

# System Parameter

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This “System Parameter” volume describes the setting of the system parameter of the subsystem, etc.

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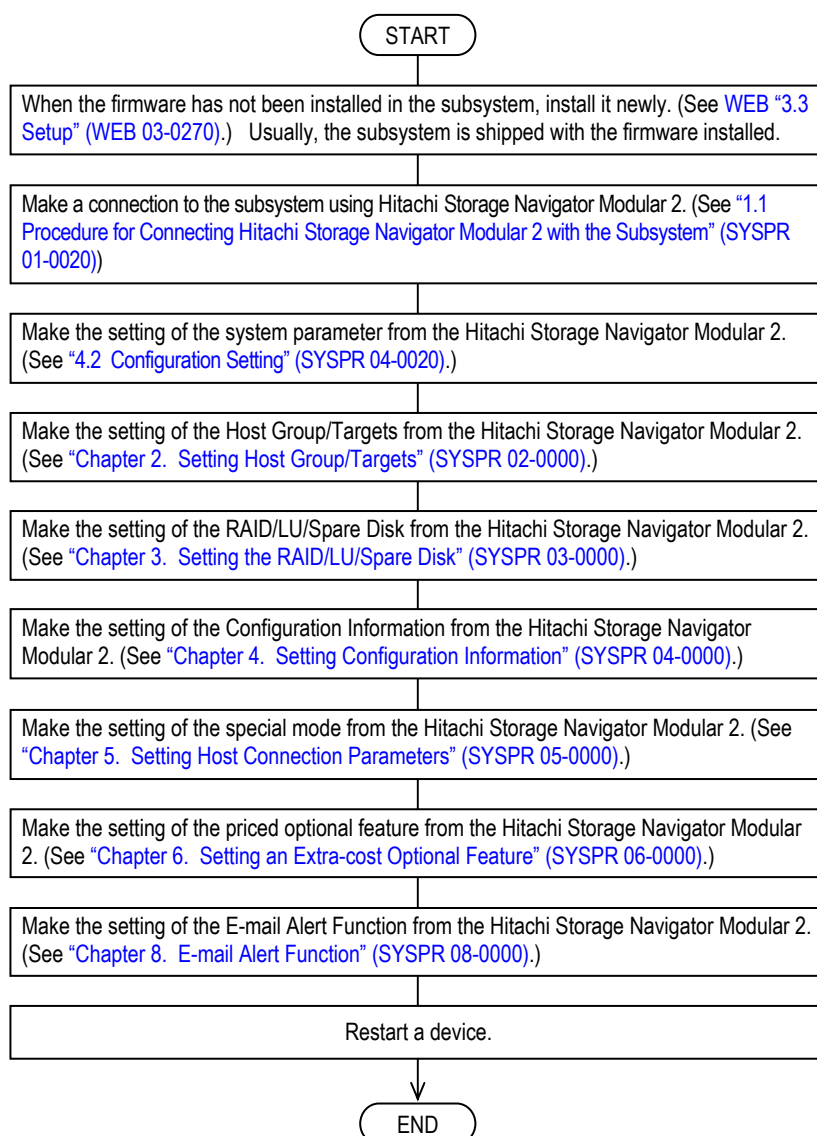
## Chapter 1. Setting (Hitachi Storage Navigator Modular 2)

This chapter explains method of setting the subsystem parameters using Hitachi Storage Navigator Modular 2. The Hitachi Storage Navigator Modular 2 can execute the setting function or the reference function by connecting it to the array subsystem when the array subsystem is in the Ready status.

Hitachi Storage Navigator Modular 2 is available even in the version 21.00 or later.

Even though the screen colors on the Hitachi Storage Navigator Modular 2 are different between the versions, the operation procedures are the same.

The procedures for setting device parameters are described below.



#### Precautions when restarting

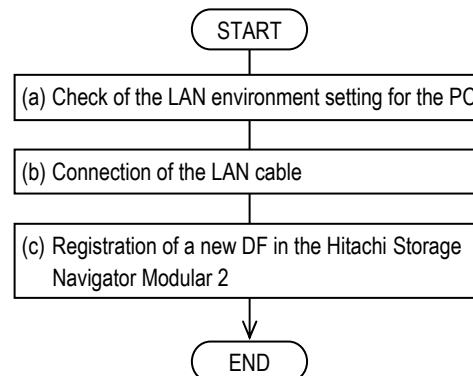
- If the array subsystem used for a remote side of TrueCopy remote replication/TrueCopy Extended Distance restarts in the status that TrueCopy remote replication/TrueCopy Extended Distance is enabled, the following phenomena occur.
  - The paths of TrueCopy remote replication/TrueCopy Extended Distance are both blocked. The notice of E-mail Alert Function, SNMP Agent Support Function, and TRAP occur at the time of the path blockade.  
Perform the notice and the check to the Failure Monitoring Department in advance.  
The path blockade automatically recovers after restarting.
  - When the status of the pair of TrueCopy remote replication/TrueCopy Extended Distance is PAIR or COPY, the pair changes to PSUE.  
If the Pair status of TrueCopy remote replication/TrueCopy Extended Distance is either PAIR or COPY, suspend the pairs before restarting the array subsystem.
- When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.  
Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then restart the subsystem.  
If the spin-down fails, execute the spin-down again.
- If the NAS Unit is connected and the NAS service is in operation, ask the NAS Unit administrator for planned shutdown of the NAS Unit.  
After rebooting the array device, ask the NAS Unit administrator to reboot the NAS Unit and check the status of the FC path (Fibre Channel path). Refer to [“Recovering from FC path errors”](#) in [“Hitachi NAS Manager User’s Guide”](#) to check the status of the FC path, and if there is a failure in the FC path, ask the NAS Unit administrator to recover the FC path.

## 1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem

The procedure for connecting Hitachi Storage Navigator Modular 2 with the subsystem is shown below.

NOTE : If there is no problem on the LAN connection or the IP address setting and the array cannot be registered in the following procedure, it is necessary to change the LAN Port Number of the PC referring to the LAN Port Number set in the array subsystem. Refer to [“4.2 \(11\) Setting of LAN Port Number” \(SYSPR04-0370\)](#).

- [\(11-1\) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more \[Recovery method\] ..... SYSPR 04-0404](#)
- [\(11-2\) When Hitachi Storage Navigator Modular 2 is Ver.4.00 or more and less than 5.00 \[Recovery method ... SYSPR 04-0435](#)
- [\(11-3\) When the Hitachi Storage Navigator Modular 2 is less than Ver.4.00 ..... SYSPR 04-0550](#)



### (1) Checking the LAN environment setting

(a) Make sure that the Hitachi Storage Navigator Modular 2 has been installed.

(b) Check the LAN environment setting for the PC

Make sure that the following settings have been made, or change the settings to the following.

(b-1) In case of the IPv4 environment

(i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 1.1.1](#).

- CTL0: 10.0.0.16 (Input example : http://10.0.0.16/)

(ii) If it is not connectable, by setting the values of Item 2 to Item 5 in [Table 1.1.1](#), specify the connectable value and perform the WEB connection.

- According to the setting value of “Maintenance PC” of Items 2 to 5 on [Table 1.1.1](#), set the IP Address and the Subnet Mask of the Maintenance PC.
- According to the “Array (LAN port for maintenance)” information of Items 2 to 5 on [Table 1.1.1](#), enter into “Address” of the WEB browser and connect with the array.

(iii) If not connected yet, refer to [Troubleshooting “3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0130\)](#).

**Table 1.1.1 Operational Environment (IPv4)**

No.	Subsystem (LAN port for maintenance)		Maintenance PC	
	IP Address	Subnet Mask	IP Address	Subnet Mask
1	CTL 0: 10.0.0.16 CTL 1: 10.0.0.17 (At the time of shipment)	255.255.255.0 (At the time of shipment)	10.0.0.2 to 0.0.0.9	255.255.255.0
2	CTL 0: 192.168.0.16 CTL 1: 192.168.0.17	255.255.255.0	192.168.0.2 to 192.168.0.9	255.255.255.0
3	CTL 0: 192.168.233.16 CTL 1: 192.168.233.17	255.255.255.0	192.168.233.2 to 192.168.233.9	255.255.255.0
4	CTL 0: 172.23.211.16 CTL 1: 172.23.211.17	255.255.255.0	172.23.211.2 to 172.23.211.9	255.255.255.0
5	CTL 0: 10.197.181.16 CTL 1: 10.197.181.17	255.255.255.0	10.197.181.2 to 10.197.181.9	255.255.255.0

(b-2) In case of the IPv6 environment

(i) Make the setting of the IP Address to be set to the PC as Item 1 in [Table 1.1.2](#).

- CTL0: fe80::16 (Input example : http://[fe80::16]/)

When connecting on WEB by the IPv6 address, put the address in brackets ([ ]).

(ii) If it is not connectable, set the value of Item 2 in [Table 1.1.2](#), and perform the WEB connection.

- According to the setting value of “Maintenance PC” of Item 2 on [Table 1.1.2](#), set the IP Address and the Subnet Mask of the Maintenance PC.
- According to the “Array (LAN port for maintenance)” information of Item 2 on [Table 1.1.2](#), enter into “Address” of the WEB browser and connect with the array.

(iii) If not connected yet, refer to [Troubleshooting “3.4 Procedure for Specifying Maintenance Port IP Address” \(TRBL 03-0130\)](#).

**Table 1.1.2 Operational Environment (IPv6)**

No.	Subsystem (LAN port for maintenance)		Maintenance PC	
	IP Address	Length of subnet prefix	IP Address	Subnet prefix
1	CTL0: fe80::16 CTL1: fe80::17 (At the time of shipment)	64 (At the time of shipment)	Automatic	Automatic
2	CTL0: fe80::f6 CTL1: fe80::f7	64	Automatic	Automatic

- Manual change of the network parameter of the Maintenance port

When the User management port is set as the same network address as the Maintenance port, the communication cannot be made normally. Prepare five patterns of the network parameter fixed values to be used in the Maintenance port, and change the network parameter fixed values to be used in the Maintenance port manually by the network parameter of the User management port.

Therefore, in the work other than the installation work of the subsystem at shipment, the maintenance LAN Port for the WEB connection is set to any of Items 1 to 5 in [Table 1.1.1](#) in case of the IPv4 environment and set to either Item 1 or 2 in [Table 1.1.2](#) in case of the IPv6 environment.

NOTE : When the network address of the LAN device, which is connected via the Gateway in the extension of the user management port, is the same as that of the Maintenance port, the communication cannot be made normally because of the conflict between them.

Therefore, use a value other than the network address set to the maintenance port for the LAN device connected to the port for the user management via Gateway. Or change the IP address of the maintenance port to a value other than the network address of the LAN device connected via Gateway by Hitachi Storage Navigator Modular 2. (Refer to [“4.2 \(4\) Setting of Maintenance LAN” \(SYSPR 04-0160\)](#).)

- (c) Make sure that negotiation of Maintenance PC is set to auto negotiation.

To check negotiation of Maintenance PC, refer to [Troubleshooting “3.1 \(6\) Procedure for setting negotiation” \(TRBL 03-0050\)](#).

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(2) Connecting the LAN cross cable

Connect the Control Unit #0 LAN Maintenance port of the subsystem and the LAN card of a PC.

(a) For the RKM/RKS

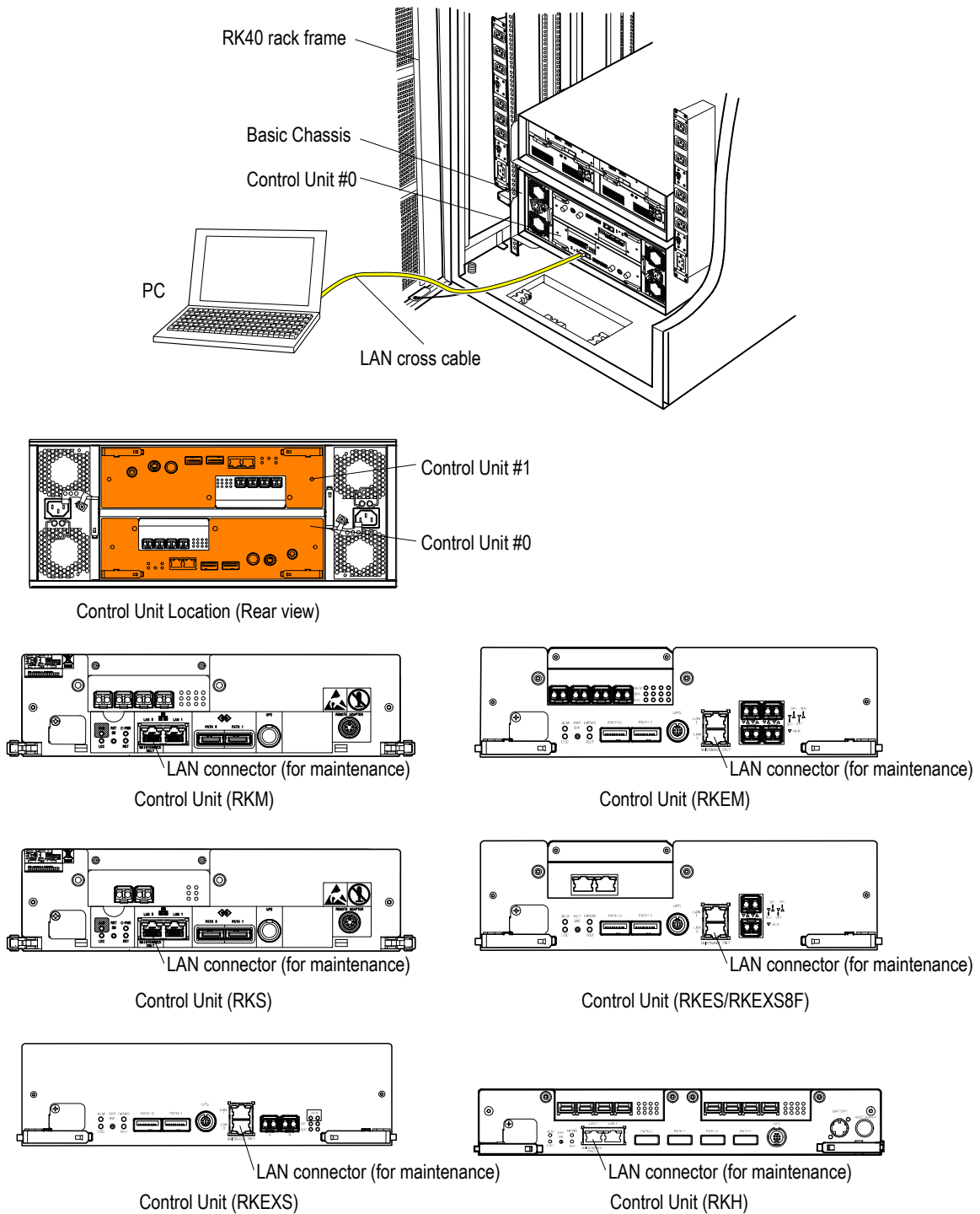


Figure 1.1.1 Connecting the LAN Cable

(3) Cautions at the time of Hitachi Storage Navigator Modular 2 use

(a) Installing a JRE (Java Runtime Environment)

Installing a JRE and setting a parameter are necessary to display the Applet screen of the Hitachi Storage Navigator Modular 2.

The JRE download from “<http://java.com/en/download/>”, and then install JRE”.

Set the parameter according to the following procedures.

- (i) In the Windows Start menu, select the [Settings] - [Control Panel].
- (ii) From the Control Panel, select the [Java].
- (iii) Click [View] of the upper position in the Java tab.
- (iv) Enter “-Xmx192m” (“-Xmx216m” when the Hitachi Storage Navigator Modular 2 is version 7.00 or later, “-Xmx464m” when the Hitachi Storage Navigator Modular 2 is version 9.72 or later) to the Java Runtime Parameters field.  
It is necessary to set the Java Runtime Parameters to display the Applet screen.
- (v) Click [OK].
- (vi) Click [OK] in the Java tab.
- (vii) Close the Control Panel.

(b) Changing the Connection Address for Applet Screen

Make the change only when you want to change the IP address of the service PC in which Hitachi Storage Navigator Modular 2 has been already installed. If you only change the connection address, the Applet screen will not be displayed.

To change the connection address used to display the Applet screen of Hitachi Storage Navigator Modular 2, operate it in the following procedure. The address specified at the time of the installation is set for the default address. Specify the IP address of the installed service PC.

- (i) Open [Setting] - [Control Panel] from the start menu of Windows of the Service PC.  
Select the “SNM2 Server” from the service (local) lists of the [Administrative Tools] - [Services], and select the stop.
- (ii) If there are other products to use HiCommand Suite Common Components, stop the service (daemon process) <sup>(†1)</sup>.
- (iii) Stop the service (daemon process) for the HiCommand Suite Common Components.
- (iv) Edit setting file (server\snmserver.properties) and change the connection address.  
For Windows:  
The jp.co.Hitachi.strdiskarray.rmi.hostname in the  
“C:\Program Files\HiCommand\StorageNavigatorModular\server\snmserver.properties”  
file specifies the connection address. Rewrite to a connection address you want to change.
- (v) Start the service (daemon process) for the HiCommand Suite Common Components.
- (vi) Open [Setting] - [Control Panel] from the start menu of Windows of the Service PC.  
Select the “SNM2 Server” from the service (local) lists of the [Administrative Tools] - [Services], and select the start.
- (vii) If there are other products to use HiCommand Suite Common Components, start the service (daemon process) <sup>(†1)</sup>.

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<sup>†1</sup> : For more information about how to stop or start the service (daemon process), refer to “[Hitachi Storage Navigator Modular 2 Graphical User Interface \(GUI\) User's Guide](#)”.



(c) Changing the Web screen function is not supported.

Hitachi Storage Navigator Modular 2 does not support the window change function of a Web browser.

The following operation procedures are for Internet Explorer to return to the Web window displayed at the last minute. However, if Hitachi Storage Navigator Modular operates them, the window may not change.

- (i) Press the Back space key.
- (ii) Press ← key while holding down the Alt key.
- (iii) Select “Back” of the menu displayed by right-clicking

If you perform any of the above (i), (ii) and (iii) on the window displayed by clicking the Create or Edit button with Hitachi Storage Navigator Modular 2, the window of “Now loading.” is displayed and it may not change. In this case, press the ✕ (Close) button at the top right of the window to close it, and operate it again.

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- (4) Registering the newly introduced array subsystem in the Hitachi Storage Navigator Modular 2
- (a) Activating the Hitachi Storage Navigator Modular 2

- (i) Check if “SNM2 Server” of the service PC is started from “Services” of “Administrative Tools” of the Control Panel of the Windows.

If not started, make it “Start”.

- (ii) Start the browser, and specify an address as follows.

<When connecting with http>

“http://xxx:23015/StorageNavigatorModular/”

<When connecting with https>

“https://xxx:23016/StorageNavigatorModular/”

xxx : IP address of the service PC.

NOTE : • The https is invalid in the status immediately after the installation. Refer to the [“Hitachi Storage Navigator Modular 2 Graphical User Interface \(GUI\) User’s Guide”](#) for the method to enable https.

- When the display of the menu, etc. on the window is broken, select the color palette from the property of the window, and make it other than True Color and 65536 or less.

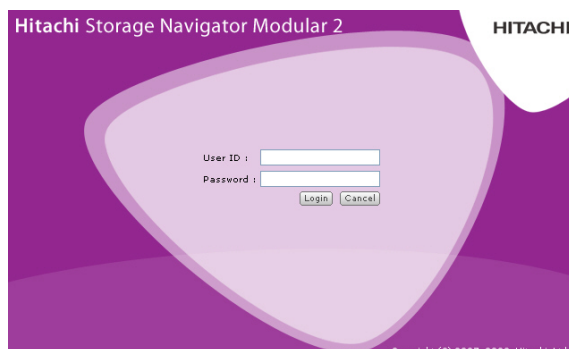
- (iii) Two windows, a title window and a login window, are displayed automatically.

When the user is registered in Hitachi Storage navigator Modular 2, enter the registered contents in the user ID and the password, and click the login button.

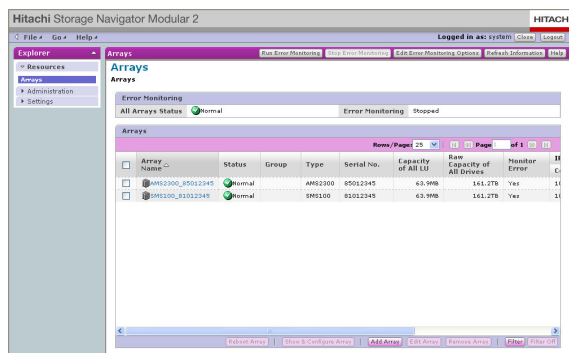
NOTE : • When Hitachi Storage Navigator Modular 2 was newly installed, enter the temporarily registered user ID “system” and password “manager”.

- If the login window is not displayed automatically, the popup may be blocked. Cancel the popup block.

Usually, “Popup is blocked” is displayed on the top of the browser. Click this display and select “Popup in this site is always allowed”.



- (iv) The Hitachi Storage Navigator Modular 2 is activated in the Normal Mode and the main window is displayed<sup>‡1</sup>.



You can execute the display of the Hitachi Storage Navigator Modular 2 Operation Mode and state of the failure monitoring and the following functions in the main window. For the operation of each function, refer to the page explaining each function.

- Registration of the disk array system (registration, deletion, change, and properties display)
- Execution of the failure monitoring and setting of the failure monitoring option
- Change of the Operation Mode
- Display of the version

‡1 : The mode change cannot be done at the time of the initial activation of the Hitachi Storage Navigator Modular 2.  
A registration of a password validates the mode change.

## (b) Changing the Maintenance Mode

Hitachi Storage Navigator Modular 2 has three Active Modes, that is, the Normal Mode, Management Mode, and Maintenance Mode. In the Normal Mode, the program displays the configuration and statuses of the disk array. In the Management or Maintenance Mode, it can set the configuration of the disk array in addition to the function in the Normal Mode.

## (i) Changing the Normal Mode to the Maintenance Mode

Change the Operation Mode from the Normal Mode to the Maintenance Mode.

- ① Check that the “mode” file exists in the following directory.

If it exists, go to Procedure ④.

\\HiCommand\StorageNavigatorModular\conf

- ② If there is no mode file, create a mode file (without extension) and write the following letters in one line. However, do not insert line feeds.

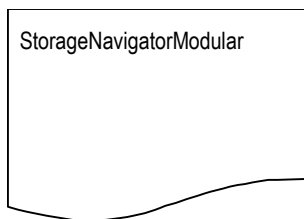


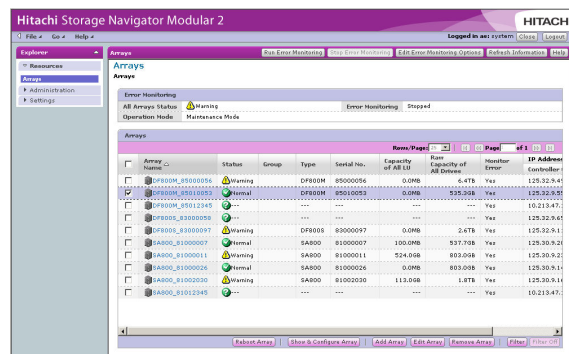
Figure 1.1.2 Mode File

- ③ Store the created mode file in the following place.

\\HiCommand\StorageNavigatorModular\conf

- ④ Put a checkmark in the array subsystem to operate on the main window, and press the [Ctrl] key, [Shift] key and the [E] key at the same time.<sup>(†1)</sup>

It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the main window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.

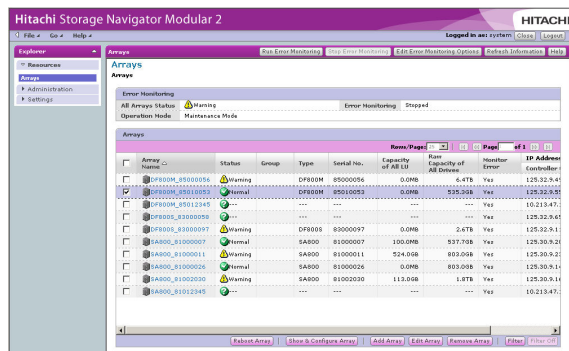


†1 : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

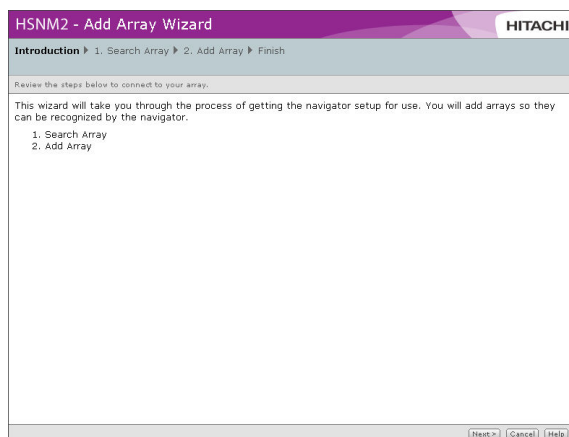
## (c) Registering the disk array system

Register the disk array system to be operated in order to operate it from the Hitachi Storage Navigator Modular 2. A registration of a non-existent disk array system cannot be done.

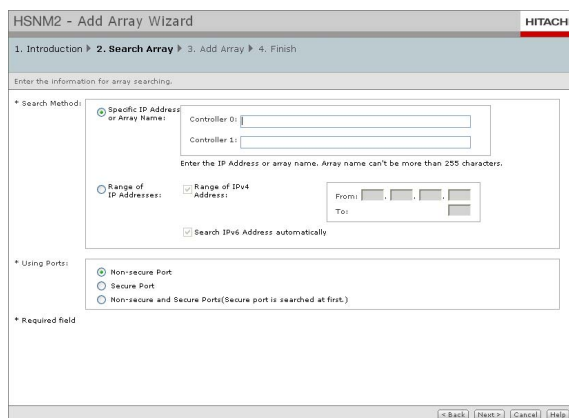
## (i) Click the [Add Array] button in the “Subsystems” window of the main window.



## (ii) “HSNM2\_Add Array Wizard” window is displayed.



## (iii) The array subsystem register is searched. Specify a search method and a range to search by a host name or an IP address.



- (iv) The search result is displayed. Specify the array subsystem to register, and click the [Next] button.

HSNM2 - Add Array Wizard

1. Introduction ▶ 2. Search Array ▶ 3. Add Array ▶ 4. Finish

All the detected arrays are added to the navigator. If you don't want to add some arrays, turn off the check-mark on the list.

\* The arrays that is added to the navigator:

Array Name	Type	Controller 0	Controller 1	Serial No.	Communication type
AMS2300_85012345	AMS2300	10.213.7.174	N/A	85012345	Non-secure

\* Required field

< Back Next > Cancel Help

- NOTE :
- The disk array system with the dual system can also be used with a single Controller only.
  - Enter the IP address only in the Control Unit to which the LAN cable is connected. If the IP address is entered in a Control Unit to which the LAN cable is not connected, an error is caused.

- (v) When a message informing of a completion of the registration is displayed, click the [Finish] button.

HSNM2 - Add Array Wizard

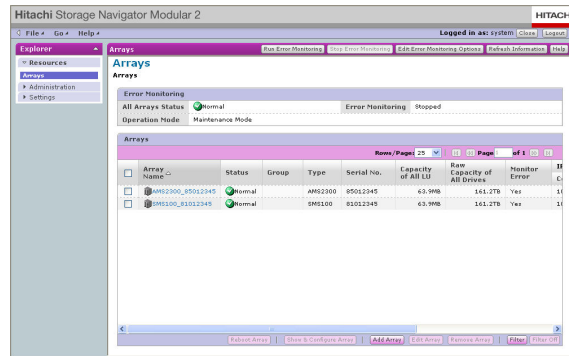
Introduction ▶ 1. Search Array ▶ 2. Add Array ▶ Finish

Click Finish to close the wizard.



**The array(s) has/have been added to the navigator.**  
After closing this wizard, you can refer and configure the array(s) from Arrays screen.

Finish

(vi) The updated main window is displayed.



There are two types of icon of the disk array system as shown below: an icon for the dual system and that for the single system.

- Icon for the dual system : 
- Icon for the single system : 



## 1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2

When it cannot be accessed the array subsystem from the Hitachi Storage Navigator Modular 2 due to the duplication of the LAN Port Number, the access will be possible by changing the LAN Port Number which the Hitachi Storage Navigator Modular 2 uses.

- "Inspect skinny" option that is the VoIP function option of firewall of Cisco is effective, and the Hitachi Storage Navigator Modular 2 cannot access to the Subsystem through the firewall. In this case, it is necessary to change in LAN port number.

### (1) Prerequisites

The LAN Port Number can be changed by the Hitachi Storage Navigator Modular 2 only when the prerequisites described below are all satisfied.

- The Hitachi Storage Navigator Modular 2 is available connecting to the LAN port of both control units.

NOTE : It is possible to change the LAN port number for every control unit from the user port management port. Refer to [“4.2 \(11\) Setting of LAN Port Number \(11-3\) \[Recovery method\]” \(SYSPR 04-0550\)](#).

### (2) Restrictions

The LAN Port Number cannot be changed in the following conditions.

- While the LAN port to be changed is used in the other application or the failure monitor. In this case, change the LAN Port Number after stopping the program that is activated.

### (3) Points of concern

When using this function, consider the following points.

- Use the number not used in the connected network in the range of 1024 to 49151 for the LAN Port Number that can be changed.
- When the HiCommand are used, the setting needs to be changed.
- When the initialization of the array subsystem and initial setup of the firmware are performed, the set LAN Port Number returns to the initial value (2000).
- When changing the LAN Port Number, set the same LAN Port Number for both Control Units, and change the port number of all the array subsystems at the site concerned to the same number.
- When the LAN Port Number set to the array subsystem and the LAN Port Number described in the services file in the PC to be connected do not correspond, the PC cannot be connected to the LAN port of array subsystem. When the PC cannot be connected to the LAN port of array subsystem after changing the LAN Port Number, check the LAN Port Number of the array subsystem and the LAN Port Number described in the services file in the PC.

### (4) Procedure of changing LAN Port Number

Refer to [“4.2 \(11\) Setting of LAN Port Number” \(SYSPR 04-0370\)](#).

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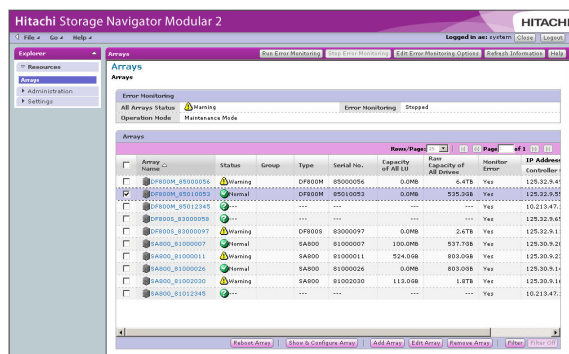
## Chapter 2. Setting Host Group/Targets

- Make a setting for making the subsystem recognized by a server.
- The setting of the host group/targets must be made for each port.

### 2.1 Before Setting Host Group/Targets

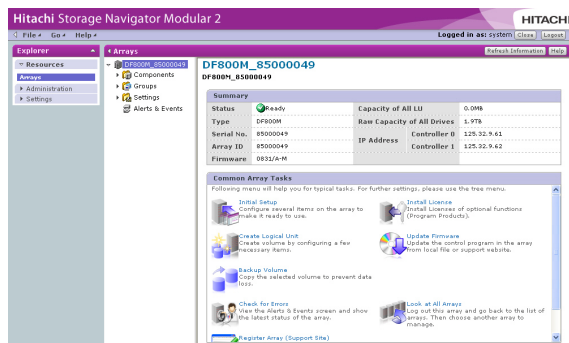
- (1) Turn on the power supply.
- (2) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (3) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

## 2.2 Setting of Option

- When RKM/RKS/RKH connects between host computer by the FC interface.  
: Go to “2.2 (1) For Fibre model” (SYSPR 02-0010)
- When RKM/RKS/RKH connects between host computer by the iSCSI interface.  
: Go to “2.2 (2) For iSCSI model” (SYSPR 02-0050)

### (1) For Fibre model

There are two methods for setting the options, that is, the simple setting and detail setting. When making the simple setting, select elements of an environment of the host computer to be connected. When the selection is made, the host group options necessary for the host computer to be connected are set automatically.

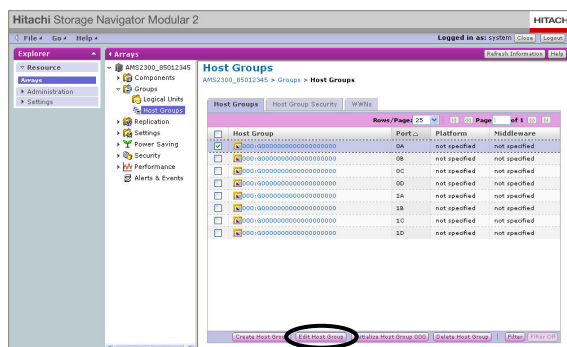
Set the directly required host group option for the detailed setting.

#### (a) Simple setting

Set the host group options necessary for the host computer to be connected by selecting elements of the environment of the host, that is, platform, alternative path, fail-over, and additional parameter. Since some host environments require detail setting as well as the simple setting, refer to the table of host connection parameters.

(i) Select the [Groups] - [Host Groups] on the unit window.

(ii) When [000:G000] is displayed, click the port that you want to set the connection mode with the host computer. Click the [Edit Host Group] button at the bottom of the window.



NOTE : In the case of the RKH, the port number 0C, 0D, 1C or 1D of the Fibre Channel is displayed according to the installation status of the Interface Board.

(iii) Click the [Options] tab.

(iv) Set a [Platform (Only one mode can be selected.)] and a [Middleware (Two or more modes may be selected.)] on the applet window. Click the [OK] button.

Common Setting : See No. 1 in Table 2.2.2, “List of Host Group Setting Items”.

Additional Setting : See No. 2 in Table 2.2.2, “List of Host Group Setting Items”.

Table 2.2.1 Simple Setting Item List

No.	Menu item	Contents		Factory setting
		Parameter <sup>(*)</sup>	How to set	
1	Platform	Not specified	Select one of the items	Not selected
		HP-UX		
		Solaris		
		AIX		
		Windows		
		Linux		
		VMware		
		NetWare		
2	Middle ware	Not specified	Select one of the items	Not selected
		VCS		
		Tru Cluster		

\*1 : When the host to be connected is Windows XP, select "Not specified" for all the items.

Table 2.2.2 List of Host Group Setting Items

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Common Setting (Only one mode can be selected.)	Standard Mode : Open system emulation mode	Select	Basic mode
		Open VMS Mode : VMS mode		
		TRESPASS Mode : TRESPASS mode		
		Wolfpack Mode : WolfPack mode		
2	Additional Setting (Two or more modes may be selected.)	Enable HP-UX Mode: This mode makes LUs, whose LU numbers are 8 up to 63, recognized when the subsystem is connected to the HP server.	Select	Not selected
		Enable PSUE Read Reject Mode : Set it when the fence level of TrueCopy remote replication is used with Data and the pair status suppresses the read access to P-VOL at the time of PSUE transition.	Select	Not selected
		Enable Mode Parameters Changed Notification Mode : Unit attention (06/2A00) is reported.	Select	Not selected
		Enable NACA Mode : Supports NACA (Normal Auto Contingent Allegiance) that is a standard on SCSI-3.	Select	Not select
		Enable Task Management Isolation Mode : Set it when the own port also does not reset the command while another port received the command reset instruction.	Select	Not select
		Enable Unique Reserve Mode 1 : Supports Persistent Reserve command.	Select	Not select
		Enable Port-ID Conversion Mode: This mode enables Port-ID that reported by Inquiry command is converted. Do not set it usually.	Select	Not selected
		Enable Tru Cluster Mode: When using Tru Cluster, you need to set this mode.	Select	Not selected
		Enable Product Serial Response Mode : This mode enables each LU to be assigned a unique DID in the SUN Cluster 3.0 system.	Select	Not select
		Enable Same Node Name Mode : This mode enables that each port of same array responses same World Wide Node Name.	Select	Not selected
		Enable CCHS Mode : CCHS convert Mode	Select	Not selected

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
2	Additional Setting (Two or more modes may be selected.)	Enable Inquiry Serial Number Conversion Mode : This mode enables serial number that reported by Inquiry command is converted. Do not set it usually.	Select	Not selected
		Enable NOP-In Suppress Mode : This mode enables suppression that NOP-In is transmitted.	Select	Not selected
		Enable S-VOL Disable Advanced Mode : The restore command can be executed for the ShadowImage S-VOL of "S-VOL Disable" attribute by setting of "S-VOL Disable Advanced Mode". Do not set it usually.	Select	Not selected
		Enable Discovery CHAP Mode <sup>(1)</sup> : Supports iSCSI Discovery with CAHP.	Select	Not selected
		Enable Unique Extended COPY Mode <sup>(2)</sup> : Supports XCOPY Command issued from the VMware.	Select	Not selected
		Enable Unique Write Same Mode <sup>(2)</sup> : Supports Write Same Command issued from the VMware.	Select	Not selected
		Enable DP Depletion Detail Reply Mode <sup>(3)</sup> : The response of the subsystem is made detailed further by selecting this mode when Thin Provisioning is used. When Thin Provisioning is used, it is recommended to select it.	Select	Not selected
		Enable Unit Attention Change Mode <sup>(4)</sup> : Suppresses the report to the Unit Attention (06/2900 (Power on Reset)).	Select	Not selected
		Enable UNMAP Short Length Mode <sup>(5)</sup> : Set this when connecting to the host which supports the UNMAP command. Required for Windows Server 2012 connection.	Select	Not selected
		Enable Change Response for Replication Mode <sup>(6)</sup> : When background copy of a replication pair is timed-out, the host may stop accessing the pair. This option changes the Sense key/Sense code the array will return to the host so that the host will continue to access the pair.	Select	Not selected

\*1 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.6.00 or later and the firmware Ver.0860/A or later.

\*2 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.00 or later and the firmware Ver.0890/A or later.

\*3 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.70 or later and the firmware Ver.0897/A or later.

\*4 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.77 or later and the firmware Ver.0897/H or later.

\*5 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.12.50 or later and the firmware Ver.08C3/F or later.

\*6 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.12.65 or later and the firmware Ver.08C3/R or later.

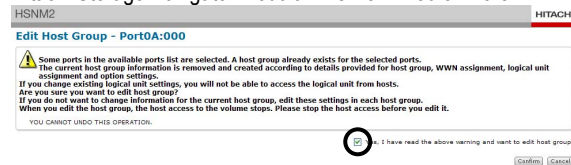
(v) The confirmation window is displayed. Click the [Confirm] button.



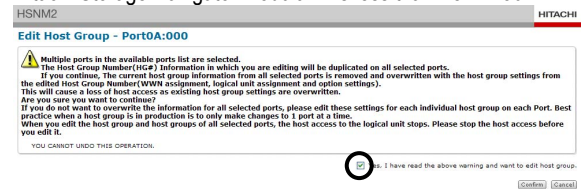
If multiple ports are selected for [\* Edit to] in the window of the procedure (iii), the following window is displayed. Check the checkbox and click the [Confirm] button.

NOTE : When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

Hitachi Storage Navigator Modular 2 is Ver.12.50 or more



Hitachi Storage Navigator Modular 2 is less than Ver.12.50

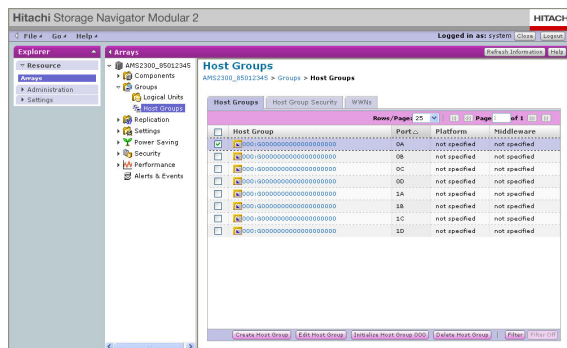


(vi) The confirmation window is display. Click the [Close] button.



(vii) The detail of the setting that has been made is displayed.

Make sure that the setting that has been made is reflected on the display.



(viii) Make the setting for the other ports in the same way.



This page is for editorial purpose only.

## (2) For iSCSI model

There are two methods for setting the options, that is, the simple setting and detail setting. When making the simple setting, select elements of an environment of the host computer to be connected. When the selection is made, the targets options necessary for the host computer to be connected are set automatically.

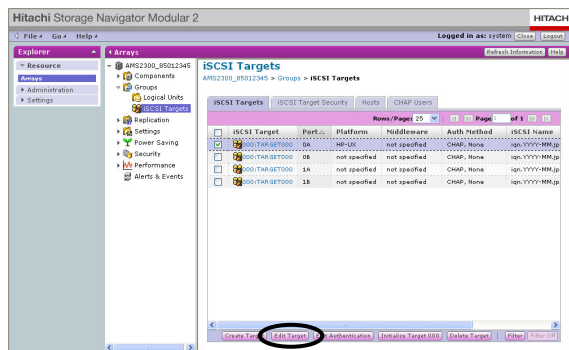
When making the detail setting, directly set the necessary targets options in the same way as conventional one.

## (a) Simple setting

Set the host group options necessary for the host computer to be connected by selecting elements of the environment of the host, that is, platform, alternative path, fail-over, and additional parameter. Since some host environments require detail setting as well as the simple setting, refer to the table of host connection parameters.

(i) Select the [Groups] - [iSCSI Targets] on the unit window.

(ii) Display the [000:TARGET000] (or [000:T000]) by clicking the port through for which you want to set the host connection mode. Click the [Edit Target] button of the window.



[illegible]

Logical Units		Options																																																																			
Select or check options for iSCSI target. When Platform or Middleware is set, Mode Setting appears automatically.																																																																					
Platform:	<input type="text" value="not specified"/>	Middleware:	<input type="text" value="not specified"/>																																																																		
Mode Settings:																																																																					
Common Settings:	<input type="text" value="Standard Mode"/>																																																																				
Additional Setting:	<table border="1"> <tbody> <tr> <td>Enable HP-UX Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable PSUE Read Reject Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Mode Parameters Changed Notification Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable NACA Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Task Management Isolation Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Unique Reserve Mode 1:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Port-ID Conversion Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Tru Cluster Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Product Serial Response Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Same Node Name Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable CCHS Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Inquiry Serial Number Conversion Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable NOP-In Suppress Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable S-VOL Disable Advanced Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Discovery CHAP Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Unique Extended COPY Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Unique Write Same Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Report iSCSI Full Portal List Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable DP Depletion Detail Reply Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Unit Attention Change Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable UNMAP Short Length Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> <tr> <td>Enable Change Response for Replication Mode:</td> <td><input type="checkbox"/></td> <td>Yes</td> </tr> </tbody> </table>			Enable HP-UX Mode:	<input type="checkbox"/>	Yes	Enable PSUE Read Reject Mode:	<input type="checkbox"/>	Yes	Enable Mode Parameters Changed Notification Mode:	<input type="checkbox"/>	Yes	Enable NACA Mode:	<input type="checkbox"/>	Yes	Enable Task Management Isolation Mode:	<input type="checkbox"/>	Yes	Enable Unique Reserve Mode 1:	<input type="checkbox"/>	Yes	Enable Port-ID Conversion Mode:	<input type="checkbox"/>	Yes	Enable Tru Cluster Mode:	<input type="checkbox"/>	Yes	Enable Product Serial Response Mode:	<input type="checkbox"/>	Yes	Enable Same Node Name Mode:	<input type="checkbox"/>	Yes	Enable CCHS Mode:	<input type="checkbox"/>	Yes	Enable Inquiry Serial Number Conversion Mode:	<input type="checkbox"/>	Yes	Enable NOP-In Suppress Mode:	<input type="checkbox"/>	Yes	Enable S-VOL Disable Advanced Mode:	<input type="checkbox"/>	Yes	Enable Discovery CHAP Mode:	<input type="checkbox"/>	Yes	Enable Unique Extended COPY Mode:	<input type="checkbox"/>	Yes	Enable Unique Write Same Mode:	<input type="checkbox"/>	Yes	Enable Report iSCSI Full Portal List Mode:	<input type="checkbox"/>	Yes	Enable DP Depletion Detail Reply Mode:	<input type="checkbox"/>	Yes	Enable Unit Attention Change Mode:	<input type="checkbox"/>	Yes	Enable UNMAP Short Length Mode:	<input type="checkbox"/>	Yes	Enable Change Response for Replication Mode:	<input type="checkbox"/>	Yes
Enable HP-UX Mode:	<input type="checkbox"/>	Yes																																																																			
Enable PSUE Read Reject Mode:	<input type="checkbox"/>	Yes																																																																			
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Enable UNMAP Short Length Mode:	<input type="checkbox"/>	Yes																																																																			
Enable Change Response for Replication Mode:	<input type="checkbox"/>	Yes																																																																			

\* Required field

Table 2.2.3 Simple Setting Item List

No.	Menu item	Contents		Factory setting
		Parameter <sup>(*)</sup>	How to set	
1	Platform	Not specified	Select one of the items	Not selected
		HP-UX		
		Solaris		
		AIX		
		Windows		
		Linux		
		VMware		
		NetWare		
2	Middle ware	Not specified	Select one of the items	Not selected
		VCS		
		Tru Cluster		

\*1 : When the host to be connected is Windows XP, select "Not specified" for all the items.

Table 2.2.4 List of Host Group Setting Items

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
1	Common Setting (Only one mode can be selected.)	Standard Mode : Open system emulation mode	Select	Basic mode
		Open VMS Mode : VMS mode		
		TRESPASS Mode : TRESPASS mode		
		Wolfpack Mode : WolfPack mode		
2	Additional Setting (Two or more modes may be selected.)	Enable HP-UX Mode: This mode makes LUs, whose LU numbers are 8 up to 63, recognized when the subsystem is connected to the HP server.	Select	Not selected
		Enable PSUE Read Reject Mode : Set it when the fence level of TrueCopy remote replication is used with Data and the pair status suppresses the read access to P-VOL at the time of PSUE transition.	Select	Not selected
		Enable Mode Parameters Changed Notification Mode : Unit attention (06/2A00) is reported.	Select	Not selected
		Enable NACA Mode : Supports NACA (Normal Auto Contingent Allegiance) that is a standard on SCSI-3.	Select	Not select
		Enable Task Management Isolation Mode : Set it when the own port also does not reset the command while another port received the command reset instruction.	Select	Not select
		Enable Unique Reserve Mode 1 : Supports Persistent Reserve command.	Select	Not select
		Enable Port-ID Conversion Mode: This mode enables Port-ID that reported by Inquiry command is converted. Do not set it usually.	Select	Not selected
		Enable Tru Cluster Mode: When using Tru Cluster, you need to set this mode.	Select	Not selected
		Enable Product Serial Response Mode : This mode enables each LU to be assigned a unique DID in the SUN Cluster 3.0 system.	Select	Not select

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
2	Additional Setting (Two or more modes may be selected.)	Enable Same Node Name Mode : This mode enables that each port of same array responses same World Wide Node Name.	Select	Not selected
		Enable CCHS Mode : CCHS convert Mode	Select	Not selected
		Enable Inquiry Serial Number Conversion Mode : This mode enables serial number that reported by Inquiry command is converted. Do not set it usually.	Select	Not selected
		Enable NOP-In Suppress Mode : This mode enables suppression that NOP-In is transmitted.	Select	Not selected
		Enable S-VOL Disable Advanced Mode : The restore command can be executed for the ShadowImage S-VOL of "S-VOL Disable" attribute by setting of "S-VOL Disable Advanced Mode". Do not set it usually.	Select	Not selected
		Enable Discovery CHAP Mode <sup>(*)</sup> : Supports iSCSI Discovery with CHAP.	Select	Not selected
		Enable Unique Extended COPY Mode <sup>(*)</sup> : Supports XCOPY Command issued from the VMware.	Select	Not selected
		Enable Unique Write Same Mode <sup>(*)</sup> : Supports Write Same Command issued from the VMware.	Select	Not selected
		Enable Report iSCSI Full Portal List Mode <sup>(*)</sup> : When the discovery is issued from the initiator, the access to the target is permitted, and it reports on target information on all ports where the initiator name is corresponding to the host.	Select	Not selected
		Enable DP Depletion Detail Reply Mode <sup>(*)</sup> : The response of the subsystem is made detailed further by selecting this mode when Thin Provisioning is used. When Thin Provisioning is used, it is recommended to select it.	Select	Not selected
		Enable Unit Attention Change Mode <sup>(*)</sup> : Suppresses the report to the Unit Attention (06/2900 (Power on Reset)).	Select	Not selected
		Enable UNMAP Short Length Mode <sup>(*)</sup> : Set this when connecting to the host which supports the UNMAP command. Required for Windows Server 2012 connection.	Select	Not selected

\*1 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.6.00 or later and the firmware Ver.0860/A or later.

\*2 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.00 or later and the firmware Ver.0890/A or later.

\*3 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.35 or later and the firmware Ver.0893/E or later.

\*4 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.70 or later and the firmware Ver.0897/A or later.

\*5 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.9.77 or later and the firmware Ver.0897/H or later.

\*6 : It is supported in the Hitachi Storage Navigator Modular 2 Ver.12.50 or later and the firmware Ver.08C3/F or later.

No.	Menu item	Contents		Factory setting
		Parameter	How to set	
2	Additional Setting (Two or more modes may be selected.)	<p><b>Enable Change Response for Replication Mode<sup>(*)</sup> :</b></p> <p>When background copy of a replication pair is timed-out, the host may stop accessing the pair. This option changes the Sense key/Sense code the array will return to the host so that the host will continue to access the pair.</p>	Select	Not selected
<p><b>*1 :</b> It is supported in the Hitachi Storage Navigator Modular 2 Ver.12.65 or later and the firmware Ver.08C3/R or later.</p>				

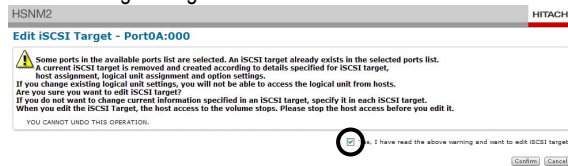
(v) The confirmation window is displayed. Click the [Confirm] button.



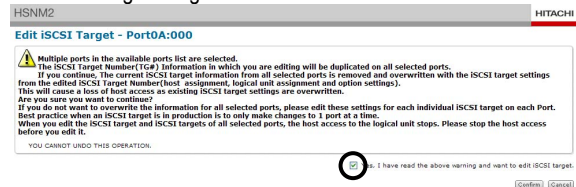
If multiple ports are selected for [\* Edit to] in the window of the procedure (iii), the following window is displayed. Check the checkbox and click the [Confirm] button.

NOTE : When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

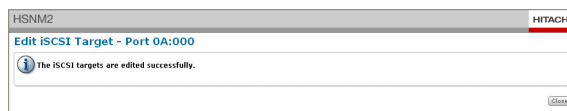
Hitachi Storage Navigator Modular 2 is Ver.12.50 or more



Hitachi Storage Navigator Modular 2 is less than Ver.12.50

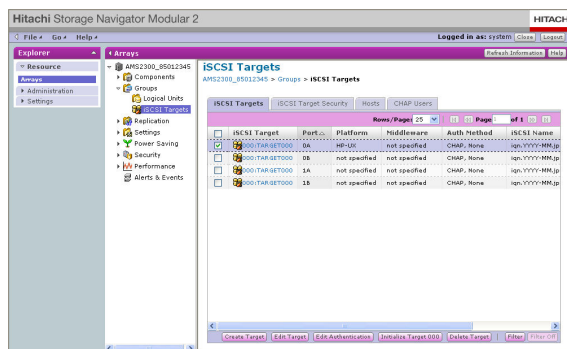


(vi) The confirmation window is displayed. Click the [Close] button.



(vii) The detail of the setting that has been made is displayed.

Make sure that the setting that has been made is reflected on the display.



(viii) Make the setting for the other ports in the same way.

## 2.3 Setting LU Mapping

### 2.3.1 LUN Assignment and Release of the Fibre Model

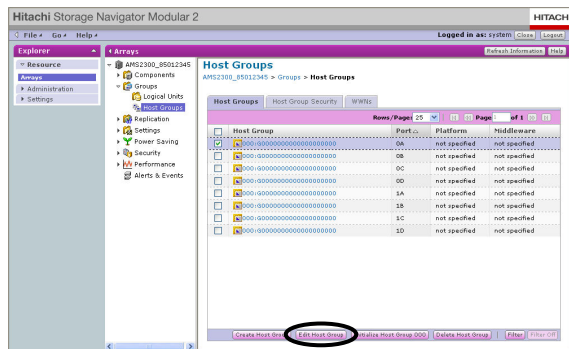
#### (1) Assigning LUNs

Set mappings of the Port ID, and Host LUN for a LUN so that they are used in the configuration set by a host computer. The setting of the mapping can be modified while an I/O is being executed using the existing mapping setting. However enabling mapping stops host I/O temporarily.

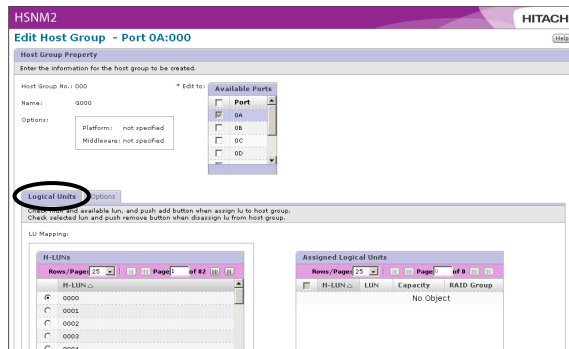
NOTE : When the array subsystem and the host computer are connected with the Fibre Channel interface, the logical unit of the array subsystem cannot be recognized unless the logical unit of number 0 is not created in the array subsystem depending on the host computer.

When using this host computer, create the logical unit of number 0 or map the logical unit to Host LUN (H-LUN) 0.

- (a) Click [Groups] - [Host Groups] in the unit window, click the port to set, and check the checkbox.



- (b) Click the [Edit Host Group] button at the bottom of the window, and click the [Logical Units] tab.

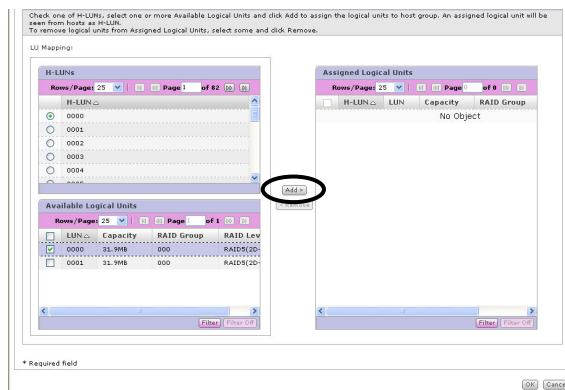


- (c) Select the [Logical Units] tab on the unit window.

Select one H-LUN. Then select one LUN you want to map on the H-LUN from the list of the [Available Logical Units] and click the [Add] button.

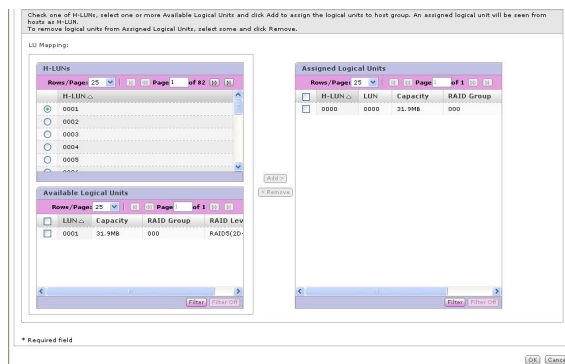
Moreover, you can assign the H-LUNs from the selected numbers sequentially and in ascending order for two or more selected LUNs.

Select an H-LUN from the [H-LUNs] list, select two or more LUNs from the [Available Logical Units] list, and click the [Add] button.



The H-LUN and LUN that were selected are moved to the [Assigned Logical Units] list.

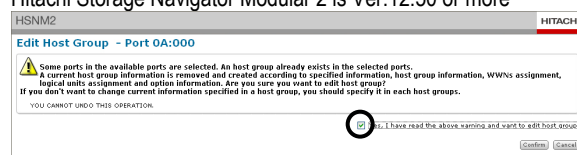
- (d) All LUN that is the mapping is moved to [Assigned Logical Units] repeating the operation of (c). After it ends, click the [OK] button.



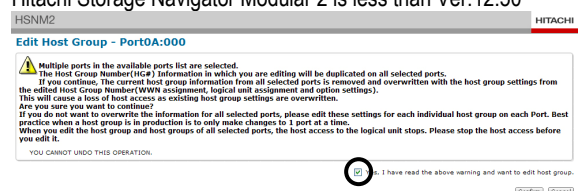
- (e) If multiple ports are selected for [\* Edit to] in the window of the procedure (b), the following window is displayed. Check the checkbox and click the [Confirm] button.

**NOTE :** When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

Hitachi Storage Navigator Modular 2 is Ver.12.50 or more

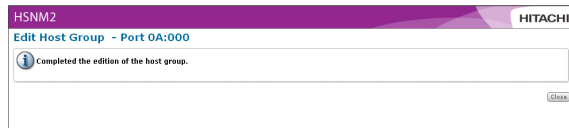


Hitachi Storage Navigator Modular 2 is less than Ver.12.50

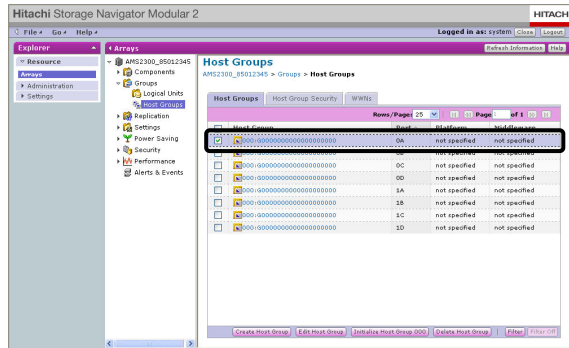




(f) The confirmation window is display. Click the [Close] button.

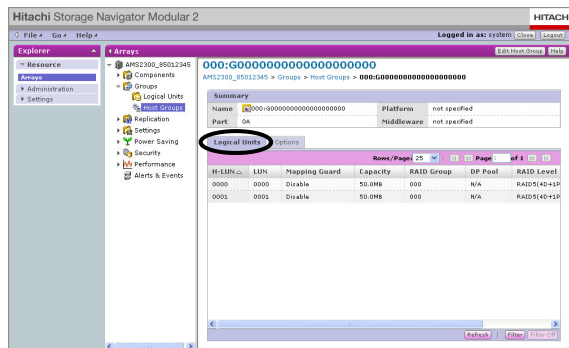


(g) Click [Groups] - [Host Groups] in the unit window, click the port to check (host group).



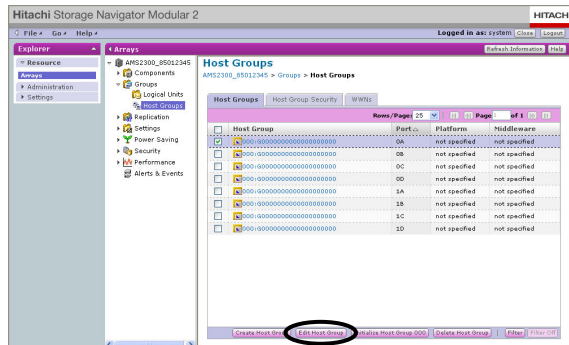
(h) Select the [Logical Units] tab.

The content set to the assigned logical unit is displayed. Check that the setting is correctly reflected.

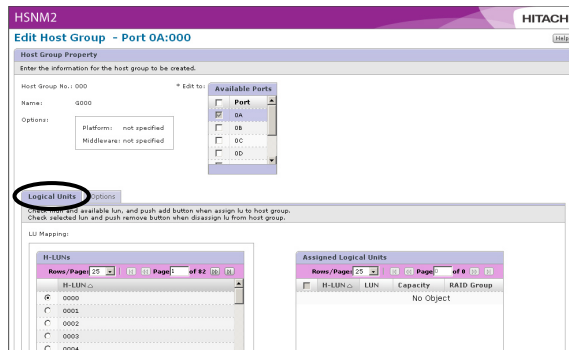


## (2) Releasing LUN assignment

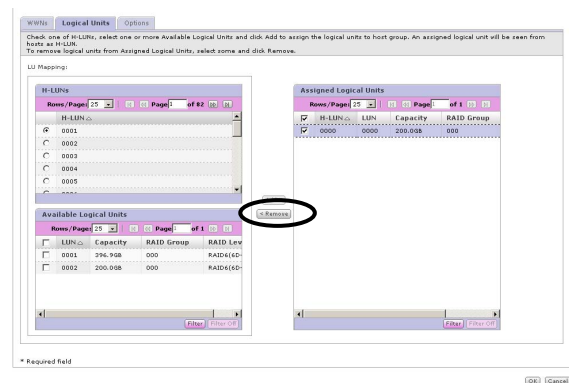
- (a) Click [Groups] - [Host Groups] in the unit window, click the port to set, and check the checkbox.



- (b) Click the [Edit Host Group] button at the bottom of the window, and click the [Logical Units] tab.



- (c) Check the checkboxes of the logical units to release from the list of [Assigned Logical Units], and click the [Remove] button.



(d) Click the [OK] button.

(e) If multiple ports are selected for [\* Edit to] in the window of the procedure (b), the following window is displayed. Check the checkbox and click the [Confirm] button.

NOTE : When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

Hitachi Storage Navigator Modular 2 is Ver.12.50 or more

Hitachi Storage Navigator Modular 2 is less than Ver.12.50

(f) The confirmation window is display. Click the [Close] button.

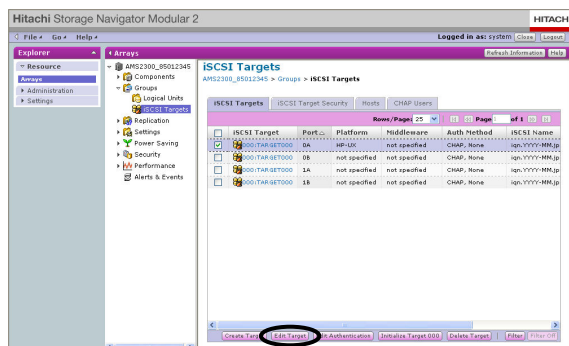
This page is for editorial purpose only.

### 2.3.2 LUN Assignment and Release of the iSCSI Model

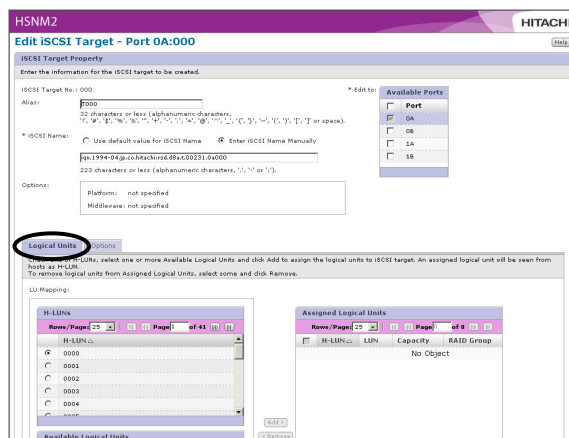
## (1) Assigning LUNs

Set mappings of the Port ID, and Host LUN for a LUN so that they are used in the configuration set by a host computer. The setting of the mapping can be modified while an I/O is being executed using the existing mapping setting.

- (a) Click [Groups] - [iSCSI Targets] in the unit window, click the port to set, and check the checkbox.



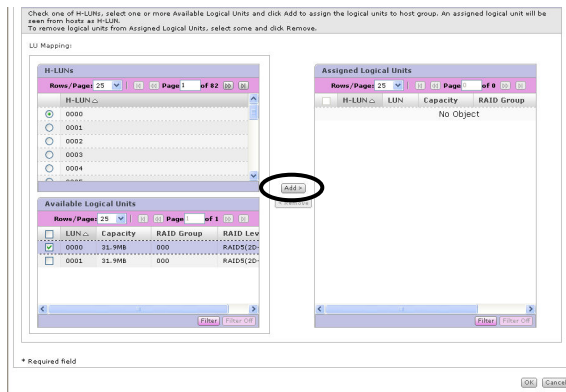
- (b) Click the [Edit Target] button at the bottom of the window, and click the [Logical Units] tab.



- (c) Select one H-LUN. Then select one LUN you want to map on the H-LUN from the list of the [Available Logical Units] and click the [Add] button.

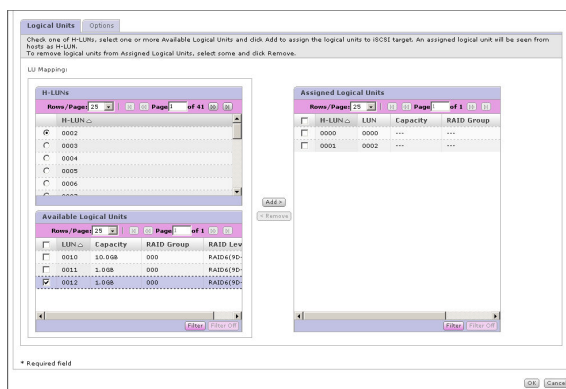
Moreover, you can assign the H-LUNs from the selected numbers sequentially and in ascending order for two or more selected LUNs.

Select an H-LUN from the [H-LUNs] list, select two or more LUNs from the [Available Logical Units] list, and click the [Add] button.



The H-LUN and LUN that were selected are moved to the [Assigned Logical Units] list.

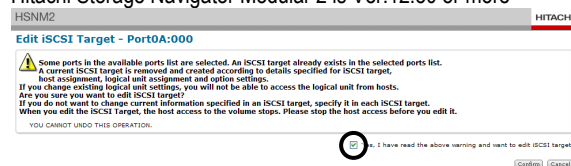
- (d) All LUN that is the mapping is moved to [Assigned Logical Units] repeating the operation of (c). After it ends, click the [OK] button.



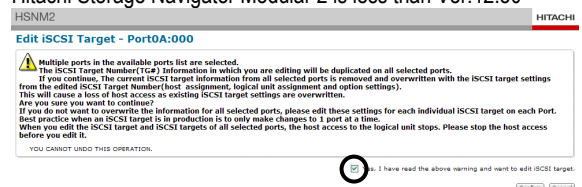
- (e) If multiple ports are selected for [\* Edit to] in the window of the procedure (b), the following window is displayed. Check the checkbox and click the [Confirm] button.

**NOTE :** When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

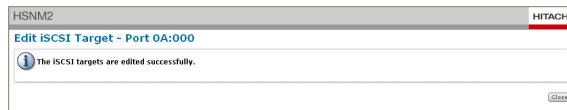
Hitachi Storage Navigator Modular 2 is Ver.12.50 or more



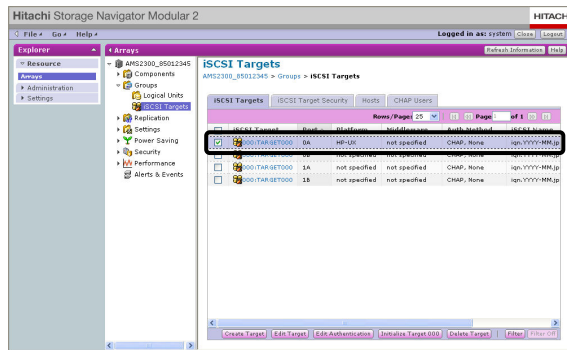
Hitachi Storage Navigator Modular 2 is less than Ver.12.50



- (f) The confirmation window is display. Click the [Close] button.

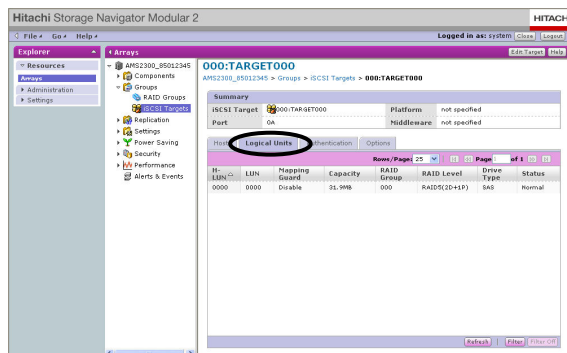


- (g) Click [Groups] - [iSCSI Targets] in the unit window, click the port to check (iSCSI Targets).



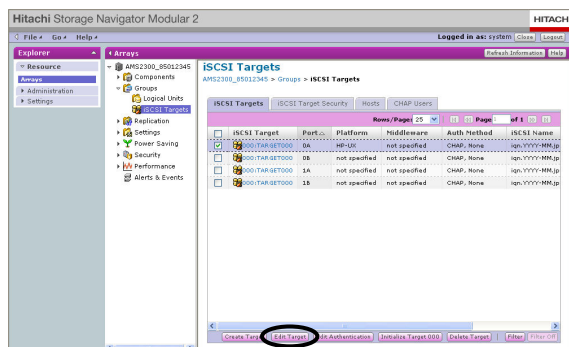
- (h) Select the [Logical Units] tab.

The content set to the assigned logical unit is displayed. Check that the setting is correctly reflected.

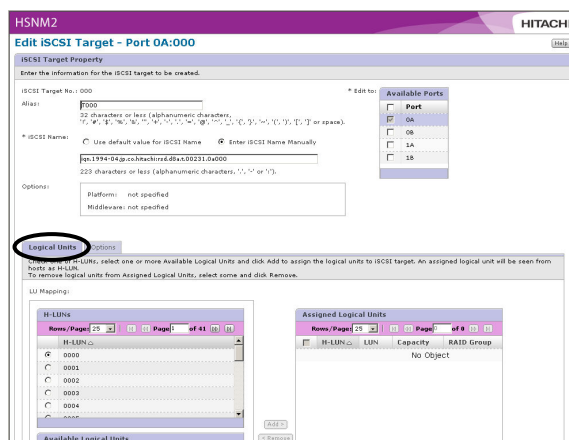


## (2) Releasing LUN assignment

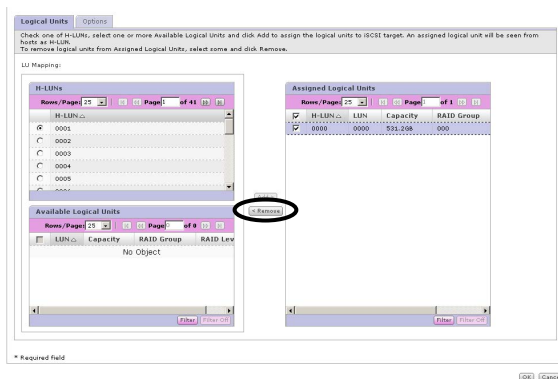
- (a) Click [Groups] - [iSCSI Targets] in the unit window, click the port to set, and check the checkbox.



- (b) Click the [Edit Target] button at the bottom of the window, and click the [Logical Units] tab.



- (c) Check the checkboxes of the logical units to release from the list of [Assigned Logical Units], and click the [Remove] button.





(d) Click the [OK] button.

(e) If multiple ports are selected for [\* Edit to] in the window of the procedure (b), the following window is displayed. Check the checkbox and click the [Confirm] button.

NOTE : When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

Hitachi Storage Navigator Modular 2 is Ver.12.50 or more

Hitachi Storage Navigator Modular 2 is less than Ver.12.50

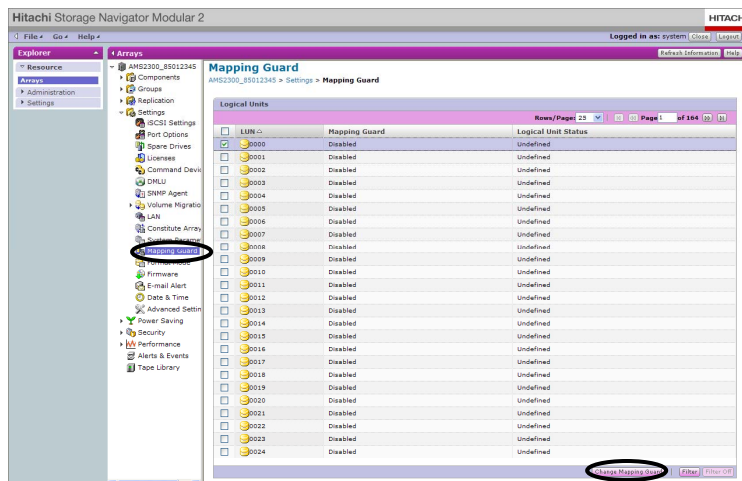
(f) The confirmation window is display. Click the [Close] button.

### 2.3.3 Setting Mapping Guard

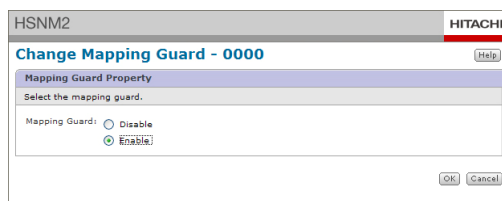
LU Mapping Guard function prevents a wrong operation in the mapping setting. LU where the mapping has been enabled cannot perform the mapping operation from the Hitachi Storage Navigator Modular 2. Specify to enable or disable LU mapping guard. Disabled is set by default.

- (a) Select the [Settings] - [Mapping Guard] in the unit window.

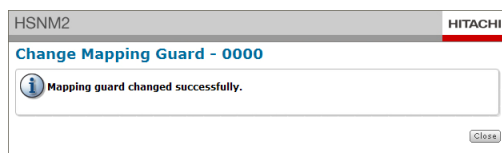
Select the LUN to enable the Mapping Guard, click the [Change Mapping Guard] button at the bottom of the window.



- (b) Check the [Enable] in the “Change Mapping Guard” window, and click the [OK] button.



- (c) The following message is displayed. Click the [Close] button.



## 2.4 Setting Target Information

The Host Connection Mode, the mapping information of Logical Unit, and LUN security information are set to the targets, not to the ports at the time of iSCSI interface addition. This enables you to select the host computer to which the subsystem is connected depending on each target.

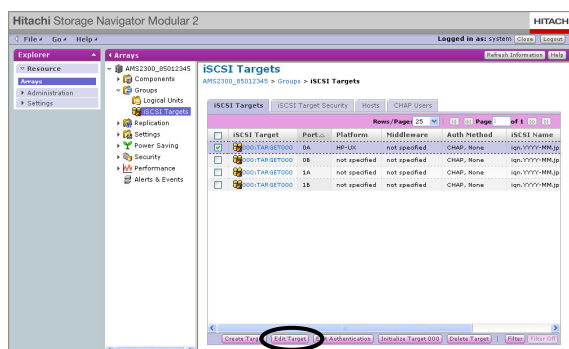
For targets, only the “000:TARGET000” (or “000:T000”) is supported.

Up to 255 targets can be set when the LUN Manager, which is an extra cost optional feature, is used.

### (1) Changing the Target Information

This enables you to change the iSCSI Name and Alias.

- (a) Select the [Groups] - [iSCSI Targets] on the unit window.
- (b) Click the port through for which you want to change the target information. Click the [Edit Target] button.



- (c) In the “Target” dialog, enter the “Alias” and “iSCSI Name”.

**iSCSI Target Property**

Enter the information for the iSCSI target to be created.

iSCSI Target No.: 000

Alias: iqn.2004-06.jp.scsictl.com:00000000000000000000

\* iSCSI Name: ☐ Use default value for iSCSI Name ☒ Enter iSCSI Name Manually  
 iqn.2004-06.jp.scsictl.com:00000000000000000000  
 223 characters or less (alphanumeric characters, ".", "-", "/" or "\").

Options: Platform: not specified  
 Middleware: not specified

**Logical Units** **Options**

Click each one of H-LUNs; select one or more available Logical Units to assign. An assigned logical unit will be seen from hosts as H-LUN.

To remove logical units from Assigned Logical Units, select some and click Remove.

**Logical Unit Mapping**

**H-LUNs**

Name / Page	25	30	Page	of 41	10
H-LUN 0					
0000					
0001					
0002					
0003					
0004					

**Available Logical Units**

Name / Page	25	30	Page	of 8	10
LUN 0					
Capacity					
RAID Group					

No Object

**Assigned Logical Units**

Name / Page	25	30	Page	of 8	10
H-LUN 0					
LUN					
Capacity					
RAID Group					

No Object

**Buttons:** [Add] [Remove] [OK] [Cancel]

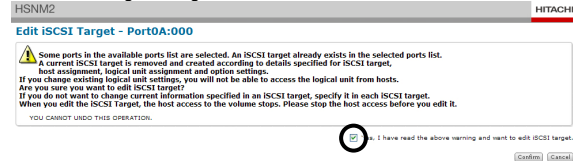
\* Required Field

- (d) Click the [OK] button.

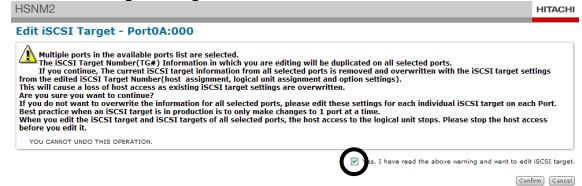
- (e) If multiple ports are selected for [\* Edit to] in the window of the procedure (c), the following window is displayed. Check the checkbox and click the [Confirm] button.

NOTE : When the Hitachi Storage Navigator Modular 2 is less than Ver.6.50, this window is not displayed.

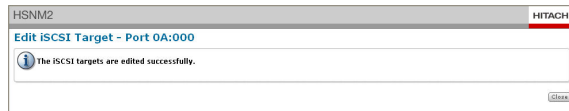
Hitachi Storage Navigator Modular 2 is Ver.12.50 or more



Hitachi Storage Navigator Modular 2 is less than Ver.12.50

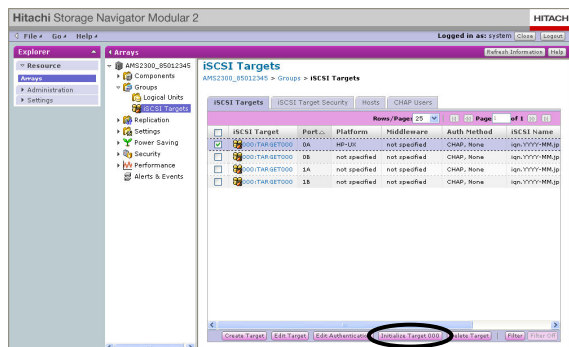


- (f) The confirmation message is displayed. Select the [Close] button.

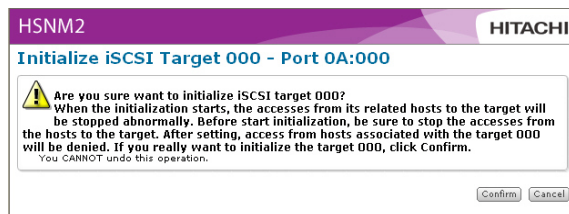


## (2) Initializing the Target information

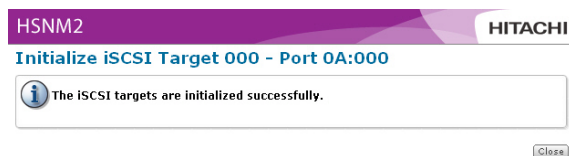
- (a) Select the [Groups] - [iSCSI Targets] on the unit window.
- (b) Put a checkmark to the port to initialize the target information, and click the [Initialize Target 000] button.



- (c) The confirmation message is displayed. Select the [Confirm] button.



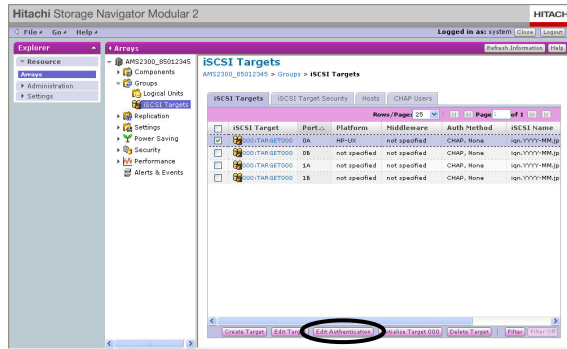
- (d) Select the [Close] button.



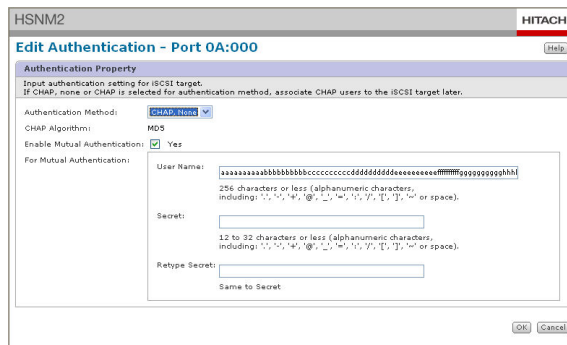
## (3) Changing authentication

You can change the authentication method and the iSCSI user information of two-way authentication.

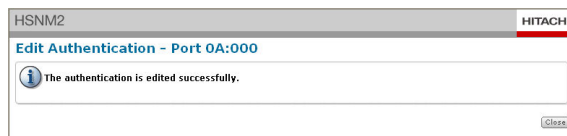
- (a) Select the [Groups] - [iSCSI Targets] on the unit window.
- (b) Put a checkmark to the port to the authentication information, and click the [Edit Authentication] button.



- (c) Select “CHAP”, “None” or “CHAP, None” for the authentication method.
- (d) Put a checkmark to “Enable Mutual Authentication”.



- (e) Select the [OK] button.
- (f) The confirmation message is displayed. Select the [Close] button.



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## 2.5 Setting CHAP Authentication

The disk array system can authenticate the iSCSI User both Initiator Authentication and Two-Way Authentication (Target Authentication) with the CHAP (Challenge Handshake Authentication Protocol).

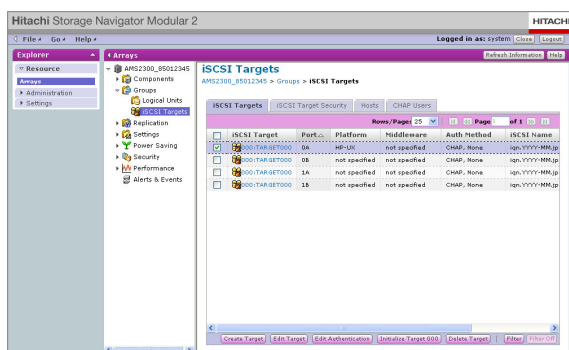
Set the same iSCSI User information (User Name/Secret) both host side and disk array system side for Initiator Authentication.

Set the same iSCSI User information (User Name/Secret) both host side and disk array system side for Two-Way Authentication (Target Authentication).

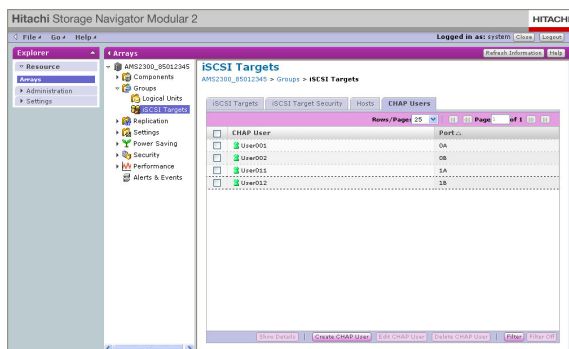
### (1) Adding a CHAP User

To authenticate the initiator, set the CHAP User to the port and assign it to the Target.

(a) Select the [Groups] - [iSCSI Targets] on the unit window, and click the [CHAP Users] tab.



(b) Click the [Create CHAP User] button.



(c) Displayed the “Create CHAP User” dialog.



- (d) Enter the [User Name], [Secret], and [Retype Secret].

HSNM2

HITCHHIKING

Create CHAP User

CHAP User Property

Enter the information for the CHAP user to be created.

\* User Name:

256 characters or less (alphanumeric characters and symbols including: " ", "+", "@", "\_", "=", "~", "\\", "/", "[", "]", "\", or space).

\* Secret:

12 to 32 characters (alphanumeric characters and symbols including: " ", "+", "@", "\_", "=", "~", "\\", "/", "[", "]", "\", or space).

\* Retype Secret:

Same to Secret

\* Required field

\* Create to:

Available Ports

☐ Port

☐ 0A

☐ 0B

☐ 1A

☐ 1B

OK

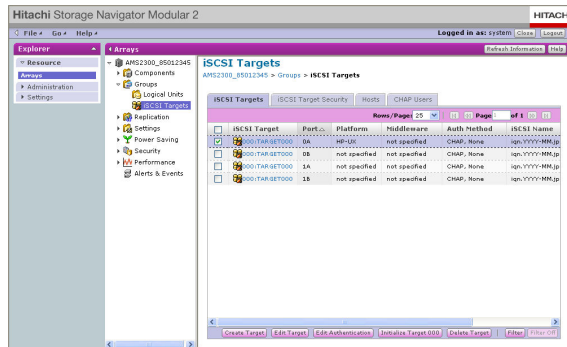
Cancel

- (e) Put a checkmark to the port to be created from the selectable ports.
- (f) Click the [OK] button.
- (g) The confirmation message is displayed. Select the [Close] button.

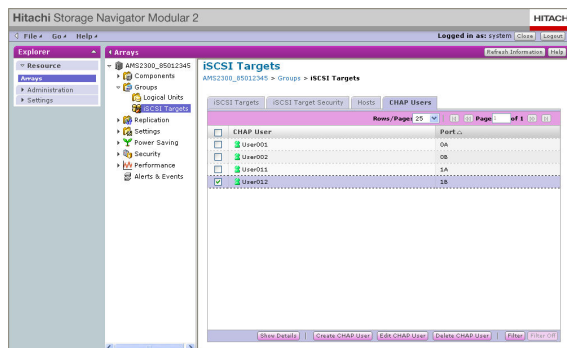
A screenshot of the HSNM2 Hitachi Network Manager 2.0 interface. The title bar at the top shows 'HSNM2' on the left and 'HITACHI' on the right. Below the title bar, the text 'Create CHAP User' is displayed in blue. A large white message box with a blue information icon on the left contains the text 'The CHAP user is created successfully.' In the bottom right corner of the message box, there is a 'Close' button.

## (2) Changing the CHAP User

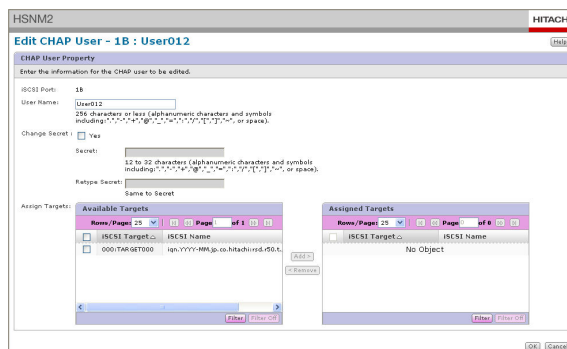
(a) Select the [Groups] - [iSCSI Targets] on the unit window, and click the [CHAP Users] tab.



(b) Click the port through for which you want to change the CHAP User. Click the [Edit CHAP User] button.



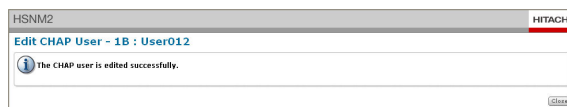
(c) The “Create CHAP User” dialog is displayed.



(d) As necessary, enter the [User Name], [Secret], and [Secret (re-input)].

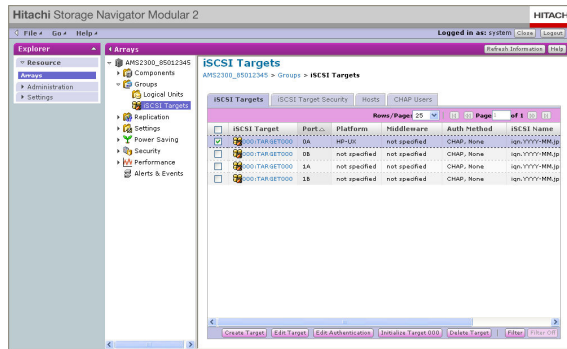
And then select the [OK] button.

(e) The confirmation message is displayed. Select the [Close] button.

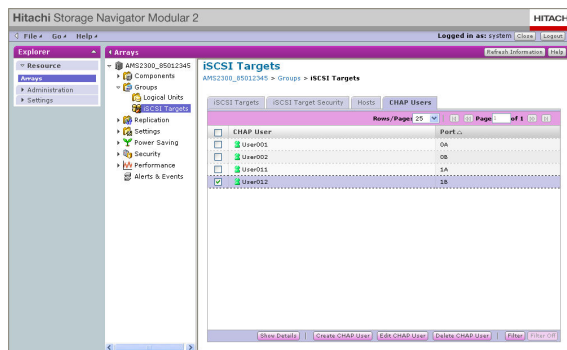


## (3) Deleting the CHAP User

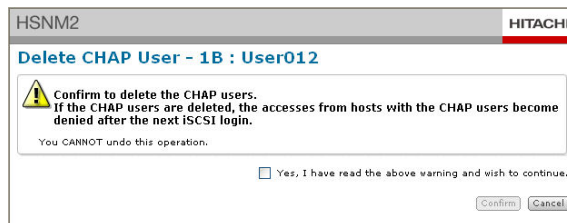
(a) Select the [Groups] - [iSCSI Targets] on the unit window, and click the [CHAP Users] tab.



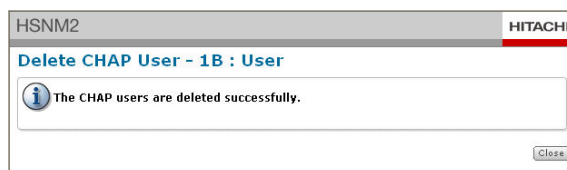
(b) Click the port through for which you want to delete the CHAP User. Click the [Delete CHAP User] button.



(c) The confirmation message is displayed. Select the [Confirm] button.



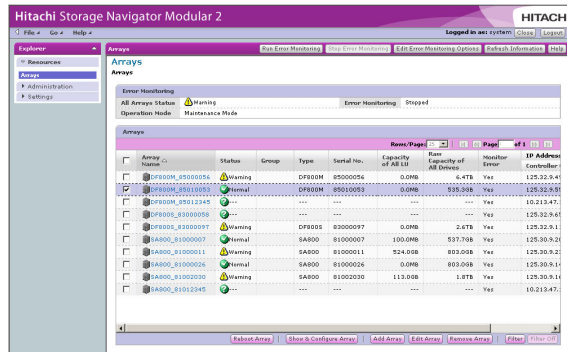
(d) Click the [Close] button.



## 2.6 Setting of Fibre Channel

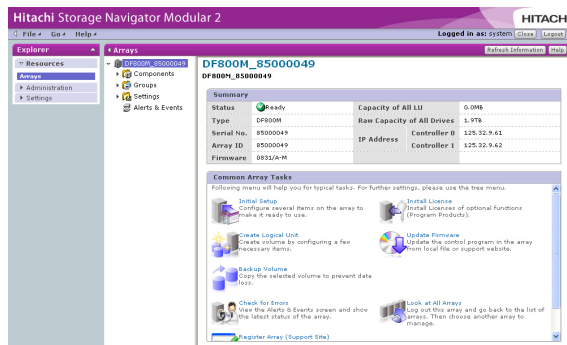
- (1) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



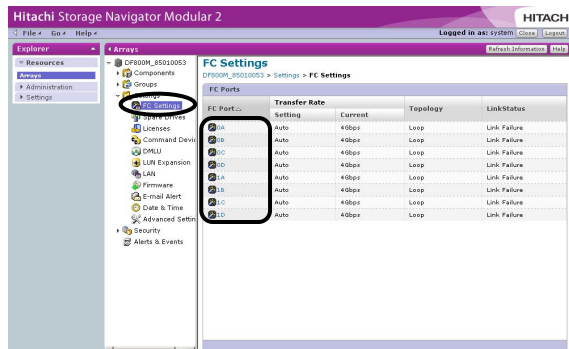
- (2) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)

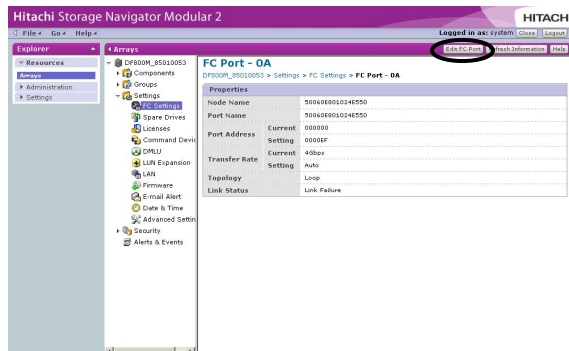


<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (3) Select [Settings] - [FC Settings] in the unit window. The “FC Settings” window is displayed.
- (4) Click [FC Ports] to set.



- (5) Click the [Edit FC Port] button at the upper right of the window.



- (6) Enter the information of the FC port to edit.

HSNM2

**Edit FC Port - Port 0A**

Properties of FC Port

Enter the information to edit the FC Port.

\* Address of Port:

\* Transfer Rate:

\* Topology:

\* Required field

OK Cancel

- ① [Address of Port] : A port address is displayed or set with a six-figure hexadecimal number.

<Current Value>

A current port address is displayed with a six-figure hexadecimal number.

<Setting>

A port address you want to set with a six-figure hexadecimal number.

- ② [Transfer Rate] : A transfer rate of the Fibre Channel can be displayed or set.  
<Current Value>

A current transfer rate of the Fibre Channel is displayed.

<New Value>

- [1Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 1Gbps.  
[2Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 2Gbps.  
[4Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 4Gbps.  
[8Gbps] : Set this when using the Fibre Channel at a fixed transfer rate of 8Gbps.  
[Auto] : Set this when using the Fibre Channel at a transfer rate that is changed automatically.

NOTE : Set the “Transfer Rate” of Fibre Channel corresponding to the transfer rate of devices connected directly with an array subsystem to each port according to the following table. When the Array is connected directly and externally with the Hitachi Universal Storage Platform V/ the Hitachi Universal Storage Platform VM, set the port transfer rate of both the Hitachi Universal Storage Platform V/ the Hitachi Universal Storage Platform VM and the Array to the fixed transfer rate (the same value for the Hitachi Universal Storage Platform V/ the Hitachi Universal Storage Platform VM and the Array selecting any one of 1G bps, 2 Gbps, 4 Gbps or 8 Gbps.).

Transfer Rate of Devices of Each Port Connected with an Array	Transfer Rate of an Array
1G bps	1G bps
2G bps	2G bps
4G bps	4G bps
8G bps	8G bps
Auto (Maximum speed 8G bps)	8G bps
Auto (Maximum speed 4G bps)	4G bps
Auto (Maximum speed 2G bps)	2G bps

NOTE : In case that the transfer rate of the Fibre Channel port of the Array is set to “Auto” an automatic negotiation is executed to determine the max transfer rate. When turn off and on the Array, the HBA or the switch, check the transfer rate by Hitachi Storage Navigator Modular 2. If the transfer rate is not max speed, pull and inset the Fibre Channel cable or change the transfer rate by Hitachi Storage Navigator Modular 2.

- ③ [Topology] : The topological setting value is specified through a selection from a pull down menu.

NOTE : When connecting the Array directly and externally with the Hitachi Universal Storage Platform V/ the Hitachi Universal Storage Platform VM, set the topologies of the both devices to “Loop”.

(7) When completing the change, click the [OK] button at the lower right of the window.

HSNM2 HITACHI

**Edit FC Port - Port 0A** [Help]

Properties of FC Port

Enter the information to edit the FC Port.

\* Address of Port: 0000EF

\* Transfer Rate: Auto

\* Topology: Loop

\* Required field

[OK] [Cancel]

(8) The setting confirmation message is displayed. Check that I/O from the host computer is stopped, and then click the [Confirm] button.

HSNM2 HITACHI

**Edit FC Port - Port 0A**

If you will do this operation, it may happen abnormal end of task or refuse I/O in mid-flow as the host access to the array. Please make sure to stop the host accesses to the array before performing this operation.  
If you have read the above warning and agree to edit the FC port, click the Confirm.

[Confirm] [Cancel]

(9) Click the [Close] button.

HSNM2 HITACHI

**Edit FC Port - Port 0A**

The FC port are edit successfully.  
It might take a while to change properties.  
Please check result of settings to link status on window of FC settings.  
Please reconfirm status to click refresh information.

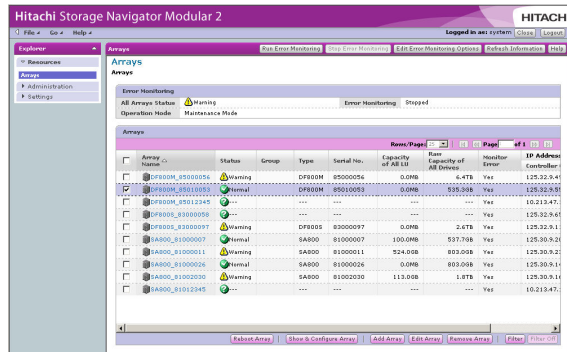
[Close]

(10) Execute the same procedure for the remaining ports.

## 2.7 Setting of iSCSI

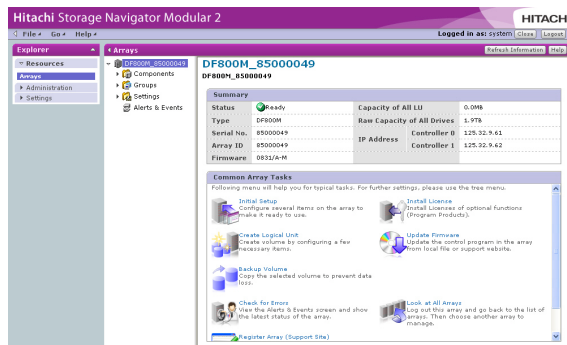
- (1) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (2) Click the array subsystem name, and open the unit window.

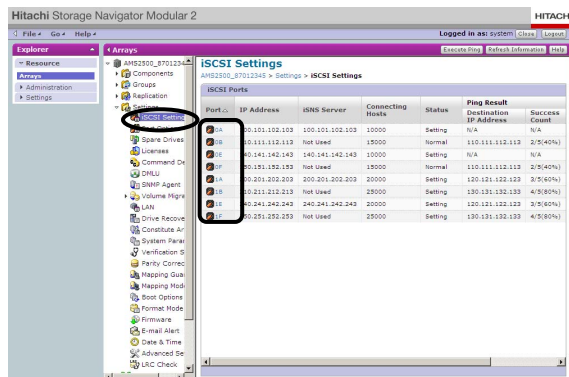
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



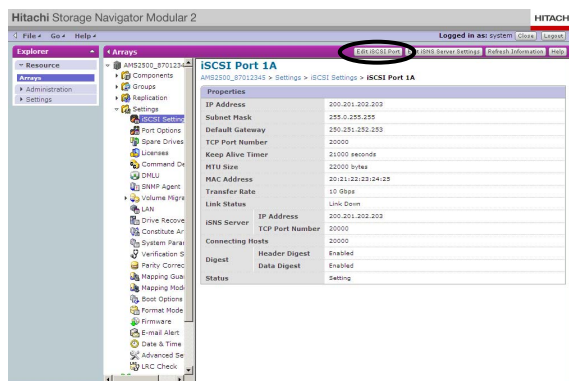
<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.



- (3) Select [Settings] - [iSCSI Settings] in the unit window. The “iSCSI Settings” window is displayed.
- (4) Click [iSCSI Ports] to set.



- (5) Click the [Edit iSCSI Port] button at the upper right of the window.



- (6) Enter the information of the iSCSI port to edit.

**ISCSI Port Property**

Enter the information to configure the iSCSI port.

\* Address: IP Address: 200.201.202.203  
Subnet Mask: 255.0.255.255  
Default Gateway: 250.251.252.253

\* TCP Port Number: 20000  
From 1 to 65535

\* Keep Alive Timer: 21000 seconds  
From 30 to 64800

MTU Size: 22000 bytes

MAC Address: 20:21:02:23:24:25

Digest: Header Digest: ☒ Enable  
Data Digest: ☒ Enable

OK Cancel

- ① [IP Address] : The IP Address can be set in the decimal number form.
- ② [Subnet Mask] : The Subnet Mask can be set in the decimal number form.
- ③ [Default Gateway] : The Default Gateway can be set in the decimal number form.
- ④ [TCP Port Number] : The TCP Port Number can be set in the decimal number form.
- ⑤ [Keep Alive Timer] : You can set the interval (in seconds) by the decimal number to check that communication with host is possible.

- ⑥ [MTU Size] : This is an abbreviation of Maximum Transmission Unit, and the maximum value of the data that can be transmitted once can be selected from 1500(default), 4500, or 9000.
- ⑦ [MAC Address] : The MAC address is displayed.
- ⑧ [Header Digest]<sup>(#1)</sup> : This enables the function which performs a CRC check for the header part of iSCSI Protocol Data Unit (PDU) in network path.
- ⑨ [Data Digest]<sup>(#1)</sup> : This enables the function which performs a CRC check for the data part of iSCSI Protocol Data Unit (PDU) in network path.

(7) When completing the change, click the [OK] button at the lower right of the window.

(8) The setting confirmation message is displayed. Check that I/O from the host computer is stopped, and then click the [Confirm] button.

(9) Click the [Close] button.

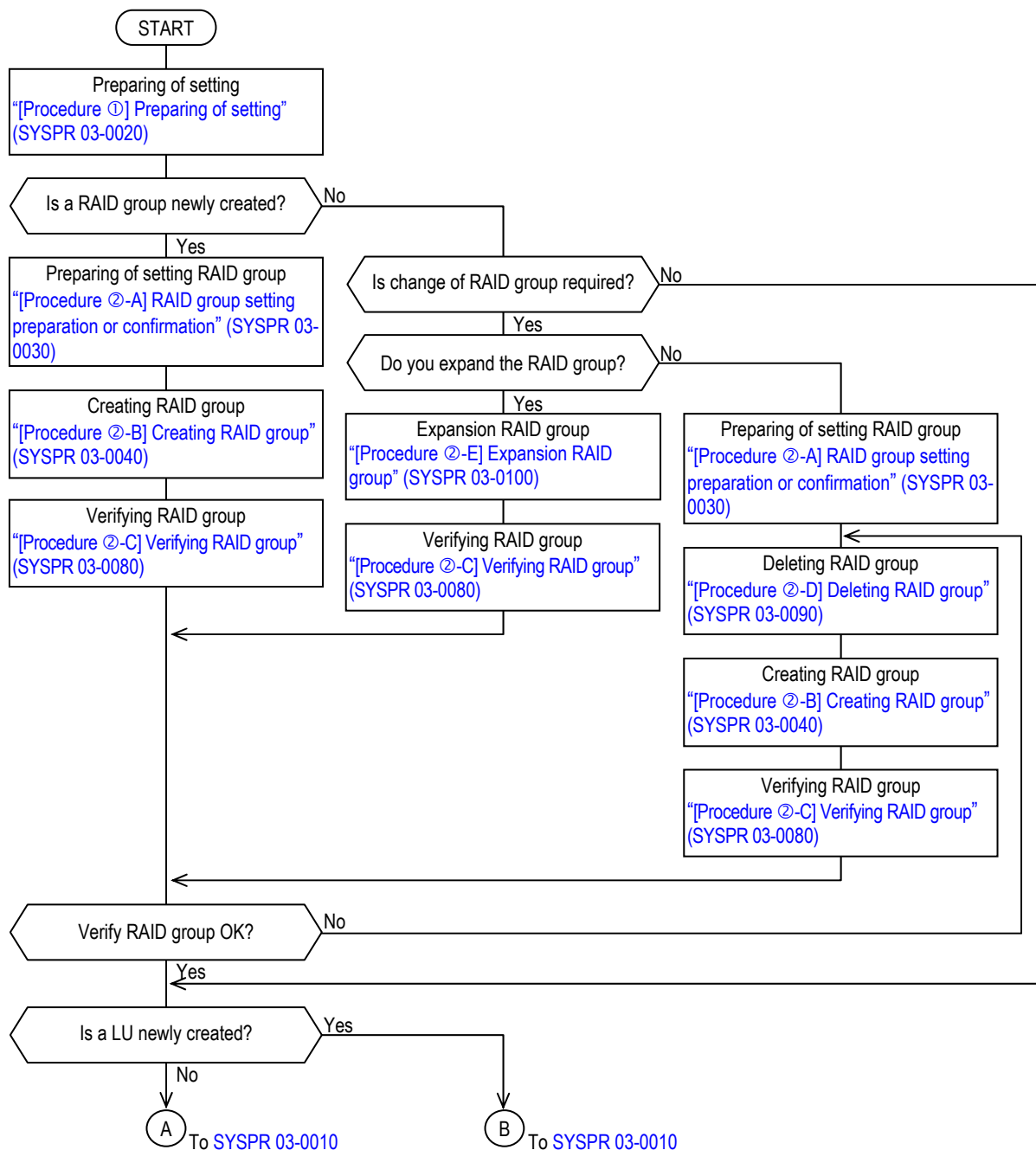
(10) Execute the same procedure for the remaining ports.

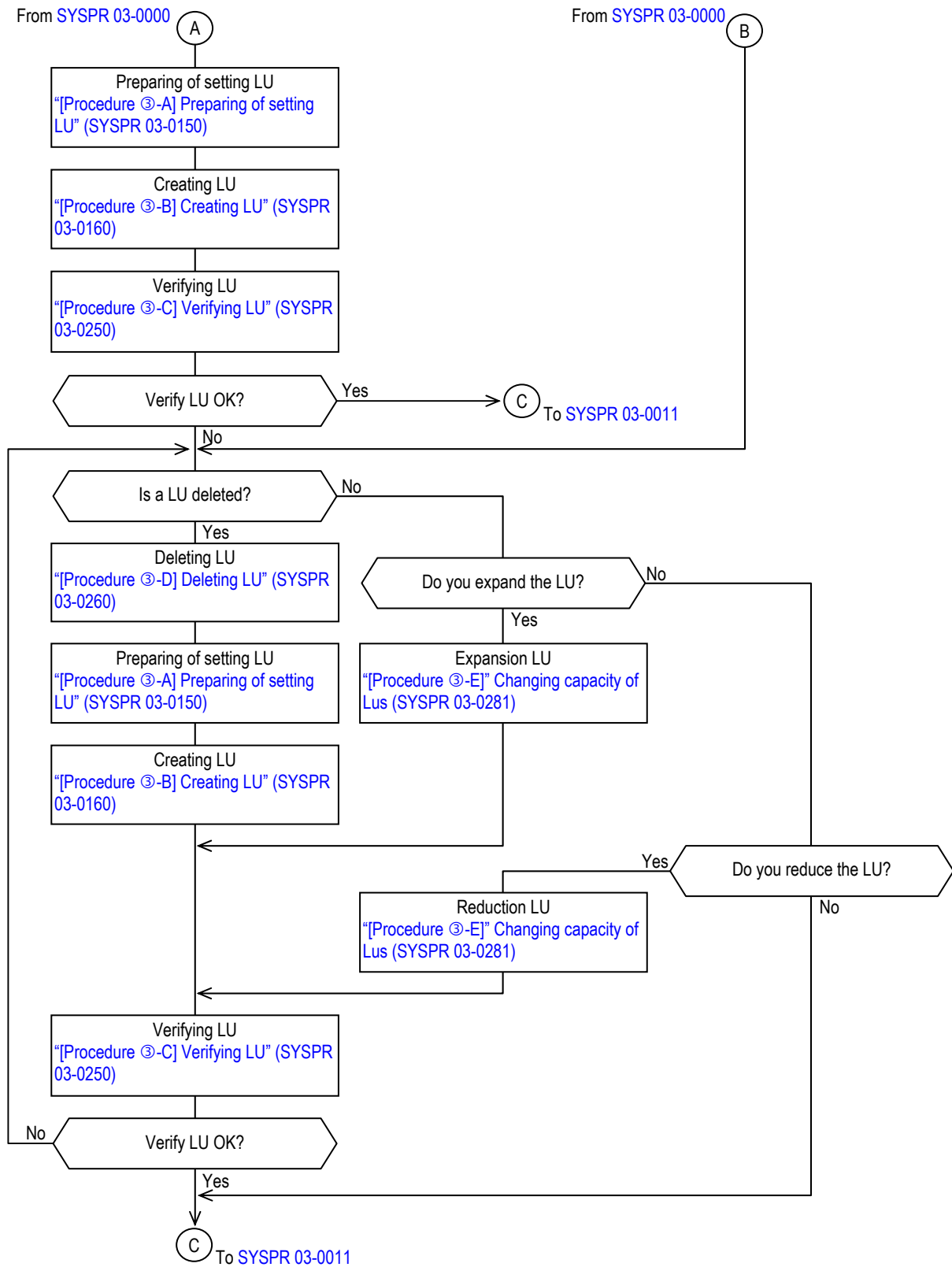
#1 : This setting is enabled only for the ports with 10 G bps transfer rate. Further, its setting and reference are available in the Hitachi Storage Navigator Modular 2 version 11.75 or later and the firmware version 08B7/G or later.

## Chapter 3. Setting the RAID/LU/Spare Disk

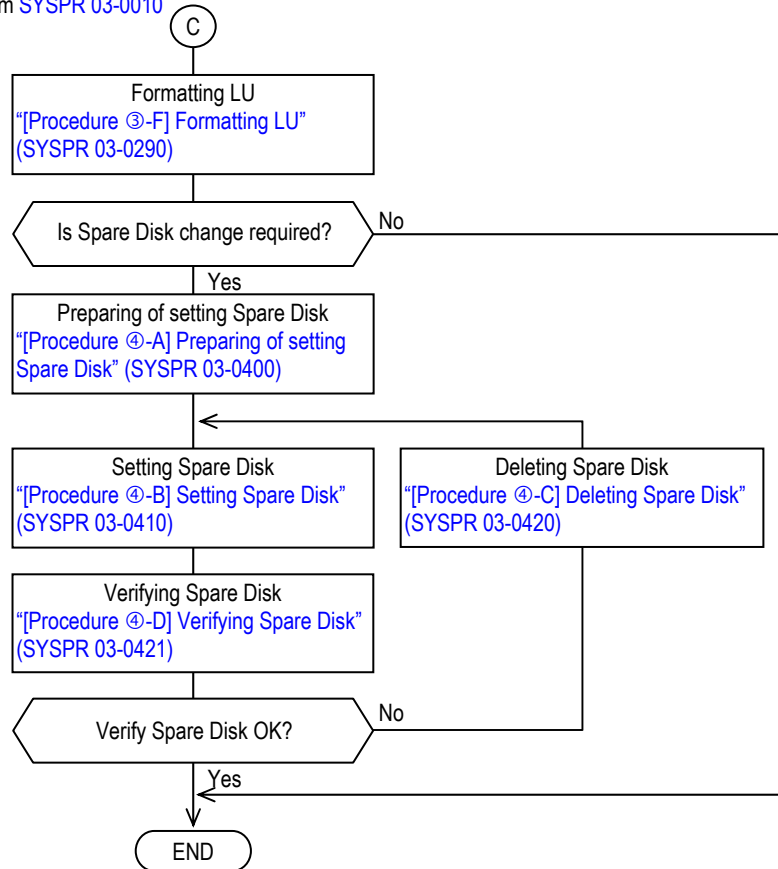
This function performs the RAID group setting, LU setting, LU formatting, and Spare Disk setting. Further, it can make the following settings.

Procedure Flow diagram for setting RAID groups, LUs and Spare Disks.





From SYSPR 03-0010



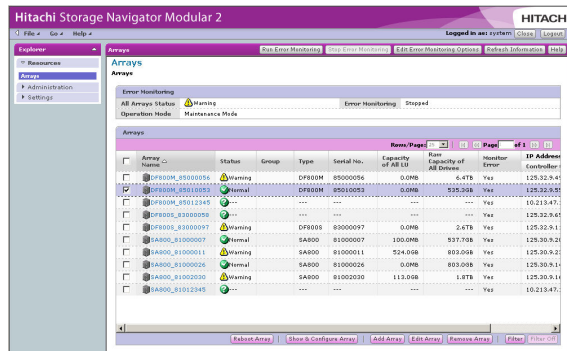
This page is for editorial purpose only.

### 3.1 Preparation of RAID/LU Setting

#### [Procedure ①] Preparing of setting

- (1) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>‡1</sup>

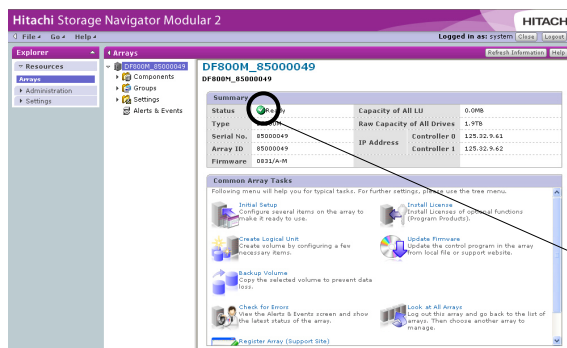
Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (2) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)

- (3) Check that the unit is ready.



Displayed in green in the ready state.

- (4) • When newly creating or changing a RAID group, go to “3.2 RAID Group Setting” (SYSPR 03-0030).  
• Go to “3.3 Setting of LU” (SYSPR 03-0130) when changing an LU without changing a RAID group.

‡1 : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

### 3.2 RAID Group Setting

Use this function when you create, expand, delete and refer to the RAID group. This function can be used in the device ready state. (The unit does not need to be re-booted.)

NOTE : Deletion of a RAID group indicates that all the user data of the deleted RAID group are lost. Before deleting the RAID group, back up the user data.

For the RAID group and RAID levels which can be set by this device, refer to [Introduction “3.7 Setting RAID Group” \(INTR 03-0340\)](#).

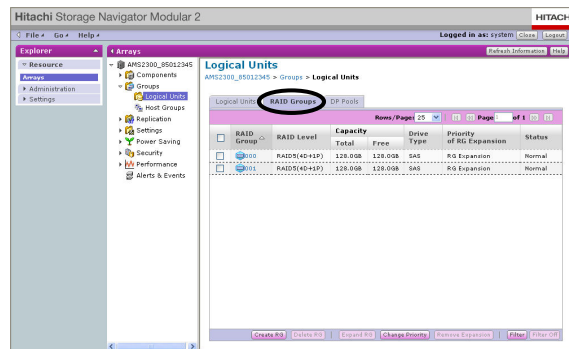
[Procedure ②-A] RAID group setting preparation or confirmation

(1) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [RAID Groups] tab.

RAID groups and logical units defined for the disk array system are displayed.

[Logical Units] : Information on all Logical Units defined for the disk array system are displayed.

[RAID Groups] : Information on all RAID groups defined for the disk array system are displayed.



[RAID Groups] : [RAID Group] : A number of the RAID group is displayed.

[RAID Level] : A RAID level that has been specified is displayed.

[Total Capacity] : A whole capacity of a RAID group is displayed.

[Free Capacity] : A remaining capacity of a RAID group is displayed.

[Drive Type] : A type of a drive assigned to a RAID group is displayed.

[Priority of RG Expansion] : The priority when performing the RAID Group expansion is displayed.

[Status] : The status of the RAID Group expansion is displayed.

- When creating the RAID group, go to “[Procedure ②-B] Creating RAID group” (SYSPR 03-0040).
- When deleting the RAID group, go to “[Procedure ②-D] Deleting RAID group” (SYSPR 03-0090).
- When expanding the RAID group, go to “[Procedure ②-E] Expanding RAID group” (SYSPR 03-0100).
- When verifying RAID group [OK], go to “3.3 Setting of LU” (SYSPR 03-0130).

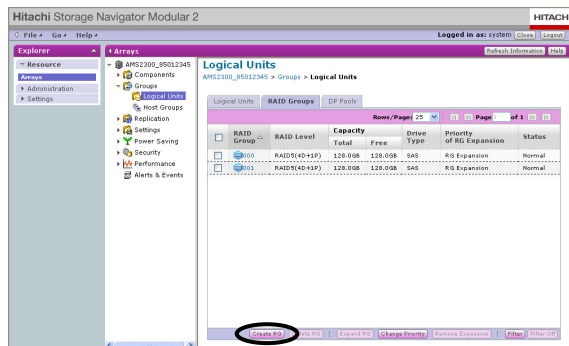
<sup>†1</sup> : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.



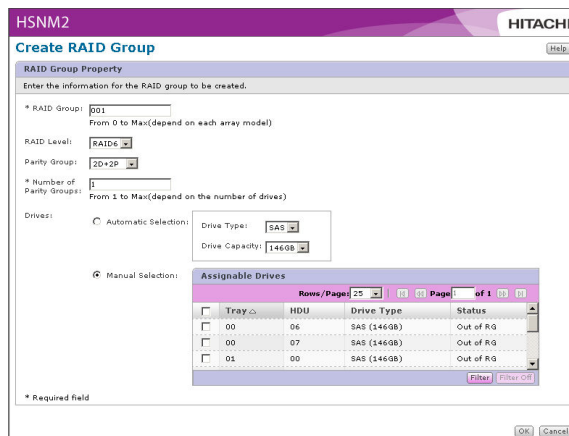
## [Procedure ②-B] Creating RAID group

(1) When creating a RAID group by selecting a drive manually

- (a) Select the [RAID Groups] tab on the unit window, and then click the [Create RG] (or [Create RAID Group]<sup>†1</sup>) button.



- (b) The [Create RAID Group] dialog is displayed. Select or enter [RAID Group], [RAID Level], [Parity Group] and [Number of Parity Groups].



<sup>†1</sup> : When the Hitachi Storage Navigator Modular 2 is less than Ver.5.20.

- (c) Select [Manual Selection] in [Drive], and put checkmarks in all drives to set in the RAID Group from [Assignable Drives].

HSNM2  
Create RAID Group

RAID Group Property

Enter the information for the RAID group to be created.

\* RAID Group: 001  
From 0 to Max(depend on each array model)

RAID Level: RAID6

Parity Group: 2D+2P

\* Number of Parity Groups: 1  
From 1 to Max(depend on the number of drives)

Drives:

☐ Automatic Selection: Drive Type: SAS Drive Capacity: 146GB

☒ Manual Selection:

Tray	HDU	Drive Type	Status
00	06	SAS (146GB)	Out of R.G.
01	07	SAS (146GB)	Out of R.G.
02	00	SAS (146GB)	Out of R.G.

\* Required field

OK Cancel

- (d) Click the [OK] button.

- (e) The confirmation window is display. Click the [Close] button.

HSNM2  
Create RAID Group

RAID group created successfully.

Close

- (f) The screen from which a RAID group was updated is displayed.

Hitachi Storage Navigator Modular 2

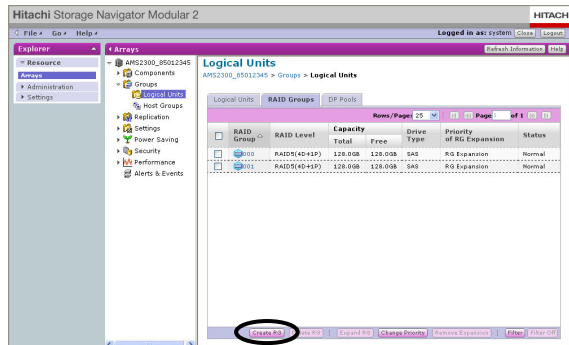
Logical Units

RAID Group	RAID Level	Capacity	Drive Type	Priority of RG Expansion	Status
001	RAID5(4D+1P)	128.0GB / 128.0GB	SAS	R.G. Expansion	Normal
002	RAID5(4D+1P)	128.0GB / 128.0GB	SAS	R.G. Expansion	Normal

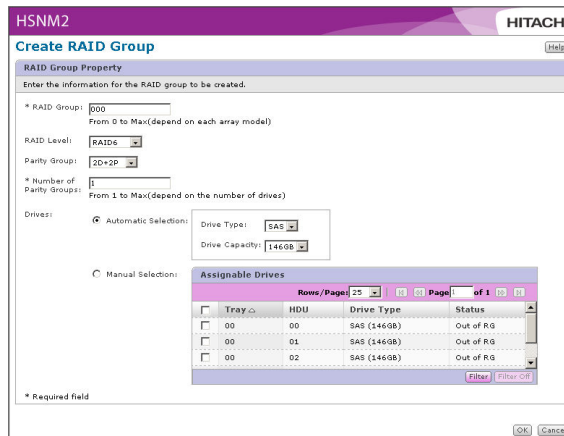
Create RG Delete RG Expand RG Change Priority Refresh Expansion Filter Filter Off

- When creating two or more RAID groups, return to “[Procedure ②-B] Creating RAID group” (SYSPR 03-0040), and set RAID groups as needed.
- When verifying RAID group [OK], go to “3.3 Setting of LU” (SYSPR 03-0130).
- When verifying RAID group [NG], go to “[Procedure ②-D] Deleting RAID group” (SYSPR 03-0090).

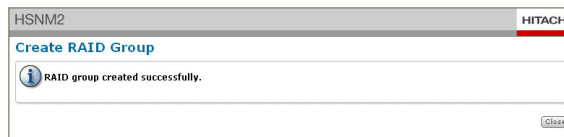
- (2) When the Disk Drive is selected automatically and the RAID group is created
- (a) Select the [RAID Groups] tab on the unit window, and then click the [Create RG] (or [Create RAID Group]<sup>(†1)</sup>) button.



- (b) The [Create RAID Group] dialog is displayed. Select or enter [RAID Group], [RAID Level], [Parity Group] and [Number of Parity Groups].



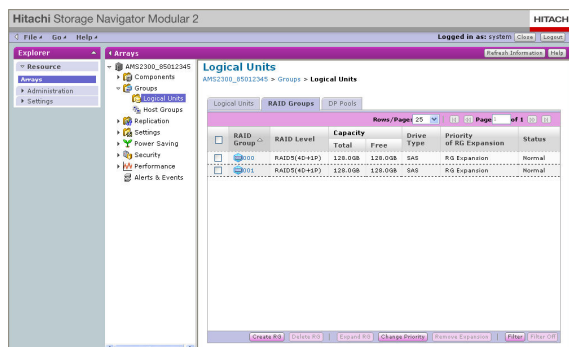
- (c) Select [Automatic Selection] for the [Drives] and select [Drive Type] and [Drive Capacity], click the [OK] button.
- (d) When the capacity of the Disk Drive (single unit) to be created in the RAID group exceeds the capacity of the Spare Disk in the subsystem, the error message is displayed.<sup>(†2)</sup>  
When the confirmation window is displayed, click the [Close] button.



†1 : When the Hitachi Storage Navigator Modular 2 is less than Ver.5.20.

†2 : Check the Disk Drive capacity (referring to Subsection “3.6 Checking the Disk Drive which Configures the RAID Group” (SYSPR 03-0460).), replace the Disk Drive with that having the appropriate capacity, and set the RAID group again.

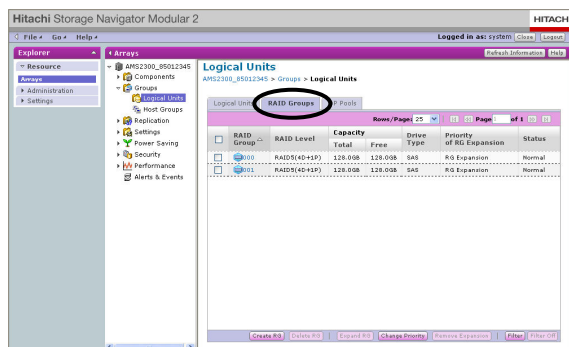
(e) The screen from which a RAID group was updated is displayed.



- When creating two or more RAID groups, return to “[Procedure ②-B] Creating RAID group” (SYSPR 03-0040), and set RAID groups as needed.
- When verifying RAID group [OK], go to “3.3 Setting of LU” (SYSPR 03-0130).
- When verifying RAID group [NG], go to “[Procedure ②-D] Deleting RAID group” (SYSPR 03-0090)

## [Procedure ②-C] Verifying RAID group

- (1) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [RAID Groups] tab.



- (2) Double-click the icon of the generated RAID group and select the assigned drive tag. The setting made in [Procedure ②-B] can be referred.

- When creating two or more RAID groups, return to “[Procedure ②-B] Creating RAID group” (SYSPR 03-0040), and set RAID groups as needed.
- When verifying RAID group [OK], go to “3.3 Setting of LU” (SYSPR 03-0130).
- When verifying RAID group [NG], go to “[Procedure ②-D] Deleting RAID group” (SYSPR 03-0090).

†1 : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.

**[Procedure ②-D] Deleting RAID group**

The RAID Group can be deleted even when LUs are defined in the specified RAID group.

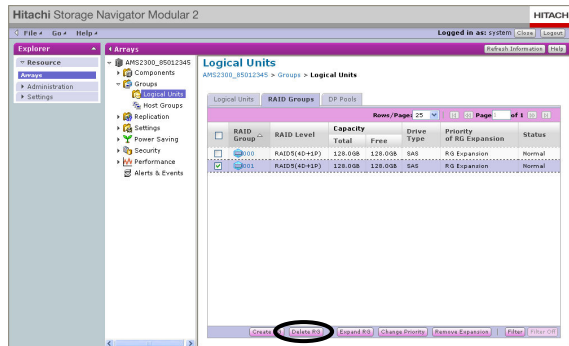
NOTE : All user data is lost by deleting the RAID group and its associated LU. Backup user data before deleting the RAID group.

**[Conditions of deletion]**

- When the LU, whose status of the forced parity correction is any of “Parity Correction”, “Waiting Parity Correction”, “Waiting Drive Reconstruction”, “Uncorrected”, “Uncorrected and Drive Detached” and “Correction Aborted”, is in the RAID group of the deletion target, this RAID group cannot be deleted.  
Change the status of the LU to “Restored” or “Correction Skipped” by executing or skipping the forced parity correction for this LU, and then delete the RAID group which has this LU.
- The RAID group cannot be deleted when Sub LUs of the unified LU remain in the RAID group to be deleted. In the case of the finally defined Sub LU, delete the RAID group after separating the Sub LU from the unified LU. If it is not the finally unified Sub LU, separate all the unified Sub LUs from the Main LU, and delete the RAID group after separating them from the unified LU.
- The RAID group cannot be deleted when there are the following LUs in the RAID group to be deleted.
  - LUs set to the pair of ShadowImage in-system replication
  - LUs set to the pair of Copy-on-write SnapShot
  - LUs set to the pair of TrueCopy remote replication
  - LUs set to the pair of TrueCopy Extended Distance
  - LUs set to the command device
  - DM-LUs
  - Reserve LUs of Modular Volume Migration
  - LUs registered in the data pool
- When the Dynamic sparing/Correction copy/Copy back is operating, delete the RAID group after the Disk Drives are restored.
- When there are LUs executing the LU switching processing in the RAID group to be deleted, the RAID group cannot be deleted because the firmware is executing the internal processing. Wait for one minute or so, and delete the RAID group.
- When there are LUs of the pair whose status of Modular Volume Migration is COPY in the RAID group to be deleted, the RAID group cannot be deleted. Delete the RAID group after the pair status of Modular Volume Migration becomes PSUS.
- The RAID group cannot be deleted when there LUs whose attribute is any of “Read Only”, “Protect” and “Can’t Guard” in the Data Retention Utility setting, whose S-VOL setting is “Setting impossible (invalid)”, and whose mode is either of “Read Capacity 0 (Zer)” and “Inquiry command shielding (Zer/Inv)”. Set the attribute to “Read/Write” in the Data Retention Utility setting, the S-VOL setting to “Setting possible (valid)” and the mode to “Unset”, and delete the RAID group.
- The RAID group to which the Power Saving function is set cannot be deleted.  
Delete the RAID group after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is “Normal (Spin Up)”.

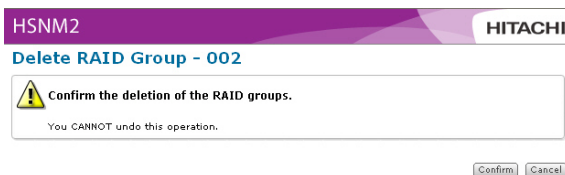
- You cannot delete the RAID group while rewriting the drive firmware. Delete the RAID Group after checking that “IZO100 HDU firmware download end” is displayed in the Information Message on WEB.

(1) Select the [RAID Groups] tab on the unit window, and then click the [Delete RG] (or [Delete RAID Group]<sup>†1</sup>) button.

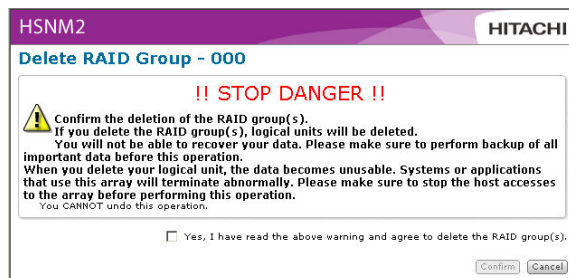


(2) If the confirmation message is displayed. Click the [Confirm] button. And, Click the [Close] button.

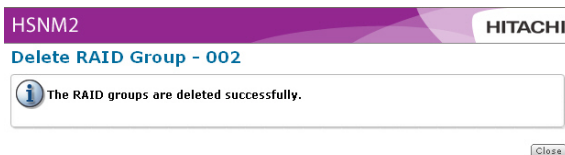
- When there is no formatted LU in a RAID group



- When there is a formatted LU in a RAID group

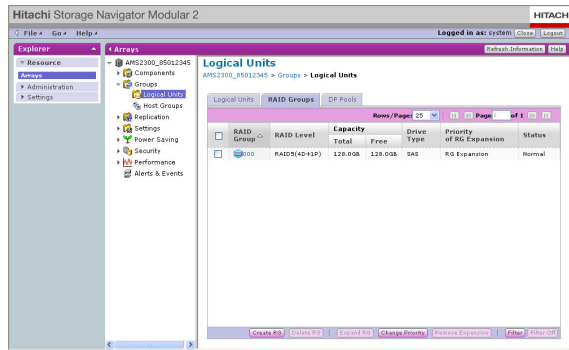


(3) Click the [Close] button.



†1 : When the Hitachi Storage Navigator Modular 2 is less than Ver.5.20.

(4) The screen from which selected RAID groups were deleted is displayed.



- When creating the RAID group, go to “[Procedure ②-B] Creating RAID group” (SYSPR 03-0040).



#### [Procedure ②-E] Expanding RAID group

For expanding the RAID group, you can expand the capacity of the RAID group online (access from the host is continued) by adding the drive to the specified RAID group. It also takes time because the reallocation of the user's data is executed in the background.

For expanding the RAID group, Hitachi Storage Navigator Modular 2 instructs the execution. Only one RAID group is expanded in one execution instruction, but two or more instructions can be executed.

However, the RAID group expansion processing operates for the maximum of two RAID groups and other RAID groups become waiting.

#### [Notes]

- The host access performance deteriorates during the RAID group expansion. Especially, the LU in the RAID group which is expanding the RAID group is largely affected. Execute the RAID group expansion in a time zone with little host access.
- For expanding the RAID group, you can specify whether to give priority to the host access or the RAID group expansion (refer to “[[Setting the priority of RAID group expansion](#)]” (SYSPR 03-0112)). You can change the specification concerned online.
- If the data on the Cache memory volatilizes and data lost occurs as well as a drive failure occurs during the RAID group expansion due to a power failure, etc., the LU during the RAID group expansion may be unformatted. Therefore, obtain a backup before executing the RAID group expansion.
- The RAID group expansion is a function to expand the number of data disks (n of nD+mP) of the RAID group. You cannot change a RAID level (e.g. 4D+1P→4D+2P). However, you can expand the RAID group from RAID 1 to RAID 1+0. You cannot expand the RAID group of RAID 0.
- The firmware version must be 0852/A or more to use the RAID group expansion. If the version is less than 0852/A, perform the update installation of the firmware (refer to [Firmware “1.4.2 \(1-1\) Transfer and update firmware” \(FIRM 01-0070\)](#)) to make the version to 0852/A or more, and then use the RAID group expansion.
- You can use the RAID group expansion only when the number of parity groups is one.
- You can use the added capacity at the time when the expansion processing of the RAID group concerned is completed.
- In one RAID group expansion, the number of drives that you can add is eight drives per RAID group.
- The drive to add should be the same drive type (SAS(3.5-inch type), SAS(2.5-inch type), SAS(SER), SAS7.2K, SATA or Flash Drive) with the RAID group of the expansion target. Moreover, the capacity more than or equal to the minimum capacity drive in the RAID group of the expansion target is required.
- We strongly recommend that the drive to add should be the same capacity and rotational speed as the RAID group of the expansion target to maximize the performance.
- When expanding the RAID group of RAID 1 or RAID 1+0, add drives of 2×n (multiple number of 2).
- The progress and operational status of the RAID group expansion are taken over although the Sequential shutdown is executed.

- When PIN OVER occurs during the RAID group expansion, the RAID group expansion processing stops. The RAID group expansion processing restarts automatically after PIN Over recovers (refer to [Troubleshooting “6.1.11 A Failure Occurred during Operation : Case 1 \(PIN Over\) \(TRBL 06-0690\)”](#)).
- When the dynamic sparing/correction copy/copy back operates during the RAID group expansion, the RAID group expansion processing stops. If the dynamic sparing/correction copy/copy back is completed, the RAID group expansion processing restarts automatically.
- When the host I/O is executed for the LU during the RAID group expansion, the termination processing of the RAID group expansion may delay (maximum of 400 seconds).

[Conditions of expansion]

- When the LU whose status of the forced parity correction is any of “Parity Correction”, “Waiting Parity Correction”, “Waiting Drive Reconstruction”, “Uncorrected”, “Uncorrected and Drive Detached” and “Correction Aborted” is in the RAID group of the expansion target, you cannot expand this RAID group.  
Execute the forced parity correction for this LU, change the LU status to “Correction Completed”, and then execute the RAID group expansion.
- When the LU during the format is in the RAID group of the expansion target, you cannot expand the RAID group. Execute it after completing the format.
- If the following LUs are in the RAID group of the expansion target, you cannot expand the RAID group. Make the LU statuses other than the following, and then expand the RAID group.
  - LUs set for a pair other than PSUS of ShadowImage in-system replication
  - LUs set for a pair other than PAIR of Copy-on-write SnapShot
  - LUs set for a pair other than PSUS of TrueCopy remote replication
  - LUs set for a pair other than PSUS of TrueCopy Extended Distance
  - LUs or reserve LU during Modular Volume Migration
  - LUs in which Cache Residency Manager is set
- If the subsystem reboot is not executed after setting/changing Cache Partition Manager, you cannot expand the RAID group. Expand the RAID group after rebooting the subsystem.
- You cannot expand the RAID group in which the Power Saving function is set.  
Check with the customer that the cancellation and power-saving status of the Power Saving function setting are “Normal (spin-up)”, and then expand the RAID group.
- When the LU under execution of the LU switching processing is in the RAID group of the expansion target, you cannot expand the RAID group because the firmware is executing the internal processing. Wait for about one minute, and then expand the RAID group.
- When the dynamic sparing/correction copy/copy back is operating, expand the RAID group after the drive is restored.
- You cannot expand the RAID group during the degeneration (drive failure occurs) and the RAID group that requires the copy back even though the data recovery to the spare drive is completed. Execute it after completing the drive restoration.
- You cannot expand the RAID group while installing the firmware. Expand the RAID group after completing the firmware installation.
- You cannot expand the RAID group while rewriting the drive firmware. Expand the RAID group after checking that “IZ0100 HDU firmware download end” is displayed in the Information Message on WEB.

## &lt;Standard of RAID group expansion processing time&gt;

The RAID group expansion takes a long time from the beginning to the end of the processing. The following table shows the standard of the required time of the RAID group expansion for each RAID group configuration before the expansion. The required time of the RAID group expansion increases according to the addition of SAS/SAS(SD), SAS7.2K, SATA Disk Drives, or Flash Drives which configure the RAID group.

NOTE : This data shows a standard of the processing time when expanding one RAID group. For the expansion of two RAID groups, the processing time is almost equal to the expansion of one RAID group because of the parallel operation by each Control Unit.

**Table 3.2.1 Standard of RAID Group Expansion Processing Time (#1) (3.5-type SAS Drive)**

				Unit : min				
Disk Drives (G byte) (*1)				142.61	287.62	392.73	439.44	575.30
Configuration before Expansion								
AMS2300 AMS2100 AMS2010(*2)	4 Disk Drives	RAID 6	(2D+2P)	70	140	190	210	280
	6 Disk Drives		(4D+2P)	110	220	300	330	440
	10 Disk Drives		(8D+2P)	210	420	580	630	840
	14 Disk Drives		(12D+2P)	320	640	880	960	1280
	3 Disk Drives	RAID 5	(2D+1P)	70	140	190	210	280
	5 Disk Drives		(4D+1P)	110	220	300	330	440
	9 Disk Drives		(8D+1P)	210	420	580	630	840
	13 Disk Drives		(12D+1P)	320	640	880	960	1280
	4 Disk Drives	RAID 1+0	(2D+2D)	80	160	220	240	320
	8 Disk Drives		(4D+4D)	120	240	330	360	480
	2 Disk Drives	RAID 1	(1D+1D)	60	120	160	180	240
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	70	140	190	210	280
	6 Disk Drives		(4D+2P)	110	220	300	330	440
	10 Disk Drives		(8D+2P)	210	420	580	630	840
	14 Disk Drives		(12D+2P)	320	640	880	960	1280
	3 Disk Drives	RAID 5	(2D+1P)	70	140	190	210	280
	5 Disk Drives		(4D+1P)	110	220	300	330	440
	9 Disk Drives		(8D+1P)	210	420	580	630	840
	13 Disk Drives		(12D+1P)	320	640	880	960	1280
	4 Disk Drives	RAID 1+0	(2D+2D)	80	160	220	240	320
	8 Disk Drives		(4D+4D)	120	240	330	360	480
	2 Disk Drives	RAID 1	(1D+1D)	60	120	160	180	240

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

\*2 : RKXS/RKEXSA/RKEXSB does not support 142.61 G bytes, 287.62 G bytes, and 392.73 G bytes Disk Drives.  
RKXS8F does not support 142.61 G bytes, and 392.73 G bytes Disk Drives.

#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

Table 3.2.1.1 Standard of RAID Group Expansion Processing Time (‡1) (2.5-type SAS Drive)

Unit : min

Disk Drives (G byte) (*1)				287.62	575.30
Configuration before Expansion					
AMS2300 AMS2100 AMS2010	4 Disk Drives	RAID 6	(2D+2P)	150	290
	6 Disk Drives		(4D+2P)	230	450
	10 Disk Drives		(8D+2P)	440	870
	14 Disk Drives		(12D+2P)	660	1320
	3 Disk Drives	RAID 5	(2D+1P)	150	290
	5 Disk Drives		(4D+1P)	230	450
	9 Disk Drives		(8D+1P)	440	870
	13 Disk Drives		(12D+1P)	660	1320
	4 Disk Drives	RAID 1+0	(2D+2D)	170	330
	8 Disk Drives		(4D+4D)	250	500
	2 Disk Drives	RAID 1	(1D+1D)	120	240
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	150	290
	6 Disk Drives		(4D+2P)	230	450
	10 Disk Drives		(8D+2P)	440	870
	14 Disk Drives		(12D+2P)	660	1320
	3 Disk Drives	RAID 5	(2D+1P)	150	290
	5 Disk Drives		(4D+1P)	230	450
	9 Disk Drives		(8D+1P)	440	870
	13 Disk Drives		(12D+1P)	660	1320
	4 Disk Drives	RAID 1+0	(2D+2D)	170	330
	8 Disk Drives		(4D+4D)	250	500
	2 Disk Drives	RAID 1	(1D+1D)	120	240

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

Table 3.2.1.2 Standard of RAID Group Expansion Processing Time (‡1) (SAS(SED) Drive)

Unit : min

Disk Drives (G byte) (*1)				575.30
Configuration before Expansion				
AMS2300 AMS2100	4 Disk Drives	RAID 6	(2D+2P)	280
	6 Disk Drives		(4D+2P)	440
	10 Disk Drives		(8D+2P)	840
	14 Disk Drives		(12D+2P)	1280
	3 Disk Drives	RAID 5	(2D+1P)	280
	5 Disk Drives		(4D+1P)	440
	9 Disk Drives		(8D+1P)	840
	13 Disk Drives		(12D+1P)	1280
	4 Disk Drives	RAID 1+0	(2D+2D)	320
	8 Disk Drives		(4D+4D)	480
	2 Disk Drives	RAID 1	(1D+1D)	240
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	280
	6 Disk Drives		(4D+2P)	440
	10 Disk Drives		(8D+2P)	840
	14 Disk Drives		(12D+2P)	1280
	3 Disk Drives	RAID 5	(2D+1P)	280
	5 Disk Drives		(4D+1P)	440
	9 Disk Drives		(8D+1P)	840
	13 Disk Drives		(12D+1P)	1280
	4 Disk Drives	RAID 1+0	(2D+2D)	320
	8 Disk Drives		(4D+4D)	480
	2 Disk Drives	RAID 1	(1D+1D)	240

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

Table 3.2.2 Standard of RAID Group Expansion Processing Time (†1) (SATA Drive)

Unit : min

Disk Drives (G byte) (†1)				491.25	737.49	983.69	1,968.52	2,953.31
Configuration before Expansion								
AMS2300 AMS2100 AMS2010 (†2)	4 Disk Drives	RAID 6	(2D+2P)	520	780	1050	2100	3150
	6 Disk Drives		(4D+2P)	650	980	1300	2600	3900
	10 Disk Drives		(8D+2P)	800	1200	1600	3200	4800
	14 Disk Drives		(12D+2P)	1000	1500	2000	4000	6000
	3 Disk Drives	RAID 5	(2D+1P)	550	830	1100	2200	3300
	5 Disk Drives		(4D+1P)	690	1050	1400	2800	4200
	9 Disk Drives		(8D+1P)	830	1250	1650	3300	4950
	13 Disk Drives		(12D+1P)	1000	1500	2000	4000	6000
	4 Disk Drives	RAID 1+0	(2D+2D)	650	1000	1300	2600	3900
	8 Disk Drives		(4D+4D)	770	1200	1500	3000	4500
	2 Disk Drives	RAID 1	(1D+1D)	520	800	1050	2100	3150
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	520	780	1050	2100	3150
	6 Disk Drives		(4D+2P)	650	980	1300	2600	3900
	10 Disk Drives		(8D+2P)	800	1200	1600	3200	4800
	14 Disk Drives		(12D+2P)	1000	1500	2000	4000	6000
	3 Disk Drives	RAID 5	(2D+1P)	550	830	1100	2200	3300
	5 Disk Drives		(4D+1P)	690	1050	1400	2800	4200
	9 Disk Drives		(8D+1P)	830	1250	1650	3300	4950
	13 Disk Drives		(12D+1P)	1000	1500	2000	4000	6000
	4 Disk Drives	RAID 1+0	(2D+2D)	650	1000	1300	2600	3900
	8 Disk Drives		(4D+4D)	770	1200	1500	3000	4500
	2 Disk Drives	RAID 1	(1D+1D)	520	800	1050	2100	3150

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

\*2 : AMS 2010 does not support 491.25 G bytes and 737.49 G bytes Disk Drives.

†1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

Table 3.2.2.1 Standard of RAID Group Expansion Processing Time (‡1) (SAS7.2K Drive)

Unit : min

Disk Drives (G byte) (*1)				1,956.94
Configuration before Expansion				
AMS2300 AMS2100 AMS2010	4 Disk Drives	RAID 6	(2D+2P)	1930
	6 Disk Drives		(4D+2P)	3030
	10 Disk Drives		(8D+2P)	5800
	14 Disk Drives		(12D+2P)	8840
	3 Disk Drives	RAID 5	(2D+1P)	1930
	5 Disk Drives		(4D+1P)	3030
	9 Disk Drives		(8D+1P)	5800
	13 Disk Drives		(12D+1P)	8840
	4 Disk Drives	RAID 1+0	(2D+2D)	2210
	8 Disk Drives		(4D+4D)	3310
	2 Disk Drives	RAID 1	(1D+1D)	1650
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	1930
	6 Disk Drives		(4D+2P)	3030
	10 Disk Drives		(8D+2P)	5800
	14 Disk Drives		(12D+2P)	8840
	3 Disk Drives	RAID 5	(2D+1P)	1930
	5 Disk Drives		(4D+1P)	3030
	9 Disk Drives		(8D+1P)	5800
	13 Disk Drives		(12D+1P)	8840
	4 Disk Drives	RAID 1+0	(2D+2D)	2210
	8 Disk Drives		(4D+4D)	3310
	2 Disk Drives	RAID 1	(1D+1D)	1650

\*1 : The drive capacity values are calculated as 1 G byte  
=1,000,000,000 bytes. This definition is different from that  
calculated as 1 k byte =1,024 bytes, which are actually displayed  
on PCs that you are using.  
The RAID group capacity values displayed in the Hitachi Storage  
Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

‡1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

Table 3.2.2.2 Standard of RAID Group Expansion Processing Time (‡1) (Flash Drive)

Unit : min

Disk Drives (G byte) (*1)				195.82
Configuration before Expansion				
AMS2300 AMS2100	4 Disk Drives	RAID 6	(2D+2P)	100
	6 Disk Drives		(4D+2P)	150
	10 Disk Drives		(8D+2P)	290
	14 Disk Drives		(12D+2P)	440
	3 Disk Drives	RAID 5	(2D+1P)	100
	5 Disk Drives		(4D+1P)	150
	9 Disk Drives		(8D+1P)	290
	13 Disk Drives		(12D+1P)	440
	4 Disk Drives	RAID 1+0	(2D+2D)	110
	8 Disk Drives		(4D+4D)	170
	2 Disk Drives	RAID 1	(1D+1D)	80
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	100
	6 Disk Drives		(4D+2P)	150
	10 Disk Drives		(8D+2P)	290
	14 Disk Drives		(12D+2P)	440
	3 Disk Drives	RAID 5	(2D+1P)	100
	5 Disk Drives		(4D+1P)	150
	9 Disk Drives		(8D+1P)	290
	13 Disk Drives		(12D+1P)	440
	4 Disk Drives	RAID 1+0	(2D+2D)	110
	8 Disk Drives		(4D+4D)	170
	2 Disk Drives	RAID 1	(1D+1D)	80

\*1 : The drive capacity values are calculated as 1 G byte  
=1,000,000,000 bytes. This definition is different from that  
calculated as 1 k byte =1,024 bytes, which are actually displayed  
on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage  
Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

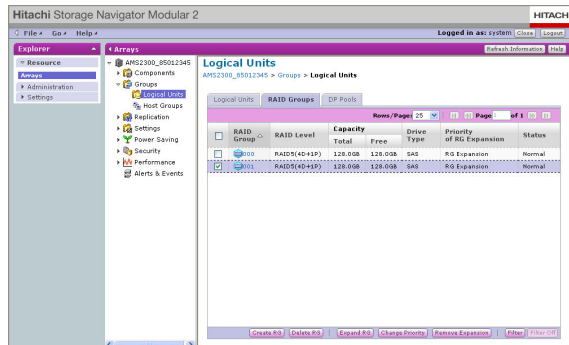
‡1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation  
from the host computer.



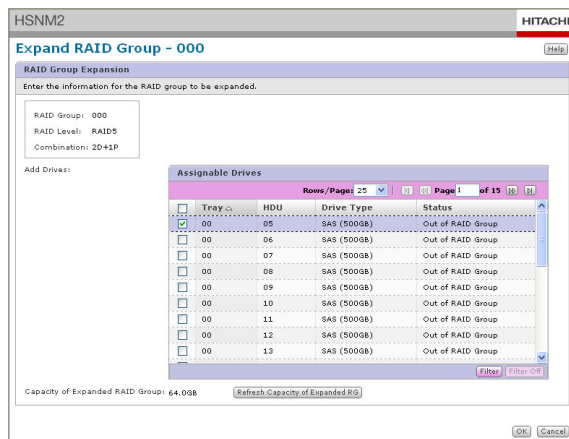
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[Execution procedure for expanding RAID group]

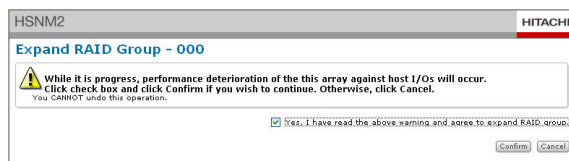
- (a) Click the [RAID Groups] tab in the unit window, check the RAID group to expand, and click the [Expand RG] button.



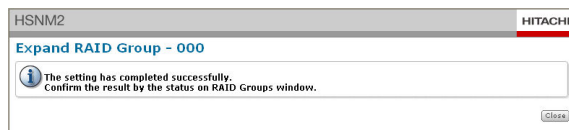
- (b) The setting window of the RAID group expansion is displayed. Select a drive to add and click the [OK] button. If there is no drive to add, execute the drive addition (refer to [Addition/Removal/Relocation "1.4.3 Adding a Disk Drive \(ADD 01-0190\)"](#)), and then execute from (a) again.



- (c) A confirmation message whether to expand the selected RAID group is displayed. If you check the confirmation checkbox and click the [Confirm] button, the RAID group expansion starts.



- (d) The RAID group expansion is starts. Click the [Close] button displayed at the lower right of the window.



- (e) When the RAID group expansion starts, the progress of the expansion processing executed in background is displayed in [Status] of the RAID group in the window.

NOTE : The percentage is not updated unless you acquire the subsystem status by [View] - [Refresh].

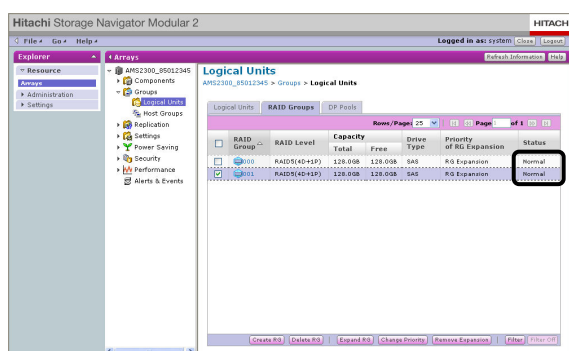
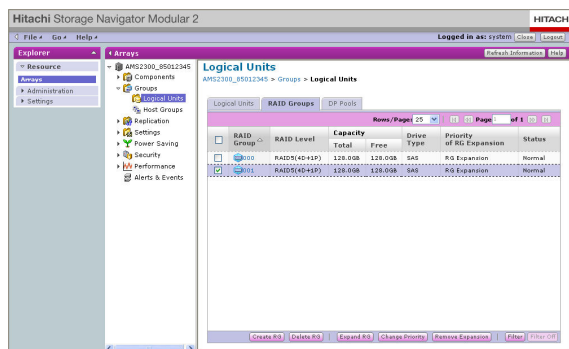


Table 3.2.3 Status Items of RAID Group Expansion

No.	Status	Content	Remarks
1	Normal	<ul style="list-style-type: none"> <li>Status that execution of the RAID group expansion is not instructed</li> <li>Status that the RAID group expansion is completed normally</li> </ul>	—
2	Expanding(xx%)	<ul style="list-style-type: none"> <li>Status that the RAID group expansion processing is executing</li> </ul>	( ) indicates the progress ratio.
3	Waiting expansion(1)(0%)	<ul style="list-style-type: none"> <li>Status that the RAID group expansion is waiting</li> <li>Status that the RAID group expansion processing is waiting for the order</li> <li>Status that RAID group expansion processing stops due to a failure, etc.</li> </ul>	<ul style="list-style-type: none"> <li>The first ( ) indicates the priority of the next execution.</li> <li>The second ( ) indicates the progress ratio.</li> </ul>

[Setting the priority of RAID group expansion]

(a) Click the [RAID Groups] tab in the unit window and click the [Change Priority] button.



(b) The Change Priority of RAID Group Expansion window is displayed.



**Table 3.2.4 Priority of RAID Group Expansion**

No.	Priority of RG Expansion	Content
1	Host Access (default)	The RAID group expansion processing is executed in at regular interval according to the load of the host I/O. The deterioration of the host I/O performance is reduced.
2	RAID Group Expansion (*1)	This is a mode to minimize the effect of the host access and to complete the RAID group expansion quickly. The RAID group expansion processing is executed continuously regardless of the load of the host I/O. In the meantime, the host access performance may deteriorate because the host I/O processing executable per unit time decreases sharply.

\*1 : Please be noticed that the priority "RAID Group Expansion" which restricts commands from the host greatly affects the host access performance.

In the following cases, if you set the priority to "RAID Group Expansion", the host access performance deteriorates drastically or commands may time out. Therefore, do not set the priority to "RAID Group expansion".

- When executing the RAID group expansion for the LU of the RAID group in which the RAID group expansion is not performed while using ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance or Copy-on-write SnapShot
- When executing the RAID group expansion and forced parity correction at the same time
- When executing the RAID group expansion and format at the same time

The host performance and standard of the RAID group expansion time when specifying each priority of the RAID group expansion are shown below.

No.	Mode	Host Access Unavailable	Host access available	
		RAID group expansion performance (*1)	Host performance (*2)	RAID group expansion performance (*1)
1	Host Access (default)	100 %	90%	30%
2	RAID Group Expansion	100 %	30%	80%

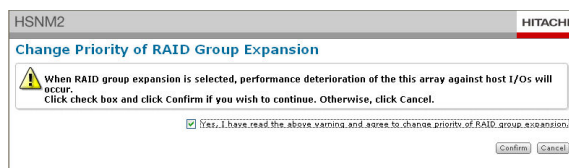
\*1 : The RAID group expansion performance is described as 100% if the priority is set to “host access” and the RAID group expansion is executed in the condition that there is no access from the host computer.

\*2 : The host performance is described as 100% if the RAID group expansion is not executed. The comparison performance is in the case of the following configuration, and the comparison performance changes according to the configuration and the amount of host access.

Configuration of Performance Measurement

Random RD/WR=70%:30%, Length 4 k bytes, and 8 multiplex host I/O are executed.

- (c) Check that the changed content is correct and click the [OK] button.
- (d) A confirmation message is displayed. Check the confirmation checkbox and click the [Confirm] button.



- (e) A normal termination message appears. Click the [Close] button.



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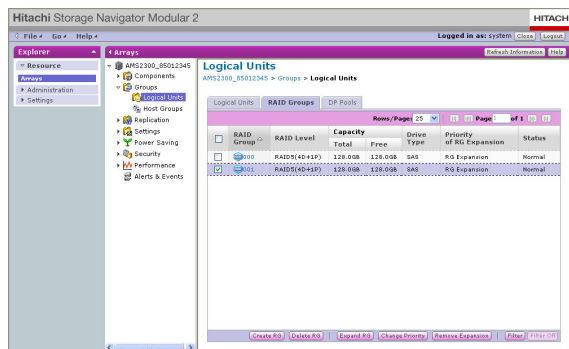
## [Deleting instruction of RAID group expansion]

For deleting the instruction of the RAID group expansion, the operation changes according to the operation mode of Hitachi Storage Navigator Modular 2 as shown below.

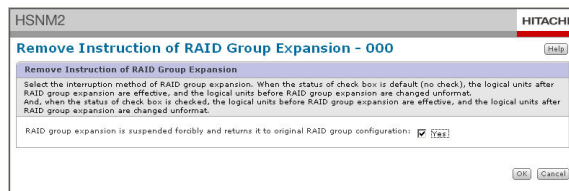
- Normal mode : The RAID group expansion processing is not performed after executing the RAID group expansion instruction, and you can only delete the waiting RAID group.
- Maintenance mode : The RAID group expansion is stopped forcibly including the RAID groups under execution of the RAID group expansion processing.  
When deleting the instruction of the RAID group under execution of the RAID group expansion processing, the LU is unformatted.

NOTE : The user data of the LU may be erased by deleting the instruction of the RAID group expansion in the maintenance mode. Therefore, do not delete the instruction of the RAID group expansion in the maintenance mode except for the case that there is any instructions by the Technical Support Center.

- (a) Click the [RAID Groups] tab in the unit window, check the RAID group to delete the instruction of the RAID group expansion, and click the [Remove Expansion] button.



- (b) When the operation mode of Hitachi Storage Navigator Modular 2 is the maintenance mode, the RAID group expansion instruction deletion window is displayed



When suspending the RAID group expansion forcibly and returning it to the original RAID group configuration, check the checkbox and click the [OK] button.

If not returning it, uncheck the checkbox and click the [OK] button.

No.	Checkbox to stop the RAID group expansion forcibly and return to the original RAID group configuration	Content
1	Unchecked	This changes the RAID group configuration forcibly to the one after completing the RAID group expansion and stops. The LU in which the RAID group is expanded is usable, and the LU in which the RAID group is not expanded becomes the unformatted status.
2	Checked	This returns the RAID group configuration forcibly to the original one before expanding the RAID group and stops. The LU in which the RAID group is not expanded is usable, and the LU in which the RAID group is expanded becomes the unformatted status.

- (c) When the operation mode of Hitachi Storage Navigator Modular 2 is the maintenance mode, the warning window is displayed. Check the confirmation checkbox only when instructed by Technical Support Center, and click the [Confirmation] button.



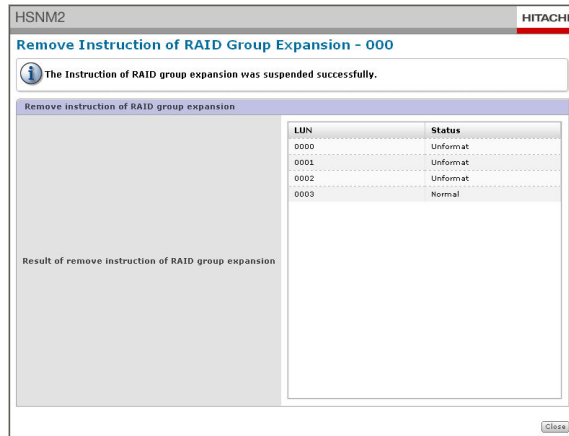


(d) The completion window is displayed. Click the [Close] button to close it.

- When the operation mode is the normal mode



- When the operation mode is the maintenance mode



### 3.3 Setting of LU

This is used to create, delete, change the capacity of (expand, reduce), refer to LUs and execute LU format.

This function can be used in the device ready state.

NOTE : The LUs in the RAID Group to which the Power Saving function is set cannot be set.  
Set the LUs after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is “Normal (Spin Up)”.

[Notes on LU setting]

#### (1) LU formatting

If the Basic Chassis is RKEH, RKEHD, or RKEXS, the following restrictions are not imposed.

The total size of LUs that can be formatted at the same time has restrictions. If the possible formatting size is exceeded, the firmware of the subsystem does not execute the formatting (error messages are displayed).

Moreover, if the LU is extended, the extended LU size is automatically formatted and it becomes the restriction target of the size that can be formatted at the same time.

Note that, the possible formatting size differs depending on the array type.

Format the total size of LUs by the recommended batch formatting size or less as shown in the table below.

Array type <sup>(*)</sup>	Recommended Batch Formatting Size		
AMS2500	359 T bytes (LU : 449 G bytes × 800 LUs)	308 T bytes (LU : 193 G bytes × 1600 LUs)	208 T bytes (LU : 65 G bytes × 3200 LUs)
AMS2300	287 T bytes (LU : 449 G bytes × 640 LUs)	247 T bytes (LU : 193 G bytes × 1280 LUs)	166 T bytes (LU : 65 G bytes × 2560 LUs)
AMS2100	179 T bytes (LU : 449 G bytes × 400 LUs)	154 T bytes (LU : 193 G bytes × 800 LUs)	104 T bytes (LU : 65 G bytes × 1600 LUs)

\*1 : If the Basic Chassis is RKES, RKEM, RKEH, RKEHD, RKEXS, RKEXSA, RKEXSB, or RKEXS8F, it has no recommended batch formatting size because it has no restrictions.

When the Basic Chassis is RKES or RKEM, the number of LUs and capacity which can be formatted in a batch are restricted depending on the Cache Unit installed in the Basic Chassis.

Basic Chassis	Cache memory capacity per Control Unit	The number of LUs which can be formatted in a batch.	The capacity which can be formatted in a batch.
RKES	2 G bytes	No restriction	352 T bytes
	4 G bytes or more	No restriction	No restriction
RKEM	4 G bytes	No restriction	544 T bytes
	8 G bytes or more	No restriction	No restriction

The formatting is executed in the following three operations (However, it has no effect on the DP volumes using the Dynamic Provisioning function).

Operation	Formatting size
Creation of LUs (with format specification)	Size of LU to create
Formatting of LUs	Size of LU to format
Extension of LUs	Size of LU to expand

The restrictions of the possible formatting size become the size of totaling three operations. Perform it so that the total of each operation becomes the recommended batch formatting size or less.

When the above-mentioned operation is executed and the restrictions of the possible formatting size are exceeded, the following messages are displayed.

No.	Operation	Message of Hitachi Storage Navigator Modular 2
1	Creation of LUs (with format specification)	DMED100005: The quick format size is over maximum value. Please retry after that specified quick format size is decreased or current executed quick format is finished.
2	Formatting of LUs	
3	Extension of LUs	DMED0E0023: The quick format size is over maximum value. Please retry after that specified quick format size is decreased or current executed quick format is finished.

(a) Creation of LUs (with format specification)

If the creation of LUs (with format specification) becomes an error, the LUs are created, but the formatting is not executed and [Status] of the [Logical Unit] tab becomes "Unformat". After checking that the status of LUs which are already executing the other formatting or extending the other LUs becomes "Normal", execute only the formatting for the LUs which performed the creation of LUs.

(b) Formatting of LUs

If the formatting of LUs becomes an error, the formatting is not executed and [Status] of the [Logical Unit] tab is still kept as before the execution. After checking that the status of LUs which are already executing the other formatting or extending the other LUs becomes "Normal", execute the formatting again.

(c) Extension of LUs

If the extension of LUs becomes an error, the extension is not executed and [Status] of the [Logical Unit] tab is still kept as before the execution. After checking that the status of LUs which are already executing the other formatting or extending the other LUs becomes "Normal", execute the extension again.

[The areas of LUs]

The areas of LUs are shown in Figure 3.3.1.

(1) Created areas of LUs

- The areas where LUs can be created are "unused free area" and "Free area created by deleting/reducing LUs". At the time when the RAID Group is created, the user data area all becomes "unused free area".
- < When the firmware version is less than 0852/A >  
LUs are created in "unused free area" in default. When creating LUs, select the unused free area as needed.  
LUs are also created in the free area where the address is consecutive from the small LBA (logical block address). The free areas of (A) to (B) cannot create one LU that matches (A) and (B) because they are not consecutive on the address in the user data area.  
LUs can be created for each of the free area of (A), (B) or (c) within the range of the capacity.

- < When the firmware version is 0852/A or more >

You can create LUs without being conscious of continuity/discontinuity of free areas.

When explaining it with Figure 3.3.1 as an example, you can create LUs up to the capacity totaling the free areas (A), (B) and (C). Internally, create LUs of the capacity necessary for each free area, and unify them.

The free areas are used as needed in order from the free area of the small LBA (Logical Block Address) in default. Moreover, when using two or more free areas, the leading LU serves as the LUN specified at the time of the creation, and other LUs assign the maximum unused LUN automatically, and they are unified to be one LU.

You can specify the free areas to use. You can also specify LUNs of LUs other than the leading LU which is assigned automatically.

- The LU capacity becomes the value entered with the Hitachi Storage Navigator Modular 2 at the time of the LU creation. The LU capacity that can be confirmed from the Hitachi Storage Navigator Modular 2 or the host computer is the value entered with the Hitachi Storage Navigator Modular 2. However, when the RAID Group which creates LUs is nD+mP or nD+qD, the user data area is ensured on the firmware management with the value of multiples of 1[M byte] × n. Therefore, the LU capacity which can be created or expand may be less than that calculated by the value entered with the Hitachi Storage Navigator Modular 2. Therefore, the capacity of LUs that can be created or expanded may be less than the calculated value entered with Hitachi Storage Navigator Modular 2.

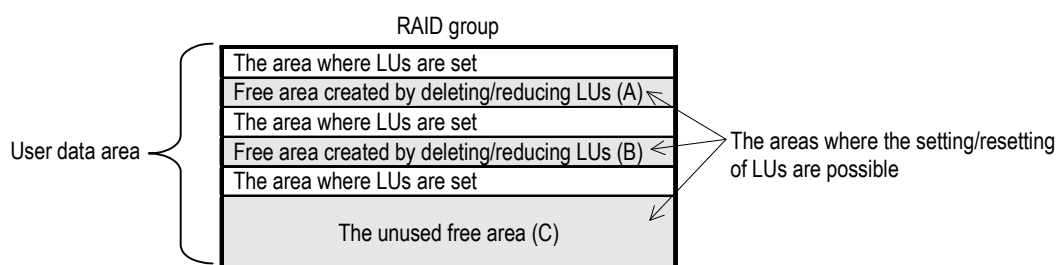


Figure 3.3.1 The Areas of LUs

## (2) Deleted areas of LUs

- The LUs other than the LUs of the value whose LBA (logical block address) at the head of the area is the largest can also be deleted.
- LUs may not be able to be deleted depending on the setting or status of the LUs (example: LUs set to the pair of ShadowImage in-system replication).
- The free capacity of the user data area increases by only the capacity of the deleted LUs by deleting LUs.
- When two or more “Free area created by deleting/reducing LUs” are consecutive on the address by deleting LUs, those areas are merged, and they become one “Free area created by deleting/reducing LUs”.
- When “Free area created by deleting/reducing LUs” and “unused free area” are consecutive on the address, those free areas are merged, and become one “unused free area”. Although LUs other than the LUs adjacent to “unused free area” shown in Figure 3.3.1 are deleted, the capacity of “unused free area” does not increase.

- If the LUs created between the user data areas are deleted/reducing, the areas where LUs are deleted ((A) and (B)) are made. LUs can be created again in each divided free area of (A) and (B) within the capacity range of each free area.

NOTE : Changing (Deletion) of LU and formatting of LU indicates that all the user data of the deleted RAID group are lost.

Before deleting the RAID group, back up the user data.

### (3) Expanded areas of LU capacity

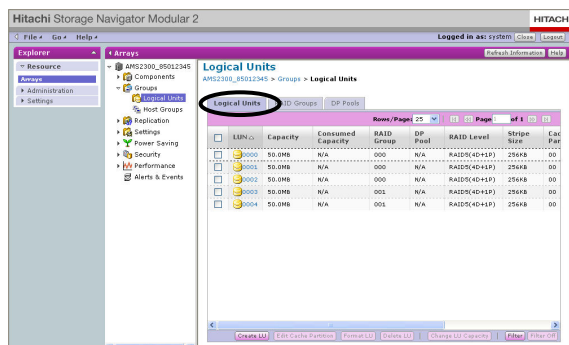
- The areas that can be used for expanding LUs are “Unused free area”, “Free area created by deleting LUs” and “Free area created by reducing LUs” of the same RAID Group as the expansion target LU.
- You can expand LUs without being conscious of continuation/discontinuity of free areas. When explaining it with Figure 3.3.1 as an example, you can create LUs up to the capacity totaling the free areas (A), (B) and (C). Internally, create LUs of the capacity necessary for each free area, and unify them to the target LU. The free areas are used as needed in order from the free area of the small LBA (Logical Block Address) in default. Moreover, the unused maximum LUN is automatically assigned to the LU newly created in each free area, and they are unified to the target LU to make one LU.  
You can specify the free areas to use. You can also specify LUNs of LUs which are assigned automatically.
- The capacity after expanding LUs becomes the value entered with Hitachi Storage Navigator Modular 2 at the time of the LU expansion. The LU capacity that you can check from Hitachi Storage Navigator Modular 2 and host computer is the value entered with Hitachi Storage Navigator Modular 2. However, when the RAID Group to expand the LU is nD+mP or nD+qD, the user data area is secured by the value of the multiple number of  $1[\text{M bytes}] \times n$  for the firmware management. Therefore, the capacity of the LU that can be created and expanded may be smaller than the calculated value entered with Hitachi Storage Navigator Modular 2

### (4) Reduced areas of LU capacity

- LU reduction is possible regardless of the value of the leading LBA (Logical Block Address) of LUs.
- LUs may not be able to be reduced depending on the setting or status of the LUs (e.g. LUs set to the pair of ShadowImage in-system replication).
- The free capacity of the user data area is increased by only the reduced capacity.
- When two or more “free areas created by deleting/reducing LUs” are consecutive on the address by reducing LUs, those areas are merged and become one “free area created by deleting/reducing LUs”.
- When the “free area created by deleting/reducing LUs” and “unused free area” are consecutive on the address, those free areas are merged and become one “unused free area”. Although LUs other than the LU adjacent to the “unused free area” shown in Figure 3.3.1 are reduced, the capacity of “unused free area” does not increase.
- If the LUs created between the user data areas are reduced, the areas (A) and (B), where the LUs are reduced, are made. You can create the LUs again in each divided free area of (A) and (B) within the capacity range of each free area.

## [Procedure ③-A] Preparing of setting LU

- (1) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [Logical Units] tab.



Logical units defined for the disk array system are displayed.

- [Logical Units] : Information on all the logical units, to which the disk array unit is assigned, is displayed.
- [LUN] : A number of the logical unit (xxx) is displayed.
- [Capacity] : A capacity specified for the logical unit is displayed.
- [RAID Group] : The RAID group defined as the logical unit is displayed.
- [RAID Level] : A RAID level of the RAID group defined as the logical unit is displayed.
- [Stripe Size] : A stripe size of the logical unit is displayed.
- [Cache Partition] : Cache Partition No is displayed.
- [Pair Cache Partition] : A definition of Pair Cache Partition is displayed.
- [Drive Type] : A type of a drive defined as a logical unit is displayed.
- [Status] : A status of the logical unit is displayed.

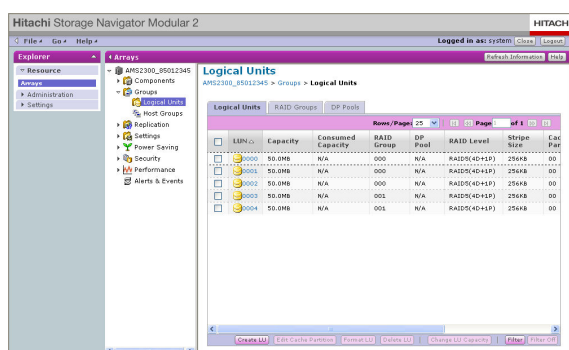
†1 : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.

## [Procedure ③-B] Creating LU

## [Conditions of creation]

- You cannot create LUs in the RAID Group during the RAID Group expansion. Execute it after completing the RAID Group expansion.
- You cannot create LUs in the RAID Group in which the Power Saving function is set. Check with the customer that the cancellation and power-saving status of the Power Saving function setting are “Normal (spin-up)”, and then create the LUs.
- You cannot create LUs while rewriting the drive firmware. Check that “IZ0100 HDU firmware download end” is displayed in the Information Message on WEB, and then create the LUs.

(1) Click the [Create LU] button.



- (2) Specify RAID Group, LUN and Capacity to set the logical unit. Specify the setting of Cache Partition as needed.

Hitachi Storage Navigator Modular 2 is less than Ver.5.20

**HSNM2** **HITACHI**

**Create Logical Unit**

Logical Unit Property

Enter the information for logical unit to be created.

\* RAID Group : 000

Free Space: No.: 0000 Capacity: 265.6GB

No.	Capacity
0000	265.6GB

\* LUN : 0001

\* Capacity : 265.6GB

Stripe Size : 256KB

Format the Logical Unit : ☒ Yes

\* Required field

OK Cancel

Hitachi Storage Navigator Modular 2 is Ver.5.20 or more, less than Ver.7.00

**HSNM2** **HITACHI**

**Create Logical Unit**

Logical Unit Property

Enter the information for logical unit to be created.

Basic Advanced

\* RAID Group : 000

\* LUN : 0002

\* Capacity : RG ALL

\* Required field

OK Cancel

Hitachi Storage Navigator Modular 2 is Ver.7.00 or more

**HSNM2** **HITACHI**

**Create Logical Unit**

Logical Unit Property

Enter the information for logical unit to be created.

Basic Advanced

Type : ☒ RAID Group ☐ DP Pool

RAID Group/DP Pool Number : 000

\* LUN : 0000

\* Capacity : RG ALL

\* Required field

OK Cancel

For an LU number, the number of an LU to be created is displayed, and for a RAID group number, the number of a RAID group to be created is displayed.

An LU with any number can be created.

When setting the LU, enter a number of the LU you want to create in the LU setting dialog box.



This page is for editorial purpose only.

## (a) Capacity specification method

When specifying the value expressly, specify it in units of All, MB, GB, TB or Block.

## &lt; When the firmware version is less than 0852/A &gt;

When setting LUs again in the area where LUs are deleted, select that in which area on the user data area to set the LUs according to the following procedure.

## (i) Select the setting area of [Capacity]. Click the [OK] button.

HSNM2 HITACHI

**Create Logical Unit**

Logical Unit Property

Enter the information for logical unit to be created.

\* RAID Group: 000

Free Space: No. 0000 Capacity: 531.2GB

No.	Capacity
0000	531.2GB

\* LUN: 0000  
From 0 to max(depend on each array model)

\* Capacity: ALL (depend on Free Space)  
From 1MB/GB/TB/Block  
Select ALL to assign selected Free Space.

Stripe Size: 256KB  
GB  
TB  
Block

Format the Logical Unit: ☒ Yes

\* Required field

OK Cancel

## (ii) Set the capacity within the range of the capacity displayed in the “Free Space”.

HSNM2 HITACHI

**Create Logical Unit**

Logical Unit Property

Enter the information for logical unit to be created.

\* RAID Group: 000

Free Space: No. 0000 Capacity: 531.2GB

No.	Capacity
0000	531.2GB

\* LUN: 0000  
From 0 to max(depend on each array model)

\* Capacity: ALL (depend on Free Space)  
From 1MB/GB/TB/Block  
Select ALL to assign selected Free Space.

Stripe Size: 256KB  
GB  
TB  
Block

Format the Logical Unit: ☒ Yes

\* Required field

OK Cancel

## (iii) The completion window is displayed. Click the [Close] button to close it.

HSNM2 HITACHI

**Create Logical Unit**

The logical unit was created successfully.  
You can select the next operation from the following or click Close.

Create more logical units by repeating the same steps:

Assign logical units to an existing iSCSI target.

iSCSI Port: ☒ 0A ☐ 0B  
☐ 1A ☐ 1B

iSCSI Target: 000-TARGET000

Assign logical units to a new iSCSI target.

Close

< When the firmware version is 0852/A or more, less than 0870/A >

You can create LUs up to the capacity totaling all free areas without specifying the areas that deleted or reduced the LUs.

- (i) Select [RAID Group] with the [Basic] tab and enter [Capacity]. Then, click the [Advanced] tab.

HSNM2 HITACHI

Create Logical Unit

Logical Unit Property

Enter the information for logical unit to be created.

Basic Advanced

\* RAID Group : 000

\* LUN : 0002  
From 0 to max (depend on each array model)

\* Capacity : RQ ALL  
From 3MB/GB/TB/block to max (depend on free space)  
Select ALL to assign size of the maximum free space in the selected RAID group.  
Select RQ ALL to assign all free spaces of the selected RAID group.

\* Required field

OK Cancel

- (ii) Set the following items with the Advanced tab, and click the [OK] button. An LU is created.

HSNM2 HITACHI

Create Logical Unit

Logical Unit Property

Enter the information for logical unit to be created.

Basic Advanced

Stripe Size : 256KB

Partition Settings :  
Cache Partition : AUTO  
Pair Cache Partition : AUTO

Format the Logical Unit : ☒ Yes

Select free spaces :  
☒ Set Automatically : Used free spaces to create logical unit :  
☐ Set Manually :  
Free Spaces  
No. Capacity  
0000 128.0TB

Used LUN to create logical unit : 0000  
From 0 to max (depend on each array model)  
At the need arises, Unused small LUN is used in order from specified LUN.

\* Required field

OK Cancel

**Table 3.3.1 List of Detailed Setting Items**

No.	Item	Content
1	Stripe Size	Specify the stripe size of LUs. We recommend the default size (256 k bytes).
2	Partition Settings	This is displayed only when installing Cache Partition Manager. <ul style="list-style-type: none"> <li>Cache partition : Specify the default Cache partition of LUs.</li> <li>Pair Cache partition : Specify the destination partition when moving for load balancing, etc.</li> </ul>
3	Format the Logical Unit	Select whether to format automatically after instructing LU creation.
4	Select free spaces	<ul style="list-style-type: none"> <li>Automatic : The free areas are used as needed in order from the free area of the small LBA (Logical Block Address) in default. Moreover, when using two or more free areas, the leading LU serves as the LUN specified at the time of creation, and other LUs assign the maximum unused LUN automatically.</li> <li>Manual : The free areas needed for creating LUs are specified. You can select two or more free areas. Moreover, the LUN other than the LU created in the leading free area is specified. (E.g. When setting 1000 to the first LUN used for creating the logical unit and creating the LU of the capacity for four free areas, LUN998, 999 and 1000 are set respectively for 3LUs created in the free areas except for the first LU)</li> </ul>

(iii) The completion window is displayed. Click the [Close] button to close it.

The screenshot shows a web-based interface for HSNM2 (Hitachi Storage Navigator Modular 2). The window title is "HSNM2" and the Hitachi logo is in the top right corner. The main heading is "Create Logical Unit". Below this, a message box with an information icon states: "The logical unit was created successfully. You can select the next operation from the following or click Close." Below the message, there are three options: "Create more logical units by repeating the same steps:" with a "Create More LU" button; "Assign logical units to an existing host group." with radio buttons for FC Port (0A, 0B, 0C, 0D, 1A, 1B, 1C, 1D) and a "Host Group" dropdown menu showing "000-000000000000000000" and an "Add to Host Group" button; and "Assign logical units to a new host group." with a "Create Host Group" button. A "Close" button is located at the bottom right of the window.

< When the firmware version is 0870/A or more >

You can create LUs up to the capacity totaling all free areas without specifying the areas that deleted or reduced the LUs.

- (i) Select [RAID Group] with the [Basic] tab and enter [Capacity]. Then, click the [Advanced] tab.

HSNM2 HITACHI

Create Logical Unit

Logical Unit Property

Enter the information for logical unit to be created.

Basic Advanced

Type : ☒ RAID Group ☐ DP Pool

RAID Group/DP Pool Number : 000

\* LUN : 0004  
From 0 to max (depend on each array model)

\* Capacity : RG ALL  
In the case of RAID group :  
From 1MB/GB/TB/block to max (depending on the amount of free space)  
Select ALL to assign the maximum free space in the selected RAID group.  
Select RG ALL to assign all free space for the selected RAID group.  
In the case of DP pool :  
From 32MB to max.

\* Required field

OK Cancel

- (ii) Set the following items with the Advanced tab, and click the [OK] button. An LU is created.

HSNM2 HITACHI

Create Logical Unit

Logical Unit Property

Enter the information for logical unit to be created.

Basic Advanced

Stripe Size : 256KB

Partition Settings :  
Cache Partition : AUTO  
Pair Cache Partition : AUTO

Format the Logical Unit : ☒ Yes

Select free space :  
☒ Set Automatically :  
☐ Set Manually :  
Used free space to create logical unit :  
Free Space  
No. Capacity  
0000 128.0TB

Used LUN to create logical unit : 0000  
From 0 to max (depend on each array model)  
As the need arises, Unused small LUN is used in order from specified LUN.

\* Required field

OK Cancel

Table 3.3.1.1 List of Detailed Setting Items

No.	Item	Content
1	Stripe Size	Specify the stripe size of LUs. We recommend the default size (256 k bytes).
2	Format the Logical Unit	Select whether to format automatically after instructing LU creation.
3	Select free spaces	<ul style="list-style-type: none"> <li>Automatic : The free areas are used as needed in order from the free area of the small LBA (Logical Block Address) in default. Moreover, when using two or more free areas, the leading LU serves as the LUN specified at the time of creation, and other LUs assign the maximum unused LUN automatically.</li> <li>Manual : The free areas needed for creating LUs are specified. You can select two or more free areas. Moreover, the LUN other than the LU created in the leading free area is specified. (E.g. When setting 1000 to the first LUN used for creating the logical unit and creating the LU of the capacity for four free areas, LUN998, 999 and 1000 are set respectively for 3LUs created in the free areas except for the first LU)</li> </ul>

(iii) The completion window is displayed. Click the [Close] button to close it.

The screenshot shows a web-based interface for HSNM2 (Hitachi Storage Navigator Modular 2). The window title is "HSNM2" and the Hitachi logo is in the top right corner. The main heading is "Create Logical Unit". Below this, a message box with an information icon states: "The logical unit was created successfully. You can select the next operation from the following or click Close." Below the message, there are three options: "Create more logical units by repeating the same steps:" with a "Create More LU" button; "Assign logical units to an existing host group." with radio buttons for FC Port (0A, 0B, 0C, 0D, 1A, 1B, 1C, 1D) and a "Host Group" dropdown menu showing "000-000000000000000000" and an "Add to Host Group" button; and "Assign logical units to a new host group." with a "Create Host Group" button. A "Close" button is located at the bottom right of the window.

## (b) Setting value of the number of logical blocks

- (i) Logical Units can split all the RAID Groups to the maximum of 2,048 (RKS), 4,096 (RKM) or 4,096 (RKH), respectively.
- (ii) Set the number of logical blocks set for each logical unit using the following multiples in accordance with RAID levels.

**Table 3.3.2 Number of Logical Blocks and RAID Levels**

RAID level	RAID width	Logical block number	RAID level	RAID width	Logical block number
RAID 0	2D	4,096	RAID 6	4D+2P	8,192
	3D	6,144		5D+2P	10,240
	4D	8,192		6D+2P	12,288
	5D	10,240		7D+2P	14,336
	6D	12,288		8D+2P	16,384
	7D	14,336		9D+2P	18,432
	8D	16,384		10D+2P	20,480
	9D	18,432		11D+2P	22,528
	10D	20,480		12D+2P	24,576
	11D	22,528		13D+2P	26,624
	12D	24,576		14D+2P	28,672
	13D	26,624		15D+2P	30,720
	14D	28,672		16D+2P	32,768
	15D	30,720		17D+2P	34,816
	16D	32,768		18D+2P	36,864
RAID 1	1D+1D	2,048		19D+2P	38,912
RAID 5	2D+1P	4,096		20D+2P	40,960
	3D+1P	6,144		21D+2P	43,008
	4D+1P	8,192		22D+2P	45,056
	5D+1P	10,240		23D+2P	47,104
	6D+1P	12,288		24D+2P	49,152
	7D+1P	14,336		25D+2P	51,200
	8D+1P	16,384		26D+2P	53,248
	9D+1P	18,432		27D+2P	55,296
	10D+1P	20,480		28D+2P	57,344
	11D+1P	22,528	RAID 1+0	2D+2D	4,096
	12D+1P	24,576		3D+3D	6,144
	13D+1P	26,624		4D+4D	8,192
	14D+1P	28,672		5D+5D	10,240
	15D+1P	30,720		6D+6D	12,288
RAID 6	2D+2P	4,096		7D+7D	14,336
	3D+2P	6,144		8D+8D	16,384

- (iii) When dividing RAID groups into multiple logical units, set the sum total of the number of logical blocks of each logical unit below the number of logical blocks per parity shown below. However, when creating multiple parity groups in each RAID group, set them below the number of logical blocks of one parity group multiplied by the number of parity groups.

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

**Table 3.3.3 Number of Logical Blocks of One Parity Group (SAS Disk Drive)**

Disk Drive capacity (*)		142.61 G bytes	287.62 G bytes	392.73 G bytes	439.44 G bytes	575.30 G bytes
RAID configuration		Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks
RAID 0	2D	557,101,056	1,123,549,184	1,534,132,224	1,716,584,448	2,247,274,496
	3D	835,651,584	1,685,323,776	2,301,198,336	2,574,876,672	3,370,911,744
	4D	1,114,202,112	2,247,098,368	3,068,264,448	3,433,168,896	4,494,548,992
	5D	1,392,752,640	2,808,872,960	3,835,330,560	4,291,461,120	5,618,186,240
	6D	1,671,303,168	3,370,647,552	4,602,396,672	5,149,753,344	6,741,823,488
	7D	1,949,853,696	3,932,422,144	5,369,462,784	6,008,045,568	7,865,460,736
	8D	2,228,404,224	4,494,196,736	6,136,528,896	6,866,337,792	8,989,097,984
	9D	2,506,954,752	5,055,971,328	6,903,595,008	7,724,630,016	10,112,735,232
	10D	2,785,505,280	5,617,745,920	7,670,661,120	8,582,922,240	11,236,372,480
	11D	3,064,055,808	6,179,520,512	8,437,727,232	9,441,214,464	12,360,009,728
	12D	3,342,606,336	6,741,295,104	9,204,793,344	10,299,506,688	13,483,646,976
	13D	3,621,156,864	7,303,069,696	9,971,859,456	11,157,798,912	14,607,284,224
	14D	3,899,707,392	7,864,844,288	10,738,925,568	12,016,091,136	15,730,921,472
	15D	4,178,257,920	8,426,618,880	11,505,991,680	12,874,383,360	16,854,558,720
	16D	4,456,808,448	8,988,393,472	12,273,057,792	13,732,675,584	17,978,195,968
RAID 1	1D+1D	278,550,528	561,774,592	767,066,112	858,292,224	1,123,637,248
RAID 5	2D+1P	557,101,056	1,123,549,184	1,534,132,224	1,716,584,448	2,247,274,496
	3D+1P	835,651,584	1,685,323,776	2,301,198,336	2,574,876,672	3,370,911,744
	4D+1P	1,114,202,112	2,247,098,368	3,068,264,448	3,433,168,896	4,494,548,992
	5D+1P	1,392,752,640	2,808,872,960	3,835,330,560	4,291,461,120	5,618,186,240
	6D+1P	1,671,303,168	3,370,647,552	4,602,396,672	5,149,753,344	6,741,823,488
	7D+1P	1,949,853,696	3,932,422,144	5,369,462,784	6,008,045,568	7,865,460,736
	8D+1P	2,228,404,224	4,494,196,736	6,136,528,896	6,866,337,792	8,989,097,984
	9D+1P	2,506,954,752	5,055,971,328	6,903,595,008	7,724,630,016	10,112,735,232
	10D+1P	2,785,505,280	5,617,745,920	7,670,661,120	8,582,922,240	11,236,372,480
	11D+1P	3,064,055,808	6,179,520,512	8,437,727,232	9,441,214,464	12,360,009,728
	12D+1P	3,342,606,336	6,741,295,104	9,204,793,344	10,299,506,688	13,483,646,976
	13D+1P	3,621,156,864	7,303,069,696	9,971,859,456	11,157,798,912	14,607,284,224
	14D+1P	3,899,707,392	7,864,844,288	10,738,925,568	12,016,091,136	15,730,921,472
	15D+1P	4,178,257,920	8,426,618,880	11,505,991,680	12,874,383,360	16,854,558,720

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.



Disk Drive capacity (*)		142.61 G bytes	287.62 G bytes	392.73 G bytes	439.44 G bytes	575.30 G bytes
RAID configuration		Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks
RAID 6	2D+2P	557,101,056	1,123,549,184	1,534,132,224	1,716,584,448	2,247,274,496
	3D+2P	835,651,584	1,685,323,776	2,301,198,336	2,574,876,672	3,370,911,744
	4D+2P	1,114,202,112	2,247,098,368	3,068,264,448	3,433,168,896	4,494,548,992
	5D+2P	1,392,752,640	2,808,872,960	3,835,330,560	4,291,461,120	5,618,186,240
	6D+2P	1,671,303,168	3,370,647,552	4,602,396,672	5,149,753,344	6,741,823,488
	7D+2P	1,949,853,696	3,932,422,144	5,369,462,784	6,008,045,568	7,865,460,736
	8D+2P	2,228,404,224	4,494,196,736	6,136,528,896	6,136,528,896	8,989,097,984
	9D+2P	2,506,954,752	5,055,971,328	6,903,595,008	7,724,630,016	10,112,735,232
	10D+2P	2,785,505,280	5,617,745,920	7,670,661,120	8,582,922,240	11,236,372,480
	11D+2P	3,064,055,808	6,179,520,512	8,437,727,232	9,441,214,464	12,360,009,728
	12D+2P	3,342,606,336	6,741,295,104	9,204,793,344	10,299,506,688	13,483,646,976
	13D+2P	3,621,156,864	7,303,069,696	9,971,859,456	11,157,798,912	14,607,284,224
	14D+2P	3,899,707,392	7,864,844,288	10,738,925,568	12,016,091,136	15,730,921,472
	15D+2P	4,178,257,920	8,426,618,880	11,505,991,680	12,874,383,360	16,854,558,720
	16D+2P	4,456,808,448	8,988,393,472	12,273,057,792	13,732,675,584	17,978,195,968
	17D+2P	4,735,358,976	9,550,168,064	13,040,123,904	14,590,967,808	19,101,833,216
	18D+2P	5,013,909,504	10,111,942,656	13,807,190,016	15,449,260,032	20,225,470,464
	19D+2P	5,292,460,032	10,673,717,248	14,574,256,128	16,307,552,256	21,349,107,712
	20D+2P	5,571,010,560	11,235,491,840	15,341,322,240	17,165,844,480	22,472,744,960
	21D+2P	5,849,561,088	11,797,266,432	16,108,388,352	18,024,136,704	23,596,382,208
	22D+2P	6,128,111,616	12,359,041,024	16,875,454,464	18,882,428,928	24,720,019,456
	23D+2P	6,406,662,144	12,920,815,616	17,642,520,576	19,740,721,152	25,843,656,704
	24D+2P	6,685,212,672	13,482,590,208	18,409,586,688	20,599,013,376	26,967,293,952
	25D+2P	6,963,763,200	14,044,364,800	19,176,652,800	21,457,305,600	28,090,931,200
	26D+2P	7,242,313,728	14,606,139,392	19,943,718,912	22,315,597,824	29,214,568,448
	27D+2P	7,520,864,256	15,167,913,984	20,710,785,024	23,173,890,048	30,338,205,696
	28D+2P	7,799,414,784	15,729,688,576	21,477,851,136	24,032,182,272	31,461,842,944
RAID 1+0	2D+2D	557,101,056	1,123,549,184	1,534,132,224	1,716,584,448	2,247,274,496
	3D+3D	835,651,584	1,685,323,776	2,301,198,336	2,574,876,672	3,370,911,744
	4D+4D	1,114,202,112	2,247,098,368	3,068,264,448	3,433,168,896	4,494,548,992
	5D+5D	1,392,752,640	2,808,872,960	3,835,330,560	4,291,461,120	5,618,186,240
	6D+6D	1,671,303,168	3,370,647,552	4,602,396,672	5,149,753,344	6,741,823,488
	7D+7D	1,949,853,696	3,932,422,144	5,369,462,784	6,008,045,568	7,865,460,736
	8D+8D	2,228,404,224	4,494,196,736	6,136,528,896	6,866,337,792	8,989,097,984

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Table 3.3.3.1 Number of Logical Blocks of One Parity Group (SAS(SED) Disk Drive)

Disk Drive capacity (*1)		575.30 G bytes
RAID configuration		Number of Logical Blocks
RAID 0	2D	2,247,274,496
	3D	3,370,911,744
	4D	4,494,548,992
	5D	5,618,186,240
	6D	6,741,823,488
	7D	7,865,460,736
	8D	8,989,097,984
	9D	10,112,735,232
	10D	11,236,372,480
	11D	12,360,009,728
	12D	13,483,646,976
	13D	14,607,284,224
	14D	15,730,921,472
	15D	16,854,558,720
	16D	17,978,195,968
RAID 1	1D+1D	1,123,637,248
RAID 5	2D+1P	2,247,274,496
	3D+1P	3,370,911,744
	4D+1P	4,494,548,992
	5D+1P	5,618,186,240
	6D+1P	6,741,823,488
	7D+1P	7,865,460,736
	8D+1P	8,989,097,984
	9D+1P	10,112,735,232
	10D+1P	11,236,372,480
	11D+1P	12,360,009,728
	12D+1P	13,483,646,976
	13D+1P	14,607,284,224
	14D+1P	15,730,921,472
	15D+1P	16,854,558,720

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Disk Drive capacity (*1)		575.30 G bytes
		Number of Logical Blocks
RAID 6	2D+2P	2,247,274,496
	3D+2P	3,370,911,744
	4D+2P	4,494,548,992
	5D+2P	5,618,186,240
	6D+2P	6,741,823,488
	7D+2P	7,865,460,736
	8D+2P	8,989,097,984
	9D+2P	10,112,735,232
	10D+2P	11,236,372,480
	11D+2P	12,360,009,728
	12D+2P	13,483,646,976
	13D+2P	14,607,284,224
	14D+2P	15,730,921,472
	15D+2P	16,854,558,720
	16D+2P	17,978,195,968
	17D+2P	19,101,833,216
	18D+2P	20,225,470,464
	19D+2P	21,349,107,712
	20D+2P	22,472,744,960
	21D+2P	23,596,382,208
	22D+2P	24,720,019,456
	23D+2P	25,843,656,704
	24D+2P	26,967,293,952
	25D+2P	28,090,931,200
	26D+2P	29,214,568,448
	27D+2P	30,338,205,696
	28D+2P	31,461,842,944
RAID 1+0	2D+2D	2,247,274,496
	3D+3D	3,370,911,744
	4D+4D	4,494,548,992
	5D+5D	5,618,186,240
	6D+6D	6,741,823,488
	7D+7D	7,865,460,736
	8D+8D	8,989,097,984

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Table 3.3.4 Number of Logical Blocks of One Parity Group (SATA Disk Drive)

Disk Drive capacity (*)		491.25 G bytes	737.49 G bytes	983.69 G bytes	1,968.52 G bytes	2,953.31 G bytes
RAID configuration		Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks
RAID 0	2D	-	-	-	-	—
	3D	-	-	-	-	—
	4D	-	-	-	-	—
	5D	-	-	-	-	—
	6D	-	-	-	-	—
	7D	-	-	-	-	—
	8D	-	-	-	-	—
	9D	-	-	-	-	—
	10D	-	-	-	-	—
	11D	-	-	-	-	—
	12D	-	-	-	-	—
	13D	-	-	-	-	—
	14D	-	-	-	-	—
	15D	-	-	-	-	—
	16D	-	-	-	-	—
RAID 1	1D+1D	959,479,808	1,440,415,744	1,921,286,144	3,844,767,744	5,768,183,808
RAID 5	2D+1P	1,918,959,616	2,880,831,488	3,842,572,288	7,689,535,488	11,536,367,616
	3D+1P	2,878,439,424	4,321,247,232	5,763,858,432	11,534,303,232	17,304,551,424
	4D+1P	3,837,919,232	5,761,662,976	7,685,144,576	15,379,070,976	23,072,735,232
	5D+1P	4,797,399,040	7,202,078,720	9,606,430,720	19,223,838,720	28,840,919,040
	6D+1P	5,756,878,848	8,642,494,464	11,527,716,864	23,068,606,464	34,609,102,848
	7D+1P	6,716,358,656	10,082,910,208	13,449,003,008	26,913,374,208	40,377,286,656
	8D+1P	7,675,838,464	11,523,325,952	15,370,289,152	30,758,141,952	46,145,470,464
	9D+1P	8,635,318,272	12,963,741,696	17,291,575,296	34,602,909,696	51,913,654,272
	10D+1P	9,594,798,080	14,404,157,440	19,212,861,440	38,447,677,440	57,681,838,080
	11D+1P	10,554,277,888	15,844,573,184	21,134,147,584	42,292,445,184	63,450,021,888
	12D+1P	11,513,757,696	17,284,988,928	23,055,433,728	46,137,212,928	69,218,205,696
	13D+1P	12,473,237,504	18,725,404,672	24,976,719,872	49,981,980,672	74,986,389,504
	14D+1P	13,432,717,312	20,165,820,416	26,898,006,016	53,826,748,416	80,754,573,312
	15D+1P	14,392,197,120	21,606,236,160	28,819,292,160	57,671,516,160	86,522,757,120

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Disk Drive capacity (*1)		491.25 G bytes	737.49 G bytes	983.69 G bytes	1,968.52 G bytes	2,953.31 G bytes
RAID configuration		Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks	Number of Logical Blocks
RAID 6	2D+2P	1,918,959,616	2,880,831,488	3,842,572,288	7,689,535,488	11,536,367,616
	3D+2P	2,878,439,424	4,321,247,232	5,763,858,432	11,534,303,232	17,304,551,424
	4D+2P	3,837,919,232	5,761,662,976	7,685,144,576	15,379,070,976	23,072,735,232
	5D+2P	4,797,399,040	7,202,078,720	9,606,430,720	19,223,838,720	28,840,919,040
	6D+2P	5,756,878,848	8,642,494,464	11,527,716,864	23,068,606,464	34,609,102,848
	7D+2P	6,716,358,656	10,082,910,208	13,449,003,008	26,913,374,208	40,377,286,656
	8D+2P	7,675,838,464	11,523,325,952	15,370,289,152	30,758,141,952	46,145,470,464
	9D+2P	8,635,318,272	12,963,741,696	17,291,575,296	34,602,909,696	51,913,654,272
	10D+2P	9,594,798,080	14,404,157,440	19,212,861,440	38,447,677,440	57,681,838,080
	11D+2P	10,554,277,888	15,844,573,184	21,134,147,584	42,292,445,184	63,450,021,888
	12D+2P	11,513,757,696	17,284,988,928	23,055,433,728	46,137,212,928	69,218,205,696
	13D+2P	12,473,237,504	18,725,404,672	24,976,719,872	49,981,980,672	74,986,389,504
	14D+2P	13,432,717,312	20,165,820,416	26,898,006,016	53,826,748,416	80,754,573,312
	15D+2P	14,392,197,120	21,606,236,160	28,819,292,160	57,671,516,160	86,522,757,120
	16D+2P	15,351,676,928	23,046,651,904	30,740,578,304	61,516,283,904	92,290,940,928
	17D+2P	16,311,156,736	24,487,067,648	32,661,864,448	65,361,051,648	98,059,124,736
	18D+2P	17,270,636,544	25,927,483,392	34,583,150,592	69,205,819,392	103,827,308,544
	19D+2P	18,230,116,352	27,367,899,136	36,504,436,736	73,050,587,136	109,595,492,352
	20D+2P	19,189,596,160	28,808,314,880	38,425,722,880	76,895,354,880	115,363,676,160
	21D+2P	20,149,075,968	30,248,730,624	40,347,009,024	80,740,122,624	121,131,859,968
	22D+2P	21,108,555,776	31,689,146,368	42,268,295,168	84,584,890,368	126,900,043,776
	23D+2P	22,068,035,584	33,129,562,112	44,189,581,312	88,429,658,112	132,668,227,584
	24D+2P	23,027,515,392	34,569,977,856	46,110,867,456	92,274,425,856	138,436,411,392
	25D+2P	23,986,995,200	36,010,393,600	48,032,153,600	96,119,193,600	144,204,595,200
	26D+2P	24,946,475,008	37,450,809,344	49,953,439,744	99,963,961,344	149,972,779,008
	27D+2P	25,905,954,816	38,891,225,088	51,874,725,888	103,808,729,088	155,740,962,816
	28D+2P	26,865,434,624	40,331,640,832	53,796,012,032	107,653,496,832	161,509,146,624
RAID 1+0	2D+2D	1,918,959,616	2,880,831,488	3,842,572,288	7,689,535,488	11,536,367,616
	3D+3D	2,878,439,424	4,321,247,232	5,763,858,432	11,534,303,232	17,304,551,424
	4D+4D	3,837,919,232	5,761,662,976	7,685,144,576	15,379,070,976	23,072,735,232
	5D+5D	4,797,399,040	7,202,078,720	9,606,430,720	19,223,838,720	28,840,919,040
	6D+6D	5,756,878,848	8,642,494,464	11,527,716,864	23,068,606,464	34,609,102,848
	7D+7D	6,716,358,656	10,082,910,208	13,449,003,008	26,913,374,208	40,377,286,656
	8D+8D	7,675,838,464	11,523,325,952	15,370,289,152	30,758,141,952	46,145,470,464

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

**Table 3.3.4.1 Number of Logical Blocks of One Parity Group (SAS7.2K Drive)**

Disk Drive capacity (*1)		1,956.94 G bytes
RAID configuration		Number of Logical Blocks
RAID 0	2D	7,644,315,648
	3D	11,466,473,472
	4D	15,288,631,296
	5D	19,110,789,120
	6D	22,932,946,944
	7D	26,755,104,768
	8D	30,577,262,592
	9D	34,399,420,416
	10D	38,221,578,240
	11D	42,043,736,064
	12D	45,865,893,888
	13D	49,688,051,712
	14D	53,510,209,536
	15D	57,332,367,360
	16D	61,154,525,184
RAID 1	1D+1D	3,822,157,824
RAID 5	2D+1P	7,644,315,648
	3D+1P	11,466,473,472
	4D+1P	15,288,631,296
	5D+1P	19,110,789,120
	6D+1P	22,932,946,944
	7D+1P	26,755,104,768
	8D+1P	30,577,262,592
	9D+1P	34,399,420,416
	10D+1P	38,221,578,240
	11D+1P	42,043,736,064
	12D+1P	45,865,893,888
	13D+1P	49,688,051,712
	14D+1P	53,510,209,536
	15D+1P	57,332,367,360

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

Disk Drive capacity (*1)		1,956.94 G bytes
		Number of Logical Blocks
RAID configuration		
RAID 6	2D+2P	7,644,315,648
	3D+2P	11,466,473,472
	4D+2P	15,288,631,296
	5D+2P	19,110,789,120
	6D+2P	22,932,946,944
	7D+2P	26,755,104,768
	8D+2P	30,577,262,592
	9D+2P	34,399,420,416
	10D+2P	38,221,578,240
	11D+2P	42,043,736,064
	12D+2P	45,865,893,888
	13D+2P	49,688,051,712
	14D+2P	53,510,209,536
	15D+2P	57,332,367,360
	16D+2P	61,154,525,184
	17D+2P	64,976,683,008
	18D+2P	68,798,840,832
	19D+2P	72,620,998,656
	20D+2P	76,443,156,480
	21D+2P	80,265,314,304
	22D+2P	84,087,472,128
	23D+2P	87,909,629,952
	24D+2P	91,731,787,776
	25D+2P	95,553,945,600
	26D+2P	99,376,103,424
	27D+2P	103,198,261,248
	28D+2P	107,020,419,072
RAID 1+0	2D+2D	7,644,315,648
	3D+3D	11,466,473,472
	4D+4D	15,288,631,296
	5D+5D	19,110,789,120
	6D+6D	22,932,946,944
	7D+7D	26,755,104,768
	8D+8D	30,577,262,592

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

**Table 3.3.4.2 Number of Logical Blocks of One Parity Group (Flash Drive)**

Flash Drive capacity ( <sup>*1</sup> )		195.82 G bytes
RAID configuration		Number of Logical Blocks
RAID 0	2D	764,932,096
	3D	1,147,398,144
	4D	1,529,864,192
	5D	1,912,330,240
	6D	2,294,796,288
	7D	2,677,262,336
	8D	3,059,728,384
	9D	3,442,194,432
	10D	3,824,660,480
	11D	4,207,126,528
	12D	4,589,592,576
	13D	4,972,058,624
	14D	5,354,524,672
	15D	5,736,990,720
	16D	6,119,456,768
RAID 1	1D+1D	382,466,048
RAID 5	2D+1P	764,932,096
	3D+1P	1,147,398,144
	4D+1P	1,529,864,192
	5D+1P	1,912,330,240
	6D+1P	2,294,796,288
	7D+1P	2,677,262,336
	8D+1P	3,059,728,384
	9D+1P	3,442,194,432
	10D+1P	3,824,660,480
	11D+1P	4,207,126,528
	12D+1P	4,589,592,576
	13D+1P	4,972,058,624
	14D+1P	5,354,524,672
	15D+1P	5,736,990,720

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.



Flash Drive capacity (*1)		195.82 G bytes
		Number of Logical Blocks
RAID configuration		
RAID 6	2D+2P	764,932,096
	3D+2P	1,147,398,144
	4D+2P	1,529,864,192
	5D+2P	1,912,330,240
	6D+2P	2,294,796,288
	7D+2P	2,677,262,336
	8D+2P	3,059,728,384
	9D+2P	3,442,194,432
	10D+2P	3,824,660,480
	11D+2P	4,207,126,528
	12D+2P	4,589,592,576
	13D+2P	4,972,058,624
	14D+2P	5,354,524,672
	15D+2P	5,736,990,720
	16D+2P	6,119,456,768
	17D+2P	6,501,922,816
	18D+2P	6,884,388,864
	19D+2P	7,266,854,912
	20D+2P	7,649,320,960
	21D+2P	8,031,787,008
	22D+2P	8,414,253,056
	23D+2P	8,796,719,104
	24D+2P	9,179,185,152
	25D+2P	9,561,651,200
	26D+2P	9,944,117,248
	27D+2P	10,326,583,296
	28D+2P	10,709,049,344
RAID 1+0	2D+2D	764,932,096
	3D+3D	1,147,398,144
	4D+4D	1,529,864,192
	5D+5D	1,912,330,240
	6D+6D	2,294,796,288
	7D+7D	2,677,262,336
	8D+8D	3,059,728,384

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

(v) Number of logical blocks per Disk Drive.

**Table 3.3.5 Number of Blocks (m) and Capacity Per Disk Drive (SAS Disk Drive)**

Disk Drive model name		DF-F800-AKH146	DF-F800-AKH300 DF-F800-AMF300	DF-F800-AKF400	DF-F800-AKH450 DF-F800-AKH450X	DF-F800-AKH600 DF-F800-AKH600X DF-F800-AMF600
Capacity (user area size) per Disk Drive	Number of blocks (m)	278,550,528	561,774,592	767,066,112	858,292,224	1,123,637,248
	Capacity (bytes)	142,617,870,336	287,628,591,104	392,737,849,344	439,445,618,688	575,302,270,976

**Table 3.3.5.1 Number of Blocks (m) and Capacity Per Disk Drive (SAS(SED) Disk Drive)**

Disk Drive model name		DF-F800-ANH600/DF-F800-ANH600X
Capacity (user area size) per Disk Drive	Number of blocks (m)	1,123,637,248
	Capacity (bytes)	575,302,270,976

**Table 3.3.6 Number of Blocks (m) and Capacity Per Disk Drive (SATA Disk Drive)**

Disk Drive model name		DF-F800-AVE500	DF-F800-AVE750	DF-F800-AVE1K DF-F800-AVE1KX	DF-F800-AVE2K DF-F800-AVE2KX	DF-F800-AVE3K DF-F800-AVE3KX
Capacity (user area size) per Disk Drive	Number of blocks (m)	959,479,808	1,440,415,744	1,921,286,144	3,844,767,744	5,768,183,808
	Capacity (bytes)	491,253,661,696	737,492,860,928	983,698,505,728	1,968,521,084,928	2,953,310,109,696

**Table 3.3.6.1 Number of Blocks (m) and Capacity Per Disk Drive (SAS7.2K Disk Drive)**

Disk Drive model name		DF-F800-AWE2K/DF-F800-AWE2KX
Capacity (user area size) per Disk Drive	Number of blocks (m)	3,822,157,824
	Capacity (bytes)	1,956,944,805,888

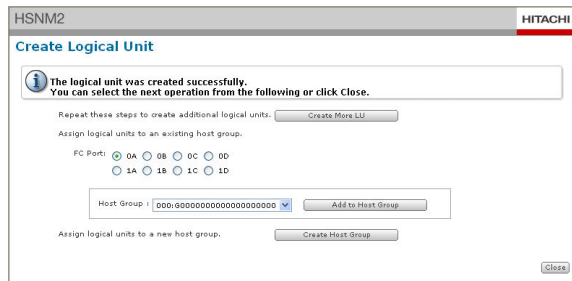
**Table 3.3.6.2 Number of Blocks (m) and Capacity Per Flash Drive**

Flash Drive model name		DF-F800-AKS200
Capacity (user area size) per Flash Drive	Number of blocks (m)	382,466,048
	Capacity (bytes)	195,822,616,576

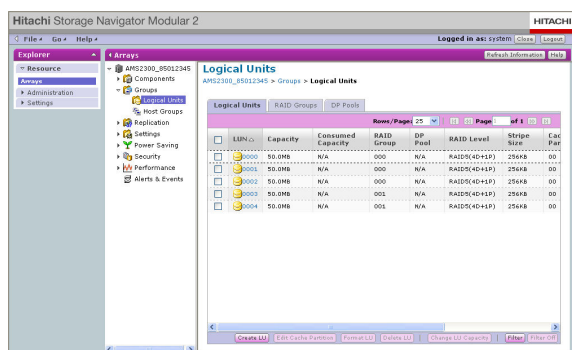
- (3) If you have put a checkmark in [Format LU], it is formatted automatically after setting the logical unit.

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

- (4) A normal termination message appears. Click the [Close] button.



- (5) Preset LU information is updated and the screen is displayed.

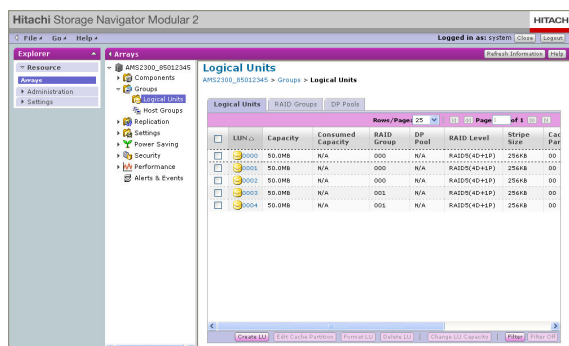


- (6) When both Fibre Channel/iSCSI interfaced are used, be sure to perform LU mapping on all created LUs, and make sure that LUs used by Fibre Channel/iSCSI and LUs used by mapped exclusive of each other.

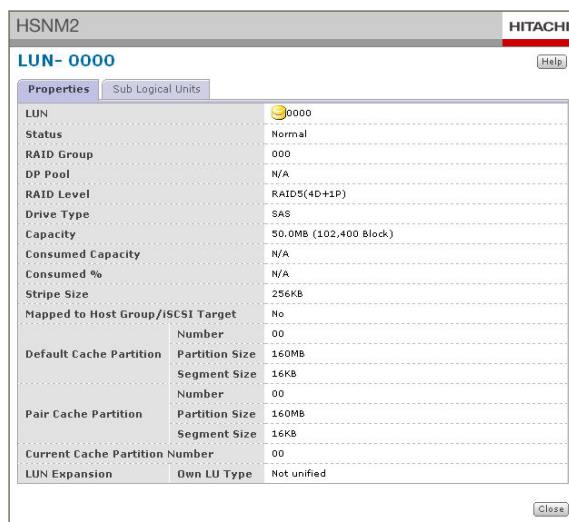
For details on how to do LU mapping, refer to [“2.3 Setting LU Mapping” \(SYSPR 02-0080\)](#).

## [Procedure ③-C] Verifying LU

(1) Click the [Logical Units] tab.



(2) The setting made in [Procedure ③-B] can be referred to by a clicking on the [LUN] of the RAID group created.



- If the confirmation of LU is OK, go to the “[Procedure ③-F] Formatting LU” (SYSPR 03-0290).
- If the setting of Default LU controller, go to the “[Procedure ③-D] Deleting LU”(SYSPR 03-0260).

### [Procedure ③-D] Deleting LU

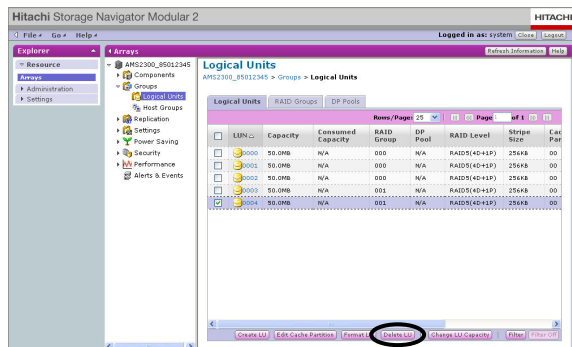
NOTE : All user data is lost by deleting the LU. Backup user data before deleting the RAID group.

#### [Conditions of deletion]

- When the LU, whose status of the forced parity correction is any of “Parity Correction”, “Waiting Parity Correction”, “Waiting Drive Reconstruction”, “Uncorrected”, “Uncorrected and Drive Detached” and “Correction Aborted”, this LU cannot be deleted.  
Change the status of the LU to “Restored” or “Correction Skipped” by executing or skipping the forced parity correction for this LU, and then delete this LU.
- You cannot delete the unified LU configured by Sub LUs of the unified LU and LUs of two or more RAID Groups. Delete it after separating the unified LUs.
- You cannot delete the following LUs. Delete the LUs after waiting for the cancellation or termination of the LUs.
  - LUs set to the pair of ShadowImage in-system replication
  - LUs set to the pair of Copy-on-write SnapShot
  - LUs set to the pair of TrueCopy remote replication
  - LUs set to the pair of TrueCopy Extended Distance
  - LUs in which Cache Residency Manager is set
  - LUs set to the command device
  - DM-LUs
  - Reserve LUs of Modular Volume Migration
  - LUs registered in the data pool
  - LUs in the RAID group during the RAID group expansion
- When the Dynamic sparing/Correction copy/Copy back is operating, delete the LUs after the Disk Drives are restored.
- When there are LUs executing the LU switching processing, the LUs cannot be deleted because the firmware is executing the internal processing. Wait for one minute or so, and delete the LUs.
- The LUs of the pair whose status of Modular Volume Migration is COPY cannot be deleted. Delete the LUs after the pair status of Modular Volume Migration becomes PSUS.
- The LUs whose attribute is any of “Read Only”, “Protect” and “Can’t Guard” in the Data Retention Utility setting, whose S-VOL setting is “Setting impossible (invalid)”, and whose mode is either of “Read Capacity 0 (Zer)” and “Inquiry command shielding (Zer/Inv)” cannot be deleted. Set the attribute to “Read/Write” in the Data Retention Utility, the S-VOL setting to “Setting possible (valid)”, and the mode to “Unset”, and delete the LUs.
- You cannot create LUs in the RAID group in which the Power Saving function is set. Check with the customer that the cancellation and power-saving status of the Power Saving function setting are “Normal (spin-up)”, and then create the LUs.
- You cannot delete LUs while rewriting the drive firmware. Check that “IZ0100 HDU firmware download end” is displayed in the Information Message on WEB, and then delete the LUs.

## [Execution procedure for deleting LUs]

(1) Click the [Logical Units] tab, and then put checkmarks in all logical units to delete.

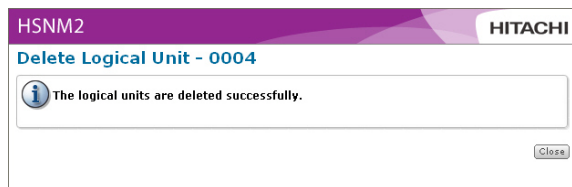


(2) Click the [Delete LU] button.

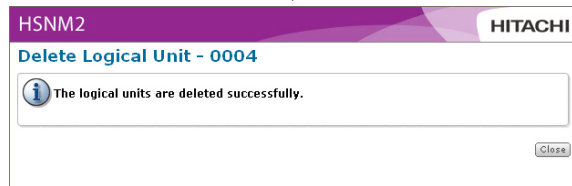
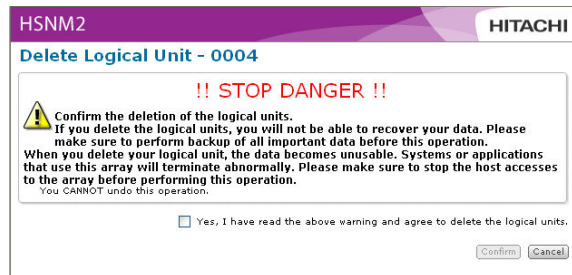
(3) A confirmation message is displayed indicating whether last LUs should be deleted or not.

When the confirmation window is displayed, click the [Close] button.

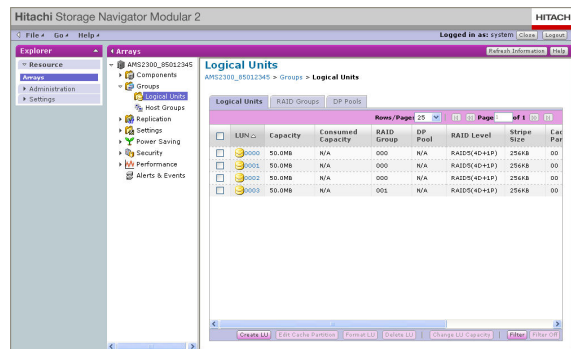
- When there is no formatted LU in a RAID group



- When there is a formatted LU exists



- (4) The LU information in which last LUs have been deleted is updated and the window is displayed.



- When creating the LU, go to “[Procedure ③-B] Creating LU” (SYSPR 03-0160).

**[Procedure ③-E] Changing capacity of LUs**

For changing capacity of LUs, you can expand or reduce the capacity of the specified LUs.

**[Note]**

- The firmware version must be 0852/A or more to use the changing capacity of LUs. If the version is less than 0852/A, perform the update installation of the firmware (refer to [Firmware “1.4.2 \(1-1\) Transfer and update firmware \(FIRM 01-0070\)”](#)) to make the version 0852/A or more, and then use the changing capacity of LUs.
- The LU reduction physically reduces the capacity. Therefore, the data such as file system may not be created depending on the host or OS. Use this function after checking that the OS allows the LU reduction.
- The free areas that you can use for LU expansion is only the free areas of the RAID group same as the expansion target LU. When you want to use the free areas of another RAID Groups, use the LU unification (refer to [“3.7 LU Unification” \(SYSPR 03-0480\)](#)).

**[Conditions of expansion]**

- When the LU whose status of the forced parity correction is any of “Parity Correction”, “Waiting Parity Correction”, “Waiting Drive Reconstruction”, “Uncorrected”, “Uncorrected and Drive Detached” and “Correction Aborted” exists, you cannot delete this LU. Execute the forced parity correction for this LU or skip it to change the LU status to “Restored” or “Correction Skipped”, and then delete this LU.
- You cannot execute the LU expansion of the LUs during format. Execute it after completing the format.
- You cannot execute the LU expansion for the unified LU configured by LUs of two or more RAID groups. When you want to expand the capacity of such LUs, use the LU unification (refer to [“3.7 LU Unification” \(SYSPR 03-0480\)](#)).
- You cannot execute the LU expansion to the LUs during saving (a drive failure occurs). Execute it after completing the drive restoration.
- You cannot expand the following LUs. Expand the LUs after waiting for the cancellation or termination for the LUs.
  - LUs set to the pair of ShadowImage in-system replication
  - LUs set to the pair of Copy-on-write SnapShot
  - LUs set to the pair of TrueCopy remote replication
  - LUs set to the pair of TrueCopy Extended Distance
  - LUs or reserve LUs of Modular Volume Migration
  - LUs in which Cache Residency Manager is set
  - LUs during format
  - LUs set to the command device
  - DM-LUs
  - LUs registered in the data pool
  - LUs in the RAID group during the RAID group expansion
- You cannot expand LUs of the RAID group in which the Power Saving function is set. Check with the customer that the cancellation and power-saving status of the Power Saving function setting are “Normal (spin-up)”, and then expand the LUs.



- If the subsystem reboot is not executed after setting/changing Cache Partition Manager, you cannot expand the LUs. Expand the LUs after rebooting the subsystem.
- In the Data Retention Utility setting, you cannot expand the LU whose attribution is any of “Read Only”, “Protect”, and “Can’t Guard”, the S-VOL setting is “Setting Impossible (disabled)”, and the mode is any of “Read Capacity 0 (Zer)” and “Inquiry Command Shielding (Zer/Inv)”. In the Data Retention Utility setting, set the attribution to “Read/Write”, the S-VOL to the “Setting Possible (Enabled)”, and mode to “Unset”, and then expand LUs.
- When the LUs under execution of the LU switching processing exist, you cannot expand the LUs because the firmware is executing the internal processing. Wait for about one minute, and then expand the LUs.
- You cannot expand LUs while rewriting the drive firmware. Check that “IZ0100 HDU firmware download end” is displayed in the Information Message on WEB, and then expand the LUs.

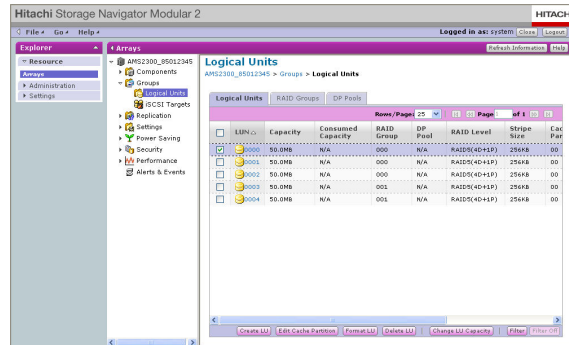
#### [Conditions of reduction]

- When the LU whose status of the forced parity correction is any of “Parity Correction”, “Waiting Parity Correction”, “Waiting Drive Reconstruction”, “Uncorrected”, “Uncorrected and Drive Detached” and “Correction Aborted” exists, you cannot reduce this LU. Execute the forced parity correction for this LU or skip it to change the LU status to “Restored” or “Correction Skipped”, and then reduce this LU.
- You cannot reduce the following LUs. Reduce the LUs after waiting for the cancellation or termination for the LUs.
  - LUs set to the pair of ShadowImage in-system replication
  - LUs set to the pair of Copy-on-write SnapShot
  - LUs set to the pair of TrueCopy remote replication
  - LUs set to the pair of TrueCopy Extended Distance
  - LUs or reserve LUs of Modular Volume Migration
  - LUs in which Cache Residency Manager is set
  - LUs during format
  - LUs set to the command device
  - DM-LUs
  - LUs registered in the data pool
  - LUs in the RAID group during the RAID group expansion
- In the Data Retention Utility setting, you cannot reduce the LU whose attribution is any of “Read Only”, “Protect” and “Can’t Guard”, the S-VOL setting is “Setting Impossible (disabled)”, and the mode is any of “Read Capacity 0 (Zer)” and “Inquiry Command Shielding (Zer/Inv)”. In the Data Retention Utility setting, set the attribution to “Read/Write”, the S-VOL to the “Setting Possible (Enabled)”, and mode to “Unset”, and then reduce LUs.
- When there are LUs under execution of the LU switching processing, you cannot reduce the LUs because the firmware is executing the internal processing. Wait for about one minute, and then reduce the LUs.

- When the dynamic sparing/correction copy/copy back is operating, reduce LUs after the drive is restored.
- You cannot reduce LUs while rewriting the drive firmware. Check that “IZ0100 HDU firmware download end” is displayed in the Information Message on WEB, and then reduce the LUs.

#### [Execution procedure for changing LU capacity]

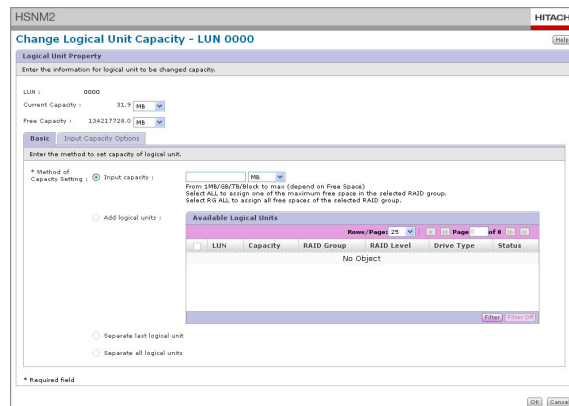
- (a) Click the [Logical Unit] tab, check “Logical Unit to Change Capacity”, and click the [Change LU Capacity] button.



- (b) The capacity change window of the logical unit is displayed. Click the [Basic Settings] tab.

- (c) Check [Enter Capacity] of the capacity setting method, and set the total capacity after changing the capacity.

When the set capacity is larger than the current capacity, it becomes LU expansion. When it is smaller, it becomes LU reduction.



(d) You can select a free area with the [Capacity Input Detailed Settings] tab.

**Table 3.3.7 List of Items for Selecting Free Areas**

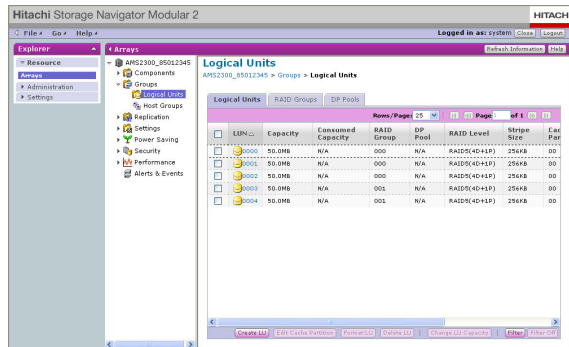
No.	Item		Content
1	Automatic		The free areas are used as needed in order from the free area of the small LBA (Logical Block Address) in default. Moreover, the unused maximum LUN is automatically assigned to the LU newly created in each free area.
2	Manual	Free area used for creating LUs	The free areas needed for expanding LUs are specified. You can specify two or more free areas.
		First LUN used for creating the LU	The LUN of the LU newly created in each free area is specified. (E.g. When setting 1000 to the first LUN used for creating the logical unit and expanding the capacity for three free areas, LUN998, 999 and 1000 are set respectively for 3LUs created in the free areas)

(e) Click the [OK] button. The following confirmation message is displayed in case of LU reduction. Check the confirmation checkbox, and click the [Confirmation] button.

(f) The completion window is displayed. Click the [Close] button to close it.

## [Procedure ③-F] Formatting LU

An LU is formatted.



## (1) Formatting while online

The format data, the parity data and the check code are written in the entire area of the LU. The subsystem ensures the consistency of the data by writing this check code in the Disk Drive.

The host immediately makes the specified LUs usable and the operation at the early stage of the system enabled by executing the format in the background.

The maximum number of LUs in which the format can be specified at the same time is the number of LUs that can be created for per subsystem. Also, when the number of LUs executing the format is less than the number of LUs that can be created per subsystem, the LU to be formatted can be added from the Hitachi Storage Navigator Modular 2.

However, the LU that internally executes the format at the same time becomes the maximum of 6 LUs/Control Unit.

Even when Hitachi Storage Navigator Modular 2 is quit while the formatting is being executed, the formatting is continued.

Table 3.3.8 LU Formatting Mode and while Online Description of Operation

No.	Connection mode of array disk management mode and device configuration	Restriction
	Single system Dual system	
1	Can be executed during online processing.	<ul style="list-style-type: none"> <li>• For ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance and Copy-on-write SnapShot, pair definition cannot be executed when LU is in quick format.</li> <li>• The unification and the separation of a logical unit cannot be executed for a logical unit in format.</li> <li>• The data pool cannot be set for a logical unit in format.</li> <li>• Copy-on-write SnapShot, and P-VOL of image (V-VOL) cannot be specified for a logical unit in the format.</li> <li>• The forced parity correction cannot be executed for a logical unit in format.</li> <li>• When a data loss occurs owing to a power failure and battery exhaustion, an LU being formatted enters the Unrestored status. Basically, use the LU after the formatting is completed.</li> </ul>

Prerequisites : • Host access performance deteriorates during format.

Formatting will impact the host access performance, especially on the LU being formatted and on the LU in the same RAID Group as the LU being formatted. Please do formatting during off-hours with less host access.

- The LUs in the RAID Group to which the Power Saving Function is set cannot be formatted.

Format the LUs after checking with the customer that the setting of the Power Saving function is released and Power Saving Status is “Normal (Spin Up)”.

NOTE : • The progress and the operation status of the format are succeeded over the planned shutdown.

- When PIN OVER occurs during format, a formatting is interrupted.

The formatting is resumed automatically after PIN OVER is recovered.

Refer to [Troubleshooting “6.1.11 A failure Occurred during Operation : Case 1 \(PIN Over\)” \(TRBL 06-0690\)](#).

- When the host I/O is executed to the LUs being formatted, the termination processing may delay. In that case, the termination processing of the format may take the maximum of 400 seconds after the progress ratio of the format becomes 99 %.

- If the owner right to the LU is switched, the formatting operation becomes standby status depending on the number of operations in the Control Unit in charge.

When the Control Unit having the owner right is formatting five LUs or less in case that the owner right of the LU being formatted is switched or when the Control Unit is not executing the format, the LU whose owner right is switched continues to be formatted.

When the Control Unit having the owner right is formatting six LUs or more in case that the owner right of the LU being formatted is switched, the order of LUs that the Control Unit executes the format becomes the order of which the format is specified from the Hitachi Storage Navigator Modular 2. At this time, the LU whose owner right is switched is continuously formatted or becomes the standby status.

The LU format cannot be executed in the following cases. When formatting them, follow the actions to be taken for each case.

- The LU format cannot be performed when the subsystem is restarting. Restart the subsystem, and perform the format after it becomes the Ready status.
- The LU format cannot be performed for the P-VOL or the S-VOL of ShadowImage in-system replication, TrueCopy remote replication and TrueCopy Extended Distance. Perform the LU format after releasing the pair.
- The LU format cannot be performed for the P-VOL or the V-VOL (SnapShot image) of Copy-on-write SnapShot. Perform the LU format after releasing the pair.
- The LU format cannot be performed in the status that the firmware of only one Control Unit is replaced in the dual controller system. Perform the LU format after completing the replacement of the firmware of both Control Units.
- When the specified LUs do not exist, perform the LU format after specifying correct LUs in CLI.
- The Sub LUs of the unified LU cannot be formatted. Specify the Main LU of the unified LU, and format it. When you want to format the Sub LUs of the unified LU, separate the Sub LUs from the unified LU, and format the Sub LUs.
- The LU format cannot be performed for the P-VOL or the S-VOL which executing Modular Volume Migration. Perform the LU format after completing Modular Volume Migration. If you want to format it immediately, cancel Modular Volume Migration, and then perform the LU format.
- The LUs registered in the data pool cannot be formatted. Delete the LUs from the data pool, and perform the LU format.
- When the Disk Drive blockade mode is set valid, if the status of the specified LUs are Normal or Regression, it cannot be formatted. Set the Disk Drive blockade mode to invalid, and perform the LU format. Return the Disk Drive blockade mode to valid after executing the format.

- When either of the “Read Only” and “Protect” is set for the access attribute of the LUs in Data Retention Utility, either of “Read Capacity 0 (Zer)” and “Inquiry command shielding (Zer/Inv)” is set for the mode, and “Setting impossible (invalid)” is set for the S-VOL setting, the LU format cannot be performed. Return the access attribute of the LUs to “Read/Write (default)”, and perform the LU format.
- If two or more LUs are formatted using the Disk Drives whose capacity is 500 Gbytes or more, the resources to format the LUs may be insufficient inside the subsystem. Perform the LU format after completing the LU format which is being executed.
- The LU format cannot be performed when the status of the forced parity correction of the specified LUs is any of “Uncorrected”, “Parity Correction”, “Waiting Parity Correction”, “Waiting Drive Reconstruction”, “Uncorrected and Drive Detached” and “Correction Aborted”. Perform the LU format after changing the status of the forced parity correction of the LU to “Correction Skipped” or “Restored” referring to [Troubleshooting “6.1.3 The Failure Occurred Immediately after Being Ready \(Forced Parity Correction\)” \(TRBL 06-0110\)](#).

When you specify the formatting, you can specify which of the formatting or host access you give priority throughout the system. (Refer to [“4.2 \(9\) Setting of Format Mode” \(SYSPR 04-0310\)](#).) The specification can be changed in the online status.

Although the format priority mode is set to “Standard” by default, the copy performance or the restore performance may be deteriorated substantially when any one of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance and Copy-on-write SnapShot of the priced options is executing the copy or restore for the pair at the time of the format execution. In that case, set the format priority mode to “Host” and restrict the format processing.

When the formatting is specified, whether the formatted data is made default or 0 (zero) can be specified for the entire system. (Refer to [“4.2 \(9\) Setting of Format Mode” \(SYSPR 04-0310\)](#).) The specification concerned can be changed online, but it is formatted by the format data of the point in time when the format is indicated.

NOTE : If the firmware version is less than 0880, use the 0 (zero) specification of the format data only when it is necessary to clear the logical unit 0 (zero) at the time of connecting to Universal Storage Platform or Network Storage Controller. For the firmware version 0880 or later, the 0 (zero) specification of the format data is set at the time of shipment and available for standard.

## &lt; Standard time required for an LU Formatting &gt;

An LU Formatting takes a long time from start to completion.

The following table shows the standard of the time required of the LU Formatting when selecting optional numbers of the Disk Drives which configure the RAID Group. The time required of the LU Formatting also increases as the number of the SAS/SAS(SSED), SAS7.2K, SATA Disk Drives, or Flash Drives that configures the RAID Group increases.

NOTE : The data above are standard times required for an LU Formatting for one or two RAID groups.

Further, the times required for the restoration vary depending on the Disk Drive capacity, number of Disk Drives, and RAID configuration.

Besides, as to some types of Disk Drives, the times required for the restoration is shortened by 10 to 20 percent.



Table 3.3.9 Standard Time Required for an LU Formatting (#1) (#2) (3.5-type SAS Disk Drive)

				Unit: min				
Disk Drives (G bytes) <sup>(#1)</sup>				142.61	287.62	392.73	439.44	575.30
Item								
AMS2300 AMS2100 AMS2010 <sup>(#2)</sup>	4 Disk Drives	RAID 6	(2D+2P)	30	60	90	90	120
	6 Disk Drives		(4D+2P)	50	100	160	150	200
	10 Disk Drives		(8D+2P)	90	180	280	270	360
	14 Disk Drives		(12D+2P)	130	260	410	390	520
	18 Disk Drives		(16D+2P)	170	340	530	510	680
	30 Disk Drives		(28D+2P)	290	580	910	870	1160
	3 Disk Drives	RAID5	(2D+1P)	30	60	110	90	120
	5 Disk Drives		(4D+1P)	50	90	160	140	180
	9 Disk Drives		(8D+1P)	80	160	250	240	320
	11 Disk Drives		(10D+1P)	100	200	310	300	400
	13 Disk Drives		(12D+1P)	120	240	380	360	480
	16 Disk Drives		(15D+1P)	150	290	470	440	580
	4 Disk Drives	RAID1+0	(2D+2D)	40	80	130	120	160
	8 Disk Drives		(4D+4D)	60	130	190	190	260
	16 Disk Drives		(8D+8D)	130	250	410	380	500
	2 Disk Drives	RAID1	(1D+1D)	30	60	100	90	120
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	50	100	160	150	200
	6 Disk Drives		(4D+2P)	70	140	220	210	280
	10 Disk Drives		(8D+2P)	110	220	340	330	440
	14 Disk Drives		(12D+2P)	150	300	470	450	600
	18 Disk Drives		(16D+2P)	190	380	590	570	760
	30 Disk Drives		(28D+2P)	300	580	940	880	1160
	3 Disk Drives	RAID5	(2D+1P)	40	80	130	120	160
	5 Disk Drives		(4D+1P)	60	120	190	180	240
	9 Disk Drives		(8D+1P)	100	200	310	300	400
	11 Disk Drives		(10D+1P)	120	240	380	360	480
	13 Disk Drives		(12D+1P)	140	280	440	420	560
	16 Disk Drives		(15D+1P)	170	340	530	510	680
	4 Disk Drives	RAID1+0	(2D+2D)	40	80	130	120	160
	8 Disk Drives		(4D+4D)	80	160	250	240	320
	16 Disk Drives		(8D+8D)	160	320	500	480	640
	2 Disk Drives	RAID1	(1D+1D)	30	60	100	90	120

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

\*2 : RKEXS/RKEXSA/RKEXSB does not support 142.61 G bytes, 287.62 G bytes, and 392.73 G bytes Disk Drives.

RKEXS8F does not support 142.61 G bytes, and 392.73 G bytes Disk Drives.

#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

#2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

Table 3.3.9.1 Standard Time Required for an LU Formatting (#1) (#2) (2.5-type SAS Disk Drive)

				Unit: min	
Disk Drives (G bytes) <sup>(#1)</sup>				287.62	575.30
Item					
AMS2300 AMS2100 AMS2010	4 Disk Drives	RAID 6	(2D+2P)	70	140
	6 Disk Drives		(4D+2P)	120	240
	10 Disk Drives		(8D+2P)	210	420
	14 Disk Drives		(12D+2P)	310	620
	18 Disk Drives		(16D+2P)	400	800
	30 Disk Drives		(28D+2P)	690	1370
	3 Disk Drives	RAID5	(2D+1P)	90	170
	5 Disk Drives		(4D+1P)	120	240
	9 Disk Drives		(8D+1P)	190	380
	11 Disk Drives		(10D+1P)	240	470
	13 Disk Drives		(12D+1P)	290	570
	16 Disk Drives		(15D+1P)	360	710
	4 Disk Drives	RAID1+0	(2D+2D)	100	200
	8 Disk Drives		(4D+4D)	150	290
	16 Disk Drives		(8D+8D)	310	620
	2 Disk Drives	RAID1	(1D+1D)	80	150
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	120	240
	6 Disk Drives		(4D+2P)	170	330
	10 Disk Drives		(8D+2P)	260	510
	14 Disk Drives		(12D+2P)	360	710
	18 Disk Drives		(16D+2P)	450	890
	30 Disk Drives		(28D+2P)	710	1410
	3 Disk Drives	RAID5	(2D+1P)	100	200
	5 Disk Drives		(4D+1P)	150	290
	9 Disk Drives		(8D+1P)	240	470
	11 Disk Drives		(10D+1P)	290	570
	13 Disk Drives		(12D+1P)	330	660
	16 Disk Drives		(15D+1P)	400	800
	4 Disk Drives	RAID1+0	(2D+2D)	100	200
	8 Disk Drives		(4D+4D)	190	380
	16 Disk Drives		(8D+8D)	380	750
	2 Disk Drives	RAID1	(1D+1D)	80	150

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

#2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

Table 3.3.9.2 Standard Time Required for an LU Formatting (#1) (#2) (SAS(SED) Disk Drive)

Disk Drives (G bytes) <sup>(#1)</sup>				Unit: min
Item				575.30
AMS2300 AMS2100	4 Disk Drives	RAID 6	(2D+2P)	120
	6 Disk Drives		(4D+2P)	200
	10 Disk Drives		(8D+2P)	360
	14 Disk Drives		(12D+2P)	520
	18 Disk Drives		(16D+2P)	680
	30 Disk Drives		(28D+2P)	1160
	3 Disk Drives	RAID5	(2D+1P)	120
	5 Disk Drives		(4D+1P)	180
	9 Disk Drives		(8D+1P)	320
	11 Disk Drives		(10D+1P)	400
	13 Disk Drives		(12D+1P)	480
	16 Disk Drives		(15D+1P)	580
	4 Disk Drives	RAID1+0	(2D+2D)	160
	8 Disk Drives		(4D+4D)	260
	16 Disk Drives		(8D+8D)	500
	2 Disk Drives	RAID1	(1D+1D)	120
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	200
	6 Disk Drives		(4D+2P)	280
	10 Disk Drives		(8D+2P)	440
	14 Disk Drives		(12D+2P)	600
	18 Disk Drives		(16D+2P)	760
	30 Disk Drives		(28D+2P)	1160
	3 Disk Drives	RAID5	(2D+1P)	160
	5 Disk Drives		(4D+1P)	240
	9 Disk Drives		(8D+1P)	400
	11 Disk Drives		(10D+1P)	480
	13 Disk Drives		(12D+1P)	560
	16 Disk Drives		(15D+1P)	680
	4 Disk Drives	RAID1+0	(2D+2D)	160
	8 Disk Drives		(4D+4D)	320
	16 Disk Drives		(8D+8D)	640
	2 Disk Drives	RAID1	(1D+1D)	120

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

#2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

Table 3.3.10 Standard Time Required for an LU Formatting (#1) (#2) (SATA Disk Drive)

Unit: min

Disk Drives (G bytes) <sup>(#1)</sup>				491.25	737.49	983.69	1,968.52	2,953.31
Item								
AMS2300 AMS2100 AMS2010 <sup>(#2)</sup>	4 Disk Drives	RAID 6	(2D+2P)	660	980	1300	2600	3900
	6 Disk Drives		(4D+2P)	710	1050	1400	2800	4200
	10 Disk Drives		(8D+2P)	850	1260	1670	3340	5010
	14 Disk Drives		(12D+2P)	910	1350	1790	3580	5370
	18 Disk Drives		(16D+2P)	1010	1490	1990	3980	5970
	30 Disk Drives		(28D+2P)	1300	1950	2560	5120	7680
	3 Disk Drives	RAID5	(2D+1P)	380	560	750	1500	2250
	5 Disk Drives		(4D+1P)	510	770	1000	2000	3000
	9 Disk Drives		(8D+1P)	770	1140	1520	3040	4560
	11 Disk Drives		(10D+1P)	890	1320	1750	3500	5250
	13 Disk Drives		(12D+1P)	1010	1490	1990	3980	5970
	16 Disk Drives		(15D+1P)	1200	1800	2360	4720	7080
	4 Disk Drives	RAID1+0	(2D+2D)	500	750	980	1960	2940
	8 Disk Drives		(4D+4D)	690	1040	1360	2720	4080
	16 Disk Drives		(8D+8D)	1170	1760	2300	4600	6900
	2 Disk Drives	RAID1	(1D+1D)	360	530	710	1420	2130
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	720	1070	1420	2840	4260
	6 Disk Drives		(4D+2P)	760	1120	1500	3000	4500
	10 Disk Drives		(8D+2P)	850	1260	1670	3340	5010
	14 Disk Drives		(12D+2P)	940	1390	1850	3700	5550
	18 Disk Drives		(16D+2P)	1030	1520	2030	4060	6090
	30 Disk Drives		(28D+2P)	1300	1920	2560	5120	7680
	3 Disk Drives	RAID5	(2D+1P)	400	590	790	1580	2370
	5 Disk Drives		(4D+1P)	520	770	1020	2040	3060
	9 Disk Drives		(8D+1P)	770	1140	1520	3040	4560
	11 Disk Drives		(10D+1P)	890	1320	1750	3500	5250
	13 Disk Drives		(12D+1P)	1020	1510	2010	4020	6030
	16 Disk Drives		(15D+1P)	1200	1780	2360	4720	7080
	4 Disk Drives	RAID1+0	(2D+2D)	500	740	980	1960	2940
	8 Disk Drives		(4D+4D)	700	1040	1380	2760	4140
	16 Disk Drives		(8D+8D)	1200	1780	2360	4720	7080
	2 Disk Drives	RAID1	(1D+1D)	370	550	730	1460	2190

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.

The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

\*2 : AMS 2010 does not support 491.25 G bytes and 737.49 G bytes Disk Drives.

#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

#2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

Table 3.3.10.1 Standard Time Required for an LU Formatting (#1) (#2) (SAS7.2K Disk Drive)

Disk Drives (G bytes) <sup>(#1)</sup>				1,956.94
Item				
AMS2300 AMS2100 AMS2010	4 Disk Drives	RAID 6	(2D+2P)	540
	6 Disk Drives		(4D+2P)	900
	10 Disk Drives		(8D+2P)	1630
	14 Disk Drives		(12D+2P)	2350
	18 Disk Drives		(16D+2P)	3080
	30 Disk Drives		(28D+2P)	5260
	3 Disk Drives	RAID5	(2D+1P)	540
	5 Disk Drives		(4D+1P)	810
	9 Disk Drives		(8D+1P)	1450
	11 Disk Drives		(10D+1P)	1810
	13 Disk Drives		(12D+1P)	2170
	16 Disk Drives		(15D+1P)	2630
	4 Disk Drives	RAID1+0	(2D+2D)	720
	8 Disk Drives		(4D+4D)	1170
	16 Disk Drives		(8D+8D)	2260
AMS2500	2 Disk Drives	RAID1	(1D+1D)	540
	4 Disk Drives	RAID 6	(2D+2P)	900
	6 Disk Drives		(4D+2P)	1270
	10 Disk Drives		(8D+2P)	1990
	14 Disk Drives		(12D+2P)	2720
	18 Disk Drives		(16D+2P)	3440
	30 Disk Drives		(28D+2P)	5260
	3 Disk Drives	RAID5	(2D+1P)	720
	5 Disk Drives		(4D+1P)	1080
	9 Disk Drives		(8D+1P)	1810
	11 Disk Drives		(10D+1P)	2170
	13 Disk Drives		(12D+1P)	2540
	16 Disk Drives		(15D+1P)	3080
	4 Disk Drives	RAID1+0	(2D+2D)	720
	8 Disk Drives		(4D+4D)	1450
	16 Disk Drives		(8D+8D)	2900
	2 Disk Drives	RAID1	(1D+1D)	540

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using. The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

#2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

Table 3.3.10.2 Standard Time Required for an LU Formatting (#1) (#2) (Flash Drive)

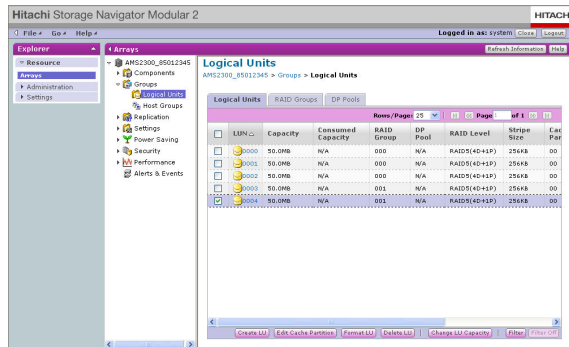
Disk Drives (G bytes) <sup>(#1)</sup>				195.82
Item				
AMS2300 AMS2100	4 Disk Drives	RAID 6	(2D+2P)	40
	6 Disk Drives		(4D+2P)	60
	10 Disk Drives		(8D+2P)	100
	14 Disk Drives		(12D+2P)	140
	18 Disk Drives		(16D+2P)	160
	30 Disk Drives		(28D+2P)	260
	3 Disk Drives	RAID5	(2D+1P)	40
	5 Disk Drives		(4D+1P)	60
	9 Disk Drives		(8D+1P)	100
	11 Disk Drives		(10D+1P)	120
	13 Disk Drives		(12D+1P)	140
	16 Disk Drives		(15D+1P)	160
	4 Disk Drives	RAID1+0	(2D+2D)	40
	8 Disk Drives		(4D+4D)	80
	16 Disk Drives		(8D+8D)	160
	2 Disk Drives	RAID1	(1D+1D)	40
AMS2500	4 Disk Drives	RAID 6	(2D+2P)	40
	6 Disk Drives		(4D+2P)	60
	10 Disk Drives		(8D+2P)	100
	14 Disk Drives		(12D+2P)	140
	18 Disk Drives		(16D+2P)	160
	30 Disk Drives		(28D+2P)	260
	3 Disk Drives	RAID5	(2D+1P)	40
	5 Disk Drives		(4D+1P)	60
	9 Disk Drives		(8D+1P)	100
	11 Disk Drives		(10D+1P)	120
	13 Disk Drives		(12D+1P)	140
	16 Disk Drives		(15D+1P)	160
	4 Disk Drives	RAID1+0	(2D+2D)	40
	8 Disk Drives		(4D+4D)	80
	16 Disk Drives		(8D+8D)	160
	2 Disk Drives	RAID1	(1D+1D)	40

\*1 : The drive capacity values are calculated as 1 G byte =1,000,000,000 bytes. This definition is different from that calculated as 1 k byte =1,024 bytes, which are actually displayed on PCs that you are using.  
The RAID group capacity values displayed in the Hitachi Storage Navigator Modular 2 are calculated as 1 k byte =1,024 bytes.

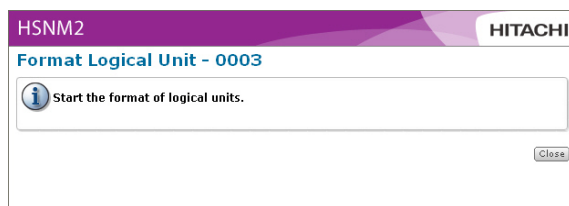
#1 : This is a standard without the I/O operation from the host computer. It takes more time with the I/O operation from the host computer.

#2 : It is the standard of the format time when executing one LU at a time. When the multiple formatting is performed for two or more LUs (n LUs), it is completed less than the time of which n times the standard time.

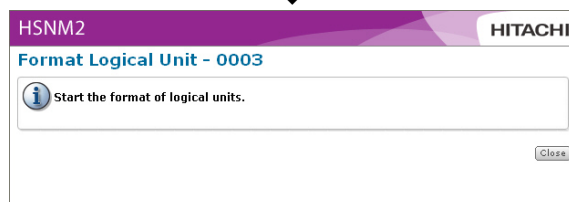
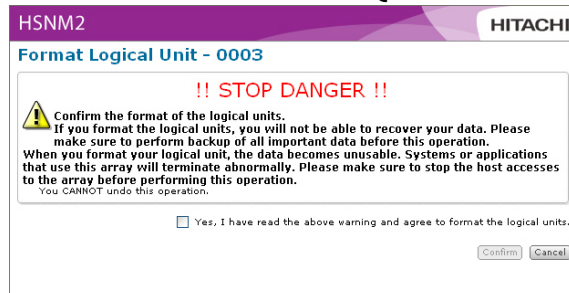
- (a) Click the [Logical Units] tab on the unit window, and then put a checkmark in the LU to format and click the [Format LU] button.



- (b) The message to confirm if it may format all the selected LUs is displayed.
- When an LU that has been “Quick” formatted does not exist



- When an LU that has been “Quick” formatted exists

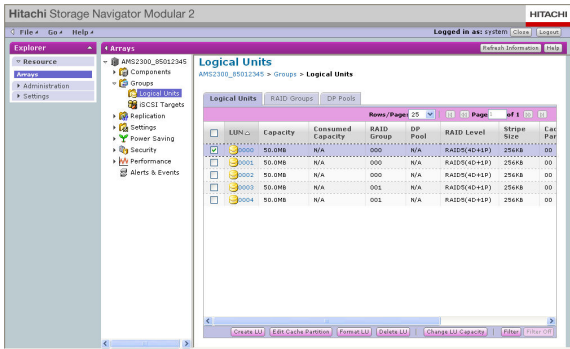


- (c) If [Close] is clicked, the specified LU is formatted<sup>(†1)</sup>.  
At this point, this LU can be recognized from the host computer.

<sup>†1</sup> : When a specified LU is formatted, the user data within the specified LU is lost. When incorrectly specifying an LU, press the [Cancel] button and redo processing by selecting an LU to be reformatted.

- (d) When the format starts, the progress of the LU format executed in the background is displayed in [Status] of the logical unit on the window. The message in the format is displayed in the column of the status of the logical unit.

NOTE : The value of percentage is not updated unless the subsystem status is referred to through selections of [Display] and [Latest Information] in this order.



If formatting terminates abnormally, refer to [Table 3.3.11](#).

Table 3.3.11 Contents of Display of Execution Result Screen

No.	Status		Result
1	“Abnormal end”	“CHECK CONDITION (xx-xxxx)” is displayed(*1) Sense key      Sense code	Unsuccessful Format Unit Unsuccessful command
2		A message is displayed.	Unsuccessful Other errors than the above

\*1 : Because this function internally uses the Format Unit command, it displays a sense key and a sense code when the pertinent command returns the Check Condition status.

When “Abnormal” is indicated on “Status”, sense-key, sense-code or message-text is indicated.

When sense key and sense code = 02-xx xx, 03-xx xx, 04-xx xx or 0B-xx xx;

For the above code, a hardware fault is assumed. When the subsystem is not recovered from the failure after retrying, remove the cause of the error considering the type and meaning of the error. (Refer to [Message “Chapter 9. Failure Analysis by Sense Data” \(MSG 09-0000\)](#) of the Maintenance Manual.



When sense key and sense code = 05-xxxx;

For the above code, an operation error is assumed. Upon checking the following items and re-execute processing. If the error is not recovered, contact our company.

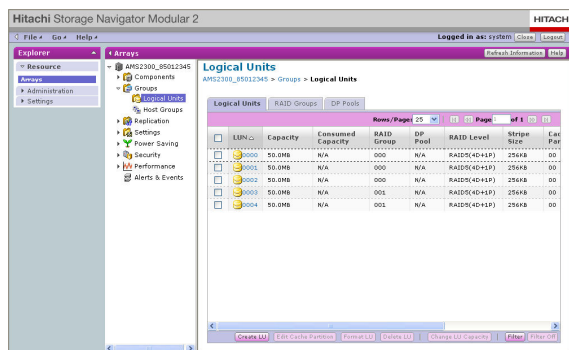
- ① Is logical unit 0 defined? Codes which will occur are 05-25 00 and 25-25 81.
- ② In spite of none of drive mounted states, is ALL RAID specified and is an LU specified for ALL CAPA formatted? A code which will occur is 05-26 00.
- ③ Is an attempt made to define an LU exceeding the capacity of the defined RAID group? A code which will occur is 05-25 80.

When sense key and sense code = 0B-FD01;

Switching of a controller in charge of an LU occurred during formatting. Check the controller in charge and re-execute formatting from the controller in charge.

When message-text is indicated, take measure according to the message.

(e) Preset LU information is updated and the screen is displayed.



- The formatting LU has terminated, go to [“3.4 Setting of Spare Disk” \(SYSPR 03-0390\)](#).

### 3.4 Setting of Spare Disk

This setting is used to set, delete and reference a Spare Disk.

The drive that can be set as the Spare Disk is a data disk.

The Disk Drive that can reconfigure the data to Spare Disk is only any one of the following types of Disk Drives; SAS (3.5-inch type), SAS (2.5-inch type), SATA, SAS7.2K, Flash Drive, and SAS(SED), which is the same type of Disk Drive as the one that requires restoration. For the setting of Spare Disk, consider the drive type.

NOTE : • If the Power Saving function is enabled, copy back is performed in the following four cases even if Spare Drive Operation Mode has been set to the default mode, which is copy back less.

Furthermore, the operation differs depending on whether the firmware version is more than or equal to 08C4/A or less than 08C4/A. (In the version of 08C4/J or more, a Flash Drive operates according to the Spare Drive Operation Mode setting.)

License key status		Source data drive	Target Spare Disk			
			Less than 08C4/A		8C4/A or more	
			System drive	Non system drive	System drive	Non system drive
Power Saving	Enable	System drive	As specified	As specified	As specified	As specified
		Non system drive	As specified	As specified	As specified	As specified
	Disable	System drive	Copy back	As specified	As specified	Copy back
		Non system drive	Copy back	As specified	Copy back	As specified

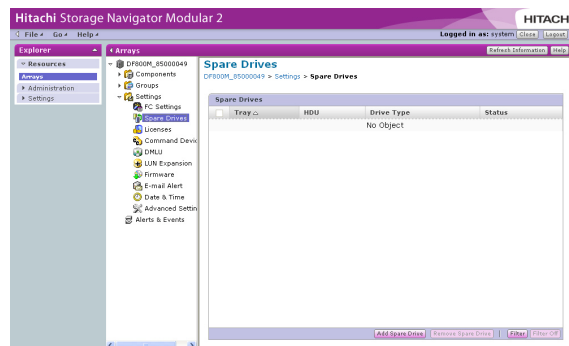
\* : System drives correspond to Disk Drives #0 to #4 in RKM/RKS, Disk Drives #0 to #4 of Unit ID#0 in RKAK/RKAKS connected to RKH, or Disk Drives #A0 to #A4 in RKAKX.

(The copy-back operates for maintaining the power saving status that can be changed in the version less than 08C4/A. The specification changed to remedy the problems such as the useless copy-back operation among system drives and the biased Spare Disk for the system drives.)

- If operated by the copy-back-less setting, the Disk Drive positions which configure the RAID group are replaced due to the Disk Drive failure restoration. In the Power Saving functions, depending on the Disk Drive positions which configure the RAID group, even if the RAID groups have the same RAID level and the number of Disk Drives, the spinup time from the power saving status may differ. Therefore, if the RAID group is configured considering the spinup time from the power saving status, it is recommended to set it to the copy-back mode.

[Procedure ④-A] Preparing of setting Spare Disk

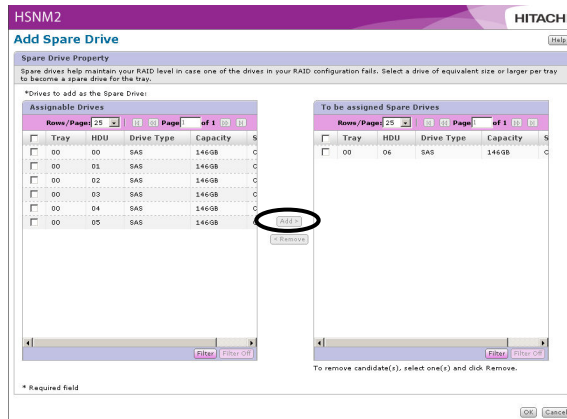
(1) Select [Settings] - [Spare Drives] on the unit window,



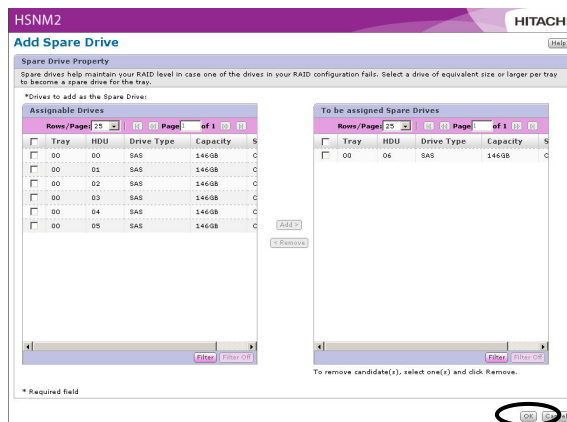
(2) Click the [Add Spare Drive] button that is displayed at the lower right part of the window.

## [Procedure ④-B] Setting Spare Disk

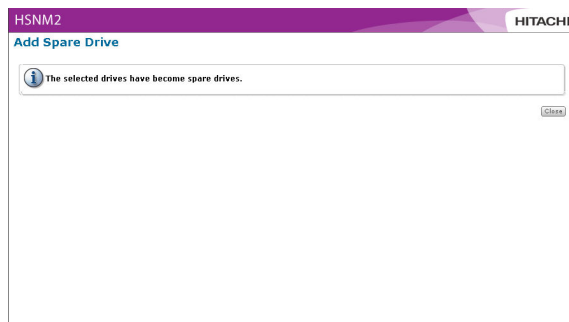
- (1) Select an HDU you want to specify as a spare drive from the [Assignable Drives] list and click the [Add] button.



- (2) The selected HDU is moved to the [To be assigned Spare Drives] list. Click the [OK] button.



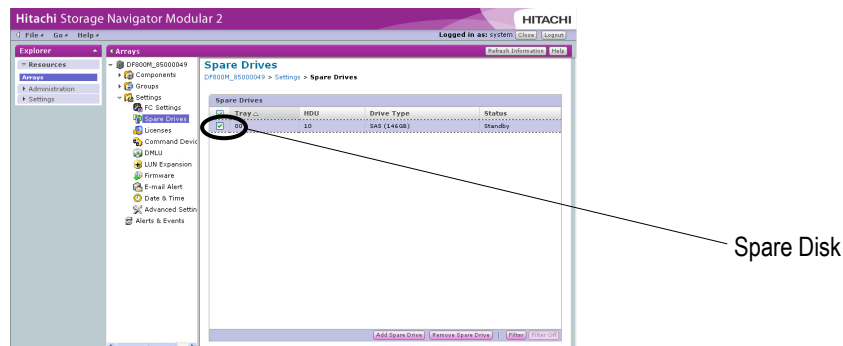
- (3) The confirmation window is display.  
Click the [Close] button.



- When verifying the Spare Disk, go to “[Procedure ④-D] Verifying Spare Disk” (SYSPR 03-0421).

## [Procedure ④-C] Deleting Spare Disk

(1) Select [Settings] - [Spare Drives] on the unit window.



(2) Click the [Remove Spare Drive] button that is displayed at the lower right part of the window.

(3) The following message is displayed. Click the [Close] button.

When incorrectly specifying a Disk Drive, press the [Cancel] button and redo processing by [Procedure ④-C].

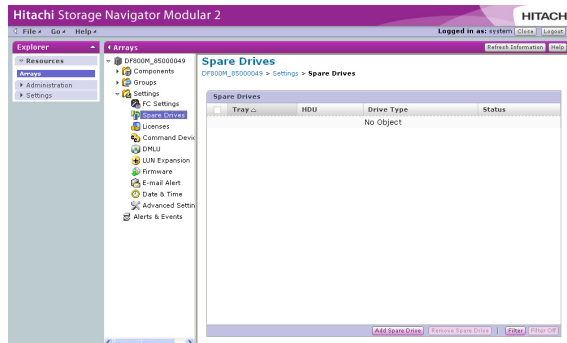


- When setting the Spare Disk, go to “[Procedure ④-B] Setting Spare Disk” (SYSPR 03-0410).

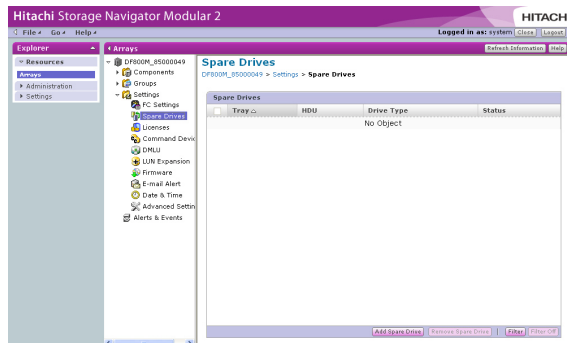
NOTE : When you set the configuration of [RAID Group] or [Logical Unit], be sure to click the [Update Information] button after closing the parameter window to make the icon of the RAID Group in the Unit window the latest information.

## [Procedure ④-D] Verifying Spare Disk

(1) Select [Settings] - [Spare Drives] on the unit window.



(2) You can make sure of the spare drive that has been set on the right side of the window by selecting [Settings] - [Spare Drive] from the tree in the unit window.



- If confirmation is OK, go to [“Chapter 2. Setting Host Group/Targets” \(SYSPR 02-0000\)](#)
- If confirmation is NG, go to [“\[Procedure ④-C\] Deleting Spare Disk” \(SYSPR 03-0420\)](#)

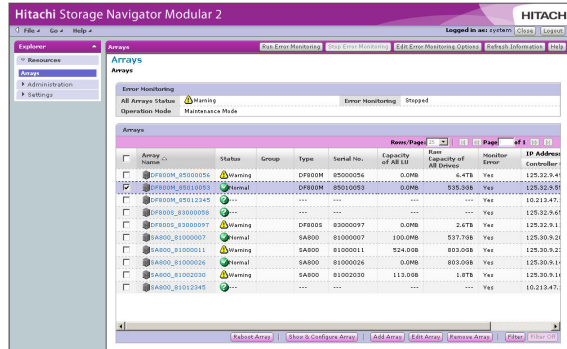
This page is for editorial purpose only.

### 3.5 Checking the Status of Disk Drive

Display the array unit component status and information by using icons. When you double-click each icon, the information of the component part indicated by the icon is displayed.

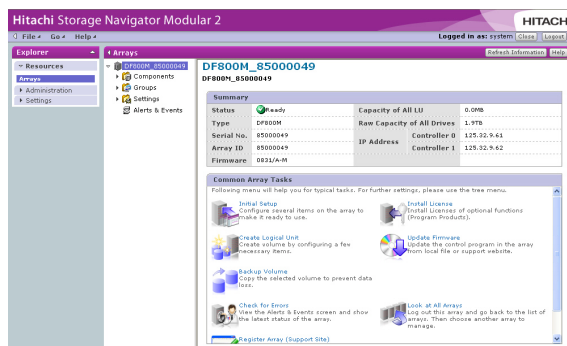
- (1) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (2) Click the array subsystem name, and open the unit window.

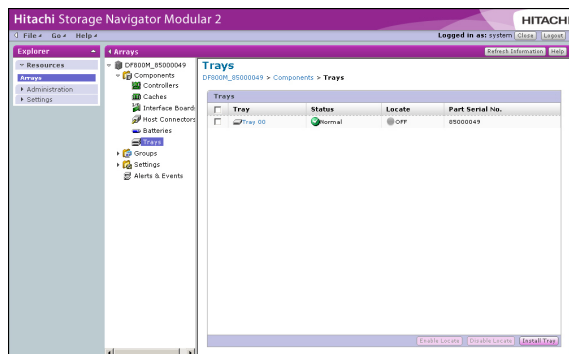
NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



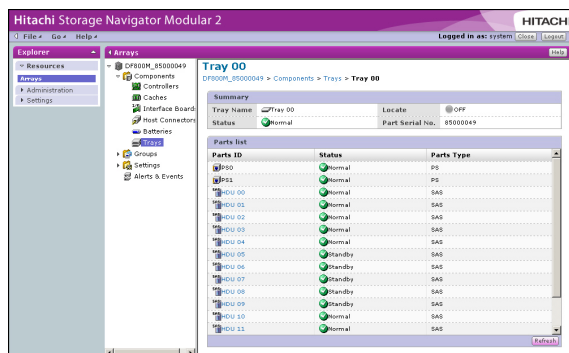
<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.



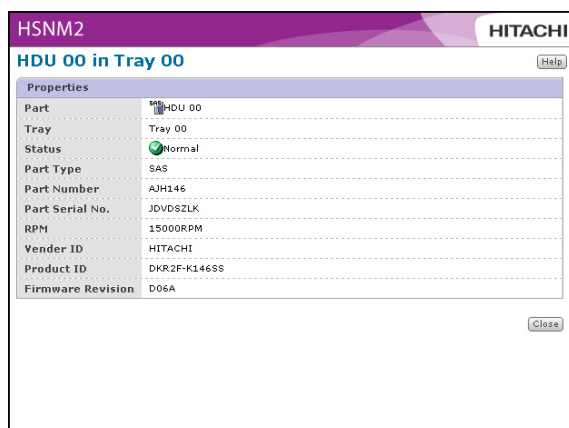
- (3) When updating the display of the components to the most recent one, click [Components] - [Trays].



- (4) When you click [Tray 00], the tray 00 window is displayed.



- (5) When you click [HDU] that you want to check the status, the detailed information of the HDU is displayed.



NOTE : The Vender ID, Product ID and Firmware Revision may not be displayed depending on the installation of the drive and the status of the drive.

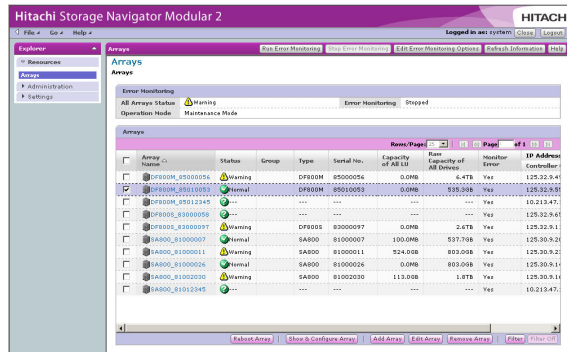
- [Part] : This field displays the name of the hard disk
- [Tray] : This field displays the name of the tray that the contains the hard disk.
- [Status] : This field displays the current operational status of the hard disk.

[Part Type]	: This field displays the type of hard disk (SAS/SAS(SSED) or SATA).
[Part Number]	: This field displays the manufacturers part number for the type of hard disk.
[Part Serial No]	: This field displays the serial number assigned to the hard disk at the factory.
[RPM]	: This field displays the rotational speed of the disk in revolutions per minute.
[Vendor ID]	: This is the name of the hard disk manufacturer
[Product ID]	: This field displays
[Firmware Revision]	: This field displays the revision of the firmware installed in the hard disk.

### 3.6 Checking the Disk Drive which Configures the RAID Group

- (1) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



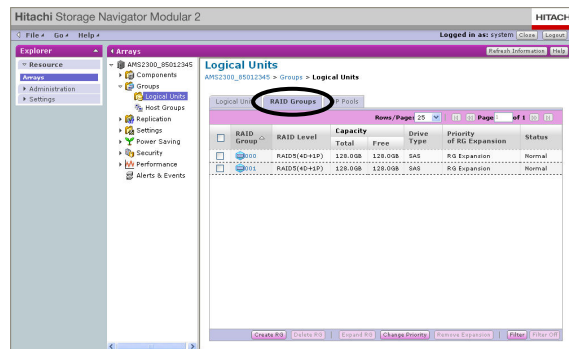
- (2) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)

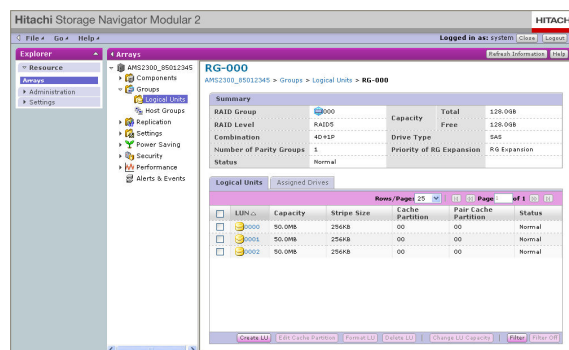


<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

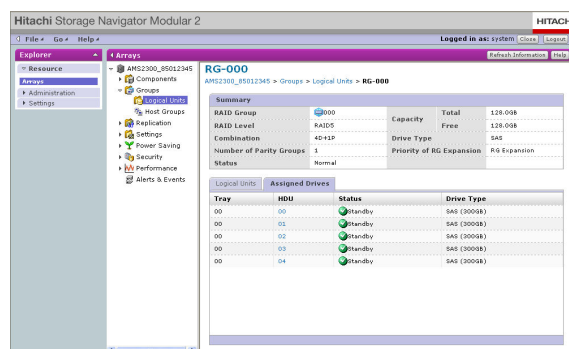
- (3) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [RAID Groups] tab.



- (4) Select the target RAID Group icon from the list view in the unit window.  
 (5) Select the [Assigned Drives] tab.



- (6) State of drive is displayed.



<sup>†1</sup> : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.

### 3.7 LU Unification

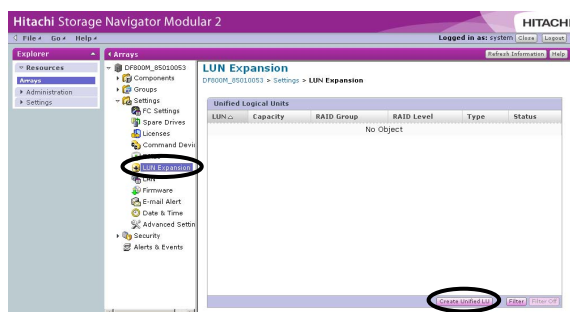
This is used to add, delete or refer to the unified LU.

NOTE : Since you will be unable to use the logical unit specified as the sub logical unit after unifying the LU, fully confirm it.

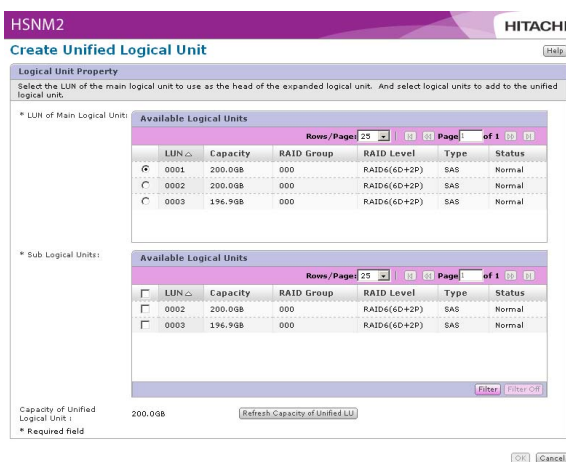
- Hitachi Storage Navigator Modular 2 Version is less than 5.00

[Create Unified LU]

- (1) Select [Settings] - [LUN Expansion], and click the [Create Unified LU] button displayed at the lower right of the window.



- (2) Select the LUN of the main logical unit from the list of the available logical units.



- (3) Select the sub logical unit from the list of the available logical units (you can select the maximum of 127 sub logical units for the main logical unit. In the example, one sub logical unit is specified).

**HSNM2** **HITACHI**

**Create Unified Logical Unit**

**Logical Unit Property**  
Select the LUN of the main logical unit to use as the head of the expanded logical unit. And select logical units to add to the unified logical unit.

\* LUN of Main Logical Unit:

LUN	Capacity	RAID Group	RAID Level	Type	Status
0001	200.0GB	000	RAID6(6D+2P)	SAS	Normal
0002	200.0GB	000	RAID6(6D+2P)	SAS	Normal
0003	196.9GB	000	RAID6(6D+2P)	SAS	Normal

\* Sub Logical Units:

LUN	Capacity	RAID Group	RAID Level	Type	Status
0002	200.0GB	000	RAID6(6D+2P)	SAS	Normal
0003	196.9GB	000	RAID6(6D+2P)	SAS	Normal

Capacity of Unified Logical Unit : 200.0GB [Refresh Capacity of Unified LU](#)

\* Required field

[OK](#) [Cancel](#)

- (4) To check the capacity after the LU unification, click the [Refresh Capacity of Unified LU] button displayed at the bottom of the window. After checking it, click the [OK] button displayed at the lower right of the window.

**HSNM2** **HITACHI**

**Create Unified Logical Unit**

**Logical Unit Property**  
Select the LUN of the main logical unit to use as the head of the expanded logical unit. And select logical units to add to the unified logical unit.

\* LUN of Main Logical Unit:

LUN	Capacity	RAID Group	RAID Level	Type	Status
0001	200.0GB	000	RAID6(6D+2P)	SAS	Normal
0002	200.0GB	000	RAID6(6D+2P)	SAS	Normal
0003	196.9GB	000	RAID6(6D+2P)	SAS	Normal

\* Sub Logical Units:

LUN	Capacity	RAID Group	RAID Level	Type	Status
0002	200.0GB	000	RAID6(6D+2P)	SAS	Normal
0003	196.9GB	000	RAID6(6D+2P)	SAS	Normal

Capacity of Unified Logical Unit : 396.9GB [Refresh Capacity of Unified LU](#)

\* Required field

[OK](#) [Cancel](#)

- (5) You will be unable to use the date of the sub logical unit after the LU unification. If you continue the work, check the checkbox, and click the [Confirm] button displayed at the lower right of the window.

**HSNM2** **HITACHI**

**Create Unified Logical Unit**

**Are you sure you want to add the logical units?**

If the RAID level or the HGU combination of the unified logical units does not match, the performance may be degraded. And the existing user data in the additional logical units will be destroyed.

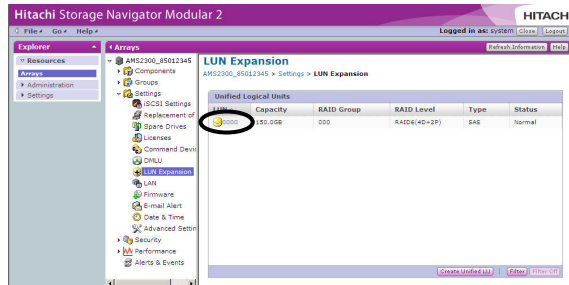
☐ Yes, I have read the above warning and agree to add the logical units.

[Confirm](#) [Cancel](#)

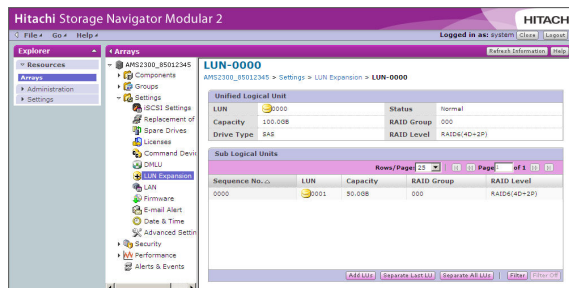
- (6) The LU unification is completed. Click the [Close] button displayed at the lower right of the window.



- (7) Check that the LUN Expansion is done.  
Select the expanded LUN in the LUN Expansion window.

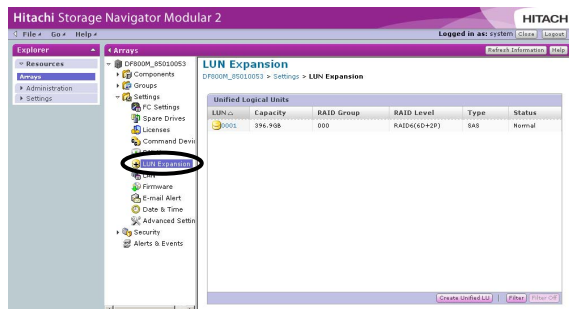


- (8) Check that the expanded LUN is displayed in the Sub Logical Units.

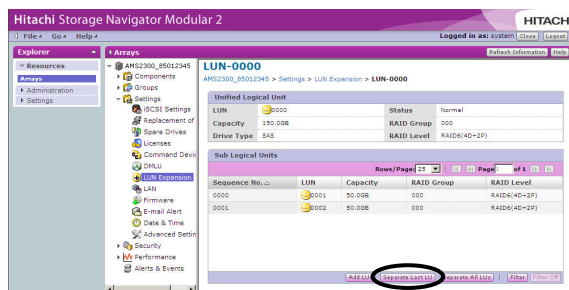


[Separate Unified LU - Separate Last Logical Unit Only]

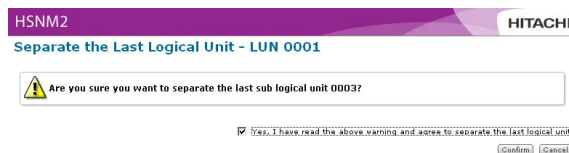
- (1) Select [Settings] - [LUN Expansion] in the unit window, and select the LU from the list of the unified LUs.



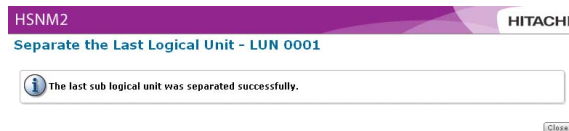
- (2) Click the [Separate Last LU] displayed at the lower right of the window.



- (3) If you continue the work, check the checkbox, and click the [Confirm] button displayed at the lower right of the window.

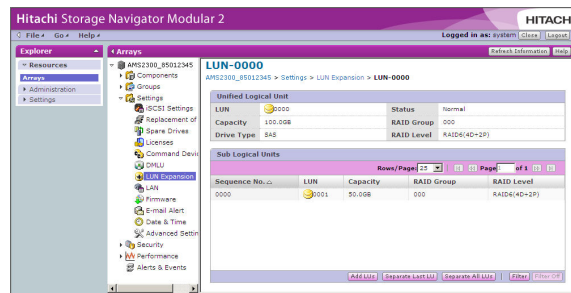


- (4) The unified LU separate is completed. Click the [Close] button displayed at the lower right of the window.



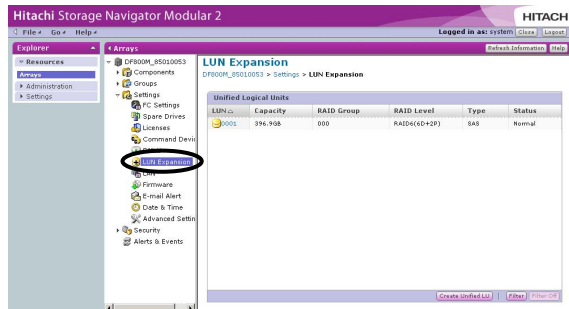


(5) Check that the released LUN is not displayed in the Sub Logical Units.

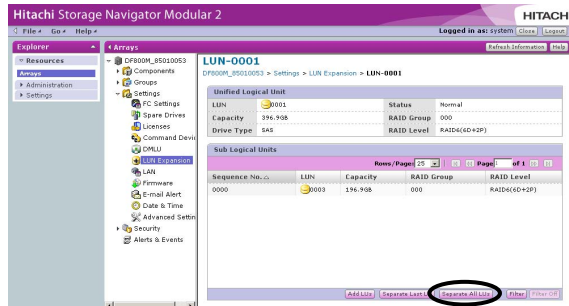


[Separate Unified LU - Separate All Logical Units]

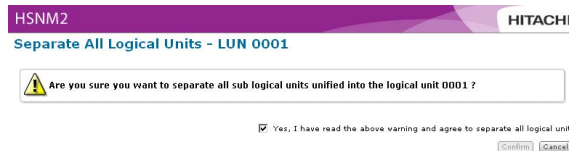
- (1) Select [Settings] - [LUN Expansion] in the unit window, and select the LU from the list of the unified LUs.



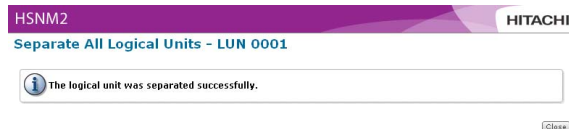
- (2) Click the [Separate All LUs] displayed at the lower right of the window.



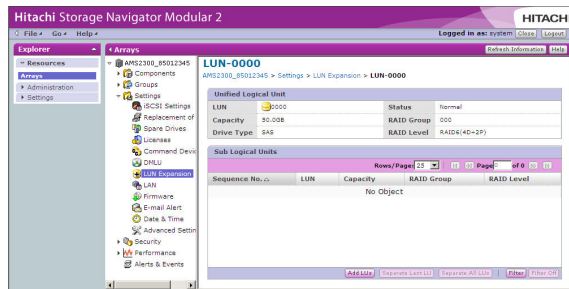
- (3) If you continue the work, check the checkbox, and click the [Confirm] button displayed at the lower right of the window.



- (4) The unified LU separate is completed. Click the [Close] button displayed at the lower right of the window.



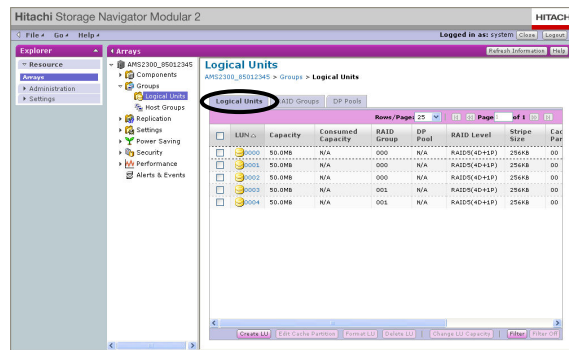
(5) Check that the LUN is not displayed in the Sub Logical Units.



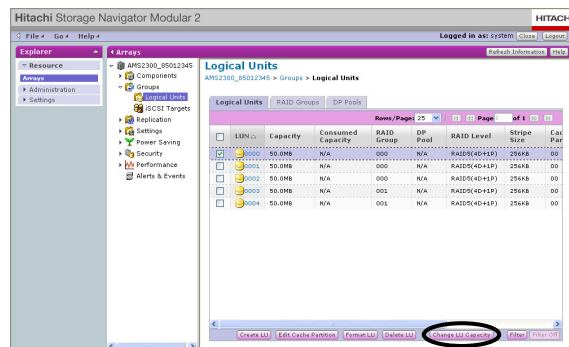
- Hitachi Storage Navigator Modular 2 Version is 5.00 or more

### [Create Unified LU]

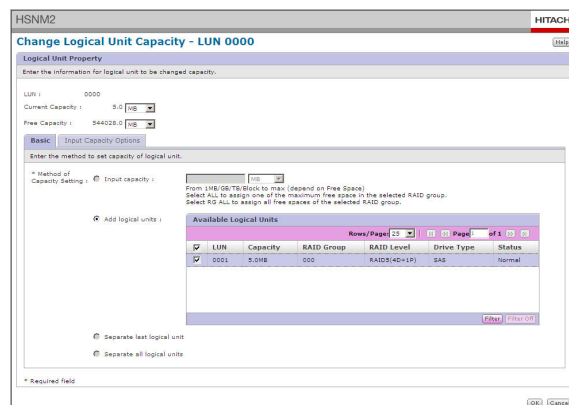
- (1) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [Logical Units] tab.



- (2) Check the LU to be a source of the unification, and click the [Change LU Capacity] button in the lower right of the window.



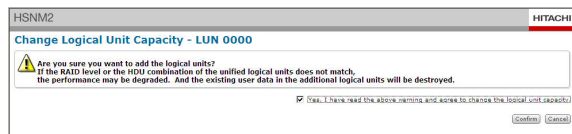
- (3) The “Change Logical Unit Capacity” window is displayed. Click the [Basic] tab.
- (4) Check [Add logical units] of the Method of Capacity Setting, and check the LU to be unified from “Available Logical Units”.



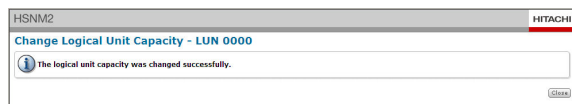
- (5) Click the [OK] button.

<sup>†1</sup> : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.

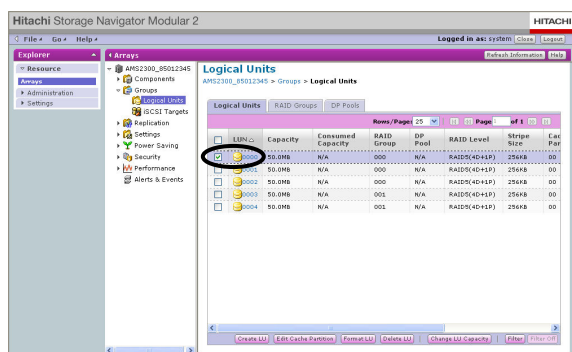
- (6) The confirmation message is displayed. For adding logical units, check the checkbox, and click the [Confirm] button displayed in the lower right of the window.



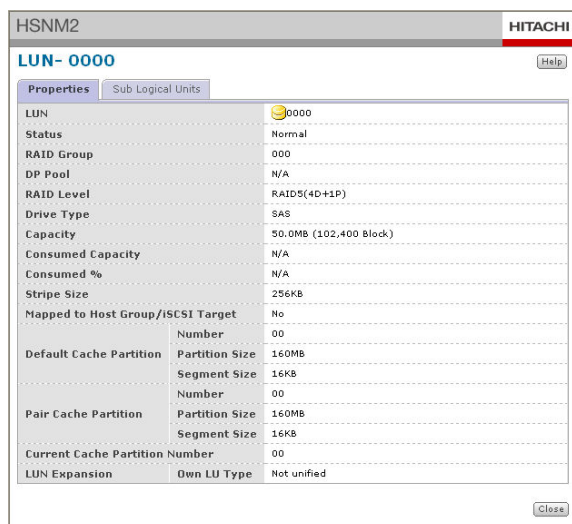
- (7) The capacity change is completed. Click the [Close] button displayed in the lower right of the window.



- (8) Check that the LUN Expansion is done. Select the expanded LUN in the RAID Group window.



- (9) The LUN window is displayed. Click the [Sub Logical Units] tab.



(10) Check that the expanded LUN is displayed.

HSNM2

HITACHI

LUN- 0000

Properties

Sub Logical Units

Rows/Page

25

14

45

Page

1

of 1

33

31

Sequence No.	LUN	Capacity	RAID Group	RAID Level
0000	0001	50.0GB	000	RAID6(4D+2P)

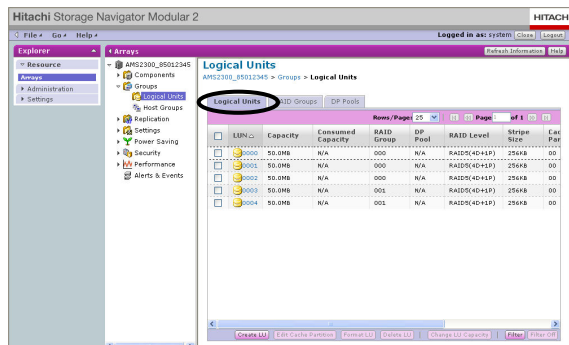
Filter

Filter Off

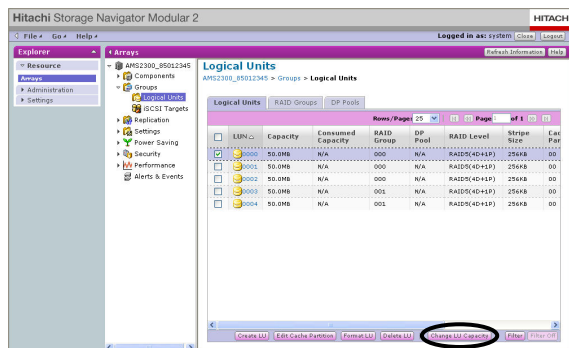
Close

[Separate Unified LU - Separate Last Logical Unit Only]

- (1) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [Logical Units] tab.

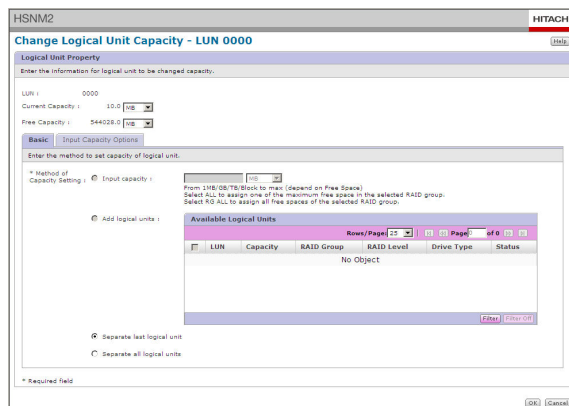


- (2) Check the LU that you want to release the unification, and click the [Change LU Capacity] button in the lower right of the window.



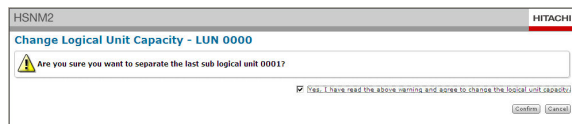
- (3) The “Change Logical Unit Capacity” window is displayed. Click the [Basic] tab.

- (4) Check [Separate last logical unit] of the capacity setting method, and click the [OK] button.



<sup>†1</sup> : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.

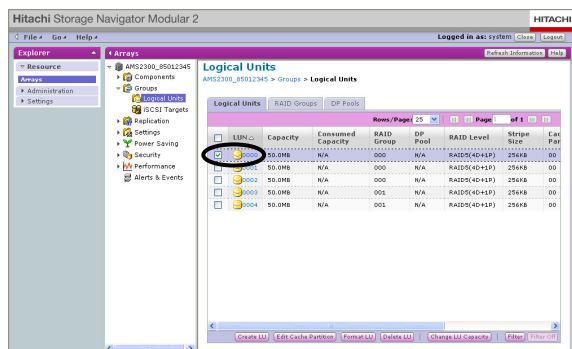
- (5) The confirmation message is displayed. For releasing the logical unit, check the checkbox, and click the [Confirm] button displayed in the lower right of the window.



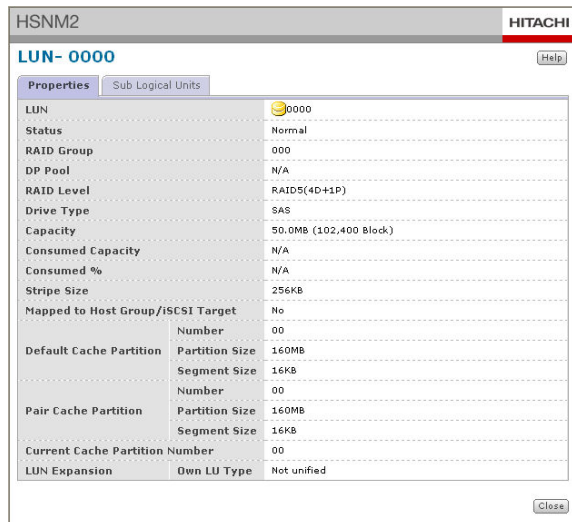
- (6) The capacity change is completed. Click the [Close] button displayed in the lower right of the window.



- (7) Check that the LU is released. Select the released LUN in the RAID Group window.

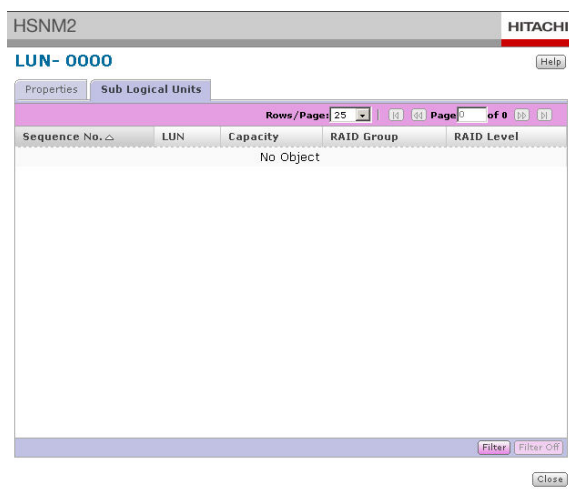


- (8) The LUN window is displayed. Click the [Sub Logical Units] tab.



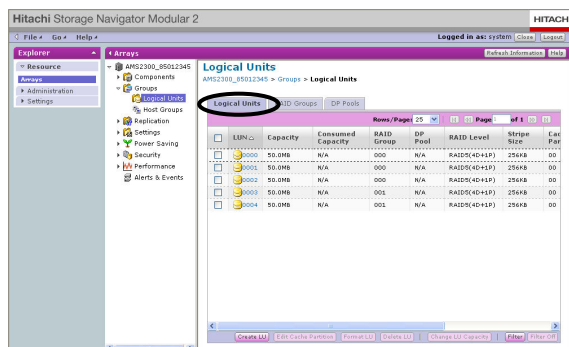


(9) Check that the released LUN is not displayed.

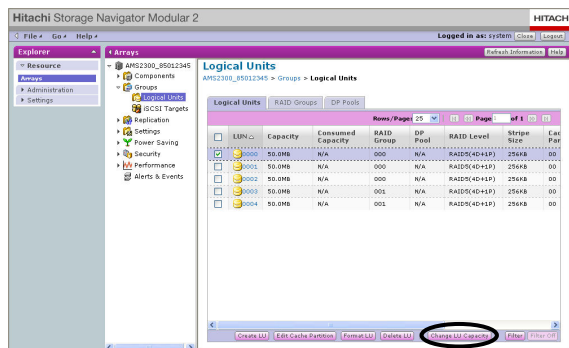


[Separate Unified LU - Separate All Logical Units]

- (1) Select [Groups] - [Logical Unit] (or [RAID Groups]<sup>†1</sup>) on the unit window, and click the [Logical Units] tab.

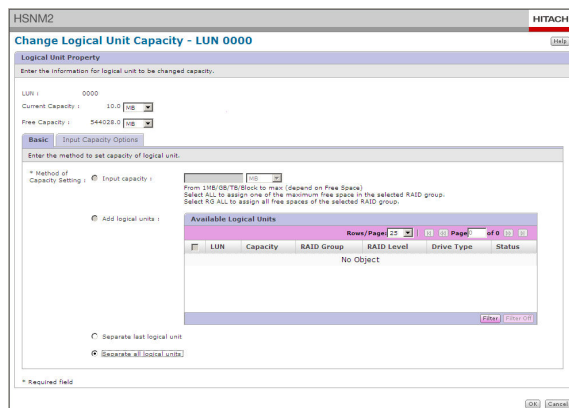


- (2) Check the LU that you want to release the unification, and click the [Change LU Capacity] button in the lower right of the window.



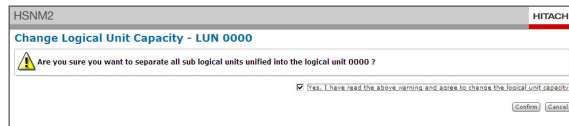
- (3) The “Change Logical Unit Capacity” window is displayed. Click the [Basic] tab.

- (4) Check [Separate all logical units] of the capacity setting method, and click the [OK] button.



†1 : When the Hitachi Storage Navigator Modular 2 is less than Ver.7.00.

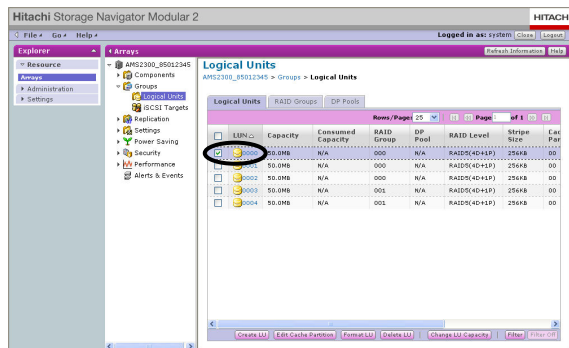
- (5) The confirmation message is displayed. For releasing all the logical units, check the checkbox, and click the [Confirm] button displayed in the lower right of the window.



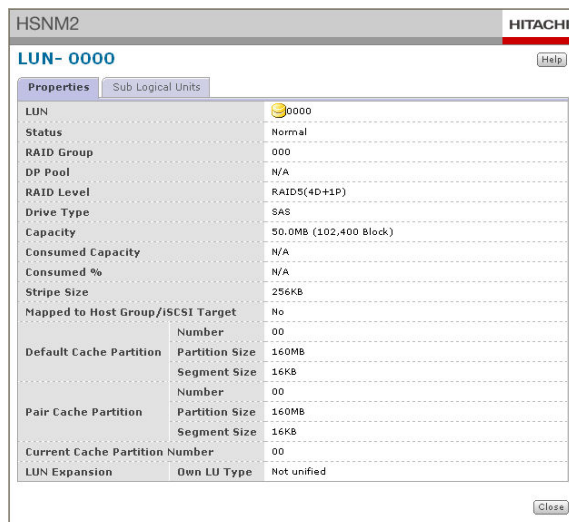
- (6) The capacity change is completed. Click the [Close] button displayed in the lower right of the window.



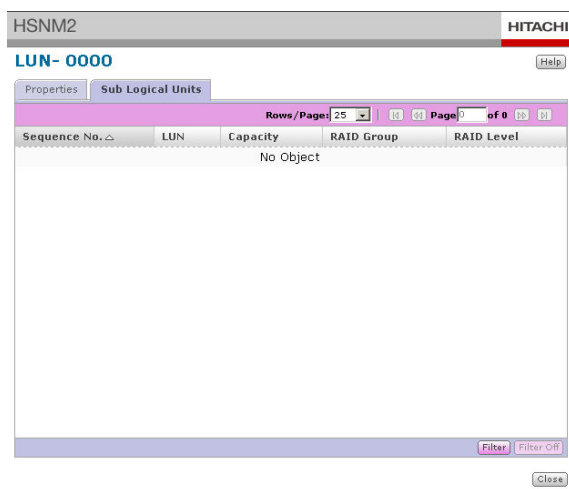
- (7) Check that the LU is released. Select the released LUN in the RAID Group window.



- (8) The LUN window is displayed. Click the [Sub Logical Units] tab.



(9) Check that the released LUN is not displayed.



## Chapter 4. Setting Configuration Information

### 4.1 Before Setting Configuration Information

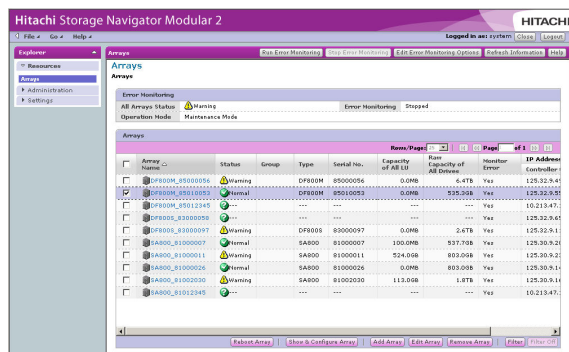
NOTE : If the setting is changed while an I/O is being executed, the I/O may be abnormally stopped or the succeeding I/O may be unable to be executed. Therefore, change the setting after stopping the I/O.

Besides, the setting on the host computer side must be changed depending on the host computer.

Operation as described below.

- (1) Turn on the power supply.
- (2) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

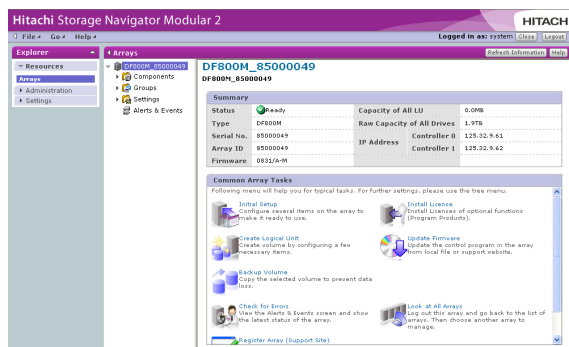
Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

(3) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



## 4.2 Configuration Settings

The setting of the configuration information has the other functions as shown below.

- The name of the configuration setting shows indication of a tag in the “Parameter” window.
- The setting entered is validated when the [Apply] button at lower right part of the “Parameter” window is clicked.
- The setting of each parameter of the “Port Option”, “Fibre Option” and “iSCSI” must be made for each port (each of Port 0A, 0B, 1A, and 1B).

**Table 4.2.1 The Menu Items of Setting Parameter**

No.	Menu item	Use	Contents	Factory setting	Reference page
1	Boot Options	Sets parameters necessary for the reboot of the subsystem.	① Setting the system start attributes	Depending on the configuration at shipment	“(1) Setting Boot Options” (SYSPR 04-0050)
			② Setting the Delay Planned Shutdown	0 minute	
			③ Setting the Vender ID	HITACHI	
			④ Setting the Product ID	DF600F	
			⑤ Setting the ROM Firmware Version	Not set	
			⑥ Setting the RAM Firmware Version	Not set	
2	System Parameter	To be used to set the system parameters.	① Selection of system parameters	—	“(2) Setting of System Parameter” (SYSPR 04-0090)
			② Setting of an action against a processor failure	Reset of occurred.	
			③ Web title	—	
			④ Setting of the mode for executing the Write and Verify	OFF	
3	LAN(*2)	Reference to and setting of the LAN configuration information.	① Maintenance Port IP Address Automatic Change Mode	Disable	“(3) Setting of LAN” (SYSPR 04-0120)
			② Reference to and/or setting of enable(*1) or disable of the DHCP mode.	OFF	
			③ Reference to and setting of IP Address.	192.168.0.16	
			④ Reference to and setting of SUB NET MASK.	255.255.255.0	
			⑤ Reference to and setting of Default Gateway.	0.0.0.0	
			⑥ Reference to and setting of Negotiation.	Auto	
			⑦ Reference to the Ether Address.	—	
			⑧ Result	—	

\*1 : When DHCP mode is valid, IP address is obtained from the DHCP server.

When the DHCP server has not started up or DHCP function has been miss-set, obtaining the IP address fails and the device IP address remains to be “0.0.0.0”. (Hitachi Storage Navigator Modular 2 or WEB cannot be used via LAN.) In this case, the device IP address can be obtained by starting up the DHCP server or setting DHCP function correctly if necessary.

When the IP address of this subsystem is acquired using the DHCP function with the configuration which uses this subsystem as an external Disk Drive of the DHCP server, if the network address of the reserved IP address for the maintenance port is assigned as an IP address, the IP addresses of the ports for user control and maintenance) compete, and they cannot be operated normally. In this case, request the system administrator not to assign “10.0.0.x,” “192.168.0.x,” “192.168.233.x” “172.23.211.x,” or “10.197.181.x” to the DHCP server as an IP address.

\*2 : This item is deleted from [Configuration Setting] of the applet window in Ver.4.00 or more of Hitachi Storage Navigator Modular 2.

No.	Menu item	Use	Contents	Factory setting	Reference page
4	Maintenance LAN <sup>(*)2</sup>	Refer to/set the maintenance port IP address.	① Reference to and setting of IP Address.	Control Unit #0: 10.0.0.16 Control Unit #1: 10.0.0.17	"(4) Setting of Maintenance LAN" (SYSPR 04-0160)"
5	Port Options <sup>(*)7</sup>	Set the port options of a controller	① Reference/setting of the port option for each port	—	"(5) Setting of Port Options" (SYSPR 04-0190)
6	Restore Options	Refers to and/or sets an option of drive restoration.	① Reference to and/or setting of the mode for Drive Restoration Mode.	Interleave (Normal)	"(6) Setting of Restore Options" (SYSPR 04-0220)
			② Reference to and/or setting of the occasion for Drive Restoration.	Automatic	
			③ Setting of the interval time.	(*)1	
			④ Setting of the processing unit size.	(*)1	
			⑤ Reference to and setting of Dynamic Sparing.	Execute (Read& Online Verify mode)	
			⑥ Reference to and setting of Spare Drive Operation Mode.	Variable	
7	Online Verify	Refers to and/or sets validity/invalidity of online verify, execution/skip (disregard) of verify test, or execution/inexecution of the cache verify.	① Refers to and/or sets validity or invalidity of online verify.	Yes (Execute mode)	"(7) Setting of Online Verify" (SYSPR 04-0260)
			② Reference/setting of skip verify. <sup>(*)4</sup>	ON	
			③ Reference/setting of cache verify. <sup>(*)5</sup>	ON	
8	Constitute <sup>(*)7</sup>	Writes system parameters and configuration information such as the RG/LU onto (a) file(s) or reads them from (a) file(s).	① Output of system parameters and configuration information to (a) file(s).	—	"(8) Setting of Constitute" (SYSPR 04-0280)
			② Input of system parameters and configuration information to (a) file(s).		
9	Format Mode	Setting of Format mode.	① Reference to and setting Format Mode.	Normal	"(9) Setting of Format Mode" (SYSPR 04-0310)
			② Reference to and setting Format Data.	0 <sup>(*)6</sup>	
10	SNMP <sup>(*)3</sup>	Writes SNMP information onto (a) file(s) or reads them from (a) file(s).	① Output of SNMP information to (a) file(s).	—	"(10) Setting of SNMP" (SYSPR 04-0350)
			② Input of SNMP information to (a) file(s).		
11	LAN Port Number <sup>(*)2</sup>	Do the setting of the LAN Port Number on the subsystem side.	① Setting of the LAN Port Number on the subsystem side	2000	"(11) Setting of LAN Port Number" (SYSPR 04-0370)

\*1 : Interval time : 0 (× 10 ms)

Recoverable data size : 1 (× 128 block)

\*2 : This item is deleted from [Configuration Setting] of the applet window in Ver.4.00 or more of Hitachi Storage Navigator Modular 2.

\*3 : This item is deleted from [Configuration Setting] of the applet window.

\*4 : This name is displayed as "Skip Online Verify" in the Ver.7.20 or more of Hitachi Storage Navigator Modular 2.

\*5 : This can be referred to/set in the Ver.7.20 or more of Hitachi Storage Navigator Modular 2 and the firmware version 0872 or more.

\*6 : The factory setting for the firmware less than 0880A is "Default".

\*7 : This item is deleted from [Configuration Setting] of the applet window in Ver.9.70 or more of Hitachi Storage Navigator Modular 2.



No.	Menu item	Use	Contents	Factory setting	Reference page
12	iSNS <sup>(*)</sup> ( <sup>(*)</sup> 2)	Do the reference to/setting of the iSNS.	① Specify whether to use iSNS Server or not	—	<a href="#">“(12) Setting the iSNS Server Information” (SYSPR 04-0580)</a>
13	Ping <sup>(*)</sup>	Reference to and setting of information regarding the Ping.	① Select the port to be sending ping ② Specify the IP Address of the initiator	—	<a href="#">“(13) Sending Ping” (SYSPR 04-0600)</a>

\*1 : When the iSCSI Interface Board is not installed in the Control Unit, this tab is not displayed.

\*2 : This item is deleted from [Configuration Setting] of the applet window.

## (1) Setting Boot Options

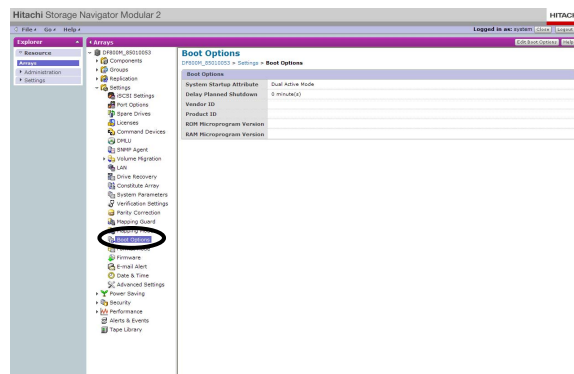
When any of the Boot Options is changed, the subsystem becomes unable to receive access from a host computer until the reboot is completed. Reset the Boot Options after making sure that access from the host computer has been stopped.

NOTE : Do not perform setting Boot Options while the READY LED (green) on the front of the Basic Chassis lights up is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

- (1-1) When the Hitachi Storage Navigator Modular 2 is version 11.0/A or more ... [SYSPR 04-0050](#)
- (1-2) When the Hitachi Storage Navigator Modular 2 is less than version 11.0/A ... [SYSPR 04-0080](#)

## (1-1) When the Hitachi Storage Navigator Modular 2 is version 11.0/A or more

(a) Select the [Settings] - [Boot Options], and click the [Edit Boot Options] button.



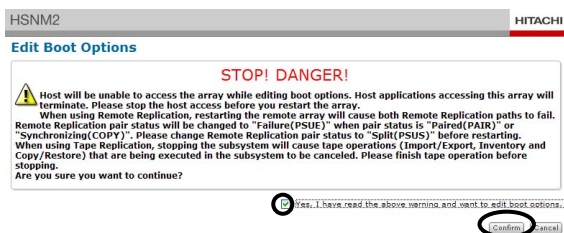
(b) An “Edit Boot Options” window is displayed.

Set the Boot Options.

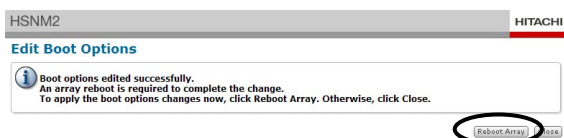
No	Parameter name	Construction	Kind of parameter		Default setting
1	System Startup Attribute	Specifies the System Startup Attribute.	Single Mode	Made in the case of the single Control Unit configuration.	Depending on the configuration at shipment
			Dual Active Mode	Made in the case of the dual Control Unit configuration.	
2	Delay Planned Shutdown	Specifies the Delay Planned Shutdown.	0 to 60 minutes	Specifies the delay time until the start of the deliberate shutdown by the minute.	0 minute
3	Vender ID	Specifies the Vender ID	8 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 8th to 15th bytes of the Standard Inquiry. Normally, no change from the default value, "HITACHI", is required.	HITACHI
4	Product ID	Specifies the Product ID	16 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 16th to 31st bytes of the Standard Inquiry. Normally, no change from the default value, "DF600F", is required.	DF600F
5	ROM Microprogram Version	Specifies the ROM Firmware Version	2 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 32nd to 35th bytes of the Standard Inquiry. Normally, no change from the default value, "Not set", is required.	Not set
6	RAM Microprogram Version	Specifies the RAM Firmware Version	2 or less half size alphabetic characters and/ or numerals.		

(c) Verify that the settings that have been made are correct and click the [OK] button.  
When the [Cancel] button is clicked, the change is canceled.

(d) The former setting is valid until the subsystem is restarted.  
When the subsystem is restarted, it does not accept accesses from a host computer until the restarting is completed. So, after making sure that access from a host computer has ceased, check the checkbox, and then click the [Confirm] button.

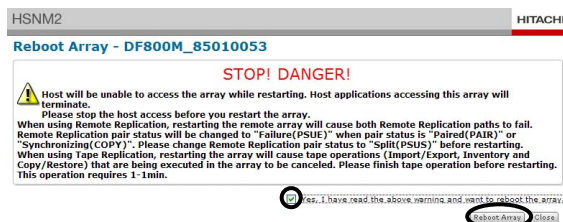


(e) The confirmation of the Boot Options edit is displayed. Click the [Reboot Array] button.



(f) A “Reboot Array” window is displayed.

After confirming the message, check the checkbox, and then click the [Reboot Array] button.

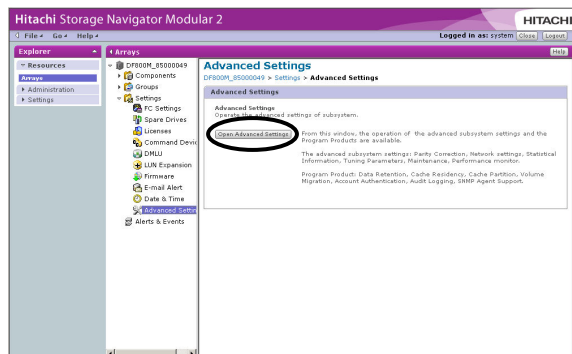


(g) A message appears, stating that the restart is successful. Click the [Close] button.

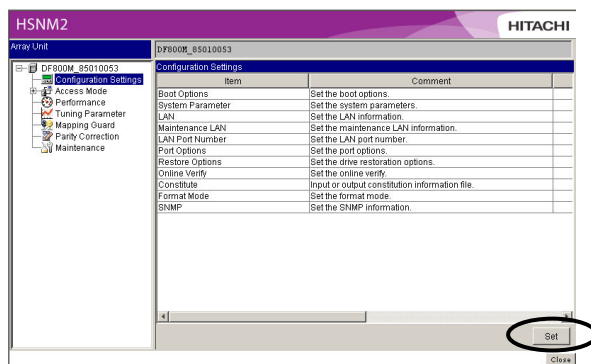


(1-2) When the Hitachi Storage Navigator Modular 2 is less than version 11.0/A

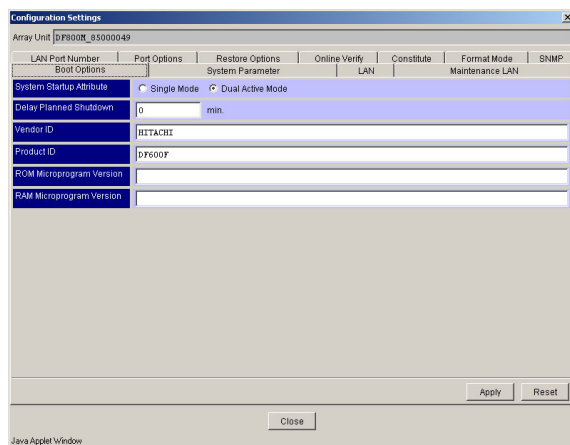
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



- (c) Click the [Boot Options] tab. A window for setting the boot options is displayed in the parameter window.



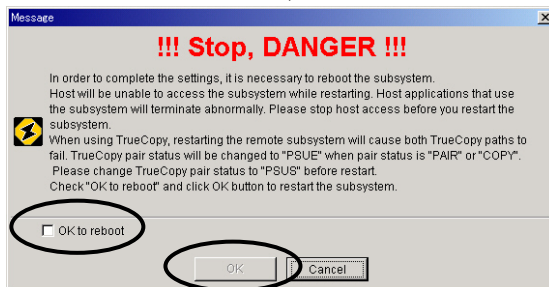
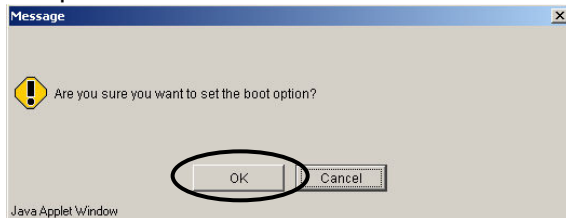
No	Parameter name	Construction	Kind of parameter		Default setting
1	System start attributes	Specifies the system start attributes.	Single mode	Made in the case of the single Control Unit configuration.	Depending on the configuration at shipment
			Dual Active mode	Made in the case of the dual Control Unit configuration.	
2	Delay Planned Shutdown	Specifies the delay time until the start of the deliberate shutdown by the minute.	0 to 60 minutes	Specifies the delay time until the start of the deliberate shutdown by the minute.	0 minute
3	Vender ID	Specifies the Vender ID	8 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 8th to 15th bytes of the Standard Inquiry. Normally, no change from the default value, "HITACHI", is required.	HITACHI
4	Product ID	Specifies the Product ID	16 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 16th to 31st bytes of the Standard Inquiry. Normally, no change from the default value, "DF600F", is required.	DF600F
5	ROM Microprogram Version	Specifies the ROM Firmware Version	2 or less half size alphabetic characters and/ or numerals.	The value that has been set is reported at 32nd to 35th bytes of the Standard Inquiry. Normally, no change from the default value, "Not set", is required.	Not set
6	RAM Microprogram Version	Specifies the RAM Firmware Version	2 or less half size alphabetic characters and/ or numerals.		

- (d) Verify that the changes that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled.

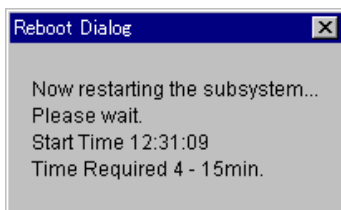
- (e) The confirmation window is display.

The former setting is valid until the subsystem is restarted.

When the subsystem is restarted, it does not accept accesses from a host computer until the restarting is completed. So, restart the subsystem after making sure that access from a host computer has ceased.

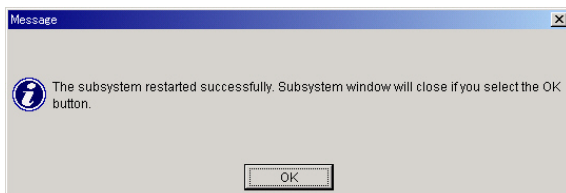


- (f) When you choose to restart the subsystem, the time the restart began is displayed. This usually takes approximately four to fifteen minutes. (about five to fifteen minutes in case of the RKH)



NOTE : It may take time for the subsystem to respond, depending on the condition of the subsystem. If it does not respond after 15 minutes or more, check the condition of the subsystem.

- (g) A message appears, stating that the restart is successful. Click the [OK] button.



- (h) The following message is displayed. Click the [Close] button.

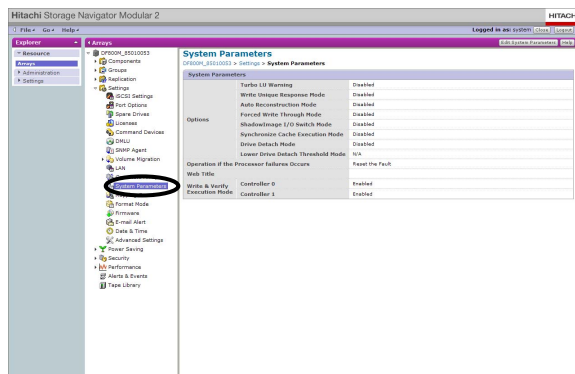
Please close this browser, then back to the subsystems window.

## (2) Setting of System Parameter

- (2-1) When the Hitachi Storage Navigator Modular 2 is Ver.10.0/A or more · [SYSPR 04-0090](#)
- (2-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.10.0/A · [SYSPR 04-0100](#)

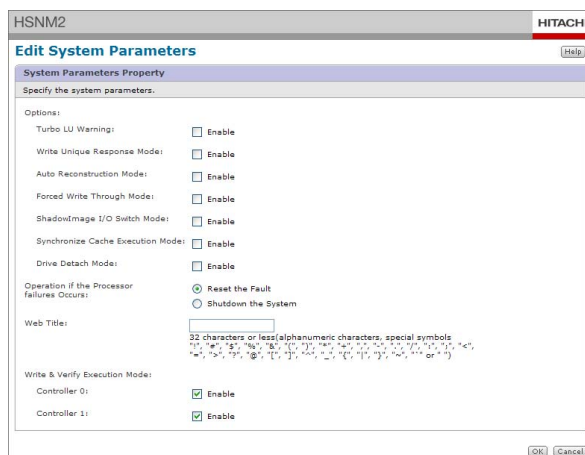
## (2-1) When the Hitachi Storage Navigator Modular 2 version is Ver.10.0/A or more

- (a) Select [Settings] - [System Parameters], and click the [Edit System Parameters] button.



## (b) The “Edit System Parameters” window is displayed.

Make the setting of the system parameters.



No.	Parameter name	Construction	Kind of parameter		Default setting
1	Option Turbo LUN Warning	This parameter is to be specified when the Turbo LU setting function is used.	Disable (Not checked)	When the write operation is received within the PIN range, the write command is executed in the Write-Through mode (*1).	Disable
			Enable (Checked)	Even if the write operation is received within the PIN range, the write-after processing (*2) is performed when the write command is received.	

\*1 : Write-Through is an operation responding to a host computer after writing write data to disk drives when the subsystem receives the write data from the host computer. Therefore, the response time of the command to the host computer delays when the subsystem executes the Write-Through.

\*2 : Write-after is an operation to return the completion report to the host computer at the time of completing data write to a Cache memory once the subsystem receives the write data from the host computer.



No.	Parameter name	Construction	Kind of parameter		Default setting
2	Write Unique Response Mode	This parameter is to be specified when a host of the NX series is connected.	Disable (Not checked)	The write-after processing (*2) is performed at the time of write command receipt.	Disable
			Enable (Checked)	The write command is unconditionally returned to the host computer after parity creation. (However, the write command for the LUs of RAID 1 and RAID 1+0 are excluded.)	
3	Auto Reconstruction Mode	This parameter specifies operations to be performed when a disk drive is pulled out.	Disable (Not checked)	Even when a disk drive is pulled out, the correction copy to a spare disk drive is not performed.	Disable
			Enable (Checked)	When a disk drive is pulled out, the correction copy to a spare disk drive is performed.	
4	Forced Write Through Mode	This parameter specifies the way to execute the write command to be used after the CTL detachment or a power failure occurs.	Disable (Not checked)	Even if the CTL detachment or a power failure has occurred, the write-after processing (*2) is performed when the write command is received.	Disable
			Enable (Checked)	When the CTL detachment or a power failure has occurred, the write command is executed in the Write-Through mode. (*1)	
5	ShadowImage I/O Switch Mode	This parameter specifies an operation of a ShadowImage in-system replication P-VOL to be performed when a disk drive double failure occurs.	Disable (Not checked)	When a double failure occurs in disk drives of a P-VOL in the PAIR status of ShadowImage in-system replication, the status is changed to PSUE.	Disable
			Enable (Checked)	When a double failure occurs in disk drives of a P-VOL in the PAIR status of ShadowImage in-system replication, the executor of the host I/O is switched to an S-VOL to continue the execution.	
6	Synchronize Cache Execution Mode	This parameter specifies an operation to be performed when the Synchronize Cache command is received.	Disable (Not checked)	No operation is performed when the Synchronize Cache command is received.	Disable
			Enable (Checked)	When the Synchronize Cache command is received, the whole data in the cache memory is written to disk drives.	
7	Drive Detach Mode	Specifies an operation to be performed when a drive failure occurs in the same RAID group.	Disable (Not checked)	When a failure occurs in the second(third) Disk Drive in the same RAID Group while one Disk Drive of RAID 1/1+0/5 (or two Disk Drives of RAID 6) is blocked due to a failure, do not make the second(third) Disk Drive blocked.	Disable
			Enable (Checked)	When a failure occurs in the second(third) Disk Drive in the same RAID Group while one Disk Drive of RAID 1/1+0/5 (or two Disk Drives or RAID 6) is blocked due to a failure, block the second(third) Disk Drive and make the LUs in the RAID Group concerned blocked (unformatted status).	
8	Lower Drive Detach Threshold Mode	Drive can be blocked early by lowering each error threshold which controls a drive blockage.	Disable (Not checked)	Drive is blocked not by lowering each error threshold which controls a drive blockage but by default threshold.	Disable
			Enable (Checked)	Drive is blocked by lowering each error threshold which controls a drive blockage.	

\*1 : Write-Through is an operation responding to a host computer after writing write data to disk drives when the subsystem receives the write data from the host computer. Therefore, the response time of the command to the host computer delays when the subsystem executes the Write-Through.

\*2 : Write-after is an operation to return the completion report to the host computer at the time of completing data write to a Cache memory once the subsystem receives the write data from the host computer.

No.	Parameter name		Construction	Kind of parameter		Default setting
9	Operation if the processor failure occurs		This parameter specifies an operation to be performed when a processor failure occurs.	Reset of occurred	The parameter resets the failure and reboots the Control Unit. (If the power supply is not turned off after the first reboot, the Control Unit is blocked when the processor failure occurs at the second time.)	Reset of occurred
				System down	The parameter blocks the Control Unit where the failure occurred.	
10	WEB Title		In the case where the Web function that is built in the disk array system is displayed with the browser, this parameter specifies characters to be displayed on the title bar of the browser.	32 or less alphanumeric characters and special symbols	Characters to be entered are alphanumeric characters, and following special symbols ("!", "#", "\$", "%", "&", "(", ")", "*", "+", " ", "-", ".", "/", ":", ";", "<", "=", ">", "?", "@", "[", "]", "^", "_", "{", " ", "}", "~", "'", and space).	Not set
11	Write & Verify Execution Mode	Controller 0	This parameter specifies an execution mode for write and verify operation for the Control Unit #0 or Control Unit #1.	Disable (Not checked)	Only the write operation is executed skipping the verify operation to the write and verify command issued by the host.	Disable
		Controller 1		Enable (Checked)	Both the write and verify operations are executed to the write and verify command issued by the host.	

(c) Check that the set contents are correct.

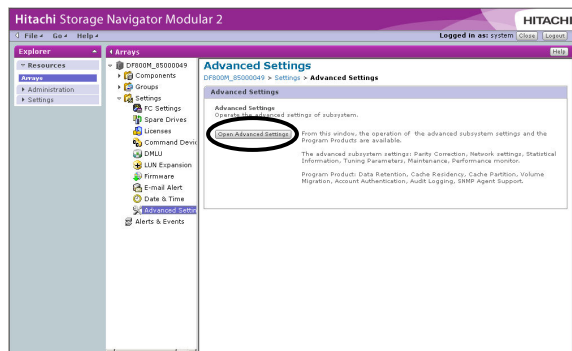
If the [Cancel] button is clicked, the change content is cancelled. Click the [OK] button to terminate the setting.

(d) The confirmation message is displayed. Click the [Close] button.

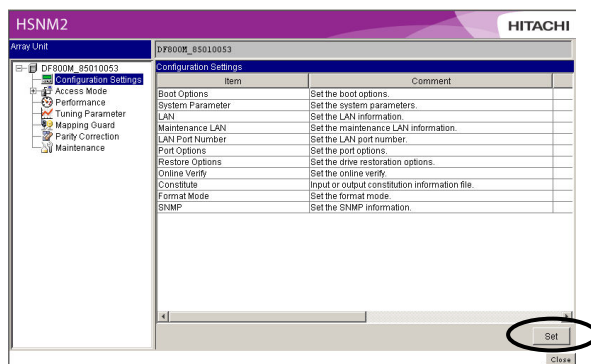


(2-2) When the Hitachi Storage Navigator Modular 2 version is less than Ver.10.0/A.

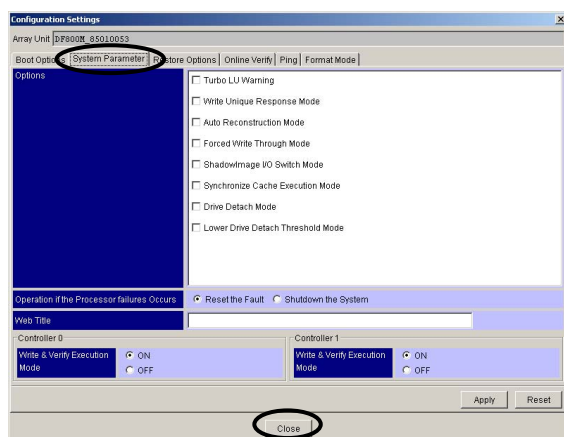
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(c) Click the [System Parameter] tab. The window for setting the “System Parameter” is displayed in the Parameter window.



No.	Parameter name		Construction	Kind of parameter		Default setting
1	Option	Turbo LUN Warning	This parameter is to be specified when the Turbo LU setting function is used.	Disable (Not checked)	When the write operation is received within the PIN range, the write command is executed in the Write-Through mode (*1).	Disable
				Enable (Checked)	Even if the write operation is received within the PIN range, the write-after processing (*2) is performed when the write command is received.	
2		Write Unique Response Mode	This parameter is to be specified when a host of the NX series is connected.	Disable (Not checked)	The write-after processing (*2) is performed at the time of write command receipt.	Disable
				Enable (Checked)	The write command is unconditionally returned to the host computer after parity creation. (However, the write command for the LUs of RAID 1 and RAID 1+0 are excluded.)	
3		Auto Reconstruction Mode	This parameter specifies operations to be performed when a disk drive is pulled out.	Disable (Not checked)	Even when a disk drive is pulled out, the correction copy to a spare disk drive is not performed.	Disable
				Enable (Checked)	When a disk drive is pulled out, the correction copy to a spare disk drive is performed.	
4		Forced Write Through Mode	This parameter specifies the way to execute the write command to be used after the CTL detachment or a power failure occurs.	Disable (Not checked)	Even if the CTL detachment or a power failure has occurred, the write-after processing (*2) is performed when the write command is received.	Disable
				Enable (Checked)	When the CTL detachment or a power failure has occurred, the write command is executed in the Write-Through mode. (*1)	
5		ShadowImage I/O Switch Mode	This parameter specifies an operation of a ShadowImage in-system replication P-VOL to be performed when a disk drive double failure occurs.	Disable (Not checked)	When a double failure occurs in disk drives of a P-VOL in the PAIR status of ShadowImage in-system replication, the status is changed to PSUE.	Disable
				Enable (Checked)	When a double failure occurs in disk drives of a P-VOL in the PAIR status of ShadowImage in-system replication, the executor of the host I/O is switched to an S-VOL to continue the execution.	
6		Synchronize Cache Execution Mode	This parameter specifies an operation to be performed when the Synchronize Cache command is received.	Disable (Not checked)	No operation is performed when the Synchronize Cache command is received.	Disable
				Enable (Checked)	When the Synchronize Cache command is received, the whole data in the cache memory is written to disk drives.	

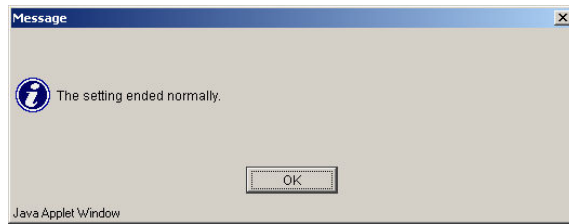
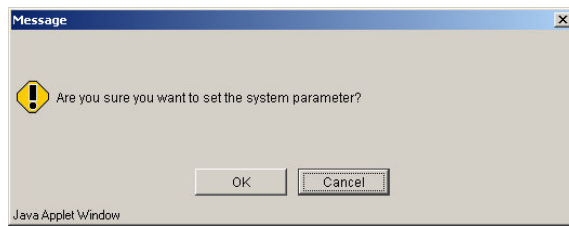
\*1 : Write-Through is an operation responding to a host computer after writing write data to disk drives when the subsystem receives the write data from the host computer. Therefore, the response time of the command to the host computer delays when the subsystem executes the Write-Through.

\*2 : Write-after is an operation to return the completion report to the host computer at the time of completing data write to a Cache memory once the subsystem receives the write data from the host computer.

No.	Parameter name	Construction	Kind of parameter		Default setting
7	Drive Detach Mode	Specifies an operation to be performed when a drive failure occurs in the same RAID group.	Disable (Not checked)	When a failure occurs in the second(third) Disk Drive in the same RAID Group while one Disk Drive of RAID 1/1+0/5 (or two Disk Drives of RAID 6) is blocked due to a failure, do not make the second(third) Disk Drive blocked.	Disable
			Enable (Checked)	When a failure occurs in the second(third) Disk Drive in the same RAID Group while one Disk Drive of RAID 1/1+0/5 (or two Disk Drives or RAID 6) is blocked due to a failure, block the second(third) Disk Drive and make the LUs in the RAID Group concerned blocked (unformatted status).	
8	Lower Drive Detach Threshold Mode	Drive can be blocked early by lowering each error threshold which controls a drive blockage.	Disable (Not checked)	Drive is blocked not by lowering each error threshold which controls a drive blockage but by default threshold.	Disable
			Enable (Checked)	Drive is blocked by lowering each error threshold which controls a drive blockage.	
9	Operation if the processor failure occurs	This parameter specifies an operation to be performed when a processor failure occurs.	Reset of occurred	The parameter resets the failure and reboots the Control Unit. (If the power supply is not turned off after the first reboot, the Control Unit is blocked when the processor failure occurs at the second time.)	Reset of occurred
			System down	The parameter blocks the Control Unit where the failure occurred.	
10	WEB Title	In the case where the Web function that is built in the disk array system is displayed with the browser, this parameter specifies characters to be displayed on the title bar of the browser.	32 or less half size alphabetic characters and/ or numerals.	Characters to be entered are half size alphabetic characters, numerals, and/or characters other than numerals (excluding ' , " , and \).	Not set
11	Write and verify mode	This parameter specifies an execution mode for write and verify operation for the Control Unit #0 or Control Unit #1.	Disable (Not checked)	Only the write operation is executed skipping the verify operation to the write and verify command issued by the host.	OFF
			Enable (Checked)	Both the write and verify operations are executed to the write and verify command issued by the host.	

(d) Check if the changes that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the settings that have been made are cancelled. To terminate the setting, click the [Close] button.

(e) The confirmation message is displayed. Click the [OK] button.



### (3) Setting of LAN

NOTE : • Do not perform setting of LAN while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

- When the TrueCopy remote replication/TrueCopy Extended Distance is enabled, and the array subsystem to be restarted is the remote disk subsystem, transit the pair status (S-VOL) of the TrueCopy remote replication/TrueCopy Extended Distance to the PSUS, and then perform the restart.

If the restart is executed, it becomes a path blockade, and the notice of E-mail Alert Function, SNMP Agent Support Function, and TRAP occur. Perform the notice and the check to the Failure Monitoring Department in advance.

The path blockade of TrueCopy remote replication/TrueCopy Extended Distance automatically recovers after restarting.

- When Power Saving of the priced option is used, if you restart the subsystem after executing the spin-down and before completing it, the spin-down may fail because of the recognition processing of the host immediately after the subsystem starts.

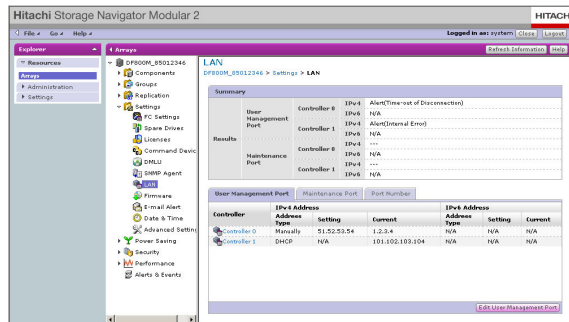
Check that there is no RAID Group whose power saving status is “Normal (command monitoring)” after executing the spin-down, and then restart the subsystem.

If the spin-down fails, execute the spin-down again.

- (3-1) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more ..... [SYSPR 04-0121](#)
- (3-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.5.00 ..... [SYSPR 04-0140](#)

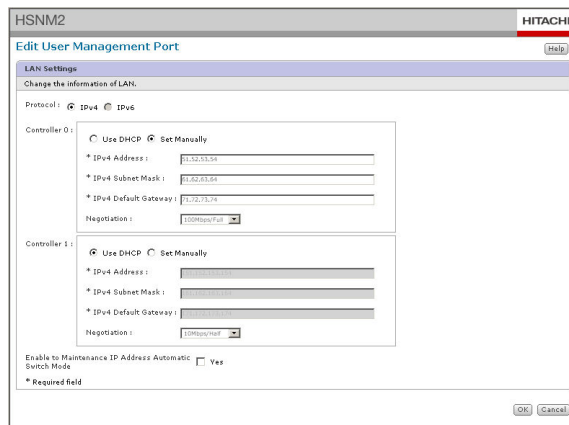
(3-1) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more

(a) Select [Settings] - [LAN], and select the [User Management Port] tab.



(b) Click the [Edit User Management Port] button.

The “LAN” setting window is displayed.



(c) Perform the setting of the LAN information.

① [Protocol] : Selects protocol.

- Go to ② when selecting IPv4 protocol.
- Go to ⑤ when selecting IPv6 protocol.

<When selecting IPv4 protocol>

② [Controller 0] : Sets the LAN parameter of Control Unit 0.

Select a setting method. If [Use DHCP] is checked, the DHCP mode is enabled.

If [Set Manually] is checked, it is specified manually.

[IPv4 Address] : The IP Address is set.

The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.

[IPv4 Subnet Mask] : Subnet Mask is set.



- [IPv4 Default Gateway] : Default Gateway is set.  
 The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway.  
 When network address of the default gateway is different from network address of IP address, the gateway address cannot be set. If no Gateway address is specified, set "0.0.0.0".
- [Negotiation] : Set the negotiation with the device connecting to the subsystem.  
 Set it to match with the device to connect.  
 You cannot set different values for IPv4 protocol and IPv6 protocol because the negotiation setting is common to the case where IPv6 protocol is used.
- ③ [Controller 1] : Sets the LAN parameter of Control Unit 1.  
 Select a setting method. If [Use DHCP] is checked, the DHCP mode is enabled.  
 If [Set Manually] is checked, it is specified manually.
- [IPv4 Address] : The IP Address is set.  
 The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.
- [IPv4 Subnet Mask] : Subnet Mask is set.
- [IPv4 Default Gateway] : Default Gateway is set.  
 The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway.  
 When network address of the default gateway is different from network address of IP address, the gateway address cannot be set. If no Gateway address is specified, set "0.0.0.0".
- [Negotiation] : Set the negotiation with the device connecting to the subsystem.  
 Set it to match with the device to connect.  
 You cannot set different values for IPv4 protocol and IPv6 protocol because the negotiation setting is common to the case where IPv6 protocol is used.
- ④ [Enable to Maintenance IP Address Automatic Switch Mode] : If the [Yes] checkbox is checked, the maintenance IP address to be switched is selected automatically.

The LAN can be set to the Control Unit which connects the LAN cable.

For the dual Control Unit, connect the LAN cable to one of the Control Units and set the LAN, and then reconnect the LAN cable to the other Control Unit and set the LAN again.

Or, when setting the information of both Control Units at the same time, set LAN after connecting the LAN cable to each Control Unit.

< When selecting IPv6 protocol >

⑤ [Controller 0] : Sets the LAN parameter of Control Unit 0.

Select a setting method. When you check [Set Automatically], the IPv6 address automatic acquisition mode is enabled.

If [Set Manually] is checked, it is specified manually.

[IPv6 Address] : The IP Address is set.

The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.

Set the IP address other than the multicast address (fe00::/8), loopback address (::1) and unset (::). Do not set the link local address (fe80::/10) because it may duplicate the link local address that the subsystem automatically generates.

[Length of Subnet Prefix] : Set the length of subnet prefix. The standard length is 64.

[IPv6 Default Gateway] : Default Gateway is set.

The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway.

When network address of the default gateway is different from network address of IP address, the gateway address cannot be set. Input is not required when the default gateway is unused.

[Negotiation] : Set the negotiation with the device connecting to the subsystem.

Set it to match with the device to connect.

You cannot set different values for IPv4 protocol and IPv6 protocol because the negotiation setting is common to the case where IPv4 protocol is used.

- ⑥ [Controller 1] : Sets the LAN parameter of Control Unit 1.

Select a setting method. When you check [Set Automatically], the IPv6 address automatic acquisition mode is enabled.

If [Set Manually] is checked, it is specified manually.

[IPv6 Address] : The IP Address is set.

The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.

Set the IP address other than the multicast address (fe00::/8), loopback address (::1) and unset (::). Do not set the link local address (fe80::/10) because it may duplicate the link local address that the subsystem automatically generates.

[Length of Subnet Prefix] : Set the length of subnet prefix. The standard length is 64.

[IPv6 Default Gateway] : Default Gateway is set.

The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway.

When network address of the default gateway is different from network address of IP address, the gateway address cannot be set. Input is not required when the default gateway is unused.

[Negotiation] : Set the negotiation with the device connecting to the subsystem. Set it to match with the device to connect.

You cannot set different values for IPv4 protocol and IPv6 protocol because the negotiation setting is common to the case where IPv4 protocol is used.

- (d) Check that the set contents are correct.

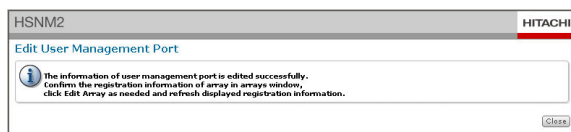
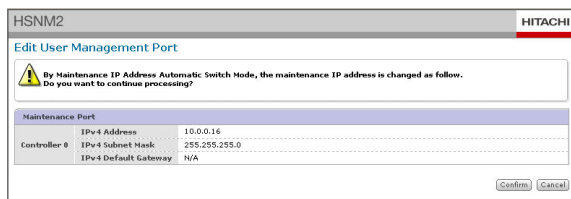
If the [Cancel] button is clicked, the change content is cancelled. Click the [OK] button to terminate the setting.

(e) Check the contents of the confirmation message window, and click the [Confirm] or [Close] button.

- When setting the [Enable to Maintenance IP Address Automatic Switch Mode] to invalid

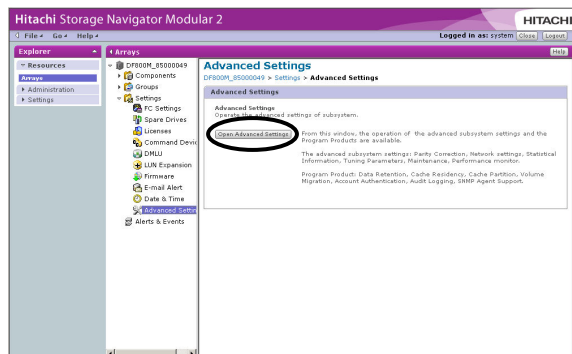


- When setting the [Enable to Maintenance IP Address Automatic Switch Mode] to valid

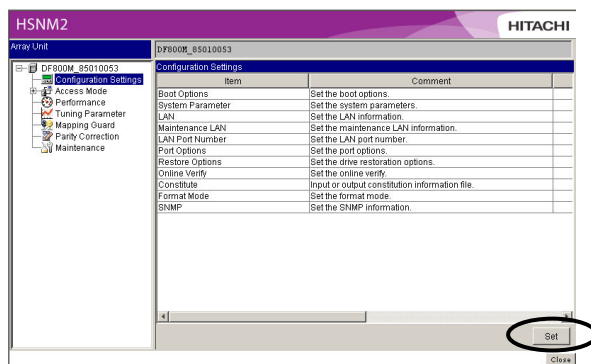


(3-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.5.00

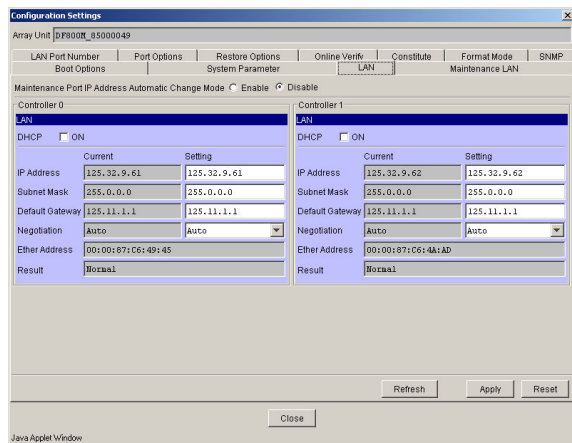
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(c) Click the [LAN] tab. The setting window of “LAN” is displayed in the Parameter window.



(d) Perform the setting of the LAN information.

① [DHCP] : The DHCP function is set.

When the checkbox is checked, the DHCP mode becomes enabled.

② [LAN] : The LAN parameter is set.

When the checkbox of [DHCP] is checked, it becomes a gray display.

[IP Address] : The IP Address is set.

The IP address in the same network address as the network address of the IP address currently specified for the port for the maintenance cannot be set.

[Subnet Mask] : Subnet Mask is set.

[Default Gateway] : Default Gateway is set.

The same IP address as the IP address currently specified for the port for the maintenance cannot be set to the default gateway. When network address of the default gateway is different from network address of IP address, the gateway address cannot be set. If no Gateway address is specified, set "0.0.0.0".

[Negotiation] : Set the negotiation with the device connecting to the subsystem. Set it to match with the device to connect.

[Ether Address] : The Ethernet address (MAC address) is displayed. It cannot be changed.

[Result] : The result of the parameter setting is displayed. It cannot be changed.

The LAN can be set to the Control Unit which connects the LAN cable.

For the dual Control Unit, connect the LAN cable to one of the Control Units and set the LAN, and then reconnect the LAN cable to the other Control Unit and set the LAN again.

Or, when setting the information of both Control Units at the same time, set LAN after connecting the LAN cable to each Control Unit.

(e) If it is checked that the changed content is correct and the [Apply] button is clicked, the confirmation message window is displayed.

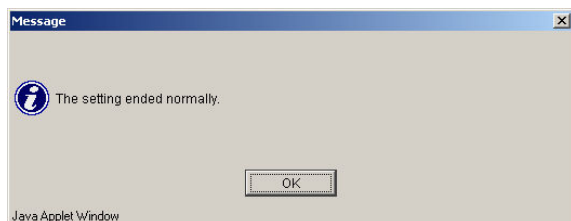
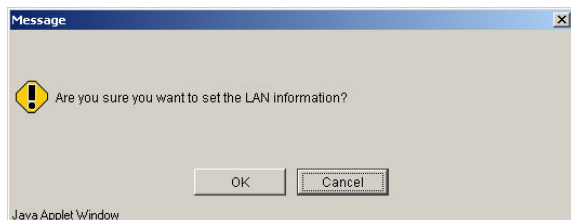
If the [Reset] button is clicked, the change content is cancelled. Click the [Close] button to terminate the setting.

NOTE : The display returns to the value before the input by clicking the [Apply] button after entering the LAN information, but the setting value is reflected by performing the restart of the subsystem.

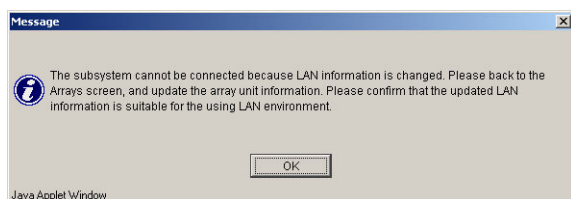
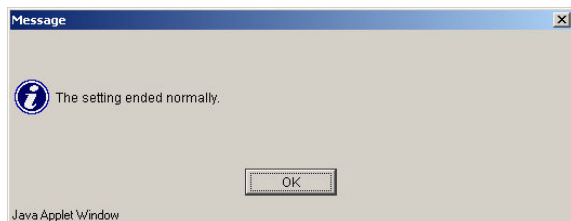
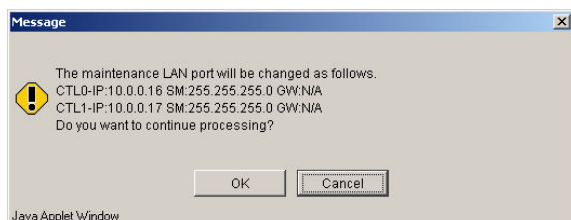
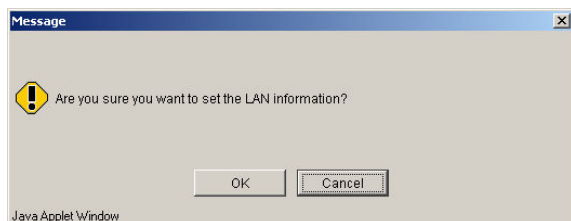
Check if the setting content is reflected correctly after restarting.

(f) Click the [OK] button of the confirmation message.

- When setting the maintenance port IP address automatic change mode to invalid



- When setting the maintenance port IP address automatic change mode to valid



(g) The following message is displayed. Click the [Close] button.

Please close this browser, then back to the subsystems window.



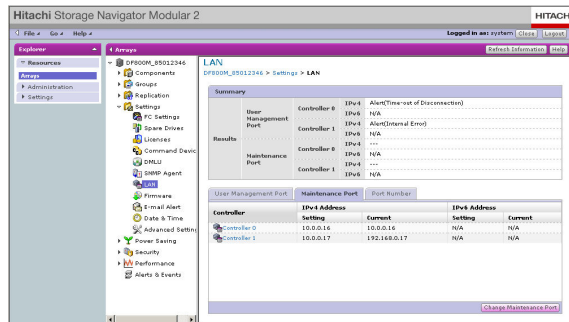
#### (4) Setting of Maintenance LAN

NOTE : • Do not make the setting of the Maintenance LAN while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH), or the WARNING LED (orange) is blinking at high speed (for the maximum of 30 to 85 minutes).

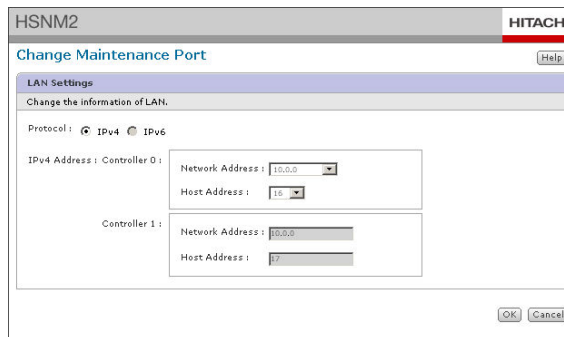
- When there is a connection in the maintenance port, the setting of the Maintenance LAN cannot be changed (it becomes “Connection waiting time-out”). Close all the programs which perform the communication to the maintenance port when changing the setting of the Maintenance LAN.
- If setting of user port is incorrect, the setting of maintenance port will be fail. Set correct setting for user port according to error message. (Refer to [“4.2 \(3\) Setting of LAN” \(SYSPR 04-0120\).](#))
- If “Maintenance Port IP Address Automatic Change Mode” is enabled, the IP address of maintenance port can not be changed.  
If you change maintenance LAN setting, set “Maintenance Port IP Address Automatic Change Mode” to “Disable”. (Refer to [“4.2 \(3\) Setting of LAN” \(SYSPR 04-0120\).](#))

- (4-1) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more .... [SYSPR 04-0161](#)
- (4-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.5.00 ... [SYSPR 04-0162](#)

- (4-1) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more  
 (a) Select [Settings] - [LAN], and select the [Maintenance Port] tab.



- (b) Click the [Change Maintenance Port] button.  
 The “Maintenance Port” setting window is displayed.



[Protocol] : Selects protocol.

[IPv4 Address]

[Controller 0] : Sets the network address and host address of Control Unit 0.

The same addresses as the network address and host address specified for other maintenance port cannot be set now.

[Controller 1] : Sets the network address and host address of Control Unit 1.

The same addresses as the network address and host address specified for other maintenance port cannot be set now.

[IPv6 Address]

[Controller 0] : Set the network address and host address of Control Unit 0.

You cannot set the same addresses as the network address and host address which are currently specified for other maintenance ports.

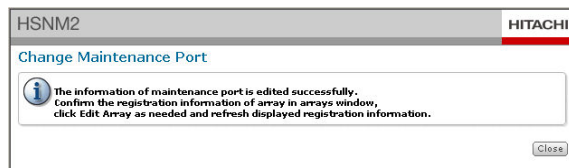
[Controller 1] : Set the network address and host address of Control Unit 1.

You cannot set the same addresses as the network address and host address which are currently specified for other maintenance ports.

- (c) Check that the set contents are correct.

If the [Cancel] button is clicked, the change content is cancelled. Click the [OK] button to terminate the setting.

- (d) Check the contents of the confirmation message window, and click the [Close] button.

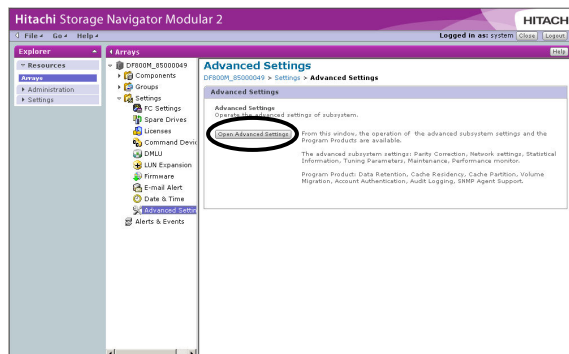


NOTE : When Control Unit 0 is set, Control Unit 1 is set automatically.

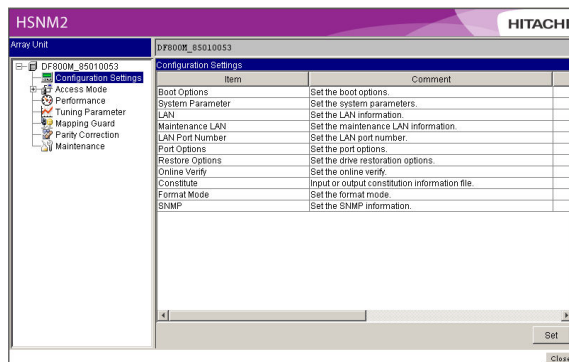
- (e) Check that the connection from Hitachi Storage Navigator Modular 2 to the subsystem is possible by the set IP address. (Refer to [“1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem”](#) (SYSPR 01-0020).)

(4-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.5.00

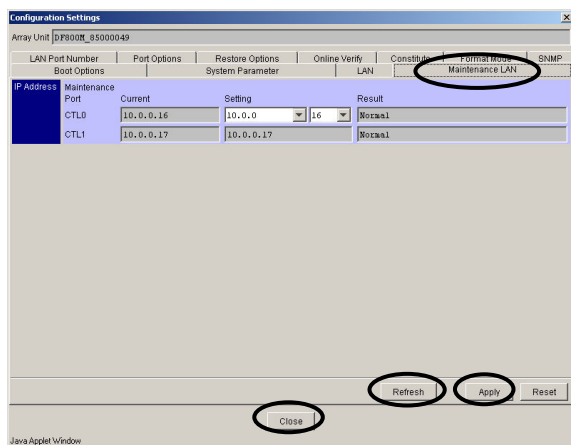
- (a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



- (b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



- (c) Click the “Maintenance LAN” tab. The “Maintenance LAN” setting window appears is displayed in the “Parameters” window.



[IP address] : This is used to set the IP address of the maintenance port.

[Current] : This displays the IP address currently set.

[Setting] : This is used to set an IP address. It selects a network address from a pull-down menu.

The same network address as the network address of the IP address which is currently specified for the user control port cannot be set. In the Maintenance mode, a host address can also be selected.

[Setting Result] : This displays a result of the IP address change process.

The setting results to be displayed and corresponding actions to be taken are shown below.

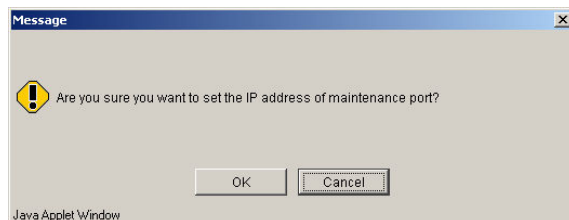
No.	Setting result	Description	Actions to be taken
1	-	An unexpected setting result value was received from through Hitachi Storage Navigator Modular 2.	Press the [Refresh] button again. If the display becomes “---” no matter how many times it is done, set the Maintenance LAN again. If the same information is displayed in spite of the above operation, replace the Control Unit. (Refer to <a href="#">Replacement “2.2.5 Replacing Control Unit” (REP 02-0450).</a> )
2	Normal	The setting result is completed normally.	(Normal completion)
3	Setting	This indicates that the setting is being processed.	Wait for a while (about five minutes), and press the [Refresh] button again. When the same information is displayed no matter how many times the update is repeated, replace the Control Unit. (Refer to <a href="#">Replacement “2.2.5 Replacing Control Unit” (REP 02-0450).</a> )
4	Alert (Time-out of Disconnection)	The setting processing was not completed though it passed the fixed time.	Close all the Hitachi Storage Navigator Modular 2 and WEB of the terminal connected to the maintenance port, and make the setting again. If the same information is displayed in spite of the operation above, replace the Control Unit. (Refer to <a href="#">Replacement “2.2.5 Replacing Control Unit” (REP 02-0450).</a> )

No.	Setting result	Description	Actions to be taken
5	Alert (Internal Error)	The setting processing terminated abnormally due to the internal failure occurrence.	Maintain it referring to the information message on WEB. Make the setting again immediately after the recovery. When this indication is displayed although no failure has occurred, make the setting again. If the same information is displayed in spite of the above operation, replace the Control Unit. (Refer to <a href="#">Replacement "2.2.5 Replacing Control Unit" (REP 02-0450).</a> )
6	Alert (Segment Duplication)	The network address of the IP address intended to be set is already used for a port of the NAS Unit.	Set the other IP address of the maintenance port. When the same information is displayed no matter which IP address is specified, set the maintenance port IP address, which has been set before the change, again, and change the duplicate IP address of the port.

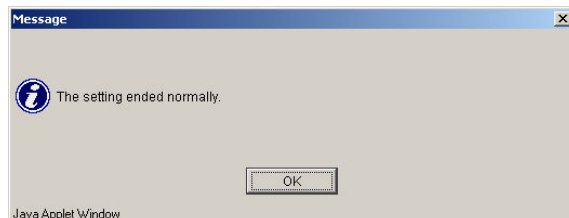
(d) When you check that the changes is correct and click the [Apply] button, the setting confirmation window is displayed.

If you click the [Reset] button, the change is canceled. To terminate the setting, click the [Close] button.

(e) Click the [OK] button in the setting confirmation window.



(f) The following confirmation window is displayed when the setting change is received. Click the [OK] button. The change process is started.



- (g) Click the [Close] button.



NOTE : When Control Unit 0 is set, Control Unit 1 is set automatically.

- (h) Close the unit window, and check that the Hitachi Storage Navigator Modular 2 can be connected to the subsystem by the set IP address. (Refer to [“1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem” \(SYSPR 01-0020\)](#).)

When it cannot be connected even if five minutes or more passed after starting the setting change, connect it to the subsystem with the IP address before the change, and maintain it according to the message of the setting result displayed in the setting window of “Maintenance LAN”.

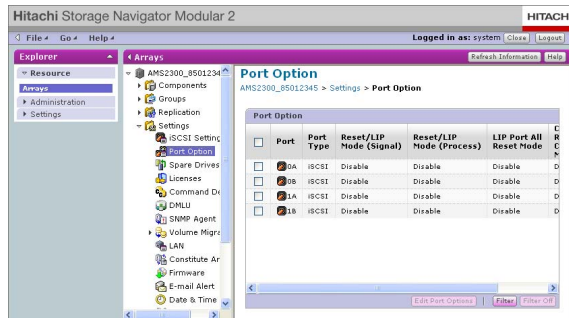
This page is for editorial purpose only.

## (5) Setting of Port Options

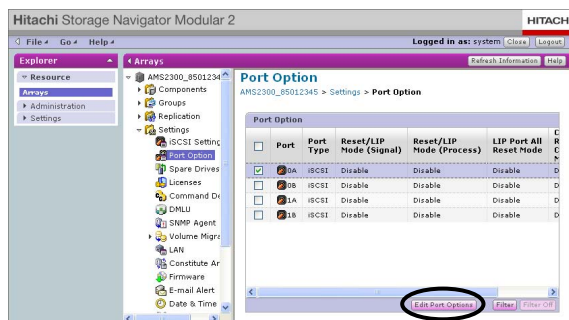
- (5-1) When the Hitachi Storage Navigator Modular 2 is version 9.70 or more ..... [SYSPR 04-0190](#)
- (5-2) When the Hitachi Storage Navigator Modular 2 is less than version 9.70 ..... [SYSPR 04-0200](#)

## (5-1) When the Hitachi Storage Navigator Modular 2 version is 9.70 or more

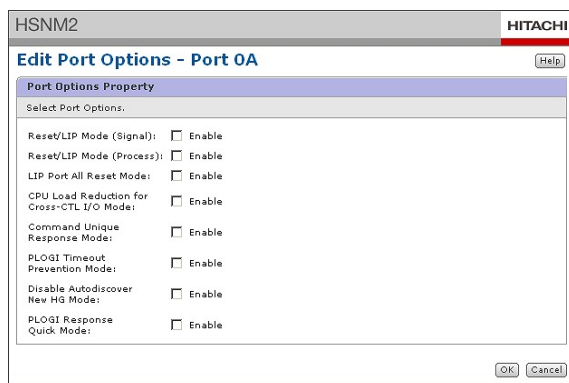
## (a) Select [Settings] - [Port Option]



## (b) Select the checkbox of the port to be set, click the [Edit Port Option] button.



## (c) The “Edit Option” is displayed. Select the checkbox of the port option to be set, click the [OK] button.



[Reset/LIP Mode (Signal)] : This is a mode for transmitting the Reset/LIP signal to another port.

[Reset/LIP Mode (Process)] : This is a mode for propagating the reset operation to another port.

[LIP Port All Reset] : This is a mode for executing the reset operation when the LIP is received.



- [CPU Load Reduction for Cross-CTL I/O Mode] : This is a mode for cutting the operating rates by adjusting the order of the I/O processing when connected to the Universal Volume Manager.
- [Command Unique Response Mode] : This is a mode for returning the check condition to the host when it takes time to respond to the command received during LU switching (B/C000).
- [PLOGI Timeout Prevention Mode] : This is a mode for preventing the FC port from being a Loop time out between the LILP processing and PLOGI processing in the early stage of the Link.
- [Disable Autodiscover New HG Mode] : This is a mode for suppressing the discovery function for a device because it has a significant impact on the host although the RSCN is issued by port when the conditions are met for the change of the appropriate host group.
- [PLOGI Response Quick Mode] : This is a mode for reducing the response time of PLOGI and link service with reset process on Fibre Channel, when connecting with OS which issues many Fibre Channel PLOGIs during the server boot.

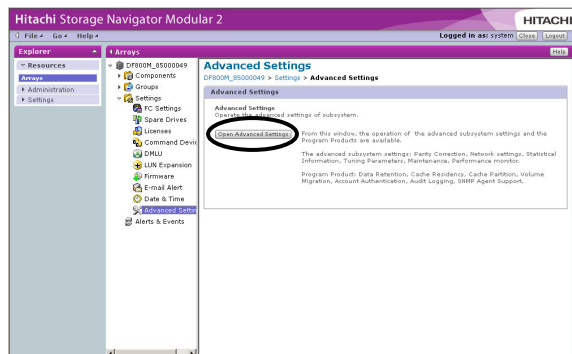
- NOTE :
- The Reset/LIP Mode (Signal) is effective when the Reset/LIP Mode (Process) is set.
  - The CPU Load Reduction for Cross-CTL I/O Mode can be referred and set in the Hitachi Storage Navigator Modular 2 version 8.53 or later and the firmware version 0885/F or later.
  - Set the CPU Load Reduction for Cross-CTL I/O Mode in the RKH, RKHE or RKHED (excluding the RKEH/RKEHD).
  - Command Unique Response Mode is available for reference and setting in the Hitachi Storage Navigator Modular 2 Ver.9.05 or later and firmware version 0890/H or later.
  - PLOGI Timeout Prevention Mode can be referred and set in the Hitachi Storage Navigator Modular 2 Ver.9.35 or later and the firmware version 089/E or later.
  - Disable Autodiscover New HG Mode can be referred and set in the Hitachi Storage Navigator Modular 2 Ver.11.05 or later and the firmware version 08B5/A or later.
  - PLOGI Response Quick Mode can be referred and set in the Hitachi Storage Navigator Modular 2 Ver.11.78 or later and the firmware version 08B7/V or later.

(d) When the setting is completed, the following message is displayed. Click the [Close] button.

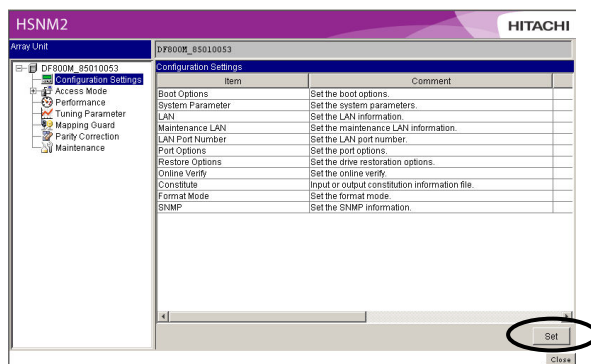


(5-2) When the Hitachi Storage Navigator Modular 2 version is less than 9.70

(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.

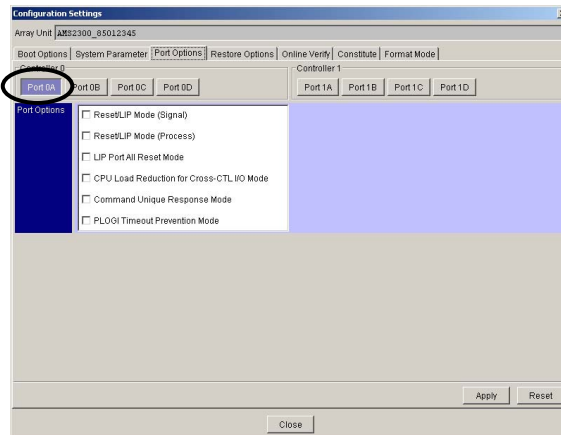


(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(c) Click the [Port Options] tab. The window for setting the “Port Options” is displayed in the Parameter window.

(d) Click the [Port 0A] button.



[Port Options]

: Specify a port options. Select an option you want to set by clicking its check box.

[Reset/LIP Mode 'Signal]

: This is a mode for transmitting the Reset/LIP signal to another port.

[Reset/LIP Mode (Process)]

: This is a mode for propagating the reset operation to another port.

[LIP Port All Reset]

: This is a mode for executing the reset operation when the LIP is received.

[CPU Load Reduction for Cross-CTL I/O Mode] : This is a mode for cutting the operating rates by adjusting the order of the I/O processing when connected to the Universal Volume Manager.

[Command Unique Response Mode]

: This is a mode for returning the check condition to the host when it takes time to respond to the command received during LU switching (B/C000).

[PLOGI Timeout Prevention Mode]

: This is a mode for preventing the FC port from being a Loop time out between the LIP processing and PLOGI processing in the early stage of the Link.

NOTE : • The Reset/LIP Mode (Signal) is effective when the Reset/LIP Mode (Process) is set.

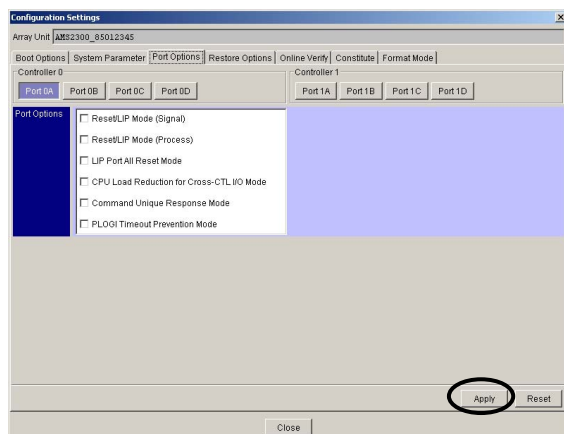
• The CPU Load Reduction for Cross-CTL I/O Mode can be referred and set in the Hitachi Storage Navigator Modular 2 version 8.53 or later and the firmware version 0885/F or later.

• Set the CPU Load Reduction for Cross-CTL I/O Mode in the RKH, RKHE or RKHED (excluding the RKEH/RKEHD). Do not set it in the RKS/RKM/RKXS/RKEXSA/RKEXSB/RKXS8F.

• Command Unique Response Mode is available for reference and setting in the Hitachi Storage Navigator Modular 2 Ver.9.05 or later and firmware version 0890/H or later.

• PLOGI Timeout Prevention Mode can be referred and set in the Hitachi Storage Navigator Modular 2 Ver.9.35 or later and the firmware version 0893E or later.

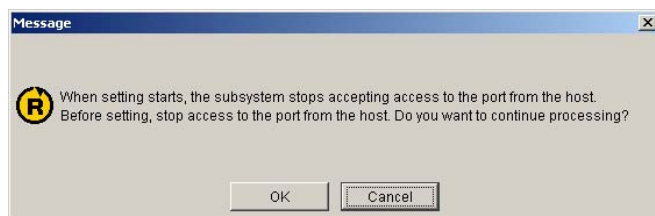
- (e) When the changes are completed, click the [Apply] button at lower right corner of the “Parameter” window. When the [Reset] button is clicked, the change is cancelled.



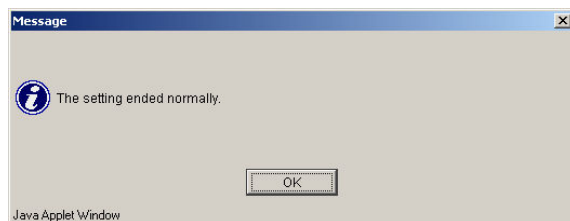
- (f) A message asking you to verify the setting is displayed. Click the [OK] button.



- (g) The following message is displayed. After making sure that the I/O request from a host is suppressed, and click the [OK] button.

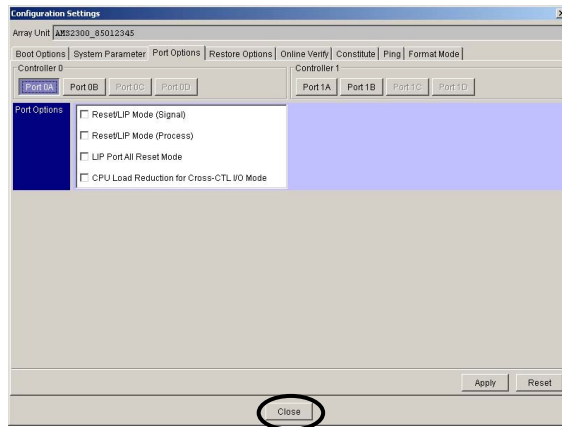


- (h) When the setting is completed, the following message is displayed. Click the [OK] button.



- (i) The setting/verification of the port 0A is completed. Do the same for the other ports.

(j) Click the [Close] button.



## (6) Setting of Restore Options

When an option is set up using this function during the drive recovery execution, it will become enabled immediately.

NOTE : • Drive Restoration Mode, Interval Time, and Processing Unit size are effective among Dynamic Sparing, Copy Back, and Correction Copy.

- Changes in the Restore Options settings will be effective right after you push the "OK" button following "Apply".

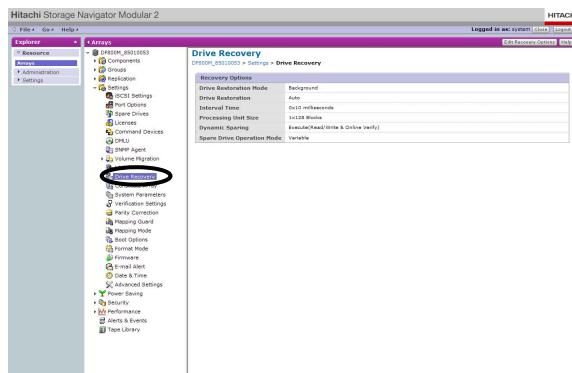
For example, if you change Drive Restoration Mode, the change will take effect immediately even on Dynamic Sparing/Copy Back/Correction Copy which is currently running.

- A change of Spare Drive Operation Mode is only effective if it is done before an HDD has completed the sparing process.

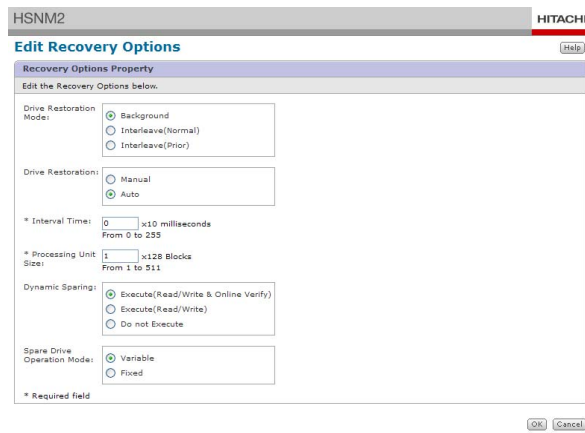
- (6-1) When the Hitachi Storage Navigator Modular 2 is version 11.0/A or more ... [SYSPR 04-0220](#)
- (6-2) When the Hitachi Storage Navigator Modular 2 is less than version 11.0/A .. [SYSPR 04-0251](#)

## (6-1) When the Hitachi Storage Navigator Modular 2 is version 11.0/A or more

- (a) Select the [Settings] - [Drive Recovery], and click the [Edit Recovery Options] button.



- (b) An "Edit Recovery Options" window is displayed.  
Set the Recovery Options.



- ① [Drive Restoration Mode] : Specify a method of drive restoration.
  - [Background] : The restoration is performed at a free time when no host I/O operation is performed.
  - [Interleave (Normal)] : The restoration is performed regularly (at fixed intervals) in a manner in which priority is given to a host command. (The restoration is performed after a host command execution is completed.)
  - [Interleave (Prior)] : The restoration is performed regularly (at fixed intervals) in a manner in which priority is taken to a host command.
- ② [Drive Restoration] : Specify whether to start operations (data restoration onto a failed drive, data restoration onto a spare drive, data copying from a spare drive to an original drive, and dynamic sparing) automatically or manually.
  - [Manual] : A data restoration and data copying from a Spare Drive to an original drive are started manually. (Not supported)
  - [Auto] : A data restoration and data copying from a Spare Drive to an original drive are started automatically.

NOTE : Hitachi Storage Navigator Modular 2 does not support the manual start. Be sure to set it to the automatic start.

- ③ [Interval Time] : Specify an interval of the restoration.  
 The default value is 0x10 ms. Concurrently with I/Os from the host, the restorations are performed in succession.  
 Treat 10ms as the unit and specify a multiplier within a range of 0 to 255.
- ④ [Processing Unit Size] : Specify a size of data to be restored.  
 The default value is 128 blocks; data of 64kbytes is restored at a time. When “Interleave” is specified, specified size of data is restored, a time specified as the “interval time” is waited for, and the next restoration is performed.  
 Treat 512 bytes (1 block) as the unit and specify a multiplier within a range of 1 to 511.
- ⑤ [Dynamic Sparing] : Specify a mode (for restoring data onto a Spare Drive) to be used when the failure count exceeds a threshold value controlled in the preventive maintenance.
  - [Execute (Read/Write & Online Verify)] : When the count of read/write errors or online verification errors exceeds a threshold value, data is restored onto a spare drive (in the case where the spare drive is unused) and failed drive is detached.



[Execute (Read/Write)] : When the count of read/write errors exceeds a threshold value, data is restored onto a Spare Drive (in the case where the Spare Drive is unused) and failed drive is detached.

When the count of online verification errors exceeds a threshold value, the dynamic sparing is not performed.

[Do not Execute] : When the count of read/write errors or online verification errors exceeds a threshold value, the dynamic sparing is not performed.

⑥ [Spare Drive Operation Mode] : Set whether to make the copy backless function <sup>(†1)</sup> enable or disable.  
It is set as [Variable] in default, and the Copy backless function is enabled.

**Table 4.2.2 Setting and Operation Specifications of “Spare Drive Operation Mode” and “Applying No Copy Back Mode on All the Units”**

Spare Drive Operation Mode	Operation specification				
	The relationship between the Failed Disk Drive and the Spare Disk				Restrictions / Notes
	The capacity and the rotational speed are corresponding	The capacity and the rotational speed are not corresponding	Only the capacity is corresponding	Only the rotational speed is corresponding	
Fixing (Fixed)	Copy back	Copy back	Copy back	Copy back	The location of the Disk Drive which configures the RAID Group never changes from the time of creating the RAID Group. Therefore, this parameter is set when fixing the location of the Disk Drive which configures the RAID Group.
Variable (Variable) (*1) (*2) (This is set in default.)	Copy backless	Copy back	Copy back	Copy back	(This is set in default.)

\*1 : If the Power Saving function is enabled, copy back is performed in the following four cases even if Spare Drive Operation Mode has been set to the default mode, which is copy back less.

Furthermore, the operation differs depending on whether the firmware version is more than or equal to 08C4/A or less than 08C4/A. (In the version of 08C4/J or more, a Flash Drive operates according to the Spare Drive Operation Mode setting.)

License key status		Source data drive	Target Spare Disk			
			Less than 08C4/A		08C4/A or more	
			System drive	Non system drive	System drive	Non system drive
Power Saving	Enable	System drive	As specified	As specified	As specified	As specified
		Non system drive	As specified	As specified	As specified	As specified
	Disable	System drive	Copy back	As specified	As specified	Copy back
		Non system drive	Copy back	As specified	Copy back	As specified

\* : System drives correspond to Disk Drives #0 to #4 in RKM/RKS, Disk Drives #0 to #4 of Unit ID#0 in RKAK/RKAKS connected to RKH, or Disk Drives #A0 to #A4 in RKAKX.

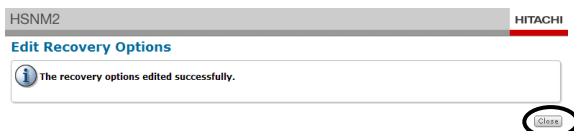
(The copy-back operates for maintaining the power saving status that can be changed in the version less than 08C4/A. The specification changed to remedy the problems such as the useless copy-back operation among system drives and the biased Spare Disk for the system drives.)

\*2 : If operated by the copy-back-less setting, the Disk Drive positions which configure the RAID group are replaced due to the Disk Drive failure restoration. In the Power Saving functions, depending on the Disk Drive positions which configure the RAID group, even if the RAID groups have the same RAID level and the number of Disk Drives, the spinup time from the power saving status may differ. Therefore, if the RAID group is configured considering the spinup time from the power saving status, it is recommended to set it to the copy-back mode.

(c) Verify that the settings that have been made are correct and click the [OK] button.

When the [Cancel] button is clicked, the change is canceled.

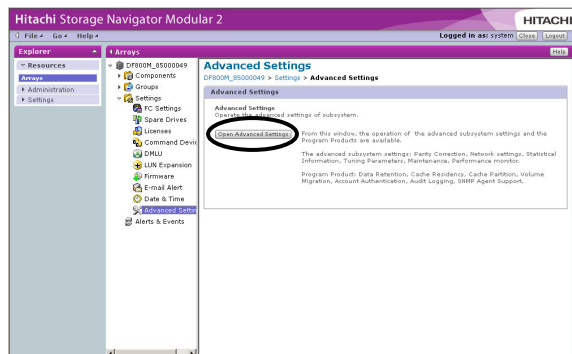
(d) The completion message is displayed. Click the [Close] button.



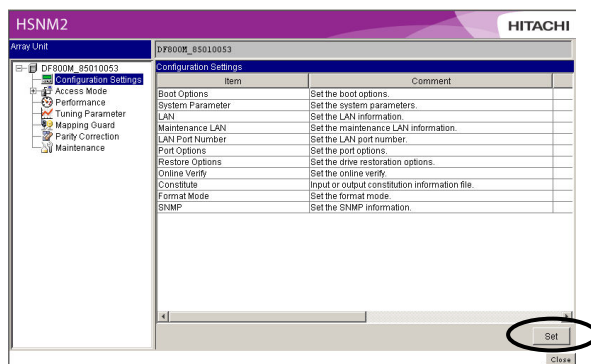
#1 : For details of the Copy backless function, refer to [Introduction “3.6 \(3\) Operation after replacing the failed Disk Drive” \(INTR 03-0270\)](#).

(6-2) When the Hitachi Storage Navigator Modular 2 is less than version 11.0/A

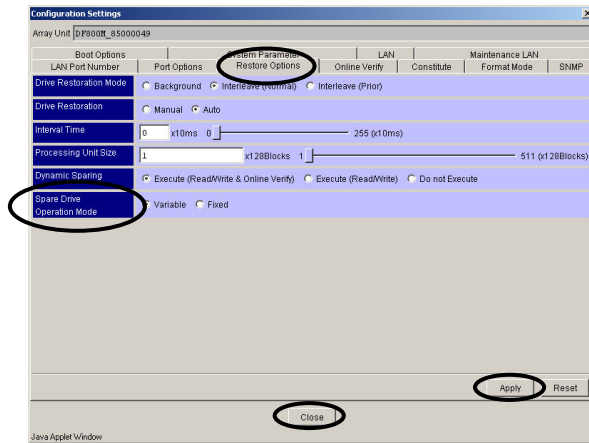
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



- (c) Click the [Restore Options] tab. The window for setting the “Restore Option” is displayed in the parameter window.



- ① [Drive Restoration Mode] : Specify a method of drive restoration.
- [Background] : The restoration is performed at a free time when no host I/O operation is performed.
  - [Interleave (Normal)] : The restoration is performed regularly (at fixed intervals) in a manner in which priority is given to a host command. (The restoration is performed after a host command execution is completed.)
  - [Interleave (Prior)] : The restoration is performed regularly (at fixed intervals) in a manner in which priority is taken to a host command.
- ② [Drive Restoration] : Specify whether to start operations (data restoration onto a failed drive, data restoration onto a spare drive, data copying from a spare drive to an original drive, and dynamic sparing) automatically or manually.
- [Manual] : A data restoration and data copying from a Spare Drive to an original drive are started manually. (Not supported)
  - [Auto] : A data restoration and data copying from a Spare Drive to an original drive are started automatically.

NOTE : Hitachi Storage Navigator Modular 2 does not support the manual start. Be sure to set it to the automatic start.

- ③ [Interval Time] : Specify an interval of the restoration.
- The default value is 0x10 ms. Concurrently with I/Os from the host, the restorations are performed in succession.
- Treat 10ms as the unit and specify a multiplier within a range of 0 to 255.

- ④ [Processing Unit Size] : Specify a size of data to be restored.  
 The default value is 128 blocks; data of 64kbytes is restored at a time. When “Interleave” is specified, specified size of data is restored, a time specified as the “interval time” is waited for, and the next restoration is performed.  
 Treat 512 bytes (1 block) as the unit and specify a multiplier within a range of 1 to 511.
  
- ⑤ [Dynamic Sparing] : Specify a mode (for restoring data onto a Spare Drive) to be used when the failure count exceeds a threshold value controlled in the preventive maintenance.
  - [Execute (Read/Write & Online Verify)] : When the count of read/write errors or online verification errors exceeds a threshold value, data is restored onto a spare drive (in the case where the spare drive is unused) and failed drive is detached.
  
  - [Execute (Read/Write)] : When the count of read/write errors exceeds a threshold value, data is restored onto a Spare Drive (in the case where the Spare Drive is unused) and failed drive is detached.  
 When the count of online verification errors exceeds a threshold value, the dynamic sparing is not performed.
  
  - [Do not Execute] : When the count of read/write errors or online verification errors exceeds a threshold value, the dynamic sparing is not performed.
  
- ⑥ [Spare Drive Operation Mode] : Set whether to make the copy backless function <sup>(†1)</sup> enable or disable.  
 It is set as [Variable] in default, and the Copy backless function is enabled.

**Table 4.2.3 Setting and Operation Specifications of “Spare Drive Operation Mode” and “Applying No Copy Back Mode on All the Units”**

Spare Drive Operation Mode	Operation specification				
	The relationship between the Failed Disk Drive and the Spare Disk				Restrictions / Notes
	The capacity and the rotational speed are corresponding	The capacity and the rotational speed are not corresponding	Only the capacity is corresponding	Only the rotational speed is corresponding	
Fixing (Fixed)	Copy back	Copy back	Copy back	Copy back	The location of the Disk Drive which configures the RAID Group never changes from the time of creating the RAID Group. Therefore, this parameter is set when fixing the location of the Disk Drive which configures the RAID Group.
Variable (Variable) (*1) (*2) (This is set in default.)	Copy backless	Copy back	Copy back	Copy back	(This is set in default.)

\*1 : If the Power Saving function is enabled, copy back is performed in the following four cases even if Spare Drive Operation Mode has been set to the default mode, which is copy back less.

Furthermore, the operation differs depending on whether the firmware version is more than or equal to 08C4/A or less than 08C4/A. (In the version of 08C4/J or more, a Flash Drive operates according to the Spare Drive Operation Mode setting.)

License key status		Source data drive	Target Spare Disk			
			Less than 08C4/A		08C4/A or more	
			System drive	Non system drive	System drive	Non system drive
Power Saving	Enable	System drive	As specified	As specified	As specified	As specified
		Non system drive	As specified	As specified	As specified	As specified
	Disable	System drive	Copy back	As specified	As specified	Copy back
		Non system drive	Copy back	As specified	Copy back	As specified

\* : System drives correspond to Disk Drives #0 to #4 in RKM/RKS, Disk Drives #0 to #4 of Unit ID#0 in RKAK/RKAKS connected to RKH, or Disk Drives #A0 to #A4 in RKAKX.

(The copy-back operates for maintaining the power saving status that can be changed in the version less than 08C4/A. The specification changed to remedy the problems such as the useless copy-back operation among system drives and the biased Spare Disk for the system drives.)

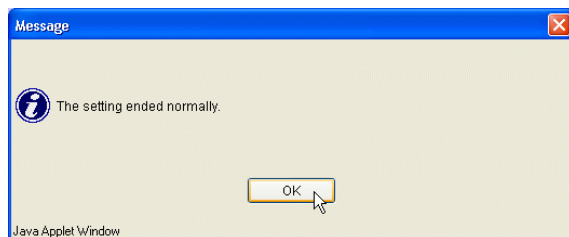
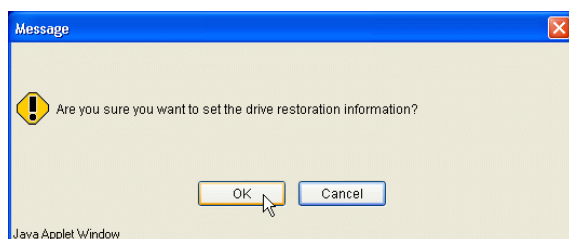
\*2 : If operated by the copy-back-less setting, the Disk Drive positions which configure the RAID group are replaced due to the Disk Drive failure restoration. In the Power Saving functions, depending on the Disk Drive positions which configure the RAID group, even if the RAID groups have the same RAID level and the number of Disk Drives, the spinup time from the power saving status may differ. Therefore, if the RAID group is configured considering the spinup time from the power saving status, it is recommended to set it to the copy-back mode.

(d) Verify that the changes that have been made are correct and click the [Apply] button.

When the [Reset] button is clicked, the change is canceled. To terminate the setting, click the [Close] button.

#1 : For details of the Copy backless function, refer to [Introduction “3.6 \(3\) Operation after replacing the failed Disk Drive” \(INTR 03-0270\)](#).

(e) Click the [OK] button following the displayed message.



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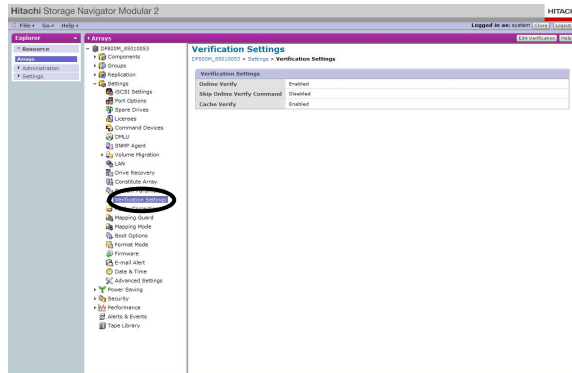


## (7) Setting of Online Verify

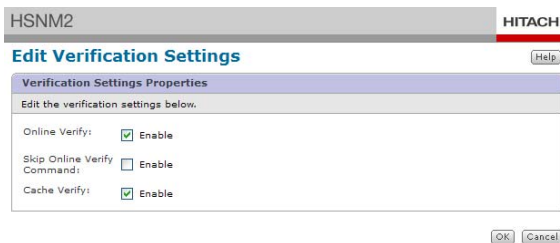
- (7-1) When the Hitachi Storage Navigator Modular 2 is version 11.0/A or more ... [SYSPR 04-0260](#)
- (7-2) When the Hitachi Storage Navigator Modular 2 is less than version 11.0/A ... [SYSPR 04-0271](#)

## (7-1) When the Hitachi Storage Navigator Modular 2 is version 11.0/A or more

(a) Select the [Settings] - [Verification Settings], click the [Edit Verification] button.

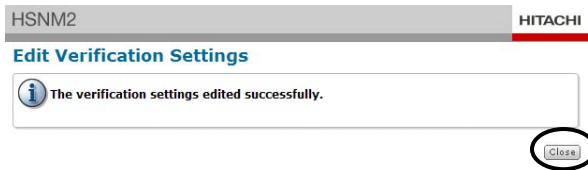


(b) An “Edit Verification Settings” window is displayed.  
Set the Verification.



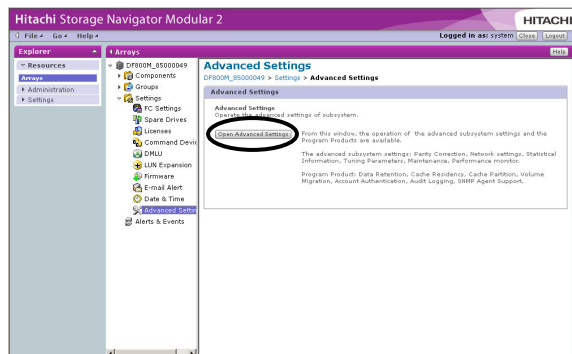
- ① [Online Verify] : Set whether or not to carry out the online verification test.  
When the check box is checked, the test is carried out.  
However, the online verify test is not executed for the Disk Drives in the RAID Group to which the Power Saving function is set.
- ② [Skip Online Verify Command] : Sets whether or not to skip the verification test.  
When [ON] is selected, the test is skipped.
- ③ [Cache Verify] : Sets whether to execute the Cache Verify or not. If [ON] is selected, the Cache Verify is executed.

- (c) Verify that the settings that have been made are correct and click the [OK] button.  
When the [Cancel] button is clicked, the change is canceled.
- (d) The completion message is displayed. Click the [Close] button.

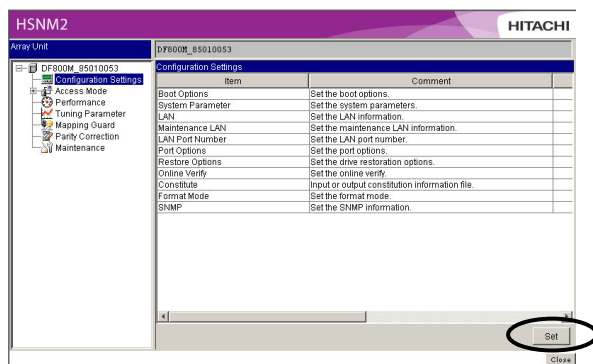


(7-2) When the Hitachi Storage Navigator Modular 2 is less than version 11.0/A

(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.

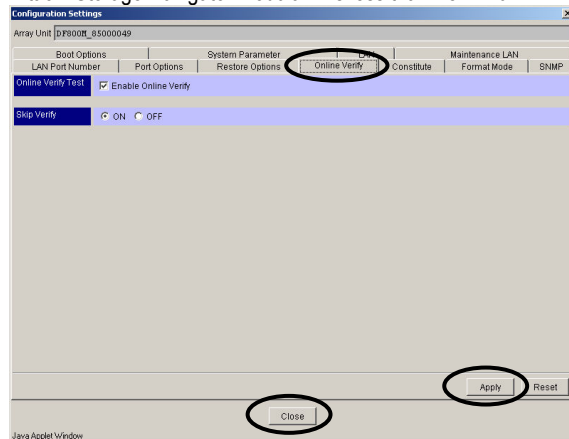


(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.

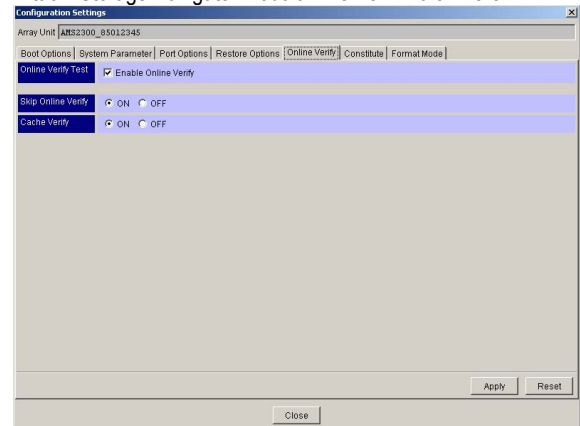


- (c) Click the [Online Verify] tab. The window for setting the “Online Verify” is displayed in the parameter window.

Hitachi Storage Navigator Modular 2 is less than Ver.7.20



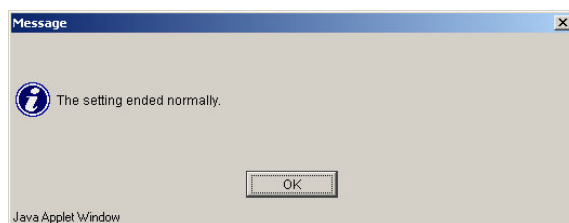
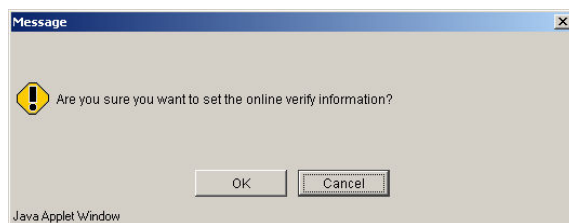
Hitachi Storage Navigator Modular 2 is Ver.7.20 or more



- ① [Online Verify Test] : Set whether or not to carry out the online verification test. When the check box is checked, the test is carried out. However, the online verify test is not executed for the Disk Drives in the RAID Group to which the Power Saving function is set.
- ② [Skip Verify]<sup>(†1)</sup> : Sets whether or not to skip the verification test. When [ON] is selected, the test is skipped.
- ③ [Cache Verify] : Sets whether to execute the Cache Verify or not. If [ON] is selected, the Cache Verify is executed.

- (d) Verify that the changes that have been made are correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled. To terminate the setting, click the [Close] button.

- (e) The confirmation message is displayed. Click the [OK] button.



<sup>†1</sup> : This name is displayed as “Skip Online Verify” in the Ver.7.20 or more of Hitachi Storage Navigator Modular 2.

## (8) Setting of Constitute

Output configuration information of the disk array system to a text file or set the configuration by using the text file.

## (8-1) When the Hitachi Storage Navigator Modular 2 version is 9.70 or more

The configuration information to be output (configuration acquisition) to a text file includes RAID group/DP Pool/logical unit, system parameters, ports information, Boot Options, parts information, and LAN information.

The configuration to be set includes RAID group/DP Pool/logical unit, system parameters, ports information, Boot Options, CHAP User (for the iSCSI), and LAN information.

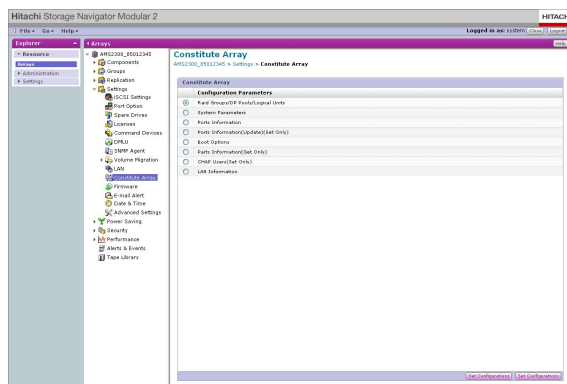
Each element of the configuration, that is, RAID group/DP Pool/logical unit, system parameters, ports information, Boot Options, parts information, or LAN information is operated by a respective file.

You can copy the configuration from/to the disk array systems by outputting the configuration information from the disk array system to a text file and setting it for another disk array system using the text file that has been output.

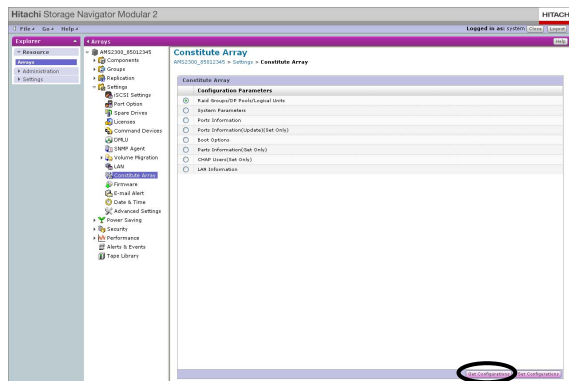
You can set a disk array system by editing the text file. Use this function to create the same disk array system. Change the element of the configuration using a respective function.

**NOTE :** Do not perform the text input (configuration acquisition) of Boot Options of the configuration copy information while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH). (Do not select [Input] or [Boot Options].)

## (a) Select [Settings] - [Constitute Array].



- (b) When the configuration information is output to a text file (configuration acquisition), select the radio button of the information to be acquired from the Configuration Parameters, and click the [Get Configurations] button.



[RAID Groups/DP Pools/Logical Units] :

This is information on definition of the RAID groups/DP Pools/logical unit set for the disk array system.

[System Parameters]

: This is the setting of system parameters made for the disk array system.

[Ports Information]

: This is information on the port/host group set for the disk array system.

[Boot Options]

: This is the setting of Boot Option made for the disk array system.

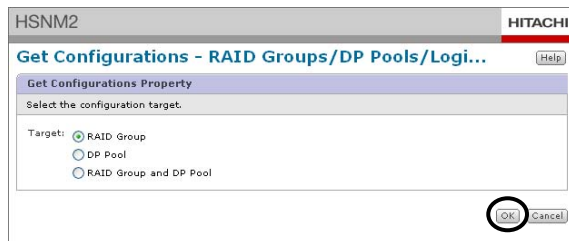
[Parts Information]

: This is the setting of parts information made for the disk array system.

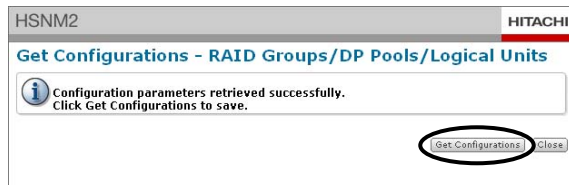
[LAN Information]

: This is the setting of LAN information for user management port and maintenance port.

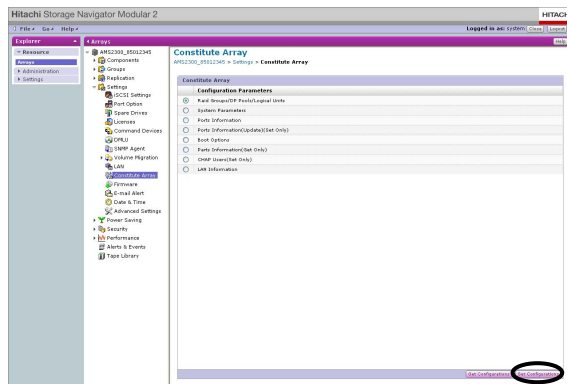
- (c) When the RAID Groups/DP Pools/Logical Units is selected in the Configuration Parameters, select the configuration target, and click the [OK] button.



- (d) To save the configuration information, click the [Get Configurations] button. Specify a location to save the file.



- (e) When setting the configuration using a text file, select the radio button of the information to be acquired from the Configurations Parameters, click the [Set Configurations] button.



[RAID Groups/DP Pools/Logical Units] : This is information on definition of the RAID groups/DP Pools/logical units set for the disk array system.

[System Parameters]

: This is the setting of system parameters made for the disk array system.

[Ports Information]

: This is information on the port/host group set for the disk array system.

[Ports Information (Update)]

: This is port/host group information to be set for the disk array system.

Specifies the setting information of Fibre or iSCSI.

[Boot Options]

: This is the setting of Boot Option made for the disk array system.

[CHAP Users]

: This is information on the CHAP User set for the disk array system.

[LAN Information]

: This is the setting of LAN information for user management port and maintenance port.

NOTE : • When you input LAN Information file, note following.

- If the “Maintenance Port IP Address Automatic Change Mode” is “ON” in the file; the IP address of maintenance port written in the file will be ignored. However, do not delete the setting of maintenance port written in the file.
- If “Maintenance Port IP Address Automatic Change Mode” is “OFF” in the file; only the network address for the IP address of maintenance port written in the file is reflected.

- When setting the iSCSI port information, perform it without the iSCSI host logged into an array subsystem.

If it is set while the iSCSI host logs into an array subsystem, the array subsystem cannot perform a command from the iSCSI host, and an I/O time-out or an abnormal termination occurs in the iSCSI host.

- (f) Specify the path that the text file, where the configuration information is described, saves. When the RAID Groups/DP Pools/Logical Units is selected in the Configuration Parameters, select the configuration target. When the Port Information (Update) is selected, specify the setting information of Fibre or iSCSI.

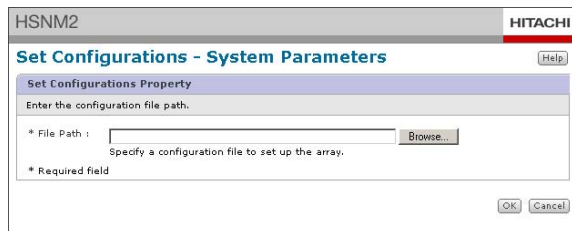
Click the [OK] button.

- When selecting the RAID Groups/DP Pools/Logical Units

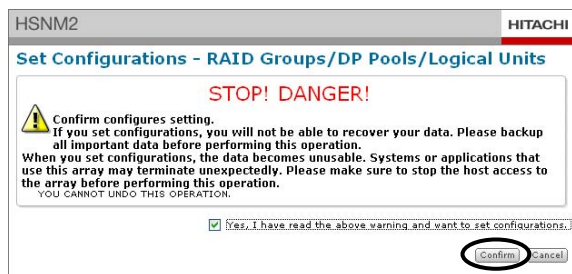
- When selecting the Ports Information (Update)



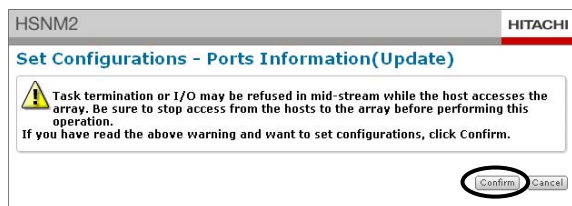
- When the parameter other than the RAID Groups/DP Pools/Logical Units and Ports Information (Update) is selected:



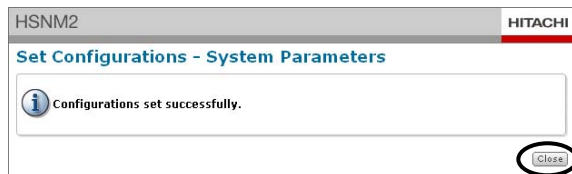
- (g) When the RAID Groups/DP Pools/Logical Units is selected in the Configuration Parameters, a warning screen is displayed. After confirming the description on the screen, turn on the checkbox, and then click the [Confirm] button.



When the Ports Information (Update) is selected in the Configuration Parameters, a caution screen is displayed. After confirming the description on the screen, click the [Confirm] button.



- (h) When the setting ends, the following message is displayed. Click the [Close] button.



This page is for editorial purpose only.

## (8-2) When the Hitachi Storage Navigator Modular 2 version is less than 9.70

The configuration information to be output to a text file includes RAID group/logical unit, system parameters, and port/host group information.

The configuration to be set includes RAID group/logical unit, system parameters, and port/host group information.

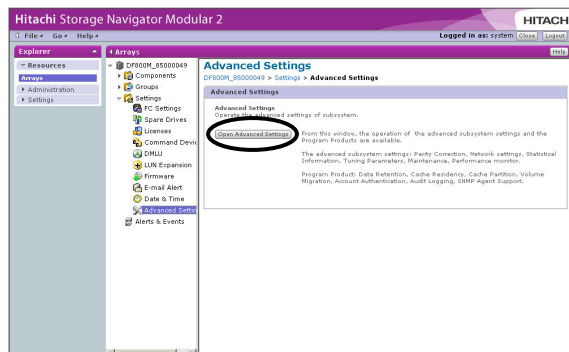
Each element of the configuration, that is, RAID group/logical unit, system parameters, and port/host group information is operated by a respective file.

You can copy the configuration from/to the disk array systems by outputting the configuration information from the disk array system to a text file and setting it for another disk array system using the text file that has been output.

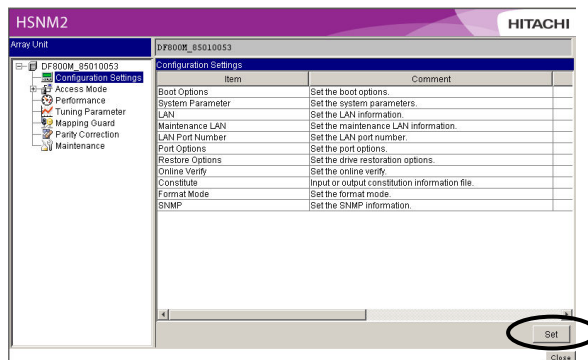
You can set a disk array system by editing the text file. Use this function to create the same disk array system. Change the element of the configuration using a respective function.

**NOTE :** Do not perform the text input of Boot Options of the configuration copy information while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH). (Do not select [Input] or [Boot Options].)

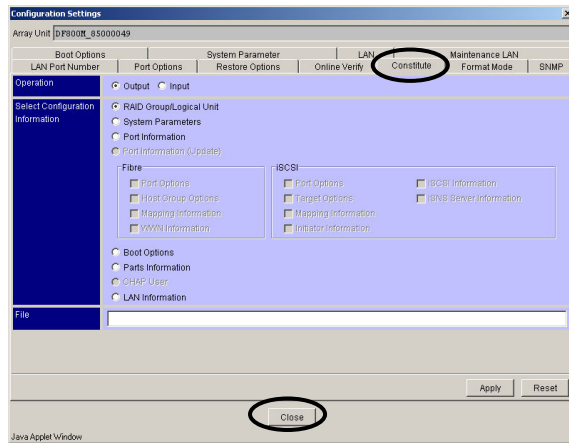
## (a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



## (b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



- (c) Click the [Constitute] tab. The window for setting the “Constitute” is displayed in the Parameter window.



- ① [Operation] : Output the set information to a text file or enter the information to be set.  
     [Output] : Selected information is output to a text file with a specified file name.  
     [Input] : Selected information is loaded and set with a specified file name.
- ② [Select Configuration Information] : Select information to be output to the text file or to be set through a reading of a text file.
  - [RAID Group/Logical Unit] : This is information on definition of the RAID group/logical unit set for the disk array system.
  - [System Parameters] : This is the setting of system parameters made for the disk array system.
  - [Port Information] : This is information on the port/host group set for the disk array system.
  - [Port Information (Update)] : This is port/host group information to be set for the disk array system.  
     Specifies the setting information of Fibre or iSCSI.
  - [Boot Option] : This is the setting of Boot Option made for the disk array system.
  - [Parts Information] : This is the setting of parts information made for the disk array system.
  - [CHAP User] : This is information on the CHAP User set for the disk array system.
  - [LAN Information] : This is the setting of LAN information for user management port and maintenance port.

NOTE : • When you input LAN Information file, note following.

- If the “Maintenance Port IP Address Automatic Change Mode” is “ON” in the file; the IP address of maintenance port written in the file will be ignored. However, do not delete the setting of maintenance port written in the file.
- If “Maintenance Port IP Address Automatic Change Mode” is “OFF” in the file; only the network address for the IP address of maintenance port written in the file is reflected.

- When setting the iSCSI port information, perform it without the iSCSI host logged into an array subsystem.

If it is set while the iSCSI host logs into an array subsystem, the array subsystem cannot perform a command from the iSCSI host, and an I/O time-out or an abnormal termination occurs in the iSCSI host.

- ③ [File] : Set the file that reads the text file output or the text file.

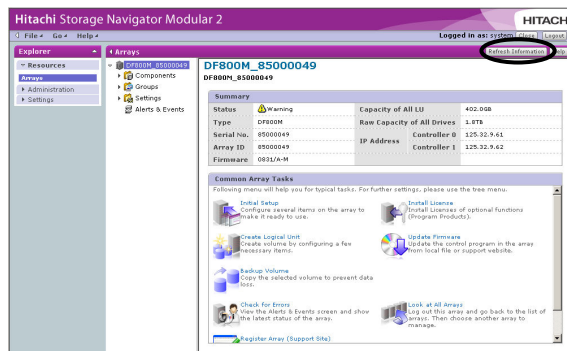
NOTE : When only the file name is specified without specifying the directory path as a textfile output destination, the text file is stored under \StorageNavigatorModular\server\ directory with the Hitachi Storage Navigator Modular 2 installed.

When the Hitachi Storage Navigator Modular 2 is installed as standard, it is stored under the following directory:

C:/Program Files\HiCommand\StorageNavigatorModular\server\

(d) To terminate the setting, click the [Close] button.

(e) The unit screen is displayed. When you set the composition of [RAID/Logical Unit File], click the [Refresh Information] button on the upper right of the window.

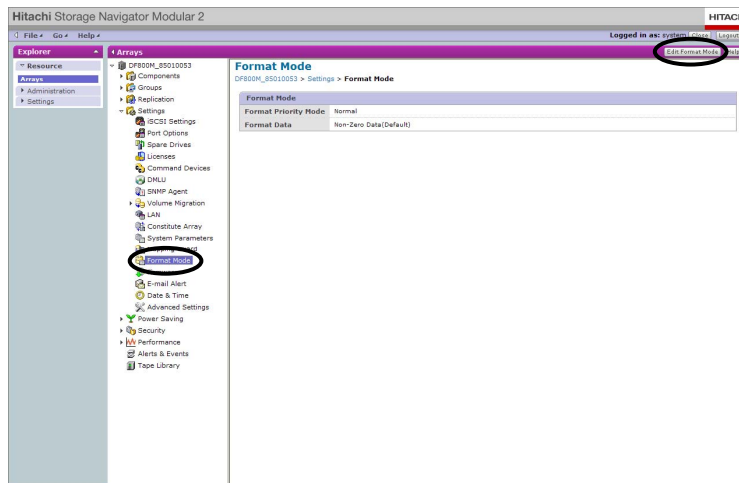


## (9) Setting of Format Mode

- (9-1) When the Hitachi Storage Navigator Modular 2 is Ver.10.0/A or more ·· [SYSPR 04-0310](#)
- (9-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.10.0/A · [SYSPR 04-0320](#)

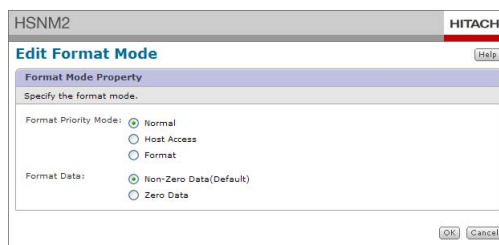
## (9-1) When the Hitachi Storage Navigator Modular 2 version is Ver.10.0/A or more

- (a) Select [Settings] - [Format Mode], and click the [Edit Format Mode] button.



## (b) “Edit Format Mode” window is displayed.

Make the setting of the format mode.



[Format Priority Mode] : Select a mode for giving/not giving priority to a formatting.

[Normal] : When the load of the host I/O is low, the format processing is executed continuously, and if not, it is executed in every constant interval. This is the setting of default.

[Host Access] : When the format priority mode is “Normal” and the format is performed during the copy/restoration of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance, or Copy-on-write SnapShot, the copy/restoration performance may be greatly deteriorated. In that case, make the format priority mode “Host Access” and limit the operation of the format.

The format processing is executed in every constant interval according to the load of the host I/O. The deterioration of the host I/O performance is reduced.

[Format] : The “Format” of the format priority mode is a mode that makes the effect by the host access a minimum and completes the format quickly for the format online by the Disk Drive addition or the format online by the recovery work for the dual failures of the Disk Drive.  
The format processing is executed regardless of the load of the host I/O. The host access performance may be deteriorated in the meantime because the host I/O processing which can be executed per unit of time decreases substantially.

[Format Data] : Select to a format Data.

[Non-Zero Data(Default)] : A formatting is performed when default Data.

[Zero Data] : A formatting is performed when 0.

If the firmware version is less than 0880, this is set when it is necessary to clear the logical unit by the data of 0(zero) connecting the subsystem to Universal Storage Platform or Network Storage Controller.

NOTE : Be careful that “Format” or the format priority mode which restricts the command from the host significantly influences the access performance of the host.

Also, in the case shown below, if the format priority mode is made “Format”, the host access performance may be greatly deteriorated, or the command may be time-out, so that do not set the format priority mode to “Format”.

- When the host access is performed for LU in the RAID Group which is the same as the LU in format
- When the format is performed while ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance, or Copy-on-write SnapShot is in use
- When the format is performed during execution of the forced parity correction.

The host performance and the standard of the format time when each format priority mode is specified are shown below. <sup>(†1)</sup>

No.	Mode	1 LU/CTL format			6 LU/CTL format		
		Without host access	With host access		Without host access	With host access	
		Format performance (*1)	Host performance (*2)	Format performance (*1)	Format performance (*1)	Host performance (*2)	Format performance (*1)
1	Normal (*1)	100 %	75 %	7 %	100 %	75 %	25 %
2	Host	7 %	85 %	5 %	30 %	90 %	20 %
3	Format	100 %	35 %	90 %	100 %	30 %	90 %

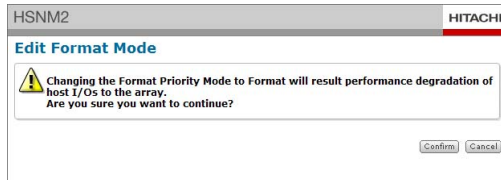
\*1 : The format performance is described as 100 % when the format priority mode is set to “Standard” and the format is executed in the condition that there is no access from the host computer.

\*2 : The host performance is 100 % when the format is not performed.

(c) Check that the set contents are correct.

If the [Cancel] button is clicked, the change content is cancelled. Click the [OK] button to terminate the setting.

(d) Check the confirmation message in the displayed window, and click the [Confirm] button at the lower right corner of window.



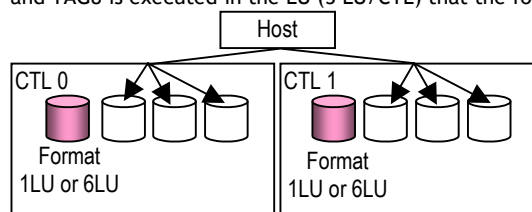
(e) The following message is displayed. Click the [Close] button.



‡1 : The comparative performance is for the following configuration, and it changes according to the configuration or the amount of the host access. Also, the comparative performance changes for the host access for the LU in format.

Configuration of the performance measurement and explanation of the condition

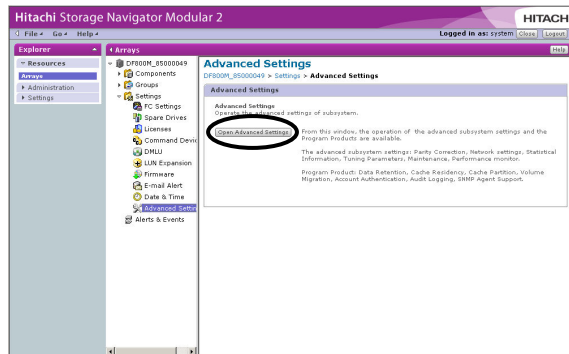
- All the LUs are created in another RAID Group, and the host I/O of random RD/WR=75 %:25 %, length 4 k bytes and TAG8 is executed in the LU (3 LU/CTL) that the format is not performed.



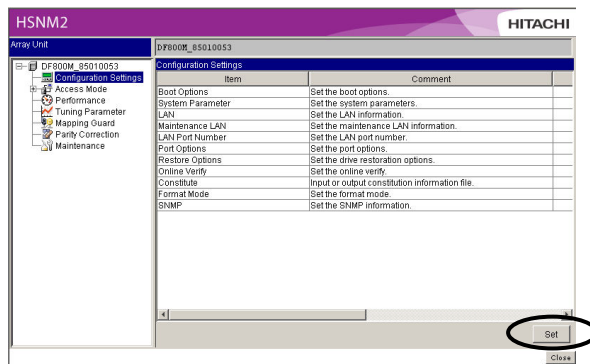


(9-2) When the Hitachi Storage Navigator Modular 2 version is less than Ver.10.0/A.

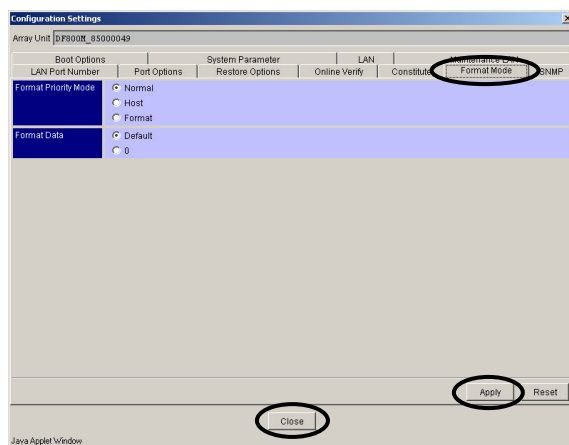
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(c) Click the [Format Mode] tab. The window for setting the “Format Mode” is displayed in the Parameter window.



[Format Priority Mode] : Select a mode for giving/not giving priority to a formatting.

[Normal] : When the load of the host I/O is low, the format processing is executed continuously, and if not, it is executed in every constant interval. This is the setting of default.

- [Host] : When the format priority mode is “Normal” and the format is performed during the copy/restoration of ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance, or Copy-on-write SnapShot, the copy/restoration performance may be greatly deteriorated. In that case, make the format priority mode “Host” and limit the operation of the format.  
The format processing is executed in every constant interval according to the load of the host I/O. The deterioration of the host I/O performance is reduced.
- [Format] : The “Format” of the format priority mode is a mode that makes the effect by the host access a minimum and completes the format quickly for the format online by the Disk Drive addition or the format online by the recovery work for the dual failures of the Disk Drive.  
The format processing is executed regardless of the load of the host I/O. The host access performance may be deteriorated in the meantime because the host I/O processing which can be executed per unit of time decreases substantially.
- [Format Data] : Select to a format Data.
- [Default] : A formatting is performed when default Data.
- [0] : A formatting is performed when 0.  
If the firmware version is less than 0880, this is set when it is necessary to clear the logical unit by the data of 0(zero) connecting the subsystem to Universal Storage Platform or Network Storage Controller.

NOTE : Be careful that “Format” or the format priority mode which restricts the command from the host significantly influences the access performance of the host.  
Also, in the case shown below, if the format priority mode is made “Format”, the host access performance may be greatly deteriorated, or the command may be time-out, so that do not set the format priority mode to “Format”.

- When the host access is performed for LU in the RAID Group which is the same as the LU in format
- When the format is performed while ShadowImage in-system replication, TrueCopy remote replication, TrueCopy Extended Distance, or Copy-on-write SnapShot is in use
- When the format is performed during execution of the forced parity correction.

The host performance and the standard of the format time when each format priority mode is specified are shown below. <sup>(‡1)</sup>

No.	Mode	1 LU/CTL format			6 LU/CTL format		
		Without host access	With host access		Without host access	With host access	
		Format performance (*1)	Host performance (*2)	Format performance (*1)	Format performance (*1)	Host performance (*2)	Format performance (*1)
1	Normal (*1)	100 %	75 %	7 %	100 %	75 %	25 %
2	Host	7 %	85 %	5 %	30 %	90 %	20 %
3	Format	100 %	35 %	90 %	100 %	30 %	90 %

\*1 : The format performance is described as 100 % when the format priority mode is set to “Standard” and the format is executed in the condition that there is no access from the host computer.

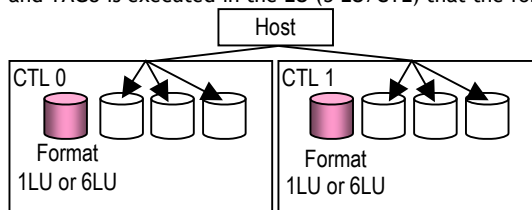
\*2 : The host performance is 100 % when the format is not performed.

- (d) Verify that the changes that has been made is correct and click the [Apply] button. When the [Reset] button is clicked, the change is canceled.

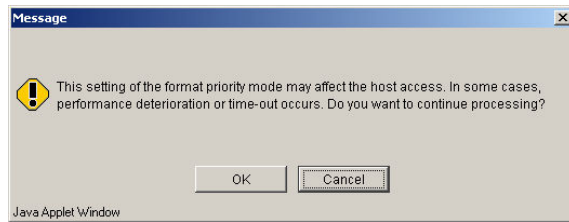
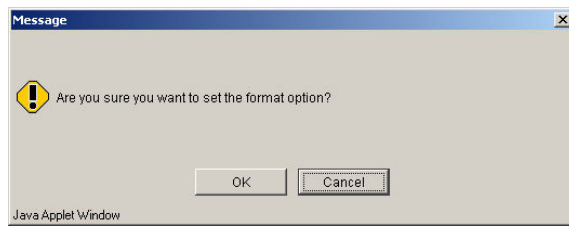
‡1 : The comparative performance is for the following configuration, and it changes according to the configuration or the amount of the host access. Also, the comparative performance changes for the host access for the LU in format.

Configuration of the performance measurement and explanation of the condition

- All the LUs are created in another RAID Group, and the host I/O of random RD/WR=75 %:25 %, length 4 k bytes and TAG8 is executed in the LU (3 LU/CTL) that the format is not performed.



- (e) The confirmation message is displayed. Click the [OK] button.



(If the Format Priority Mode is select to "Format")



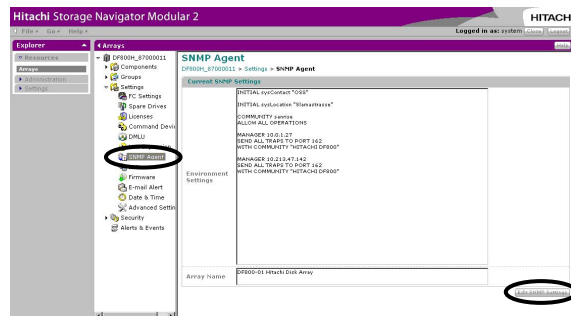
- (f) To terminate the setting, click the [Close] button.

This page is for editorial purpose only.

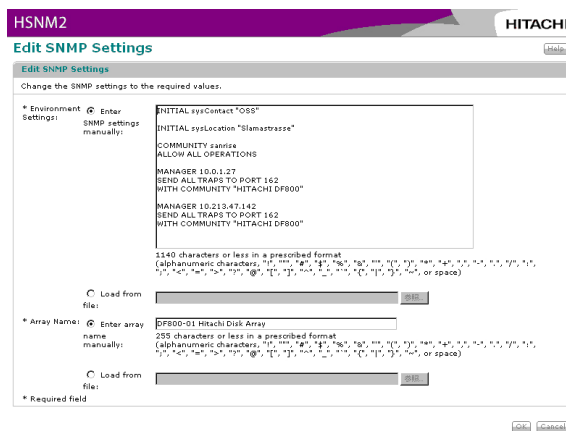
## (10) Setting of SNMP

NOTE : Do not perform setting of SNMP while the READY LED (green) on the front of the Basic Chassis is blinking at high speed (for the maximum of 30 to 50 minutes, or 40 to 60 minutes in case of the RKH).

(a) Select [Settings] - [SNMP Agent] in the unit window. The “SNMP” window is displayed.



When registering newly or correcting it, click “Edit SNMP Settings”.



(b) Setting the operation environment and the disk array system name

(i) Preparation of the operation environment setting file and the disk array name setting file

- The samples of the operation environment setting file (config.txt) and the disk array system name setting file (name.txt) are stored in the priced option program (SNAP). Edit them according to the SNAP environment beforehand.

NOTE : Refer to the manual attached to the priced option program for the editing method.

- Store the edited files (config.txt and name.txt) in the service PC.  
Example) \\Windows (or WinNT)\\Temp\\

(ii) Loading the edited files

- Select “File Input” for setting the operation environment, click [Reference], and select the operation environment setting file (config.txt).
- Select “File Input” for setting the array subsystem name, click [Reference], and specify the path where the array subsystem name setting file (name.txt) is stored.
- Click the [OK] button.

(c) Click the [Close] button.



## (11) Setting of LAN Port Number

The port number of the TCP/IP connection used for the communication between the array subsystem and the Hitachi Storage Navigator Modular 2 can be set with the optional LAN Port Number (the range of 1024 to 49151). (The array subsystem default value is “2000”.)

The LAN port number of the array subsystem is set in the Hitachi Storage Navigator Modular 2, and the LAN port number which the Hitachi Storage Navigator Modular 2 uses is set by editing the “services” file of the computer in which the Hitachi Storage Navigator Modular 2 is installed.

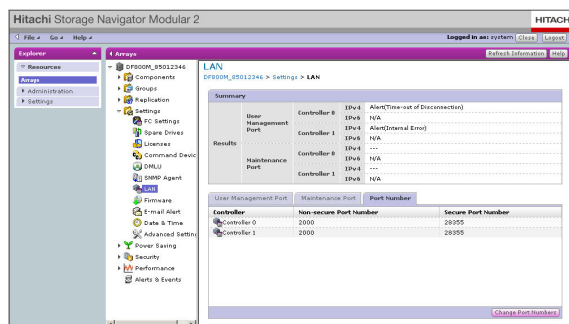
It is required that each LAN port number communicated between the array subsystem and the Hitachi Storage Navigator Modular 2 is set to the same value. Also, the LAN port number of the array subsystem can be set per Control Unit. This LAN port number is common to the LAN port for the user control and the LAN port for the maintenance per Control Unit.

- (11-1) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more .... [SYSPR 04-0370](#)
- (11-2) When Hitachi Storage Navigator Modular 2 is Ver.4.00  
or more and less than 5.00 ... [SYSPR 04-0410](#)
- (11-3) When the Hitachi Storage Navigator Modular 2 is less than Ver.4.00 ... [SYSPR 04-0440](#)

## (11-1) When the Hitachi Storage Navigator Modular 2 is Ver.5.00 or more

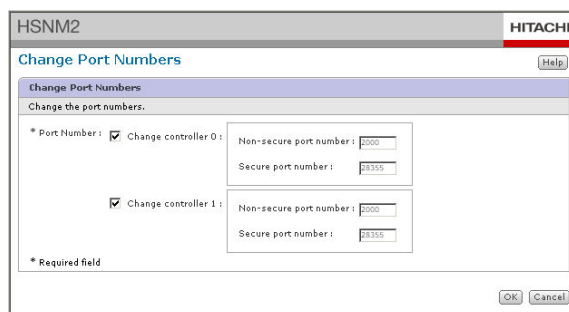
[When LAN is connected to both Control Units and the setting change is performed]

(a) Select [Settings] - [LAN], and select the [Port Number] tab.



(b) Click the [Change Port Numbers] button.

The “Change Port Numbers” window is displayed.





- (c) Set [Non-secure port number] and [Secure port number] for each of Control Unit 0 and Control Unit 1. After confirming it, click the [OK] button displayed at the lower right of the window.

- (d) Check the content of the displayed message (when the port number was changed, if you do not work as described in the message, it may not be able to connect with the array subsystem (refer to (f) (SYSPR 04-0380)), and click the [Close] button displayed at the lower right of the window.

- (e) The window moves to the Arrays window in about 10 seconds after clicking the [Close] button.
- (f) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Hitachi Storage Navigator Modular 2 uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number. When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services),
- Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name> <port number>/<protocol> [<aliases...>] [#<comment>]
#
echo          7/tcp
echo          7/udp
:
:
radacct       1813/udp          # RADIUS accounting protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/udp          # NFS server
knetd         2053/tcp          # Kerberos de-multiplexor
man           9535/tcp          # Remote Man Server
df-damp-snm-ssl 2222/tcp        # Hitachi Storage Navigator Modular 2 (ssl)
:
```

When changing "Normal port number" → 2001

When changing "Secure port number" → 2222

• UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, "Assigned Numbers" (October 1994). Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]
tcpmux      1/tcp          # TCP port service multiplexer
tcpmux      1/udp          # TCP port service multiplexer
.
.
.
gdp-port    1997/tcp       # Cisco Gateway Discovery Protocol
gdp-port    997/udp        # Cisco Gateway Discovery Protocol
df-damp-snm 2001/tcp       # Hitachi Storage Navigator Modular 2
nfs         2049/tcp       nfsd
nfs         2049/udp       nfsd
.
.
df-damp-snm-ssl 22222/tcp   # Hitachi Storage Navigator Modular 2 (ssl)
```

When changing "Normal port number"

When changing "Secure port number"

NOTE : When there is no line of "df-damp-snm" in the services file, use the LAN Port Number of "2000" and connect it.

Also, when it cannot be connected with the LAN Port Number specified in the file, use "2000" and connect it again.

- (g) After starting the Hitachi Storage Navigator Modular 2, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Hitachi Storage Navigator Modular 2, and then check that the unit window is displayed.

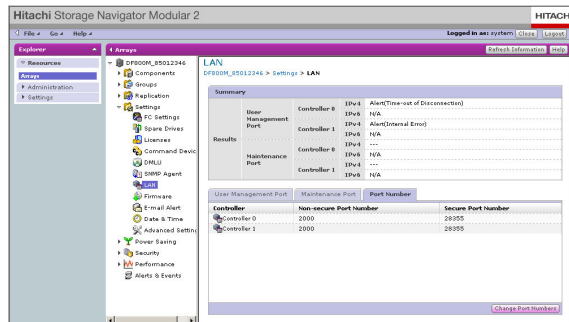
When it is necessary to change the LAN port number used in the Hitachi Storage Navigator Modular 2 installed in the customer's computer, add the port information which the Hitachi Storage Navigator Modular 2 uses (In case of the normal port, a line shows [service-name] as "df-damp-snm", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2". In case of the secure port, a line shows [service-name] as "df-damp-snm-ssl", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2 (ssl)".), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.

Also, when the LAN port number used in the Hitachi Storage Navigator Modular 2 is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.

Delete the backup file of the services file for the service PC as needed.

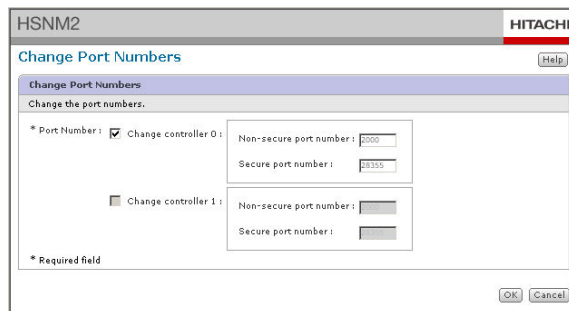
[When LAN is connected to one of the Control Units and the setting change is performed]

(a) Select [Settings] - [LAN], and select the [Port Number] tab.



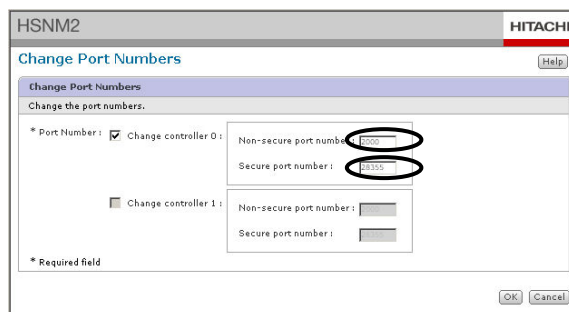
(b) Click the [Change Port Numbers] button.

The "Change Port Numbers" window is displayed.

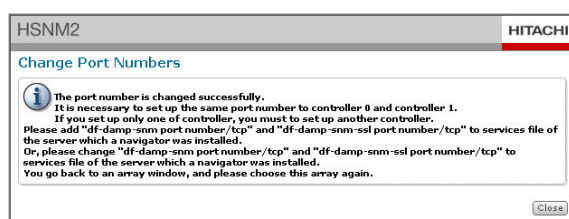


(c) The information on the Control Unit-side connected to the service PC via LAN is displayed in the activated status. The operation procedure is shown here on the assumption that the service PC is connected to Control Unit #0 of the array subsystem.

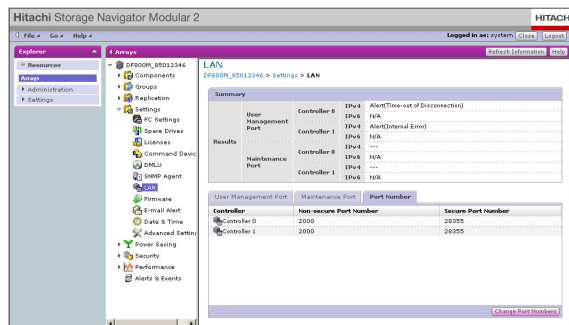
Set [Normal Port Number] and [Secure Port Number] for Control Unit 0. After confirming it, click the [OK] button displayed at the lower right of the window.



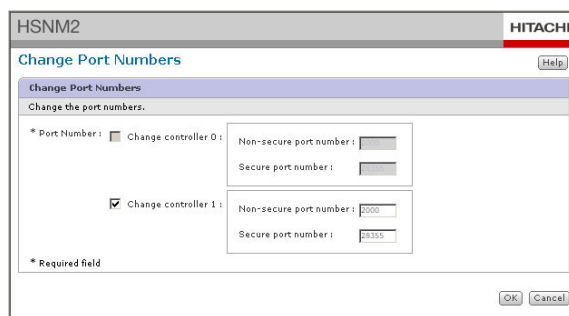
(d) Check the content of the displayed message, and click the [Close] button displayed at the lower right of the window.



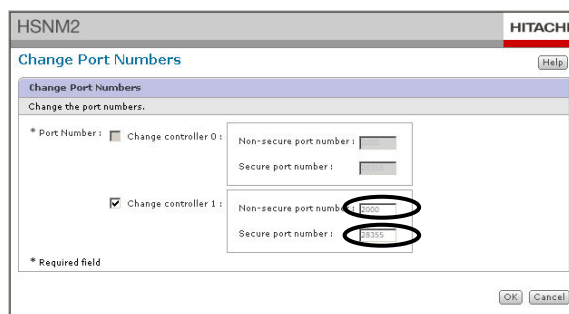
- (e) The window moves to the Arrays window in about 10 seconds after clicking the [Close] button.
- (f) Switch the LAN cable connection of Hitachi Storage Navigator Modular 2 to the Control Unit #1-side. Edit the array subsystem concerned in the array list window and set the IP address of Control Unit #1. After the edit, select the array subsystem concerned in the array list window.
- (g) Select [Settings] - [LAN], and select the [Port Number] tab.



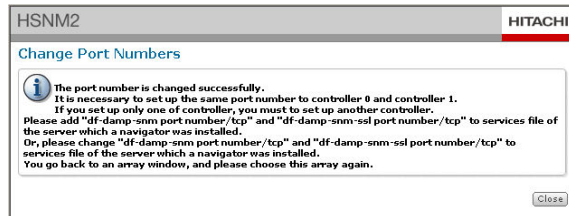
- (h) Click the [Change Port Numbers] button.  
The "Change Port Numbers" window is displayed.



- (i) Set [Normal Port Number] and [Secure Port Number] for Control Unit 1. After confirming it, click the [OK] button displayed at the lower right of the window.



- (j) Check the content of the displayed message (when the port number was changed, if you do not work as described in the message, it may not be able to connect with the array subsystem (refer to (l) (SYSPR 04-0402)), and click the [Close] button displayed at the lower right of the window.



- (k) The window moves to the Arrays window in about 10 seconds after clicking the [Close] button.
- (l) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Hitachi Storage Navigator Modular 2 uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.
- When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services),
- Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
echo          7/tcp
echo          7/udp
.
.
radacct       1813/udp          # RADIUS accounting protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/udp          # NFS server
knetd         2053/tcp          # Kerberos de-multiplexor
man           9535/tcp          # Remote Man Server
df-damp-snm-ssl 22222/tcp       # Hitachi Storage Navigator Modular 2 (ssl)
.
```

When changing "Normal port number" →

When changing "Secure port number" →

- UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, "Assigned Numbers" (October 1994). Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]
tcpmux          1/tcp          # TCP port service multiplexer
tcpmux          1/udp          # TCP port service multiplexer
.
.
.
gdp-port        1997/tcp       # Cisco Gateway Discovery Protocol
gdp-port 1      997/udp        # Cisco Gateway Discovery Protocol
df-damp-snm     2001/tcp       # Hitachi Storage Navigator Modular 2
nfs             2049/tcp       nfsd
nfs             2049/udp       nfsd
.
.
df-damp-snm-ssl 22222/tcp      # Hitachi Storage Navigator Modular 2 (ssl)
```

When changing "Normal port number"

When changing "Secure port number"

NOTE : When there is no line of "df-damp-snm" in the services file, use the LAN Port Number of "2000" and connect it.

Also, when it cannot be connected with the LAN Port Number specified in the file, use "2000" and connect it again.

- (m) After starting the Hitachi Storage Navigator Modular 2, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Hitachi Storage Navigator Modular 2, and then check that the unit window is displayed.

When it is necessary to change the LAN port number used in the Hitachi Storage Navigator Modular 2 installed in the customer's computer, add the port information which the Hitachi Storage Navigator Modular 2 uses (In case of the normal port, a line shows [service-name] as "df-damp-snm", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2". In case of the secure port, a line shows [service-name] as "df-damp-snm-ssl", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2 (ssl)".), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.

Also, when the LAN port number used in the Hitachi Storage Navigator Modular 2 is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.

Delete the backup file of the services file for the service PC as needed.

**[Recovery method]**

When a problem occurs during the LAN Port Number change work, recover it according to the following procedure.

- (a) When the setting of either Control Unit failed (Or, when setting the LAN Port Number for every Control Unit)

Connect the LAN cable only to the Control Unit to be set and perform the setting change of the LAN Port Number.

- (i) Set the LAN Port Number of the Control Unit to be set in the services file.

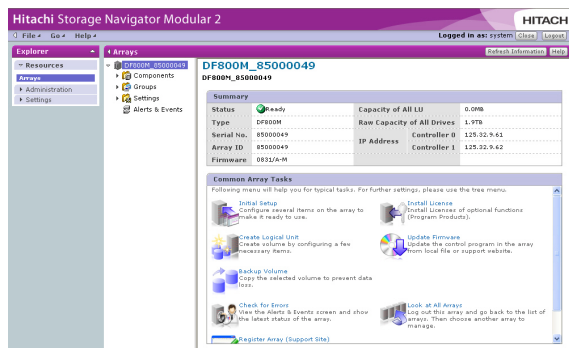
If it is unknown, check it using the WEB browser. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))

- (ii) Connect the LAN cable only to the Control Unit to be set, and register it in the Hitachi Storage Navigator Modular 2 with the IP address of the Control Unit concerned.

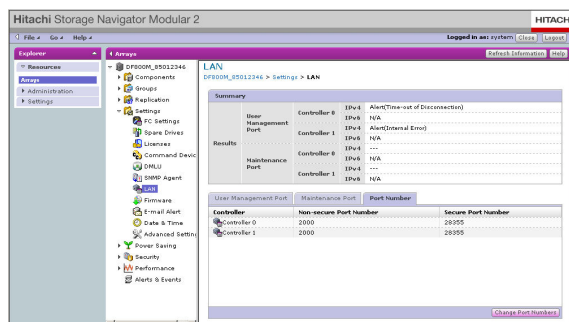
- (iii) Started the Hitachi Storage Navigator Modular 2.

- (iv) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to [“1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\).](#))



- (v) Select [Settings] - [LAN], and select the [Port Number] tab.



- (vi) Click the [Change Port Numbers] button.  
The “Change Port Numbers” window is displayed.

- (vii) Select the radio button of the Control Unit to be set, and enter the LAN Port Number to be set in the text file of the [Port Number].  
Setting the LAN Port Number of the other Control Unit which has already performed the setting change.
- (viii) Click the [OK] button.
- (ix) Check the content of the displayed message, and click the [Close] button displayed at the lower right of the window.

- (x) Edit the services file to the new LAN Port Number.
- (xi) Check that the Hitachi Storage Navigator Modular 2 can be started again.
- (b) Although the LAN Port Number of the services file and the LAN Port Number set in the array subsystem are same, the Hitachi Storage Navigator Modular 2 cannot be accessed to the array subsystem.
- (i) Check the LAN Port Number of the services file and the LAN Port Number of the array subsystem by the WEB browser again. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\)](#).)



(c) Already when it is not possible to accessed it from Hitachi Storage Navigator Modular 2 to the array subsystem.

(i) Confirm both Control Units are same LAN Port Number. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))

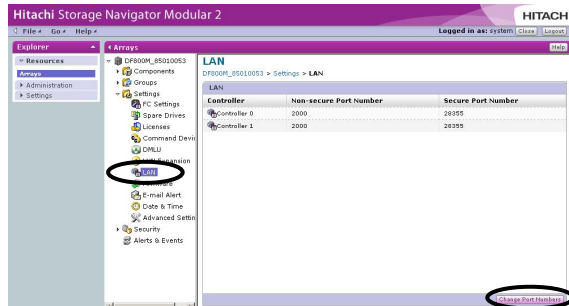
Register to the services file, and start Hitachi Storage Navigator Modular 2.

(ii) If they are still same, there is a possibility that LAN Port Number overlaps with other equipment.

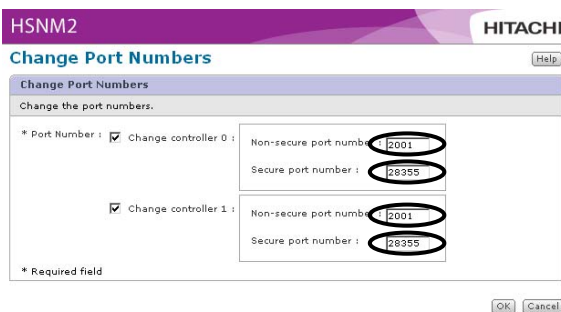
When this is verified, connect LAN crossing cable directly with the LAN port of the control unit in the Subsystem and change the LAN port number.

Please set it by one. (Refer to “[[When LAN is connected to one of the Control Units and the setting change is performed](#)]” (SYSPR 04-0400).)

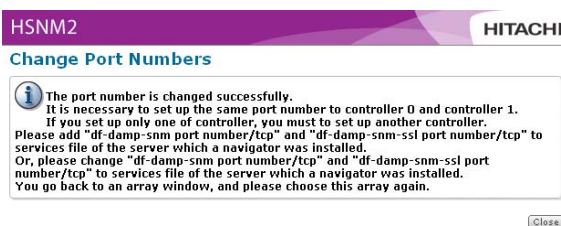
- (11-2) When Hitachi Storage Navigator Modular 2 is Ver.4.00 or more and less than 5.00  
 [When LAN is connected to both Control Units and the setting change is performed]  
 (a) Select [Settings] - [LAN] in the unit window, and click the [Change Port Numbers] button displayed at the lower right of the window.



- (b) Check the checkboxes of [Change controller 0] and [Change controller 1], and set the [Non-secure port number] and [Secure port number] for each. After confirming it, click the [OK] button displayed at the lower right of the window.



- (c) Check the content of the displayed message (when the port number was changed, if you do not work as described in the message, it may not be able to connect with the array subsystem (refer to (e) (SYSPR 04-0420)), and click the [Close] button displayed at the lower right of the window.



- (d) The window moves to the Arrays window in about 10 seconds after clicking the [Close] button.

- (e) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Hitachi Storage Navigator Modular 2 uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.

When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services),  
Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
echo          7/tcp
echo          7/udp
.
.
.
radacct       1813/udp          # RADIUS accounting protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/udp          # NFS server
knetd         2053/tcp          # Kerberos de-multiplexor
man           9535/tcp          # Remote Man Server
df-damp-snm-ssl 22222/tcp       # Hitachi Storage Navigator Modular 2 (ssl)
```

When changing "Normal port number" →

When changing "Secure port number" →

- UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, "Assigned Numbers" (October 1994). Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]
#
tcpmux        1/tcp             # TCP port service multiplexer
tcpmux        1/udp             # TCP port service multiplexer
.
.
.
gdp-port      1997/tcp          # Cisco Gateway Discovery Protocol
gdp-port      997/udp           # Cisco Gateway Discovery Protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/tcp          # NFS server
nfs           2049/udp          # NFS server
df-damp-snm-ssl 22222/tcp       # Hitachi Storage Navigator Modular 2 (ssl)
```

When changing "Normal port number" →

When changing "Secure port number" →

NOTE : When there is no line of "df-damp-snm" in the services file, use the LAN Port Number of "2000" and connect it.

Also, when it cannot be connected with the LAN Port Number specified in the file, use "2000" and connect it again.

- (f) After starting the Hitachi Storage Navigator Modular 2, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Hitachi Storage Navigator Modular 2, and then check that the unit window is displayed.

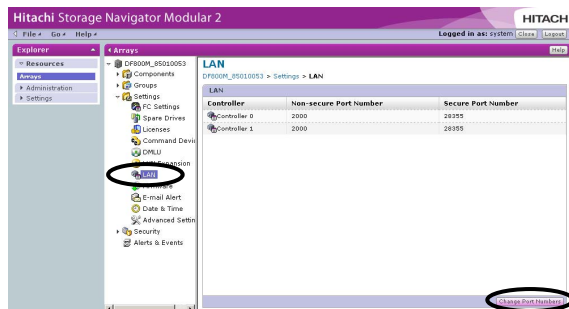
When it is necessary to change the LAN port number used in the Hitachi Storage Navigator Modular 2 installed in the customer's computer, add the port information which the Hitachi Storage Navigator Modular 2 uses (In case of the normal port, a line shows [service-name] as "df-damp-snm", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2". In case of the secure port, a line shows [service-name] as "df-damp-snm-ssl", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2 (ssl)".), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.

Also, when the LAN port number used in the Hitachi Storage Navigator Modular 2 is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.

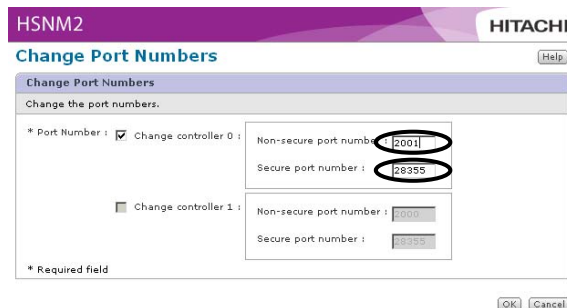
Delete the backup file of the services file for the service PC as needed.

[When LAN is connected to one of the Control Units and the setting change is performed]

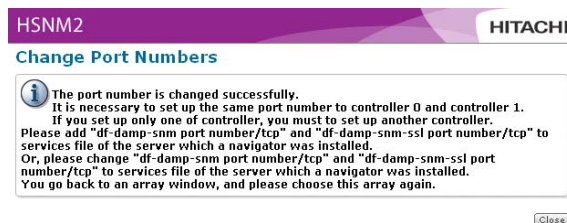
- (a) Select [Settings] - [LAN] in the unit window, and click the [Change Port Numbers] button displayed at the lower right of the window.



- (b) The information on the Control Unit-side connected to the service PC via LAN is displayed in the activated status. The operation procedure is shown here on the assumption that the service PC is connected to Control Unit #0 of the array subsystem. Check the checkbox of only [Change controller 0], and set the [Non-secure port number] and [Secure port number]. After confirming it, click the [OK] button displayed at the lower right of the window.

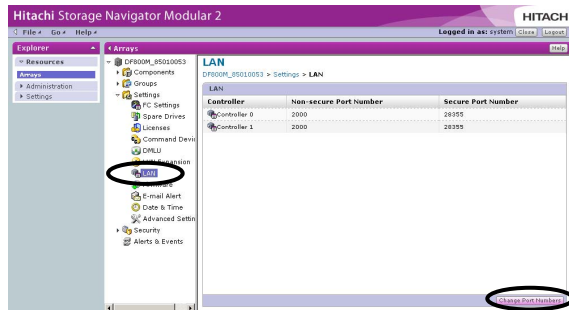


- (c) Check the content of the displayed message, and click the [Close] button displayed at the lower right of the window.

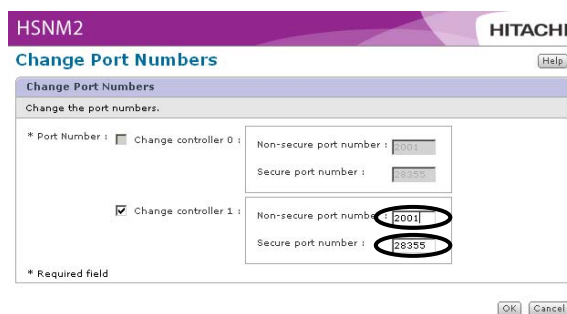


- (d) The window moves to the Arrays window in about 10 seconds after clicking the [Close] button.
- (e) Switch the LAN cable connection of Hitachi Storage Navigator Modular 2 to the Control Unit #1-side. Edit the array subsystem concerned in the array list window and set the IP address of Control Unit #1. After the edit, select the array subsystem concerned in the array list window.

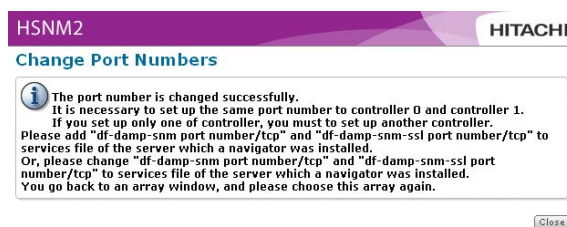
- (f) Select [Settings] - [LAN] in the unit window, and click the [Change Port Numbers] button displayed at the lower right of the window.



- (g) Check the checkbox of only [Change controller 1], and set the [Non-secure port number] and [Secure port number]. After confirming it, click the [OK] button displayed at the lower right of the window.



- (h) Check the content of the displayed message (when the port number was changed, if you do not work as described in the message, it may not be able to connect with the array subsystem (refer to (j) (SYSPR 04-0433)), and click the [Close] button displayed at the lower right of the window.



- (i) The window moves to the Arrays window in about 10 seconds after clicking the [Close] button.

- (j) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Hitachi Storage Navigator Modular 2 uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.

When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services),  
Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
echo          7/tcp
echo          7/udp
.
.
.
radacct      1813/udp          # RADIUS accounting protocol
df-damp-snm  2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd         2049/udp          # NFS server
knetd        2053/tcp          # Kerberos de-multiplexor
man          9535/tcp          # Remote Man Server
df-damp-snm-ssl 2222/tcp      # Hitachi Storage Navigator Modular 2 (ssl)
```

When changing "Normal port number" →

When changing "Secure port number" →

- UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, "Assigned Numbers" (October 1994). Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]
#
tcpmux        1/tcp          # TCP port service multiplexer
tcpmux        1/udp          # TCP port service multiplexer
.
.
.
gdp-port      1997/tcp          # Cisco Gateway Discovery Protocol
gdp-port      997/udp          # Cisco Gateway Discovery Protocol
df-damp-snm    2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/tcp          # NFS server
nfs           2049/udp          # NFS server
df-damp-snm-ssl 2222/tcp      # Hitachi Storage Navigator Modular 2 (ssl)
```

When changing "Normal port number" →

When changing "Secure port number" →

NOTE : When there is no line of "df-damp-snm" in the services file, use the LAN Port Number of "2000" and connect it.

Also, when it cannot be connected with the LAN Port Number specified in the file, use "2000" and connect it again.

- (k) After starting the Hitachi Storage Navigator Modular 2, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Hitachi Storage Navigator Modular 2, and then check that the unit window is displayed.

When it is necessary to change the LAN port number used in the Hitachi Storage Navigator Modular 2 installed in the customer's computer, add the port information which the Hitachi Storage Navigator Modular 2 uses (In case of the normal port, a line shows [service-name] as "df-damp-snm", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2". In case of the secure port, a line shows [service-name] as "df-damp-snm-ssl", [port/protocol] as "<Set LAN Port Number>/tcp", and [comment] as "# Hitachi Storage Navigator Modular 2 (ssl)".), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.

Also, when the LAN port number used in the Hitachi Storage Navigator Modular 2 is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.

Delete the backup file of the services file for the service PC as needed.



**[Recovery method]**

When a problem occurs during the LAN Port Number change work, recover it according to the following procedure.

- (a) When the setting of either Control Unit failed (Or, when setting the LAN Port Number for every Control Unit)

Connect the LAN cable only to the Control Unit to be set and perform the setting change of the LAN Port Number.

- (i) Set the LAN Port Number of the Control Unit to be set in the services file.

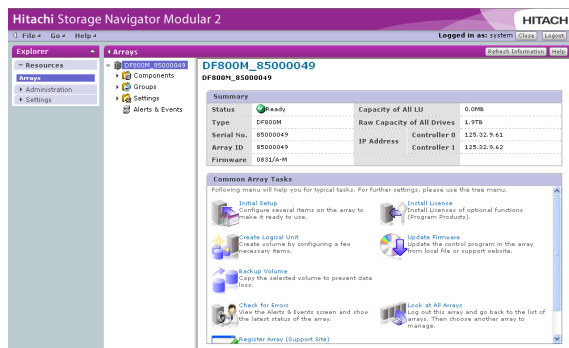
If it is unknown, check it using the WEB browser. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))

- (ii) Connect the LAN cable only to the Control Unit to be set, and register it in the Hitachi Storage Navigator Modular 2 with the IP address of the Control Unit concerned.

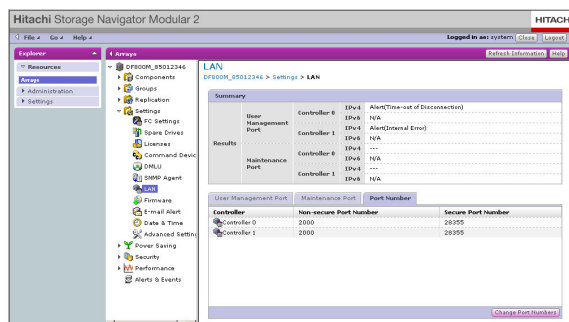
- (iii) Started the Hitachi Storage Navigator Modular 2.

- (iv) Click the array subsystem name, and open the unit window.

**NOTE :** There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to [“1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\).](#))



- (v) Select [Settings] - [LAN], and select the [Port Number] tab.



- (vi) Click the [Port Numbers] button.

The “Change Port Numbers” window is displayed.

- (vii) Select the radio button of the Control Unit to be set, and enter the LAN Port Number to be set in the text file of the [Port Number].

Setting the LAN Port Number of the other Control Unit which has already performed the setting change.

- (viii) Click the [OK] button.

- (ix) Check the content of the displayed message, and click the [Close] button displayed at the lower right of the window.

- (x) Edit the services file to the new LAN Port Number.

- (xi) Check that the Hitachi Storage Navigator Modular 2 can be started again.

- (b) Although the LAN Port Number of the services file and the LAN Port Number set in the array subsystem are same, the Hitachi Storage Navigator Modular 2 cannot be accessed to the array subsystem.

- (i) Check the LAN Port Number of the services file and the LAN Port Number of the array subsystem by the WEB browser again. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))

(c) Already when it is not possible to accessed it from Hitachi Storage Navigator Modular 2 to the array subsystem.

(i) Confirm both Control Units are same LAN Port Number. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))

Register to the services file, and start Hitachi Storage Navigator Modular 2.

(ii) If they are still same, there is a possibility that LAN Port Number overlaps with other equipment.

When this is verified, connect LAN crossing cable directly with the LAN port of the control unit in the Subsystem and change the LAN port number.

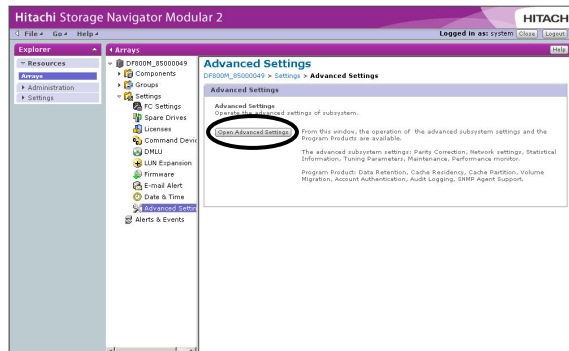
Please set it by one. (Refer to “[[When LAN is connected to one of the Control Units and the setting change is performed](#)]” (SYSPR 04-0431).)

This page is for editorial purpose only.

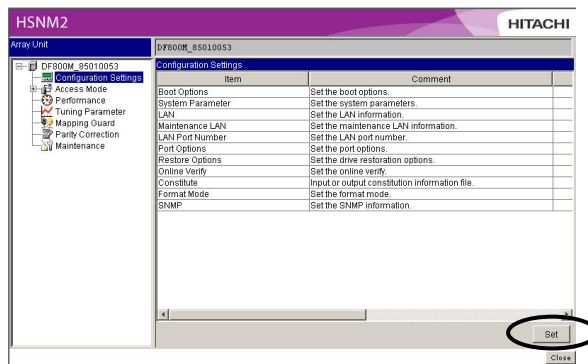
(11-3) When the Hitachi Storage Navigator Modular 2 is less than Ver.4.00

[When LAN is connected to both Control Units and the setting change is performed]

(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



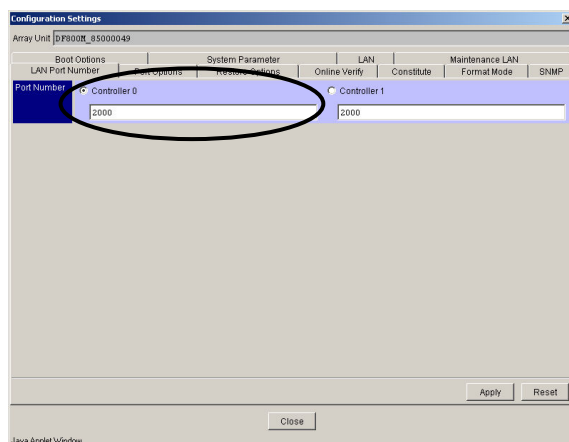
(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(c) Click the [LAN Port Number] tab. The setting window of “LAN Port Number” is displayed on the parameter window.

Only the information on the Control Unit side connected to the service PC through LAN is displayed in the activated status.

First of all, the work procedure is displayed here based on the case where the service PC is connected to the Control Unit #0 of the array subsystem.

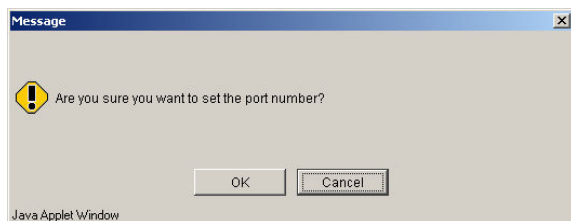


① [Port Number] : Refer to/set the LAN Port Number.

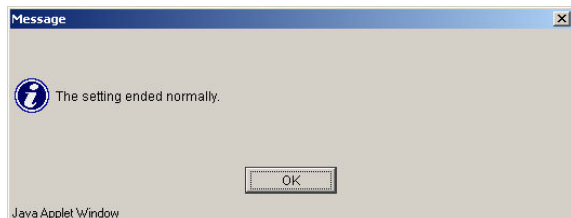
- (d) Click the radio button of the Control Unit 0, and enter the LAN Port Number to be set.  
Enter a port number that is not used by the OS that is operating Hitachi Storage Navigator Modular 2, various types of applications, etc. in the port number field.

NOTE : Set the LAN Port Number one side each. Here, the operation set in the order of the Control Unit 0 to the Control Unit 1 is shown.

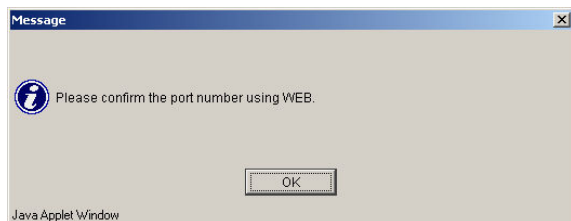
- (e) Click the [Apply] button.  
(f) The following message appears. Click the [OK] button.



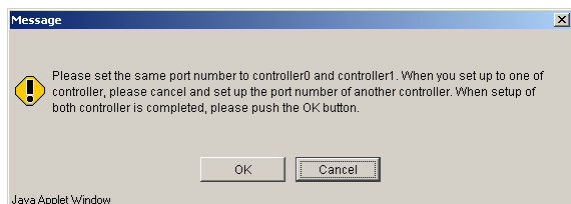
- (g) Click the [OK] button.



- (h) The following message appears. Click the [OK] button after referring to WEB that it is set correctly. (Refer to [WEB "2.6 Network Information" \(WEB 02-0120\).](#))

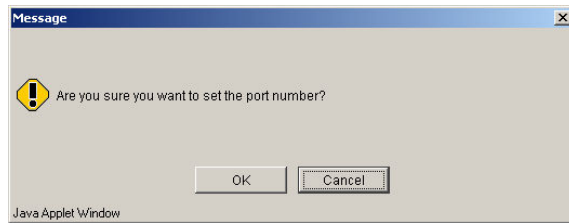


- (i) Only the Control Unit 0 side was set, so that click the [Cancel] button.

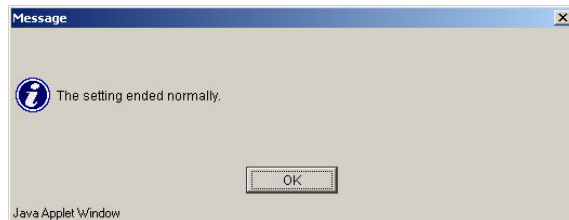


- (j) Select the radio button of [Control Unit 1], and enter the port number to be set in the text field of [Port Number]. Enter the set value in Control Unit 0.  
(k) Click the [Apply] button.

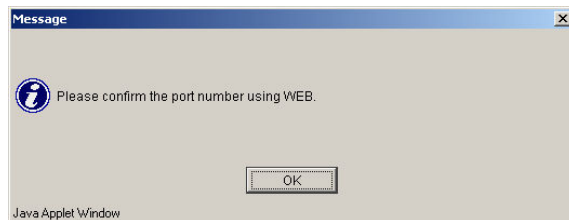
- (l) The confirmation message is displayed. Click the [OK] button.



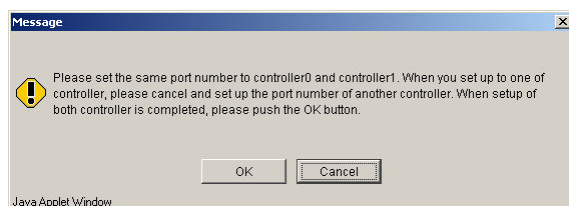
- (m) Click the [OK] button.



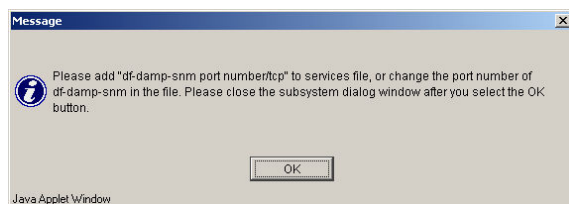
- (n) The following message appears. Click the [OK] button after referring to WEB that it is set correctly. (Refer to [WEB "2.6 Network Information" \(WEB 02-0120\).](#))



- (o) Click the [OK] button.



- (p) Click the [OK] button. The Unit screen is closed.



- (q) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Hitachi Storage Navigator Modular 2 uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.

When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services),  
Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
echo          7/tcp
echo          7/udp
.
.
.
radacct       1813/udp          # RADIUS accounting protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/udp  nfs     # NFS server
knetd         2053/tcp          # Kerberos de-multiplexor
man           9535/tcp          # Remote Man Server
```

- UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, "Assigned Numbers" (October 1994). Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]
#
tcpmux        1/tcp             # TCP port service multiplexer
tcpmux        1/udp             # TCP port service multiplexer
.
.
.
gdp-port      1997/tcp          # Cisco Gateway Discovery Protocol
gdp-port 1    997/udp          # Cisco Gateway Discovery Protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfs           2049/tcp  nfsd    #
nfs           2049/udp  nfsd    #
```

NOTE : When there is no line of “df-damp-snm” in the services file, use the LAN Port Number of “2000” and connect it.

Also, when it cannot be connected with the LAN Port Number specified in the file, use “2000” and connect it again.



- (r) After starting the Hitachi Storage Navigator Modular 2, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Hitachi Storage Navigator Modular 2, and then check that the unit window is displayed.

When it is necessary to change the LAN port number used in the Hitachi Storage Navigator Modular 2 installed in the customer's computer, add the port information which the Hitachi Storage Navigator Modular 2 uses (a line where [service-name] is "df-damp-snm", [port/protocol] is "(set LAN Port Number)/tcp" and [comment] is "# Hitachi Storage Navigator Modular 2"), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.

Also, when the LAN port number used in the Hitachi Storage Navigator Modular 2 is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.

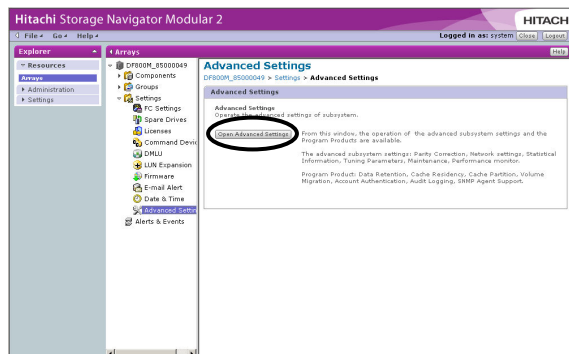
Delete the backup file of the services file for the service PC as needed.

[When LAN is connected to one of the Control Units and the setting change is performed]

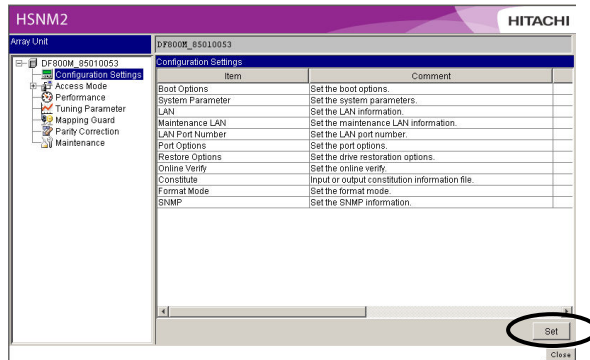
Connect the PC to the Control Unit side where the setting change is performed, and open the configuration setting window of the Hitachi Storage Navigator Modular 2. The procedure for setting the Control Unit 1 after setting the Control Unit 0 is displayed here.

NOTE : When performing the setting change for one of every Control Units, perform the subsystem registration to the Hitachi Storage Navigator Modular 2 in one of every Control Units. It takes more than usual time when connecting it to one of the Control Units by using the subsystem registration information of both Control Units.

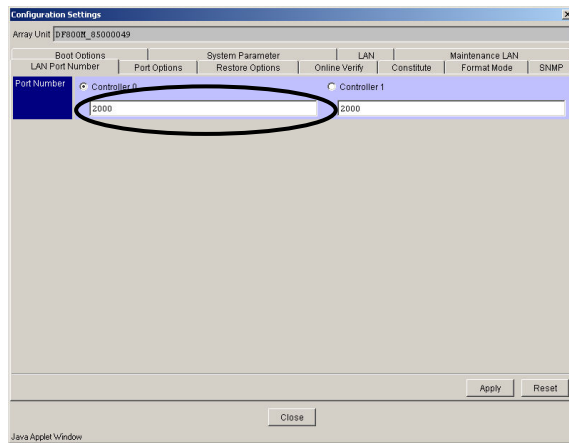
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



- (c) Click the [LAN Port Number] tab. The setting window of “LAN Port Number” is displayed on the parameter window.



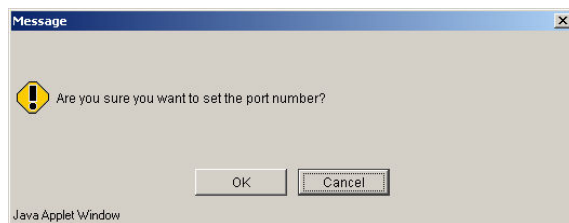
- ① [Port Number] : Refer to/set the LAN Port Number.

- (d) Enter the LAN Port Number to be set.

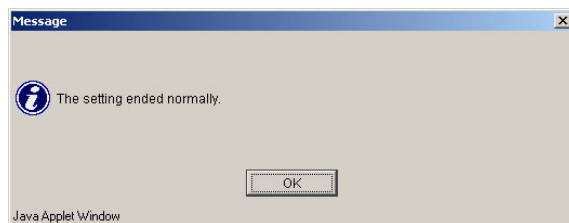
Enter a port number that is not used by the OS that is operating Hitachi Storage Navigator Modular 2, various types of applications, etc. in the port number field.

- (e) Click the [Apply] button.

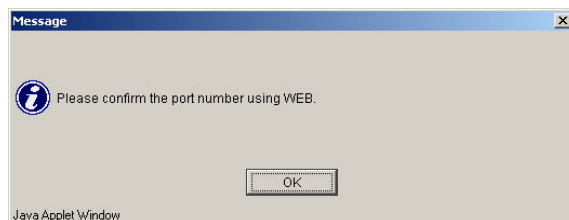
- (f) The following message appears. Click the [OK] button.



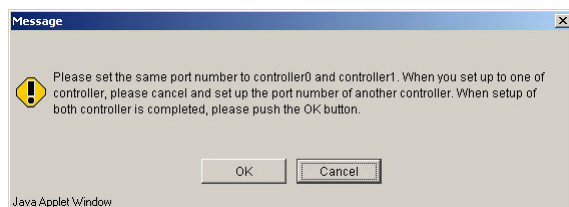
- (g) Click the [OK] button.



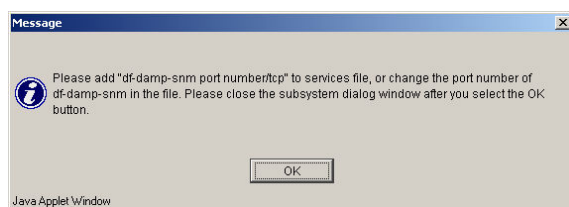
- (h) The following message appears. Click the [OK] button after referring to WEB that it is set correctly. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))



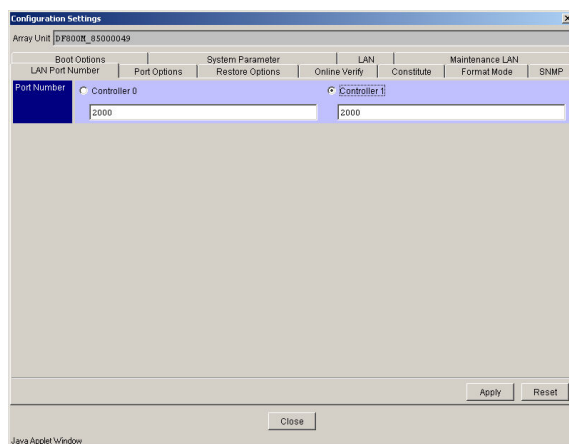
- (i) Click the [OK] button.



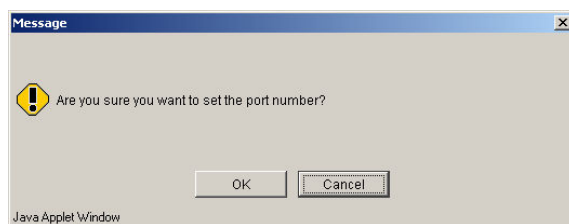
- (j) Click the [OK] button. The Unit screen is closed.



- (k) Switch the connection of the Hitachi Storage Navigator Modular 2 to the Control Unit 1 side. After that, click the [LAN Port Number] tab. The setting window of "LAN Port Number" is displayed in the Parameter window.



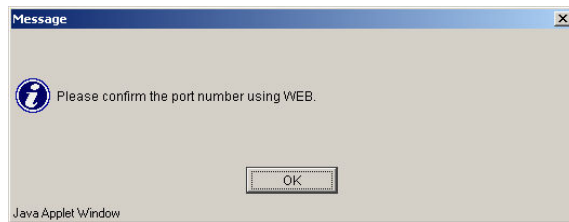
- (l) Enter the LAN Port Number to be set.  
Enter a port number that is not used by the OS that is operating Hitachi Storage Navigator Modular 2, various types of applications, etc. in the port number field.
- (m) Click the [Apply] button.
- (n) The following message appears. Click the [OK] button.



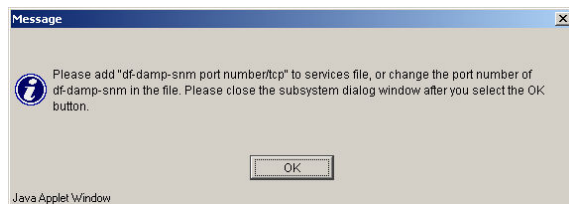
(o) Click the [OK] button.



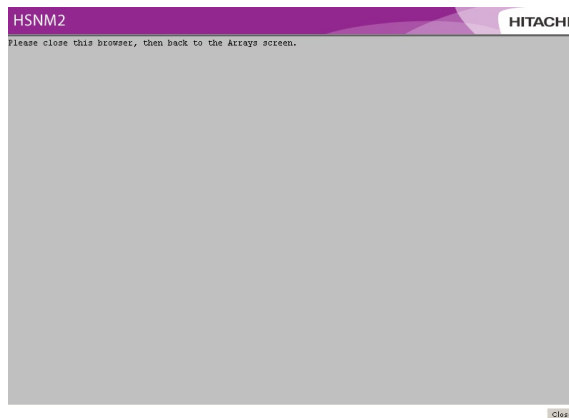
(p) The following message appears. Click the [OK] button after referring to WEB that it is set correctly. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\)](#).)



(q) Click the [OK] button. The Unit screen is closed.



(r) Click the [Close] button.



- (s) After creating the backup file of the services file for the service PC, open the original services file, add the LAN port number which the Hitachi Storage Navigator Modular 2 uses (underlined part), and then overwrite and save it. Enter the same number as the set number in the array subsystem for the LAN Port Number.

When adding it to the last line, the return code is needed at the end of the input line.

- Windows 2000 (C:\WINNT\system32\drivers\etc\services),  
Windows XP (C:\WINDOWS\system32\drivers\etc\services)

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This file contains port numbers for well-known services defined by IANA
#
# Format:
#
# <service name> <port number>/<protocol> [aliases...] [#<comment>]
#
echo          7/tcp
echo          7/udp
:
:
:
radacct       1813/udp          # RADIUS accounting protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfsd          2049/udp  nfs      # NFS server
knetd         2053/tcp          # Kerberos de-multiplexor
man           9535/tcp          # Remote Man Server
```

- UNIX (/etc/services)

```
# /etc/services:
# $Id: services,v 1.31 2002/04/03 16:53:20 notting Exp $
#
# Network services, Internet style
#
# Note that it is presently the policy of IANA to assign a single well-known
# port number for both TCP and UDP; hence, most entries here have two entries
# even if the protocol doesn't support UDP operations.
# Updated from RFC 1700, "Assigned Numbers" (October 1994). Not all ports
# are included, only the more common ones.
#
# The latest IANA port assignments can be gotten from
#   http://www.iana.org/assignments/port-numbers
# The Well Known Ports are those from 0 through 1023.
# The Registered Ports are those from 1024 through 49151
# The Dynamic and/or Private Ports are those from 49152 through 65535
#
# Each line describes one service, and is of the form:
#
# service-name port/protocol [aliases ...] [# comment]
#
tcpmux        1/tcp             # TCP port service multiplexer
tcpmux        1/udp             # TCP port service multiplexer
:
:
:
gdp-port      1997/tcp          # Cisco Gateway Discovery Protocol
gdp-port 1    997/udp          # Cisco Gateway Discovery Protocol
df-damp-snm   2001/tcp          # Hitachi Storage Navigator Modular 2
nfs           2049/tcp  nfsd
nfs           2049/udp  nfsd
```

NOTE : When there is no line of “df-damp-snm” in the services file, use the LAN Port Number of “2000” and connect it.

Also, when it cannot be connected with the LAN Port Number specified in the file, use “2000” and connect it again.

- (t) After starting the Hitachi Storage Navigator Modular 2, click the icon of the array subsystem whose LAN Port Number was changed in the main window of the Hitachi Storage Navigator Modular 2, and then check that the unit window is displayed.

When it is necessary to change the LAN port number used in the Hitachi Storage Navigator Modular 2 installed in the customer's computer, add the port information which the Hitachi Storage Navigator Modular 2 uses (a line where [service-name] is "df-damp-snm", [port/protocol] is "(set LAN Port Number)/tcp" and [comment] is "# Hitachi Storage Navigator Modular 2"), to the services file, and then request the customer's network administrator to check that the unit window of the array subsystem is displayed.

Also, when the LAN port number used in the Hitachi Storage Navigator Modular 2 is set to other than "2000" for the services file for the service PC, reset the LAN port number to the default value "2000" after completing all works, and then save the services file.

Delete the backup file of the services file for the service PC as needed.

**[Recovery method]**

When a problem occurs during the LAN Port Number change work, recover it according to the following procedure.

- (a) When the setting of either Control Unit failed (Or, when setting the LAN Port Number for every Control Unit)

Connect the LAN cable only to the Control Unit to be set and perform the setting change of the LAN Port Number.

- (i) Set the LAN Port Number of the Control Unit to be set in the services file.

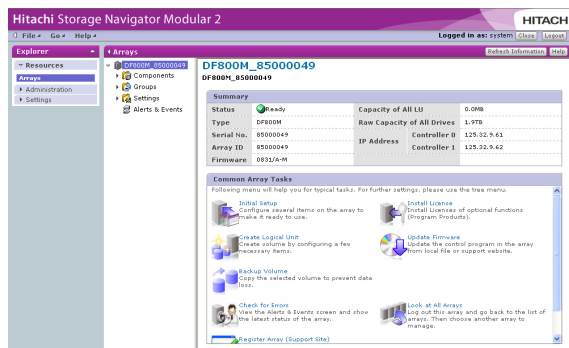
If it is unknown, check it using the WEB browser. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))

- (ii) Connect the LAN cable only to the Control Unit to be set, and register it in the Hitachi Storage Navigator Modular 2 with the IP address of the Control Unit concerned.

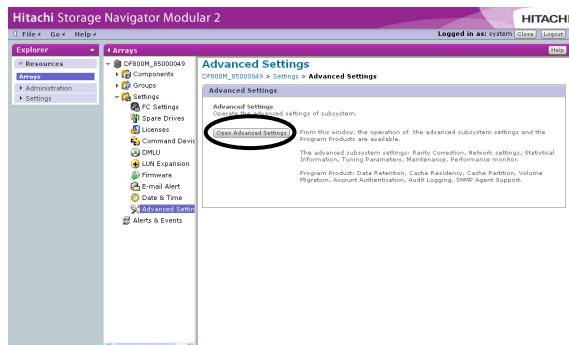
- (iii) Started the Hitachi Storage Navigator Modular 2.

- (iv) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to [“1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\).](#))

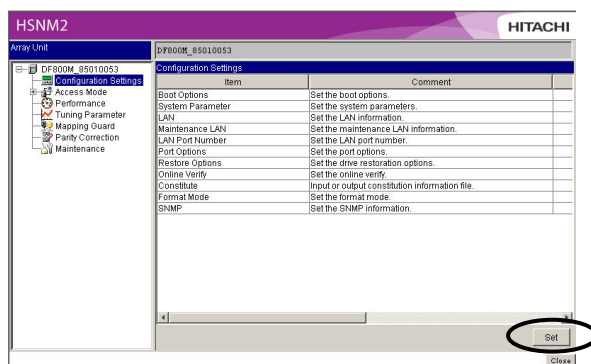


- (v) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.





(vi) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(vii) Select [Tools] – [Configuration Settings] in the unit window.

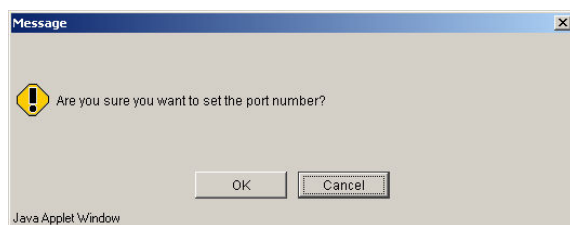
(viii) Click the [LAN Port Number] tab.

(ix) Select the radio button of the Control Unit to be set, and enter the LAN Port Number to be set in the text file of the [Port Number].

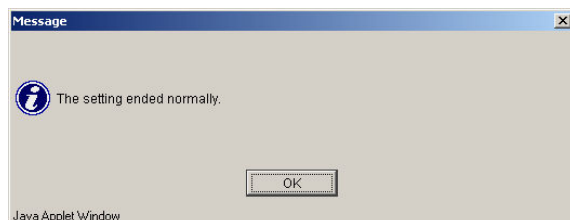
Setting the LAN Port Number of the other Control Unit which has already performed the setting change.

(x) Click the [Apply] button.

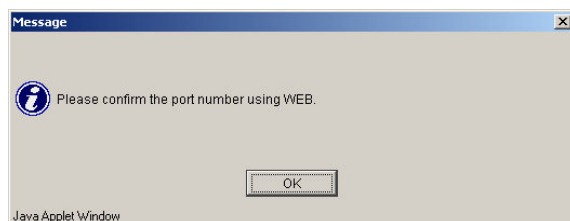
(xi) The following message appears. Click the [OK] button.



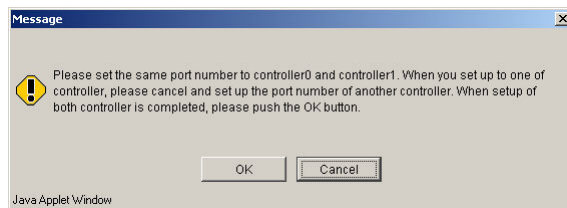
(xii) Click the [OK] button.



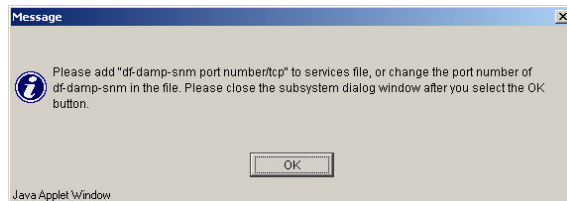
(xiii) The following message appears. Click the [OK] button after referring to WEB that it is set correctly. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))



(xiv) Click the [OK] button.



(xv) Click the [OK] button. The Unit screen is closed.



(xvi) Edit the services file to the new LAN Port Number.

(xvii) Check that the Hitachi Storage Navigator Modular 2 can be started again.

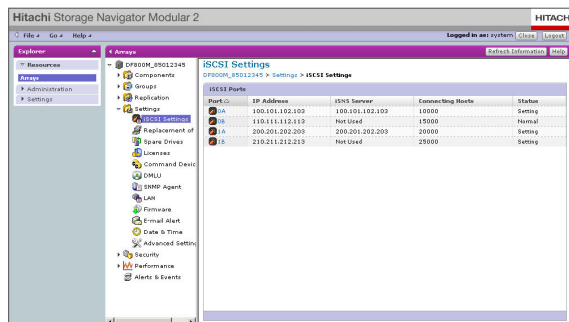
- (b) Although the LAN Port Number of the services file and the LAN Port Number set in the array subsystem are same, the Hitachi Storage Navigator Modular 2 cannot be accessed to the array subsystem.
  - (i) Check the LAN Port Number of the services file and the LAN Port Number of the array subsystem by the WEB browser again. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))
- (c) Already when it is not possible to accessed it from Hitachi Storage Navigator Modular 2 to the array subsystem.
  - (i) Confirm both Control Units are same LAN Port Number. (Refer to [WEB “2.6 Network Information” \(WEB 02-0120\).](#))  
Register to the services file, and start Hitachi Storage Navigator Modular 2.
  - (ii) If they are still same, there is a possibility that LAN Port Number overlaps with other equipment.  
When this is verified, connect LAN crossing cable directly with the LAN port of the control unit in the Subsystem and change the LAN port number.  
Please set it by one. (Refer to [“\[When LAN is connected to one of the Control Units and the setting change is performed\]” \(SYSPR 04-0490\).](#))

## (12) Setting the iSNS Server Information

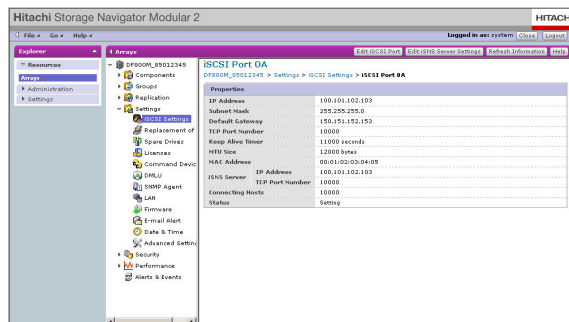
iSNS(Internet Storage Name Service) provides the same function as the Name Server of the Fabric Switch on the Fibre Channel interface.

The disk array system registers the iSCSI port information on the iSNS Server. The host as iSCSI initiator discovers the iSCSI target with iSCSI disk array system information registered on the iSNS Server.

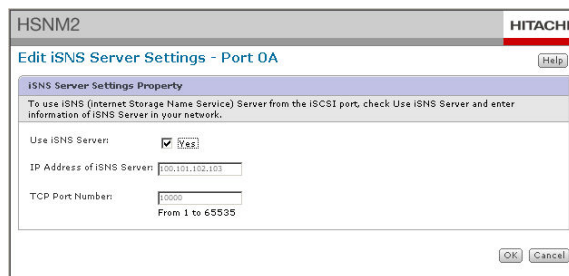
- (a) Select [Settings] - [iSCSI Settings], and click the iSCSI port to be set.



- (b) Click the [Edit iSNS Server Settings] button.



- (c) Set the iSNS server.

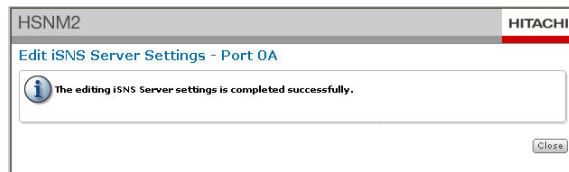


- ① [Use iSNS Server] : Specify whether to use iSNS Server or not.

When using the iSNS server, specify the “IP Address of iSNS Server” and “TCP Port Number” of the iSNS Server.

- (d) When the changes is completed, click the [OK] button at the lower right of the window.  
The content of the change is canceled by clicking the [Cancel] button.

- (e) The message of the setting confirmation is displayed.  
Click the [Close] button.



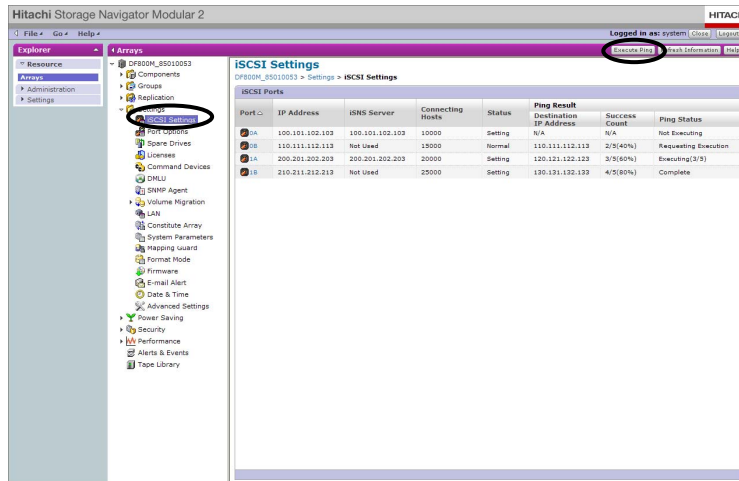
## (13) Sending Ping

Sends the ping to the initiator (host) and displays the result of the sending.

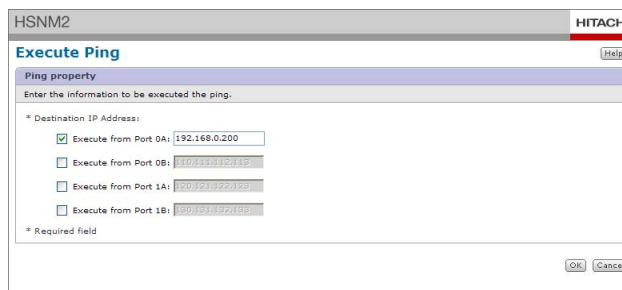
- (13-1) When the Hitachi Storage Navigator Modular 2 is Ver.10.0/A or more ·· [SYSPR 04-0600](#)
- (13-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.10.0/A · [SYSPR 04-0610](#)

## (13-1) When the Hitachi Storage Navigator Modular 2 version is Ver.10.0/A or more

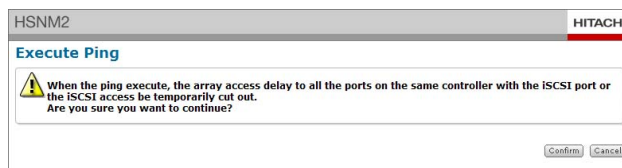
(a) Select [Settings] - [iSCSI Settings], and click the [Execute Ping] button.



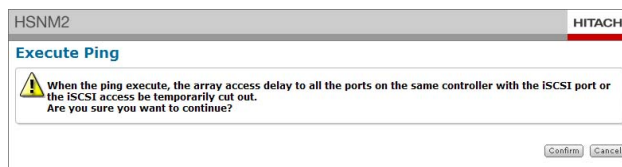
(b) “Execute Ping” window is displayed. Enter the Destination IP address, and click the [OK] button.



(c) Check the confirmation message, and click the [Confirm] button at the lower right corner of window.

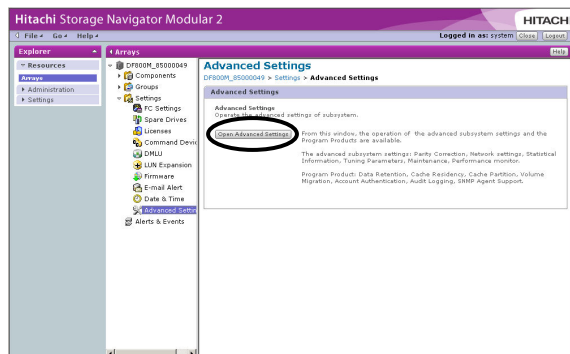


(d) Check the message in the displayed window, and click the [Confirm] button at the lower right corner of window.

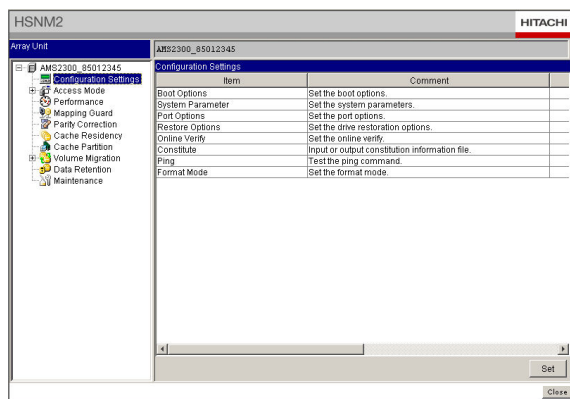


(13-2) When the Hitachi Storage Navigator Modular 2 version is less than Ver.10.0/A.

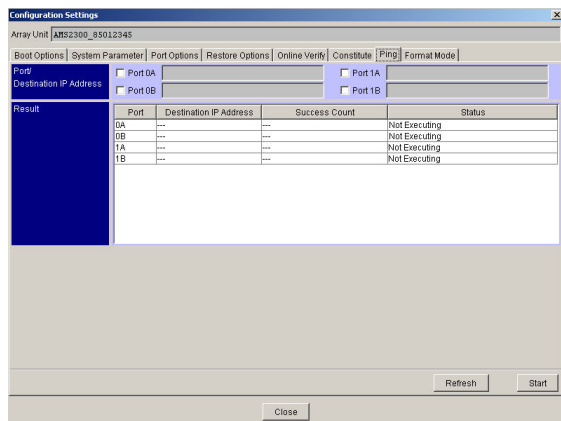
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Configuration Settings] on the applet window, and click the [Set] button.



(c) Click the [Ping] tab. The setting window of “Ping” is displayed on the parameter window.

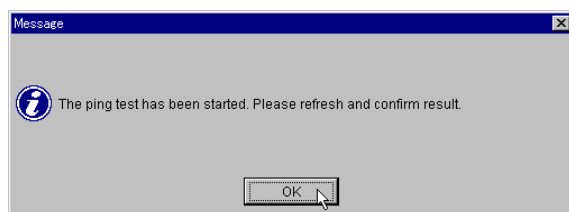
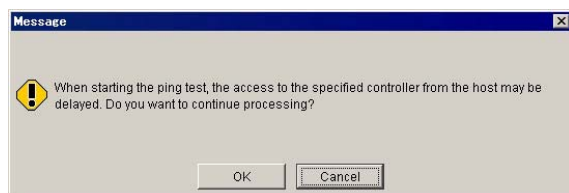
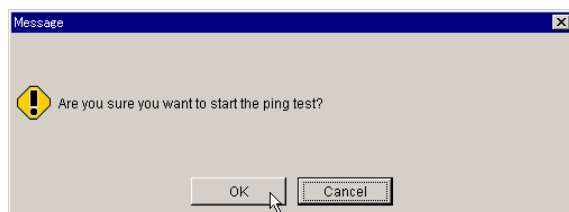


① [Port] : Select the port to be sending ping.

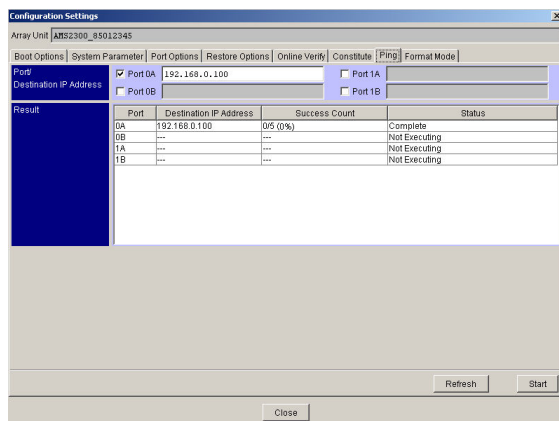
② [Destination IP Address] : Specify the IP Address of the initiator.

(d) When the changes is completed, click the [Start] button at the lower right of the window.

(e) The message of the setting confirmation is displayed. Click the [OK] button.



The result is displayed.



(f) As necessary, select the [Refresh] button to display the latest information.

This page is for editorial purpose only.



## Chapter 5. Setting Host Connection Parameters

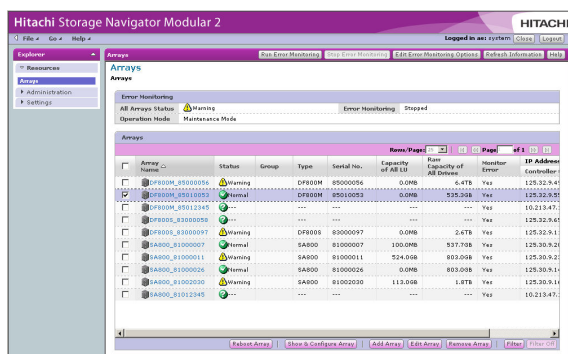
A procedure for setting the host connection parameters for the subsystem offline is shown below. Make the setting following the procedure.

### 5.1 Simple Setting for Connecting to the Host Computer

#### (1) For Fibre model

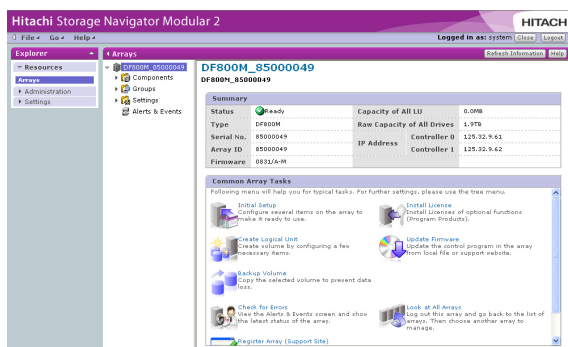
- (a) Turn on the power supply.
- (b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



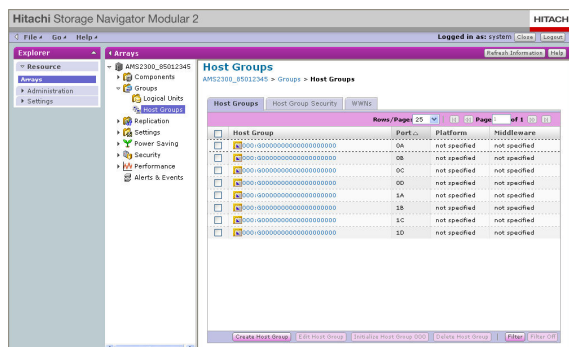
- (c) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)

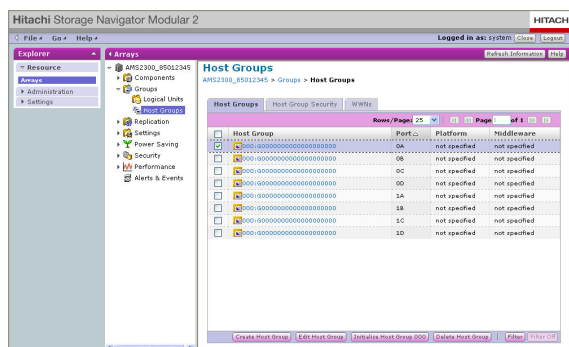


<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

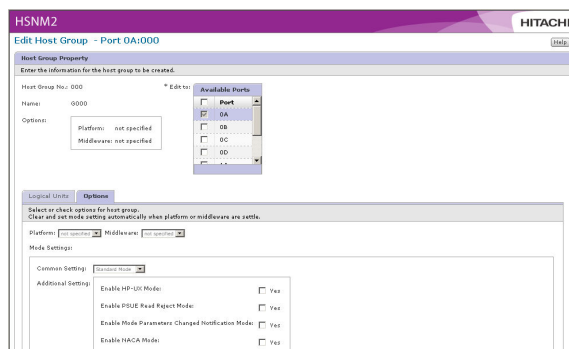
(d) Select the [Groups] - [Host Groups] on the Unit screen.



(e) Check the [Host Groups] that sets the information on the unit window, and click the [Edit Host Group] button.



(f) Click the [Options] tab.



- (g) Select [Platform], and [Middleware] that conform to the environment of a host to be connected. When [Platform] and [Middleware] are selected, the mode necessary for the [Additional Setting] are set automatically. Select the mode of [Additional Setting] as needed, and click the [OK] button.

No.	Menu Item	Description		Setting made at the factory
		Parameters	Selection Method	
1	Platforms	Not specified	Select one of items	Not specified
		HP-UX		
		Solaris		
		AIX		
		Windows		
		Linux		
2	Middleware	Not specified	Select one of items	Not specified
		VCS		
		TruCluster		

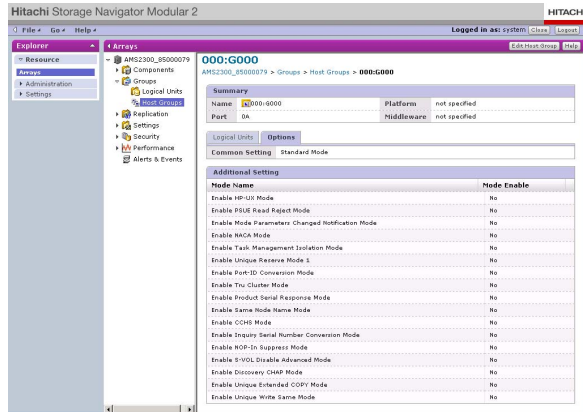
- (h) The completion window is display. Click the [Close] button.

- (i) Click the port to check.

(j) Click the [Option] tab on the unit window.

Verify that the display reflects the selected host environment (platform and middleware).

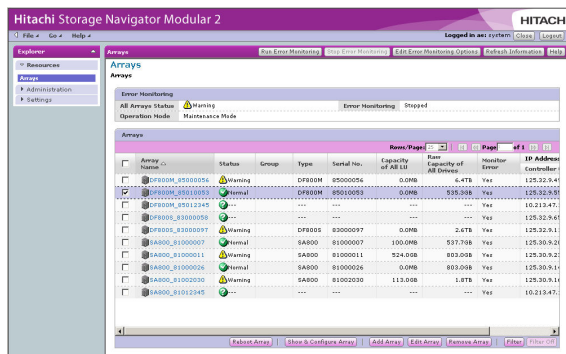
When the [Common Setting] and [Additional Setting] are set directly, verify that the display reflects the mode setting that has been made.



## (2) For iSCSI model

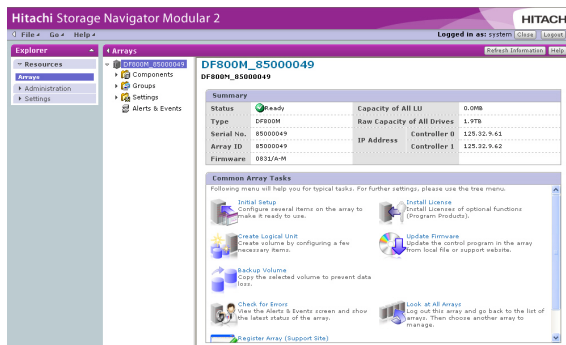
- (a) Turn on the power supply.
- (b) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>‡1</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



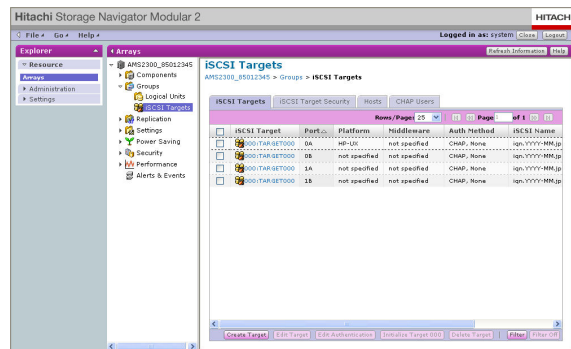
- (c) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)

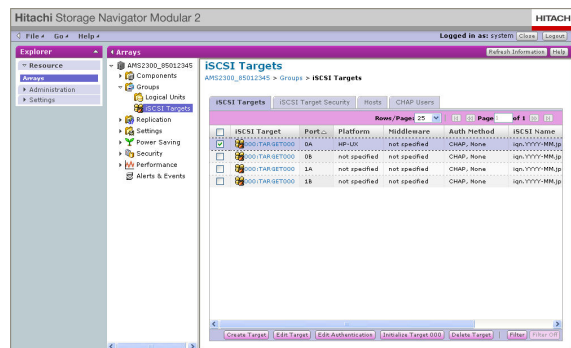


<sup>‡1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

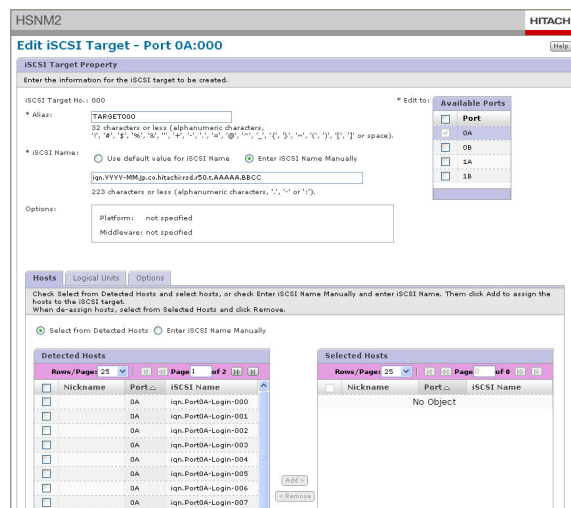
(d) Select the [Groups] - [iSCSI Targets] on the Unit screen.



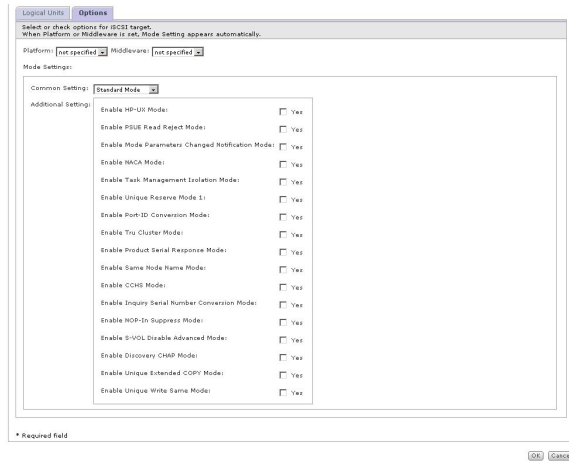
(e) Check the [iSCSI Targets] that sets the information on the unit window, and click the [Edit Target] button.



(f) Click the [Options] tab.

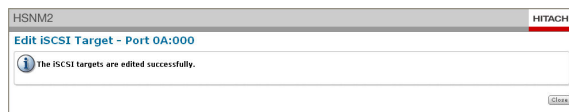


- (g) Select [Platform], and [Middleware] that conform to the environment of a host to be connected. When [Platform] and [Middleware] are selected, the mode necessary for the [Additional Setting] are set automatically. Select the mode of [Additional Setting] as needed, and click the [OK] button.

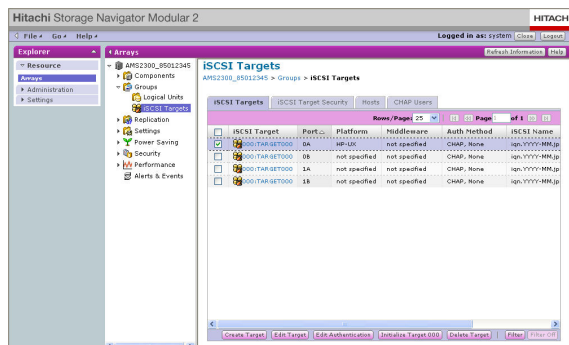


No.	Menu Item	Description		Setting made at the factory
		Parameters	Selection Method	
1	Platforms	Not specified	Select one of items	Not specified
		HP-UX		
		Solaris		
		AIX		
		Windows		
		Linux		
		VMware		
2	Middleware	Not specified	Select one of items	Not specified
		VCS		
		TruCluster		

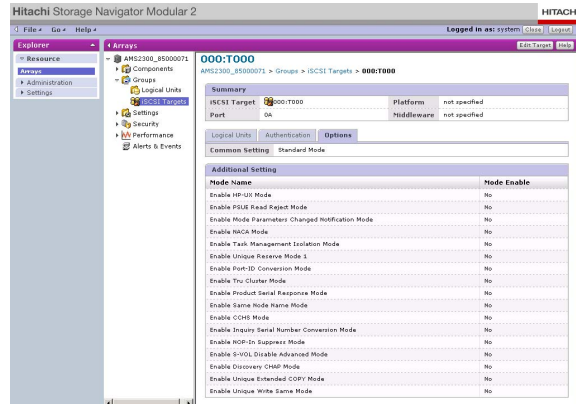
- (h) The completion window is display. Click the [Close] button.



- (i) Click the port to check.



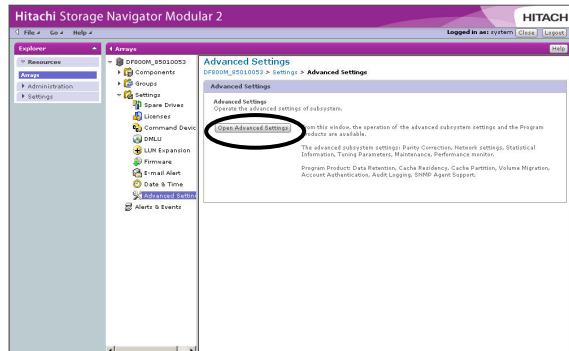
- (j) Click the [Option] tab on the unit window.  
 Verify that the display reflects the selected host environment (platform and middleware).  
 When the [Common Setting] and [Additional Setting] are set directly, verify that the display reflects the mode setting that has been made.



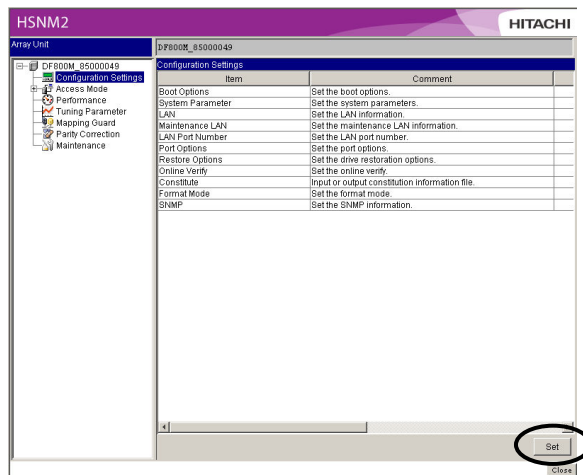


## 5.2 When Using the Subsystem in Drive Detach Mode

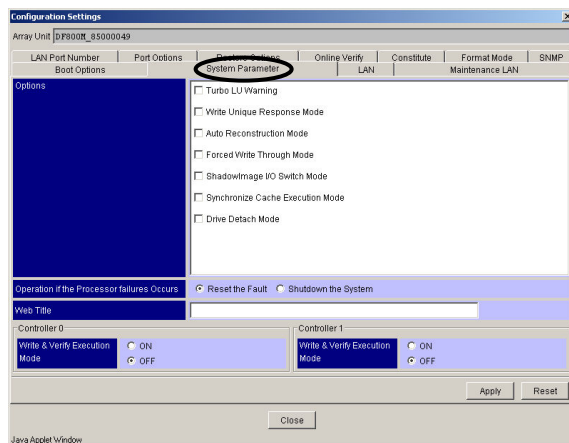
- (1) Select the [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



- (2) Select the [Configuration Settings] on the applet window, and click the [Set] button.

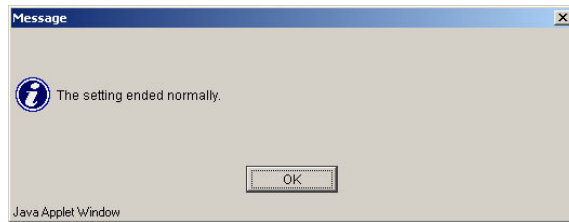
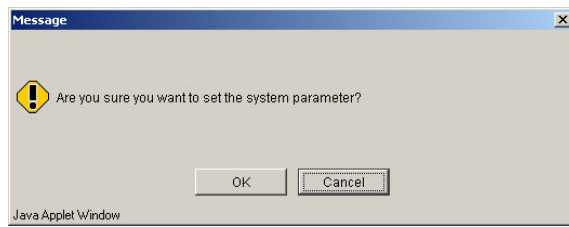


- (3) Click the [System Parameter] tab.



- (4) Select the [Drive Detach Mode].
- (5) After the setting is complete, click the [Apply] button.

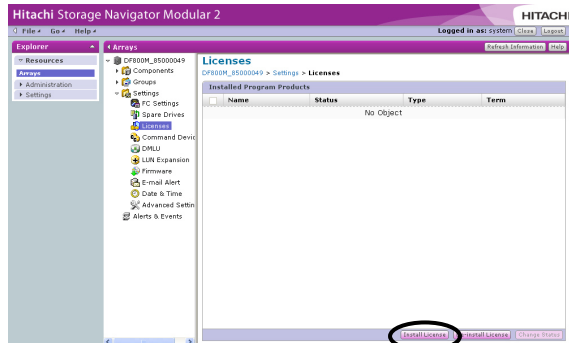
(6) The confirmation window is display. Click the [OK] button.



(7) Click the [OK] button.

## Chapter 6. Setting an Extra-cost Optional Feature

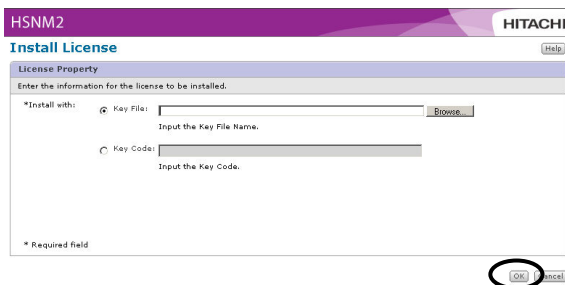
- (1) Select the [Settings] - [Licenses] on the Unit screen.



- (2) Click the [Install License] button.

- (3) When you unlock the option using the key code, click the [Key Code:] radio button, then set up the key code. For the key code of the priced optional features, refer to the priced optional features manual.

When you unlock the options using the key file, click the [Key File:] radio button, and then set up the path for the key file. The [Browse] button is used, the path to a key file can be set correctly.



- (4) Click the [OK] button.

- NOTE :
- Depending on the option, the subsystem may need to be restarted in order to set the unlocking feature effective.
  - In two minutes immediately after unlocking or validating the license of Data At Rest Encryption, the RAID group creation, the DP pool creation, and the spare drive assignment may not be possible for the SAS(SED) Disk Drives (if the operation is executed, an error message is displayed). Select the [Security] - [Data At Rest Encryption] in the unit window to display the Data At Rest Encryption window, verify that Normal is displayed in the All Key Information.

For setting optional feature, refer to the installation or setting section in the manual attached to an extra-cost each extra-cost optional feature.

This page is for editorial purpose only.

## Chapter 7. System Parameter Setting List

The following table lists the connection parameter settings using Hitachi Storage Navigator Modular 2.

### (1) DF800 system parameter setting

#### Host Connection Parameters Setting

Host Group Option/iSCSI Target Option											
Simple Setting : The platform/middleware to connect are selected.											
1	Platforms	Windows	Linux	Solaris	HP-UX	AIX	VMware	Net Ware	Not specified	----	
2	Middleware	Not specified							VCS	Tru Cluster	

Detail Setting : The following parameters will be selected automatically according to Simple Setting.

Even when you have selected "Not Specified" in the platform of Simple Setting, if you select the same parameter as the specified platform in Detail Setting, it operates in the same way as specified.

Basic Setting (Select one of these modes)	Standard Mode	✓	✓	✓	✓	✓	✓	✓	✓		
	Open VMS Mode										
	Wolfpack Mode										
	TRESPASS Mode										
Detail Setting (Multiple selections)	Enable HP-UX Mode				✓						
	Enable PSUE Read Reject Mode				✓						
	Enable Mode Parameters Changed Notification Mode										
	Enable NACA Mode					✓					
	Enable Task Management Isolation Mode										
	Enable Unique Reserve Mode 1									✓	
	Enable Port ID Conversion Mode										
	Enable Tru Cluster Mode										✓
	Enable Product Serial Response Mode										
	Enable Same Node Name Mode										
	Enable CCHS Mode										
	Enable Inquiry Serial Number Conversion Mode										
	Enable NOP-In Suppress Mode							✓			
	Enable S-VOL Disable Advanced Mode										
	Enable Discovery CHAP Mode						✓				
	Enable Unique Extended Copy Mode						✓				
	Enable Unique Write Same Mode						✓				

✓ : Parameter that is selected automatically by Simple Setting.

Blank : Parameter that is selected manually if needed.

Not specified : All other supported are specified.

### Host Connection Parameters Setting (Continued)

Host Group Option/iSCSI Target Option

Simple Setting : The platform/middleware to connect are selected.

1	Platforms	Windows	Linux	Solaris	HP-UX	AIX	VMware	Net Ware	Not specified	---
2	Middleware	Not specified							VCS	Tru Cluster

Detail Setting : The following parameters will be selected automatically according to Simple Setting.

Even when you have selected "Not Specified" in the platform of Simple Setting, if you select the same parameter as the specified platform in Detail Setting, it operates in the same way as specified.

Detail Setting (Multiple selections)	Enable Report iSCSI Full Portal List Mode										
	Enable DP Depletion Detail Reply Mode						✓				
	Enable Unit Attention Change Mode										
	Enable UNMAP Short Length Mode	✓									
	Enable Change Response for Replication Mode										

✓ : Parameter that is selected automatically by Simple Setting.

Blank : Parameter that is selected manually if needed.

Not specified : All other supported are specified.

**NOTE :** • Using the Hitachi Storage Navigator Modular 2, specify the platform (operating system) and the Middleware (cluster software).

The remaining parameters are automatically set by the system based on the combination of the platform and the cluster option you specify.

- Combination of platform and middleware shown on gray backgrounds to be selected in Simple Setting is not related to the support availability.
- When connecting it with winBoot/i of emBoot Inc. by the iSCSI connection, please enable the option "NOP-In Suppress Mode" in Detail Setting.
- When connecting it with Open Enterprise Server of Novell, Inc. by the iSCSI connection, please enable the option "NOP-In Suppress Mode" in Detail Setting.
- When using CHAP(Discovery session) by VMware of the iSCSI connection, please enable the option "Discovery CHAP Mode" in Detail Setting. In case of the FC connection, "Discovery CHAP Mode" is unable even if "Discovery CHAP Mode" is enabled option.
- When connecting it with Tru64, please select "Not specified" in Platform of Simple Setting.

It is not necessary to select "HP-UX" in Platform of Simple Setting for Tru64.  
(Continued to the next page)

- When connecting the RKH, RKHE or RKHED (Excluding RKEH/RKEHD) to the Universal Storage Platform V/VM by the Universal Volume Manager feature, select the “CPU Load Reduction for Cross-CTL I/O Mode” in Port Options. (Refer to [“4.2 \(5\) Setting of Port Options” \(SYSPR 04-0190\).](#))
- **[When the firmware version is 08C3/F or more]**
  - The default status of the port option “UNMAP Short Length Mode” is as follows:
    - The port which includes the host group for which the Windows is selected as platform: Enable (selected status)
    - The ports other than the one described above: Disable (unselectable status)
  - For Windows Server 2012 connections, check “UNMAP Short Length Mode”.  
Otherwise, the UNMAP command may time out and not terminate. (Refer to [“2.2 Setting of Option” \(SYSPR 02-0010\).](#))
  - When changing “UNMAP Short Length Mode”, be sure to restart the host.  
Otherwise, the host operation is not changed correctly.

- **[When the firmware version is 08B5/A or 08B5/B]**

The port option “Disable Autodiscover New HG Mode” cannot be selected (disabled) by default.

If either “WWN addition or deletion operation for host group” or “Change operation for the simple setting mode” is executed when newly creating host groups and adding LUNS using LUN Manager, Linkdown message (RSCN (status change notification) for the switch configuration or LIP for the direct-connected configuration is issued.) may be left not only in a log of the host in the host groups concerned but also throughout the port.

If the log described above becomes a problem in other hosts connected to the same port, make the port option “Disable Autodiscover New HG Mode” enable.

- **[When the firmware version is 08B5/D]**

The default status of the port option “Disable Autodiscover New HG Mode” is as follows:

- The port which includes the host group for which the VMware is selected as platform: Disable (unselectable status)
- The ports other than the one described above: Enable (selected status)

When this mode is set to Disable, LIP or RSCN is sent from the port on the array subsystem if the following host group operations are performed for the port which includes the host group for which any of VMware/Windows/Linux/Solaris is specified as platform.

If the LUN cannot be recognized from the VMware/Windows/Linux/Solaris when HBA is newly connected to the array subsystem, it may be allowed to recognize LUN by making this mode disable and executing the following host group operations.

## &lt;Host group operations&gt;

- WWN addition or deletion operation for host group
- Change operation for the simple setting mode

When this mode is set to Enable, if host group for which the VMware is selected as platform is created, or the platform is changed from the other OS to VMware in the existing host group, the value for this mode becomes invalid automatically. However, even if the host group for which the VMware is selected as platform is deleted or the platform is changed from VMware to the other OS in the existing host group, the value for this mode is not changed automatically. After the host groups is created or deleted, or the platform is changed, check the status of this mode with the port option of the Hitachi Storage Navigator Modular 2.

Furthermore, when this mode is edited by manual using the Hitachi Storage Navigator Modular 2 Ver. 11.50 or later after the firmware version is changed to 08B5/D, even if host group for which the VMware is selected as platform are created, or the platform is changed from the other OS to VMware in the existing host group, the value for this mode is not changed automatically anymore. Therefore, check the status of this mode.

LIP is sent when the HBA and the array subsystem are directly connected, and RCN is sent when the HBA and the array subsystem are connected through Switch.

When LIP or RSCN is sent, a message such as Linkdown may be left in a log of not only the host connected to the host group in operation but also all the hosts connected to the port. Therefore, make this mode enable in the system which monitors host logs.

- When it is configuration with many LUs, OS booting time may become long if OS issues PLOGI several times for every LU. Select the “PLOGI Response Quick Mode” in Port Options, in order to make this phenomenon avoid. (Refer to [“4.2 \(5\) Setting of Port Options” \(SYSPR 04-0190\).](#))



## Chapter 8. E-mail Alert Function

### 8.1 Outline

#### 8.1.1 Overview and Restriction

The E-mail alert is a function to send an E-mail of failure information to the previously registered mail address from the built-in Control Unit of the subsystem when a failure occurs in the array subsystem. Since the array subsystem sends the E-mail stand-alone in this function, it cannot send the E-mail in the following cases. In the dual controller configuration, even if a failure is detected in both Control Units, the Control Unit that detects the failure first sends a failure mail and the other one does not send the same mail (detering dual failure report).

- When the array subsystem goes down (Not Ready)
- When the Control Unit is blocked in the single controller configuration
- When a failure occurs while changing the E-mail setting information (parameter)
- When there is a problem on the communication path such as LAN cable
- When the array subsystem is starting/rebooting
- When the E-mail report is deterred (Disable E-mail alert)
- When the E-mail setting information (parameter) is incorrect
- When the DHCP function is enabled and the DHCP server goes down (or does not start)

NOTE : • In the dual controller configuration, a Control Unit, which detects the failure first, executes the E-mail report, so that always insert the LAN cables to both Control Units and enable the E-mail alert function. Both Control Unit #0 and Control Unit #1 may send the mail.

- Use the Control Unit #0 side for the setting in the dual controller configuration.
- When many failures occur at the same time in the array subsystem, the subsystem cannot send E-mail corresponding to all failures.
- If data inconsistency happens with all data in the cache memory gone due to a problem such as system down and the combination of power outage and battery failure, the setting done from the start of the array to the occurrence of data inconsistency will return to where it was before the start of the array. So it is necessary to check and reconfigure the E-mail Alert setting after maintenance work for a failure that leads to data inconsistency.

## 8.2 Details of Sent Mails

### 8.2.1 Examples of Sent Mails

The example of the full text of the sent mail is shown below.

The content of the mail consists of “From: header”, “To: header” and “mail text” same as usual mails.

The mail text consists of a failure message and Information Message. The failure message consists of the failure occurrence date, array subsystem name, customer’s specific information and failure message, etc. The Information Message displays the failure information and status information (up to 50) that the array subsystem detected by the time the mail was sent.

- Example of mail

```

Mon, Mar, 14 13:48:24 2011 /StorageSystem/UNIT_Cinf_HT-4065-RK_12345678_00_0119/ ARRAY Drive Detached.
Mon, Mar, 14 13:48:24 2011 /StorageSystem/UNIT_Cinf_HT-4065-RK_12345678_00_0119/ ARRAY Detached Drive Position Unit
No.00 HDU No.01.
Mon, Mar, 14 13:48:24 2011 /StorageSystem/UNIT_Cinf_HT-4065-RK_12345678_00_0119/ ARRAY DriveType AVE500.
Mon, Mar, 14 13:48:24 2011 / StorageSystem/UNIT_Cinf_HT-4065-RK_12345678_00_0119/ ARRAY DeviceType 01.
Timezone : (GMT+09:00) Osaka/ Sapporo/ Tokyo
Hardware serial number: 83001000
Firmware version : Controller 0 = 08B0/A-M, Controller 1 = 08B0/A-M
Hardware serial number for controller/tray : 83010000
Failed part revision : --
Failed Drive information : --
Drive operation time : --
Drive failed factor information : --
-----
This information is automatically generated.
-----
Subsystem Warning occurred. Please confirm the Alert window of Storage Navigator Modular.
Following message is a WEB information message.
-----
03/11/2007 06:01:41 C1 W09zab HDU alarm (Unit-00, HDU-01, Type-00)      :HDU /STRC
                                     :
                                     :
( Following are also WEB messages up to total 50 messages. )

```

## 8.2.2 Details of the Sent Mail Format

The details of the header and text format, which configure the mail, are shown below.

No.	Item	Description	Purpose
1	Automatic processing information	Mail transmission time (day, month, date, hour, minute, second, year)	For running customer information and failure information
2		Type of array ("StorageSystem"(*1) fixed)	
3		Additional mail information (settable (settable only in Hitachi Storage Navigator Modular 2" maintenance mode) (63 alphanumeric numbers or less)	
4		Details failure message	
5	Time zone	Time zone set in array	
6	Array serial number	Array serial number	
7	The version downgrade of the firmware	Firmware version of each Control Unit	
8	Serial number of the failed tray	Serial number of the failed tray	
9	Revision of failed part	ENC firmware revision or drive firmware revision	
10	Failed drive information	Marker name, product ID, firmware revision, drive serial number	
11	Drive operation time	Total time of drive operation	
12	Cause information of drive failure	64-byte information from internal trace data	Failure analysis
13	Fix message to end users	Message to press end users to refer to the HSMN2 alert window	Same as left-mentioned
14	Web messages	Most recent Web messages (50)	Failure analysis

\*1 : It varies depending on the firmware version. When the firmware version is less than 0890/A, it is "DF800", and when the firmware version is 0890/A or more and less than 08B0/A, it is "AMSSMS".

## 8.2.3 List of Failure Report Messages

**Table 8.2.1 List of Array Subsystem Messages**

No.	Warning factor	Failure Messages (△: One-byte space, !: Linefeed code)	Remarks
1	Control Unit Failure	ARRAY△Controller△Detached.! ARRAY△DeviceType△ZZ.	-
2	Battery Failure	ARRAY△Battery△Alarm.! ARRAY△DeviceType△ZZ.	-
3	Fan Failure	ARRAY△Fan△Alarm.! ARRAY△DeviceType△ZZ.	-
4	Power Supply Failure	ARRAY△ACDC△Power△Supply△Failure.! ARRAY△Unit△No.XX△BOX△No.YY.! ARRAY△Power△Supply△Type△V.! ARRAY△DeviceType△ZZ.	XX : Unit # ("00"- "3B") YY : Power Unit # ("00"- "01") V : Power Supply Type 0 : AC, 1 : DC
5	Drive Failure	ARRAY△Drive△Detached.! ARRAY△Detached△Drive△Position△Unit△No.XX△HDU△No.YY.! ARRAY△DriveType△WW.! ARRAY△DeviceType△ZZ.	XX : Unit # ("00"- "3B") YY : Disk Drive # ("00"- "17") WW : Drive Type (AKH146, AKH300, AMF300, AKH450, AKH600, ANH600, AMF600, AKF400, AVE500, AVE750, AVE1K, AVE2K, AVE3K, AKS200, AKH450X, AKH600X, ANH600X, AVE1KX, AVE2KX, AVE3KX, AWE2K, AWE2KX)
6	Spare Disk Failure	ARRAY△Drive△Detached.! ARRAY△Detached△Drive△Position△Unit△No.XX△HDU△No.YY.! ARRAY△DriveType△WW.! ARRAY△DeviceType△ZZ.	XX : Unit # ("00"- "3B") YY : Disk Drive # ("00"- "17") WW : Drive Type (AKH146, AKH300, AMF300, AKH450, AKH600, ANH600, AKF400, AVE500, AMF600, AVE750, AVE1K, AVE2K, AVE3K, AKS200, AKH450X, AKH600X, ANH600X, AVE1KX, AVE2KX, AVE3KX, AWE2K, AWE2KX)
7	ENC Failure	ARRAY△ENC△Alarm.! ARRAY△Unit△No.XX△ENC△No.YY.! ARRAY△ENCType△W.! ARRAY△DeviceType△ZZ.	XX : Unit # ("00"- "3B") YY : ENC Unit # ("00"- "01") W : ENC Type (0 : for RKAK, 1 : for SA800/SA810, 2 : for RKAKX, 3 : RKAKS, Z : unknown)
8	Host Connector Failure	ARRAY△HostConnector△Alarm.! ARRAY△DeviceType△ZZ.	-
9	Additional Battery Box Failure	ARRAY△Additional△Battery△Alarm.! ARRAY△BatteryType△Y.! ARRAY△DeviceType△ZZ.	Y : Battery Type (0)
10	Path Failure between the Array subsystem (AMS) and the Array subsystem (AMS)	ARRAY△Path△Alarm.! ARRAY△DeviceType△ZZ.	-

ZZ : RKS : "02", RKM : "03", RKH : "04", RKES : "06", RKEM : "07", RKEH : "08", RKEXS : "09", RKAK : "0A", RKAKX : "0B", RKEXA : "0C", RKEXS8F : "0D", RKAKS : "0E"

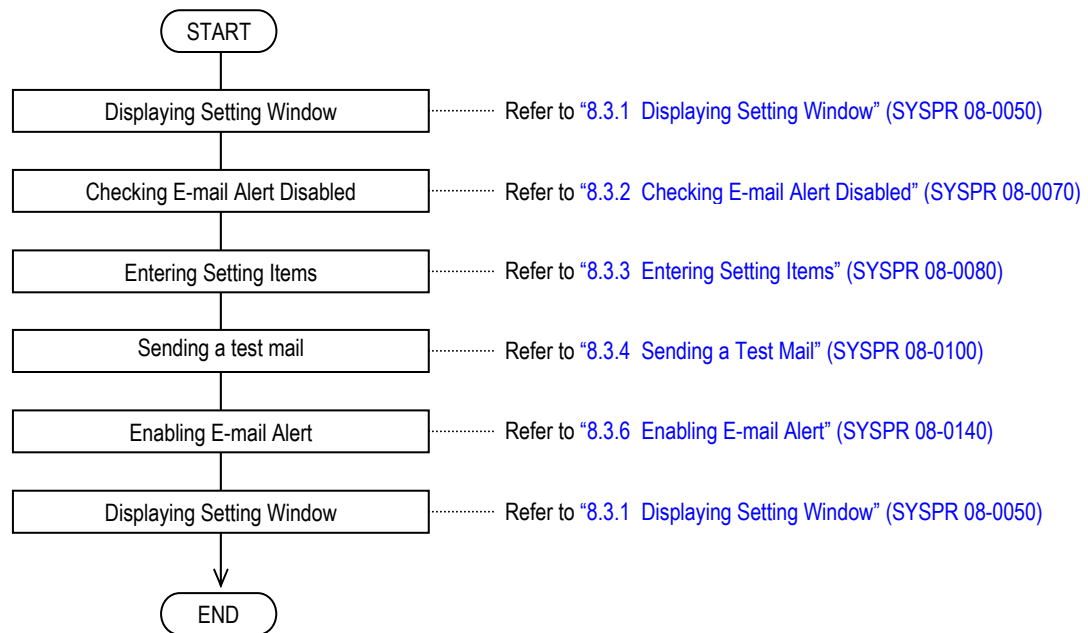
No.	Warning factor	Failure Messages (△: One-byte space, !: Linefeed code)	Remarks
11	Battery Backup Circuit Failure	ARRAY△Cache△Backup△Circuit△Alarm.! ARRAY△DeviceType△ZZ.	-
12	Array Subsystem Warning	ARRAY△Warning.! ARRAY△DeviceType△ZZ.	-
13	Power Unit (DC) Filter Replacement Request	ARRAY△Please△replace△the△Air△Filter△of△Bezel. ARRAY△DeviceType△ZZ.	-
14	Report Test	Test△message	-

ZZ : RKS : "02", RKM : "03", RKH : "04", RKES : "06", RKEM : "07", RKEH : "08", RKEXS : "09", RKAK : "0A", RKAKX :  
 "0B", RKEXSA : "0C", RKEXS8F : "0D", RKAKS : "0E"

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### 8.3 Setting Procedure

The work outline flow is shown below.



### 8.3.1 Displaying Setting Window

Set the E-mail alert function using Hitachi Storage navigator Modular 2.

Refer to [“1.1 Procedure for Connecting Hitachi Storage Navigator Modular 2 with the Subsystem” \(SYSPR 01-0020\)](#) for how to connect Hitachi Storage Navigator Modular 2.

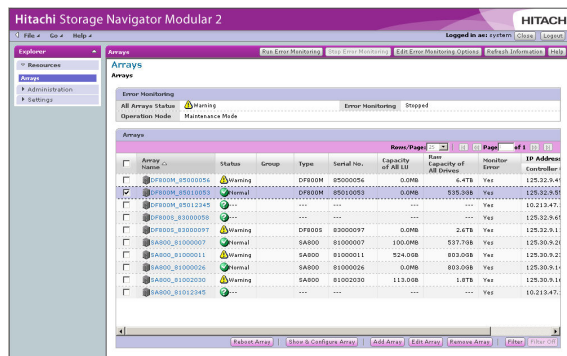
You can set the E-mail alert function without restarting the array subsystem.

**NOTE :** If data inconsistency happens with all data in the cache memory gone due to a problem such as system down and the combination of power outage and battery failure, the setting done from the start of the array to the occurrence of data inconsistency will return to where it was before the start of the array. So it is necessary to check and reconfigure the E-mail Alert setting after maintenance work for a failure that leads to data inconsistency.

- (1) Check the array subsystem to be set in the main window and press the [Ctrl] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

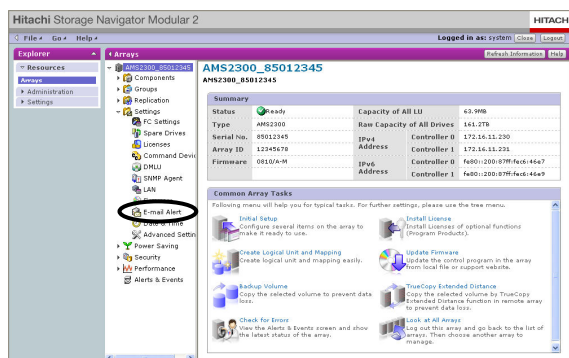
Maintenance Mode is displayed in [Operation Mode] on the top of the window.

Hitachi Storage Navigator Modular 2 operates in the maintenance mode.

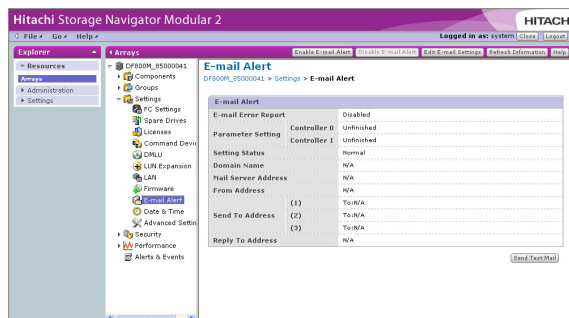




(2) Select [Settings] - [E-mail Alert] in the unit window.



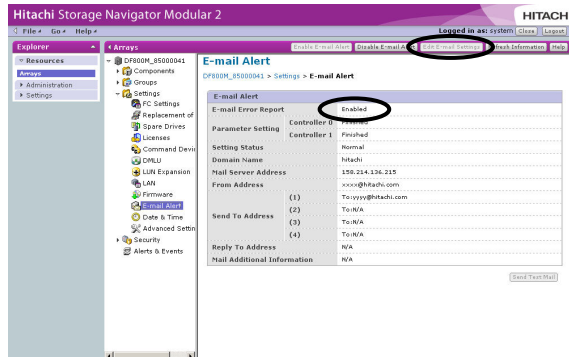
(3) The “E-mail Alert” window is displayed.



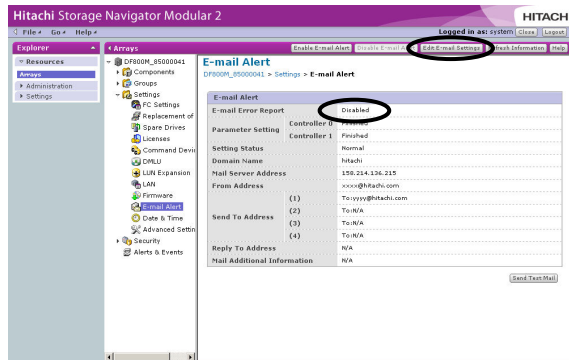
### 8.3.2 Checking E-mail Alert Disabled

(1) Check that E-mail alert is [Disabled].

If it is “Enabled”, click the [Disable E-mail Alert] button and change the E-mail alert to “Disabled”.



(2) Click the [Edit E-mail Settings] in the window and move to the “E-mail Setting Edit” window.



### 8.3.3 Entering Setting Items

- (1) Enter each parameter of E-mail according to the following description.

[Reply To Address] is not an indispensable parameter to input, but be sure to enter other parameters.

Hitachi Storage Navigator Modular 2 is Ver.9.00 or more

Hitachi Storage Navigator Modular 2 is less than Ver.9.00

① [Domain Name]:

Enter the domain name of the mail server. Enter it within 255 alphanumeric numbers.

② [Mail Server Address]:

Enter the IP address of mail server.

In case of IPv4, enter it with decimal numbers.

In case of IPv6, delimit the numerical value indicated by the hexadecimal number in unit of 16 bits by a colon (:) and enter it. The input by abbreviated notation is also acceptable. Do not add "0 (zero)" to the head of the IP address.

③ [From Address]:

Enter the mail address of the sender. The value entered in From: header of the mail to send is set. Enter it within 63 alphanumeric numbers.

④ [Send To Address]:

Enter destination mail address. The value entered in To: header of the mail to send is set. Enter it within 63 alphanumeric characters. You can set up to four mail addresses. You may input it any place in (1) to (4).

⑤ [Replay To Address]:

Enter the return mail address. The value is set in Reply To: header. Enter it within 63 alphanumeric numbers. The input is not indispensable for this parameter.

NOTE : Do not set it unless otherwise instructed.

⑥ [Mail Additional Information]:

Enter the customer's specific information. The setting value is reflected in the mail text to send. Enter it within 63 alphanumeric numbers.

NOTE : Because it is case sensitive, be careful of it at the input.

UNIT\_Cinf\_HT-4065-RK\_12345678\_00\_0119 (Reserved area)

①      ②      ③      ④      ⑤      ⑥

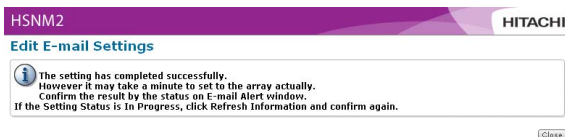
No.	Item	Description format
①	Customer information start code	UNIT_Cinf (Fastening)
②	Formal device model name	One-byte capital alphanumeric numbers, variable length
③	Serial number (serial #)	One-byte capital alphanumeric numbers, variable length (No "0 (zero)" at the head of characters) Array subsystem as per nameplate
④	Faction	00 (Fastening)
⑤	Site code	One-byte capital alphanumeric numbers of four digits, fixed length
⑥	(Reserved area) (*1)	One-byte alphanumeric numbers, variable length (omissible)

\*1 : Be sure to start with a delimiter symbol ("\_" underscore) when you input it in the reserved area.  
When you omit the input in the reserved area, do not enter a delimiter symbol ("\_" underscore) after the site code ⑤.

NOTE : When you clear all the parameter values, click the [Initialize Parameters] button.

All the parameter values currently input are cleared.

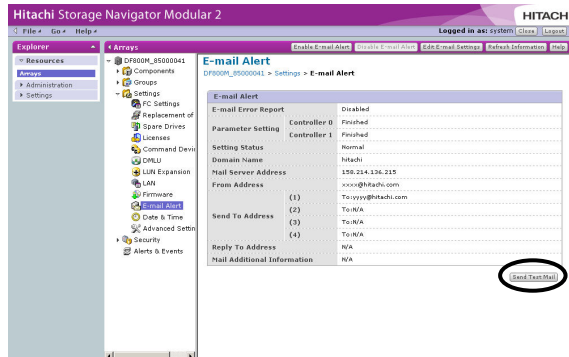
- (2) After completing the input of all the parameters, check the contents and click the [OK] button. The "Setting Completed" window is displayed. Click the [Close] button. The parameter input is completed.



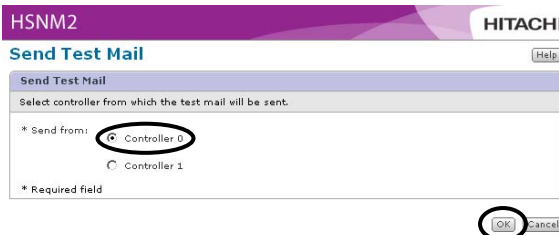
- (3) An error message may be displayed from Hitachi Storage Navigator Modular 2 when setting or changing this function. In this case, take actions according to the message content.

### 8.3.4 Sending a Test Mail

- (1) Send a test mail to check if you can actually send a mail with the set content. You can send a test mail only when the E-mail alert is “Disabled”.<sup>(#1)</sup>  
Click the [Send Test Mail] button to send a test mail.



- (2) The “Send Test Mail” window is displayed. Select [Controller 0] for the sender and click the [OK] button to send a test mail.  
If you click the [Cancel] button, you can stop sending the test mail.



- (3) If you click the [OK] button, the “Send Test Mail” window is displayed. Click the [Close] button.

NOTE : In the dual configuration, select [Controller 1] and sent a test mail in the same way.



- (4) Check if the test mail is actually sent with the person of [Send To Address] set in the parameter input window in “8.3.3 Entering Setting Items” (SYSPR 08-0080). If it is not sent, refer to “8.3.5 Maintenance when the Mail Does Not Reach the Destination” (SYSPR 08-0110). In the dual configuration, send the test mail again, and then send a test mail by selecting [Controller 1].  
If there is no problem on the test mail sending on the Control Unit #1 side, go to “8.3.6 Enabling E-mail Alert” (SYSPR 08-0140).

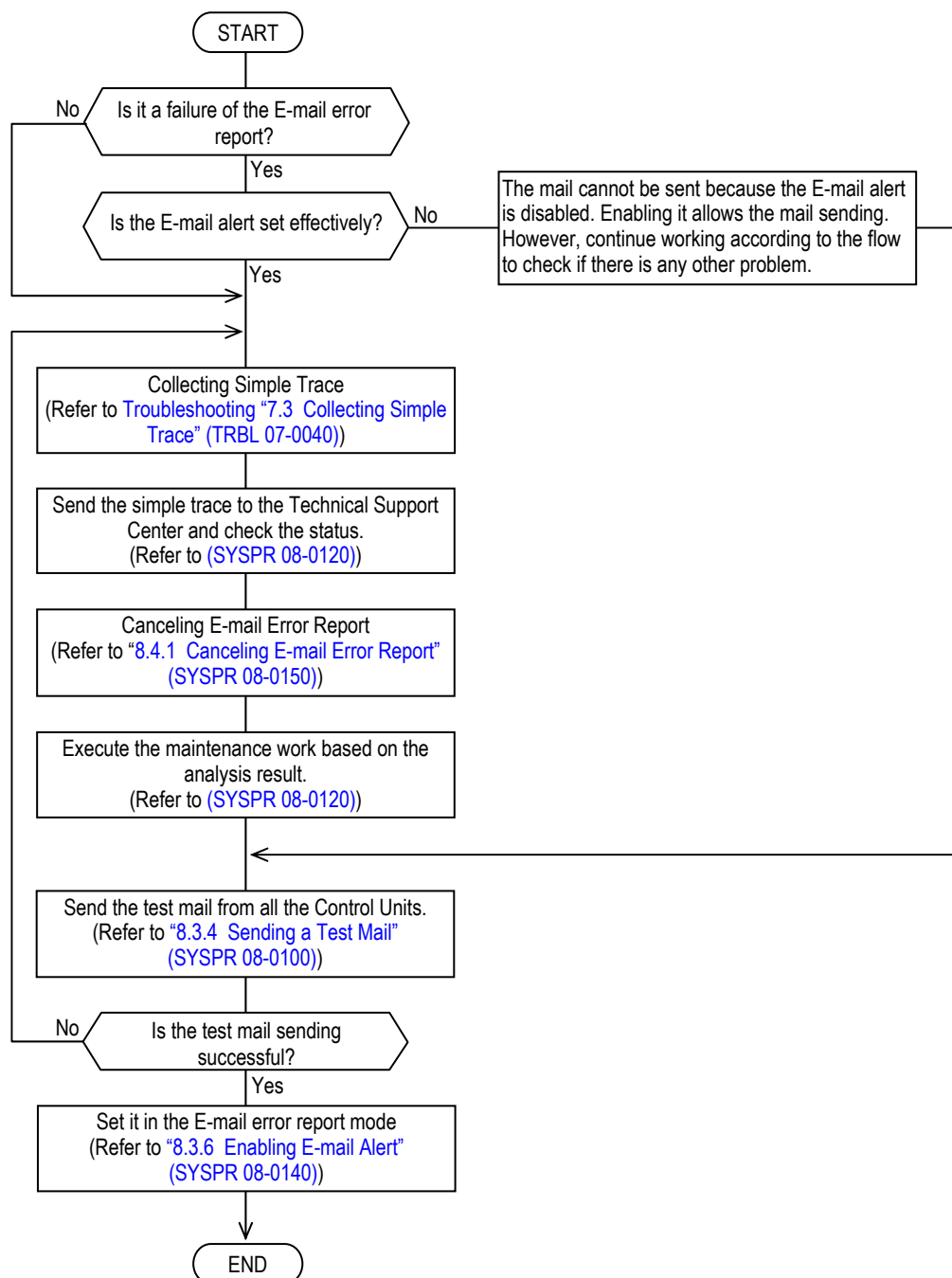
<sup>#1</sup> : When the firmware version is 08C3/D or more, a test mail can be issued even if the E-mail Alert is “Enabled”.  
However, in this procedure, issue it in the “Disabled” status.

### 8.3.5 Maintenance when the Mail Does Not Reach the Destination

The failure analysis procedure by the simple trace and the actions to be taken when the mail does not reach the destination are shown here.

The workflow of the failure analysis by the simple trace is shown below.

Specify the failed part and deal with it according to the following procedure.



Perform the maintenance work based on the analysis result of the simple trace.

Send the simple trace to the Technical Support Center and request the analysis.

Check the status (mail sending status) value acquired from the analysis and perform the maintenance work according to the following table.

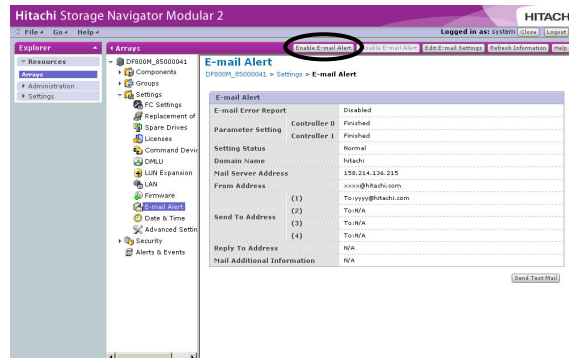
No.	Status (Mail sending status)	Description	Suspected failure part	Recovery methods	Reference page
1	eRmMsgPending	Main sending is in process	-	Send the test mail, and collect the simple trace again after a while and analyze it.	-
2	eRmMsgSent	Message sending from the array subsystem is successful.	① Destination address setting error	Refer to the E-mail sending parameter table and check if the destination address is correctly described. If it is incorrect, correct the address from Hitachi Storage Navigator Modular 2 and sent the test mail again.	"8.3.3 Entering Setting Items" (SYSPR 08-0080)
			② Failure between the mail server and ASSIST Center	Check if there is no error in the hardware and the path including the intermediate device.	-
3	eRmMsgInvalidBody	Message data cannot be received.	① Control Unit	Contact the Technical Support Center.	-
4	eRmMsgMissingAddress	Message address unsetting	① Destination address is invalid	Refer to the E-mail sending parameter table and check if the IP address of the mail server is correctly entered. If it is incorrect, correct the address from Hitachi Storage Navigator Modular 2 and sent the test mail again.	"8.3.3 Entering Setting Items" (SYSPR 08-0080)
5	eRmMsgAbortNoServer	The connection cannot be established to the mail server.	① IP address setting error of the mail server	Refer to the E-mail sending parameter table and check if the IP address of the mail server is correctly entered. If it is incorrect, correct the address from Hitachi Storage Navigator Modular 2 and sent the test mail again.	"8.3.3 Entering Setting Items" (SYSPR 08-0080)
			② Setting error of the mail server	Check the setting of the mail server and set it so that the communication from the array subsystem is allowed.	-
6	eRmMsgAbortTcpError	TCP error	① Failure between the subsystem and mail server	Check if there is no error in the hardware and the path including the intermediate device.	-
			② Abnormality of the communication port	Replace the Control Unit.	Replacement "2.2.5 Replacing Control Unit" (REP 02-0450)

No.	status (Mail sending status)	Description	Suspected failure part	Recovery methods	Reference page
7	eRmMsgCancelled	The mail sending was cancelled in the user application	① Control Unit	Contact the Technical Support Center.	-
8	eRmMsgAbortGeneral	Errors other than the one mentioned above.	① Control Unit	Collect the simple trace and replace the Control Unit. Sent the collected simple trace to the Technical Support Center.	<a href="#">Replacement "2.2.5 Replacing Control Unit" (REP 02-0450)</a>

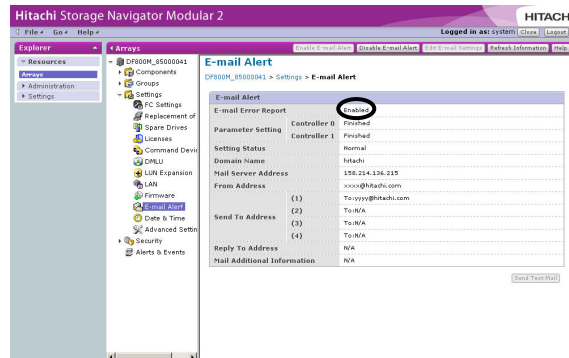


### 8.3.6 Enabling E-mail Alert

- (1) Enable the E-mail alert. Click the [Enable E-mail Alert] button to change the E-mail alert “Enabled”.



- (2) Check that the E-mail alert is “Enabled”.

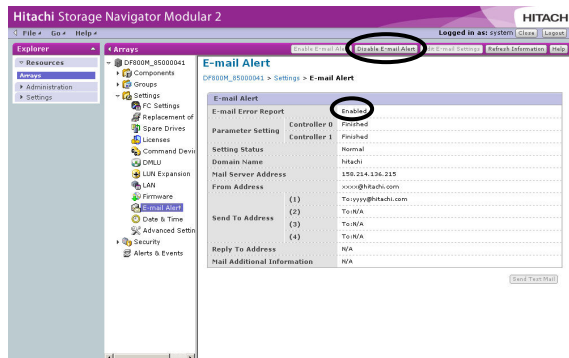


The setting is completed above.

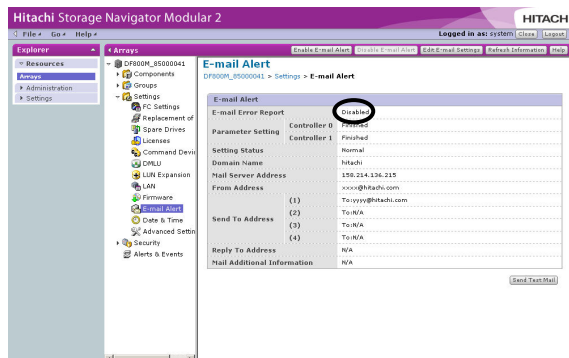
## 8.4 Procedure for Canceling E-mail Error Report

### 8.4.1 Canceling E-mail Error Report

- (1) Check that the E-mail alert is “Enabled”. If it is “Disabled”, it is already cancelled. If it is “Enables”, click the [Disable E-mail Alert] button and change the E-mail alert to “Enable”.



- (2) Check that the E-mail alert is “Disabled”.



The setting is completed above.

## 8.5 Correspondence by Report Messages

Prepare the maintenance parts described in the presumed failure part corresponding to the failure report message when the array subsystem fails, and perform the maintenance work according to [“Troubleshooting”](#) after arriving at the local site.

No.	Failure report message	Failure content	Presumed failure part
1	ARRAY Controller Detached. ARRAY DeviceType ZZ.	The Control Unit was regressed (It had a failure or was not connected), or a failure was detected in the Control Unit of another system during the initial setting operation. <sup>(*)</sup>	Control Unit FC Interface Board iSCSI Interface Board (There may be a double failure) Narrow down the failed parts in the Information Message on WEB (refer to <a href="#">Troubleshooting “4.3 Confirm log messages” (TRBL 04-0100)</a> . However, when “ARRAY Cache Memory Alarm.” is notified at the same time, the failed part is the Cache memory.
2	ARRAY Battery Alarm. ARRAY DeviceType ZZ.	An error occurred in the Cache Backup Battery.	Cache Backup Battery
3	ARRAY Fan Alarm. ARRAY DeviceType ZZ.	An error occurred in the Fan Unit.	Fan Unit
4	ARRAY ACDC Power Supply Failure. ARRAY Unit No.XX BOX No.YY. ARRAY DeviceType ZZ.	An error occurred in the Power Unit.	Power Unit
5	ARRAY Drive Detached. ARRAY Detached Drive Position Unit No.XX HDU No.YY. ARRAY DriveType WW. ARRAY DeviceType ZZ.	A Disk Drive blockade occurred.	Disk Drive
6	ARRAY Drive Detached. ARRAY Detached Drive Position Unit No.XX HDU No.YY. ARRAY DriveType WW. ARRAY DeviceType ZZ.	A Spare Disk Drive blockade occurred.	Disk Drive
7	ARRAY ENC Alarm. ARRAY Unit No.XX ENC No.YY. ARRAY ENCType WW. ARRAY DeviceType ZZ.	An error occurred in the ENC Unit.	ENC Unit
8	ARRAY HostConnector Alarm.I ARRAY DeviceType ZZ.	An error occurred in the Host Connector.	Host Connector
9	ARRAY Additional Battery Alarm. ARRAY BatteryType Y. ARRAY DeviceType ZZ.	An error occurred in the Additional Battery Box	Additional Battery Box
10	ARRAY Path Alarm. ARRAY DeviceType ZZ.	A path blockade occurred between the array subsystems (AMS).	Errors of the remote subsystem to be paired. (Refer to <a href="#">Troubleshooting “6.1.17 Path Blockade Occurs in the TrueCopy remote replication/TrueCopy Extended Distance Function” (TRBL 06-0820)</a> .)

\*1 : When the failure of the message code “W01z0x CTL alarm” occurs, the Control Unit blockade and array subsystem Warning are notified, and the array subsystem is changed from the Ready status to Warning status. The Warning status of the array subsystem may recover automatically to the Ready status depending of the failure factors.

No.	Failure report message	Failure content	Presumed failure part
11	ARRAY Cache Backup Circuit Alarm. ARRAY DeviceType ZZ.	An error occurred in the Cache backup circuit.	When "ARRAY Battery Alarm." is notified at the same time, the failed part is the Backup Battery Unit. When only this message is notified, the failed part is the Control Unit.
12	ARRAY Warning. ARRAY DeviceType ZZ.	An error occurred in the Array subsystem.	When only this message is notified, it is required to isolate the failed parts in the Information Message on WEB. (Refer to <a href="#">Troubleshooting "4.3 Confirm log messages" (TRBL 04-0100)</a> or <a href="#">Troubleshooting "Chapter 8. Trouble Analysis by LED Indication" (TRBL 08-0000).</a> )
13	ARRAY Please replace the Air Filter of Bezel. ARRAY DeviceType ZZ.	The request for replacing Power Unit (DC) Filter is issued.	Power Unit (DC) Filter
14	ARRAY Pool Consumed Capacity Early Alert Pool number XX. ARRAY DeviceType ZZ.	DP pool consumed capacity exceeded the Early Alert threshold.	DP pool DP pool capacity becomes smaller, or the threshold setting value is small. If the DP pool remaining capacity is little, extend the DP pool capacity. If the threshold setting value is small, change the setting value to larger.
15	ARRAY Pool Consumed Capacity Depletion Alert Pool number XX. ARRAY DeviceType ZZ.	DP pool consumed capacity exceeded the Depletion Alert threshold.	DP pool DP pool capacity becomes smaller, or the threshold setting value is small. If the DP pool remaining capacity is little, extend the DP pool capacity. If the threshold setting value is small, change the setting value to larger.
16	ARRAY Pool Consumed Capacity Over Pool number XX. ARRAY DeviceType ZZ.	DP pool consumed capacity reaches the upper limit, and the DP pool unused capacity was depleted.	DP pool DP pool capacity is depleted. Extend the DP pool capacity. DP pool capacity can be increased by deleting or formatting the LU being used. When creating or extending DP Volume, increase the pool capacity, or set a large threshold value.
17	ARRAY Pool Over Provisioning Warning Pool number XX. ARRAY DeviceType ZZ.	The capacity of DP Volume in a DP pool exceeded the Fore Warning threshold for Over Provisioning.	DP Volume The capacity of DP Volume allocated to DP pool exceeds threshold. If the pool capacity is not depleted, there is no problem with its use.
18	ARRAY Pool Over Provisioning Limit Pool number XX. ARRAY DeviceType ZZ.	The capacity of DP Volume in a DP pool exceeded the Over Warning threshold for Over Provisioning.	DP Volume The capacity of DP Volume allocated to DP pool exceeds threshold. If the pool capacity is not depleted, there is no problem with its use. When creating or extending DP Volume, increase the pool capacity, or set a large threshold value.

No.	Failure report message	Failure content	Presumed failure part
19	ARRAY Port Error Threshold Over ARRAY Device Type ZZ	A failure occurred in the path of the Fibre Channel port, and the threshold value of the failure detection count was exceeded.	The failure occurrence count has exceeded the threshold value. Narrow down the failed part and take countermeasures. (Refer to <a href="#">Troubleshooting "6.1.29 Failure Determination and Recovery Methods of Fibre Channel Port Path" (TRBL 06-1200).</a> )

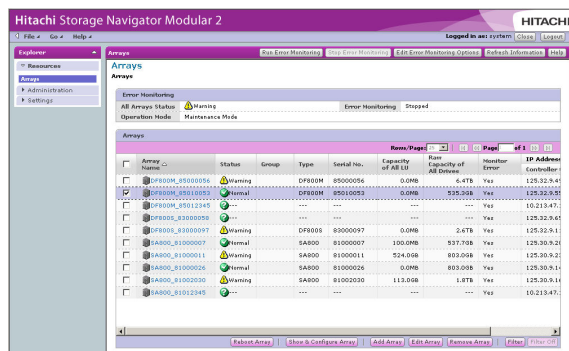
This page is for editorial purpose only.

## Chapter 9. Setting Tuning Parameter

### 9.1 Before Setting Tuning Parameter

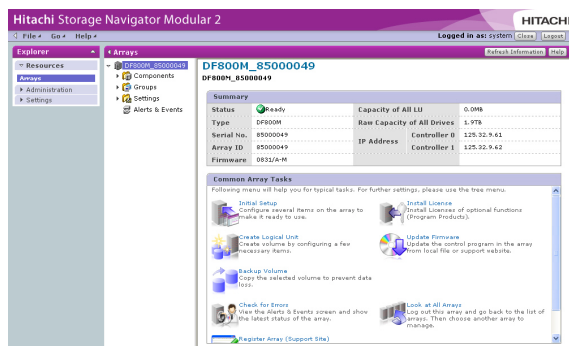
- (1) Turn on the power supply.
- (2) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (3) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

## 9.2 Setting of Tuning Parameter

The setting of the tuning parameter has the other functions as shown below.

**Table 9.2.1 The Menu Items of Setting Parameter**

No.	Menu item	Use	Contents	Factory setting	Reference page
1	Multi Stream	Parameters of Multi Stream and pre-fetching are set.	① Setting a scope	System	“(1) Setting Multi Stream” (SYSPR 09-0020)
			② Selecting a mode	Changes the Multi Stream mode Read	
			③ Selecting next pre-fetching	Changes the next pre-fetching Enable	
			④ Selecting a pre-fetching standard	Changes the pre-fetching standard Base	
			⑤ Setting an amount of pre-fetching (it can be set only when “Logical Unit” is selected for “Range of Application”)	Changes the amount of the fixed pre-fetching 256 Changes the amount of the basic pre-fetching 128	
			⑥ Setting sequential determination	Changes the number of sequential determination 3	
2	System Tuning <sup>(1)</sup> System <sup>(2)</sup>	System turning parameters are set.	① Setting a dirty flushing opportunity	5	“(2) Setting System Tuning” (SYSPR 09-0100)
			② Setting a dirty flushing stop opportunity	5	
			③ Selecting a Cache control mode	FIFO	
			④ Selecting a trace strengthening mode	ON	
			⑤ Selecting load balancing	Enable	
			⑥ Selecting load balancing monitoring time	3	
			⑦ Dirty Data Flush Number Limit	Disable	
			⑧ Load Reduction for Changing Configuration Mode	Disable	
3	LU Ownership	An owner right of logical units is set.	① Selecting a controller in charge of logical units	Depends on the configuration at shipment	“(3) Setting LU Ownership” (SYSPR 09-0140)

\*1 : When the version of Hitachi Storage Navigator Modular 2 is Ver. 6.02 or more

\*2 : When the version of Hitachi Storage Navigator Modular 2 is less than Ver. 6.02

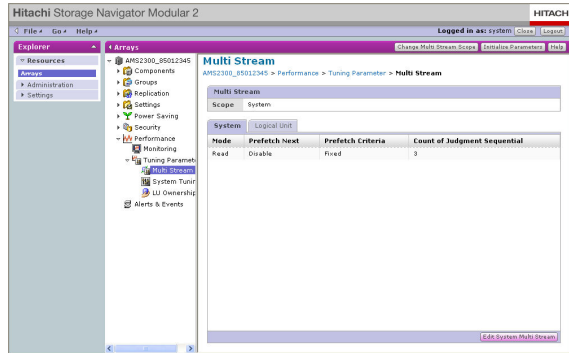


## (1) Setting Multi Stream

- (1-1) When the Hitachi Storage Navigator Modular 2 is Ver.6.02 or more ..... [SYSPR 09-0020](#)
- (1-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.6.02 .... [SYSPR 09-0060](#)

(1-1) When the Hitachi Storage Navigator Modular 2 is Ver.6.02 or more

(a) Select [Performance] - [Tuning Parameters], and select [Multi Stream].



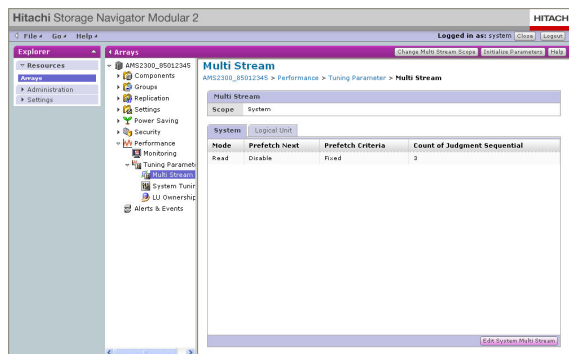
(b) Select [Scope].

When selecting [System] for [Scope], select the [System] tab.

When selecting [Logical Unit] for [Scope], select the [Logical Unit] tab.

(b-1) When selecting [System]

(i) Click the [Edit System Multi Stream] button.



(ii) The parameter in the system Multi Stream window is set.

[System Multi Stream] : Selects Multi Stream in units of system.

[Mode]

: The operation mode of Multi Stream is displayed. Read and Read/Write can be set. Read is selected by default.

Read : Performs sequential determination individually for two or more sequential read.

Read/Write : Performs sequential determination individually for two or more sequential read and flushes data to drives as a whole as much as possible when accessing two or more sequential write.

[Prefetch Next]

: Whether the prefetch next is performed is displayed.

Enabled/Disabled can be set. Enabled is selected by default.

[Prefetch Criteria]

: The prefetch criteria is displayed. Fixed/Basic can be set. Basic is selected by default.

[Count of Judgment Sequential]

: The count of judgment sequential is displayed. This is used as a threshold value to determine that a series of commands is sequential.

A number from 0 to 10 can be set. Three is entered by default.

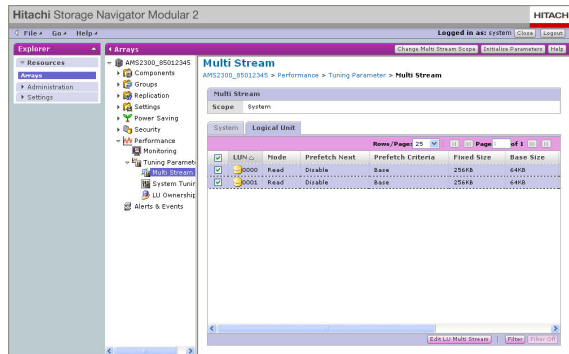
- 0 : Does not prefetch.

- 1 : Prefetches surely.

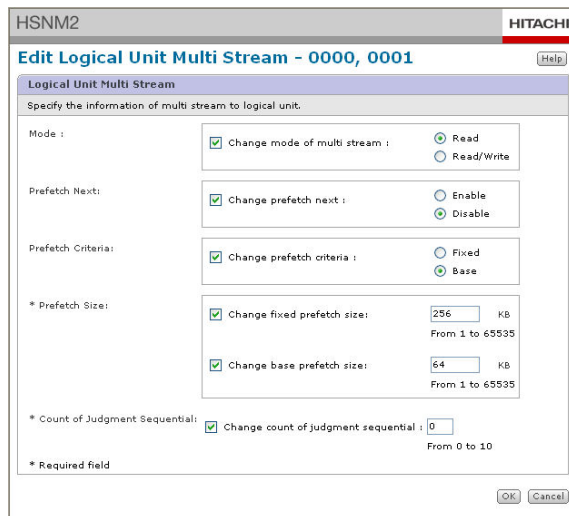
- 2 or more : Prefetches when receiving the consecutive commands more than or equal to the specified number.

(b-2) When selecting [Logical Unit]

- (i) Select a logical unit to be set (two or more are allowed), and click the [Edit LU Multi Stream] button.



- (ii) The parameter in the Logical Unit Multi Stream window is set.



[Logical Unit Multi Stream] : Selects Multi Stream in units of Logical Unit.

[Mode]

: The operation mode of Multi Stream is displayed. Read and Read/Write can be set. Read is selected by default.

Read : Performs sequential determination individually for two or more sequential read.

Read/Write : Performs sequential determination individually for two or more sequential read and flushes data to drives as a whole as much as possible when accessing two or more sequential write.

[Prefetch Next]

: Whether the prefetch next is performed is displayed.

Enabled/Disabled can be set. Enabled is selected by default.

[Prefetch Criteria]

: The prefetch criteria is displayed. Fixed/Basic can be set. Basic is selected by default.

[Prefetch Size] : The amount of prefetching of the standard selected by the prefetching standard is set.

It can be entered in the range from 1 k bytes to 65535 k bytes.

[Count of Judgment Sequential] : The count of judgment sequential is displayed. This is used as a threshold value to determine that a series of commands is sequential.

A number from 0 to 10 can be set. Three is entered by default.

- 0 : Does not prefetch.
- 1 : Prefetches surely.
- 2 or more : Prefetches when receiving the consecutive commands more than or equal to the specified number.

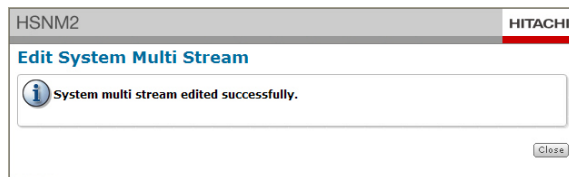
(c) Check that the set contents are correct.

If the [Cancel] button is clicked, the change content is cancelled.

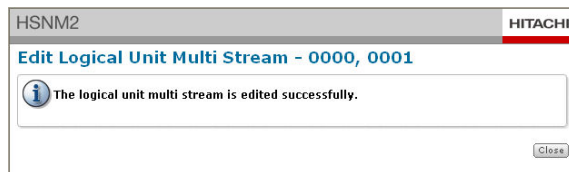
Click the [OK] button to terminate the setting.

(d) Check the contents of the confirmation message window, and click the [Close] button.

When selecting [System]



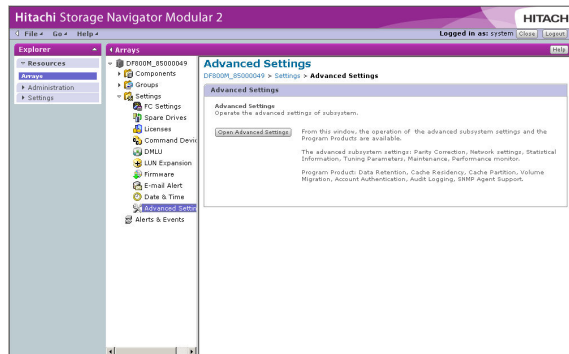
When selecting [Logical Unit]



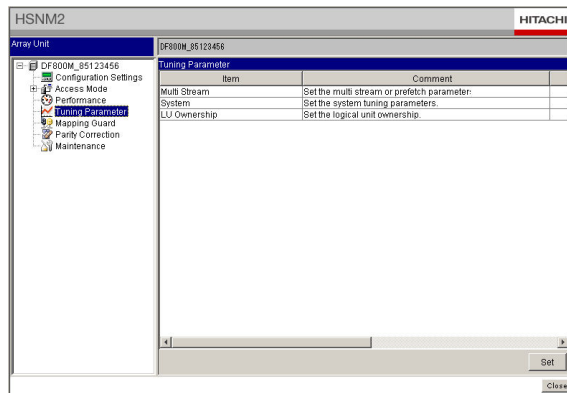
(e) Check that the content set in the Multi Stream window is reflected.

(1-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.6.02

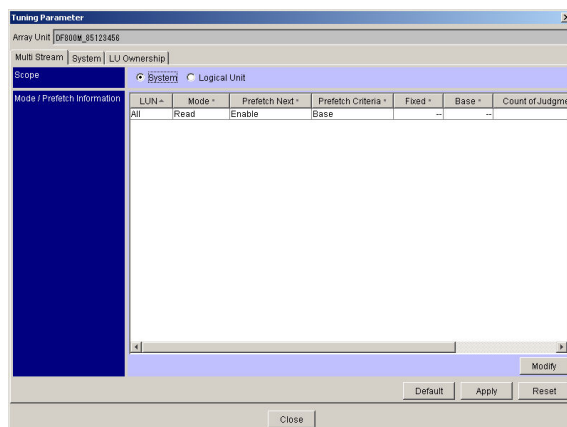
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Tuning Parameter] on the applet window, and click the [Set] button.



(c) Click the [Multi Stream] tab. The setting window of “Multi Stream” is displayed in the Parameter window.

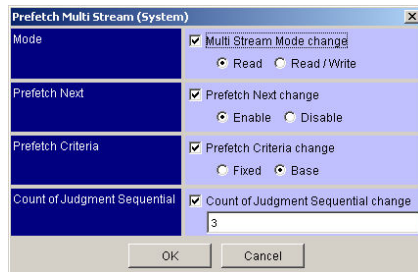


- ① [Scope] : The Scope of Multi Stream is displayed.  
The Scope is two, a system and a logical unit. A system is displayed by default.  
System : Multi Stream is set in units of system.  
Logical Unit : Multi Stream is set in units of logical unit.
- ② [Mode / Prefetch Information] : The operation mode of Multi Stream and prefetching information are set.

(d) Set [Scope] and [Mode / Prefetch Information].

(d-1) When selecting [System]

(i) Click the [Modify] button.

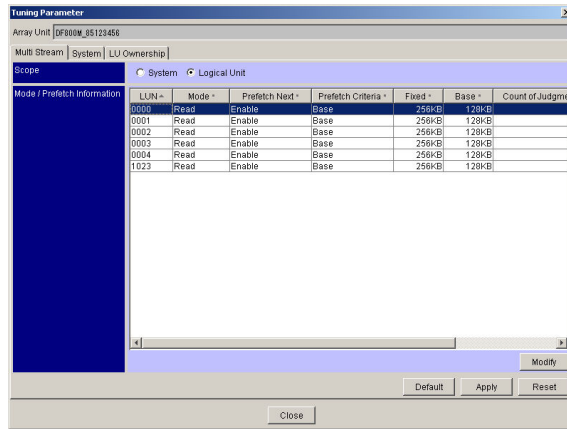


- [Mode] : The operation mode of Multi Stream is displayed. Read and Read/Write can be set. Read is selected by default.
- Read : Performs sequential determination individually for two or more sequential read.
- Read/Write : Performs sequential determination individually for two or more sequential read and flushes data to drives as a whole as much as possible when accessing two or more sequential write.
- [Prefetch Next] : Whether the prefetch next is performed is displayed. Enabled/Disabled can be set. Enabled is selected by default.
- [Prefetch Criteria] : The prefetch criteria is displayed. Fixed/Basic can be set. Basic is selected by default.
- [Count of Judgment Sequential] : The count of judgment sequential is displayed. This is used as a threshold value to determine that a series of commands is sequential. A number from 0 to 10 can be set. Three is entered by default.
- 0 : Does not prefetch.
  - 1 : Prefetches surely.
  - 2 or more : Prefetches when receiving the consecutive commands more than or equal to the specified number.

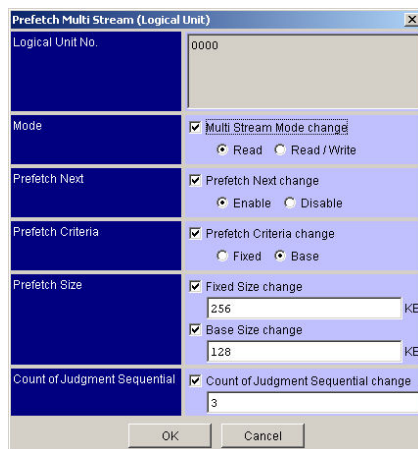
## (d-2) When selecting [Logical Unit]

When selecting [Logical Unit] as [Scope], you can set it for each logical unit. When selecting [Logical Unit], [Prefetch Size] can be set.

## (i) Select a logical unit to be set, and click the [Modify] button.



## (ii) The parameter in the Prefetch Multi Stream (Logical Unit) window is set.



## [Mode]

: The operation mode of Multi Stream is displayed. Read and Read/Write can be set. Read is selected by default.

Read : Performs sequential determination individually for two or more sequential read.

Read/Write : Performs sequential determination individually for two or more sequential read and flushes data to drives as a whole as much as possible when accessing two or more sequential write.

## [Prefetch Next]

: Whether the prefetch next is performed is displayed.

Enabled/Disabled can be set. Enabled is selected by default.

## [Prefetch Criteria]

: The prefetch criteria is displayed. Fixed/Basic can be set. Basic is selected by default.

[Prefetch Size] : The amount of prefetching of the standard selected by the prefetching standard is set.

It can be entered in the range from 1 k bytes to 65535 k bytes.

[Count of Judgment Sequential] : The count of judgment sequential is displayed. This is used as a threshold value to determine that a series of commands is sequential.

A number from 0 to 10 can be set. Three is entered by default.

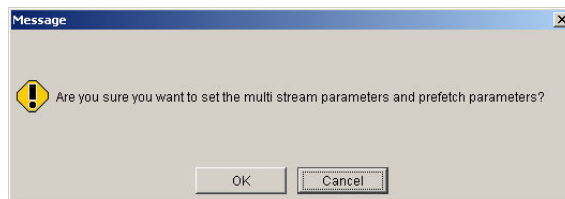
- 0 : Does not prefetch.
- 1 : Prefetches surely.
- 2 or more : Prefetches when receiving the consecutive commands more than or equal to the specified number.

(e) Check if the changes that have been made are correct and click the [Apply] button.

When the [Reset] button is clicked, the settings that have been made are cancelled.

It is set to the default value by clicking the [Default] button.

(f) The confirmation message is displayed. Click the [OK] button.



(g) Click the [OK] button.



(h) Check that the content set in the Parameter window is reflected.

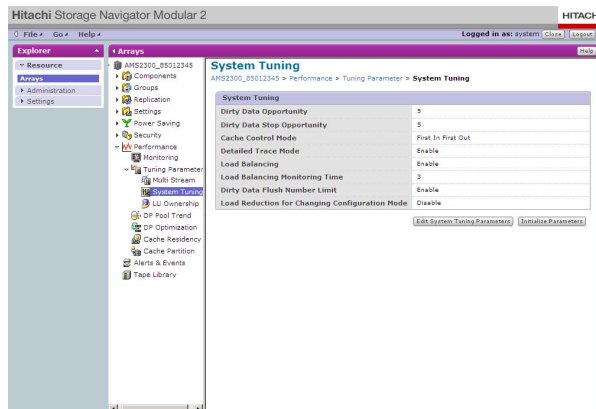


## (2) Setting System Tuning

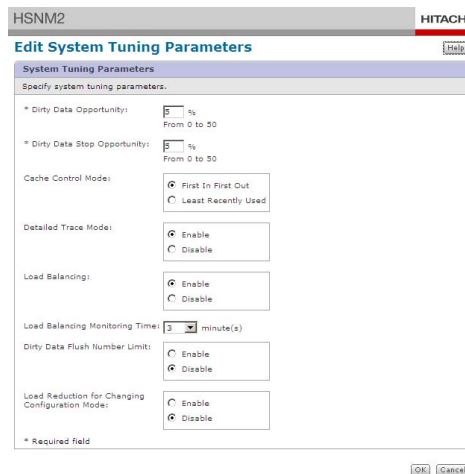
- (2-1) When the Hitachi Storage Navigator Modular 2 is Ver.6.02 or more ..... [SYSPR 09-0100](#)
- (2-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.6.02 .... [SYSPR 09-0120](#)

(2-1) When the Hitachi Storage Navigator Modular 2 is Ver.6.02 or more

(a) Select [Performance] - [Tuning Parameters], and select [System Tuning].



(b) Click the [Edit System Tuning Parameters] button.



(c) The parameter in the System Tuning window is set.

[System Tuning] : The dirty flushing, Cache control mode, trace strengthening mode and load balancing can be changed in the system turning window.

[Dirty Data Opportunity] : The dirty data opportunity is displayed. It can be entered in the range from 0% to 50%.

[Dirty Data Stop Opportunity]: The dirty data stop opportunity is displayed. It can be entered in the range from 0% to 50%.

[Cache Control Mode] : The cache control mode is displayed. FIFO or LRU can be selected. FIFO is selected by default.

[Detailed Trace Mode] : The detailed trace mode is displayed. Enabled or Disabled can be selected. Enable is selected by default.

- [Load Balancing] : The load balancing is displayed. Enabled or Disabled can be selected. Enabled is selected by default.
- [Load Balancing Monitoring Time] : The load balancing monitoring time is displayed. The time of 0, 3, 10, 15, 30, 60, 120, or 180 (minutes) can be selected. Three minutes is selected by default.
- [Dirty Data Flush Number Limit] : It limits the number of the concurrent execution of the processing which flushes the dirty data in the Cache Unit to the drive. Enable or Disable can be selected. Disable is selected by default.
- [Load Reduction for Changing Configuration Mode] : The effect for host I/Os is reduced by changing the configuration request from a Hitachi Storage Navigator Modular 2 to the Array. If enabled, the host I/O has the highest priority and the accesses from the Hitachi Storage Navigator Modular 2 and LAN are made to wait. This cannot allow you to get the performance information. When the Hitachi Dynamic Provisioning is used, the waiting time to complete the operation of the Virtual LU takes longer.

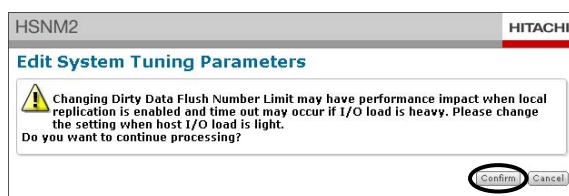
- NOTE :
- The Dirty Data Flush Number Limit can be set in the Hitachi Storage Navigator Modular2 Ver.9.35 or later and the firmware version 0893/E or later.
  - The Load Reduction for Changing Configuration Mode can be set in the Hitachi Storage Navigator Modular2 Ver.11.50 or later and the firmware version 08B5/A or later.

- (d) Check that the set contents are correct.

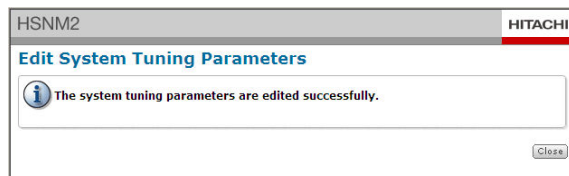
If the [Cancel] button is clicked, the change content is cancelled.

Click the [OK] button to terminate the setting.

- (e) When the [Dirty Data Flush Number Limit] is enabled, the confirmation message is displayed. Check the contents of the confirmation message window, and click the [Confirm] button.



- (f) Check the contents of the confirmation message window, and click the [Close] button.

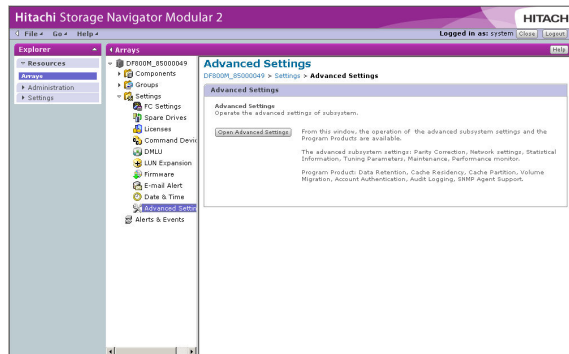


- (g) Check that the content set in the System Tuning window is reflected.

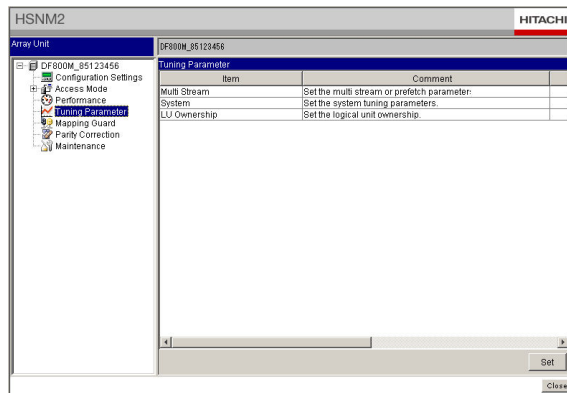
This page is for editorial purpose only.

(2-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.6.02

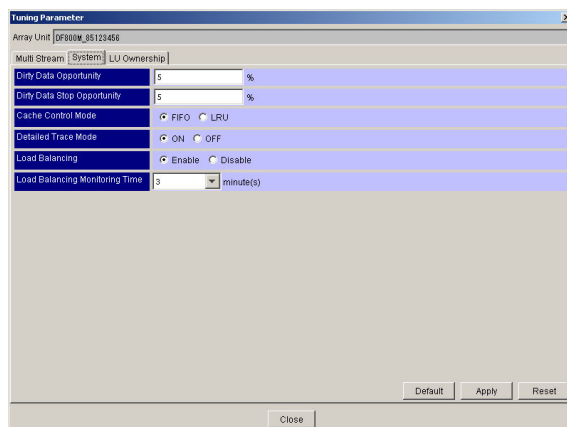
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Tuning Parameter] on the applet window, and click the [Set] button.



(c) Click the [System] tab. The setting window of “System” is displayed in the Parameter window.



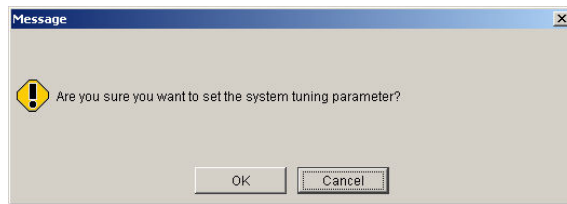
[Dirty Data Opportunity] : The dirty data opportunity is displayed. It can be entered in the range from 0% to 50%.

[Dirty Data Stop Opportunity] : The dirty data stop opportunity is displayed. It can be entered in the range from 0% to 50%.

[Cache Control Mode] : The cache control mode is displayed. FIFO or LRU can be selected. FIFO is selected by default.

- [Detailed Trace Mode] : The detailed trace mode is displayed. Enabled or Disabled can be selected. Enable is selected by default.
- [Load Balancing] : The load balancing is displayed. Enabled or Disabled can be selected. Enabled is selected by default.
- [Load Balancing Monitoring Time] : The load balancing monitoring time is displayed. The time of 0, 3, 10, 15, 30, 60, 120, or 180 (minutes) can be selected. Three minutes is selected by default.

- (d) Set six types of parameters in the window.
- (e) Check if the changes that have been made are correct and click the [Apply] button.  
When the [Reset] button is clicked, the settings that have been made are cancelled.  
It is set to the default value by clicking the [Default] button.
- (f) The confirmation message is displayed. Click the [OK] button.



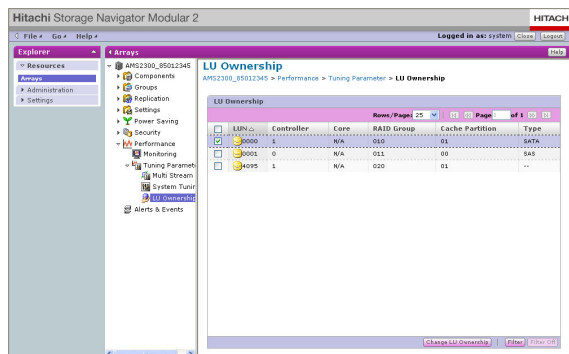
- (g) Check that the content set in the Parameter window is reflected.

## (3) Setting LU Ownership

- (3-1) When the Hitachi Storage Navigator Modular 2 is Ver.6.02 or more ..... [SYSPR 09-0140](#)
- (3-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.6.02 .... [SYSPR 09-0150](#)

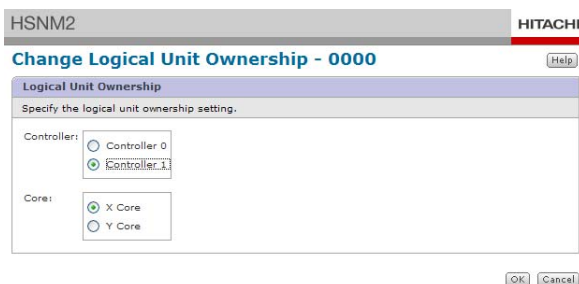
(3-1) When the Hitachi Storage Navigator Modular 2 is Ver.6.02 or more

(a) Select [Performance] - [Tuning Parameters], and select [LU Ownership].



(b) Select a logical unit to be set (two or more are allowed), and click the [Change LU Ownership] button.

(c) Set the Controller or the Core in the LU Ownership window.

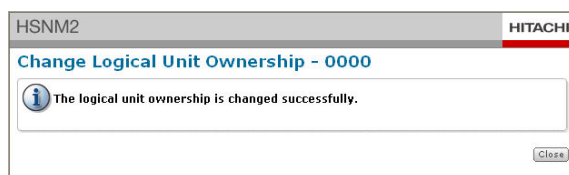


(d) Check that the set contents are correct.

If the [Cancel] button is clicked, the change content is cancelled.

Click the [OK] button to terminate the setting.

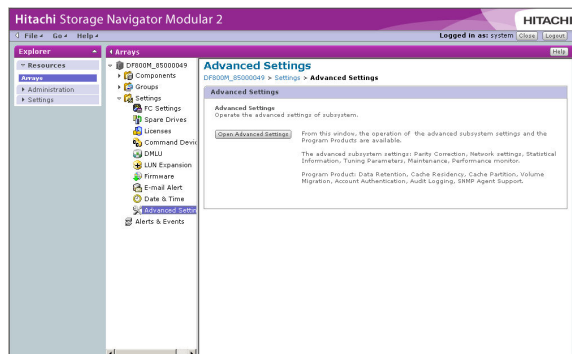
(e) Check the contents of the confirmation message window, and click the [Close] button.



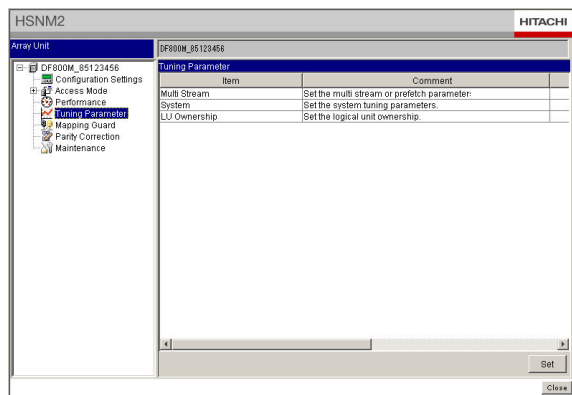
(f) Check that the content set in the LU Ownership window is reflected.

(3-2) When the Hitachi Storage Navigator Modular 2 is less than Ver.6.02

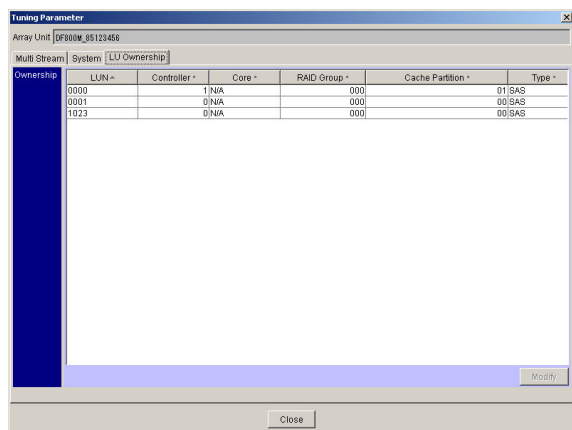
(a) Select [Settings] - [Advanced Settings], and click the [Open Advanced Settings] button.



(b) Select the [Tuning Parameter] on the applet window, and click the [Set] button.

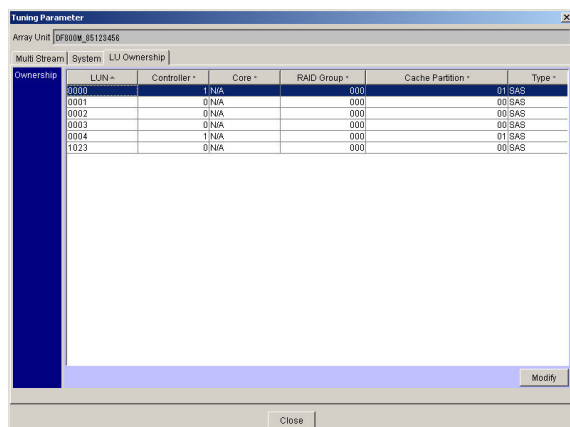


(c) Click the [LU Ownership] tab. The setting window of “LU Ownership” is displayed in the Parameter window.

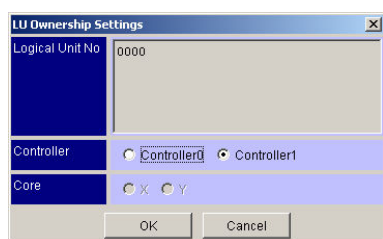




(d) Select a logical unit to be set (only one is possible), and click the [Change] button.

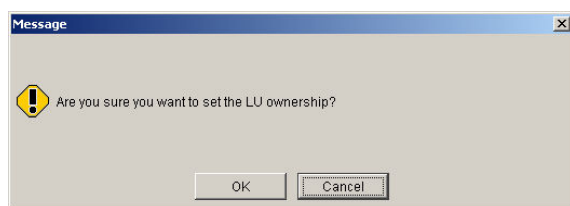


(e) Set the Control Unit in the setting window.



(f) Check if the changes that have been made are correct and click the [Apply] button.  
When the [Reset] button is clicked, the settings that have been made are cancelled.  
It is set to the default value by clicking the [Default] button.

(g) The confirmation message is displayed. Click the [OK] button.



(h) Click the [OK] button.



(i) Check that the content set in the Parameter window is reflected.

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## Chapter 10. Setting Air Filter Information

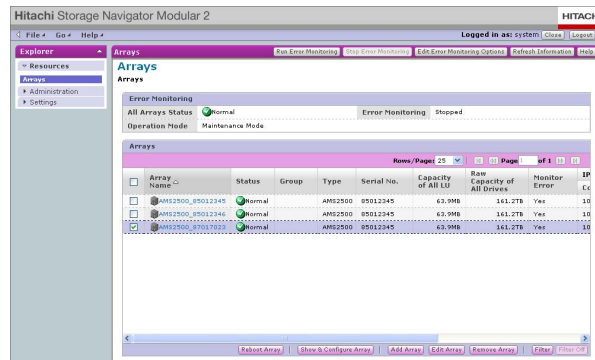
When the Hitachi Storage Navigator Modular 2 is Ver.7.00 or more, the Air Filter information can be set.

Air Filter is installed inside the Front Bezel (front side cover of the array). The Air Filter can be installed when the power supply (DC current) is used. This Air Filter needs to be changed depending on the subsystem operation period (8800 hours). Therefore, when performing this setting, perform the E-mail Alert setting together, and monitor the time for replacement. (Refer to “Chapter 4. E-mail Alert Function” (SYSPR 08-0000).)

### 10.1 Before Setting Air Filter Information

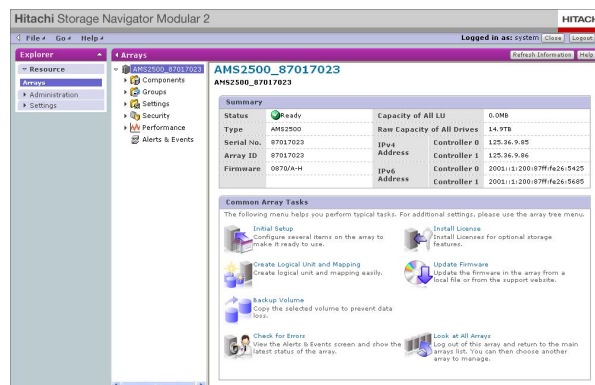
- (1) Turn on the power supply.
- (2) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (3) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

## 10.2 Setting Air Filter Information

The setting of the Air Filter information has the items as shown below.

**Table 10.2.1 Lists of Configuration Setting Items**

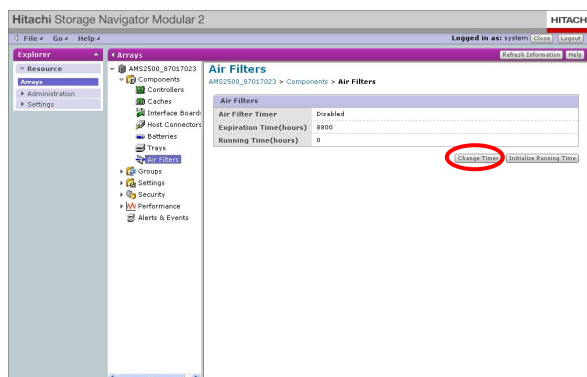
No.	Menu item	Use	Contents	Factory setting
1	Air Filter <sup>(*)</sup>	Setting Air Filter Information	① Setting Air Filter Timer function ② Displaying the Expiration Time (hours) ③ Displaying the Running Time (hours)	Disabled 8800 (Fixed value, unmodifiable) 0 (Setting impossible, possible to clear it only by 0.)

\*1 : It displays when the version of Hitachi Storage Navigator Modular 2 is Ver. 7 or more

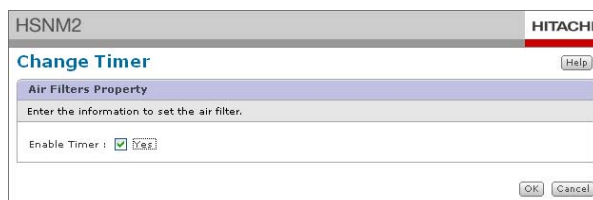
### (1) Changing Air Filter timer function

#### (a) Select [Components] - [Air Filters].

Click the [Change Timer] button.



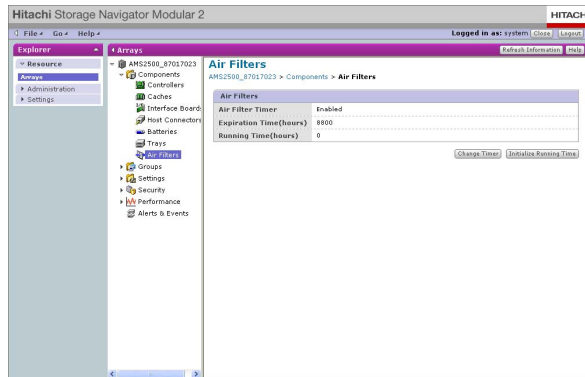
#### (b) To make the [Enable Timer] checkbox in the Change Timer window enabled, check the checkbox. To make it disabled, uncheck the checkbox and click the [OK] button.



#### (c) Check the contents in the confirmation message window, and click the [Close] button.



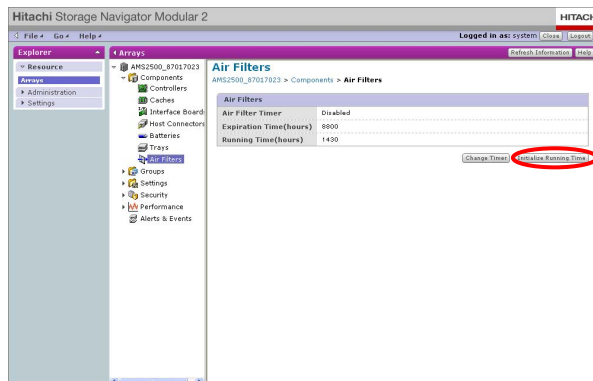
(d) Check that the content set in the Air Filters window is reflected.



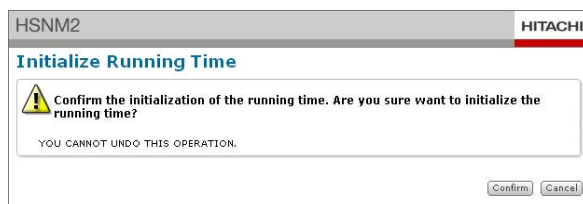
(2) Initializing Air Filter Running Time

(a) Select [Components] - [Air Filters].

Click the [Initialize Running Time] button.



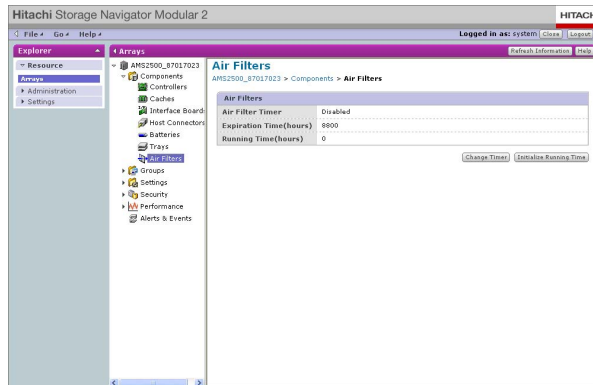
(b) Check the contents in the confirmation message window, and click the [Confirm] button.



(c) Check the completion of Initializing Running Time, and click the [Close] button.



(d) Check that the content set in the Air Filters window is reflected.



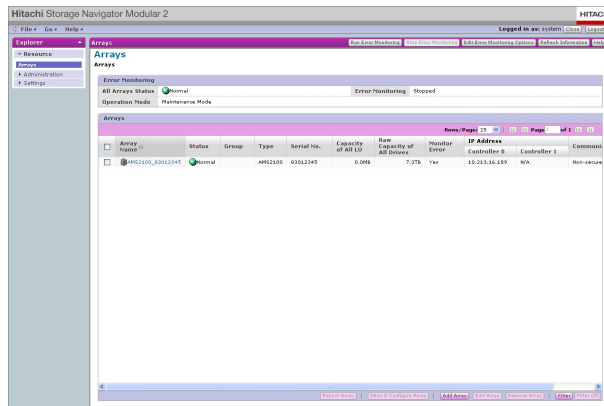
## Chapter 11. Setting SATA Write & Compare

When the Hitachi Storage Navigator Modular 2 is Ver.8.50 or more, the SATA Write & Compare can be set.

### 11.1 Before Setting SATA Write & Compare

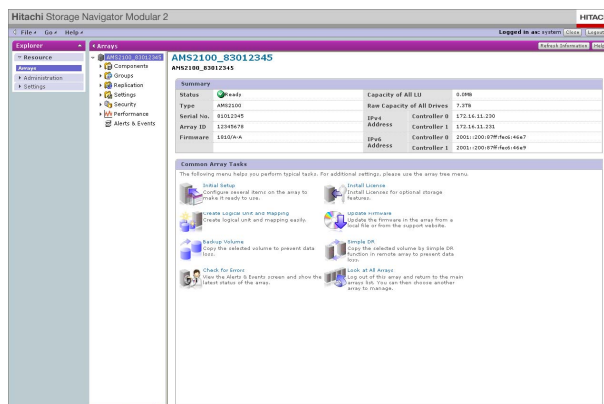
- (1) Turn on the power supply.
- (2) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



- (3) Click the array subsystem name, and open the unit window.

**NOTE :** There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)



<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

## 11.2 Setting SATA Write & Compare

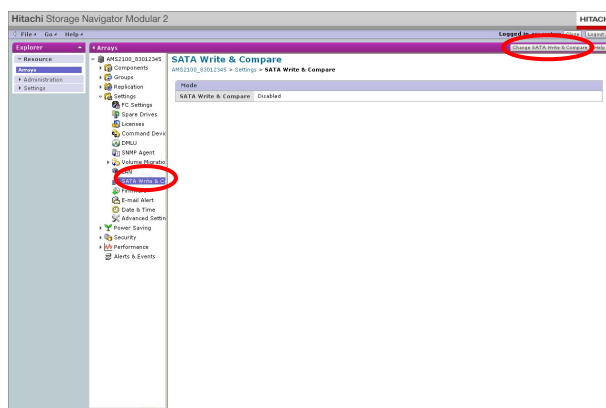
The setting of the SATA Write & Compare has the items as shown below.

**Table 11.2.1 Lists of Items**

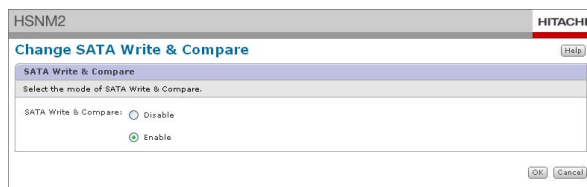
No.	Menu item	Use	Contents	Factory setting
1	SATA Write & Compare <sup>(*)</sup>	Setting SATA Write & Compare which is a drive data security function.	Setting SATA Write & Compare	Enabled

\*1 : It displays when the version of Hitachi Storage Navigator Modular 2 is Ver. 8.50 or more

- (1) Select [Settings] - [SATA Write & Compare].  
Click the [Change SATA Write & Compare] button.

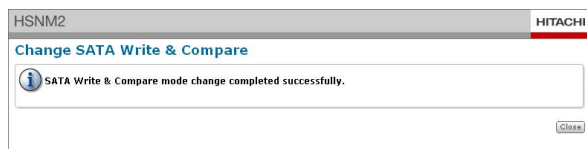


- (2) When performing SATA Write & Compare, check the [Enable] in the SATA Write & Compare window, and click the [OK] button.  
When not performing SATA Write & Compare, check the [Disable] in the SATA Write & Compare window, and click the [OK] button.



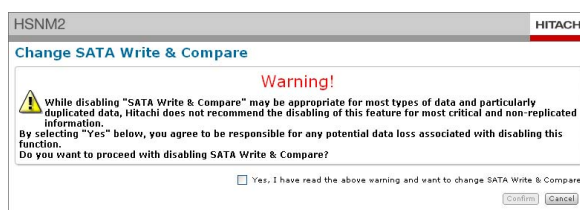


(3) The setting completion window is displayed. Click the [Close] button.

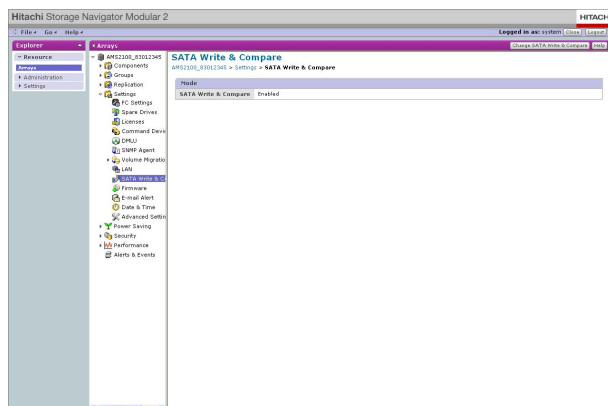


NOTE : When the [Disable] is checked in the step (2), the following confirmation window is displayed.

Make sure that there is no problem with disabling the SATA Write & Compare, click the checkbox, and then click the [Confirm] button. The above setting completion window is displayed.



(4) The setting result of the SATA Write & Compare is reflected.



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## Chapter 12. Data At Rest Encryption Master Authentication Key

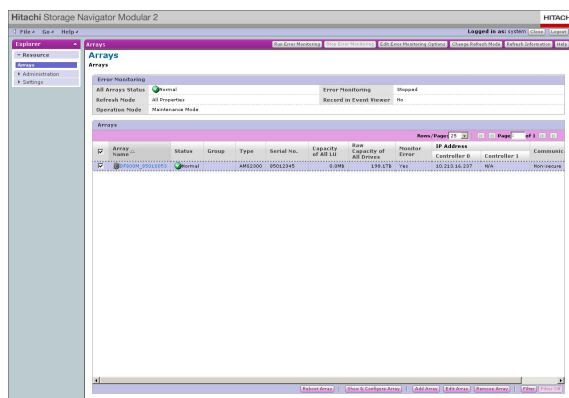
### 12.1 Backing Up the Master Authentication Key

NOTE : The license of the Data At Rest Encryption, which is an priced option, should be unlocked and enabled.

The procedure for backing up the master key is described below.

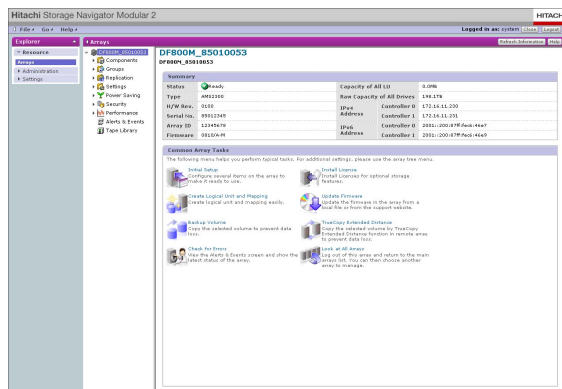
- (1) Turn on the power supply.
- (2) Start Hitachi Storage Navigator Modular 2, put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

Check that “Maintenance Mode” is displayed in [Operation Mode] on the top of the main window.



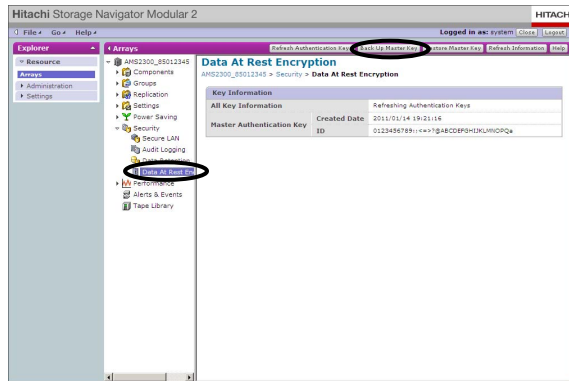
- (3) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” (SYSPR 01-0120).)

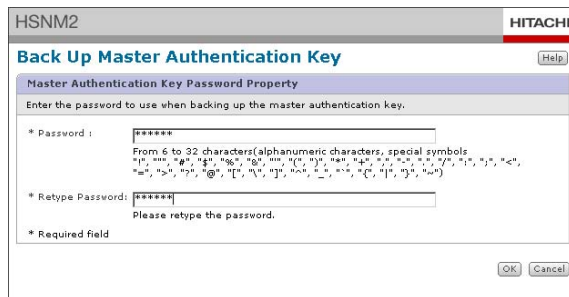


<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (4) Select the [Security] - [Data At Rest Encryption] in the unit window, click the [Back Up Master Key] button.



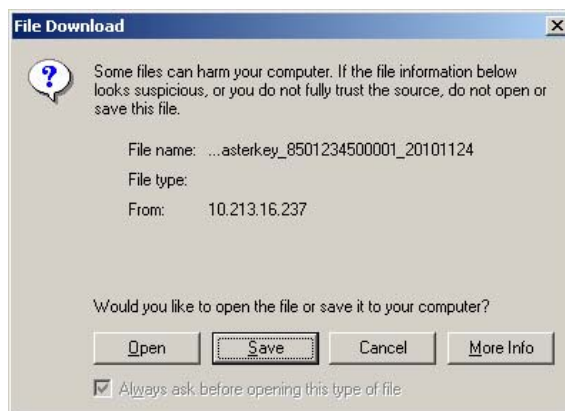
- (5) The “Back Up Master Authentication Key” setting window is displayed. Enter “abcdef” as password, and click the [OK] button. The password is used for restoring the master authentication key.



- (6) The following window is displayed. Check the contents of the window, and click the [Back Up Master Key] button.



- (7) The following window is displayed. Click the [Save] button. Specify anywhere to save the file. Do not change the backup file name.



## 12.2 Restoring the Master Authentication Key

The procedure for restoring the master authentication key from its backup is described below.

NOTE : When restoring the master authentication key, restore only either one of the Control Units.

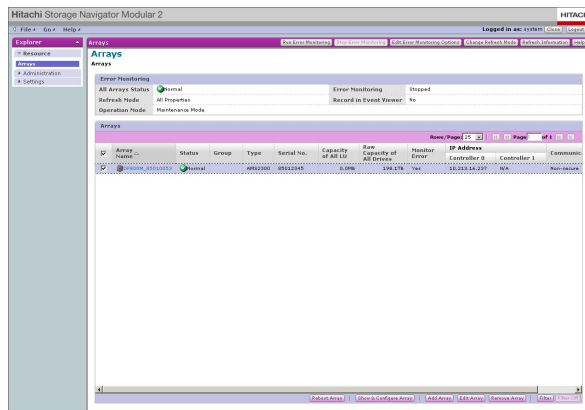
If the Control Unit #0 and the Control Unit #1 are accessed respectively and restored at the same time, the Control Units cannot be restored.

(1) When the Hitachi Storage Navigator Modular 2 version is 10.03 or more

(a) Start the Hitachi Storage Navigator Modular 2.

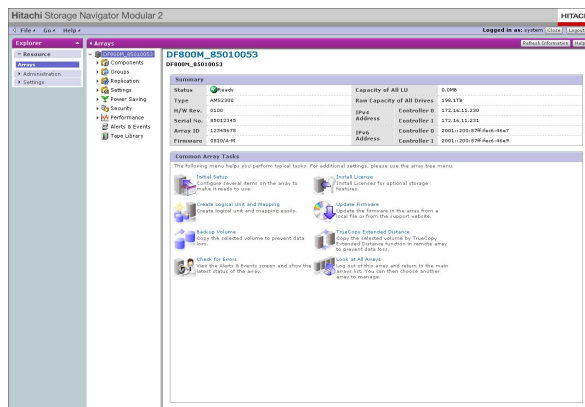
(b) Put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



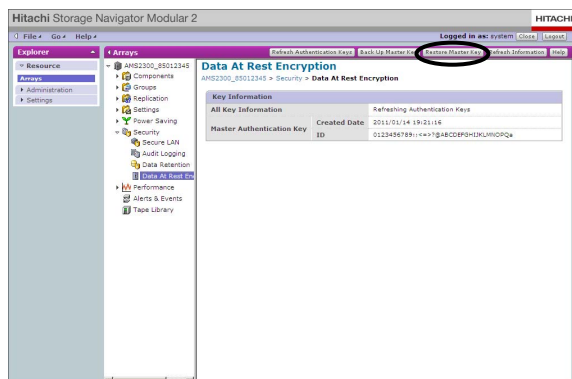
(c) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\)](#).)



<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

- (d) Select [Security] - [Data At Rest Encryption] on the unit window, and click the [Restore Master Key] button.



- (e) The Restore Master Authentication Key window is displayed.

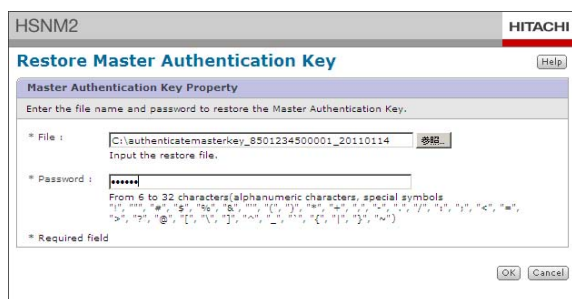
Enter the backup file and password.

Store the backup file under “C:\” or “C:\diskarray-microprogram”.

Specify the file name including the directory path for the [File].

Do not change the backup file name.

Click the [OK] button.



- (f) Click the [Close] button.

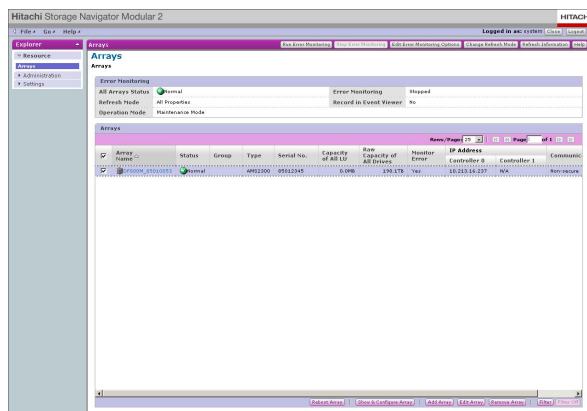


(2) When the Hitachi Storage Navigator Modular 2 version is less than V10.03

(a) Start the Hitachi Storage Navigator Modular 2.

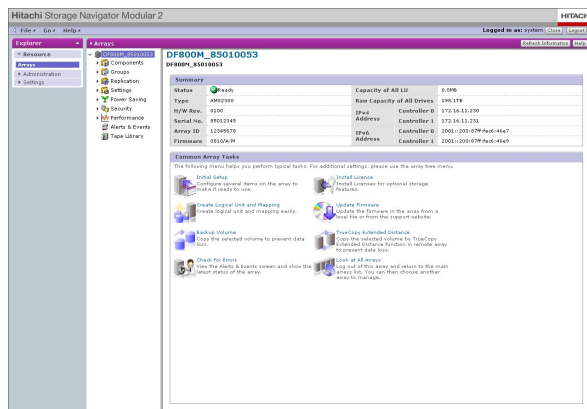
(b) Put a checkmark to the array subsystem to set, press the [Ctrl] key, [Shift] key and [E] key at the same time, and change the operation mode to “Maintenance Mode”.<sup>(†1)</sup>

It is displayed as “maintenance mode” in [Operation Mode] of the upper part of the window, and Hitachi Storage Navigator Modular 2 is operated in the maintenance mode.



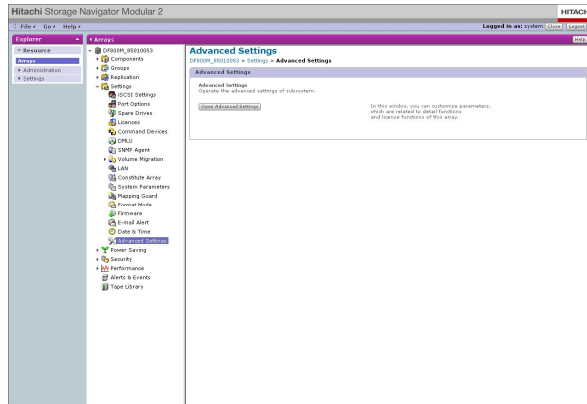
(c) Click the array subsystem name, and open the unit window.

NOTE : There is a case that the LAN Port Number is changed. When the main screen is not displayed even though the icon of the array subsystem is clicked, use the changed LAN Port Number, and execute it again. (Refer to [System Parameter “1.2 LAN Port Number Change by Hitachi Storage Navigator Modular 2” \(SYSPR 01-0120\).](#))

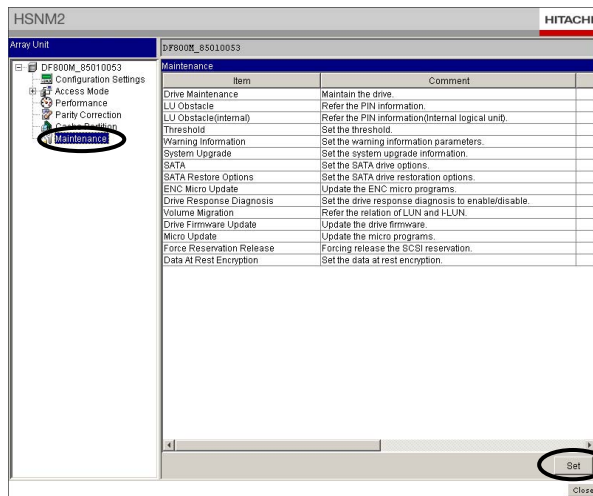


<sup>†1</sup> : When the array subsystem to operate is not registered, click the blank area (other than buttons and characters) in the “Arrays” window, and press the [Ctrl] key, [Shift] key and [E] key at the same time.

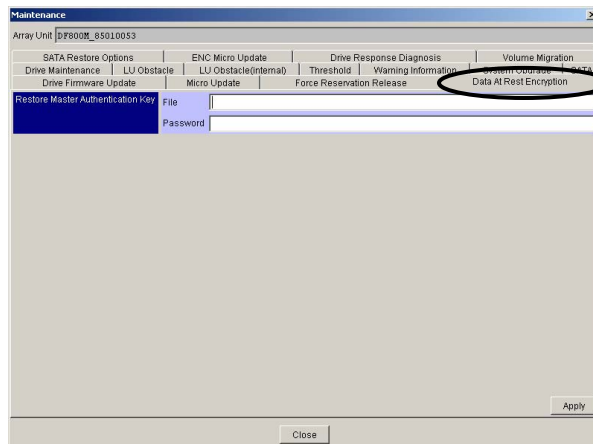
- (d) Select [Settings] - [Advanced Settings] on the unit window, and click the [Open Advanced Settings] button.



- (e) Select the [Maintenance] on the applet window, and click the [Set] button at the lower right corner of window.



- (f) The “Maintenance” dialog window is displayed. Select the [Data At Rest Encryption] tab.

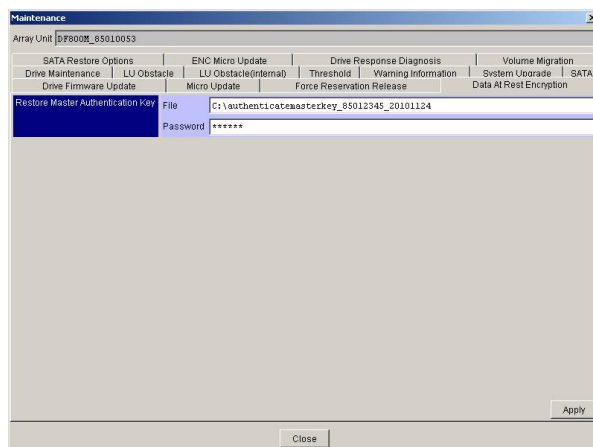




## (g) Set the Restore Master Authentication Key.

Store the backup file under “C:\” or “C:\diskarray-microprogram”.

Do not change the backup file name.



[File] : Specify the file in which the master authentication key has been backed up.

NOTE : Specify the file name including the directory path for the [File].

[Password] : Enter the password specified when the master authentication key was backed up.

(h) The warning window is displayed. After confirming whether it is OK to restore the master authentication key, select the “OK to set” check box, and click the [OK] button.



(i) Click the [OK] button.



