



**Hitachi Freedom Storage™  
Thunder 9500™ V Series  
LUN Management 9500V  
User's Guide**



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## Document Revision Level

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## Source Documents Used in this Revision

- LUN Management User's Guide (RSD-93df657-1, dated 5/16/03).

## Changes in this Revision:

- Made various changes to Table 1.1
- Added Table 1.2 Conditions of Using LUN Management
- Added Linux® to Table 1.3
- Added new screen capture to section 3.3
- Added Index

## Referenced Documents

- *9500V User and Reference Manual* (MK-92DF601)
- *Resource Manager 9500V User's Guide for GUI* (MK-92DF605)
- *Resource Manager 9500V User's Guide for CLI* (MK-92DF603)

# Preface

Before using LUN Management, read the operating procedures and notices included in this guide.

This document assumes that:

- The user has a background in data processing and understands direct-access storage device subsystems and their basic functions.
- The user is familiar with the Disk array subsystem.
- The user has read and understands the *Resource Manager 9500V User's Guide for GUI* (MK-92DF605) and/or the *Resource Manager 9500V User's Guide for CLI* (MK-92DF603).

**Note:** For additional information on the 9500V subsystem features and functions, please contact your Hitachi Data Systems account team, or visit Hitachi Data Systems online at <http://www.hds.com>.

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**Note:** The screens shown in this document were captured on a Windows® system with the Internet Explorer web browser. The screens may display differently on other operating systems and browsers. Please refer to the *Resource Manager 9500V User's Guide for GUI* (MK-92DF605) for further information on other operating systems and browsers.

**Note:** The term "9500V" refers to the entire Hitachi Freedom Storage™ Thunder 9500™ V Series subsystem family, unless otherwise noted.

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# Chapter 1 Overview of LUN Management

The LUN Management feature can set Option (Host Connection Mode), Logical Unit (LU) and WWN (World Wide Name) for each Connected-Host; so that multiple Hosts can be connected to a Port.

By using the LUN Management feature, each Host can access a Logical Unit as if it is a dedicated Port to the Host, even if the Host shares the Port with other Hosts.

## 1.1 Creating a Host Group

The system-configuration engineer connects a Port of the Disk Array subsystem to a Host using the Switch, etc., then sets a data input/output path between the Host and the LU using LUN Management. This setting specifies which Host can access which LU.

In order to set a data input/output path, the Hosts that are authorized to access the LU are required to be classified as a Host Group. Then the classified Host Group is set to the Port.

For example, when a Windows Host and a Linux Host are connected to Port A, it is necessary to create Host Groups of LUs to be accessed from the Windows Host and the Linux Host respectively using LUN management (see Figure 1.1).

A Host Group Option (Host Connection Mode) can be set to the created Host Groups. This validates the Host Group Option that was set to each Host Group.

The Hosts that are connected to different Ports cannot share an identical Host Group.

Even if the LU to be accessed is the same, respective Host Groups should be created for respective Ports to which the Hosts are connected.

## 1.2 Setting a Host

After creating a Host Group, the Host that has been classified to the Host Group is set. The setting is performed by using the World Wide Name (WWN) of the Host Bus Adapter (HBA). The identical WWN cannot be set to another Host Group in the identical Port.

For example, the WWN of the Windows Host Bus Adapter is registered to the Windows Host Group in the Port A and the WWN of the Linux Host Bus Adapter is registered to the Linux Host Group also in the Port A (see Figure 1.1).

Component Status		Logical Status		Host Groups			
				LUN	H-LUN	Capacity	Current Controller
Controller 0							
Port A				0	0	30.0MB	0
000:WindowsA				1	1	32.5MB	0
Option							
Logical Unit				2	2	30.0MB	0
WWN							
001:Linux							
Option							
Logical Unit							
WWN							
Port B							
000:WindowsB							
Option							
Logical Unit							
WWN							
001:Solaris							
Option							
Logical Unit							
WWN							
Controller 1							
Port A							
Port B							

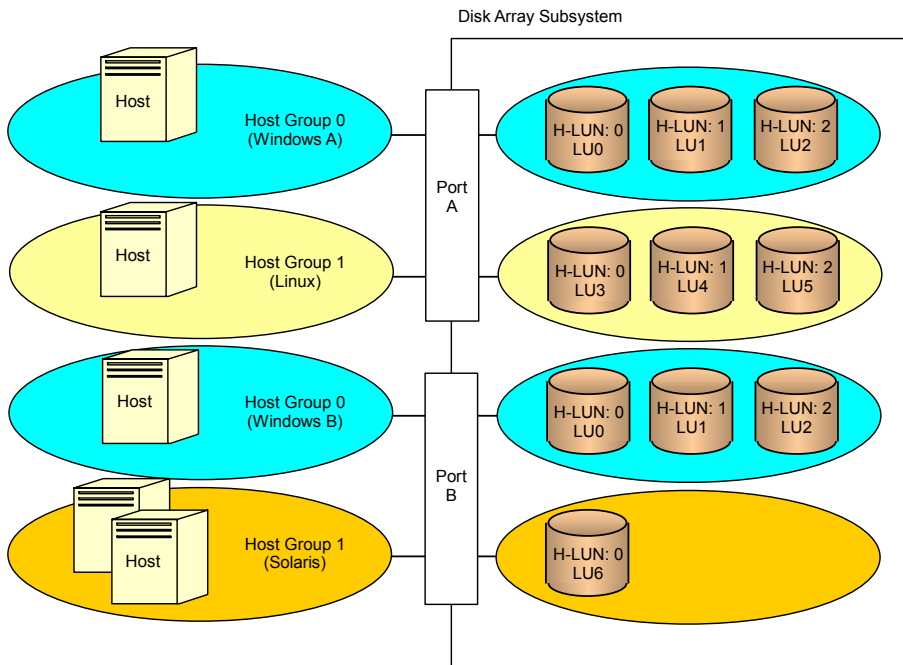


Figure 1.1 Setting Access Paths between Hosts and Logical Units

### 1.3 Setting a Logical Unit

After setting a Host to a Host Group, the LU is connected to the Host Group by setting a LU Mapping to the Host Group. Then a data input/output path is set between the LU and the Host that belongs to the Host Group. Consequently, the Host can access the LU.

As described above, the LU that can be accessed from a Host is determined by the Host Group. A Host can access a LU that is connected to the Host group to which the Host belongs, but cannot access a LU that is connected to another Host Group.

For example, a Host that belongs to the Windows Host Group in the Port A cannot access the LUs in the Linux Host Group. Similarly, a Host that belongs to the Linux Host Group cannot access the LUs in the Windows Host Group (refer to Figure 1.1).

LUN Management can set a Host to access multiple LUs. In Figure 1.1, for example, a Host in the Windows Host Group in Port B can access three LUs.

Further, LUN Management can set a LU to be accessed from multiple Hosts. For example, in Figure 1.1, two Hosts in the Solaris Host Group in the Port B can access the same LU.

### 1.4 Setting After Operation has Started

LUN Management can add, modify, or delete a Host Group after operation of the system has started. For example, when an additional disk is installed or an additional Host is connected, an additional Host Group can be created. When removing an existing Host, the Host Group that is connected to the Host is deleted first and then the Host will be removed.

**Note:** When adding, modifying, or deleting the settings by LUN Management, it is not necessary to reboot the Disk Array subsystem.

## 1.5 Specifications

The specifications of LUN Management are shown in Table 1.1.

**Table 1.1 The Specifications of LUN Management**

Item	Specifications
Host Group	<ul style="list-style-type: none"> <li>• Up to 128 Host Groups can be set for each Port.</li> <li>• Host Group 0 (zero) is required.</li> </ul>
Setting/Deleting a Host Group	<ul style="list-style-type: none"> <li>• Host Groups 1 through 127 can be set or deleted.</li> <li>• Host Group 0 (zero) cannot be deleted. In order to delete WWN and LU Mapping of Host Group 0 (zero), initialize Host Group 0 (zero).</li> </ul>
Host Group Name	<ul style="list-style-type: none"> <li>• A name is assigned to a Host Group upon creation. This Host Group Name can be changed.</li> </ul>
WWN (Node Name, Port Name)	<ul style="list-style-type: none"> <li>• Up to 128 World Wide Names (WWN) of Host Bus Adapters (HBA) can be set for a Host Group or port.</li> <li>• An identical WWN cannot be assigned to another Host Group on the identical same Port.</li> <li>• WWN can also be set to the Host Group by selecting from a Logged WWN of the Host Bus Adapter that is connected to the Port.</li> </ul>
WWN Nickname	<ul style="list-style-type: none"> <li>• An optional Nickname can be assigned to a WWN allocated to the Host Group. A Nickname can be omitted.</li> <li>• A Nickname assigned to a WWN is valid until the WWN is deleted.</li> </ul>
Host Connection Mode	<ul style="list-style-type: none"> <li>• The Host Connection Mode of the Host Group can be changed.</li> </ul>
LU Mapping	<ul style="list-style-type: none"> <li>• LU Mapping can be set to the Host Group.</li> <li>• Up to 256 LU Mappings can be set for a Host Group. Up to 256x128 LU Mappings can be set for a Port.</li> </ul>
Enable/Disable setting for each port	<ul style="list-style-type: none"> <li>• LUN Management can be set enable or disable for each Port.</li> <li>• When LUN Management is disabled, previously set LUN Management information is kept and is available when it is enabled again.</li> </ul>
Online setting	<ul style="list-style-type: none"> <li>• When adding, modifying, or deleting the setting by LUN Management, it is not necessary to reboot the Disk Array subsystem.</li> </ul>
Concurrent use with SANTinel	<ul style="list-style-type: none"> <li>• LUN Management cannot be used together with SANTinel concurrently.</li> </ul>

Conditions of using LUN Management are shown in Table 1.2.

**Table 1.2 Conditions of using LUN Management**

Item	Conditions
Means of making setting	Disk Array Management Program 2 (Ver. 7.20 or later) is required.
Microprogram revision	Microprogram of revision 0652 or later is required.
Use of LUN Management together with other optional functions	Optional functions other than LUN Security can be used together with LUN Management.
Queue Depth	Max. 32 commands per LU Max. 512 commands per port

## 1.6 Notes

- Verify that the LUN Management setting information is correct and accurate.
- This function is not available when a host (OS or driver) cannot identify a LU without LUN#0. It is necessary to set H-LUN = 0 to the Host Group in this case.

**Table 1.3 Combinations of OS and HBA**

OS	HBA	Remarks
HP-UX®	HP® HBA	When HP connection mode2 = ON is selected
IRIX	SGI™ HBA	
Windows® 2000	Emulex® HBA (with Miniport Driver) Qlogic® HBA	
Linux®	Emulex® HBA Qlogic® HBA	

- When you replace an HBA in a host attached to a Disk Array subsystem using Host Group, be sure to change the setting of the LUN Management.
- LUN Management settings (enabling or disabling) are not valid immediately after the setting. To make the setting valid, reboot the host (to be recognized again).
- The WWN set up by SANTinel is taken over to LUN Management as login WWN. However, when WWN (a Node Name or Port Name) of all zero is set up by SANTinel, install LUN Management after deleting the WWN.

## Chapter 2 Preparing for LUN Management Operations (GUI)

This chapter provides instructions for preparing for LUN Management operations using the GUI version of the Resource Manager 9500V. This section includes the following:

- Installing the LUN Management feature
- Uninstalling the LUN Management feature

**Note:** Procedures for installing the LUN Management feature using CLI are available in Appendix A.

The LUN Management feature is usually unselectable (locked); to make it available, you must install the LUN Management feature and make its functions selectable (unlocked). **To install this function, the key code provided with the optional feature is required.**

Follow the instructions below to install The LUN Management feature. LUN Management is installed and uninstalled using Resource Manager 9500V.

**Note:** Before installing and uninstalling, make sure that the array unit is in normal operating condition (for details, refer to the *Resource Manager 9500V User's Guide for GUI (MK-92DF605)*). If a failure such as a controller blockade has occurred, installation and uninstallation operations cannot be performed.

### 2.1 System Requirements

To be able to use LUN Management, you need:

- the 9500V subsystem installed
- the LUN Management software enabled

For details on all of the above, please refer to *Resource Manager 9500V User's Guide for GUI (MK-92DF605)*.

### 2.2 Installing LUN Management

To install the LUN Management feature using the GUI version of Resource Manager 9500V:

1. Start the Resource Manager 9500V and change the operation mode to Management Mode (administrator mode). For details, refer to the *Resource Manager 9500V User's Guide for GUI (MK-92DF605)*.
2. Register the subsystem (array unit) in which you will install the LUN Management feature. Connect to the subsystem. For details, refer to the *Resource Manager 9500V User's Guide for GUI (MK-92DF605)*.

The Array System Viewer panel appears; it displays the connected subsystem (see Figure 2.1).

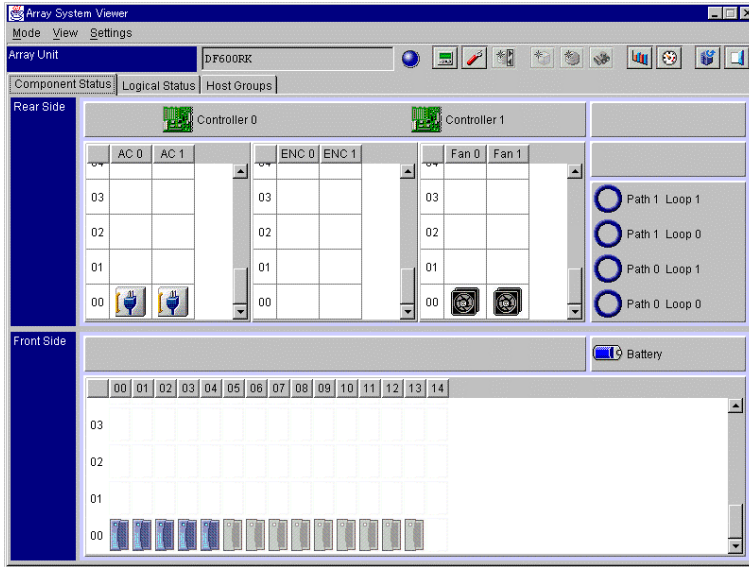



Figure 2.1 Array System Viewer Panel (Component Status Page)

3. From the **Settings** menu, select **Configuration Settings**. Alternatively, from the tool bar, select the **Configuration Settings**  button.

The Parameter panel is displayed.

4. On the Parameter panel, select the **Options** tab.

The **Options** page is displayed in front (see Figure 2.2).

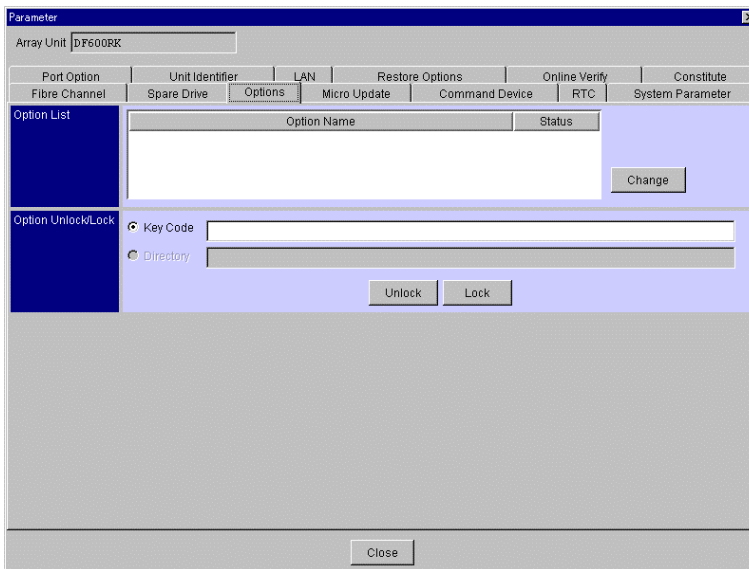
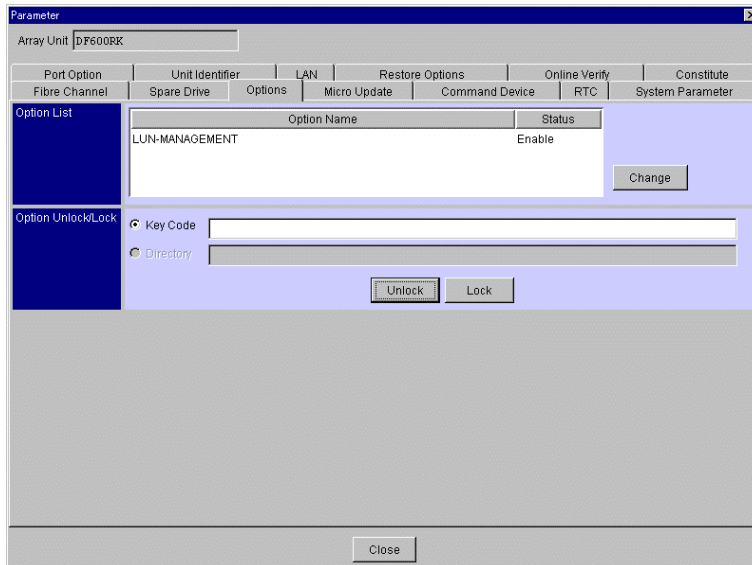


Figure 2.2 Parameter Panel (Options Page)

5. Enter a **key code** in the text box and click the **Unlock** button.
6. A screen appears, requesting confirmation to unlock LUN Management. Click the **OK** button.

In the **Option Name**, LUN-MANAGEMENT is displayed; the status is **Enable** (see Figure 2.3).



**Figure 2.3 Parameter Panel (Unlocked: Enable)**

The LUN Management feature is now installed (unlocked). To perform other operations, connect to the subsystem again and open the Array System Viewer panel.

## 2.3 Uninstalling LUN Management

Follow the instructions below to uninstall the LUN Management feature. When it is uninstalled, the LUN Management feature is not available (locked) until it is opened by the key code.


**Note:** The following condition must be satisfied in order to uninstall the LUN Management feature.

- All host group security must be set to disable.

### To uninstall LUN Management:

1. Start the Resource Manager 9500V and change the operation mode to **Management Mode** (administrator mode).
2. Register the subsystem (array unit) in which you will uninstall the LUN Management feature. Connect to the subsystem.

The Array System Viewer panel (refer to Figure 2.1) appears; it displays the connected subsystem.

3. From the **Settings** menu, select **Configuration Settings**. Alternatively, from the tool bar, select the **Configuration Settings**  button.

The Parameter panel is displayed.

4. On the Parameter panel, select the **Options** tab.

The **Options** page (refer to Figure 2.3) is displayed in front.

5. Enter a **key code** in the text box and click the **Lock** button.
6. A screen appears, requesting confirmation to lock LUN Management. Click the **OK** button.

The LUN Management feature is now uninstalled (locked). To perform other operations, connect to the subsystem again and open the Array System Viewer panel.


## 2.4 Enabling or Disabling

The LUN Management feature can be set to enable or disable when it is installed.

Follow the instructions below to enable/disable LUN Management:

1. Start the Resource Manager 9500V and change the operation mode to **Management Mode** (administrator mode).
2. Register the subsystem (array unit) in which you will change the status of the LUN Management feature. Connect to the subsystem.

The **Array System Viewer** panel (refer to Figure 2.1) appears; it displays the connected subsystem.

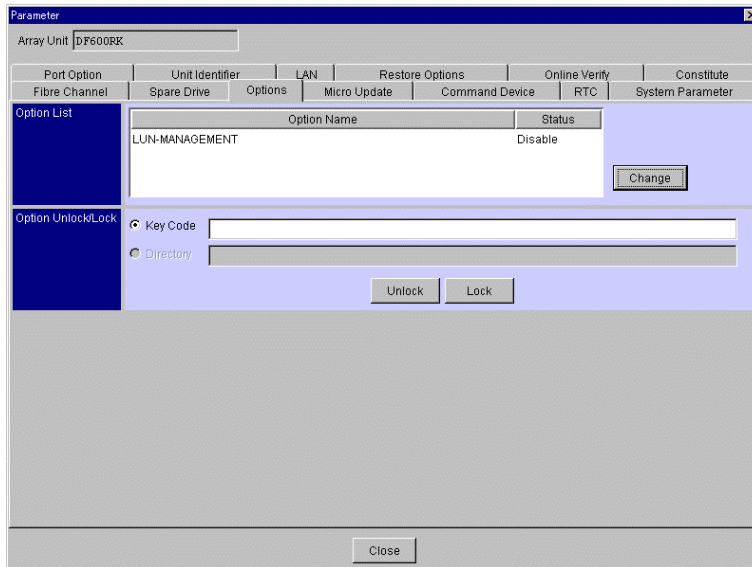
3. From the **Settings** menu, select **Configuration Settings**. Alternatively, from the tool bar, select the **Configuration Settings**  button.

The Parameter panel is displayed.

4. On the **Parameter** panel, select the **Options** tab.

The **Options** page (refer to Figure 2.3) is displayed in front.

5. From the **Option Name**, select **LUN-MANAGEMENT** and then select the **Change** button.
6. A message appears, confirming that you want to change the status (enable or disable). Click the **OK** button.



**Figure 2.4 Parameter Panel (Unlocked: Disable)**

The status of LUN Management feature is now changed (enabled/disabled). To perform other operations, connect to the subsystem again and open the Array System Viewer panel.

**Note:** When disabling or uninstalling this LUN Management feature, it is necessary to disable the Host Group Security of all ports.



## Chapter 3 Performing LUN Management Operations (GUI)

This chapter explains how to execute the LUN Management feature using the GUI version of the Resource Manager 9500V. This section includes the following:

- Adding a Host Group
- Setting a Host Group Option
- Setting Logical Units
- Adding a WWN
- Changing a Host Group Name
- Deleting a Host Group
- Initializing the Host Group 0
- Changing a WWN
- Deleting a WWN
- Deleting a Logged WWN

**Note:** Procedures for executing the LUN Management feature using CLI are available in Appendix A.

### 3.1 Adding a Host Group

To create a Host Group for each Port, you must:

- Set the Host Group Security to enable for each Port.
- Create a Host Group.

#### 3.1.1 Setting the Host Group Security

The Host Group Security default setting is **disable** for each port.

**To set the Host Group Security to enable for each port:**

1. Start the Resource Manager 9500V and change the operation mode to **Management Mode** (administrator mode).
2. Register the subsystem (array unit) in which you will set the enable/disable of Host Group Security. Connect to the subsystem.

The Array System Viewer panel appears; it displays the connected subsystem (refer to Figure 2.1).

3. Click the **Host Groups** tab.

4. Select **Port A** or **Port B** in **Controller 0** or **Controller 1**. Right-click the icon of the selected Port (a context menu appears). In the drop down menu, select **Enable/Disable** (see Figure 3.1).

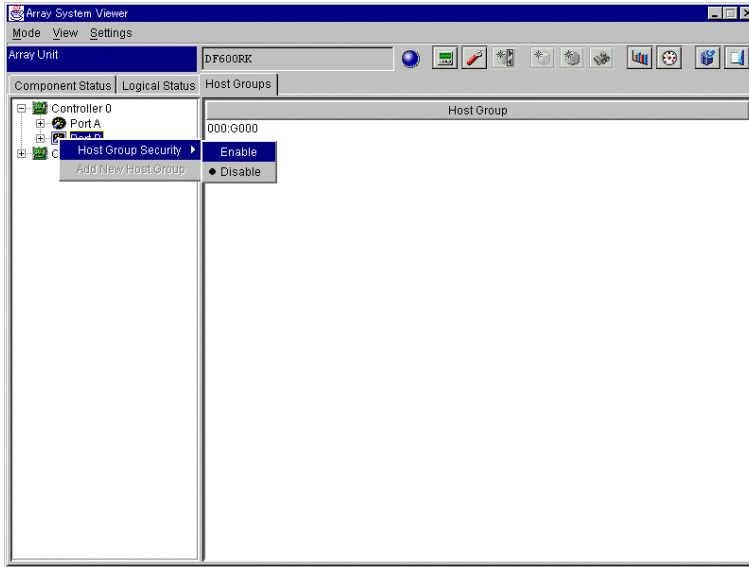


Figure 3.1 Setting the Host Group Security in the Context Menu

The setting can be started from the Settings menu by selecting **Settings** → **Security** → **Host Group Security** → one of the port options → **enable** (see Figure 3.2).

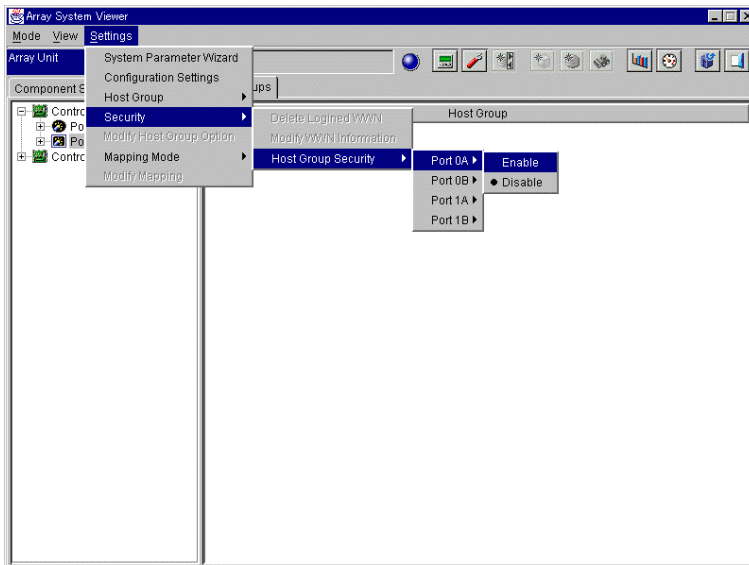
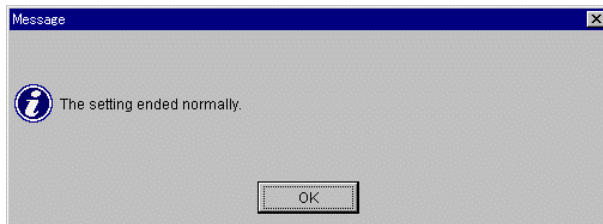
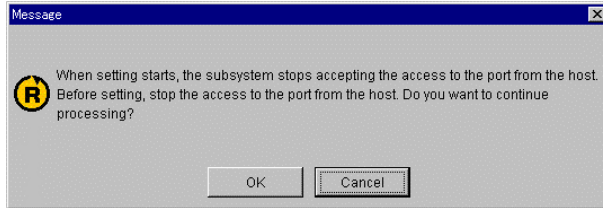
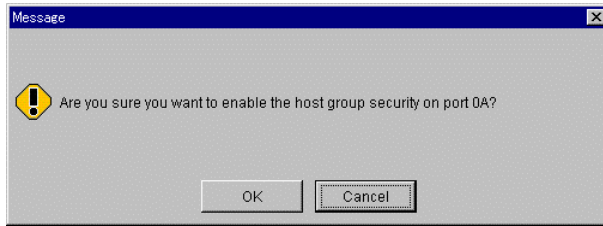


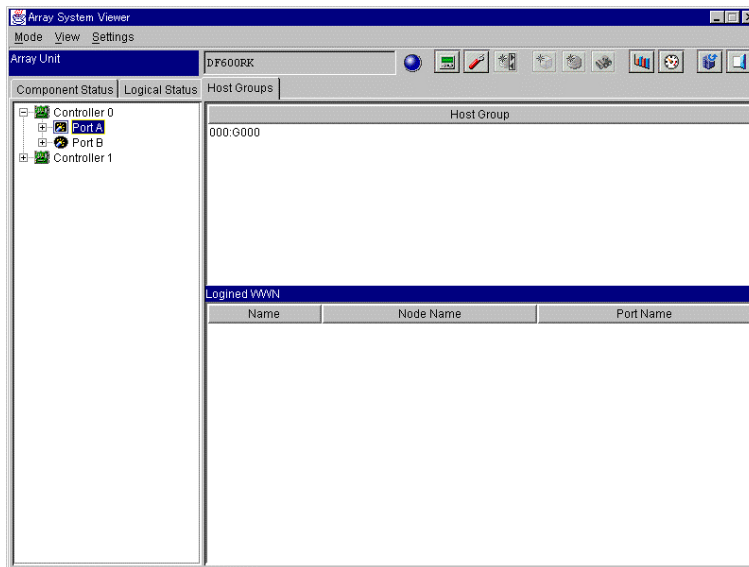
Figure 3.2 Setting the Host Group Security in the Setting Menu

5. The confirmation message is displayed. Click the **OK** button.



If the Host Group Security has been set enable, **Logged WWN** is displayed.

The **WWN** of the Host Bus Adapter that is connected to the selected Port is displayed in the **Logged WWN** as shown below.



### 3.1.2 Adding a Host Group

To create Host Groups for each Port:

1. Select **Port A** or **Port B**, and right-click the icon of the selected Port (a context menu appears). In the drop down menu, select **Add New Host Group** (see Figure 3.3).

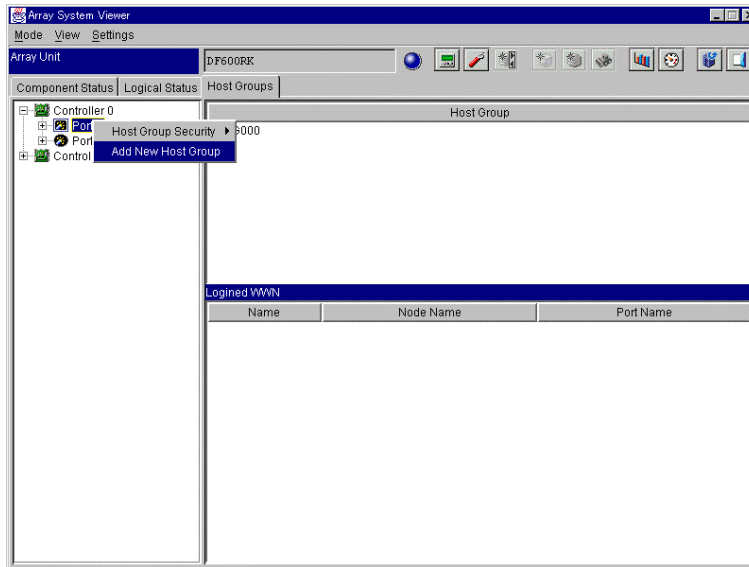


Figure 3.3 Adding a Host Group in the Context Menu

The process can be started from the Settings menu by selecting **Settings → Host Group → Add** (see Figure 3.4).

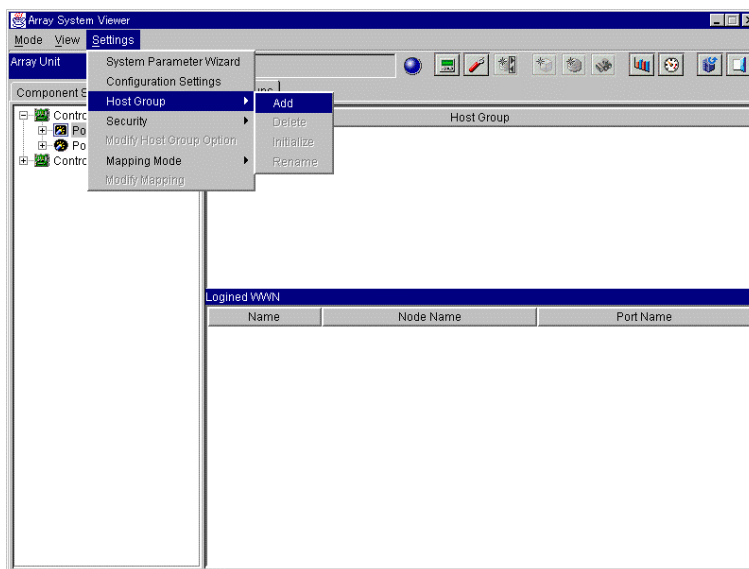


Figure 3.4 Adding a Host Group in the Settings Menu

2. In the resulting Host Group dialogue box, enter the **No.** and the **Name**, and click the **OK** button (see Figure 3.5).

- **No.:** Enter a numeral from 1 through 127.
- **Name:** Enter the name of the Host Group with eight or less alphanumeric characters.

(Excluding \, /, : , , , ; , \* , ? , " , < , > , | and ')

Spaces at the top or end are ignored. An identical name cannot be used in an identical Port.

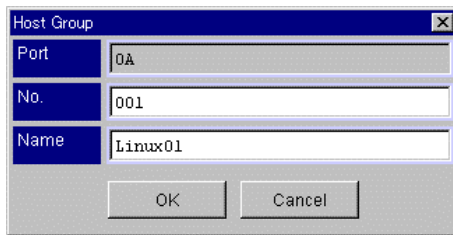
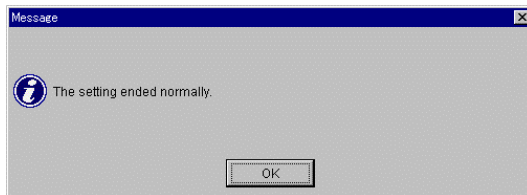
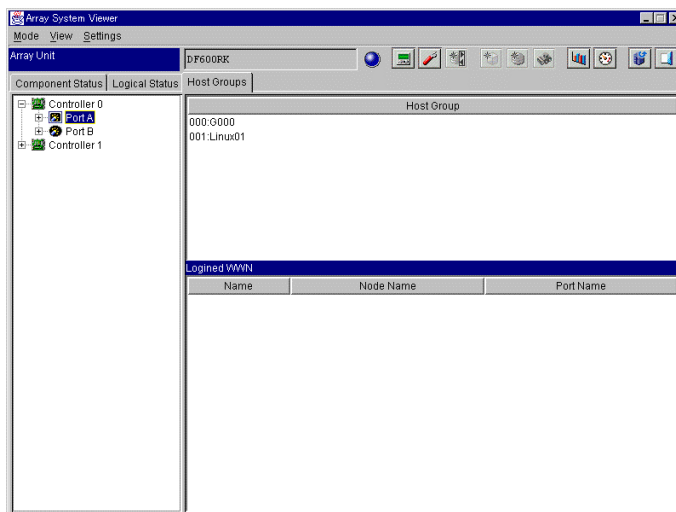


Figure 3.5 Host Group Dialogue Box

3. The confirmation message is displayed. Click the **OK** button.



The information that has been set is displayed as shown below.



## 3.2 Setting a Host Group Option

To set a Host Group Option for each Host Group:

1. Select an **Option** icon in the Host Group and select the **Modify Host Group Option** in the **Settings** menu (see Figure 3.6).

The process can be started from the context menu of the Option icon.

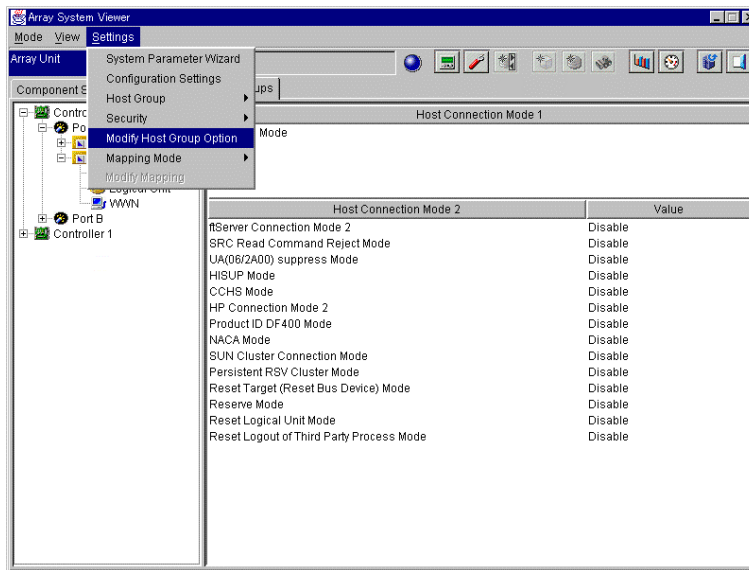
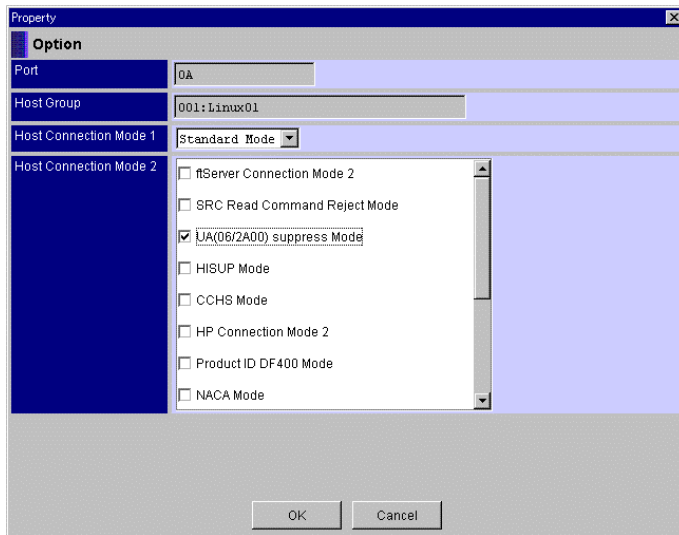


Figure 3.6 Setting a Host Group Option in the Settings Menu

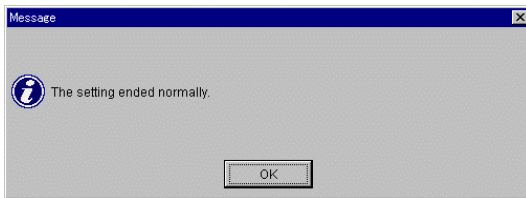
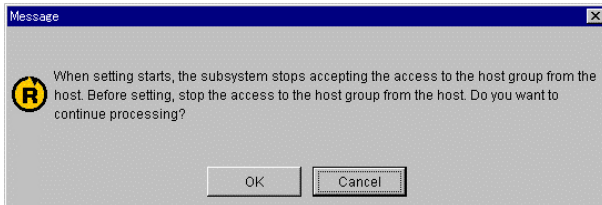
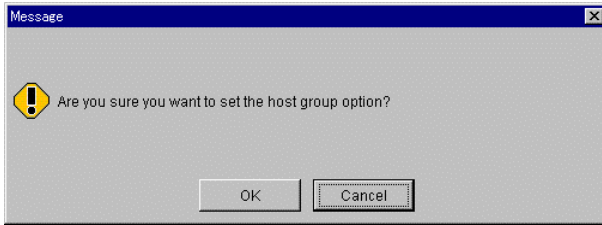
The **Option Property** screen is displayed.

2. Specify **Host Connection Mode 1** and **Host Connection Mode 2**, and click the **OK** button (see Figure 3.7).

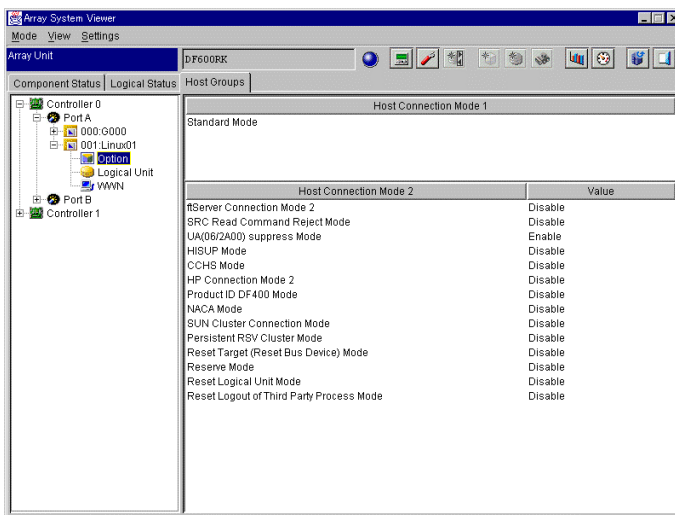


**Figure 3.7** Setting a Host Connection Mode

3. The confirmation message is displayed. Click the **OK** button.



The information that has been set is displayed as shown below.



### 3.3 Setting Logical Units

To set Logical Units to each Host Group:

**Note:** This process is called LU Mapping.

1. Select a **Logical Unit** icon in the Host Group and then select **Modify Mapping** in the **Settings** menu (see Figure 3.8).

This process can be started from the context menu of the **Logical Unit** icon.

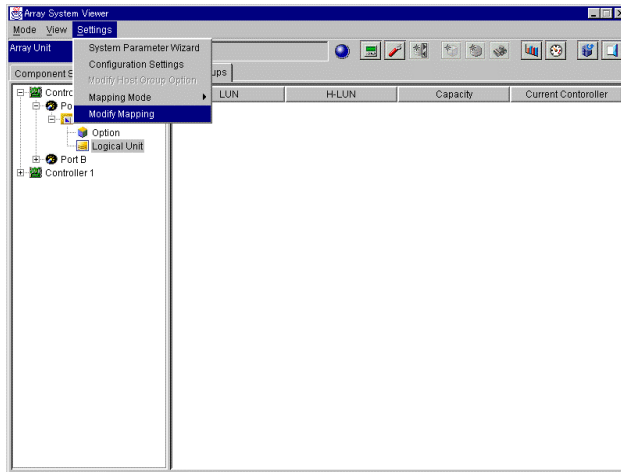


Figure 3.8 Modify Mapping in the Setting Menu

The **Mapping Property** is displayed.

It is necessary to set **Enable** to **Mapping Mode** for setting LU Mapping.

2. Select the **LUN** number, then select **HostLUN** number. Click the  button and add **LUN/HostLUN** number to **Reserved Configuration List**.

Add all the Logical Units to be recognized by the Host, then click the **OK** button (see Figure 3.9).

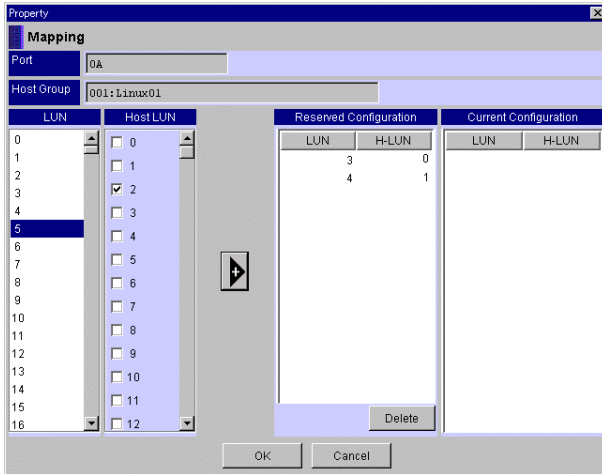
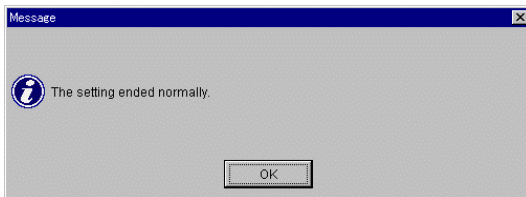
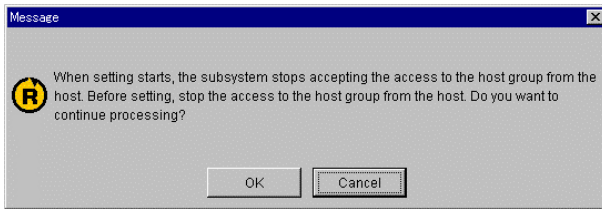
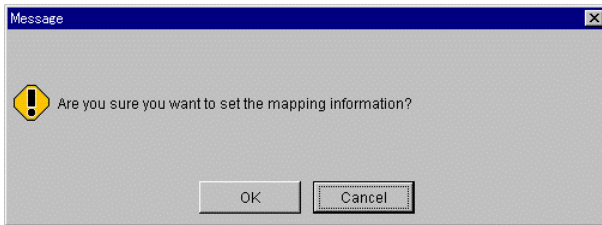
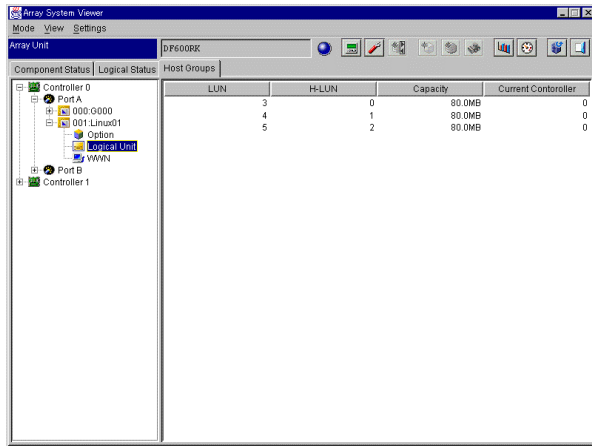


Figure 3.9 Mapping Property

3. The confirmation message is displayed. Click the OK button.



The information that has been set is displayed as shown below.



### 3.4 Adding a WWN

WWNs of a Host Bus Adapter are set to each Host Group. When a Port is connected to a Host, WWNs of Host Bus Adapters that are listed in **Logged WWN** can be selected and added to the Host Group. WWN is used for identifying Hosts.

For the process of obtaining WWN Information, see Appendix B.

#### 3.4.1 Adding a WWN by Entry

To add a WWN by entry:

1. Select a **WWN** icon in the Host Group, then point to **Security** in the **Settings** menu and select **Modify WWN Information** (see Figure 3.10).

This process can be started from a context menu of a **WWN** icon.

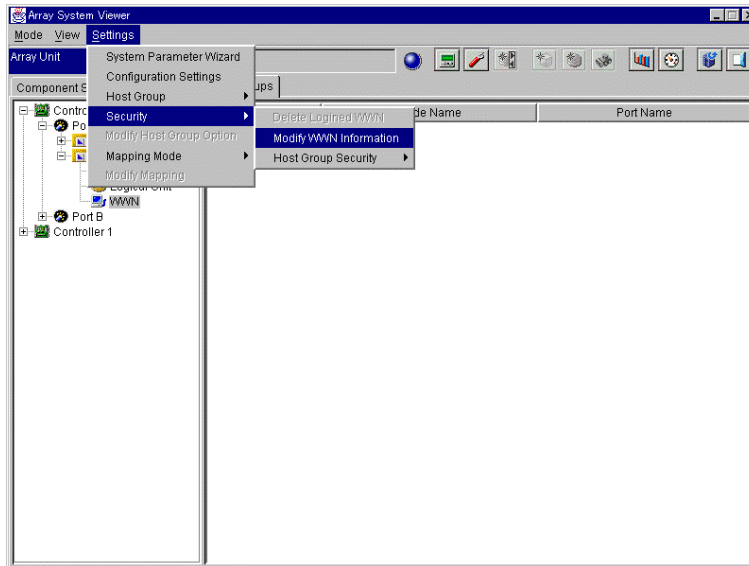


Figure 3.10 Modify WWN Information from the Setting Menu

WWN Information Property screen is displayed (see Figure 3.11).

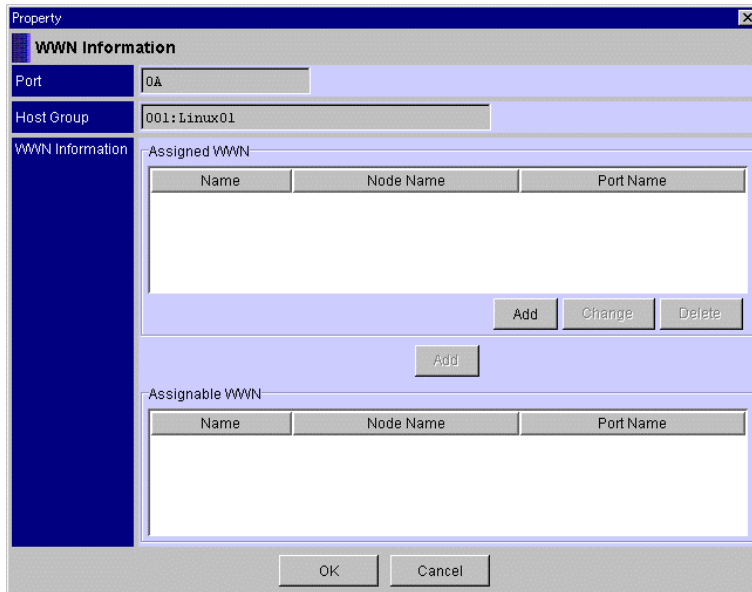


Figure 3.11 WWN Information Property

2. In the WWN Information Property screen, click the **Add** button. The **WWN** dialogue box is displayed (see Figure 3.12).

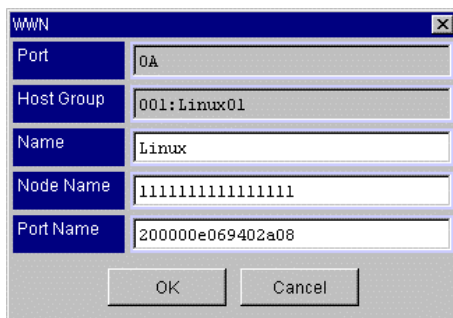
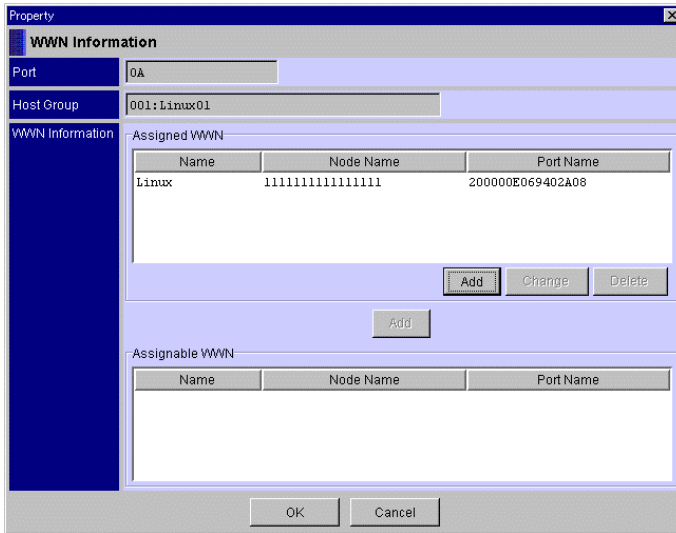


Figure 3.12 WWN Dialogue Box

3. In the WWN dialog box, enter the **Name** (Nickname), the **Node Name**, and the **Port Name**. Then click the **OK** button.
  - **Name:** Enter the name of the Host Group with eight or less alphanumeric characters.  
(Excluding \, /, :, , , ;, \*, ?, ", <, >, | and ')
  - **Node Name:** Enter the Node Name with sixteen hexadecimal numerals.
  - **Port Name:** Enter the Port Name with sixteen hexadecimal numerals.

The information that has been entered in the WWN dialog box is displayed in the **WWN Information Property** screen (see Figure 3.13).



**Figure 3.13 WWN Information Property Screen (completed)**

WWN Setting Items that can be omitted are shown in Table 3.1, as well as items that are used for identifying Hosts.

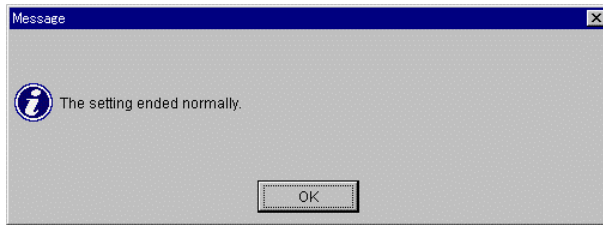
**Table 3.1 WWN Settings Items**

Setting Item	Omission of setting	Use for identification of the Host
Name	Can be omitted	Not used
Node Name	Setting is necessary	Not used
Port Name	Setting is necessary	Used

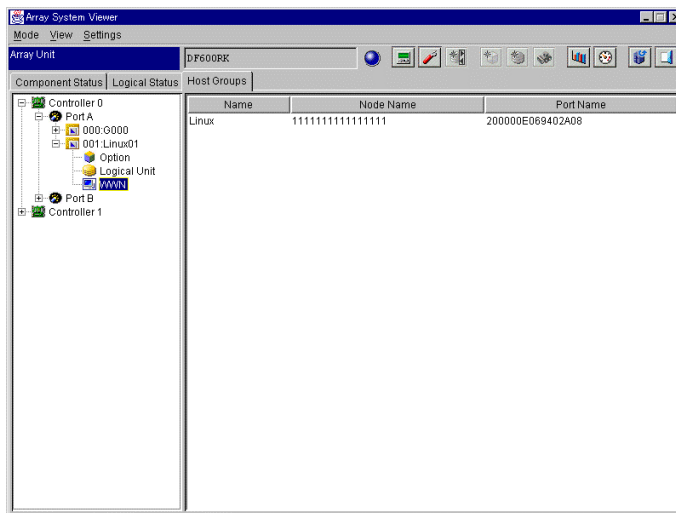
**Note:** Up to 128 WWNs can be assigned for a Port. This means, the total of the number of WWNs that have been already assigned (**Assigned WWN**) and the number of WWNs that can be assigned (**Assignable WWN**) further is 128 for a Port. When the number of WWNs assigned to a Port exceeds 128 and further input is impossible, delete a **Logined WWN** that is not assigned to a Host Group.

4. In the **WWN Information Property** screen, click the **OK** button.

5. The confirmation message is displayed. Click the **OK** button.



The information that has been set is displayed as shown below.



### 3.4.2 Selecting and Adding an Assignable WWN

To select and add an assignable WWN:

1. Select a **WWN** icon in a Host Group, then point to **Security** in the **Settings** menu and select **Modify WWN Information** (for details, refer to Figure 3.10).

This process can be started from a context menu of a **WWN** icon.

The **WWN Information Property** screen is displayed.

2. WWNs of Host Bus Adapters being connected to the Port are displayed in **Assignable WWN**. When a WWN of the Host Bus Adapter being connected to the Port is already assigned to another Host Group in the same Port, the WWN is not displayed in **Assignable WWN**. When the WWN is deleted from the Host Group to which the WWN has been assigned, the WWN is displayed in **Assignable WWN**.

Select WVN Information in the **Assignable WWN** list and click the **Add** button (see Figure 3.14).

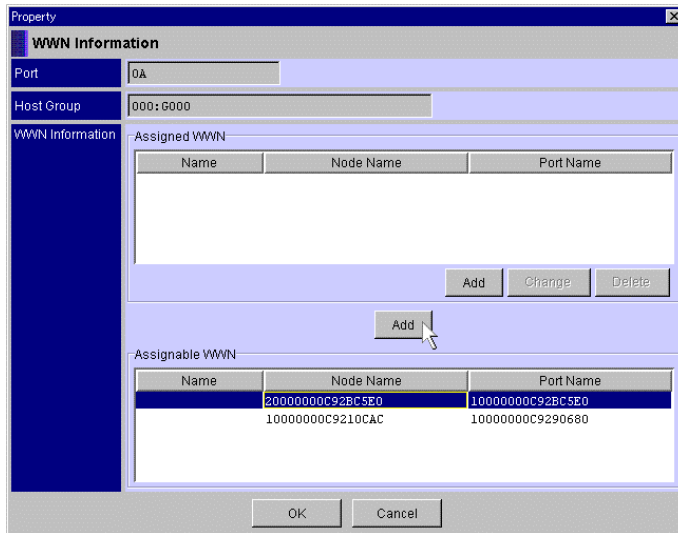
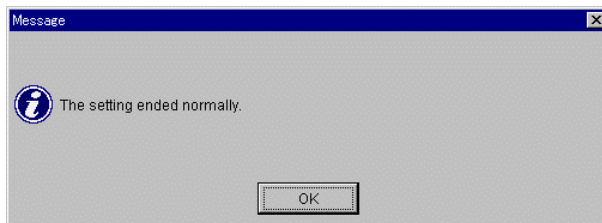


Figure 3.14 WWN Information Property screen (assignable WWN)

- The WWN moves from the **Assignable WWN** list to the **Assigned WWN** list.
3. In the **WWN Information Property** screen, click the **OK** button.
  4. The confirmation message is displayed. Click the **OK** button.



**Note:** In some cases, the WWN is not listed in the **Assignable WWN** list, even though the Port is connected to a Host. When the WWN to be assigned to a Host Group is not listed in the **Assignable WWN** list, input and add the WWN.

### 3.5 Changing a Host Group Name

To change a Host Group name:

1. Select the **Host Group** requiring the Host Group Name change. Then point to the Host Group in the **Settings** menu and select **Rename** (see Figure 3.15).

This process can be started from a context menu of the **Host Group**.

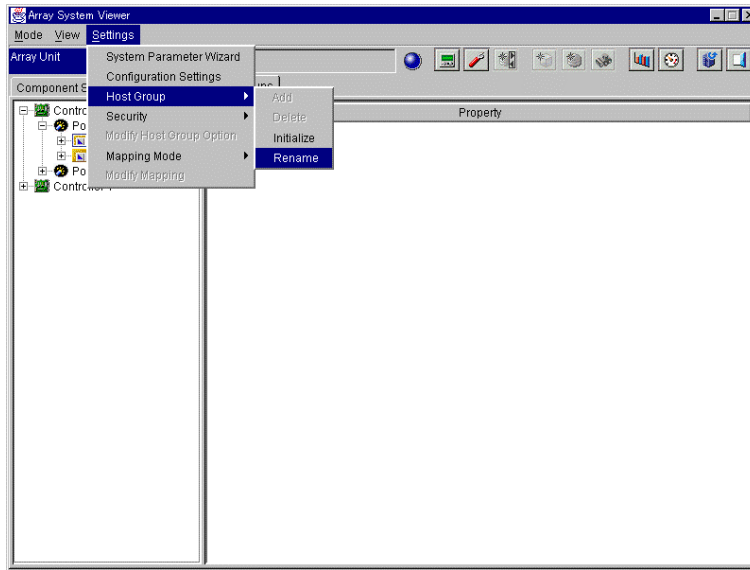


Figure 3.15 Changing the Host Group Name in the Settings Menu

2. In the resulting Host Group dialogue box, change the **Name** and click the **OK** button (see Figure 3.16).

- **Name:** Enter the name of the Host Group with eight or less alphanumeric characters.

(Excluding \, /, :, , , ;, \*, ?, ", <, >, | and ')

Spaces at the top or end are ignored. An identical name cannot be used in an identical Port.

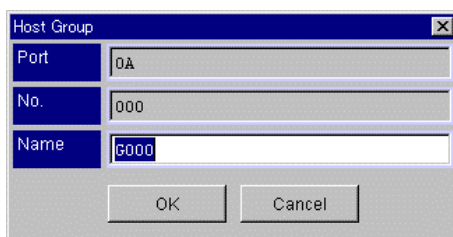
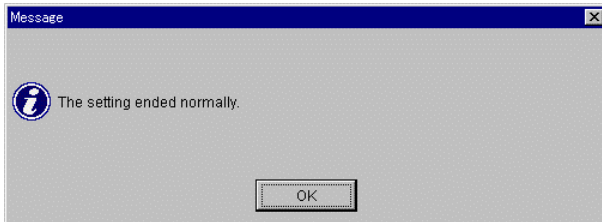
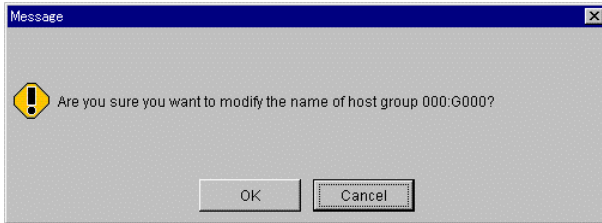


Figure 3.16 Host Group Dialogue Box (name change)

3. The confirmation message is displayed. Click the **OK** button.



### 3.6 Deleting a Host Group

**Note:** Host Group 0 cannot be deleted. When deleting all the WWNs and all the Logical Units in the Host Group 0, initialize the Host Group 0 (refer to 3.7).

**To delete a Host Group:**

1. Select the Host Group to be deleted, then point to **Host Group** in the **Settings** menu, and select **Delete** (see Figure 3.17).

This process can be started from the context menu of the **Host Group**.

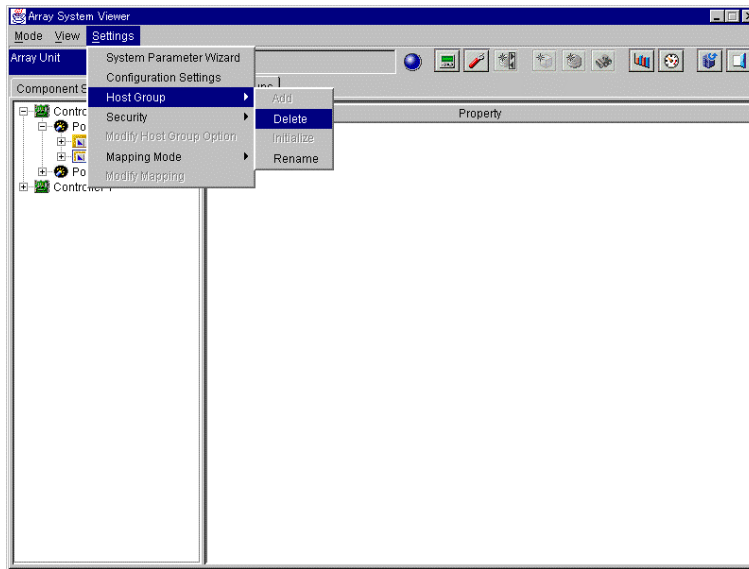
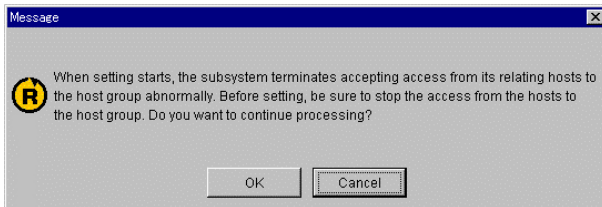
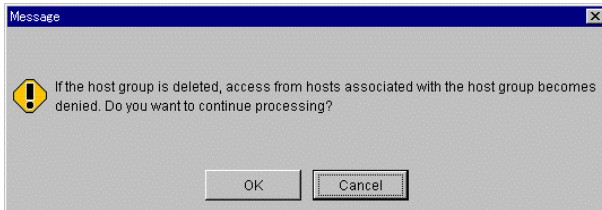
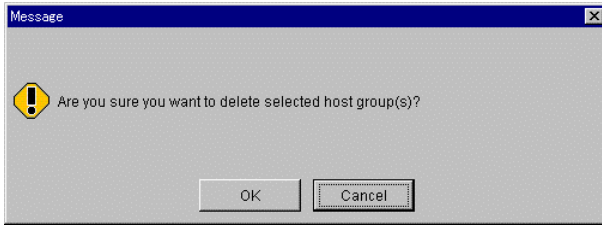


Figure 3.17 Deleting a Host Group from the Settings Menu

2. The confirmation message is displayed. Click the **OK** button.



### 3.7 Initializing the Host Group 0

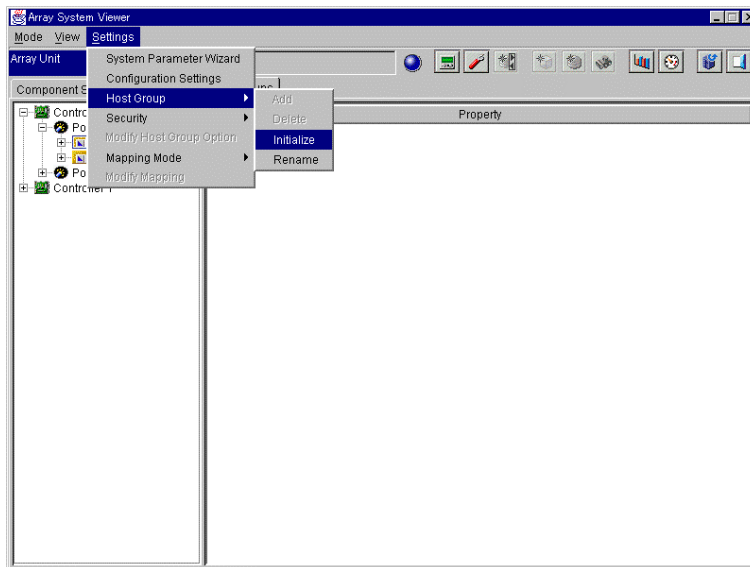
The Host Group 0 can be reset to the default state.

When the Host Group 0 is reset to the default state, WWNs that belong to the Host Group 0 are deleted and the settings of the Logical Units that belong to the Host Group 0 are also deleted. The Host Group Option of the Host Group 0 is reset to the default state and the Host Group Name is reset to G000.

**To initialize the Host Group 0:**

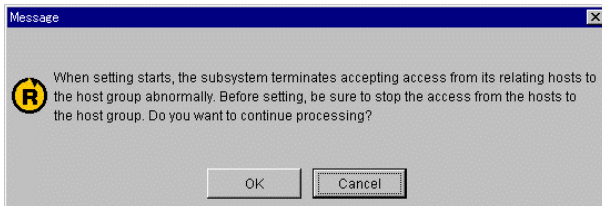
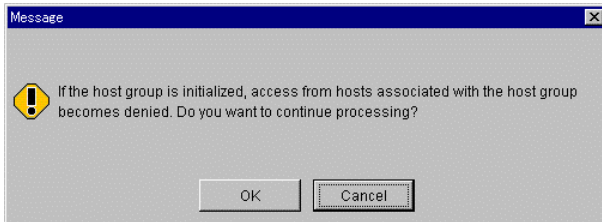
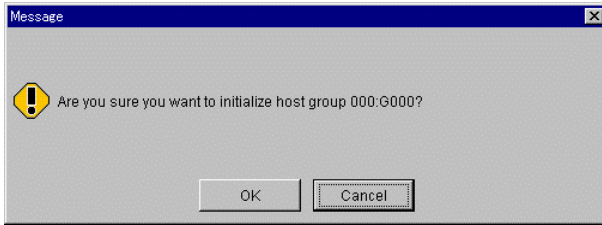
1. Select the **Host Group 0** to be initialized, then point to **Host Group** in the **Settings** menu and select **Initialize** (see Figure 3.18).

This process can be started from the context menu of the **Host Group 0**.



**Figure 3.18** Initializing the Host Group 0 from the Settings Menu

2. The confirmation message is displayed. Click the **OK** button.



## 3.8 Changing a WWN

To change a WWN:

1. Select a **WWN** icon in a Host Group, then point to **Security** in the **Settings** menu and select **Modify WWN Information** (refer to Figure 3.10).

This process can be started from a context menu of a **WWN** icon.

The **WWN Information Property** screen is displayed.

2. Select a **Name** to be changed and click the **Change** button, as shown below.

Name	Node Name	Port Name
Linux	1111111111111111	200000E069402A08

The **WWN** dialogue box is displayed.

3. Enter the **Name**, the **Node Name**, or the **Port Name**. Then click the **OK** button (see Figure 3.19).

- **Name:** Enter the name of the Host Group with eight or less alphanumeric characters.

(Excluding \, /, :, , , ;, \*, ?, ", <, >, | and ')

Spaces at the top or end are ignored. An identical name cannot be used in an identical Port.

- **Node Name:** Enter the Node Name with sixteen hexadecimal numerals.
- **Port Name:** Enter the Port Name with sixteen hexadecimal numerals.

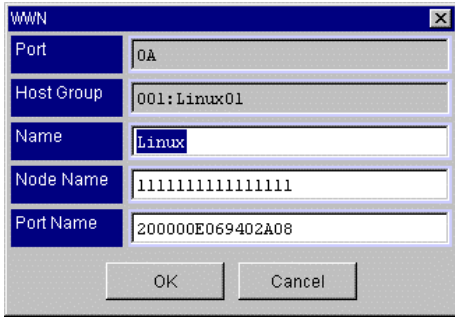
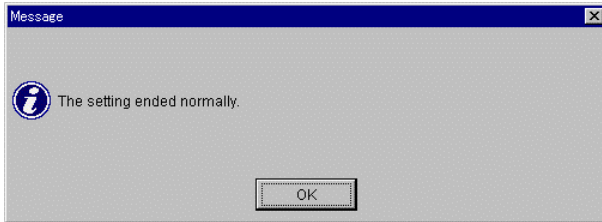


Figure 3.19 WWN Dialogue Box (changing WWN)

The information that has been entered is displayed on **WWN Information Property**.

4. Click the **OK** button on **WWN Information Property**.
5. The confirmation message is displayed. Click the **OK** button.



### 3.9 Deleting a WWN

To deleted a WWN:

1. Select a **WWN** icon in a Host Group, then point to **Security** in the **Settings** menu and select **Modify WWN Information** (refer to Figure 3.10).

This process can be started from a context menu of a **WWN** icon.

**WWN Information Property** is displayed.

2. Select the **Name** to be deleted in the **Assigned WWN** list and click the **Delete** button.

Name	Node Name	Port Name
Linux	11111111111111111111	200000E069402A08

When the WWN to be deleted is an entered WWN and has not been connected to the Host after the entry, the WWN to be deleted is deleted from the **Assigned WWN** list.

When the WWN to be deleted is a Logged WWN, or has been connected to the Host of the WWN after the entry, the WWN to be deleted is moved from the **Assigned WWN** list to the **Assignable WWN** list (see Figure 3.20).

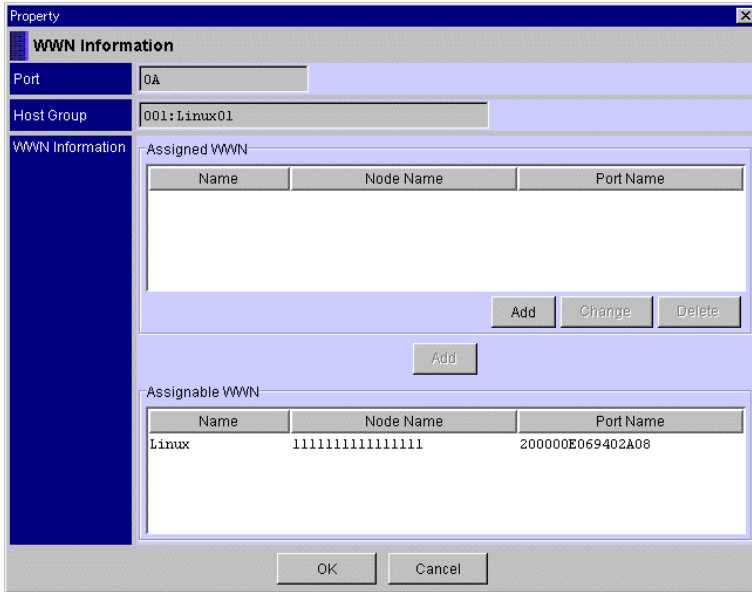
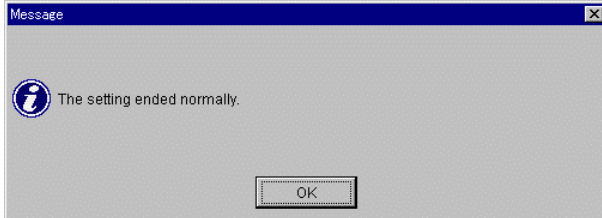


Figure 3.20 WWN Information Property Screen (deleted WWN)

3. In the **WWN Information Property** screen, click the **OK** button.
4. The confirmation message is displayed. Click the **OK** button.



### 3.10 Deleting a Logged WWN

To delete a Logged WWN:

1. In Port A or Port B, select a **Logged WWN** to be deleted, then point to **Security** in the **Settings** menu and select **Delete Logged WWN** (see Figure 3.21).

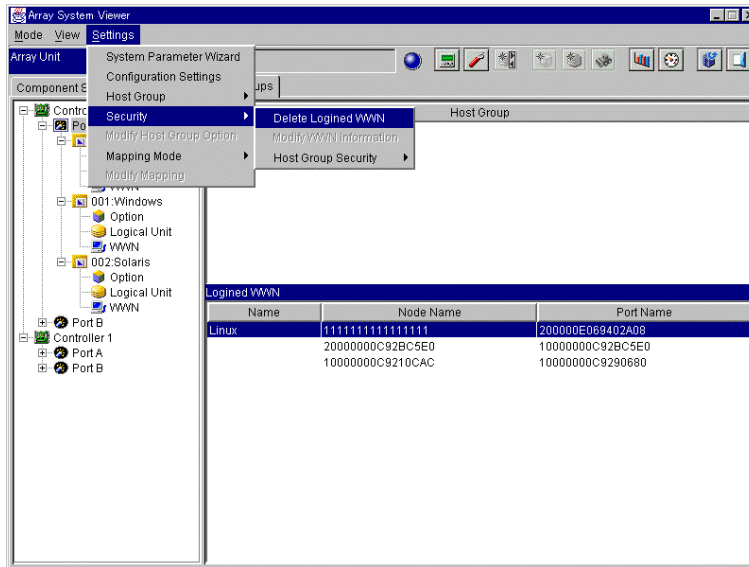
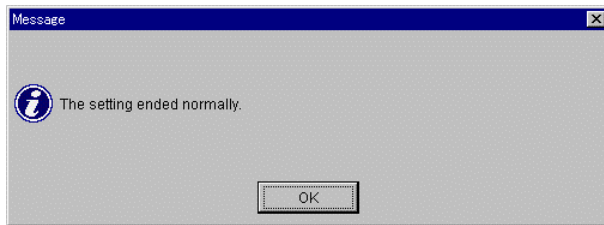
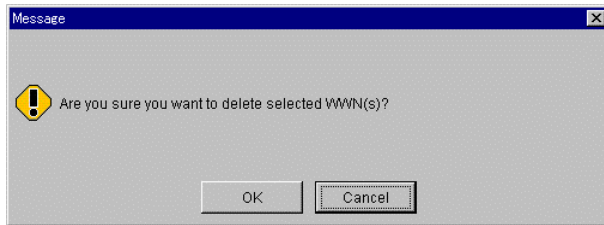


Figure 3.21 Deleting a Logged WWN

When a WWN that has been already assigned to a Host Group is deleted from the **Logged WWN** list, the WWN is deleted from the list but the assignment to the Host Group remains.

2. The confirmation message is displayed. Click the **OK** button.



# Chapter 4 Troubleshooting

## 4.1 Troubleshooting

The 9500V subsystem provides continuous data availability and is not expected to fail in any way that would interrupt access to user data. For troubleshooting information on the 9500V subsystem or Resource Manager, please refer to the *9500V User and Reference Manual* (MK-92DF601).

## 4.2 Calling the Hitachi Data Systems Technical Support Center

If you need to call the Hitachi Data Systems Technical Support Center, be sure to provide as much information about the problem as possible. Include the circumstances surrounding the error or failure and the exact content of any error codes and/or messages displayed. The worldwide Hitachi Data Systems Technical Support Centers are:

- Hitachi Data Systems North America/Latin America  
San Diego, California, USA  
1-800-348-4357
- Hitachi Data Systems Europe  
Contact Hitachi Data Systems Local Support
- Hitachi Data Systems Asia Pacific  
North Ryde, Australia  
011-61-2-9325-3300



# Appendix A Operations Using CLI

This appendix includes the following:

- Installing LUN Management
- Uninstalling LUN Management
- Enabling or Disabling LUN Management
- Adding a Host Group
- Setting a Host Group Option
- Setting Logical Units (LU Mapping)
- Adding a WWN
- Changing a Host Group Name
- Deleting a Host Group
- Initializing the Host Group 0
- Changing a WWN
- Deleting a WWN
- Deleting a Logged WWN

## A.1 Installing LUN Management

The LUN Management option is usually unselectable (locked). To make this option available, you must install LUN Management and make its functions selectable (unlocked). To install this function, use the key code provided with the optional feature.

LUN Management is installed and uninstalled through the Resource Manager 9500V.

**To install this function, the key code provided with the optional feature is required.**

**Note:** Before installing and uninstalling, make sure that the array unit is in normal operating condition. If a failure such as a controller blockade has occurred, installation and uninstallation operations cannot be performed.

To install the LUN Management feature using the CLI version of Resource Manager 9500V:

1. From the command prompt, register the subsystem (array unit) in which you will install the LUN Management feature. Connect to the subsystem.
2. Unlock the optional features by executing the `auopt` command as follows:

**Example 1:**

```
% auopt -unit df600 -lock off -keycode Key code
Password:
Option was opened.
%
```

**Example 2:**

```
% auopt -unit df600 -refer
Password:
Option name      Status
LUN-MANAGEMENT  Enable
%
```

## A.2 Uninstalling LUN Management

When the LUN Management feature is uninstalled, the LUN Management feature is not available (locked) until it is opened by the key code.

To uninstall LUN Management, use the key code provided with the optional feature.

LUN Management is installed and uninstalled through the Resource Manager 9500V (for details, refer to the *Resource Manager 9500V User's Guide for GUI* (MK-92DF605)).

**To uninstall LUN Management, using the CLI version of Resource Manager 9500V:**

1. From the command prompt, register the subsystem (array unit) in which you will uninstall the LUN Management feature and connect to the subsystem.
2. Lock the optional features by executing the **auopt** command as follows:

### **Example 1:**

```
% auopt -unit df600 -lock on -keycode Key code
Password:
Option was closed.
%
```

### **Example 2:**

```
% auopt -unit df600 -refer
Password:
DMEC002015:No information displayed.
%
```

### A.3 Enabling or Disabling LUN Management

LUN Management can be set to enable or disable after installation. This allows LUN Management to be activated or deactivated without the necessity of using the key code.

**Note:** When disabling or uninstalling this LUN Management feature, it is necessary to disable the Host Group Security of all ports.

**To enable/disable LUN Management using the CLI version of Resource Manager 9500V:**

1. From the command prompt, register the subsystem (array unit) in which you will change the status of the LUN Management feature and connect to the subsystem.
2. Execute the `auopt` command to change the status (enable or disable) of the LUN Management feature.

The following is an example of how to change the status from enable to disable. To change the status from disable to enable, enter `enable` after the `-st` option.

**Example 1:**

```
% auopt -unit df600 -option LUN-MANAGEMENT -st disable
Password:
Option setting ended normally.
%
```

**Example 2:**

```
% auopt -unit df600 -refer
Password:
Option name      Status
LUN-MANAGEMENT  Disable
%
```

## A.4 Adding a Host Group

To create a Host Group for each Port, you must:

- Set the Host Group Security to enable for each Port.
- Create a Host Group.

### A.4.1 Setting the Host Group Security

The Host Group default setting is **disable** for each Port.

To set the Host Group Security to be valid or invalid:

1. From the command prompt, register the subsystem (array unit) in which you want to set the host group security information and connect to the subsystem.
2. Execute the `auhgwwn` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A

Use `off` with `-hgs` option, when disabled LUN Management is changed.

#### Example:

```
% auhgwwn -unit df600 -set -hgs 0 A on
Password:
Are you sure you want to enable the host group security on port0A? (y/n [n]): y
When setting starts, the subsystem stops accepting the access to the port from the
host.
Before setting, stop the access to the port from the host.
Do you want to continue processing? (y/n [n]): y
The security information has been set successfully.
%
```

4. Specify as follows when the checking information has been set:

#### Example:

```
% auhgwwn -unit df600 -refer
Password:
Port 0A Host Group Security ON
Port 0B Host Group Security OFF
Port 1A Host Group Security OFF
Port 1B Host Group Security OFF
%
```

## A.4.2 Adding a Host Group

### To create Host Groups for each Port:

1. From the command prompt, register the subsystem (array unit) in which you want to set the host group information and connect to the subsystem.
2. Execute the `auhgdef` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 1
  - Host group name: win001

### Example:

```
% auhgdef -unit df600 -add 0 A -gno 1 -gname win001
Password:
Host group information has been set successfully.
%
```

4. Specify as shown when setting the following information:

### Example:

```
% auhgdef -unit df600 -refer
Password:
Port 0A
  Group  HostGroupName
    0    G000
    1    win001
Port 0B
  Group  HostGroupName
    0    G000
Port 1A
  Group  HostGroupName
    0    G000
Port 1B
  Group  HostGroupName
    0    G000
%
```

## A.5 Setting a Host Group Option

To set a Host Group Option for each Host Group:

1. From the command prompt, register the subsystem (array unit) in which you want to set the host group option information and connect to the subsystem.
2. Execute the `auhgopt` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 1
  - Host Connection Mode 1: Standard
  - Host Connection Mode 2: UA(06/2A00) suppress Mode

**Example:**

```
% auhgopt -unit df600 -set 0 A -gno 1 -HostConnection standard -UASuppress enable
Password:
Are you sure you want to set the host group option? (y/n [n]): y
When setting starts, the subsystem stops accepting the access to the host group
from the host.
Before setting, stop the access to the host group from the host.
Do you want to continue processing? (y/n [n]): y
The host group option has been set successfully.
%
```

## A.6 Setting Logical Units

To set Logical Units to be recognized by each host to each Host Group:

**Note:** This process is called LU Mapping.

1. From the command prompt, register the subsystem (array unit) in which you want to set the logical unit mapping information and connect to the subsystem.
2. Execute the `auhgmap` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 1
  - Logical Unit to be recognized by the host: 0
  - Subsystem internal Logical Unit: 0

It is necessary to set **Enable to Mapping Mode** for setting LU Mapping.

**Example:**

```
% auhgmap -unit df600 -add 0 A 1 0 0
Password:
The mapping information has been set successfully.
%
```

4. Specify as shown when setting the following information:

**Example:**

```
% auhgmap -unit df600 -refer
Password:
Mapping mode = ON
Port Group          H-LUN LUN
  0A 001:win001      0    0
%
```

## A.7 Adding a WWN

WWNs of Host Bus Adapter are set to each Host Group (see A.7.1).

When a Port is connected to a Host, WWNs of Host Bus Adapters that are listed in **Logined WWN** can be selected and added to the Host Group (see A.7.2).

WWN is used for identifying Hosts.

For the process of obtaining WWN Information, refer to Appendix B.

### A.7.1 Adding a WWN by Entry

To add a WWN by entry:

1. From the command prompt, register the subsystem (array unit) in which you want to set the WWN information and connect to the subsystem.
2. Execute the `auhgwwn` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 1
  - Host information (node name and port name): 1111111111111111 and 200000e069402a08
  - WWN nickname: win001

**Example:**

```
%auhgwwn -unit df600 -set -permhg 0 A 1111111111111111 200000e069402a08 -wname win001
-gno 1
Password:
The security information has been set successfully.
%
```

4. Specify as shown when setting the following information:

**Example:**

```
% auhgwwn -unit df600 -refer
Password:
Port 0A Host Group Security ON
Logined WWN
  Name      Node name      Port name
Assigned WWN
  Name      Node name      Port name      Host Group
win001     1111111111111111 200000E069402A08 001:win001
Assignable WWN
Port 0B Host Group Security OFF
Port 1A Host Group Security OFF
Port 1B Host Group Security OFF
%
```

## A.7.2 Selecting and Adding an Assignable WWN

To display the Assignable WWN list and to assign the WWN on the Assignable WWN list:

1. From the command prompt, register the subsystem (array unit) in which you want to set the WWN information and connect to the subsystem.
2. Execute the `auhgwwn` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: `df600`
  - Controller: `0`
  - Port: `A`
  - Host group number: `0`

**Example:**

```
% auhgwwn -unit df600 -refer -permhg 0 A -gno 0
Password:
Port 0A Host Group Security ON
Assigned WWN
  Name      Node name      Port name      Host Group
Assignable WWN
  Name      Node name      Port name
           10000000C9210CAC  10000000C9290680
% auhgwwn -unit df600 -assign -permhg 0 A 10000000C9210CAC 10000000C9290680 -gno 0
Password:
The security information has been set successfully.
% auhgwwn -unit df600 -refer -permhg 0 A -gno 0
Password:
Port 0A Host Group Security ON
Assigned WWN
  Name      Node name      Port name      Host Group
           10000000C9210CAC  10000000C9290680  000:G000
Assignable WWN
  Name      Node name      Port name
%
%
```

## A.8 Changing a Host Group Name

### To change a Host Group name:

1. From the command prompt, register the subsystem (array unit) in which you want to change the host group name and connect to the subsystem.
2. Execute the `auhgdef` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 1
  - Current host group name: win001
  - New host group name: win002

### Example:

```
% auhgdef -unit df600 -chg 0 A -gno 1 -newgname win002
Password:
Are you sure you want to change the name of host group? (y/n [n]): y
Host group information has been set successfully.
%
```

## A.9 Deleting a Host Group

### To delete a Host Group:

1. From the command prompt, register the subsystem (array unit) in which you want to delete the host group and connect to the subsystem.
2. Execute the `auhgdef` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: `df600`
  - Controller: `0`
  - Port: `A`
  - Host group number: `1`

### Example:

```
% auhgdef -unit df600 -rm 0 A -gno 1
Password:
Are you sure you want to delete specified host group(s)? (y/n [n]): y
After setting, access from hosts associated with the host group will be denied.
Do you want to continue processing? (y/n [n]): y
When setting starts, the subsystem stops accepting the access to the host group
from the host. Do you want to continue processing? (y/n [n]): y
Host group information has been set successfully.
%
```

## A.10 Initializing the Host Group 0

### To initialize the Host Group:

1. From the command prompt, register the subsystem (array unit) in which you want to initialize the specified host group 0 and connect to the subsystem.
2. Execute the `auhgdef` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A

### Example:

```
% auhgdef -unit df600 -init 0 A
Password:
Are you sure you want to initialize host group 0? (y/n [n]): y
After setting, access from hosts associated with the host group 0 will be denied.
Do you want to continue processing? (y/n [n]): y
When setting starts, the subsystem stops accepting the access to the host group
from the host. Do you want to continue processing? (y/n [n]): y
Host group information has been set successfully.
%
```

## A.11 Changing a WWN

### To change a WWN:

1. From the command prompt, register the subsystem (array unit) in which you want to change the WWN information and connect to the subsystem.
2. Execute the `auhgwwn` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 1
  - Host information (node name and port name): 1111111111111111 and 200000e069402a08
  - WWN nick name: winNT01

### Example:

```
%auhgwwn -unit df600 -chg -rename 0 A 1111111111111111 200000e069402a08 -gno 1
      -newwname winNT01
Password:
The security information has been set successfully.
%
```

4. Specify as shown when setting the following information:

### Example:

```
% auhgwwn -unit df600 -refer
Password:
Port 0A Host Group Security ON
  Logged WWN
    Name      Node name      Port name
Assigned WWN
    Name      Node name      Port name      Host Group
winNT01     1111111111111111 200000E069402A08 001:win001
Assignnable WWN
Port 0B Host Group Security OFF
Port 1A Host Group Security OFF
Port 1B Host Group Security OFF
%
```

## A.12 Deleting a WWN

To delete the WWN on the assigned WWN list:

1. From the command prompt, register the subsystem (array unit) in which you want to delete the WWN information and connect to the subsystem.
2. Execute the `auhgwwn` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host group number: 0
  - Host information (node name and port name): 1111111111111111 and 200000e069402a08

**Example:**

```
% auhgwwn -unit df600 -rm -permhg 0 A 1111111111111111 200000e069402a08 -gno 0
Password:
The security information has been set successfully.
%
```

4. Specify as shown when setting the following information:

**Example:**

```
% auhgwwn -unit df600 -refer -permhg 0 A -gno 0
Password:
Port 0A Host Group Security ON
Assigned WWN
  Name      Node name      Port name      Host Group
Assignable WWN
  Name      Node name      Port name
1111111111111111 200000E069402A08
%
```

## A.13 Deleting a Logged WWN

To display and delete the logged WWN on the logged WWN list:

1. From the command prompt, register the subsystem (array unit) in which you want to delete the WWN information and connect to the subsystem.
2. Execute the `auhgwwn` command to specify the subsystem.
3. Use the following settings:
  - Subsystem name: df600
  - Controller: 0
  - Port: A
  - Host information (node name and port name): 1111111111111111 and 200000e069402a08

**Example:**

```
% auhgwwn -unit df600 -refer -login 0 A
Password:
Port 0A Host Group Security ON
  Logged WWN
    Name      Node name      Port name
    Linux     1111111111111111 200000E069402A08
             10000000C9210CAC 10000000C9290680

% auhgwwn -unit df600 -rm -perm 0 A 1111111111111111 200000e069402a08
Password:
Are you sure you want to delete selected WWN? (y/n [n]) y
The security information has been set successfully.
%
```

## Appendix B Using the WWN Change Operation when the HBA is Replaced

When you replace the HBA of the host (server) using LUN Management, you need to change the WWN setting of LUN Management. This section includes the following information:

- WWN Change Procedure when the HBA is replaced
- Obtaining the WWN of a Host

### B.1 WWN Change Procedure when the HBA is Replaced

To change the WWN when the HBA is replaced:

1. Check the WWN before and after HBA replacement. For the WWN after HBA replacement, see Obtaining the WWN of a Host in section B.2.
2. Change the WWN before HBA replacement to the WWN after HBA replacement by the following LUN Management setting procedure.

When changing the setting, refer to Changing the WWN of the Host HBA in section 3.8.

3. Restart the host with the replaced HBA. Verify that the LU was recognized; this must occur before HBA replacement can be recognized after the HBA replacement. When the LU is not recognized, LUN Management is not correctly set. Use the procedures from step 2 above to set the WWN again.

### B.2 Obtaining the WWN of a Host

The node name, port name, and N\_port ID of a host (which is required as host identification information) can be obtained using the host console.

This section explains how to obtain the WWN of a host on the following systems:

- Solaris™
- HP®
- IBM®
- SGI™
- Windows NT®/Windows® 2000

## B.2.1 Solaris™

There are two methods for obtaining the WWN of a host. Each are described below:

### Method 1:

To obtain the WWN of a host when the JNI HBA is FC64-1063 or FCI-1063 (driver version: HIT.06.01 earlier):

1. Execute the following command to obtain the WWN of the HBA.

```
# dmesg      ← Command name
:
Ethernet address = 8:0:20:89:b:7
root nexus = Sun Ultra 2 UPA/SBus (UltraSPARC-II 296MHz)
sbus0 at root: UPA 0x1f 0x0 ...
fas0: rev 2.2 FEPS chipSUNW,fas0 at sbus0: SBus0 slot 0xe offset 0x8800000 and slot
0xe offset 0x8810000 Onboard device sparc9 ipl 4
sd0 at SUNW,fas0: target 0 lun 0
sd0 is /sbus@1f,0/SUNW,fas@e,8800000/sd@0,0
    <SUN4.2G cyl 3880 alt 2 hd 16 sec 135>
sd6 at SUNW,fas0: target 6 lun 0
sd6 is /sbus@1f,0/SUNW,fas@e,8800000/sd@6,0
fcaw0: Host: Port 000001 (WWN 200000e0694005e5)
fcaw0: JNI Fibre Channel Adapter model FCW
fcaw0: 64-bit SBus 1: IRQ 3: FCODE Version 12 [alf55]
fcaw0: Fibre Channel WWN: 200000e0694005e5
fcaw0: FCA Driver Version 2.2.0.HIT.03, Feb 04, 1999 for Solaris 2.6
fcaw0: All Rights Reserved.
fcaw0: < Total IOPB space used: 1140160 bytes >
fcaw0: < Total DMA space used: 4235293 bytes >
fcaw0: < DMA redzone len 224 bytes >
fcaw1: Host: Port 000001 (WWN 200000e0694005f6)
fcaw1: JNI Fibre Channel Adapter model FCW
fcaw1: 64-bit SBus 3: IRQ 3: FCODE Version 12 [alf55]
fcaw1: Fibre Channel WWN: 200000e0694005f6
fcaw1: FCA Driver Version 2.2.0.HIT.03, Feb 04, 1999 for Solaris 2.6
fcaw1: All Rights Reserved.
fcaw1: < Total IOPB space used: 1140160 bytes >
fcaw1: < Total DMA space used: 4235293 bytes >
```

2. Read and record the port name and the N\_Port ID. The node name can be obtained from the port name. Replace the value "20" of the highest one byte of the port name (200000e069xxxxx) by "10".

### Example:

```
Port name:    200000e0694005e5
              ↓
Node name:    100000e0694005e5
```

## Method 2:

When the JNI HBA is FC64-1063 or FCI-1063 (driver version: HIT.07 later), or FCE-1063, FCE-6410, FCE-6460, FCE-1473, FCC-6460 the system parameters of the subsystem must be changed.

1. Execute the following command to obtain the file name of the HBA.

### Example:

```
E250-1# luxadm inq /dev/rdisk/c3t0d0s2 ←Command name

INQUIRY:
  Physical Path:
    /devices/pci@1f,4000/fibre-channel@4/sd@0,0:c,raw
  Vendor:          HITACHI
  Product:         DF600F
  Revision:
  Device type:     0x0 (Disk device)
  Removable media: no
  ISO version:     0
  ECMA version:    0
  ANSI version:    2 (Device complies to ANSI X3.131-1994 (SCSI-2))
  Response data format: 2
  Additional length: 0x73
                VENDOR-SPECIFIC PARAMETERS
  Byte#           Hex Value                               ASCII
  36  44 35 30 4c 30 30 42 41 30 30 30 30 00 31 41 00    D50L00BA0000.1A.
      00 01 00 00
  96  00 00 05 00 00 00 ff 00 10 00 00 00 0e 24 90 74    .....$.t
      10 00 08 00 20 b0 19 a8                               ....
```

Node Name

2. Refer to the node name shown in the previous output example. The port name can be obtained from the node name. When the node name is 100000000e249074, the port name is obtained through replacement of the top byte, that is, 10 with 20. Therefore, the port name turns out to be 200000000e249074.

### Example:

Node name:     100000000e249074  
                  ↓  
Port name:     200000000e249074

### To determine an HBA Location:

Identify the WWN using the WWN label attached to the JNI HBA.

## B.2.2 HP®

To obtain the WWN of a host when the HP® HBA is A3404A, A3740A, A5158A, A6684A, A6685A, or A6795A:

1. Execute the following command to obtain the file name of the HBA.

**Example:**

```
# iocscan -nfc fc
Class  I H/W Path Driver S/W State H/W Type Description
=====
fc    0 0/4/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
fc    1 0/5/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
fc    2 0/8/0/0 td CLAIMED INTERFACE HP Tachyon TL/TS Fibre Channel Mass S
storage Adapter
      /dev/td2 _____ Device file Name
fc    3 0/12/0/0 td CLAIMED INTERFACE HP Tachyon TL/TS Fibre Channel Mass S
storage Adapter
      /dev/td3 _____ Device file Name
fc    4 1/10/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
fc    5 1/12/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
```

2. Refer to the Device file name shown in the output example above. In this example, the device file names are: /dev/td2 and /dev/td3.
3. Using the device file names shown above, execute the command shown below to obtain the WWN of the HBA.

**Example:**

```
# fcmsutil /dev/td3
Vendor ID is = 0x00103c
Device ID is = 0x001028
TL Chip Revision No is = 2.3
PCI Sub-system Vendor ID is = 0x00103c
PCI Sub-system ID is = 0x000006
Previous Topology = PITOPT_FABRIC
Local N_Port_id is = 0x011600
N_Port Node World Wide Name = 0x0060b000008829f
N_Port Port World Wide Name = 0x0060b000008829e
Driver state = AWAITING_LINK_UP
Hardware Path is = 0/12/0/0
Number of Assisted IOs = 504123690
Number of Active Login Sessions = 0
```

4. Refer to the node name and port name shown in the example above.

**To determine an HBA Location:**

When HP-UX® is running in HP9000, you may not be able to match the HBA with the WWN because there is no way to identify the HBA address based on the slot location. In this case, correlate the HBA with a WWN using the following procedure:

1. Connect the host and the subsystem, and then start the system.
2. Execute the following command to obtain the device file name of the HBA.

**Example:**

```
# ioscan -nfc fc
Class  I H/W Path Driver S/W State H/W Type Description
=====
fc     0 0/4/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
fc     1 0/5/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
fc     2 0/8/0/0 td CLAIMED INTERFACE HP Tachyon TL/TS Fibre Channel Mass S
storage Adapter
      /dev/td2 Address of /dev/td2 Device file Name
fc     3 0/12/0/0 td CLAIMED INTERFACE HP Tachyon TL/TS Fibre Channel Mass S
storage Adapter
      /dev/td3 Address of /dev/td3 Device file Name
fc     4 0/10/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
fc     5 0/12/0/0 fcT1 UNCLAIMED UNKNOWN PCI SerialBus (107e0004)
```

3. Disconnect the Fibre channel cable of the HBA of the WWN that you wish to identify.
4. Determine which disk is currently connected and its correspondence with the device file of the HBA.

**Example:**

```
# ioscan -nC disk
Class  I H/W Path Driver S/W State H/W Type Description
=====
disk   0 0/0/1/0.2.0 sdisk CLAIMED DEVICE HP DVD-ROM 6x/32x
      /dev/dsk/c0t2d0 /dev/rdisk/c0t2d0
disk   1 0/0/2/0.6.0 sdisk CLAIMED DEVICE SEAGATE ST39102LC
      /dev/dsk/c1t6d0 /dev/rdisk/c1t6d0
disk   2 0/0/2/1.6.0 sdisk CLAIMED DEVICE SEAGATE ST39103LC
      /dev/dsk/c2t6d0 /dev/rdisk/c2t6d0
disk  169 0/8/0/0.1.19.232.0.0.0 sdisk CLAIMED DEVICE HITACHI DF600F
      /dev/dsk/c19t0d0 /dev/rdisk/c19t0d0
disk  170 0/8/0/0.1.19.232.0.0.1 sdisk CLAIMED DEVICE HITACHI DF600F
      /dev/dsk/c19t0d1 /dev/rdisk/c19t0d1
:
disk  141 0/12/0/0.1.19.228.0.0.0 sdisk NO HW not connected
      /dev/dsk/c21t0d0 /dev/rdisk/c21t0d0
disk  297 0/12/0/0.1.19.228.0.0.1 sdisk NO HW
      /dev/dsk/c21t0d1 /dev/rdisk/c21t0d1
:
```

As indicated in the above example, the disks identified as NO-HW are not connected. According to this information and the address of the device file of the HBA, the device file name of the HBA, whose cable has been disconnected, is: /dev/td3.

Execute the **fcmsutil** to obtain the WWN of the /dev/td3.

5. Plug in the disconnected Fibre channel cable.

## B.2.3 IBM®

To obtain the WWN of a host when the IBM is FC6227 or FC6228:

1. Execute the following command to obtain the device file name of the HBA.

**Example:**

```
# lsparent -C -k iocb
fcs0 Available 27-08 FC Adapter ← device file Name
fcs1 Available 3A-08 FC Adapter
fcs2 Available 31-08 FC Adapter
fcs3 Available 34-08 FC Adapter
```

2. Refer to the Device file name shown in the example above. In this example, the device file names are: fcs0, fcs1, fcs2, and fcs3.
3. Using the device file names given in the previous example, execute the following example to obtain the WWN of the HBA.

**Example:**

```
# lscfg -vl fcs0
DEVICE          LOCATION      DESCRIPTION
fcs0            27-08        FC Adapter

Part Number.....09P1162
EC Level.....D
Serial Number.....KT04904230
Manufacturer.....0010
FRU Number.....09P1173
Network Address.....10000000C925437E ← Port Name
ROS Level and ID.....02903290
Device Specific.(Z0).....4002206D
Device Specific.(Z1).....10020193
Device Specific.(Z2).....3001506D
Device Specific.(Z3).....02000909
Device Specific.(Z4).....FF101450
Device Specific.(Z5).....02903290
Device Specific.(Z6).....06113290
Device Specific.(Z7).....07113290
Device Specific.(Z8).....20000000C925437E
Device Specific.(Z9).....SS3.22A0
Device Specific.(ZA).....S1F3.22A0
Device Specific.(ZB).....S2F3.22A0
Device Specific.(YL).....P1-I8/Q1
```

The value shown in the Network Address section in the output example above is the port name.

**To determine an HBA Location:**

Identify the WWN using the WWN label attached to the JNI HBA.

## B.2.4 SGI™

To obtain the WWN of a host when the SGI™ is XT-FV-1PORT:

1. Execute the following command to obtain the WWN of the HBA.

**Example:**

```
origin2002 1# scsiha -w 2
2 Portname: 210000e08b01cb83 ← Port Name of the Slot 2

origin2002 2# scsiha -w 8
8 Portname: 210000e08b01fe64 ← Port Name of the Slot 8

origin2002 3# scsiha -w 11
11 Portname: 210000e08b01f454 ← Port Name of the Slot 11
```

2. Refer to the port name shown in the output example above.

**To determine an HBA Location:**

The location and arrangement of slots vary, depending on the model of SGI™ server. However, you match the HBA and WWN by referring to the slot location of each model.

## B.2.5 Windows NT®/ Windows® 2000

There are two methods for obtaining the WWN of a host:

- Emulex® Port Driver/SCSI Miniport Driver
- Qlogic® QLA2200F/QLA2300F

### B.2.5.1 Emulex® Port Driver

When the Emulex® driver is installed on the host, the Emulex® Configuration Tool (elxcfg.exe) is installed on Windows NT®/Windows® 2000. Run the Emulex® Configuration Tool to obtain the WWN of the host. Follow these steps:

1. Start the **elxcfg.exe**.
2. Double-click **HBA** to obtain the **WWN** on the Available Adapter list. (Adapters corresponding to the number of installed HBAs are displayed.)
3. The **Port WWN** (Port Name) and **Node WWN** (Node Name) are displayed in the Adapter Information screen.
4. When two or more HBAs are installed, repeat Steps 2 through 3 above.

### B.2.5.2 Emulex® SCSI Miniport Driver

When the Emulex® driver is installed on the host, the LightPulse™ Utility/NT (lputilnt.exe) is installed on Windows NT®/Windows® 2000. Run the LightPulse™ Utility/NT to obtain the WWN of the host. Follow these steps:

1. Start the lputilnt.exe.
2. Select **Adapter X** on the display. (Adapters corresponding to the number of installed HBAs are displayed.)
3. Select **Adapter Revision Levels** on the Category menu.
4. IEEE Address XX-XX-XX-XX-XX-XX (6 bytes) appears on the bottom of the screen.
5. Place **10-00** before the IEEE Address XX-XX-XX-XX-XX-XX. This is a port name.

**Example:**

10-00-XX-XX-XX-XX-XX-XX

6. The node name is equal to the port name.
7. The N\_Port ID is omitted.
8. When two or more HBAs are installed, repeat Steps 2 through 7 above.

**Note:** The LightPulse™ Utility/NT is supported by the Emulex® driver of version 4.2 or later. If the version is earlier than 4.2, check the IEEE Address by the label on the board.

### B.2.5.3 Qlogic® QLA2200F/QLA2300F:

To obtain the WWN of a host on the Windows NT® (Qlogic®2200F):

1. When the host starts up or when the QLA2xxx board is initialized for rebooting, the message: Press<ALT-Q> for Fast!UTIL appears. Press the **Q** key while holding down the **ALT** key. The Qlogic® Fast!UTIL utility starts.
2. Select an adapter corresponding to the HBA. (Adapters corresponding to the number of installed HBAs are displayed.)
3. Select **Configuration Settings** from the Fast!UTIL option and press the **Enter** key.
4. Select **Host Adapter Settings** from Configuration Setting and press the **Enter** key.
5. Read the value in the Adapter Node Name field on the Host Adapter Settings window. This contains the node name and the port name of the host (set for security).
6. When two or more HBAs are installed, repeat Steps 2 through 5 above.

**Example:**

```
Qlogic Fast!UTIL Version x. xx

Select Adapter(Example)
Adapter Type      I/O Address
WLA2xxx          F800

Host Adapter Settings(Example)
BIOS Address      : D8000
BIOS Revision     : 1.28
Adapter Serial Number : A26181
Interrupt Level   : 5
Adapter Node Name : 200000E0 8B00 4566
                  .
                  .
```

node name and port name



## Appendix C Verifying and Setting the Queue Depth

More servers can be connected when connections to hosts are concentrated at one port. On the other hand, since the number of multipliable commands that can be handled by one port of the disk array subsystem is limited, exceeding the limit may cause a decrease in performance. Therefore, the sum of the numbers of multipliable commands of hosts that share a port should be specified so as to not exceed the value of the limit per port.

This appendix explains how to verify and set the Queue Depth on the following systems:

- Solaris™
- HP-UX®
- AIX®
- IRIX®
- Windows NT®/Windows® 2000

**Table C.1 The Queue Depth Configuration**

Platform	HBA	Queue Depth		Unit of Setting
		Unit of Value	Default	
Solaris™		LU	256	OS
HP-UX®		LU	8	LU
AIX®		LU	1	LU
IRIX®		LU	1	LU
Windows®	Emulex® (Port)	LU	8	HBA
	Emulex® (MiniPort)	LU	32	HBA
	Qlogic®	Port	16	HBA

## C.1 Solaris™

- Verifying the Queue Depth

Execute the following command to verify the Queue Depth set for the Solaris™ system.

**Example:**

```
# adb -k /dev/ksyms /dev/mem
physmem 7171
sd_max_throttle/D
sd_max_throttle:
sd_max_throttle:           64
```

- Setting the Queue Depth

1. Make a backup of the `/etc/system` file.
2. Edit the `/etc/system` file as shown in the example below.
3. Save your changes and exit the text editor.
4. Shutdown and reboot to apply the Queue Depth setting.

**Example:**

```
set sd:sd_max_throttle=64           <-- add this line to /etc/system file
set ssd:ssd_max_throttle=64       <-- add this line to /etc/system file
                                     (for SUN generic Host Bus Adapter)
```

## C.2 HP-UX®

The Queue Depth is set to the disk device managed by Logical Volume Manager (LVM).

- Verifying the Queue Depth

Execute the following command to verify the Queue Depth set for the HP® system.

**Example:**

```
# scsictl -a /dev/rdisk/c22t1d0 <-- Verify the Queue Depth for device file(c22t1d0)
immediate_report = 0; queue_depth = 8
#
```

- Setting the Queue Depth

Execute the following command to set and verify the Queue Depth set for the HP® system.

**Example:**

```
# scsictl -a -m queue_depth=32 /dev/rdisk/c22t1d0 <-- Set Queue Depth value(32) to the device file
immediate_report = 0; queue_depth = 8 (c22t1d0)
# scsictl -a /dev/rdisk/c22t1d0
immediate_report = 0; queue_depth = 32
#
```

The **scsictl** command allows you to view and change the Queue Depth parameter for each device. However, this command only allows you to change the Queue Depth for one device at a time. The Queue Depth will be reset to the default value the next time the system is restarted. Therefore, you also need to create and register a start-up script to set the Queue Depth for the disk array subsystem each time you restart.

### C.3 AIX®

Before installing the Hitachi Dynamic Link Manager™, you should set the Queue Depth to LUs.

- Verifying the Queue Depth

Execute the following command to verify the Queue Depth set for the AIX® system.

**Example:**

```
# lsattr -El hdisk1                                <-- show the Device Parameter for hdisk1
scsi_id      0xe8                                SCSI ID                                False
lun_id      0x1000000000000000                    Logical Unit Number ID                False
location    Location Label                        True
ww_name     0x50060e8000427730                    FC World Wide Name                    False
pvid        none                                Physical volume identifier             False
queue_depth 32                                Queue DEPTH                            True    <-- Queue Depth of hdisk1
q_type      simple                               Queuing TYPE                           True
q_err       yes                                Use QERR bit                           True
clr_q       no                                Device CLEARS its Queue on error      True
rw_timeout  30                                READ/WRITE time out value            True
start_timeout 60                                START unit time out value            True
reassign_to 120                                REASSIGN time out value              True
#
```

- Setting the Queue Depth

Execute the following command to set the Queue Depth set for the AIX® system.

**Example:**

```
# chdev -l hdisk1 -a queue_depth=32
hdisk1 changed
#
```

## C.4 IRIX®

Command tag queuing (CTQ) must be enabled to optimize the performance of the disk array subsystem. Since CTQ is disabled by default in IRIX® systems, you need to enable it and set the Queue Depth for each LU using the `fx` utility.

- Setting the Queue Depth

Execute the following command to set the Queue Depth for the IRIX® system.

**Example:**

```
origin2002 9# fx -x "dksc(2,1,0)"      <-- Start the fx utility and enter LU
                                       (controller_number:2 drive_number:1 lun_number:0)
fx version 6.5, Jan  8, 2002
...opening dksc(2,1,0)
...drive selftest...OK
Scsi drive type == HITACHI DF600F

----- please choose one (? for help, .. to quit this menu)-----
[exi]t          [d]ebug/          [l]abel/          [a]uto
[b]adblock/     [ex]rcise/         [r]epartition/

fx> /label/set/param                    <-- Set the device parameter

fx/label/set/parameters: Error correction = (enabled)
fx/label/set/parameters: Data transfer on error = (enabled)
fx/label/set/parameters: Report recovered errors = (enabled)
fx/label/set/parameters: Delay for error recovery = (enabled)
fx/label/set/parameters: Err retry count = (0)
fx/label/set/parameters: Transfer of bad data blocks = (disabled)
fx/label/set/parameters: Auto bad block reallocation (write) = (enabled)
fx/label/set/parameters: Auto bad block reallocation (read) = (enabled)
fx/label/set/parameters: Read ahead caching = (enabled)
fx/label/set/parameters: Write buffering = (disabled)
fx/label/set/parameters: Drive disable prefetch = (0)
fx/label/set/parameters: Drive minimum prefetch = (0)
fx/label/set/parameters: Drive maximum prefetch = (0)
fx/label/set/parameters: Drive prefetch ceiling = (0)
fx/label/set/parameters: Enable CTQ = (disabled) enable      <-- Enter "enable"
fx/label/set/parameters: CTQ depth = (2) 64                  <-- Enter desired Queue Depth
fx/label/set/parameters: Read buffer ratio = (0/256)
fx/label/set/parameters: Write buffer ratio = (0/256)
* * * * * W A R N I N G * * * * *
about to modify drive parameters on disk dksc(2,1,0) ok? yes  <-- Enter "yes"

----- please choose one (? for help, .. to quit this menu)-----
[exi]t          [d]ebug/          [l]abel/          [a]uto
[b]adblock/     [ex]rcise/         [r]epartition/

fx> exi                                          <-- Exit the fx utility

label info has changed for disk dksc(2,1,0).  write out changes? (yes)

origin2002 10#
```

## C.5 Windows NT®/Windows® 2000

### ■ Emulex® Port Driver

When the Emulex® driver is installed on the host, the Emulex® Configuration Tool (**elxcfg.exe**) is installed on Windows NT®/Windows® 2000. Run the Emulex® Configuration Tool to verify and set the Queue Depth to each HBA.

The Port Driver can set the Queue Depth for each LU.

1. Start the **elxcfg.exe**.
2. Select the HBA to set the Queue Depth on the Available Adapter list. (Adapters corresponding to the number of installed HBAs are displayed.)
3. Set the desired Queue Depth to the Maximum Queue Depth (see Figure C.1).

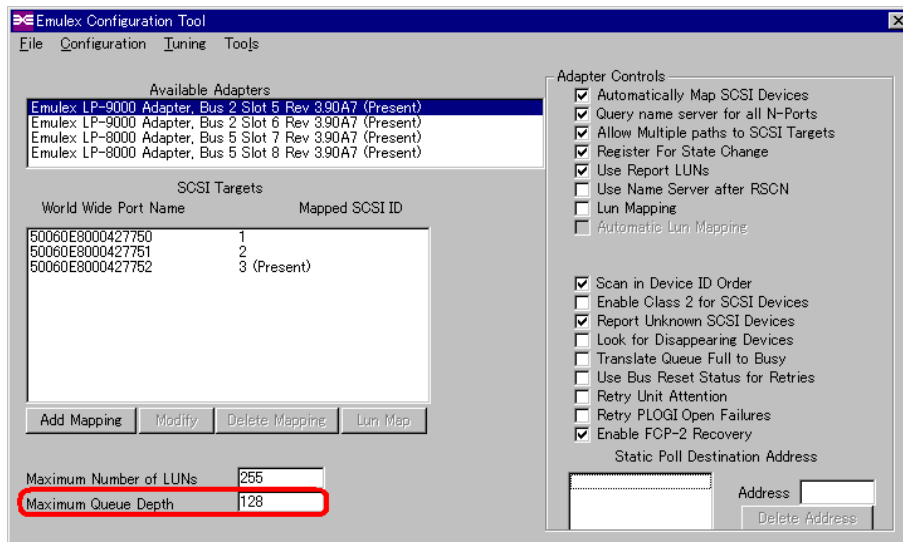


Figure C.1 Emulex® Configuration Tool

### ■ Emulex® SCSI Miniport Driver

When the Emulex® driver is installed on the host, the Emulex® Configuration Tool (**elxcfg.exe**) is installed on Windows NT®/Windows® 2000. Run the Emulex® Configuration Tool to verify and set the Queue Depth to each HBA.

The SCSI Miniport Driver can set the Queue Depth for each LU.

1. Start the **lputilnt.exe**.
2. Select the HBA to set the Queue Depth on the display. (Adapters corresponding to the number of installed HBAs are displayed.)
3. Select the **Driver Parameters** in the Category drop-down list (refer the Figure C.2).
4. Double-click the Queue Depth parameter (refer the Figure C.3).
5. Set the desired Queue Depth as a hexadecimal value in the **Modify Driver Parameter** screen (refer the Figure C.4).

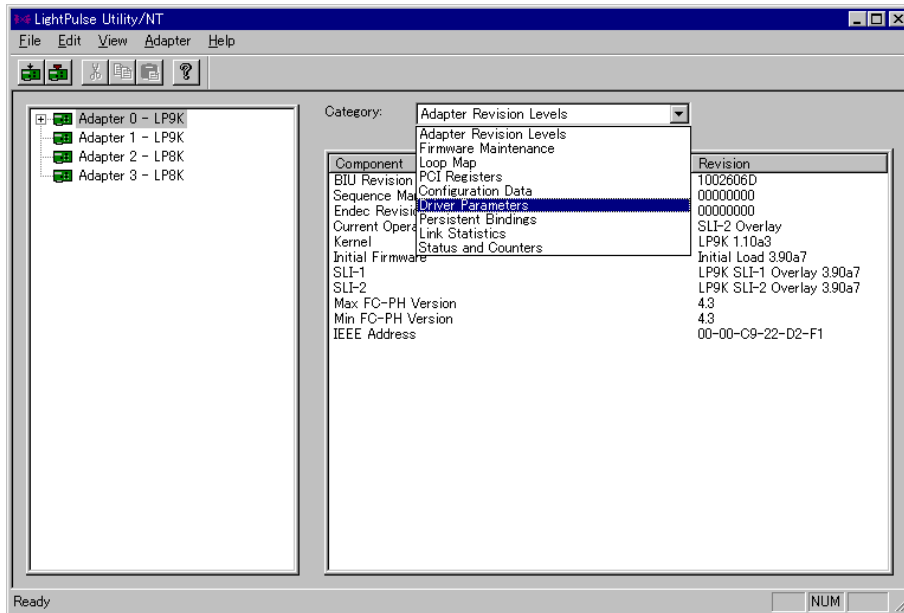


Figure C.2 Selecting the Drive Parameters

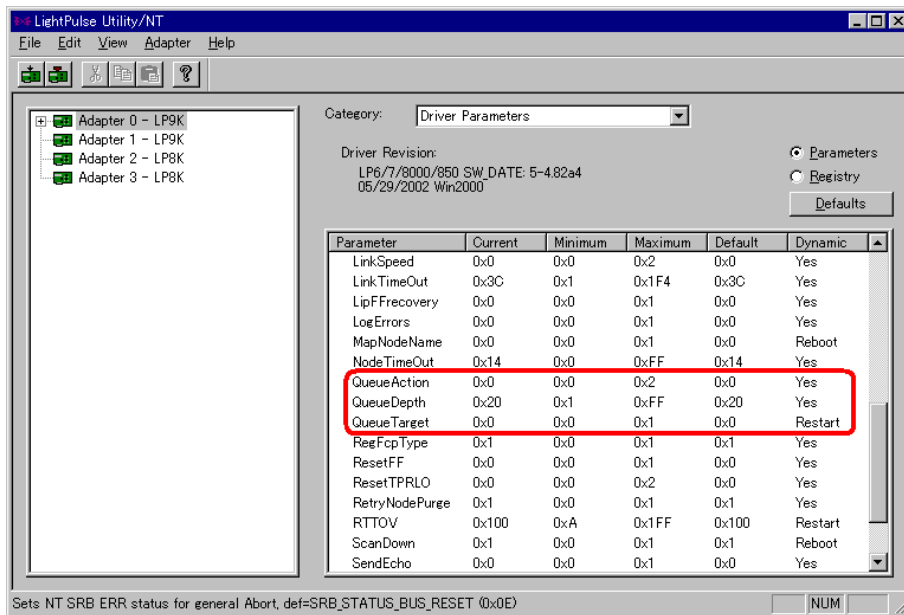
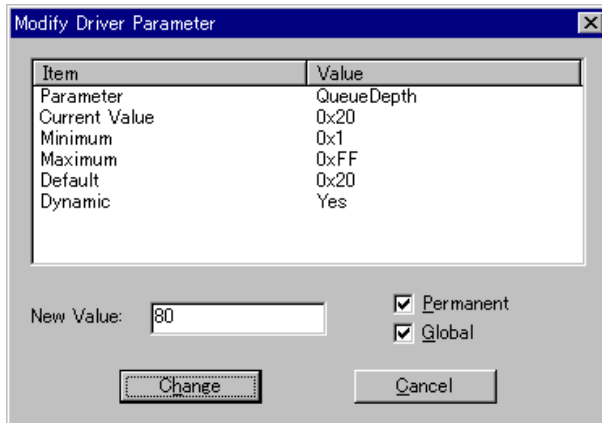


Figure C.3 Selecting the Queue Depth



**Figure C.4** Setting the Queue Depth Value

- Qlogic® HBA

The Qlogic® HBA can set the Queue Depth for each LU.

1. When the host starts up, press the Q key while holding down the Ctrl or Alt key.
2. Select an adapter corresponding to the HBA. (Adapters corresponding to the number of installed HBAs are displayed.)
3. Select **Configuration Setting** and press the **Enter** key.
4. Select **Advanced Adapter Setting** and press the **Enter** key.
5. Set the desired Queue Depth to **Execution Throttle**.

## Acronyms and Abbreviations

CLI	command line interface
CTQ	command tag queuing
GUI	graphical user interface
HBA	host bus adapter
LU	logical unit
LUN	logical unit number
LUN Security	Now known as SANTinel
SANTinel	Previously known as LUN Security
WWN	world wide name



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