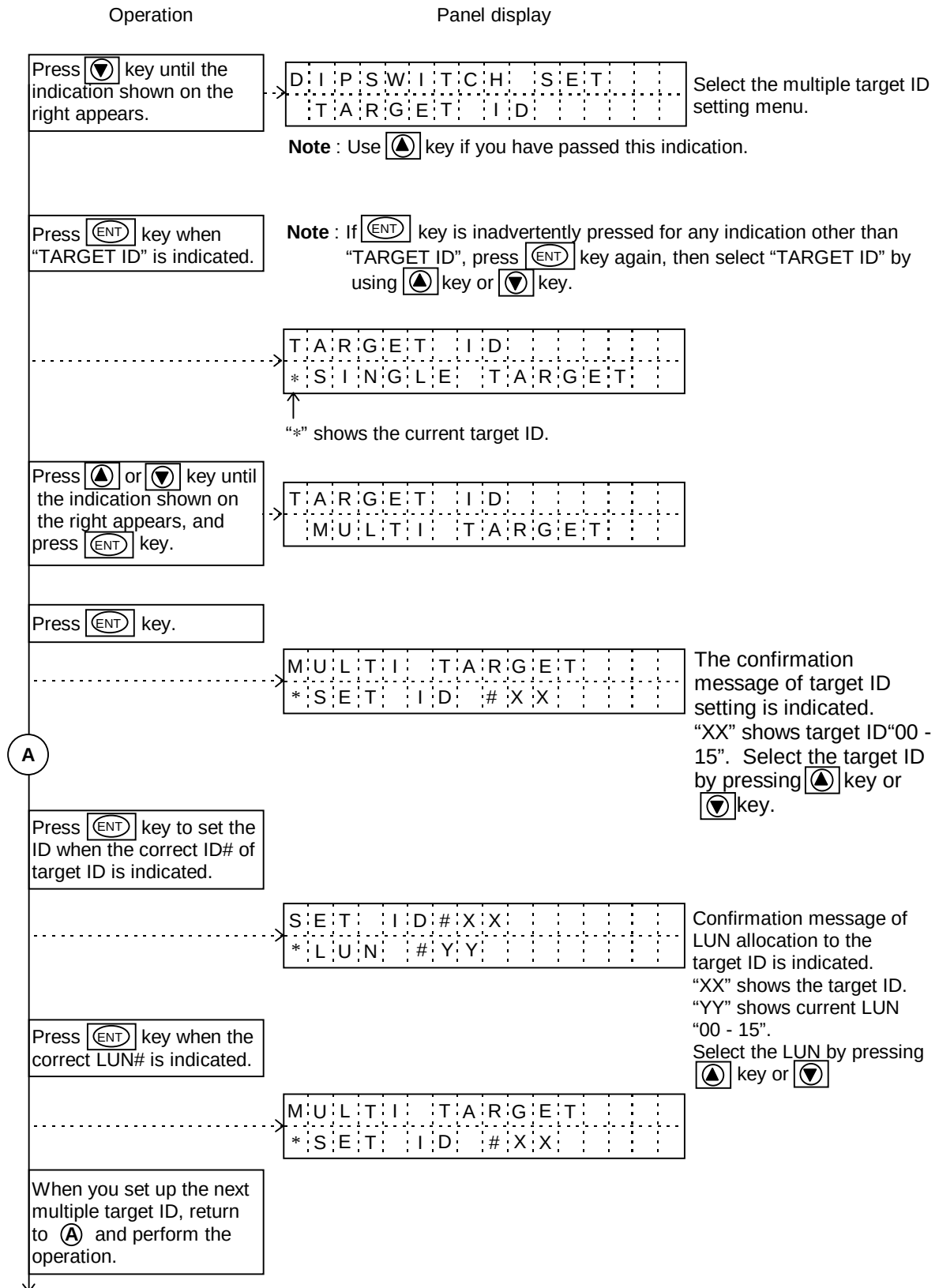
X : controllers No.

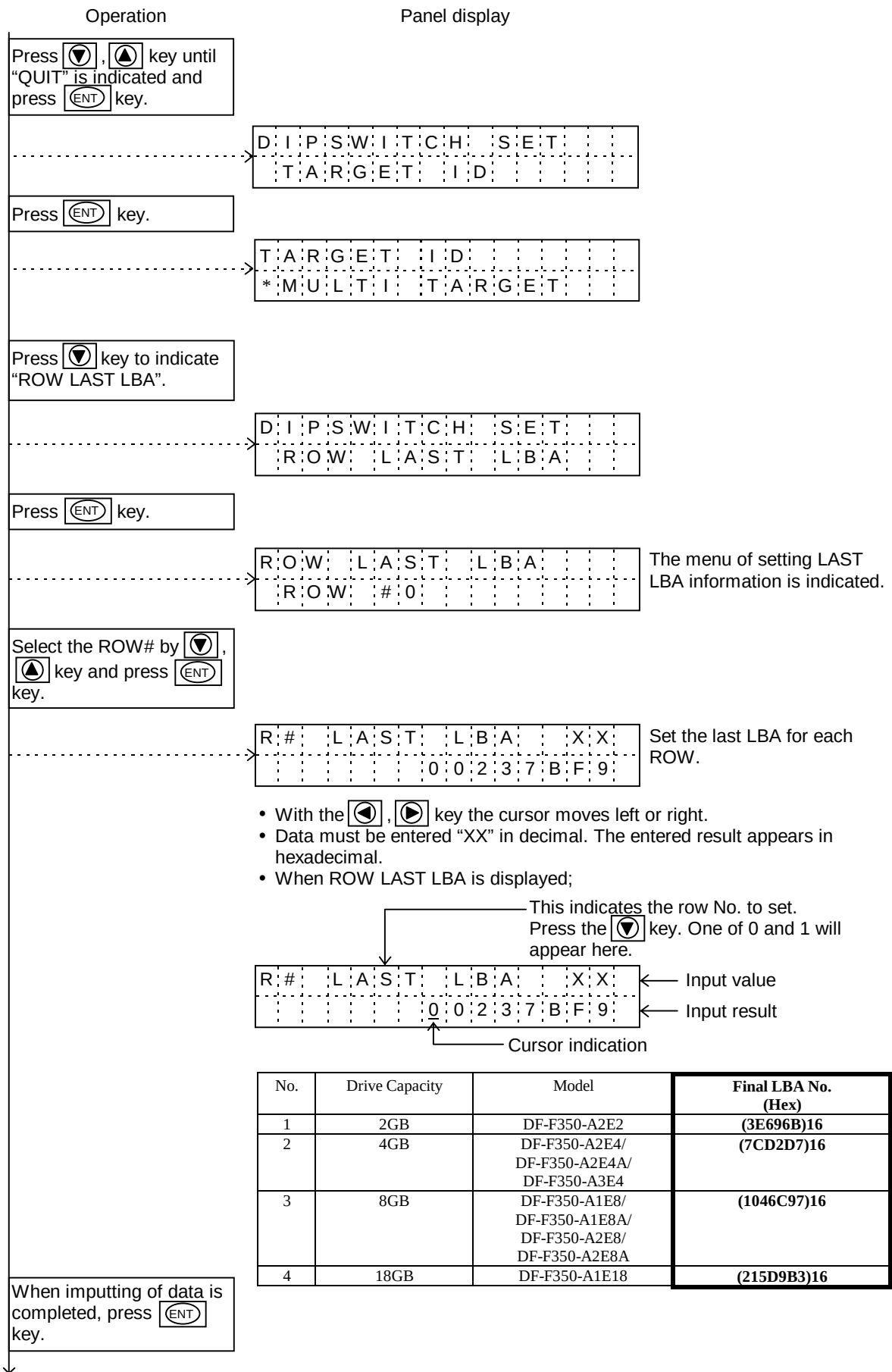
(b) Setting the TARGET ID.

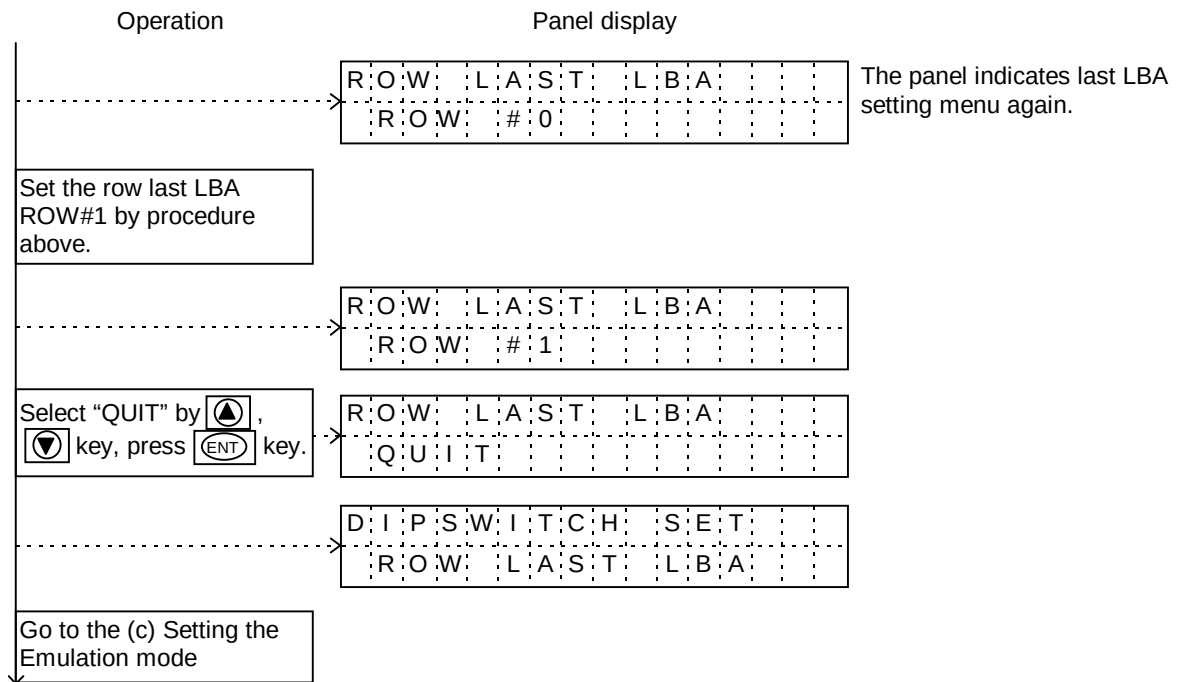
(b-1) Setting the single target ID.



(b-2) Setting the multiple target ID.

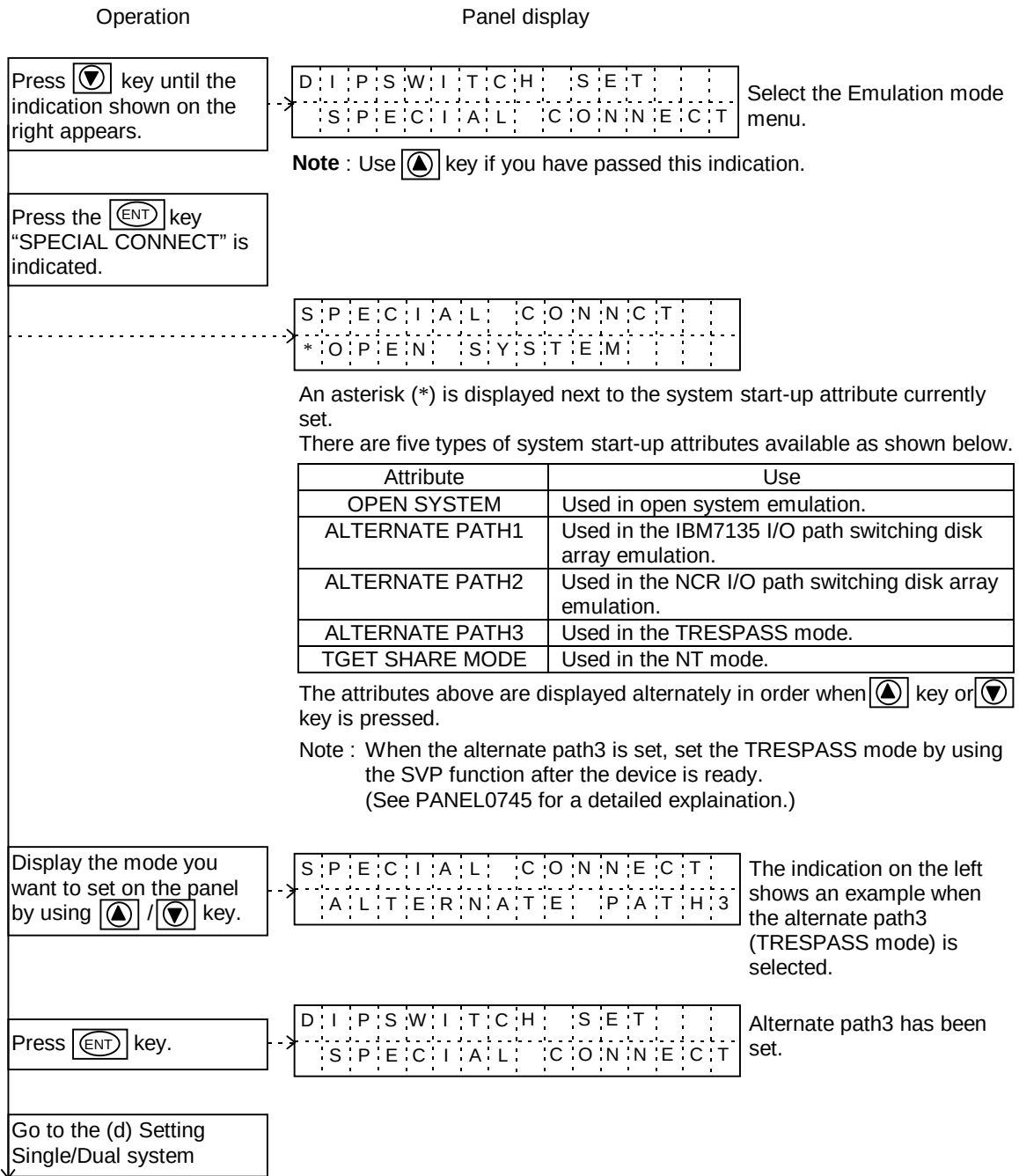






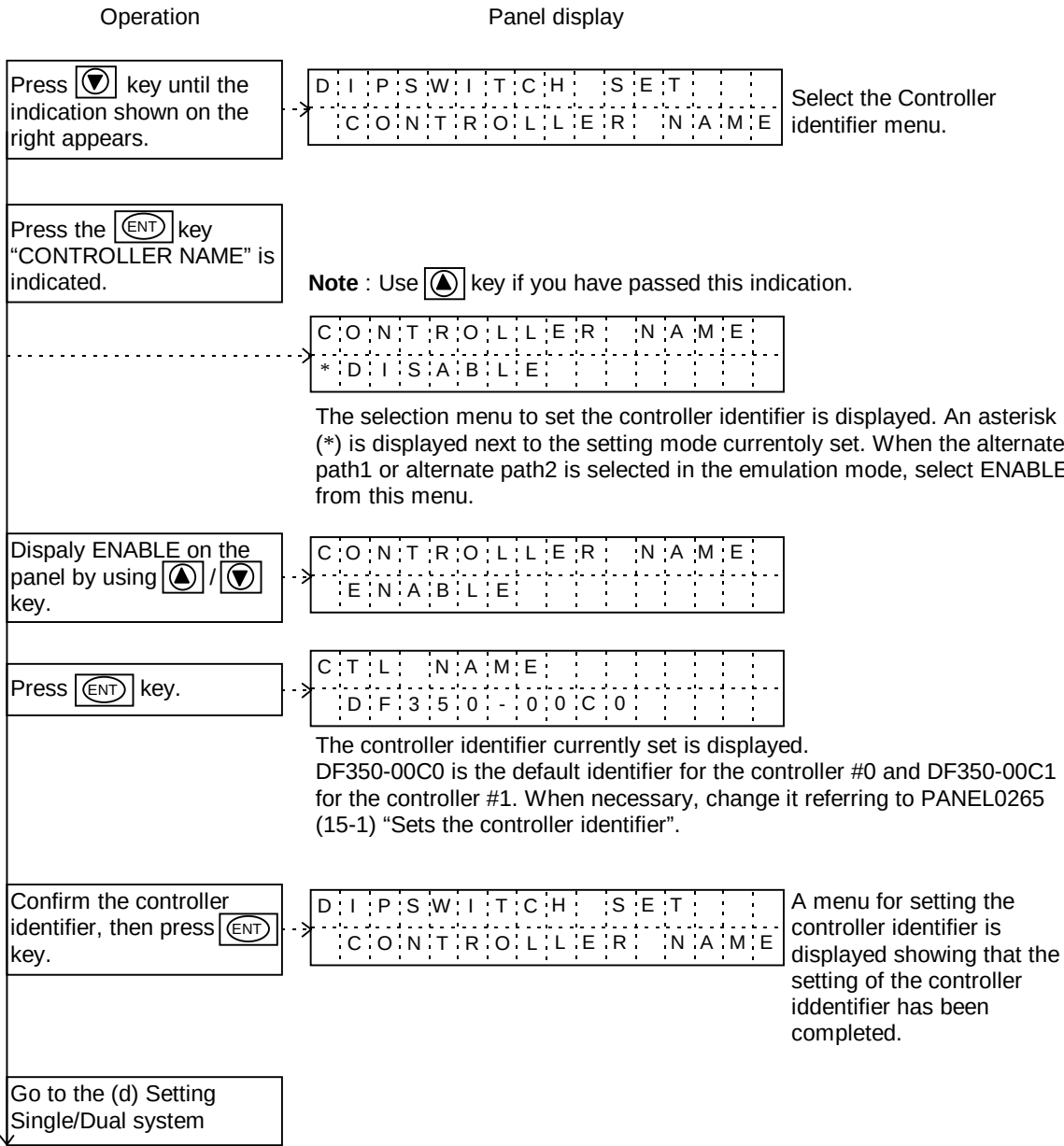
- Note)** * Setting and changing of multi target ID make the relation between the target ID and the LUN only.
The defining and formatting LU can be executed both after and before this operation.
- * If this operation is finished , turn off the power and turn on the power again.
 - * Resetting of SINGLE TARGET ID is required when returning to SINGLE TARGET function after switching to MULTI TARGET function from previous SINGLE TARGET function.
 - * If you want to set the multi target ID when the LU is already set, the LUN can be set to any number from #00 to #07. If you want to set any number from #00 to #15 to LUN, set the multi target ID after deleting the LU.
 - * The multi target ID must be set for each controller. In case of dual controller system and MULTI TARGET IDs are set for the both controller, set MULTI TARGET ID for each controller.

(c) Setting the Emulation mode

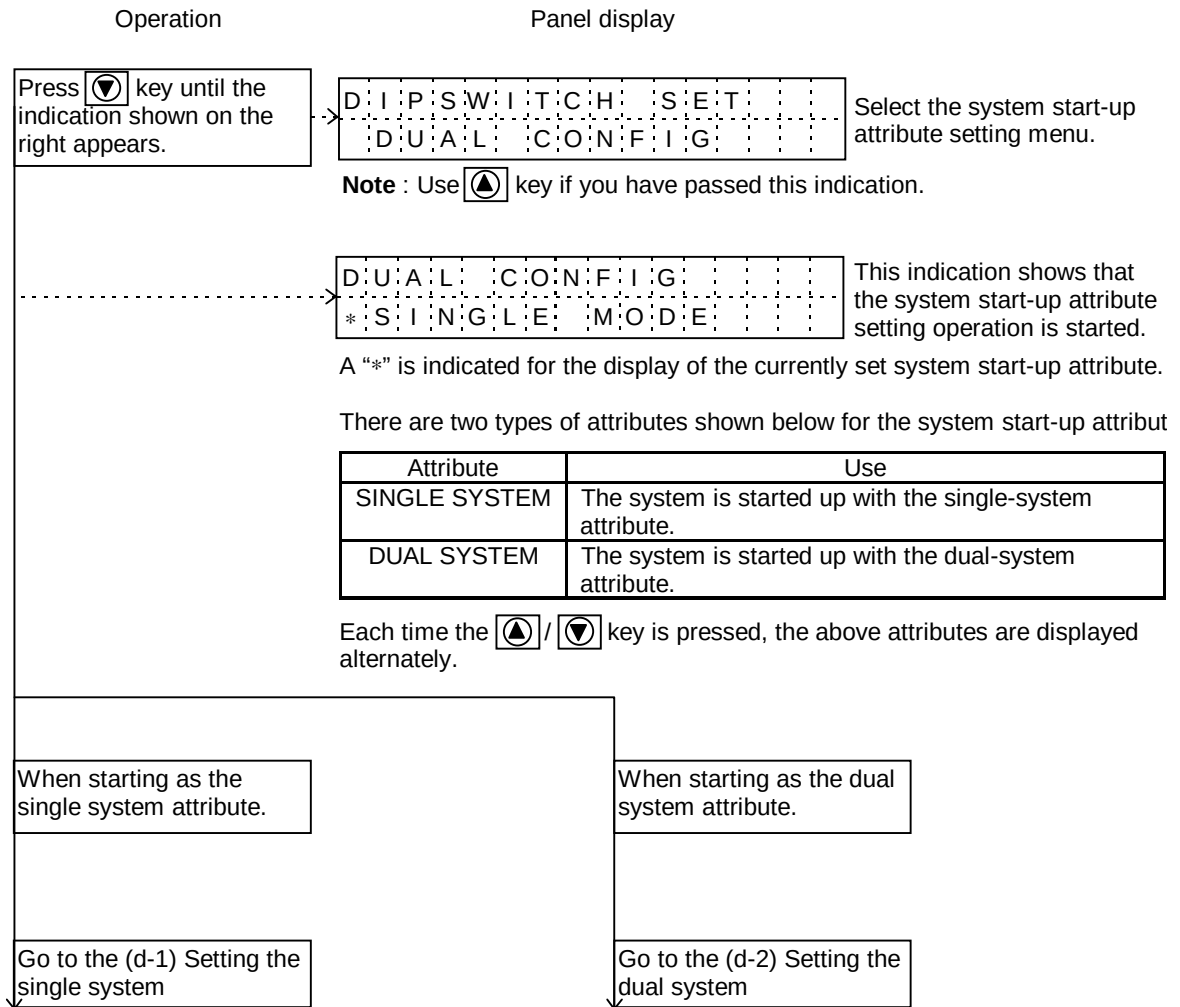


When the alternate path1 or alternate path2 is selected, set the controller name, product type. (See RH-INST0387.)

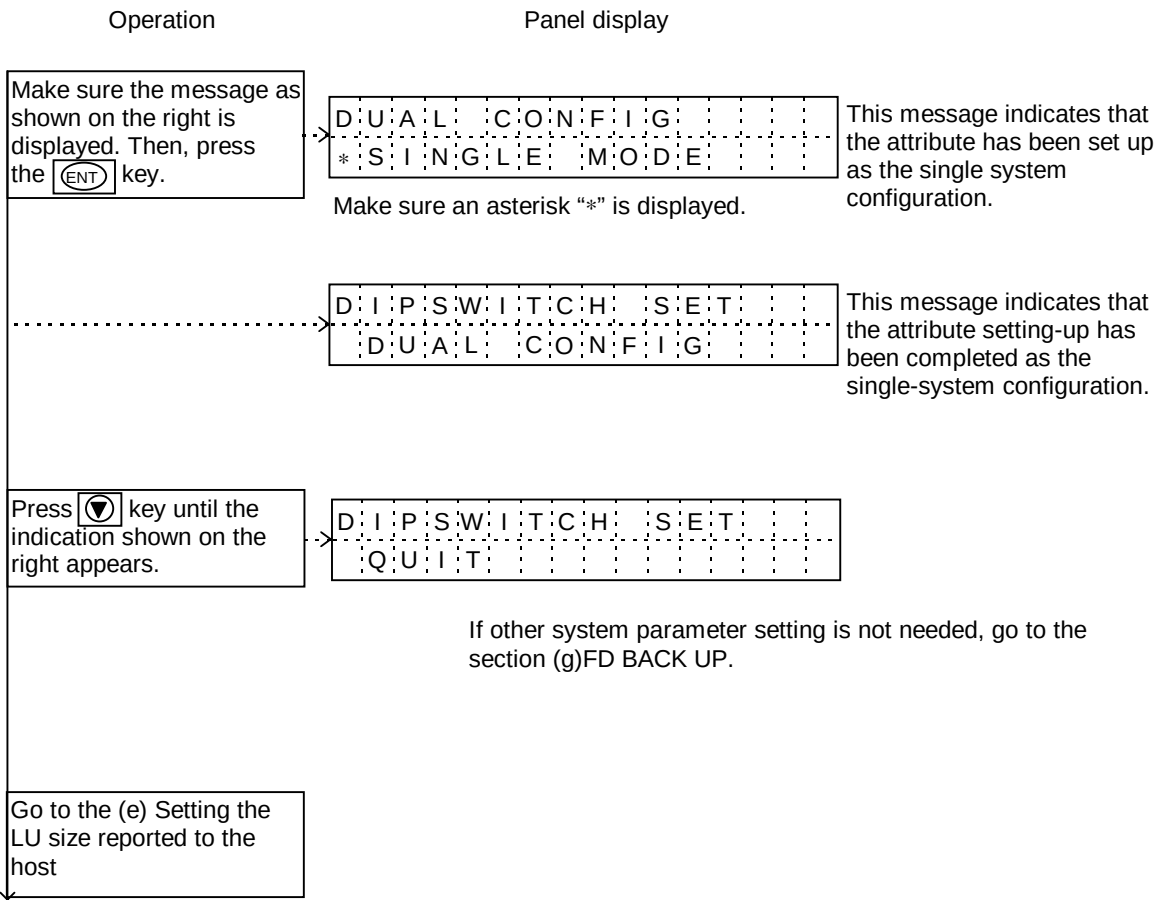
When the alternate path3 is selected, go to the single/dual system setting.

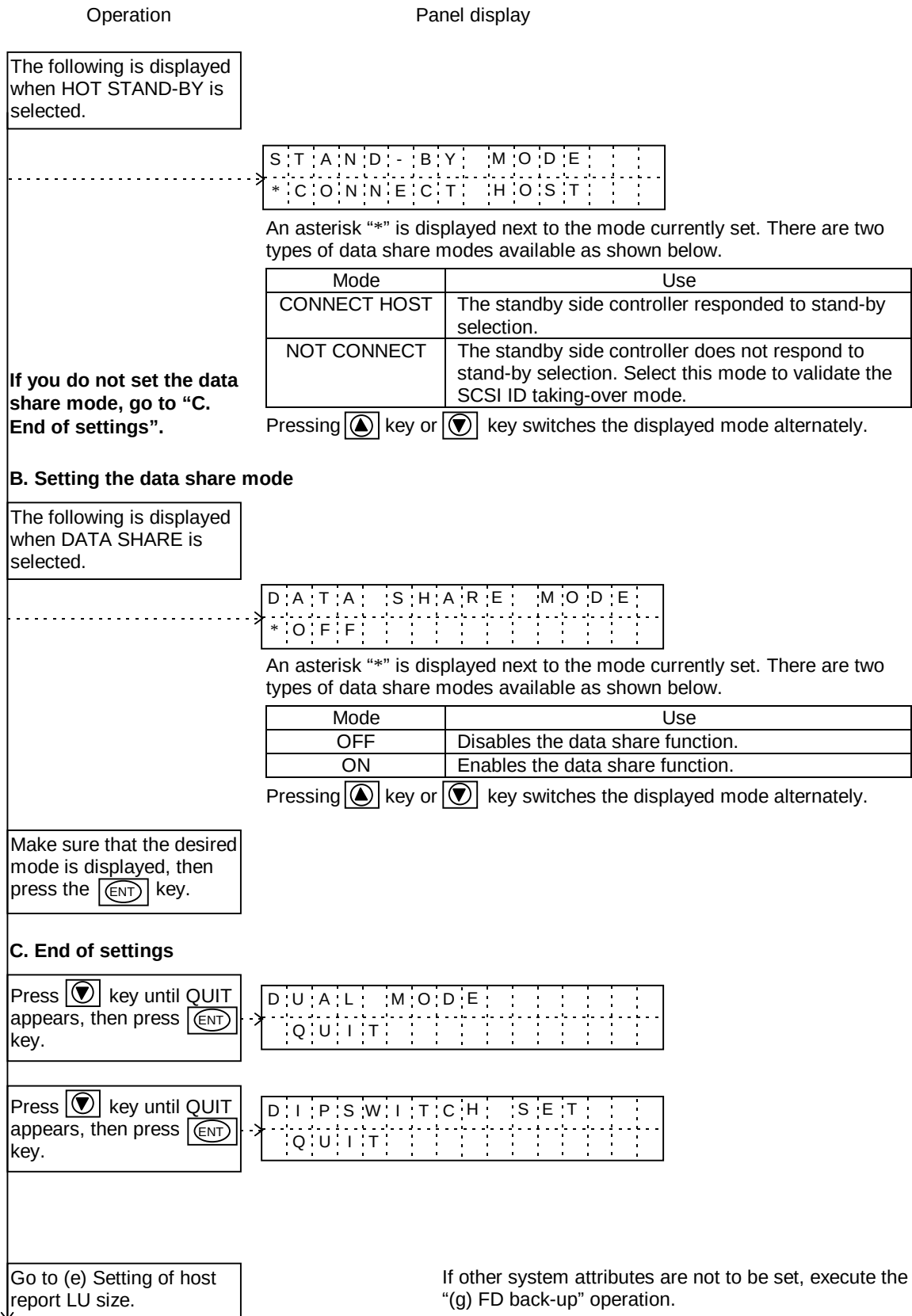


(d) Setting Single/Dual system

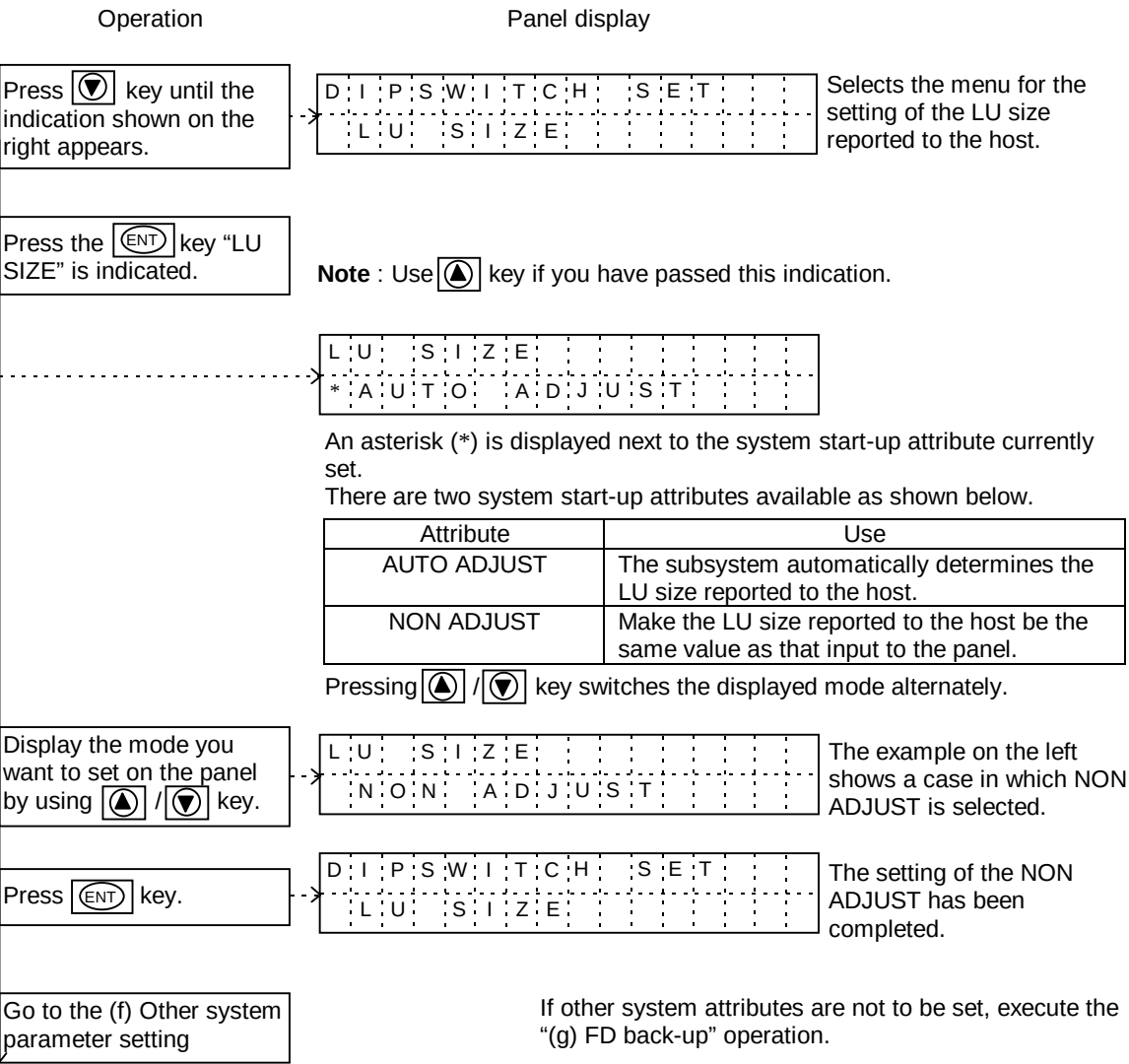


(d-1) Setting the single system





(e) Setting the LU size reported to the host



(f) Other System Parameter Setting

Besides (a) Setting the IP address, (b) Setting the TARGET ID, and (c) Setting SINGLE/DUAL system, there are several setting functions as below. The setting at the factory shipment is shown on the table in the addendum to the device.

To change the setting, see "PANEL0080".

The menu items and their usage are as follows.

(The item Nos. 1, 2, 4, 5, 8, 10, 13, 20, and 22 in the following table must be set for each controller.)

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	???????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	Select	NOT CONNECT
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT (*2)	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : NT mode	Select	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	Select	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per block.	Select	512B
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inhibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) RACK MOUNT : Rackmount (RK) HIGH RACK MOUNT : Rackmount (RKH) CABINET, WRACK : Cabinet type (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	Select	Depending on the configuration from the factory
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Enter	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
17	CONTROLLER NAME (*4)	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid. CTL NAME : Controller identifier.	Select	DISABLE
18	ROW LAST LBA (*3)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET

*3 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

*4 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
21	GENERATE SYS (*5)	Specifies the loading method for the new/old microprogram.	NEW SYSTEM : Loads the new microprogram. OLD SYSTEM : Loads the old microprogram.	Select	NEW SYSTEM
22	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL TYPE : Dual system attribute DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute (*7) OFF : Not used in the Data share mode ON : Used in the Data share mode	Select	Depending on the configuration from the factory
24	LU SIZE (*6)	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
25	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
26	SYS REV	Limit the revision Nos. of installing system.	Displays the startup program revision.	—	“0304”
27	OPTION	Specifies the optional function when using it.	Enters the option code using the panel keypad.	Enter	“0000”
28	BOOT PROG V/R	Displays the startup program revision.	Displays the startup program revision.	—	
29	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
30	QUIT	Terminates the parameter input.	Enters using the panel keypad.	Enter	

*5 This menu can be used in the Flush Program Ver.PB24 and before.

*6 This menu can be used in the Flush Program Ver.PB24 and later.

*7 This function can be used in Micro_Disk_Ver.0304 or later.

(f-1) Setting RS232C error information sending mode

In order to use the failure notification program, the setting for the “ERROR INF” of the system parameter must be changed to “ON (NORMAL)”.

Operation	Panel display
	D I P S W I T C H S E T R O M R E S P M O D E
Press  key until the indication shown on the right appears. Press  key.	D I P S W I T C H S E T E R R O R I N F Note : Use  key if you have passed this indication.
Confirm that the indication is changed as shown on the right, which shows that the ERROR INF setting operation is started.	E R R O R I N F * O F F
Press  or  key until the indication shown on the right appears. Press  key.	E R R O R I N F O N (N O R M A L)
Make sure that the message as shown on the right is displayed.	D I P S W I T C H S E T E R R O R I N F
Press  or  key until the indication shown on the right appears. Press  key.	D I P S W I T C H S E T Q U I T
For the dual system, an indication shown on the right appears. Make the setting in the same way as the above.	D I P S W I T C H S E T ■ R O M R E S P M O D E

(g) FD back-up.
There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) needs to be backed up to FD or restored from FD when installing optional parts or replacing parts. This case, perform back-up to FD or restore from FD according to “2.3.1 Back-up procedure to FD (RH-OPTION0050.)” or “2.3.2 Restoring procedures to FD (RH-OPTION0080.)”.
(Raid configuration setting, LU configuration setting, etc are not contained in system parameter.)

Back-up procedure to FD

- (1) Turn the power off according to RH-OPTION0120.

Notice: In case the power is not normally turned off, the user’s data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 4.1.3.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

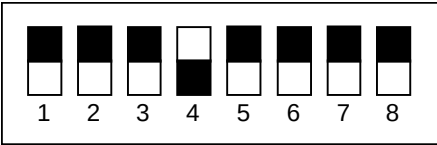
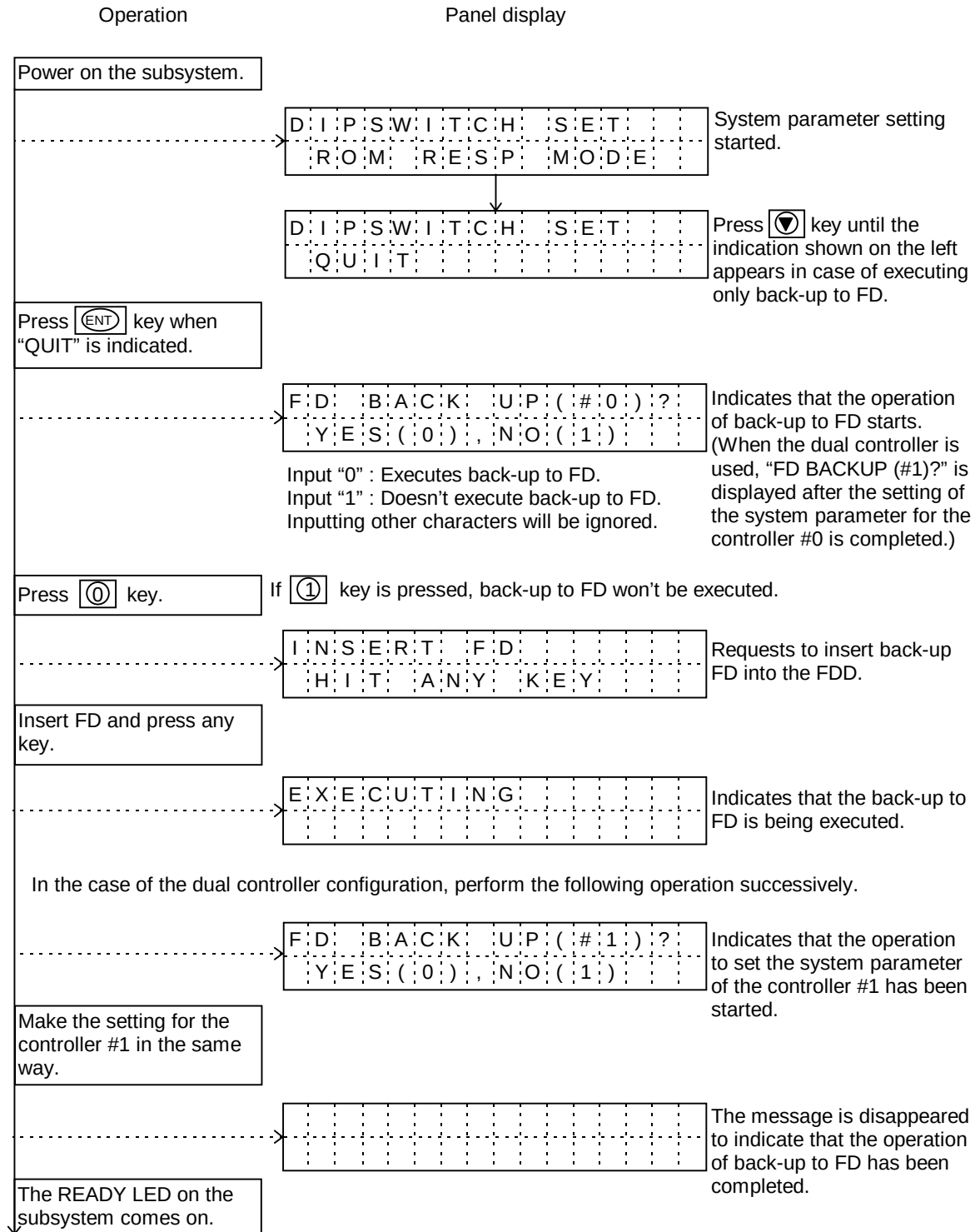


Figure 4.1.3 DIP Switches

(3) Operate panel's keys as described below.



(4) Set DIP switch No.4 as shown in Figure 4.1.4.

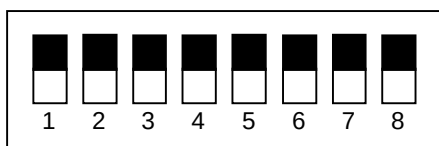
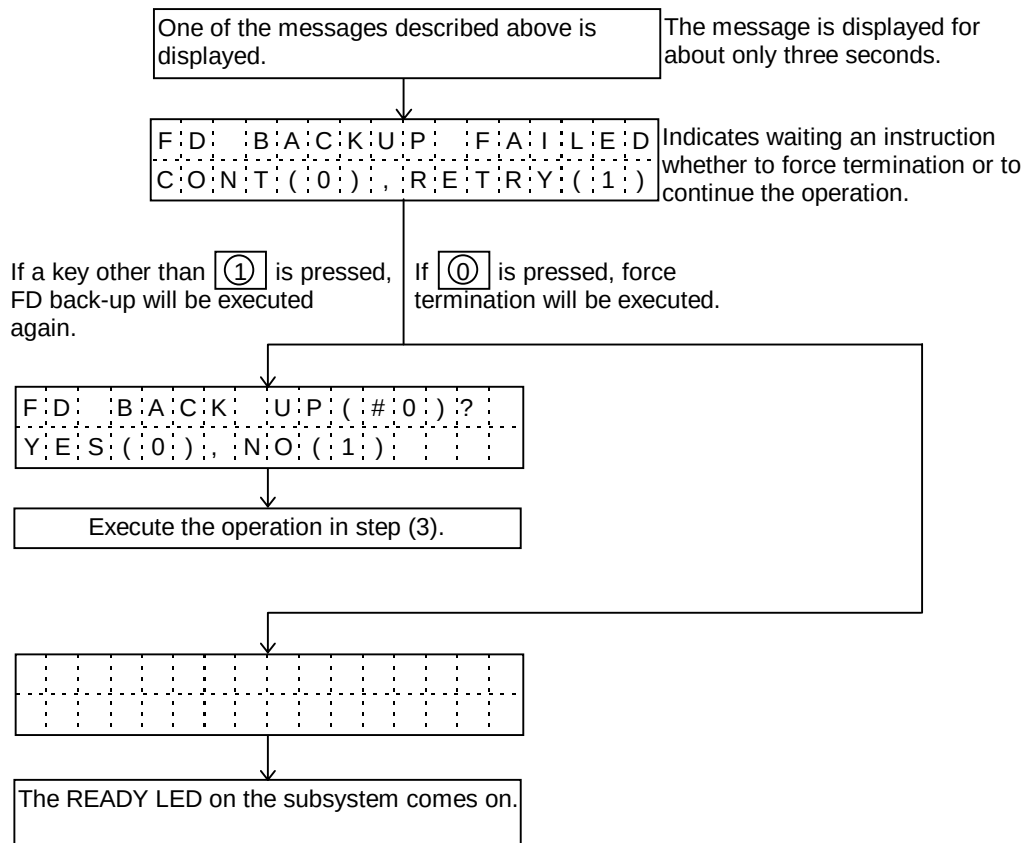


Figure 4.1.4 DIP Switches

Note 1 : While the back-up to FD is being executed, the following messages may be displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting failure of the FD drive motor occurred. Try again.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or is the condition of write-protected. Format or release write-protection.
Write error occurred in FD which was inserted. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So try again following the operation described below.

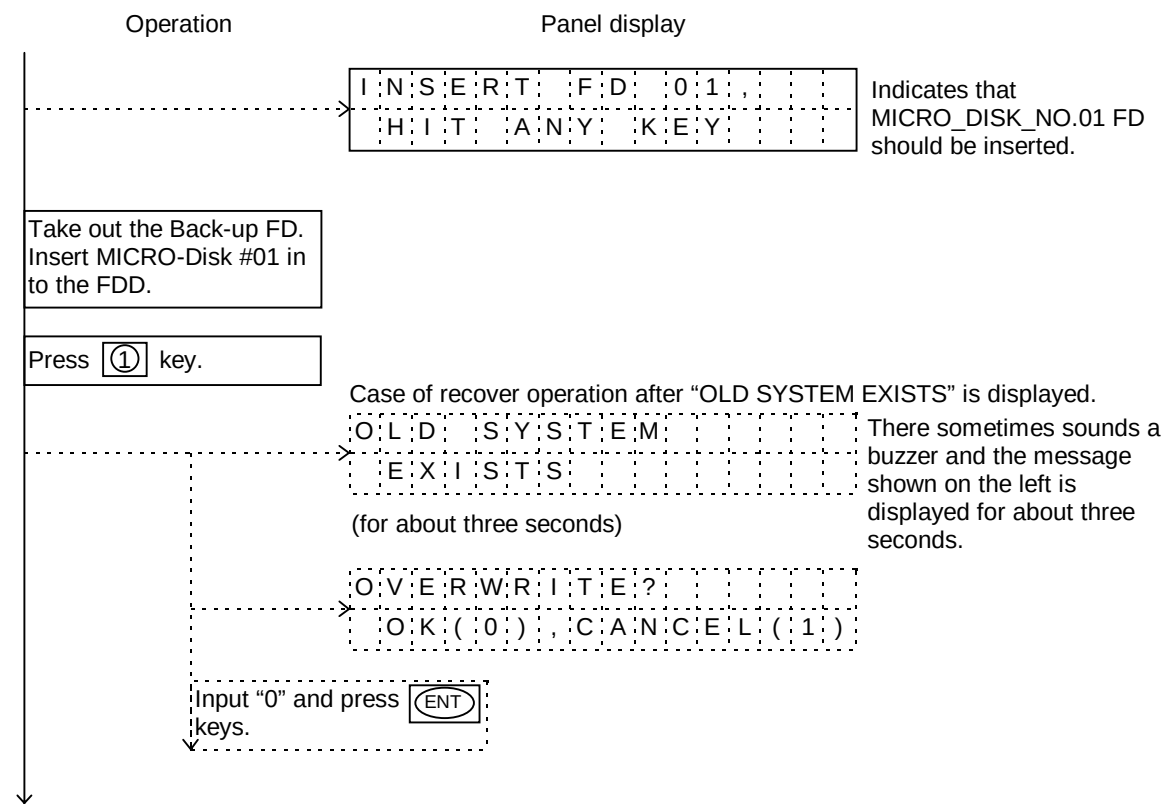
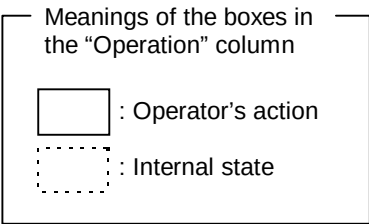


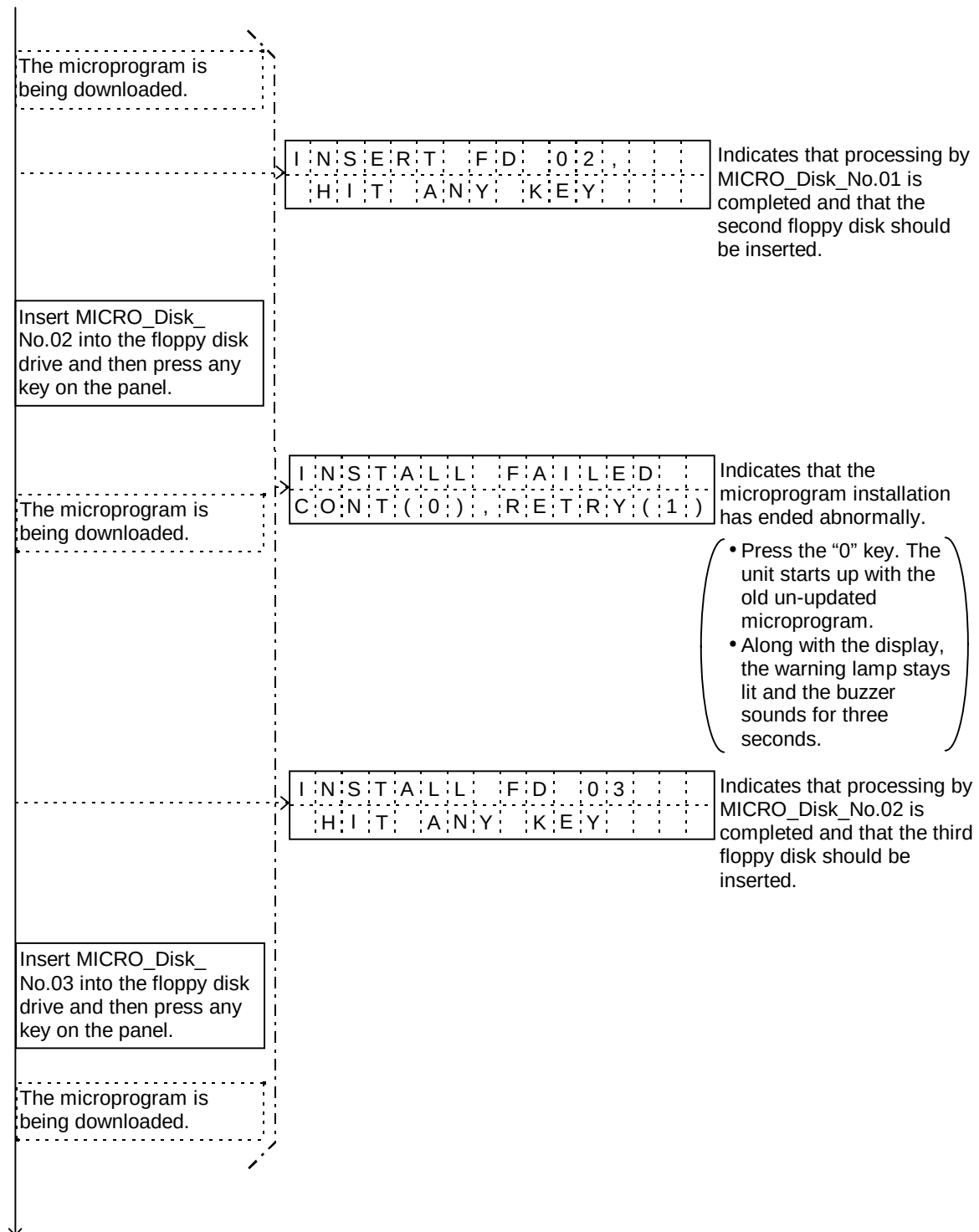
Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Note that the FD will be overwritten in back-up.

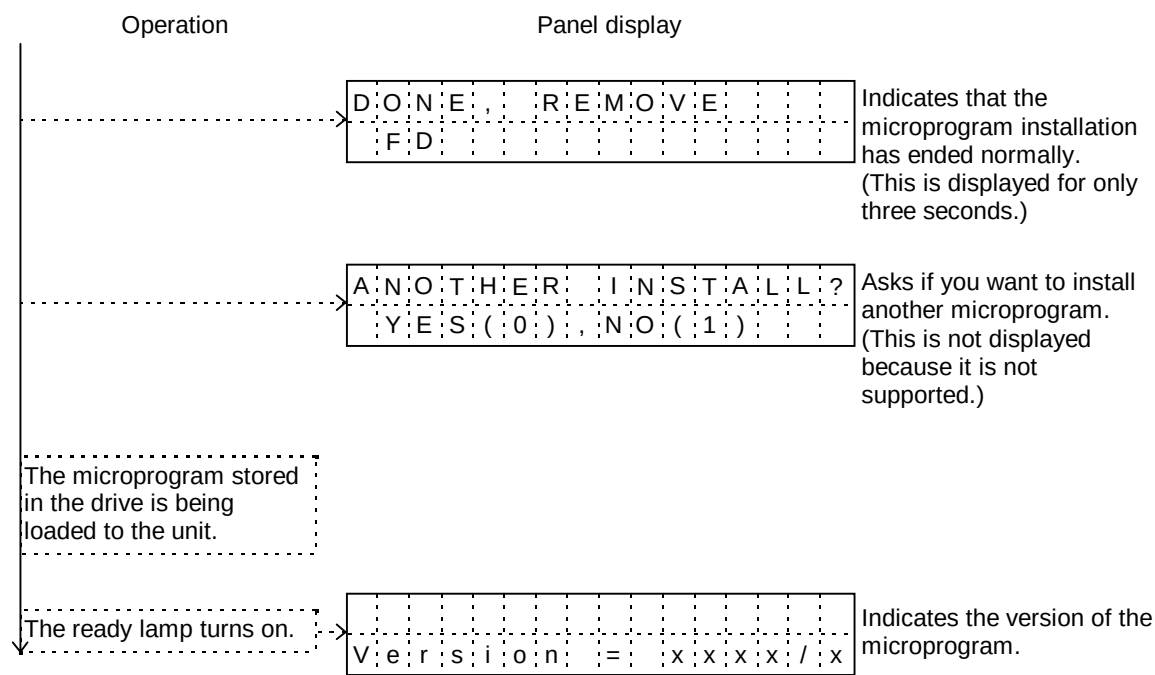
Note 3 : Even if back-up FD is left at FDD after back-up operation, no error will occur on the subsystem.

(h) Download Program
Download program is used to update the microprogram stored in the drive. Three floppy disks are used for downloading.

Note : Be sure that no drive failure is present before updating the microprogram.







(1) Set DIP switch No.1 as shown in Figure 4.1.2.

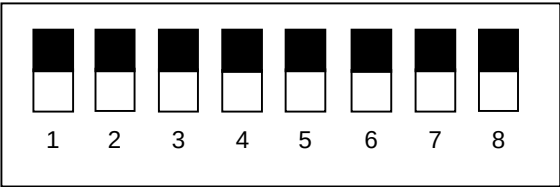


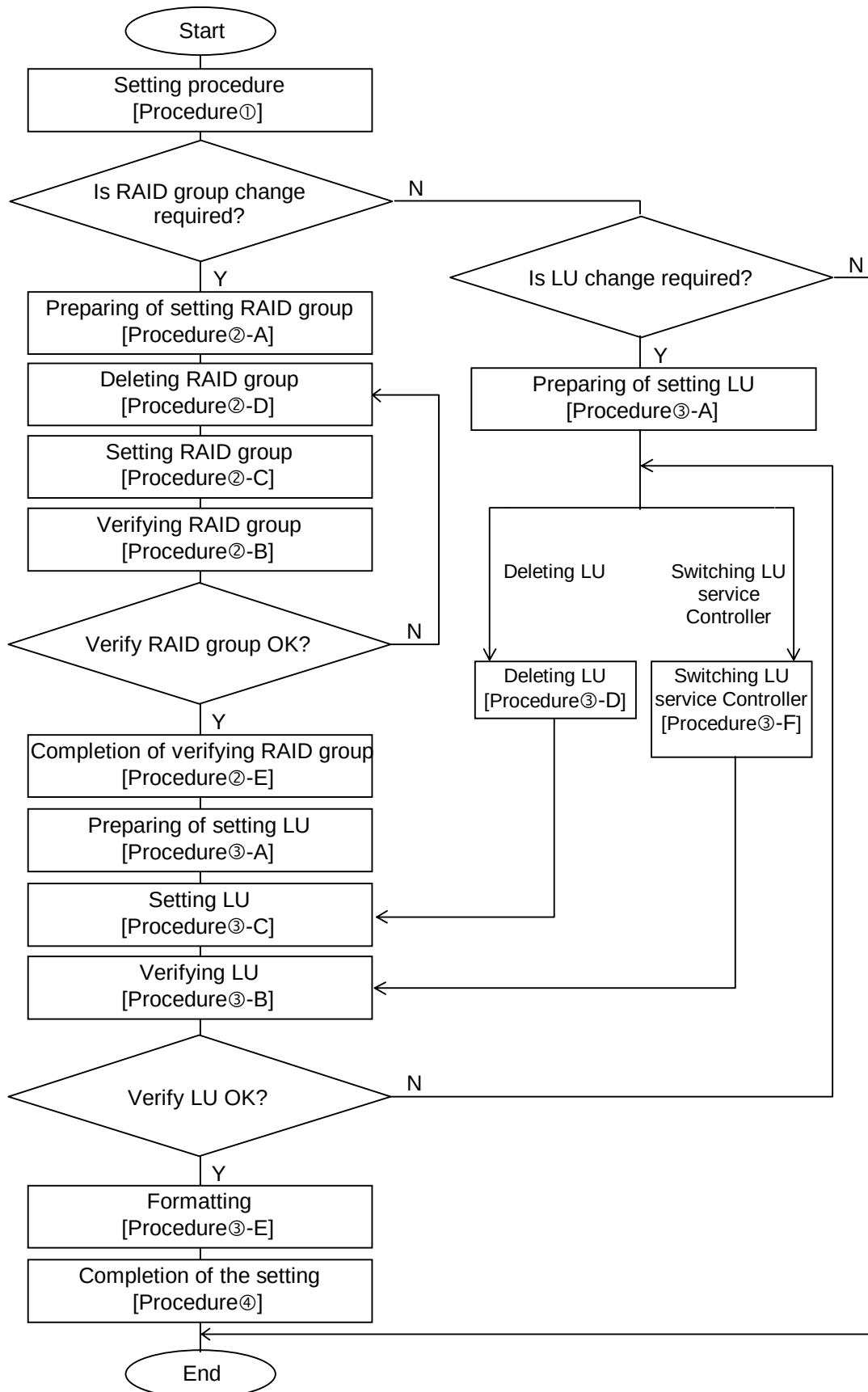
Figure 4.1.2 Standard DIP Switch Settings

Note : If the dual controller option (DF-F350-F2MCF) is installed, use the same settings for both controllers.

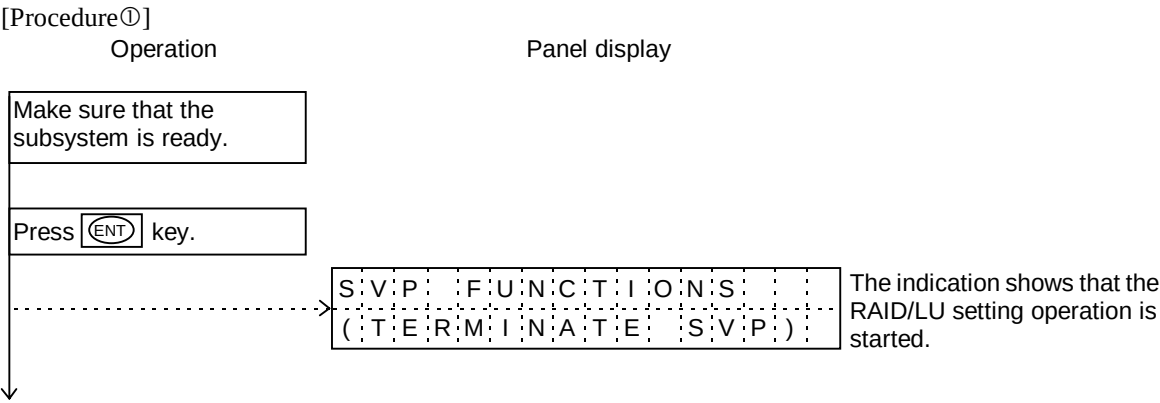
4.2 Setting the Subsystem Configuration Information

This function can be used when the subsystem is ready.

(During this operation, READ/WRITE command issued from the host cannot be executed. When the host command is received, Not Ready is reported to the host.)



4.2.1 Preparing of setting RAID/LU



When changing RAID group, go to procedure ②-A “Preparing of setting RAID group”.
When changing no RAID group but LU, go to procedure ③-A “Preparing of setting LU”.
When changing no RAID group and LU, go to quit.

4.2.2 Setting the RAID group

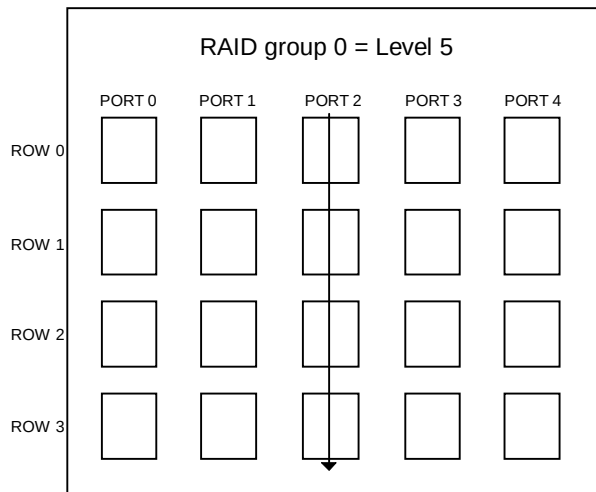
This function is used for setting, deleting and referring the RAID group. This function can be used when the subsystem is ready.

(Setting the DIP switch and turning off/on the subsystem are not required. Read/Write operation from the host can not be executed during this function. When the host command is received, Not Ready is reported to the host.)

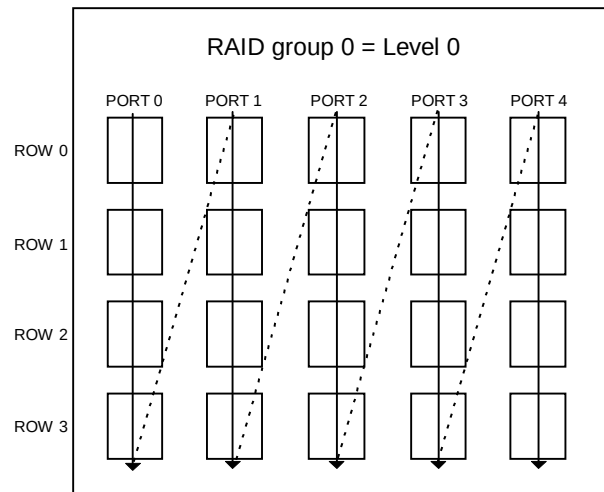
Notice : By deleting the RAID group all user data of the deleted RAID group is lost. Back up user data before deleting the RAID group.

RAID group and RAID level can be set as shown below by using this setting function.

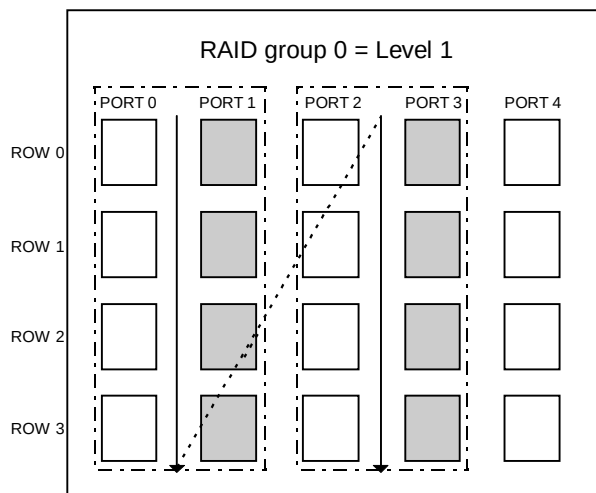
Setting one RAID group with the entire subsystem. (Arrows "↓" indicate the direction of storing data.)



The function stores data in the way executing the data striping over four disks and generating parity data on one disk.

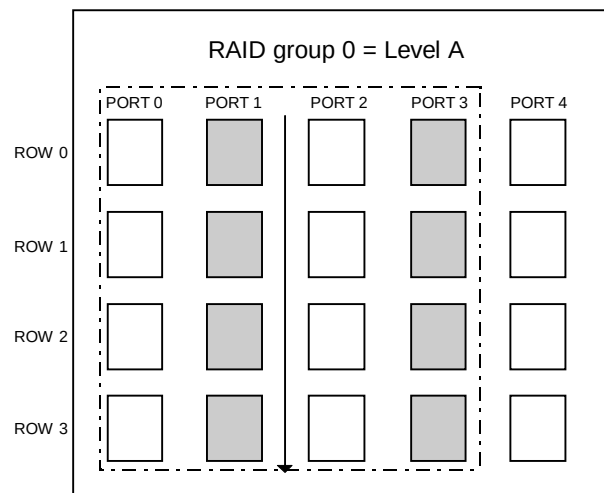


The function stores data without executing neither the data striping nor parity data generation.



The function stores data in the way doubly writing it on the main disk and sub-disk without executing the data striping.

□ : indicates a main disk
 ■ : indicates a sub-disk

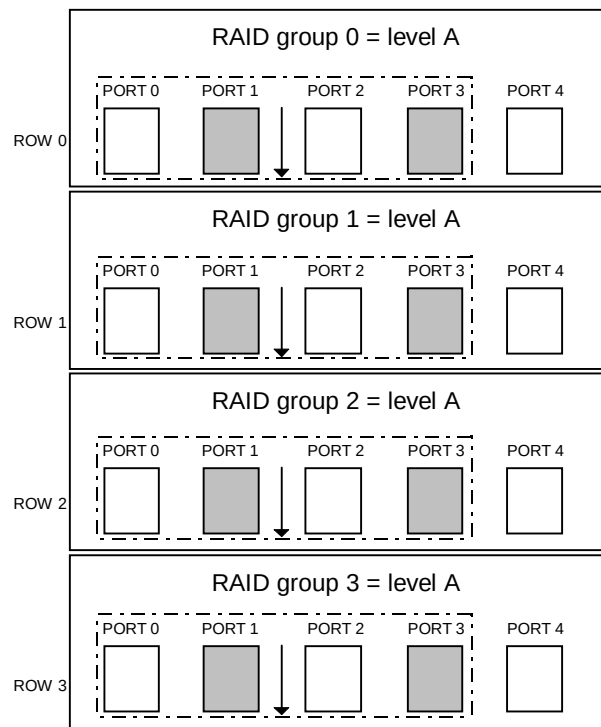
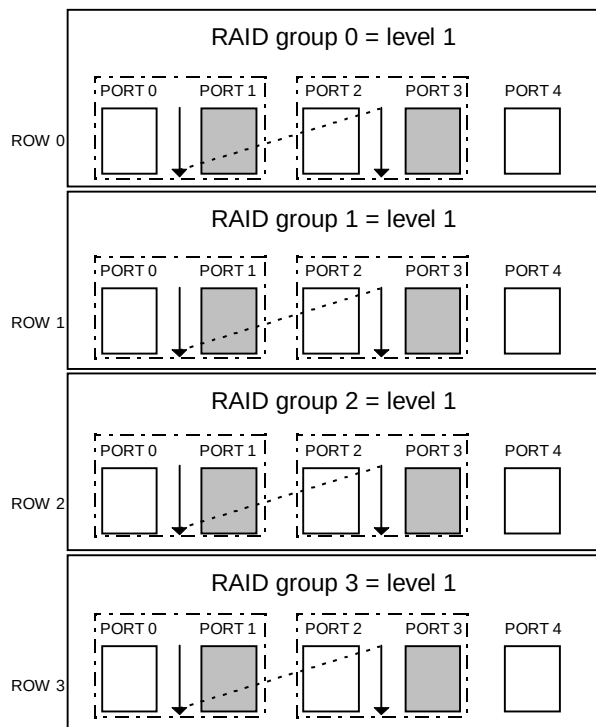
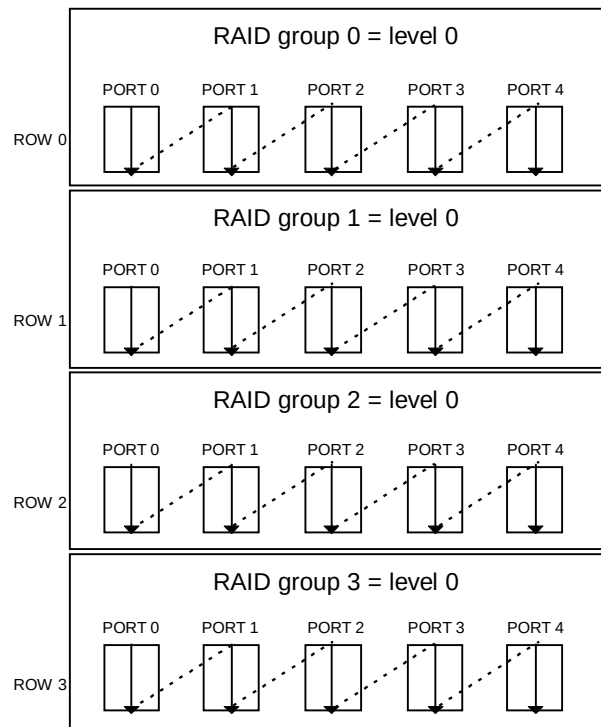
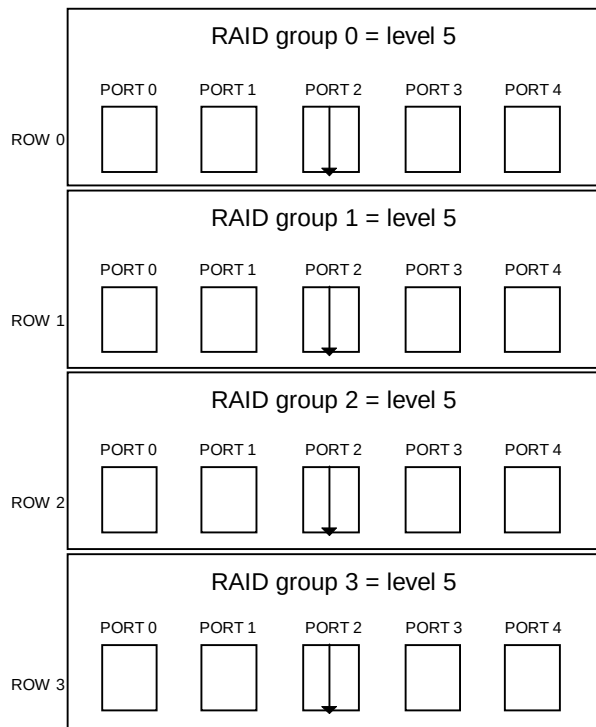


The function stores data in the way doubly writing it on the main disk and sub-disk and executing the data striping over two disks of port 0 and port 2.

□ : indicates a main disk
 ■ : indicates a sub-disk

Setting one RAID group with each row of disks (Arrows “↓” indicates the direction of storing data.)

Data cannot be stored extending over two or more RAID groups even if RAID levels of them are the same. The following are examples having set RAID groups of the same RAID level, however, each row has its own RAID level.



Setting the number of data disks when setting RAID level 5

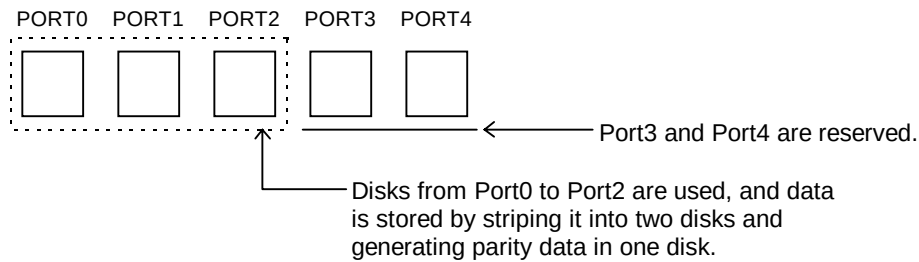
When Micro_Disk Ver.0305** (** is optional) or later is used, number of data disks can be selected from 2, 3 and 4 in the definition of RAID5.

(4 for the number of data disks and 1 for the number of parity disks are automatically set when 5 is set for RAID level in the case Micro_Disk Ver.0304** (** is optional) or earlier is used.)

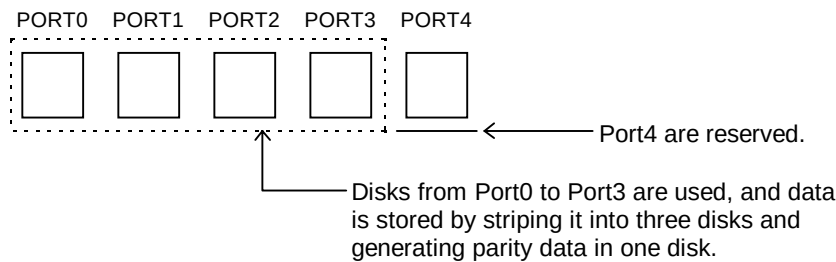
For the of setting procedure, see pages PANEL0380 or RH-INST0534.

The direction of data storage is the same as the conventional case in which the RAID level is 5. Setting is also same as before; the entire subsystem or each row can be set to one group. The following explains the overview of data storage using the example of setting each row to one group.

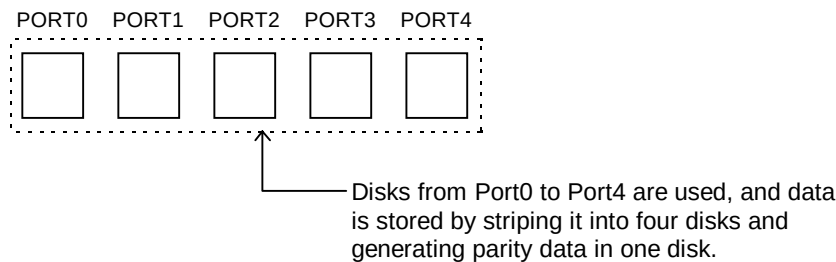
- (1) For the configuration of 2 data disks + 1 parity disk



- (2) For the configuration of 3 data disks + 1 parity disk

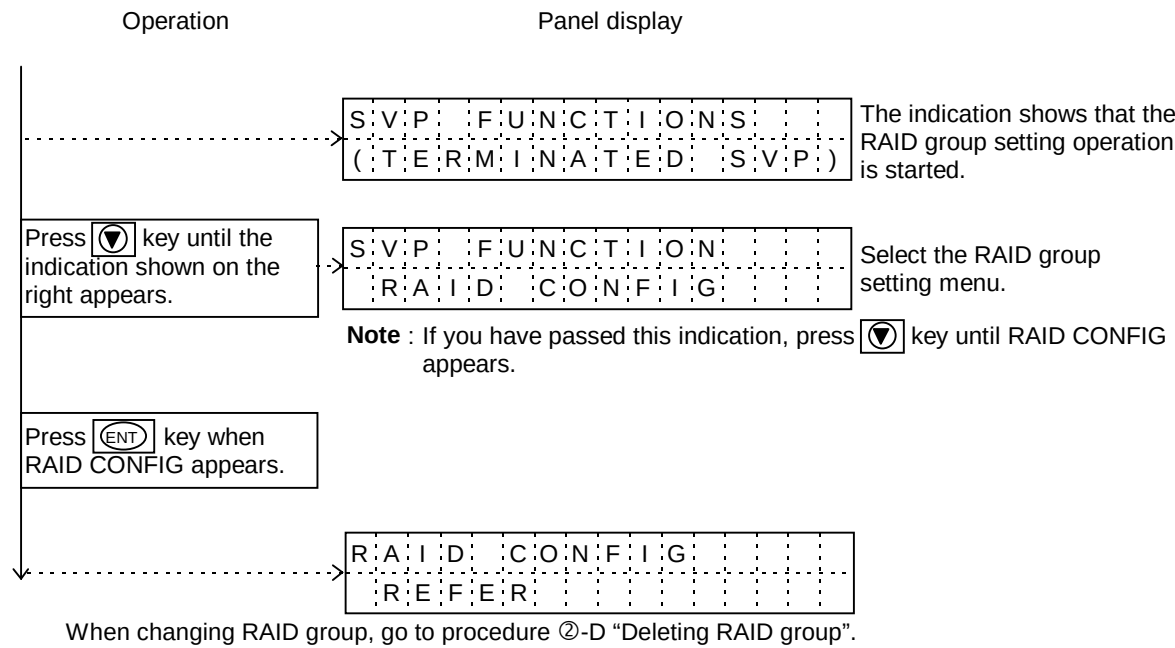


- (3) For the configuration of 4 data disks + 1 parity disk (same configuration as when RAID5 is defined using Micro_Disk Ver.0304** or earlier)

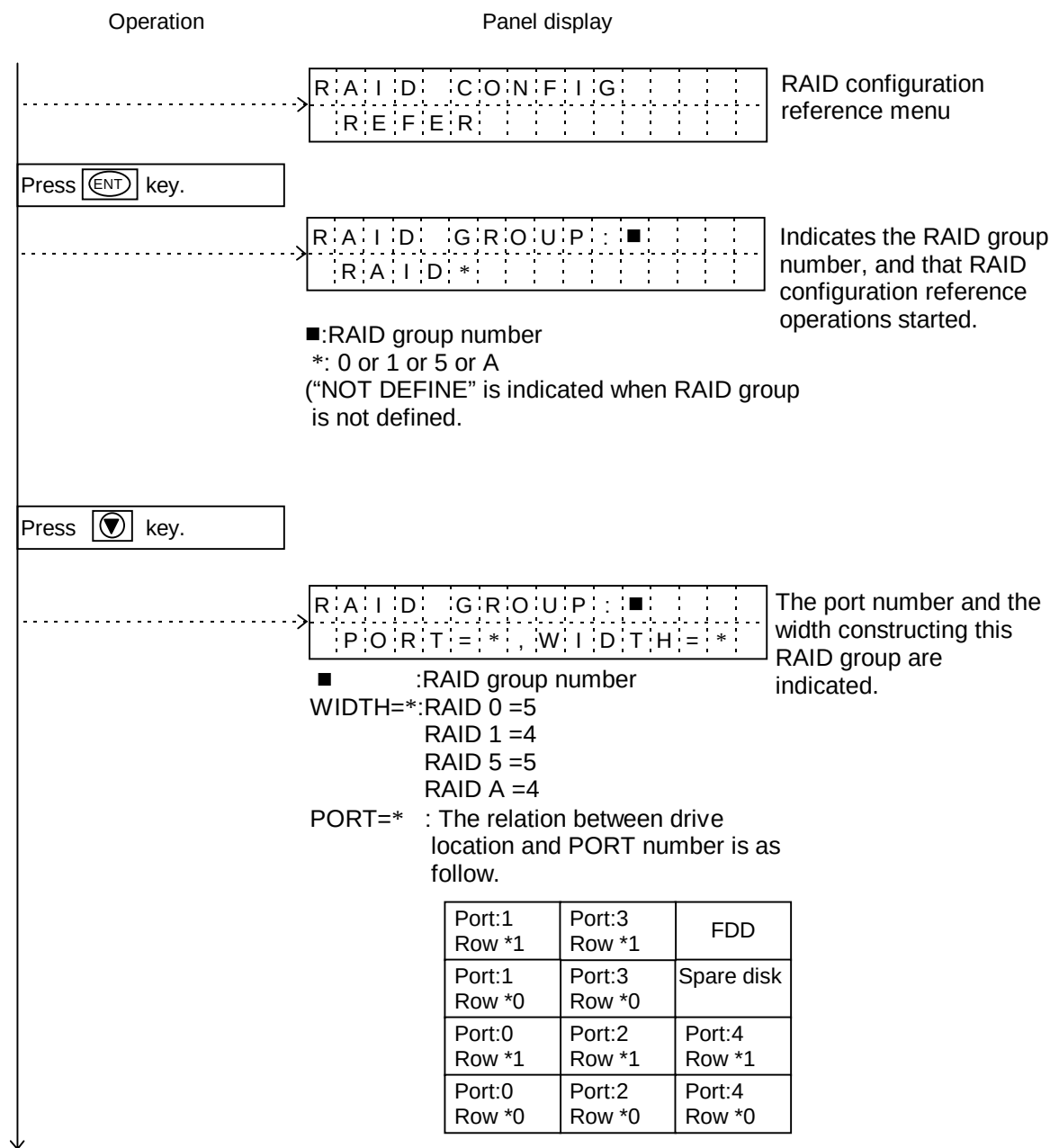


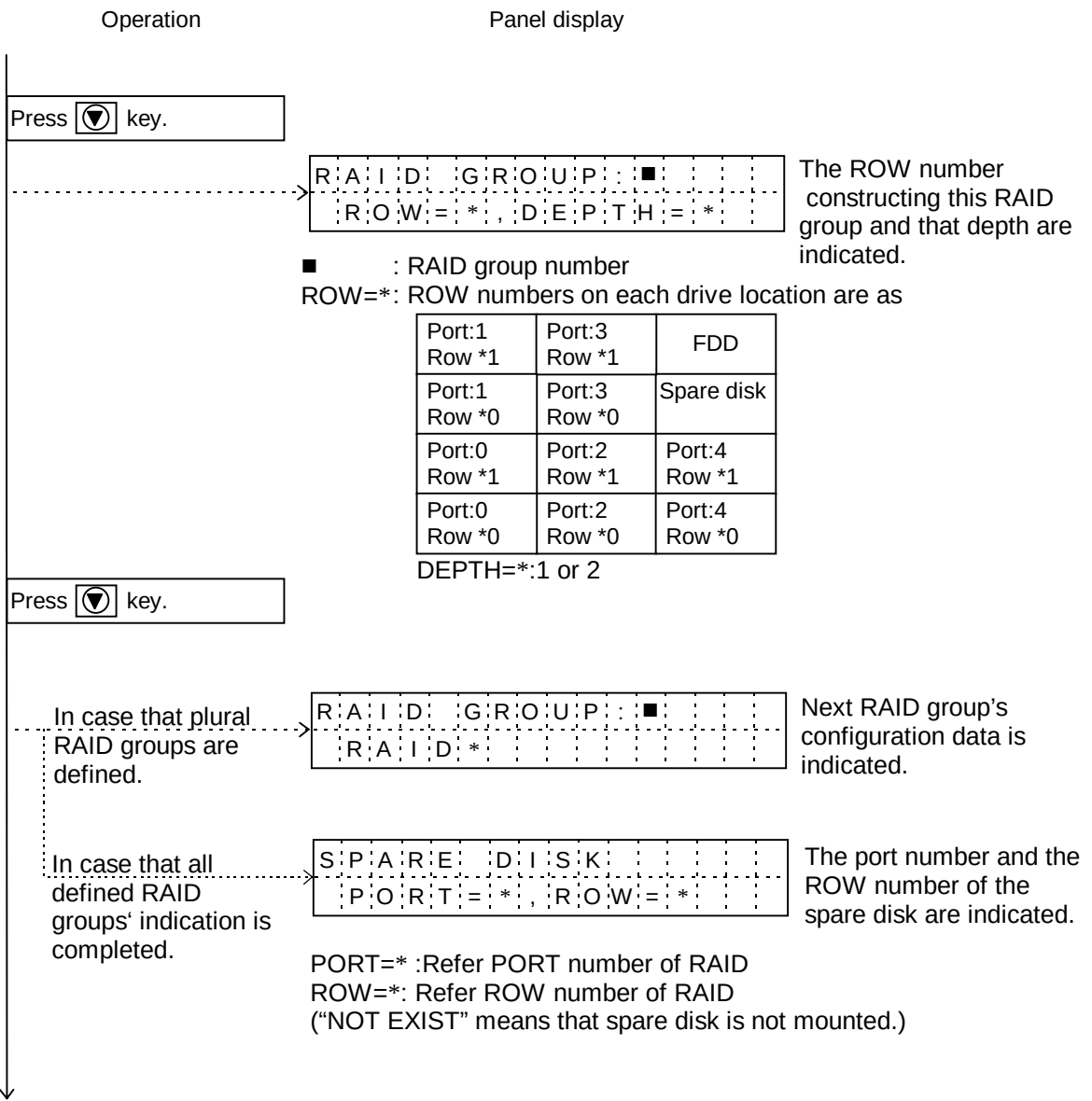
Notice : When changing the data disk configuration, be sure to start from re-definition of the RAID group. Accordingly, the stored data will be lost. So be sure to create a back up copy of the data when the configuration is changed.

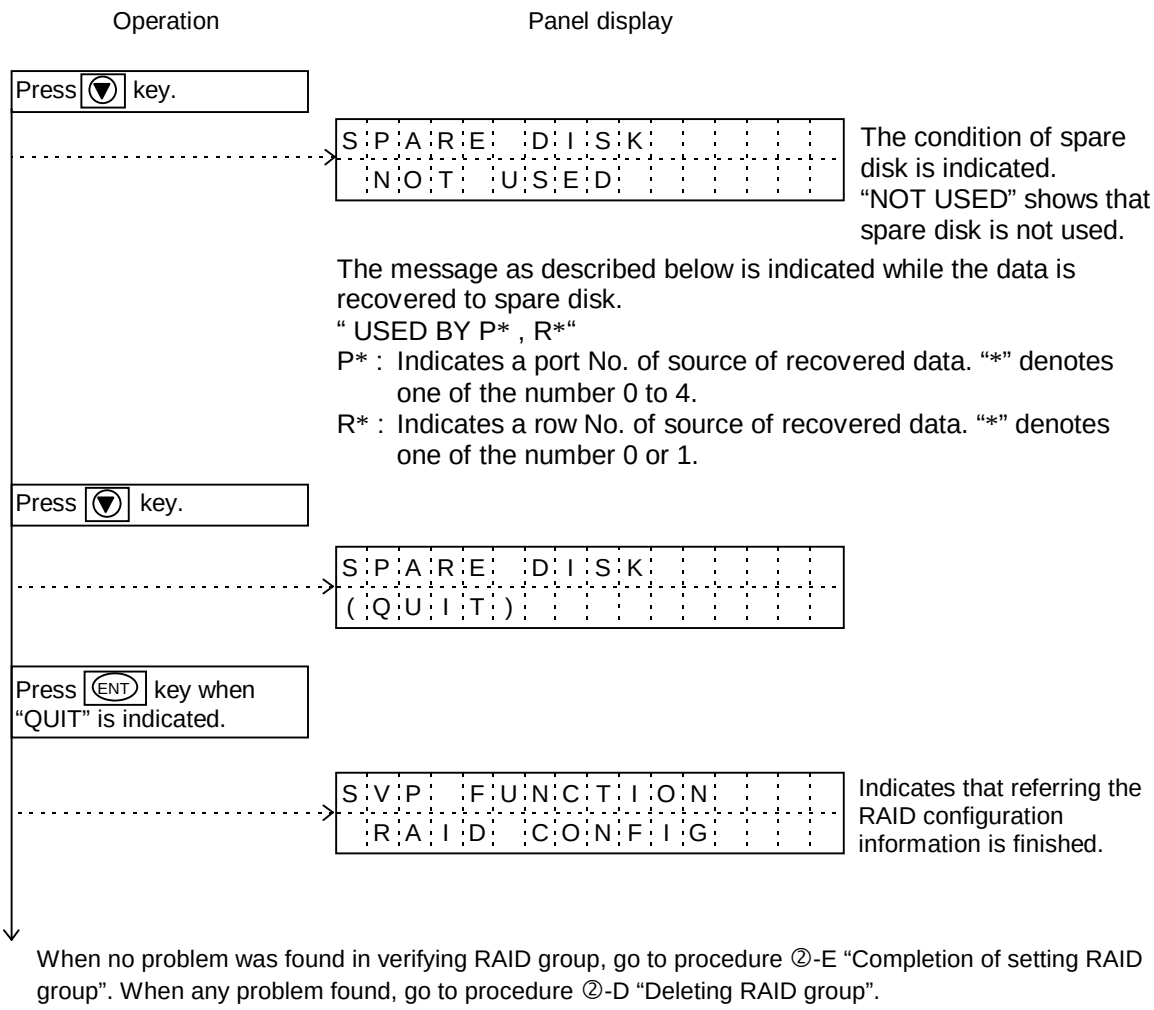
[Procedure②-A] Preparing of setting RAID group



[Procedure②-B] Verifying RAID group





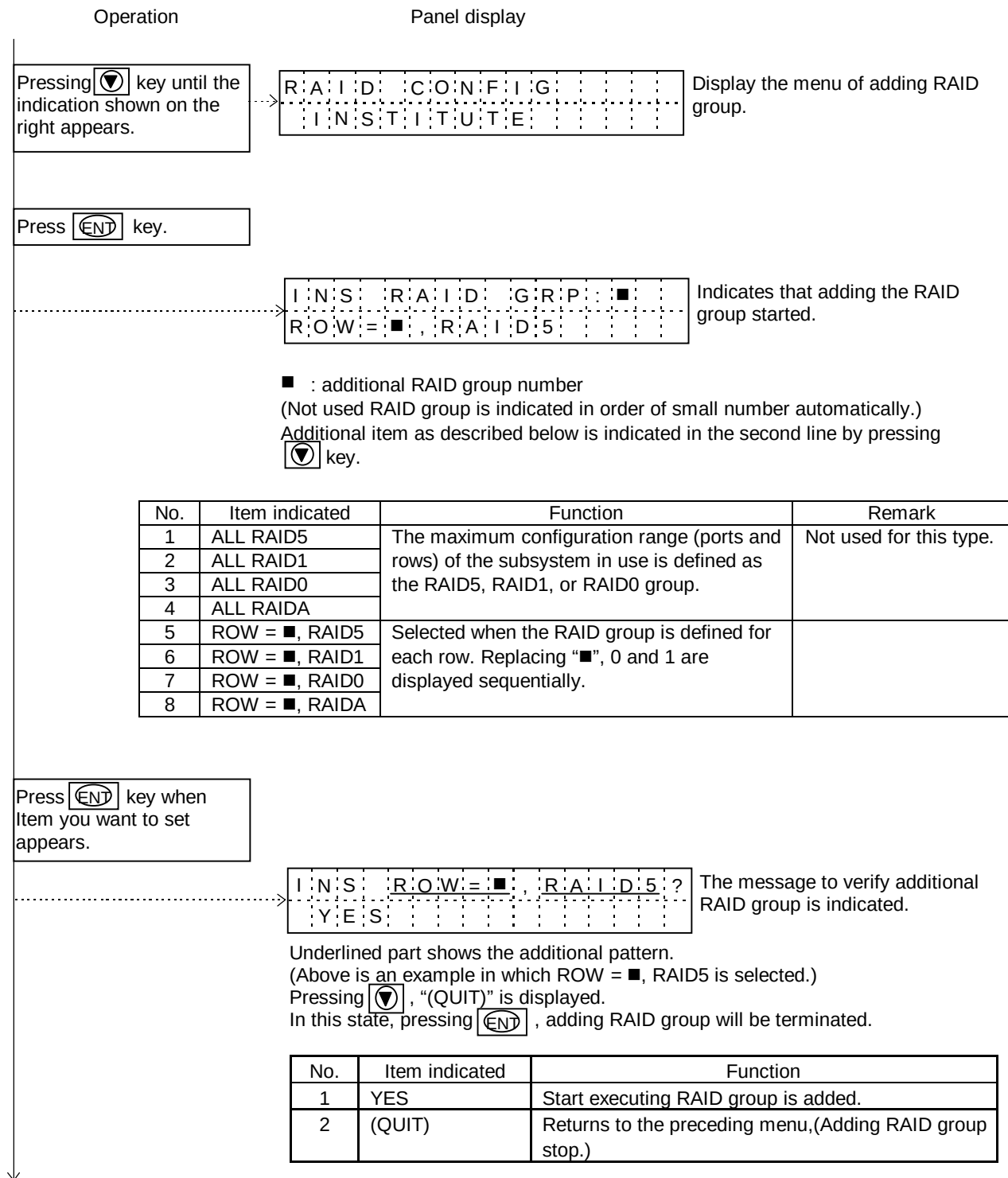


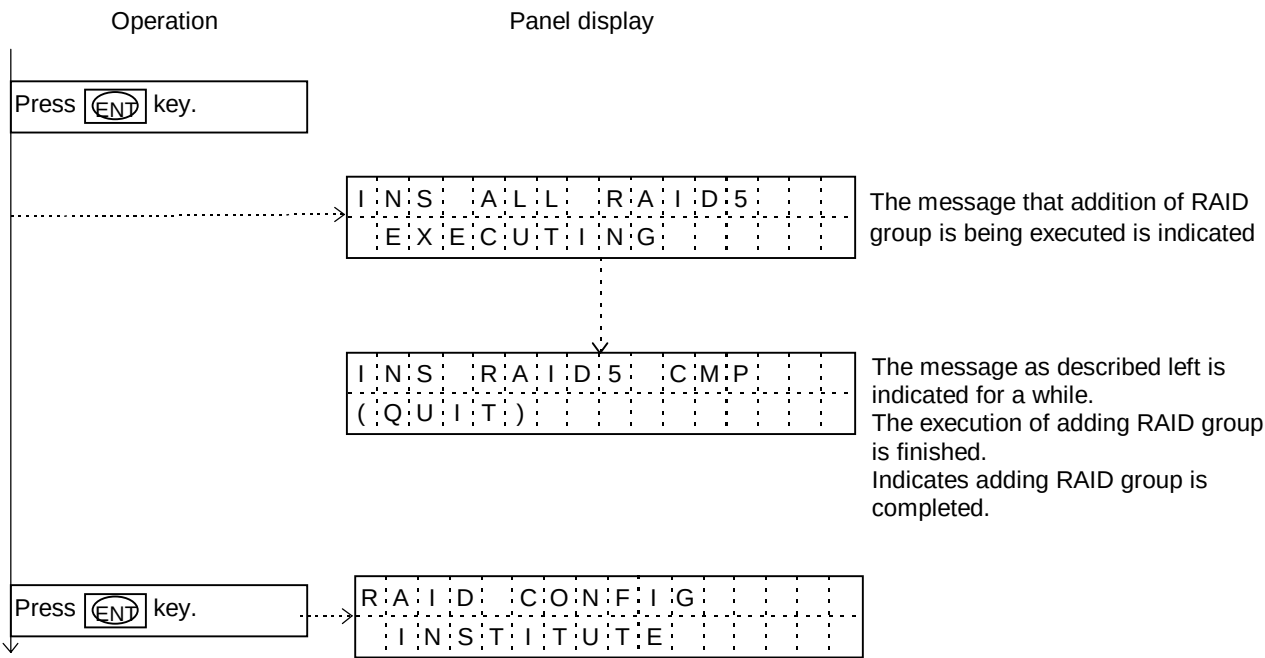
Operation for defining the RAID5 differs depending on whether the version of Micro_Disk is 0304** (** is optional) or earlier, or 0305** (** is optional) or later.

Confirm the version of Micro_Disk and operate in the way corresponds to it. (In the case of RAID0, RAID1 and RAIDA the operation is the same irrespective of the version of Micro_Disk.)

[Procedure②-C] Setting RAID group

(1) RAID group setting when the version is 0304** (**is optional) or earlier

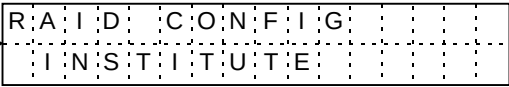
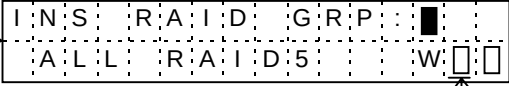
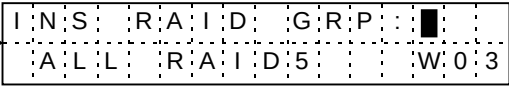


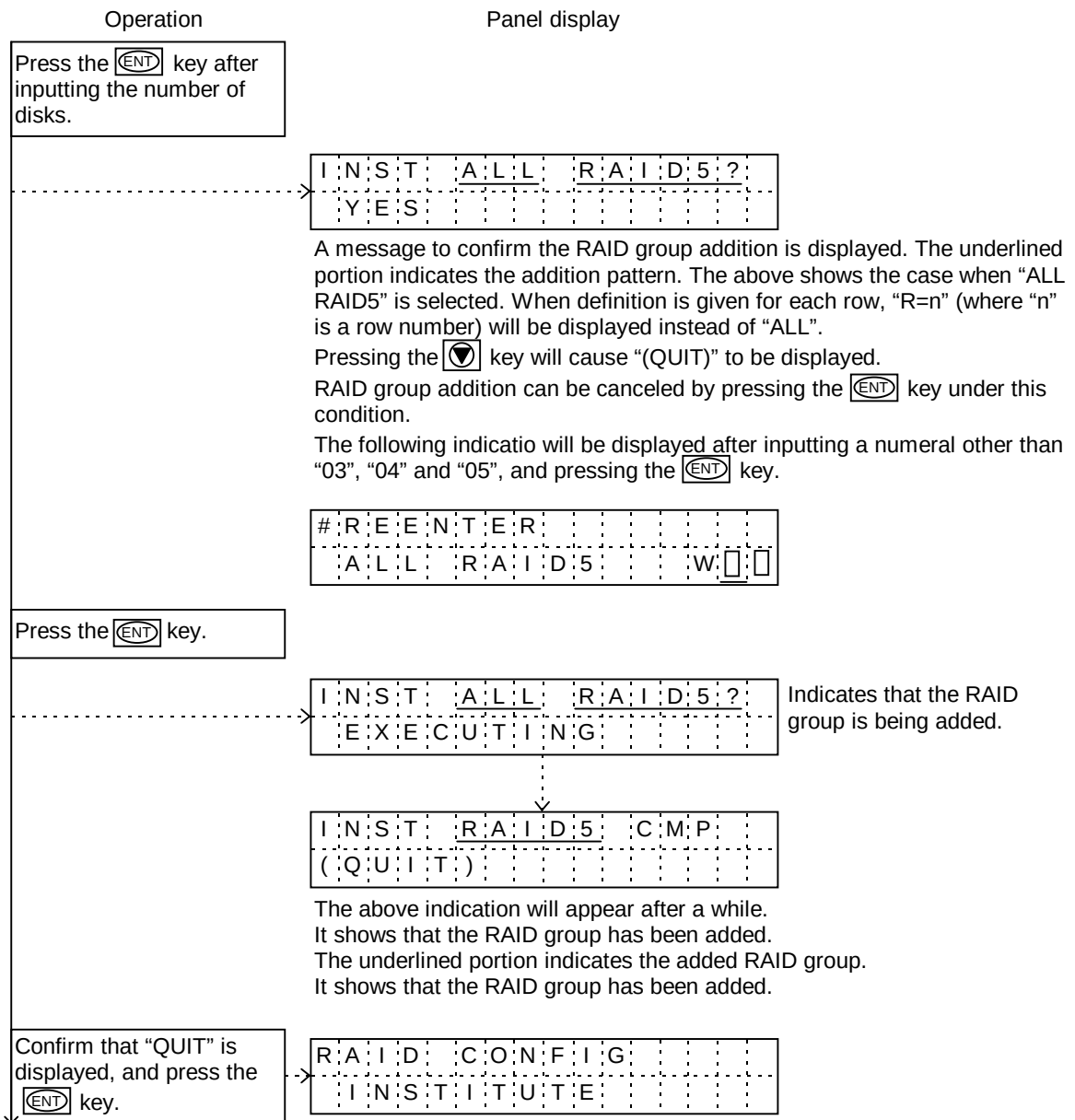


Go to procedure ②-B “Verifying RAID group”
Note : Set RAID group for each ROW when you want to set it for each ROW.

(2) RAID group setting when the version is 0305** (** is optional) or later

When Micro_Disk Ver.0305** (** is optional) or later is used, the number of disks including the parity disk must be input when defining RAID5. (This is not necessary for RAID0, 1 and A.)

Operation	Panel display																								
Press the  key repeatedly until the indication shown on the right appears.	 RAID group adding function menu is displayed.																								
Press the  key.	 Displays that RAID group adding operation has started. “<u> </u>” (underline) denotes the position to input the number of the disks including the parity disk. ■ : Displays the number of the RAID group to be added. (Reserved RAID groups are automatically displayed from a lower number.) On the second line, the following addition patterns are displayed sequentially by pressing the  key. <table border="1"> <thead> <tr> <th>No.</th> <th>Displayed pattern</th> <th>Purpose of use</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>ALL RAID5 W□□</td> <td rowspan="4">Selected when the maximum subsystem configuration is defined as one RAID group.</td> <td rowspan="4"></td> </tr> <tr> <td>2</td> <td>ALL RAID1</td> </tr> <tr> <td>3</td> <td>ALL RAID0</td> </tr> <tr> <td>4</td> <td>ALL RAIDA</td> </tr> <tr> <td>5</td> <td>ROW=■, RAID5 W□□</td> <td rowspan="4">Selected when the RAID group is defined for each row. Replacing “■”, 0 and 1 are displayed sequentially.</td> <td rowspan="4"></td> </tr> <tr> <td>6</td> <td>ROW=■, RAID1</td> </tr> <tr> <td>7</td> <td>ROW=■, RAID0</td> </tr> <tr> <td>8</td> <td>ROW=■, RAIDA</td> </tr> </tbody> </table>	No.	Displayed pattern	Purpose of use	Remarks	1	ALL RAID5 W□□	Selected when the maximum subsystem configuration is defined as one RAID group.		2	ALL RAID1	3	ALL RAID0	4	ALL RAIDA	5	ROW=■, RAID5 W□□	Selected when the RAID group is defined for each row. Replacing “■”, 0 and 1 are displayed sequentially.		6	ROW=■, RAID1	7	ROW=■, RAID0	8	ROW=■, RAIDA
No.	Displayed pattern	Purpose of use	Remarks																						
1	ALL RAID5 W□□	Selected when the maximum subsystem configuration is defined as one RAID group.																							
2	ALL RAID1																								
3	ALL RAID0																								
4	ALL RAIDA																								
5	ROW=■, RAID5 W□□	Selected when the RAID group is defined for each row. Replacing “■”, 0 and 1 are displayed sequentially.																							
6	ROW=■, RAID1																								
7	ROW=■, RAID0																								
8	ROW=■, RAIDA																								
Make sure that the “ <u> </u> ” (underline) is placed at the top position and enter the numeral.	<table border="1"> <thead> <tr> <th>Configuration</th> <th>Panel key pressing sequence</th> </tr> </thead> <tbody> <tr> <td>2 data disks + 1 parity disk</td> <td> → </td> </tr> <tr> <td>3 data disks + 1 parity disk</td> <td> → </td> </tr> <tr> <td>4 data disks + 1 parity disk</td> <td> → </td> </tr> </tbody> </table>  The above shows the example when the configuration of two data disks + one parity disk is set.	Configuration	Panel key pressing sequence	2 data disks + 1 parity disk	 → 	3 data disks + 1 parity disk	 → 	4 data disks + 1 parity disk	 → 																
Configuration	Panel key pressing sequence																								
2 data disks + 1 parity disk	 → 																								
3 data disks + 1 parity disk	 → 																								
4 data disks + 1 parity disk	 → 																								



Go to procedure ②-B "Verifying RAID group"

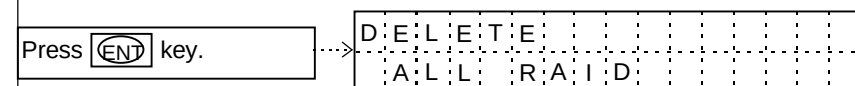
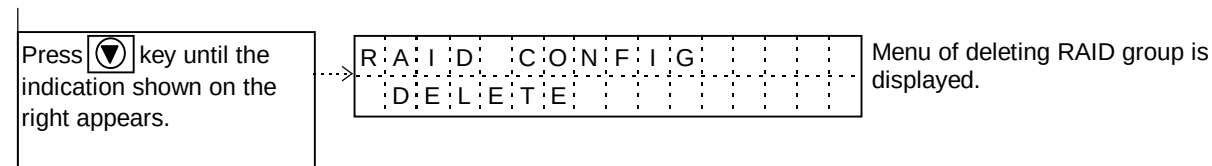
Note : Set RAID group for each ROW when you want to set it for each ROW.

[Procedure②-D] Deleting RAID group

Notice : With this operation, Logical Units are deleted, and the user's data will be lost. Be sure to make back up copy before this operation.

Operation

Panel display



Contents of the second-line indication

No.	Item indicated	Function
1	ALL RAID	Deletes all RAID group.
2	RG■ (RAID*)	Deletes appointed RAID group. (■ : RAID group No. * : RAID level)
3	(QUIT)	Returns to the preceding menu.
4	(TERMINATE SVP)	Complete the SVP operation by maintenance panel.

Note : "NO EFFECT" is indicated when no deletable RAID group exists.

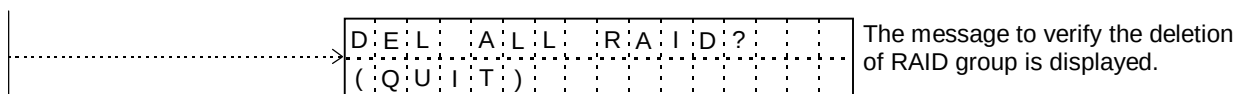


Go to ① when you want to delete all RAID groups , Go to ② when you want to delete appointed RAID group.

①Deleting all RAID groups

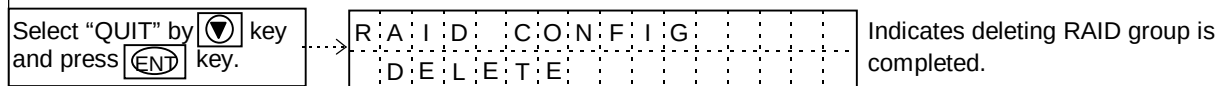
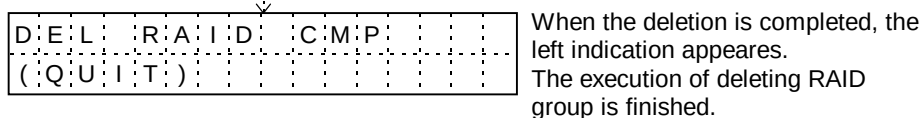
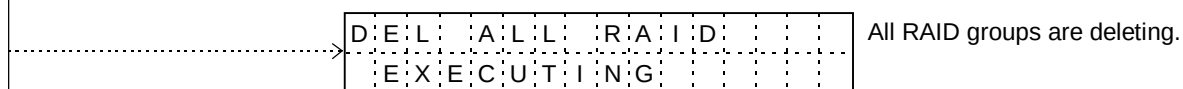
Operation

Panel display



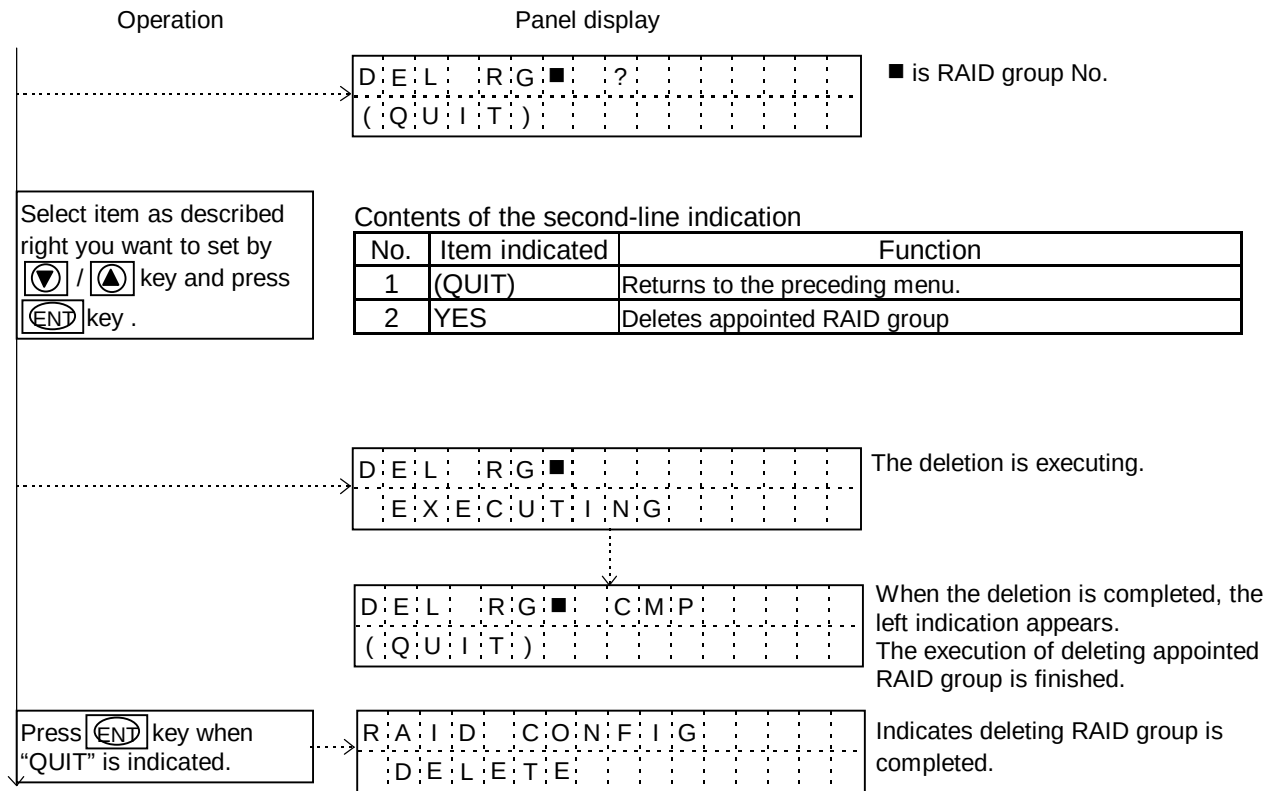
Contents of the second-line indication

No.	Item indicated	Function
1	(QUIT)	Returns to the preceding menu.
2	YES	Deletes all RAID groups.



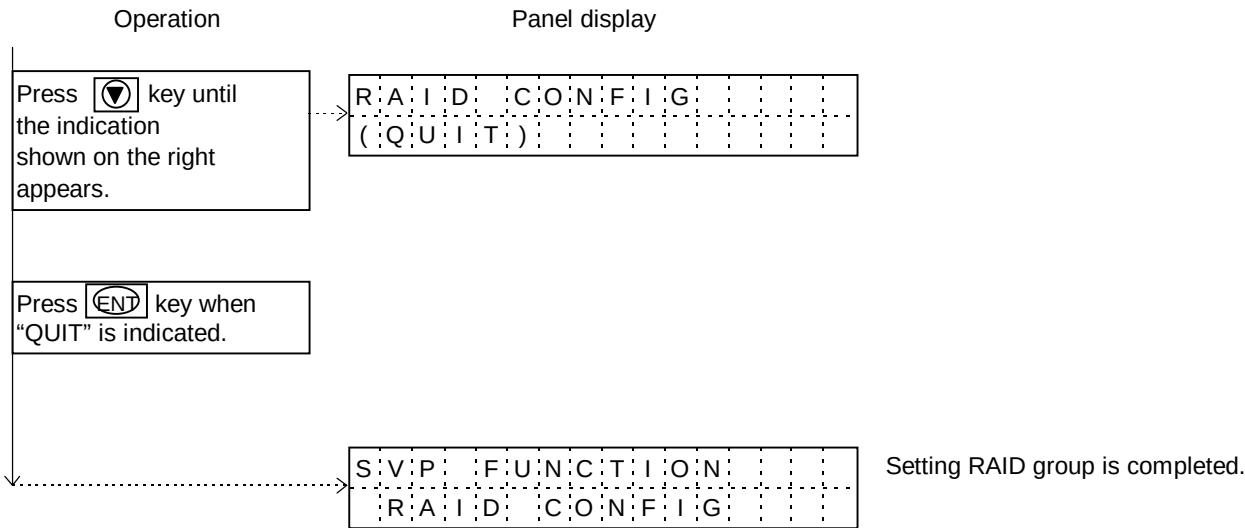
Go to procedure ②-C "Setting RAID group".

②Deleting appointed RAID group



Go to procedure ②-C "Setting RAID group".

Procedure②-E] Completion of setting RAID group



4.2.3 Setting LU

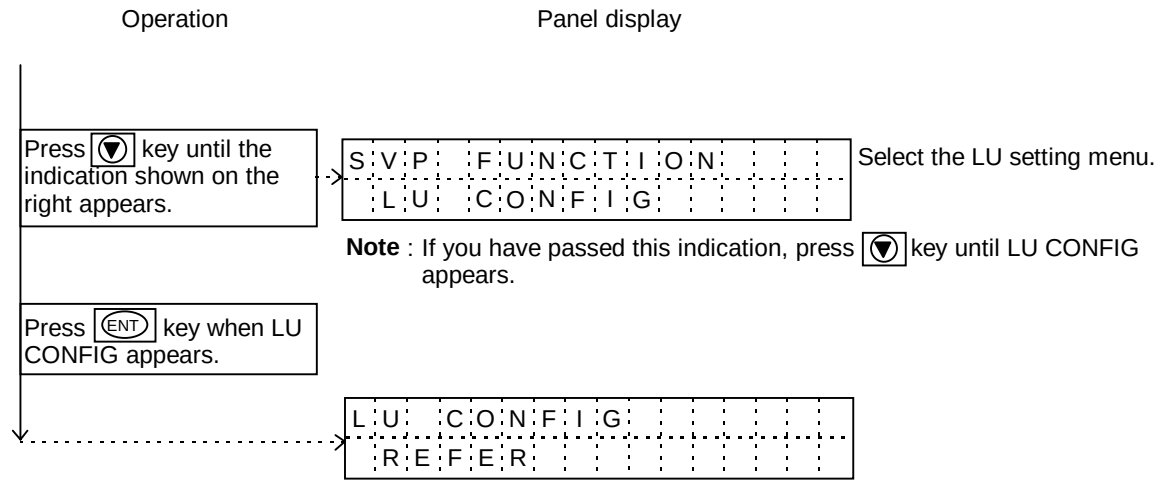
Following procedures are used to set, delete, refer, or format the LU.

This function can be used when the subsystem is ready.

Notice : All user data is lost by deleting the LU.

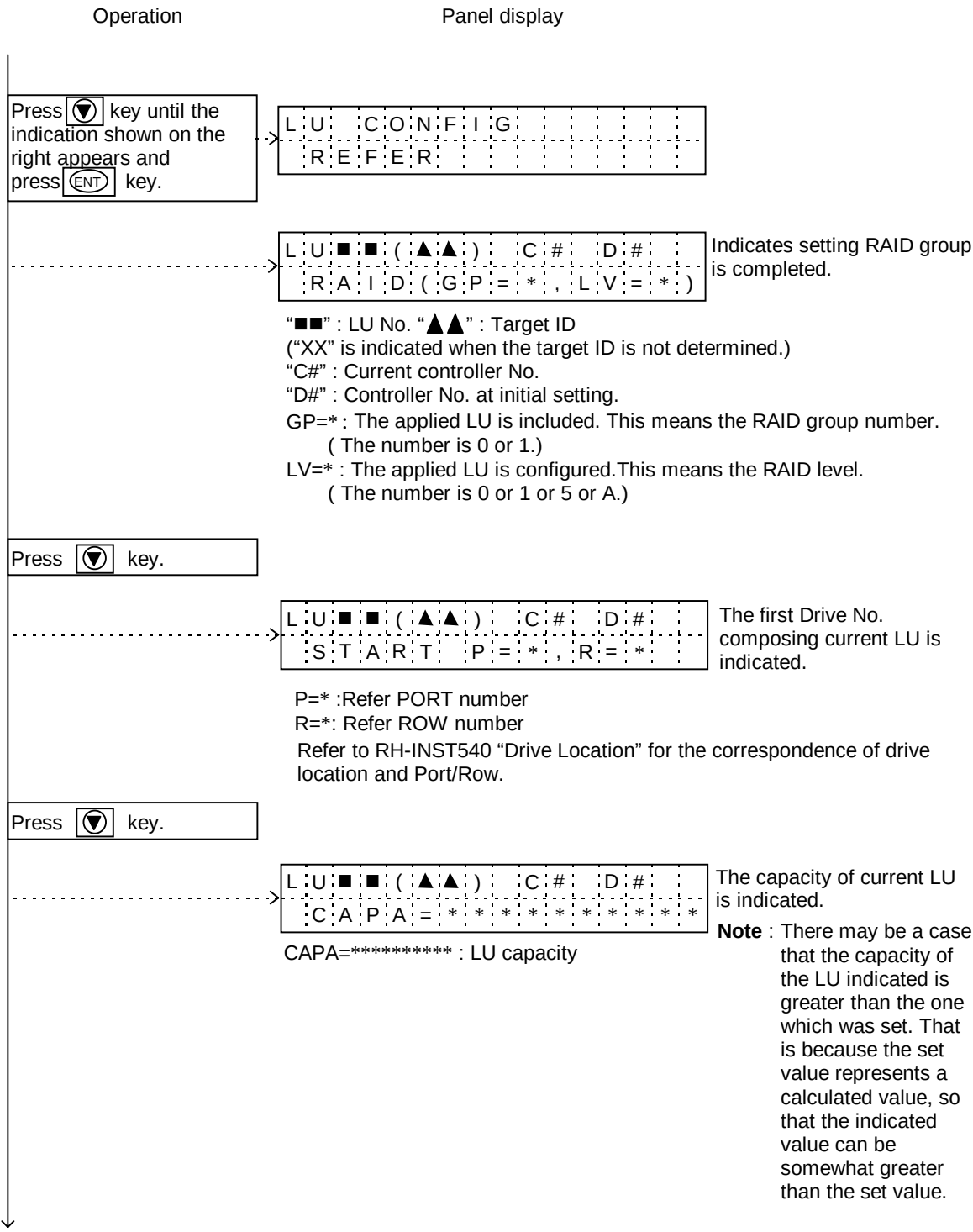
Be sure to back-up the user data before deleting the LU.

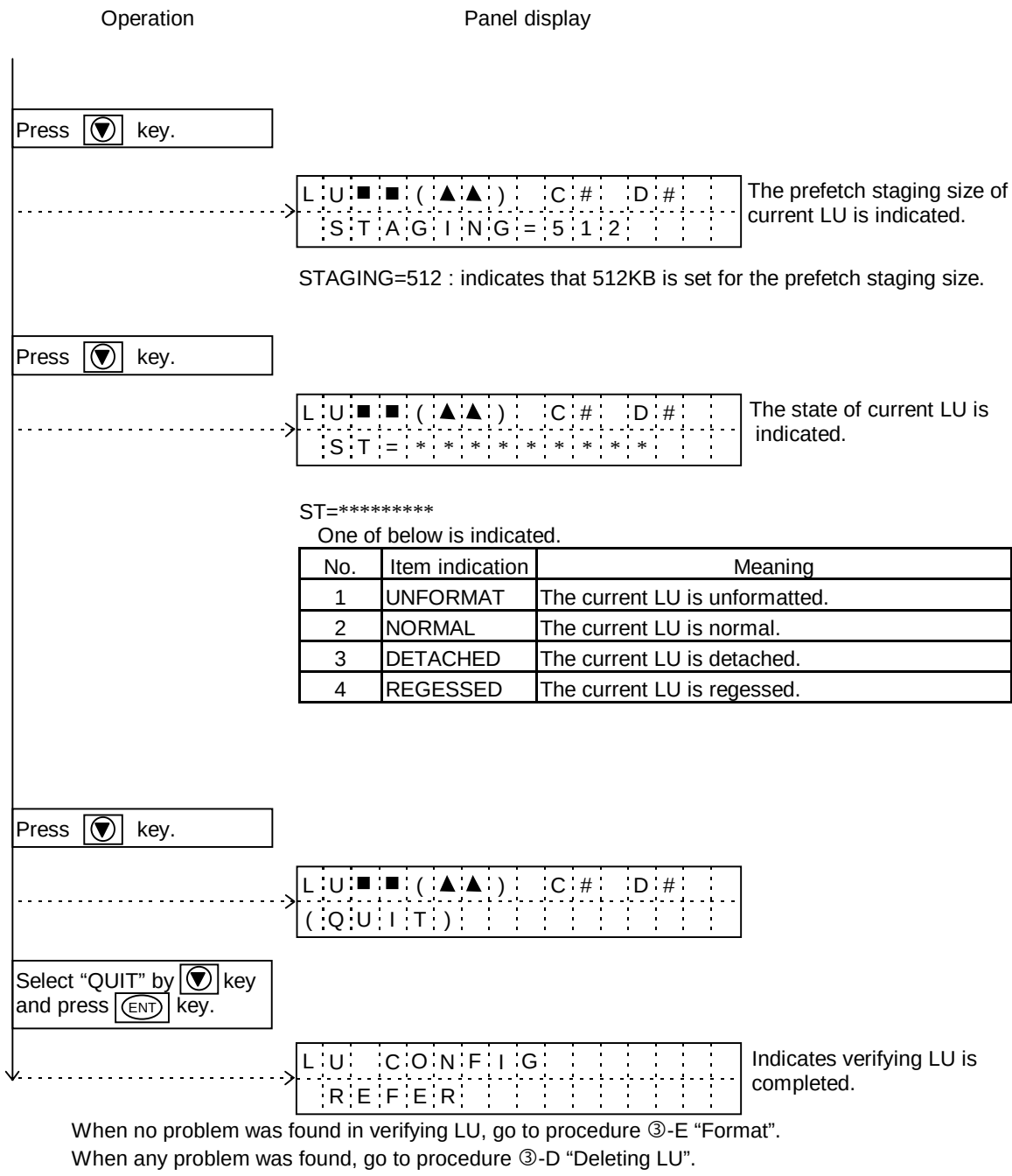
[Procedure③-A] Preparing of setting LU



When RAID group is already set, go to procedure ③-C “Setting LU”.
When changing no RAID group, go to procedure ③-D “Deleting LU”.

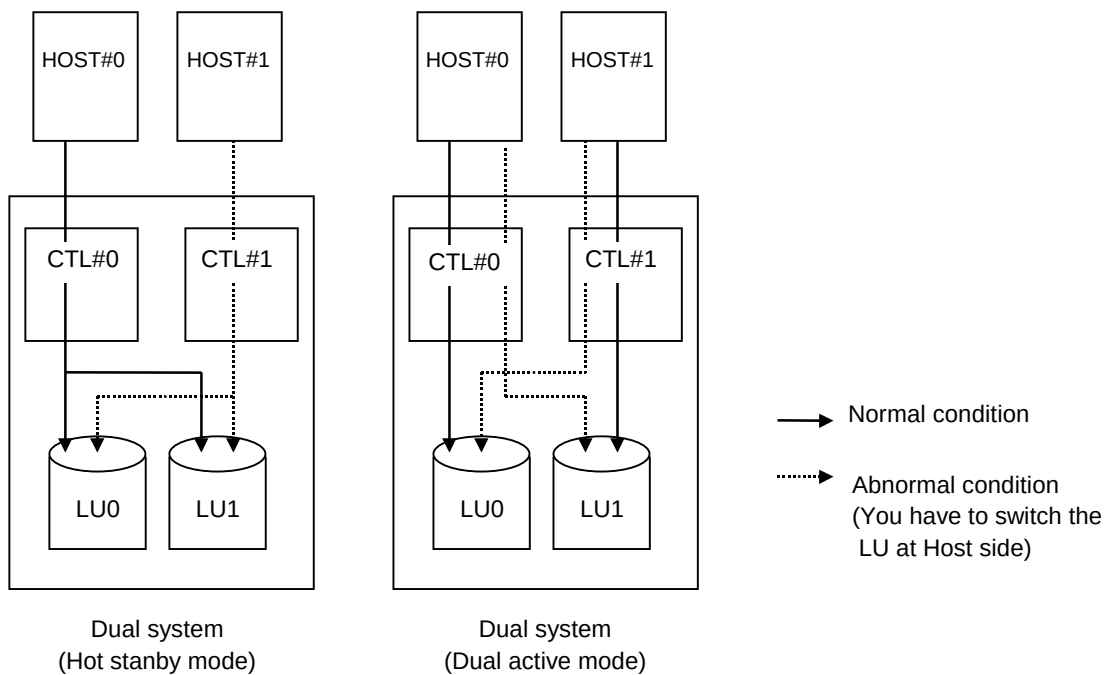
[Procedure③-B] Verifying LU





[Procedure③-C] Setting LU

Note) You have to assign service controller to set the LU when dual active mode is selected in the dual system.
Refer to the figure as described below to set the LU assigned service controller.



* The function of “Hot standby mode”.

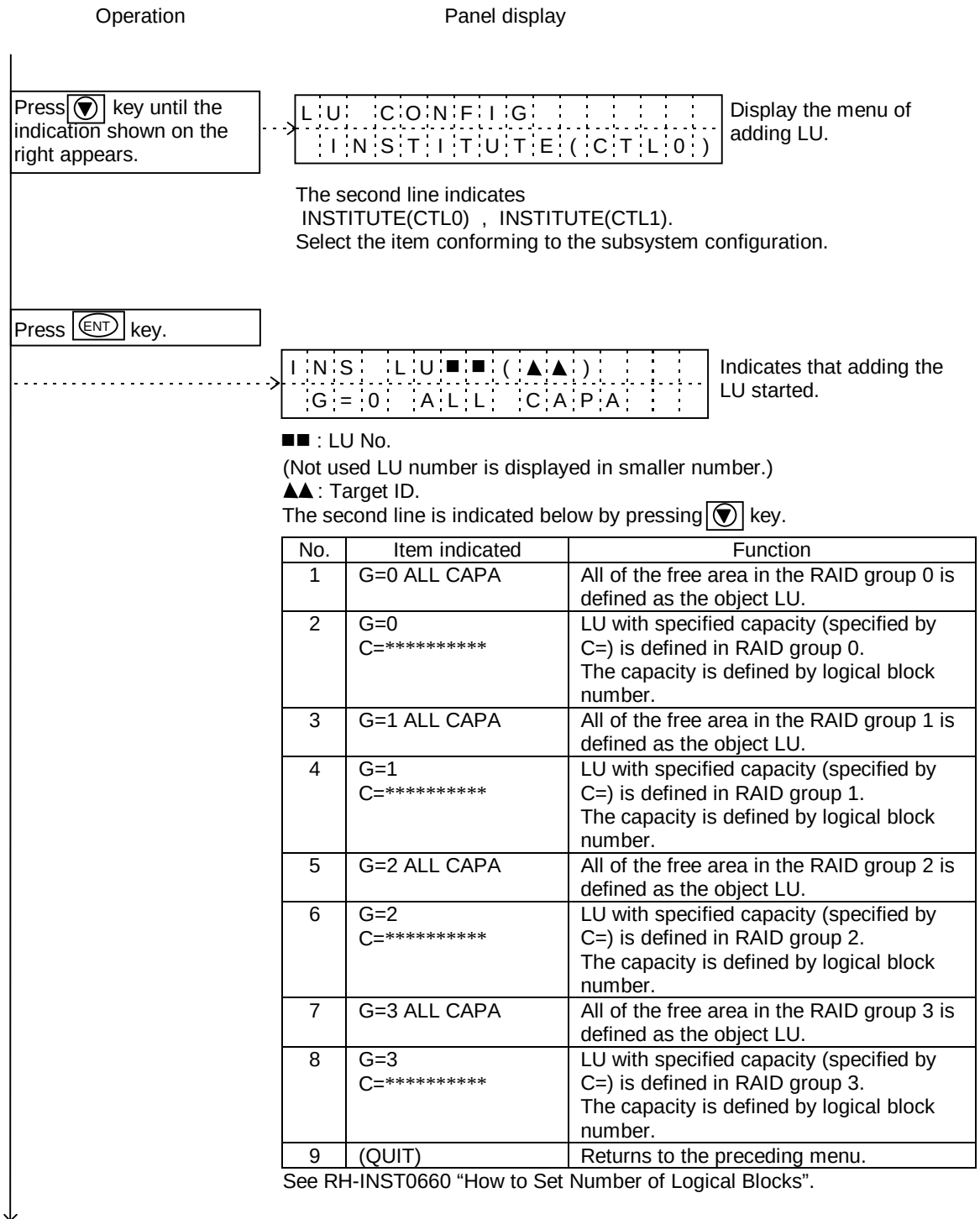
It is possible that the system is continued to execute commands by switching the direction of the commands from Host system to the other controller , if the Host system or the controller failure occurs.

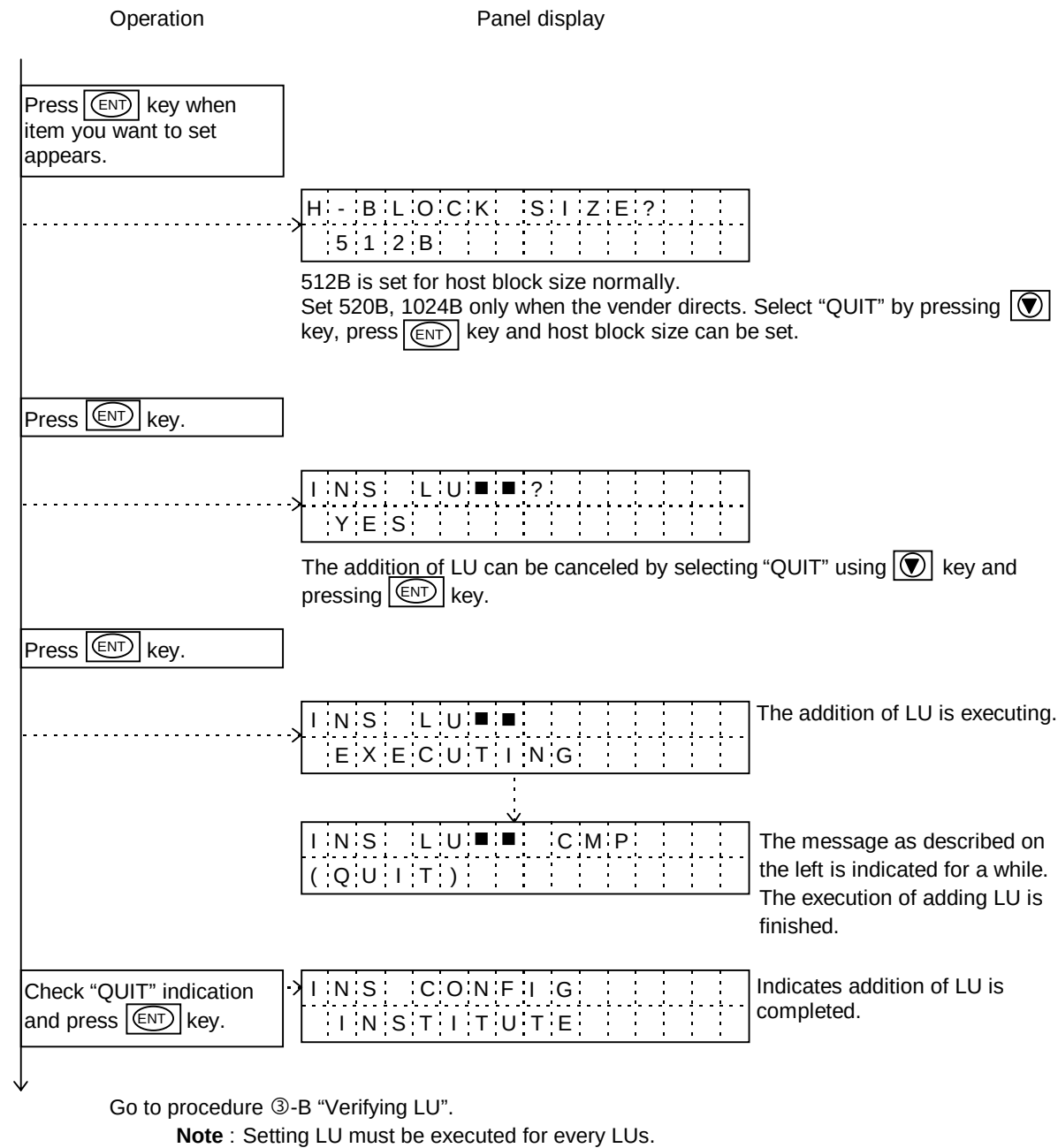
* The function of “Dual active mode”

Controller #0 and #1 are the service controller of LU#0 and #1 respectively.

In the case of example as described above, select “INSTITUTE (CTL0)” when you set LU0 and “INSTITUTE (CTL1)” when set LU1.

In case a service controller is assigned to LU#0 and #1, it is possible to access from HOST#0 and #1, however the data transmitting performance is lowered because of switching LU.





Supplement / How to Set Number of Logical Blocks

G=*

C=*****



Enter a value (number of logical blocks) here.

- (1) All RAID groups can be divided into up to 8 logical units.
- (2) Set the number of logical blocks to be set for each logical unit to multiples of the following values according to the RAID level.

RAID0	128
RAID1	128
RAIDA	256
RAID5(4D+1P)	512
RAID5(3D+1P)	384
RAID5(2D+1P)	256

- (3) When dividing each RAID group into multiple logical units, the total number of blocks in each logical units must be set to the number of logical blocks per row as shown below or less.
- (4) The following lists the number of logical blocks per row.

① When five drives are mounted on a row;

(4disks in the case of RAID1, RAID5 and RAID5 (3D+1P); 3disks in the case of RAID5 (2D+1P))

RAID configuration \ Model (Capacity)	DF-F350-A2E2 (2.0GB)	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4 (4.1GB)	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A (8.7GB)	DF-F350-A1E18 (17.8GB)
RAID0	20,200,960	40,652,160	85,085,440	174,681,600
RAID1/RAIDA	8,080,384	16,260,864	34,034,176	69,872,640
RAID5(4D+1P)	16,160,768	32,521,728	68,068,352	139,745,280
RAID5(3D+1P)	12,120,576	24,391,296	51,051,264	104,808,960
RAID5(2D+1P)	8,080,384	16,260,864	34,034,176	69,872,640

②When n drives are mounted on a row (n < 5);

- RAID0

Number of logical blocks = $m^{(*1)} \times n^{(*2)}$

- RAID1

Number of logical blocks = $m^{(*1)} \times \text{int}(n/2)^{(*3)}$

*1: Refer to the table below for m.

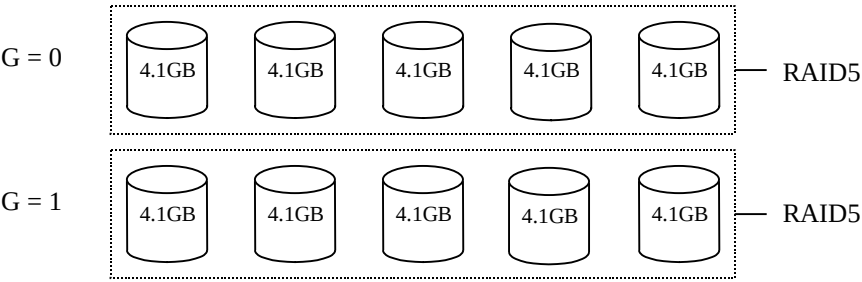
*2: n is 2 or larger in this case.

*3: int means "rounding down".

	DF-F350-A2E2	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	DF-F350-A1E18
Capacity	(2.0GB)	(4.1GB)	(8.7GB)	(17.8GB)
m	4,040,192	8,130,432	17,017,088	34,936,320

(5) Examples of the number of logical blocks set are shown below.

Example ① An example of a logical unit of disk (4.1GB 10units) is devied into 4LUs.



Groups 0 to 1 are all defined as RAID5 and all the groups are divided into eight logical units each with almost the same capacity. Each group is thus divided into two logical units.

- Group 0

Since the number of logical blocks for RAID5 is taken as 32,521,728 ($512 \times 63,519$) from subsection ① of (4), the result becomes $63,519 \div 2 \doteq 31,760$.

Thus, enter the following.

LU0: G=0

C=16,261,120 ($512 \times 31,760$)

LU1: C=16,260,608 ($512 \times (63,519-31,760)$)

- Groups 1

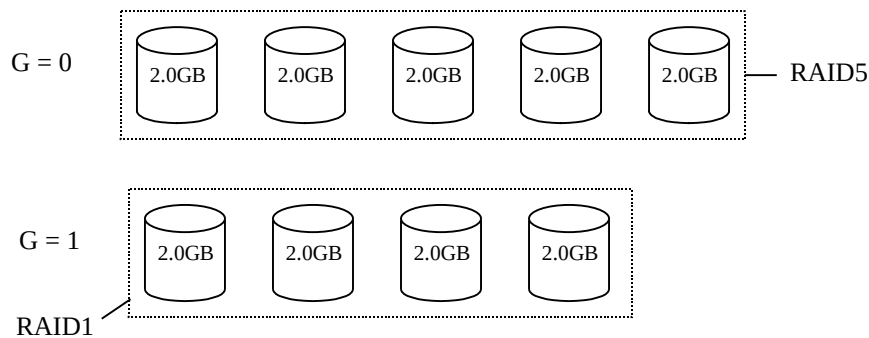
Enter LU2 to LU3 in the same way as for Group 0.

LU2 : G=1

C=16,261,120

LU3 : C=16,260,608

Example ② An example of a logical unit of disk (2.0GB 9units) is devied into 5LUs.



The following shows an example in which a mixture of different RAID levels is used between Group 0 and 1, and each group is divided into logical units with a capacity different from each other.

- Group 0

Since the number of logical blocks for RAID5 is taken as 16,160,768 ($512 \times 31,564$) from subsection ① of (4), Group 0 is divided into three LUs as shown below.

Enter the following.

LU0 : G=0

C=800,768($512 \times 1,564$)

LU1 : C=5,120,000($512 \times 10,000$)

LU2 : C=10,240,000($512 \times (31,564-1,564-10,000)$)

- Group 1

Since the number of logical blocks for RAID1 is calculated as $4,040,192 \times \text{int}(4/2) = 8,080,384$ ($128 \times 63,128$) from subsection ② of (4), Group 1 can be divided into two LUs as shown below.

Enter the following.

LU3 : G=1

C=2,960,384($128 \times 23,128$)

LU4 : C=5,120,000($128 \times (63,128-23,128)$)

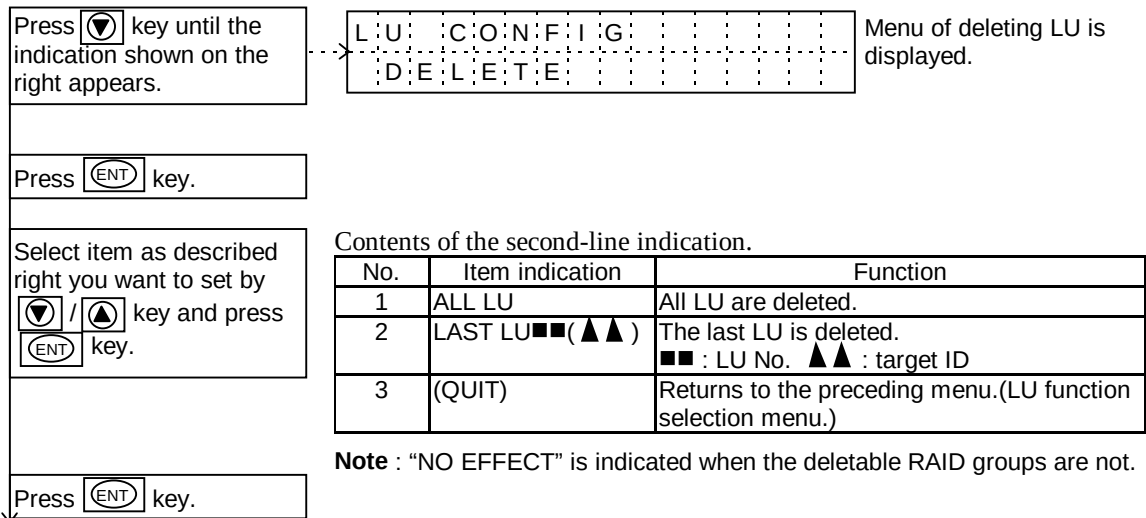
[Procedure③-D] Deleting LU

Note : All user data is lost by deleting the LU.

Be sure to back-up the user data before deleting the LU.

Operation

Panel display



In case of deletion of all LU, go to ①.

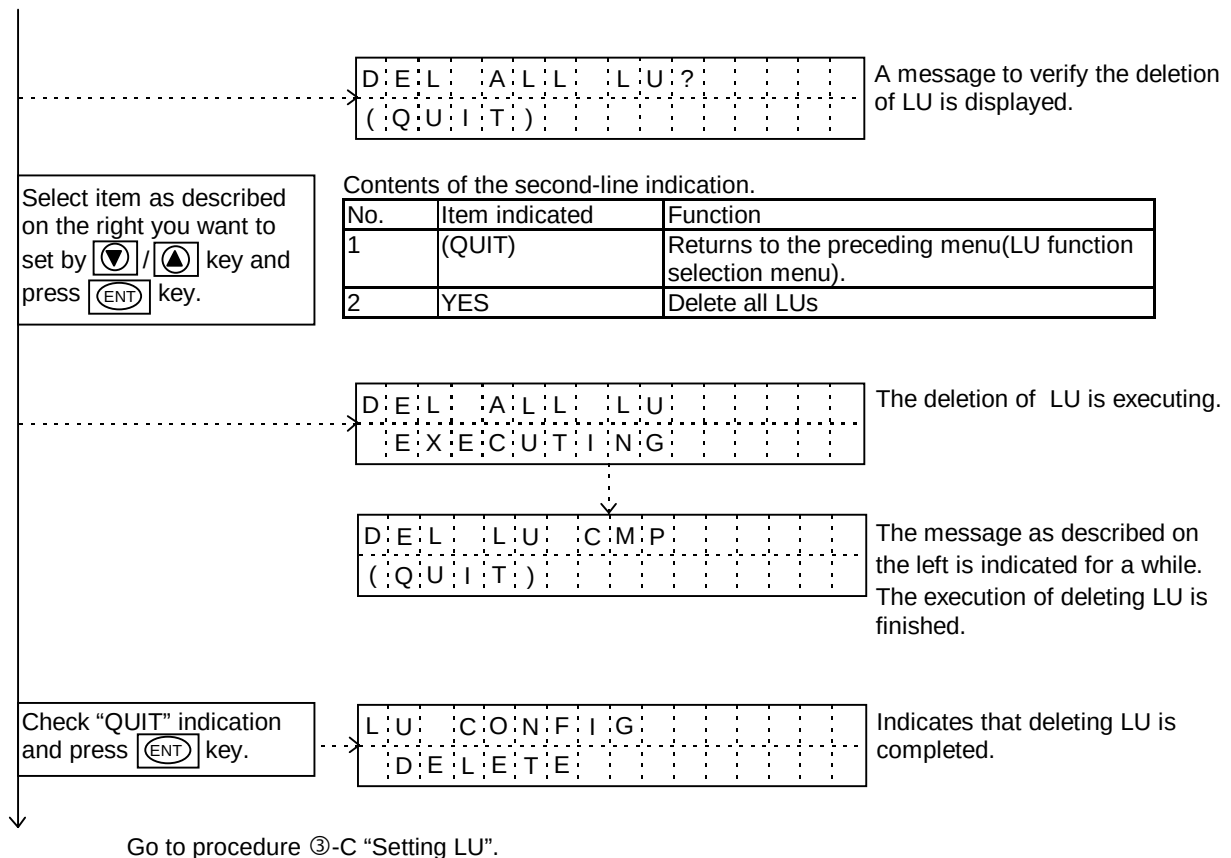
In case of deletion of the last LU, go to ②.

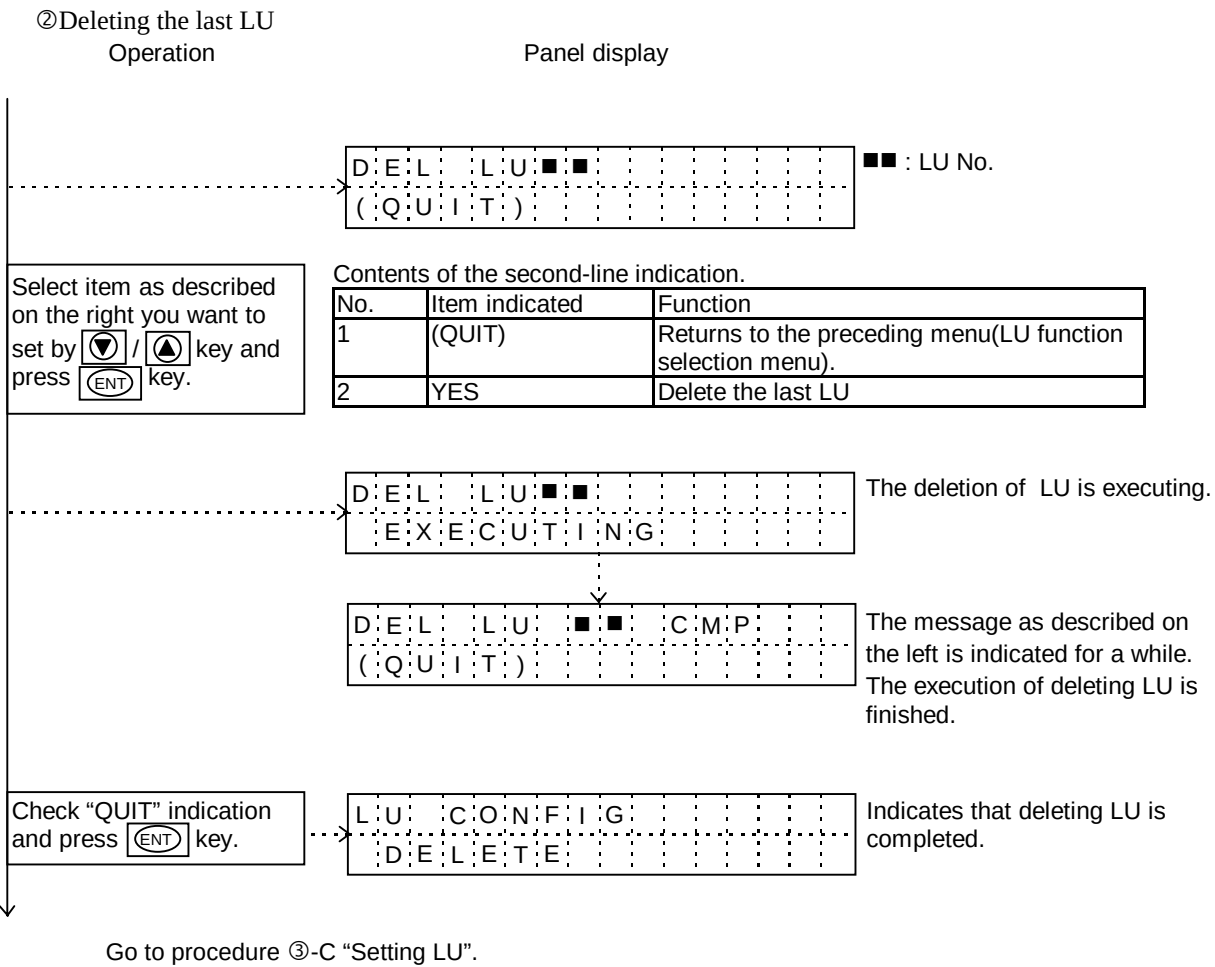
To cancel this operation menu, choose QUIT.

①Deleting all LU

Operation

Panel display



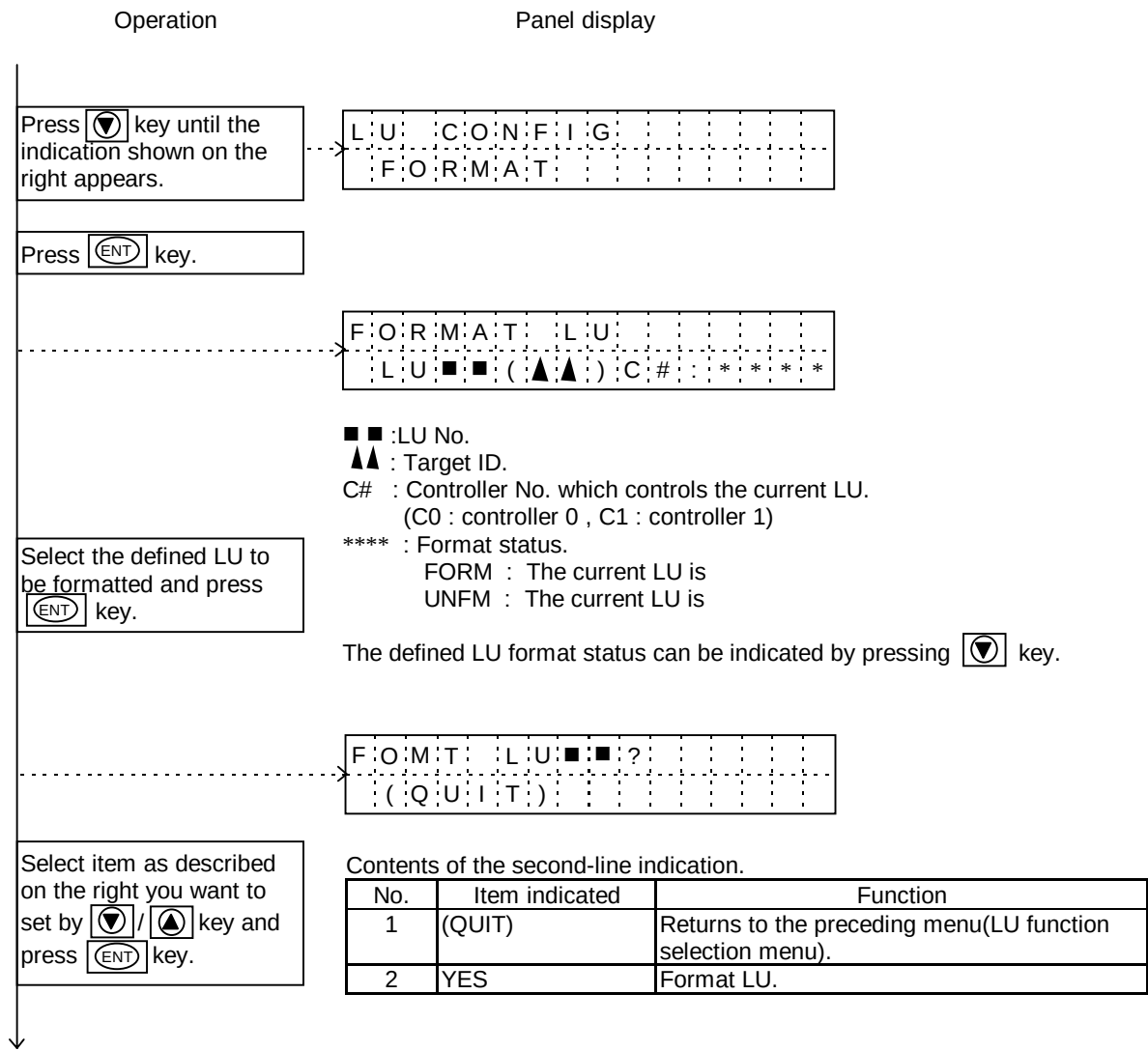


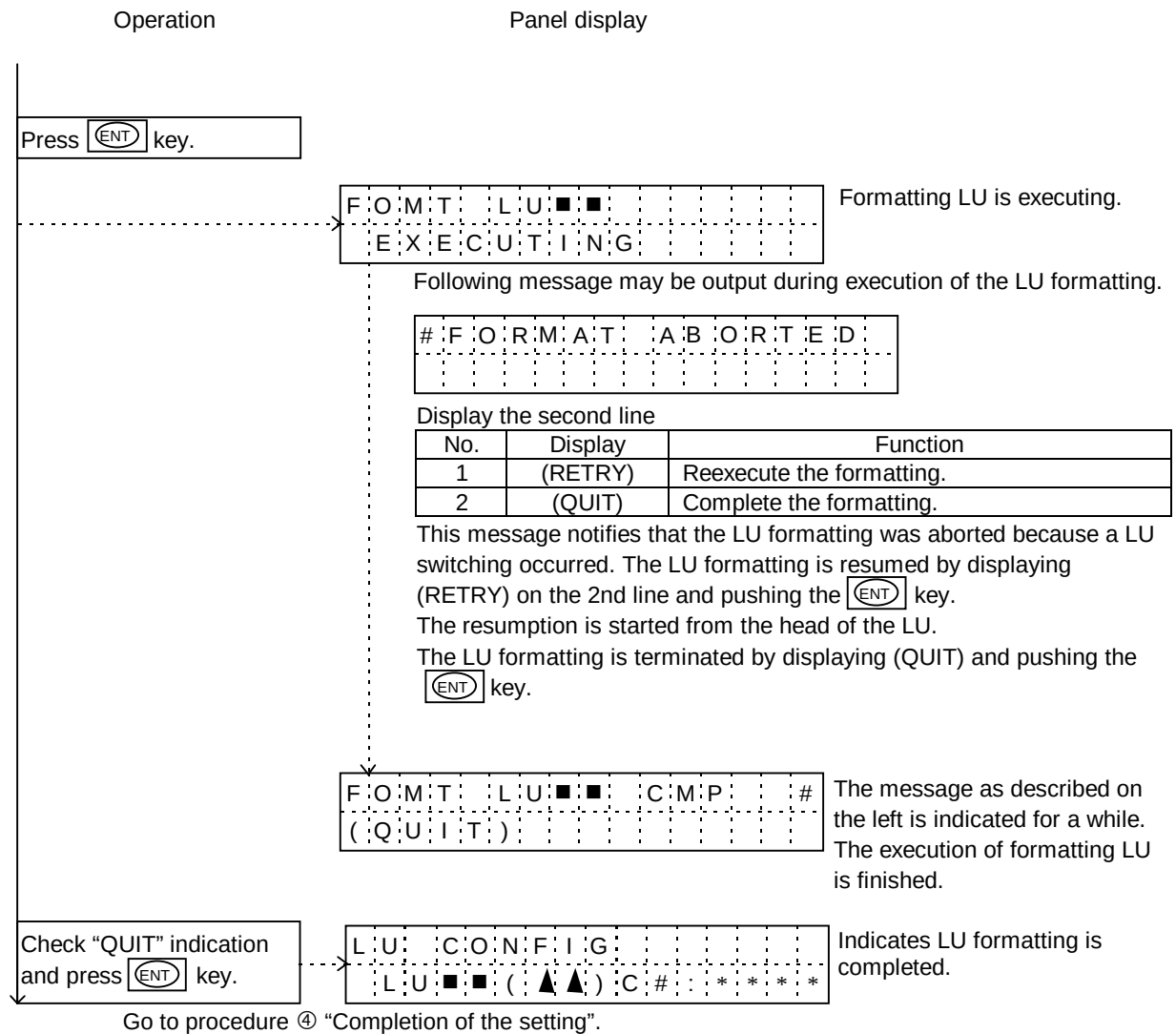
[Procedure③-E] Formatting

Notice : Note that user data will be lost by formatting the formatted LU.

Besides, be sure to execute the LU formatting for each set LU. When the microprogram of version 0304 or later is used, read/write access from the upper device is possible to the LUs other than that being formatted. Accordingly, the formatting for the LU newly added can be executed while executing usual jobs after the addition of the row(s) following the procedures explained on pages RH-OPTION0230 - 0320.

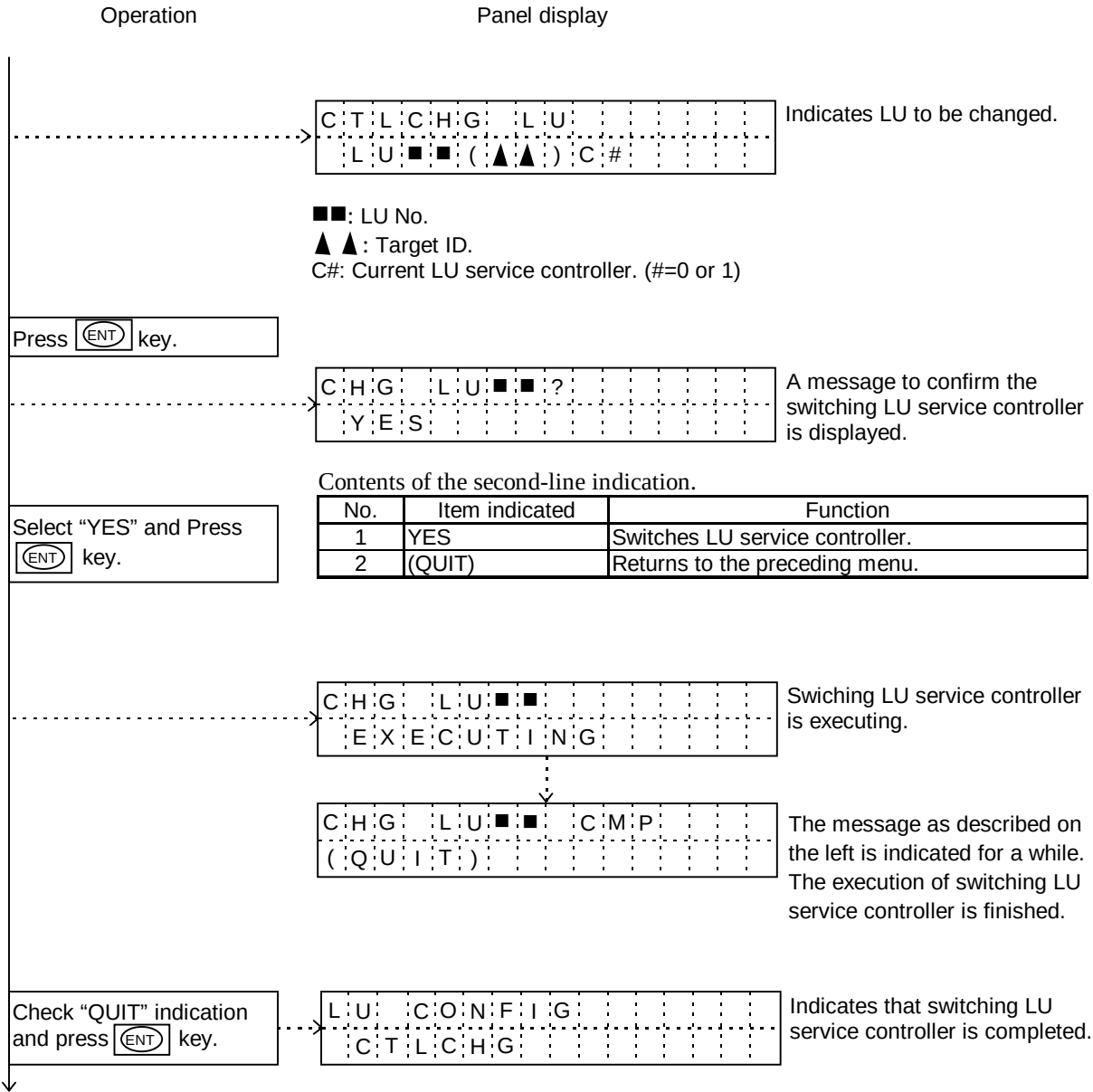
However, a reexecution is needed because the LU format is canceled when the subsystem receives a SCSI reset from the upper device.





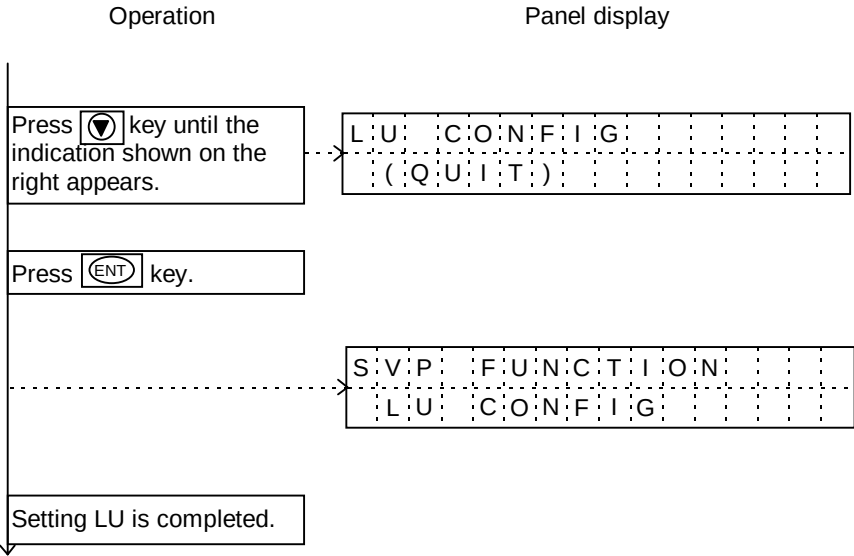
[Procedure③-F] Switching LU service Controller

Note : This function can be used when dual active mode in the dual system is set.



Note : Turn on the power of the subsystem again to make valid switching LU service controller.

[Procedure④] Completion of the setting



LU setting for dual controller configuration

In the case of dual controller configuration(Dual active mode), each LU has to be allocated to a controller which controls that LU in the LU setting operation.

But in the case of dual controller configuration(Hot standby mode), all LU are automatically allocated to the controller #0. (When one of the controllers is blocked, all LU are automatically allocated to the other controller.)

4.2.4 Setting other parameter

The menu items and the use are shown below. Refer to PANEL chapter (PANEL0340) to change the parameter shown below. The function shown below can be used when the subsystem is ready and the LU#0 is already defined.

No.	Menu item	Use	Description	Setting before shipment
1	RAID CONFIG	RAID configuration information reference/setting menu	① Reference to RAID configuration information ② Definition of RAID group ③ Deletion of RAID group	
2	LU CONFIG	LU configuration information reference/setting menu	① Reference to LU configuration information ② Definition of LU ③ Deletion of LU ④ Formatting of LU ⑤ Switching LU service controller	
3	SYSTEM OPT (CUR)	System option setting (Only a current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time	
	SYSTEM OPT (SVD)	System option setting (A saved value and current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time ⑨ Setting of the job time-out limit ⑩ Setting of the number of detections in the execution of the reselection time-out ⑪ Setting of the TRESPASS mode (*1)	
4	DRIVE MAINTEN	Drive maintenance menu	① Instruction of drive detaching ② Instruction of drive recovery ③ Reference to drive data recovery status ④ Drive self diagnosis ⑤ Parity matching check ⑥ ECC check ⑦ LA check ⑧ Drive format ⑨ Recovery of system information ⑩ Reference of the disk failure statistical information.	

*1 : This menu is displayed only when ALTERNATE PATH3 has been set by SPECIAL CONNECT of the system parameter.

No.	Menu item	Use	Description	Setting before shipment
5	MICRO VER/REV	Microprogram version/revision numbers reference menu	① Reference to microprogram version/revision	
6	GATHERING (CTL0)	Gathers information of the controller #0 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
7	GATHERING (CTL1)	Gathers information of the controller #1 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
8	MEMORY MAINT	Memory content reference/update menu	① Reference/update of memory content	
9	RECV ERR INFO	Error display of recovery when the power is on	① Displays the errors occur during recovery operation performed while power is on	
10	PIN INFO	Display of PIN existence of every LU	① Display of PIN data existence	
11	WARNING INFO	Display of unrecovered warning information	The current warning information is indicated	
12	CLEAR LOG(CT0)	Clearing log information of controller #0	Log information related controller and host I/F is cleared	
13	CLEAR LOG(CT1)	Clearing log information of controller #1	Log information related controller and host I/F is cleared	
14	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

5. Changing the Configuration

5.1 Shifting to Hot Standby from Dual Active

Shifting to Hot Standby from Dual Active while the controller is blocked cannot be performed. Perform the shifting after the blockage is recovered. If PIN segment exists, shifting cannot be performed. Perform the shifting after the PIN segment is recovered.

To see if PIN segment exists, refer to PANEL chapter (PANEL0690 (8)).

- (1) Before turning the power on, set DIP switch No.4 as Figure 5.1.1.

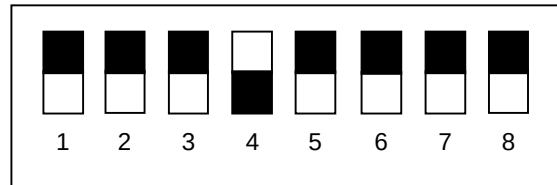
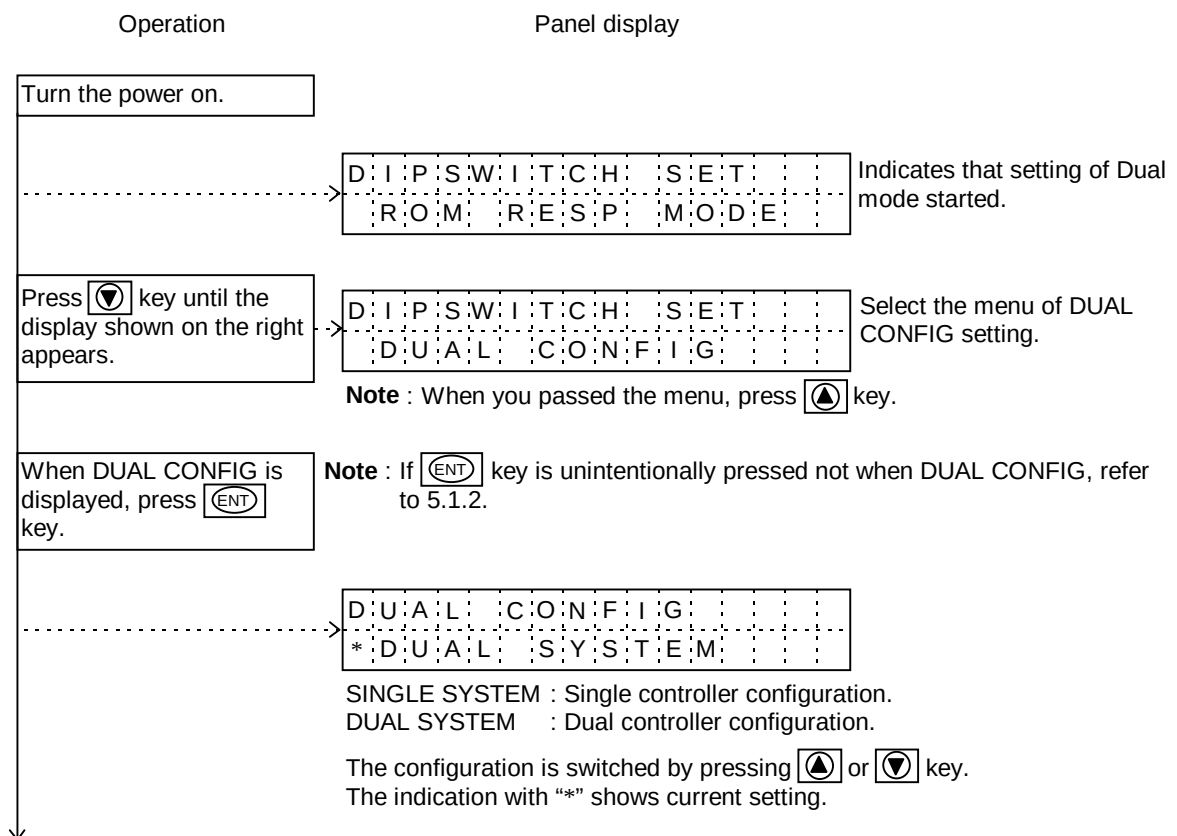
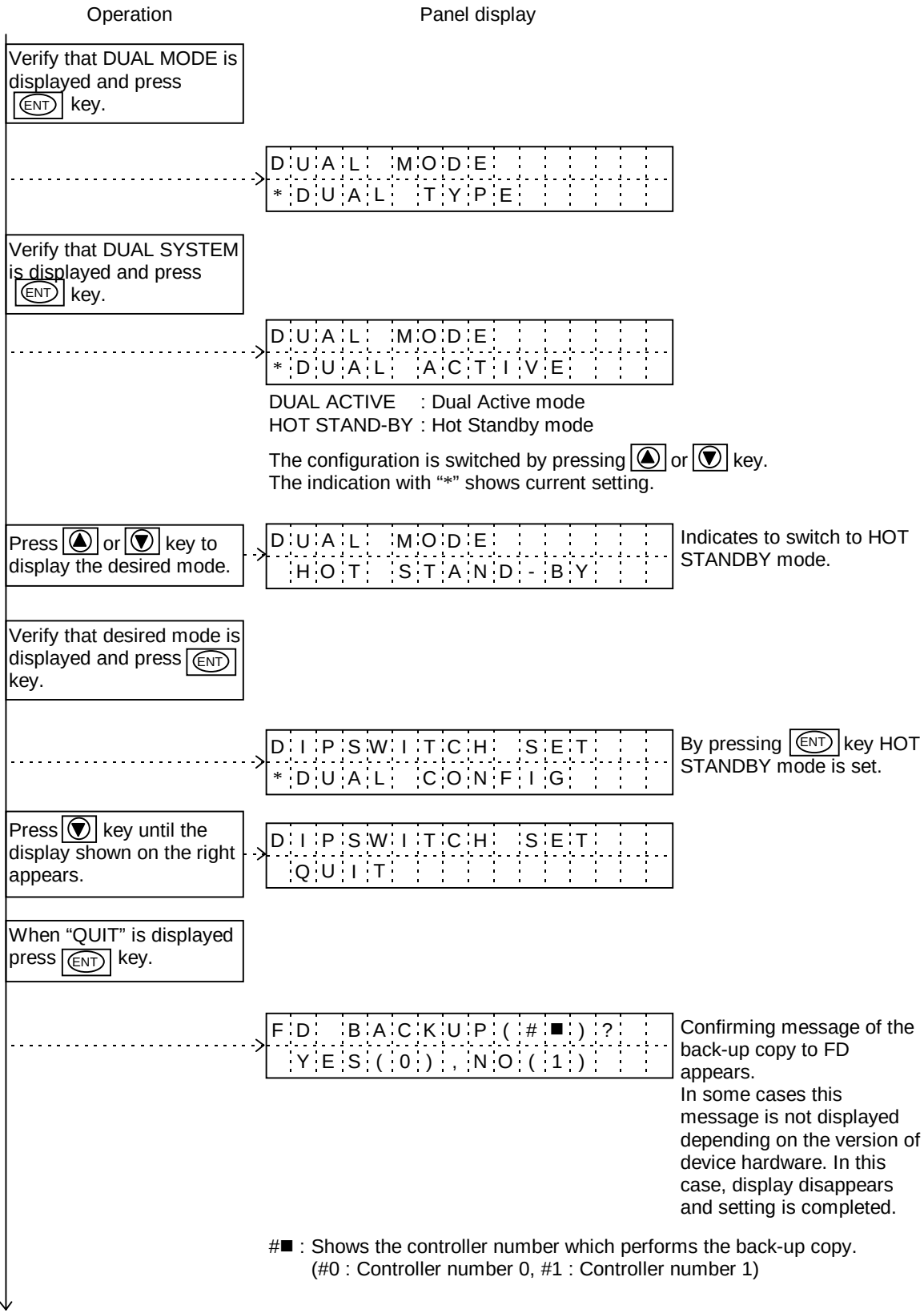
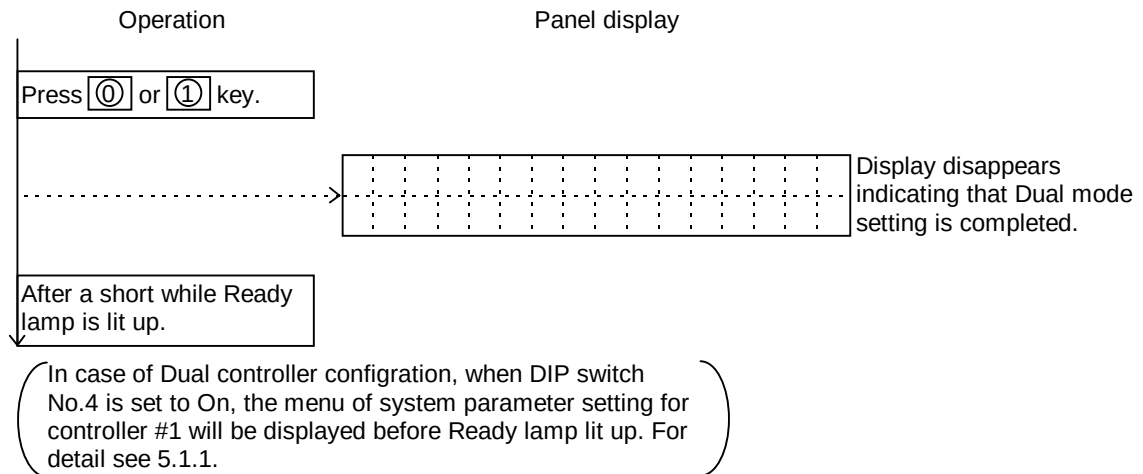


Figure 5.1.1 DIP switch for shifting to Dual system

- (2) Perform as the procedure shown below.







(3) Set DIP switch No.4 as Figure 5.1.2. (Shifting to Dual System has not started yet.)

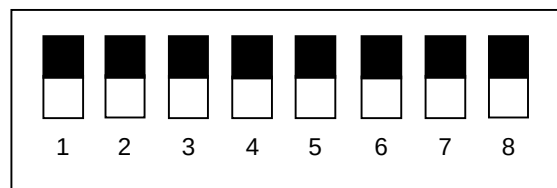


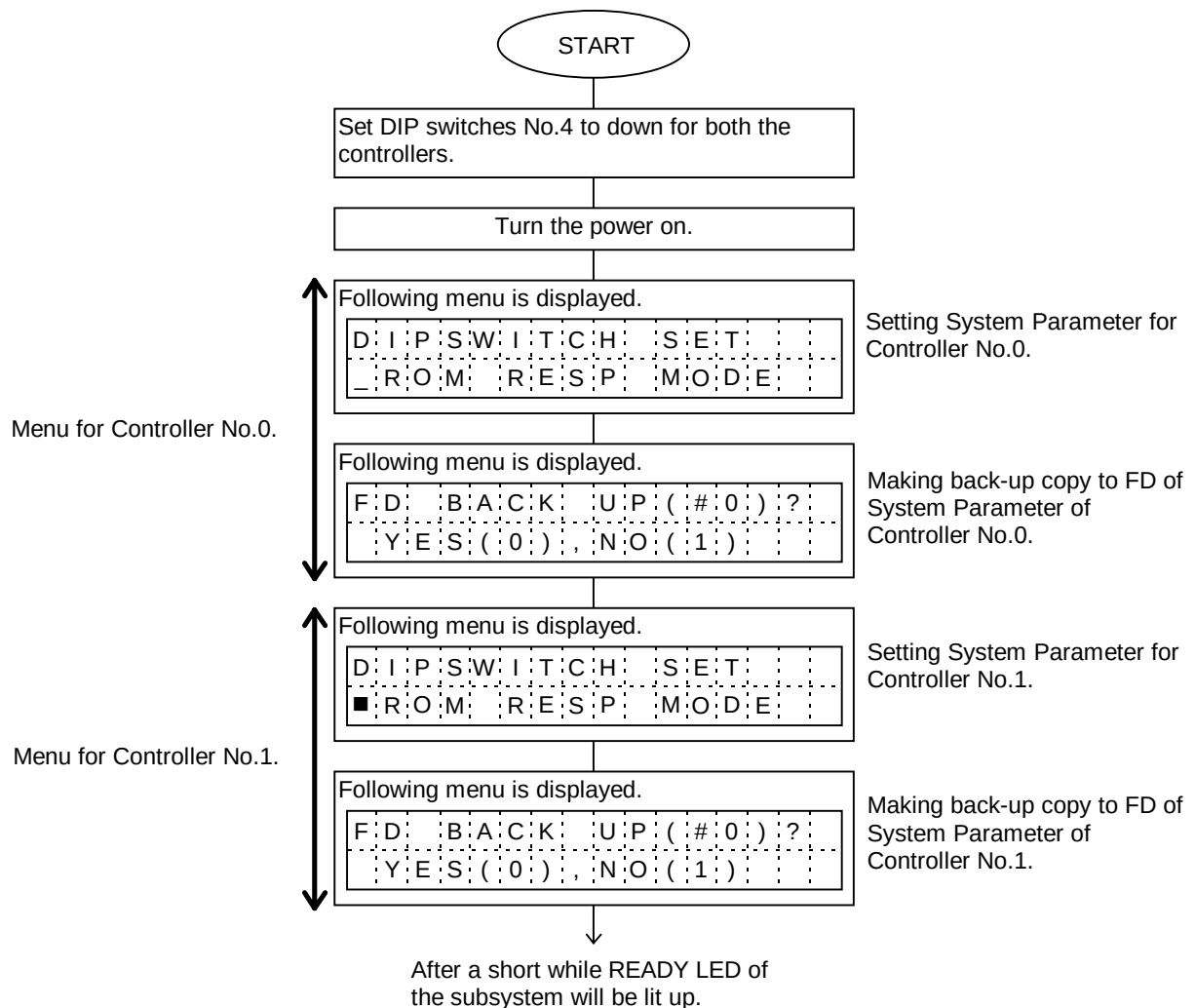
Figure 5.1.2 DIP Switch, shifting to Dual System has not started yet.

Note 1 : When setting Dual mode under dual controller, the setting of controller No.0 will be valid. The setting of controller No.1 will be ignored.

Note 2 : After switching to Dual Active configuration from Hot Standby configuration, Controller No.0 will be the LU Service Controller for previously set LU. To switch LU Service Controller No.1, see “6 PANEL Chapter” (PANEL0570 (4-5)).

5.1.1 Operation of system parameter setting menu under dual controller configuration

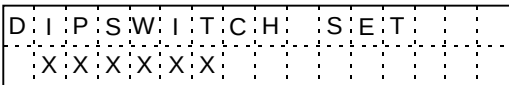
Set DIP switches No.4 to down for both controllers under dual controller configuration, and turn the power off to set the information on EEPROMs of both the controllers.



Note : In case one of DIP switches No.4 is set to down under dual controller configuration, after completion of menu setting for the corresponding controller, READY LED of the subsystem will be lit up.

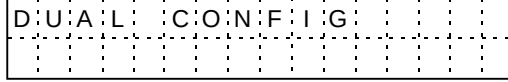
5.1.2 Returning procedure in system parameter setting menu

During system parameter setting menu when wrong menu is selected ( key is pressed), the method of returning for each menu is shown below.

After the operation below  is displayed.

(XXXXXX : Wrongly selected menu)

Then select desired menu by pressing  or  key.

No.	Menu	Procedure to return
1	ROM RESP MODE	Press  key.
2	WRITE&VERIFY	Press  key.
3	STRIPE SIZE	Press  key.
4	LAN CONST	Press  key to display “QUIT” and press  key.
5	TARGET ID	Press  key.
6	CONNECT AS/400	When NOT CONNECT : Press  key. When CONNECT AS/400 : Press  key, and after displaying “QUIT”, press  key.
7	CONNECT VMS	Press  key.
8	SPECIAL CONNECT	Press  key.
9	SAVE DATA PTR	Press  key.
10	HOST BLK SIZE	Press  key.
11	ERROR INF	Press  key.
12	CONTROLLER	Press  key.
13	SPARE DISK	Press  key.
14	SERIAL NO	Press  key.
15	ROM V/R	Press  key.
16	RAM V/R	Press  key.
17	CONTROLLER NAME	Press  key.
18	ROW LAST LBA	When Menu is ROW LAST LBA : Press  key to display “QUIT”, then press  key.
19	BUZZER	Press  key.
20	SYSTEM ERROR	Press  key.
21	GENERATE SYS	Press  key.
22	INQUIRY INF	Press  key to display “QUIT” and press  key.
23	DUAL CONFIG	Press  key until  is displayed.
24	LU SIZE	Press  key.
25	SYNC CONTROL	Press  key.
26	SYS REV	Press  key.
27	OPTION	Press  key.
28	BOOT PROG V/R	Press  key.
29	RTC SET	Press  key to display “QUIT(ENT KEY)” and press  key.

6. Subsystem Settings for Use in Special Modes

6.1 When Using I/O Path Switching Function in the State Being Connected to IBM RS6000

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to IBM RS6000, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.1.1.

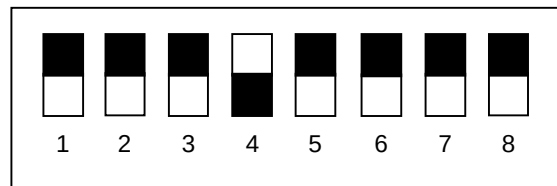
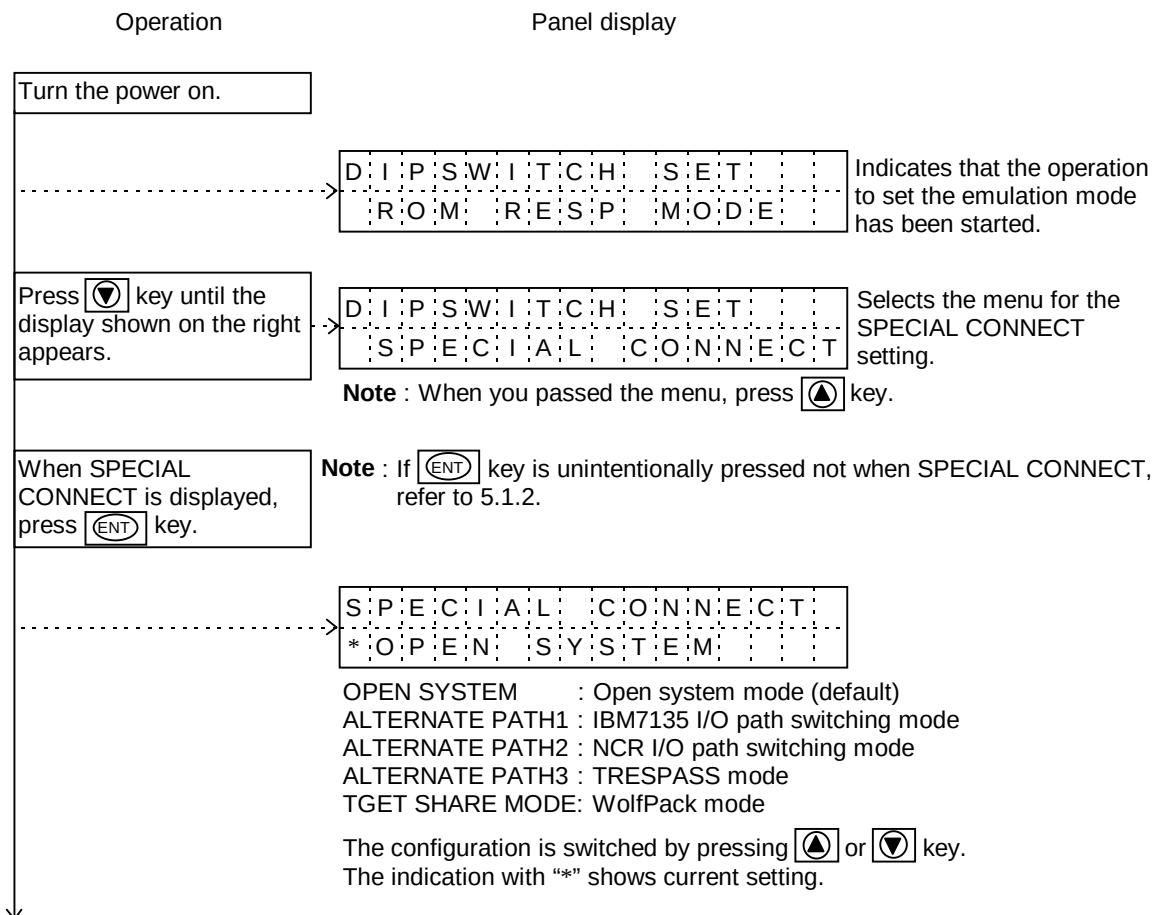
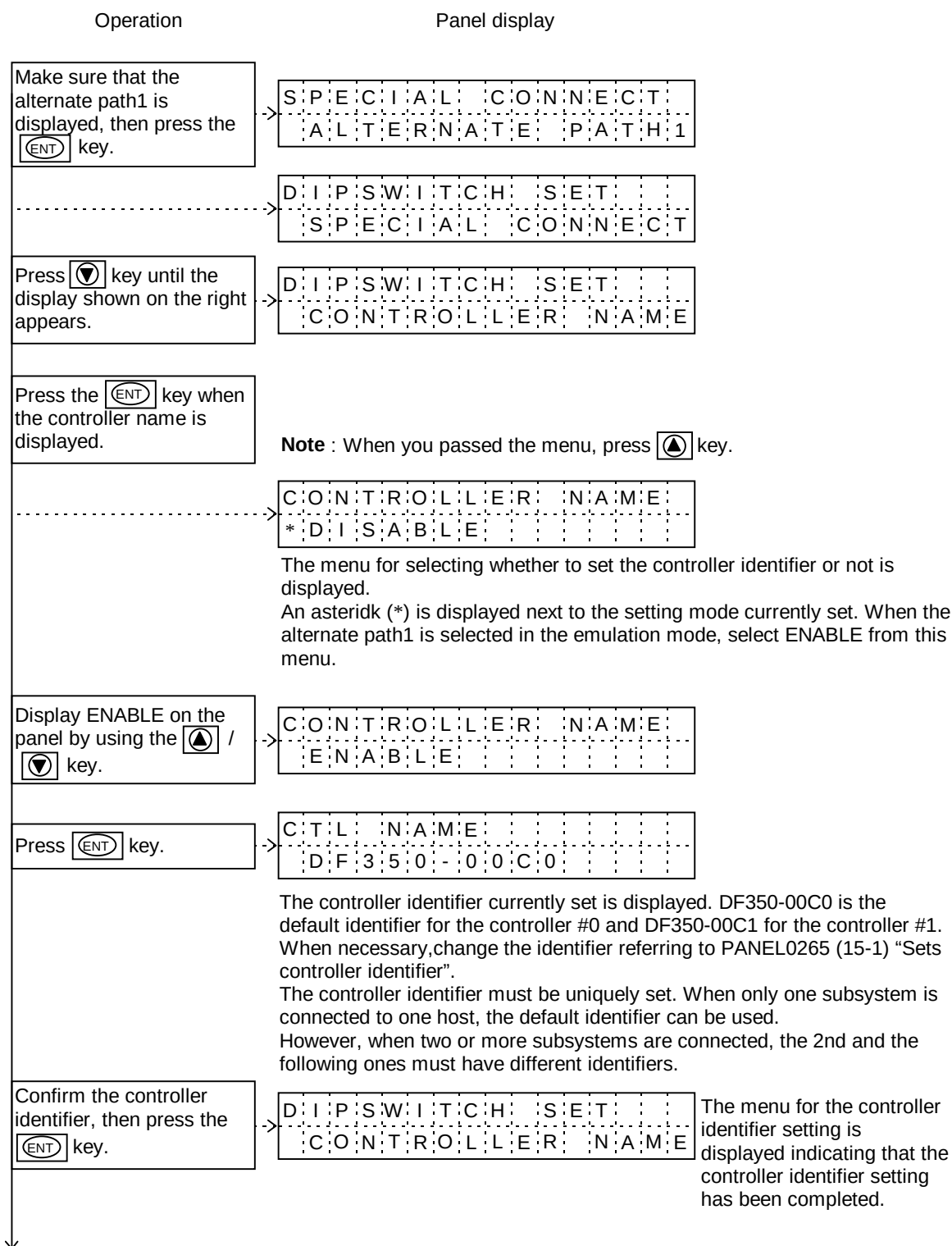
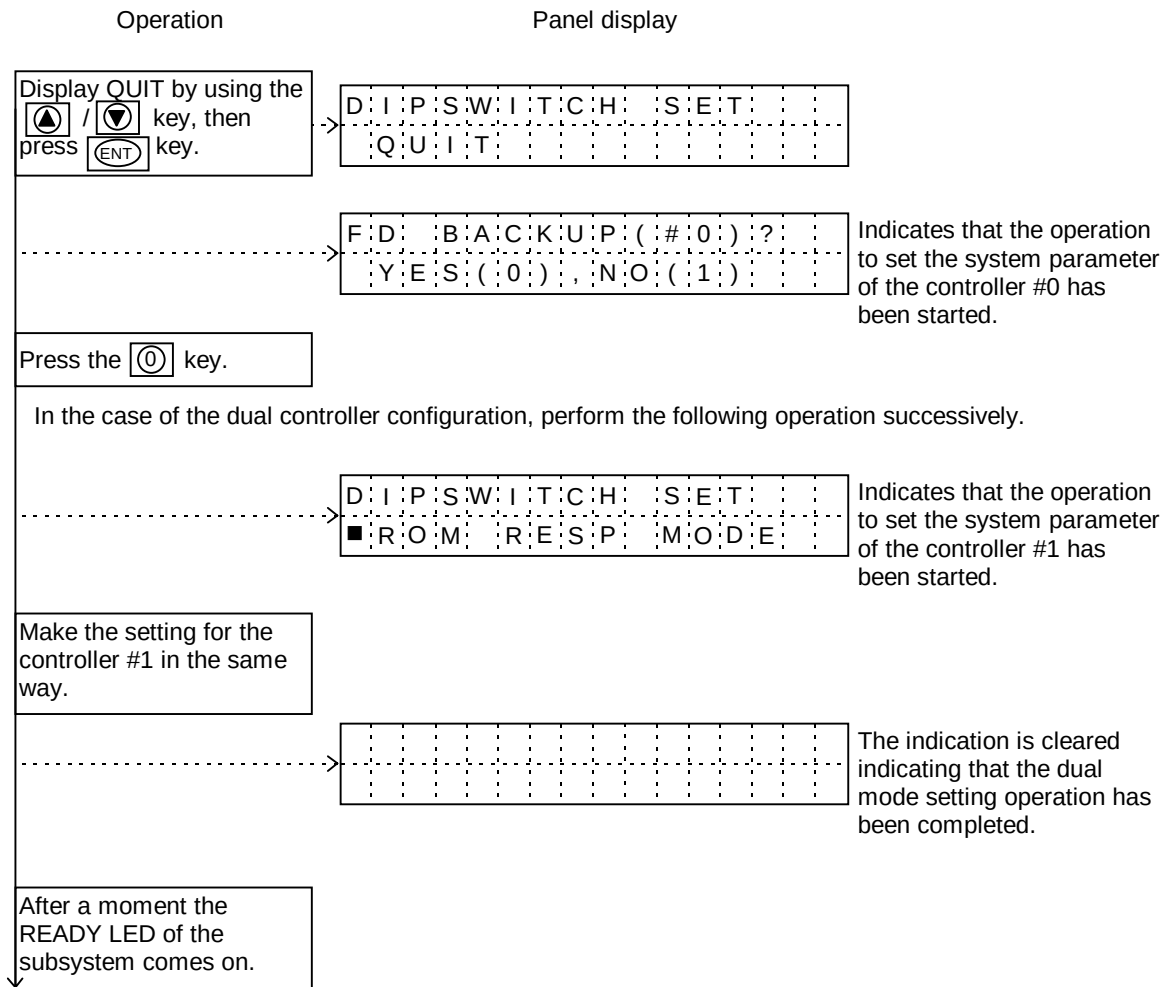


Figure 6.1.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.1.2.

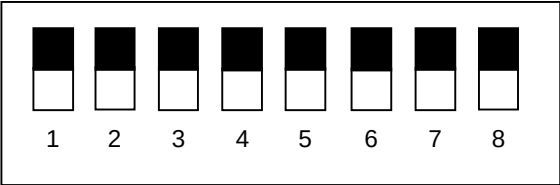


Figure 6.1.2 DIP switches (Being set for Standard setting)

6.2 When Using I/O Path Switching Function in the State Being Connected to NCR World Mark

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to NCR World Mark, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.2.1.

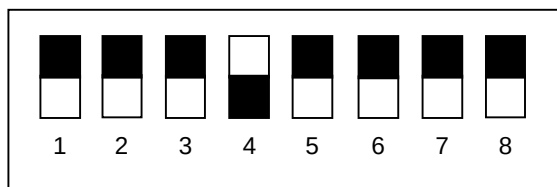
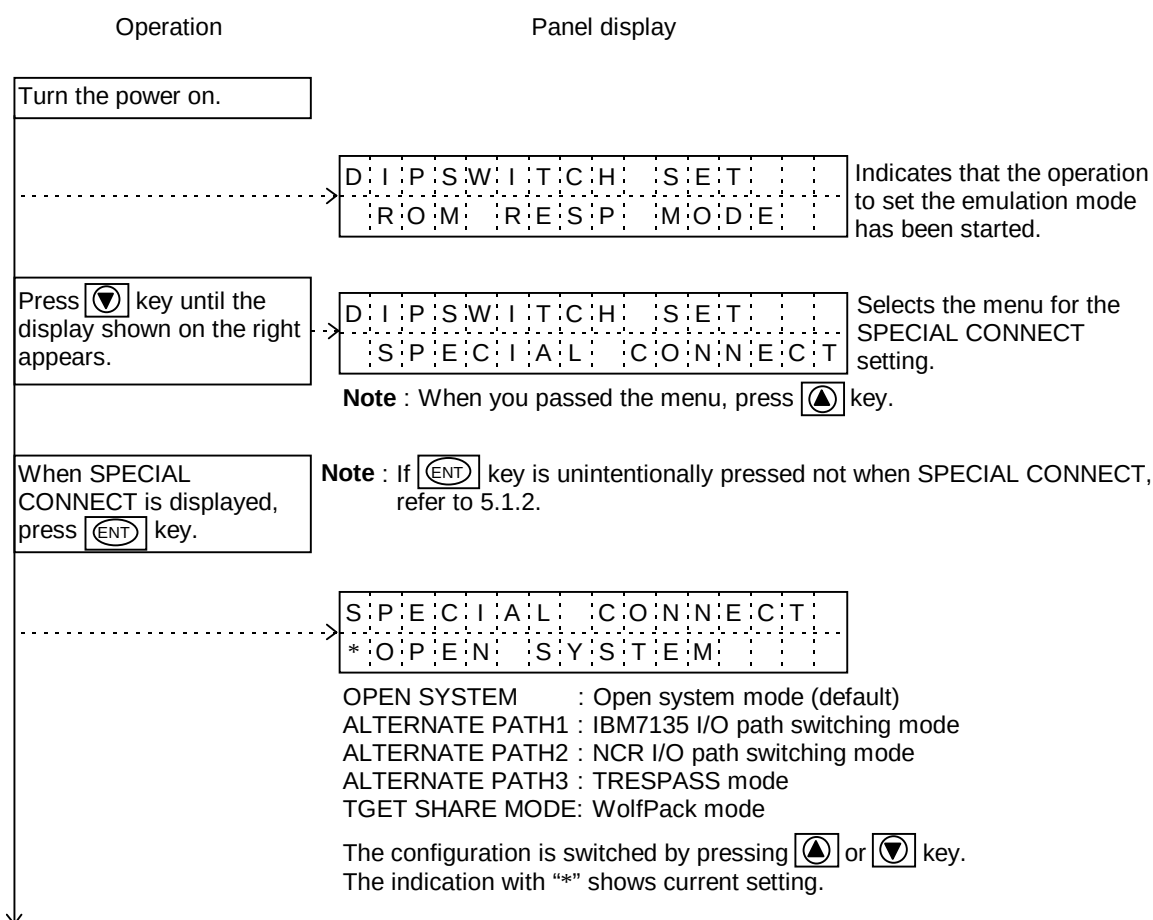
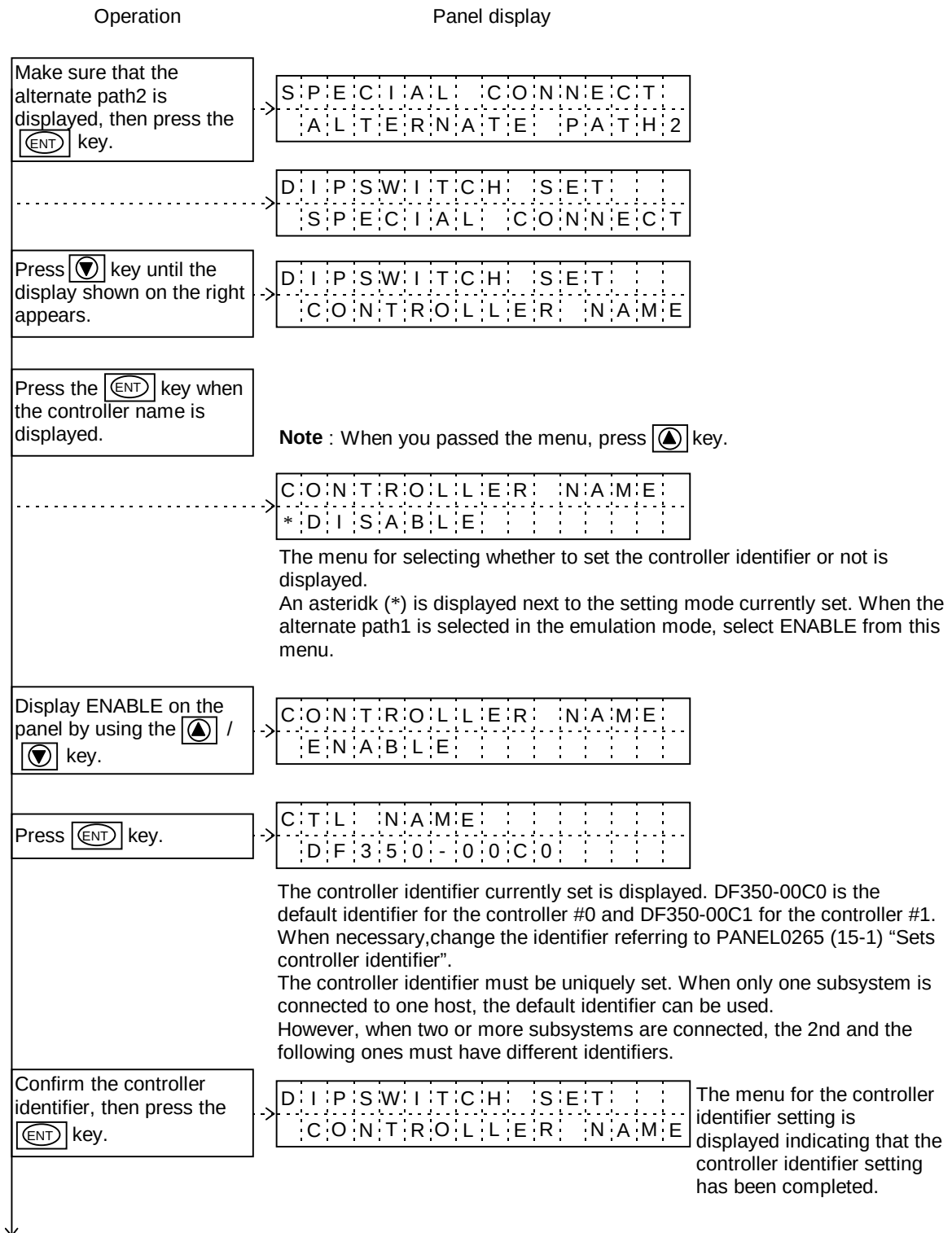
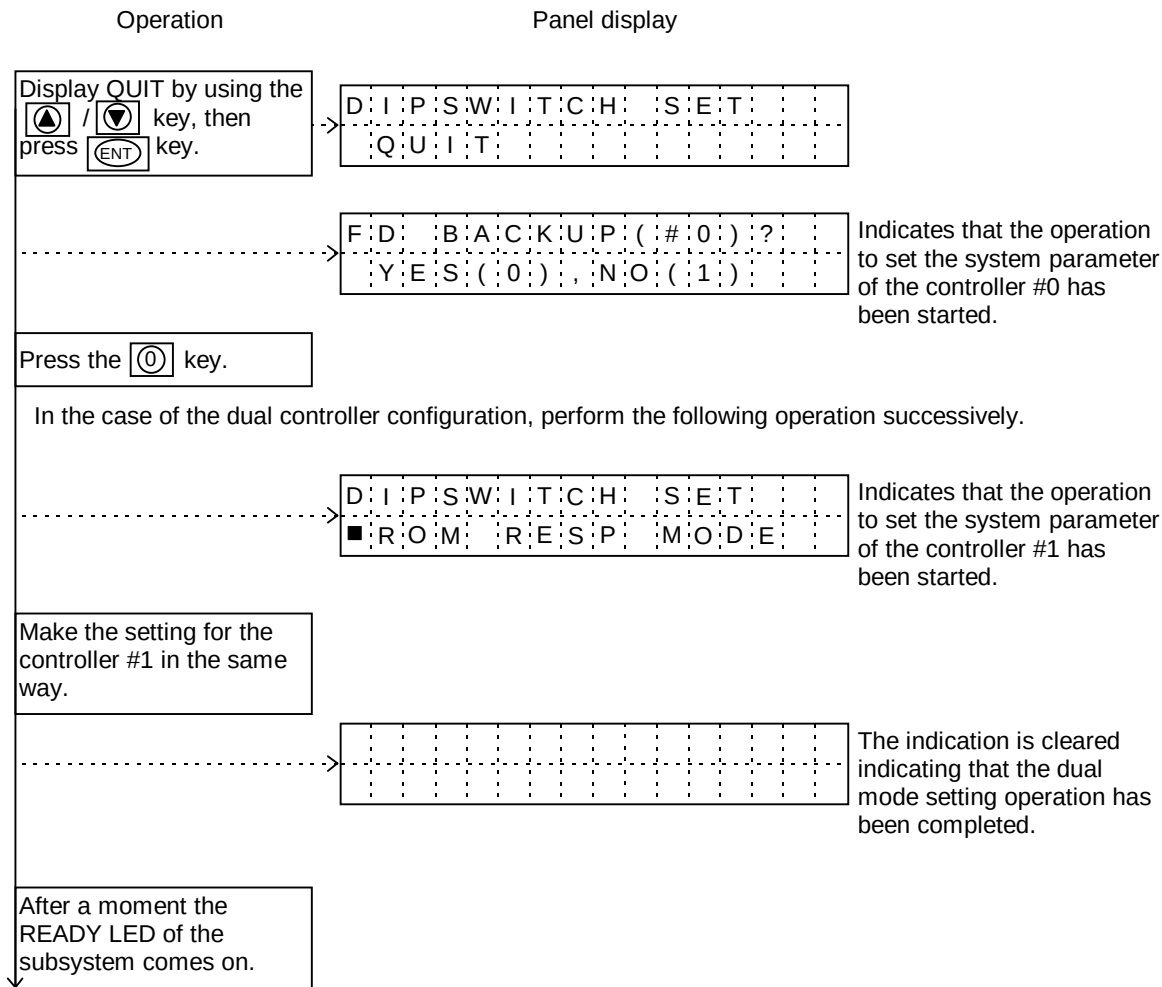


Figure 6.2.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.2.2.

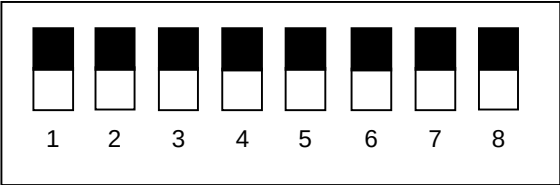


Figure 6.2.2 DIP switches (Being set for Standard setting)

6.3 When Using I/O Path Switching Function in the State Being Connected to Sequent NUMA-A

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to Sequent NUMA-A, setting of the emulation mode and the setting of the TRESPASS mode from the SVP function is needed.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.3.1.

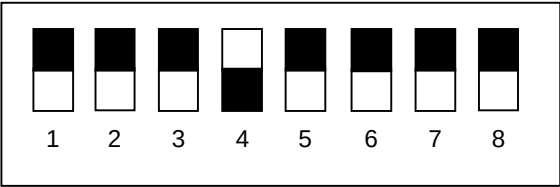
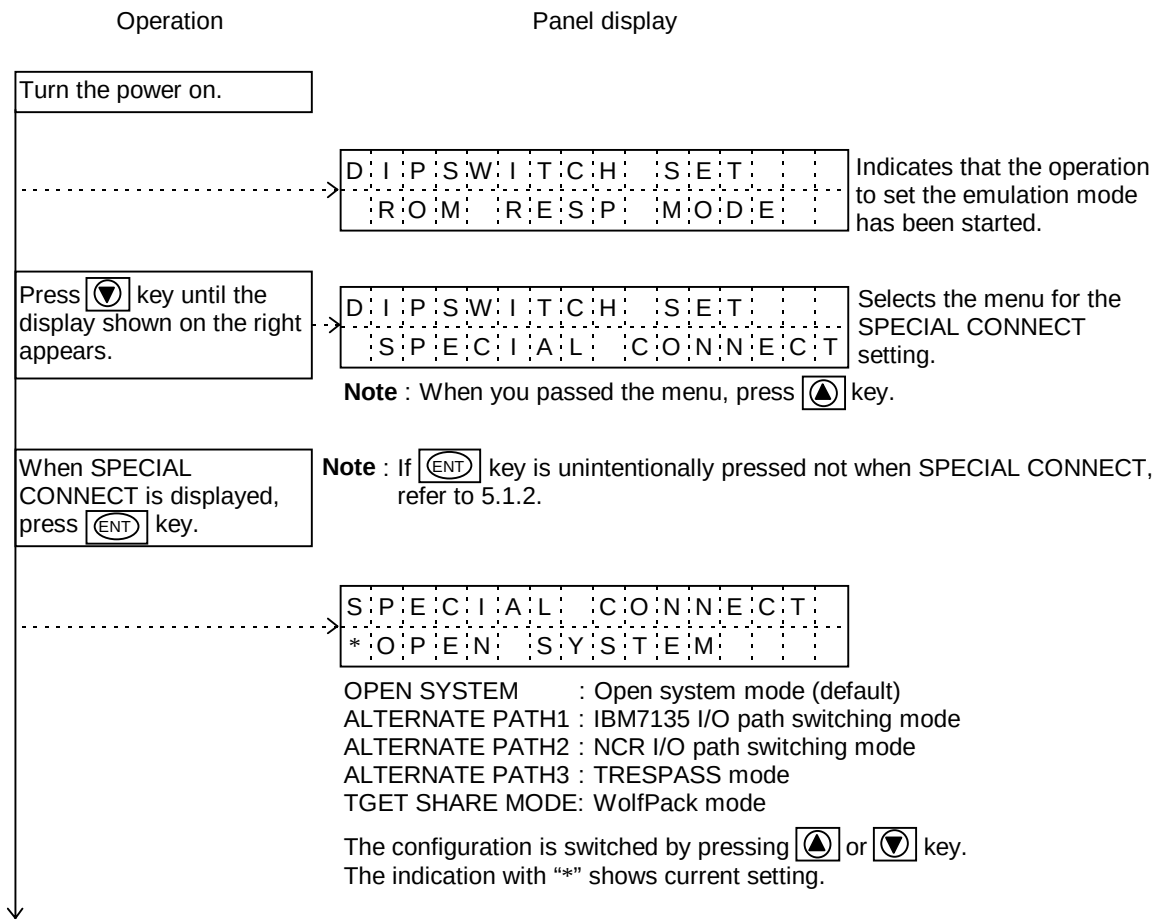
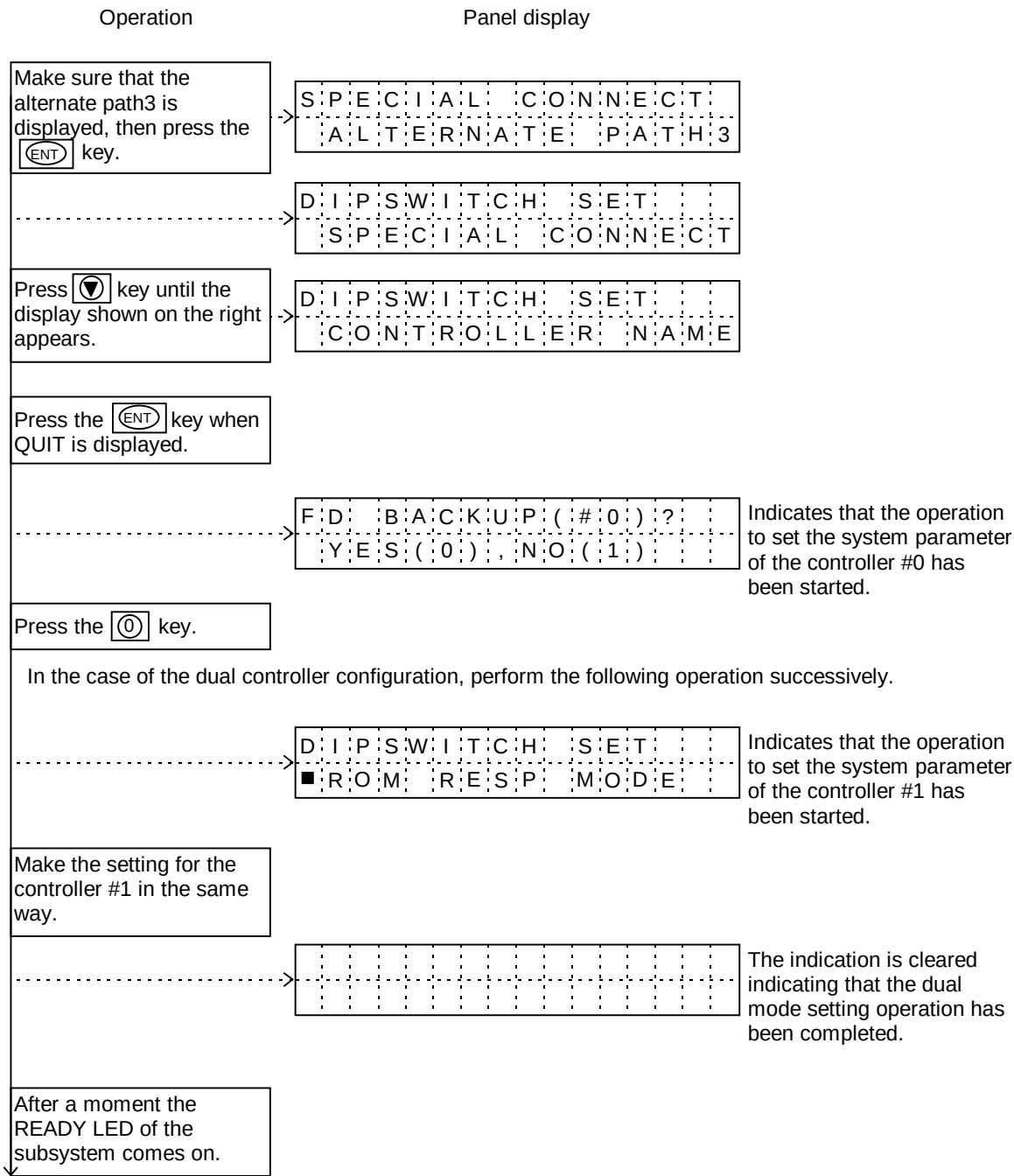


Figure 6.3.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.3.2.

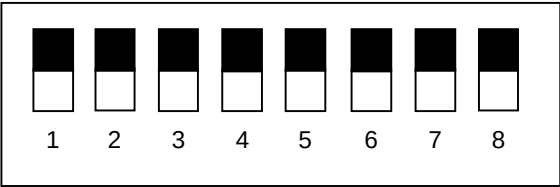
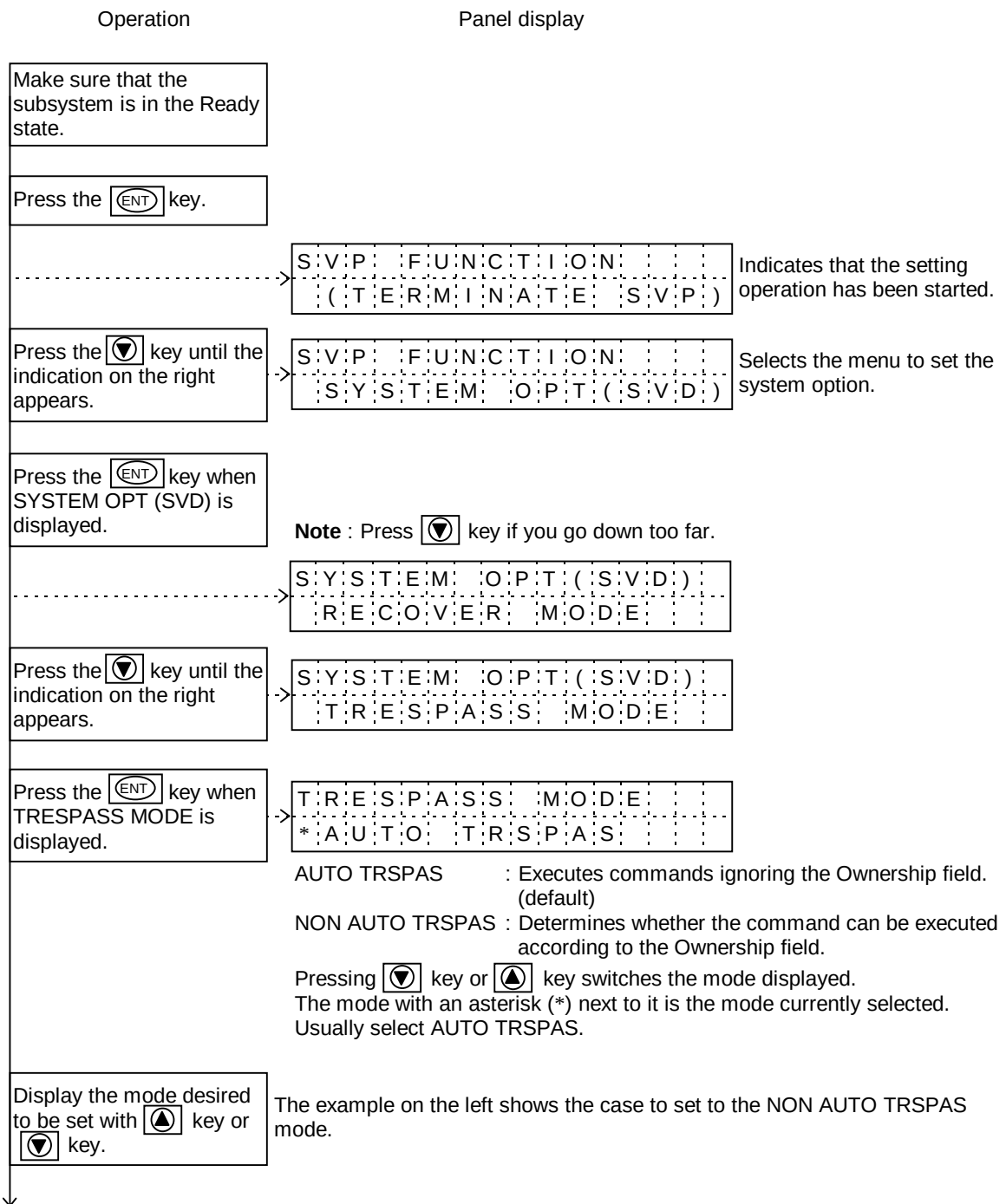
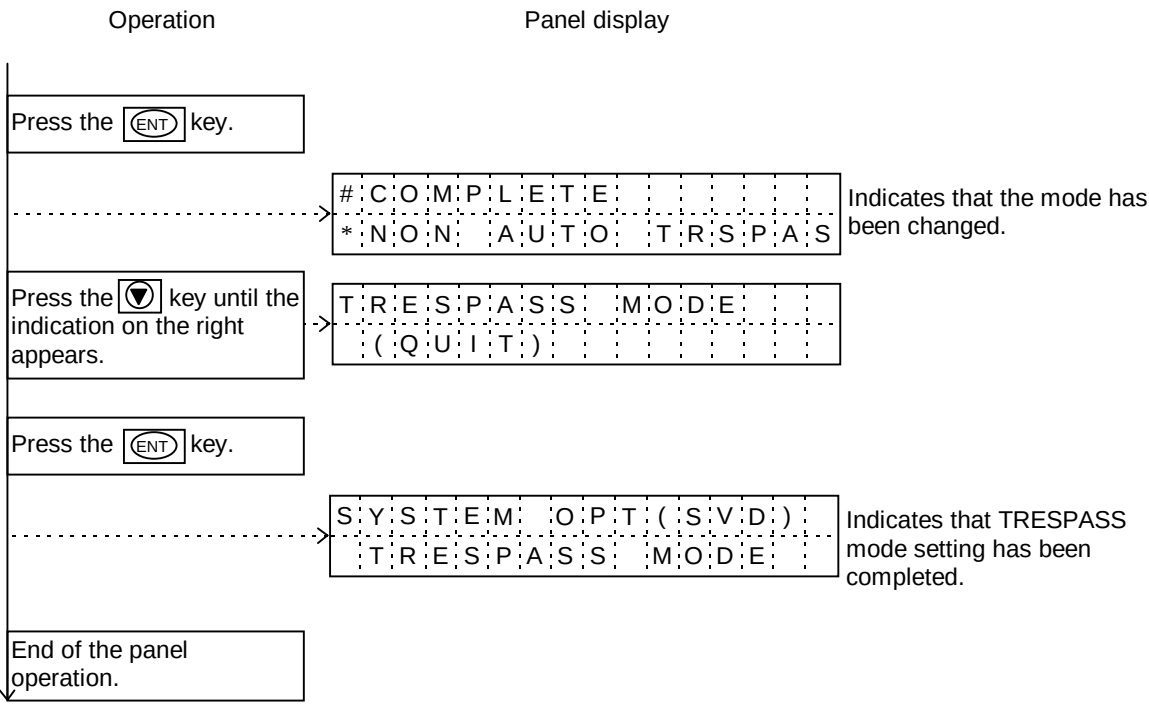


Figure 6.3.2 DIP switches (Being set for Standard setting)

(4) Setting the TRESPASS mode.

This function can be used when the subsystem is in the Ready state. (There is no need to set the DIP switch or reset the power. Ready/write operation cannot be executed from the host while this operation is being performed. When the host command is received, "Not Ready" is returned to the host.)





6.4 Using in the 1024-byte Host Block Size Mode

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

In order to use the subsystem with a host block size of 1024 byte, the host block size must be set to 1024 bytes when defining the LU. Accordingly, the LU used with a host block size of 512 bytes cannot be used in the 1024 byte host block size mode. In this case, it is necessary to redefine the LU.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.4.1.

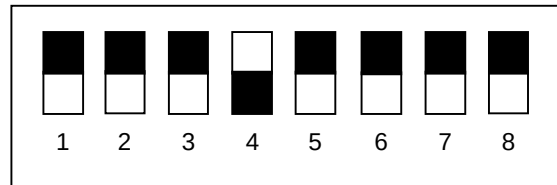
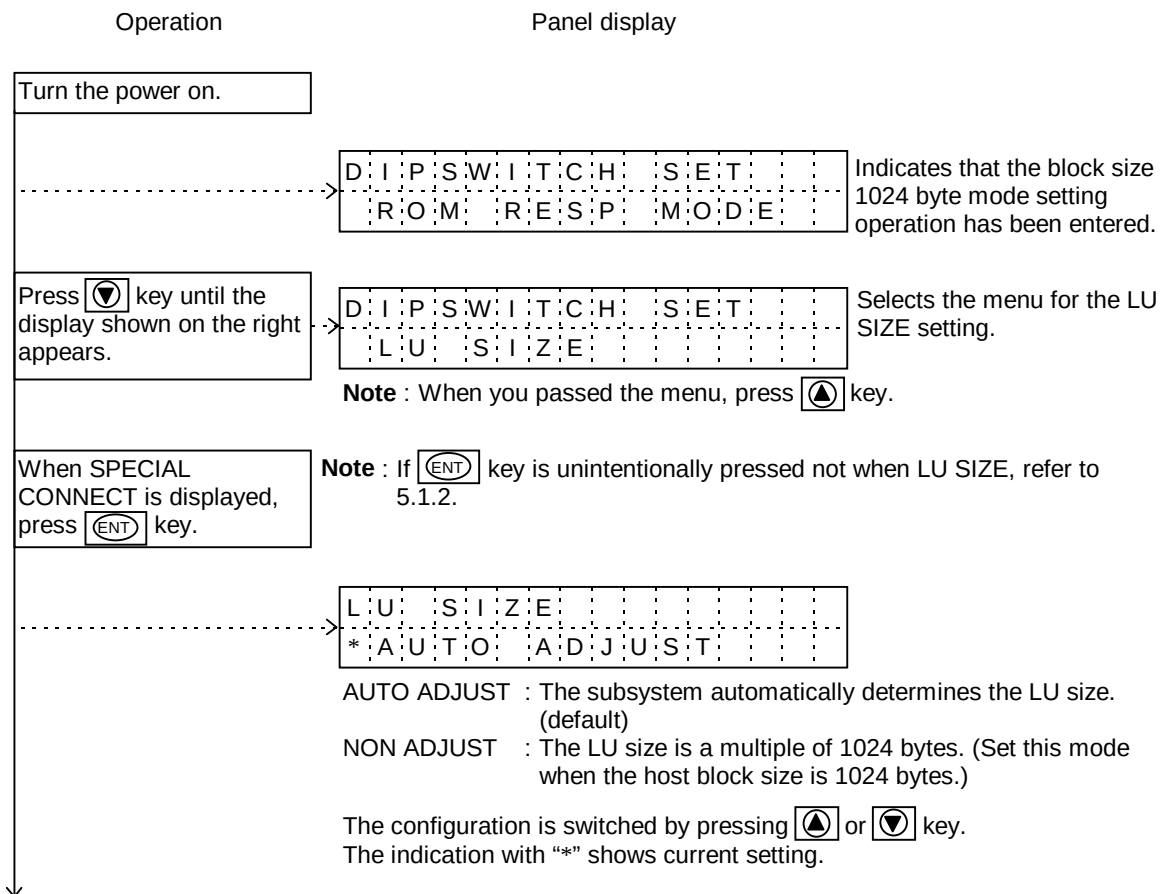
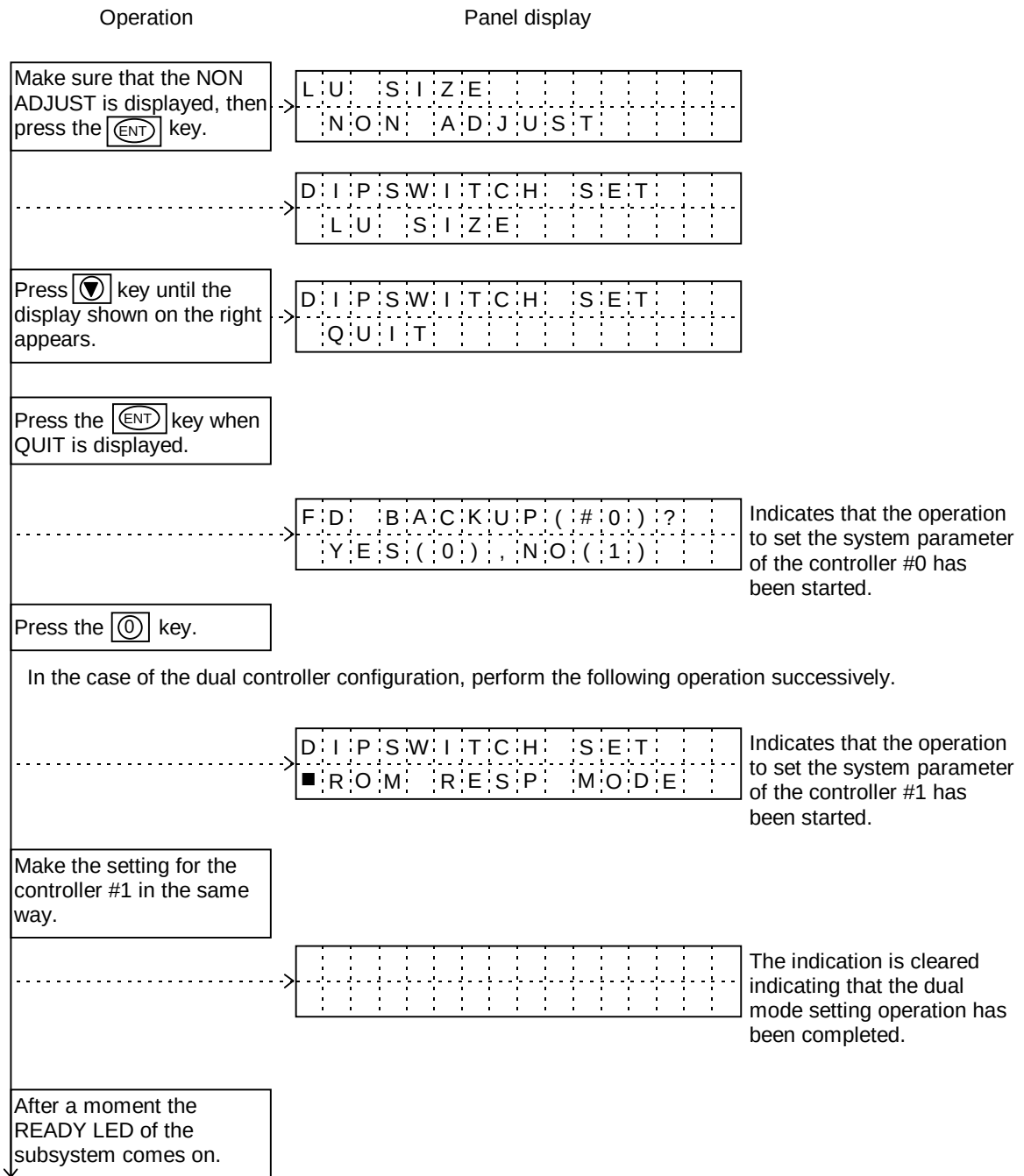


Figure 6.4.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





- (3) Set the DIP switch No.4 as shown in Figure 6.4.2.

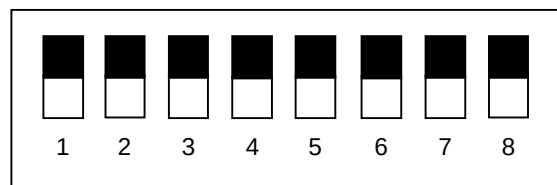


Figure 6.4.2 DIP switches (Being set for Standard setting)

- (4) Setting of the host block length when setting the LU.

When setting the LU, define the host block size as 1024 bytes. (See PANEL0570 “Adds the LU” for a detailed explanation.)

6.5 Using in the WolfPack Mode

6.5.1 When the WolfPack is used in the single configuration

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.5.1.

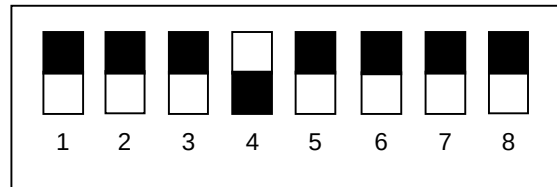
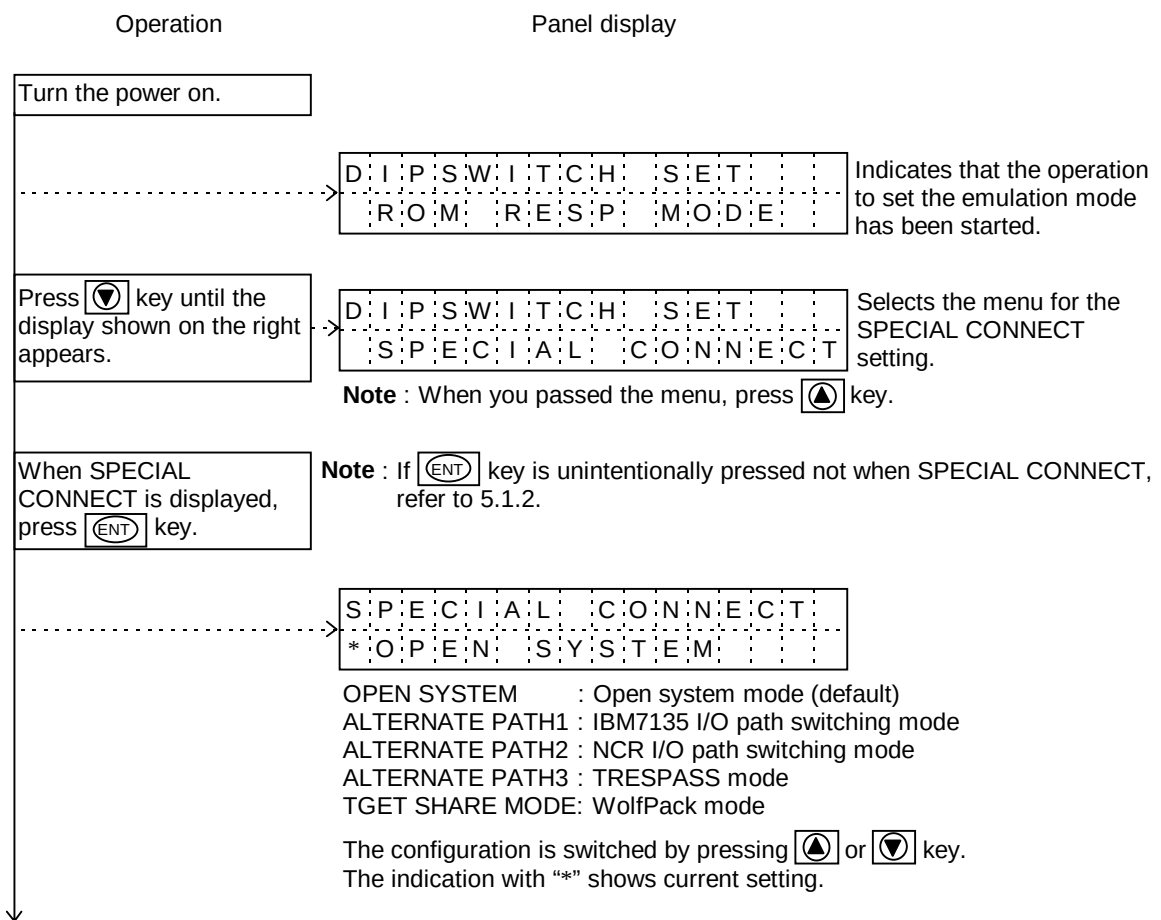
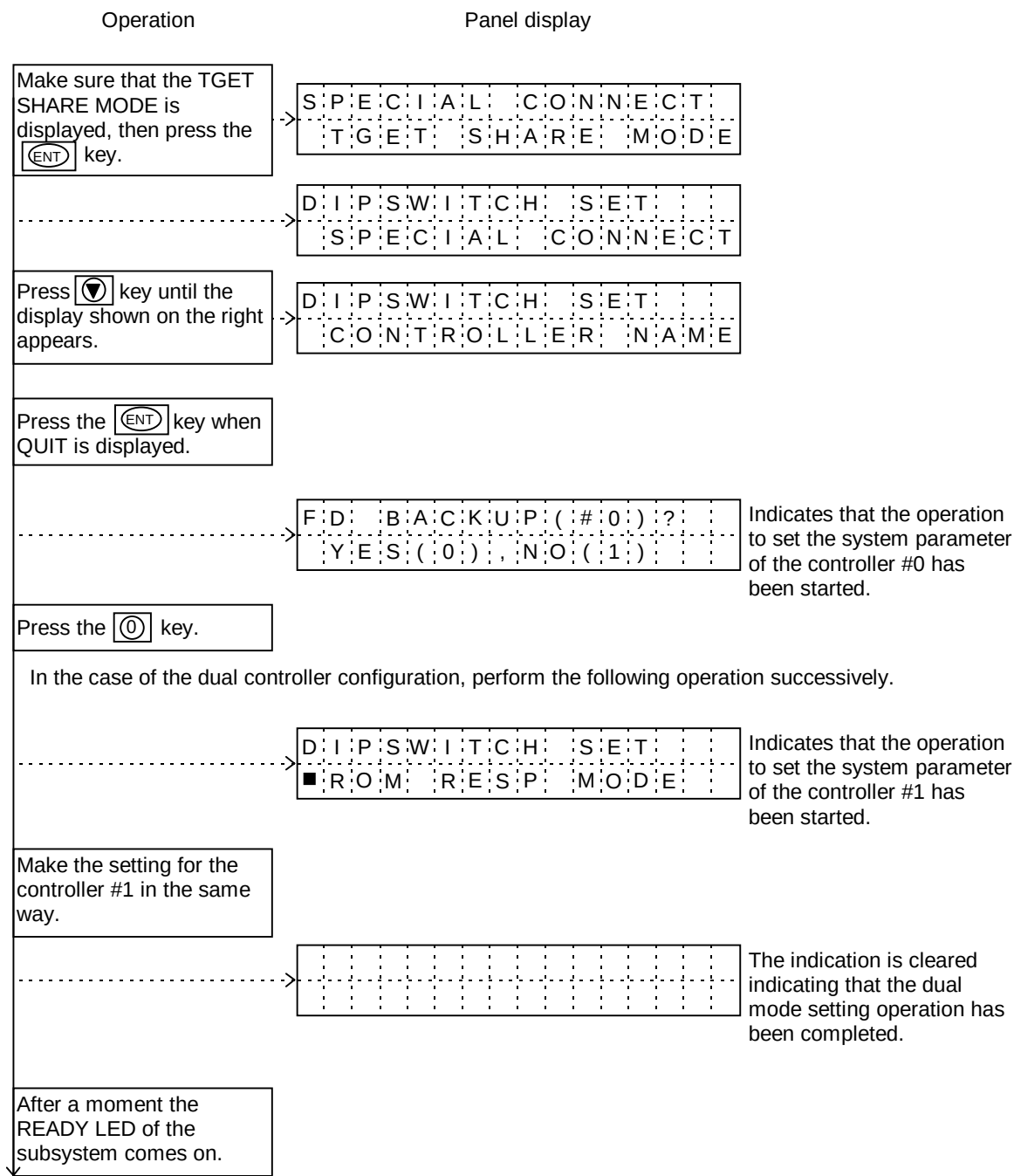


Figure 6.5.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.5.2.

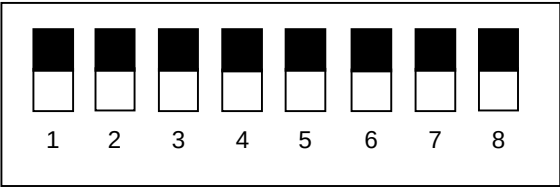


Figure 6.5.2 DIP switches (Being set for Standard setting)

6.5.2 When the WolfPack is used in the dual configuration

When using the subsystem in WolfPack mode in the dual configuration, execute the following setting and use it.

- Setting WolfPack mode
- Setting OPTION mode

To use the subsystem in this mode, the microprogram must be Ver.0306/B or later.

- Setting WolfPack mode

Set the mode by referring to page RH-INST0910.

- Setting DATA SHARE mode

Set the mode by referring to page RH-INST0930.

- Setting OPTION mode

(1) Before turning the power on, set DIP switch No.4 as Figure 6.5.3.

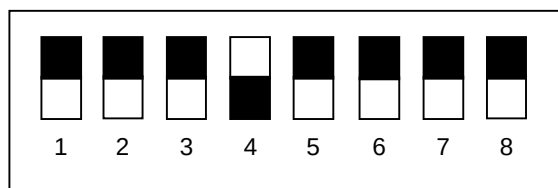
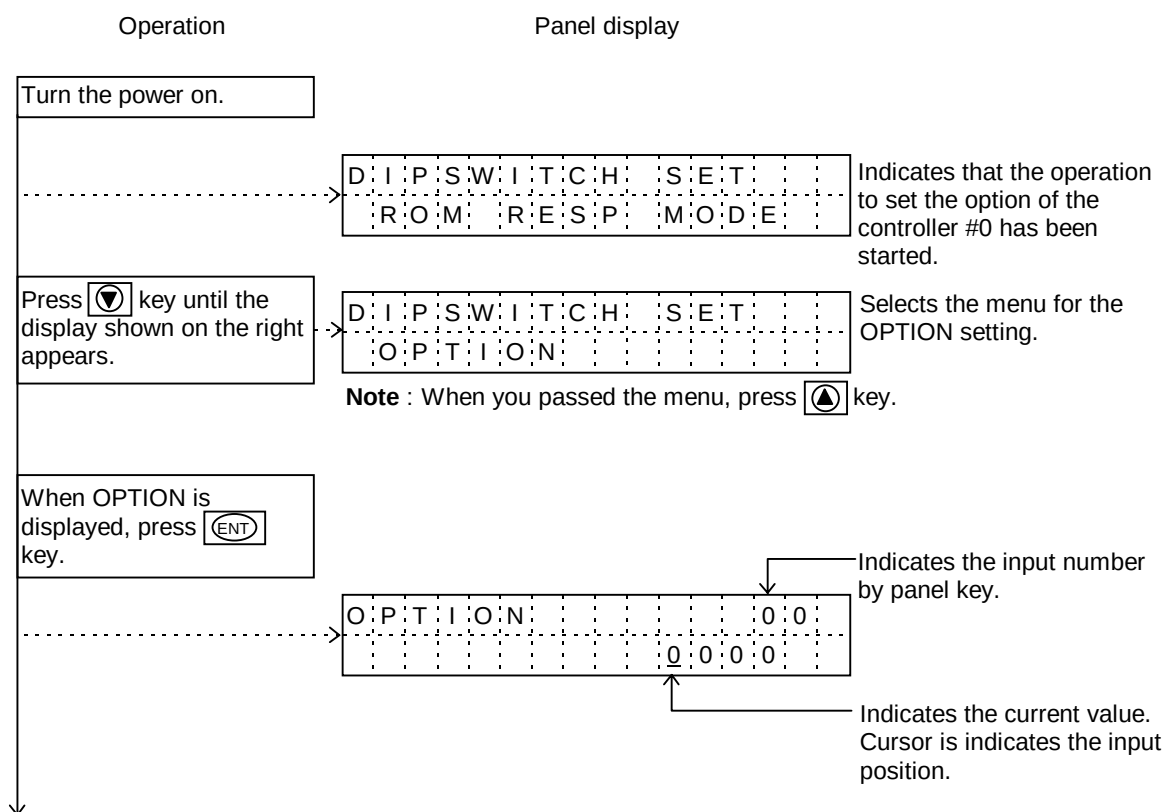
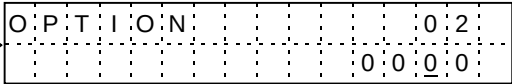
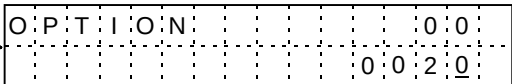
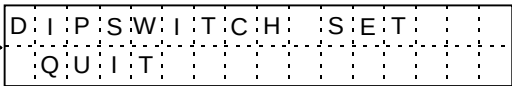
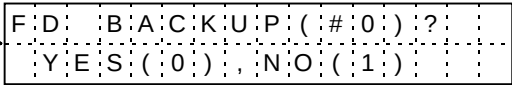
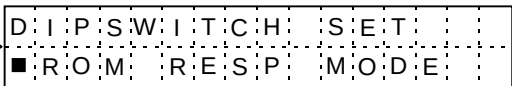
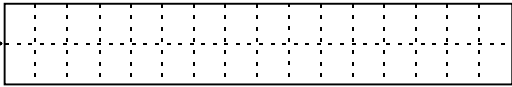


Figure 6.5.3 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the third is underlined, press the  key, and then press the  key on the panel.	 If a figure at the top is not underlined, move the underline ("_") to the required position using the  or  key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("_") moves to the next position.	
Confirm that the current value has been set to "0020", then press the  key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the  /  key, then press  key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	
	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the dual mode setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.5.4.

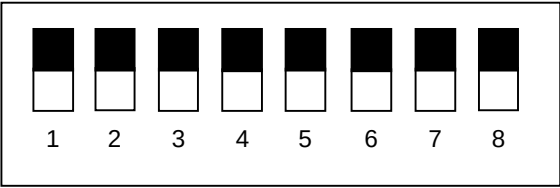


Figure 6.5.4 DIP switches (Being set for Standard setting)

6.6 Using in the DATA SHARE MODE

Use a combination of the microprogram version 0304 or later and Flash Program version PB26 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.6.1.

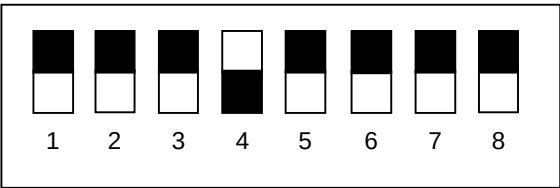
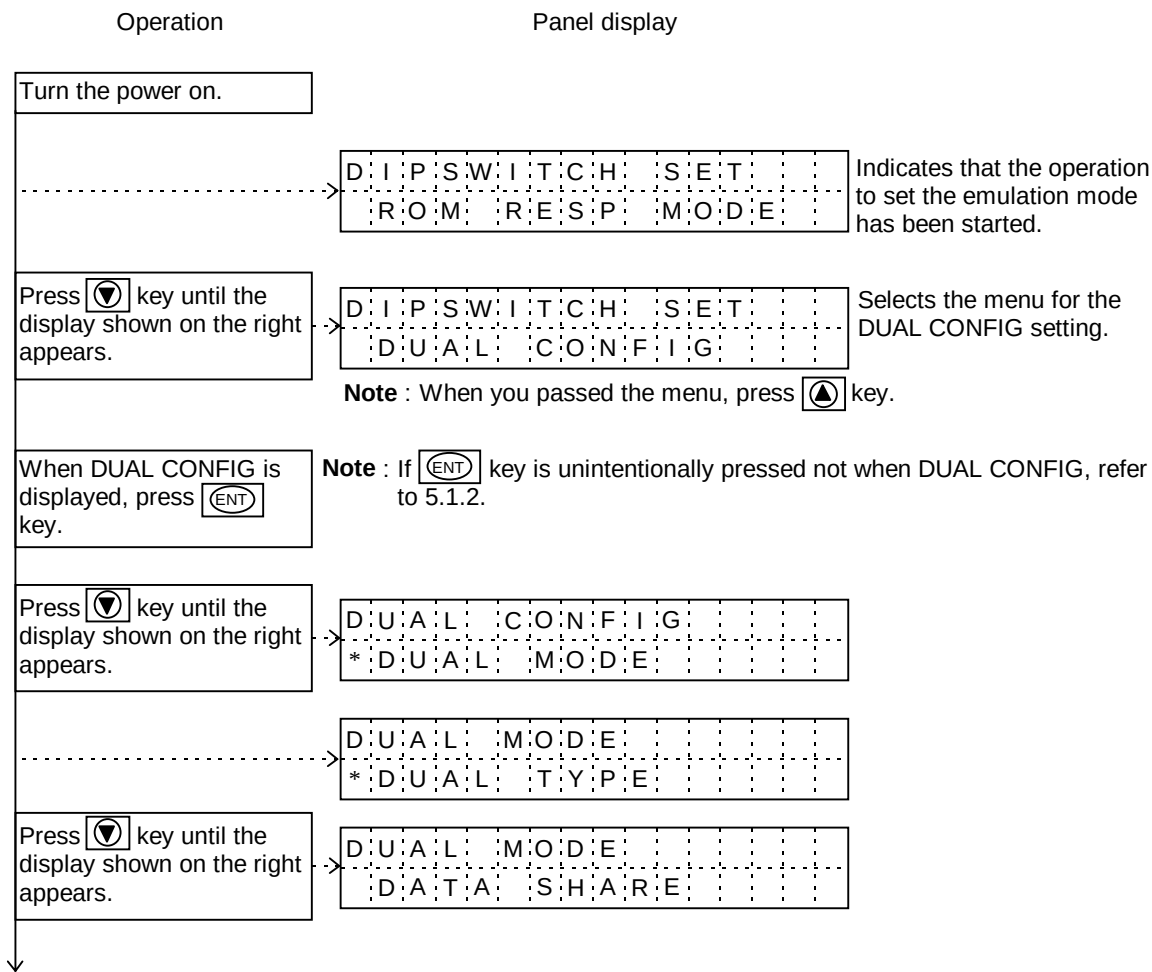
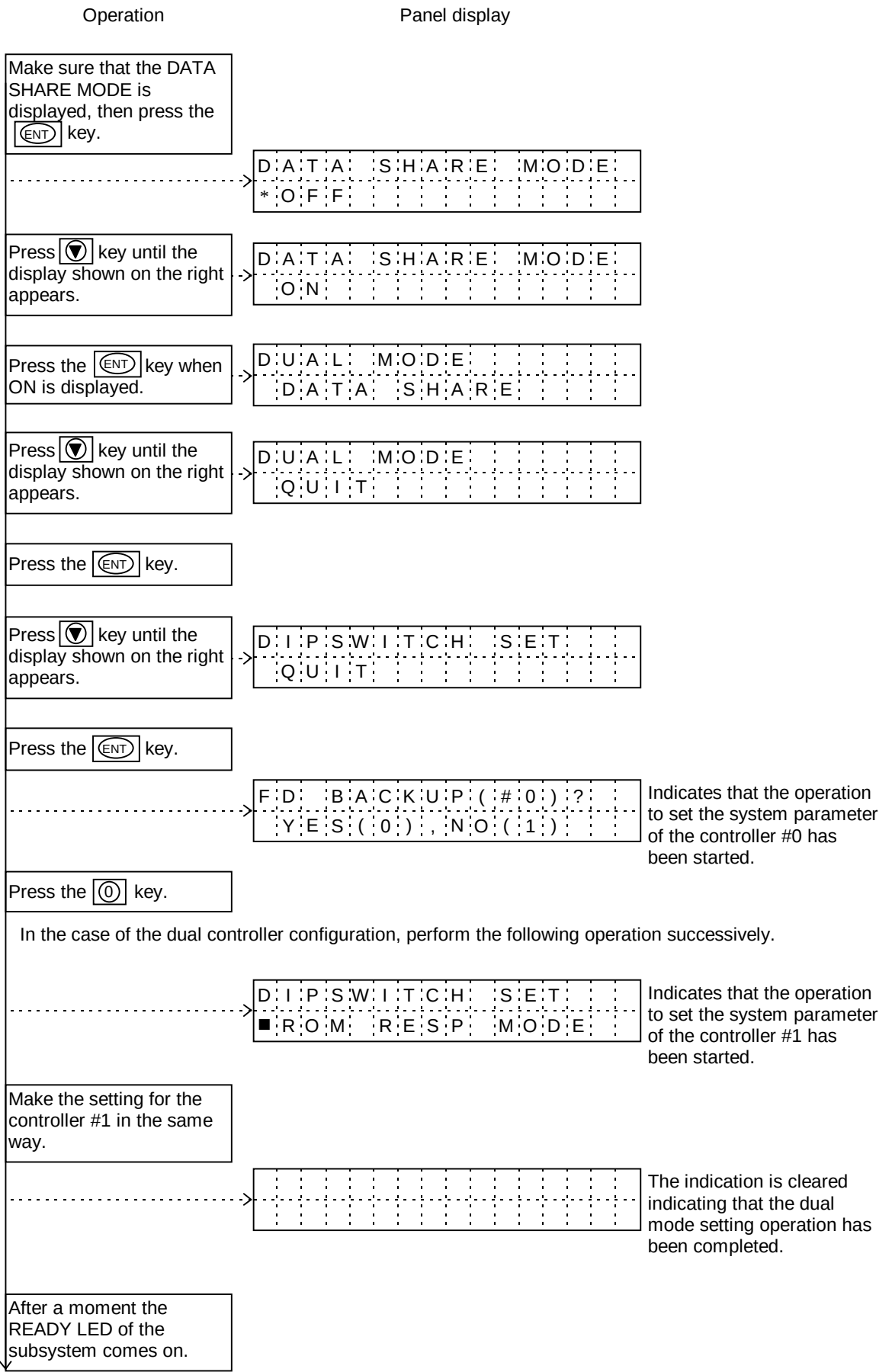


Figure 6.6.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.6.2.

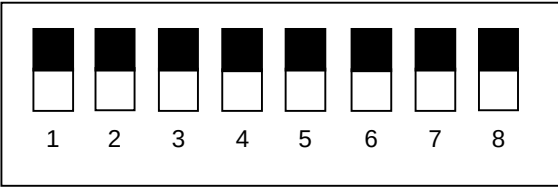


Figure 6.6.2 DIP switches (Being set for Standard setting)

6.7 When the VxVM Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.7.1.

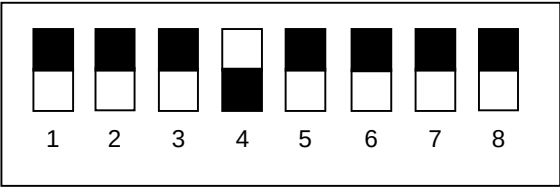
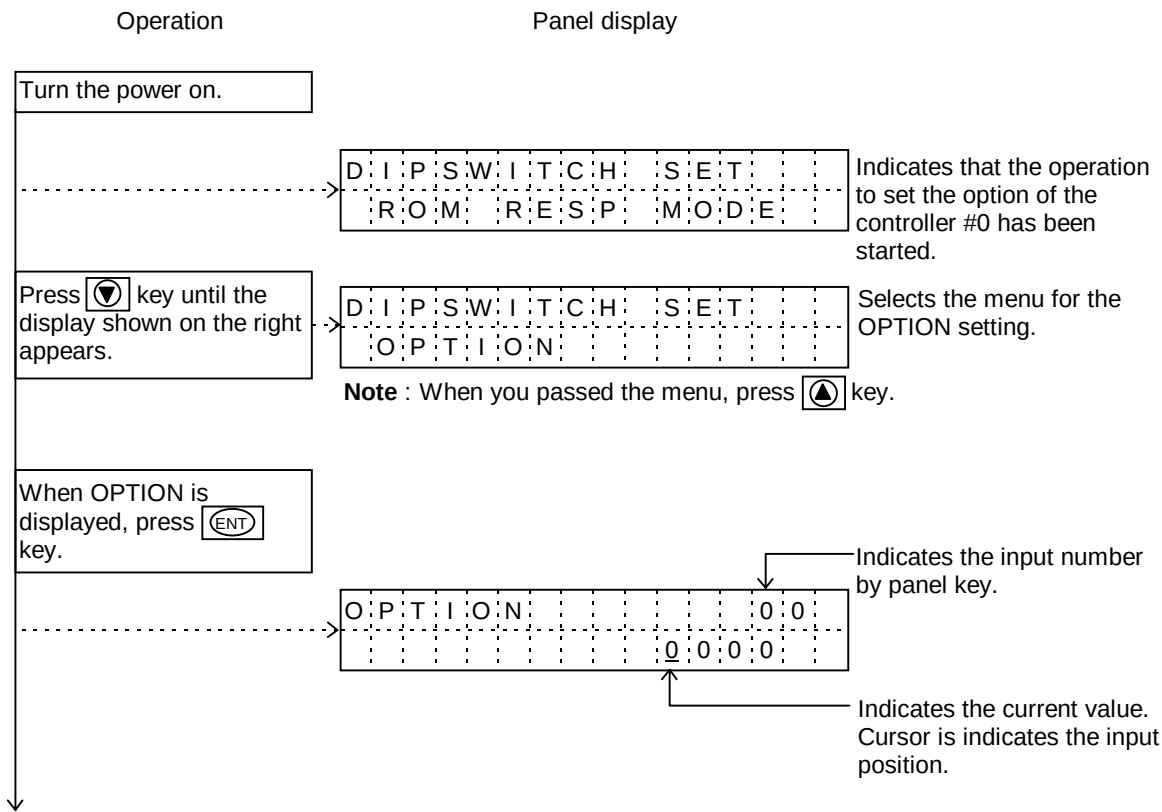
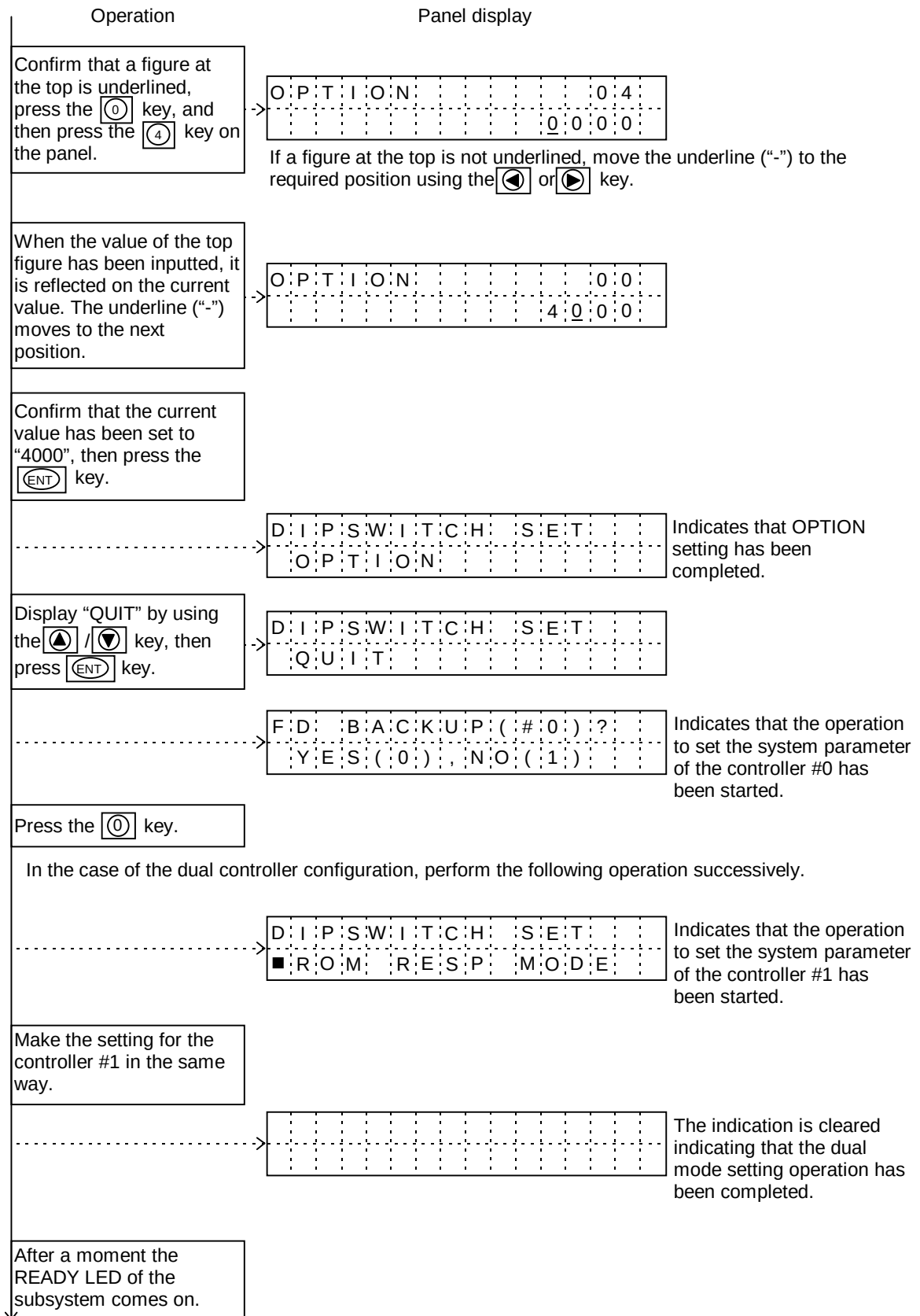


Figure 6.7.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.7.2.

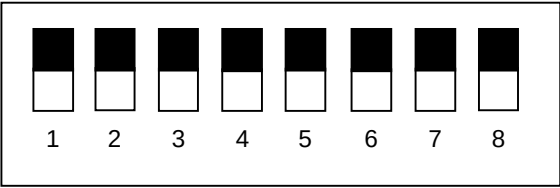


Figure 6.7.2 DIP switches (Being set for Standard setting)

6.8 When the HACMP Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(By using this option, a combination of HACMP and 7135 emulation becomes usable. To use the combination, settings of both this option and 7135 emulation are needed. (For the setting procedure, see Section 6.1.))

(1) Before turning the power on, set DIP switch No.4 as Figure 6.8.1.

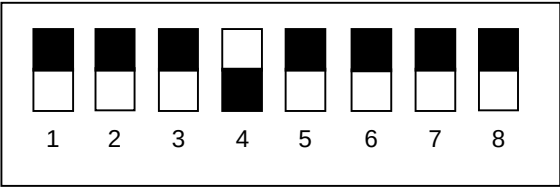
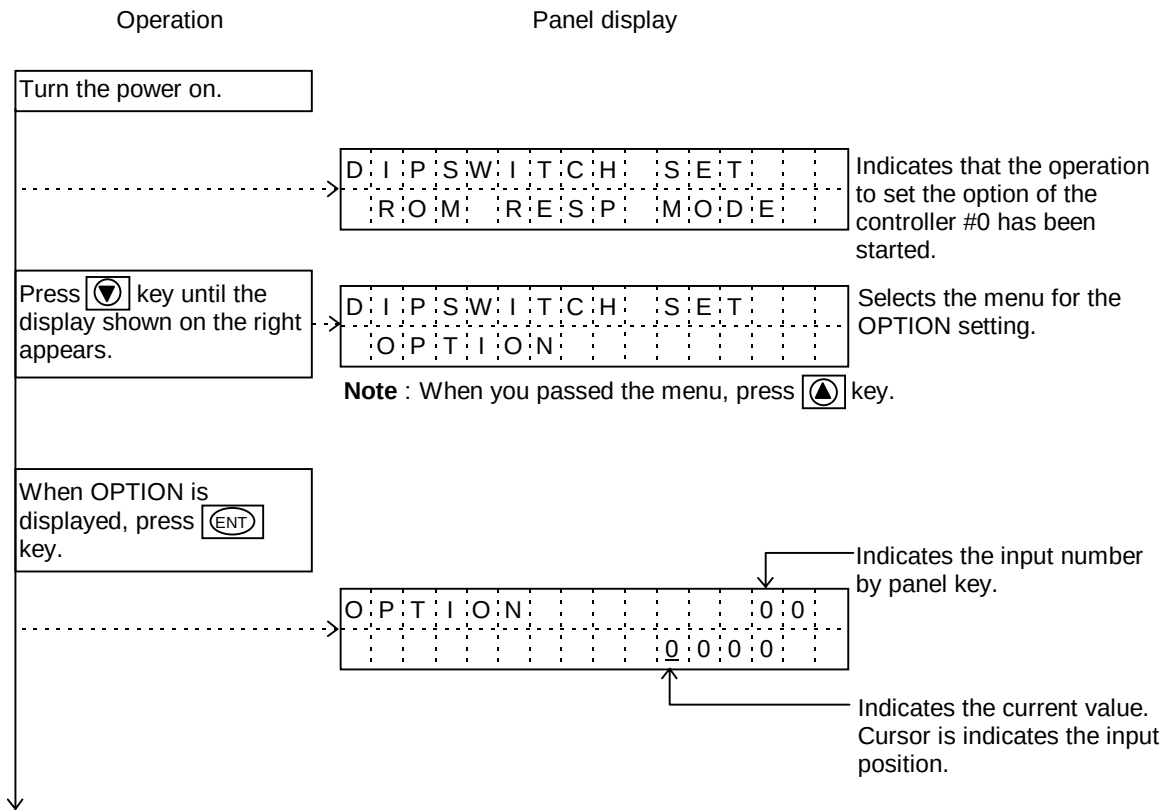
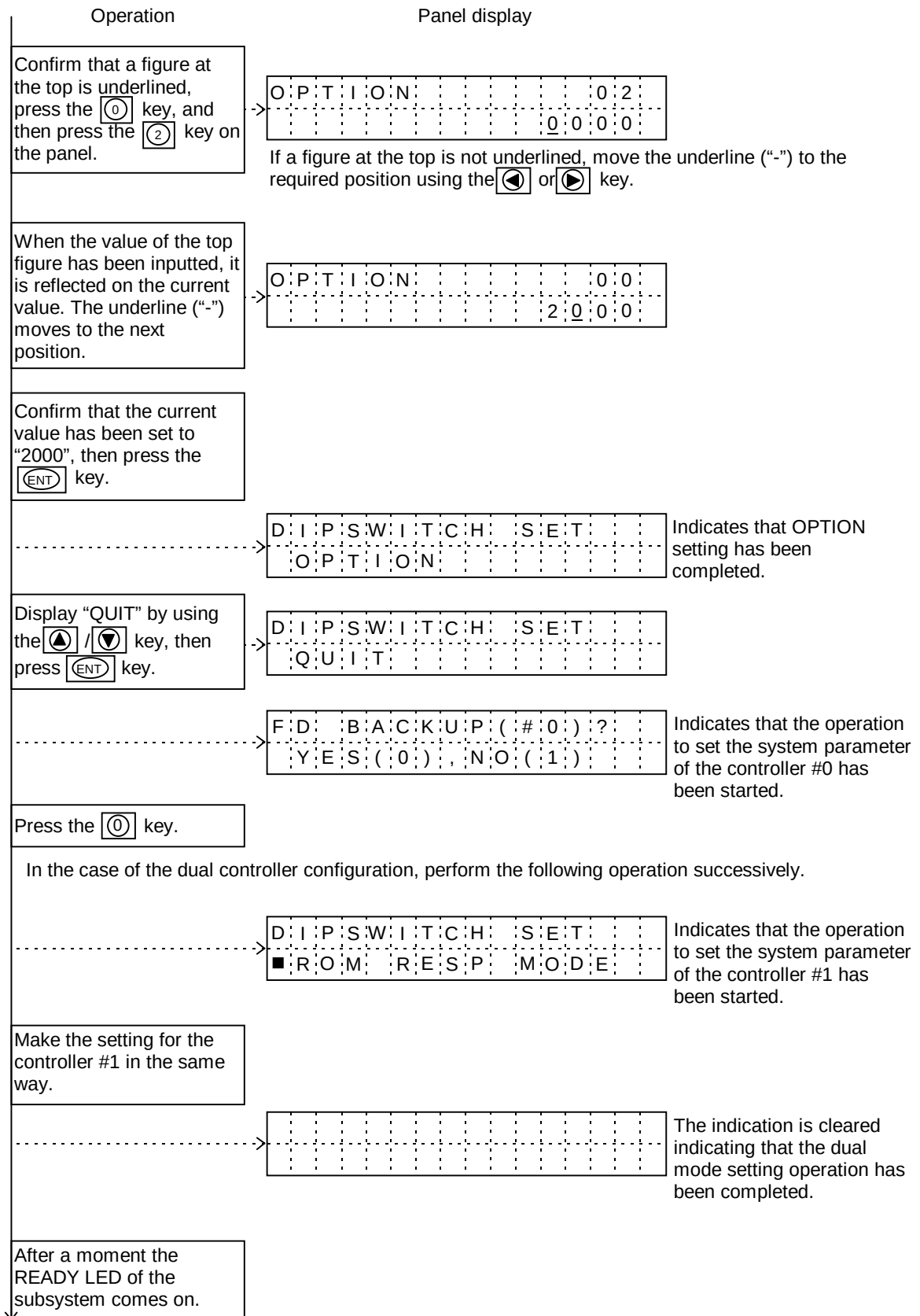


Figure 6.8.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.8.2.

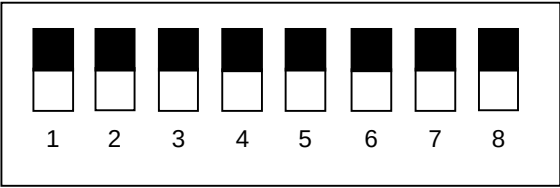


Figure 6.8.2 DIP switches (Being set for Standard setting)

6.9 When Sun OS Solaris 2.5.1 or later is used by the host side

If the following message is displayed on the console screen while executing SUN Format command, use the subsystem with its mode changed to this one.

[Computing capacity exceeds actual disk capacity.]

To use the subsystem in this mode, its microprogram version must be 0304/L, 0305/B or later.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.9.1.

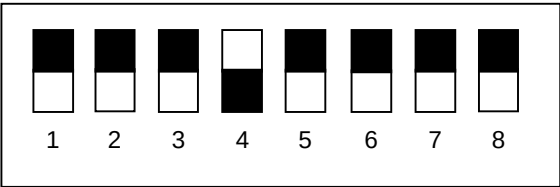
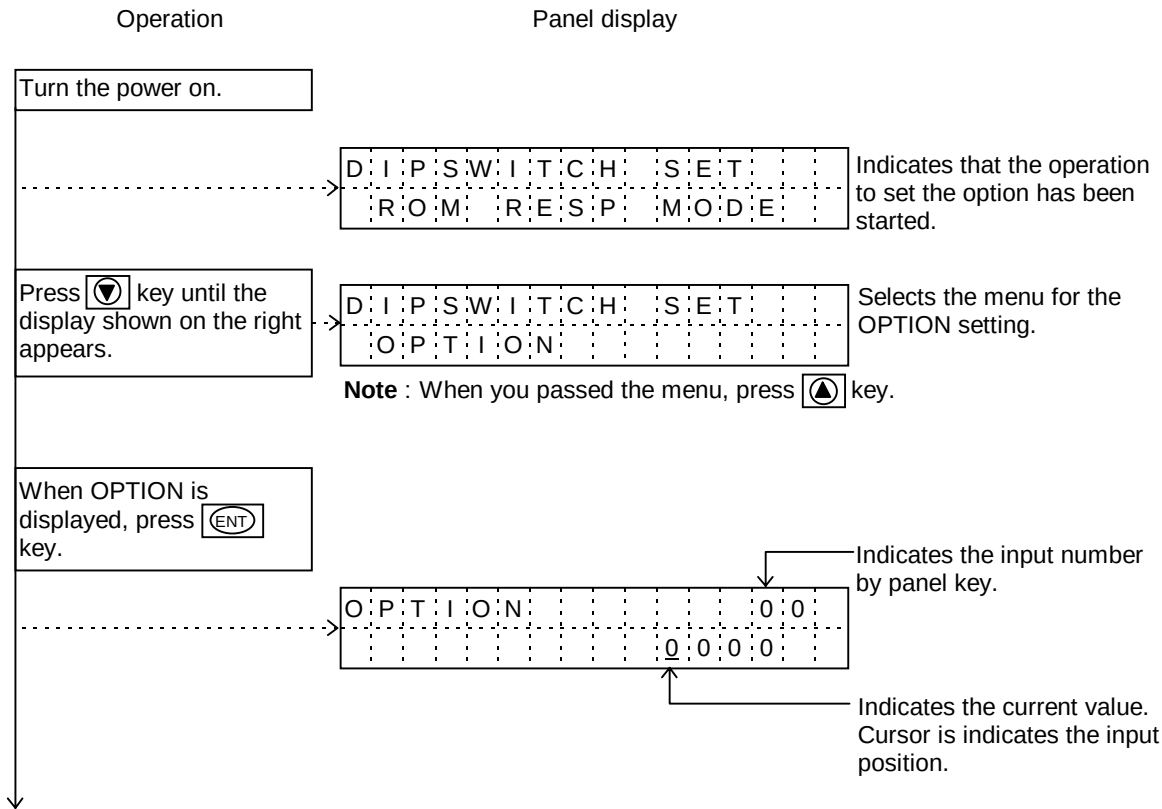
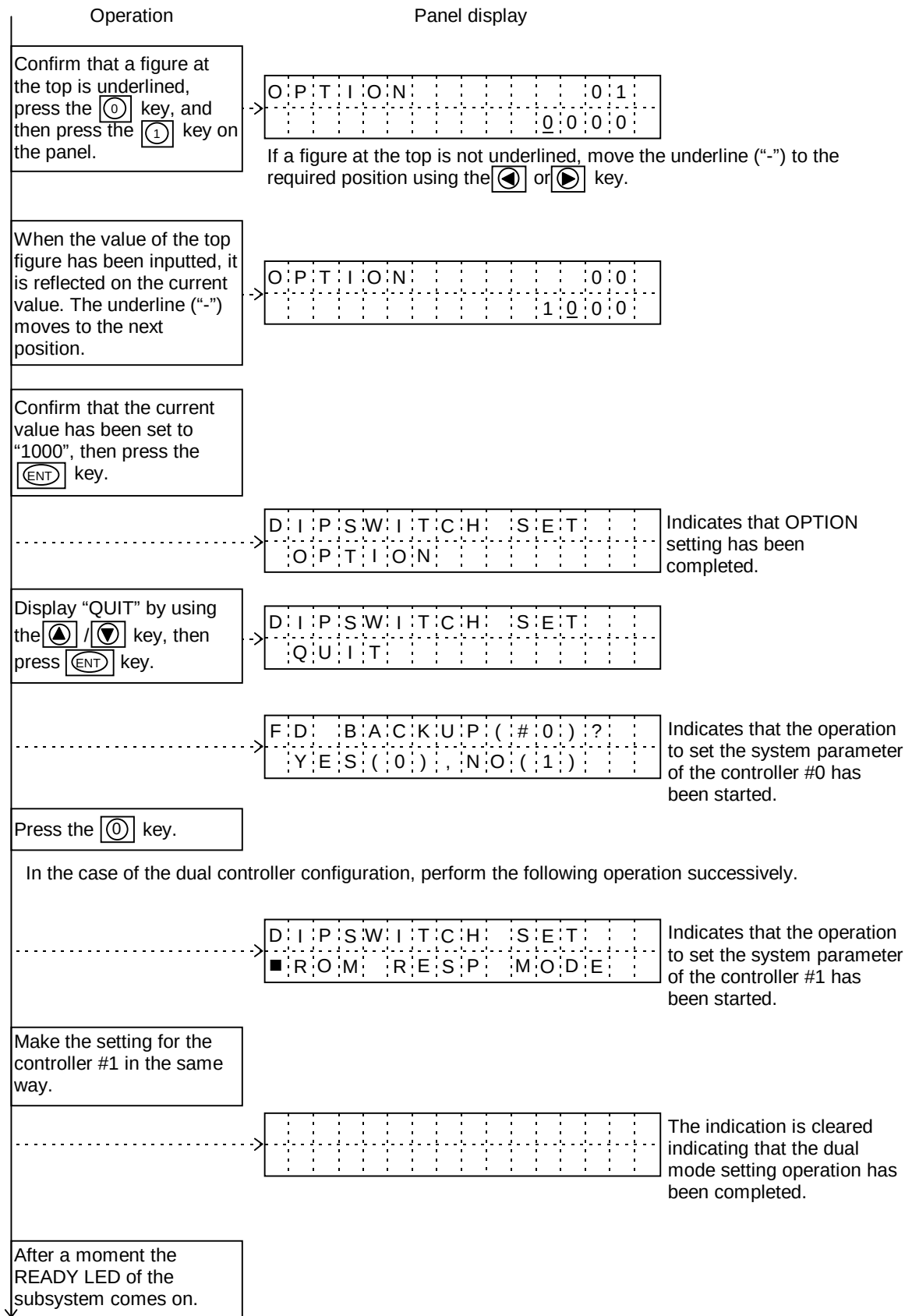


Figure 6.9.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.9.2.

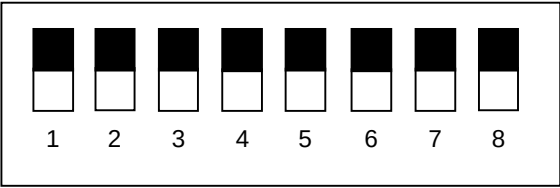


Figure 6.9.2 DIP switches (Being set for Standard setting)

6.10 When Using the Subsystem in Connection with MP5400

When using the subsystem in the state connected with the MP5400, it is necessary to use it with the microprogram Ver.0305/A or later. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.10.1.

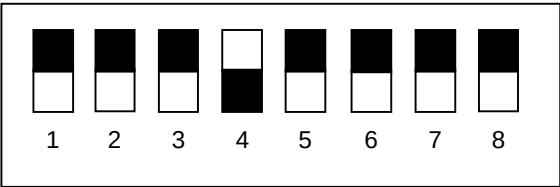
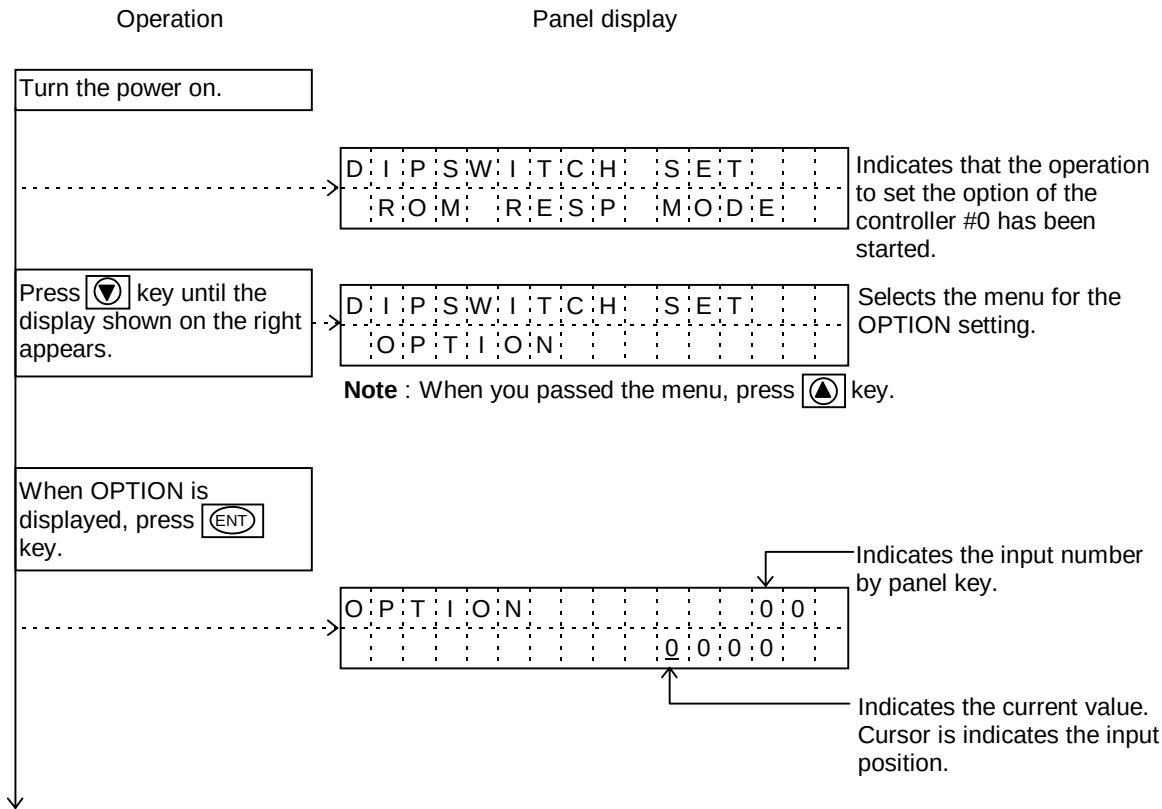
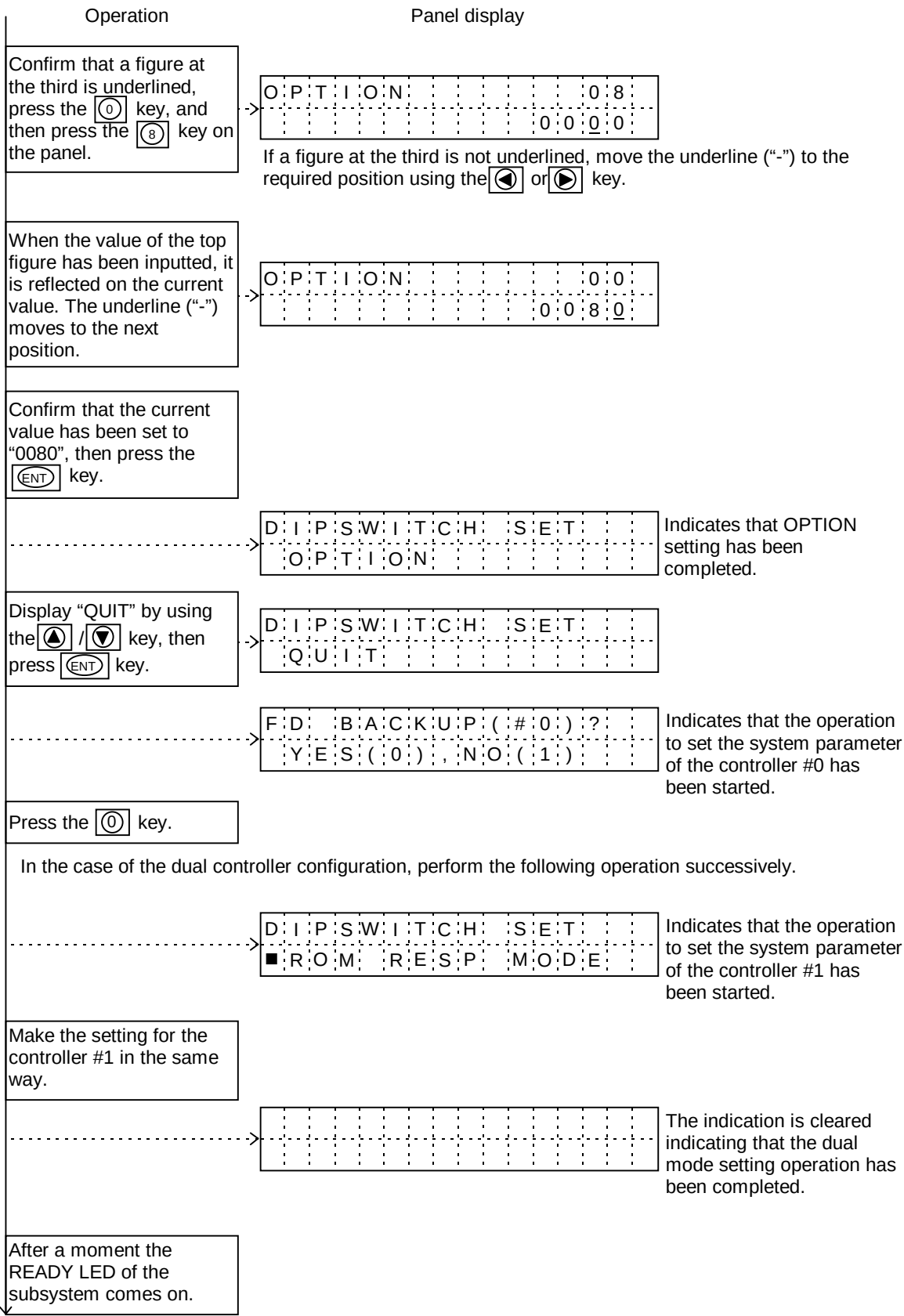


Figure 6.10.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.10.2.

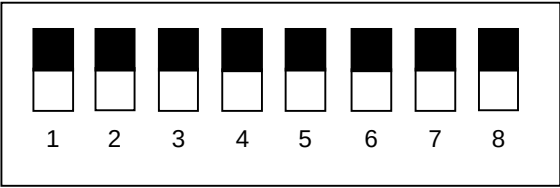


Figure 6.10.2 DIP switches (Being set for Standard setting)

6.11 When Using the Subsystem in LU Blockade Mode

When the subsystem is used in this mode, if a blockade failure occurs on the second disk in the same ROW, the disk concerned is blocked and the LU in which the disk concerned is included is blocked.

When the LU is blocked, data cannot be read from or written onto the LU concerned. If the blocked LU is accessed, a sense key/sense code=0313180 is reported.

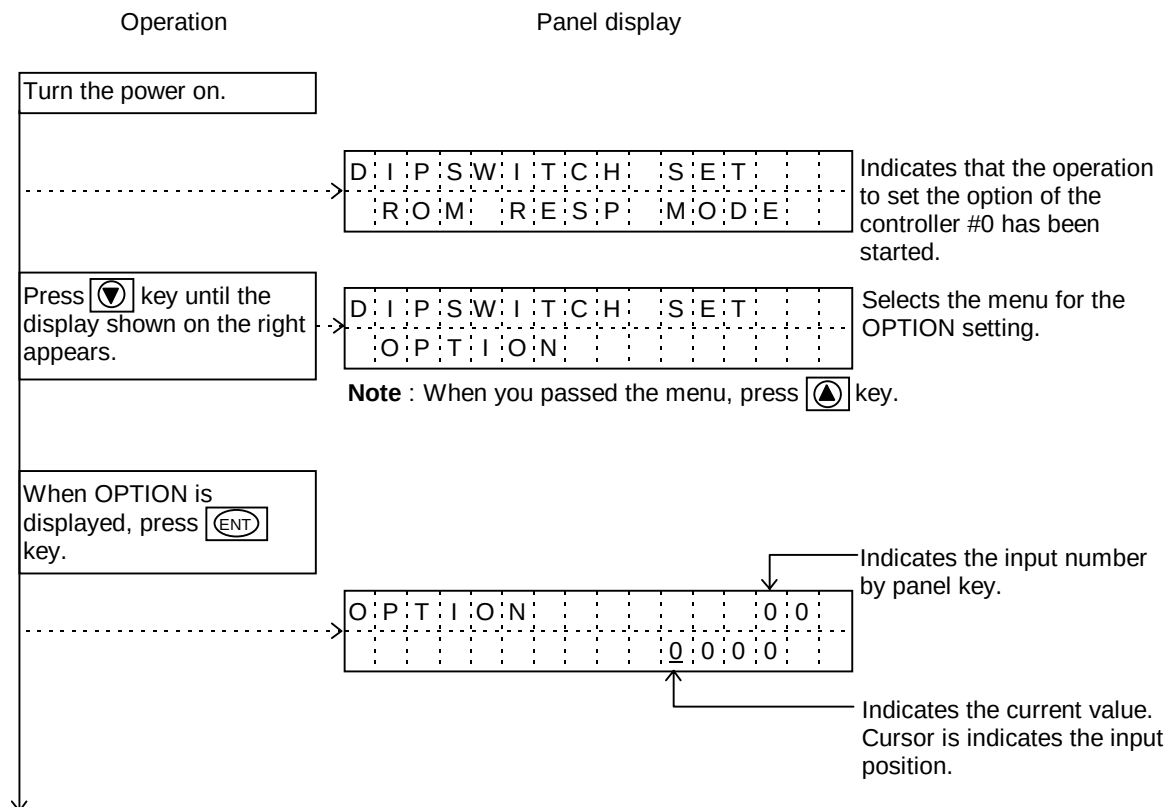
To use the subsystem in this mode, the microprogram must be Ver.0305/B or later.

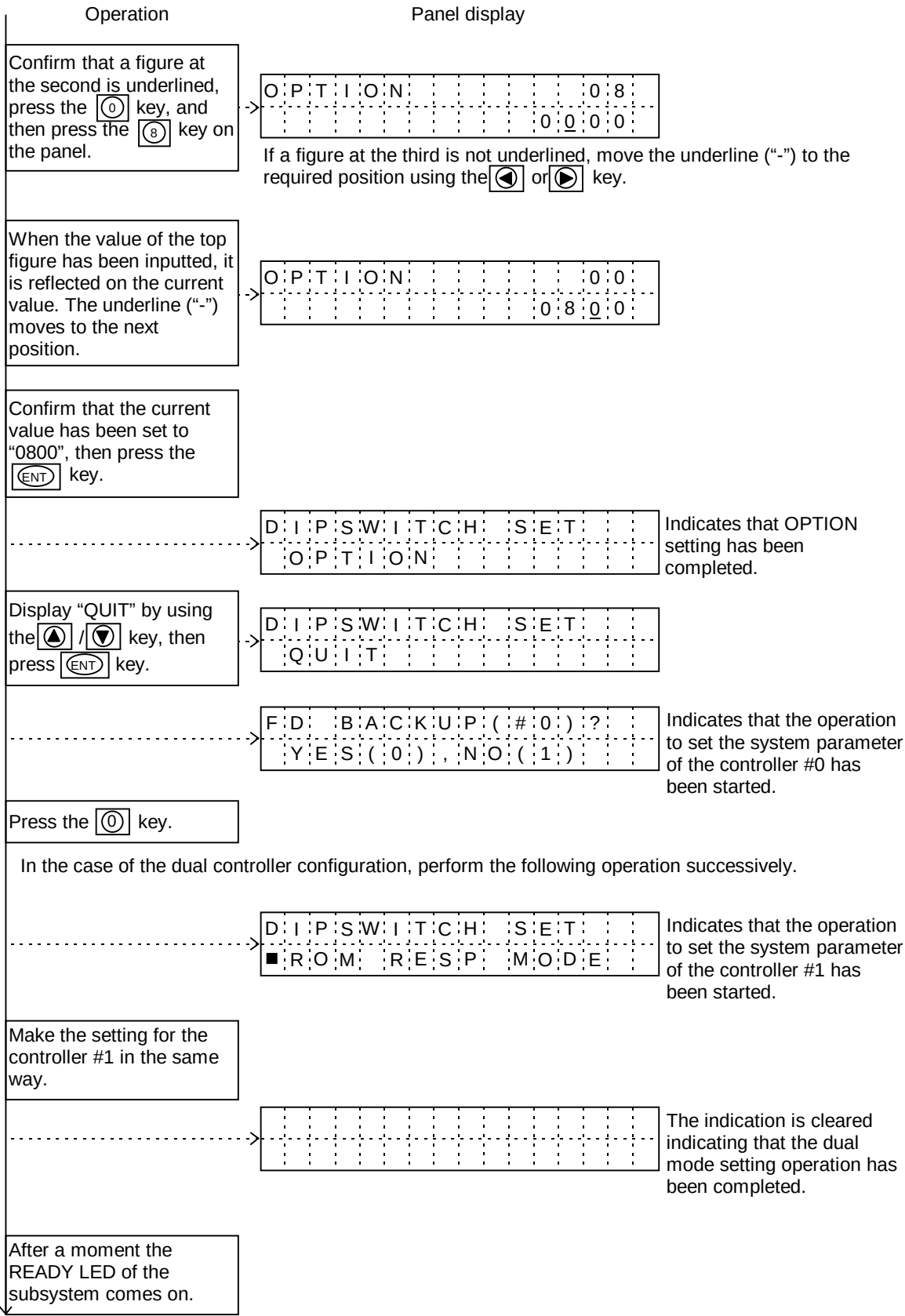
- (1) Before turning the power on, set DIP switch No.4 as Figure 6.11.1.



Figure 6.11.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.11.2.

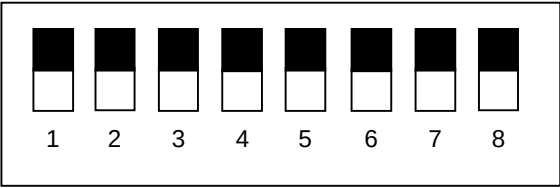


Figure 6.11.2 DIP switches (Being set for Standard setting)

6.12 When outputting information whether a warning is given in the subsystem via RS232C

When outputting information whether a warning is given in the subsystem via RS232C, the microprogram version 0307/F or later is required to be used. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.12.1.

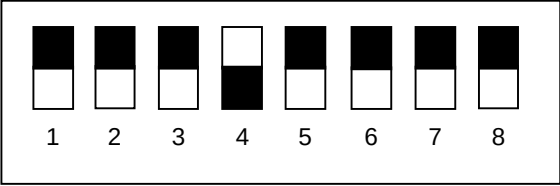
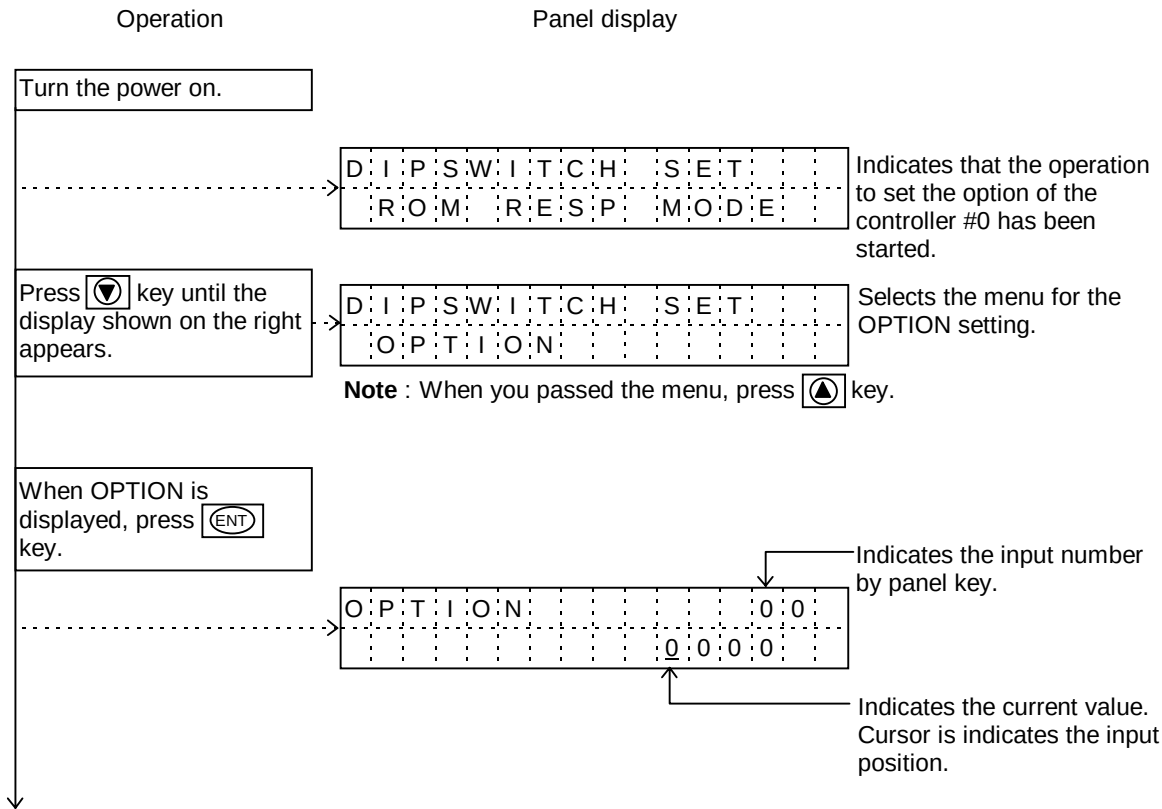
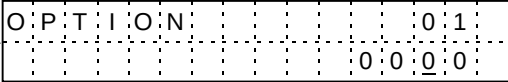
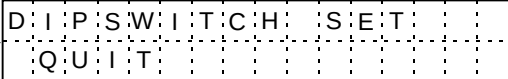
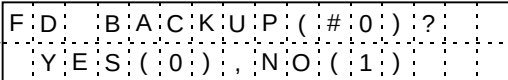
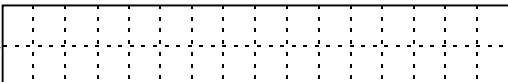


Figure 6.12.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the third is underlined, press the  key, and then press the  key on the panel.	 If a figure at the third is not underlined, move the underline ("—") to the required position using the  or  key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("—") moves to the next position.	
Confirm that the current value has been set to "0010", then press the  key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the  /  key, then press  key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the option setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.12.2.

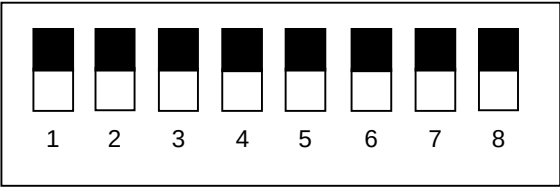


Figure 6.12.2 DIP switches (Being set for Standard setting)

DF350 Disk Subsystem

9. OPTIONAL INSTALLATION (Rack Mount (RKH/U1) Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Jan.31.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0240 0280	The description of DF-F350-A2E4A was added in the table. The description of DF-F350-A2E4A was added in the table.	AD AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0060 0070 0100 0110 0115 0210 0212 0214 0220 0240 0250 0280	Changed the flow. Changed the flow. Changed the flow. (2) was deleted. This page was newly added. Changed. This page was newly added. This page was newly added. Changed the figure. Changed the figure. (DIP switch) Changed the figure. Changed the figure.	CH CH CH DL AD CH AD AD CH CH CH CH
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0110 0212 0220	Delete Note. Change Flowchart. Added power off.	DL CH AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0020 0150 0172-0176 0240 0280 0290	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.) Added 2.6.1, 2.6.2. Added 2.6.1. These page were newly added. Added A2E8/A1E18. Added A2E8/A1E18 and (2). Change item No.	AD AD AD AD AD AD CH
6	Oct.15.'98	A.Yamanashi			0050 0060 0080 0090 0240 0280	Added case of the dual controller. Added case of the dual controller. Added case of the dual controller. Added case of the dual controller. Added A3E4/A2E8A. Added A3E4/A2E8A.	AD AD AD AD AD AD

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1. Note when Installing the Optional Features

- (1) Be sure to back-up copy user data before installing the optional features. A mis-operation might cause the loss of user's data.
- (2) Back-up the system parameter according to “Back-up Procedure of System Parameter”. (See RH-OPTION0050.)
- (3) Power off the subsystem according to power off procedure before installing the optional features. If not, user's data might be lost.

2. Installing the Optional Features

2.1 Unit Appearance Check

Check visually the unit appearance for distortion or damage during the transportation.

2.2 Checking Items of System Components and the Other Items Shipped with the Unit

Check items and quantities of system components (model, serial number, and quantity) and other items shipped together with the unit. Cross-check with the packing list.

2.3 Back-up Procedure of System Parameter

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) are need to be copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters following “Back-up procedure to FD” (See RH-OPTION0050) or “Restoring procedures from FD” (See RH-OPTION0080).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to RH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

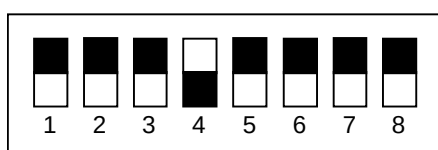
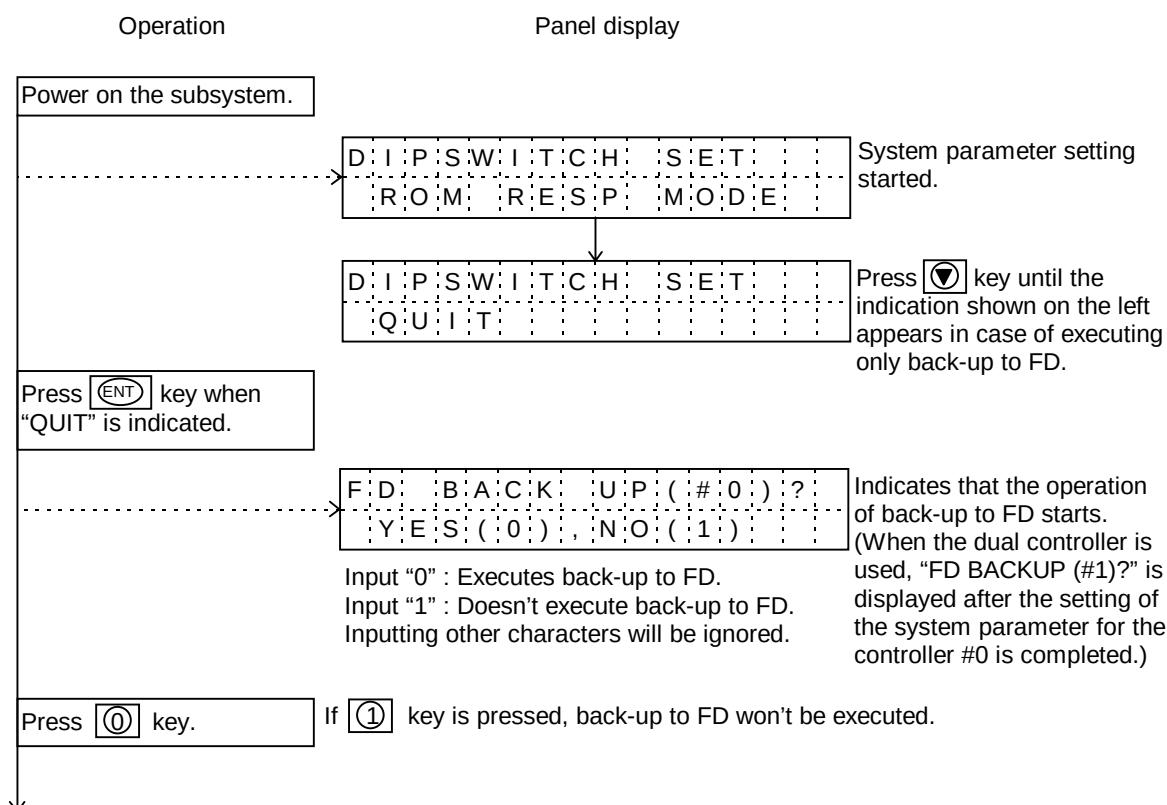
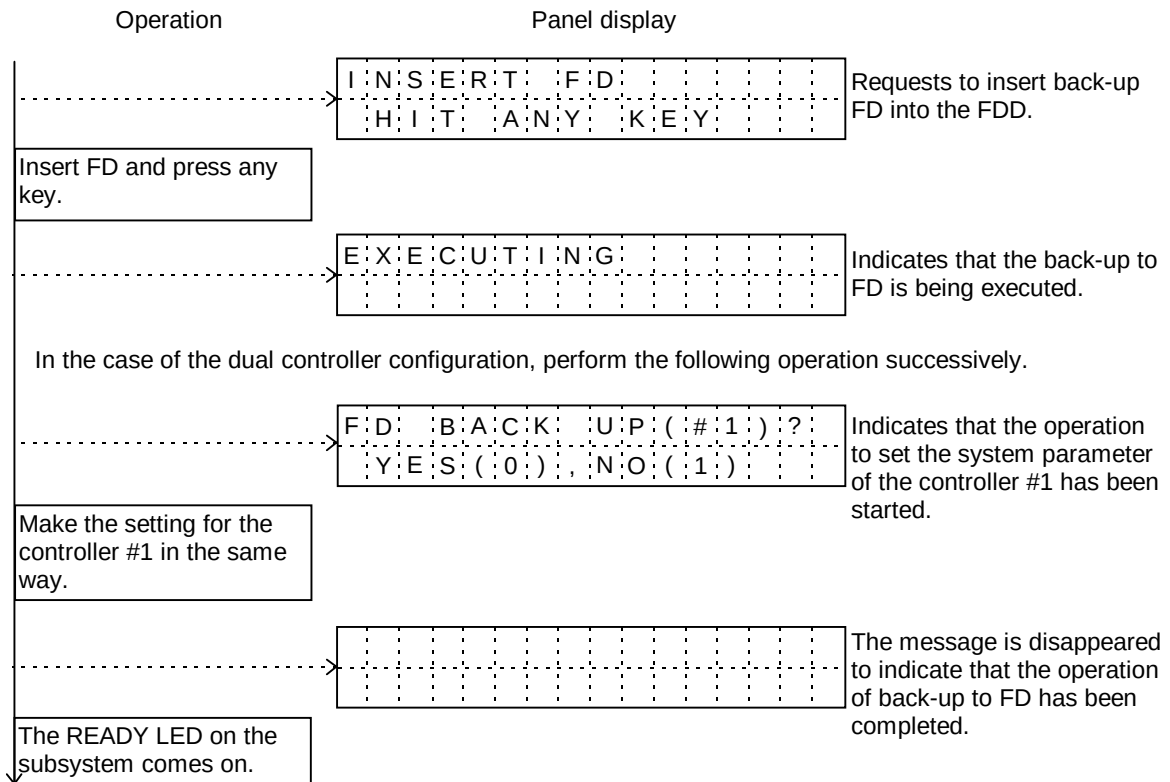


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

- (3) Operate as described below.





(4) Set DIP switch No.4 as shown in Figure 2.3.2.

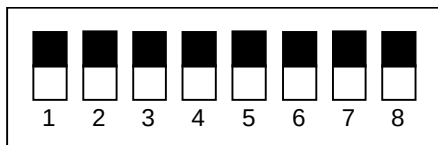
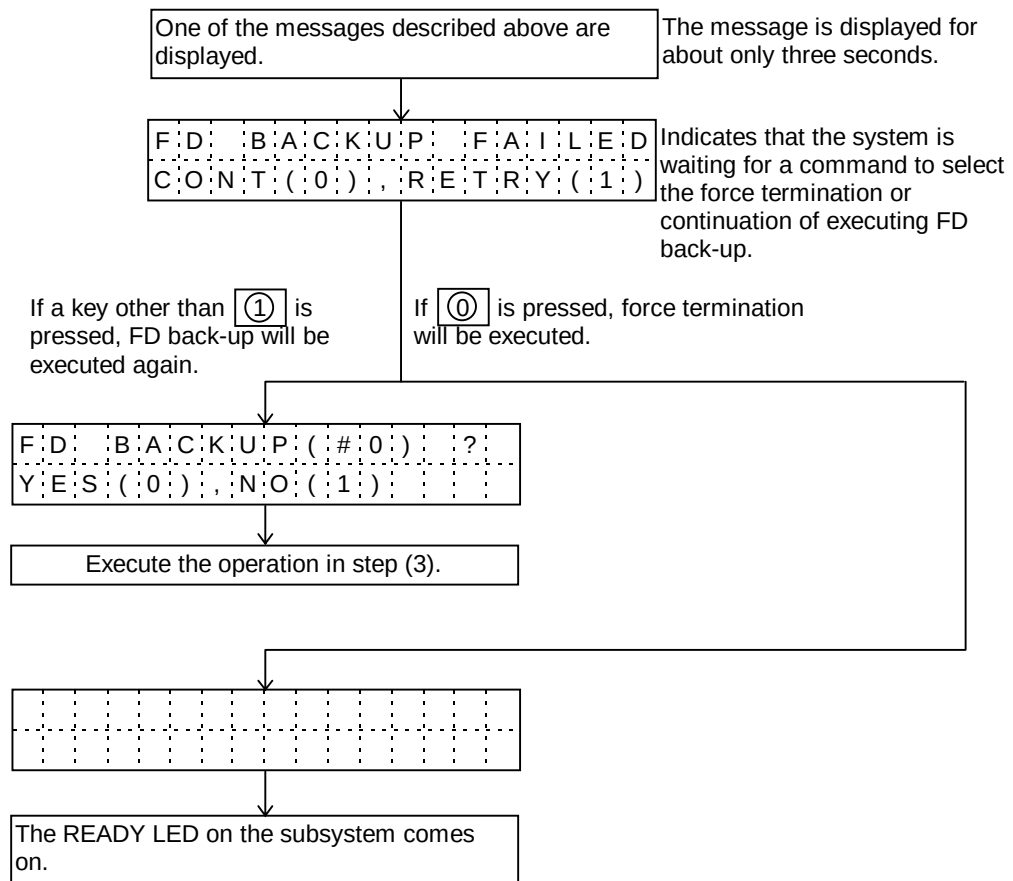


Figure 2.3.2 DIP Switches

Note 1 : While the back-up to FD is being executed, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP switches as shown in Figure 2.3.3.

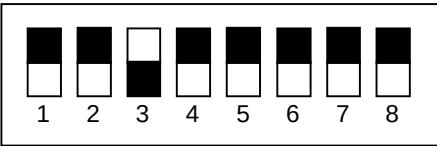
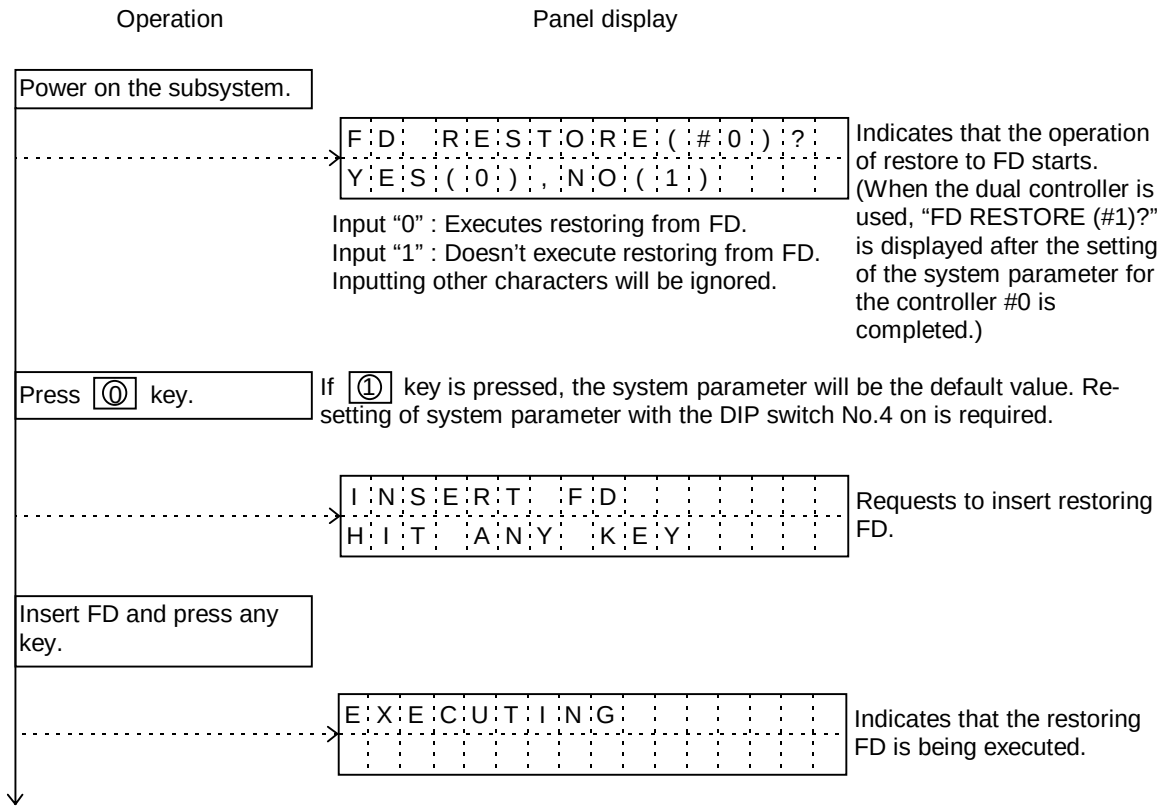
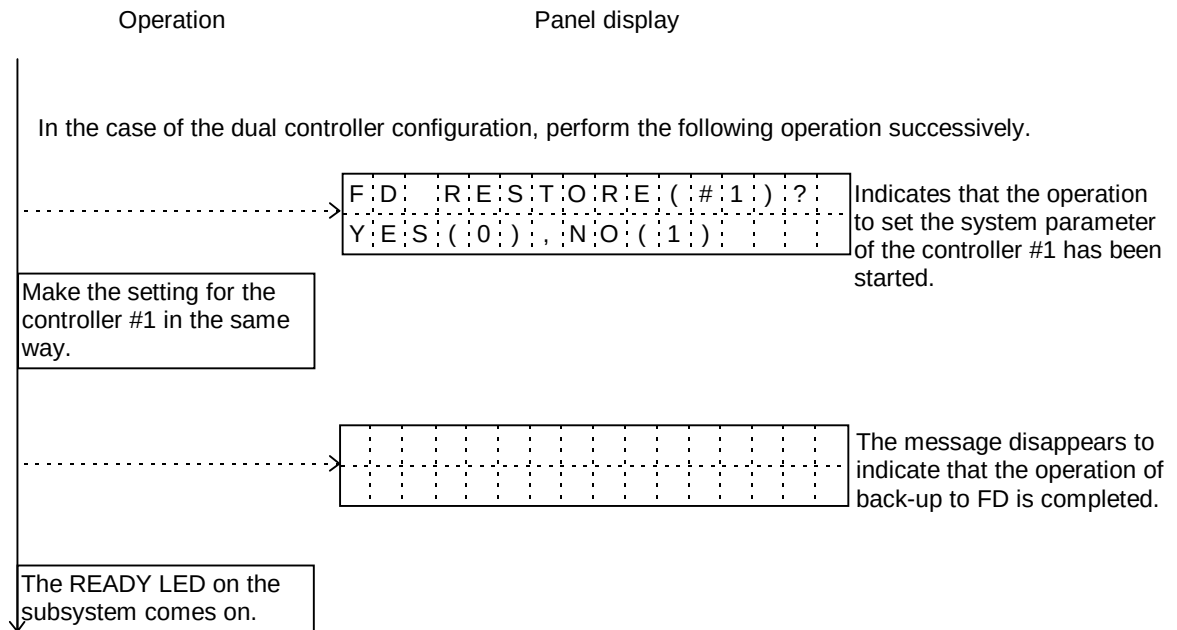


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

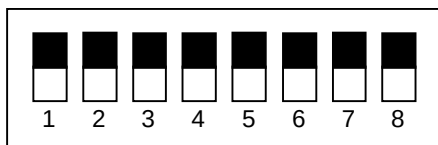
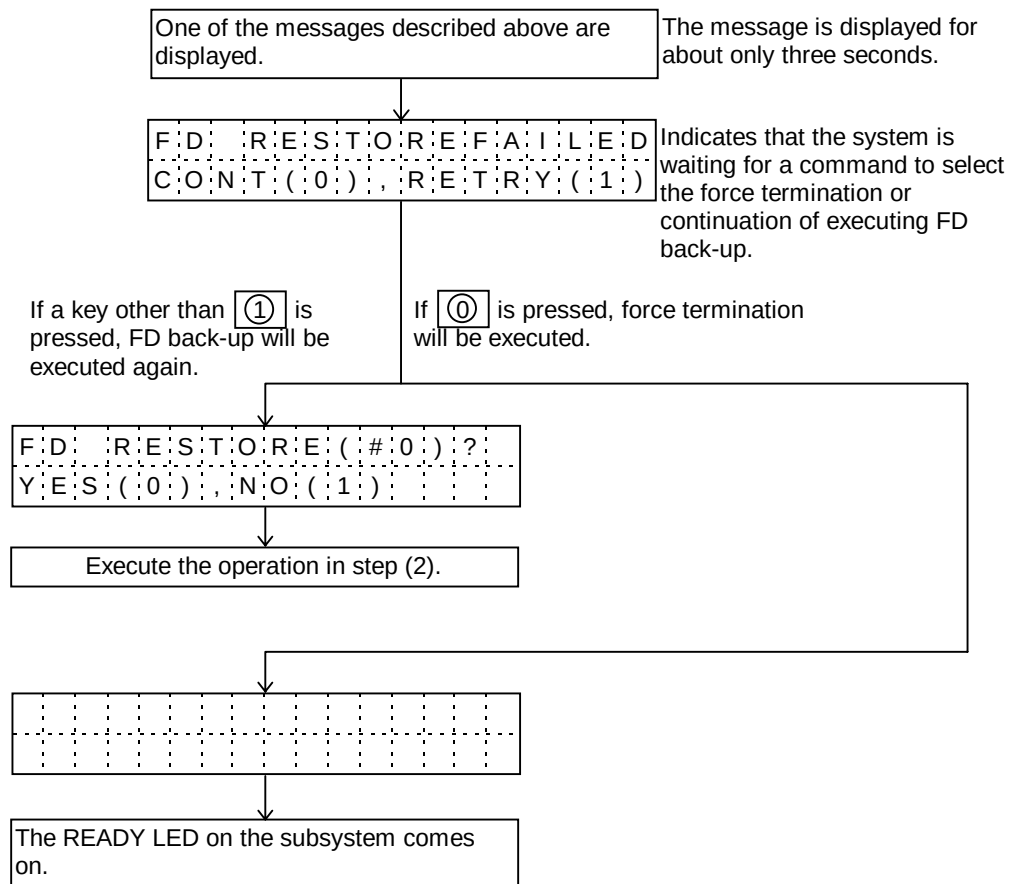


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-execute following the operation described below.



Note 2 : In case that restoring operation ended in failure and was force terminated, setting of EEPROM will be default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

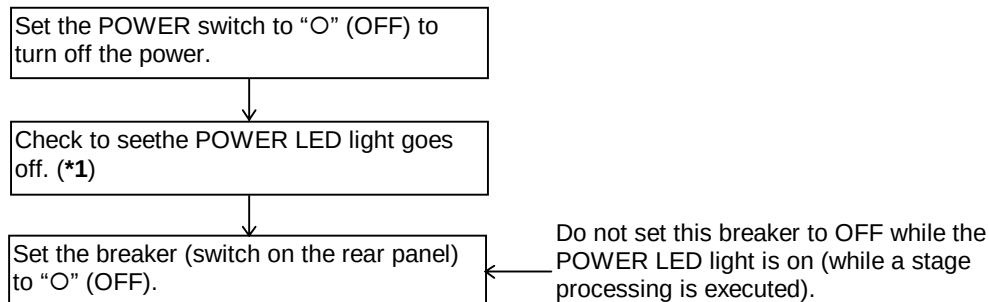
Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

2.4 Power OFF

Turn off the power correctly according to the Power OFF Procedure (1) shown below.

Notice : If optional features are not installed to the system correctly, user data may be lost.

(1) Power OFF procedure



If a power down occurs or the breaker is set to OFF by mistake before the POWER LED goes off, turn on the power right away according to the “(2) Power ON procedure” below, then execute the power off procedure above.

*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to “|” (ON) with the power switch (POWER SW) set to “O” (OFF).

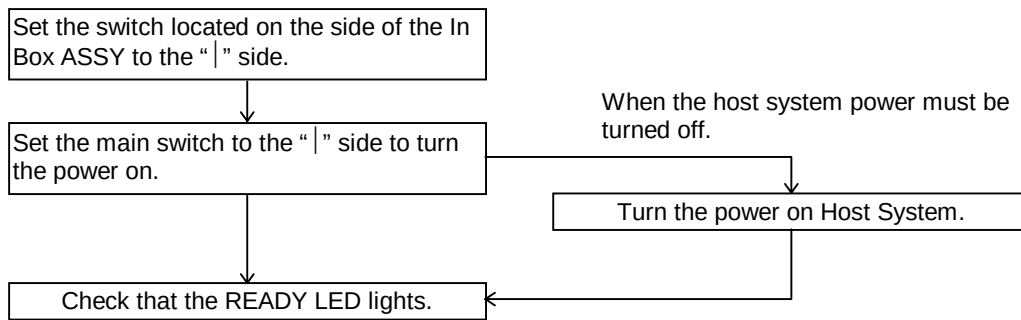
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on----- Indicates the back-up mode.

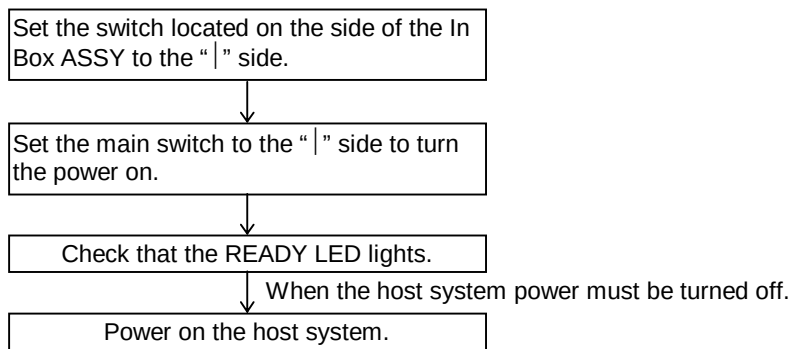
CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.5 Attaching/Removing and Opening/Closing the Covers

2.5.1 Attaching/Removing the front cover

- (1) Removing procedure. (See Figure 2.5.1.)

① Hold the grooves at both sides of the front cover and pull it toward you.

Note : Attach/Remove the front cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

- (2) Attaching procedure. (See Figure 2.5.1.)

① Fit the guide plate of the main body with the slots of the front cover (four places), press the front cover against them.

Note : Attach/Remove the front cover gently to avoid a shock. Precision components are installed.

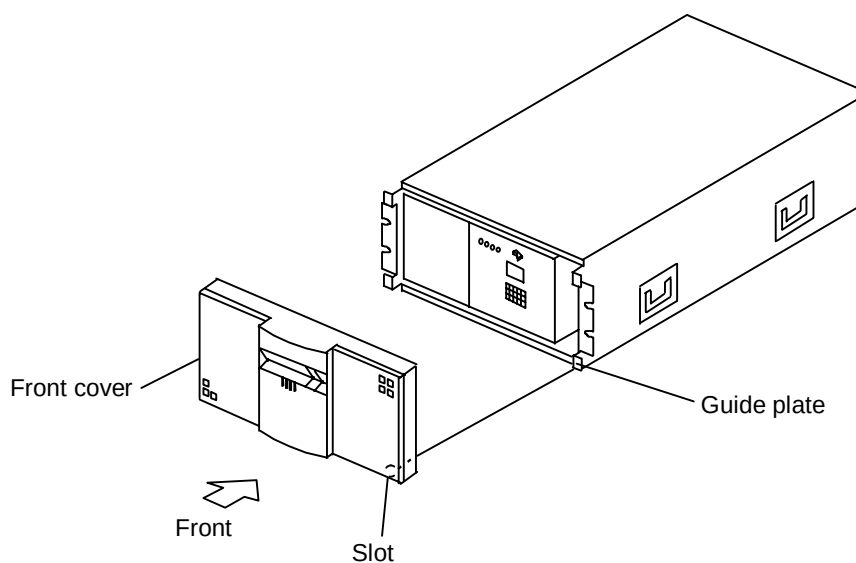


Figure 2.5.1 Attaching/Removing the Front Cover

2.5.2 Opening/Closing the front panel

(1) Opening procedure (See Figure 2.5.2.)

- ① Remove the front cover. (See RH-OPTION0120.)
- ② Insert the key, turn it to the arrow direction (···➤) and hold the left of the front panel to open to the right.

Note : Open/Close the covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing procedure (See Figure 2.5.2.)

- ① Close the front panel.
- ② Turn the key to the arrow direction (➡) and secure the front panel.
- ③ Attach the front cover.

Note : Keep the key carefully lest it should be lost.

Note : Open/Close the covers gently to avoid a shock. Precision components are installed.

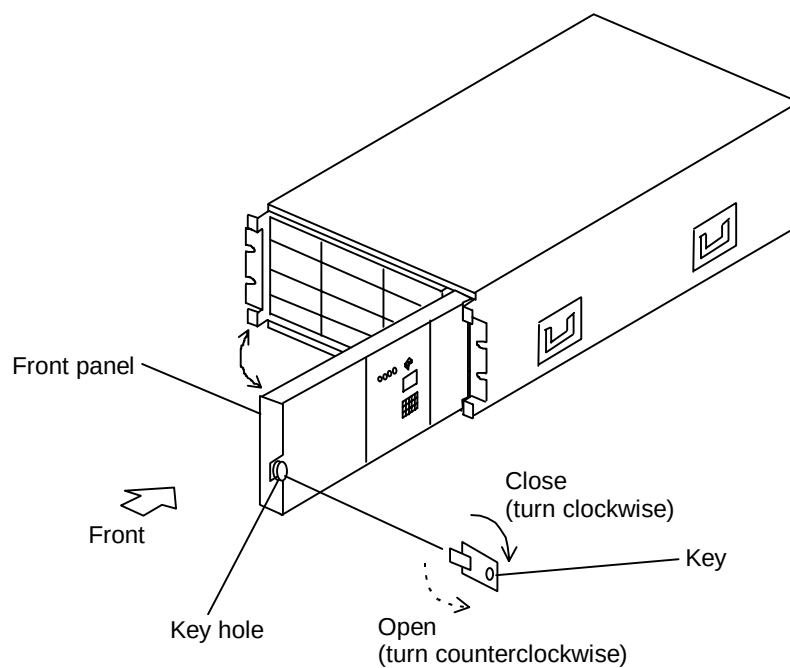


Figure 2.5.2 Opening/Closing the Front Panel

2.5.3 Attaching/Removing the rear covers

Tools : Philips screwdriver (No.2)

(1) Removing procedure (See Figure 2.5.3.)

- ① Remove (a) screw and 4 (b) screws, and remove rear cover 1.
- ② Remove 4 (a) screws of 2 rear cover 2s, and remove rear cover 2s.

Note : Attach/Remove the rear covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Installing procedure. (See Figure 2.5.3.)

- ① Fix rear cover 2 then rear cover 1 in the reversed order as removing procedure.

Note : Attach/Remove the rear covers gently to avoid a shock. Precision components are installed.

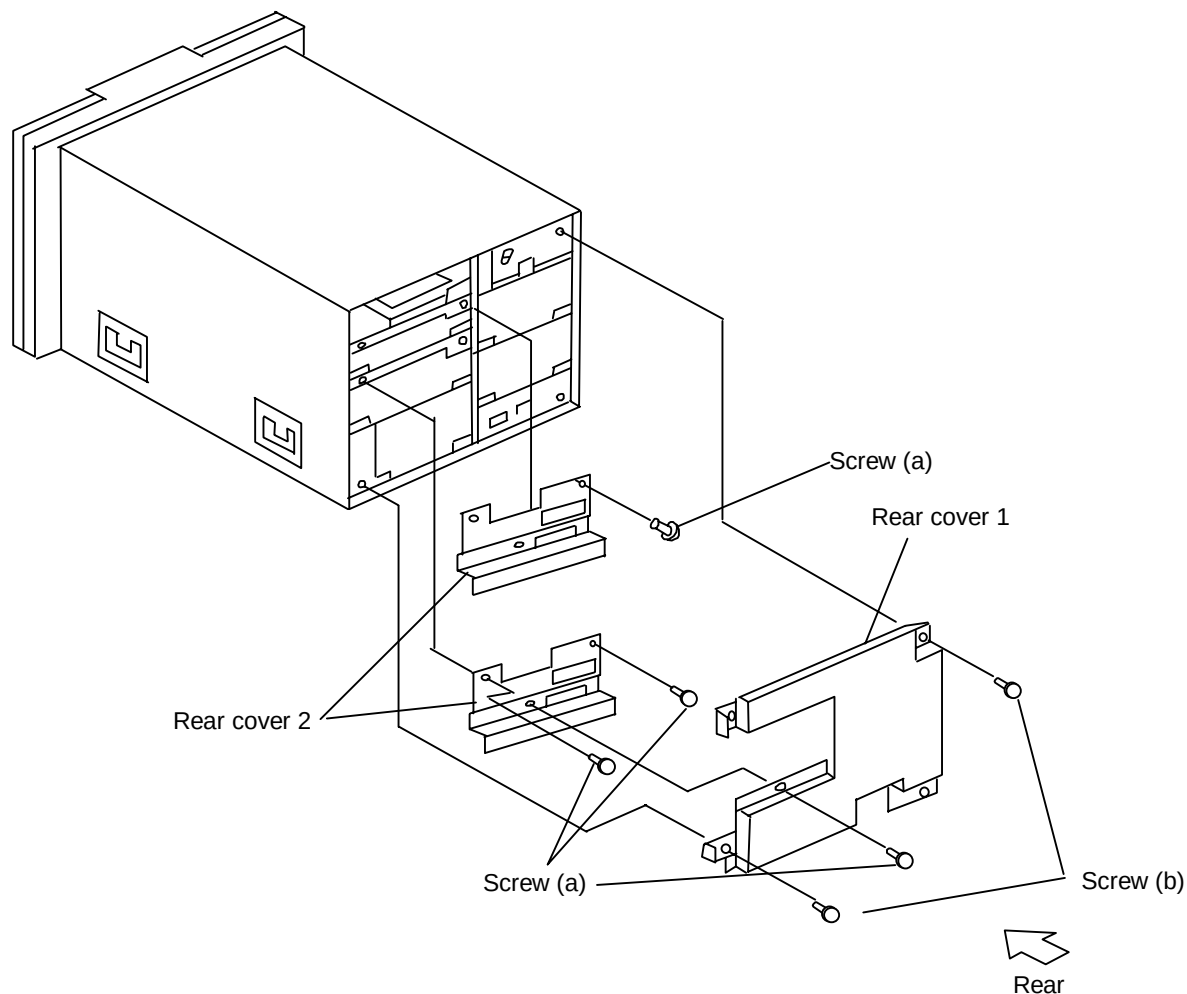


Figure 2.5.3 Opening/Closing the Rear Cover

2.6 Installing the CTL ASSY and I/F ADAPTER ASSY

2.6.1 When changing the single controller configuration to the dual controller configuration

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See RH-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Remove rear cover 1 and 2.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on RH-OPTION0180.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked erection (→) at the same time. (See Figure 2.6.1.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.6.1.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

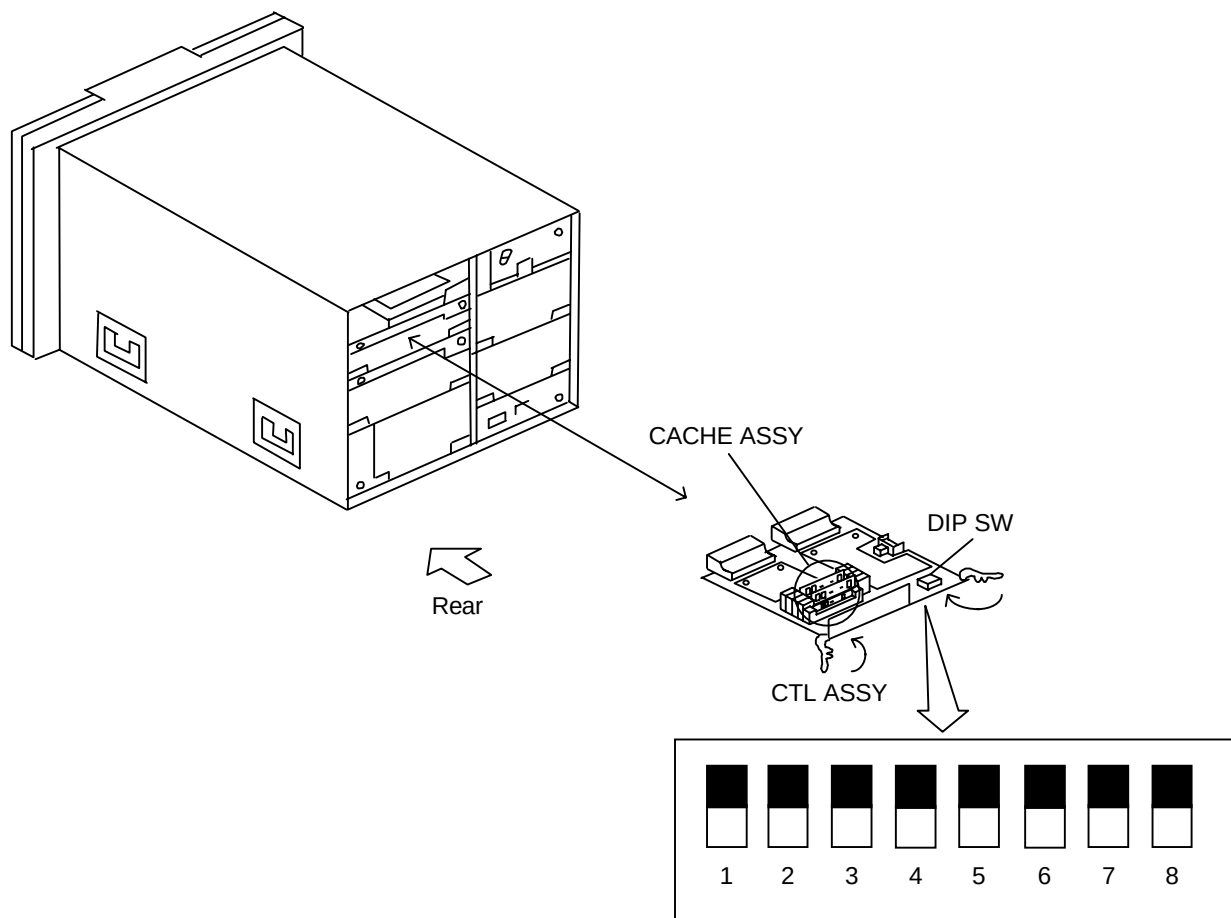


Figure 2.6.1 Installing the CTL ASSY

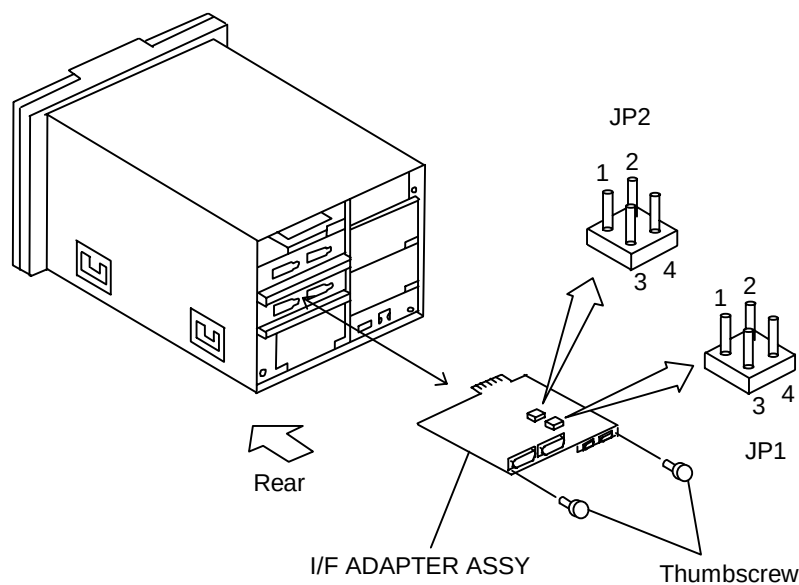
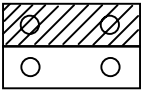
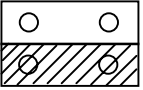
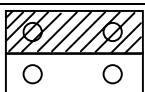
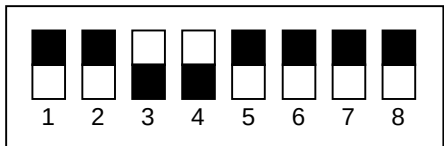


Figure 2.6.2 Installing the I/F ADAPTER ASSY

Table 2.6.1 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. (See RH-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

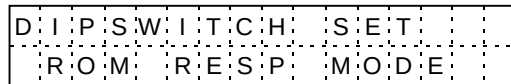
- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See RH-OPTION0080.)

- (10) When system parameter set up menu appears as below, select "DUAL MODE" in "DUAL CONFIG" (setting of Dual operation attribute) menu. (See PANEL0080.)

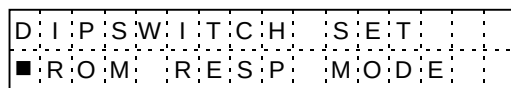
Set target ID for each CTL ASSY individually in "TARGET ID" (setting Target ID) menu.

Set the items #1, 2, 4, 5, 9, 11, 14, 17, 22, 25 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. "■" appears on the panel when the CTL1 system parameter is to be set.
 "■" not displayed : CTL0 system parameter is set.
 "■" displayed : CTL1 system parameter is set.

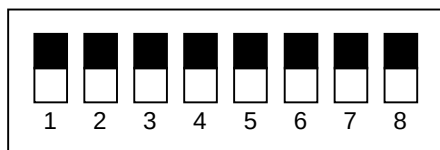


This indicates CTL0 system parameter setting.



This indicates CTL1 system parameter setting.

- (11) After the setting is ended, make a copy of the data into the back-up FD again. (See RH-OPTION0060.)
- (12) Check to see that READY LED is on.
- (13) Turn off the unit (by setting the POWER switch on the front panel to off).
- (14) Set the DIP SW on both boards as shown below.



- (15) Turn on the unit (by setting the POWER switch on the front panel to on). (See RH-OPTION0110.)
- (16) In a short while, the READY LED on the unit comes on.
 Check to see "Version XXXX/X" is displayed on the PANEL, and that corresponds to see system floppy disk version.
- (17) Attach Rear Cover 1 and 2.

2.6.2 When changing the single controller configuration using in WolfPack connection to the dual controller configuration

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See RH-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Remove rear cover 1 and 2.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on RH-OPTION0180.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked erection (→) at the same time. (See Figure 2.6.3.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.6.3.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

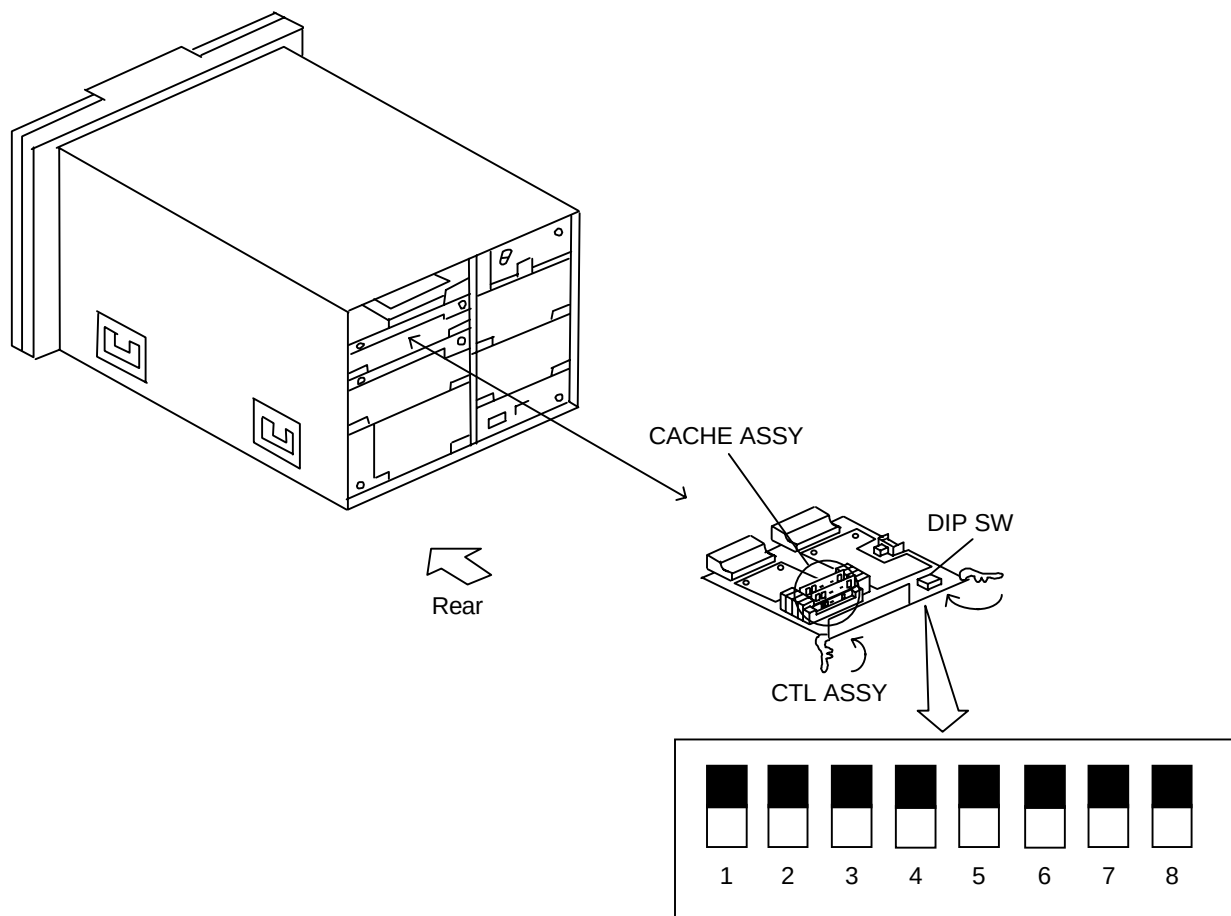


Figure 2.6.3 Installing the CTL ASSY

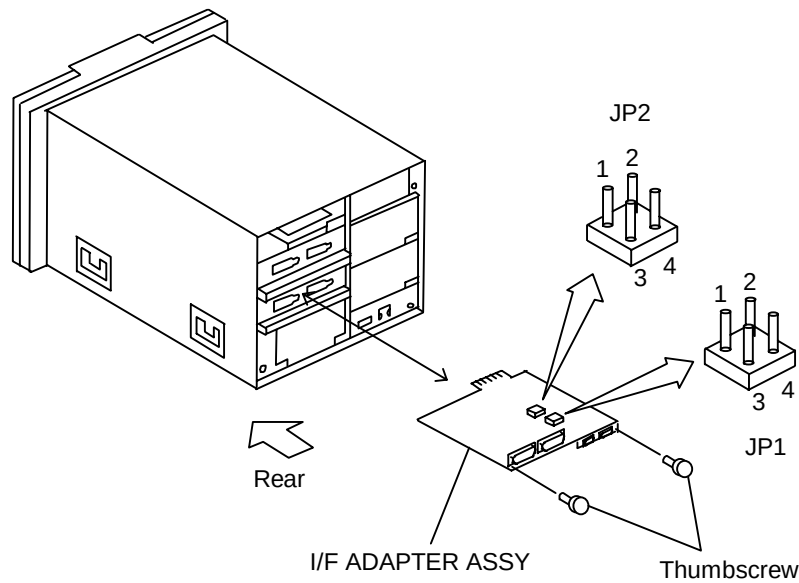


Figure 2.6.4 Installing the I/F ADAPTER ASSY

Table 2.6.2 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. (See RH-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See RH-OPTION0080.)

(10) Set the following system parameters.

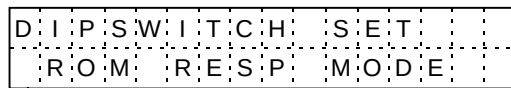
- Set the attribute to “DUAL ACTIVE” and “DATA SHARE MODE” in the DUAL CONFIG (dual operation attribute setting) menu window.
- Set the code “0020” in the OPTION (option code setting) menu window.
- Set the target ID separately for the both CTL ASSYs in the TARGET ID (target ID setting) menu window.

Set the items #1, 2, 4, 5, 9, 11, 14, 17, 22, 25 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

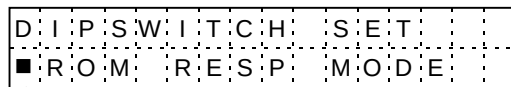
- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. “■” appears on the panel when the CTL1 system parameter is to be set.

“■” not displayed : CTL0 system parameter is set.

“■” displayed : CTL1 system parameter is set.



This indicates CTL0 system parameter setting.



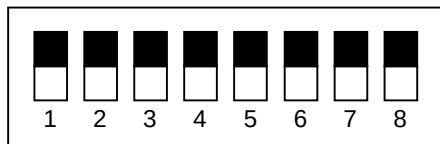
This indicates CTL1 system parameter setting.

(11) After the setting is ended, make a copy of the data into the back-up FD again. (See RH-OPTION0060.)

(12) Check to see that READY LED is on.

(13) Turn off the unit (by setting the POWER switch on the front panel to off).

(14) Set the DIP SW on both boards as shown below.



(15) Turn on the unit (by setting the POWER switch on the front panel to on). (See RH-OPTION0110.)

(16) In a short while, the READY LED on the unit comes on.

Check to see “Version XXXX/X” is displayed on the PANEL, and that corresponds to see system floppy disk version.

(17) Attach Rear Cover 1 and 2.

2.7 Installing the CACHE ASSY

- (1) Turn off the power according to the power-off procedure in RH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Section" (See TRBL0030) and turn off the power.

- (2) Remove Rear Cover 1 and 2.

- (3) Remove the CTL ASSY. (See RH-OPTION0150.)

(When a DF-F350-F2MCF has been installed already, remove both boards, and here after in the same way.)

- (4) Install a CACHE ASSY.

Note 1 : The capacity of the CACHE ASSYs to be mounted in cache slots #0 and #4, slots #1 and #5, slots #2 and #6, and slots #3 and #7 must be the same.

Note 2 : If a DF-F350-F2MCF has been installed already, mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- (5) Mount the CTL ASSY.

- (6) Attach Rear Cover 1 and 2 and turn the power on following RH-OPTION0110.

Installation example of CACHE ASSY

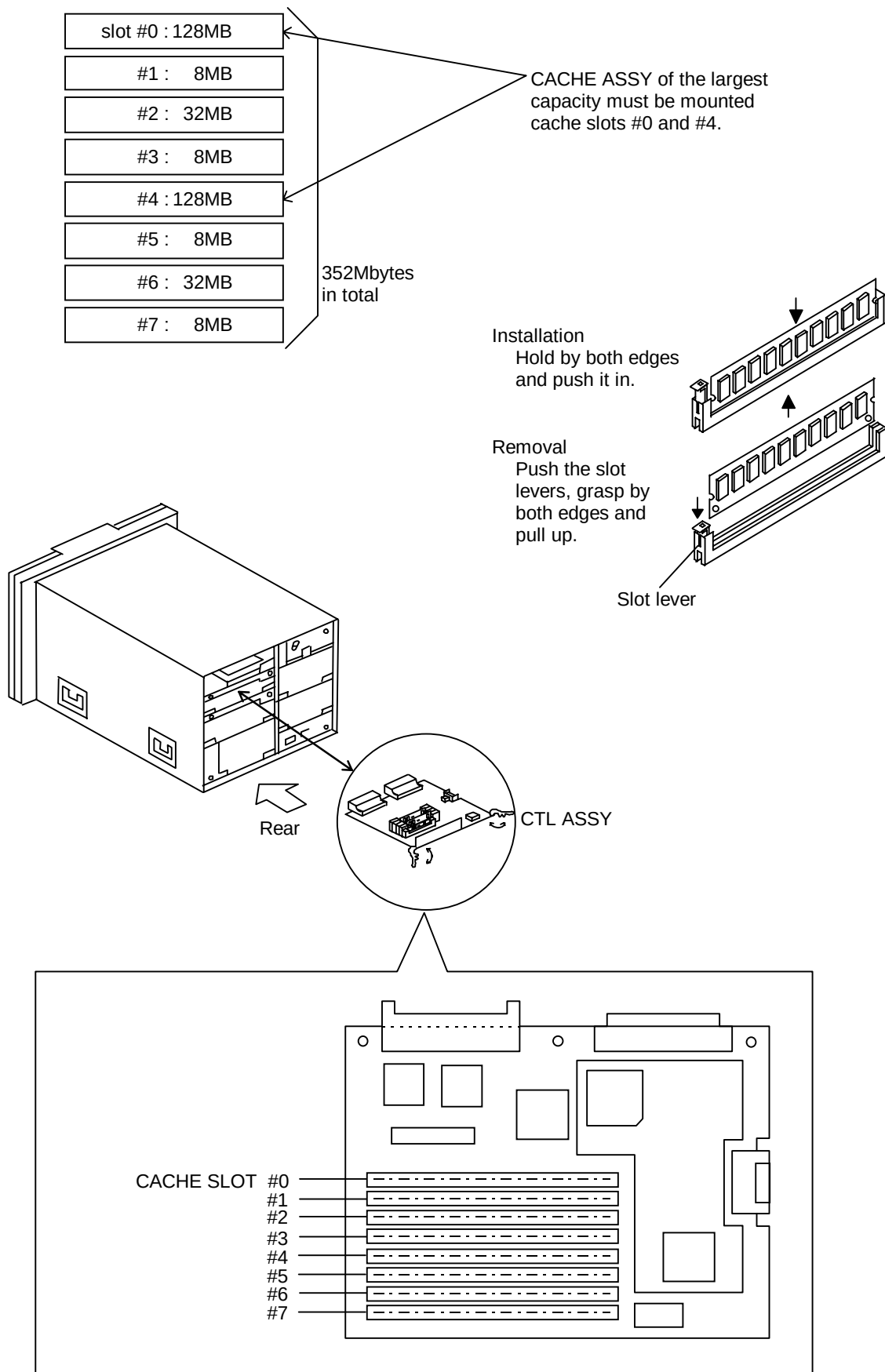


Figure 2.7.1 Installing a CACHE ASSY

2.8 Installing the LAN ASSY

- (1) Turn off the power according to the power-off procedure in RH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove rear cover 1 and 2.
- (3) Remove the CTL ASSY. (See RH-OPTION0150.)
- (4) Install a LAN ASSY. (See Figure 2.8.1.)

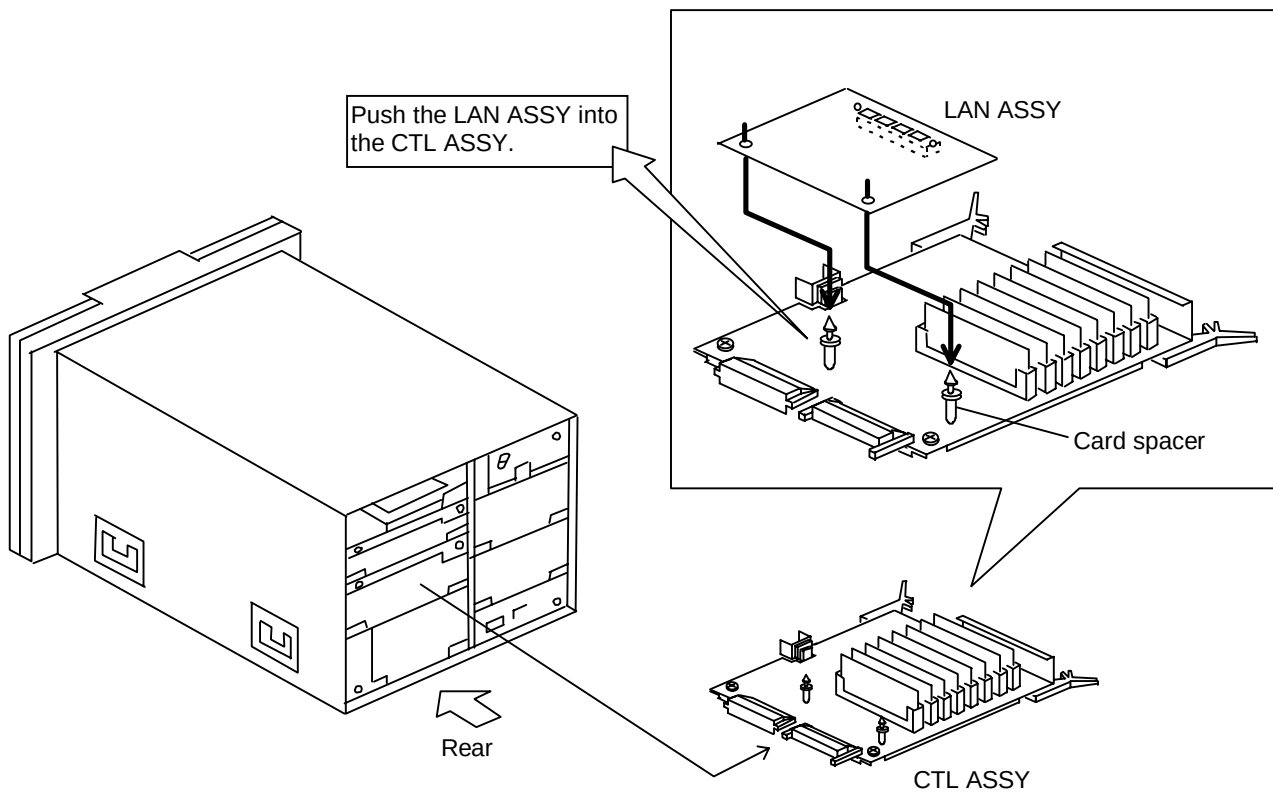
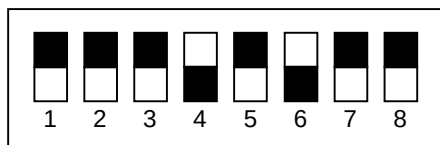


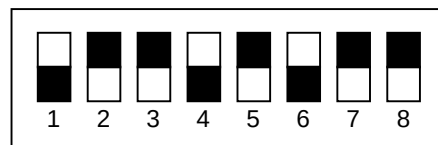
Figure 2.8.1 Installing a LAN ASSY

- (5) Mount the CTL ASSY.
 - (6) Set the DIP switches on the CTL ASSY as described below. (See RH-OPTION0150.) depending on the LAN ASSY to be used.
- (When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

[DF-F350-G1M1]



[DF-F350-G2M1 (SNMP)]



- (7) Turn on the power according to the power-on procedure in RH-OPTION0110.
- (8) Remove the front cover.
- (9) Set LAN connection state on the panel.

① Panel display

C	O	N	N	E	C	T
L	A	N				

← Pressing , key, items are scrolled.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”.)

② Displayed Item

No.	Message display	Description
1	CONNECT	LAN connected
2	NOT CONNECT	LAN not connected

- (10) Set IP address on the panel. (See RH-INST0330)
- (11) Set SUB NET MASK. (See RH-INST0340)
- (12) Set DEFAULT GATEWAY address. (See RH-INST0350.)
- (13) Set System parameter on the panel. (See RH-INST0290.)
- (14) After setting ② in Chapter 5 and selecting “QUIT” on the panel, when “FD BACK UP” appears on the screen, insert a back-up FD and make a back-up copy of the system parameter.

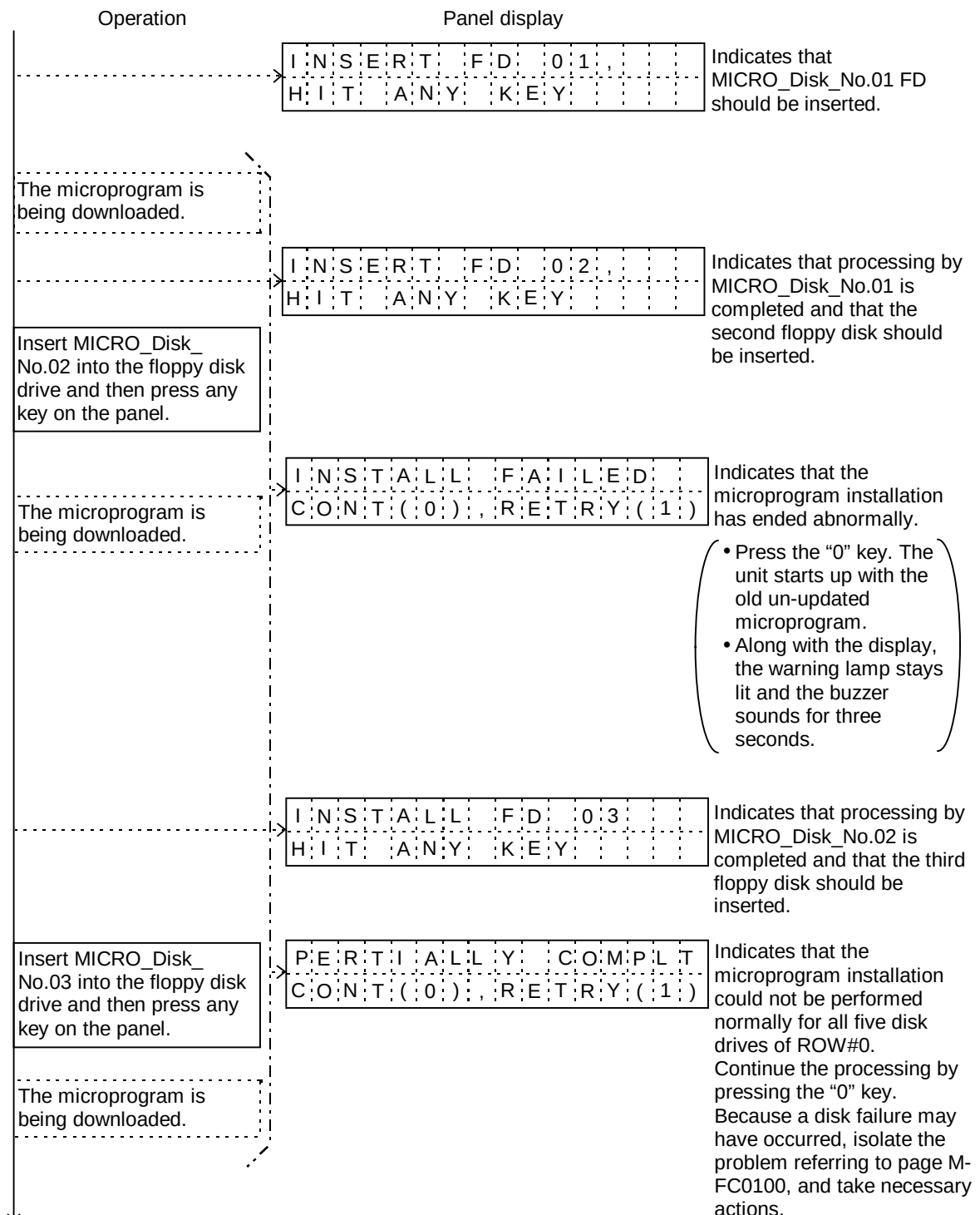
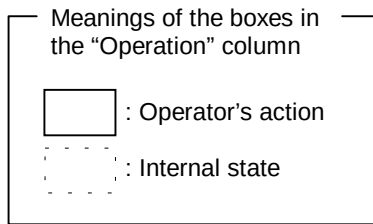
DIP	SWITCH	SET			FD	BACKUP (#0)	?
QUIT					YES (0)	NO (1)	

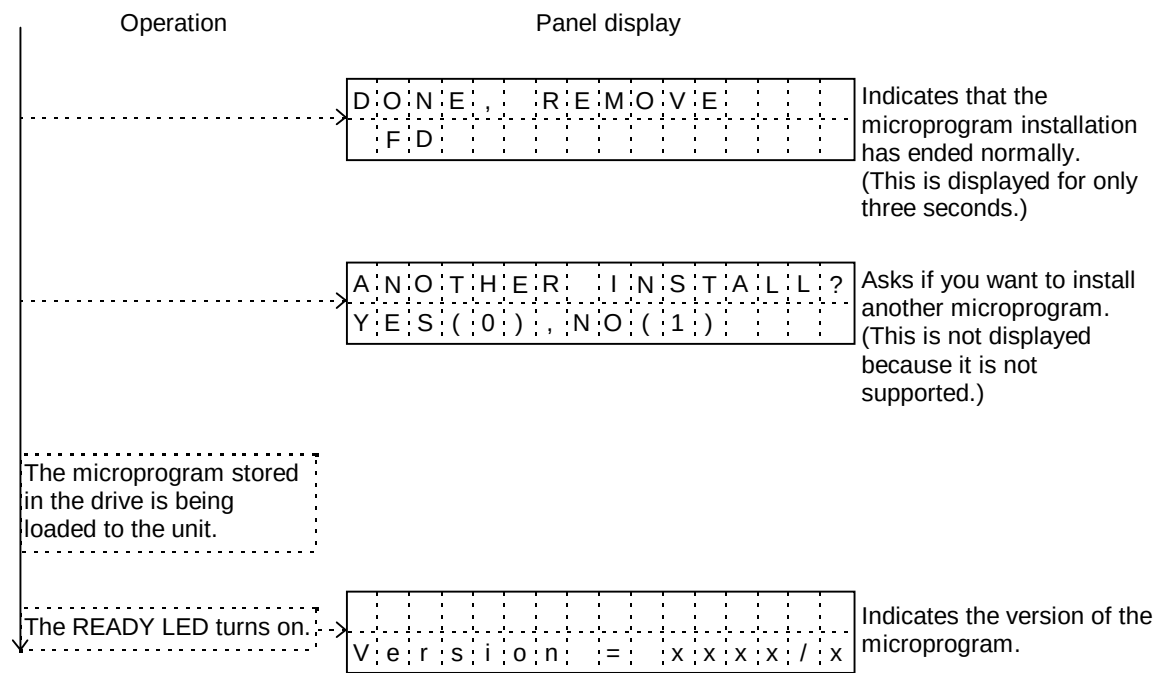
If this message appears, make a back-up copy of the data in the EEPROM into the BACKUP floppy disk.

In case of dual configuration, "FD BACK UP (#1)?" is displayed. Select the controller to be restored.

(15) Perform the following procedure.

Note : Use a set of three FDs (containing a microprogram corresponding to the SNMP) supplied with the DF-F350-G2M1 when it is shipped from the factory.





- (16) Reset the DIP switches (4, 6 or 1, 4, 6) to the original positions after the system is ready.
- (17) Close the front cover.
- (18) Close the side covers.

2.9 Installing the AC/DC Power Supply

Perform the following procedure

(1) Installing procedure

- ① Turn off the subsystem following the power-off procedure explained in RH-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

- ② Remove rear cover 1 and 2.

- ③ Loosen the screw ① on the safety cover and disconnect one end of the FG cable.

- ④ Loosen the screws ② on the safety cover and remove the safety cover with moving the plates in the arrow-marked direction (→).

- ⑤ Insert the redundant AC/DC power supply in a predetermined position and push the handle in the arrow-marked direction (→).

- ⑥ Fix the FG cable detached in (2) with screw ①.

- ⑦ Attach rear cover 1 and 2.

- ⑧ Turn on the subsystem following the power-on procedure explained in RH-REP0050.

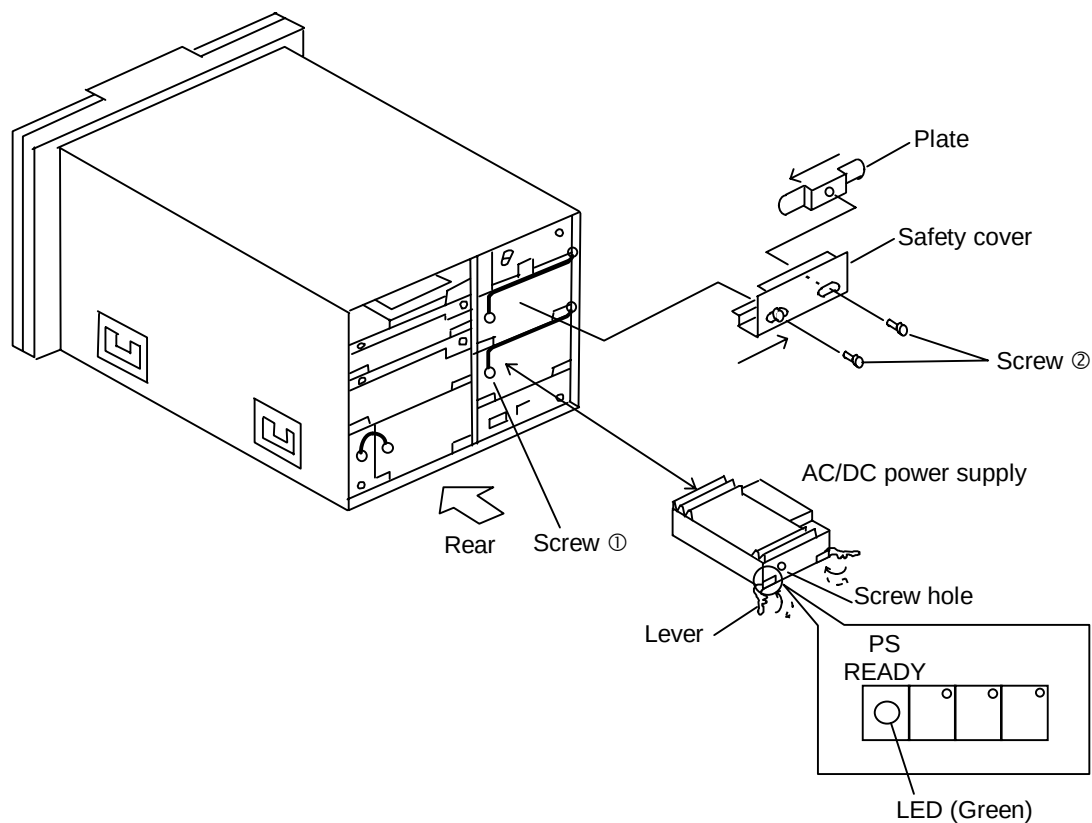


Figure 2.9.1 Installing the AC/DC Power Supply

2.10 Installing the HDU ASSY

Since the procedure differs depending on the cases below, be careful in installing the HDU ASSY.

- [1] Capacity expansion with HDU ASSY exchange
- [2] Capacity expansion with additional HDU ASSY installation
- [3] Installing a spare HDU ASSY



Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

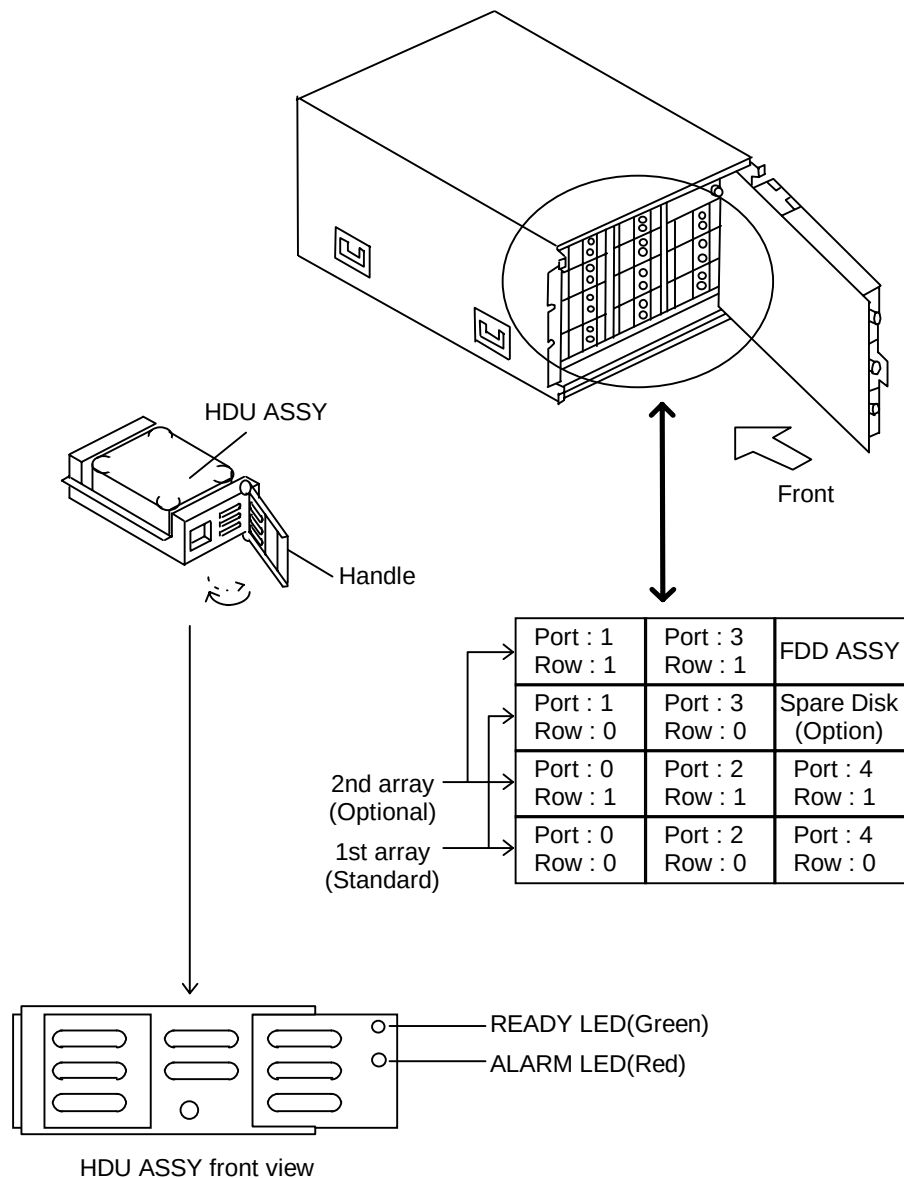


Figure 2.10.1 Installing the HDU ASSY

[1] Capacity expansion with HDU ASSY exchange

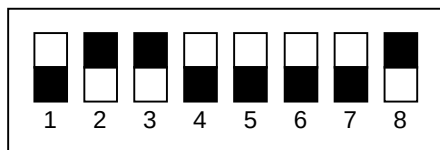
After this operation all the user's data will be lost. Be sure to make a back-up copy of data before beginning this operation. (See RH-OPTION0050.)

- (1) Turn off the power according to the power-off procedure in RH-OPTION0110.

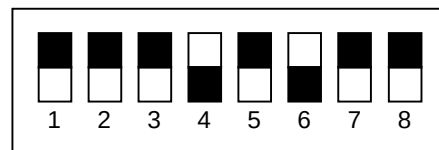
Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove the front cover and open the front panel.
 (3) Remove the old HDU ASSY and set the new HDU ASSY. (See Figure 2.10.1 in RH-OPTION0230.)
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



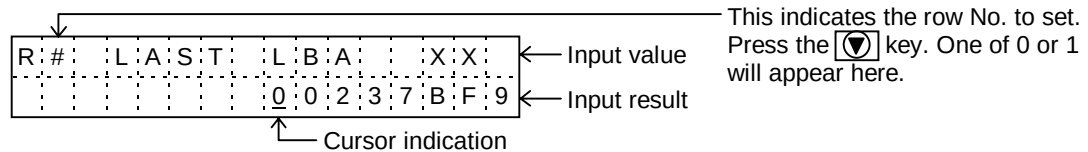
For ROW=0



For ROW≠0

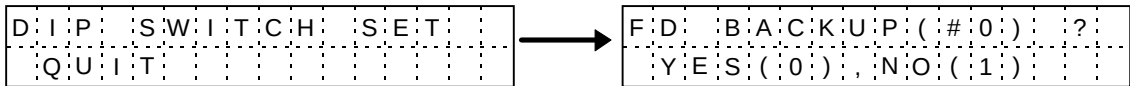
- (5) Turn on the power according to the power-on procedure RH-OPTION0110.
 (6) Set LBA on the panel following the table below. Set the capacity of each drive following the display. (See RH-OPTION0260.)

- When ROW LAST LBA is displayed;



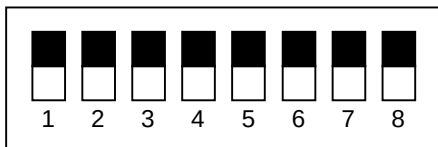
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting "QUIT" on the panel, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of the system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.



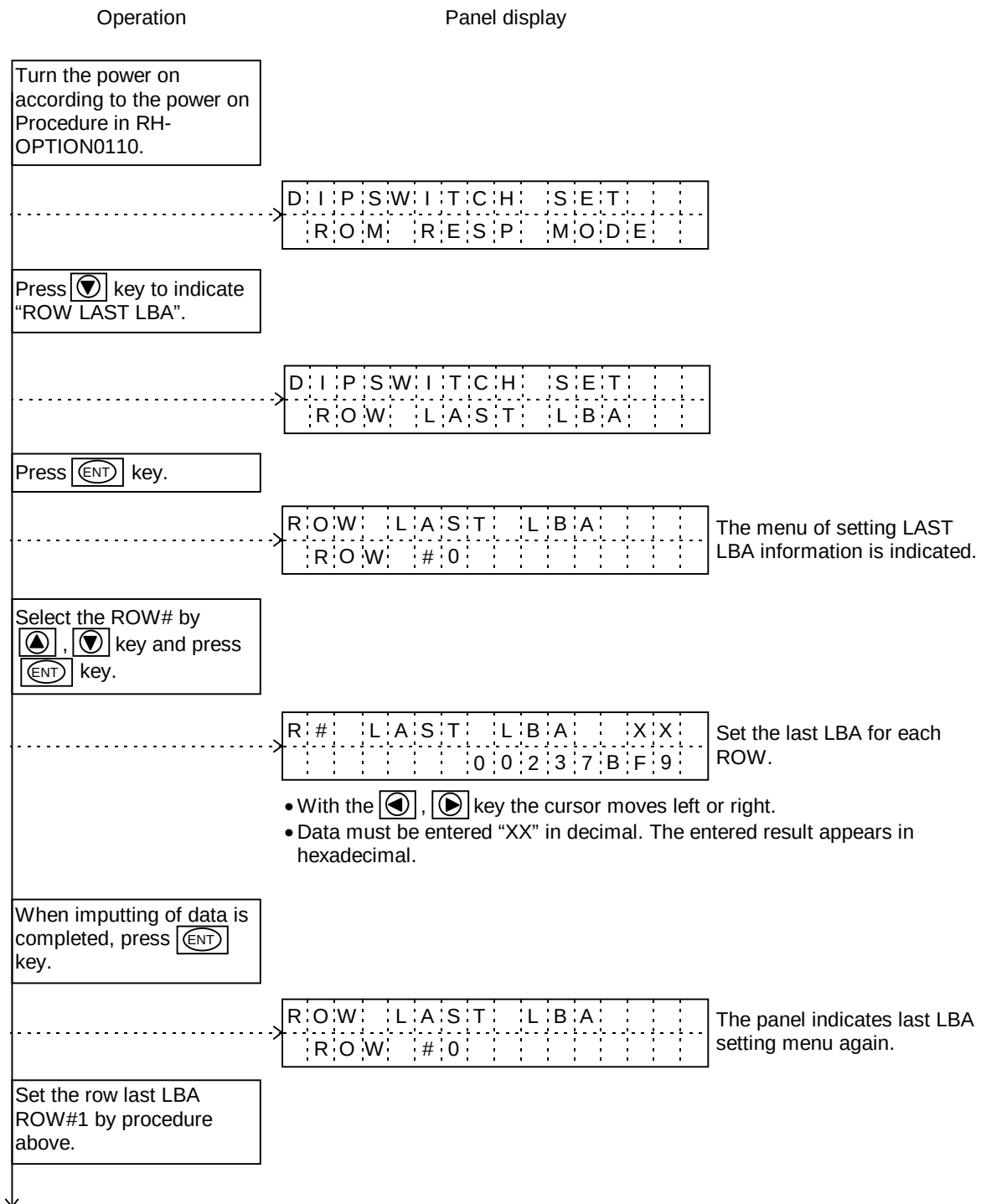
If this message appears, make a back-up copy of the data in the EEPROM into the back-up floppy disk.
In case of dual configuration, "FD BACK UP (#1)?" is displayed.
Select the controller to be restored.

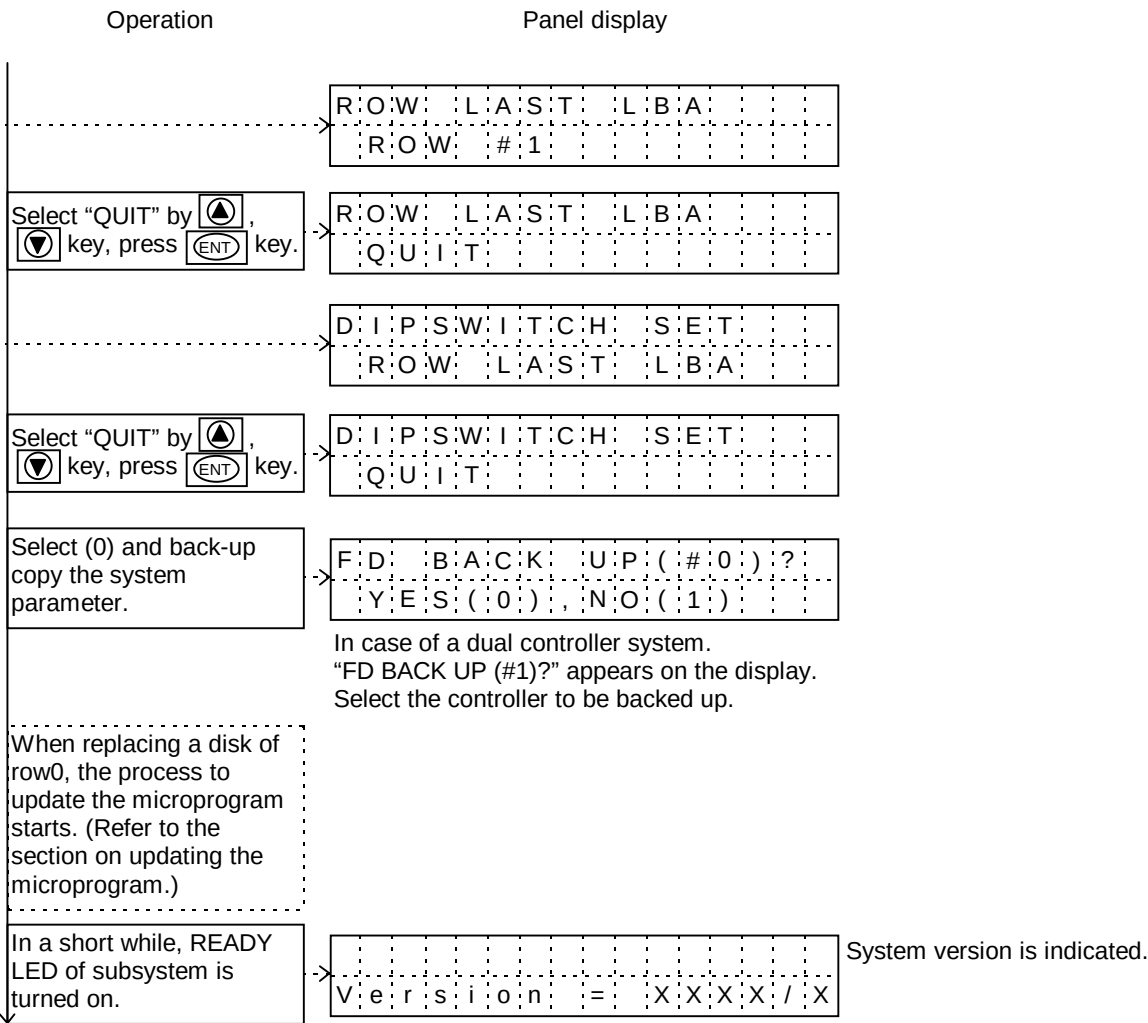
- (8) Reset the DIP switch 4 and 6 to the original positions after the system is ready.



- (9) Only in case of exchanging ROW0 disk, revise the microprogram. (See "5 MICROPROGRAM-FC" Chapter)
- (10) Set up the RAID group and the LU. (See Installation Chapter.)
- (11) Close the front panel.
- (12) Attach the front cover.

Set the LAST LBA number on the panel according to the flow below.





[2] Capacity expansion with additional HDU ASSY installation

Additional HDU installation to a new ROW.

- (1) Turn off the power according to the power-off procedure in RH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) When the capacity of the AC/DC power supply becomes short owing to the addition of the disk, add the AC/DC power supply. (see page RH-OPTION0190.)

Table 2.10.1 Number of Required AC/DC Power Supplies Corresponding the Number of Rows

Number of Rows	Number of power supplies (without redundancy)	Number of power supplies (with redundancy)
1	1	2
2	2	3

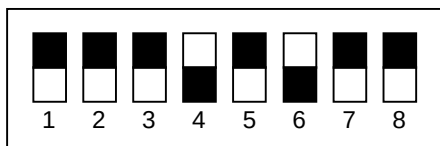
- (3) Remove the front cover and open the front panel.

- (4) Open the rear covers 1, 2.

- (5) Install an additional HDU ASSY.

- (6) Set the DIP switches 4 and 6 on the CTL ASSY to down.

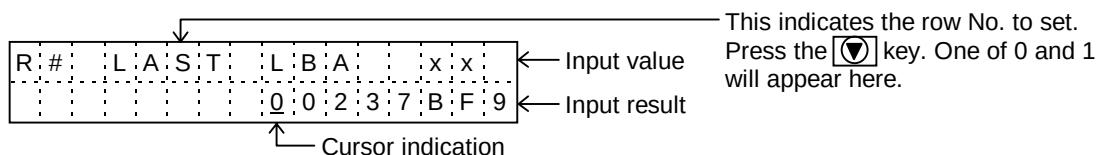
(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



- (7) Turn on the power according to the power-on procedure in RH-OPTION0110.

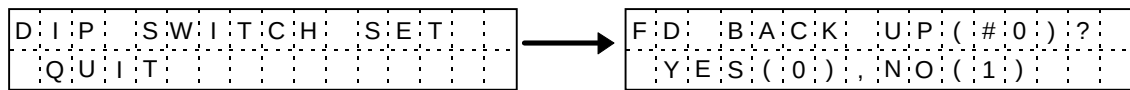
- (8) Set the system LBA number with the panel according to the table below. In setting the available capacity of each drive follow ROW LAST LBA menu. Set the capacity following the displayed menu. (See RH-OPTION0260.)

- When ROW LAST LBA is displayed;



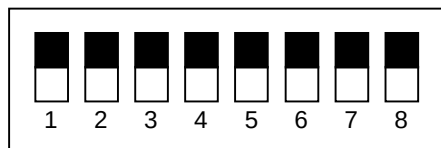
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (9) After selecting "QUIT" on the panel screen, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.



If this message appears, select (0) and make a back-up copy of the data in the EEPROM into the back-up floppy disk.
In case of a dual system, it is displayed "FD BACK UP (#1)?" . Select the controller to be backed up.

- (10) Reset the DIP switch 4, 6 to the original positions after the system is ready.



- (11) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

- (12) Close the front panel and rear covers 1, 2.

- (13) Attach the front cover.

Additional HDU installation to existing ROW.

- (1) Turn off the power according to the power-off procedure in RH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove the front cover and open the front panel.

- (3) Install additional HDU.

Be sure to install an HDU of capacity no less than pre-installed HDUs. When an HDU of less capacity is installed, after power on (5), warning LED will light up and display shown in Figure 2.10.2 will appear. Prepare an HDU of appropriate capacity and re-install from (1).

Set the capacity referring to the system parameter setting table.

H	Z	1	4	X	Y	P	O	N	C	A	P	-	X	Y

X : Port number

Y : Row number

Figure 2.10.2 Panel Display when Improper Capacity

- (4) Turn the power on following the power on procedure. (See RH-OPTION0110.)

- (5) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

[3] Installing a spare HDU ASSY

- (1) Turn off the power according to the power-off procedure in RH-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove the front cover and open the front panel.
 (3) Open the rear covers 1, 2.
 (4) Install a spare HDU ASSY.

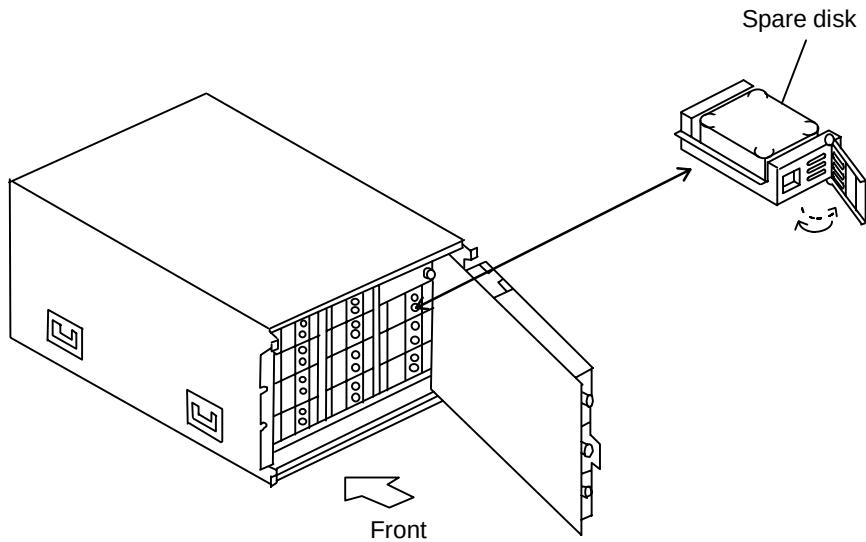
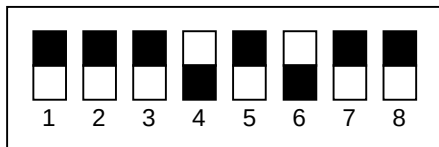


Figure 2.10.3 Installation of Spare Disk

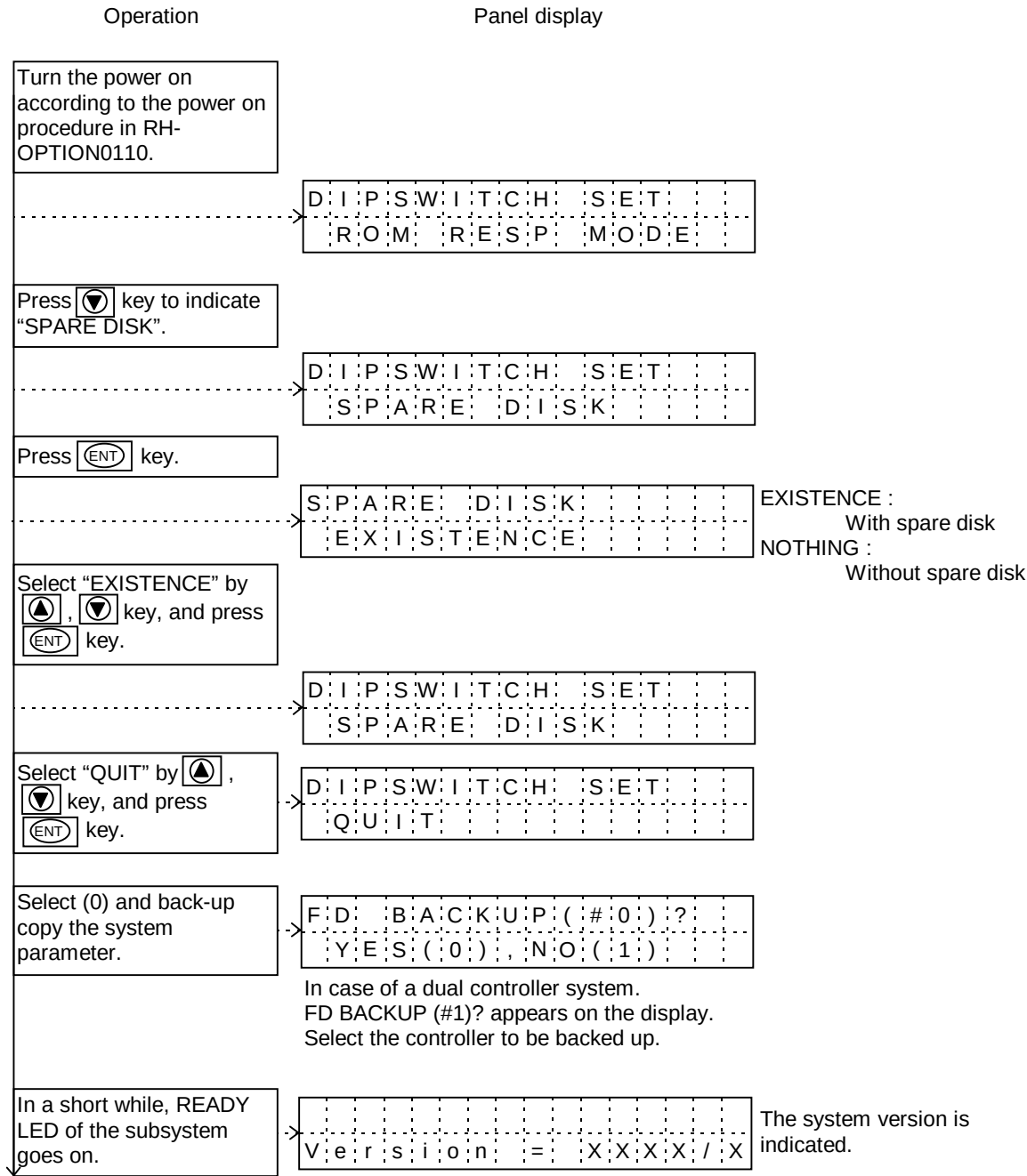
- (5) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2MCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

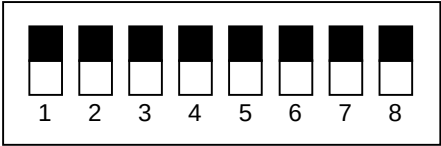


- (6) Turn on the power according to the power-on procedure in RH-OPTION0110.

(7) Set the spare disk from the PANEL according to the flow below.



(8) Reset the DIP switches 4 and 6 to the original positions, after READY LED lit up.



(9) Close the front panel and rear cover 1, 2.

(10) Attach the front panel.

DF350 Disk Subsystem
10. PARTS CATALOG
(Rack Mount (RKH/U1) Type)

Rev.4

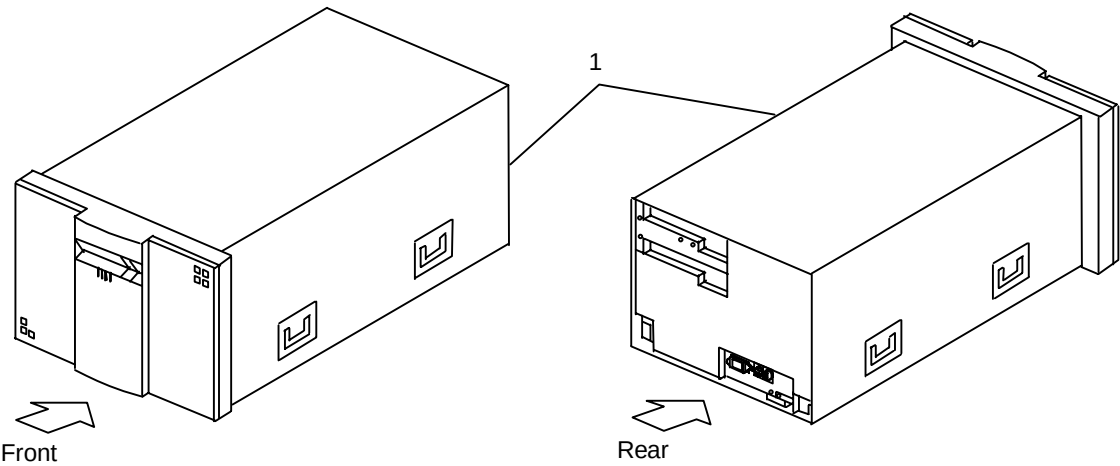
Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: A: Addition C: Change CR: Correction DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Mar.20.'97	A.Yamanashi	M.Sato	M.Sato	All	Issued	
1	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0040	The description of DF-F350-A2E4A was added in the table.	AD
2	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0040	The description of DF-F350-A1E8A was added in the table.	AD
3	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0040 0050	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.) Added A2E8/A1E18. Added DF-F350-DRUSS	AD AD
4	Oct.15.'98	A.Yamanashi			0040	Added DF-F350-A3E4/A2E8A.	AD

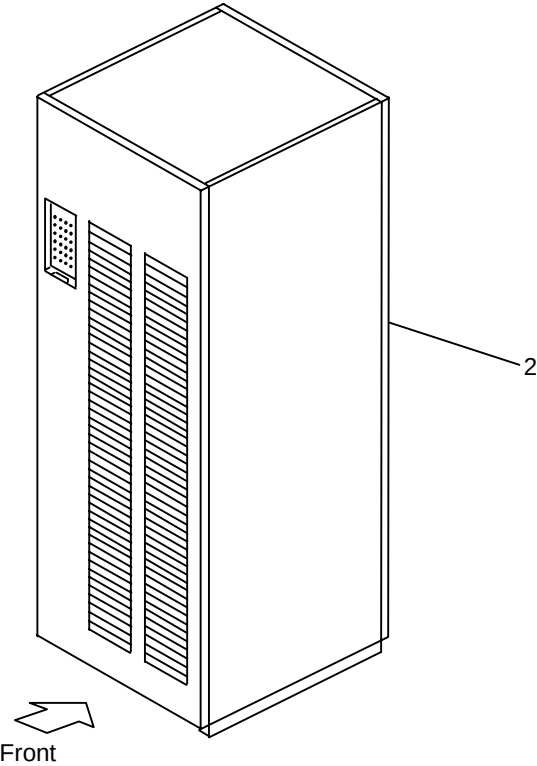
HOW TO USE THIS PARTS CATALOG

LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	3244615-C	• FINAL ASSY (SEE LIST 1)	1	
2	2099945-A	• FRONT PANEL ASSY	1	
3	3237448-C	• FAN ASSY	3	
4	3244610-A	• FDD ASSY	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-11	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-11	S.P.
7	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-11	S.P.
7a	3243084-Q	• HDU ASSY (DF-F350-A2E4A)	2-11	S.P.

- ① indicates the list number of the assembly given on the visual index.
- ② indicates the item number given on the drawing in the catalog section.
- ③ indicates the part number.
- ④ has the following meaning.
- indicates an assembly or equivalent part.
 - indicates a subassembly or equivalent part included in an assembly indicated by....
- ⑤ indicates the unit type.
- ⑥ indicates the possible number of the subsystem.
- ⑦ indicates S.P.
- If S.P. is written in Remarks, the part or the assembly is spare parts.

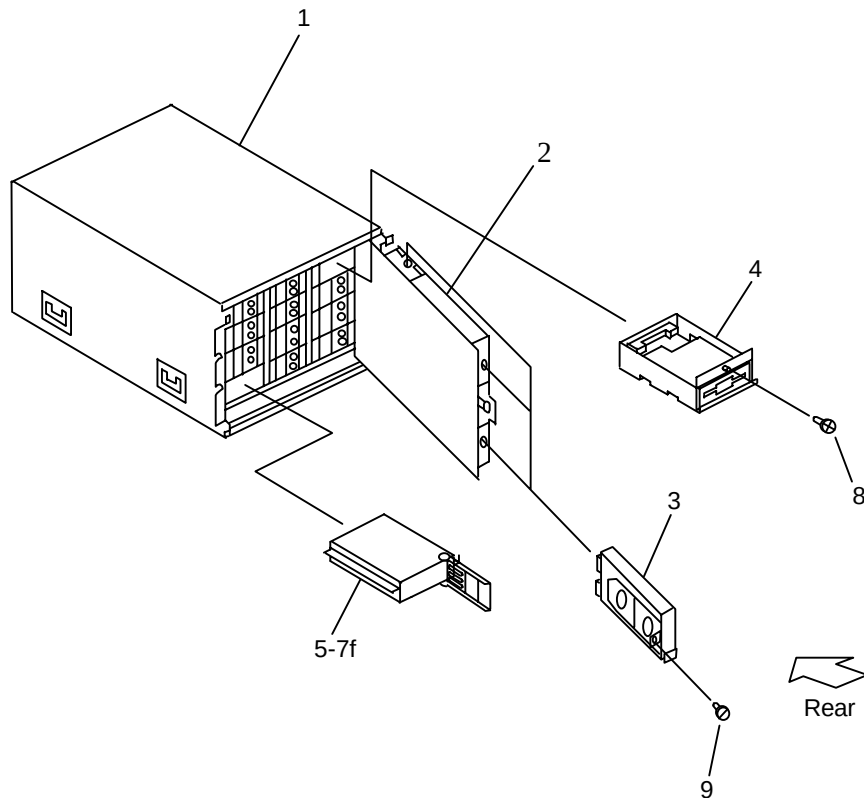


Rack Mount (RKH) Type

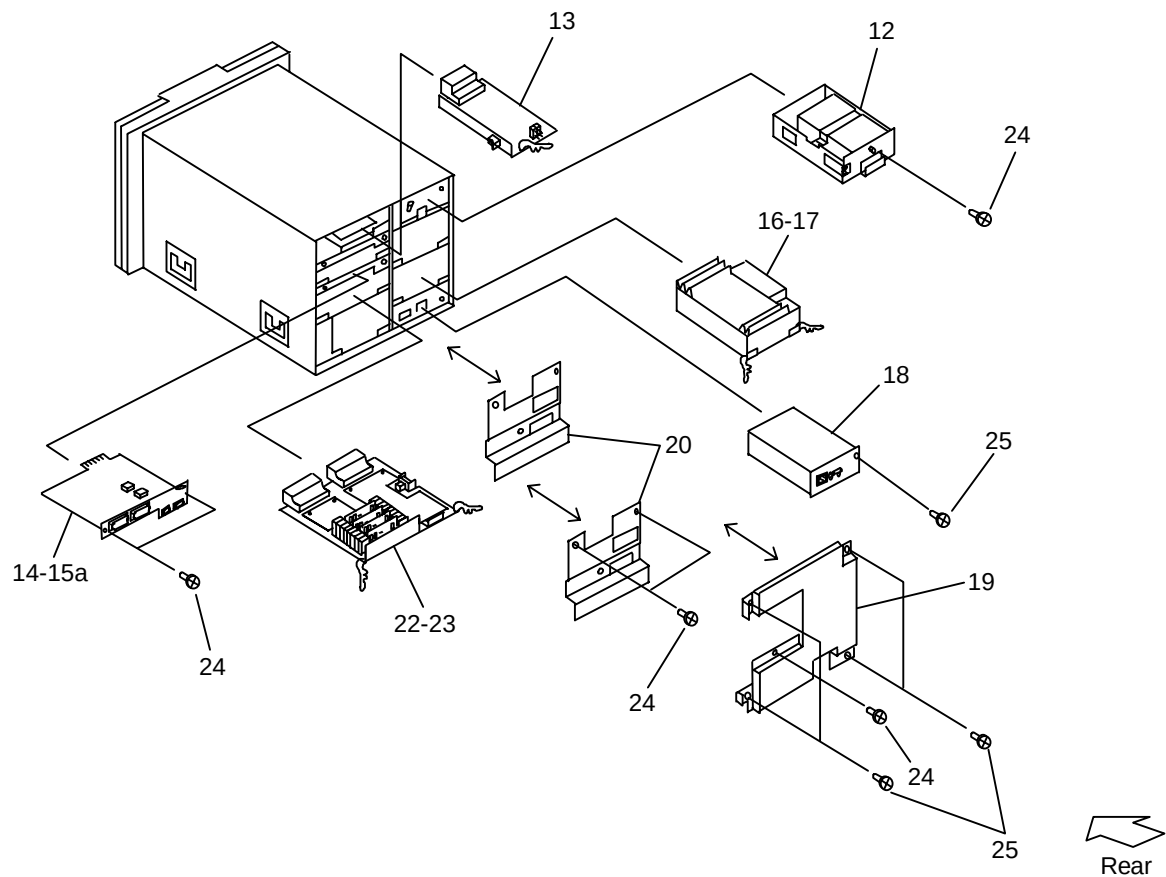


DF-F350-U1

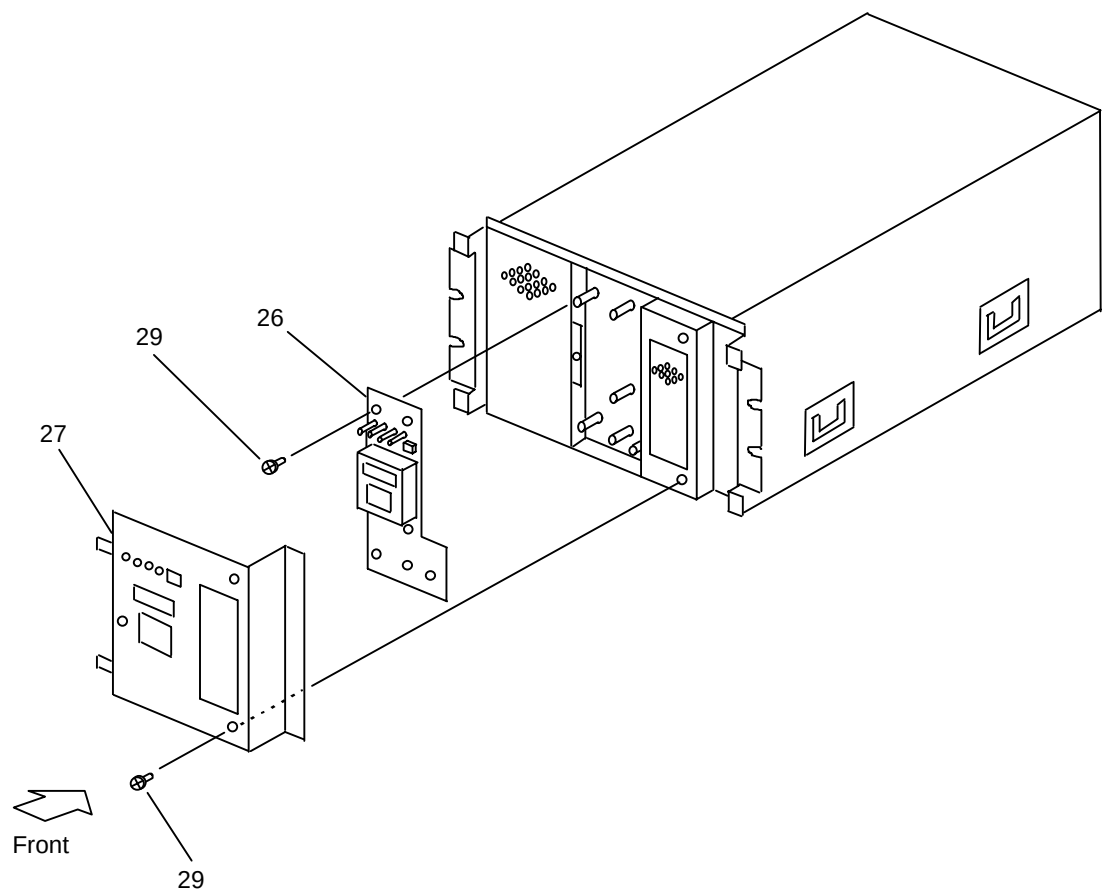
LIST NO.	NAME OF PARTS	SHEET NO.
1	FINAL ASSY (RKH)	RH-PARTS0040
2	FINAL ASSY (U1)	RH-PARTS0090



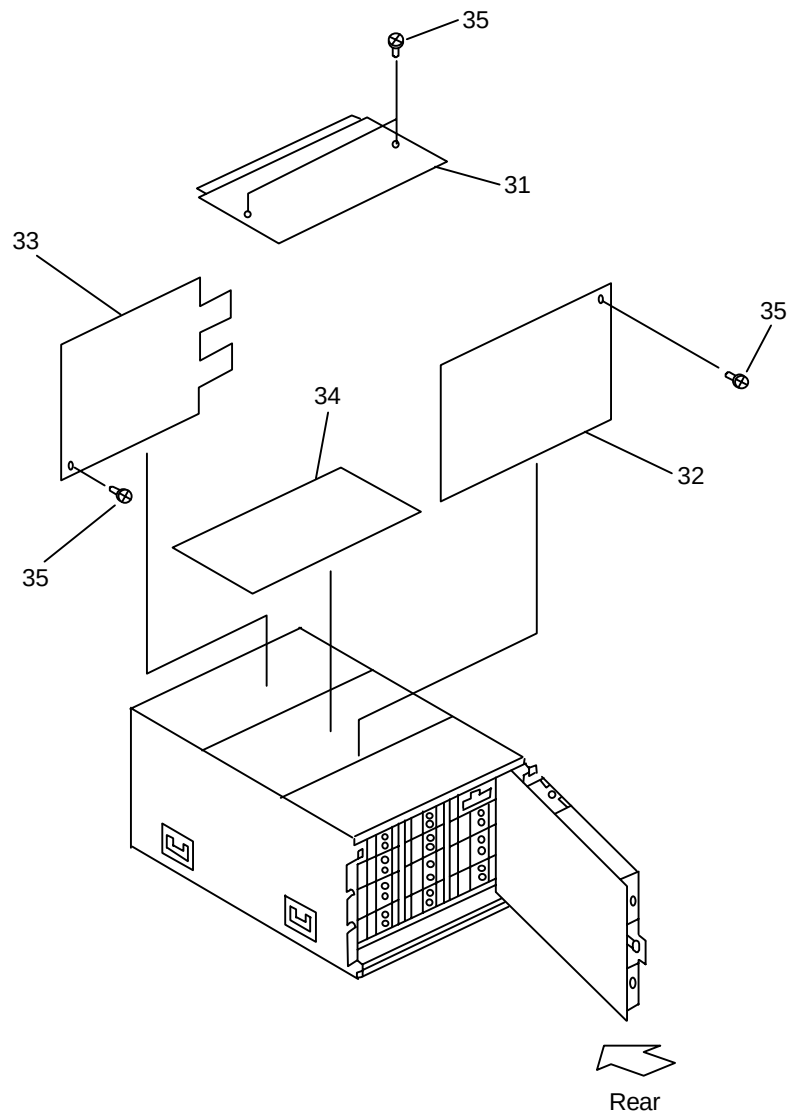
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	3244615-C	FINAL ASSY	1	DF350-RKH
2	2099945-A	• FRONT PANEL ASSY	1	
3	3237448-C	• FAN ASSY	3	
4	3244610-A	• FDD ASSY	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-11	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-11	S.P.
7	3252929-E	• HDU ASSY (DF-F350-A3E4)	2-11	S.P.
7a	3252929-B	• HDU ASSY (DF-F350-A2E8)	2-11	S.P.
7b	3252929-D	• HDU ASSY (DF-F350-A2E8A)	2-11	S.P.
7c	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-11	S.P.
7d	3252929-A	• HDU ASSY (DF-F350-A1E18)	2-11	S.P.
7e	3243084-Q	• HDU ASSY (DF-F350-A2E4A)	2-11	S.P.
7f	3243084-R	• HDU ASSY (DF-F350-A1E8A)	2-11	S.P.
8	SB306	• BIND SCREW (M3 × 6.3)	1	
9	5483798-1	• THUMBSCREW	3	
10				



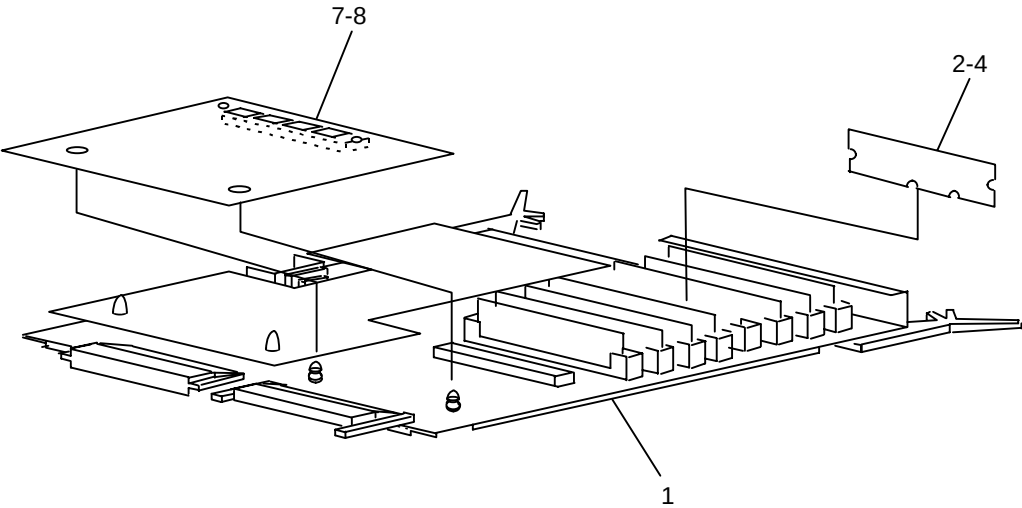
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
11		• BATTERY ASSY	1	S.P.
12	3244611-B	• SVP ASSY (SVP)	1	
13	3243079-A			
14	3244773-1	• I/F ASSY (DUMMY)	0-1	
15	3247226-A	• I/F ADAPTER ASSY (DF-F350-DRUDS)	1-2	S.P.
15a	3247226-C	• I/F ADAPTER ASSY (DF-F350-DRUSS)	1-2	S.P.
16	5486141-303	• AC/DC SUPPLY (DF-F350-B2M)	1-3	S.P.
17	3243406-A	• AC/DC ASSY (BLIND)	0-2	
18	5486142-302	• IN BOX ASSY	1	
19	3244614-A	• REAR COVER (1)	1	
20	3244692-B	• REAR COVER (2)	2	
21				
22	3247188-A	• CTL ASSY (DF-F350-F1MCF) (SEE LIST 1-22)	1	S.P.
23	3247188-B	• CTL ASSY (DF-F350-F2MCF) (SEE LIST 1-23)	0-1	S.P.
24	SB306	• BIND SCREW (M3 × 6.3)	8	
25	SB408	• BIND SCREW (M4 × 8)	5	



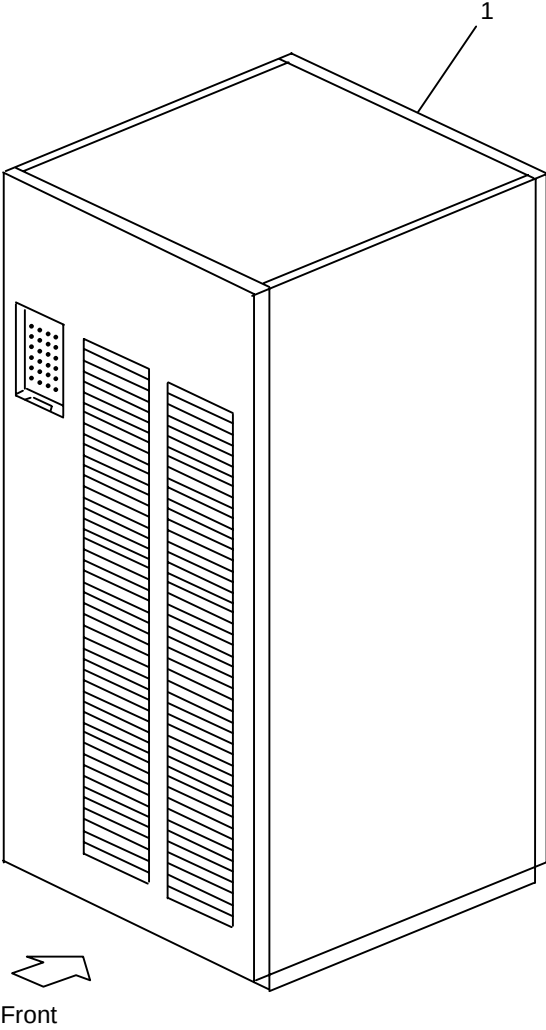
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
26	3244612-A	• SVP ASSY (PANEL)	1	S.P.
27	3244774-A	• COVER (LCD) ASSY	1	
28				
29	SB306	• BIND SCREW (M3 × 6.3)	9	
30				



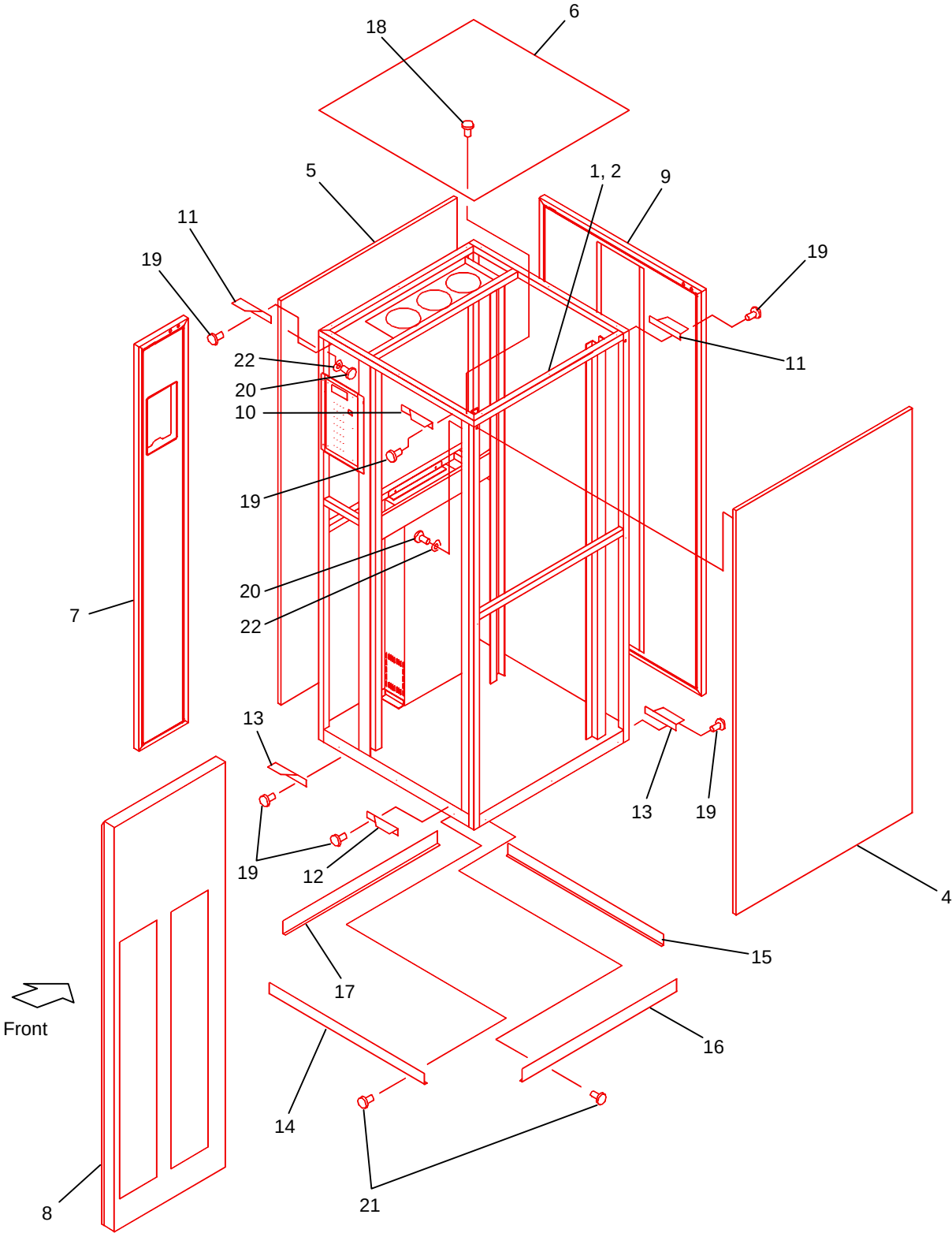
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-				
31	3240448-A	• TOP COVER	1	
32	1504079-A	• SZ786 PK ASSY	1	S.P.
33	1504080-B	• SZ787 PK ASSY	1	S.P.
34	1504081-A	• SZ788 PK ASSY	1	S.P.
35	SB306	• BIND SCREW (M3 x 6.3)	40	
36				



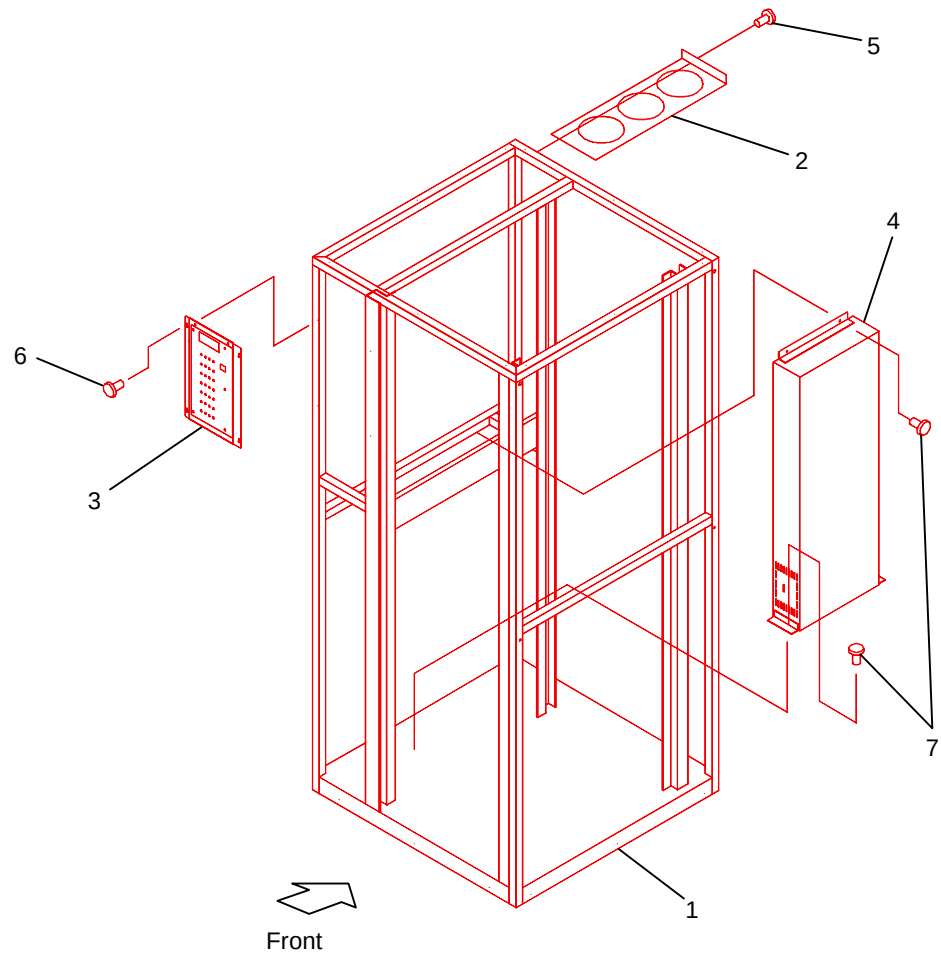
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-22-		CTL ASSY		
1	3247188-A	• CTL ASSY (DF-F350-F1MCF)	1	S.P.
2	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
3	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
4	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
5				
6				
7	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
8	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.
1-23-		CTL ASSY		
1	3247188-B	• CTL ASSY (DF-F350-F2MCF)	1	S.P.
2	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
3	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
4	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
5				
6				
7	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
8	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
2-		FINAL ASSY		
1		FINAL ASSY (SEE LIST 2-1)		



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
2-		FINAL ASSY		
1	1504062-	FINAL ASSY	1	DF-F350-U1
2	1504061-A	• FRAME ASSY (SEE LIST 2-2)	1	
3				
4	3244609-A	• SIDE COVER ASSY	1	
5	3244609-B	• SIDE COVER ASSY	1	
6	3243432-1	• COVER (TOP)		
7	1504057-A	• FRONT DOOR (A) ASSY	1	
8	1504058-A	• FRONT DOOR (B) ASSY	1	
9	1504059-A	• REAR DOOR ASSY	1	
10	5460631-A	• HINGE ASM (U)	1	
11	5460631-B	• HINGE ASM (U)	2	
12	5460630-A	• HINGE ASM (L)	1	
13	5460630-B	• HINGE ASM (L)	2	
14	3244508-1	• SKIRT (FRONT)	1	
15	3244508-2	• SKIRT (REAR)	1	
16	3244509-1	• SKIRT (SIDE R)	1	
17	3244509-2	• SKIRT (SIDE L)	1	
18	3183101-1	• HWA BIND SCREW	12	
19	BS510	• HEXAGON SOCKET BOLT (M5 × 10)	12	
20	SB536	• BIND SCREW (M5 × 16)	8	
21	5409006-1	• SCREW (BLACK)	12	
22	2051001-532	• LL WASHER	8	
23				



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
2-2-	1504061-A	FRAME ASSY		
1	3244527-A	• FRAME (SUB) ASSY	1	
2	2099974-A	• FAN (U1) ASSY	1	
3	3244608-A	• OP PANEL ASSY	1	
4	5490538-A	• PDB (POWER DISTRIBUTION BOX)	1	
5	SB416	• BIND SCREW (M4 × 16)	2	
6	SB316	• BIND SCREW (M3 × 16)	4	
7	SB408	• HEXAGON SOCKET BOLT (M4 × 8)	6	

DF350 Disk Subsystem

11. INSTALLING IN RACK FRAME

(Rack Mount (RKH/U1) Type)

Rev.3

Read this manual carefully and keep it.
• Before starting operation, read the safety instructions carefully and fully understand them. • After reading this manual, keep it at hand for your reference.

HITACHI

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: AD: Addition CR: Change CK: Correction DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Mar.25.'97	T.Okada	K.Kogawa	M.Sato	All	Issued	
1	Sep.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0040	Added 'RKWH' at table 1.2.1.	AD
					0050	Added (Do the work following...)	AD
					0100	Added (The mass of the...)	AD
					0130	Added (Do the work following...)	AD
					0140	Added the 'Remove the front cover.'	AD
					0150	Added 2.4.2 section.	AD
					0190	Added (The mass of the...)	AD
					0200	Changed the 2.4.6 section.	CH
2	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0120	Added URASD.	AD
					0180	Added URASD.	AD
					0230	"fron" was changed to "from".	CR
3	Oct.15.'98	A.Yamanashi			0120	Added 12, 13 on URASD table.	AD

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1. Installing Into HP Rack Frame

1.1 Space (Height Inside the Rack) Required for Installation

The space of 7 units height (EIA standard) is required to install DF350-RKH into the HP rack.

1.2 Optional Parts Required for Installation (Model names : DF-F350-URHP)

Table 1.2.1 shows optional parts required to install one DF350-RKH disk subsystem.

Table 1.2.1 Parts Required for Installation of DF-F350-URHP

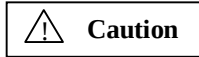
No.	Part No.	Part Name	Qty.	Remarks
①	3243426-1	Rail	1	For right hand side
②	3243426-2	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (R)
④	5490710-2	Stopper	1	For the rail (L)
⑤	5486490-1	Spacer (HP)	2	RKH
⑥	3250931-1	Spacer (HP)	2	RKWH (Not used RKH)
⑦	5486485-1	Fastener	14	For securing the subsystem/rails (2 spares are included)
⑧	BH612	Bolt (M6 × 12.5)	4	For securing the spacer (HP) (2 spares are included)
⑨	SB516	Binding screw (M5 × 16)	10	For securing the rail (2 spares are included)
⑩	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stoppers (2 spares are included)
⑪	SB532	Binding screw (M5 × 32)	6	For securing the subsystem (2 spares are included)
⑫	WP005	Washer (M5)	6	For the hexagon socket head bolt (2 spares are included)
⑬	3243319-69	Nameplate (parts)	1	Already affixed to the rail
⑭	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem

1.3 Tools Required

- Socket wrench (4mm)
- Spanner (10mm)
- Philips screwdriver (No.2)
- Torque wrench (T25) (*1)

*1 : Used to remove parts previously installed in the HP frame.

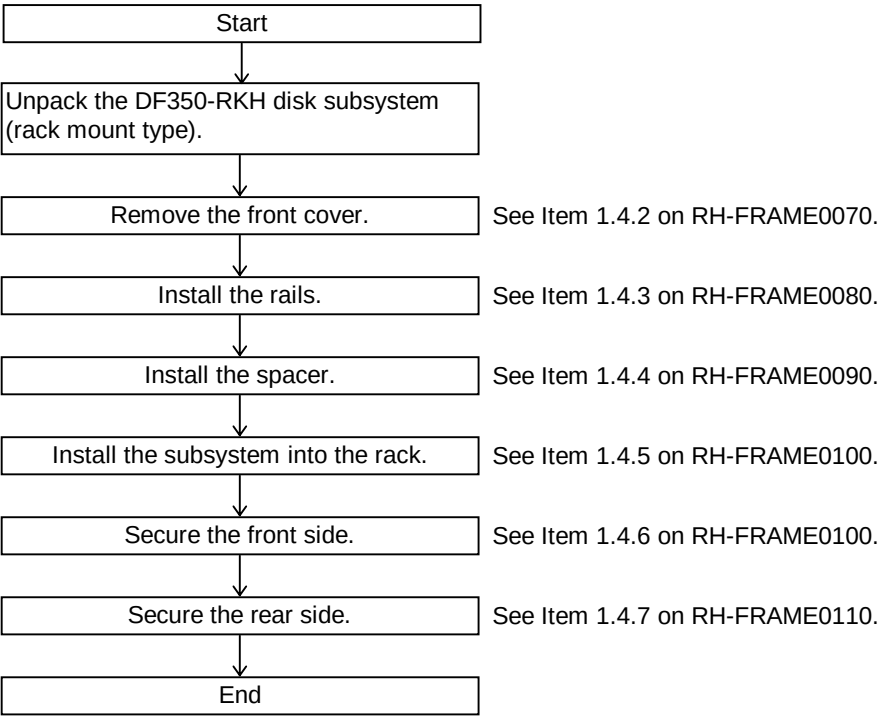
1.4 Installing the Subsystem into the Rack



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKH disk subsystem is approximately 60kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning HP rack frame.

1.4.1 Procedures for installation

Install the unit following the procedure below.



1.4.2 Removing and installing the front cover

(1) Removal and installation of the front cover.

① Removal

Hold the grooves located on both sides of the front cover and pull the front cover toward you to remove it.

② Installation

Mate the grooves of the front cover with the guide plate of the subsystem, and secure the front cover by pressing its four corners.

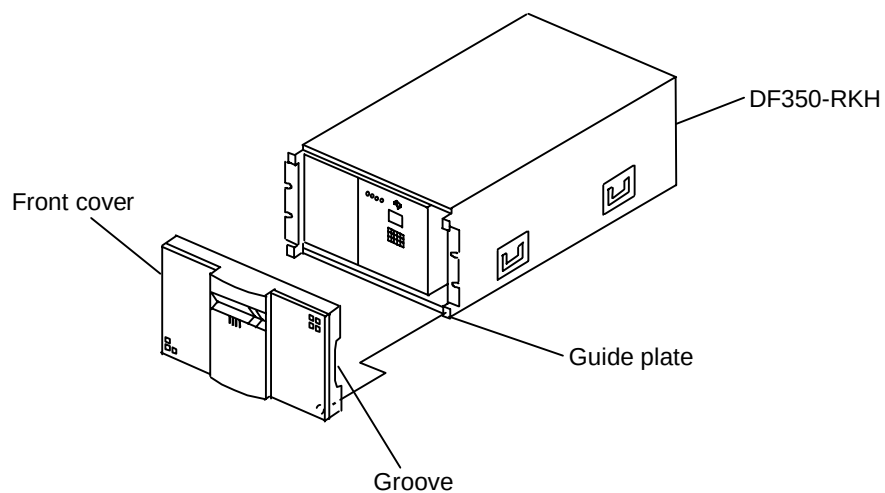


Figure 1.4.1 Removing and Installing the Front Cover

1.4.3 Installing the rails (See Figure 1.4.2 and 1.4.3.)

- (1) Temporarily secure the ③ Stopper (R) to the ① Rail (R) using ⑩ Hexagon socket head bolts (M5 × 8) and ⑫ Washer (M5) (at two places). (See Figure 1.4.2.)
- (2) Insert the protruded portions of the ① Rail (R) into the rectangular holes on both the front and rear sides of the rack frame at right hand side of the desired installing position. (See Figure 1.4.3.)
- (3) Install the fasteners aligning their holes with the holes of the rail and the rack frame (at two places each on the front and rear sides). (See Figure 1.4.3.)
- (4) Secure the ① Rail (R) using the ⑨ Binding screws (M5 × 16) (at two places each on the front and rear sides).
- (5) Temporarily attach the ④ Stopper (L) to the ② Rail (L), and secure the ② Rail (L) to the rack frame in the same way.

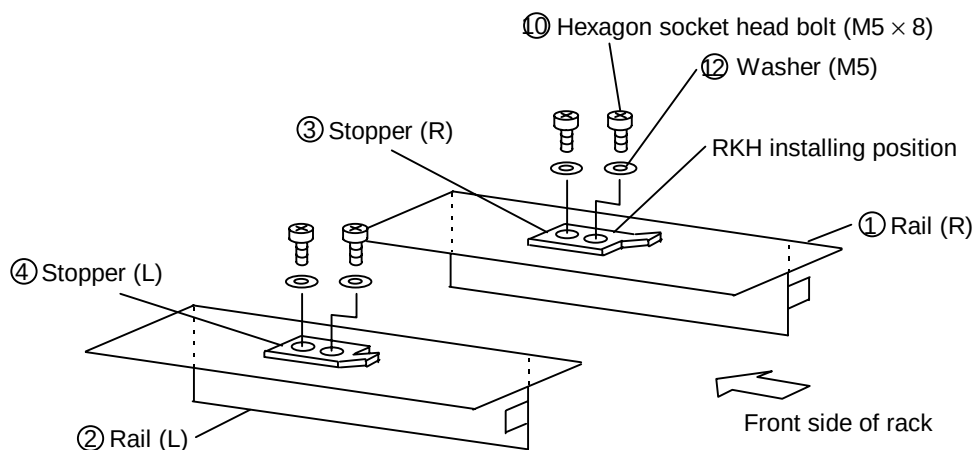


Figure 1.4.2 Temporary Attachment of the Stopper

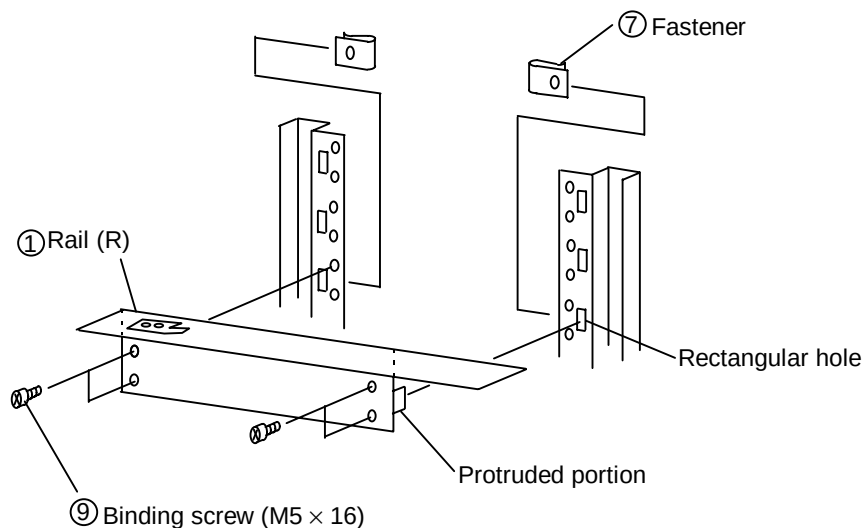


Figure 1.4.3 Securing the Rail to the Rack Frame

1.4.4 Installing the spacer (See Figures 1.4.4 and 1.4.5.)

- (1) Insert the ⑧ Bolt (M6 × 12.5) into the hole in the face of the rack frame from the inner side, place the indented side of the ⑤ Spacer (HP) against the rack, and secure the spacer so that it becomes parallel with the rack frame (two places, on the right and left sides).
- (2) Install the fasteners to the rack frame at the positions where the spacer is indented at 1st and 3rd indentations.

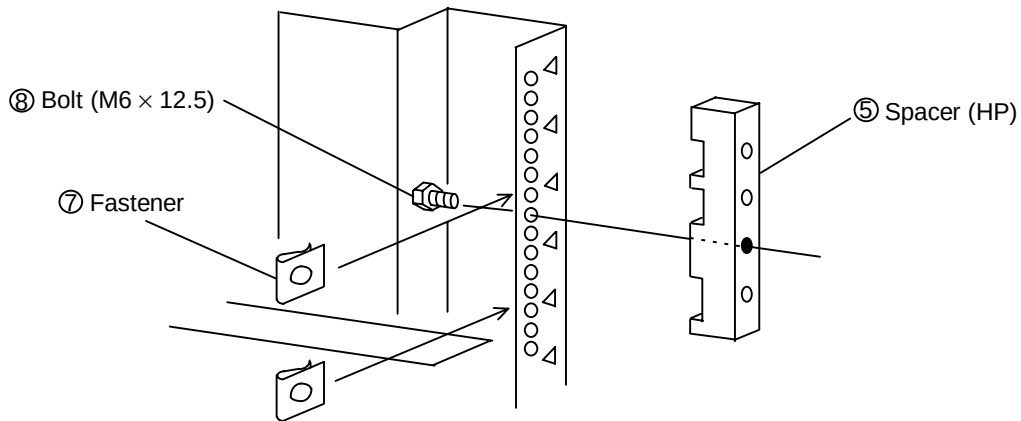


Figure 1.4.4 Installing the Spacer and Fasteners

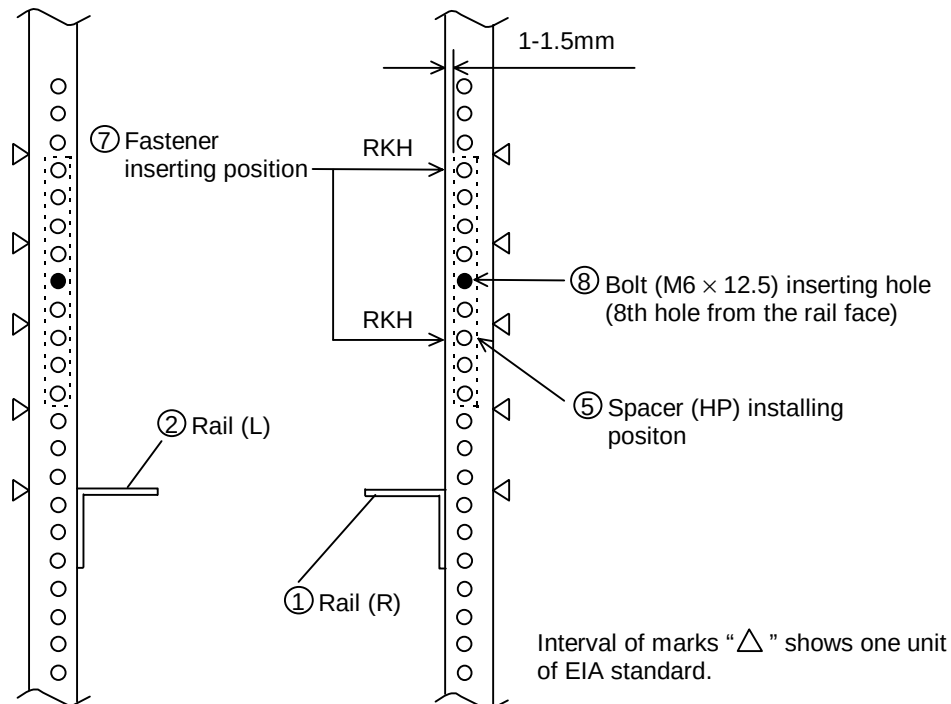
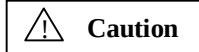


Figure 1.4.5 Relationship between the Installing Positions of the Rail and the Spacer (HP)

1.4.5 Installing the subsystem into the rack (See Figure 1.4.6.)



The mass of the DF350-RKH is approximately 60kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-RKH is secured tightly before installing the DF350-RKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Hold the four handles and place the subsystem on the rails. Then, push it all the way into the rack.

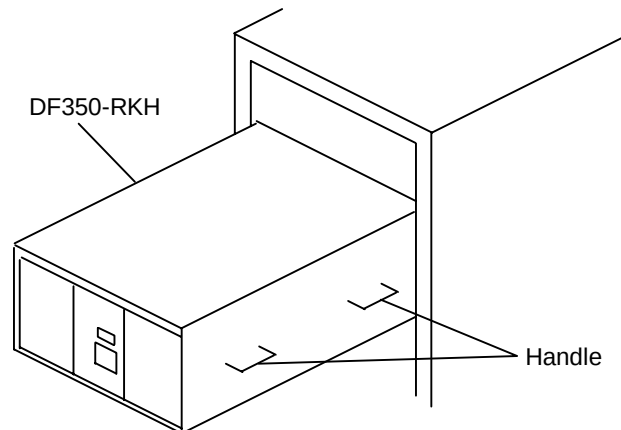


Figure 1.4.6 Installing the Subsystem in the Rack

1.4.6 Securing the front side of the subsystem (See Figure 1.4.7.)

- (1) Secure the subsystem at four places using the ⑪ Binding screws (M5 × 32).
- (2) Reinstall the front cover by pressing it against the subsystem. (See Figure 1.4.1.)

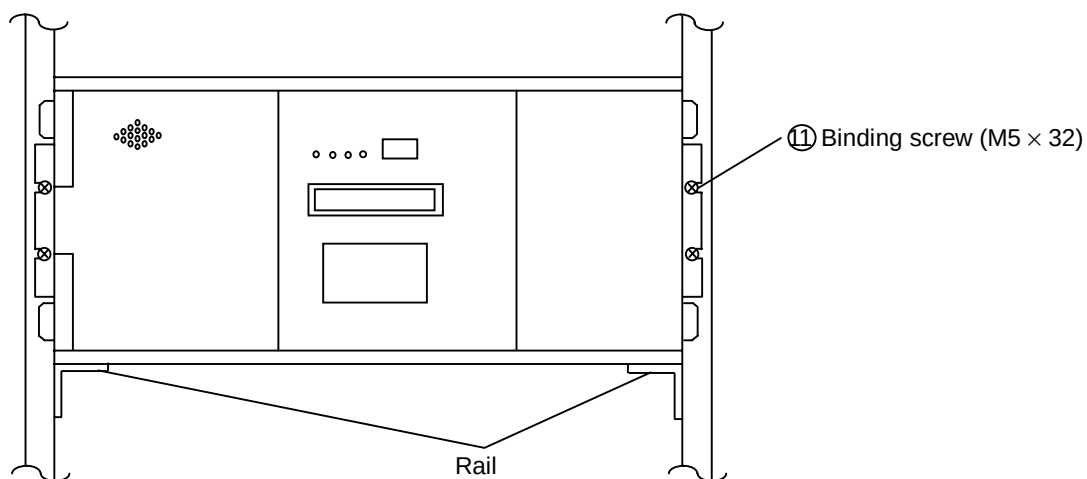
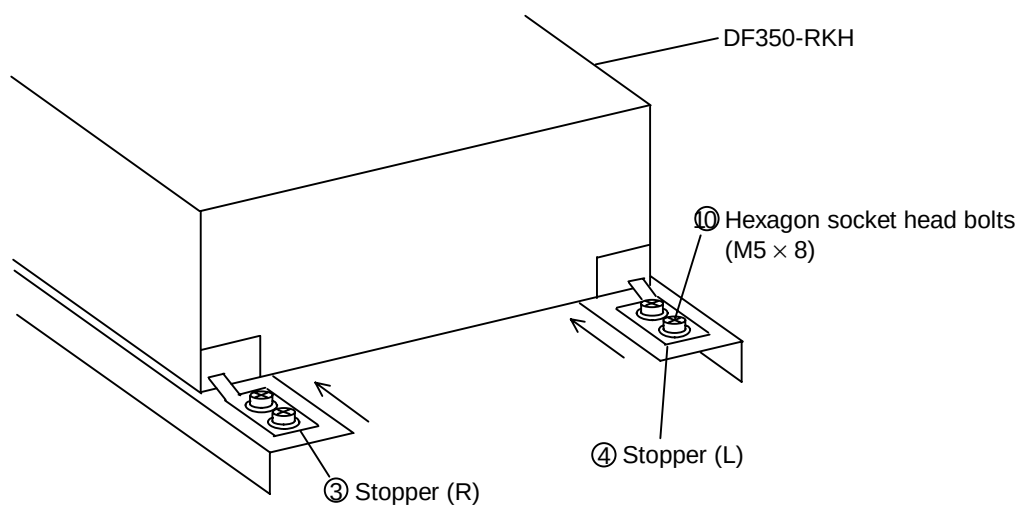


Figure 1.4.7 Securing the Front Side of the Subsystem

1.4.7 Securing the rear side of the subsystem (See Figure 1.4.8.)

- (1) Slide the ③ Stopper (1) and ④ Stopper (2) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the ⑩ Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

**Figure 1.4.8 Securing the Rear Side of the Subsystem**

2. Installing Into IBM AS/400 (9309) Rack Frame

2.1 Space (Height Inside the Rack) Required for Installation

The space of 6 units height (EIA standard) is required to install DF350-RKH into the IBM AS/400 (9309) rack.

2.2 Optional Parts Required for Installation (Model names : DF-F350-URAS/DF-F350-URASD)

Table 2.2.1/2.2.2 shows optional parts required to install one DF350-RKH disk subsystem.

Table 2.2.1 Parts Required for Installation of DF-F350-URAS

No.	Part No.	Part Name	Qty.	Remarks
①	2098876-A	Rail	1	For right hand side
②	2098876-B	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (L)
④	5490710-2	Stopper	1	For the rail (R)
⑤	5486419-1	Fastener (M5)	10	For securing the subsystem/rails (2 spares are included)
⑥	SB516	Bind screw (M5 × 16)	14	For securing the rail/subsystem (2 spares are included)
⑦	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stopper (2 spares are included)
⑧	WP005	Washer (M5)	6	For the hexagon socket head bolt (2 spares are included)
⑨	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem
⑩	3243319-68	Nameplate (parts)	1	Already affixed to the rail
⑪	5486321-1	Stopper (R)	1	For DF300-RK
⑫	5486321-2	Stopper (L)	1	For DF300-RK

* The No. 11 and 12 optional parts are not used for installation of DF350-RKH.

Table 2.2.2 Parts Required for Installation of DF-F350-URASD

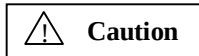
No.	Part No.	Part Name	Qty.	Remarks
①	2102429-A	Rail	1	For right hand side
②	2102429-B	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (L)
④	5490710-2	Stopper	1	For the rail (R)
⑤	5486419-1	Fastener (M5)	10	For securing the subsystem/rails (4 spares are included)
⑥	SB516	Bind screw (M5 × 16)	12	For securing the rail/subsystem (4 spares are included)
⑦	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stopper (2 spares are included)
⑧	2051001-513	LL washer	6	For the hexagon socket head bolt (2 spares are included)
⑨	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem
⑩	3243319-205	Nameplate (parts)	1	Already affixed to the rail
⑪	SB416	Bind screw (M4 × 16)	4	For securing the rail
⑫	BS406	Hexagon socket head bolt (M4 × 6.3)	4	
⑬	2051001-413	LL washer	4	

* The No. 11, 12, and 13 optional parts are not used for installation of DF350-RKH.

2.3 Tools Required

- Philips screwdriver (No.2)
- Socket wrench (4mm)

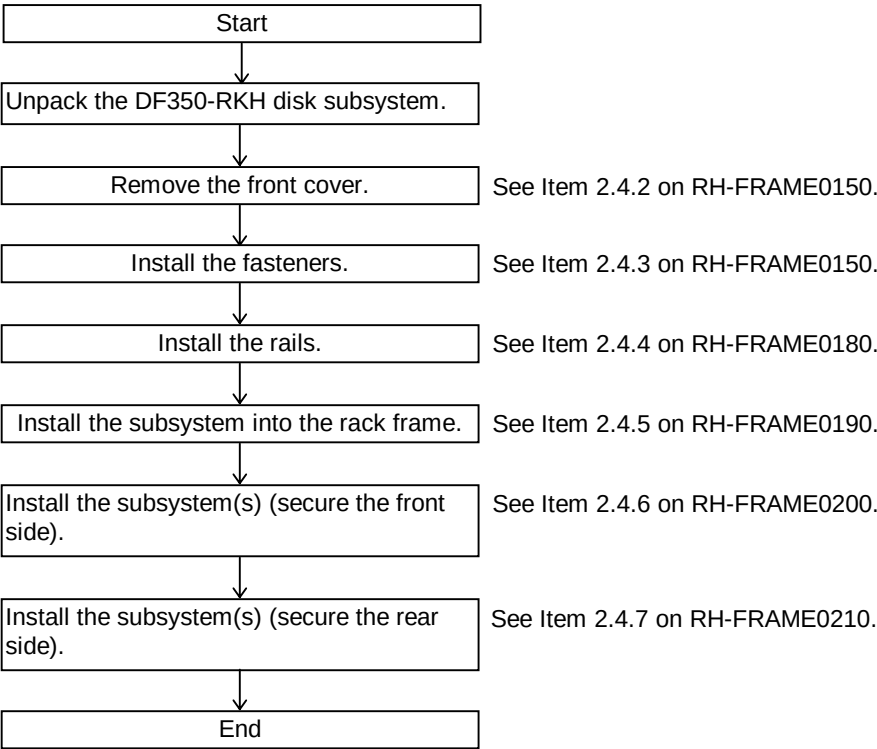
2.4 Installing the Subsystem into the Rack Frame



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKH disk subsystem is approximately 60kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning IBM AS/400 (9309) rack frame.

2.4.1 Procedures for installation

Install the unit following the procedure below.



2.4.2 Removing and installing the front cover

(1) Removal and installation of the front cover.

① Removal

Hold the grooves located on both sides of the front cover and pull the front cover toward you to remove it.

② Installation

Mate the grooves of the front cover with the guide plate of the subsystem, and secure the front cover by pressing its four corners.

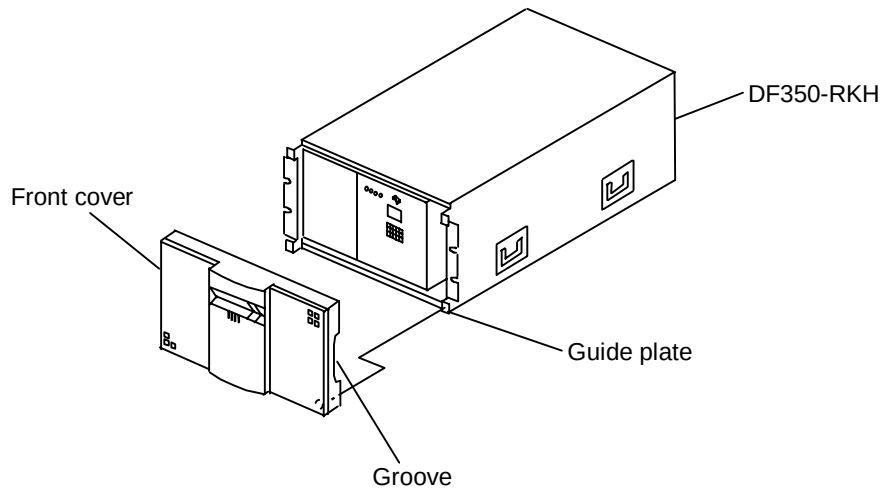
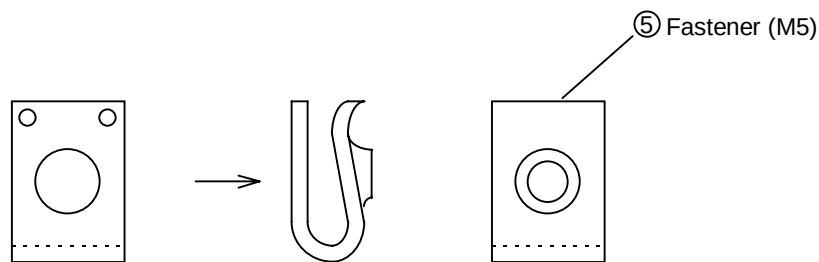


Figure 2.4.2 Removing and Installing the Front Cover

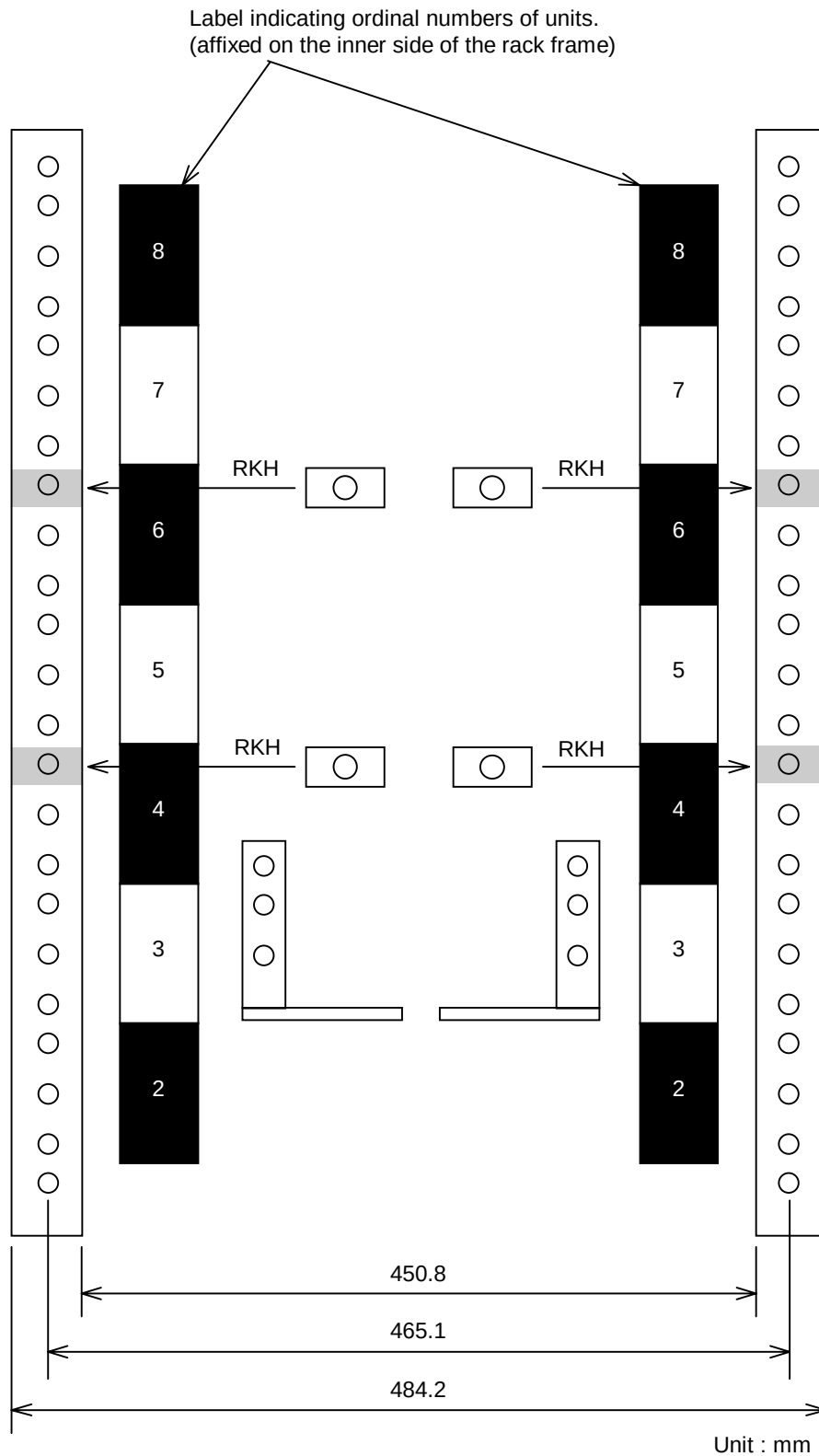
2.4.3 Installing the fasteners (See Figure 2.4.3 (a) to 2.4.3 (c).)

- (1) Insert the fasteners on the front side of the rack frame with their flat sides facing toward you.
- (2) Insert the fasteners to the top holes of upper 1st and 3rd units from the unit where the rail is to be installed.
- (3) Insert the fasteners on the rear side of the rack frame with their flat sides facing toward you.
- (4) Insert the fasteners to the top hole of the unit where the rail is to be installed and the middle hole of upper 1st unit.



Insert a screw in the direction of an arrow.

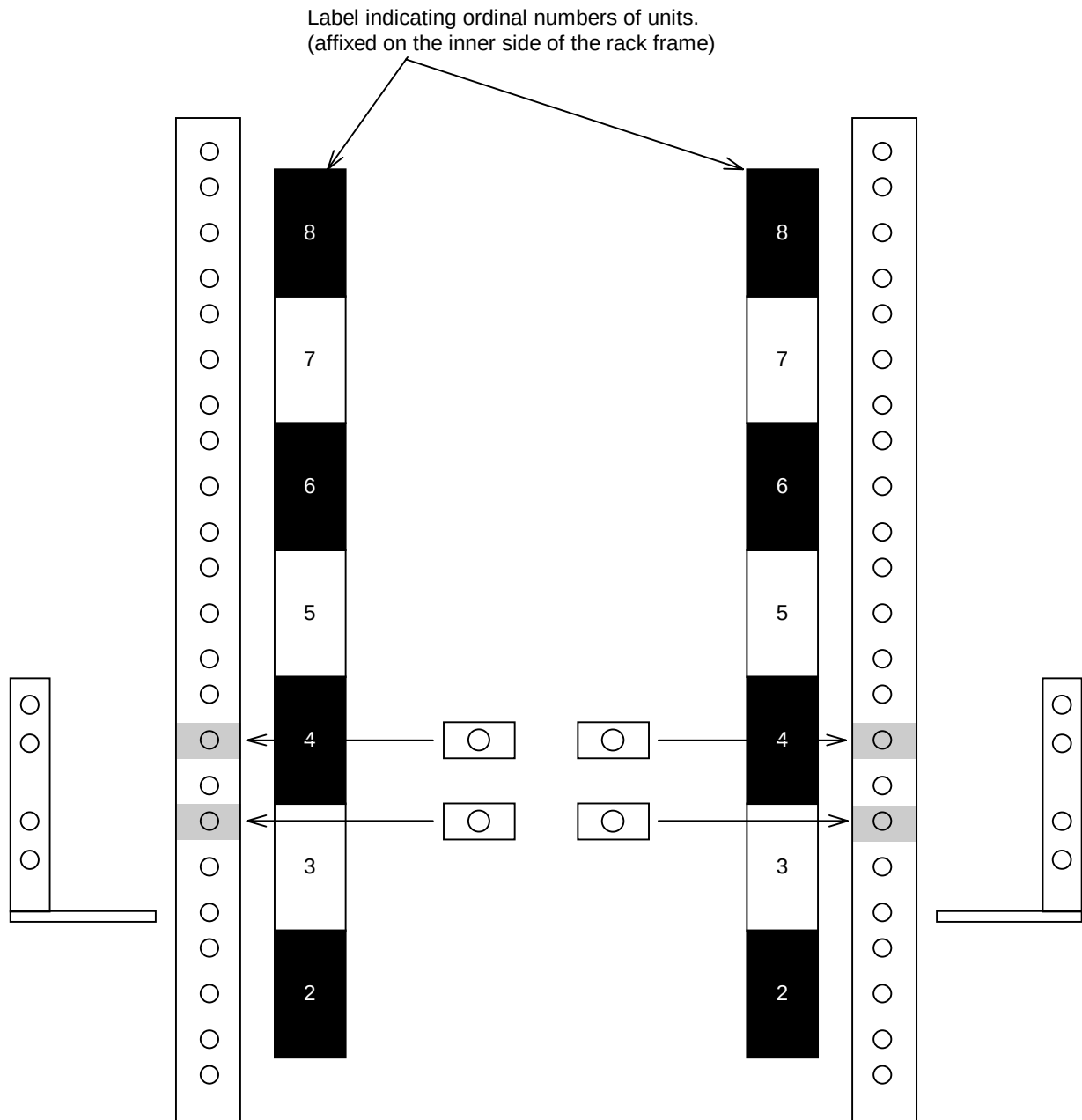
Figure 2.4.3 (a) Fastener



Note 1 : A figure "  " indicates the fastener.

Note 2 : Above diagram shows the composition when the rails are installed at the 3rd unit.

Figure 2.4.3 (b) Fastener Installing Locations in the Front of the Rack Frame



Note 1 : A figure "  " indicates the fastener.

Note 2 : Above diagram shows the composition when the rails are installed at the 3rd unit.

Figure 2.4.3 (c) Fastener Installing Locations in the Rear of the Rack Frame

2.4.4 Installing the rails (See Figure 2.4.4.)

- (1) Fix the ④ Stopper (R) to the ① Rail (R) temporarily with ⑦ Hexagon socket head bolts (M5 × 8) and ⑧ Washers (M5) (for URAS) or ⑧ LL washers (for URASD).
- (2) Insert the ① Rail (R) into the rack frame and secure it with ⑥ Bind screws (M5 × 16) (both front and rear sides).
- (3) Fix the ③ Stopper (L) temporarily to the ② Rail (L), insert the ② Rail (L) into the rack frame and secure it in the same way.

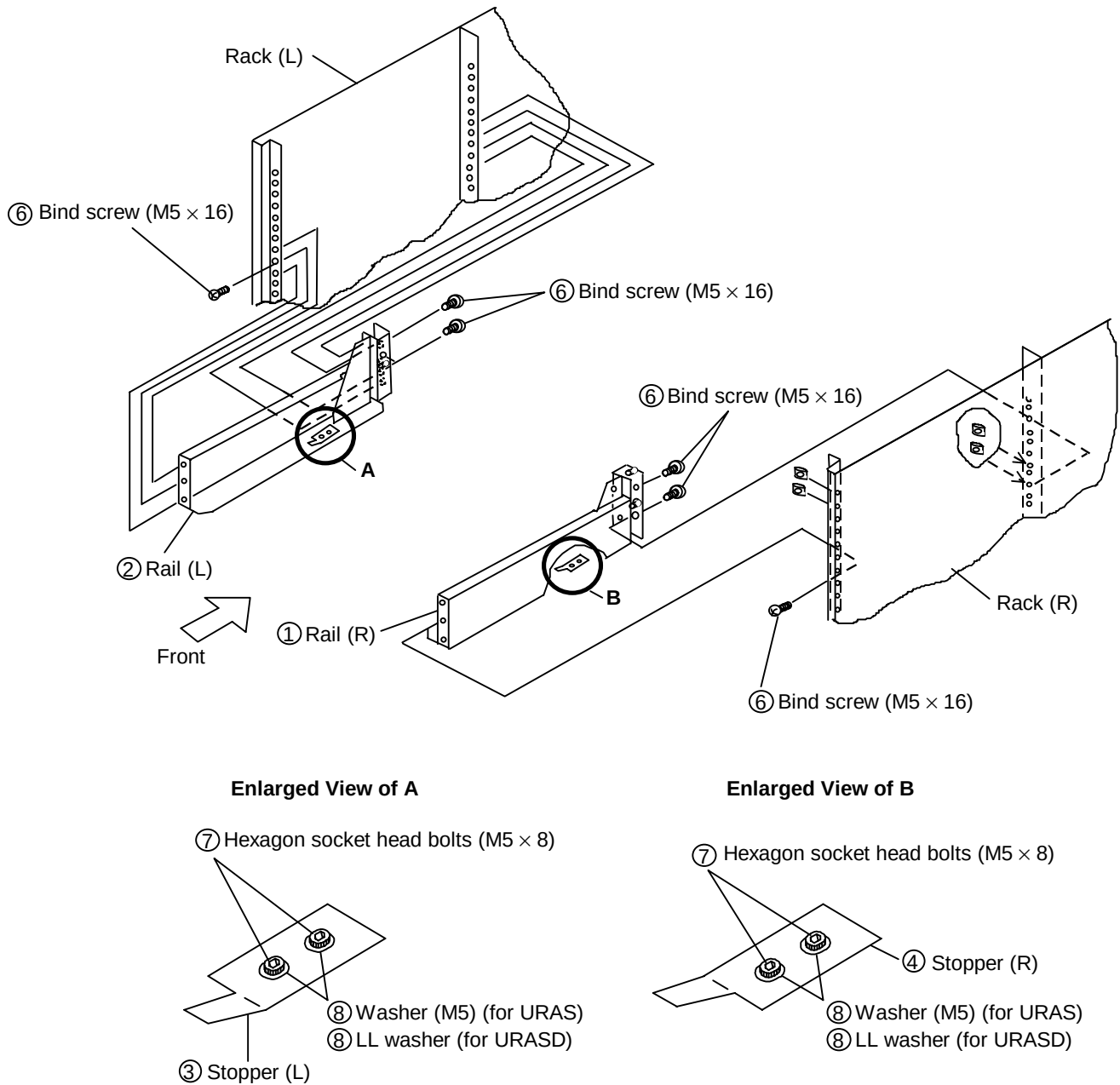
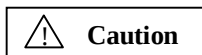


Figure 2.4.4 Installing the Rails

2.4.5 Installing the subsystem into the rack (See Figure 2.4.5.)



The mass of the DF350-RKH is approximately 60kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-RKH is secured tightly before installing the DF350-RKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Hold the four handles and place the subsystem on the rails. Then, push it gently all the way into the rack frame.

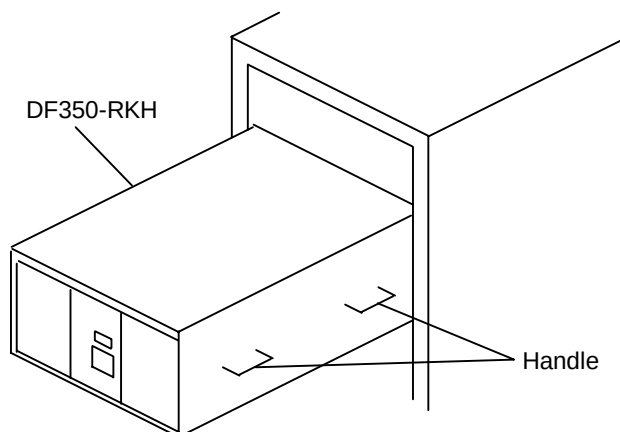


Figure 2.4.5 Installing the Subsystem in the Rack

2.4.6 Securing the front side of the subsystem (See Figure 2.4.6.)

- (1) Secure the subsystem at four places using the ⑥ Binding screws (M5 × 16).
- (2) Reinstall the front cover by pressing it against the subsystem. (See Figure 2.4.2.)

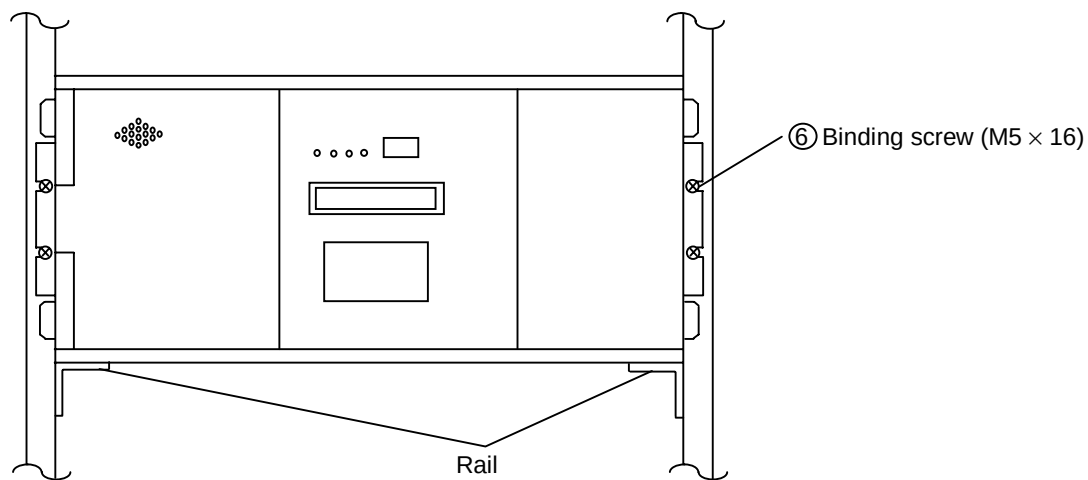
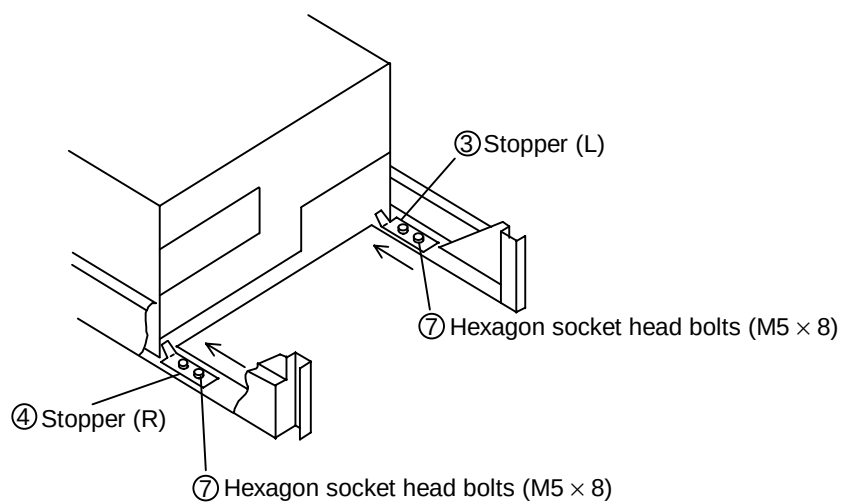


Figure 2.4.6 Securing the Front Side of the Subsystem

2.4.7 Securing the rear side (See Figure 2.4.7.)

- (1) Slide the ③ Stopper (1) and ④ Stopper (2) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the ⑦ Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

**Figure 2.4.7 Securing the Rear Side**

3. Installing Into Hitachi Rack Frame (U1)

3.1 Space (Height Inside the Rack) Required for Installation

The space of 6 units height (EIA standard) is required to install DF350-RKH into the Hitachi rack.

3.2 Optional Parts Required for Installation (Model names : DF-F350-URHT)

Table 3.2.1 shows optional parts required to install one DF350-RKH disk subsystem.

Table 3.2.1 Parts Required for Installation of DF-F350-URHT

No.	Part No.	Part Name	Qty.	Remarks
①	3243500-1	Rail	1	For right hand side
②	3243500-2	Rail	1	For left hand side
③	5490715-1	Stopper	1	For the rail (R)
④	5490715-2	Stopper	1	For the rail (L)
⑤	5486467-2	Nut plate	4	For securing the rail
⑥	5490724-A	Nut plate ASSY	2	
⑦	BS520	Hexagon socket head bolt (M5 × 20)	10	For securing the rail (2 spares are included)
⑧	BS508	Hexagon socket head bolt (M5 × 8)	4	For securing the stopper (2 spares are included)
⑨	SB408	Bind screw (M4 × 8)	6	For securing the nut plate/bracket (2 spares are included)
⑩	SB510	Bind screw (M5 × 10)	6	For securing the subsystem (2 spares are included)
⑪	3243319-69	Nameplate (parts)	1	Already affixed to the rail
⑫	5486468-1	Clamper (1)	2	For securing the AC cables
⑬	3244501-1	Bracket	1	For securing the AC cables
⑭	SB306	Binding screw (M3 × 6.3)	6	For securing the clamper (2 spares are included)
⑮	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem

3.3 Tools Required

- Socket wrench (4mm)
- Spanner (10mm)
- Philips screwdriver (No.2)

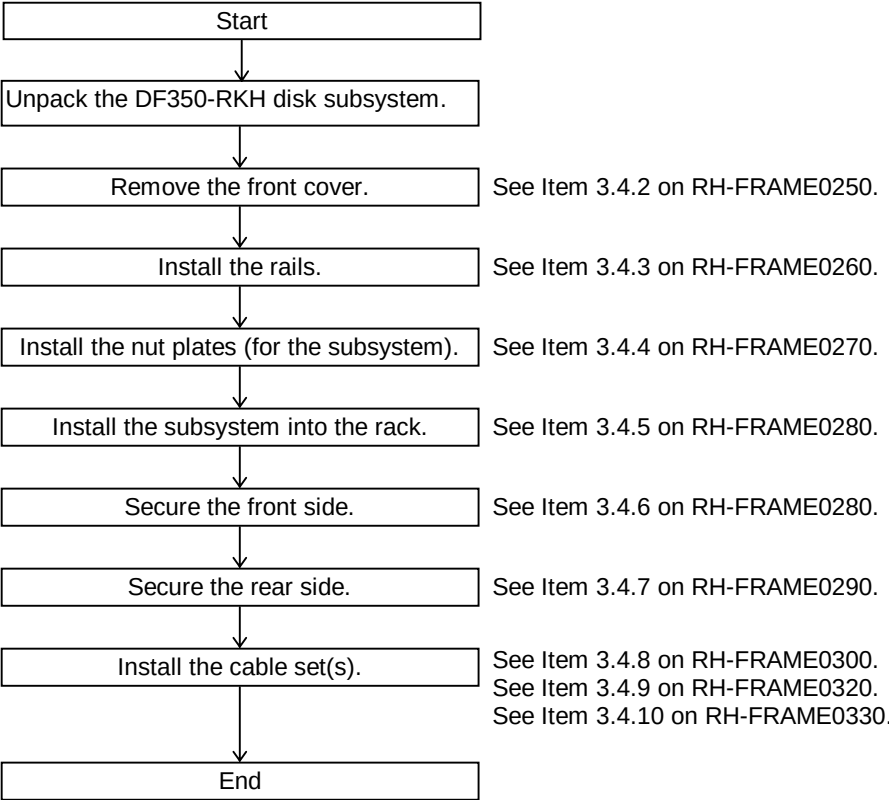
3.4 Installing the Subsystem into the Rack



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKH disk subsystem is approximately 60kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.

3.4.1 Procedures for installation

Install the unit following the procedure below.



3.4.2 Removing and installing the front cover

(1) Removal and installation of the front cover.

① Removal

Hold the grooves located on both sides of the front cover and pull the front cover toward you to remove it.

② Installation

Mate the grooves of the front cover with the guide plate of the subsystem, and secure the front cover by pressing its four corners .

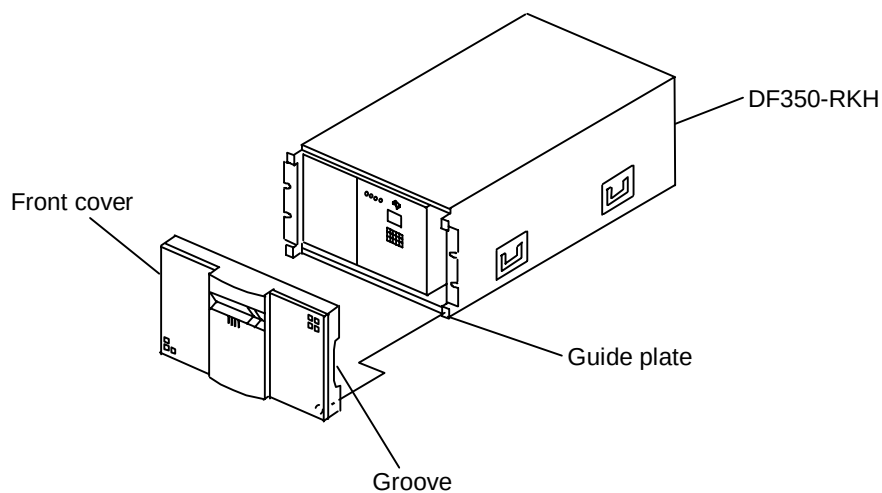


Figure 3.4.1 Removing and Installing the Front Cover

3.4.3 Installing the rails (See Figure 3.4.2 and 3.4.3.)

- (1) Temporarily secure the ③ Stopper (R) to the ① Rail (R) using ⑧ Hexagon socket head bolts (M5 × 8). (See Figure 3.4.2.)
- (2) Insert the protruded portions of the ① Rail (R) into the rectangular holes on both the front and rear sides of the rack frame at right hand side of the desired installing position. (See Figure 3.4.3.)
- (3) Position the ⑤ Nut plates (for securing rails aligning their holes with the holes of the rail) and the rack frame and secure the ① Rail (R) with two ⑦ Hexagon socket head bolts (M5 × 20) (at two places each on the front and rear sides). (See Figure 3.4.3.)
- (4) Temporarily attach the ④ Stopper (L) to the ② Rail (L), and secure the ② Rail (L) to the rack frame in the same way.

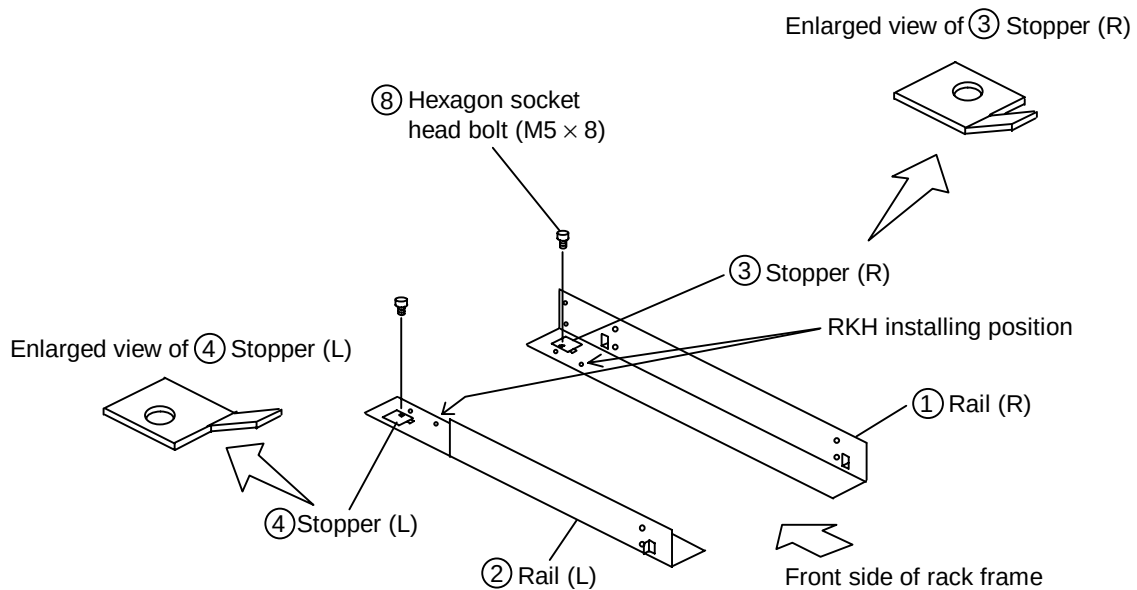


Figure 3.4.2 Temporary Attachment of the Stopper

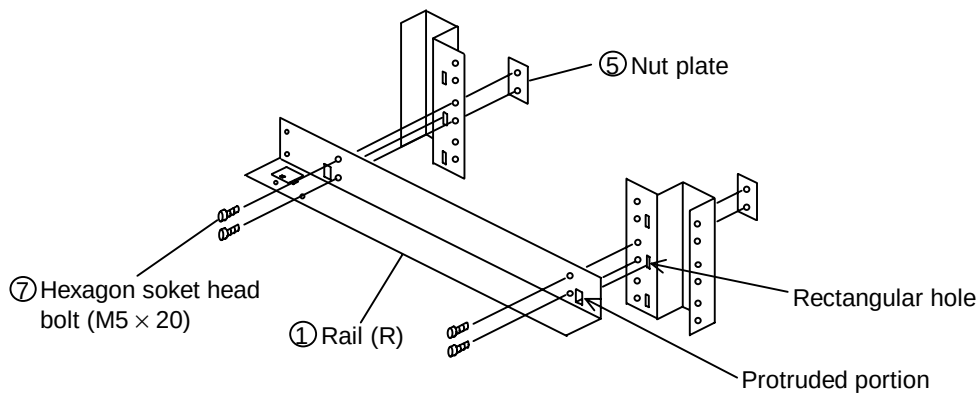


Figure 3.4.3 Securing the Rail to the Rack Frame

3.4.4 Installing the nut plate assys (for securing the subsystem) (See Figure 3.4.4.)

- (1) Position the ⑥ Nut plate ASSY on the inner side of the rack frame aligning its lowermost screw hole with a hole of the rack frame (3rd hole from the face of the rail).
- (2) Secure the ⑥ Nut plate ASSY with two ⑨ Bind screws (M4 × 8) so that it becomes parallel with the edge of the rack frame.

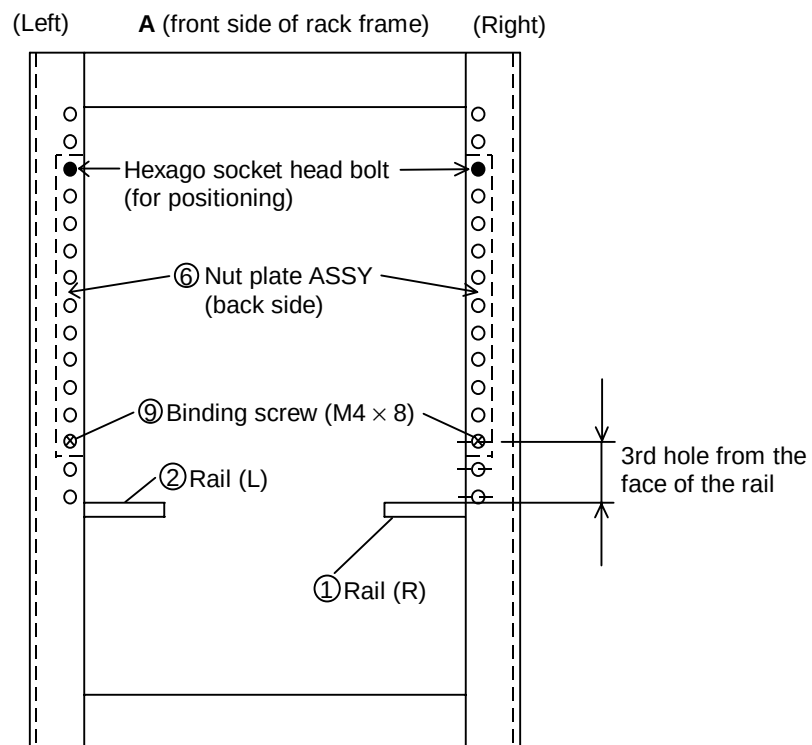
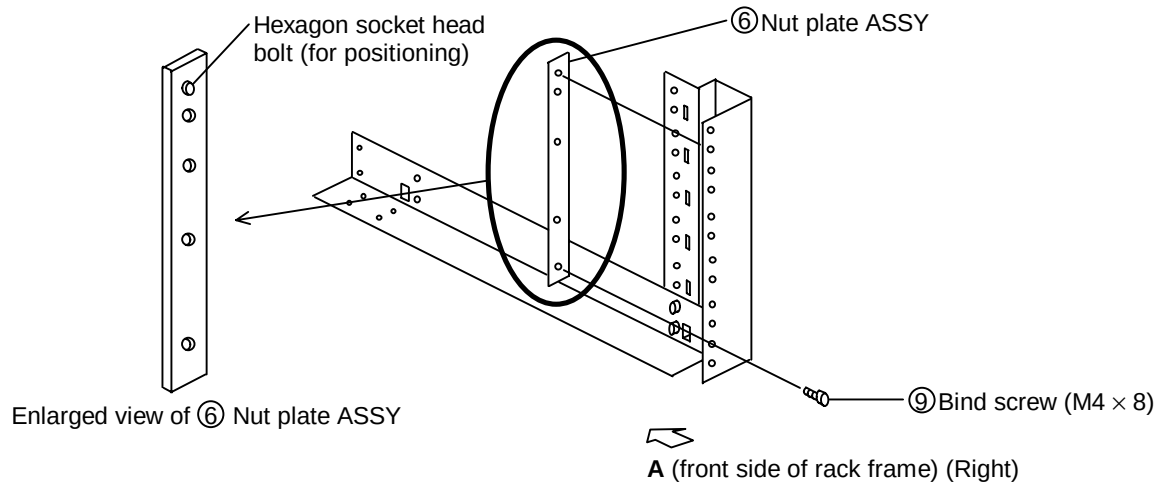


Figure 3.4.4 Installing the Nut Plate ASSY (for Securing the Subsystem)

3.4.5 Installing the subsystem into the rack (See Figure 3.4.5.)



The mass of the DF350-RKH is approximately 60kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-RKH is secured tightly before installing the DF350-RKH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Hold the four handles and place the subsystem on the rails. Then, push it all the way into the rack.

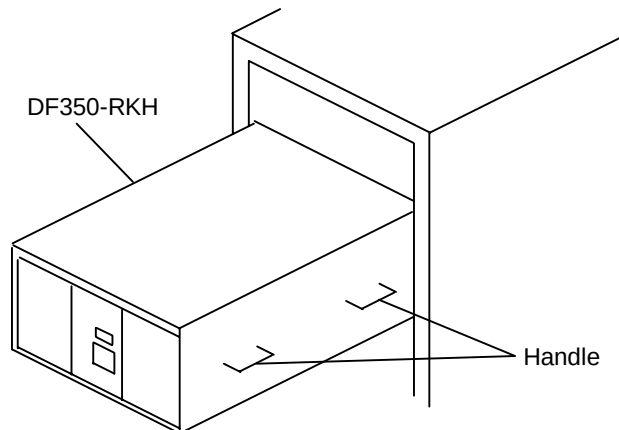


Figure 3.4.5 Installing the Subsystem in the Rack

3.4.6 Securing the front side of the subsystem (See Figure 3.4.6.)

- (1) Secure the subsystem at four places using the ⑩ Bind screws (M5 × 10).
- (2) Mate the latches of the front cover with the protruded portions of the subsystem, and secure the front cover by pressing its four corners. (See Figure 3.4.1.)

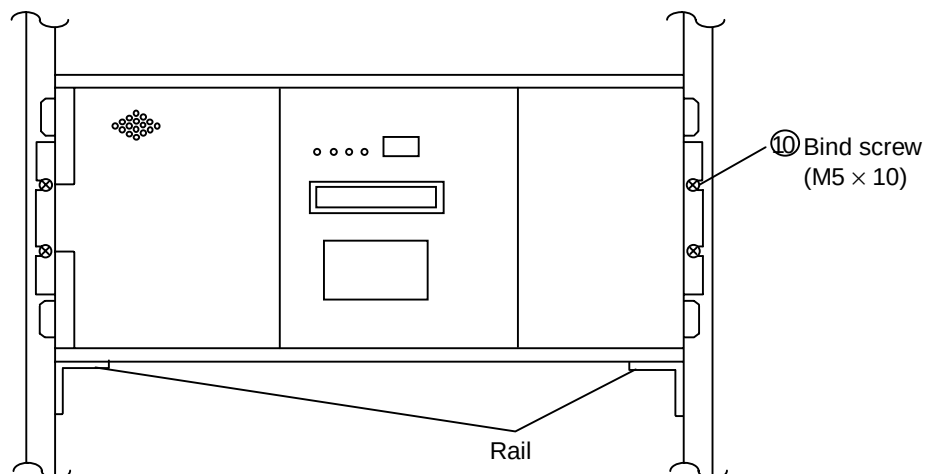


Figure 3.4.6 Securing the Front Side of the Subsystem

3.4.7 Securing the rear side of the subsystem (See Figure 3.4.7.)

- (1) Slide the ③ Stopper (R) and ④ Stopper (L) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the ⑧ Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

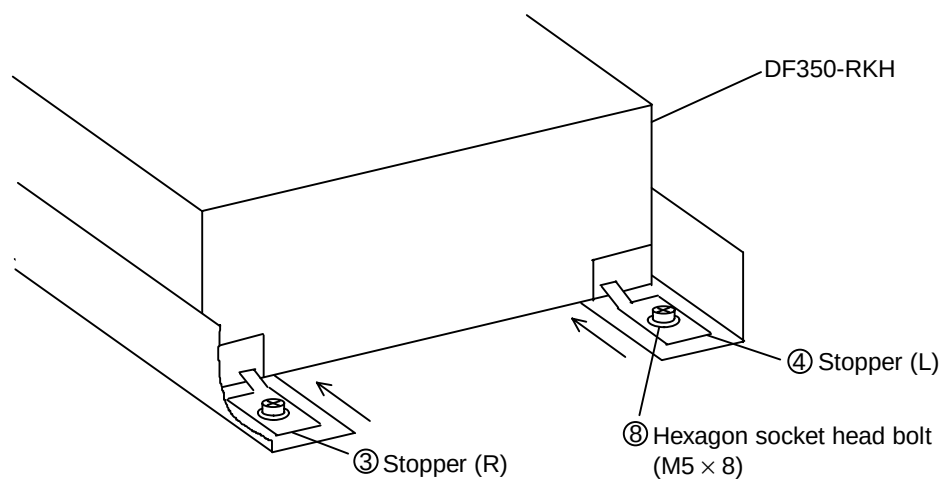


Figure 3.4.7 Securing the Rear Side of the Subsystem

3.4.8 Connection and disconnection of AC cable sets to/from subsystems

- (1) Connect or disconnect the AC cable sets to/from the subsystem(s) installed on the rack following the procedures shown below.
- (2) Connecting procedure for each subsystem. (See Figure 3.4.8.)
 - ① Turn off the PDB breaker (CB1).
 - ② Plug the socket of the AC cable set into the inlet of the subsystem.
 - ③ Fix the ⑬ Bracket with the two ⑨ Bind screws (M4 × 8) and pass the AC cable sets through two ⑫ Clampers (1).
 - ④ Plug the socket of the AC cable set into the PDB.
- (3) Disconnecting procedure for each subsystem.
 - ① Turn off the PDB breaker (CB1).
 - ② Unplug the socket of the AC cable set from the inlet of the subsystem and the outlet of the PDB.
 - ③ Loosen the four ⑭ Bind screws (M3 × 6.3). Remove the ⑫ Clampers (1).

Note : On completion of work, fix the ⑫ Clampers (1) to the ⑬ Bracket with the four ⑭ Bind screws (M3 × 6.3).

Notice : Do not attach the Clampers (1) and Bracket to the lowermost rail.

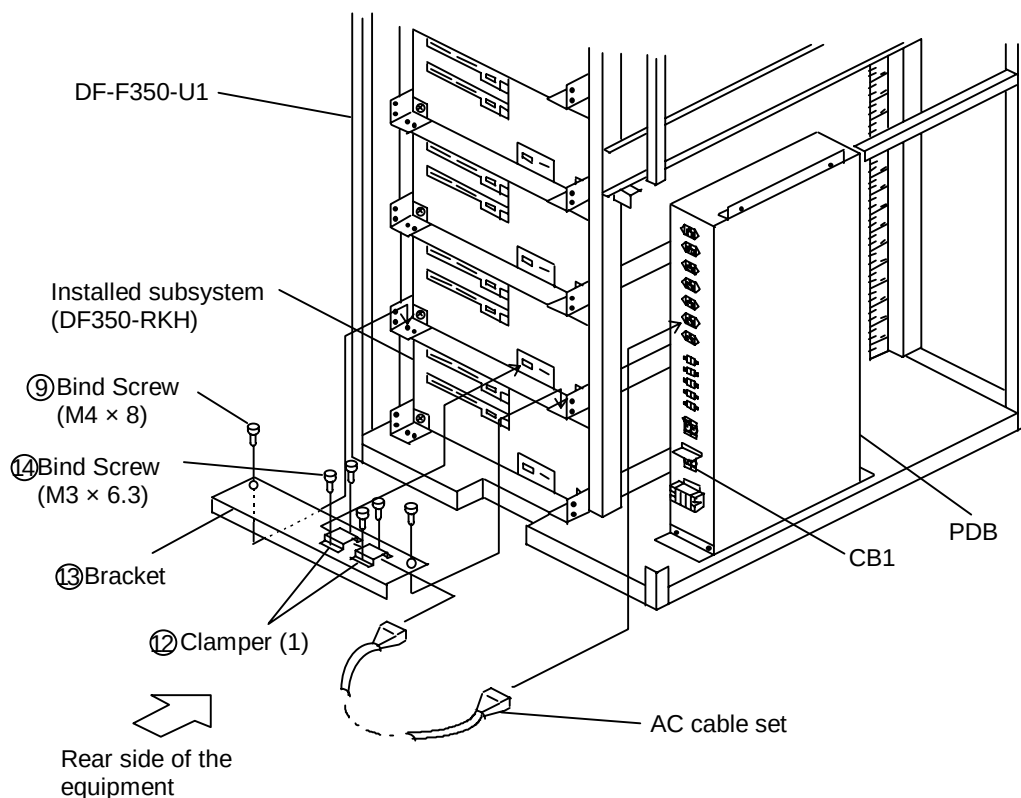
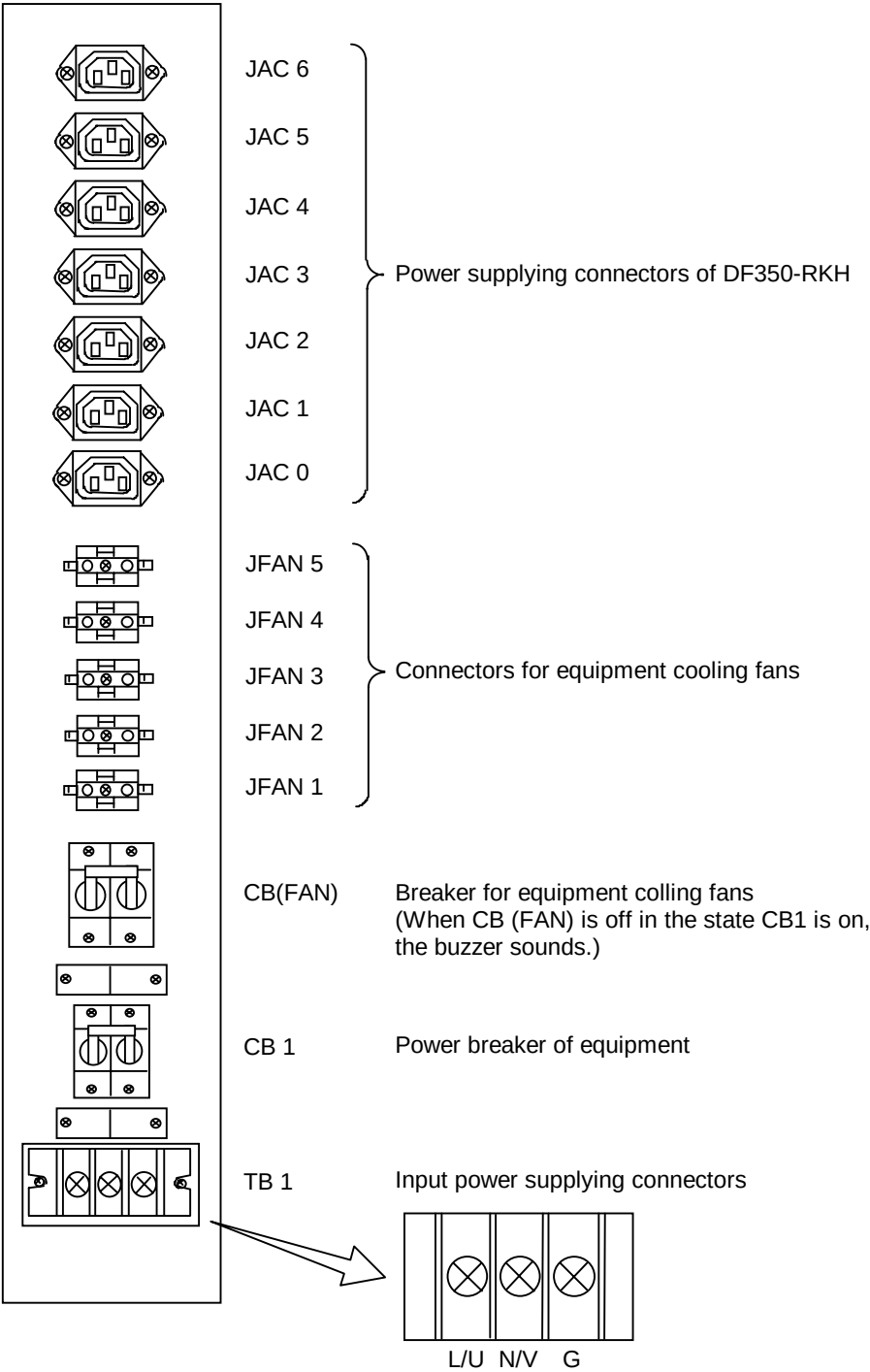


Figure 3.4.8 Connection and Disconnection of AC Cable set(s) to Subsystem(s)



 **Warning**

A large leak current flows when plural subsystems of DF350-RKH are installed. Be sure to ground them for preventing an electric shock accident.

Figure 3.4.9 Appearance of PDB

3.4.9 Connection of relay cables between panel assembly and DF350-RKHs

(1) Procedures to connect relay cables to DF350-RKHs.

- ① Remove the SVPs from the subsystems. (For the SVP removal procedure, refer to the manual of the subsystem.)
- ② Plug the connectors (P6-0 to P6-6) of the subsystems installed on the DF-F350-U1 into J6s of the SVPs of the subsystems. (Perform these works one by one starting from the lowermost subsystem.)
- ③ Reinstall the SVPs in the subsystems. (For the SVP installing procedure, refer to the manual of the subsystem.)

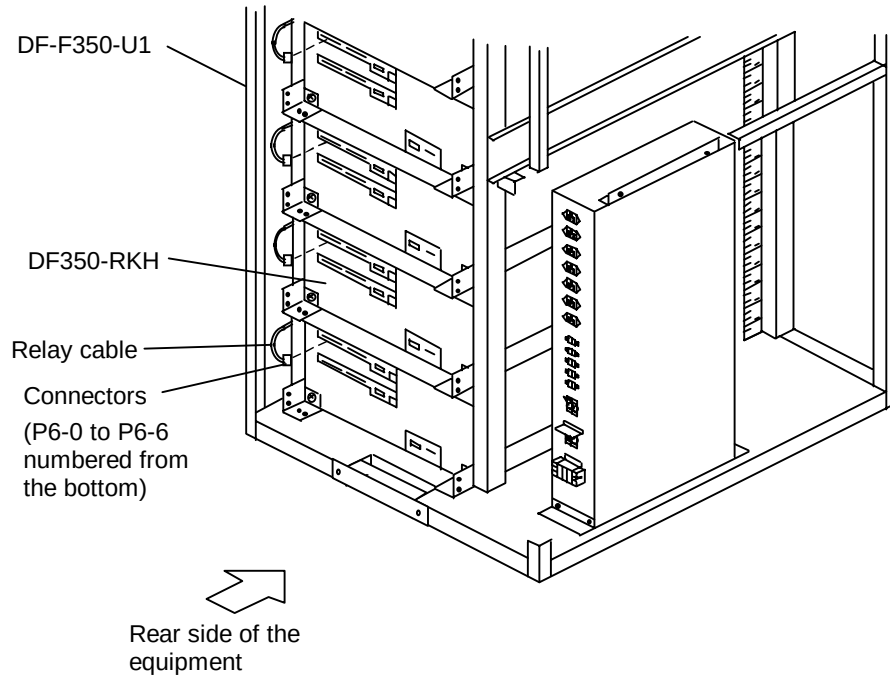


Figure 3.4.10 Connection of Relay Cables (for DF350-RKHs)

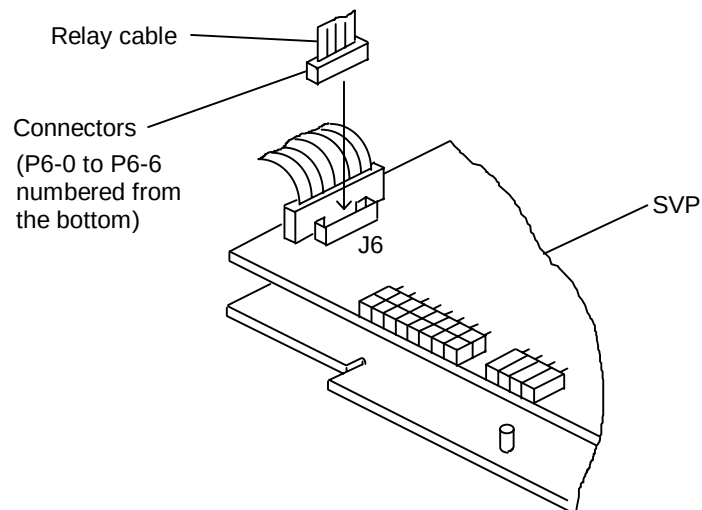
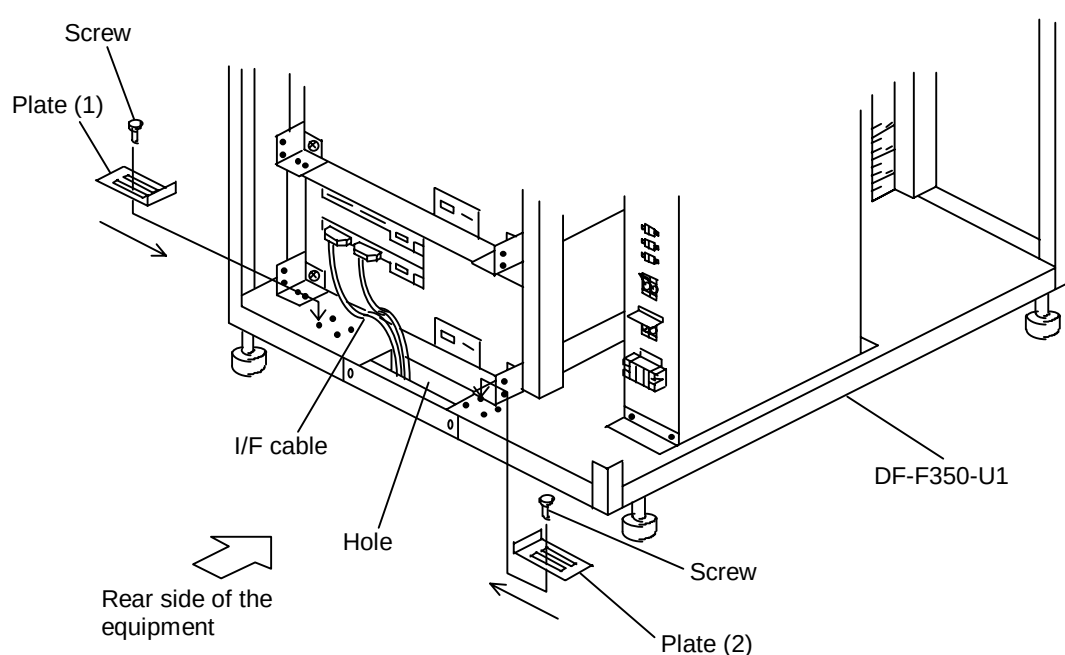


Figure 3.4.1 Relay Cable Connection to SVP

3.4.10 Fixing I/F cables of subsystems (See Figure 3.4.12 and 3.4.13.)

(1) Fixing method '1'. (See Figure 3.4.12.)

- ① Loosen the screws, and remove plates (1) and (2).
- ② Pass the I/F cable through the hole onto the floor. Press plates (1) and (2) against the cable in the direction of the arrows (→), then tighten four screws.

**Figure 3.4.12 Fixing I/F Cable (Method '1')**

(2) Fixing method '2'. (See Figure 3.4.13.)

- ① Loosen the screws, and remove plates (1), (2) and (3).
- ② Pass the I/F cable through the hole onto the floor. Tighten two screws. Attach plate (3).
- ③ Press the plates (1) and (2) against the cable in the direction of the arrows (→), and tighten four screws.

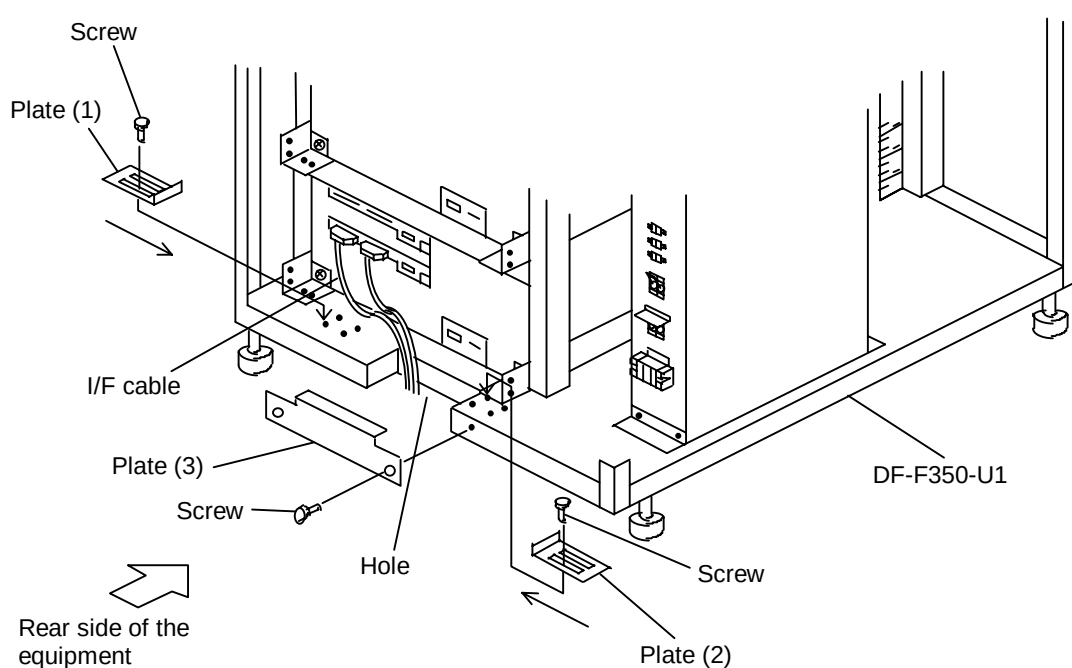


Figure 3.4.13 Fixing I/F Cable (Method '2')

DF350 Disk Subsystem
7. PARTS REPLACEMENT
(Rack Mount (RKWH/U2) Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.26.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0190	A sentence was added.	AD
					0230	"RAID0" was changed to "RAID1" in the figure.	CR
					0330	"STSDTSVER" was changed to "SYS DTSVER". (Pages 0370, 0390, 0420 and 0450 were changed by the same reason.)	CR
					0370	Figure 9.1 was changed.	CH
					0375	Newly created by inserting a figure of the label layout.	AD
					0400	An explanation in the case there exist the redundancy was added.	AD
					0405	Newly created by shifting from the front sheet.	AD
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0040	Added CACHE ASSY and ④.	AD/
						Deleted *1, 2.	DL
					0050	Added "Refer to THEORY..." in Figure.	AD/
						Deleted (2).	DL
					0055	This page was newly added.	AD
					0100	Added "The READY LED on..."	AD
					0110	Deleted "DIPSWITCH SET".	DL/
						Shifting from 0120.	AD
					0120	Shifting from 0130.	AD
					0130	Flow was shifting to 0120.	DL
					0190	Added 4.1.1.	AD
					0195	This page was newly added.	AD
					0200	Added RAID A.	AD
					0220	Added (1). ((1)→(1-1)).	AD
					0230	Added RAID A.	AD
					0235	This page was newly added.	AD
					0238	This page was newly added.	AD
					0240	Added RAID A.	AD
					0250	Deleted (C) - (i).	DL/
						Added DYNAMIC SPARE.	AD
					0260	Added (C) - (i).	AD/
						Shifting the section 4.3 to 0265.	DL
					0265	This page was newly added.	AD
					0310	Added Notice 1, 2.	AD
					0325	This page was newly added.	AD
					0330	Added Notice 1, 2.	AD
					0361 - 0367	These page were newly added.	AD
					0410	Added Notice 1, 2.	AD
					0420	Added Notice 1, 2.	AD
					0430	Added "Redundant CTL option".	AD
					0450	Added Notice 1, 2.	AD
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0340	Added Notice 1.	AD
					0364	Added Notice 1.	AD
					0400	Added WARNING.	AD
					0405	Delete (5).	DL
					0410	Added CAUTION	AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.)	AD
					0040	Added A2E4A/A2E8/A1E8A/A1E18.	AD

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
6	Oct.15.'98	A.Yamanashi			0020	Added "Procedures for replacing I/F ADAPTER ASSY or BATTERY ASSY".	AD
					0040	Added A3E4/A2E8A.	AD
					0100	Added case of the dual controller.	AD
					0130	Added case of the dual controller.	AD
					0310	Added "Procedures for replacing I/F ADAPTER ASSY or BATTERY ASSY".	AD
					0370	Added "Procedures for replacing I/F ADAPTER ASSY or BATTERY ASSY".	AD
					0480	This page was newly added.	AD

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2.3.1 Back-up procedure to FD	RW-REP0090
2.3.2 Restoring procedures from FD	RW-REP0130
3. Attaching/Removing and Opening/Closing the Covers.....	RW-REP0160
3.1 Attaching/Removing the Front Bezel	RW-REP0160
3.2 Opening/Closing the Rear Cover	RW-REP0170
3.3 Opening/Closing the Front Panel.....	RW-REP0180
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4.1.1 Procedure of data recovery and HDU ASSY replacement	
when no spare disk is installed.....	RW-REP0190
4.1.2 When a spare disk is installed.....	RW-REP0195
4.2 Procedures of Data Recovery and HDU Replacement	
Under RAID1, 5 Configuration.....	RW-REP0200
4.2.1 Procedure of data recovery and HDU ASSY replacement	
when no spare disk is installed.....	RW-REP0200
4.2.2 Procedures of data recovery and HDU ASSY replacement	
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8.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier	RW-REP0330
8.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later.....	RW-REP0361
9. Replacing I/F ADAPTER ASSY	RW-REP0370
10. Replacing SVP ASSY	RW-REP0390
11. Replacing AC/DC power supply.....	RW-REP0400
12. Replacing In Box ASSY	RW-REP0410
13. Replacing CACHE ASSY	RW-REP0420
14. Replacing LAN ASSY.....	RW-REP0450
15. Procedure for Replacing I/F ADAPTER ASSY or BATTERY ASSY	RW-REP0480

1. Mechanical Configuration

Figures 1.1 show mechanical configuration and parts location of this subsystem.

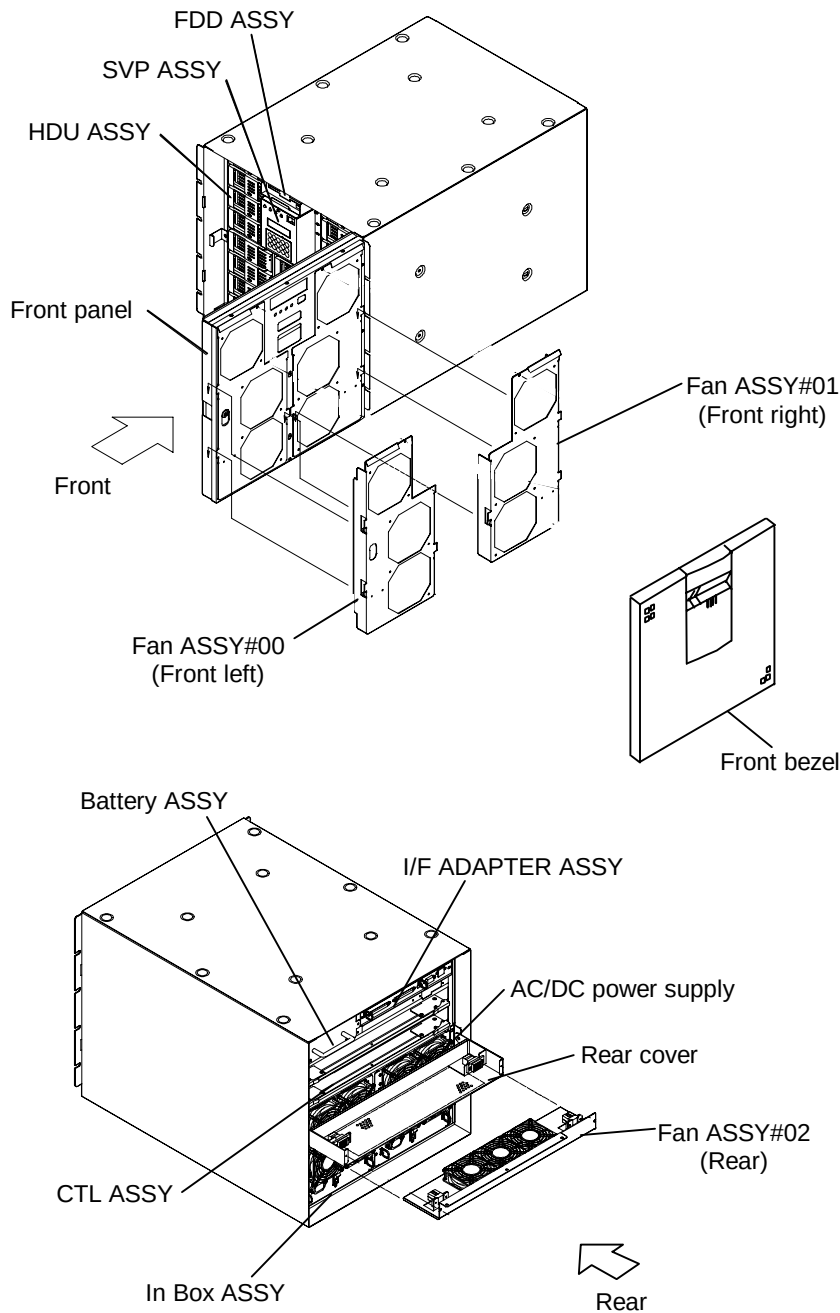


Figure 1.1 Appearance and Component Layout of DF350 (RKWH/U2)

2. Maintenance Procedure

(1) Turning power on/off when replacing parts

Turning on/off procedure varies depending on the parts to be replaced.

Follow the procedures described in the table below for replacing each part.

No	Product name	Drawing No.	Model	Turning on/off power	
				Option not provided	Option provided
1	HDU ASSY (2GB1"H)	3243084-E	DF-F350-A2E2	④	④
2	HDU ASSY (4GB1"H) (*1)	3252929-E	DF-F350-A3E4	④	④
3	HDU ASSY (4GB1"H)	3243084-F	DF-F350-A2E4	④	④
4	HDU ASSY (4GB1"H)	3243084-Q	DF-F350-A2E4A (For AS/400)	④	④
5	HDU ASSY (8GB1"H)	3252929-B	DF-F350-A2E8	④	④
6	HDU ASSY (8GB1"H)	3252929-D	DF-F350-A2E8A (For AS/400)	④	④
7	HDU ASSY (8GBH"H)	3243084-G	DF-F350-A1E8	④	④
8	HDU ASSY (8GBH"H)	3243084-R	DF-F350-A1E8A (For AS/400)	④	④
9	HDU ASSY (18GBH"H)	3252929-A	DF-F350-A1E18	④	④
10	Fan ASSY (front left) #00	2099367-A	DF-F350-P1RW	③	—
11	Fan ASSY (front right) #01	2099368-A	DF-F350-P2RW	③	—
12	Fan ASSY (rear) #02	3245118-A	DF-F350-P3RW	③	—
13	Battery ASSY	2099365-B	DF-F350-N2RW	③	—
14	FDD ASSY	3245116-A	DF-F350-M1RW	③	—
15	CTL ASSY	3247396-A /B	DF-F350-F1WCF /F2WCF	②	③
16	I/F ADAPTER ASSY (WD-pin-lock-screw type)	3247398-A	DF-F350-DWUDS	①	①
17	SVP ASSY	3247397-A	DF-F350-L1WL	②	—
18	AC/DC power supply	5486141-302	DF-F350-B1RW	②	③
19	In Box ASSY	5486142-305	DF-F350-Q1RW	②	—
20	CACHE ASSY	3247121-A	DF-F350-C8E	②	—
21	CACHE ASSY	3247121-B	DF-F350-C32E	②	—
22	CACHE ASSY	3247121-C	DF-F350-C128E	②	—
23	LAN ASSY	5493862-A	DF-F350-G1M1	②	③
24	LAN ASSY (SNMP)	5493862-B	DF-F350-G2M1	②	③

① Turning the power off DF350 Disk Subsystem and Host System.

② Turning the power off DF350 Disk Subsystem.

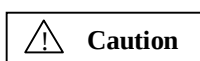
③ Turning the power off is unnecessary.

④ Turning the power on DF350 Disk Subsystem.

(*1): It is necessary to use it with the Micro_Disk Ver.0307 or later.

Notice : When a part which requires to turn the power off or on for replacement (marked with ① and ②) is to be replaced, turn the power off correctly according to the instruction in RW-REP0050 beforehand.

Otherwise, there is a risk that the user data is destroyed.



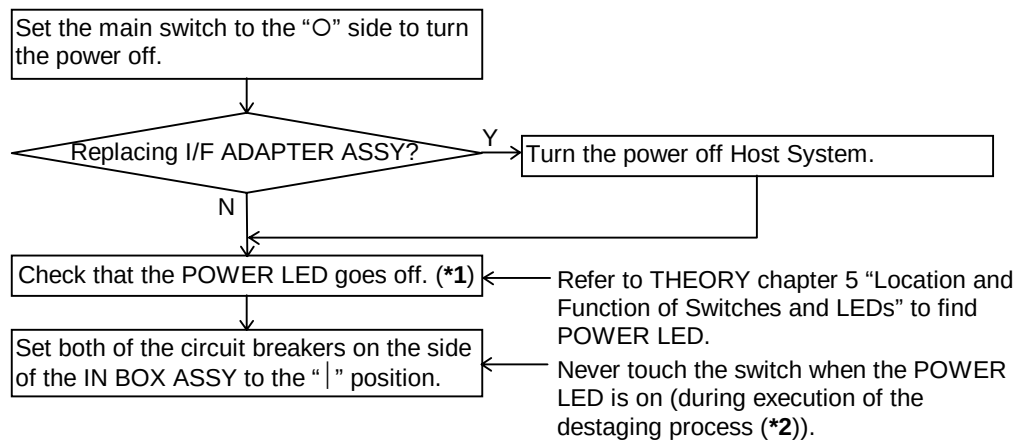
Caution

When replacing parts without turning off the power, do not put on metallic accessories or watches so that to avoid electric shock.

Be careful not to touch the electrified parts with a screwdriver etc.

2.1 Turning the Power On/Off for Each String

(1) Turning the power off



*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

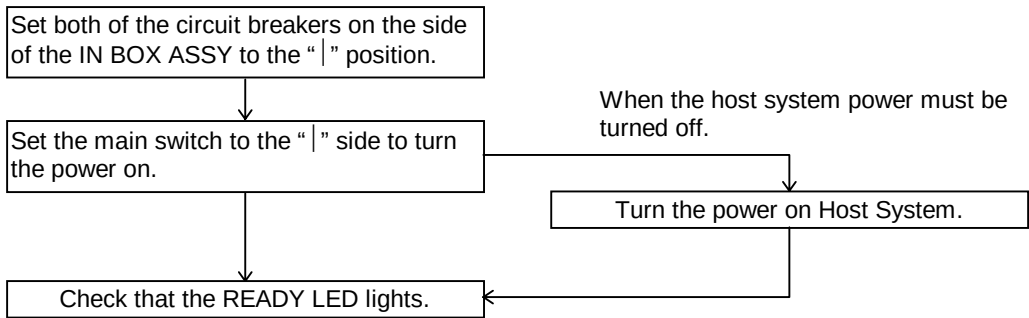
Notice : In case the data is not properly backed up, the user's data will be lost.

***2** The cache memory installed in this subsystem is controlled with a write-after method. When turning off the power, the subsystem automatically writes all the data left on the cache memory unwritten to the hard disk drive. (This operation is called a destaging.) The subsystem turns off the power when this process is completed. When the power is turned off according to the power failure or by the operation of the breaker, the destaging can not be performed. In this case, the subsystem enters the mode of battery back-up. If the system is kept in this state, the battery may be discharged and the user data might be lost. Therefore, be sure to follow the power-off procedure explained above.

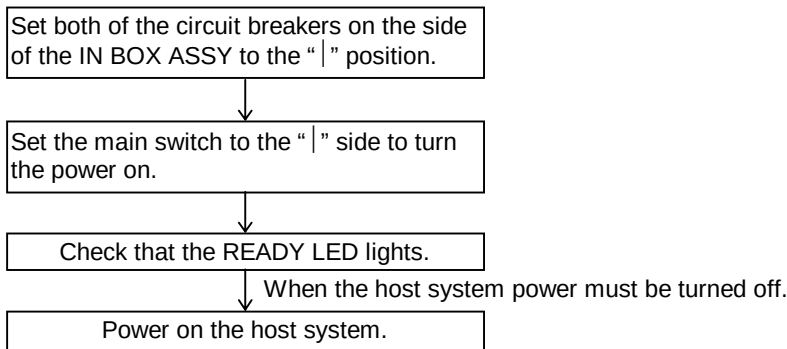
If the breaker is turned off due to power failure or by mistake before the POWER LED goes off, turn the power on again according to Item (2), "Turning the power on" promptly and then execute the power-off procedure explained above.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



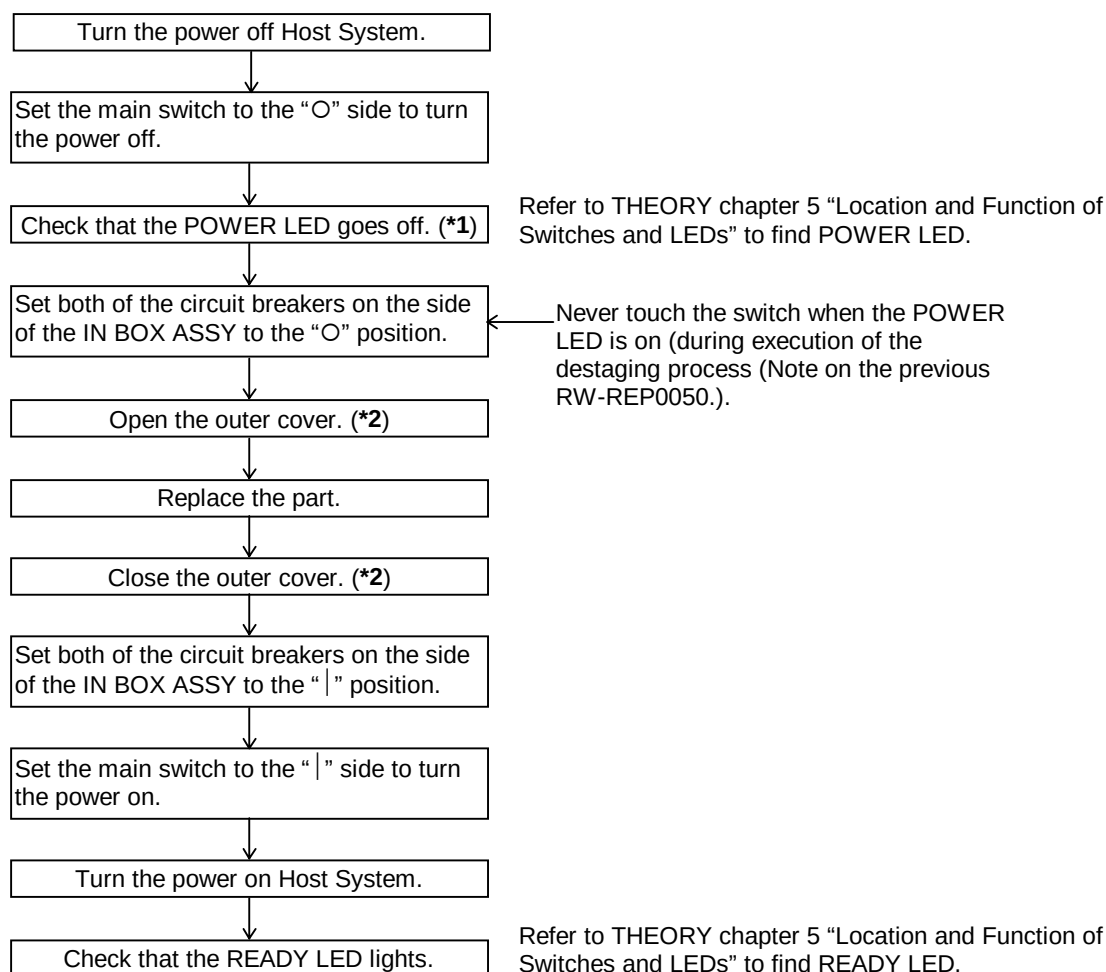
(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.2 Part Replacement Procedures

- (1) Procedure for the case of turning the power off both DF350 Disk Subsystem and Host System is inevitable.



Notice: In case the power is not normally turned off, the configuration data will be lost and the user's data will be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

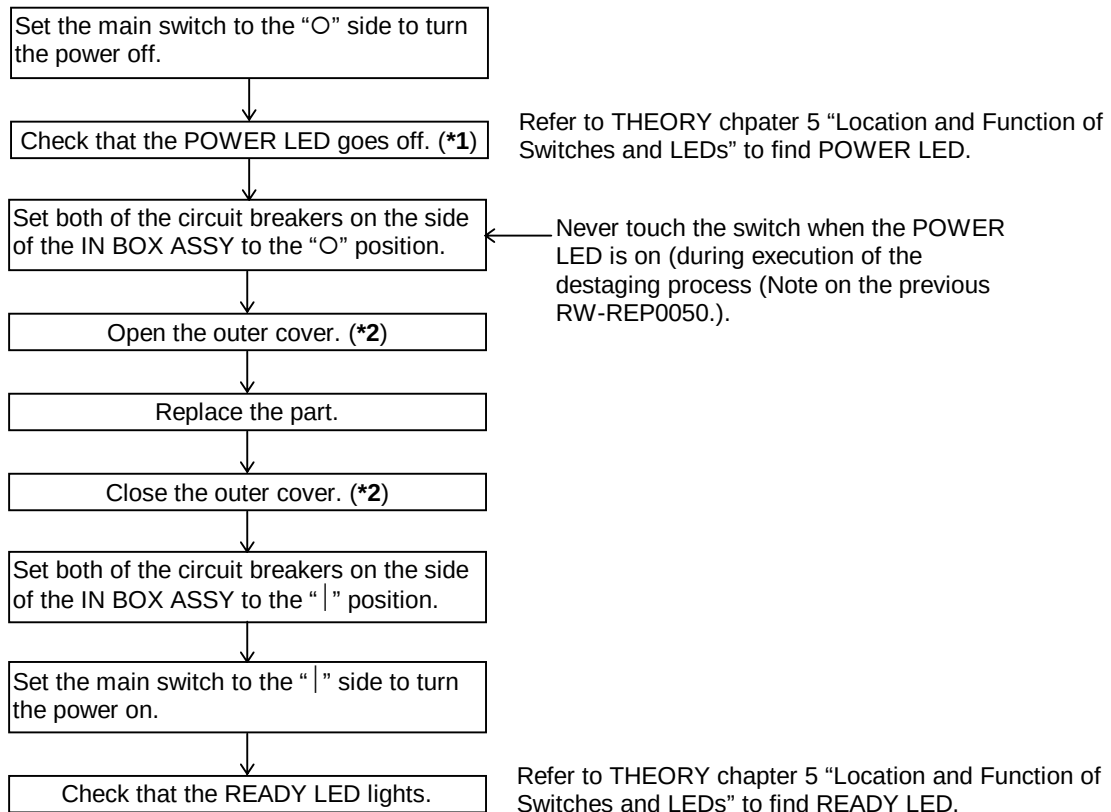
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

***2** Outer cover : Front bezel
Rear cover

- (2) Procedure for the case of turning the power off DF350 Disk Subsystem is inevitable.



Notice: In case the power is not normally turned off, the user's data might be lost.

***1** Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

- Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to "I" (ON) with the power switch (POWER SW) set to "O" (OFF).

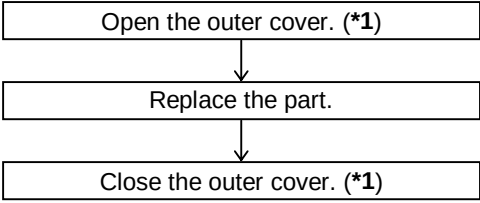
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on ----- Indicate the back-up mode.

CACHE PWR LED off ----- Indicate that the back-up mode is canceled.

- *2** Outer cover : Front bezel
Rear cover

(3) Procedure for the case of turning the power off DF350 is either not necessary or prohibited.



*1 Outer cover : Front bezel
Rear cover

2.3 Back-up Procedure of System Parameter

There are cases where system parameters (Target ID, buzzer setting, drive recovery mode, etc.) are copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters forllowing “2.3.1 Back-up procedure of system parameter” (RW-REP0090) or “2.3.2 Restore procedure of system parameter” (RW-REP0130).
(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to RW-REP0050.

Notice: In case the power is not normally turned off, the user’s data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2WCF) has been installed.

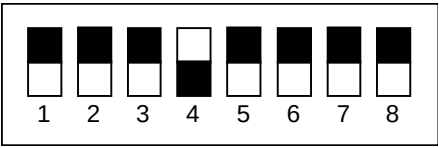
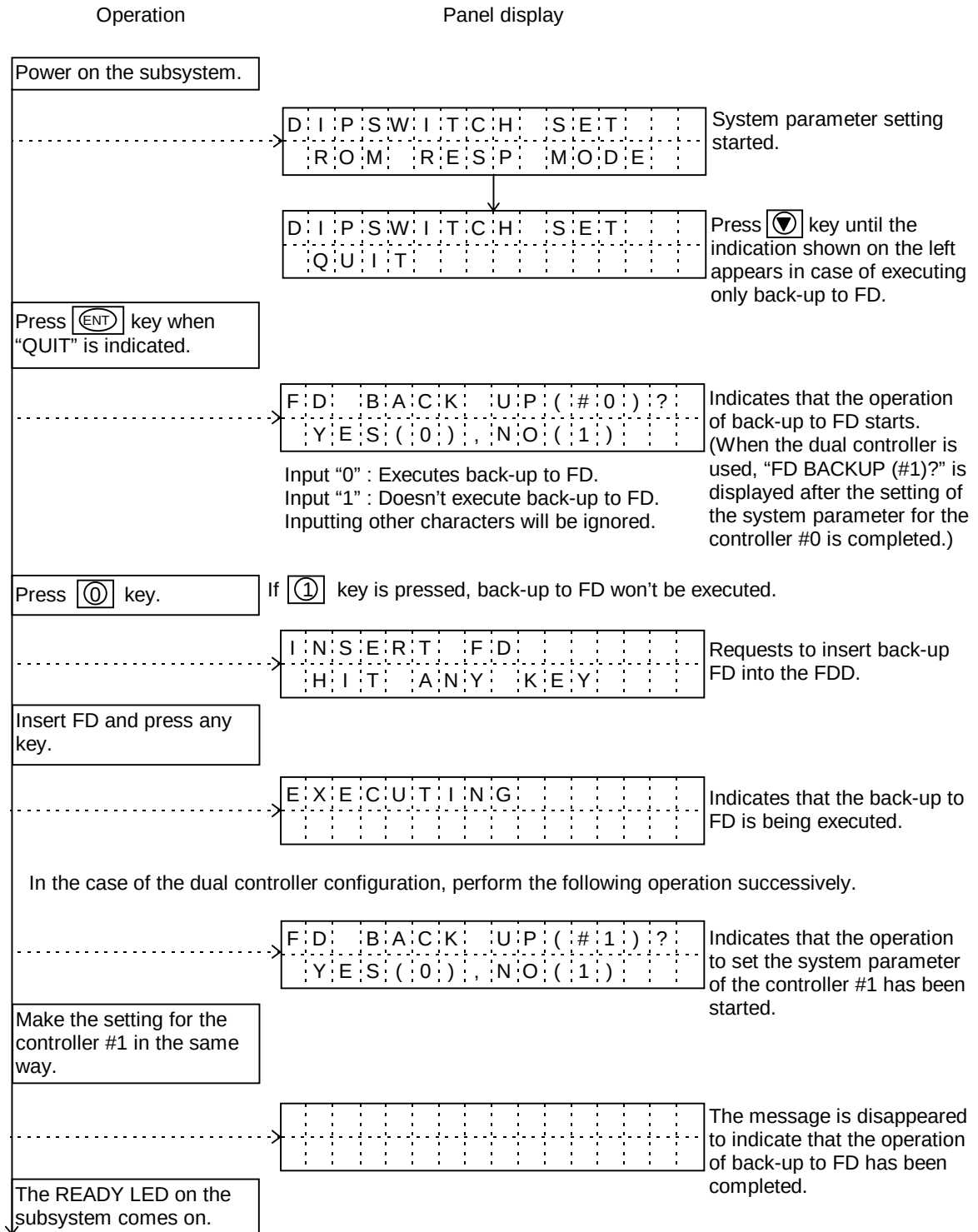


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

(3) Operate as described below.



(4) Set DIP switch No.4 to setting as shown in Figure 2.3.2.

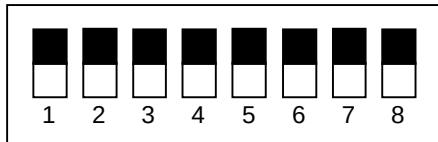
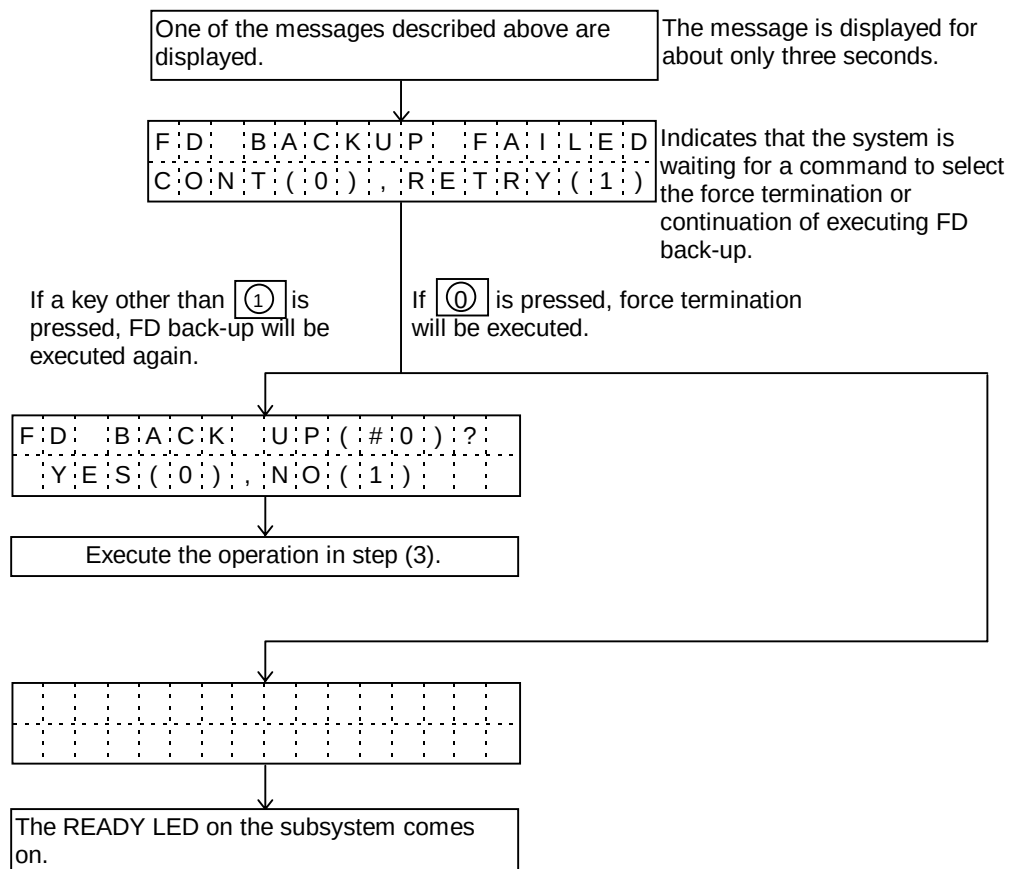


Figure 2.3.2 DIP Switches

Note 1 : While executing the back-up to FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute..
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

Note 4 : "SYSPRM0.DAT" or "SYSPRM1.DAT" file is stored in system parameter backed up FD. The case of optional SNMP system, SNMP configuration environment files ("Config.TXT" and "NAME.TXT") are stored with system parameter file.

Note 5 : In case with optional SNMP system and system parameter is restored without SNMP configuration environment files, Subsystem becomes ready without SNMP function. In this case, the warning lamp on the panel comes on and one of messages below is shown on PANEL.

W	0	1	6	0	1	F	D	E	R	R		
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	2	F	O	P	N	E	R	R
V	E	R	S	I	O	N	=	X	X	X	X	/X

W	0	1	6	0	0	S	N	M	P	I	N	V	1
V	E	R	S	I	O	N	=	X	X	X	X	/X	

Only Dual controller system.

This case, re-restore the subsystem with a FD in which SNMP configuration environment files is stored.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP switches as shown in Figure 2.3.3.

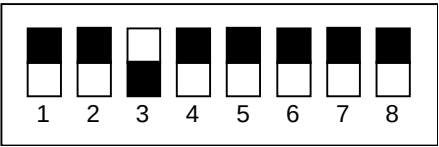
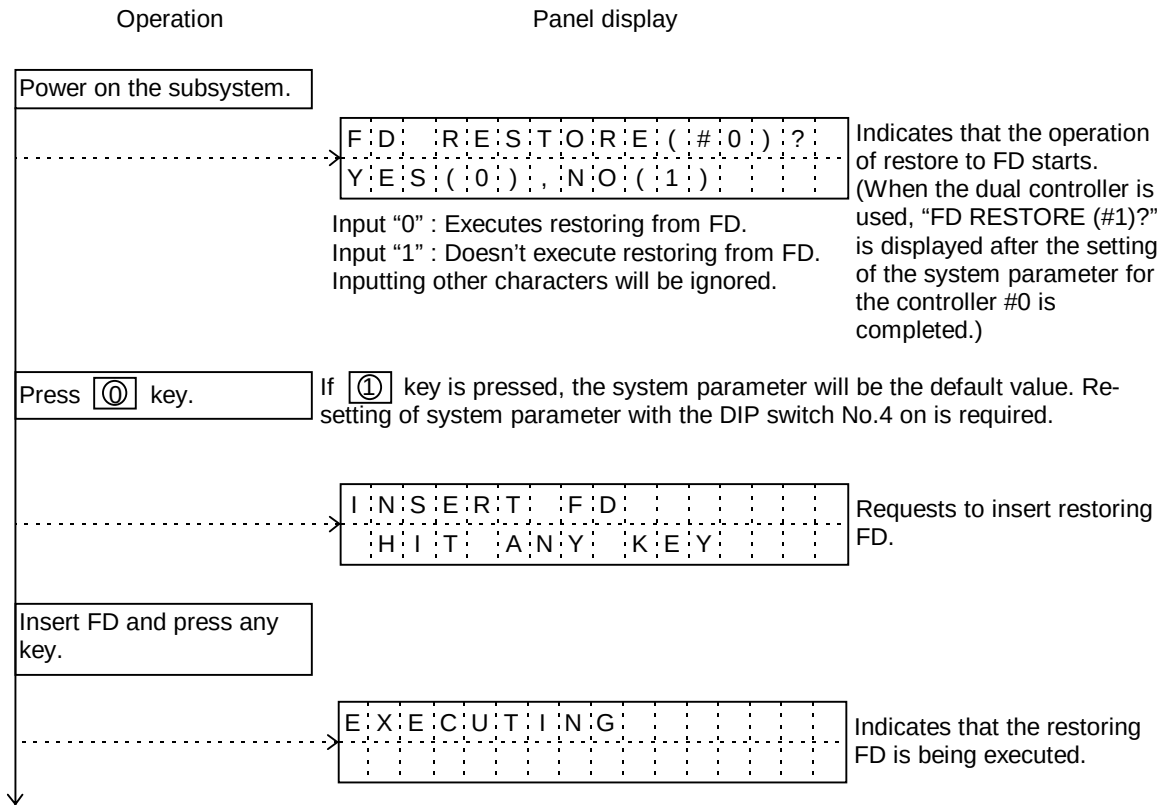
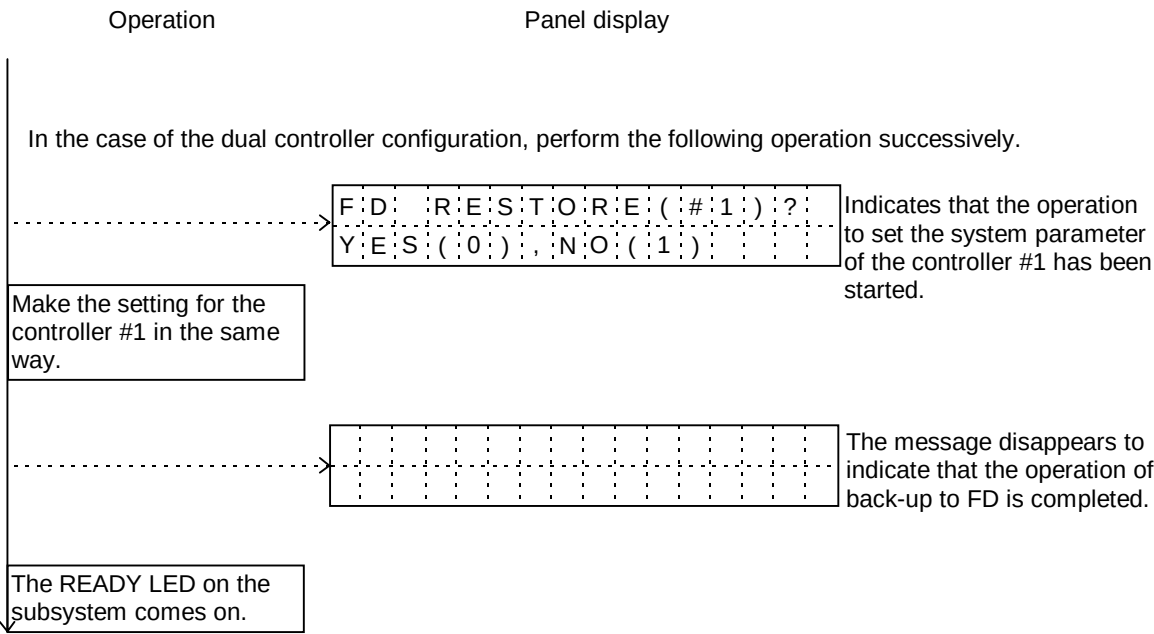


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

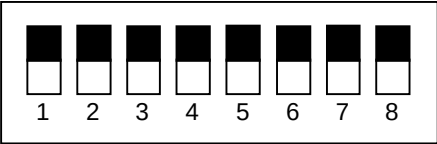
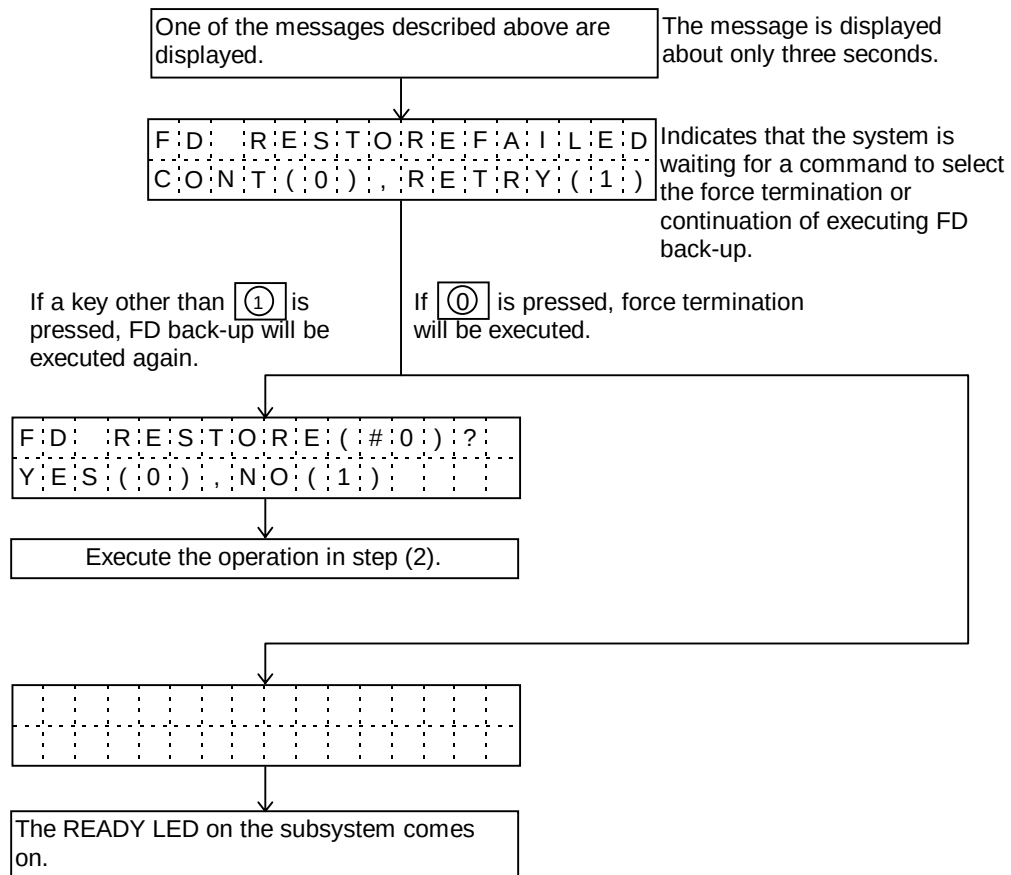


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-restore the system following the operation described below.



Note 2 : In case that restoring operation ended in failure and force terminated, setting of system parameter will be with default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

3. Attaching/Removing and Opening/Closing the Covers

3.1 Attaching/Removing the Front Bezel

- (1) Removing the front bezel. (See Figure 3.1.1.)

① Hold the grooves at both sides of the front bezel and pull it toward you.

Note : Open/Close the front bezel carefully to avoid subjecting the subsystem to any impact since it has precision components.

- (2) Attaching the front bezel. (See Figure 3.1.1.)

① Fit the guide plate of the main body with the slots of the front bezel (four places), press the front bezel against them.

Note : Open/Close the front bezel gently to avoid a shock. Precision components are installed.

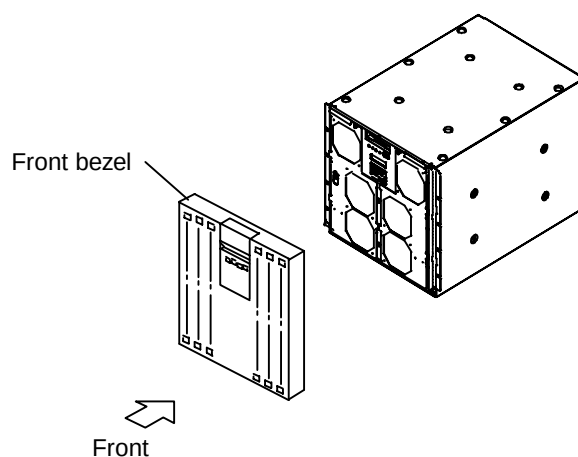


Figure 3.1.1 Attaching/Removing the Front Bezel

3.2 Opening/Closing the Rear Cover

Tools : Philips screwdriver (No.2)

(1) Removing the rear cover. (See Figure 3.2.1.)

① Remove the 2 thumbscrews and open the rear cover.

Note : Open/Close the rear cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Attaching the rear cover. (See Figure 3.2.1.)

① Attach the rear cover in the reversed order as (1).

Note : Open/Close the rear cover gently to avoid a shock. Precision components are installed.

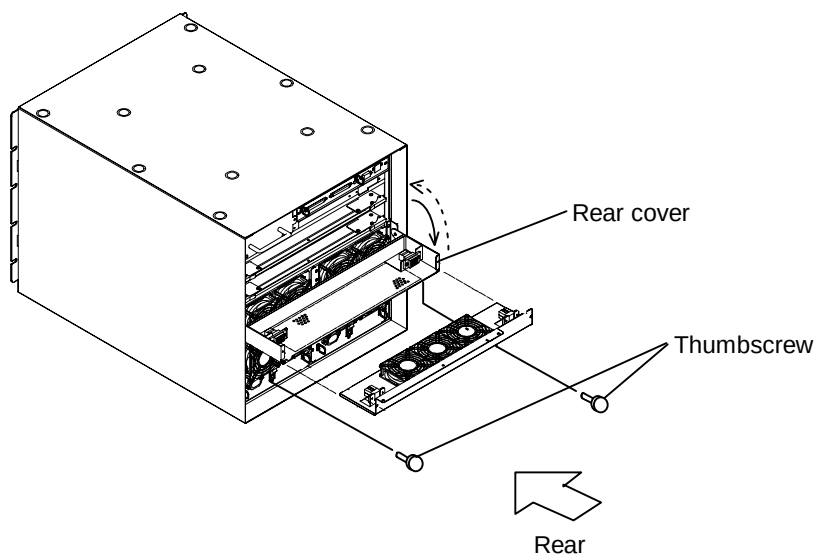


Figure 3.2.1 Opening/Closing the Rear Cover

3.3 Opening/Closing the Front Panel

(1) Opening the front panel. (See Figure 3.3.1.)

- ① Remove the front bezel.
- ② Insert the key, turn it to the arrow direction (→) and hold the left of the front panel to open to the right.

Note : Open/Close the covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing the front panel. (See Figure 3.3.1.)

- ① Close the front panel.
- ② Turn the key to the arrow direction (↶) and secure the front panel.
- ③ Attach the front bezel.

Note : Keep the key carefully lest it should be lost.

Note : Open/Close the covers gently to avoid a shock. Precision components are installed.

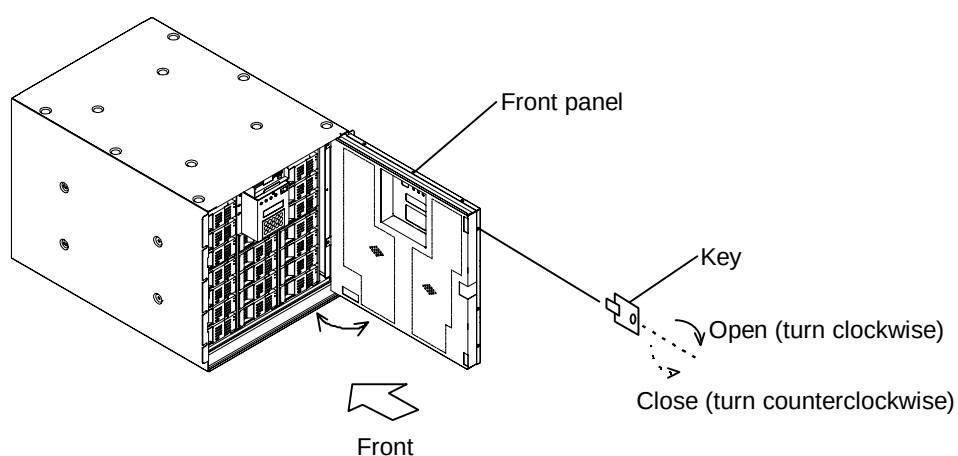


Figure 3.3.1 Opening/Closing the Front Panel

4. Replacing HDU ASSY

The method of replacing HDU varies depending on the RAID configuration.

When replacing the HDU ASSY, confirm the RAID configuration of the subsystem beforehand, and follow the procedure below according to the configuration.

To confirm the RAID configuration, refer to page PANEL0390 (3.3.2 (1) Reference/setting menu of RAID configuration information.)

Notice : Be sure to replace the HDU ASSY with the power kept on. . (This procedure is except for when the Micro-Disk version is 0303 or earlier.)**

Proceed the replacement and the data recovery following the procedure below. RAID Specification of replacing HDU can be seen on the panel display. (See PANEL0390.)

Notice : If you delete or re-format the set-up RAID group or LU, user's data in that will be deleted. Be sure to back-up copy the user's data before these operation.

4.1 Procedure of Data Recovery and HDU Replacement Under RAID0 Configuration

4.1.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

The replacement procedure differs depending on whether the Micro_Disk version is 0303** (** is optional) or earlier, or 0304** (** is optional) or later. Confirm the version first, then execute the replacement following the procedure determined according to the version.

When the Micro_Disk version is 0303** (** is optional) or earlier

- (1) Turn the subsystem power off according to the powering off procedure (see page RW-REP0050).
- (2) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY (Disk) Replacement Procedure" on page RW-REP0265.
- (3) Turn the subsystem power on according to the powering on procedure (see page RW-REP0050). Following messages will be displayed on the panel when a disk of row 0 is replaced.

I00DXY SYS-CP-XY----- Starting system area recovery

I00EXY SYSRCV-XY----- Completing system area recovery

X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)

If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.

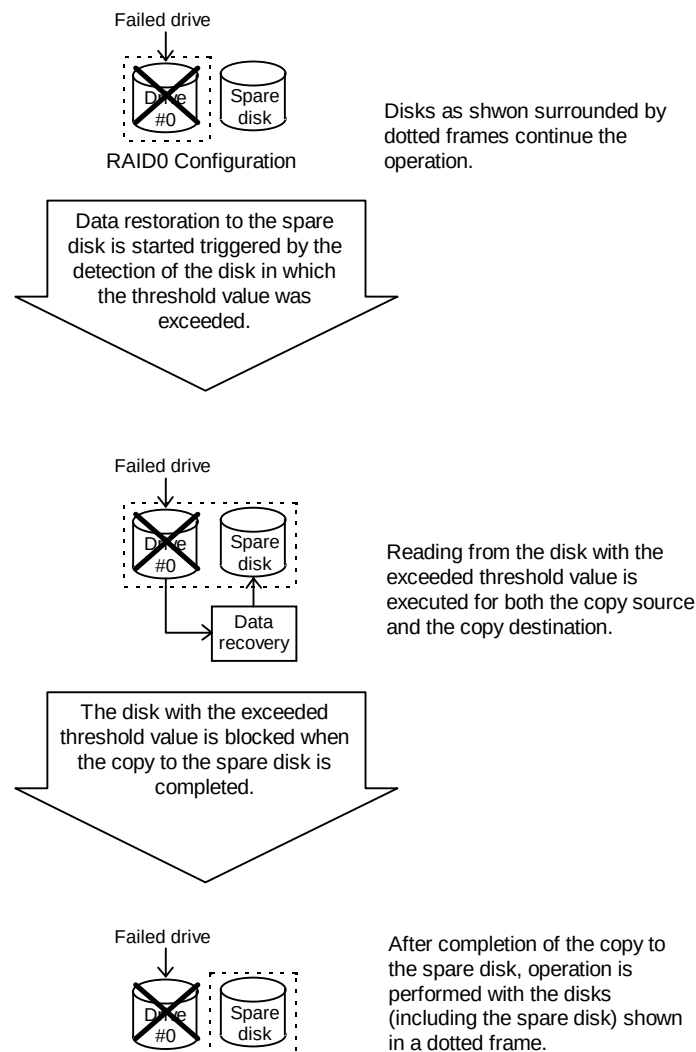
- (4) Execute an LU formatting. For the LU formatting procedure, see page RW-INST0710.
- (5) Restore the data using the backed up data.

When the Micro_Disk version is 0304** (** is optional) or later

- (1) Pull out the disk in which a failure occurred, and insert the replacement disk. For the specific procedures to remove and install the disk, see "HDU ASSY Replacement Procedure" on page RW-REP0265.
- (2) In a short time after the disk is inserted, the ALARM lamp on the HDU ASSY goes out and the READY lamp comes on. If the inserted disk is that of row 0, following messages will be displayed on the panel.
 I00DXY SYS-CP-XY----- Starting system area recovery
 I00EXY SYSRCV-XY----- Completing system area recovery
 X : Port number, Y : Row number (XY indicates a location of the disk whose system area is being recovered (or has been recovered).)
 If the ALARM lamp of the HDU ASSY is on after the replacement, power off the subsystem and reexecute the replacement.
- (3) Execute an LU formatting. For the LU formatting procedure, see page RW-INST0710.
- (4) Restore the data using the backed up data.

4.1.2 When a spare disk is installed

When the Micro_Disk version is 0304** (** is optional) or later, data restoration to the spare disk is executed by the dynamic sparing function. Conditions for restoration to the spare disk and messages, etc. are the same as those to the RAID1, 5 and A. See pages RW-REP0235 through 0238.



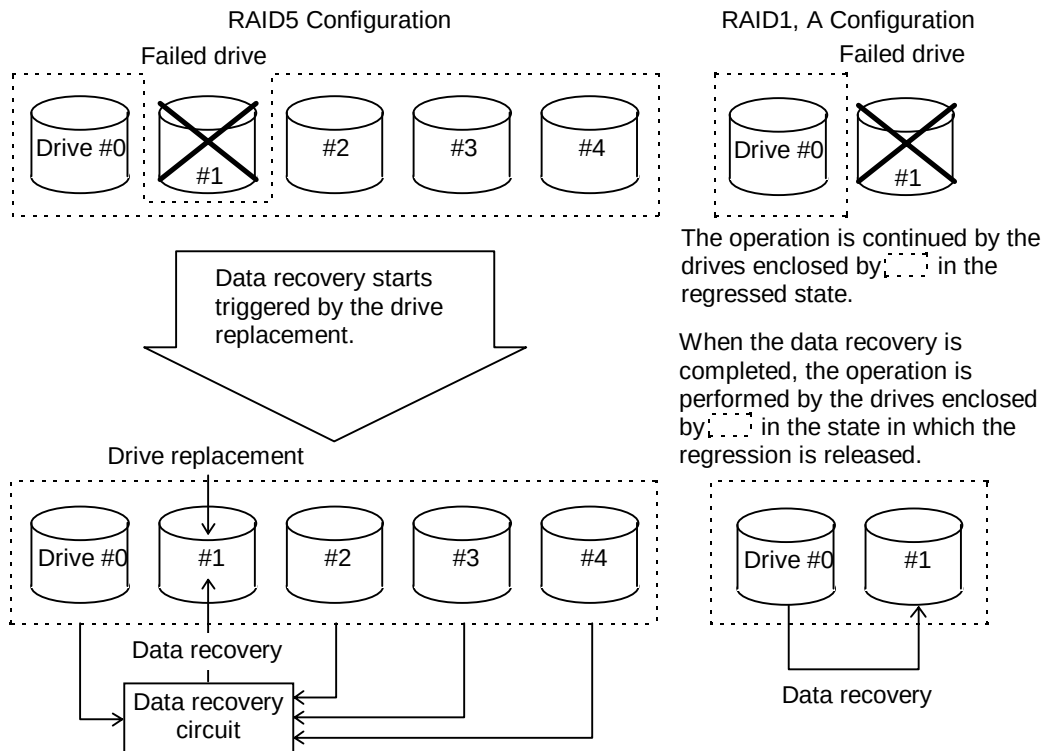
4.2 Procedure of Data Recovery and HDU Replacement Under RAID1, 5, A Configuration

4.2.1 Procedure of data recovery and HDU ASSY replacement when no spare disk is installed

When a failure occurred at a HDU ASSY, replace the failed HDU with a spare HDU.

To replace a HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See RW-REP0265.) With the replacement, data in the failed HDU will be automatically recovered. The panel display is described at “① Transition of panel display”. (See RW-REP0210.)

Note : When DRIVE MAINTENANCE (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINTENANCE again).



In the following cases, the recovery will not start automatically. Operation to start the recovery is required.

- (1) When the drive recovery mode is set to “NOT AUTOMATIC MODE”, the data recovery will not start automatically when the drive is replaced.

In this case, it is necessary to instruct recovery from the panel. (For further details, refer to the Hitachi Disk Array Subsystem Panel Operation Manual.)

- (2) When failures occurred in plural drives, if the second faulty drive is replaced during data recovery of the first drive, the data recovery of the second drive will not start automatically.

In this case, it is necessary to remove and insert the second drive again after the data recovery for the first drive is completed. Or, it is necessary to instruct recovery from the panel. Select “DRIVE MAINTENANCE (RECOVER STATUS)” and make sure that data recovery is completed normally.

① Transition of panel display

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of drive recovery

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the drive under recovery.

* : Only with the replacement of HDU in Row = 0.

② Confirming completion of data recovery

Select DRIVE MAINT (RECOVER STATUS) with the panel and check to see that the data recovery is completed normally (COMP).

③ When the data recovery fails (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(a) Data recovery onto the replacement drive

(i) When the faulty portion is the replaced drive (PORT X, ROW Y)

- Replace the drive again.
- Make sure that the data recovery is completed normally (COMP).

(ii) When the faulty portion is other than the replaced drive

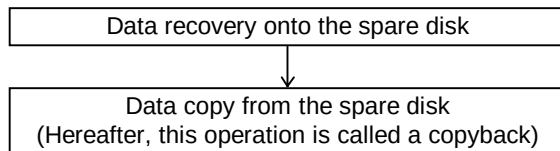
- Remove and insert the replaced drive and start data recovery again.
- Check to see that the data recovery is completed normally (COMP). When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. Ask for an instruction. When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive.

4.2.2 Procedures of data recovery and HDU ASSY replacement when a spare disk is installed

When a failure occurred in a HDU at a system with a spare drive, the data in the failed HDU is automatically recovered to the spare drive. After replacement of the failed HDU, the data in the spare drive will be copied back to the replaced HDU.

To replace HDU, refer to “4.3 HDU ASSY Replacement Procedure”. (See RW-REP0265.) The panel display is described “Transition of Panel Display”. (See RW-REP0250.)

Note : When DRIVE MAINT (RECOVER STATUS) is selected from the panel during data recovery, the progress rate (%) of the data recovery at the moment can be seen (to see the progress rate again, return to the previous screen and then select DRIVE MAINT again).



(1) Data recovery onto the spare disk

There are two types of data recovery onto the spare disk depending on the incentive.

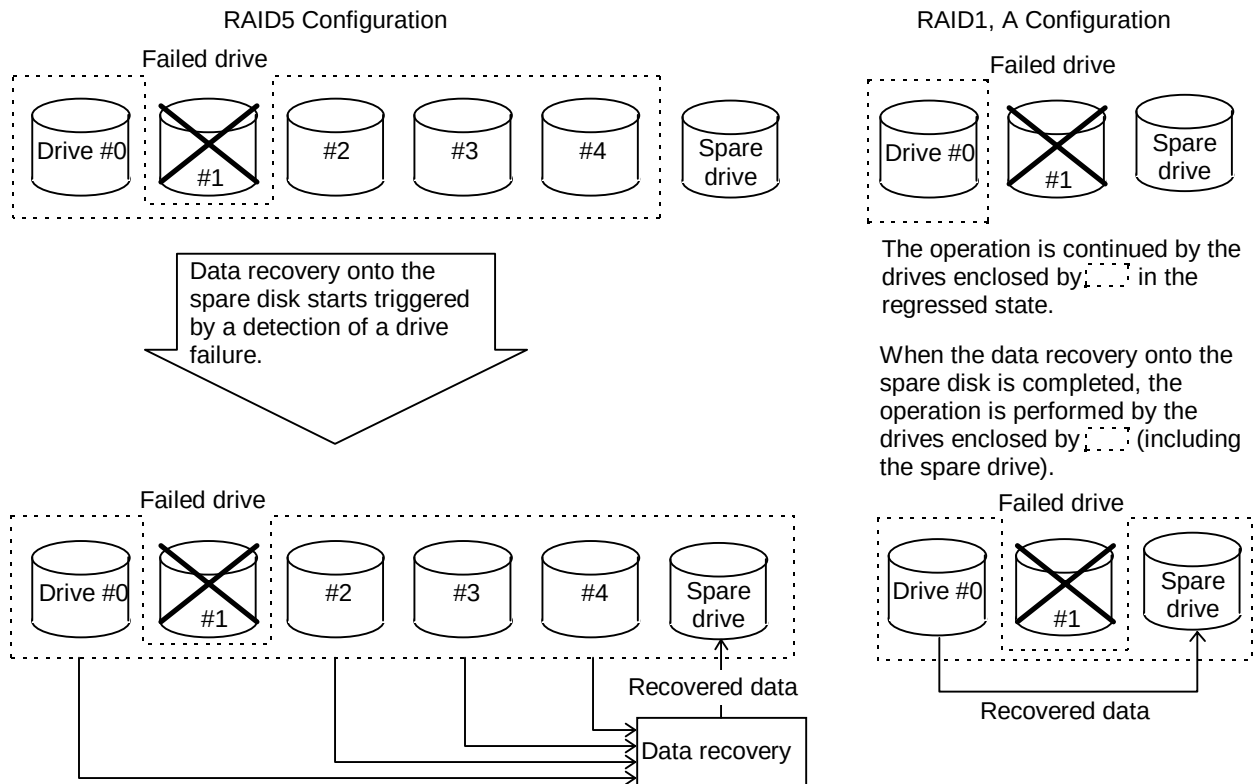
- Data recovery onto the spare disk when a failure in the disk is detected.
- Data copy onto the spare disk when a disk is detected in which the error count has exceeded its threshold value. (This operation will be called “dynamic sparing” hereafter. Note that some microprograms of certain version do not support the operation.)

(1-1) Data recovery onto the spare disk when a disk failure is detected.

As to data recovery onto the spare disk, as shown in the drawing on the following page, when a drive failure occurs, the data of the failed drive is recovered automatically onto the spare disk.

Automatic recovery onto the spare disk is executed only under the following condition.

Condition : “When a drive failure is detected, the spare disk is an unused disk.”



In the following cases, the data recovery onto the spare disk will not start automatically. An action to start the data recovery is required.

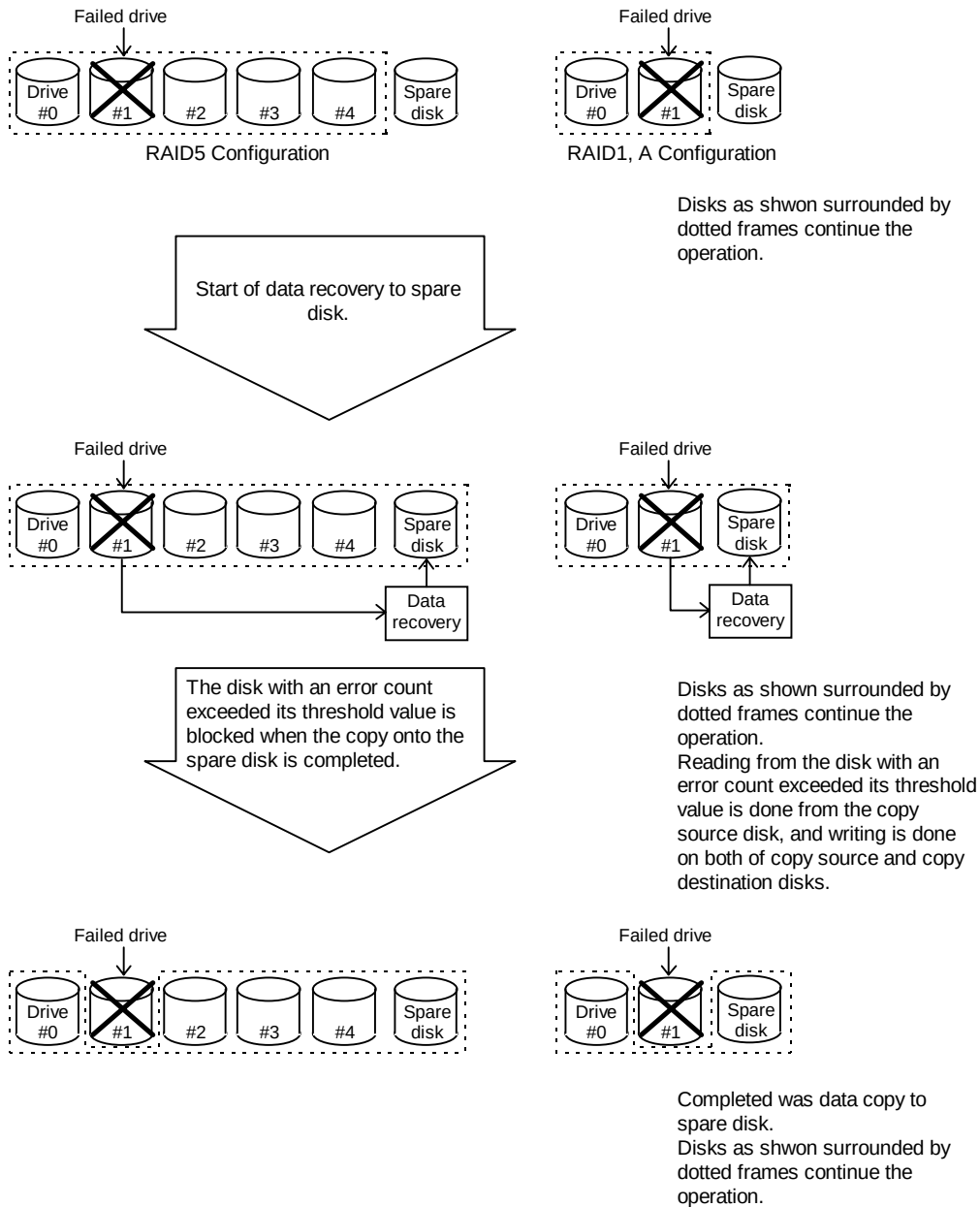
- ① When the drive recovery mode is set to "NOT AUTOMATIC MODE", the data recovery onto the spare disk will not start automatically.
In this case, it is necessary to instruct recovery onto the spare disk with the panel. (See RW-REP0280)
- ② If a further drive failure occurs while the spare disk is used already (data of a drive has been already recovered onto the spare disk), the data of the nearly failed drive will not be recovered onto the spare disk.
Even after the copyback is completed in the above state and the spare disk enters the unused state, the data of the second failed drive will not be recovered onto the spare disk.
- ③ If a disk of no failure (a drive which is not blocked) is removed, no data recovery onto the spare disk will be executed. In this case, to recover data onto the spare disk, it is necessary to instruct a recovery from the panel. (See RW-REP0280)
- ④ When the spare disk is replaced because a spare disk failure occurred during data recovery to the spare disk, the data recovery to the replaced spare disk will not start automatically. In this case, it is necessary to instruct recovery to the spare disk with the panel. (See RW-REP0280)
- ⑤ If a faulty drive is replaced during data recovery to the spare disk, the data copy back the replaced drive will not start automatically even after the data recovery to the spare disk is completed.
In this case, it is necessary to remove and insert the replaced drive again after the data recovery onto the spare disk is completed.

(1-2) Data recovery onto the spare disk by means of the dynamic sparing

Data recovery onto the spare disk is performed as shown below. When a disk is detected in which the error count has exceeded its threshold value, data stored in the disk is copied automatically onto the spare disk.

The automatic data recovery onto the spare disk is performed only when the following condition is met.

Condition : The spare disk is not in use when a disk is detected in which the error count has exceeded its threshold value.



The subsystem displays the following message on the panel when detecting a disk in which the error count has exceeded its threshold value.

I03■XY ■:0 - D
 ▲▲▲▲▲ -XY ▲▲▲▲▲ : Message text } See TRBL0275, 0278.

At the time when an error count exceeded its threshold value is detected, only a message display on the panel is done without blocking the concerning disk, and the dynamic sparing is started.

The disk with an error count exceeded its threshold value is blocked after the dynamic sparing is completed.

Refer to page RW-REP0250 for panel display transition when the dynamic sparing is performed.

In the following cases in which a disk with an error count exceeded its threshold value is detected, the disk is blocked without an execution of the dynamic sparing.

- When the dynamic sparing mode is set not to execute the dynamic sparing.
- When a disk with an error count exceeded its threshold value is detected after the data has been recovered or while the sparing disk is being used for the data recovery.
- Another disk with an error count exceeded its threshold value is detected during the dynamic sparing operation.

In each case above, the disk with an error count exceeded its threshold value is blocked.

Procedures for data recovery and disk replacement are the same as those for the installation of the spare disk (refer to pages RW-REP0200 through RW-REP0260).

Errors counted in the subsystem and default threshold values for them are listed below.

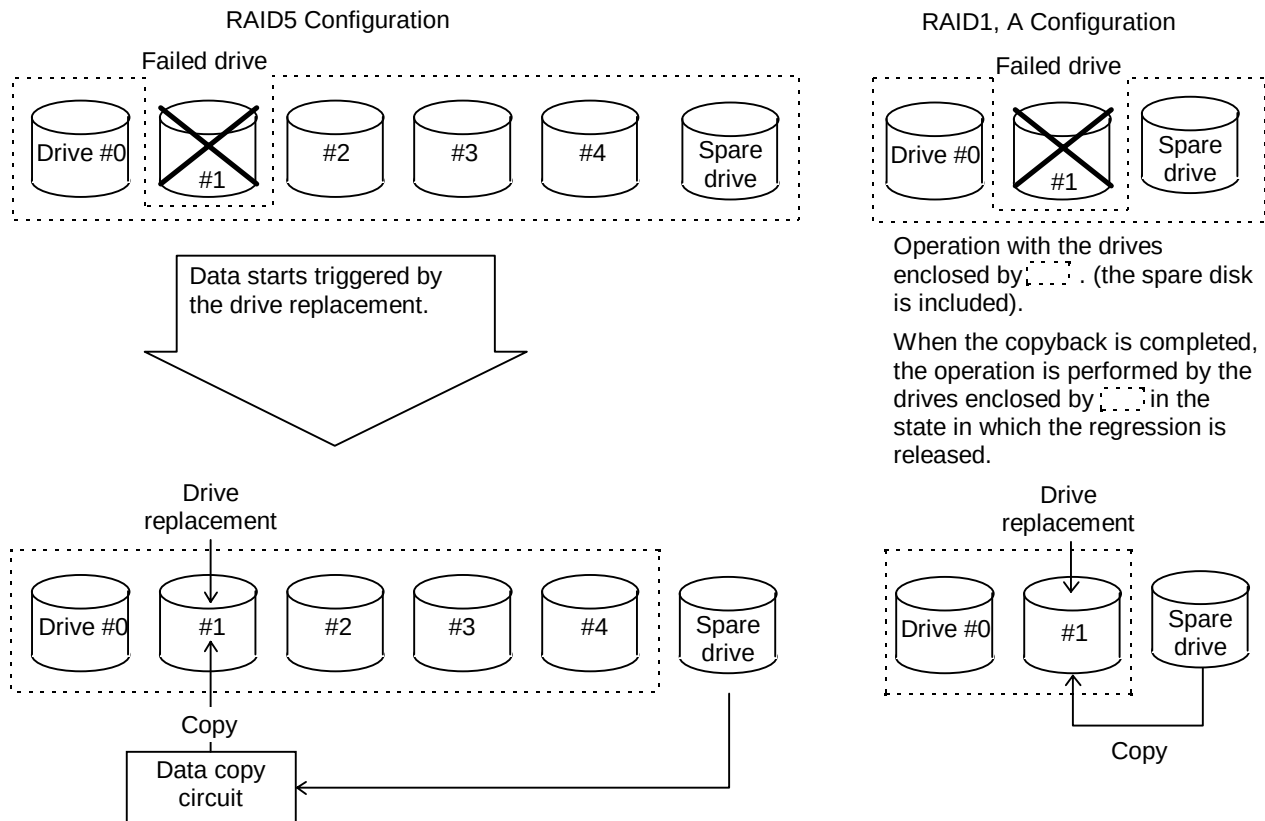
Item No.	Kind of error	Threshold (Default)
1	Drive mechanical error. (Recovered)	50
2	Drive mechanical error. (Unrecovered)	2
3	Drive medium error. (Recovered)	100
4	Drive medium error. (Unrecovered)	50
5	Drive R/W error. (Recovered)	10
6	Drive R/W error. (Unrecovered)	2
7	Drive I/F error. (Recovered)	50
8	Drive I/F error. (Unrecovered)	2
9	Drive hardware error. (Recovered)	50
10	Drive hardware error. (Unrecovered)	2
11	Drive SCSI I/F error. (Recovered)	50
12	Drive SCSI I/F error. (Unrecovered)	2
13	Collectable errors in online verify.	100
14	Uncollectable errors in online verify.	50

The threshold values above can be referred to and updated from the maintenance panel. (See page PANEL0745.)

Besides, the then error count can be referred to concerning the recovered or unrecovered drive media errors, correctable errors in online verify operations, correctable errors, and uncorrectable errors.

(2) Copyback

When a new drive is inserted to where a failure occurred as shown in the drawing below, the copyback will be executed automatically.



In the following cases, the copyback will not start automatically. Operation to start the copyback is required.

- ① When the copyback mode is set to "NOT AUTOMATIC MODE", the copyback will not start automatically after the drive replacement.

In this case, it is necessary to instruct copyback with the panel. (See RW-REP0280)

- ② If a faulty drive is replaced during data recovery to the spare disk, the data copy back to the replaced drive will not start automatically even after the data recovery to the spare disk is completed.

In this case, it is necessary to remove and insert the replacement drive again after the data recovery onto the spare disk is completed.

(a) Transition of panel display.

(i) Data recover (Data recovery onto the spare disk when a disk failure is detected.)

W202XY DRVALM-XY: Drive blocked

I01044 RCV-ST-44 : Start of data area recovery

I01144 RCVEND-44 : Completion of data area recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(ii) Data recover (Dynamic sparing)

I01DXY DYNMSP-XY : Start of Dynamic sparing

I01044 RCV-ST-44 : Start of HDU ASSY recover

I01144 RCVEND-44 : Completion of data recovery

I006XY SPDRCN-XY : Completion of recovery onto spare disk

W202XY DRVALM-XY: Drive X, Y were blocked

Note : Symbols X and Y indicated above represent the following.

X indicates port No., Y indicates row No., and XY indicates the location of the recovered drive.

(iii) Copyback

I00DXY SYS-CP-XY : Start of system area recovery (*)

I00EXY SYSRCV-XY : Completion of system area recovery (*)

I010XY RCV-ST-XY : Start of data area recovery

I011XY RCVEND-XY : Completion of data area recovery

I005XY DRVRCV-XY : Completion of recovery onto the drive to which the data has been copied.

Note : Symbols X and Y indicated above represent the following.

X indicates port No., and Y indicates row No., and XY indicates the location of the drive to which the data is copied.

* : This message is displayed only when replacing HDU ASSY.

(b) Confirming completion of data recovery or copyback

Select DRIVE MAINTEN (RECOVER STATUS) from the panel and make sure that the data recovery is completed normally (COMP).

(c) When the data recovery fails (I012XY RCVFLT-XY)

Select RECV ERR INFO from the panel and locate the faulty portion.

(i) Data recovery to the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery to the spare disk will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

When the data recovery is completed normally, remove the failed drive (causing the system to be regressed) and replace the drive. (When the failed drive is removed, the data recovery to the spare disk will not start, where as when the drive is replaced, the data recovery to the replaced drive starts.)

(ii) When the dynamic sparing

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the dynamic sparing will not start.
- ➋ Replace the drive at the regressed location. In this case, the data recovery onto the replacement drive starts.

- When the faulty portion is other than the spare disk

- ➊ Replace the drive at the regressed location. In this case, the data recovery to the replaced drive starts.

- ➋ Make sure that the data recovery ends normally (COMP).

When the data recovery is completed abnormally, it is a double failure, and cannot be recovered. (See 3. Trouble shooting chapter TRBL0830)

(iii) Copyback to the replaced drive from the spare disk

- When the faulty portion is the spare disk (PORT 4, ROW 4)

- ➊ Replace the spare disk. In this case, the data recovery onto the spare disk will not start.
- ➋ Replace the drive in the regressed location. In this case, the data recovery onto the replacement drive starts.

- ➌ Make sure that the data recovery is completed normally (COMP).

- When the faulty portion is other than the spare disk

- ➊ Replace the drive which failed during data recovery and make sure that the data recovery is completed normally (COMP).

- ➋ Replace the drive which is regressed first and make sure that the copyback is completed normally (COMP).

4.3 HDU ASSY Replacement Procedure (See Figure 4.3.1.)



Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

(1) Removing procedure

- ① Remove the front bezel and open the front panel. (See RW-REP0160, RW-REP0180.)
- ② Check to see the drive installing location of the message text DRVALM-XY (XY indicates the installing location) on the panel is correct and the ALARM LED of the HDU ASSY is on.

W	2	0	2	X	Y	D	R	V	A	L	M	X	Y

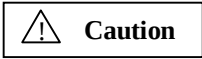
X : Port number
Y : Row number

- ③ Open the handle in the direction of the arrow (···➤) and pull it out and remove the HDU ASSY.

Note : Be sure to replace the HDU ASSY when the subsystem is in the ready state. (If the HDU assembly is replaced when the power of the subsystem is off, the data recovery operation will not start.)

(2) Installing procedure

- ① Open the handle fully, insert the HDU ASSY in place, and rotate the handle in the direction of the arrow (➡).



Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

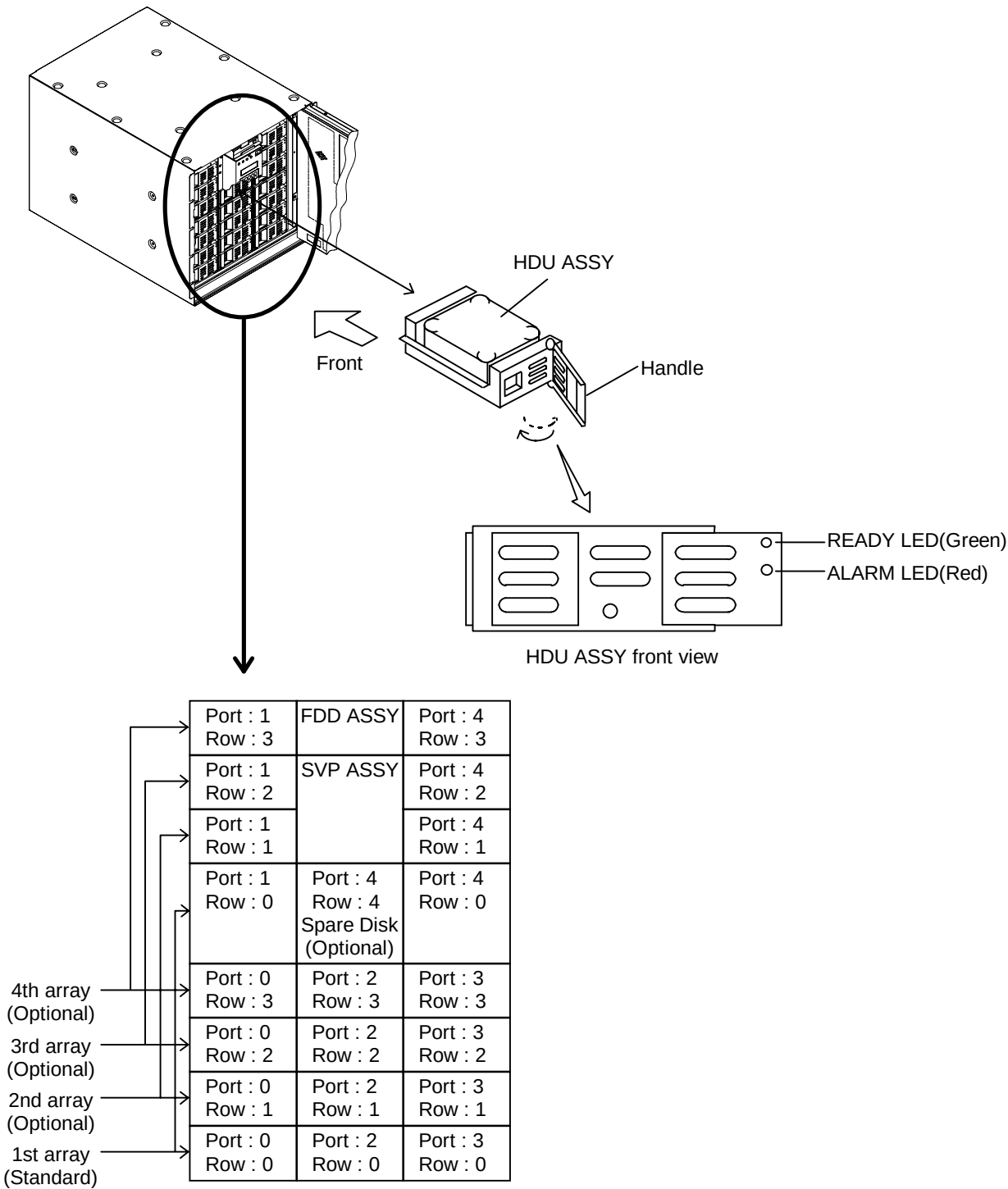
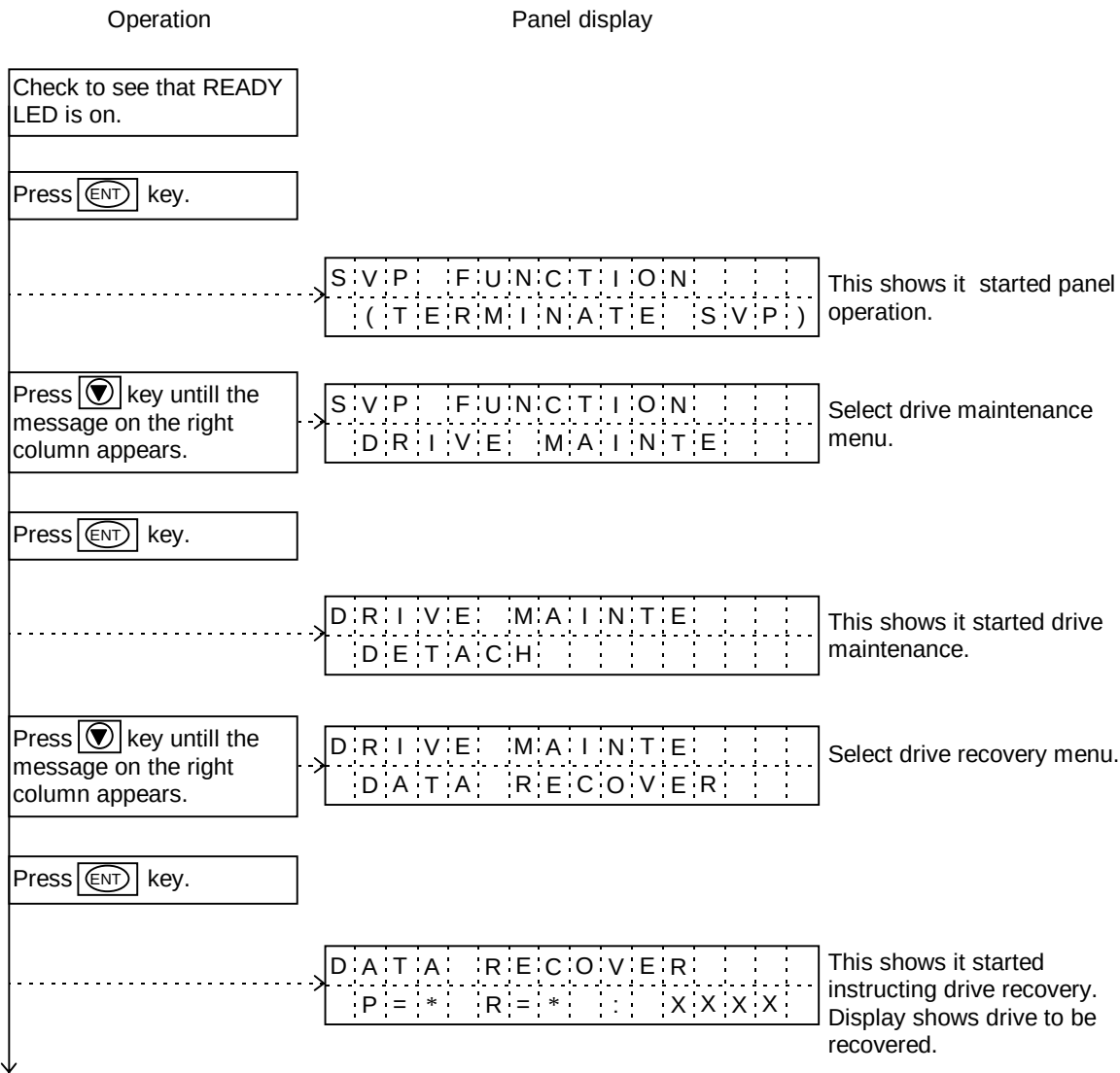


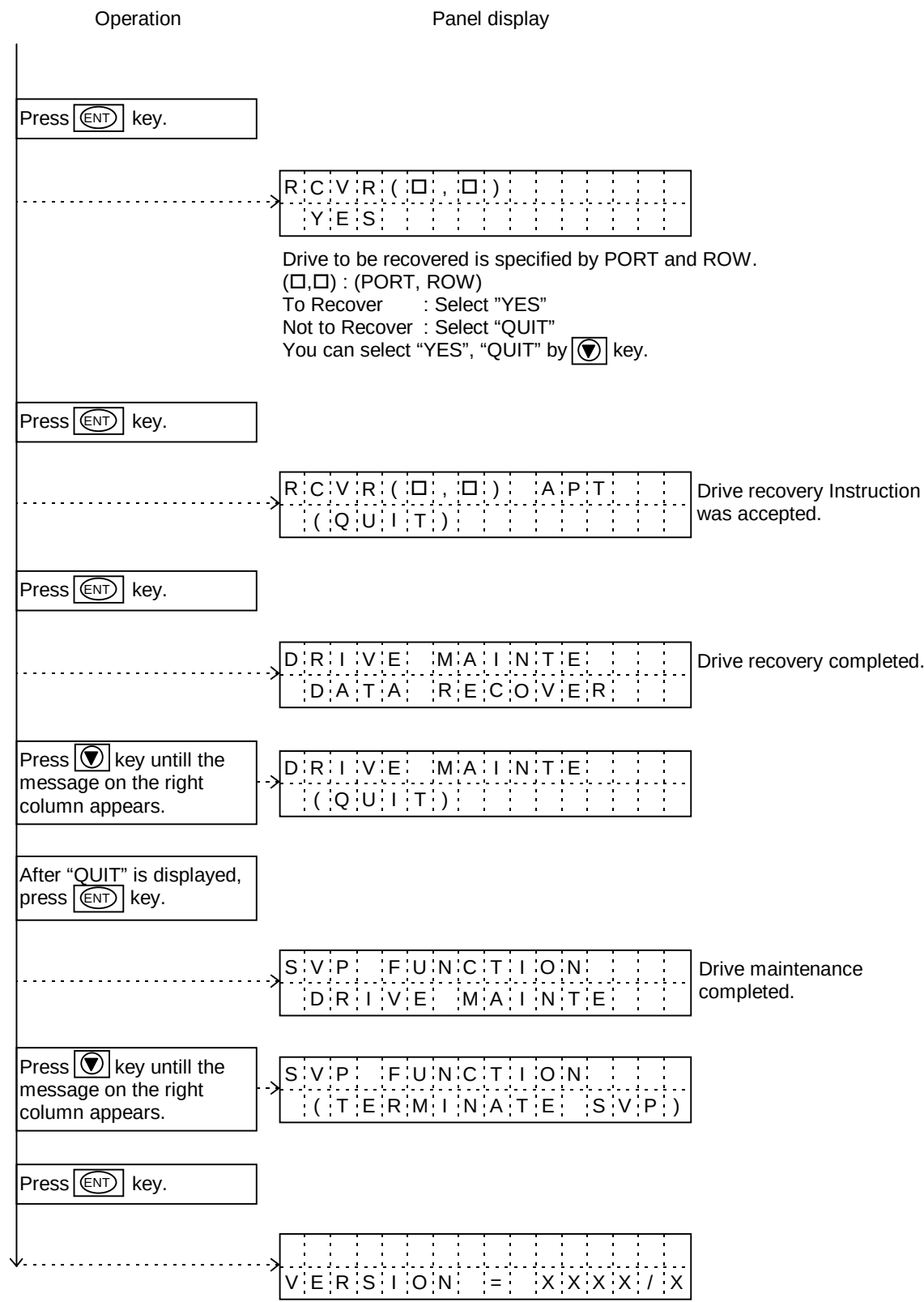
Figure 4.3.1 Replacing HDU ASSY

4.4 Manual Instruction of Data Recovery

This is for manually instructing data recovery. (In a case of dual controller system, which controller to process is automatically specified. No instruction of controller is required.) You can operate this function under device ready and LU#0 instituted (LU can be not formatted yet).



- P=* : Port# of Drive to be recovered.
R=* : Row# of Drive to be recovered.
XXXX : Status of Drive to be recovered. Status is one of below.
- STDBY (not used)
 - DETACH (blocked)
 - NO : (RAID, LU not set yet)



5. Replacing Fan ASSY (See Figure 5.1.)

When replacing FAN ASSY, turning off the power is not required.



Caution

FAN is rotating with high speed, be careful not to be caught by the FAN.

(1) Removing procedure

- ① Remove the front bezel and open the front panel, or open the rear cover, depending on which Fan ASSY is going to be replaced. (See RW-REP0160, 0170, 0180.)
- ② Remove the thumbscrew and pull Fan ASSY toward you.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)

(2) Installing procedure

- ① Install Fan ASSY to the predetermined position and tighten the thumbscrew.
- ② Check to see that WARNING LED goes off and it displays as (3).
- ③ Close the front panel and attach the front bezel or close the rear cover. (See RW-REP0160, 0170, 0180.)

(3) Transition of panel display

I002XX FANRCV-XX----- Termination of fan failure recovery

(XX indicates the installing location)

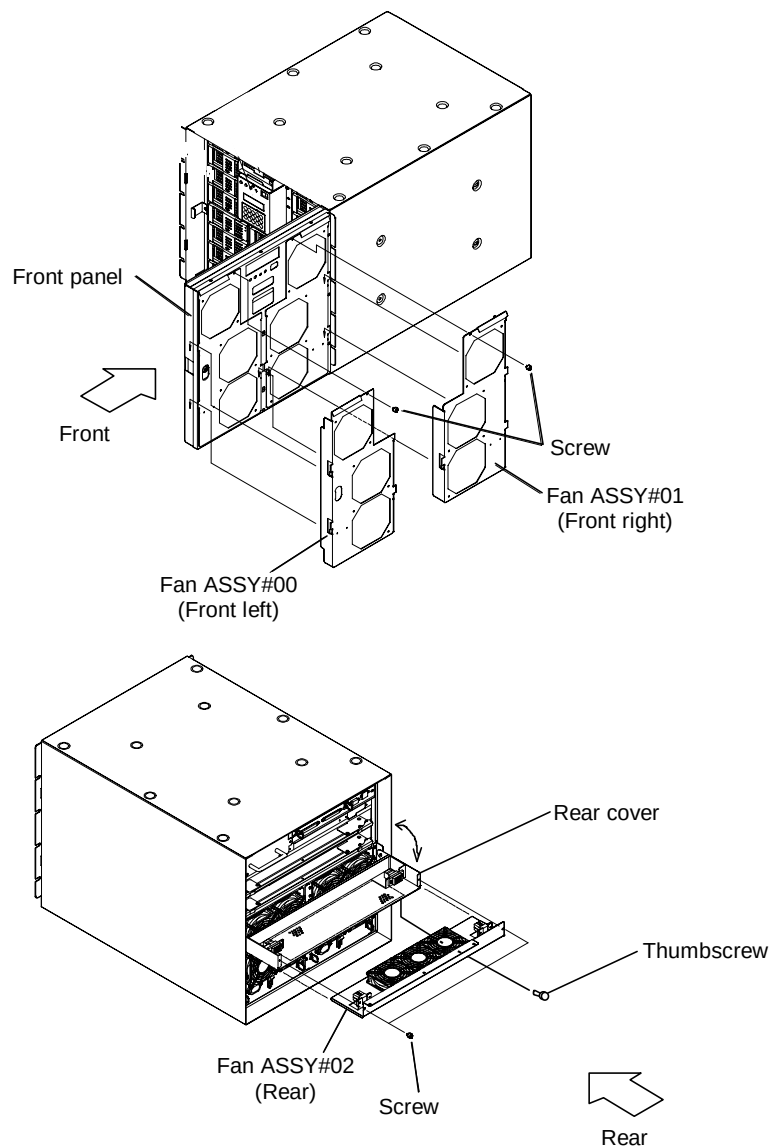


Figure 5.1 Replacing Fan ASSY

6. Replacing Battery ASSY (See Figure 6.1.)

When the subsystem is mounted on the DF-F350-U2 rack frame, start the following work after completing the works explained in "15. Procedure for Replacing I/F ADAPTER ASSY or BATTERY ASSY" on page RW-REP0480.

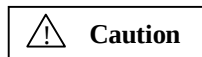
Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

When the battery is to be replaced with power turned off, read RW-REP0050, "Turning the power off." and "Turning-ON procedure." thoroughly and follow RW-REP0060, "Part Replacement Procedures".

(1) Removing procedure

- ① Turn the switch on the Battery ASSY to "O" side.
(The WARNING LED comes on and a buzzer sounds. Press either key on the panel to stop them.)
- ② Remove the thumbscrews and pull the Battery ASSY to your side by grasping it by its handle.



Do not disintegrate removed Battery. It may cause burn or electric shock.

(2) Installing procedure

- ① Insert the Battery ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Turn the switch on the Battery ASSY to "I" side.
- ③ Check to see that WARNING LED goes off and it displays as (3).

Note : When removing/mounting the Battery ASSY, turn the switch to "O" side.

(3) Transition of panel display

I00100 BATRCV ----- Termination of battery recovery

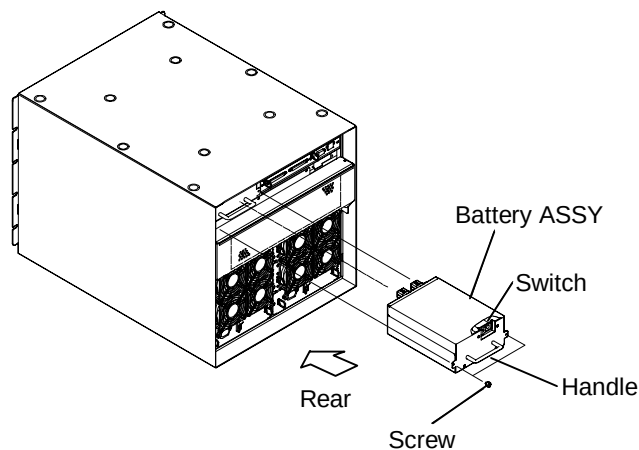


Figure 6.1 Replacing Battery ASSY

Note : The lead-acid battery is a precious resource which can be recycled.

The battery uses lead which is a heavy metal and sulfuric acid which is a deleterious substance. Therefore, never case it off at the place where the replacement of it is done.

When a part is to be replaced or a used product is to be discarded, take out the lead-acid battery to get it recycled. See page "ENTRY0120" for the safety of depositing and storing the battery.

When the battery ASSY is replaced, power on the subsystem and charge the battery for more than two hours before returning the subsystem to the customer.

7. Replacing FDD ASSY (See Figure 7.1.)

When replacing FDD ASSY, turning off the power is not required.

(1) Removing procedure

- ① Remove the front bezel and open the front panel. (RW-REP0160, RW-REP0180.)
- ② Remove the thumbscrew and pull the FDD ASSY to your side grasping it by its handle.

(2) Installing procedure

- ① Insert the FDD ASSY into the right place holding it by its handle and tighten the thumbscrew.
- ② Close the front panel and attach the front bezel. (See RW-REP0160, RW-REP0180.)

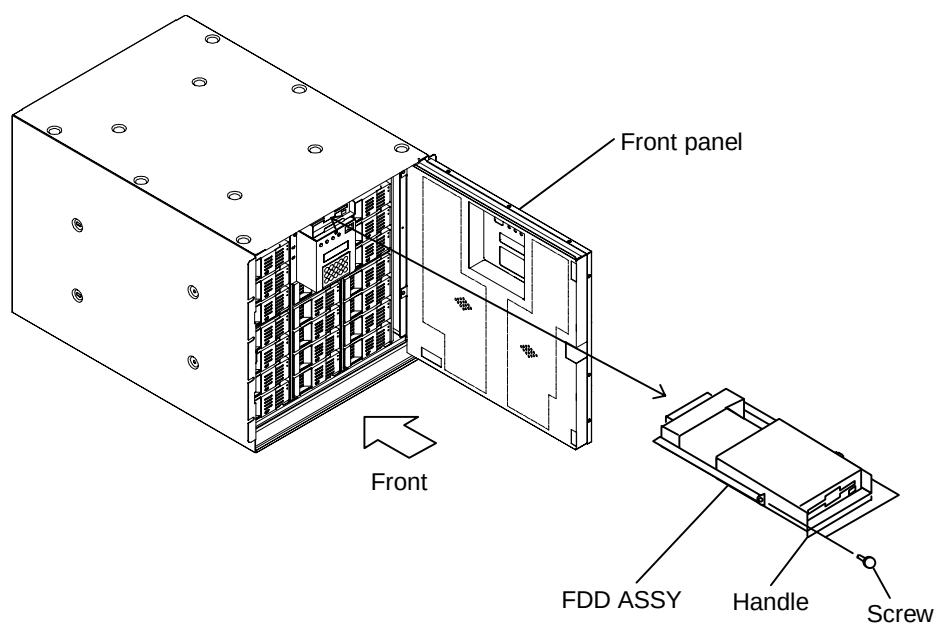


Figure 7.1 Replacing FDD ASSY

8. Replacing CTL ASSY

The replacement procedure differs depending on the Micro_Disk version. Confirm the version first, then execute the replacement following the procedure determined according to the version.

- (1) When the Micro_Disk version is 0303** (** is optional) or earlier
Go to section 8.1 “CTL ASSY Replacement when Version is 0303** (** is optional) or earlier” on page RW-REP0330.
- (2) When the Micro_Disk version is 0304** (** is optional) or later
Go to section 8.2 “CTL ASSY Replacement when Version is 0304** (** is optional) or later” on page RW-REP0361.

8.1 CTL ASSY Replacement when Version is 0303** (** is optional) or earlier

In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.

(See RW-REP0090.)

- ② Turn off the subsystem following the power-off procedure explained in RW -REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ Open the rear cover. (See RW-REP0170.)
- ⑤ Open the right and left levers to the direction of arrows (···→) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

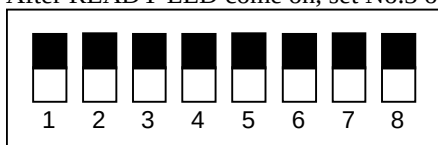
- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (→) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.



- ⑥ Turn on the subsystem according to the power-on procedure explained in RW -REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See RW-REP0130.) If no system parameter FD, proceed the setting the panel with the table prepared in ①. (Refer to PANEL Chapter.)
- ⑧ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑨ Turn off the power according to the power off procedure in RW-REP0050.
- ⑩ Turn on the power according to the power on procedure in RW-REP0050. (Soon, the ASSY will enter the ready status.)
- ⑪ Close the rear cover. (See RW-REP0170.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED is on).

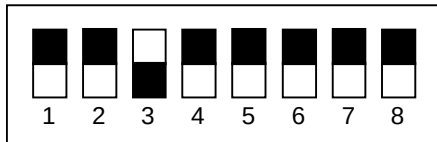
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① Open the rear cover. (See RW-REP0170.)
- ② Disconnect the cables (RS232C).
- ③ Check to see which CTL ASSY is blocked (FAIL LED is lit up).
- ④ Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ⑤ Remove the CACHE ASSY and the LAN ASSY. (option)

(2) Installing procedure

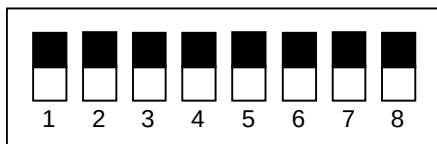
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ When the WARNING LED on PANEL goes off and the message below appears on the PANEL, set No.3 of DIP switch to as shown.



The message on the PANEL "I619XX CTL RCU-XX". (XX : Indicates the installing location < 00 or 01 >.)

- ⑤ Connect the disconnected cables (RS232C).

⑥ Close the rear cover. (See RW-REP0170.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option) , replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

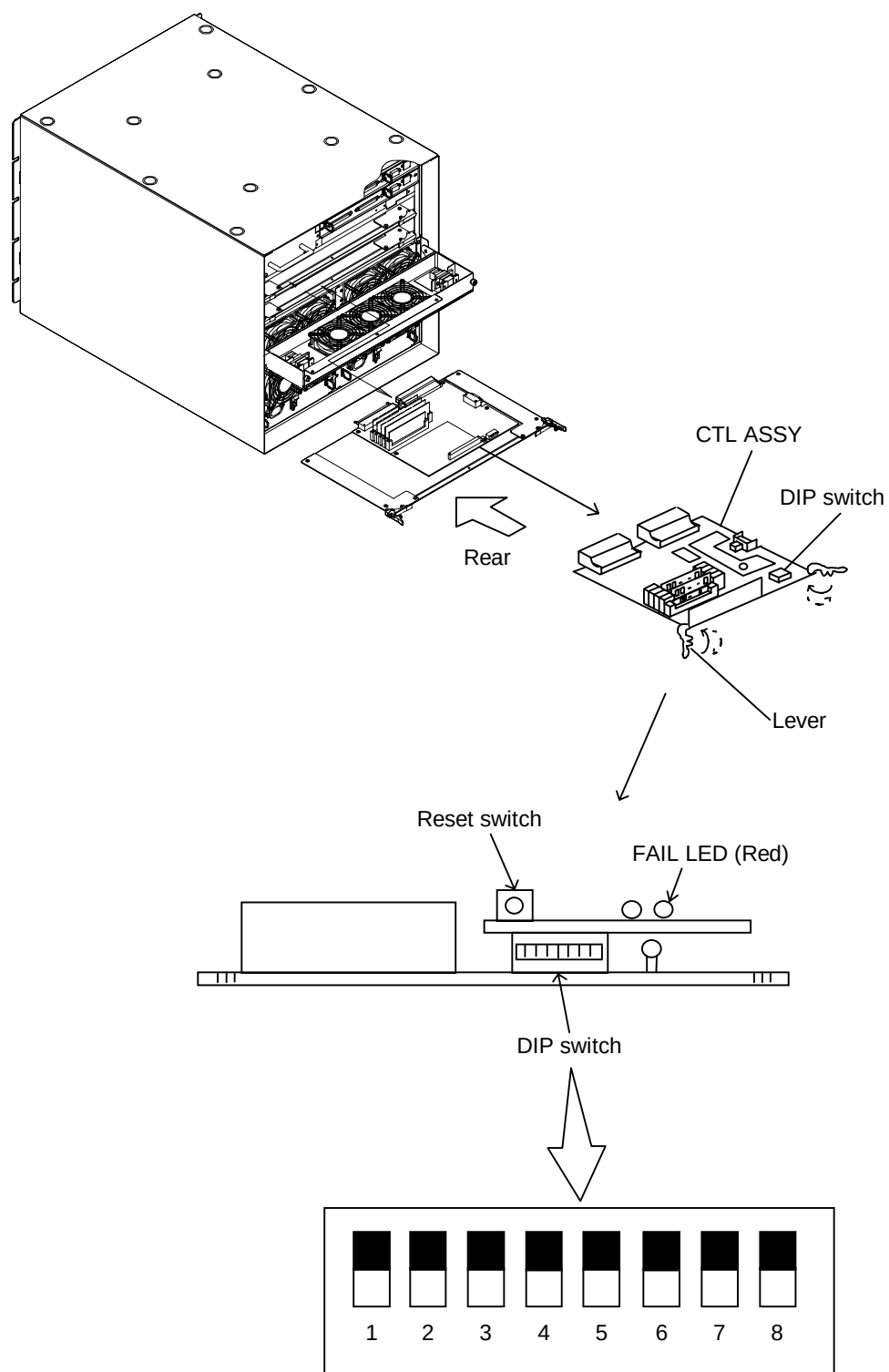


Figure 8.1.1 Replacing CTL ASSY

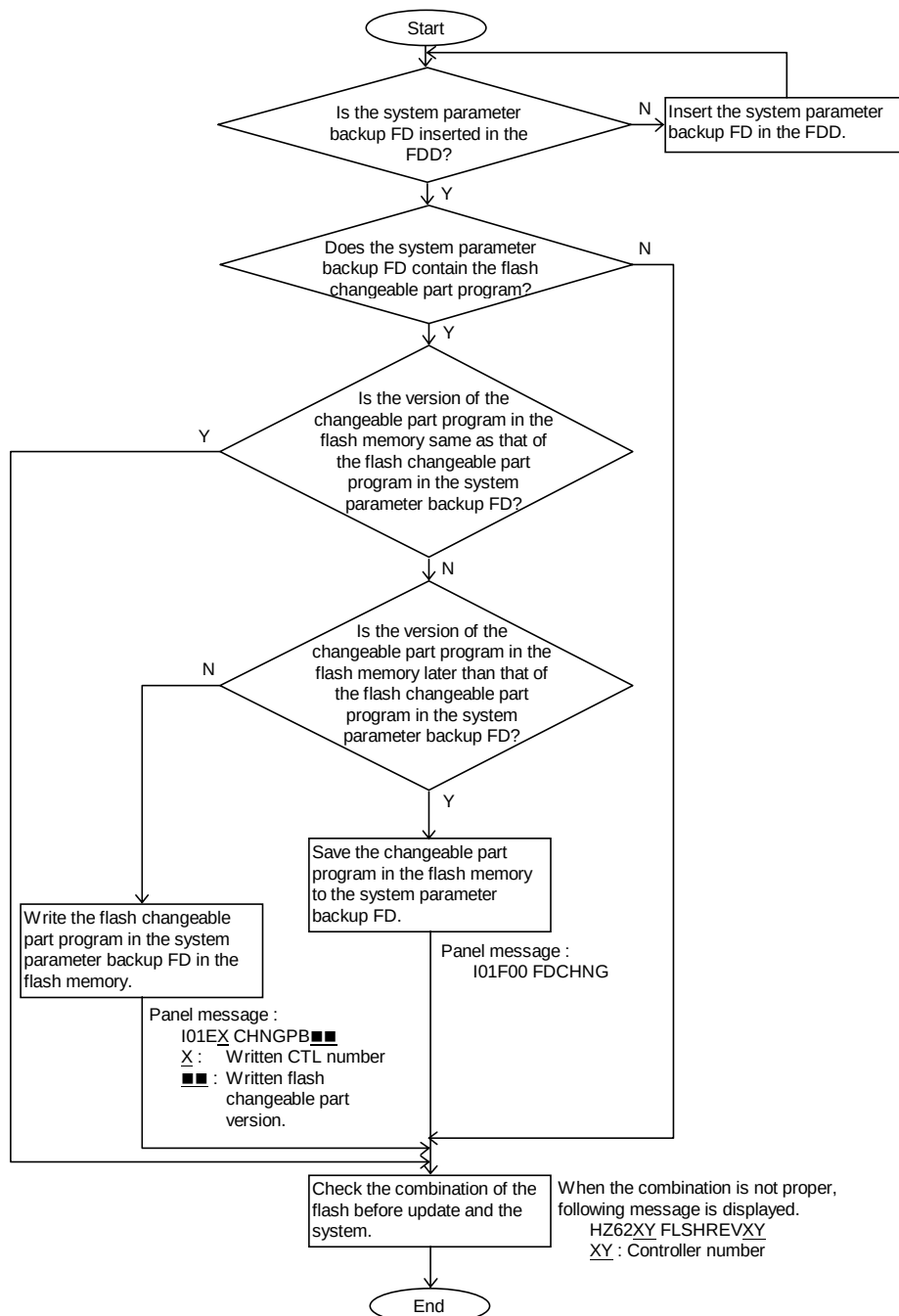
8.2 CTL ASSY Replacement when Version is 0304** (** is optional) or later

The automatic updating function of the flash changeable part is added to the subsystem whose Micro_Disk version is 0304** (** is optional) or later. To use the function the system parameter backup FD must be inserted. By using the function, service person can replace the CTL ASSY without giving care to the combination of the Micro_Disk version and the flash changeable part version of the CTL ASSY.

(If the system parameter backup FD is not inserted when replacing the CTL ASSY, prepare the CTL ASSY whose flash changeable version is the same as that of the CTL ASSY to be replaced, or PB26 or later, and execute the replacement following the procedure explained in Section 8.1 "CTL ASSY Replacement when Version is 0304** (** is optional) or earlier".)

Outline of flash changeable part automatic updating function

The following is a processing flow of the flash changeable part automatic updating function. This processing is performed by the Micro_Disk of version 0304** (** is optional) or later.



In case no optional redundant CTL installed

(1) Removing procedure

- ① Insert back-up FD into the FDD, copy the system parameter to FD.
(See RW-REP0090.)
- ② Turn off the subsystem following the power-off procedure explained in RW-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

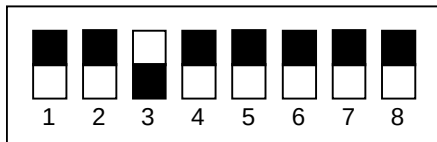
Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Troubleshooting Section" (See TRBL0030) and turn off the power.

- ③ Disconnect the cable (RS232C).
- ④ First open the rear cover. (See RW-REP0170.)
- ⑤ Open the right and left levers to the direction of arrows (···→) at the same time then remove the CTL ASSY.
- ⑥ Remove the CACHE ASSY and the LAN ASSY if installed.

(2) Installing procedure

- ① Prepare the FD in which the system parameter was copied in (1) ①. If it is not available, prepare the table of system parameter setting.
- ② Reinstall the removed CACHE ASSY and LAN ASSY in CTL ASSY. Be sure to install it in the same position as before.
- ③ Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.
Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.
- ④ Connect the disconnected cables (RS232C).
- ⑤ Set No.3 of the DIP switch of the CTL ASSY to down position.

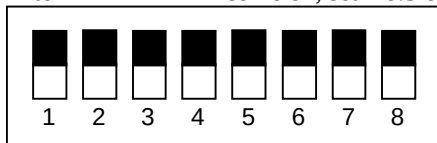


- ⑥ Turn on the subsystem according to the power-on procedure explained in RW-REP0050.
- ⑦ Set the system parameter of replaced CTL ASSY with the FD prepared at ①. (See RW-REP0130.)

- ⑧ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
Version = XXXX/X	Subsystem READY LED comes on.	Go to step ⑨
I01EX CHNGPB■■■ HZ62XY FLSHREVXY X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	Subsystem ALARM LED comes on. (Version of flash changeable part was updated to PB■■■. Current system cannot operate with the flash changeable part whose version is not updated.)	Operation1 : Return the DIP switch of the CTL ASSY. Operation2 : Turn off the power following the powering off procedure shown on page RW-REP0050. Operation3 : Turn on the power following the powering on procedure shown on page RW-REP0050. Check if the following message is displayed on the panel. Version = XXXX/X Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see RW-REP0367), then go to step ⑨.
I01EX CHNGPB■■■ Version = XXXX/X X : Controller number (0 or 1) ■■■ : Version of flash changeable part is displayed.	Subsystem READY LED comes on. (Version of flash changeable part was updated to PB■■■. Current system can operate with the flash changeable part whose version is not updated.)	Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■■ (see RW-REP0367), then go to step ⑨.

- ⑨ After READY LED come on, set No.3 of DIP switch to as shown.



- ⑩ Turn off the power according to the power off procedure in RW-REP0050.
 ⑪ Turn on the power according to the power on procedure in RW-REP0050. (Soon, the ASSY will enter the ready status.)
 ⑫ Close the rear cover. (See RW-REP0170.)

In case optional redundant CTL is installed

When the subsystem is of dual controllers, a controller can be replaced while the power on.

Notice 1: Do not replace (pull out) the CTL ASSY which operates normally. Before replacing the CTL ASSY, confirm that it is blocked (the FAIL LED in on).

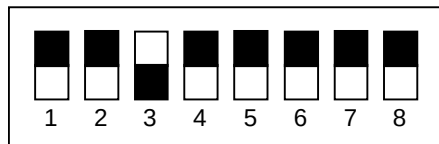
Notice 2: In this case, the controller must be replaced one after another. When Dual controllers are replaced at the same time, the power should be turned off before replacement.

(1) Removing procedure

- ① First open the side cover 1 and then the side cover 2. (See RW-REP0170.)
- ② Disconnect the cables (RS232C).
- ③ Confirm the blocked CTL ASSY (with the FAIL LED turned on). (See Figure 8.2.1.)
- ④ Take out the CTL ASSY by pulling both levers on left and right side at the same time toward the directions shown by allows (·····➤)
- ⑤ Remove the CACHE ASSY. If the LAN ASSY is installed, also remove it.

(2) Installing procedure

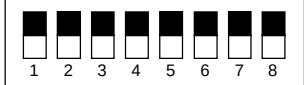
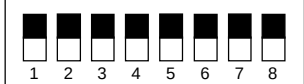
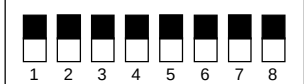
- ① Reinstall the removed CACHE ASSY and the LAN ASSY (option) in the new CTL ASSY. Be sure to install it in the same position as before.
- ② Set No.3 of the DIP switch of the CTL ASSY.



- ③ Insert the CTL ASSY into the right position with the right and left levers being opened, then close the both levers to the direction of arrows (—→) at the same time.

Note : If the CTL ASSY is caught by something when it is installed, do not push it in forcibly. Retry the installation from the beginning. If forced, pins might be broken.

- ④ One of the following messages is displayed on the panel. It does not mean a failure. Confirm the message and recover the subsystem state by performing the corresponding operation.

Message on the panel	Subsystem state	Operation
I619XX CTLRCV-XX XX : Controller number (00 or 01) is displayed.	The WARNING LED goes out and the READY LED of the subsystem comes on.	Return the DIP switch No.3 as shown below, then go to step ⑤ 
I01EX CHNGPB■■ HZ62XY FLSHREVXY H60422 CTLFAIL W015XX CTLALM-XX XX : Controller number (00 or 01) is displayed. X : Controller number (0 or 1) ■■ : Version of flash changeable part is displayed. XY : Controller number (01 or 10) is displayed.	The WARNING LED comes on, and the READY LED of the subsystem comes on in the state that one of the CTL ASSYs is blocked. (The flash changeable part has been updated to the version PB■■. Current system cannot operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Pull out the inserted CTL ASSY (with the FAIL LED turned on). Operation2 : Insert the CTL ASSY again. (Leave the DIP switch No.3 as set to on.) Operation3 : Return the DIP switch No.3 as shown in the Figure below when the WARNING lamp on the panel goes out and the following message is displayed on the panel.  Operation4 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see RW-REP0367), then go to step ⑤. I619XX CTLRCV-XX
I01EX CHNGPB■■ I619XX CTLRCV-XX	The WARNING LED goes out and the READY LED of the subsystem comes on. (The flash changeable part has been updated to the version PB■■. However, the current system can operate with the flash changeable part of earlier version on the CTL ASSY inserted.)	Operation1 : Return the DIP switch No.3 as shown below.  Operation2 : Paint the boxes on the CHANGEABLE revision label affixed on the CTL ASSY up to ■■ (see RW-REP0367), then go to step ⑤.

- ⑤ Connect the disconnected cables (RS232C).
- ⑥ Close the rear cover. (See RW-REP0170.)

When replacing a CTL in a dual controller system (with Redundant CTL option), the system parameter is automatically loaded to the replaced CTL from another CTL. The setting with FD or manual setting is not required.

But, when both CTL ASSY failed at the same time, this automatic operation is not available. In this case, it is necessary to restore from FD. Operate in the same way as single controller.

When replacing a CTL in a dual controller system (with redundant CTL option) , replacement with power off is allowed. The procedure is similar to the replacement in a single controller system. In this case the setting of system parameter from FD or manual operation is also not necessary. (Though installing procedure ⑦ in the single controller system (without redundant CTL option) is not necessary.)

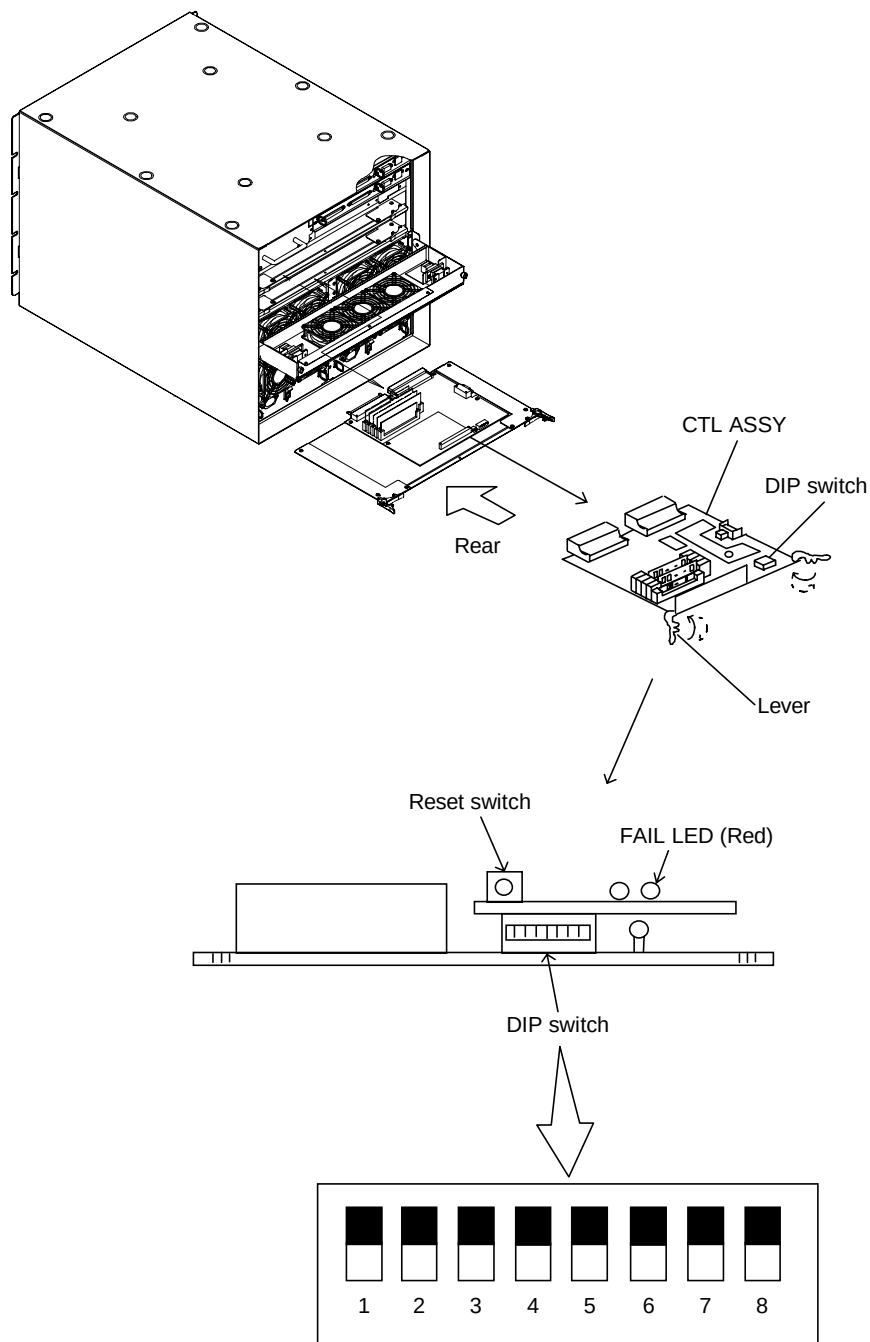


Figure 8.2.1 Replacing CTL ASSY

Painting flash revision label

Figure 8.2.2 shows how to paint the flash revision label. (It shows a case to paint the boxes up to PB26.)

Location of the label is shown in Figure 8.2.3.

FIXED	PBXX	01	02	03	04
		05	06	07	08
		10	11	12	13
		15	16	17	18
		19			
CHNGABLE	PBXX	21	22	23	24
		25	26	27	28
		30	31	32	33
		35	36	37	38
					39

An example to paint the boxes of the CHANGEABLE label up to 26.

Figure 8.2.2 Revision Label Layout and Numbers to be Painted

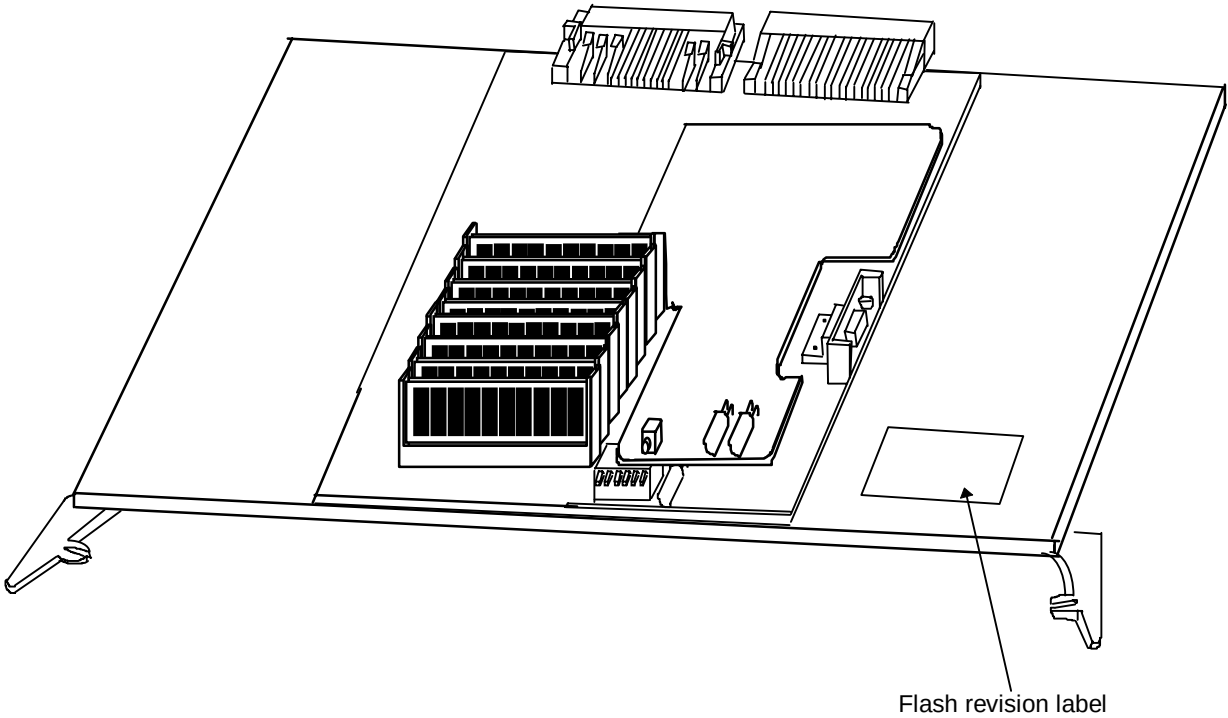


Figure 8.2.3 Location of Revision Label on CTL ASSY

9. Replacing I/F ADAPTER ASSY (See Figure 9.1, 9.2, 9.3 and Table 9.1.)

When the subsystem is mounted on the DF-F350-U2 rack frame, start the following work after completing the works explained in “15. Procedures for Replacing I/F ADAPTER ASSY or BATTERY ASSY” on page RW-REP0480.

Be sure to turn the power off DF350 subsystem and host system before disconnecting the SCSI cable.
(That other SCSI devices makes an error and acted, if not or DF350 subsystem only.)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RW-REP0050 and turn off the host system.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to “O” side with panel display “TOOMNYPIN” or “SYSDTSVER” or “POFFCMUNC”.

In this case refer to “Troubleshooting Section” (See TRBL0030) and turn off the power.

- ② Disconnect the SCSI cable, the terminator, and the LAN cable (option).
- ③ Open the rear cover. (See RW-REP0170.)
- ④ Remove the bind screw and pull the I/F ADAPTER ASSY toward you to remove it.

(2) Mounting procedure

- ① Make the setting of the terminator power, (JP1, JP2) as the setting of the removed I/F ADAPTER ASSY.
- ② Insert the I/F ASSY into the right place and tighten the bind screw.
- ③ Connect the disconnected cables etc.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 9.2.)

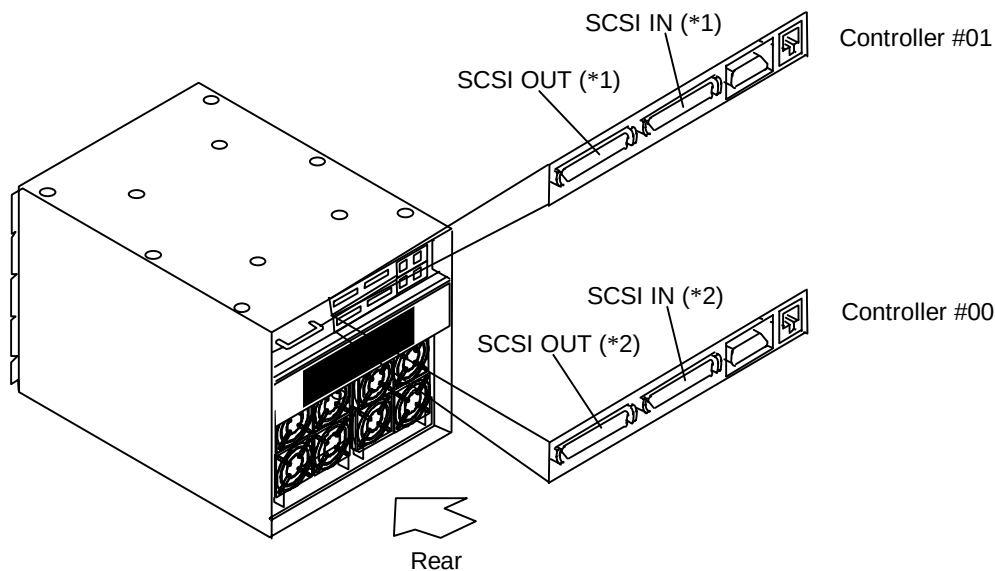


Figure 9.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT : Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

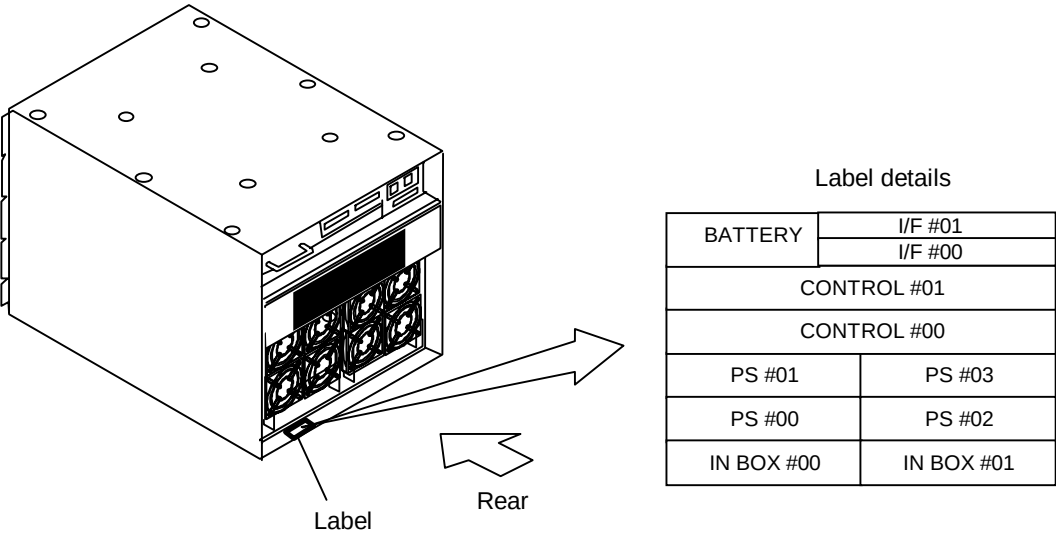


Figure 9.2 Label Layout

④ Close the rear cover. (See RW-REP0170.)

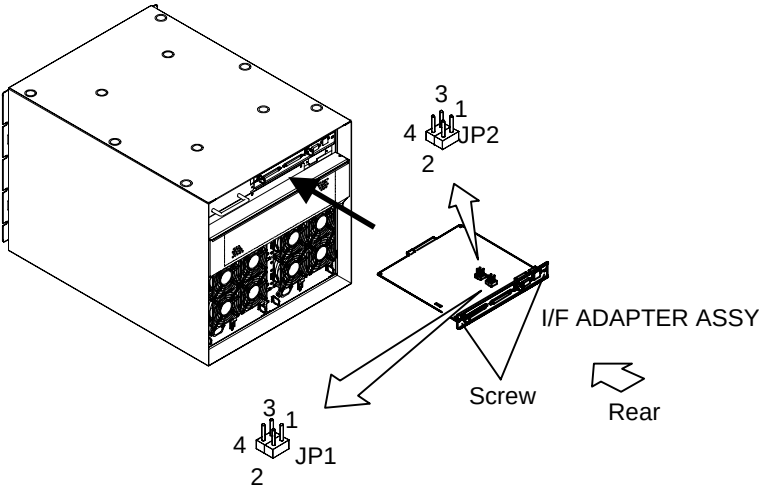
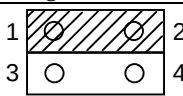
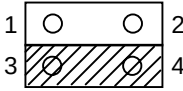
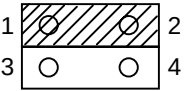
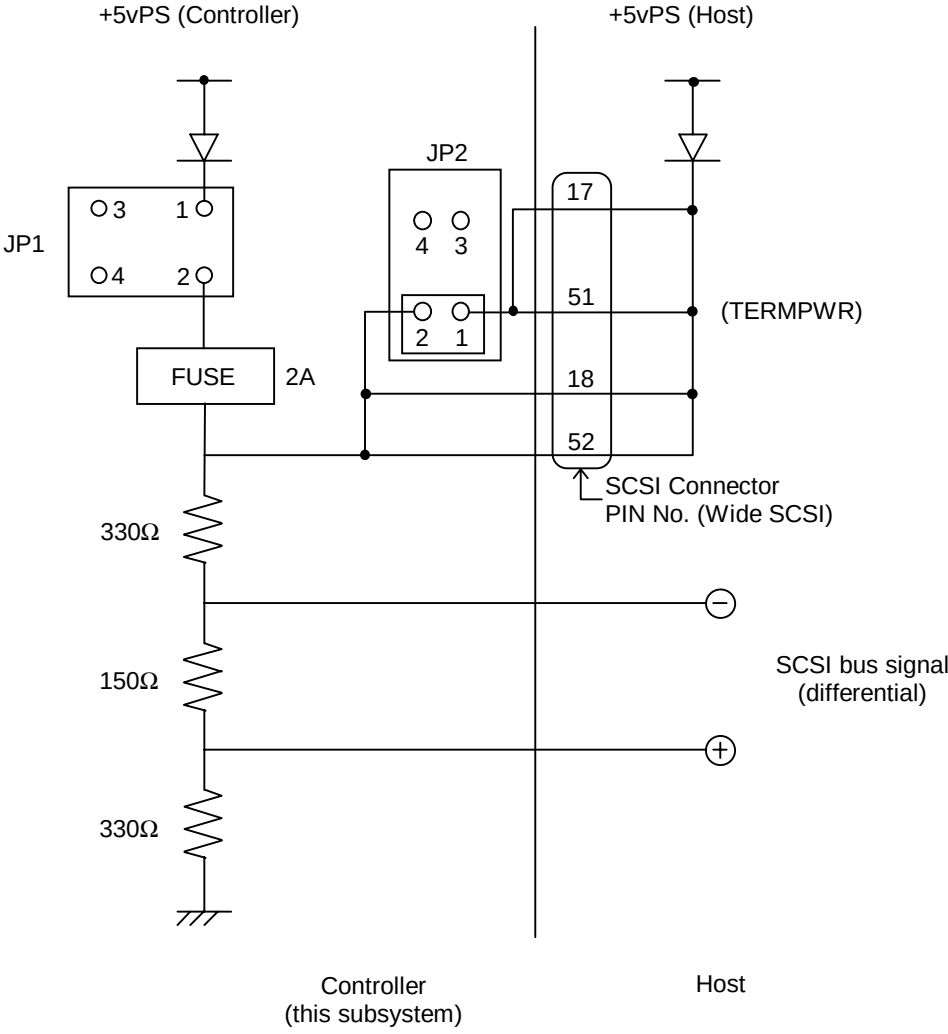


Figure 9.3 Replacing I/F ADAPTER ASSY

Table 9.1 Setting the Terminator Power

No.	Name	Jumper setting	Function
1	JP1	Self power supply 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
		External power supply 	Terminator power +5VPS is supplied only from the power source of the host computer.
2	JP2		Be sure to set this jumper with the pins 1 and 2 short-circuited.



10. Replacing SVP ASSY (See Figures 10.1)

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RW-REP0050. (Be sure to read and understand the procedure because if the power is turned off improperly, user data might be destroyed.)

Sometimes the subsystem does not go power off after the main switch turned to “O” side with panel display “TOOMNYPIN” or “SYSDTSVER” or “POFFCMUNC”.

In this case refer to “Trouble shooting Chapter” (See TRBL0030) and turn off the power.

- ② Check to see that POWER LED goes off.

Notice : In case the power is not normally turned off, the user’s data might be lost.

- ③ Turn the breaker at the rear to “O” side.
- ④ Remove the front bezel and open the front panel. (See RW-REP0160, RW-REP0180.)
- ⑤ Remove screw.
- ⑥ Remove SVP ASSY.

(2) Mounting procedure

- ① Make the setting of Remote/Local as the setting of the removed SVP ASSY.
(For setting of the jumper, see “THEORY Chapter, 5. Location and Function of Switches and LEDs”.)
- ② Install the SVP ASSY in the reverse order of the removing.

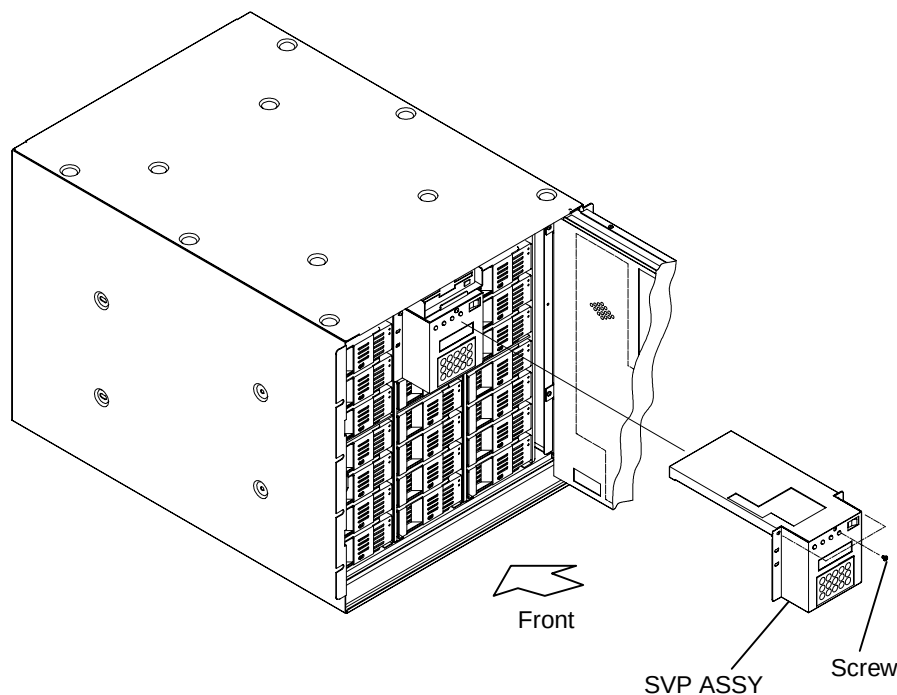
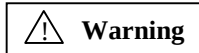


Figure 10.1 Replacing SVP ASSY

11. Replacing AC/DC power supply (See Figure 11.1.)



**Only the maintenance personnel can perform this replacement.
The operation by the user is prohibited.**

Tool : Phillips screwdriver (No.2)

Because the rack mount (RKWH) type is equipped with a redundant power supply as a standard, a hot replacement of the power supply is possible.

(1) Removing procedure

- ① Remove the screw and the AC/DC power supply.

(2) Mounting procedure

- ① Insert the AC/DC power supply to the right place, and tighten the screw.

(3) Transition of panel display

I003XX PSRCV-XX ----- DC power recovery is completed.

(In case with replacement while power on.)

When the subsystem is allowed to be shut off, it is recommended to replace the power supply in the following procedure.

(4) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RW-REP0050.

Notice : In case the power is not normally turned off, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC".

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Remove the screw and the AC/DC power supply.

(5) Mounting procedure

- ① Press the "O" side of the In Box ASSY switch.
- ② Press the "O" side of the AC/DC power supply switch. Insert the AC/DC power supply to the right place, and tighten the screw.
- ③ Turn on the subsystem following the power-on procedure explained in RW-REP0050.

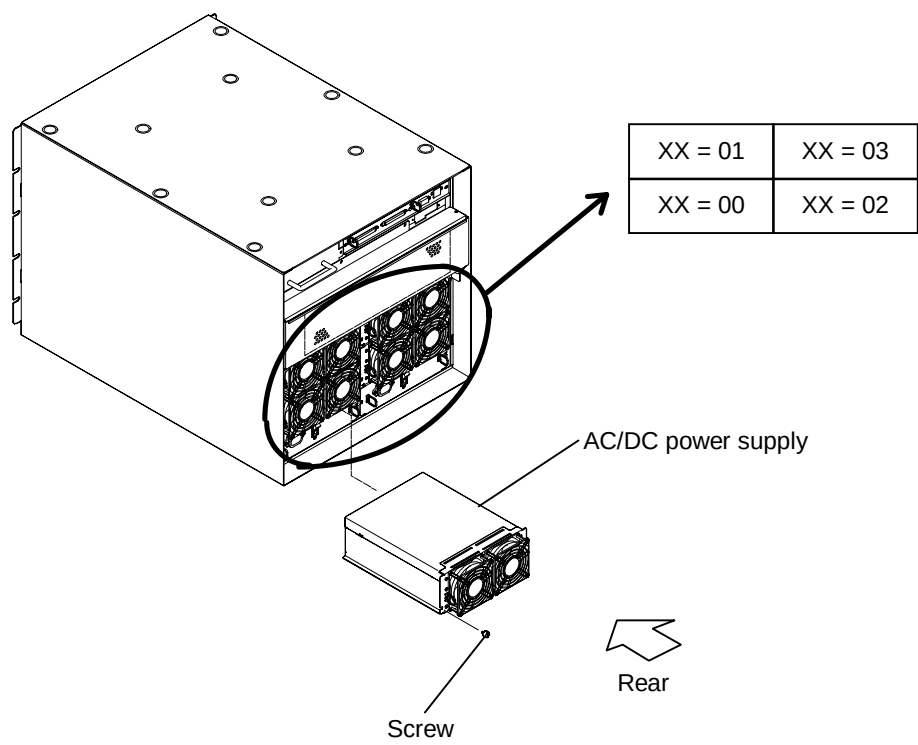


Figure 11.1 Replacing AC/DC power supply

12. Replacing In Box ASSY (See Figure 12.1.)

**WARNING**

Do not touch inside of In Box ASSY. Electricity remains even if main switch is off.

**CAUTION**

This unit has more than one power supply cord.

Disconnect two power supply cord before servicing to avoid electric shock.

(1) Removing procedure

- ① Turn off the subsystem following the power-off procedure explained in RW-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Disconnect the power supply cable.
- ③ Remove the screw and remove In Box ASSY.

(2) Installing procedure

- ① Install In Box ASSY to the predetermined position and tighten the screw.
- ② Connect the disconnected cables.
- ③ Turn the power on following the power-on procedure in RW-REP0050.

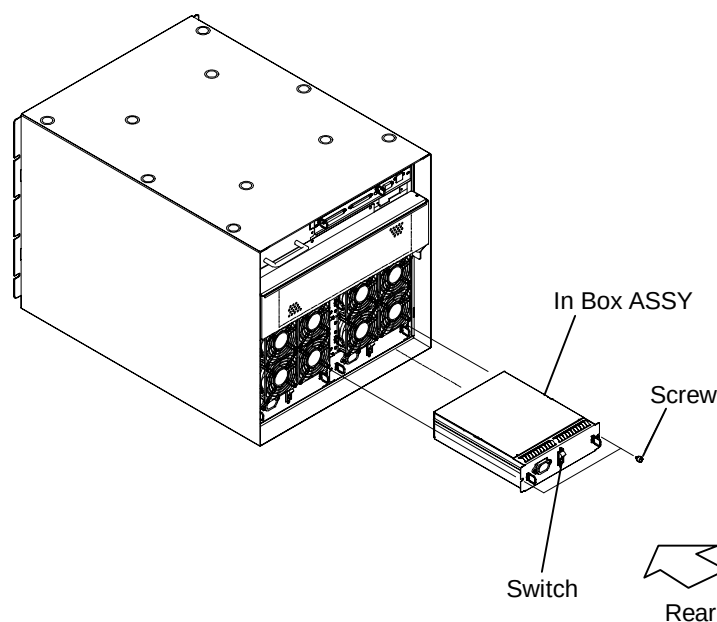


Figure 12.1 Replacing In Box ASSY

13. Replacing CACHE ASSY

In case no optional redundant CTL installed

(1) Procedures

- ① Turn off the subsystem following the power-off procedure explained in RW-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

- ② Open the rear cover to remove CTL ASSY. (See RW-REP0325.)

- ③ Replace CACHE ASSY.

Note 1 : Slots #0 and #4, #1 and #5, #2 and #6, #3 and #7 are pairs respectively. Install the cache having the same capacity for these each pair slots..

Note 2 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- ④ Install the CTL ASSY.

- ⑤ Turn power on following the procedure explained in RW-REP0050.

- ⑥ Close the rear cover. (See RW-REP0170.)

Installation example of CACHE ASSY

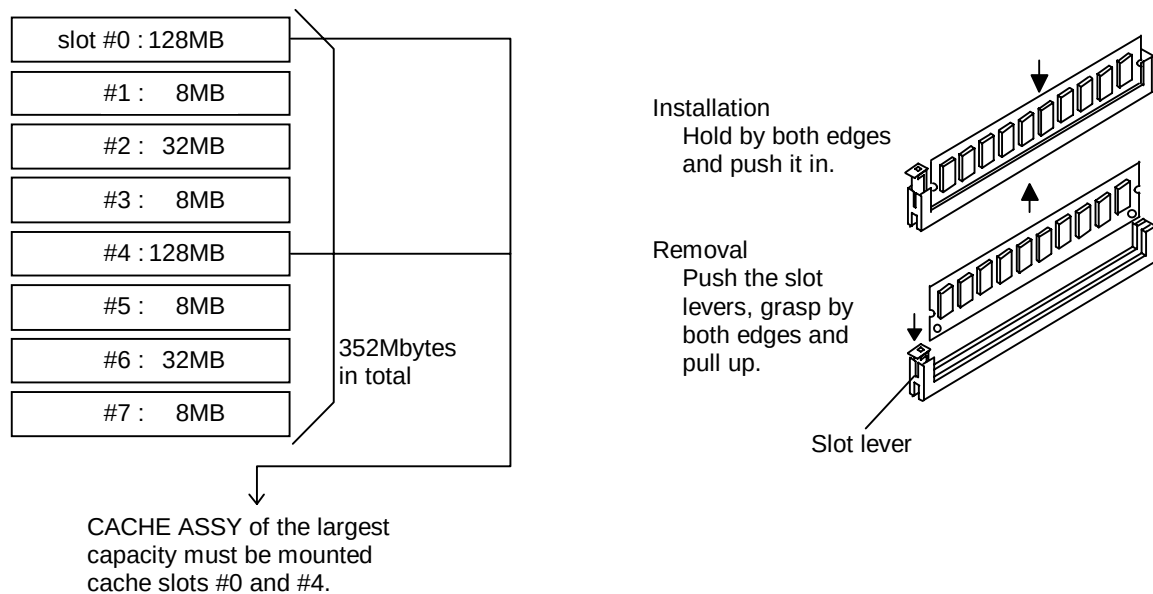


Figure 13.1 Replacing CACHE ASSY

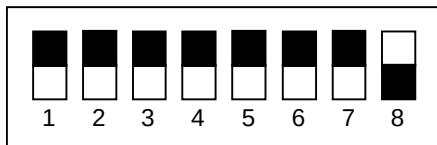
In case optional redundant CTL is installed

When the subsystem are dual controller system, CACHE ASSY can be replaced while the power on.

Note : In this case, the CACHE ASSY must be replaced one controller at one time. In case CACHE ASSY for both CTL ASSY are replaced at the same time, turn the power off before replacement.

(1) Procedure

- ① Open the rear cover. (See RW-REP0170.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.

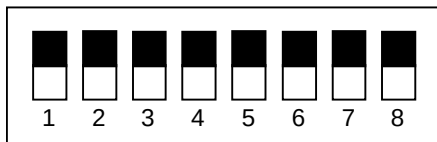


- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that FAIL LED on the CTL comes on and it enters into the blocked state. (See RW-REP0440.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Replace the CACHE ASSY.

Note 1 : When replacing a cache, install the cache having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : CACHE ASSY for the same slot of both CTL ASSY should have the same capacity.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Insert the CTL ASSY.
- ⑩ Connect the disconnected cable (RS232C).
- ⑪ Close the rear cover. (See RW-REP0170.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

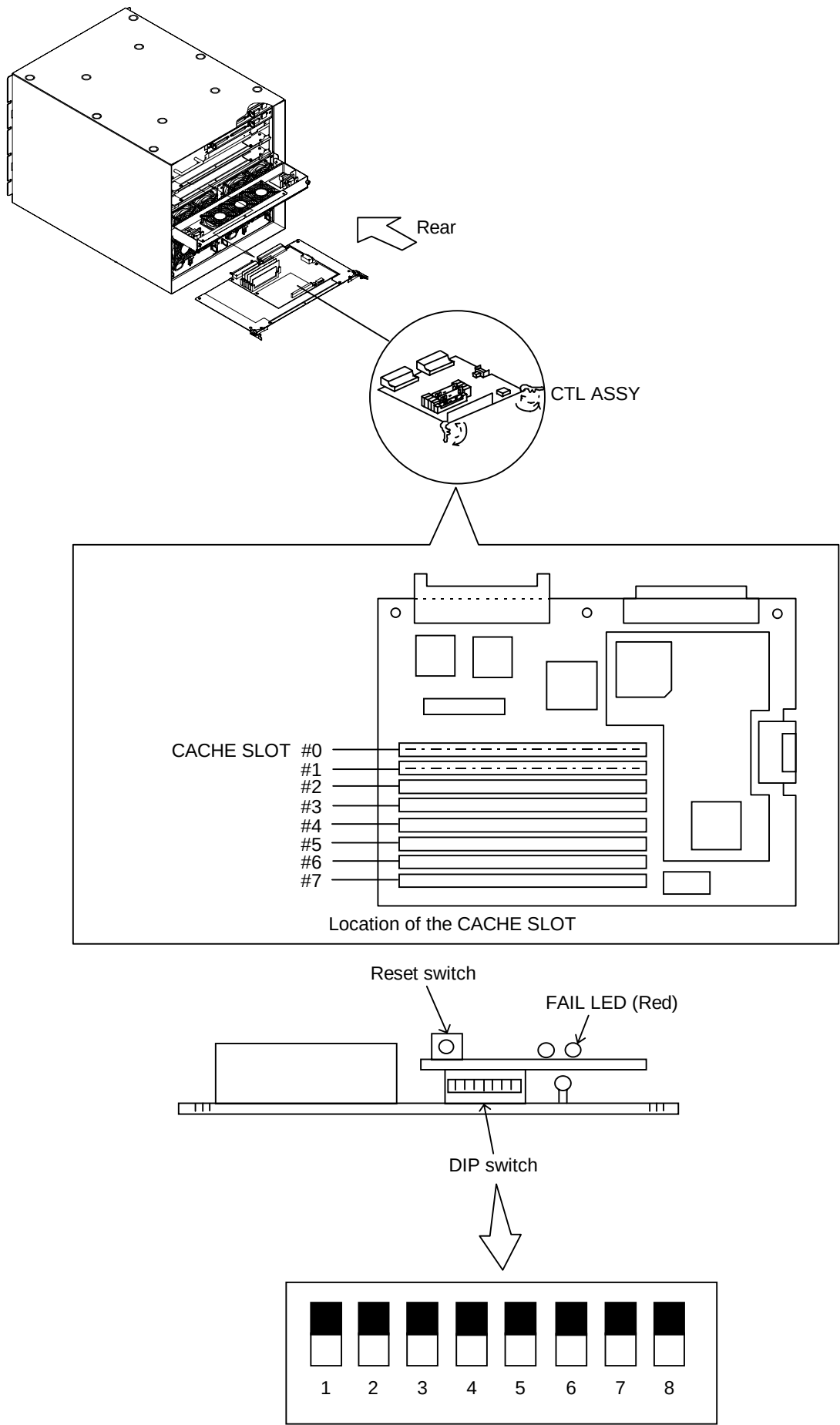


Figure 13.2 CTL ASSY

14. Replacing LAN ASSY

When no optional redundant CTL installed

Note : Configuration setting change is sometimes required because Mac Address is changed after replacing LAN ASSY.

(1) Procedures

① Turn off the subsystem following the power-off procedure explained in RW-REP0050.

Notice 1 : Be sure to read the above mentioned instruction because user's data may be lost if the power is not turned off normally.

Notice 2 : When the power has been already turned off, check the CACHE PWR LED (see page THEORY0210) to see if the cache backup is not being performed. If the cache backup is being performed, turn on and off the replacement after the power is turned off normally.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Chapter" (See TRBL0030) and turn off the power.

② Open the rear cover and remove CTL ASSY. (See RW-REP0325.)

③ Pinch the latching heads of card spacers with needle-nose pliers etc. , then pull the LAN ASSY up with care not to touch with surrounding parts. (See Figure 14.1.)

Notice : If your hand or a tool touches with CTL ASSY, touched part may be damaged.

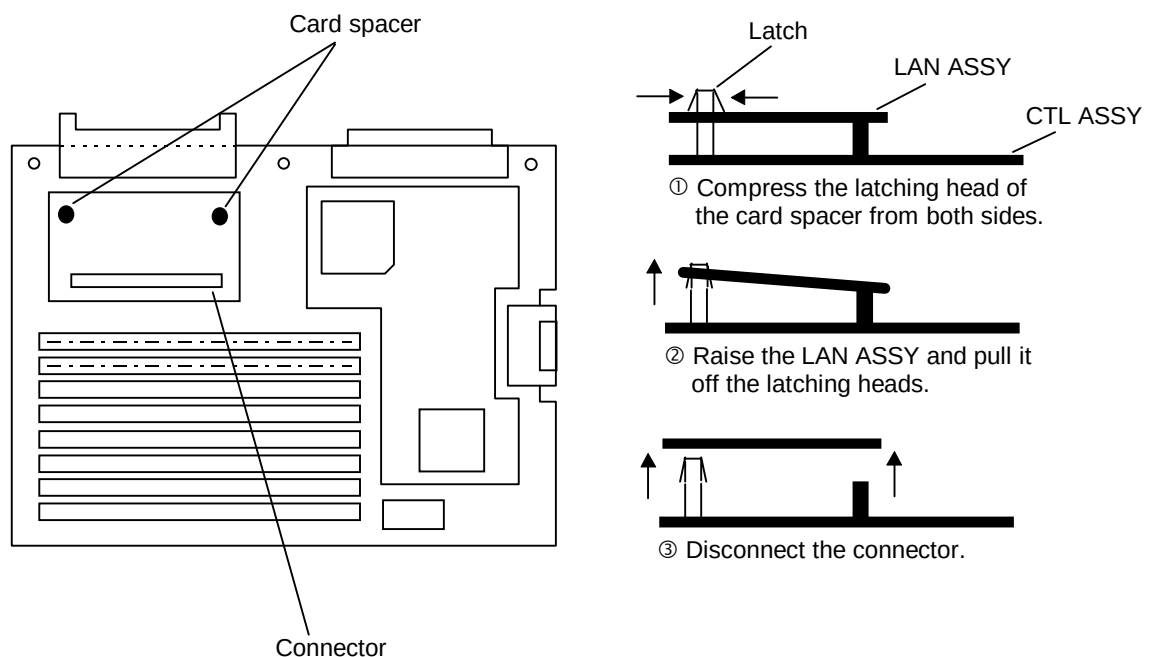


Figure 14.1 Replacing LAN ASSY (1)

- ④ Mount a LAN ASSY for replacement by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑤ Reinstall the CTL ASSY.
- ⑥ Close the rear cover. (See RW-REP0170.)
- ⑦ Turn on the power. (See RW-REP0050.)

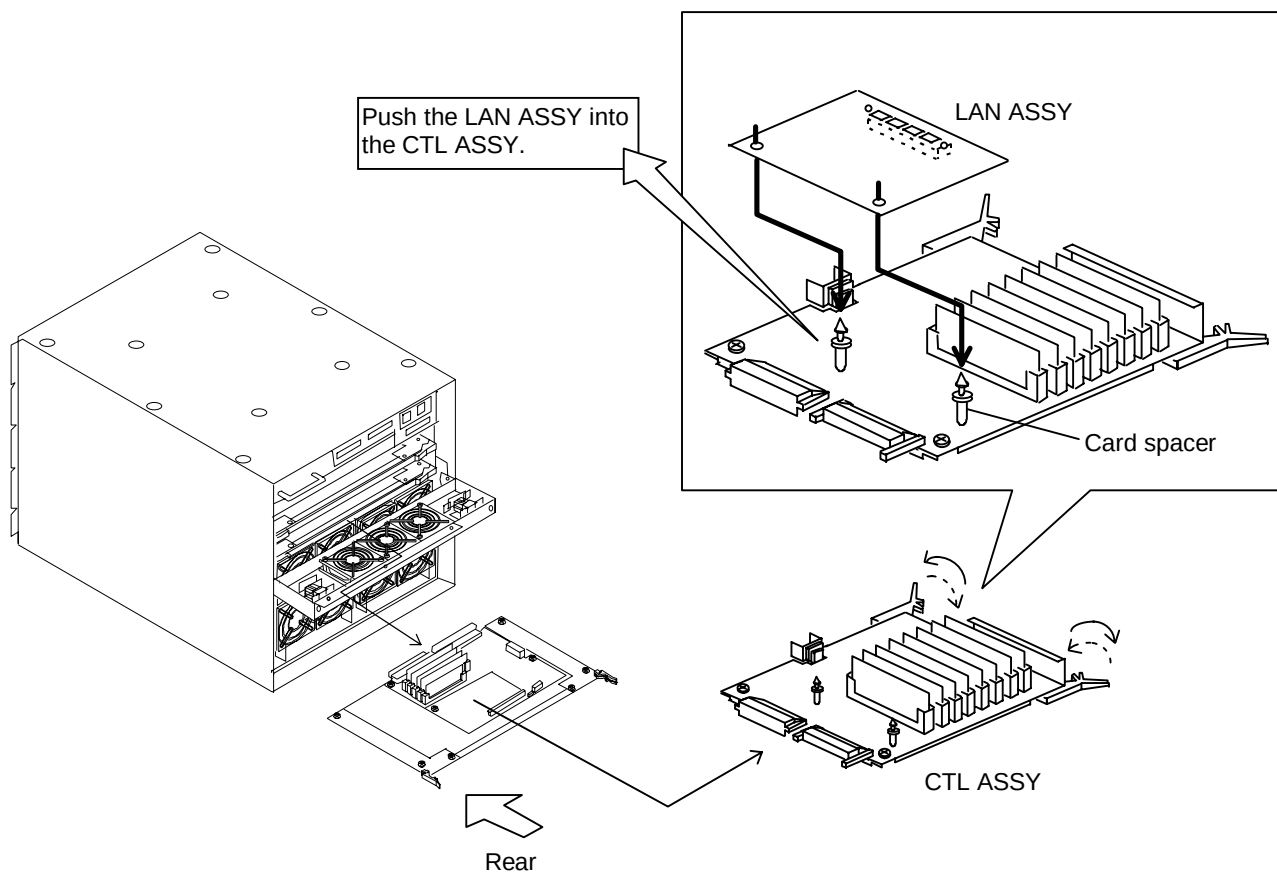


Figure 14.2 Replacing LAN ASSY (2)

When optional redundant CTL installed

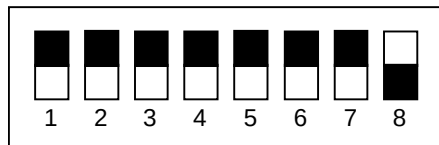
When the subsystem are dual controller system, LAN ASSY can be replaced while the power on.

Note : When replacing LAN ASSY, perform the replacement for each CTL ASSY one after another.

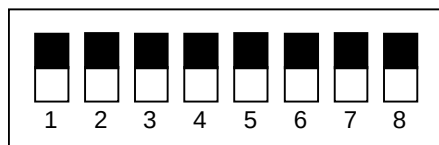
When replacing both LAN ASSY at a time, turn off the power like the case of single configuration.

(1) Procedure

- ① Open the rear cover. (See RW-REP0170.)
- ② Disconnect the cable (RS232C).
- ③ Set No.8 DIP switch of the corresponding CTL ASSY.



- ④ Push the reset switch of the corresponding CTL ASSY.
- ⑤ Wait ten seconds, check to see that the FAIL LED on the CTL ASSY comes on and it enters the blocked state. (See Figure 14.3.)
- ⑥ Open the right and left levers to the direction of arrows (→) at the same time then remove the CTL ASSY.
- ⑦ Remove the LAN ASSY by pulling it upward. Then mount a new LAN ASSY by aligning its mounting holes with the card spacers and pressing the LAN ASSY against the spacers until it is latched with clicks.
- ⑧ Set No.8 of DIP switch to as shown.



- ⑨ Reinstall the CTL ASSY.
- ⑩ Close the rear cover. (See RW-REP0170.)

When an optional redundant CTL (for dual configuration) has been installed, the replacement can be performed with machine power off. In this case follow the same procedure as that for single configuration.

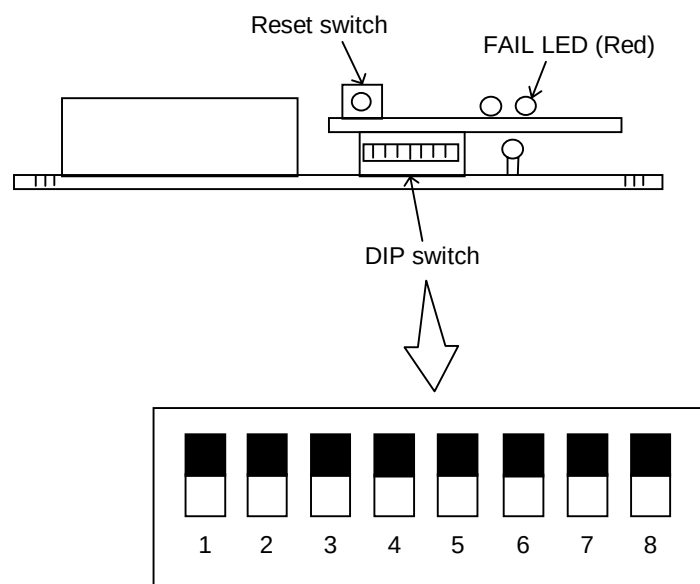


Figure 14.3 Replacing LAN ASSY (3)

15. Procedure for Replacing I/F ADAPTER ASSY or BATTERY ASSY

- (1) Open the rear door of the U2 rack frame.
- (2) Remove the CHANNEL-1 above the I/F ADAPTER ASSY or the BATTERY ASSY to be replaced by removing four SB510 screws.

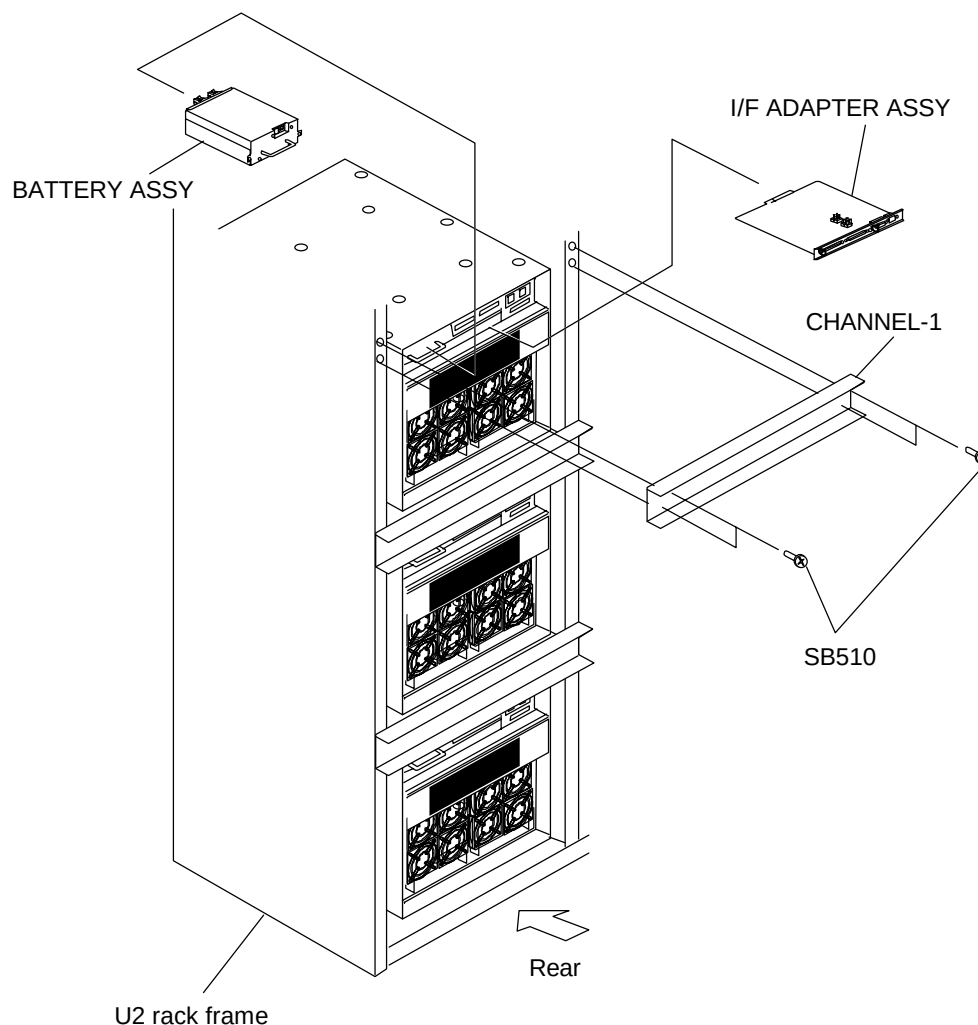


Figure 15.1 Replacement of the I/F ADAPTER ASSY and the BATTERY ASSY when the Subsystem is Mounted on the Rack Frame

- (3) Remove and replace the I/F ADAPTER ASSY or the BATTERY ASSY.
- (4) Reinstall the removed CHANNEL-1 with the four SB510 screws.
- (5) Close the rear door of the U2 rack frame.

DF350 Disk Subsystem

8. INSTALLATION

(Rack Mount (RKWH/U2) Type)

Rev.6

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Feb.28.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	May.12.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Jul.20.'97	A.Yamanashi	Y.Morishita	M.Sato	0020 0040 0270 0280 0290 0310 0320 0385 0420	Chapter 6 was added to the table. 4.2 was added. Figure 3.7.2 was added. Figure 3.7.3 was changed. Dipswitch was changed. Flowchart were changed. (Pages 0360, 0380, 0390, 0400, 0410, 0450, 0460, 0470, 0480 and 0610 were changed by the same reason.) Dipswitch was changed. This page was newly added. (Pages 0386, 0387, 0415, 0416, 0445, 0482, 0484, 0820-0930 were added by the same reason.) Table was changed. (Pages 0430 and 0440 were changed by the same reason.)	AD AD AD CH CH CH CH AD CH
3	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0320 0410 0430 0440 0450 0455 0460 0470 0490 0510 0512 0514 0520 0550 0570 0610 0650 0660 0710 0720 0750 0760 0780 0810 0940-1040	Added 6.7, 6.8. Changed setting of DIP switch. Added “*1”. Added *4/Deleted Item No.21. Added *5, SYS REV and OPTION. Added setting the DIP switch. This page was newly added. Added setting the DIP switch. Changed flow chart. Changed flow chart. Added Figure. This page was newly added. This page was newly added. Added RAID A. Added RAID A. Added TERMINATE SVP. Added RAID A. Added “1024B”. Added RAID A. Changed Notice. Added FORMAT ABORD. Changed the table. Changed the table. Added DUAL TYPE. Added 7, 8, 12, 17, 24, 25 and 26 in the table. These page were newly added.	AD CH AD AD/DL AD AD AD AD CH CH AD AD AD AD AD AD AD AD CH AD CH CH AD AD AD
4	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0020 0513 0550 0562 0564 0660 1050-1100	Added 6.9, 6.10. This page was newly added. Added “Operation for difining...”. This page was newly added. This page was newly added. Split RAID5. These page were newly added.	AD AD AD AD CH AD
5	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.)	AD

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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REV.1	May.1998	Oct.1998				

RW-INST0011

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1. Appearance and Maintenance Area

1.1 Appearance

Figure 1.1.1 shows appearance of the DF350 disk subsystems. (Rack Mount (RKWH) type)

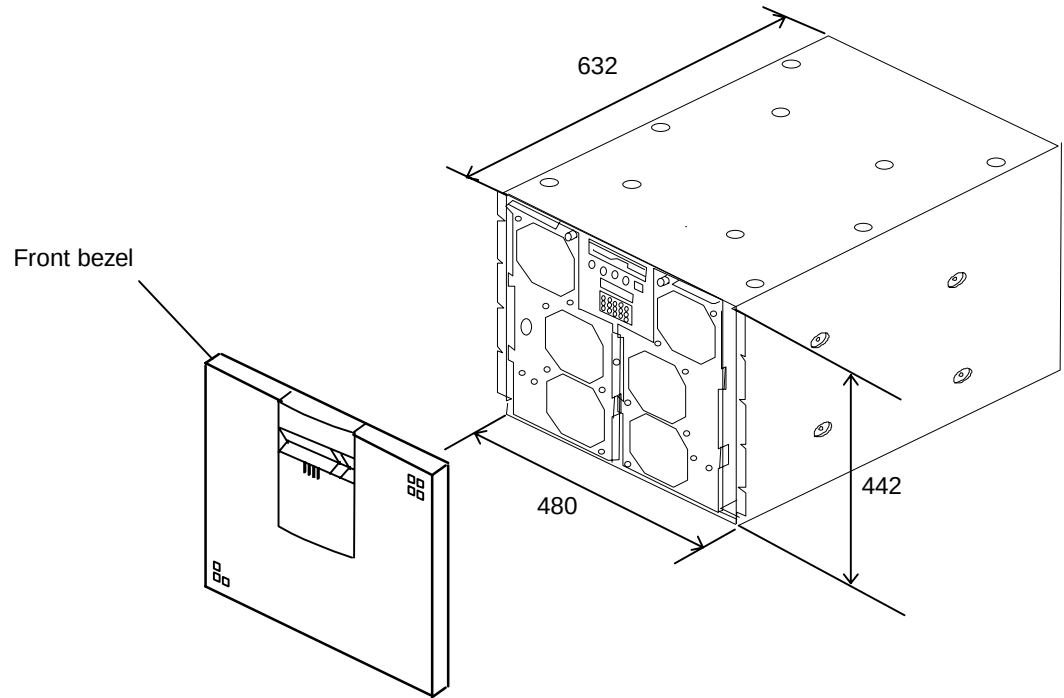


Figure 1.1.1 Appearance

1.2 Maintenance Area

Figure 1.2.1 shows maintenance area for the DF350 disk subsystems. (Rack Mount (RKWH) type)

UNIT : mm

- : External dimension of the subsystem
- ▲ : Front of the subsystem
- : Maintenance area

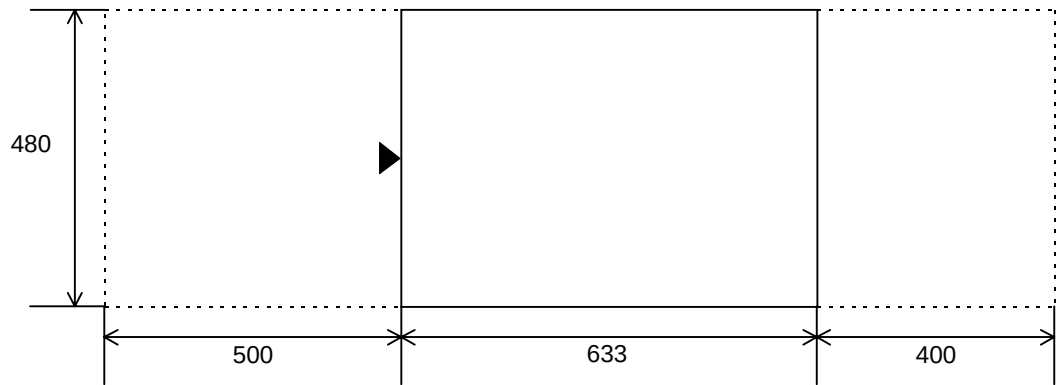


Figure 1.2.1 Maintenance Area

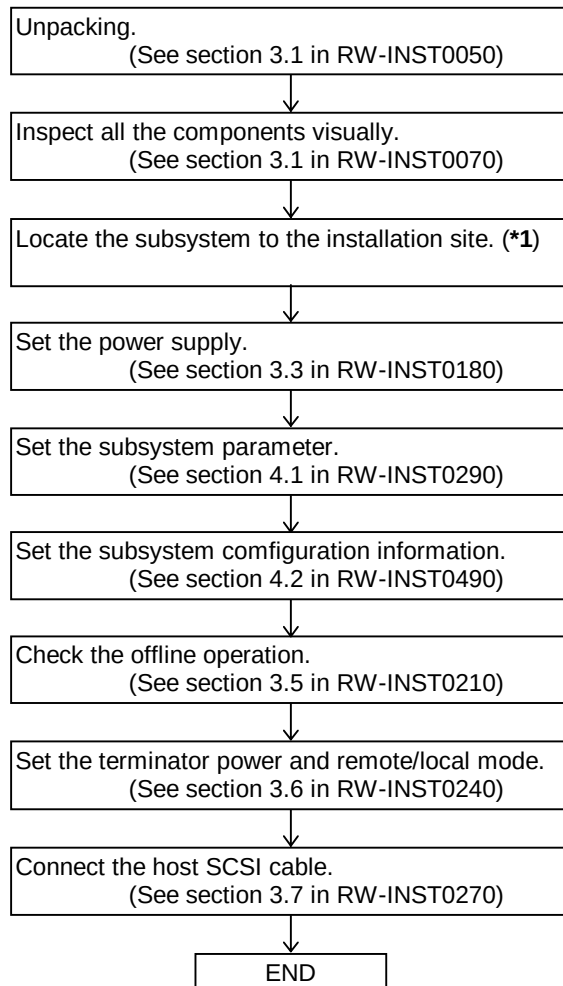
2. Installation

- (1) Tool needed for installation

Phillips screwdriver (No.2).

- (2) How to install

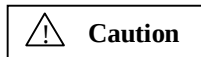
The following flow chart describes how to install the subsystem.



***1 : Place the subsystem with 30cm or more apart from the wall for both the front and the rear because of the ventilation.**

3. Installation Procedure

3.1 Inspecting all the Components



The unpacking and installation should be carried out by 2 or more personnel to prevent turning over of the device or being caught under the device.

3.1.1 Unpacking

- (1) Figure 3.1.1 shows how the subsystem has been packed.
- (2) Figures 3.1.2 to 3.1.4 show the subsystem without external packaging.
- (3) Unpacking
 - ① Loosen the polyester bands.
 - ② Remove nails for T/W.
 - ③ Remove the external packaging and packing materials.
 - ④ Take the subsystem out of the polyethylene bag.
 - ⑤ Keep keys (2pcs) in the box attached to the unit. (This key is used to open the front panel, so be careful not to lose.)
 - ⑥ Remove shock absorbing material and tapes, etc. attached to the devicee.
 - ⑦ Remove desicating agent on the top of the device. (See Figure 3.1.3.)
 - ⑧ Take the subsystem off the CART ASSY. (The CART ASSY belongs to the customer.)

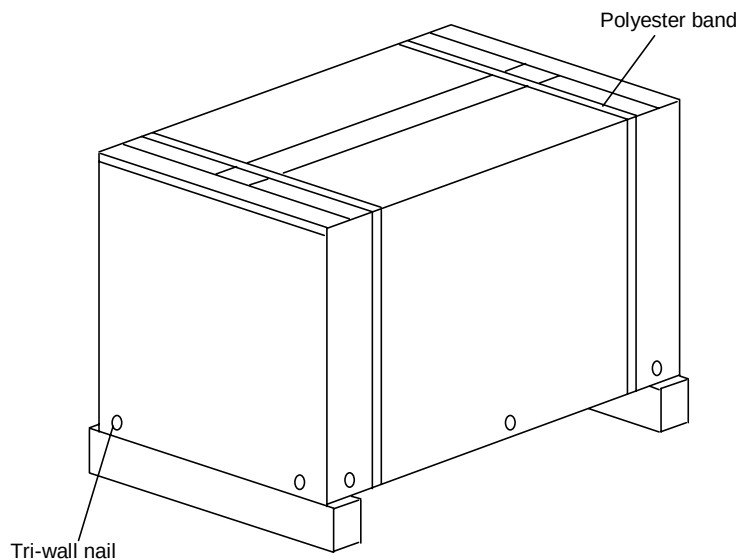


Figure 3.1.1 Subsystem being Packed

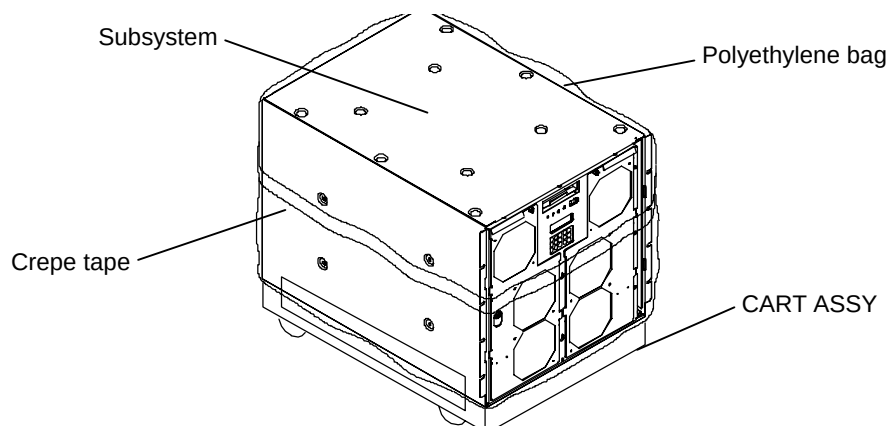


Figure 3.1.2 Subsystem without External Packaging

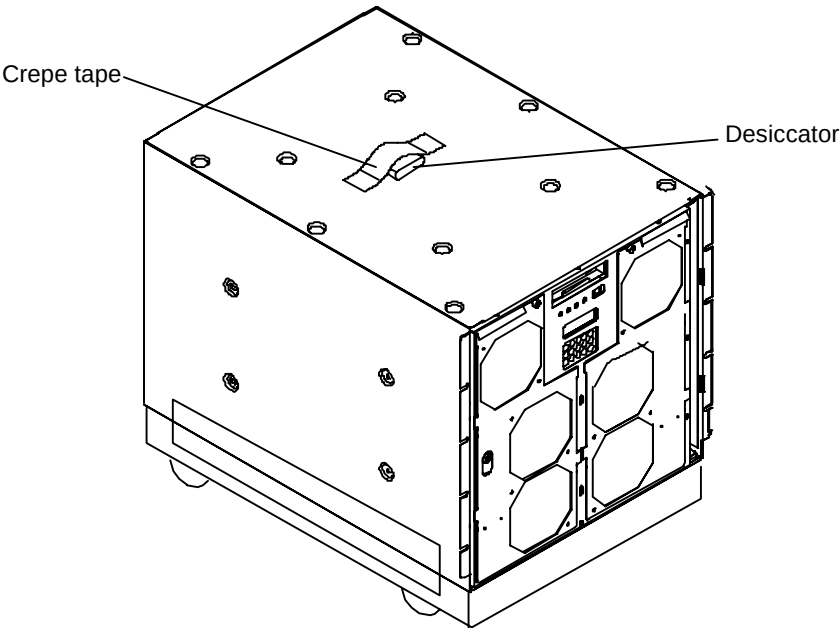


Figure 3.1.3 Location of Desiccantor

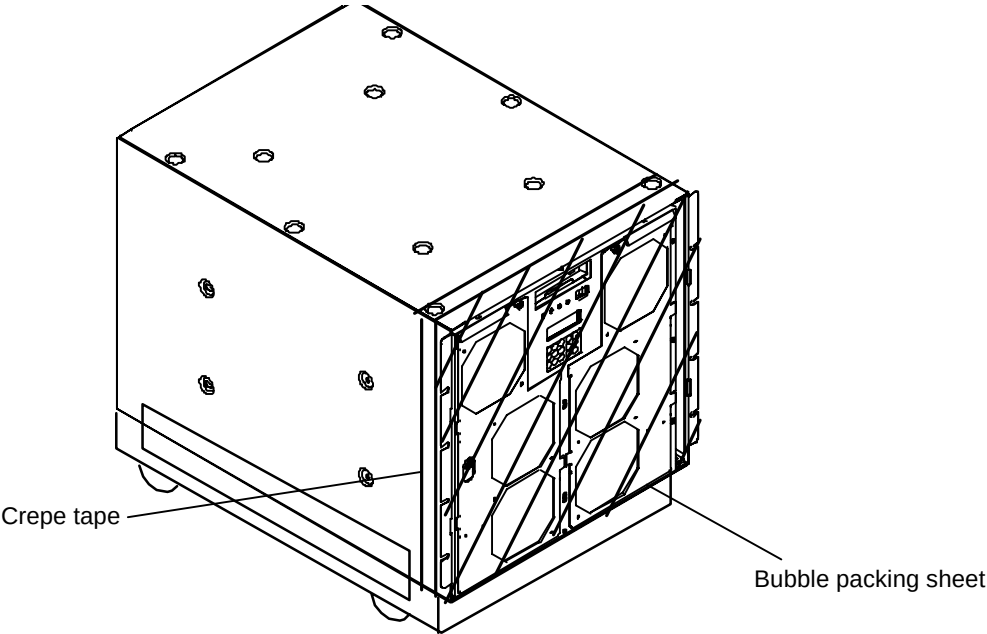


Figure 3.1.4 Front Cover Protection

3.1.2 Inspecting all the components visually

Check the following components before installation according to a customer's configuration.

Table 3.1.1 Mandatory Features

Model Name	Specification	Quantity	Comment
DF350-RKWH	Rack mount (RKWH)	1	(Installed AC/DC power supply)
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	1 (RAID5 :4D+1P)	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	4 (RAIDA, RAID5: 3D+1P) 3 (RAID5 :2D+1P) 2 RAID0/1	HDU ASSY
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	2	CACHE ASSY
DF-F350-DWUDS	Interface board (*2) for wide differential SCSI interface	1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.2 Optional Features

Model Name	Specification	Quantity	Comment
DF-F350-E2E2 -E2E4 -E3E4 -E2E4A (*1) -E2E8 -E2E8A (*1) -E1E8 -E1E8A (*1) -E1E18	1"H disk drive (516B Format, 2.0GB × 5) (516B Format, 4.1GB × 5) (516B Format, 4.1GB × 5) (524B Format, 4.1GB × 5) (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) Half height disk drive (516B Format, 8.7GB × 5) (524B Format, 8.7GB × 5) (516B Format, 17.8GB × 5)	0 - 3	HDU ASSY
DF-F350-A2E2 -A2E4 -A3E4 -A2E4A (*1) -A2E8 -A2E8A (*1) -A1E8 -A1E8A (*1) -A1E18	1"H disk drive (516B Format, 2.0GB × 1) (516B Format, 4.1GB × 1) (516B Format, 4.1GB × 1) (524B Format, 4.1GB × 1) (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) Half height disk drive (516B Format, 8.7GB × 1) (524B Format, 8.7GB × 1) (516B Format, 17.8GB × 1)	0 - 21	HDU ASSY
DF-F350-C8E -C32E -C128E	Cache memory (8MB) (32MB) (128MB)	0, 2, 4, 6 or 8	CACHE ASSY
DF-F350-G1M1 -G2M1	LAN board LAN board (SNMP)	0 - 2	LAN ASSY
DF-F350-F2WCF	Controller for dual composition	0 or 1	CTL ASSY
DF-F350-DWUDS	Interface board (*2) for wide differential SCSI interface	0 or 1	I/F ADAPTER ASSY

*1 DF-F350-A/E2E4A, A/E1E8A and A/E2E8A are the disk drive for AS/400 of IBM.

*2 This includes a terminator.

Table 3.1.3 Accessories

Model Name	Specification	Quantity	Comment
DF-F350-J1 -J2	Power supply cable (Connector attached to two poles with earth) (Inlet type connector, EN60320 STANDARD SHEET C14)	0 or 1	
DF-F350-K050L -K150L -K068S -K268S -K168S -K350L	Interface cable (50PL, 1.5m) (50PL, 3m) (68PS, 1.5m) (68PS, 3m) (68PS, 5m) (50PL, 5m)	0 -	
DF-F350-S1	RS232C cable	0 -	

3.1.3 Inspecting the subsystem components and addendum

This subsection describes how to install the basic components into the subsystem.

Figures 3.1.5 and 3.1.6 show mechanical configuration and parts location of this subsystem.

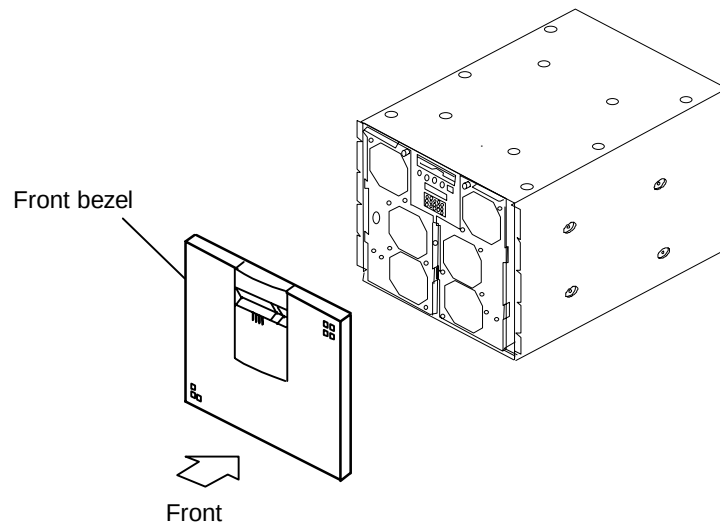


Figure 3.1.5 Appearance of DF350 Disk Subsystem (RACK MOUNT (RKWH) type)

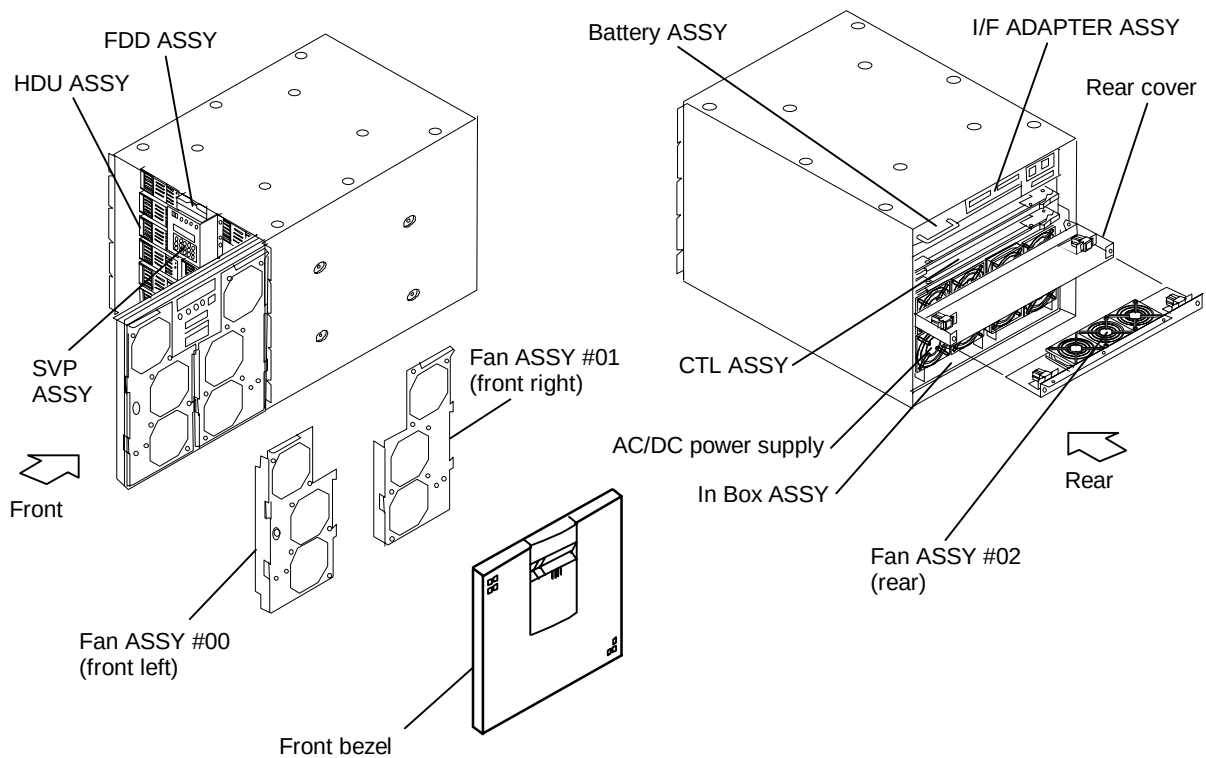


Figure 3.1.6 Parts Location

3.2 Install the Subsystem

3.2.1 Requirement of installing

(1) Elevated Operating Ambient Temperature

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient.

Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacture's maximum rated ambient temperature (T_{mra}).

(2) Reduced Air Flow

Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

(3) Mechanical Loading

Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

(4) Circuit Overloading

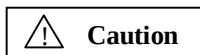
Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

(5) Reliable Earthing

Reliable earthing of rack-mounted equipment should be maintained.

Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

3.2.2 Install the subsystem



Do not block the ventilation. With the temperature rise, it may cause failure or fire.

Attaching and Removing the front bezel

(1) Removing procedure (See Figure 3.2.1.)

① Hold the grooves on both sides of the front bezel and pull it toward you.

(2) Attaching procedure (See Figure 3.2.1.)

① Fit the guide plates of the main body and press the front bezel against them.

Note : Attach/Remove the front bezel carefully to avoid subjecting the subsystem to any impact since it has precision components.

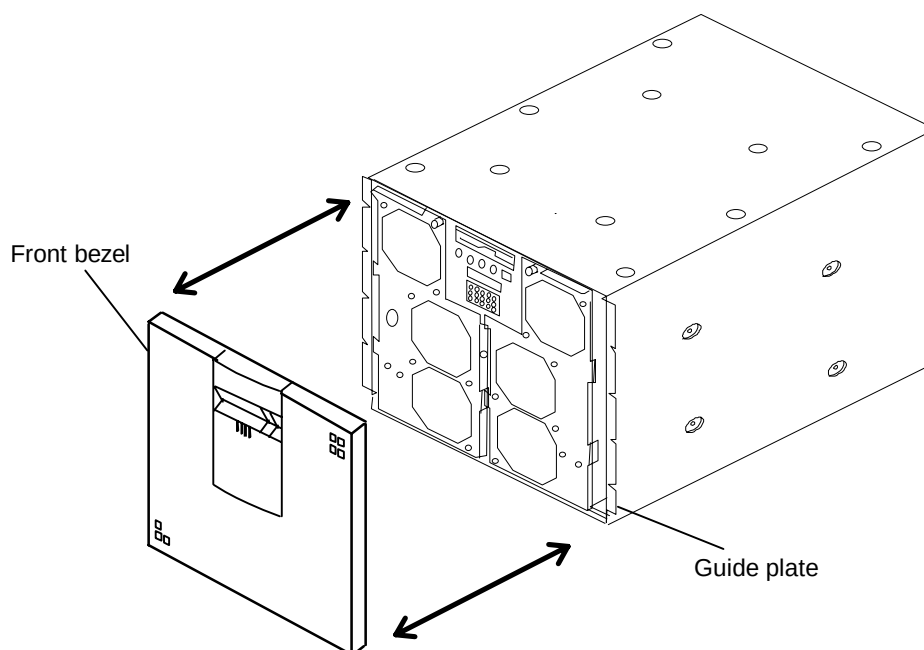


Figure 3.2.1 Attaching and Removing the Front Bezel

Opening/Closing the front panel

(1) Opening procedure

- ① Remove the front bezel. (See RW-INST0110.)
- ② Insert the key attached to the subsystem into the key hole and turn it to the direction of an arrow (→) and open the front panel to the right.

Note : Open/Close the covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing procedure

- ① Close the front panel.
- ② Turn the key to the direction of an arrow (↶) and secure the front panel.
- ③ Attach the front bezel. (See RW-INST0110.)

Note : Keep the key carefully lest it should be lost.

Note : Open/Close the bezel gently to avoid a shock. Precision components are installed.

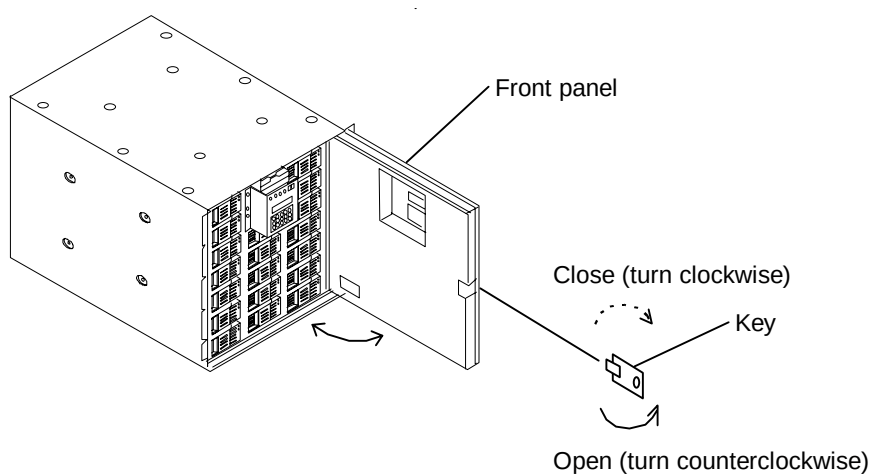


Figure 3.2.2 Opening/Closing the Front Panel

Opening/Closing the rear cover

Tools : Philips screwdriver (No.2)

(1) Opening procedure (See Figure 3.2.3.)

- ① Remove 2 thumb screws of rear cover and open rear cover.

Note : Open/Close the rear cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing procedure (See Figure 3.2.3.)

- ① Close rear cover in the reversed order of removing procedure.

Note : Open/Close the rear cover gently to avoid a shock. Precision components are installed.

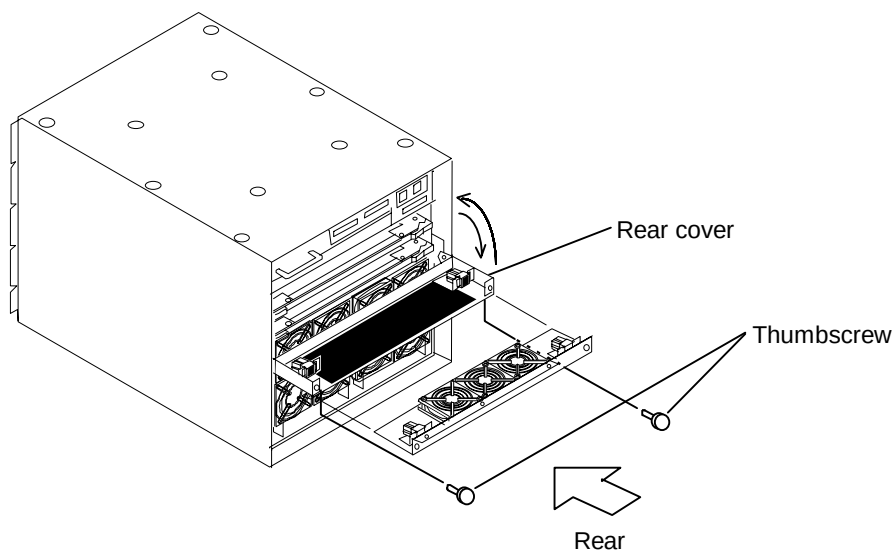


Figure 3.2.3 Opening/Closing the Rear Cover

3.2.3 Installing HDU ASSY (See Figure 3.2.4.)

- (1) Open the handle in the direction of an arrow (···→) completely and insert the HDU ASSY into the right place.
- (2) Close the handle in the direction of an arrow (→).

 **Caution**

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

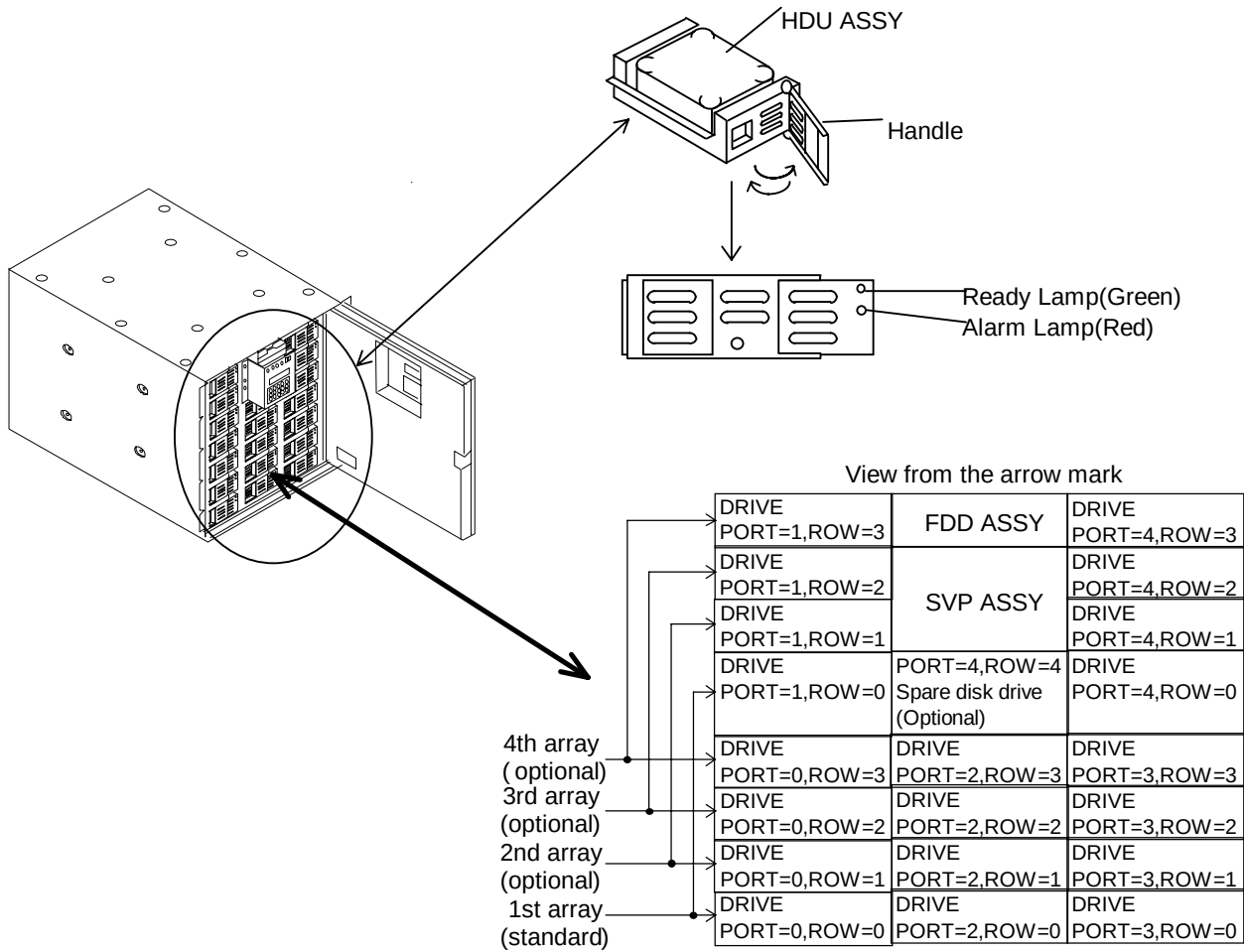


Figure 3.2.4 Installing HDU ASSY

3.2.4 Setting I/F ADAPTER ASSY (See Figure 3.2.5.)

- (1) Insert the I/F ADAPTER ASSY into the right place and tighten the two bind screws.

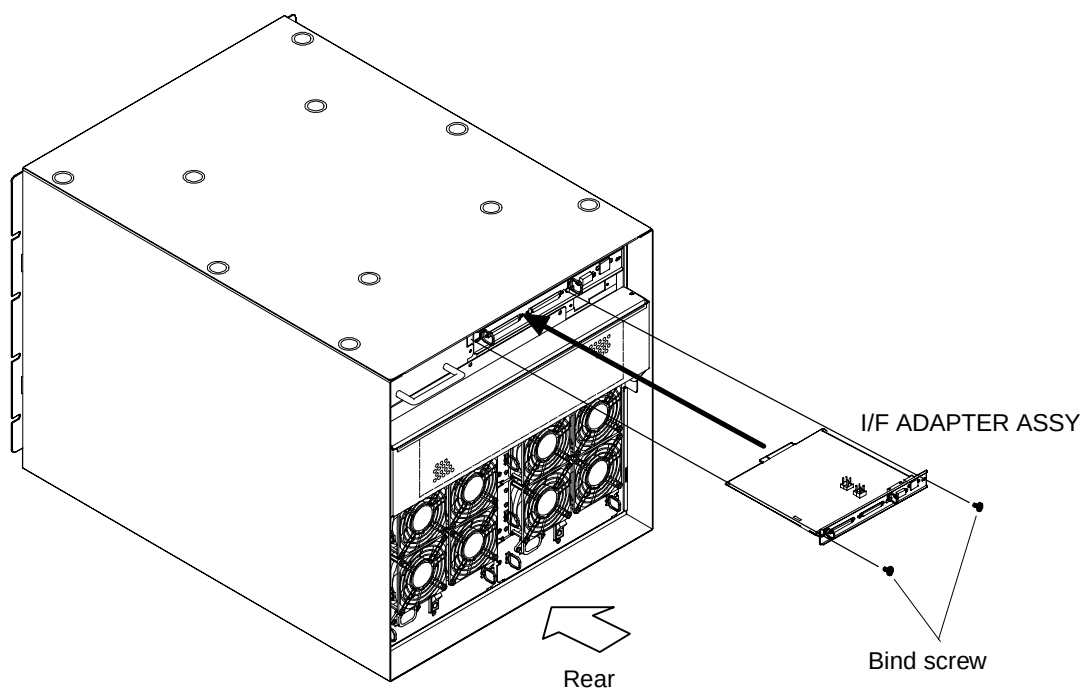


Figure 3.2.5 Setting I/F ADAPTER ASSY

3.2.5 Installing CACHE ASSY (See Figure 3.2.6 and Figure 3.2.7.)

Note 1 : Be sure to install the cache assemblies having the same capacity in slots #0 and #4, slots #1 and #5, slots #2 and #6, or slots #3 and #7.

Note 2 : When the cache assemblies are to be inserted into the cache slots, insert them in the order of cache slots #0 and #4, cache slots #1 and #5, cache slots #2 and #6 and then cache slots #3 and #7.

Note 3 : Be sure to install the cache assembly having the maximum capacity in slot #0 and #4.

Note 4 : If the redundant CTL ASSY has been installed, install the cache assembly having the same capacity into the same slot.

- ① Open the rear cover. (See RW-INST0130.)
- ② Pull out the CTL ASSY. Open the right and left levers to the direction of arrows (···➤) at the same time then remove the CTL ASSY.
- ③ Install the CACHE ASSY.
- ④ Insert the CTL ASSY into the former place. Insert the CTL ASSY into the right place with its right and left levers being opened, then close the both levers to the direction of arrows (➡) at the same times.
- ⑤ Close the rear cover. (See RW-INST0120.)

Installation example of CACHE ASSY

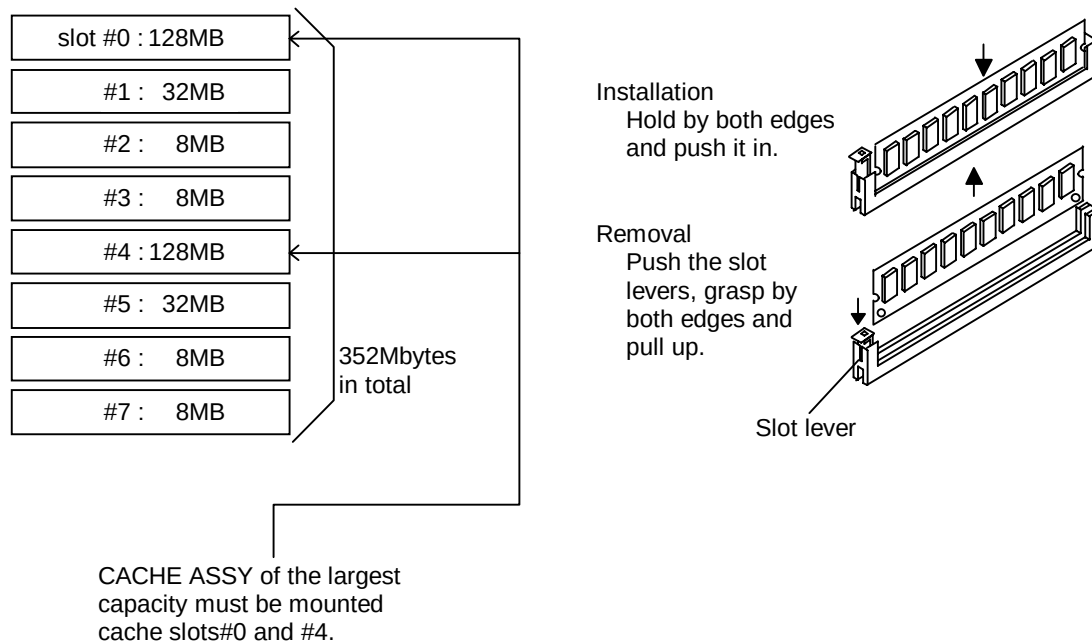


Figure 3.2.6 Installing CACHE ASSY

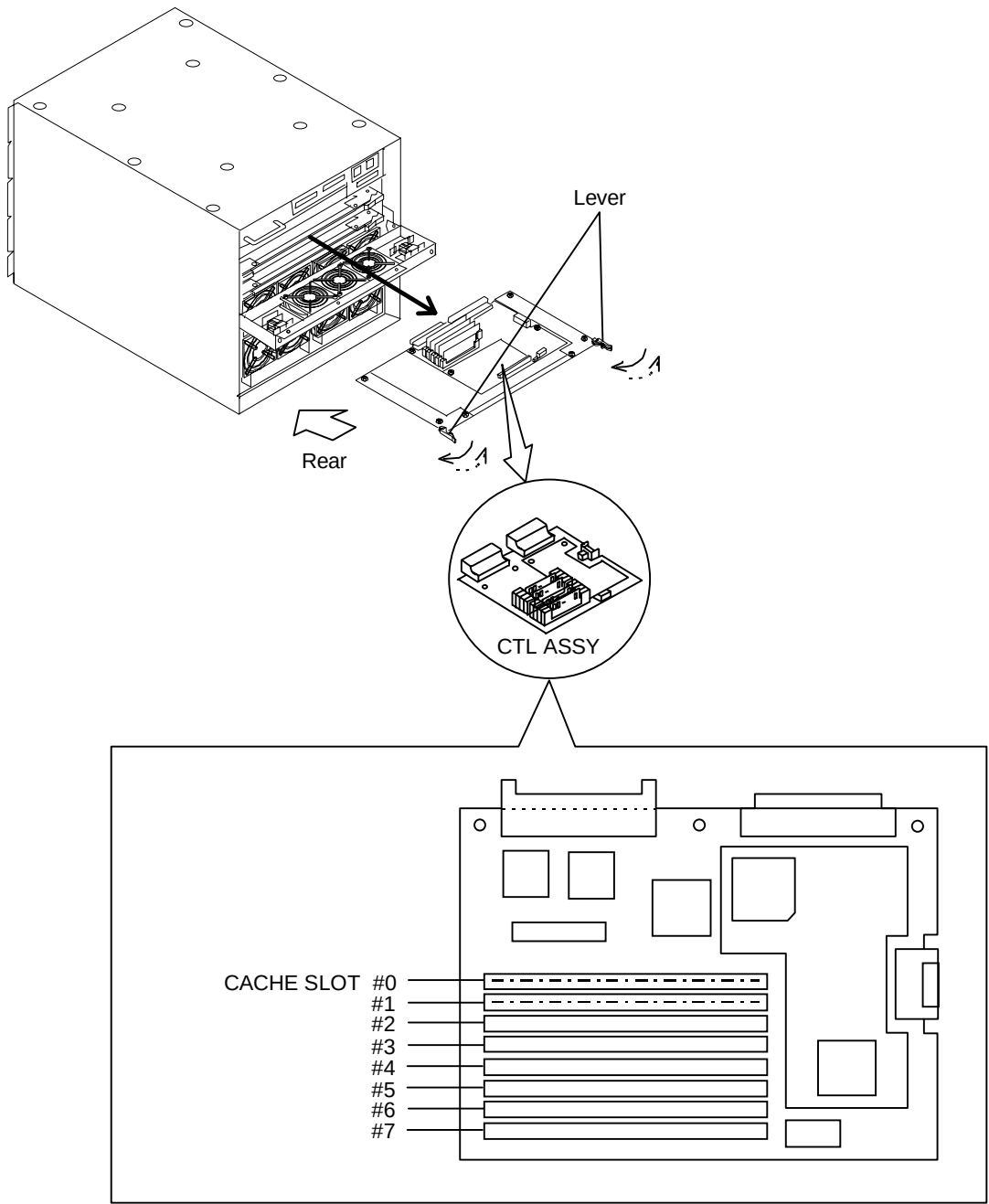
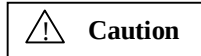


Figure 3.2.7 Installing CACHE ASSY

3.3 Setting the Power Supply

The power for the boards, drives, and fans of the DF350 disk subsystem is supplied by the In Box ASSY and AC/DC power supply converting AC to the DC power.

Turn the power on according to procedures (1) to (6) described below.



Make sure that AC cable is not damaged. It may cause electric shock or fire.

- (1) Verify that the breaker (switch at the rear side) is set to "O" (Off). Then, attach AC cable. (See Figure 3.3.1.)
- (2) Turn on AC power.
- (3) Turn "On" the power switch of the battery (at the rear side of the unit). Then turn "On" the breaker (1). (See Figure 3.3.2.)
- (4) Verify that all the DIP switches are set to "Off" (upper position). Note, no need to remove CTL ASSY.
- (5) Close front panel and turn "On" the main switch. (See Figure 3.3.3.)
- (6) Make sure that the subsystem becomes ready a few minutes later.

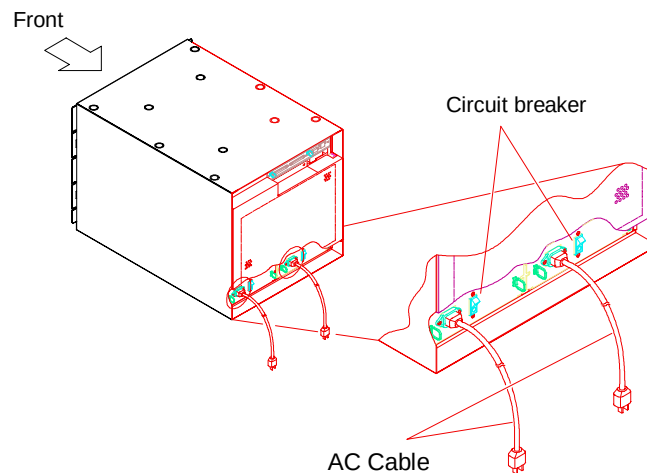


Figure 3.3.1 AC Cable Connection

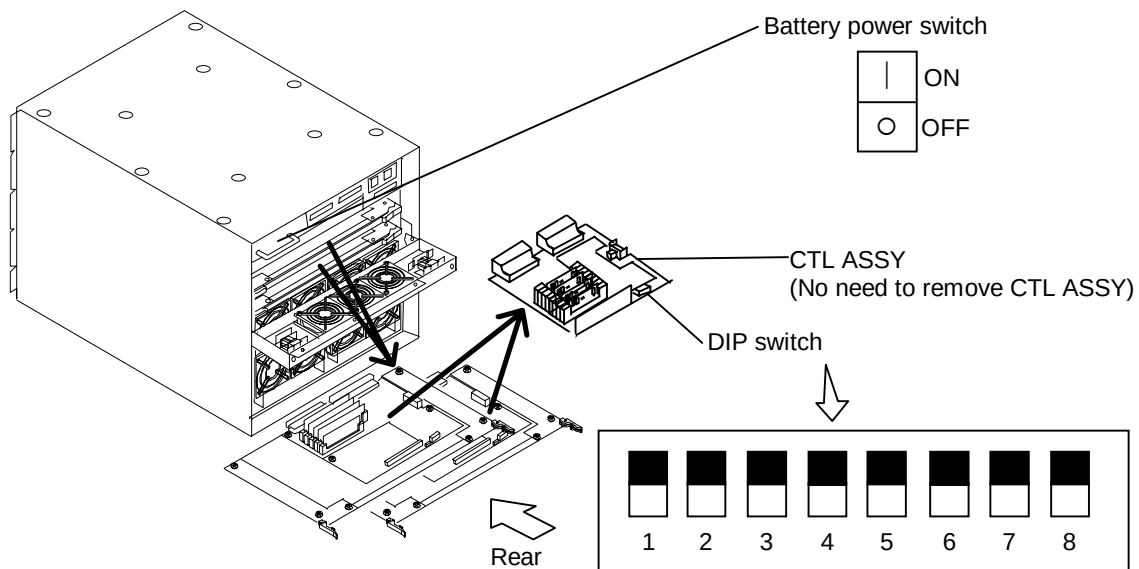


Figure 3.3.2 Inside Construction of the Subsystem

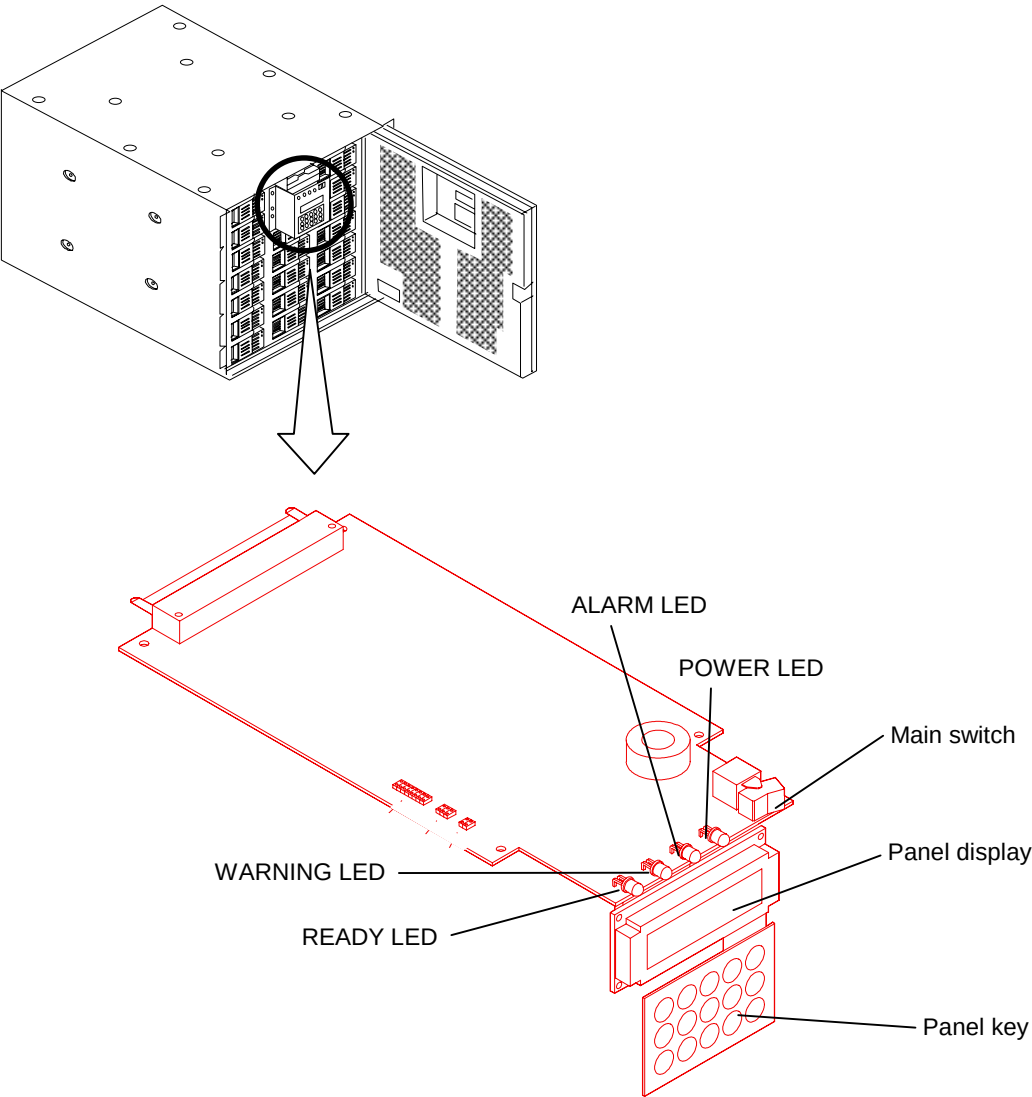


Figure 3.3.3 Panel

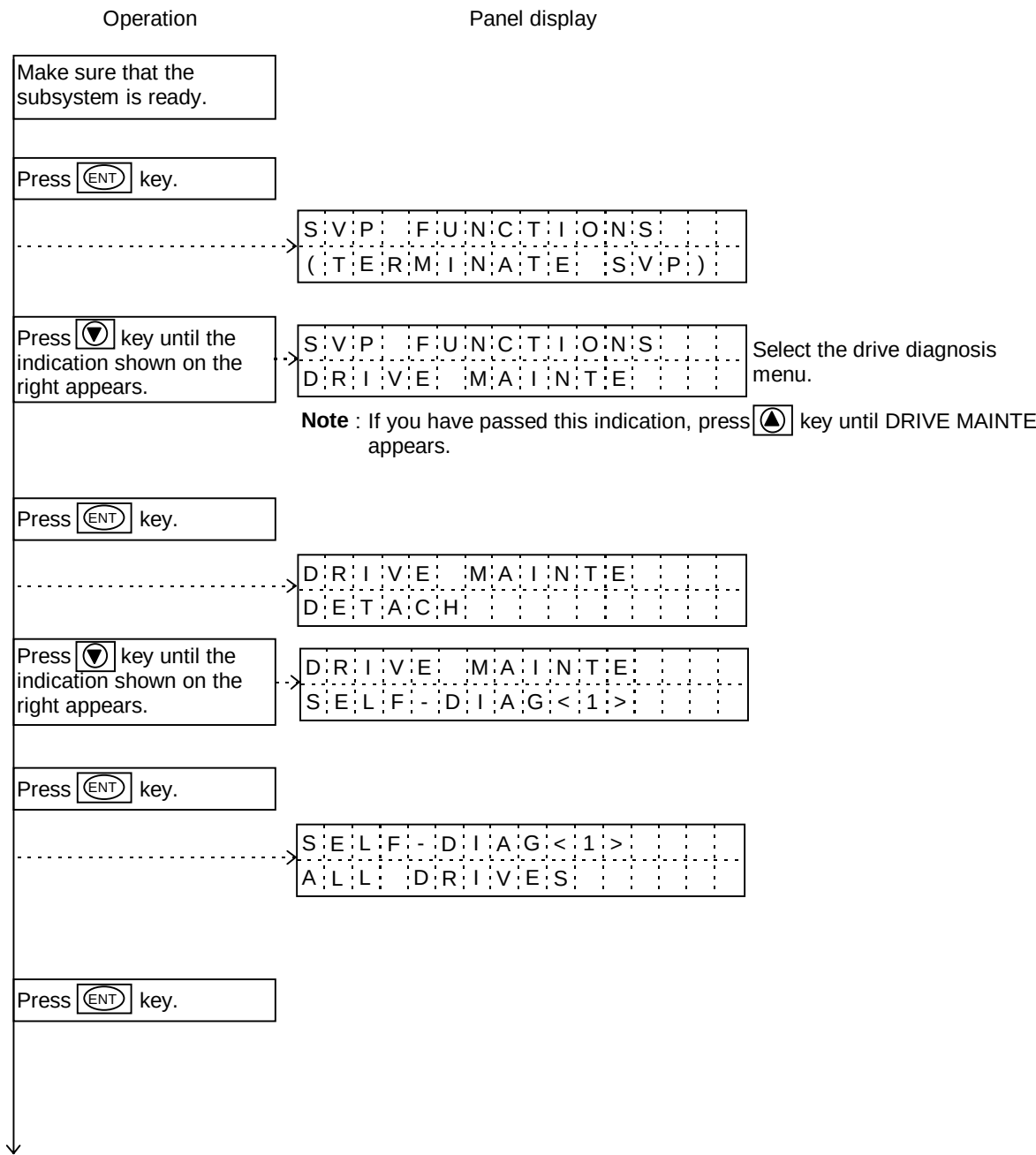
3.4 Setting the Subsystem Parameter

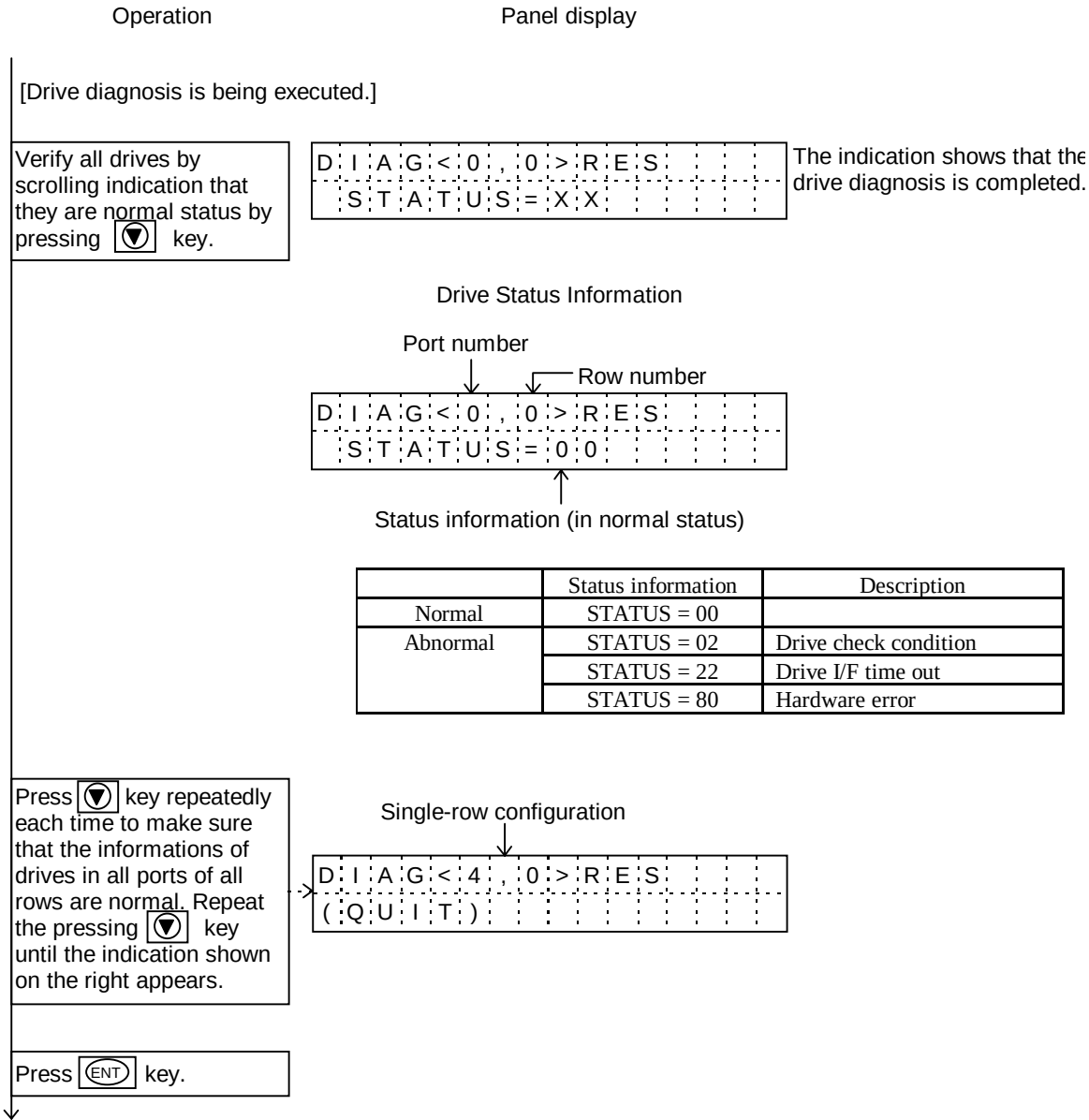
See Chapter “Setting the Subsystem Parameter” in RW-INST0290.

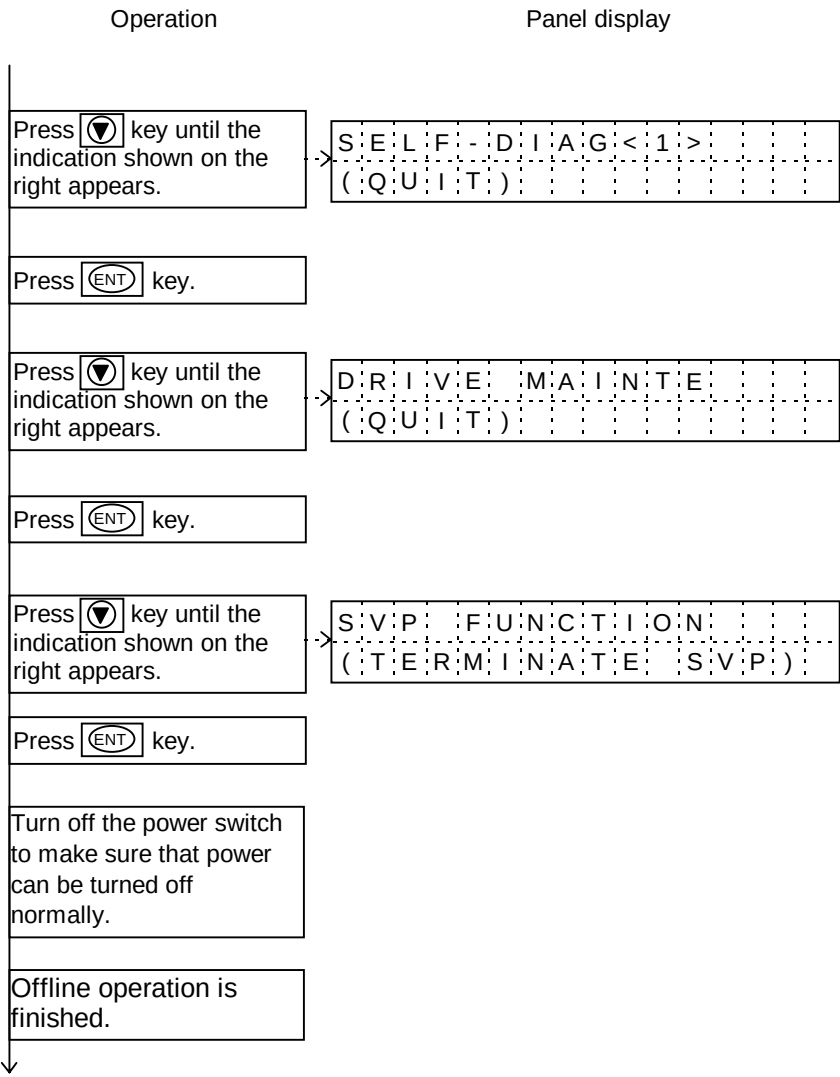
3.5 Checking the Offline Operation

After opening the front cover, execute the drive diagnosis using the Panel display and the ten key as instructed below, and make sure that the diagnosis is completed normally on each of all drives.

① Operate as described below.





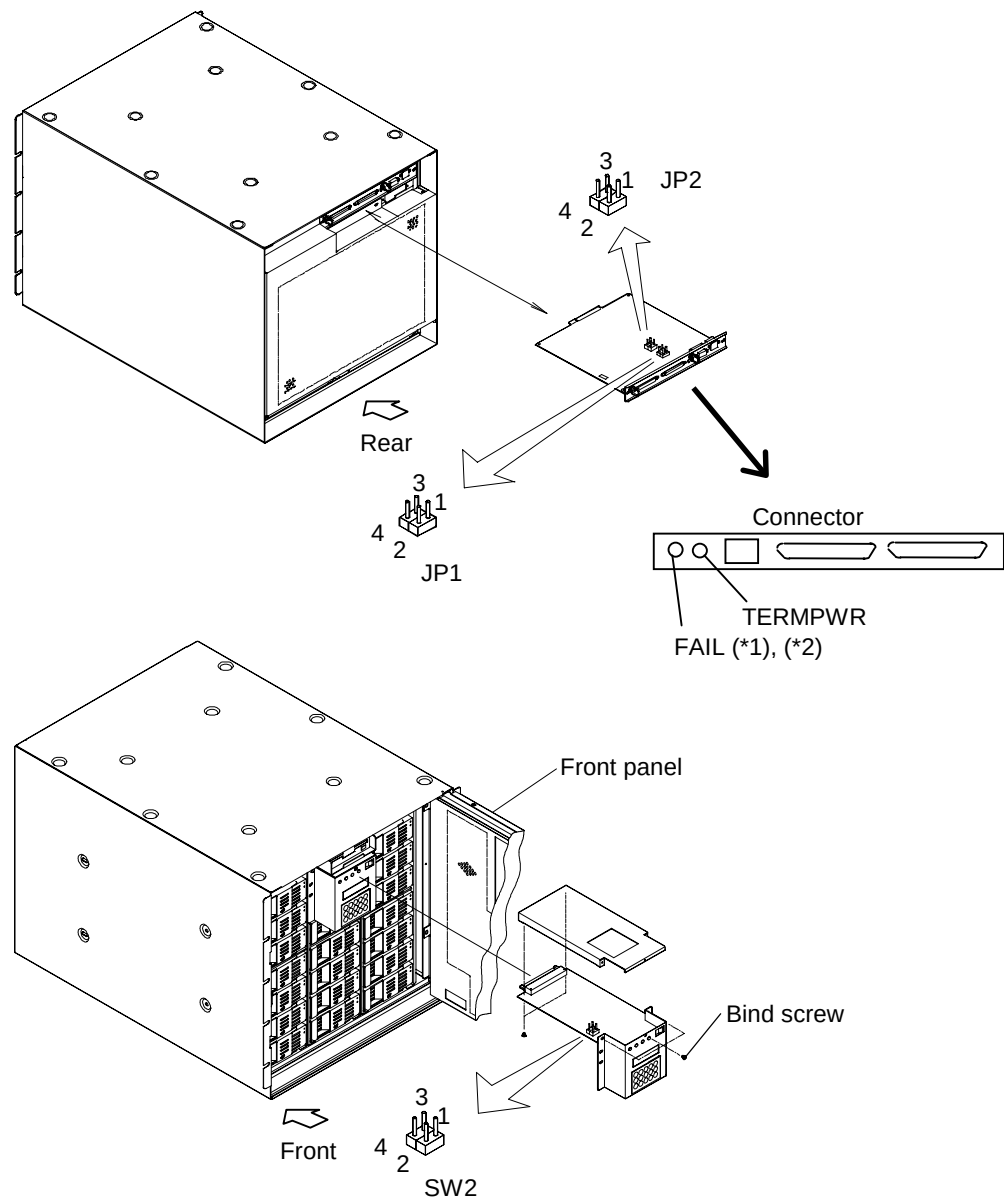


3.6 Setting the Terminator Power and Remote/Local Mode

Switching the power of DF350 can be controlled by Host system (Remote Control) under the mode of terminator power is supplied by SCSI bus. Switching the mode of Remote/Local is carried out by jumper setting of SW4 on SVP panel and JP1 of terminator power setting.

Note : While connecting to RS6000 model 220/230, terminator power should be supplied from outside (Local mode). Switching the power by the host system cannot be carried out. When the host is not connected or powered off, the data recovery with the maintenance panel, nor the formatting the array cannot be carried out.

- (1) Perform destaging (See ENTRY0040) and make sure that it is not in the cache back-up state. Turn off both main switch on the panel and the breaker at the rear side of the unit.
- (2) Remove terminator resistor from I/F ADAPTER ASSY.
- (3) Open the front panel.
- (4) Pull out the SVP ASSY and I/F ADAPTER ASSY.
- (5) Set the JP1 and SW2 according to Figure 3.6.1 and Table 3.6.1. (Set JP2 (equipped on I/F ADAPTER ASSY for only Wide SCSI like DRWDS or DRWSS) with the pins 1 and 2 short-circuited.)
- (6) After setting the terminator power, insert the I/F ADAPTER ASSY and tighten the bind screw. And insert the SVP ASSY.
- (7) Fix terminator resistor to I/F ADAPTER ASSY.
- (8) Close front panel and turn "On" the breaker.

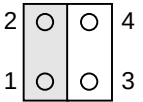
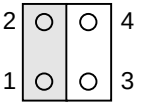
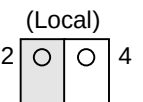
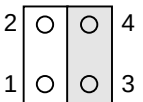
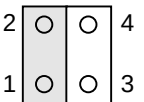
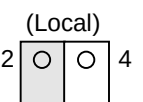
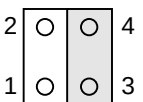
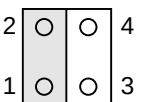
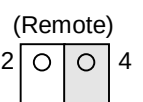
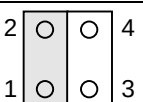
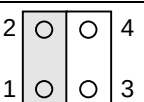
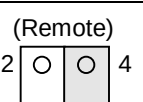


LED Name	Color	ON	OFF	Remark
TERMPWR	Green	Terminator power supplied.	Terminator power is not supplied.	—
FAIL	Red	Single ended signal is connected to Differential I/F card. (Failure)	Differential signal is connected.	(*1) Only mounted on Differential I/F card.

*2 This LED is valid only when all the devices connected to SCSI I/F are powered on. When one of the devices is not powered on, sometimes this LED is lit up.

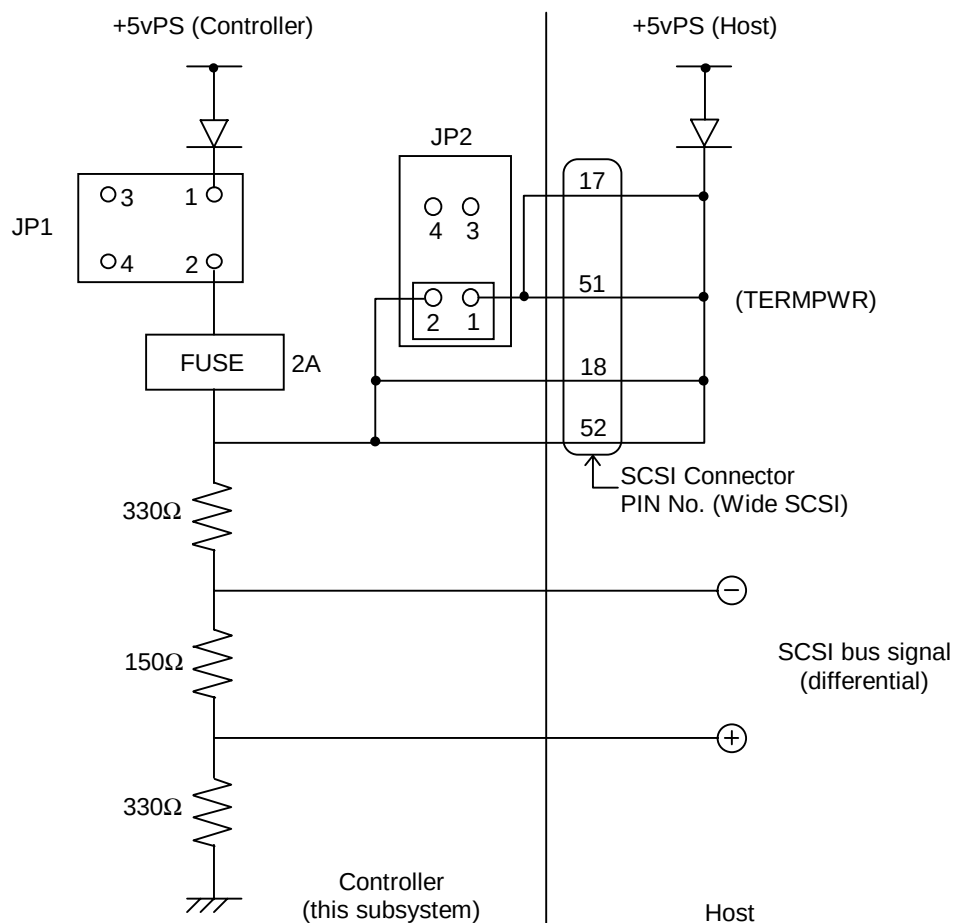
Figure 3.6.1 Setting the Terminator Power and Remote/Local Mode

Table 3.6.1 Setting the Terminator Power and Remote/Local Mode (*1)

No.	Jumper Setting			Function
	JP1 Terminator Power	JP2 (*2)	SW2 Remote/Local Mode	
1			(Local) 	Terminator power +5VPS is supplied from the array controller and host computer. (Set at factory before shipment)
2			(Local) 	The combination can not be set.
3			(Remote) 	Terminator power +5VPS is supplied only from the power source of the host computer.
4			(Remote) 	The combination can not be set.

*1 The terminator power means that the power for the terminator is supplied from the host so that the SCSI bus is not shut down by a power failure of the subsystem.

*2 Set this jumper (JP2) with the pins 1 and 2 short circuited.



3.7 Connecting the SCSI Cable

Connect the SCSI cables after confirming the controller number indicated on the label.

Note 1 : When the controller is used in a dual configuration, connect the cables to the connectors corresponding to the host to be connected. (See Figure 3.7.2.)

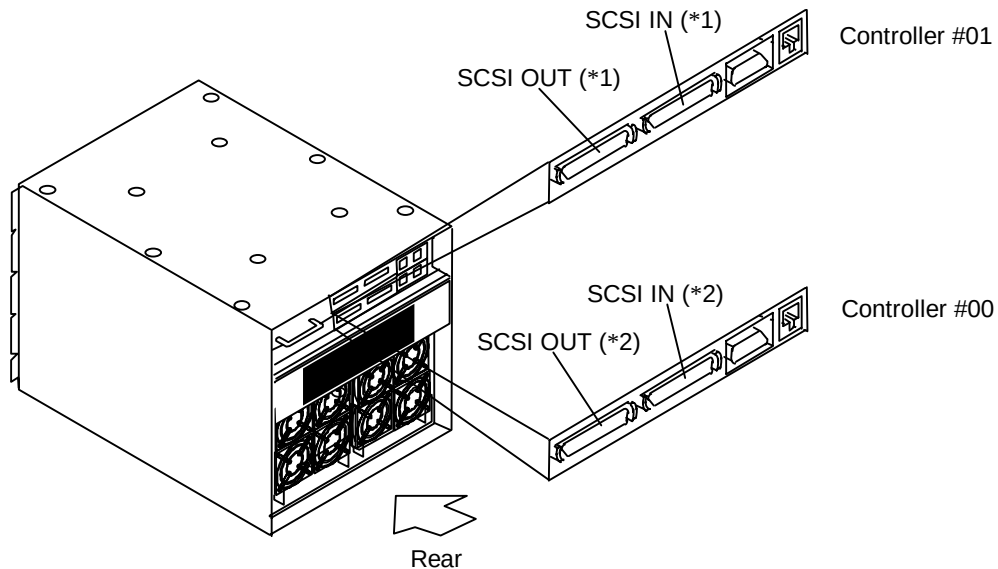


Figure 3.7.1 SCSI Connector Layout

SCSI IN : Connects the SCSI cable from the host or from the SCSI OUT of the other SCSI unit.

SCSI OUT: Connects the SCSI cable to the terminator resistor or the other SCSI unit.

Note 2 : The opposite combination of SCSI OUT and SCSI IN (left side : SCSI IN, right side : SCSI OUT) can also be used.

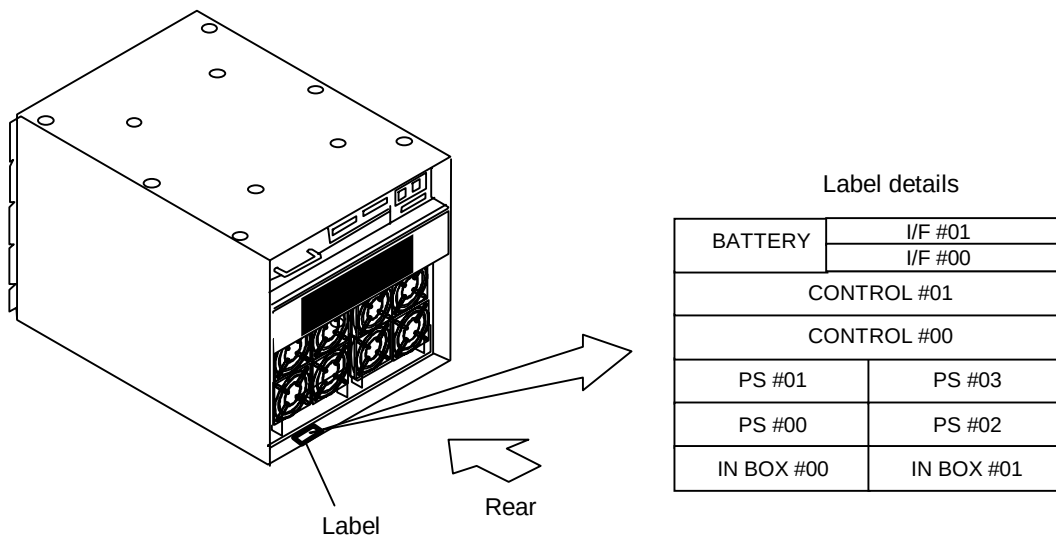


Figure 3.7.2 Label Layout

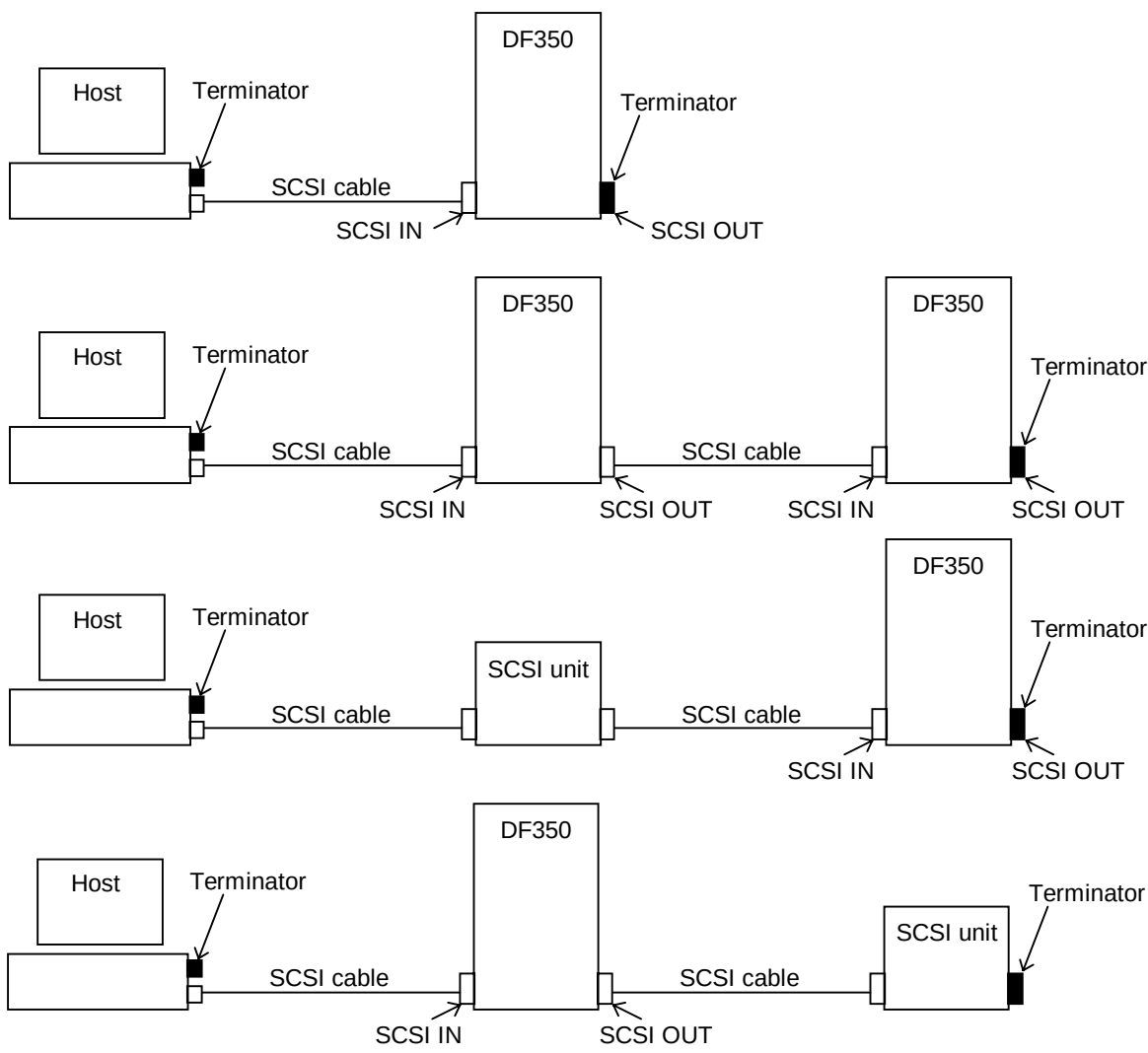


Figure 3.7.3 SCSI Connections

4. Setting the Subsystem Parameter

4.1 Setting the System Parameter

(1) Setting the system parameters and downloading

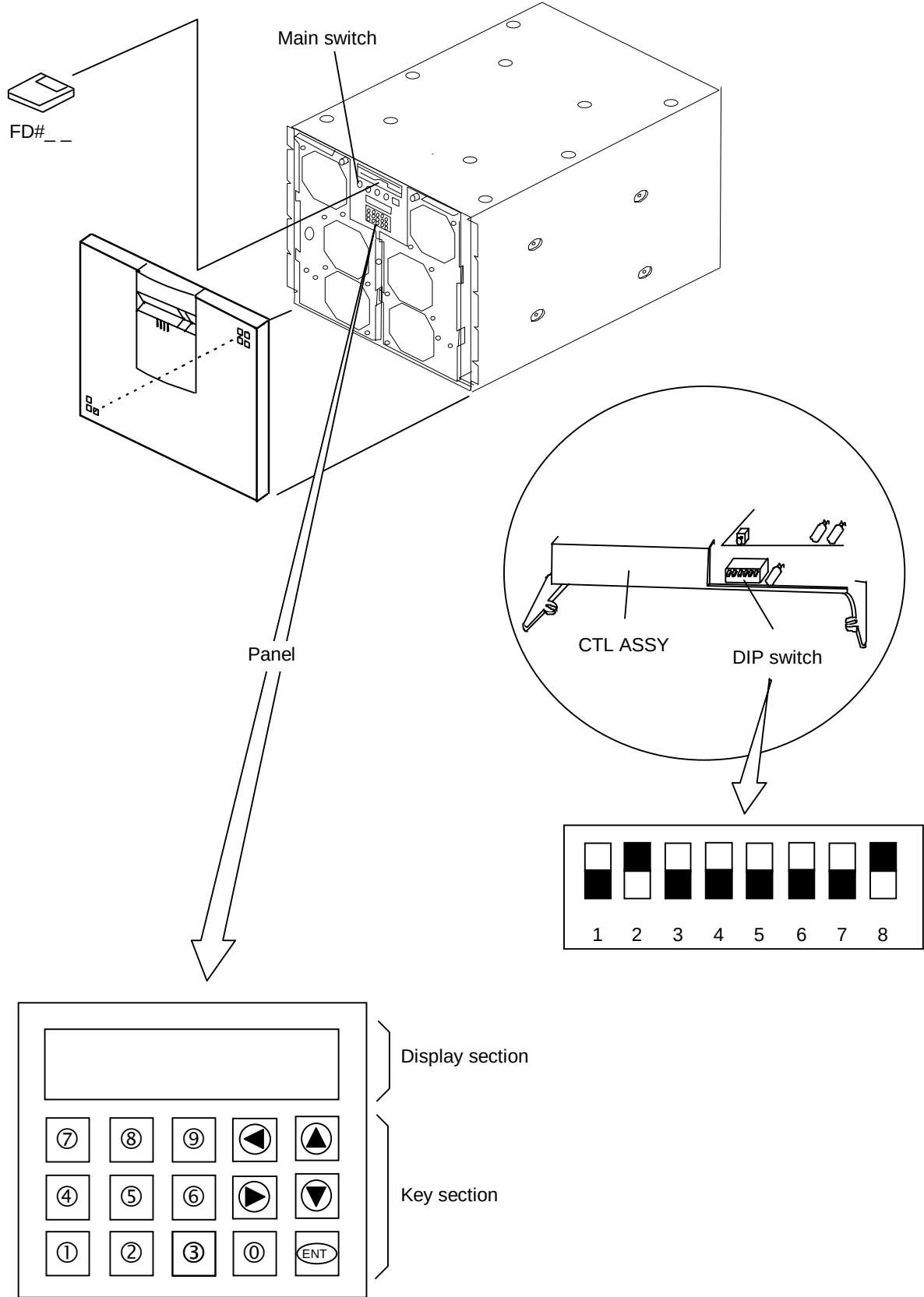
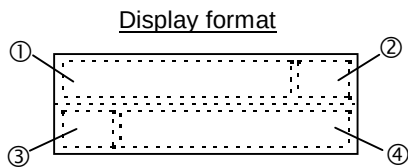


Figure 4.1.1 DIP Switches (System parameter is Set)

(1) Display

While setting up DIPSWITCH or SVP FUNCTION, menu etc. are displayed at panel display in the following display format .



① Menu title

There are two kinds of menu title described below.

DIPSWITCH SET:

For setting the target ID, buzzer, etc.

SVP FUNCTION:

For the operations other than described above.

② Warning

A hatch mark “#” indicates that a message has occurred in the host command processing during panel operation.

③ Current setting

An asterisk “*” indicates the item currently set.

④ Menu item/parameter value

This indicates the menu item or the parameter value entered from the panel.

One display is provided for the two controllers. You can determine which of the two controllers displayed the message as follows.

Message from the controller No. 0: The first (left most) character is in uppercase.

Message from the controller No. 1: The first (left most) character is in lowercase.

Example) Controller No. 0: DIPSWITCH SET

Controller No. 1: dIPSWITCH SET

For the dual controllers, the message with the display format 1 and the menu title with the display format 2 are displayed as indicated above. (For the panel operation messages, the first (left most) character is always in uppercase regardless of the controller No.)

For the single controller, the first (left most) character is always in uppercase.

(2) Keys

Use the - keys for panel operation.



Used for entering the parameter values.



Used for determining the menu or the input parameter.

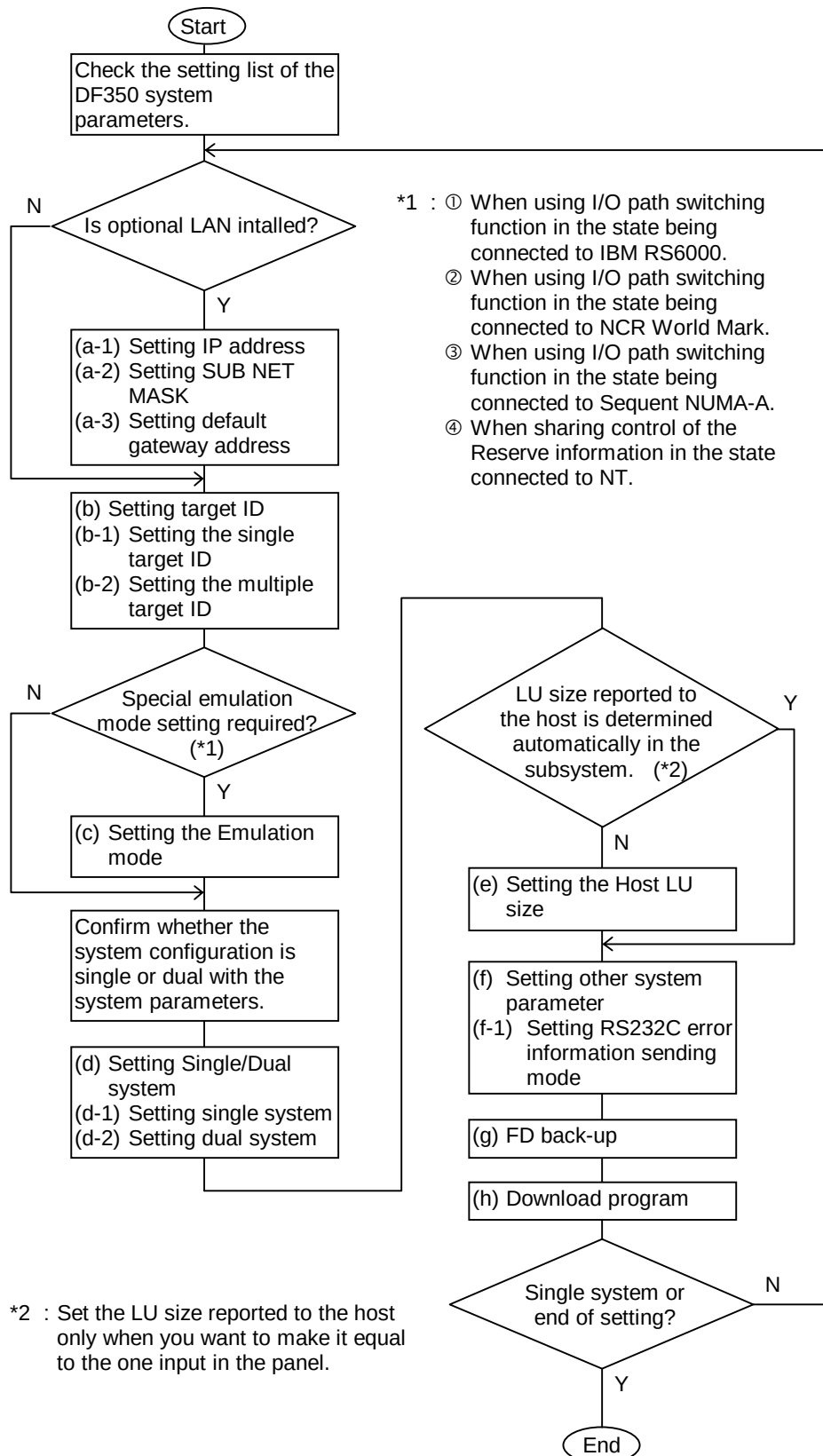


Used for determining the parameter input position.



Used for selecting the menu.

Operate as the flow described below.



Operate as described below.

(1) Before powering on the subsystem, set DIP switches shown in Figure 4.1.2.

In case of Dual Contoroller system (installed DF-F350-F2WCF) , set DIP switches of both contorollers.

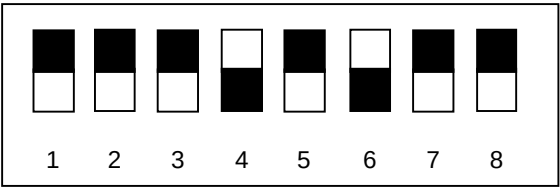
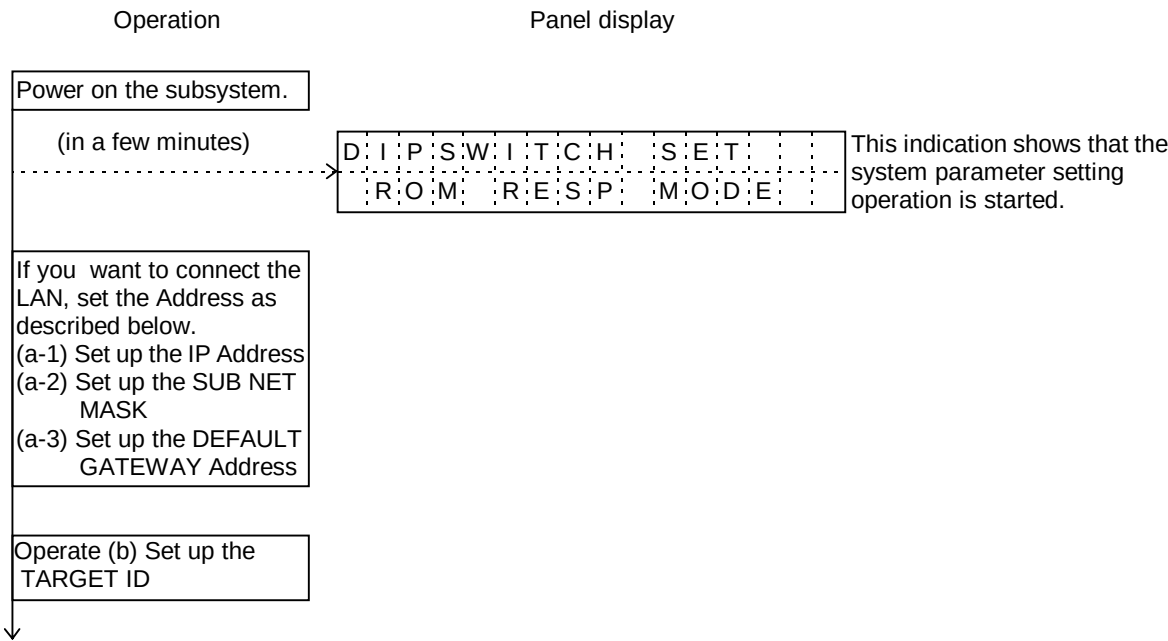
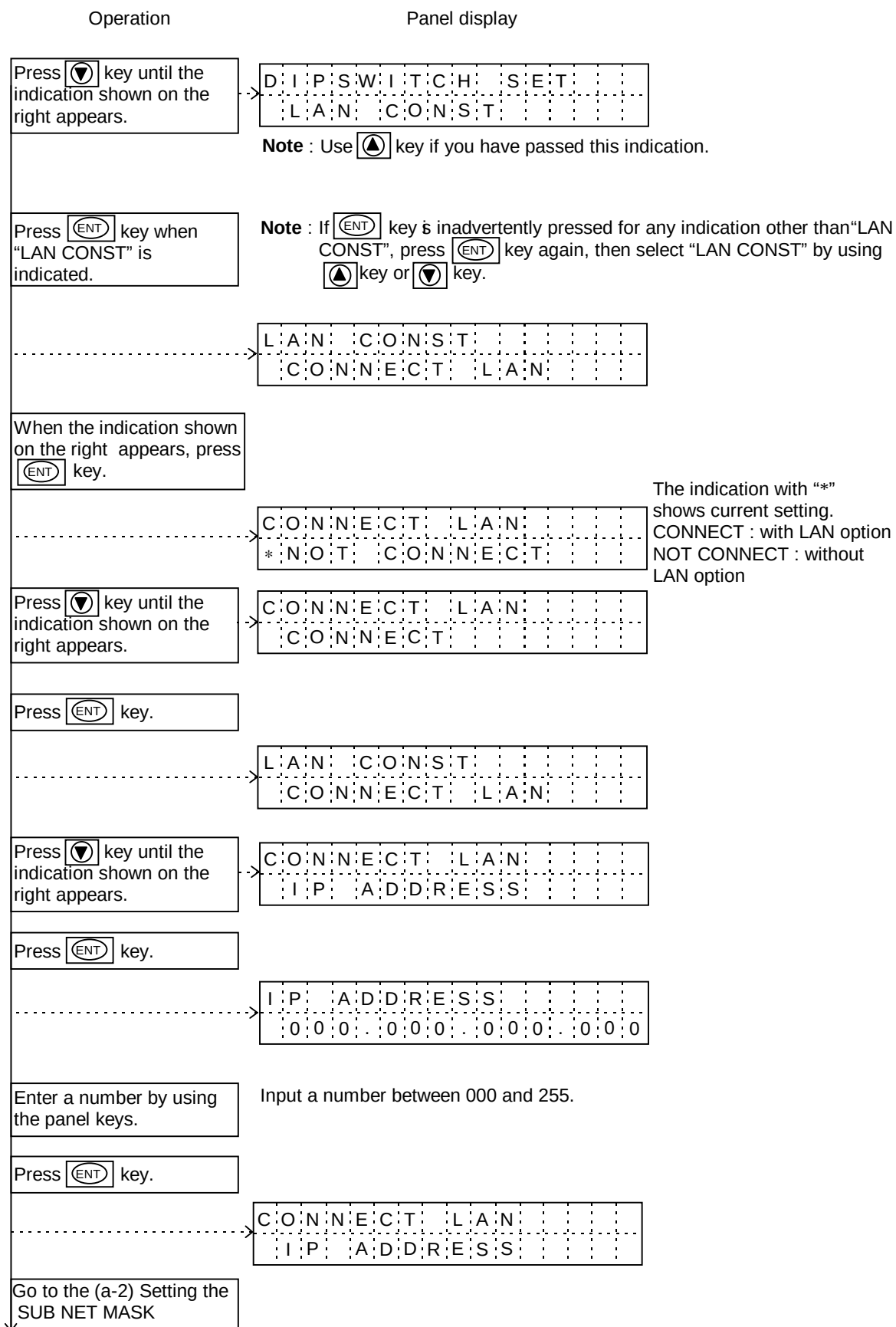


Figure 4.1.2 DIP switches (For setting the system parameter)

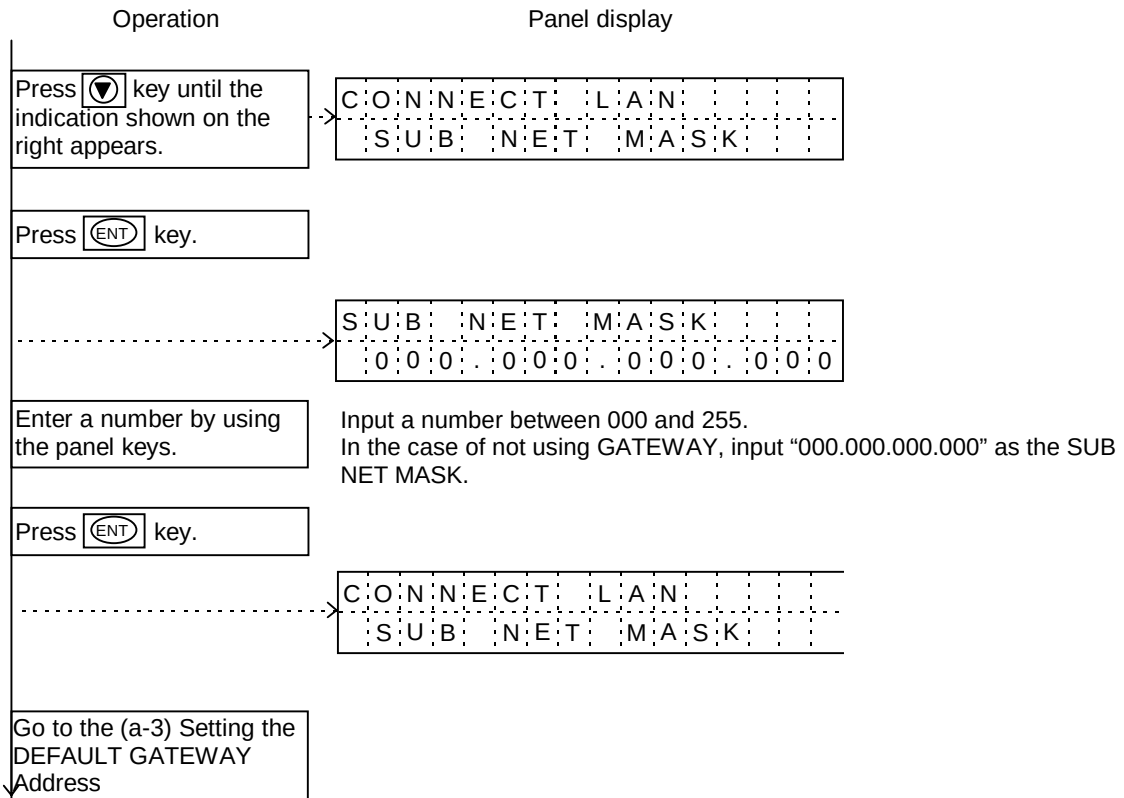
(2) Operate panel's keys as described below.



(a-1) Setting the IP address.



(a-2) Setting the SUB NET MASK

***Note**

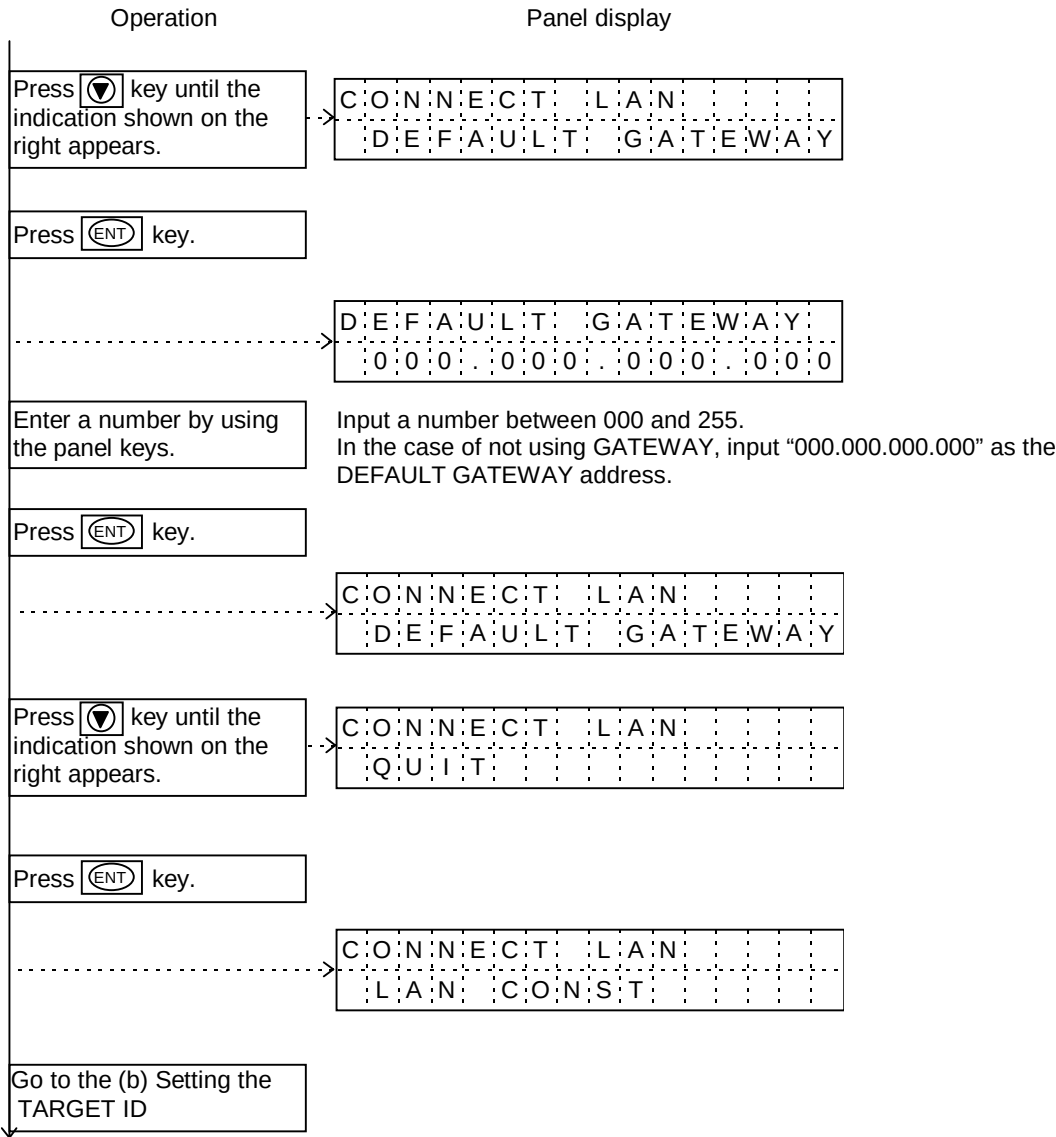
If "000.000.000.000" as the SUB NET MASK is set, this subsystem automatically adopts default SUB NET MASK for each IP address as described in the table 4.1.1.

Table 4.1.1 Default SUB NET MASK related with IP address

No.	IP Address of the subsystem	DEFAULT SUB NET MASK
1	from 000.000.000.000 to 127.255.255.255	255.000.000.000
2	from 128.000.000.000 to 191.255.255.255	255.255.000.000
3	others	255.255.255.000

If a smaller SUB NET MASK than default number is entered, this subsystem adopts default number.

(a-3) Setting the DEFAULT GATEWAY address



***Note**

If an invalid GATEWAY address is set (the IP address of the device is different from network address.), either of warning messages as shown below is displayed until the READY LED of the subsystem lights on.

Power off the subsystem and set IP address and default GATEWAY address correctly.

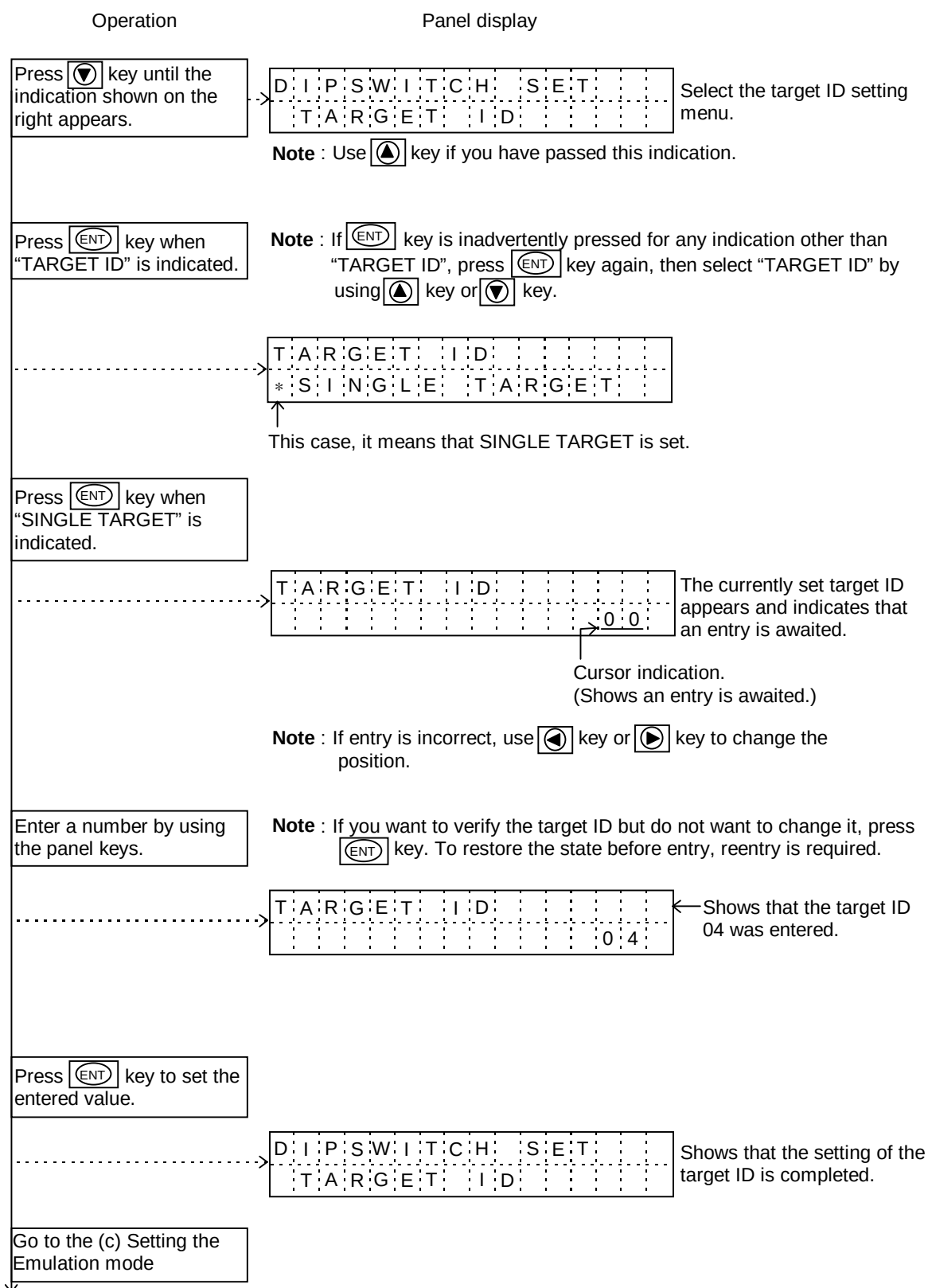
W	0	1	7	0	0	G	A	D	E	R	R		
				.		.		.					

W	0	1	7	0	0	G	A	D	E	R	R	-	X
				.		.		.					

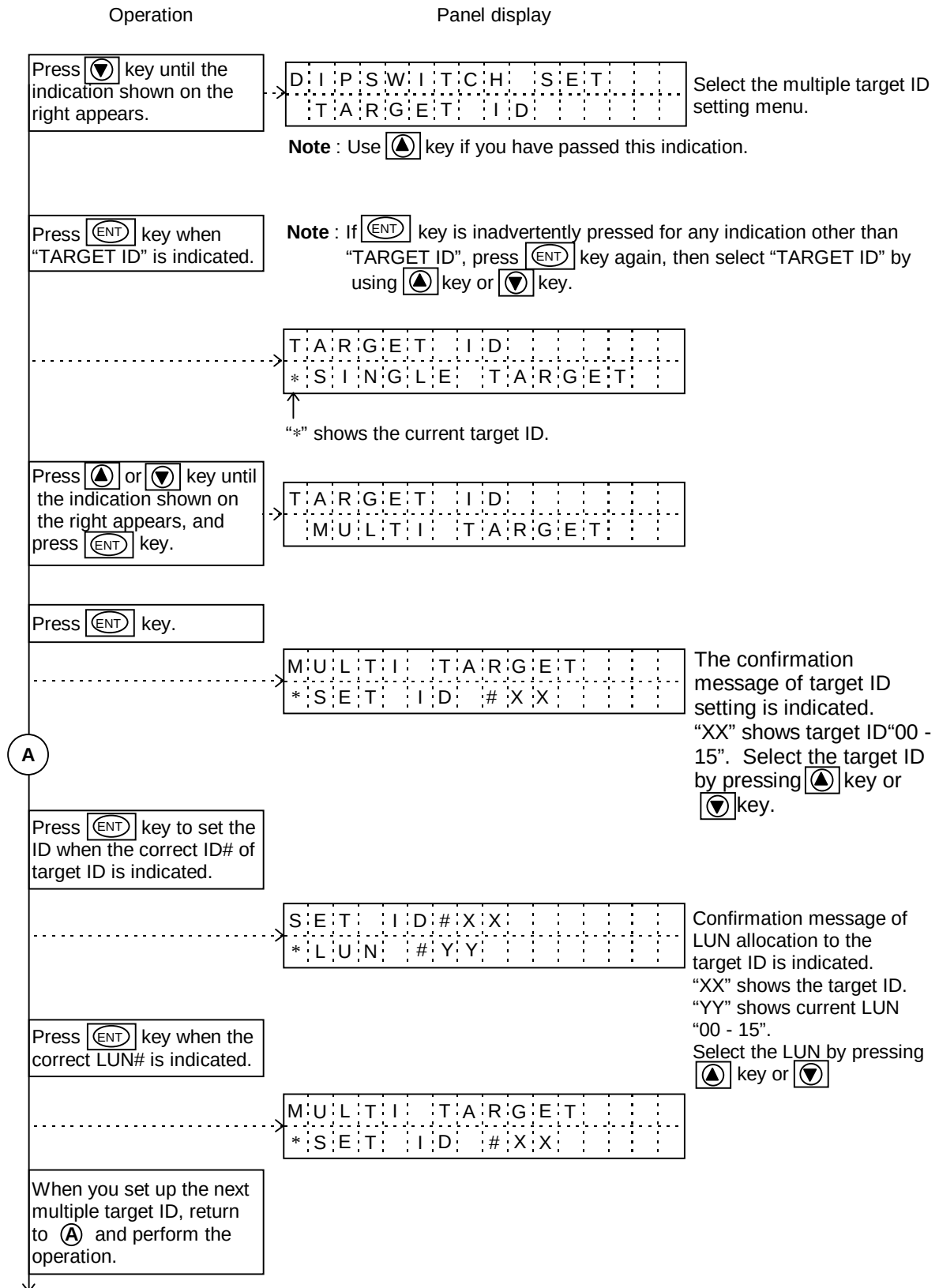
X : controllers No.

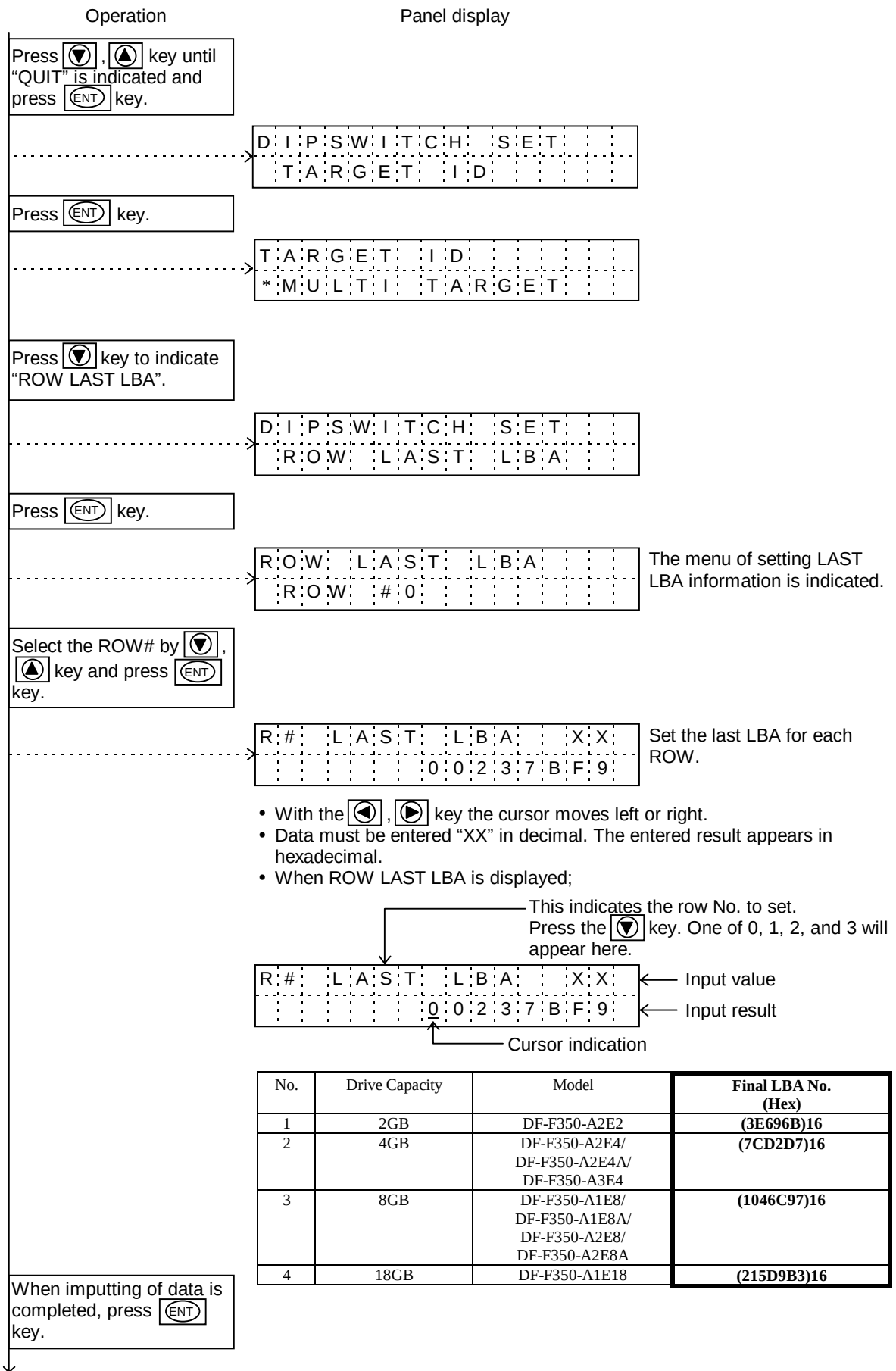
(b) Setting the TARGET ID.

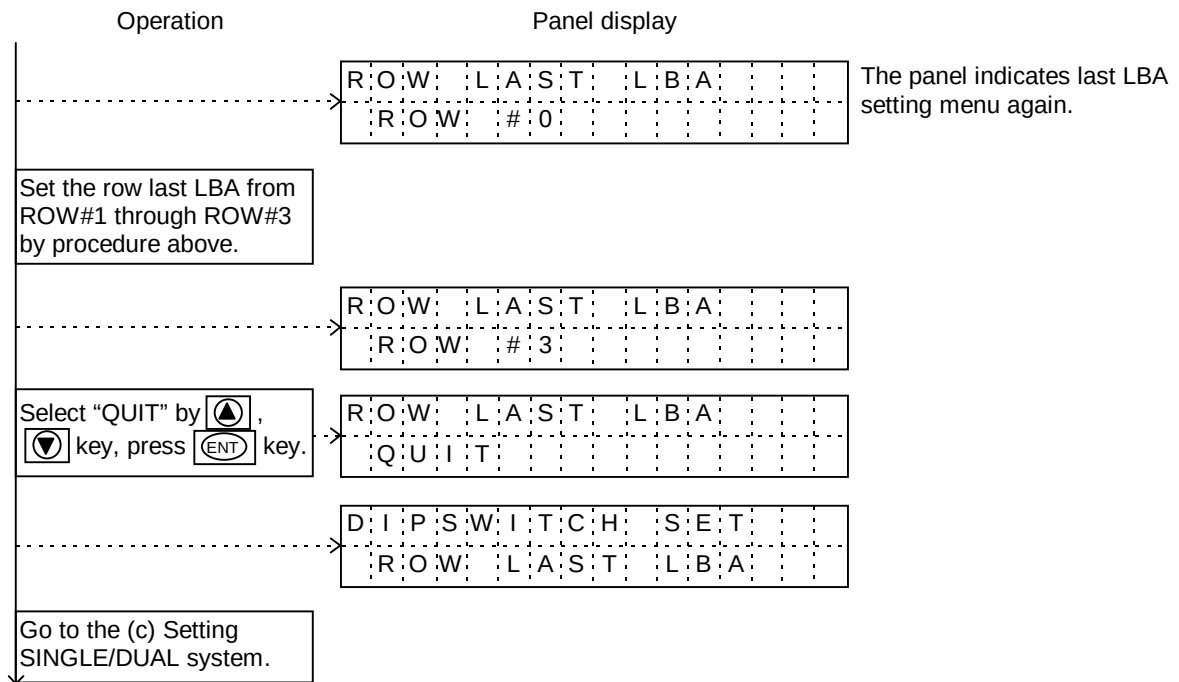
(b-1) Setting the single target ID.



(b-2) Setting the multiple target ID.

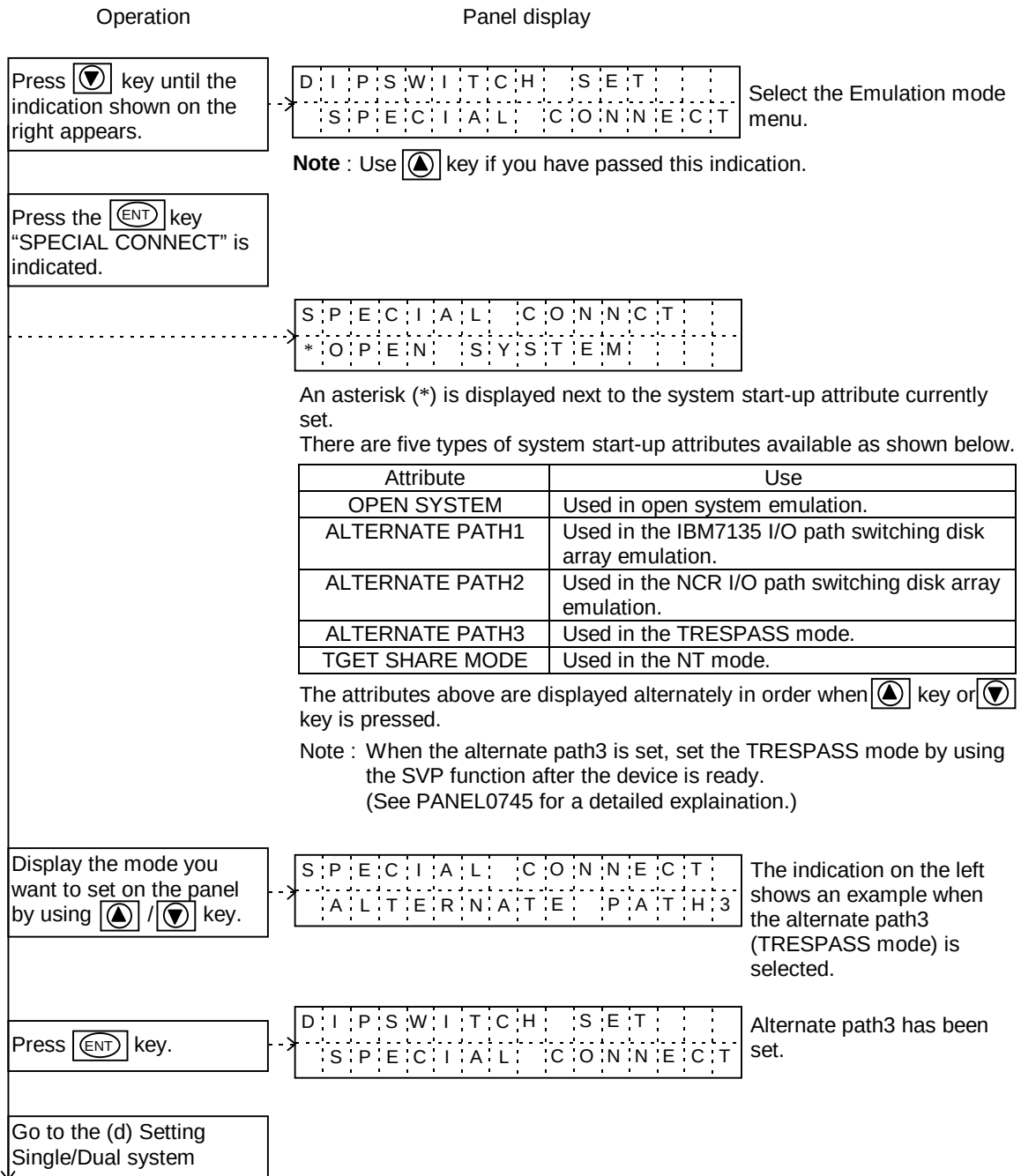






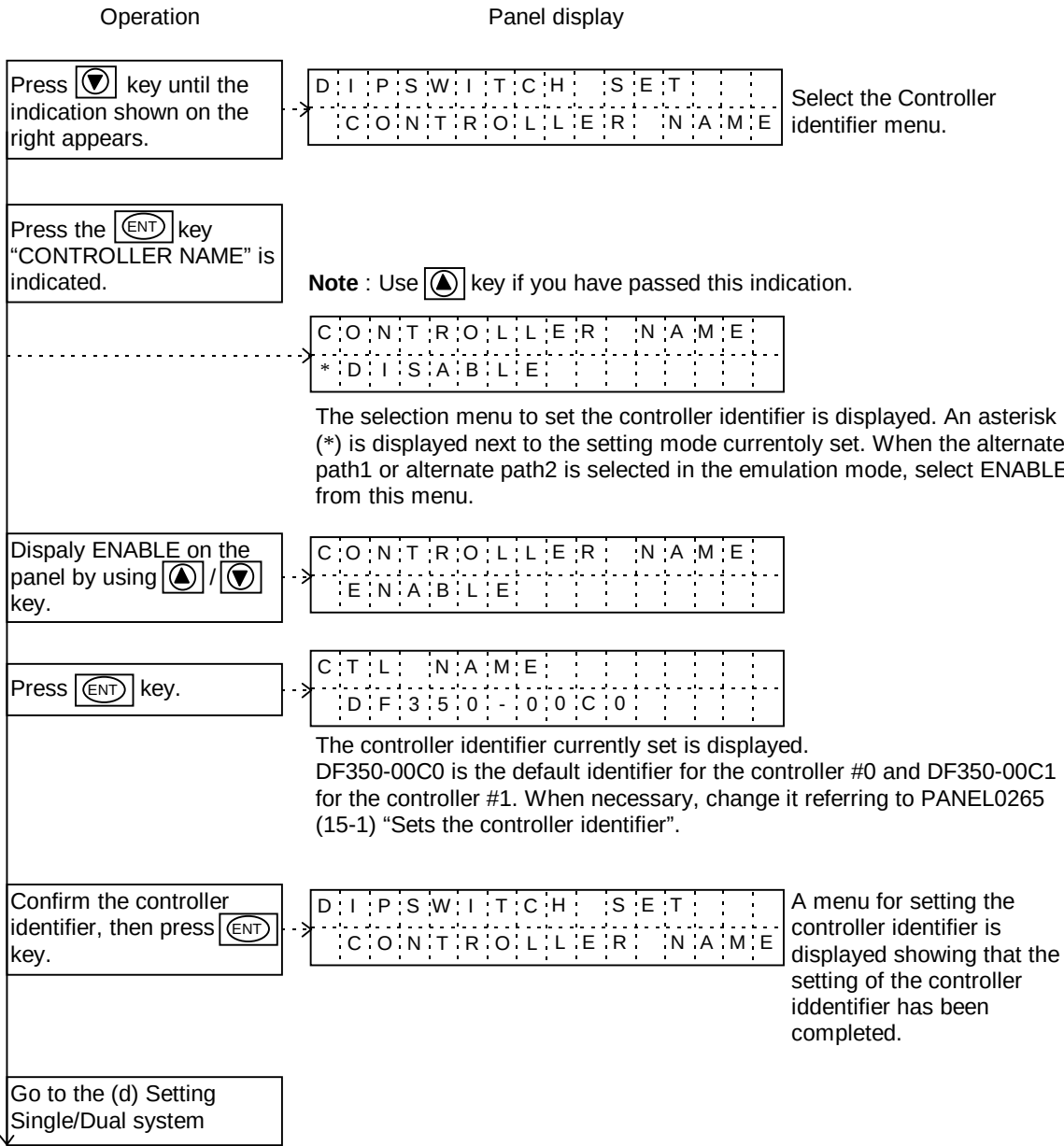
- Note)** * Setting and changing of multi target ID make the relation between the target ID and the LUN only.
 The defining and formatting LU can be executed both after and before this operation.
- * If this operation is finished, turn off the power and turn on the power again.
 - * Resetting of SINGLE TARGET ID is required when returning to SINGLE TARGET function after switching to MULTI TARGET function from previous SINGLE TARGET function.
 - * If you want to set the multi target ID when the LU is already set, the LUN can be set to any number from #00 to #07. If you want to set any number from #00 to #15 to LUN, set the multi target ID after deleting the LU.
 - * The multi target ID must be set for each controller. In case of dual controller system and MULTI TARGET IDs are set for the both controller, set MULTI TARGET ID for each controller.

(c) Setting the Emulation mode

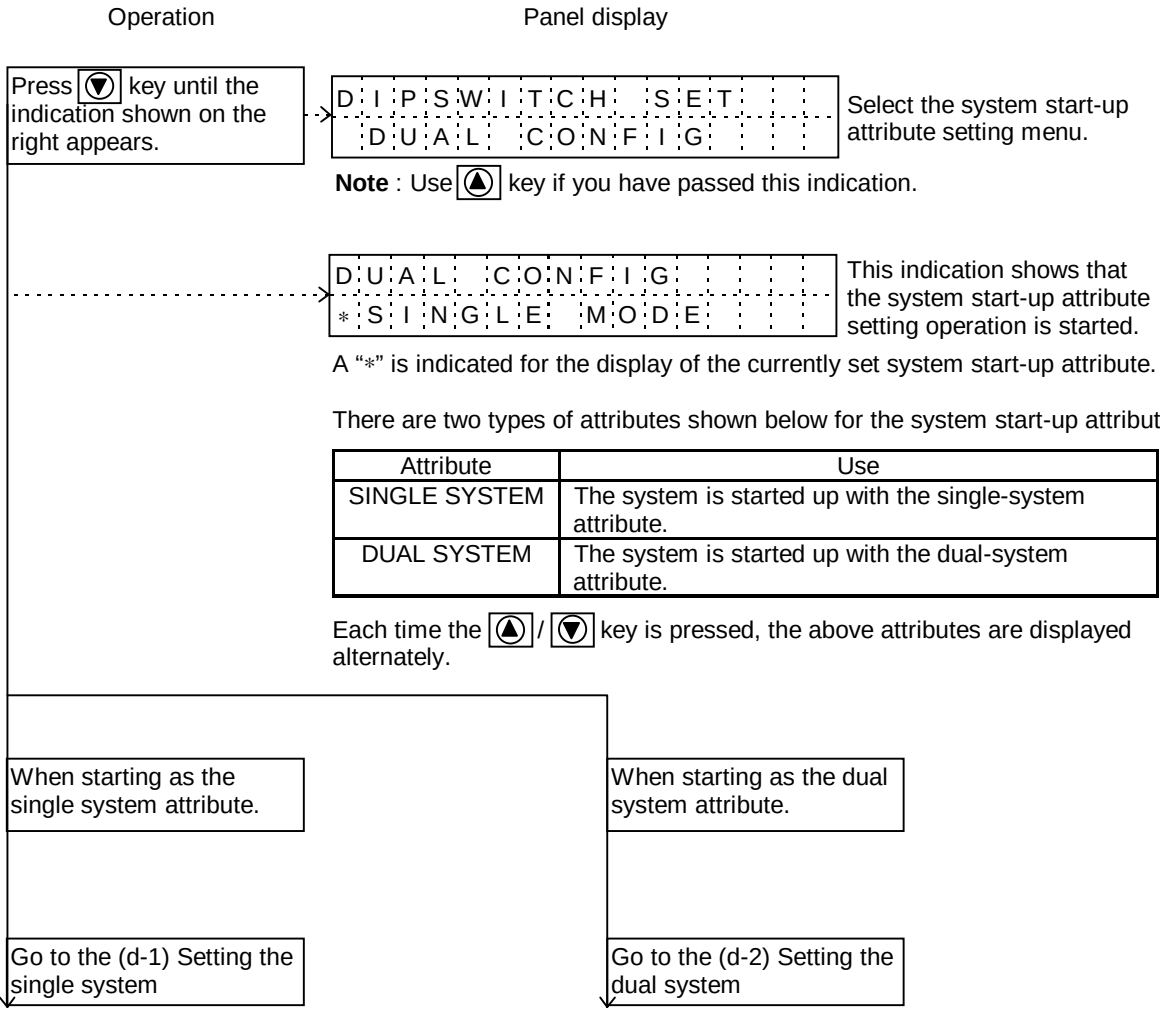


When the alternate path1 or alternate path2 is selected, set the controller name, product type. (See RW-INST0387.)

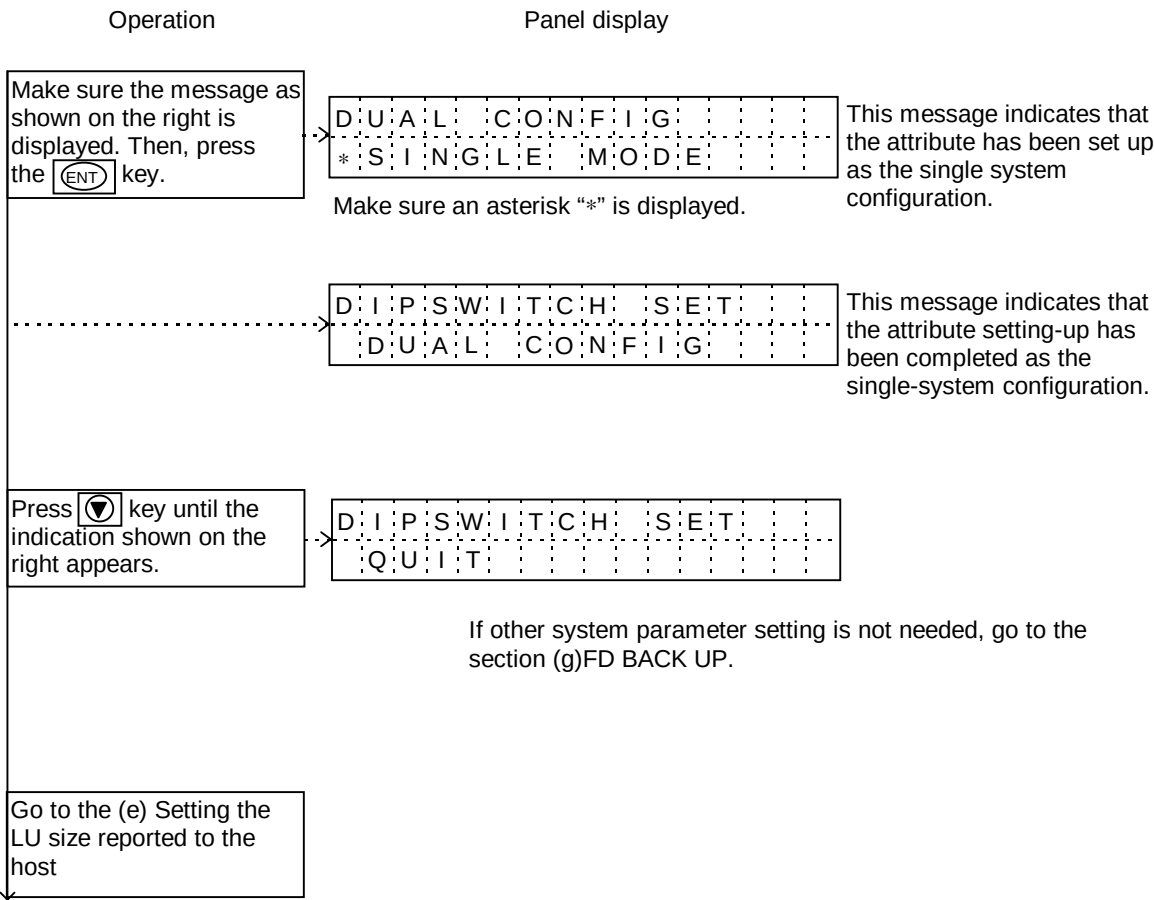
When the alternate path3 is selected, go to the single/dual system setting.



(d) Setting Single/Dual system



(d-1) Setting the single system



(d-2) Setting the dual system

There are five operating modes available as shown in Table 4.1.2.

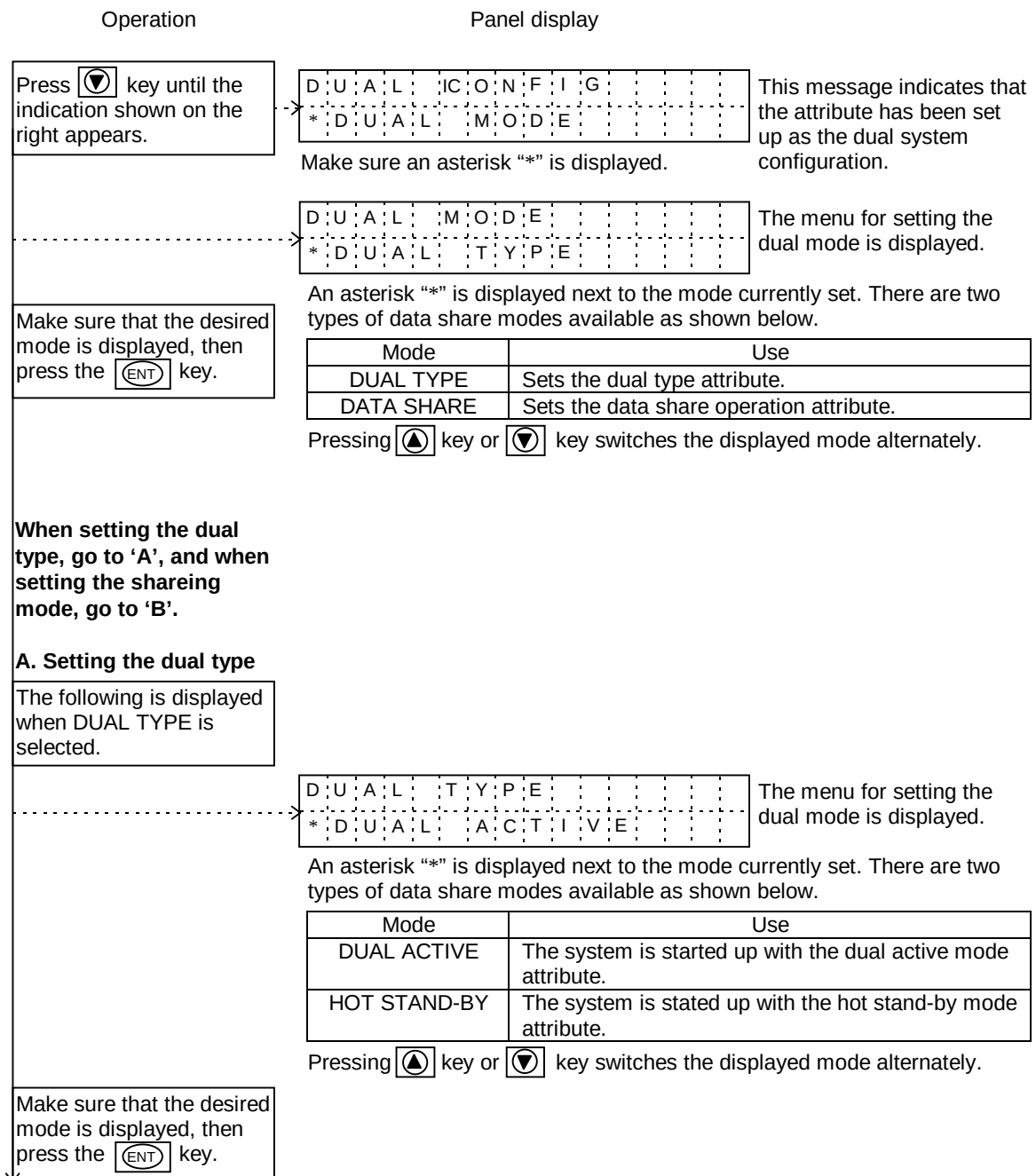
To validate each mode, panel setting shown in the Table 4.1.2 is required.

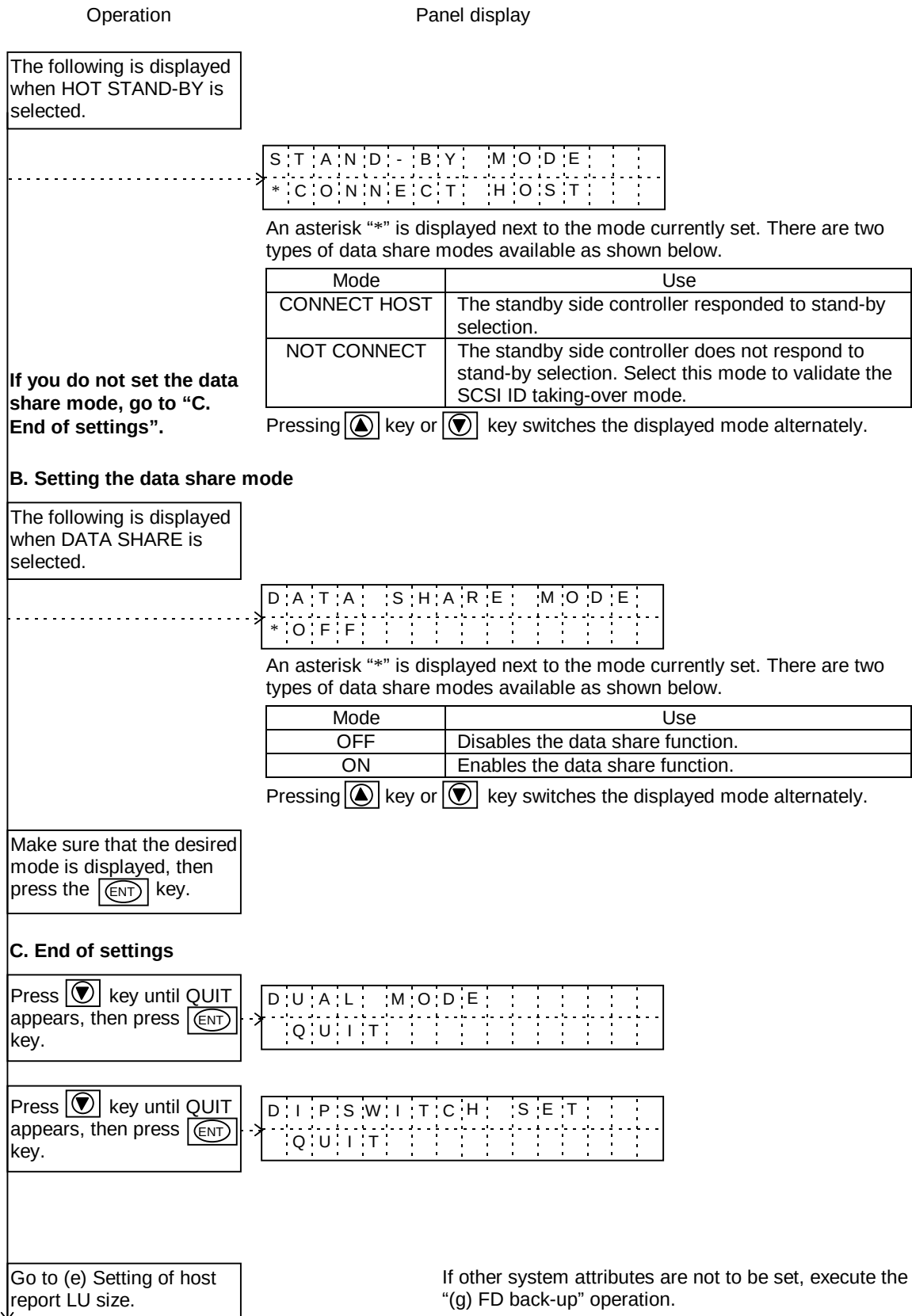
Perform the operations instructed in item (C-2) and succeeding items referring to the Table 4.1.2.

Table 4.1.2 Active mode and panel setting (Dual system configuration)

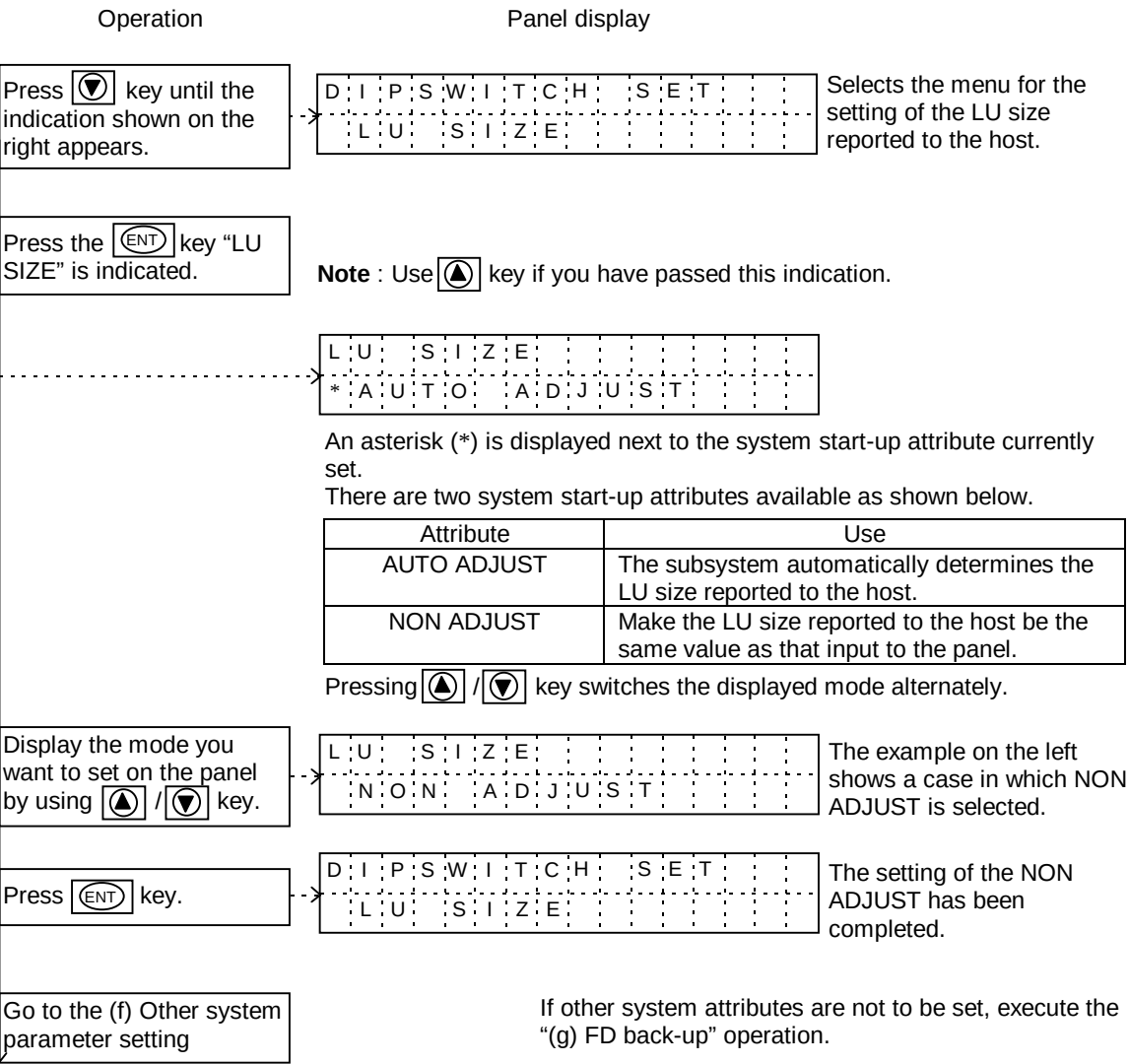
Active mode		Panel set		
HOT STAND-BY	Normal	DUAL TYPE	STAND-BY MODE	DATA SHARE MODE
	Data share (*1)	HOT STAND-BY	CONNECT HOST	OFF
	SCSI ID taking over		NOT CONNECT	ON
DUAL ACTIVE	Normal	DUAL ACTIVE	Invalid	OFF
	Data share (*1)			ON

*1 : This function can be used in Micro_disk_Ver.304 or later.





(e) Setting the LU size reported to the host



(f) Other System Parameter Setting

Besides (a) Setting the IP address, (b) Setting the TARGET ID, and (c) Setting SINGLE/DUAL system, there are several setting functions as below. The setting at the factory shipment is shown on the table in the addendum to the device.

To change the setting, see "PANEL0080".

The menu items and their usage are as follows.

(The item Nos. 1, 2, 4, 5, 8, 10, 13, 20, and 22 in the following table must be set for each controller.)

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
1	ROM RESP MODE	Specifies the host response mode between power on and controller ready status.	BUSY : Responds "BUSY". NOT READY : Responds "Not Ready".	Select	BUSY
2	WRITE & VERIFY	Specifies the write and verify execution mode.	ON : Does not inhibit the write and verify execution mode. OFF : Inhibits the write and verify execution mode.	Select	ON
3	STRIPE SIZE	Specifies the data striping size.	16KB : Stripes the data in 16kbytes. 32KB : Stripes the data in 32kbytes. 64KB : Stripes the data in 64kbytes.	Select	64KB
4	LAN CONST	Specifies the LAN configuration information. ① CONNECT LAN Specifies whether or not the LAN board is mounted.	CONNECT : LAN board is mounted. NOT CONNECT : LAN board is not mounted.	Select	Depending on the configuration from the factory
		② IP ADDRESS Sets the IP address.	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		③ SUB NET MASK	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		④ DEFAULT GATEWAY	Enters the numerical value using the panel keypad.	Enter	000.000.000.000
		⑤ ETHER ADDRESS (*1)	Enters the numerical value using the panel keypad.	Only for reference	???????????
5	TARGET ID	Sets the target (this controller) ID.	SINGLE TARGET : Sets the single target ID. MULTI TARGET : Sets the multiple target IDs.	Enter	SINGLE TARGET 00
6	CONNECT AS/400	Specifies whether or not the AS/400 is connected.	CONNECT AS/400 : Connects the AS/400 NOT CONNECT : Does not connect the AS/400.	Select	NOT CONNECT
7	CONNECT VMS	Specifies whether or not the VMS is connected.	CONNECT : Connects the VMS. NOT CONNECT : Does not connect the VMS.	Select	NOT CONNECT
8	SPECIAL CONNECT (*2)	Specifies the emulation mode.	OPEN SYSTEM : Open system emulation mode ALTERNATE PATH1 : IBM7135 I/O path switch emulation mode ALTERNATE PATH2 : NCR I/O path switch emulation mode ALTERNATE PATH3 : TRESPASS mode TGSET SHARE MODE : NT mode	Select	OPEN SYSTEM

*1 Changing the ETHER ADDRESS with this menu is impossible after shipment.

*2 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
9	SAVE DATA PTR	Specifies whether or not the Save Data Pointer requires to be reported to the host.	NOTHING : Does not report to the host. AFTER DATA & CMD : Reports after reception of data and command. ONLY AFTER DATA : Reports after transferring data. ONLY AFTER CMD : Reports after reception of command.	Select	NOTHING
10	HOST BLK SIZE	Specifies the drive format size.	512B : The drive format size is 512bytes per block. 520B : The drive format size is 520bytes per block. 1024B : The drive format size is 1024bytes per (*3) block.	Select	512B
11	ERROR INF	Specifies the error information send mode for the RS232C.	OFF : Inhibit outflow of information. ON (NORMAL) : Does not inhibit outflow of information. ON (HITRACK) : Does not inhibit outflow of information for the HITRACK.	Select	Depending on the unit's factory setting (OFF for Japan)
12	CONTROLLER	Specifies the controller type.	DESKTOP : Desktop (DK) MINI TOWER, DKH : Mini tower (MK), Desktop (DKH) RACK MOUNT : Rackmount (RK) HIGH RACK MOUNT : Rackmount (RKH) CABINET, WRACK : Cabinet type (CK), Rackmount (RKWH)	Select	Depending on the configuration from the factory
13	SPARE DISK	Specifies whether or not the spare disk is mounted.	EXISTENCE : Spare disk mounted NOTHING : Spare disk not mounted	Select	Depending on the configuration from the factory
14	SERIAL NO	Specifies the serial No. of the controller.	Enters the numerical value using the panel keypad.	Enter	
15	ROM V/R	Specifies the ROM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
16	RAM V/R	Specifies the RAM microprogram revision.	Enters the numerical value using the panel keypad.	Enter	Revision from the factory
17	CONTROLLER NAME (*4)	Sets the controller identifier.	DISABLE : Setting of the controller identifier is invalid. ENABLE : Setting of the controller identifier is valid. CTL NAME : Controller identifier.	Select	DISABLE
18	ROW LAST LBA (*3)	Specifies the capacity that a single drive uses (for each ROW).	Enters the numerical value using the panel keypad.	Enter	Depending on the configuration from the factory
19	BUZZER	Specifies whether or not the buzzer sounds when displaying the warning or fault message.	ENABLE : Buzzer sounds. DISABLE : Buzzer does not sound.	Select	ENABLE
20	SYSTEM ERROR	Specifies the operation if the processor failure occurs.	AUTO RESET : Resets a fault. SYSTEM DOWN : Shutdown the system.	Select	AUTO RESET

*3 The ROW LAST LBA is displayed for setting the capacity that a single drive uses. Sets the capacity according to the menu displayed.

*4 This menu can be used in the Flush Program Ver.PB24 and later.

No.	Menu item	Usage	Contents		Factory setting
			Parameter	How to set	
21	GENERATE SYS (*5)	Specifies the loading method for the new/old microprogram.	NEW SYSTEM : Loads the new microprogram. OLD SYSTEM : Loads the old microprogram.	Select	NEW SYSTEM
22	INQUIRY INF	Specifies the vendor name, model name, and command queuing.	VENDER TYPE : Vendor name PRODUCT TYPE : Model name COMMAND QUEUING : Command queuing ON : Executes the command queuing. OFF : Inhibits the command queuing.	Enter Enter Select	VENDER TYPE = HITACHI PRODUCT TYPE = DF350 COMMAND QUEUING = ON
23	DUAL CONFIG	Specifies the system startup attribute.	SINGLE MODE : Single configuration DUAL MODE : Dual configuration DUAL TYPE : Dual system attribute DUAL ACTIVE : Dual stand-by configuration setting HOT STAND-BY : Hot stand-by configuration setting CONNECT HOST : The SCSI ID taking-over is not executed NOT CONNECT : The SCSI ID taking-over is executed DATA SHARE MODE : Data share mode attribute (*7) OFF : Not used in the Data share mode ON : Used in the Data share mode	Select	Depending on the configuration from the factory
24	LU SIZE (*6)	Sets the LU size reported to the host.	AUTO ADJUST : The LU size reported to the host is automatically determined by the subsystem. NON ADJUST : The LU size reported to the host is a multiple of 1024 bytes.	Select	AUTO EXTEND
25	SYNC CONTROL	Sets the transfer rate control information.	STANDARD : Determines the transfer rate automatically. MANUA : Sets the upper limit of the transfer rate manually.	Select	SINGLE : 10 DIFFERENTIAL : 20
26	SYS REV	Limit the revision Nos. of installing system.	Displays the startup program revision.	—	“0304”
27	OPTION	Specifies the optional function when using it.	Enters the option code using the panel keypad.	Enter	“0000”
28	BOOT PROG V/R	Displays the startup program revision.	Displays the startup program revision.	—	
29	RTC SET	Sets the internal clock.	Enters the time using the panel keypad.	Enter	Year, month, day, day of the week, hour, minute, second
30	QUIT	Terminates the parameter input.	Enters using the panel keypad.	Enter	

*5 This menu can be used in the Flush Program Ver.PB24 and before.

*6 This menu can be used in the Flush Program Ver.PB24 and later.

*7 This function can be used in Micro_Disk_Ver.0304 or later.

(f-1) Setting RS232C error information sending mode

In order to use the failure notification program, the setting for the “ERROR INF” of the system parameter must be changed to “ON (NORMAL)”.

Operation	Panel display
	D I P S W I T C H S E T R O M R E S P M O D E
Press  key until the indication shown on the right appears. Press  key.	D I P S W I T C H S E T E R R O R I N F Note : Use  key if you have passed this indication.
Confirm that the indication is changed as shown on the right, which shows that the ERROR INF setting operation is started.	E R R O R I N F * O F F
Press  or  key until the indication shown on the right appears. Press  key.	E R R O R I N F O N (N O R M A L)
Make sure that the message as shown on the right is displayed.	D I P S W I T C H S E T E R R O R I N F
Press  or  key until the indication shown on the right appears. Press  key.	D I P S W I T C H S E T Q U I T
For the dual system, an indication shown on the right appears. Make the setting in the same way as the above.	D I P S W I T C H S E T ■ R O M R E S P M O D E

(g) FD back-up.

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) needs to be backed up to FD or restored from FD when installing optional parts or replacing parts. This case, perform back-up to FD or restore from FD according to “2.3.1 Back-up procedure to FD (RW-OPTION0050.)” or “2.3.2 Restoring procedures to FD (RW-OPTION0080.)”.

(Raid configuration setting, LU configuration setting, etc are not contained in system parameter.)

Back-up procedure to FD

- (1) Turn the power off according to CK-OPTION0120.

Notice: In case the power is not normally turned off, the user’s data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 on CTL ASSY as shown in Figure 4.1.3.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2MCF) has been installed.

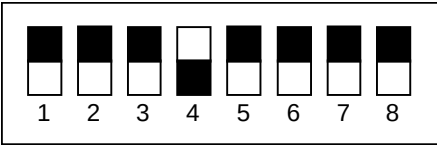
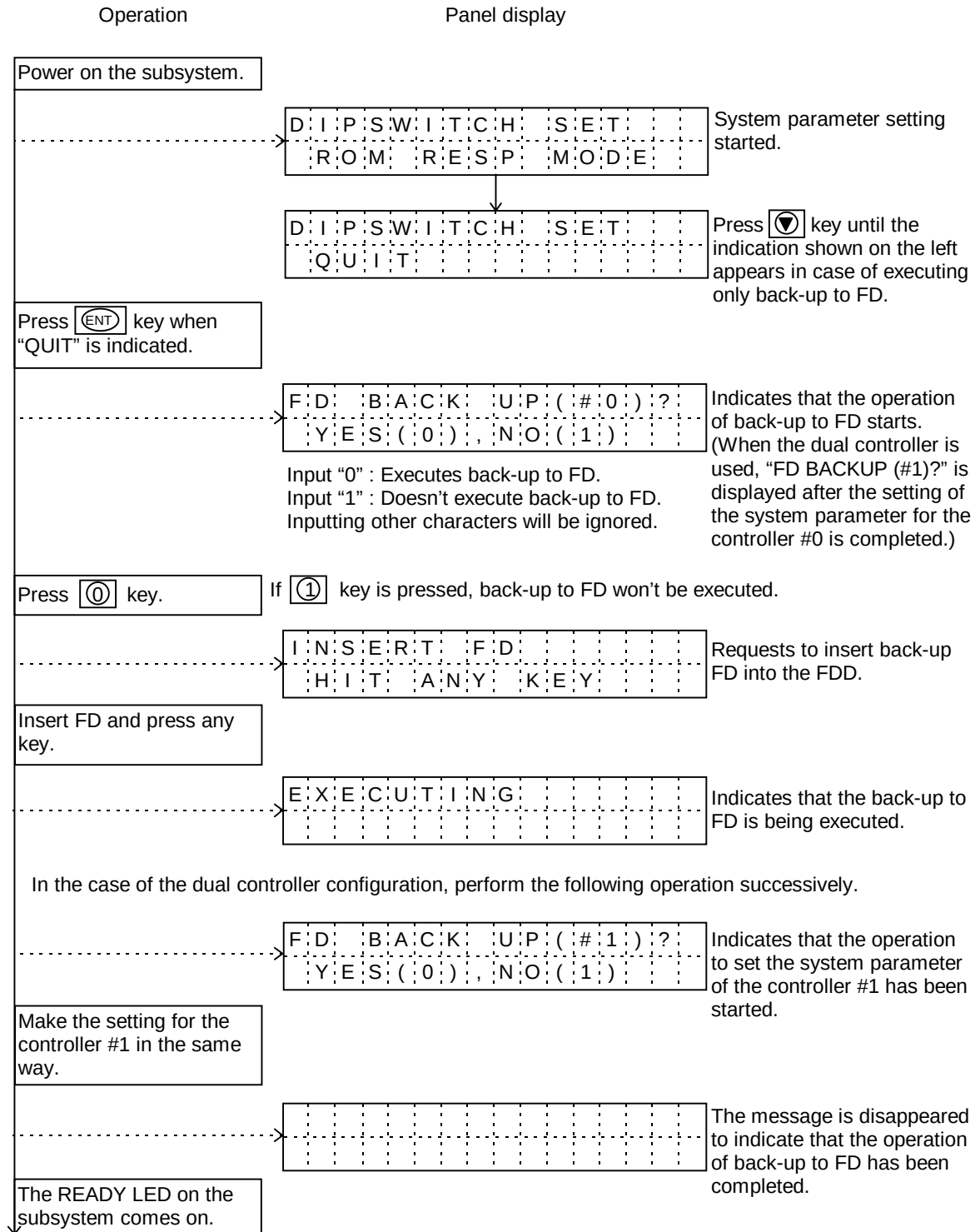


Figure 4.1.3 DIP Switches

(3) Operate panel's keys as described below.



(4) Set DIP switch No.4 as shown in Figure 4.1.4.

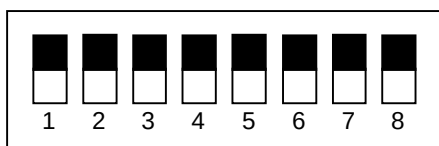
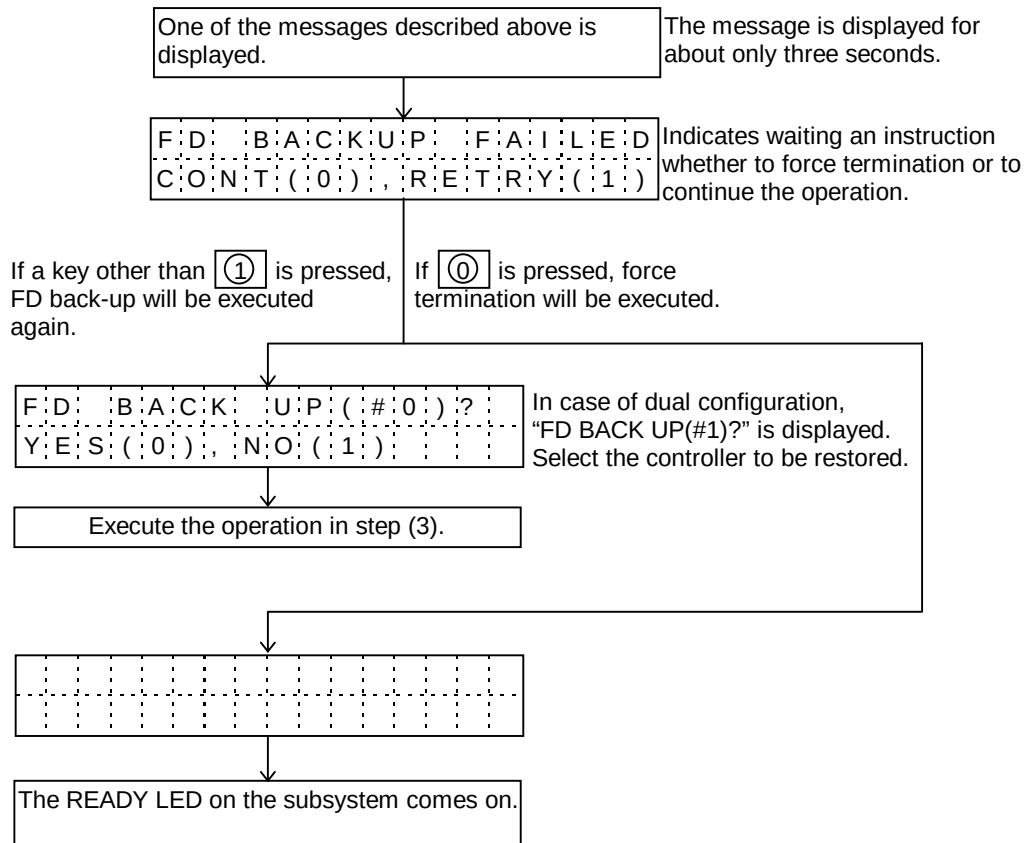


Figure 4.1.4 DIP Switches

Note 1 : While the back-up to FD is being executed, the following messages may be displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting failure of the FD drive motor occurred. Try again.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or is the condition of write-protected. Format or release write-protection.
Write error occurred in FD which was inserted. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So try again following the operation described below.

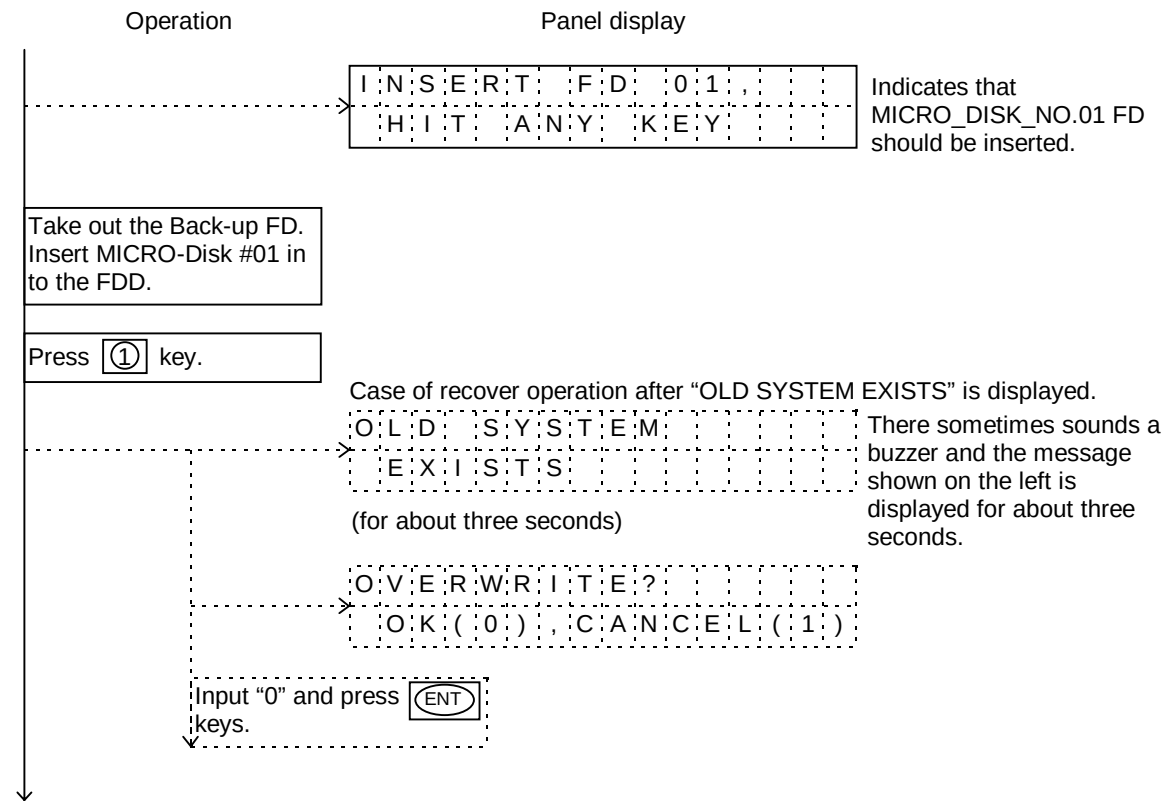
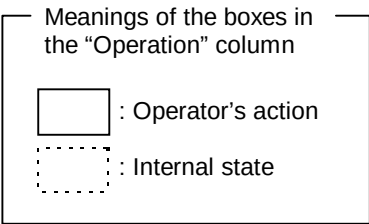


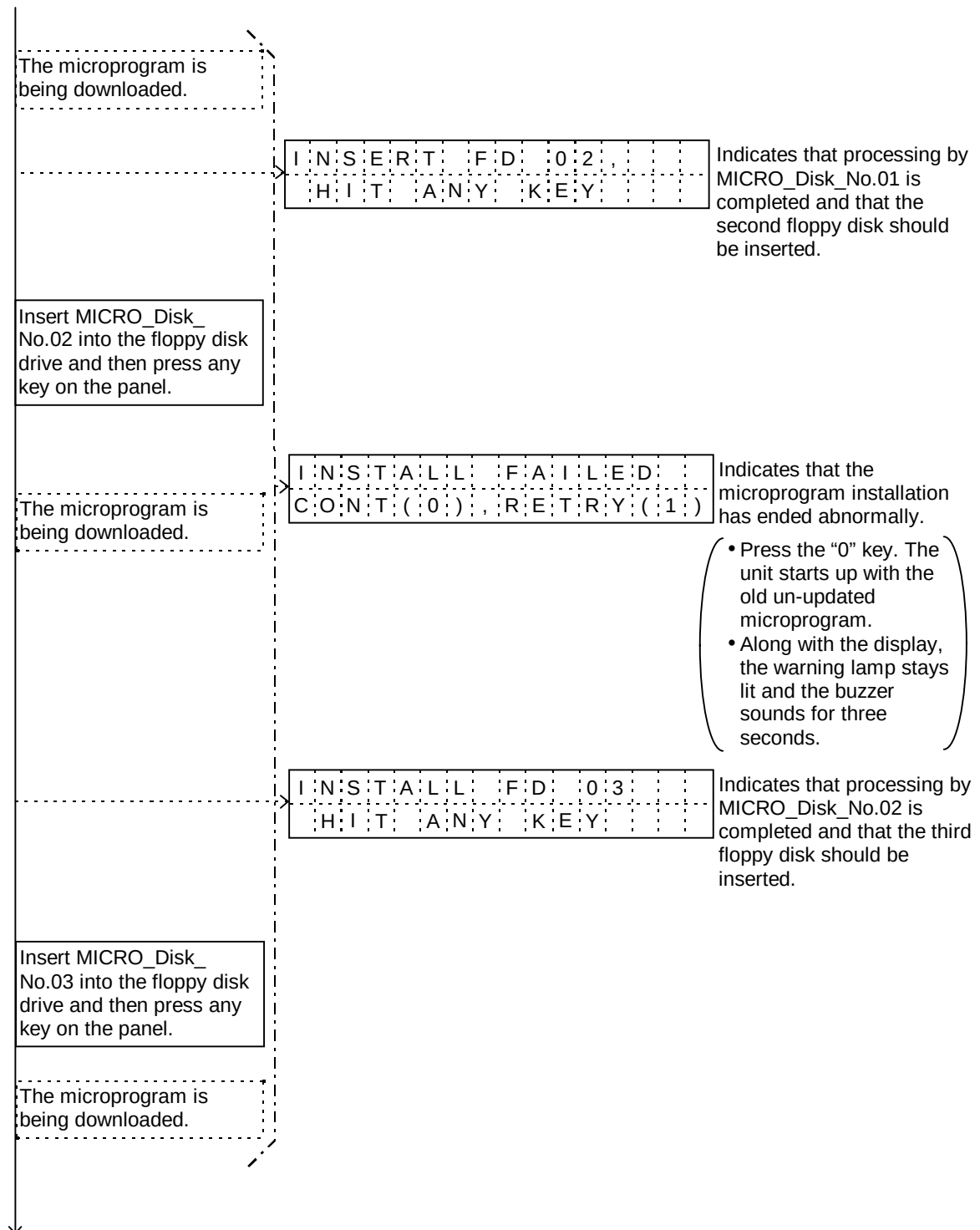
Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Note that the FD will be overwritten in back-up.

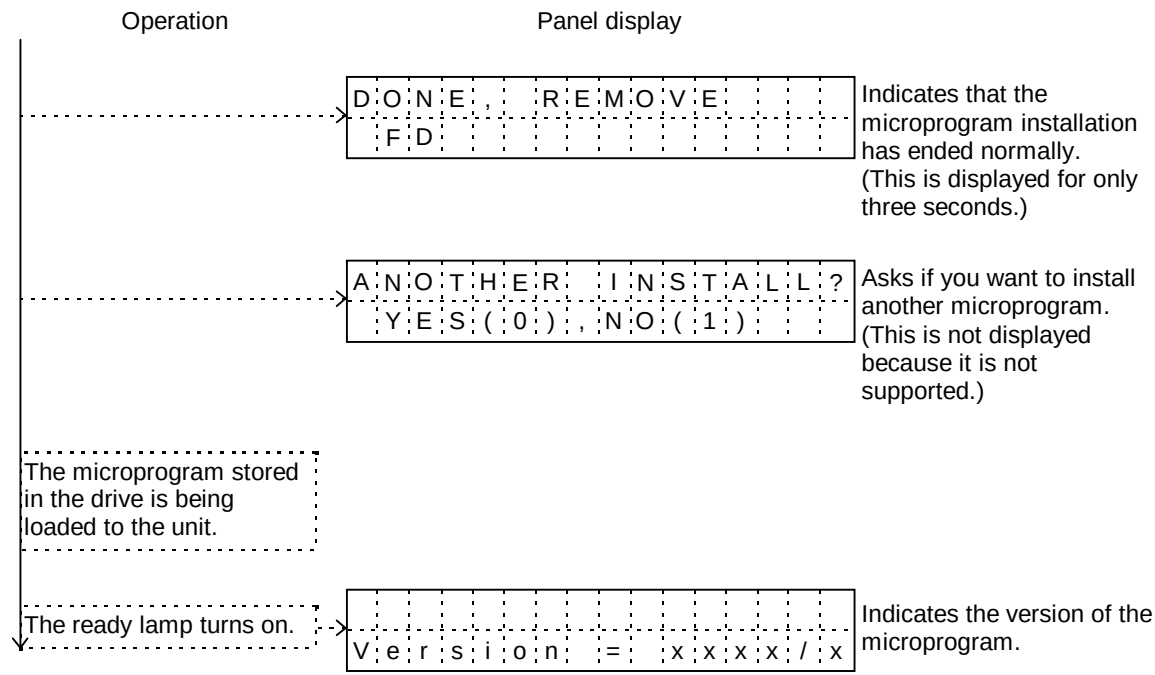
Note 3 : Even if back-up FD is left at FDD after back-up operation, no error will occur on the subsystem.

(h) Download Program
Download program is used to update the microprogram stored in the drive. Three floppy disks are used for downloading.

Note : Be sure that no drive failure is present before updating the microprogram.







(1) Set DIP switch No.1 as shown in Figure 4.1.2.

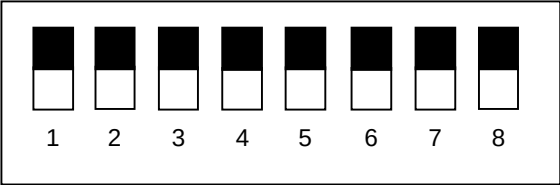


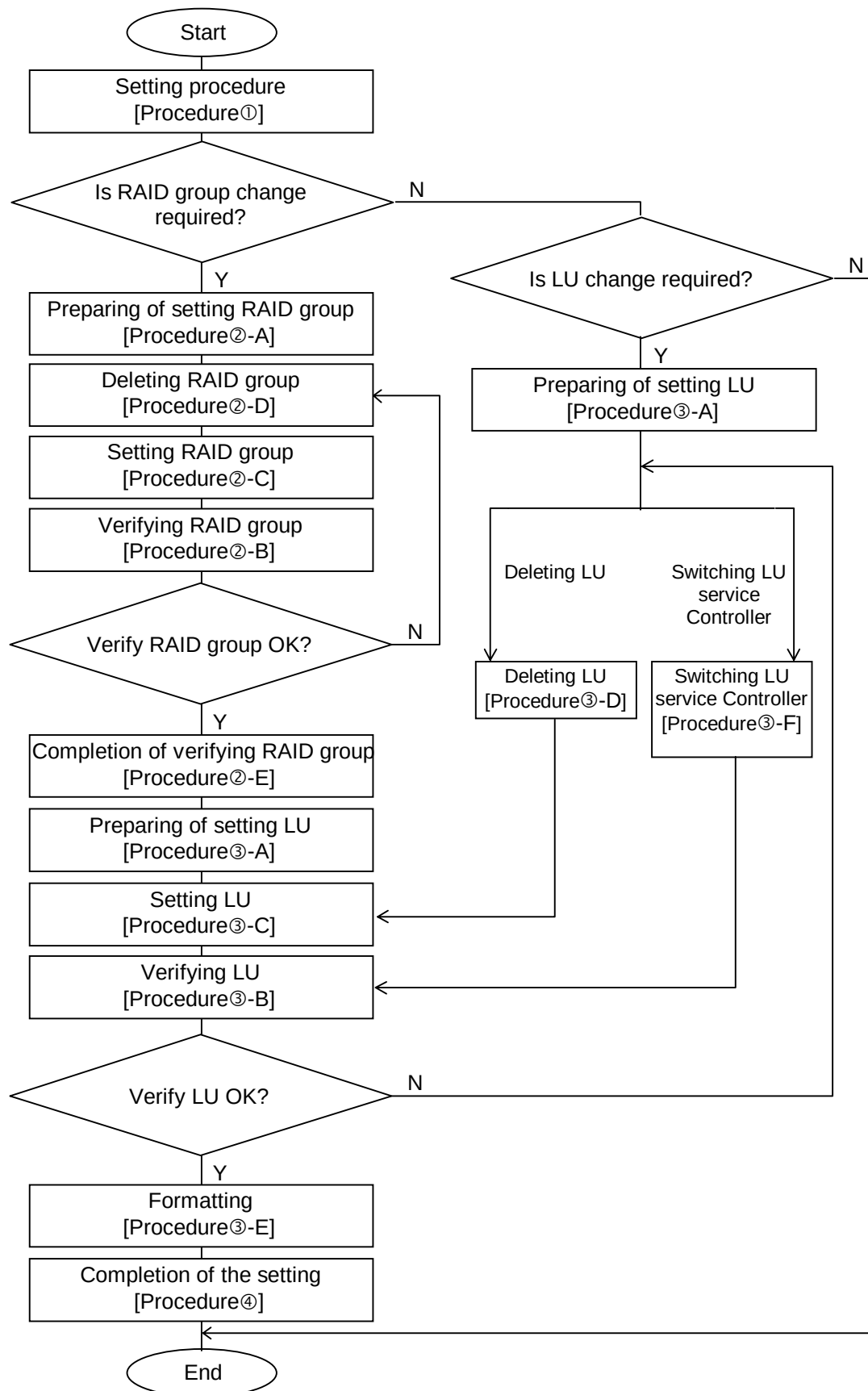
Figure 4.1.2 Standard DIP Switch Settings

Note : If the dual controller option (DF-F350-F2WCF) is installed, use the same settings for both controllers.

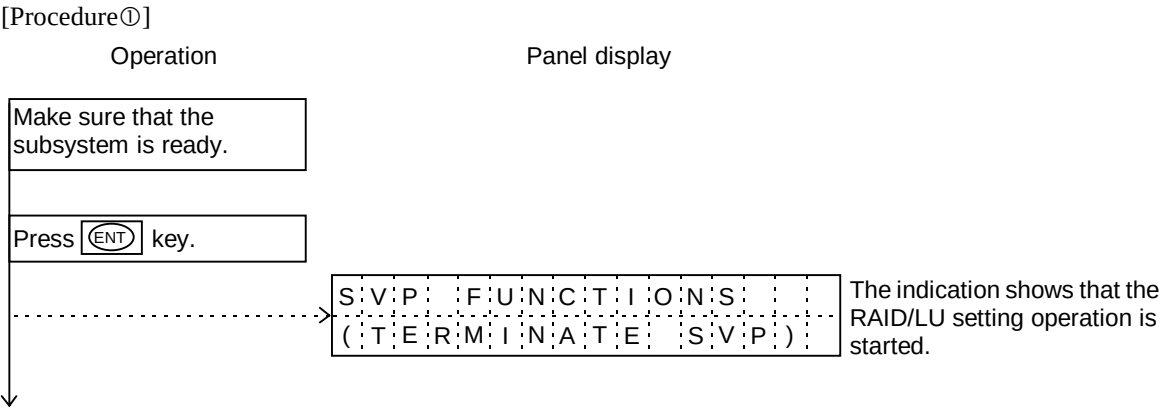
4.2 Setting the Subsystem Configuration Information

This function can be used when the subsystem is ready.

(During this operation, READ/WRITE command issued from the host cannot be executed. When the host command is received, Not Ready is reported to the host.)



4.2.1 Preparing of setting RAID/LU



When changing RAID group, go to procedure ②-A “Preparing of setting RAID group”.
When changing no RAID group but LU, go to procedure ③-A “Preparing of setting LU”.
When changing no RAID group and LU, go to quit.

4.2.2 Setting the RAID group

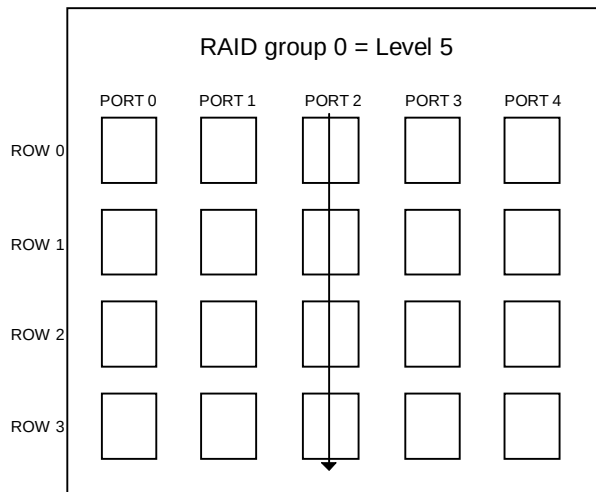
This function is used for setting, deleting and referring the RAID group. This function can be used when the subsystem is ready.

(Setting the DIP switch and turning off/on the subsystem are not required. Read/Write operation from the host can not be executed during this function. When the host command is received, Not Ready is reported to the host.)

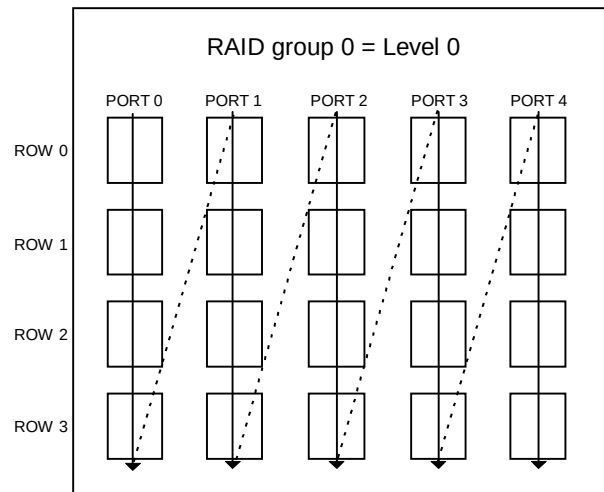
Notice : By deleting the RAID group all user data of the deleted RAID group is lost. Back up user data before deleting the RAID group.

RAID group and RAID level can be set as shown below by using this setting function.

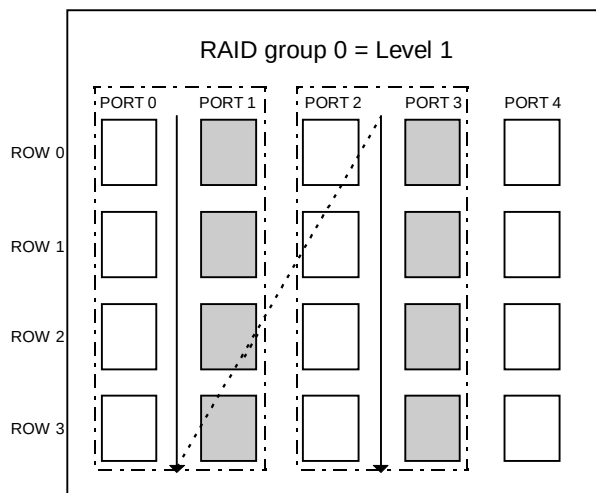
Setting one RAID group with the entire subsystem. (Arrows "↓" indicate the direction of storing data.)



The function stores data in the way executing the data striping over four disks and generating parity data on one disk.

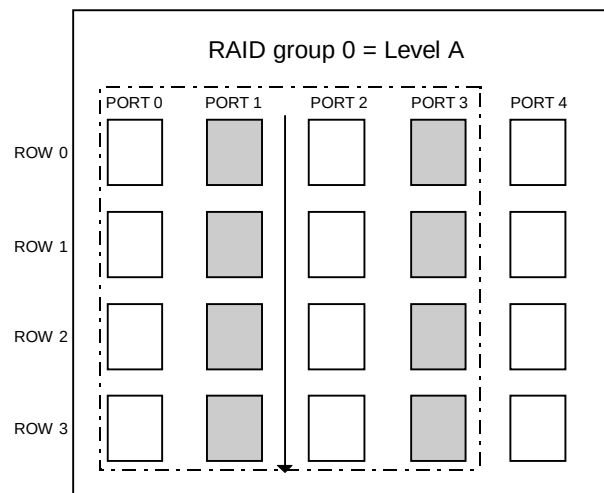


The function stores data without executing neither the data striping nor parity data generation.



The function stores data in the way doubly writing it on the main disk and sub-disk without executing the data striping.

□ : indicates a main disk
 ■ : indicates a sub-disk

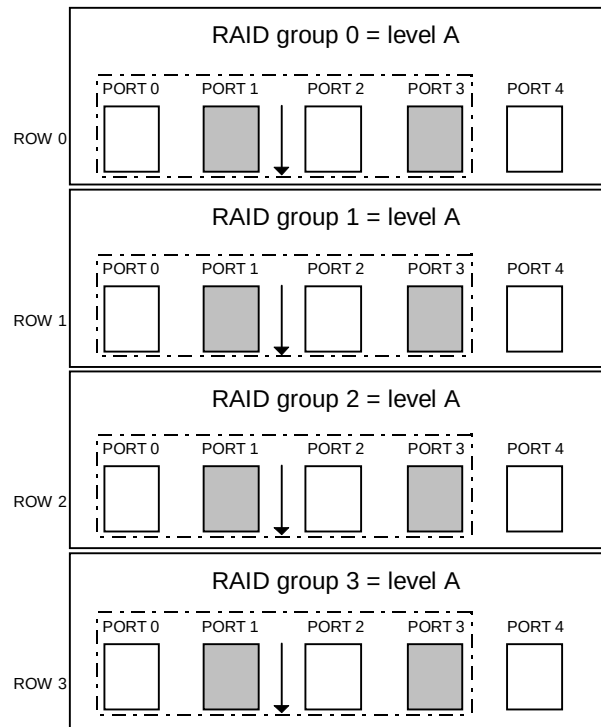
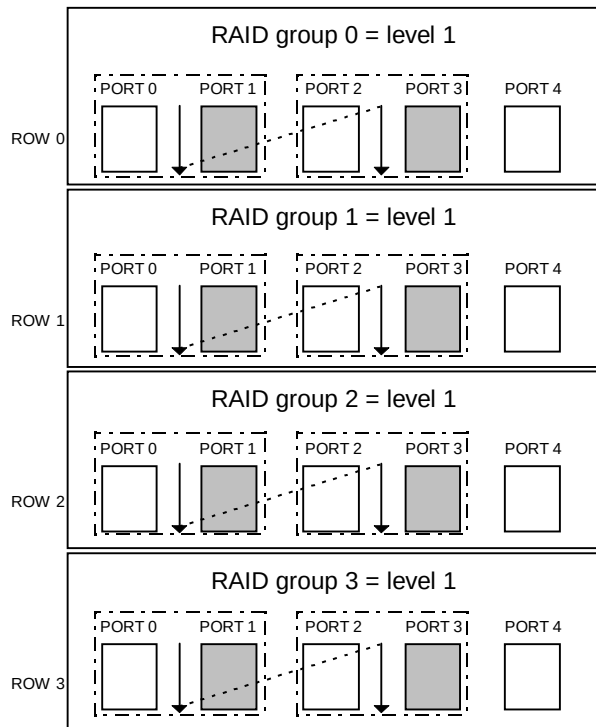
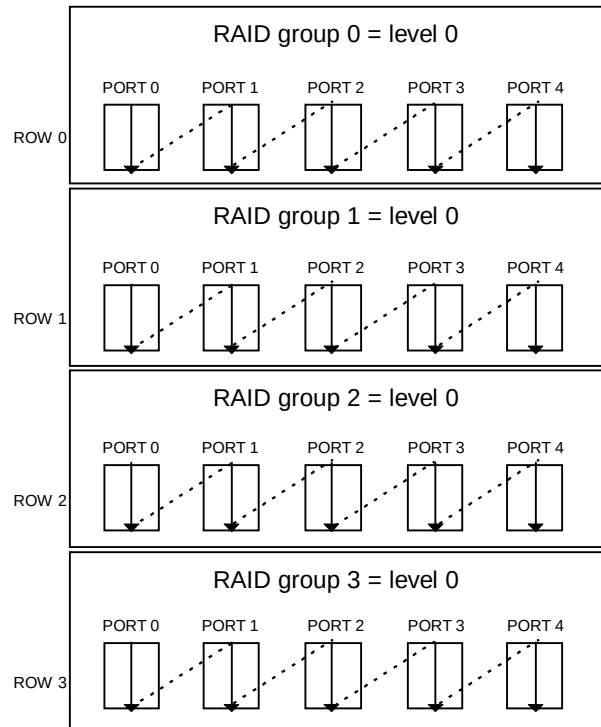
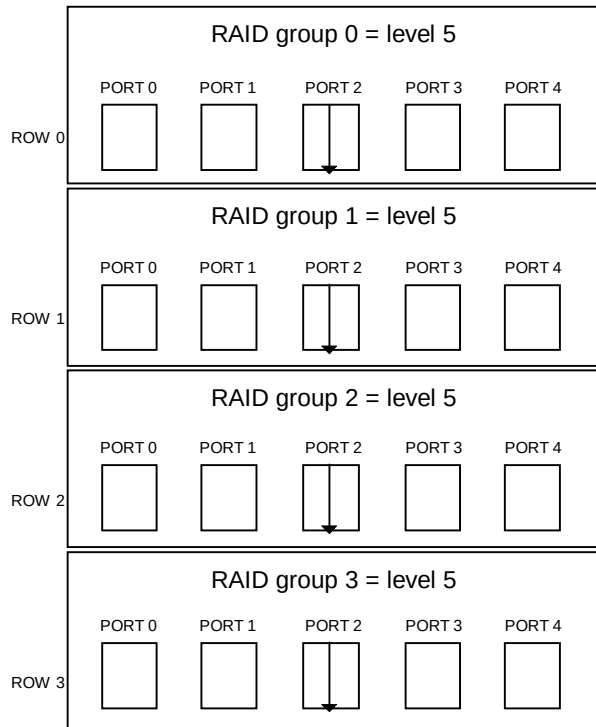


The function stores data in the way doubly writing it on the main disk and sub-disk and executing the data striping over two disks of port 0 and port 2.

□ : indicates a main disk
 ■ : indicates a sub-disk

Setting one RAID group with each row of disks (Arrows “↓” indicates the direction of storing data.)

Data cannot be stored extending over two or more RAID groups even if RAID levels of them are the same. The following are examples having set RAID groups of the same RAID level, however, each row has its own RAID level.



Setting the number of data disks when setting RAID level 5

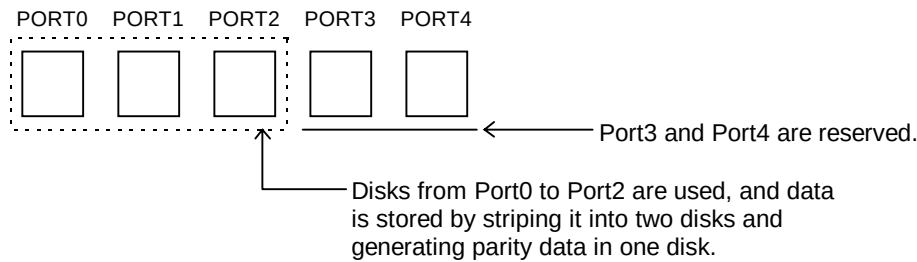
When Micro_Disk Ver.0305** (** is optional) or later is used, number of data disks can be selected from 2, 3 and 4 in the definition of RAID5.

(4 for the number of data disks and 1 for the number of parity disks are automatically set when 5 is set for RAID level in the case Micro_Disk Ver.0304** (** is optional) or earlier is used.)

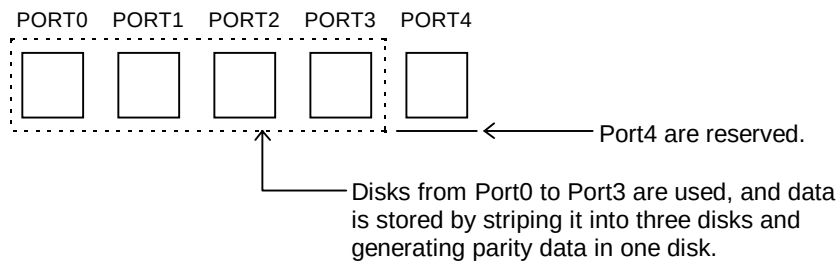
For the of setting procedure, see pages PANEL0380 or RW-INST0534.

The direction of data storage is the same as the conventional case in which the RAID level is 5. Setting is also same as before; the entire subsystem or each row can be set to one group. The following explains the overview of data storage using the example of setting each row to one group.

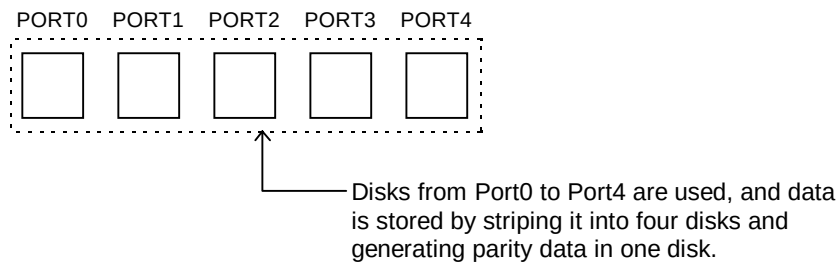
- (1) For the configuration of 2 data disks + 1 parity disk



- (2) For the configuration of 3 data disks + 1 parity disk

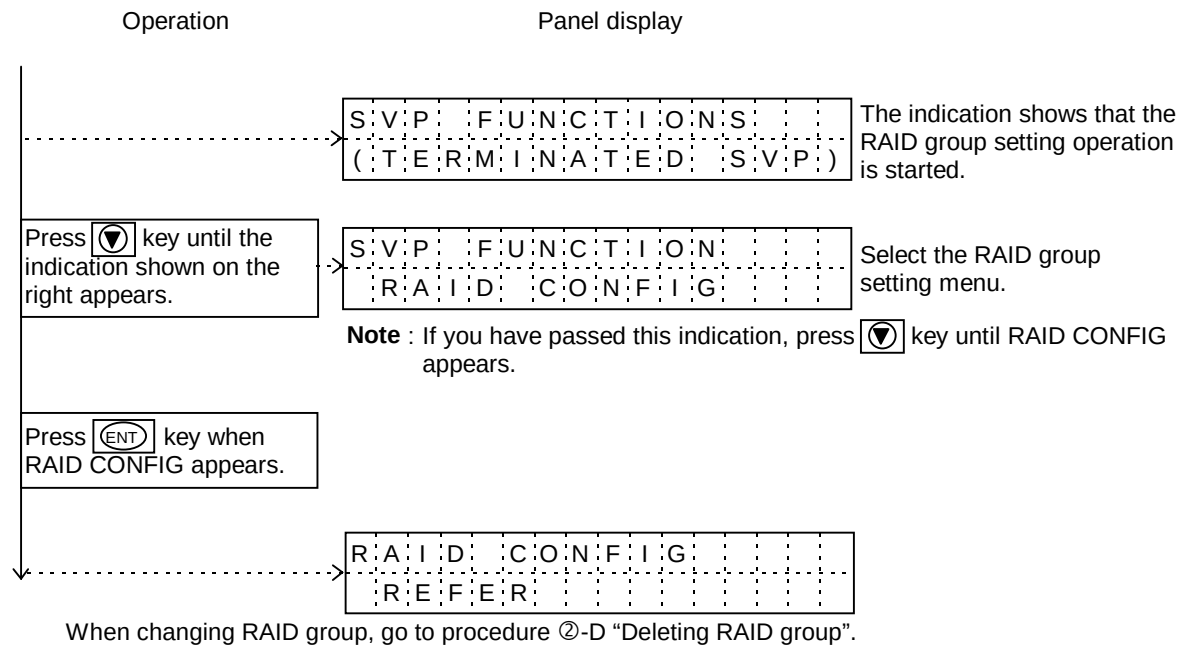


- (3) For the configuration of 4 data disks + 1 parity disk (same configuration as when RAID5 is defined using Micro_Disk Ver.0304** or earlier)

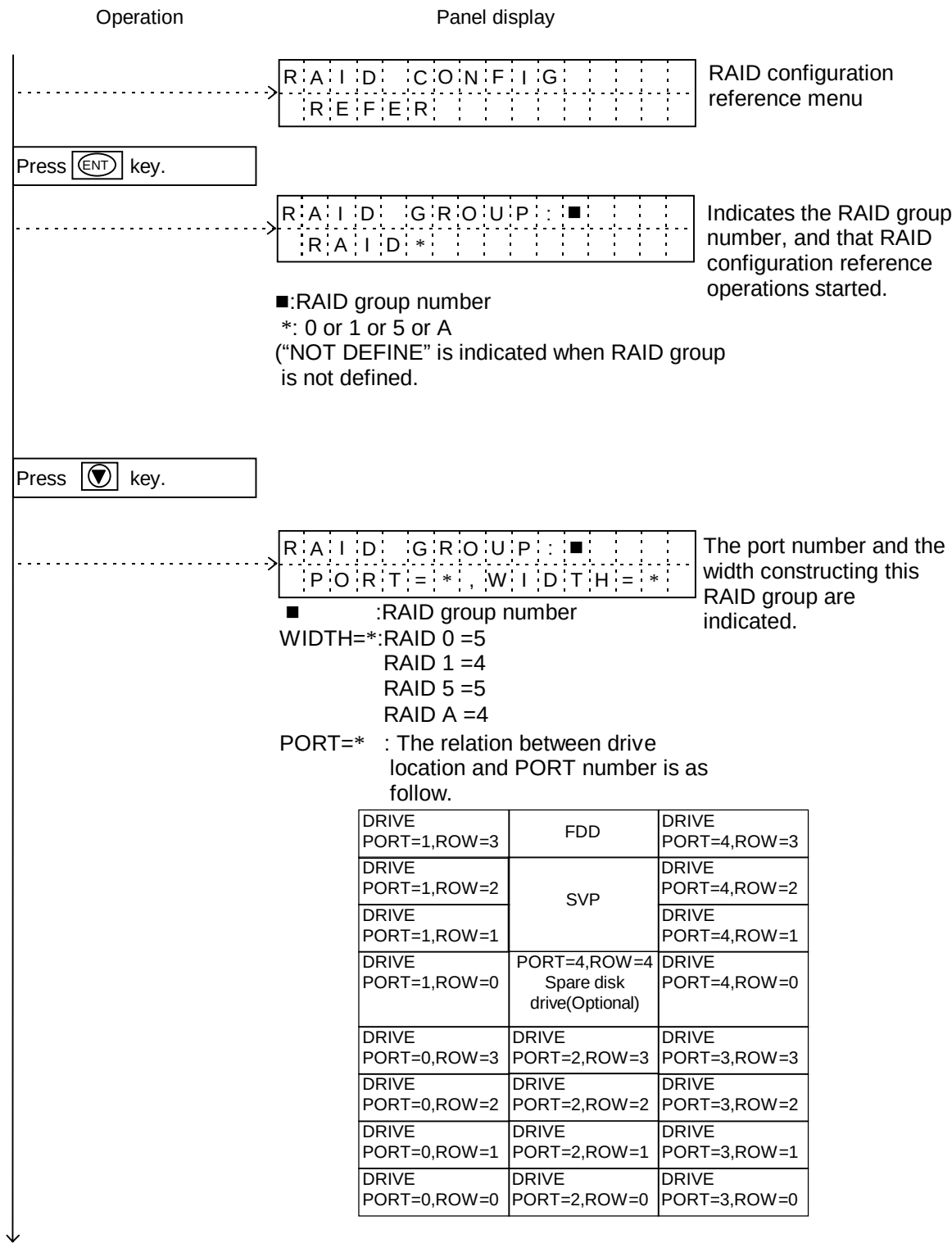


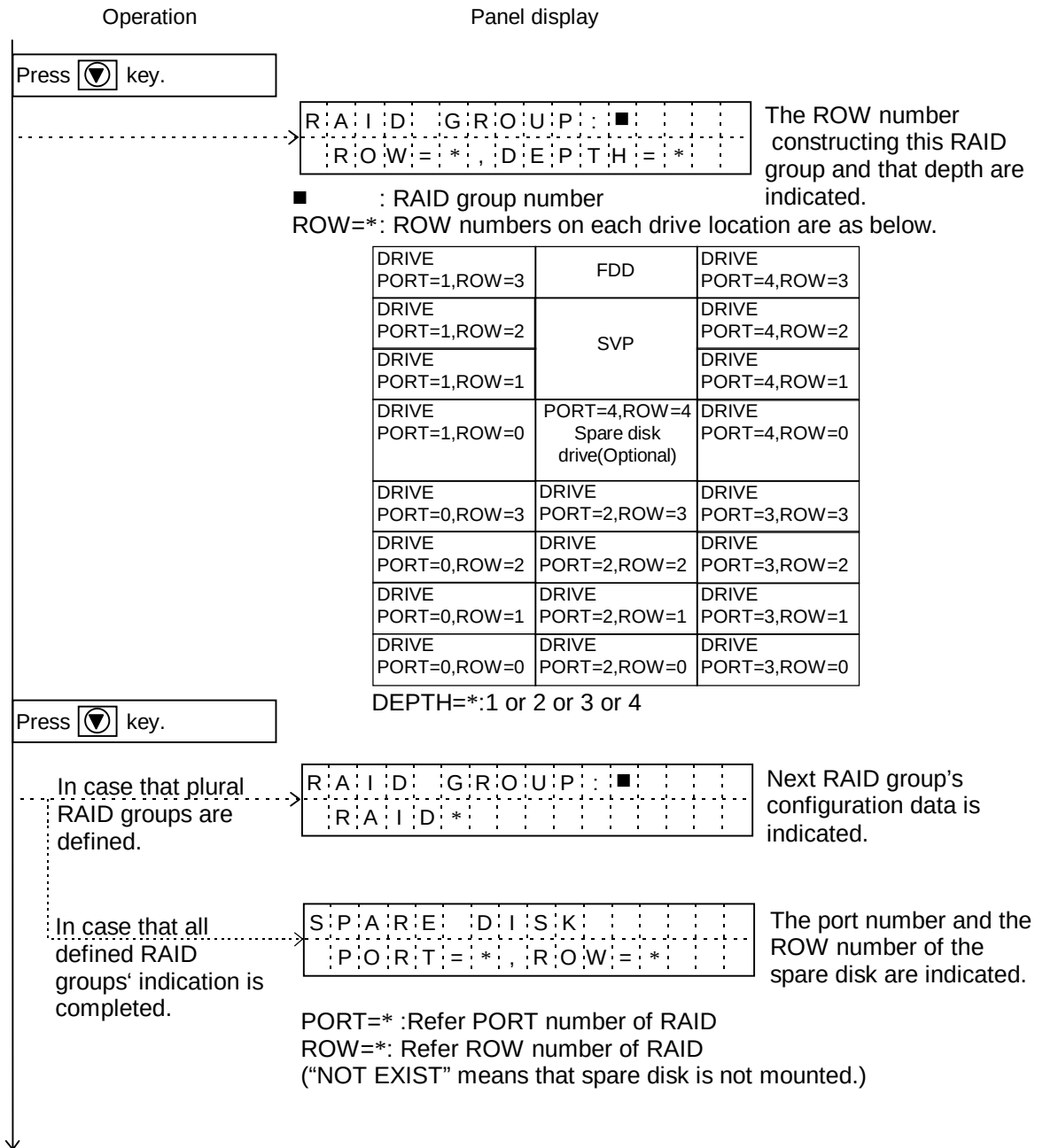
Notice : When changing the data disk configuration, be sure to start from re-definition of the RAID group. Accordingly, the stored data will be lost. So be sure to create a back up copy of the data when the configuration is changed.

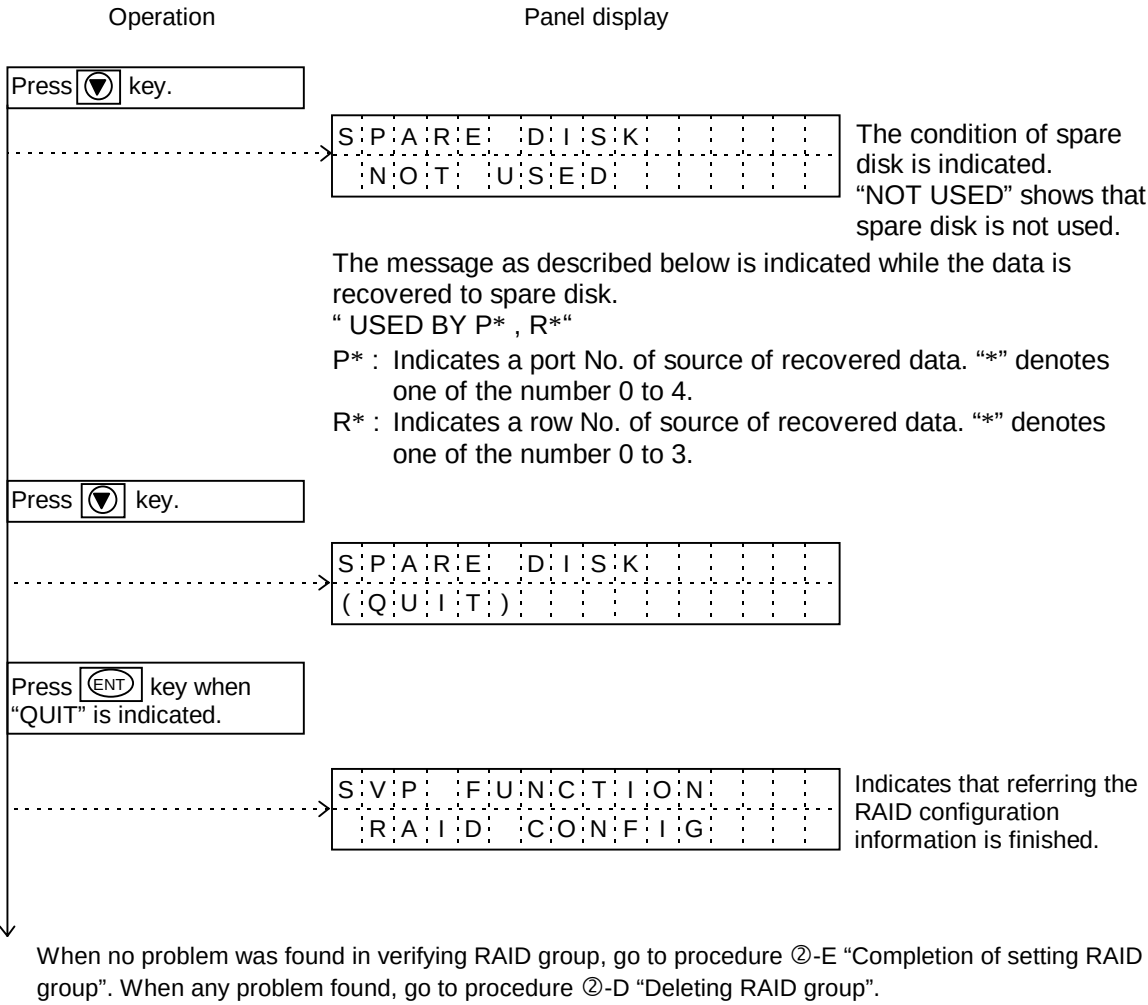
[Procedure②-A] Preparing of setting RAID group



[Procedure②-B] Verifying RAID group





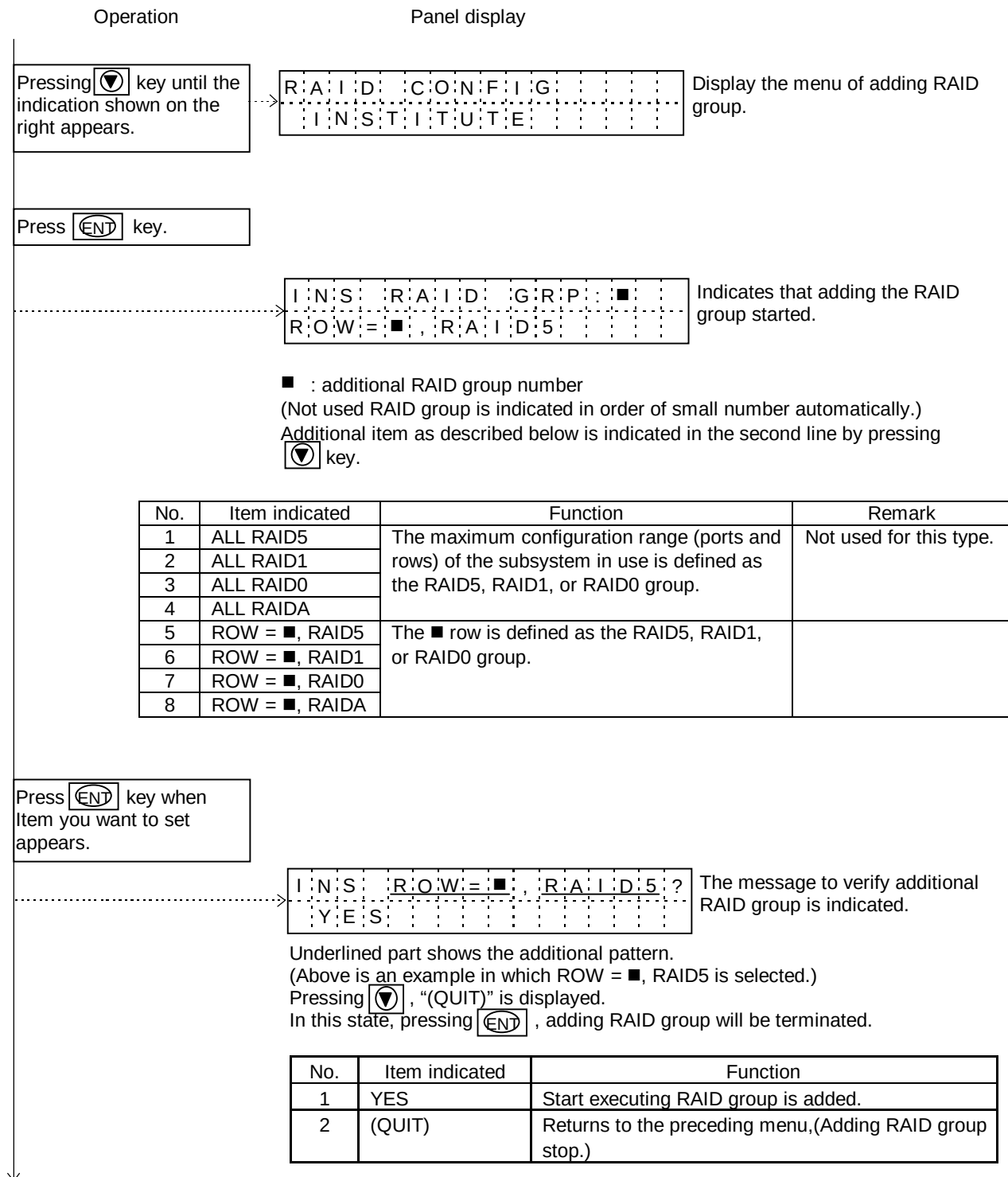


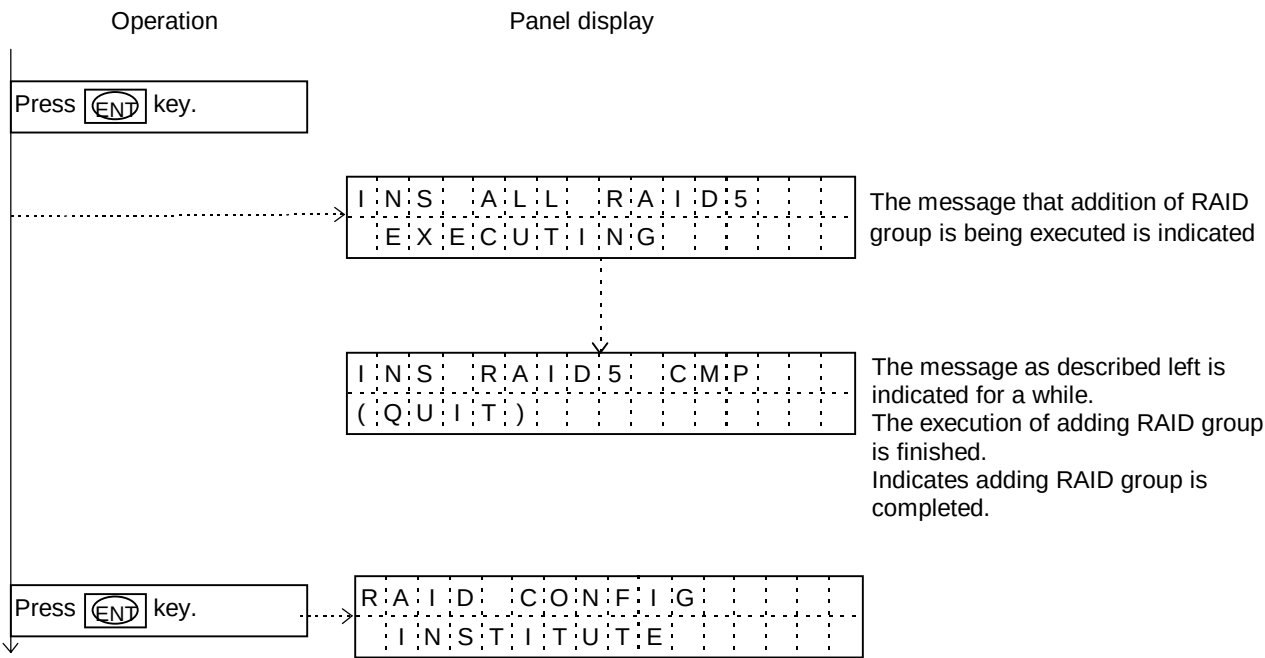
Operation for defining the RAID5 differs depending on whether the version of Micro_Disk is 0304** (** is optional) or earlier, or 0305** (** is optional) or later.

Confirm the version of Micro_Disk and operate in the way corresponds to it. (In the case of RAID0, RAID1 and RAID5 the operation is the same irrespective of the version of Micro_Disk.)

[Procedure②-C] Setting RAID group

(1) RAID group setting when the version is 0304** (**is optional) or earlier

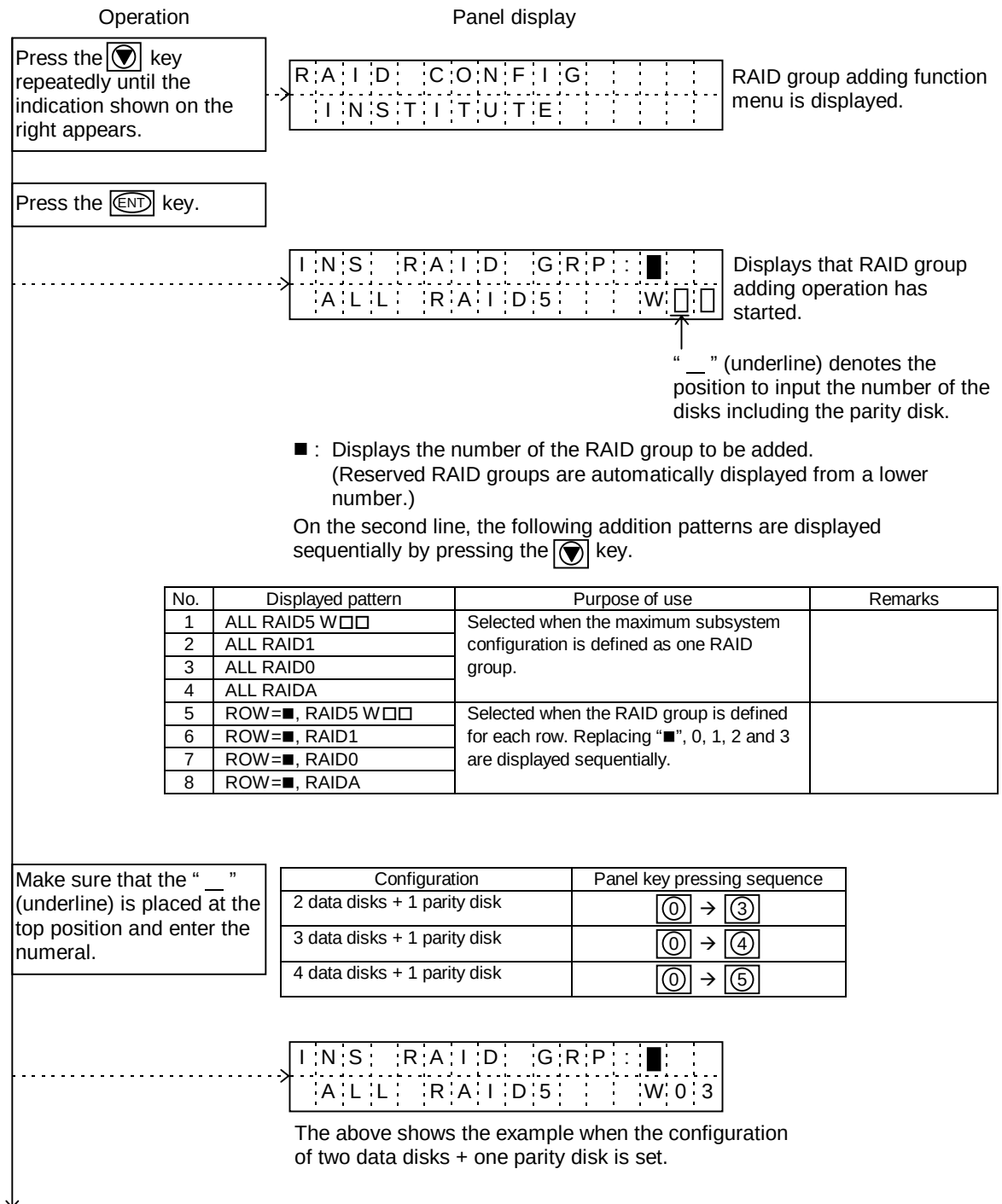


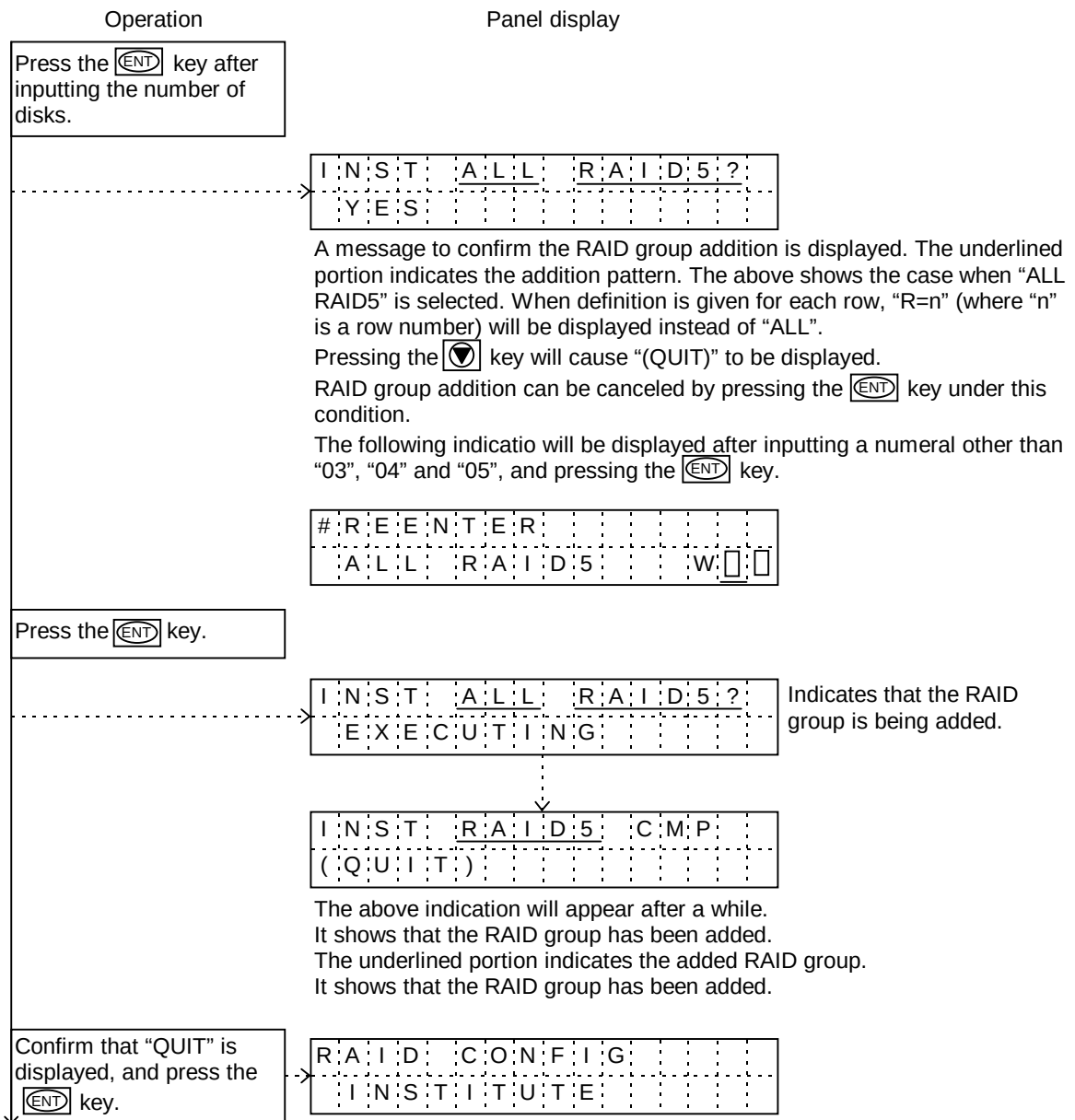


Go to procedure ②-B “Verifying RAID group”
Note : Set RAID group for each ROW when you want to set it for each ROW.

(2) RAID group setting when the version is 0305** (** is optional) or later

When Micro_Disk Ver.0305** (** is optional) or later is used, the number of disks including the parity disk must be input when defining RAID5. (This is not necessary for RAID0, 1 and A.)



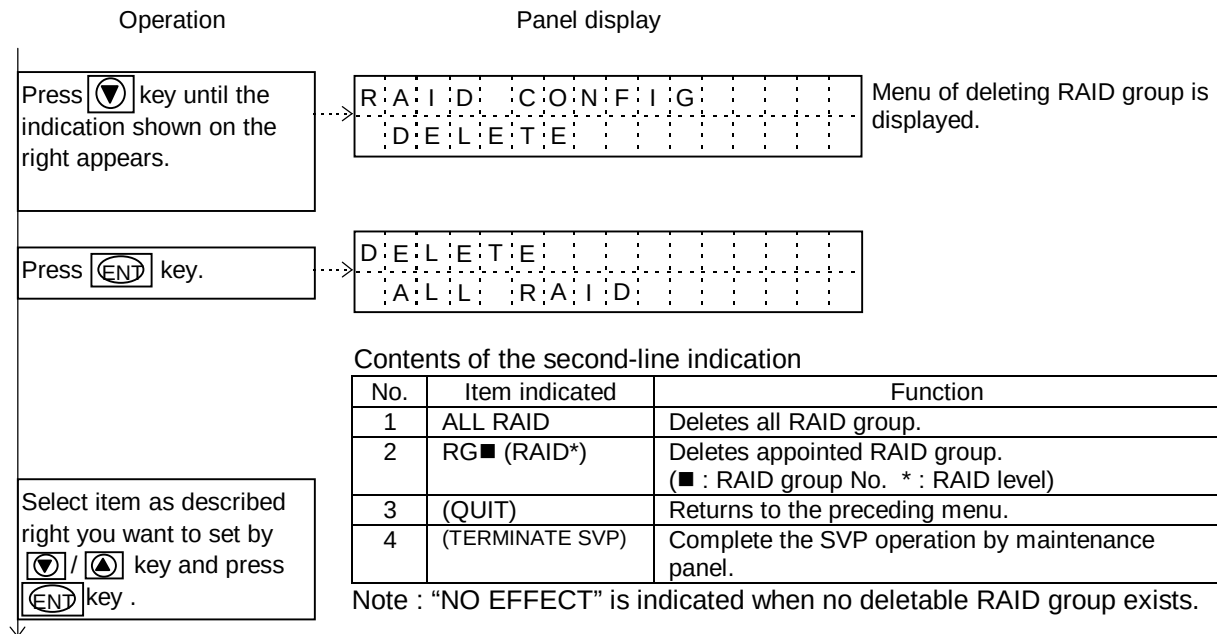


Go to procedure ②-B "Verifying RAID group"

Note : Set RAID group for each ROW when you want to set it for each ROW.

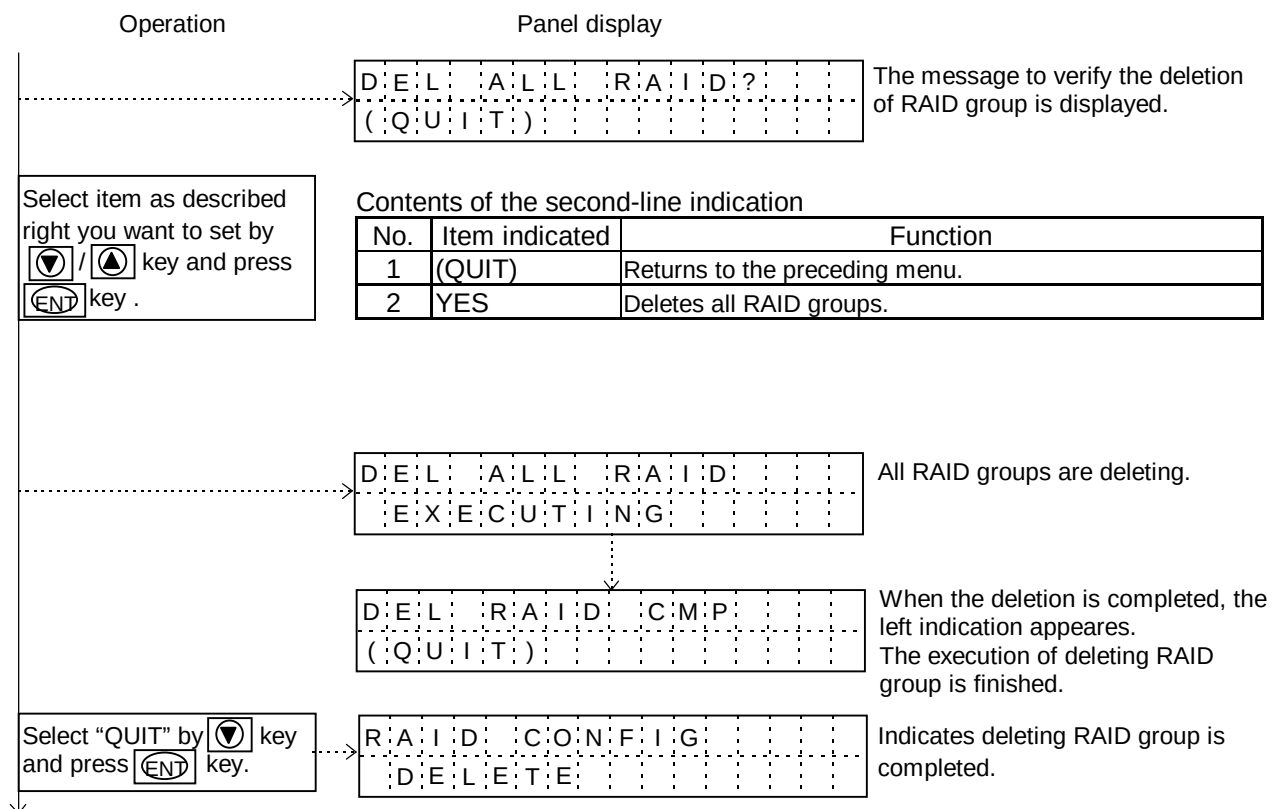
[Procedure②-D] Deleting RAID group

Notice : With this operation, Logical Units are deleted, and the user's data will be lost. Be sure to make back up copy before this operation.



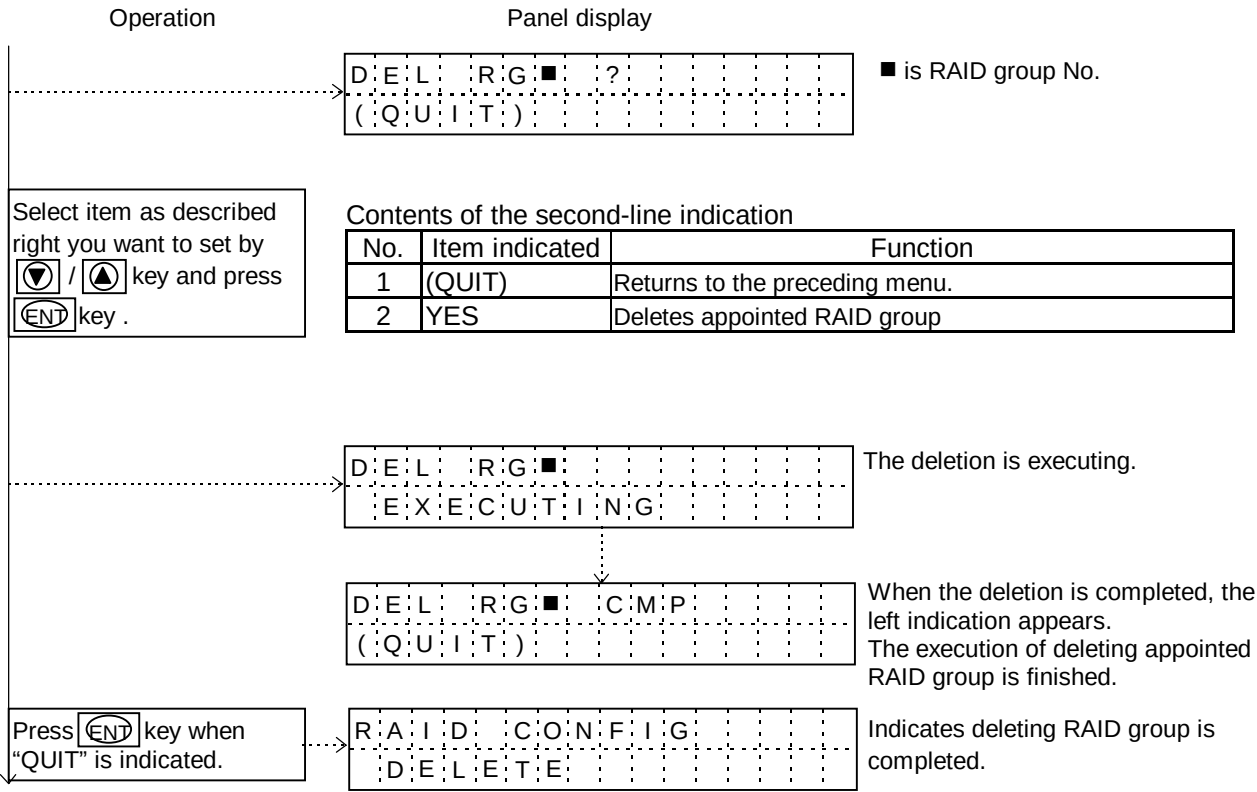
Go to ① when you want to delete all RAID groups , Go to ② when you want to delete appointed RAID group.

①Deleting all RAID groups



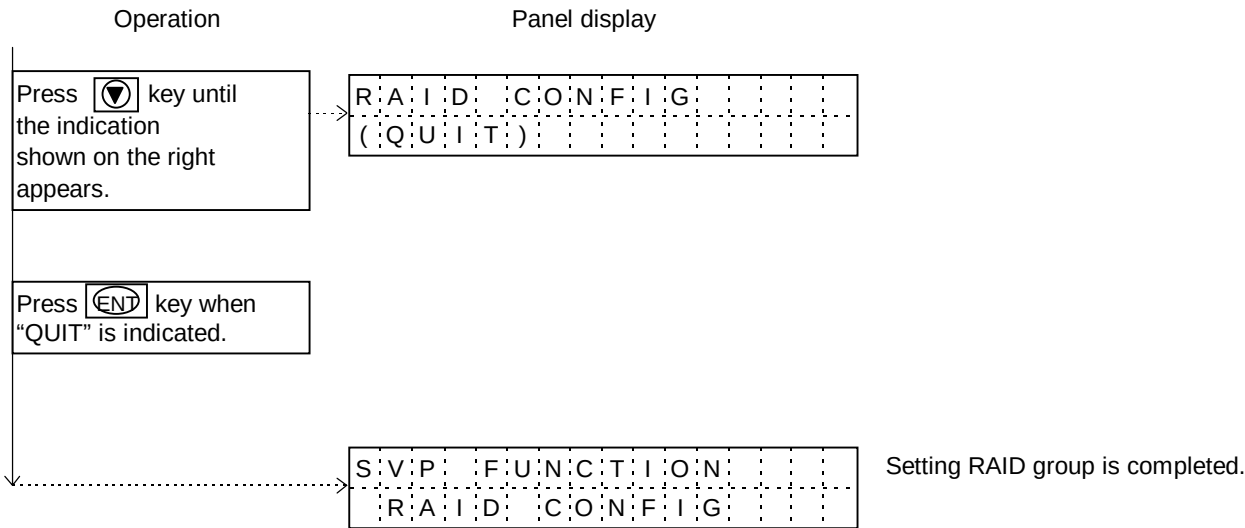
Go to procedure ②-C "Setting RAID group".

②Deleting appointed RAID group



Go to procedure ②-C "Setting RAID group".

[Procedure②-E] Completion of setting RAID group



4.2.3 Setting LU

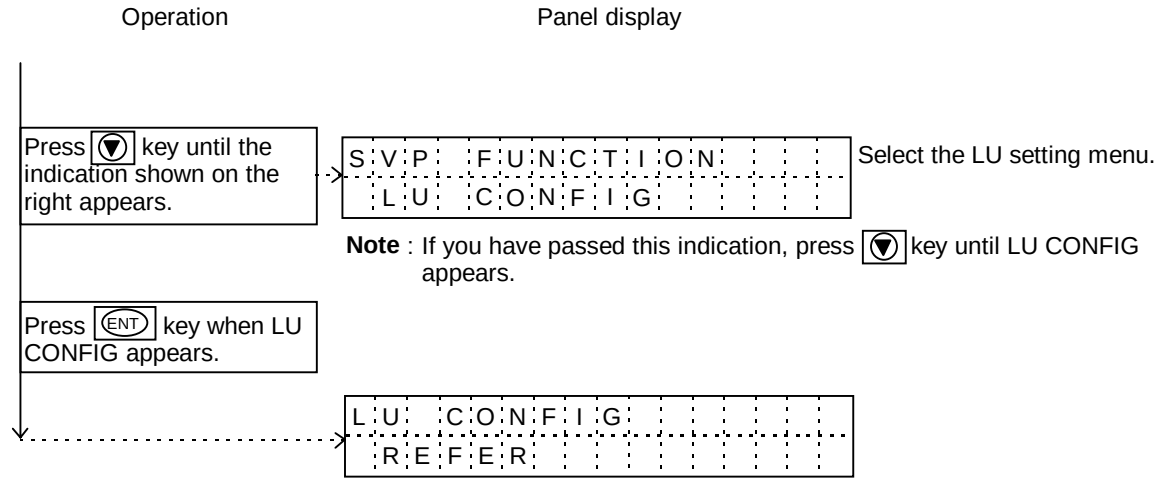
Following procedures are used to set, delete, refer, or format the LU.

This function can be used when the subsystem is ready.

Notice : All user data is lost by deleting the LU.

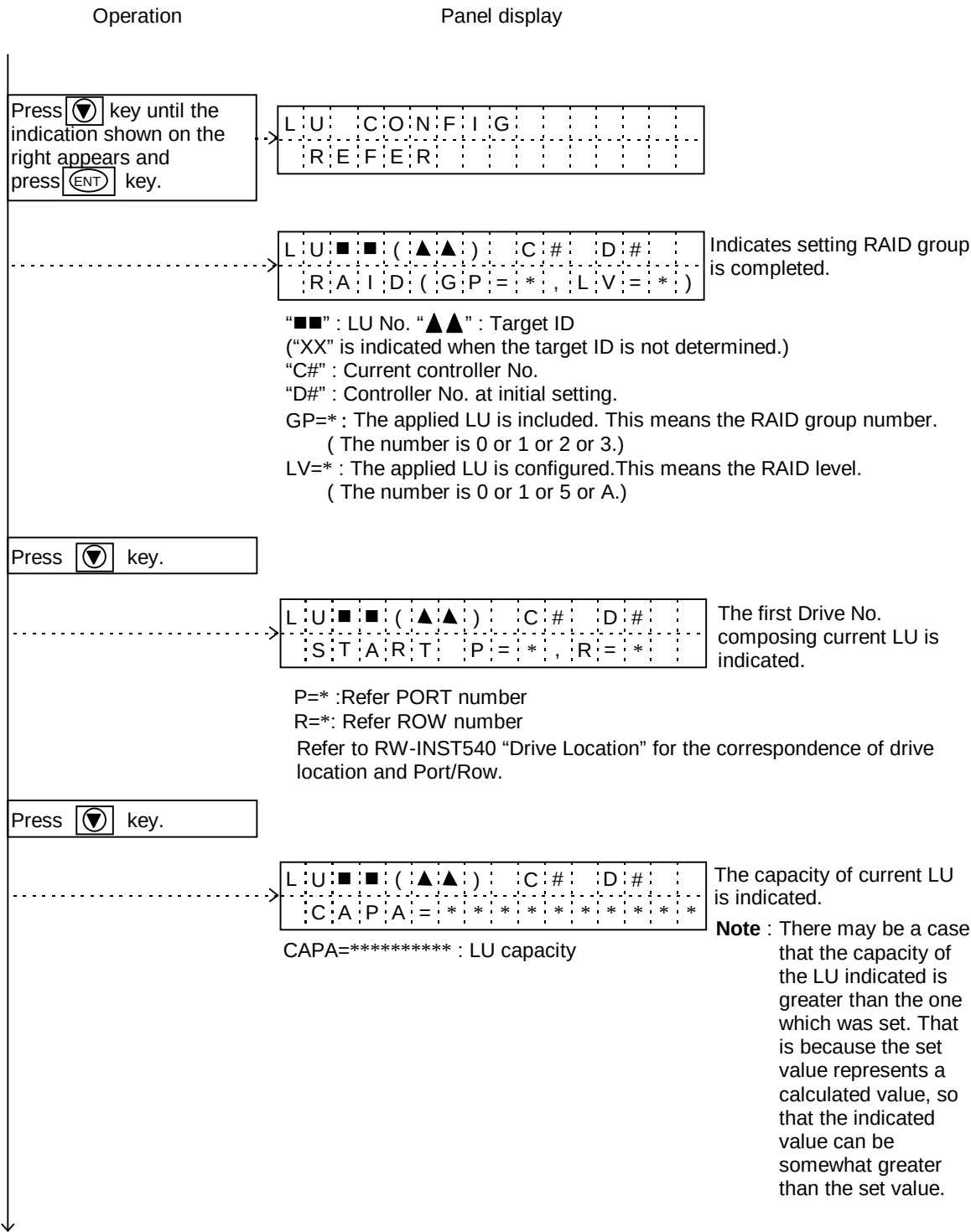
Be sure to back-up the user data before deleting the LU.

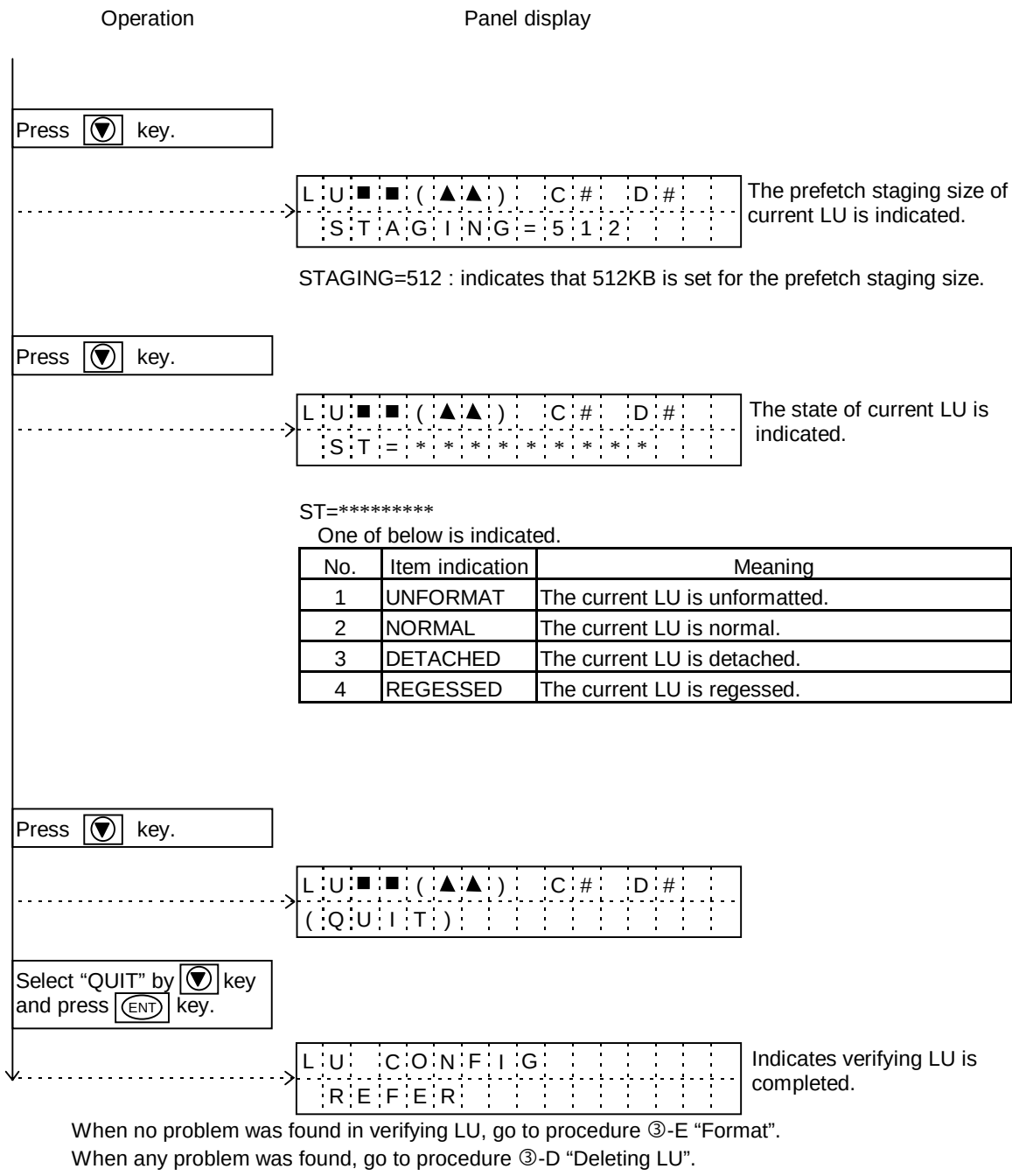
[Procedure③-A] Preparing of setting LU



When RAID group is already set, go to procedure ③-C “Setting LU”.
When changing no RAID group, go to procedure ③-D “Deleting LU”.

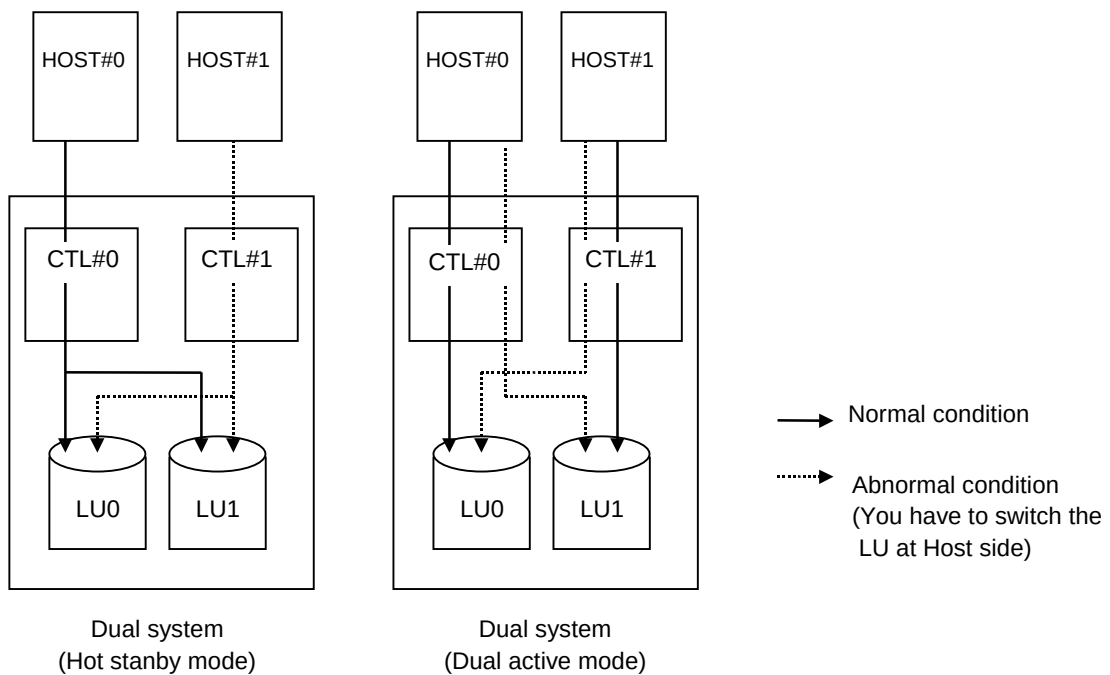
[Procedure③-B] Verifying LU





[Procedure③-C] Setting LU

Note) You have to assign service controller to set the LU when dual active mode is selected in the dual system.
Refer to the figure as described below to set the LU assigned service controller.



* The function of “Hot standby mode”.

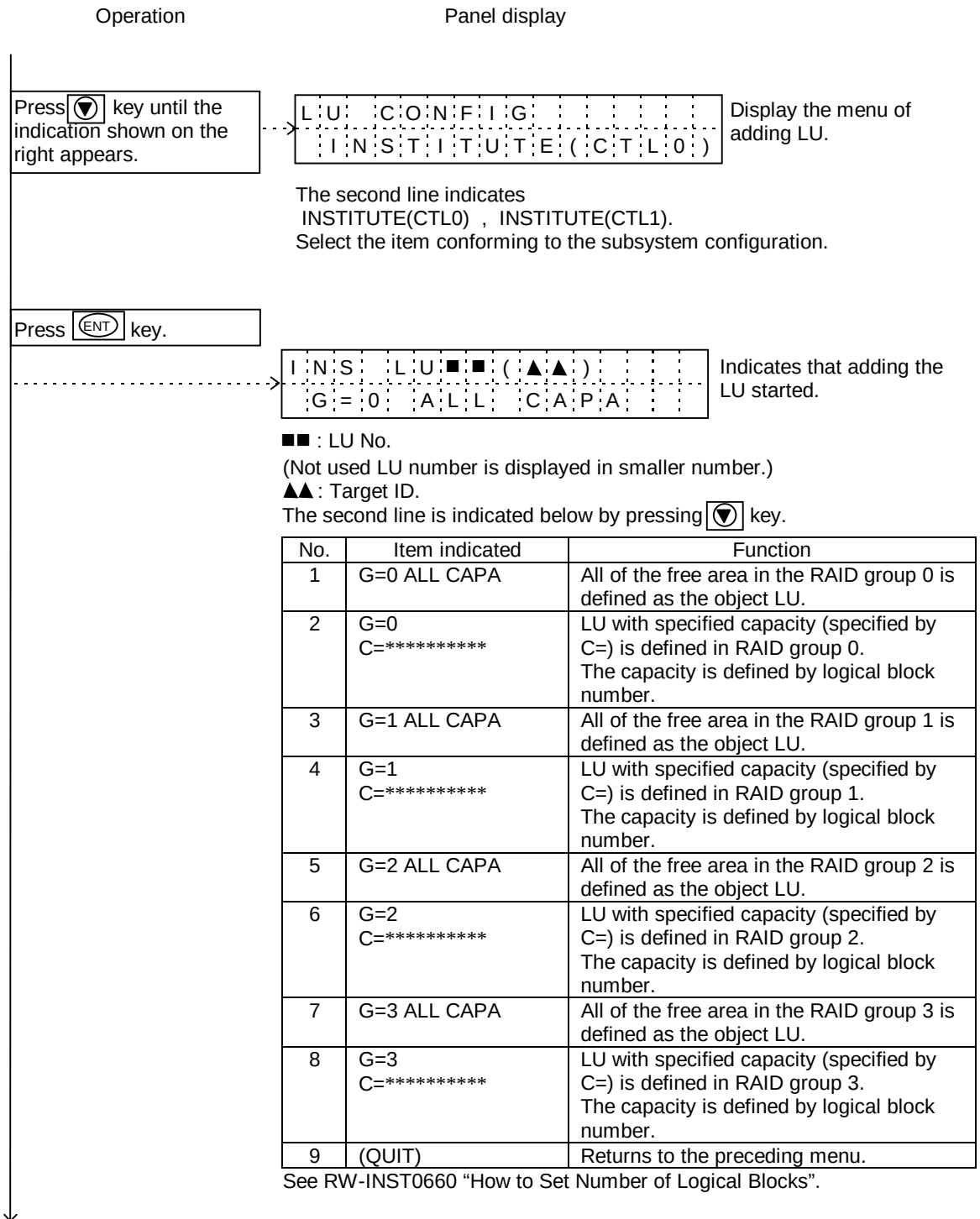
It is possible that the system is continued to execute commands by switching the direction of the commands from Host system to the other controller, if the Host system or the controller failure occurs.

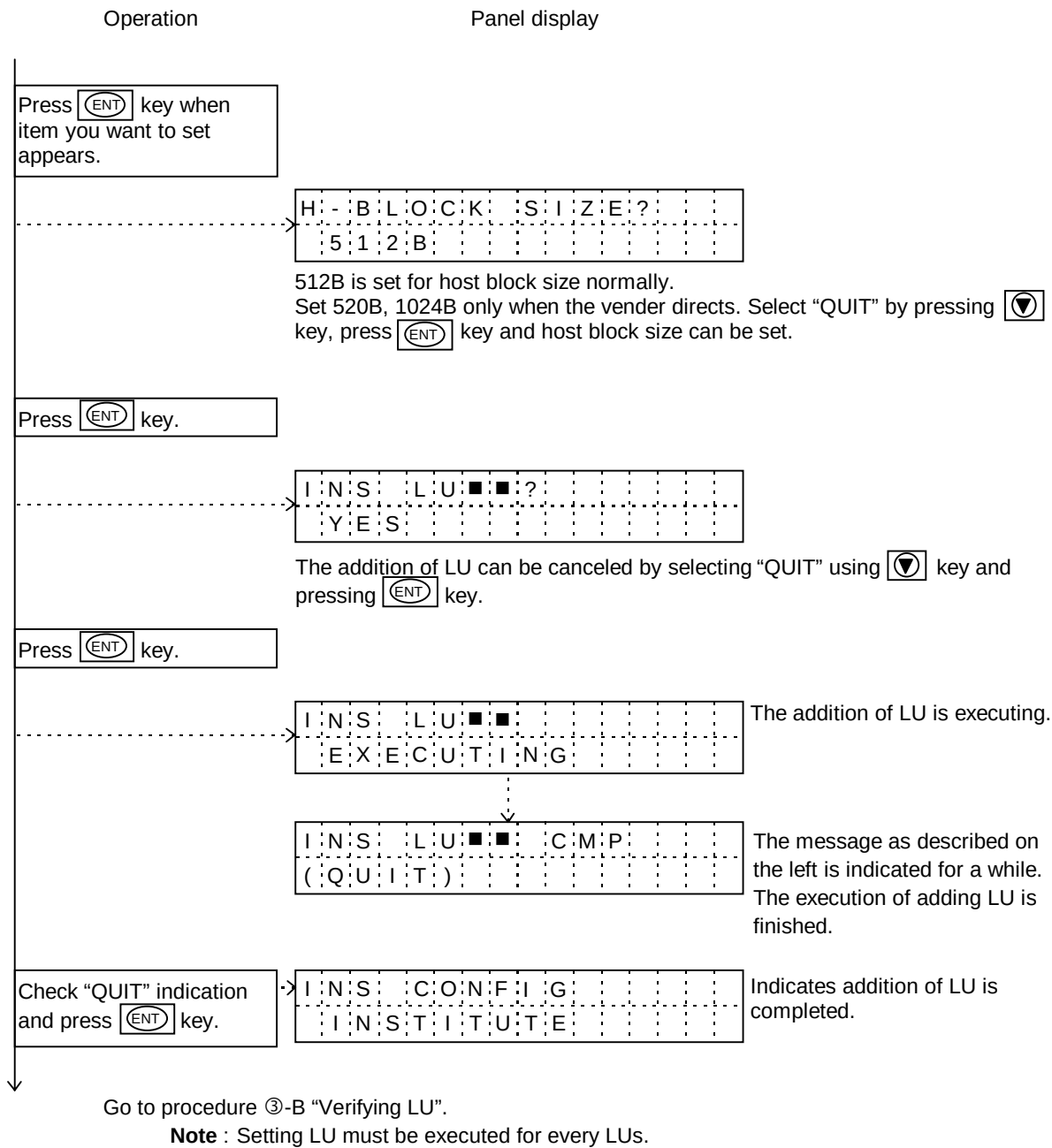
* The function of “Dual active mode”

Controller #0 and #1 are the service controller of LU#0 and #1 respectively.

In the case of example as described above, select “INSTITUTE (CTL0)” when you set LU0 and “INSTITUTE (CTL1)” when set LU1.

In case a service controller is assigned to LU#0 and #1, it is possible to access from HOST#0 and #1, however the data transmitting performance is lowered because of switching LU.





Supplement / How to Set Number of Logical Blocks

G=*

C=*****



Enter a value (number of logical blocks) here.

- (1) All RAID groups can be divided into up to 8 logical units.
- (2) Set the number of logical blocks to be set for each logical unit to multiples of the following values according to the RAID level.

RAID0	128
RAID1	128
RAIDA	256
RAID5(4D+1P)	512
RAID5(3D+1P)	384
RAID5(2D+1P)	256

- (3) When dividing each RAID group into multiple logical units, the total number of blocks in each logical units must be set to the number of logical blocks per row as shown below or less.
- (4) The following lists the number of logical blocks per row.

① When five drives are mounted on a row;

(4disks in the case of RAID1, RAIDA and RAID5 (3D+1P); 3disks in the case of RAID5 (2D+1P))

RAID configuration \ Model (Capacity)	DF-F350-A2E2 (2.0GB)	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4 (4.1GB)	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A (8.7GB)	DF-F350-A1E18 (17.8GB)
RAID0	20,200,960	40,652,160	85,085,440	174,681,600
RAID1/RAIDA	8,080,384	16,260,864	34,034,176	69,872,640
RAID5(4D+1P)	16,160,768	32,521,728	68,068,352	139,745,280
RAID5(3D+1P)	12,120,576	24,391,296	51,051,264	104,808,960
RAID5(2D+1P)	8,080,384	16,260,864	34,034,176	69,872,640

②When n drives are mounted on a row (n < 5);

- RAID0

Number of logical blocks = $m^{(*)1} \times n^{(*)2}$

- RAID1

Number of logical blocks = $m^{(*)1} \times \text{int}(n/2)^{(*)3}$

*1: Refer to the table below for m.

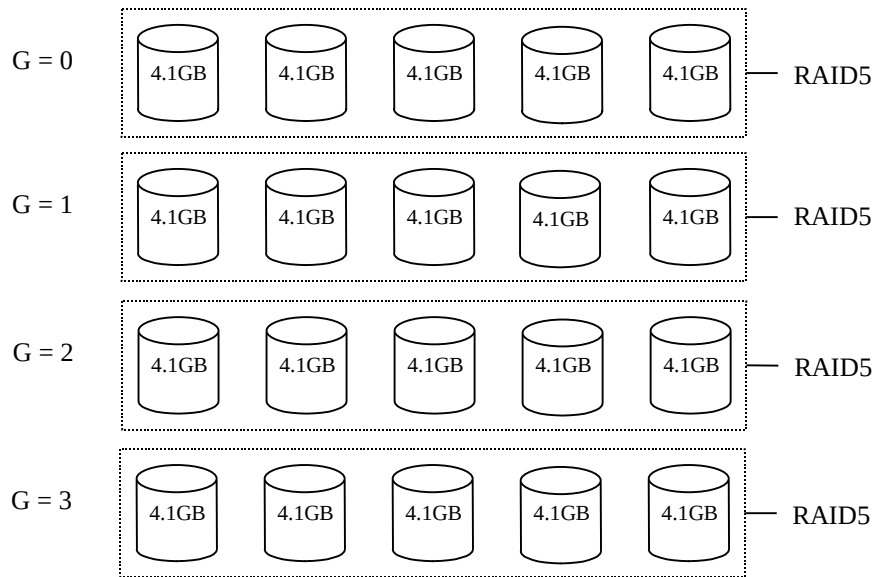
*2: n is 2 or larger in this case.

*3: int means "rounding down".

	DF-F350-A2E2	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	DF-F350-A1E18
Capacity	(2.0GB)	(4.1GB)	(8.7GB)	(17.8GB)
m	4,040,192	8,130,432	17,017,088	34,936,320

(5) Examples of the number of logical blocks set are shown below.

Example ① An example of a logical unit of disk (4.1GB 20units) is devied into 8LUs.



Groups 0 to 3 are all defined as RAID5 and all the groups are divided into eight logical units each with almost the same capacity. Each group is thus divided into two logical units.

- Group 0

Since the number of logical blocks for RAID5 is taken as 32,521,728 ($512 \times 63,519$) from subsection ① of (4), the result becomes $63,519 \div 2 \doteq 31,760$.

Thus, enter the following.

LU0: G=0

C=16,261,120 ($512 \times 31,760$)

LU1: C=16,260,608 ($512 \times (63,519-31,760)$)

- Groups 1 - 3

Enter LU2 to LU7 in the same way as for Group 0.

LU2 : G=1

C=16,261,120

LU3 : C=16,260,608

LU4 : G=2

C=16,261,120

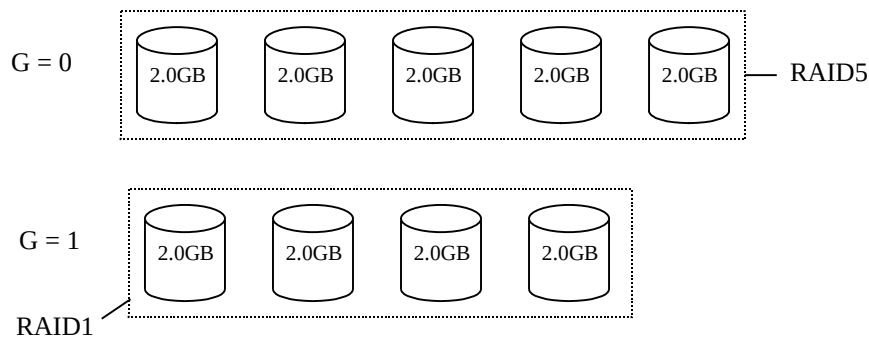
LU5 : C=16,260,608

LU6 : G=3

C=16,261,120

LU7 : C=16,260,608

Example ② An example of a logical unit of disk (2.0GB 9units) is devied into 5LUs.



The following shows an example in which a mixture of different RAID levels is used between Group 0 and 1, and each group is divided into logical units with a capacity different from each other.

- Group 0

Since the number of logical blocks for RAID5 is taken as 16,160,768 ($512 \times 31,564$) from subsection ① of (4), Group 0 is divided into three LUs as shown below.

Enter the following.

LU0 : G=0

C=800,768($512 \times 1,564$)

LU1 : C=5,120,000($512 \times 10,000$)

LU2 : C=10,240,000($512 \times (31,564-1,564-10,000)$)

- Group 1

Since the number of logical blocks for RAID1 is calculated as $4,040,192 \times \text{int}(4/2) = 8,080,384$ ($128 \times 63,128$) from subsection ② of (4), Group 1 can be divided into two LUs as shown below.

Enter the following.

LU3 : G=1

C=2,960,384($128 \times 23,128$)

LU4 : C=5,120,000($128 \times (63,128-23,128)$)

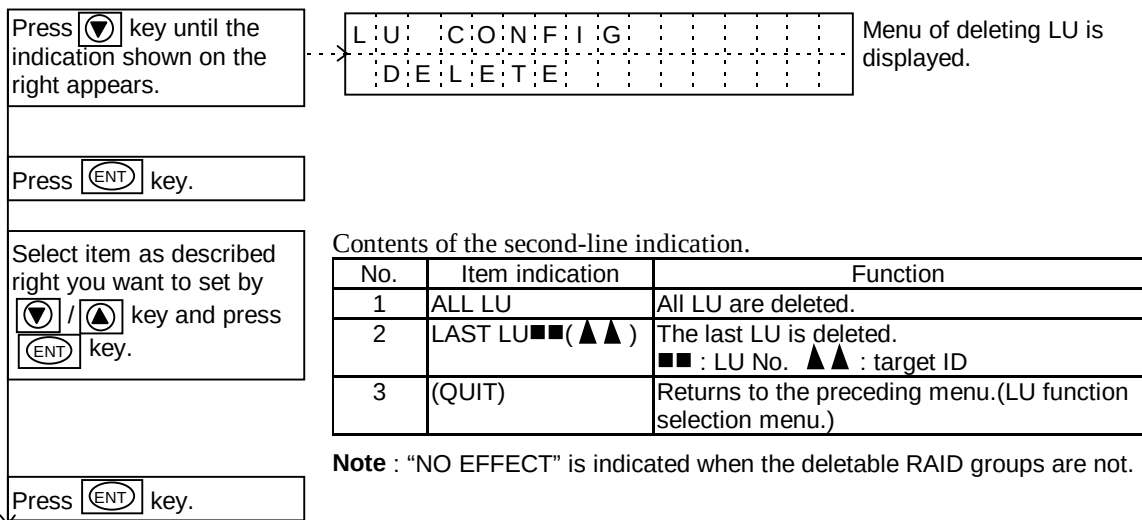
[Procedure③-D] Deleting LU

Note : All user data is lost by deleting the LU.

Be sure to back-up the user data before deleting the LU.

Operation

Panel display



In case of deletion of all LU, go to ①.

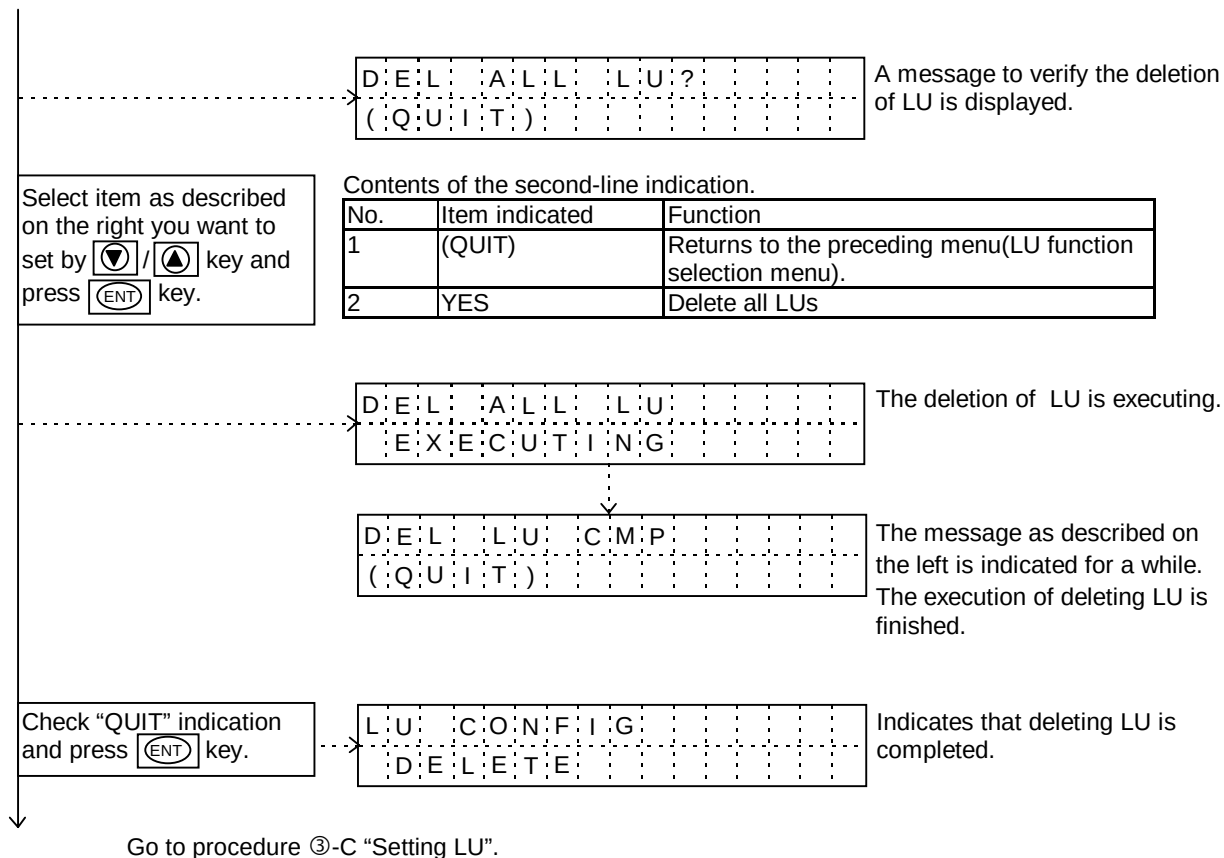
In case of deletion of the last LU, go to ②.

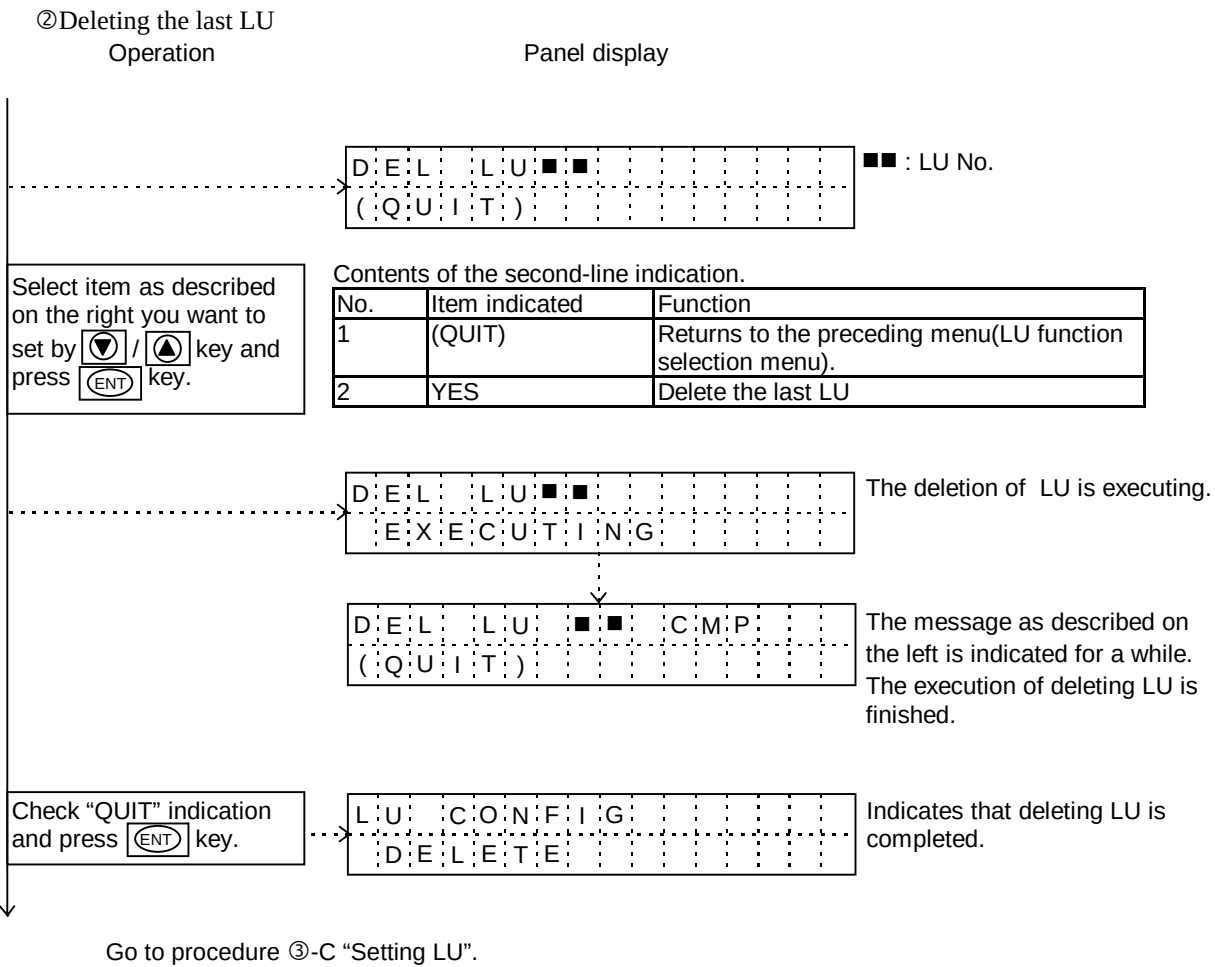
To cancel this operation menu, choose QUIT.

①Deleting all LU

Operation

Panel display



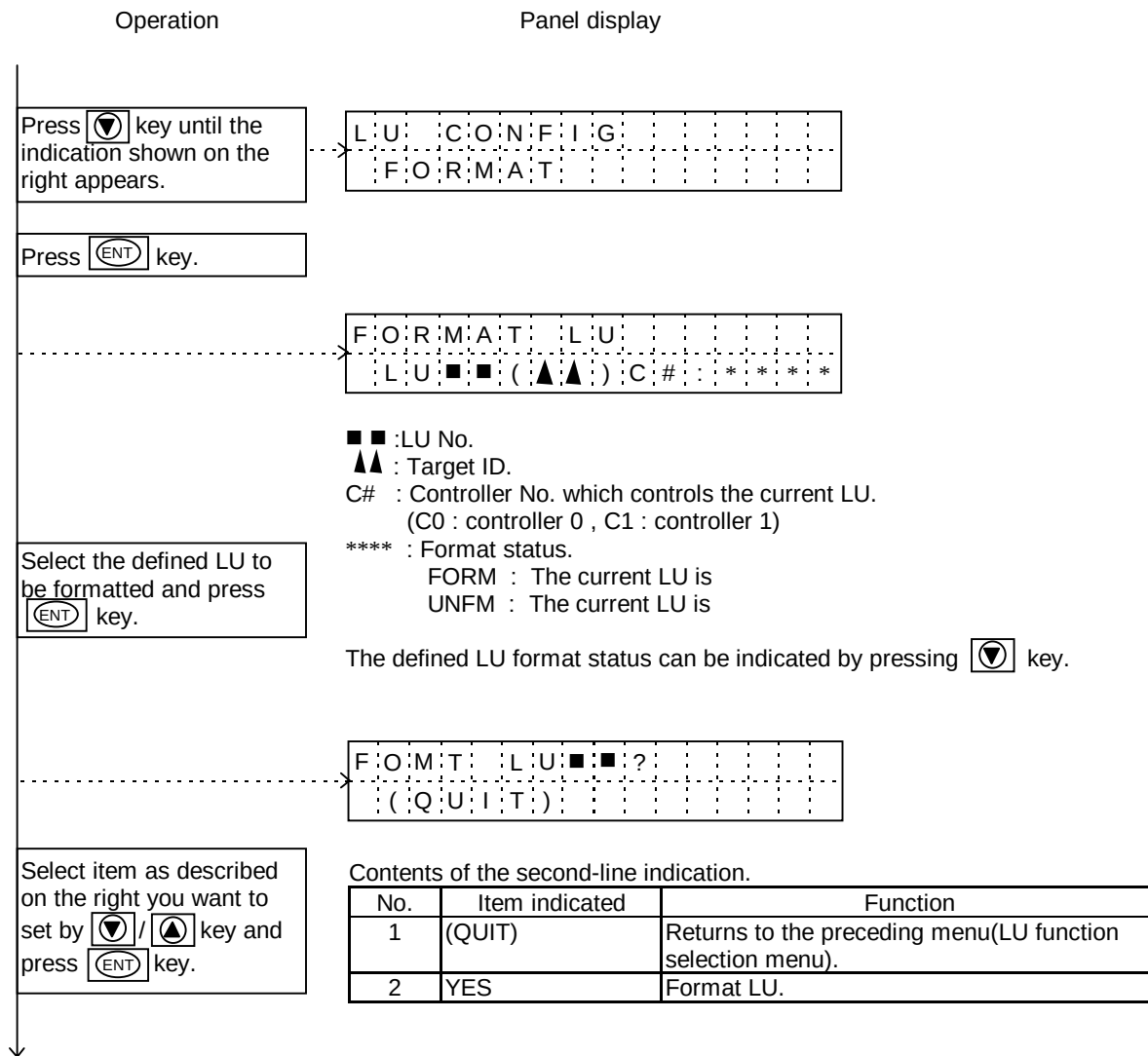


[Procedure③-E] Formatting

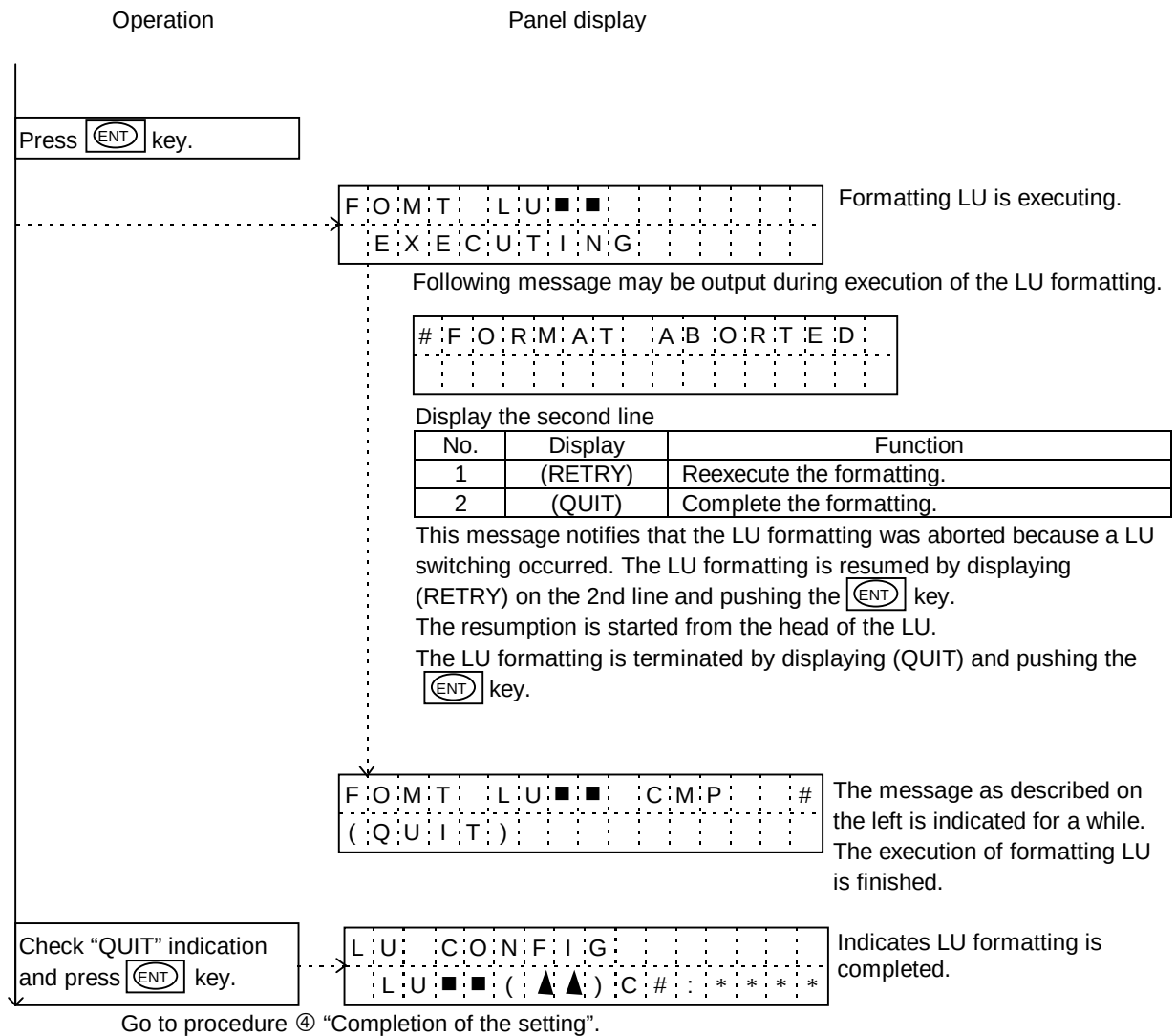
Notice : Note that user data will be lost by formatting the formatted LU.

Besides, be sure to execute the LU formatting for each set LU. When the microprogram of version 0304 or later is used, read/write access from the upper device is possible to the LUs other than that being formatted. Accordingly, the formatting for the LU newly added can be executed while executing usual jobs after the addition of the row(s) following the procedures explained on pages RW-OPTION0220 - 0310.

However, a reexecution is needed because the LU format is canceled when the subsystem receives a SCSI reset from the upper device.

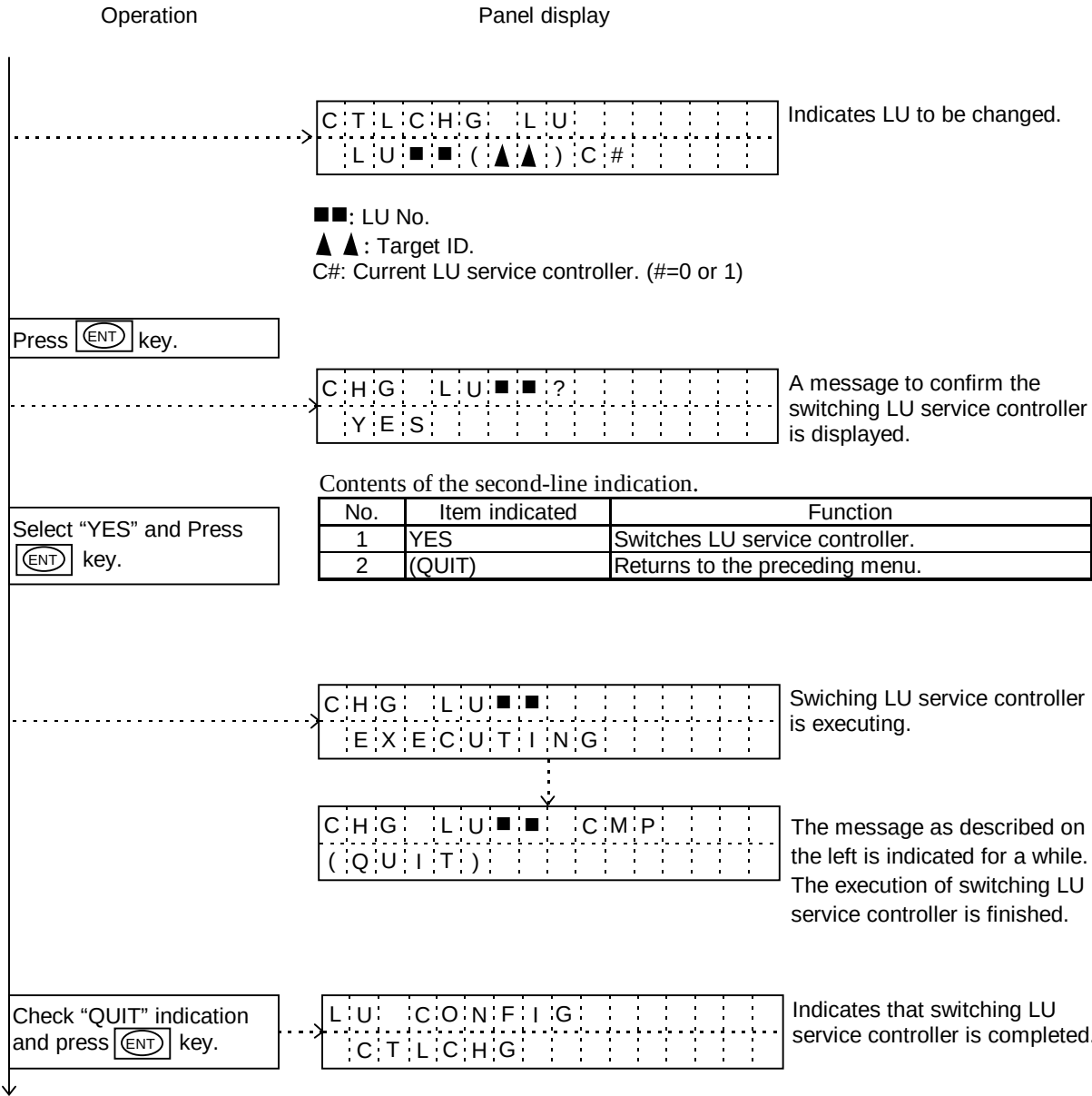


Note : LU format must be executed every set LUs.



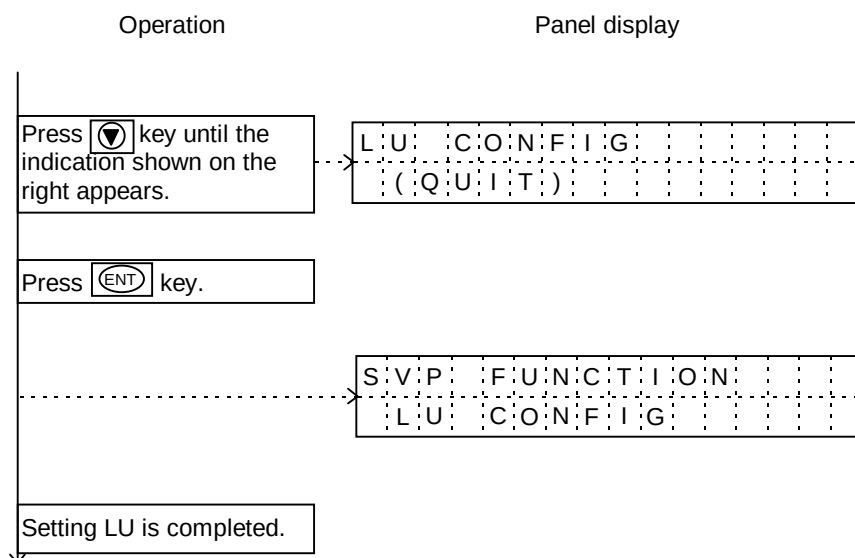
[Procedure③-F] Switching LU service Controller

Note : This function can be used when dual active mode in the dual system is set.



Note : Turn on the power of the subsystem again to make valid switching LU service controller.

[Procedure④] Completion of the setting



LU setting for dual controller configuration

In the case of dual controller configuration(Dual active mode), each LU has to be allocated to a controller which controls that LU in the LU setting operation.

But in the case of dual controller configuration(Hot standby mode), all LU are automatically allocated to the controller #0. (When one of the controllers is blocked, all LU are automatically allocated to the other controller.)

4.2.4 Setting other parameter

The menu items and the use are shown below. Refer to PANEL chapter (PANEL0340) to change the parameter shown below. The function shown below can be used when the subsystem is ready and the LU#0 is already defined.

No.	Menu item	Use	Description	Setting before shipment
1	RAID CONFIG	RAID configuration information reference/setting menu	① Reference to RAID configuration information ② Definition of RAID group ③ Deletion of RAID group	
2	LU CONFIG	LU configuration information reference/setting menu	① Reference to LU configuration information ② Definition of LU ③ Deletion of LU ④ Formatting of LU ⑤ Switching LU service controller	
3	SYSTEM OPT (CUR)	System option setting (Only a current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time	
	SYSTEM OPT (SVD)	System option setting (A saved value and current value)	① Drive recovery execution mode ② Copyback recovery mode ③ Correction copy recovery mode ④ Setting of the dynamic sparing starting mode. ⑤ Setting of the interval time in the recovery ⑥ Setting of the unit of recovery processing ⑦ Setting of the Online Verify function ⑧ Setting of the idling time ⑨ Setting of the job time-out limit ⑩ Setting of the number of detections in the execution of the reselection time-out ⑪ Setting of the TRESPASS mode (*1)	
4	DRIVE MAINTEN	Drive maintenance menu	① Instruction of drive detaching ② Instruction of drive recovery ③ Reference to drive data recovery status ④ Drive self diagnosis ⑤ Parity matching check ⑥ ECC check ⑦ LA check ⑧ Drive format ⑨ Recovery of system information ⑩ Reference of the disk failure statistical information.	

*1 : This menu is displayed only when ALTERNATE PATH3 has been set by SPECIAL CONNECT of the system parameter.

No.	Menu item	Use	Description	Setting before shipment
5	MICRO VER/REV	Microprogram version/revision numbers reference menu	① Reference to microprogram version/revision	
6	GATHERING (CTL0)	Gathers information of the controller #0 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
7	GATHERING (CTL1)	Gathers information of the controller #1 in FD in case of dual system configuration	① Output of dump information being stored in the drive to floppy disk ② Output of trace information being stored in the drive to floppy disk ③ Output of trace information being stored in the memory to floppy disk	
8	MEMORY MAINT	Memory content reference/update menu	① Reference/update of memory content	
9	RECV ERR INFO	Error display of recovery when the power is on	① Displays the errors occur during recovery operation performed while power is on	
10	PIN INFO	Display of PIN existence of every LU	① Display of PIN data existence	
11	WARNING INFO	Display of unrecovered warning information	The current warning information is indicated	
12	CLEAR LOG(CT0)	Clearing log information of controller #0	Log information related controller and host I/F is cleared	
13	CLEAR LOG(CT1)	Clearing log information of controller #1	Log information related controller and host I/F is cleared	
14	THRESHOLD	Reference/setting of the threshold value.	Reference/setting of the threshold value.	

5. Changing the Configuration

5.1 Shifting to Hot Standby from Dual Active

Shifting to Hot Standby from Dual Active while the controller is blocked cannot be performed. Perform the shifting after the blockage is recovered. If PIN segment exists, shifting cannot be performed. Perform the shifting after the PIN segment is recovered.

To see if PIN segment exists, refer to PANEL chapter (PANEL0690 (8)).

- (1) Before turning the power on, set DIP switch No.4 as Figure 5.1.1.

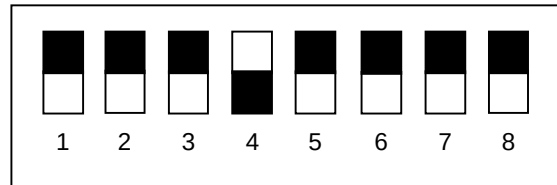
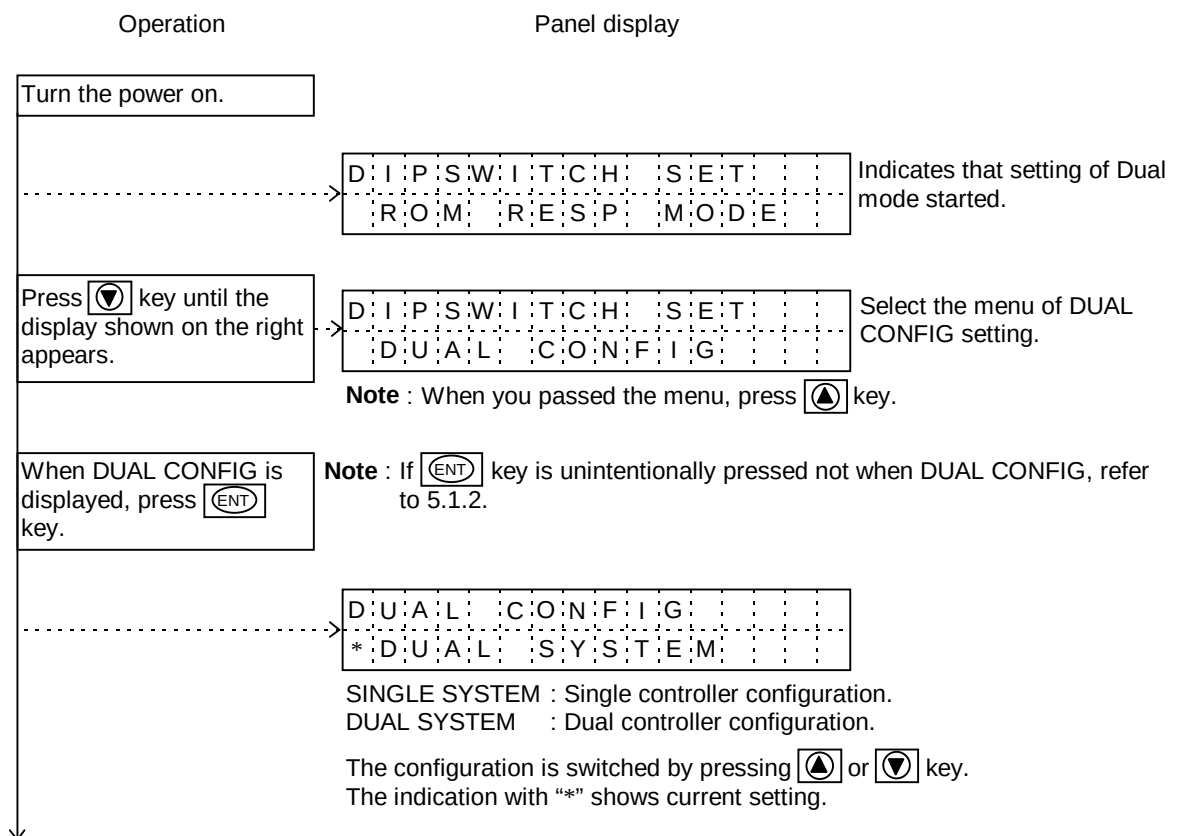
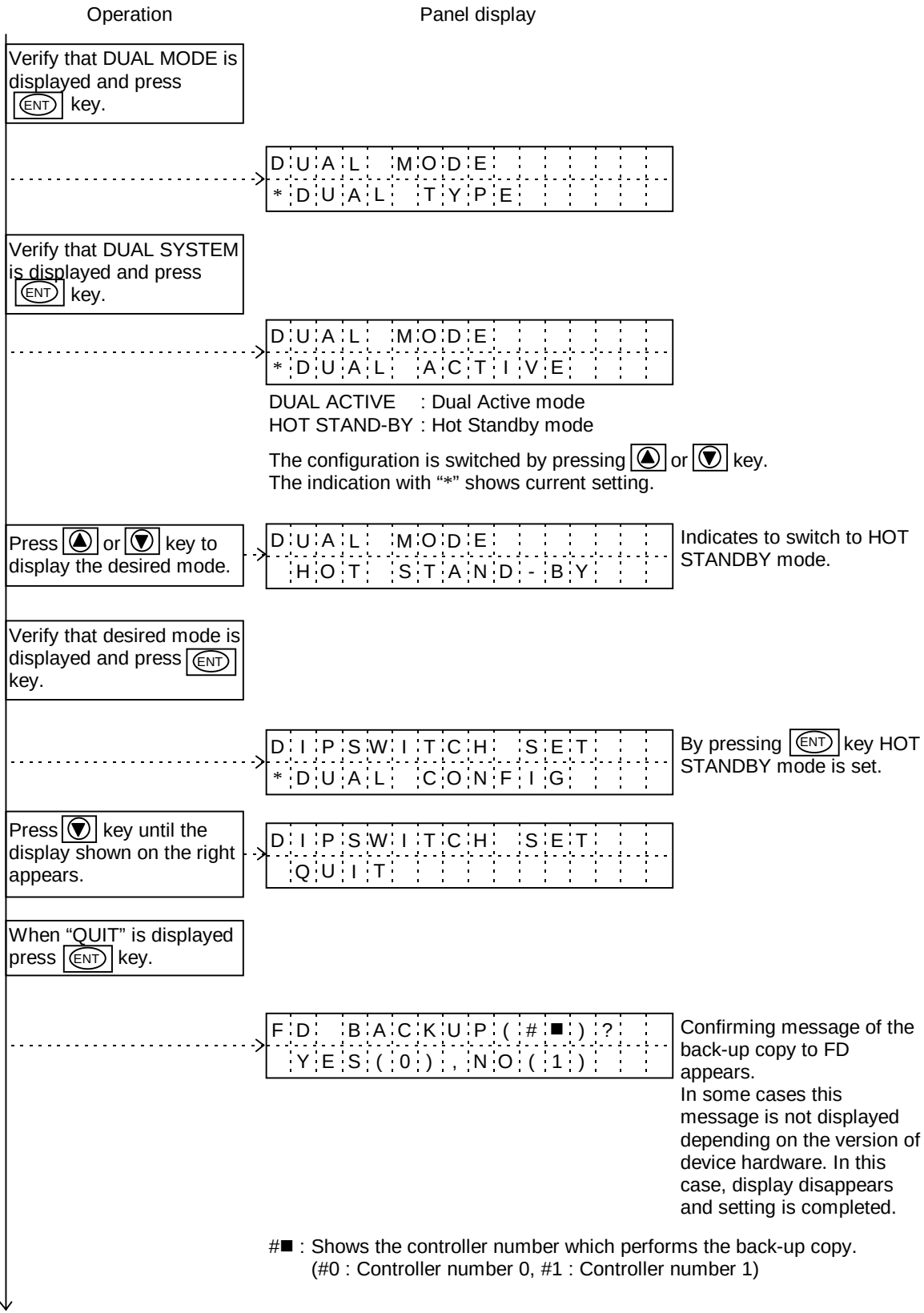
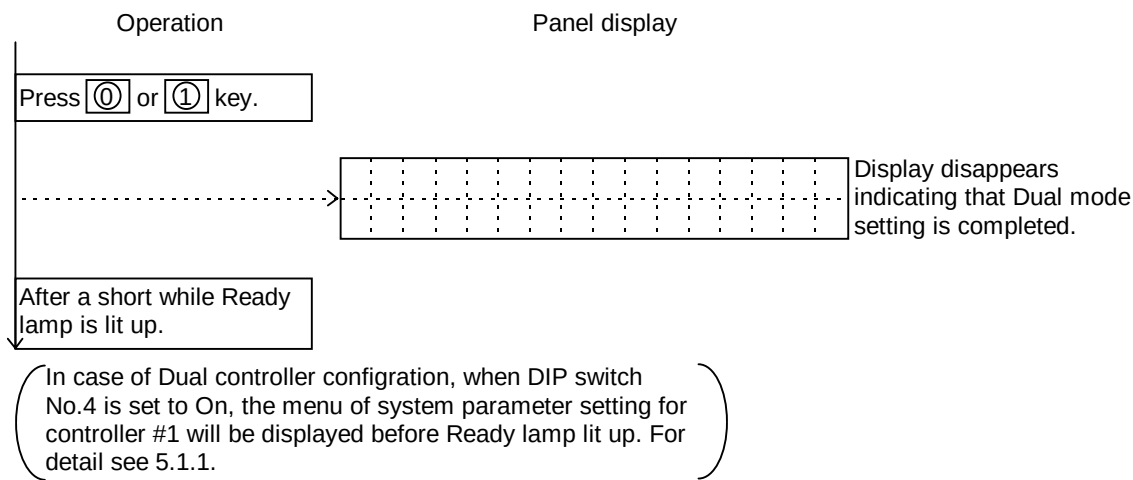


Figure 5.1.1 DIP switch for shifting to Dual system

- (2) Perform as the procedure shown below.







(3) Set DIP switch No.4 as Figure 5.1.2. (Shifting to Dual System has not started yet.)

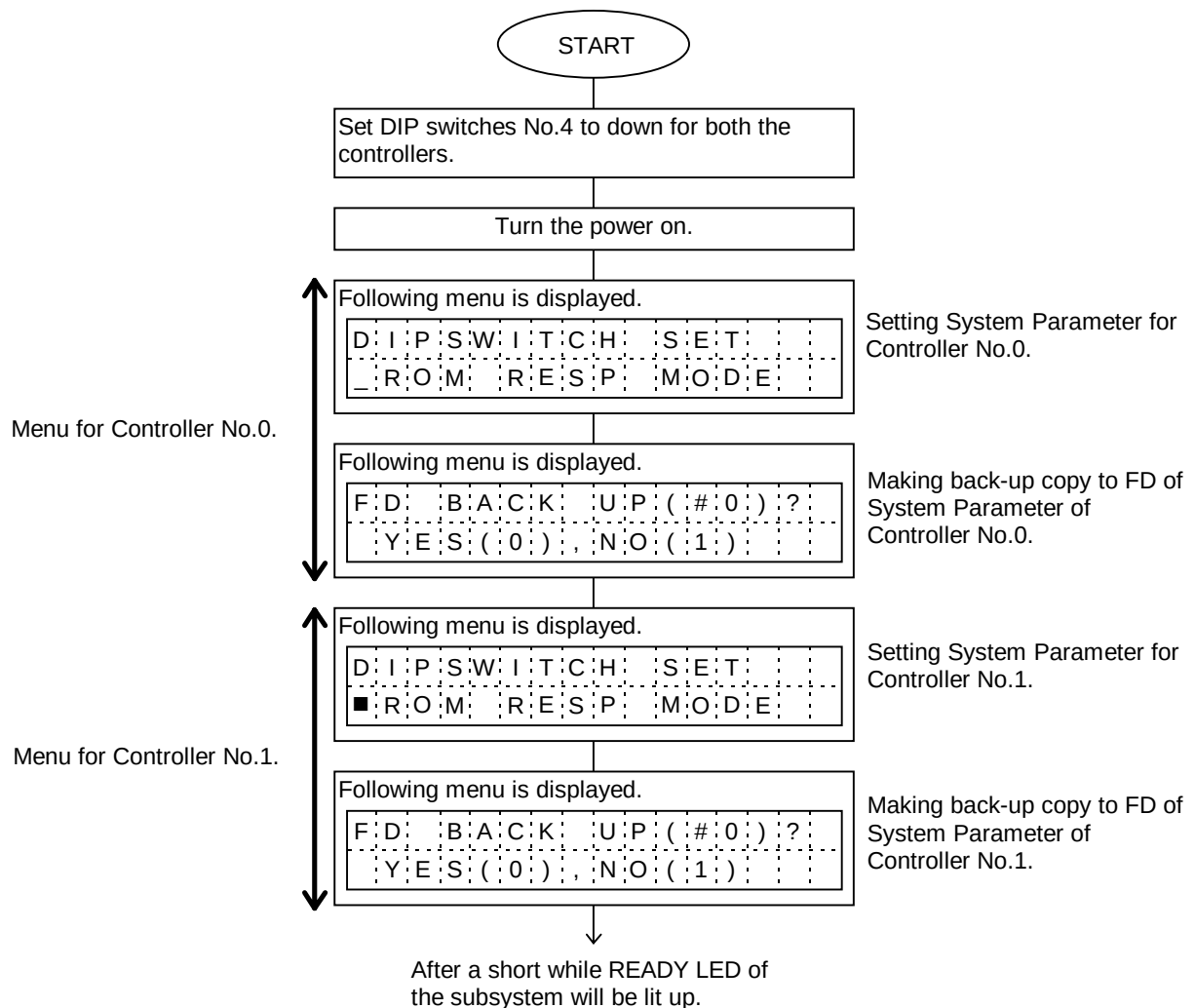


Figure 5.1.2 DIP Switch, shifting to Dual System has not started yet.

- Note 1 :** When setting Dual mode under dual controller, the setting of controller No.0 will be valid. The setting of controller No.1 will be ignored.
- Note 2 :** After switching to Dual Active configuration from Hot Standby configuration, Controller No.0 will be the LU Service Controller for previously set LU. To switch LU Service Controller No.1, see “6 PANEL Chapter” (PANEL0570 (4-5)).

5.1.1 Operation of system parameter setting menu under dual controller configuration

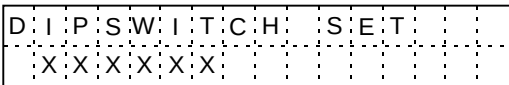
Set DIP switches No.4 to down for both controllers under dual controller configuration, and turn the power off to set the information on EEPROMs of both the controllers.



Note : In case one of DIP switches No.4 is set to down under dual controller configuration, after completion of menu setting for the corresponding controller, READY LED of the subsystem will be lit up.

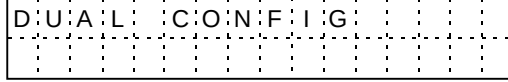
5.1.2 Returning procedure in system parameter setting menu

During system parameter setting menu when wrong menu is selected ( key is pressed), the method of returning for each menu is shown below.

After the operation below  is displayed.

(XXXXXX : Wrongly selected menu)

Then select desired menu by pressing  or  key.

No.	Menu	Procedure to return
1	ROM RESP MODE	Press  key.
2	WRITE&VERIFY	Press  key.
3	STRIPE SIZE	Press  key.
4	LAN CONST	Press  key to display “QUIT” and press  key.
5	TARGET ID	Press  key.
6	CONNECT AS/400	When NOT CONNECT : Press  key. When CONNECT AS/400 : Press  key, and after displaying “QUIT”, press  key.
7	CONNECT VMS	Press  key.
8	SPECIAL CONNECT	Press  key.
9	SAVE DATA PTR	Press  key.
10	HOST BLK SIZE	Press  key.
11	ERROR INF	Press  key.
12	CONTROLLER	Press  key.
13	SPARE DISK	Press  key.
14	SERIAL NO	Press  key.
15	ROM V/R	Press  key.
16	RAM V/R	Press  key.
17	CONTROLLER NAME	Press  key.
18	ROW LAST LBA	When Menu is ROW LAST LBA : Press  key to display “QUIT”, then press  key.
19	BUZZER	Press  key.
20	SYSTEM ERROR	Press  key.
21	GENERATE SYS	Press  key.
22	INQUIRY INF	Press  key to display “QUIT” and press  key.
23	DUAL CONFIG	Press  key until  is displayed.
24	LU SIZE	Press  key.
25	SYNC CONTROL	Press  key.
26	SYS REV	Press  key.
27	OPTION	Press  key.
28	BOOT PROG V/R	Press  key.
29	RTC SET	Press  key to display “QUIT(ENT KEY)” and press  key.

6. Subsystem Settings for Use in Special Modes

6.1 When Using I/O Path Switching Function in the State Being Connected to IBM RS6000

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to IBM RS6000, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.1.1.

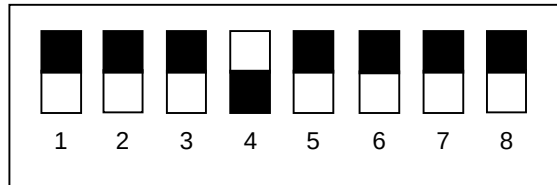
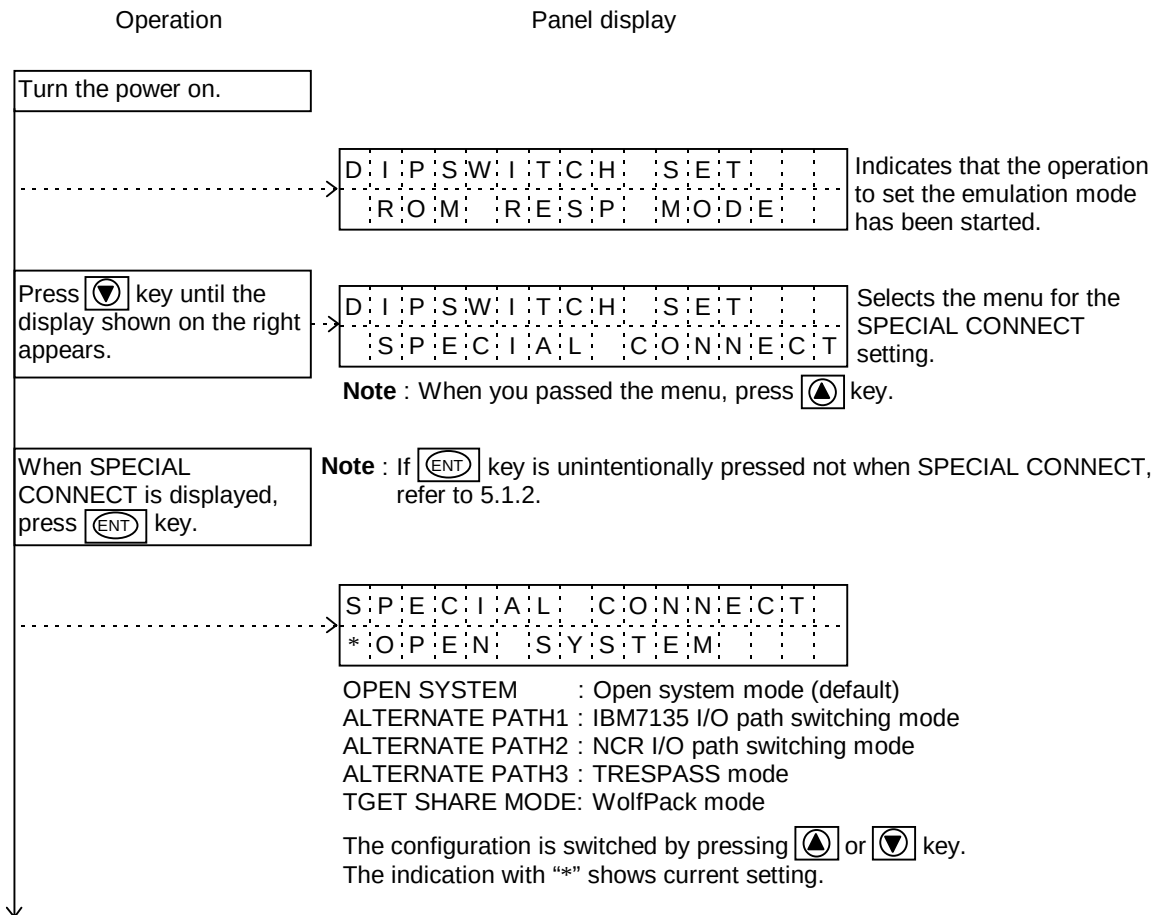
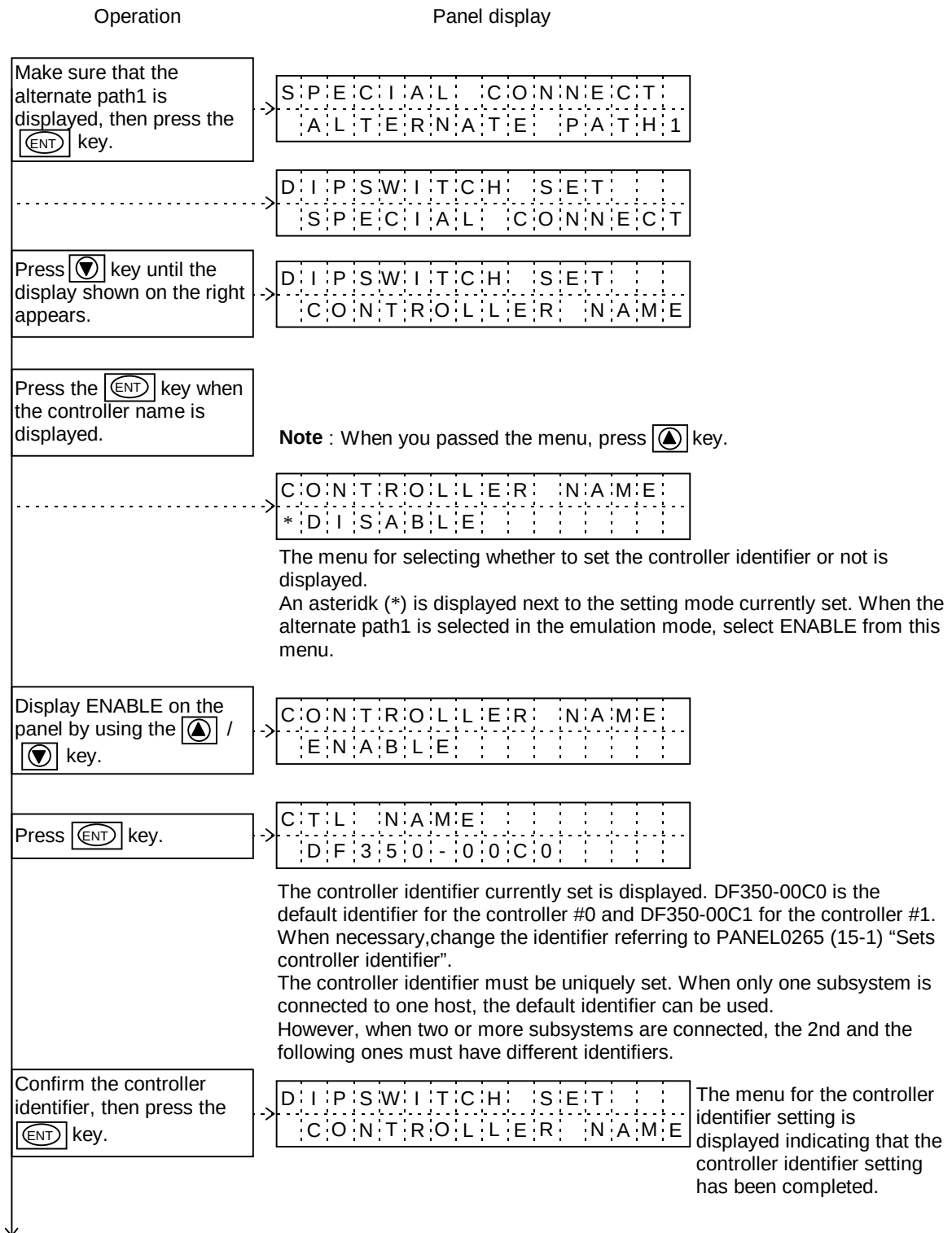
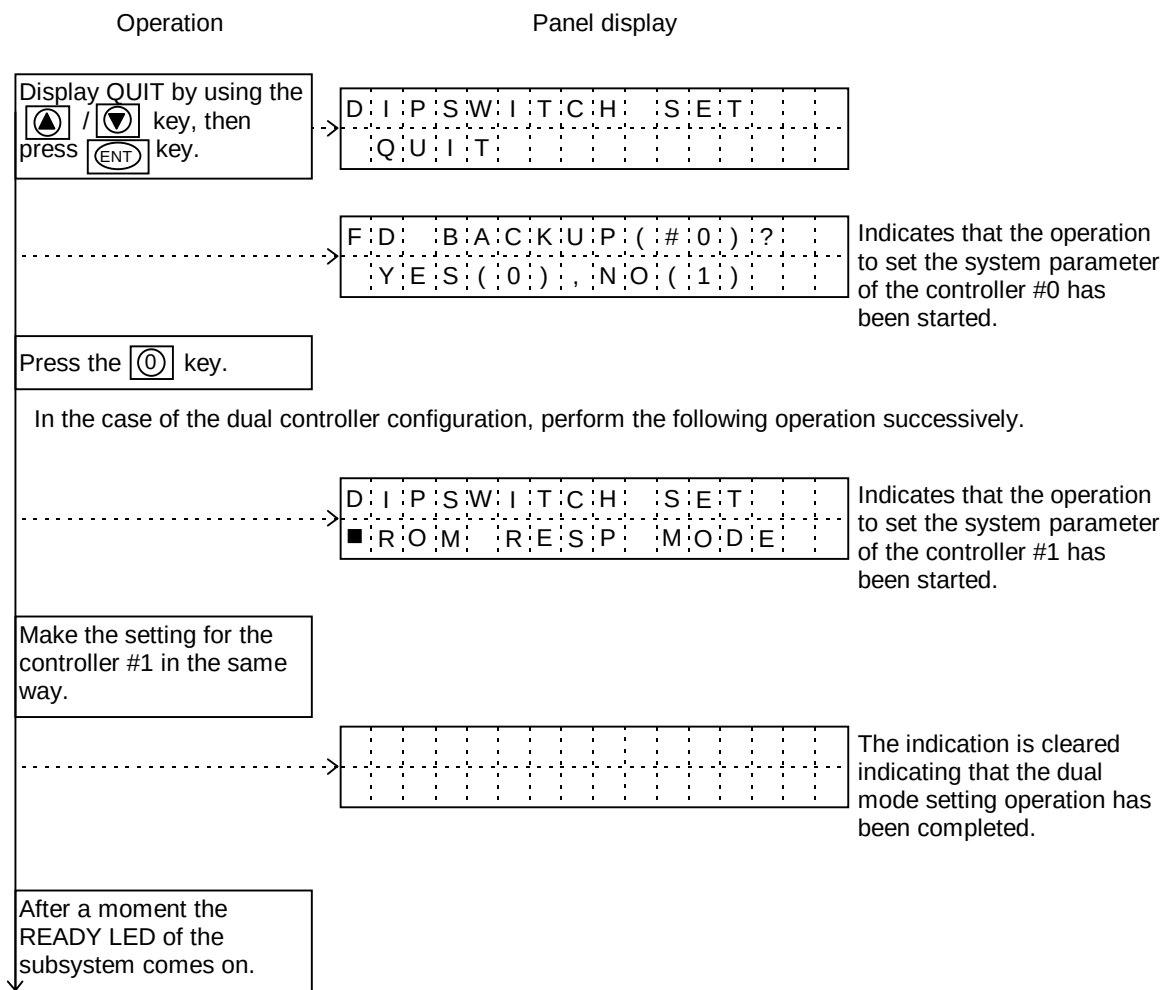


Figure 6.1.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.1.2.

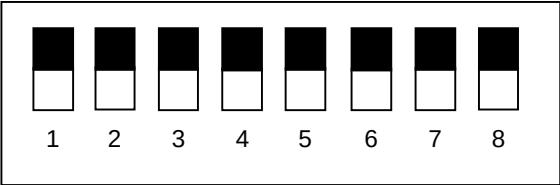


Figure 6.1.2 DIP switches (Being set for Standard setting)

6.2 When Using I/O Path Switching Function in the State Being Connected to NCR World Mark

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to NCR World Mark, settings instructed below are required.

- Emulation mode setting
- Controller identifier setting

(1) Before turning the power on, set DIP switch No.4 as Figure 6.2.1.

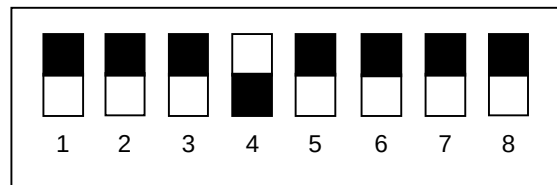
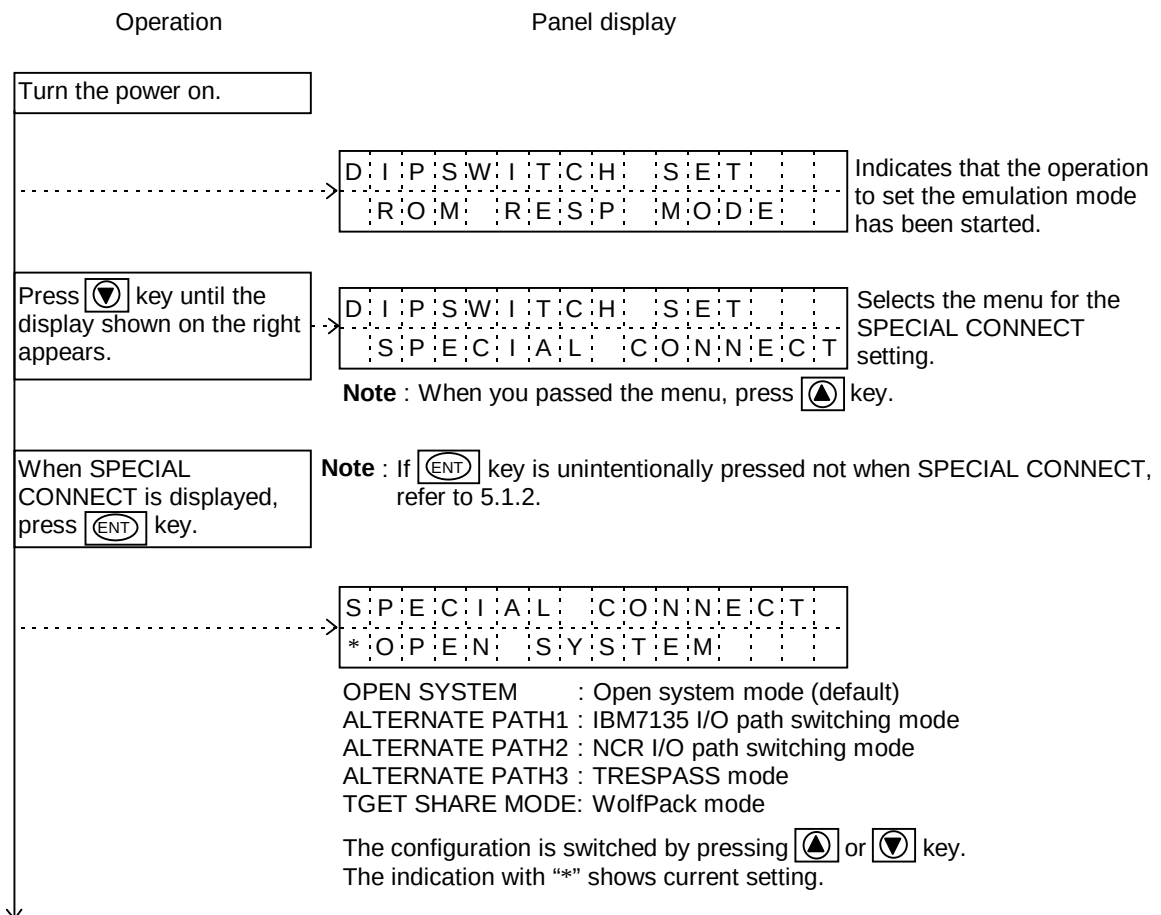
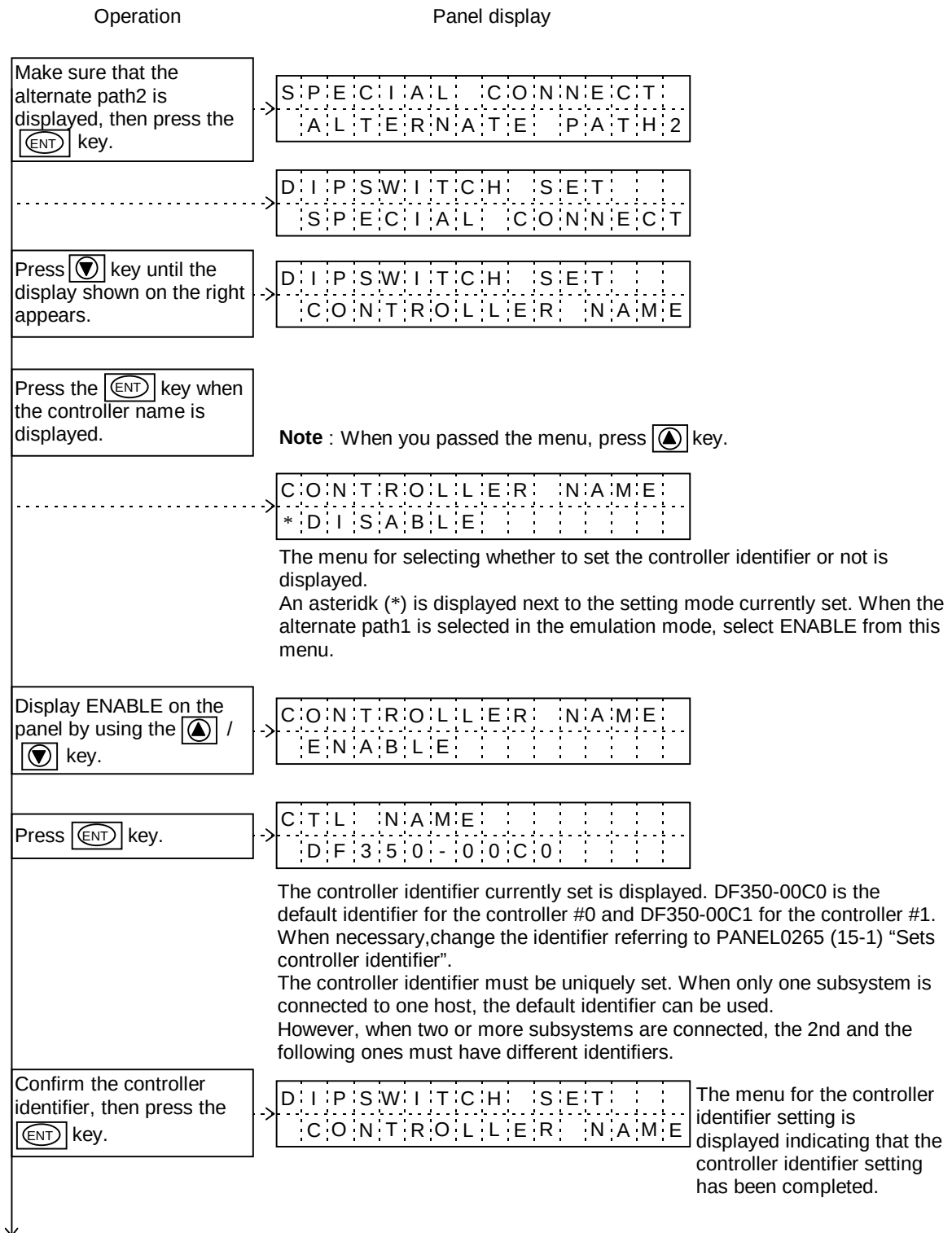
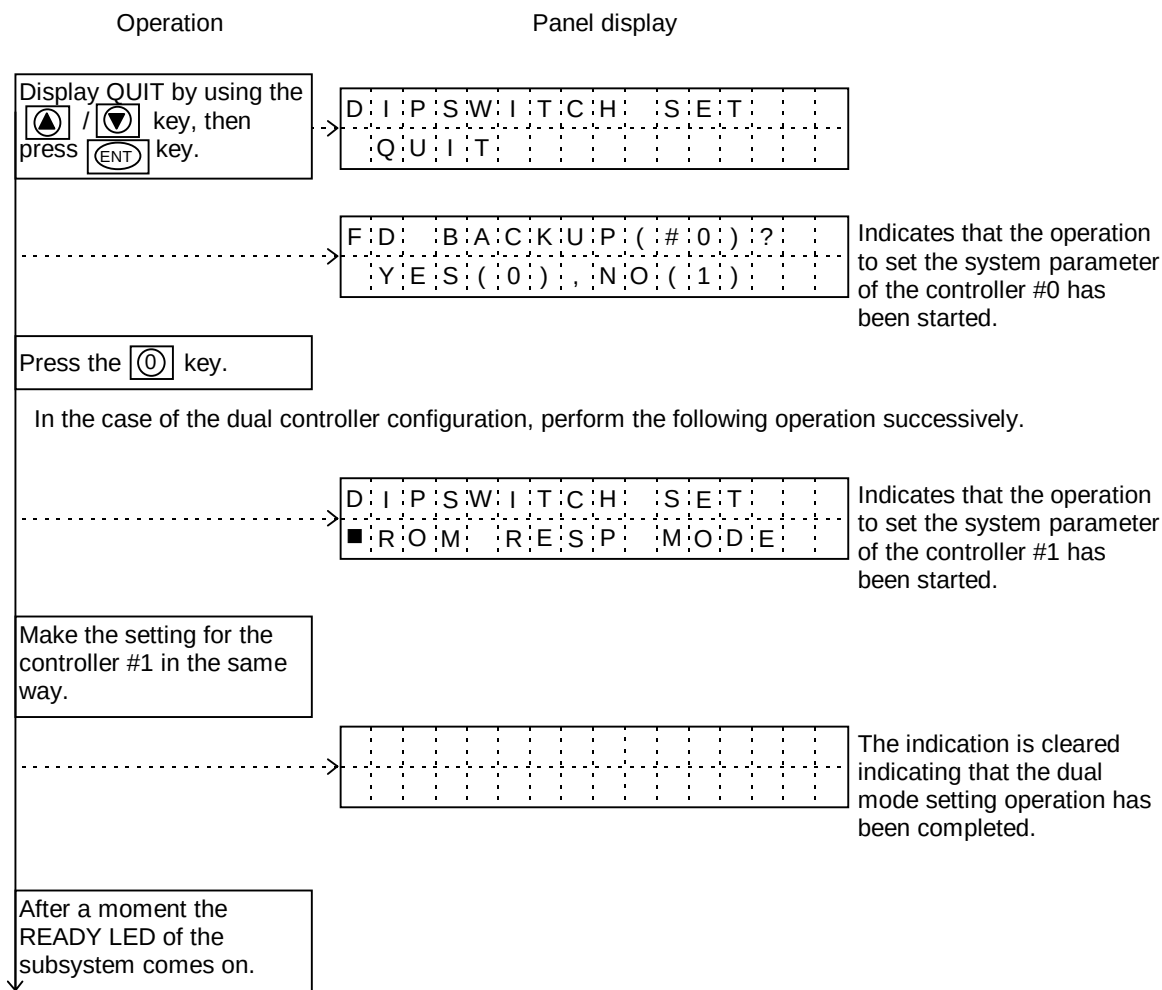


Figure 6.2.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.







(3) Set the DIP switch No.4 as shown in Figure 6.2.2.

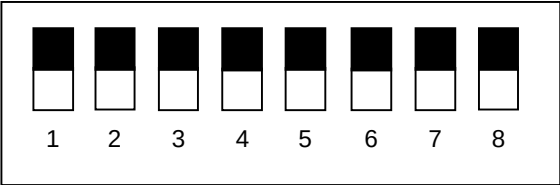


Figure 6.2.2 DIP switches (Being set for Standard setting)

6.3 When Using I/O Path Switching Function in the State Being Connected to Sequent NUMA-A

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

When using the I/O path switching function in the state being connected to Sequent NUMA-A, setting of the emulation mode and the setting of the TRESPASS mode from the SVP function is needed.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.3.1.

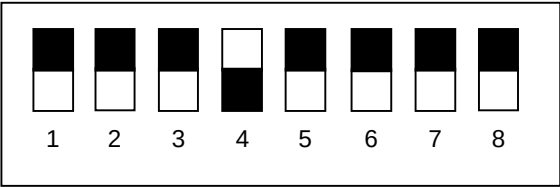
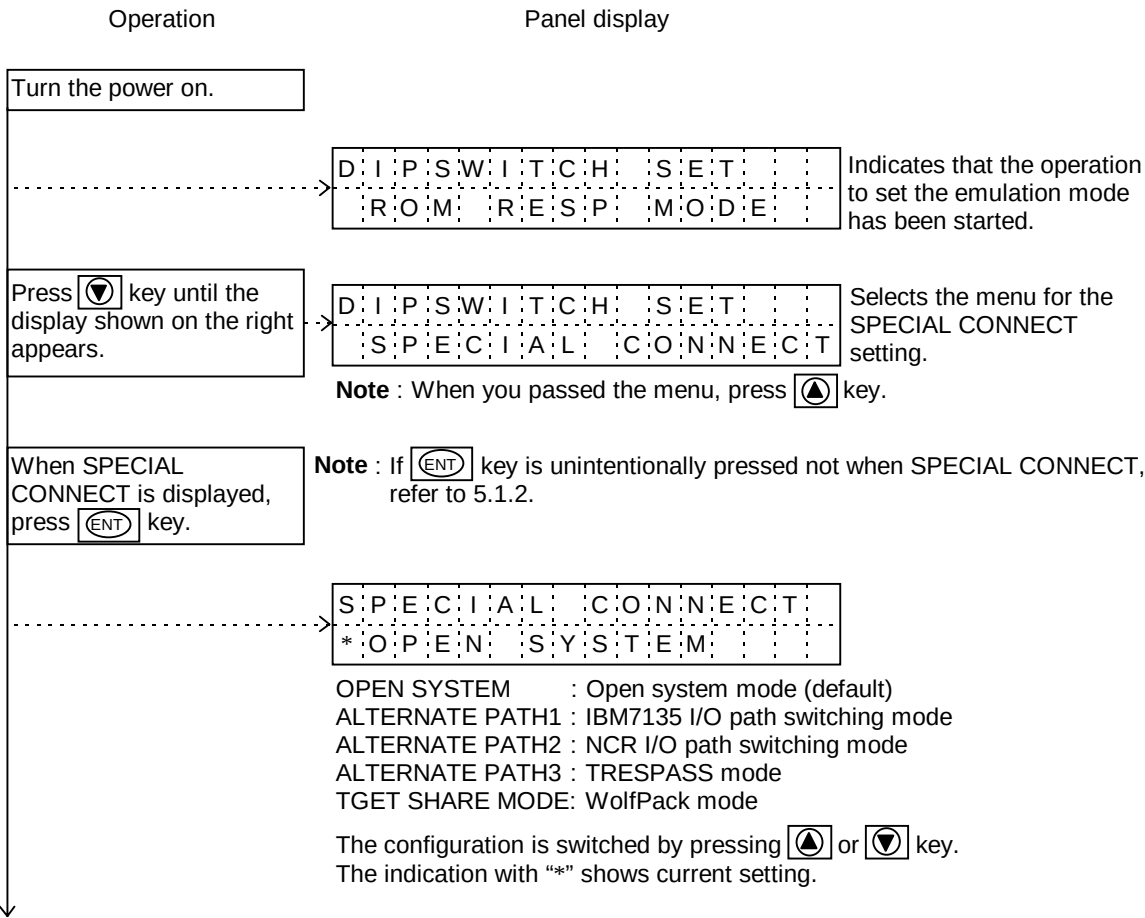
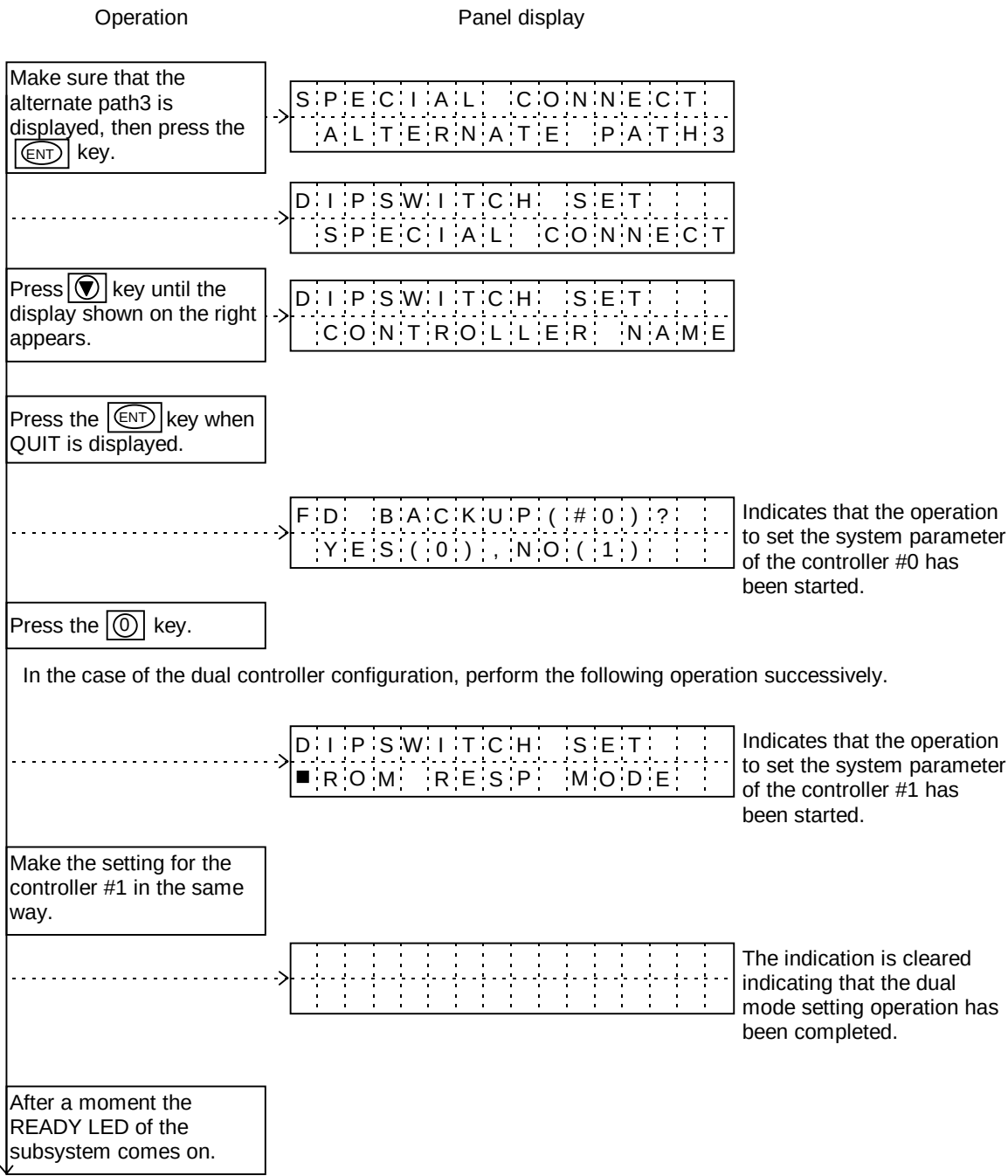


Figure 6.3.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.3.2.

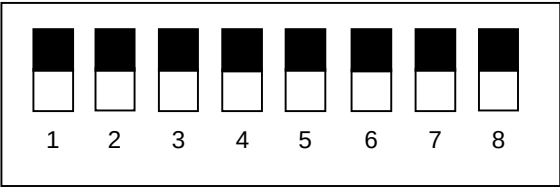
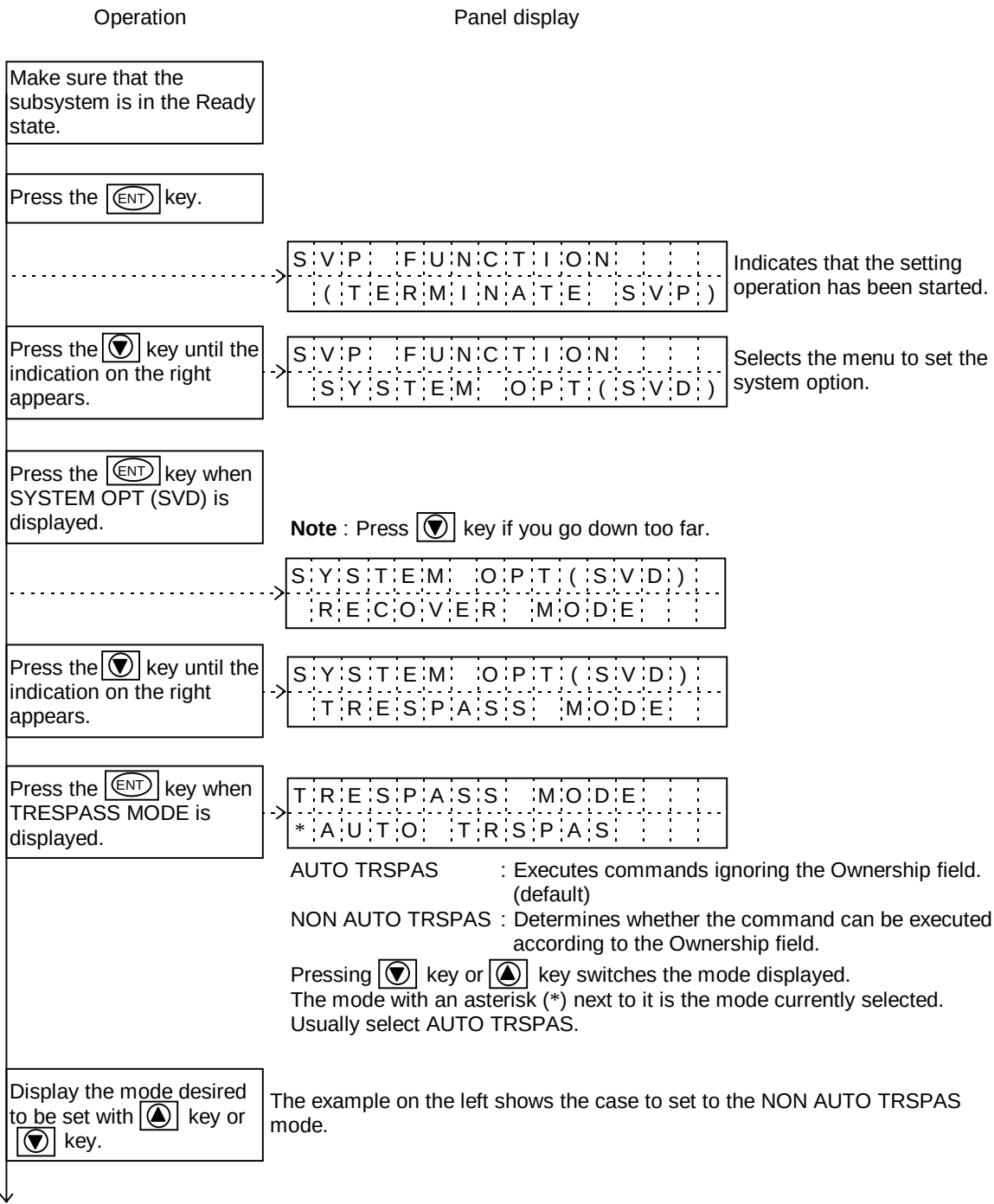
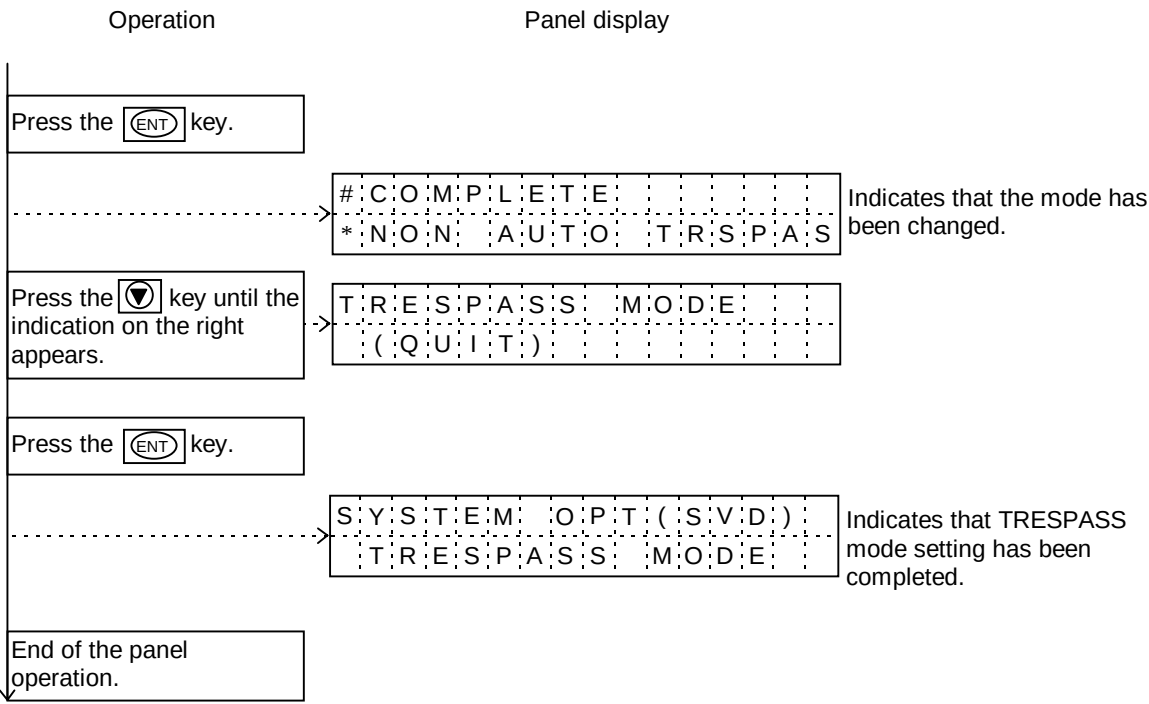


Figure 6.3.2 DIP switches (Being set for Standard setting)

(4) Setting the TRESPASS mode.

This function can be used when the subsystem is in the Ready state. (There is no need to set the DIP switch or reset the power. Ready/write operation cannot be executed from the host while this operation is being performed. When the host command is received, “Not Ready” is returned to the host.)





6.4 Using in the 1024-byte Host Block Size Mode

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

In order to use the subsystem with a host block size of 1024 byte, the host block size must be set to 1024 bytes when defining the LU. Accordingly, the LU used with a host block size of 512 bytes cannot be used in the 1024 byte host block size mode. In this case, it is necessary to redefine the LU.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.4.1.

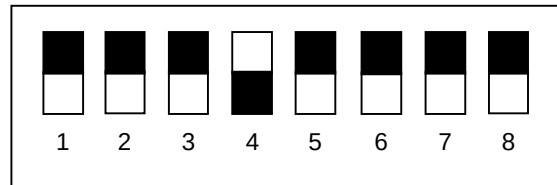
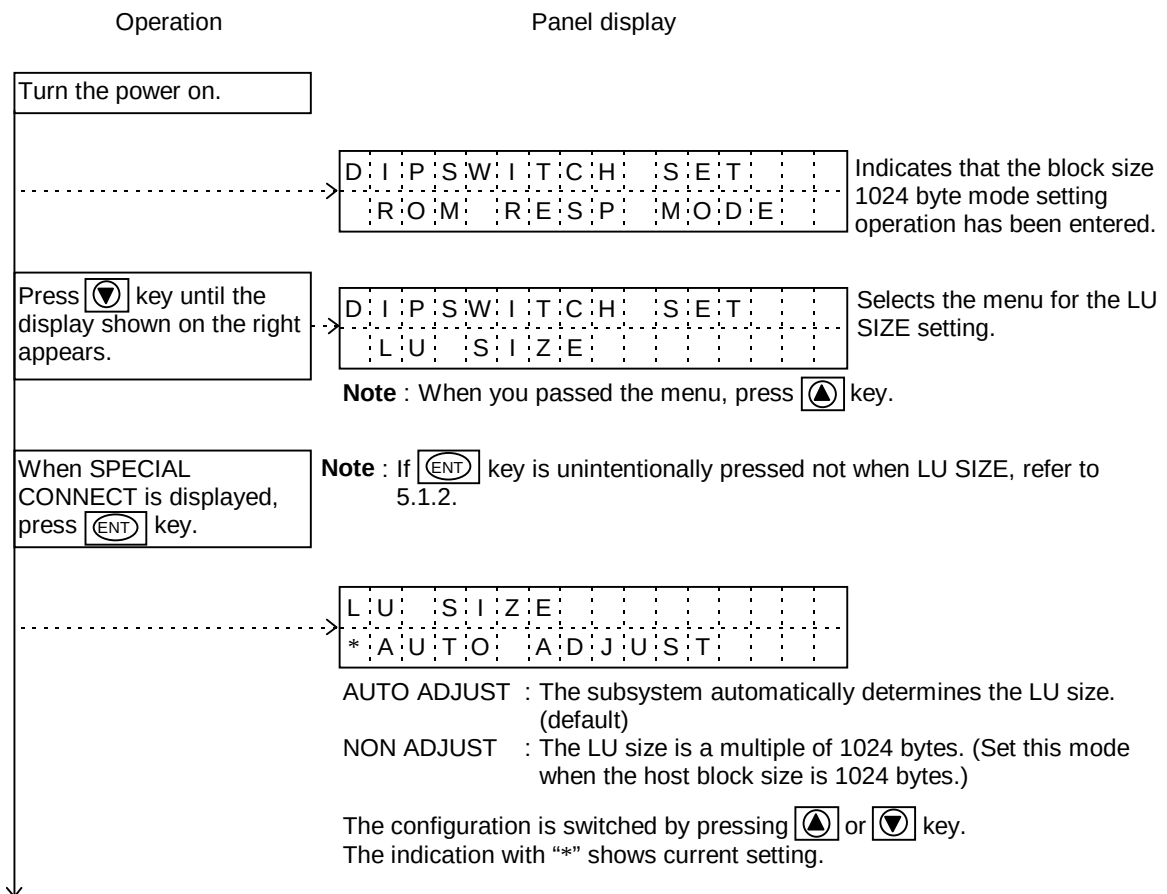
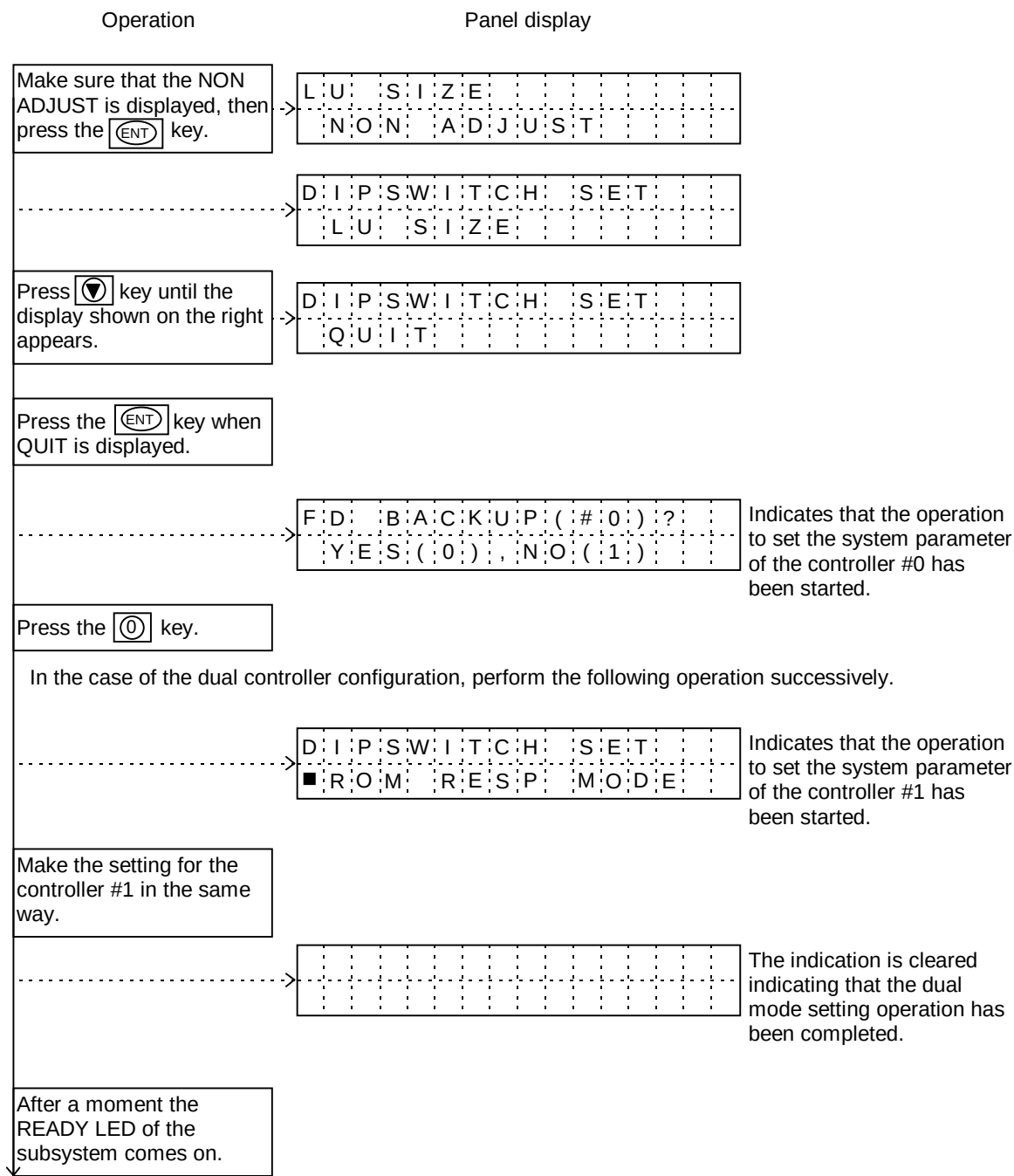


Figure 6.4.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.4.2.

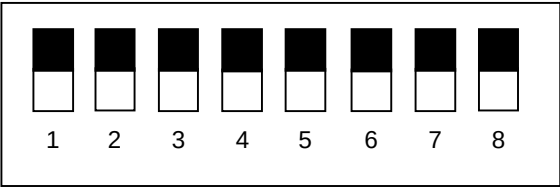


Figure 6.4.2 DIP switches (Being set for Standard setting)

(4) Setting of the host block length when setting the LU.
When setting the LU, define the host block size as 1024 bytes. (See PANEL0570 “Adds the LU” for a detailed explanation.)

6.5 Using in the WolfPack Mode

6.5.1 When the WolfPack is used in the single configuration

Use a combination of the microprogram version 0303 or later and Flash Program version PB24 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.5.1.

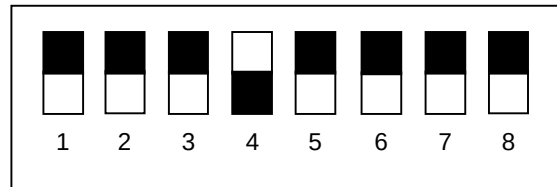
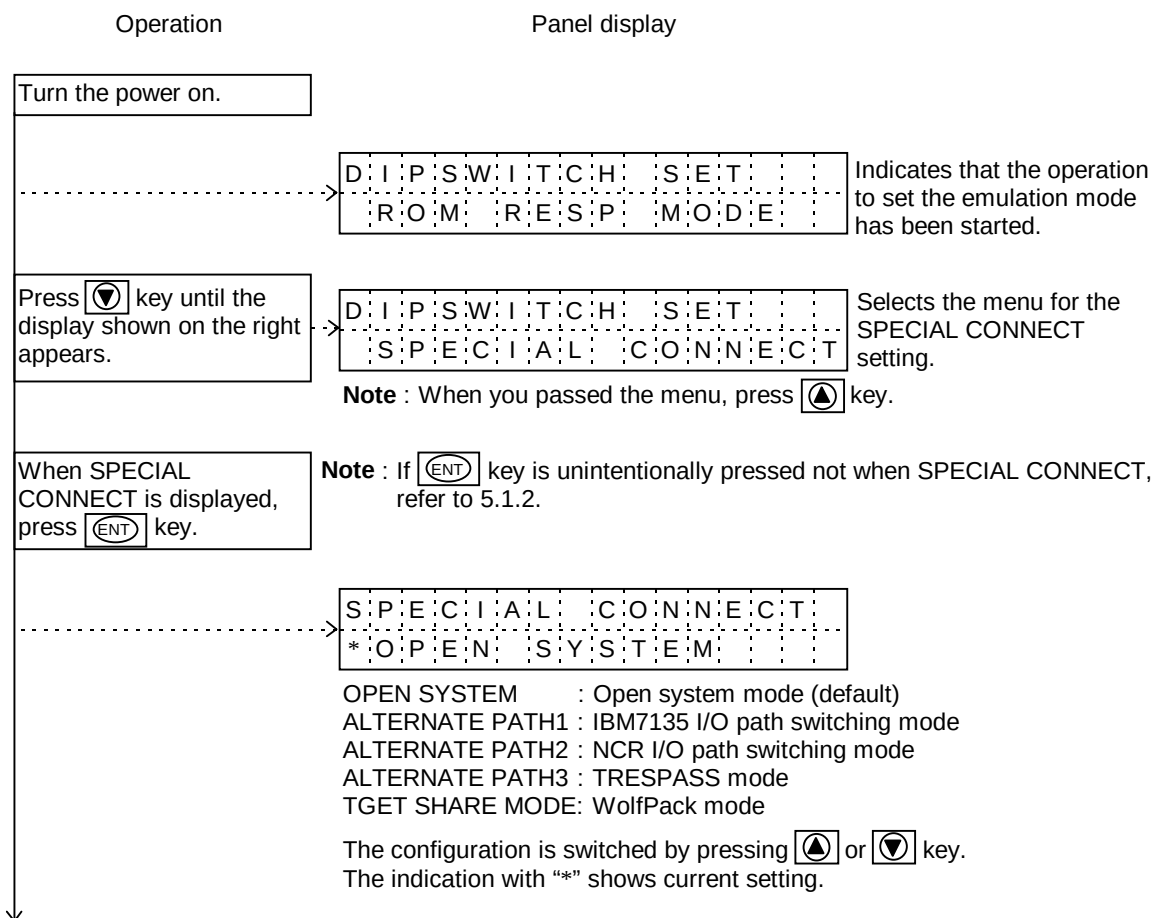
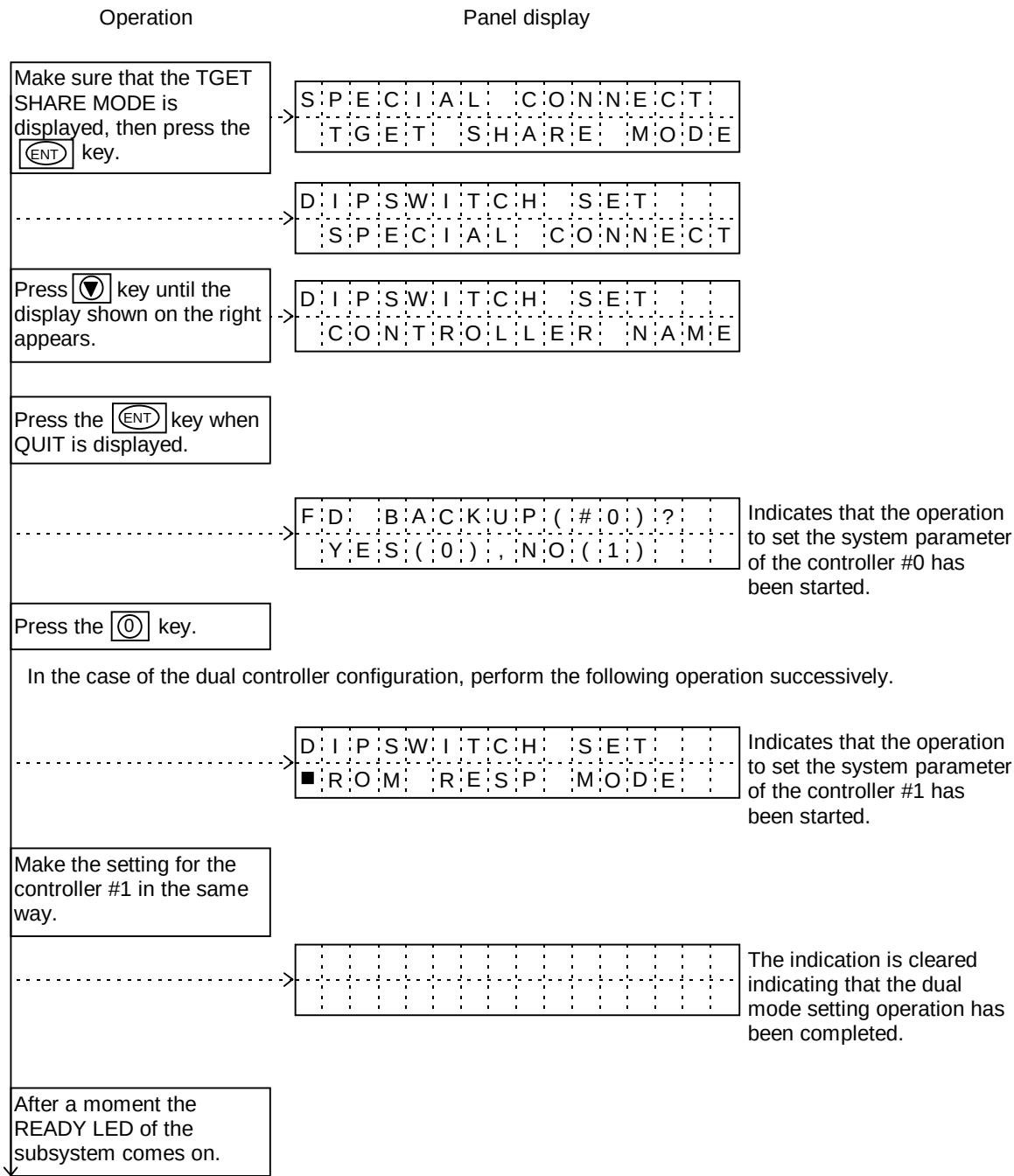


Figure 6.5.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.5.2.

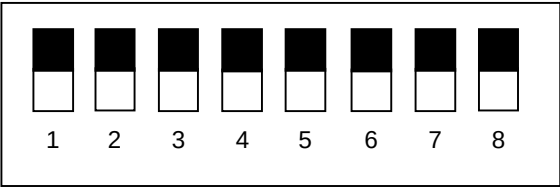


Figure 6.5.2 DIP switches (Being set for Standard setting)

6.5.2 When the WolfPack is used in the dual configuration

When using the subsystem in WolfPack mode in the dual configuration, execute the following setting and use it.

- Setting WolfPack mode
- Setting OPTION mode

To use the subsystem in this mode, the microprogram must be Ver.0306/B or later.

- Setting WolfPack mode

Set the mode by referring to page RW-INST0910.

- Setting DATA SHARE mode

Set the mode by referring to page RW-INST0930.

- Setting OPTION mode

(1) Before turning the power on, set DIP switch No.4 as Figure 6.5.3.

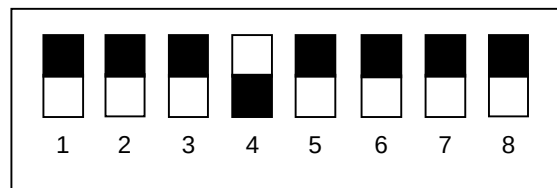
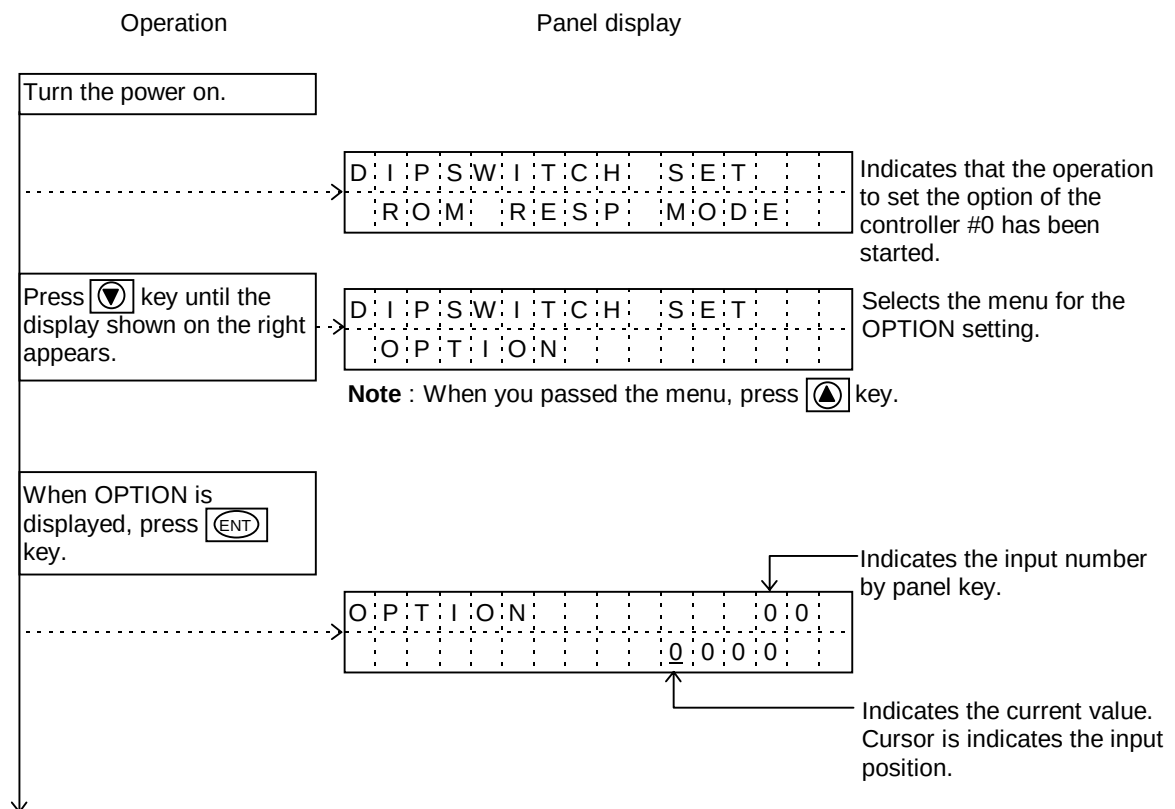
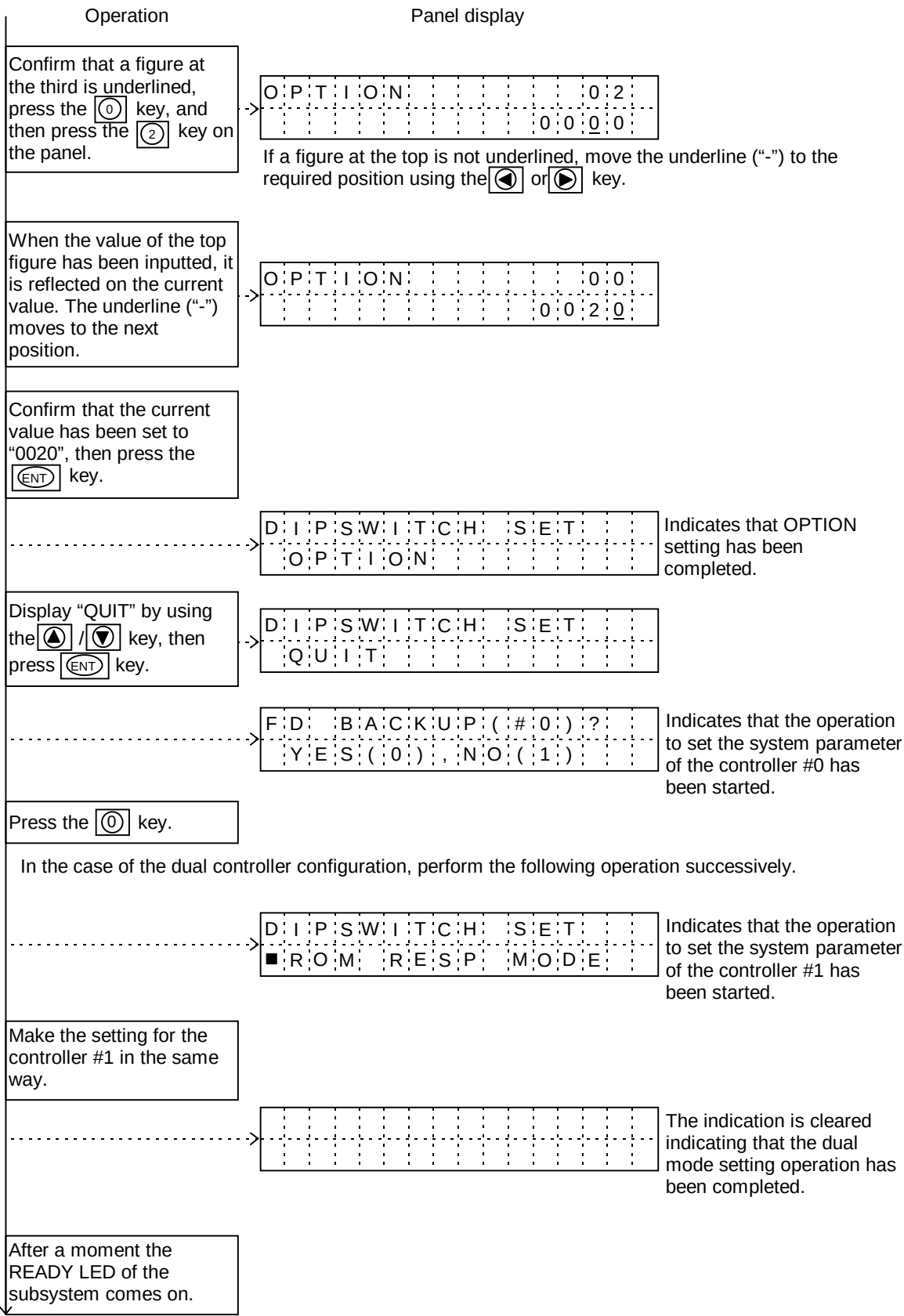


Figure 6.5.3 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.5.4.

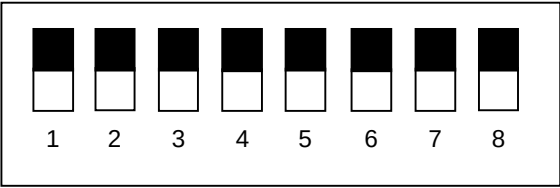


Figure 6.5.4 DIP switches (Being set for Standard setting)

6.6 Using in the DATA SHARE MODE

Use a combination of the microprogram version 0304 or later and Flash Program version PB26 or later when using the subsystem in this mode.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.6.1.

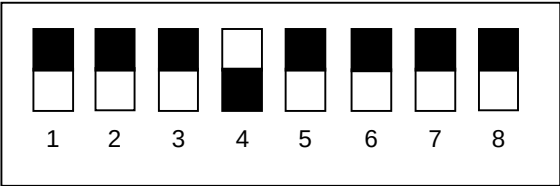
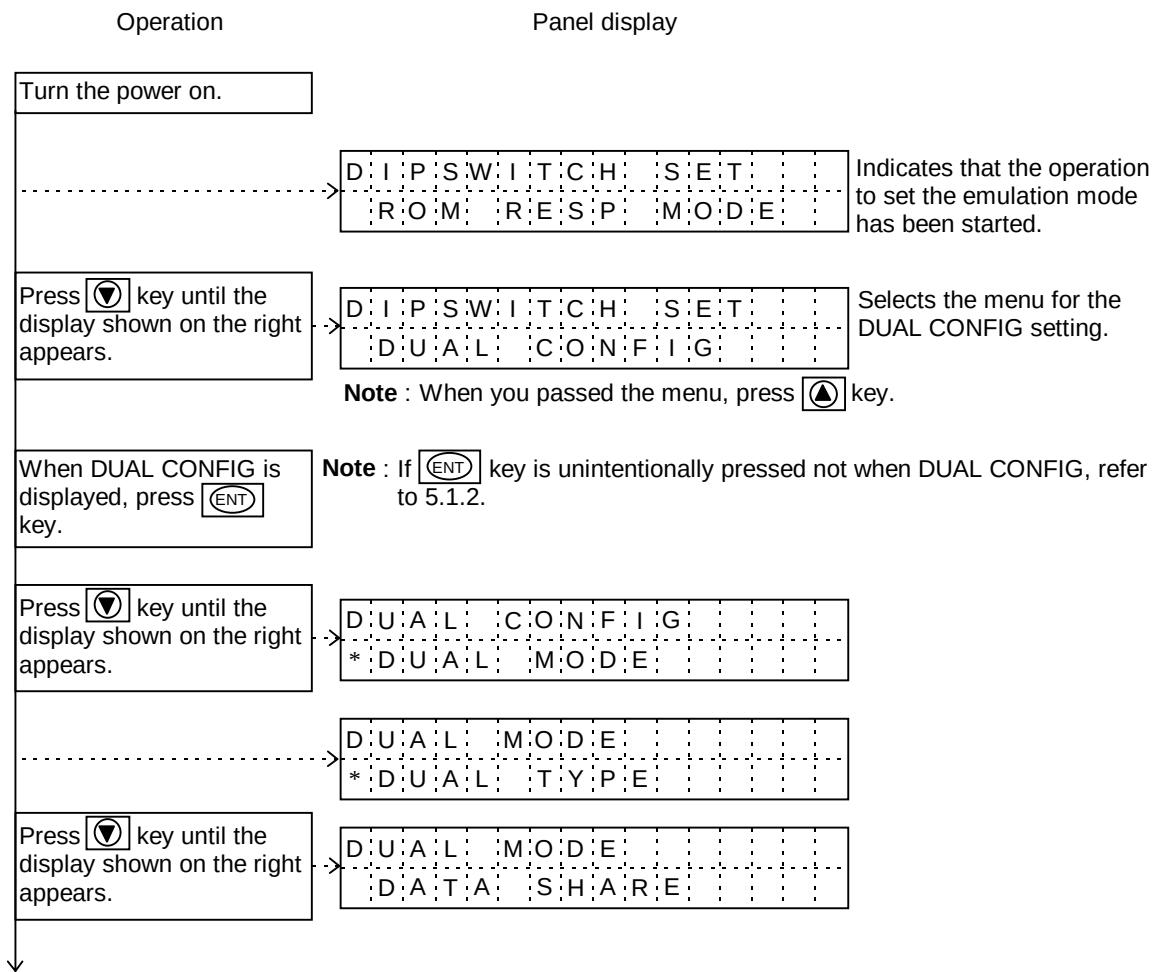
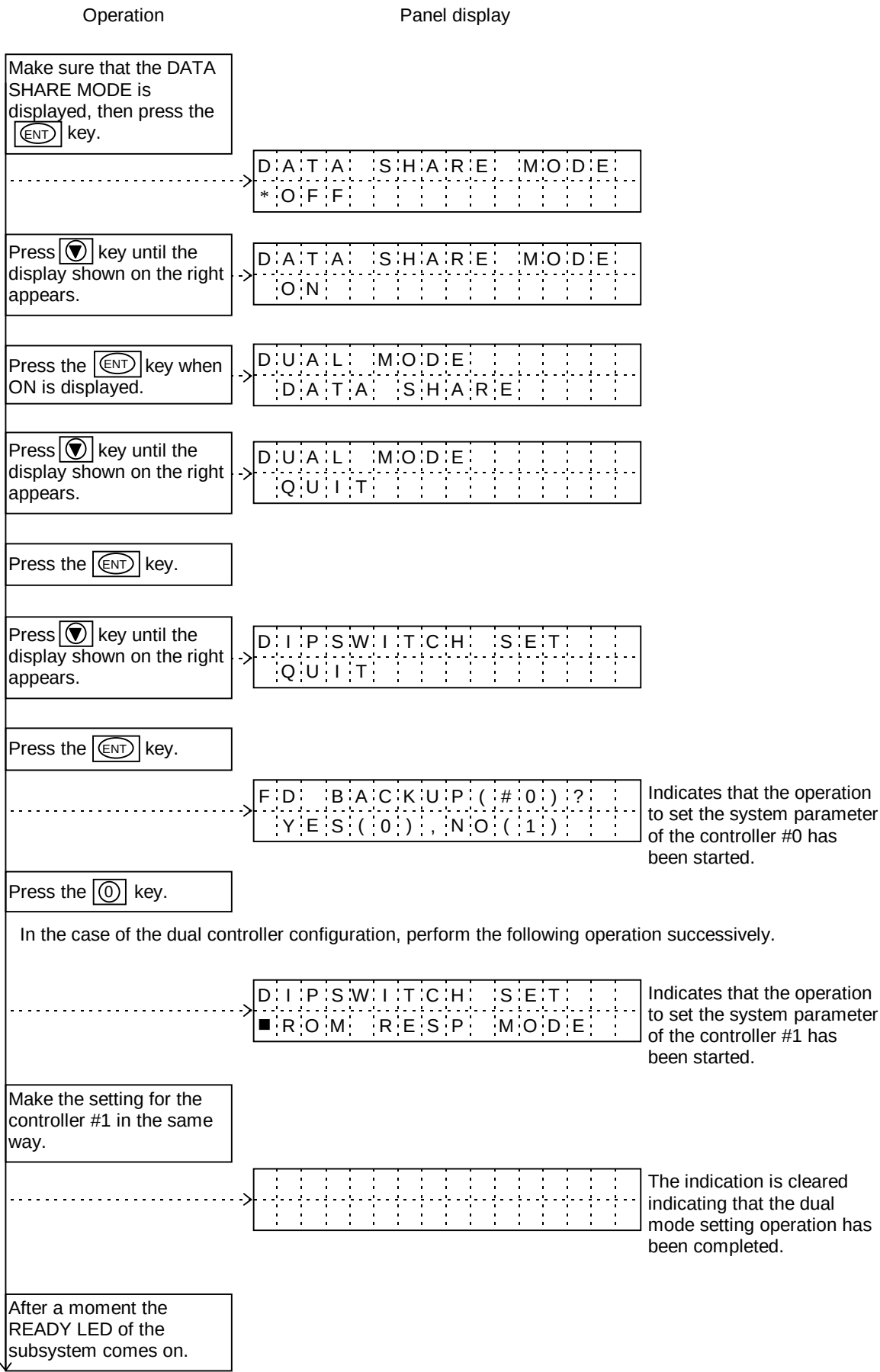


Figure 6.6.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.6.2.

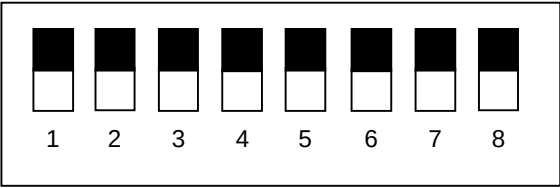


Figure 6.6.2 DIP switches (Being set for Standard setting)

6.7 When the VxVM Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.7.1.

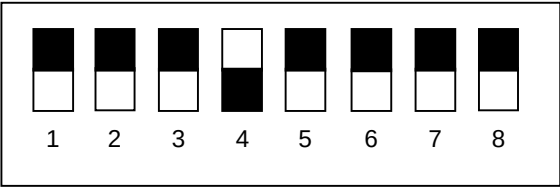
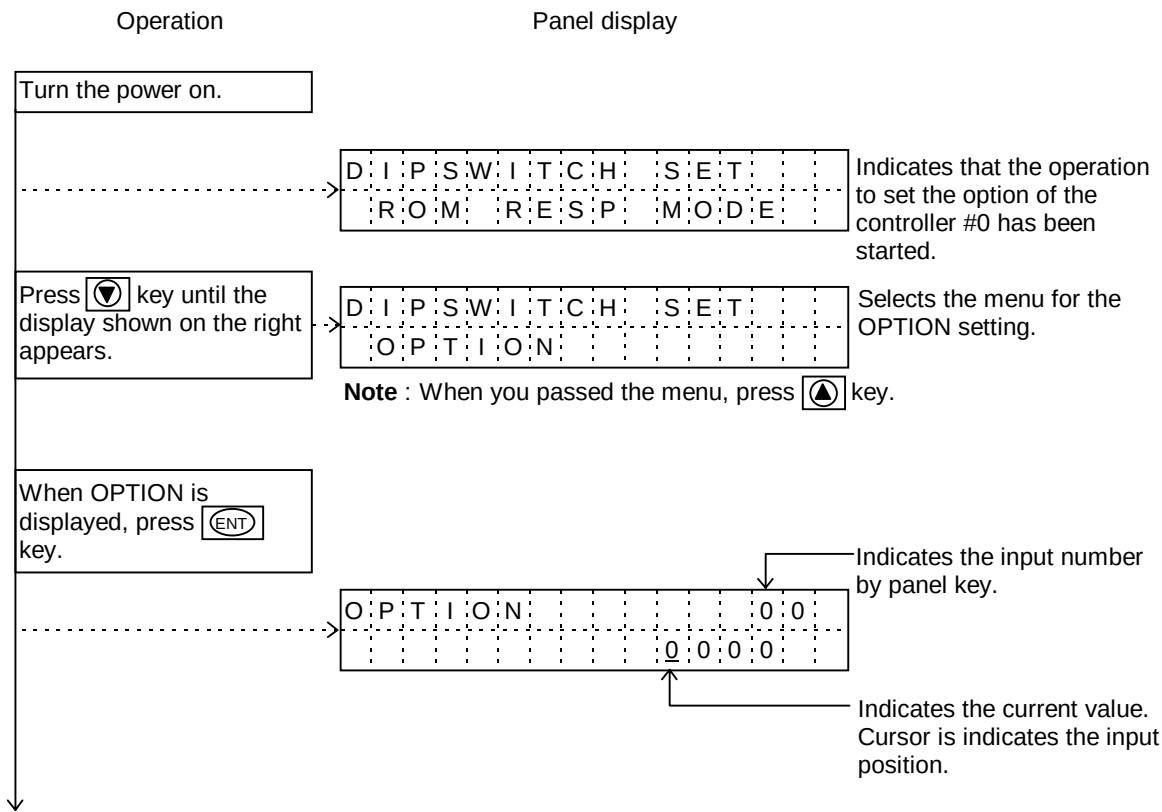
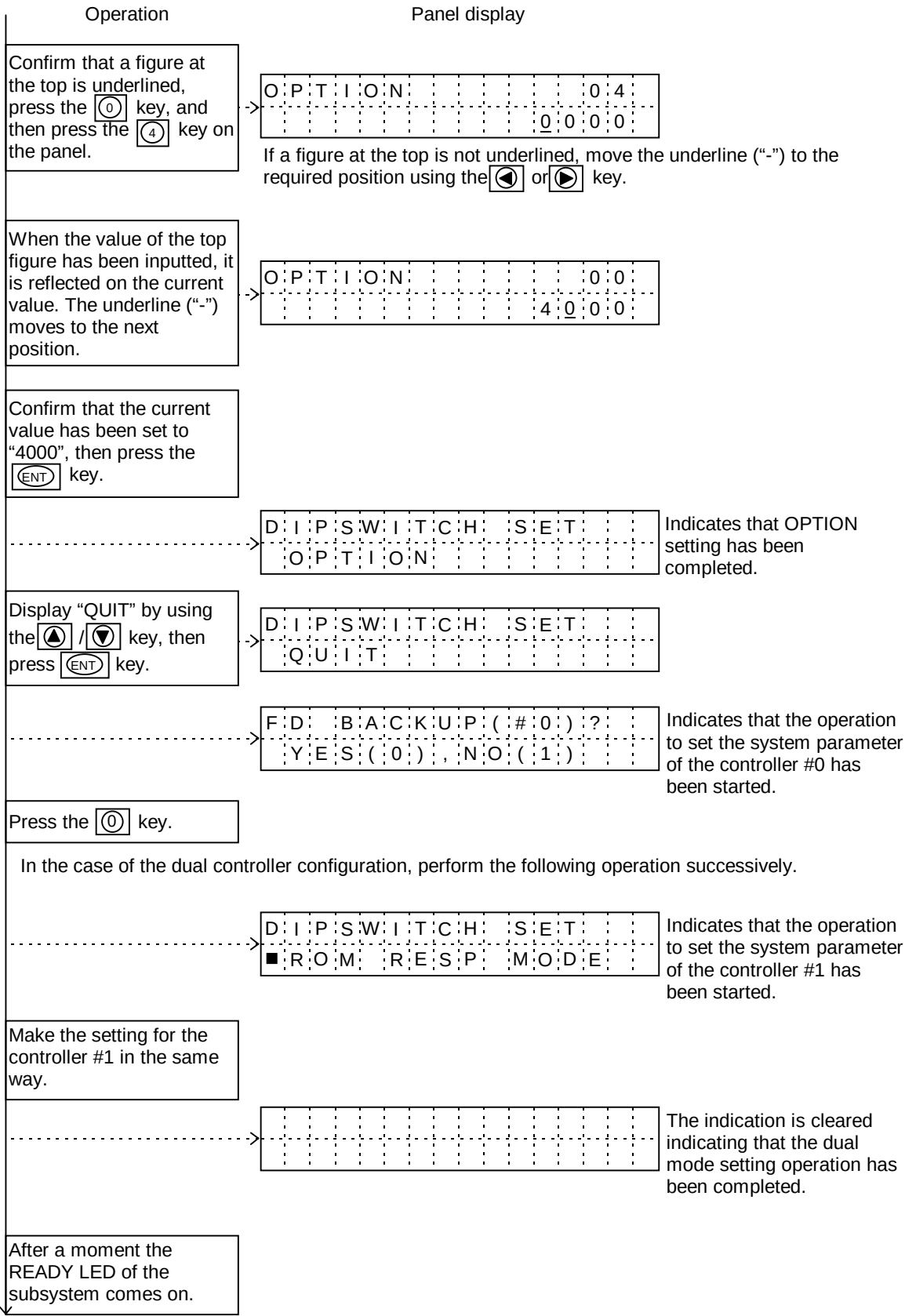


Figure 6.7.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.7.2.

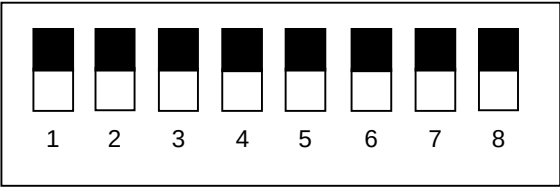


Figure 6.7.2 DIP switches (Being set for Standard setting)

6.8 When the HACMP Is Used on the Host Side

When the VxVM is used on the host side, it must be used with a combination of the microprogram version 0304/K or later and the flash program version PB26 or later. Use it with the system parameter menu options set using the combination of the above programs.

A procedure to set the options is explained below.

(By using this option, a combination of HACMP and 7135 emulation becomes usable. To use the combination, settings of both this option and 7135 emulation are needed. (For the setting procedure, see Section 6.1.))

(1) Before turning the power on, set DIP switch No.4 as Figure 6.8.1.

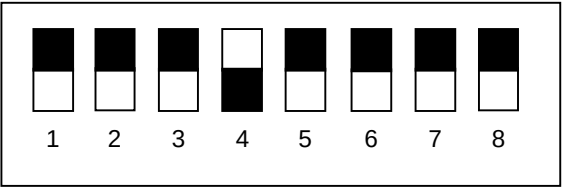
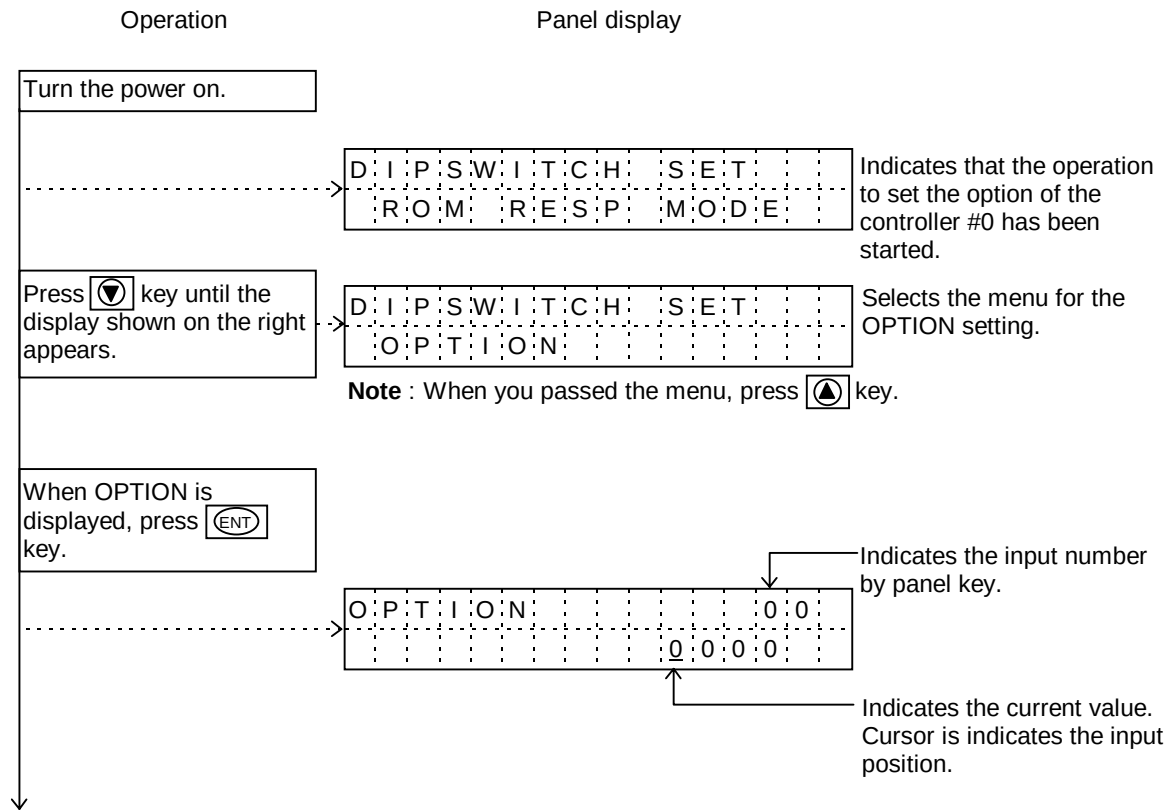
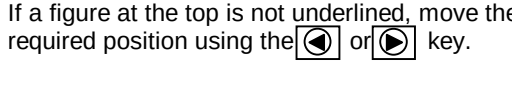
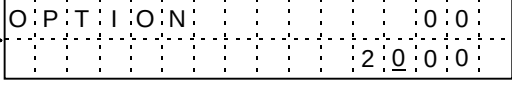
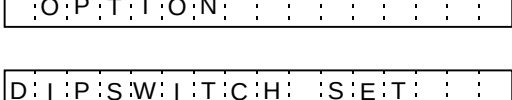
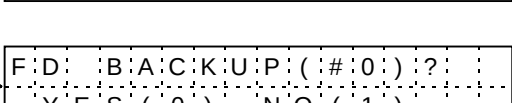
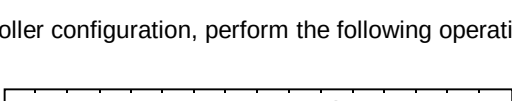
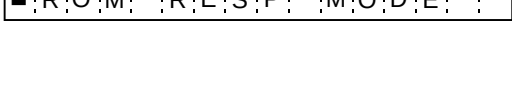


Figure 6.8.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.



Operation	Panel display
Confirm that a figure at the top is underlined, press the  key, and then press the  key on the panel.	 If a figure at the top is not underlined, move the underline ("—") to the required position using the  or  key.
When the value of the top figure has been inputted, it is reflected on the current value. The underline ("—") moves to the next position.	
Confirm that the current value has been set to "2000", then press the  key.	 Indicates that OPTION setting has been completed.
Display "QUIT" by using the  /  key, then press  key.	
	 Indicates that the operation to set the system parameter of the controller #0 has been started.
Press the  key.	
In the case of the dual controller configuration, perform the following operation successively.	
	 Indicates that the operation to set the system parameter of the controller #1 has been started.
Make the setting for the controller #1 in the same way.	
	 The indication is cleared indicating that the dual mode setting operation has been completed.
After a moment the READY LED of the subsystem comes on.	

(3) Set the DIP switch No.4 as shown in Figure 6.8.2.

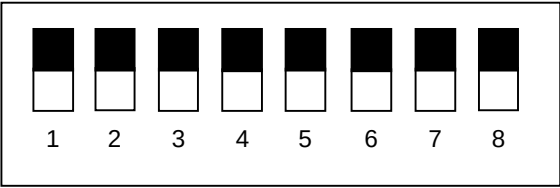


Figure 6.8.2 DIP switches (Being set for Standard setting)

6.9 When Sun OS Solaris 2.5.1 or later is used by the host side

If the following message is displayed on the console screen while executing SUN Format command, use the subsystem with its mode changed to this one.

[Computing capacity exceeds actual disk capacity.]

To use the subsystem in this mode, its microprogram version must be 0304/L, 0305/B or later.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.9.1.

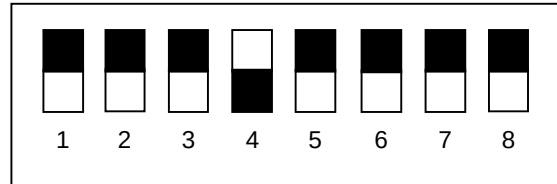
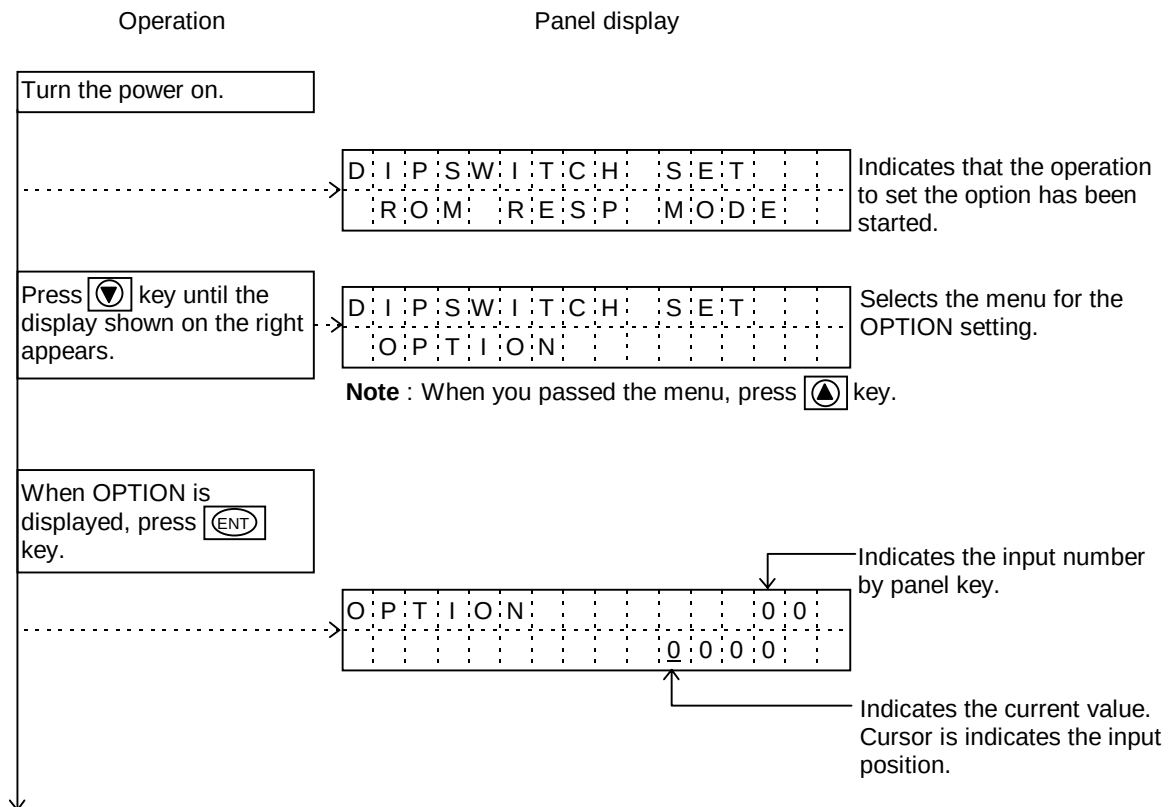
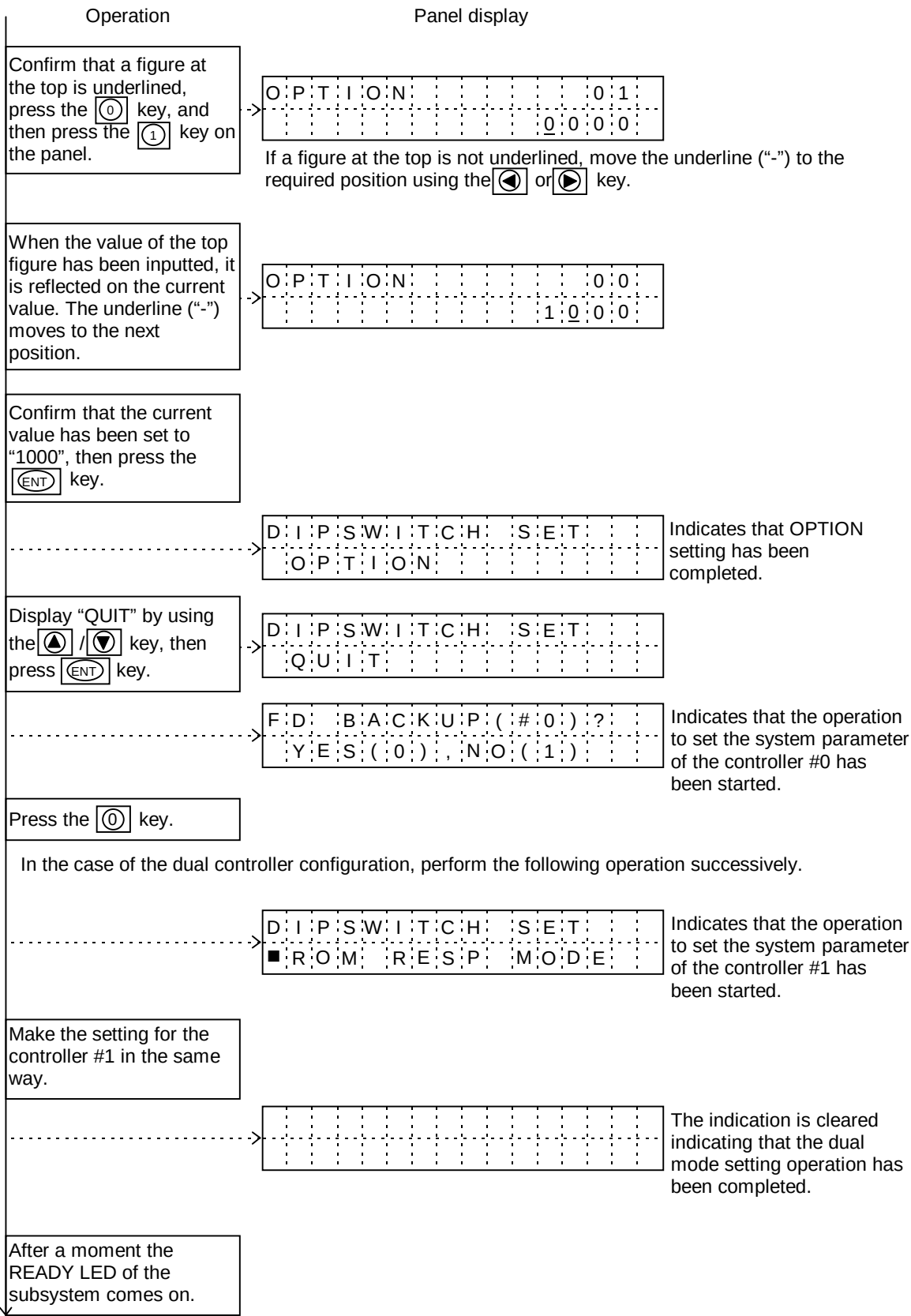


Figure 6.9.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.9.2.

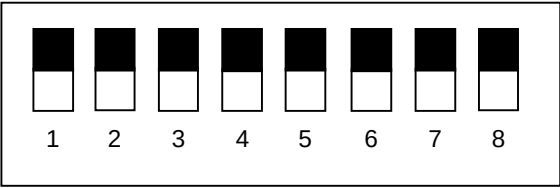


Figure 6.9.2 DIP switches (Being set for Standard setting)

6.10 When Using the Subsystem in Connection with MP5400

When using the subsystem in the state connected with the MP5400, it is necessary to use it with the microprogram Ver.0305/A or later. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

(1) Before turning the power on, set DIP switch No.4 as Figure 6.10.1.

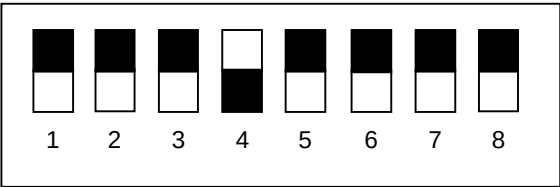
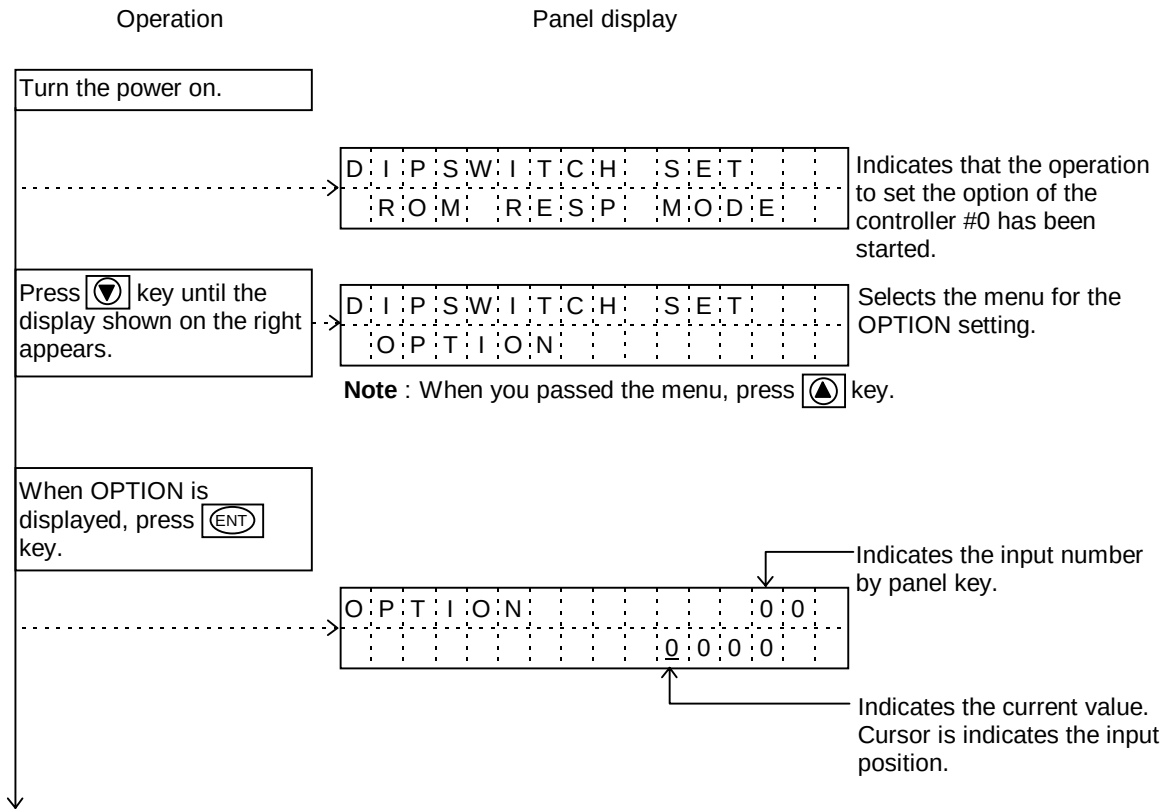
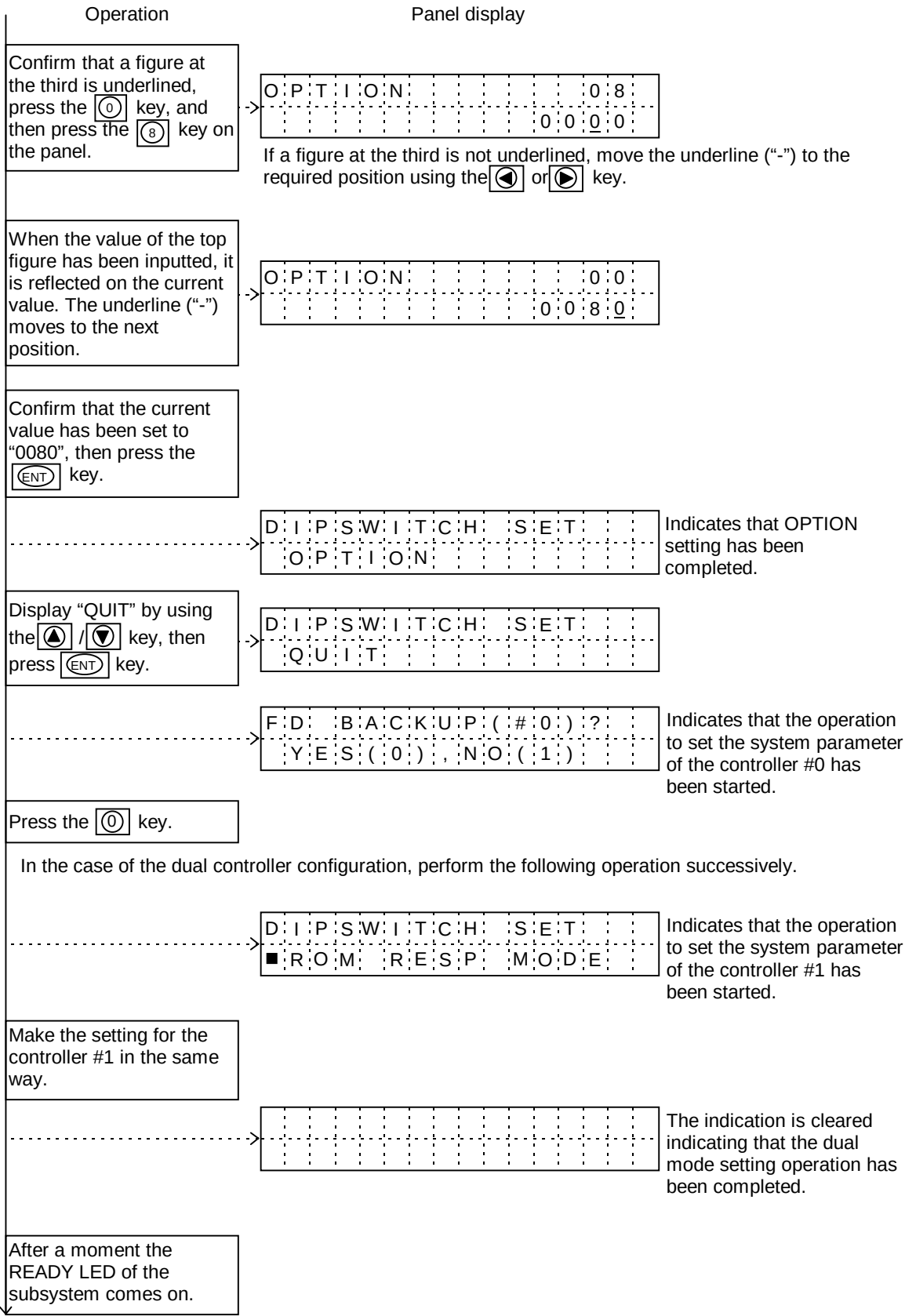


Figure 6.10.1 DIP Switches (Being set for System parameter settings)

(2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.10.2.

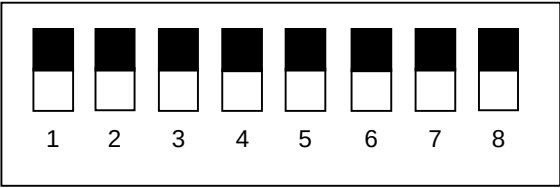


Figure 6.10.2 DIP switches (Being set for Standard setting)

6.11 When Using the Subsystem in LU Blockade Mode

When the subsystem is used in this mode, if a blockade failure occurs on the second disk in the same ROW, the disk concerned is blocked and the LU in which the disk concerned is included is blocked.

When the LU is blocked, data cannot be read from or written onto the LU concerned. If the blocked LU is accessed, a sense key/sense code=0313180 is reported.

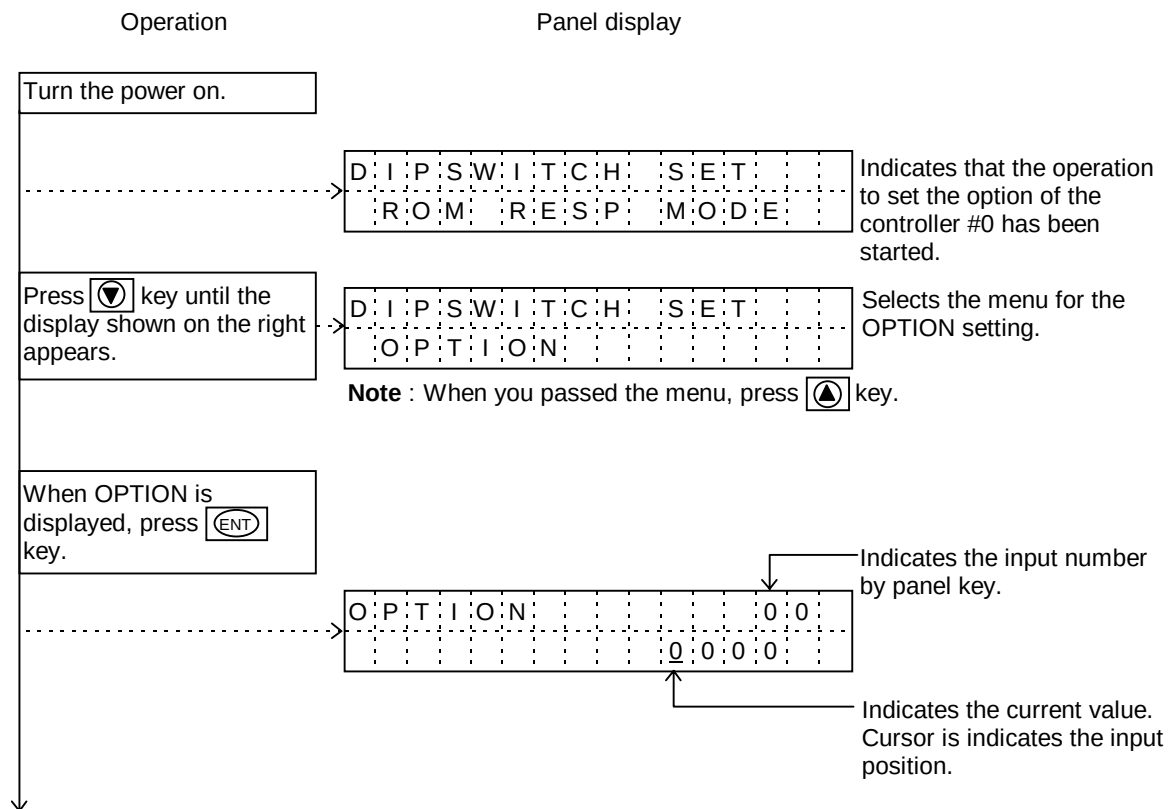
To use the subsystem in this mode, the microprogram must be Ver.0305/B or later.

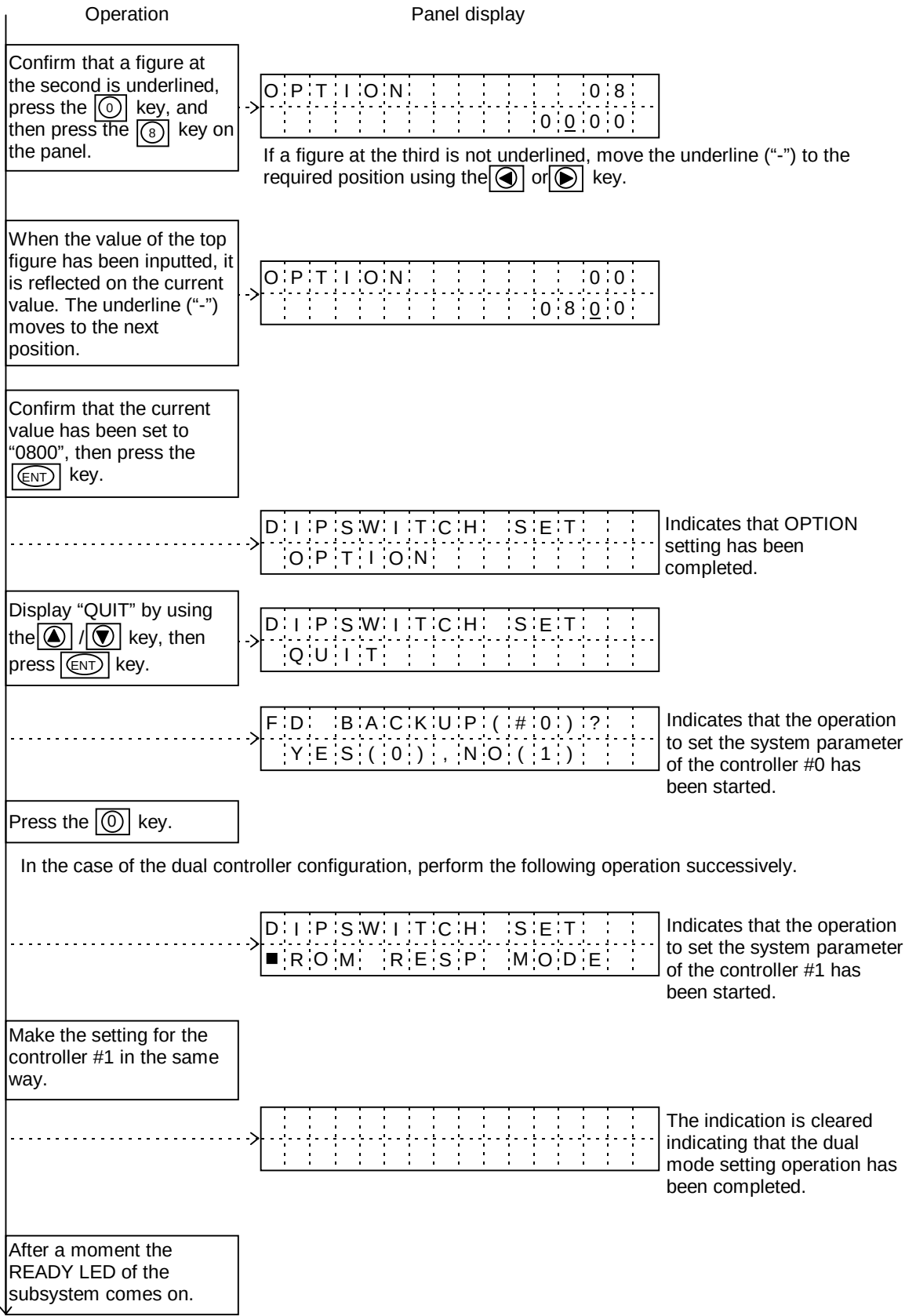
- (1) Before turning the power on, set DIP switch No.4 as Figure 6.11.1.



Figure 6.11.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.11.2.

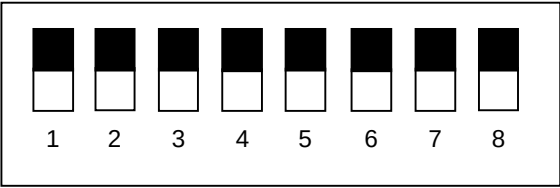


Figure 6.11.2 DIP switches (Being set for Standard setting)

6.12 When outputting information whether a warning is given in the subsystem via RS232C

When outputting information whether a warning is given in the subsystem via RS232C, the microprogram version 0307/F or later is required to be used. Set OPTION in the system parameter menu. The procedure to set OPTION is explained below.

- (1) Before turning the power on, set DIP switch No.4 as Figure 6.12.1.

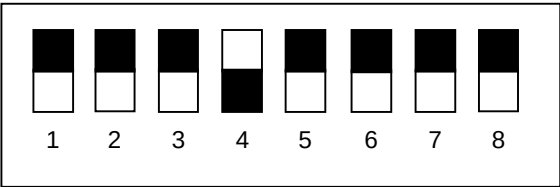
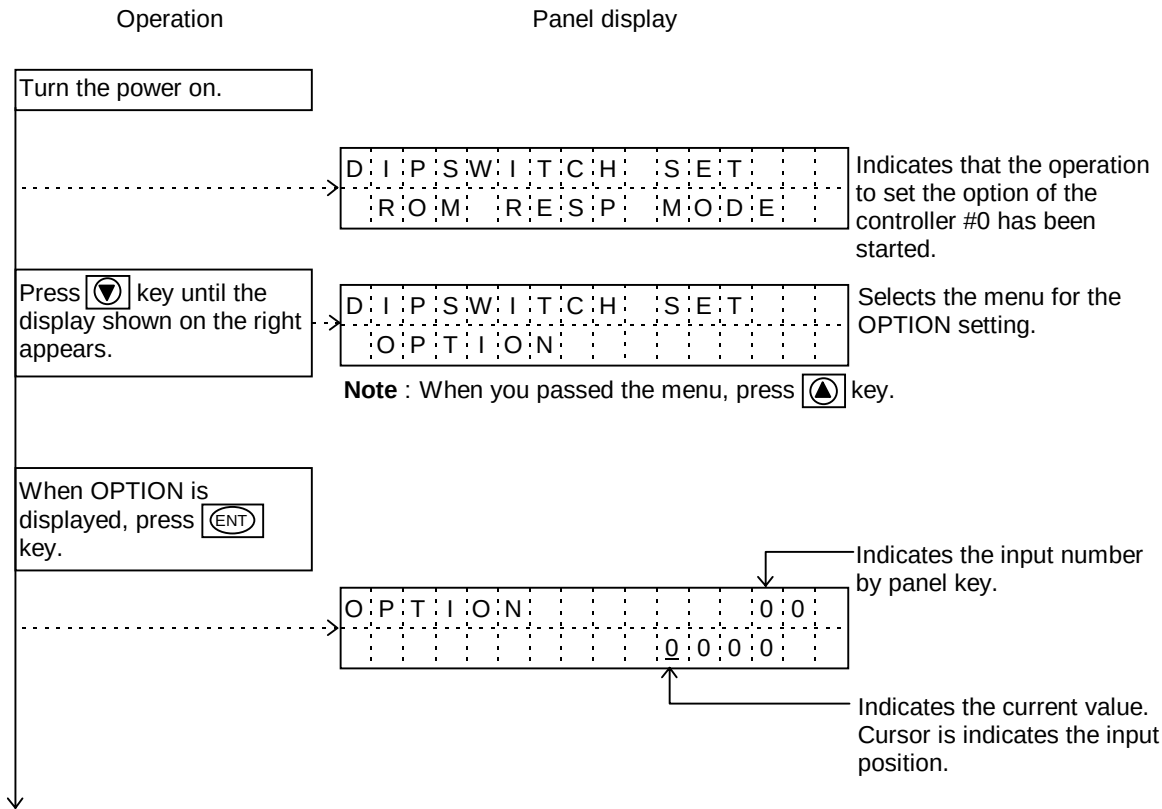
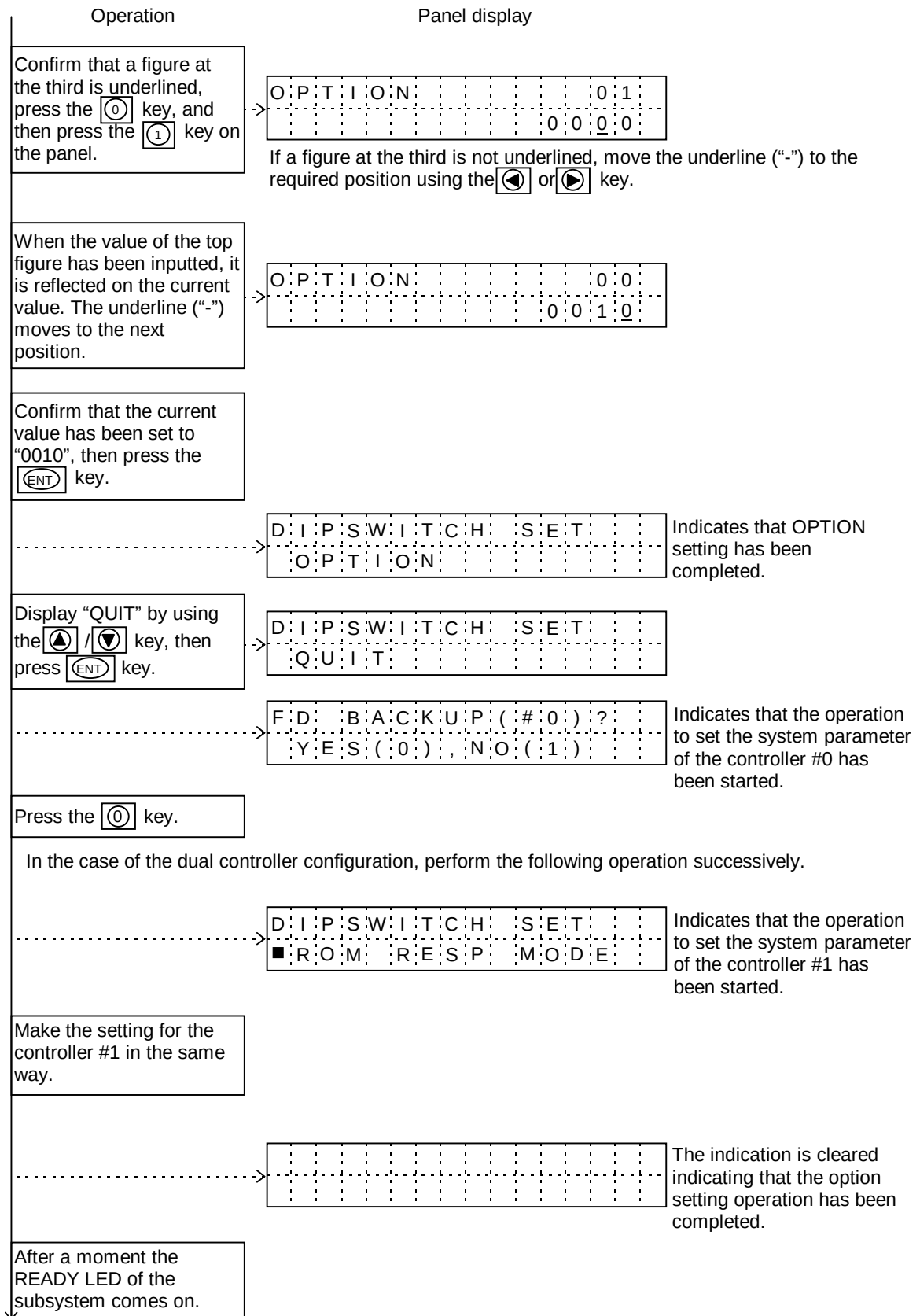


Figure 6.12.1 DIP Switches (Being set for System parameter settings)

- (2) Perform as the procedure shown below.





(3) Set the DIP switch No.4 as shown in Figure 6.12.2.

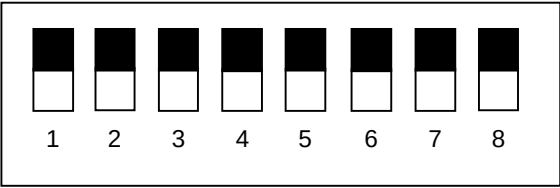


Figure 6.12.2 DIP switches (Being set for Standard setting)

DF350 Disk Subsystem

9. OPTIONAL INSTALLATION (Rack Mount (RKWH/U2) Type)

Rev.5

REVISION CONTROL

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Jan.31.'97	A.Yamanashi	K.Kozawa	M.Sato	All	Issued	
1	Apr.3.'97	A.Yamanashi	M.Sato	M.Sato	All	Entirely revised	CH
2	Dec.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	0060 0110 0115 0210 0212 0214 0240 0260 0270	Changed the flow. (2) was deleted. This page was newly added. Changed. This page was newly added. The page was newly added. Changed the figure. Changed the flow. CHanged the figure.	CH DL AD CH AD AD CH CH CH
3	Feb.25.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	0212	Change Flowchart.	CH
4	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0230 0270	"DF350" was added as an item of the header. (Revision number of each page was left unchanged.) Added A2E4A/A2E8/A1E8A/A1E18. Added A2E4A/A2E8/A1E8A/A1E18.	AD AD AD
5	Oct.15.'98	A.Yamanashi			0050 0060 0080 0090 0230 0270	Added case of the dual controller. Added case of the dual controller. Added case of the dual controller. Added case of the dual controller. Added A3E4/A2E8A. Added A3E4/A2E8A.	AD AD AD AD AD AD

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and the Other Items Shipped with the Unit.....	RW-OPTION0040
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1. Note when Installing the Optional Features

- (1) Be sure to back-up copy user data before installing the optional features. A mis-operation might cause the loss of user's data.
- (2) Back-up the system parameter according to "Back-up Procedure of System Parameter". (See RW-OPTION0050.)
- (3) Power off the subsystem according to power off procedure before installing the optional features. If not, user's data might be lost.

2. Installing the Optional Features

2.1 Unit Appearance Check

Check visually the unit appearance for distortion or damage during the transportation.

2.2 Checking Items of System Components and the Other Items Shipped with the Unit

Check items and quantities of system components (model, serial number, and quantity) and other items shipped together with the unit. Cross-check with the packing list.

2.3 Back-up Procedure of System Parameter

There are cases where System Parameters (Target ID, buzzer setting, drive recovery mode, etc.) are need to be copied to FD or restored from FD when installing optional parts or replacing parts. In this case, copy or restore system parameters following “Back-up procedure to FD” (See RW-OPTION0050) or “Restoring procedures from FD” (See RW-OPTION0080).

(RAID configuration setting, LU configuration setting, etc. are not contained in system parameter.)

2.3.1 Back-up procedure to FD

- (1) Turn the power off according to RW-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Before power on the subsystem, set DIP switch No.4 as shown in Figure 2.3.1.

Note : Be sure to set the same data for both controllers if the dual controller option (-F2WCF) has been installed.

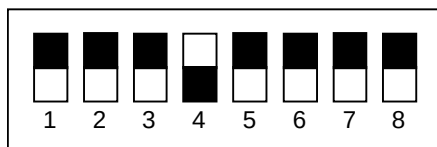
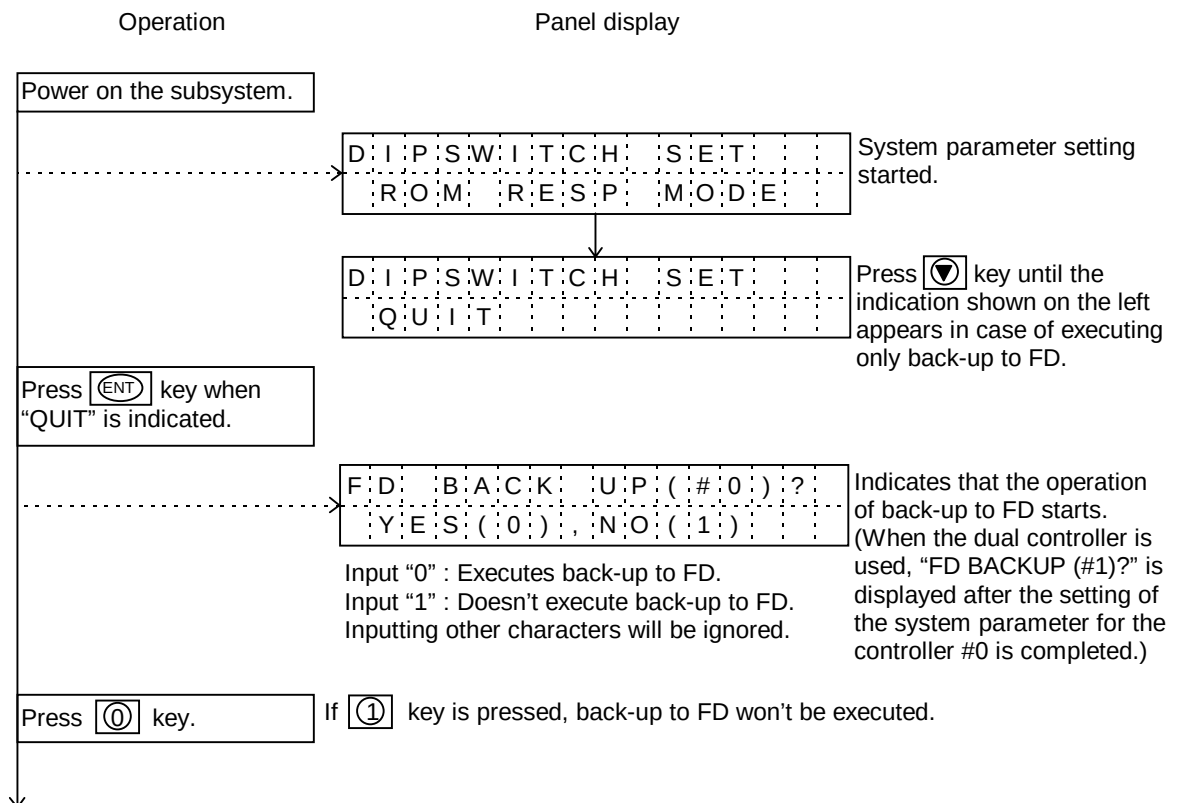
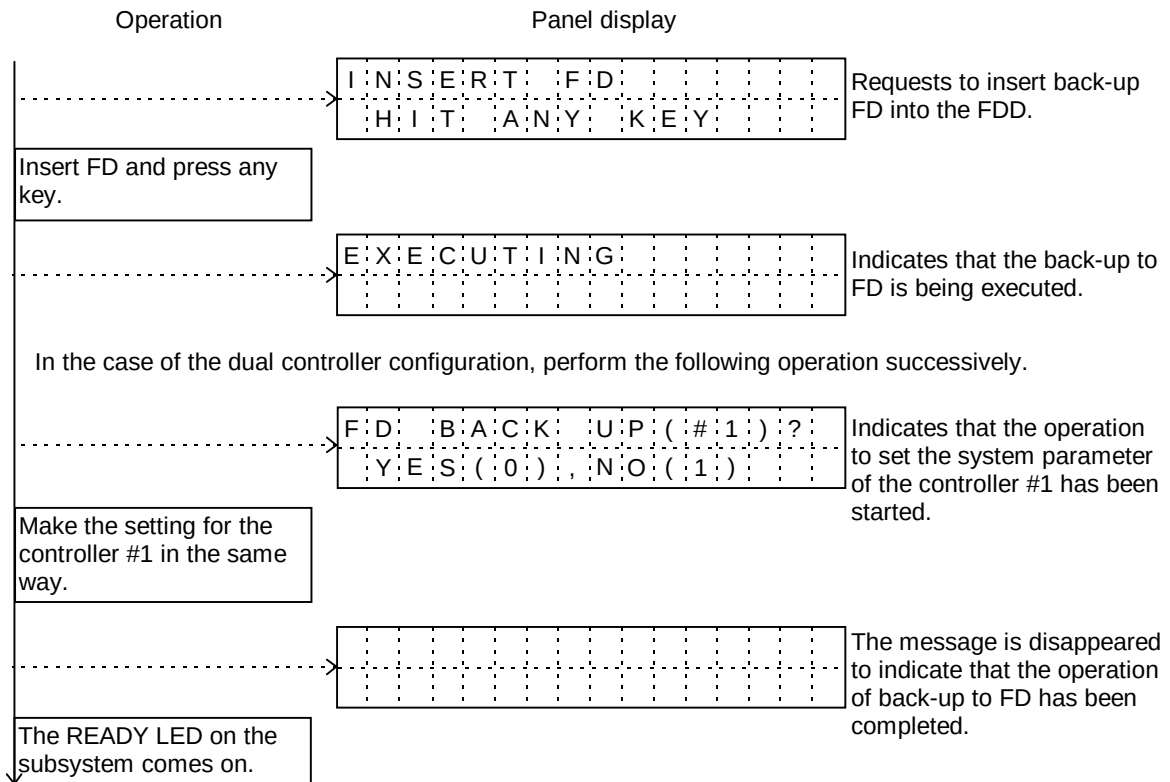


Figure 2.3.1 DIP Switches
(Back-up operation to FD is allowed)

- (3) Operate as described below.





(4) Set DIP switch No.4 as shown in Figure 2.3.2.

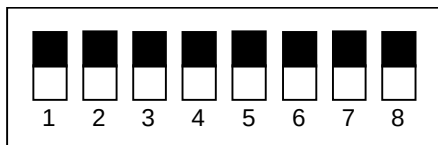
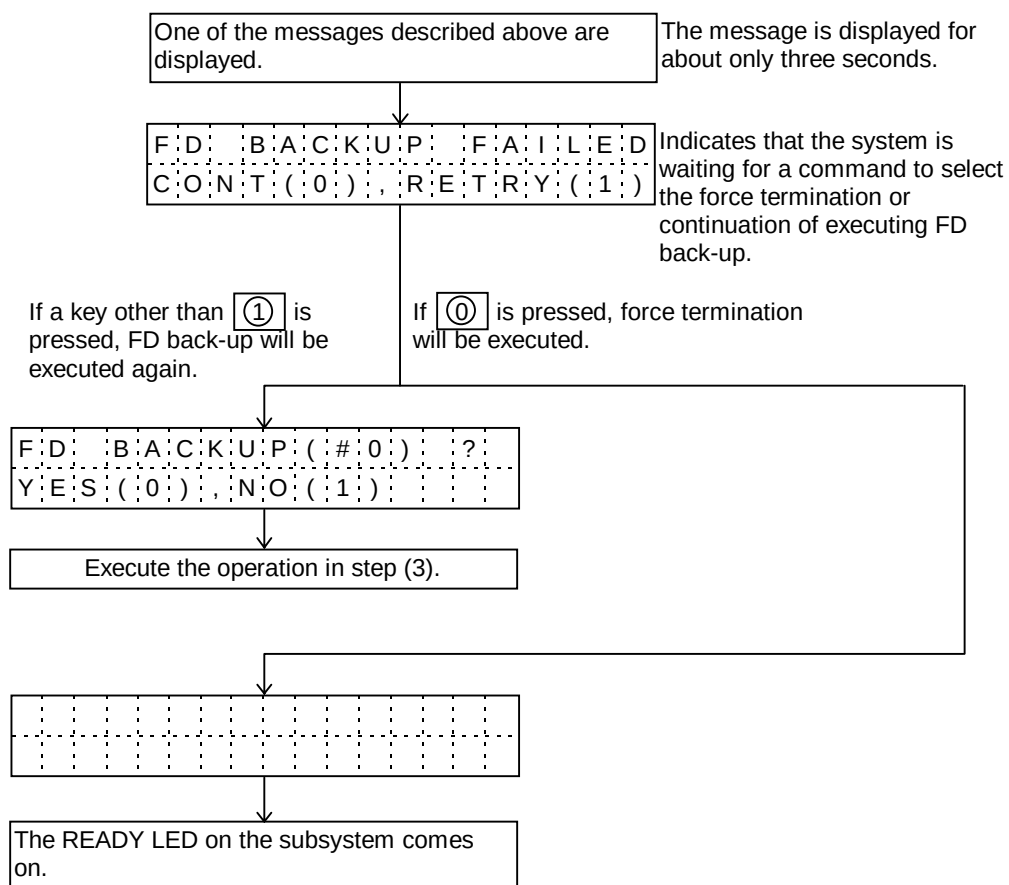


Figure 2.3.2 DIP Switches

Note 1 : While the back-up to FD is being executed, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Re-execute.
- **FILE WRITE ERROR**
FD which was inserted is not formatted, or write-protected. Format or release write-protection.
Write error occurred in FD. Insert another FD.

If these messages are displayed, back-up to FD hasn't been executed. So re-execute following the operation described below.



Note 2 : Use 3.5" FD (1.44MB) formatted by MS-DOS for back-up FD. Besides, note that the FD will be overwritten during back-up.

Note 3 : Even if back-up FD is left at FDD after back-up operation, error won't occur on the subsystem.

2.3.2 Restoring procedures from FD

- (1) Before power on the subsystem, set DIP switch No.3 as shown in Figure 2.3.3.
In case of dual controller system, set both the DIP switches as shown in Figure 2.3.3.

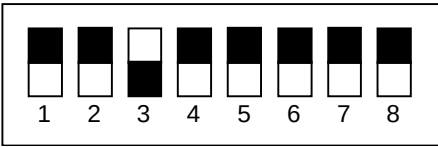
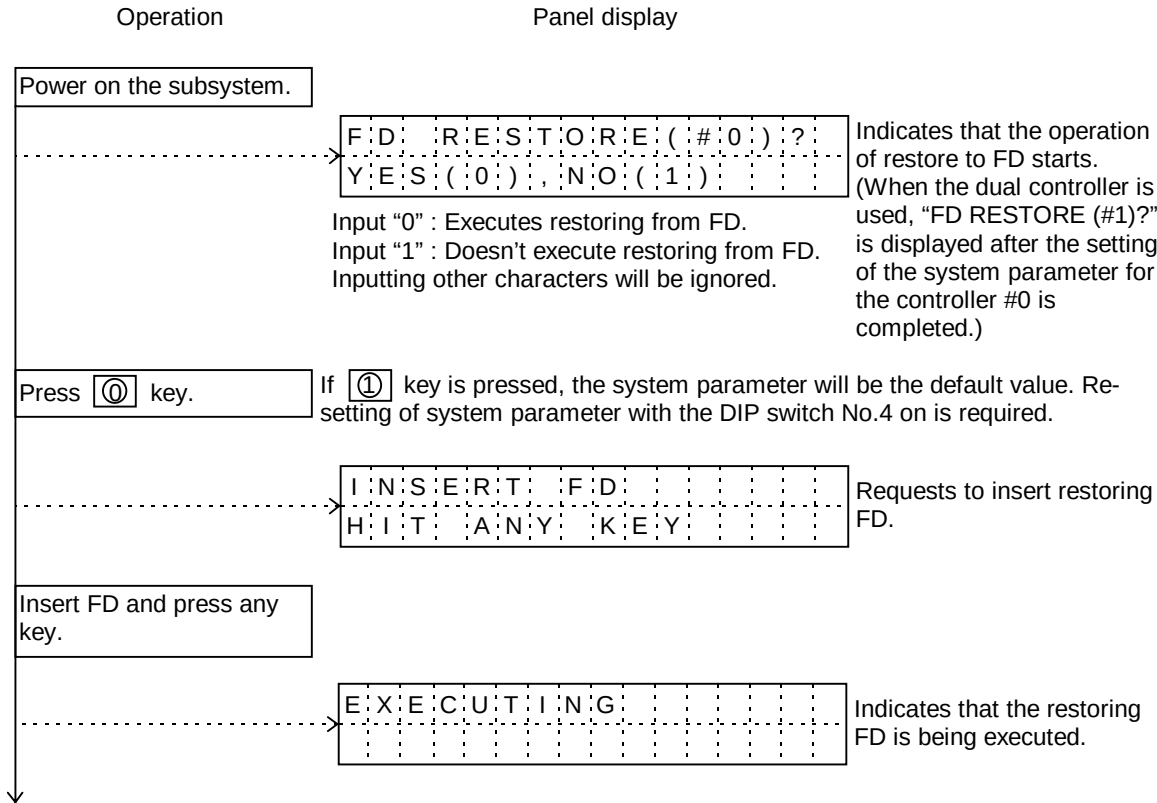
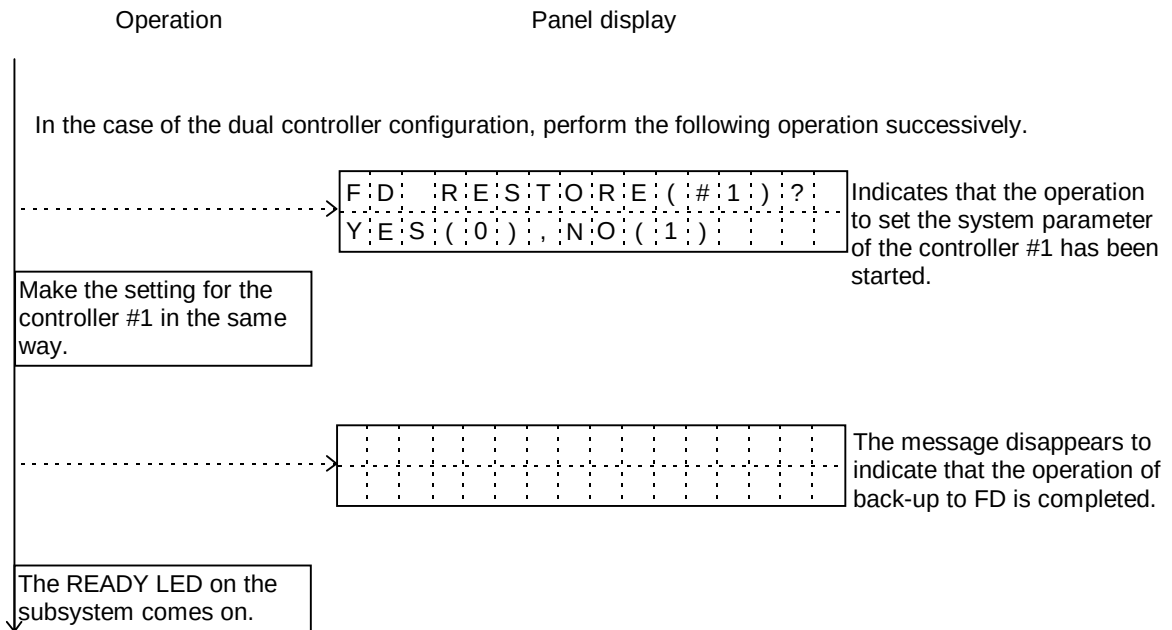


Figure 2.3.3 DIP Switches
(Restoring operation from FD is available)

- (2) Operate as described below.





(3) Set DIP switch No.3 as shown in Figure 2.3.4.

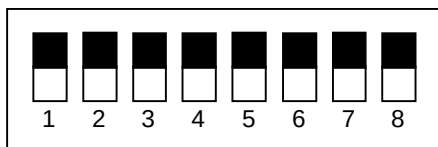
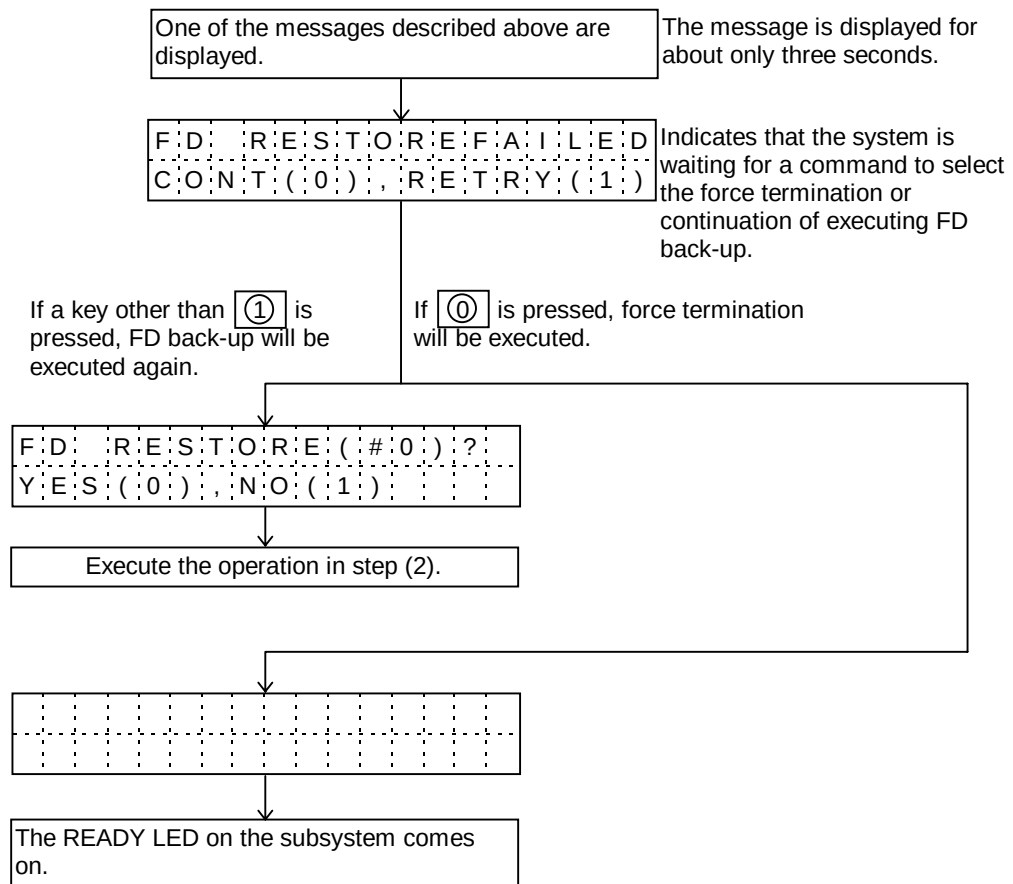


Figure 2.3.4 DIP Switches

Note 1 : While executing the restoring from FD, the messages described below are sometimes displayed.

- **FD NOT INSERTED**
FD isn't inserted. Insert FD into the FDD.
- **FD MOTOR NOT STARTED**
Starting of FD Motor ended in failure. Try again.
- **BAD FD INSERTED**
Inserted FD is not formatted. Format FD.
- **FILE READ ERROR**
Read error occurred in FD. Try again.

If these messages are displayed, restoring from FD hasn't been executed. So re-execute following the operation described below.



Note 2 : In case that restoring operation ended in failure and was force terminated, setting of EEPROM will be default value.

Accordingly, re-setting with the DIP switch No.4 On is required.

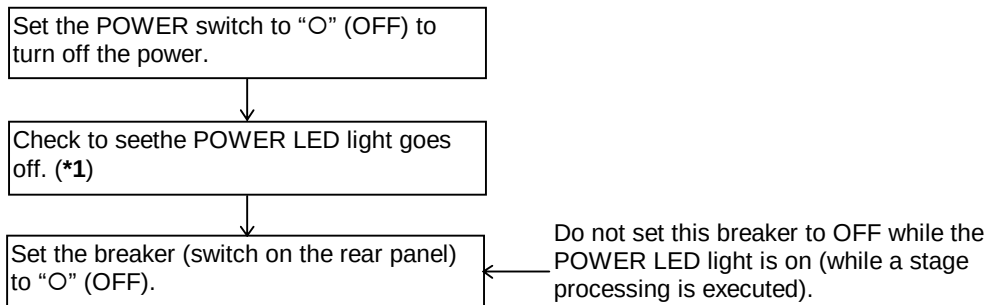
Note 3 : Even if FD which was used to restore is left at FDD after back-up operation, error won't occur on the subsystem.

2.4 Power OFF

Turn off the power correctly according to the Power OFF Procedure (1) shown below.

Notice : If optional features are not installed to the system correctly, user data may be lost.

(1) Power OFF procedure



If a power down occurs or the breaker is set to OFF by mistake before the POWER LED goes off, turn on the power right away according to the “(2) Power ON procedure” below, then execute the power off procedure above.

*1 Check the back-up state of the CACHE memory.

Be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

The CACHE memory of this unit provides write-after control. If data is not yet written, before the power is turned off, the unit automatically writes the data on the CACHE memory to the hard disk. This is called destaging. After this processing is completed, the power is turned off.

If the power is turned off in a state in which destaging cannot be completed due to an unexpected power interruption or a tripped circuit breaker, the CACHE memory switches to the back-up mode using the battery for data integrity. If any equipment of the unit is removed or inserted in this back-up mode, the battery may stop supplying power, resulting in the user data being lost. When you handle any equipment of the unit with the unit power off, be sure to check the back-up state of the CACHE memory and make sure that the back-up mode is canceled before starting maintenance work.

• Checking the back-up state of the cache memory

You can determine whether the unit is in the back-up mode by checking the indication of the CACHE PWR (green LED) on the CTL ASSY, as described below.

Set the circuit breaker on the rear of the unit to “|” (ON) with the power switch (POWER SW) set to “O” (OFF).

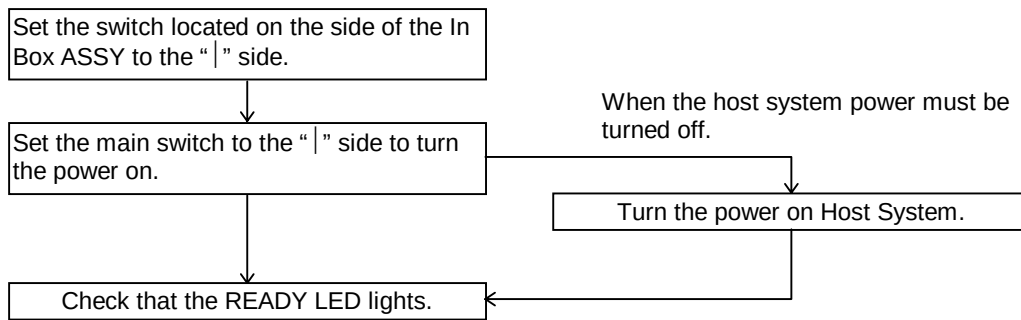
Determine the state of the memory from the indication of the CACHE PWR.

CACHE PWR LED on----- Indicates the back-up mode.

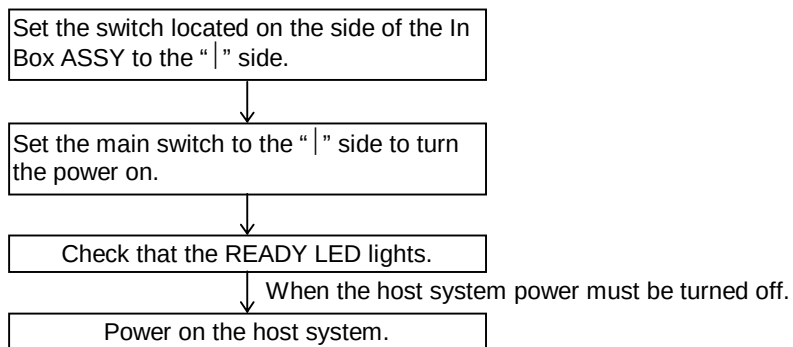
CACHE PWR LED off ----- Indicates that the back-up mode is canceled.

(2) Turning-ON procedure

(2-1) Powering on procedure (when the power control is set to REMOTE)



(2-2) Powering on procedure (when the power control is set to LOCAL)



Note : In some systems, the host cannot recognize the DF350 if the host is started up before the DF350 becomes ready.

2.5 Attaching/Removing and Opening/Closing the Covers

2.5.1 Attaching/Removing the front bezel

(1) Removing procedure (See Figure 2.5.1.)

- ① Hold the grooves located on both sides of front bezel and pull front bezel toward you to remove it.

Note : Attach/Remove the front bezel carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Attaching procedure (See Figure 2.5.1.)

- ① Mate the grooves of the front bezel with the guide plate of the subsystem, and secure front bezel by pressing its four corners.

Note : Attach/Remove the front bezel gently to avoid a shock. Precision components are installed.

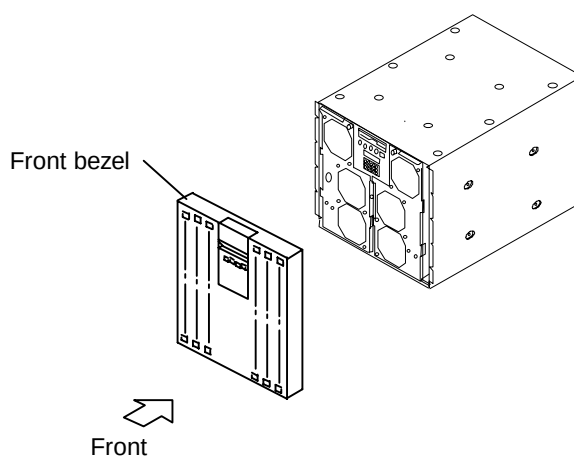


Figure 2.5.1 Attaching/Removing the Front Bezel

2.5.2 Opening/Closing the front panel

(1) Opening procedure (See Figure 2.5.2.)

- ① Remove the front bezel. (See RW-OPTION0120.)
- ② Insert the key into the key hole and turn it to the direction of an arrow (→), and hold the left side of front panel and open it to the right.

Note : Open/Close the covers carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing procedure (See Figure 2.5.2.)

- ① Close the front panel.
- ② Turn the key to arrow(←) direction and fix front panel.
- ③ Install front bezel.

Note : Keep the key carefully lest it should be lost.

Note : Open/Close the covers gently to avoid a shock. Precision components are installed.

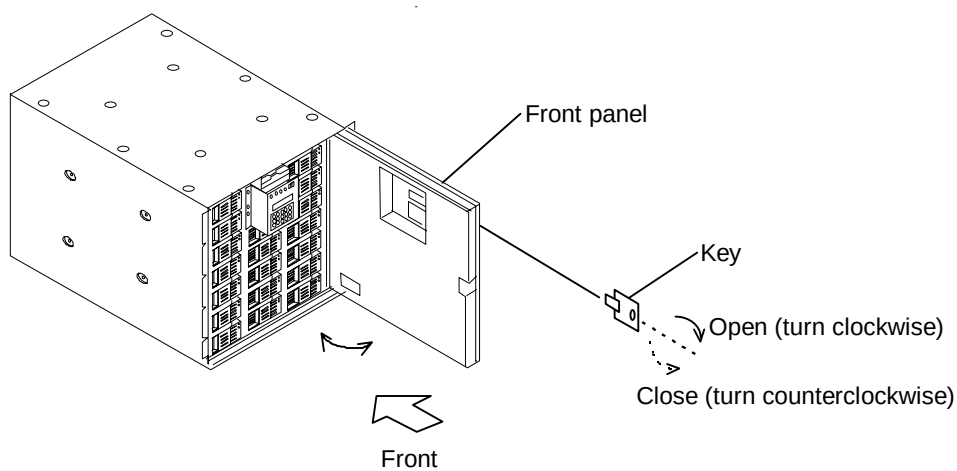


Figure 2.5.2 Opening/Closing the Front Panel

2.5.3 Opening/Closing the rear cover

Tools : Philips screwdriver (No.2)

(1) Opening procedure (See Figure 2.5.3.)

- ① Remove 2 thumb screws of rear cover and open rear cover.

Note : Open/Close the rear cover carefully to avoid subjecting the subsystem to any impact since it has precision components.

(2) Closing procedure (See Figure 2.5.3.)

- ① Close rear cover in the reversed order of removing procedure.

Note : Open/Close the rear cover gently to avoid a shock. Precision components are installed.

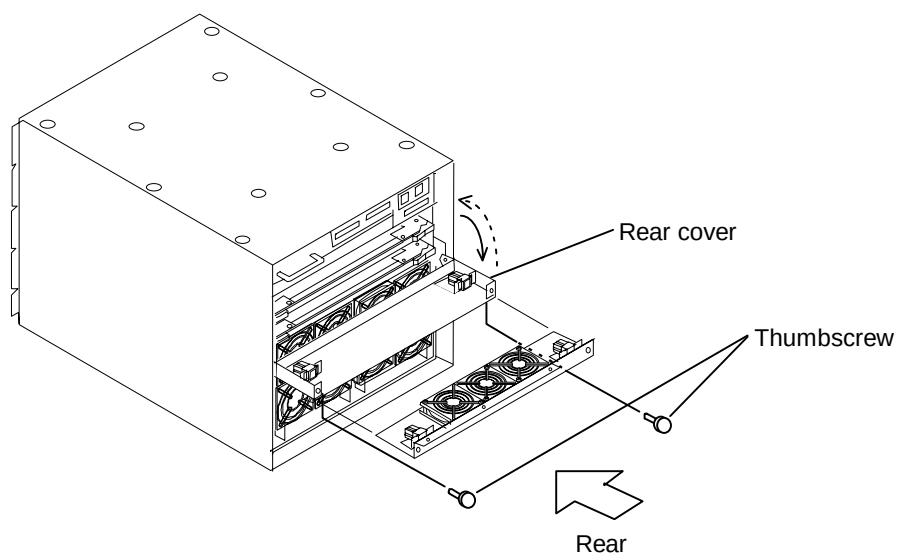


Figure 2.5.3 Opening/Closing the Rear Cover

2.6 Installing the CTL ASSY (Upgrading from Single-System to Dual-System) and I/F ADAPTER ASSY

- (1) Insert a back-up floppy disk in a drive and make a back-up copy of the system parameter into the FD.
- (2) Turn off the unit. (See RW-OPTION0110.)

Notice : If the power is not turned off normally, the user's data might be lost.

- (3) Open rear cover.
- (4) Install a CACHE ASSY in the additional CTL ASSY. (Mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively as shown on RW-OPTION0180.)
- (5) Insert the CTL ASSY in a predetermined position with the right and left levers opened. Push the right and left levers in the arrow-marked erection (→) at the same time. (See Figure 2.6.1.)
- (6) Install the additional I/F ADAPTER ASSY. (See Figure 2.6.2.) Set JP1 and JP2 on the I/F ADAPTER to the same condition as the pre-installed I/F ADAPTER ASSY.

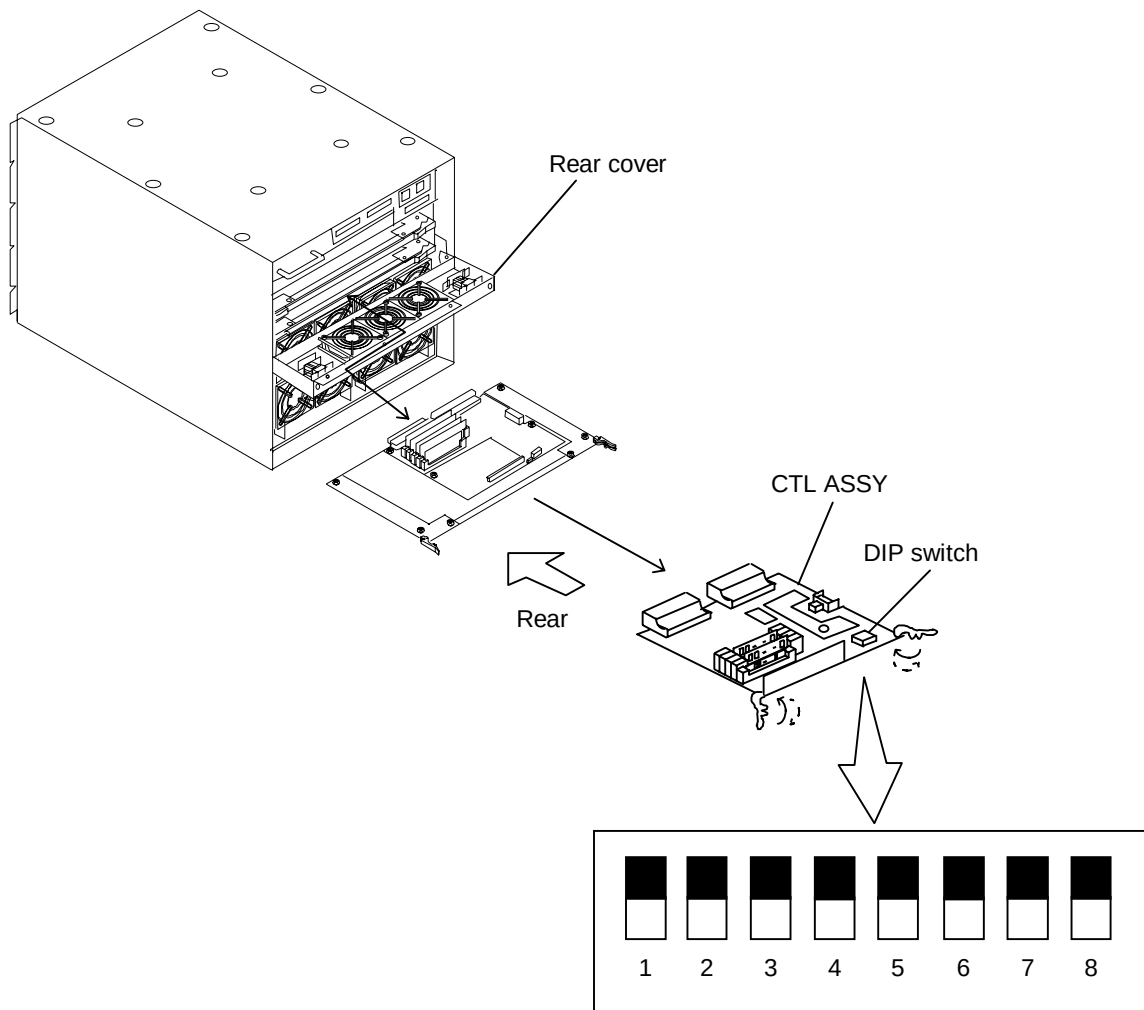


Figure 2.6.1 Installing the CTL ASSY

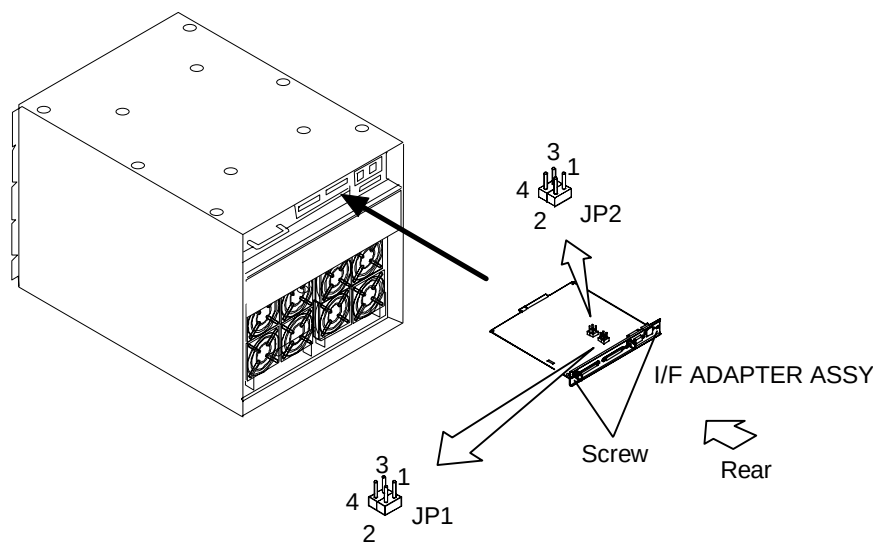
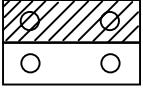
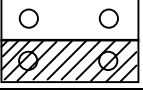
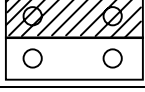
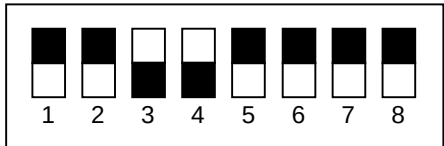


Figure 2.6.2 Installing the I/F ADAPTER ASSY

Table 2.6.1 Terminator Power Setting

No.	Name	Jumper setting	Function
1	JP1	Power fed by itself 	Feeds terminator power +5VPS from the array controller and the host. (Factory set)
		Power fed from other 	Feeds terminator power +5VPS only from the host power supply.
2	JP2		Set these jumpers so that pins 1 and 2 short-circuit.

- (7) Connect SCSI cable, terminator, LAN (option) cable RS232C cable.
- (8) Set the DIP SW of both CTL ASSYs as shown below. (See RW-OPTION0110.)



Note : Be sure to set the DIP SW of both CTL ASSYs.

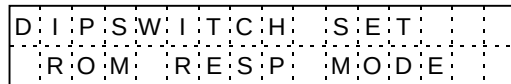
- (9) Insert the system parameter back-up FD and restore the system parameter data from the FD. (See RW-OPTION0080.)

- (10) When system parameter set up menu appears as below, select "DUAL MODE" in "DUAL CONFIG" (setting of Dual operation attribute) menu. (See PANEL0080.)

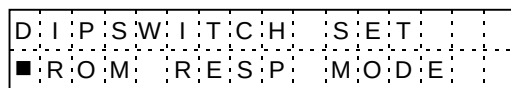
Set target ID for each CTL ASSY individually in "TARGET ID" (setting Target ID) menu.

Set the items #1, 2, 4, 5, 8, 10, 13, 20, 22 in system parameter set up menu (See PANEL0080) for each controller individually. (The other menus are common menus. Same settings are executed for both controllers. Modification by CTL1 is not available.)

- The system parameter setting menu appears on the panel in the order of CTL0 and CTL1. "■" appears on the panel when the CTL1 system parameter is to be set.
 - "■" not displayed : CTL0 system parameter is set.
 - "■" displayed : CTL1 system parameter is set.

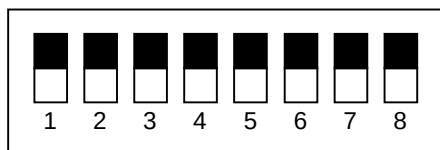


This indicates CTL0 system parameter setting.



This indicates CTL1 system parameter setting.

- (11) After the setting is ended, make a copy of the data into the back-up FD again. (See RW-OPTION0050.)
- (12) Check to see that READY LED is on.
- (13) Turn off the unit (by setting the POWER switch on the front panel to off).
- (14) Set the DIP SW on both boards as shown below.



- (15) Turn on the unit (by setting the POWER switch on the front panel to on). (See RW-OPTION0110.)
- (16) In a short while, the READY LED on the unit comes on.
Check to see "Version = XXXX/X" is displayed on the PANEL, and that corresponds to see system floppy disk version.
- (17) Close rear cover.

2.7 Installing the CACHE ASSY

- (1) Turn off the power according to the power-off procedure in RW-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

Sometimes the subsystem does not go power off after the main switch turned to "O" side with panel display "TOOMNYPIN" or "SYSDTSVER" or "POFFCMUNC". In this case refer to "Trouble shooting Section" (See TRBL0030) and turn off the power.

- (2) Open rear cover.

- (3) Remove the CTL ASSY. (See RW-OPTION0150.)

(When a DF-F350-F2MCF has been installed already, remove both boards, and here after in the same way.)

- (4) Install a CACHE ASSY.

Note 1 : The capacity of the CACHE ASSYs to be mounted in cache slots #0 and #4, slots #1 and #5, slots #2 and #6, and slots #3 and #7 must be the same.

Note 2 : If a DF-F350-F2WCF has been installed already, mount a CACHE ASSY of the same capacity in the same corresponding slot of the optional CTL ASSY as those of the already installed CTL ASSY respectively.

Note 3 : CACHE ASSY of the largest capacity must be mounted cache slots #0 and #4 in case that CACHE ASSYs of different capacity are used.

- (5) Mount the CTL ASSY.

- (6) Close rear cover and turn on the power according to the power on procedure(RW-OPTION0110)

Installation example of CACHE ASSY

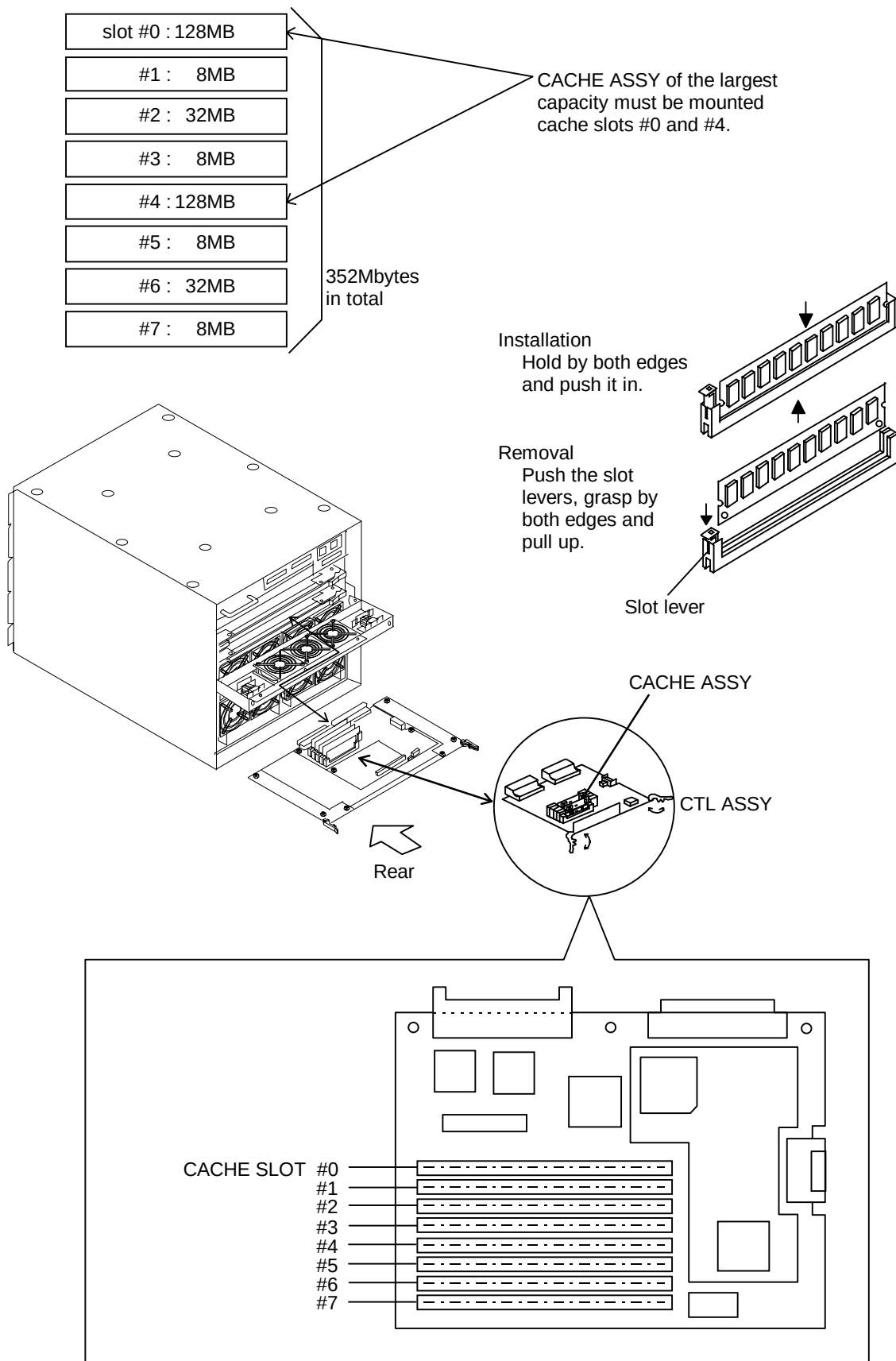


Figure 2.7.1 Installing a CACHE ASSY

2.8 Installing the LAN ASSY

- (1) Turn off the power according to the power-off procedure in RW-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Open rear cover.
- (3) Remove the CTL ASSY. (See RW-OPTION0150.)
- (4) Install a LAN ASSY. (See Figure 2.8.1.)

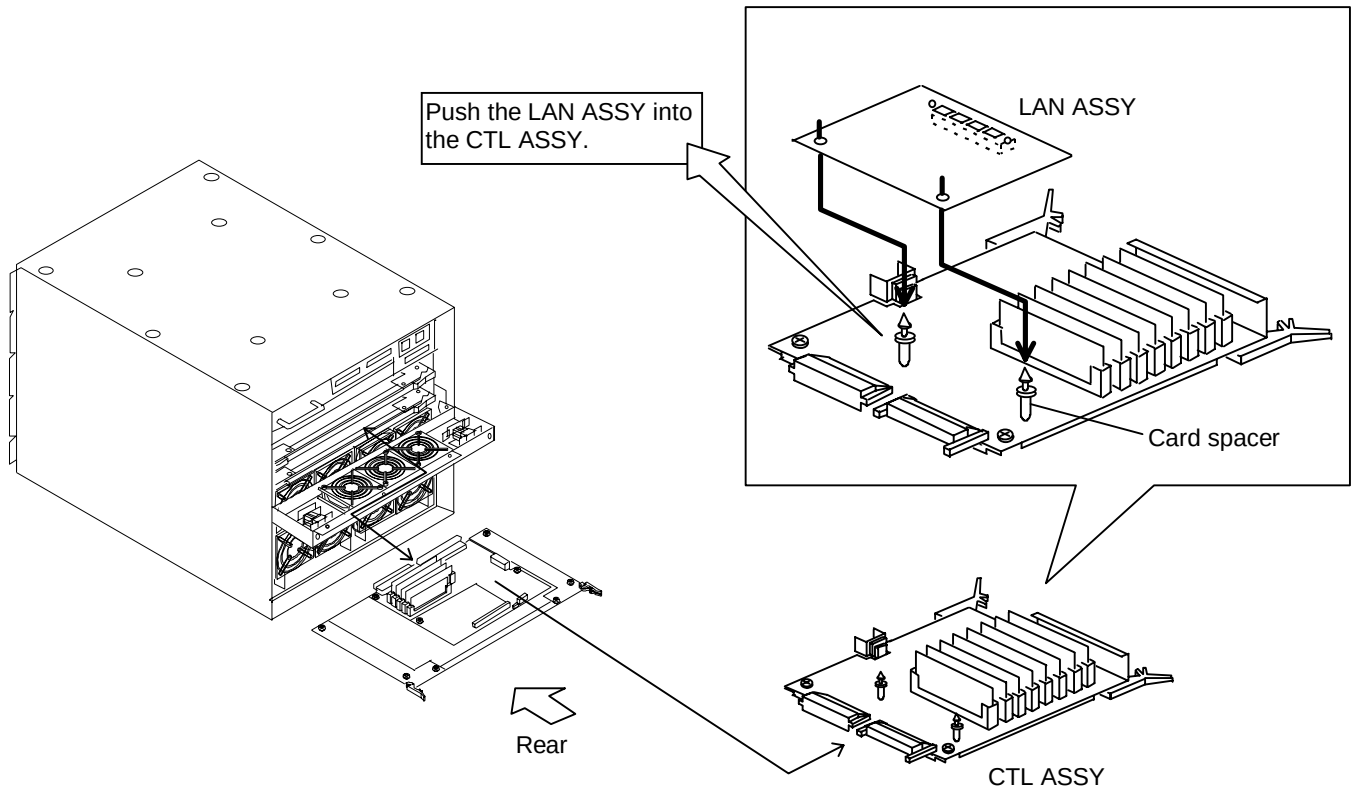
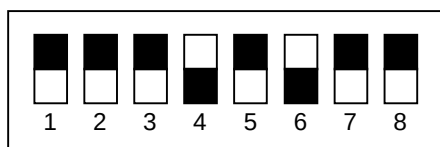


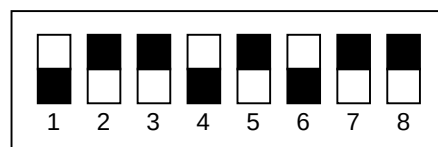
Figure 2.8.1 Installing a LAN ASSY

- (5) Mount the CTL ASSY.
 - (6) Set the DIP switches on the CTL ASSY as described below. (See RW-OPTION0150.) depending on the LAN ASSY to be used.
- (When a DF-F350-F2WCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

[DF-F350-G1M1]



[DF-F350-G2M1 (SNMP)]



- (7) Turn on the power according to the power-on procedure in RW-OPTION0110.
- (8) Remove the front bezel.
- (9) Set LAN connection state on the panel.

① Panel display

[illegible]

← Pressing , key, items are scrolled.

Display start position (The message shown in the table below ② is displayed on this position. The current setting of the parameter is preceded by an asterisk “*”.)

② Displayed Item

No.	Message display	Description
1	CONNECT	LAN connected
2	NOT CONNECT	LAN not connected

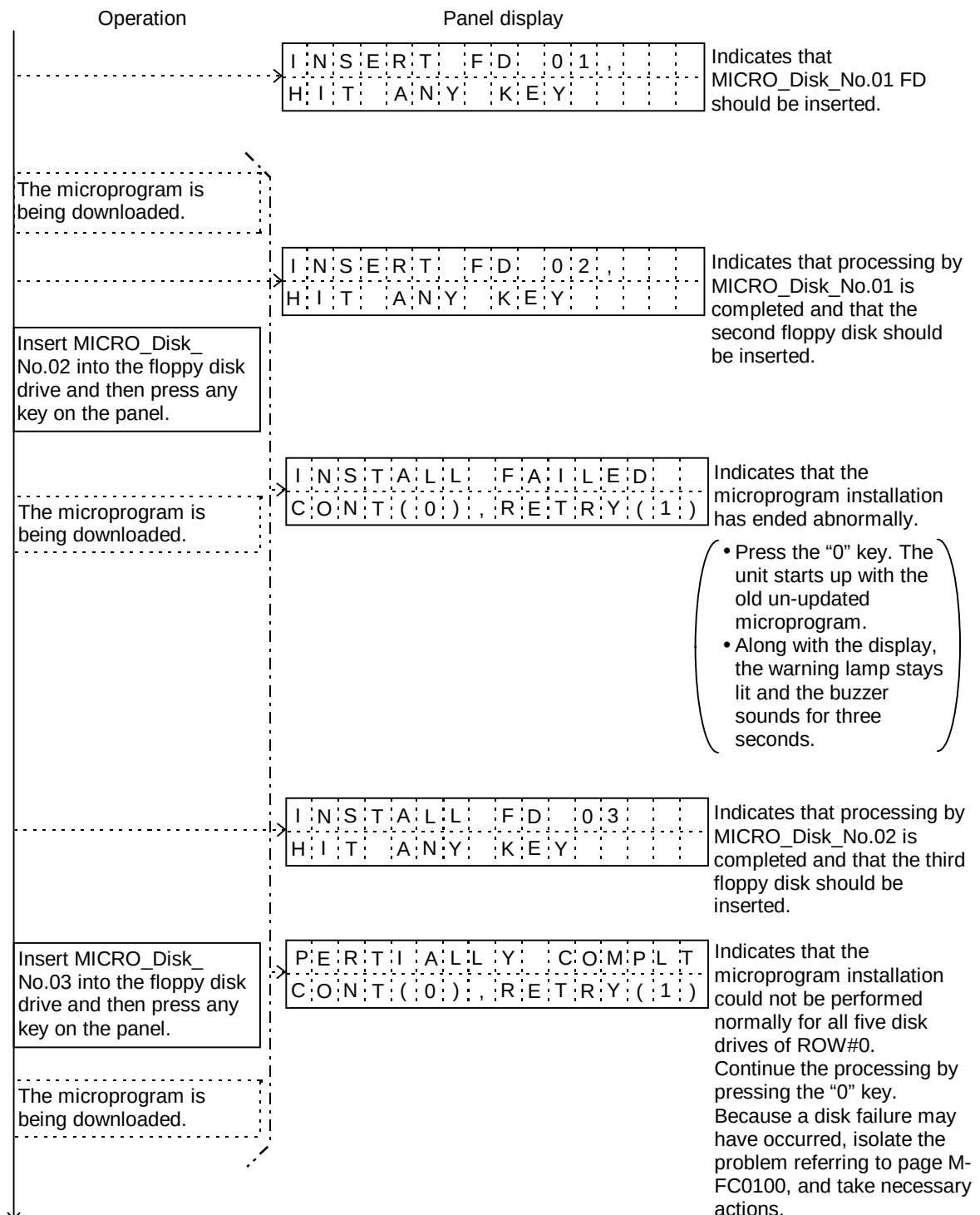
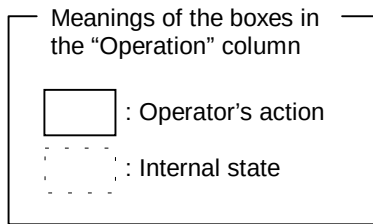
- (10) Set IP address on the panel. (See RW-INST0330)
- (11) Set SUB NET MASK. (See RW-INST0340)
- (12) Set DEFAULT GATEWAY address. (See RW-INST0350.)
- (13) Set System parameter on the panel. (See RW-INST0290.)
- (14) After setting ② in Chapter 5 and selecting “QUIT” on the panel, when “FD BACK UP” appears on the screen, insert a back-up FD and make a back-up copy of the system parameter.

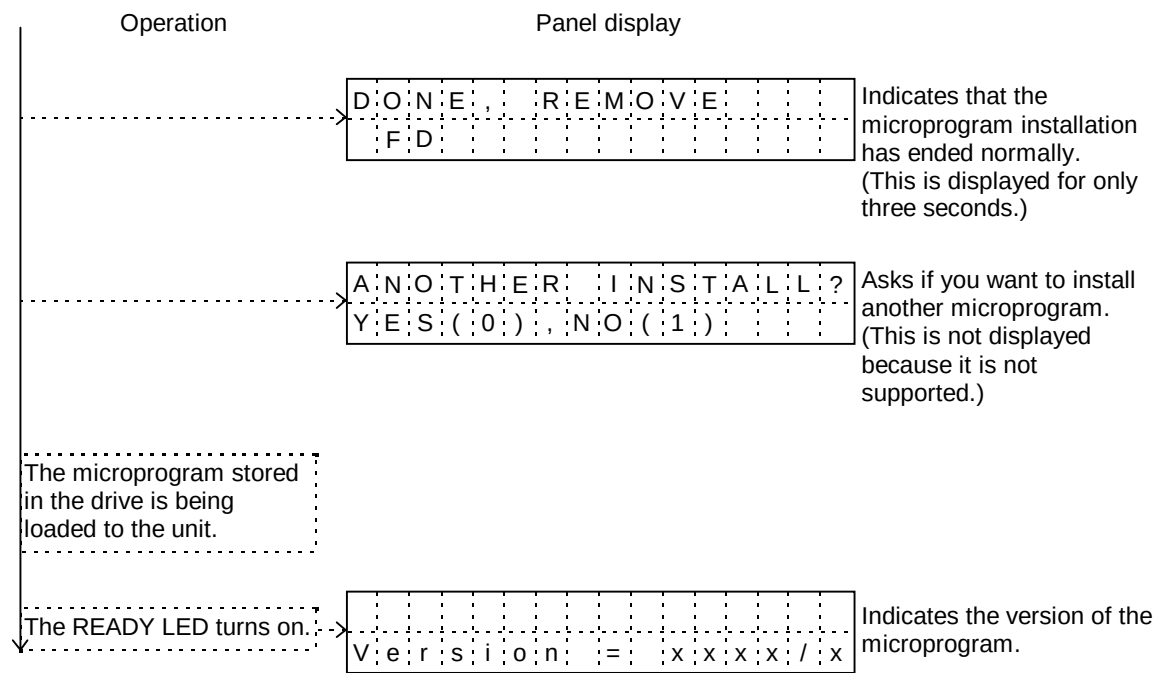
DIP	SWITCH	SET		$\longrightarrow$	FD	BACK	UP (#0)?	
QUIT					YES (0),	NO (1)		

If this message appears, make a back-up copy of the data in the EEPROM into the BACKUP floppy disk. In case of dual configuration, "FD BACK UP (#1)?" is displayed. Select the controller to be restored.

(15) Perform the following procedure.

Note : Use a set of three FDs (containing a microprogram corresponding to the SNMP) supplied with the DF-F350-G2M1 when it is shipped from the factory.





- (16) Reset the DIP switches (4, 6 or 1, 4, 6) to the original positions after the system is ready.
- (17) Close the front cover.
- (18) Close the side covers.

2.9 Installing the HDU ASSY

Since the procedure differs depending on the cases below, be careful in installing the HDU ASSY.

- [1] Capacity expansion with HDU ASSY exchange
- [2] Capacity expansion with additional HDU ASSY installation
- [3] Installing a spare HDU ASSY



Caution

Do not subject the HDU ASSY to any impact or vibration since it is a precision component.

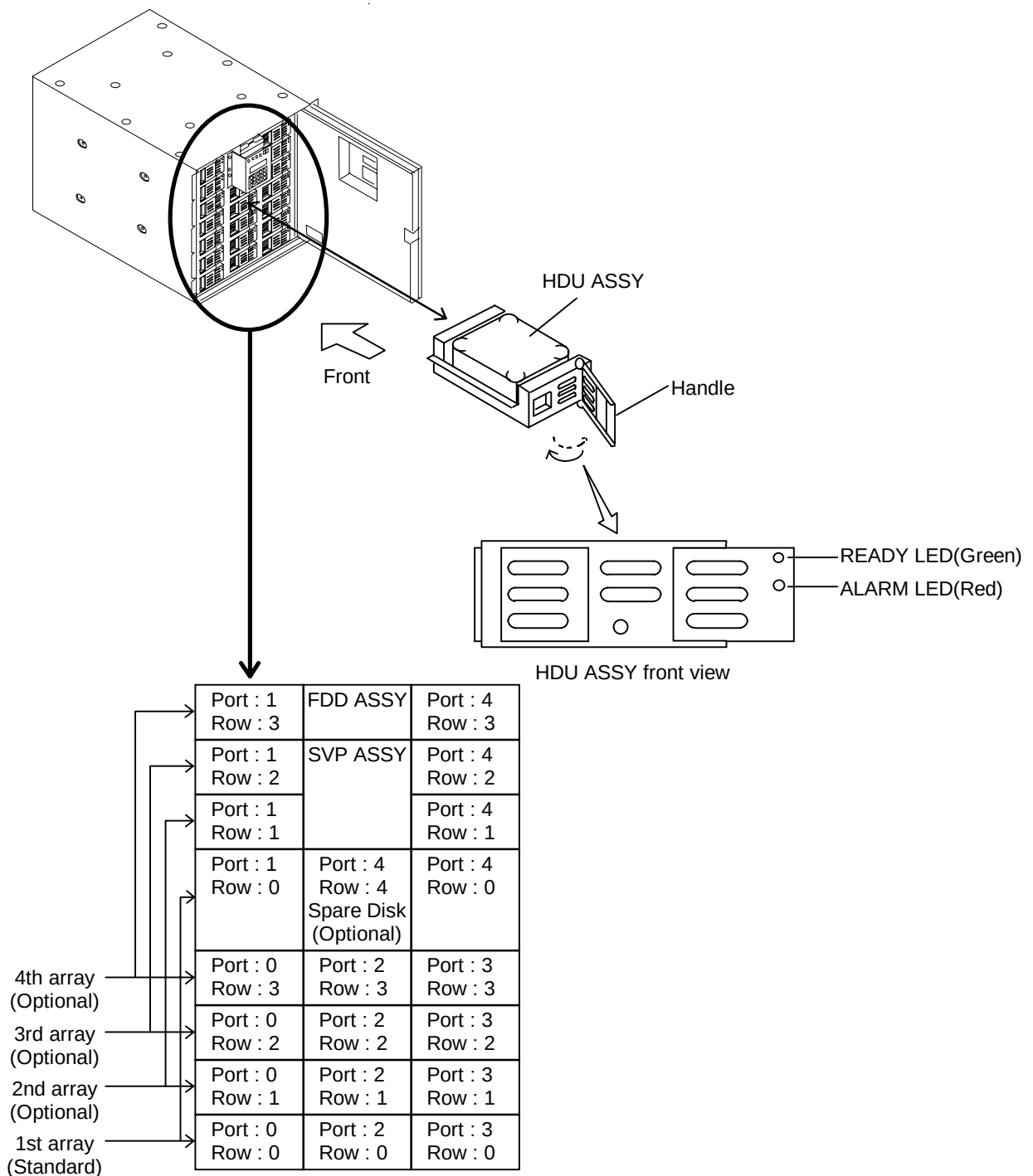


Figure 2.9.1 Installing the HDU ASSY

[1] Capacity expansion with HDU ASSY exchange

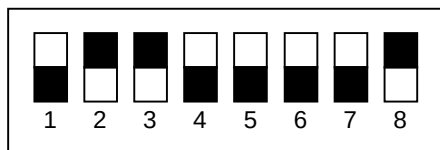
After this operation all the user's data will be lost. Be sure to make a back-up copy of data before beginning this operation. (See RW-OPTION0050.)

- (1) Turn off the power according to the power-off procedure in RW-OPTION0110.

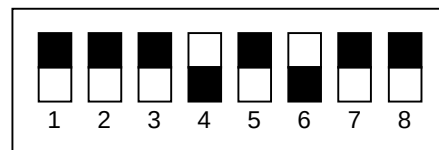
Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove the front bezel and open the front panel.
 (3) Remove the old HDU ASSY and set the new HDU ASSY. (See Figure 2.9.1 in RW-OPTION0220.)
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2WCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



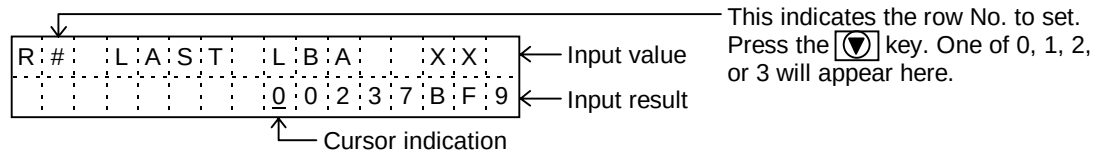
For ROW=0



For ROW≠0

- (5) Turn on the power according to the power-on procedure RW-OPTION0110.
 (6) Set LBA on the panel following the table below. Set the capacity of each drive following the display. (See RW-OPTION0250.)

- When ROW LAST LBA is displayed;



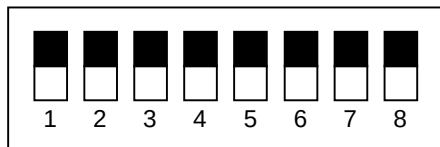
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting "QUIT" on the panel, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of the system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.



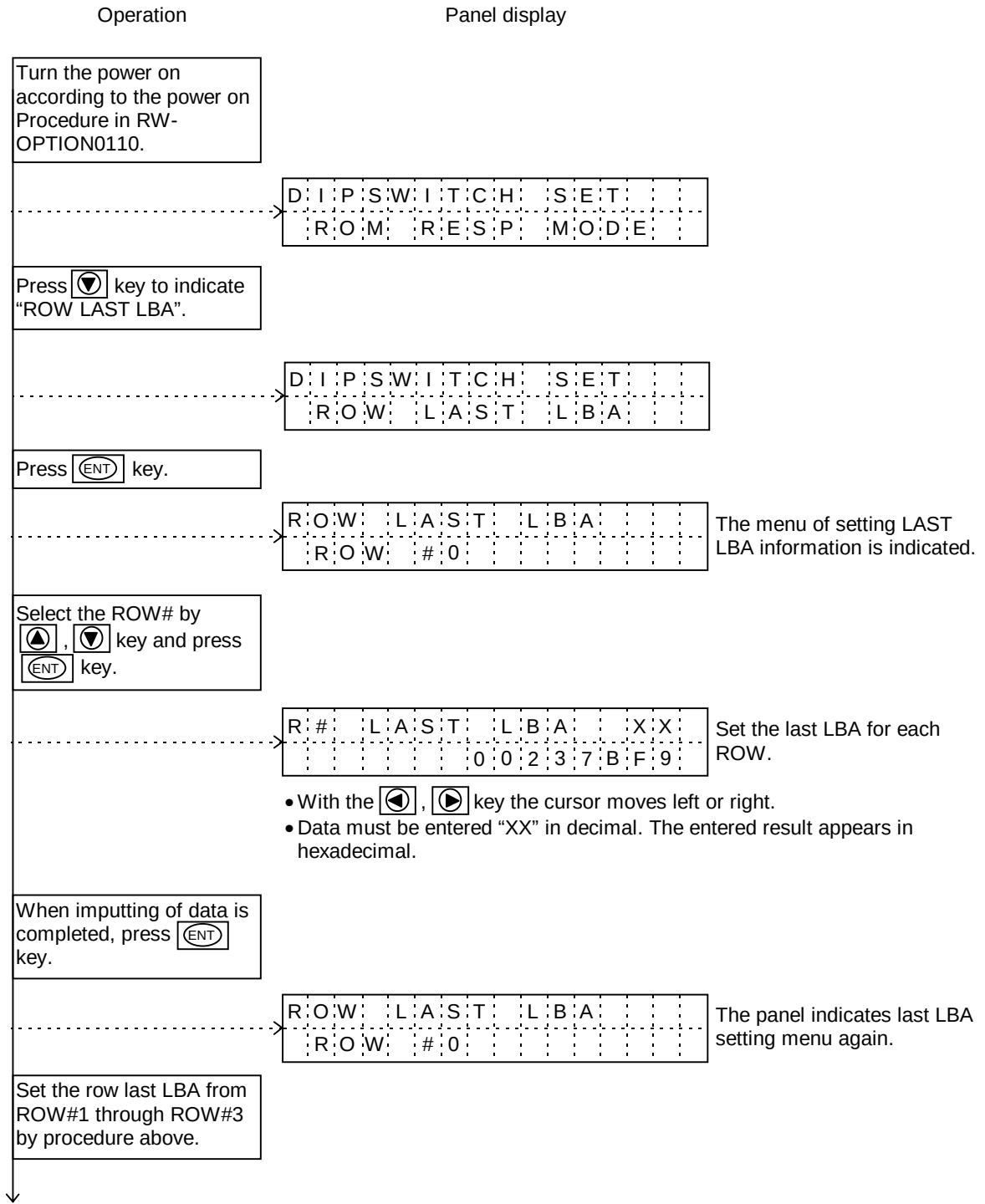
If this message appears, make a back-up copy of the data in the EEPROM into the back-up floppy disk.
In case of dual configuration, "FD BACK UP (#1)?" is displayed.
Select the controller to be restored.

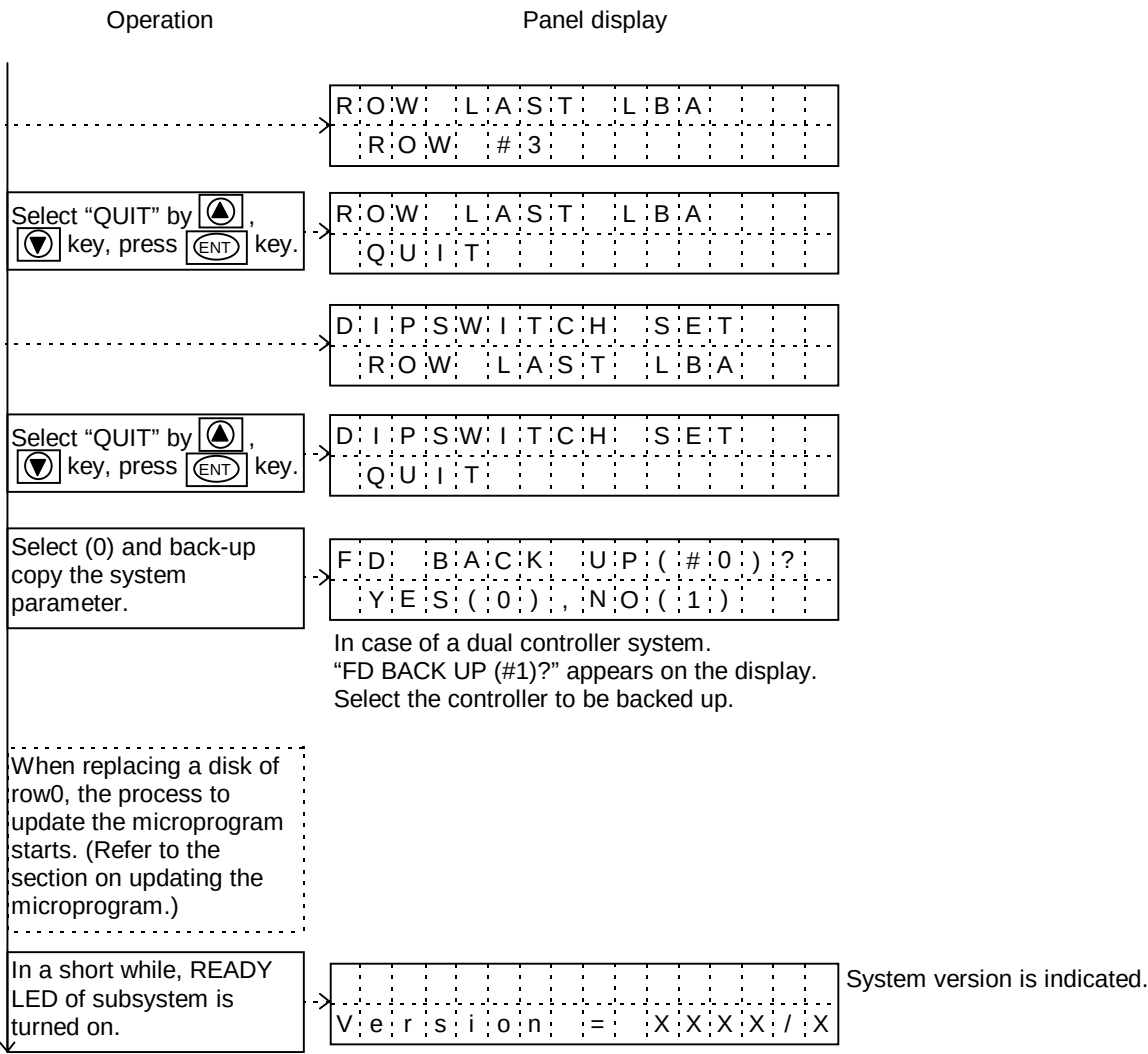
- (8) Reset the DIP switch 4 and 6 to the original positions after the system is ready.



- (9) Only in case of exchanging ROW0 disk, revise the microprogram. (See "5 MICROPROGRAM-FC" Chapter)
- (10) Set up the RAID group and the LU. (See Installation Chapter.)
- (11) Close the front panel.
- (12) Attach the front bezel.

Set the LAST LBA number on the panel according to the flow below.





[2] Capacity expansion with additional HDU ASSY installation

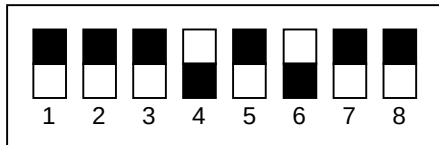
Additional HDU installation to a new ROW.

- (1) Turn off the power according to the power-off procedure in RW-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

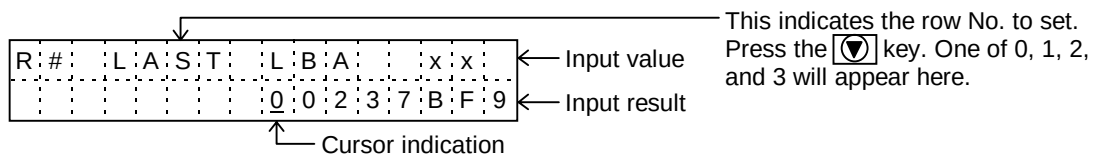
- (2) Remove the front bezel and open the front panel.
 (3) Install an additional HDU ASSY.
 (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2WCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)



- (5) Turn on the power according to the power-on procedure in RW-OPTION0110.
 (6) Set the system LBA number with the panel according to the table below. In setting the available capacity of each drive follow ROW LAST LBA menu. Set the capacity following the displayed menu. (See RW-OPTION0250.)

- When ROW LAST LBA is displayed;



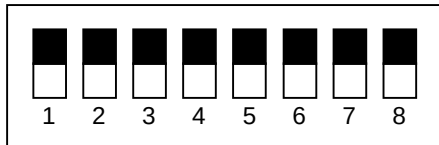
No.	Drive Capacity	Model	Final LBA No. (Hex)
1	2GB	DF-F350-A2E2	(3E696B)16
2	4GB	DF-F350-A2E4/ DF-F350-A2E4A/ DF-F350-A3E4	(7CD2D7)16
3	8GB	DF-F350-A1E8/ DF-F350-A1E8A/ DF-F350-A2E8/ DF-F350-A2E8A	(1046C97)16
4	18GB	DF-F350-A1E18	(215D9B3)16

- (7) After selecting "QUIT" on the panel screen, when "FD BACK UP" appears on the screen, insert a back-up FD and make a back-up copy of system parameter. The "FD BACK UP" message may not appear for some unit types, so ignore this step in that case.



If this message appears, select (0) and make a back-up copy of the data in the EEPROM into the back-up floppy disk.
 In case of a dual system, it is displayed "FD BACK UP (#1)?". Select the controller to be backed up.

- (8) Reset the DIP switch 4, 6 to the original positions after the system is ready.



- (9) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

- (10) Close the front panel.

- (11) Attach the front bezel.

Additional HDU installation to existing ROW.

- (1) Turn off the power according to the power-off procedure in RW-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove the front bezel and open the front panel.

- (3) Install additional HDU.

Be sure to install an HDU of capacity no less than pre-installed HDUs. When an HDU of less capacity is installed, after power on (5), warning LED will light up and display shown in Figure 2.9.2 will appear.

Prepare an HDU of appropriate capacity and re-install from (1).

Set the capacity referring to the system parameter setting table.

H	Z	1	4	X	Y	P	O	N	C	A	P	-	X	Y

X : Port number

Y : Row number

Figure 2.9.2 Panel Display when Inproper Capacity

- (4) Turn the power on following the power on procedure. (See RW-OPTION0110.)

- (5) Set up the RAID group and the LU. (See Installation Chapter.)

Notice : Deleting or re-formatting the set up RAID group or LU, the data is also deleted. Be sure to make a back-up copy of user's data before execution.

[3] Installing a spare HDU ASSY

- (1) Turn off the power according to the power-off procedure in RW-OPTION0110.

Notice : If the power is not turned off normally, the user's data might be lost.

- (2) Remove the front bezel and open the front panel.
- (3) Install a spare HDU ASSY.

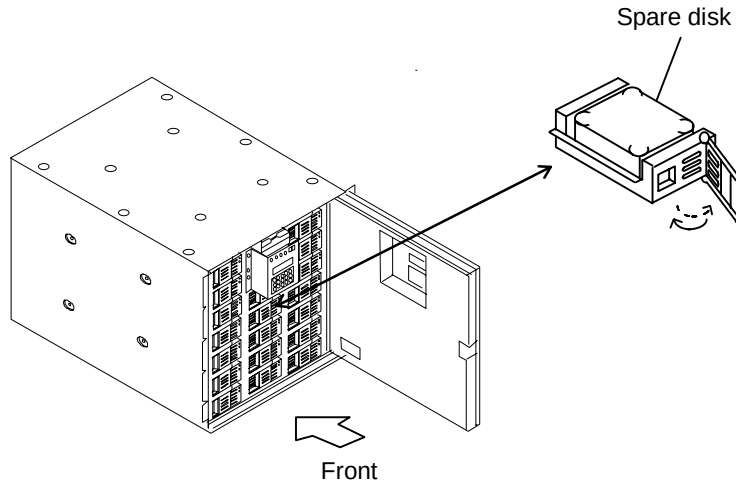
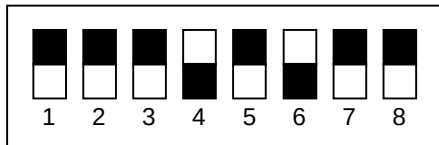


Figure 2.9.3 Installation of Spare Disk

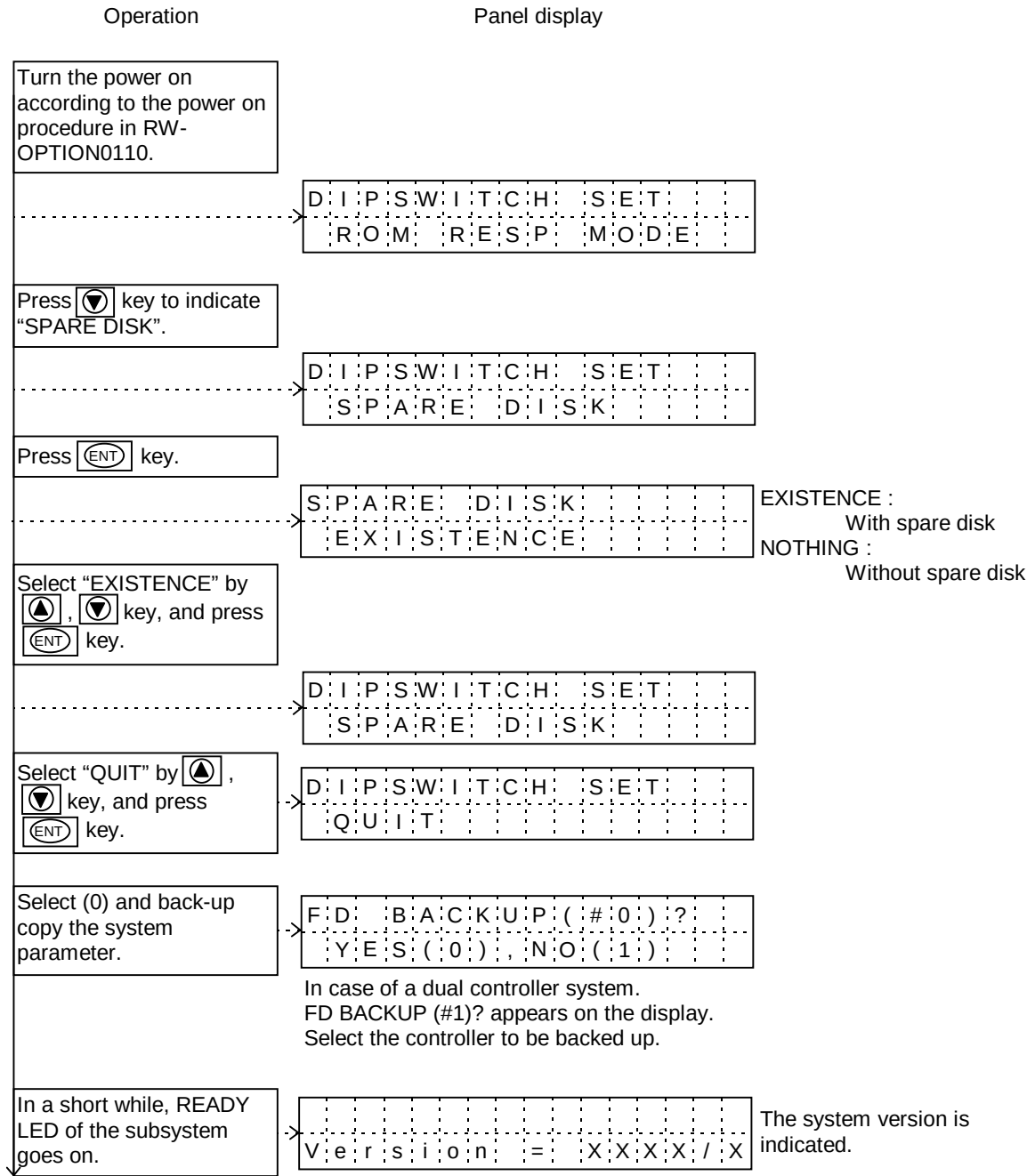
- (4) Set the DIP switches 4 and 6 on the CTL ASSY to down.

(When a DF-F350-F2WCF has been installed already, be sure to set the DIP switches on both CTL ASSYs.)

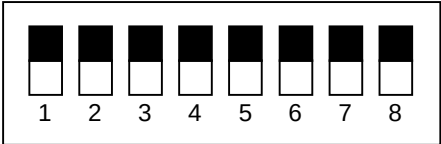


- (5) Turn on the power according to the power-on procedure in RW-OPTION0110.

(6) Set the spare disk from the PANEL according to the flow below.



(7) Reset the DIP switches 4 and 6 to the original positions, after READY LED lit up.



(8) Close the front panel.

(9) Attach the front bezel.

DF350 Disk Subsystem
10. PARTS CATALOG
(Rack Mount (RKWH/U2) Type)

Rev.2

Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

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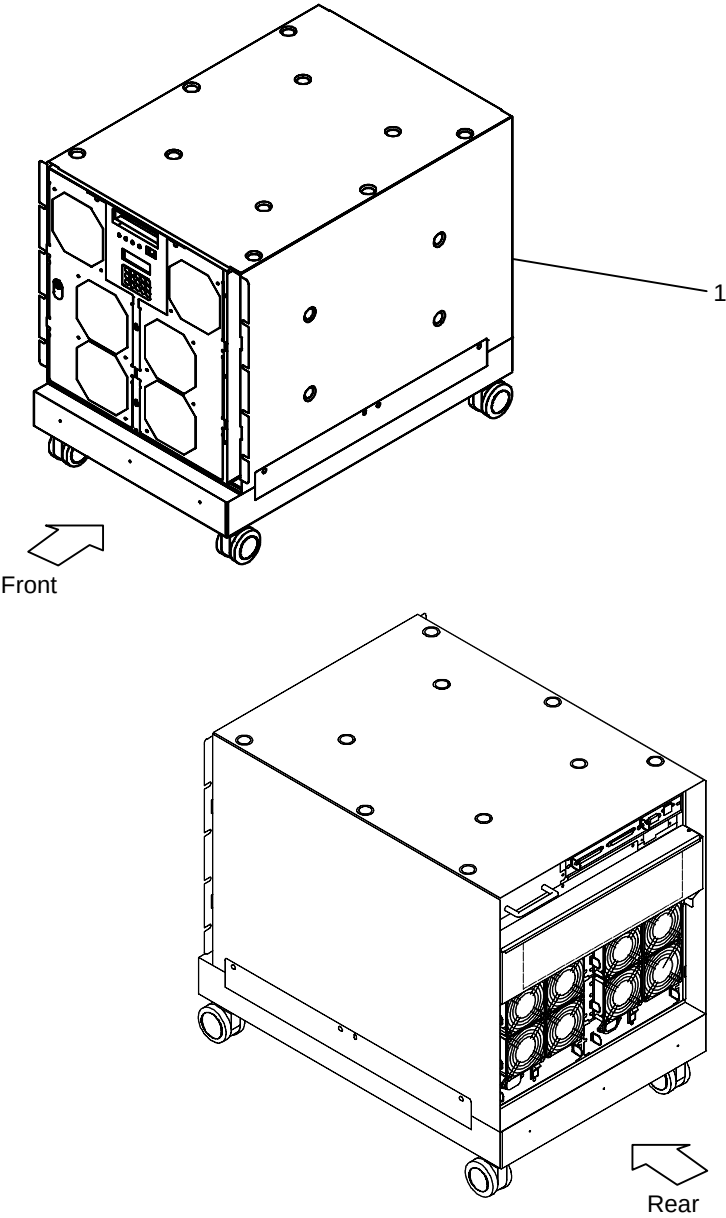
REV.2	Feb.1997	May.1998	Oct.1998			

RW-PARTS0010

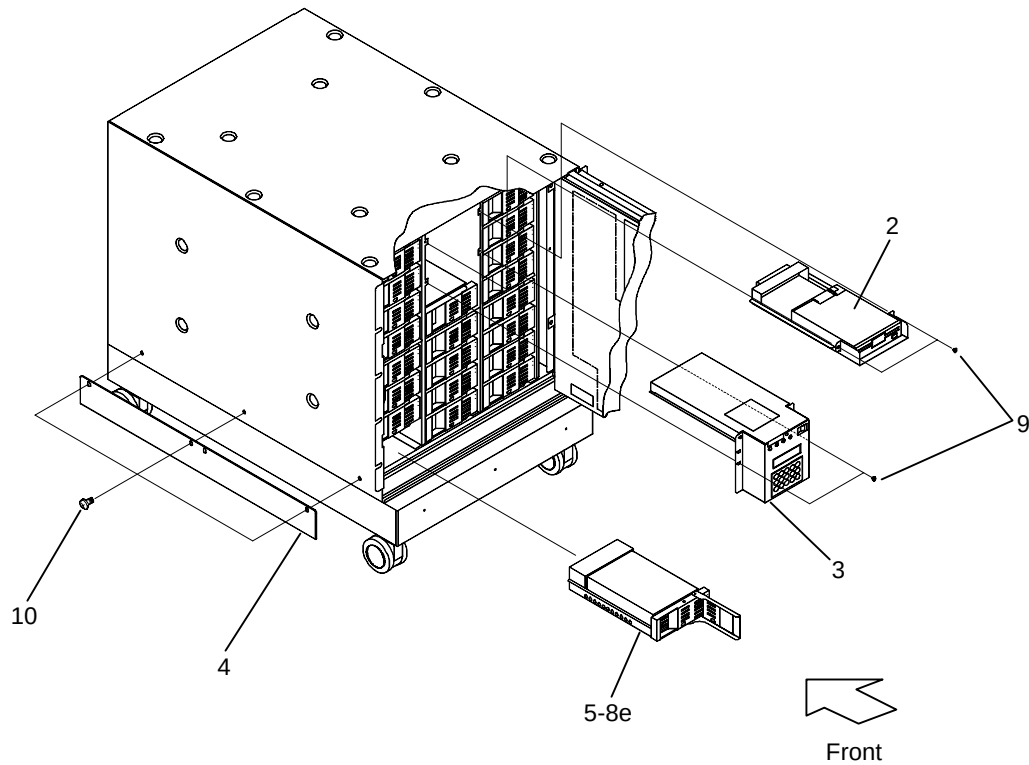
HOW TO USE THIS PARTS CATALOG

LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	1504188-A	FINAL ASSY (SEE LIST 1)	1	
2	3240337-A	• FDD ASSY	1	S.P.
3	3247397-A	• SVP PANEL ASSY	1	S.P.
4	3247273-1	• PLATE	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-21	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-21	S.P.
7	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-21	S.P.

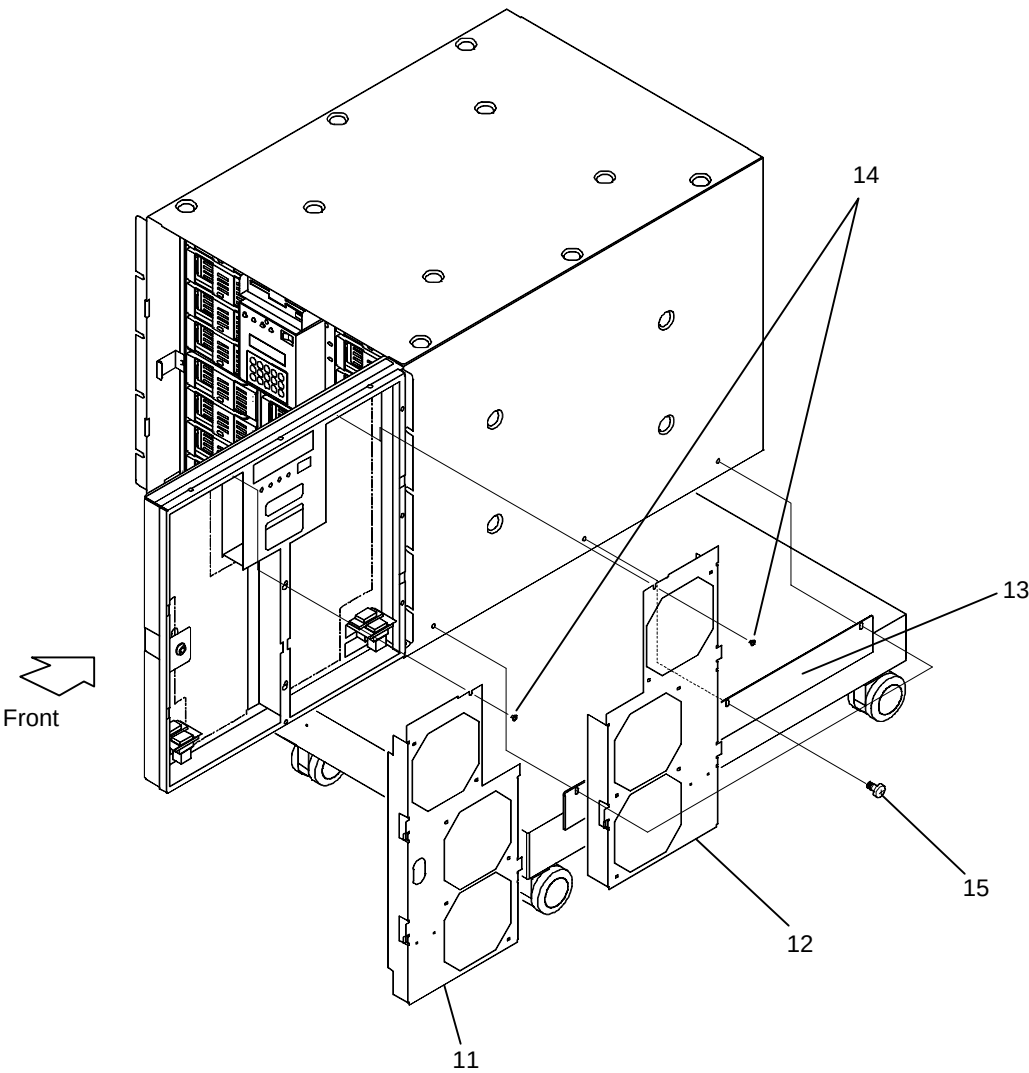
- ① indicates the list number of the assembly given on the visual index.
- ② indicates the item number given on the drawing in the catalog section.
- ③ indicates the part number.
- ④ has the following meaning.
- indicates an assembly or equivalent part.
 - indicates a subassembly or equivalent part included in an assembly indicated by....
- ⑤ indicates the unit type.
- ⑥ indicates the possible number of the subsystem.
- ⑦ indicates S.P.
- If S.P. is written in Remarks, the part or the assembly is spare parts.



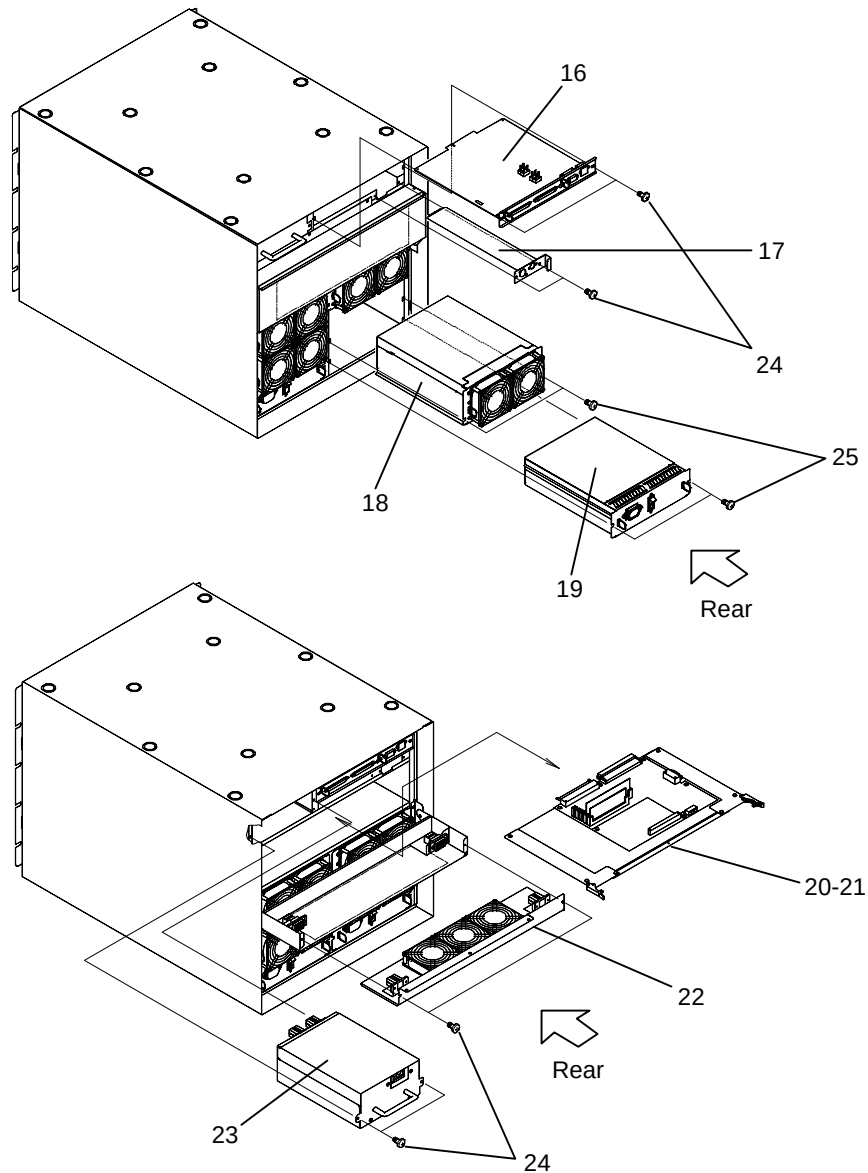
LIST NO.	NAME OF PARTS	SHEET NO.
1	FINAL ASSY	RW-PARTS0040



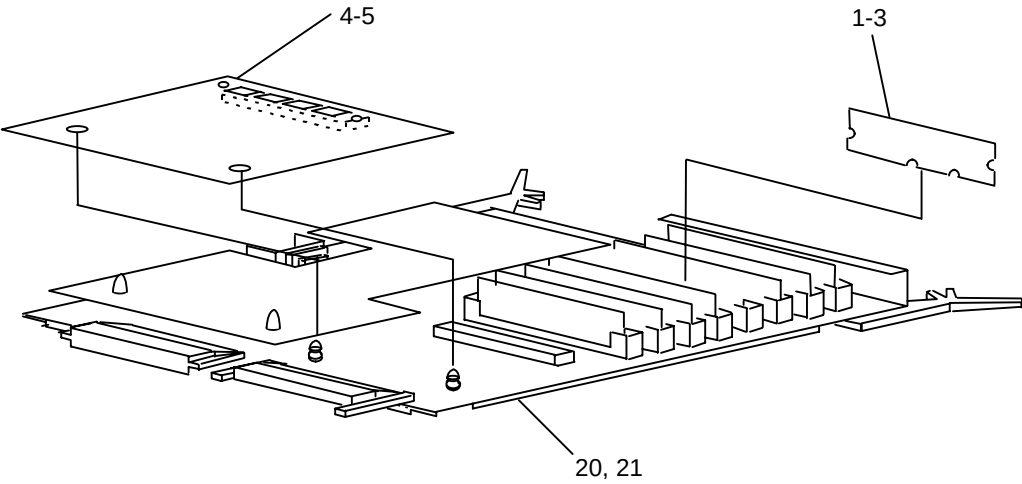
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
1	1504188-A	FINAL ASSY (SEE LIST 1)	1	
2	3240337-A	• FDD ASSY	1	S.P.
3	3247397-A	• SVP PANEL ASSY	1	S.P.
4	3247273-1	• PLATE	1	
5	3243084-E	• HDU ASSY (DF-F350-A2E2)	2-21	S.P.
6	3243084-F	• HDU ASSY (DF-F350-A2E4)	2-21	S.P.
7	3252929-E	• HDU ASSY (DF-F350-A3E4)	2-21	S.P.
8	3252929-B	• HDU ASSY (DF-F350-A2E8)	2-21	S.P.
8a	3252929-D	• HDU ASSY (DF-F350-A2E8A for AS/400)	2-21	S.P.
8b	3243084-G	• HDU ASSY (DF-F350-A1E8)	2-21	S.P.
8c	3252929-A	• HDU ASSY (DF-F350-A1E18)	2-21	S.P.
8d	3243084-Q	• HDU ASSY (DF-F350-A2E4A for AS/400)	2-21	S.P.
8e	3243084-R	• HDU ASSY (DF-F350-A1E8A for AS/400)	2-21	S.P.
9	SB306	• BIND SCREW (M3 × 6)	4	
10	SB408	• BIND SCREW (M4 × 8)	3	



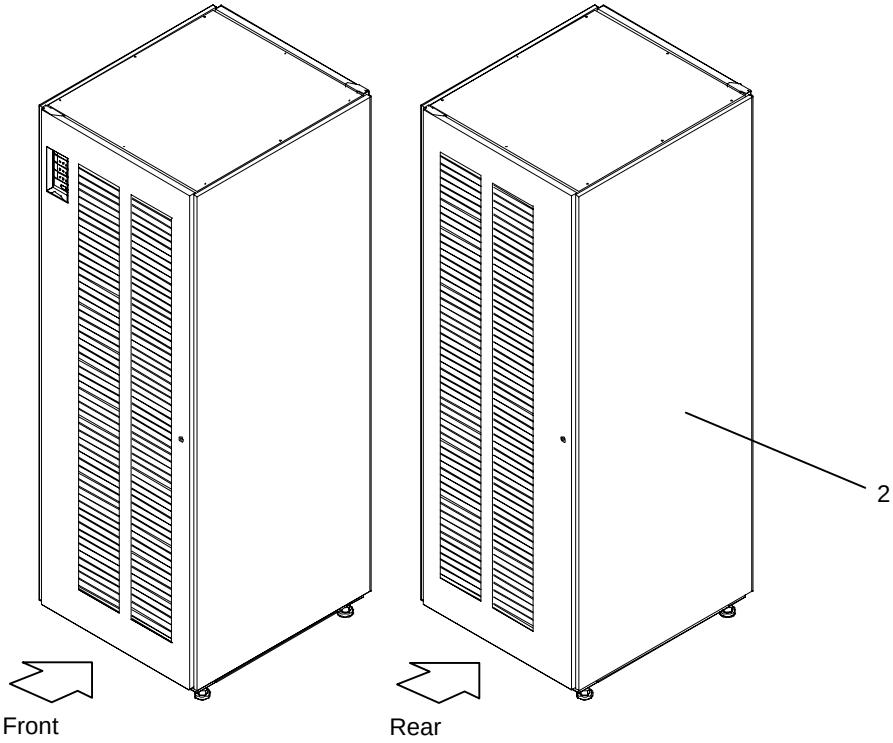
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
11	2099367-A	• FAN (F-L) ASSY (DF-F350-P2RW)	1	S.P.
12	2099368-A	• FAN (F-R) ASSY (DF-F350-P1RW)	1	S.P.
13	2100472-A	• CART ASSY	1	
14	SB306	• BIND SCREW (M3 × 6)	2	
15	SB408	• BIND SCREW (M4 × 8)	3	



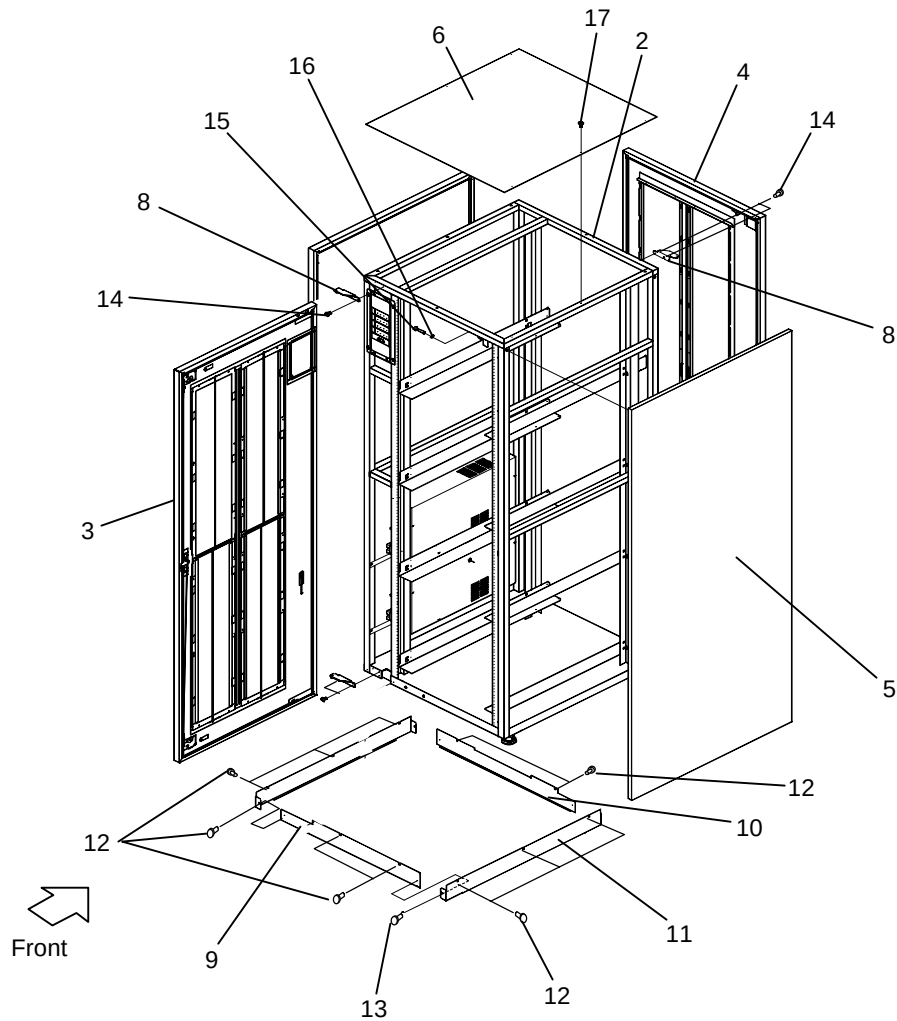
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-		FINAL ASSY		
16	3247398-A	• I/F ADAPTER ASSY (DF-F350-DWUDS)	1-2	S.P.
17	5494034-A	• HI-OP ASSY	1	S.P.
18	2098747-A	• AC/DC POWER SUPPLY (RW)	4	S.P.
19	5486142-305	• IN BOX ASSY	2	S.P.
20	3247396-A	• CTL ASSY (DF-F350-F1WCF)	1	S.P.
21	3247396-B	• CTL ASSY (DF-F350-F2WCF)	0-1	S.P.
22	3245118-A	• FAN (R) ASSY	1	S.P.
23	2099365-A	• BATTERY ASSY	1	S.P.
24	SB306	• BIND SCREW (M3 × 6)	8	
25	SB408	• BIND SCREW (M4 × 8)	4	



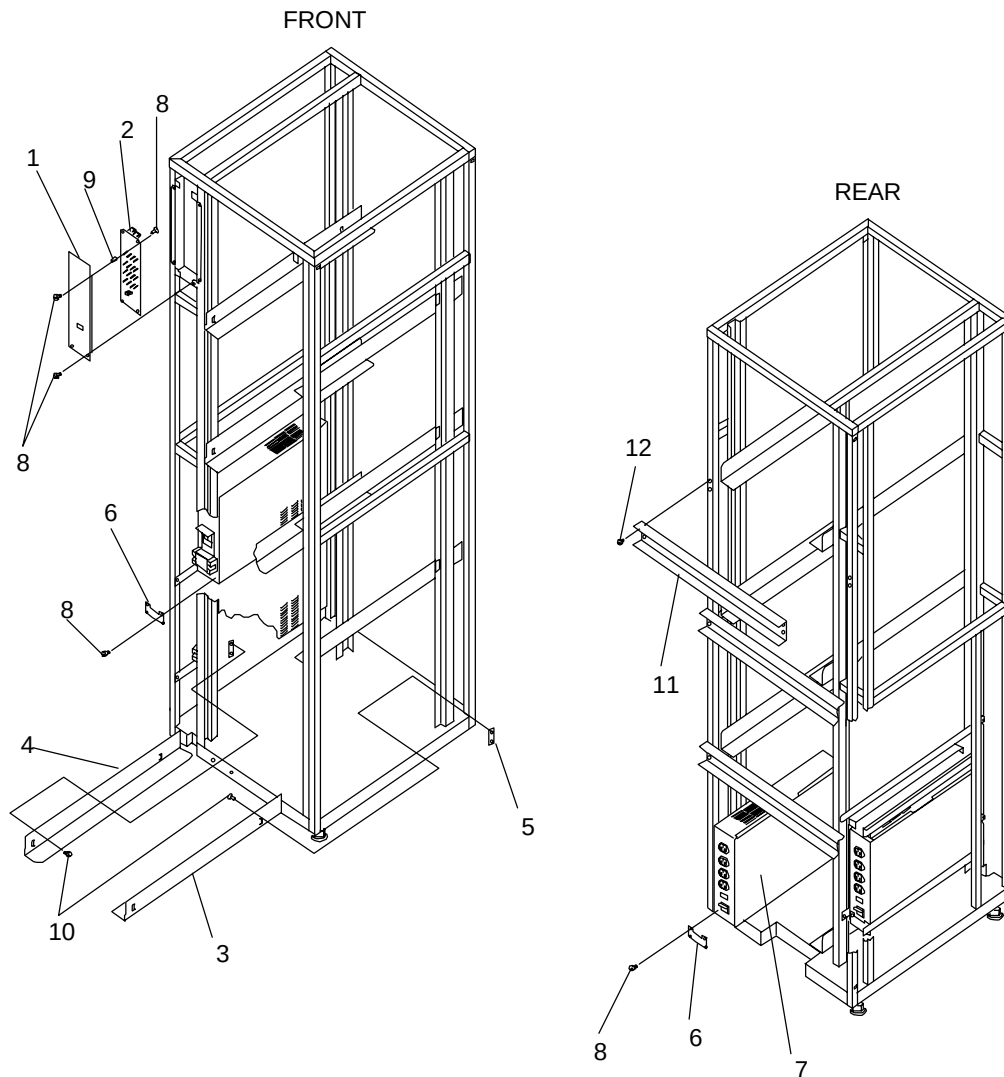
LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
1-20-		FINAL ASSY		
1	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
2	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
3	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
4	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
5	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.
1-21-		CTL ASSY		
1	3247121-A	•• CACHE MEMORY (DF-F350-C8E)	2, 4, 6, 8	S.P.
2	3247121-B	•• CACHE MEMORY (DF-F350-C32E)	2, 4, 6, 8	S.P.
3	3247121-C	•• CACHE MEMORY (DF-F350-C128E)	2, 4, 6, 8	S.P.
4	5493862-A	•• LAN ASSY (DF-F350-G1M1)	0-1	S.P.
5	5493862-B	•• LAN ASSY (DF-F350-G2M1)	0-1	S.P.



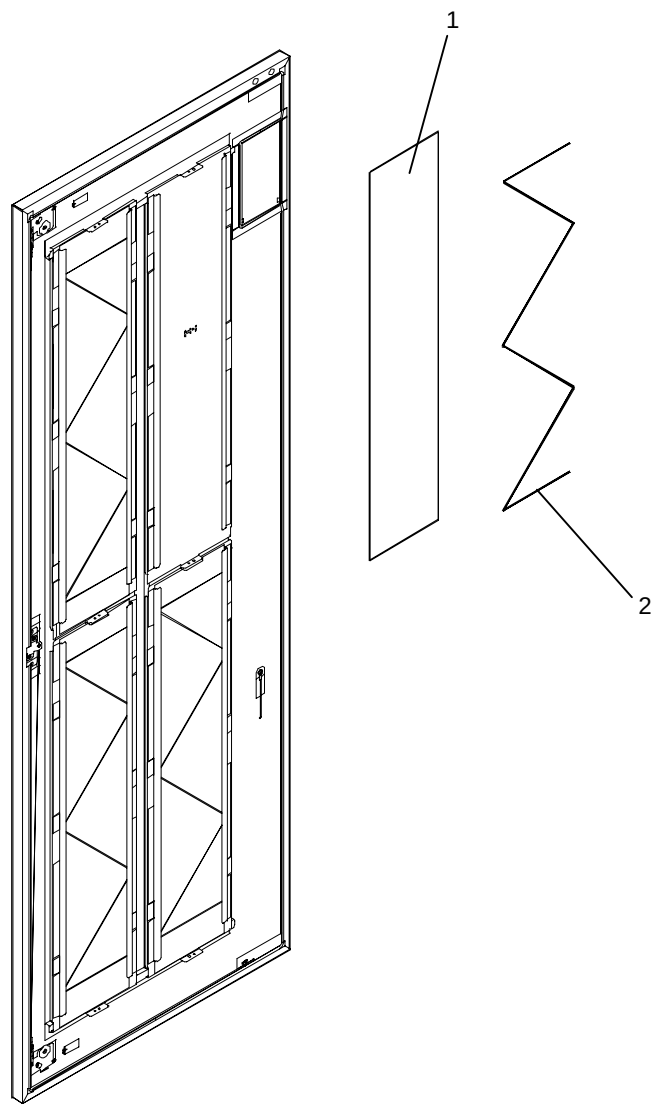
LIST NO.	NAME OF PARTS	SHEET NO.
2	FINAL ASSY	RW-PARTS0090



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
2-		FINAL ASSY		
1	1504440-A	FINAL ASSY (U2)	1	
2	1504439-A	• SUB FINAL ASSY	1	
3	1504437-A	• FRONT DOOR ASSY	1	
4	1504438-A	• REAR DOOR ASSY	1	
5	3245128-A	• SIDE COVER ASSY	1	
6	3245112-1	• TOP COVER	1	
7	5460630-B	• HINGE ASM (L)	2	
8	5460631-B	• HINGE ASM (U)	2	
9	3245121-1	• SKIRT (FRONT)	1	
10	3245122-1	• SKIRT (REAR)	1	
11	3245123-1	• SKIRT (SIDE)	2	
12	5409006-1	• SCREW (BLACK)	10	
13	5411531-2	• SCREW (BLACK)	4	
14	BS510	• HEXAGON SOCKET BOLT	4	
15	SB536	• BIND SCREW (M5 × 36)	4	
16	2051001-532	• LL WASHER	4	
17	3183101-1	• HWA BIND SCREW	8	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
2-2-	1504439-A	SUB FINAL ASSY		
1	3247197-1	• PANEL (OP)	1	S.P.
2	2100418-A	• SH045-A PK ASSY	1	
3	3247413-1	• RAIL (HT)	4	
4	3247413-2	• RAIL (HT)	4	
5	5486467-1	• PLATE NUT	16	
6	5494025-1	• STOPPER (PDB)	4	S.P.
7	5490856-A	• PDB ASSY	2	
8	SB306	• BIND SCREW (M3 × 6)	18	
9	3183001-312	• LONG NUT	4	
10	BS510	• HEXAGON SOCKET BOLT	4	
11	3247412-1	• CHANNEL-1	3	
12	SB510	• BIND SCREW (M5 × 10)	12	



LIST AND INDEX NUMBER	PARTS NUMBER	NAME OF PARTS	UNIT PER ASSY	REMARKS
2-3-	1504437-A	FRONT DOOR ASSY		
1	3245124-1	• FILTER	4	S.P.
2	3245163-1	• FILTER STOPPER	4	
3				
4				
5				

DF350 Disk Subsystem

11. INSTALLING IN RACK FRAME

(Rack Mount (RKWH/U2) Type)

Rev.2

Read this manual carefully and keep it.
• Before starting operation, read the safety instructions carefully and fully understand them. • After reading this manual, keep it at hand for your reference.

HITACHI

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Legend for revision codes : AD : Addition CH : Change CR : Correction DL : Deletion

Legend for Revision Codes: A: Add, C: Change, CR: Correction, DE: Deletion							
REV.	Date	DRW.	CHKD	APPD	Sheet No.	Description	Code
0	Sep.10.'97	A.Yamanashi	Y.Morishita	H.Iwasaki	All	Issued	
1	May.20.'98	A.Yamanashi	Y.Morishita	H.Iwasaki	All 0050 0140 0210	“DF350” was added as an item of the header. (Revision number of each page was left unchanged.) “fron” was changed to “from”. Added URASD. Added URASD.	AD CR AD AD
2	Oct.15.'98	A.Yamanashi			0140	Added 12, 13 on URASD table.	AD

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2.4.3 Installing the fasteners.....	RW-FRAME0180
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1. Installing Into HP Rack Frame

1.1 Space (Height Inside the Rack) Required for Installation

The space of 11(=10+1) units height (EIA standard) is required to install DF350-RKWH into the HP rack.

1.2 Optional Parts Required for Installation (Model names : DF-F350-URHP)

Table 1.2.1 shows optional parts required to install one DF350-RKWH disk subsystem.

Table 1.2.1 Parts Required for Installation of DF-F350-URHP

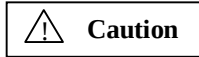
No.	Part No.	Part Name	Qty.	Remarks
①	3243426-1	Rail	1	For right hand side
②	3243426-2	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (R)
④	5490710-2	Stopper	1	For the rail (L)
⑤	3250931-1	Spacer (HP)	2	RKWH
⑥	5486490-1	Spacer (HP)	2	RKH (Not used RKWH)
⑦	5486485-1	Fastener	14	For securing the subsystem/rails (2 spares are included)
⑧	BH612	Bolt (M6 × 12.5)	4	For securing the spacer (HP) (2 spares are included)
⑨	SB516	Binding screw (M5 × 16)	10	For securing the rail (2 spares are included)
⑩	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stoppers (2 spares are included)
⑪	SB532	Binding screw (M5 × 32)	6	For securing the subsystem (2 spares are included)
⑫	WP005	Washer (M5)	6	For the hexagon socket head bolt (2 spares are included)
⑬	3243319-69	Nameplate (parts)	1	Already affixed to the rail
⑭	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem

1.3 Tools Required

- Socket wrench (4mm)
- Spanner (10mm)
- Philips screwdriver (No.2)
- Torque wrench (T25) (*1)

*1 : Used to remove parts previously installed in the HP frame.

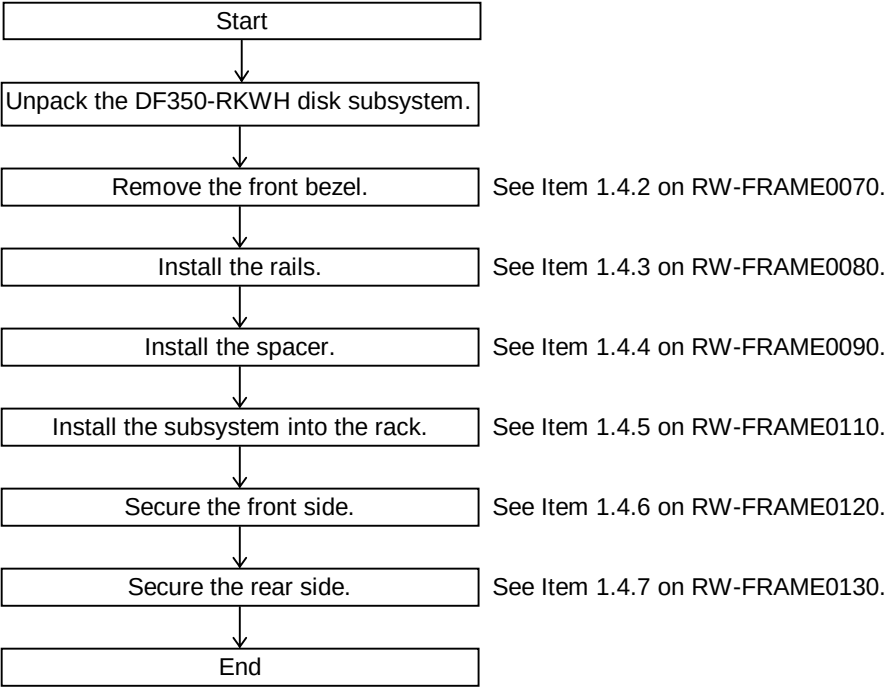
1.4 Installing the Subsystem into the Rack



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKWH disk subsystem is approximately 105kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning HP rack frame.

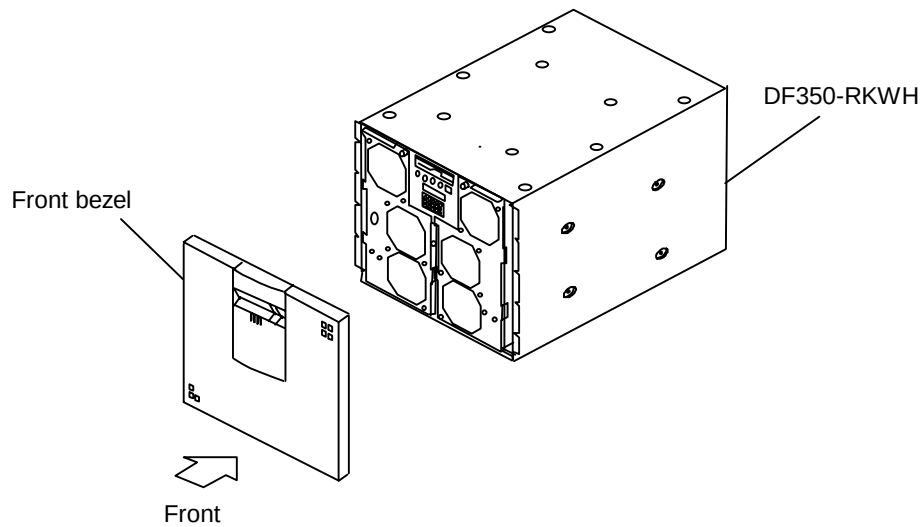
1.4.1 Procedures for installation

Install the unit following the procedure below.

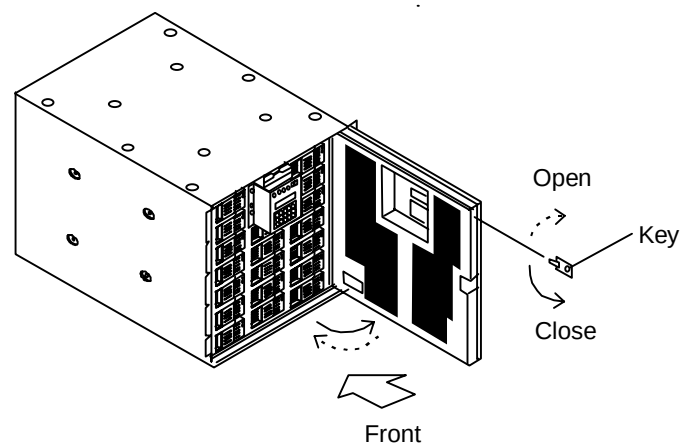


1.4.2 Removing and installing the front bezel

(1) Removal and installation of the front bezel.

**Figure 1.4.1 Removing and Installing the Front Bezel**

(2) Removal and installation of the front panel.

**Figure 1.4.2 Opening and Closing the Front Panel**

1.4.3 Installing the rails (See Figure 1.4.3 and 1.4.4.)

- (1) Temporarily secure the ③ Stopper (R) to the ① Rail (R) using ⑩ Hexagon socket head bolts (M5 × 8) and ⑫ Washer (M5) (at two places). (See Figure 1.4.3.)
- (2) Insert the protruded portions of the ① Rail (R) into the rectangular holes on both the front and rear sides of the rack frame at right hand side of the desired installing position. (See Figure 1.4.4.)
- (3) Install the fasteners aligning their holes with the holes of the rail and the rack frame (at two places each on the front and rear sides). (See Figure 1.4.4.)
- (4) Secure the ① Rail (R) using the ⑨ Binding screws (M5 × 16) (at two places each on the front and rear sides).
- (5) Temporarily attach the ④ Stopper (L) to the ② Rail (L), and secure the ② Rail (L) to the rack frame in the same way.

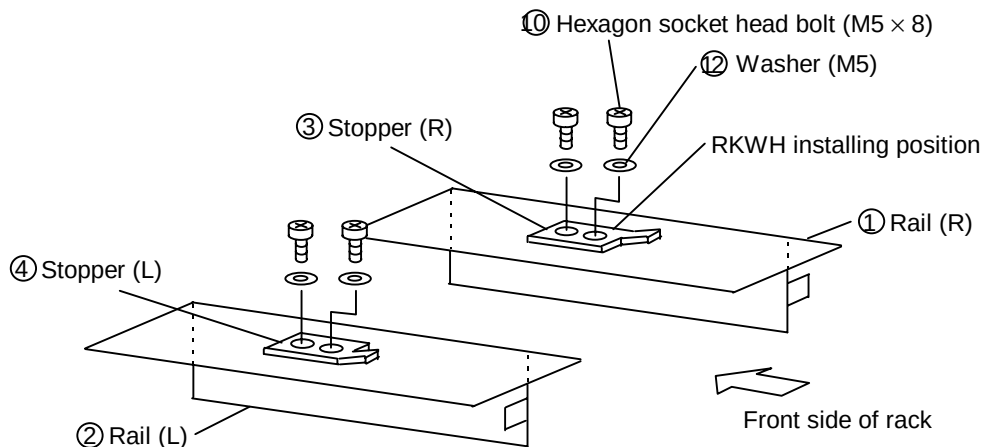


Figure 1.4.3 Temporary Attachment of the Stopper

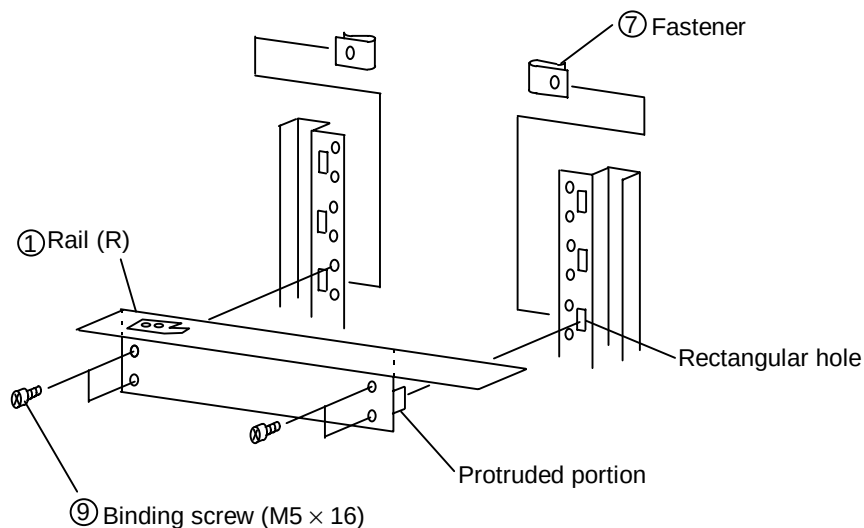


Figure 1.4.4 Securing the Rail to the Rack Frame

1.4.4 Installing the spacer (See Figures 1.4.5 and 1.4.6.)

- (1) Insert the ⑧ Bolt (M6 × 12.5) into the hole in the face of the rack frame from the inner side, place the indented side of the ⑤ Spacer (HP) against the rack, and secure the spacer so that it becomes parallel with the rack frame (two places, on the right and left sides).
- (2) Install the fasteners to the rack frame at the positions where the spacer is indented at 2nd and 8th indentations.

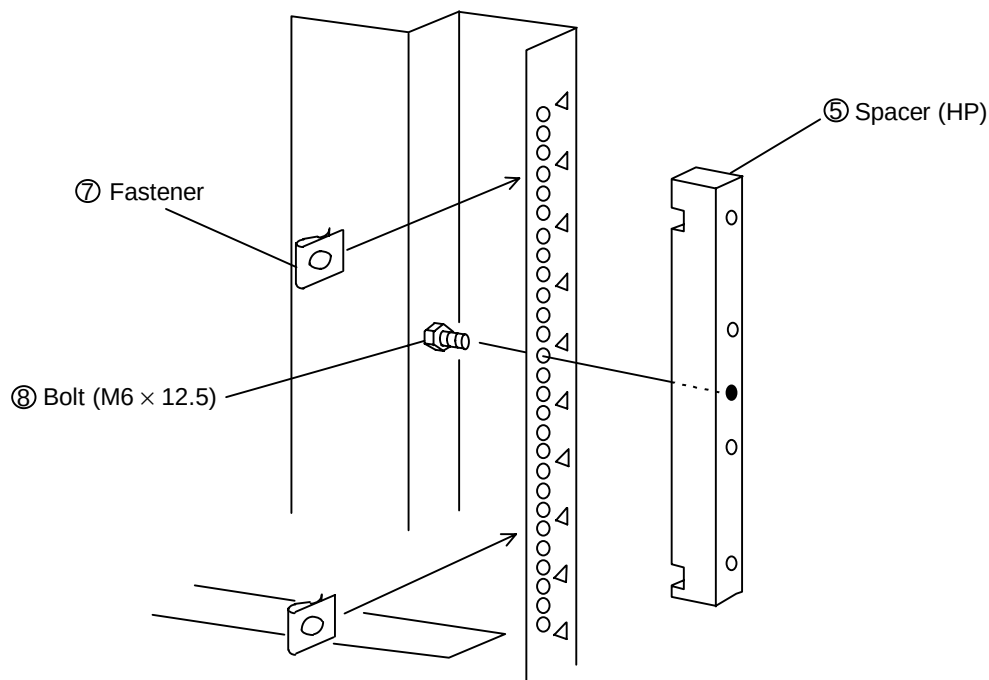


Figure 1.4.5 Installing the Spacer (HP) and Fasteners

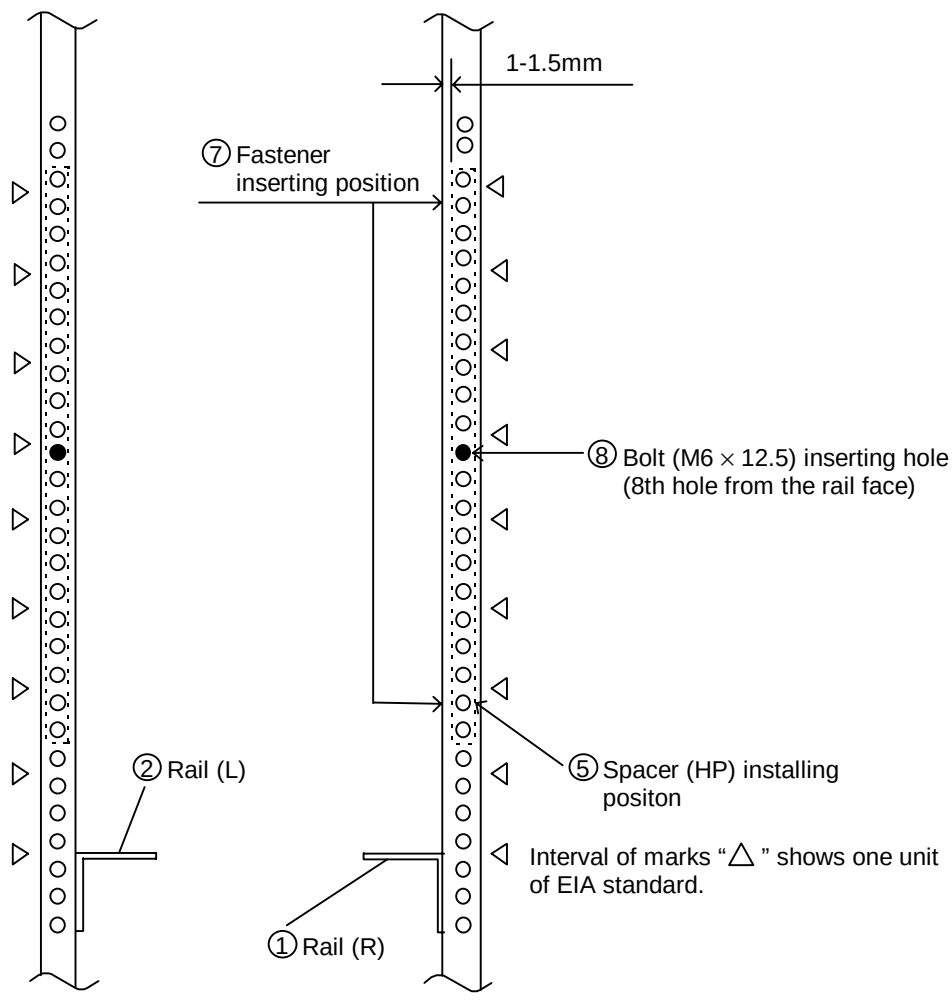
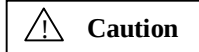


Figure 1.4.6 Relationship between the Installing Positions of the Rail and the Spacer (HP)

1.4.5 Install the subsystem into the rack (See Figure 1.4.7.)



The mass of the DF350-RKWH is approximately 105kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-RKWH is secured tightly before installing the DF350-RKWH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Place the DF350-RKWH unit on the elevator of the lifter.
- (2) Move it to the rack frame installing position.
- (3) Place it on the rails in the rack frame.
- (4) Push it towards the rear of the rack frame gently.

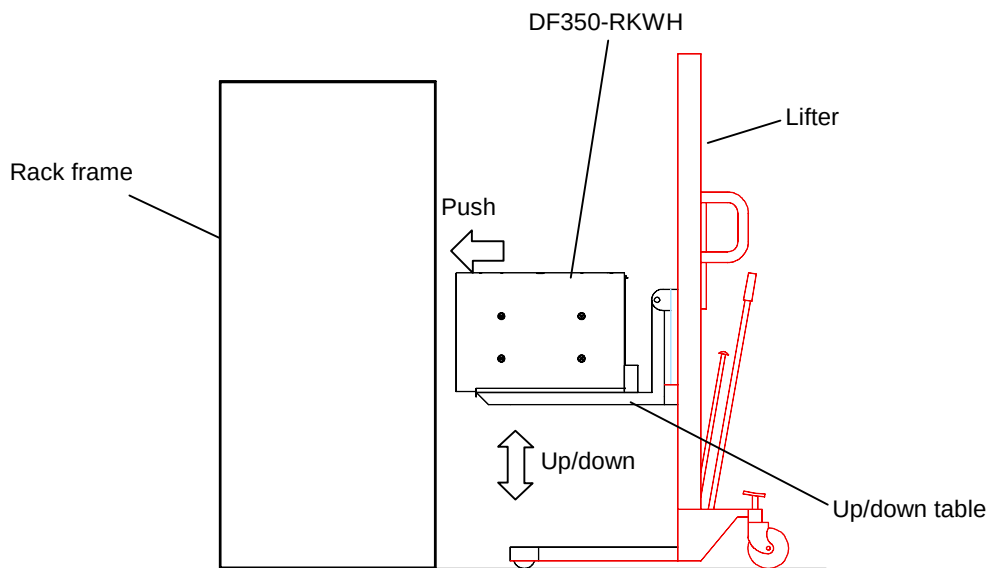
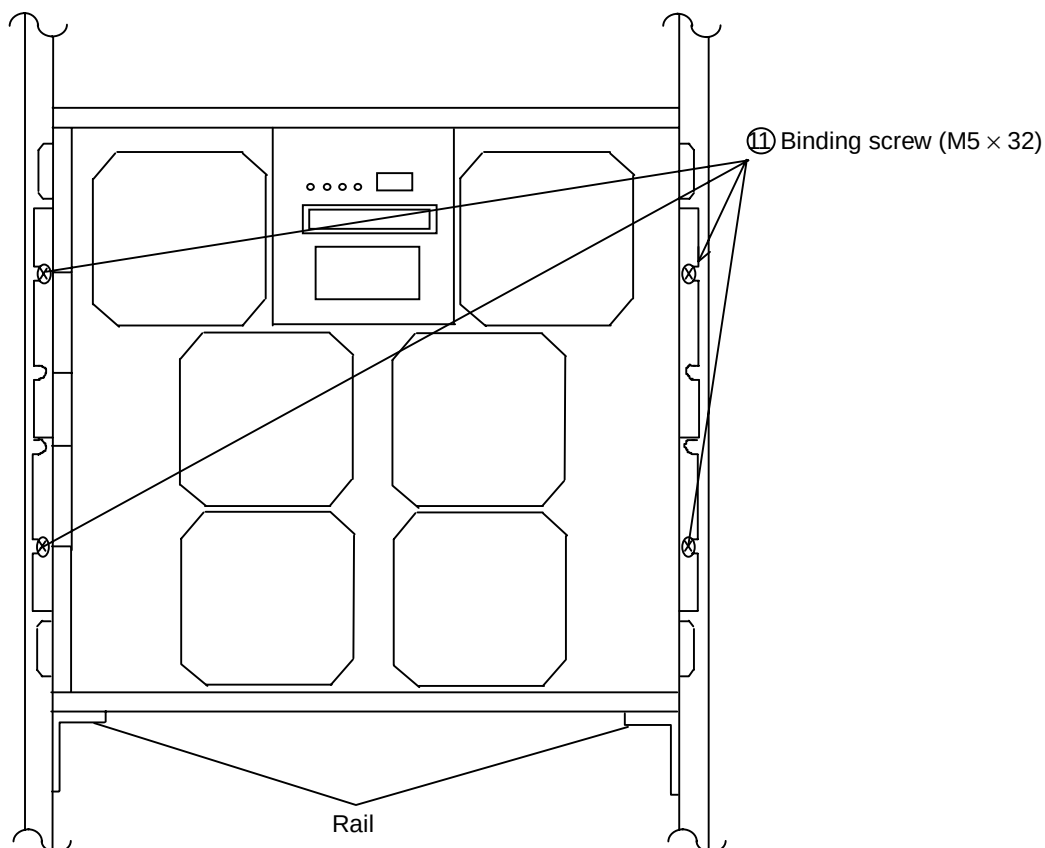


Figure 1.4.7 Install the DF350-RKWH into the Rack Frame

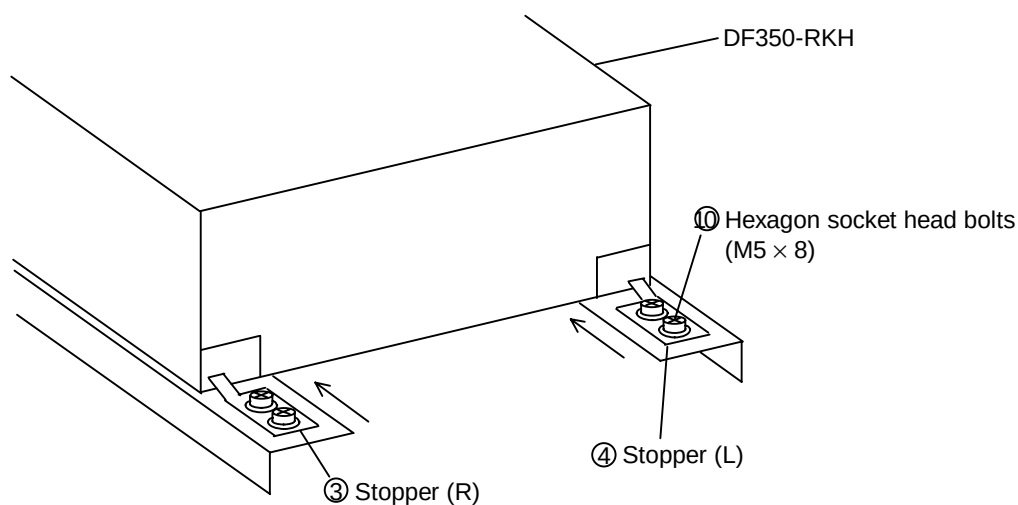
1.4.6 Securing the front side of the subsystem (See Figure 1.4.8.)

- (1) Secure the subsystem at four places using the ⑪ Binding screws (M5 × 32).
- (2) Attaching the front bezel. (See RW-FRAME0070.)

**Figure 1.4.8 Securing the Front Side of the Subsystem**

1.4.7 Securing the rear side of the subsystem (See Figure 1.4.9.)

- (1) Slide the ③ Stopper (1) and ④ Stopper (2) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the ⑩ Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

**Figure 1.4.9 Securing the Rear Side of the Subsystem**

2. Installing Into IBM AS/400 (9309) Rack Frame

2.1 Space (Height Inside the Rack) Required for Installation

The space of 10 units height (EIA standard) is required to install DF350-RKWH into the IBM AS/400 (9309) rack.

2.2 Optional Parts Required for Installation (Model names : DF-F350-URAS/DF-F350-URASD)

Table 2.2.1/2.2.2 shows optional parts required to install one DF350-RKWH disk subsystem.

Table 2.2.1 Parts Required for Installation of DF-F350-URAS

No.	Part No.	Part Name	Qty.	Remarks
①	2098876-A	Rail	1	For right hand side
②	2098876-B	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (L)
④	5490710-2	Stopper	1	For the rail (R)
⑤	5486419-1	Fastener (M5)	10	For securing the subsystem/rails (2 spares are included)
⑥	SB516	Bind screw (M5 × 16)	14	For securing the rail/subsystem (2 spares are included)
⑦	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stopper (2 spares are included)
⑧	WP005	Washer (M5)	6	For the hexagon socket head bolt (2 spares are included)
⑨	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem
⑩	3243319-68	Nameplate (parts)	1	Already affixed to the rail
⑪	5486321-1	Stopper (R)	1	For DF300-RK
⑫	5486321-2	Stopper (L)	1	For DF300-RK

* : The No.11 and 12 optional parts are not used for installation of DF350-RKWH.

Table 2.2.2 Parts Required for Installation of DF-F350-URASD

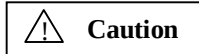
No.	Part No.	Part Name	Qty.	Remarks
①	2102429-A	Rail	1	For right hand side
②	2102429-B	Rail	1	For left hand side
③	5490710-1	Stopper	1	For the rail (L)
④	5490710-2	Stopper	1	For the rail (R)
⑤	5486419-1	Fastener (M5)	10	For securing the subsystem/rails (4 spares are included)
⑥	SB516	Bind screw (M5 × 16)	12	For securing the rail/subsystem (4 spares are included)
⑦	BS508	Hexagon socket head bolt (M5 × 8)	6	For securing the stopper (2 spares are included)
⑧	2051001-513	LL washer	6	For the hexagon socket head bolt (2 spares are included)
⑨	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem
⑩	3243319-205	Nameplate (parts)	1	Already affixed to the rail
⑪	SB416	Bind screw (M4 × 16)	4	For securing the rail
⑫	BS406	Hexagon socket head bolt (M4 × 6.3)	4	
⑬	2051001-413	LL washer	4	

* The No. 11, 12, and 13 optional parts are not used for installation of DF350-RKWH.

2.3 Tools Required

- Philips screwdriver (No.2)
- Socket wrench (4mm)

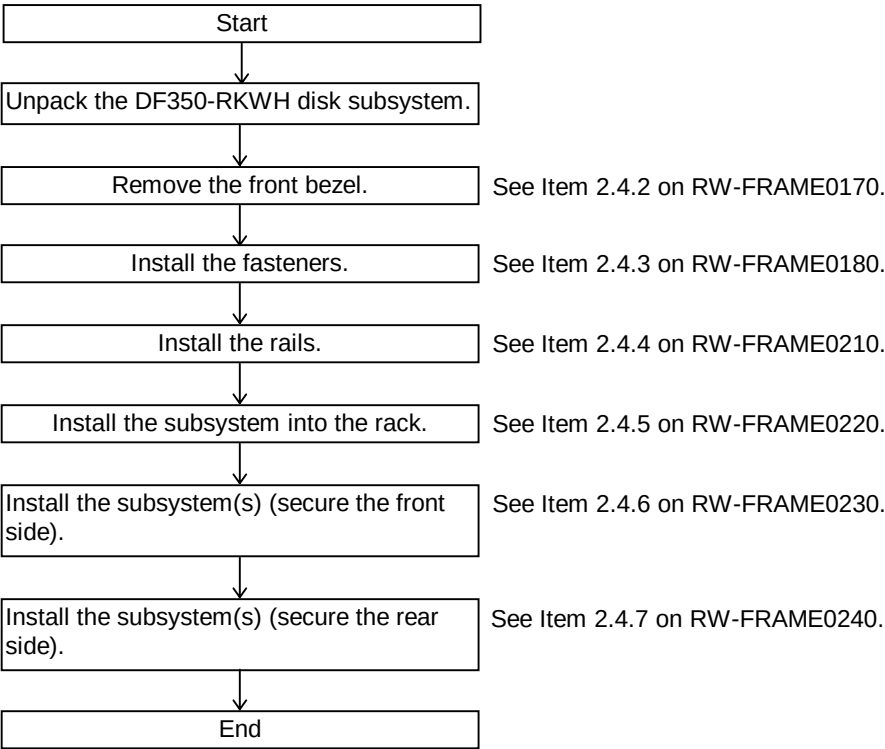
2.4 Installing the Subsystem into the Rack Frame



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKWH disk subsystem is approximately 105kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.
- Do the work following other safety instructions concerning IBM AS/400 (9309) rack frame.

2.4.1 Procedures for installation

Install the unit following the procedure below.



2.4.2 Removing and installing the front bezel

(1) Removal and installation of the front bezel.

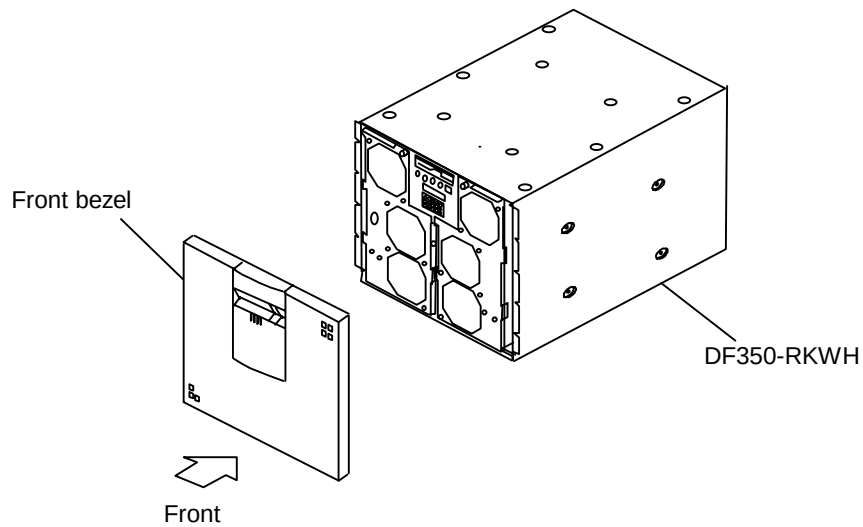


Figure 2.4.1 Removing and Installing the Front Bezel

(2) Removal and installation of the front panel.

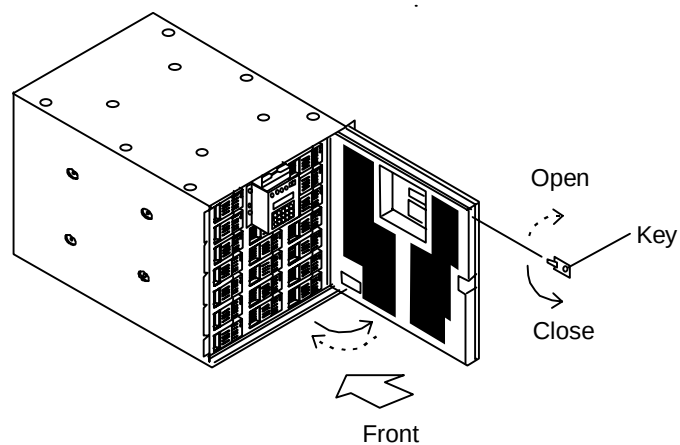
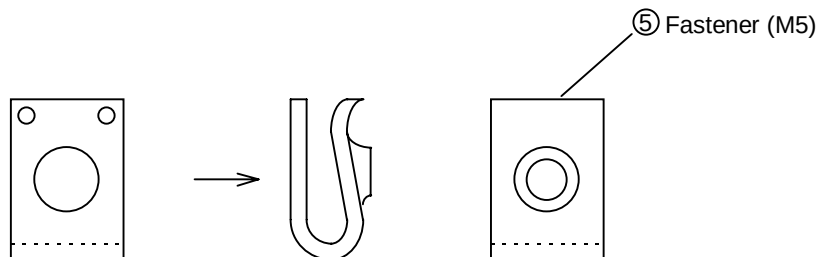


Figure 2.4.2 Opening and Closing the Front Panel

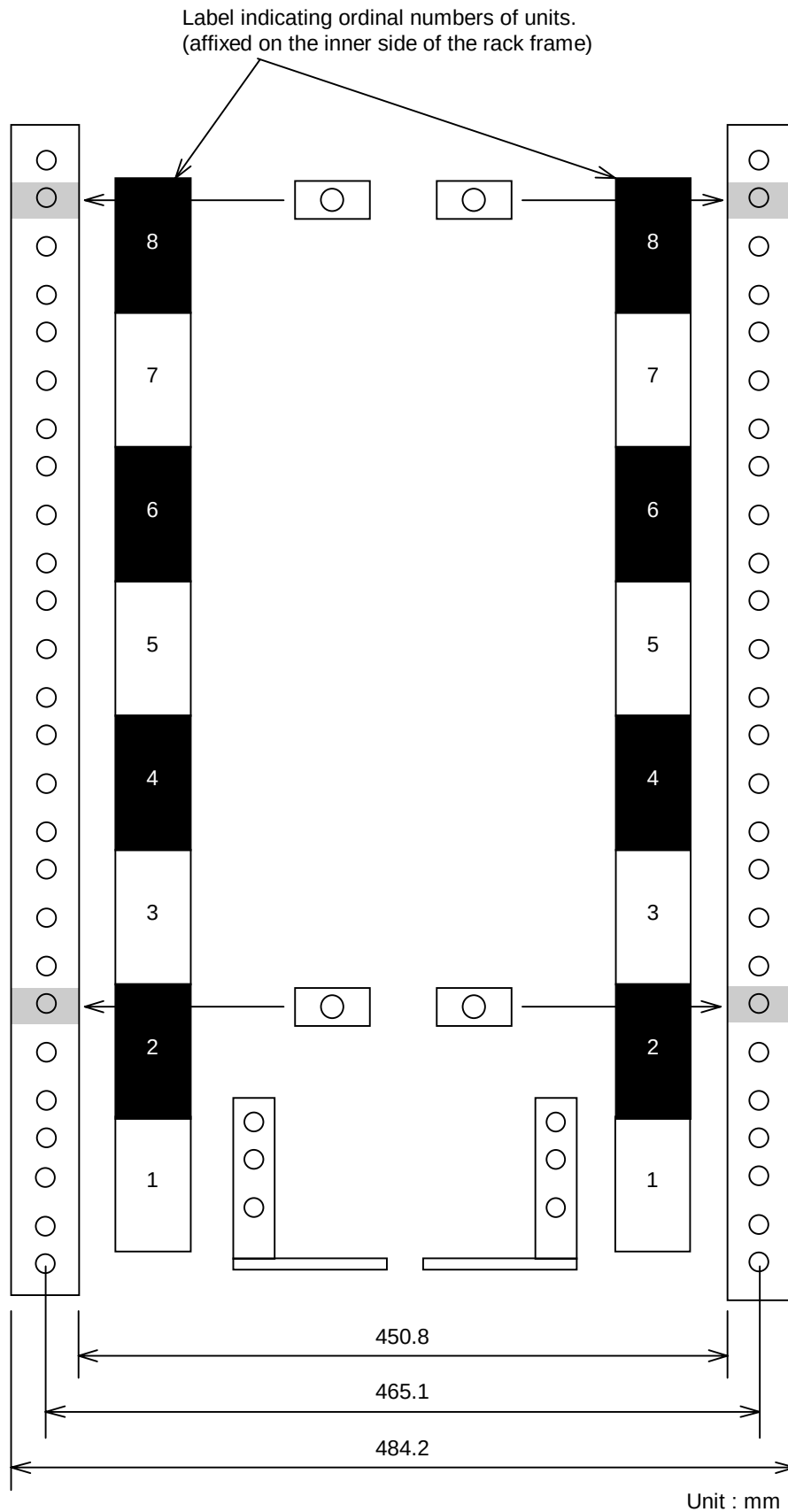
2.4.3 Installing the fasteners (See Figure 2.4.3 (a) to 2.4.3 (c).)

- (1) Insert the fasteners on the front side of the rack frame with their flat sides facing toward you.
- (2) Insert the fasteners to the top holes of upper 1st and 3rd units from the unit where the rail is to be installed.
- (3) Insert the fasteners on the rear side of the rack frame with their flat sides facing toward you.
- (4) Insert the fasteners to the top hole of the unit where the rail is to be installed and the middle hole of upper 1st unit.



Insert a screw in the direction of an arrow.

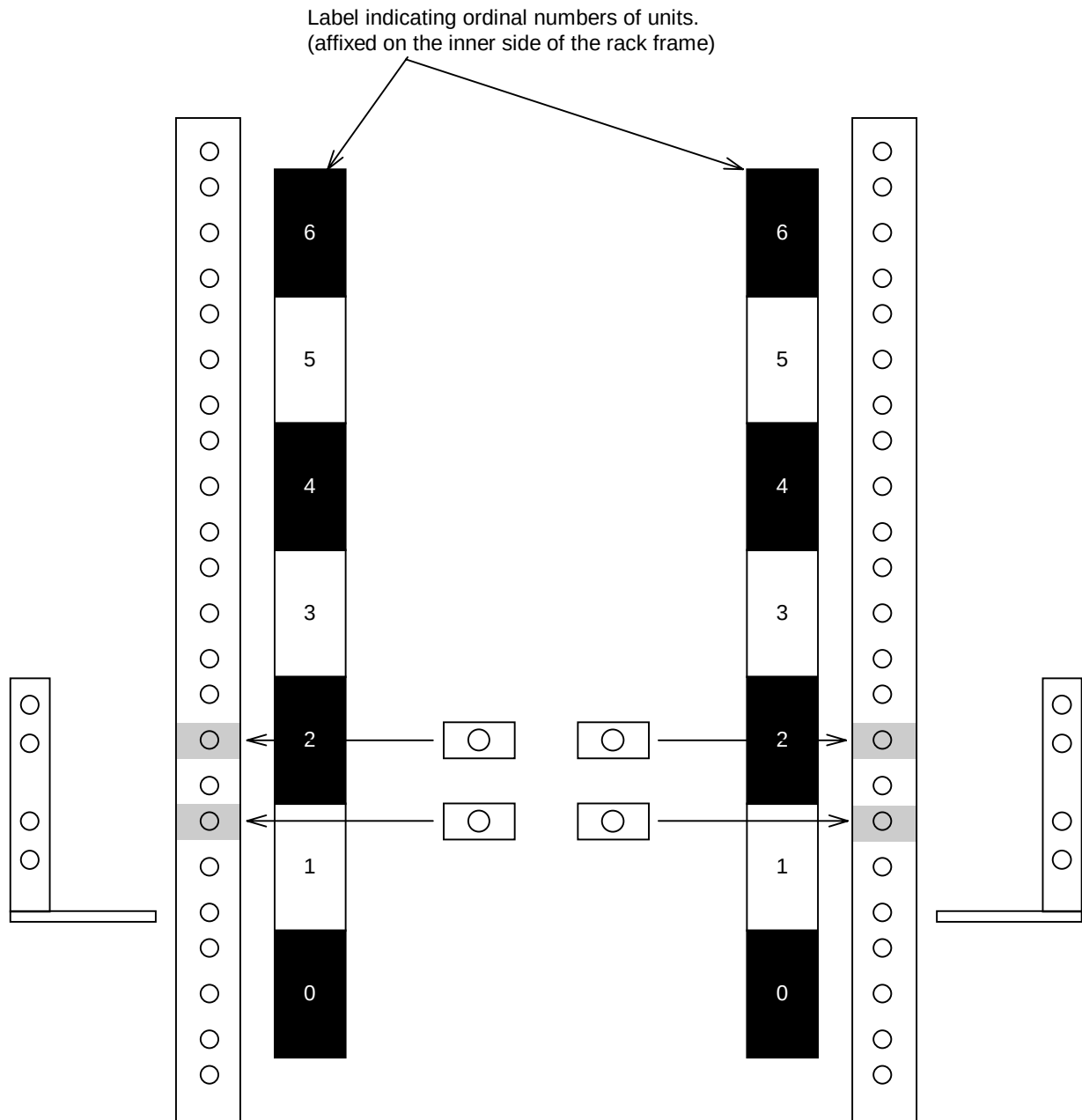
Figure 2.4.3 (a) Fastener



Note 1 : A figure “  ” indicates the fastener.

Note 2 : Above diagram shows the composition when the rails are installed at the 3rd unit.

Figure 2.4.3 (b) Fastener Installing Locations in the Front of the Rack Frame



Note 1 : A figure “” indicates the fastener.

Note 2 : Above diagram shows the composition when the rails are installed at the 3rd unit.

Figure 2.4.3 (c) Fastener Installing Locations in the Rear of the Rack Frame

2.4.4 Installing the rails (See Figure 2.4.4.)

- (1) Fix the ④ Stopper (R) to the ① Rail (R) temporarily with ⑦ Hexagon socket head bolts (M5 × 8) and ⑧ Washers (M5).
- (2) Insert the ① Rail (R) into the rack frame and secure it with ⑥ Bind screws (M5 × 16) (both front and rear sides).
- (3) Fix the ③ Stopper (L) temporarily to the ② Rail (L), insert the ② Rail (L) into the rack frame and secure it in the same way.

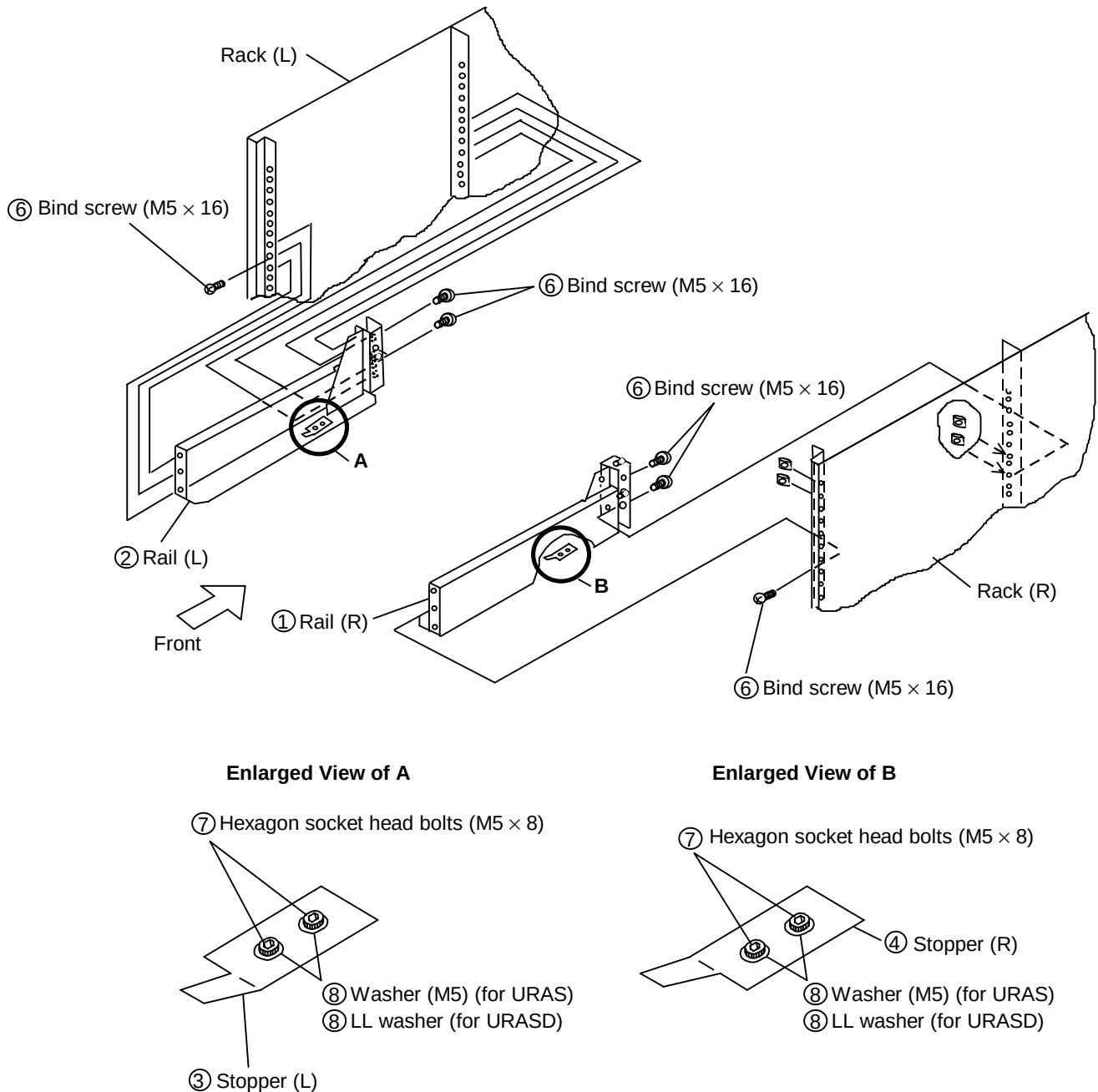
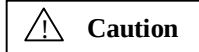


Figure 2.4.4 Installing the Rails

2.4.5 Install the subsystem into the rack (See Figure 2.4.5.)



The mass of the DF350-RKWH is approximately 105kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-RKWH is secured tightly before installing the DF350-RKWH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Place the DF350-RKWH unit on the elevator of the lifter.
- (2) Move it to the rack frame installing position.
- (3) Place it on the rails in the rack frame.
- (4) Push it towards the rear of the rack frame gently.

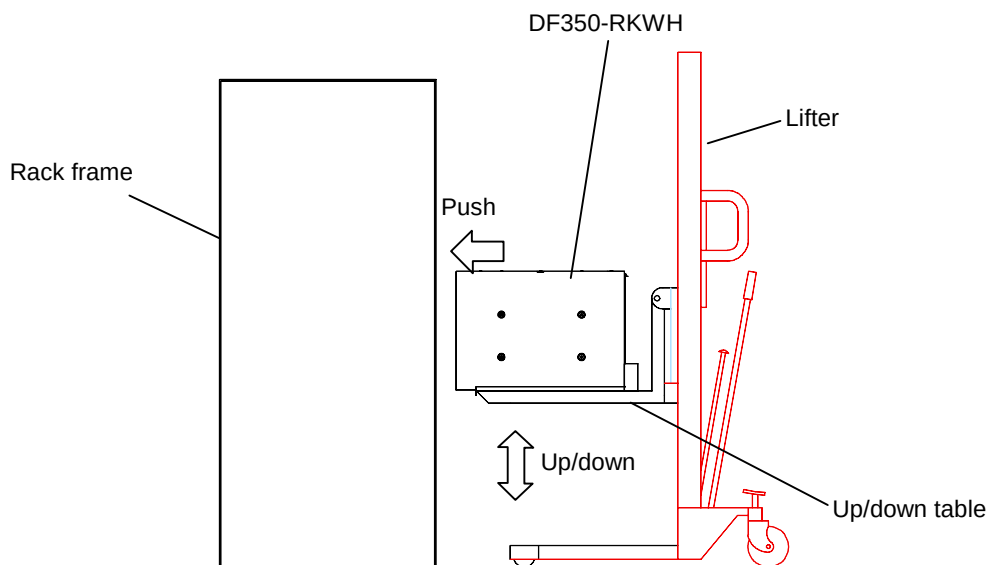


Figure 2.4.5 Install the DF350-RKWH into the Rack Frame

2.4.6 Securing the front side of the subsystem (See Figure 2.4.6.)

- (1) Secure the subsystem at four places using the ⑥ Binding screws (M5 × 16).
- (2) Attaching the front bezel. (See RW-FRAME0070.)

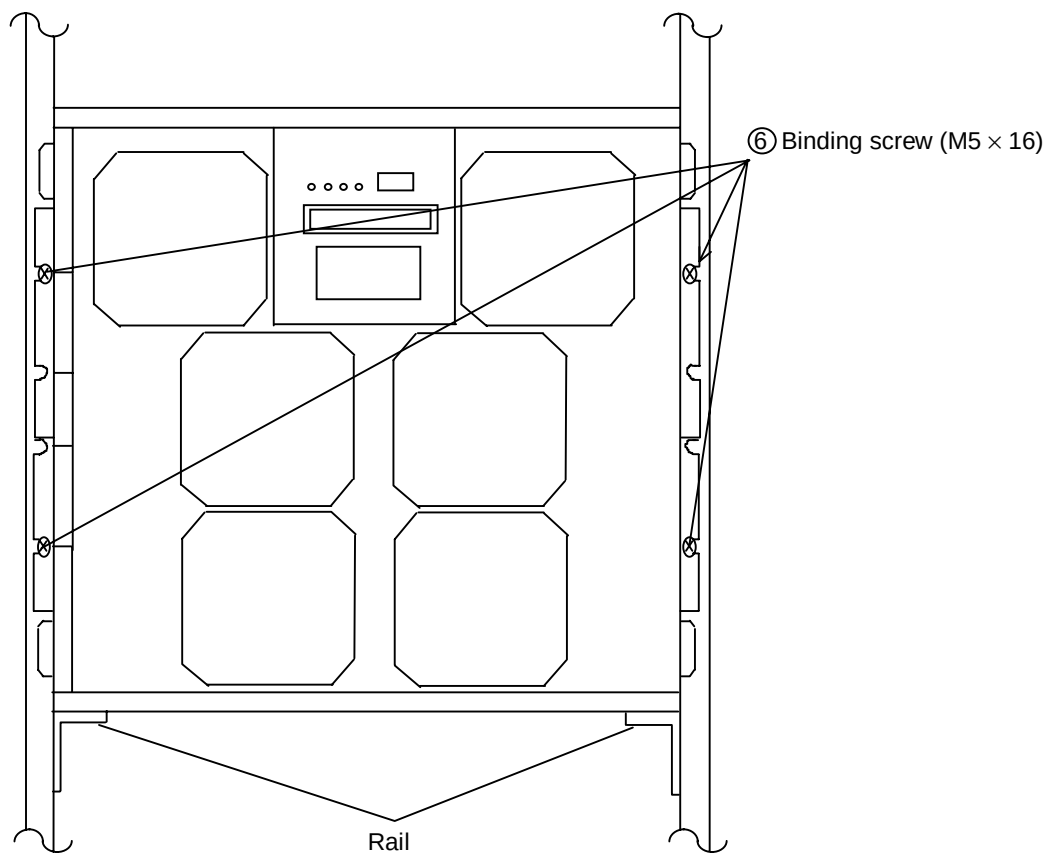


Figure 2.4.6 Securing the Front Side of the Subsystem

2.4.7 Securing the rear side of the subsystem (See Figure 2.4.7.)

- (1) Slide the ③ Stopper (1) and ④ Stopper (2) in the direction shown by arrows to engage their bent tips with the rear bottom of the subsystem.
- (2) Tighten the ⑦ Hexagon socket head bolts (M5 × 8) fastening the stoppers to secure the rear side of the subsystem.

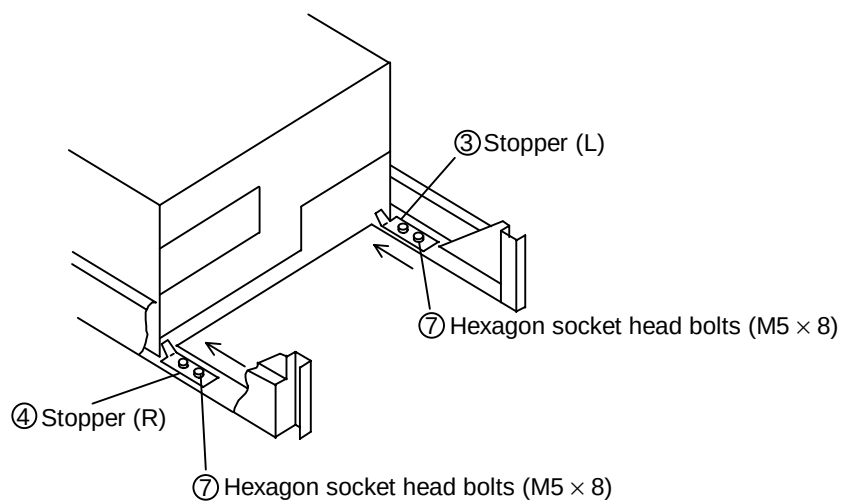


Figure 2.4.7 Securing the Rear Side of the Subsystem

3. Installing Into Hitachi Rack Frame (U2)

3.1 Space (Height Inside the Rack) Required for Installation

The space of 10 units height (EIA standard) is required to install DF350-RKWH into the Hitachi rack.

3.2 Optional Parts Required for Installation (Model names : DF-F350-URHT)

Table 3.2.1 shows optional parts required to install one DF350-RKWH disk subsystem.

Table 3.2.1 Parts Required for Installation of DF-F350-URHT

No.	Part No.	Part Name	Qty.	Remarks
①	3243500-1	Rail	1	For right hand side (*1)
②	3243500-2	Rail	1	For left hand side (*1)
③	5490715-1	Stopper	1	For the rail (R)
④	5490715-2	Stopper	1	For the rail (L)
⑤	5486467-2	Nut plate	4	For securing the rail (*1)
⑥	5490724-A	Nut plate ASSY	2	
⑦	BS520	Hexagon socket head bolt (M5 × 20)	10	For securing the rail (2 spares are included) (*1)
⑧	BS508	Hexagon socket head bolt (M5 × 8)	4	For securing the stopper (2 spares are included)
⑨	SB408	Bind screw (M4 × 8)	6	For securing the nut plate/bracket (2 spares are included)
⑩	SB510	Bind screw (M5 × 10)	6	For securing the subsystem (2 spares are included)
⑪	3243319-67	Nameplate (parts)	1	Already affixed to the rail
⑫	5486468-1	Clamper (1)	2	For securing the AC cables
⑬	3244501-1	Bracket	1	For securing the AC cables
⑭	SB306	Bind screw (M3 × 6.3)	6	For securing the clamper (2 spares are included)
⑮	5409042-3	Repeat binder	3	For securing SCSI and AC cables on the subsystem

*1 : Not used DF350-RKWH.

3.3 Tools Required

- Socket wrench (4mm)
- Spanner (10mm)
- Philips screwdriver (No.2)

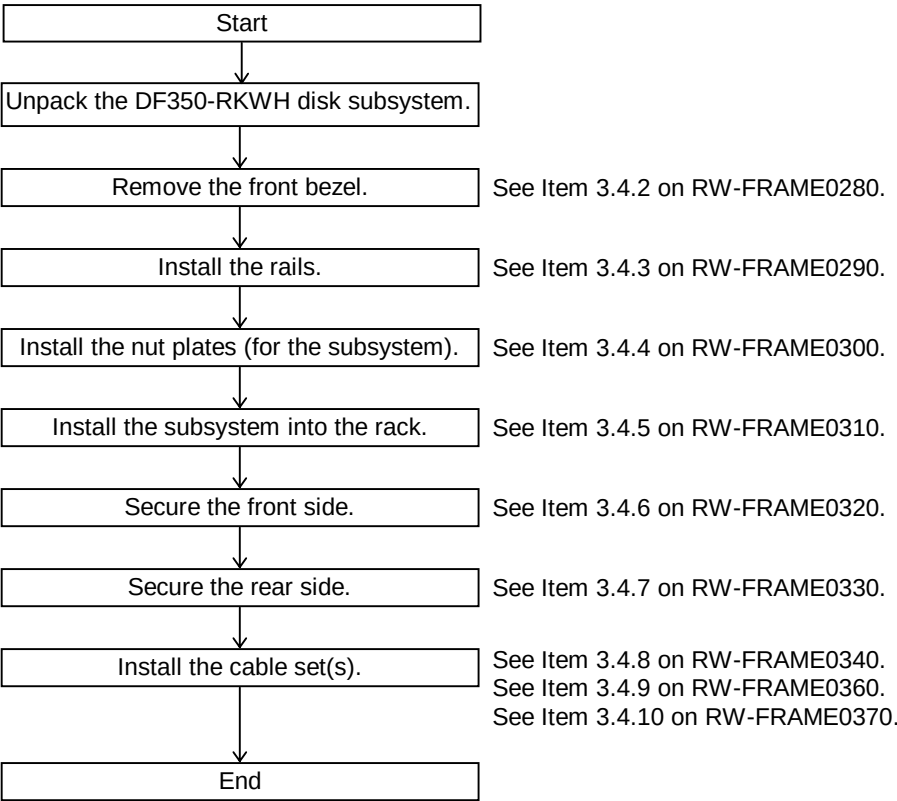
3.4 Installing the Subsystem into the Rack



- The leveling bolts of the frame should have been lowered to touch the floor before installing the subsystem into the rack.
Do not attempt to start installation before lower the leveling bolts (to prevent the equipment from falling).
- Do not drawout two or more subsystems from the rack at a time (to prevent the equipment from falling).
- Be sure to perform the work with two or more persons. The weight of the DF350-RKWH disk subsystem is approximately 105kg.
- Install subsystems to the rack starting from the bottom position, in order to prevent turning over.

3.4.1 Procedures for installation

Install the unit following the procedure below.



3.4.2 Removing and installing the front bezel

- (1) Removal and installation of the front bezel.

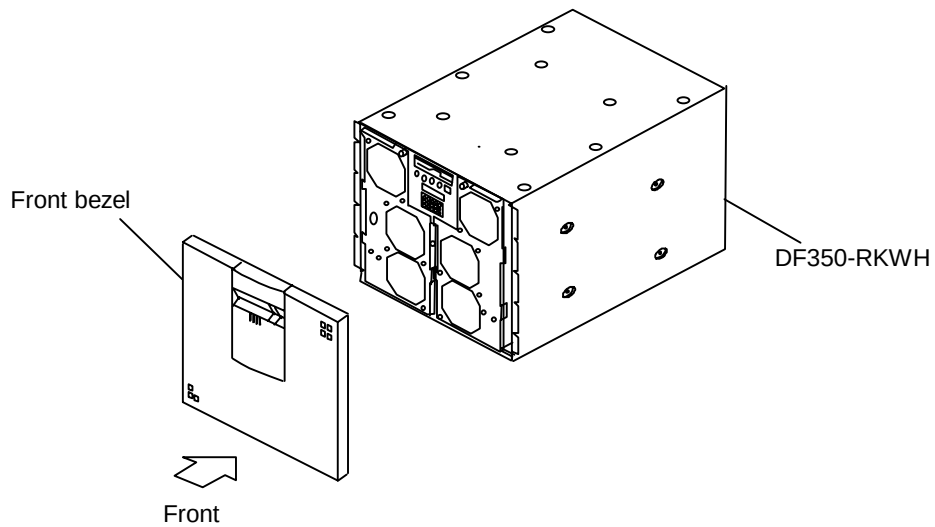


Figure 3.4.1 Removing and Installing the Front Bezel

- (2) Removal and installation of the front panel.

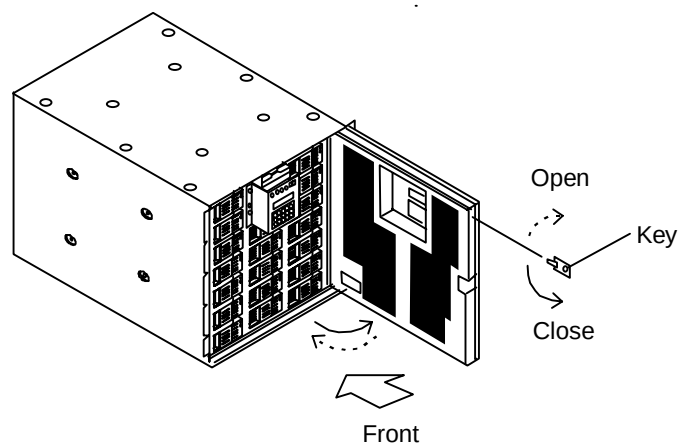


Figure 3.4.2 Opening and Closing the Front Panel

3.4.3 Installing the rails (See Figure 3.4.3 and 3.4.4.)

- (1) Temporarily secure the ③ Stopper (R) to the ① Rail (R) using ⑧ Hexagon socket head bolts (M5 × 8). (See Figure 3.4.3.)
- (2) Insert the protruded portions of the ① Rail (R) into the rectangular holes on both the front and rear sides of the rack frame at right hand side of the desired installing position. (See Figure 3.4.4.)
- (3) Position the ⑤ Nut plates (for securing rails aligning their holes with the holes of the rail) and the rack frame and secure the ① Rail (R) with two ⑦ Hexagon socket head bolts (M5 × 20) (at two places each on the front and rear sides). (See Figure 3.4.4.)
- (4) Temporarily attach the ④ Stopper (L) to the ② Rail (L), and secure the ② Rail (L) to the rack frame in the same way.

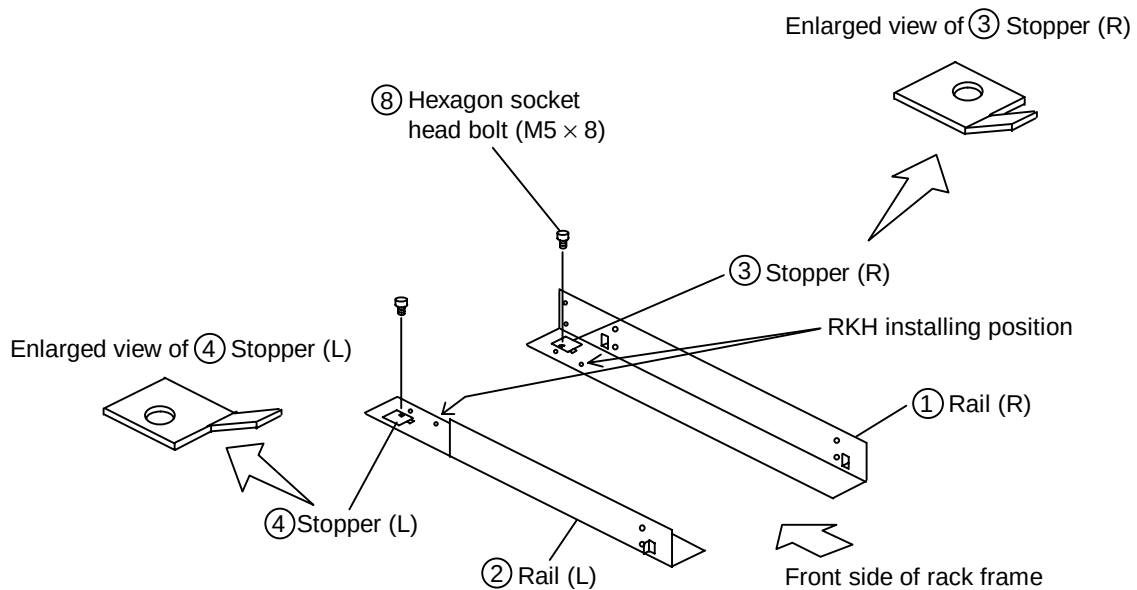


Figure 3.4.3 Temporary Attachment of the Stopper

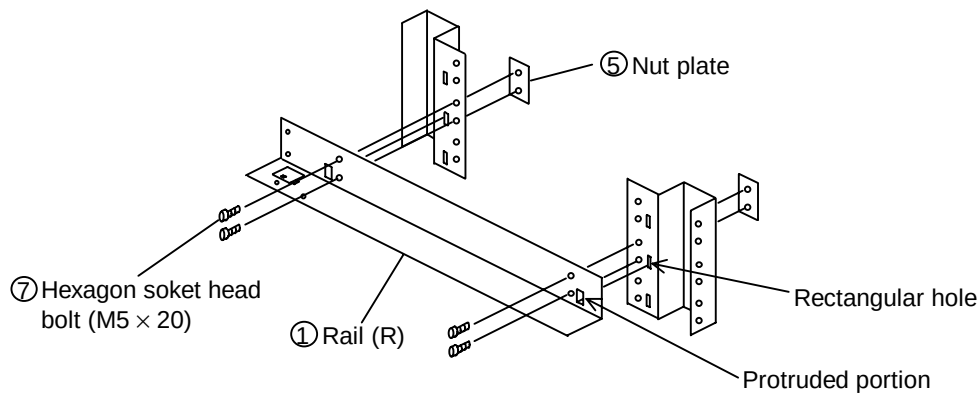


Figure 3.4.4 Securing the Rail to the Rack Frame

3.4.4 Installing the nut plate assys (for securing the subsystem) (See Figure 3.4.5.)

- (1) Position the ⑥ Nut plate ASSY on the inner side of the rack frame aligning its lowermost screw hole with a hole of the rack frame (3rd hole from the face of the rail).
- (2) Secure the ⑥ Nut plate ASSY with two ⑨ Bind screws (M4 × 8) so that it becomes parallel with the edge of the rack frame.

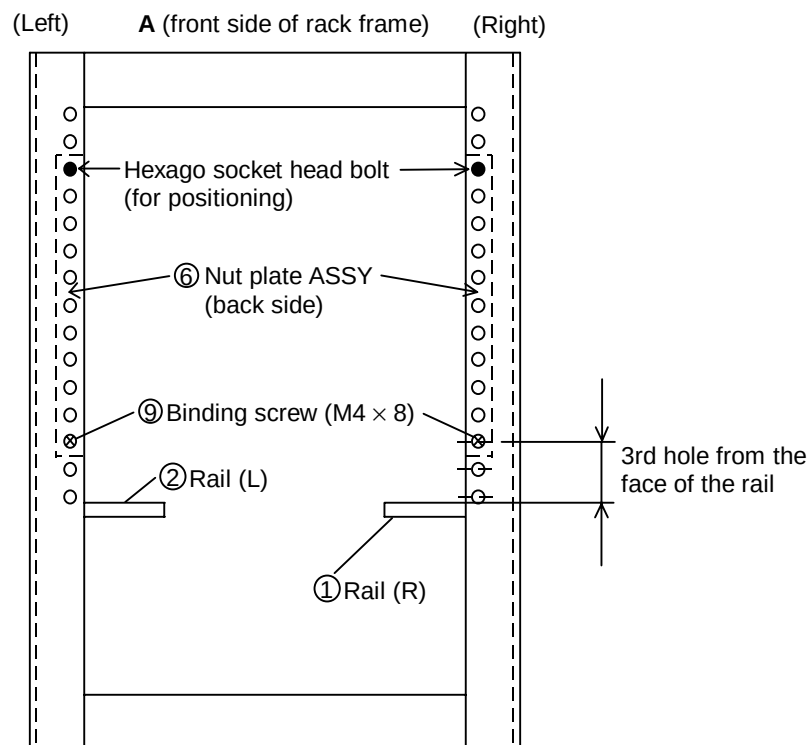
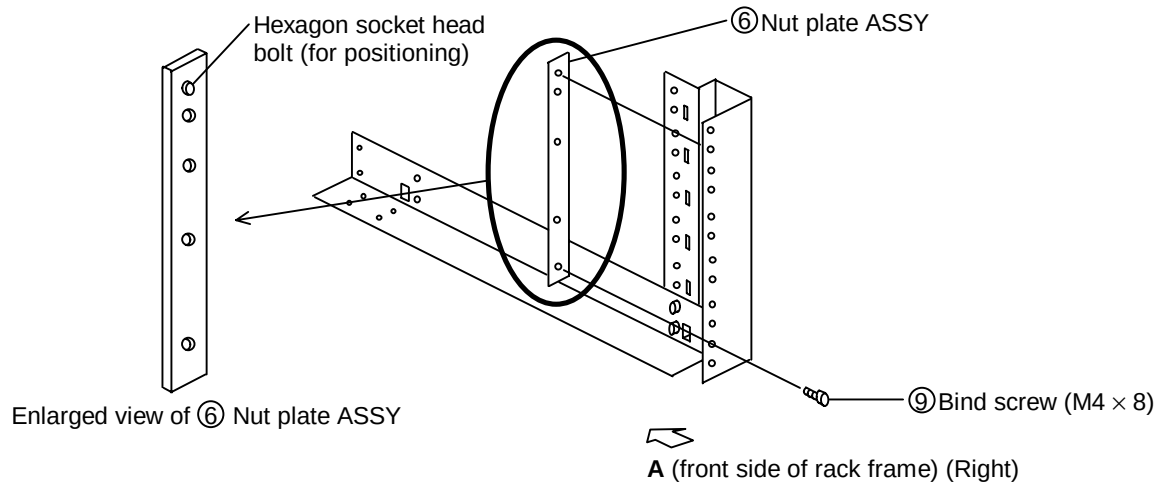


Figure 3.4.5 Installing the Nut Plate ASSY (for Securing the Subsystem)

3.4.5 Install the subsystem into the rack (See Figure 3.4.6.)



The mass of the DF350-RKWH is approximately 105kg. Be sure to hold it by its handles with two or more persons when installing it in the rack frame.

Make sure that the front panel of the DF350-RKWH is secured tightly before installing the DF350-RKWH in the rack frame. If not, the front panel may come off during the installation causing a personal injury.

- (1) Place the DF350-RKWH unit on the elevator of the lifter.
- (2) Move it to the rack frame installing position.
- (3) Place it on the rails in the rack frame.
- (4) Push it towards the rear of the rack frame gently.

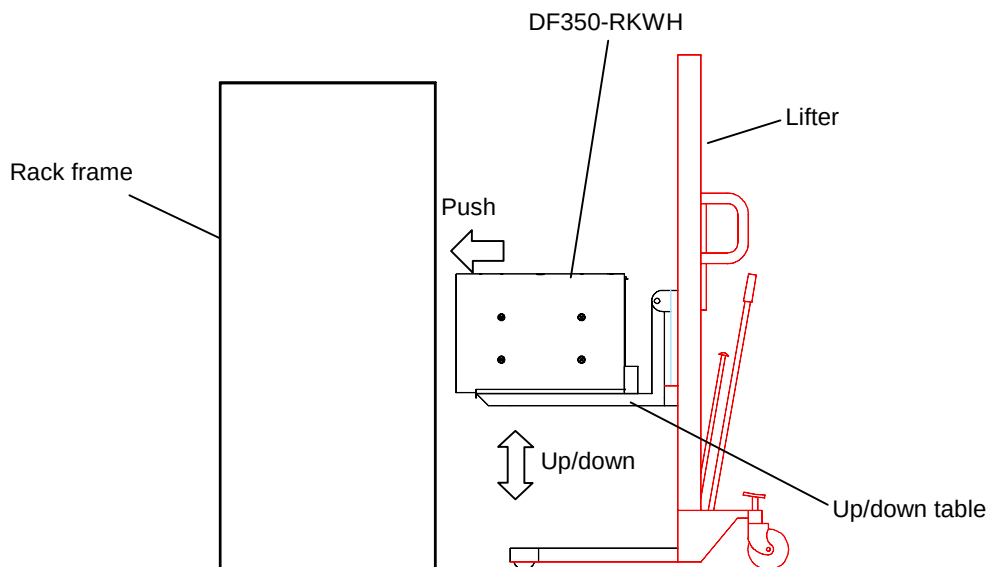


Figure 3.4.6 Install the DF350-RKWH into the Rack Frame

3.4.6 Securing the front side of the subsystem (See Figure 3.4.7.)

- (1) Secure the subsystem at four places using the ⑩ Binding screws (M5 × 10).
- (2) Attaching the front bezel. (See RW-FRAME0070.)

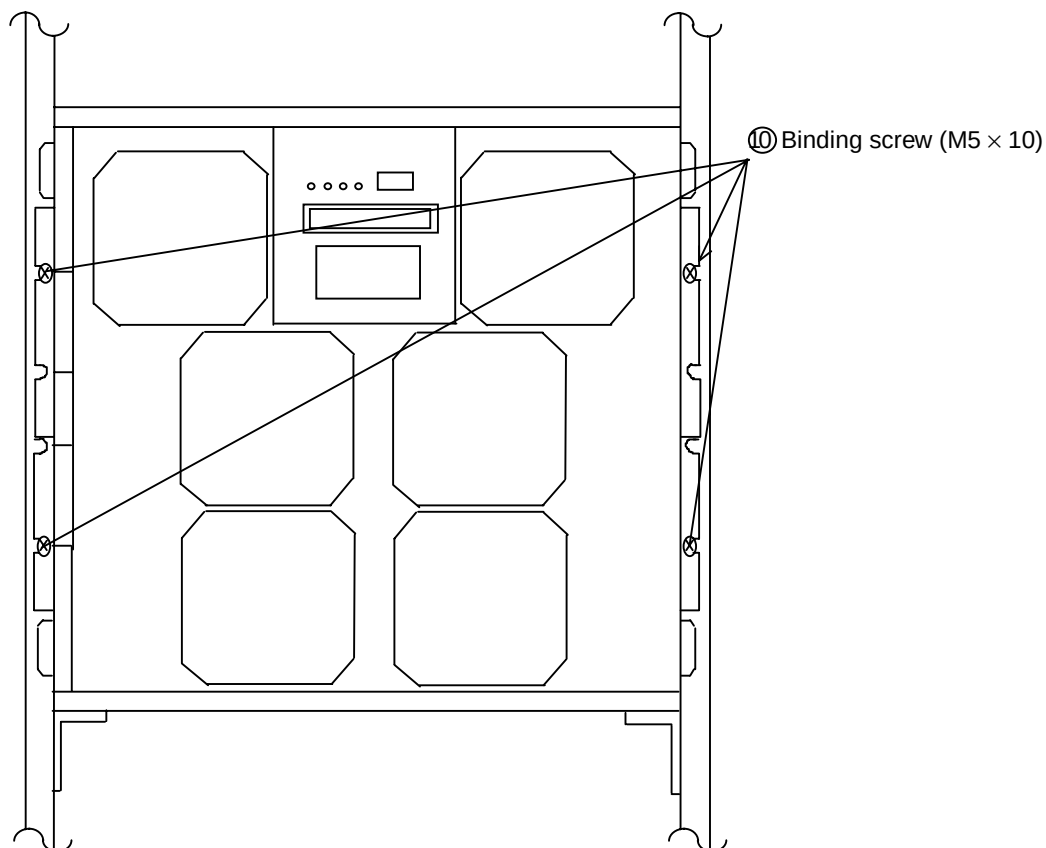


Figure 3.4.7 Securing the Front Side of the Subsystem

3.4.7 Securing the rear side of the subsystem (See Figure 3.4.8.)

- (1) Tighten the Binding screw (M4 × 6.3) fastening the rear side of the subsystem.

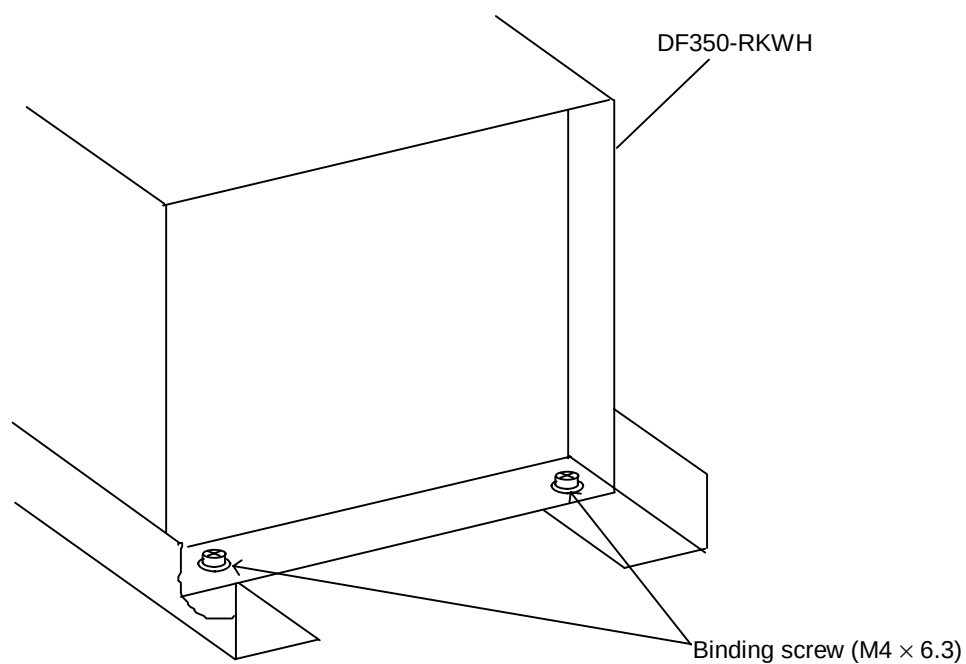


Figure 3.4.8 Securing the Rear Side of the Subsystem

3.4.8 Connection and disconnection of AC cable sets to/from subsystems

- (1) Connect or disconnect the AC cable sets to/from the subsystem(s) installed on the rack following the procedures shown below.
- (2) Connecting procedure for each subsystem. (See Figure 3.4.9.)
 - ① Turn off the PDB breaker (CB1).
 - ② Plug the socket of the AC cable set into the inlet of the subsystem.
 - ③ Fix the ⑬ Bracket with the two ⑨ Bind screws (M4 × 8) and pass the AC cable sets through two ⑫ Clampers (1).
 - ④ Plug the socket of the AC cable set into the PDB.

- (3) Disconnecting procedure for each subsystem.

- ① Turn off the PDB breaker (CB1).
- ② Unplug the socket of the AC cable set from the inlet of the subsystem and the outlet of the PDB.
- ③ Loosen the four ⑭ Bind screws (M3 × 6.3). Remove the ⑫ Clampers (1).

Note : On completion of work, fix the ⑫ Clampers (1) to the ⑬ Bracket with the four ⑭ Bind screws (M3 × 6.3).

Notice : Do not fix the lowermost AC cable by the binder.

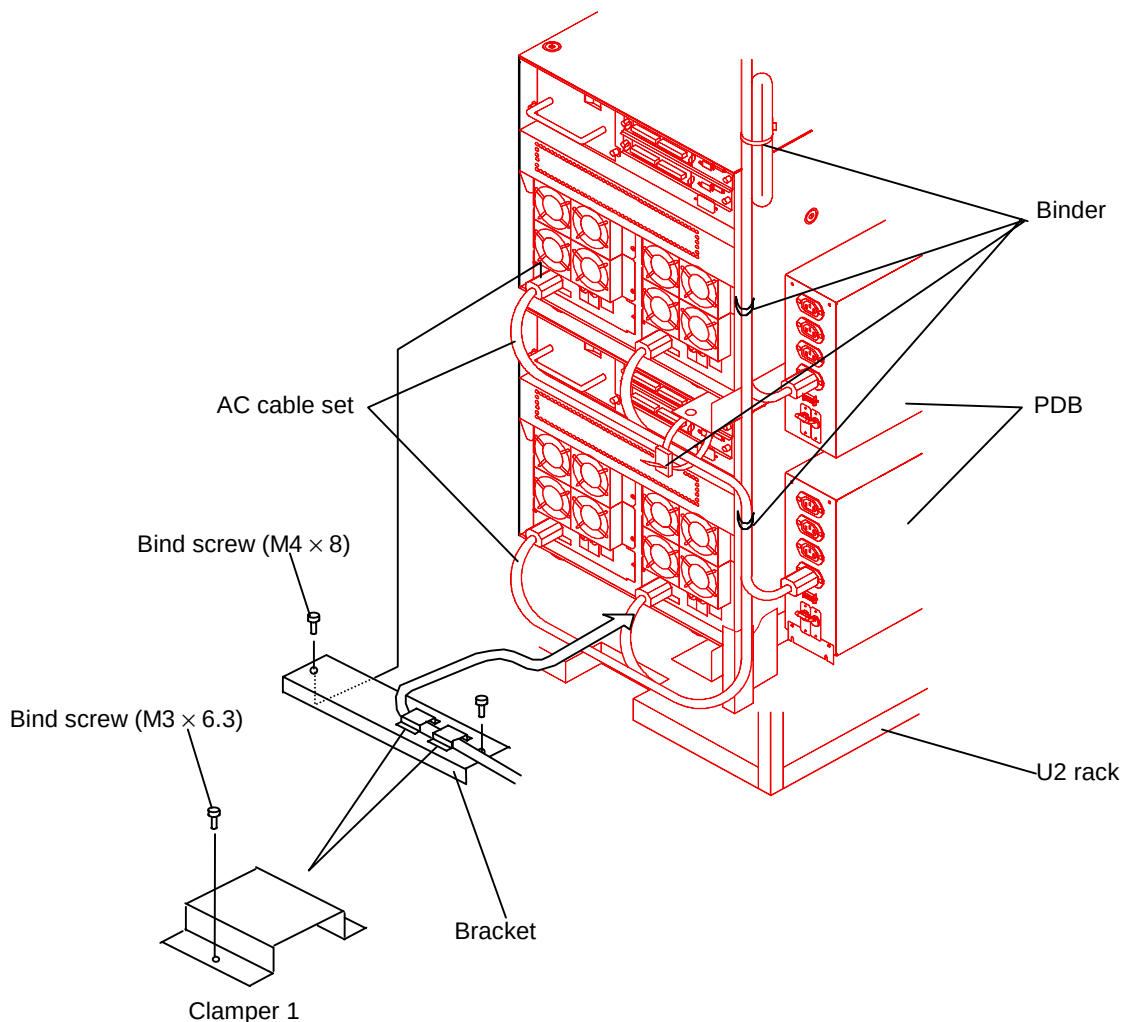
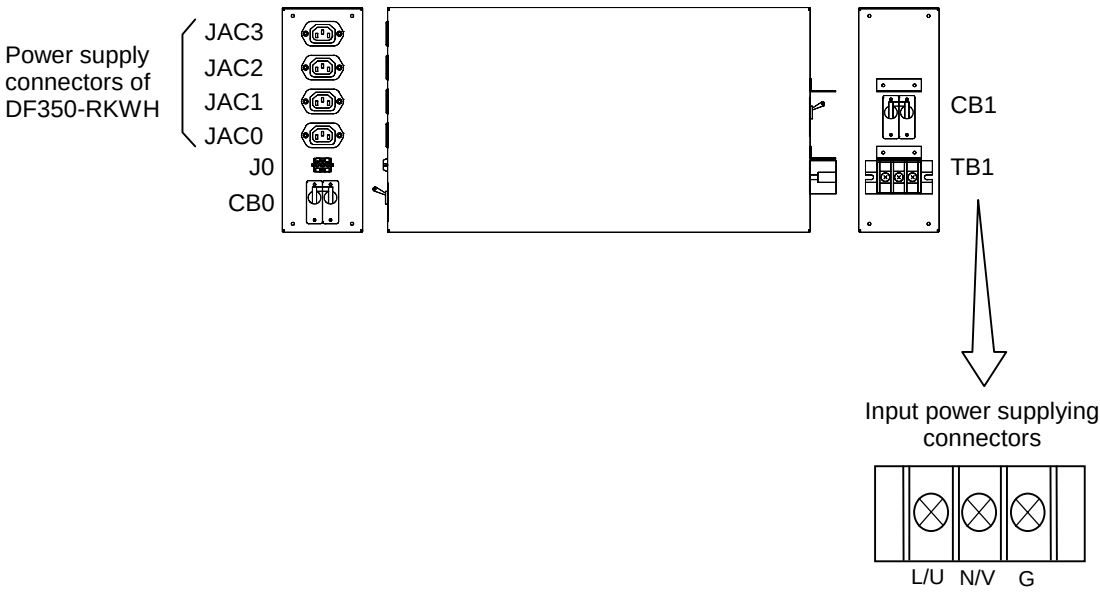


Figure 3.4.9 Connection and Disconnection of AC Cable set(s) to Subsystem(s)



 **Warning**

A large leak current flows when plural subsystems of DF350-RKWH are installed. Be sure to ground them for preventing an electric shock accident.

Figure 3.4.10 Appearance of PDB

3.4.9 Connection of relay cables between panel assembly and DF350-RKWHs

(1) Procedures to connect relay cables to DF350-RKWHs.

- ① Plug the connectors (P10 to P13) of the subsystems installed on the DF-F350-U2 into J10 to J13 of the subsystems. (Perform these works one by one starting from the lowermost subsystem.)

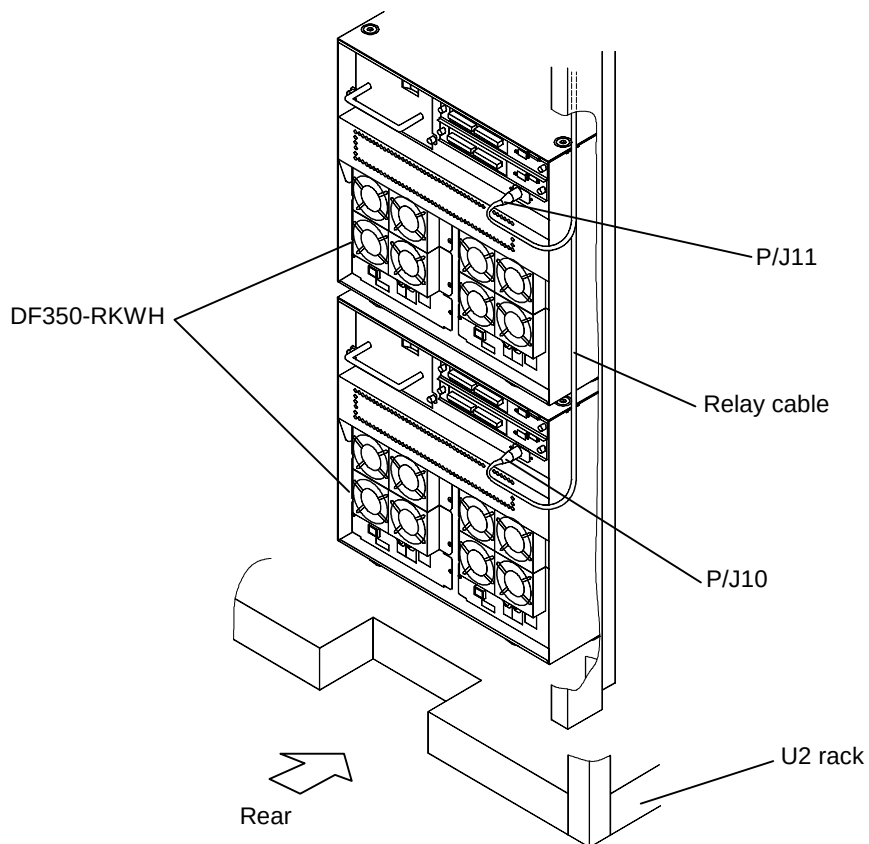


Figure 3.4.11 Connection of Relay Cables (for DF350-RKWHs)

3.4.10 Fixing I/F cables of subsystems (See Figure 3.4.12.)

- ① Loosen the screws, and remove plates (1), (2) and (3).
- ② Pass the I/F cable through the hole onto the floor. Tighten two screws. Attach plate (3).
- ③ Press the plates (1) and (2) against the cable in the direction of the arrows (→), and tighten four screws.

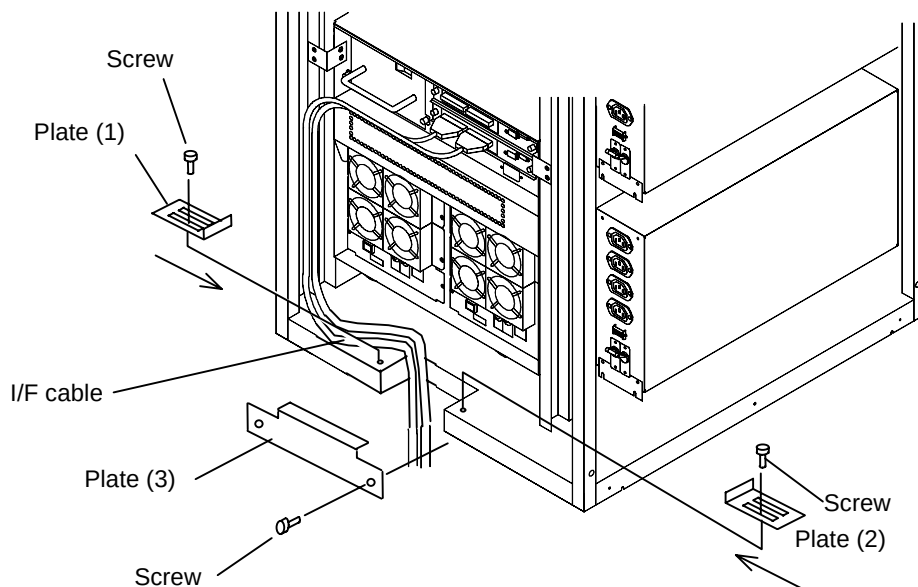


Figure 3.4.12 Fixing I/F Cable