

digitalTM

*Storage***Works** 

Getting Started

RAID Array 310 V3.2 for
Windows NT – Alpha

Installation Guide

EK-SMRAE-IG. D01

Digital Equipment Corporation
Maynard, Massachusetts

The disclosure of this information does not grant to the user a license under any patents, pending patents, trademarks, or copyrights or other rights of Digital Equipment Corporation, or of any third party.

This software is proprietary to and embodies the confidential technology of Digital Equipment Corporation.

Possession, use or copying of the software described in this publication is authorized only pursuant to a valid written license from Digital Equipment Corporation or an authorized sublicensor.

Digital Equipment Corporation makes no representation that the use of its products in the manner described in this publication will not infringe on existing or future patent rights, nor do the descriptions contained in this publication imply the granting of licenses to make, use, or sell equipment or software in accordance with the description.

The following are trademarks of Digital Equipment Corporation:

AXP, DEC, RAID Array 310, StorageWorks, and the Digital Logo.

Microsoft and MS-DOS are registered trademarks and Windows NT is a trademark of Microsoft Corporation

Contents

Revision Record	v
About This Guide	vii
Getting Started	ix
1 Unpacking and Setting Up Your RAID Array 310 Subsystem Components	
1.1 Introduction.....	1-1
1.2 Site Preparation.....	1-1
1.3 Unpacking the RAID Array 310	1-2
1.4 Preparing the RAID Array 310 for Operation.....	1-3
1.5 Mounting the Base	1-3
1.6 Connecting the Subsystem Power Cords.....	1-4
1.7 Connecting the CLI Serial Interface.....	1-7
1.8 Installing Disk SBBs in the RAID Array 310 Enclosure	1-8
1.9 Charging the RAID Array Controller Write-back Cache Batteries.....	1-9
2 Installing the Host Adapter on an Alpha-based System	
2.1 Host Adapter Description	2-1
2.2 Before You Install the Host SCSI Adapter.....	2-1
2.3 Installing the SCSI Host Adapter.....	2-2
2.4 Connecting the Subsystem.....	2-5
2.5 Configuration Utilities.....	2-5
2.6 Verifying KZPSA Installation	2-6
2.7 Installing the Device Driver (Completing the KZPSA Installation).....	2-7
2.8 Installing the RAID 310 Series WNT Device Driver (HSZDISK.SYS Driver).....	2-8
3 Installing Command Console Software and Creating Your First Volume	
3.1 Introduction.....	3-1
3.2 Installing Command Console Software in the Management Station	3-2
3.3 Launching Command Console.....	3-2
3.4 Establishing Communications with the 310 Array	3-3
3.5 Configuring the RAID Controller	3-4
3.6 Creating Your First Volume	3-5
4 Completing Your Configuration Under Windows NT	
4.1 Completing Your Configuration under Windows NT.....	4-1
4.1.1 Verifying that HSZDISK.SYS Loaded.....	4-1
4.1.2 Completing a New RAID Array Configuration.....	4-2
4.1.3 Changes to RAID Array Configuration	4-7

5 Communicating Over a Network

5.1	Introduction	5-1
5.2	Agent Connection Licensing	5-2
5.3	Before You Start.....	5-2
5.4	Installing the Agent	5-2
5.5	Adding a System to the Network	5-5

Appendix A: Accessing the Command Line Interpreter (CLI)

Appendix B Upgrading Controller Software

Figures

1-1	Minimum Installation Clearance Measurements	1-2
1-2	Unpacking the RAID Array 310.....	1-3
1-3	Mounting the Base.....	1-4
1-4	Subsystem AC Power Receptacles	1-5
1-5	Subsystem CLI Serial Connector	1-8
1-6	StorageWorks SCSI Bus Port and SCSI ID Assignment.....	1-8
2-1	Typical KZPSA Installations	2-3
2-2	Connecting SCSI Cable	2-4
2-3	SCSI Cable Connection to Controller	2-5
3-1	Command Console's Control Panel	3-2
3-2	Connect Local Dialog Box (for Serial Connection)	3-3
3-3	Configure System Button.....	3-4
3-4	Controller's Tab.....	3-4
3-5	Subsystem Window, Subsystem View Tab Selected	3-5
3-6	Create Dialog Box	3-6
3-7	Advanced Options Dialog Box.....	3-6
3-8	Subsystem View Showing 3/5 RAIDset.....	3-7
4-1	Successful HSZDISK Load.....	4-2
4-2	Disk Administrator Screen Display	4-3
4-3	Partition Pull-down Menu.....	4-4
4-4	Create Primary Partition Window	4-5
4-5	Tools Pull-down Choices	4-6
4-6	Format Menu	4-7
5-1	Agent Configuration Utility Menu	5-3
5-2	Agent Password Dialog Box	5-3
5-3	Client Configuration Utility Screen.....	5-4
5-4	Storage Subsystem Configuration Utility Screen.....	5-4
5-5	Network Configuration Utility Screen.....	5-5
5-6	Add System Dialog Box	5-6

Tables

1-1	Recommended Country-Specific AC Power Cords	1-5
1-2	Cabling Kit Components	1-7
2-1	RAID Array 310 Windows NT Qualified Adapter.....	2-1
5-1	Minimum Agent Host System Requirements	5-2

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
EK-SMRAE-IG. B01	June 1996	Updates
EK-SMRAE-IG. C01	April 1997	Updates to add support for HSOF V3.1 and StorageWorks Command Console V1.1B
EK-SMRAE-IG. C01	January 1998	Updates to add support for HSOF V3.2.

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 StorageWorks Command Console.
- Configuring the RAID Array using the StorageWorks Command Console.

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: Installing the Host Adaptor on an Alpha-based System

This chapter provides instructions for preparing and installing the host adaptor.

Chapter 3: Installing the Command Console Software and Creating Your First Volume

This chapter describes how to install a copy of the Command Console, a Graphical User Interface and creating your first volume.

Chapter 4: Completing Your Configuration Under Windows NT

This chapter describes how to configure your RAID Array 310 subsystem using the Windows NT Disk Administrator.

Chapter 5: Communicating Over a Network

This chapter contains provides instructions on how to establish communication over a network, including installing and configuring the agent.

Appendix A: Accessing the Command Line Interpreter

This appendix contains information on how to access the Command Line Interpreter (CLI) for various maintenance and diagnostic tools.

Appendix B: Upgrading Controller Software

This appendix contains the procedures for backing up and upgrading the controller software.

Associated Documents

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

Table 1 Associated Documents

Document Title	Order Number
<i>Desktop 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>StorageWorks Command Console V1.1 User's Guide</i>	AA-R24LA-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 filenames

Support and Services

Who to contact in the Americas

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

Who to contact in Europe

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

Who to contact in Asia Pacific

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

Getting Started

This section provides an overview for preparing and installing the RAID Array 310 V3.2 for Windows NT-Alpha 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 Windows NT (Alpha) platform kit or an adapter and an enabling 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. Installing the Host Adapter (Chapter 2)
4. Installing the Command Console Software and Using Your First Volume (Chapter 3)

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 3 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
4. Install the Host Adapter
5. Install the Command Console Software and Create Your First Volume.

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 or Version 4.0
- Intel PC running Windows NT or Windows 95 (to run Command Console software)

NOTE

If you do not intend to use Command Console, you can set up your RAID 310 subsystem using CLI via Terminal or Terminal emulator.

Inventory the StorageWorks RAID Array 310 Subsystem Platform Specific 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 (BN21K-xx)
- Media for RAID 310 Manager and host adapter drivers
- *StorageWorks Command Console for Alpha/Intel User's Guide (AA-QU63A-TE)*
- This *Getting Started – RAID Array V3.2 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.

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

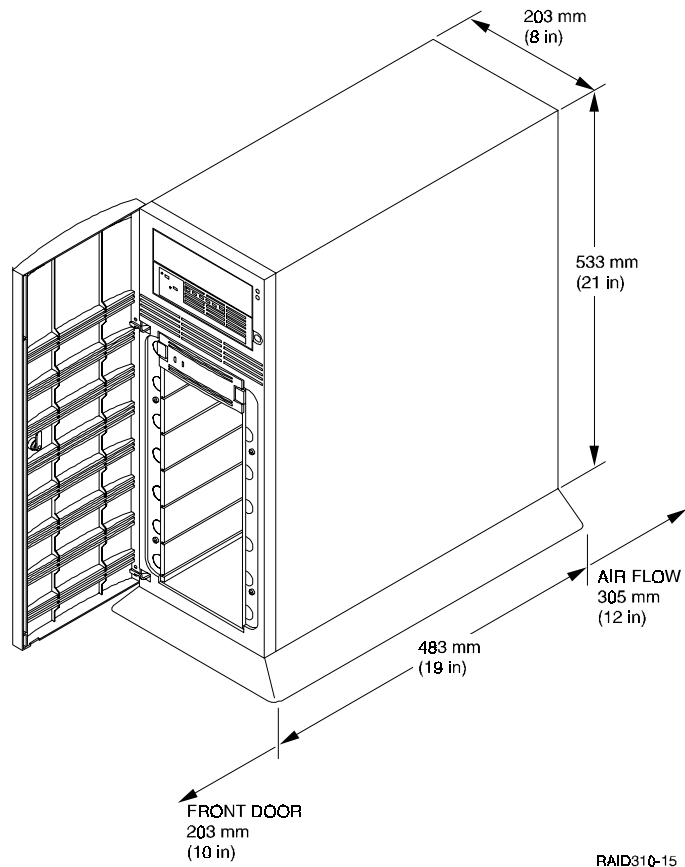
The installation of your RAID Array 310 subsystem is accomplished by performing the major steps as follows:

- 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 Command Console software and creating your first volume (*Chapter 3*)
- Completing your configuration under Windows NT (*Chapter 4*)

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 (203 mm or 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.

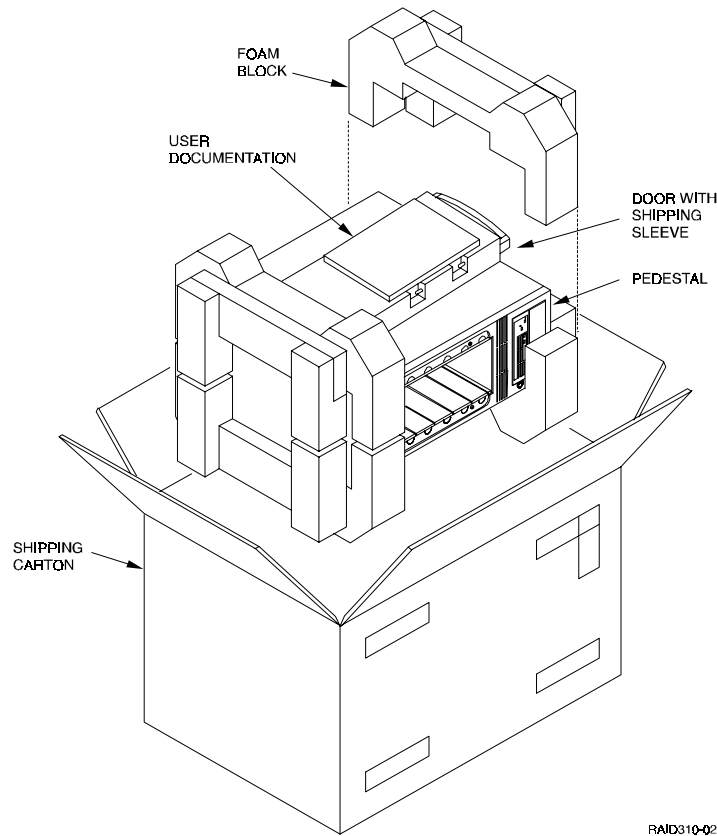
NOTE

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:

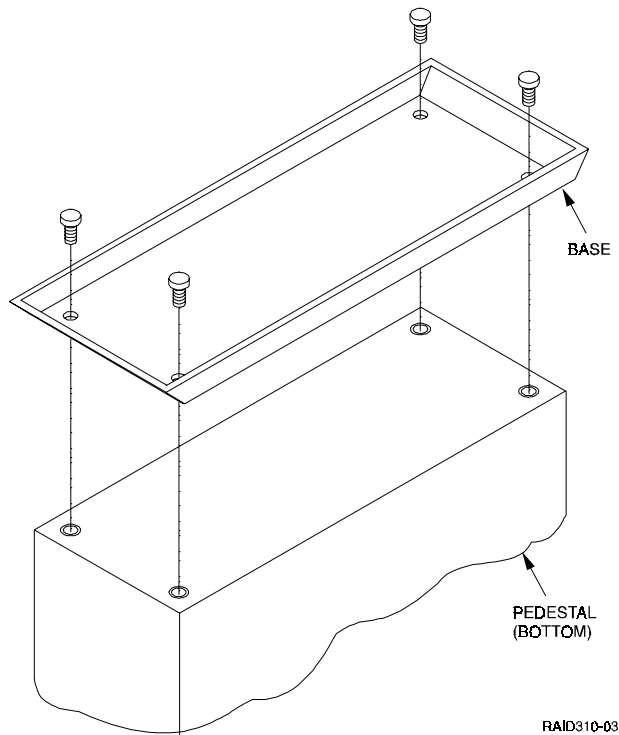
1. Mounting the base as described in Section 1.5.
2. Installing the disk SBB's.
3. Configuring the RAID Array 310.
4. Connecting the power and SCSI bus cables.
5. Checking the subsystem for proper operation.
6. Mounting the door.

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

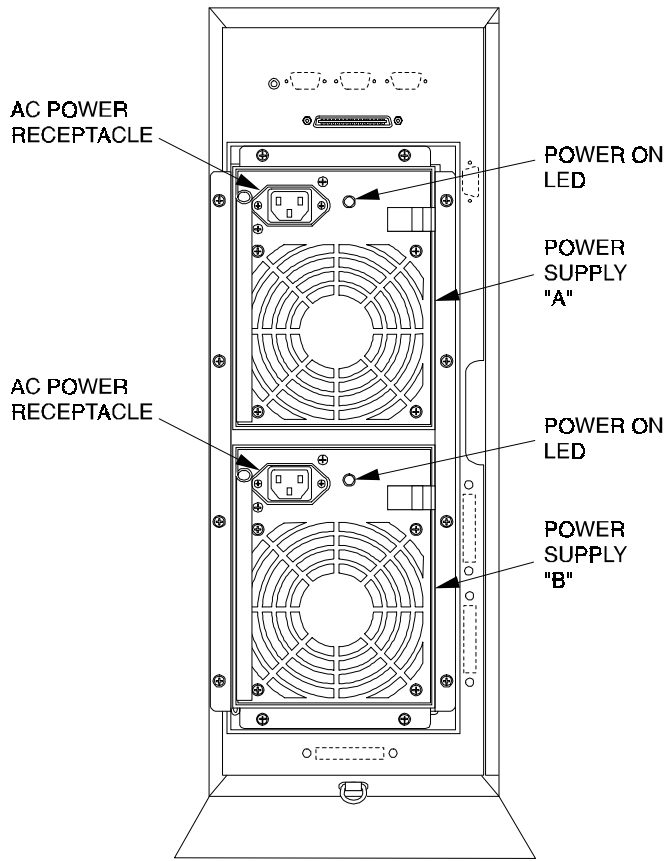
The subsystem contains two identical power supplies which provide redundant power to the RAID Array 310. Each supply is equipped with an ac power receptacle for connection to a 125 or 250 vac power source. Two power cords are required to operate and provide redundant power to the subsystem. Table 1–1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

Country	Voltage	Plug Type	Order No.
Australia	250 Vac	AS3112-1981	BN19H-2E
C. Europe	250 Vac	CEE 7/7 (Schuko)	BN19C-2E
Denmark	250 Vac	Afsnit 107	BN19K-2E
India	250 Vac	BS 546	BN19S-2E
Ireland	250 Vac	BS 1363	BN19A-2E
Israel	250 Vac	SI 32	BN18L-2E
Italy	250 Vac	CEI 213-16/VII	BN19M-2E
Japan	125 Vac	NEMA 5-15	BN27S-03
N. Zealand	250 Vac	AS3112-1981	BN19H-2E
S. Africa	250 Vac	BS 546	BN19S-2E
Switzerland	250 Vac	SEV 1011	E0-BN19H-2E
U. K.	250 Vac	BS 1363	BN19A-2E
U. S.	125 Vac	NEMA 5-15	BN27S-03

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 Command Console software.

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

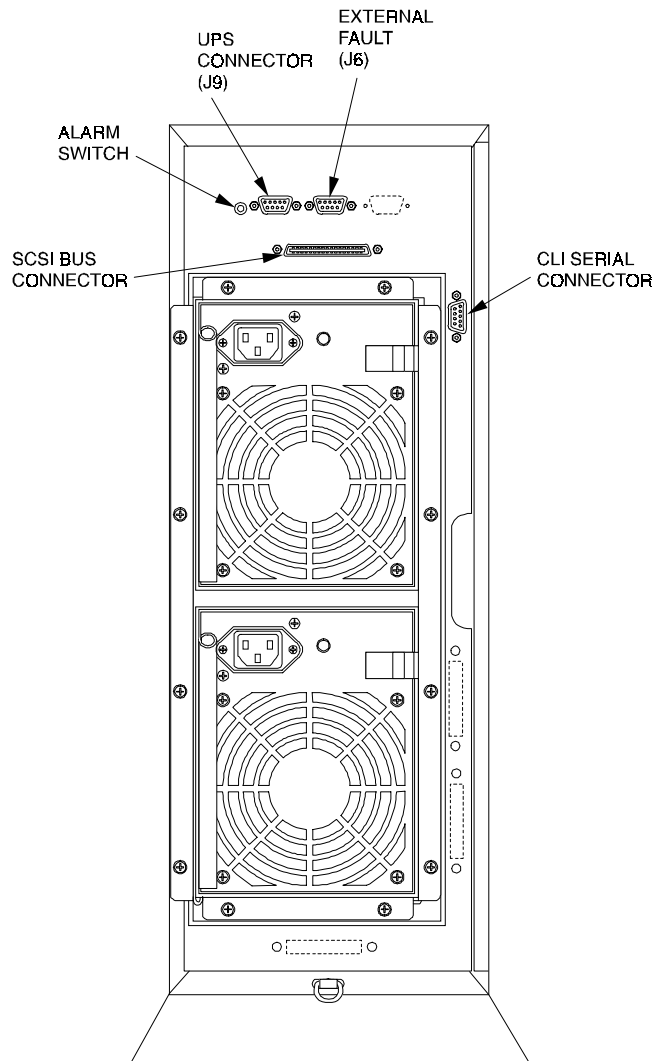
1. Locate the cabling kit that came with the RAID subsystem. The kit should contain the following components:

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.

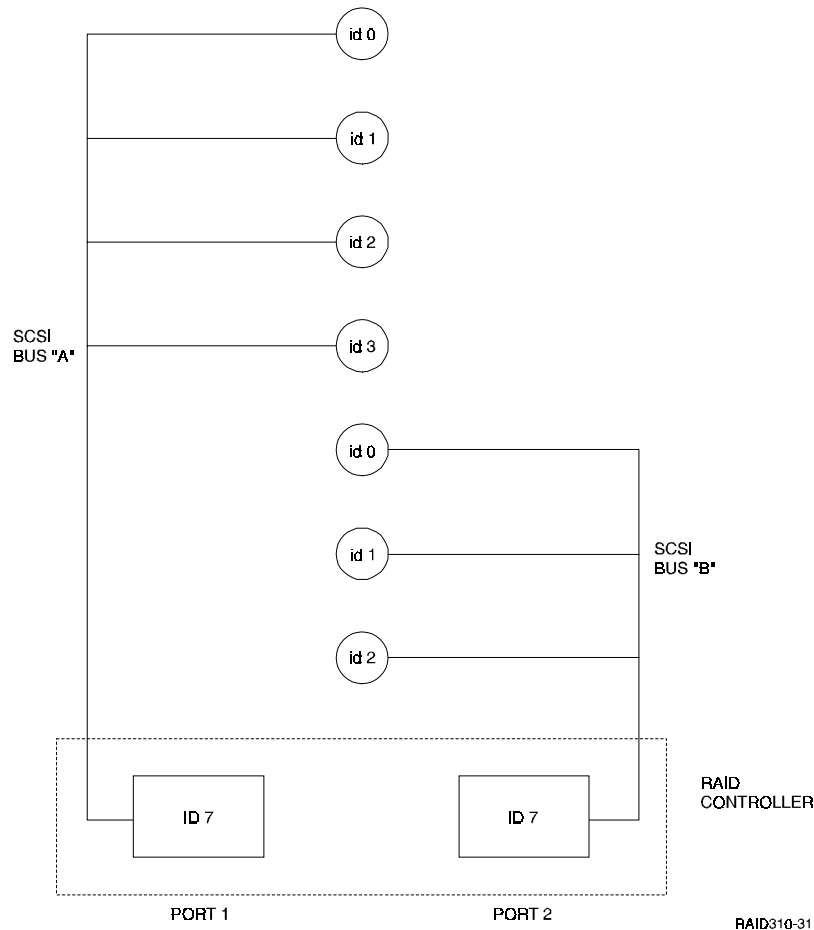
Figure 1 –5 Subsystem CLI Serial Connector



RAID310-30

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 once per second. Power on the subsystem for a minimum of 6 hours. The battery will be fully recharged in the time specified.

Installing the Host Adapter on an Alpha-based System

In preparing your array for first time use, you need to connect your Alpha-based system to the RAID subsystem through a 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.

2.1 Host Adapter Description

The host adapter is a SCSI-2 fast wide (16-bit) differential host adapter. Only one adapter, for a PCI-based system, is qualified for use with your RAID Array 310. See Table 2-1.

Table 2-1 RAID Array 310 Windows NT Qualified Adapter

PCI Adapter	Firmware Revision	BIOS Revision	NT V3.51 Driver and Date
KZPSA-BB	V A10	V 1.3	DECKZPSX.SYS 6/14/96

The adapter connects your host computer to the StorageWorks RAID Array 310 Subsystem through the connecting SCSI cable.

2.2 Before You Install the Host SCSI Adapter

You need the following items before you begin:

- The host adapter,
- Your computer system hardware manual for reference information,
- Host adapter User's Guide,
- Appropriate tools to access your computer,
- The SCSI cable (BN21K-xx), 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 Array 310 Installation Kit V3.2 for Windows NT* CD-ROM (contains the HSZDISK.SYS driver)

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.

2.3 Installing the SCSI Host 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.

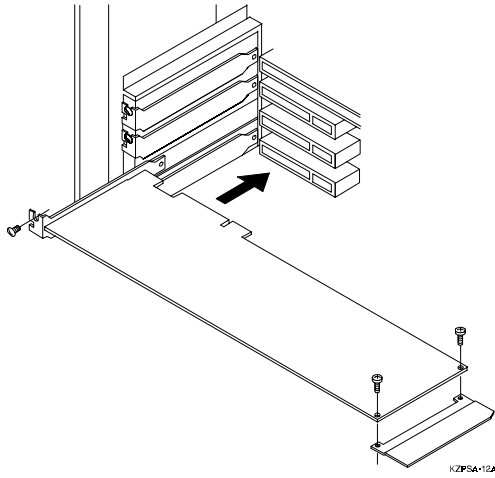
NOTE

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.

4. 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 5 of the procedure to secure the KZPSA adapter.
5. 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.
6. Replace your host computer covers; refer to your host computer manual.
7. Connect the SCSI cable to the host adapter as shown in Figure 2–2.
8. 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.

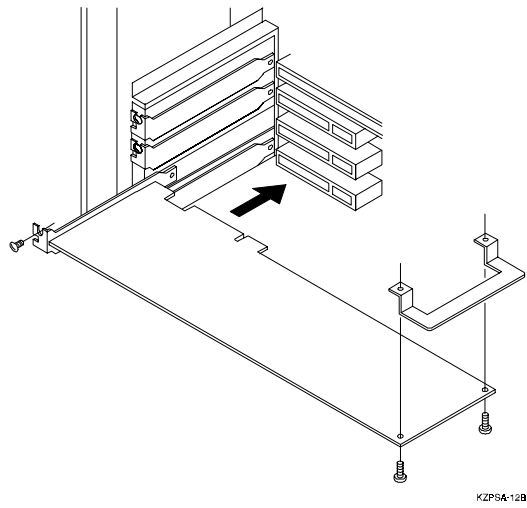
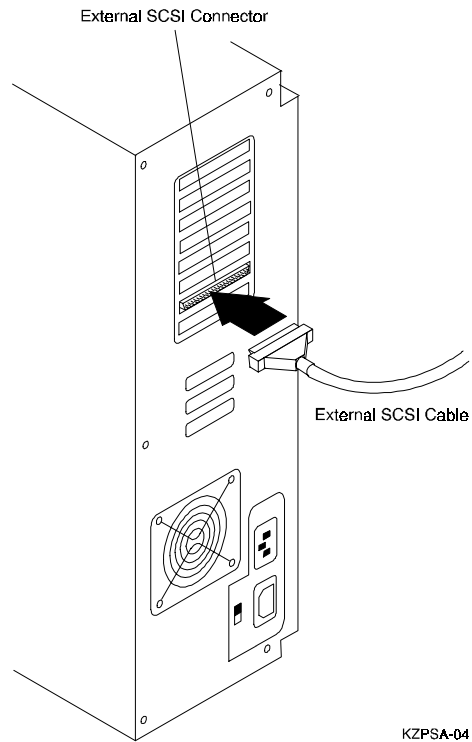


Figure 2–2 Connecting SCSI Cable



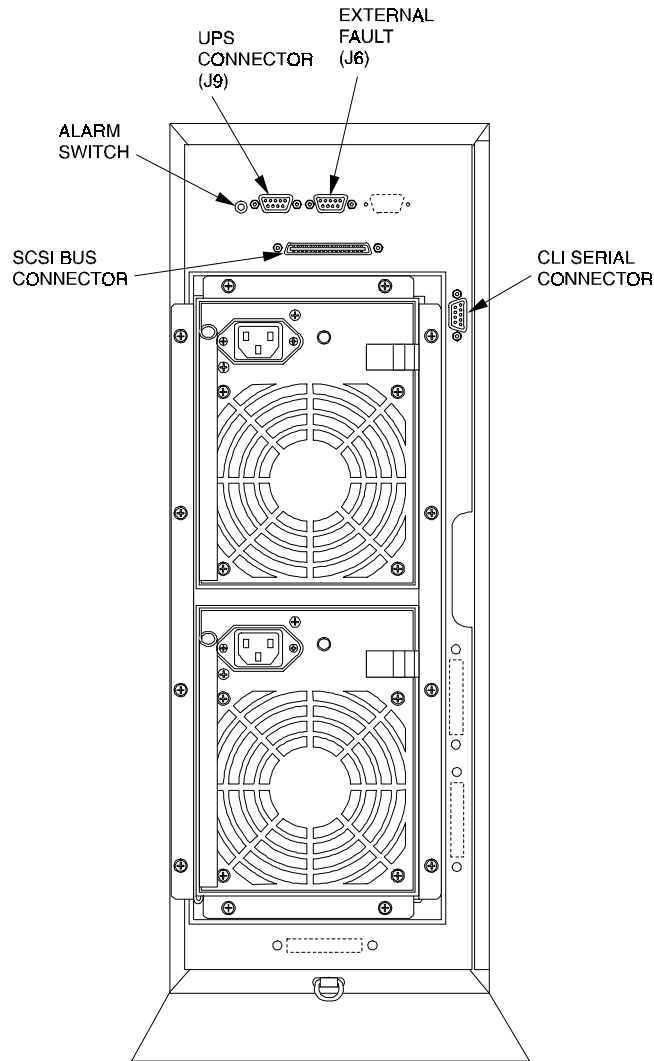
2.4 Connecting the Subsystem

Turn off AC power to the enclosure.

Install the SCSI cable between the host system and the RAID Controller.

- Connect the straight end of the SCSI cable (BN21K-xx) to the 68-pin connector showing through the rear of the Alpha-based system and tighten the screws.
- Connect the right-angle end of the SCSI cable (BN21K-xx) to the 68-pin connector on the rear of the RAID 310 enclosure and tighten the screws.

Figure 2-3 SCSI Cable Connection to Controller



3. Connect the power cable to the storage enclosure if it has not yet been installed. Do so by connecting the female end of the power cable to the RAID Controller power controller located at the lower left front corner of the array. Plug the power cable into a 110/220 VAC line voltage source (the power supply automatically senses the voltage level and will work with either voltage).

2.5 Configuration Utilities

Adapter-specific software that is required during this process is included in your adapter package. Utilize only the adapters and drivers supplied with the adapter kit as these are tested and certified to function with the HSZ20 RAID Controller.

2.6 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 start-up 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.

2.7 Installing the Device Driver (Completing the KZPSA Installation)

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 v3.51 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-F4 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.

To install the driver for the KZPSA host adapter using Windows NT 4.0, double-click the SCSI adapter's icon in *Control Panel*. Choose the *Drivers* tab and the *Have Disk* button. Insert the KZPSA Alpha AXP software diskette into the floppy drive and click OK. Select the DIGITAL KZPSA PCI to SCSI adapter and click OK. The driver will be copied to the correct location on the system disk.

2.8 Installing the RAID 310 Series WNT Device Driver (*HSZDISK.SYS* Driver)

Locate the CD-ROM disk labeled RAID Array 310 Installation Kit V3.1 for Windows NT. It contains the *HSZDISK.SYS* driver.

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

1. Insert the RAID Array 310 Installation Kit V3.2 for Windows NT CD-ROM.
2. Run File Manager or Explorer and navigate to the CD-ROM folder drivers/HZinstal.
3. Run Setup by double-clicking it.
4. The installation process copies the driver into the correct subdirectory and creates the necessary Registry entries.

Installing Command Console Software and Creating Your First Volume

This chapter contains instructions for installing Command Console, a Graphical User Interface (GUI), and creating your first volume.

3.1 Introduction

This chapter describes how to install and use Command Console software to create your first volume, a 3/5 RaidSet. Do the sections in order. At the end of this chapter you will have created your first volume.

Procedure summary:

- Install Command Console software.
- Launch Command Console.
- Establish communications with the controller over the serial port.
- Set failover (for dual-controller operation only).
- Configure the HSZ20 controller for Windows NT operation.
- Create your first volume.

Connection methods:

There are three ways to connect to your RAID 310 Array.

Serial Port – This method is covered in this chapter and is the recommended method for local, direct connection to your array. This method must be used to create your first volume.

SCSI Bus – A local connection method, SCSI bus connection is covered in the Command Console User's Guide.

Network Connection – You can communicate with your RAID 310 Array over a TCP/IP network. Communication is by means of the agent process. Chapter 5 of this Guide describes this method.

A note on communicating over a network:

If you are planning to configure and monitor your RAID310 Array over a network, one volume must be created for network communications. This volume, the “communications” volume, is created using the serial port. DIGITAL recommends creating and designating a RAID 3/5 volume as the “communications” volume. RAID 3/5 is highly reliable and provides the most stable communication link.

3.2 Installing Command Console Software in the Management Station

Command Console installs from the RAID Array 310 Installation Kit V3.2 For Windows NT CD-ROM disk using a standard Windows installation routine. Command Console installs on an Intel based Windows 95 or an Intel-based Windows NT platform. (The platform is referred to as the Management Station.) The program is self-extracting and stores Command Console into the directory `C:\Command_Console` by default. You have the option to change the disk or directory location. To install Command Console:

1. Place the CD in the CD-ROM drive.
2. Run *File Manager* or *Windows Explorer*.
3. Navigate to the folder: *drive_letter:* \Client.
4. Double-click on *Install*.
5. Follow the instructions in the setup program to complete the installation.

NOTE

The Management Station must be either an Intel-based Windows NT platform or an Intel-based Windows 95 platform.

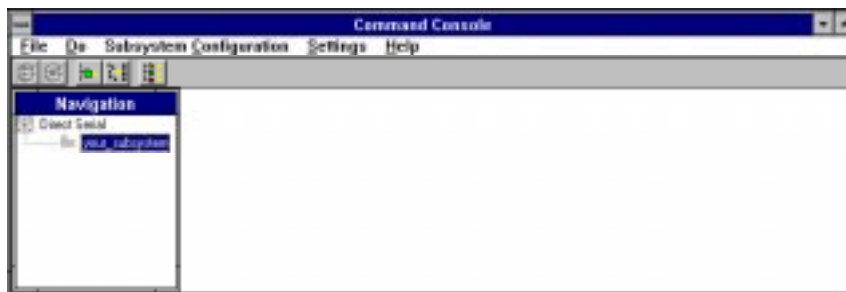
3.3 Launching Command Console

Launch the Local Version (serial port communications) of Command Console by typing

swcc.exe direct

in the *RUN* dialog command-line box and pressing Enter. Command Console displays the Control Panel (Figure 3–1).

Figure 3–1 Command Console’s Control Panel



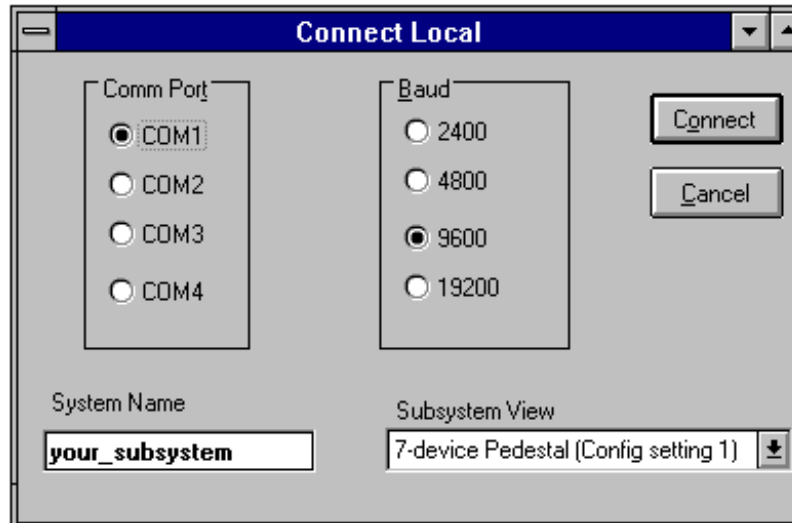
A Divider Bar splits the Control Panel into two smaller windows: the Navigation Window (on the left) and the Subsystem Window (on the right). The Subsystem Window lets you view, configure and monitor the storage subsystem shown in the Navigation Window. The Control Panel also has a Menu Bar and below it a Toolbar. For more information on Command Console’s windows, menus and tools, refer to the Command Console User’s Guide.

3.4 Establishing Communications with the 310 Array

The simplest connection to your storage subsystem is a direct serial connection from the Management Station (the host system running Command Console) to the storage subsystem's serial maintenance port. To establish a serial connection proceed as follows:

1. Launch the Local Version of Command Console.
2. Select the **Settings | Controller Communications | Serial** command to display the dialog box shown in Figure 3–2.

Figure 3–2 Connect Local Dialog Box (for Serial Connection)



3. Select the appropriate communications port and select the 9600 baud rate for your subsystem.

NOTE

Default communication parameters for the RAID 310 controller are 9600 baud, 8 bits, no parity, one stop bit.

4. Enter a name for your storage subsystem or leave the default name.
5. Select *7-device Pedestal (Config setting 1)* subsystem view from the pull-down list.
6. Click on *Connect*. Command Console connects to the subsystem's controller by means of its serial maintenance port and the subsystem icon turns green. (A red icon indicates a communication problem between Command Console and your subsystem. Recheck the connection and the settings.)

3.5 Configuring the RAID Controller

1. Click the Configure Subsystem button on the Toolbar to access Command Console's configuration function (See Figure 3-3 below.)

Figure 3-3 Configure System Button



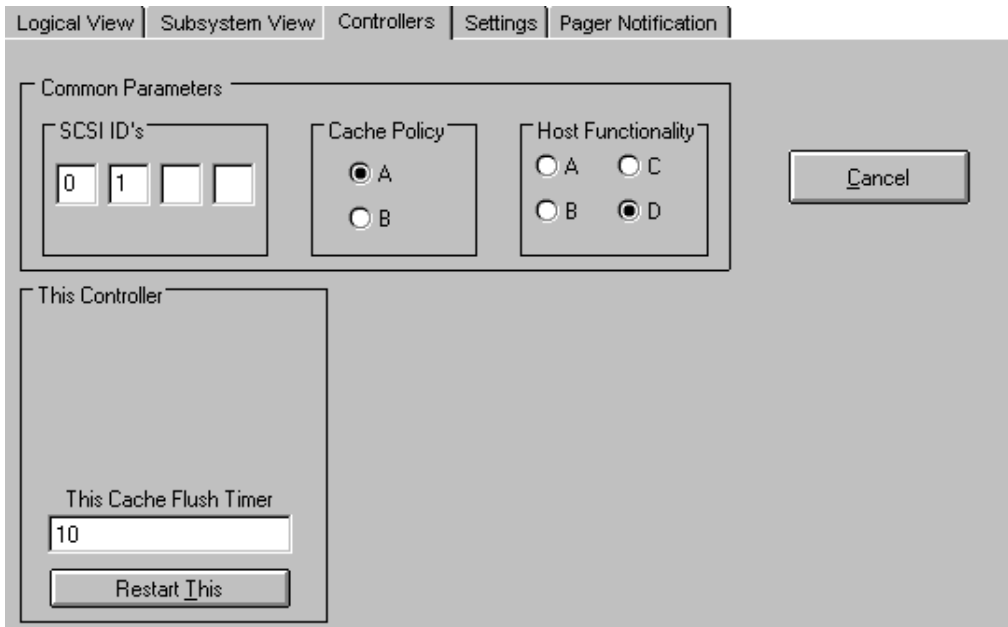
1. Select the **Controllers** tab (Figure 3–4) in the **Subsystem Window**.
2. Set the controller's operating parameters as follows:
 - Set up to four *SCSI ID's*, for example '0,1,2,3' (must not conflict with your host adapter ID, which is normally set to ID 7),
 - Set *Cache Policy* to A (write-back cache),
 - Set *Host Functionality* to D (D is required for NT),
 - Set *This Cache Flush Timer* to 10 (10 is recommended).

NOTE

Host Functionality must be set to D in an NT environment.

3. Click the *Restart This* (single controller installed) button. The message, "Configuring your system" displays, followed by an information box with the message. There will be a 90 second delay for controller restart.

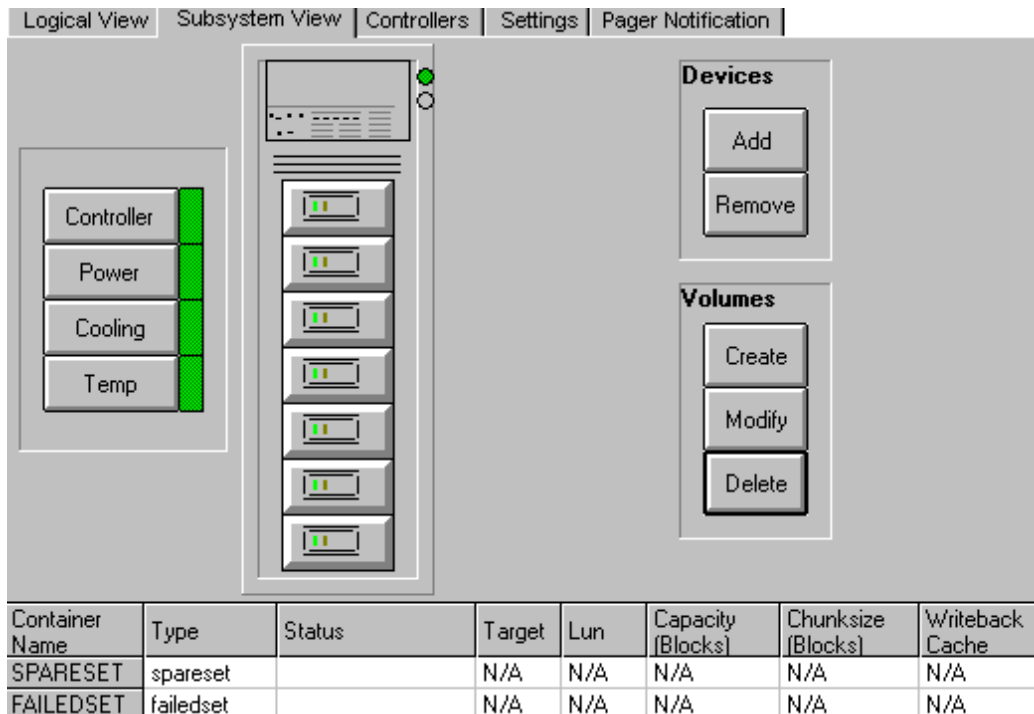
Figure 3–4 Controllers Tab



3.6 Creating Your First Volume

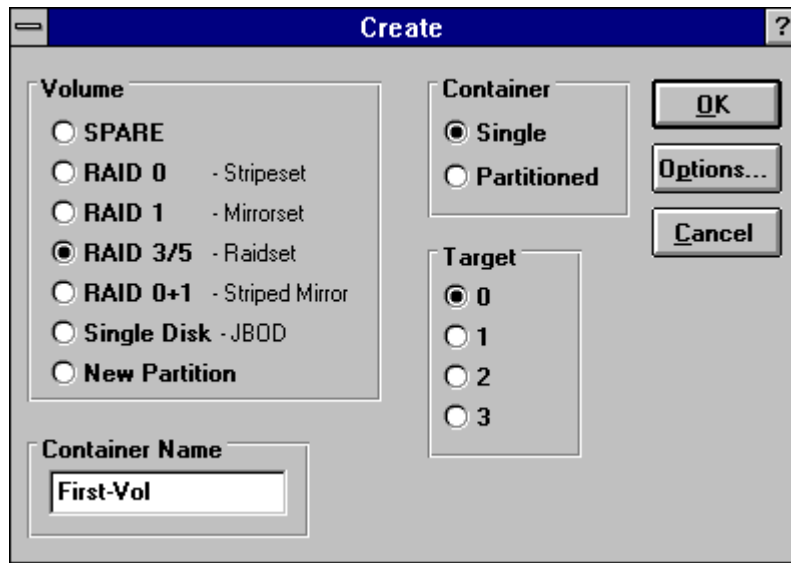
1. Click on the Configure Subsystem button and select the **Subsystem View** tab (Figure 3–5). To display a physical view of your RAID 310 Array.
2. The first time you configure an array the disks are displayed blank. The array controller does not recognize the devices until they are added to the array's configuration. Click the *Add* button to add devices.

Figure 3–5 Subsystem Window, Subsystem View Tab Selected



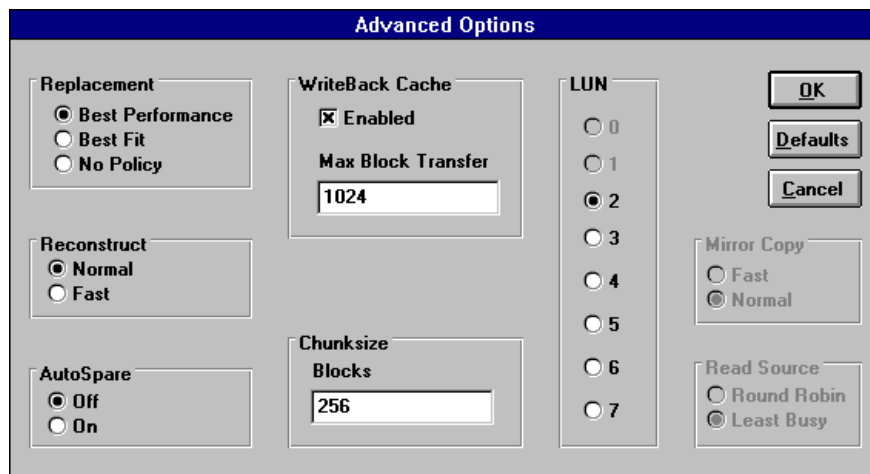
3. Click on the *Create* button to display the *Create* dialog box (Figure 3–6).

Figure 3–6 Create Dialog Box



4. Click on the *RAID 3/5* radio button.
5. Type the name of the container in the *Container Name* field.
6. Select the *Single* radio button. In this example, *Single* is selected to create a non-partitioned volume.
7. Choose a *Target* number and click on its radio button.
8. Command Console sets typical (default) volume parameters. To change the default settings, click on the *Options* button to access the *Advanced Options* dialog box (Figure 3–7).

Figure 3–7 Advanced Options Dialog Box



9. Make the desired changes to the default settings on the *Advanced Options* dialog box and click on *OK*.

10. When the *Create* dialog box displays, click on *OK*.
11. A *Select* box displays prompting you to click on the disks that you want to include in the volume. After you select the disks, click the *Create* button. Command Console creates the 3/5 RAIDset, labeling the set members 3/5 (shown in Figure 3–8).

Figure 3–8 Subsystem View Showing 3/5 RAIDset

Container Name	Type	Status	Target	Lun	Capacity (Blocks)	Chunksize (Blocks)	Writeback Cache
FIRST_VOL	raidset	INIT	0	0	53293005	256	ON
SPARESET	spareset		N/A	N/A	N/A	N/A	N/A
FAILEDSET	failedset		N/A	N/A	N/A	N/A	N/A

At this time you can create additional volumes and complete your storage configuration. Forms are provided in Appendix A to record your configuration. Refer to the Command Console User's Guide and the on-line documentation for additional configuration information.

Completing your Storage Configuration under Windows NT

This chapter contains instructions for how to complete your configuration using the Windows NT Disk Administrator.

4.1 Completing Your Configuration under Windows NT

In order for Windows NT to recognize new RAID Array 310 devices or changes to existing configurations, you must reboot your system to restart Windows NT.

4.1.1 Verifying that HSZDISK.SYS Loaded

Prior to running Disk Administrator, verify that hszdisk recognizes the volumes that you created in the RAID Array 310 Subsystem as follows:

Open the *Event Viewer* in the *Administrative Tools* group. Look for an entry for hszdisk in the Event Viewer window.

- If an entry for hszdisk appears with 0 in the *Event* column, as shown in Figure 4–1, the hszdisk loaded successfully and connected to at least one logical volume in the RAID Array 310.
- If no entry for the hszdisk appears in the Event View window, reinstall hszdisk.
- If an entry for hszdisk appears with a 1 in the *Event* column, hszdisk did not load because it did not find a logical drives. Reconfigure the array.

Figure 4–1 Successful hszdisk Load

Event Viewer - System Log				
Log	View	Options	Help	
Date	Time	Source	Category	Event
3/21/96	9:16:30 AM	hszdisk	None	0
3/21/96	9:16:24 AM	EventLog	None	6005
3/21/96	9:13:54 AM	BROWSER	None	8033
3/21/96	9:13:52 AM	BROWSER	None	8033

4.1.2 Completing a New RAID Array Configuration

This section summarizes how to use the Windows NT Disk Administrator to complete a new RAID 310 Array configuration under Windows NT. For additional information, refer to your Windows NT documentation. Before you begin, remember to safeguard critical data. Back up your system using normal backup procedures before altering device partitions.

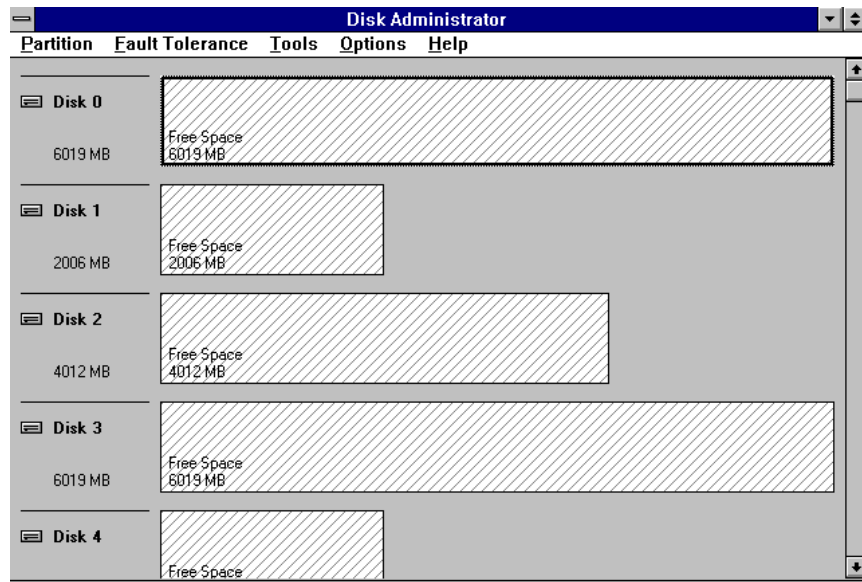
Starting the Disk Administrator

Double-click on the *Disk Administrator* icon in the *Administrative Tools* program group to run the Disk Administrator. A representative example of a Disk Administrator screen is shown in Figure 4–2.

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 4–2 Disk Administrator Screen Display



Understanding the Disk Administrator Display

Disk Administrator creates a “Bar Chart” display of your disk configuration. The figure shows that Windows NT has named the various devices that were created using the RAID Array 310 Command Console 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 shown for each disk (JBOD) or storage set 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 should represent all your RAID Array 310 logical volumes. The figure also shows the corresponding free space for each entity.

Verifying your configuration

1. Check that there is an entry in the Disk Administrator display for each of your RAID Array 310 volumes. If there is not, you should go back and recheck your configuration.
2. Check that the capacity shown matches the size of the physical disk or the RAID Array 310 storageset. If it does not match, recheck the logical configuration for the RAID Array 310 and its members.

NOTE

Disk Administrator displays the “usable” capacity of a RAIDset and MIRRORset, not the combined total of the physical members.

Creating the partitions

1. For each disk shown, click on the partition area that you want to create.
2. Select the **Partition** pull-down menu and choose **Create** (see Figure 4–3) to display the *Create Primary Partition* window (see Figure 4–4).

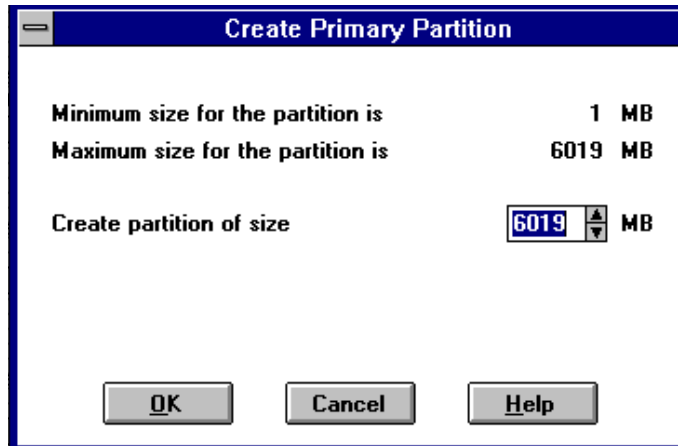
NOTE

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

Figure 4–3 Partition Pull-down Menu



See Figure 4–4 Create Primary Partition Window



1. In the **Create Primary Partition** window, enter the size partition you want, then click on **OK**. (Depending upon the partition size you choose, a message window may appear asking you to confirm your selection.)
2. Continue to create new partitions until all disks have been partitioned.

Making drive letters 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.” If the disk configuration change drive letters are subject to change after reboot. As an option, you can make the drive letters permanent. If you want to make the letter assignments permanent procedure as follows:

1. Access the **Tools** pull-down menu.
2. Select **Drive Letter** then choose **To Assign**. This process must be repeated for each partition (drive letter) that you wish to make “permanent.”

Committing the changes

When you have created all your partitions, commit the changes:

1. Access the **Partition** pull-down menu
2. Click on **Commit Changes Now**. A message window appears asking you to confirm the changes. Confirm the changes if they are correct.

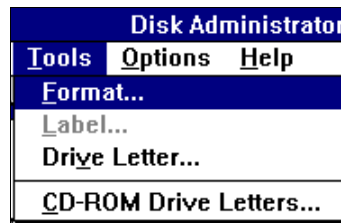
NOTE

A message window will appear following this step asking you if you wish to save a copy of the configuration to a floppy. You may do so at this time, as prompted by the screen display.

Formatting the newly created partition

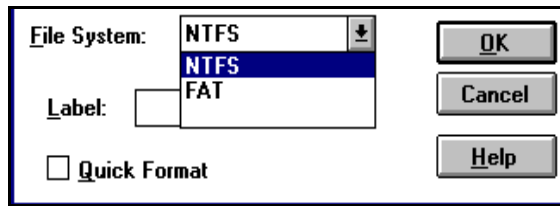
1. While still running Disk Administrator, click on the **Tools** pull-down menu, (Figure 4-5) and select **Format** to access the **Format** menu (Figure 4-6). The **Format** menu choices allow you to choose the file system type **FAT** or **NTFS** and the **Quick Format** option.

Figure 4-5 Tools Pull-Down Choices



2. Select a file system and click **OK** to begin the format process. A message window appears advising you when the formatting is complete.

Figure 4–6 Format Menu



3. Continue to format each new partition until all partitions have been formatted.
4. When all partitions have been formatted, close Disk Administrator. At this point, the configuration has been completed, and is recognized by Windows NT.

4.1.3 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 Command Console to create new StorageSets (refer to the Command Console User's Guide and on-line documentation to make the changes).

Removing disk partitions

1. From **Disk Administrator**, click the partition you wish to delete.
2. Access the **Partition** menu and choose **Delete**.
3. Continue selecting and deleting the partitions until you have done so to all the partitions you wish to change. When finished, click on **Commit Changes Now**. You may now reconfigure the RAID 310 Array using Command Console.
4. Reboot your system so Windows NT will recognize the changes.

Communicating Over a Network

This chapter introduces you to Command Console's agent and provides instructions on how to establish communication over a network. The instructions include how to install and configure the agent and how to add systems to the network using Command Console (the client).

5.1 Introduction

To communicate with your 310 RAID Array over a network, two software applications are required: an agent and a client. The client is a Graphical User Interface which installs and runs on a system designated as a Management Station. From the Management Station you can configure and monitor your RAID Array. The agent installs and runs unseen in the background on the storage subsystem's host computer. First you install the agent and then the client. Together the two provide the software link required for communication over a network.

The agent:

The agent runs on the host system as a server application and connects to the client via the TCP/IP network protocol. To establish communication over a network, you must install the agent in the storage subsystem's host system.

The agent provides the software interface between the host storage subsystem and any number of client sessions running on either the host or remote system, allowing you to configure and monitor your storage subsystem from many locations.

The agent provides access protection and asynchronous fault notification. You can configure the agent to use TCP notification to the client or SNMP notification to an SNMP-compatible monitoring application.

The client:

In this document the client is called Command Console. Command Console is the control interface for your RAID Array. Before you can communicate with your storage subsystem over a network, the subsystem and host system must be added to Command Console's database.

NOTE

The Management Station must be either an Intel-based Windows NT platform or an Intel-based Windows 95 platform.

5.2 Agent Connection Licensing

The basic, network version of Command Console comes with a built-in license to connect to one agent program. To run more than one agent, you must purchase a multi-agent license.

The license number determines the number of agents you can connect Command Console (the client) to. The Command Console **Settings | License Upgrade** command accesses the license number dialog box.

5.3 Before You Start

- Your system resources must meet the minimum requirements listed in Table 5–1.

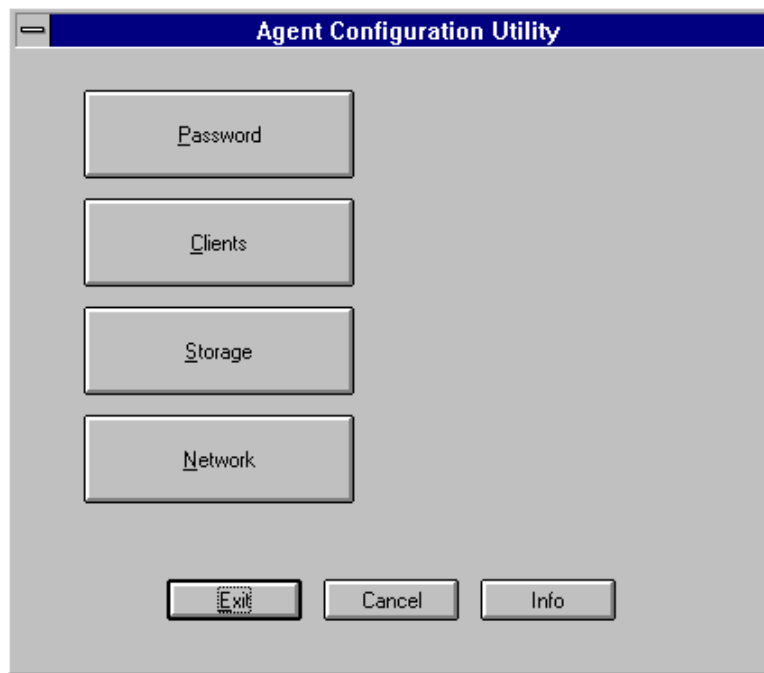
Table 5–1 Minimum Management Station System Requirements

Host Feature	Requirement
PC Requirements	Intel 486, 66 MHz, 16 MB memory, 1 MB free disk space, and CD-ROM drive
Operating System	Windows NT 3.51 or NT 4.0
Network Connection	TCP/IP-compatible network card
Controller Compatibility	StorageWorks RAID 310 controller running operating firmware Version 3.1 or higher.

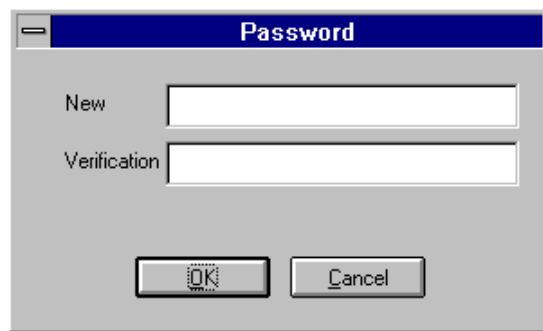
- Decide if you need password protection for the agent’s host system. You may specify a password during the agent’s installing routine.
- You will also need the IP name of Command Console’s host system and you need to name the storage subsystem(s) connected to the agent’s host system.
- You need to have installed TCP/IP services on your NT server.
- You need to have created a “communications” volume on your RAID 310 Array using Command Console and a serial port connection (Chapter 3), and assigned a Windows NT drive letter to the “communications” volume using the Disk Administrator (Chapter 4).

5.4 Installing the Agent

- Place the RAID Array 310 Installation Kit V3.2 for Windows NT CD–ROM in your storage subsystem’s host system CD–ROM drive.
- Open the AGENT subdirectory in File Manager.
- Double click the SETUP . EXE file. The installation program begins and displays the *Agent Configuration Utility* menu. The menu, shown in Figure 5-1, provides four choices: *Password*, *Clients*, *Storage* and *Network*. If you need more information on configuring the agent, click the *Info* button.

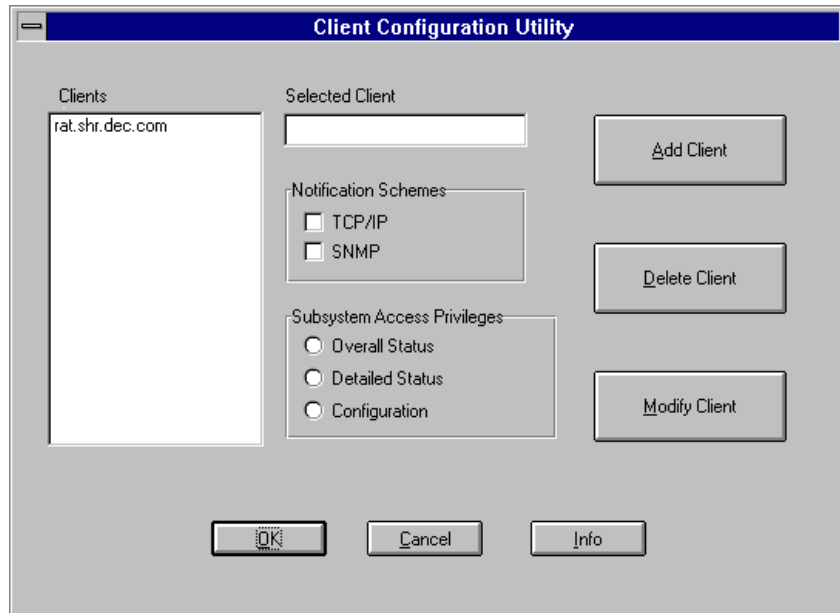
Figure 5–1 Agent Configuration Utility Menu

4. Click *Password*, enter a password in the *New* and *Verification* text boxes (Figure 5–2), and click *OK*.

Figure 5–2 Agent Password Dialog Box

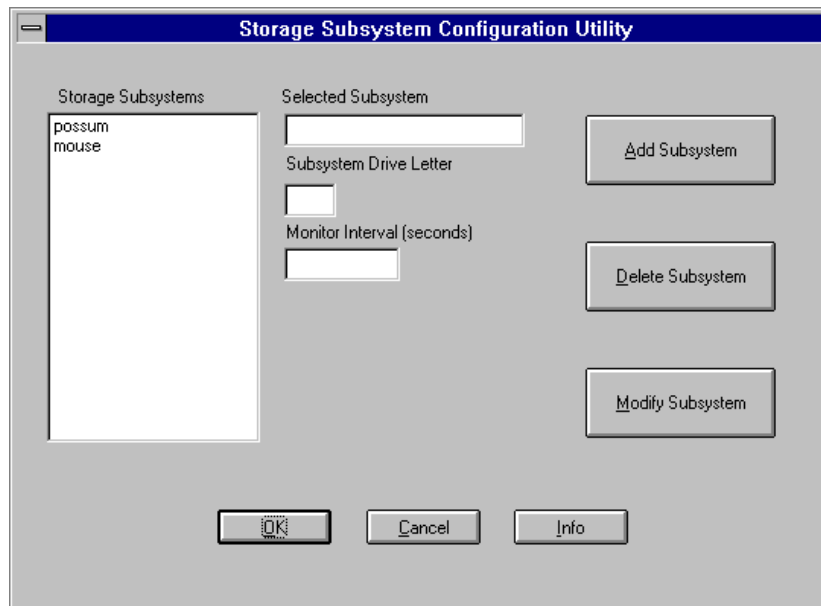
5. Click *Clients* to access the *Client Configuration Utility* (Figure 5–3). Enter the name of Command Console's host system and configure the client. Choose TCP/IP (for Command Console) or SNMP notification. Then click on *Add Client*.
6. Repeat this step until all management workstations have been added and appear in the *Clients* box on the left-hand side of the window. Then click *OK*.

Figure 5–3 Client Configuration Utility Screen



6. Click *Storage* to access the *Storage Subsystem Configuration Utility* (Figure 5-4), assign and enter the name of your storage subsystem, its Windows NT drive letter and the monitoring interval in seconds. When you are finished click *Add Subsystem*.
7. When all subsystems have been added and appear in the *Storage Subsystems* box, click *OK*.

Figure 5–4 Storage Subsystem Configuration Utility Screen



7. Default network configuration settings usually are not changed unless the default port numbers are being used by another application. If a conflict exists, click the *Network* button and change the default settings. (See Figure 5-5). For more information on port numbers (windows socket numbers), click on the *Info* button.

Figure 5-5 Network Configuration Utility Screen

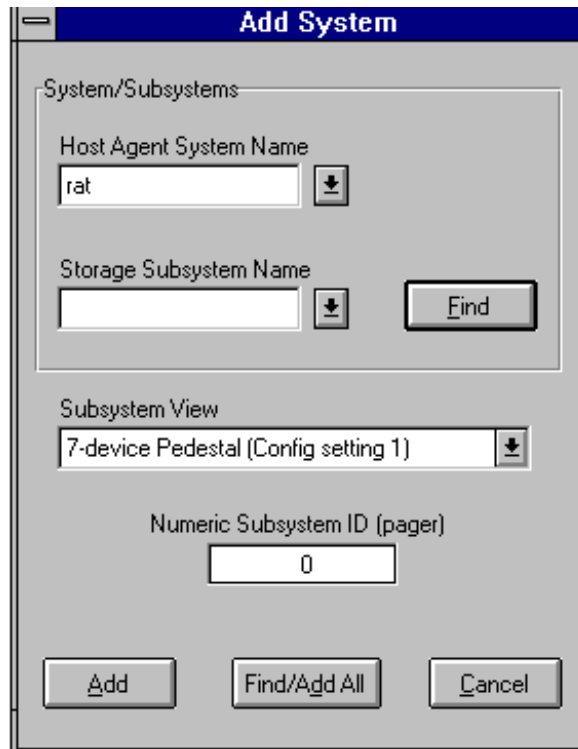
8. Return to the *Agent Configuration Utility* menu and click *OK* to install the agent.

5.5 Adding A System to the Network

Systems are added to the network using Command Console, the client. Command Console can be installed locally in the storage subsystem's host system or in a remotely located PC running Windows 95 or Windows NT, referred to as the Management Station. To complete the network link proceed as follows:

1. Install Command Console in the Management Station. This is the system you will use to configure and monitor your RAID 310 Array. Command Console installation is covered in Chapter 3.
2. Make sure that you have properly installed and configured an agent on the host system you want to connect.
3. Launch the icon representing the Network Version of Command Console to display the Control Panel.
4. From the Menu Bar choose **Configuration | Add System** to access the *Add System* dialog box (Figure 5-6).

Figure 5–6 Add System Dialog Box



5. Enter the host platform agent and storage subsystem names as defined in the agent. After you enter the host system name, you can use the *Find* button to find and list the storage subsystems connected to a host system. Command Console finds all the subsystems connected to the host system and creates a pull-down list of their names. You can then select a name from the list.
6. Select *7-device Pedestal (Config setting 1)* for the *Subsystem View* and click on either the *Add* button (adds the subsystem shown in the *Storage Subsystem Name* box to the network) or the *Find/Add All* button (adds all the storage subsystems connected to the host system). Command Console displays the icons for the added system and subsystem(s) in the Navigation Window.



Accessing the Command Line Interpreter (CLI)

This chapter contains instructions for accessing the Command Line Interpreter (CLI). The CLI is used to access various maintenance and diagnostic programs.

A.1 What is the CLI?

The Command Line Interpreter (CLI) is an alternate user interface for the RAID 310 controller. Using a connection between the controller's maintenance port and your computer system's communications port, the CLI can be used to enter commands, access various reports, and run diagnostic tools. For additional information regarding these commands, reports, and tools, refer to the *HSZ20 Array Controller User's Guide* (EK-SMCS2-UG).

A.2 Accessing the CLI

NOTE

Before performing the following procedures, you must exit and close the RAID Array 310 manager graphical user interface. This is necessary to permit the serial data line and associated communications port on the computer system to run with the terminal emulator program, as described below.

The CLI is accessed from your system's Windows NT Terminal program (in the Accessories group). The Terminal program uses the serial data line that connects the maintenance port on a RAID 310 controller to your computer system communications port (Com1, Com2, etc.).

Although you may use a separate maintenance terminal, we recommend using the Terminal program. Doing so simplifies the procedure because the serial data line already has been connected as part of your system installation procedure. You can also use most commercially-available communications programs.

The Following procedures assumes your serial data line remains connected from the RAID 310 controller maintenance port to the communications port on your computer system. Follow these procedures to access the CLI:

1. Start the communications program on your system.
2. Set the communications program to use the serial port (**COM1**, **COM2**, etc.) that is connected to the controller.

3. Set the communications parameters to:
 - 9600 baud
 - 8 bits
 - 1 stop bit
 - No parity
4. From your communication program, issue a connect command to establish a connection with the controller, and then press the Enter key. You should see the CLI prompt, which looks similar to

HSZ20>

From this prompt, you may issue your CLI commands. For further information regarding CLI commands, reports, etc., refer to the *HSZ20 Array Controller User's Guide* (EK-SMCS2-UG).

B

Upgrading Controller Software

This appendix contains the procedures for backing up and upgrading the controller software.

B.1 Backing up your system

Before performing the upgrade, backup all data and files from your RAID Array 310 subsystem.

B.2 Saving the RAID Array 310 Configuration

In the following steps, you need to record your configuration for use in the event that the configuration is not correctly preserved during the software upgrade.

First, record the controller configuration. Display the controller information by using the CLI command:

```
HSZ20> show this_controller full
```

Record the following:

SCSI Targets	
Preferred Targets	
Cache Flush Timer	
Cache Policy	
Host Functionality Mode	

Here is a display similar to what you'll see. The information fields you need to find are underlined.

```
Controller:
  ZG43700116 HSZ20 Controller Software, Hardware A02
  Not configured for dual-redundancy
  SCSI address 7
  Time: NOT SET
Host port:
  SCSI target(s) (4, 5) Preferred target(s) (4, 5)
  TRANSFER_RATE_REQUESTED = 10 MHZ
Cache:
  16 megabyte write cache, version 2
  Cache is GOOD
  Battery is GOOD
  No unflushed data in cache
  CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
  CACHE_POLICY = A
  NOCACHE UPS
  Host Functionality Mode = D
```

```
Licensing information:
  RAID (RAID Option) is ENABLED, license key is VALID
  WBCA (Writeback Cache Option) is ENABLED, license key is VALID
  MIRR (Disk Mirroring Option) is ENABLED, license key is VALID
Extended information:
  Terminal speed 9600 baud, eight bit, no parity, 1 stop bit
  Operation control: 00000004 Security state code: 95018
  Configuration backup disabled
```

B.2.1 Record Logical Units

List the Logical Units by entering:

```
HSZ20> show unit full full
```

This display is similar to what you'll see.

```
LUN                               Uses
D100                               S28
  Switches:
    RUN                               NOWRITE_PROTECT           READ_CACHE
    WRITEBACK_CACHE
    MAXIMUM_CACHED_TRANSFER_SIZE = 32
  State:
    ONLINE to this controller
    Not reserved
    PREFERRED_PATH = THIS_CONTROLLER
  Size: 20547350 blocks
D200                               M1
  Switches:
    RUN                               NOWRITE_PROTECT           READ_CACHE
    WRITEBACK_CACHE
    MAXIMUM_CACHED_TRANSFER_SIZE = 32
  State:
    ONLINE to this controller
    Not reserved
    PREFERRED_PATH = THIS_CONTROLLER
  Size: 4109470 blocks
```

Record, and mark when enabled, the information in the following table. The top line shows how to record entries for D100 of the sample.

Table B–1 Logical Unit Table

LUN	USES	RUN	WRITE PROTECT	READ CACHE	WRITEBACK CACHE	MAX CACHED TRANSFER SIZE
D100	S28	X		X	X	32

Next, list the storagesets you have configured:

```
SWXRC> SHOW STORAGESETS FULL
```

The controller responds with a display similar to that shown below:

```
Name          Storageset      Uses           Used by
S28           stripeset      DISK130        D100
                DISK220

Switches:
  CHUNKSIZE = 256 blocks
State:
  NORMAL
  DISK130 (member 0) is NORMAL
  DISK220 (member 1) is NORMAL
Size: 50268168 blocks

M1            mirrorset      DISK100        D200
                DISK110

Switches:
  POLICY (for replacement) = BEST_PERFORMANCE
  COPY (priority) = NORMAL
  READ_SOURCE = LEAST_BUSY
  MEMBERSHIP = 2, 2 members present
```

Record the storageset information in the Storageset Table (Table B–2). The first row shows how to record for S28 of the sample:

NOTE

Not all column headings apply to all storagesets.

Table B–2 Storageset Table

NAME	STORAGE-SET	USES	USED BY	POLICY	COPY	READ-SOURCE	RECON-STRUCT	CHUNK-SIZE
S28	Stripeset	DISK130 DISK220	D100					256
FAILED SET	AUTOSPARE	NOAUTOSPARE						

B.3 Upgrading Controller Software Using Windows NT

To upgrade software on these subsystems to Version V32Z, copy a new version of the software image from the CD-ROM, on which the new software image was distributed, to the controller. To do this, you need the following:

- The software distribution CD-ROM which came in the StorageWorks RAID Array for the RAID 310 upgrade kit.
- Windows 3.1 and 3.11, Windows for Work Groups, Windows NT, or Windows 95 running on a PC with a CD-ROM drive and a serial connection to the RAID Array subsystem.
- A terminal emulation program that runs the Kermit protocol and supports binary transfers.

In addition, stop any terminate-and-stay-ready (TSR) programs, such as screen savers, that may be running on that server.

It takes approximately 40 minutes to download the new software image at 19200 baud. To begin upgrading the controller software, start and setup the terminal emulation program as specified in the following example.

NOTE

If you are using Windows 95 or Windows NT 4.0, skip to section B.5.

B.4 Windows 3.1/3.11, Windows for Work Groups, or Windows NT 3.51 Procedures

1. Open the Windows *Accessories* and click to highlight the *Terminal* program.
2. Select File from the menu bar and click Copy or F8 to copy the Terminal icon. Change the group name from Accessories to RAID Manager or Command Console. (This step is optional).
3. If you copied Terminal to either the RAID Manager or Command Console group, go to that group now.
4. Click on Terminal to highlight the icon.
5. Click File from the menu bar followed by Properties. From the Properties menu:
 - Change the icon description name from Terminal to HSZ Term.
 - Press the Tab key which highlights **TERMINAL.EXE**. Now press the right arrow cursor key once. Next, press the spacebar and type: **HSZ.TRM**. Click the OK button.

6. Double-click the HSZ term icon. You should receive the error message, “Cannot find the settings file HSZ.TRM”, click OK. After the Terminal Program starts, select the *Communications* option from the *Settings* menu. Set these communication parameters:

- Baud rate = 9600
- Data Bits = 8 (default)
- Stop Bits = 1 (default)
- Parity = None (default)
- Flow Control = Xon/Xoff (default) or None
- Connector = (appropriate Com port)

Click OK when you complete the settings.

7. Click File from the Terminal menu bar and choose Save As.... Type in HSZ.TRM. Click OK.

NOTE

It is recommended that the window be maximized while upgrading the firmware or when running other diagnostics.

Click OK when you complete the settings.

Press the Enter key and the default prompt appears.

8. Set the controller prompt by typing:

```
set this_controller prompt=HSZ20>
```

NOTE

Wherever the controller prompt is “HSZ20>”, its string should be 1 to 16 characters long and enclosed in quotes.

9. To change the controller's baud rate to 19200, type:

```
HSZ20> set this_controller terminal_speed=19200
```

10. Change the Terminal program's baud rate to match the controller's.

NOTE

Remember to change the Command Console software baud rate from 9600 to 19200.

11. Press the Enter key and the HSZ20> prompt appears. Now you are ready to begin downloading the software.

12. To download the new software, follow these steps:

NOTE

The Code Load/Code Patch (CLCP) Utility messages shown are for a RAID Array 310 Subsystem. The CLCP Utility messages for other RAID Array subsystems are similar.

1. Insert the distribution CD-ROM containing the binary file of the new software image into a CD-ROM drive of a computer connected to the RAID Array controller.
2. Copy the firmware image from the CD-ROM software directory - D:\firmware\v3.1 into a temporary directory on the system disk.
3. Start the terminal program with the communications settings as specified above.
4. Press the Enter key to get to the HSZ20> prompt.
5. Invoke the CLCP utility, at the HSZ20> prompt, type: **run clcp**.

```
Select an option from the following list:
Code Load and Patch Utility Main Menu
      0:  Exit
      1:  Enter Code LOAD utility
      2:  Enter Code PATCH utility
```

Enter option number (0..2) ? 1

6. Type: **1** and press the Return key. The utility displays the following message:

```
You have selected the Code Load Utility. This utility is used to
load a new software image into the program card currently inserted
in the controller.
```

```
Type ^Y or ^C (then RETURN) at any time to abort code load.
```

```
The code image may be loaded using SCSI Write Buffer commands
through the SCSI Host Port, or using KERMIT protocol through the
Maintenance Terminal Port.
```

```
      0:  Exit
      1:  Enter the SCSI Host Port
      2:  Use the Maintenance Terminal Port
```

Enter option number (0..2) [0] ? 2

7. Type: **2** and press the Return key. The utility displays the following message:

```
-----
Perform the following steps before continuing:
```

```
*get new image file on the serial line host computer
```

```
*configure KERMIT with the following parameters:
```

```
terminal speed 19200 baud, eight bit, no parity, 1 stop bit
```

```
It will take approximately 35 to 45 minutes to perform the code load
operation.
```

```
WARNING: proceeding with Code Load will overwrite the current
content of your program code with a new image. Enter Y (then RETURN)
to continue
```

```
[N] ? y
```

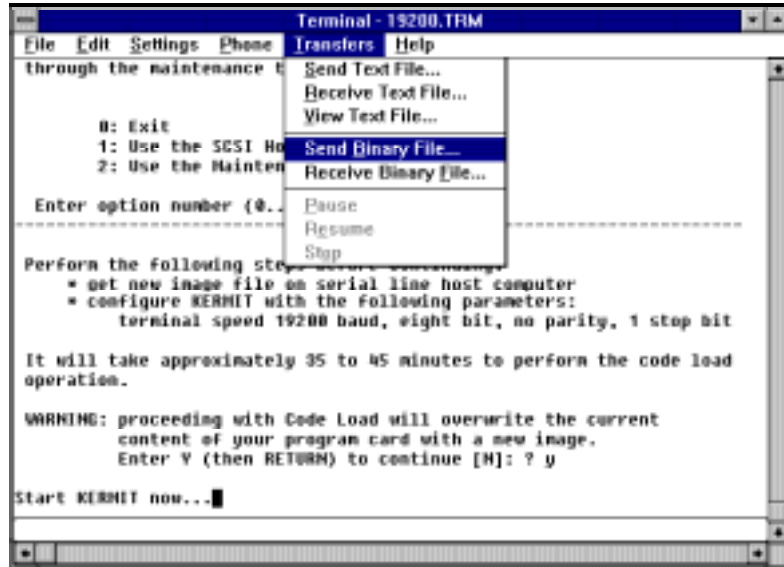
```
Start KERMIT now...
```

8. Exit any MS-Windows sessions and select *Binary Transfers* from the *Settings* menu to start Kermit.
9. Select *Kermit* and click OK.
10. Select *Send Binary File* from the *Transfers* menu to begin downloading the new software as shown in Figure 1-1

CAUTION

You must use a binary transfer mode. Failure to use a binary transfer mode will result in corruption of the controller software.

Figure B–1 Select Send Binary Files from the Transfers Menu

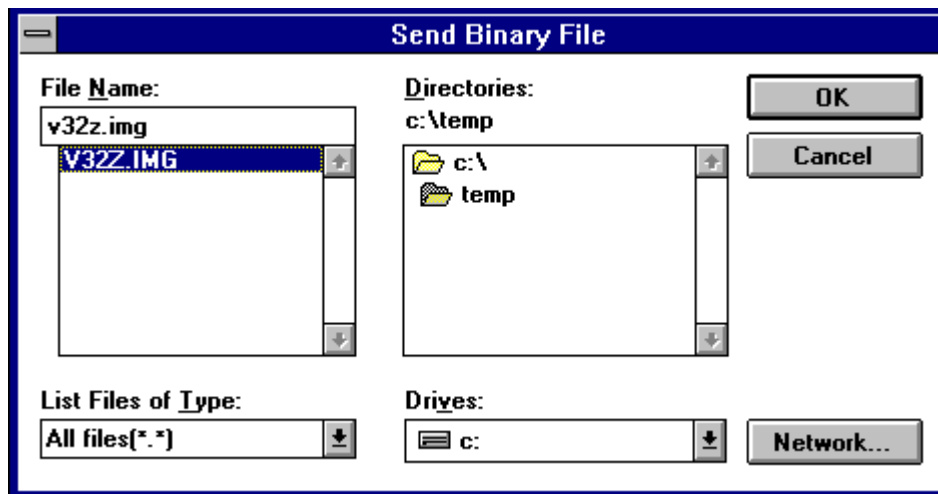


11. Select the V32Z.IMG file and Click OK as shown in figure B-2.

NOTE

The following figures show a sample software version level and not the software version level that you will actually download. The correct software version level is specified in the text of this procedure.

Figure B–2 Select the V32Z.IMG File



When the download completes, the utility displays the following message before reprogramming the controller's program care:

CAUTION

Do not interrupt the power to the RAID subsystem while the CLCP Utility reprograms the controller. The CLCP utility saves the software in non-volatile RAM on the controller. Any interruption of this procedure will result in the inability of the subsystem to reboot.

KERMIT file transferred successfully.
Program card is being re-programmed with new file.

*** Do not interrupt this step ***

Manufacturer code read from memory card= 8989

Device Code read from memory card= bdbd

12. If the main menu appears, press 0 to exit the utility.
13. Verify that this process successfully copied the new version of the software onto the controller.

At the CLI prompt, type:

```
HSZ20> show this_controller
```

The CLI displays information indicating the current software version of the controller similar to the following:

```
Controller Model: HSZ20
Serial Number: CX54300265 Hardware version: A02(02)
Software Version:V32Z
Informational Report
Instance Code: 0102030A
Last Failure Code:86000020 (No Last Failure Parameters)
Controller:
    HSZ20 CX54300265 Software V32Z, Hardware A02
    Not configured for dual-redundancy
    SCSI address 7
    Time: NOT SET
Host Port:
    SCSI target(s) (0, 1, 2, 3), Preferred target(s)
    (0, 1, 2, 3)
    TRANSFER_RATE_REQUESTED = 10MB
Cache:
16 megabyte write cache, version 2
Cache is GOOD
Battery is GOOD
No unflushed data in cache
CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
CACHE_POLICY = A
Host Functionality Mode = D.
```

B.5 Windows 95 and Windows NT 4.0 Upgrade Procedures

To begin upgrading the controller software, start and set up the terminal emulation program as specified in the following example:

1. Click the Start button and cursor to the Program menu. At the right of the menu bar, highlight Accessories.
2. To the right of Accessories, select Hyperterminal. Click the Hyperterminal menu to create a new terminal session.
3. Enter HSZ Term as the Connection Description name. Press the Tab key once and select the OK icon.
4. At the “Connect To” menu, change the connection settings for your particular system setup by pressing the Enter key. Choose the appropriate com port for your system and click OK.

NOTE

COM1 is the default connection setting.

5. Change the Port Settings baud rate from 2400 to 9600 bits per second.
6. Select Xon/Xoff or None as the Flow Control setting. Click OK. This will return you to your newly-created Terminal session.
7. Press the Enter key again and you should receive the default prompt. At the prompt, type ?. The controller will provide a list of available commands.

NOTE

For a list of additional command options, type the command followed by a space plus a ?.

8. Click File at the menu bar. Choose Save, to save the configuration you have just created.
9. Set the controller prompt by typing at the prompt. (This step is optional):

set this_controller prompt=HSZ20>

NOTE

Wherever the controller prompt is HSZ20>, its string should be 1 to 16 characters long and enclosed in quotes.

10. Change the controller’s baud rate to 19200 by typing:

HSZ20> **set this_controller terminal_speed=19200**

11. Change the Terminal’s baud rate to match the controller’s.

CAUTION

Remember to change the Command Console software baud rate from 9600 to 19200.

12. Press the Enter key and the HSZ20> prompt appears. Now you are ready to begin downloading the software.
13. To download the new software, follow these steps:

NOTE

The Code Load/Code Patch (CLCP) Utility messages shown are for a RAID Array 310 Subsystem. The CLCP Utility messages for other RAID Array subsystems are similar.

1. Insert the distribution CD-ROM containing the binary file of the new software image into a CD-ROM drive of a computer connected to the RAID Array controller.
2. Copy the firmware image from the CD-ROM software directory - *D:\firmware\v32z.img* onto a temporary directory on the system disk.
3. Start the terminal program with the communications settings as specified above.
4. Press the Enter key to get to the HSZ20> prompt.
5. Invoke the CLCP utility, at the HSZ20> prompt, type: **run clcp**.

Select an option from the following list:

Code Load and Patch Utility Main Menu

- 0: Exit
- 1: Enter Code LOAD utility
- 2: Enter Code PATCH utility

Enter option number (0..2) ? 1

6. Type: 1 and press the Return key. The utility displays the following message:

You have selected the Code Load Utility. This utility is used to load a new software image into the program card currently inserted in the controller.

Type ^Y or ^C (then RETURN) at any time to abort code load.

The code image may be loaded using SCSI Write Buffer commands through the SCSI Host Port, or using KERMIT protocol through the Maintenance Terminal Port.

- 0: Exit
- 1: Enter the SCSI Host Port
- 2: Use the Maintenance Terminal Port

Enter option number (0..2) [0] ? 2

7. Type: 2 and press the Return key. The utility displays the following message:

Perform the following steps before continuing:

- get new image file on the serial line host computer
- * configure KERMIT with the following parameters:
- terminal speed 19200 baud, eight bit, no parity,
- 1 stop bit

It will take approximately 35 to 45 minutes to perform the code load operation.

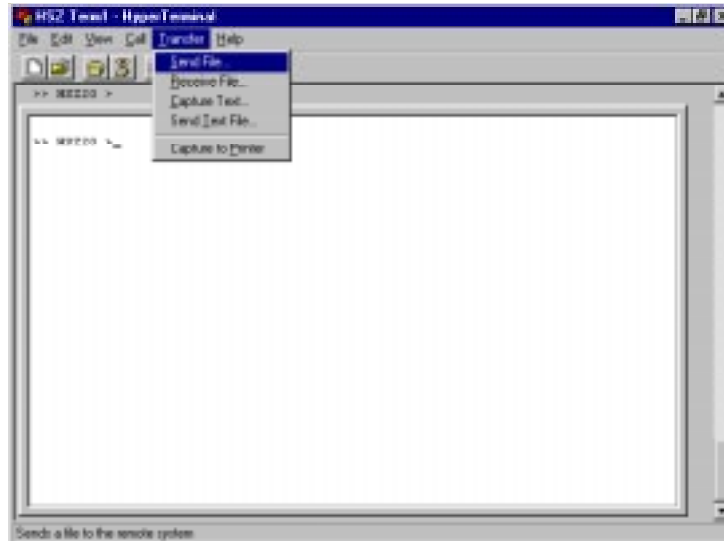
WARNING: proceeding with Code Load will overwrite the current content of your program code with a new image. Enter Y (then RETURN) to continue

[N] ? y

Start KERMIT now...

8. Select *Send File* from the *Transfer* menu.

Figure B–3 Select Send File from the Transfer Menu

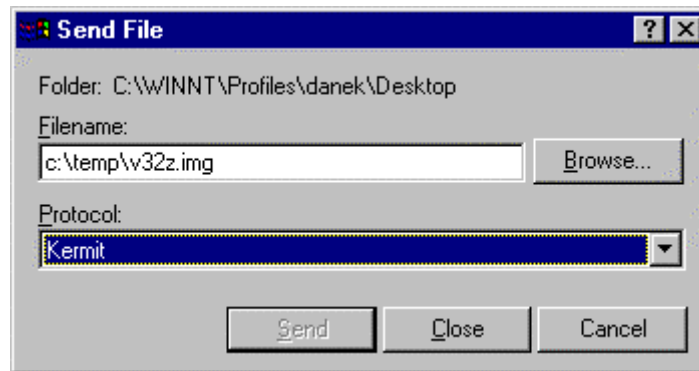


9. Type the location of the firmware image file in the Filename box. Select Kermit in the Protocol box and click the *Send* button.

NOTE

The following figure shows a sample software version level and not the software version level that you will actually download. The correct software version level is specified in the text of this procedure.

Figure B–4 Select the V32Z.IMG File



When the download completes, the utility displays the following message before reprogramming the controller's program care:

CAUTION

Do not interrupt the power to the RAID subsystem while the CLCP Utility reprograms the controller. The CLCP utility saves the software in non-volatile RAM on the controller. Any interruption of this procedure will result in the inability of the subsystem to reboot.

```
KERMIT file transferred successfully.
Program card is being reprogrammed with new file.
*** Do not interrupt this step ***
  Manufacturer code read from memory card= 8989
  Device Code read from memory card= bdbd
```

10. If the main menu appears, press 0 to exit the utility.
11. Verify that this process successfully copied the new version of the software onto the controller.
12. At the CLI prompt, type:

```
HSZ20> show this_controller
```

The CLI displays information indicating the current software version of the controller similar to the following:

```
Controller Model: HSZ20
Serial Number: CX54300265 Hardware version: A02(02)
  Software Version:V32Z
Informational Report
Instance Code: 0102030A
Last Failure Code:86000020 (No Last Failure Parameters)
HSZ20>show this_controller
Controller:
  HSZ20 CX54300265 Software V32Z, Hardware A02
  Not configured for dual-redundancy
  SCSI address 7
  Time: NOT SET
```

```
Host Port:
          SCSI target(s) (0, 1, 2, 3), Preferred target(s) (0, 1, 2, 3)
          TRANSFER_RATE_REQUESTED = 10MB

Cache:
16 megabyte write cache, version 2
Cache is GOOD
Battery is GOOD
No unflushed data in cache
CACHE_FLUSHED_TIMER = DEFAULT (10 seconds)
CACHE_POLICY = A
Host Functionality Mode = D.
```

B.6 Reverting to Previous Software Image Versions

For reversions to previous firmware releases, substitute the required image file for V32Z.IMG in the previous section (step 2) as the correct software image filename. Previous firmware images are stored in the directory, \firmware.

B.7 Manual RAID Array 310 Configuration Restoration

The configuration of the storage sets on the RAID array 310 is usually unaffected by changing the software version. The configuration parameters, however, should be logged before performing any upgrade.

Reader's Comments

Manual Order Number:

EK-SMRAE-IG. D01

Digital is committed to providing the best possible products and services. Since our manuals are important components of our products, we value your comments, corrections, and suggestions for improvements. Please take a few minutes to fill out and return this form, attaching additional sheets, if needed. Thank you.

Manual Rating	Excellent	Good	Fair	Poor
Accuracy (correct presentation of facts)	[]	[]	[]	[]
Completeness (adequate information)	[]	[]	[]	[]
Clarity (easy to understand)	[]	[]	[]	[]
Organization (logical sequence of information)	[]	[]	[]	[]
Layout (easy to follow subject matter)	[]	[]	[]	[]
Indexing (easy to locate desired information)	[]	[]	[]	[]

Errors Noted *(please include page, paragraph, table or figure number)*

Most-Liked Features

Least-Liked Features

Suggestions for Improvement

Return Address: Digital Equipment Corporation Customer Research Response Center 334 South Street, SHR3-2/S27 Shrewsbury, MA 01545	_____
	Name _____ Phone _____

	Title _____

	Company _____

	Street Address _____

Mail Stop _____	

City _____ State _____ ZIP _____	

Country (if other than USA) _____	

