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MICRO00-00

MICRO-FC SECTION

MICRO00-10

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MICRO01-10

1. Overview

The following micro-program FC (Field Change) functions are provided.

No.	Function	Description	
1	Online micro-program exchange	The micro-program exchange is performed without	
		stopping I/O between the host and the DKC.	
2	Offline micro-program exchange	The micro-program exchange is performed with I/O	
		stopped.	
3	FCWIZARD micro-program exchange	The micro-program exchange is automatically executed	
		without displaying the micro-program type selection	
		window to maintenance personnel.	

MICRO01-20

1.1 Micro-program Types

The following micro-programs can be exchanged by using the SVP.

No.	Micro-program	Description	Media	SVP	Version
				Local	Down
				Drive	
1	DKCMAIN	Micro-program that runs on MP		0	0
2	HTP	Micro-program that controls CMF (FIVE-FICON) ports		0	0
3	DKB	Micro-program for SAS-CTL		0	0
4	DKBN	Micro-program that runs on DKBN		0	0
5	SVP	Micro-program that runs on SVP	0	×	×
		(including micro-program exchange functions)			
6	SSVP	Micro-program that runs on SSVP	0	×	×
7	GUM	Micro-program that runs on GUM	0	0	0
8	FCDG	Micro-program that checks CMF (FIVE-FICON) ports	0	0	0
9	RAMBOOT	Micro-program that runs during initial startup of MP	0	0	0
10	Expander	Micro-program that runs on Expander	0	0	0
11	NSW	Micro-program that runs on NSW	0	0	0
12	CONFIG	Configuration information file	0	×	×
13	CFM	Micro-program for CFM for cache destage	0	0	0
14	HDD	Micro-program that runs on HDD	0	0	0
		(Micro-programs differ by HDD model.)			
15	ISCF	Micro-program for iSCSI protocol chip	0	0	0
16	FCBK	Micro-program for 32G FC protocol chip	0	0	0
17	ISW	Micro-program for ISW (Interconnect Switch)	0	0	0

○ : support× : not support

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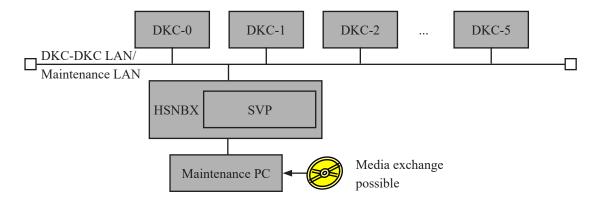
MICRO01-30

1.2 Micro-program Exchange Flow

Perform the micro-program exchange by operating the Maintenance PC connected to the SVP via the maintenance LAN.

Read each micro-program data from the media inserted into the Maintenance PC drive.

Figure 1-1 System Diagram

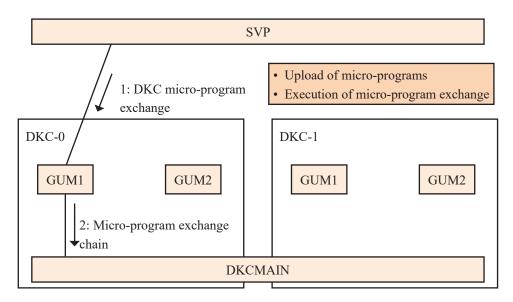


The SVP contains up to two generations of media data, and its temporary area is used for executing the micro-program exchange. The micro-program exchange uses up to 2 GB of SVP capacity.

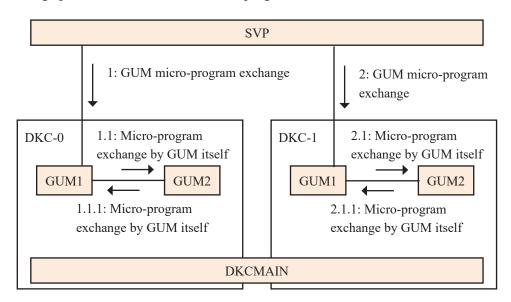
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MICRO01-40

• Exchange process outline of DKC micro-programs other than GUM micro-program



• Exchange process outline of GUM micro-program



SVP keeps two generations (NEW and OLD version) of the micro-programs.

Micro-programs can be exchanged in the following three ways.

- Downloading after storing the micro-programs from Media to the SVP Local Drive
- Download the latest version (NEW of Local Drive in SVP)
- Download the old version (OLD of Local Drive in SVP)

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1.3 Micro-program Exchange

Micro-programs can be exchanged off-line or on-line.

1. Off-line

The storage system is blocked. \rightarrow Micro-programs are rewritten. \rightarrow The storage system is recovered.

2. On-line

Transfer micro-programs to the DKC



The processor is blocked for maintenance. ←



Micro-programs are rewritten.



The processor is recovered.

This is performed for each exchanging unit.

- NOTE: The SVP checks the version of the micro-program to be exchanged before rewriting it. When the SVP determines that the micro-program cannot be rewritten, it displays an error message and cancels the exchange of the micro-program.
 - The SVP terminates the exchange of micro-programs when the error status is displayed (i.e. when a message "..... error " or "..... failed" is displayed) or when [Cancel] is selected.

If you want to retry the exchange, please start from the first step of the MICRO-FC procedure.

However, in the case the error status is displayed during a download from SVP to DKC (FM) by procedures in "3.3 Transferring micro-programs" or "4.3 Transferring micro-programs to the DKC", you can retry it with procedures in "3.4 SVP Local Drive Download" or "4.4 SVP Local Drive Download".

- All program files which are automatically exchanged on an SVP during a microprogram exchange, will also be automatically exchanged on the other SVP when the
 SVP High Availability Feature is installed and the other SVP is functional.
 Please confirm that both SVPs contain the same program versions after exchanging
 program versions. However, SVP switching must be performed before and after the
 version check.
 - (Refer to "SVP Switching" (SVP02-14-10).)
- If it is required to version down the current micro-program running on the DKC to a version that is not the last installed, do not attempt this without receiving guidance specific to your case from technical support division or the factory.

This needs to be analyzed on a case by case basis and a unique procedure may need to be provided for each case.

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NOTICE:

Online and offline microprogram exchange procedure time described in this manual is standard time (approximate time).

Required time for microprogram exchange depends on usage conditions of storage systems, especially the amount of write pending data. When the amount of write pending data of the whole system is large, microprogram exchange might take longer time than described.

A CAUTION

In case of ShadowImage for Mainframe/ShadowImage/Volume Migration/FlashCopy (R)/Thin Image, the differential bitmap data on the shared memory of DKC is volatilized by the offline microprogram exchange operation.

FlashCopy (R), the relationship is all released. Also, in case of Thin Image, Pool is blocked.

Execute the online microprogram exchange operation not to volatilize the differential bitmap data on the shared memory of DKC, the relationship of FlashCopy (R), and the Pool information on Thin Image.

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MICRO02-10

2. Pre-Process Micro FC

2.1 Connect to SVP from Maintenance PC

Connect to SVP from Maintenance PC, with referring "Connecting the PC to the SVP" (SVP01-30).

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MICRO03-10

3. Micro-program Exchange Procedure (On-line)

3.1 Processing before exchange

- Check the storage system status through the entire status display. (Check the versions of all the microprograms through the version display.)
- Make sure that no processing is in progress. (*1)
 - *1: In case Dynamic Sparing, Correction Copy, or Copy Back is running, the micro-program exchange can be performed if HDD micro-program is not included. For details, refer to "Notes on maintenance during LDEV Format/drive copy operations" (THEORY05-03-10).
- Perform post processing for PIN data.
- Check that all processors are normal.

NOTICE: It is recommended to execute this function in the status of all MP's utilization rates less than 50% because processing time of this function may be influenced by I/O processing.

NOTICE: If the status of LDEV which is created by external device mapping function is "Maintenance blockade" status and micro-exchange is operated, the maintenance blockaded LDEV status is restored and the status is changed to the normal status.

NOTICE: Do not use newly supported functions until all micro-program exchange operations are completed.

NOTICE: Do not open the Maintenance Utility (Sub Panel) window during micro-program exchange. If the window is opened, micro-program exchange may end abnormally. In the case that the Maintenance Utility (Sub Panel) window needs to be opened due to an error and so on, contact T.S.D. for help.

NOTICE: When the SVP High Reliability Kit has been installed and an SVP fail over (SIM = 7ff3xx) is detected, take action for the failure (SIM = 7ff3xx) first.

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NOTICE: At the time of the ISCF micro-program exchange, the iSCSI protocol ASIC on the CHB is rebooted.

> The iSCSI port links down (for about 10 seconds) and then links up, which causes temporary disconnections from host servers.

To avoid temporary disconnections, stop host I/Os on the path, or perform the preprocessing such as the pair suspend at the time of pair creation on the iSCSI path.

Consult your customer about stopping host I/Os or performing the preprocessing such as the pair suspend and create a procedure plan before starting the work.

NOTICE: If the following case occurs during a series of micro-program exchanges, the ISCF micro-program exchange is skipped and SIM = 3c97xx is reported. After the microprogram exchanges work, check for the SIM on the SVP. When SIM = 3c97xx is reported, perform the micro-program exchanges work again by following the procedure described in TROUBLESHOOTING SECTION (TRBL05-1390). Case causing a skip of the ISCF micro-program exchange:

> The ISCF micro-program exchange is executed for one CHB at a time. Connections are temporarily disconnected for the ISCF micro-program exchange to ensure alternate paths. After a while, the number of connections gets back to the original number. In the case where the number of connections does not get back to the original number within 60 seconds, the ISCF micro-program exchange is skipped.

NOTICE: If the LAN error (SIM = 73ff00) is detected, take actions to solve the error of SIM = 73ff00 first.

NOTICE: At the time of the micro-program exchange, fans on the target storage system might rotate at a high speed temporarily.

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MICRO03-30

Micro-program exchange time largely varies depending on the device configuration and the combination of micro-program versions.

When the micro-program version and the base version are matched in some micro-program type, exchange time is shortened because the micro-program exchange is completed only by updating the control information. Also, the more the mounted hardware to have exchange is, the longer the exchange time is, and the less, the shorter.

Exchange time for each micro-program type is as follows. The exchange time does not include waiting time to respond to various screen messages.

Table 3-1 On-line Micro-program Exchange time (approximate)

(unit: minutes)

Micro-program	Read time from media	Micro-program exchange time
DKCMAIN		10 (*1)
HTP		1 (*2)
ISCF		10
DKB		15
DKBN		13
SVP		20
SSVP		10 (*3)
FCDG		1
RAMBOOT	10	0 (*1) (*4)
Expander		5
NSW		3
GUM		0 (*5)
FCBK		5
ISW		15
CONFIG		10
CFM		3
HDD		25
Total	10	130

- *1: When "By 1/4 per System" is selected as a reboot pattern.
- *2: 1 minute when the number of PKs is 10 or less, and 2 minutes when the number of PKs is greater than 10.
- *3: 20 minutes when the Additional SVP is installed.
- *4: 0 minute when the RAMBOOT micro-program exchange is performed concurrently with the DKCMAIN micro-program exchange, and 10 minutes when only the RAMBOOT micro-program exchange is performed.
- *5: 0 minute when the GUM micro-program exchange is performed concurrently with the DKCMAIN micro-program exchange, and 30 minutes when only the GUM micro-program exchange is performed.

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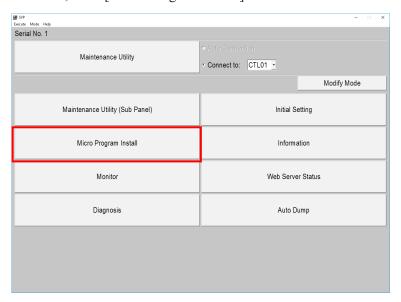
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3.2 Storing the micro-programs to be substituted in the SVP

- 1. In the SVP window, change the mode to [Modify] from [View].
- 2. In the SVP window, click [Micro Program Install].



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3. In the 'Microprogram Exchange' dialog box,

[How]: Select [Online FC].

[From]: Select the source from which to store the micro-programs.

[PC-Drive]: Select the Maintenance PC and the drive letter from which to store the micro-programs.

[From]'s selection branch

Media: After being stored on the SVP Local Drive from Media, the micro-programs are

downloaded.

--- Select from the selection of PC-Drive.

SVP Local Drive: The latest versions on the SVP Local Drive are downloaded.

--- Go to 3.4 Step 1.

Version down: Old versions on the SVP Local Drive are downloaded.

--- Go to 3.5 Step 1.

[PC-Drive]'s selection branch

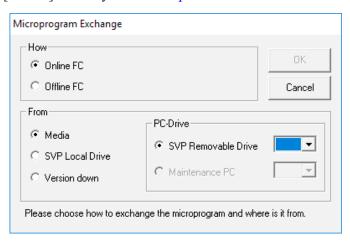
SVP Removal Drive: The SVP's drive --- Select the drive letter and click [OK].

Go to Step 4.

Maintenance PC: The Maintenance PC's drive --- Select the drive letter and click [OK].

Go to Step 4.

Clicking [Cancel] returns you to be Step 2.



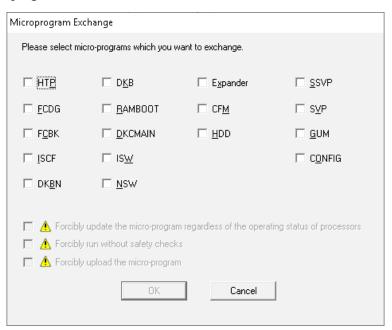
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4. The 'Microprogram Exchange' dialog box appears. Select one or more items from the list of the type of micro-programs, and click [OK].

 \square : Micro-programs to be substituted.



Details of the checkboxes with the alert mark are shown in the table below.

Item	Description		
Forcibly update the micro-program regardless	If you check this item, the micro-program exchange will be		
of the operating status of processors	executed regardless of the MP operating rate. (This items is not		
	checked by default.)		
Forcibly run without safety checks	If you check this item, the micro-program exchange will be		
	executed without status checks of storage system parts including		
	blocked parts. (This items is not checked by default.)		
Forcibly upload the micro-program	If you check this item, the micro-program will be transferred to		
	the storage system even when the version is the same. (This items		
	is not checked by default.)		

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5. When DKCMAIN, or RAMBOOT were selected, you can select the reboot pattern from the list.

A CAUTION

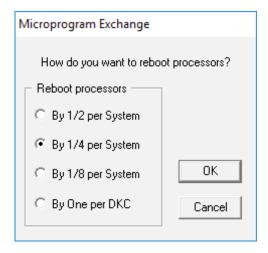
Please select a reboot pattern by taking the following table into account.

REBOOT PATTERN		By 1/2	By 1/4	By 1/8	By One
		per System	per System	per System	per DKC
EXCHANGE	STANDARD VALUE	25	30	40	120
TIME	[MINUTE] (APPROX.)				
		SHORT ←			→ LONG
EFFECT ON PERFORMANCE OF DKC		BIG ←			→ SMALL
MP operating rate in which micro-programs can		Below 50%	Below 65%	Below 75%	Below 85%
be exchanged (*1)					

- *1: One or more MPs do not exceed the regulated operating rate.
- Sometimes an "error" message is displayed temporarily in [Reboot status display]. But, there is no problem if the reboot is finished without error.

Please select one of these patterns and click [OK].

- By 1/2 per System: Reboot by half MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 50%.
- By 1/4 per System: Reboot by quarter MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 65%.
- By 1/8 per System: Reboot by 1/8 MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 75%.
- By One per DKC : Reboot by minimum reboot unit MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 85%.

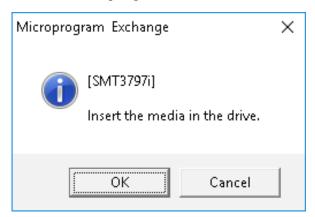


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6. If you have selected Media, the message [SMT3797i] appears. Insert the Media and click [OK].



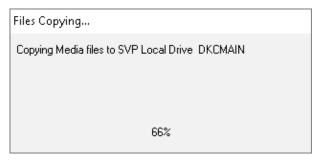
<<Error>>

No Media or uncorrect Media in the disk drive:

The Message "Insert the correct Media." is displayed.

Insert the correct Media and click [Retry].

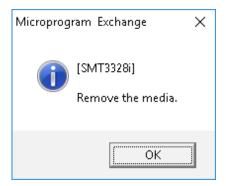
7. If you have selected Media, the message "Copying Media files to SVP Local Drive DKCMAIN" appears.



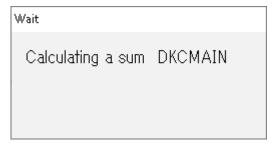
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8. If you have selected Media, the message [SMT3328i] appears. Remove the Media and click [OK].



After copy end, sum checker starts. While checking, the message appears.



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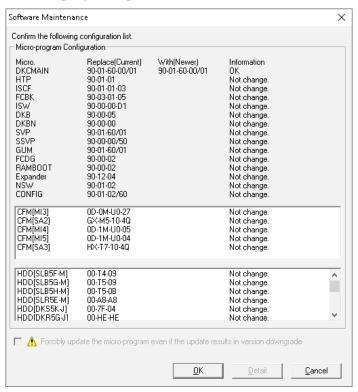
9. On the 'Software Maintenance' dialog box, the micro-program types, current versions, new versions, and message are displayed.

<Display with no error>

The message "Confirm the following configuration list." is displayed below the title bar. The microprogram can be replaced only when all rows in the information column show "OK", "Not change" or "Warning".

To continue processing, click [OK].

To terminate micro-program replacement, click [Cancel].



NOTICE: Approval of the Technical Support Division is required for downgrading microprogram versions.

Item	Description		
Forcibly update the micro-program even if	If you check this item, the micro-program exchange will be executed		
the update results in version downgrade	even when the micro-program versions of the selected HDD, CFM,		
	and Expander to be installed are earlier than their current micro-		
	program versions. (This item is not checked by default.)		

A CAUTION

Be sure to click the [Detail] button when "Warning" is displayed. Confirm the contents and contact the Technical Support Division to ask whether to click [OK] or [Cancel].

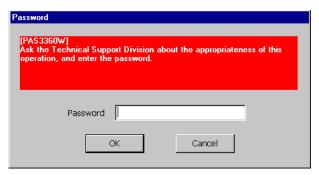
When the Technical Support Division determined to be [OK]: Click the [OK] button. When the Technical Support Division determined to be [Cancel]: If you click the [Cancel] button, the processing of the micro-program replacement is terminated.

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If you click [OK] when "Warning" is displayed, the Password window might be displayed. Input password and click [OK] to continue processing.



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<Display with an error>

A sample error display is shown on the right. An error message is displayed below the title bar.

At the same time, error information is displayed in the information column.

Click [Cancel] to terminate the micro-program replacement.

(NOTE: The [OK] button is disabled.)

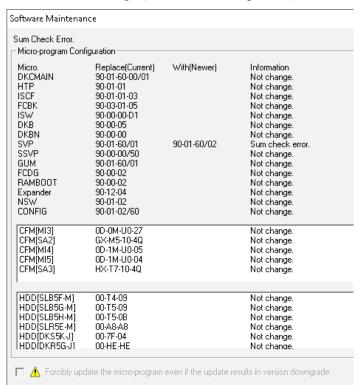
Click [Detail] to display detailed error information.

Before attempting to rerun, be sure to correct the cause of the error. Refer to the entire status (SVP SECTION), action code (ACC SECTION), and other information.

Below are messages and information that may be displayed in the Information column.

NOTE: Click [Detail] to display detailed error information, and confirm the cause of these errors.

- "Version error"
- "Revision error"
- "Warning"
- "Can't read the configuration of the micro-program."
- "Warning" (Function bit map error)



NOTICE: Approval of the Technical Support Division is required for downgrading microprogram versions.

Item	Description		
Forcibly update the micro-program even if	If you check this item, the micro-program exchange will be executed		
the update results in version downgrade	even when the micro-program versions of the selected HDD, CFM,		
	and Expander to be installed are earlier than their current micro-		
	program versions. (This item is not checked by default.)		

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Table 3-2 Version Check Message Table

	Message :	Contents and Maintenance	
1	Confirm the following configuration list.	Check the version (Normal or Warning).	
		If Warning, it is necessary to be approved by T.S.D. (Technical	
		Support Division).	
2	Version error.	Incorrect version. Confirm the micro-program version.	
3	Can't read the configuration of the micro-	Error caused while the micro-program configuration is being	
	program.	read. Recover the blockade of a concerned processor.	
4	Internal error. (On SVP Logic)	Inconsistent logic. (SVP logic)	
		Retry exchange. If the same message is displayed, power SVP	
		off and on.	
5	Internal error. (On SVP Memory)	Inconsistent logic. (SVP memory)	
		Retry exchange. If the same message is displayed, power SVP	
		off and on.	
6	Internal error. (On Temporary Files)	Inconsistent logic. (temporary file)	
		Retry exchange. If the same message is displayed, power SVP	
		off and on.	
7	Version error.	Incorrect version. (partial replacement)	
	(Previous maintenance needed)	Confirm the micro-program version.	
8	Version error.	Incorrect version. (partial replacement)	
	(Incompatible MP exists)	Confirm the micro-program version.	
9	Sum Check error.	Sum check code is incorrect. Micro-program data in Micro-Media	
		isn't correct. Exchange the Micro-Media.	
10	Revision error	Incorrect revision. Confirm the micro-program revision.	
11	The micro-program is incompatible with the	Incorrect micro-program. Confirm the micro-program version and	
	system.	system. Contact T.S.D. (Technical Support Division).	
12	Combination error	Incorrect micro-program exchange process. Confirm the	
		combination of micro-program version and the exchange process.	
13	Internal Version error.	The combination of versions of the DKCMAIN micro-program	
	DKCMAIN - another micro-program	and the micro-program with an error is not valid. Check the	
	combination of Version error.	exchange procedure of the micro-program with the version	
		error and the order of performing the exchange procedures of	
		the DKCMAIN micro-program and the micro-program with the	
		version error.	

^{*1:} If SSB = AE0D is reported, remove NFHxx-QxxxSS in the spare disk, and then add it again to perform the HDD micro-program exchange.

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Blank Sheet

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MICRO03-150

	Information	Contents		
1	OK The micro-program is replaceable.			
2	Version error	MP has an incorrect micro-program version.		
3	Internal error [#xxxx]	Inconsistent logic error has occurred.		
		[internal error code]		
		0001: Parameter error		
		0002: Memory allocation error		
		0003: Memory allocation error		
		0005: File I/O error		
4	Not change	The micro-program will not be replaced.		
5	Read error	An error has occurred while reading the current configuration.		
6	Sum Check error	The sum check code is incorrect.		
7	Warning	It is necessary to contact T.S.D. (Technical Support Division) for		
		approval.		
8	Revision error	MP has an incorrect micro-program revision.		

NOTE: For "Function ID Table", refer to "7.3 Function ID Table".

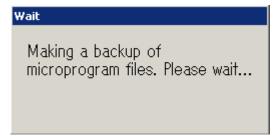
When the error message 2179 is displayed on SVP while exchanging micro-programs, check the function detected by the message, take actions, and then perform the exchange again.

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MICRO03-160

10. The message "Making a backup of microprogram files. Please wait..." appears.



- 11. File copy in SVP.
 - DKC: go to 3.3.1.
 - SSVP: go to 3.3.2 Step 1.
 - SVP: go to 3.3.2 Step 2.
 - Config: go to 3.3.3.



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MICRO03-170

3.3 Transferring micro-programs

3.3.1 Transferring micro-programs to the DKC

1. The message "Now Reading storage system configuration..." appears. The current DKC configuration is read.



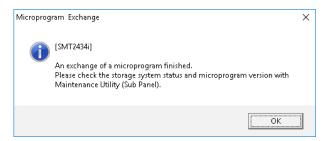
If an error occurs while downloading micro-programs, resolve the cause of the error using Maintenance Display (SVP SECTION), Action Code (ACTION CODE SECTION), and other information, then start from the beginning of the MICRO procedure to execute the exchange again. At this time, you can select [SVP Local Drive] or [Media] at 3.2 Step 3.

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2. In response to the message [SMT2434i], click [OK].

Go to 3.6.



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MICRO03-190

3.3.2 Transferring micro-programs to SVP/SSVP

1. If SSVP is selected as the micro-program exchange target, the message "SSVP microprogram update." is displayed.

If transferring micro-program is only SSVP, go to Step 4.



2. Just before completion of the micro-program exchange, the message "Blocking DKC-SVP communication. Wait..." is displayed.



<<Error>>

Internal error:

- "Information file doesn't exist or open error has occurred!"
- "SVP-SSVP communication blockade error has occurred."

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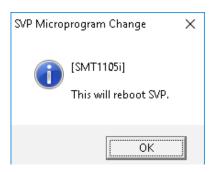
3. End of the exchange.

Click [OK].

SVP is rebooted automatically.

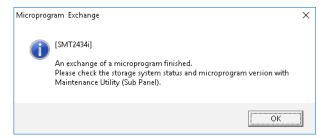
NOTE: • After SVP reboot, because the connection with the Maintenance PC and the SVP goes out, make re-connection and check surely the message of the micro-program exchange end.

- To reconnect the remote desktop after SVP disconnection, wait 5 miutes or more after clicking [OK] in the [SMT1105i] message.
- At the time of reconnection to the SVP, the Command Prompt window might be displayed in the SVP window. This is not a problem.



4. In response to the message [SMT2434i], click [OK].

Go to 3.6.



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MICRO03-201

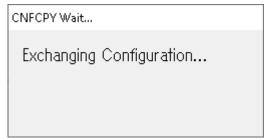
3.3.3 Config Update

1. The message "Now Reading storage system configuration..." appears. The current DKC configuration is read.



If an error occurs while downloading micro-programs, resolve the cause of the error using Maintenance Display (SVP SECTION), Action Code (ACTION CODE SECTION), and other information, then start from the beginning of the MICRO procedure to execute the exchange again. At this time, you can select [SVP Local Drive] or [Media] at 3.2 Step 3.

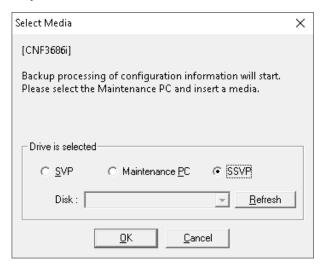
2. The message "Exchanging Configuration..." appears.



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MICRO03-202

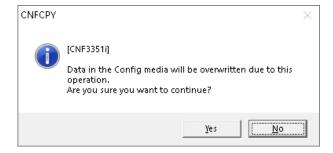
- 3. Choose any one of media and Click [OK].
 - SVP: The case using a USB memory connected to SVP (normally not used)
 - Maintenance PC: The case using a drive or a USB memory on Maintenance PC
 - SSVP: Only the case when there are instructions



4. When no old configuration information is saved on the selected media, no window is appeared. Go to Step 5.

When other configuration information has been saved on it, the message shown on the right is displayed. Click [Yes] to continue the process.

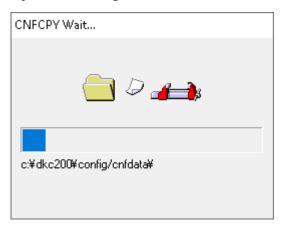
Click [No] when the backup to the Config media is not necessary. Go to Step 7.



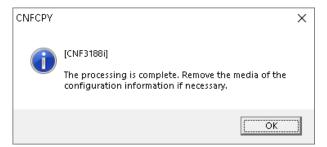
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5. The backup of the configuration information to the Config media is performed. While this operation is being done, the CNFCPY Wait... window is displayed.



6. After removing the Config media as needed, click [OK].



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7. <SVP reboot>

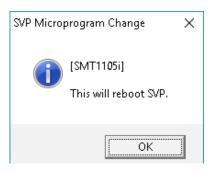
End of the exchange.

Click [OK].

SVP is rebooted automatically.

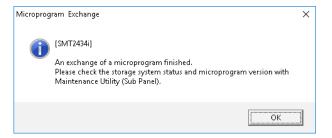
NOTE: • After SVP reboot, because the connection with the Maintenance PC and the SVP goes out, make re-connection and check surely the message of the micro-program exchange end.

- To reconnect the remote desktop after SVP disconnection, wait 5 miutes or more after clicking [OK] in the [SMT1105i] message.
- At the time of reconnection to the SVP, the Command Prompt window might be displayed in the SVP window. This is not a problem.



8. In response to the message [SMT2434i], click [OK].

Go to 3.6.



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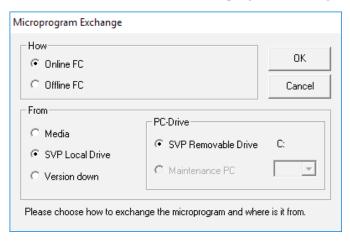
Rev.1

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3.4 SVP Local Drive Download

The latest version of micro-programs on the SVP Local Drive is downloaded to DKC.

1. [How]: Select [Online FC]. [From]: Select [SVP Local Drive] in the 'Microprogram Exchange' dialog box, and click [OK].

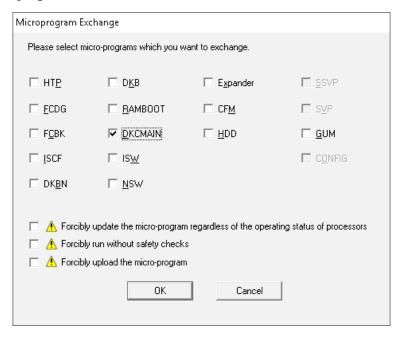


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Rev.1

- 2. Select one or more items from the list of the type of micro-programs, and click [OK].
 - \square : Micro-programs to be substituted.



Details of the checkboxes with the alert mark are shown in the table below.

Item	Description		
Forcibly update the micro-program regardless	If you check this item, the micro-program exchange will be		
of the operating status of processors	executed regardless of the MP operating rate. (This items is not		
	checked by default.)		
Forcibly run without safety checks	If you check this item, the micro-program exchange will be		
	executed without status checks of storage system parts includi		
	blocked parts. (This items is not checked by default.)		
Forcibly upload the micro-program	If you check this item, the micro-program will be transferred to		
	the storage system even when the version is the same. (This items		
	is not checked by default.)		

MICRO03-220

3. When DKCMAIN, or RAMBOOT were selected, you can select the reboot pattern from the list.

A CAUTION

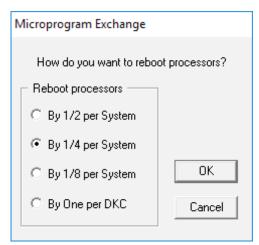
Please select a reboot pattern by taking the following table into account.

REBOOT PATTERN		By 1/2	By 1/4	By 1/8	By One
		per System	per System	per System	per DKC
EXCHANGE	STANDARD VALUE	25	30	40	120
TIME	[MINUTE] (APPROX.)				
		SHORT ←			→ LONG
EFFECT ON PERFORMANCE OF DKC		BIG ←			→ SMALL
MP operating rate in which micro-programs can		Below 50%	Below 65%	Below 75%	Below 85%
be exchanged (*1)					

- *1: One or more MPs do not exceed the regulated operating rate.
- Sometimes an "error" message is displayed temporarily in [Reboot status display]. But, there is no problem if the reboot is finished without error.

Please select one of these patterns and click [OK].

- By 1/2 per System: Reboot by half MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 50%.
- By 1/4 per System: Reboot by quarter MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 65%.
- By 1/8 per System: Reboot by 1/8 MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 75%.
- By One per DKC : Reboot by minimum reboot unit MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 85%.



4. Execute from 3.2 Step 9.

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MICRO03-230

3.5 Version Down



Ask the Technical Support Division about the appropriateness of the operation.

Do not execute the Version Down function during initial copy or resynchronization of TrueCopy, Universal Replicator, or global-active device. If you execute it, the micro-program exchange may fail.



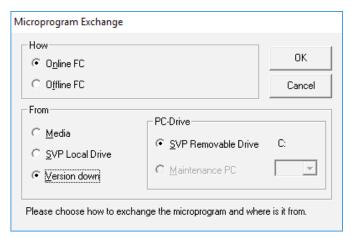
After HTP Version Down, replace the 4ML16/4MS16.

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MICRO03-240

If you want to restore micro-programs to the previous versions of the micro-programs after the exchange (by Media), execute the Version Down function.

[How]: Select [Online FC].
 [From]: Select [Version down] in the Microprogram Exchange window, and click [OK].



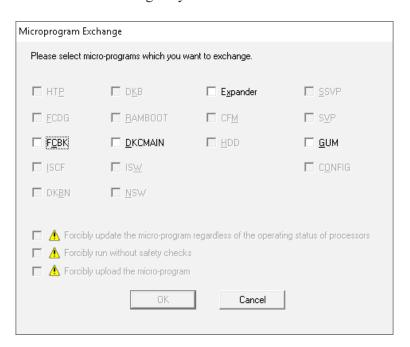
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2. Micro-programs to be restored are displayed in the Microprogram Exchange window.

NOTE: The Version Down function can restore only the micro-program exchanged by Media. It is not possible to execute the Version Down function for the micro-program which is not exchanged by Media.



Details of the checkboxes with the alert mark are shown in the table below.

Item	Description	
Forcibly update the micro-program regardless	If you check this item, the micro-program exchange will be	
of the operating status of processors	executed regardless of the MP operating rate. (This items is not	
	checked by default.)	
Forcibly run without safety checks	If you check this item, the micro-program exchange will be	
	executed without status checks of storage system parts including	
	blocked parts. (This items is not checked by default.)	
Forcibly upload the micro-program	If you check this item, the micro-program will be transferred to	
	the storage system even when the version is the same. (This items	
	is not checked by default.)	

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MICRO03-250

3. When DKCMAIN, or RAMBOOT were selected, you can select the reboot pattern from the list.

A CAUTION

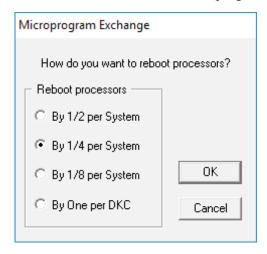
Please select a reboot pattern by taking the following table into account.

REBOOT PATTERN		By 1/2	By 1/4	By 1/8	By One
		per System	per System	per System	per DKC
EXCHANGE	STANDARD VALUE	25	30	40	120
TIME	[MINUTE] (APPROX.)				
		SHORT ←			→ LONG
EFFECT ON PERFORMANCE OF DKC		BIG ←			→ SMALL
MP operating rate in which micro-programs can		Below 50%	Below 65%	Below 75%	Below 85%
be exchanged (*1)					

- *1: One or more MPs do not exceed the regulated operating rate.
- Sometimes an "error" message is displayed temporarily in [Reboot status display]. But, there is no problem if the reboot is finished without error.

Please select one of these patterns and click [OK].

- By 1/2 per System: Reboot by half MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 50%.
- By 1/4 per System: Reboot by quarter MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 65%.
- By 1/8 per System: Reboot by 1/8 MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 75%.
- By One per DKC : Reboot by minimum reboot unit MPs in the DKC storage system. The MP operating rate in which the micro-program exchange is available is below 85%.



4. Return to 3.2 Step 9.

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MICRO03-260

3.6 Checking the functions after exchange

Check that the version of the recently installed micro-program is the same as that of the replaced micro-program by using the version display in the MAINTENANCE function. (See SVP SECTION.)

NOTE: If you find "??-??···" or incompatibility version, recover the status following the "5.1 Recovery procedure in on-line menu was selected".

After changing the mode from [Modify Mode] to [View Mode], select the [Execute]-[Exit] menu on the maintenance screen and then check that Web Console starts. If it failed to start, recover it referring to trouble shooting in the WEB CONSOLE SECTION.

When the customer uses Storage Navigator, request the customer to restart the Storage Navigator running PC (Web client) surely after replacing the micro-program.

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MICRO04-10

4. Micro-program Exchange Procedure (Off-line)

4.1 Processing before exchange

- Check the storage system status with the maintenance display. (Check the versions of all programs through with the version display.)
- Make sure that correction copy and other processing are not in progress.
- Perform post processing for PIN data.
- Check that all processors are normal.
- Check that all channel paths to the storage system are off-line (to block all micro-programs).
- DKCMAIN, HTP, ISCF, DKB, DKBN, FCDG, RAMBOOT, FCBK, ISW, and NSW micro-programs can be exchanged off-line.
- If there are the relationships of FlashCopy (R), or if Thin Image is installed, perform the steps shown in *1 when performing the off-line micro-program exchange.
- In case of performing the off-line micro-program exchange for UR/UR for z/OS pairs, please make sure not to perform on the MCU and RCU simultaneously.
- In some primary storage systems and in some secondary storage systems, when off-line micro-program exchange is executed under the Universal Replicator's remote copy configuration, please suspend the pairs that were previously registered in EXCTG.
 - Furthermore, please do not exchange micro-program on the supervisor-side storage system and subordinate-side storage system at the same time.
- In an OPEN environment, when exchanging the micro-program off-line in the remote copy configuration using multiple primary and secondary storage system of Universal Replicator, first suspend all the pairs in this configuration.
- When any LDEV is being migrated by nondisruptive migration, it is recommended to stop the migration, and to replace the microgram offline after returning to operation on the migration source.
- To exchange the micro-program off-line when global-active device pairs exist, suspend all the pairs.
 - *1: Off-line Micro-program Exchange
 - (1) Check for the presence of the relationships of FlashCopy (R) on the Compatible FlashCopy (R) Information window on Storage Navigator. Refer to the chapter on information display in "Hitachi Compatible FlashCopy (R) User Guide".
 - (a) When there is no relationship: Go to Step (2).
 - (b) When there are the relationships:Ask the customer to delete all relationships. However, notify the customer that data in T-VOL is not guaranteed if relationships being copied are deleted.
 - (2) If Thin Image is installed, notify the customer that data in S-VOL is not guaranteed.
 - (3) Perform the off-line micro-program exchange.
 - (4) If required, establish the relationships of FlashCopy (R) again.
 - (5) If Thin Image is installed, ask the customer to restore pool-VOLs.
 - NOTE: If Step (1) is not performed before the micro-program exchange, all relationships of FlashCopy (R) are forcibly deleted. If T-VOL is an external volume, the storage system might start up while keeping T-VOL in the normal state but not in the blocked state. However, data in T-VOL is not guaranteed. So, deletion of the data set in T-VOL (or volume initialization) must be performed.
 - When you perform the off-line micro-program exchange, ask the customer to stop using FlashCopy (R).

MICRO04-20

NOTICE: If the status of LDEV which is created by external device mapping function is "Maintenance blockade" status and micro-exchange is operated, the maintenance blockaded LDEV status is resorted and the status is changed to the normal status.

NOTICE: Do not open the Maintenance Utility (Sub Panel) window during micro-program exchange. If the window is opened, micro-program exchange may end abnormally. In the case that the Maintenance Utility (Sub Panel) window needs to be opened due to an error and so on, contact T.S.D. for help.

NOTICE: When off-line micro-exchange is executed, monitor information on the collection on Dynamic Tiering/active flash is annulled. Therefore, the next relocation is not executed for the automatic execution mode. Please execute the termination processing of the monitor if necessary for the manual execution mode.

After off-line micro-exchange, the relocation executed before off-line micro exchange is restarted regardless of the execution mode.

NOTICE: If the LAN error (SIM = 73ff00) is detected, take actions to solve the error of SIM = 73ff00 first.

Table 4-1 Off-line Micro-program Exchange time (approximate)

(unit: minutes)

Micro-program	Read time from media	Transfer time	Micro-program exchange time
DKCMAIN		5	25
НТР		1	30
ISCF		1	30
DKB		1	30
DKBN	9	1	30
FCDG		1	0
RAMBOOT		1	25
FCBK		1	30
ISW		1	30
NSW		1	45
Total	9	14	275

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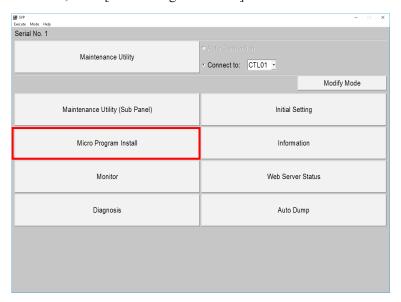
etary DKC910I

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4.2 Storing the micro-programs to be substituted in the SVP

1. In the SVP window, change the mode to [Modify] from [View].

2. In the SVP window, click [Micro Program Install].



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3. In the 'Microprogram Exchange' dialog box,

[How]: Select [Offline FC].

[From]: Select the source from which to store the micro-programs.

[PC-Drive]: Select the Maintenance PC and the drive letter from which to store the micro-programs.

[From]'s selection branch

Media: After being stored on the SVP Local Drive from Media, the micro-programs are

downloaded.

--- Select from the selection of PC-Drive.

SVP Local Drive: The latest versions on the SVP Local Drive are downloaded.

--- Go to 4.4 Step 1.

Version down: Old versions on the SVP Local Drive are downloaded.

--- Go to 4.5 Step 1.

[PC-Drive]'s selection branch

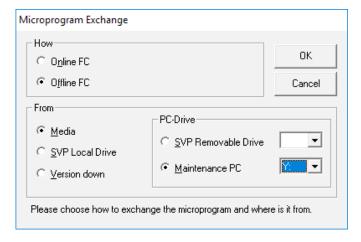
SVP Removal Drive: The SVP's drive --- Select the drive letter and click [OK].

Go to Step 4.

Maintenance PC: The Maintenance PC's drive --- Select the drive letter and click [OK].

Go to Step 4.

Clicking [Cancel] returns you to be Step 2.



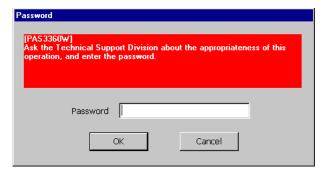
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4. Input password

If you want to continue this process enter the password, and click [OK].



MICRO04-60

5. The 'Microprogram Exchange' dialog box appears.Select one or more items from the list of the type of micro-programs, and click [OK].☑ : Micro-programs to be substituted.

Microprogram Exchange				
Please select micro-programs which you want to exchange.				
□ HTB	□ D <u>K</u> B	☐ Expander	□ <u>s</u> svp	
□ <u>F</u> CDG		☐ CF <u>M</u>	□ S <u>V</u> P	
□ F <u>C</u> BK	☑ DKCMAIN	□ HDD	□ <u>G</u> UM	
□ <u>I</u> SCF	□ IS <u>W</u>		☐ C <u>O</u> NFIG	
□ DK <u>B</u> N	□ <u>N</u> SW			
☐ ⚠ Forcibly update the micro-program regardless of the operating status of processors ☐ ⚠ Forcibly run without safety checks ☐ ⚠ Forcibly upload the micro-program OK Cancel				

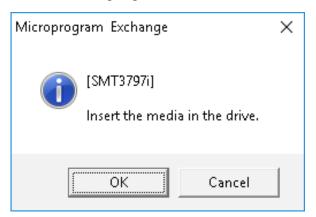
Details of the checkboxes with the alert mark are shown in the table below.

Item	Description
Forcibly update the micro-program regardless	If you check this item, the micro-program exchange will be
of the operating status of processors	executed regardless of the MP operating rate. (This items is not
	checked by default.)
Forcibly run without safety checks	If you check this item, the micro-program exchange will be
	executed without status checks of storage system parts including
	blocked parts. (This items is not checked by default.)
Forcibly upload the micro-program	If you check this item, the micro-program will be transferred to
	the storage system even when the version is the same. (This items
	is not checked by default.)

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6. If you have selected Media, the message [SMT3797i] appears. Insert the Media and click [OK].



<<Error>>

No Media or incorrect Media in the disk drive:

The Message "Insert the correct Media." is displayed. Insert the correct Media and click [Retry].

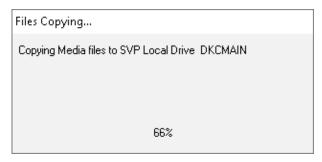
Internal error:

- "Old files erase failed, copy stop."
- "Memory error has occurred."
- "File I/O error has occurred."
- "Logical error has occurred."
- "The directory create error and copy stop."
- "The file size is Wrong and copy stop."

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7. If you have selected Media, the message "Copying Media files to SVP Local Drive DKCMAIN" appears.



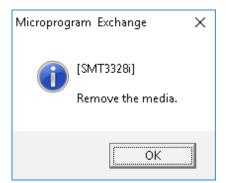
<<Error>>

Internal error:

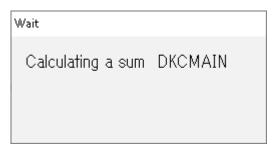
- "The file size is Wrong and copy stop."
- "The directory create error and copy stop."
- "Micro-program version disagreement and copy stop."
- "Logical error has occurred."
- "File I/O error has occurred."
- "Memory error has occurred."

NOTE: When the error message "File I/O error has occurred." or "Memory error has occurred." is displayed, power SVP off and on again if the same message appears after reexecuting the micro-program exchange (See (SVP01-190) and (SVP01-200)). Then execute the same micro-program exchange again. If the same error occurs (the same error message is displayed), replace SVP hardware (See (REP(RSVP)00-00)).

8. If you have selected Media, the message [SMT3328i] appears. Remove the Media and click [OK].



After copy end, sum checker starts. While checking, the message appears.



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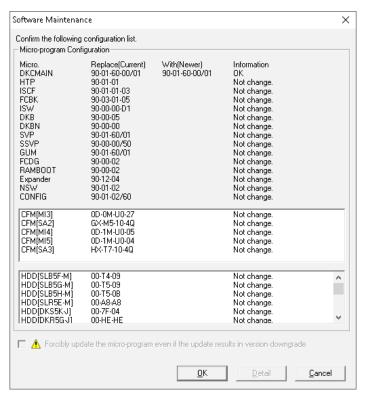
9. On the 'Software Maintenance' dialog box, the micro-program types, current versions, new versions, and message are displayed.

<Display with no error>

The message "Confirm the following configuration list." is displayed below the title bar. The microprogram can be replaced only when all rows in the information column show "OK", "Not change" or "Warning".

To continue processing, click [OK].

To terminate micro-program replacement, click [Cancel].



NOTICE: Approval of the Technical Support Division is required for downgrading microprogram versions.

Item	Description	
Forcibly update the micro-program even if	If you check this item, the micro-program exchange will be executed	
the update results in version downgrade	even when the micro-program versions of the selected HDD, CFM,	
	and Expander to be installed are earlier than their current micro-	
	program versions. (This item is not checked by default.)	

A CAUTION

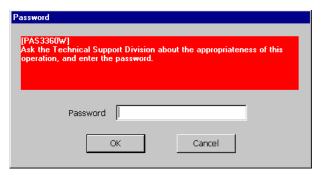
Be sure to click the [Detail] button when "Warning" is displayed. Confirm the contents and contact the Technical Support Division to ask whether to click [OK] or [Cancel].

When the Technical Support Division determined to be [OK]: Click the [OK] button. When the Technical Support Division determined to be [Cancel]: If you click the [Cancel] button, the processing of the micro-program replacement is terminated.

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MICRO04-100

If you click [OK] when "Warning" is displayed, the Password window might be displayed. Input password and click [OK] to continue processing.



MICRO04-110

<Display with an error>

An example of error window is shown below. An error message is displayed below the title bar.

At the same time, error information is displayed in the information column.

Click [Cancel] to terminate the micro-program replacement.

(NOTE: The [OK] button is disabled.)

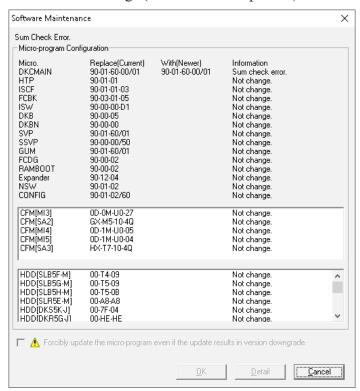
Click [Detail] to display detailed error information.

Before attempting to rerun, be sure to correct the cause of the error. Refer to the entire status (SVP SECTION), action code (ACC SECTION), and other information.

Below are messages and information that may be displayed in the Information column.

NOTE: Click [Detail] to display detailed error information, and confirm the cause of these errors.

- "Version error"
- "Revision error"
- "Warning"
- "Can't read the configuration of the micro-program."
- "Warning" (Function bit map error)



NOTICE: Approval of the Technical Support Division is required for downgrading microprogram versions.

Item	Description
Forcibly update the micro-program even if	If you check this item, the micro-program exchange will be executed
the update results in version downgrade	even when the micro-program versions of the selected HDD, CFM,
	and Expander to be installed are earlier than their current micro-
	program versions. (This item is not checked by default.)

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Table 4-2 Version Check Message Table

	Message:	Contents and Maintenance	
1	Confirm the following configuration list.	Check the version (Normal or Warning).	
		If Warning, it is necessary to be approved by T.S.D. (Technical	
		Support Division).	
2	Version error.	Incorrect version. Confirm the micro-program version.	
3	Can't read the configuration of the micro-	Error caused while the micro-program configuration is being	
	program.	read. Recover the blockade of a concerned processor.	
4	Internal error. (On SVP Logic)	Inconsistent logic. (SVP logic)	
		Retry exchange. If the same message is displayed, power SVP	
		off and on.	
5	Internal error. (On SVP Memory)	Inconsistent logic. (SVP memory)	
		Retry exchange. If the same message is displayed, power SVP	
		off and on.	
6	Internal error. (On Temporary Files)	Inconsistent logic. (temporary file)	
		Retry exchange. If the same message is displayed, power SVP	
		off and on.	
7	Version error.	Incorrect version. (partial replacement)	
	(Previous maintenance needed)	Confirm the micro-program version.	
8	Version error.	Incorrect version. (partial replacement)	
	(Incompatible MP exists)	Confirm the micro-program version.	
9	Sum Check error.	Sum check code is incorrect. Micro-program data in Micro-Media	
		isn't correct. Exchange the Micro-Media.	
10	Revision error	Incorrect revision. Confirm the micro-program revision.	
11	The micro-program is incompatible with the	Incorrect micro-program. Confirm the micro-program version and	
	system.	system. Contact T.S.D. (Technical Support Division).	
12	Combination error	Incorrect micro-program exchange process. Confirm the	
		combination of micro-program version and the exchange process.	
13	Internal Version error.	The combination of versions of the DKCMAIN micro-program	
	DKCMAIN - another micro-program	and the micro-program with an error is not valid. Check the	
	combination of Version error.	exchange procedure of the micro-program with the version	
		error and the order of performing the exchange procedures of	
		the DKCMAIN micro-program and the micro-program with the	
		version error.	

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MICRO04-130

Blamk Sheet

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	Information	Contents	
1	OK	The micro-program is replaceable.	
2	Version error	MP has an incorrect micro-program version.	
3	Internal error [#xxxx]	Inconsistent logic error has occurred.	
		[internal error code]	
		0001: Parameter error	
		0002: Memory allocation error	
		0003: Memory allocation error	
		0005: File I/O error	
4	Not change	The micro-program will not be replaced.	
5	Read error	An error has occurred while reading the current configuration.	
6	Sum Check error	The sum check code is incorrect.	
7	Warning	It is necessary to contact T.S.D. (Technical Support Division) for	
		approval.	
8	Revision error	MP has an incorrect micro-program revision.	

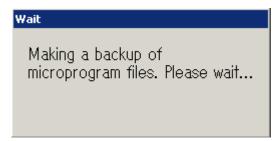
NOTE: For "Function ID Table", refer to "7.3 Function ID Table".

When the error message 2179 is displayed on SVP while exchanging micro-programs, check the function detected by the message, take actions, and then perform the exchange again.

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10. The message "Making a backup of micro program files. Please wait..." appears.



11. File copy in SVP. Go to 4.3 Step 1.



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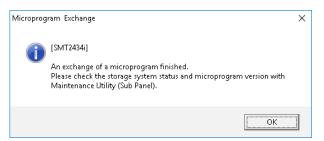
4.3 Transferring micro-programs to the DKC

1. The message "Now Reading storage system configuration..." appears. The current DKC configuration is read.



<<Error>>

- "On exchanging a micro-program, An error has occurred. XX processing is stopped"
- "The processor of an obstacle blockade exits. XX processing is stopped"
- "The processor that failed in an exchange of micro-program exists"
- "An error had occurred in XX blockade processing"
- "File size check error"
- "Invalid file contents"
- 2. The message "Downloading *** micro-program..." (***: DKCMAIN, ...) appears.
- 3. The message "Now MP Rebooting... Group# n/N" appears. All processors are recovered.
- 4. After completion of the micro-program exchange, click [OK] in response to the message [SMT2434i]. Go to 4.6.



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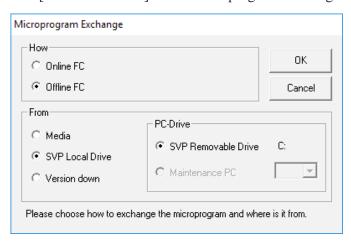
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MICRO04-170

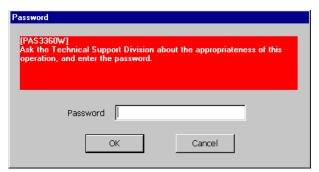
4.4 SVP Local Drive Download

Download the latest version of the micro-program on the SVP Local Drive.

1. [How]: Select [Offline FC]. [From]: Select [SVP Local Drive] in the 'Microprogram Exchange' dialog box, and click [OK].



If you want to continue this process enter the password, and click [OK].

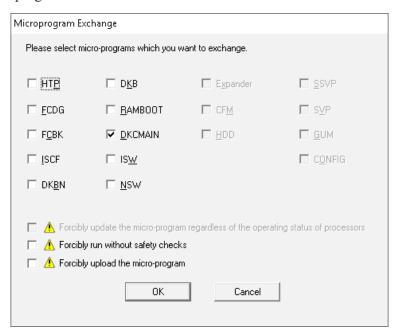


DKC910I

MICRO04-180

- 2. The 'Microprogram Exchange' dialog box appears.

 Select one or more items from the list of the type of micro-programs, and click [OK].
 - \square : Micro-programs to be substituted.



Details of the checkboxes with the alert mark are shown in the table below.

Item	Description
Forcibly update the micro-program regardless	If you check this item, the micro-program exchange will be
of the operating status of processors	executed regardless of the MP operating rate. (This items is not
	checked by default.)
Forcibly run without safety checks	If you check this item, the micro-program exchange will be
	executed without status checks of storage system parts including
	blocked parts. (This items is not checked by default.)
Forcibly upload the micro-program	If you check this item, the micro-program will be transferred to
	the storage system even when the version is the same. (This items
	is not checked by default.)

Return to 4.2 Step 9.

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MICRO04-190

If an error occurs in downloading micro-programs to DKC, remove the cause of an error using Maintenance Display (SVP SECION), Action Code (ACTION SECTION), and other information to execute the exchange again. Then start from the first step of MICRO-FC procedure. At this time, you can select [SVP Local Drive] at 4.2 Step 3.

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4.5 Version Down



Ask the technical support division about the appropriateness of the operation.

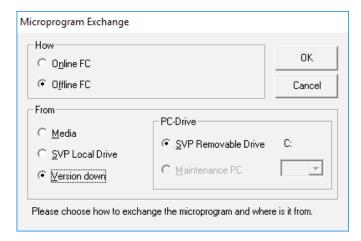
Do not execute the Version Down function during initial copy or resynchronization of TrueCopy, Universal Replicator, or global-active device. If you execute it, the micro-program exchange may fail.

If you want to restore the micro-program to the previous version of the micro-program after the exchange (by Media), execute the Version Down function.

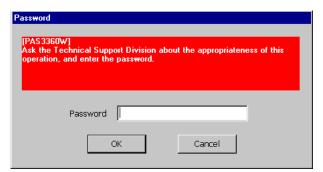
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[How]: Select [Offline FC].
 [From]: Select [Version down] in the 'Microprogram Exchange' dialog box, and click [OK].



If you want to continue this process enter the password, and click [OK].



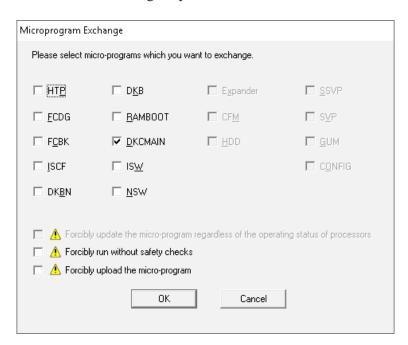
MICRO04-220

2. The 'Microprogram Exchange' dialog box appears.

Select one or more items from the list of the type of micro-programs, and click [OK].

 \square : Micro-programs to be substituted.

NOTE: The Version Down function can restore only the micro-program exchanged by Media. It is not possible to execute the Version Down function for the micro-program which is not exchanged by Media.



Details of the checkboxes with the alert mark are shown in the table below.

Item	Description
Forcibly update the micro-program regardless	If you check this item, the micro-program exchange will be
of the operating status of processors	executed regardless of the MP operating rate. (This items is not
	checked by default.)
Forcibly run without safety checks	If you check this item, the micro-program exchange will be
	executed without status checks of storage system parts including
	blocked parts. (This items is not checked by default.)
Forcibly upload the micro-program	If you check this item, the micro-program will be transferred to
	the storage system even when the version is the same. (This items
	is not checked by default.)

Return to 4.2 Step 9.

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MICRO04-230

4.6 Checking the functions after exchange

Check that the version of the recently installed micro-program is the same as that of the replaced micro-program by using the version display in the MAINTENANCE function. (See SVP SECTION.)

NOTE: If you find "??-??···" or incompatibility version, recover the status following the "5.2 Recovery procedure in off-line menu was selected".

After changing the mode from [Modify Mode] to [View Mode], select the [Execute]-[Exit] menu on the maintenance screen and then check that Web Console starts. If it failed to start, recover it referring to trouble shooting in the WEB CONSOLE SECTION.

When the customer uses Storage Navigator, request the customer to restart the Storage Navigator running PC (Web client) surely after replacing the micro-program.

5. Trouble Recovery Procedure in Exchanging Micro-programs

5.1 Recovery procedure in on-line menu was selected

If a failure occurs during micro-program exchange, perform the necessary recovery operation for the phenomenon according to the table below.

NOTICE:

Micro-program exchange may fail when SVP is under heavy load for running virus checker, monitor, etc. In this case, wait for a while, and then perform the micro-program exchange again.

If the micro-program exchange operation failed again, perform the recovery operation by following the procedures in this section.

Case	Phenomenon	Reference page and action
1	A power failure occurs.	MICRO05-30
2	The message "On exchanging a micro-program, an error has occurred" is displayed before the Version window appears.	
	(1) When the message is "An error occurred while reading from the micro program media".	Perform the micro-program exchange again according to the action for the message ID.
	(2) When the message is "A file I/O error has occurred in the SVP Local Drive".	MICRO05-60
	(3) Others	MICRO05-40
3	An AP error occurs, resulting in SVP trouble (Key-in operations are disabled and the screen disappears).	MICRO05-40
4	One of the following messages is displayed. • "A time-out error occurred during communication with the web server." • "An error occurred during communication with the web server." • "A time-out error occurred on the GUM."	MICRO05-40
5	When the message is "An error occurred while uploading.".	Perform the micro-program exchange again. If the phenomenon persists, perform the procedure in MICRO05-130
6	Procedure for returning the micro-program version to the previous version.	MICRO05-70
7	In the case of incorrect version display ("??-??" or incompatibility). (The disagreement of a binary version (Internal administrative information) contains it.) (Refer to (SVP03-05-40))	MICRO05-40

(To be continued)

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MICRO05-20

(Continued from preceding page)

Case	Phenomenon	Reference page and action
8	An error occurs in the HDD micro-program replacing.	MICRO05-90
9	An error occurs in the SSVP micro-program replacing.	MICRO05-100
10	An error occurs in the Expander/NSW micro-program	MICRO05-110
	replacing.	
11	An error occurs in the DKB/DKBN micro-program replacing.	MICRO05-120
12	The message "An error occurred while uploading." appears, or	MICRO05-130
	other phenomenon occurs.	
13	An error occurs in the GUM micro-program replacing.	MICRO05-140
14	In the case status of display (XXX microprogram Updating.	MICRO05-80
	(100%)) is not changed for approximately 30 minutes.	
	(XXX : The name of micro-program)	

[Sections to be referenced for recovery procedure]

(i) Status display : "Activating and Terminating STATUS" (SVP03-01-10)

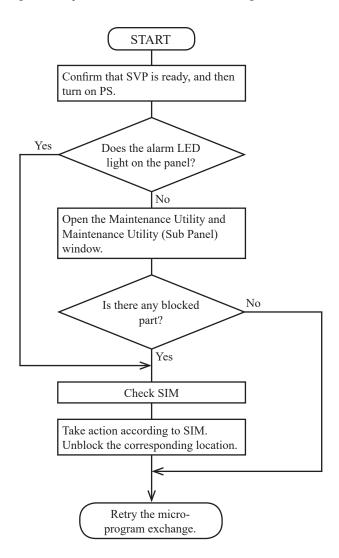
(ii) Version display : "Version of Microprogram" (SVP03-05-10)

(iii) Maintenance part exchange: "Hot Replace" (REP(GE)02-10)(iv) Log indication : "SSB Log" (SVP02-02-20)

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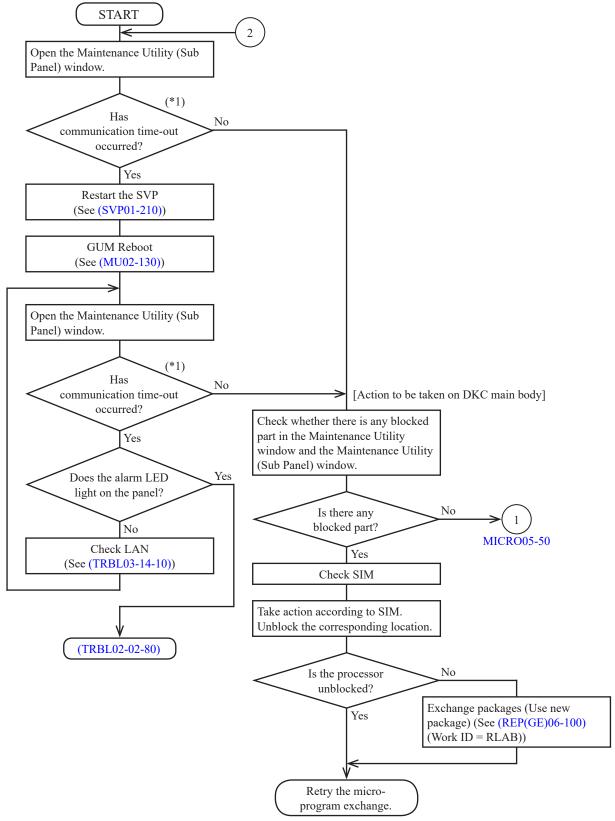
MICRO05-30

[Recovery Procedure for Power Failure]



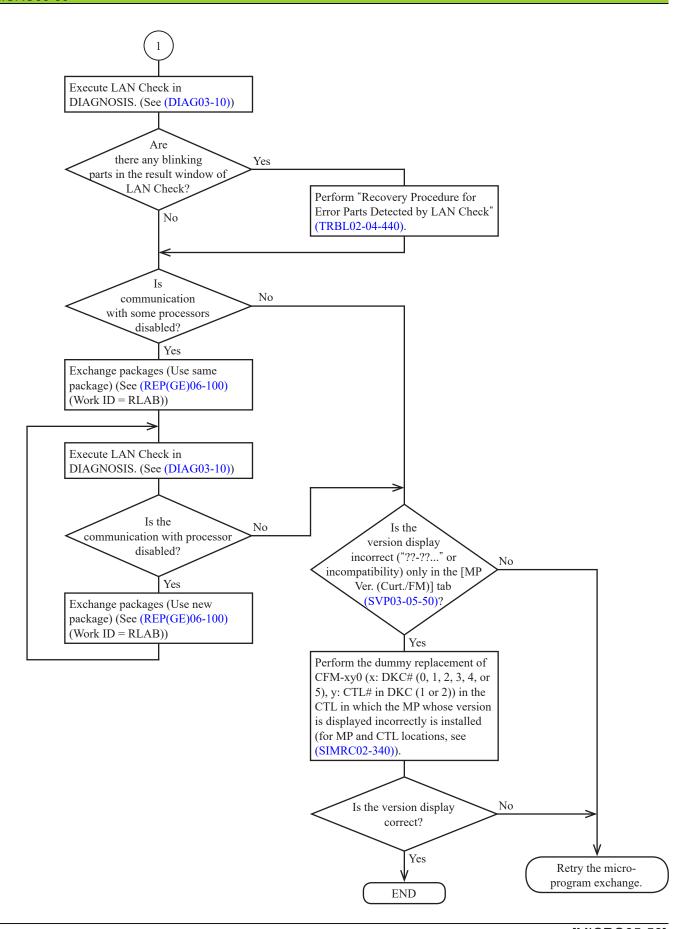
MICRO05-40

[Recovery Procedure for Communication Time-out/PC Trouble in Downloading Micro-program /Version incompatibility]



*1: The message "communication error occurred SVP-DKC" is displayed.

MICRO05-50

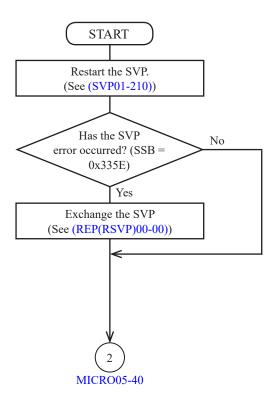


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MICRO05-60

[Recovery Procedure for I/O Error on SVP Hard Disk]

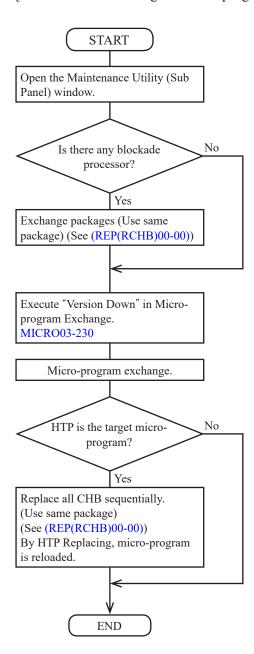


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MICRO05-70

[Procedure for returning the micro-program version to the previous version]



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MICRO05-80

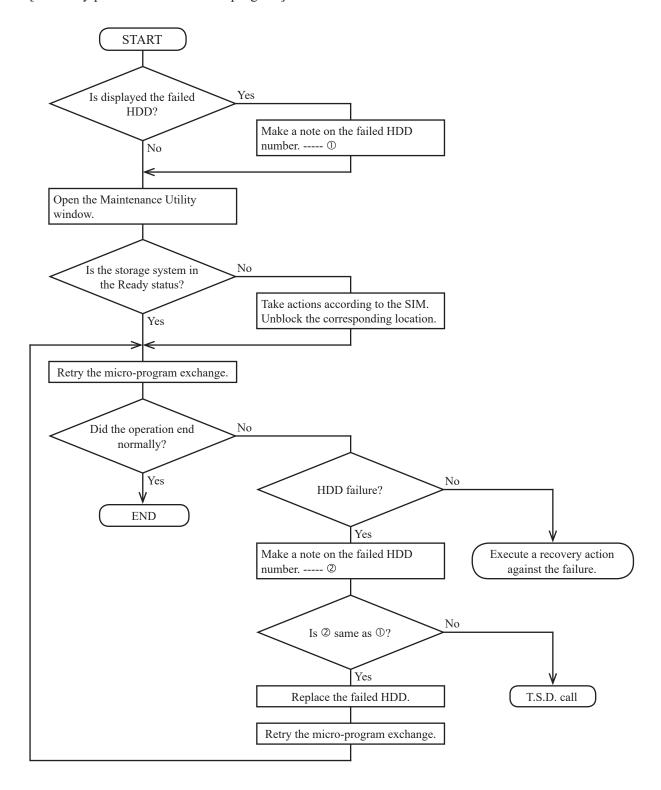
[Recovery procedure when the status of the display (XXX microprogram update (100%)) does not change for approximately 30 minutes]

- 1. Connect to Maintenance Utility of each CTL and reboot each GUM. See (MU02-130).
- 2. Connect to Maintenance Utility of each CTL and release the system lock. See (MU02-110).
- 3. Retry the micro-program exchange.

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MICRO05-90

[Recovery procedure HDD micro-program]

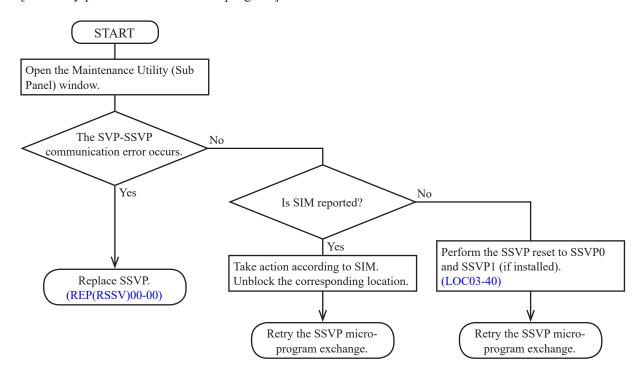


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MICRO05-100

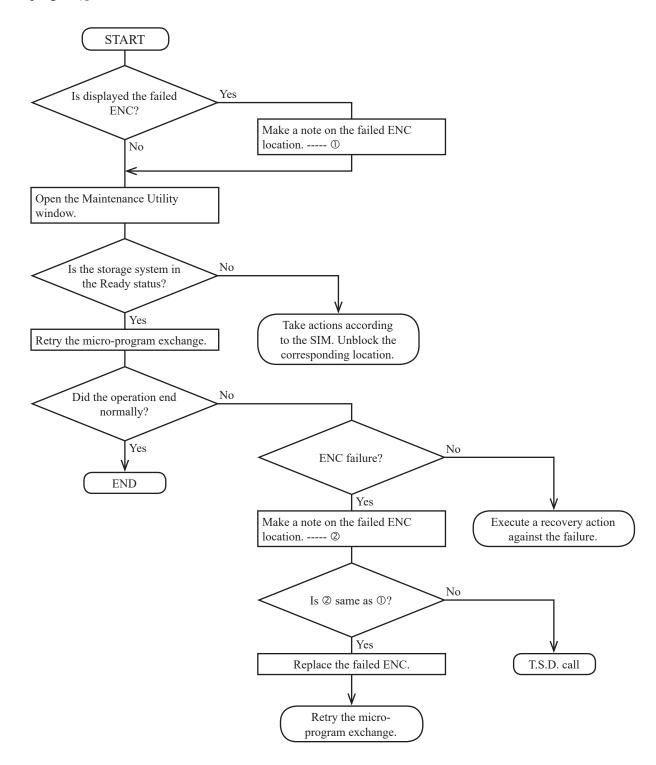
[Recovery procedure SSVP micro-program]



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MICRO05-110

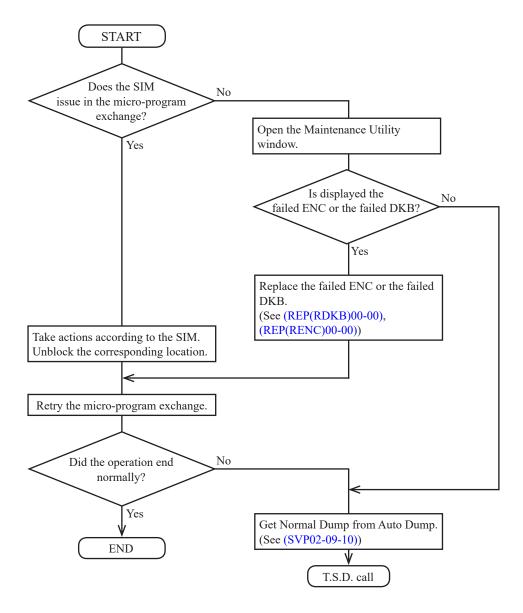
[Recovery procedure when error occurs during a downloading of the micro-program (Expander/NSW micro-program)]



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MICRO05-120

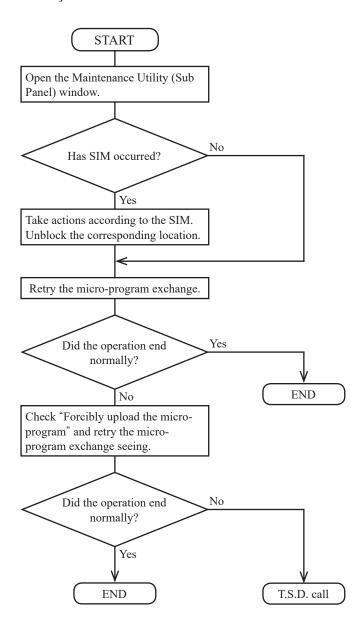
[Recovery procedure when an error occurs during a downloading of the micro-program (DKB/DKBN micro-program)]



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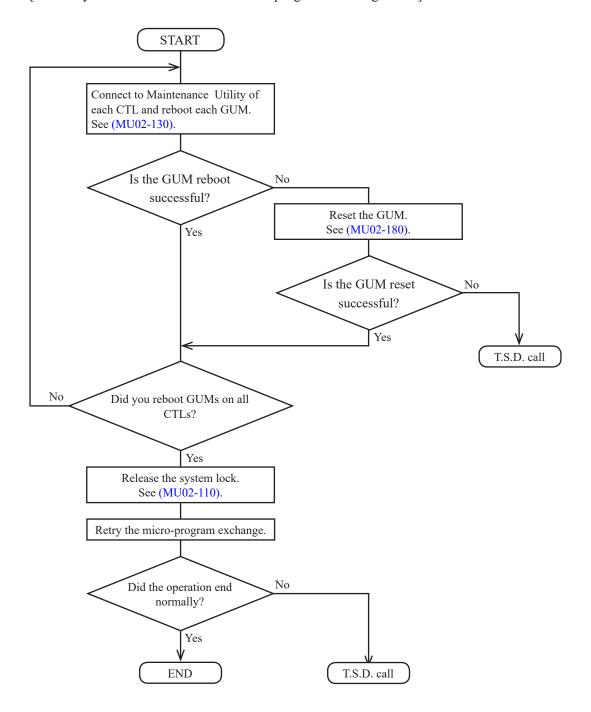
MICRO05-130

[Recovery procedure when the message "An error occurred while uploading." appears or other phenomenon occurs]



MICRO05-140

[Recovery Procedure When GUM Micro-program Exchange Fails]



5.2 Recovery procedure in off-line menu was selected

If a failure occurs during micro-program exchange, perform the necessary recovery operation for the phenomenon according to the table below.

NOTICE: Micro-program exchange may fail when SVP is under heavy load for running virus checker, monitor, etc. In this case, wait for a while, and then perform the micro-program exchange again.

If the micro-program exchange operation failed again, perform the recovery operation by following the procedures in this section.

Case	Phenomenon	Reference page and action
1	A power failure occurs.	MICRO05-160
2	The message "On exchanging a micro-program, an error has	_
	occurred" is displayed before the Version window appears.	
	(1) When the message is "An error occurred while reading	Perform the micro-program
	from the micro program media".	exchange again according to the
		action for the message ID.
	(2) When the message is "A file I/O error has occurred in	MICRO05-190
	the SVP Local Drive".	
	(3) In the case SIM 62Axxx (Moderate) is output for	MICRO05-200
	a pool that contains a virtual volume with capacity	
	saving enabled.	
	(4) Others	MICRO05-170
3	An AP error occurs, resulting in SVP trouble (Key-in	MICRO05-170
	operations are disabled and the screen disappears).	
4	One of the following messages is displayed.	MICRO05-40
	• "A time-out error occurred during communication with the	
	web server."	
	• "An error occurred during communication with the web	
	server."	
	• "A time-out error occurred on the GUM."	
5	When the message is "An error occurred while uploading.".	Perform the micro-program
		exchange again.
		If the phenomenon persists,
		perform the procedure in
		MICRO05-130.
6	In the case of incorrect version display ("??-??" or	MICRO05-170
	incompatibility). (The disagreement of a binary version	
	(Internal administrative information) contains it.) (Refer to	
	(SVP03-05-40))	
7	Other phenomenon occurs.	MICRO05-130

[Sections to be referenced for recovery procedure]

(i) Status display : "Activating and Terminating STATUS" (SVP03-01-10)

(ii) Version display : "Version of Microprogram" (SVP03-05-10)

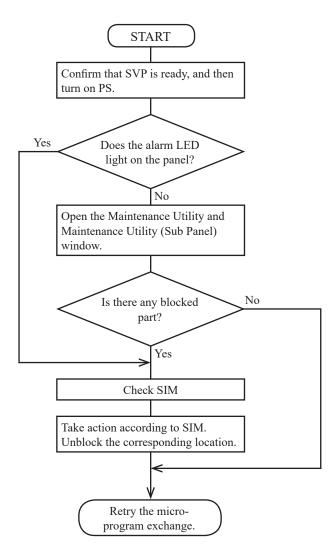
(iii) Maintenance part exchange: "Hot Replace" (REP(GE)02-10)

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MICRO05-160

[Recovery Procedure for Power Failure]



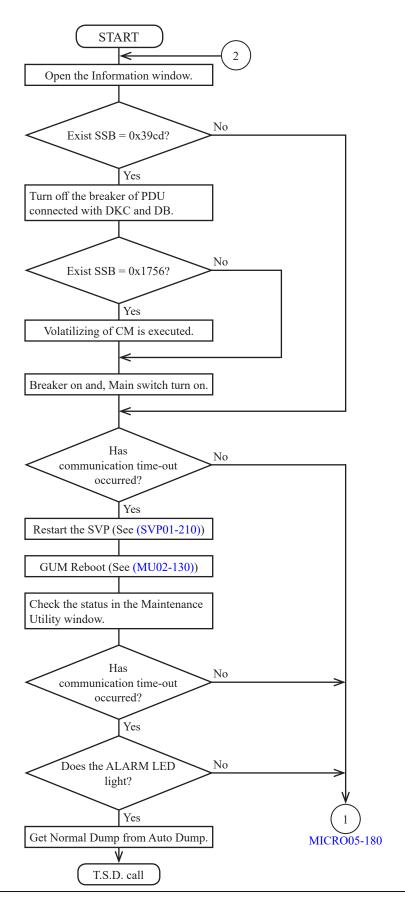
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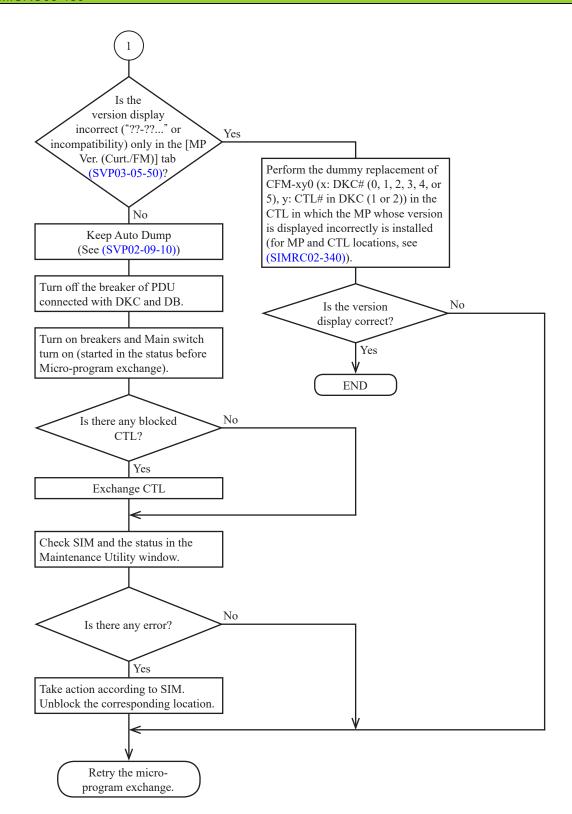
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MICRO05-170

[Recovery Procedure for an error in data transferred to the DKC/AP error/SVP error]



MICRO05-180

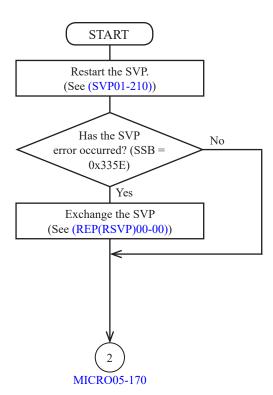


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MICRO05-190

[Recovery Procedure for I/O Error on SVP Hard Disk]



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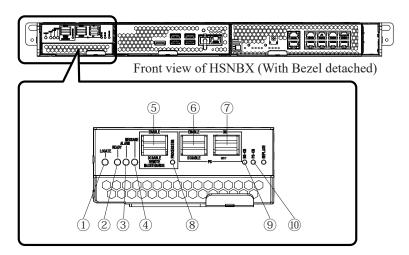
MICRO05-200

[In the case SIM 62Axxx (Moderate) is output for a pool that contains a virtual volume with capacity saving enabled]

When SIM 62Axxx (Moderate) is output for a pool that contains a virtual volume with capacity saving enabled, because PS OFF cannot be performed, take the following procedure:

- 1. Perform non-volatile PS off for the storage system. ("Non volatilization power-off and restarting procedure" (TRBL08-20))
- 2. While holding the PS SW ENABLE switch (⑤) on the HSNPANEL in the ENABLE position, turn on the PS ON/PS OFF switch (⑦) and confirm that the PS ON LED (⑥) turns green. (LOC03-10)

Table 5-1 Switch and LEDs of HSNPANEL



- 3. Ask the user to take the actions as indicated in SIM = 62Axxx.
- 4. Perform the micro-program replacement again.

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MICRO06-10

6. Microprogram Exchange Wizard

Only inserting the Media and execute the Microprogram Exchange Wizard, micro-program are exchanged automatically according to the contents of the definition.

A CAUTION

Perform the micro-program exchange when MP processing rate is less than 50%. If the MP processing rate is 50% or higher, micro-program exchange may end abnormally.

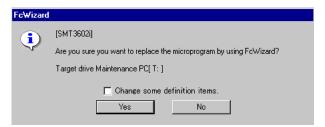
A CAUTION

SVP does a reboot twice during FC Wizards execution, so if SVP does a reboot, please log on manually.

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MICRO06-20

- The starting method
- 1. Connect the Maintenance PC to the SVP.
- 2. Insert Media that the micro-program was stored in the Media drive of the Maintenance PC.
- 3. Change the SVP mode to [Modify].
- 4. Select [FcWizard].
- 5. The message "Are you sure you want to replace the microprogram by using FcWizard?" appears. Click [Yes].



If you check the "Change some definition items" these following dialog appears and you can change some definition of the micro-program exchange.

[Reboot processor] dialog

If the target micro-programs contains DKCMAIN or RAMBOOT, you can select processors' reboot pattern.

Refer to 3.2 Step 5.

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MICRO06-30

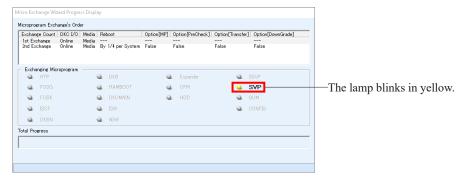
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6. According to the contents of the definition file stored in the Media, micro-program is exchanged automatically (If you change some definitions FcWizard follows those.).

A CAUTION

SVP does a reboot twice during FC Wizards execution, so if SVP does a reboot, please log on manually.

7. The progress dialog is displayed upper left, and the lamp of the micro-program under execution blinks in yellow.

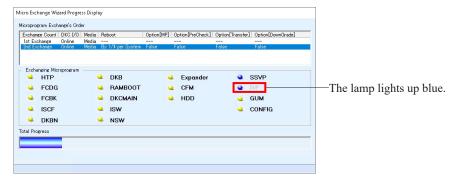


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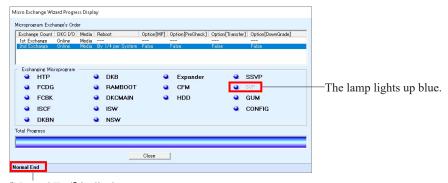
8. The lamp of the micro-program exchanged normally lights up blue.



9. After the micro-program exchange, [Close] is displayed.

Normal End:

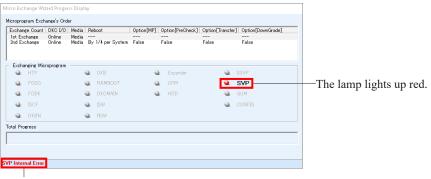
After all micro-program exchange finish, "Normal End" is displayed on the dialog lower left.



"Normal End" is display.

Abnormal End:

The lamp of micro-program lights up red, and the error information is displayed on the dialog lower left.



The error information.

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MICRO06-50

Error information	Action		
MP Reboot stop, Due to heavy I/O load	■ "Change some definition items" is not checked:		
	If more than 50% MP operating rate is detected, stop the micro-program		
	exchange.		
	Change some definition items" is checked:		
	• When the reboot pattern "By 1/2 per System" of the processor is selected,		
	if more than 50% MP operating rate is detected, stop the micro-program		
	exchange.		
	• When the reboot pattern "By 1/4 per System" of the processor is selected,		
	if more than 65% MP operating rate is detected, stop the micro-program		
	exchange.		
	• When the reboot pattern "By 1/8 per System" of the processor is selected,		
	if more than 75% MP operating rate is detected, stop the micro-program		
	exchange.		
	• When the reboot pattern "By One per DKC" of the processor is selected,		
	if more than 85% MP operating rate is detected, stop the micro-program		
	exchange.		
	Check the MP operating rate. After fulfilling the MP operating rate that is		
	below the above regulated rate, re-execute the micro-program exchange.		
Micro Version Error	The micro-program version is incorrect. Confirm the version.		
Micro Sum Check Error	Sum check code is incorrect. Micro-program data in micro-media isn't		
	correct. Exchange the micro-media.		
Micro Revision Error	The micro-program revision is incorrect. Confirm the revision.		
Micro Combination Error	If you perform the micro-program exchange with the combination of these		
	micro-program versions, DKC/DB may be partially blocked. Confirm the		
	micro-program versions and exchange procedure.		
Micro Media Error	The micro-media has an error. Replace the micro-media.		
Version Error (SNMPv3)	You cannot exchange to the micro program that does not support the		
	SNMPv3, because the status of The Extension SNMP that supports SNMPv3		
	is "Enable".		
	In consultation with the customer, please judge whether or not to run the		
	micro program exchange.		
	In order to re-run the micro program, after the micro exchange interruption,		
	please perform the following steps.		
	(1) Select the "Disable" of the Extension SNMP.		
	(2) Re-run the micro program.		
	(3) Select the "Enable" of the Extension SNMP.		
SVP Internal Error	Perform the SSVP reset to SSVP0 and SSVP1 (if installed). (LOC03-40)		
(When SSVP replacing failure)	Then retry the micro-program exchange.		
Errors other than above	Confirm SIM on the Maintenance Utility (Sub Panel) window, remove the		
	error and then retry the micro-program exchange.		

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10. After confirming the message, push [Close] and end.

11. Change the SVP mode to [View].

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7. Appendixes

7.1 OSSs Installed on the SVP and Their Versions

When the SVP micro-program is installed, OSSs are also installed at the same time.

Table 7-1 OSS Versions Installed at the Time of Micro-program Exchange (*1)

OSS Version	Software			
OSS Version	Apache	Java	Jetty	Perl
When the micro-program version	2.4.37	11.0.1+13	9.4.14	5.28.1.1
is 90-01-01-x0/xx or later and	(OpenSSL1.1.1a)			
less than 90-01-51-x0/xx				
When the micro-program version	2.4.39	11.0.4+11	9.4.14	5.28.1.1
is 90-01-51-x0/xx or later and	(OpenSSL1.1.1c)			
less than 90-01-61-x0/xx				
When the micro-program version	2.4.37	11.0.4+11	9.4.14	5.28.1.1
is 90-01-61-x0/xx or later and	(OpenSSL1.1.1a)			
less than 90-02-01-x0/xx				
When the micro-program version	2.4.39	11.0.5+10	9.4.21	5.28.2.1
is 90-02-01-x0/xx or later	(OpenSSL1.1.1d)			

^{*1: &}quot;7.2 Version Check of Third Party Software" provides how to check the OSS versions.

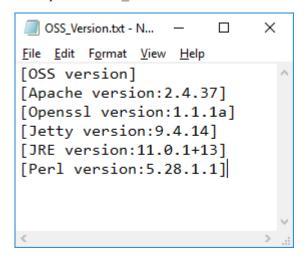
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7.2 Version Check of Third Party Software

You can check the OSS versions installed on the SVP by seeing the text in "<Installation directory of SVP micro-program >\svp\OSS\GYSS_Version.txt".



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7.3 Function ID Table

Function ID	Function	Contents	Action
04:21	Support for the	Suppresses the version downgrade	Remove all NVMe drives/DBNs/DKBNs, and then
	NVMe function	from the micro-program version that	retry the micro-program exchange.
		supports the NVMe function to the	
		version that does not support it.	
04:25	Install / Remove	Suppresses the version downgrade	Perform the removal of the Controller Chassis, and
	Controller Chassis	to the micro-program version that	then retry the micro-program exchange.
		does not support the Install/Remove	
		Controller Chassis function, when	
		removal of the Controller Chassis	
		is required due to the abnormal end	
		of the installation/removal of the	
		Controller Chassis.	
04 : 26	Support for the	Suppresses the version downgrade	Delete all virtual storage machines (resource
	function to expand	from the micro-program version that	groups on which the virtual ID of the product
	the number of VSM	supports the function to expand the	and the virtual ID of the serial number are set) by
	(Virtual Storage	number of VSM (Virtual Storage	using the [raidcom delete resource] command of
	Machine)	Machine) to the version that does not	RAID Manager, and then retry the micro-program
		support it.	exchange.
			Be sure to delete all resources (LDEV number,
			parity group, external volume, port, host group
			number, and iSCSI target number) of a resource
			group to be deleted before deleting the resource
			group.
			For details of the [raidcom delete resource]
			command, see Command Control Interface
			Command Reference.
04:29	Support for	Suppresses the version downgrade	In the Edit Mainframe System Functions window
	zHyperWrite +	from the micro-program version that	of Web Console, disable the "zHyperWrite + 3DC
	3DC Multi Target	supports the zHyperWrite + 3DC	Multi Target" function, and then try the micro-
		Multi Target function to the version	program exchange again.
		that does not support it.	For detailed operations on Web Console, see
			Provisioning Guide for Mainframe Systems.

(To be continued)

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(Continued from preceding page)

Function ID	Function	Contents	Action
05:00	Nimble Support as external storage	Suppresses the version downgrade from the micro-program version that supports the external storage HPE Nimble Storage to the version that	Delete all mappings to the volumes of the storage system which vendor name is "Nimble" and model is "Server" in the External Storage window of Web Console, and then retry the micro-program
05:02	Support for GAD + VVOL	does not support it. Suppresses the version downgrade from the micro-program version that supports the combination of globalactive device and SLU to the version that does not support it.	exchange. Perform the following, and then retry the microprogram exchange. • Set the same value for the actual ID and the virtual ID of the LDEV with the ALU or SLU attribute, and move the resource to the actual storage machine. • When the global-active device pair is composed of the LDEVs with the SLU attribute, delete the pair. • When two or more LDEVs with the ALU attribute are defined per host group, remove the LU definitions of the LDEVs with the ALU attribute so that the number of such LDEVs is one or less per host group.
05:03	Support for the Increase LUN per Port function	Increases the maximum number of LUNs per port to 4096.	The micro-program exchange cannot be performed because LUNs with LUN ID 2048 or greater are created. Remove the LUNs with LUN ID 2048 or greater, and then retry the micro-program exchange.
05:05	Drive support of SLx5x-MxTxSS	Suppress the version downgrade from the micro-program version that supports the installation of SLx5x-MxTxSS to the version that does not support it. • SLx5y-MzTzSS x: Manufacturer (R or B) y: Generation (A to Z) zTz: Capacity (TB) (T is a decimal point.)	Perform the removal of the SLx5x-MxTxSS, wait for 2 minutes or more, and then retry the microprogram exchange.
05:06	Encryption setting is transient state	Suppresses version downgrade to the micro-program that does not support the function that suppresses maintenance operations during a transient state of the encryption setting, when the encryption setting ends abnormally (or is being processed).	Contact the customer's security administrator, initialize the encryption setting (or wait for the completion of the processing), and then retry the micro-program exchange.

(To be continued)

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(Continued from preceding page)

Function ID	Function	Contents	Action
05:13	Support for Pool	Suppresses the version downgrade	Change the pool subscription rate limit setting of
	Subscription Limit	from the micro-program version that	all pools to "-" (unlimited).
		supports Pool Subscription Limit to	
		the version that does not support it.	
05 : 14	Install/Remove	Suppresses the version downgrade	Perform the removal of the Controller Board, and
	Controller Boards	to the micro-program version that	then retry the micro-program exchange.
		does not support the Install/Remove	
		Controller Board function, when	
		removal of the Controller Board is	
		required due to the abnormal end	
		of the installation/removal of the	
		Controller Board.	
05:15	Suppression of the	Suppresses the micro-program	Check the version of the selected micro-program,
	micro-program	exchange of the micro-program	and then perform the micro-program exchange
	exchange with the	version that supports the SAS	with the micro-program version that supports the
	micro-program	function with the micro-program	SAS function.
	version dedicated	version dedicated for the NVMe	
	for the NVMe	function.	
	function	(Suppresses the micro-program	
		exchange with the DKCMAIN	
		micro-program version 90-01-6x-xx/	
		xx (x: arbitrary value))	
05:18	Support for	Suppresses the version downgrade	Perform the following, and then retry the micro-
	Accelerated	from the micro-program version that	program exchange (*1).
	Compression	supports accelerated compression to	1. Shrink all pool-VOLs belonging to the parity
		the version that does not support it.	groups with accelerated compression enabled.
			2. Delete LDEVs in the expanded area.
			3. Select the parity groups with accelerated
			compression enabled, and then perform the
			parity group formatting.
			4. Disable the accelerated compression setting for
			the parity groups.
07:18	NVMe drive on	Suppresses version downgrade from	In the External Storage window of Web Console,
	external storage	the micro-program that allows a	delete all volume mappings of the Hitachi storage
	support	Hitachi storage system in which	system in which NVMe drives are installed, and
		NVMe drives are installed to be	then retry the micro-program exchange.
		connected as an external storage	
		system to the micro-program that	
		does not allow that.	

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*1: When the micro-program exchange fails and SSB = AE0D is reported, remove NFHxx-QxxxSS spare drives and free drives, and then retry the micro-program exchange.

After the micro-program exchange, install the spare drives. If data is stored in spare drives when the accelerated compression setting is enabled, the compressed data remains in the spare drives. In such a case, SSB = AE0D is reported, and the version downgrade to the micro-program version that does not support accelerated compression is suppressed.

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7.4 Function ID Table for GUM

NOTE: Even if the function ID (GXX:XX) is displayed in the Microprogram Exchange window and the micro-program exchange processing is suspended, each of micro-program might be exchanged at the time of the maintenance other than the microprogram exchange if the data transfer is completed.

If the function ID (GXX:XX) is displayed, perform any of the following.

- Perform the contents described in the Action column of the GUM function ID table, and then select the same micro-program type as the one that the error occurred and the micro-program exchange.
- Select the same micro-program type as the one that the error occurred and the micro-program exchange by the media of the version before the update.

Function ID	Function	Contents	Action
G00:64	2CBX-2CTL	Suppresses version downgrade from	Change the storage system configuration to the
	support	the micro-program that supports the	2CBX-4CTL configuration, and then retry the
		2CBX-2CTL configuration to the	micro-program exchange.
		micro-program that does not support	
		it.	

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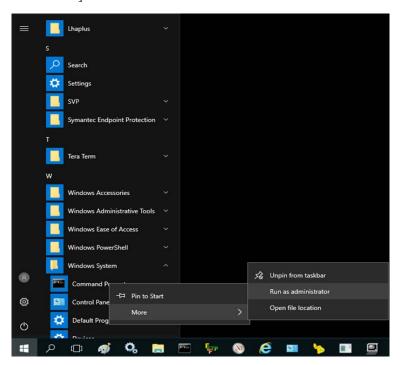
7.5 Version upgrade of RAID Manager (SVP)

The procedure of the upgrade of RAID Manager installed in SVP is shown. Especially, work concerned is unnecessary execution when there is no instruction from the factory.

- 1. Connect the Maintenance PC to the SVP.
- 2. Insert the micro-program media.

 Insert the micro-program media into the drive of the Maintenance PC.
- 3. Launch the command prompt with the Administrator authority.

 Select [Start]-[Windows System], right-click the displayed [Command Prompt], and then select [More][Run as administrator].



4. Disable RESTAPI. Enter "C:\DKC200\restapi\uninstall.bat" in the command prompt and press the Enter key.

5. Start the installer.

Enter "\\tsclient\D\RM\Setup.exe /SVP" in the command prompt and press the Enter key. (Enter a space before /SVP).

NOTE: The format of the input value is "\\tsclient\<Drive name>\ RM\Setup.exe /SVP".

Use the name of the drive in which the media is inserted. In the example above, the media is inserted in the D drive.

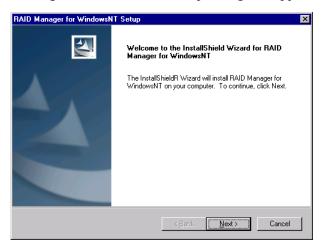
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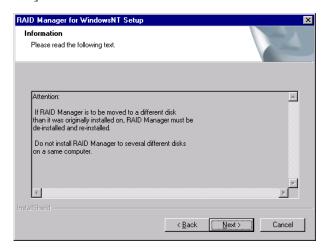
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6. Move to the next dialog box.

The RAID Manager for WindowsNT Setup dialog box appears. Click [Next>].



7. Move to the next dialog box. Click [Next >].



When Locked File Detected window is displayed, click [Retry] after waiting for about five minutes.

NOTE: Locked File Detected window is displayed when RAID Manager process is not terminated.

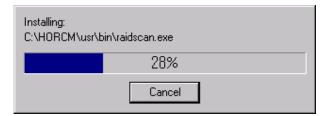
At this time, you should wait until RAID Manager process is terminated.



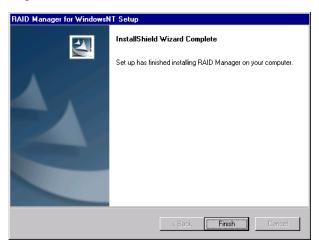
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8. Wait for the installation to complete.



9. Complete the installation operation. Click [Finish].



10. Enable RESTAPI

Enter "C:\DKC200\restapi\install.bat" in the command prompt and press the Enter key.

11. Reboot SVP.

Right-click [Start], and then select [Run]. Enter "shutdown /r /t 0" and click [OK]. SVP reboots.

NOTE: If the SVP High Reliability kit is installed, you need to install it in the standby SVP by using the same procedure. For the procedure of switching to the standby SVP, see "SVP Switching" (SVP02-14-10).