



Getting Started

RAID Array 310 for Windows NT – Intel

Installation Guide

Order Number: EK-SMRAA-IG. A01

Digital Equipment Corporation
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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-SMRAA-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 Adaptec Host Adapter board into your Intel-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: Adaptec Host Adapter Installation

This chapter describes the steps required to install the Adaptec host adapter in your Intel-based 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.

Chapter 4: 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
<i>Deskside RAID Subsystem User's Guide</i>	EK-SMCPG-UG
<i>StorageWorks RAID Array 310 Configuration and Maintenance User's Guide</i>	EK-SMCS2-UG
<i>RAID Manager for Alpha/Intel User's Guide</i>	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
<i>italic type</i>	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 Intel-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:

- Intel-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 one of the following host adapters in your computer system and connecting it to the RAID controller:
 - Adaptec Model 2744W for Intel-based EISA systems (Chapter 2)
 - Adaptec Model 2944W for Intel-based PCI systems (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 host adapter in your system, connect it to the RAID Array, and verify it is recognized by your system. This guide covers the following host adapters models:
 - Adaptec host adapter for an Intel-based system (Chapter 2)
 - Adaptec Model 2744W is for Intel-based EISA systems
 - Adaptec Model 2944W is for Intel-based PCI systems
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:

- Intel-based PCI or EISA system with an available PCI or EISA slot (depending upon the host adapter used)
- 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:

- One of the following host adapters:
 - Adaptec Model 2744W for Intel-based EISA systems
 - Adaptec Model 2944W for Intel-based PCI 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 – Intel 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.

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

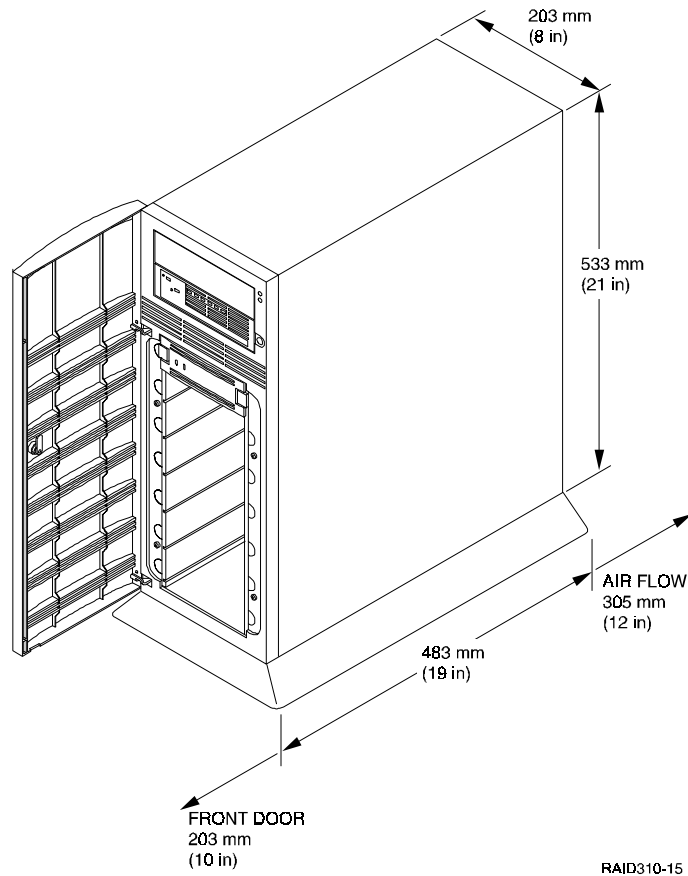
The installation of your RAID Array 310 subsystem is accomplished by performing six major steps as follows:

- 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.

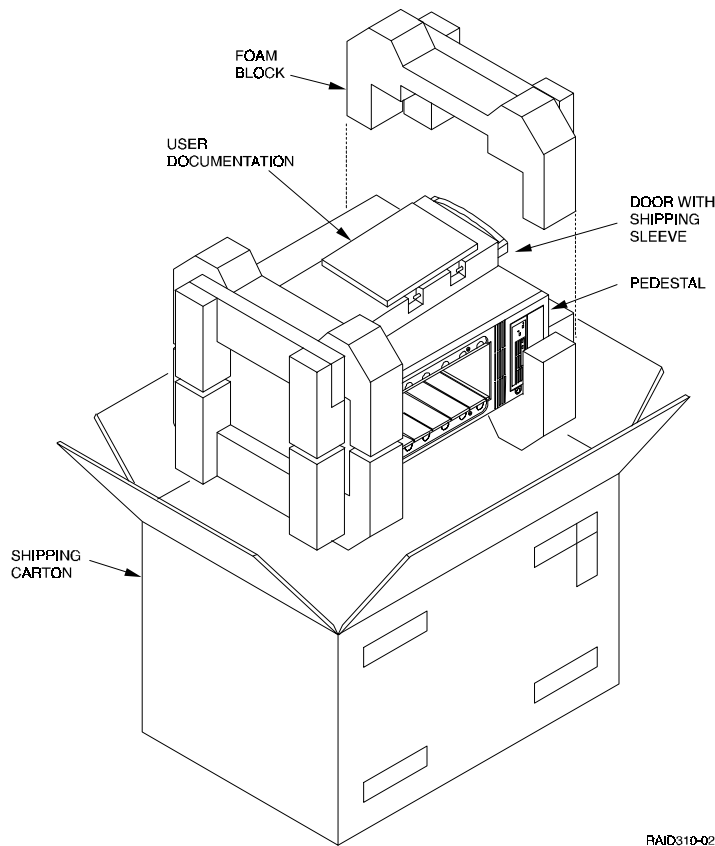
NOTE

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.

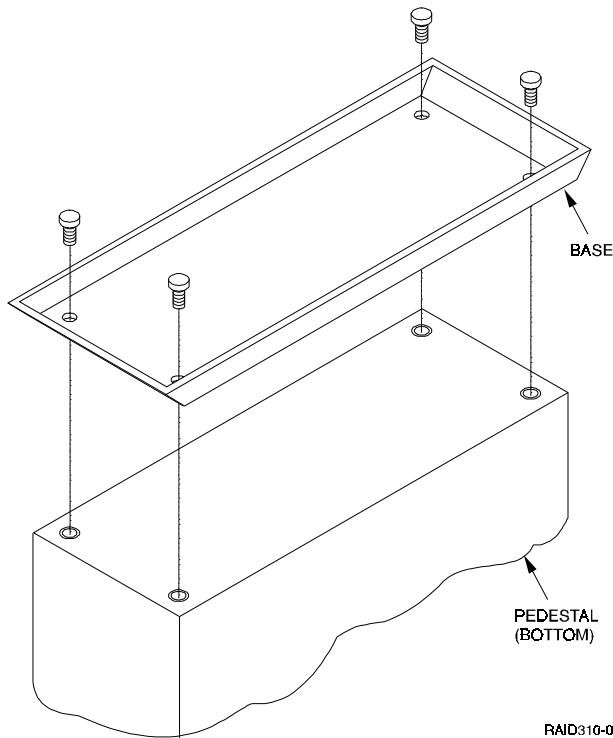
1.5 Mounting the Base

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

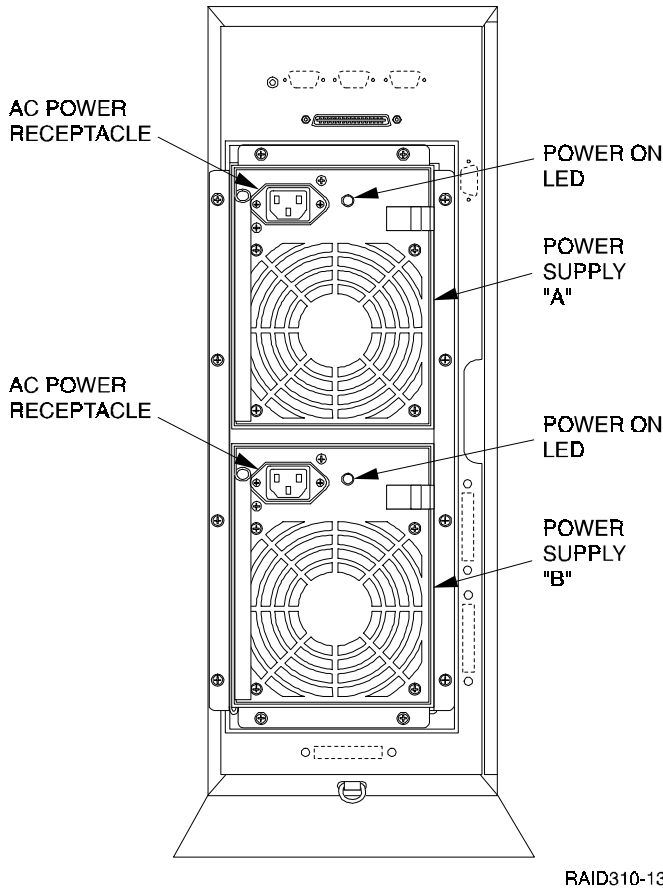
The subsystem contains two identical power supplies which provide redundant power to the RAID Array 310. Each supply is equipped with an ac power receptacle for connection to a 125 or 250 vac power source. Two power cords are required to operate and provide redundant power to the subsystem. Table 1-1 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



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 Intel-based host computer.

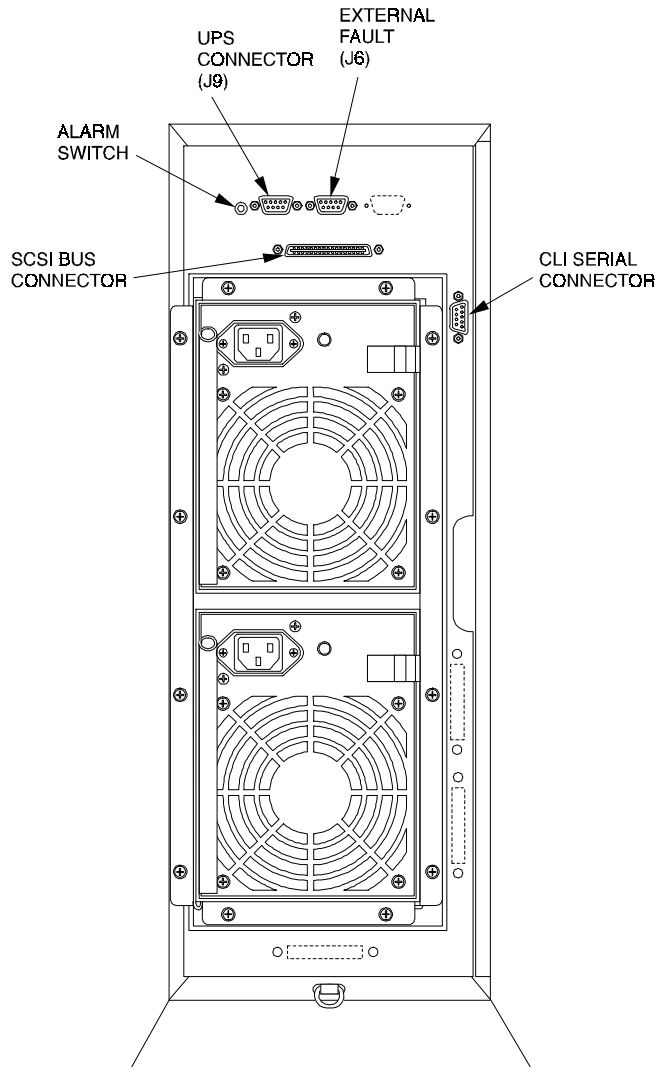
1. Locate the cabling kit that came with the RAID subsystem. The kit should contain the following components:

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 one 9-pin female connector to an end of the 10-foot terminal cable, attach a second 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

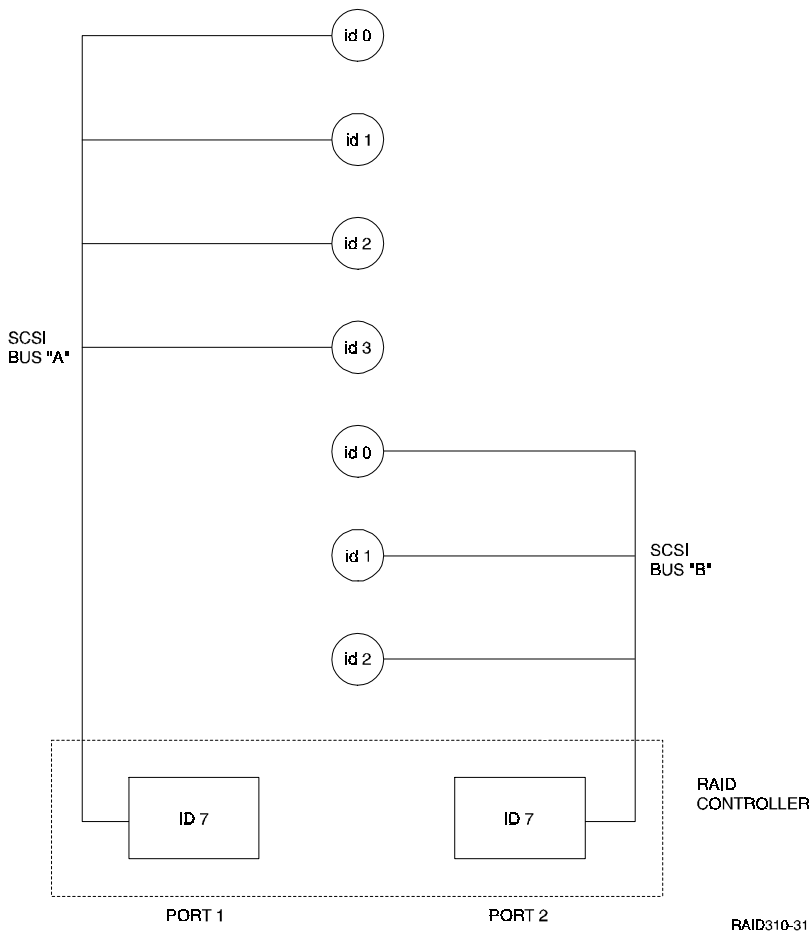


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1.8 Installing Disk SBBs in the RAID Array 310 Enclosure

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 now 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.

Adaptec Host Adapter Installation

In preparing your array for first time use, you need to connect your Intel-based system to the RAID subsystem through the Adaptec 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 Adaptec drivers on the computer system.

CAUTION

The Adaptec Host Adapters listed below are the only ones that are qualified for use with StorageWorks RAID 310. Only boards with the listed revision levels should be used.

2.1 Install the Adaptec Host Adapter

The Adaptec SCSI host adapter is a SCSI-2 fast wide (16-bit) differential host adapter. Two versions of the adapter, as specified in Table 2–1, are available and are discussed in this chapter, depending upon whether your computer is an EISA- or PCI- based system:

Table 2–1 RAID Array 310 Qualified Adapters

Adapter	Firmware Revision	BIOS Revision	Family Manager Set	NT V3.51 Driver and Date
SWXA3-BS AHA-2944W PCI	927000-01 A or B	927201-00 A or B V 1.16	V1.20	AIC78XX.SYS 8/14/95
SWXI3-B 2744W EISA	909900-01 A	549306-00D V2.11		ARROW.SYS

You need the following before you begin:

- The appropriate Adaptec SCSI adapter (2744W or 2944W). Use precautions to protect the board from static discharge.
- Your computer system hardware manual
- Adaptec Adapter User's Guide
- 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
- Media labeled *RAID 300, 400 Series WNT Intel Drivers* (contains the HSZDISK.SYS driver)

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

2.1.1 Preparing to Install the Host Adapter

Before installing the adapter in your host 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.

2. Open the computer to gain access to the motherboard, and locate an appropriate available slot to install the adapter. Refer to your computer system manual for assistance in how to gain access to the mother board and for identifying the appropriate slot in which to install the adapter. Refer to your Adaptec adapter user manual for any guidelines or restrictions regarding slot selection for the adapter.

2.1.2 Installing the Host Adapter

You must do the following to successfully install the host adapter:

1. Install the host adapter board in your computer; the board connector is held in place with the screw you removed from the blank panel. Ensure that the board end plate metal tab aligns in the computer chassis opening properly; otherwise the adapter will not seat properly.
2. Replace your host computer covers; refer to your host computer manual for additional information, if necessary.

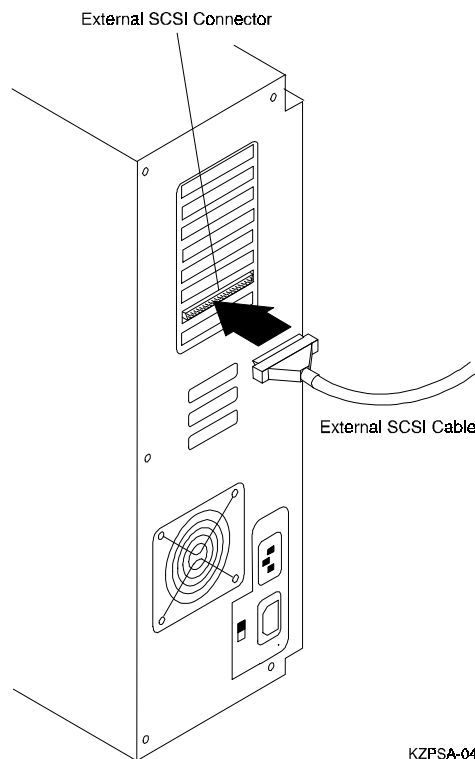
The adapter is now physically installed. To complete the installation of the adapter, you need to connect it to the subsystem, and load the appropriate Adaptec adapter driver software. Some computer systems may also require you to run configuration utilities.

2.2 Connecting the SCSI Cable to the Host System and the Subsystem

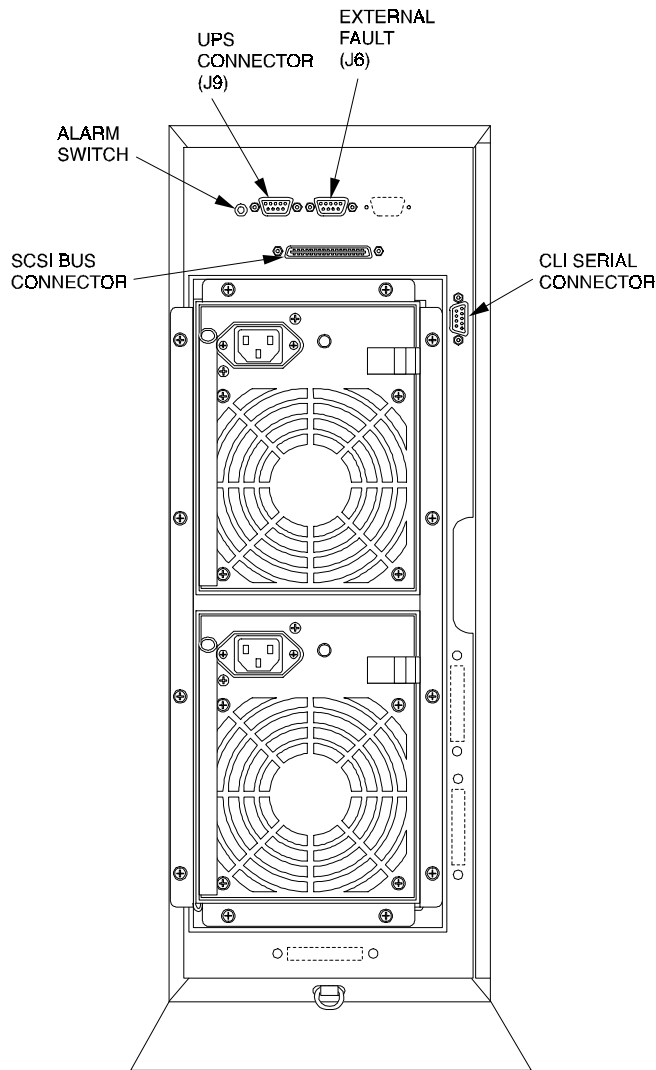
Connect the host system to the subsystem by fastening an end of the SCSI cable to each.

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

Figure 2-1 Host System SCSI 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 SCSI connector on the back of the subsystem shown in figure 2-2.
4. Secure the SCSI cable to the controller by tightening the two screws on the cable connector.

Figure 2–2 Subsystem SCSI Bus Connector

RAID310-30

2.3 Running Configuration Utilities

Some PCI- or EISA-system environments may require that you run configuration utilities after installing the adapter. Consult your system documentation to verify if your EISA- or PCI-based system requires you to run such configuration utilities (e.g., EISA configuration utility).

Follow the instructions described in your system documentation to run these utilities.

Your adapter package includes the adapter-specific software required during this process.

2.4 Verifying Adapter Settings

After installing the host adapter, verify that it is configured to the default settings. See Section 3, *Default Settings* in the *Adaptec Installation Guide* (fold out), Adaptec Stock Number 510497–00 for a list of the default settings. If you need to change the settings back to the defaults, see Section 8, *Configuring the Host Adapter* in the *Adaptec Installation Guide*.

2.5 Loading the Adapter Driver for Use with Windows NT

You can load the software drivers used by Windows NT for the Adaptec adapter in one of two ways, depending upon whether Windows NT is already installed on your system.

If Windows NT is not installed, perform the procedures described in Section 2.5.1 followed by 2.5.2. If Windows NT is already installed, perform the procedures described in Section 2.5.2.

2.5.1 Windows NT Not Installed on System

If Windows NT was not present on the system when the adapter was installed, you should load Windows NT at this time. As part of its installation sequence, Windows NT will automatically determine that the Adaptec adapter has been physically installed in the system. Windows NT will then automatically load the appropriate Adaptec adapter driver from the Windows NT CDROM.

After Windows NT is installed, replace the Adaptec device driver loaded during the Windows NT installation procedure with the one on the enclosed Adaptec Windows NT diskette as describes in Section 2.5.2.

2.5.2 Windows NT Previously Installed

If Windows NT was already present on the system when the adapter was installed, you need to load the appropriate Adaptec adapter driver at this time. The Adaptec driver is contained on the Adaptec Windows NT diskette.

To install the drivers, follows these steps:

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. The Insert Disk window appears.
8. Insert the Adaptec Family Manager set diskette for Windows NT into your system's floppy drive.
9. Type, for example: **A:\winnt\3_5** and Click OK. Windows NT Setup momentarily displays a window and then displays the Select OEM Option window.
10. Click OK to select the driver entry displayed in the Select OEM Option window. The Select SCSI Adapter Option window appears.
11. Click Install to add the selected driver displayed in the Select SCSI Adapter Option window. The SCSI Adapter Setup Window appears.

12. Click Close to close the SCSI Adapter Setup Window.
13. Restart your system for the new driver to take effect.

2.6 Installing the Device Driver (*HSZDISK.SYS* Driver)

Locate the diskette labeled *RAID 300, 400 Series WNT Intel Drivers*. It contains the *HSZDISK.SYS* driver.

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

1. Insert the *RAID 300, 400 Series WNT Intel Drivers* diskette into your floppy drive.
2. From Windows NT, 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 *i386* sub-directory by typing the following command: **CD \i386**
5. Type the following command:

```
hszinst1 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 system (e.g., C:\WINNT35).

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

2.7 Verifying the System Recognizes the Host Adapter

Part of your computer’s start-up sequence (self-test and sizing checks) includes identifying and displaying the names of the adapters installed in your system. The displays are in the form of momentary screen displays during the start up sequence. You may utilize these momentary screen displays to verify that the system recognizes the installed Adaptec adapter. 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.

Although it is not a necessary step in the Getting Started process, you may want to restart your computer at this time and verify that the system recognizes the installed adapter.

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.

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 storage sets, 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)

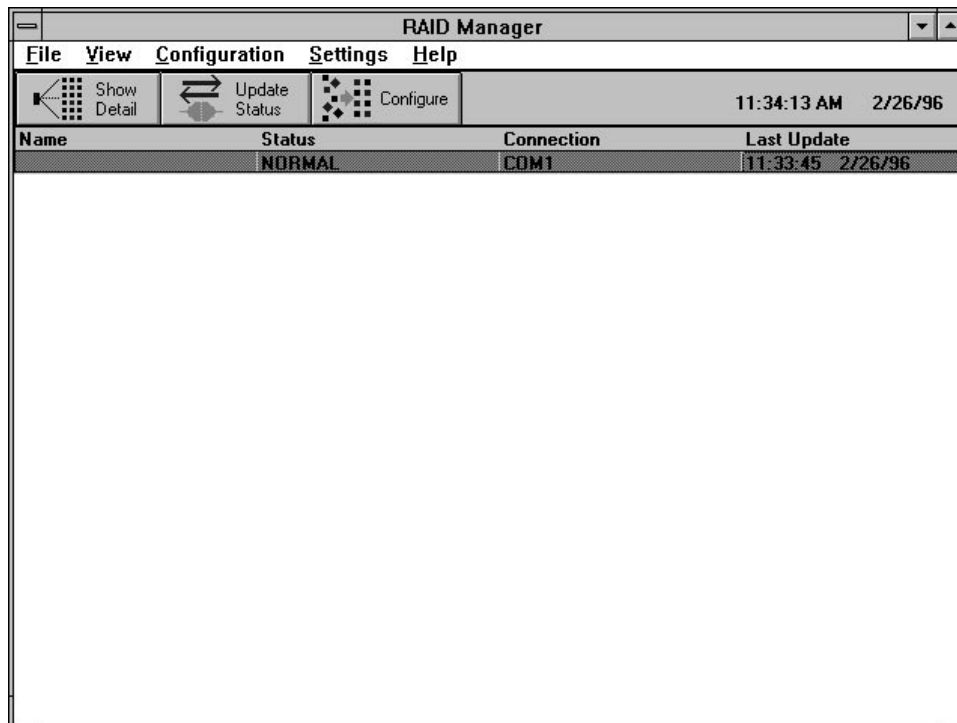
The setup program creates the necessary directories and icons and loads the RAID Manager software onto your system. The setup program loads the software into the default directory, C:\RAID.

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

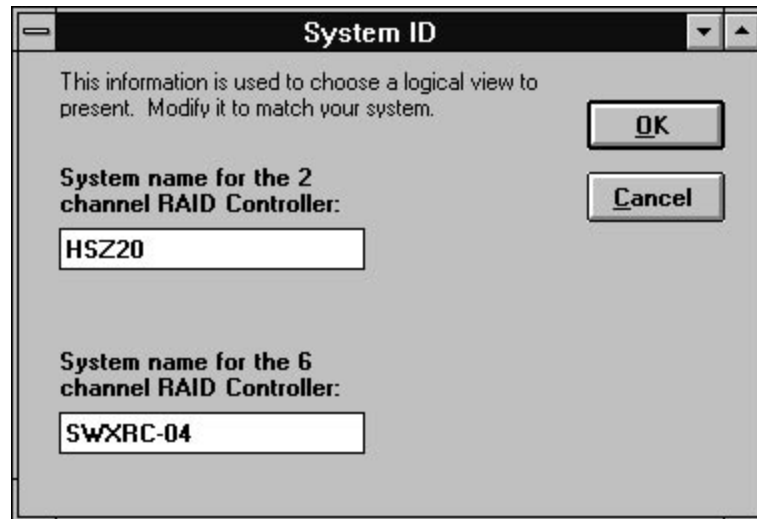


2. From the RAID Manager main window, click on **Settings**. This opens the Settings pull-down menu, which provides a number of choices including: **Controller Communications**, **Fault Notification**, **System ID**, **Select Physical View**, **Physical View Preferred**, **Logical View Preferred**, and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

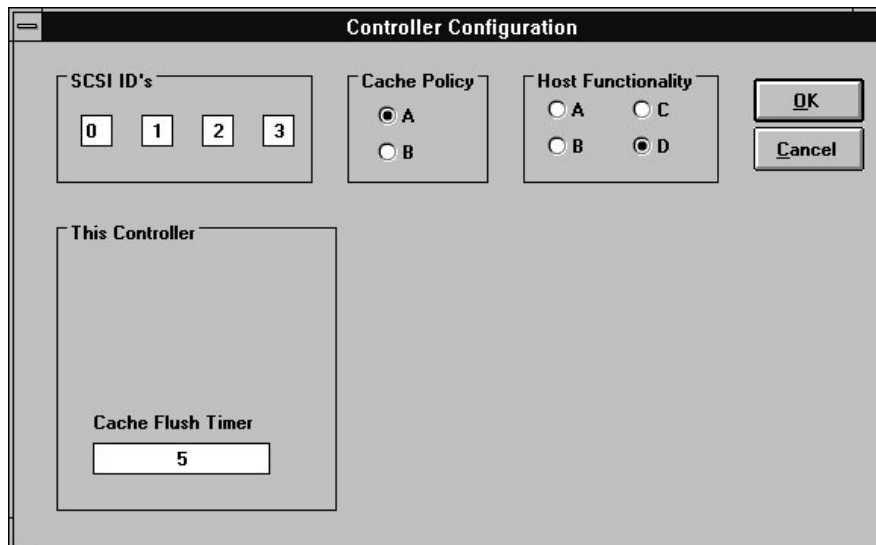
- Select **“A”** for **Cache Policy**; this sets cache policy “A” mode. Cache policy A mode (the default) provides write-back caching. Refer to *StorageWorks RAID Array 310 Configuration and Maintenance Guide* (EK–SMCS2–UG. A01) for more information regarding caching and cache policy.
- Select the choice,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

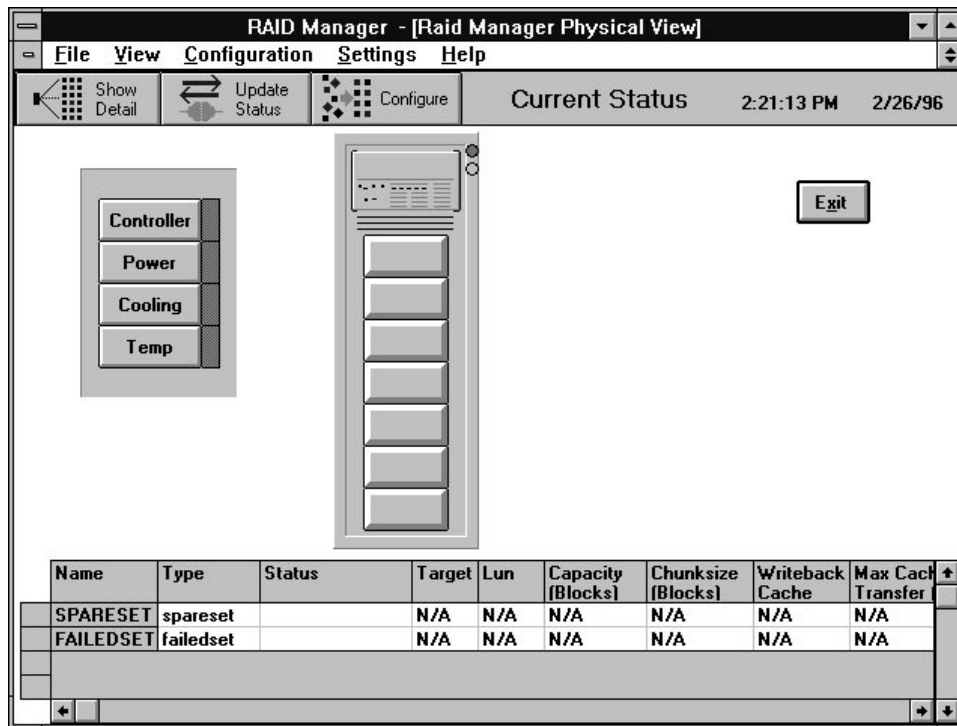
1. Activate the RAID Manager by clicking on the **RAID Manager** icon (typically accessed from the Windows NT Program Manager).

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

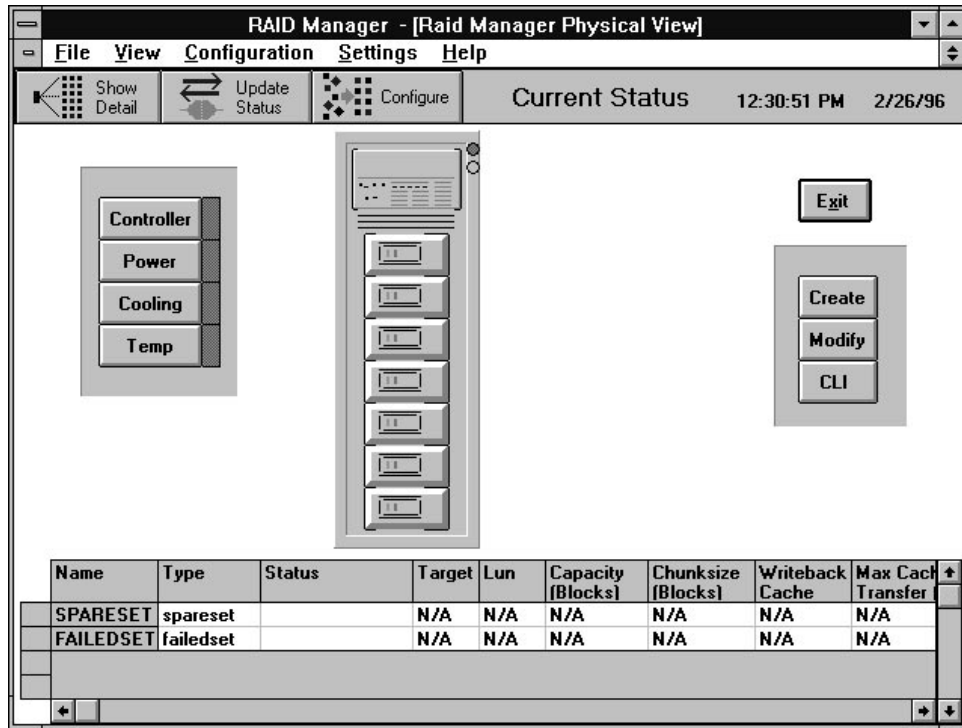


5. At the window menu choices, click on the **Configuration** pull down menu.
6. Choose **Modify** from the choices listed.

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

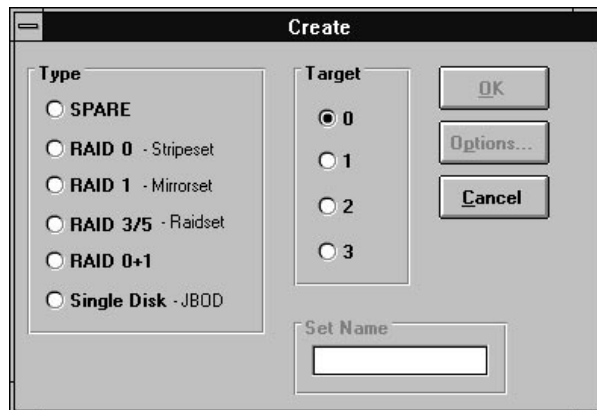
Click on the **Configure** button near the top of the main window. Three configuration buttons appear in the right side of the window: **Create**, **Modify**, and **CLI**.

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 - Stripset**, **RAID 1 - Mirrorset**, **RAID 5/3 - Raidset**, **RAID 0+1**, and **Single Disk - JBOD**.

Figure 3–6 Create Window



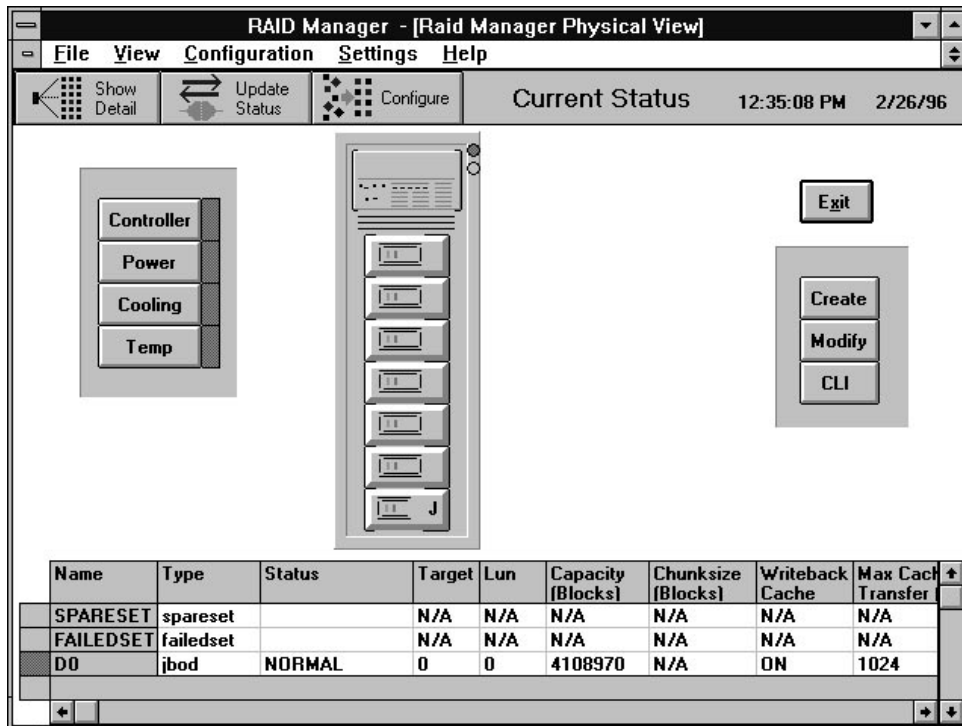
- For this example, select **Single Disk - JBOD**, then click on **OK**.

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.

- 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**

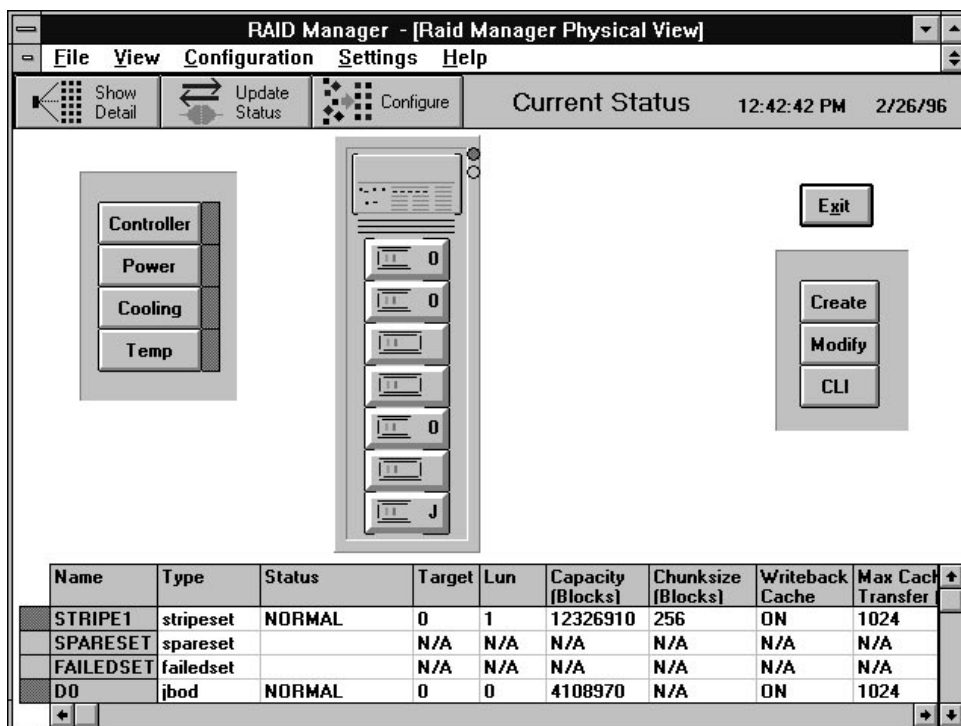
2. For this example, select **RAID 0 - Stripeset**. Then, in the **Set Name** box, type a name for the Stripeset. For our example, the name is “**Stripe1**”. Click on **OK** when finished.

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**.

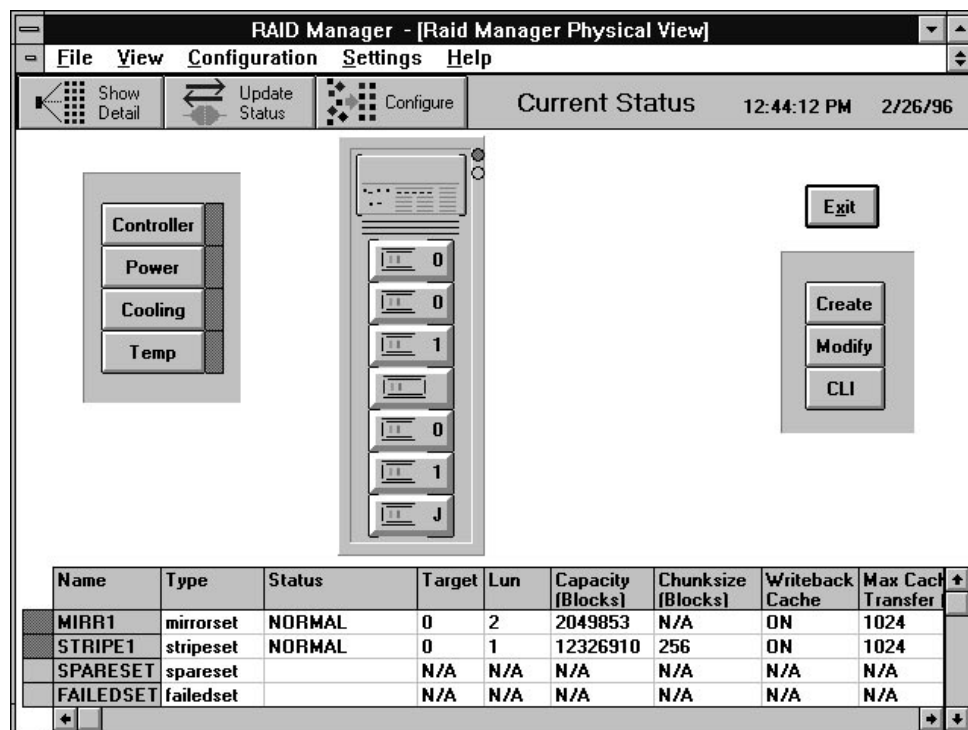
2. For this example, select **RAID 1 - Mirrorset**, then, in the **Set Name** box, type a name for the Mirrorset. For our example, the name is “**Mirr1**”. Click on **OK** when finished.

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 Storageesets

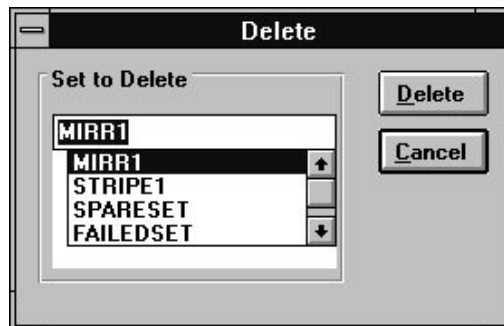
To delete storageeset elements, perform the following steps:

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

2. For this example, choose (click on) **Delete Storageeset** 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 storageeset 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 Storageesets 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.

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.

The screenshot shows the Event Viewer window titled "Event Viewer - System Log on \\HERAT". The window has a menu bar with "Log", "View", "Options", and "Help". Below the menu bar is a table with the following columns: Date, Time, Source, Category, Event, User, and Computer. The table contains four rows of event data:

Date	Time	Source	Category	Event	User	Computer
3/21/96	9:16:30 AM	hszdisk	None	0	N/A	HERAT
3/21/96	9:16:24 AM	EventLog	None	6005	N/A	HERAT
3/21/96	9:13:54 AM	BROWSER	None	8033	N/A	HERAT
3/21/96	9:13:52 AM	BROWSER	None	8033	N/A	HERAT

If an entry for hszdisk appears with a 1 in the *Event* column, similar to the screen shown in 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.

The screenshot shows the Event Viewer window titled "Event Viewer - System Log on \\HERAT". The window has a menu bar with "Log", "View", "Options", and "Help". Below the menu bar is a table of log entries. The table has columns for Date, Time, Source, Category, Event, User, and Computer. The first entry is highlighted, showing a failure of hszdisk at 9:24:58 AM on 3/21/96.

Date	Time	Source	Category	Event	User	Computer
3/21/96	9:24:58 AM	hszdisk	None	1	N/A	HERAT
3/21/96	9:24:48 AM	EventLog	None	6005	N/A	HERAT
3/21/96	9:20:39 AM	BROWSER	None	8033	N/A	HERAT
3/21/96	9:20:37 AM	BROWSER	None	8033	N/A	HERAT

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:

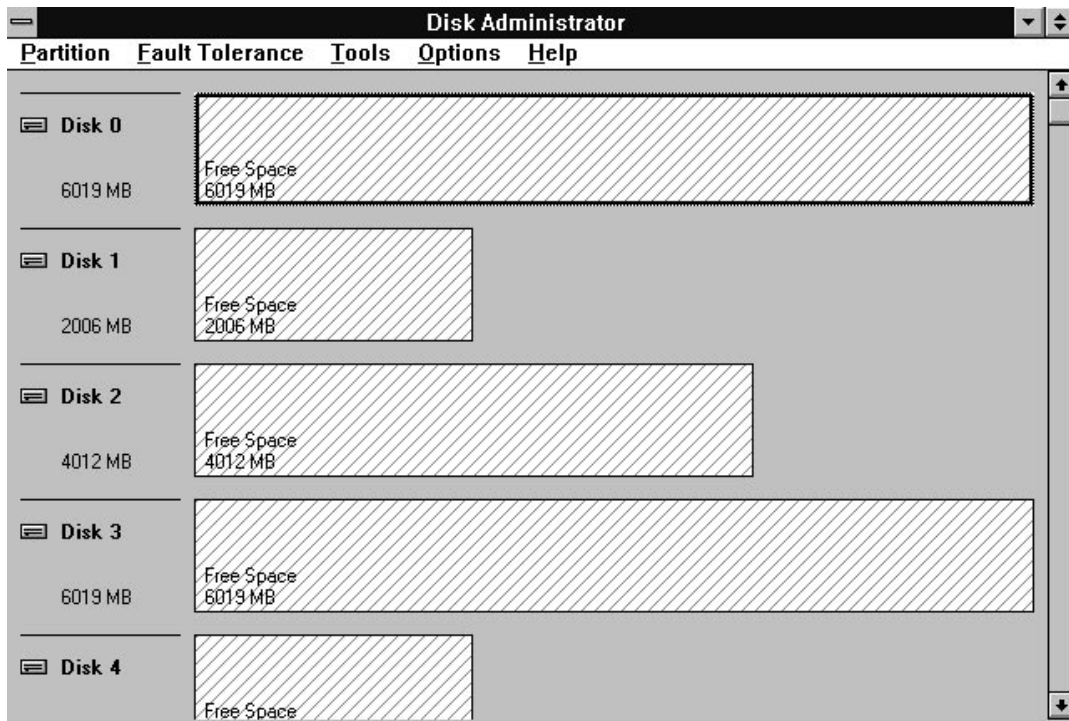
1. Select **Program Manager**
2. Select **Administrative Tools**
3. Select **Disk Administrator**

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

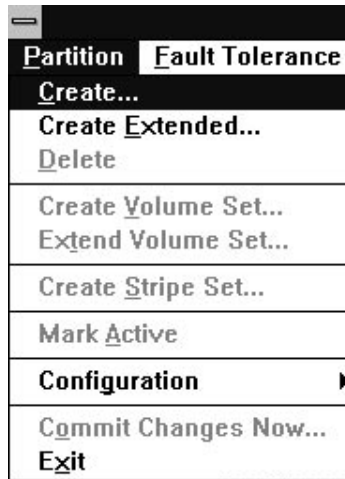
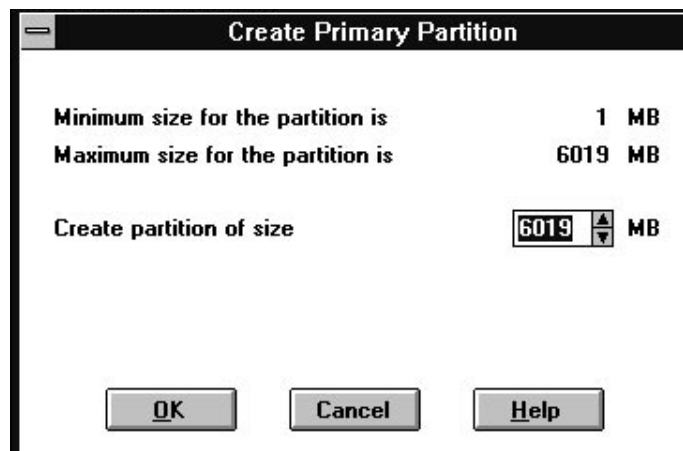


Figure 4–5 Create Primary Partition Window



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.”

- 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.

- 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

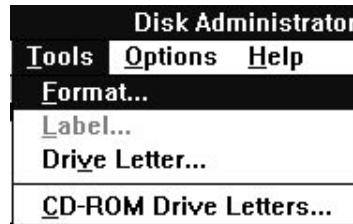


Figure 4-7 Format Menu



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



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.
