Compaq StorageWorks

RAID Array 3000 Subsystem
Second Controller Option

Installation Guide
EK–SM3KC–IG. D01

Warning!
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention!
Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

JAPAN

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USA

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. Any modifications to this device - unless expressly approved by the manufacturer - can void the user's authority to operate this equipment under part 15 of the FCC rules.

Contents

Figures

Revision Record

This Revision Record provides a concise publication history of this guide. It lists the revision levels, release dates, and a summary of changes.

The following revision history lists all revisions of this publication and their effective dates. The publication part number is included in the Revision Level column, with the last entry denoting the latest revision. This publication supports the installation and configuration of the Second Controller Option into the StorageWorks RAID Array 3000 Pedestal and Controller Shelf storage subsystems.

Revision Level	Date	Summary of Changes
EK–SM3KC–IG. A01	January, 1998	Original release.
EK–SM3KC–IG. B01	May, 1998	Expands controller configuration procedure using Command Console Client (SWCC).
EK–SM3KC–IG. C01	Sept, 1998	Adds a procedure to upgrade firmware using serial interface.
EK–SM3KC-IG D01	July, 1999	Adds dual controller configuration procedure.

About This Guide

This section identifies the audience of this guide. It also describes its contents and includes a list of associated documents and the conventions.

Intended Audience

This guide is intended for installers and operators of the RAID Array 3000 Pedestal and Controller Shelf storage subsystems. Installing the subsystems and its components (options) requires a general understanding of basic SCSI terminology and product installation procedures.

Document Structure

This guide contains the following sections:

1.0 Introduction – summarizes the content of this guide.

2.0 Install Firmware Upgrade – includes the steps required to install the second controller option into the pedestal or controller shelf enclosures. The Information includes saving the existing configuration using the SWCC console, upgrading the firmware, and installing the cache memory SIMM modules to accommodate the second controller.

3.0 Configuring a Dual Controller Installation for a Single Serial Port – describes how to configure the subsystem for dual-controller operation when only serial port is available on the host system.

Associated Documents

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

Table 1 Associated Documents

Document Title	Order Number
StorageWorks RAID Array 3000 Storage Subsystem Hardware User's Guide	*EK–SMCPO–UG*
StorageWorks RAID Array 3000 Controller Shelf Hardware User's Guide	*EK-SMCPQ-UG*
StorageWorks RAID Array 3000 Configuration and Maintenance Guide	*EK–SMCS2–UG*
Installation Instructions for the RAID Array Replacement Controller – SWXRC-03	*EK–SMCPL–PN*
Command Console 2.1 for RAID Array 3000, User's Guide	*AA–RBF2B–TE*

Conventions

Table 2 Style Conventions

Style	Meaning
plain monospace type	Text
boldface type	For the first instance of terms being defined in text, or both.
italic type	*For emphasis, manual titles, chapter summaries, keyboard key names.*

Support and Services

Who to contact in the Americas

Information and Product Questions:	Local Sales Office / StorageWorks Hotline 1-800-786-7967
Installation Support:	Contact the Compaq Distributor where the Storage Solution was Purchased / Local Digital Sales Office.
DIGITAL Multivendor Customer Service (MCS):	
Installation	Contact the Compaq Customer Support Center (CSC).
Warranty	Contact the Compaq Customer Support Center (CSC) for warranty service after solution is installed and operating.
Remedial	Contact the Compaq Customer Support Center (CSC)
	Note: A Service Contract is recommended when the equipment is out of warranty. Contact the local Compaq Sales Office.
Customer Support Center (CSC)	1 800-354-9000

Who to contact in Europe

Information and Product Questions:	Contact the Compaq Distributor or reseller
Installation Support and Installation:	Contact the Compaq Distributor or reseller from whom the Storage Solution was purchased.
For Warranty Service	See the Warranty Card packaged with the product.
For Remedial Service	Contact the Compaq Distributor or reseller from whom the Storage Solution was purchased.
	Note: A Service Contract is recommended when the equipment is out of warranty.

Who to contact in Asia Pacific

For all services, contact the Compaq Distributor or reseller from whom the equipment was purchased.

Second Controller Option

This guide describes how to install a second RAID controller in the RAID Array 3000 pedestal or controller shelf. The second controller option adds a fail/safe feature to your storage subsystem. The guide also contains a procedure describing how to configure the subsystem for dual-controller operation when only one serial port is available on the host.

NOTE

The following second controller option installation and configuration procedures apply to both the pedestal and the rackmount controller shelf. For clarity, only the pedestal is illustrated in this guide.

1.0   Introduction

The controller option adds a second (redundant) controller unit to your subsystem to preserve the integrity of data should the first controller malfunction. The second controller is installed directly below the existing controller in the bottom controller slot of the RAID Array 3000 pedestal (see Figure 1) or the rack-mount controller shelf version of the subsystem.

The installation procedure consists of adding two SIMM memory modules to the redundant controller and, depending on the option kit you are installing (see inventory below), one or two SIMM modules to the existing controller. Following the memory upgrade, you must upgrade the firmware in both controllers , seat the devices in their respective controller slots and configure the subsystem to accommodate a redundant controller.

Perform an inventory of the items contained in the second controller kit option. The kit should contain the following:

RAID Array 3000 Controller

For option kit DS-HSZ22-AA, 3 SIMMs

For option kits DS-HSZ22-AB, 4 SIMMs

CD with new Firmware

Model Label

Warranty Card

This Guide

Figure 1 Second Controller Pedestal Slot Location
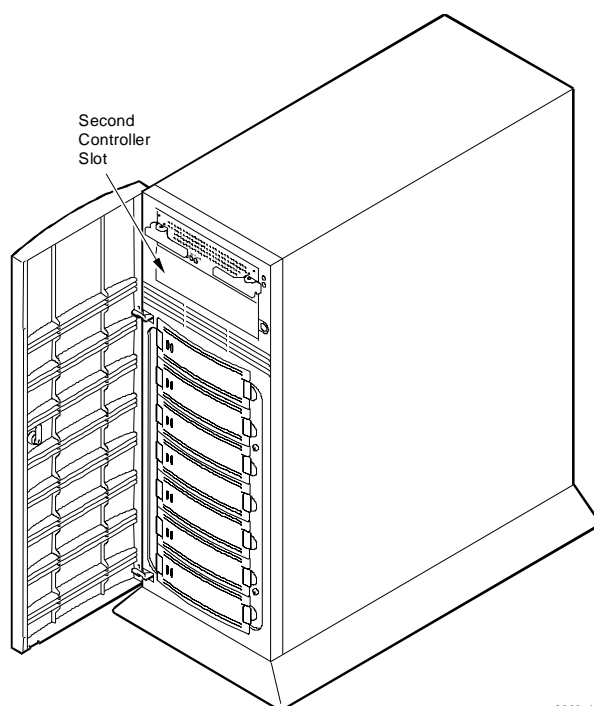
3000-48

2.0   Installing the Upgrade

CAUTION

To prevent an electrical discharge from damaging the SIMMs, always wear an ESD wrist or foot strap connected to a suitable ground when handling the memory modules.

NOTE

You can upgrade your firmware using the SCSI or network connection methods. These methods provide the fastest way to upgrade your firmware. To update your controller's firmware, proceed as follows.

2.1 Save Existing Configuration

> **NOTE**
>
> You must save the subsystem configuration using the StorageWorks Command Console Client (SWCC) before performing the installation procedure. Otherwise, the RAID controller may lose your configuration.

To save your current configuration:

Select the **Storage** pull-down menu from the Toolbar (see Figure 2), click on **Controller,** select **Configuration**, and then **Save**.

Figure 2. Saving the Existing Configuration
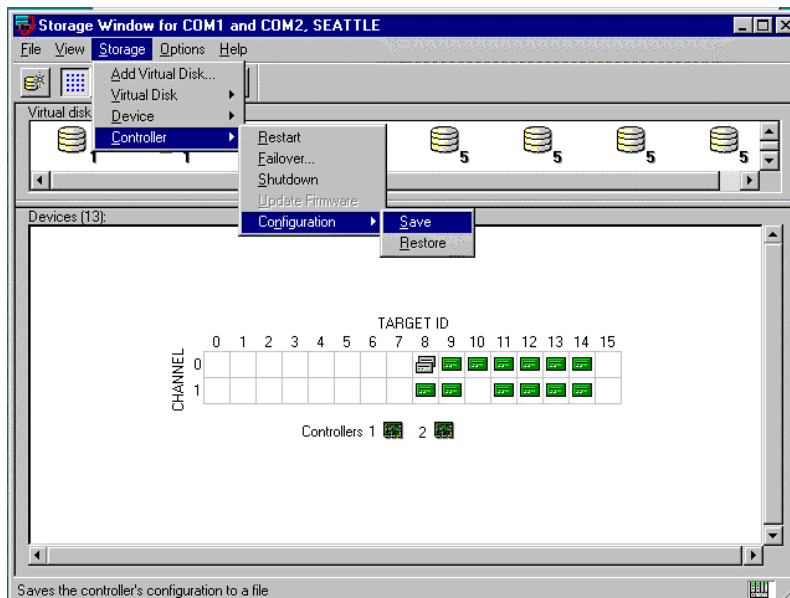
A saved configuration screen with a "Save to File" field appears as shown in Figure 3. The example in Figure 3 shows the file name as `c:\config1`.

Enter your file name in the "Save to File" field and click on **Save.**

Figure 3. Saved Configuration
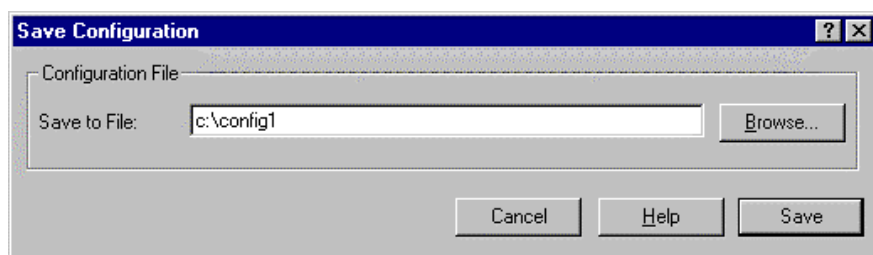
2.2 Update Firmware

CAUTION

If the systems disk is on the RA3000, firmware cannot be upgraded with SWCC. Establish a temporary system disk on a disk drive outside the RA3000 and proceed with these instructions or follow the alternative shown in Section 2.2.2

2.2.1 Update Firmware Using SWCC

Start SWCC and choose **SCSI** or **Network Connection**. From the **Storage** menu (see Figure 4), select **Controller**, and then select **Update Firmware**.

Figure 4 Update Firmware Command
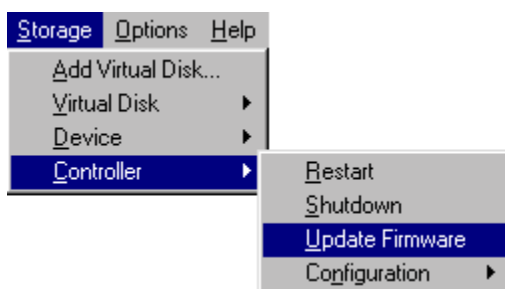
A window will appear (see Figure 5) asking you to specify the firmware file that you want to load. This file resides on the CD supplied with the controller kit option. You can easily identify Firmware software by its `.fdi` extension. Enter the `.fdi` file name (for example, D:\firmware\xxx.fdi), then click **Start Update**. Upon completion of the Firmware update, the system will automatically reboot and update the controller's firmware.

Figure 5. Firmware Update Dialog Box
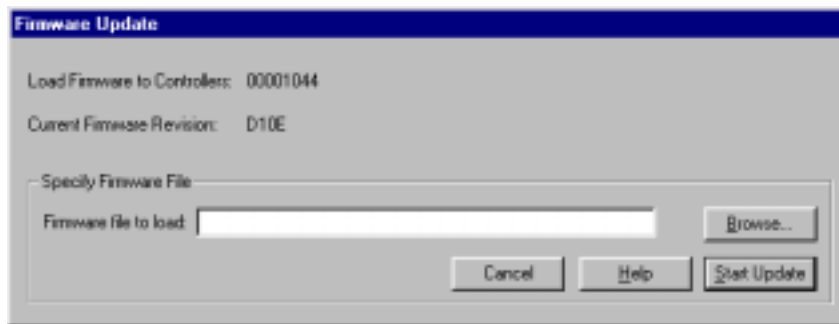
2.2.2   Update Firmware Using Serial Interface

NOTE

Follow this procedure only when the host operating system is installed on the RA3000.

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1. Properly shutdown your host system

2. Using either a laptop computer or a computer other than that attached to the RA3000, connect a serial cable between the COM port on that machine and the corresponding serial port (CTR1 or CTR2) for the controller on the RA3000.

3. Start a terminal emulator session. On Windows NT, we suggest the Hyper-Terminal emulator. Settings to be used are 9600 baud, 8 bits, No Parity, 1 stop bit, XON/XOFF.

4. To get the controller's attention, press Escape/& (escape key, shift key, number 7). The controller should respond with a banner stating DEC HSZ22 DEC Monitor Utility, followed by the firmware revision number. You will not actually be using this utility to upgrade the firmware, but knowing that it is operational makes the next step easier.

5. Reset the controller by power cycling the RA3000 subsystem. You should see a "**Flash Boot Utility...** " banner, followed by instructions to type CTRL/C to abort. Press CTRL/C to abort the load sequence. A "**FLASH Boot Utility Options**" menu should be displayed.

6. Choose menu item (2), Change serial baud rate. Select 38400. When presented with the "Please change your baud rate and press RETURN" message, do so from within HyperTerminal via the **File\Properties** menu, then choose '**Configure.**.. If there is no response from the utility after changing the baud rate, proceed with Step 6.

7. After changing the baud rate, you may have to close and re-enter HyperTerminal. Press the RETURN key after HyperTerminal restarts. You should see **the FLASH Boot Utility Option** menu again.

8. Select menu item "**1) Download new Firmware Image**". Using the Transfer menu in HyperTerminal, choose **Send Text File** and send the firmware. You should see a "**Receiving code for System Version <ver>**" message, followed by a series of \ | / - characters cycling at the end of the line. At 9600 baud, the download will take between 45-60 minutes. At 38400, it should take around 10-12 minutes. At completion, you'll see the **FLASH Programming complete** message, followed by the **FLASH Boot Utility Options** menu again.

9. Select item 9, **Restart Controller**. You'll be instructed to reset the baud rate back to 9600, which you'll again do from the HyperTerminal **File \Properties \Configure**... menu. As before, you'll probably have to exit and restart HyperTerminal to get any response. Press Enter when Hyperterminal restarts.

10. Your firmware should now be upgraded.

2.3 Shutdown RA3000

1. Ensure that both host ports are in a quiescent state (no I/O activity).

2. Shut down the Host System.

3. Issue a "shutdown" command from the SWCC Console to the pedestal (or controller shelf) controller.

4. Power **OFF** the pedestal or controller shelf as applicable.

2.4   Install Two SIMMs into Second Controller

1. Install two of the SIMM modules into the second controller (make sure all SIMM modules are of the same type) by aligning the connector pins and inserting the modules into the SIMM module connectors as shown in Figure 6.

Figure 6. Insert Module into SIMM Connector

3000-32
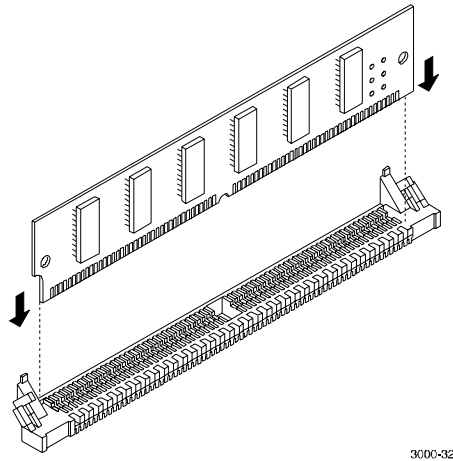
2. Ensure the module is firmly seated and then gently pivot it toward the controller board until it snaps into place as shown in Figure 7.

Figure 7. Pivot Module Down to Seat

3000-33
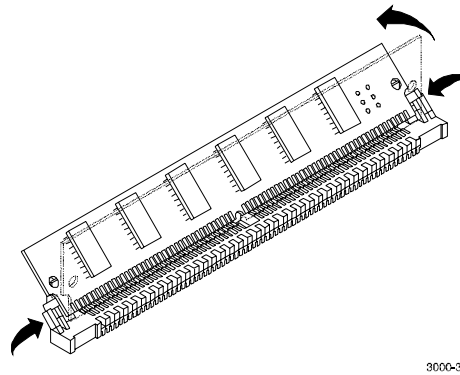
2.5   Replace Existing Controller

1.   Replace the existing controller (see Figure 8 to remove) with the new controller.

Figure 8. Remove Controller from Top Slot
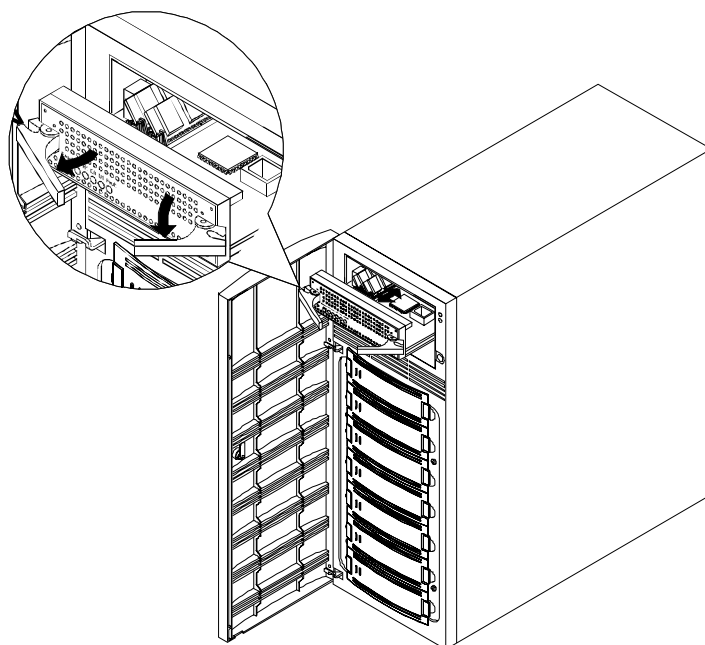
3000-14

NOTE

Ensure you install the new controller in the same slot as the existing controller removed in step 1 above. Do not leave the existing controller in the pedestal (or controller shelf) while performing the following step.

2.   Power up the system and proceed to the following section to restore the configuration on the new controller.

2.6 Restore Configuration

To restore your configuration to the new controller:

1. Restart SWCC in the "Serial Mode" (refer to *your RA3000 Getting Started Guide* for instructions).

2. Select the **Storage** pull-down menu from the Toolbar, then choose **Controller**.

3. From the **Controller** pull-down menu (Figure 9), select **Configuration**, and then **Restore**.

Figure 9. Restoring Configuration to New Controller
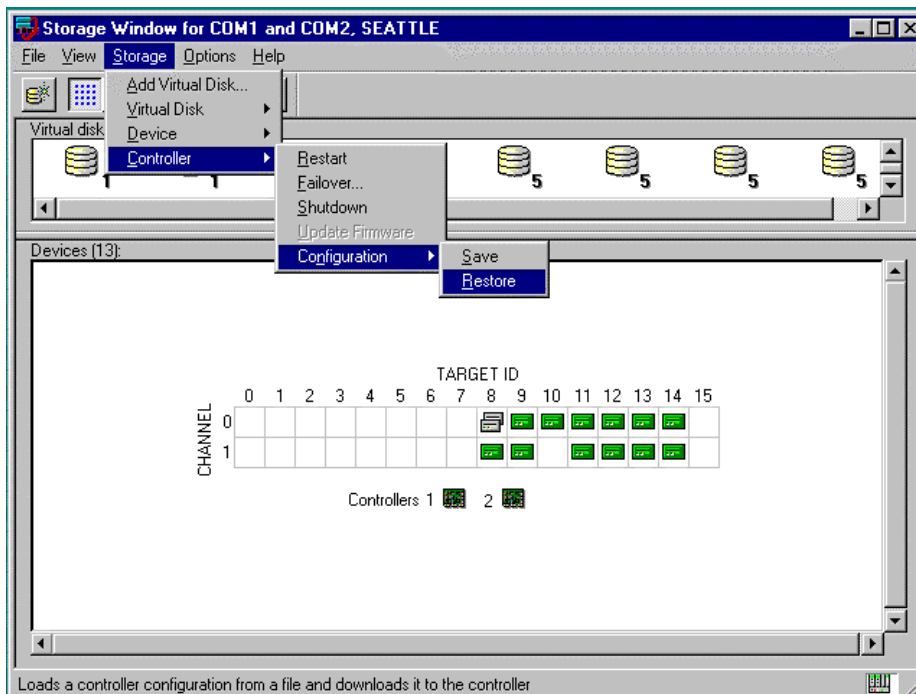
The saved configuration screen with a "Restore from File" field appears as shown in the example of Figure 10.

Figure 10. Restored Configuration Example
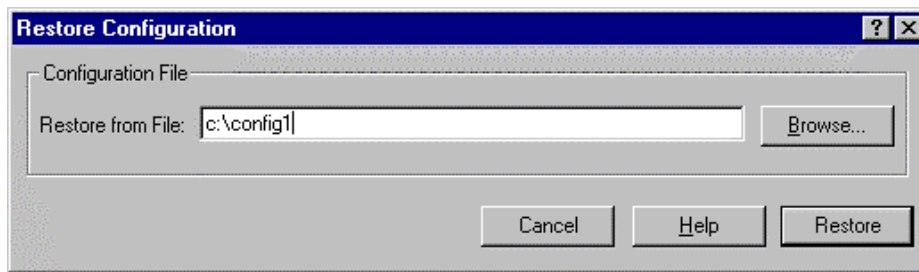
NOTE

Restoring the configuration in the following step may take up to 5 minutes. Be patient.

4.   Enter the file name that you saved in Section 2.1 and click on **Restore**.

2.7   Update Firmware on Second Controller

1.   After configuration has been restored, update firmware on the second controller. Repeat the procedure in Section 2.2.1 or 2.2.2.

2.   After the configuration has been restored and firmware has been updated, power down the system.

2.8   Install Original Controller

1.   If installing option kit DS-HSZ22-AA, add the second SIMM to the original controller. If installing option kit DS-HSZ22-AB, replace the existing SIMM with the two remaining SIMMs supplied with the kit. (See Section 2.4 for instructions.)

2.   Install the second controller into the pedestal (or controller shelf) and power up the system. The system is now in the dual-redundant operating mode.

3.   Locate the second serial cable that came in the second controller kit. Connect this cable to the second controller serial port on the RA3000 and to COM 2 port and restart SWCC in serial mode. You now have two serial connections.

4.   To check that the controller pair is in redundant mode, click on the **Controller** icon. Properties for both controllers should be visible. Firmware revision of both controllers must be identical. If either controller is shown in gray, refer to your *RA3000 Getting Started Guide* for more detailed instructions.

3.0 Configuring a Dual Controller Installation for a Single Serial Port

This section describes how to configure your RA3000 storage system for dual controller operation when only one serial port is available on the host. If required, refer to your Getting Started guide for SWCC installation instructions. The information in this section is divided as follows:

- Configuring the RA3000 Storage System for dual-controller operation
- Connecting to your dual controller storage system using a serial connection
- Verifying the Controller Operating Parameters

3.1 Configuring the RA3000 for the Active Mode of Operation

If you are upgrading from a single controller storage system, the installed controller will be in the active/passive mode of operation. To configure the storage system using a single serial connection, the dual controllers must be placed in active/active mode. Perform the procedure to change your storage system from "active/passive" to "active/active" mode of operation.

1. Shutdown the RA3000 storage system, install the second controller, and restart the system.

2. Connect the host serial port to the serial port connector on the top controller of the RA3000.

3. Open an HSZ22 monitor utility terminal session. The terminal settings should be: 9600 BAUD, 8 bits, no parity, 1 stop bit, XON/XOFF. If prompted for a password, enter "RAID".

4. When the terminal session is displayed, press "ESCAPE/&" (key sequence: Esc, Shift, 7). The controller should respond with banner listing *HSZ22 Monitor Utility* followed by the Firmware revision number.

5. Select *Setup Parameters* from the main menu.

6. Select *Rdnt Ctrlr Parameters* and change the value of Host I/O Channel 1 to *Passive*. Press Ctrl-Z to exit.

7. Transfer the serial cable to the serial port on the bottom controller and press "Ctrl -Z". When the Monitor Utility screen is displayed, press any key to continue.

8. Select *Setup Parameters* and then select *Rdnt Ctrlr Parameters* from the main menu.

9. Both channels should be displayed as "Passive". Select the host I/O channel that was **not** reconfigured in step 5 and change its value *Active*.
Press CTRL-Z to exit.

10. Restart the controllers by power cycling the RA3000 storage system.

11. Recheck the *Rdnt Ctrlr Parameters.* The controller *Values* should display *Active/Passive*.

12. Transfer the serial cable to the serial port on the top controller on the RA3000 and press Ctrl-Z.

13. Check the *Rdnt Ctrlr Parameters.* The controller *Values* should display *Passive/Active*.

Your storage system is now properly configured for dual controller operation from a single serial host port. Proceed to the next section to configure the controllers.

3.2   Configuring the Dual Controllers

In order to create a virtual disk, a serial connection must be made to the controller. The serial connection provides a local connection to the RA3000 (HSZ22) controller. To configure the controller, perform the following steps:

1. Ensure the RA3000 Storage System is turned off.

2. Connect the serial cable between the host serial connector and the top controller's serial port connector.

3. Power on the RA3000 storage system.

4. Open the StorageWorks management utility.

5. Select the *Serial* button in the HSZ22 Management window.

6. Select the serial port available on the host's workstation and then click on the *Connect* button.

7. When the second connection window appears, select *Cancel*. Once the connection is established, a storage window will appear with the connected port identified at the top of the window.

8. From the Storage menu, select *Add Virtual Disk*. Select *JBOD* from the menu (you may select any RAID level you wish) and then select *Next*.

9. Select *drive* from the window *Devices Available to Create a New Virtual Disk* and then select *Next*.

10. Select *Add* and then select *Next*.

11. A window is displayed prompting for selection of the host port that the "JBOD" should be created on. There is a single connection to the controller so only one host port will be available. Select *Next*.

12. Choose a LUN number and enable the write-back cache.

13. Select *Next* and then *Finish*.

14. You have now created one Virtual Device (JBOD) on the top controller. Disconnect the serial cable from the top controller and reconnect the cable to serial port connector on the bottom (redundant) controller.

15. Close and reopen the StorageWorks window and repeat steps 4 through 13 above (Note: If the storage window connection is lost when the cable is moved, reopen the HSZ22 *StorageWindow*).

16. Once the second "Virtual Disk" has been created, close the StorageWorks window.

17. To complete dual-controller configuration, perform the following.

    - Ensure all cables and connections to your server are in place
    - Leave the RA3000 Rack Mount Storage System powered on
    - Reboot the server

Refer to your *Getting Started Guide* to configure the virtual disks as communications LUNs.

3.3   Connecting to Your Dual Controller Storage System

1. Open the StorageWorks management utility.

2. Refer to the *Getting Started Guide* for instructions describing how to connect the RA3000 to your host system.

3.4   Verifying the Controller Operating Parameters

For optimal dual- controller performance and load balancing, the host ports should be configured as listed below. Verify these parameters from the "Controller Properties" page:

- Host I/O channel 0 for Controller 1 (top) to Active

- Host I/O channel 1 for Controller 1 to Passive

- Channel 0 Target ID for Controller 1 to 0

- Channel 1 Target ID for Controller 2 to 1

> **NOTE**
>
> It is allowable to configure the host I/O and target IDs as follows:
>
> Controller 1 (top) may be set to "Passive" while host I/O channel 1 for Controller 1 is set to "Active". As long as each host channel value and channel target ID value is unique, the system is correctly configured for Active/Active mode.

1. Select the "Environment" tab from the *Controller Properties* window.

2. Ensure the cabinet and UPS settings are set to 'normal'.

3. Select the <u>C</u>ache tab from the "Controller Properties" window. The SIMMs parameters must be identical between controllers.

4. Select *OK*. The system is now ready for dual-controller operation. Configuration of additional RAIDsets may now be performed as desired.