



**Hitachi TagmaStore®
Adaptable Modular Storage
and Workgroup Modular Storage
Storage Navigator Modular for Web
User's Guide**

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Changes in this Revision

- Added a new chapter which contains an overview of the TagmaStore[®] AMS and WMS.
- Made minor editorial changes throughout the document.
- Added a new list of acronyms.

Preface

Storage Navigator Modular is an application that allows you to configure and monitor your Hitachi TagmaStore® Adaptable Modular Storage (AMS) and Workgroup Modular Storage (WMS) disk array subsystems.

This document describes the requirements and procedures for executing configuration setting and display, information display, and error monitoring of the Hitachi TagmaStore Adaptable Modular Storage (AMS) and Workgroup Modular Storage (WMS) disk array subsystems using Storage Navigator Modular for Web. Before starting operations, please read this document to ensure that you thoroughly understand operating instructions and procedures.

This document is intended for users with a background in data processing and who understand RAID disk array subsystems and their basic functions. Specific examples of appropriate users include:

- System administrators responsible for the operation of systems, including array units.
- System engineers responsible for the construction of systems, including array units.
- Customer support engineers responsible for the maintenance of array units.

This document assumes the following:

- The user is familiar with the Adaptable Modular Storage (AMS) and/or Workgroup Modular Storage (WMS) subsystem.
- The user has a thorough knowledge of basic Windows® operations including Microsoft® Internet Explorer.
- The user is capable of installing and setting IIS (Internet Information Service) for Windows systems.

Note: The screens shown in this document were captured on a Windows 2000 system with an array unit configured as a dual system and connected to a LAN. Some screens are different on a Windows 2003 system.

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Software Version

This document revision applies to TagmaStore Adaptable Modular Storage and Workgroup Modular Storage version 7.10 and higher.

Comparing the Web, GUI, and CLI Versions of Storage Navigator Modular

Storage Navigator Modular software has three separate versions for managing the Hitachi TagmaStore Adaptable Modular Storage and Workgroup Modular Storage: the Web version (described in this user guide), a graphical user interface (GUI) version, and a command line interface (CLI) version. The following table provides an overview:

Application	User Interface	Configuration	Comparisons	User Guide
Storage Navigator Modular for Web	Web browser	<ul style="list-style-type: none"> ▪ Operating system: Windows ▪ Network: One or more storage subsystems, a Web server and Web client computer are connected through a LAN. ▪ Installation: The application is installed on the Web server. The Java™ runtime environment (for running Java applets in a browser) is installed on the Web client computer. ▪ Operation: User runs the program from a Web browser on the client computer. 	<ul style="list-style-type: none"> ▪ Used with HiCommand Device Manager software to help centrally manage storage subsystems. ▪ May also be used without HiCommand software. ▪ Requires a Web server. 	<i>Storage Navigator Modular for Web User's Guide (MK-95DF719)</i>
Storage Navigator Modular Graphical User Interface (GUI)	Traditional graphical user interface (GUI)	<ul style="list-style-type: none"> ▪ Operating system: Windows, or UNIX®/Linux® ▪ Network: Storage subsystems connect to the host computer through a LAN. ▪ Installation and operation: Program is installed on and run from the host computer. 	GUI appearance is similar to Web version.	<i>Storage Navigator Modular Graphical User Interface (GUI) User's Guide (MK-95DF711)</i>
Storage Navigator Modular Command Line Interface (CLI)	Command line interface (CLI)		For users that prefer command line interfaces or wanting to run scripts.	<i>Storage Navigator Modular Command Line Interface (CLI) User's Guide (MK-95DF712)</i>

Convention for Storage Capacity Values

Storage capacity values for hard disk drives are calculated based on the following values:

- 1 KB = 1,000 bytes
- 1 MB = 1,000² bytes
- 1 GB = 1,000³ bytes
- 1 TB = 1,000⁴ bytes

Storage capacity values for logical units (LUs) are calculated based on the following values:

- 1 KB = 1,024 bytes
- 1 MB = 1,024² bytes
- 1 GB = 1,024³ bytes
- 1 TB = 1,024⁴ bytes
- 1 block = 512 bytes

Referenced Documents

- *Hitachi TagmaStore Adaptable Modular Storage and Workgroup Modular Storage LUN Manager User's Guide*, MK-95DF703
- *Hitachi TagmaStore Adaptable Modular Storage and Workgroup Modular Storage ShadowImage In System Replication Software User's Guide*, MK-95DF709
- *Hitachi TagmaStore Adaptable Modular Storage TrueCopy Synchronous Remote Replication Software User's Guide*, MK-95DF710

Comments

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Chapter 1 Overview of TagmaStore® AMS and WMS

1.1 Overview of TagmaStore AMS and WMS

The TagmaStore Adaptable Modular Storage (AMS) and Workgroup Modular Storage (WMS) provide scalable, cost-effective modular storage for Microsoft Exchange Server and other business applications. You can use the AMS or WMS to implement storage consolidation, first SAN deployment, backup, or data archiving.

The AMS and WMS enable you to meet compliance requirements, protect your data, and reduce recovery times, while benefiting from flexible storage solutions that allow you to manage your data growth. The centralized storage infrastructure allows you to reduce the complexity and cost of your storage management. Fully redundant and hot-swappable components let you to keep applications online, while within-system volume replication and incremental copy functions allow for frequent backups. The available RAID-6 architecture gives you high availability and rapid RAID group rebuild, while the Hi-Track “call home” service and remote maintenance functions provide the security of 24/7 support from expert service professionals.

You can partition and dedicate cache to maximize the performance of high-I/O operations. You can leverage the AMS or WMS together with the enterprise-class TagmaStore Universal Storage Platform (USP) or Network Storage Controller (NSC) to implement a tiered storage solution to manage the data lifecycle. Simple SAN and SAN Starter solutions allow easy deployment. SAN-attached servers can use diskless boot, and Network Attached Storage (NAS) applications allow for high-capacity storage.

Chapter 2 Storage Navigator Specifications and Requirements

Storage Navigator Modular for Web is used to reference status and to set up the configuration of an array unit.

This chapter contains the following sections:

- 2.1 Notes on Using Storage Navigator Modular
- 2.2 Operating System Environments
- 2.3 Connecting
- 2.4 Installing

2.1 Notes on Using Storage Navigator Modular

When using Storage Navigator Modular, consider the following:

- All of the output files from the Storage Navigator Modular are sent to the Web server side. Specify all of the files that Storage Navigator Modular inputs and all of the applications that the Storage Navigator Modular activates as files on the Web server side.
- The application program that is specified by Storage Navigator Modular is executed by the SYSTEM account of a Web server. Therefore, the application that has the GUI or requires the authority for the network access cannot be specified. Also, the necessary DDL must be set for the path of the system environment variables of the Web server. When the data definition language (DDL) that is necessary for the path of the system environment variables of the Web server is not found, the application program cannot be executed.
- The Storage Navigator Modular functions of cannot be used unless a TCP/IP communication is made between the array unit and the Web server. Verify that the TCP/IP is set correctly.
- Some Storage Navigator Modular functions are not available while the array unit is online with a host. For more information, see Chapter 3.
- When a high I/O load exists, the functions that are available while online might cause a command time-out in the host or a recovering fault in Storage Navigator Modular. Hitachi Data Systems recommends that these functions be executed while offline.
- When Storage Navigator Modular is installed in the host connected to an array unit, I/O loading from a host might cause a command time-out on the host side or an abnormal termination on the Storage Navigator Modular side.
- Installing Storage Navigator Modular in a host that does not connect an array unit is recommended.
- At least one logical unit must be configured in the array unit to make all of Storage Navigator Modular functions available. If no logical unit is defined in the array unit, some functions cannot be executed.
- When the Web server enters the suspension status (low power mode) while Storage Navigator Modular is running, Storage Navigator Modular might not operate correctly after the Web server is released from the suspension status.
- When you operate Storage Navigator Modular, disable power management through Windows® so that the Web server will not enter the suspension status.
- Storage Navigator Modular allows multiple Array Unit screens to open for one array unit. When performing operations by opening multiple Array Unit screens for one array unit, operations may terminate abnormally. Open only one Array Unit screen for one array unit to operate an array unit.
- You can perform error monitoring when an Array Unit screen is open. However, when you perform error monitoring with operations of a Array Unit screen concurrently, error monitoring operation and Array Unit screen operations may terminate abnormally. To start error monitoring, close all Unit screens, then perform error monitoring.

- Setting items displayed in the window for setting the configuration, etc. can be changed in some windows with the **Tab** key. When the setting items cannot be changed with the **Tab** key, specify the setting items using a mouse.

- If Storage Navigator Modular does not succeed in connecting to the array unit, the following message may display:

`An invalid response was received from the subsystem`

This message indicates that Storage Navigator Modular may have been connected to the array unit while the array unit automatically rebooted. Reconnect to the array unit after 3 minutes.

- Storage Navigator Modular may hang up in the following cases:
 - The communication with the connected array unit fails due to controller blockage, array unit failure, disconnected LAN connection, or the array unit receives a Reset/LIP from the host.
 - Other applications are working concurrently and memory utilization or a CPU use rate is high.

If Storage Navigator Modular hangs up, terminate it forcibly. Check the array unit status and the connection status of the LAN. Reboot Storage Navigator Modular once again.

- The Java™ Applet Window may be displayed at the bottom of a screen item (such as a dialog box, popup menu, combo box) on a Storage Navigator Modular panel (see Figure 3.3). This is not an error.
- When Storage Navigator Modular is booted up by Windows, a **Main** screen may not open, depending on the version of DirectX. Update the DirectX of version 8.1 or later (only client PC side).
- If v monitor color is not adjusted after starting Storage Navigator Modular under Solaris™, use a `/usr/sbin/fbconfig` command to increase the color number depth. The depth of the color number that can be specified is `-prconf` option.
- If the **Next** or **Back** button is pressed continuously at a short interval while using the System Parameter Wizard, the screen may freeze. To avoid this, verify that the page is changed in the Wizard screen before pressing the **Next** or **Back** button.
- When the installation for altering the Windows version is performed, the Windows version begins its service automatically and the installation is completed.
- A user who has already logged in can be automatically logged out when another user logs in or the same user logs in again. If the preceding user is still using it, an error or a wrong indication may result.
- When Web Navigator connects the disk array subsystem over a LAN, it uses the TCP/IP port number of 2000. The TCP/IP port number of the disk array subsystem is set as 2000 by default. Since the setting of the port number of the disk array subsystem (AMS500/AMS200/WMS100 with the microprogram version of 0726/E or later, 9500V/9520V with the microprogram version of x65B/H or later) can be changed. Check the port number setting in the Web window when the disk array subsystem cannot be connected.
- The restrictions listed in Table 2-1 exist if Storage Navigator Modular is used in combination with other programs, for one array unit:

Table 2-1 Restrictions for Multiple Programs used Concurrently for One Array Unit

Program Name	Concurrent Use Supported	Concurrent Use Not Supported
Storage Navigator Modular	<ul style="list-style-type: none"> – Storage Navigator Modular (<i>Note 1</i>) – SNMP Agent – DAMP Web Server 	<ul style="list-style-type: none"> – DAMP GUI – DAMP for Web
DAMP GUI	<ul style="list-style-type: none"> – SNMP Agent – DAMP Web Server 	<ul style="list-style-type: none"> – Storage Navigator Modular – DAMP GUI – DAMP for Web
DAMP (Web)	<ul style="list-style-type: none"> – SNMP Agent – DAMP Web Server 	<ul style="list-style-type: none"> – Storage Navigator Modular – DAMP GUI – DAMP for Web
SNMP Agent	<ul style="list-style-type: none"> – Storage Navigator Modular – DAMP GUI – DAMP for Web – SNMP Agent – DAMP Web Server 	N/A
Disk Array Unit Web Server	<ul style="list-style-type: none"> – Storage Navigator Modular – DAMP GUI – DAMP for Web – SNMP Agent – DAMP Web Server 	N/A

Note 1: You can have two concurrent instances of Storage Navigator Modular, provided that they are not connected to the same array system. If one instance terminates forcibly, that may affect the other instance.

Additionally, if one Storage Navigator Modular terminates forcibly while using two Storage Navigator Modular products simultaneously, another Storage Navigator Modular may terminate abnormally. If this occurs, operate the Storage Navigator Modular that has abnormally terminated again.

If you run a combination of programs in which concurrent use is not allowed, when a program with a usage restriction placed on it has been started, start another program with that combination after terminating the running program.

To operate other programs, refer to their respective user’s guides, which are provided with the program products.

- When connecting the disk array subsystem with Storage Navigator Modular over a LAN, the disk array subsystem may not be able to connect because a time-out of the data transfer occurs. This will depend on the LAN environment. When Storage Navigator Modular cannot be connected with the disk array subsystem, verify that the connection is correct using the **ping** command. If a response to the **ping** command is normal, the LAN environment may affect the data transfer. The length of data to be transferred can be changed with the “lanconf.inf” file in the directory in which Storage Navigator Modular is installed. The default setting is “32768”. Change the setting to “16384” or “8192”, in this order or to a multiple of 1024, and then retry. The new setting becomes effective from the next operation. A restart of Storage Navigator Modular is not required. Operation of Storage Navigator Modular may take some time, depending on the setting. If the connection cannot be made regardless of the setting change, review the LAN environment.
- If an array unit failure is detected, contact the Hitachi Customer Engineer.
- Do not use the reserved words prescribed for each OS and device names that indicate the input/output destinations as a file name when a file is output. Windows includes “con”, “pm”, “aux”, etc., and UNIX includes “/dev*”, etc. For example, when `con.txt` is specified as an output file name, an error message displays.
- If the Web Navigator is used in a server that has two or more LAN cards or an IP address, see Appendix D.

2.2 Operating System Environments

Storage Navigator Modular is operated by connecting to the array unit over a LAN. When an array unit is connected to a LAN, the Web server, in which Storage Navigator Modular is installed, must be connected with the network and must operate normally.

■ Web server

- OS: Windows NT 4.0 (SP6a), Windows 2000 (SP1, SP2, SP3), Windows XP (SP2), Windows Server 2003 (SP1), or Windows Server 2003 (R2).
- Web server: IIS, Hitachi Web Server.
- CPU: Pentium® III, IV (500 MHz or more is recommended.)
- Memory: 256 MB or more is recommended.
- Available disk capacity: 26 MB max. (Free capacity of 100 MB or more is required.)
- Network adapter.
- Monitor: Resolution 1,024 × 768 or more is recommended, 256 colors or more.

■ Web client

- OS: Windows 2000 (SP1, SP2, SP3, SP4), Windows XP (SP1, SP2), Windows Server 2003 (SP1), or Windows Server 2003 (R2).
- Browser: IE 5.5 (SP1, SP2), IE6.0 (SP1, SP2).
- CPU: Pentium-III, IV (333 MHz or more is recommended.)
- Memory: 256 MB or more is recommended.
- Available disk capacity: A free capacity of 100 MB or more is required.
- Network adapter.
- Monitor: Resolution 1,024 × 768 or more is recommended, 256 colors or more.

■ JRE

- Windows: j2re-1_4_2_07-windows-i586-p.exe

■ LAN connection

- When an array unit is connected directly to a Web server, a 10BaseT/100BaseT twisted pair cable crossover cable is used.
- When an array unit is connected to a Web server over a hub, a 10BaseT/100BaseT twisted pair cable is used.

■ Port number of TCP/IP

- When connecting the disk array subsystem and a LAN, Web Navigator uses the port number of 2000. When changing the port number, add “df-damp-snm port number/TCP” to the services file of the OS. In addition, when changing the port number, it is also required to change the port number of the disk array subsystem to be connected. When the port number of the disk array subsystem is set as 2000, the disk array subsystem can be connected to the LAN though it takes time for the connection even if another port number is registered in the services file.

2.3 Connecting the Interface

This section provides examples of connections between a host in which Storage Navigator Modular has been installed and an array unit.

When two or more LAN cards are installed in a Web server and a segment set in each LAN card is different from the others, the disk array subsystem can be accessed only from the LAN card managed by the Web server as a Local host. When accessing the disk array subsystem from the other segment, make the configuration that a router is used. Install one LAN card in the Web server to be installed.

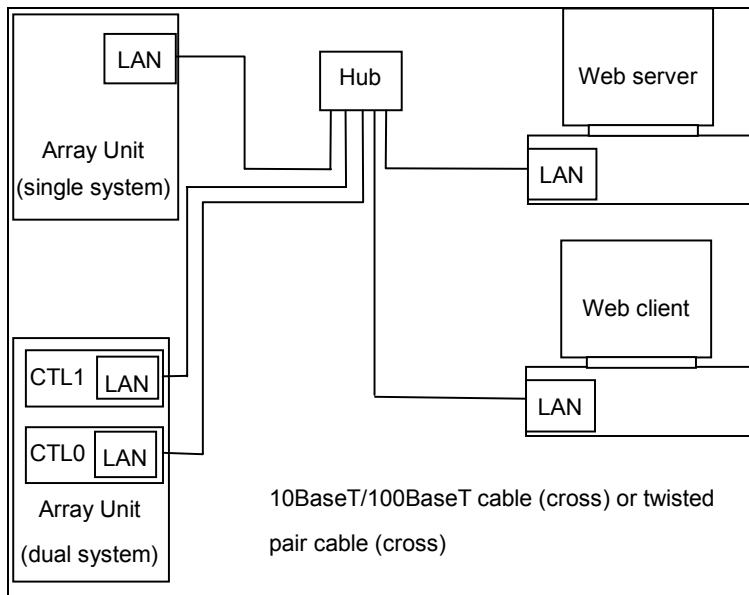


Figure 2.1 LAN with a Hub

Note: If an array unit is already connected with a LAN, a Web server is connected to the same network as the array unit.

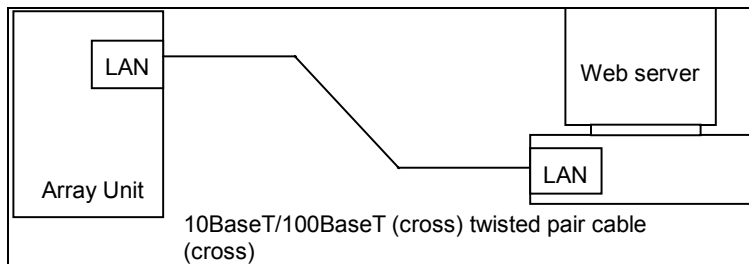


Figure 2.2 LAN without a Hub

2.4 Installing Storage Navigator Modular

This section describes the following procedures to install Storage Navigator Modular:

- Installing Storage Navigator Modular on the Web Server.
- Installing the Java Plug-in on the Web client.
- Ensuring that there are no conflicts with the firewall software or Web DAMP software.

To upgrade an installed Storage Navigator Modular to version 6.00, see section 2.5.

2.4.1 If Resource Manager 9500V/9520V for Web (Web DAMP) is Installed

If Web DAMP is installed, Storage Navigator Modular does not recognize the subsystem unless you perform the following steps *before* you register the subsystem with Storage Navigator Modular.

Perform the following to ensure that Storage Navigator Modular operates correctly when Web DAMP is installed:

1. Install Storage Navigator Modular. See section 2.4.2.
2. Copy the `utlprm.inf` file from the Web DAMP folder (typically `C:\Program Files\DA Manager Web`) to the Storage Navigator Modular Web installation folder (typically `C:\Program Files\Storage Navigator Modular Web`).
3. Start Storage Navigator Modular. See section 4.1.1.
4. Enter **Management Mode**.
5. From the **Edit** menu, select **Modify**.
The Modify Array Unit window displays.
6. Click **OK**.

2.4.2 Installing Storage Navigator Modular on the Web Server

Storage Navigator Modular is installed on a web server (see section 2.2 for compatible web servers). Before installing Storage Navigator Modular, ensure that the web server operates correctly.

To install Storage Navigator Modular on the Web server:

1. Start the Web server. See section 4.1.1.
2. Boot up Windows.
3. Execute `SNM-xxxx-W-Web.exe` in the `stonavm_win` directory of the provided CD.
(The portion “xxxx” of file names varies with the version of Storage Navigator Modular, etc.)
4. Register the location for installation with the Web server.

5. When running Storage Navigator Modular with HiCommand Device Manager, set the memory size (for details see Appendix B: Notes on Making Multiple Launches).

2.4.3 Ensuring that Firewall Software does not Block Access to Storage Navigator Modular

After installing Storage Navigator Modular on the web server, ensure that any firewall software on the web server computer does not block access to Storage Navigator Modular:

- If you use Windows Firewall: Follow the procedure below for Windows Server 2003 (SP1) or Windows XP (SP2).
- If you use other firewall software: Refer to your firewall documentation to ensure that access is permitted to the Storage Navigator Modular program, `jre1.4.2\bin\client\snmsrv.exe`.

To set access to Storage Navigator Modular through the Windows Firewall:

1. From the **Control Panel**, select **Windows Firewall**.
The **Windows Firewall** dialog box displays.
2. If the Windows Firewall setting is:
 - **Off**: The firewall will not interfere with Storage Navigator Modular. Close the firewall dialog box and discontinue this procedure.
 - **On**: Ensure that the **Don't allow exceptions** option is *not* selected and continue with this procedure.
3. Select the **Exceptions** tab.
4. Click **Add Program**.
5. Click **Browse** to navigate to and select the `jre1.4.2\bin\client\snmsrv.exe` file in the installation folder. The default location is `C:\Program Files\Storage Navigator Modular Web\jre1.4.2\bin\client\snmsrv.exe`.

Note: If you experience Web server communication problems, you may also need to ensure that the firewall does not block the Web server application.

2.4.4 Installing Java Plug-in on Web Client

Install the Java Plug-in, which is included as part of the Java 2 Runtime Environment, Standard Edition (JRE). The plug-in uses applets in the client browser to communicate with Storage Navigator Modular on the web server.

Note: Installing the Java Plug-in when a different version is already installed may cause operating problems with the Web client. If you experience such problems, uninstall the other version.

To install the Java plug-in on a Windows web client:

1. Start the Web client. See section 4.1.1.
2. Boot Windows.

3. Run the `j2re-1_4_2_07-windows-i586-p.exe` that is bundled with the supplied CD.

To install the Java plug-in on a Solaris web client:

Install the `j2re-1_4_2_07-solaris-sparc.sh` that is bundled with the supplied CD.

2.5 Upgrading the Storage Navigator Modular

Before performing an upgrade, be sure to terminate Storage Navigator Modular.

To upgrade the Storage Navigator Modular:

1. On the Web server:
 - a. Execute the `SNM-xxxx-W-Web.exe` in the `stonavm_win` directory of the provided CD-R. (The portion “xxxx” of file names varies with the version of Storage Navigator Modular, etc.) The updated Storage Navigator Modular can be run without restarting Web server.
 - b. Ensure that any firewall software does not block access to Storage Navigator Modular. See section 2.4.3.
2. On the Web client: Activate Storage Navigator Modular from the browser. See section 4.1.1.

2.6 Uninstalling Storage Navigator Modular

To uninstall Storage Navigator Modular:

1. On the Web server:
 - a. From **Control Panel**, use **Add or Remove Programs** to uninstall Storage Navigator Modular.
 - b. Delete the installation folder (typically `C:\Program Files\Storage Navigator Modular Web`).
2. On the Web client: From **Control Panel**, use **Add or Remove Programs** to uninstall Java 2 Runtime Environment Standard Edition `j2re-1.4.2_07`.

Chapter 3 Functions

This chapter includes the following:

- 3.1 Storage Navigator Modular Functions for AMS/WMS
- 3.2 Screens
- 3.3 Pop-Up (Right-Click) MenusPop-Up (Right-Click) Menus

3.1 Storage Navigator Modular Functions for AMS/WMS

Table 3-1 lists the Storage Navigator Modular functions. The functions that are available varies, depending on the current Storage Navigator Modular operation mode: monitor mode [Normal] or management mode [Management]. The mode can be changed in the startup screen prior to connecting to the array unit.

Table 3-1 Storage Navigator Modular Functions

Category	Name of Function	Outline of Function	Remarks	Usability During Operation	Mode	
					Normal	Mgmt
Configuration display	Component status display	Displays the status of a component, such as drive and fan, by using an icon.	—	Yes	Yes	Yes
	Property display	Displays the status about system components of the subsystem, RAID, logical units, etc.	—	Yes	Yes	Yes
RAID group definition	RAID group creation	Adds a RAID group. You can set a new RAID group by specifying its disk number, RAID level, and group range for the RAID group to be created.	—	Yes	No	Yes
	RAID group deletion	Deletes a defined RAID group or a specified RAID group.	Caution: This function invalidates user data of the deleted RAID group.	No	No	Yes
LU definition	LU creation	Used to add a logical unit (LU). A new logical unit is added by specifying its capacity.	A logical unit can be added only in an order of lower to higher numbers.	Yes	No	Yes
	LU formatting	Makes a defined logical unit (LU) accessible by the host. This function writes null data to the specified logical unit.	This operation is always required to make a logical unit accessible to the host. Caution: This function invalidates all user data on disks.	No/Yes	No	Yes
	LU deletion	Deletes the last defined logical unit (LU).	Caution: This function invalidates user data on the deleted LU.	No	No	Yes
	Change of default controller in charge of an LU	Changes the default controller in charge of an logical unit (LU) as follows: CTL0 → CTL1 and CTL1 → CTL0	—	Yes	No	Yes

Category	Name of Function	Outline of Function	Remarks	Usability During Operation	Mode	
					Normal	Mgmt
	Parity Correction	Restores the logical unit in which the parity error has occurred.	—	Yes	No	Yes
Setting the selection	LU creation	Creates logical units using a Wizard	—	Yes	No	Yes
	Setting up spare disk drive	Sets up spare disk drives.	—	Yes	No	Yes
	Differential Management LU	Sets up the differential management LU	—	Yes	No	Yes
	Command device	Sets up the command devices	—	Yes	No	Yes
	Setup and display of the priced optional features	Opens and closes the priced optional features key, and sets and displays the enable/disable condition.	—	Yes	No	Yes
Configuration setting	Setting the boot option	Sets up the boot option.	To make the setting valid, restart the subsystem.	No	No	Yes
	Setting and display of the fibre-channel information	Sets and displays port addresses and security information, etc.	—	No	No	Yes
	System parameter	Sets up the System parameters.	—	Yes	No	Yes
	Port option	Sets up the port options.	—	Yes	No	Yes
	Setting the drive restoration option	Sets a drive restoration mode, automatic or non-automatic start of copy-back, and automatic or non-automatic start of correction copy, time interval, restoring processing unit size, and Dynamic sparing mode.	Optimum time interval and restoring processing unit are set before shipment. Do not change these values unless required; decreased performance could result.	No	No	Yes
	On-line verify setting	Sets execution or non-execution of the on-line verify function and an interval for it.	Note that an incautious change in the setting may decrease the level of performance.	No	No	Yes
Configuration setting (continued)	LAN configuration information setting	Sets the IP Address, Sub Net Mask, Default Gateway Address, and the DHCP mode.	—	Yes	No	Yes

Category	Name of Function	Outline of Function	Remarks	Usability During Operation	Mode	
					Normal	Mgmt
	Setup and display of RTC	Sets and displays the date and time.	—	Yes	No	Yes
	Configuration information file output and its setup by use of a file.	Outputs system parameters and RAID group and logical unit configuration information to a file individually. Sets system parameters and RAID group and logical unit configuration information using a file.	If system parameters are set using a file, restart the subsystem in order to validate the settings. When RAID/LU configuration information is set, if setting it with user data stored in the disk drive, the user data is set invalid.	Yes	Yes	Yes
	Microprogram replacement	Downloads and updates the microprogram of the subsystem.	To validate the downloaded microprogram, restart the subsystem.	No/Yes	No	Yes
Statistical information display	Controller use information display	Displays previous statistical information by selecting a related item.	—	Yes	No	Yes
Performance	Command operation status display	Outputs the command operation status during a certain period or a specified period to the file in the text format.	—	Yes	Yes	Yes
Error monitoring	Report when a failure occurs and controller status display	Displays the status of the subsystem, and displays the result of monitoring it by polling. When an error is detected while monitoring, outputs the error into a log file, sends it to a specified address by E-Mail, and starts a specified application.	If a failure occurs, contact maintenance personnel.	Yes	Yes	Yes

3.2 Screens

The Storage Navigator Modular operations screen consists of three screens, dialog boxes, and error messages. This section describes the configurations of the three screens.

When you start Storage Navigator Modular, the **Main** screen displays. The **Main** screen of Storage Navigator Modular is located within the browser.

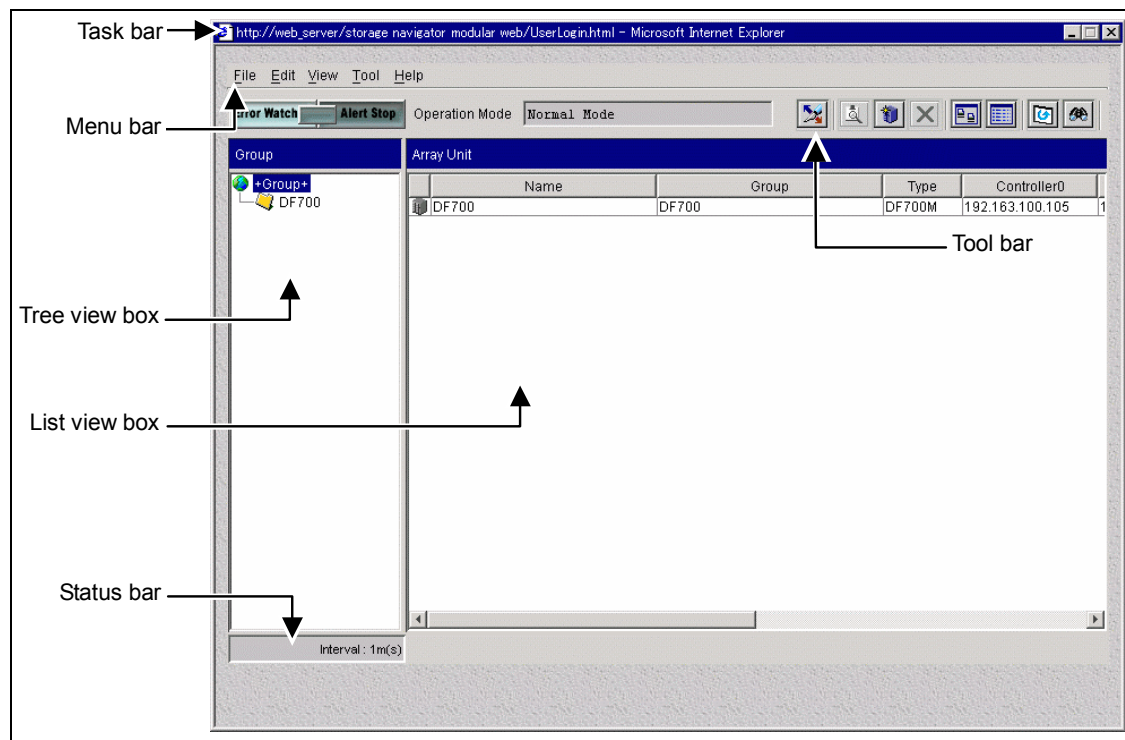


Figure 3.1 Storage Navigator Modular Main Screen

This screen includes the task bar, the menu bar, the tool bar, two view boxes, and the status bar; this is similar to other Windows applications.

Displayed in the tree view box are group names that have been registered. Displayed in the list view box are array unit names that have been registered in a group.

Double-clicking **+ Group +** enables you to fold a group into its icon and display the group.

Clicking a group icon displays only the array units that have been registered in that specific group. Clicking **+ Group +** displays all array units that have been registered.

When you double-click a registered array unit name, an Array Unit screen displays. On the Array Unit screen, the status of the array unit system components and configuration information of logical units, etc. displays selectively by switching the tab. For example, the following screen displays a connection with an AMS500 subsystem.

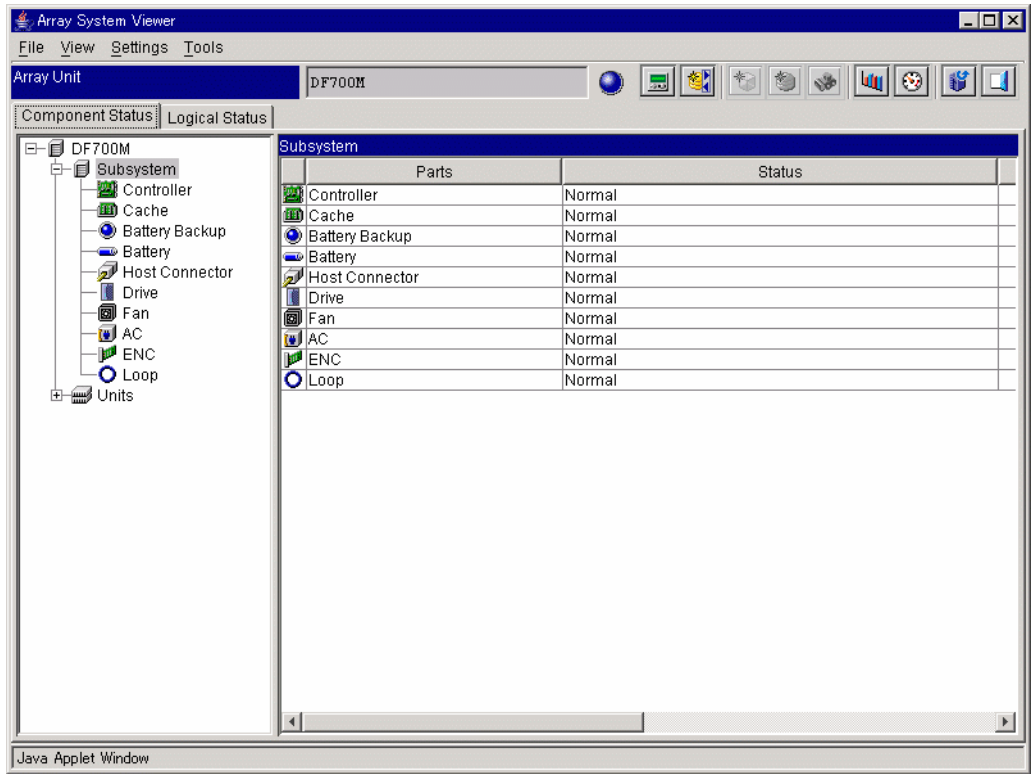



Figure 3.2 Component Status Tab (AMS500 shown)

3.2.1 Menu and Tool Bars



The following sections contain examples of the various icons and objects that display on the Main screen, the Array Unit screen, and the Status Bars.

3.2.1.1 Main Screen



File:

Menu	Toolbar	Function
Open		Displays the Unit screen.
Reboot	—	Reboot the subsystem.




Edit:

Menu	Toolbar	Function
Add		Registers the subsystem.
Add Automatically	—	Registers the subsystem automatically.
Modify	—	Changes the registration contents of the subsystem.
Delete		Deletes the registration of the subsystem, which is registered in the Storage Navigator Modular.
Monitoring	—	Sets the Monitoring Enable or Disable.

View:

Menu	Toolbar	Function
Icon		Displays the property of the subsystem by an icon.
Detail		Displays the property of the subsystem in detail.
Refresh	—	Checks the status of the subsystem.

Tool:


Menu	Toolbar	Function	
Operation Mode	Change		Changes the active mode.
	Set Password	—	Sets the password.
Error Monitoring	Execution		Executes the error monitoring.
	Scheduled Execution	—	Starts the error monitoring.
	Stop	—	Stops the error monitoring.
	Options		Displays the Monitoring Options screen.
	Account	—	Registers the failure monitoring account.
User Regist/Delete	—	Registers or deletes the users who login Storage Navigator Modular.	

Help:


Menu	Toolbar	Function
Version	—	Displays the revision of the Storage Navigator Modular.

3.2.1.2 The Unit Screen




Mode:

Menu	Toolbar	Function
Exit		Terminates the Array Unit screen.





View:

Menu	Toolbar	Function
Properties	—	Displays the property of the subsystem.
Drive Configuration	—	Displays the drive configuration of the subsystem.
Refresh		Refreshes the Array Unit screen.

Settings:

Menu		Toolbar	Function
RAID Group	Create		Displays the RAID group settings screen.
	Delete	—	Delete specified RAID group.
Logical Unit	Create		Displays the logical unit settings screen.
	Format		Formats the logical unit (Max. 6).
	Change Default Controller	—	Changes default controller of the logical unit.
	Parity Correction	—	Corrects the logical unit parity.
	Delete	—	Deletes specified logical unit.




Tools:

Menu	Toolbar	Function
Wizard		Starts the logical unit wizard.
Configuration Settings		Displays the configuration settings screen.
Mapping Guard	—	Display the LU mapping guard settings screen.
Performance Output File		Outputs the performance of the subsystem.
Settings	—	Sets the collection of performance statistics.
Statistical Information		Displays the statistics information of the subsystem.
Information Message	—	Displays the information message of the subsystem.
Tuning Parameter	—	Displays the tuning parameter screen.

3.2.2 Status Bars

Table 3-2 lists the status bars that are described throughout this User's Guide.

Table 3-2 Status Bar Descriptions

Status Bar	Description
 Interval : 1m(s)	Error Monitoring is stopped.
 Running Interval : 1m(s)	Error Monitoring is running.
 Wait Interval : 1m(s)	Error Monitoring in the interval.

3.3 Pop-Up (Right-Click) Menus

The pop-up menus are context-sensitive and display when you click the right the mouse button on the **Main** screen or Array Unit screen (**Logical Status** tab).

3.3.1 Pop-up Menus on Main Screen

Figure 3.3 shows the pop-up menu that displays when you select a disk array subsystem on the **Main** screen.

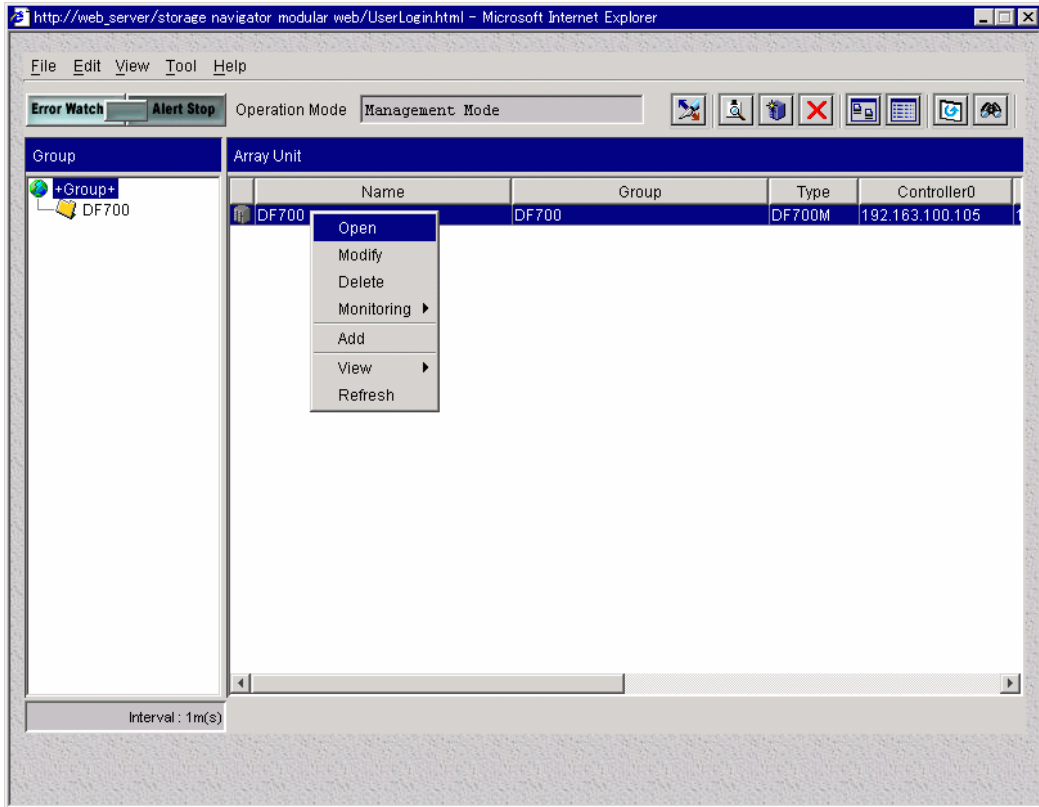


Figure 3.3 Pop-up Menu on Main Screen: Disk Array Subsystem Selected

Table 3-3 describes the Figure 3.3 pop-up menu options.

Table 3-3 Pop-up Menu Options on Main Screen: Disk Array Subsystem Selected

Selection	Menu Option	Function
Disk array subsystem icon	Open	Displays the Unit screen.
	Modify	Changes the registration contents of the subsystem.
	Delete	Deletes the registration of the subsystem registered in the Storage Navigator Modular.
	Monitoring	Sets the Monitoring Enable or Disable.
	Add	Registers the subsystem.
	View	Sets the view mode.
	Refresh	Checks the status of the subsystem.

Figure 3.4 shows the pop-up menu that displays when nothing is selected on the **Main** screen

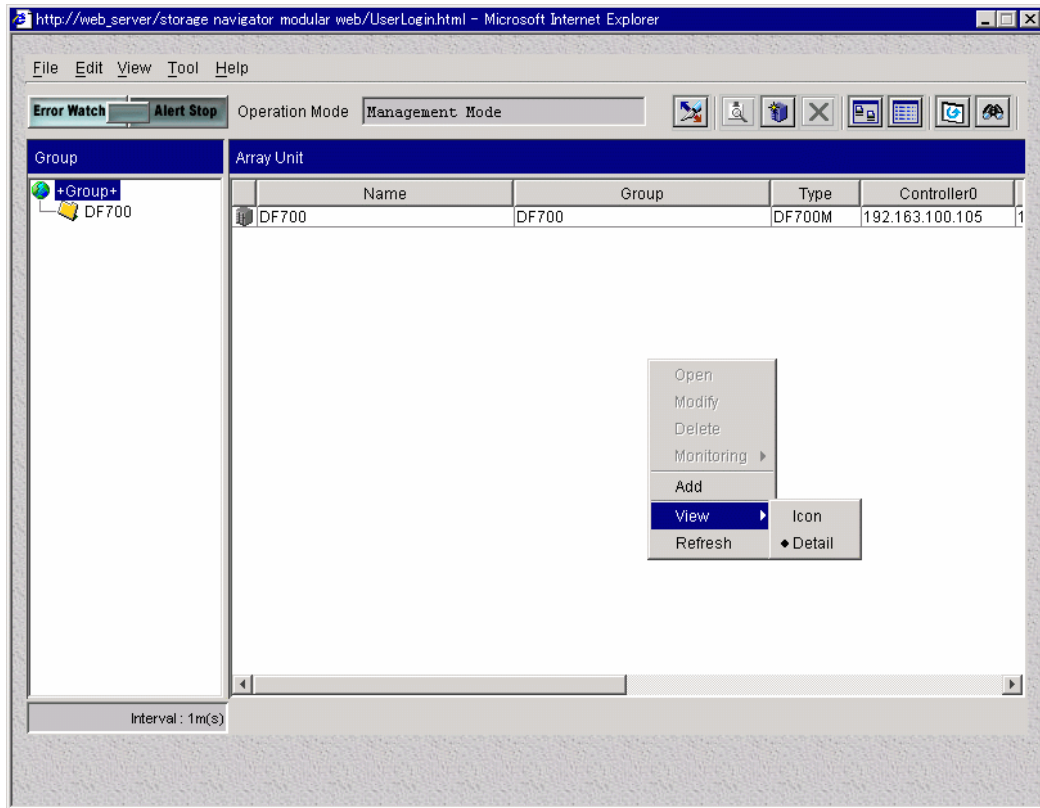


Figure 3.4 Pop-up Menu on Main Screen: No Selection

Table 3-4 describes the Figure 3.4 pop-up menu options.

Table 3-4 Pop-up Menu Options on Main Screen: No Selection

Selection	Menu Option	Function
None (List view box with nothing selected)	Add	Registers a new subsystem.
	View	Sets the view mode.
	Refresh	Checks the status of the subsystem, and refreshes the screen.

3.3.2 Pop-up Menus on Array Unit Screen

Figure 3.5 shows the pop-up menu that displays when a RAID group number is selected on the Array Unit screen.

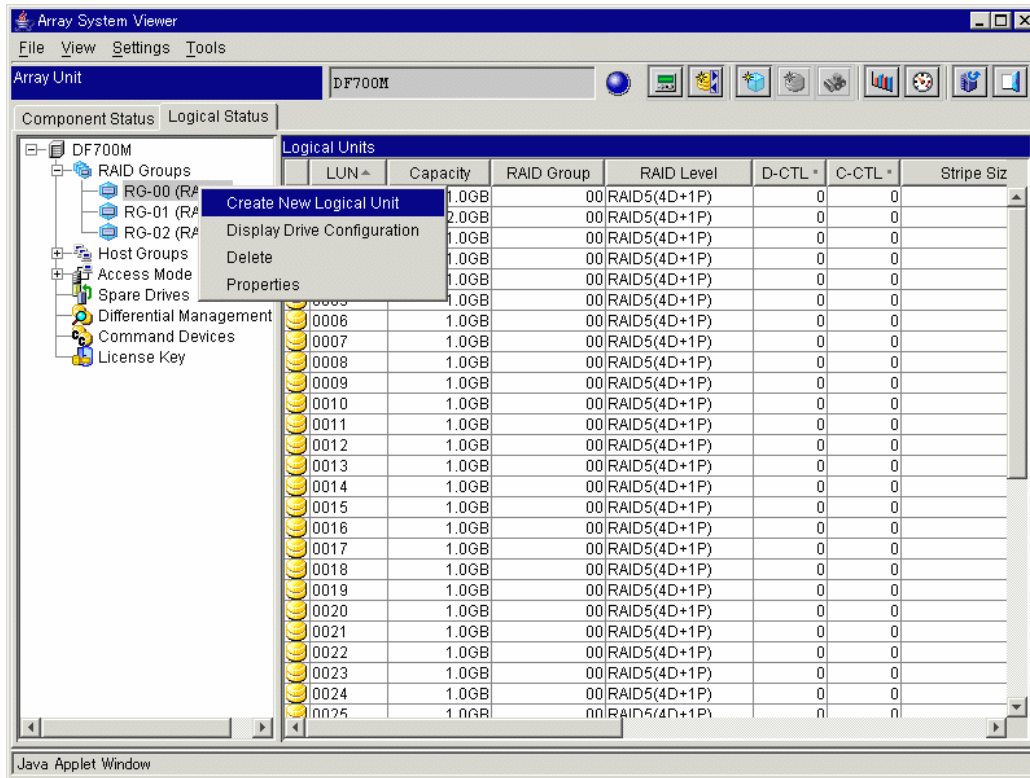


Figure 3.5 Pop-up Menu on Array Unit Screen: RAID Group Number Selected

Table 3-5 describes the Figure 3.5 pop-up menu options.

Table 3-5 Pop-up Menu Options on Array Unit Screen: RAID Group Number Selected

Selection	Menu Option	Function
RAID group number icon	Create New Logical Unit	Displays the property dialog box for creating a new logical unit.
	Display Drive Configuration	Displays the drive configuration of the subsystem.
	Delete	Deletes the selected RAID group.
	Properties	Displays the property of the RAID group.

Figure 3.6 shows the pop-up menu that displays when RAID Groups is selected on the Array Unit screen.

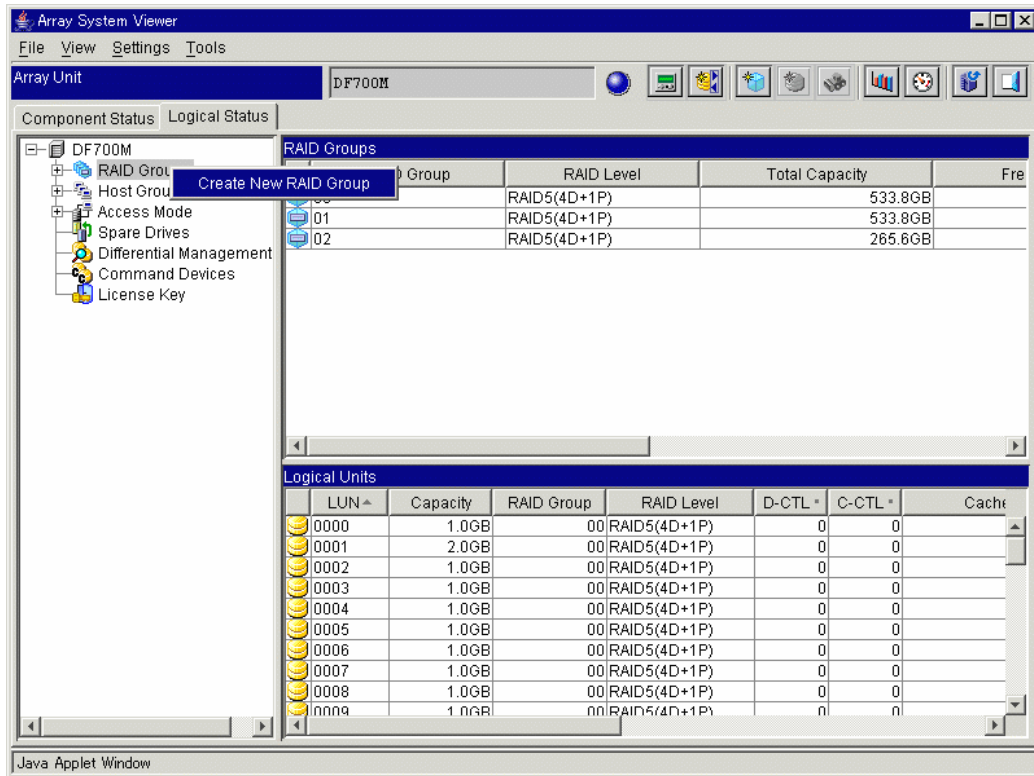


Figure 3.6 Pop-up Menu on Array Unit Screen: RAID Groups Selected

Table 3-6 describes the Figure 3.6 pop-up menu option.

Table 3-6 Pop-up Menu Options on Unit Screen: RAID Groups Selected

Selection	Menu Option	Function
RAID Groups	Create New RAID Group	Displays the RAID group settings screen.

Figure 3.7 shows the pop-up menu that displays when one logical unit icon is selected on the Array Unit screen.

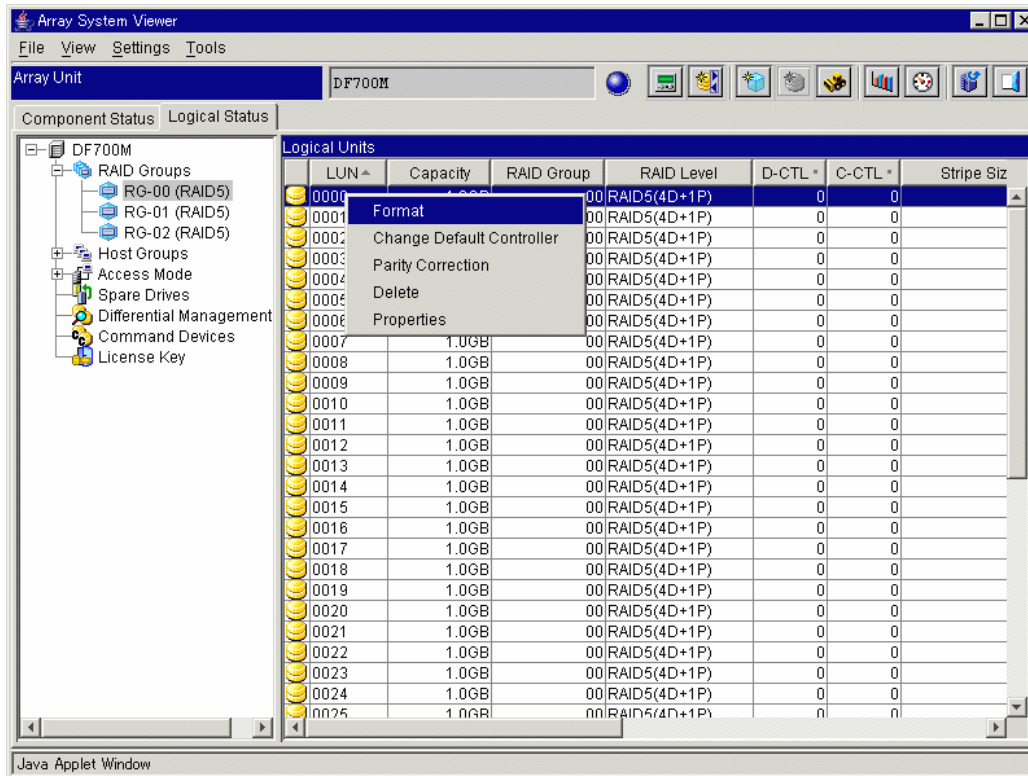


Figure 3.7 Pop-up Menu on Array Unit Screen: One Logical Unit Selected

Table 3-7 describes the Figure 3.7 pop-up menu options.

Table 3-7 Pop-up Menu Options on Array Unit Screen: One Logical Unit Selected

Selection	Menu Option	Function
Logical unit icon (one)	Format	Format the logical unit.
	Change Default Controller	Change default controller of logical unit.
	Parity Correction	Correct the logical unit parity.
	Delete	Delete the selected logical unit.
	Properties	Display the property of the logical unit.

Figure 3.8 shows the pop-up menu that displays when multiple logical unit icons are selected on the Array Unit screen.

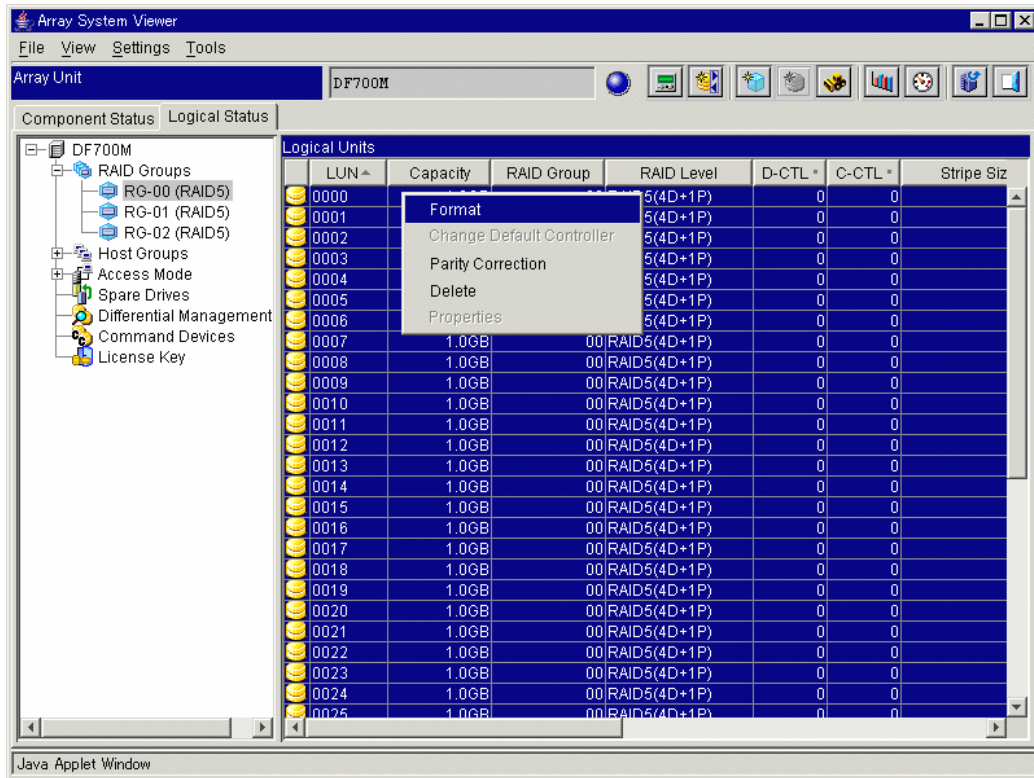


Figure 3.8 Pop-up Menu on Array Unit Screen: Multiple Logical Units Selected

Table 3-8 describes the Figure 3.8 pop-up menu options.

Table 3-8 Pop-up Menu Options on Array Unit Screen: Multiple Logical Units Selected

Selection	Menu Option	Function
Logical unit icons (two or more)	Format	Format the logical units (maximum 6).
	Parity Correction	Correct the logical unit parity.
	Delete	Delete the selected logical units.

Figure 3.9 shows the pop-up menu that displays when a drive icon is selected on the Array Unit screen.

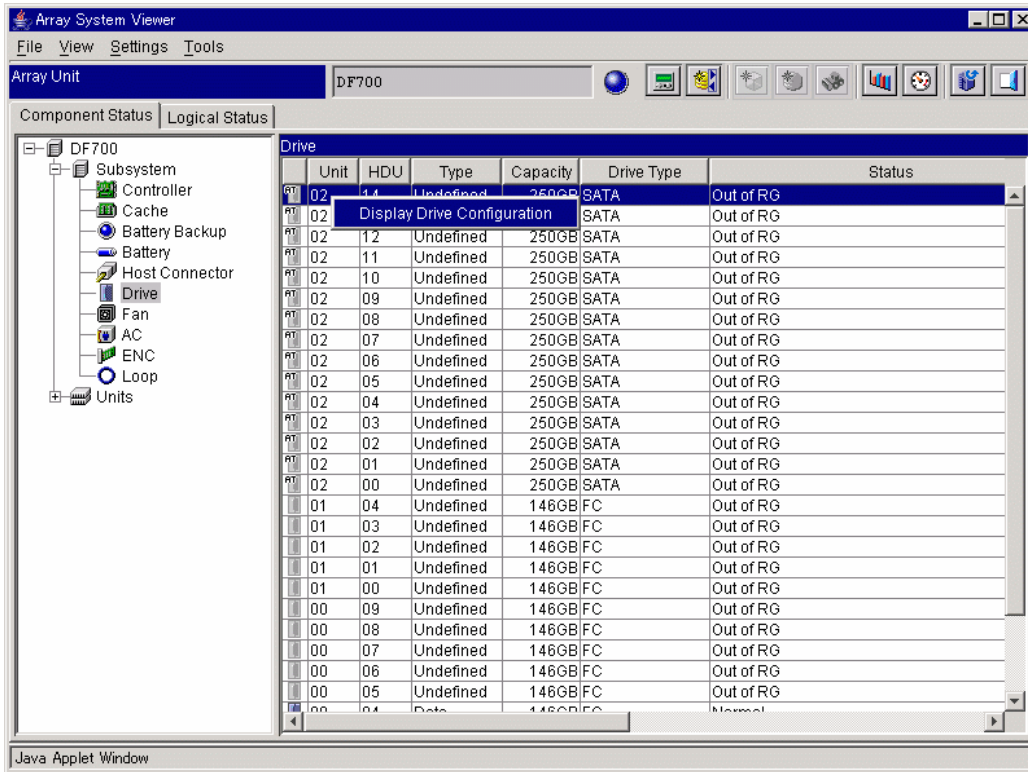


Figure 3.9 Pop-up Menu on Array Unit Screen: Drive Selected

Table 3-9 describes the pop-up menu option in Figure 3.9.

Table 3-9 Pop-up Menu Options on Array Unit Screen: Drive Selected

Selection	Menu Option	Function
Drive icon	Display Drive Configuration	Display the drive configuration of an array unit.

Chapter 4 Operating the Storage Navigator Modular GUI

The Storage Navigator Modular GUI displays the status of array units, sets up the configuration of array units, and monitors array units for errors.

The operations in this chapter can be used for Windows.

This chapter includes the following:

- 4.1 Basic Operations
- 4.2 Main Screen and Array Unit Screen Properties

4.1 Basic Operations

This section describes the following basic operations:

- Starting
- Password Setting
- Changing the Operation Mode
- Registering an Array Unit
- Version Display
- Terminating
- Restarting an Array Unit

The operation of these functions conforms to Windows.

When changing the TCP/IP port number of the disk array subsystem (see Table 4-1), that is connected over a LAN, register the changed port number as “df-damp-snm port number/TCP”. Before starting Web Navigator, you must register the changed port number in the services file of the OS on which Web Navigator is installed. If it is not registered, the disk array subsystem may not be able to be connected to the LAN.

Table 4-1 Registering a Changed TCP/IP Port Number

Disk Array Subsystem	Microprogram Version
AMS500/AMS200/WMS100	0726/E or later
9500V/9520V	x65B/H or later

4.1.1 Starting

To start the Storage Navigator Modular, use the appropriate procedure.

- Web Server
- Web Client

Web Server

1. Set the directory in which Storage Navigator Modular is installed as a virtual directory. Complete the setting of the virtual directory from the Internet Service Manager of the IIS. For setting the virtual directory, refer to Windows Help.
2. Verify through **Control Panel → Administrative Tools → Services** whether Web Navigator (**SNM Server**) has started.
Start the **SNM Server** if it has not started.

Web Client

- Activate the browser and specify the URL as follows. See Figure 4.1.

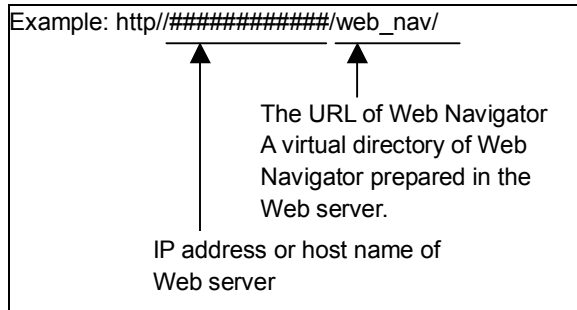


Figure 4.1 Specify URL

For the URL, specify a host name or IP address of Storage Navigator Modular. Do not specify a loop back address such as localhost and 127.0.0.1.

The window for activating the applet displays.

Note: When Storage Navigator Modular is used on Windows, an error may occur in which the menu display is disabled by a menu bar operation with the mouse. If this occurs, disable the pointer tail or the pointer shadow in **Mouse** properties in the **Control Panel**.

If the menu display has not recovered, disable the **Scheme** for the **Pointers** tab in the **Mouse** properties.

Erroneous settings may disable the display menu. If the menu display remains disabled, set the value to 65536 or less for the **Color pallet** properties in the **Display**.

Operating the Web Client

1. In the Storage Navigator Modular screen, select **Click here** to log on. See Figure 4.2.

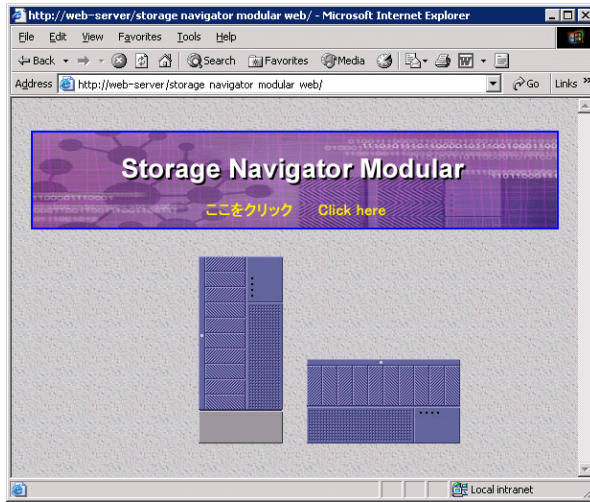


Figure 4.2 Storage Navigator Modular Log in Window

The logon screen displays.

2. Enter your logon information and click **LOGIN**.
For the initial default logon after installation, enter the following:
 - User ID: **tempuser**
 - Password: **12mak7si**

Storage Navigator Modular starts in **Normal Mode** and the **Main** screen displays. See Figure 4.3.

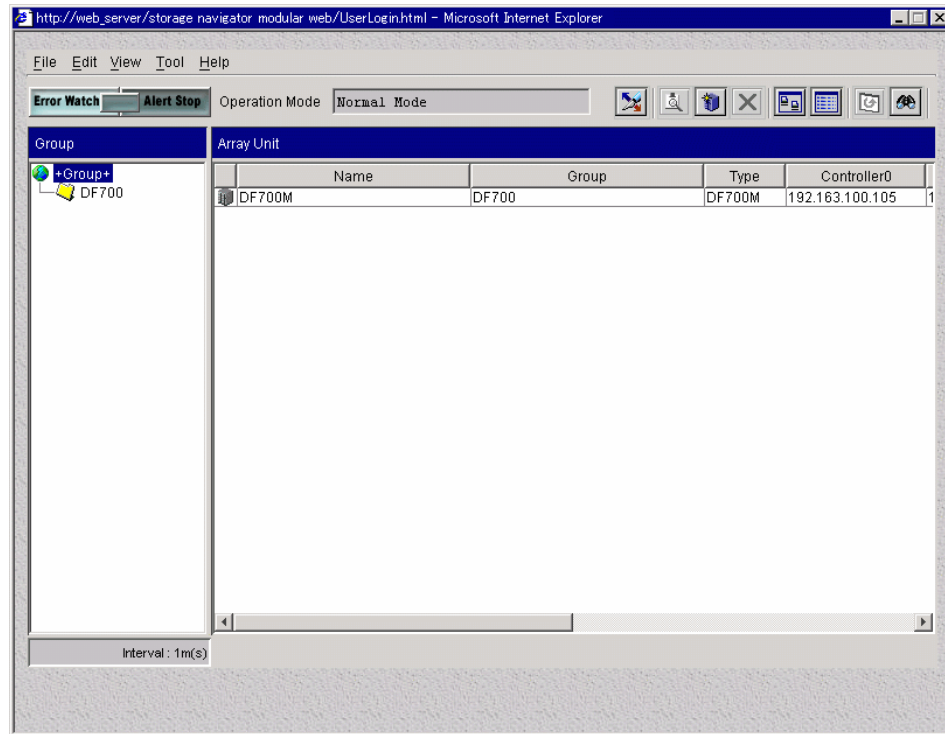



Figure 4.3 Storage Navigator Modular Web Main Window

The following functions are performed from the **Main** screen:

- Registering the array unit (Register, Delete, Change, and Refer of the property).
- Executing error monitoring and setting error monitoring option.
- Changing the operation mode.
- Setting and changing the password for logging on to Management Mode.
- Displaying the version.

Note: When Storage Navigator Modular is first started, the change mode function is disabled. To enable the change mode, register the password. See section 4.1.2.

3. Click the icon of an array unit on the **Main** screen.

4. From the **File** menu, click **Open** or click (). This operation can also be done from the context menu of the subsystem icon.

The Array Unit screen of the subsystem displays. See Figure 4.4.

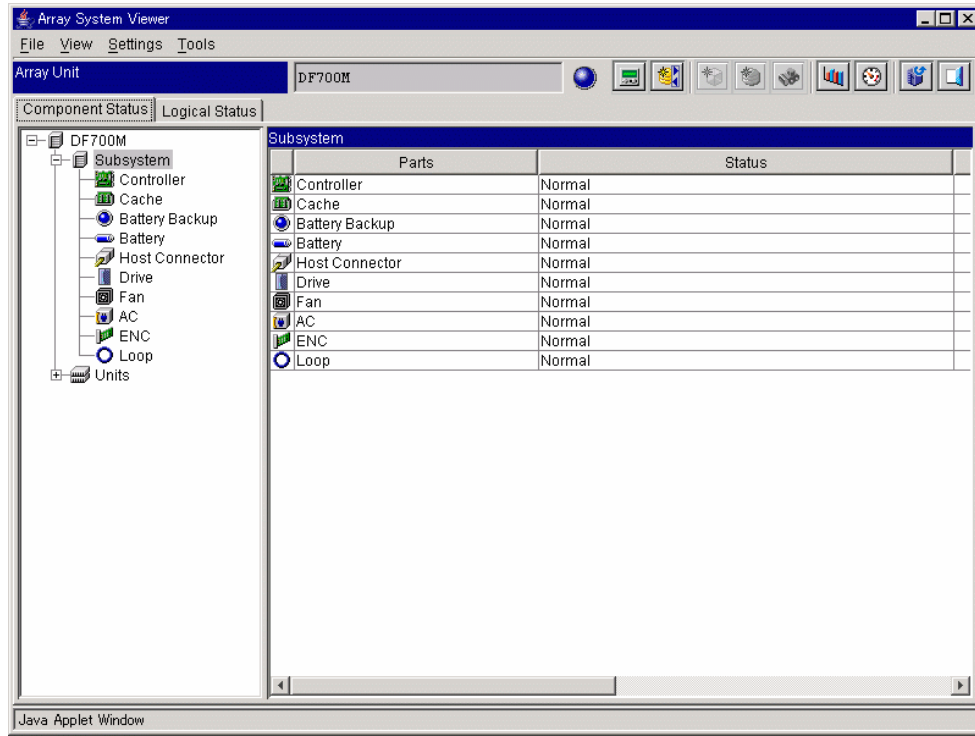


Figure 4.4 Array System Viewer – Array Unit

The following functions are performed in the Array Unit screen:

- Displaying the status of the array unit. See section 4.2.2.
- Displaying and defining the RAID/logical unit. See section 5.1.
- Displaying and defining the configuration information (the setting of spare drives). See Chapter 6.
- Setting system parameters. See section 9.6.

4.1.2 Registering and Deleting Users

Use the following procedure to register the users who log on to Storage Navigator Modular or to delete users who are registered:

1. On the **Tool** menu, click **User Regist/Delete**.
2. Enter the **User ID** and **Password** using four to eight alphanumeric characters (0 to 9, a to z, and/or A to Z), then click **Add**.

Up to 20 users can be registered. See Figure 4.5.

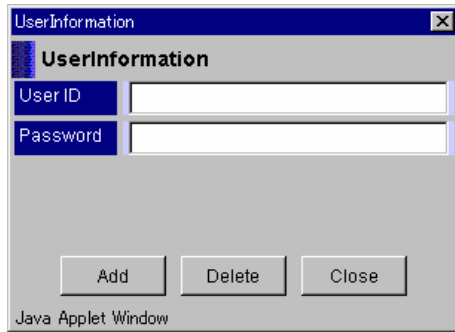


Figure 4.5 User Information Dialog Box

When deleting a registered user, enter the registered information **User ID** and **Password** and click **Delete**. You need to have at least one registered user. you cannot delete the last user.

3. When the confirmation message displays, click **OK**.

Note: When using Storage Navigator Modular, delete the temporary user ID and password after you register a new user.

4.1.3 Automatic Log-off

If the Web Server is not accessed within 20 minutes when Storage Navigator Modular is used by the Web client, a log-off will occur automatically.

Access from Storage Navigator Modular to the Web server occurs when performing operations such as setting configurations. Changing displayed contents, such as changing the selected **Tab** key of the Array Unit screen, do not initiate an automatic log-off.

When an automatic log-off occurs, a message displays informing you that the Web server cannot be connected because an automatic log-off was caused by the operation. When the message displays, log on again after shutting down Storage Navigator Modular completely.

An automatic log-off occurs when a secondary screen, such as the Configuration Setting screen and System Parameters Wizard screen, is opened after the Main and Array Unit screens. The secondary screen returns after the message displays. When this occurs, quit Storage Navigator Modular completely after closing the secondary screen by clicking **Cancel** or **Close**.

4.1.4 Setting Passwords

To set a password when using Storage Navigator Modular in **Management** mode:

To Enter or Change a Password:

1. From the **Tool** menu of Storage Navigator Modular Web, select **Operation Mode** → **Set Password**.
2. Enter the password information. Passwords may have up to 12 alphanumeric characters.
3. Click **OK**.

To Delete a Password:

Note: To delete a password, Storage Navigator Modular must be uninstalled and reinstalled.

1. Delete the directory where Storage Navigator Modular is installed.

Note: To save the information of the registered array unit, back up the **utlprm.inf** and **utlprm2.inf** files in the directory where Storage Navigator Modular is installed.

2. Create a directory with the same path and the same name as those of the directory deleted in step 1.
3. Re-install Storage Navigator Modular.

Note: When the **utlprm.inf** and **utlprm2.inf** files have been backed up in step 1, copy these files to the directory created in step 2.


4.1.5 Changing Operation Mode

Storage Navigator Modular is provided with two operation modes: **Normal** mode and **Management** mode. In **Normal** mode, both array unit configuration and status are displayed. In **Management** mode, the array unit configuration can be set in addition to **Normal** mode functions.

Change the operation mode in accordance with the operation of the array unit.

Changing from Normal Mode to Management Mode

Change the operation mode from **Normal** mode to **Management** mode. When logging-in is performed in Normal Mode, **Normal** mode displays in **Operation** mode in the upper part of the **Main** screen.

1. From the **Tool** menu of Storage Navigator Modular Web, select **Operation Mode** → **Change**, or click .
2. When the password-input screen displays, enter a password and click **OK**. See Figure 4.6.

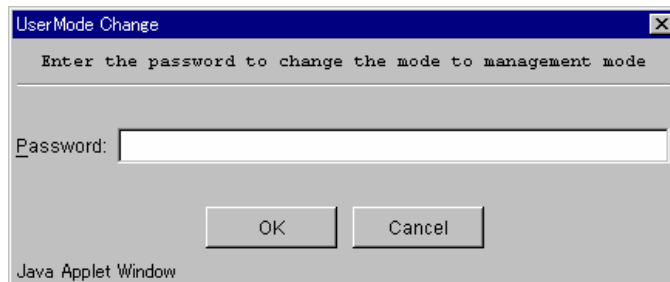



Figure 4.6 User Mode Change

Management mode displays in **Operation Mode** in the upper part of the **Main** screen. Storage Navigator Modular operates in **Management** mode.

Changing from Management Mode to Normal Mode

You can change the operation mode from **Management** mode to **Normal** mode. Logging in is performed in Management Mode. **Management Mode** displays in **Operation Mode** (it displays in the upper part of the **Main** screen).

1. On the **Tool** menu, select **Operation Mode → Change**, or click .
2. When the confirmation message displays, click **OK**.

Normal mode displays in **Operation** mode in the upper part of the **Main** screen. Storage Navigator Modular operates in **Normal** mode.

4.1.6 Registering Subsystem

To operate the array unit from Storage Navigator Modular, register the subsystem. You cannot register a subsystem that does not exist.

New Automatic Registration

1. On the **Edit** menu of Storage Navigator Modular Web, select **Add Automatically**. You can also complete this operation from the context menu of the list view box. The **Add Array Unit Automatically** window displays. See Figure 4.7.

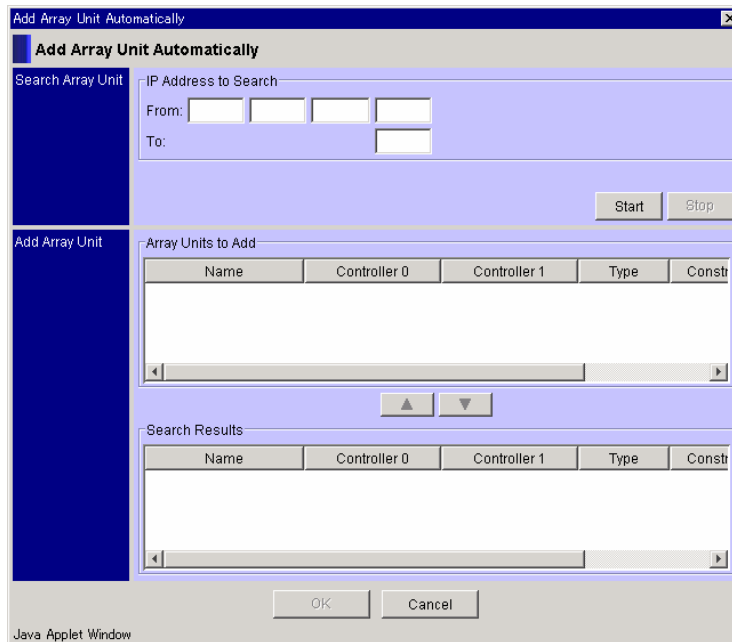


Figure 4.7 Add Array Unit Automatically

2. Enter the IP addresses in the **From:** and **To:** boxes of **IP Address to Search** of the Search Array Unit and click **Start**.

The window displays the available IP addresses. See Figure 4.8.

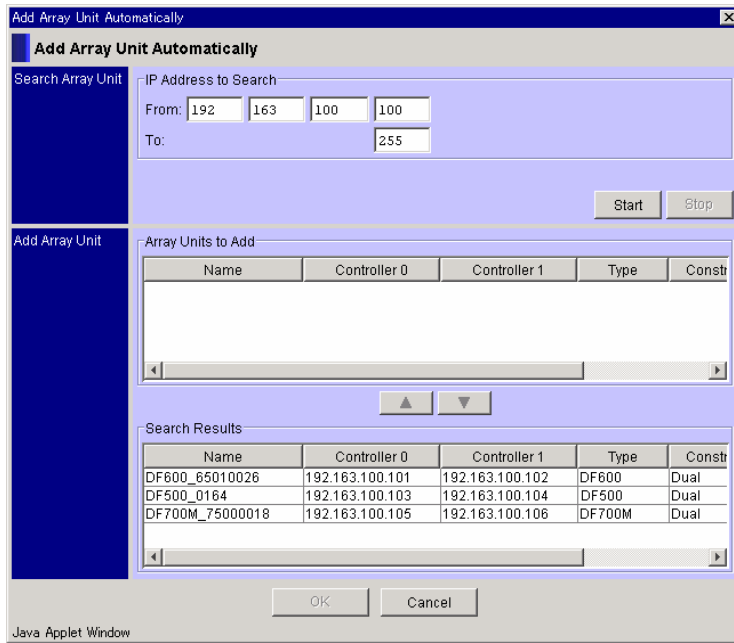


Figure 4.8 Add Array Unit Automatically - IP Address

- Under Search Results, select one or more names to register and click . The selected subsystems are moved from the Search Results list to the Array Units to Add list of the Add Array Unit. See Figure 4.9.

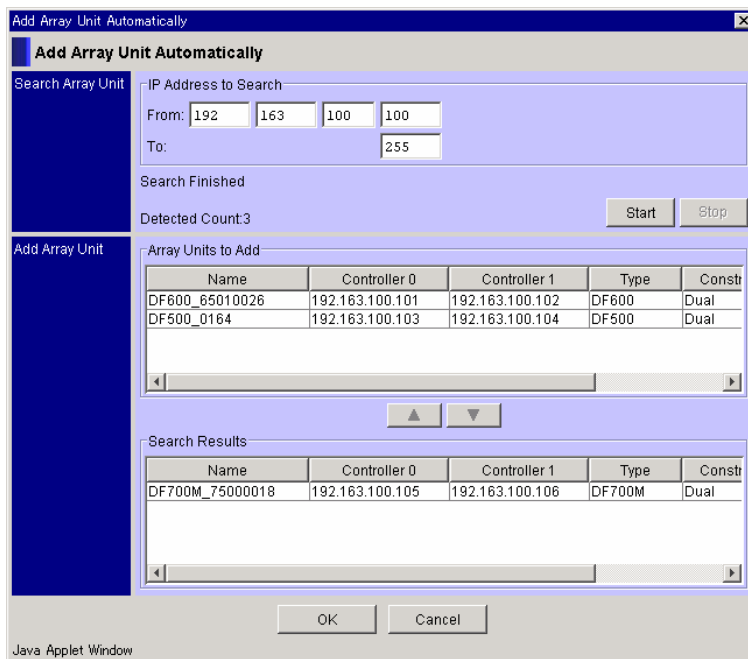


Figure 4.9 Add Array Unit Automatically - Search Results

- Click OK.
- When the confirmation message displays, click OK.

6. The Result screen shows that subsystems are added. Click **Close**. See Figure 4.10.

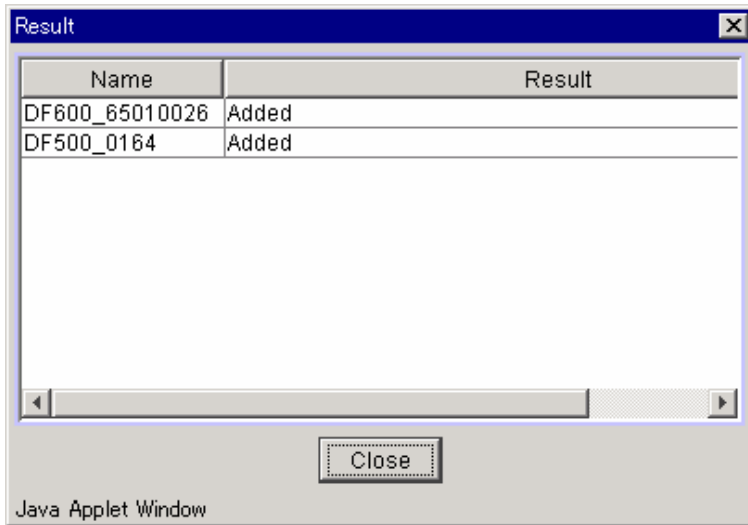



Figure 4.10 Result Window

The updated **Main** screen displays, as illustrated in Figure 4.3.

New Registration

1. On the **Edit** menu of Storage Navigator Modular Web Main window, select **Add**, or click . You can also complete this operation from the context menu of the list view box.
2. The TCP/IP simple connection dialog displays. Input the IP address of controller 0 and/or controller 1, and click **OK** or **Detail**. See Figure 4.11.

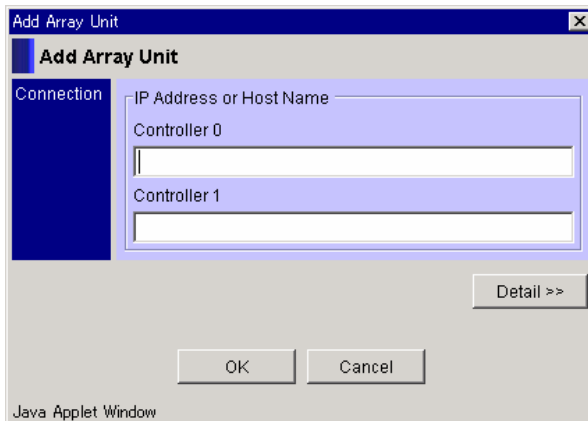


Figure 4.11 Add Array Unit

3. Enter the registration information and click **OK**. See Figure 4.12.

The screenshot shows a Java Applet Window titled "Add Array Unit". The window has a dark blue header bar with the title and a close button. Below the header, there are several sections with dark blue labels on the left and light blue backgrounds on the right. The "Connection" section has two radio buttons: "TCP/IP(LAN)" (selected) and "RS232C". Below this is a label "IP Address or Host Name" followed by two text input fields labeled "Controller 0" and "Controller 1". The "Name" section has a single text input field. The "Group" section has a dropdown menu. The "Error Monitoring" section has a checked checkbox labeled "Monitoring Target" and a text area labeled "Mail Additional Information" with scroll bars. At the bottom right of the main area is a button labeled "Simple <<". At the bottom center are "OK" and "Cancel" buttons. The footer of the window says "Java Applet Window".

Figure 4.12 Add Array Unit - Registration

- **Connection:** TCP/IP(LAN)
- **IP Address or Host Name:** Specify the GUI connection information of controller 0/1. Specify **IP Address** or **Host Name**.
- **Name:** Registered name of the subsystem. Specify up to 16 alphanumeric characters or characters (-, _, @, ., space code).
- **Group:** Group name when the subsystems are controlled as a group. Specify the group name using up to 16 alphanumeric characters or characters (-, _). When the subsystems are controlled as a group, input its name. If not, it is not necessary to input the name. The maximum registered number of groups is 200.
- **Error Monitoring:** Specify whether or not to perform error monitoring.
- **Check (ON display):** Error monitoring.
- **No check (OFF display):** No error monitoring.

Note: In the subsystem in a dual system, only one controller can be used in the LAN connection mode. Specify **IP Address/Host Name** for the connected controller side only.

4. When the registration completion Message dialog box displays, click **OK**. See Figure 4.13.

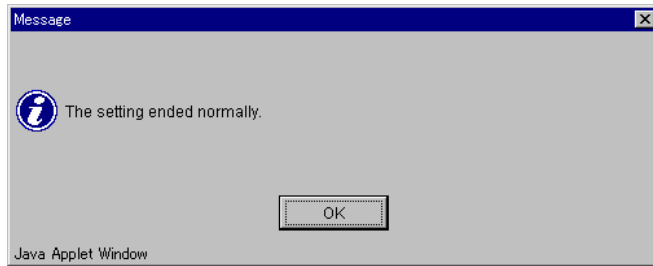


Figure 4.13 Message Window

The updated Storage Navigator Modular Web **Main** window displays as shown in Figure 4.3.

When you input **Group**, the subsystem icon displays in the frame enclosed with the input group.

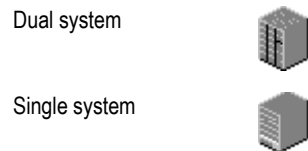


Figure 4.14 Subsystem Icons

Changing Registration Contents

To change the registration contents of array units registered in Storage Navigator Modular:

1. Click the icon of the subsystem on the **Main** screen of the Storage Navigator Modular. On the **Edit** menu, select **Modify**.

You can also complete this operation from the context menu of the disk array subsystem icon.

2. Change the registration contents and click **OK**. See Figure 4.15.

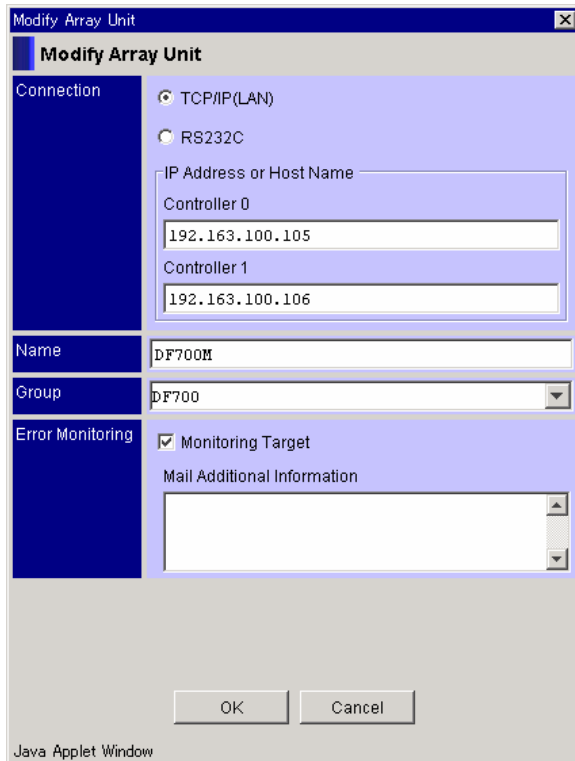



Figure 4.15 Modify Array Unit

3. Click **OK** to continue through the confirmation messages. The updated **Main** screen displays.

Deleting Registration

To delete the registration of an array unit that is registered in Storage Navigator Modular.

1. Click the icon of an array unit on the **Main** screen of the Storage Navigator Modular. On the **Edit** menu, select **Delete** or click  in the tool bar. You can also complete this operation from the context menu of the disk array subsystem icon.
2. When a message displays confirming whether the registration should be deleted, click **OK**.
3. The Result screen displays. Click **Close**. See Figure 4.16.

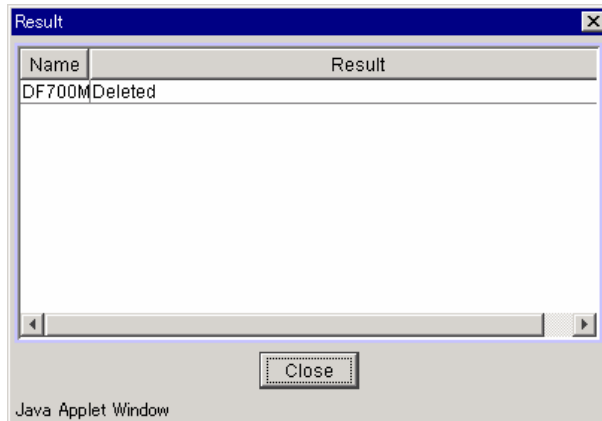



Figure 4.16 Result Window

The updated **Main** screen displays.

Displaying Registration Contents

To display the registration contents of the subsystem that is registered in Storage Navigator Modular:

1. Click the icon of the subsystem on the **Main** screen of the Storage Navigator Modular. On the **Edit** menu, select **Delete**. Or click  in the tool bar. You can also complete this operation from the context menu of the subsystem icon.
2. Click **OK** to acknowledge the confirmation deletion message.
3. The Result screen displays. Click **Close**.

The updated **Main** screen displays.



4.1.7 Version Display

To display the version of Storage Navigator Modular:

On the **Help** menu, select **Version**. The Storage Navigator Modular version displays.

4.1.8 Terminating Storage Navigator Modular

To terminate Storage Navigator Modular when the Array **Unit** screen is open, close it and terminate Storage Navigator Modular:

1. Click  on the Main screen.
2. Click  on the Applet screen.

The **Main** screen closes and Storage Navigator Modular is terminated. When you run the Web server, close the prompt screen.

4.1.9 Restarting Subsystem

WARNING: Rebooting requires stopping I/O from the host.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

To restart the subsystem:

1. Click the icon of an array unit on the **Main** screen of the Storage Navigator Modular.
2. On the **File** menu on Storage Navigator Modular Web Main window, select **Reboot**.
3. Click **OK**, as needed, to acknowledge the restart confirmation messages.
4. When restarting an array unit, the restart time displays. Restarting takes approximately 4 to 15 minutes.

Note: It may take time for an array unit to respond, depending on the condition of the array unit. If it does not respond after 15 minutes, check the condition of the array unit.

5. A message displays indicating that restart has terminated. Click **OK**.

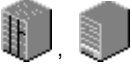



4.2 Main Screen and Array Unit Screen Properties

This section describes the Main screen and Array Unit screen properties.

4.2.1 Displaying Main Screen Property


Display the array unit status and information by using icons.

Array Unit Status

 Gray	<ul style="list-style-type: none">▪ Initial Main screen when starting Storage Navigator Modular.▪ Out of error monitoring.
 Gray + Blue	<ul style="list-style-type: none">▪ Normal
 Gray + Yellow	<ul style="list-style-type: none">▪ Warning
 Gray	<ul style="list-style-type: none">▪ Subsystem is system down.▪ Subsystem is power off.▪ Error in communication with the subsystem.

4.2.2 Displaying Status and Properties of Subsystem and Components

To show the properties and status of subsystem components on the Storage Navigator Modular:

On the **File** menu, select **Open**, or click . The subsystem component status displays. See Figure 4.17.

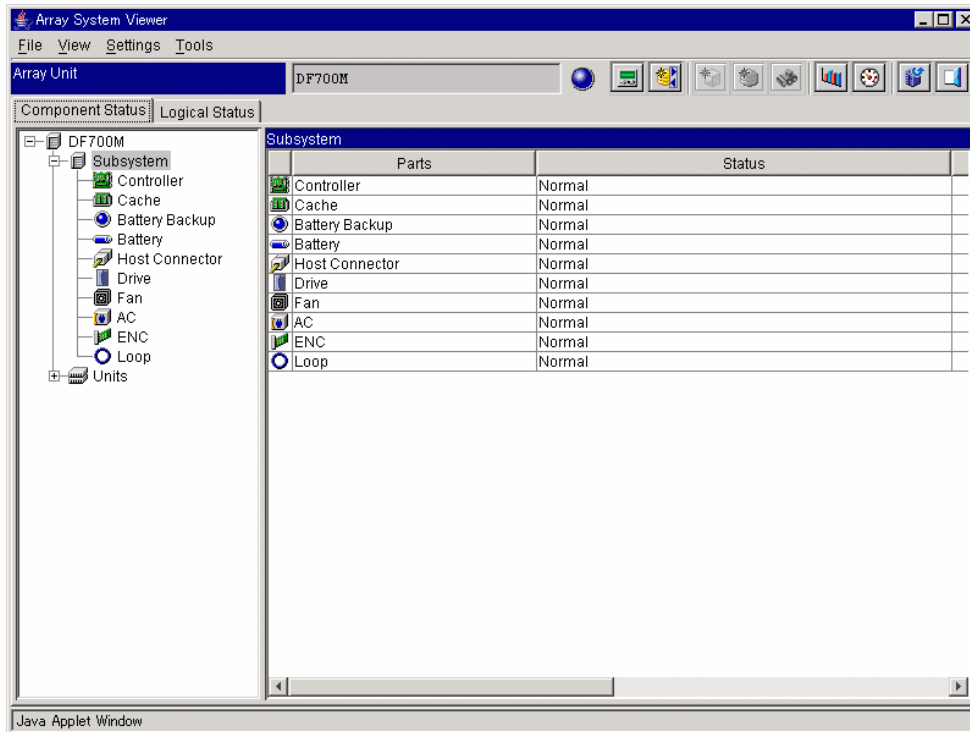



Figure 4.17 Array System View

- To update the component display, on the **View** menu, select **Refresh** or click .
- To display component status and properties, select the component in the Component Status tab.
- To display the properties of the subsystem, on the **View** menu, select **Properties**. The **Property** screen displays the following information. See Figure 4.18.

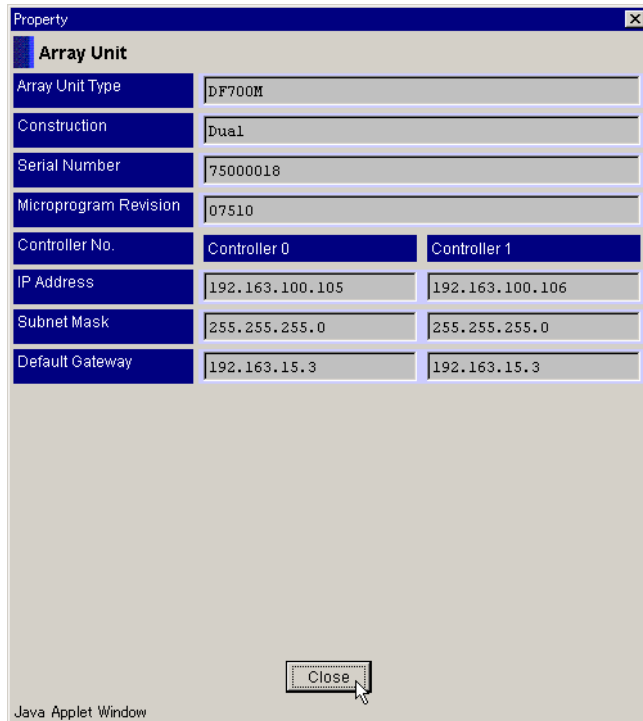



Figure 4.18 Property – Array Unit

- **Array Unit Type:** Subsystem type
- **Construction:** Subsystem configuration type
- **Serial Number:** Subsystem serial number
- **Microprogram Revision:** Subsystem microprogram revision
- **Controller Number**
- **IP Address:** IP address of each controller
- **Subnet Mask:** Subnet Mask of each controller
- **Default Gateway:** Default gateway of each controller

4.2.3 Displaying Array Unit Configuration Information

To display array unit configuration information on the Storage Navigator Modular:

1. Click an array unit icon on the Array Unit screen. On the **Tools** menu of the **Array System Viewer** window, select **Configuration Settings** or click .
2. Click the **LAN** tab.

The LAN configuration displays the information that is validated in the subsystem. See Figure 4.19.

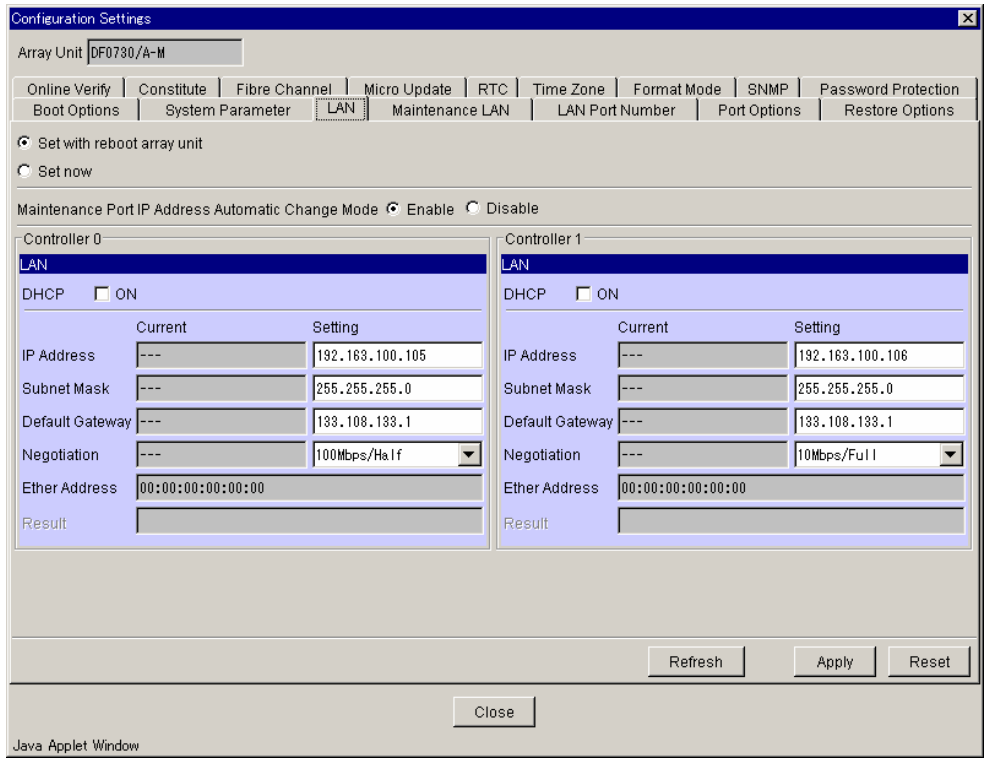


Figure 4.19 Configuration Settings - LAN panel

4.2.4 Displaying an Information Message

To display the Information Message dialog box, see Figure 4.20.

Click a patrol lamp icon (🔍) in the Array Unit Screen.

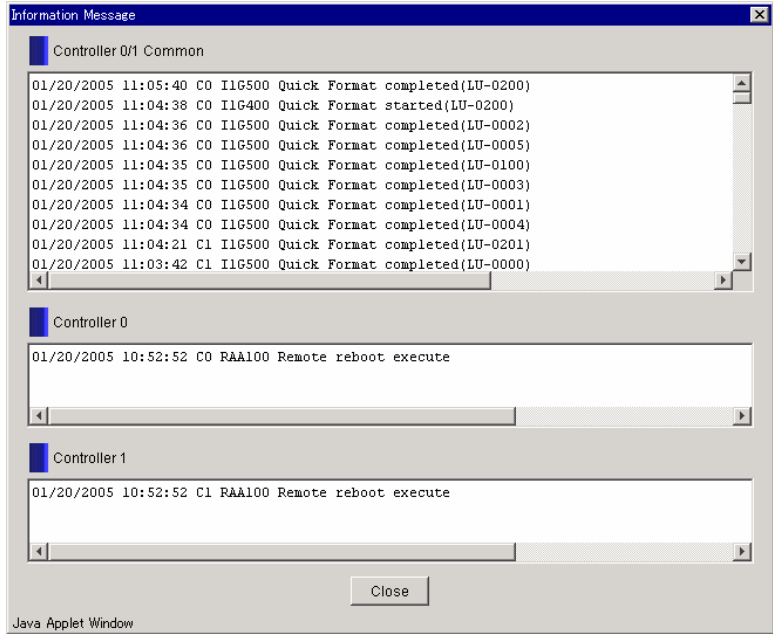


Figure 4.20 Information Message

- **Controller 0/1 Common:** After the array unit starts, the fault information and status information displays in the **Controller 0/1 Common** box.
- **Controller 0:** As the array unit starts, the fault information and status information displays in the box of Controller 0.
- **Controller 1:** As the array unit starts, the fault information and status information displays in the box of Controller 1.

Chapter 5 Definition of RAID Group/Logical Unit

The Storage Navigator Modular Graphical User Interface (GUI) can be used to set and delete the RAID group. Additionally, the logical unit can be created and deleted.

In **Monitor** mode, the current definition information is displayed, but no button for the definition is displayed.

This chapter includes the following sections:

- 5.1 Displaying RAID Group/Logical Unit Definition
- 5.2 Creating a RAID Group Automatically
- 5.3 Creating a RAID Group Manually
- 5.4 Deleting a Specified RAID Group
- 5.5 Constituting a Logical Unit Automatically
- 5.6 Constituting a Logical Unit Manually
- 5.7 Formatting a Logical Unit
- 5.8 Deleting a Specified Logical Unit
- 5.9 Changing Default Controller in Charge of a Logical Unit
- 5.10 Parity Correction

5.1 Displaying RAID Group/Logical Unit Definition

1. Click the **Logical Status** tab on the **Logical Units** panel.

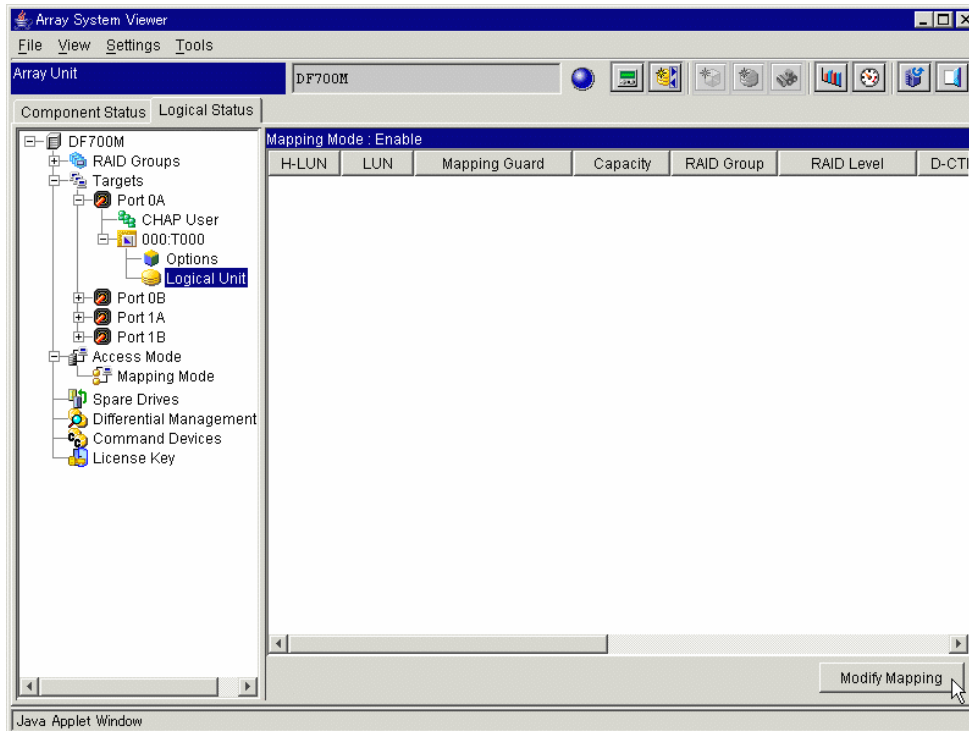


Figure 5.1 Array System Viewer - Logical Units

Figure 5.1 displays the definition information of all RAID groups and all logical units defined in the array unit:

- **RAID Groups:** Information about all RAID groups defined for an array unit displays for each RAID group.
 - **Logical Units:** Information about all logical unit number (LUN) defined for an array unit displays for each LUN.
2. To display the relation of the RAID group that defines the logical unit and a drive, select **Drive Configuration** on the **View** menu.
The **Drive Configuration** dialog displays.

- When you click the RAID group number icon, the RAID level is highlighted on the icon for the drive that composes the RAID group. Figure 5.2 shows a modified layout. The displayed RAID level overlaps the icon.

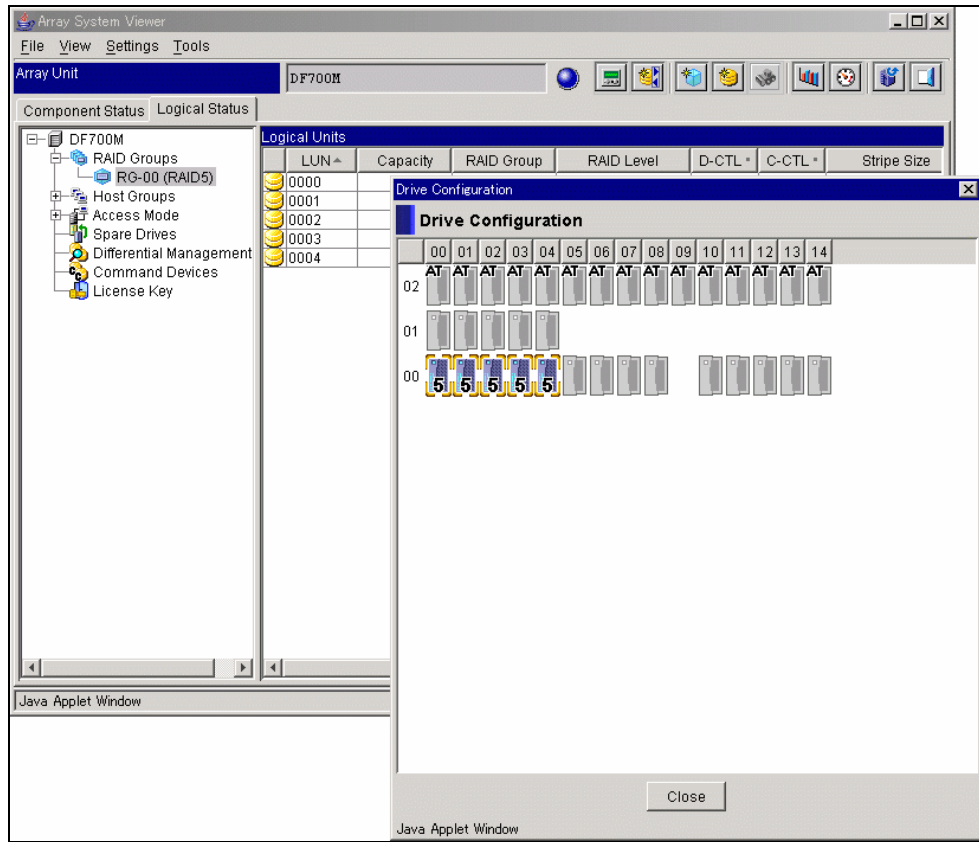



Figure 5.2 Array System Viewer - Drive Configuration

5.2 Creating a RAID Group Automatically

To create a new RAID group by selecting the drives automatically:

1. Click the **Logical Status** tab on the **Array Unit** screen.
2. On the **Settings** menu of the **Array System Viewer**, select **RAID Group**, then click **Create**, or click .

You can also complete this operation from the context menu of the **RAID Groups** icon.

The **Create RAID Group** dialog displays. See Figure 5.3.

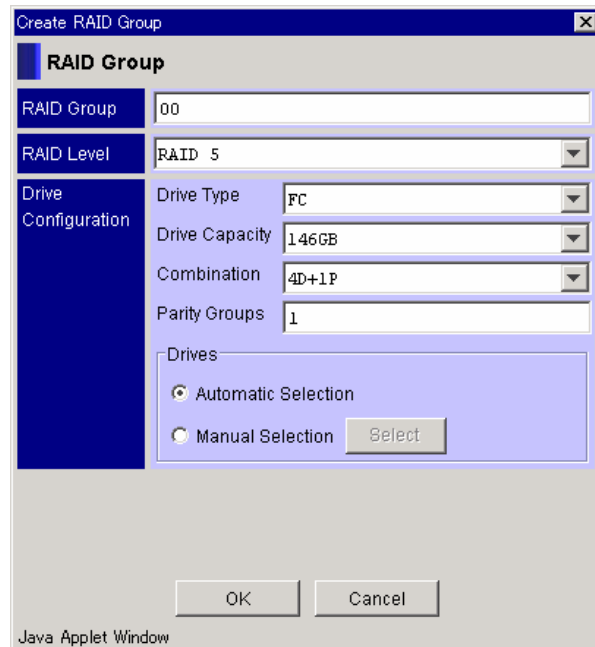


Figure 5.3 Create RAID Group Dialog Box

3. Select and/or enter a **RAID Level** and **Drive Configuration** which includes the **Drive Type**, **Drive Capacity**, **Combination**, and **Parity Groups**, then click **OK**.
4. Click **OK** as needed to continue and to respond to the confirmation messages.

Clicking **OK** updates the set RAID group and displays Figure 5.4.

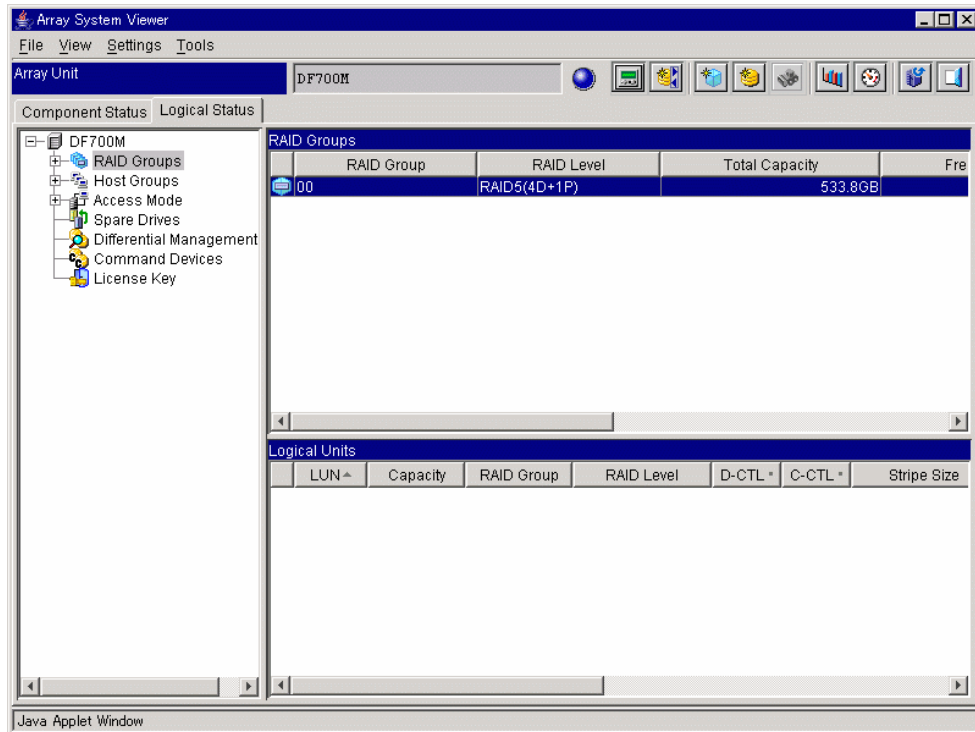



Figure 5.4 Array System Viewer - Array Unit

5.3 Creating a RAID Group Manually

To create a new RAID group by selecting the drives manually:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 5.5.
2. On the **Settings** menu of the Array System Viewer, select **RAID Group**, and then click **Create** or click .

You can also complete this operation from the context menu of the **RAID Groups** icon.

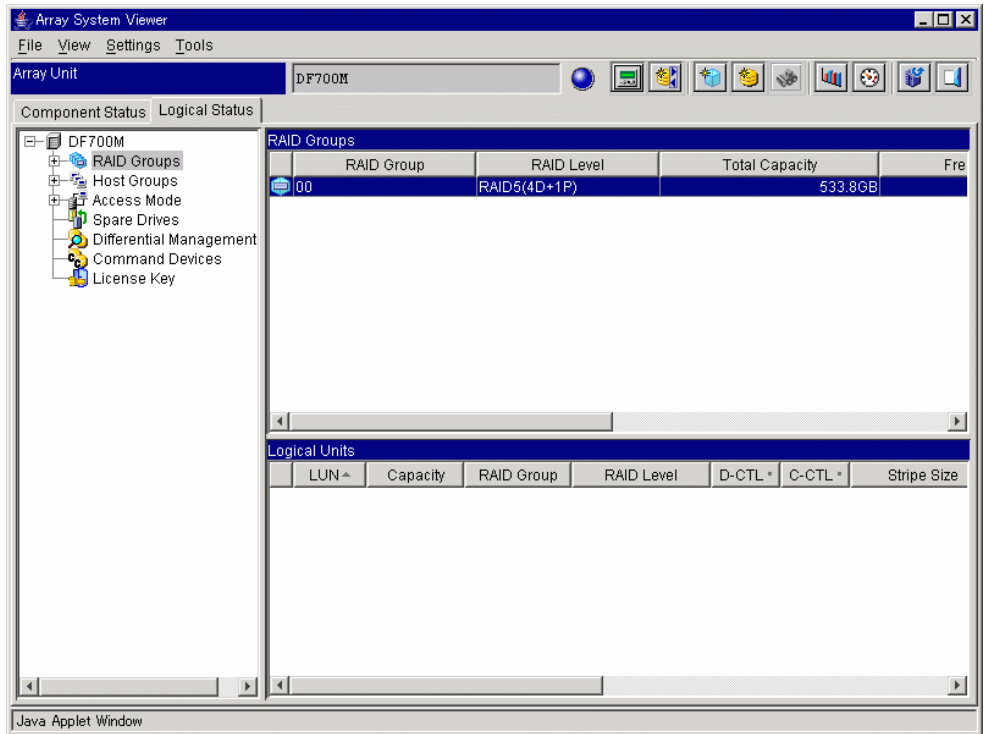


Figure 5.5 Array System Viewer - RAID Group

3. Enter the settings in the Create RAID Group dialog box. See Figure 5.6.

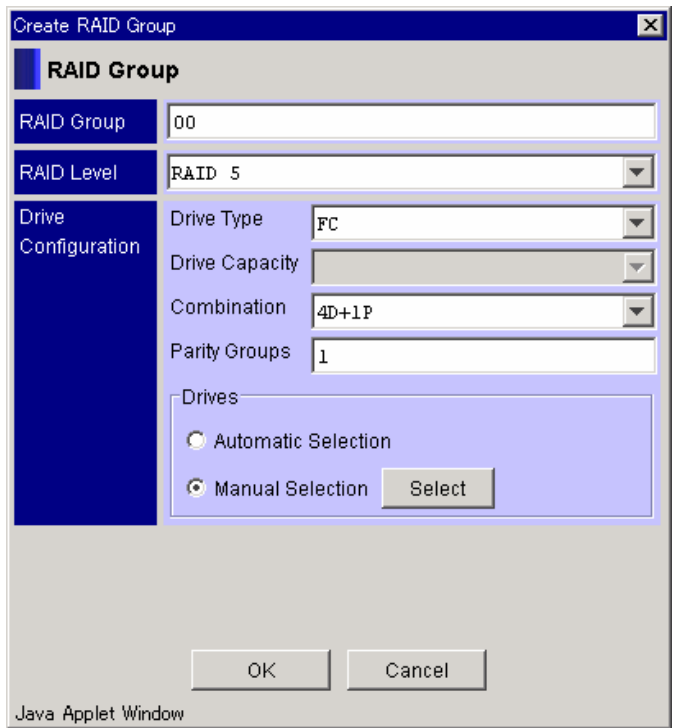


Figure 5.6 Create RAID Group Dialog Box

- In **Drives**, in the Select Drives dialog box, select the **Manual Selection** option, and click **Select**. See Figure 5.6.

The **Select Drives** dialog displays. See Figure 5.7.

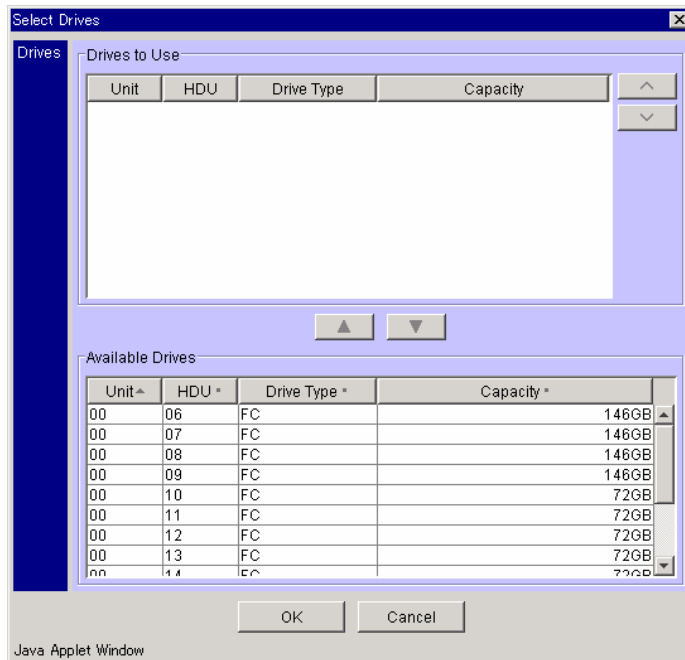



Figure 5.7 Select Drives Dialog Box

- In **Available Drives** list, click the **HDU** number. See Figure 5.7.
- Click the HDU number to compose a RAID group, keeping the **Shift** key pressed. See Figure 5.8.
- Click .

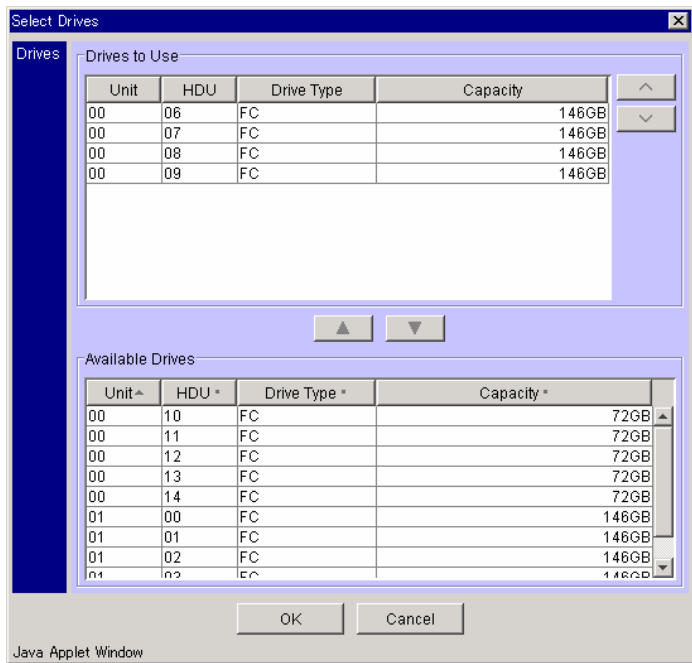


Figure 5.8 Select Drives

- Click **OK** as needed to continue and to respond to messages.
Clicking **OK** updates the set RAID group and displays Figure 5.9.

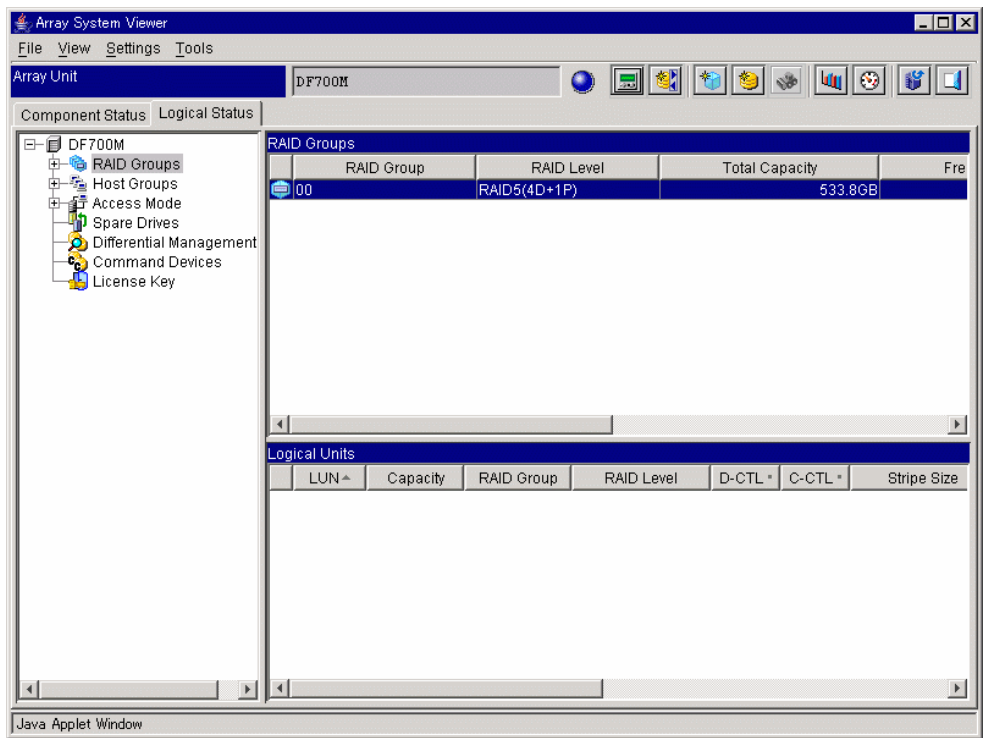


Figure 5.9 Array System Viewer - Array Unit

5.4 Deleting a Specified RAID Group

To delete a specified RAID group from set RAID groups:

1. Click the **Logical Status** tab on the **Array Unit** screen.
2. Click the icon of a RAID group on the **Array Unit** screen.

To delete more than one RAID group, select additional groups while pressing the **Shift** key.

3. On the **Settings** menu of the Array System Viewer, select **RAID Group** and click **Delete**. See Figure 5.10.

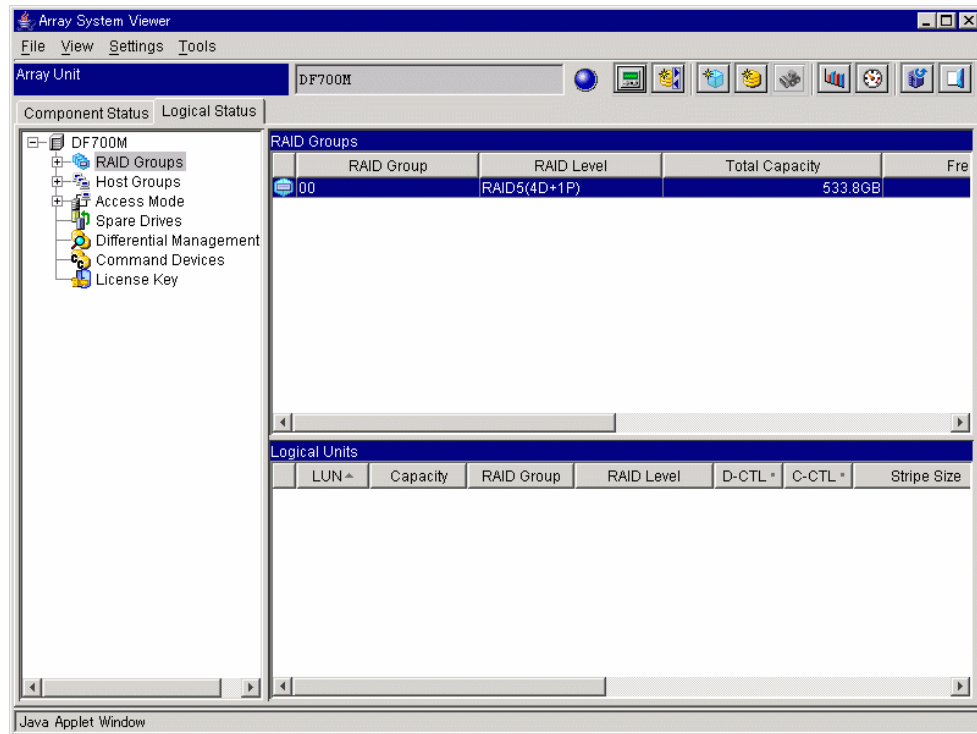


Figure 5.10 Array System Viewer - RAID Group

4. To continue through warning or status messages, click **OK** or **Close**.

Note: If a logical unit is defined in the RAID group, all of the user data is invalidated by deleting the RAID group.

If a logical unit is defined in the specified RAID group, this RAID group cannot be deleted, depending on the disk array subsystem. To delete the specified RAID group, first delete all logical units in the specified RAID group, and then delete the RAID group. This updates the deleted RAID group and displays Figure 5.11 .

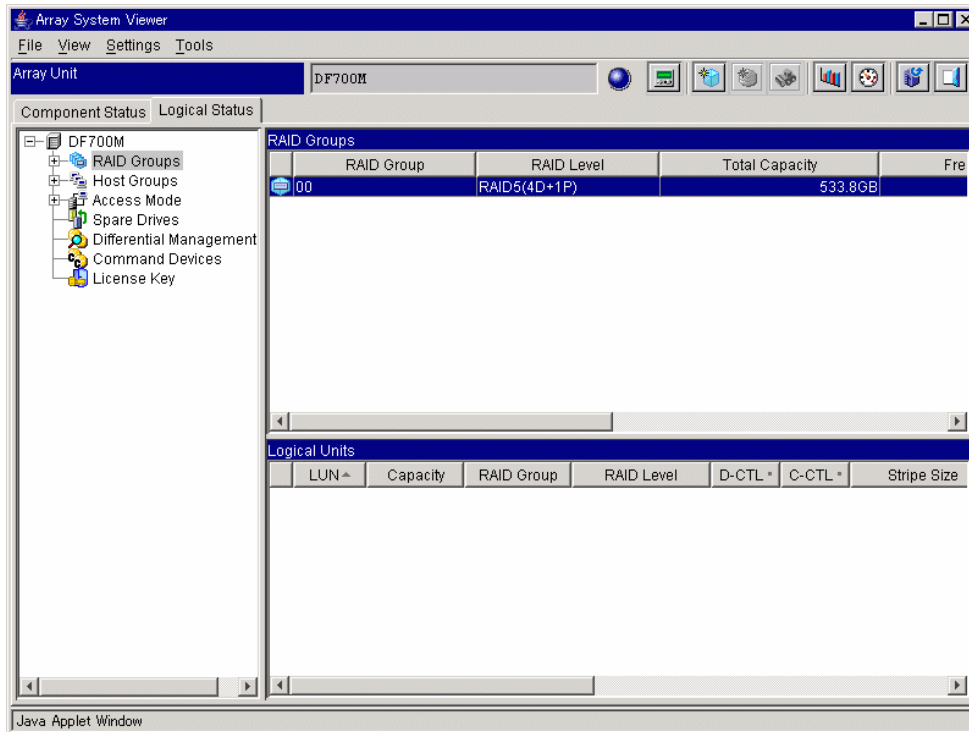



Figure 5.11 Array System Viewer – Array Unit

5.5 Constituting a Logical Unit Automatically

1. Click the **Logical Status** tab on the **Array Unit** screen.
2. Click the icon of the desired RAID group to create a logical unit.
3. On the **Settings** menu, select **Logical Unit** and click **Create**, or click . See Figure 5.12.

You can also complete this operation from the context menu of the RAID group number icon.

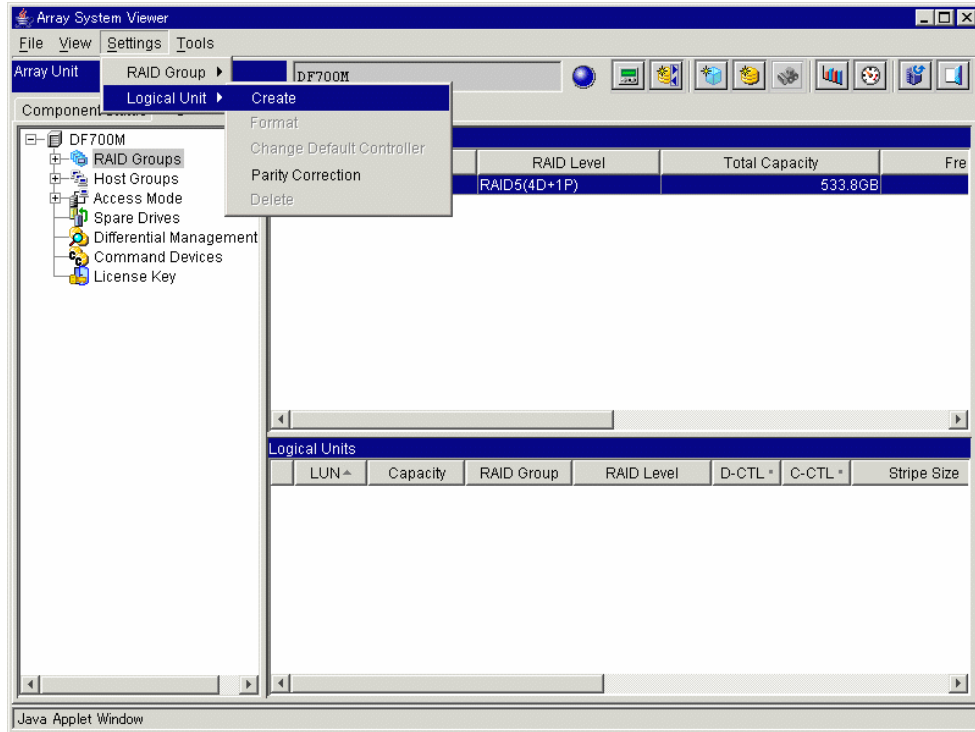


Figure 5.12 Array System Viewer - Logical Unit

The Create Logical Unit menu displays. See Figure 5.13.

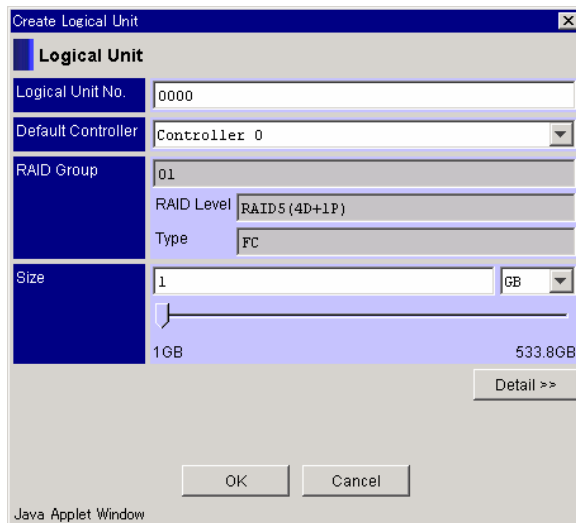


Figure 5.13 Create Logical Unit Dialog Box

4. Select a **Logical Unit No.**, **Default Controller**, and input **Size**.

A created logical unit number displays the **Logical Unit No.** and RAID group number and displays the logical units that are defined for the **RAID Group**. Additionally, a logical unit capacity that can be created displays:

- Specify Number of **Block**, **MB**, or **GB** Increased.

To specify a value clearly, specify the allocation (number of blocks, MBs, or GBs). When you allocate all of the remaining capacity of the designated RAID group, specify a capacity displayed on the screen.

Notes:

- When the capacity of a logical unit is specified by GB or MB and the capacity is specified as the rightmost value of the slider, a logical unit with the whole free capacity of the RAID group to which the logical unit belongs is created. When a fractional capacity is included in the free capacity, a logical unit with a capacity that includes it is created. (You can see whether the free capacity has a fractional portion by viewing the **Free Capacity** field.) When you want to create a logical unit that does not have a fractional capacity, specify the logical unit using the other unit.
- The relation between MB and blocks is: 1 MB = 2,048 blocks. A fraction less than 2,048 blocks is omitted. The relationship between GB and MB is 1 GB = 1,024 MB. A fraction less than 1,023 MB is omitted.

Example: 2,048,000 blocks = 1,000 MB
2,049,024 blocks = 1,000 MB

– Specify the **Controller No.**

Select **Controller 0** or **Controller 1** to select the controller in charge of the logical unit. If you select the wrong controller, the logical unit can unexpectedly switch during operation. Performance quality may deteriorate as a result.

This is necessary with a dual system connection. It is not displayed with a single system connection.

Note: When dual active mode is selected in the dual system, the controller in charge of a logical unit must be selected to set up the logical unit. Perform the logical unit setting, including the selection of the controller that is referred to in Figure 5.14. When you change a controller in charge of the logical unit, see section 5.9.

Example:

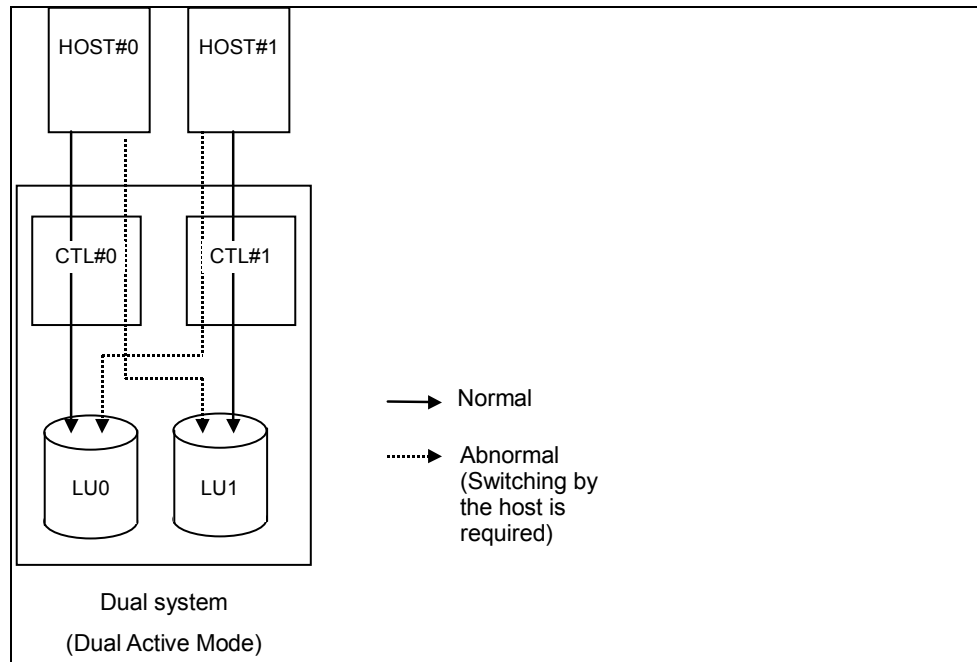


Figure 5.14 Dual Active Mode

- **Dual Active Mode:** Select a controller to access from the host to the logical unit as the controller for the logical unit.

In Figure 5.14, CTL#0 is in charge of logical unit0 and CTL#1 is in charge of logical unit1. In this example, set up the logical unit by selecting optional button **CTL#0** to select logical unit0 and button **CTL#1** to select logical unit1 respectively.

5. After setting logical unit information, click **OK**.

6. A message displays stating that the setting is complete. Click **OK**.
Clicking **OK** updates the logical unit information, and then Figure 5.15 displays.

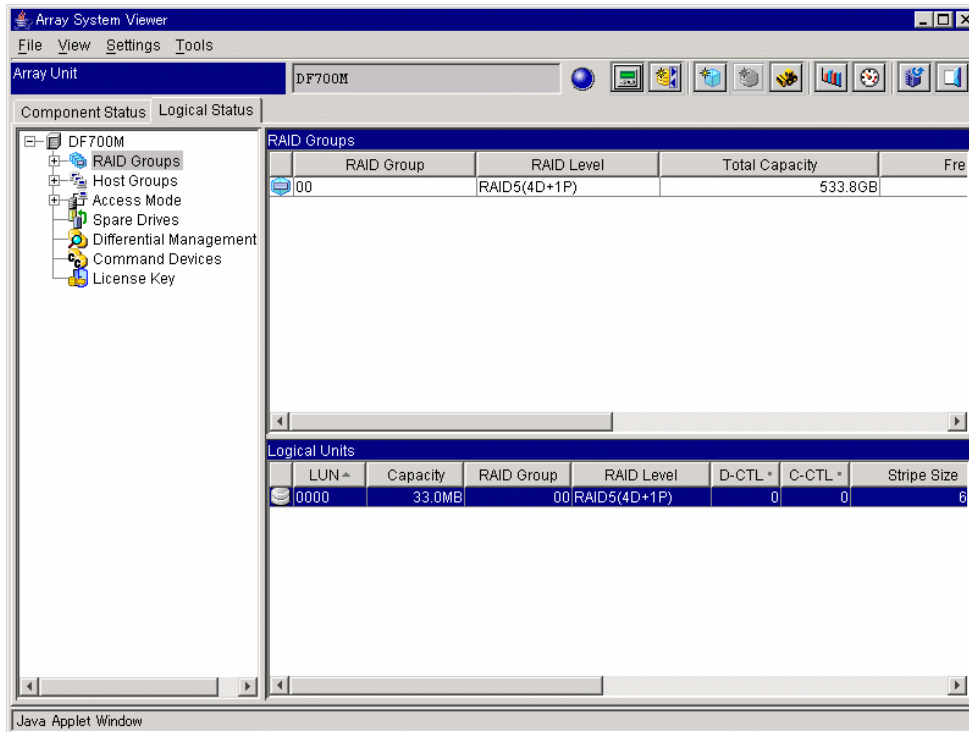



Figure 5.15 Array Unit Logical Unit

5.6 Constituting a Logical Unit Manually

1. Click the **Logical Status** tab on the Array Unit screen. See Figure 5.16.
2. Click the icon of the desired RAID group to create a logical unit.
3. On the **Settings** menu, select **Logical Unit** and click **Create**, or click . See Figure 5.16.

This operation can also be completed from the context menu of the RAID group number icon.

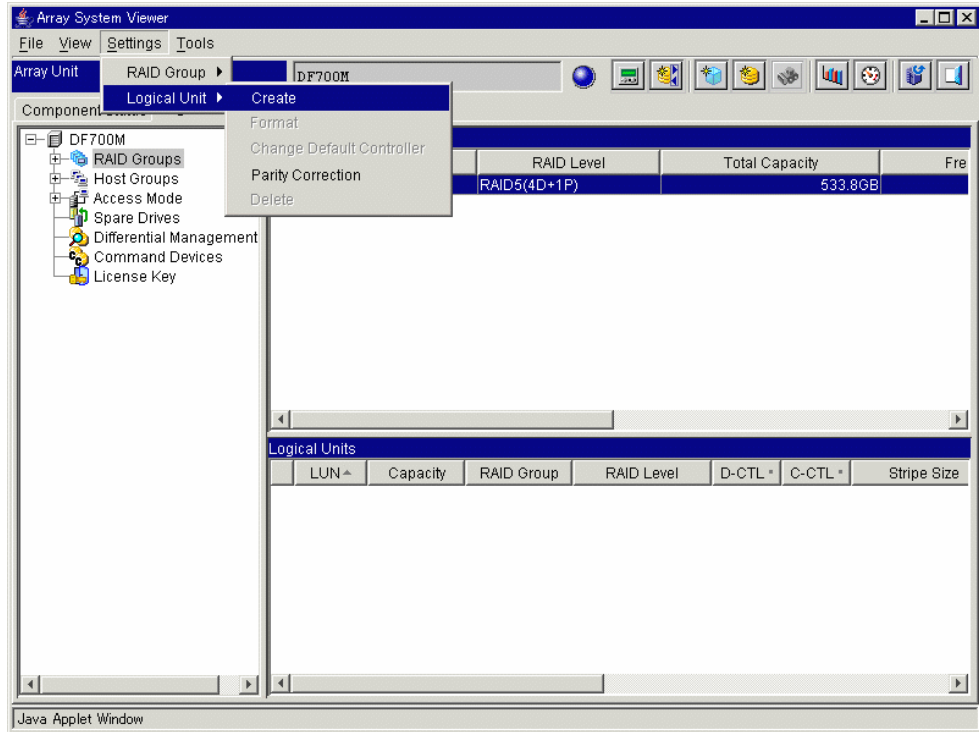


Figure 5.16 Array Unit - Create Logical Unit

The Create Logical Unit screen displays. See Figure 5.17.

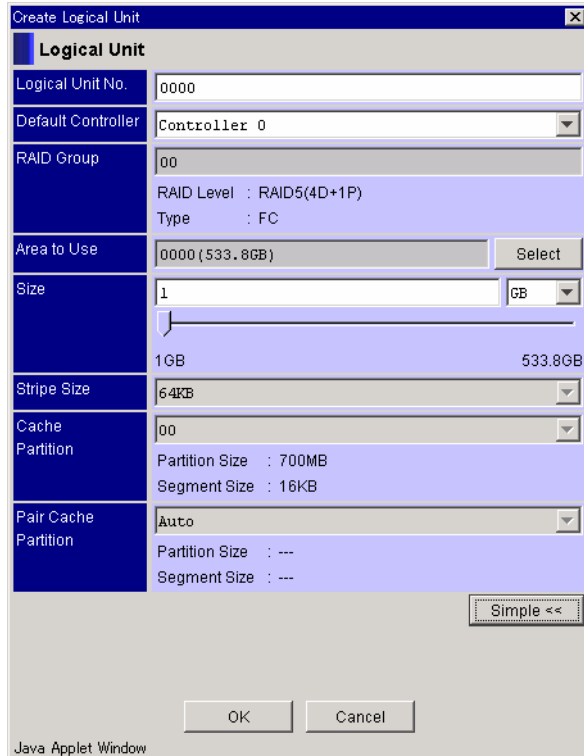


Figure 5.17 Create Logical Unit

4. Click **Detail**.
5. Select a **Logical Unit No.**, a **Default Controller**, and the input **Size**. Click **Select**. See Figure 5.18.

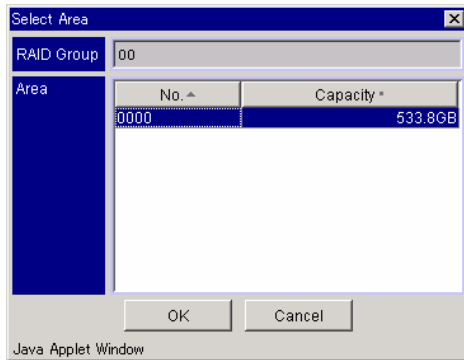


Figure 5.18 Select Area Dialog Box

6. Select **Area** and **No.** and then click **OK**.
7. In the **Create Logical Unit** dialog box, click **OK**.
8. Click **OK** to confirm the confirmation messages.

Clicking OK updates the logical unit information and displays Figure 5.19.

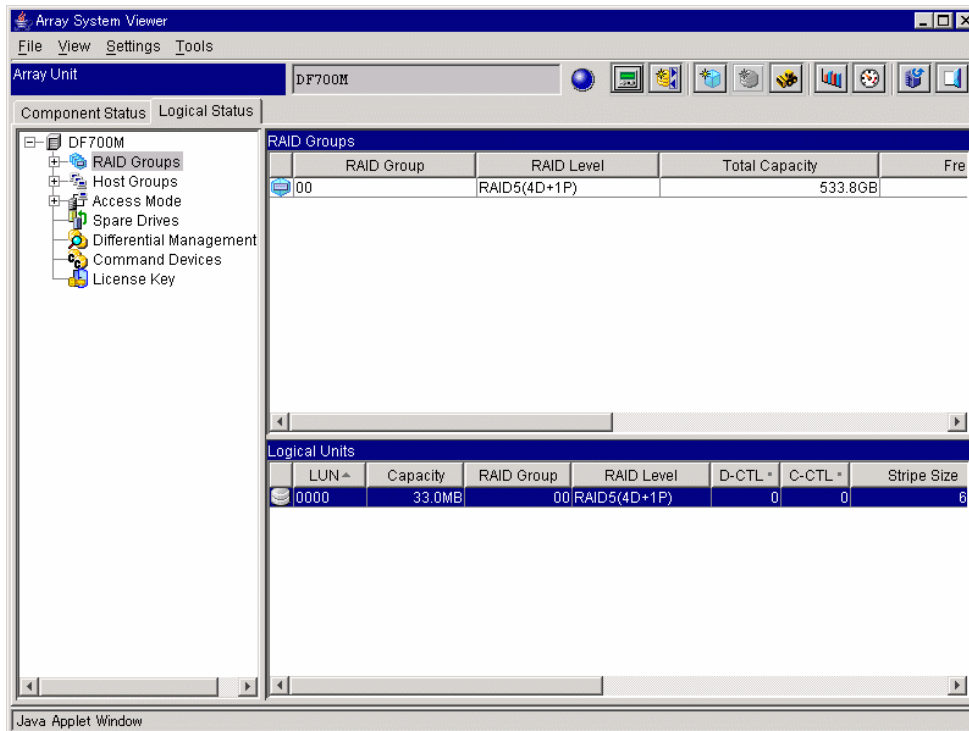


Figure 5.19 Array Unit – Logical Unit

5.7 Formatting a Logical Unit

To format the logical unit:

- **Format:** If multiple logical units are specified, up to six logical units are formatted concurrently. A host I/O can be received even when formatting logical units.

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the logical unit icon on the Array Unit screen. On the context menu of the logical unit icon, select **Format**. See Figure 5.20.

When you select multiple logical units, hold down the **Ctrl** key and click the icons of the logical units you want to format.

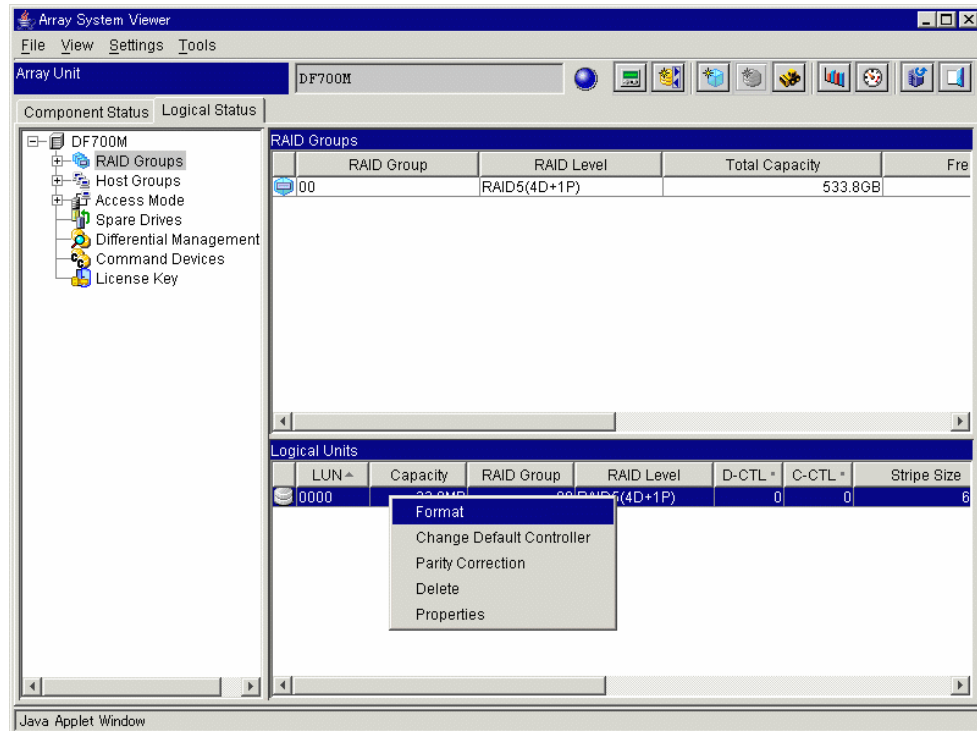


Figure 5.20 Logical Unit - Format

Note: The formatting may be interrupted during the following conditions:

- A host is rebooting
 - I/O path switching
 - Access to a logical unit of the non-ownership controller
3. To continue through warning and confirmation messages, click **OK**.
This updates the formatted logical unit information and displays Figure 5.21.

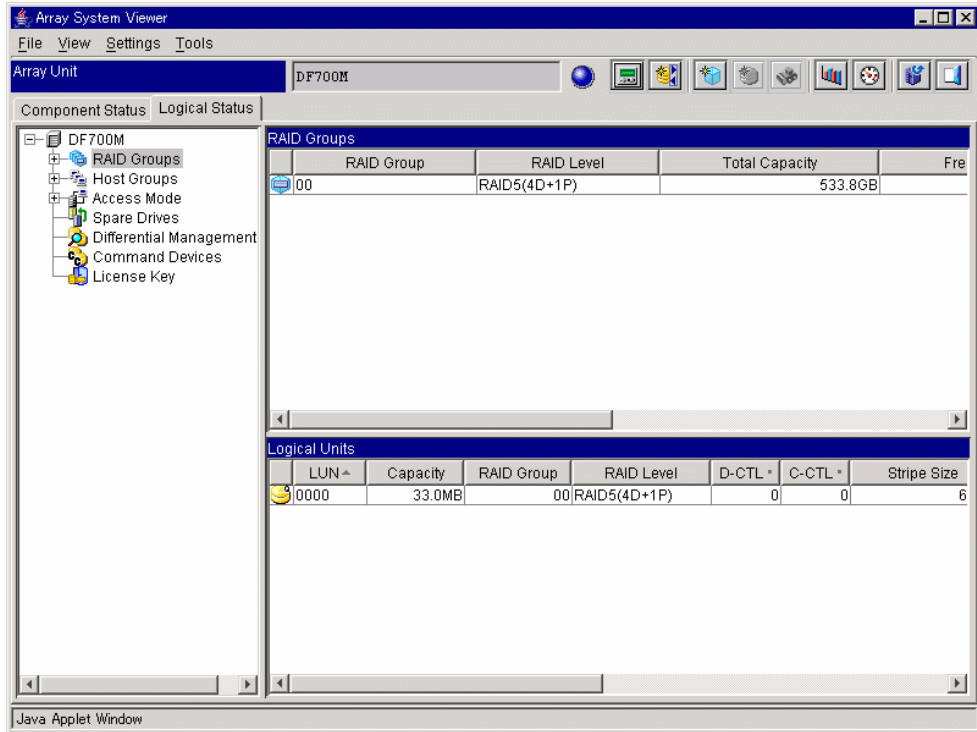


Figure 5.21 Logical Unit Information

5.8 Deleting a Specified Logical Unit

To delete a specified logical unit:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 5.22.
2. Click the logical unit icon on the **Array Unit** screen. On the context menu of the logical unit icon, select **Delete**.

When you select multiple logical units, press the **Ctrl** key, and click the logical units icons that you want to delete.

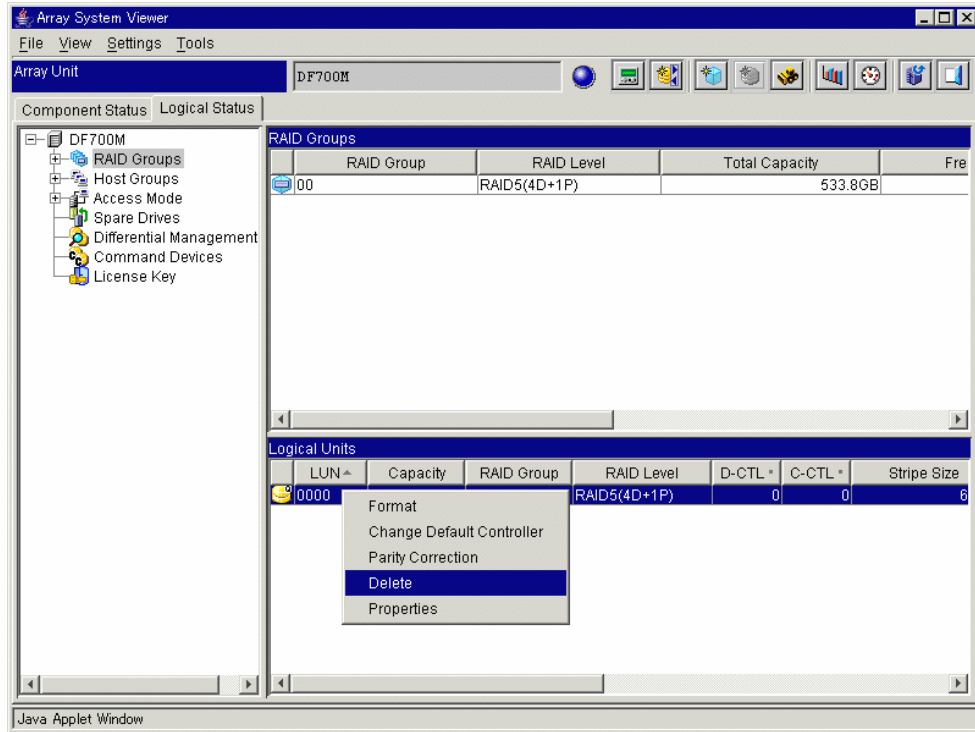


Figure 5.22 Logical Unit - Delete

3. To continue through confirmation and status messages, click **OK** and **Close**.
The logical unit is deleted.

5.9 Changing Default Controller in Charge of a Logical Unit

To change the default controller in charge of a logical unit:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 5.23.
2. Click the logical unit in the **Array Unit** screen. On the context menu of the logical unit icon, select **Change Default Controller**.

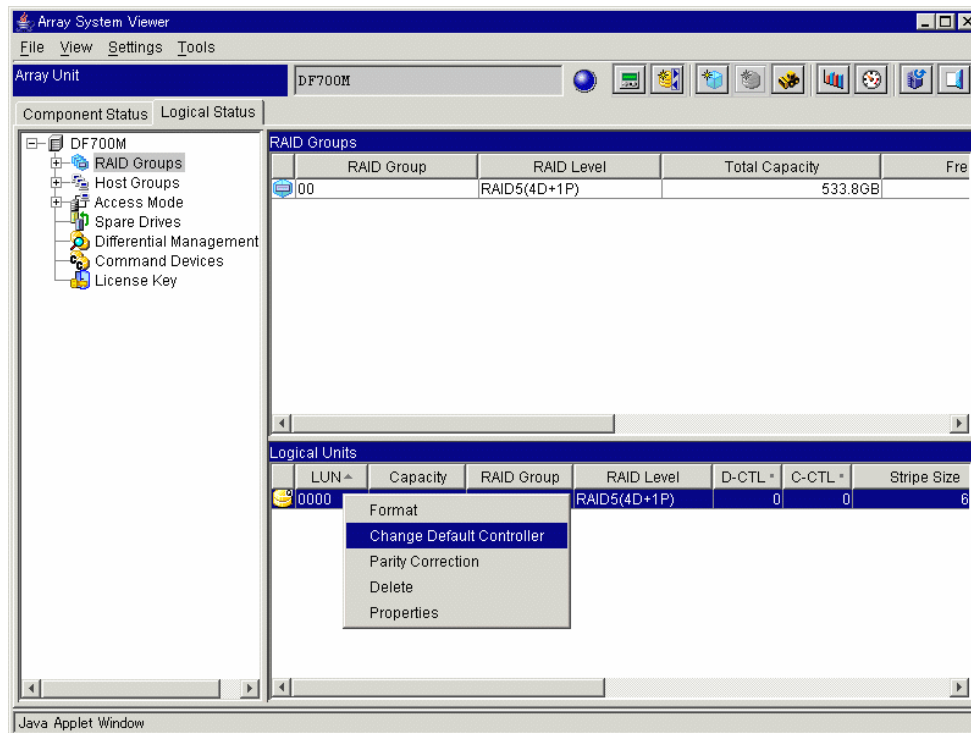


Figure 5.23 Logical Units - Change Default Controller

3. To continue through confirmation and status messages, click **OK**.
4. The default controller in charge of the logical unit is changed.

Note: Switching the default controller owning the logical unit changes the default controller currently displayed. When the switching is executed twice, the specified controller is changed to the original default controller that is controlling the logical unit.

5.10 Parity Correction

Restore the logical unit in which the parity error occurred. From the status of the logical unit, you can determine if a parity error has occurred.

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 5.24.
2. Select the logical unit to which you want to correct parity. Select **Logical Unit** in the **Settings** menu, and then select **Parity Correction**.

If the parity restoration displays in halftone, no parity error has occurred.

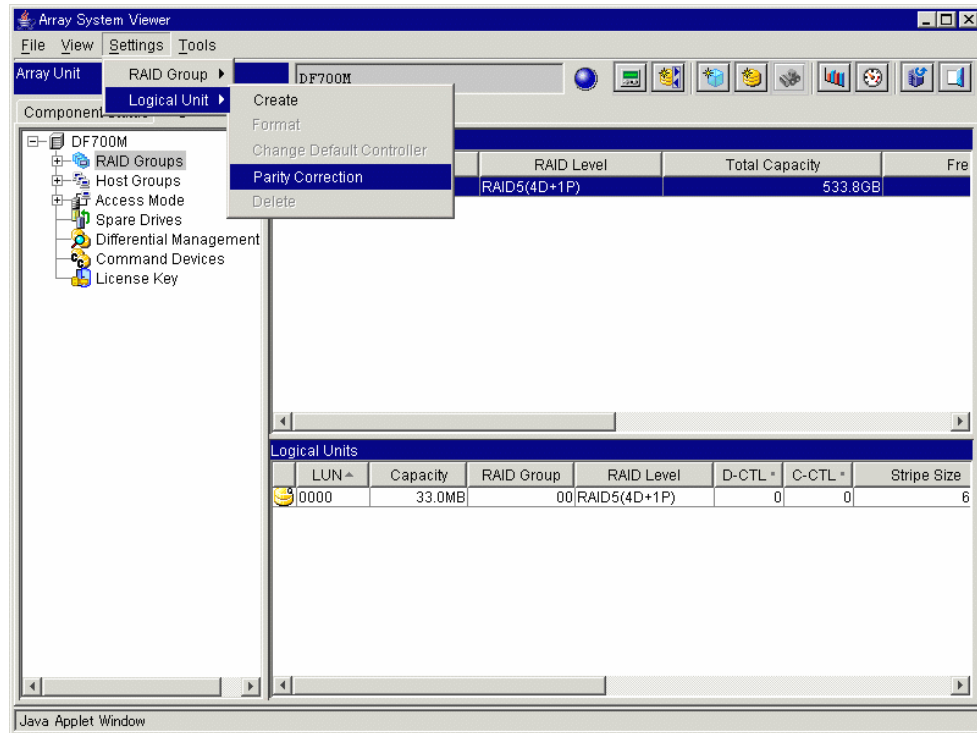


Figure 5.24 Logical Unit – Parity Correction

To continue, click **OK** in the confirmation message.

The unconnected logical units list displays. See Figure 5.25.

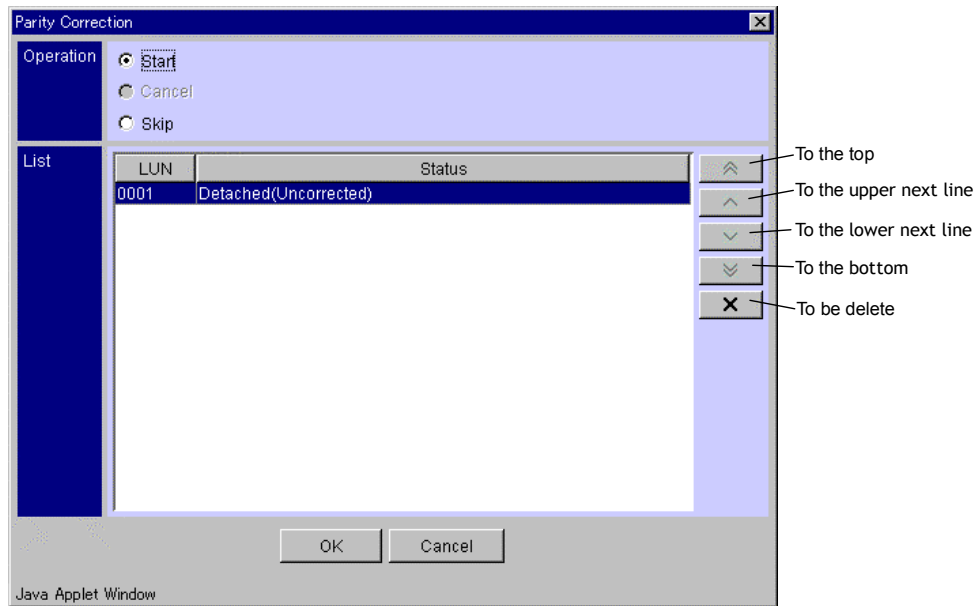


Figure 5.25 Parity Correction Dialog Box

3. Change the order of the restoration process, when necessary.
(The logical unit listed at the top is processed first.)
 4. To continue, click **Start**, and then click **OK**. (Or to cancel, click **Skip** and click **OK**.)
 5. A message displays. Click **OK**.
 6. A message displays stating that the parity correction has started. Click **OK**.
- Storage Navigator Modular only directs the process being performed. The subsystem microprogram performs the specific operation.

Chapter 6 Configuring Array Unit

This chapter includes the following:

- 6.1 Creating Logical Units by Wizard
- 6.2 Designating Spare Drives
- 6.3 Setting Differential Management LU
- 6.4 Setting Command Devices
- 6.5 Setting Optional Features

6.1 Creating Logical Units by Wizard

To create logical units by wizard:

1. On the **Tools** menu, select **Wizard** → **Create Logical Units**.

On the **Select Usage** drop down list (see Figure 6.1), select logical unit usage. A dialog box displays where you can select the usage by setting the suitable parameter for **Drive Type**, **RAID Level**, and **Parity**. If you want to customize the parameter, click **Customize** and select Parameter to set the **Drive Type**, **RAID Level**, and **Parity**. See Table 6-1.

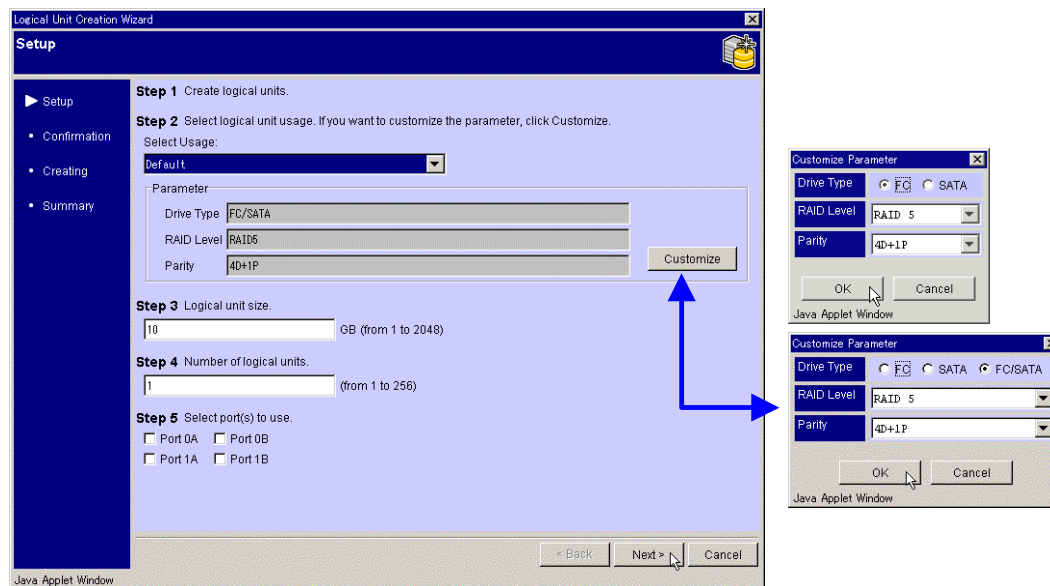


Figure 6.1 Logical Unit Creation Wizard - Setup

Table 6-1 Usage for Logical Unit

Usage	Recommended RAID Configuration	Drive Type
Default	4D+1P	FC/SATA
Data Base	4D+1P	FC
File System	4D+1P	FC
Backup	8D+1P	FC
Archive	8D+1P	SATA
Archive2	8D+2P	SATA
Streaming	4D+1P	SATA
Digital Surveillance System	8D+1P	FC
High Performance Computing	4D+4D	FC

2. Specify the logical unit size, number of logical units, and port(s) to use. See Figure 6.1.
3. Select **Next**.
4. The specification contents display. See Figure 6.2. When the specification contents are no problem, click **Confirm**. If you want to modify the contents, click **Back**.

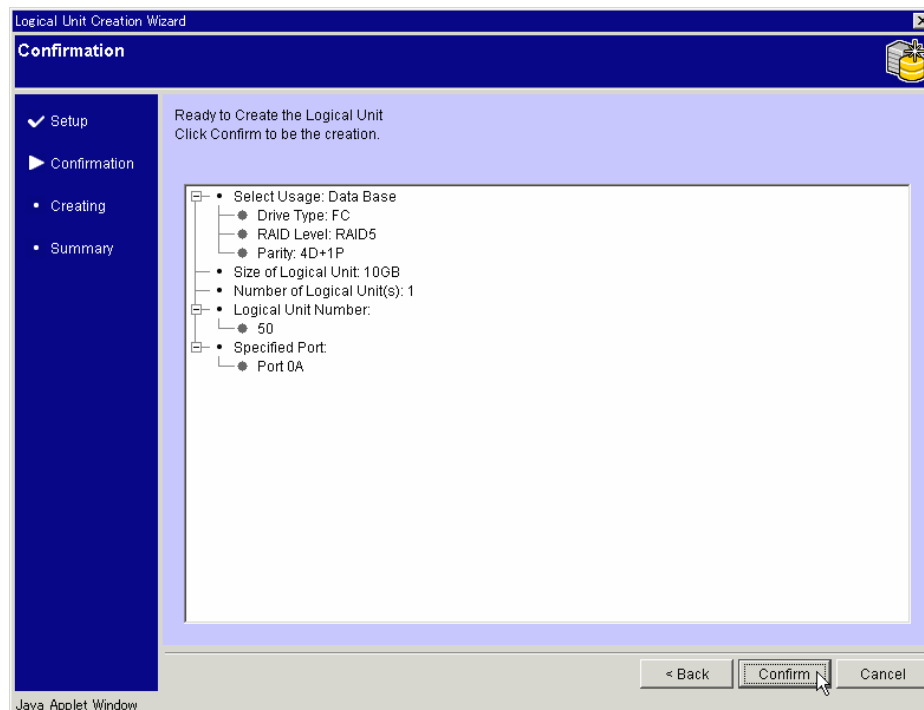


Figure 6.2 Logical Unit Creation Wizard - Confirmation

5. Click **Done**. The Logical Unit Creation Wizard Summary displays. See Figure 6.3.

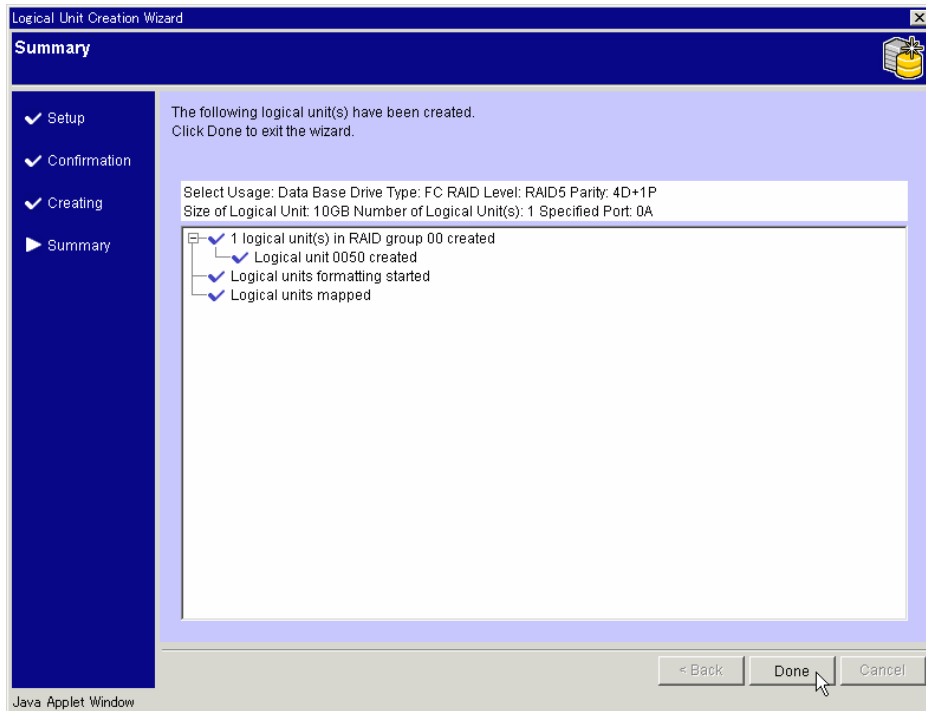


Figure 6.3 Logical Unit Creation Wizard - Summary

6.2 Designating Spare Drives

To ensure maximum storage capacity, assign a spare drive in the subsystem. Any drive except a data drive can be assigned as spare.

6.2.1 Designating Spare Drives

To designate a spare drive:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 6.4.
2. Click the **Spare Drives** icon.

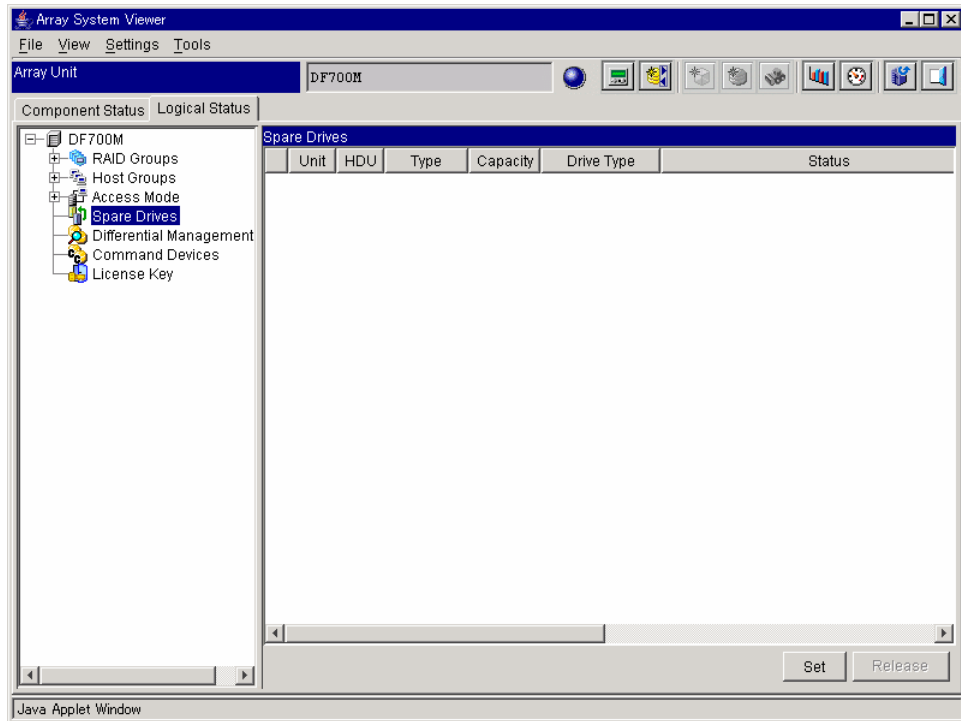


Figure 6.4 Array System Viewer - Spare Drives

3. Click **Set**. The **Spare Drives Settings** dialog displays. See Figure 6.5.

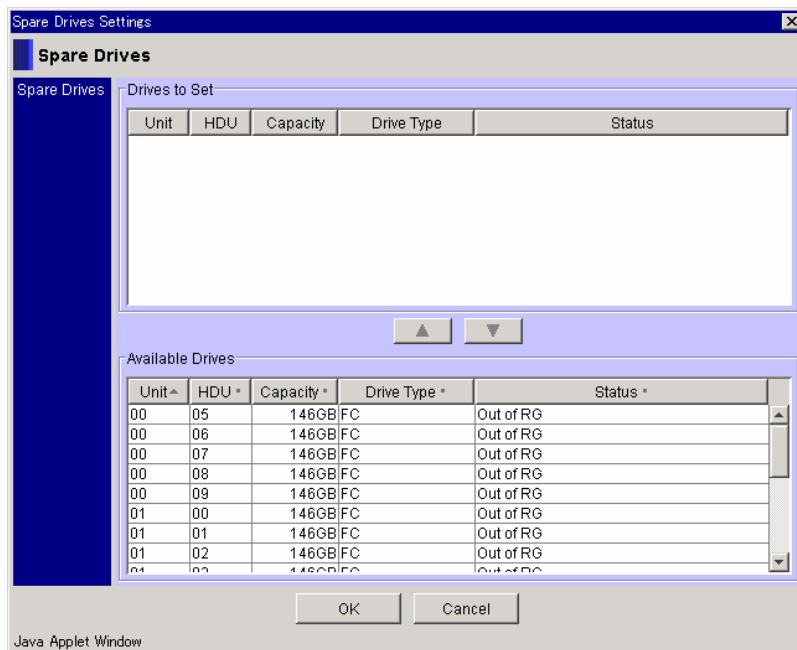



Figure 6.5 Spare Drives Settings Dialog Box

4. In the **Available Drives** list, select the **HDU** number for the spare drives you want to set, and click .

The selected **HDU** number moves to the **Drives to Set** list. See Figure 6.6.

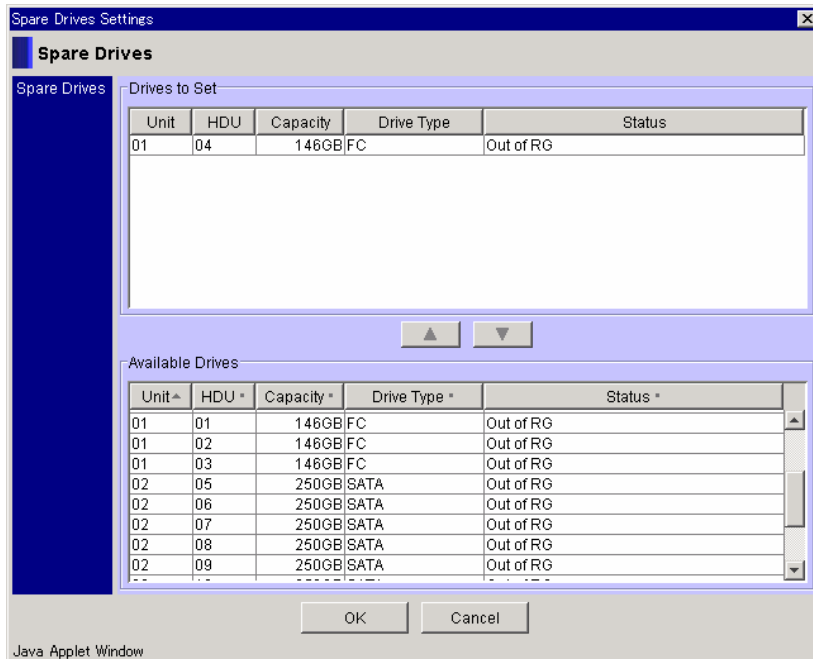


Figure 6.6 Spare Drives - Available Drives

5. Click OK.
6. Confirmation and status messages display To continue through the confirmation and status messages, click OK and Close.

The setting information displays. See Figure 6.7.

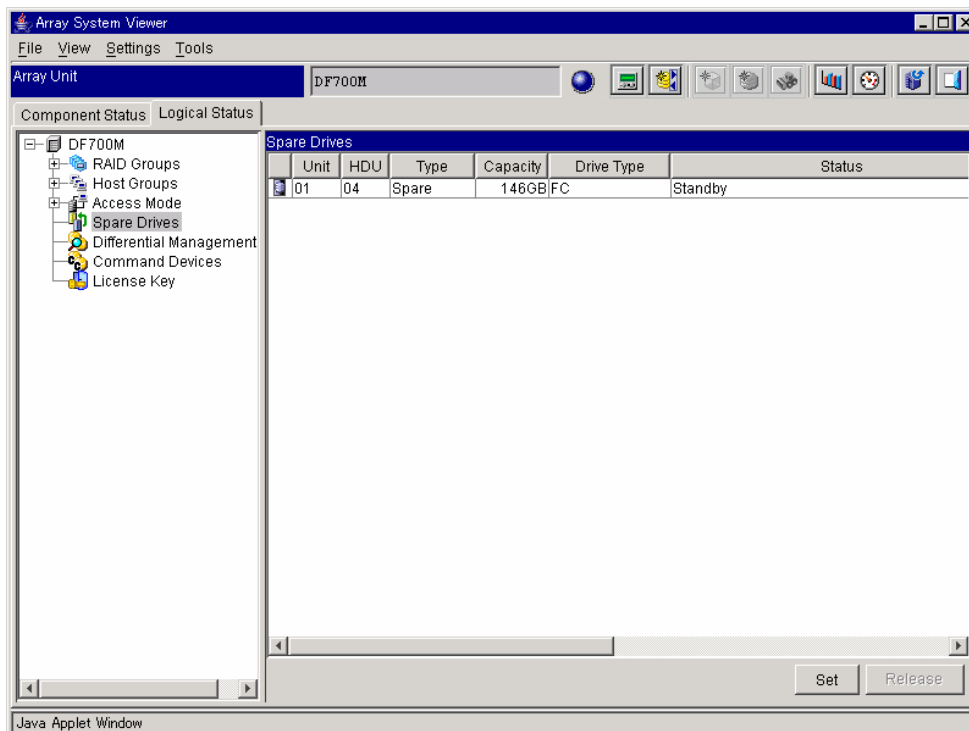


Figure 6.7 Array System Viewer

6.2.2 Releasing Spare Drive

To release the spare drive:

1. Click the **Logical Status** tab on the **Array Unit** screen.
2. Click the **Spare Drives** icon. See Figure 6.8.

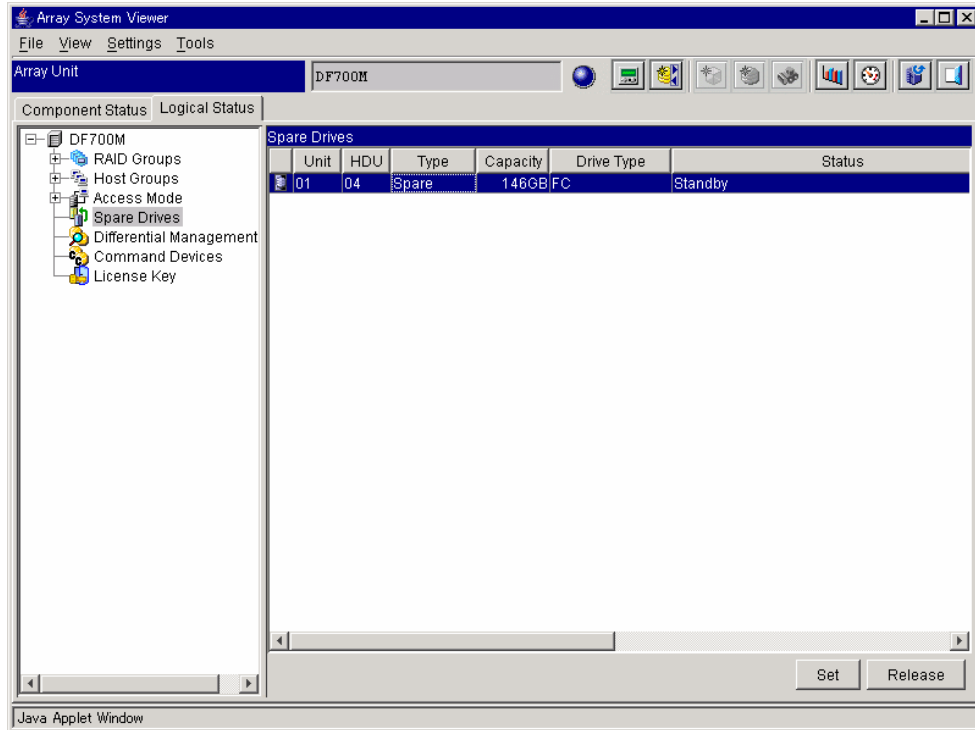


Figure 6.8 Array System Viewer – Spare Drives

3. Select the HDU number of the spare drives you want to release. Click **Release**. Confirmation and status messages display. To continue through the confirmation and status messages, click **OK** and **Close**. The setting information displays.

6.3 Setting Differential Management LU

When the Differential Management LU is not set, you can set it. The Differential Management LU is an exclusive logical unit for storing the differential data at the time when the volume is copied. The Differential Management LU in the disk subsystem is treated in the same way as the other logical units. However, a logical unit that is set as the Differential Management LU is not recognized by a host because it is hidden.

The minimum logical unit size for the Differential Management LU is 5 GB. Up to the two Differential Management LUs can be set. The second Differential Management LU is used for the mirroring.

6.3.1 Setting Differential Management LU

To set the Differential Management LU:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 6.9.
2. Click the **Differential Management LU** icon.

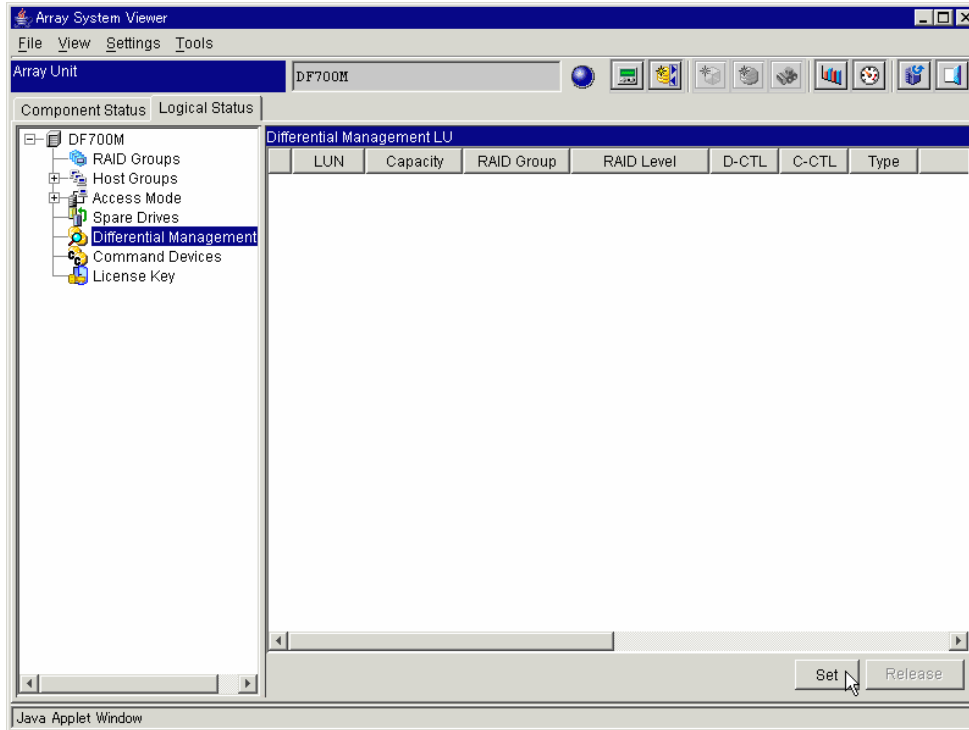


Figure 6.9 Array System Viewer - Differential Management

3. Click **Set**.

The **Select Logical Unit** dialog box displays. See Figure 6.10.

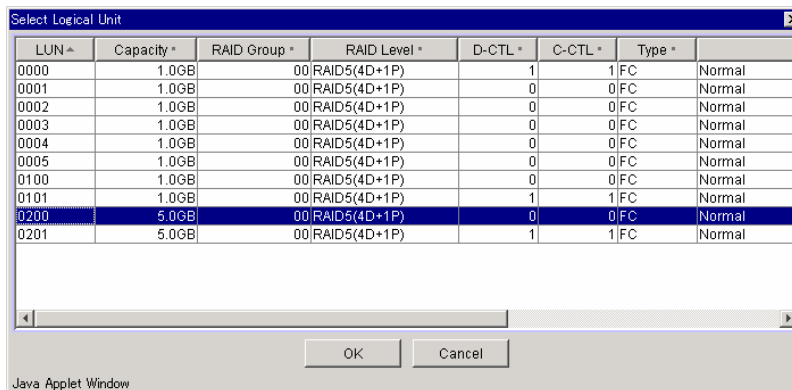


Figure 6.10 Select Logical Unit Dialog Box

4. Select the LUN you want to set to the differential management LU, and click **OK**.
5. Confirmation and status messages display. To continue through the confirmation and status messages, click **OK**.

The setting information displays. See Figure 6.11.

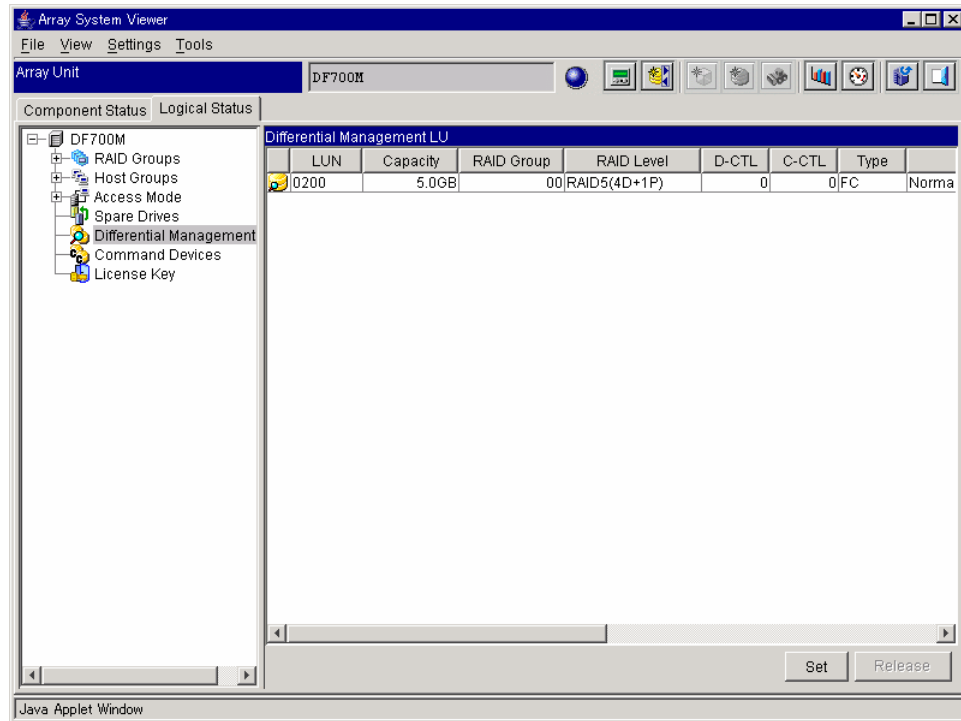


Figure 6.11 Array System Viewer - Setting Information

6.3.2 Releasing Differential Management LU

To release the differential management LU:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 6.12.
2. Click the **Differential Management LU** icon..

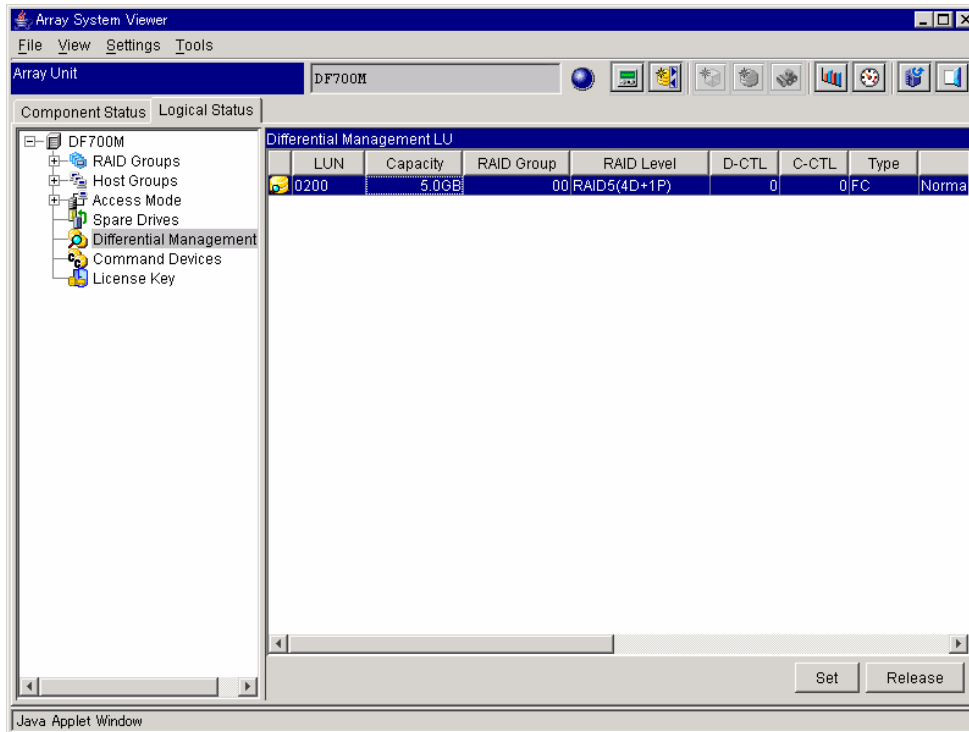


Figure 6.12 Array System Viewer - Differential Management

3. Select the LUN you want to release to the differential management LU, and click **Release**.
4. Confirmation and status messages display. To continue through the confirmation and status messages, click **OK**.

The setting information displays.

6.4 Setting Command Devices

Two command devices can be designated for the subsystem. The Command Device LU size must be greater than or equal to 33 MB.

6.4.1 Setting Command Devices

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 6.13.
2. Click the **Command Devices** icon.

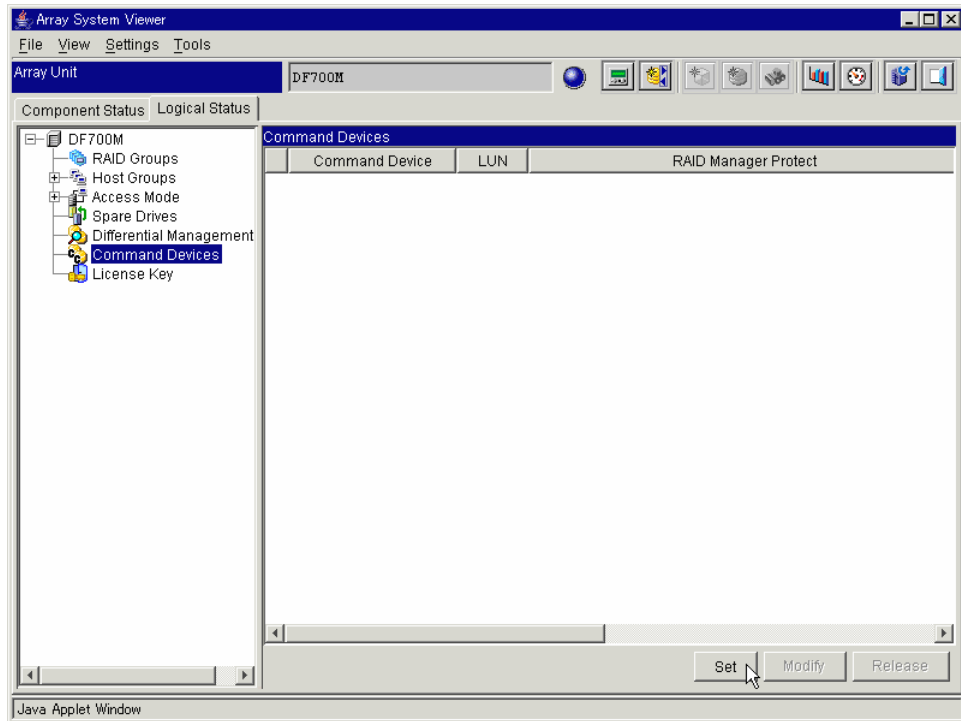


Figure 6.13 Array System Viewer - Command Devices

3. Click Set.

The Command Devices to Set dialog box displays. See Figure 6.14.

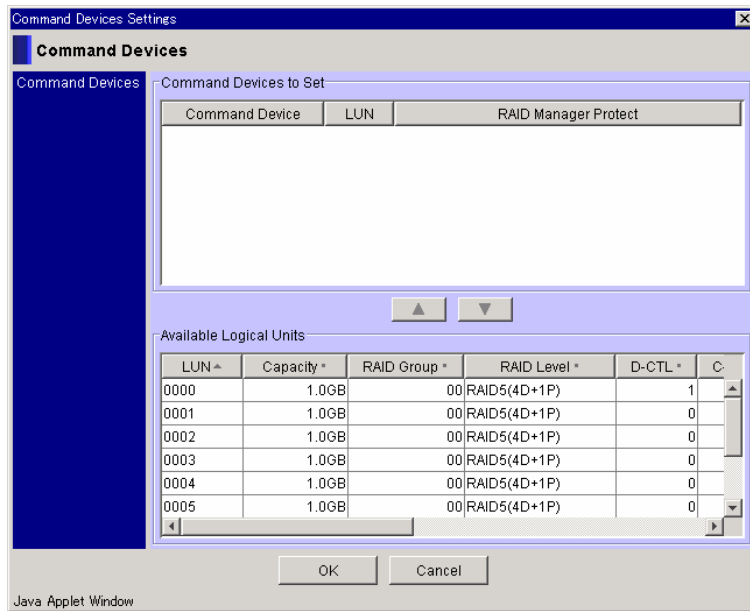


Figure 6.14 Command Devices Window

4. In the **Available Logical Units** list, select the LUN you want to set in the command devices, and click . See Figure 6.15.

The selected LUN moves to the **Command Devices to Set** list.

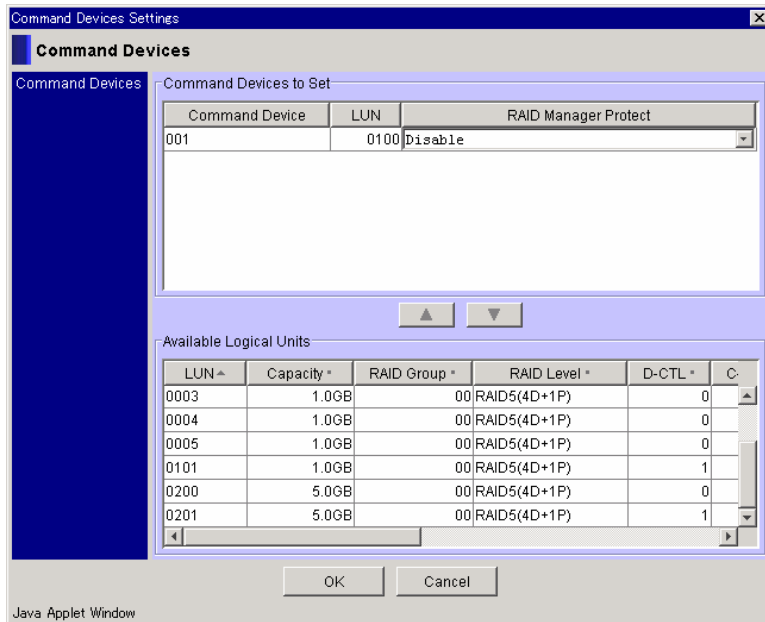


Figure 6.15 Command Devices - Available Logical Units

5. Click OK.
6. A message displays. Click OK.

The setting information displays. See Figure 6.16

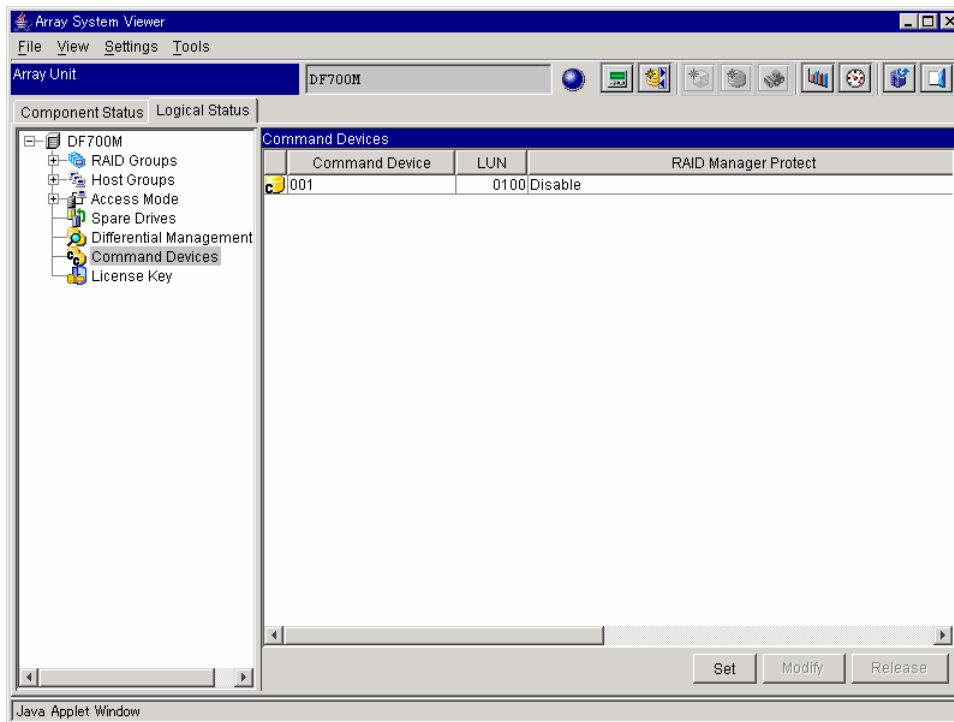


Figure 6.16 Array System Viewer - Setting Information

6.4.2 Changing Command Devices

To change the command devices:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 6.17.
2. Click the **Command Devices** icon.

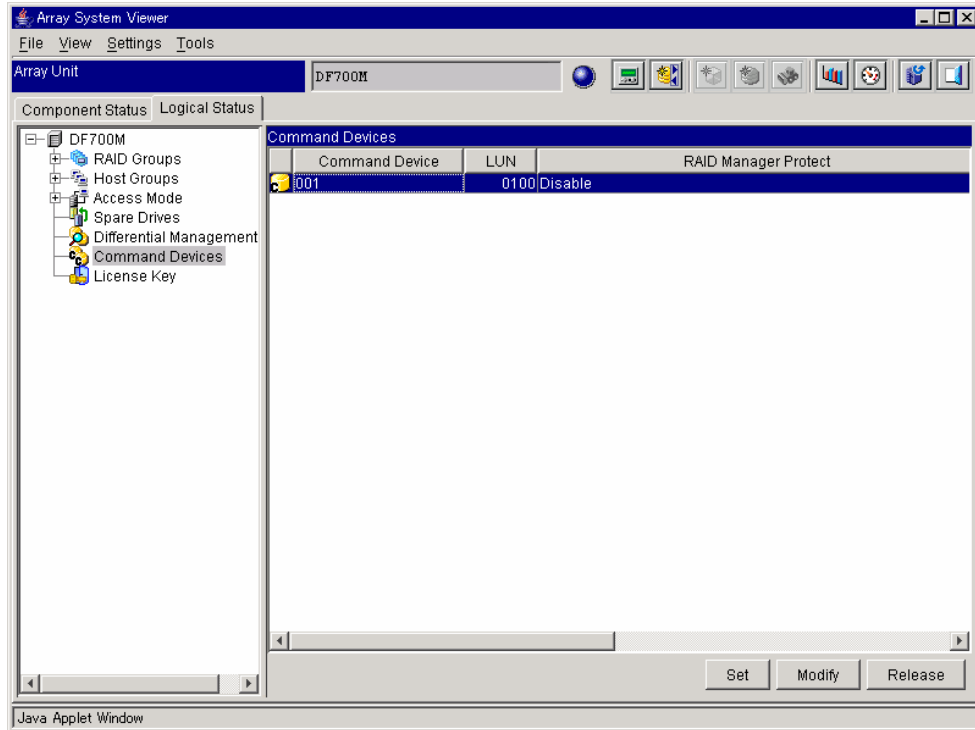


Figure 6.17 Array System Viewer - Command Devices

3. Select the **Command Device** number you want to change in the Command Device dialog box, and click **Modify**.

The **Modify Command Devices** dialog box displays. See Figure 6.18.



Figure 6.18 Modify Command Devices Dialog Box

4. In the RAID Manager Protect drop-down list, select **Disable** or **Enable**.
5. Click **OK**.
6. Confirmation and status messages display. Click **OK** to continue through confirmation and status messages.

The setting information displays. See Figure 6.19.

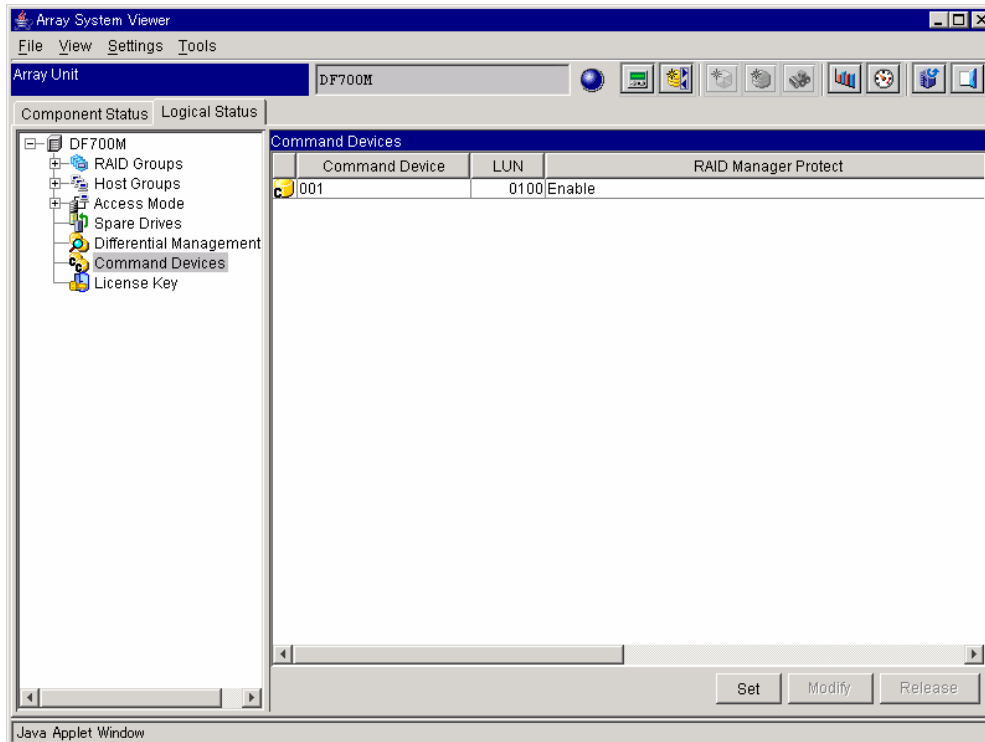


Figure 6.19 Array System Viewer - Setting Information

6.4.3 Releasing Command Devices

To release the command devices:

1. Click the **Logical Status** tab on the **Array Unit** screen.
2. Click the **Command Devices** icon.
3. Select the **Command Device** number you want to release the command devices, and click **Release**.
4. Confirmation and status messages display. Click **OK** to continue through confirmation and status messages.

The setting information displays.

6.5 Setting Optional Features

This section describes how to install and uninstall optional features.

6.5.1 Installing Optional Features

WARNING: Rebooting requires stopping I/O from the host.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

To install the optional features:

1. Click the **Logical Status** tab on the **Array Unit** screen. See Figure 6.20.
2. Click the **License Key** icon.

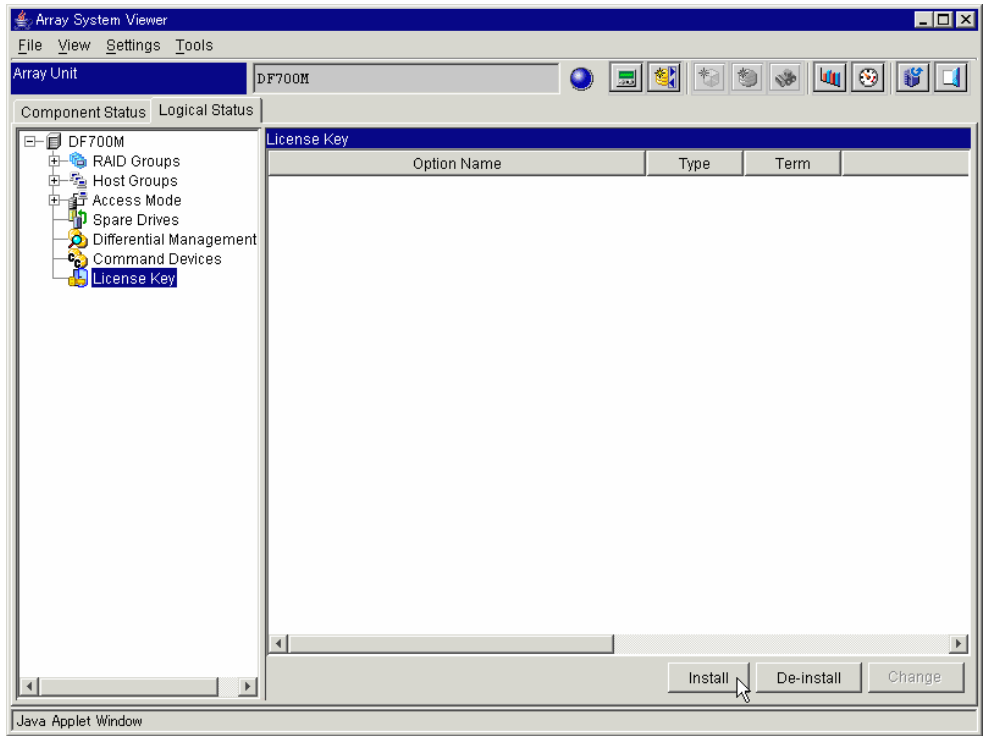


Figure 6.20 Array System Viewer - License Key

3. Click Install.

The Install Options dialog box displays. See Figure 6.21.

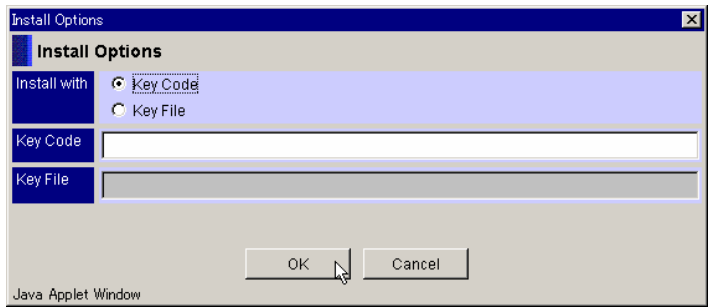


Figure 6.21 Install Options Dialog Box

4. Choose an install option, Key Code, or Key File:

Key Code: For the key code of the priced optional features, refer to the priced optional features manual. In the Key Code field, enter the key code, and click **OK**.

Key File: In the Key File field, enter the path to the key file and click **OK**. An Install Options box displays. Select the desired features, and click **OK**. See Figure 6.22.

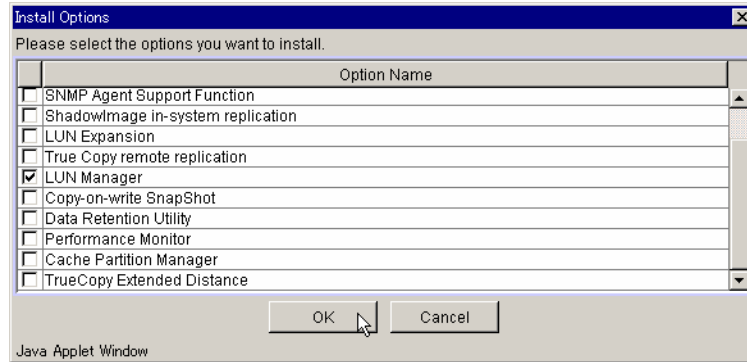


Figure 6.22 Install Options - Option Name

5. In any confirmation screens that display, click **OK** or **Close** to continue.
6. A status message indicates whether the install is successful.

Note: Some options may require a subsystem restart before the options are functional. Follow the on-screen instructions. Before restarting, ensure that the host is not accessing data on the subsystem. A subsystem restart takes about 4 to 15 minutes.

To perform other operations on the **Main** screen (see section 3.2), select the subsystem from the **Main** screen and open the selected Array **Unit** screen.

Note: For additional information on priced optional features, refer to the corresponding manual of each feature.

6.5.2 De-installing Optional Features

WARNING: Rebooting requires stopping I/O from the host.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

To de-install the optional features:

1. Click the **Logical Status** tab on the **Array Unit** screen.
2. Click the **License Key** icon.
3. Click **Close**.

The **De-install Options** dialog displays. See Figure 6.23.

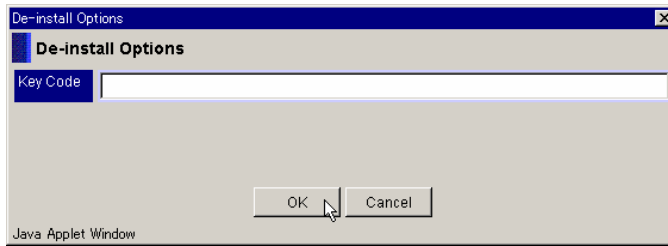


Figure 6.23 De-install Options Dialog Box

4. Enter the key code, and click **OK**.
5. A status message displays and indicates whether the de-install is successful.

Note: If the message indicates that a subsystem restart is needed, follow the instructions in the message. Before restarting, ensure that the host is not accessing data on the subsystem. A subsystem restart takes about 4 to 15 minutes.

To perform other operations on the **Main** screen (see section 3.2), select the subsystem from the Main screen and open the selected Unit screen.

6.5.3 Setting Optional Features

After releasing the key of the optional feature, set enable or disable this feature.

WARNING: Rebooting requires stopping I/O from the host.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

To set the optional features:

1. Click the **Logical Status** tab on the Array Unit screen. See Figure 6.24.
2. Click the **License Key** icon.

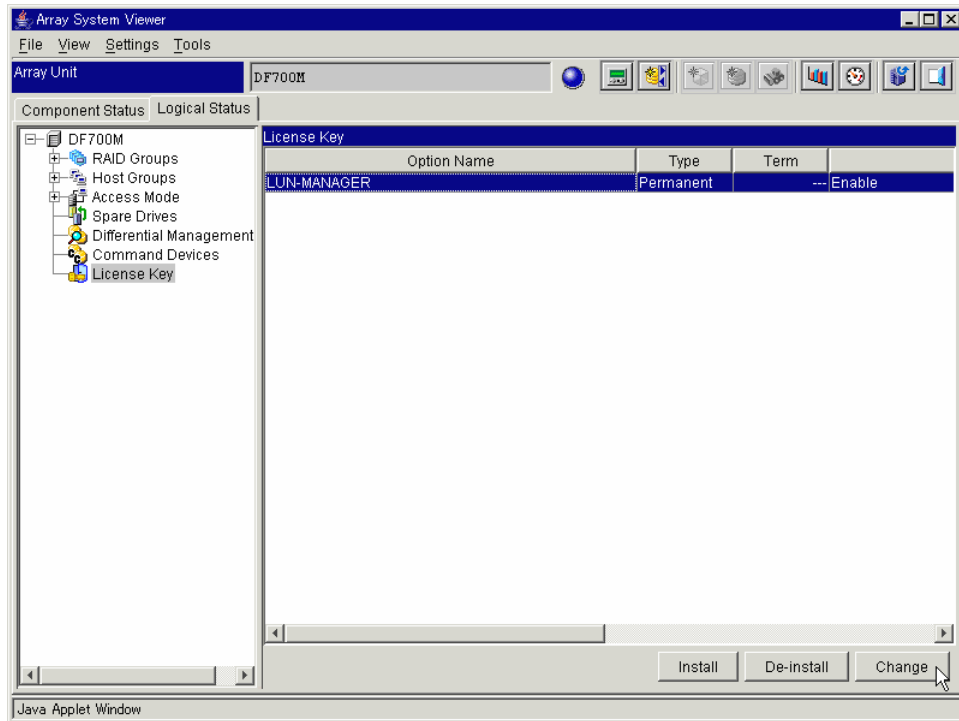


Figure 6.24 Array System Viewer - License Key

3. Select the optional features to be set up, and click **Change**.
4. A confirmation message displays. Click **OK** to continue setting the enable/disable option.
5. A status message displays and indicates that the priced optional features have been set up.

Note: If the message indicates that a subsystem restart is needed, follow the instructions in the message. Before restarting, ensure that the host is not accessing data on the subsystem. A subsystem restart takes about 4 to 15 minutes.

To perform other operations on the **Main** screen (see section 3.2), select the subsystem from the **Main** screen and open the selected Unit screen.

Chapter 7 Setting Host Group Information

This chapter contains information about setting a host group 0 (000:G000), such as a host group option and mapping information.

For information on creating a host group, refer to the LUN Manager User's Guide.

This chapter includes the following sections:

- 7.1 Setting Host Group Options
- 7.2 Setting Mapping Guard
- 7.3 Specifying Mapping Mode

7.1 Setting Host Group Options

To set the host group options:

1. Click the **Logical Status** tab. See Figure 7.1.
2. Click the **PortA** plus sign.
3. Click the **000:G000** plus sign, then select **Option**.
4. Click **Simple Settings**.

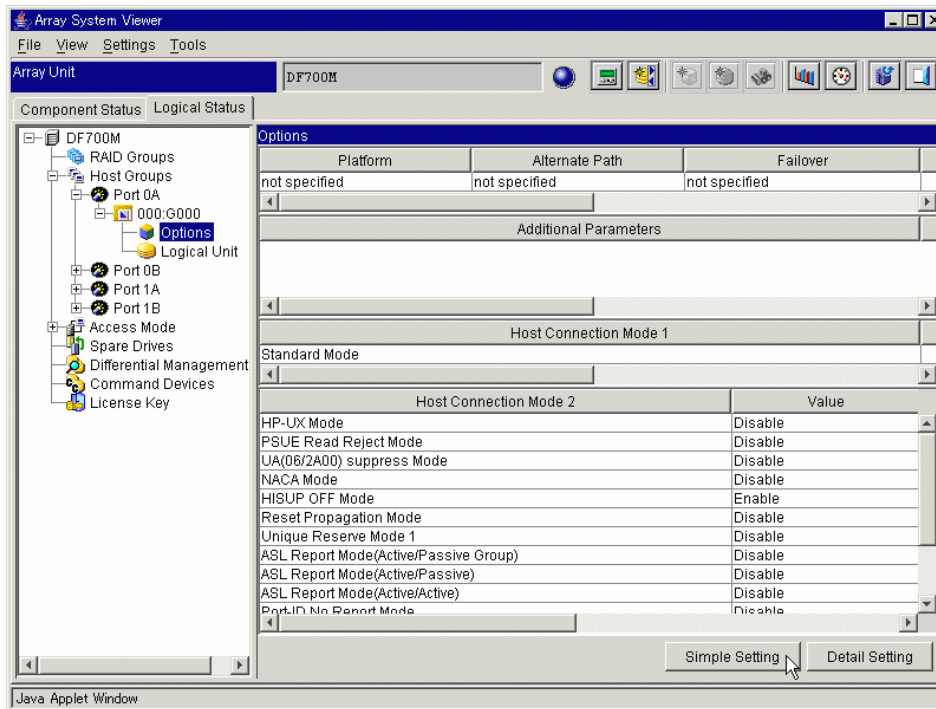


Figure 7.1 Array System Viewer - Simple Settings

5. As necessary, select **Platform**, **Alternate Path**, and **Failover**. See Figure 7.2. The combination, which can be chosen for every platform, is limited.

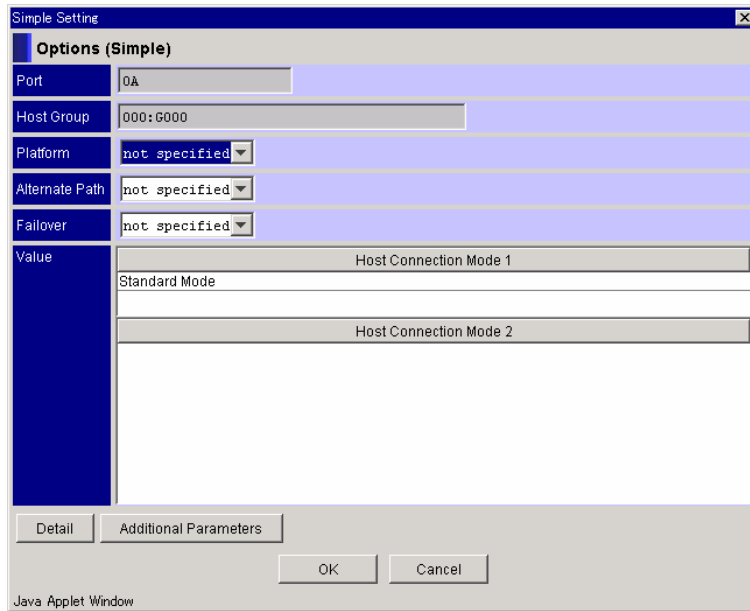


Figure 7.2 Simple Settings Dialog Box

Platform:

- HP-UX
- Solaris
- AIX®
- Windows 2000
- Windows 2003
- Linux®
- Tru64
- Not specified

Alternate path:

- Not specified
- PV Link: Can be used by HP-UX.
- HDLM: Can be used by Solaris, AIX, and Windows 2000/2003.
- VxVM: Can be used by HP-UX, AIX, Solaris, Windows 2000/2003, and Linux.
- MPxIO: Can be used by Solaris.

Failover:

- Not specified
- MC/ServiceGuard: Can be used by HP-UX.
- SunCluster: Can be used by Solaris.
- VCS: Can be used by Solaris and Linux.
- HACMP: Can be used by AIX.
- MSCS: Can be used by Windows 2000/2003.

- Tru Cluster: Can be used by Tru64.

6. Click **Additional Parameters**. See Figure 7.3.

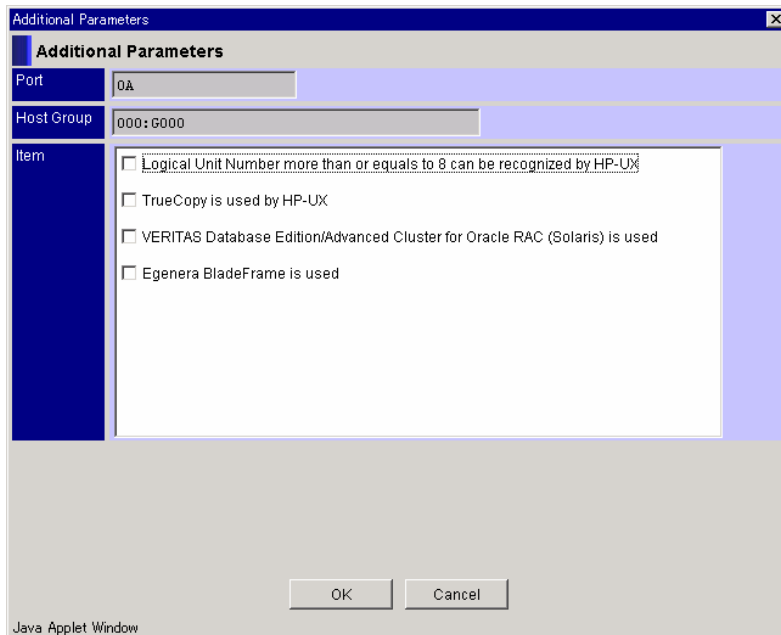


Figure 7.3 Additional Parameters Dialog Box

7. Select the appropriate options in the Item group and click **OK**.

8. Click **Detail**. See Figure 7.4.

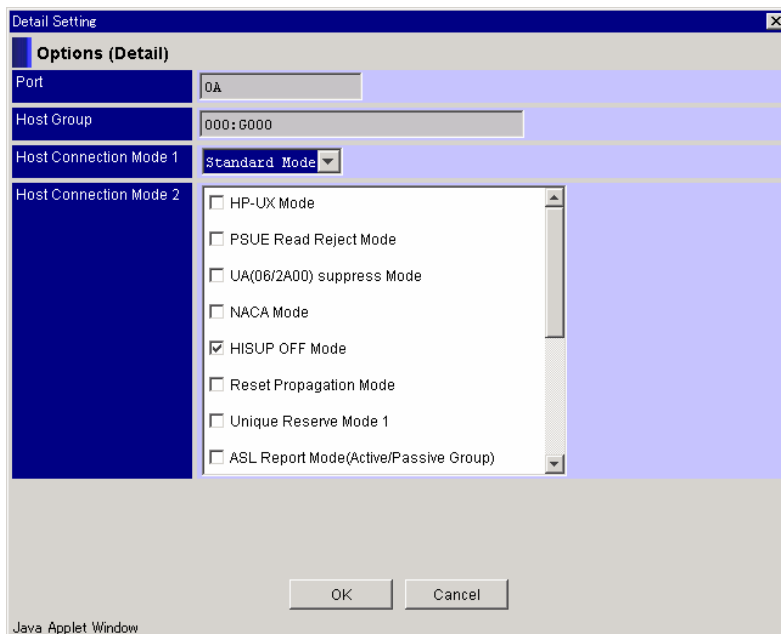


Figure 7.4 Detail Settings Dialog Box

9. Select **Host Connection Mode 1**, **Host Connection Mode 2** and click **OK**.

Host Connection Mode 1:

- Standard Mode: Open system emulation mode
- Open VMS Mode: Open VMS mode
- TRESPASS Mode: TRESPASS mode
- Wolfpack Mode: Wolfpack mode

Host Connection Mode 2:

- HP-UX Mode: Enables the HP-UX Mode.
- PSUE Read Reject Mode: Enables the PSUE Reject Mode.
- UA (60/2A00) Suppress Mode: Suppresses the unit attention (06/2A00).
- NACA Mode: Enables the NACA Mode.
- HISUP OFF Mode: Enables the HISUP OFF Mode.
- Reset Propagation Mode: The mode to propagate reset to other ports.
- Unique Reserve Mode 1: Enables the Unique Reserve Mode 1.
- ASL Report Mode (Active/Passive Group): Enables the ASL Report Mode (Active/Passive Group).
- ASL Report Mode (Active/Passive): Enables the ASL Report Mode (Active/Passive).
- ASL Report Mode (Active/Active): Enables the ASL Report Mode (Active/Active).
- Port ID No Report Mode: Enables the Port ID No Report Mode.
- Port ID Conversion Mode: Enables the Port ID Conversion Mode.
- TruCluster Mode: Enables the TruCluster Mode.
- Product Serial Response Mode: Enables the Product Serial Response Mode.
- Same Node Name Mode: Enables the Same Node Name Mode.
- CCHS Mode: Enables the CCHS convert.
- SPC-2 Mode: Enables the SPC-2 Mode.

10. Click **OK**.

11. A confirmation message displays. Click **OK**.

The modified host group options display.

7.2 Setting Mapping Guard

Mapping guard is a function to protect mapping setting against erroneous operation. Users cannot perform the mapping operation on the Storage Navigator to the Logical Unit on which the mapping guard is set to effective.

To enable or disable Mapping Guard:

1. Click the **Logical Status** tab on the Array Unit screen.
2. On the **Tools** menu, select **Mapping Guard**.

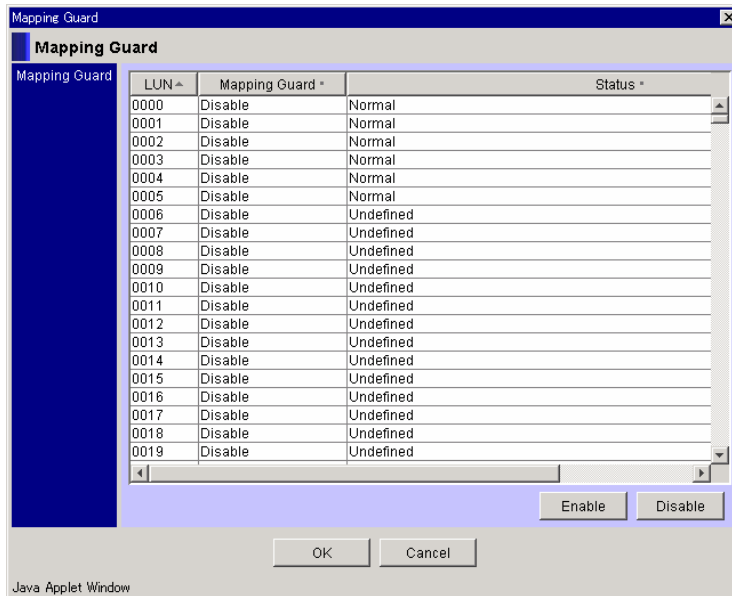


Figure 7.5 Mapping Guard Dialog Box

3. In the Mapping Guard window. See Figure 7.5.
 - a) Select a LUN.
 - b) Click **Enable** or **Disable**.
 - c) Click **OK**.
4. A confirmation message displays. Click **OK**.

7.3 Specifying Mapping Mode

To enable or disable Mapping Mode:

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the **Access Mode** plus sign next to the **Mapping Mode**. See Figure 7.6.

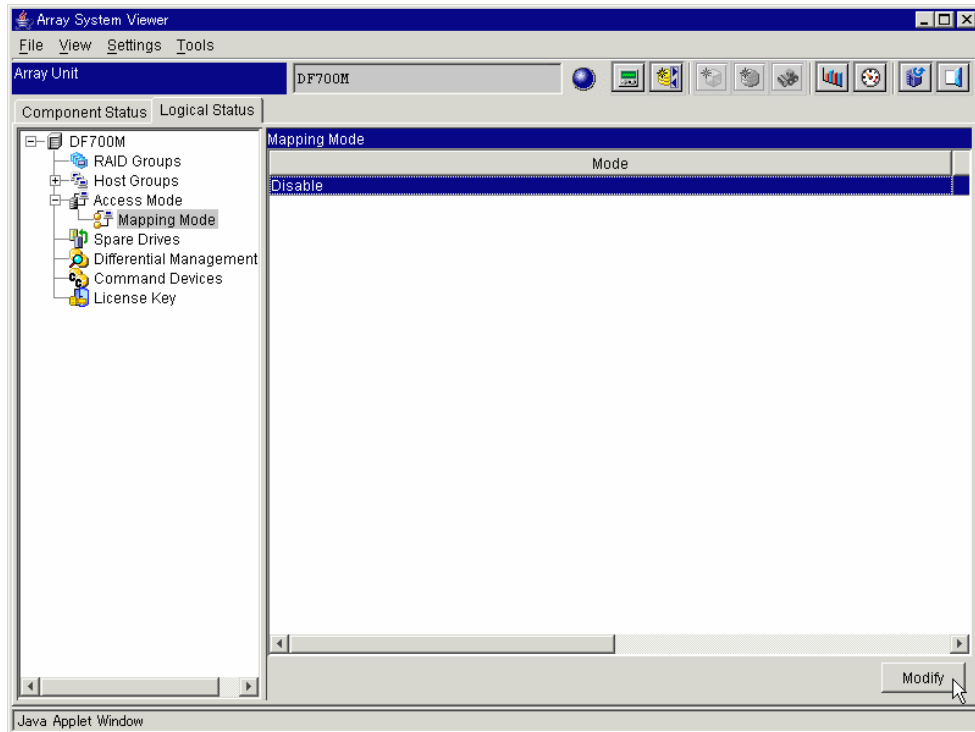


Figure 7.6 Array System Viewer - Mapping Mode

3. On the **Mapping Mode** list, select **Enable** or **Disable** and click **Modify**.
This operation can also be done from the context menu of the list view.
The **Mapping Mode** dialog box displays. See Figure 7.7.

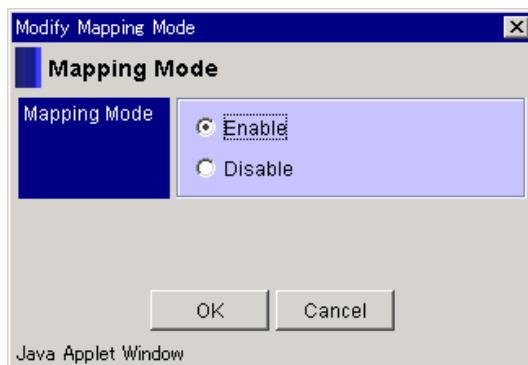


Figure 7.7 Modify Mapping Mode Dialog Box

4. Select **Enable** or **Disable** and click **OK**.
5. A confirmation message displays. Click **OK**.
The setting information displays.

7.3.1 Setting Mapping Information

To set mapping information:

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the **Port 0A** plus sign and select **000:G000**.
3. Select the **Logical Unit** icon. See Figure 7.8.

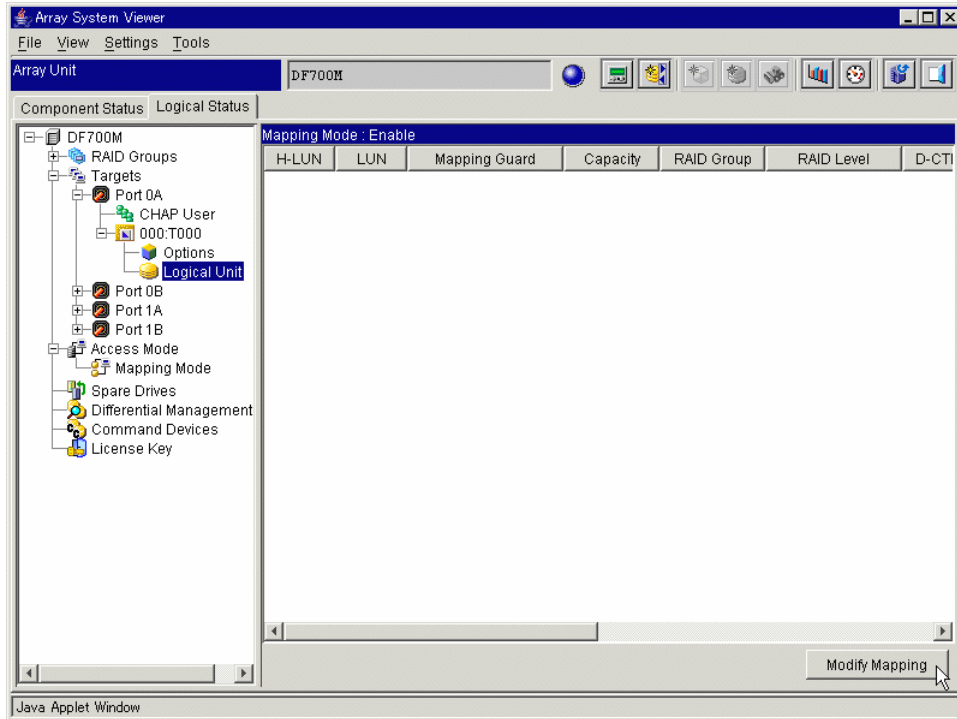


Figure 7.8 Array System Viewer - Logical Unit

4. Select **Modify Mapping**.
The **Mapping Property** dialog box displays. See Figure 7.9.

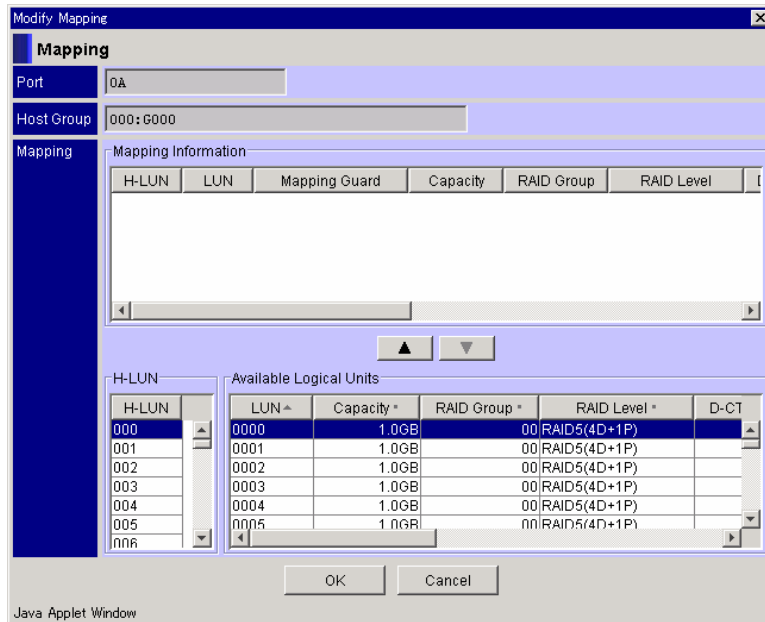


Figure 7.9 Modify Mapping Dialog Box

5. Select one H-LUN to be added. Select LUN, and click . The added contents display in the Mapping Information list. See Figure 7.10.

To delete, click the line to be deleted in Mapping Information list and click . The deleted contents disappear.

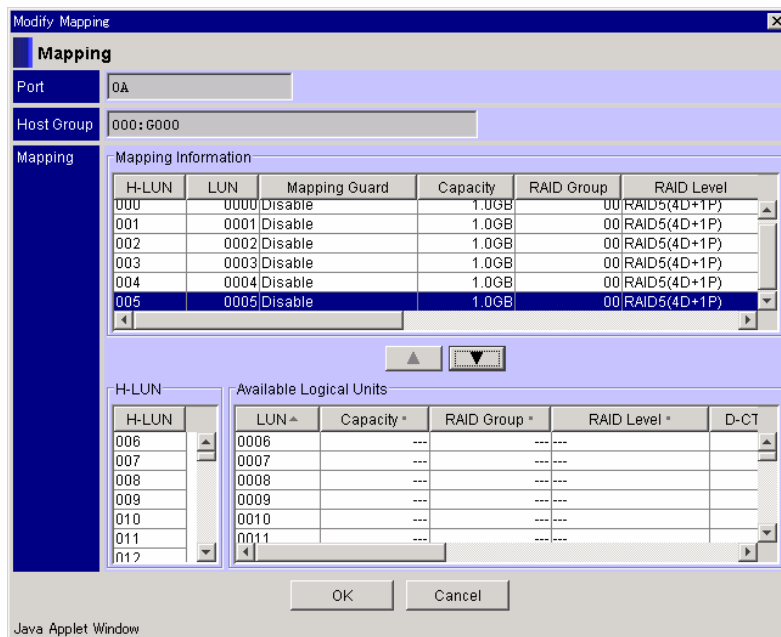


Figure 7.10 Modify Mapping Window

6. Click OK.
7. A confirmation message displays. Click OK.

The set mapping information is updated and the following window displays. See Figure 7.11.

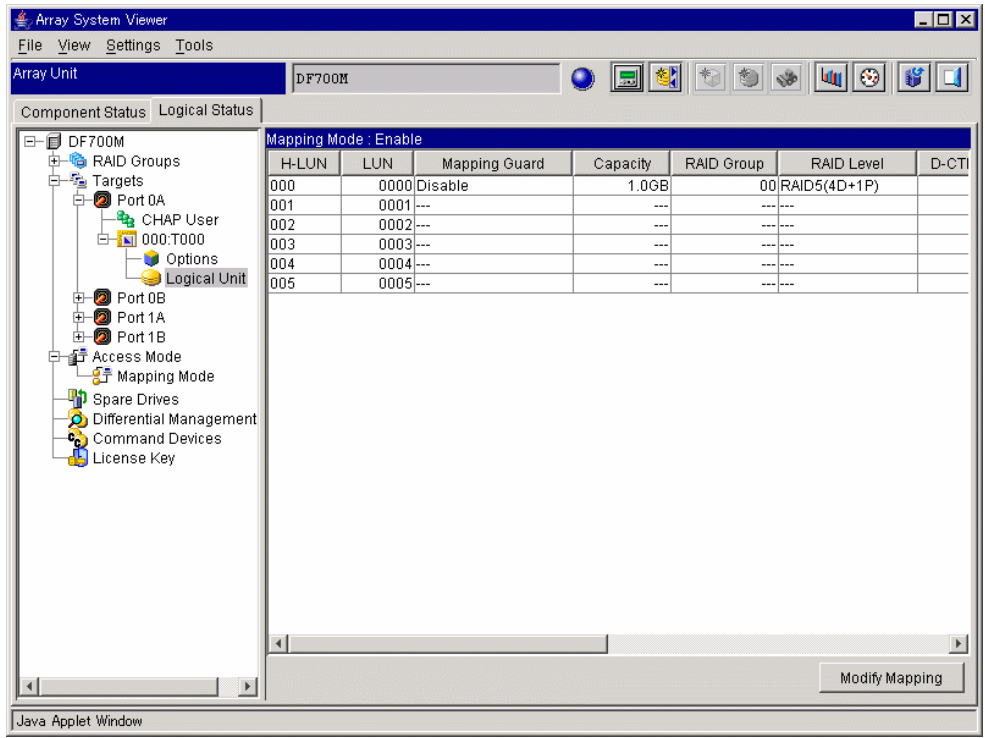


Figure 7.11 Array System Viewer - Set Mapping Information

Chapter 8 Setting Target Information

This chapter contains information about setting Target 0 (000:T000) information, such as a target options and mapping information. For information on creating a target, refer to the LUN Manager User's Guide.

This chapter includes the following sections:

- 8.1 Setting Target Options
- 8.2 Setting Mapping Guard
- 8.3 Specifying Mapping Mode
- 8.4 CHAP User
- 8.5 Setting a Target Information

8.1 Setting Target Options

To set the target options:

1. Click the **Logical Status** tab. See Figure 8.1.
2. Click the **Port 0A** plus sign.
3. Click the **000:T000** plus sign and select **Options**.
4. Click **Simple Settings**.

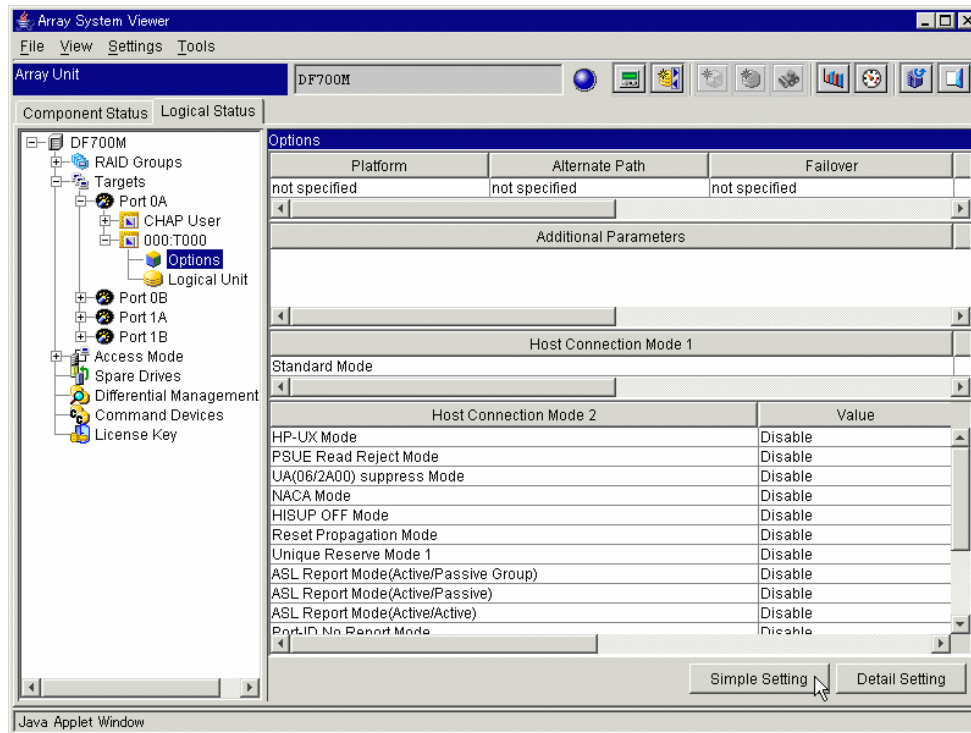


Figure 8.1 Array System Viewer - Simple Settings

5. As necessary, select **Platform**, **Alternate Path**, and **Failover**. The combination, which can be chosen for every platform, is limited. See Figure 8.2.

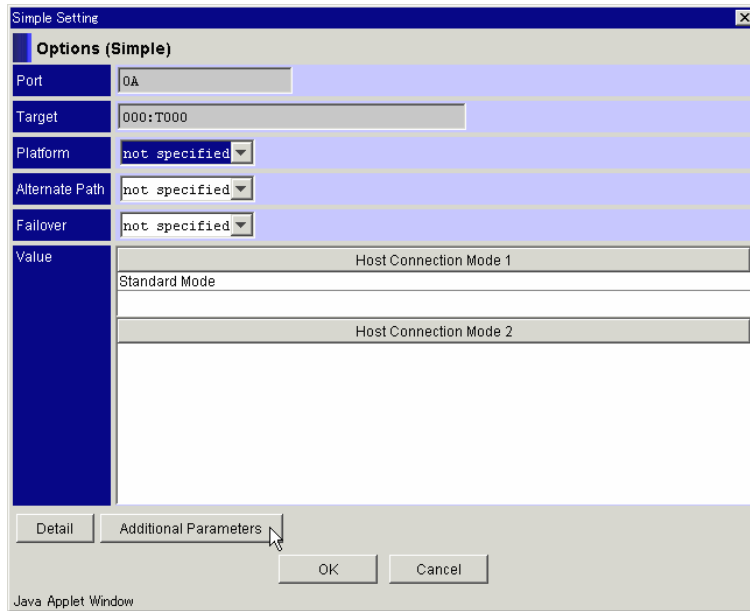


Figure 8.2 Simple Settings Dialog Box

Platform:

- HP-UX
- Solaris
- AIX
- Windows 2000
- Windows 2003
- Linux
- Tru64
- Not specified

Alternate path:

- Not specified
- PV Link: Can be used by HP-UX.
- HDLM: Can be used by Solaris, AIX®, and Windows 2000/2003.
- VxVM: Can be used by HP-UX, AIX®, Solaris, Windows 2000/2003, and Linux.
- MPxIO: Can be used by Solaris.

Failover:

- Not specified
- MC/ServiceGuard: Can be used by HP-UX.
- SunCluster: Can be used by Solaris.
- VCS: Can be used by Solaris and Linux.
- HACMP: Can be used by AIX.
- MSCS: Can be used by Windows 2000/2003.

- Tru Cluster: Can be used by Tru64.

6. Click **Additional Parameters**. See Figure 8.3.

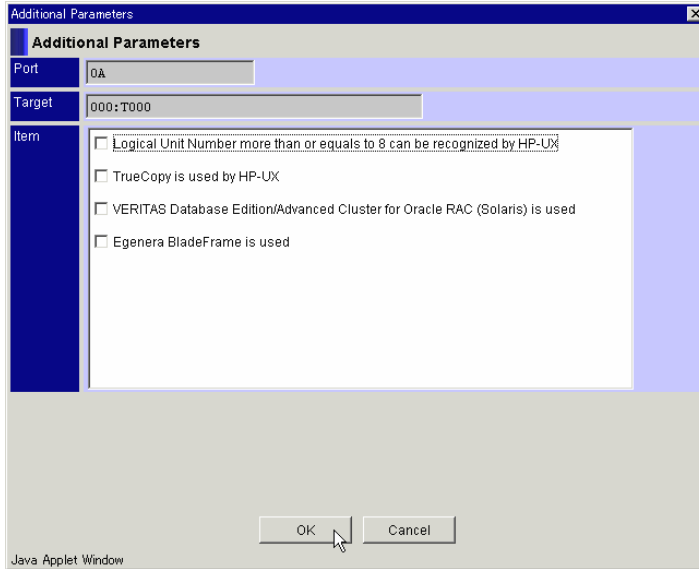


Figure 8.3 Additional Parameters Dialog Box

7. Select the appropriate options in the Item group and click **OK**.

8. Click **Options (Detail)**. See Figure 8.4.

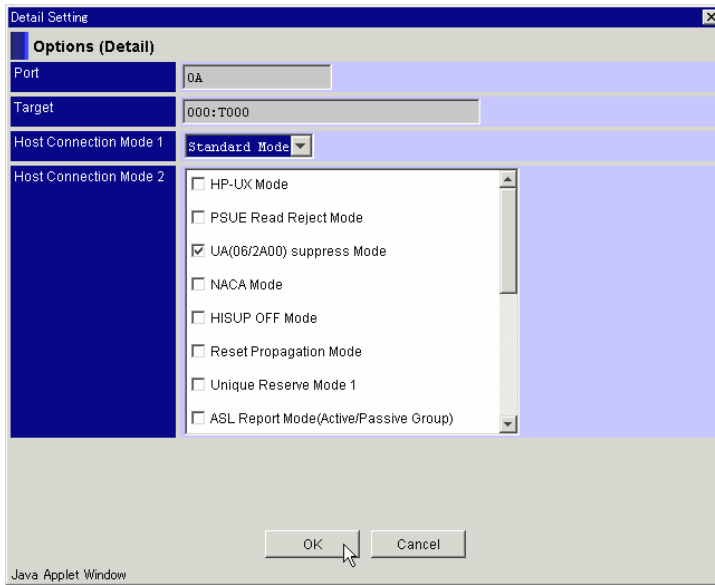


Figure 8.4 Detail Setting Dialog Box

9. Select **Host Connection Mode 1**, **Host Connection Mode 2** and click **OK**.

Host Connection Mode 1:

- Standard Mode: Open system emulation mode
- Open VMS Mode: Open VMS mode
- TRESPASS Mode: TRESPASS mode

- Wolfpack Mode: Wolfpack mode

Host Connection Mode 2:

- HP-UX Mode: Enables the HP-UX Mode.
- PSUE Read Reject Mode: Enables the PSUE Reject Mode.
- UA (60/2A00) Suppress Mode: Suppresses the unit attention (06/2A00).
- NACA Mode: Enables the NACA Mode.
- HISUP OFF Mode: Enables the HISUP OFF Mode.
- Reset Propagation Mode: The mode to propagate reset to other ports.
- Unique Reserve Mode 1: Enables the Unique Reserve Mode 1.
- ASL Report Mode (Active/Passive Group): Enables the ASL Report Mode (Active/Passive Group).
- ASL Report Mode (Active/Passive): Enables the ASL Report Mode (Active/Passive).
- ASL Report Mode (Active/Active): Enables the ASL Report Mode (Active/Active).
- Port ID No Report Mode: Enables the Port ID No Report Mode.
- Port ID Conversion Mode: Enables the Port ID Conversion Mode.
- Tru Cluster Mode: Enables the Tru Cluster Mode.
- Product Serial Response Mode: Enables the Product Serial Response Mode.
- Same Node Name Mode: Enables the Same Node Name Mode.
- CCHS Mode: Enables the CCHS convert.
- SPC-2 Mode: Enables the SPC-2 Mode.

10. Click **OK**.

11. A confirmation message displays. Click **OK**.

The modified target options display.

8.2 Setting Mapping Guard

To enable or disable Mapping Guard:

1. Click the **Logical Status** tab on the Array Unit screen.
2. On the **Tools** menu, select **Mapping Guard**.

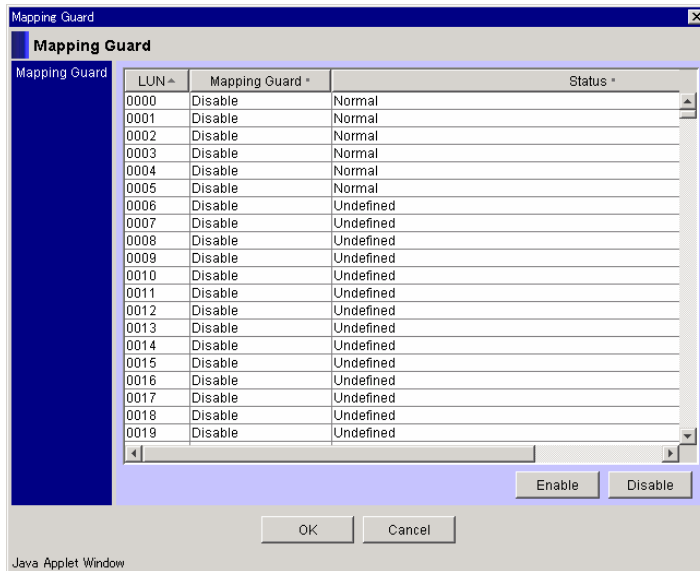


Figure 8.5 Mapping Guard window

3. In the **Mapping Guard** window: See Figure 8.5.
 - a. Select a **LUN**.
 - b. Click **Enable** or **Disable**.
 - c. Click **OK**.
4. A confirmation message displays. Click **OK**.

8.3 Specifying Mapping Mode

To enable or disable **Mapping Mode**:

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the **Access Mode** plus sign. Select **Mapping Mode**. See Figure 8.6.

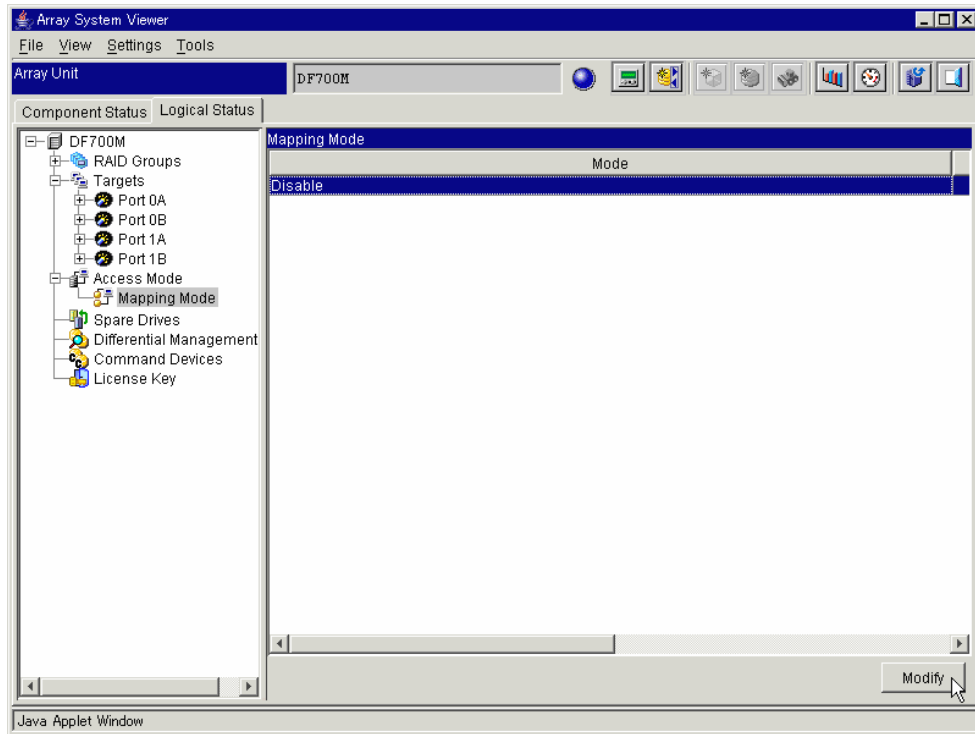


Figure 8.6 Array System Viewer - Mapping Mode

3. On the **Mapping Mode** list, select **Enable** or **Disable**, and click **Modify**.
This operation can also be done from the context menu of the list view.
The **Mapping Mode** dialog box displays. See Figure 8.7.

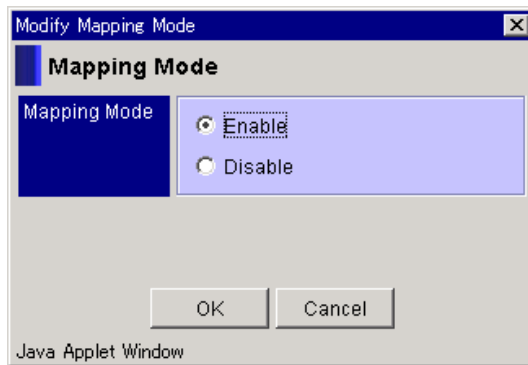


Figure 8.7 Modify Mapping Mode Dialog Box

4. Select **Enable** or **Disable** and click **OK**.
5. A confirmation message displays. Click **OK**.
The setting information displays.

8.3.1 Setting Mapping Information

To set mapping information:

1. Click the **Logical Status** tab on the Array Unit screen. See Figure 8.8.
2. Click the **Port 0A** plus and select **000:T000**.
3. Select the **Logical Unit** icon.

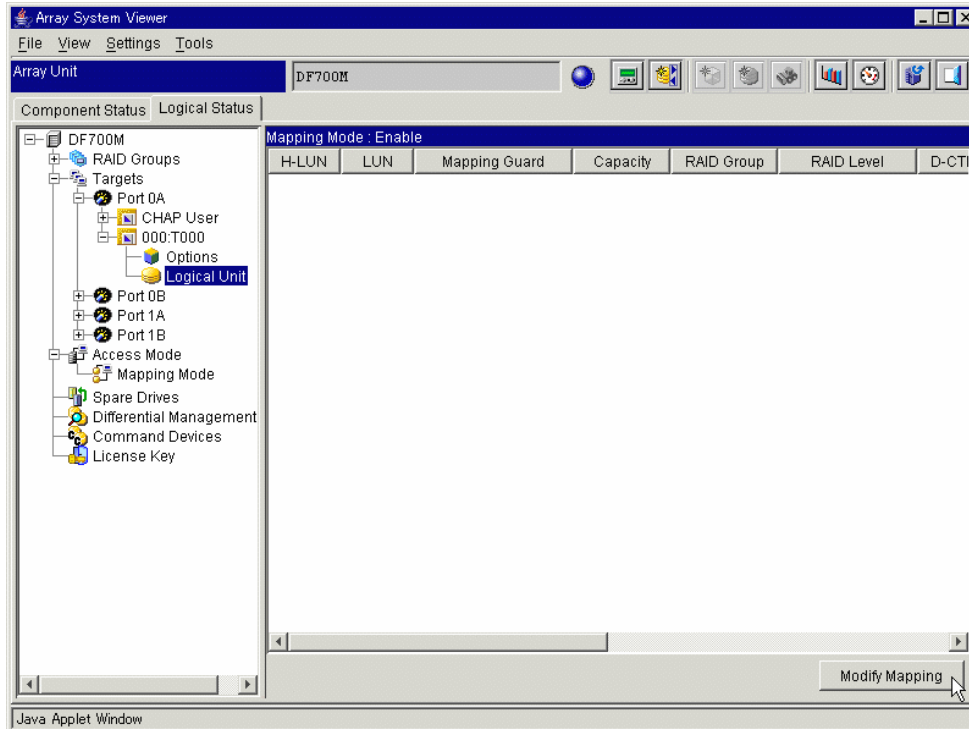


Figure 8.8 Array System Viewer - Logical Unit

4. Select **Modify Mapping**.

The **Mapping Property** dialog box displays. See Figure 8.9.

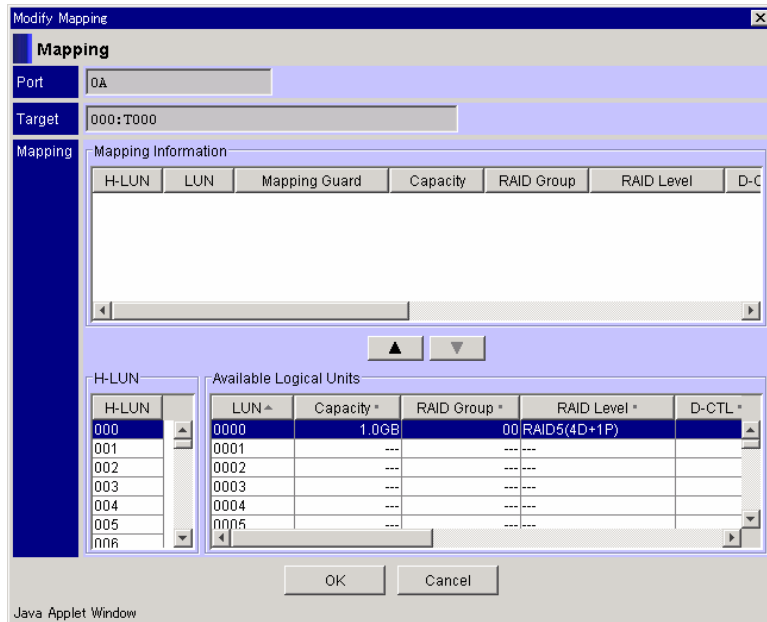


Figure 8.9 Modify Mapping Dialog Box

5. Select one H-LUN to be added. Select LUN, and click . The added contents display in the **Mapping Information** list. See Figure 8.10.

To delete, click the line to be deleted in the **Mapping Information** list and click . The deleted contents disappear.

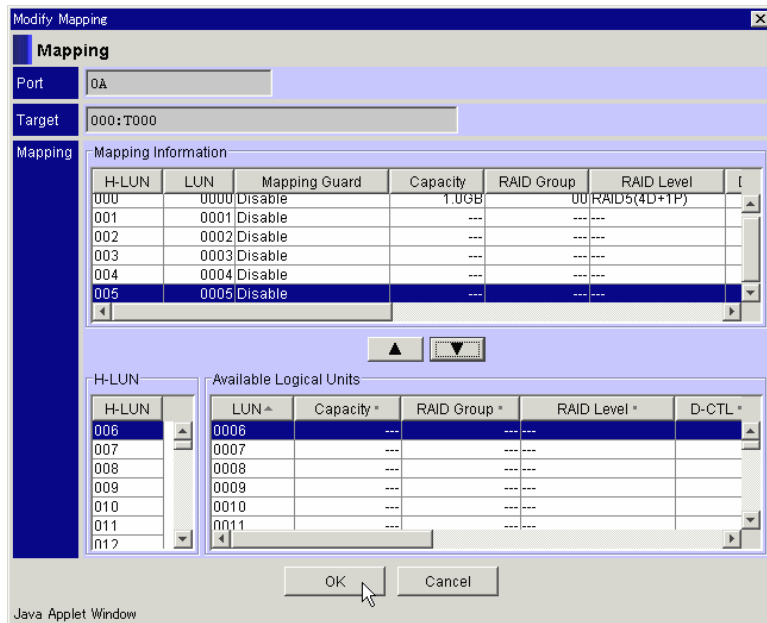


Figure 8.10 Modify Mapping - Mapping Information

6. Click **OK**.
7. A confirmation message displays. Click **OK**.

The set mapping information is updated and the following window displays. See Figure 8.11.

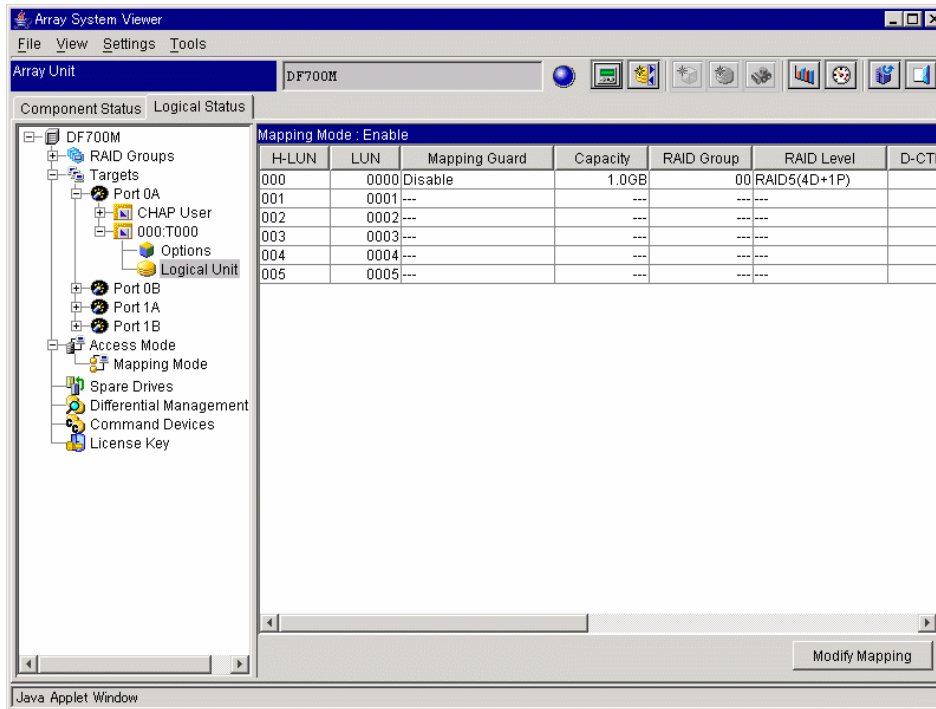


Figure 8.11 Array System Viewer - Set Mapping Information

8.4 CHAP User

This section contains information about adding, changing, and deleting a CHAP user.

8.4.1 Adding a CHAP User

To add a CHAP User:

1. Click the **Logical Status** tab. See Figure 8.12.
2. Click the **Port 0A** plus sign and select **CHAP User**.
3. Click **Add**.

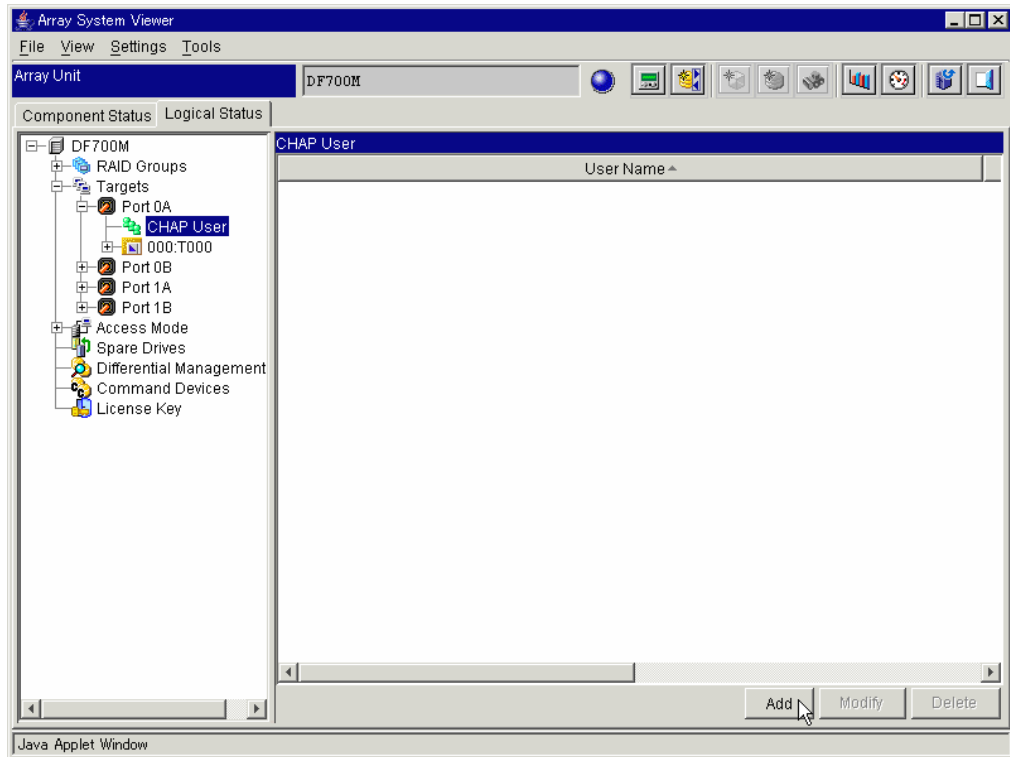


Figure 8.12 Array System Viewer - CHAP User

The CHAP User dialog box displays. See Figure 8.13.

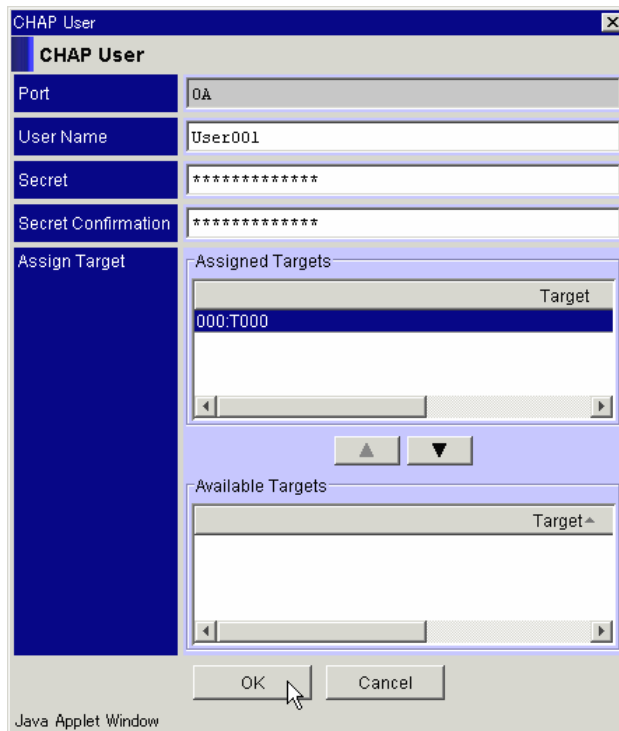



Figure 8.13 CHAP User Dialog Box

4. In the CHAP User dialog box, enter the User Name, Secret, and Secret Confirmation.

5. From the **Available Targets** list, select the target to be assigned, and click .
 - **User Name:** Enter the name of the User with 256 or less alphanumeric character. The following symbols can be used:
(. - + @ _ = : / [] ~ (space))
 - **Secret:** Enter the Secret from 12 through 32 alphanumeric characters. The following symbols can be used:
(. - + @ _ = : / [] ~ (space))
6. Click **OK**.
7. A confirmation message displays. Click **OK**.

8.4.2 Changing the CHAP User

To change the CHAP user:

1. Click the **Logical Status** tab. See Figure 8.14.
2. Click the **Port0A** plus sign and select **CHAP User**.
3. Select the **CHAP User** to be changed from the **CHAP User** list.
4. Click **Modify**.

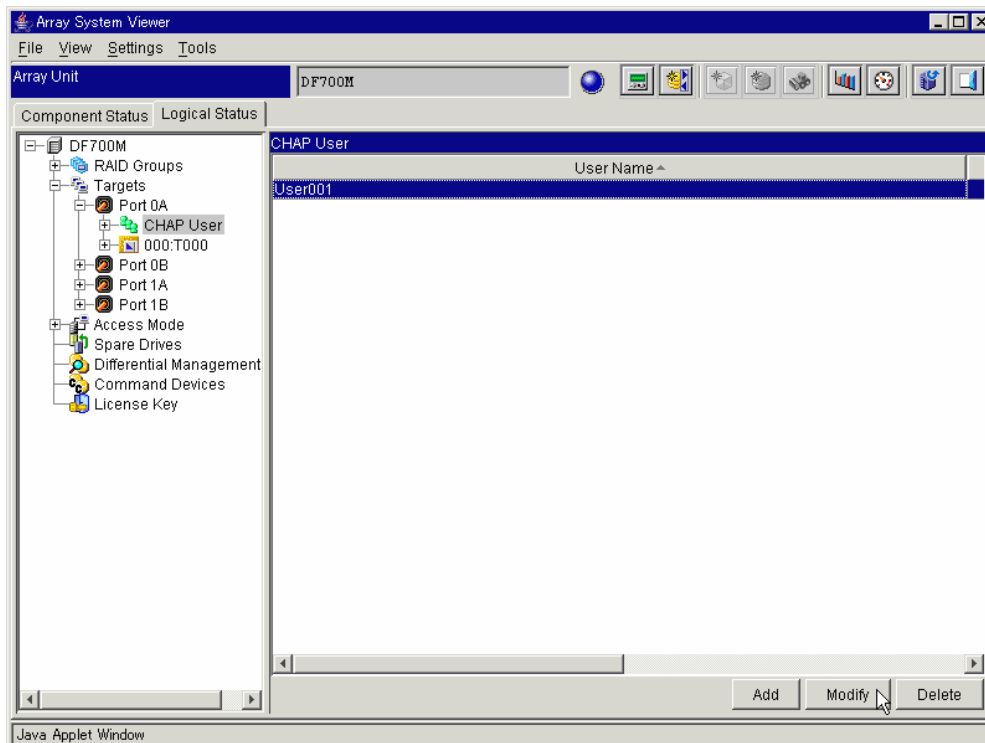


Figure 8.14 Array System Viewer - CHAP User List

The CHAP User dialog box displays. See Figure 8.15.

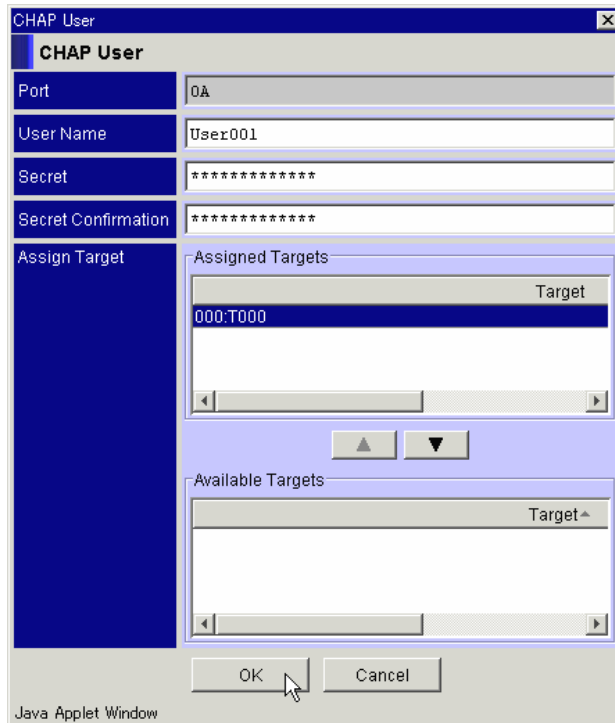


Figure 8.15 CHAP User dialog box

5. As necessary, enter the **User Name**, **Secret**, and **Secret Confirmation**.
6. As necessary, change the assigned Target, and click **OK**.
7. A confirmation message displays. Click **OK**.

8.4.3 Deleting the CHAP User

To delete the CHAP user:

1. Click the **Logical Status** tab. See Figure 8.16.
2. Click the **Port0A** plus sign and select **CHAP User**.
3. Select the **CHAP User** to be deleted from the **CHAP User** list.
4. Click **Delete**.

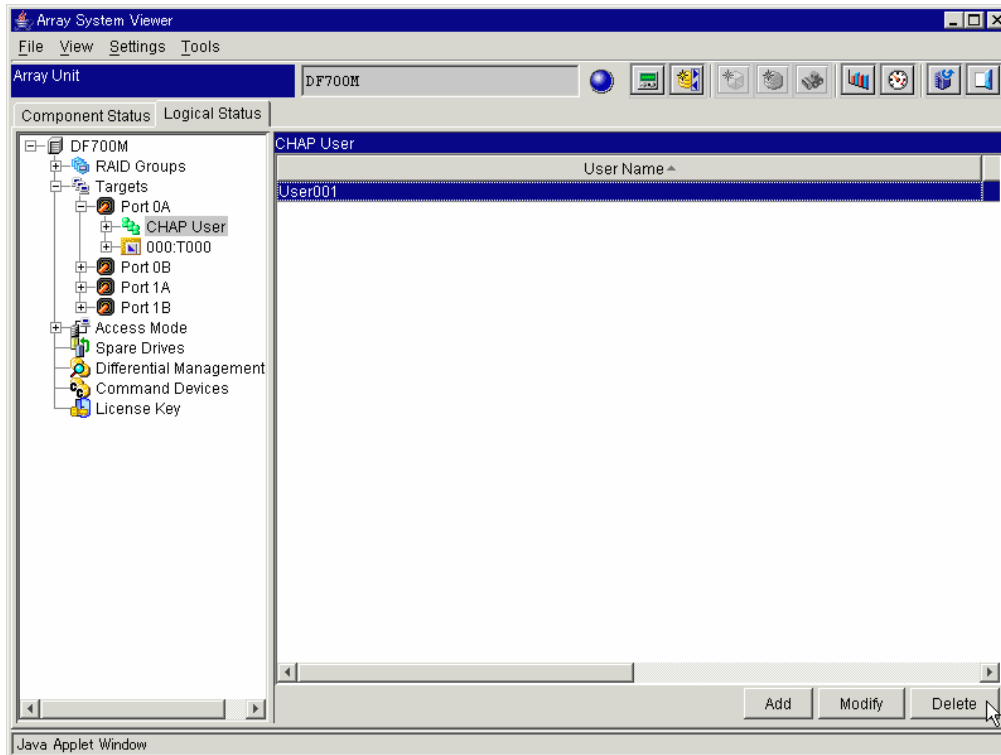


Figure 8.16 Array System Viewer - CHAP User Delete

5. A confirmation message displays. Click OK.

8.5 Setting a Target Information

This section includes changing target information and initializing the target.

8.5.1 Changing Target Information

1. Click the **Logical Status** tab. See Figure 8.17.
2. Click **Port0A**.
3. Select the **Target** to be changed from the **Target** list.
4. Click **Modify**.

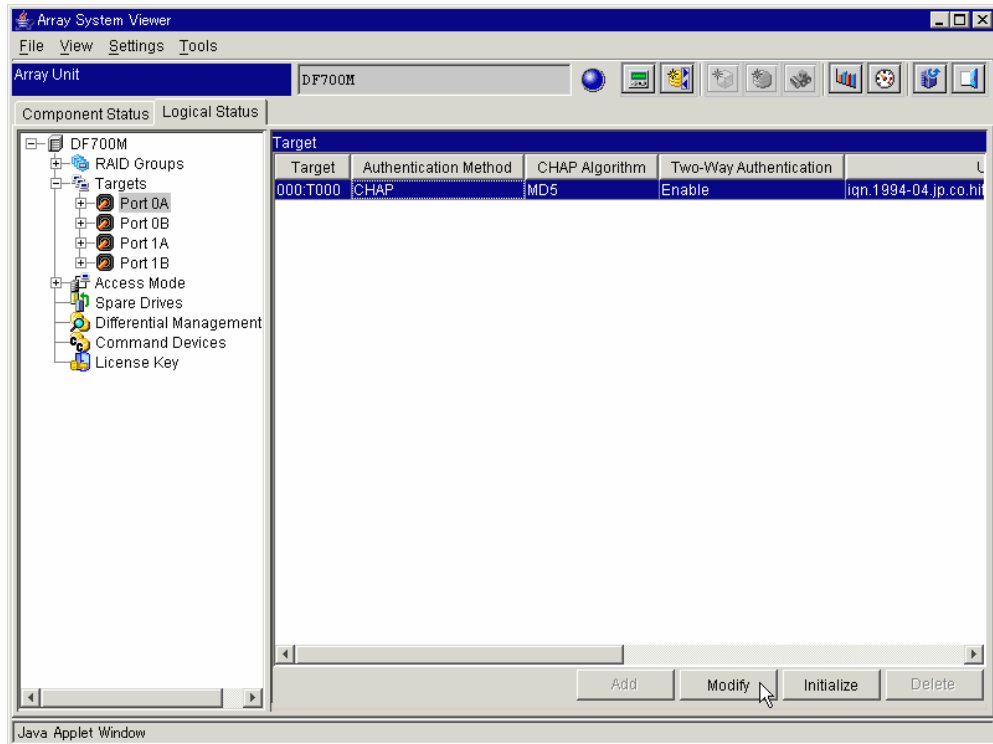


Figure 8.17 Array System Viewer - Target

The Target dialog box displays. See Figure 8.18.

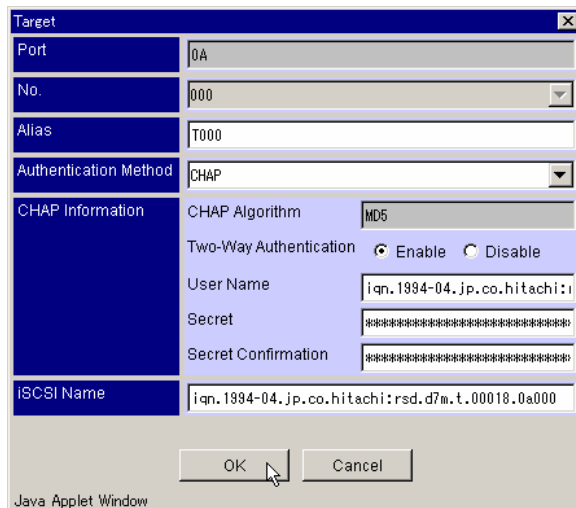


Figure 8.18 Target Dialog Box

5. In the **Target** dialog box, enter or select the **Alias**, the **Authentication Method**, the **CHAP Information**, the **iSCSI Name**.
 - **Alias:** Enter the name of the Target with 32 or less alphanumeric character. (Excluding \, /, : , , ; , * , ? , “ , < , > , | and ‘)
Spaces at the top or end are ignored. An identical name cannot be used in an identical Port.
 - **Authentication Method:** Select the **CHAP**, **None**, or **CHAP, None**.

- **CHAP Information:**
CHAP Algorithm: Displayed MD5 always.
Two-Way Authentication: Select the **Enable** or **Disable** radio button.
When the **Enable** radio button is selected, specify following items.
User Name: Enter the name of the User with 256 or less alphanumeric character.
The following symbols can be used:
(. - + @ _ = : / [] ~ (space))
Secret: Enter the Secret from 12 through 32 alphanumeric characters. The following symbols can be used:
(. - + @ _ = : / [] ~ (space))
Secret Confirmation: Enter the characters that enter into the **Secret**.
 - **iSCSI Name:** Enter the name of the iSCSI Name with 223 or less alphanumeric character. A period (.), hyphen (-), and colon (:) can be used.
6. Select the **Authentication Method** from the drop-down list.
 - **Name:** Enter the name of the Target with 16 or less alphanumeric character.
(Excluding \, /, : , , ; , * , ? , “ , < , > , | and ‘)
Spaces at the top or end are ignored. An identical name cannot be used in an identical Port.
 - **Authentication Method:** Select the **CHAP**, **None**, or **CHAP, None**.
 - **iSCSI Name:** Enter the name of the iSCSI Name with 233 or less alphanumeric character. A period (.), hyphen (-), and colon (:) can be used.
 7. Click **OK**.
 8. A confirmation message displays. Click **OK**.

8.5.2 Initializing the Target

1. Click the **Logical Status** tab. See Figure 8.19.
2. Click the **Port**.
3. Select the **Target** to be initialized from the **Target** list.
4. Click **Initialize**.

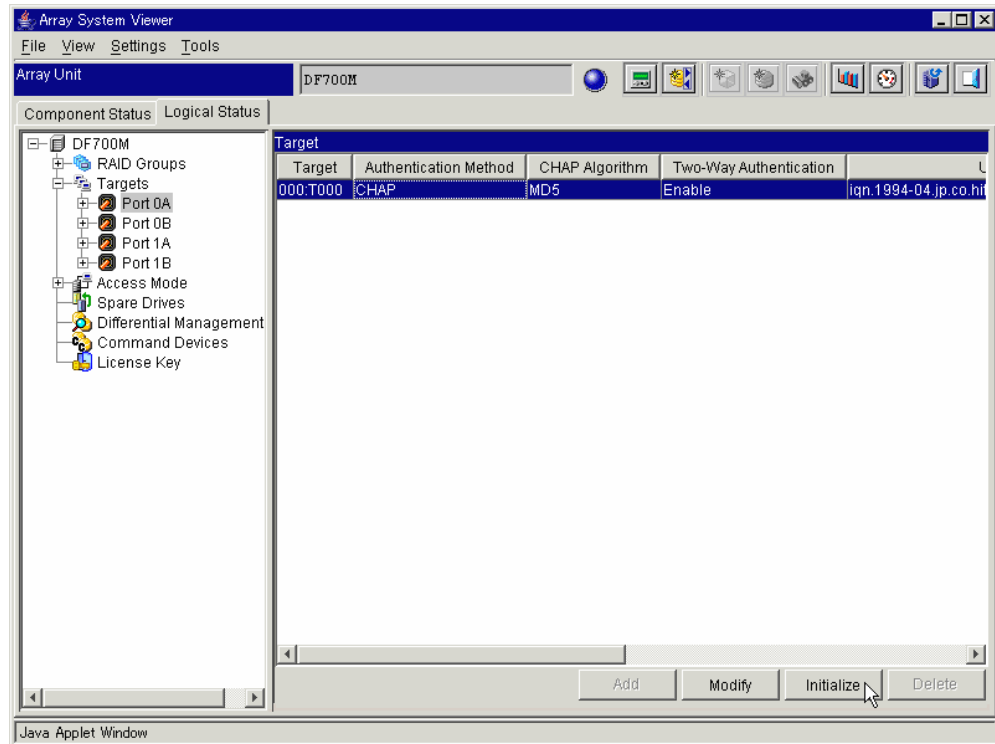


Figure 8.19 Array System Viewer - Initialize

5. A confirmation message d. displays. Click **OK**.

Chapter 9 Setting System Parameters

This chapter contains information about setting a system configuration, such as Fibre information, for an array unit. Individual items to be set are selected by switching the tab screen. Tab screens might not display, depending on the connected array unit and other variables.

This chapter includes the following sections:

- 9.1 Setting Boot Options
- 9.2 Setting Fibre Channel Information
- 9.3 Setting iSCSI Port Information
- 9.4 Setting iSNS Server Information
- 9.5 Sending Ping
- 9.6 Setting System Parameters
- 9.7 Setting Port Options
- 9.8 Setting Drive Restoration Options
- 9.9 Online Verify Mode
- 9.10 Setting Format Priority Mode
- 9.11 Setting LAN Configuration
- 9.12 Setting the LAN Port Number
- 9.13 Setting the IP Address of the Maintenance Port
- 9.14 Setting RTC
- 9.15 Setting Time Zone and NTP Server
- 9.16 Outputting Configuration Information to a File
- 9.17 Replacing a Microprogram
- 9.18 Setting the Backend Diagnosis Information

9.1 Setting Boot Options


When the boot option is set, the subsystem requires a restart after setting changes.

WARNING: Rebooting requires stopping I/O from the host.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

To set the boot option:

1. On the Tools menu, select **Configuration Settings** or click . Click the **Boot Option** tab and set the options. See Figure 9.1.

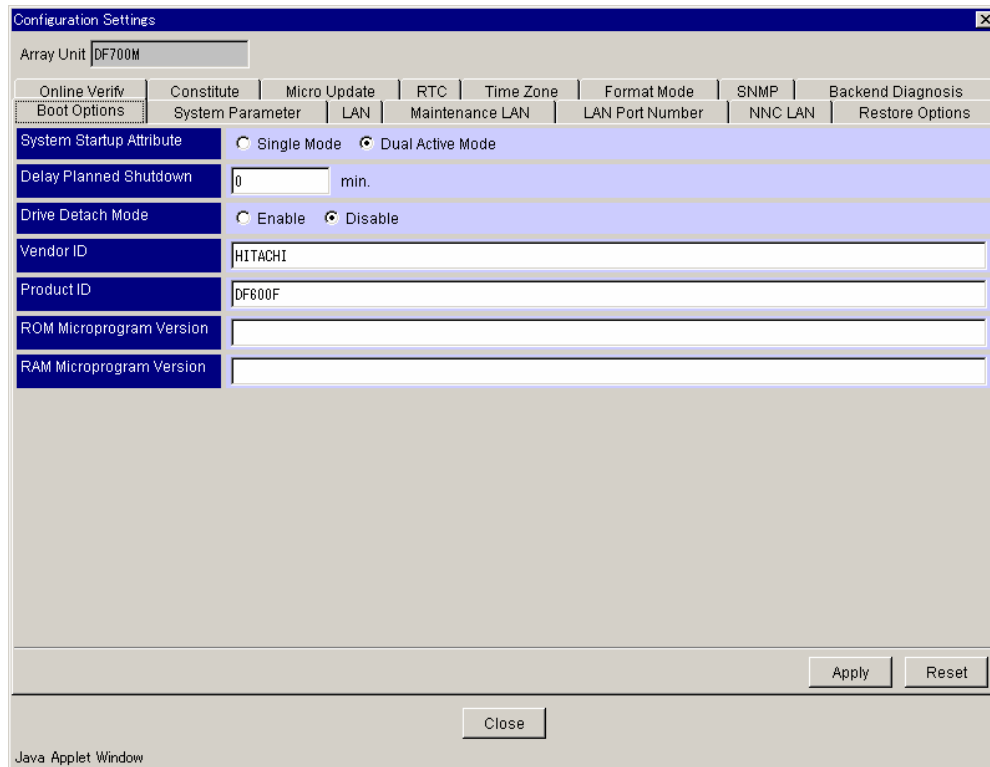


Figure 9.1 Configuration Settings - Boot Option

- **System Startup Attribute:** Select the subsystem configuration.
 - **Single Mode:** Single configuration
 - **Dual Active Mode:** Dual active configuration
- **Delay Planned Shutdown:** Specify the time in minutes to delay the execution of the planned shutdown when the main switch has turned off. The applicable range is from 0 to 60 minutes.
- **Drive Detach Mode:** Validates the drive blockade mode.


- **Vendor ID:** Enter an eight-character vendor name. When the name consists of less than eight characters, make an eight-character entry by filling the rest with space(s). The default value set in HITACHI△. (△ Denotes a space.)
 - **Product ID:** Enter a 16-character model name. When the name consists of less than 16 characters, make a 16-character entry by filling the rest with space(s). The default value set in DF600F△△△△△△△△△△. (△ Denotes a space.)
 - **ROM Microprogram Version:** Specifies a microprogram version of a ROM reported by inquiry command.
 - **RAM Microprogram Version:** Specifies a microprogram version of a RAM reported by inquiry command.
2. Click **Apply**.
 3. Follow the information in messages that appear. Click **OK** to continue or **Cancel**.
 4. The subsystem restarts in about 4 to 15 minutes.

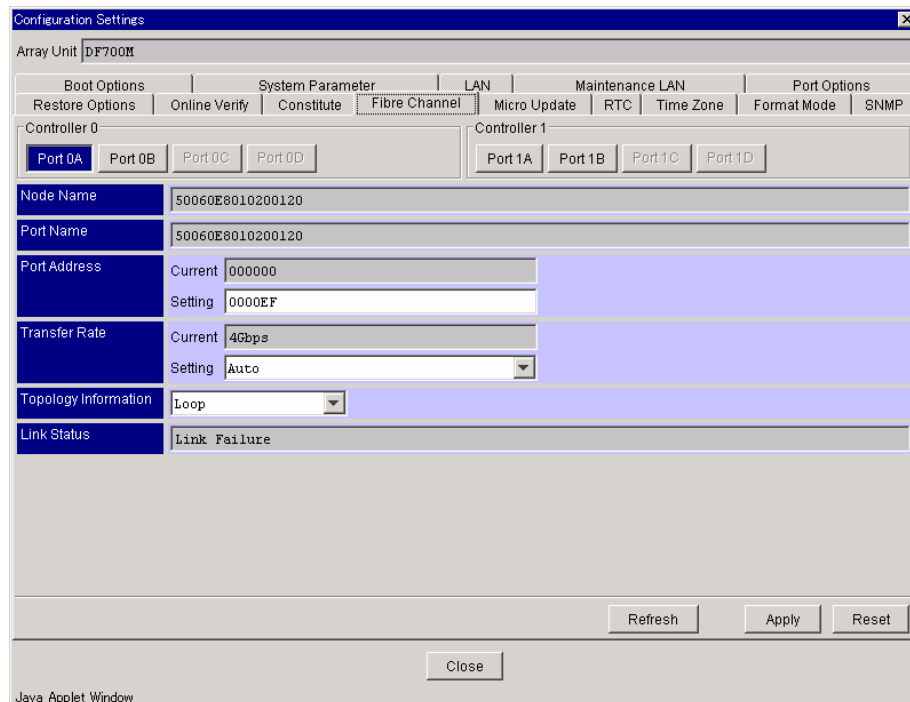
9.2 Setting Fibre Channel Information

Fibre channel settings include **Port Address**, **Transfer Rate**, and **Topology Information**.

9.2.1 Displaying Fibre Channel Information

To display fibre channel information:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Fibre Channel** tab. See Figure 9.2.



Configuration Settings	
Array Unit DF700M	
Boot Options System Parameter LAN Maintenance LAN Port Options Restore Options Online Verify Constitute Fibre Channel Micro Update RTC Time Zone Format Mode SNMP	
Controller 0	
<input type="button" value="Port 0A"/> <input type="button" value="Port 0B"/> <input type="button" value="Port 0C"/> <input type="button" value="Port 0D"/>	
Controller 1	
<input type="button" value="Port 1A"/> <input type="button" value="Port 1B"/> <input type="button" value="Port 1C"/> <input type="button" value="Port 1D"/>	
Node Name	50060E8010200120
Port Name	50060E8010200120
Port Address	Current: 000000 Setting: 0000EF
Transfer Rate	Current: 4Gbps Setting: Auto
Topology Information	Loop
Link Status	Link Failure
<input type="button" value="Refresh"/> <input type="button" value="Apply"/> <input type="button" value="Reset"/>	
<input type="button" value="Close"/>	

Java Applet Window

Figure 9.2 Configuration Settings - Fibre Channel


- **Node Name:** Describes 8 bytes of data hexadecimal (with 16 characters).
- **Port Name:** Describes 8 bytes of data hexadecimal (with 16 characters).
- **Port Address:** Port address displays as a hexadecimal number.
- **Transfer Rate:** Indicates fibre transfer rate.
- **Topology Information:** Indicates topology status.
- **Link Status:** Indicates link status.
 - **LinkUp (Private Loop):** Arbitrated Loop that is not connected with the Fibre Channel switch.
 - **LinkUp (Public Loop):** Arbitrated Loop that is connected with Fibre Channel switch.
 - **LinkUp (N_Port connection):** Connect Point to Point with host.
 - **LinkUp (F_Port connection):** Connect Point to Point with Fibre Channel switch.
 - **Loop Port Bypass:** Bypassed from the loop.
 - **Standby:** Standby state.
 - **LinkDown:** Link is down.
 - **LinkFailure:** Link initialization condition.

9.2.2 Setting Fibre Channel Settings

Fibre channel information is set up on a port basis.

Note: This procedure causes the subsystem to cease host access. Before setting, stop access to the port from the host.


To set the fibre channel settings:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Fibre Channel** tab.
3. Set the **Port Address**, **Transfer Rate**, and **Topology Information** making them conform to an environment that matches a host.
 - **Port Address:** Enter 8 bytes of data hexadecimal (with 16 characters).
 - **Transfer Rate:** Select the value from the drop-down menu.
 - **Topology Information:** Select the value from the drop-down menu.
4. Click **Apply**.
5. Click **OK** to continue.

Note: It may take time to complete the setting. Click **Refresh** to verify that the correct settings have been made.

9.3 Setting iSCSI Port Information

To set the iSCSI port information:

1. On the **Tools** menu, select **Configuration Settings** or click . Click the **Boot Option** tab and set options.
2. Click the **iSCSI** tab. See Figure 9.3.

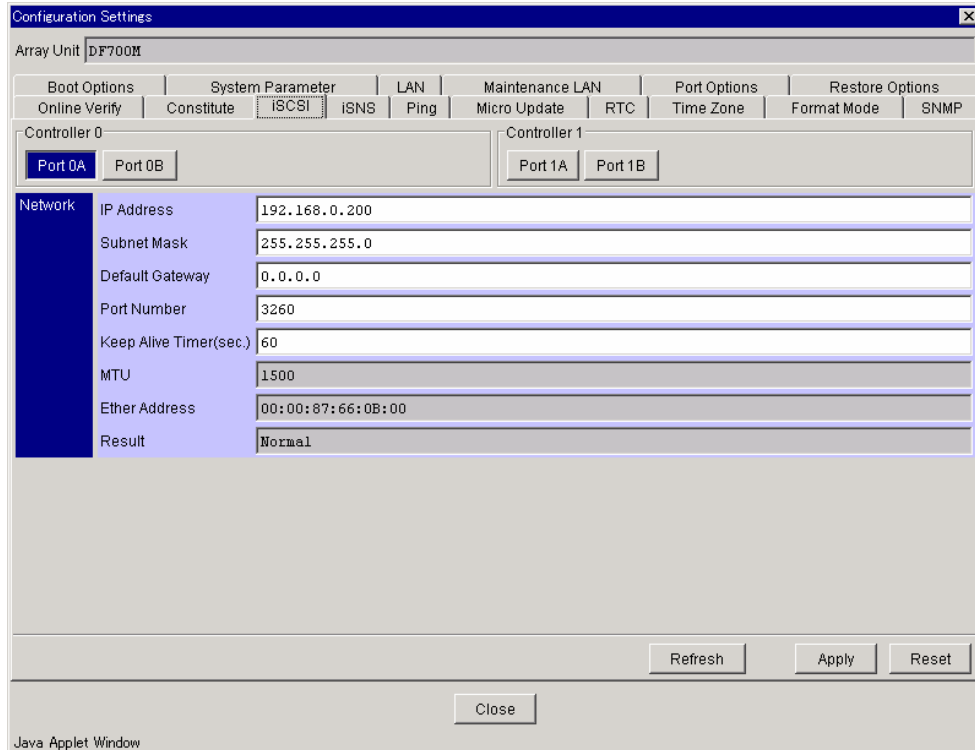



Figure 9.3 Configuration Settings - iSCSI

3. Set the iSCSI port parameters:
 - **Network:** Set the **IP Address**, **Subnet Mask**, **Default Gateway**, **Port Number**, and **Keep Alive Timer(sec.)** making them conform to an environment.
4. Click **Apply**.
5. Click **OK** to continue.

9.4 Setting iSNS Server Information

To set the iSNS server information:

1. On the **Tools** menu, select **Configuration Settings** or click . Click the **Boot Option** tab and set options.
2. Click the **iSNS** tab. See Figure 9.4.

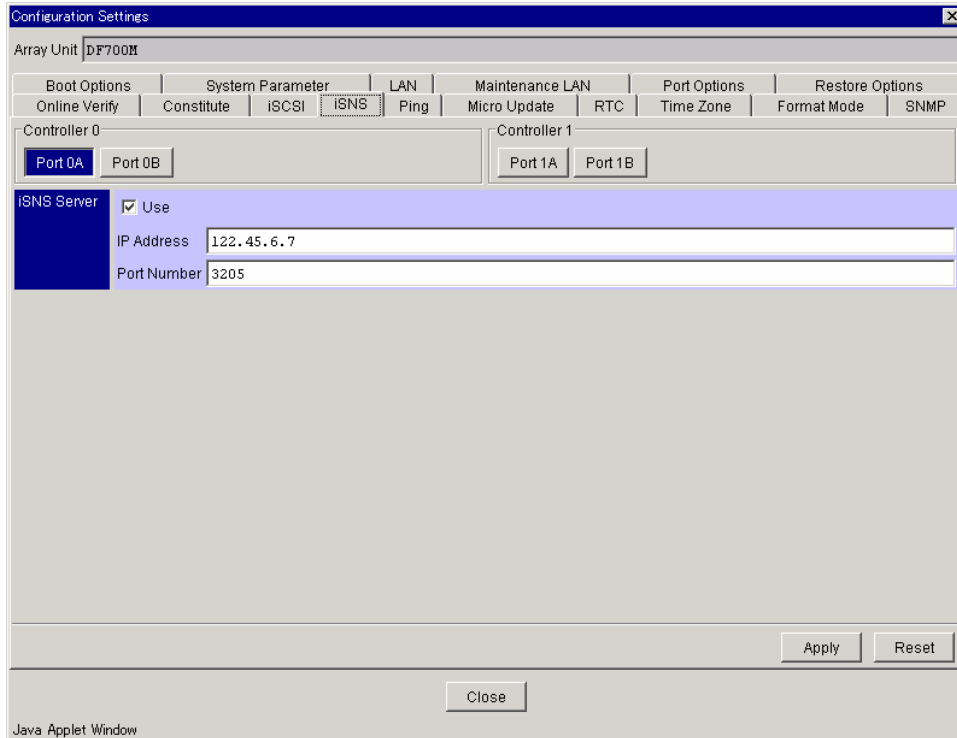



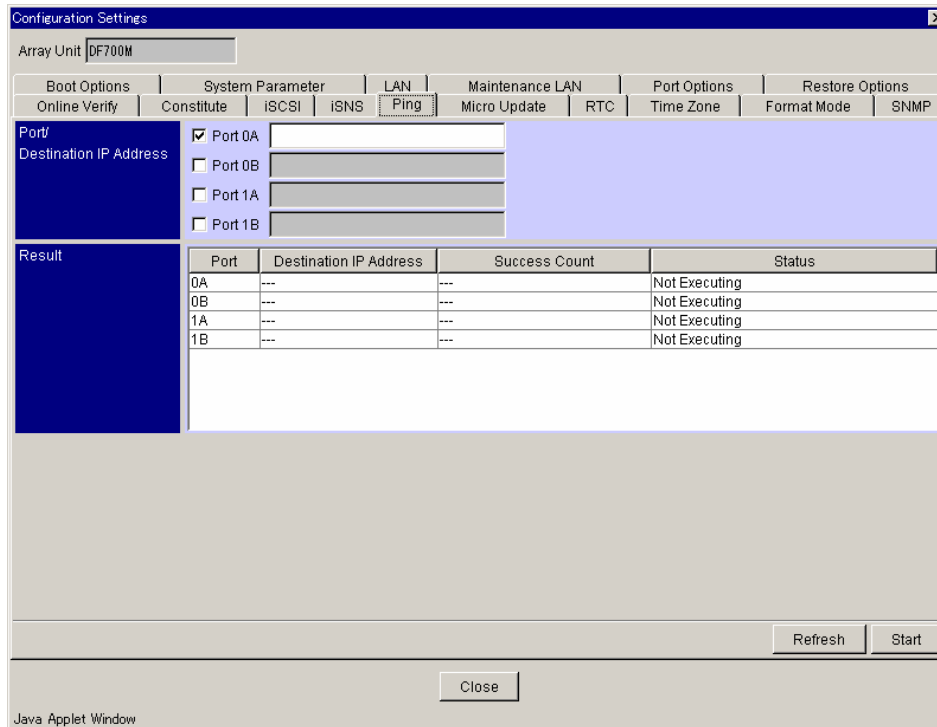
Figure 9.4 Configuration Settings - iSNS

3. Set the iSNS server parameters:
 - Select **iSNS Server**
 - Click **Use**: Specify whether to use the iSNS server or not. When use the iSNS server, specify the **IP Address** and **Port Number** of the iSNS server.
4. Click **Apply**.
5. Click **OK** to continue.

9.5 Sending Ping

Sends the ping to the initiator (host) and displays the result of the sending.

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Boot Option** tab and set options.
3. Click the **Ping** tab. See Figure 9.5.




Port	Destination IP Address	Success Count	Status
0A	---	---	Not Executing
0B	---	---	Not Executing
1A	---	---	Not Executing
1B	---	---	Not Executing

Figure 9.5 Configuration Settings - Ping

4. Set the ping parameters:
 - **Port:** Select the port that sends the ping.
 - **Destination IP Address:** Specify the IP address of the initiator.
5. Click **Start**.
6. Click **OK** to continue.
The result displays.
7. Select **Refresh** as necessary to display the latest information.

9.6 Setting System Parameters

This setting information becomes valid without restarting the subsystem.

1. On the **Tools** menu, click the **Configuration Settings** or click .
2. Click the **System Parameter** tab .See Figure 9.6.

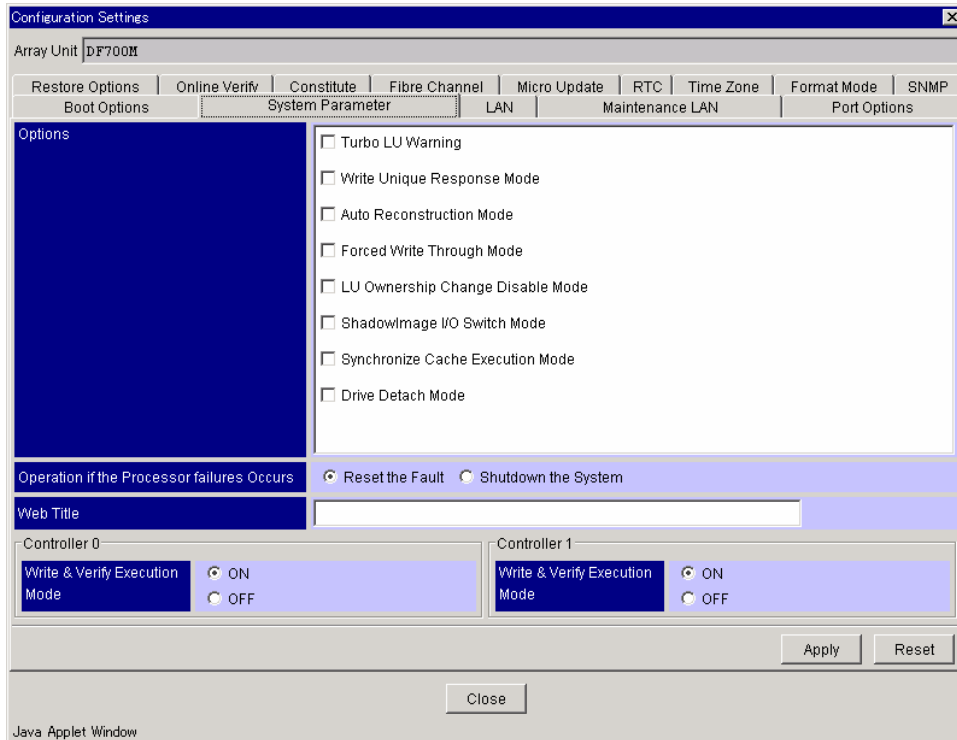


Figure 9.6 Configuration Settings - System Parameter

3. Set the system parameters. See Table 9-1 for a description of these parameters.
4. Click **Apply**.
5. Click **OK**.


Table 9-1 Setting System Parameters

Parameter	Description	Operation
Turbo LU Warning	This parameter is to be specified when the Turbo LU setting function is used. Default = Disable	Disable: When the Turbo LU can no longer be maintained due to a failure, the parameter allows host access to be issued. Enable: When the Turbo LU can no longer be maintained due to a failure and the performance is lowered, the parameter suppresses host access and issues a warning.
Write Unique Response Mode	This parameter is to be specified when a host of the NX series is connected. Default = Disable	Disable: Cache memory is used for write commands. Enable: Write commands are executed unconditionally in write-through mode (write data directly to disk without using cache).
Auto Reconstruction Mode	This parameter specifies operations to be performed when a disk drive is removed. Default = Disable	Disable: When a disk drive is removed, correction copy to a spare disk drive is not performed. Enable: When a disk drive is removed, correction copy to a spare disk drive is performed. Caution: This mode is for test purposes and should only be used by authorized service personnel.
Forced Write Through Mode	This parameter specifies the method for executing write commands after a CTL detachment or power failure. Default = Disable	Disable: If a CTL detachment or power failure has occurred, cache memory is used for write commands. Enable: If a CTL detachment or power failure has occurred, write commands are executed in write-through mode (write data directly to disk without using cache).
LU Ownership Change Disable Mode	This parameter specifies an operation to re-assign an LU to a non-owner controller when the controller attempts to access the LU. Default = Disable	Disable: Request internal processing to the Control Unit in charge of the LU. If there is no access for one minute from the Control Unit in charge of the LU, reallocate the Control Unit in charge of the LU. Enable: The access is always made by the Control Unit that controls the LU concerned by request, without re-assigning the LU to a Control Unit that wants to access the LU.
ShadowImage I/O Switch Mode	This parameter specifies an operation of a ShadowImage P-VOL to be performed when a double disk drive failure occurs. Default = Disable	Disable: If a double failure occurs in disk drives of a ShadowImage P-VOL in the PAIR status, the status is changed to PSUE. Enable: If a double failure occurs in disk drives of a ShadowImage P-VOL in the PAIR status, the execution of the host I/O is switched to the S-VOL to continue the execution. Note: For further information, see the ShadowImage User's Guide.
Synchronize Cache Execution Mode	This parameter specifies an operation to be performed when the Synchronize Cache command is received. Default = Disable	Disable: No operation is performed when the Synchronize Cache command is received. Enable: When the Synchronize Cache command is received, all data in the cache memory is written to disk drives. Note: For further information, see the TrueCopy User's Guide.
Drive Detach Mode	Specifies an operation to be performed when a drive failure occurs in the same RAID group. Default = Disable	Disable: When a failure occurs in a disk drive in a state in which another disk drive in the same RAID group has already been detached due to a failure, the parameter does not detach the disk drive that failed secondarily. Enable: When a failure occurs in a disk drive in a state in which another disk drive in the same RAID group has already been detached due to a failure, the parameter detaches the disk drive that failed secondarily and detaches LUs (makes LUs unformatted) in the RAID group concerned.

Parameter	Description	Operation
Operation if the Processor Failure Occurs	This parameter specifies the operation to be performed when a processor failure occurs. Default = Reset of occurred	Reset the Fault: The parameter resets the failure and reboots the Control Unit. Shutdown System: The parameter shuts the disk array subsystem down.
Web	When the Web function built in the disk subsystem is displayed with the browser, this parameter specifies characters to be displayed in the browser title bar. Default = Not set	Characters that can be entered (maximum 32) are alphabetic characters, numerals, and characters other than numerals (excluding ', ", and \).
Write & Verify Execution Mode	This parameter specifies the execution mode for write and verify operation. Default = ON	ON: The write and verify operation is performed. OFF: The write and verify operation is not performed.

9.7 Setting Port Options

The **Port Options** tab allows you to set the system parameter port options. The setting information becomes valid without restarting the subsystem.

1. On the **Tools** menu, click the **Configuration Settings** or click .
2. Click the **Port Options** tab. See Figure 9.7.

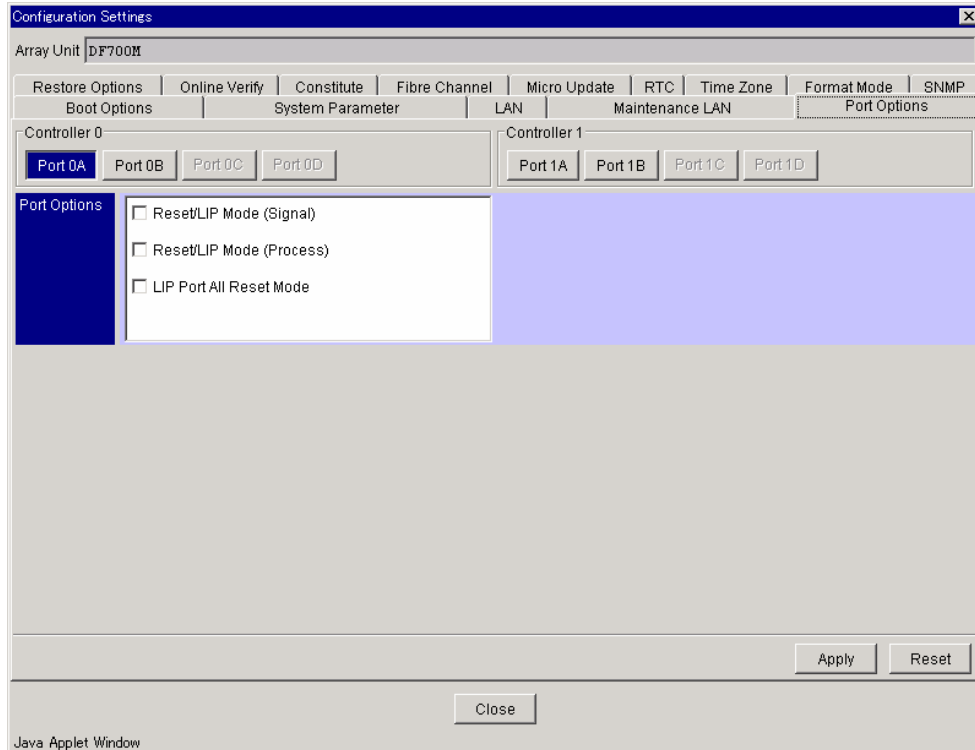


Figure 9.7 Configuration Settings - Port Options


3. Select the desired port, and then select the desired **Port Options**:
 - **Reset/LIP Mode (Signal)**: Set this option to transmit Reset/LIP signals to other ports.
 - **Reset/LIP Mode (Process)**: Set this option to transmit reset processing to other ports. If this option is set, the **Reset/LIP Mode (signal)** is automatically enabled.
 - **LIP Port ALL Reset Mode**: Set this option to execute reset on receiving LIP.

Note: Multiple **Port Options** can be set, but depending on the setting, it may not function properly. If it is to be set, please refer to the appended subsystem manual and set only the applicable parameters.
4. Click **Apply** to apply the selected settings to the subsystem.

9.8 Setting Drive Restoration Options

Do not set drive restoration options while a drive restoration is in progress.

To set drive restoration options:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click **Restore Options** tab. See Figure 9.8.

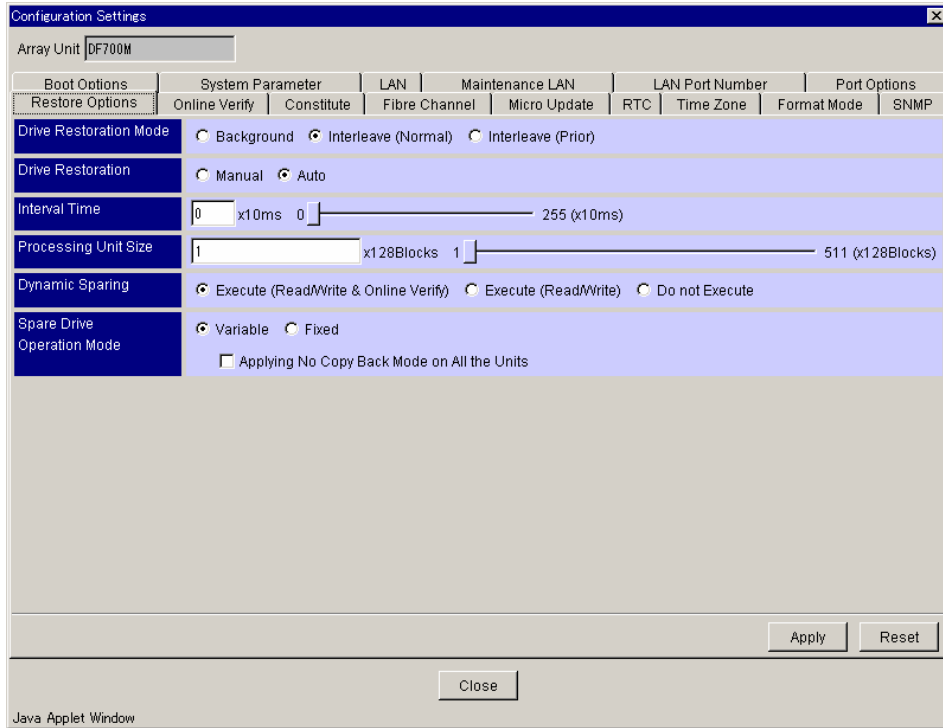


Figure 9.8 Configuration Settings - Restore Options

3. Enter the following settings:

Drive Restoration Mode:

- **Background:** Executes drive restoration while host I/O processing is not executed.
- **Interleave (Normal):** Restores the drive at preset time intervals (specified as “Interval Time”) giving preference to a host command (restores after executing the command).
- **Interleave (Prior):** Restores the drive at preset time intervals (specified as “Interval Time”) taking preference over a host command.

Drive Restoration:

- **Manual:** Starts restoring data and copying by manual operations.
- **Auto:** Automatically starts data and copying restoration.

Interval Time:

The default is 10×10 ms with restoration executed at intervals of 100 ms. To set, specify a multiplication factor from 0 to 255 in a unit of 10 ms.

- **Processing Unit Size:** Specify the size of the data block to be restored. The value of the range of 1 to 511 is specified by a multiple of 128. The minimum value is 128, which restores 65 KB data in a single operation. When Interleave mode is specified, the function restores the data of the processing unit size that is specified, waits for the time interval that is specified, and then starts the next data restoration.

Dynamic Sparing: Specify a mode for data restoration for the spare drive when the error occurrence count controlled by preventive maintenance exceeds the threshold value.

- **Execute (Read/Write & Online Verify):** When the error occurrence count in **Read/Write Error** or **Online Verify Error**, **Threshold Value Over** and **Start of Dynamic Sparing** display on the panel. Data restoration is performed for the spare drive (when the spare drive is not used), and the error disk is blocked.
- **Execute (Read/Write):** When the error occurrence count in **Read/Write Error** exceeds the threshold value, **Threshold Value Over** and **Start of Dynamic Sparing** displays on the panel. Data restoration is performed for the spare disk in the spare drive (when the spare disk is not used), and the error disk is blocked. When the error occurrence count in **Online Verify Error** exceeds the threshold value, **Threshold Value Over** displays on the panel, but **Dynamic Sparing** is not performed.
- **Do not Execute:** When the error occurrence count in **Read/Write Error** or **Online Verify Error** exceeds the threshold value, **Threshold Value Over** displays on the panel, but **Dynamic Sparing** is not performed.


Spare Drive Operation Mode: Specify the spare drive operation mode.

- **Variable:** When a failed drive is replaced, the new drive becomes a spare drive.
- **Applying No Copy Back Mode on All Units:** Specify whether to set the **Applying No Copy Back Mode on All Units** effective or ineffective.
- **Fixed:** Uses only a drive that is designated as a spare (see section 6.2.1).

4. Click **Apply**.
5. A confirmation message displays. Click **OK**.

9.9 Online Verify Mode

To enable Online Verify Test or to skip Online Verify:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Online Verify** tab. See Figure 9.9.

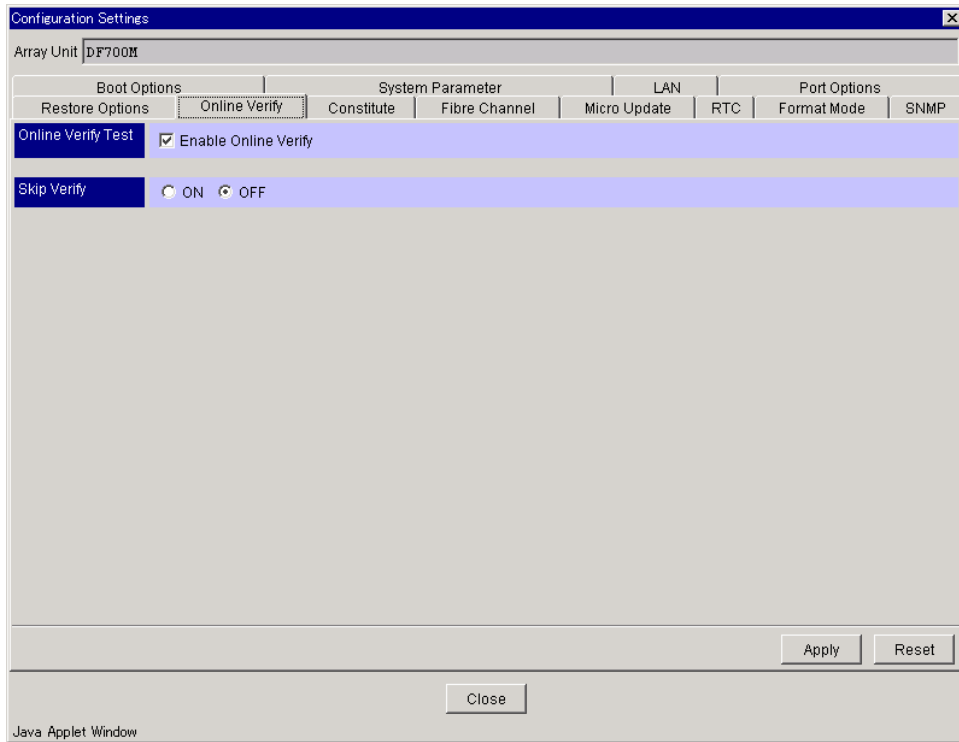



Figure 9.9 Configuration Settings - Online Verify

3. Select the desired options:
 - **Online Verify Test**
 - **Skip Verify:** When a verify command is received from a host, ensure that verification operation is performed.
4. Click **Apply**.
5. A confirmation message displays. Click **OK**.

9.10 Setting Format Priority Mode

Changes to Format Priority Mode apply without restarting the subsystem.

To change the Format Priority Mode:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Format Mode** tab. See Figure 9.10.

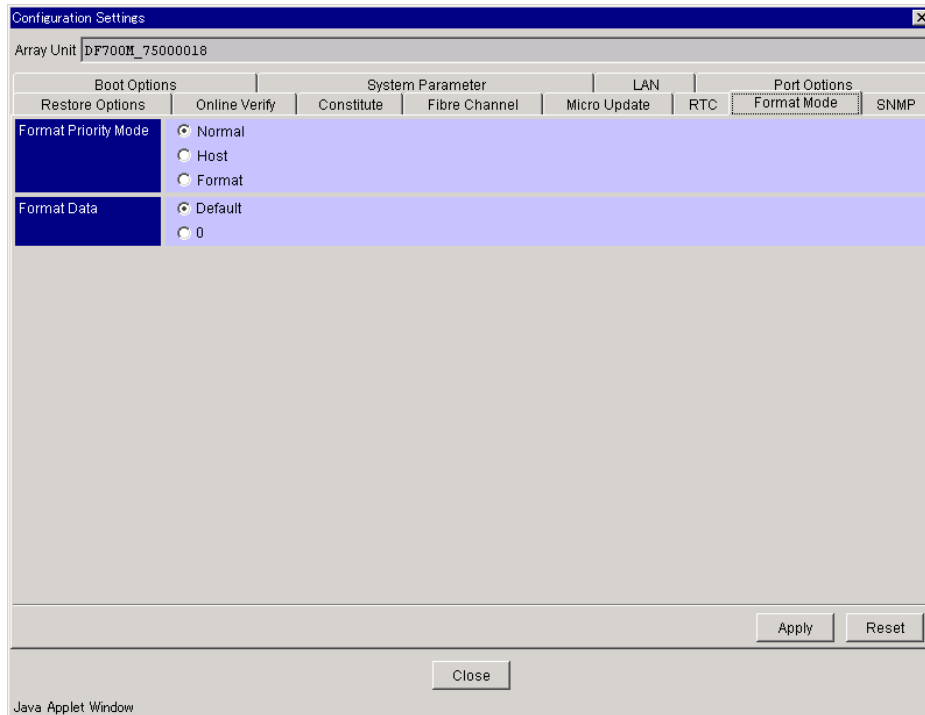


Figure 9.10 Configuration Settings - Format Mode

3. Select the **Format Priority** mode and **Format Data** settings.

Format Priority mode:

- **Normal:** Formats at an idle time when no host I/O is executed.
- **Host:** Host's I/O is executed preferentially.
- **Format:** Subsystem formats are done preferentially.

Format Data: Specify a format data.


4. Click **Apply**.
5. A confirmation message displays. Click **OK**.

9.11 Setting LAN Configuration

9.11.1 Setting LAN Configuration without Rebooting

LAN information cannot be set when it accesses the user port and the maintenance port of the controller to be set with Web, etc. Execute LAN information after stopping access to the controller to be set.

To Set the LAN configuration without rebooting:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **LAN** tab.
3. Select **Set now without reboot**. See Figure 9.11.

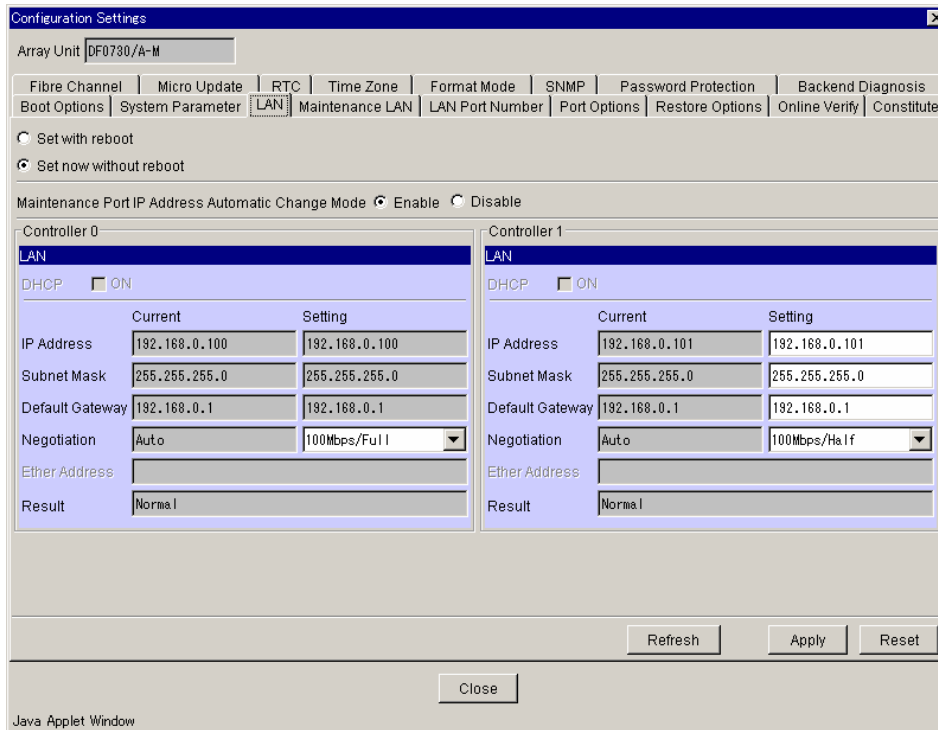


Figure 9.11 Configuration Settings - LAN panel

- **Set with reboot:** Rebooting is necessary.
 - **Set now without reboot:** Rebooting is unnecessary. You cannot select the DHCP mode.
 - **Maintenance Port IP Address Automatic Change Mode:** The IP address of the maintenance port is set automatically in accordance with the IP address that has been set. When the mode is set as **Enable**, the maintenance port cannot be set with the **Maintenance LAN** tab.
 - **LAN:** Specify **IP Address**, **Subnet Mask**, **Default Gateway**, and **Negotiation**, which is part of the LAN information. **Ether Address** is displayed but cannot be changed.
 - The **Setting** value and the **Current** value are displayed as the information that has been set and that is enabled in the subsystem, respectively.
4. Click **Apply**.
 5. A message displays stating that the setting is completed. To continue, click **OK**.
 6. Figure 9.12 displays when the LAN information is set in the case that it accesses the user port and the maintenance port of the controller to be set with Web, etc.

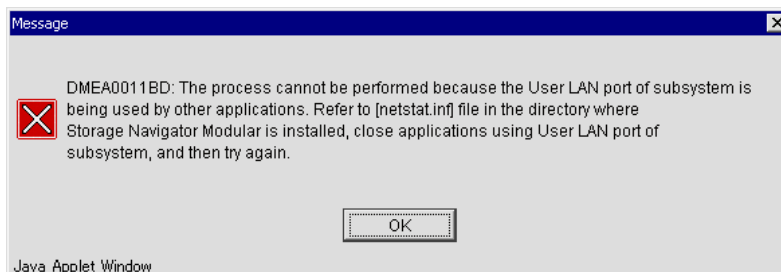
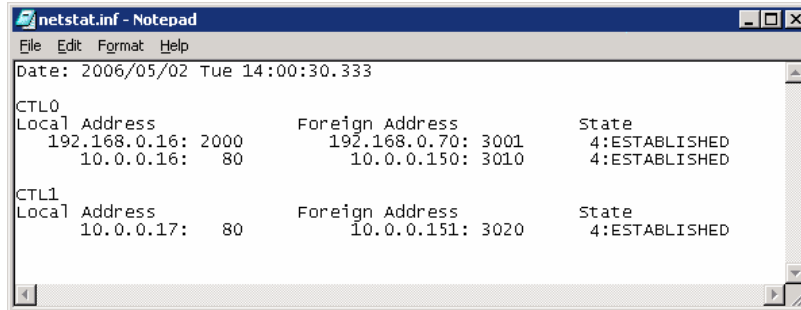


Figure 9.12 LAN Message

The usage condition of the LAN port is output to netstat.inf. See Figure 9.13. In the netstat.inf file, “Local address” means IP address of the controller, “Foreign Address” means IP address of PC connecting with the subsystem, “State” means the status of TCP connection. Regardless of “Status” in the netstat.inf file, stop the all application currently connecting from “Foreign address”, and execute it again.



```
netstat.inf - Notepad
File Edit Format Help
Date: 2006/05/02 Tue 14:00:30.333

CTL0
Local Address          Foreign Address      State
192.168.0.16: 2000    192.168.0.70: 3001    4:ESTABLISHED
10.0.0.16: 80         10.0.0.150: 3010    4:ESTABLISHED

CTL1
Local Address          Foreign Address      State
10.0.0.17: 80         10.0.0.151: 3020    4:ESTABLISHED
```

Figure 9.13 netstat.inf - Notepad

9.11.2 Setting LAN Configuration with Rebooting


This procedure requires restarting the subsystem.

WARNING: Rebooting requires stopping I/O from the host.

WARNING: Setting the LAN configuration is a disruptive procedure for TrueCopy or TrueCopy Extended Distance operations. The subsystem restart required by this procedure disrupts TrueCopy or TrueCopy Extended Distance settings and causes both TrueCopy or TrueCopy Extended Distance paths to fail. You must re-establish TrueCopy or TrueCopy Extended Distance operations after restart.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

To set the subsystem LAN configuration:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **LAN** tab. See Figure 9.14.
3. Select **Set with reboot**.

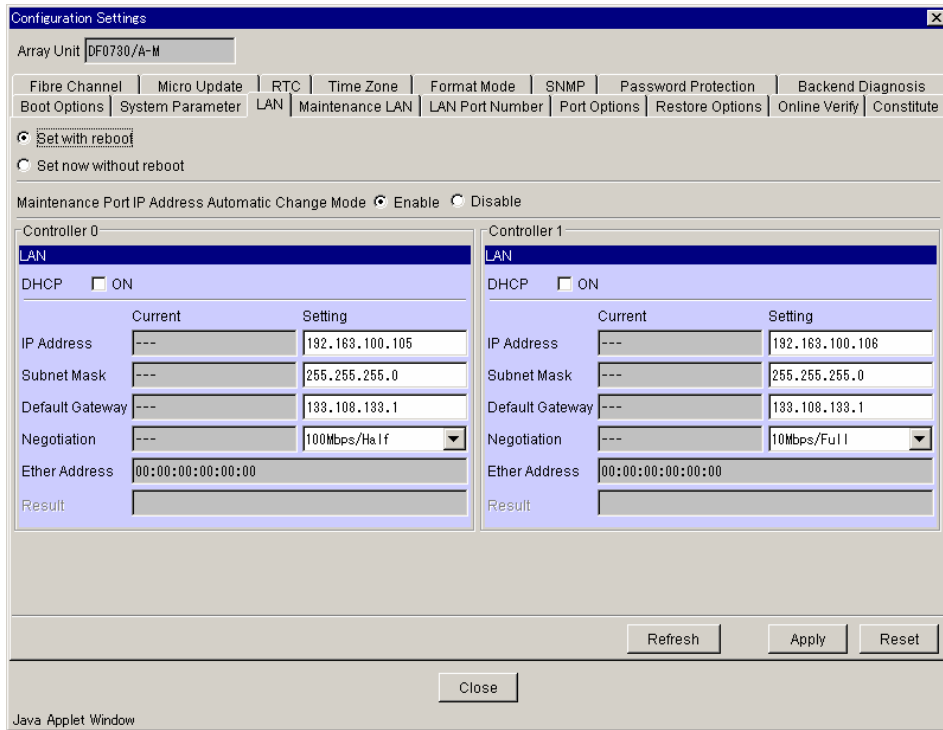


Figure 9.14 Configuration Settings - Set with Reboot Array Unit

- **Maintenance Port IP Address Automatic Change Mode:** The IP address of the maintenance port is set automatically in accordance with the IP address that has been set. When the mode is set as **Enable**, the maintenance port cannot be set with the **Maintenance LAN** tab.
- **DHCP:** Specifies whether the DHCP mode will be valid or invalid.
- **LAN:** Specifies **IP Address**, **Subnet Mask**, **Default Gateway**, or **Negotiation**, which is part of the LAN information. **Ether Address** is displayed but cannot be changed.
- The **Setting** value and the **Current** value are displayed as the information that has been set and that is enabled in the subsystem, respectively.

Note: When **ON** is selected in **DHCP**, **Network** is disabled (gray) and cannot be selected.

4. Click **Apply**.
5. A message indicates that a subsystem restart is needed to apply the settings. Before restarting, be certain that the host is not accessing data on the subsystem. A subsystem restart takes about 4 to 15 minutes.
To continue, click **OK**.
6. A message warns that the subsystem restart can cause disruptions when using TrueCopy or TrueCopy Extended Distance: failure of TrueCopy or TrueCopy Extended Distance paths and changing pairs with PAIR or COPY status to PSUE.
To restart and apply the LAN settings, click **OK**.

Notes:


- To validate the LAN information, restart the array unit. The previous settings stay valid until restarting. The array unit cannot access the host until the reboot is completed and the system restarts. Therefore, ensure that the host has stopped accessing data before beginning the restart process.
- If LAN configuration information is modified, an error message (Interface Error) may display without displaying a restart completion message when restarting is initiated. When an error message displays after the LAN configuration information is modified and a restarting is directed to be done, close the Array Unit screen, make a change in the information that has been registered through the Main screen, and then open the Array Unit screen again.

9.12 Setting the LAN Port Number

The port number can be set when the microprogram version of the AMS500/AMS200/WMS100 array subsystem is 0726/E or later (9500V/9520V array subsystem is x65B/H or later) and the version of Web Navigator is 2.61 or later.

The port number is set for each controller, however, set both controllers without closing the setting window. After setting the both controllers, close the Array Unit screen and edit the services file of the OS that is operating Web Navigator. When the two or more disk array subsystems are registered, set all of them. The setting of the services file is enabled without closing the Main screen.

Set the port number in a range of 1024 to 49151.

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **LAN Port Number** tab. See Figure 9.15.

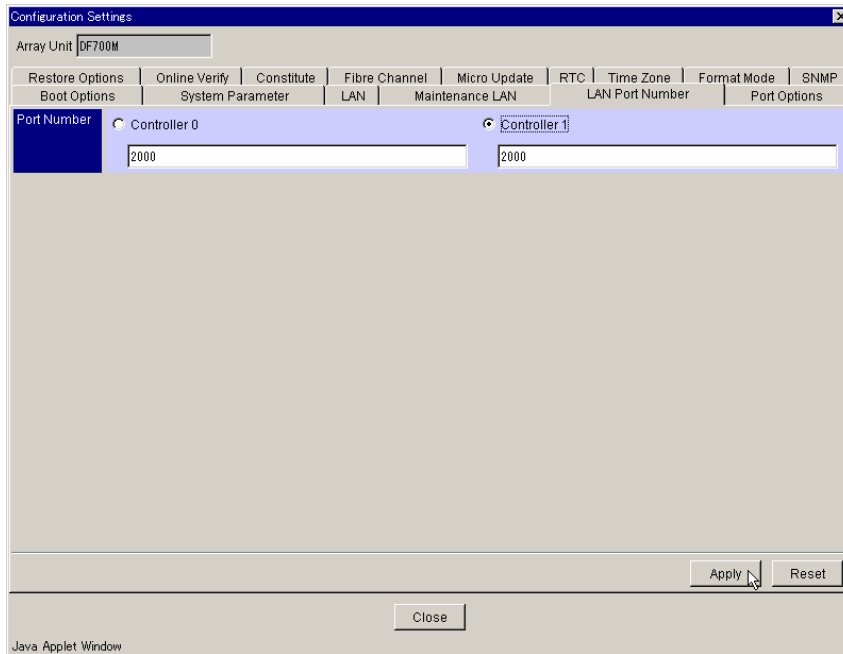


Figure 9.15 Configuration Settings - LAN Port Number

3. Select the radio button of **Controller1** and enter a port number in the port number text field.

Note: Enter a port number that is not used by the OS that is operating Web Navigator, various types of applications, etc. in the port number field.

4. Click **Apply**.
5. When the confirmation message displays, click **OK** (three times).
6. When the following confirmation message displays, click **Cancel**. See Figure 9.16.

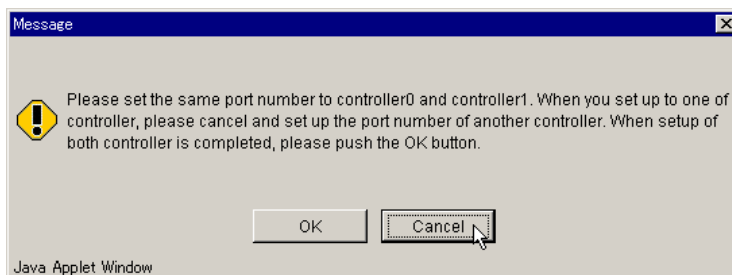


Figure 9.16 Message Dialog Box

Web Navigator goes to the **LAN Port Number** tab screen.

7. Select the radio button of the **Controller0** and enter a port number to be set in the port number text field. Enter the port number that is set in the **Controller1**.
8. Click **Apply**.
9. When the confirmation message displays, click **OK** (five times).
The Unit screen is closed.

An example of the edit of the services file (in the case of Windows 2000):

1. Open the services file using a text editor such as Notepad.exe, etc.
2. Add a port number to be used by Web Navigator referring to the following example, and then overwrite and save it.


When adding the port number to the last line, ensure that you start a new line.

```
# 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
nfsd          2049/udp          nfs          #NFS server
knetd        2053/tcp          #Kerberos de-multiplexor
man          9535/tcp          #Remote Man Server
df-damp-snm  23456/tcp
```

9.13 Setting the IP Address of the Maintenance Port

Note: The LAN configuration information for the maintenance of the subsystem is usually set at the factory shipment, therefore you do not have to set it.

To set the IP address of the maintenance port:

1. On the Tools menu, select **Configuration Settings** or click .
2. Click the **Maintenance LAN** tab. See Figure 9.17.

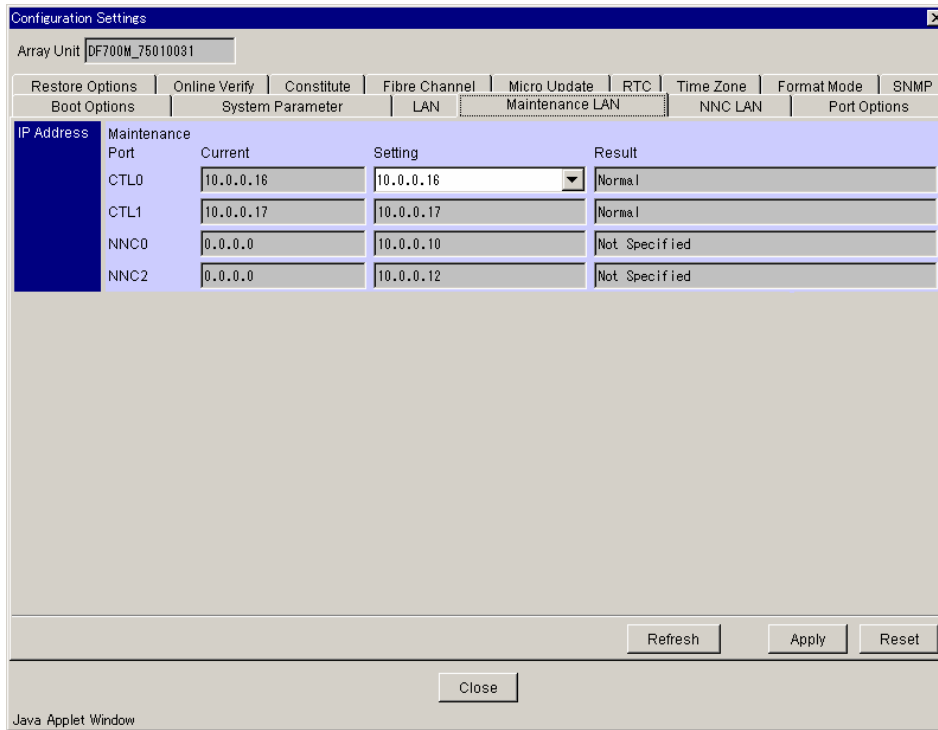


Figure 9.17 Configuration Settings - Maintenance LAN Panel


IP Address: Select the IP address of the CTL0 from the drop-down list. When the **Maintenance Port IP Address Automatic Change Mode** is set as **Enable** with the **LAN** tab, the display is grayed and the setting cannot be made.

3. Click **Apply**.
4. When the confirmation message displays, click **OK**.

9.14 Setting RTC

Changes to the RTC apply without restarting the subsystem.

To set the RTC:

1. On the **Settings** menu, click the **Configuration Settings** or click .
2. Click the **RTC** tab. See Figure 9.18.

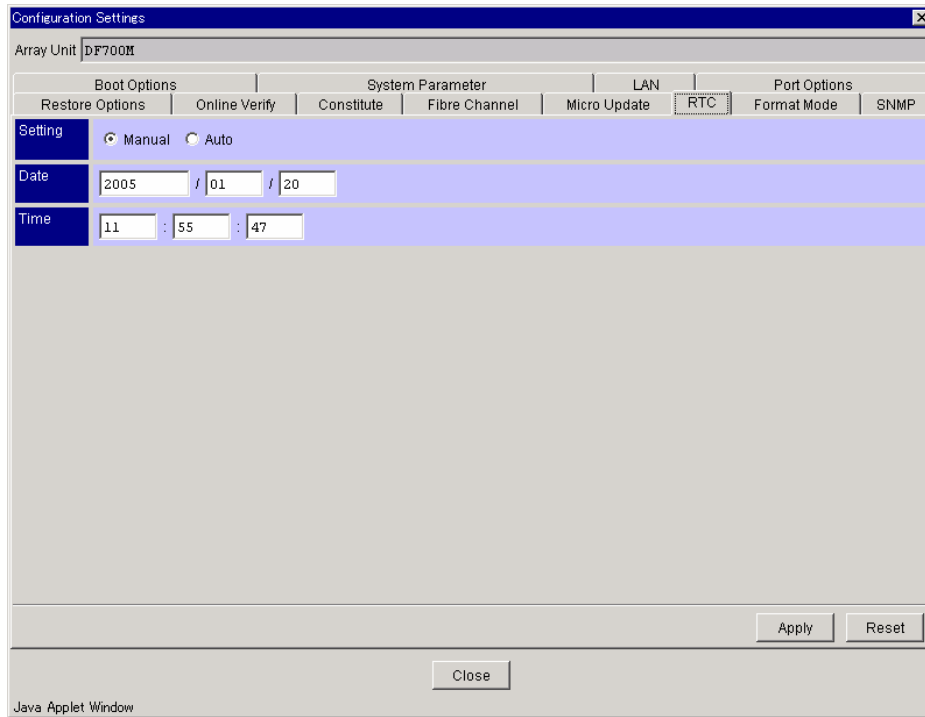



Figure 9.18 Configuration Settings - RTC

3. Set the RTC:
 - **Setting:** Select Manual or Auto.
 - **Manual:** Sets the date and time.
 - **Auto:** Sets the time of the Web Server executing the Storage Navigator Modular.
 - **Date:** Displays the date.
 - **Time:** Displays the time.
4. Click **Apply**.
5. A confirmation message displays. Click **OK**.

9.15 Setting Time Zone and NTP Server

To set the time zone:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Time Zone** tab. See Figure 9.19.

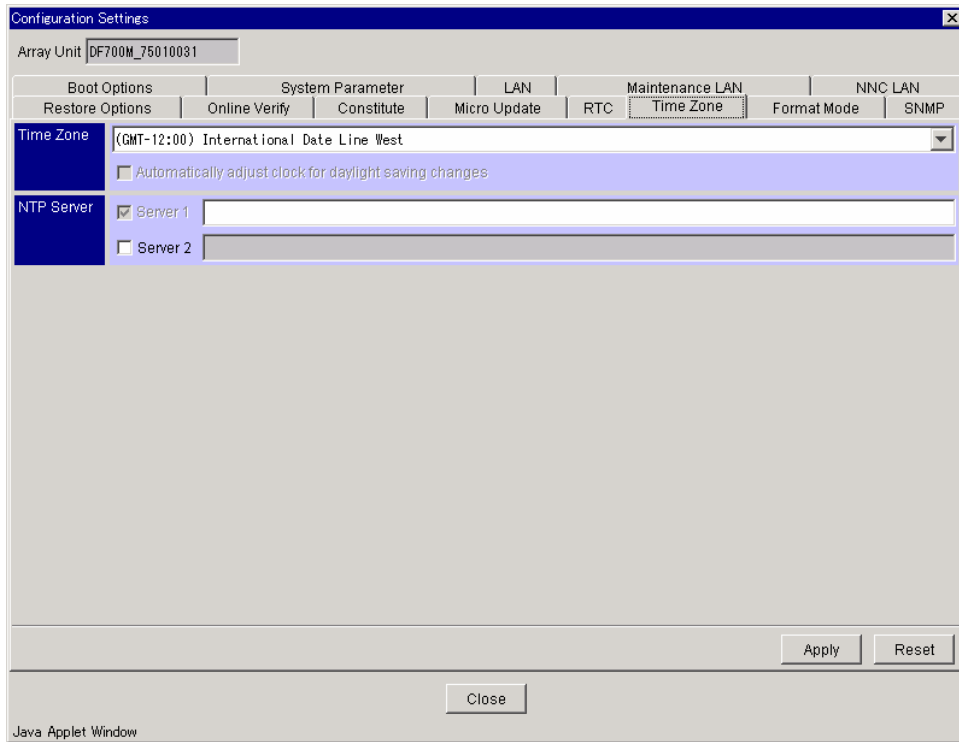


Figure 9.19 Configuration Settings - Time Zone

- **Time Zone:** Select a time zone from the **Time Zone** drop-down list.
 - **Automatically adjust clock for daylight saving changes:** Specify whether to use the daylight saving or not.
 - **NTP Server:** Specify the IP address of the NTP server.
3. Click **Apply**.
 4. When the confirmation message displays, click **OK**.

9.16 Outputting Configuration Information to a File

This section describes how to output the configuration information of the subsystem in a text file or set the configuration using a text file.

The configuration information output in a text file includes the status of the system parameters, RAID group/logical unit, port/host group, and the constituent parts of the subsystem. The configuration to be set includes the system parameters, RAID group/logical unit, and port/host group. The status of the constituent parts of the subsystem cannot be set.


The configuration information is handled with separate text files for the system parameters, for RAID group/logical unit, and for port/host group.

Copying configuration information between subsystems can be executed by outputting a text file of the configuration from the subsystem, then using the output text file to set another subsystem.

Editing a text file to set the subsystem can be done, however, it is recommended that this function be used for the configuration of the same subsystem. To change the configuration, use individual functions.

9.16.1 File Output for System Parameters

To output the settings of the system parameters for the subsystem in text form to a specified file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.20.

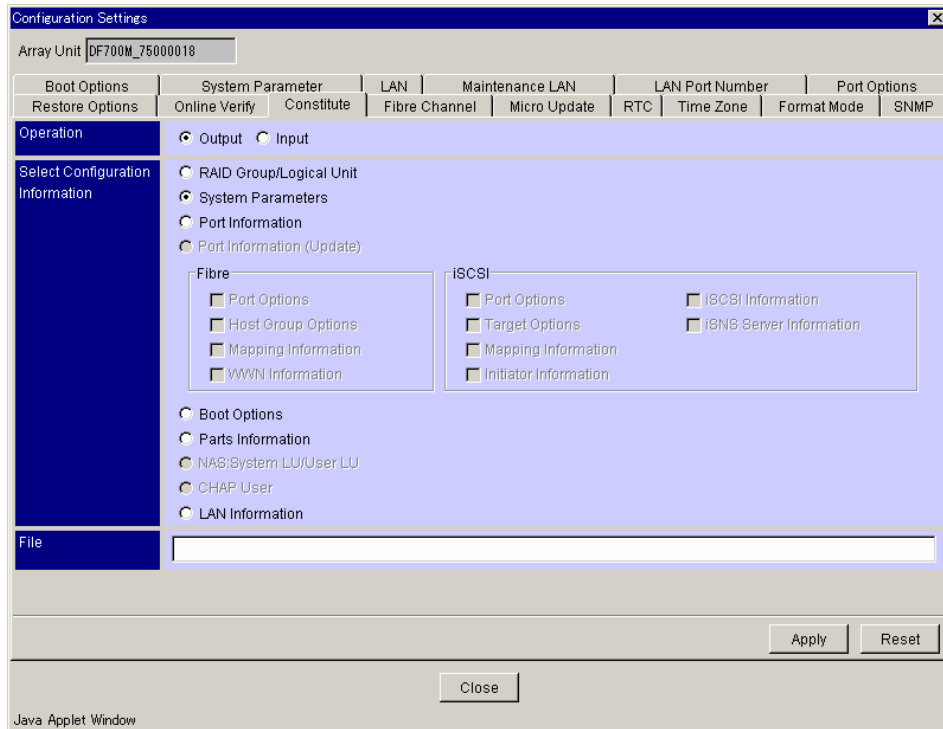


Figure 9.20 Configuration Settings - Constitute panel (Output)

3. Check the **System Parameters** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the configuration file will be output.
5. Select the **Output** option.
6. Click **Apply**.
7. When the confirmation message displays, click **OK**.

System parameter information is saved in the form of a text file with the specified file name. The format of the output file consists of the following items. The outline of the layout of the output file is shown in Figure 9.21.

- File header
- Subsystem registration name with the Storage Navigator Modular

- Output time (Web Server time where the Storage Navigator Modular is installed)
- Microprogram revision
- Subsystem type
- Serial number
- Common controller parameters
- Controller parameters

```

Online System parameter list.

DF Name : DF700M
Date : 2005/01/20 12:10:38
Micro Program Revision : 07510
Array Unit Type : DF700M
Serial Number : 75000018

---- Online System Parameter ----
Options
Turbo LU Warning = OFF
Write Unique Response Mode = OFF
Auto Reconstruction Mode = OFF
Forced Write Through Mode = OFF
LU Ownership Change Disable Mode = OFF
ShadowImage I/O Switch Mode = OFF
Synchronize Cache Execution Mode = OFF
Operation if the Processor failures Occurs = Reset the Fault
Web Title = ""
---- CTL0 Parameter ----
Write & Verify Execution Mode = 0N
---- CTL1 Parameter ----
Write & Verify Execution Mode = 0N

```

Figure 9.21 System Parameter Output File Format

9.16.2 Setting System Parameters with a File

Set the system parameters in the subsystem with the information described in the file. If you set the system parameters using a file that was output when a priced optional feature is in an unlocked state, the setting may terminate abnormally. To set system parameters, use a file that was output when all priced optional features are in a locked state.


For a dual system, setting cannot be executed if one of the controllers is detached. Verify that the subsystem is operating normally.

When system parameters are set, the subsystem cannot execute commands from the host. The functions of the Storage Navigator Modular can no longer work; however, the wizard sets the system parameters and failure monitoring. After setting, restart the subsystem. Confirm that it is operating successfully. It connects to the host and the Storage Navigator Modular.

To set subsystem parameters with a file:


1. Edit the file for setting the system parameters to set the subsystem. The file has a specified format. The format of the file is the same as that of the file output by the subsystem. Refer to the following sections of this manual for the format and parameters of the file respectively.

For the format of the file, see section 9.16.1.

2. On the **Tools** menu, select **Configuration Settings** or click .
3. Click the **Constitute** tab.
4. Click the **System Parameter** option.
5. Specify the directory and file name of the file that describes the system parameters edited in step 1. The specified file name displays in the text box.
6. Select the **Input** option.
7. Click **Apply**.
8. When the confirmation message displays, click **OK**.

9.16.3 RAID/Logical Units and Configuration File Output Status

To output RAID group/logical unit definition information already set in the subsystem to a specified file in a text format:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.22.

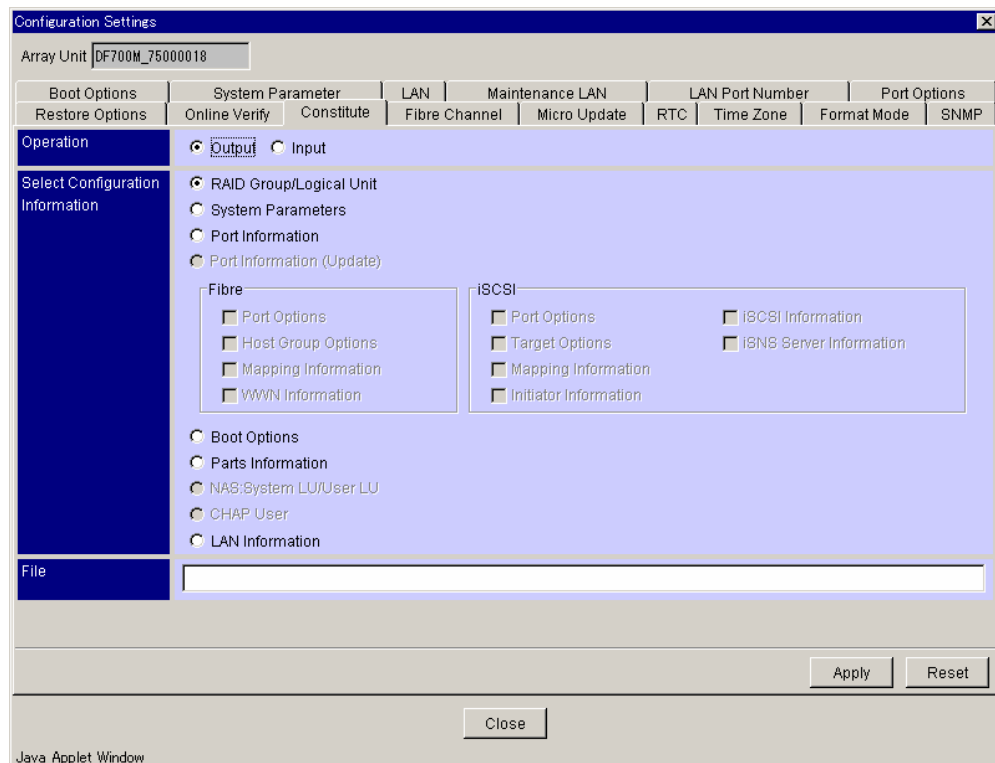


Figure 9.22 Configuration Settings - Constitute panel (output)

3. Click the **RAID Group/Logical Unit** option in the **Select Configuration Information** box.
4. Specify the directory and file name to output the file of the configuration.
5. Select the **Output** option.
6. Click **Apply**.
7. When the confirmation message displays, click **OK**.

System parameter information is saved in the form of a text file with the specified file name.

The format of the output file consists of the following items. An outline of the layout of the output file is shown in Figure 9.23.

- File header
- Subsystem registration name at the Storage Navigator Modular
- Output time (Web Server time where the Storage Navigator Modular is installed)
- Microprogram revision
- Subsystem type
- Serial number
- RAID group/logical unit configuration
- Status of constituent parts

```

Array unit configuration information list.
DF Name : DF700H
Date : 2005/01/20 12:15:21
Micro Program Revision : 07510
Array Unit Type : DF700H
Serial Number : 75000018

---- RAID Configuration Information ----
RAID RAID Start Location Number of HDU Number of Free Capacity Type
Group Level [Unit No. HDU No.] in parity group parity group [block]
  0 5 0 0 5 1 1081827328 FC
  1 5 1 0 5 1 1117478912 FC

-- End

---- RG-DRIVE Location ----
RAID Group position of drive belonging to RAID Group(Unit No.-HDU No.)
  0 0-0 0-1 0-2 0-3 0-4
  1 1-0 1-1 1-2 1-3 1-4

-- End

---- LU Configuration Information ----
LU Capacity Status Staging Number of Number of RAID RAID Number of Stripe Size Capacity Type
No. [block] [block] Current CTL Default CTL Group Level Cache Partition [KB] [MB/GB]
  0 2097152 Normal 512 1 1 0 5 0 64 1.0 GB FC
  1 2097152 Normal 512 0 0 0 5 0 64 1.0 GB FC
  2 2097152 Normal 512 0 0 0 5 0 64 1.0 GB FC

-- End

---- Drive Configuration Information ----
Location Status Type Vendor ID Product ID Revision Serial Number Capacity Drive Type
Unit0 ,HDU0 Standby Data SEAGATE DKS2C-J146FC 4C00 3HV8V727 146GB FC
Unit0 ,HDU1 Normal Data SEAGATE DKS2C-J146FC 4C00 3HV8X2WH 146GB FC
Unit0 ,HDU2 Normal Data SEAGATE DKS2C-J146FC 4C00 3HV8XTS1 146GB FC

-- End

```

Figure 9.23 RAID Group/Logical Unit Configuration Information Output File Format

9.16.4 Setting RAID Group/Logical Unit Definition with a File

Set the subsystem according to the RAID group/logical unit setting information described in a file. If the setup of the RAID group/logical unit is configured and completed, all of the previous user's data will be lost. The RAID group/logical unit configuration, as specified in the file, is set after deleting the current RAID group/logical unit. If user data is needed, configure the setting after backing up the system.

1. Edit the file to set the RAID group/logical unit information in the subsystem. The file has a specified format. The format of the file is the same as that of the file output by the subsystem. For the proper file format, see section 9.16.3.

The parameters in the file are **RAID configuration information**, **LU configuration information**, and **Drive information** in the format of the output file. In the output file, there are items that give the status of constituent parts. Ignore these items while setting up the configuration. The parameters are described below:

- a) **RAID configuration information:** Sets the RAID configuration which specifies RAID level, RAID group number and RAID size. If the RAID group is not set, “-” is shown after **Level**, and no other parameters are set.
- b) **LU configuration information:** Sets the logical unit configuration.

Specifies the logical unit number, logical unit capacity, pre-read capacity, number of controllers in current use, number of controllers in default use, RAID group number and RAID level, and logical unit status.

In logical unit status, for cases where formatting is to be executed, specify **Normal**. Formatting cannot be executed if another status is specified.


In cases where the full capacity of the RAID group is allocated to one logical unit, specify **All** in **Capacity**.

If the number of the controller in current use is specified as “0” or “1”, it becomes the same as the number of the controller in default use.

In cases where logical units of less than the maximum logical unit number are created, specify at the end that “After nn, not define” (nn: the last logical unit number + 1).

- c) **Drive information:** Sets the configuration of the HDU installed in the subsystem. For an HDU that is not installed, do not specify anything.

When a capacity bigger than that of the installed HDU is specified, it is regarded as an error and not set.

2. On the **Tools** menu, select **Configuration Settings** or click .
3. Click the **Constitute** tab.
4. Click the **RAID Group/Logical Unit** option.
5. Specify the directory and name of the file that describes the RAID group definition and logical unit definition edited in step 1. The specified file name is shown in the text box.
6. Select the **Input** option.
7. Click **Apply**.
8. Messages display and warn you of the following:


- The procedure deletes the current RAID/LU configuration.
- User data in the logical units are invalidated and cannot be recovered.

To continue, click **OK** in the messages.

9. A message displays, stating that the RAID configuration setting has started:
 - When the setting of the RAID group ends abnormally, an error message displays and interrupts processing.
 - If the setting of the RAID group ends normally, a message that the setting of logical unit has started displays, and executes the logical unit setting.
 - When the logical unit setting ends abnormally, an error message displays and interrupts processing.
 - If the logical unit setting ends normally, formatting of the set logical unit starts.
10. A message displays stating that the setting is complete. Click **OK**.

9.16.5 Port/Host Group Information File Output

To output the settings of the port/host group information for the subsystem in text form to a specified file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.24.

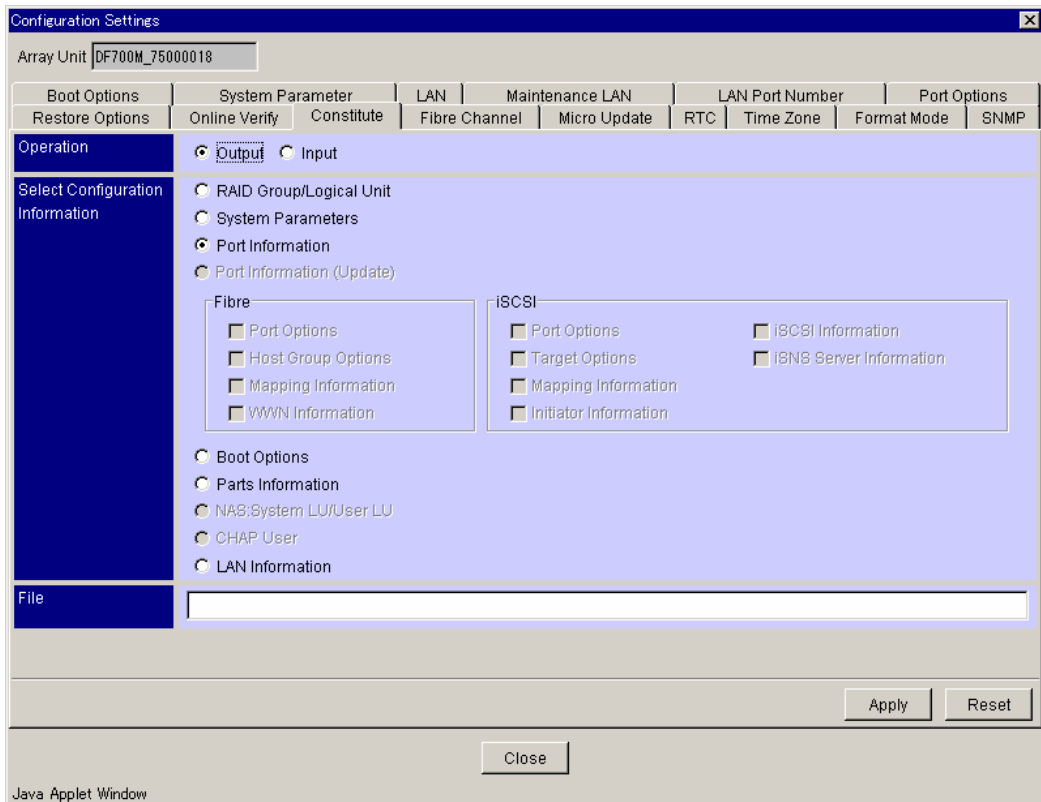


Figure 9.24 Configuration Settings - Constitute panel (output)

3. Check the **Port Information** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the host group information file will be output.
5. Click the **Output** option.
6. Click **Apply**.
7. When the confirmation message displays, click **OK**.

The host group information is saved in the form of a text file with the specified file name.

The format of the output file consists of the following items. The outline of the layout of the output file is shown in Figure 9.25.

- File header
- Registration name with the Storage Navigator Modular of the subsystem
- Output time (Web Server time where the Storage Navigator Modular is installed.)
- Microprogram revision
- Subsystem type
- Serial number
- Mapping mode
- Port option
- Host group option
- Host group information
- Logical unit mapping information

```

Configuration Information list.
DF Name : DF700M
Date : 2005/01/21 06:47:20
Micro Program Revision : 07510
Array Unit Type : DF700M
Serial Number : 75000018

---- CommonInformation ----
MappingMode = ON

---- CTL0 ----
---- PortA ----
---- PortOptions ----
Reset/LIP Mode(Signal) = OFF
Reset/LIP Mode(Process) = OFF
LIP Port All Reset Mode = OFF

---- HostGroupList ----
---- HostGroupInformation ----
HostGroupNumber = 0

---- HostsSystemConfiguration ----
Platform = not specified
Alternate Path = not specified
Failover = not specified
Additional Parameters
None

---- HostGroupOptions ----
Host Connection Mode 1 = Standard Mode
Host Connection Mode 2
HP-UX Mode = ON
PSUE Read Reject Mode = OFF
UA(06/2A00) suppress Mode = OFF
NACA Mode = OFF
Reset Propagation Mode = OFF
Unique Reserve Mode 1 = OFF
ASL Report Mode(Active/Passive Group) = OFF
ASL Report Mode(Active/Passive) = OFF
ASL Report Mode(Active/Active) = OFF
Port-ID No Report Mode = OFF
Port-ID Conversion Mode = OFF
Tru Cluster Mode = OFF
Product Serial Response Mode = OFF
Same Node Name Mode = OFF
CCHS Mode = OFF

---- LuMapping ----
H-LUN      LUN
  0         0
  1         1
  2         2


-- HostGroupInformationEnd
-- HostGroupListEnd

```

Figure 9.25 Format Outline of Port/Host Group Information Output File

9.16.6 Setting Port/Host Group Information with a File

To set Port/Host Group settings with a file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.26.

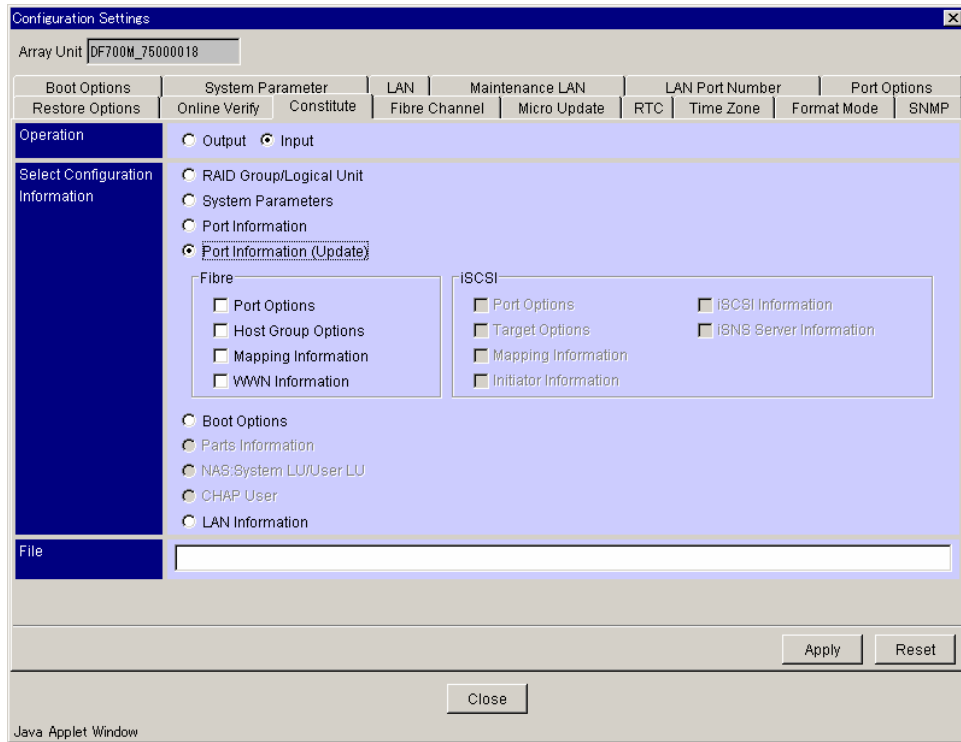



Figure 9.26 Configuration Settings - Constitute panel (input)

3. Click the **Port Information (Update)** option in the **Select Configuration Information** box.
4. Select the items that you will set from setting information for **Fibre**. An error will occur if nothing is chosen. (When the LUN Manager function is valid, the WWN Information displays for setting information for **Fibre**.)
5. Specify the directory and file name to which the host group information file will be input.
6. Select the **Input** option.
7. When the confirmation message displays, click **OK** to continue.
8. One or more messages advise that a subsystem restart is required. Follow the on-screen instructions to stop subsystem access and click **OK** to continue.
9. A message displays, stating that the setting is complete. Click **OK**.

9.16.7 File Output of Boot Option Information

1. On the Tools menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.27.

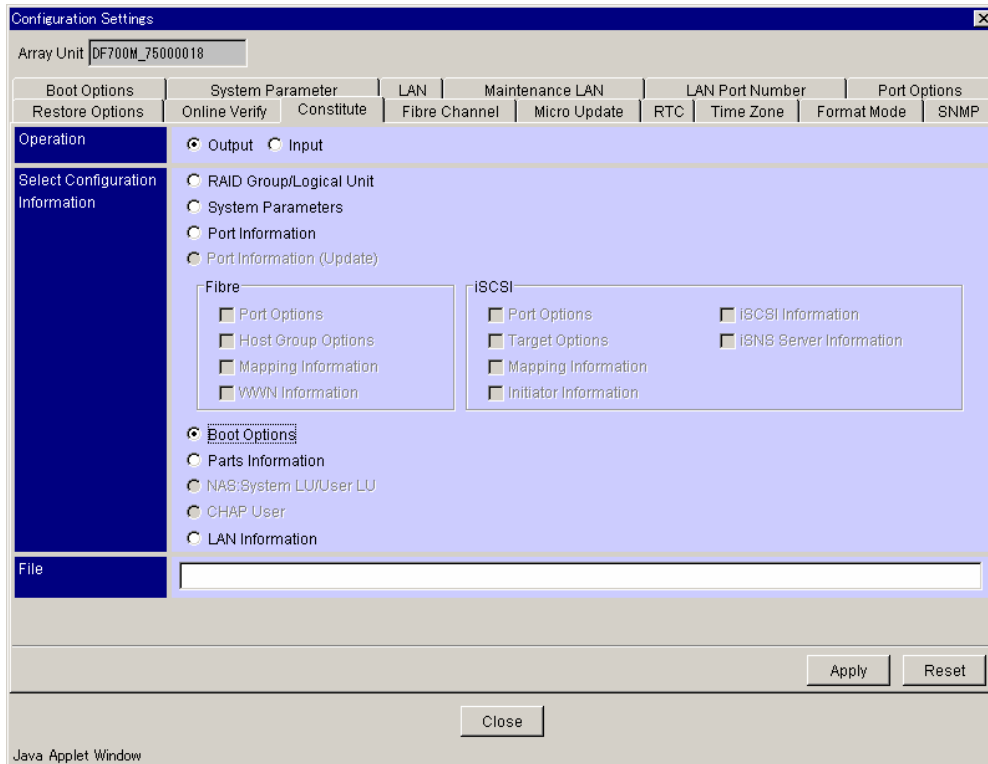


Figure 9.27 Configuration Settings – Boot options (output)

3. Check **Boot Options** in the **Select Configuration Information** box.
4. Specify the directory and file name to which the boot option information file will be output.
5. Click **Apply**.
6. When the confirmation message displays, click **OK**.

The boot options information is saved in the form of a text file with the specified file name.

The format of the output file consists of the following items. The outline of the layout of the output file is shown in Figure 9.28.

- File header
- Registration name with the Storage Navigator Modular of the subsystem
- Output time (Web Server time where the Storage Navigator Modular is installed.)
- Microprogram revision
- Subsystem type
- Serial number

- Boot options information

```
Boot Option list.
DF Name : DF700M_75000018
Date : 2006/04/12 09:52:09
Micro Program Revision : 0735/B-M
Array Unit Type : DF700M
Serial Number : 75000018

---- Boot Options ----
System Startup Attribute = Dual Active Mode
Delay Planned Shutdown = 0
Options
  Drive Detach Mode = OFF
INQUIRY Information
  Vendor ID = HITACHI
  Product ID = DF600F
  ROM Microprogram Version =
  RAM Microprogram Version =
```


Figure 9.28 Format Outline of Boot Options Information Output File

9.16.8 Setting Boot Option Information with a File

WARNING: Rebooting requires stopping I/O from the host.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot the subsystem, change the pair status to PSUS before you reboot.

WARNING: If you are using a NAS, you must also stop the clusters between NAS units. When restarting the subsystem, you must restart the clusters.

1. On the Tools menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.29.

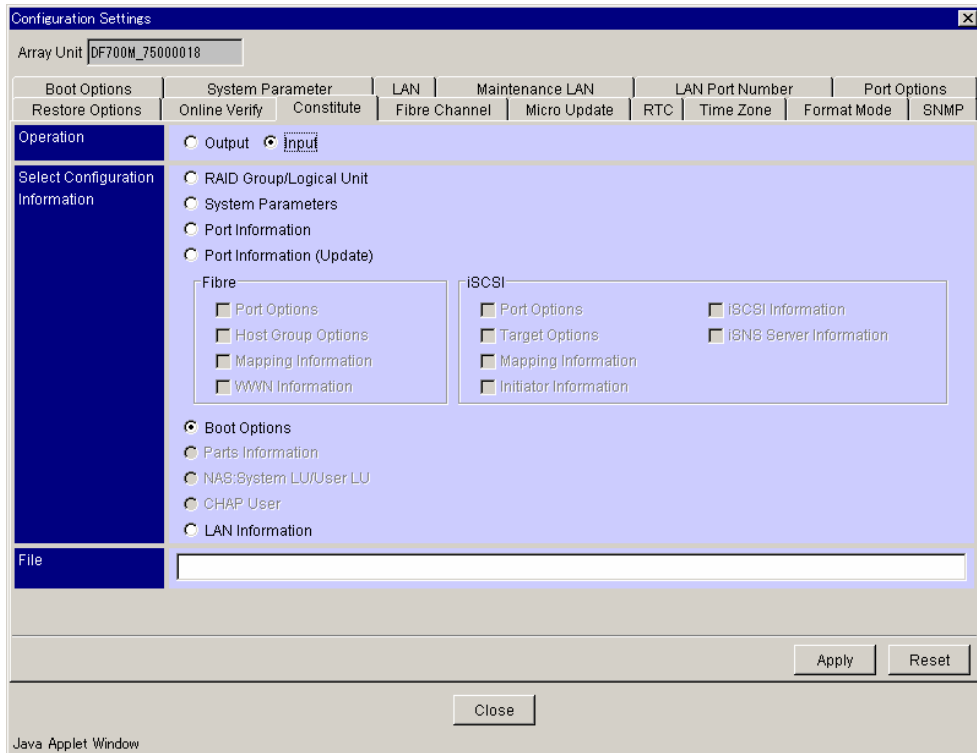


Figure 9.29 Configuration Settings - Boot Options (input)

3. Check **Boot Options** and **Input** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the boot option information file will be input.
5. Click **Apply**.
6. When the confirmation message displays, click **OK**.
7. One or more messages advise that a subsystem restart is required. Follow the on-screen instructions to stop subsystem access and click **OK**.


When you choose to restart the subsystem, the time the restart began displays. This usually takes approximately 4 to 15 minutes.

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, check the condition of the subsystem.

8. A message displays, stating that the restart is successful.

9.16.9 File Output of Parts Information

To output parts information to a file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.30.

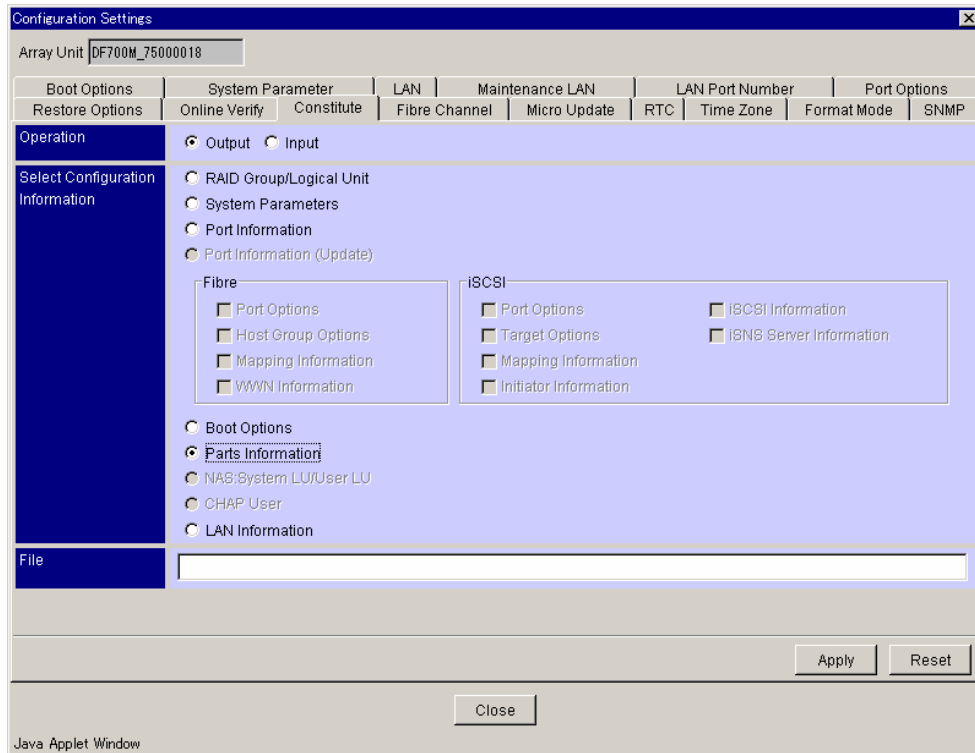



Figure 9.30 Configuration Settings - Parts Info Panel (output)

3. Check **Parts Information** in the **Select Configuration Information** box.
4. Specify the directory and file name to which the parts information file will be output.
5. Click **Apply**.
6. When the confirmation message displays, click **OK**.

9.16.10 Outputting NAS System LU/User LU to a File

To output the NAS system LU/User LU to a file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.31.

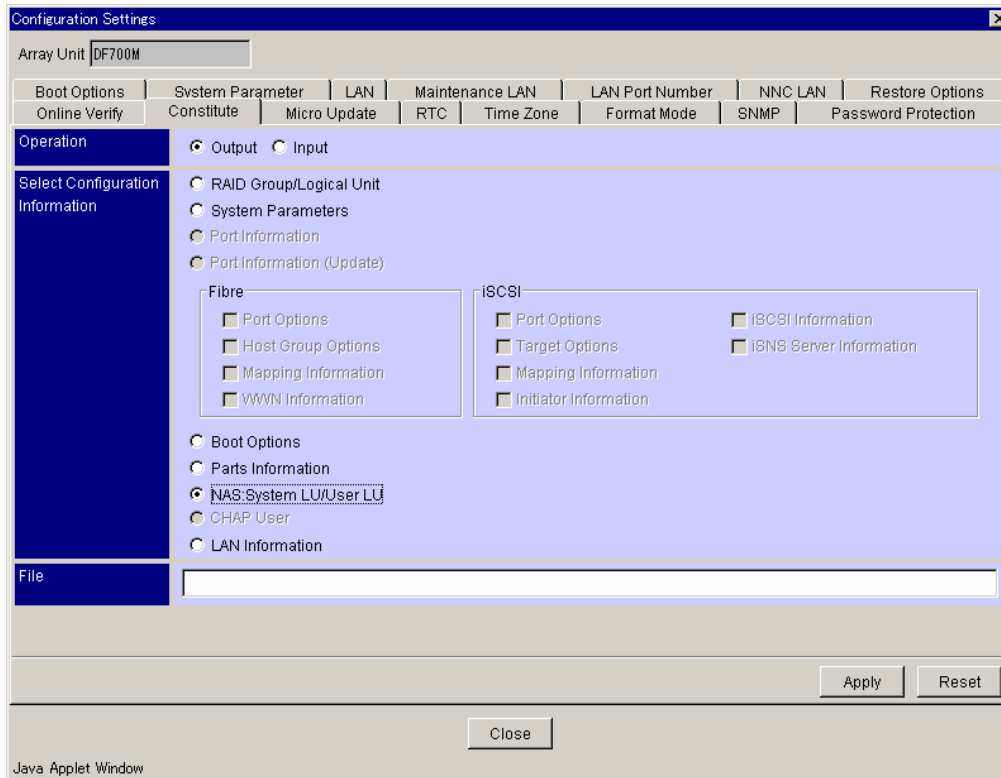


Figure 9.31 Configuration Settings - NAS System LUN Panel (output)

3. Check the **NAS: System LU/User LU** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the NAS system LU/User LU information file will be output.
5. Click **Apply**.
6. When the confirmation message displays, click **OK**.

The NAS System LU and NAS User LU information is saved in the form of a text file with the specified file name.

The format of the output file consists of the following items. The outline of the layout of the output file is shown in Figure 9.32.

- File header
- Registration name with the Storage Navigator Modular of the subsystem
- Output time (Web Server time where the Storage Navigator Modular is installed.)
- Microprogram revision
- Subsystem type
- Serial number
- NAS System LU information
- NAS User LU information

```

NAS LU mapping information list.
DF Name : DF700H_77000002
Date : 2006/05/19 18:49:03
Micro Program Revision : 0750/A-H
Array Unit Type : DF700H
Serial Number : 77000002

---- NNC 1/3 Mapping Information ----
---- System LU Information ----
System LU                                LUN
System Disk(CTL0)                        0
System Disk(CTL1)                        1
Volume for Dump(CTL0)                   2
Volume for Dump(CTL1)                   3
Command Device                           4
Working Area for Dump                    5
System Common Volume                     6
Backup Volume for Common                  7
Backup Volume for Common 2                8

-- Separator

---- User LU Information ----
H-LUN      LUN
0          9
1         10
2         11
3         12
4         13
5         14
6         15
7         16
8         17
9         18
10        20


-- Separator

-- End

```


Figure 9.32 Format Outline of NAS System/User LU Information Output File

9.16.11 Setting NAS System LU/User LU Information with a File

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab.
3. Check the **NAS:System LU/User LU** option and **Input** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the NAS system LU/User LU information file will be input.
5. Click **Apply**.
6. When the confirmation message displays, click **OK**.

9.16.12 File Output of iSCSI Port Information

To output the settings of the iSCSI port information for the subsystem in text form to a specified file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.33.

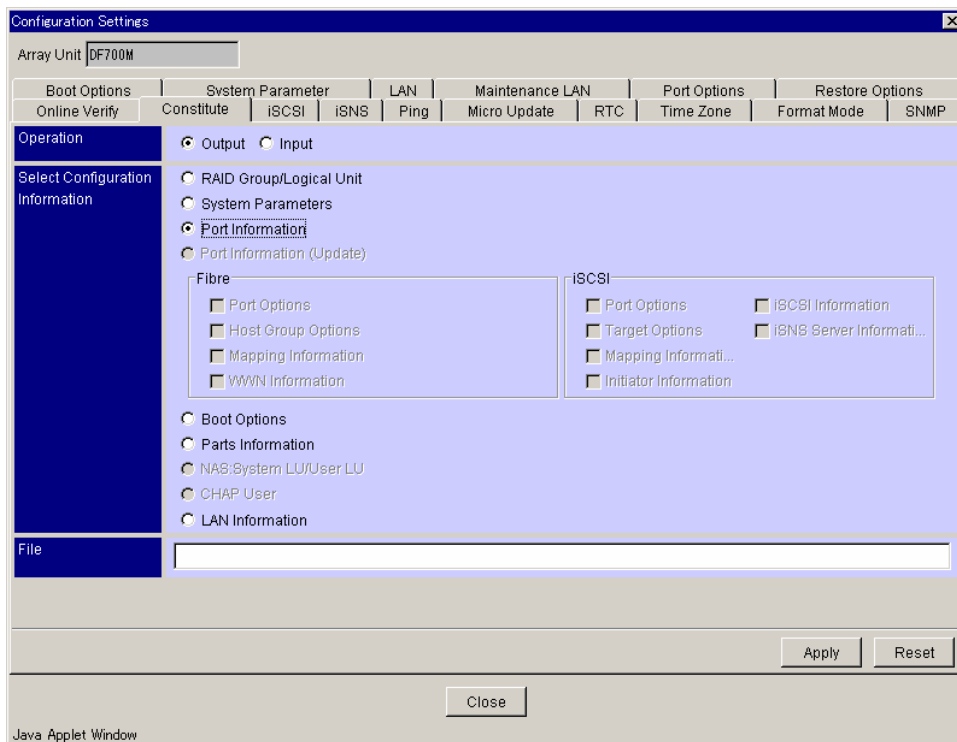


Figure 9.33 Configuration Settings - Port Information Panel (output)

3. Check the **Port Information** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the iSCSI port information file will be output.
5. Click the **Output** option.

6. Click **Apply**.
7. When a message displays, confirming that the iSCSI port information is output with the specified file name, click **OK**.

The iSCSI port information is saved in the form of a text file with the specified file name.

The format of the output file consists of the following items. The outline of the layout of the output file is shown in Figure 9.34.

- File header
- Registration name with the Storage Navigator Modular of the subsystem
- Output time (Web Server time where the Storage Navigator Modular is installed.)
- Microprogram revision
- Subsystem type
- Serial number
- Mapping mode
- iSCSI port information
- Port options
- Target information
- Host system configuration
- Target options
- Logical unit mapping information

```

Configuration Information list.

DF Name : DF700M_75010009
Date : 2006/05/19 18:50:37
Micro Program Revision : 0750/A-M
Array Unit Type : DF700M
Serial Number : 75010009

---- CommonInformation ----
MappingMode = OFF

---- CTL0 ----
---- PortA ----
PortType = iSCSI
---- iSCSIPortInformation ----
IPAddress = 192.168.0.200
SubnetMask = 255.255.255.0
DefaultGateway = 0.0.0.0
PortNumber = 3260
KeepAliveTimer = 60
MTU = 1500
EthernetAddress = 00:00:87:66:0B:00

---- PortOptions ----
Reset/LIP Mode(Signal) = OFF
Reset/LIP Mode(Process) = OFF
LIP Port All Reset Mode = OFF

---- TargetList ----
---- TargetInformation ----
TargetNumber = 0
TargetAlias = "T000"
iSCSI Name = "iqn.1994-04.jp.co.hitachi:rsd.d7m.t.10009.0a000"
Authmethod = CHAP,None

---- HostSystemConfiguration ----
Platform = not specified
Alternate Path = not specified
Failover = not specified
Additional Parameters
None

---- Targetoptions ----
Host Connection Mode 1 = Standard Mode
Host Connection Mode 2
HP-UX Mode = OFF
PSUE Read Reject Mode = OFF
UA(06/2A00) suppress Mode = OFF
NACA Mode = OFF
HISUP OFF Mode = OFF
Reset Propagation Mode = OFF
Unique Reserve Mode 1 = OFF
ASL Report Mode(Active/Passive Group) = OFF
ASL Report Mode(Active/Passive) = OFF
ASL Report Mode(Active/Active) = OFF
Port-ID No Report Mode = OFF
Port-ID Conversion Mode = OFF
Tru Cluster Mode = OFF
Product Serial Response Mode = OFF
Same Node Name Mode = OFF
CCHS Mode = OFF
SPC-2 Mode = OFF


---- LuMapping ----
H-LUN      LUN
-- TargetInformationEnd
-- TargetListEnd
---- PortB ----
PortType = iSCSI
---- iSCSIPortInformation ----

```

Figure 9.34 Format Outline of iSCSI Port Information Output File

9.16.13 Setting iSCSI Port Information with a File

To set iSCSI Port settings with a file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.35.

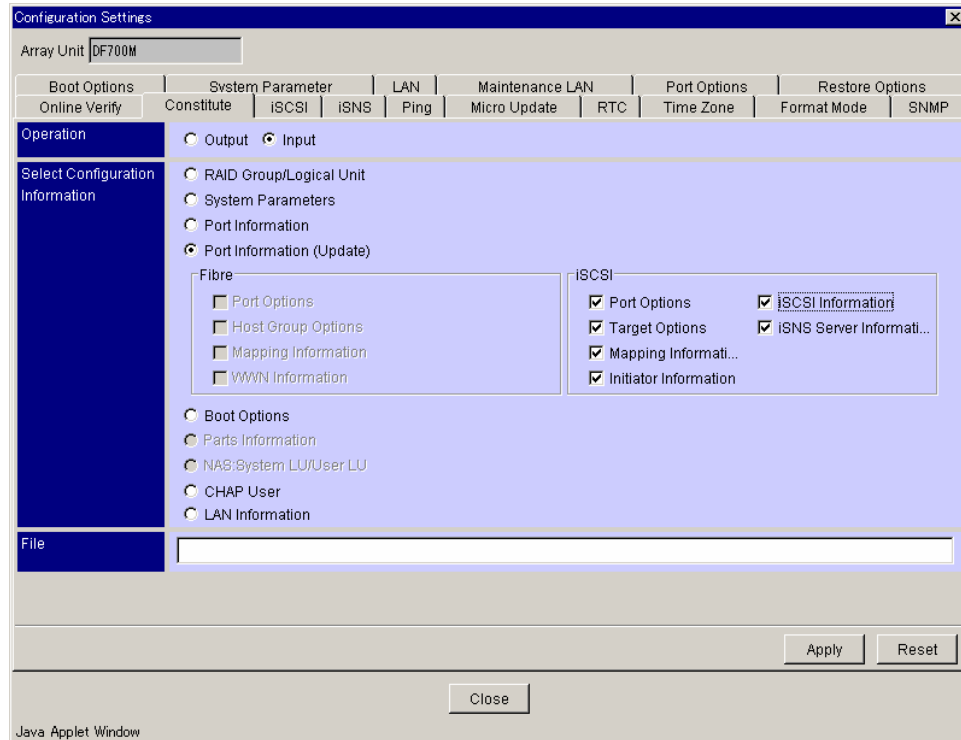



Figure 9.35 Configuration Settings - Port Information Update Panel (input)

3. Click the **Port Information (Update)** option in the **Select Configuration Information** box.
4. Select the items that you will set from Setting Information for **iSCSI**. An error occurs if nothing is chosen. (When the LUN Manager function is valid, the Initiator Information displays for Setting Information for **iSCSI**.)
5. Specify the directory and file name to which the iSCSI port information file will be input.
6. Select the **Input** option.
7. A confirmation message displays. To continue, click **OK**.
8. One or more messages advise that a subsystem restart is required. Follow the on-screen instructions to stop subsystem access and click **OK** to continue.
9. A message displays, stating that the setting is complete. Click **OK**.

9.16.14 Setting CHAP User Information with a File

1. On the Tools menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.36.

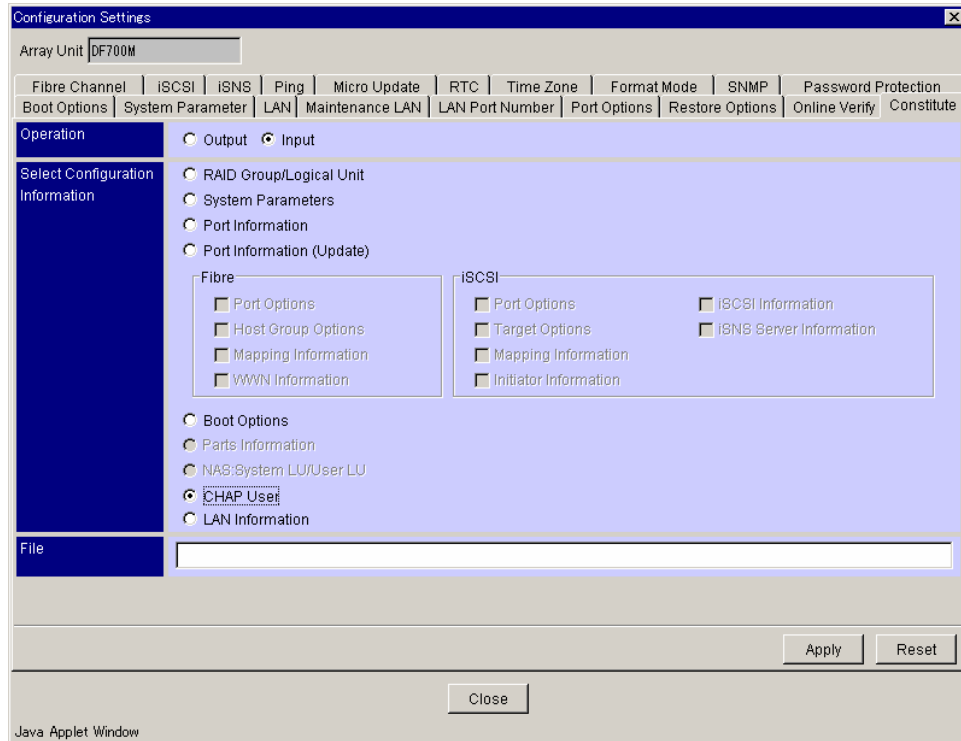


Figure 9.36 Configuration Settings - CHAP User (input)

3. Click the **CHAP User** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the CHAP User information file will be input.
5. Select the **Input** option.
6. A confirmation message displays. To continue, click **OK**.


The CHAP User information setting file format is shown in Table 9-2.

Table 9-2 CHAP User Information Setting File Format

File Contents	Descriptions
User name,secret,Target No. or alias ...	The lines are invalid until <CHAP User> appears.
<CHAP User>,,	The valid lines are from <CHAP User> to <END>.
<Port 0A>,,	The line specifies the port. (<Port ALL> specifies all ports.)
hitachi-0,abcdefghij00,alias0	The first column is CHAP User, and the second column is Secret.
hitachi-1,abcdefghij01,alias1	The third row and the following are aliases of Target to assign.
#hitachi-1,abcdefghij01,alias1	The line with the first character of # is a comment line. (Invalid line.)
hitachi-2,abcdefghij02,3	The Target number can be specified as the alias of Target.
<Port 0B>,,	
<Add CHAP User>,,	If <Add CHAP User> is specified, CHAP User is added.
hitachi-0,abcdefghij00,alias0	If nothing is specified, all CHAP Users are deleted, and then added.
hitachi-1,abcdefghij01,alias0,alias01,alias02	One or more Targets can be specified.
<Port 1A>,,	
<Port 1B>,,	
<END>,,	The line of <END> and the following are all invalid lines.

9.16.15 File Output of LAN Information

To output the settings of the LAN information for the subsystem in text form to a specified file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.37.

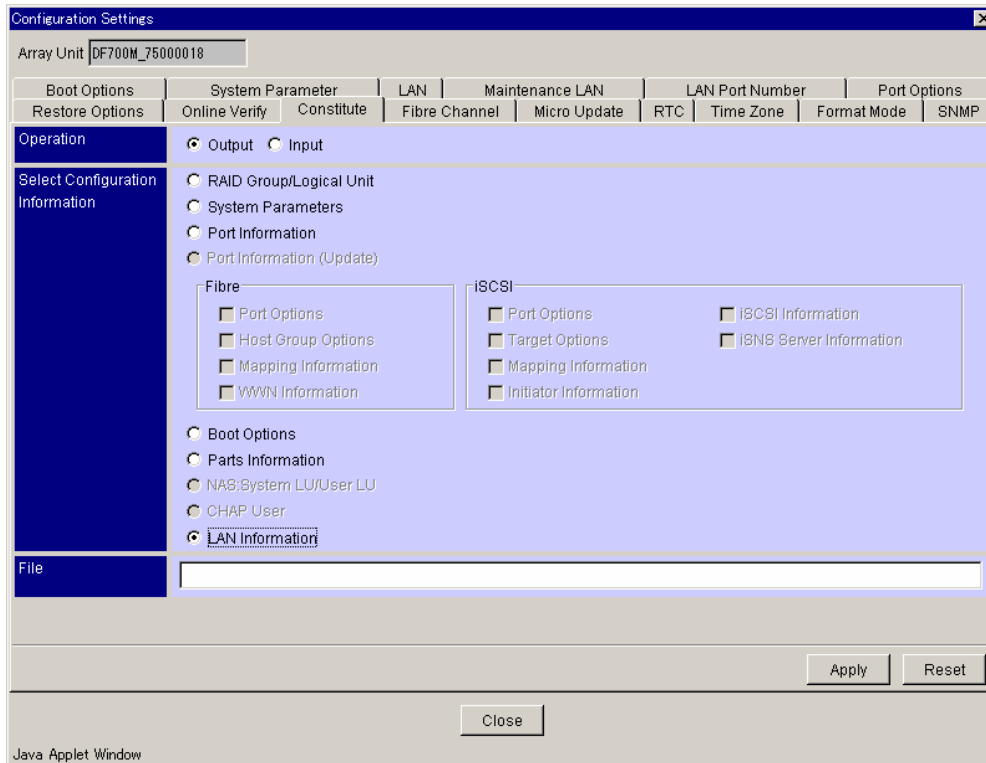


Figure 9.37 Configuration Settings window (output)

3. Check the **LAN Information** option in the **Select Configuration Information** box.
4. Specify the directory and file name to which the LAN information file will be output.
5. Click the **Output** option.
6. Click **Apply**.
7. When a message displays, confirming that the LAN information is output with the specified file name, click **OK**.

The LAN information is saved in the form of a text file with the specified file name.

The format of the output file consists of the following items. The outline of the layout of the output file is shown in Figure 9.38.

- File header.
- Registration name with the Storage Navigator Modular of the subsystem.
- Output time (Web Server time where the Storage Navigator Modular is installed.).
- Microprogram revision.
- Subsystem type.
- Serial number.
- User LAN information.
Maintenance Port IP Address Automatic Change Mode.
- Maintenance Port LAN information.

Concerning the Ether Address of the user LAN information, only the information on the controller connected over the LAN is output. To output the information on the both controllers, connect the both controllers over the LAN. When the information is output in the state in which the controller(s) is (are) blocked, the LAN information on the blocked controller(s) is output as 0.0.0.0.

```
LAN parameter list.
DF Name : DF700M_75000018
Date : 2006/04/05 16:01:57
Micro Program Revision : 0735/A-M
Array Unit Type : DF700M
Serial Number : 75000018

---- User LAN Parameter ----
Maintenance Port IP Address Automatic Change Mode = ON
---- CTL0 Parameter ----
DHCP = OFF
IP Address = 192.168.15.217
Subnet Mask = 255.255.255.0
Default Gateway = 192.168.15.3
Ether Address = 00:00:87:74:8E:62
---- CTL1 Parameter ----
DHCP = OFF
IP Address = 192.168.15.218
Subnet Mask = 255.255.255.0
Default Gateway = 192.168.15.3
Ether Address = 00:00:87:74:8E:03


---- Maintenance LAN Parameter ----
CTL0 IP Address = 10.0.0.16
CTL1 IP Address = 10.0.0.17
NNC0 IP Address = 10.0.0.10
NNC2 IP Address = 10.0.0.12
```

Figure 9.38 Format Outline of LAN Information Output File

9.16.16 Setting LAN Information with a File

WARNING: The User LAN Parameter (Maintenance Port IP Address Automatic Change Mode, IP Address, Subnet Mask, Default Gateway) and Maintenance LAN Parameter (Network Address) can be set up. The other information cannot be set up.

To set LAN settings with a file:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Constitute** tab. See Figure 9.39.

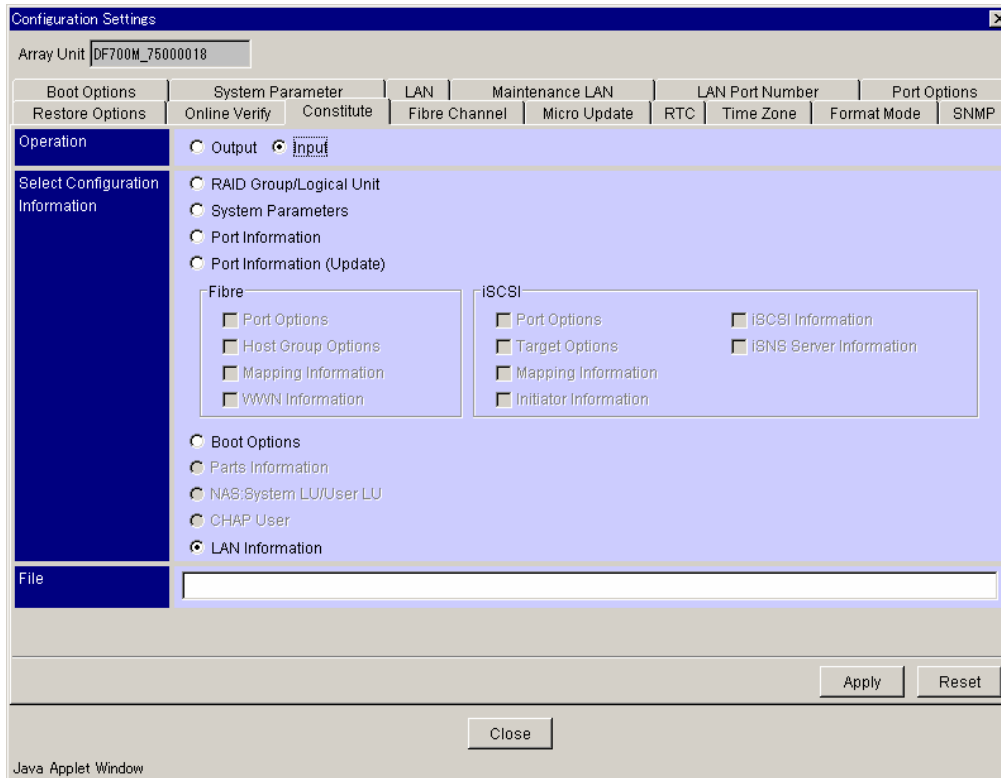


Figure 9.39 Configuration Settings Window

3. Click the **Input** option in the **Operation** box.
4. Check the **LAN Information** option in the **Select Configuration Information** box.
5. Specify the directory and file name to which the LAN information file will be input.
6. Click **Apply**.
7. A confirmation message displays. To continue, click **OK**.

9.17 Replacing a Microprogram

Note: If a microprogram is read during the microprogram download, the download processing is interrupted. Read a microprogram after checking that it is not under download.

The function downloads and replaces the microprogram in the subsystem. When replacing the microprogram, download it, and then replace it.

This section includes the following:


- Microprogram Download.
- Replacing the Microprogram.

9.17.1 Microprogram Download

Download the microprogram from the CD-R into the subsystem. In the download, the microprogram is stored in the subsystem; the microprogram of the subsystem is not replaced.

1. Copy the microprogram from the CD-R to the hard disk.

Note: For a directory where the Storage Navigator Modular is installed, do not copy the microprogram directly to the CD-R. Create a subdirectory and copy it under this subdirectory. Specify the name of a directory in the hard disk drive to which the microprogram is copied, with a one-byte coded alphanumeric.

2. On the Tools menu, select **Configuration Settings** or click .
3. Click the **Micro Update** tab. See Figure 9.40.

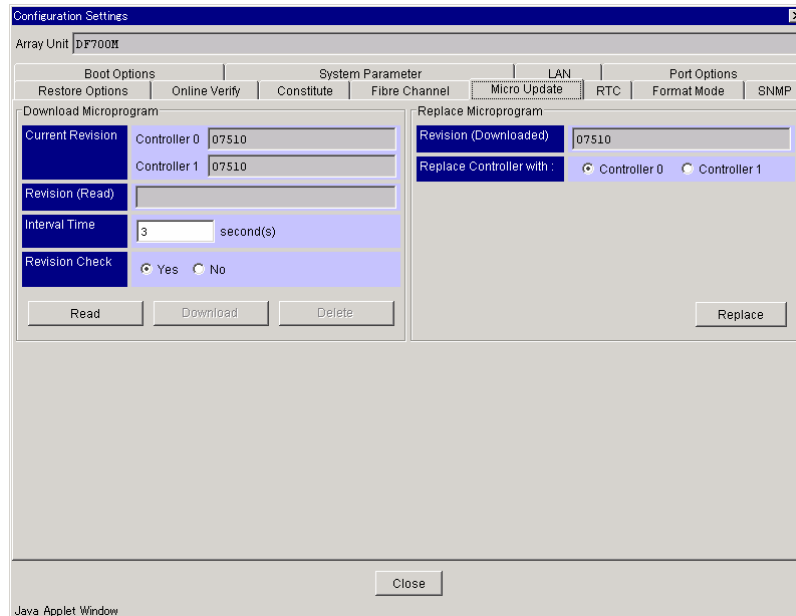


Figure 9.40 Configuration Settings Window – Microprogram

- **Current Revision:** Microprogram revision of each controller of the subsystem.
- **New Revision:** A microprogram revision stored in the system in which the Storage Navigator Modular is installed. When the microprogram is not read, a blank is displayed.
- **Interval Time:** Interval time for download. Specify the time between 1 and 60 seconds. For the LAN connection, when the interval time is specified as 3 seconds, the download requires approximately 9 minutes. The time required for the execution varies with the network status and depends on I/Os issued by the host. When the interval time is specified as one second longer, the time required for the download is prolonged by 3 minutes.

This function can be used during execution of the I/O instructed by the host. However, when the download function is executed, I/O performance of the host is reduced. To enhance performance, specify a longer interval time.

- **Revision Check:** Instructs the revision check of the microprogram to be downloaded. When the download instruction is specified, whether or not a hot replacement is applicable to the microprogram is checked. Select **Yes**.

When no microprogram is read, the **Download** and **Delete** buttons are displayed in gray and cannot be selected.

4. The microprogram is read into the PC in which the Storage Navigator Modular is installed. Click **Read**. When a revision is displayed **Revision (Read)**, the microprogram is already read. To download the microprogram that is already read, execute **Download**.

When you have clicked **Read**, specify the revision directory in which the microprogram is installed is specified, all the microprograms are read automatically.

5. When a confirmation message displays, asking whether to read the microprogram, click **OK**.

If the microprogram is already read, a confirmation message displays. When **OK** is clicked, the microprogram is overwritten. To stop reading the microprogram, click **Cancel**.

To delete the microprogram that is already read in the Web Server, click **Delete**. When a confirmation message displays, click **OK**.

6. When a window for specifying a revision directory in which the read microprogram exits displays, enter this directory. See Figure 9.41. When **OK** is clicked, reading the microprogram is started.

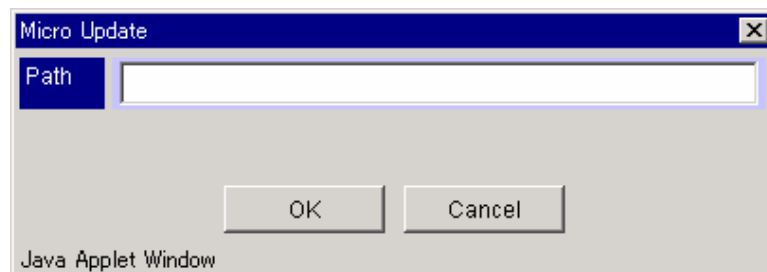


Figure 9.41 Micro Update Dialog Box

Figure 9.42 shows a path-input example.

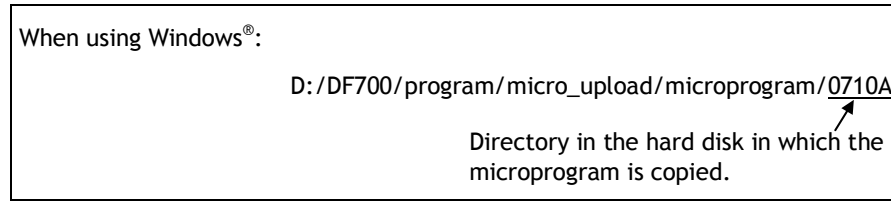


Figure 9.42 Path-Input Example

7. When a message displays indicating that the microprogram has been read, click **OK**. The revision of the read microprogram displays in the **Revision (Read)** field. See Figure 9.43.

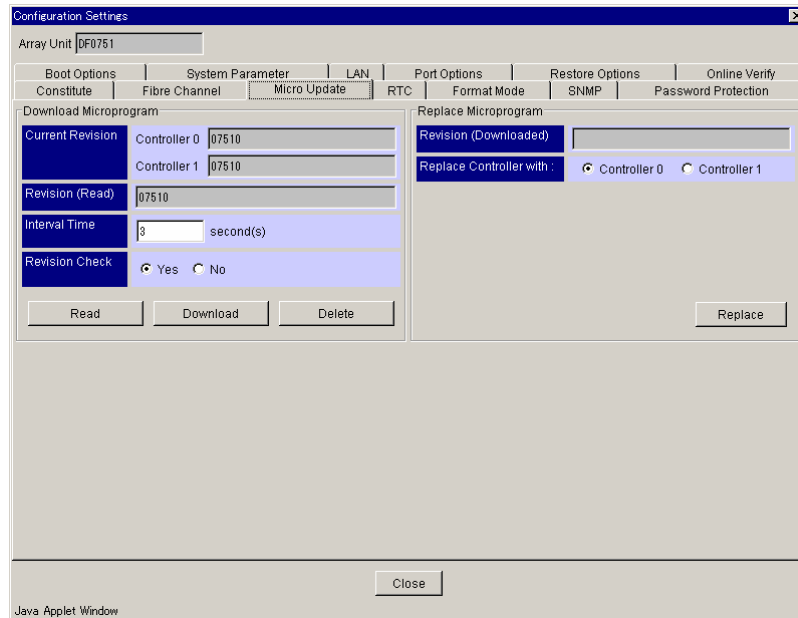


Figure 9.43 Configuration Settings - Revision

8. To download the microprogram, click **Download**.
9. When a confirmation message displays requesting confirmation to download the microprogram, click **OK**.
10. Select the access receptionist opportunity from the host after microprogram replaced. See Figure 9.44.

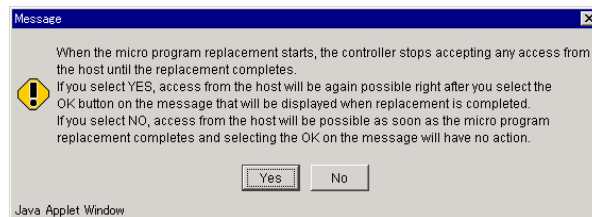


Figure 9.44 Message dialog box

- If you click **Yes**, the Storage Navigator Modular will not receive access from the host until you click **OK**.

- If you click **No**, the Storage Navigator Modular receives access from the host.

A message displays stating that the download is being executed. See Figure 9.45. This message displays the revision of the program being downloaded, interval time, and progress.

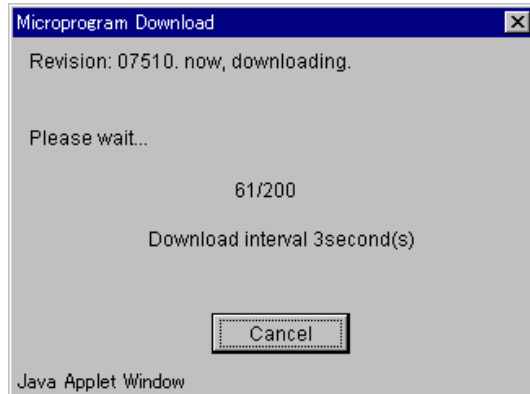


Figure 9.45 Microprogram Download Dialog Box

The download can be aborted. To abort the download halfway, click **Cancel**. A confirmation message displays. See Figure 9.46. When **OK** is clicked, the download is aborted. When **Cancel** is clicked, the download is continued.

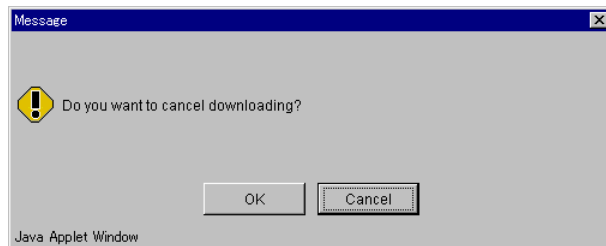


Figure 9.46 Message Dialog Box (Cancel)

11. When the microprogram is normally downloaded, a confirmation message displays. Click **OK**.

Note: After the microprogram downloads, restart the subsystem or replace the microprogram. If a hot replacement of the controller board is done before restarting the subsystem or the microprogram replacement, the replaced new controller may be blocked. Download may terminate with a DME505EA03 message when the subsystem is heavy host I/Os. Perform the download operation again.

9.17.2 Replacing a Microprogram


Replace the microprogram for the controller with the microprogram downloaded in the subsystem. When replacing the microprogram, replace both controller 0 and controller 1 microprograms. When connecting with both controllers or only with controller 0, replacement begins with controller 0 and then with controller 1. When connecting only with controller 1, replacement takes place in controller 1 and then controller 0.

Note: When only the controller of one side replaces microprograms and the Array Unit screen is closed, there is a case where the Array Unit screen stops opening after that. When the Array Unit screen does not open, replace the microprograms after replacing the microprograms into the registration of a controller that is not replacing microprograms.

WARNING: This operation will interrupt I/O from the host and may require rebooting the subsystem.

WARNING: If you are using TrueCopy or TrueCopy Extended Distance and you are required to reboot, change the pair status to PSUS before you reboot.

To replace the microprogram:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Micro Update** tab. See Figure 9.47.

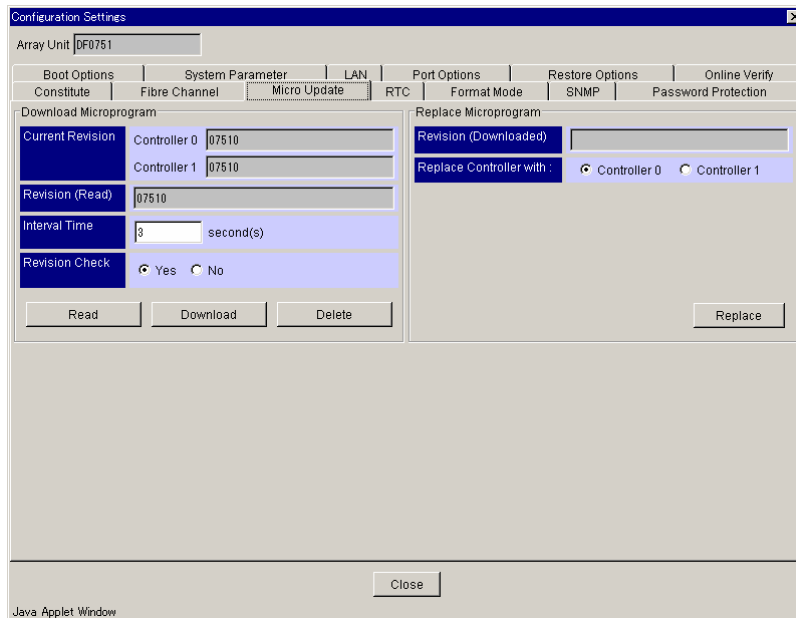


Figure 9.47 Configuration Settings - Micro Update

3. Select the controller whose microprogram is to be replaced and click **Replace**.
4. A confirmation message displays. Click **OK**. See Figure 9.48.

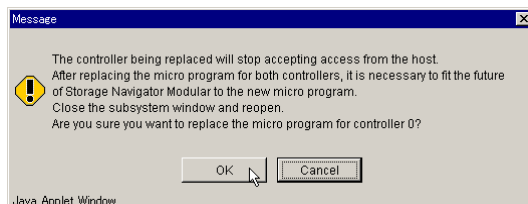


Figure 9.48 Confirmation Message

A status message displays.

5. After the microprogram download, the following message displays. See Figure 9.49. Check the contents of the message and click **OK**.

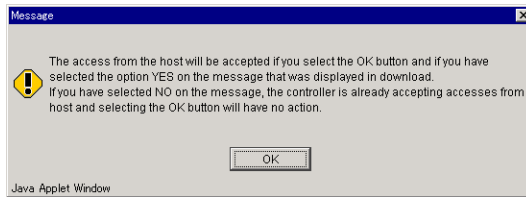


Figure 9.49 Message Dialog Box

6. When the microprogram replacement terminates normally, a completion message displays. When you click **OK**, the replacement microprogram updates and a window displays.


If the downloaded microprogram fails, a failure message displays. To validate the downloaded microprogram, restart the subsystem.

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, check the condition of the subsystem.

7. Repeat this procedure to replace the microprogram on the other controller. When replacements for both controllers terminate normally, the subsystem microprogram replacement is complete.

Note: When a microprogram is replaced, if the microprogram for only one of the controllers is replaced, the subsystem declares a warning state. When the other controller's subsystem is replaced, the subsystem recovers from the warning state. Always replace the microprogram for both controllers.

9.18 Setting the Backend Diagnosis Information

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **Backend Diagnosis** tab. See Figure 9.50.

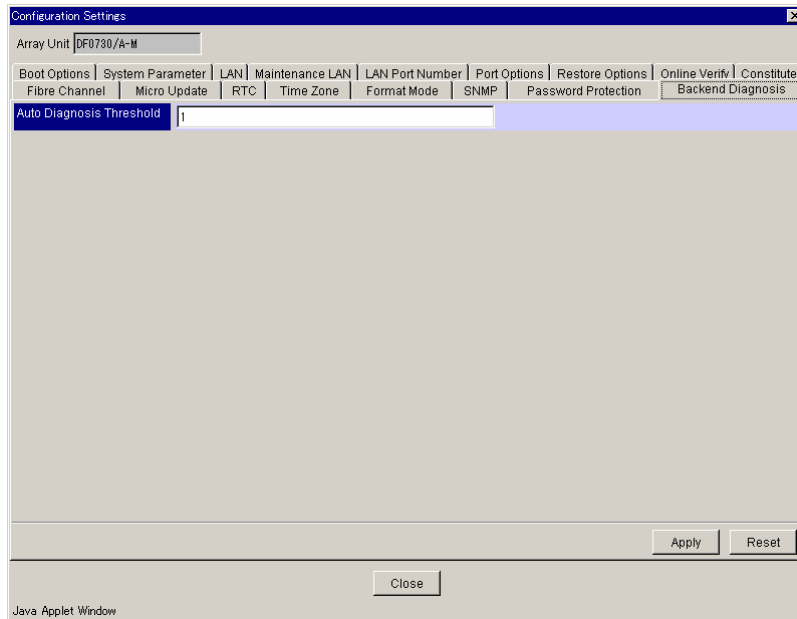


Figure 9.50 Backend Diagnosis Setting

- **Auto Diagnosis Threshold:** Specify the value in a range of 1 to 255.
3. Click **Apply**.
 4. A confirmation message displays. Click **OK**.

Chapter 10 Configuring NNC

This chapter includes the following sections:

- 10.1 Setting NNC LAN Information
- 10.2 Setting NAS System Logical Units
- 10.3 Setting NAS User Logical Units
- 10.4 Shutting Down/Booting/Rebooting NNC

Figure 10.1 shows an example of a connection of the host computer (Web Server) in which the Storage Navigator Modular is installed and the disk array subsystem to which the NNC option has been added.

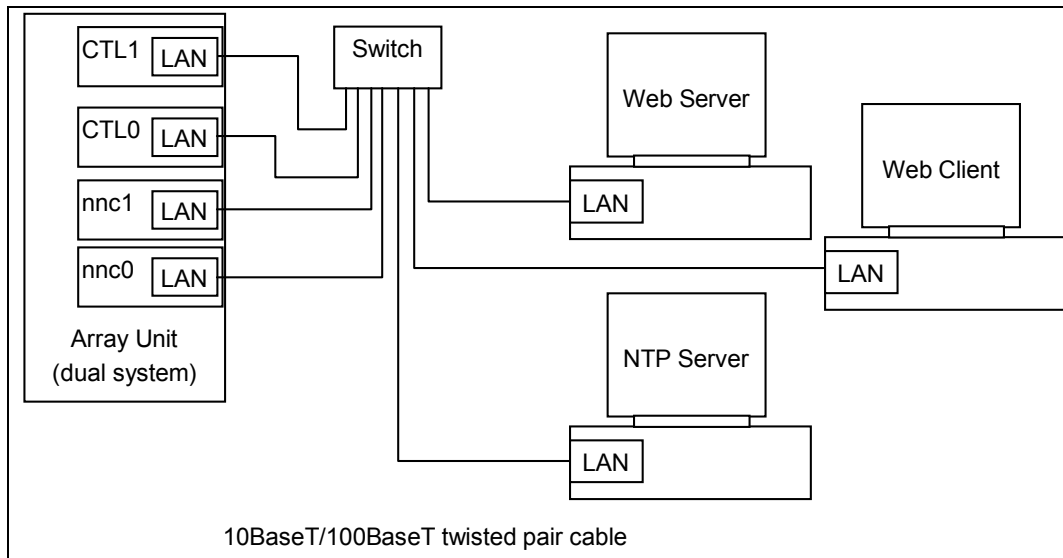

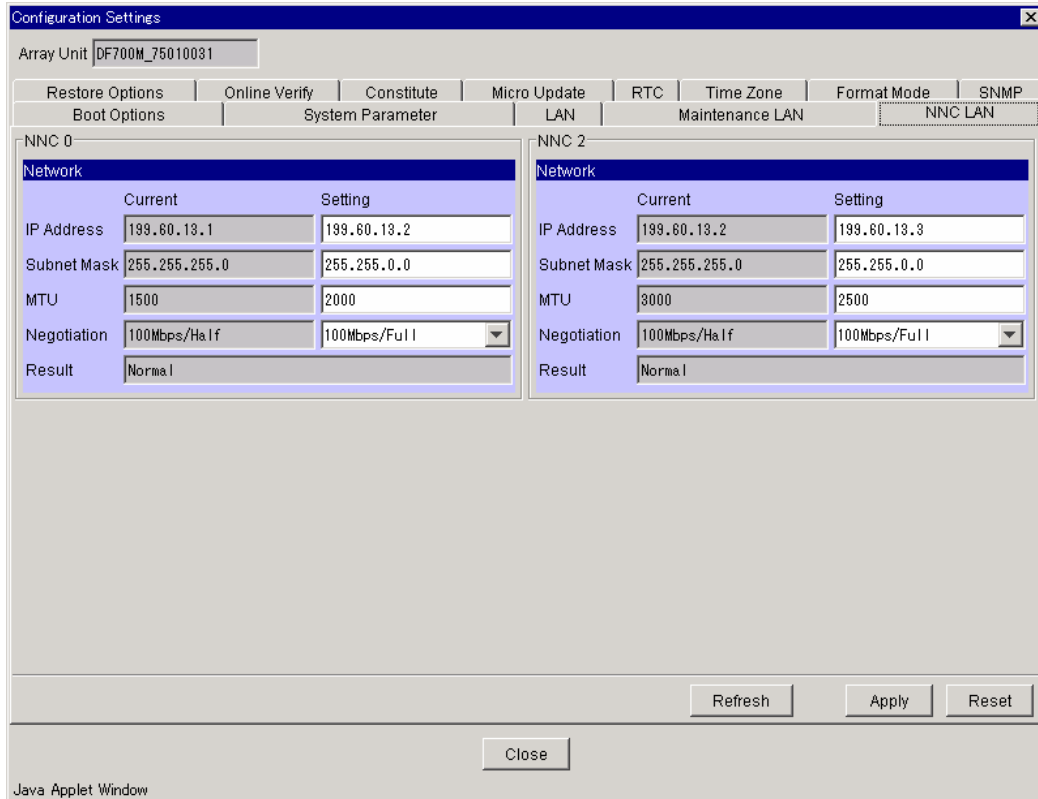


Figure 10.1 Disk Array Subsystem with NNC Option (Management Ports)

10.1 Setting NNC LAN Information

To set the NNC LAN information for management port:

1. On the **Tools** menu, select **Configuration Settings** or click .
2. Click the **NNC LAN** tab. See Figure 10.2.



NNC 0		NNC 2			
Network		Network			
	Current	Setting			
IP Address	199.60.13.1	199.60.13.2	IP Address	199.60.13.2	199.60.13.3
Subnet Mask	255.255.255.0	255.255.0.0	Subnet Mask	255.255.255.0	255.255.0.0
MTU	1500	2000	MTU	3000	2500
Negotiation	100Mbps/Half	100Mbps/Full	Negotiation	100Mbps/Half	100Mbps/Full
Result	Normal		Result	Normal	

Figure 10.2 Configuration Settings - NNC LAN

Network: Specify the **IP Address**, **Subnet Mask**, **MTU**, and **Negotiation**, which is part of the LAN information.

3. Click **Apply**.
4. When the confirmation message displays, click **OK**.

10.2 Setting NAS System Logical Units

Note: The NAS system logical units are usually set at the factory shipment, so that a user is not required to set them.

Nine logical units are required for the NAS system. Figure 10.3 shows the capacity that is necessary. When no logical unit is available for allocating to the NAS system logical unit, create it. See section 5.5 for information about creating a logical unit.

For NNC Type2

Name	LUN	Capacity
System Disk(CTL0)	0000	29.0GB
System Disk(CTL1)	0100	29.0GB
Volume for Dump(CTL0)	0001	6.0GB
Volume for Dump(CTL1)	0101	6.0GB
Command Device	0005	35.0MB
Command Device(Secondary)	0007	35.0MB
System Common Volume	0008	6.0GB
Backup Volume for Common	0009	6.0GB
Backup Volume for Common 2	0010	6.0GB

For NNC Type1

Name	LUN	Capacity
System Disk(CTL0)	0000	15.0GB
System Disk(CTL1)	0100	15.0GB
Volume for Dump(CTL0)	0001	5.0GB
Volume for Dump(CTL1)	0101	5.0GB
Command Device	0005	35.0MB
Working Area for Dump	0006	5.0GB
System Common Volume	0008	3.0GB
Backup Volume for Common	0009	3.0GB
Backup Volume for Common 2	0010	3.0GB

Figure 10.3 Example of Name LUN Capacity display

To set the NAS system logical units:

10.2.1 For NNC Type2

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the NAS plus sign. See Figure 10.4.
3. Click the **NNC0/2** plus sign.

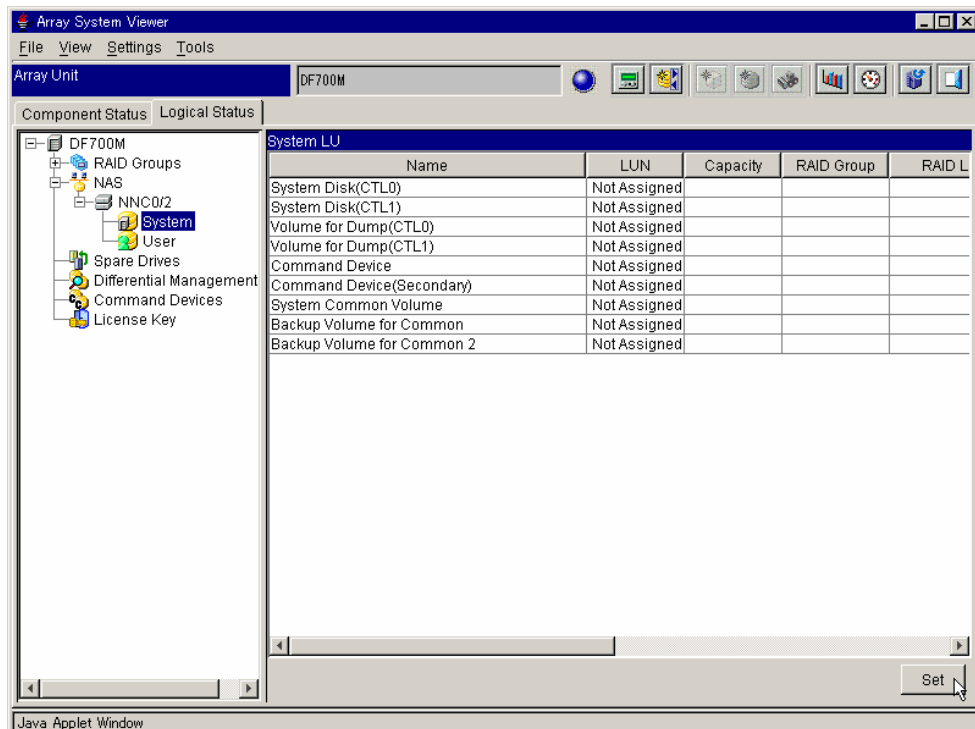


Figure 10.4 Array System Viewer - NNC0/2

4. Click Set.

The System LU dialog displays. See Figure 10.5.

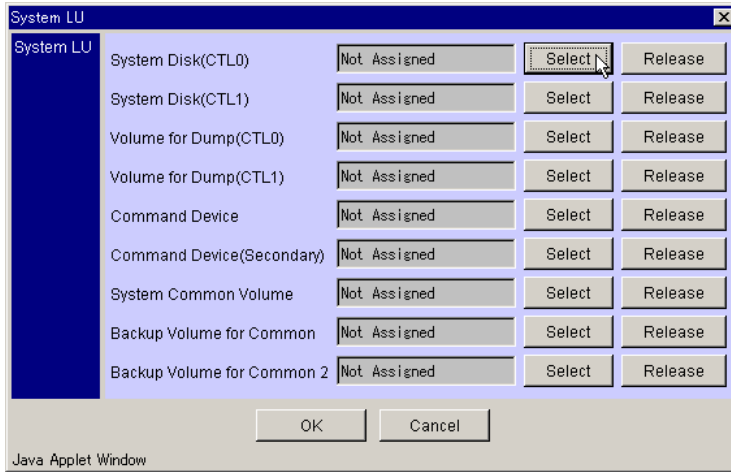


Figure 10.5 System LU dialog box

5. Click Select to set the System LU.

The Select Logical Unit dialog displays. See Figure 10.6.

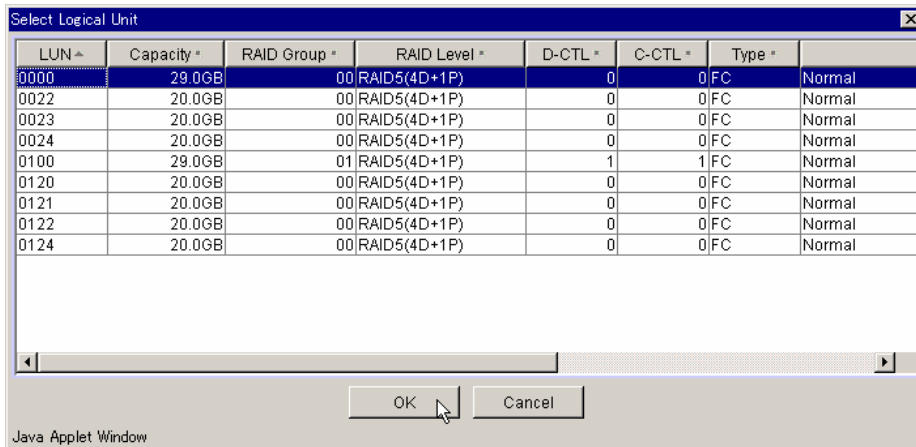


Figure 10.6 Select Logical Unit Dialog Box

6. Select the LUN you want to set the System LU and click OK.

The selected LUN displays to the System LU dialog box. See Figure 10.7.

7. Repeat steps 5 and 6 and complete a System LU list.

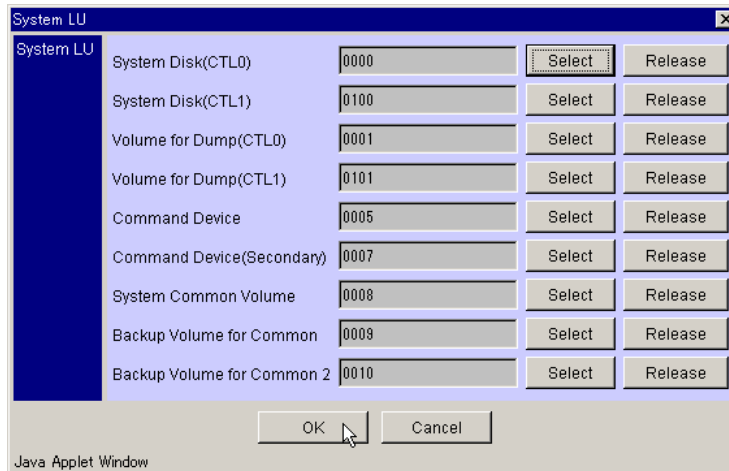


Figure 10.7 System LU Dialog Box

8. Click OK.
9. When the confirmation message displays, click OK.

10.2.2 For NNC Type1

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the NAS plus sign. See Figure 10.8.
3. Click the NNC0/2 plus sign.

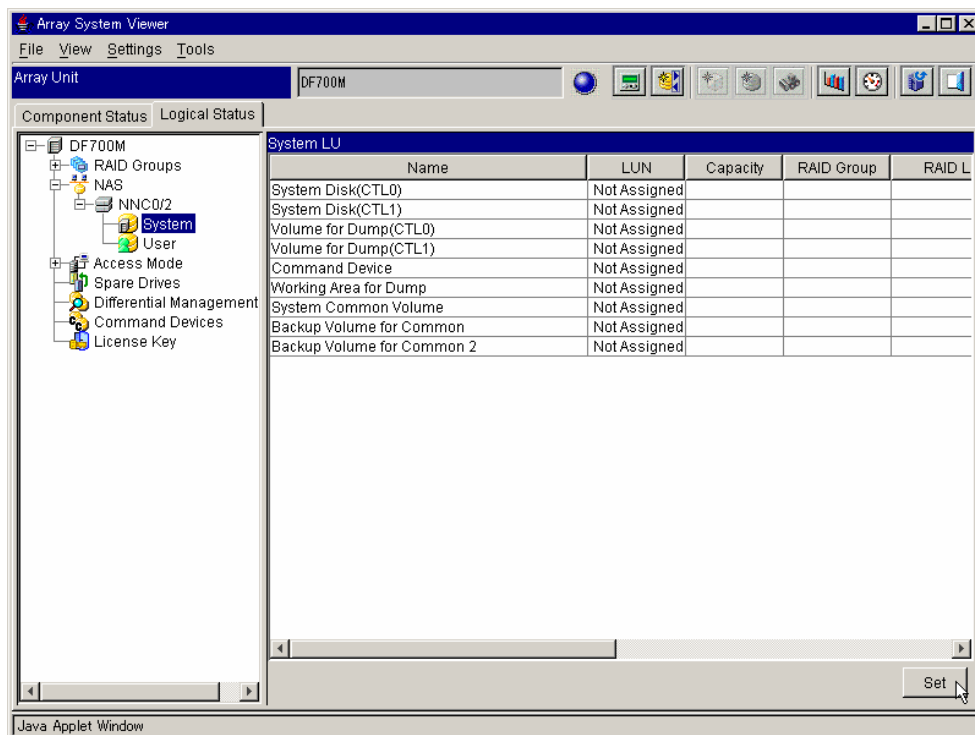


Figure 10.8 Array System Viewer - NNC0/2

4. Click **Set**.

The **System LU** dialog displays. See Figure 10.9.

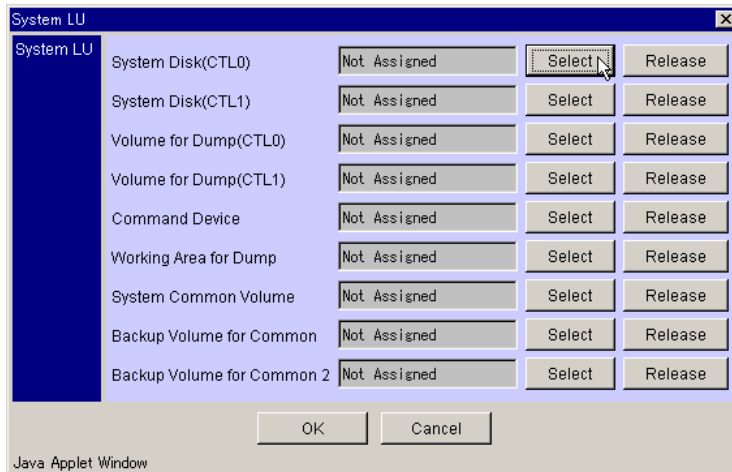


Figure 10.9 System LU dialog box

5. Click **Select** to set the System LU.

The **Select Logical Unit** dialog displays. See Figure 10.10.

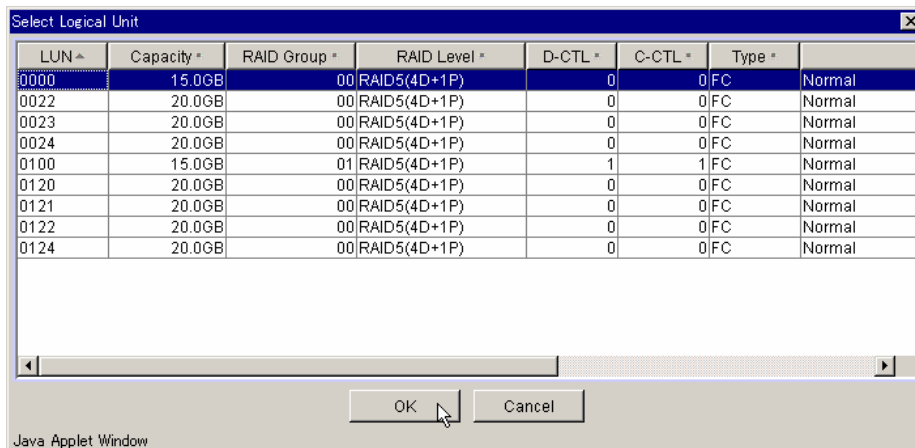


Figure 10.10 Select Logical Unit Dialog Box

6. Select the **LUN** you want to set the System LU and click **OK**.

The selected LUN displays to the **System LU** dialog box. See Figure 10.11.

7. Repeat steps 5 and 6 and complete a System LU list.

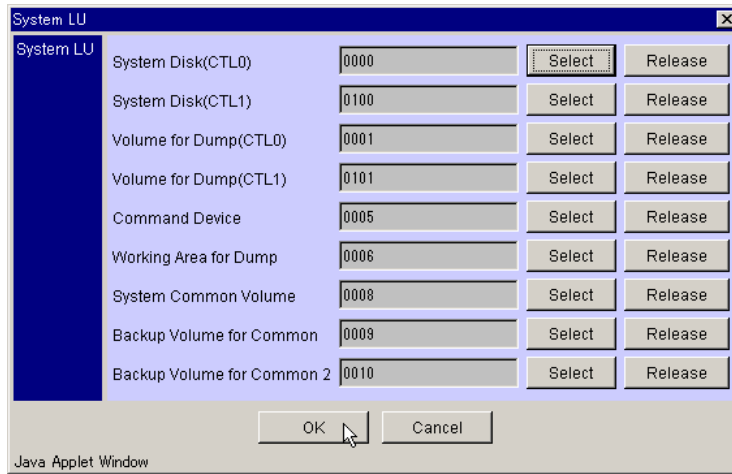


Figure 10.11 System LU Dialog Box

8. Click **OK**.
9. When the confirmation message displays, click **OK**.

10.3 Setting NAS User Logical Units

When no logical unit is available for allocating to the logical unit for the NAS user, create it. See section 5.5 for information about creating a logical unit.

To set the NAS user logical units:

1. Click the **Logical Status** tab on the Array Unit screen.
2. Click the **NAS** plus sign. See Figure 10.12.
3. Click the **NNC0/2** plus sign.

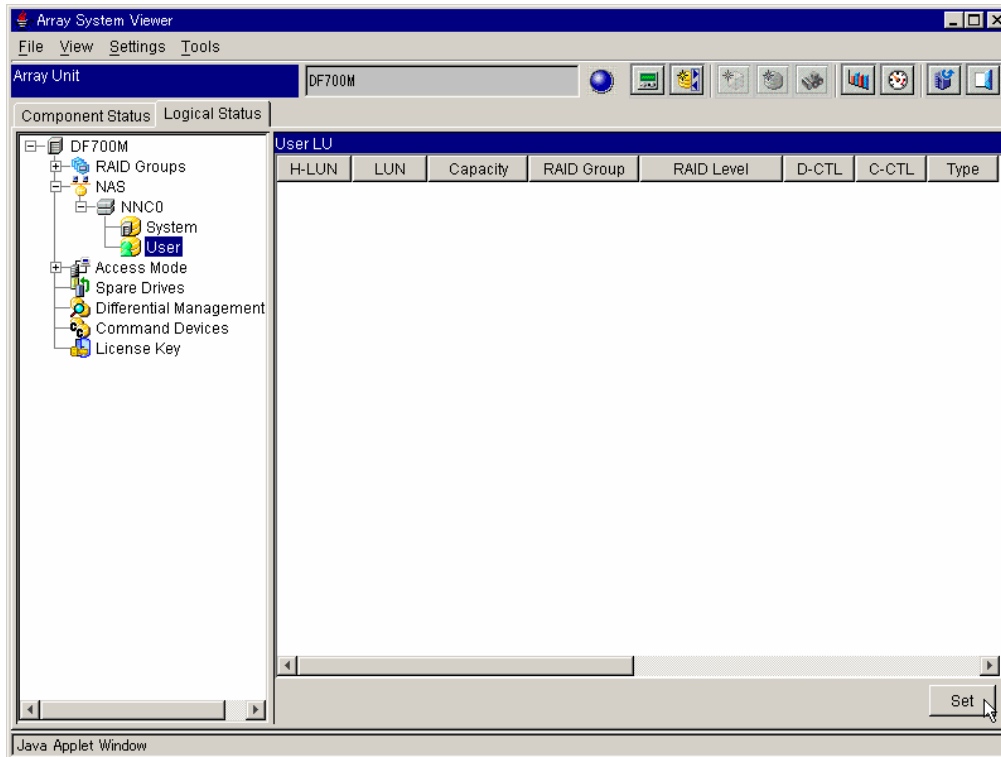


Figure 10.12 Array System Viewer - User

4. Click Set.

The User LU dialog box displays. See Figure 10.13.

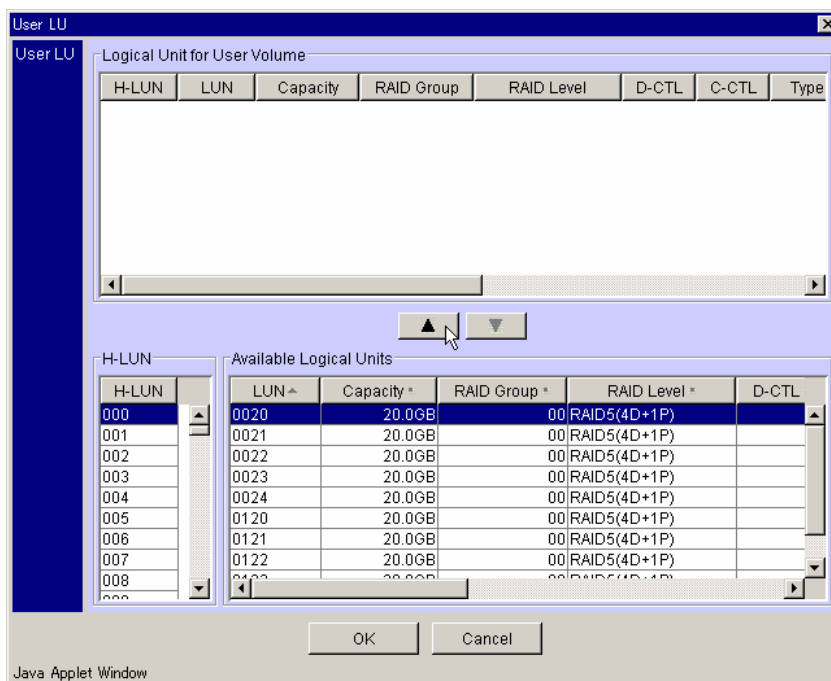



Figure 10.13 User LU Dialog Box

5. Select one H-LUN to be added. Select one LUN and click . The added contents are displayed in Logical Unit for User Volume list.

- Repeat step 5 and complete a User LU list. See Figure 10.14.

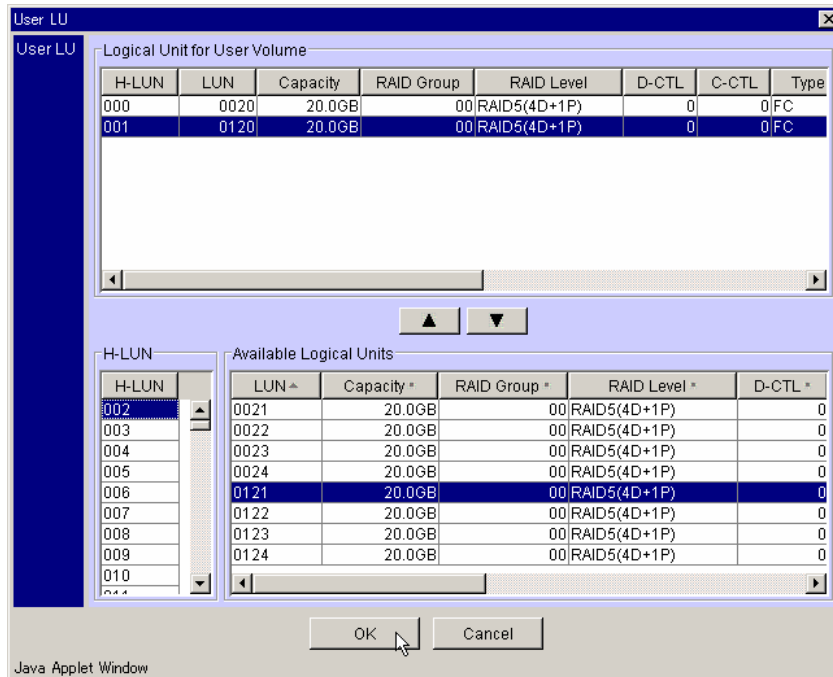



Figure 10.14 User LU - H-LUN

To cancel the assigned user LU, click the H-LUN to be canceled in the **Logical Unit for User Volume** list and click .

The selected H-LUN moves to the **Available Logical Units** list.

- Click **OK**.
- When the confirmation message displays, click **OK**.

10.4 Shutting Down/Booting/Rebooting NNC

10.4.1 Shutting Down the NNC

Note: When shutting down the NNC, just after the subsystem power ON or cluster start from the NAS Manager Modular, stop the NNC after the following confirmation displays:

- The cluster status is "ACTIVE", and the resource group status is "Online" or "Offline".

When shutting down NCC and NNC is not in the above situation, it is possible that the cluster setting and resource group setting cannot execute normally.

(Example: When executing the cluster stop from the NAS Manager Modular that is connected to the NNC which is not executed the shutdown the NNC, it is possible that the cluster stop is not finished.) In this case, reboot the NNC, which is not executed the shutdown the NNC from Storage Navigator Modular.

- Click the **Logical Status** tab on the Array Unit screen.

2. Select the **NAS** icon and then select the **NNC** number on the **NNC Status** list. See Figure 10.15.

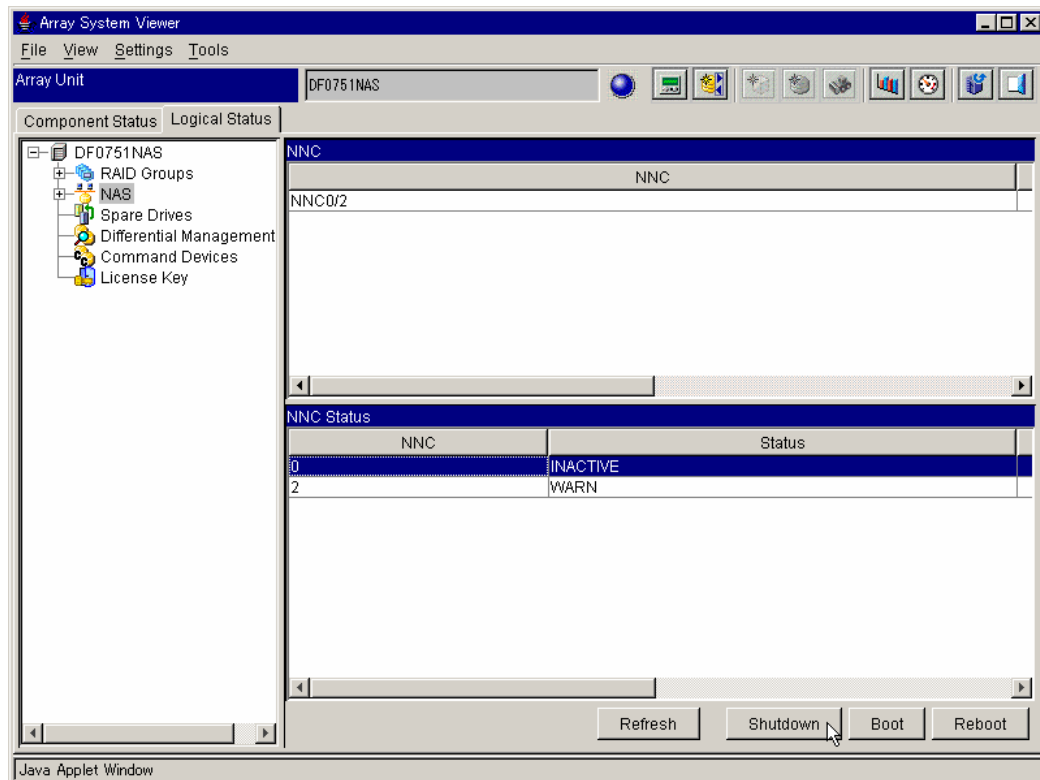


Figure 10.15 Array System Viewer - NNC Status

- **NNC Status:** Status of NAS OS:
 - **ACTIVE:** NAS OS is active and the Node is in operation.
 - **BOOT:** NAS OS is in boot process.
 - **DISUSE:** The controller is blocked.
 - **DOWN:** NAS OS is abnormally stopped.
 - **DUMP:** A NAS Dump is being collected.
 - **HUNGUP:** NAS OS is hung-up.
 - **INACTIVE:** NAS OS is in operation and the Node is stopped.
 - **INST:** NAS OS is in installation process.
 - **NEW:** NAS OS is not installed.
 - **SHUTDOWN:** NAS OS is in shutdown process.
 - **STOP:** NAS OS is normally stopped.
 - **WARN:** NAS Manager is not installed, or NAS OS is in operation and the status of the Node is unknown.
3. Click **Shutdown**.
 4. When the confirmation message displays, click **OK**.

10.4.2 Booting the NNC

Note: There is not a difference in operation of boot and reboot. Do not specify anything for the boot option.

1. Click **Logical Status** on the Array Unit screen.
2. Select the **NAS** icon, and then select the **NNC** number on the **NNC Status** list. See Figure 10.16.

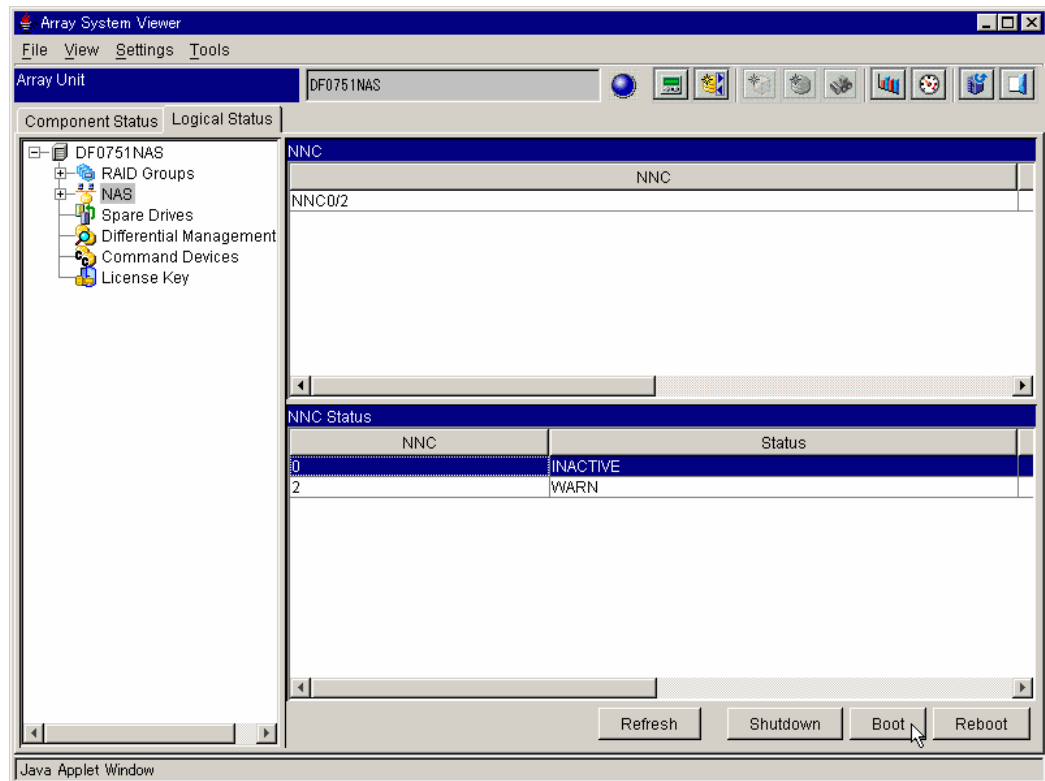


Figure 10.16 Array System Viewer - NNC Status list

3. Click **Boot**.
4. When the confirmation message displays, click **OK**.

10.4.3 Rebooting the NNC

Note: When rebooting the NNC immediately after the subsystem power ON or cluster start from NAS Manager Modular, reboot the NNC after the following confirmation displays.

- The cluster status is "ACTIVE", and the resource group status is "Online" or "Offline".

When rebooting the NNC and NCC is not in the above situation, it is possible that the cluster setting and resource group setting cannot execute normally.

(Example: When executing the cluster stop from the NAS Manager Modular that is connected to NNC which is not executed the rebooting the NNC, it is possible that the cluster stop is not finished.) In this case, reboot the NNC which is not executed the rebooting the NNC from Storage Navigator Modular.

1. Click **Logical Status** on the Array Unit screen.
2. Select the **NAS** icon, and then select the **NNC** number on the **NNC Status** list. See Figure 10.17.

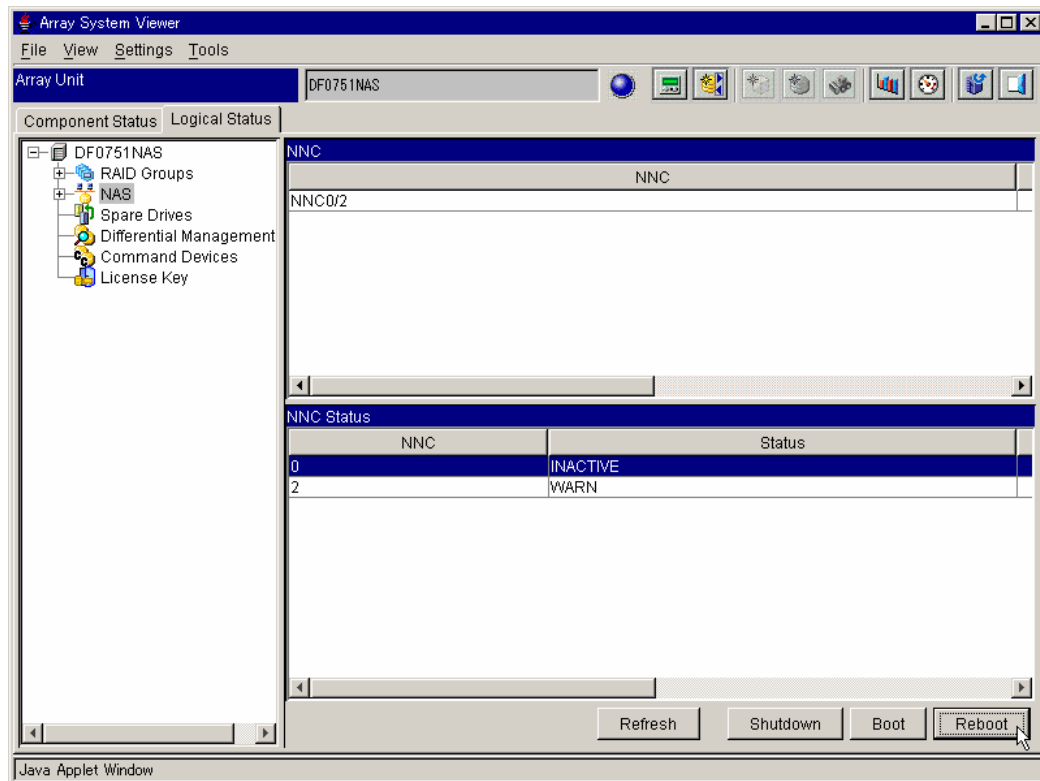


Figure 10.17 Array System Viewer - NNC Status list

3. Click **Reboot**.
4. When the confirmation message displays click **OK**.

Chapter 11 Displaying Statistical Information

This chapter includes the following sections:

- 11.1 Displaying Controller Activity
- 11.2 Displaying Host Commands Received (Read/Writes per LU)
- 11.3 Displaying Command Execution Activity
- 11.4 Displaying Cache Load Condition

11.1 Displaying Controller Activity

To display controller activity:

On the Tools menu, select **Statistical Information** or click . See Figure 11.1.

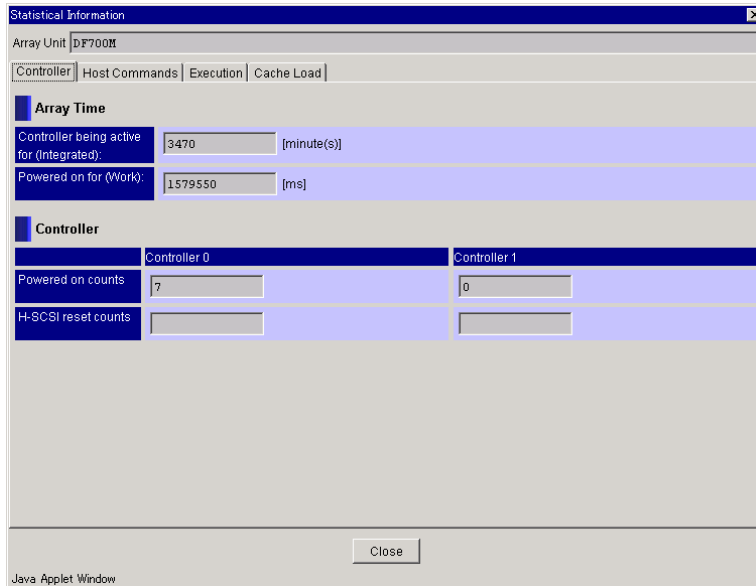


Figure 11.1 Statistical Information Window

- **Array Time**
 - Controller is active for (Integrated): The accumulated time when the power is applied from the initial powering on of the disk array subsystem to the latest powering off is displayed by the minute.
 - Power on for (Work): The time elapsed from the powering on of the disk array subsystem to the present time is displayed by the millisecond.
- **Controller**
 - Powered on counts: Integrated number of power ON times (at interruption) of the controller.
 - H-SCSI reset counts: Integrated number of host bus SCSI reset times (total of interruptions and messages) of the controller (not supported).

11.2 Displaying Host Commands Received (Read/Writes per LU)

To display the cumulative read and write commands per logical unit, select the **Host Commands** tab. See Figure 11.2.

Statistical Information

Array Unit: DF700M

Controller: Host Commands | Execution | Cache Load

Controller 0				Controller 1			
LU	Read	Write		LU	Read	Write	
0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0
2	0	0	0	2	0	0	0
3	0	0	0	3	0	0	0
4	0	0	0	4	0	0	0
5	0	0	0	5	0	0	0
6	0	0	0	6	0	0	0
7	0	0	0	7	0	0	0
8	0	0	0	8	0	0	0
9	0	0	0	9	0	0	0
10	0	0	0	10	0	0	0
11	0	0	0	11	0	0	0
12	0	0	0	12	0	0	0
13	0	0	0	13	0	0	0

Close

Java Applet Window

Figure 11.2 Statistical Information - Host Commands

11.3 Displaying Command Execution Activity

To display the command execution activity, select the **Execution** tab. See Figure 11.3.

Statistical Information

Array Unit: DF700M

Controller: Host Commands | Execution | Cache Load

Controller 0					Controller 1				
Title					Title				
A : Logical Unit					A : Logical Unit				
B : Read Cache Hits					B : Read Cache Hits				
C : Write Cache Hits					C : Write Cache Hits				
D : Sequential Read					D : Sequential Read				
E : Sequential Write					E : Sequential Write				
F : Prefetch Stagings					F : Prefetch Stagings				
G : Write Through Operation					G : Write Through Operation				
A	B	C	D		A	B	C	D	
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	0	0
2	0	0	0	0	2	0	0	0	0
3	0	0	0	0	3	0	0	0	0
4	0	0	0	0	4	0	0	0	0
5	0	0	0	0	5	0	0	0	0
6	0	0	0	0	6	0	0	0	0
7	0	0	0	0	7	0	0	0	0
8	0	0	0	0	8	0	0	0	0
9	0	0	0	0	9	0	0	0	0
10	0	0	0	0	10	0	0	0	0

Close

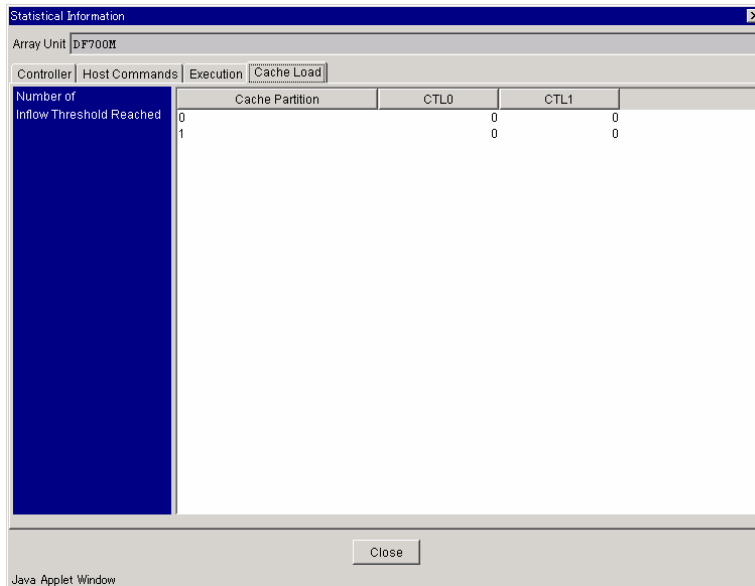
Java Applet Window

Figure 11.3 Statistical Information - Execution

- **A: Logical Unit:** Logical unit number
- **B: Read Cache Hits:** Total of READ commands (hitting cache or partially hitting cache)
- **C: Write Cache Hits:** Total of WRITE commands (cache read hits)
- **D: Sequential Read:** Total of READ commands (recognized as sequential reading)
- **E: Sequential Write:** Total of WRITE commands (recognized as sequential writing)
- **F: Prefetch Staging:** Total of prefetch jobs executed
- **G: Write Through Operation:** Total of WRITE or WRITE & VERIFY commands (substituted by Write-Through operations)
- **H: Reassigned Blocks:** Number of re-assigned blocks (not supported)

11.4 Displaying Cache Load Condition

To display cache load activity, click the **Cache Load** tab. See Figure 11.4.



Number of Inflow Threshold Reached	Cache Partition	CTL0	CTL1
0		0	0
1		0	0

Figure 11.4 Statistical Information - Cache Load

Number of Inflow Threshold Reached: Total number of occurrences of inflow limitations.

This equipment manages the amount of data in cache as an inflow limit. When the host tries to write data exceeding this limit, an inflow limitation occurs. In this case, the write request from the host waits until part of the write data is transferred to the drive.

Chapter 12 Acquiring Performance Information

In the statistics information, the command operation state is output for each logical unit in the array unit. The command operation state consists of three types of data: the number of received commands, the number of cache-hit commands, and the cache hit rate for each Read or Write command.

This chapter includes the following sections:

- 12.1 Collecting Performance Statistics
- 12.2 Manually Outputting Performance Statistics to a Text File
- 12.3 Automatically Outputting Performance Statistics to a Text File

12.1 Collecting Performance Statistics

To collect performance statistics:

1. On the Tools menu, select **Performance** → **Settings**. See Figure 12.1.

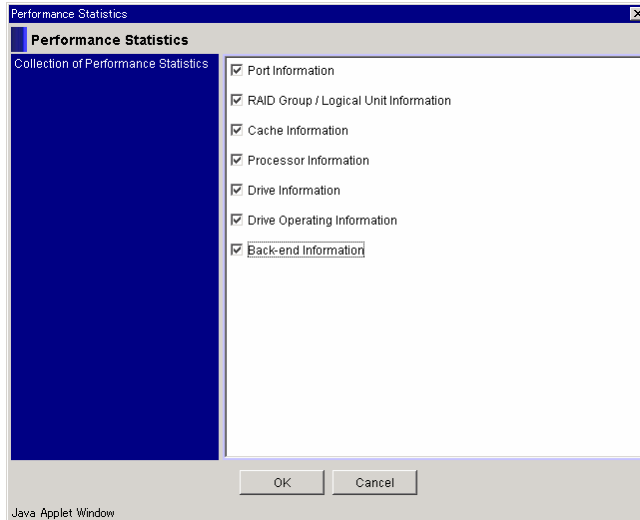



Figure 12.1 Performance Statistics Window

2. Select items from the **Collection of Performance Statistics**.
3. Click **OK**.

A confirmation message indicates that the host access may be affected during statistic collection. Click **OK**.

12.2 Manually Outputting Performance Statistics to a Text File

To create a performance-statistic text file:

1. On the Tools menu, select **Performance** → **Output File** or click . See Figure 12.2.

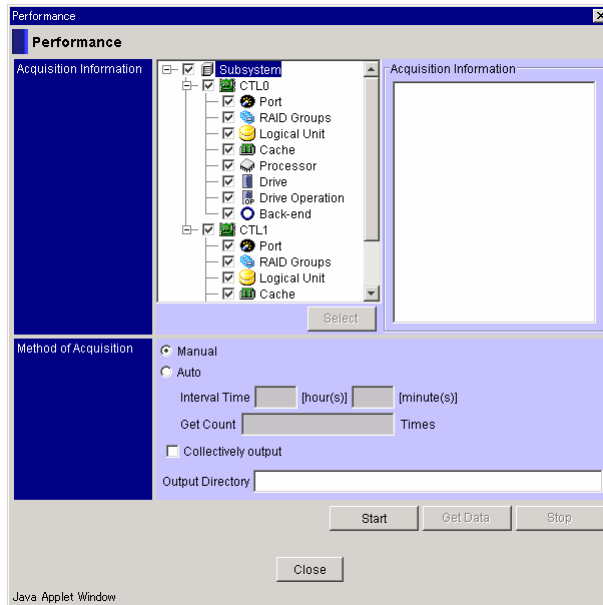


Figure 12.2 Performance Window

2. Select a component name (**Port**, **RAID Groups**, **Logical Unit**, **Cache**, **Processor**, **Drive**, **Drive Operation**, or **Back-end**) for information about the controller.
3. Specify the extent of the output using **Select**, excluding the **Cache** and **Processor**. When the extent is not specified, all is output. For example, when you want to specify an extent of information on the **Logical Unit**, select the **Logical Unit** icon, click **Select**, and specify the extent of the **Logical Unit**. See Figure 12.3.

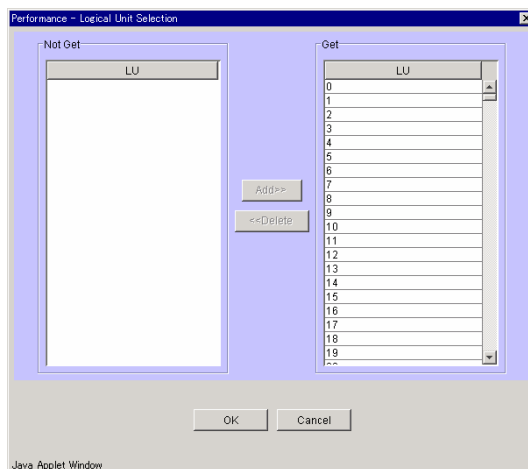


Figure 12.3 Performance - Logical Unit Selection

4. Click the number of the first LU you do not want to output. Scroll the LU numbers with the slider keeping the **Shift** key pressed, and click the number of the last LU. See Figure 12.4.

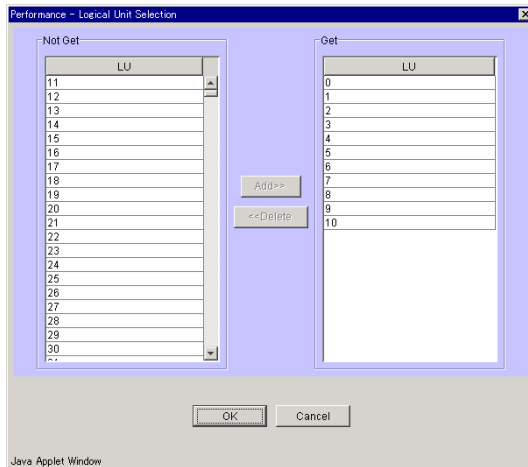


Figure 12.4 Performance - Logical Unit Selection

5. Click **OK**.
6. Select the **Manual** option.
7. Set the **Collectively output** option:
 - Select to append the current output to the previous output.
 - Clear to collect only the current output.
8. Specify the output directory. If the output directory is omitted, output defaults to the directory Storage Navigator Modular installation directory.
9. Click **Start**.
10. Click **Get Data**. See Figure 12.5.

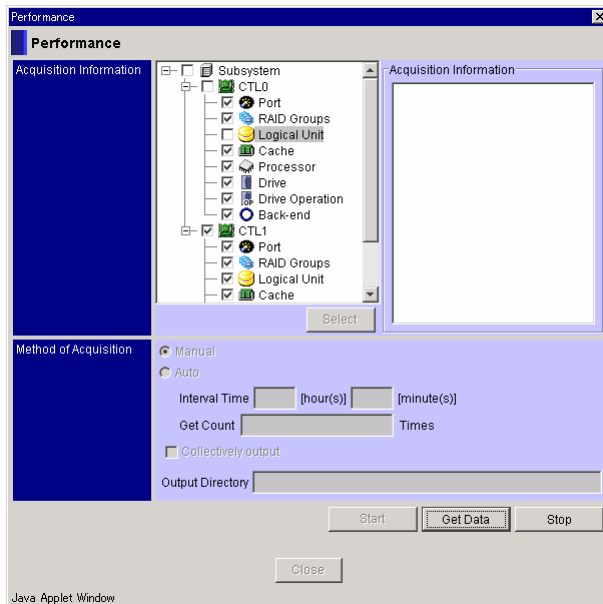


Figure 12.5 Performance Window

a) When the **Collectively output** is not specified:

These files are output in the text file format.

: pfm\$\$\$\$\$.txt (\$\$\$\$\$: serial number from 00000 to 19999)

Note: Files are output with the names of pfm00000.txt to pfm19999.txt. After pfm19999.txt, pfm00000.txt is overwritten. Transfer the necessary information to another directory.

The information is acquired according to the following timing. See Figure 12.6.

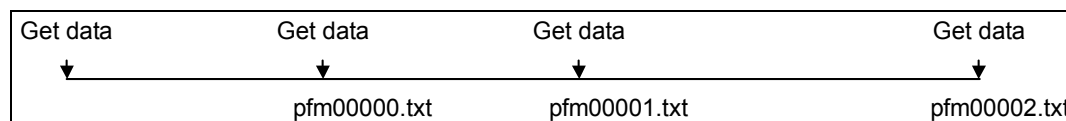


Figure 12.6 Timing

b) When the **Collectively output** is specified:

This file is output in the text file format (pfm.txt).

11. After the file processed is terminated, a confirmation message displays. Click **OK**.

12. Click **Stop**.

When the single system is connected, information is only collected for the controller 0 side.

Note: For AMS500 subsystems, a single output to text file is 500 KB. Multiple outputs increase the file size proportionally. A file with 20,000 outputs requires about 10 GB of disk space.

- **No.:** Output number.
- **Information getting time:** Time and date when the information is acquired.
- **CTL:** Controller number.
- **Port:** Port number.
- **IO Rate (IOPS):** Number of Read/Write commands received per second.
- **Read Rate (IOPS):** Number of Read commands received per second.
- **Write Rate (IOPS):** Number of Write commands received per second.
- **Read Hit (%):** Rate of the number of the Read commands, which could cache-hitting, out of the Read commands received in the specified period.
- **Write Hit (%):** Rate of the number of the Write commands, which could write data immediately to the cache, out of the Write commands received in the specified period.
- **Trans. Rate (MB/S):** Transfer size of Read/Write commands per second.
- **Read Trans. Rate (MB/S):** Transfer size of Read commands per second.
- **Write Trans. Rate (MB/S):** Transfer size of Write commands per second.
- **Read CMD Count:** Received number of Read commands.
- **Write CMD Count:** Received number of Write command.

- **Read CMD Hit Count:** Number of the Read commands that had been cache-hit.
- **Write CMD Hit Count:** Number of the Write commands, which could write data immediately to the cache.
- **Read Trans. Size (MB):** Transfer size of Read commands.
- **Write Trans. Size (MB):** Transfer size of Write commands.
- **RG:** RAID group number.
- **LU:** Logical unit number.
- **Read CMD Hit Count2:** Number of the Hit Read Special Path commands out of the read commands that made cache hits.
- **Read CMD Hit Time(microsec.):** The average response time of the Hit Read Special Path command.
- **Read CMD Hit Max Time(microsec.):** The maximum response time of the Hit Read Special Path command.
- **Write CMD Hit Count2:** Number of the Write Special Path commands out of the Write commands, which could write data immediately to the cache.
- **Write CMD Hit Time(microsec.):** The average response time of the Write Special Path command.
- **Write CMD Hit Max Time(microsec.):** The maximum response time of the Write Special Path command.
- **Read CMD Miss Count:** The number of the Miss Read Special Path commands out of the Read commands that made no cache hits.
- **Read CMD Miss Time(microsec.):** The average response time of the Miss Read Special Path command.
- **Read CMD Miss Max Time(microsec.):** The maximum response time of the Miss Read Special Path command.
- **Write CMD Miss Count:** The number of the Random Write Special Path commands that could complete the high-speed process up to the parity generation that is an extended process of the Write command.
- **Write CMD Miss Time(microsec.):** The average response time of the Random Write Special Path command.
- **Write CMD Miss Max Time(microsec.):** The maximum response time of the Random Write Special Path command.
- **Read CMD Job Count:** The number of the Read commands that could not perform the high-speed process.
- **Read CMD Job Time(microsec.):** The average response time of the Read command job.
- **Read CMD Job Max Time(microsec.):** The maximum response time of the Read command job.
- **Write CMD Job Count:** The number of the Write commands that could not perform the high-speed process.
- **Write CMD Job Time(microsec.):** The average response time of the Write command job.

- **Write CMD Job Max Time(microsec.):** The maximum response time of the Write command job.
- **Read Hit Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Hit Read Special Path commands.
- **Read Hit Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Hit Read Special Path commands.
- **Read Hit Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Hit Read Special Path commands.
- **Read Hit Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Hit Read Special Path commands.
- **Write Hit Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Write Special Path commands.
- **Write Hit Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Write Special Path commands.
- **Write Hit Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Write Special Path commands.
- **Write Hit Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Write Special Path commands.
- **Read Miss Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Miss Read Special Path commands.
- **Read Miss Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Miss Read Special Path commands.
- **Read Miss Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Miss Read Special Path commands.
- **Read Miss Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Miss Read Special Path commands.
- **Write Miss Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Random Write Special Path commands.
- **Write Miss Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Random Write Special Path commands.
- **Write Miss Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Random Write Special Path commands.
- **Write Miss Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Random Write Special Path commands.
- **Read Job Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Read command job.
- **Read Job Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Read command job.

- **Read Job Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Read command job.
- **Read Job Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Read command job.
- **Write Job Delay CMD Count(<300ms):** The number of commands, whose response time is less than 300 ms, out of the Write command job.
- **Write Job Delay CMD Count(300-499ms):** The number of commands, whose response time is in a range of 300 ms to 499 ms, out of the Write command job.
- **Write Job Delay CMD Count(500-999ms):** The number of commands, whose response time is in a range of 500 ms to 999 ms, out of the Write command job.
- **Write Job Delay CMD Count(1000ms-):** The number of commands, whose response time is 1000 ms or more, out of the Write command job.
- **Tag Count:** The maximum number of tags in the specified period.
- **Cache Write Pending Rate (%):** Rate of cache usage capacity (middle+physical) within the cache capacity.
- **Cache Clean Queue Usage Rate (%):** Rate of clean cache usage.
- **Cache Middle Queue Usage Rate (%):** Rate of middle cache usage.
- **Cache Physical Queue Usage Rate (%):** Rate of physical cache usage.
- **Cache Total Queue Usage Rate (%):** Rate of total cache usage.
- **Partition:** Partition number.
- **Usage (%):** Operation rate of the processor.
- **Host-Cache Bus Usage Rate (%):** The use rate of the bus between the host and the cache.
- **Drive-Cache Bus Usage Rate (%):** The use rate of the bus between the drive and the cache
- **Processor-Cache Bus Usage Rate (%):** The use rate of the bus between the processor and the cache.
- **Cache (DRR) Bus Usage Rate (%):** The use rate of the bus between the parity generation circuit (DRR) and the cache.
- **Dual Bus Usage Rate (%):** The use rate of the bus between the controllers.
- **Total Bus Usage Rate (%):** The total use rate of the cache bus.
- **Unit:** Unit number.
- **HDU:** HDU number.
- **Online Verify. Rate (IOPS):** Number of Online Verify commands per second.
- **Online Verify CMD Count:** Number of Online Verify commands.
- **Operating Rate (%):** Operation rate of the drive.
- **Tag Count:** Number of Tag.
- **Unload Time (min.):** Unload time of the drive.
- **Path:** Path number.
- **Loop:** Loop number.

12.3 Automatically Outputting Performance Statistics to a Text File

Command operation state for each logical unit in the subsystem is output at the specified intervals by the specified times.

1. On the **Tools** menu, select **Performance** or click . See Figure 12.7.

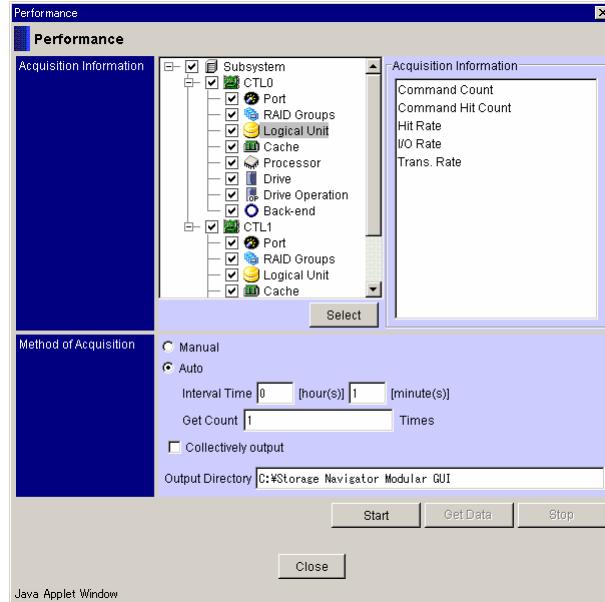


Figure 12.7 Performance Window

2. Select a component name (**Port**, **RAID Groups**, **Logical Unit**, **Cache**, **Processor**, **Drive**, **Drive Operation**, or **Back-end**) for information about the controller.
3. Specify the extent to be output using **Select**, excluding the **Cache** and **Processor**. When the extent is not specified, all is output. For example, when you want to specify an extent of information on the **Logical Unit**, select the **Logical Unit** icon, click **Select**, and specify the extent of the **Logical Unit**.
4. Select the **Auto** option.
5. Specify the **Interval Time** and **Get Count** Times.
6. When you want to make an output as an addition to the information previously output, check the **Collectively output** check box. Do not check this box when you want to overwrite the information that was previously output.
7. Specify the output directory. If the output directory is omitted, it will be outputted to the directory where the Storage Navigator Modular is installed.

8. Click **Start**. See Figure 12.8.

A status message displays.

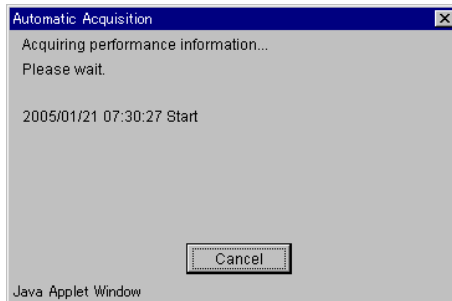


Figure 12.8 Automatic Acquisition Dialog Box

- a) When **Collectively output** is not specified:

These files are output in the text file format.

: pfm\$\$\$\$\$.txt (\$\$\$\$\$: serial number from 00000 to 19999)

Note: Files are output with the names of pfm00000.txt to pfm19999.txt. After pfm19999.txt, pfm00000.txt is overwritten. Transfer necessary information to another directory.

- b) When **Collectively output** is specified:

This file is output in the text file format (pfm.txt).

9. After the file processed terminates, a confirmation message displays. Click **OK**.

When the single system is connected, only information from controller 0 is collected.

The format to the file to be retrieved is the same as that of the file retrieved manually.

Note: For AMS500 subsystems, a single output to text file is 500 KB. Multiple outputs increase the file size proportionally. A file with 20,000 outputs requires about 10 GB of disk space.

Chapter 13 Monitoring Errors

This chapter includes the following sections:

- 13.1 Setting Error Monitoring Options
- 13.2 Registering the Failure Monitoring Account
- 13.3 Outputting Failure Information to a Log File
- 13.4 Error Monitoring
- 13.5 Checking Status

13.1 Setting Error Monitoring Options

During error monitoring, when a failure is detected on the monitored array unit, the E-mail Report or one in a specified application can be started.

In **Error Alert**, click the **E-Mail Error Report Enabled** check box and the **Execute Application** check box to enable them. See Figure 13.1.

1. On the **Tool** menu, select **Error Monitoring** → **Options** or click .

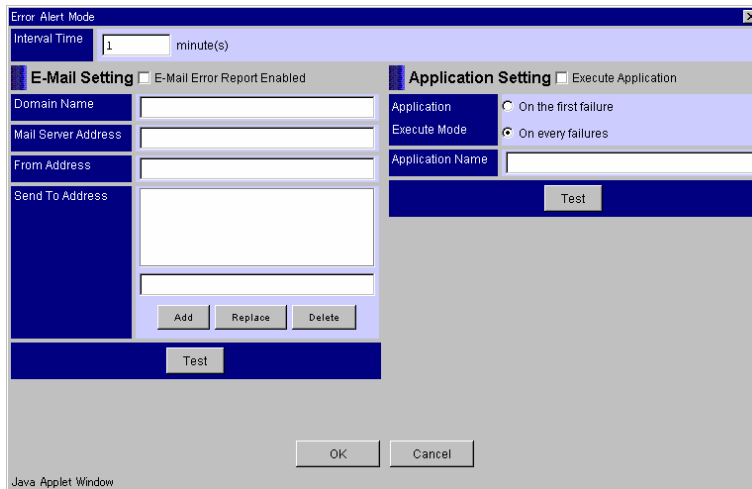


Figure 13.1 Setting Error Monitoring Options

13.1.1 Interval Time

1. Specify the interval time for error monitoring.

Specify **Interval Time** in the range of 1 minute to 720 minutes (12 hours). The interval means the time from an end of all target array unit monitoring until the start of the next monitoring.

2. Click **OK**.

The setting is validated without rebooting Storage Navigator Modular.

13.1.2 E-mail Report

When an error is detected by error monitoring, the contents of the error are reported.

If an error is detected on the array unit while error monitoring is executed, the following error information is reported by E-mail. Usually, the subject is appended before the E-mail is transmitted.

- E-mail Subject
- E-mail Message Text

E-Mail Subject

For E-mail, the section that failed is appended to the subject. The subject format is shown below. Table 13-1 shows a list of subjects.

Storage Navigator Modular/Obstruction (Failed Part)

Table 13-1 List of E-mail Subjects

Subject	Meaning
Disk	A drive blockade occurred (for 9200).
FC Disk	An FC drive blockade occurred (for 9500V).
SATA Disk	An SATA drive blockade occurred.
DC Power	A DC power supply failure occurred.
Battery	A battery voltage error occurred.
Fan	A fan failure occurred.
Controller	A controller blockade occurred. (This occurs only in the dual controller configuration.)
AC Power	An AC power supply error occurred.
Cache Memory	A cache failure occurred.
Cache Backup Circuit	A backup circuit failure occurred.
ENC	An enclosure error occurred.
SENC	An SENC error occurred.
Loop	A loop error occurred.
Path	A path blockade occurred.
Warning	The array unit entered the warning state.
Array connection	A failure occurred in the connection with the subsystem. A power OFF or a failure occurred in the subsystem.
Host Connector	A host connector error occurred (for the AMS subsystem).
NNC	An NNC blockade occurred (for the AMS subsystem).

E-mail Message Text

When using E-mail, the failed part is reported using the message text in the subject. The format of the message text is shown below. A list of messages is shown in Table 13-2 and Table 13-3. The message format is:

Day, Mon.dd hh:mm:ss yyyy/DF Name/message text

Table 13-2 List of E-mail Message Texts (AMS200 and AMS500)

No.	Message Text	Meaning of Message
1	ARRAY Alert Started.	The error monitoring is started.
2	ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No.X HDU No.Y.	An FC drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
3	ARRAY SATA Drive Detached. ARRAY Detached SATA Drive Position Unit No.X HDU No.Y.	An SATA drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
4	ARRAY Battery Alarm. Position Battery No.X.	A battery voltage error occurred.
5	ARRAY Fan Alarm. Position Unit No.XX Fan No.X.	A fan failure occurred.
6	ARRAY CONTROLLER Detached. Position CONTROLLER No.X.	A controller blockade occurred. (This occurs only in the dual controller configuration.)
7	ARRAY AC Power Supply Failure. Position Unit No.XX AC Power No.X.	An AC power supply error occurs.
8	ARRAY Cache Memory Alarm.	A cache failure occurred.
9	ARRAY Cache Backup Circuit Alarm.	A backup circuit failure occurred.
10	ARRAY ENC Alarm. Position Unit No.XX ENC No.X.	An enclosure error occurred.
11	ARRAY SENC Alarm. Position Unit No.XX SENC No.X.	An SENC error occurred.
12	ARRAY Loop Alarm.	A loop error occurred.
13	ARRAY Path Alarm.	A path blockade occurred.
14	ARRAY Host Connector Alarm. Position CONTROLLER No.X.	A host connector error occurred.
15	ARRAY Warning.	The array unit entered the warning state.
16	ARRAY Storage Navigator Modular Interface error occurred	A failure occurred in the connection with the array unit. A power OFF or a failure occurred in the array unit.
17	ARRAY NNC Detached. Position NNC No.X.	An NNC blockade occurred.
18	ARRAY NNC Warning. Position NNC No.X.	An NNC partial blockade occurred.

Table 13-3 List of E-mail Message Texts (9200 and 9500V)

No.	Message Text	Meaning of Message
1	ARRAY Alert Started.	The error monitoring is started.
2	ARRAY Drive Detached. ARRAY Detached Drive Position Port No.X Row No.Y	A drive blockade occurred. (9200: The blocked drive is indicated with a set of a Port No. and a Row No.)
3	ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No.X HDU No.Y.	An FC drive blockade occurred (for 9500V). (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
4	ARRAY SATA Drive Detached. ARRAY Detached SATA Drive Position Unit No.X HDU No.Y.	An SATA drive blockade occurred (for 9500V). (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
5	ARRAY Battery Alarm.	A battery voltage error occurred.
6	ARRAY Fan Alarm.	A fan failure occurred.
7	ARRAY CONTROLLER Detached.	A controller blockade occurred. (This occurs only in the dual controller configuration.)
8	ARRAY AC Power Supply Failure.	An AC power supply error occurs.
9	ARRAY Cache Memory Alarm.	A cache failure occurred.
10	ARRAY Cache Backup Circuit Alarm.	A backup circuit failure occurred.
11	ARRAY ENC Alarm.	An enclosure error occurred.
12	ARRAY SENC Alarm.	An SENC error occurred.
13	ARRAY Loop Alarm.	A loop error occurred.
14	ARRAY Path Alarm.	A path blockade occurred.
15	ARRAY Warning.	The array unit entered the warning state.
16	ARRAY Storage Navigator Modular Interface error occurred	A failure occurred in the connection with the array unit. A power OFF or a failure occurred in the array unit.

1. Specify the setting items in the E-mail Report.

- **E-mail Error Report Enabled:** Specifies whether or not to execute the E-mail Report when an error is detected by error monitoring. When this item is checked off, the E-mail Report will be executed. ON/OFF is displayed on the right side depending on whether a check mark exists or not.
- **Domain Name:** Specifies a domain name. Specify it in 39 or less alphanumeric characters or a code.
- **Mail Server Address:** Specifies the IP address or host name of the mail server. Specify the host name in 99 or less alphanumeric characters.
- **From Address:** Specifies the mail address of the E-mail sender. Specify it in 99 or less alphanumeric characters or a code.
- **Send To Address:** Specifies the mail address of the E-mail receiver. Specify it in 99 or less alphanumeric characters or a code. Up to 20 addresses can be set as receivers.

Add: Specify the **Send To Address** in the text box above **Add** and click **Add**. The **Send to Address** added to the **Send to Address** list displays.

Replace: Click the **Send to Address** to be replaced in the **Send to Address** list. Specify the **Send to Address** in the text box above **Add**. Click **Replace**. The replaced **Send to Address** displays in the **Send to Address** list.

Delete: Click the **Send to Address** to be deleted in the **Send to Address** list and click **Delete**. The deleted **Send to Address** disappears from the **Send to Address** list.

2. To verify the setting, click **Test**.

When the mail has been normally transmitted, a confirmation message displays. Click **OK**.

The following mail is transmitted to the set **Send to Address**. Check the receipt of mail by **Send to Address**. If the mail has not been received, check the setting.

- **Subject:** Storage Navigator Modular/Obstruction (test)
- **message:** Day, Mon. dd hh:mm:ss yyyy/DF Name /Test message:
Day: Day of the week **hh:mm:ss:** Hours, minutes, and seconds
Mon: Month **yyyy:** Year
dd: Date

3. Click **Close**.

The setting is validated without rebooting Storage Navigator Modular.

13.1.3 Setting Additional Information on E-mail

When registering or changing the properties of the subsystem, you can add unique information on the E-mail header or on the unit trace information header.

1. In the **Properties** window of the subsystem, in the **Mail Additional Information** text box, enter the information in less than or equal to 64-byte characters. See Figure 13.2.

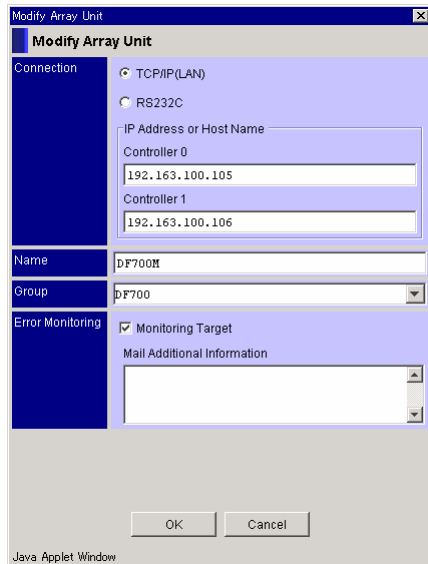


Figure 13.2 Modify Array Unit - Properties

The information set on E-mail is added to the E-mail attribute. The format follows:

- Day, Mon. dd hh:mm:ss yyyy/DF Name/Additional Information/message text

To delete the information, select text and press the **Delete** key.

13.1.4 Executing Application

Execute Application is set so that another application may be started if an array unit error is detected when error monitoring is executed.

When the application is started, it activates the window. The current size and position are displayed.

1. Set the necessary items to start an application.
 - **Execute Application:** Specifies whether or not to activate the application when a failure is detected by the error monitoring. The application is activated when the check box is clicked. ON/OFF is displayed on the right side depending on whether a check mark exists or not.
 - **Application Execute Mode:** Specifies when to activate the application:
 - **On the first failure:** The specified application is activated when the first failure is detected after the error monitoring has been activated. When failures are detected continuously, the application is not activated. To activate the application again when a failure is detected after the application has been activated, terminate the error monitoring once and then restart it.
 - **On every failure:** The specified application is activated when a failure is detected after the error monitoring has been activated. When the same failure is detected while the error monitoring is executed, the application is not activated at the second and subsequent detections of it.

Note: When you select **On every failure**, the specified application is started upon detection of each error. Consequently, multiple specified applications may be started and the system may hang-up. Select **On first failure**. After occurrence of an error, stop error monitoring, and restart it after a recovery from the error.

If an error is caused by starting the specified application during error monitoring, a message is displayed and error monitoring is suspended. When the message is closed, the monitoring continues.

- **Application Name:** Specifies a path and a file name of the application to be activated. See Figure 13.3. When the file name is long, enclose it with the quotation marks ("). When specifying a data file name of the application, specify the full path if the data file is not in the same directory in which Storage Navigator Modular is located.

– **For Windows**

Example 1: "C: \abc\application.exe"

Example 2: "C: \abc\application.exe (option)"

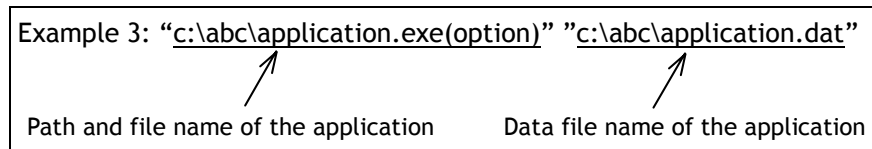


Figure 13.3 Example Application Name

2. To check the setting, click **Test**. Verify that the specified application is started.
3. Click **OK**. Setting will be validated without rebooting Storage Navigator Modular.

13.2 Registering the Failure Monitoring Account

Failure monitoring cannot be applied to an array unit that is an object of the account management unless it is logged in. Register the common user ID and the password for the monitoring to be used at the time of the failure monitoring. Registering is required to create the user ID and the password for the failure monitoring beforehand for each array unit that the account management has validated.

1. On the **Tool** menu, select **Error Monitoring** → **Account**. See Figure 13.4.

Unit Name	Type	Result
DF700M	DF700M	Untested

Figure 13.4 Monitoring Account Information

2. Select the **Enable** radio button on the **Monitoring Account** box. Enter the **User ID** and the **Password** for the failure monitoring that were created beforehand.
In the **Monitoring Test Result** list, array units for which the failure monitoring has been validated are displayed.
3. To check whether the failure monitoring can be applied to the certain array unit, select the array unit from the **Monitoring Test Result** list and click the **Test** button.
4. Verify that displayed **OK** in the **Result** column and click the **OK** button.
5. A message displays, click **OK**.

13.3 Outputting Failure Information to a Log File

When a failure is detected in the array unit when error monitoring is executed, the function outputs the failure information to a log file.

The log file is output in the text file format with a file name of `errlog.txt` to the same directory in which Web Navigator execution file is located. The format for displaying the array unit state transition is shown below as an example. The file format is shown in the following figure. A list of message texts is shown in Table 13-4 and Table 13-5.

Day, Mon. dd hh:mm:ss yyyy/DF Name/message text:

- **Day:** Day of the week
- **hh:mm:ss:** Hours, minutes, and seconds
- **Mon:** Month
- **yyyy:** Year
- **dd:** Date

Table 13-4 Message Texts (AMS200 and AMS500)

No.	Message Text	Meaning of Message
1	ARRAY Alert Started.	The error monitoring is started.
2	ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No.X HDU No.Y.	An FC drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
3	ARRAY SATA Drive Detached. ARRAY Detached SATA Drive Position Unit No.X HDU No.Y.	A SATA drive blockade occurred. (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
4	ARRAY Battery Alarm. Position Battery No.X.	A battery voltage error occurred.
5	ARRAY Fan Alarm. Position Unit No.X Fan No.X.	A fan failure occurred.
6	ARRAY CONTROLLER Detached. Position CONTROLLER No.X.	A controller blockade occurred. (This occurs only in the dual controller configuration.)
7	ARRAY AC Power Supply Failure. Position Unit No.X AC Power No.X.	An AC power supply error occurs.
8	ARRAY Cache Memory Alarm.	A cache failure occurred.
9	ARRAY Cache Backup Circuit Alarm.	A backup circuit failure occurred.
10	ARRAY ENC Alarm. Position Unit No.X ENC No.X.	An enclosure error occurs.
11	ARRAY SENC Alarm. Position Unit No.X SENC No.X.	An SENC error occurred.
12	ARRAY Loop Alarm.	A loop error occurs.
13	ARRAY Path Alarm.	A path blockade occurred.
14	ARRAY Host Connector Alarm. Position CONTROLLER No.XX. Host Connector No.X.	A host connector error occurs.
15	ARRAY Warning.	The array unit entered the warning state.
16	ARRAY Storage Navigator Modular Interface error occurred.	A failure occurred in the connection with the array unit. A power OFF or a failure occurred in the array unit.
17	ARRAY NNC Detached. Position NNC No.X.	An NNC blockade occurred.
18	ARRAY NNC Warning. Position NNC No.X.	An NNC partial blockade occurred.

Table 13-5 Message Texts (9200 and 9500V)

No.	Message Text	Meaning of Message
1	ARRAY Alert Started.	The error monitoring is started.
2	ARRAY Drive Detached. ARRAY Detached Drive Position Unit No.X HDU No.Y.	A drive blockade occurred (for 9200). (The blocked drive is indicated with a set of a Unit No. and a HDU No.)
3	ARRAY FC Drive Detached. ARRAY Detached FC Drive Position Unit No.X HDU No.Y.	An FC drive blockade occurred (for 9500V). (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
4	ARRAY SATA Drive Detached. ARRAY Detached SATA Drive Position Unit No.X HDU No.Y.	A SATA drive blockade occurred (for 9500V). (The blocked drive is indicated with a set of a Unit No. and an HDU No.)
5	ARRAY Battery Alarm.	A battery voltage error occurred.
6	ARRAY Fan Alarm.	A fan failure occurred.
7	ARRAY CONTROLLER Detached.	A controller blockade occurred. (This occurs only in the dual controller configuration.)
8	ARRAY AC Power Supply Failure.	An AC power supply error occurs.
9	ARRAY Cache Memory Alarm.	A cache failure occurred.
10	ARRAY Cache Backup Circuit Alarm.	A backup circuit failure occurred.
11	ARRAY ENC Alarm.	An enclosure error occurred.
12	ARRAY SENC Alarm.	An SENC error occurred.
13	ARRAY Loop Alarm.	A loop error occurred.
14	ARRAY Path Alarm.	A path blockage occurred.
15	ARRAY Warning.	The array unit entered the warning state.
16	ARRAY Storage Navigator Modular Interface error occurred.	A failure occurred in the connection with the array unit. A power OFF and a failure occurred in the array unit.

The output size of a log file is up to 520 k bytes. When the log information exceeds the limit, the log file is renamed to “errlog.txt.pre” and log file “errlog.txt” is newly created.

The string “--- end ---” comes at the end of log information output. If the log information surpasses its limit again, the existing log file “errlog.txt” is replaced with “errlog.pre.txt” and then a new log file “errlog.txt” is created again.

Note: “Time when a failure is detected” is determined by the clock in the Web Server installing Web Navigator.

13.4 Error Monitoring

Error monitoring checks the component status of the array unit. This including drives, controller, battery, fan, power supply, and cache. Placing a check in the **Error Watch** box in registered array unit information enables error monitoring at an interval specified for the interval time.

Note: When you perform error monitoring, close the Array Unit screen before monitoring. If error monitoring is performed with the Array Unit screen open, array units may not be monitored normally.

To monitor errors:

1. Click **Error Watch** **Alert Stop** : Error Watch on the Main screen. See Figure 13.5.

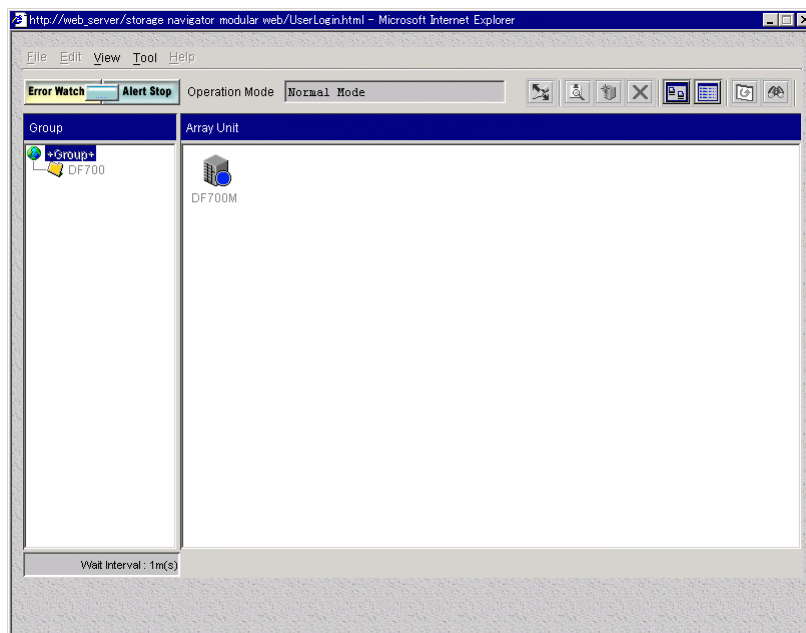







Figure 13.5 Storage Navigator Modular – Array Unit

Monitoring is started for the array unit for which “Error Alert” is specified. The **Error Watch** button on the **Main** screen displays **Error Watch** **Alert Stop** . After the start of error monitoring, the monitoring status displays in the status bar. The icon displays a monitoring result of the array unit.

After error monitoring is performed for all the target array units, monitoring will be started again for these target array units after the lapse of the specified interval time.





Error monitoring status displays on the left side of the scroll bar in the following three states. Additionally, the monitoring result of all the array units subject to monitoring displays with icons.

Table 13-6 Error Monitoring Status





Monitoring Status	Display Characters	Character Color	Array Unit Status
Stop	Stop	 Gray	Error monitoring is not executed.
Monitoring	Monitoring	 Blue	Error monitoring is executed and the all the target array units are normal.
	Monitoring	 Red	Error monitoring is executed and errors are detected in some of the target array units.
Waiting	Waiting	 Blue	Error monitoring is at the interval time and all the target array units that were previously monitored are normal.
	Waiting	 Red	Error monitoring is at the interval time and errors are detected in some of the target array units that were previously monitored.

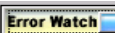

As an error monitoring result, the status displays with the icon color of the array unit in the **Main** screen.

Subsystems in the dual system:

 Gray	<ul style="list-style-type: none"> Not monitored Monitored but failure to authenticate a user
 Gray + Blue	<ul style="list-style-type: none"> Normal
 Gray + Yellow	<ul style="list-style-type: none"> An error is detected. A communication error occurs in a controller.
 Gray	<ul style="list-style-type: none"> A power OFF or a failure of the array unit occurred. A communication error occurs in both controllers.


Subsystems in the single system:

 Gray	<ul style="list-style-type: none"> Not monitored Monitored but failure to authenticate a user
 Gray + Blue	<ul style="list-style-type: none"> Normal
 Gray + Yellow	<ul style="list-style-type: none"> An error is detected.
 Gray	<ul style="list-style-type: none"> A power OFF or a failure of the array unit occurred. A communication error occurred.

- To display the detail information of the array unit, stop error monitoring, click an array unit to be displayed, and click  . The contents of display may be different depending on the relationship between **Error Alert** result and “Time” because polling is performed.

When the icon displays a **Caution** symbol, this represents a communication disable status with the array unit. Detailed information cannot be displayed.

- Click , and **Error Alert** will stop. The icon of the array unit continues to display the last error monitoring result.

Click the icon of an array unit on the **Main** screen, and then click .

Note: When the icon displays a **Caution** symbol as an **Error Alert** result, this represents a connection disable status to the array unit or an information get disable status from the array unit. The causes are as follows:

Table 13-7 Icon Caution Error Alert

Cause	Contents of Check
Communication line failure	Check the LAN line.
Connected array unit failure	Check the READY status of the subsystem.
Too high I/O load from the host	Check the array unit operation status.
Execution of the logical unit format of the connected array unit, wizard setting of system parameter, or SNMP environment information setting	Check the array unit status or restart the subsystem.

- Check all of the above. After verifying that the connection with the array unit displayed with a **Caution** symbol has been enabled, start error monitoring.

If the icon of the array unit goes yellow because of a controller blockage, the same status as that of the **Caution** symbol icon may be provided.

If error monitoring is performed, and the array unit icon displays with a **Caution** symbol, the icon of the normal array unit may be displayed with a **Caution** symbol. If the cause corresponds to “Too high I/O load from the host”, continue to execute monitoring.

If a drive whose display color is not blue in **Unit Status** in the **Array Unit** screen (a drive that is not logical unit-formatted or an undefined spare drive) is pulled out, no error report will be made but it has no effect on the operation. Insert it once again.

If an error occurs, contact a Customer Engineer.

13.5 Checking Status

You can check the status of the following subsystem components: drives, controllers, batteries, fans, power supply and cache. A status check is done on the subsystem for which the check box of the **Error Alert Flag** in “Array Unit Define” is selected.

To check the status of subsystem components:

On the **View** menu, select **Refresh**. See Figure 13.6.

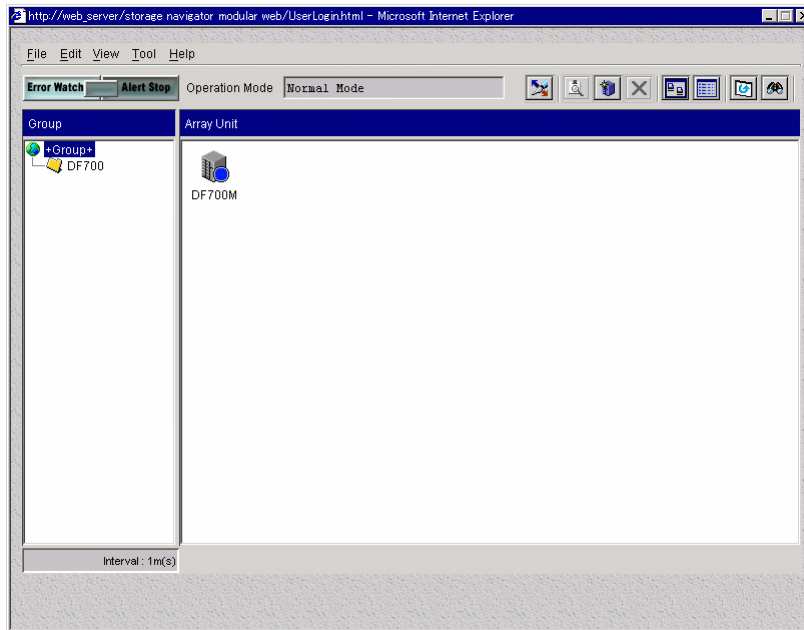


Figure 13.6 Storage Navigator Modular Web - Group

The status of an array unit for which error monitoring is specified is checked. When checking begins, the icon of an array unit displays with the check result reflected into the icon.

The status check performs functions equivalent to those of error monitoring. When an error is detected in an array unit that has been checked, output of a log, sending of an E-mail, and restarting of a specified application are performed in accordance with the settings of the monitor options.

Chapter 14 Tuning Parameters

The tuning parameters include parameters concerning the system and logical unit.

This chapter includes the following sections:

- 14.1 Multi Stream Tuning Parameters
- 14.2 Prefetch Parameters
- 14.3 Setting System Tuning Parameters

14.1 Multi Stream Tuning Parameters

1. On the Tools menu, click **Tuning Parameter**.

The **Tuning Parameter** panel displays. See Figure 14.1.

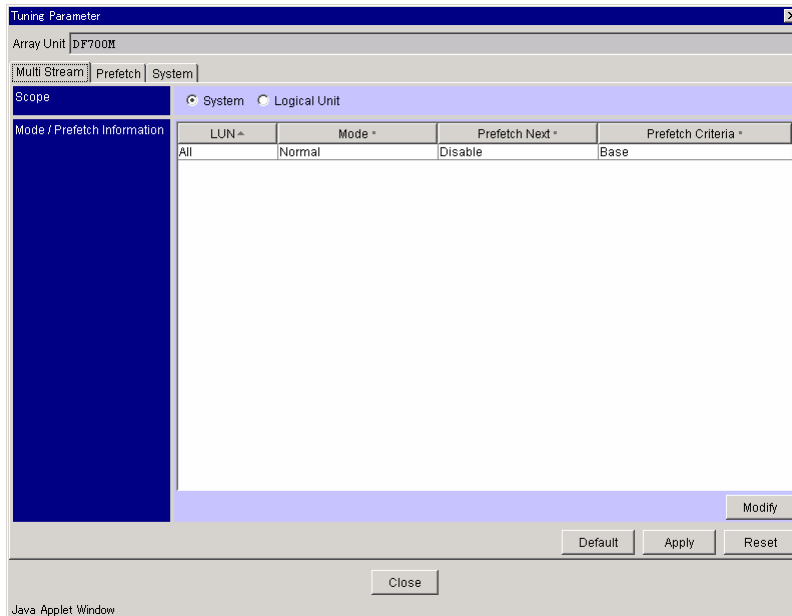


Figure 14.1 Tuning Parameter Window

- **Scope:** Select **System** or **Logical Unit**.
 - **Mode / Prefetch Information:**
 - **LUN:** Displays **All**.
 - **Mode:** Displays **Normal**, **Read**, **Write**, or **Read/Write**.
 - **Prefetch Next:** Displays **Disable** or **Enable**.
 - **Prefetch Criteria:** Displays **Base** or **Fixed**.
2. When you want to modify the setting, click **Modify**.
- The **Prefetch Multi Stream (System)** dialog displays. See Figure 14.2.

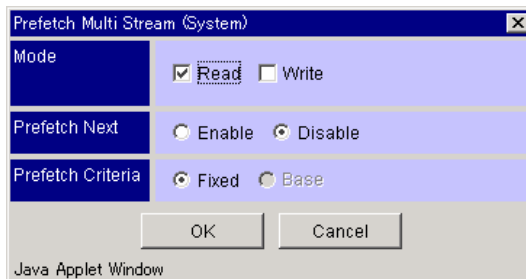


Figure 14.2 Prefetch Multi-Stream Dialog Box

- **Mode:** Specify the mode:
 - **Read:** When you select the **Read** mode, specify the **Prefetch Next** **Enable** or **Disable**.

- **Write:** When you select the **Write** mode, you cannot specify the **Prefetch Next**.
 - **Prefetch Criteria:** Specify the pre-fetch criteria.
3. Specify the parameters and click **OK**.
 4. Select the **Logical Unit** on the **Scope**. See Figure 14.3.

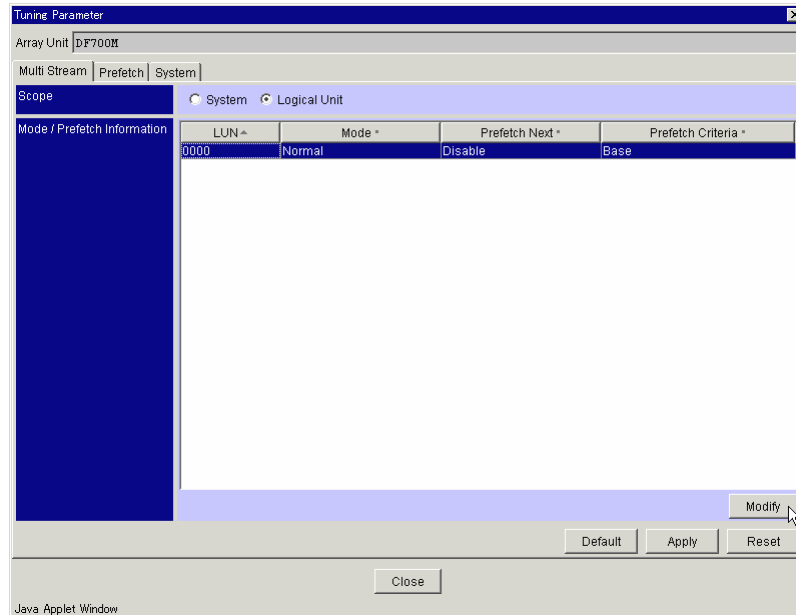


Figure 14.3 Tuning Parameter - Logical Unit

- **Scope:** Select **System** or **Logical Unit**.
 - **Mode / Prefetch Information:**
 - **LUN:** Displays logical unit number.
 - **Mode:** Displays **Normal**, **Read**, **Write**, or **Read/Write**.
 - **Prefetch Next:** Displays **Disable** or **Enable**.
 - **Prefetch Criteria:** Displays **Base** or **Fixed**.
5. Select the LUN setting to modify, and click **Modify**.

The **Prefetch Multi Stream (Logical Unit)** dialog displays. See Figure 14.4.

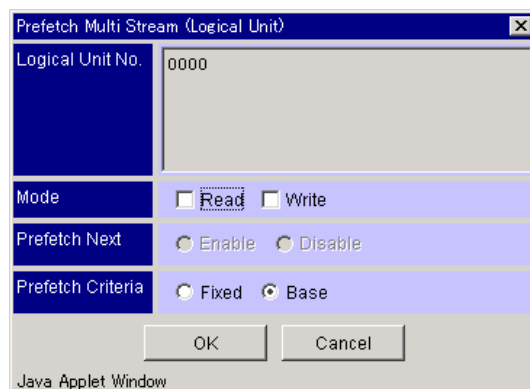


Figure 14.4 Prefetch Multi Stream - Logical Unit

- **Logical Unit No.:** Displays the logical unit number.
 - **Mode:** Specify the mode:
 - **Read:** When you select the **Read** mode, specify the **Prefetch Next** Enable or Disable.
You can specify only **Fixed** in the **Prefetch Criteria**.
 - **Write:** When you select the **Write** mode, cannot specify the **Prefetch Next**.
 - **Prefetch Criteria:** Specify the pre-fetch criteria.
6. Specify the parameters and click **OK**.
 7. Click **Apply** on the **Tuning Parameter** panel.
 8. A message displays, stating that the setting is complete. Click **OK**.

To initialize the Multi Stream parameters:

1. When you want to initialize the multi stream parameters, click **Default** on the **Tuning Parameter** panel.
2. A message displays stating that the setting is complete. Click **OK**.

14.2 Prefetch Parameters

1. On the **Tools** menu, select **Tuning Parameter**.

The **Tuning Parameter** panel displays. See Figure 14.5.

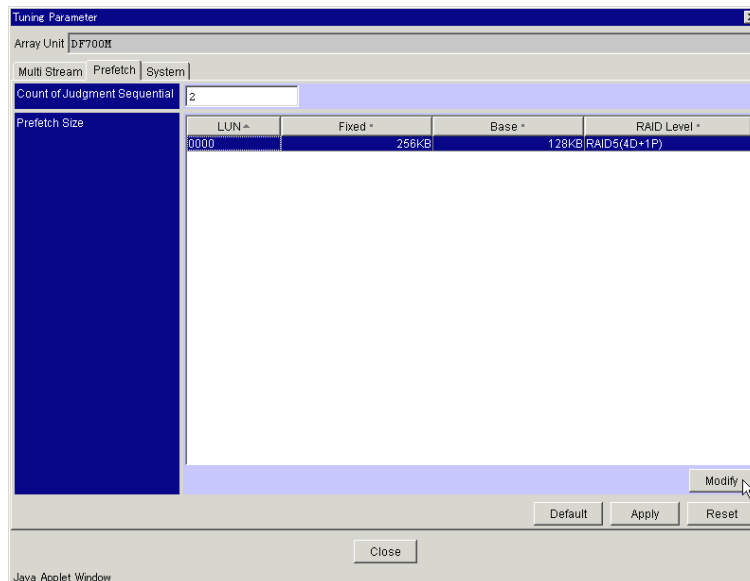


Figure 14.5 Tuning Parameter Window

- **Count of Judgment Sequential:** Specify the count of judgment sequential.
2. Select the LUN you want to modify the prefetch size, and then click **Modify**.
The **Prefetch Staging Size** dialog displays. See Figure 14.6.

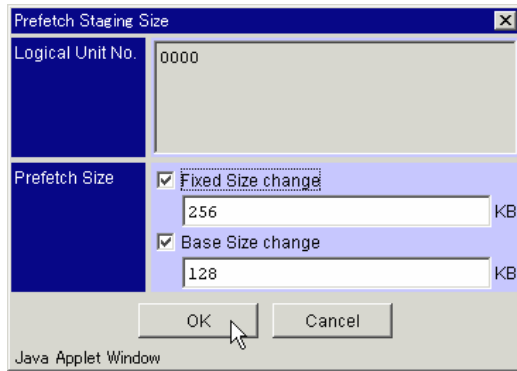


Figure 14.6 Prefetch Staging Size Dialog Box

3. Specify **Prefetch Size**, click **OK**.
4. Click **Apply**.
5. The **Setting Complete** message displays; click **OK**.
6. Initialize the Prefetch parameters.
7. When you want to initialize the prefetch parameters, click **Default** on the **Prefetch** tab.
8. A message displays stating that the setting is complete. Click **OK**.

14.3 Setting System Tuning Parameters

To customize system tuning parameters:

1. From the **Tools** menu, select **Tuning Parameter**.
The **Tuning Parameter** panel displays.
2. Click the **System** tab. See Figure 14.7

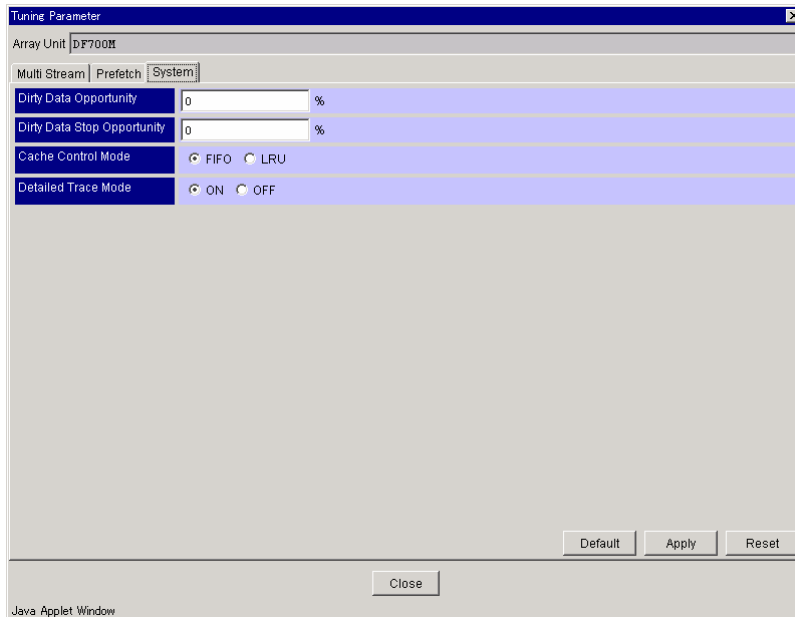


Figure 14.7 Tuning Parameter Window

- **Dirty Data Opportunity:** Specify an occasion to de-stage dirty data (%).
- **Dirty Data Stop Opportunity:** Specify an occasion to stop de-staging dirty data (%).
- **Cache Control Mode:** Specify the cache control mode.
- **Detailed Trace Mode:** Specify the detailed trace mode.

3. Click **Apply**.
4. A confirmation message displays. Click **OK** to apply the settings.

To restore the default system tuning parameters:

1. From the **Tools** menu, select **Tuning Parameter**.
The **Tuning Parameter** panel displays.
2. Click the **System** tab.
3. Click **Default**.
4. A confirmation message displays. Click **OK** to apply the settings.

Appendix A Cooperation with HiCommand Device Manager

This appendix describes the operating environments and the installation method when using Storage Navigator Modular with Solaris.

This appendix includes the following sections:

- **A.1** About Cooperation
- A.2 About Solaris

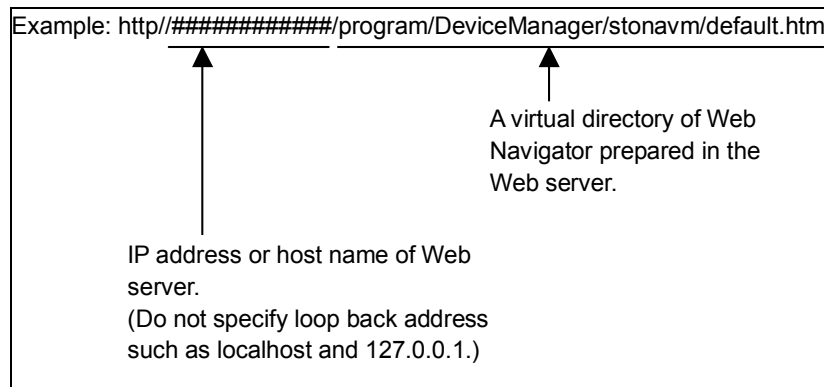
A.1 About Cooperation

HiCommand Device Manager and Storage Navigator Modular can cooperate with each other.

For procedures about installing HiCommand Device Manager and registering Storage Navigator Modular, refer to the HiCommand Device Manager manual.

Install Storage Navigator Modular (Web server) in the same server computer in which HiCommand Device Manager has been installed.

When starting Storage Navigator Modular (Web Client) using the Web server affiliated with HiCommand Device Manager, specify the URL shown below.



A.2 About Solaris

The Solaris version of Storage Navigator Modular can be used only when it cooperates with HiCommand Device Manager.

See the following for installation.

Web server

1. Create a new directory (**example:** /usr/stonavm) for installing Storage Navigator Modular. Copy the SNM-xxxx-S-GUI.tar file, which is in the stonavm_sol directory of the provided CD-R, to the newly created directory in the hard disk drive.

(The portion “xxxx” of file names varies with the version of the Storage Navigator Modular, etc.)

2. The SNM-xxxx-S-GUI.tar is the Tar format of a file. Develop the file by referring to the example below.

Example: tar xvf SNM-xxxx-S-GUI.tar

3. Edit the snmsrv file into a directory of Storage Navigator Modular.

Alter the part, DFHOME=/home/user/public_html/stonavm, into the directory in which Storage Navigator Modular has been installed.

At this time, suppose that DFHOME=/usr/stonavm.

4. Copy the snmsrv file to the /etc/init.d directory and make a hard link, which is named S99snmsrv, in the /etc/rc3.d directory.

Example: cp /usr/stonavm/snmsrv /etc/init.d & ln /etc/init.d/snmsrv /etc/init.d/S99snmsrv

5. Restart the SUN™ server.
6. Set the memory size, if necessary, referring to Appendix B Notes on Making Multiple Launches.

Web client

For information about Web Client operations such as settings of the Web browser and Java Plug-in in Web client, refer to the HiCommand Device Manager manual.

Appendix B Notes on Making Multiple Launches

B.1 Making Two or More Launches

Two or more launches cannot be made for the same disk array subsystem. However, two or more launches can be made for different disk array subsystems.

B.2 Notes on Making Multiple Launches

When two or more launches are made at the same time, the operation of Storage Navigator Modular may become unstable because its memory capacity becomes insufficient. This can be avoided when the maximum usable memory size of Java is enlarged through a setting. The default memory size is 64 MB. The maximum size that can be set varies and depends on the environment. Use the following procedure to set the memory size for Windows and Solaris servers:

For Windows Server™

For Windows, the memory capacity becomes insufficient if the number of simultaneous launches is six or more. When the number of launches is about six or more, perform the following procedure.

1. Select **Control Panel** → **Administrative Tools** → **Service**.
2. Stop **SNM Server**.
3. Select **Run** from the Windows Start menu, and input **regedit**.
4. Select **Export Registry File** from the **Registry** menu of the Registry Editor. Back up the current registry information by selecting **Export range**, **Selected branch** and saving the information.
5. Select the following keys from the tree view of the Registry Editor.
HKEY_LOCAL_MACHINE
 \SYSTEM
 \CurrentControlSet
 \Services
 \SNMServer
 \Parameters
6. Double-click **Options** in the list view. Add the following character string at the end of the value data.
|-Xmx#m
Specify a numerical value larger than 64 for the “#”. The standard value is an estimated number of simultaneous launches multiplied by 12.

Example: When the estimated number of simultaneous launches is eight, add|-Xmx96m.
7. Exit the Registry Editor.
8. Start **SNM Server**.

For Solaris Server

For Solaris, the memory capacity becomes insufficient if the number of simultaneous launches is four or more. When the number of launches is four or more, perform the following procedure:

1. Edit the `snmsrv` file in the directory in which Storage Navigator Modular has been installed.

Change the following “`$DAMP_JAVAHOME/bin/java jp.co. hitachi. str. diskarray. rmi. FileServer &`” to the following:

```
“$DAMP_JAVAHOME/bin/java -Xmx#m jp.co. hitachi. str. diskarray. rmi. FileServer &”
```

Specify a numerical value larger than 64 for the # symbol. The standard value is an estimated number of simultaneous launches multiplied by 20.

Verify that the standard change is different from the above for the Windows server™.

Example: When the estimated number of simultaneous launches is eight:

```
“$DAMP_JAVAHOME/bin/java -Xmx160m jp.co. hitachi. str. diskarray. rmi. FileServer &”
```

2. Copy the `snmsrv` file to the `/etc/init.d` directory.
3. Restart Solaris server.

Appendix C Using Resource Manager 9500V/9520V for Web and Storage Navigator Modular

If you are using Resource Manager 9500V/9520V for Web, in addition to Storage Navigator Modular for Web, run one of the following procedures for your Windows or Solaris server.

For Windows Servers

1. Select **Control Panel** → **Administrative Tools** → **Service**.
2. Stop the **SNM Server** and **DFMNG Server**.
3. Select **Run** from the Windows Start menu, and enter **regedit**.
4. Select **Export Registry File** from the **Registry** menu of the Registry Editor. Back up the current registry information by selecting **Export range**, **Selected branch** and then save the information.
5. Select the following keys from the tree view of the Registry Editor.
HKEY_LOCAL_MACHINE
 \SYSTEM
 \CurrentControlSet
 \Services
 \SNMServer
 \Parameters
6. Double-click **Options** in the list view. Add the following character string to the front of the value **data**: (|wrkdir).
;< the directory in which Resource Manager 9500V/9520V for Web has been installed>\DAMP2\CONFMNG2.JAR|wrkdir
7. Select the following keys from the tree view of the Registry Editor.
 \SYSTEM
 \CurrentControlSet
 \Services
 \DFMNGServer
 \Parameters
8. Double-click **Options** in the list view. Add the following character string to the front of the value **data**: (|wrkdir).
;<Storage Navigator Modular Web installation directory>\server\stonavm.jar|wrkdir
9. Exit the Registry Editor.
10. Start the **SNM Server** and **DFMNG Server**.

For Solaris Servers

1. Edit the `snmsrv` file in the directory in which *Storage Navigator Modular for Web* has been installed.
2. Add the following character string after the line of
“`CLASSPATH=$STONAVM_HOME/stonavm.jar`”
;< the directory in which *Resource Manager 9500V/9520V for Web* has been installed>\`damp2\confmng2.jar`
3. Copy the `snmsrv` file to the `/etc/init.d` directory.
4. Edit the `dfmngsrv` file in the directory in which *Resource Manager 9500V/9520V for Web* has been installed.
5. Add the following character string after the line of
“`CLASSPATH=$DAMP_ROOT_DIR_PATH/confmng2.jar`”
;<Storage Navigator Modular Web installation directory>\
`server\stonavm.jar`
6. Copy the `dfmngsrv` file to the `/etc/init.d` directory.
7. Restart Solaris the server.

Appendix D Logging on when Two or More LAN Cards are Installed on the Server

The login can be accepted from only one LAN card even if two or more LAN cards are installed in the server. Perform the following procedure to accept the login from the other LAN card.

1. Add the following file in the “server” directory located in the install directory:

File name: `snmserver.properties`

2. Edit the `snmserver.properties` file to have the following contents and save the file:

`jp.co.hitachi.str.diskarray.rmi.hostname=<IP address or host name>`

Example

To accept logins from the LAN card of which IP address is “192.168.100.101”.

`jp.co.hitachi.str.diskarray.rmi.hostname=192.168.100.101`

3. For the Windows server™, restart **SNM Server** service.

For the Solaris server, reboot the SUN server.

Appendix E Changing the Port Number for Storage Navigator Modular

Storage Navigator Modular uses TCP port number 1099. If the server uses TCP port number 1099 port for another application, Storage Navigator Modular will not work. Perform the following procedure to use another port number for Storage Navigator Modular.

To change the port number for Storage Navigator Modular:

1. Add the following file in the “server” directory located in the install directory:

File name: `snmserver.properties`

2. Edit the `snmserver.properties` file with the following contents and save the file:

```
jp.co.hitachi.str.diskarray.rmi.port=<port number>
```

Example:

To use TCP port number 10990 for the Web Navigator:

```
jp.co.hitachi.str.diskarray.rmi.port=10990
```

3. Edit “UserLogin.html” located in the install directory.

Example:

To use TCP port number 10990 for the Web Navigator, add the following lines:

```
1      <!--  
  
..      ..  
65     "<PARAM NAME='model' VALUE='models/HyaluronicAcid.xyz'>",  
Add 66     "<PARAM NAME='SNM_RMI_PORT' VALUE='10990'>",  
  
..      ..  
106    "<PARAM NAME='model' VALUE='models/HyaluronicAcid.xyz'>",  
Add 107    "<PARAM NAME='SNM_RMI_PORT' VALUE='10990'>",  
  
..      ..  
155    </HTML>
```

4. For the Windows server™, restart **SNM Server** service.

For the Solaris server, reboot the SUN server.

Acronyms and Abbreviations

Acronym	Expansion
AMS	Adaptable Modular Storage
CLI	command line interface
DAMP	Disk Array Management Program
DDL	data definition language
DHCP	dynamic host configuration protocol
GUI	graphical user interface
HACMP	High Availability Cluster Multi-Processing
HDLM	Hitachi Dynamic Link Manager
IIS	Internet Information Service
JRE	Java 2 Runtime Environment
KB	kilobytes
LAN	local-area network
LIP	loop initialization primitive
LU	logical unit
LUN	logical unit number
MB	megabyte
NAS	network-attached storage
NNC	network node controller
NTP	network time protocol
PV	physical volume
RAID	redundant array of inexpensive disks
RTC	real-time clock
SNM	Storage Navigator Modular
SNMP	simple network management protocol
VCS	VERITAS Cluster Server
VxVM	VERITAS Volume Manager
WMS	Workgroup Modular Storage

Glossary

A

Attribute

As used in this document, an attribute is one or more qualities possessed by an object.

C

Cache

Cache is a temporary, high-speed storage mechanism. It can be either a reserved section of main memory or an independent high-speed storage device. Two types of caching are found in computers: memory caching and disk caching. Memory caches are built into the architecture of microprocessors and often computers have external cache memory. Disk caching works like memory caching; however, it uses slower, conventional main memory that on some devices is called a memory buffer.

Capacity

Capacity is the amount of information (in bytes) that can be stored on a disk drive. The capacity of a hard disk drive is usually expressed in megabytes. Capacity is the measure of the potential contents of a device; the volume it can contain or hold. In communications, capacity refers to the maximum possible data transfer rate of a communications channel under ideal conditions.

Channel

A channel is the path data communication follows between two nodes of a network. It is the link between the central processor and the peripherals. A channel can be the physical cabling that connects the nodes on a network, an electronic signal traveling over a pathway, or a sub-channel in a carrier frequency.

Configuration

Configuration for hardware involves setting various switches and jumpers. For software it means defining the values of parameters. For hardware and software respectively, configuration is the arrangement of the components that make up the system or the set up and set values of the software.

L

Logical

Logical is used to describe a user's view of the way data or systems are organized. The opposite of logical is physical, which refers to the real organization of a system. A logical description of a file is that it is a quantity of data collected together in one place. The file appears this way to users. Physically, the elements of the file could live in segments across a disk.

Logical Unit (LU)

See User Logical Unit (LU)

Logical Volume

An area on a disk consisting of device files that are logically integrated using a volume manager.

M

Microcode

Microcode is the lowest-level instructions directly controlling a microprocessor. Microcode is generally hardwired and cannot be modified.

P

Pair

See ShadowImage pair.

Panel

In this document a panel is equivalent to a window.

Parity

The quality of being either odd or even. The fact that all numbers have a parity is commonly used in data communications to ensure the validity of data. This is called parity checking. So parity provides an error detection scheme that uses an extra checking bit, called the parity bit, to allow the receiver to verify that the data is error free.

Permission

Using SMB/CIFS, HTTP, WebDAV, and SMT0 gateways, permissions are granted from the owner to members of a group or other users to allow access to data files or directories in an archive. Read, write, and execute permissions can be granted for files, directories, or symbolic links.

R

Remote or target site

A site that has the mirrored data of the production site.

S

SATA

Serial ATA is a serial link, a single cable with a minimum of four wires creates a point-to-point connection between devices. ATA is a computer bus technology primarily designed for transfer of data to and from a hard disk. SATA is the successor to the legacy Advanced Technology Attachment standard (ATA, also known as IDE or Integrated Drive Electronics).

Service

A service is the set of functions that one of the seven (7) Open Systems Interconnection (OSI) model layers delivers to the layer above it. For example, the TCP layer provides a reliable byte-stream service to the application layer above it.

ShadowImage

ShadowImage is a software program that replicates user data on TagmaStore® USP disks, bypassing the host system.

Shadowimage Pair

A disk is a Logical Volume Image (LVI). S-VOLs and T-VOLs are ShadowImage volumes for Source and Target. Data is physically copied from the S-VOL to the T-VOL.

SNMP

Simple Network Management Protocol is a protocol used to facilitate monitoring and management of clusters through an external interface. SNMP sends notifications to IP addresses whenever certain types of events occur.

Snapshot

A term used to denote a copy of the data and data-file organization on a node in a disk file system. A snapshot is a replica of the data as it existed at a particular point in time.

T

Target site

See Remote or target site.

TrueCopy

TrueCopy is a software program that replicates user data between two TagmaStore USP disks, bypassing the host system.

U

User Logical Unit (LU)

A user logical unit is a term used to describe any device file located on an external disk subsystem connected to the TagmaStore USP or NSC by a fibre channel.

V

Volume

A volume is the basic unit of storage that includes recovery logs and storage pools. A volume can be a logical volume management (LVM) logical volume, a standard file system file, a tape cartridge, or an optical cartridge. The various types of defined volumes include: external, internal, copy source, copy destination, reserve, data, journal, virtual, pool, system, LUSE, copy pair, and USP.

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