Compaq StorageWorks™

Command Console V2.2 for the RAID Array 3000 (Pedestal and Rack Mount Models)
User's Guide

Command Console V2.2 for the RAID Array 3000 (Pedestal and Rack Mount Models) User's Guide
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About This Guide

Purpose and Scope

This guide is designed to be used as step-by-step instructions to run and use the Compaq *StorageWorks™ Command Console V2.2 for the RAID Array 3000 (Pedestal and Rack Mount Models) User's Guide.*

Intended Audience

This document is written for installers and operators.

Document Structure

This guide contains the following information:

Chapter 1: Introduction

■ What is the StorageWorks Command Console

■ About the Client

■ About the Agent

■ Command Console's Features

Chapter 4: Command Console Client's Windows, Menus and Tools

■ Menus and Commands

■ Navigation Window Menu Bar

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Chapter 5: Maintenance and Troubleshooting

■ Backing up files

■ Updating Controller Firmware

■ General Troubleshooting Guidelines

■ Troubleshooting Client and Agent Connections

■ Windows NT Event Logging

Related Documents

In addition to this guide, the following documentation is useful to the reader:

Table 1
Related Documents

Document Title	Part Number
RAID Array 3000 Subsystem Second Controller Option Installation Guide	EK-SM3KC-IG.E01
RAID Array 3000 Controller Shelf Hardware User's Guide	EK-SMCPQ-UG.D01
RAID Array 3000 Pedestal Storage Subsystem Hardware User's Guide	EK-SMCPO-UG.C01

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
FILENAMES	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase, unless case sensitive.
Type	When you are instructed to *type* information, type the information **without** pressing the **Enter** key.
Enter	When you are instructed to *enter* information, type the information and then press the **Enter** key.

Symbols in Text

The following symbols are found in the text of this guide to indicate different types of information.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

The following symbols are placed on equipment to indicate the presence of potentially hazardous conditions:

This symbol in conjunction with any of the following symbols indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a Network Interface Connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

These symbols on power supplies or systems indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg   **WARNING:** To reduce the risk of personal injury or damage to the
Weight in lb   equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.

- The full weight of the rack rests on the leveling jacks.

- The stabilizing feet are attached to the rack if it is a single rack installation.

- The racks are coupled together in multiple rack installations.

- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq website. Access the Compaq website:

http://www.compaq.com

Be sure to have the following information available before you call Compaq:

■ Technical support registration number (if applicable)

■ Product serial number

■ Product model name and number

■ Applicable error messages

■ Add-on boards or hardware

■ Third-party hardware or software

■ Operating system type and revision level

Compaq Website

The Compaq website has information on this product. Access the Compaq website:

http://www.compaq.com/storage

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

■ In the United States, call 1-800-345-1518.

■ In Canada, call 1-800-263-5868.

■ Elsewhere, see the Compaq website for locations and telephone numbers

Introduction

This chapter defines StorageWorks Command Console, describes Command Console's features, and provides network and device support information.

What is StorageWorks Command Console?

SWCC is a program, which provides a method of monitoring, configuring, and troubleshooting your RA3000. Command Console is comprised of three components: The Command Console Client, the HSZ22 Client, and the HSZ22 Agent.

You can use Command Console with three different connections (Table 1-1): Serial, Small Computer System Interface (SCSI), and TCP/IP network. You need to install the Client software with all of these connections. If you plan to use Command Console over a TCP/IP network, you need to also install the agent software.

Table 1-1
Connections That Can Be Used with SWCC

Connections That Can Be Used with SWCC	Agent Software Required?
Network connection by means of TCP/IP	Yes
Direct serial connection	No
Host-bus SCSI connection	No

About the Client

The Client is the Graphical User Interface (GUI) program designed for Windows NT 4.0 SP4, and Windows 2000. It provides a method of configuring, operating, monitoring, and troubleshooting your storage subsystem. The client is divided into two parts: The Command Console Client and the HSZ22 Client. The Command Console Client provides the navigation window that you see when you select StorageWorks Command Console in Start|Programs|Command Console.

This Navigation window provides you with the navigation tree in addition to other functions. The navigation tree provides a way for you to manage your systems. The HSZ22 Client provides a Storage window that displays the status of a particular subsystem. You can access the Storage window by selecting HSZ22 Storage window in Start|Programs|Command Console or by using the navigation tree (TCP/IP network connections only). The Storage window displays the status of the virtual disks connected to the HSZ22 controller.

> **NOTE:** The HSZ22 refers to the controller, which is installed in the RA3000 pedestal or rack mount system.

About the Agent

The Agent is a companion program that is installed on one of the supported operating systems that a controller is connected to. The Agent program runs in the background as a service, letting the Client communicate with your storage subsystem over a network. A subsystem is comprised of the controller and the hard drives that are connected to it.

Network Connection

SWCC has sophisticated networking capabilities. If Client is running on a local system that has a TCP/IP network connection, you can connect SWCC through the network to a host system that has the Agent program and is connected to your storage subsystem.

Agent acts as Client's assistant in controlling your storage subsystem. Commands sent from Client are received by agent and are routed to the storage subsystem through the subsystem's SCSI host bus. Subsystem status is transmitted back to Client from agent through the network connection. You can also use Agent for access protection.

By using a network connection, you can configure and monitor your storage subsystem from anywhere on your local area network (LAN), which is a network confined to a single geographic location. If your have a wide area network (WAN) or a connection to the Internet, you can also monitor your subsystem with the TCP/IP network protocol.

> **NOTE:** SWCC does not support the dynamic host configuration protocol (DHCP) or the Windows Internet Name Service (WINS).

Table 1-2 lists a brief overview of the steps that you need to complete:

Table 1-2
How to Set Up SWCC for a Network Connection

Step	Procedure
1	Install the Client software. See Chapter 2 "Installing and Setting Up the Command Console Client"
2	Create a virtual disk by using a serial connection. See Chapter 2 "Installing and Setting Up the Command Console Client"
3	Set up a TCP/IP connection for the Clients and Agent. Connect the RA3000 by using a SCSI cable to the host adapter. See Figure 1-1.
4	Install the HSZ22 Agent. Refer to the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform.
5	Add the name of the Client system to the Agent's list of Client system entries. Refer to the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform.
6	Add the name of the Agent system to the navigation tree of each Client system that is on the Agent's list of Client system entries. See, "Adding a System to the Navigation Tree," in Chapter 2 "Installing and Setting Up the Command Console Client".
7	Set up pager notification. See Chapter 3 "Using Command Console". E-mail notification is also available for some operating systems.

Figure 1-1 shows a Network connection.
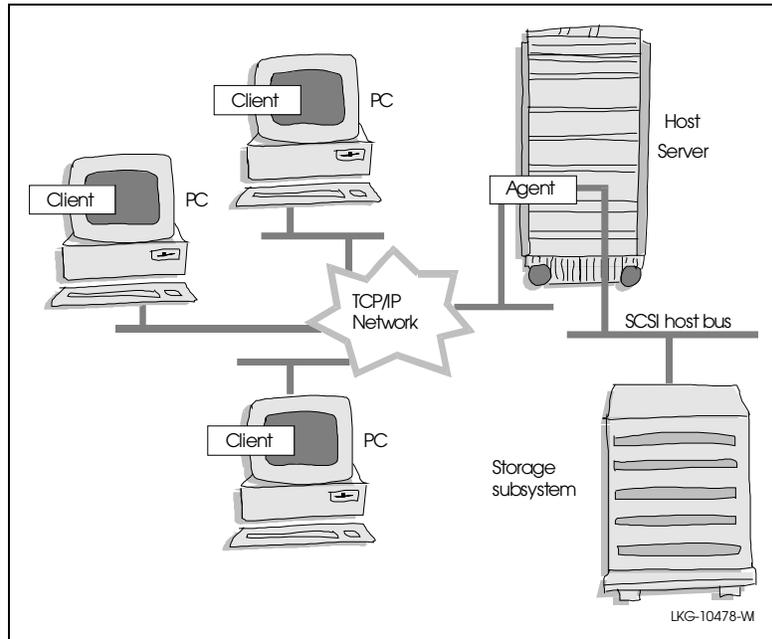
Figure 1-1. Network connection

Local Serial Port Connection

The simplest connection to the storage subsystem is a direct cable connection from the local system that has the storage window installed to one of the subsystem controller's serial maintenance ports (Figure 1-2). Because direct serial connections are only available with a stand-alone Storage window, you will be not be able to connect locally to a subsystem by means of the Navigation Tree. Table 1-3 lists an overview of the steps that you need to complete:

Table 1-3
How to Set Up SWCC for a Serial Connection

Step	Procedure
1	Install the Client software. See Chapter 2 "Installing and Setting Up the Command Console Client".
2	Set up a serial connection. See Figure 1-2.
3	Create a virtual disk by using a serial connection. See Chapter 2 "Installing and Setting Up the Command Console Client".
4	For more information, see "Establishing a Serial Connection Single Controller" and Establishing a Serial Connection, Dual Controller" in Chapter 2.

Figure 1-2 shows a local serial port connection.
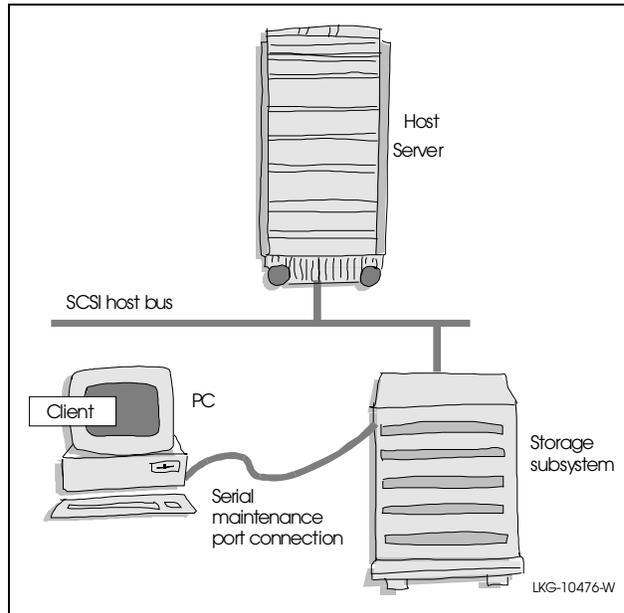
Figure 1-2. Local serial port connection

SCSI-Bus Connection Windows NT and Windows 2000

You can use the SCSI connection to connect the Client to your storage subsystems. To do this, you must connect the Compaq StorageWorks controller subsystem to the Client system through the SCSI-bus (Figure 1-3). In addition, the subsystem must contain at least one configured virtual disk.

If your subsystem does not contain a configured virtual disk, you must establish a temporary connection through the controller's serial maintenance port, to create a virtual disk for the subsystem. Table 1-4 lists an overview of the steps that you need to complete:

Table 1-4
How to Set Up SWCC for a Local SCSI Bus Connection

Step	Procedure
1	Install the Client software. See Chapter 2 "Installing and Setting Up the Command Console Client"
2	Create a virtual disk by using a serial connection. See Chapter 2 "Installing and Setting Up the Command Console Client".
3	Set up a SCSI connection for the hardware. See Figure 1-3.
4	Use SWCC to establish a SCSI bus connection (Start|Programs|Command Console|HSZ22 Storage Window). For more information, see "Establishing a SCSI Connection, Single Controller" and Establishing a SCSI Connection, Dual Controller" in Chapter 3.
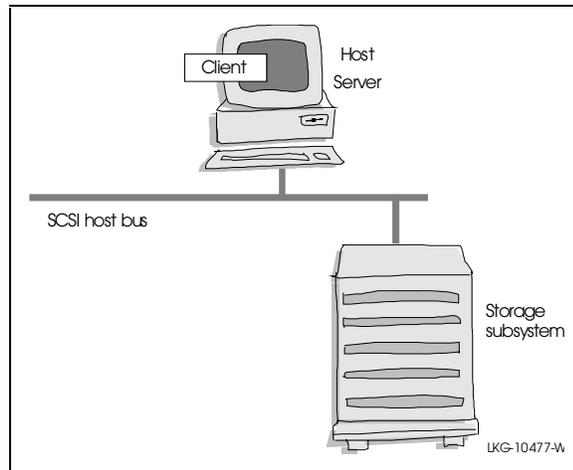
Figure 1-3. Local SCSI bus connection

Available Connections

Features and limitations of the available connections must be considered in choosing a connection to use for Client and your subsystems. Each connection differs in the type of features and limits. Table 1-5 lists features that are offered by each connection.

Table 1-5
Features of Connections Supported by the RA3000

Connection Type	Create Virtual Disk	Delete Virtual Disk	Fault Events: Client Visual Notification	Fault Events: Paging Notification	Fault Events: Event Logging
Local serial connection (navigation tree and agent not used)	Supported	Supported	Supported	Not supported	Not supported
Local SCSI bus connection (navigation tree and agent not used)	Supported	Supported	Supported	Not supported	Not supported
Remote network connection (client and agent on different computers remote network connection)	Supported	Supported	Supported	Supported	Supported

NOTE: You can reconfigure the storage subsystems by using SWCC. For the operating system to properly reflect these changes, you may need to take action outside the scope of SWCC, such as initializing the drive or restarting the system. For further information, refer to the operating system documentation.

Command Console's Features

The following are Command Console's features:

■ Manages StorageWorks RAID Arrays over a serial port, SCSI bus, or TCP/IP network.

■ Configures RAID Arrays using menus, icons, and system views.

■ Features an explorer-like Navigation window, which allows you to obtain the properties of your storage systems and subsystems. This feature is only available to TCP/IP network connections.

■ Upgrades the firmware for the controller by using the Storage window (Storage|Controller|Update firmware).

■ Monitors storage subsystems including power, fan, temperature, device, controller, and cache.

■ Provides password protection to prevent unauthorized access to the subsystems.

■ Interfaces with Windows NT logging capability. Lists RAID array events in the Application Log of the Windows Event Log Viewer (Start|Programs|AdministrativeTools|Event viewer).

■ Includes indexed, context-sensitive, and "What's This?" online Help.

■ Notifies you of subsystem problems by pager. This feature is only available to TCP/IP network connections.

Hardware and Software Requirements

The minimum requirements to properly run Command Console are listed in Table 1-6.

Table 1-6
Minimum Hardware and Software Requirements

Item	Requirements
Management station	Intel 486/66 MHz with 16 MB of RAM memory and 10-MB free hard disk space.
Operating system	Windows NT 4.0 SP4 and Windows 2000.
Monitor	VGA at 800x600 resolution.
Modem	Hayes-compatible (for event notification).
Serial port	RS-232 (for local connection).
Network adapter	See Chapter 2 "Installing and Setting Up the Command Console Client"
Controller compatibility	The RAID Array 3000 controller (HSZ22).
Host software	ASPI SCSI driver required for host port virtual terminal connection.

Chapter **2**

Installing and Setting Up the Command Console Client

This chapter covers how to install the Command Console Client and set up the software so that it can communicate with your RA3000.

Before you can use StorageWorks Command Console (SWCC), you will need to complete the following steps:

1. Install the Command Console Client. The HSZ22 Client will also install. The HSZ22 Storage window displays the status of the virtual disks connected to a particular controller.

2. Create a virtual disk by using a serial connection.

3. If you are planning to use SWCC over a TCP/IP network, you also need to install the Agent software on the computer that is connected to your HSZ22 controller. Refer to the *Getting Started RAID Array Installation Guide* for your operating system and platform.

This chapter will tell you how to complete these steps. For information on how to upgrade the controller firmware, refer to the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform.

This chapter also contains information on how to add an Agent system to the Navigation Tree. This chapter also provides information on setting up the Command Console so it sends fault notification by pager. The Navigation Tree shows the status of your storage systems in the Navigation window. The Navigation window is the window that appears when you click Start|Programs|Command Console|StorageWorks Command Console.

Installing Command Console Client

You can install the Command Console Client from a CD-ROM onto Windows NT 4.0 SP4, and Windows 2000. The installation program is self-extracting and it installs the Command Console Client into the directory C:\program files\SWCC by default. During setup, you have the option to install the program on a different hard drive.

Before you install the Client software, you should read the release notes that came with this kit. If you have the Command Console Client version 1.1b or earlier, remove the program and the Asynchronous Event Service (AES).

Install the client software as follows:

1. Place the CD titled RA3000 Solution Software Version 1.3 in the CD-ROM drive.

2. Run File Manager or Windows Explorer.

3. Navigate to the folder drive_letter:\SWCC

4. Double-click **Setup**.

5. Follow the instructions in the setup program to complete the installation.

6. The first screen of the SWCC setup displays (Figure 2-1). Select the
   options to install the SWCC Navigation window and the HSZ22
   Controller. The last option installs the HSZ22 device-specific Client for
   SWCC. Click **Next**
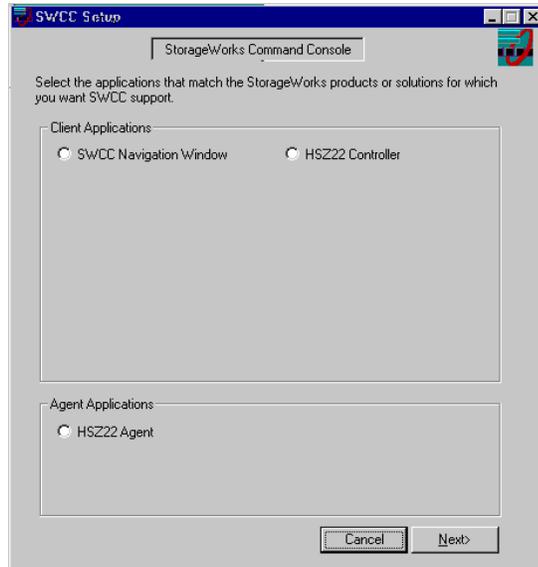
Figure 2-1. First SWCC Setup screen

7. The second SWCC Setup screen is displayed (Figure 2-2). The default installation directory can be changed with the **Browse** button. Click **Next**.
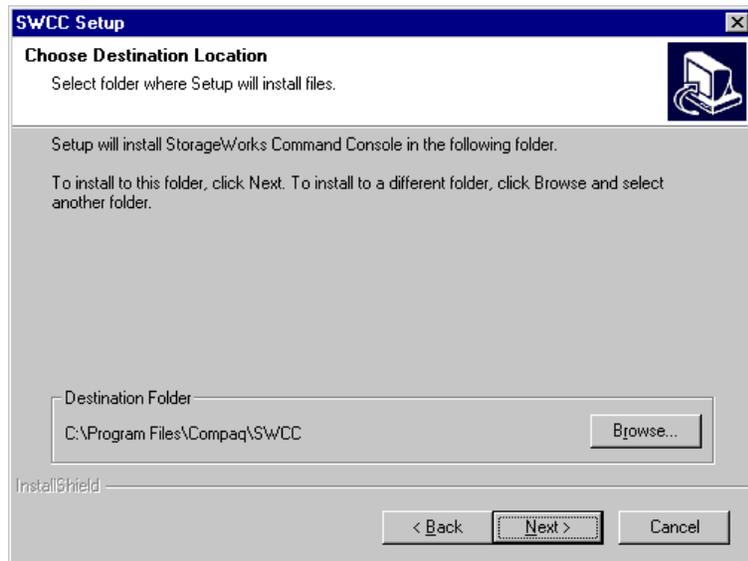
Figure 2-2. Second SWCC Setup screen for Client Installation

8. The Asynchronous Event Service (AES) starts and the following software installs:

   a. Command Console Client

   b. HSZ22 Client

   NOTE: After the Command Console Client is installed, you can access its Help, which provides detailed information on the configuration and use of Command Console. You can access Help for the Command Console by clicking Help in its window.

The installation will install the Command Console Client and the HSZ22 Client, which contains the HSZ22 Storage window. After the program installs, it will start the AES.

Stopping and Starting AES on Window NT and Windows 2000

To stop or start AES:

1. Open the Services window (Start|Settings|Control Panel|Services).

2. Click the **AsyncEventSvc** entry.

3. Click **Stop** or **Start**, then click **Close**.

To disable the automatic start of AES when your system boots, change the startup option to manual in the Services window, as described below:

1. Open the Services window, (Start|Settings|Control Panel|Services).

2. Double-click the **AsyncEventSvc** entry. The Service window appears.

3. Select **Manual** under Startup Type, and click **OK**.

Removing the Command Console Client

Before you remove the Command Console Client from your computer, remove AES from Windows. This will prevent the system from reporting that a service failed to start every time the system is booted. Steps 2 through 4 tell you how to remove the Command Console Client.

1. Remove AES from the computer.

2. Go to the command prompt *(*Start|Programs|Command Prompt) and change to the directory to which you installed the Command Console Client. Type the following command and then press the **Enter** key:

   C:\Program Files\COMPAQ\SWCC>   AsyncEventService -remove

3. Click **Start|Settings|Control Panel**, and then double-click the **Add/Remove Programs** icon in the Control Panel. The Add/Remove Program Properties window appears.

4. Select **Command Console V2.2** located in the window, and then click **Add/Remove**. The computer asks:

   Are you sure you want to completely remove the selected application and all of its components?

5. Click **Yes**. The computer removes only the Command Console Client.

   NOTE: The procedure described only removed the Command Console Client. You can remove a device-specific Client by using the Add/Remove program (Start|Settings|Control Panel|Add/Remove Programs).

Creating Your First Virtual Disk

The initial virtual disk on each controller has to be created through a serial connection. After a virtual disk is created, it can be used as a communications LUN for a SCSI or network connection. A virtual disk is a group of hard drives or partitions of hard drives linked together to form a single disk. The communications LUN establishes a connection between the subsystems and the command console agent on your host systems. If you remove this communications LUN, you will no longer be able to use SWCC to monitor the subsystem.

Establishing a Serial Connection, Single Controller

The simplest connection to a storage subsystem is a direct, cable connection from the Client's host system to one of the storage subsystem's serial ports. To establish a serial connection, connect a serial cable from one of the computer's COM ports to the storage subsystem's CTR TOP (controller in top slot) or CTR BOTTOM (controller in second slot) configuration port and proceed as follows:

1. Open the HSZ22 storage window (Start|Programs|Command Console|HSZ22 Storage Window). The connection choice dialog box appears.

2. Select the Serial option, and then click **OK**. The HSZ22 Management: Serial Connection dialog box (Figure 2‑3) appears.

3. From the drop-down menu, select the COM port that connects to your RA3000 controller, and then click the **Connect** button. When the storage window appears, you are connected to your storage subsystem.
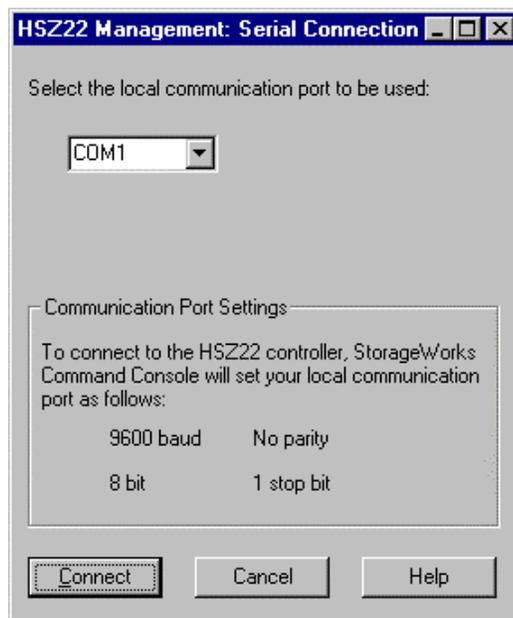
Figure 2-3. Connection dialog box for storage window

Establishing a Serial Connection, Dual Controller

1. Perform steps 1 and 2 in the previous section, "Establishing a Serial Connection, Single Controller."

2. When Client displays the next dialog box (Figure 2–4), select the computer's COM port that the top controller (CTR TOP) is connected to, then click the **Connect** button.

Figure 2-4. Establishing a connection to the top controller

3. On the next dialog box (Figure 2–5), select the COM port that the second (redundant) controller (CTR BOTTOM, the redundant controller) is connected to, and then click the **Connect** button. Client displays the dual-controller Storage Window.
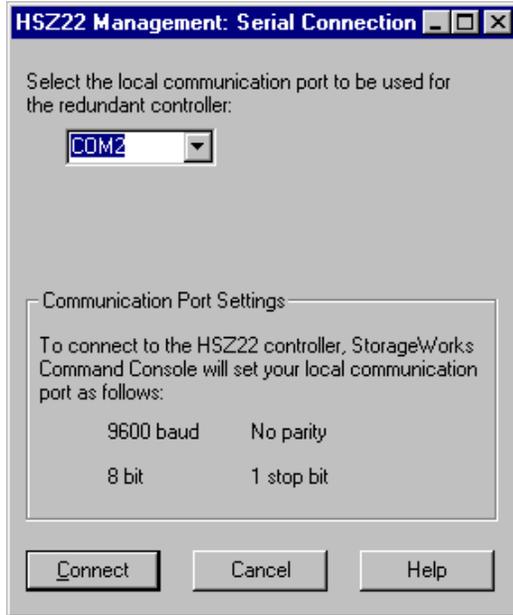
Figure 2-5. Establishing a connection to the second (redundant) controller

Creating a Virtual Disk by Using a Serial Connection

Command Console Client can create a number of different RAID levels on your RA3000. You can create:

■ Single-device virtual disks Just a Bunch of Drives (JBODs)

■ Striped virtual disks (RAID 0)

■ Mirrored virtual disks (RAID 1)

■ Striped mirrored virtual disks (RAID 0+1)s

■ Striped parity virtual disks with fixed parity disk (RAID 4)

■ Striped parity virtual disks with floating parity disk (RAID 5)

Virtual disks are created using command console client's Add Virtual Disk Wizard.

> **NOTE:** If you want to utilize both controllers in the subsystem, they must be configured for active/active mode. See "Configuring a Dual-Controller System" in Chapter 3 "Using Command Console".

Starting the Wizard:

Access the subsystem's storage window. Select **Add Virtual Disk** from the Storage menu to start the Virtual Disk Wizard.

To start the Virtual Disk Wizard, Access the subsystem's Storage Window, and select Add Virtual Disk from the Storage menu.

Storage	Options	Help
Add Virtual Disk...		
Virtual Disk		▶
Device		▶
Controller		▶

1. Select the Redundant Array of Independent Disks (RAID) level, and then click **Next**. This selection will determine the type of virtual disk that you will create. In this example, we will create a RAID 5 virtual disk and partition it into two RAID 5 virtual disks of approximately equal capacity.
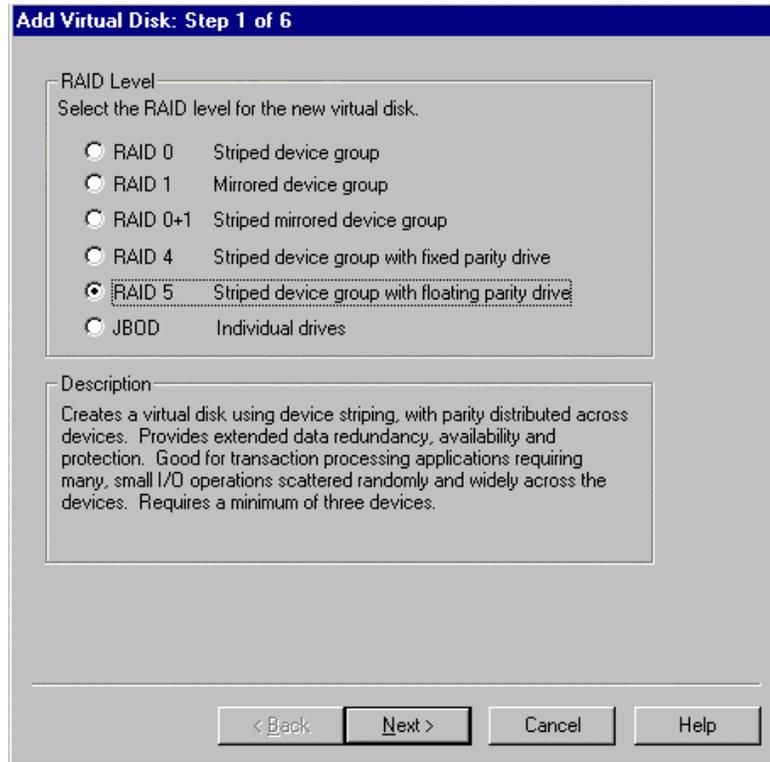
Figure 2-6. Virtual disk wizard step 1

2. Select the devices for your virtual disk by clicking them in the Devices available to create a new virtual disk windowpane. As you click them, they are listed in the Details of selected devices windowpane. The wizard provides helpful information at each step (Figure 2-7). The wizard tells you that you need to select at least three disks to create a RAID 5 virtual disk. We have selected the three available devices located on Channel 0.
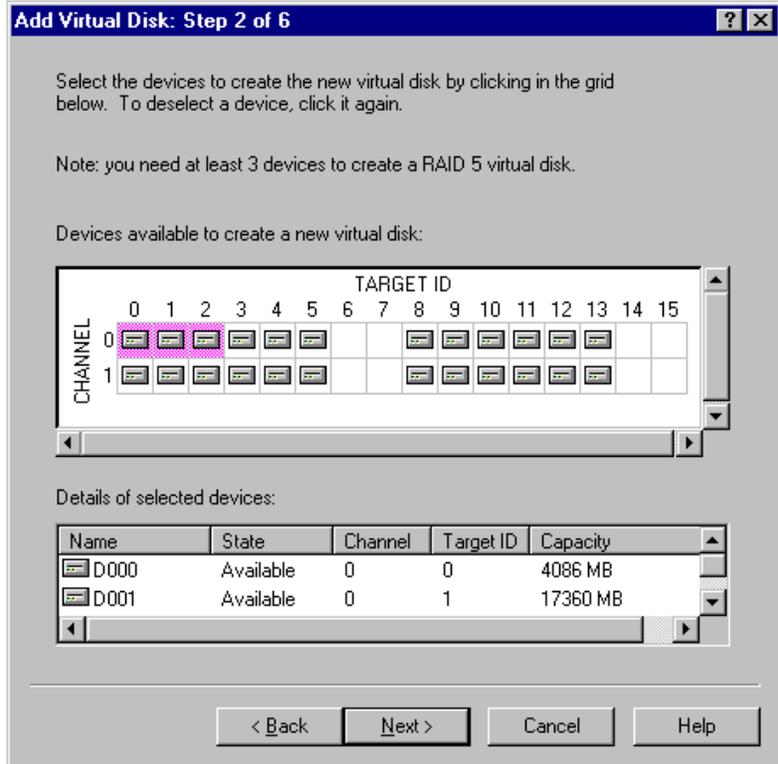
Figure 2-7. Virtual disk wizard step 2 (rack mount model)

3. Select the capacity of the virtual disk, and then click **Next**. The wizard offers you the option of using only a portion of the capacity of the devices you have selected for your new virtual disk. It displays the total, available capacity of the devices you have selected in the capacity box. Enter the size of the virtual disk you want to create in the capacity text box, then click **Add**.

In this example we first created a 4000-MB partition, virtual disk 1, shown in the virtual Disk windowpane. For the second virtual disk, we will create another disk from the remaining capacity by clicking **Add** a second time. When finished, click **Next** (Figure 2-8).
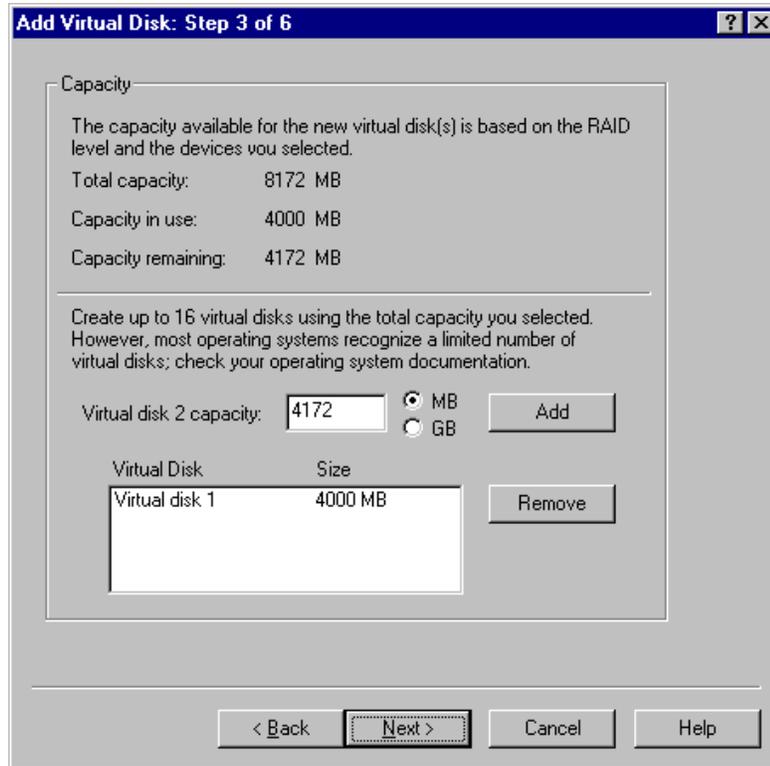
Figure 2-8. Virtual disk wizard step 3

From the three disk members, you have created two disk partitions: Virtual disk 1 and Virtual disk 2 (Figure 2-9). You can create from one to eight virtual disks.
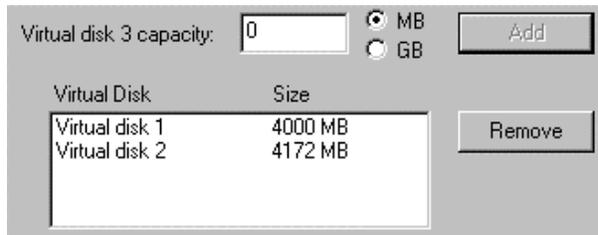
Figure 2-9. Virtual disk partitions

4. Specify the strip size and host ports (0 or 1) then click **Next**. RAID array management software uses strips in mapping virtual disk block addresses to member block addresses.
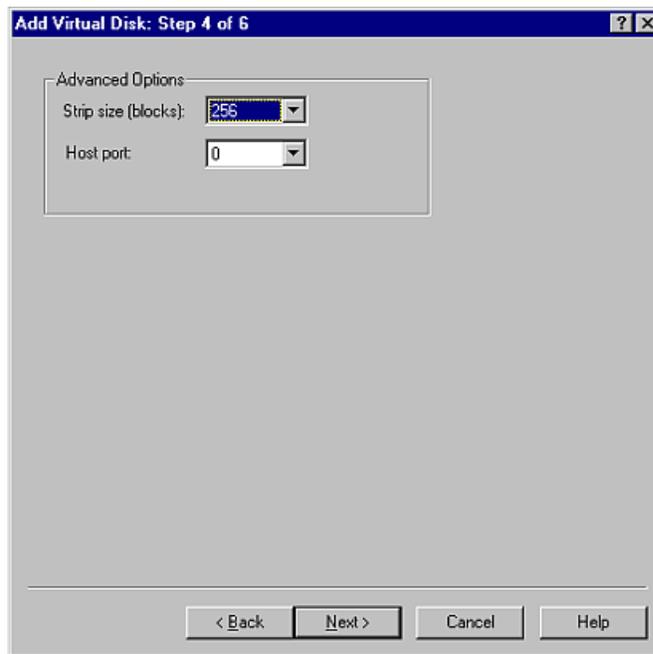
Figure 2-10. Virtual disk wizard step 4

5. Select a logical unit number and cache option (Figure 2-11). Command console automatically assigns a logical unit number (LUN) for each virtual disk. However, if you want to change the LUN, click the down arrow and select the new number from the list. If you want to enable writeback cache, check the Enable box; then click **Next**.
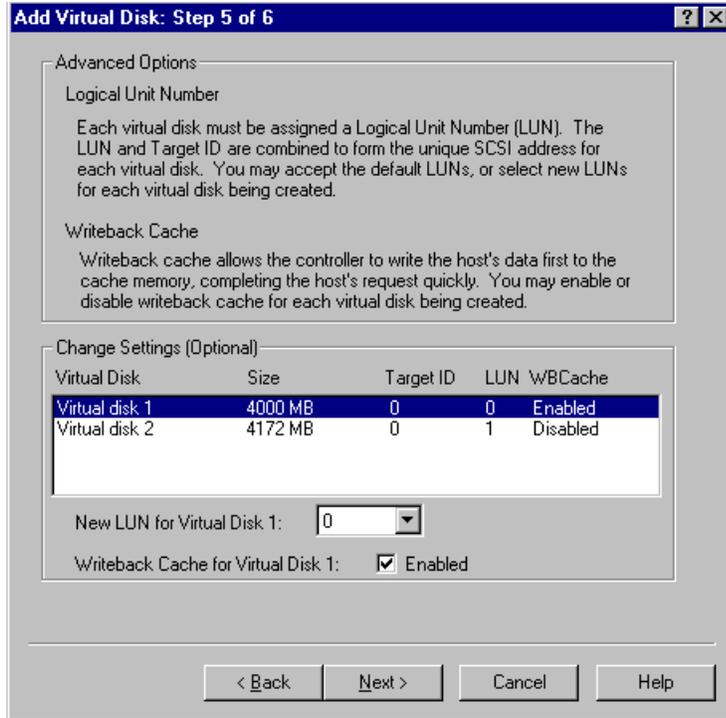
Figure 2-11. Virtual disk wizard step 5

6. Confirm and create the Virtual Disks 1 and 2. The Final Virtual Disk Wizard window, step 6 (Figure 2-12), recaps the choices you have made in steps 1 through 5. If you are satisfied with your choices, click **Finish**.
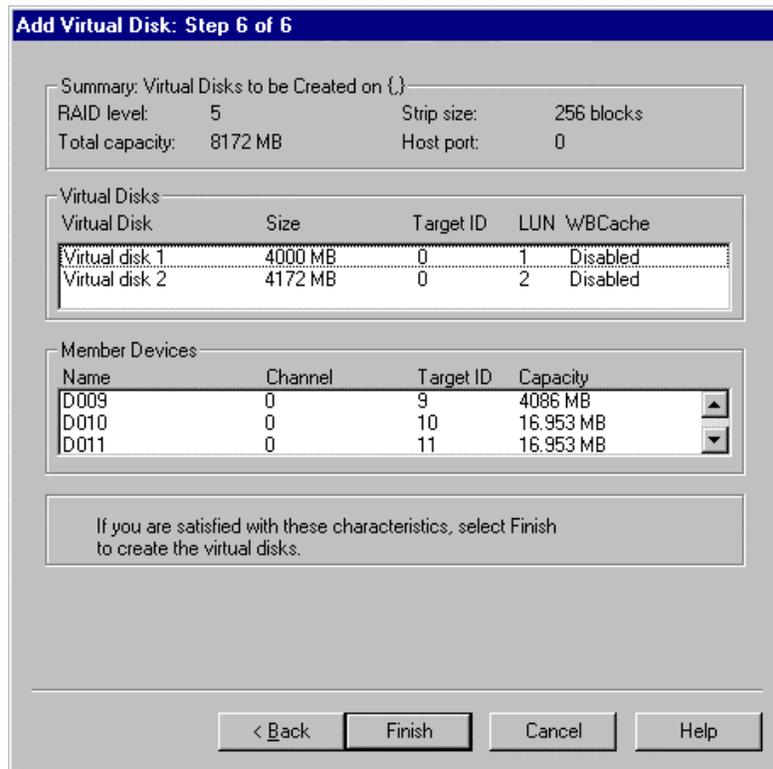
Figure 2-12. Virtual disk wizard step 6

When you see the Successful Completion dialog box (Figure 2-13), click **OK**.

Figure 2-13. Successful completion dialog box

Figure 2–14 shows what the storage window looks like during the creation of the virtual disk. You cannot use the virtual disks until they are finished being constructed.
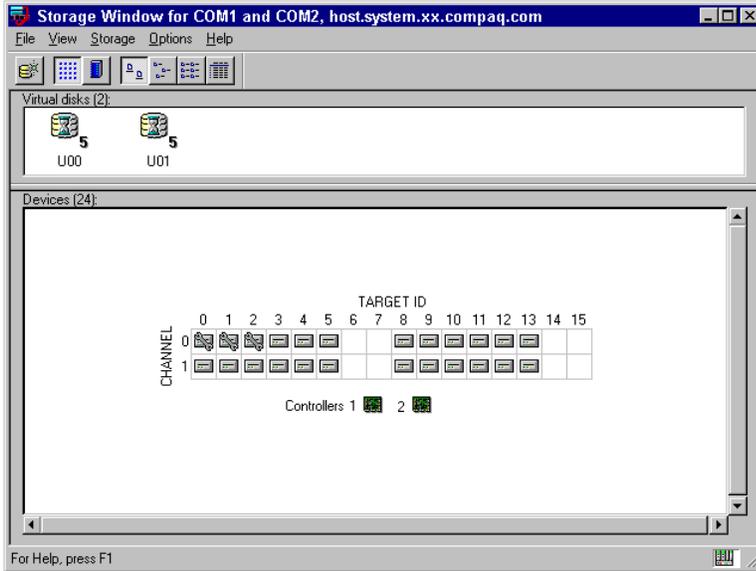
Figure 2-14. Storage window during creation of virtual disks U01 and U02
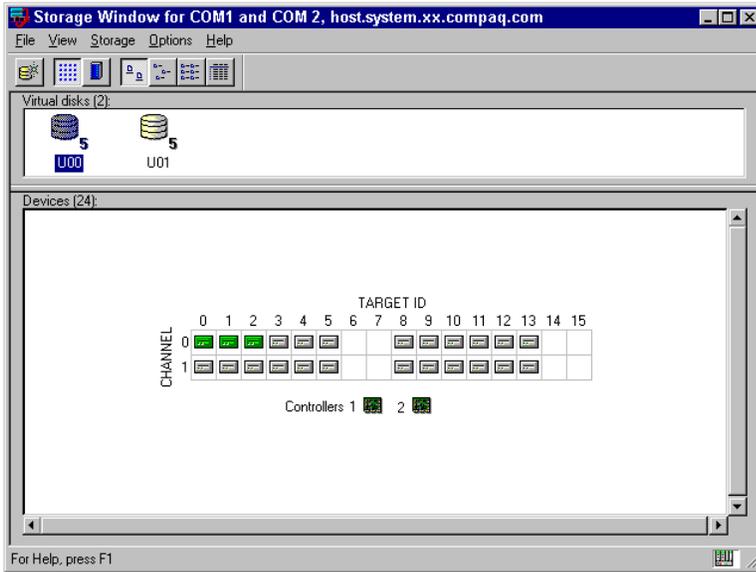
Figure 2-15. Storage window after creation of virtual disks U01 and U02

Installing the Agent Software

If you use command console over a TCP/IP network, then you will need to install the Agent software on the computer that is connected to your RA3000. The Agent software provides communication over the network between your client system and the RA3000. Refer to the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform.

Adding a System to the Navigation Tree

When you add a system to the Navigation Tree, you are telling the Client software to monitor that system. Before you add a system to the Navigation Tree, you need to have the agent software already installed on that system and the name of your client system on the agent's list of client system entries.

1. From the File menu, click **Add System**.

2. Enter your host's name or your host's IP address in the host name or TCP/IP address text box (Figure 2–14), and click **Apply**. After you click **Apply**, client adds an icon for the added system in the Navigation Window (Figure 2–15). In the host name or TCP/IP address text box, you are told the TCP/IP address has been resolved for the name you entered.

Figure 2-16 shows the Adding an agent system to the Navigation Tree diagram.
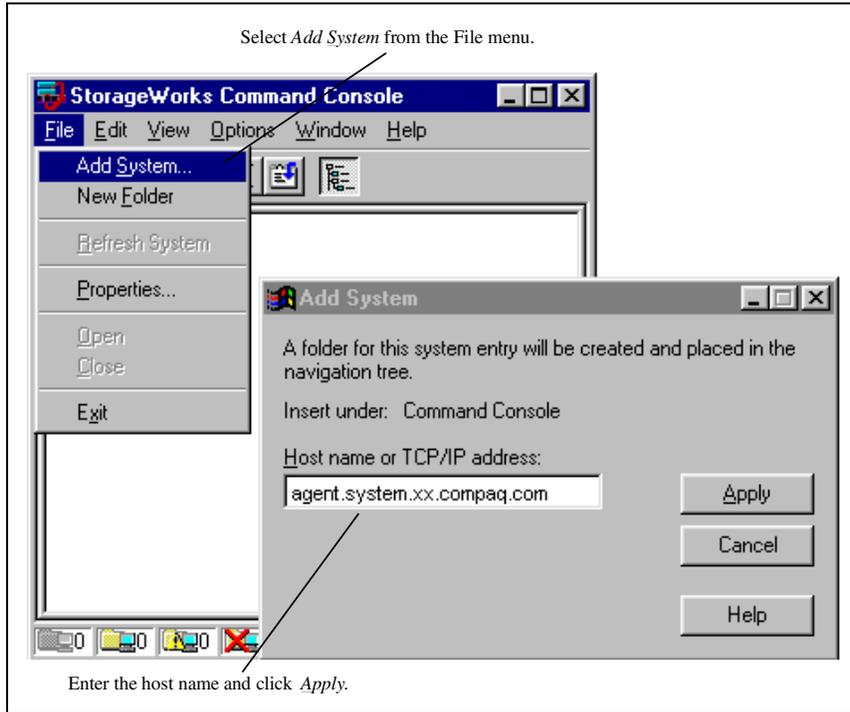
Figure 2-16. Adding an agent system to the Navigation Tree

CAUTION: If the Agent is stopped, status changes in the Navigation Tree, in the storage window, and in the Windows NT event viewer will not be received. To obtain the latest status after the Agent has been stopped, you will need to refresh the display for that system in the Navigation Tree (File|Refresh System) and in the storage window (View|Refresh). Instead of using the refresh option, you can close and then open the navigation window and storage window. If others are managing that system, ask them to notify you before they stop the Agent software.

Figure 2-17 shows an example of the system added to the Navigation Tree.
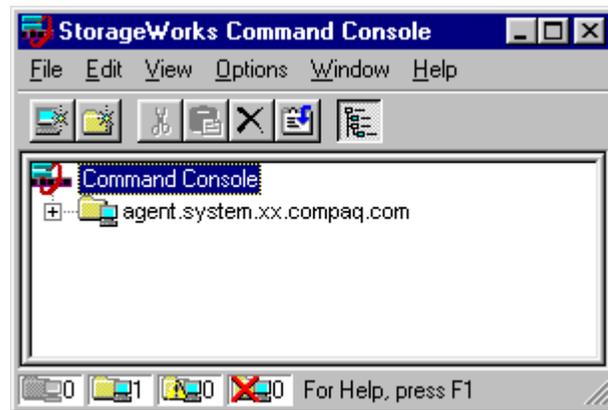
Figure 2-17. System added to the Navigation Tree

Fault Notification by Pager (TCP/IP Network Connections)

You can set up Command Console so that it notifies you by a page when a critical event occurs. This function will work with alphanumeric and numeric pagers. You can configure this function so that it sends pages to numerous people at different times. For example, if you have several people, who monitor the network in shifts, you can configure this function so that the software only pages the person, who is currently working.

For more information on how to set up the pager notification, see "Setting Up Pager Notification" in Chapter 3 "Using Command Console". You can also find information about paging in the online Help. You can access this section quickly by going to the index entry, monitoring, faults using pagers, in the online Help.

> **CAUTION:** To receive pages, the following must occur:
>
> ■ The Asynchronous Event Service (AES) must be running.
>
> ■ The Agent service must be running.
>
> ■ In the Agent's list of client system entries, you must select the TCP/IP notification scheme for your client system.

Chapter *3*

Using Command Console

This chapter contains additional information on how to configure and use Command Console.

This section provides information on how to configure and use the Command Console's features. You can also find information by using the online Help. For information on your agent, refer to the Refer to the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform. This chapter provides information on the following topics:

■ About the Asynchronous Event Service (AES)
    (TCP/IP Network Connections)

■ Start menu options for Command Console

■ Choosing a connection method

■ Using the Navigation window

■ Configuring a single controller

■ Configuring a dual-controller system

■ Adding devices

■ Creating a virtual disk

■ Deleting virtual disks

■ Modifying virtual disks

■ Managing and creating spare devices

■ Clearing failed devices

■ Using configuration files

■ Monitoring the status of the RA3000

■ Setting up pager notification

> △ **CAUTION:** For your client system to receive updates about your subsystems over a TCP/IP network, the following must occur:
>
> ■ The Asynchronous Event Service (AES) must be running.
>
> ■ The agent service must be running.
>
> ■ Your client system must be on the agent's list of client system entries.

About the AES
(TCP/IP Network Connections Only)

The AES is a component of the Command Console client. It runs in the background as a service that provides status updates of the subsystems to its client system. For a client system to receive updates it must be running AES and the agent must also be running. When AES receives a new trap (message), it passes the trap to the Navigation Tree of the client system that has AES running. The Navigation Tree, in turn, passes the trap to the appropriate Storage windows. You can identify a new trap that has been passed to the Navigation Tree because the status of one or more of its icons will change.

AES can also send traps to predefined pager numbers. To activate this function, you must predefine each pager number in the User Profile section of the Event Notification menu.

You can change whether AES starts at boot time. You can also stop or start AES. However, you need AES running to receive pages notifying you of faults and to provide updates to the Navigation Tree and Storage window. If AES is stopped, the client software will no longer provide updates to the Navigation Tree and Storage window. There will also not be any pager fault notification.

Stopping and Starting AES on Windows NT and Windows 2000

Stop or start AES as follows:

1. Open the Services window (Start|Settings|Control Panel|Services).

2. Click the **AsyncEventSvc** entry. The Service window appears.

3. Click **Stop** or **Start**, then click **Close**.

To disable the AES from automatically starting when your system boots, perform the following:

1. Open the Services window (Start|Settings|Control Panel|Services).

2. Double-click **AsyncEventSvc**. The Service window appears.

3. Select **Manual** under Startup Type.

Start Menu Options for Command Console

Command Console client (Figure 3-1) provides you with two program choices: HSZ22 Storage window and StorageWorks Command Console. Choosing HSZ22 Storage window allows you to connect to only one storage subsystem. Choosing StorageWorks Command Console displays the Navigation window, which contains the Navigation Tree and set up pager notification. You can use the Navigation Tree to monitor storage subsystems over a TCP/IP network.
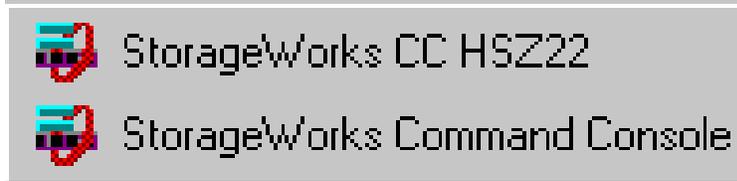
Figure 3-1. Path for Command Console

If you select the HSZ22 Storage window, client displays the How do you want to connect to the HSZ22 controller? Dialog box (Figure 3–2). This selection lets you connect to a storage subsystem by using one of the following connections: serial, SCSI, or TCP/IP network.
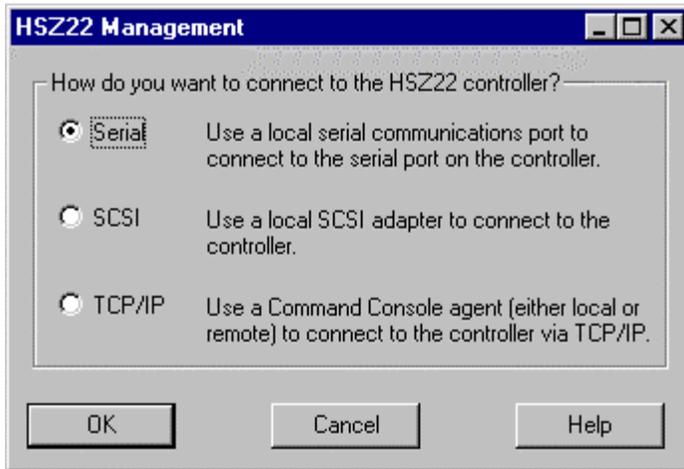
Figure 3-2. Connection choices for connecting to a single storage subsystem

If you select StorageWorks Command Console, the first window you will see is the Navigation window (Figure 3–3). The Navigation window allows you to monitor many subsystems over the TCP/IP network. You can also use the Navigation window to open a Storage window.
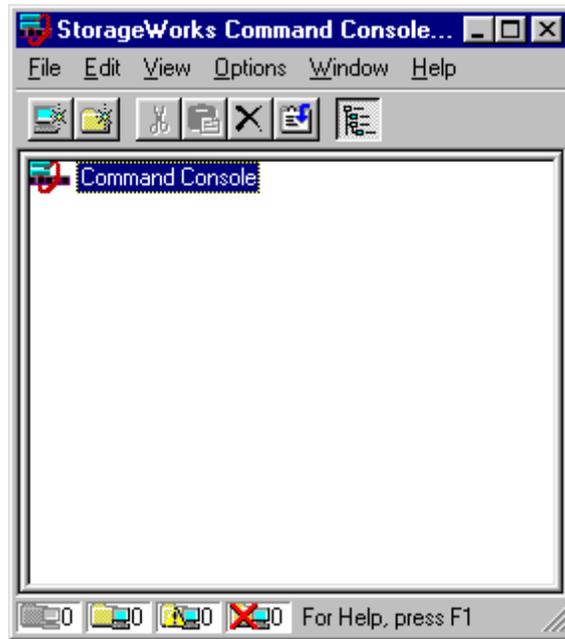
Figure 3-3. StorageWorks Command Console Navigation window

Choosing a Connection Method

The HSZ22 client offers three ways to connect to your storage subsystem: Over the controller's serial port, the SCSI bus or over a TCP/IP network. The serial port and SCSI bus connections are local connections and allow you to connect to only one storage subsystem. You can connect to one or many storage subsystems by using a TCP/IP network connection.

Establishing a Serial Connection, Single Controller

The simplest connection to a storage subsystem is a direct cable connection from the client's host system to one of the storage subsystem's serial ports. To establish a serial connection, connect a serial cable from one of the computer's COM ports to the storage subsystem's CTR TOP (controller in top slot) or CTR BOTTOM (controller in second slot) configuration port and proceed as follows:

1. Select HSZ22 Storage window.

2. When the Connection Choice dialog box displays, select the Serial option, then click **OK** to display the HSZ22 Management: Serial Connection dialog box (Figure 3–4).

3. The drop-down menu, select the computer COM port that your RA3000 is connected to, then click the **Connect** button to display the Storage window. When the Storage window displays, you are connected to your storage subsystem.

Figure 3-4. HSZ22 Management Serial Connection dialog box for Storage window

Establishing a Serial Connection, Dual Controller

1. Open the HSZ22 Storage window (Start|Programs|Command Console|HSZ22 Storage window).

2. When client prompts you for the type of connection, select the Serial option.

3. When client displays the HSZ22 Management: Serial Connection dialog box (Figure 3–5), select the computer's COM port that the top controller (CTR TOP) is connected to, and then click the **Connect** button.

Figure 3-5. Establishing a serial connection to the top controller

1. In the second HSZ22 Management: Serial Connection dialog box, select the COM port that the second controller (CTR BOTTOM, the redundant controller) is connected to, then click the **Connect** button (Figure 3–6). Client displays the dual-controller Storage window.

Figure 3-6. Establishing a serial connection to the
second (redundant) controller

Establishing a SCSI Connection, Single Controller

If client's host operating system is Windows NT or Windows 2000, you can connect to, monitor and manage one storage subsystem over the SCSI bus.

Before you can connect to your storage subsystem over the SCSI bus, at least one virtual disk must be configured for the controller. To create the first virtual disk you must use a serial connection to the subsystem. The procedure to create the first virtual disk is summarized as follows:

■ Establish a serial connection to your RAID using the Establishing a Serial Connection, Single Controller procedure provided in this User's Guide.

■ Create a virtual disk. See "Creating a Virtual Disk".

■ Reboot your system.

■ Start the disk administrator, create the partition and assign the drive letter for the two virtual disks.

To connect over the SCSI bus proceed, as follows:

1. Open the HSZ22 Storage window (Start|Programs|Command Console|HSZ22 Storage window).

2. When the Connection Dialog box displays, select the SCSI option.

3. When the HSZ Management: Local SCSI Connection dialog box appears, select a drive, then click **OK** (Figure 3–7). Command Console will shortly connect to the RA3000 and display the Storage window.
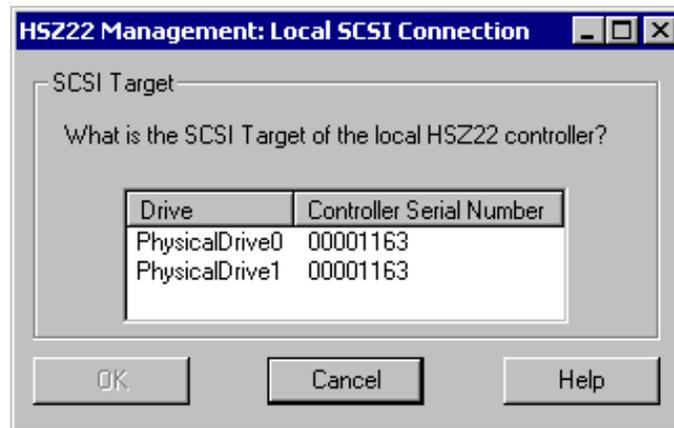
Figure 3-7. HSZ22 Management: Local SCSI connection dialog box

Establishing a SCSI Connection, Dual Controller

If Client's host operating system is Windows, you can connect to, monitor and manage your RA3000 over the SCSI bus.

Before you can connect to your storage subsystem over the SCSI bus, at least one virtual disk must be configured for each host port. To create the virtual disks you must use a serial connection to the subsystem. The procedure to create the virtual disks is summarized as follows:

■ Establish a serial connection to your RAID using the Establishing a Serial Connection, Dual Controller procedure provided in this User's Guide.

■ Create a virtual disk for each host port. See "Creating a Virtual Disk."

■ Reboot your system.

■ Start the disk administrator, create the partitions and assign drive letters for the two virtual disks.

For a dual-controller configuration, to connect over the SCSI bus proceed as follows:

1. Open the HSZ22 Storage window (Start|Programs|Command Console|HSZ22 Storage window).

2. When the Connection Dialog box appears, select the SCSI option.

3. When the HSZ22 Management: Local SCSI Connection dialog box
   appears, select a drive, then click **OK** (Figure 3–8). (In this example we
   have selected drive PhysicalDrive0 for the first controller, Serial
   Number 1163.)

Figure 3-8. HSZ22 Management: Local SCSI connection dialog box, dual
controller

4. When the second HSZ22 Management: Local SCSI Connection dialog
   box appears (Figure 3–9), select a drive for the redundant controller. (In
   this example we have selected drive PhysicalDrive1 for the redundant
   controller, Serial Number 1114.). Command Console will shortly
   connect to the RA3000 and display the Storage window.

Figure 3-9. HSZ22 Local SCSI connection dialog box for redundant controller

NOTE: If your agent system has only one SCSI port, you can still establish a SCSI connection with your dual controllers. For more information, refer to the *Hardware User's Guide* for your operating system and platform.

Connecting Over a Network

To communicate with your storage subsystem over a network, two software applications are required: Command Console client and Command Console agent. Client is the Graphical User Interface (GUI), which installs and runs a Windows NT 4.0 SP4 or Windows 2000 system (minimum level). Agent installs and runs unseen in the background on the storage subsystem's host computer, running Windows NT 4.0 SP6a or Windows 2000 SP1 (minimum levels.)

Client must be installed before agent. Together the two provide the software link required for communication over a network. The installation of agent is covered in the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform. Also refer to online help.

The basic steps for connecting and communicating over a network:

■ Install and configure Agent on the storage subsystem's host computer.

■ Check that you have at least one virtual disk created on your storage subsystem. If necessary, create one using a serial connection to the RA3000.

■ Select either HSZ22 Storage window (for a single storage subsystem) or, StorageWorks Command Console (for configuring and monitoring multiple storage subsystems over a network). Choosing StorageWorks Command Console displays the Navigation window, a graphical tool for managing RA3000 subsystems over a network.

Connecting to a RA3000 over the Network

1. Open the HSZ22 Storage window from the Start menu
   (Start|Programs|Command Console|HSZ22 Storage window).

2. When client displays the How do you want to connect to the HSZ22
   controller? dialog box, select the TCP/IP option. Client displays the
   HSZ22 Management: TCP/IP Network Connection dialog box
   (Figure 3–10).
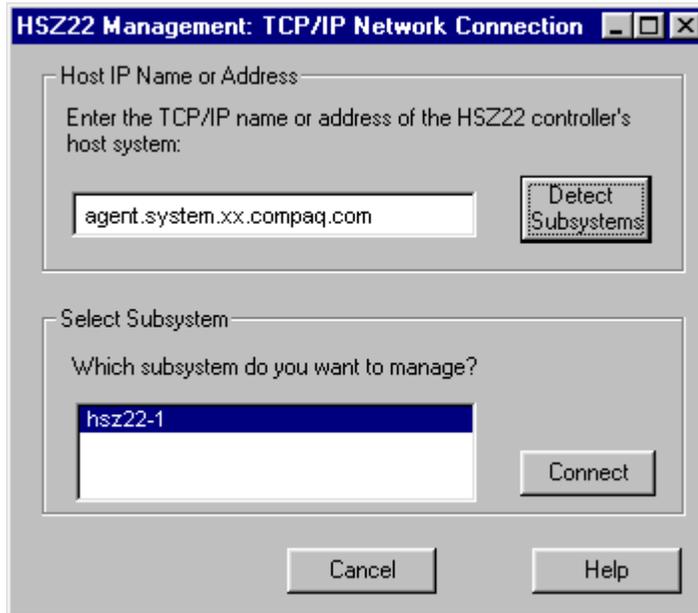
Figure 3-10. HSZ22 Management: TCP/IP Network Connection dialog box

3. Enter the host IP name *(*agent.system.xx.compaq.com is used in this
   example) or IP address in the text box, then click Detect Subsystems*.*
   Client will search and find the storage subsystem connected to
   agent.system.xx.compaq.com and will display it in the Which
   Subsystem Do You Want To Manage? windowpane. Select the storage
   subsystem, hsz22-1 in this example; then click **Connect**. After a short
   period of time, Client displays the Storage window. (The name of the
   storage subsystem, HSZ22-1*,* is defined during Agent installation).

Creating and Managing a Network of RA3000s

If you select StorageWorks Command Console from the Start menu, Client displays the Navigation window (Figure 3–11). The Navigation window is a navigation tool used to manage and monitor many storage subsystems over a network. See "Using the Navigation Window" section in this chapter.
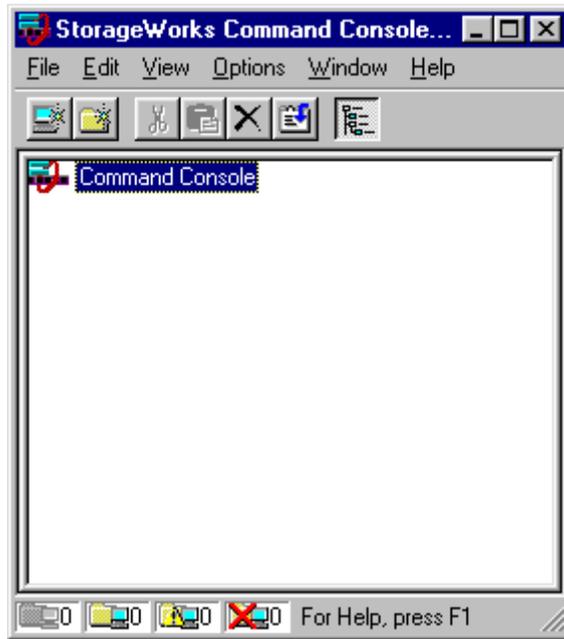
Figure 3-11. Navigation window without the Navigation Tree

Using the Navigation Window

The Navigation window contains a menu bar and the Navigation Tree to help you in managing your storage systems and subsystems. In this window, you can configure your pager notification and view the properties of your storage systems and subsystems. Pager notification is discussed in detail in "Setting Up Pager Notification" in this chapter. In this section, we will focus more on how you will use the Navigation Tree to view your storage.

You can use the Navigation window to view the status of many storage systems. When you add systems to the Navigation Tree, you are not impacting the network. You may want to compare adding a system to when mapping to a network drive in Windows Explorer. Both provide additional access to a system. In this case, you will not be accessing files on the system. Instead, you will be viewing the storage of the RA3000 connected to the system.

For example, two systems, agent.system.xx.compaq.com and another.agent.sys.xx.compaq.com, have been added to the Navigation Tree (Figure 3-12). The system, agent.system.xx.compaq.com, is connected to a storage subsystem named HSZ22-1 and another.agent.sys.xx.compaq.com is connected to subsystem. When these systems were added, the RAID arrays that were attached to them were also added to the Navigation Tree.

Figure 3-12. Navigation window with the Navigation Tree

Adding a System to the Navigation Tree

When you add a system to the Navigation Tree, you are telling the client software to monitor that system. Before you add a system to the Navigation Tree, you need to have the agent software already installed on that system and the name of your client system on the agent's list of client system entries.

Add a system to the Navigation Tree as follows:

1. From the File menu, click **Add System**.

2. Enter your host's name or your host's IP address in the Host Name or TCP/IP Address*:* text box (Figure 3–13) and click **Apply**.
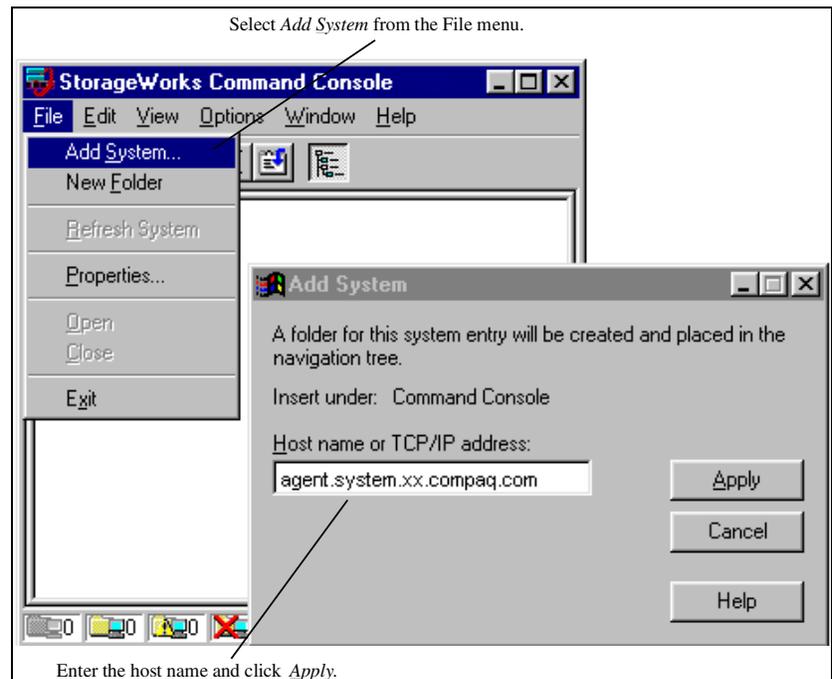
Figure 3-13. Adding an agent system to the Navigation Tree

3. Client adds an icon for the added system in the Navigation window
   (Figure 3–14). In the Host Name or TCP/IP Address text box, you are
   told the TCP/IP address has been resolved for the name you entered.

Figure 3-14. System added to the Navigation Tree

4. Click the **Close** button.

Deleting a System

1. In the Navigation window, click the system that you want to delete.

2. From the Edit menu, click **Delete**.

Creating and Using General Folders

Use folders to help organize your storage. Folders can be dragged and dropped within the Navigation Tree. Folders can only be placed under the Command Console root or under another general folder in the Navigation Tree. Folders can be used to group systems and other general folders, but they cannot be used to group controllers. In this example we have created the general folder My Servers and have placed two hosts, agent.system.xx.compaq.com and another.agent.sys.xx.compaq in the folder (Figure 3–15). To create a new folder:

1. From the File menu, choose **New Folder**.

2. Name the new folder in the Navigation window by double-clicking its label and entering a new name.

Figure 3-15. Adding a general folder

Renaming a Folder

1. Double-click the folder name in the Navigation Tree.

2. Enter the new name. Only user-created general folders that you create can be renamed.

Viewing the Hierarchy in the Navigation Window

1. Click on a folder in the Navigation Tree to display its contents.

2. Click the plus signs (+) to display more folders, systems, and controllers. To open a folder, double-click it.

Viewing and Modifying a System Folder's Properties

1. Right-click a system icon in the Navigation Tree.

2. Click **Properties** from the Shortcut menu to view the system folder properties.
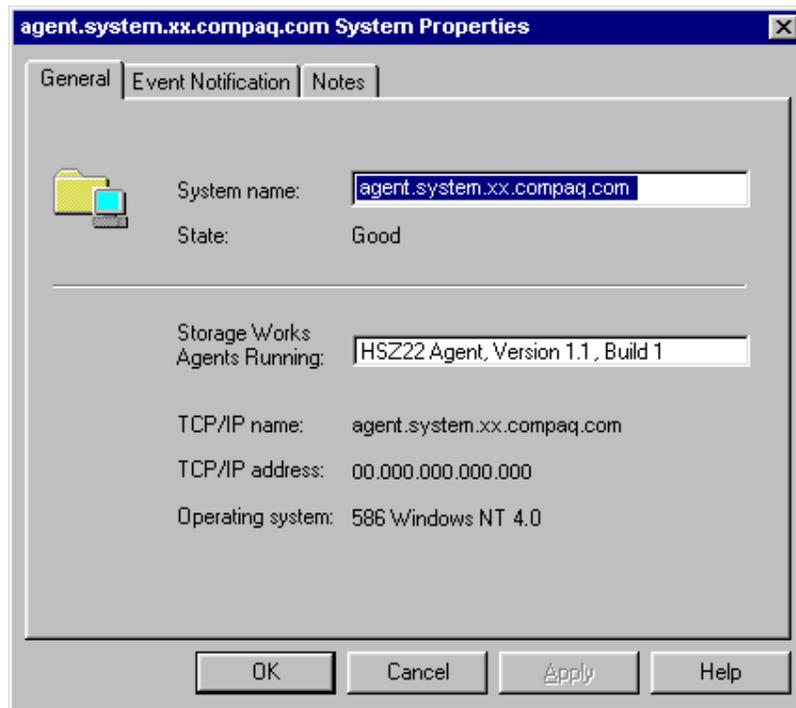
Figure 3-16. System properties for an agent system

Opening a Storage Window

1. Connect to a storage subsystem.

2. In the Navigation window, double click a system folder.

3. Double-click the Storage window icon to open a Storage window.

Configuring a Single Controller

Your controller's operating parameters are stored in property sheets. Double-clicking a controller icon in the Storage window or right clicking on the icon and selecting Properties accesses controller property sheets. To access a property sheet, click its tab.

Changes to controller settings require a controller restart to place the changes in effect. The program prompts you for confirmation before it restarts your controller.

After you change a parameter that causes a controller restart, there is approximately a 90-second delay while the controller reinitializes. If the controller does not communicate with client after this delay, power cycle the RA3000.

1. Access the controller's property sheets by double-clicking the controller's icon. The controller property sheet will be displayed. The controller has four property sheets and can be accessed by clicking on a tab.

5. The RA3000 has four property sheets: General, Host Ports, Environment, and Cache.
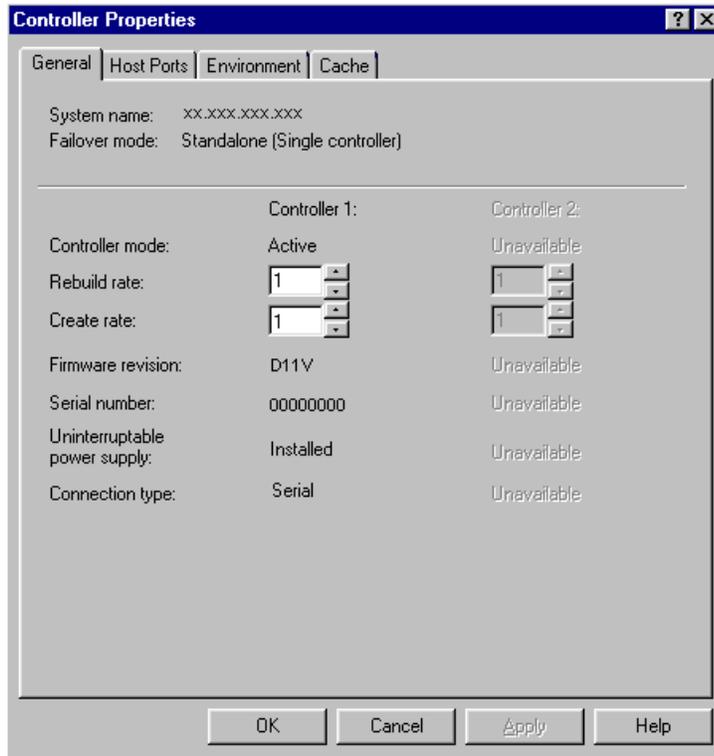
Figure 3-17. General controller properties tab

6. Click the **Host Ports** tab to display the host port operating parameters and set the host port operating parameters. The default settings for Windows NT are shown in Figure 3–18. For other operating systems, refer to the *Getting Started RAID Array 3000 Installation Guide*.
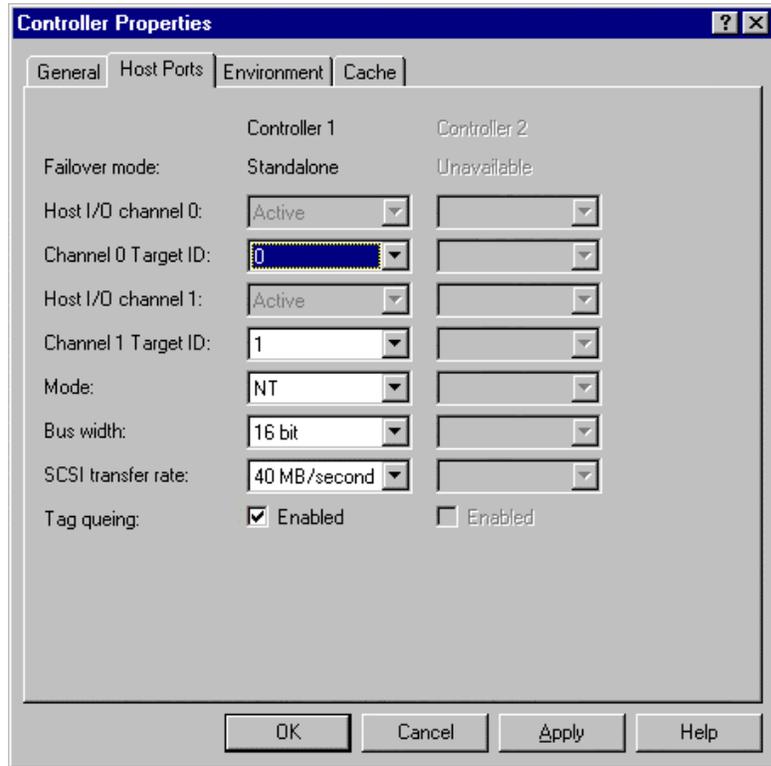
Figure 3-18. Host ports controller properties tab

7. Click the **Environment** tab (Figure 3–19) to verify that the system is operating within normal environmental parameters.
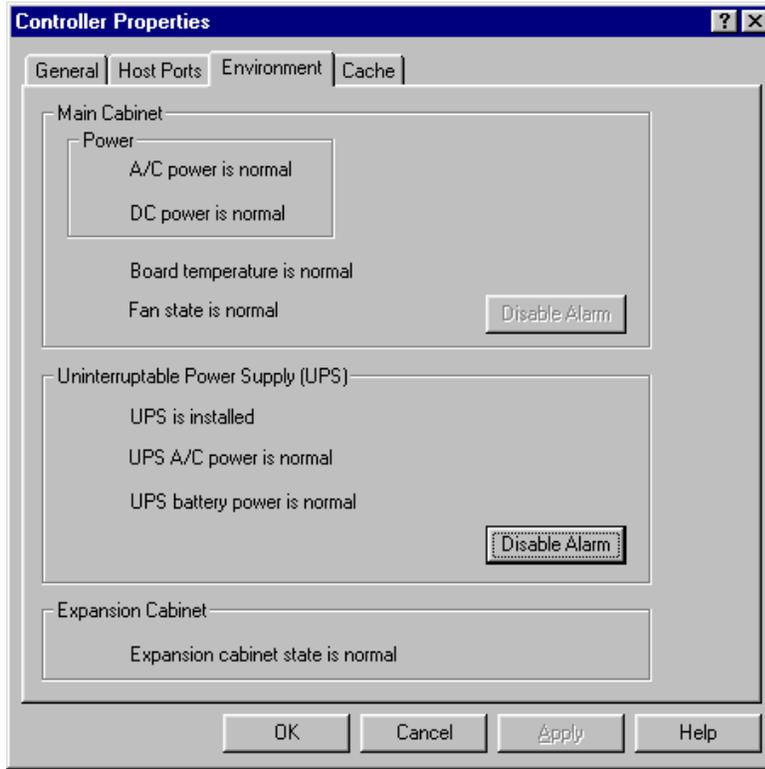
Figure 3-19. Environment controller properties tab

8. Click the **Cache** tab (Figure 3–20) to check cache size. Your RA3000 comes with one 16-MB SIMM installed in slot A.
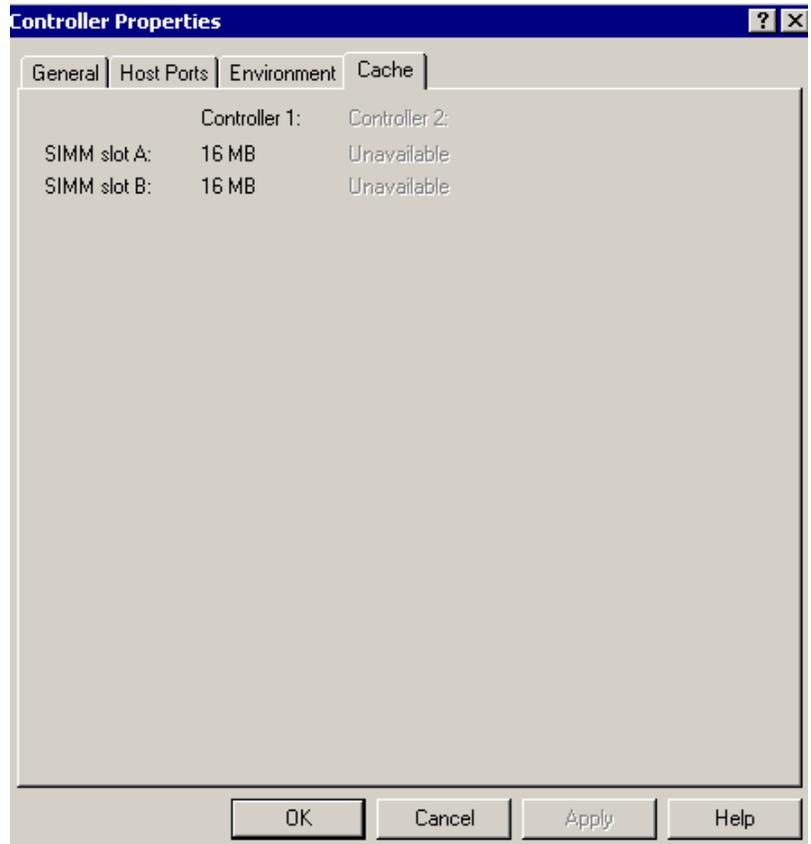
Figure 3-20. Cache controller properties tab

Configuring a Dual-Controller System

> **NOTE:** To configure the system for dual-controller operation, you should have a computer with two serial ports. If your computer has only one serial port, refer to the *Hardware User's Guide*.

The default settings for Windows are shown in Figure 3–21. For other operating systems, refer to the *Getting Started RAID Array 3000 Installation Guide*.

In dual-controller operation each controller must be configured for either Active/Active mode or Active/Passive mode.

■ In the Active/Active mode, the top controller sees one host port as active, while the bottom controller sees the other host port as active. The controllers see their non-active host ports as passive. If one of the controllers fails, the surviving controller sees both host ports as active. Therefore, the surviving controller ensures that both host busses remain operational. The Active/Active mode can be useful for balancing I/O activity between controllers.

■ In the Active/Passive mode the primary controller sees both host ports as active. The remaining controller sees both host ports as passive. If the primary controller fails, the remaining controller takes over and sees both host ports as active.

The Active/Active mode is the preferred mode. Configure the Active/Active mode as follows:

1. In the Storage window double-click on one of the controller icons to access its property sheets.

2. Click the **Host Ports** tab to display the host port property sheet (Figure 3–21).
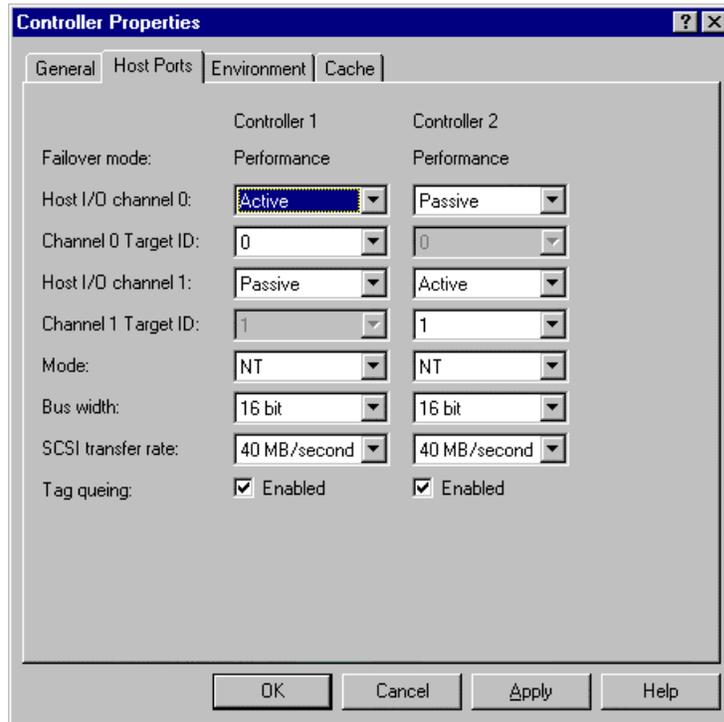
Figure 3-21. Host ports default settings for dual-controller Windows

3. Set host I/O channel 0 for controller 1 to active.

4. Set host I/O channel 1 for controller 1 to passive.

2. Set the channel 0 target ID for controller 1.

3. Set the channel 1 target ID for controller 2.

4. Set the mode for both controllers to NT.

5. To apply the changes on the Host Ports property sheet, Command Console restarts the controllers. Make sure that the host ports are quiescent, then click **OK**.

NOTE: In Active/Active mode, the system is configured to control one SCSI host port on each controller. To utilize both controllers, each SCSI port must connect to a host bus adapter. The two adapters can be in one host system or in two different host systems.

Adding Devices

The controller must identify all physical devices before they can be used as virtual disks. On startup or restart, the RA3000 will automatically recognize any new devices you have installed in the pedestal. You can also add devices online without restarting the controller. To add a device insert the device in the slot, select Device from the Storage menu; then New to access the Add New Device dialog box and then click the **OK** button (Figure 3–22).

Figure 3-22. Add new device dialog box

You can also display the Add New Device confirmation box by right clicking on the empty box on the new device.
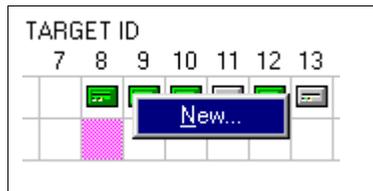
Creating a Virtual Disk

Command Console client can create a number of different types of RAID levels. You can create:

■ Single-device virtual disks (JBODs)

■ Striped virtual disks (RAID 0)

■ Mirrored virtual disks (RAID 1)

■ Striped mirrored virtual disks (RAID 0+1)

■ Striped parity virtual disks with fixed parity disk (RAID 4)

■ Striped parity virtual disks with floating parity disk (RAID 5)

Virtual disks are created using Command Console client's Add Virtual Disk Wizard as follows:

1. To start the Add Virtual Disk Wizard access the subsystem's Storage window, then click **Add Virtual Disk** from the Storage menu.

2. Select the Redundant Array of Independent Disks (RAID) levels, then click **Next**. This selection will determine the type of virtual disk that you will create. In this example, we will create a RAID 5 virtual disk and partition it into two RAID 5 virtual disks of approximately equal capacity.
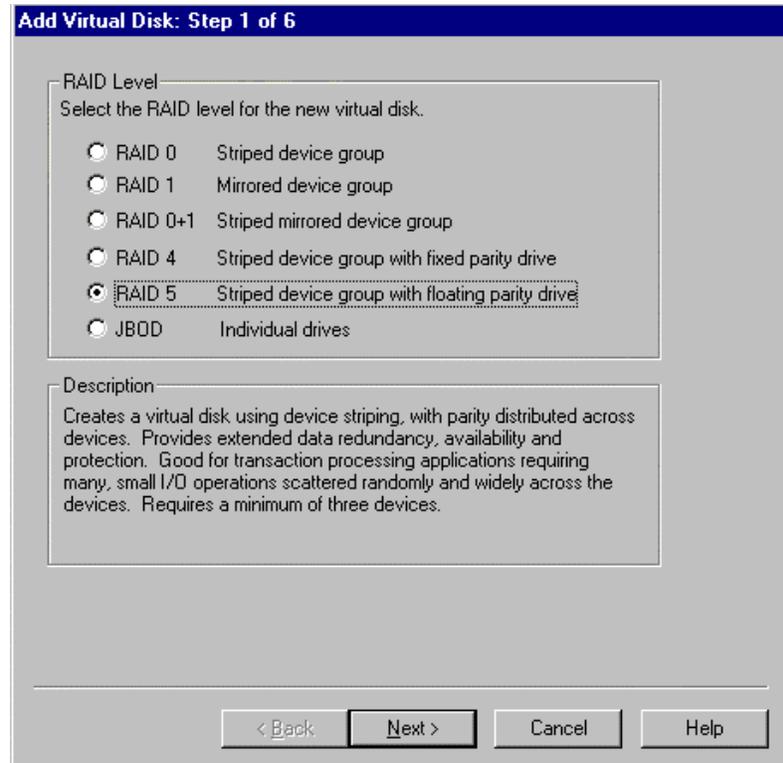
Figure 3-23. Add Virtual Disk: Step 1 of 6

3. Select the devices for your virtual disk by clicking on them in the
   Devices Available To Create a New Virtual Disk:windowpane
   (Figure 3-24). As you click them, they are listed in the Details of
   Selected Devices*:* windowpane. The wizard provides helpful
   information at each step. In Figure 3-24, the wizard tells you that you
   need to select at least three disks to create a RAID 5 virtual disk. We
   have selected the three available devices located on Channel 0.
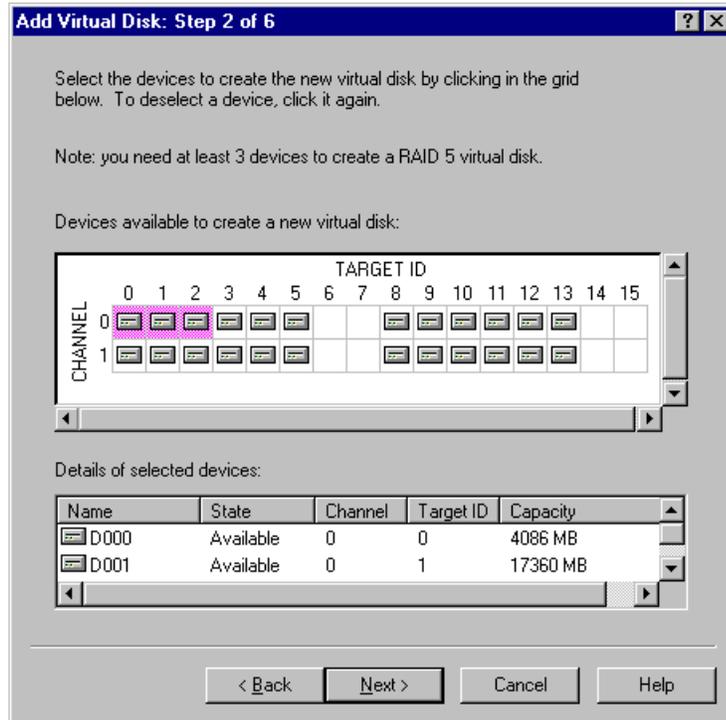
Figure 3-24. Add Virtual Disk: Step 2 of 6 (rack mount model)

4. Select the capacity of the virtual disk, and then click **Next** (Figure 3-25). The wizard offers you the option of using only a portion of the capacity of the devices you have selected for your new virtual disk. It displays the total, available capacity of the devices you have selected in the capacity box. Enter the size of the virtual disk you want to create in the capacity text box, then click **Add**.

In this example we first created a 4000-MB partition, virtual disk 1, shown in the Virtual Disk windowpane. For the second virtual disk, we will create another disk from the remaining capacity by clicking **Add** a second time. When finished, click **Next**.
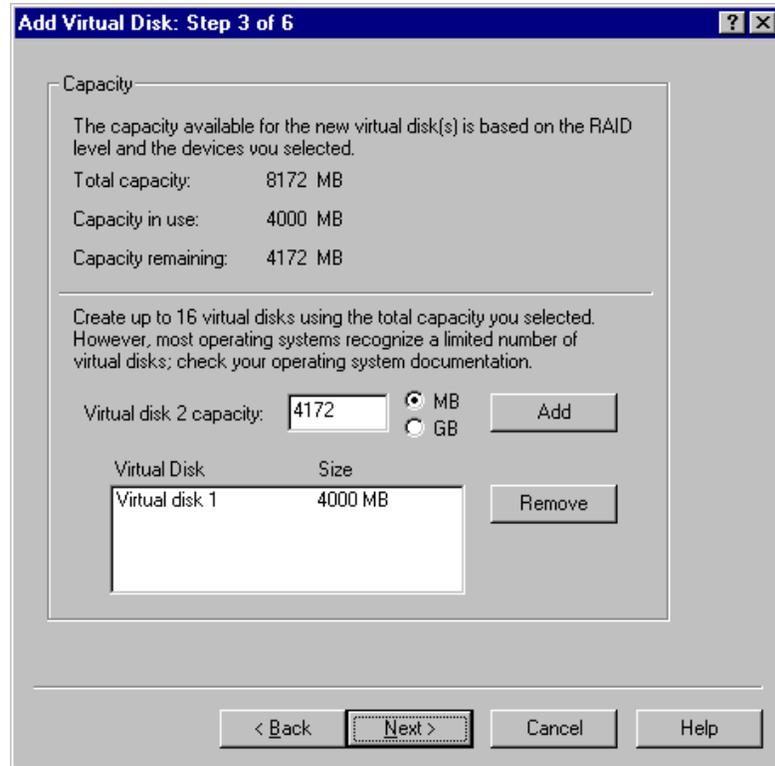
Figure 3-25. Add Virtual Disk: Step 3 of 6

From the three disk members, you have created two disk partitions: Virtual disk 1 and Virtual disk 2 (Figure 3-26). You can create from one to eight virtual disks.
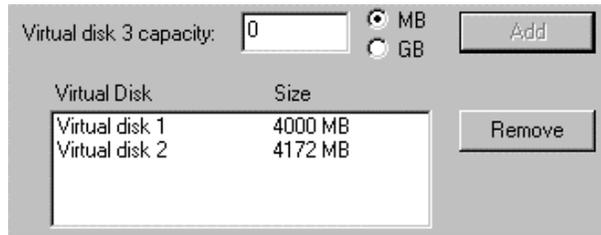
Figure 3-26. Virtual disk partitions

5. Specify the strip size and host port (0 or 1), then click **Next** (Figure 3-27).
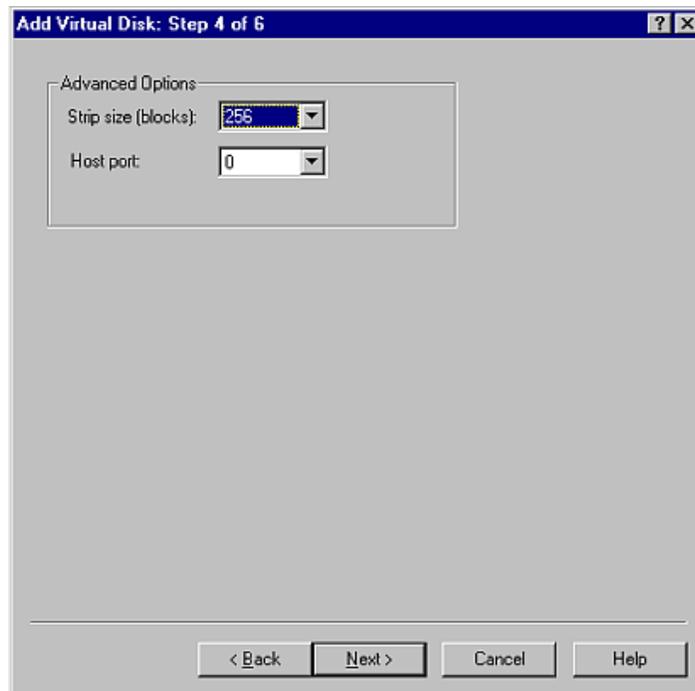
Figure 3-27. Add Virtual Disk: Step 4 of 6

6. Select a LUN and cache option. Command Console automatically assigns a LUN for each virtual disk (Figure 3-28). However, if you want to change the LUN, click the **down arrow** and select the new number from the list. If you want to enable writeback cache, check the Enable box, then click **Next**.
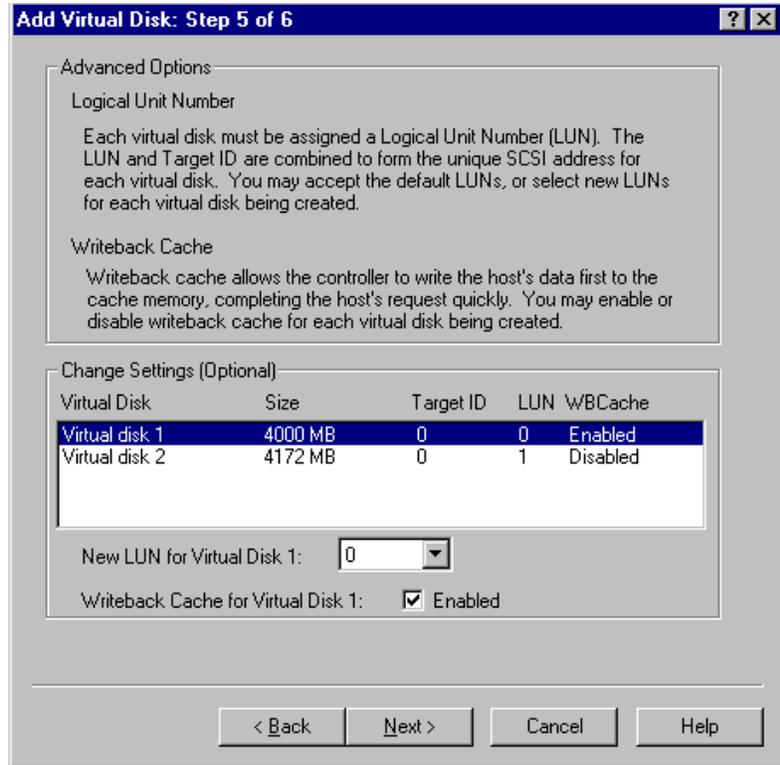
Figure 3-28. Add Virtual Disk: Step 5 of 6

7. Confirm and create the virtual disks 1 and 2. The final virtual disk wizard window, step 6 (Figure 3-29), recaps the choices you have made in steps 1 through 5. If you are satisfied with your choices, click **Finish**.
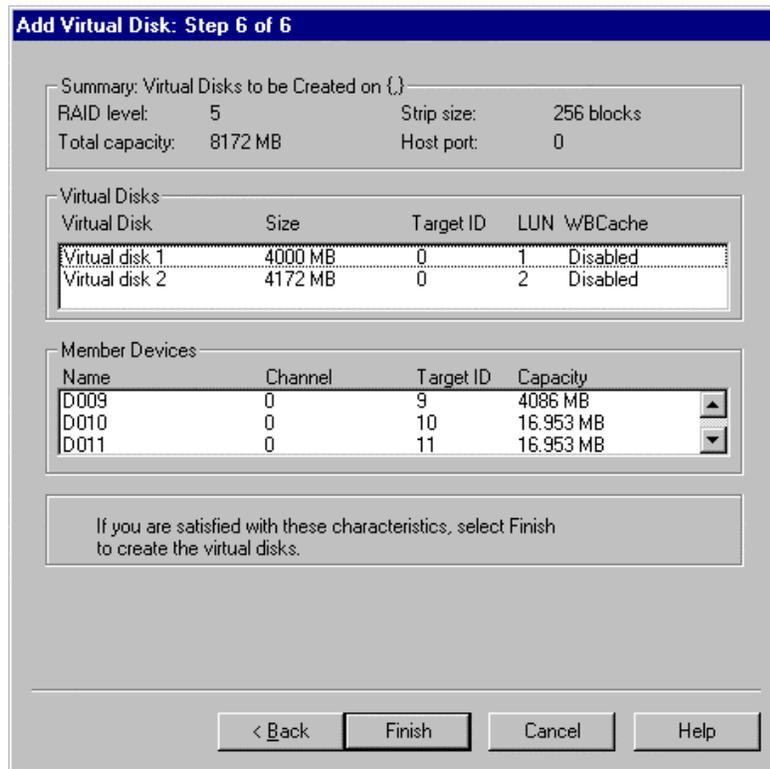
Figure 3-29. Add Virtual Disk: Step 6 of 6

When you see the Successful Completion dialog box (Figure 3-30), click **OK**.

Figure 3-30. Add Virtual Disk: Successful completion dialog box

Figure 3–31 shows what the Storage window looks like during the creation of the virtual disk. You cannot use the virtual disks until they are finished being created.
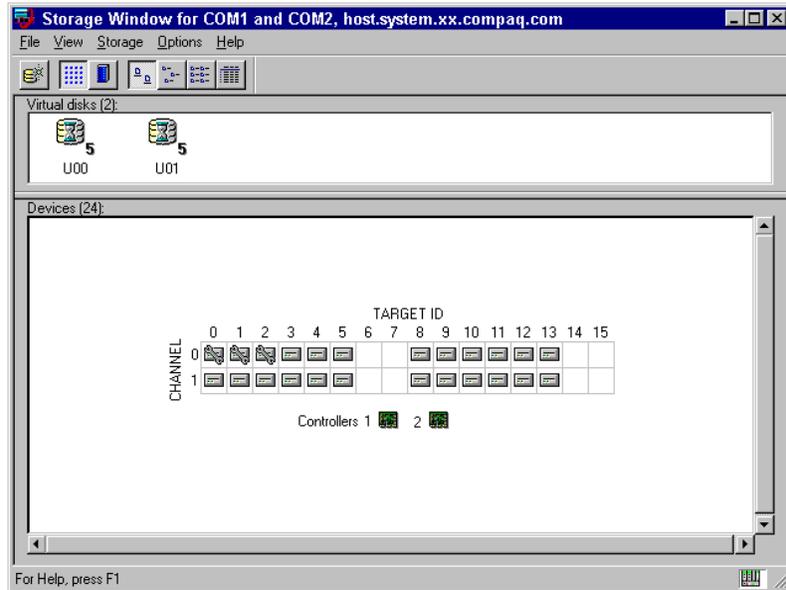
Figure 3-31. Storage window during creation of virtual disks
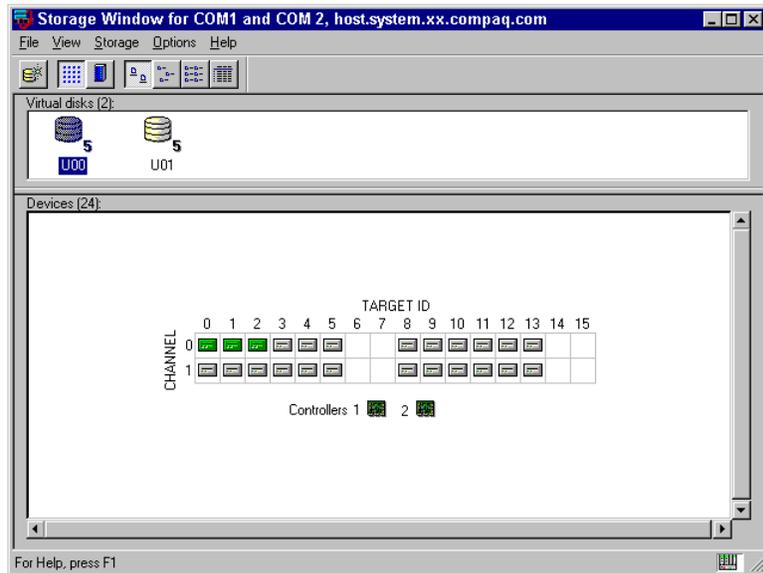
Figure 3-32. Storage window after creation of virtual disks

Deleting Virtual Disks

△ **CAUTION:** Verify that you are not deleting the communications LUN. If you delete the communications LUN, you will not be able to communicate with your subsystems.

■ Although virtual disks do not exist in a physical sense, it is their logical structure that ties together the physical pieces of your data spread across their members. Use extreme caution when deleting a virtual disk. You may be deleting valuable user data.

1. In Windows NT, use the Disk Administrator to first delete the partition.

2. Click on the icon of the virtual disk you want to delete.

3. From the Storage menu, select **Virtual Disk**, then **Delete**.

4. If Client prompts you for your password, enter it.

5. When client prompts to confirm the change, click the **Yes** button to continue. Client deletes your virtual disk from your configuration and refreshes the Storage window.

Modifying Virtual Disks

You can modify the characteristics of your virtual disks in two ways: you can change its operating characteristics or remove members.

> △ **CAUTION:** The virtual disks in your storage subsystem are logical containers that hold your user data. Use extreme caution when modifying the characteristics of a virtual disk. You may be putting valuable, user data at risk.

Changing Virtual Disk Operating Parameters

You can change the operating parameters of any of your virtual disks by accessing their property sheets.

1. Double-click the icon of any virtual disk to access its property sheets. The first sheet displayed is the **General** tab (Figure 3–33). This tab is informational and lists the characteristics of the virtual disk.
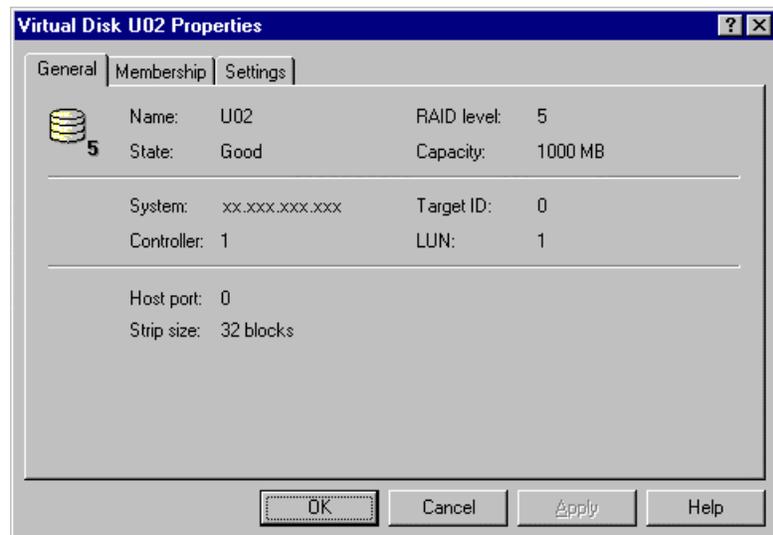
Figure 3-33. Virtual disk properties General tab

2. Click the **Settings** tab to access the setting property sheet (Figure 3–34). You can change the logical unit number (LUN) or enable/disable writeback cache. Select a new LUN from the Drop-down menu. Click the checkbox to Enable writeback cache. To apply the LUN change you must restart the controller. Click the **OK** button to save the changes and exit.
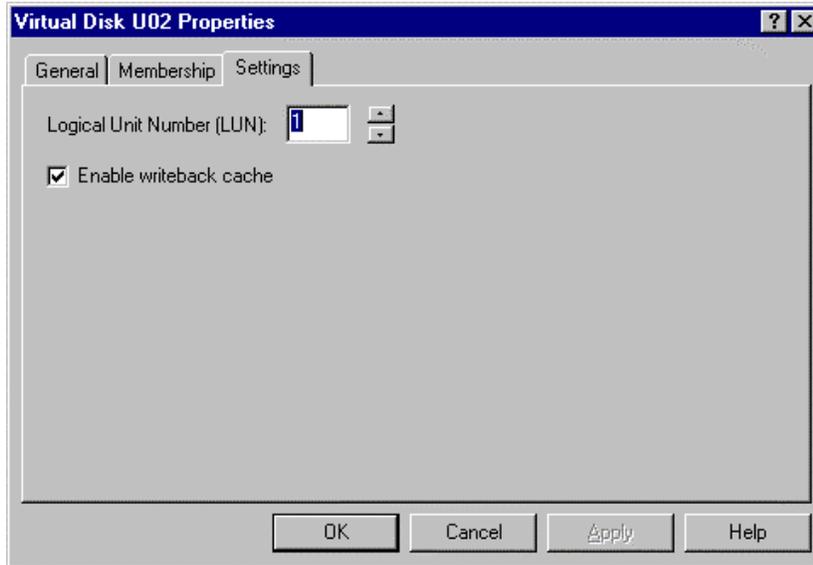
Figure 3-34. Virtual disk properties Settings tab

Removing Virtual Disk Members (Deleting Devices)

> ⚠ **CAUTION:** Use extreme caution when removing a member of a virtual disk. You may be putting valuable, user data at risk if you delete a member inappropriately.

To physically remove a device from your subsystem, you must first remove it from the controller's list of known devices. Remove a device from the controller's list of known devices as follows:

1. Click the icon of the device you want to delete.

2. From the Storage menu, select **Device**, then **Remove From Group**.

3. If the client prompts you for your password, enter it.

4. When client prompts you to confirm the change, click the **Yes** button to continue. Client deletes the device from your configuration and refreshes the Storage window.

Setting Passwords and Security Options (Network Only)

Password security prevents unauthorized users from changing or removing storage configurations. In Command Console, any operation that involves changing controller, virtual disk, or device settings requires a password.

You do not need a password to view Command Console storage configurations. A password is not required when client is connected locally to the storage subsystem via a serial port or host SCSI bus connection. The two security options, selectable from the Storage window's Options menu are: View Only and Make changes (Figure 3-35).

Figure 3-35. Security options menu

View Only Mode

In view only mode, users can view configurations and monitor storage status, but cannot make changes to controller, virtual disk, or device properties. To prevent others from making configuration changes, choose View Only from the Options menu.

Password Security

Password security prevents unauthorized users from changing or removing storage configurations. You created a password when you installed a Command Console agent on a system. The password is encrypted and stored in the file where the Command Console agent resides. To set or change a password, use the Agent Configuration utility.

Command Console allows a valid password to make configuration changes for one hour. If there is no user input for one hour, Command Console resets itself to view only. Any configuration change resets the timer and keeps the password active for one hour.

Managing and Creating Spare Devices

Making a spare device part of a virtual disk will protect the integrity of the RAID setup. This proves especially true for virtual disks that have RAID requirements of two or more devices. Should one device fail, the virtual disk will automatically activate the spare device, as an instant replacement for the failed one.

How a Spare Works

■ If a device fails in a RAID 1, RAID 0+1, RAID 4, or RAID 5 virtual disk, the spare automatically replaces the failed device. The controller reconstructs all virtual disks the failed device was a member of, as long as the device was not part of a non-redundant virtual disk.

■ Once the controller writes data to a spare, the spare becomes part of the same device group in which a device failed.

> **CAUTION:** If a spare is smaller than the disk that failed, it will not be able to replace that disk. The spare must be as large as the disk that failed.

To create a spare:

1. Click the device in the Storage window that you want to make as a spare. The device must be available, and it must have a capacity equal to or greater than the lowest capacity drive in the group for an automatic failed drive replacement.

2. From the Storage menu, click **Device**, then click **Make Spare**.

Clearing Failed Devices

You can easily identify a failed device in the Storage window, its icon will appear with a red X covering it. To clear the failed device from the Storage menu, select **Device**, then **Clear Failure**.

Using Configuration Files

You can use a configuration file to save a particular subsystem configuration and to view or reconstruct it at a later time. You can revert to one of these saved configurations at any time. Client reads the configuration file you choose and sets up your subsystem accordingly. In order to save or restore a configuration, you must have a serial connection to both controllers.

Saving Configuration Settings to a File

1. From the Storage menu select **Controller**, **Configuration**, then **Save** (Figure 3–36).
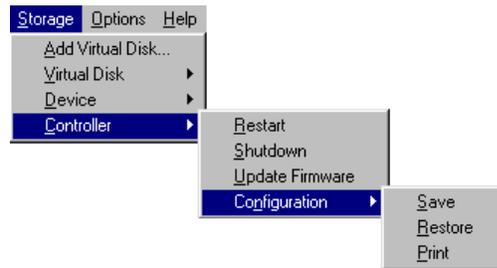
Figure 3-36. Configuration file submenu

2. When the Save Configuration dialog box displays (Figure 3–37), specify a file name in the text box, then click the **Save** button. The current configuration settings, including caches, LUNS, host port, and strip size will be saved to a file at the location you specify.
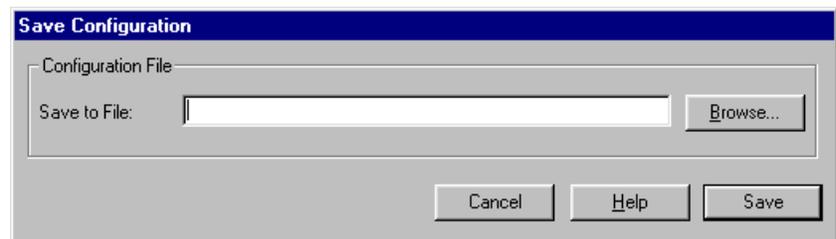
Figure 3-37. Save Configuration dialog box

Restoring Configuration Settings from a File

You can automatically restore/configure your entire storage subsystem from a previously saved configuration file. Client can configure your subsystem from a file only if the file corresponds to your subsystem's hardware configuration. Make sure that the file you select corresponds to your subsystem's hardware configuration.

> ⚠ **CAUTION:** Make sure you are completely aware of the configuration information contained in the configuration file you choose. If you choose a file that is not compatible with the current configuration of the data on your devices, you put your data at risk.

1. From the Storage menu select **Controller**, **Configuration**, and **Restore**.

2. When the Restore Configuration dialog box displays (Figure 3–38), specify the location (path) and file name in the text box, then click the **Restore** button. The configuration settings as defined in the file, including caches, LUNS, host port and stripe size will be restored.
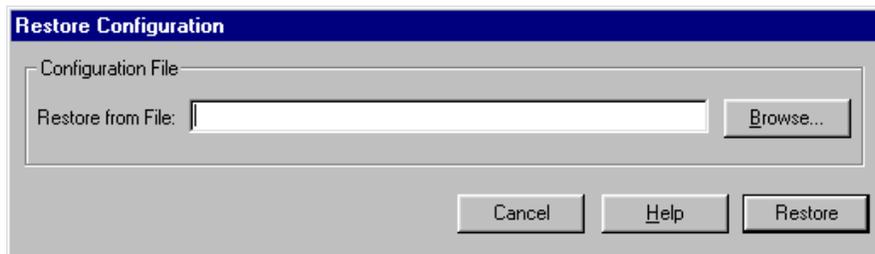
Figure 3-38. Restore Configuration dialog box

> ⚠ **CAUTION:** You will be unable to restore the original configuration settings if the original hardware and connections have been replaced, or if the original configuration settings were not saved before implementing the new changes.

Printing a Configuration File

To print a configuration file, select **Controller** from the Storage menu, then **Configuration** and **Print**.

Monitoring the Status of the RA3000

Command Console provides two ways to monitor your storage subsystem visually on the computer's screen or remotely using pagers.

Icons in the Navigation and Storage windows show the status of host systems, storage subsystems, devices, and controllers. In addition, an Environmental Monitoring Unit (EMU) indicator in the lower right corner summarizes the condition of the power supply, Uninterruptable Power Supply (UPS), fan, temperature, and expansion cabinets.

If you are connected locally to your RA3000, you must manually refresh the screen to check system status. Refresh the screen from the Storage window's View menu by selecting **Refresh**.

Pager Notification Provides Updates of Status

You can configure Command Console so that it notifies you by a page when a critical event occurs on one of your subsystems. This function works with alphanumeric and numeric pagers. You can configure this function so that it notifies certain people at different times. For more information on how to set up pager notification see "Setting up Pager Notification" in this chapter.

Navigation Window Icons Show System Status

The icons in the Navigation window change to show system status. For example, if a device fails in a storage system connected to a controller on a system, the system folder will indicate the failure. A yellow exclamation mark indicates a warning condition and a red X indicates failure.

Storage Window Icons Show Device, Controller, and Virtual Disk Status

The Storage window provides detailed information in both physical and logical views of an individual storage subsystem in the Storage window. In each view, icons represent device and virtual disk states. These icons change to indicate status. A red X through a device indicates device failure.

In addition an EMU icon in the lower, right corner of the Storage window indicates a subsystem's environmental condition. The EMU icon displays a yellow triangle with an exclamation mark when there is an environmental problem, such as a fan failure.

Double-clicking on the **EMU** Icon displays the controller's Environment property sheet (Figure 3–39), which shows main cabinet and UPS status. In this example, the triangle next to A/C power is abnormal indicates a UPS failure.
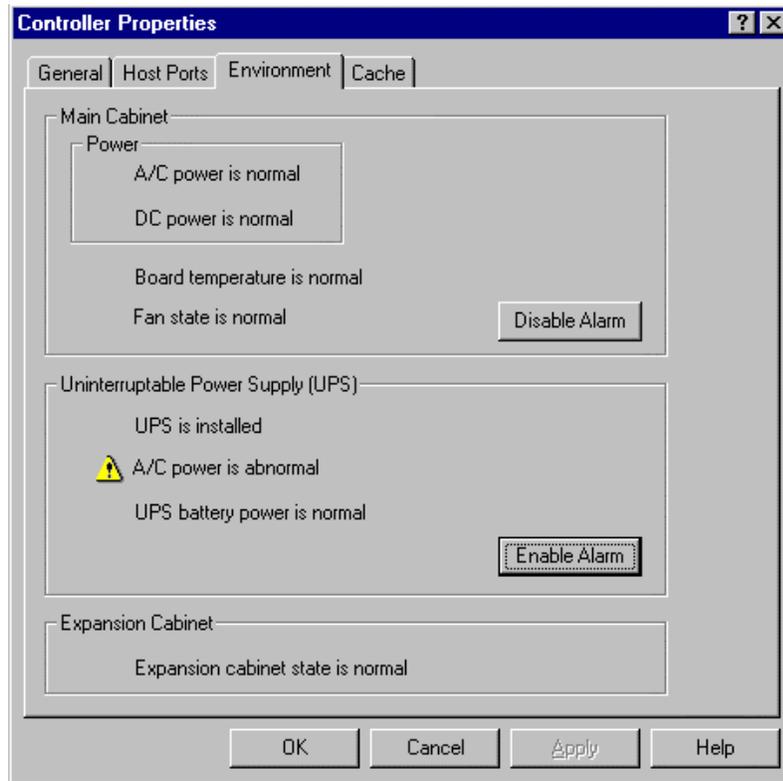
Figure 3-39. Environment tab

Setting Up Pager Notification

Command Console will monitor events on your storage subsystem and notify you of critical events by pager. You can use either an alphanumeric or numeric pager. If you use an alphanumeric pager text messages will be sent to you. The message will include the host system name, storage subsystem name, and a text event message. For numeric pagers you must assign numbers to your host systems and storage subsystems. The event message will also be a four-number code, indicating a critical event.

Command Console can send messages that notify either you or a group of people you designate at different shift times.

The steps for setting up critical event notification by pager are:

■ Set pager preferences. This includes setting your modem's COM port, pager service baud rate, and polling interval.

■ Define a user profile. This includes entering your pager number, identification number (alphanumeric pagers only), and the time period in which you want to be notified.

■ For numeric pagers only, assign pager codes. This includes assigning three-digit numbers to the host systems and storage subsystems you want to monitor.

■ As an option, create a group of people to notify from the user profiles you have defined.

> △ **CAUTION:** To receive pages, the following must occur:
>
> ■ The Asynchronous Event Service (AES) must be running.
>
> ■ The agent service must be running.
>
> ■ In the agent's list of client system entries, you must select the TCP/IP notification scheme for your client system.

Setting Pager Preferences

1. From the Options menu, click **Preferences**. The event Notification Preferences dialog box (Figure 3-40) appears.
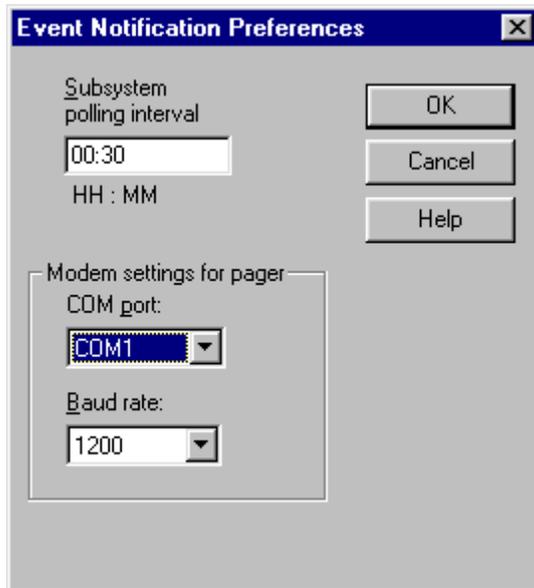
Figure 3-40. Event Notification Preferences dialog box

2. Enter the polling interval in the Subsystem Polling Interval box. The standard, default polling interval is 30 minutes.

3. Select the COM port that your modem uses on your computer.

4. For alphanumeric pagers select the baud rate, usually 1200, of your paging service provider's TAP modem.

Defining a User Profile

1. From the Options menu, click **Event Notification**, then **User Profiles**.

2. Click the **New** button and enter a name on the General tab. A description is optional. Use Edit to make changes to an existing profile.

3. Select the **Pager** tab.

4. Click the **Enabled** checkbox (Figure 3–41).
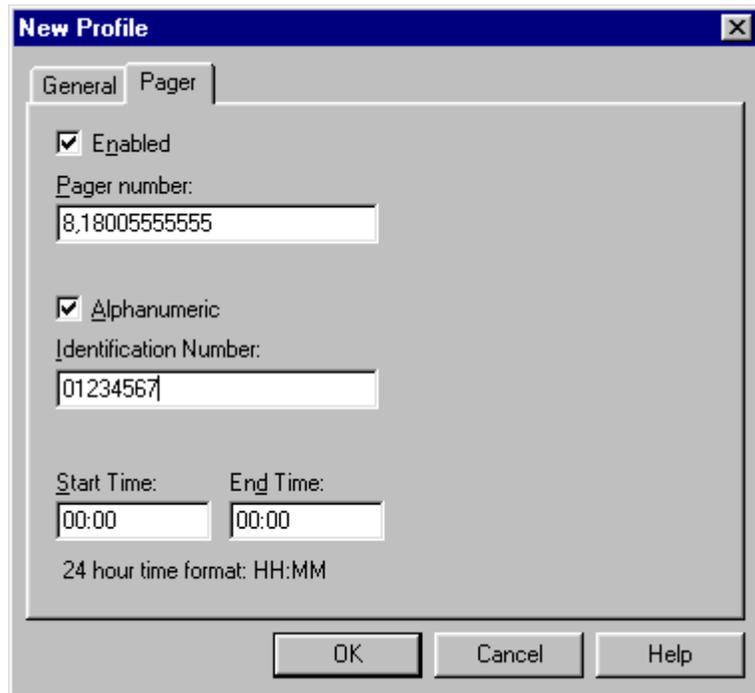
Figure 3-41. Pager tab configured for a numeric pager

5. If you have a numeric pager, enter its phone number in the Pager number*:* box.

6. If you have an alphanumeric pager, enter service provider's TAP phone number in the Pager number*:* box. Click the Alphanumeric checkbox and enter the pager identification number in the Identification Number*:* box.

7. Enter the start and end times in HH:MM, 24-hour format. For example, 08:00 as start and 17:00 as end. Leave both fields set to 00:00 if you want to be notified 24 hours a day.

Tips and Notes for Setting Up Pagers

■ If you need to dial a code to access an outside number, it must proceed the phone number in the pager number field.

■ Do not use commas with alphanumeric pagers, except if required to access an outside line.

■ If you are configuring an alphanumeric pager, you must supply the paging service provider's TAP service modem number in the Pager Number Text box.

■ When you enter a numeric pager number, you can optionally use one or more commas to specify a two-second wait interval. Each comma causes the pager dialer to wait two seconds before sending the pager identification number to the paging company. You may need to add additional commas using the trial and error method so that Command Console will pause long enough for the pager company greetings to complete.

■ Not every paging company requires a pager identification number. If your pager is assigned a unique phone number to call the paging company, do not enter a pager identification number.

■ Command Console supports the TAP paging protocol.

■ See your pager documentation to determine which special characters are supported.

■ Consult Command Console's HELP for the latest information on how to diagnose problems that could arise when sending pages. Help provides instructions on how to put AES into debug mode.

Setting Up Pager Codes for Numeric Pagers

Numeric pager support lets you receive notification about critical events by means of numerical coded messages. A numeric pager usually has three fields separated by hyphens. The first field signifies the area code, the second field signifies the exchange, and the third field signifies the four-digit extension. When you receive a page from Command Console, the first field signifies a three-digit number for the host system, the second field is a three-digit number for the subsystem controller, and the last field is a four-digit code for the critical event.
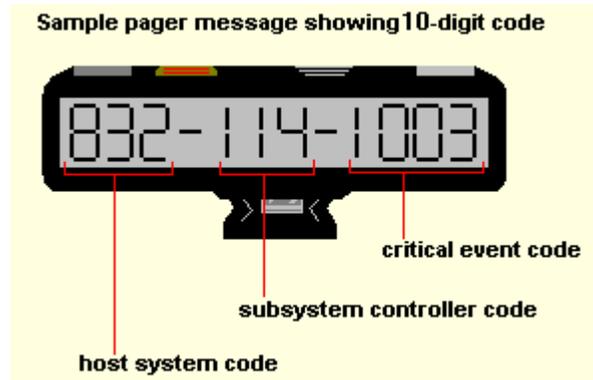
Figure 3-42. Numeric pager readout

First, set up pager codes by assigning a three-digit code for each host system. Next, assign another three-digit code for each subsystem controller connected to that host. The last four digits are pre-assigned event codes. If you choose, the event codes can be modified. System codes, subsystem controller codes, and event codes can only be numeric. Alphanumeric codes are not supported.

Assigning a Pager Code to a Host System

1. Click a host system in the Navigation window.

2. From the File menu, click **Properties**.

3. Click the **Event Notification** tab.

4. Enter a three-digit number in the Pager Identification Number text box.

Assigning a Pager Code to a Subsystem Controller

1. Click a subsystem controller in the Navigation window.

2. From the File menu, click **Properties**.

3. Click the **Event Notification** tab.

4. Enter a three-digit number in the Pager Identification Number text box.

Viewing and Changing a Pager Critical Event Code

1. From the Options menu, click **Event Notification Pager Codes**.

2. Click the code you want to edit, then select **Edit**.

3. Type the new four-digit pager code in the text box. The default codes are shown in Table 3-1.

Table 3-1
Pager Critical Event Codes

Critical Event	Code	Description
Disk fault	1000	Physical device failure
Power supply fault	1001	
Fan fault	1002	
Battery fault	1003	
Temperature fault	1004	
Controller fault	1005	Controller has detected internal fault.
Communication fault	1006	Agent cannot communicate with subsystem.
Other Controller fault	1007	One controller is reporting a fault on other controller.
External fault	1008	
LUN fault	1009	Virtual disk failure

Setting Up Notification Lists

1. From the Options menu, click **Event Notification**, then select **Notification List**.

2. Click the **New** button and the New Event Procedure dialog box (Figure 3-43) appears. Enter a name for the new notification list in the Name*:* text box.

Figure 3-43. Setting up a notification list

3. Type a brief description of the list (optional) in the Description text box.

4. Add members to the list by clicking the checkbox next to each person's name. When you are finished click **OK**.

5. Next, associate a host system or controller to the list you have just created.

Creating a Notification List

1. Click a host system or a controller subsystem in the Navigation window.

2. From the File menu, click **Properties**.

3. Click the **Event Notification** tab.

4. Select a list from the Notification list (Figure 3-44) drop-down list; then click **OK**.
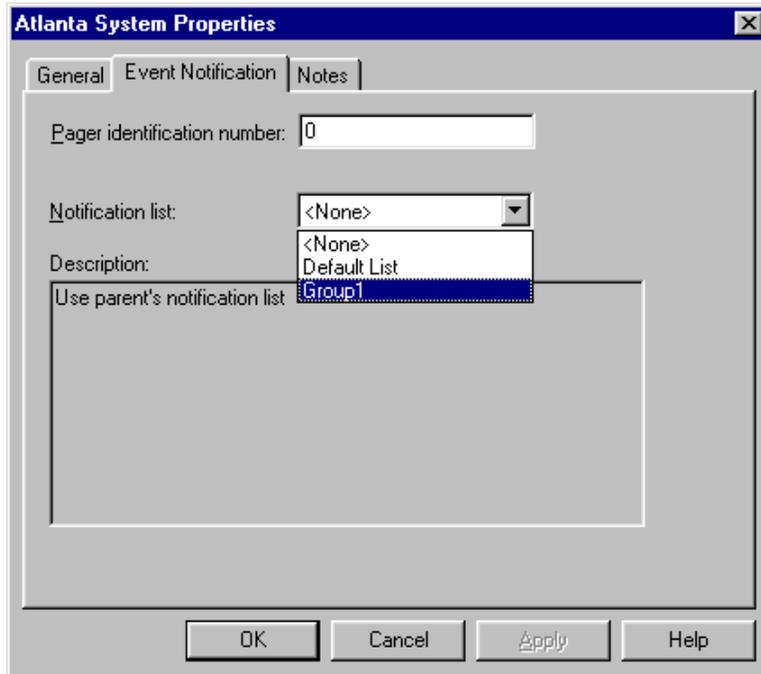
Figure 3-44. Selecting a group for notification

Tips and Notes for Creating Notification Lists

■ Use notification lists to notify groups of people of critical events.

■ You cannot add a user to a list until a user profile has been created for the user. Be sure you have created the user profiles first before creating a notification list.

■ You must first create a notification list before you can associate a system or controller with a notification list.

■ Use the property pages to associate notification lists with systems and subsystem critical events.

Command Console Client's Windows, Menus, and Tools

This chapter describes Command Console's Client windows, menus, and tools. Command Console is a Windows-style Graphical User Interface (GUI) that uses standard Windows navigation, command selection, and configuration features. Folders are used to arrange storage subsystems and a wizard creates virtual disks. Options and commands are selected using drop-down menus, tabs, dialog boxes, buttons, and check boxes. Windows can be sized and moved or minimized. Command Console client has two main windows, the Navigation Window and the Storage Window (Figure 4-1).

The Navigation Window is a navigation tool for adding host computers and storage subsystems to the network and for managing of storage subsystems over a network.

The Storage Window provides detailed information on your devices, controllers, and virtual disks. Every storage subsystem has its own Storage Window. This window lets you configure your controllers and create and manage virtual disks.
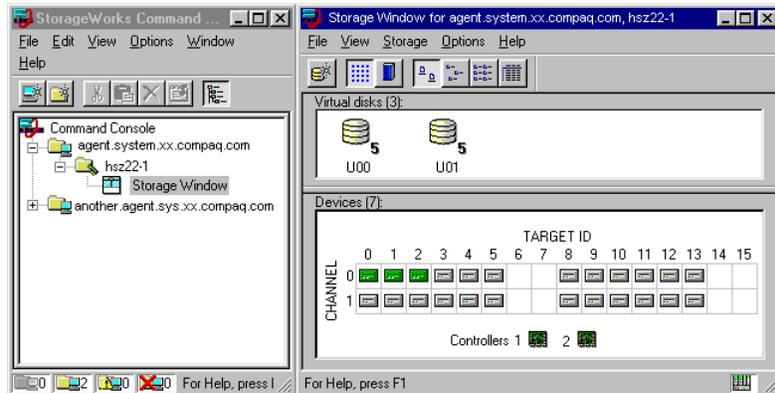
Figure 4-1. Console Client navigation and storage windows

Menus and Commands

Drop-down Menus

Both the Navigation Window and Storage Window have menu bars and drop-down menus. Each drop-down menu presents a group of related functions. For example, file management functions are located in the File menu.

Menu and Command Access Methods

You can use the mouse or the keyboard to access menus and commands. For keyboard access press **Alt+** key for the underlined letter in the menu name, followed by the underlined letter in the command name.

Shortcut Menus

Instead of using the standard menus to find the command you need, use the right mouse button to click a system, virtual disk, device, or folder. The menu that appears shows the most frequently used commands for that item.

Navigation Window

The Navigation Window provides a list of all the host computers and storage
subsystems to which Client is connected (Figure 4–2). The Navigation
Window is made up of host system folders, storage subsystem and general
folders. It has a menu bar, toolbar, and a status bar.

You can use the Navigation Window to see all the systems and storage
managed by Command Console. This is especially useful for monitoring
storage by watching the Navigation Window for problems or failures. The host
systems and subsystems are displayed in the naviagation tree.

Command console will monitor your network connection and storage
subsystem and report status by changing the icons in the Navigation Window.
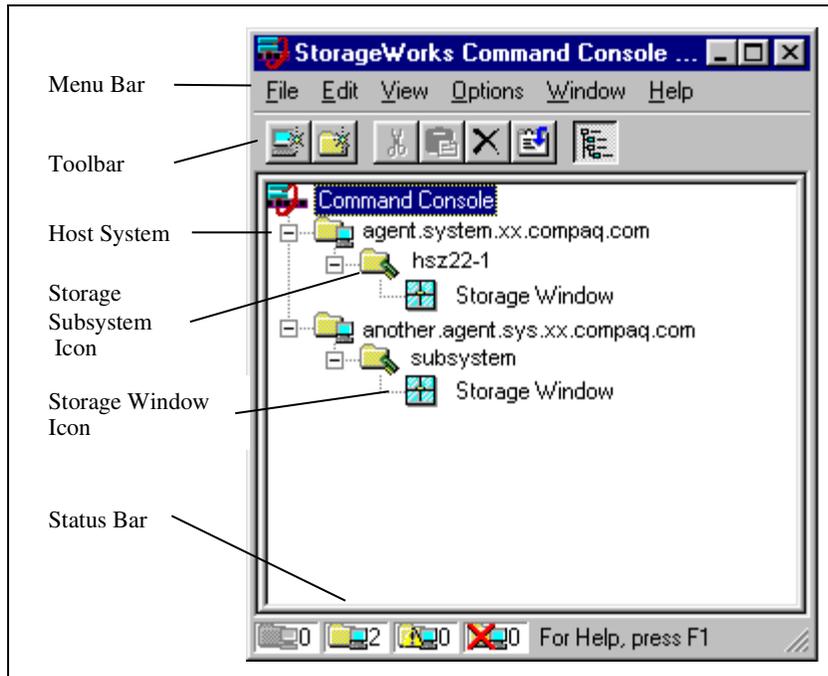
Figure 4-2. RAID Array 3000 navigation window

The Navigation Window uses the following icons:

Icon Name	Icon	Function/Description
System Folder		Shows the node of the host system containing controllers, virtual disks, and devices.
General Folder		This is a folder that you create. A general folder may be used to group other folders.
Controller Folder		Shows the Storage Window associated with a controller.
Storage Window		Double clicking the Storage Window icon in the Navigation Window launches a Storage Window. The Storage Window shows all the virtual disks and devices associated with a storage subsystem.

System Folders

A system folder shows the node containing storage. The following shows the four states that system folders can have in the Navigation Tree:

 Connection to the system has been established but there is a critical condition.

 Connection to the system is working properly.

 A system warning, subsystem may not be fully functional or in rebuild state.

 A grayed out folder means no connection to the storage subsystem.

General Folders

A general folder is a container for grouping folders or systems. You can create general folders with the Add Folder command.

All controllers, virtual disks, and devices inside this folder are operating properly.

A system warning. Subsystem within the folder may not be fully functional or in rebuild state.

A grayed out folder indicates no connection to the subsystem.

A controller, virtual disk, or device inside this folder may have failed.

Controller Folders

A controller folder shows all the storage associated with a controller.

All virtual disks and devices contained in this folder are working properly.

A virtual disk or device contained in this folder may have failed.

A grayed out folder indicates no connection to the controller.

A virtual disk or device contained in this folder has failed.

Navigation Window Menu Bar

The menu bar (Figure 4–3) is at the top of the Navigation Window .It provides drop-down menu selections for Navigation Window tasks.

Figure 4-3. Navigation window menu bar

The menu bar contains the following drop-down menus:

- File menu

- Edit menu

- View menu

- Options menu

- Window menu

- Help menu

These menus and their commands are described in the online Help.

Navigation Window Toolbar

The Navigation Window toolbar (Figure 4–4) is located directly under the menu bar and provides buttons to activate some of the frequently used Command console functions. To display or hide the toolbar, you can toggle the toolbar option on the View menu.

Figure 4-4. Toolbar

Navigation Window Toolbar Buttons

Frequently used Navigation Window functions can be accessed by clicking a button on the Navigation Tree toolbar. The toolbar buttons are the following:

	Add System
	Add new Folder
	View system properties
	Cut folder
	Paste folder
	Delete folder
	View Navigation Tree

Navigation Window Status Bar

The status bar (Figure 4–5) provides information about the number of systems currently connected to the Command Console client and the state of those connections.

The status bar provides colored status indicators to indicate the current state of system connections. Red indicates a failure and yellow a warning (possible failure).

Figure 4-5. Status bar
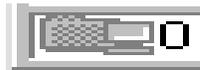
 A grayed out icon indicates the number of disconnected systems. In this example 0 systems are disconnected from client.
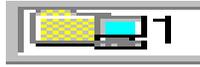
 A full-color icon indicates the number of fully functional "good" systems. In this example 1 system is good and online.
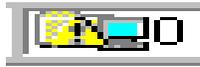
 A yellow triangle with an exclamation mark indicates the number of degraded systems. In this example 0 systems are degraded.
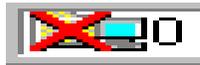
 A red X indicates a failed system. In this example there are 0 failed systems.

Storage Window

The Storage Window (Figure 4–6) provides detailed information on any storage subsystem that you have added to the Navigation Tree. You can open a separate Storage Window for each subsystem you have added in the Navigation Window.

The Storage Window has a menu bar, toolbar, Virtual Disk Window, Device Window, and status bar.

In this example (Figure 4-6) two Storage Windows are opened: one for the host system, another.agent.sys.xx.compaq.com, and one for the agent system agent.system.xx.compaq.com. The Storage Window for agent.system.xx.compaq.com is active.
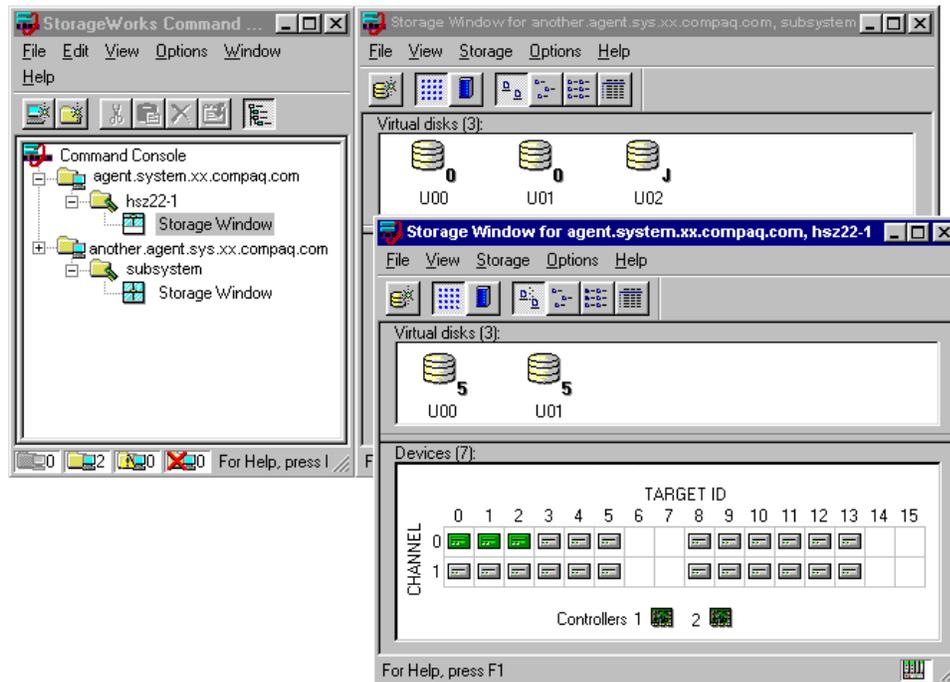
Figure 4-6. Multiple storage windows opened from the navigation window

Storage Window Menu Bar

The menu bar (Figure 4–7) provides drop-down menu selections for the functions you can perform in the Storage Window.

Figure 4-7. Storage window menu bar

There are five drop-down menus in the menu bar:

■ File menu

■ View menu

■ Storage menu

■ Options menu

■ Help menu

These menus and their commands are described in the online Help.

Storage Window Toolbar

The toolbar (Figure 4–8) provides buttons for performing many of the Storage Window functions. You can alternately display or hide the toolbar by clicking the toolbar entry in the View menu.

Figure 4-8. Storage window toolbar

Icon Name	Icon	Function/Description
Add Virtual Disk button		Enables you to add a new virtual disk to your storage subsystem.
Cabinet button		Displays your devices in a pictorial view of your cabinet.
Grid button		Displays your devices as a logical array of icons.
Large Icons button		Displays your virtual disks as large icons.
Small Icons button		Displays your virtual disks as small icons.
List button		Displays your virtual disks as an array of small icons.
Details button		Displays your virtual disks as a detailed list.

Virtual Disk Window

The Virtual Disk Window (Figure 4–9) provides detailed information about the virtual disks in the storage subsystem.
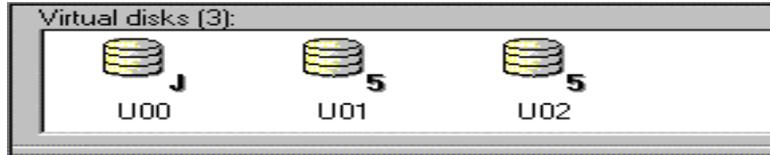
Figure 4-9. Virtual disk window

View Options

You have four options for viewing the information in the Virtual Disk Window. You can select any one of these options by clicking Virtual Disk in the View menu (Figure 4–10).
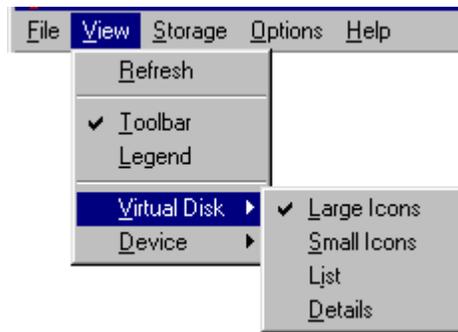
Figure 4-10. Virtual disk window view options

Large Icons, Small Icons, and List Views

If you choose the Large Icons, Small Icons, or List options from the Virtual Disk option in the View menu, the program uses icons to indicate the underlying structure (that is, the type) of the virtual disks in the virtual disk window as follows:

Indicates a JBOD (that is, a single-disk) virtual disk.

Indicates a RAID 0+1virtual disk.

Indicates a RAID 0 virtual disk.

Indicates a RAID 4 virtual disk.

Indicates a RAID 1 virtual disk.

Indicates a RAID 5 virtual disk.

The program also uses icons to indicate the status of the virtual disks in the virtual disk window as follows:

Indicates that the virtual disk is completely operational

Indicates that the controller is destroying any data on the virtual disk and is writing its own file structure

Indicates that the virtual disk is not operational

Indicates that the virtual disk is in the process of regenerating the data on one of its members

Indicates that the virtual disk is reduced

Details View

If you choose the Details option in the View menu (Figure 4–11), the Virtual Disk Window displays four information fields:

Virtual disks (3):				
Name	State	Capacity	RAID Level	
U00	Good	3.995 GB	Single Disk (JBOD)	
U01	Good	1.960 GB	Single Disk (JBOD)	
U02	Good	3.910 GB	Striped Parity (RAID 5)	

Figure 4-11. Virtual disk details view

Name: name client has given your virtual disk.

State: current operational state of the virtual disk. There are five possible states:

■ Good –virtual disk is completely operational.

■ Failed –virtual disk is completely non-functional.

■ Initializing –controller is destroying any data on the virtual disk and is writing its own file structure.

■ Reduced –virtual disk has one failed member.

■ Reconstructing –virtual disk is in the process of regenerating the data on one of its members.

Capacity: The maximum amount of data (in bytes), that the virtual disk can contain.

RAID level: The underlying structure of the virtual disk. There are five possible levels:

■ Single disk –virtual disk consists of a single disk drive.

■ RAID 0 –virtual disk is a striped disk.

■ RAID 1 –virtual disk is a mirrored disk.

■ RAID 0/1 –virtual disk is a striped mirrored disk.

■ RAID 4 –virtual disk is a striped disk with a fixed parity disk.

■ RAID 5 –virtual disk is a striped disk with a floating parity disk.

NOTE: You can change the width of an information field by dragging one of its borders.

Virtual Disk Properties

You can view virtual disk properties by accessing their property sheets. You can access a virtual disk's property sheets directly by double-clicking the virtual disk's icon in any view. You can also right-click the icon and select Properties.

Locating Virtual Disk Members

You can locate the members of any virtual disk by clicking on its icon in the Virtual Disk Window. Its members appear as shaded device icons in the Device Window.

Device Window

The Device Window (Figure 4–12) provides detailed information about the devices that you have configured in your storage subsystem. You can display a menu of device icons and their meanings by clicking Legends on the View menu.
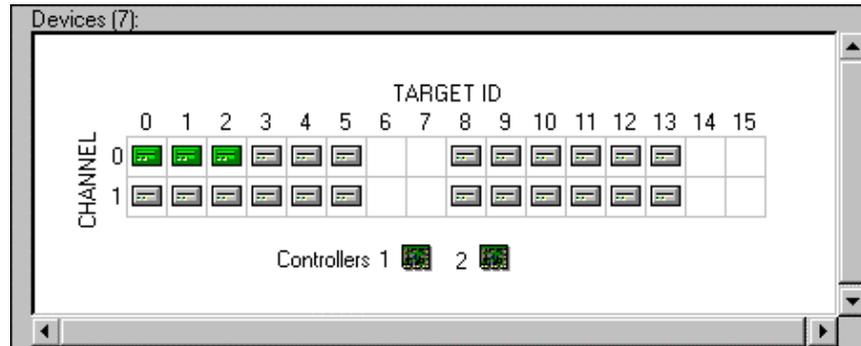
Figure 4-12. Device window (grid view shown)

Device Properties

You can view device properties by accessing their property sheets (Figure 4–13).. To access a device's property sheets directly, double-click it or right click a device icon and select **Properties**. There are three device property sheets: General, Membership, and Support Information.

The General property sheet provides general device information such as target ID, capacity, and transfer rate.

Figure 4-13. Device general property sheet

The Membership sheet (Figure 4–14) shows which virtual disk the device is part of. In this example the device belongs to virtual disk U02 which is currently operating in a reduced state.
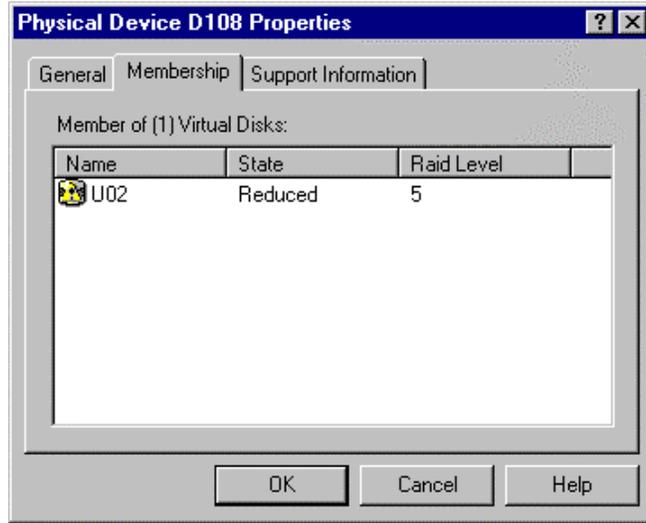
Figure 4-14. Device membership property sheet

The Support Information Property sheet (Figure 4–15) shows the device by name and manufacturer. Its firmware revision is also provided.
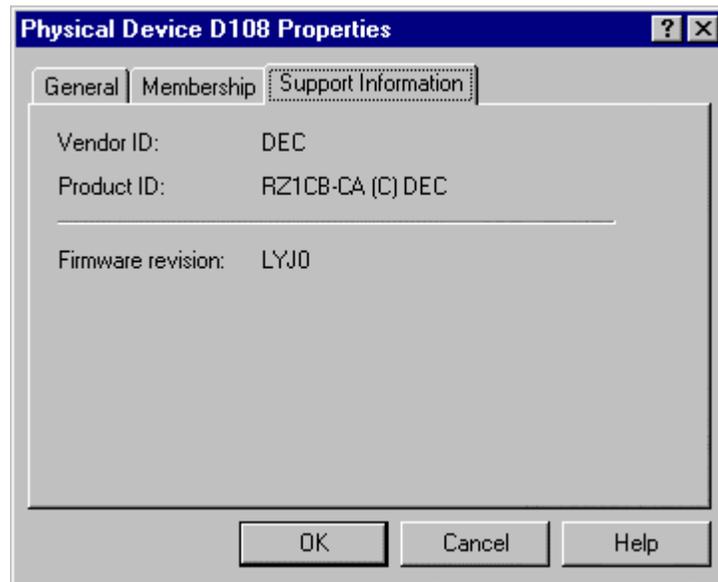
Figure 4-15. Support information property sheet

View Options

You have two options: a grid view or a cabinet view for displaying the devices in your storage subsystem. You can select either of these options in the Device selection in the View menu.

Grid View

If you choose the Grid view, the Device Window displays your storage subsystem as an array of icons. Your devices are arranged vertically in the grid by device bus and horizontally by target on the bus. Icons indicate each physical device that you have added to your configuration as described below. A blank slot indicates that no device is installed or that you have not added an installed device.

Indicates operational disk used in virtual disk

Indicates a disk that has been added to the configuration and is available for use in a virtual disk

Indicates a disk that is a spare and is available for automatic replacement of a failed member in a RAID virtual disk

Indicates disk that is not operational

Indicates disk that is reconstructing

In grid view, the controllers are arranged just below the device array. Icons indicate the status of your controllers, as follows:

Indicates an operational controller

Indicates a controller that is not operational

Cabinet View

If you choose the Cabinet view in the Device selection in the View menu, the program displays a pictorial representation of your cabinet (Figure 4–16).
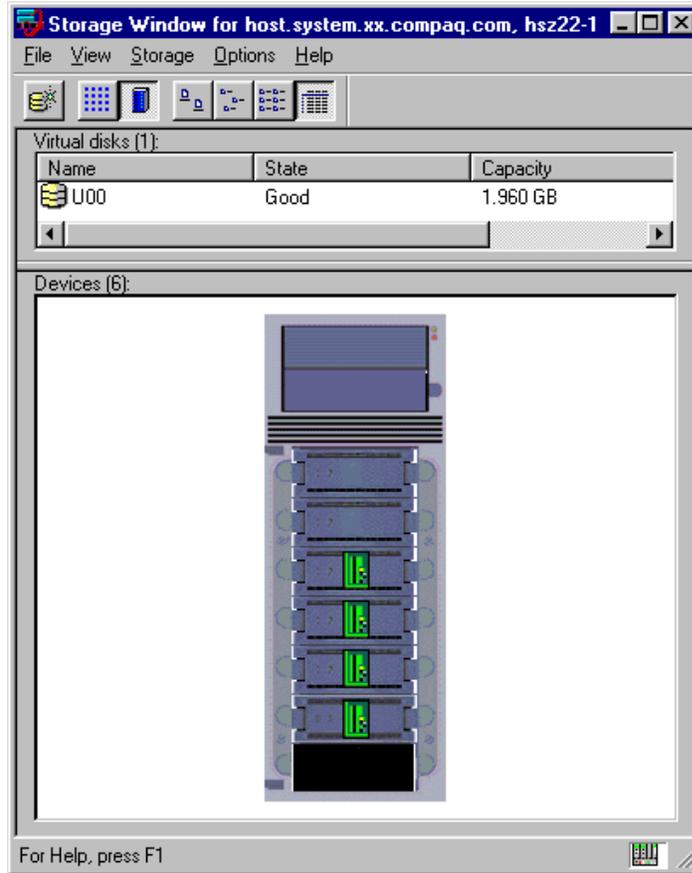
Figure 4-16. Cabinet view of the pedestal model

Change View

You can change the view of your cabinet by using the Change View function in the Storage Window so that it can accurately reflect how your RA3000 appears. The following subsystem cabinet views are offered:

- Single Bus
- Split Bus
- Rack 3 Shelf
- Rack 1 Shelf
- Single Bus

- Rack 4 Shelf
- Rack 3 Shelf
- Rack 2 Shelf
- Dual Pedestal

The following subsystem logical views of virtual disks are offered:

- Two channel small
- Two channel large
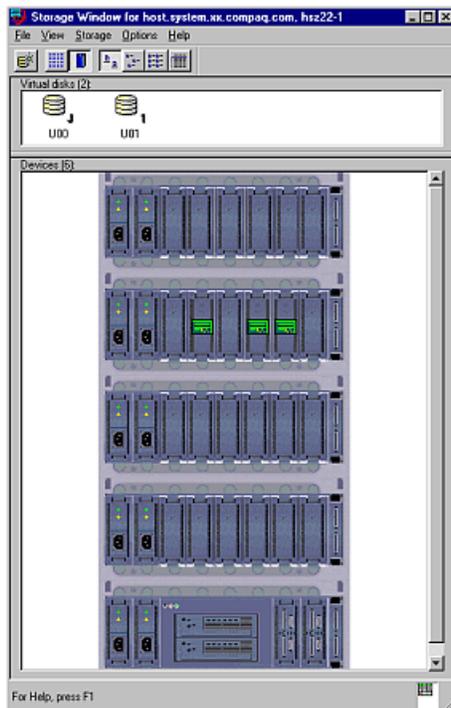
Figure 4-17. View of rack four shelf with two channels small

Disk and Controller Properties

You can view very detailed attributes of your disks and controllers by accessing their property sheets. You can access the property sheets directly by double-clicking the object's icon in either view. You can also right-click the icon, then select **Properties**.

Locating Virtual Disk Members

You can locate the members of any virtual disk by clicking its icon in the Virtual Disk Window. Its members are shown as shaded device icons in the Device Window.

EMU Icon

The EMU icon (Figure 4–18) provides environmental status of the pedestal and UPS. The EMU icon is located in the lower right corner of the Storage Window. Double-click the icon to view the Environment properties sheet.
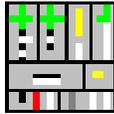
Figure 4-18. EMU icon

Chapter **5**

Maintenance and Troubleshooting

This chapter provides system backup recommendations, instructions on how to upgrade your controller's software, and troubleshooting tips.

Backing up Files

Configuration and data files should be backed up to prevent the loss of data. These files contain information about your storage subsystems.

Backing up your Configuration File

Keep a back-up copy of your current configuration file to facilitate restoration if the storage subsystem configuration file becomes corrupted, if you want to restore a previous configuration setting, or if you need to reconfigure a failed controller.

Backing up Data Files

You should consistently back up your data files to ensure their integrity. Make sure you have a consistent and comprehensive subsystem backup policy in place while using command console. If you do not maintain consistent backups of your data, you put it at risk.

Following good subsystem management practice, you should back up the data on your disk drives to aid in recovery if there is a primary system failure, if the integrity of a storage device becomes questionable, or if you experience gross user error.

The client software does not automatically back up your data for you. Use the appropriate host backup utilities for this purpose.

Updating Controller Firmware

See the release notes for your version of client for information and restrictions on downloading various versions of controller software. You can upgrade your firmware using a network or a SCSI connection as follows:

> **NOTE:** If the operating system is installed on the RA3000, you cannot use SWCC to download firmware. Refer to the *Getting Started RAID Array 3000 Installation Guide* for your operating system and platform.

1. From the Storage menu, select **Controller**, then **Update Firmware** (Figure 5–1).
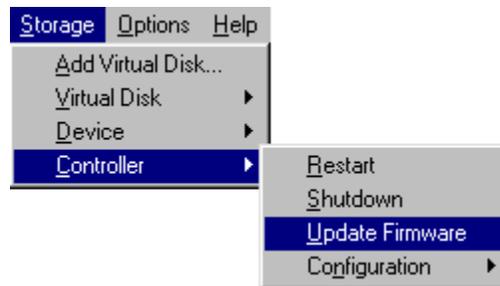
Figure 5-1. Update firmware command

2. Firmware Update dialog box will appear, asking you to specify the firmware file that you want to load. You can easily identify Firmware software by its .fdi extension. Enter the *FDI FILE* name, then click **Start Update**. Upon completion of the firmware update, the system will automatically reboot and update the controller's firmware.
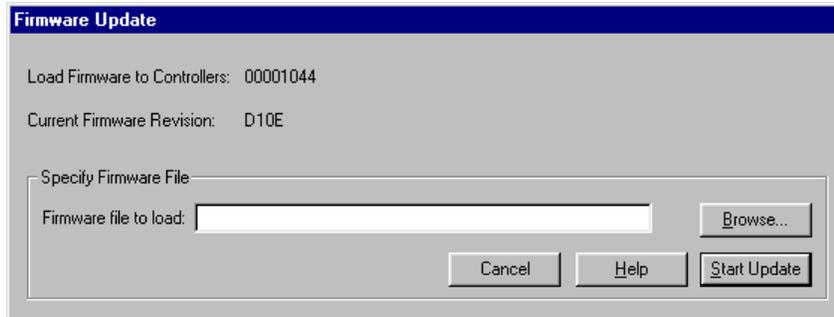
Figure 5-2. Firmware Update dialog box

General Troubleshooting Guidelines

Before contacting Compaq Technical Support, review the following information and the latest command console release notes to determine if you have a problem that you can easily correct. Also, keep in mind that system performance characteristic such as scan and initialization times directly relate to the capacity of you storage subsystem. If you are using client over a network, response times are related to network speed and load.

Initializing Virtual Disks

The initialization time for a virtual disk is dependent on the number of members in the virtual disk and the size of the virtual disk. The virtual disk is not available for I/O during initialization.

Error Displayed but Current Status Good

If you notice that an error is displayed in client but the current subsystem status is good, an error may have occurred in the past with a subsequent break in the communications between client and the controller. To clear the error, you must exit client and restart.

Troubleshooting Client and Agent Connections

■ Make sure the system names used for the client and agent match each other consistently. As a general rule, always use lowercase letters when entering names.

■ If you have entered the host name in the *HOST* file, verify that it is spelled correctly and that it is in lowercase letters. The host name is not required in this file, but TCP/IP will look here first when resolving host names. The *HOST* file is on the client system in the following directory:

  ■ On Windows NT, \WINNT\SYSTEM32\DRIVERS\ETC

■ Make sure you have the correct port numbers in the client's *SERVICES* file as follows:

  ■ On Windows NT, look in the \WINNT\SYSTEM32\DRIVERS\ETC\SERVICES file.

  Be sure the port entries are followed by a carriage return if they are the last entries in the file as shown below:

spgui	4998/tcp
spagent3	4994/tcp

■ Make sure the command console agent on the host system is using a correct host name to recognize the client. If the host system is Windows NT, run the Agent Configuration Utility (H22AgntCfgWiz.exe) or examine the client.ini file on the host system. On other host systems, look at the client.ini file.

■ If you are using a Windows NT Client, run NETSTAT at the MS-DOS prompt to check the TCP/IP active connections.

■ Check the client name that the agent's host system sees is the same as the name specified in the agent's client.ini file. Run NETSTAT at the MS-DOS prompt on the agent, if you are using a Windows NT host system, and check the TCP/IP active connections.

■ Make sure the Agent's host system has been configured to recognize the client by its assigned name rather than by an alias name. If the host system has been configured to recognize the client by an alias name, remove the alias name from the system's hosts file.

NOTE: Always reboot the client system after making changes to the hosts or services file.

■ Command Console does not support DHCP (Dynamic Host Configuration Protocol) connections, where Clients are configured for TCP/IP at system startup time.

Windows NT Event Logging

The HSZ22 Agent gathers traps obtained from the subsystems and puts them in the Application Log of the Windows NT Event Viewer program (*Start|Programs|Administrative Tools|Event Viewer*). It resides on its computer and on the client systems that it notifies (Event Viewer is on Windows NT operating systems only).

To view these traps, go into the Application Log (*Log|Application*) in the Event Viewer. The events for your subsystems and Agent will be listed under the sources: AsyncEventSvc and HSZ22 Agent. You can obtain additional details of an event, by double-clicking its entry.

For your client system to receive traps, the Asynchronous Event Service (AES) needs to be running on that computer. Start AES as follows:

Windows NT- Go to Start|Settings|Control Panel|Services. Select **AsyncEventSvc** (stands for Asynchronous Event Service), and then click **Start**.

> $\triangle$ **CAUTION:** To receive traps in the Application Log of the Windows NT Event Viewer of the client system, the following must occur:
>
> ■ AES must be running.
>
> ■ The Agent service must be running.
>
> ■ In the Agent's list of client system entries, you must select the TCP/IP notification scheme for your client system.