DF500
Disk Array Subsystem
User's Guide
Software Part

Precautions

Before using this equipment, please carefully read the instructions for safety described in this guide. Be sure to observe the precautions provided in the description.
Keep this guide in an easy-to-access place that allows the operator to refer to it any time.

Thank you very much for selecting the Hitachi DF500 Disk Array.
The Hitachi DF500 Disk Array Subsystem is an array unit used to store electronic data.

This user's guide describes the equipment operating method and precautions for the operator to operate the Hitachi DF500 Disk Array.

Note that Hitachi shall not assume the responsibility for any operation result deriving from an improper usage that is not described in this guide.

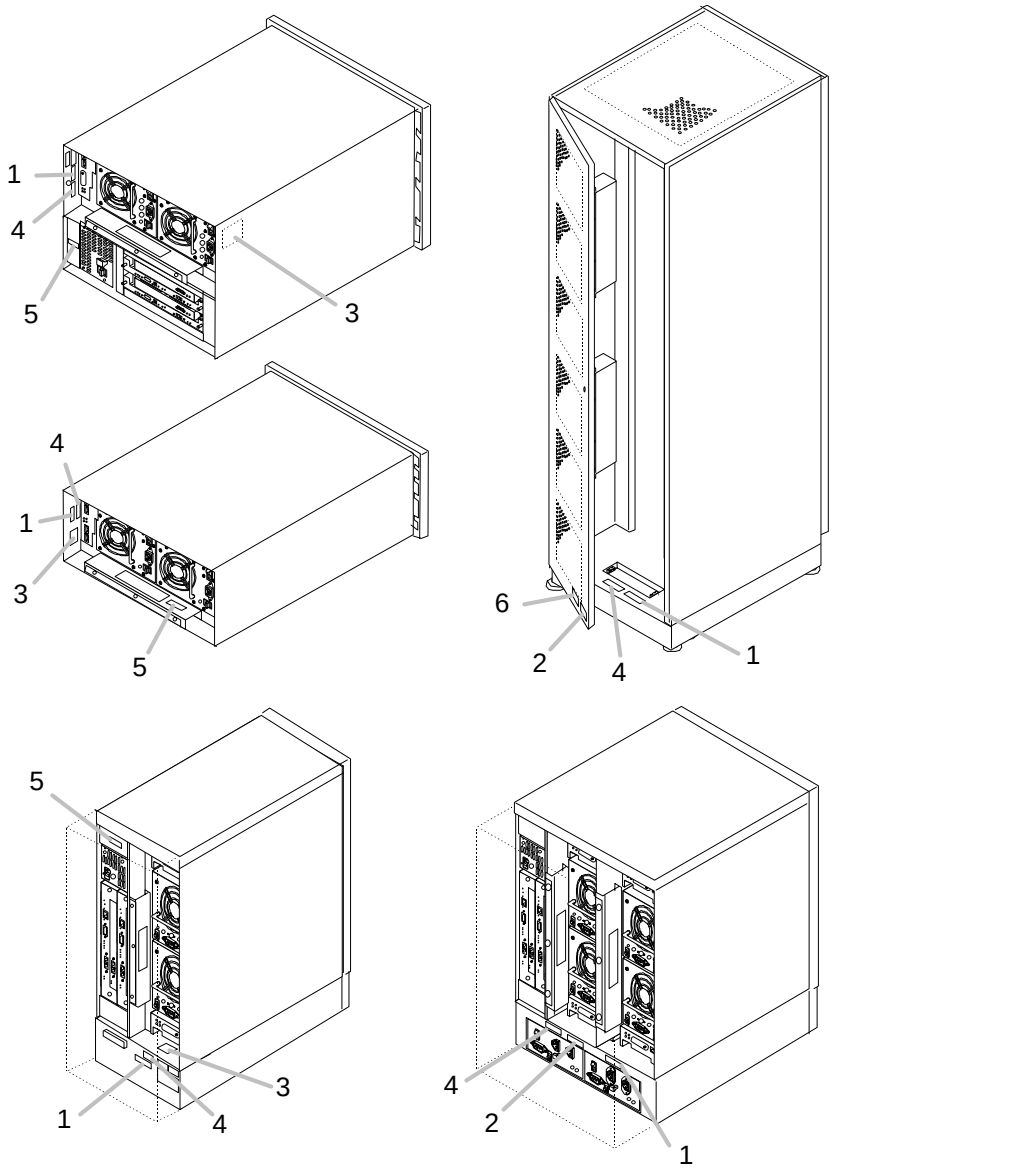
The Hitachi DF500 Disk Array Subsystem has been certified capable of being connected to all the devices listed below. Hitachi does not guarantee DF500's operation in connection with any system that has not yet been tested for connectivity with the DF500 subsystem.

Equipment Warranty

The equipment free-of-charge warranty period is three years after the date of purchase.

EMI Regulation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction guide, may cause harmful interference in which case the user will be required to correct the interference at his own expense. Testing was done with shielded cables. Therefore, in order to comply with the FCC regulations, you must use shielded cables with you installation.



1

警告使用者:
這是甲類的資訊產品,在居住的環境中使用時,可能會造成射頻干擾,在這種情況下,使用者會被要求採取某些適當的對策。

2

この装置は,クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI−A

3

"This equipment complies with the requirements in part 15 of FCC Rules for a Class A computing device and PartⅡ.Vol.122.No.20 of Canada Gazette for a Class A digital apparatus. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference."

4

檢磁3892W004

5

この装置は,クラスA情報技術装置です。
この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI−A

6

"This equipment complies with the requirements in part 15 of FCC Rules for a Class A computing device and PartⅡ.Vol.122.No.20 of Canada Gazette for a Class A digital apparatus. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference."

Figure 0.1 EMI Regulation Labels Affixed on the Subsystem

Registered Trademark and Copyright

- IBM is the registered trademark of the International Business Machines Corporation in U.S.A.
- Sun is the trademarks or registered trademark of the Sun Microsystems, Inc. in U.S.A.
- HP is the registered trademark of the Hewlett-Packard Corporation, Inc. in U.S.A.
- The other company names and product names described in the guide are the trademarks or registered trademarks of the respective companies.

Backup

Even if the user's data has been lost because of a failure, Hitachi cannot guarantee it. Therefore, make a backup copy of your data on your own account.
This will minimize data damage.

: For system parameter backup, refer to the User's Guide, Software Part, "Chapter 4 : Setting System Parameters" (page 66).

In addition, unit parameters are restored (set up again) after optional hardware components are added or replaced, and hence data backup is necessary.

Contents

List of Figures

List of Tables

On This Guide

Composition of This Guide

This guide is comprised of two parts, namely, software part and hardware part.
The respective parts explain the following contents.

- Software Part
  Contains the information on microprogram install processing, equipment parameters setting, and fault monitoring function.
- Hardware Part
  Contains the information required for using the equipment such as equipment installation and device-to-device cable connections.

Contents of the “Software” Volume

The software part consists of the following chapters.

“Chapter 1 : Safety Summary”
Describes important items to human accidents and equipment failures when using this equipment. Before using the equipment, read the contents of this chapter carefully with a good understanding of them.

“Chapter 2 : Software Composition”
This chapter explains the software.

“Chapter 3 : Installing Microprogram”
This chapter explains the procedure for installing the microprogram.

“Chapter 4 : Setting Subsystem Parameters”
This chapter explains the procedures for setting the system parameters, ID of own port, and configuration information and the procedure for setting the subsystem when it is to be used in the special mode.

“Chapter 5 : When You Are in Difficulty”
This chapter contains information on actions to be taken when failures occur in the subsystem. Follow the instructions written in this guide.

“Appendixes”
Appendixes show information on the host side parameters setting, the list of error codes, and the list of software.

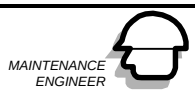
Conventions

Conventions used in this User's Guide are explained below.
The symbol marks used in this guide mean as follows.

Table 0.1 Representation in the Description

Representation example	Contents
“ ”	Represents the title of a chapter, section, or sub-section.
‘ ’	Represents a name that must be emphasized.
•	Represents that the contents having no relation with the order are itemized.

Table 0.2 Symbol Marks in the Description

Marks to be used	Contents of representation
	The contents of the description must be conducted by a maintenance engineer. (***Note 1***)
	There is a noteworthy point in the contents of the description. (***Note 2***)
	Concerning the contents of the description, there are supplement contents.
	Concerning the contents of the description, there is a reference page.

Note 1 : Wherever this symbol mark is indicated, be sure to read and understand the notice before starting your work.
In addition, all work with this symbol mark indicated is referred to service personnel only. If the work is done by anyone other than service personnel, Hitachi does not ensure personal safety and machine operation.

Note 2 : Wherever this symbol mark is indicated, be sure to read and understand the notice before starting your work.

Conversion of Model Names

Throughout this manual, product model name is written as “DF500”. When you want to use this manual for the A-6542 series, please replace the model name “DF500” with “A-6542”.

REFERENCE  : For conversion of model names, refer to the “DF500 Disk Array Subsystem Specifications” manual.

Chapter 1 ⚠SAFETY SUMMARY

1.1 Common Precautions on Safety

When using the equipment, observe the following so as not to get hurt.
Read the following contents carefully with a good understanding of them.

- Perform operations in accordance with the instructions or procedures described in this manual.
- Be sure to follow the cautionary notes written on labels affixed to the equipment.
- Be sure to follow the cautionary notes written in this manual.

1.1.1 Symbol Marks

The catching heading below shows that a safety notice or instruction follows.
A combination of the heading "CAUTION" with a symbol (graphical symbol) is used.

This symbol indicates the existence of a potential hazard which may cause a rather light injury or serious damage to the equipment if the written contents are not observed.

1.1.2 Users are Requested to be Alert for Themselves

The precautions described in this manual have been thoroughly reviewed. However, we can not warn against every possible accident. Be alert to hazards not described in this manual, work safely. When operating the equipment, be on your own guard against an injury as well as observe the instructions written in the manual.

1.1.3 Repair, Modification, and Disassembly

Users must not repair, remodel, or disassemble the equipment. Such actions may cause personal injury or damage to the equipment. Or, it will cause a malfunction of the equipment.

1.2 Precautions for Using the Equipment

1.2.1 Precautions on Equipment

- If you take notice of unusual smell, abnormal heat generation, or smoke emission, shut off the power feed to the equipment and inform the maintenance engineer of it. Do not ignore such conditions as it is will cause an electric shock or fire.
- Do not give any shock to the equipment by falling or striking, otherwise it will cause an electric shock, fire, or failure.
- Do not use the equipment for any purpose other than its intended purpose.
  Otherwise, an injury or failure will be caused.

1.2.2 Other Precautions

- When a failure occurs in the unit, take action according to this manual so as to prevent personal injury.
  If the trouble does not correspond to any corrective measure written in this manual, inform the maintenance engineer of it.

1.3 Precautions in an Emergency

1.3.1 Occurrence of an Electric Shock

- Do not touch the person struck by electricity in haste. DO NOT TOUCH THE VICTIM UNTIL POWER FLOW HAS BEEN STOPPED.
- To shut off the electric flow to a victim, disconnect the power feed cable of the equipment. In spite of this action, electricity cannot be shut off, separate the victim from the current source by using a non-conductive material such as dry wooden bar.
- Contact a qualified rescuer immediately, for the victim.
- When the victim has lost consciousness, practice artificial respiration on the victim. To provide for such a case, learn how to practice artificial respiration.
- When the victim's heart has stopped, give a heart massage. The treatment should always be conducted by a person who has been trained and qualified. Unqualified person is prohibited from conducting this treatment.

1.3.2 Occurrence of a Fire

- To shut off the electric flow to the equipment, pull out the power feed cable to stop the power supply.
- If a fire cannot be extinguished though the electric flow has been shut off, alert qualified fire fighters, Contact the fire station immediately or follow your building's fire alert procedure.

1.4 Warning Indications

1.4.1 CAUTION Statements

No CAUTION statement.

Chapter 2 Software Composition

2.1 Software Composition

2.1.1 Microprogram

Microprogram is a program controls basic hardware operations which accompany the execution of given instructions performed by a CPU.
Version of the microprogram is controlled by means of a number with a format of 'xxxx/x'. The microprogram for the fibre channel, '055x/x (x is optional)' is available and it is provided being contained in five FDs. The microprogram for the SCSI, '050x/x (x is optional)' is available and it is provided being contained in five FDs.
However, there may be a case where the '/x' is not included in the microprogram version number or the microprograms are controlled under another control system.

2.1.2 System Parameters

Parameters necessary for the process to start the subsystem, from turning on of the main switch to coming on of the READY LED (green), are called system parameters. The system parameters are stored in the flash memory. They can be backed up onto an FD.
When the system parameter is changed, make a backup of it onto the FD.

2.1.3 Configuration Information

This is information on the configuration for the subsystem to record customer's data such as RAID configuration and LU capacity.
The configuration information exists in the disk drive when the main switch is turned off, and is propagated onto the RAM when the main switch is turned on. When the configuration information is changed, information in the disk drive is updated at the same time.

2.1.4 SNMP Information

SNMP information is a parameter to make the SNMP agent support function operate effectively. When the SNMP information makes the SNMP agent support function effective, it edits the template contained in the SNMP information contained in the SNMP EVA FD and register it in the subsystem.

2.1.5 Storage for Parameters

The storages in which the parameters on the controller are stored are shown in Table 2.1.

Table 2.1 Storage for Parameters

No.	Parameter	Storage	Description
1	• Fixed part program • Flash program • System parameters	Flash memory (and backup FD)	• The parameters are stored in the flash memory. No provision of storage against a power shut off is required for the parameters because the flash memory can retain information even if a power is shut off. • The parameters can be backed up to the following to provide against a trouble. Fixed part program ------- Cannot be backed up Flash program ---------- Automatically backed up to the system area. System parameters ---------- Manually backed up to the backup FD.
2	• Microprogram • Configuration information • SNMP information	System area	• Generally, information in a RAM is erased when the main switch is turned off. Therefore, the subsystem also stores the parameters used on the RAM on the Disk drive. (An area is reserved in the Disk drive to store them. The area is called system area.) • The system area is provided on the Disk drives #0 to #4 in the RK frame. Therefore, the system area has redundancy as far as the Disk drives #0 to #4 in the RK frame.

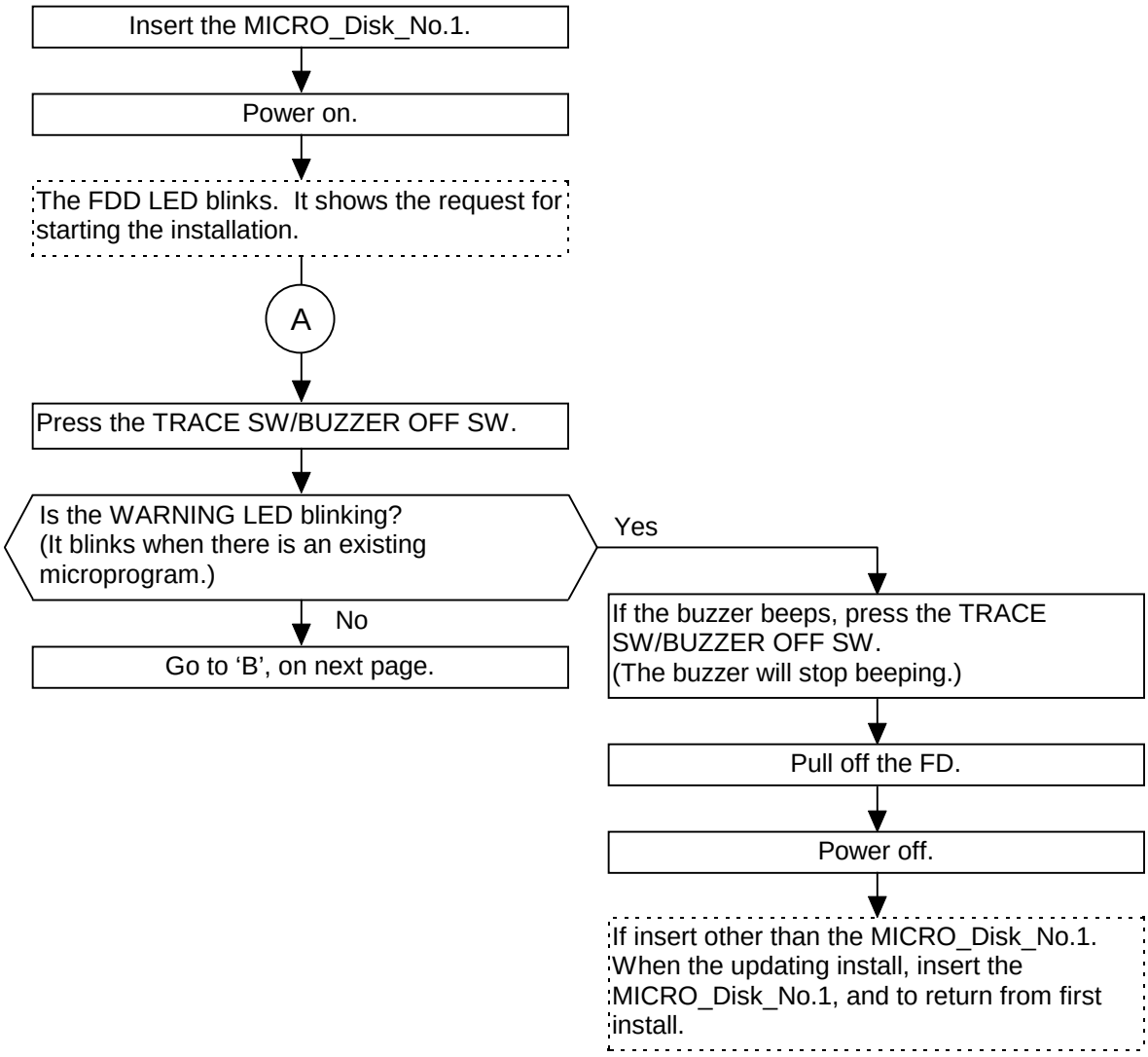
Chapter 3 Updating Microprogram

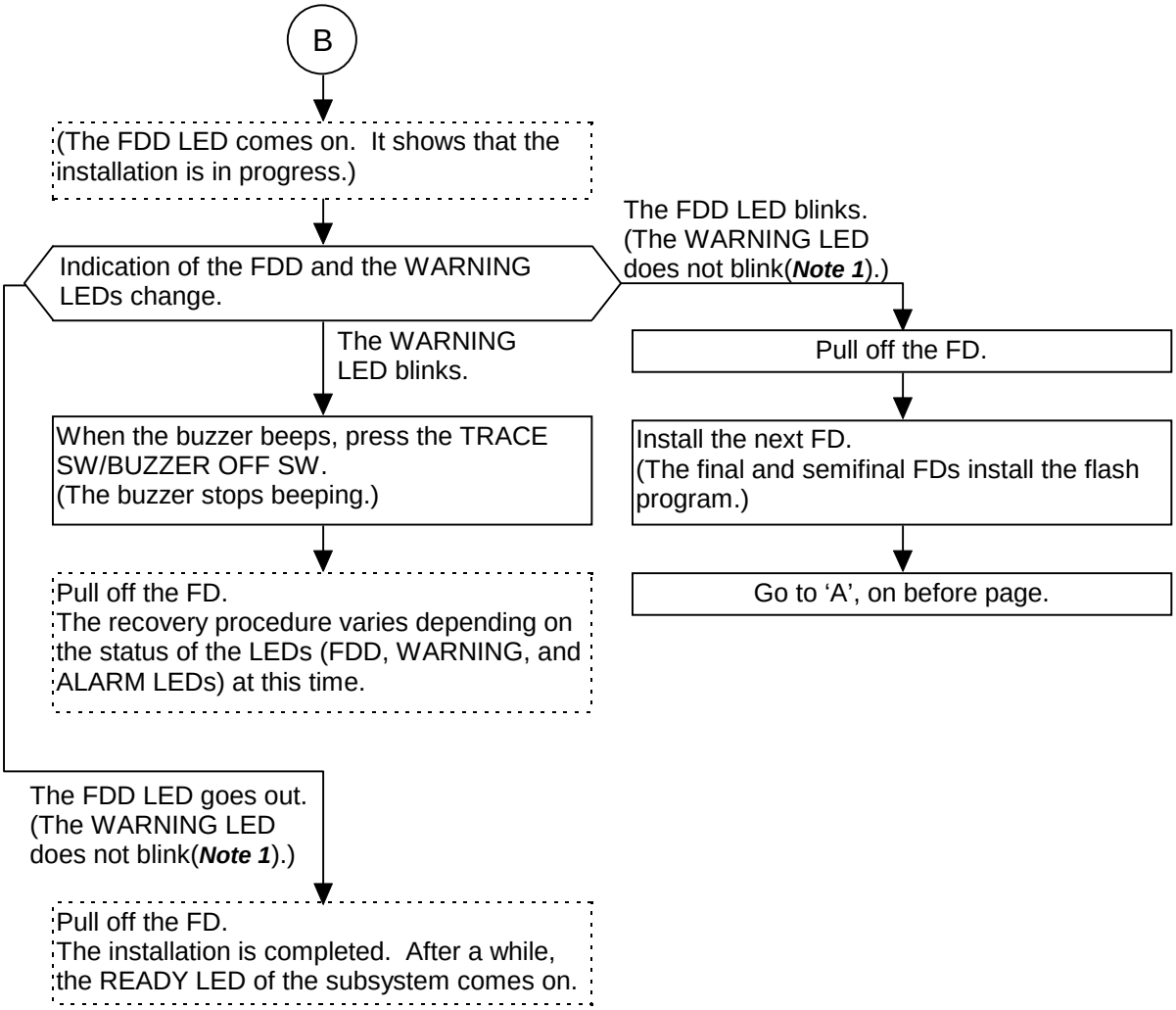
3.1 Updating Microprogram

: 'Updating Microprogram' is referred to trained service personnel only. The user must not do it.

This is a work to update the microprogram in the subsystem. The microprogram is downloaded from the FD.
Operation as described below.

1. Turn off the power supply.
2. Operation as described below.





Note 1 : When the first blinking of WARNING LED, stop the blinking for a while waiting.

3.1.1 Procedures for Recovering from Failures Occur During Installation

<Failure which causes an FD change request>

Table 3.1 LED Status

FDD LED	WARNING LED	ALARM LED	Recovery procedure
Blinking	Blinking	Off	Replace the FD with a correct one and press the TRACE SW/BUZZER OFF SW again.

Table 3.2 Details of WEB Error Logs

Message code	Message text	Recovery procedure
RB2000	FD un-formatted	An unformatted FD is inserted.
RB2100	FD not inserted	No FD is inserted.
RB2300	Bad FD inserted	An incorrect FD is inserted.

<Failure which causes system down>

Table 3.3 LED Status

FDD LED	WARNING LED	ALARM LED	Recovery procedure
Off	Blinking	On	Insert a correct FD, turn on the power again, and perform the operation over again from the beginning. If a recovery from the failure is not successful nevertheless, connect the WEB and recover from the failure following the recovery procedure against each WEB message. (see chapter 5)

Table 3.4 Details of WEB Error Logs

Message code	Message text	Recovery procedure
RB1500	No END.DAT found in FD	The END.DAT is not stored in the FD.
RB3100	File open error	The opening of the file failed.
RB3200	File read error	The reading of the file failed.
RB3400	Bad FD file	An error was detected in the file.
RB3500	Bad block FD	An illegality was detected in the block ID.
RB3600	Bad LBA in FD	The LBA specified by the FDD is not stored in the system area.
RB7000	Program size too large	The program size is too large.
RB8300	Empty system retry full install	The updating installation cannot be done because there is no existing system.
RBA000	Down grade check NG	A downgrade of the program was detected.
RBA0xy	Bad sequence number (Unit-x,HDU-y)	Information of new and old programs in Disk drives do not agree with each other.
RBC000	No drive available	No installable Disk drive exists.
RBC10x	Drive block size error (Unit-0,HDU-y)	An illegal block size of the Disk drive was detected.
RBC2xy	Unknown drive (Unit-x,HDU-y)	The Disk drive capacity is smaller than half the system area.

3.1.2 Procedures for Checking Performance of the System Copy Operation

You can verify whether the system copy operation has occurred by viewing the 'Information Message' window in the WEB window. (see figure 3.1)

- When a system copy occurs

MM/DD/YYYY HH:MM:SS Cx I140xy System copy started (Unit-x, HDU-y)

Date Time Detect Controller# x : Unit ID#, y : Disk drive#

- When no system copy occurs

MM/DD/YYYY HH:MM:SS Cx I10000 Subsystem is Ready

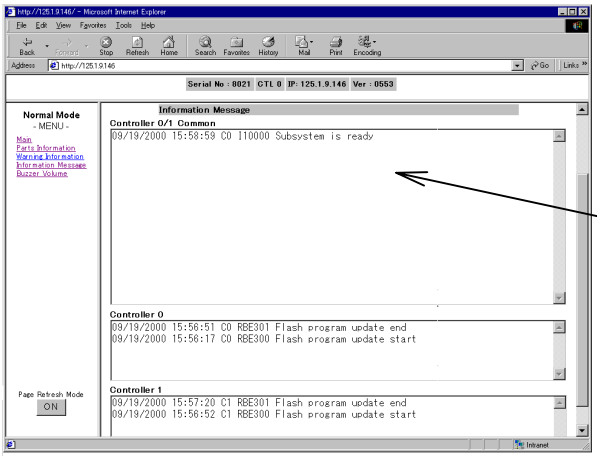


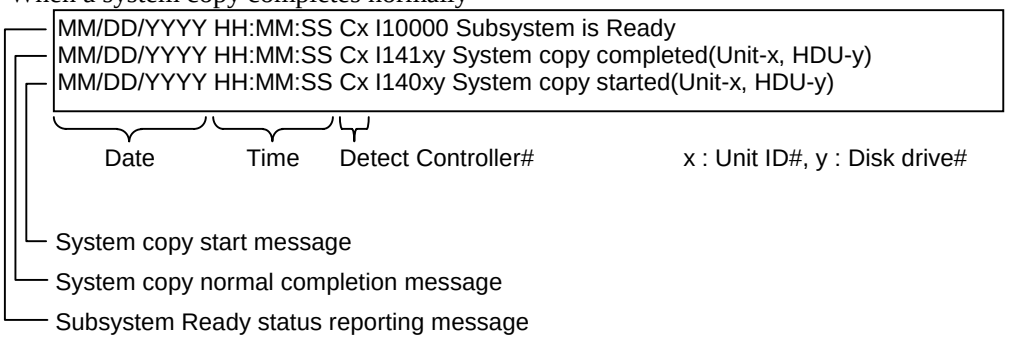
Figure 3.1 System Copy Operation Occurred Confirming Screen

SUPPLEMENT : The 'Warning Information' is displayed by the microprogram revisions 05x3 and later.

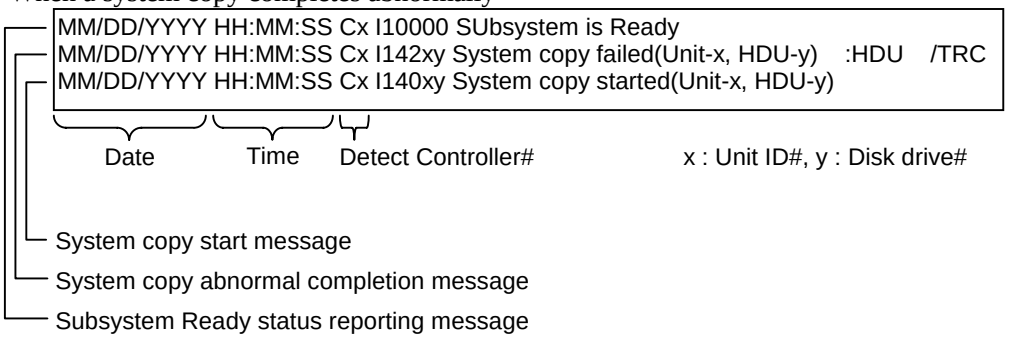
3.1.3 Procedures for Checking State of the System Copy Completion

You can verify whether the system copy operation has occurred by viewing the 'Information Message' window in the WEB window. (see figure 3.2)

- When a system copy completes normally



- When a system copy completes abnormally



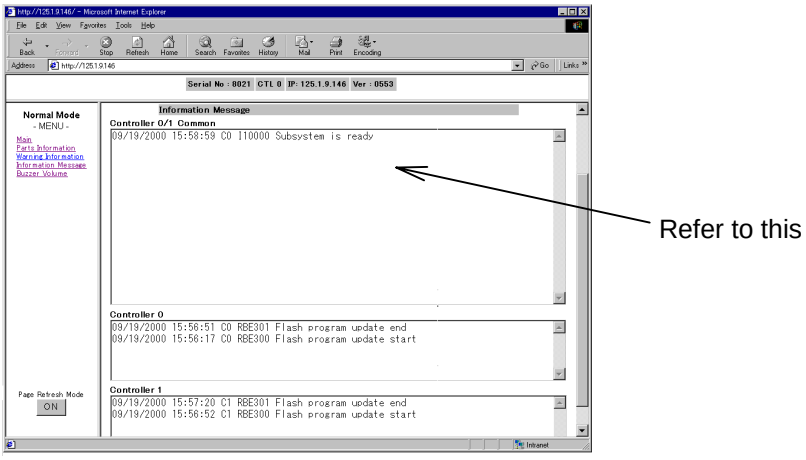


Figure 3.2 System Copy Complet Operation Confirming Screen

SUPPLEMENT : The 'Warning Information' is displayed by the microprogram revisions 05x3 and later.

Chapter 4 Setting Subsystem Parameters

4.1 Procedures for Setting System Parameters

: 'Procedures for setting system parameters' is referred to trained service personnel only.
The user must not do it.

The procedures for connecting to the Disk Array management program 2 are shown.
Before starting connection work to the Disk Array management program 2, check the following items to system engineers.

4.1.1 Checking State of Using LAN Function

Table 4.1 LAN Function Status of Use Investigation Method

Item	LAN function		Contents to be checked	Investigation method
1	LAN status of use		Being used or unused	Check that cable is connected to the LAN connector.
2	RS232C port status of use		Being used or unused	Check that cable is connected to the R232C connector.
3	Maintenance terminal (WEB/Array Disk management program 2)		Provided or none	Inquire of customers or system engineers.
4	Network parameters setting value	DHCP	Enable or disabled (***Note 1***)	Inquire of customers or system engineers or refer to setting values from trace or RS232C. (***Note 2***)
		IP Address	Setting value (***Note 1***)	
		Subnet Mask	Setting value (***Note 1***)	
		Default Gateway	Setting value (***Note 1***)	

Note 1 : When the customer uses the subsystem with the network function un-set, the network parameters remain those set at the factory.

Network parameters	Shipment setting value
DHCP	Disable
IP Address	192.168.0.16
Subnet Mask	255.255.255.0
Default Gateway	Nothing

Note 2 : When the IP address is unknown, connect to the disk array management program 2 via the RS232C.

4.1.2 Section and Preparation of Service Terminal

Determination and preparation of maintenance terminal to be used.

4.1.3 Connecting with the Disk Array Management Program 2

Connect the ‘Disk array management program 2’

SUPPLEMENT : The Disk Array management program 2 is provided by the Disk Array management program Ver.5.10 or later.

SUPPLEMENT : For the connection procedures, refer to the “Disk Array management program 2 (for GUI) User’s Guide”.

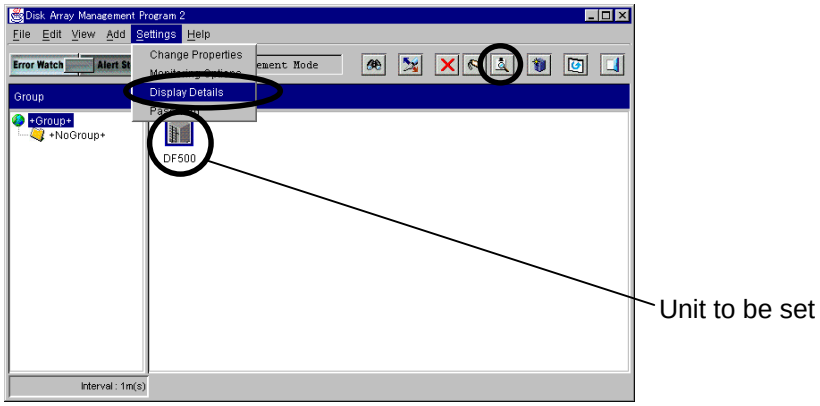
4.1.4 Preparing the Disk Array Management Program 2

The procedures for setting a system parameters from the Disk Array management program 2 are described.

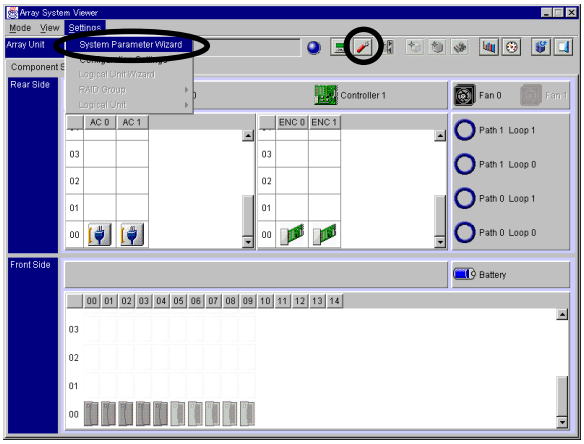
1. Turn on the power supply.
2. Start the Disk Array management program 2 and set the operation mode in the [Maintenance Mode].

SUPPLEMENT : Refer to the “Disk Array management program 2 (for GUI) User’s Guide”.

3. Click the icon of an array unit on the Main window, and then select the [Settings] menu, click [Display Detailes]. Or, click the [Display Details] in the tool bar.

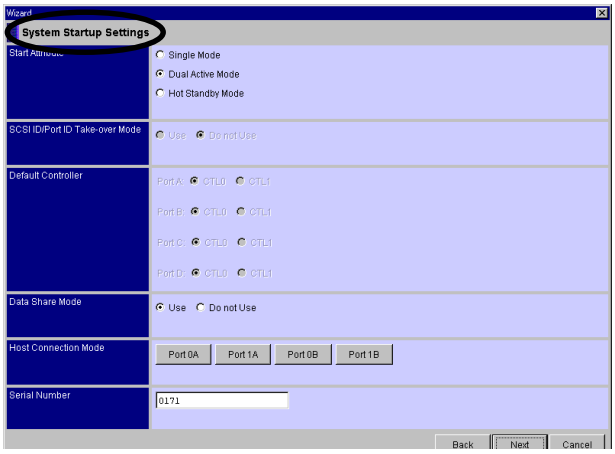


4. On the [Settings] menu, click [System Parameter Wizard]. Or, click the [System Parameter Wizard] in the tool bar.



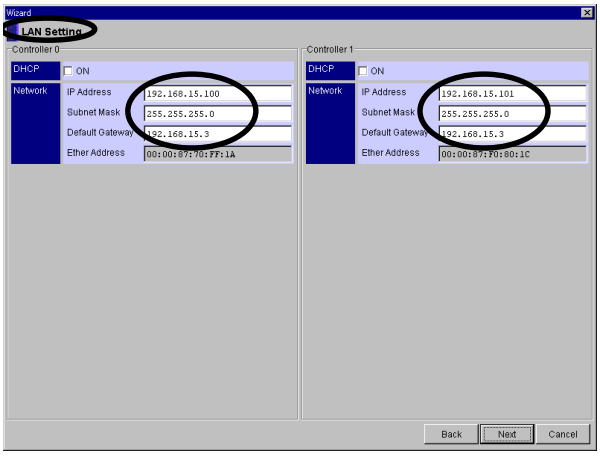
5. Click the [Basic Settings], click the [Next] button.

6. Check that [System Startup Settings] is displayed.



4.1.5 Setting Network Option

1. Click the [Next] button until [LAN Setting] is displayed.

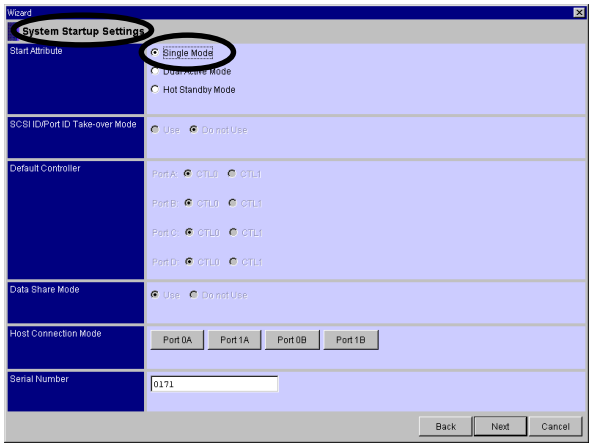


2. After [LAN Setting] has been displayed, set Controller #0/#1.
   Enter a numeric value in the IP address column.
3. Setting a subnet mask value.
   Enter a numeric value in the subnet mask column.
4. Setting a default gateway value.
   Enter a numeric value in the default gateway column.
   If gateway is un-used, enter '0.0.0.0'.
5. The network option setting terminated.
   Until [System Startup Setting] is displayed, click the [Back] button.

4.1.6 Configuring single-controller subsystems

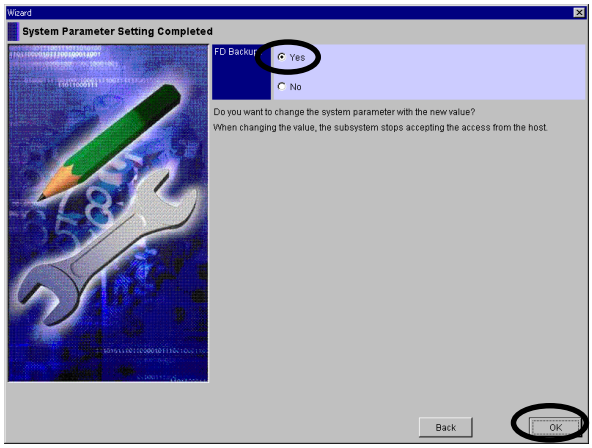
A procedure to set when the equipment uses configuring single-controller subsystem is explained below.

1. Check that [System Startup Setting] is displayed and click the [Single Mode] of a [System Startup Settings].



2. When not setting other system attributes, click the [Next] button until [System Parameter Setting Completed] is displayed.
3. Select [Yes] of [FD Backup?], then click the [OK] button.
   [Yes] : Backup the system parameters.
   [No] : Not backup the system parameters.

INPORTANCE :When you modified the setting, select [Yes] to ensure the FD to be backed up.



4. If an error message is displayed during execution of backup into a floppy disk, perform the operation in accordance with the following procedures.

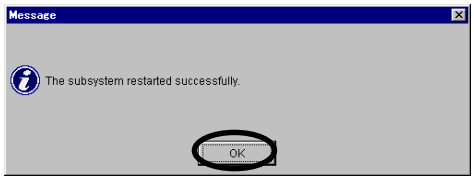
   The meaning of an error message and its response are listed Table 4.2.

Table 4.2 Error Messages

Error message	Actions to take
Because a backup FD is not inserted, information could not be set.	No FD is not inserted. Insert a FD.
Because of a backup FD drive motor error, information could not be set.	A device error occurred. Re-execute processing.
A write error to a backup FD occurred.	A write error to a FD occurred. Replace the FD with a write-enable FD and re-execute processing.

   If one of the above error messages is displayed, system parameters backup to a floppy disk is not executed. Re-insert the floppy disk and re-execute processing. Nevertheless, if an error message is displayed, replace the floppy disk with a new floppy disk with a new floppy disk and re-execute processing.

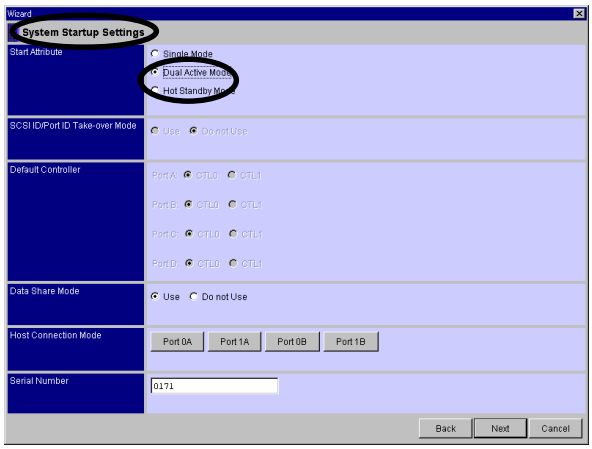
5. If system parameters setting is completed, the following window is displayed. Click the [OK] button.



4.1.7 Configuring dual-controller subsystems

A procedure to set when the equipment uses configuring dual-controller subsystem is explained below.

1. Check that [System Startup Setting] is displayed and click the [Dual Active Mode] or [Hot Standby Mode] of a [System Startup Settings].



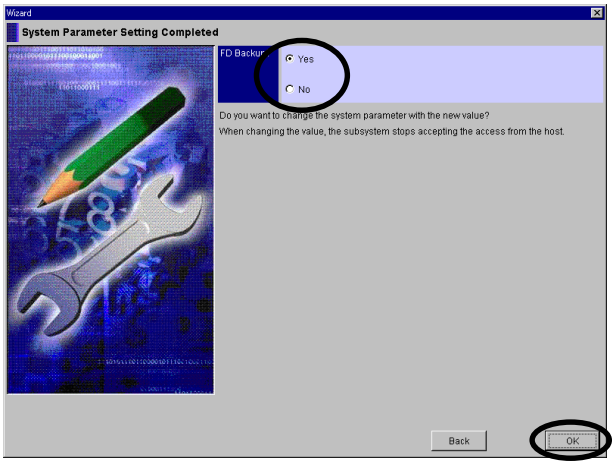
A dual system has the operation modes shown in Table 4.3
To enable each mode, the setting of Table 4.3 is necessary.

Table 4.3 Operation Mode of Dual System Configuration

Operation mode		Setting	
		SCSI ID/Port ID Take-over mode	Data Share mode
Dual Active Mode/Hot Standby Mode	Normal	Not used	Not used
	Data Share	Not used	Used
	SCSI ID/Port ID Take-over	Used	Disabled

2. When not setting other system attributes, click the [Next] button until [System Parameter Setting Completed] is displayed.
3. Select [Yes] of [FD Backup?], then click the [OK] button.
   [Yes] : Backup the system parameters.
   [No] : Not backup the system parameters.

INPORTANCE :When you modified the setting, select [Yes] to ensure the FD to be backed up.



4. If an error message is displayed during execution of backup into a floppy disk, perform the operation in accordance with the following procedures.

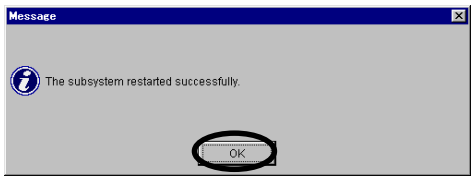
   The meaning of an error message and its response are listed Table 4.4.

Table 4.4 Error Messages

Error message	Actions to take
Because a backup FD is not inserted, information could not be set.	No FD is not inserted. Insert a FD.
Because of a backup FD drive motor error, information could not be set.	A device error occurred. Re-execute processing.
A write error to a backup FD occurred.	A write error to a FD occurred. Replace the FD with a write-enable FD and re-execute processing.

If one of the above error messages is displayed, system parameters backup to a floppy disk is not executed. Re-insert the floppy disk and re-execute processing. Nevertheless, if an error message is displayed, replace the floppy disk with a new floppy disk with a new floppy disk and re-execute processing.

5. If system parameters setting is completed, the following window is displayed. Click the [OK] button.



4.2 Setting Fibre Channel Information

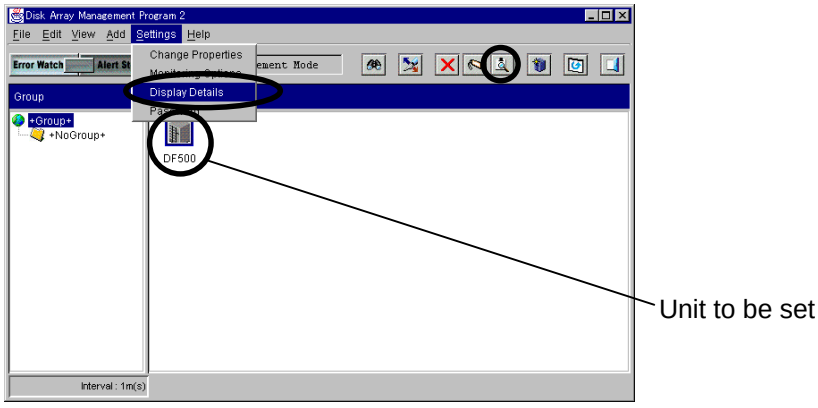
MAINTENANCE ENGINEER : 'Configuring self port address is referred to trained service personnel only. The user must not do it.

The fibre channel information is displayed and set.
Operation as described below.

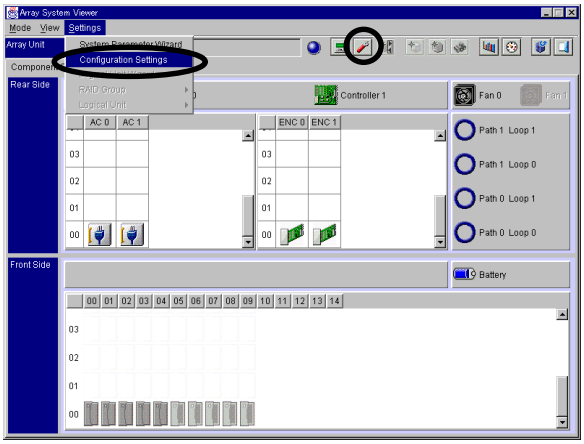
1. Turn on the power supply.
2. Start the Disk Array management program 2 and set the operation mode in the [Maintenance Mode].

SUPPLEMENT : Refer to the "Disk Array management program 2 (for GUI) User's Guide".

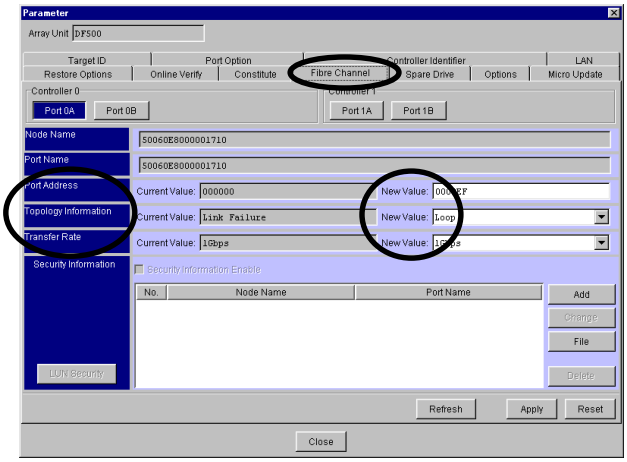
3. Click the icon of an array unit on the Main window, and then select the [Settings] menu, click [Display Detailes]. Or, click the [Display Details] in the tool bar.



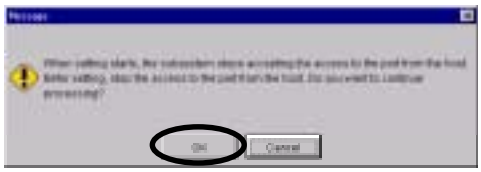
4. On the [Settings] menu, click [Configuration Settings]. Or, click the [Configuration Settings] in the tool bar.



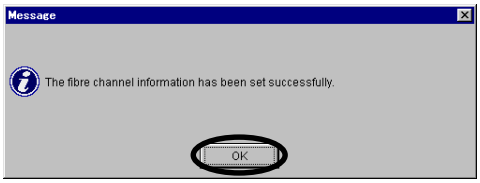
5. Click the [Fibre Channel] tab.



6. Set a [Port Address], [Topology Information], [Transfer Rate].
   [Port Address]: Port address is displayed as a hexadecimal number.
   [Topology Information]: Indicate the topology status.
   [Transfer Rate]: Indicate the fibre transfer rate.
7. Click the [Apply] button.
8. A confirmation messaage indicating. After making sure that I/O operation initiated by the host has stopped, click the [OK] button.



9. A message indicating completion of setting is displayed, click the [OK] button.



4.3 Setting Configuration Information

MAINTENANCE ENGINEER : 'Setting configuration information' is referred to trained service personnel only. The user must not do it.

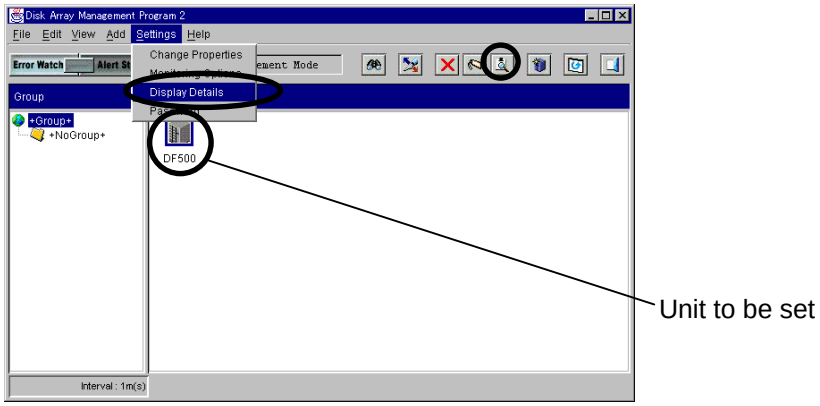
This function can be used in the device ready state (R/W cannot be executed from the host in operation. When a host command is received, Not Ready is reported to the host computer).

4.3.1 Preparing for RAID group/logical unit setting

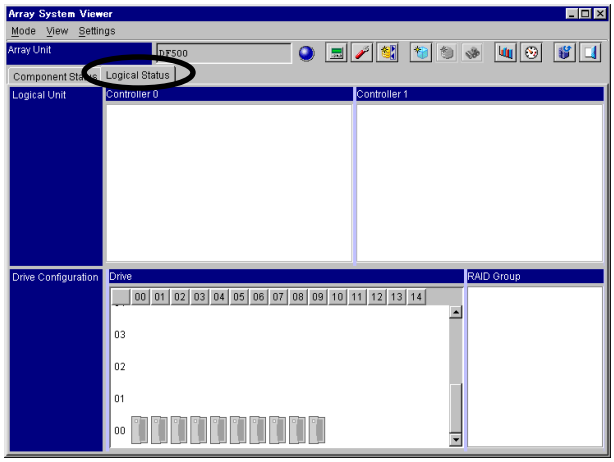
1. Start the Disk Array management program 2 and set the operation mode in the [Maintenance Mode].

SUPPLEMENT : Refer to the "Disk Array management program 2 (for GUI) User's Guide".

2. Click the icon of an array unit on the Main window, and then select the [Settings] menu, click [Display Detailes]. Or, click the [Display Details] in the tool bar.

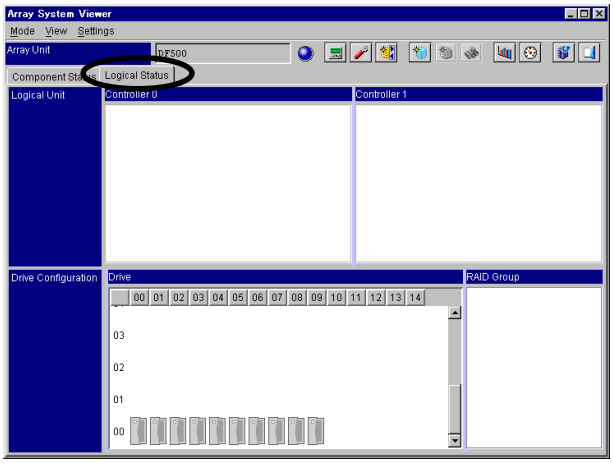


3. Click the [Logical Status] tab.

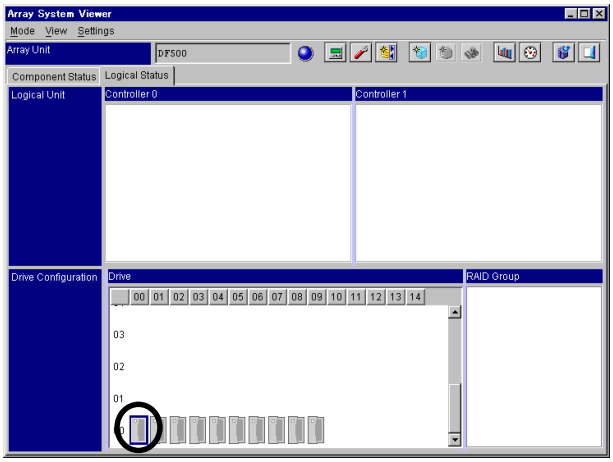


4.3.2 Setting RAID Group

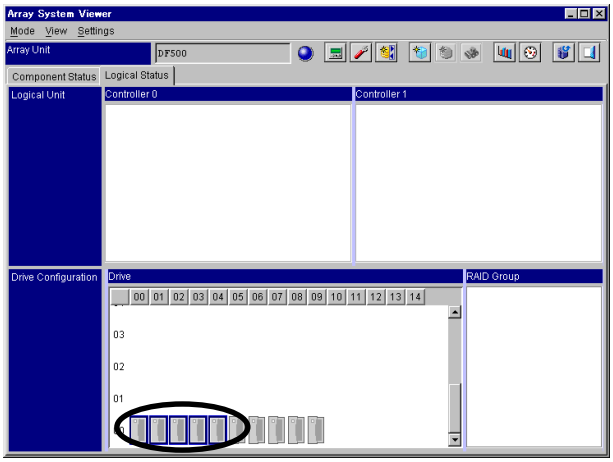
1. Click the [Logical Status] tab.



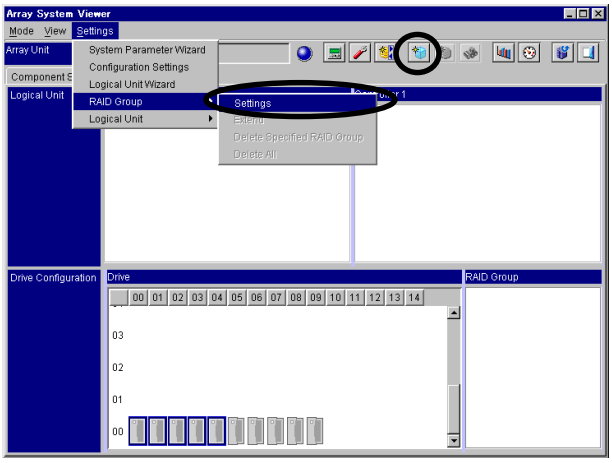
2. Clicks the top drive of which an RAID group is comprised. The drive that is clicked is displayed with a selected appearance.



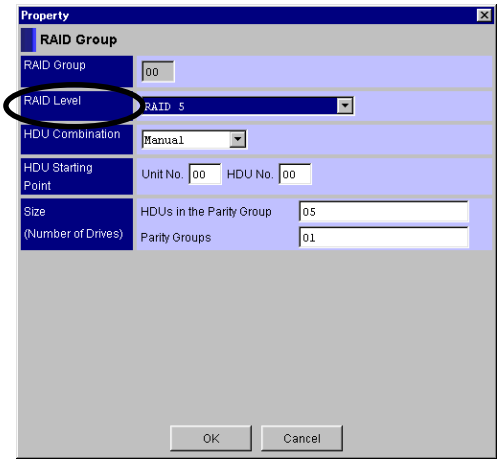
3. Holding down the [shift] key, clicks the last drive of an RAID group which to create. Drives of the RAID group which to create are enclosed by a rectangular box.



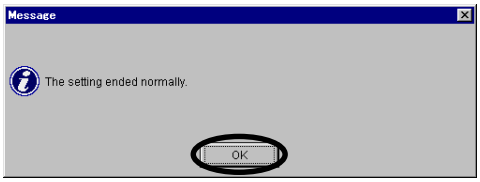
4. On the [Settings - RAID Group] menu,click [Settings]. Or, click the [RAID Group Settings] in the tool bar.



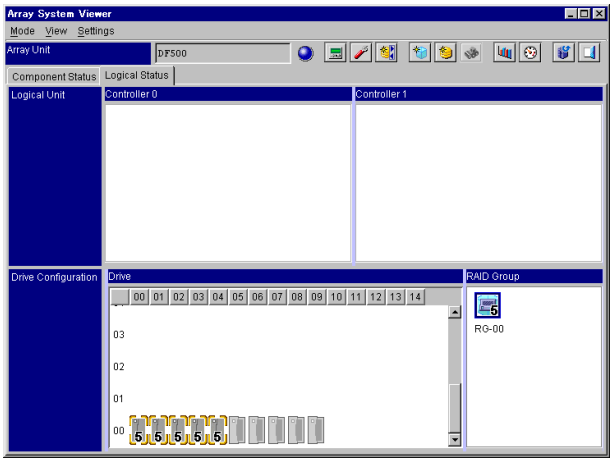
5. Select a RAID level and click the [OK] button.



6. A message indicating completion of setting is displayed, click the [OK] button.



The set RAID group is updated and then the window is displayed.



If the RAID group setting is not successful, delete the affected RAID group, and try creating the RAID group again.

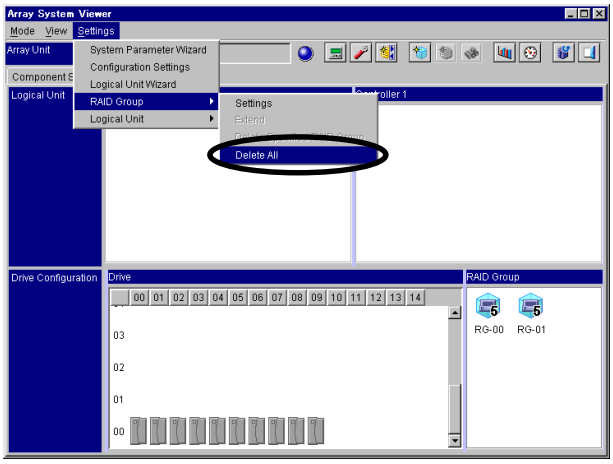
SUPPLEMENT : Refer to the “Deleting RAID group” (page 26).

4.3.3 Deleting RAID Group

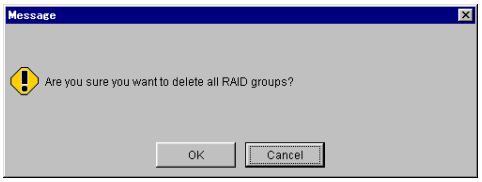
Deleting all RAID groups

INPORTANCE : All user data is lost by deleting the logical unit. Backup user data before deleting the RAID group.

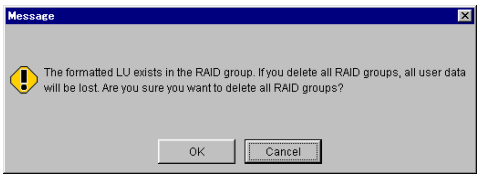
1. On the [Settings - RAID Group] menu, click [Delete All].



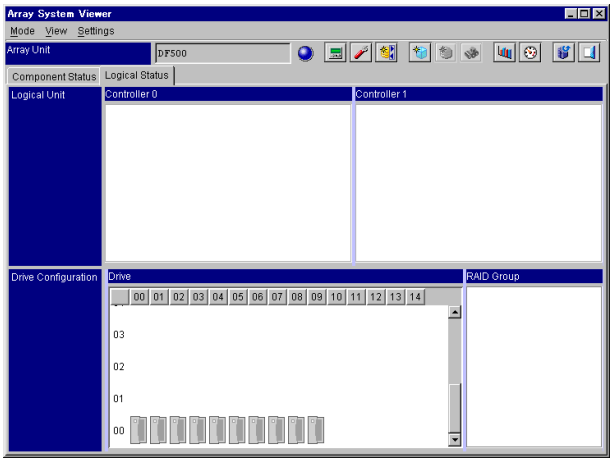
2. If the confirmation message is displayed. Click the [OK] button.
   - When there is no formatted logical unit in a RAID group



   - When there is a formatted logical unit in a RAID group



The deleted RAID group is updated and the window is displayed.

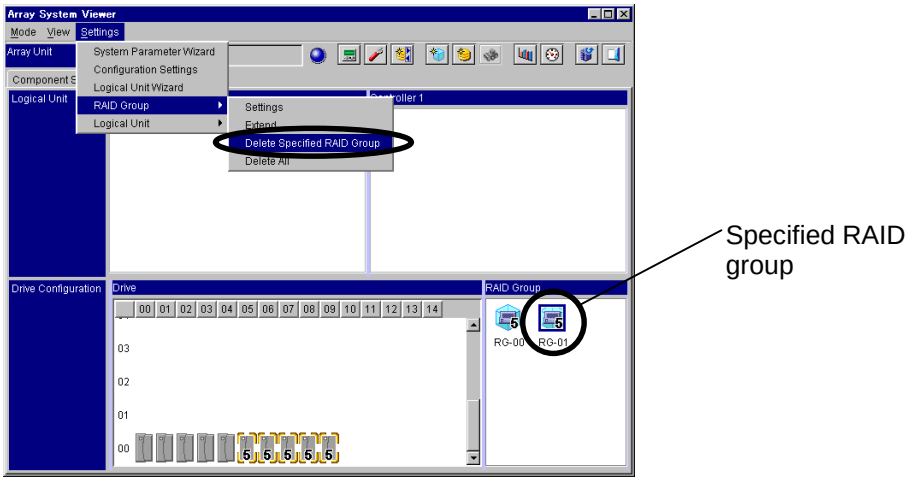


REFERENCE : When the reset a RAID group, refer to “Setting RAID group” (page 23).

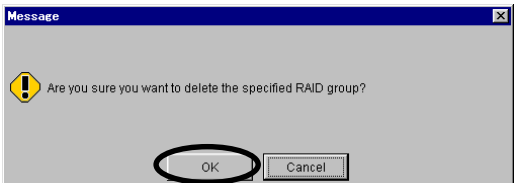
Deleting a RAID groups

INPORTANCE : If an logical unit is defined in a specified RAID group, the RAID group can be deleted. Delete the specified RAID group after having deleted all logical units within the specified RAID group.

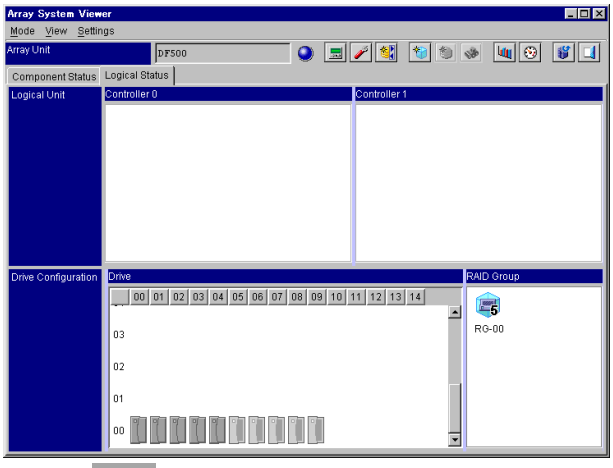
1. Click the icon of a RAID group on the Unit window. And on the [Settings - RAID Group] menu, click [Delete Specified RAID Group].



2. If the confirmation message is displayed. Click the [OK] button.



The window from which RAID groups the selected were deleted is displayed.



REFERENCE : When the reset a RAID group, refer to “Setting RAID group” (page 23).

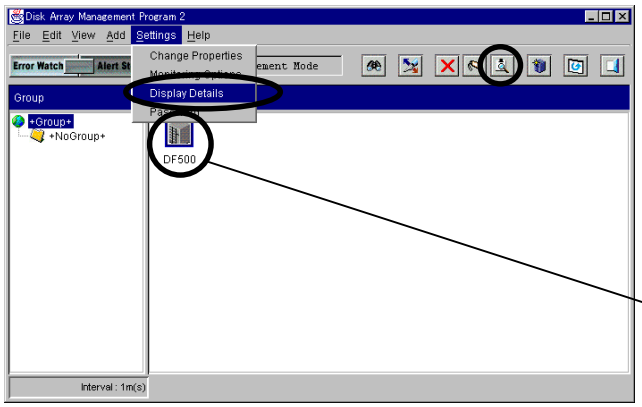
4.3.4 Preparing for logical unit setting

This function can be used in the device ready state.

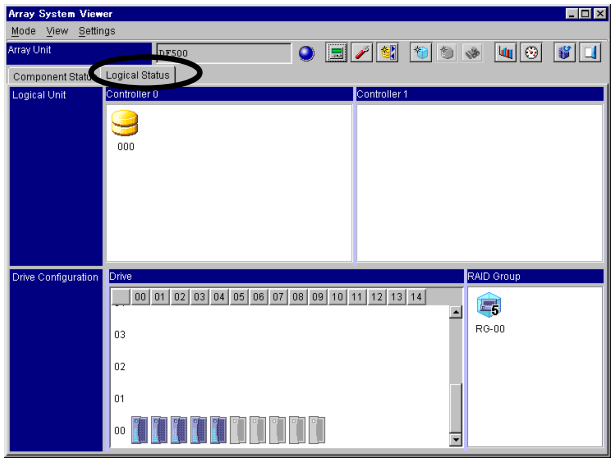
1. Start the Disk Array management program 2 and set the operation mode in the [Maintenance Mode].

SUPPLEMENT : Refer to the “Disk Array management program 2 (for GUI) User’s Guide”.

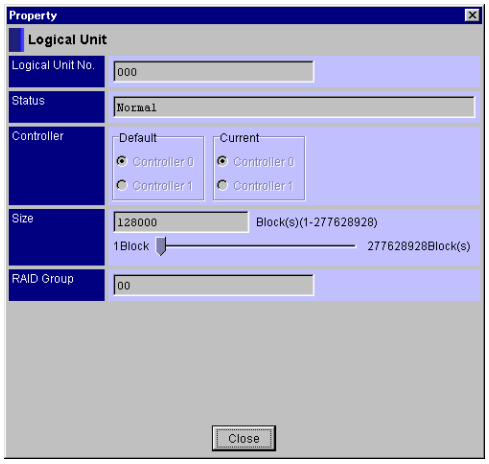
2. Click the icon of an array unit on the Main window, and then select the [Settings] menu, click [Display Detailes]. Or, click the [Display Details] in the tool bar.



2. Click the [Logical Status] tab. The current logical unit setting status is displayed.



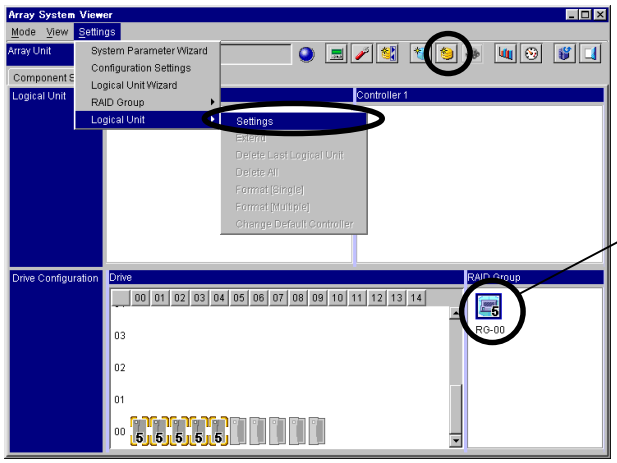
When you double-click each icon, displayed property window of logical unit.



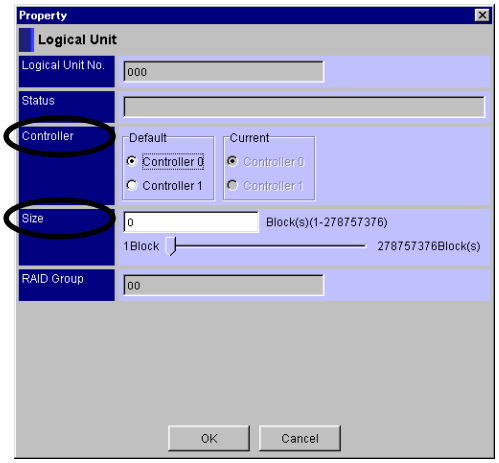
[Logical Unit No.]: Logical unit No.
[Status]: Status
[Controller]: Controller No. in charge of the default/current logical unit
[Size]: Capacity in which the logical unit is defined
[RAID Group]: RAID group number in which logical units are defined

4.3.5 Setting logical unit

1. Click the icon of a logical unit on the Unit window. On the [Settings - Logical Unit] menu, click [Settings]. Or, click the [Logical Unit Settings] in the tool bar.



2. Select a controller in charge in [Controller] and input [Size].



A created logical unit No. is displayed for the [Logical Unit No.], and a created RAID group No. for the [RAID Group]. In addition, an logical unit capacity that can be created is displayed.

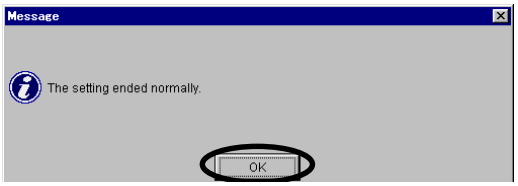
Capacity specification method

When explicitly specifying a value, specify a capacity (the number of blocks) using a decimal number.

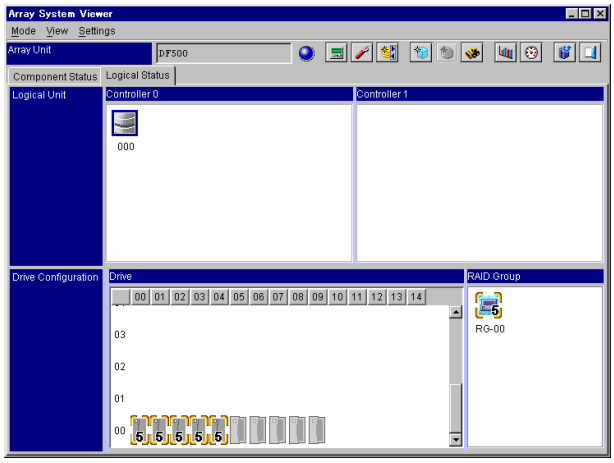
The subsystem can be divided into a maximum of 64 logical units.

REFERENCE : Refer to “Appendix D Number of Logical Blocks” (page 128).

3. After completion of the setting, click [OK] button.



The set logical unit information is updated and the window is displayed.

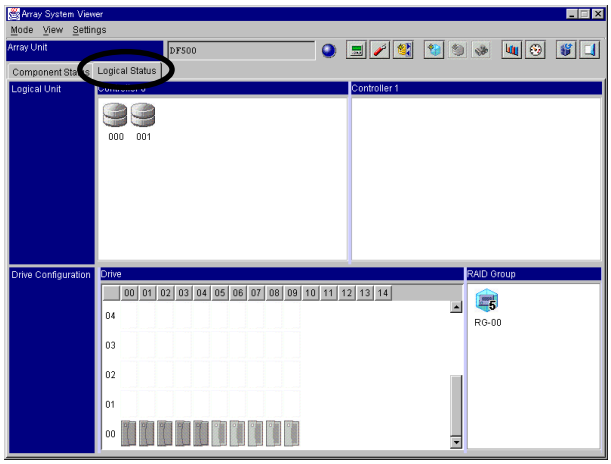


4.3.6 Deleting logical unit

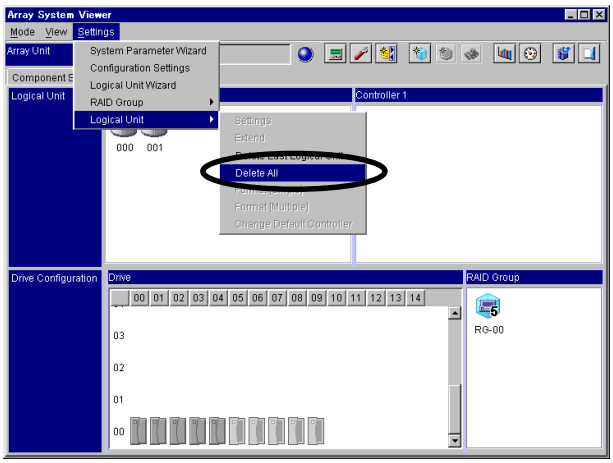
Deleting the all logical unit

INPORTANCE : All user data is lost by deleting the logical unit. Backup user data before deleting the logical unit.

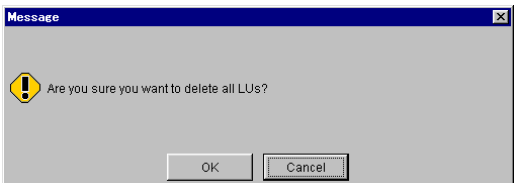
1. Click the [Logical Status] tab on the Unit window.



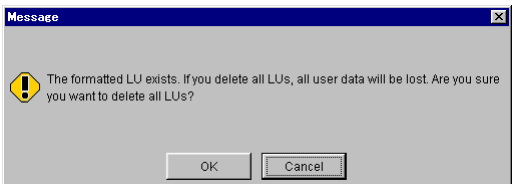
2. On the [Settings - Logical Unit] menu, click [Delete All].



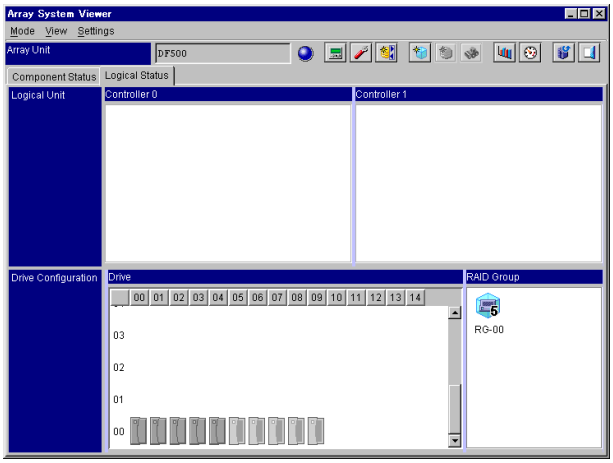
3. A confirmation message is displayed indicating whether all logical units should be deleted or not.
   - When there is no formatted logical unit.



   - When there is a formatted logical unit.



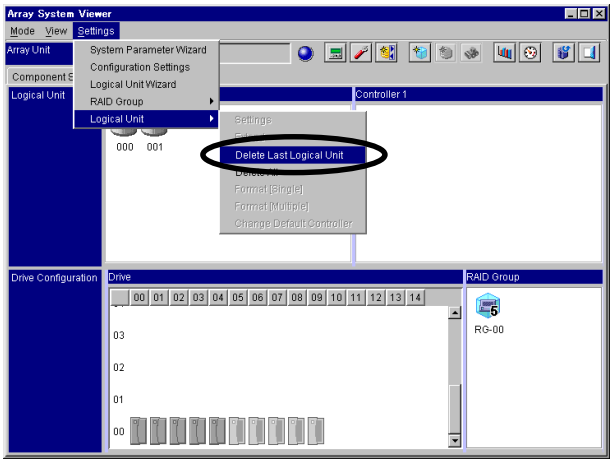
4. Click the [OK] button, and all logical units will be deleted. When all the logical units have been deleted, the user data in the logical units will be lost.
   The logical unit information in which all the logical units have been deleted is updated and the window is displayed.



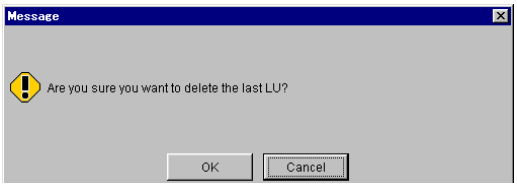
Deleting the last logical unit

INPORTANCE :When the last logical unit have been deleted, the user data in the last logical unit will be lost.

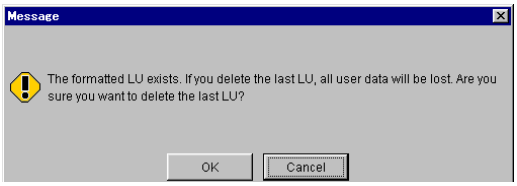
1. Click the [Logical Status] tab on the Unit window.
2. On the [Settings - Logical Unit] menu, click [Delete Last Logical Unit].



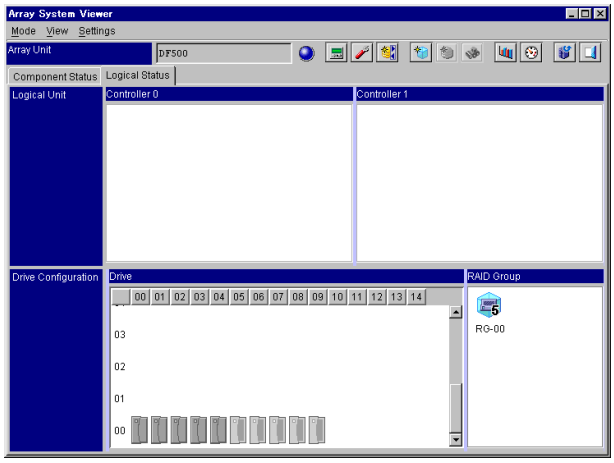
3. A confirmation message is displayed indicating whether last logical units should be deleted or not.
   - When there is no formatted logical unit.



   - When there is a formatted logical unit.



4. Click the [OK] button, and last logical units will be deleted. When the last logical units have been deleted, the user data in the logical units will be lost.
   The logical unit information in which the last logical unit has been deleted is updated and the window is displayed.



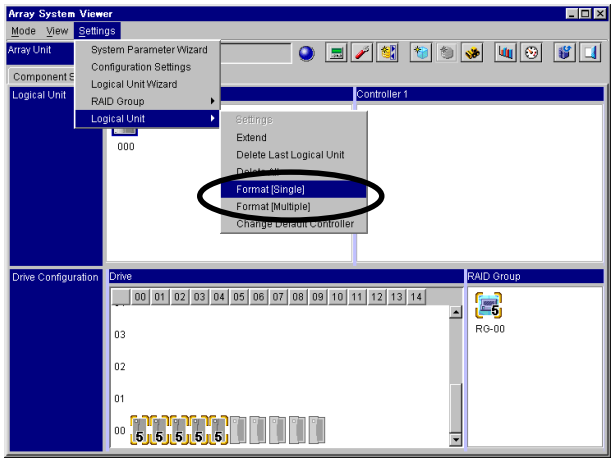
4.3.7 Formatting logical unit

The execution method of formatting is divided into two modes.

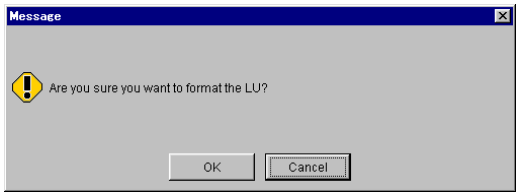
- Format (single)
  Specified logical units are formatted one by one and the progress of the formatting is displayed.
- Format (multiple)
  If multiple logical units are specified, up to six logical units are formatted concurrently, and the progress of formatting is displayed.
  When the logical units are configured for each drive, the time required for the formatting is reduced by 30 to 50 (%).

INPORTANCE : When formatting an logical unit whose logical unit capacity is less than 100,000 (blocks), formatting may terminate abnormally. When formatting an logical unit whose logical unit capacity is 100,000 (blocks), select [Format (single)].

1. Click the icon of a logical unit on the Unit window. And then select [Settings - Logical Unit] menu, click [Format[Single]] or [Format[Multiple]].
   When you select multiple logical units, holding down the [Ctrl] key, clicks the icons of logical units which to format.

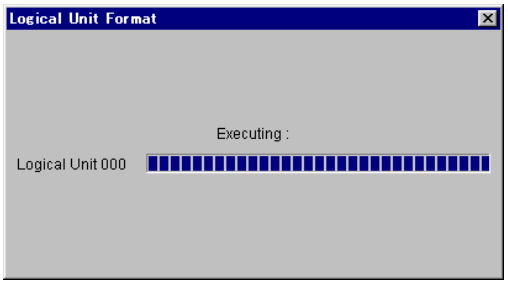


2. A confirmation message appears to confirm whether the selected logical units may be formatted or not.

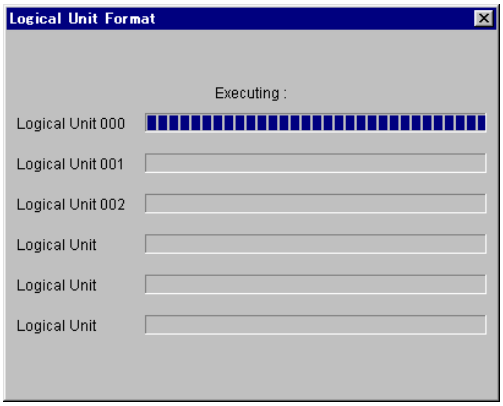


INPORTANCE : When a specified logical unit is formatted, the user data within the specified logical unit is lost. When incorrectly specifying an logical unit, press the [Cancel] button and redo processing by selecting an logical unit to be reformatted.

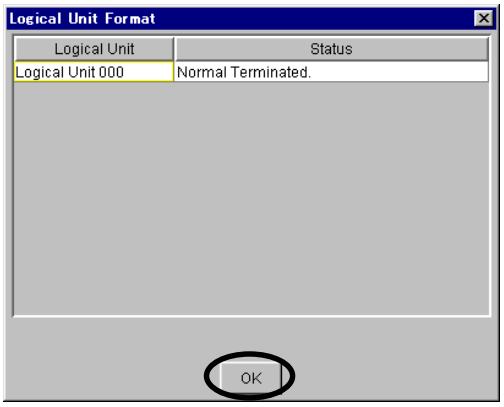
3. Click the [OK] button to format the specified logical units.
   - When [Format(Single)] is specified
     The logical unit number being formatted of execution progress are displayed for the specified logical unit. The progress status indication is renewed every 10 seconds.



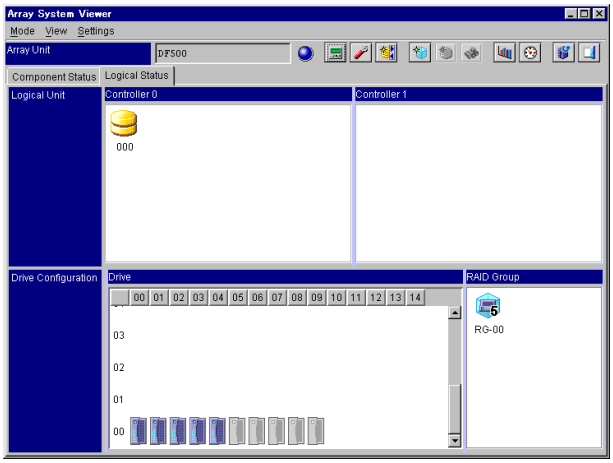
   - When [Format (Multiple)] is specified
     The logical unit number being formatted of the formatting are displayed for the specified logical unit. The progress of the formatting is renewed every 10 seconds.
     When multiple logical units are specified, up to 6 logical units are formatted in the order starting with the smallest logical unit number and the progress of the formatting is displayed. After one logical unit is formatted, the next logical unit is formatted and the progress of the formatting is displayed.



4. When a message is displayed indicating that the specified logical unit has been formatted, click the [OK] button.



If formatting is terminated abnormally, see the contents of the result.
The formatted logical unit information is updated and then the window is displayed.

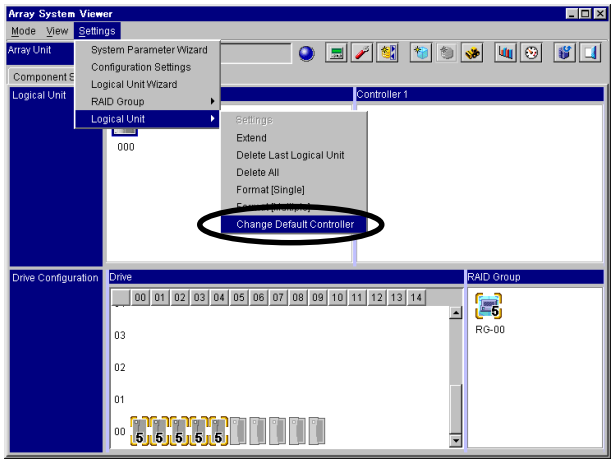


Displayed	Action to be taken
'02-xxxx', '03-xxxx', '04-xxxx' or '0B-xxxx'	For the above code, a hardware fault is assumed. If the fault is not recovered after re-execution, contact our company.
'05-xxxx'	For the above code, an operation error is assumed. Upon checking the following items and re-execute processing. If the error is not recovered, contact our company.
'05-2500' or '05-2581'	Is logical unit 0 defined?
'05-2600'	In spite of none of drive mounted states, is ALL RAID specified and is an logical unit specified for ALL CAPA formatted?
'05-2580'	Is an attempt made to define an logical unit exceeding the capacity of the defined RAID group?
'0B-FD01'	Switching of a controller in charge of an logical unit occurred during formatting. Check the controller in charge and re-execute formatting from the controller in charge.
'An error occurred in the communication with an array device.'	The message indicating that 'An error occurred in the communication with an array device.' at the time when selecting [Formatting (single)] is output since the progress window cannot be displayed due to the interface failure between the array disk management program and a device. For logical unit formatting, only the logical unit being executed is continuously formatted.

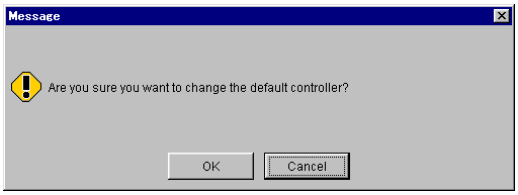
4.3.8 The Change of the Controller in Charge of a Default LU

SUPPLEMENT : The change of the controller in charge of a default LU can be used only for the dual active mode configuration of a dual system.

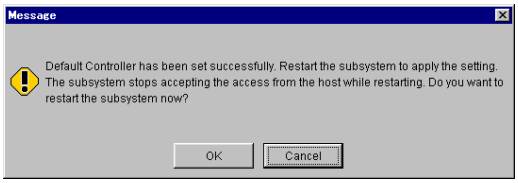
1. Click the last logical unit in the Unit window. And then select [Settings - Logical Unit] menu, click [Change Default Controller].



A confirmation message is displayed indicating whether default controller in charge of an logical unit should be changed or not.

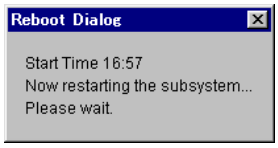


2. Click the [OK] button, and default controller in charge of an logical unit will be changed.
3. A message indicating that the default controller with which an logical unit is connected has been changed. A confirmation message indicating a request for restarting is displayed, so clicks the [OK] button when restarting.



To validate the setup default controller of an logical unit, restart the array unit. The previous setting stays valid until restarting. When restarting is initiated, the array unit is not ready to accept an access from the host for duration from initiation until the restarting terminates. Therefore, after making sure that the host has stopped accessing, initiate restarting.

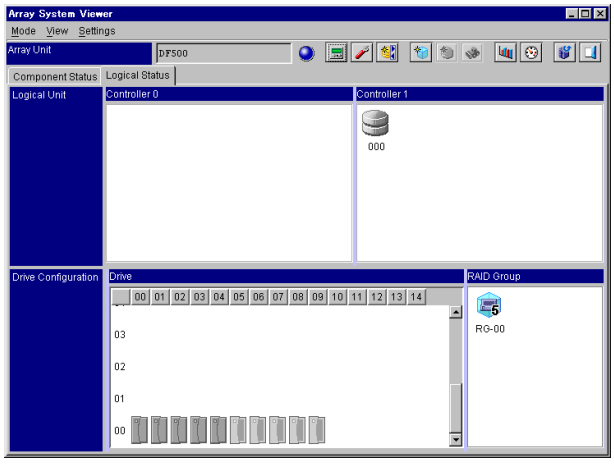
When instruction to restart an array unit, the time the restarting has began is displayed. The restarting takes about two to six minutes.



SUPPLEMENT : It may take time for an array unit to respond, depending on the condition of the array unit. If it does not still respond after 10 minutes or more pass, check the condition of the array unit.

4. A message indicating that the restarting has terminated is displayed, so clicks the [OK] button.

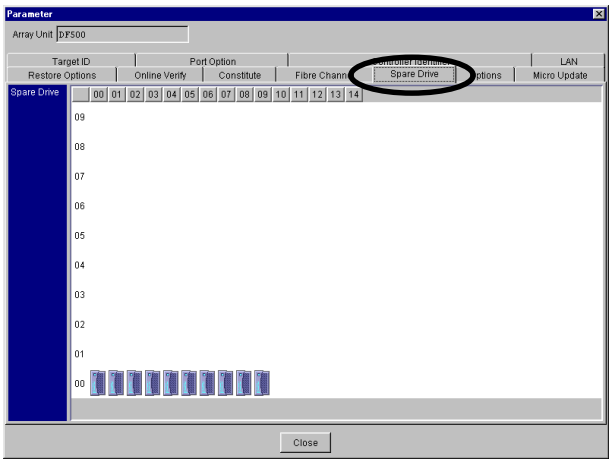
When clicking the [OK] button, the unit window is closed. To perform other operations, select again on the main window an array unit which to operate, and open the unit window.
When not restarting, logical unit information, in which the default controller of an logical unit has been changed, is displayed on the window after being updated.



SUPPLEMENT : Execution of a switching of the default controller controlling the logical unit changes the default controller currently displayed. When the switching is continuously executed twice, the specified controller is changed to the original default controller controlling the logical unit.

4.3.9 Setting Spare Disk

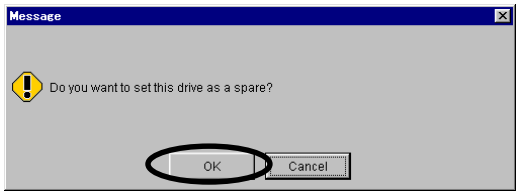
1. On the [Settings] menu, click [Configuration Settings]. Or, click the [Configuration Settings] in the tool bar.



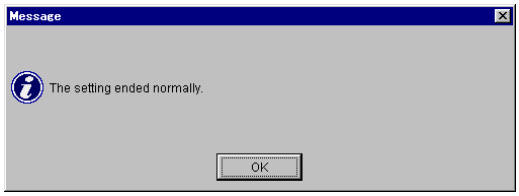
2. To setup the spare drive, double-click the icon of the HDU to be setup as a spare drive.

INPORTANCE :HDUs that can be set to a spare drive are data disk drives for which an RAID group is not yet defined, excluding HDUs 0 and 1 in Unit 0.

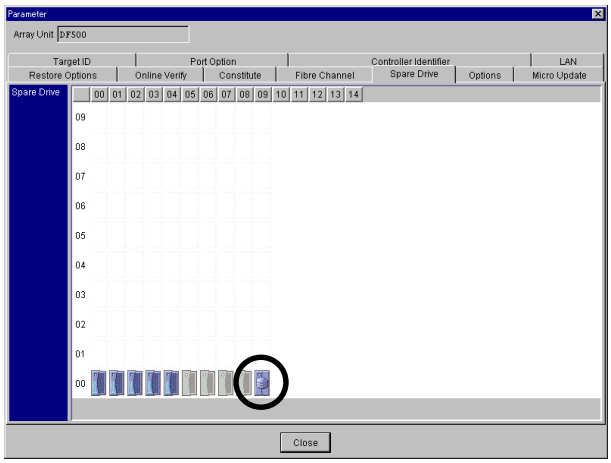
3. The confirmation message for spare drive setup is displayed. Click the [OK] button.



4. A message indicating completion of setting is displayed, click the [OK] button.

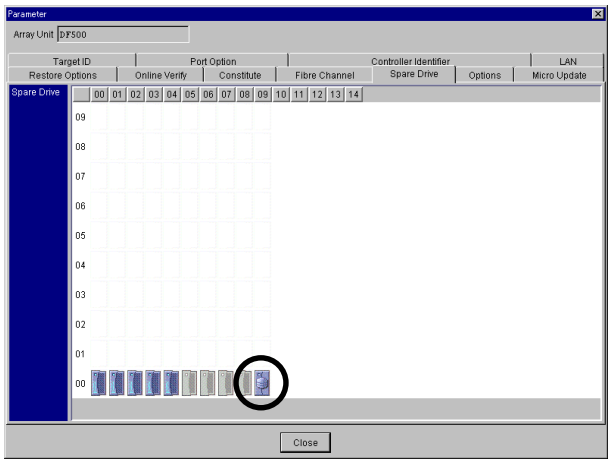


The icon of the HDU which is setup is updated and displayed.



4.3.10 Canceling Spare Disk Setting

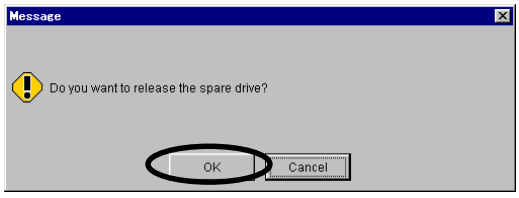
1. On the [Settings] menu, click [Configuration Settings]. Or, click the [Configuration Settings] in the tool bar.
2. To cansel the spare drive setup, click the icon of the HDU to be canceled.



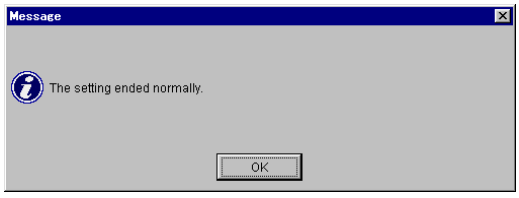
 : Spare disk

 : Data disk

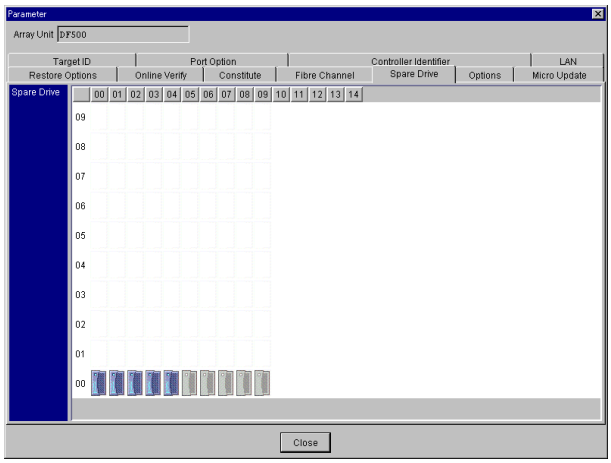
3. The confirmation message for spare drive canceled is displayed. Click the [OK] button.



4. A message indicating completion of setting is displayed, click the [OK] button.



The icon of the HDU which is setup is updated and displayed.

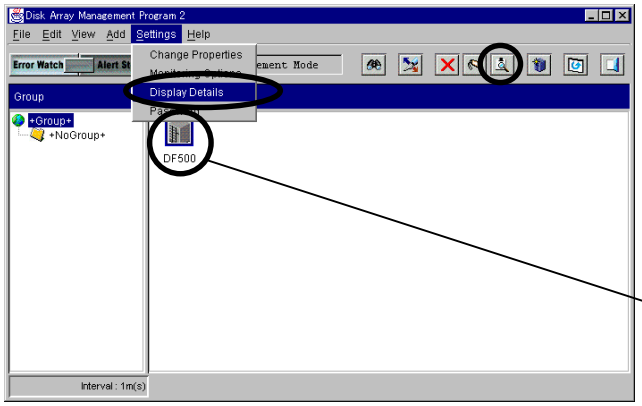


4.4 Setting the Subsystem when Using It in the Special Mode

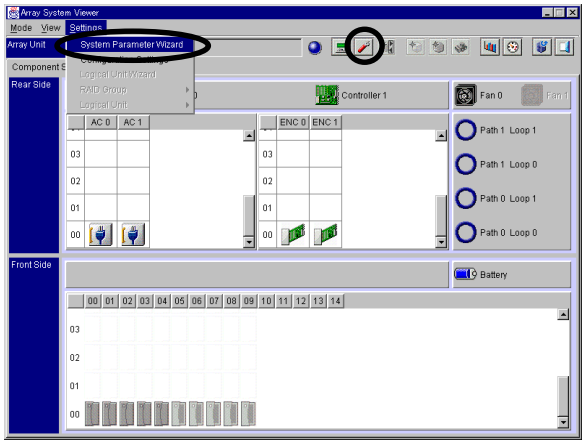
: ‘Setting the subsystem when using it in the special mode’ is referred to trained service personnel only.
The user must not do it.

Set a device from the array disk management program 2. Perform the operation of setting accordance with the following below.

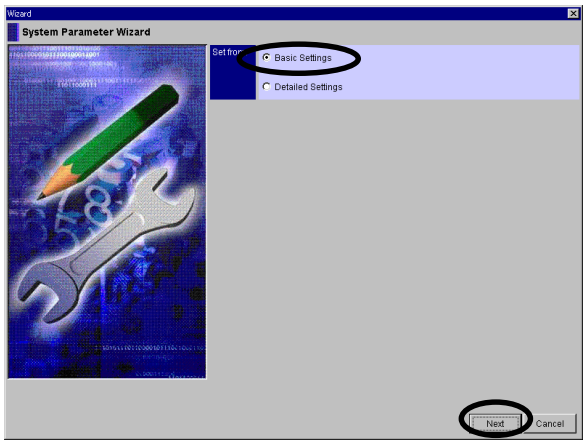
1. Turn on the power supply.
2. Click the icon of an array unit on the Main window, and then select the [Settings menu], click [Display Detailes]. Or, click the [Display Details] in the tool bar.



3. On the [Settings] menu, click [System Parameter Wizard]. Or, click the [System Parameter Wizard] in the tool bar.



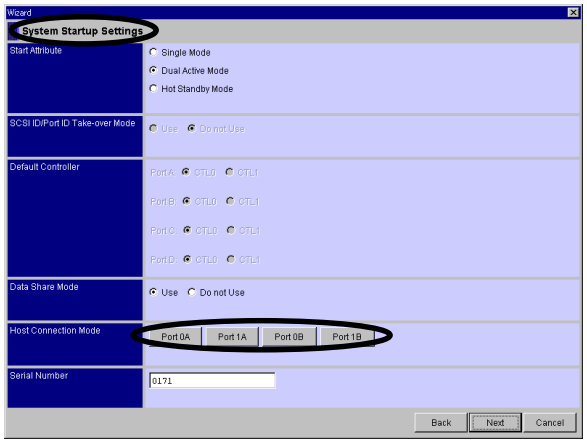
4. Click the [Basic Settings], click the [Next] button.



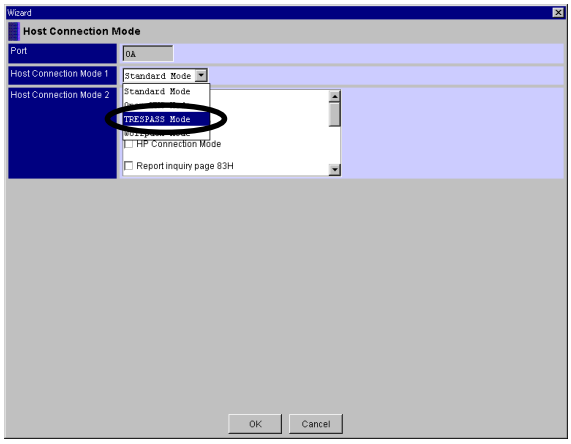
Perform the operation corresponding to a model to be set.
For detailed operation, see the following.

- When using the I/O bus switching function in Sequent NUMA-Q connection

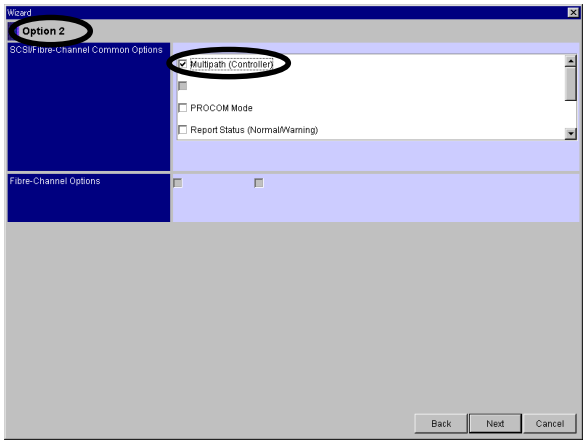
1. On [System Startup Settings], click the port set in the [Host Connection Mode].



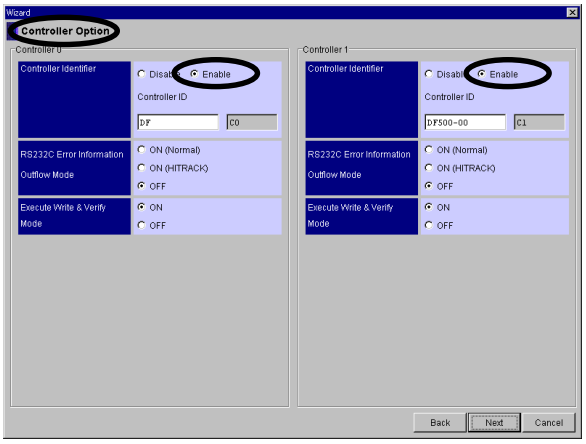
2. Select the [TRESPASS Mode] in the [Host Connection Mode 1].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [Option 2] is displayed.
5. After [Option 2] is displayed and click the [Multipath (Controller)] in the [SCSI/Fibre-Channel Common Options].



6. Click the [Next] button until [Controller Option] is displayed.
7. After [Controller Option] is displayed and click [Enable] in the [Controller Identifier].
   If nothing is input to a [controller ID], ‘DF500-00’ (default value) is reported.
   A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.

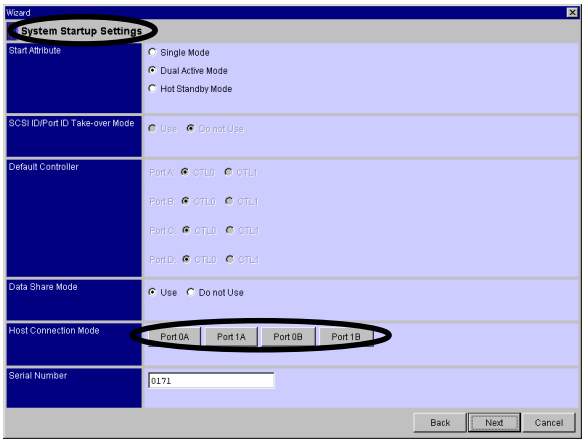


8. Click the [Next] button unitl [System Parameter Setting Completed] is displayed.
9. Backup the device setting.

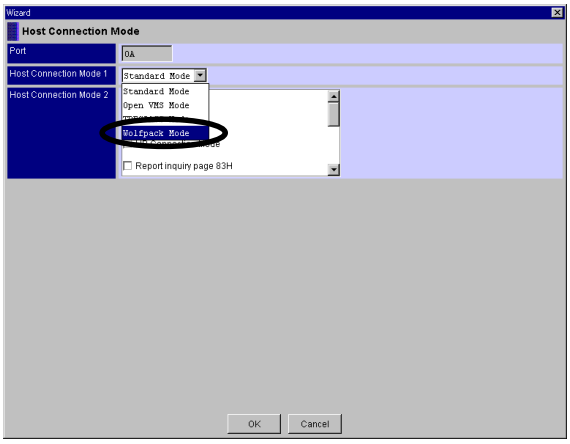
REFERENCE : Refer to page 66.

- Using in the WolfPack Mode

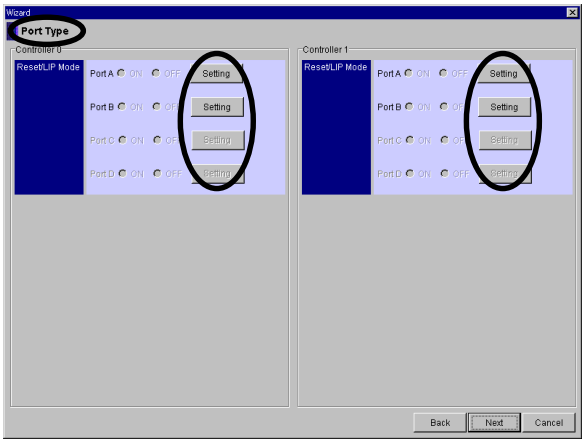
1. On [System Startup Settings], click the port set in the Host Connection Mode].



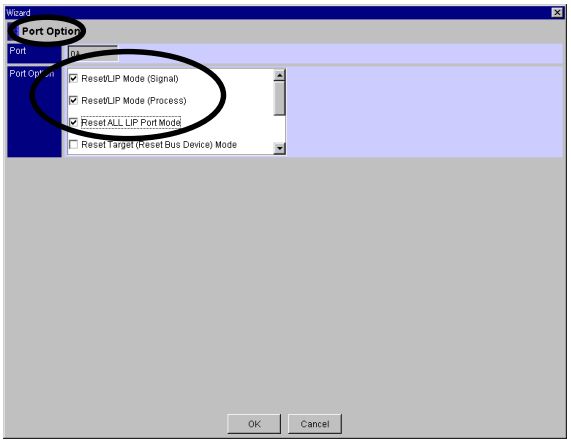
2. Select the [Wolfpack Mode] in the [Host Connection Mode 1].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [Port Type] is displayed.
5. After [Port Type] has been displayed, select the port set and click the [Setting] button.



6. Select [Reset/LIP Mode (Signal)], [Reset/LIP Mode (Process)] and [Reset ALL LIP Port Mode] of the [Port Option].

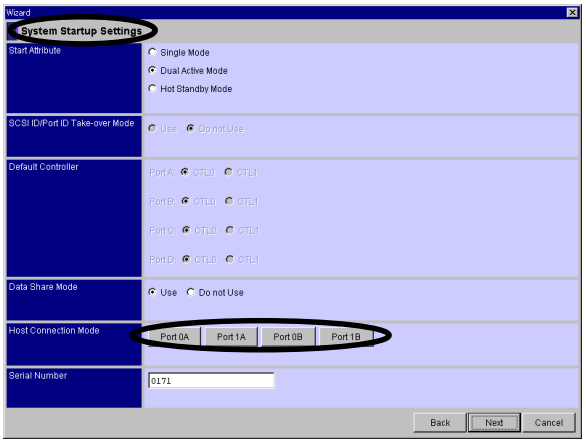


7. Click the [OK] button. Return to [Port Type].
8. Click the [Next] button until [System Parameter Setting Completed] is displayed.
9. Backup the device setting.

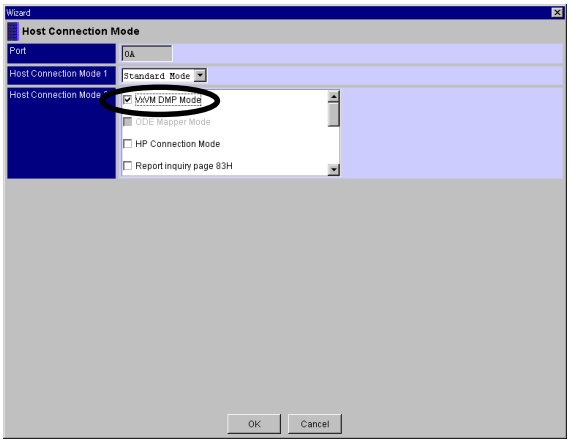
REFERENCE : Refer to page 66.

- When the VxVM DMP is used on the host side (When the VxVM V2.6/2.6.1 is used)

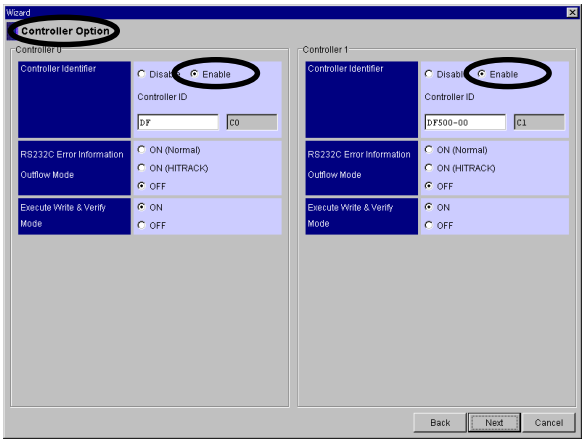
1. On [System Startup Settings], click the port set in the [Host Connection Mode].



2. Select the [VxVM DMP Mode] in the [Host Connection Mode 2].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [Controller Option] is displayed.
5. After [Controller Option] is displayed and click [Enable] in the [Controller Identifier].
   If nothing is input to a [controller ID], ‘DF500-00’ (default value) is reported.
   A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.

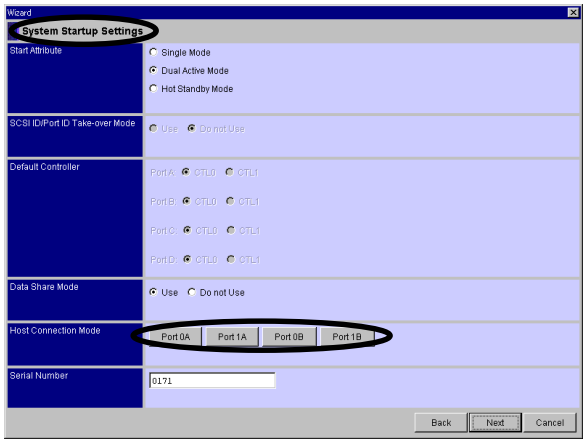


6. Click the [Next] button unitl [System Parameter Setting Completed] is displayed.
7. Backup the device setting.

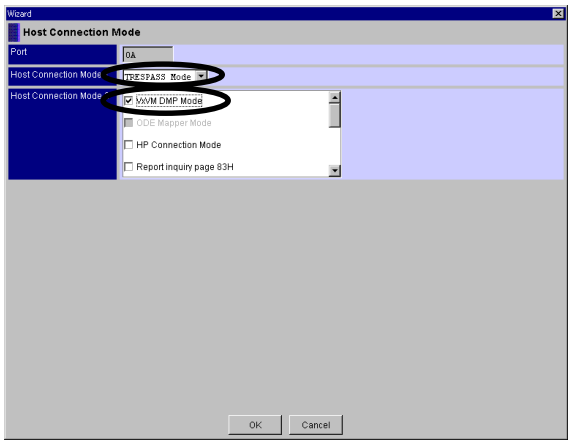
REFERENCE  : Refer to page 66.

- When the VxVM DMP is used on the host side (When VxVM V3.0.1 is used)

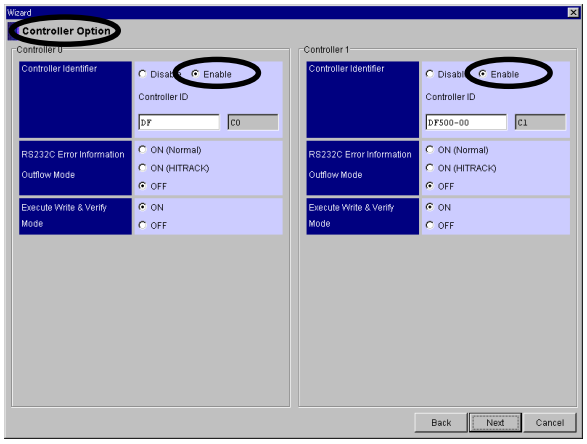
1. On [System Startup Settings], click the port set in the [Host Connection Mode].



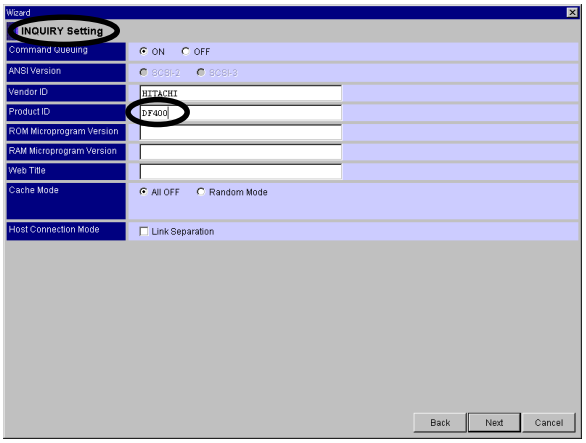
2. Select the [TRESPASS Mode] in the [Host Connection Mode 1].
   Select the [VxVM DMP Mode] in the [Host Connection Mode 2].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [Controller Option] is displayed.
5. After [Controller Option] is displayed and click [Enable] in the [Controller Identifier].
   If nothing is input to a [controller ID], 'DF500-00' (default value) is reported.
   A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.



6. Click the [Back] button until [INQUIRY Setting] is displayed.
7. When [INQUIRY Setting] is displayed, enter ‘DF400’ in [Product ID].

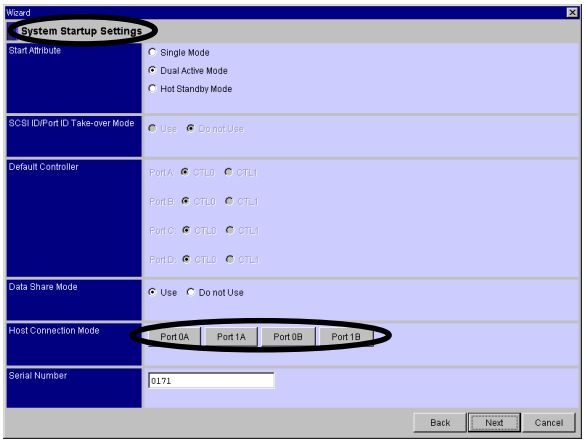


8. Click the [Next] button until [System Parameter Setting Completed] is displayed.
9. Backup the device setting.

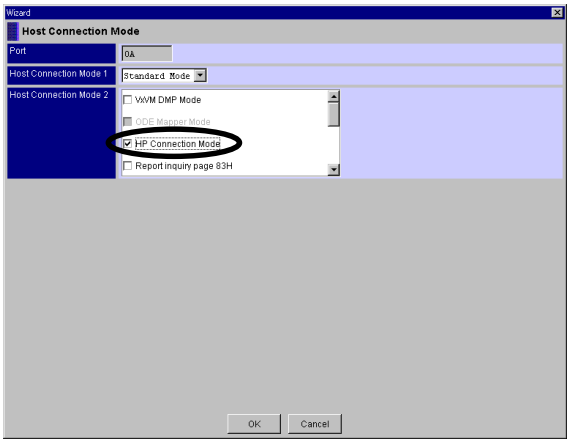
REFERENCE : Refer to page 66.

- When the HP Host Board Adapter is connected

1. On [System Startup Settings], click the port set in the [Host Connection Mode].



2. Select the [HP Connection Mode] in the [Host Connection Mode 2].

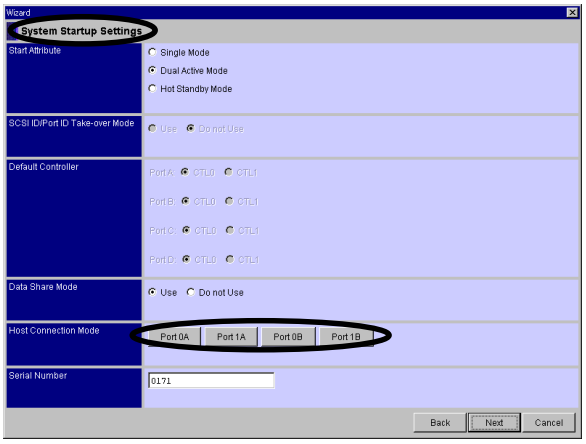


3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [System Parameter Setting Completed] is displayed.
5. Backup the device setting.

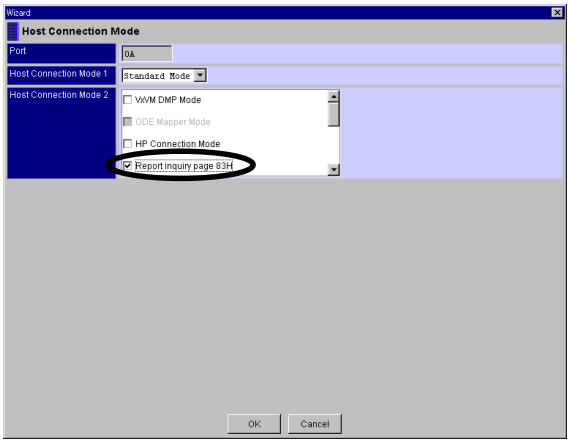
REFERENCE : Refer to page 66.

- When using the HITACHI pass manager

1. On [System Startup Settings], click the port set in the [Host Connection Mode].



2. Select the [Report inquiry page 83H] in the [Host Connection Mode 2].

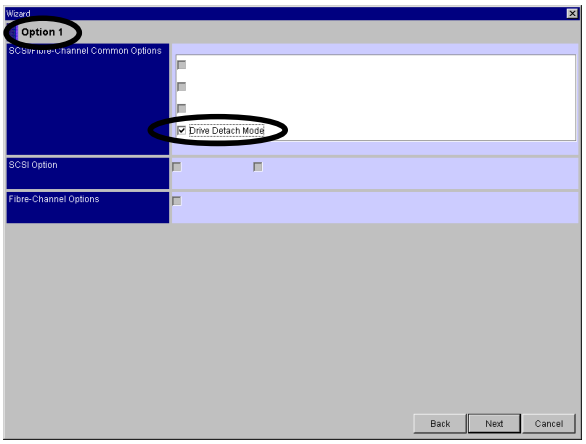


3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [System Parameter Setting Completed] is displayed.
5. Backup the device setting.

REFERENCE : Refer to page 66.

- When using the subsystem in LU blockade mode

1. Click the [Next] button until [Option 1] is displayed.
2. After [Option 1] has been displayed, click the [Drive Detach Mode] in the [SCSI/Fibre-Channel Common Options].

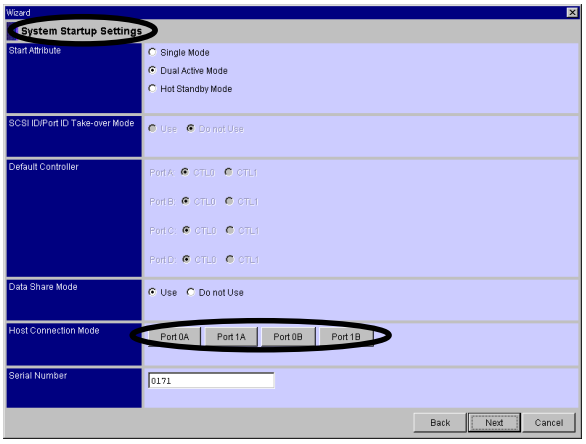


3. Click the [Next] button until [System Parameter Setting Completed] is displayed.
4. Backup the device setting.

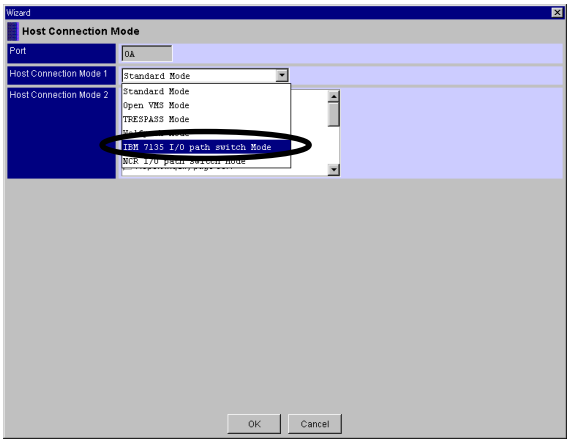
REFERENCE : Refer to page 66.

- When using IBM7135 I/O path switching function

1. On [System Startup Settings], click the port set in the [Host Connection Mode].

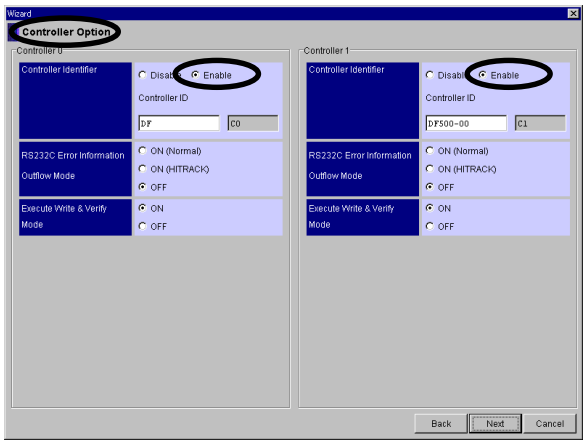


2. Select the [IBM 7135 I/O path switch Mode] in the [Host Connection Mode 1].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [Controller Option] is displayed.

5. After [Controller Option] is displayed and click [Enable] in the [Controller Identifier].
   If nothing is input to a [controller ID], ‘DF500-00’ (default value) is reported.
   A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.

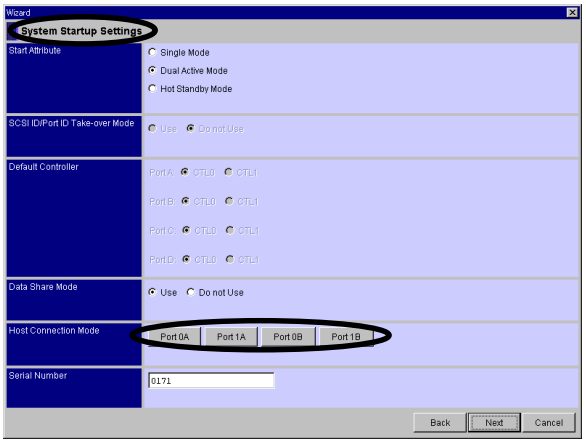


6. Click the [Next] button unitl [System Parameter Setting Completed] is displayed.
7. Backup the device setting.

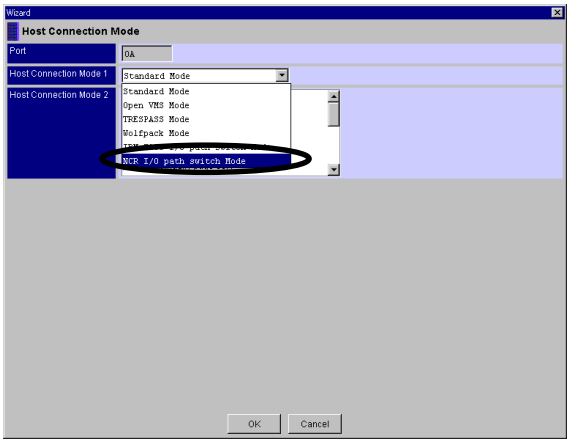
REFERENCE : Refer to page 66.

- When using NCR I/O path switching function

1. On [System Startup Settings], click the port set in the [Host Connection Mode].

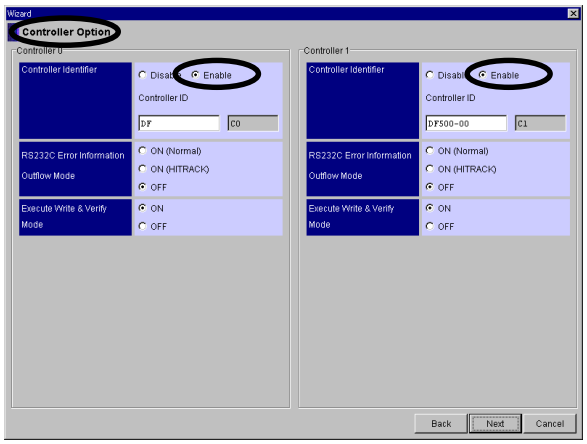


2. Select the [NCR I/O path switch Mode] in the [Host Connection Mode 1].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [Controller Option] is displayed.

5. After [Controller Option] is displayed and click [Enable] in the [Controller Identifier].
   If nothing is input to a [controller ID], ‘DF500-00’ (default value) is reported.
   A controller identifier needs to be set every device. When connecting only one device under control of a host computer, a default value can be used as is. From the second host computer, the controller identifier needs to be changed.

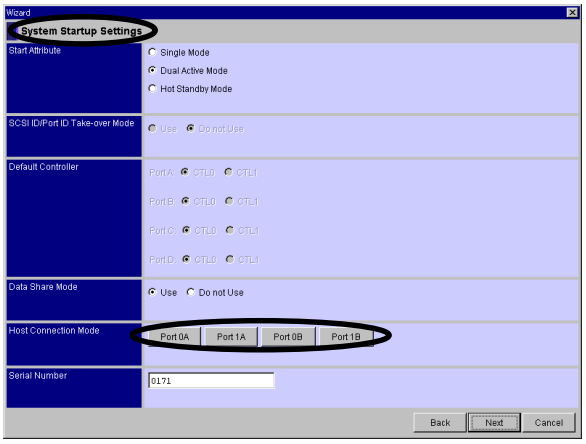


6. Click the [Next] button unitl [System Parameter Setting Completed] is displayed.
7. Backup the device setting.

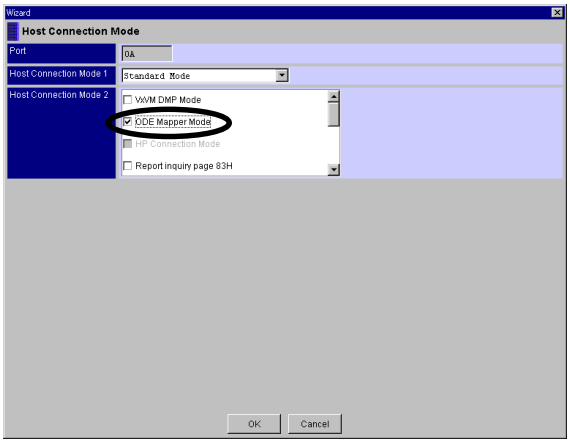
REFERENCE : Refer to page 66.

- When using the subsystem in ODE Mapper mode

1. On [System Startup Settings], click the port set in the [Host Connection Mode].



2. Select the [ODE Mapper Mode] in the [Host Connection Mode 2].

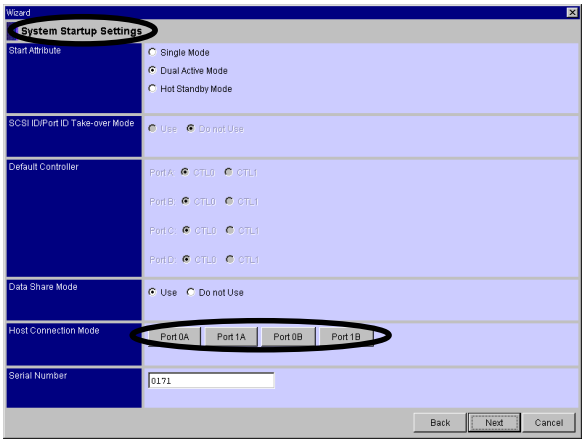


3. Click the [Next] button until [System Parameter Setting Completed] is displayed.
4. Backup the device setting.

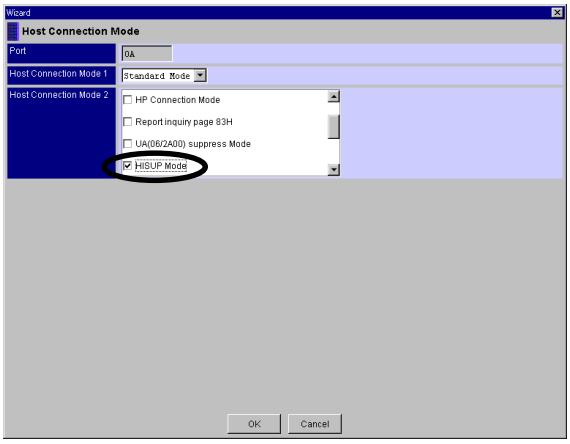
REFERENCE : Refer to page 66.

- When making nine or more LUs recognized by using Qlogic HBA on Windows 2000/NT

1. On [System Startup Settings], click the port set in the [Host Connection Mode].



2. Select the [HISUP Mode] in the [Host Connection Mode 2].

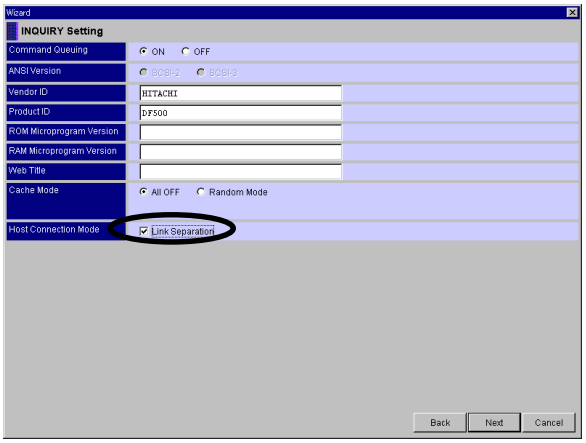


3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [System Parameter Setting Completed] is displayed.
5. Backup the device setting.

REFERENCE : Refer to page 66.

- When using HACMP or I/O path switching function in the host (AIX) connection

1. Click the [Next] button until [INQUIRY Setting] is displayed.
2. After [INQUIRY Setting] is displayed and click the [Link Separation] in the [Host Connection Mode].

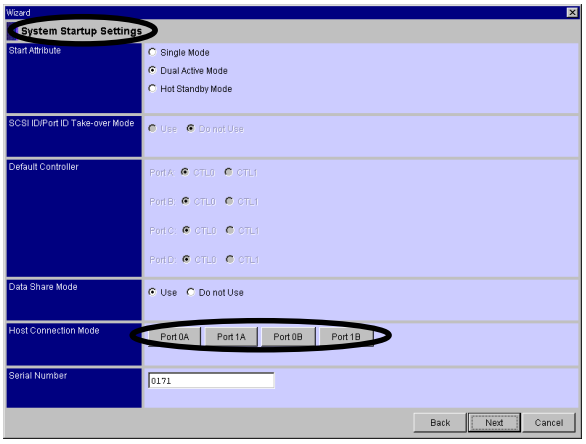


3. Click the [Next] button until [System Parameter Setting Completed] is displayed.
4. Backup the device setting.

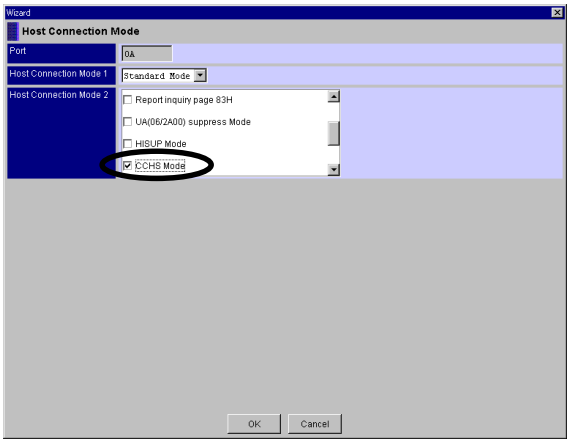
REFERENCE : Refer to page 66.

- When the subsystem is used being connected to Hitachi 3050

1. On [System Startup Settings], click the port set in the [Host Connection Mode].



2. Select the [CCHS Mode] in the [Host Connection Mode 2].



3. Click the [OK] button. Return to [System Startup Settings].
4. Click the [Next] button until [System Parameter Setting Completed] is displayed.
5. Backup the device setting.

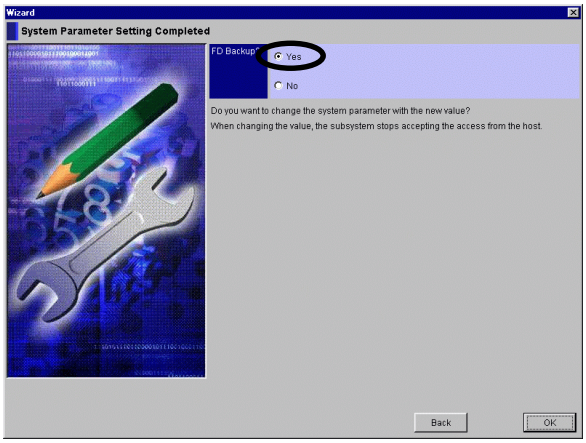
REFERENCE : Refer to page 66.

Backup procedure

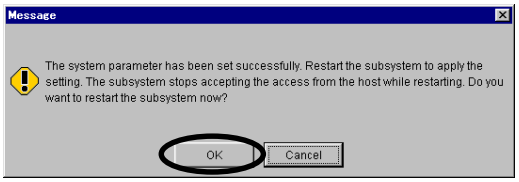
INPORTANCE :When you modified the setting, select [Yes] to ensure the FD to be backed up.

1. Set the [FD Backup].
   [Yes] : Executes the backup.
   [No] : Inhibit the backup.
   Then, click the [OK] button.

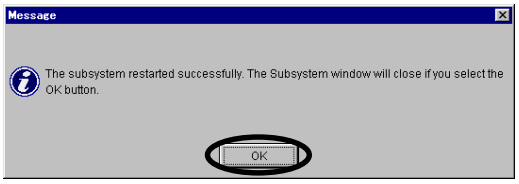
INPORTANCE :The system parameters information is saved on the backup FD in the array unit. When the setting is changed, it is necessary to save the system parameters information once again. Be sure to select [Yes].



2. When terminated set the system parameters, then following window is displayed. Click the [OK] button.



3. Restarting the subsystem.



Chapter 5 When You Are in Difficulty

5.1 Before Using the WEB

: 'Before using the WEB' is referred to trained service personnel only. The user must not do it.

5.1.1 Operational Environment

The operating environment where is able to use WEB is shown below. The operating environment is shown below.

Table 5.1-1 The Operating Environment

No.	Item	Description
1	OS	Microsoft Windows 95, 98, 2000/NT 4.0, ME Solaris2.6, AIRIX6.4
2	PC	Pentium (Pentium Ⅱ (233 MHz or more) is recommended), Memory 40 Mbytes or more (64 Mbytes or more is recommended or more)
3	WS	Turbo Sparc 170 M Hz, Memory 256 Mbytes or more R10000 195 M Hz, Memory 128 Mbytes or more
4	Disk requirement	When a memory dump of 5 Mbytes or more is to be done, a capacity of more than 180 Mbytes/controller is required.

Table 5.1-2 Support Browser

(○ : support ×: Unsupport)

No	Platform	OS	browser	Ver(*1)	Micro Rev. (*1)				
					0552 0552/A	05×3	05×4/B	05×5/C 05×6 05×7	After 05×8
1	WS	IRIX	Netscape Navigator	4.7	○	○	○	○	○
				4.76	×	×	×	○	○
		Solaris 2.6	Netscape Navigator	4.7	○	○	○	○	○
				4.76	×	×	×	○	○
2	PC	windows	Internet Exploror	5.0	○	○	○	○	○
				5.5(*2)	×	×	○	○	○
			Netscape Navigator	4.7	○	○	○	○	○
				4.75	×	×	×	×	○
				4.76	×	×	×	×	○

*1 : Throughout a table the nonexistent version is an unsupport.

*2 : Service Pack1 is included.

5.1.2 Characteristics of Network Functions

- LAN interface
  The connector for 10Base-T/100Base-TX is equipped with the controller. 10Base-T/100Base-TX is selected automatic.
- IP Address setting function by arp
  The IP Address setting function by the arp/ping command can be used. The IP Address setting function by arp/ping is limited to only when the IP Address is not changed from the factory setting value.
- Network parameter
  DF500 is having the following network parameter and can change/set up from the WEB browser/Disk array control program.

Table 5.2 Network Parameter

Network parameter	Description	Factory setting value
DHCP	Enable/Disable of the DHCP function is set up.	Disable
IP Address (***Note 1***)	The IP Address is changed/set up.	192.168.0.16
Subnet Mask	The Subnet Mask is changed/set up.	255.255.255.0
Default Gateway	The Default Gateway is changed/set up.	—

Note 1 : Please manage the IP Address after the change certainly, if the IP Address is changed from the IP Address of factory setting.

5.1.3 Connecting to Network

1. Connection to the network

- LAN connector position
  Please connect the LAN cable with the LAN connector that was shown in the figure. (see figure 5.1)

2. Setting/change of the network parameter
   The setting/change of the network parameter is possible with the following method.
   - Setting of the IP Address by arp/ping
   - Setting of the network parameter by the WEB browser

- Setting of IP Address by arp/ping

: The IP Address setting by arp/ping is limited to only when the IP Address of the device is not changed from the factory setting value (192.168.0.16) to prevent the change of the IP Address that is not planned.

Setting of the IP Address by the arp/ping command from Windows 98, ME, 2000, Windows NT 4.0

The IP Address can be set up by the arp/ping command in accordance with the following procedure.

1. Execute the command below following the MS-DOS prompt of the Windows PC connected to the same network segment to which the subsystem is connected.

```
arp   -s   IP address   Physical address
ping   IP address
```

   - IP address : The IP Address where you want to set up to the device.
   - Physical address : The Physical Address where it is displayed with the label of the Controller is divided to the units of 2 column with '-' and used.

   Example : When IP Address 192.168.15.64 is set up to the Controller of the Physical Address 00:00:87:12:34:56 (when there are 192.168.15.32 devices in the same network segment)

```
arp   -s   192.168.15.64  00-00-87-12-34-56
ping   192.168.15.64
```

2. If the message such as 'Reply from 192.168.15.64...' comes back from the device the IP Address is set up normally.
3. In order to fix the IP Address, sequentially shutdown the subsystem once, wait for one minute, and then restart it.

Setting of the IP Address by the arp/ping command from Windows 95

The IP Address can be set up by the arp/ping command in accordance with the following procedure.

1. Execute the command below following the MS-DOS prompt of the Windows PC connected to the same network segment to which the subsystem is connected.

```
ping   An IP address of other LAN device on the same network segment
arp   -s   IP address   Physical address
ping   IP address
```

- IP address : The IP Address where you want to set up to the device.
- Physical address : The Physical Address where it is displayed with the label of the Controller is divided to the units of 2 column with '-' and used.

Example : When IP Address 192.168.15.64 is set up to the Controller of the Physical Address 00:00:87:12:34:56 (when there are 192.168.15.32 devices in the same network segment)

```
ping   192.168.15.32
arp   -s   192.168.15.64  00-00-87-12-34-56
ping   192.168.15.64
```

2. If the message such as 'Reply from 192.168.15.64...' comes back from the device, the IP Address is set up normally.
3. In order to fix the IP Address, sequentially shutdown the subsystem once, wait for one minute, and then restart it.

Setting of the IP Address by the arp/ping command from UNIX

The IP Address can be set up by the arp/ping command in accordance with the following procedure.

1. Execute the command below following the UNIX machine connected to the same network segment to which the subsystem is connected.

```
arp   -s   IP address   Physical address temp
ping   IP address
```

- IP address : The IP Address where you want to set up to the device.
- Physical address : The Physical Address where it is displayed with the label of the Controller is divided to the units of 2 column with ':' and used.

Example : When IP Address 192.168.15.64 is set up to the Controller of the Physical Address 00:00:87:12:34:56 (when there are 192.168.15.32 devices in the same network segment)

```
arp   -s   192.168.15.64  00:00:87:12:34:56   temp
ping   192.168.15.64
```

2. If the message such as 'Reply from 192.168.15.64...' comes back from the device, the IP Address is set up normally.
3. In order to fix the IP Address, sequentially shutdown the subsystem once, wait for one minute, and then restart it.

- Setting of the network parameter by the WEB browser

INPORTANCE :The network addresses for both controllers are possible set up from the one side Controller as dual Controller configuration.

1. Please change the Controller to the Maintenance Mode after pushing the SRST switch of the Controller that LAN cable was connected.
   Wait for a while (about ten seconds) and press the SRST switch of the Controller#1 immediately (within ten seconds) after the FAIL LED (red) of the Controller#0 comes on. (Sometimes the buzzer may beeps when the SRST switch is pressed, however, you do not have to stop it until these operations are completed.)
   Please change both Controllers to the Maintenance Mode as dual system configuration. (see figure 5.1)
2. Please input the IP Address of the Controller where was connected with the LAN cable to [Address] of the WEB browser. Please input the IP Address of one Controller as the dual system configuration. The network parameters of both controllers can be set up from one Controller. (see figure 5.2)
3. Please click 'Network'. (see figure 5.3)
4. The item regarding Network is displayed. Please click [Change] for the setting. Please click [Back] of the browser for the unsetting. (see figure 5.4)
5. Please set up/select the corresponding item (DHCP, IP Address, Subnet Mask, Default Gateway) that is set up from the pull-down menu or input them.
   At this time, please set up/select the item that is set up all. (see figure 5.5)
6. Please click [Set] button after setting completion. (see figure 5.6)
7. The screen that displayed the setting contents is displayed.
   Please click [Save] if setting is correct. Please click [Resume], if the setting contents are changed. (see figure 5.7)
8. If [Resume] is clicked, it returns to the setting window of before.
   If [Save] is clicked, the window is displayed. (see figure 5.8)
9. The window is displayed at the later time for a while. (see figure 5.9)
   Please click [OK], if the setting is continued. Please click [Cancel], if the setting is stopped. If [Cancel] was clicked, the system parameter is not set up.
10. If [OK] button is clicked, the window is displayed. (see figure 5.10)

When the microprogram is Rev.05x3 or earlier, go to step (16) and subsequent steps after executing step (11). When the microprogram is Rev.05x4 or later, go to step (12) and subsequent steps after executing step (10).

11. If the following window is displayed at the later time for a while, the setting is completion. If [OK] is clicked, it returns to the menu. (see figure 5.11)
12. The following window is displayed when the system parameter setting is completed. Click the [OK] button when you want to backup the system parameters or [Cancel] button when you want to skip the backup and return to menu window. (see figure 5.12)
13. When the [OK] button is clicked, the following window is displayed. Insert the backup FD in the subsystem and click the [OK] button. When you discontinue the backup, click the [Cancel] button to return to the menu window. (see figure 5.13)
14. When the [OK] button is clicked, the following window is displayed. (see figure 5.14)
15. When the following window is displayed after a while, the backup is completed. When the [OK] button is clicked, the window is returned to the menu window. (see figure 5.15)
16. Please click [Go to Normal Mode] to do setting effectively. Please select the [Go to Normal Mode] button of the top or down of the menu window. (see figure 5.16)
17. During execution, the window is displayed. (see figure 5.17)

18. The confirmation message is displayed at the later time for a while. Please click [OK] for the continuation. (see figure 5.18)
19. During execution, the following window is displayed. (see figure 5.19)
20. If the return to the Usually Mode completes, the device becomes the Ready status. Please confirm that READY LED of the device front is lighted. (see figure 5.20)

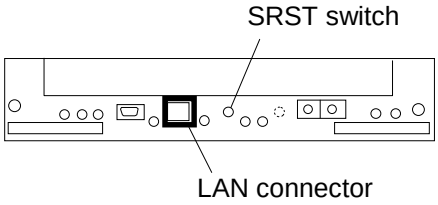


Figure 5.1 LAN Connector

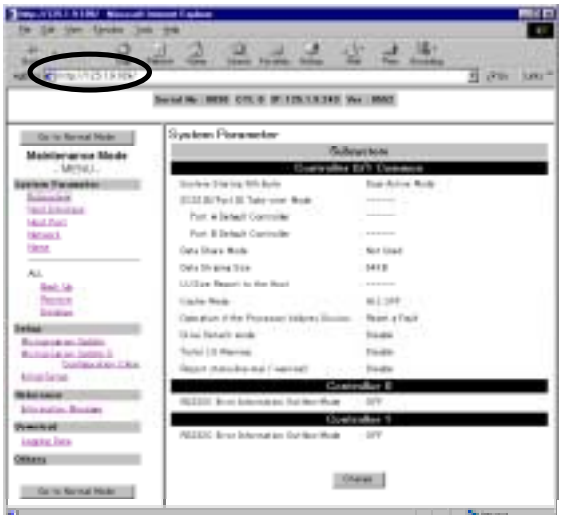


Figure 5.2 WEB Screen (1)

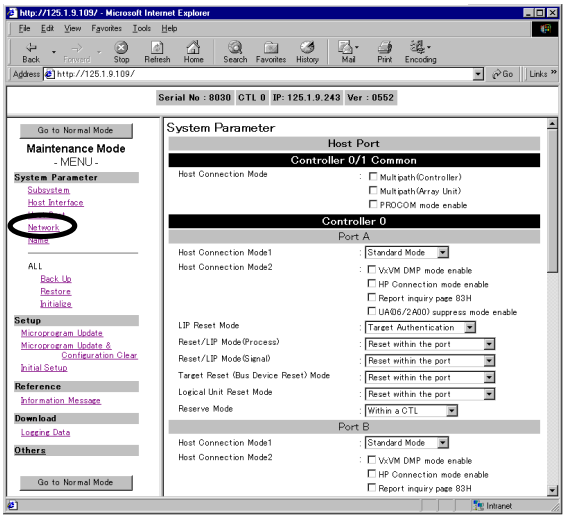


Figure 5.3 WEB Screen (2)

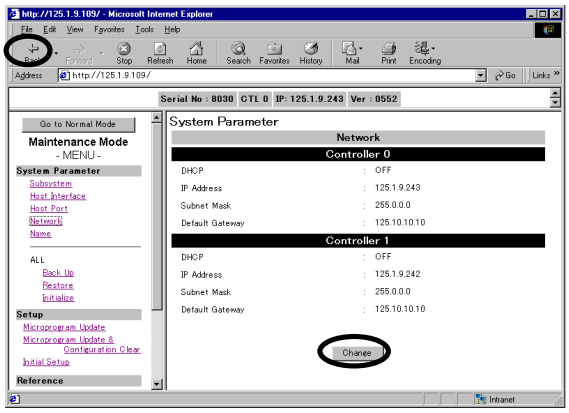


Figure 5.4 WEB Screen (3)

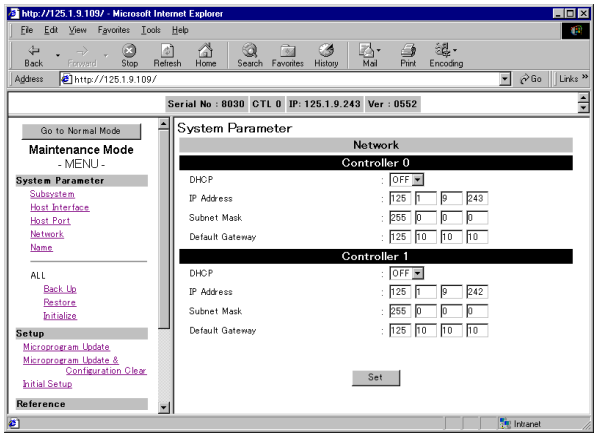


Figure 5.5 WEB Screen (4)

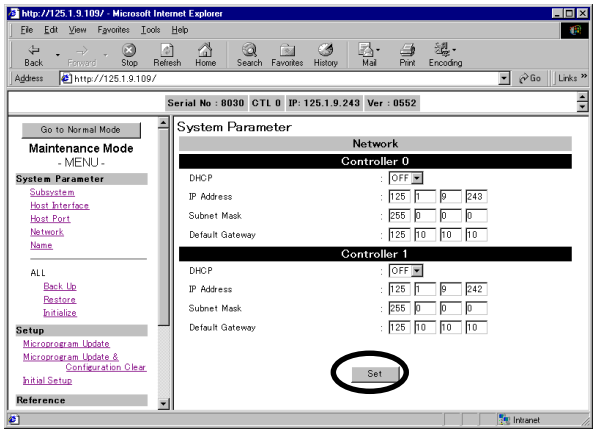


Figure 5.6 WEB Screen (5)

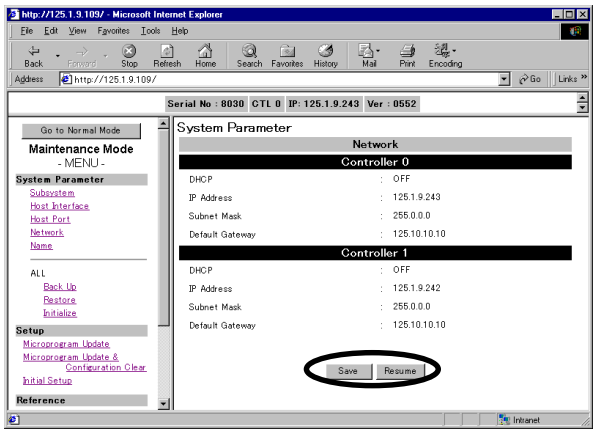


Figure 5.7 WEB Screen (6)

Figure 5.8 WEB Screen (7)

Figure 5.9 WEB Screen (8)

Figure 5.10 WEB Screen (9)

Figure 5.11 WEB Screen (10)

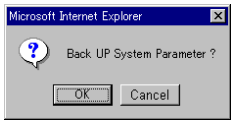


Figure 5.12 WEB Screen (11)

Figure 5.13 WEB Screen (12)

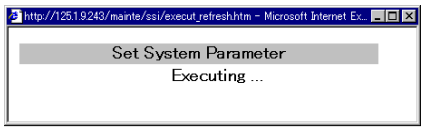


Figure 5.14 WEB Screen (13)

Figure 5.15 WEB Screen (14)

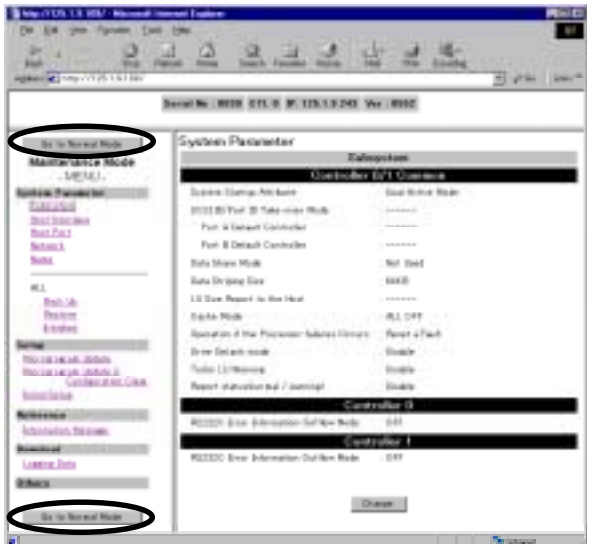


Figure 5.16 WEB Screen (15)

Figure 5.17 WEB Screen (16)

Figure 5.18 WEB Screen (17)

Figure 5.19 WEB Screen (18)

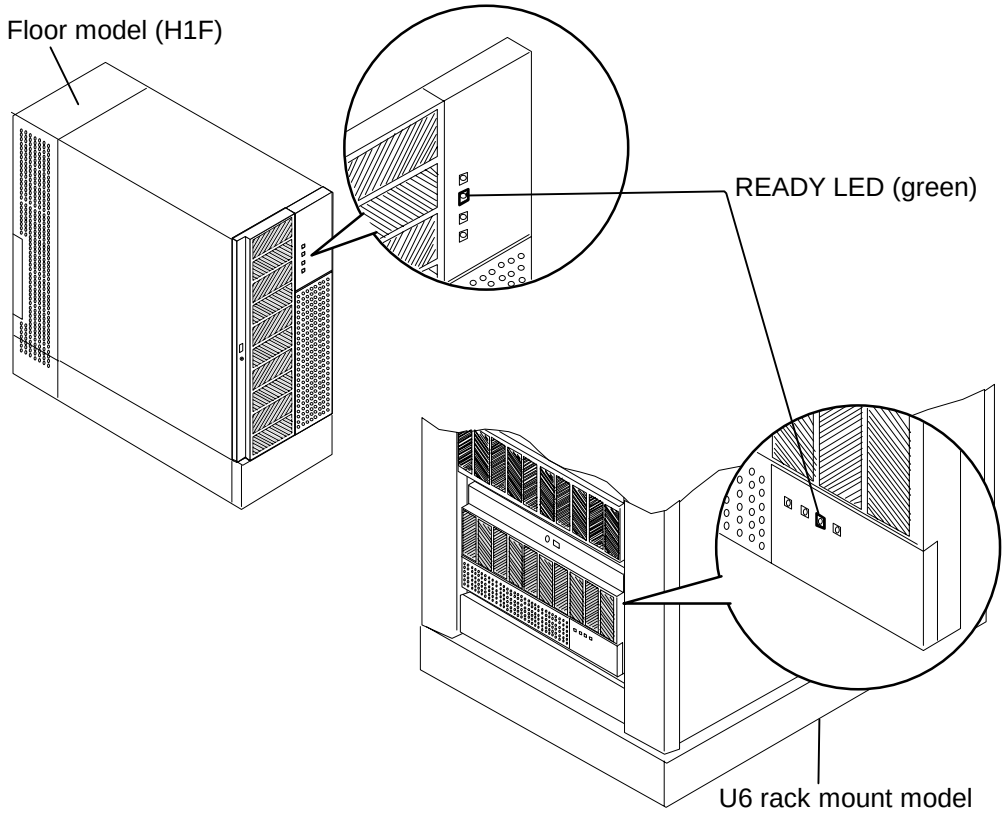


Figure 5.20 READY LED Position

5.2 Operation Procedure in the Normal Mode

MAINTENANCE ENGINEER : 'Operation procedure in the normal mode' is referred to trained service personnel only.
The user must not do it.

5.2.1 How to Place the Subsystem in the Normal Mode

Please change the IP Address of the Controller where it set up to [Address] of the WEB browser, to enter to the Normal Mode.
Please set up the IP Address of the Controller where was connected with the network as the dual system configuration. The status of the devices (both controllers) can be monitored from one controller.
If it is connected, the screen is displayed. (see figure 5.21)

SUPPLEMENT : The 'Warning Information' is displayed by the microprogram revisions 05x3 and later.

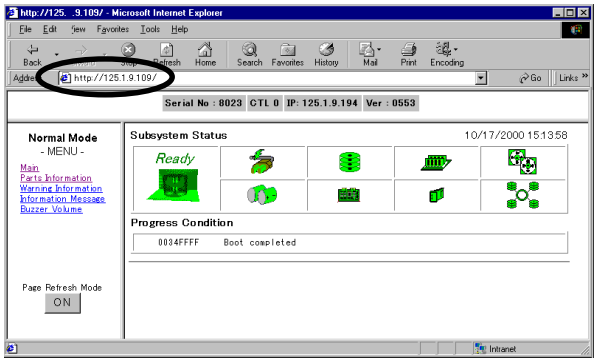


Figure 5.21 WEB Screen (19)

5.2.2 Outline of Screens

If the function of the Normal Mode is shown with the menu form and clicked, the proper function is executed. The main screen outline of the Normal Mode. (see figure 5.22)

- Version frame
  The version frame displays the following information.

  Version
  The version of the Microprogram of the device is shown.

  IP Address
  The IP Address of the controller where it was connected is shown.

- Menu frame
  If the function of the Normal Mode is displayed with the menu frame and clicked, the proper function is executed.

  Main
  The Main screen of the Normal Mode is displayed.

  Parts Information
  The status of the exchange parts is displayed.

  Warning Information
  The fault information that was detected during the status of the device information are displayed.
  The 'Warning Information' is displayed by the microprogram revisions 05x3 and later.

  Information Message
  The fault information that was detected during the device operation and the status of the device information are displayed.

  Buzzer Volume
  The screen that the Buzzer Volume is set up is displayed.

  Page Refresh Mode
  This is the button that sets up on/off of an automatic redisplay function.
  If this is clicked, the mode of on/off changes.
  As the [ON] display : This is not refreshed.
  As the [OFF] display : The screen of the mainframe is refreshed every 5 seconds.
  The refresh time currently (RTC) is displayed on the right top.

SUPPLEMENT : When the PC enters the suspension status during operation while the Page Refresh Mode is set to ON, the Web may not operate correctly after the PC is released from the suspension status. In the case where the Web is connected for the purpose of status monitoring, etc., set the power management of the PC so that the PC should not enter the suspension status.

- Main frame

  Subsystem Status
  The status of the device and the status of the exchange parts are displayed.

  Progress Condition
  The Progress Condition as the device booting is displayed.

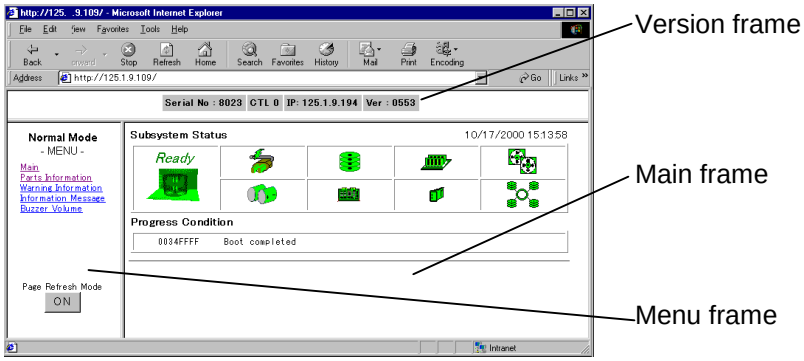


Figure 5.22 WEB Screen (20)

5.2.3 Main Screen in the Normal Mode

The main screen of the mormal mode is consisted of the patrol lamp, the summary of exchange parts status, the progress condition display box.
The patrol lamp shows the status of LED (READY (Green), WARNING (Yellow), ALARM (Red)) of the device front.
The progress condition as the device booting is displayed in the progress condition display box.
The summary of exchange part status tells the abnormality of the exchange parts by changing the background of the parts red. The detailed information of the proper parts is displayed by the click of the parts image. (see figure 5.23)

- Page refreshed
  This is the button that sets up on/off of an automatic redisplay function. (see figure 5.23)
  If this is clicked, the mode of on/off changes.
  As the [ON] display : This is not refreshed.
  As the [OFF] display : The screen of the mainframe is refreshed every 5 seconds.
  The refresh time currently (RTC) is displayed on the right top.

- Patrol lamp
  Monitoring the device, the status is displayed. (see Table 5.3)

- Display of progress condition
  The progress condition as the device booting is displayed.

- Summary of exchange parts status
  The condition of the exchange parts is displayed. If the image of the part is clicked, the details of the proper part are displayed. (see Table 5.4 to 5.11)

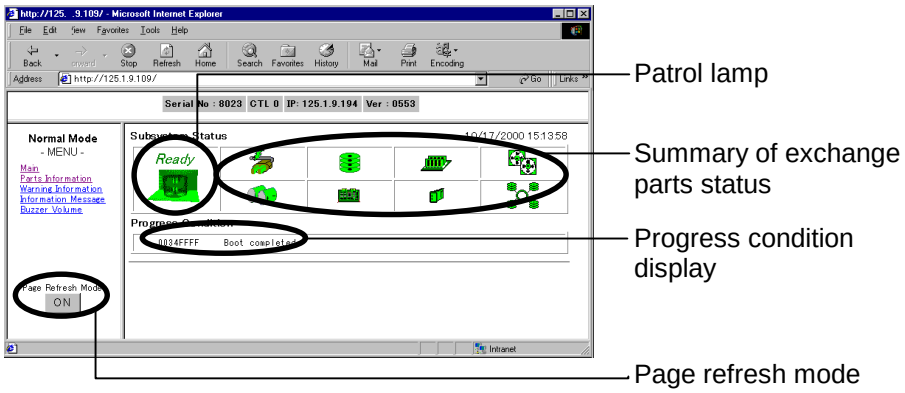


Figure 5.23 WEB Screen (21)

Table 5.3 Patrol Lamp

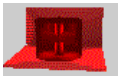
Image	Status
Booting...	During the start
 Green	Normal
 Yellow	Warning status
 Red	Alarm status

Table 5.4 AC/DC Power Supply

Image	Status
 Green	Normal
 Red	AC/DC power supply error

Table 5.5 Disk Drive

Image	Status
 Green	Normal
 Red	Disk drive error

Table 5.6 Cache Memory

Image	Status
 Green	Normal
 Red	Cache memory error

Table 5.7 Fan Unit

Image	Status
 Green	Normal
 Red	Fan unit error

Table 5.8 Battery Unit

Image	Status
 Green	Normal
 Red	Battery error

Table 5.9 Controller

Image	Status
 Green	Normal
 Red	Controller error

Table 5.10 ENC Board

Image	Status
 Green	Normal
 Red	ENC board error

Table 5.11 Fibre Loop

Image	Status
 Green	Normal
 Red	Fibre loop error

5.2.4 Display of Replaceable Component Statuses (Parts Information)

The display screen of exchange part status displays the status of the disk drive, controller, cache memory, fiber loop, fan unit, battery unit, AC/DC power supply, ENC board that are implemented. Furthermore, this is not displayed, if it is not implemented. Also, the exchange part of abnormal status displays a red image.

- The Parts Information screen (see figure 5.24, 5.25, 5.26)
- When checking the status of a component through a message, a clicking on the 'Warning Information' of the menu frame in the main window changes the window to the one shown figure 5.27 and a detailed message explaining the component status is displayed.
- The meaning of the image that displays it with the display screen exchange part status (see Table 5.12 to 5.19)

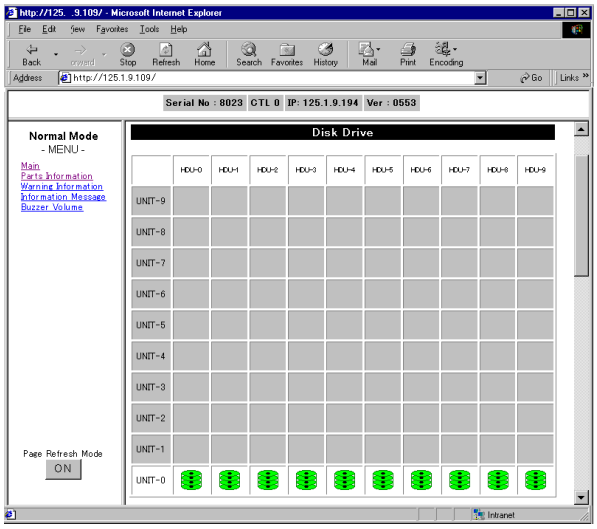


Figure 5.24 WEB Screen (22)

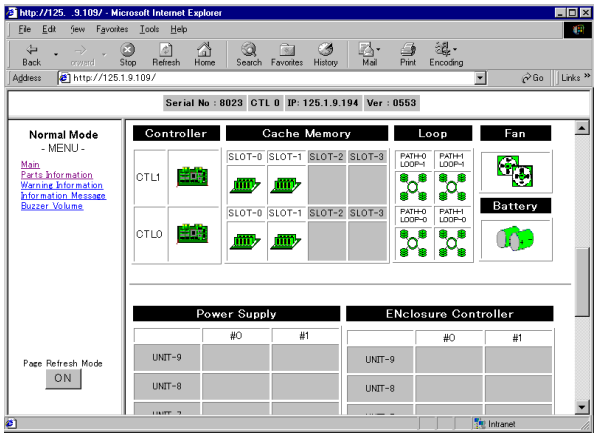


Figure 5.25 WEB Screen (23)

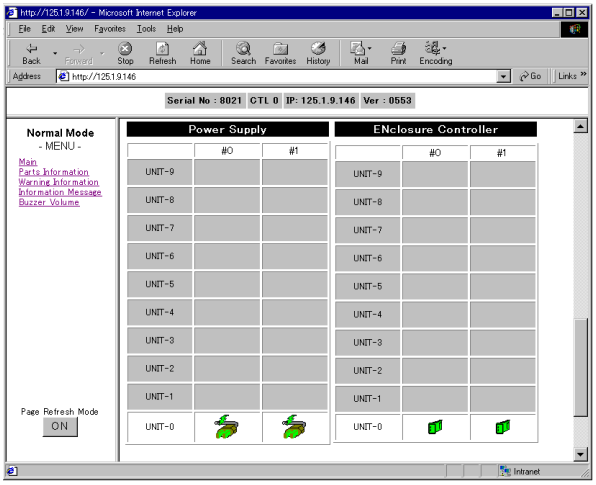


Figure 5.26 WEB Screen (24)

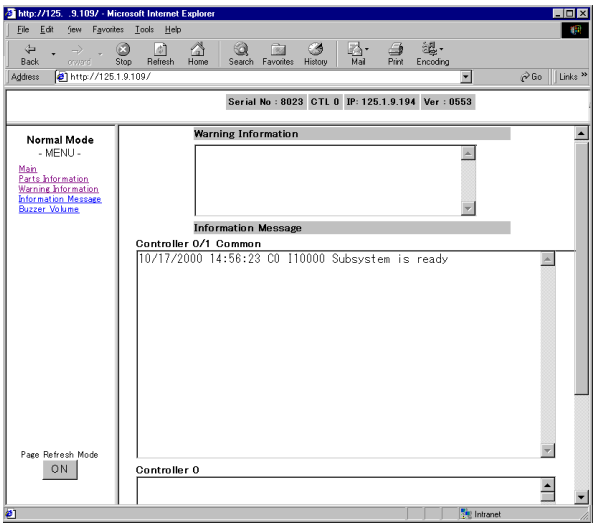


Figure 5.27 WEB Screen (25)

Table 5.12 Disk Drive

Image	Status
 Green	Normal
 Red	Fault has occurred to the Disk drive
 Red line	Disk drive port that the fault occurred is not implementing the Disk drive
NO display	Disk drive is not implemented ()Except for the status where the Disk drive that the fault occurred was drawn out

Table 5.13 Controller

Image	Status
 Green	Normal
 Red	Shutdown of the Controller (Status where it is not implemented with the setting of the dual system configuration is included)
 Yellow	Fault of the battery backup circuit
NO display	Even the fault has not occurred without being implemented with the setting of single system configuration

Table 5.14 Cache Memory

Image	Status
	Normal
 Red	Fault (Status where is not implemented and extracted the fault cache memory is included)
NO display	It is not implemented and there is not a fault

Table 5.15 Battery Unit

Image	Status
 Green	Normal
 Red	There is a fault or not implemented

Table 5.16 Fan Unit

Image	Status
 Green	Normal
 Red	There is a fault or not implemented

Table 5.17 AC/DC Power Supply

Image	Status
 Green	Normal
 Red	It is fault occurred or not implemented

Table 5.18 ENC Board

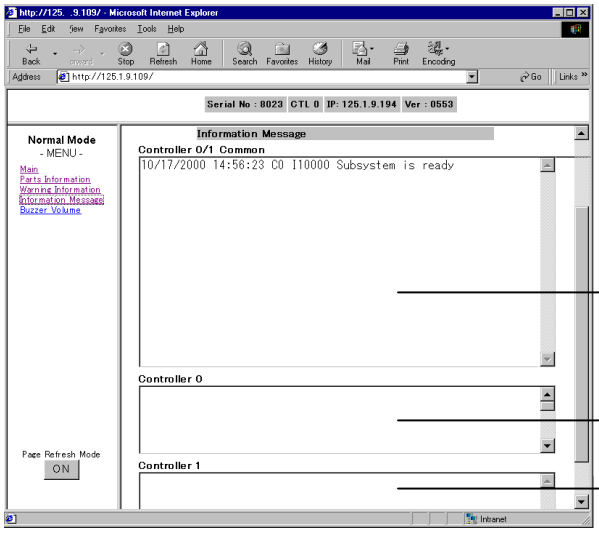
Image	Status
 Green	Normal
 Red	It is fault occurred or not implemented

Table 5.19 Fibre Loop

Image	Status
 Green	Normal
 Red	Fault

5.2.5 Information Message

The fault information and status information of the device that detected it in during the device operation are displayed.
The fault information and status information after the device booting are displayed in the Controller 0/1 Common box.
The fault information and status information as the device booting are displayed in the box of Controller 0 and Controller 1 every the controller.
The Information Message screen is shown below. (see figure 5.28)



The fault information and status information are displayed.

Figure 5.28 WEB Screen (26)

5.2.6 Setting Buzzer Sound Volume

SUPPLEMENT : Make the setting of the buzzer volume in the environment in which I/O's from a host are not issued while the system is maintained or before the host is started up.

The buzzer volume can be adjusted with 5 stages.
Please click 'Buzzer Volume' of menu frame to enter into the buzzer volume setting screen.
If the buzzer volume is designated with the radio button and the [OK] button is clicked, the buzzer volume is changed.
The buzzer volume setting screen is shown below. (see figure 5.29)

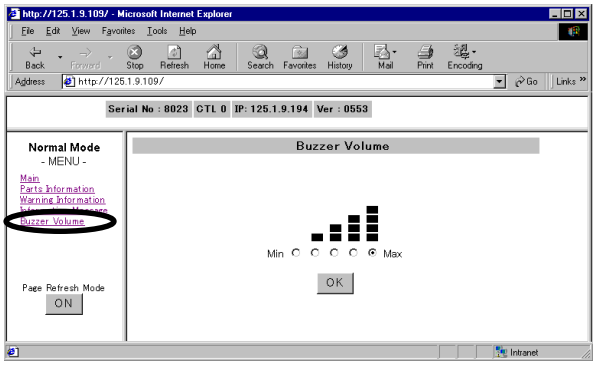


Figure 5.29 WEB Screen (27)

5.3 Troubleshooting by Means of Connecting WEB

: 'Troubleshooting by means of connecting WEB' is referred to trained service personnel only.
The user must not do it.

5.3.1 Checking Subsystem Status

Check the position of the failed part of the unit on the main window in the normal mode of the WEB.
The state of the equipment can be confirmed in the following window. (see figure 5.30)

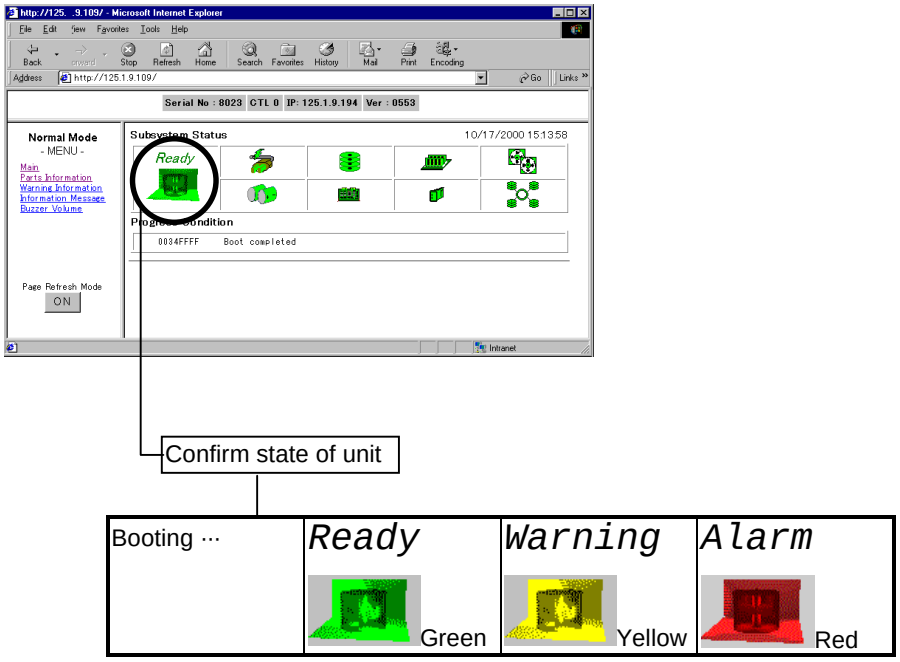


Figure 5.30 WEB Screen (28)

5.3.2 Checking Display of Progress State

If ‘Booting...’ is indicated in the window (the controller is being started up), the progress of start-up operation can be confirmed according to the following procedure. (see figure 5.31)

1. Turn on the page refresh mode (click the [ON] button).
   The window is updated automatically at the interval of 5 seconds.
   (If the [OFF] button of the page refresh mode is indicated, the above operation is not necessary.)
   If the page refresh mode is not indicated in the main window, press the update button of the browser to update the window.
2. See the indication of progress of the window.
   If the start-up operation is completed, ‘Boot completed’ is indicated in this part.
3. Confirm replacement part summary.
   The state of each replacement parts can be confirmed with the replacement part summary. (see figure 5.32)
   If any part fails, its summary becomes red. If the red part summary is clicked, the state confirmation window of the part appears and the position of the failed part is confirmed more in detail .

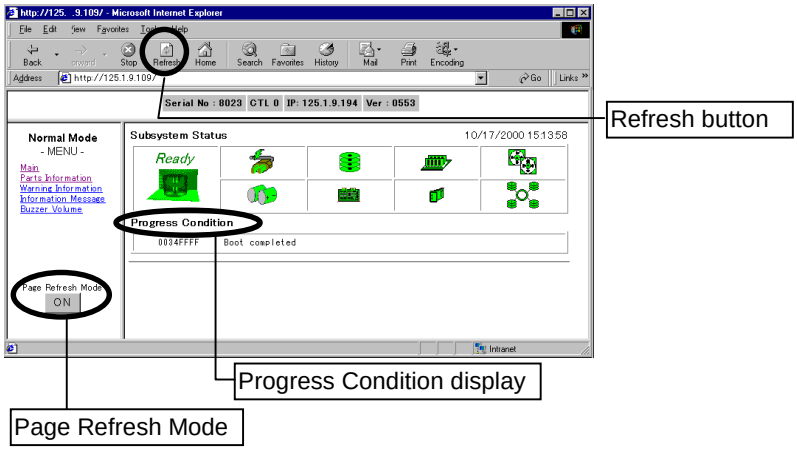
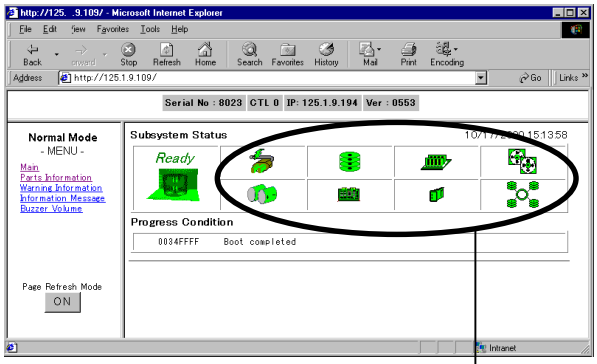


Figure 5.31 WEB Screen (29)



Summary of exchange parts status

AC/DC power supply	Disk drive	Cache memory	Fan unit
Battery unit	Controller	ENC board	Loop

Figure 5.32 WEB Screen (30)

5.3.3 Checking Status of Each Component

Click each part of [Replace Part Summary] in the main window, and the following window appears and the state of the part is indicated.
In this case, the selected (clicked) part is at the head of the window.
You can select this window by clicking the [Parts Information] menu in the main window, too.
In this window, you can confirm the state of each part in detail.

1. If any part fails, its image becomes red. (see figure 5.33, 5.34)

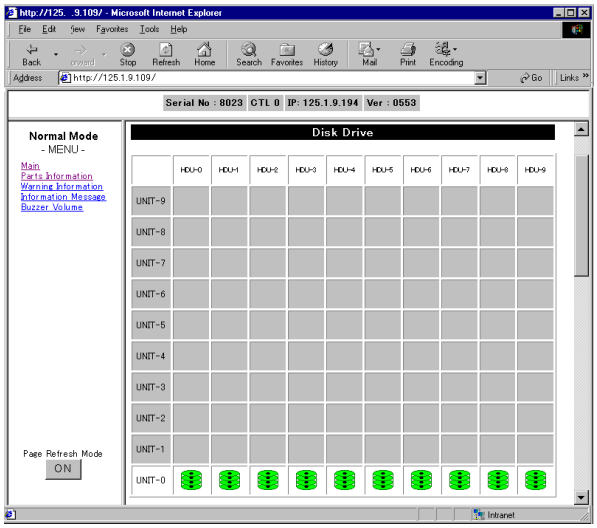


Figure 5.33 WEB Screen (31)

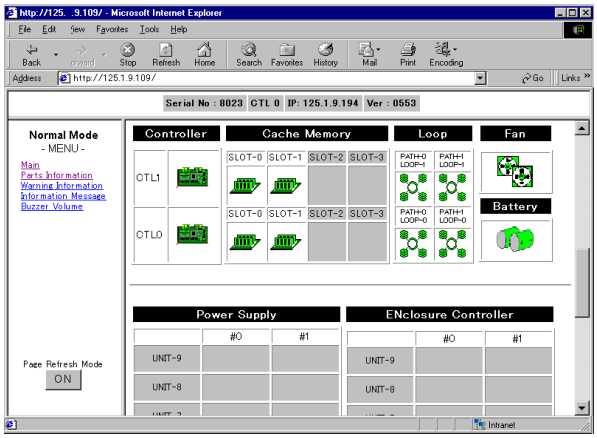


Figure 5.34 WEB Screen (32)

5.3.4 Checking Log Message

1. Procedure for confirming log messages
   Click the [Information Message] menu in the main window, and the 'Information Message window' appears.
   In the 'Information Message window', you can identify the cause of the failure and confirm the recovery measures. (see figure 5.35)
   This information on the failures which were detected during operation of the unit and state of the unit is indicated in the above window.
   The information on the failures and state at the time of start-up of the unit is indicated for each Controller in the [Controller 0] and [Controller 1] boxes.
   The contents of each message are shown below.

- CUDG (Self-test at power-on) detection message
  The CUDG detection message is indicated in the [Controller 0] or [Controller 1] box as shown below.

MM/DD/YYYY HH:MM:SS Cx	54 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	50 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	4C ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	48 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	44 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	40 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	3C △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	38 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	34 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	30 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	2C △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	28 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	24 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	20 □□□□□□□□
MM/DD/YYYY HH:MM:SS Cx	○○○○○○○○○○
MM/DD/YYYY HH:MM:SS Cx	CTLx

MM/DD/YYYY : Date of occurrence
HH:MM:SS : Time of occurrence
Cx : # of Controller in which failure is detected
◆◆◆◆◆◆◆◆ : PCI Config information
△△△△△△△△ : Detailed information
□□□□□□□□ :Message code
○○○○○○○○○○ : Message text (Any number of letters)
CTLx : CUDG executing controller #

- Flash/RAM micro detection message
  The Flash/RAM micro detection message is indicated in the [Controller 0/1 Common], [Controller 0], of [Controller 1] box as shown below.
  The latest one is indicated at the top line.

SUPPLEMENT : As the date and time of occurrence indicated by the message, the RTC set in the detection controller is used.
If the RTC is different from one control to another, the indicated time of occurrence may be different from one message to another (the message on the upper line is indicated earlier than the one on the lower line).
In this case, the actually latest message is indicated at the top, too.

```
MM/DD/YYYY HH:MM:SS Cx □□□□□□ ○○○○○○○○○○ : △△△△△△/◆◆◆
MM/DD/YYYY HH:MM:SS Cx □□□□□□ ○○○○○○○○○○ : △△△△△△/◆◆◆
                                  :
                                  :
```

MM/DD/YYYY : Confirmed date
HH:MM:SS : Confirmed times
Cx : Error detected Controller#
□□□□□□□□ : Message Code
Rxxxxx : Flash detected messages
Ixxxxx : Progress messages
Wxxxxx: Warning messages
Hxxxxx : Failure messages
○○○○○○○○○○ : Message text (Optional font number)
△△△△△△△△ : Recovery measures code
◆◆◆ : Collecting failure information code

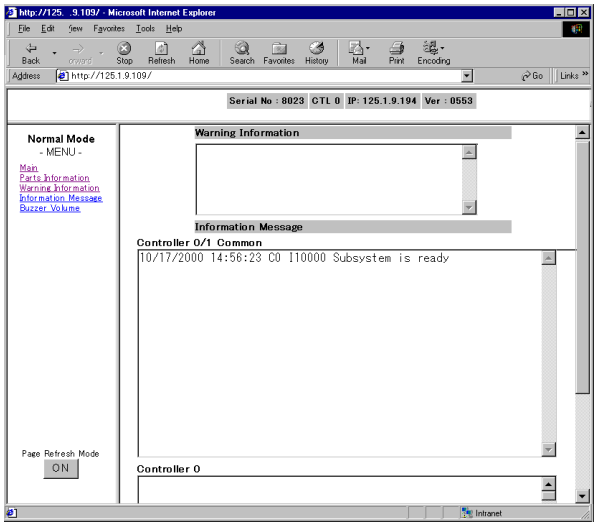


Figure 5.35 WEB Screen (33)

5.3.5 How to Read Failure Information

- The history of the unit after it is turned on is indicated in the Information Message.
- The message of Subsystem is Ready indicates the time when the unit is ready.
  The messages made after the power is turned on until the unit is ready are indicated before this message. The messages made after the unit is ready are indicated after this message.
- Particularly pay attention to Wxxxxx (Warning message), Hxxxxx (Failure message), and Rxxxxx (Flash detection message).
- The following messages are indicated when failures occur and when they are solved.
  It the recovery message is indicated after a failure occurrence message, the failure has been solved and you do not need to solve it.

Table 5.20 How to Read Failure Information

No.	Description	Failure detected messages	Failure recovery messages
1	Controller error/ recover	W0010x: CTL alarm (CTL-x)	I0010x: CTL recovered (CTL-x)
2	error/recovery	W0D0x0: Cache alarm (CTL-y, CACHE-z)	I002xy: Cache recovered (CACHE-y/z)
3	Cache memory error/recovery	W03000:Battery alarm	I00300: Battery recovered
		W03100: Battery removed	
		W03200: Battery SW off	
		W03300: Battery charge alarm	
4	Battery backup board error/recovery	W0340x: Battery backup circuit alarm (CTL-x)	I0040x: Battery backup circuit recovered (CTL-x)
5	Fan error/recovery	W04000: FAN alarm	I00500: FAN recovered
6	Power supply error/ recovery	W050xy: PS alarm (Unit-x, PS-y)	I006xy: PS recovered (Unit-x, PS-y)
7	Disk drive error/ recovery	W060xy: HDU alarm (Unit-x, HDU-y)	I007xy: HDU recovered (Unit-x, HDU-y)
8	Spare disk error/ recovery	W061xy: Spare HDU alarm (Unit-x, HDU-y)	I009xy: Spare HDU recovered (Unit-x, HDU-y)
9	Loop error/recovery	W080xy: Loop alarm (PATH-x, LOOP-y)	I00Axy: Loop recovered (PATH-x, LOOP-y)
10	ENC board error/ recovery	W090xy: ENC alarm (PATH-x, LOOP-y)	I00Bxy: ENC recovered (PATH-x, LOOP-y)
11	UPS error/recovery	W0C000: UPS alarm	I00D00: UPS recovered

5.3.6 Troubleshooting by Means of Messages

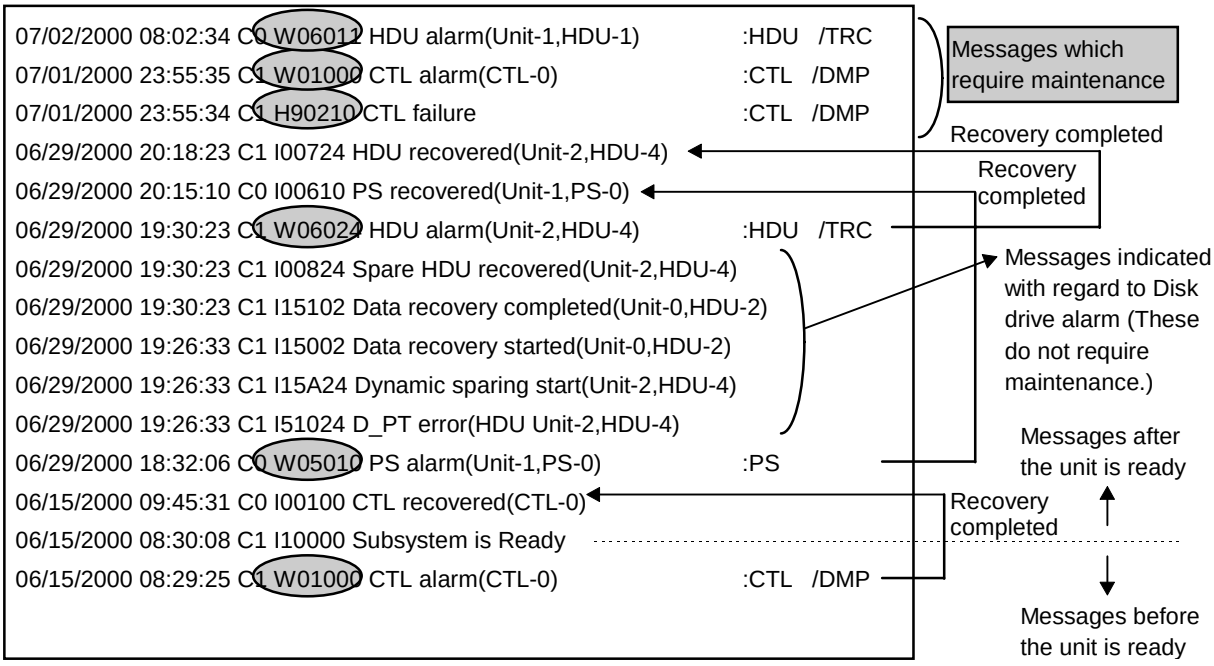
The contents of each failure detected during operation are reported by a message.
The failures detected during operation after the main switch of this unit is turned on and the state of the unit are reported.
The following messages are indicated.

MM/DD/YYYY HH:MM:SS Cx	54 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	50 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	4C ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	48 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	44 ◆◆◆◆◆◆◆◆
MM/DD/YYYY HH:MM:SS Cx	40 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	3C △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	38 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	34 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	30 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	2C △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	28 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	24 △△△△△△△△
MM/DD/YYYY HH:MM:SS Cx	20 □□□□□□□□
MM/DD/YYYY HH:MM:SS Cx	○○○○○○○○○○
MM/DD/YYYY HH:MM:SS Cx	CTLx

MM/DD/YYYY : Date of occurrence
HH:MM:SS : Time of occurrence
Cx : # of Controller in which failure is detected
◆◆◆◆◆◆◆◆ : PCI Config information
△△△△△△△△ : Detailed information
□□□□□□□□ : Message code
○○○○○○○○○○ : Message text (Any number of letters)
CTLx : CUDG executing controller #

- Message text : Message text is indicated.
- Description : Contents of failure are described concretely.
- Recovery measures : How to recover from failure is indicated.

Example of message analysis



Appendix

Appendix A Host Side Parameters Setting

- OS and HBA supported by DF500 (Fibre Channel)

No	OS	HBA					Note
		Vendor	Model	Bus Type	Driver	BIOS	
1	HP-UX 11i(11.11)	HP	A5158A	PCI	Bundle	—	
2		HP	A3740A	PCI	Bundle	—	
3		HP	A3404A	HSC	Bundle	—	
4	HP-UX 11.0	HP	A5158A	PCI	Bundle	—	
5		HP	A3740A	PCI	Bundle	—	
6		HP	A3404A	HSC	Bundle	—	
7	HP-UX 10.20	HP	A3404A	HSC	Bundle	—	
8	Solaris 2.6/7/8	Sun	X6729A	PCI	Bundle	—	*1
9		Sun	X6730A	SBus	Bundle	—	*2
10		JNI	FC64-1063	SBus	2.5.8HIT07	—	
11		JNI	FCI-1063	PCI	2.5.8HIT07	—	
12		Emulex	LP8000	PCI	4.10g	3.81a1	
13		Emulex	LP9002	PCI	4.10g	3.81a1	
14		Q-logic	QLA2300F	PCI	Not release	—	
15	AIX 4.3.3	IBM	FC6227	PCI	Bundle	—	
16	IRIX 6.5	SGI	XT-FC-1PORT	XIO	Bundle	—	
17		SGI	PCI-FC-1PORT	PCI	Bundle	—	
18		Prisa	NetFX-XIO64	XIO	NetFX2.1	—	
19	Tru64 UNIX 4.0F	Compaq	KGPSA-BC	PCI	Bundle:1.09	—	
20	Tru64 UNIX 4.0G	Compaq	KGPSA-CA	PCI	Bundle:1.21	—	
21	Tru64 UNIX 5.1	Compaq	KGPSA-CA	PCI	Bundle:1.21	—	
22	Windows 2000 AS	Emulex	LP7000E	PCI	Mini port:4.41a8	3.20a10	
23		Emulex	LP8000	PCI	Mini port:4.41a8	3.81a1	
24		Emulex	LP9002	PCI	Mini port:4.41a8	3.81a1	
25		Q-logic	QLA2100F	PCI	7.05.05	1.37	
26		Q-logic	QLA2200F	PCI	7.05.05	1.61	
27		Q-logic	QLA2300F	PCI	8.00.08	1.04	
28	Windows NT4.0 EE	Emulex	LP7000E	PCI	Mini port:4.41a8	3.20a10	
29		Emulex	LP8000	PCI	Mini port:4.41a8	3.20x4	
30		Emulex	LP9002	PCI	Mini port:4.41a8	3.81a1	
31		Q-logic	QLA2100F	PCI	7.05.05	1.37	
32		Q-logic	QLA2200F	PCI	7.05.05	1.44	
33		Q-logic	QLA2300F	PCI	8.00.08	1.04	
34	Netware 5.0	Q-logic	QLA2100F	PCI	4.15a	1.37	
35	Linux Redhat 6.1	Q-logic	QLA2100F	PCI	2.11	1.54	
36	Linux Redhat 6.2	Q-logic	QLA2100F	PCI	Bundle	1.44	
37	Turbo Linux Sever 6.1	Q-logic	QLA2100F	PCI	Bundle	—	
38		Q-logic	QLA2200F	PCI	Bundle	—	

If you use a Sun HBA X6729A or X6730A, the following patches must be applied.
In addition, connection via an FC Switching HUB (Fabric Mode) is not allowed.

*1: Solaris 2.6
X6729A: 105356-15 SunOS 5.6: /kernel/drv/ssd and /kernel/drv/sd patch
107280-05 SunStorEdge PCI FC-100 Host Adapter1.0: /kernel/drv/ifp patch

*2: Solaris 2.6
X6730A: 105375-22 SunOS 5.6: sf & socal driver patch
105357-04 SunOS 5.6: /Kernel/drv/ses patch
105356-15 SunOF 5.6: /kernel/drv/ssd and /kernel/drv/sd patch

*3: Solaris 7
X6729A: 107292-07 SunOS 5.7: ifp driver patch

*4: Solaris 7
X6730A: 107469-08 SunOS 5.7: sf & socal drivers patch

*5: Solaris 8
X6730A: 109460-03 SunOS 5.8: socal and sf driver patch

- OS and HBA supported by DF500 (SCSI)

No	OS	HBA					Note
		Vendor	Model	Bus Type	Driver	BIOS	
1	HP-UX 11i(11.11)	HP	A5150A:LVD	PCI	Bundle	—	
2		HP	A5149A:LVD	PCI	Bundle	—	
3		HP	A4800A:WD	PCI	Bundle	—	
4	HP-UX 11.0	HP	A5150A:LVD	PCI	Bundle	—	
5		HP	A5149A:LVD	PCI	Bundle	—	
6		HP	A4800A:WD	PCI	Bundle	—	
7		HP	A2969A:WD	HSC	Bundle	—	
8	HP-UX 10.20	HP	A2969A:WD	HSC	Bundle	—	
9	Solaris 2.6	Sun	X1065A:Ultra	SBus	Bundle	—	
10		Sun	X6541A:Ultra	PCI	Bundle	—	
11	Solaris 7	Sun	X1065A:Ultra	SBus	Bundle	—	
12		Sun	X6541A:Ultra	PCI	Bundle	—	
13	Solaris 8	Sun	X1065A:Ultra	SBus	Bundle	—	
14		Sun	X6541A:Ultra	PCI	Bundle	—	
15	AIX 4.3.3	IBM	6205:LVD	PCI	Bundle	—	
16		IBM	6207:Ultra	PCI	Bundle	—	
17		IBM	6209:WD	PCI	Bundle	—	
18		IBM	2416:WD	MCA	Bundle	—	
19	IRIX 6.5	SGI	XT-SCSIB -4P-1FS:Ultra	XIO	Bundle	—	
20	Tru64 UNIX 4.0F	Compaq	KZPBA-CB:Ultra	PCI	Bundle	—	
21	Tru64 UNIX 4.0G	Compaq	KZPBA-CB:Ultra	PCI	Bundle	—	
22		Compaq	SYM8952U:LVD	PCI	Bundle	—	
23	Tru64 UNIX 5.1	Compaq	KZPBA-CB:Ultra	PCI	Bundle	—	
24		Compaq	SYM8952U:LVD	PCI	Bundle	—	
25	NCR SVR4	NCR	Quad Ultra	PCI	Bundle	—	
26	Windows 2000 AS	Adaptec	ASC-29160	PCI	d4.0	2.57.0	
27		Adaptec	AHA-2944UW	PCI	d2.23	2.20.0	
28	Windows NT4.0 EE	Adaptec	ASC-29160	PCI	d3.4	2.57.0	
29		Adaptec	AHA-2944UW	PCI	d2.3	1.25	
30	Netware 5.0	Adaptec	AHA-2944UW	PCI	Bundle	1.25	
31	Linux Redhat 6.1	Adaptec	AHA-2944UW	PCI	Bundle	—	
32	Linux Redhat 6.2	Adaptec	AHA-2944UW	PCI	5.1.28/3.2.4	2.20.0	
33	Turbo Linux Sever 6.1	Adaptec	AHA-2944UW	PCI	Bundle	—	

- FC Switching HUB and FC HUB supported by DF500 (FC Switching HUB)

No	OS	FC Switching HUB				Note
		Vendor	Model	Mode	Firmware	
1	HP-UX 11i(11.11)	Brocade	Silkworm2800	Fabric/QL	2.1.9f/2.2.2b	Fabric FA5158A
2		Brocade	Silkworm2010	Fabric/QL	2.2.2b	Fabric FA5158A
3	HP-UX 11.0	Brocade	Silkworm2800	QL	2.2.2b	
4		Brocade	Silkworm2010	QL	2.2.2b	
5	HP-UX 10.20	Brocade	Silkworm2800	QL	2.2.2b	
6		Brocade	Silkworm2010	QL	2.2.2b	
7	Solaris 2.6	Brocade	Silkworm2800	Fabric/QL	2.2.2b	JNI/Emulex
8		Brocade	Silkworm2010	Fabric/QL	2.2.2b	JNI/Emulex
9		Ancor	sanBOX	—	3.03.42	JNI
10	Solaris 7	Brocade	Silkworm2800	Fabric/QL	2.2.2b	JNI/Emulex
11		Brocade	Silkworm2010	Fabric/QL	2.2.2b	JNI/Emulex
12		Ancor	sanBOX	—	3.03.42	JNI
13	Solaris 8	Brocade	Silkworm2800	Fabric/QL	2.2.2b	JNI/Emulex
14		Brocade	Silkworm2010	Fabric/QL	2.2.2b	JNI/Emulex
15		Ancor	sanBOX	—	3.03.42	JNI
16	AIX 4.3.3	Brocade	Silkworm2800	Fabric	2.2.2b	
17		Brocade	Silkworm2010	Fabric	2.2.2b	
18	IRIX 6.5	Brocade	Silkworm2800	Fabric/QL	2.2.2b	
19		Brocade	Silkworm2010	Fabric/QL	2.2.2b	
20	Tru64 UNIX 4.0F	Brocade	Silkworm2800	Fabric	2.1.7	
21		Brocade	Silkworm2010	Fabric	2.1.7	
22	Tru64 UNIX 4.0G	Brocade	Silkworm2800	Fabric/QL	2.1.7	
23		Brocade	Silkworm2010	Fabric/QL	2.1.7	
24	Tru64 UNIX 5.1	Brocade	Silkworm2800	Fabric/QL	2.2.2b	
25		Brocade	Silkworm2010	Fabric/QL	2.2.2b	
26	Windows 2000 AS	Brocade	Silkworm2800	Fabric/QL	2.2.2b	
27		Brocade	Silkworm2010	Fabric/QL	2.2.2b	
28		Ancor	sanBOX	—	3.03.42	
29	Windows NT4.0 EE	Brocade	Silkworm2800	Fabric/QL	2.2.2b	
30		Brocade	Silkworm2010	Fabric/QL	2.2.2b	
31		Ancor	sanBOX	—	3.03.42	
32	Linux Redhat 6.2	Brocade	Silkworm2010	Fabric	2.2.2b	

- FC Switching HUB and FC HUB supported by DF500 (FC HUB)

No	OS	FC Switching HUB				Note
		Vendor	Model	Mode	Firmware	
1	HP-UX 11I(11.11)	—	—	—	—	*1
2	HP-UX 11.0	—	—	—	—	*1
3	HP-UX 10.20	HP	A3724A	—	—	
4	Solaris 2.6	Gadzoox	Gibralter GS	—	—	
5		Emulex	LH-5000	—	—	
6	Solaris 7	Gadzoox	Gibralter GS	—	—	
7		Emulex	LH-5000	—	—	
8	Solaris 8	Gadzoox	Gibralter GS	—	—	
9		Emulex	LH-5000	—	—	
10	AIX 4.3.3	—	—	—	—	HUB connection not allowed.
11	IRIX 6.5	Emulex	LH-5000	—	—	
12	Tru64 UNIX 4.0F	—	—	—	—	HUB connection not allowed.
13	Tru64 UNIX 4.0G	—	—	—	—	HUB connection not allowed.
14	Tru64 UNIX 5.1	Emulex	LH-5000	—	—	
15	Windows 2000 AS	Vixcel	Rapport1000	—	—	
16		Vixcel	Rapport2000	—	—	
17		Emulex	LH-5000	—	—	
18	Windows NT4.0 EE	Vixcel	Rapport1000	—	—	
19		Vixcel	Rapport2000	—	—	
20		Emulex	LH-5000	—	—	
21	Linux Redhat 6.2	Emulex	LH-5000	—	—	

*1: Use Brocade Silkworm2800/2010 QL Mode as an alternative method.

The following describes parameters information of HBAs that are used by each platform.
If you use individual HBAs provided by each vendor, set the parameters values described below.
In addition, if you use a 2 G Bps HBA in 1 G Bps mode, set-up values are the same as those for use in 2 G Bps mode.
If a 2 G Bps I/F card on the DF500 side is used in 1 G Bps mode, set-up values on the HBA side are also the same.

If Solaris2.6/Solaris7/Solaris8 are used

When connecting a DF500 by using a Host Bus Adapter JNI FC64-1063, the "/kernel/drv/fcaw.conf" file must be edited and set up as follows.
Set-up values are described below. Use their respective default values for other parameters.

- If connecting a DF500 directly or via an FC HUB: fca-nport = 0
- If connecting a DF500 via an FC Switching HUB: fca-nport = 1

The following describes parameters extracted from the "/kernel/drv/fcaw.conf" file.

No	Parameter	Default	Value	Note
1	scsi-initiator-id	0x7d	Any	
2	fca_nport	0	0 or 1	Loop = 0, Fabric = 1
3	public_loop	0	—	
4	target_controllers	126	—	
5	ip_disable	1	—	
6	qfull_retry_count	0	—	
7	qfull_retry_interval	1000	—	
8	failover	30	—	
9	failover_extension	0	—	
10	recovery_attempts	5	—	
11	class2_enable	0	—	
12	fca_heartbeat	0	—	
13	reset_glm	0	—	
14	timeout_reset_enable	0	—	
15	busy_retry_delay	500	—	
16	link_recovery_delay	100	—	
17	scsi_probe_delay	0	—	
18	def_hba_binding	"fcaw*"	—	
19	def_wwpn_binding	"xxxxxxxxxxxxxxxx"	—	
20	def_wwnn_binding	"xxxxxxxxxxxxxxxx"	—	
21	def_port_binding	"$xxxxxx"	—	
22	fca_verbose	1	—	

When connecting a DF500 by using a Host Bus Adapter JNI FCI-1063, the "/kernel/drv/fca-pci.conf" file must be edited and set up as follows. Set-up values are described below. Use their respective default values for other parameters.

- If connecting a DF500 directly or via an FC HUB: fca-nport = 0
- If connecting a DF500 via an FC Switching HUB: fca-nport = 1

The following describes parameters extracted from the "/kernel/drv/fca-pci.conf" file.

No	Parameter	Default	Value	Note
1	scsi-initiator-id	0x7d	Any	
2	fca_nport	0	0 or 1	Loop = 0, Fabric = 1
3	public_loop	0	—	
4	target_controllers	126	—	
5	ip_disable	1	—	
6	qfull_retry_count	0	—	
7	qfull_retry_interval	1000	—	
8	failover	30	—	
9	failover_extension	0	—	
10	recovery_attempts	5	—	
11	class2_enable	0	—	
12	fca_heartbeat	0	—	
13	reset_glm	0	—	
14	timeout_reset_enable	0	—	
15	busy_retry_delay	500	—	
16	link_recovery_delay	100	—	
17	scsi_probe_delay	0	—	
18	def_hba_binding	"fca-pci*"	—	
19	def_wwpn_binding	"xxxxxxxxxxxxxxxx"	—	
20	def_wwnn_binding	"xxxxxxxxxxxxxxxx"	—	
21	def_port_binding	"$xxxxxx"	—	
22	fca_verbose	1	—	

When connecting a DF500 by using a Host Bus Adapter Emulex LP8000/LP9002, the "/kernel/drv/lpfc.conf" file must be edited and set up as follows. Set-up values are described below. Use their respective default values for other parameters.

- If connecting a DF500 directly or via an FC HUB: topology = 4 (Loop mode only)
- If connecting a DF500 via an FC Switching HUB: topology = 2 (point-to-point mode only)

The following describes parameters extracted from the "/kernel/drv/fca-pci.conf" file.

No	Parameter	Default	Value	Note
1	log-verbose	0	—	
2	log-only	1	—	
3	automap	1	—	
4	fcp-on	1	—	
5	lun-queue-depth	30	—	
6	tgt-queue-depth	0	—	
7	no-device-delay	1	—	
8	network-on	1	—	
9	xmt-que-size	256	—	
10	scan-down	2	—	
11	linkdown-tmo	30	—	
12	nodev-holdid	0	—	
13	nodev-tmo	0	—	
14	delay-rsp-err	0	—	
15	check-cond-err	0	—	
16	num-iocbs	512	—	
17	num-bufs	512	—	
18	topology	4	2 or 4	Loop = 4, Fabric = 2
19	ip-class	3	—	
20	fcp-class	3	—	
21	use-adisc	0	—	
22	fcpfabric-tmo	0	—	
23	post-ip-buf	128	—	
24	dqfull-throttle	1	—	
25	zone-rscn	0	—	
26	ack0	0	—	
27	class-code	0x00020000	—	
28	flow_control	"duplex"	—	
29	queue	"qfifo"	—	
30	disk	"scdk"	—	
31	use-lomempages	0	—	
32	link-speed	0	—	

If Windows 2000 Advanced Server are used

If connecting a DF500 by installing a Host Bus Adapter Emulex LP7000E/LP8000/LP9002 and using SCSI Miniport Driver Version5-4.41a8, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- If used as Boot disk: Enable or disable BIOS on this Adapter = enable
- If used as Boot disk, and connecting a DF500 directly or via an FC HUB: Topology selection = 1
- If used as Boot disk, and connecting a DF500 via an FC Switching HUB: Topology selection = 2

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
1	Enable or disable BIOS on this Adapter	disabled	—	Boot disk is used: Enabled
2	Change default ALPA of this adapter	0x01	Any	
3	Change PLOGI Retry Timer	0	—	
4	Topology Selection	1	1 or 2	FC-AL:1, Fabric:2 (Only when specifying Boot disk)
5	Enable or disable Spinup delay	disabled	—	
6	Enable or disable Auto Scan	disabled	—	
7	Enable or disable EDD 3.0	disabled	—	

In addition, the Registry options must be set and changed as follows:
Use their respective default values for parameters.
The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	AbortStatus	0x0E	—	
2	Class	2	—	
3	CrfIntrpt	0	—	
4	CrfMsCnt	0	—	
5	CrfRspCnt	0	—	
6	DiscoveryDelay	0	—	
7	ElsRetryCount	1	—	
8	ElsRjtCount	45	—	
9	ElsTimeOut	0	—	
10	EmulexOptions	0x0	—	
11	EnableDPC	0	—	
12	FrameSizeMSB	0	—	
13	HardAddress	0	—	
14	HardAlpa	0x00	—	
15	HlinkTimeOut	30	—	
16	HostName	—	—	
17	HppIoTimeOut	30	—	
18	InitialDelay	1	—	
19	LinkSpeed	0	—	
20	LinkTimeOut	60	—	
21	LipFFrecovery	0	—	
22	LogErrors	0	—	
23	MapBus0	0	—	
24	MapNodeName	0	—	
25	NodeTimeOut	20	—	
26	QueueAction	0	—	
27	QueueDepth	32	—	
28	QueueTarget	0	—	
29	RegFcpType	0	—	
30	ResetFF	0	—	
31	ResetTPRLO	1	—	In the case of MSCS configuration = 1 is mandatory.
32	RetryInterval	45	—	
33	RetryIoTimeOut	1	—	
34	RetryNodePurge	1	—	
35	RTTOV	256	—	
36	ScanDown	0	—	
37	SendEcho	0	—	
38	SimulateDevice	0	—	
39	SnsALL	0	—	
40	TargetBlkSize	16384	—	
41	TargetEnable	0	—	
42	Topology	2	—	
43	TrafficCop	0	—	
44	TimeOutValue	0x3c	—	
45	MaximumSGList	0x81	—	
46	NumberOfRequests	0x96	—	

If connecting a DF500 by installing a Host Bus Adapter Q-logic QLA2100F and using Miniport Driver Version 7.05.05, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- Frame size = 2048
- Adapter Hard Loop ID = Enable
- Execution Throttle = 256
- Login Retry Count = 30
- Port Down Retry Count = 30
- IOCB Allocation = 512

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
Host Adapter Settings				
1	Host Adapter BIOS	Disabled	—	
2	Frame Size	1024	2048	
3	Loop Reset Delay	5	—	
4	Adapter Hard Loop ID	Disabled	Enabled	
5	Hard Loop ID	0	Any	
Advanced Adapter Settings				
6	Execution Throttle	16	256	
7	Fast Command Posting	Enabled	—	
8	>4GByte Addressing	Disabled	Disable or Enable	In the case of MSCS configuration = Enable is mandatory.
9	LUNs Per Target	8	—	
10	Enable LIP Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
11	Enable LIP Full Login	Yes	—	
12	Enable Target Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
13	Login Retry Count	8	30	
14	Port Down Retry Count	8	30	
15	Drivers Load RISC Code	Enabled	—	
16	Enable Database Updates	No	—	
17	IOCB Allocation	256	512	
18	Extended Error Logging	Disabled	—	

In addition, the Registry options must be set and changed as follows:
Use their respective default values for parameters.
The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	MaximumSGList	REG_DWORD:F0x41	—	
2	NumberOfRequests	0x96	—	
3	FabricSupported	1	—	
4	FabricDeviceCount	64	—	
5	ConfigRequired	0	—	
6	Portname		—	
7	MSCS	2	—	In the case of MSCS configuration = 2 is mandatory.
8	UseSameNN	1	—	
9	TimeOutValue	0x3c	—	

If connecting a DF500 by installing a Host Bus Adapter Q-logic QLA2200F and using Miniport Driver Version 7.05.05, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- Frame size = 2048
- Adapter Hard Loop ID = Enable
- Execution Throttle = 256
- Login Retry Count = 30
- Port Down Retry Count = 30
- IOCB Allocation = 512

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
Host Adapter Settings				
1	Host Adapter BIOS	Disabled	—	
2	Frame Size	1024	2048	
3	Loop Reset Delay	5	—	
4	Adapter Hard Loop ID	Disabled	Enabled	
5	Hard Loop ID	0	Any	
Advanced Adapter Settings				
6	Execution Throttle	16	256	
7	Fast Command Posting	Enabled	—	
8	>4GByte Addressing	Disabled	Disable or Enable	In the case of MSCS configuration = Enable is mandatory.
9	LUNs Per Target	8	—	
10	Enable LIP Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
11	Enable LIP Full Login	Yes	—	
12	Enable Target Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
13	Login Retry Count	8	30	
14	Port Down Retry Count	8	30	
15	Drivers Load RISC Code	Enabled	—	
16	Enable Database Updates	No	—	
17	Disable Database Load	No	—	
18	IOCB Allocation	256	512	
19	Extended Error Logging	Disabled	—	
Extended Firmware Settings				
20	Extended Control Block	Enabled	—	
21	RIO Operation Mode	0	—	
22	Connection Options	3	0,1 or 3	In the case of MSCS configuration, Loop = 0, Fabric = 1
23	Class 2 Service	Disabled	—	
24	ACK0	Disabled	—	
25	Fibre Channel Tape Support	Disabled	—	
26	Fibre Channel Confirm	Disabled	—	
27	Command Reference Number	Disabled	—	
28	Read Transfer Ready	Disabled	—	
29	Response Timer	0	—	
30	Interrupt Delay Timer	0	—	

In addition, the Registry options as follows:
Use their respective default values for parameters.
The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	MaximumSGList	REG_DWORD:F0x41	—	
2	NumberOfRequests	0x96	—	
3	FabricSupported	1	—	
4	FabricDeviceCount	64	—	
5	ConfigRequired	0	—	
6	Portname	—	—	
7	FC Tape	—	—	
8	MSCS	2	—	In the case of MSCS configuration = 2 is mandatory.
9	UseSameNN	1	—	
10	TimeOutValue	0x3c	—	

If connecting a DF500 by installing a Host Bus Adapter Q-logic QLA2300F and using Miniport Driver Version 8.00.08, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- Frame size = 2048
- Adapter Hard Loop ID = Enable
- Execution Throttle = 256
- Login Retry Count = 30
- Port Down Retry Count = 30
- IOCB Allocation = 512

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
Host Adapter Settings				
1	Host Adapter BIOS	Disabled	—	
2	Frame Size	2048	2048	
3	Loop Reset Delay	5	—	
4	Adapter Hard Loop ID	Disabled	Enabled	
5	Hard Loop ID	0	Any	
Advanced Adapter Settings				
6	Execution Throttle	16	256	
7	Fast Command Posting	Disabled	—	
8	>4GByte Addressing	Disabled	Disable or Enable	In the case of MSCS configuration = Enable is mandatory.
9	LUNs Per Target	8	—	
10	Enable LIP Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
11	Enable LIP Full Login	Yes	—	
12	Enable Target Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
13	Login Retry Count	8	30	
14	Port Down Retry Count	8	30	
15	Drivers Load RISC Code	Enabled	—	
16	Enable Database Updates	No	—	
17	Disable Database Load	No	—	
18	IOCB Allocation	256	512	
19	Extended Error Logging	Disabled	—	
Extended Firmware Settings				
20	Extended Control Block	Enabled	—	
21	RIO Operation Mode	0	—	
22	Connection Options	2	0,1 or 2	In the case of MSCS configuration, Loop = 0, Fabric = 1
23	Class 2 Service	Disabled	—	
24	ACK0	Disabled	—	
25	Fibre Channel Tape Support	Disabled	—	
26	Fibre Channel Confirm	Disabled	—	
27	Command Reference Number	Disabled	—	
28	Read Transfer Ready	Disabled	—	
29	Response Timer	0	—	
30	Interrupt Delay Timer	0	—	
31	Data Rate	0	2	Auto Mode

In addition, the Registry options as follows:
Use their respective default values for parameters.
The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	MaximumSGList	REG_DWORD:F0x21	—	
2	NumberOfRequests	0x96	—	
3	FabricSupported	—	—	
4	FabricDeviceCount	—	—	
5	ConfigRequired	—	—	
6	Portname	—	—	
7	FC Tape	—	—	
8	MSCS	2	—	In the case of MSCS configuration = 2 is mandatory.
9	UseSameNN	1	—	
10	TimeOutValue	0x3c	—	

If Windows NT4.0 Enterprise Edition are used

If connecting a DF500 by installing a Host Bus Adapter Emulex LP7000E/LP8000/LP9002 and using SCSI Miniport Driver Version5-4.41a8, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- If used as Boot disk: Enable or disable BIOS on this Adapter = enable
- If used as Boot disk, and connecting a DF500 directly or via an FC HUB: Topology selection = 1
- If used as Boot disk, and connecting a DF500 via an FC Switching HUB: Topology selection = 2

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
1	Enable or disable BIOS on this Adapter	disabled	—	Boot disk is used: Enabled
2	Change default ALPA of this adapter	0x01	Any	
3	Change PLOGI Retry Timer	0	—	
4	Topology Selection	1	1 or 2	FC-AL:1, Fabric:2 (Only when specifying Boot disk)
5	Enable or disable Spinup delay	disabled	—	
6	Enable or disable Auto Scan	disabled	—	
7	Enable or disable EDD 3.0	disabled	—	

In addition, the Registry options must be set and changed as follows:
Use their respective default values for parameters.
The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	AbortStatus	0x0E	—	
2	ARBTOV	1000		
3	Class	2	—	
4	CrfMsCnt	0	—	
5	CrfRspCnt	0	—	
6	DiscoveryDelay	0	—	
7	ElsRetryCount	1	—	
8	ElsRjtCount	45	—	
9	ElsTimeOut	0	—	
10	EmulexOption	0x0	—	
11	EnableDPC	0	—	
12	FrameSizeMSB	0	—	
13	HardAddress	0	—	
14	HardAlpa	0x00	—	
15	HlinkTimeOut	30	—	
16	HostName	—	—	
17	HppIoTimeOut	30	—	
18	InitialDelay	1	—	
20	LinkTimeOut	60	—	
21	LipFFrecovery	0	—	
22	LogErrors	0	—	
23	MapBus0	0	—	
24	MapNodeName	0	—	
25	NodeTimeOut	20	—	
26	QueueAction	0	—	
27	QueueDepth	32	—	
28	QueueTarget	0	—	
30	ResetFF	0	—	
31	ResetTPRLO	1	—	In the case of MSCS configuration = 1 is mandatory.
32	RetryInterval	45	—	
33	RetryIoTimeOut	1	—	
34	RetryNodePurge	1	—	
35	RTTOV	256	—	
36	ScanDown	0	—	
37	SendEcho	0	—	
38	SimulateDevice	0	—	
39	SliFlags	0		
40	SnsALL	0	—	
41	Topology	2	—	
42	TrafficCop	0	—	
43	TimeOutValue	0x3c	—	
44	MaximumSGList	0x81	—	
45	NumberOfRequests	0x96	—	

If connecting a DF500 by installing a Host Bus Adapter Q-logic QLA2100F and using Miniport Driver Version 7.05.05, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- Frame size = 2048
- Adapter Hard Loop ID = Enable
- Execution Throttle = 256
- Login Retry Count = 30
- Port Down Retry Count = 30
- IOCB Allocation = 512

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
Host Adapter Settings				
1	Host Adapter BIOS	Disabled	—	
2	Frame Size	1024	2048	
3	Loop Reset Delay	5	—	
4	Adapter Hard Loop ID	Disabled	Enabled	
5	Hard Loop ID	0	Any	
Advanced Adapter Settings				
6	Execution Throttle	16	256	
7	Fast Command Posting	Enabled	—	
8	>4GByte Addressing	Disabled	Disable or Enable	In the case of MSCS configuration = Enable is mandatory.
9	LUNs Per Target	8	—	
10	Enable LIP Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
11	Enable LIP Full Login	Yes	—	
12	Enable Target Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
13	Login Retry Count	8	30	
14	Port Down Retry Count	8	30	
15	Drivers Load RISC Code	Enabled	—	
16	Enable Database Updates	No	—	
17	IOCB Allocation	256	512	
18	Extended Error Logging	Disabled	—	

In addition, the Registry options as follows:
Set-up values are described below. Use their respective default values for other parameters.

- LargeLuns = 1

The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	MaximumSGList	REG_DWORD:F0x41	—	
2	NumberOfRequests	0x96	—	
3	FabricSupported	1	—	
4	FabricDeviceCount	64	—	
5	ConfigRequired	0	—	
6	largeLuns	0x00	1	service pack4 or higher
7	Portname	—	—	
8	MSCS	2	—	In the case of MSCS configuration = 2 is mandatory.
9	UseSameNN	1	—	
10	TimeOutValue	0x3c	—	

If connecting a DF500 by installing a Host Bus Adapter Q-logic QLA2200F and using Miniport Driver Version 7.05.05, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- Frame size = 2048
- Adapter Hard Loop ID = Enable
- Execution Throttle = 256
- Login Retry Count = 30
- Port Down Retry Count = 30
- IOCB Allocation = 512

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
Host Adapter Settings				
1	Host Adapter BIOS	Disabled	—	
2	Frame Size	1024	2048	
3	Loop Reset Delay	5	—	
4	Adapter Hard Loop ID	Disabled	Enabled	
5	Hard Loop ID	0	Any	
Advanced Adapter Settings				
6	Execution Throttle	16	256	
7	Fast Command Posting	Enabled	—	
8	>4GByte Addressing	Disabled	Disable or Enable	In the case of MSCS configuration = Enable is mandatory.
9	LUNs Per Target	8	—	
10	Enable LIP Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
11	Enable LIP Full Login	Yes	—	
12	Enable Target Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
13	Login Retry Count	8	30	
14	Port Down Retry Count	8	30	
15	Drivers Load RISC Code	Enabled	—	
16	Enable Database Updates	No	—	
17	Disable Database Load	No	—	
18	IOCB Allocation	256	512	
19	Extended Error Logging	Disabled	—	
Extended Firmware Settings				
20	Extended Control Block	Enabled	—	
21	RIO Operation Mode	0	—	
22	Connection Options	3	0,1 or 3	In the case of MSCS configuration, Loop = 0, Fabric = 1
23	Class 2 Service	Disabled	—	
24	ACK0	Disabled	—	
25	Fibre Channel Tape Support	Disabled	—	
26	Fibre Channel Confirm	Disabled	—	
27	Command Reference Number	Disabled	—	
28	Read Transfer Ready	Disabled	—	
29	Response Timer	0	—	
30	Interrupt Delay Timer	0	—	

In addition, the Registry options as follows:
Set-up values are described below. Use their respective default values for other parameters.

- LargeLuns = 1

The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	MaximumSGList	REG_DWORD:F0x21	—	
2	NumberOfRequests	0x96	—	
3	FabricSupported	1	—	
4	FabricDeviceCount	64	—	
5	ConfigRequired	0	—	
6	LargeLuns	0x00	1	
7	Portname	—	—	
8	FC Tape	—	—	
9	MSCS	2	—	In the case of MSCS configuration = 2 is mandatory.
10	UseSameNN	1	—	
11	TimeOutValue	0x3c	—	

If connecting a DF500 by installing a Host Bus Adapter Q-logic QLA2300F and using Miniport Driver Version 8.00.08, BIOS must be set up and changed as follows: Set-up values are described below. Use their respective default values for other parameters.

- Frame size = 2048
- Adapter Hard Loop ID = Enable
- Execution Throttle = 256
- Login Retry Count = 30
- Port Down Retry Count = 30
- IOCB Allocation = 512

The following describes parameters extracted from BIOS.

No	Parameter	Default	Value	Note
Host Adapter Settings				
1	Host Adapter BIOS	Disabled	—	
2	Frame Size	2048	2048	
3	Loop Reset Delay	5	—	
4	Adapter Hard Loop ID	Disabled	Enabled	
5	Hard Loop ID	0	Any	
Advanced Adapter Settings				
6	Execution Throttle	16	256	
7	Fast Command Posting	Disabled	—	
8	>4GByte Addressing	Disabled	Disable or Enable	In the case of MSCS configuration = Enable is mandatory.
9	LUNs Per Target	8	—	
10	Enable LIP Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
11	Enable LIP Full Login	Yes	—	
12	Enable Target Reset	No	No or Yes	In the case of MSCS configuration = Yes is mandatory.
13	Login Retry Count	8	30	
14	Port Down Retry Count	8	30	
15	Drivers Load RISC Code	Enabled	—	
16	Enable Database Updates	No	—	
17	Disable Database Load	No	—	
18	IOCB Allocation	256	512	
19	Extended Error Logging	Disabled	—	
Extended Firmware Settings				
20	Extended Control Block	Enabled	—	
21	RIO Operation Mode	0	—	
22	Connection Options	2	0,1 or 2	In the case of MSCS configuration, Loop = 0, Fabric = 1
23	Class 2 Service	Disabled	—	
24	ACK0	Disabled	—	
25	Fibre Channel Tape Support	Disabled	—	
26	Fibre Channel Confirm	Disabled	—	
27	Command Reference Number	Disabled	—	
28	Read Transfer Ready	Disabled	—	
29	Response Timer	0	—	
30	Interrupt Delay Timer	0	—	
31	Data Rate	0	2	Auto Mode

In addition, the Registry options as follows:
Set-up values are described below. Use their respective default values for other parameters.

- EnableLun0 = 1

The following describes parameters extracted from Registry Options.

No	Parameter	Default	Value	Note
1	MaximumSGList	REG_DWORD:F0x21	—	
2	NumberOfRequests	0x96	—	
3	FabricSupported	—	—	
4	FabricDeviceCount	—	—	
5	ConfigRequired	—	—	
6	LargeLuns	0x01	—	
7	Portname	—	—	
8	FC Tape	—	—	
9	MSCS	2	—	In the case of MSCS configuration = 2 is mandatory.
10	UseSameNN	1	—	
11	EnableLun0	0	1	
12	TimeOutValue	0x3c	—	

If Tru64 UNIX 5.1 are used

If connecting a DF500 directly or via an FC HUB by using a Host Bus Adapter KGPSA-CA, the Fibre Topology of the Host Bus Adapter must be set to “Loop”.
The following describes an example of the procedure for operations.

```
P00>> wwidmgr –show adapter                                    :Adapter item No. check
P00>> wwidmgr –set adapter –item[Adapter item No] –topo loop
```

If connecting a DF500 via an FC Switching HUB by using a Host Bus Adapter KGPSA-CA, the Fibre Topology of the Host Bus Adapter must be set to “Loop”.
The following describes an example of the procedure for operations.

```
P00>> wwidmgr –show adapter                                    :Adapter item No. check
P00>> wwidmgr –set adapter –item[Adapter item No] –topo fabric
```

Appendix B List of Software

Classification	Model	Name	Specification
Turbo LU residence function	DF-F500-WLU	Turbo LU residence function	Turbo LU residence function
Fibre security function	DF-F500-WSEC	Fibre security control function	Fibre security control function for supporting SAN system (Port, LUN security)
ID take-over function	DF-F500-WD	ID take-over control function	SCSI ID/Port ID take-over control function (SCSI Hot Standby + FC Port ID Dual Active ID Succession)
SNMP support function	DF-F500-WS	SNMP support control function	SNMP support control function
Password protection function	DF-F500-WSPS	Password protection control function	Password protection control function
MRCF-Lite function	DF-F500-WCFL	MRCF-Lite control function	MRCF-Lite function

Appendix C List of Message Codes (Web)

- Errors detected by CUDG

Message code	Message text	Failure part	Recovery measures
01814101	BOOT ROM0 ERR	Controller	Call your maintenance engineer
01814102	BOOT ROM0 ERR		
01814103	BOOT ROM0 ERR		
01814201	BOOT ROM1 ERR		
01814202	BOOT ROM1 ERR		
01814203	BOOT ROM1 ERR		
01815801	BOOT ROM0 ERR		
01824301	CSDS RW ERR		
01824302	CSDS RW ERR		
01824303	CSDS RW ERR		
01834401	L2RW ERR		
01834402	L2RW ERR		
01844501	MCTL RW ERR		
01844502	MCTL RW ERR		
01844503	MCTL DMA ERR		
01844504	MCTL DMA ERR		
01844505	MCTL DMA ERR		
01844601	MCTL FORCE ERR		
01844602	MCTL FORCE ERR		
01844603	MCTL FORCE ERR		
01844701	LAN CTL RW ERR		
01844702	LAN CTL LB ERR		
01844703	LAN CTL LB ERR		
01844D01	CTC CH0 ERR		
01844D02	CTC CH0 ERR		
01844D03	CTC CH0 ERR		
01844D04	CTC CH1 ERR		
01844D05	CTC CH1 ERR		
01844D06	CTC CH1 ERR		
01845101	FDC BUFF ERR		
01845102	FDC BUFF ERR		
01864801	SI0 CTL RW ERR		
01864802	SI0 CTL RW ERR		
01864803	SI0 CTL LB ERR		
01864804	SI0 CTL LB ERR		
01874901	DCTL1 RW ERR		
01874902	DCTL1 RW ERR		
01874A01	DUAL RW ERR		
01874A02	DUAL RW ERR		
01874C01	DCTL FR1 ERR		
01874C02	DCTL FR1 ERR		
01874C03	DCTL FR1 ERR		
01874E07	H_PT0 XFER ERR		
01874E08	H_PT0 XFER ERR		
01874E09	H_PT0 XFER ERR		
01874E0A	H_PT0 XFER ERR		
01874E0B	H_PT0 XFER ERR		
01874E0C	H_PT0 XFER ERR		
01874E0D	H-PT1 XFER ERR	Interface board or controller	
01874E0E	Hh-PT1 XFER ERR		
01874E0F	H-PT1 XFER ERR		
01874E10	H-PT1 XFER ERR		
01874E11	H-PT1 XFER ERR		
01874E12	H-PT1 XFER ERR		
01874E13	H-PT1 XFER ERR		
01874E14	H_PT0 FR ERR	Controller	
01874E15	H_PT0 FR ERR		
01874E16	H_PT0 FR ERR		

Message code	Message text	Failure part	Recovery measures
01874E17	H_PT1 FR ERR	Interface board or controller	Call your maintenance engineer
01874E18	H_PT1 FR ERR		
01875301	DCTL2 RW ERR	Controller	
01875302	DCTL2 RW ERR		
01875501	DMA0 XFER ERR		
01875502	DMA0 XFER ERR		
01875503	DMA0 XFER ERR		
01875504	D_PT0 XFER ERR		
01875505	D_PT0 XFER ERR		
01875506	D_PT0 XFER ERR		
01875507	D_PT0 XFER ERR		
01875508	D_PT0 XFER ERR		
01875509	D_PT0 XFER ERR		
0187550A	D_PT0 XFER ERR		
0187550B	D_PT0 XFER ERR		
0187550C	D_PT1 XFER ERR		
0187550D	D_PT1 XFER ERR		
0187550E	D_PT1 XFER ERR		
0187550F	D_PT1 XFER ERR		
01875510	D_PT1 XFER ERR		
01875511	D_PT1 XFER ERR		
01875512	D_PT1 XFER ERR		
01875513	D_PT1 XFER ERR		
01875601	DMA0 FR ERR		
01875602	D_PT0 FR ERR		
01875603	D_PT0 FR ERR		
01875604	D_PT0 FR ERR		
01875605	D_PT0 FR ERR		
01875606	D_PT1 FR ERR		
01875607	D_PT1 FR ERR		
01875710	H_PT0 XFER ERR		
01875711	H_PT0 XFER ERR		
01875712	H_PT0 XFER ERR		
01875713	H_PT0 XFER ERR		
01875714	H_PT0 XFER ERR		
01875715	H_PT0 XFER ERR		
01875716	H_PT0 XFER ERR		
01875717	H_PT0 XFER ERR		
01875718	H_PT1 XFER ERR	Interface board or controller	
01875719	H_PT1 XFER ERR		
0187571A	H_PT1 XFER ERR		
0187571B	H_PT1 XFER ERR		
0187571C	H_PT1 XFER ERR		
0187571D	H_PT1 XFER ERR		
0187571E	H_PT1 XFER ERR		
0187571F	H_PT1 XFER ERR		
01875720	H_PT0 FR ERR	Controller	
01875721	H_PT0 FR ERR		
01875722	H_PT0 FR ERR		
01875723	H_PT0 FR ERR		
01875724	H_PT1 FR ERR	Interface board or controller	
01875725	H_PT1 FR ERR		
01884B01	CACHE1 INF ERR	Cache memory or controller	
01884B02	CACHE1 INF ERR		
01884B03	CACHE1 IMP ERR		
01884B04	CACHE1 IMP ERR		
01884B05	CACHE1 SIZE ERR		
01884B06	CACHE1 SIZE ERR		
01884B07	CACHE1 SIZE ERR		
01884B08	CACHE1 RW ERR		
01884B09	CACHE1 RW ERR		
01884B0A	CACHE1 ADR ERR		
01884B0B	CACHE1 ADR ERR		
01884B0C	CACHE1 ECC ERR		
01884B0D	CACHE1 ECC ERR		
01885401	CACHE2 INF ERR		
01885402	CACHE2 INF ERR		
01885403	CACHE2 RW ERR		
01885404	CACHE2 RW ERR		

Message code	Message text	Failure part	Recovery measures
01885405	CACHE2 ADR ERR	Cache memory or controller	Call your maintenance engineer
01885406	CACHE2 ADR ERR		
01894E01	HSPC IMP ERR	Interface board or controller	
01894E02	HSPC RW ERR		
01894E03	HSPC SCR RW ERR		
01894E04	HSPC LPBK ERR		
01894E05	HSPC LPBK ERR		
01894E06	H_PT0 XFER ERR	Controller	
018A4F01	DFPC0 RW ERR		
018A4F02	DFPC0 RW ERR		
018A4F03	DFPC0 LPINI ERR		
018A4F04	DFPC0 LPBK ERR		
018A4F05	DFPC0 LPBK ERR		
018A4F06	DFPC0 LPBK ERR		
018A4F07	DFPC0 LPBK ERR		
018A4F08	DFPC1 RW ERR		
018A4F09	DFPC1 RW ERR		
018A4F0A	DFPC1 LPINI ERR		
018A4F0B	DFPC1 LPBK ERR		
018A4F0C	DFPC1 LPBK ERR		
018A4F0D	DFPC1 LPBK ERR		
018A4F0E	DFPC1 LPBK ERR		
018B5001	FDC ERR	Floppy disk drive or controller	
018C5201	RTC ERR	Controller	
018C5202	RTC ERR		
018D5701	HFPC IMP ERR	Interface board or controller	
018D5702	HFPC0 RW ERR	Controller	
018D5703	HFPC0 RW ERR		
018D5704	HFPC0 LPINI ERR		
018D5705	HFPC0 LPBK ERR		
018D5706	HFPC0 LPBK ERR		
018D5707	HFPC0 LPBK ERR		
018D5708	HFPC0 LPBK ERR		
018D5709	HFPC1 RW ERR	Interface board or controller	
018D570A	HFPC1 RW ERR		
018D570B	HFPC1 LPINI ERR		
018D570C	HFPC1 LPBK ERR		
018D570D	HFPC1 LPBK ERR		
018D570E	HFPC1 LPBK ERR		
018D570F	HFPC1 LPBK ERR		
018xxxD1	CACHE ACCESS ERR	Cache memory or controller	
018xxxD1	CACHE ACCESS ERR		
018xxxE0	HARD ERR	Controller	
018xxxF0	PCI STS ERR		

- Flash detected messages

Message code	Message text	Failure part	Recovery measures
R00100	PS OFF time over/PS alarm	Controller	Call your maintenance engineer
R00110	INSTACK threshold over		
R00120	INSTACK back over		
R00140	MCTL data parity error [DP3]		
R00141	MCTL data parity error [DP2]		
R00142	MCTL data parity error [DP1]		
R00143	MCTL data parity error [DP0]		
R00150	MCTL REG access error [RDRGWR]		
R00170	MCTL ready time-out		
R00180	CTC Parity error (CH-0)		
R00181	CTC Parity error (CH-1)		
R00190	Watchdog-timer counter parity error		
R00191	FDC-DMA ADR counter count over		
R00192	FDC-DMA ADR counter parity error		
R10100	C/P-BRG parity error		
R10101	C/P-BRG system error		

Message code	Message text	Failure part	Recovery measures
R10102	C/P-BRG master abort	Controller	Call your maintenance engineer
R10103	C/P-BRG target abort		
R10104	C/P-BRG data parity error		
R10105	C/P-BRG PCI SERR		
R10106	C/P-BRG PCI PERR		
R10107	C/P-BRG memory read parity error		
R10110	MCTL parity error		
R10111	MCTL system error		
R10120	LAN parity error		
R10121	LAN system error		
R10130	P/P-BRG0 parity error		
R10131	P/P-BRG0system error		
R10132	P/P-BRG1 parity error		
R10133	P/P-BRG1 system error		
R10140	DMA#0 parity error		
R10141	DMA#0 system error		
R10150	D_PORT parity error		
R10151	D_PORT system error		
R10152	H_PORT parity error		
R10153	H_PORT system error		
R10160	HFPC-A parity error		
R10161	HDPC-A system error		
R10162	HFPC-B parity error		
R10163	HFPC-B system error		
R10164	HSPC-A parity error		
R10165	HSPC-A system error		
R10166	HSPC-B parity error		
R10167	HSPC-B system error		
R10170	DFPC0 parity error		
R10171	DFPC0 system error		
R10172	DFPC1 parity error		
R10173	DFPC1 system error		
R10180	MCTL SERR		
R10190	MCTL PCI-ARBT-CNT parity error		
R10191	MCTL M-ABT-CNT parity error		
R20220	DCTL access error [2BWR]		
R20230	CTL lock aborted		
R20240	Other CTL lock time-out		
R20250	PCI BUFF parity error [RPDPTY]		
R20260	DCTL access error [WR PROTECT]		
R20270	CACHE address over [MPU]		
R20271	CACHE address over [DMA0]		
R20272	CACHE address over [D_PORT0]		
R20273	CACHE address over [D_PORT1]		
R20274	CACHE address over [H_PORT0]		
R20275	CACHE address over [H_PORT1]		
R20276	CACHE address over [M_MPU]		
R20280	CACHE write error		
R20281	CACHE REF counter parity error		
R20290	Other CTL lock response time-out		
R303xy	ECC uncorrectable error (CACHE-x/y)	Cache memory	
R304xy	ECC correction failed (CACHE-x/y)		
R31000	ECC write parity error [MPU]	Controller	
R31100	ECC generate error [MPU]		
R312xx	ECC uncorrectable error (CTL-x)		
R40100	DUAL I/F data error [DMPERR]		
R40106	DUAL I/F parity error [EMPRPTY]		
R40107	DUAL I/F parity error [IMRPTY]		
R40108	DUAL I/F parity error [EMPWPTY]		

Message code	Message text	Failure part	Recovery measures
R4010E	DUAL I/F parity error [IMWPTY]	Controller	Call your maintenance engineer
R4010F	DUAL I/F parity error [ID0WPTYE]		
R40110	DUAL I/F parity error [IDP0WPTYE]		
R40111	DUAL I/F parity error [IDP1WPTYE]		
R40120	DUAL I/F CACHE address over [EMPCADROV]		
R40121	DUAL I/F CACHE address over [EMMPUCADR]		
R40122	DUAL I/F CACHE address over [EDOCADR]		
R40123	DUAL I/F CACHE address over [EDP0CADR]		
R40124	DUAL I/F CACHE address over [EDP1CADR]		
R40125	DUAL I/F CACHE address over [CHP0DCADR]		
R40126	DUAL I/F CACHE address over [EHP1DCADR]		
R40130	DUAL I/F ready time-out [IMRDYT]		
R40131	DUAL I/F ready time-out [ID0RDYT]		
R40132	DUAL I/F ready time-out [IDP0RDYT]		
R40133	DUAL I/F ready time-out [IDP1RDYT]		
R40140	DUAL I/F clock error [CLKERR]		
R40150	DUAL I/F error [MDTDCHK]		
R40160	DUAL I/F access error [EMPWPROT]		
R40161	DUAL I/F address parity error [EADRPERR]		
R40200	DUAL I/F error [DMPERR]		
R40201	DUAL I/F access error [EMMPWPROT]		
R40202	DUAL I/F parity error [IMMPUWPTYE]		
R40210	DUAL I/F ready time-out [MMPURDYT]		
R40211	DUAL I/F parity error [EMMPUWPTYE]		
RA00xx	Microprogram error [FLS]	—	Re-starting the equipment
RA0410	Host name delete error	Controller	Call your maintenance engineer
RA0411	NFS unmount error		
RA0412	NFS mount error		
RA0413	Host name add error		
RA0414	NFS file open error		
RA0415	System file error		
RA1000	Loop error	—	
RA2000	DIPSW read error	Controller	
RA30xy	CACHE size mismatch b/w. CTL (CACHE-x/y)	Cache memory	
RA4000	CTL synchronized error	Controller	
RA4100	CTL initial synchronized error		
RA4200	Maintenance mode synchronized error		
RA5000	I/F fatal error	Interface board or controller	
RA5100	ID Succession failed [config]	—	
RA5200	ID Succession failed [system parameter]		
RA6000	CTL number mismatch		
RA6100	System parameter underfined		
RA6200	System parameter SUM check error	Controller	
RA7000	Microprogram revision mismatch	—	Re-starting the equipment
RA7100	System program error [NO SCSI]		Call your maintenance engineer
RA7200	System program error [NO FIBER]		
RA7300	System program error [NO SCREENING]		

Message code	Message text	Failure part	Recovery measures
RA7400	System program error [NO SCREENING]	—	Call your maintenance engineer
RA7500	System program error [Unsupport]		
RA9000	Task make error	Controller	
RAA000	CUDG skip	—	—
RAA100	Remote reboot execute		
RAA200	Option data initialized		
RB1000	FD device error		Replace the failed FD
RB1100	FD device install error		
RB1200	FD read error		
RB1300	FD number error		Check the FD number
RB1400	Open/Read error [END.DAT]		Replace the failed FD
RB1500	No END.DAT found in FD		
RB1600	FD control error		
RB1700	File seek error		
RB2000	FD unformatted		Formatting the FD
RB2100	FD not inserted		Inserting the FD
RB2200	FD write protected		Canceling the FD
RB2300	Bad FD inserted		Replace the failed FD
RB3000	File size error		
RB3100	File open error		
RB3200	File read error		
RB3300	File write error		
RB3400	Bad FD file		
RB3500	Bad block ID		
RB3600	Bad LBA in FD		
RB4000	File open error [MAINPRG.DAT]		
RB4100	Rile read error [MAINPRG.DAT]		
RB5000	FD read error [USTR500.DAT]		
RB5100	Status error [USTR500.DAT]		
RB7000	Program size too large		Replace the installation FD with correct one
RB8000	Old microprogram exists		Call your maintenance engineer
RB8100	Install failed		
RB8200	Install partially complete		
RB8300	Empty system retry full install		
RB8400	Down load failed		
RB8500	Microprogram extract error		
RB9000	System parameter restore failed		
RB9100	Another system parameter restore failed		
RBA000	Down grade check NG		
RBA100	Unsupported microprogram error		
RBA200	Unsupported FM0 program error		
RBA300	Unsupported FM1 program error		
RBB0xy	Bad sequence number (Unit-x, HDU-y)	Disk drive	
RBC000	No drive available		
RBC1xy	Drive block size error (Unit-x, HDU-y)		
RBC2xy	Unknown drive (Unit-x, HDU-y)		
RBD000	FM0 program write error	Controller	
RBD100	FM1 program write error		
RBE000	Flash memory write error		
RBE100	Flash memory SUM check error		
RBE200	Flash program update error	—	
RBE300	Flash program update start		—
RBE301	Flash program update end		
RBF000	Backup FD error	Backup FD	Changed the failed FD.
RC0000	System parameter restore complete	—	—

- Progress messages

Message code	Message text	Failure part	Recovery measures
I0010x	CTL recovered (CTL-x)	—	—
I002xy	CACHE recovered (CACHE-x/y)		
I00300	Battery recovered		
I0040x	Battery backup circuit recovered (CTL-x)		

Message code	Message text	Failure part	Recovery measures
I00500	FAN recovered	—	—
I006xy	PS recovered (Unit-x, PS-y)		
I007xy	HDU recovered (Unit-x, HDU-y)		
I008xy	Spare HDU recovered (Unit-x, HDU-y)		
I009xy	Spare HDU recovered (Unit-x, HDU-y)		
I00Axy	Loop recovered (Path-x, Loop-y)		
I00Bxy	ENC recovered (Unit-x, ENC-y)		
I00D00	UPS recovered (UPS-x)		
I00E00	Battery removed		
I00F00	Battery SW off		
I142xy	System copy failed (Unit-x, HDU-y)	Disk drive	Call your maintenance engineer
I150xy	Data recovery started (Unit-x, HDU-y)	—	—
I151xy	Data recovery completed (Unit-x, HDU-y)		
I152xy	Data recovery failed (Unit-x, HDU-y)		Call your maintenance engineer
I153xy	Data recovery partial (Unit-x, HDU-y)		
I15Axy	Dynamic sparing start (Unit-x, HDU-y)		—
I160xx	FLASH other revision edit (REV-xx)		
I17001	Default LU-CTL change failed [PIN]	Disk drive	Call your maintenance engineer
I17002	Default LU-CTL change failed [PS OFF]	—	Set the equipment in the ready state and turn off the power, then turn on the power again
I17003	Default LU-CTL change failed [HOT]		Use the system as it is
I17004	Default LU-CTL change failed [LU]		
I18000	PIN-over recovered		—
I19000	Online Micro-update completed		
I1A00x	Turbo-LU disable (Default CTL-x)		Set the equipment in the ready state and turn off the power, then turn on the power again
I1A10x	Turbo-LU deleted (Default CTL-x)		—
I1A2xy	Turbo-LU warning recovered (CTL-x, ERR-y)		
I1A3xx	Turbo-LU enable (Default CTL-x)		
I1B000	Forced parity correction started		
I1B100	Forced parity correction completed		
I1C0xy	Loop diagnostic start (Path-x, Loop-y)		
I1C1xy	Loop diagnostic end (Path-x, Loop-y)		
I20100	FD system error	Controller	Call your maintenance engineer
I20200	FD data over		
I20300	FD write protected	—	Unprotected FD.
I20400	FD unformatted		Formatting the FD
I20500	FD device error	Controller	Call your maintenance engineer
I20600	FD file open error	—	Replace the failed FD
I20700	FD access interrupt		Call your maintenance engineer
I301xy	HDU error (Unit-x, HDU-y)		
I30200	System HDU error		
I303xy	HDU read capacity failed (Unit-x, HDU-y)		
I304xy	HDU spin up failed (Unit-x, HDU-y)	Disk drive	
I305xy	HDU read capacity failed (Unit-x, HDU-y)		
I410xy	HDU error over (Unit-x, HDU-y) [HDRCV]		

Message code	Message text	Failure part	Recovery measures
I411xy	HDU error over (Unit-x, HDU-y) [HDUNR]	Disk drive	Call your maintenance engineer
I412xy	HDU error over (Unit-x, HDU-y) [MDRCV]		
I413xy	HDU error over (Unit-x, HDU-y) [MDUNR]		
I414xy	HDU error over (Unit-x, HDU-y) [RWRCV]		
I415xy	HDU error over (Unit-x, HDU-y) [RWUNR]		
I416xy	HDU error over (Unit-x, HDU-y) [IFRCV]		
I417xy	HDU error over (Unit-x, HDU-y) [IFUNR]		
I418xy	HDU error over (Unit-x, HDU-y) [CHRCV]		
I419xy	HDU error over (Unit-x, HDU-y) [CHUNR]		
I41Axy	HDU error over (Unit-x, HDU-y) [SCRCV]		
I41Bxy	HDU error over (Unit-x, HDU-y) [SCUNR]		
I41Cxy	HDU error over (Unit-x, HDU-y) [ONVRCV]		
I41Dxy	HDU error over (Unit-x, HDU-y) [ONVUNR]		
I4200x	Online Micro-update (CTL-x)	—	—
I502xy	HDU change Info (Unit-x, HDU-y)		
I510xy	D_PT error (HDU Unit-x, HDU-y)	Disk drive	Call your maintenance engineer
I6010x	LAN failure (CTL-x)	LAN cable or controller	
I60200	Link failure [LIMIT OVER]	—	
I603xy	Obstacle part unknown (PATH-x, LOOP-y)		
I604xy	ENC Recovery NG HDU-HG (Unit-x, HDU-y or z)	Disk drive	
I605xy	ENC Recovery NG ENC-NG (Unit-x, ENC-y)	ENC board	
I606xy	ENC Thermal alarm (Unit-x, ENC-y)	—	
I607xx	CACHE error over (CACHE-x/y) [CRECT]		
I60800	LU change over		
I609xy	ENC cable error (Unit-x, ENC-y)		
I61000	ENC error inf.[parity error]		
I61100	ENC error inf [H8 bus parity error]		
I61200	ENC error inf.[SEF-0 error]		
I61300	ENC error inf.[SEF-1 error]		
I61400	ENC error inf.[SEF-2 error]		
I61500	ENC error inf.[SEF-3 error]		
I61600	ENC error inf.[SEF-4 error]		
I61700	ENC error inf [CUDG ECTLREGERR]		
I61800	ENC error inf [CUDG H8SIOERR]		
I61900	ENC error inf [CUDG H8SIOERR]		
I61A00	ENC error inf.[H8SIOERR]		
I61B00	ENC error inf.[ECTL force test]		
I61C00	ENC error inf.[SES-HDU error]		
I61D00	Shoutdown warning		Turn off power supply by mein switch.
I61E00	PIN-over [Forced parity correction]		—

- Warning messages

Message code	Message text	Failure part	Recovery measures
W0100x	CTL alarm (CTL-x)	Controller	Call your maintenance engineer
W02000	Other CTL removed		

Message code	Message text	Failure part	Recovery measures
W03000	Battery alarm	Battery unit	Call your maintenance engineer
W03100	Battery alarm		
W03200	Battery removed		
W03300	Battery charge alarm		
W0340x	Battery backup circuit alarm (CTL-x)	Battery unit or controller	
W04000	FAN alarm	Fan unit	
W050xy	PS alarm (Unit-x, PS-y)	AC/DC power supply	
W060xy	HDU alarm (Unit-x, HDU-y)	Disk drive	
W061xy	Spare HDU alarm (Unit-x, HDU-y)		
W070xy	HDU spin up failed (Unit-x, HDU-y)		
W071xy	HDU inquiry error (Unit-x, HDU-y)		
W072xy	HDU read capacity failed (Unit-x, HDU-y)		
W073xy	HDU replace failed (Unit-x, HDU-y)		
W080xy	Loop alarm (Path-x, Loop-y)	—	
W090xy	ENC alarm (Unit-x, ENC-y)	ENC board	
W0B0xy	ENC recovery failed (Unit-x, ENC-y)	—	
W0C000	UPS alarm (UPS-x)	UPS not mounted	
W0D0x0	CACHE alarm (CTL-x, CACHE-y)	Cache memory	
W0E0xx	LU alarm (LU-xx)	—	
W120xx	User data lost (LU-xx)		
W22000	PS OFF failed [NO HDU]		
W23000	PS OFF failed [CACHE ERR]		
W310xx	DMA error (DMA-xx)	Controller	
W320xy	LA error (D_PT-0, CTL-x, TRNS-y)	—	
W321xy	LA error (D_PT-1, CTL-x, TRNS-y)		
W322xy	LA error (H_PT-0, CTL-x, TRNS-y)		
W323xy	LA error (H_PT-1, CTL-x, TRNS-y)		
W330xy	LRC error (D_PT-0, CTL-x, TRNS-y)		
W331xy	LRC error (D_PT-1, CTL-x, TRNS-y)		
W340xy	LRC error (H_PT-0, CTL-x, TRNS-y)		
W341xy	LRC error (H_PT-1, CTL-x, TRNS-y)		
W41000	PIN write error		
W41100	PIN over [PNLEVLOV]		
W4200x	SNMP invalid (CTL-x) [Config]		
W43000	SNMP invalid [RAM Device MAKE ERR]	Controller	
W43100	SNMP invalid [RAM Device INIT ERR]		
W43200	SNMP invalid [RAM Device CREATE ERR]		
W43300	SNMP invalid [RAM Device WRITE ERR]		
W43400	SNMP failure [APL ERR]		
W440xy	Turbo-LU warning (CTL-x, ERR-y)	—	
W4500x	Online micro-update executing (CTL-x)		
W4600x	Online micro-update started (CTL-x)		
W47000	Serial number error [WWN]		

- Failure messages

Message code	Message text	Failure part	Recovery measures
H00100	PCI data parity error [DMA0PERR]	Controller	Call your maintenance engineer
H00110	INTSTACK threshold over		
H00120	INTSTACK back over		
H00121	INTSTACK memory over		
H00130	M-DMA0ADR counter count over		
H00131	M-DMA0 ADR counter parity error		
H00140	MCTL data parity error [DP3]		
H00141	MCTL data parity error [DP2]		
H00142	MCTL data parity error [DP1]		
H00143	MCTL data parity error [DP0]		
H00150	MCTL REG access error [RDRGWR]		
H00160	MPU FAN alarm		
H00170	MCTL Ready time-out		
H00180	CTC parity error (CH-0)		
H00181	CTC parity error (CH-1)		
H00190	Watchdog-timer counter parity error		
H00191	FDC-DMA ADR counter count over		
H00192	FDC-DMA ADR counter parity error		
H10100	C/P-BRG parity error		
H10101	C/P-BRG system error		
H10102	C/P-BRGmaster abort		
H10103	C/P-BRGtarget abort		
H10104	C/P-BRGdata parity error		
H10105	C/P-BRG PCI SERR		
H10106	C/P-BRG PCI PERR		
H10107	C/P-BRG memory read parity error		
H10110	MCTL parity error		
H10111	MCTL system error		
H10120	LAN parity error		
H10121	LAN system error		
H10130	P/P-BRG0 parity error		
H10131	P/P-BRG0 system error		
H10132	P/P-BRG1 parity error		
H10133	P/P-BRG1 system error		
H10140	DMA#0 parity error		
H10141	DMA#0 system error		
H10150	D_PORT parity error		
H10151	D_PORT system error		
H10152	H_PORT parity error		
H10153	H_PORT system error		
H10160	HFPC-A parity error		
H10161	HFPC-A system error		
H10162	HDPC-B parity error		
H10163	HFPC-B system error		
H10164	HSPC-A parity error		
H10165	HSPC-A system error		
H10166	HSPC-B parity error		
H10167	HSPC-B system error		
H10170	DFPC0 parity error		
H10171	DFPC0 system error		
H10172	DFPC1 parity error		
H10173	DFPC1 system error		
H10180	MCTL PCI SERR		
H10190	MCTL PCI-ARBT-CNT parity error		
H10191	MCTL M-ABT-CNT parity error		
H1090x	CACHE read PCI ERR [OTH_CTL] (CTL-x)		
H1093x	CACHE write PCI ERR [OTH_CTL] (CTL-x)		
H20100	Parity generation LA error [DRR]	Controller or cache memory	

Message code	Message text	Failure part	Recovery measures
H20220	DCTL access error [2BWR]	Controller	Call your maintenance engineer
H20230	CTL lock abort		
H20240	Other CTL lock time-out		
H20250	PCI BUFF parity error [RPDPTY]		
H20260	DCTL access error [WRPROTECT]		
H20270	CACHE address over [MPU]		
H20271	CACHE address over [DMA0]		
H20272	CACHE address over [D_PORT0]		
H20273	CACHE address over [D_PORT1]		
H20274	CACHE address over [H_PORT0]		
H20275	CACHE address over [H_PORT1]		
H20276	CACHE address over [M_MPU]		
H20280	CACHE write error		
H20281	CACHE REF counter parity error		
H20290	Other CTL lock response time-out		
H203A0	DCTL time-out [H_PORT]		
H204A1	DCTL time-out [D_PORT]		
H205B0	DMA forced stop failed		
H206B1	DMA#0 hard error end reset failed		
H2091x	CACHE address over [OTH_CTL] (CTL-x)		
H2094x	DCTL access error [OTH_CTL] (CTL-x)		
H2095x	DCTL hard error [OTH CTL] (CTL-x)		
H301xx	ECC write parity error (DMA-xx)		
H302xx	ECC generate error (DMA-xx)		
H303xy	ECC uncorrectable error (CACHE-x/y)	Cache memory	
H304xy	ECC correction failed (CACHE-x/y)		
H3050x	ECC uncorrectable error (CTL-x)	Controller or cache memory	
H3092x	CACHE uncorrectable ERR [OTH_CTL] (CTL-x)	Controller	
H40100	DUAL I/F data error [DMPERR]		
H40101	DUAL I/F data error [DDM0DTE]		
H40102	DUAL I/F data error [EDP0DTE]		
H40103	DUAL I/F data error [EDP1DTE]		
H40104	DUAL I/F data error [EHP0DTE]		
H40105	DUAL I/F data error [EHP1DTE]		
H40106	DUAL I/F parity error [EMPRPTY]		
H40107	DUAL I/F parity error [IMRPTY]		
H40108	DUAL I/F parity error [EMPWPTY]		
H40109	DUAL I/F clock error [ED0WPTYE]		
H4010A	DUAL I/F parity error [EDP0WPTYE]		
H4010B	DUAL I/F parity error [EDP1WPTYE]		
H4010C	DUAL I/F parity error [EHP0EPTYE]		
H4010D	DUAL I/F parity error [EHP1WPTYE]		
H4010E	DUAL I/F parity error [IMWPTY]		
H4010F	DUAL I/F parity error [ID0WPTYE]		
H40110	DUAL I/F parity error [IDP0WPTYE]		
H40111	DUAL I/F parity error [IDP1WPTYE]		

Message code	Message text	Failure part	Recovery measures
H40112	DUAL I/F parity error [IHP0WPTYE]	Controller	Call your maintenance engineer
H40113	DUAL I/F parity error [IHP1WPTYE]		
H40120	DUAL I/F CACHE address over [EMPCADROV]		
H40121	DUAL I/F CACHE address over [EMMPUCADR]		
H40122	DUAL I/F CACHE address over [ED0CADR]		
H40123	DUAL I/F CACHE address over [EDP0CADR]		
H40124	DUAL I/F CACHE address over [DEP1CADR]		
H40125	DUAL I/F CACHE address over [EHP0DCADR]		
H40126	DUAL I/F CACHE address over [EHP1DCADR]		
H40130	DUAL I/F ready time-out [IMRDYT]		
H40131	DUAL I/F ready time-out [ID0RDYT]		
H40132	DUAL I/F ready time-out [IDP0RDYT]		
H40133	DUAL I/F ready time-out [IDP1RDYT]		
H40134	DUAL I/F ready time-out [IHP0RDYT]		
H40135	DUAL I/F ready time-out [IHP1RDYT]		
H40140	DUAL I/F clock error [ICLKERR]		
H40141	DUAL I/F clock error [D0ICLKER]		
H40142	DUAL I/F clock error [IDP0ICLKER]		
H40143	DUAL I/F clock error [IDP1ICLKER]		
H40144	DUAL I/F clock error [IHP0ICLKER]		
H40145	DUAL I/F clock error [IHP1ICLKER]		
H40150	DUAL I/F error [MDTDCHK]		
H40151	DUAL I/F error [ID0DDTDCHK]		
H40152	DUAL I/F error [D10DDTDK]		
H40153	DUAL I/F error [D11DDTDK]		
H40160	DUAL I/F access error [EMPWPROT]		
H40161	DUAL I/F address parity error [EADRPERR]		
H40170	DUAL I/F clock error [ECLKERR]		
H90100	PS DC Voltage alarm	AC/DC power supply (RK)	
H90210	CTL failure	Controller	
H90320	Watch-dog time-out		
H90330	Connection unit excess (Max.5)	—	Check that five or more equipment are not connected.
HA0100	CUDG error		Call your maintenance engineer
HA020x	RTC alarm (CTL-x)	Controller	
HA0310	M-DMA transfer time-out		
HA0311	M-DMA retry error		
HA0312	M-DMA multiple run		
HA0313	M-DMA stop time-out		
HA0420	FLASH write error		
HA0530	SERIAL open error	RS232C cable, controller	
HA0531	SOCKET open error	LAN cable, controller	
HA0532	ACCEPT open error		
HB0210	Target abort INT status error	Controller or inter face board	
HB0320	H-FPC PCI INT STS REG error [CRS]		
HB0421	H-FPC PCI STS REG error [RMA]		

Message code	Message text	Failure part	Recovery measures
HB0522	H-FPC PCI STS REG error [DPE]	Controller	Call your maintenance engineer
HC0100	HSPC PCI bus parity error		
HC0101	HSPC PCI bus fault		
HC0200	HSPC initialize time-out		
HC0300	HSPC FIF0 error		
HD0100	DFPC error over [DFPCINM]		
HD1100	HDU CDB check code error [RETRY]		
HD1200	HDU CDB check code error [OVER]		
HD21xx	Host transfer DMA error over (DMA-xx)		
HD22xx	CACHE error over (CACHE-x/x) [CRECT]		
HE0100	Backend down [All Loop NG]	—	
HE020x	Backend down [NO SES-HDU BKW] (Unit-x)		
HE030x	Backend down [NO SES-HDU BKD] (Unit-x)		
HE040x	Backend down [NO ENC] (Unit-x)		
HE050x	Backend down [Unit# ERR] (Unit-x)		
HE06xy	Backend down [AL_PA] (PATH-x, LOOP-y)		
HE0710	Backend loop change error [OWN]		
HE0711	Backend loop change error [OTH]		
HE082x	CTL loop failure (CTL-x)	Controller	
HE0930	BKD job time-out		
HE0A31	BKW job time-out		
HE0Bxy	ENC thermal alarm [PSOFF] (Unit-x, ENC-y)		
HE0C00	Controller thermal alarm [OWN]	—	
HE0D00	Controller thermal alarm [OTH]		
HE0E00	Controller thermal alarm [PSOFF]		
HE0Fxy	Backend down [Cable ERR] (Unit-x, ENC-y)		
HF0100	Data transfer check error [SEGPOSERR]	Controller	
HF0101	Data transfer check error [WRNODTYBK]		
HF0102	Data transfer check error [RDDTYBLK]		
HF0103	Data transfer check error [RDSEGERR]	Controller or cache memory	
HF0104	Data transfer check error [WSGQATERR]	Controller	
HF0105	Data transfer check error [WSEGPDEV]	Controller of cache memory	
HF0106	Data transfer check error [WSEGLOCK]		
HF0107	Data transfer check error [CCPLUNERR]	Controller of cache memory	
HF0108	Data transfer check error [CCPLBAERR]		
HF0109	Data transfer check error [PARLUNERR]		
HF010A	Data transfer check error [PARLBAERR]		
HF010B	Data transfer check error [QUEUEERR]		
HF010C	Data transfer check error [COWDRVERR]		
HF010D	Data transfer check error [LACHEKMOD]	Controller	

Message code	Message text	Failure part	Recovery measures
HF010E	Data transfer check error [DSTPOSERR]	Controller or cache memory	Call your maintenance engineer
HF010F	Data transfer check error [SEGPOSOTH]		
HF0110	Data transfer check error [CMPNGHC]	Controller	
HF0111	Data transfer check error [CMPNGSP]		
HF0112	Data transfer check error [CMPNGPA]		
HF0113	Data transfer check error [CMPNGCP]		
HF0114	Data transfer check error [CMPNGDC]		
HF0115	Data transfer check error [CMPNGCD]		
HF0116	Data transfer check error [SSGQATERR]		
HG0100	CTL communication send time-out		
HG0210	0TH CTL Response time-out [CMDFMWR]		
HG0311	0TH CTL Response time-out [OFW]		
HG0312	Resource release time-out		
HG0413	Data share job time-out		
HG0514	LU-CTL change time-out		
HH010x	System parameter undefined (CTL-x)	—	
HH020x	Flash revision mismatch (CTL-x)	Controller	
HH03xx	FLASH-RAM program I/F error (CTL-x)		
HH0400	Unsupported function enabled	—	
HH0510	Task make error [INMTSKERR]	Controller	
HH0620	JOB make error		
HH0930	No system HDU	—	
HH0A40	System HDU access error	Controller	
HH0Bxy	HDU capacity shortage (Unit-x, HDU-y)	Disk drive	
HH0C50	HDU changed before PS ON	—	
HH0D60	Stripe size changed		
HH0Exy	CACHE access error (CACHE-x/y) [PON]	Cache memory	
HH0F0x	CACHE SLOT REG error (CTL-x)	Cache memory or controller	
HH1070	PIN segment error [PINSEGOV]	Controller	
HH1180	DCTL hard error [PS ON]		
HH1290	System down selected [USRDATLST]	—	
HH12A0	Forced parity correction time-out	Disk drive or controller	
HH13B0	System change failed [PIN]	Controller	
HH13B1	System change failed [PSOFF]		
HH14C0	CACHE mode change failed [POFF]	—	
HH16D0	CTL recovery failed [DRR ERR]	Controller	
HH17xx	Unit which cannot be managed (Unit-x)	—	
HH180x	Cache size over [CTL-x]	Controller	
HI0100	PS OFF failed [DSTG HUNG]		
HI0201	PS OFF failed [POFNONCLD]	—	Turn on PS, then off again.
HI0202	PS OFF failed [POFNOJOB]		
HI0310	OTHPS OFF time-out	Controller	Call your maintenance engineer
HI0420	System down selected [PS OFF]	—	
HI05xy	CACHE access error (CACHE-x/y) [POFF]		
HJ01xx	Microprogram error [INM]	Controller	
HJ02xx	Microprogram error [POF]		
HJ03xx	Microprogram error [RST]		
HJ04xx	Microprogram error [SCK]		

Message code	Message text	Failure part	Recovery measures
HJ05xx	Microprogram error [CIT]	Controller	Call your maintenance engineer
HJ06xx	Microprogram error [RSM]		
HJ07xx	Microprogram error [FTD]		
HJ08xx	Microprogram error [FSM]		
HJ09xx	Microprogram error [LSM]		
HJ0Axx	Microprogram error [HSC]		
HJ0Bxx	Microprogram error [NCR]		
HJ0Cxx	Microprogram error [HSW]		
HJ0Dxx	Microprogram error [SCP]		
HJ0Exx	Microprogram error [SMD]		
HJ0Fxx	Microprogram error [PRS]		
HJ10xx	Microprogram error [COW]		
HJ11xx	Microprogram error [RCH]		
HJ12xx	Microprogram error [RAD]		
HJ13xx	Microprogram error [DSC]		
HJ14xx	Microprogram error [DMA]		
HJ15xx	Microprogram error [ERR]		
HJ16xx	Microprogram error [RCF]		
HJ17xx	Microprogram error [DRC]		
HJ18xx	Microprogram error [OFW]		
HJ19xx	Microprogram error [ONW]		
HJ1Axx	Microprogram error [DST]		
HJ1Bxx	Microprogram error [CPR]		
HJ1Cxx	Microprogram error [COM]		
HJ1Dxx	Microprogram error [SVI]		
HJ1Exx	Microprogram error [LUC]		
HJ1Fxx	Microprogram error [PRO]		
HJ20xx	Microprogram error [BKW]		
HJ21xx	Microprogram error [BKD]		

Appendix D Number of Logical Blocks

Set the number of logical blocks set for each logical unit using the following multiples in accordance with RAID levels.

RAID level		Logical block
RAID 0	(2D)	256
	(3D)	384
	(4D)	512
	(5D)	640
	(6D)	768
	(7D)	896
	(8D)	1024
	(9D)	1152
	(10D)	1280
	(11D)	1408
	(12D)	1536
	(13D)	1664
	(14D)	1792
	(15D)	1920
	(16D)	2048
RAID 1	(1D+1P)	128
RAID 5	(2D+1P)	256
	(3D+1P)	384
	(4D+1P)	512
	(5D+1P)	640
	(6D+1P)	768
	(7D+1P)	896
	(8D+1P)	1024
	(9D+1P)	1152
	(10D+1P)	1280
	(11D+1P)	1408
	(12D+1P)	1536
	(13D+1P)	1664
	(14D+1P)	1792
	(15D+1P)	1920
RAID 0+1	(2D+2P)	256
	(3D+3P)	384
	(4D+4P)	512
	(5D+5P)	640
	(6D+6P)	768
	(7D+7P)	896
	(8D+8P)	1024

The number of logical blocks of one parity group is shown below.

RAID level		Disk drive (capacity)			
		8.7 G bytes	17.8 G bytes	35.6 G bytes	71.6 G bytes
RAID 0	(2D)	34,034,176	69,512,448	139,378,688	279,824,384
	(3D)	51,051,264	104,268,672	209,068,032	419,736,576
	(4D)	68,068,352	139,024,896	278,757,376	559,648,768
	(5D)	85,085,440	173,781,120	348,446,720	699,560,960
	(6D)	102,102,528	208,537,344	418,136,064	839,473,152
	(7D)	119,119,616	243,293,568	487,825,408	979,385,344
	(8D)	136,136,704	278,049,792	557,514,752	1,119,292,536
	(9D)	153,153,792	312,806,016	627,204,096	1,259,209,728
	(10D)	170,170,880	347,562,240	696,893,440	1,399,121,920
	(11D)	187,187,968	382,318,464	766,582,784	1,539,034,112
	(12D)	204,205,056	417,074,688	836,272,128	1,678,946,304
	(13D)	221,222,144	451,830,912	905,961,472	1,818,858,496
	(14D)	238,239,232	486,587,136	975,650,816	1,958,770,688
	(15D)	255,256,320	521,343,360	1,045,340,160	2,098,682,880
	(16D)	272,273,408	556,099,584	1,115,029,504	2,238,595,072
RAID 1	(1D+1P)	17,017,088	34,756,224	69,689,344	139,912,192
RAID 5	(2D+1P)	34,034,176	69,512,448	139,378,688	279,824,384
	(3D+1P)	51,051,264	104,268,672	209,068,032	419,736,576
	(4D+1P)	68,068,352	139,024,896	278,757,376	559,648,768
	(5D+1P)	85,085,440	173,781,120	348,446,720	699,560,960
	(6D+1P)	102,102,528	208,537,344	418,136,064	839,473,152
	(7D+1P)	119,119,616	243,293,568	487,825,408	979,385,344
	(8D+1P)	136,136,704	278,049,792	557,514,752	1,119,297,536
	(9D+1P)	153,153,792	312,806,016	627,204,096	1,259,209,728
	(10D+1P)	170,170,880	347,562,240	696,893,440	1,399,121,920
	(11D+1P)	187,187,968	382,318,464	766,582,784	1,539,034,112
	(12D+1P)	204,205,056	417,074,688	836,272,128	1,678,946,304
	(13D+1P)	221,222,144	451,830,912	905,961,472	1,818,858,496
	(14D+1P)	238,239,232	486,587,136	975,650,816	1,958,770,688
	(15D+1P)	255,256,320	521,343,360	1,045,340,160	2,098,682,880
RAID 0+1	(2D+2P)	34,034,176	69,512,448	139,378,688	279,824,384
	(3D+3P)	51,051,264	104,268,672	209,068,032	419,736,576
	(4D+4P)	68,068,352	139,024,896	278,757,376	559,648,768
	(5D+5P)	85,085,440	173,781,120	348,446,720	699,560,960
	(6D+6P)	102,102,528	208,537,344	418,136,064	839,473,152
	(7D+7P)	119,119,616	243,293,568	487,825,408	979,385,344
	(8D+8P)	136,136,704	278,049,792	557,514,752	1,119,297,536

Appendix E Glossary

- CTL
  Controller
- DHCP
  DHCP is an abbreviation for Dynamic Host Configuration Protocol, and it is a client/server type protocol according to which a server automatically assigns an IP address when each client has started.
- Fibre channel
  A set of standards of interfaces that are connected through optical fiber, etc. to achieve high-speed data transfer between devices.
- IP address
  IP address is an abbreviation for Internet Protocol Address, and it is a numeral string which shows an address of a computer connected to a network.
- LED
  Light-Emitting Diode
- LU
  Logical Unit
- RAID
  Redundant Array of Independent (Inexpensive) Disks
  A concept proposed in 1987 by a research group of the University of California, Berkeley. RAID distributes accesses among multiple disk drives, and thereby realizes a storage subsystem with high-speed accessibility, a large capacity, and high reliability.
  The University of California defined six levels of configurations from RAID 0 through RAID 5, and one of the levels is selected based on the trade-off in terms of cost and speed to meet the user's need.
- SNMP
  SNMP is an abbreviation for Simple Network Management Protocol, and it is one of the network protocols developed to manage a network.
- Spare disk
  A disk drive which is mounted separately from the disk drives for usual write and read operation, and when a failure occurs in a disk drive, data stored in the failed drive is copied to the spare disk drive so that the disk subsystem can continue to be available equivalently to the original subsystem.
- Flash memory
  ROM that can be electrically erased and reprogrammed.
  A type of EEPROM (Electrically Erasable and Programmable).
  It can retain information without electricity and is widely used as an external storage, etc.

- Host computer
  A computer which manages devices. In the case of the disk array, a computer which makes the disk array store data is applicable to the term.
- Microprogram
  A program that controls the basic operation of hardware when a CPU processes a programmed instruction.

DF500
Disk Array Subsystem
User's Guide

Software Part

Sixth edition : April, 2001

HITACHI

K6602354