StorageW*ks™

Getting Started

RAID Array 310 for Windows NT – Alpha

Installation Guide

Order Number: EK–SMRAE-IG. A01

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Revision Record

This Revision Record provides a concise publication history of this manual. It lists the manual revision levels, release dates, and reasons for the revisions. It also describes how the changes to affected pages are marked in the manual.

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 StorageWorks RAID Array 310 Subsystem.

Revision Level	Date	Summary of Changes
EK–SMRAE–IG. A01	April 1996	Initial Release

About This Guide

This section identifies the audience of this guide and describes the contents (chapter by chapter) and structure. In addition, this section includes a list of associated documents and the conventions used in this guide.

This guide provides the following:

- Description of how to unpack and assemble the RAID Array 310 Subsystem
- How to install the KZPSA Host Adapter board into your Alpha–based system.
- Installing and using the RAID Array 310 Manager for Windows NT.
- Configuring the RAID Array using the RAID Array 310 Manager.

Audience

This guide is intended for administrators and system integrators of StorageWorks RAID Array 310 Subsystems. Installing the StorageWorks RAID Array 310 Subsystem requires a general understanding of RAID concepts, Windows NT, and product installation procedures

Document Structure

This guide contains the following chapters:

Chapter 1: Unpacking and Setting Up Your RAID Array 310 Subsystem Components

This chapter describes how to unpack and place the Deskside RAID Subsystem.

Chapter 2: KZPSA Host Adapter Installation

This chapter describes the steps required to install the KZPSA host adapter in your Alpha system.

Chapter 3: Installing and Using the RAID Array 310 Manager for Windows NT

This chapter describes how to install and use of the RAID Array 310 Manager for Windows NT. The chapter also describes how to create your initial configuration.

Chapter4: Completing your Configuration Setup under Windows NT

This chapter describes how to use Disk Administrator in Windows NT to complete the installation.

Appendix A: Configuration Record

This appendix contains blank forms that may be used to provide a record of your system configuration.

Associated Documents

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

Table 1 Associated Documents

Document Title	Order Number
Deskside RAID Subsystem User's Guide	EK-SMCPG-UG
StorageWorks RAID Array 310 Configuration and Maintenance User's Guide	EK-SMCS2-UG
RAID Manager for Alpha/Intel User's Guide	AA-QU63A-TE

Conventions

This guide uses the following documentation conventions:

Table 2 Style Conventions

Style	Meaning
`boldface monospace type`	To be input by the user
`plain monospace type`	Screen text
italic type	For emphasis, manual titles, utilities, menus, screens, and file-names

Getting Started

This section provides an overview for preparing and installing the RAID Array 310 for Windows NT in your Alpha-based system. Detailed information is contained in Chapters 1 through 5.

Thank you for purchasing a StorageWorks RAID Array 310 Subsystem. You should have received the following:

- StorageWorks RAID Array 310 Manager for Windows NT platform kit
- StorageWorks RAID Array 310 Subsystem (SWXRA-Yx)

> **NOTE**
>
> Installing the StorageWorks RAID Array 310 Subsystem requires a technical understanding of the following:
> - Alpha-based Computer System
> - RAID array concepts
> - Windows NT
> - Basic hardware installation procedures
> - Or, contact your supplier or service representative for installation assistance.

The major steps for installing and setting up the StorageWorks RAID Array 310 Subsystem include the following:

1. Performing the pre-installation steps listed below.
2. Unpacking the RAID 310 Deskside Subsystem. (Chapter 1)
3. Unpacking and installing the KZPSA host adapter in your computer system and connecting the host adapter to the RAID controller. (Chapter 2)
4. Installing the RAID Array 310 Manager for Windows NT (Chapter 3)
5. Configuring the communications port settings (Chapter 3)
6. Creating an Initial Configuration (Chapter 3)
7. Completing the Installation under Windows NT (Chapter 4)

Installation "Checklist"

This section expands upon the preceding steps to provide a "checklist" or "roadmap" to assist you during the installation process. Detailed procedures are provided in subsequent chapters in this guide. Depending upon your specific configuration requirements, however, you may not need to perform all the tasks identified:

1. Perform the pre-installation steps listed below (see this Getting Started chapter).
2. Plan your configuration: This means "mapping out" how you are going to set up your single disks (JBODs), Stripesets, Mirrorsets, and RAIDsets in your RAID Array. (Useful

tools for this purpose are the configuration record sheets provided in Chapter 4 and the Appendix of this guide.)

3. Unpack and locate the RAID Array 310 Subsystem. This includes:

    - Positioning the RAID Array subsystem
    - Connecting the RAID Array maintenance port to the system using the serial cable (Chapter 1)

4. Unpack and install the KZPSA host adapter in your system, connect it to the RAID Array, and verify it is recognized by your system.

5. Install the RAID Array 310 Manager for Windows NT software (Chapter 3).

6. Set the Controller communications parameters (Chapter 3).

7. Create an initial configuration (Chapter 3).

8. Record your RAID configuration (Chapter 3).

9. Complete your RAID configuration using Windows NT Disk Administrator (Chapter 4).

Pre-installation Steps:

Before starting your installation, follow these pre-installation steps:

- Back up your system files using your normal procedure.
- Verify the availability of user-supplied hardware and software.
- Inventory the contents of the StorageWorks RAID Array 310 Subsystem platform kit.
- Inventory the contents of the StorageWorks RAID Array 310 Subsystem.

Perform a System Backup

Follow normal procedures to backup your system before installing the subsystem.

Verify User-Supplied Hardware and Software (System Requirements)

The StorageWorks RAID Array 310 Subsystem requires the following user-supplied hardware and software:

- Digital Alpha-based system with an available PCI slot
- The associated system hardware manual(s)
- Appropriate tools to service your computer
- The Windows NT operating system – Version 3.51

Inventory the StorageWorks RAID Array 310 Subsystem Platform Kit Components

The Storage Works RAID Array 310 Platform Kit provides the following components:

- A KZPSA-BB host adapter for Alpha-systems
- SCSI cable, with a right-angle high-density 68-pin connector on one end and a straight high-density 68-pin connector on the other (BN31G-02)
- Media for RAID 310 Manager and host adapter drivers
- *RAID Manager for Alpha/Intel User's Guide* (AA-QU63A-TE)
- This *Getting Started – RAID Array for Windows NT – Alpha Installation Guide*
- Release Notes containing version-specific instructions for system installation
- RAID Array 310 Controller Firmware License Keys

The StorageWorks RAID Array 310 Subsystem (SWXRA-Yx) provides the following components:

- The StorageWorks Deskside RAID Subsystem
- The Deskside RAID Subsystem User's Guide
- The RAID Array 310 Configuration and Maintenance User's Guide
- Serial cable (RJ12 to 9-pin serial) for connecting the maintenance port of the RAID controller to the serial port of your system, PC, or maintenance terminal
- Power Cable
- Enclosure keys

> **NOTE**
>
> Retain the Firmware License Keys information in a safe place. They are required if it becomes necessary to reinitialize the RAID Array Controller.

1

Unpacking and Setting Up Your RAID Array 310 Subsystem Components

This chapter describes the site preparation and unpacking procedures for the RAID Array 310 Subsystem. It also describes the procedure to recharge the controller write-back cache battery and making the CLI interface-connection between the subsystem and the host adapter.

1.1 Introduction

The installation of your RAID Array 310 subsystem is accomplished by performing six major steps as follows:

- Unpacking and setting up the mechanical configuration (*Chapter 1*)

- Connecting ac power and recharging the controller write-back cache battery (*Chapter 1*)

- Making the serial interface connection between the RAID Array 310 and the host system (*Chapter 1*)

- Installing the SCSI host adapter and making the SCSI connection to the host (*Chapter 2*)

- Installing the SCSI software driver (*Chapter 3*)

- Configuring your RAID 310 disk array subsystem (*Chapter 3*)

1.2 Site Preparation

Before installing the subsystem, make sure that adequate space is available in front of the enclosure for opening the front door (10 inches clearance) and around the enclosure for adequate airflow. See Figure 1–1 for specific space requirements.

Figure 1–1 Minimum Installation Clearance Measurements
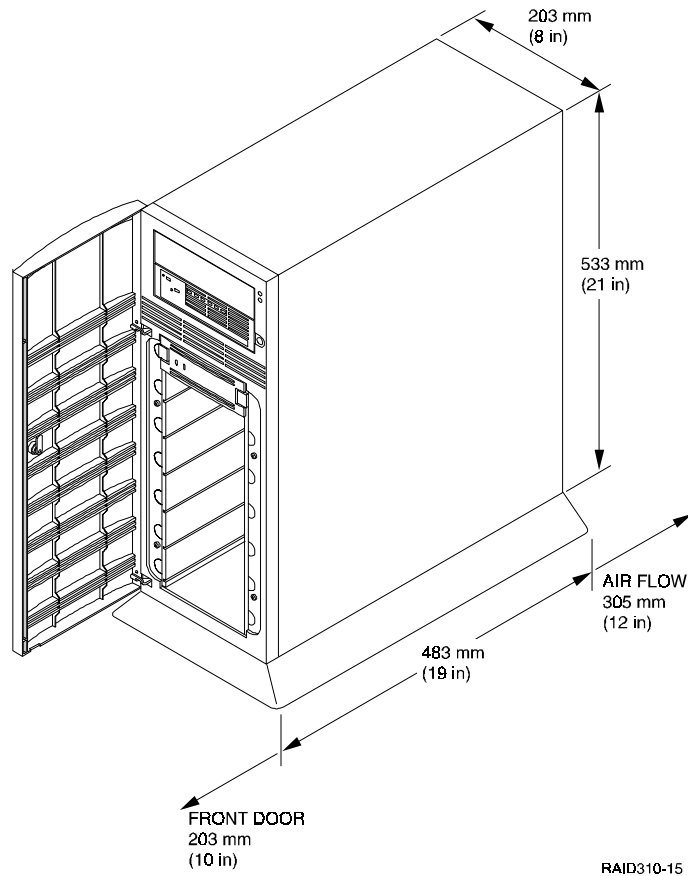
1.3   Unpacking the RAID Array 310

The shipping containers provide maximum protection for the subsystem and all components. We recommend that you unpack the subsystem in the installation area.

NOTE

Before unpacking the equipment, inspect the shipping carton for signs of external damage. Report any damage to the local carrier and to your sales representative.

Refer to Figure 1–2 and complete the following procedure to unpack the subsystem:

1. Orient the shipping container as shown.

2. Open the container and remove the subsystem and packing material.

3. Remove the top foam blocks.

4. Remove the door.

5. Remove the subsystem.

6. Replace all packing material in the shipping container and store for future use.

Figure 1–2 Unpacking the RAID Array 310
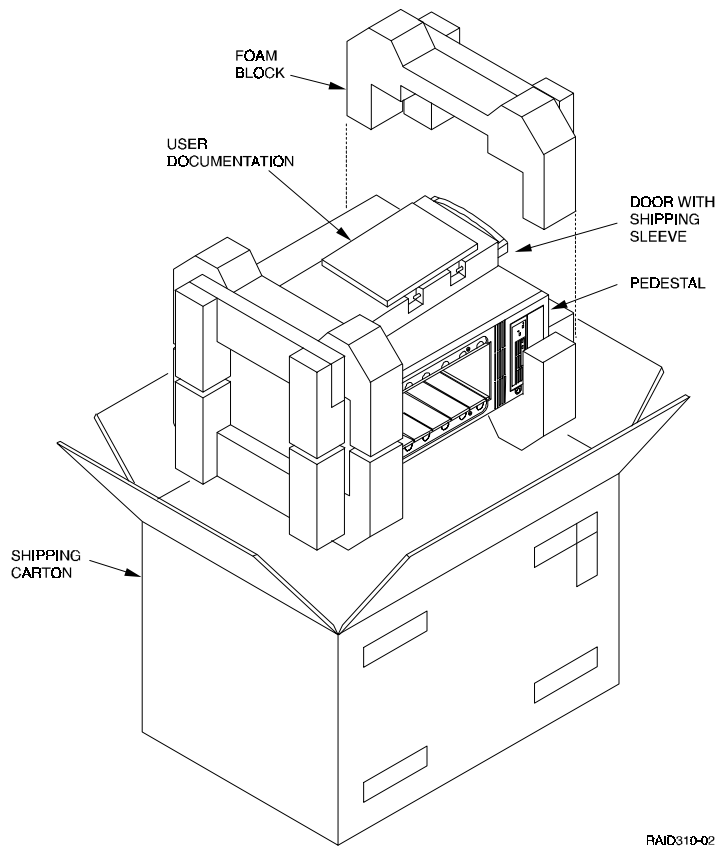
1.4   Preparing the RAID Array 310 for Operation

Preparing the RAID Array 310 for operation involves the following procedures:

1. Mounting the base as described in Section 1.5.

2. Installing the disk SBB's.

3. Configuring the RAID Array 310.

4. Connecting the power and SCSI bus cables.

5. Checking the subsystem for proper operation.

6. Mounting the door.

1.5   Mounting the Base

Mount the stabilizing base to the subsystem as follows:

1. Place the subsystem on its top.

2. Align the base with the bottom of the subsystem as shown in Figure 1–3.

3. Install the four hex-head 6-32 screws through the base into the subsystem and tighten the screws using a 3/16 hex-head screwdriver.

4. Set the subsystem on its base and continue the installation process.

Figure 1–3 Mounting the Base
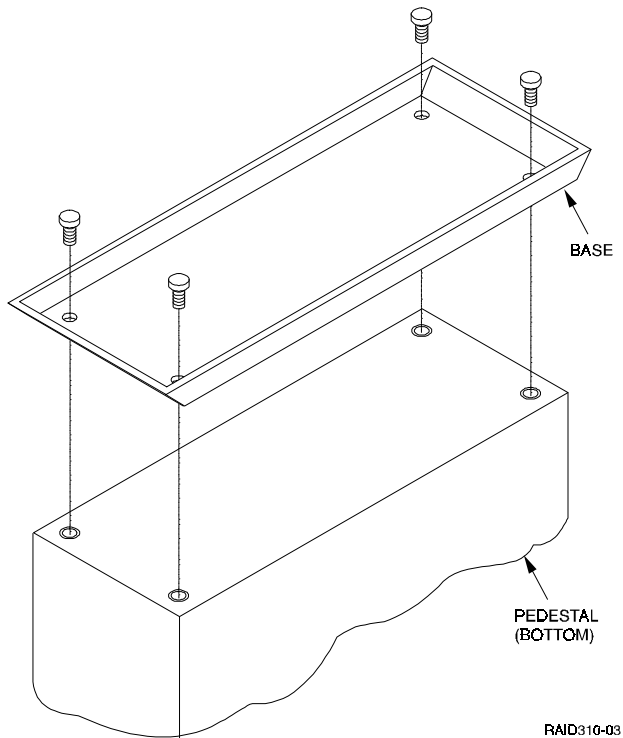
1.6   Connecting the Subsystem Power Cords

The subsystem contains two identical power supplies which provide redundant power to the RAID Array 310. Each supply is equipped with an ac power receptacle for connection to a 125 or 250 vac power source. Two power cords are required to operate and provide redundant power to the subsystem. Table 1–1 lists and describes the Digital power cords available for the subsystem. Since these cords are country-specific, ensure that your cords match those listed in Table 1–1 for your installation.

Obtain the correct power cords for your ac power source and connect them between the ac receptacles on the power supplies (Figure 1–4) and the ac outlets (the power supply automatically senses the voltage level and will work with either voltage).

Table 1–1 Country-Specific Power Cords

Country	Voltage	Connector	Plug Type	Length	Order No.
Australia	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
C. Europe	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
Denmark	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
India	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
Ireland	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
Israel	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
Italy	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
Japan	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
N. Zealand	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
S. Africa	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
Switzerland	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
U. K.	250 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E
U. S.	125 Vac	IEC 320 C13, C14	AS3112 - 1981	2.5 m	BN19H-2E

Figure 1–4 Subsystem AC Power Receptacles

RAID310-13
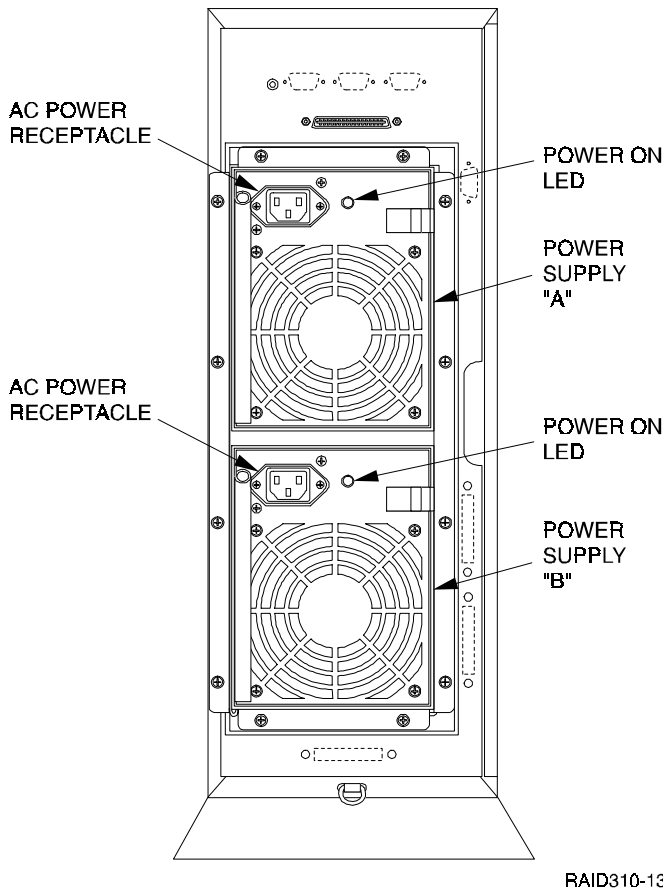
1.7   Connecting the CLI Serial Interface

NOTE

You need to connect the serial interface no matter how you access the RAID controller, whether through a terminal, Windows NT terminal or the RAID Manager software.

Follow the steps below to connect the RAID Array 310 to a serial port on the Alpha-based host computer.

1. Locate the cabling kit that came with the RAID subsystem. The kit should contain the following components:

Table 1–2 Cabling Kit Components

Qty	Digital Part No.	Description
1	BC16E–10	10-foot Terminal Cable
2	H8571–J	9-pin "J" Female to Cable Connector

2. Use the components listed in Table 1–2 to construct a connecting cable as follows: attach a 9-pin female connector to one end of the 10-foot terminal cable, and a 9-pin female connector to the other end of the cable.

3. Plug one connector into the *CLI serial connector* on the rear panel of the RAID Array 310 (see Figure 1–5).

4. Plug the other end of the cable into an available 9-pin serial port on your system or terminal emulator. Note which serial port you use, because you will need that information when using the communications program.

Figure 1–5 Subsystem CLI Serial Connector
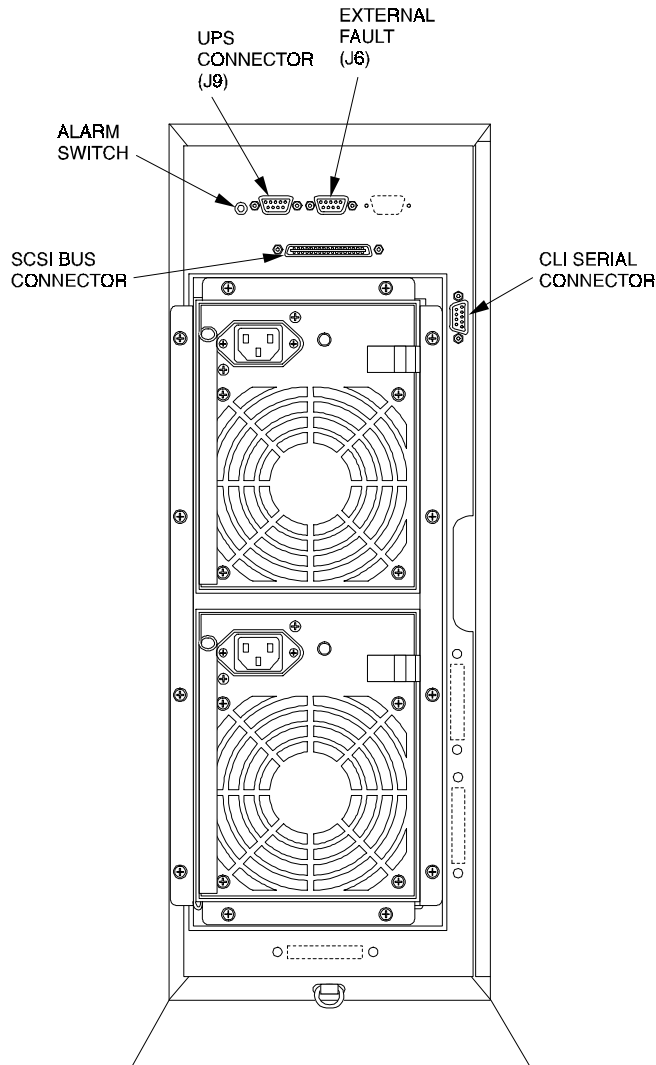
1.8   Installing Disk SBBs in the RAID Array 310 Enclosure

You may install the disk drive SBBs into the RAID Array 310 enclosure at this time. To install an SBB, hold it in both hands, insert it into the guide slots, and firmly push it into the shelf until the mounting tabs snap in place. Figure 1–6 shows a layout of the SCSI bus ports and corresponding SCSI ID assignments in the enclosure. Refer to *Chapter 3, Configuration Rules and Restrictions*, included with your system.

Figure 1–6 StorageWorks SCSI Bus Port and SCSI ID Assignment
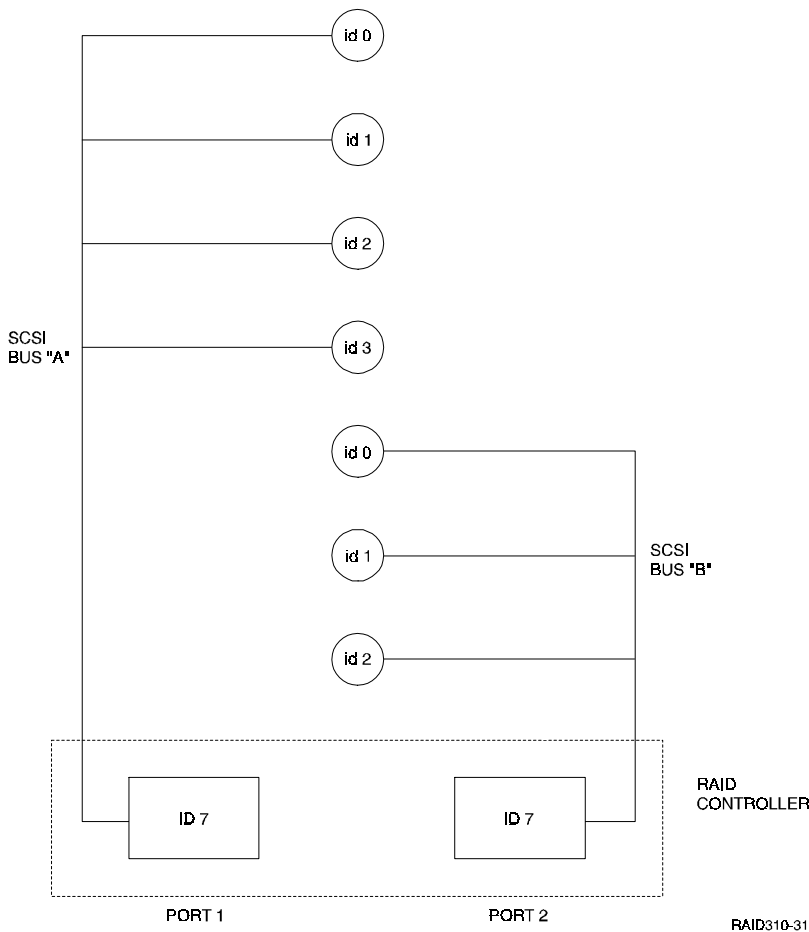
1.9   Charging the RAID Array Controller Write-back Cache Batteries

The Write-back Cache Module in the controller contains a battery that may have discharged since the time it was factory-installed.

CAUTION

Loss of power before the write-back cache battery is fully charged may result in the loss of data.

We recommend that you take this opportunity to recharge the batteries. This is accomplished by doing the following:

Apply power to the controller, by pressing the power switch on the front of the subsystem. You should hear a momentary audible tone (beep), and see the indicator LEDs illuminate. In addition, a green LED on the front panel of the subsystem should flash at approximately 1 Hz. Power on the subsystem for a minimum of 6 hours. The battery will be fully re-charged in the time specified.

2

KZPSA Host Adapter Installation

In preparing your array for first time use, you need to connect your Alpha-based system to the RAID subsystem through the KZPSA host adapter board. This chapter, along with your system and the associated StorageWorks RAID Array 310 Subsystem manuals, provides instructions for preparing and installing the host adapter and the subsystem enclosure, and installing the appropriate KZPSA drivers on the system..

2.1 Install the KZPSA Host Adapter

The KZPSA host adapter is a SCSI-2 fast wide (16-bit) differential host adapter. The adapter installs in a PCI slot in the Alpha-based host system, connecting the computer to the StorageWorks RAID Array 310 Subsystem through the connecting cable.

You need the following before you begin:

- The KZPSA PCI-to-SCSI host adapter board (use precautions to protect the board from static discharge)
- Your computer system hardware manual
- Appropriate tools to service your computer
- The SCSI cable (BN31G-02), with a right angle high density 68-pin connector on one end and a straight high density 68-pin connector on the other

Refer to your computer system manual for additional reference information on installing a host adapter.

2.1.1 Preparing to Install the Host Adapter

Before installing the host adapter in your system, take precautions to protect the board from electrostatic discharge.

CAUTION

To protect the board from static discharge, always use proper ESD procedures. In addition, do not remove the board from its anti-static protective cover until you are ready to install the adapter.

Install the host adapter by performing the following steps:

1. Shut down your operating system.

2. When the system has halted, power down the host computer and all attached peripherals. Disconnect power cables from the host computer.

WARNING

Failure to remove power from the host computer and peripherals can introduce a personal hazard, or can result in damage to the host computer or loss of stored data.

---

3. Open the computer to gain access to the motherboard. Refer to your computer system manual for assistance in completing this procedure.

2.1.2 Installing the Host Adapter

The following steps must be performed to successfully install the KZPSA host adapter:

NOTE

Two board extender guides are included in the KZPSA Adapter Kit; one is factory-installed on the adapter and one is provided as an optional guide for alternate system configurations. If the installed extender does not fit in your system, replace it with the other extender as shown in Figure 2–1.

---

1. Remove the blank filler panel from the rear of the system and retain the screw that held it in place. The screw is used in Step 2 of the procedure to secure the KZPSA adapter.

2. Install the KZPSA adapter board in a PCI slot in your system. The board connector is held in place with a screw you remove from a blank panel as shown in Figure 2–1. Ensure that the board end plate metal tab aligns in the system chassis opening properly; otherwise the adapter will not seat properly. Replace the factory-installed guide with the correct configuration for your system if necessary.

3. Replace your host computer covers; refer to your host computer manual.

4. Connect the SCSI cable to the host adapter as shown in Figure 2–2.

5. The KZPSA adapter is now physically installed. Later in the installation process, you will power on your system and configure the KZPSA adapter.

Figure 2–1 Typical KZPSA Installations

With factory-installed metal extender guide.
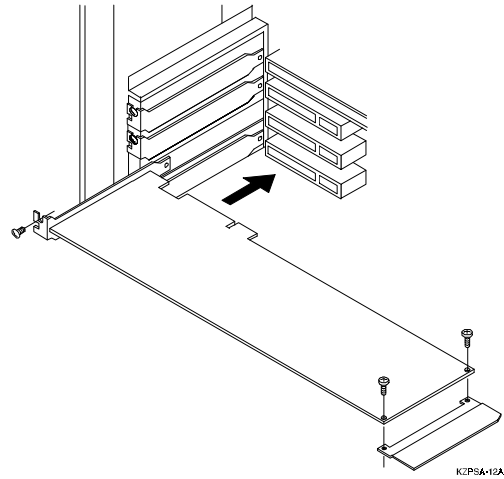
With alternate metal extender guide.
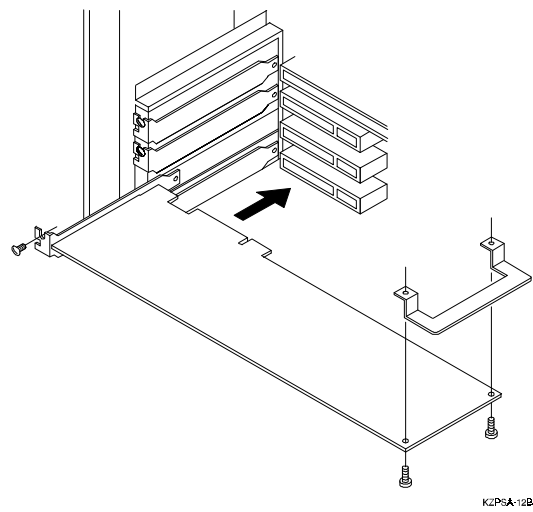
2.2 Connecting the SCSI Cable to the Host System and the Subsystem

Connect the host system to the subsystem by fastening and end of the SCSI cable to each.

1. Connect one end of the BN31G-02 two meter cable to the SCSI port on the host adapter board as shown in Figure 2–2.

Figure 2–2 Host System SCSI Bus Connector
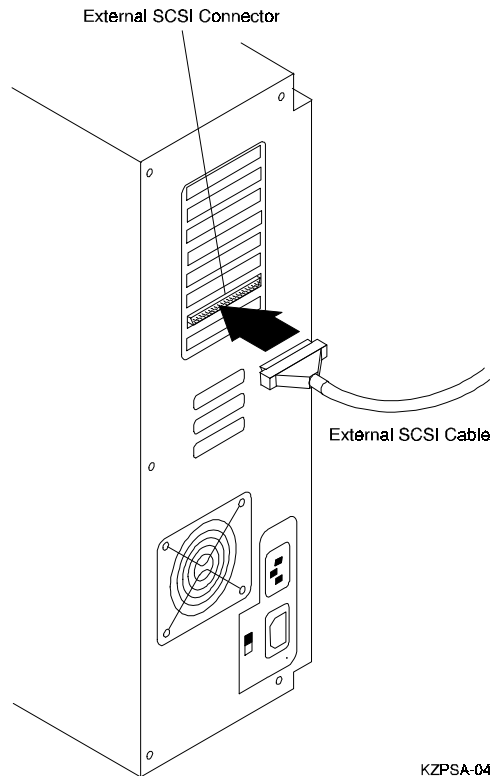
2. Secure the SCSI cable to the host adapter by tightening the two screws on the cable connector.

3. Connect the other one end of the BN31G-02 two meter cable to the controller SCSI connector on the back of the subsystem shown in figure 2–3.

4. Secure the SCSI cable to the controller by tightening the two screws on the cable connector.

Figure 2–3 Subsystem SCSI Bus Connector
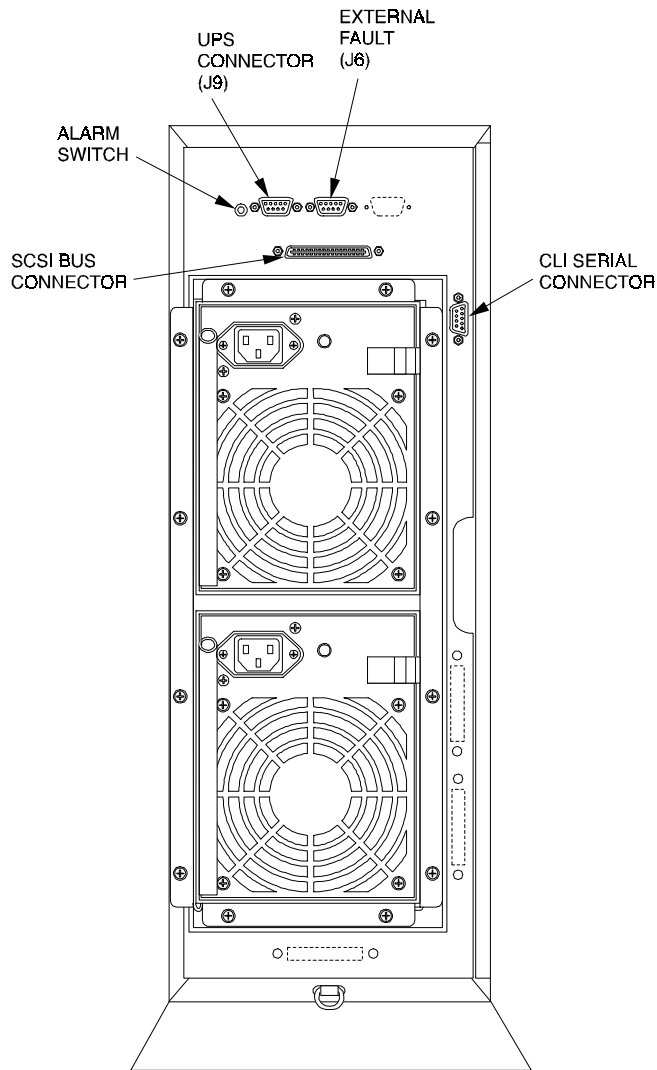
2.3   Verifying KZPSA Installation

After the KZPSA adapter has been installed in your system, you can verify that it is recognized by the system by performing the following steps:

1. Power up your Alpha-based system; the system should go through its start up sequence, including self test and sizing checks. The system should then display the startup menu. The display on your screen will appear briefly (about 30 seconds). You need to interact with the system during this period; otherwise, you will have to reboot the system and repeat this process.

2. When the screen appears, it should contain information similar to the following:

```
        ARC Multiboot Alpha AXP Version x.y-z

        Copyright (c) 1993-1995 Microsoft Corporation

        Copyright (c) 1993-1995 Digital Equipment Corporation

                        Boot Menu:



 (Depending upon your specific system configuration, several
 lines of menu choices are displayed here.)
```

If you do not see a Boot menu, refer to your system documentation for more information about initially setting up your Alpha-based system. Return to this procedure when you have the Boot Menu displayed.

3. Within the Boot Menu, several lines of menu choices appear; from the list of choices, select the **Supplementary Menu** item.

4. Next, select the **Display Hardware Configuration** item. The system will now display several pages of information about your system.

5. Press the *Return* or *Enter* key to move through the pages until your screen has the **PCI Slot Information** display. Your screen should look similar to the following:

Bus	Virtual Slot	Function	Vendor	Device	Rev.	Device Type
0	6	0	1000	1	2	SCSI
0	7	0	8086	482	3	EISA
0	13	0	1011	8	1	SCSI

6. Note that the third line in the list contains a Vendor ID field of "1011" and a device type of "8". These two values uniquely identify the KZPSA. Search your display for a line (or lines if you installed more than one KZPSA) containing these exact values. If there is no entry that corresponds to the KZPSA, your adapter may not be installed correctly. Power off your system and repeat the installation process, then repeat this procedure. If successful, continue with the next step. Otherwise, refer to your *KZPSA PCI to SCSI Storage Adapter User's Guide* for further troubleshooting suggestions.

7. When you have verified that all the KZPSA controllers you installed have been recognized, continue to press *Enter* until you return to the Supplementary Menu. Then select the `Boot Menu` item to return to the Boot menu. From the Boot Menu, choose to boot the Windows NT system.

8. The KZPSA adapter contains "user-modifiable" parameters. However, the factory default settings of the parameters should be appropriate for most normal RAID Array 310 installations.

   See Chapter 2 of the *KZPSA PCI to SCSI Storage Adapter User's Guide* for a discussion of adapter parameters. If you need to modify the parameters, select `Run a Program` from the Boot Menu and follow the steps in Chapter 6 of the *KZPSA PCI-to-SCSI Storage Adapter User's Guide*.

   When you are finished making changes (if any) to the "user-modifiable" parameters, continue with the following sections of this guide to install the KZPSA device driver.

2.4   Installing the Device Driver (Completing the KZPSA Installation)

Locate the two diskettes shipped with your RAID Array 310 subsystem that contain the Windows NT Alpha device drivers *(DECKZPSX.SYS* and *HSZDISK.SYS)* as well as various tools used during the installation and verification process. The diskettes are located in separate boxes and are labeled:

- *KZPSA Alpha AXP Software*
- *RAID 300, 400 Series WNT Alpha Drivers*

2.4.1 Installing the *DECKZPSX.SYS* Driver

Locate your diskette labeled *KZPSA Alpha AXP Software* and make a copy of it now. Store the original in a safe place.

NOTE

The diskette also holds a file containing the firmware currently in the adapter. This is shipped in case the firmware in the adapter gets corrupted. It can be loaded into the KZPSA via the KZPSA firmware update utility. Refer to Chapter 6, "KZPSA Utilities", in the *KZPSA PCI-to-SCSI Storage Adapter User's Guide* for more information.)

This procedure describes how to install the KZPSA devices. The procedure assumes that Windows NT has been installed and that no KZPSA drivers have yet been installed. To install the drivers, proceed as follow:

1. Log into the Windows NT system with *Administrator* privileges.

2. Click on the **Windows NT Setup** icon in the main program group.

3. Select the **Options** menu in the Windows NT Setup window.

4. Select the **Add/Remove SCSI Adapter** function.

5. Click on the **Add** button in the dialog box.

6. A warning message is displayed; click on the **OK** button in the Confirm box.

7. From the list of adapters on the display, scroll to the end of the list, and select **Other**. You may have to click on the list to reveal all of the options including the "Other" option.

8. Insert the diskette labeled *KZPSA Alpha AXP Software* into the floppy drive. The prompt "**a:**" is displayed for the default drive.

9. Click on **OK** at the prompt.

10. The screen displays `DIGITAL KZPSA PCI to SCSI ADAPTER`. Click on **OK**.

11. The Select Adapter Option box displays the name of the adapter, `DIGITAL KZPSA PCI to SCSI ADAPTER`. Click on the **Install** button.

12. The Windows NT Setup dialog box displays the path information from Step 8 above. Click on the **Continue** button to copy the driver to Windows NT.

13. When the operation is completed, click on the **Close** button.

14. Close the window (Alt-F14 keystroke) to leave the Windows NT Setup function and remove the diskette from the drive.

The device driver is now loaded, and will be installed when you reboot your system. Note, however, that you do not need to reboot your system at this time.

NOTE

The KZPSA adapter and its attached devices may not be used as boot devices on Windows NT – Alpha-based systems at this time.

2.4.2   Installing the *HSZDISK.SYS* Driver

Install the *HSZDISK.SYS* driver by performing the following steps:

1. Insert the diskette labeled *RAID Array 300, 400 Series WNT Alpha Drivers* into your floppy drive.

2. Click on command prompt in the Main program group.

3. Type the drive letter corresponding to your floppy drive (e.g., **A:**).

4. Change to the *Alpha* sub-directory by typing the following command: **CD \Alpha**

5. Type the following command:

    ```
    hszinstl drive_letter:\NT_root_directory
    ```

    where:

    "`drive_letter`" and "`NT_root_directory`" correspond to the root path of your Windows NT system files on your Alpha-based system (e.g., `C:\WINNT35`).

6. The installation process copies the driver into the correct subdirectory and creates the necessary Registry entries.

Congratulations!

You may now proceed to Chapter 3 of this guide, *Installing and Using the RAID Array 310 Manager for Windows NT*, to create storagesets.

3

Installing and Using the RAID Manager for Windows NT

This chapter contains instructions for installing the RAID Manager software, configuring the system, and creating an initial configuration. This chapter also contains sheets for recording your configuration.

NOTE

The procedures in this chapter assume that the write-back cache module batteries have been fully recharged, as described in *Chapter 1* of this guide. If you have not yet recharged your write-back cache batteries, you should do so at this time.

3.1 RAID Manager for Windows NT

The RAID Manager for Windows NT is a graphical user interface that facilitates configuring and monitoring your RAID 310 subsystem.

The manager lets you:

- Create single-disk units, RAID 0 (Stripesets), RAID 1 (Mirrorsets), RAID 0+1, and RAID 5/3 (RAIDsets), and Spares.
- Examine and modify LUN parameters
- Examine and modify controller parameters
- Monitor the addition and removal of disk drives from the array
- Identify hot-spare drives that the system can use for automatic LUN reconstruction

Additional information regarding the RAID Manager for Windows NT is contained in the manual, *RAID Manager for Alpha/Intel User's Guide*, (AA-QU63A-TE). For additional background information regarding RAID and storagesets, refer to the manual, *StorageWorks RAID Array 310 Configuration and Maintenance Guide* (EK–SMCS2–UG. A01)

3.2 Overview: Installing and Using the RAID Manager for Windows NT

The steps required to Install and run the RAID Manager for Windows NT include the following:

- Install the RAID Manager software on your host NT computer system or on a different Windows NT system (which can be in a remote location).

- Set the communications parameters required by the maintenance port on the HSZ20 controller.

- Identify the controller as Model HSZ20.
- Set up your initial RAID configuration using the RAID Manager.

3.3   Installing the RAID Manager Software

Locate the diskette, *RAID 300, 400 Series for Windows/WNT RAID Manager*, and insert it in your disk drive.

Access **Program Manager** in Windows NT.

From the Program Manager, click on **File** and select **Run** from the pull-down menu.

At the **Run** command line, enter the name of the disk drive you inserted the disk in, followed by this command: **SETUP.EXE** (for example., A:\SETUP.EXE)

The setup program creates the necessary directories and icons and loads the RAID Manager software onto your system. The setup program loads the software into the default directory, C:\RAID.

3.4   Identifying Controller and Setting Controller Communications

To identify the controller as HSZ20 and set the communications parameters for the serial link to the HSZ20 maintenance port, follow these steps:

1. Click on the **RAID Manager** icon to access the RAID Manager. The RAID Manager main window appears, similar to the screen shown in Figure 3–1. The main window contains five pull-down menu choices: **File**, **View**, **Configuration**, **Settings**, and **Help**.

Figure 3–1 RAID Manager Main Window
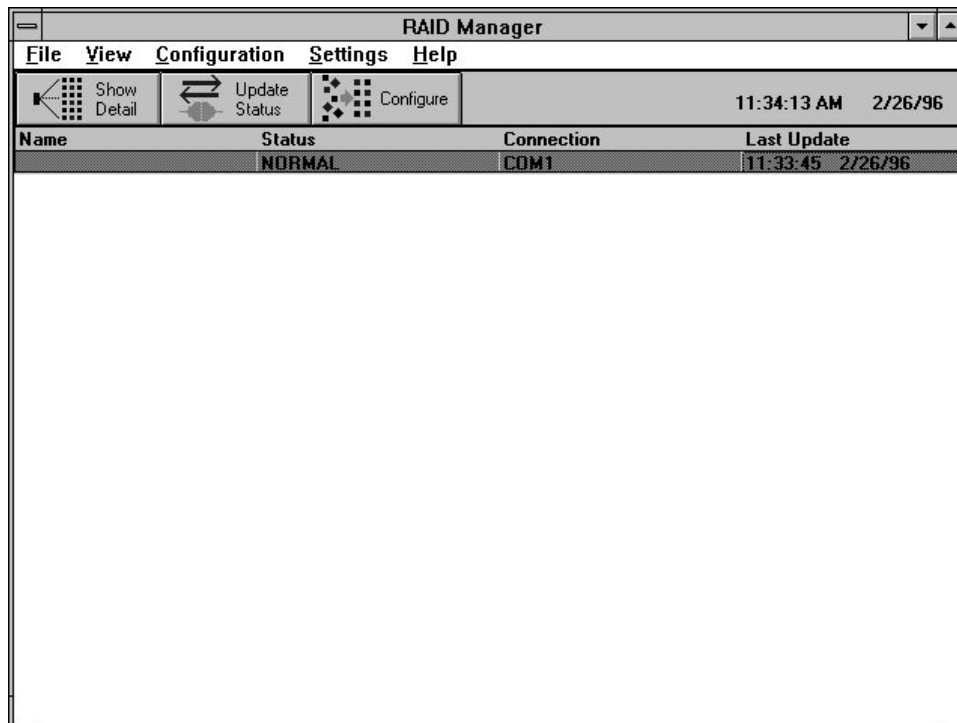
2. From the RAID Manager main window, click on **Settings**. This opens the Settings pull-down menu, which provides a number of choices including: **Controller Communications**, **Fault Notification**, **System ID**, **Select Physical View**, **Physical View Preferred**, **Logical View Preferred**, and **Password**.

3. Select **System ID**.

   The System ID window contains two fill-in boxes, as shown in Figure 3–2. Verify that the field labeled *System Name for the 2 channel RAID Controller* identifies HSZ20 as the 2-channel RAID Controller. If not, type: **HSZ20** in that field. Click Ok when you finish.

Figure 3–2 The System ID Window

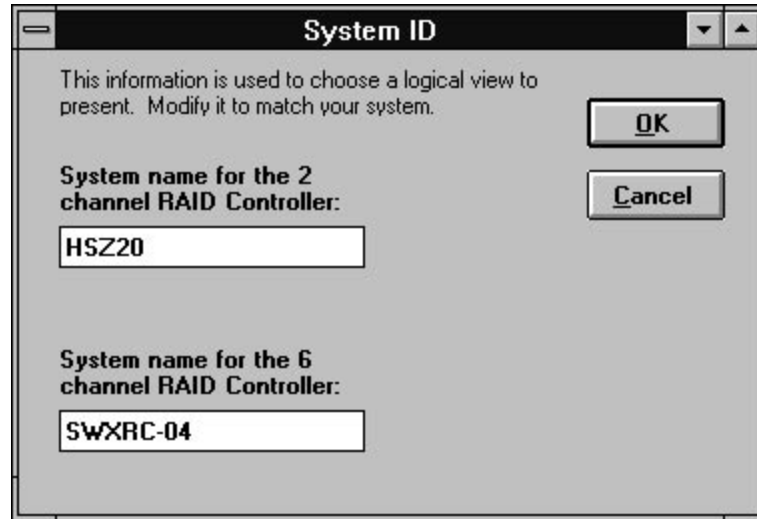4. At the RAID Manager main window, again click on Settings. This time, from the list of choices in the Settings pull-down menu, select **Controller Communications**.

   The Controller Communications window opens. At the Controller Communications window, make the following selections:

   • Choose the **COM** port (COM1, COM2, COM3, etc.) used to connect to the HSZ20 maintenance port.

   • For **Baud Rate**, choose **9600**.

   • For the **Connect** interval, choose **Continuous**.

5. When finished making your choices, click on **Connect** at the Controller Communications window. The RAID Manager returns you back to the RAID Manager main window. Note that the narrow status bar that extends across the window (about one third of the way from the top) has changed color from red to green, if you have connected successfully.

3.5   Setting the Controller Configuration

At the RAID Manager main window, click on the **Configuration** pull-down menu. The **Configuration** pull-down menu provides the following choices: **Create Storageset**, **Delete Storageset**, **Modify**, **Controller**, **Configure from File**, **Delete All Storagesets**, **Controller Firmware Load**.

Select the choice, **Controller**. The Controller Configuration Window appears, similar to window shown in Figure 3–3.

Make the following two selections in the Controller Configuration Window:

- Select "**A**" for **Cache Policy;** this sets cache policy "A" mode. Cache policy A mode (the default) provides write-back caching. Refer to *StorageWorks RAID Array 310 Configuration and Maintenance Guide* (EK−SMCS2−UG. A01) for more information regarding caching and cache policy.

- Select the choice, "**D**" for **Host Functionality**; this sets the controller to operate in Windows NT mode. This choice is required for the controller to operate correctly with Windows NT. Refer to *StorageWorks RAID Array 310 Configuration and Maintenance Guide* (EK−SMCS2−UG. A01) for more information.

- Go to the bottom of the window and enter a value of 5 for the Cache Flush Timer.

> **NOTE**
>
> You must select choice "D" for Host Functionality for the HSZ20 controller to operate correctly with Windows NT. You must also set the Cache Flush Timer to 5.

Click on **OK** after making the above selections.

Figure 3–3 Controller Configuration Window
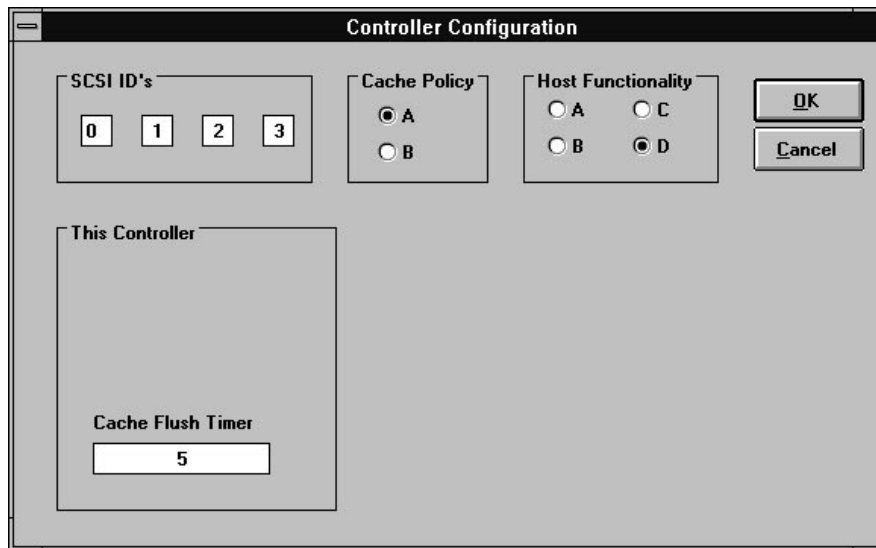
This completes the initial setup procedures. You may now configure your system using the RAID Manager graphical user interface. The RAID Manager graphical user interface facilitates the configuration process for you.

NOTE

You cannot create RAIDsets or mirrorsets if the write-back cache batteries are not fully charged.

To check controller battery status, click on the Controller button at the left of the window. Doing so brings up the Controller Status display, which includes the battery status. When the battery status shows "*good,*" you may continue and create your initial configuration.

To help you get started, and to familiarize you with the manager, we have provided simplified practice examples for setting up an initial configuration. (Your display screens may look slightly different from those shown here, depending upon the version of your RAID Manager software.) Complete instructions for using the manager are contained in the manual, *RAID Manager for Alpha/Intel User's Guide*, (AA-QU63A-TE), included with the system.

NOTE

The RAID Manager graphical user interface facilitates configuring your system. However, the configuration process is not finished until you complete the steps described in Chapter 4*, Completing Your Configuration Setup under Windows NT.*

You may use the examples in the following sections to practice setting up your configuration. The examples shown describe how to configure a disk, a Stripeset, Mirrorset, and a Spare disk. Configurations other than those described are set up in a manner similar to the examples shown. When you finish with the examples, you may delete the practice configuration.

3.6   Creating an Initial Configuration

The following steps describe creating an initial configuration for your subsystem.

NOTES

If you have not already done so, you may wish to take this opportunity now to plan how you are going to configure your system using disks (JBODs), Stripesets, Mirrorsets, RAIDsets, or combinations. This will allow you to better make use of the examples given.

For background information relative to the above terms, refer to the *StorageWorks RAID Array 310 Configuration and Maintenance Guide* (EK−SMCS2−UG. A01).

The procedures described in this section are summary in nature. For more information, refer to the manual, *RAID Manager for Alpha/Intel User's Guide* (AA-QU63A-TE).


3.6.1   Displaying Physical/Logical View of System

The RAID Manager allows you to view your configuration in either a physical view or a logical view. The examples shown use the physical view. Select physical view by performing the following steps:

1. Activate the RAID Manager by clicking on the **RAID Manager** icon (typically accessed from the Windows NT Program Manager).

    The screen momentarily displays the message: *Please Wait. Scanning Your System*. The RAID Manager main window appears, similar to the window shown in Figure 3–1.

2. Click on the **Settings** pull-down menu. From the Settings pull-down menu choices, choose **Physical View Preferred** (for our examples).

3. Return to the main window and again click on the Settings pull-down menu. Choose **Select Physical View**, **HSZ20,** so that the RAID Manager displays the correct enclosure type in the physical view.

4. Click on the **Show** Detail button to cause the physical view to be displayed.

    In the example shown, Figure 3−4, the RAID Manager does not display any disks, although disks may already exist in your enclosure. The RAID Manager displays disks only after you add them through the RAID Manager.

Figure 3–4 Physical View
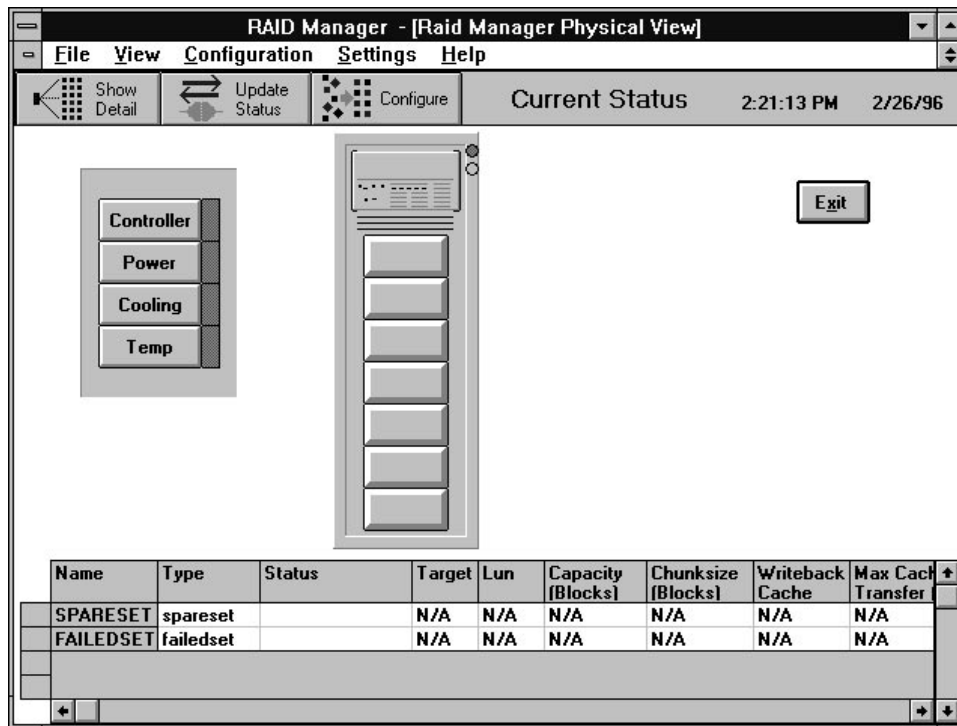
5. At the window menu choices, click on the **Configuration** pull down menu.

6. Choose **Modify** from the choices listed.

    The Modify window appears, and lists the following choices: **Add Devices**, **Remove Devices**, and **Change Devices**.

7. Select (click on) **Add Devices** from the choices listed, then click on **OK**.

    Doing so brings up a message screen that advises you: *Please insert the new devices into your system, then press OK to have the controller scan for these devices.*

8. Insert any disks into your enclosure if you have not already done so. In this example, we add seven disks to make a total of seven disks in the enclosure.

9. When you have finished adding disks, click on **OK**. The RAID Manager scans the system for any new devices, then displays the updated view of the system. Figure 3–5 shows the updated physical view (for our example) with seven disks displayed.

Figure 3–5 Updated Physical View
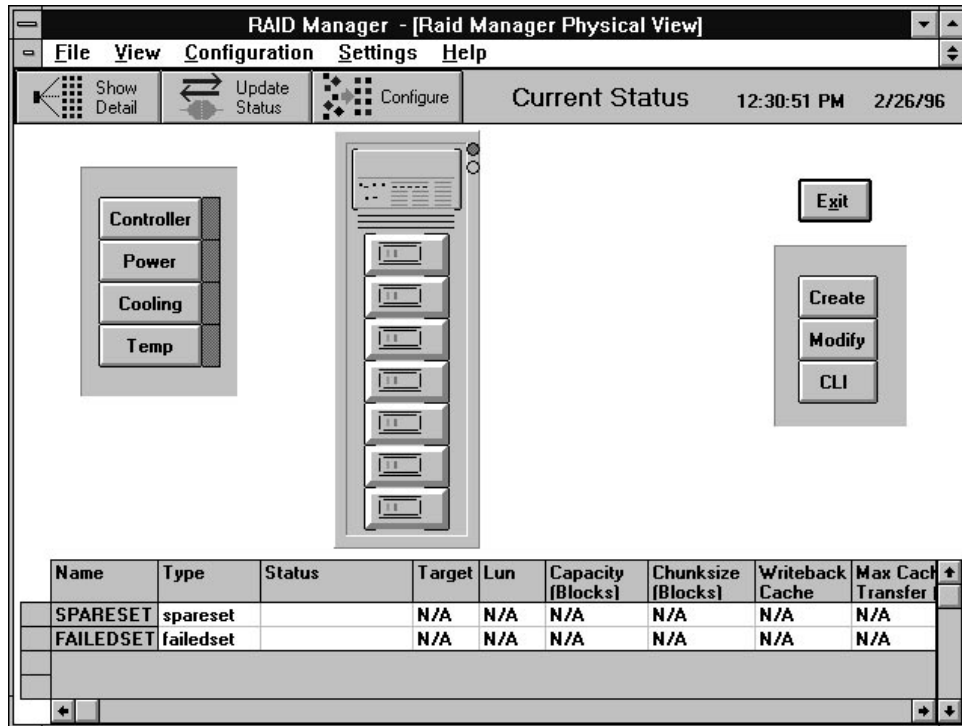
3.6.2   Practice Example: Creating a Single Disk

Click on the **Configure** button near the top of the main window. Three configuration buttons appear in the right side of the window: **Create**, **Modify**, and **CLI.**

To create a single disk, perform the following steps:

1.   Click on the **Create** button.

   The **Create** button opens and displays the **Create** window (see Figure 3–6). Use the Create window to select from the following choices: **SPARE, RAID 0 - Stripeset**, **RAID 1 - Mirrorset**, **RAID 5/3 - Raidset**, **RAID 0+1**, and **Single Disk - JBOD.**

Figure 3–6 Create Window
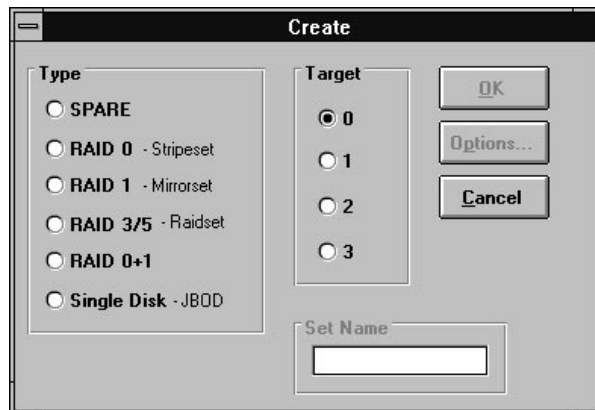
2.   For this example, select **Single Disk - JBOD**, then click on **OK**.

The RAID Manager responds by displaying a message window advising you to click on the disk you wish to use (in our physical view) for the single disk. In our example, we select the disk at the bottom of the screen.

3. After selecting the disk, click on **Create** in the message window

The RAID Manager responds by updating the physical view (see Figure 3–7). The physical view now shows the lowest disk superimposed with the letter "**J**," to indicate JBOD (Single Disk). Note also that the status bar at the bottom of the window has been updated to reflect the added component.

Figure 3–7 Updated Physical View – Disk (JBOD) Added
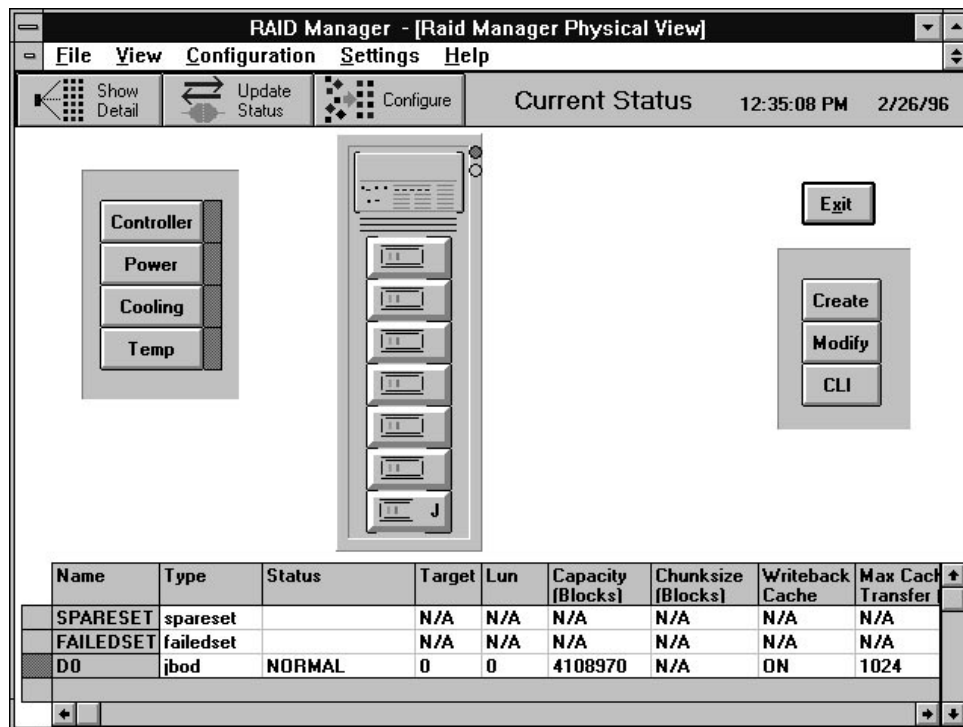
3.6.3 Practice Example: Creating a Stripeset

Click on the **Configure** button near the top of the main window, if necessary, to display the three configuration buttons in the right side of the window: **Create**, **Modify**, and **CLI.**

To create a Stripeset, perform the following steps:

1. Click on **Create**.

   The Create button opens and displays the Create window (see Figure 3–6). Use the Create window to select from the following choices of storageset types: **SPARE, RAID 0 - Stripeset**, **RAID 1 - Mirrorset**, **RAID 5/3 - Raidset**, **RAID 0+1**, and **Single Disk - JBOD**

2. For this example, select **RAID 0 - Stripeset**. Then, in the **Set Name** box, type a name for the Stripeset. For our example, the name is "**Stripe1**". Click on **OK** when finished.

   The RAID Manager responds by displaying a message window advising you to click on at least two disks to use for the Stripeset.

3. Select the disks to use for the Stripeset. In our example, we select three. When finished, click on **Create** in the message window.

   The RAID Manager responds by updating the physical view (see Figure 3–8). The physical view now shows the three, stripeset disks superimposed with the letter "**0**," to indicate RAID 0 - Stripeset. Note also that the status bar at the bottom of the window has been updated to reflect the added component.

Figure 3–8 Updated Physical View – Stripeset Added
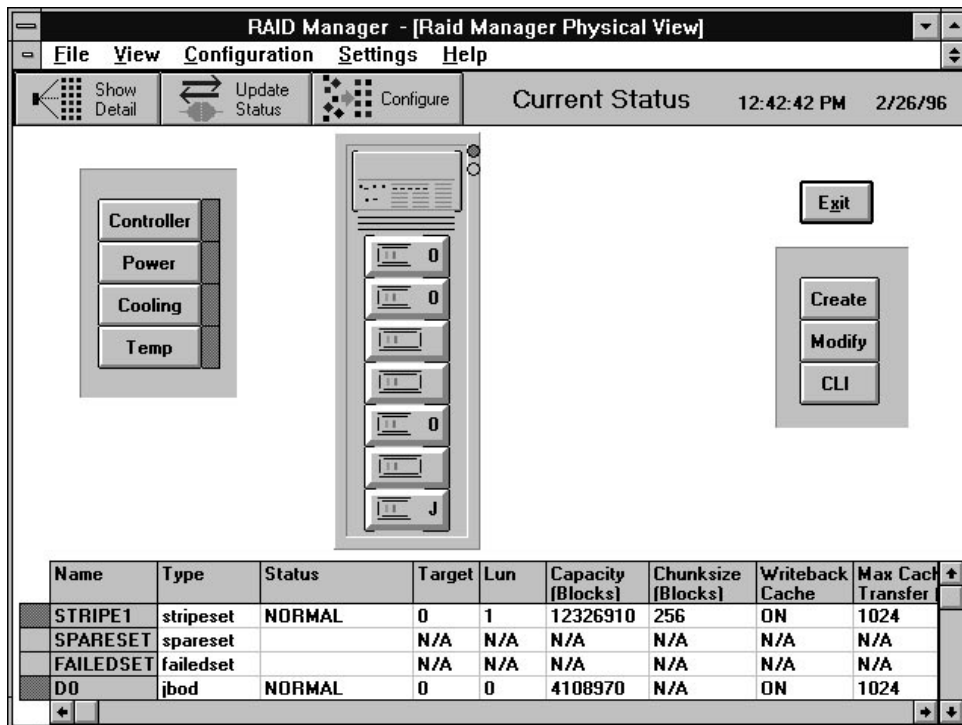
3.6.4 Practice Example: Creating a Mirrorset

Click on the **Configure** button near the top of the main window, if necessary, to display the three configuration buttons in the right side of the window: **Create**, **Modify**, and **CLI.**

To create a Mirrorset, perform the following steps:

1. Click on **Create**.

    The Create button opens and displays the Create window (see Figure 3–6). Use the Create window to select from the following choices of storageset types: **SPARE, RAID 0 - Stripeset**, **RAID 1 - Mirrorset**, **RAID 5/3 - Raidset**, **RAID 0+1**, and **Single Disk - JBOD.**

2. For this example, select **RAID 1 - Mirrorset**, then, in the **Set Name** box, type a name for the Mirrorset. For our example, the name is "**Mirr1**". Click on **OK** when finished.

    The RAID Manager responds by displaying a message window advising you to click on at least two disks to use for the Mirrorset.

3. Select the disks to use for the Mirrorset. In our example, we select (click on) two disks. When finished, click **Create** in the message window.

    The RAID Manager responds by updating the physical view (see Figure 3–9). The physical view now shows the two Mirrorset disks superimposed with the letter "**1**," to indicate RAID 1 - Mirrorset. Note also that the status bar at the bottom of the window has been updated to reflect the added component.

Figure 3–9 Updated Physical View – Mirrorset Added
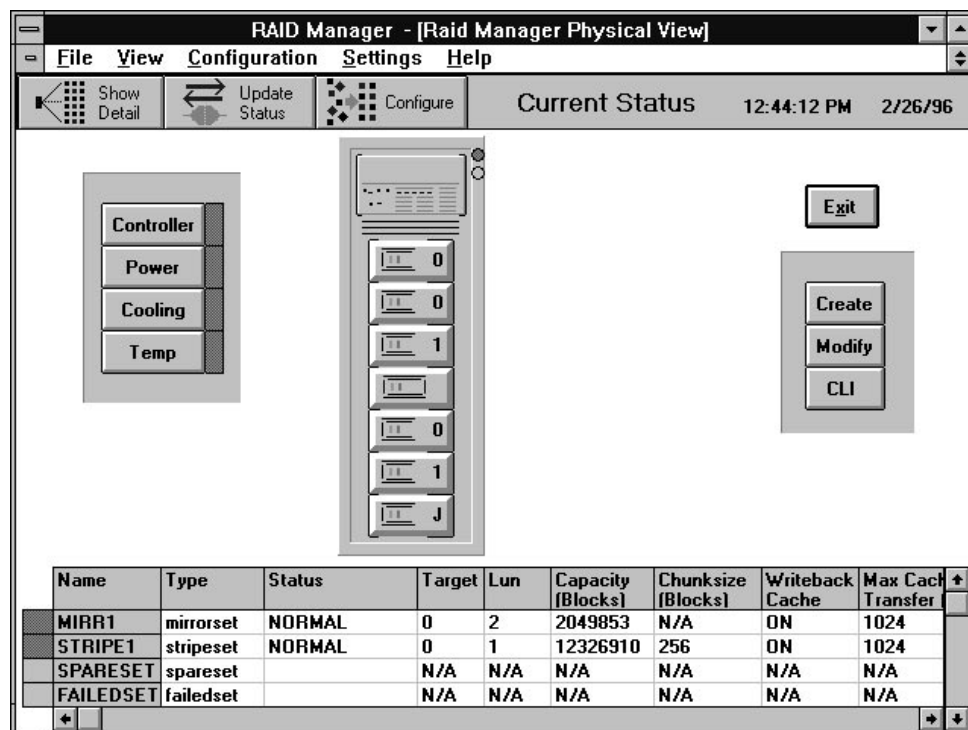
3.6.5 Practice Example: Adding a Spare Disk

Click on the **Configure** button near the top of the main window, if necessary, to display the three configuration buttons in the right side of the window: **Create**, **Modify**, and **CLI.**

To create a spare by using the remaining disk in our example, perform the following steps:

1. Click on **Create**.

    The Create button opens and displays the Create window (see Figure 3–6). Use the Create window to select from the following choices of strongest types: **SPARE, RAID 0 - Stripeset**, **RAID 1 - Mirrorset**, **RAID 5/3 - Raidset**, **RAID 0+1**, and **Single Disk - JBOD.**

2. Click on **Spare** from the choices listed, then click on **OK**.

    When the physical view window opens, click on the disk to be identified as a spare, then **Create**. The RAID Manager identifies the spare disk with the letter "S."

3.6.6 Practice Example: Deleting Storagesets

To delete storageset elements, perform the following steps:

1. Select the **Configuration** pull down menu. The choices include: **Create Storageset**, **Delete Storageset**, **Modify**, **Controller**, **Configure from File**, **Delete All Storagesets**, **Controller Firmware Load**.

2. For this example, choose (click on) **Delete Storageset** from the choices listed.

    The RAID Manager opens the Delete window (see Figure 3–10).

Figure 3–10 Delete Window

3. Select **Mirr1** for the first storageset to delete in our example.

    Doing so opens a message window to confirm the delete operation. The message window asks if you are sure you want to delete the set and advises you to type **yes** to verify the delete command.

4. Type **yes** in the message window to confirm your intent to delete, then click on **OK**.

    Doing so causes the RAID Manager to delete the set and to update the physical view.

5. Continue to delete remaining Storagesets or single disks by returning to the main window, choosing the **Configuration** pull-down menu, and repeating the above steps to delete the remaining practice examples.

Congratulations!

You are now prepared to create an actual configuration for your subsystem. Use the *RAID Manager for Alpha/Intel User's Guide* (AA-QU63A-TE) and the skills learned during the practice examples to set up your specific configuration.

If you need information relative to accessing the Command Line Interpreter (to run maintenance or diagnostic programs), refer to the *StorageWorks RAID Array 310 Configuration and Maintenance Guide* (EK−SMCS2−UG. A01).

After you create your configuration, save it, as specified in section 3.7

3.7   Saving the RAID Configuration

You may save your configuration information in two ways.

1. Access the RAID Manager **File** pull-down menu. From the choices listed, choose **Save**. The RAID Manager saves the configuration information in a configuration file. The file may be accessed later by selecting the **Configuration** pull-down menu, then choosing the selection, **Configure from File**.

2. Record your configuration in the following table (additional worksheets appear in Appendix A of this guide) to maintain a hard copy of your configuration information. You can find target and LUN information in the status bar below the physical view of the configuration (see Figure 3–8).

This completes the steps required to create an initial configuration for your controller using the RAID Manager. Now, you must complete the installation.

3.8   Completing the Installation

After saving (or recording) your configuration, you must reboot your system, then use Windows NT **Disk Administrator** to complete the configuration under Windows NT. Doing so ensures that Windows NT recognizes the partition/format configuration information.

You must also use Windows NT **Disk Administrator** to complete the configuration under Windows NT when changes are made to the configuration. Go to *Chapter 4, Completing your Configuration Setup under Windows NT* to complete the installation.

Date_____

Name of RAIDset	Type of RAIDset	Target	LUN	Disk(s) Used

4

Completing your Configuration Setup under Windows NT

This chapter contains instructions for how to complete your configuration set up through Disk Administrator under Windows NT.

4.1　Completing Configurations under Windows NT

In order for Windows NT to recognize new RAID Array 310 devices or changes to existing configurations, you need to do the following:

- Reboot your system to restart Windows NT after creating your RAID configuration
- Verify that hszdisk.sys recognizes the devices you created for your RAID Array 310
- Run the Windows NT Disk Administrator to partition and format the devices.

4.1.1　Rebooting your System

If after creating your RAID configuration, you have not rebooted your system, reboot it now.

4.1.2 Verifying that hszdisk.sys Loaded

Prior to running Disk Administrator, verify that hszdisk recognizes the devices that you created in the RAID Array 310 Subsystem.

To verify hszdisk, follow these steps:

1. Find the *Event Viewer* in the *Administrative Tools* group and open it.

    Look for an entry for hszdisk in the Event Viewer window.

    If no entry for the hszdisk appears in the Event View window, go to Chapter 2 of this guide and reinstall hszdisk.

    If an entry for hszdisk appears with 0 in the *Event* column, similar to the screen shown in Figure 4–1, the hszdisk loaded successfully and connected to at least one logical drive in the RAID Array 310. Go on to Section 4.1.3 to complete the new array configuration.

Figure 4–1 How the hszdisk entry appears when it loads successfully.

If an entry for hszdisk appears with a 1 in the *Event* column, similar to the screen shown Figure 4–2, the hszdisk did not load successfully due to its not finding any logical drives. If the hszdisk did not load successfully, go to Chapter 3 of this guide, and reconfigure the array. If after reconfiguring the array, hszdisk still fails to load, contact your Sales Representative.

Figure 4–2 How the hszdisk entry appears when it fails to load.

3. Close the Event Viewer when you finish verifying hszdisk.sys.

4.1.3   Completing a New RAID Array Configuration

The steps listed in this section are necessary to complete your RAID Array installation. This section describes how to use Disk Administrator to complete a new configuration under Windows NT. The instructions listed here are summary in nature. For additional information, refer to your Windows NT documentation.

> **NOTE**
>
> To safeguard critical data, backup your system using normal backup procedures before altering device partitions.

To begin, run **Disk Administrator** from within Windows NT by performing the following steps**:**

1. Select **Program Manager**

2. Select **Administrative Tools**

3. Select **Disk Administrator**

NOTE

The first time you run Disk Administrator after adding new disks, one or more message window(s) may appear asking you to confirm whether you want to have Disk Administrator provide its "signature" on the new disks. Confirm doing so (by clicking on **Yes**) in order to have Disk Administrator recognize these new disks. For more information on this subject, refer to your Windows NT documentation.

Figure 4–3 shows the screen display for a representative configuration.

Figure 4–3 Disk Administrator Screen Display
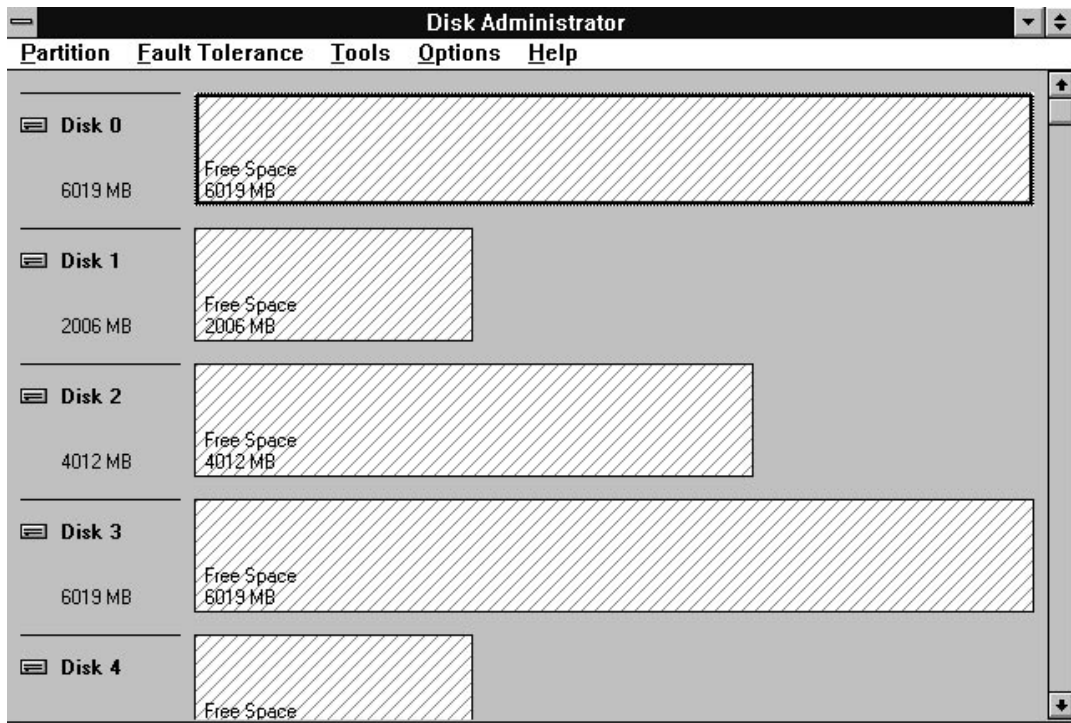
Understanding the Disk Administrator Display

Disk Administrator creates a "Bar Chart" display of your disk configuration (see Figure 4–3), The figure shows that Windows NT has named the various devices that were created using the RAID Array 310 manager graphical user interface. Each disk device found by Windows NT is given a name, e.g., Disk 0, Disk 1, etc. There should be an entry (device) shown for each disk (JBOD) or storageset created.

Windows NT assigns disk names based on the order in which the system drivers "find" disks during Windows NT boot. The RAID Array 310 uses a special disk class driver (*HSZDISK.SYS)* that connects to all HSZ20 disks *before* any other disks present in the system are connected. Therefore, the first entries in the Disk Administrator display (see Figure 4–3) should represent all your RAID Array 310 Logical Disks.

Before proceeding, verify the following:

1. There should be an entry in the Disk Administrator display for each of your disks or RAID Array 310 logical disks.

    If there is not, you should go back and recheck your configuration. You may need to verify either the logical or physical (or both) configuration of your RAID Array 310.

2. The capacity shown for each device should match the size of the physical disk or the RAID Array 310 storageset.

    NOTE

    Disk Administrator displays the "usable" capacity of a RAIDset and Mirrorset, not the combined total of the physical members.

    If it does not, you should recheck the logical configuration for the RAID Array 310 and its members.

To complete your configuration under Windows NT, perform the following steps:

1. Create partitions as follows:

    - For each disk shown, first select (click on) the partition area that you wish to create.
    - Then, click on the **Partition** pull-down menu. From the **Partition** pull-down menu, choose **Create** (see Figure 4–4).

    Doing so opens the **Create** window (see Figure 4–5).

    NOTE

    A disk cannot be accessed unless it contains at least 1 valid partition that was created under disk administrator.

Figure 4–4 Partition Pull-Down Menu
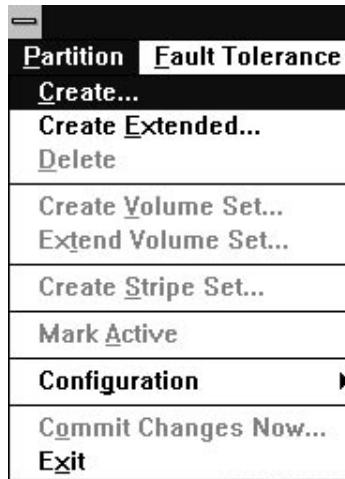
Figure 4–5 Create Primary Partition Window
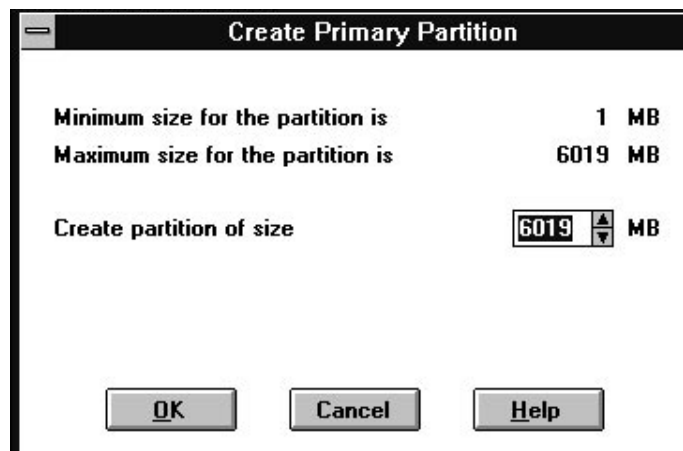
In the window, enter the size partition you want, then click on **OK**.

2. Continue to create new partitions until all disks have been partitioned.

3. Optional: Make disk logical names permanent.

    The process of creating partitions assigns a logical name (the letter "C," "D," etc.) to each partition. These letter assignments, under Windows NT, will normally "float." That is, they are subject to changing (after reboot), if the disk configuration changes. You may, however, make these assignments "permanent." (For more information on this subject, you should consult your Windows NT documentation.) If you wish to make the letter assignments "permanent," access the **Tools** pull-down menu. From the choices given, select **Drive Letter** then choose **To Assign**. This process must be repeated for each partition (drive letter) that you wish to make "permanent."

4. When you have created all your partitions, go back to the **Partition** pull down menu and click on **Commit Changes Now** (see Figure 4–4).

   A message window will then appear asking you to confirm that you wish to commit these changes.

   After confirming that you wish to commit the changes, a new message screen should appear advising that the commit changes action was successful.

5. While still running Disk Administrator, click on the **Tools** pull-down menu, then select **Format** (see Figure 4–6).

   The **Format** menu choices (see Figure 4–7) allow you to choose either **FAT** or **NTFS**. You must select one of these file system options for the disk to be usable.

   You may also choose the **Quick Format** option. Select **OK** to begin the format process. For further information regarding these options, refer to your Windows NT documentation.

   A message window appears advising you when the formatting is complete.

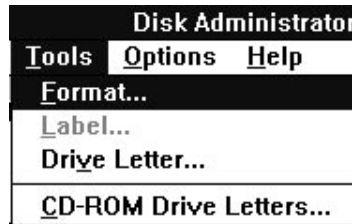**Figure 4–6 Tools Pull-Down Choices**

Figure 4–7 Format Menu

6. Continue to format each new partition until all partitions have been formatted.

7. When all partitions have been formatted, close Disk Administrator. At this point, the configuration has been completed, and is recognized by Windows NT.

4.1.4   Changes to RAID Array Configuration

NOTE

To safeguard critical data, backup your system using normal backup procedures before altering device partitions.

Do not alter partitions that contain important data.

When making changes to an existing RAID Array configuration, any existing disk partitions to be changed (or removed) must first be deleted using Windows NT Disk Administrator. After they have been deleted, you may use the RAID Array 310 Manager described in this manual, *Chapter 3, Installing and Using the RAID Array 310 Manager for Windows NT*, to make the changes.

To remove disk partitions, run **Disk Administrator** from within Windows NT by performing the following steps**:**

1. Select **Program Manager**

2. Select **Administrative Tools**

3. Select **Disk Administrator**

Delete the partitions you intend to change (or remove) by performing the following steps:

1. From **Disk Administrator**, select (click on) the partition you wish to delete.

2. Pull down the **Partition** menu.

3. Choose **Delete**, then continue.

4. Continue selecting and deleting the partitions until you have done so to all the partitions you wish to change.

5. Go back to the **Partition** pull down menu and click on **Commit Changes Now**.

6. At this point all disks you intend to reconfigure have been deleted from Windows NT. You may now reconfigure the RAID array using the RAID Array 310 Manager as described in this manual, *Chapter 3, Installing and Using the RAID Array 310 Manager for Windows NT*.

7. You now need to reboot your system for changes made thus far to be recognized by Windows NT.

8. After rebooting, you need to perform the steps listed at the beginning of this chapter, *Section 4.1.3, Completing a New RAID Array Configuration*, in order for the changes to take effect.

9. After completing the steps described in *Section 4.1.3, Completing a New RAID Array Configuration*, you are done.

A

Configuration Records – Blank Forms

This contains copies of the two tables used in Chapter 3 to record the configuration of your system. If additional copies are required, these tables can be reproduced as necessary.

Date_____

Name of RAIDset	Type of RAIDset	Target	LUN	Disk(s) Used

Date_____

Name of RAIDset	Type of RAIDset	Target	LUN	Disk(s) Used

Date_____

Name of RAIDset	Type of RAIDset	Target	LUN	Disk(s) Used