



Getting Started

RAID Array 310 v3.2 for OpenVMS

Installation Guide

EK-SMVMS-IG. C01

Digital Equipment Corporation
Maynard, Massachusetts

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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 for OpenVMS – Alpha systems.

Revision Level	Date	Summary of Changes
EK–SMVMS–IG. A01	September 1996	Original Release
EK–SMVMS–IG. B01	April 1997	Updated to add support for HSOF V3.1 and StorageWorks Command Console V1.1
EK–SMVMS–IG. C01	January 1998	Updated to add support for HSOF V3.2 and StorageWorks Command Console V1.2.

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
- Configuring the RAID Array
- How to install the KZPSA Host Adapter board into your system

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, OpenVMS, 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 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 system or maintenance terminal.

Chapter 2: Creating an Initial Controller Configuration

This chapter contains instructions for creating an initial configuration for your RAID Array controller. It also briefly describes the CLI (Command Line Interpreter).

Chapter 3: Installing the SCSI Host Adapter Hardware

This chapter describes the steps required to connect the RAID Array 310 subsystem to your Alpha system.

Chapter 4: Installing and Configuring the Command Console Agent

This chapter contains instructions for installing Command Console as well as creating your first volume.

Chapter 5: Installing the Command Console Client

This chapter describes how to install a copy of the Command Console Client on each of your client systems.

Appendix A: Configuration Guidelines

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>StorageWorks RAID Array 310 Configuration and Maintenance Guide</i>	EK-SMCS2-UG
<i>RAID Array 310 Deskside Subsystem User's Guide</i>	EK-SMCPL-UG
<i>Release Notes</i>	

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 for OpenVMS 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 Subsystem
- StorageWorks RAID Array 310 OpenVMS platform kit

NOTE

Installing the StorageWorks RAID Array 310 Subsystem requires a technical understanding of the following:

- Digital Alpha-based Computer Systems
- RAID array concepts
- OpenVMS
- 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. (Chapter 1)
2. Unpacking and locating the RAID Array 310 Subsystem, and charging the write-back cache module batteries (Chapter 1)
3. Connecting the maintenance terminal and establishing communications (Chapter 2)
4. Using the Command Line Interpreter (CLI) (Chapter 2)
5. Creating an Initial Controller Configuration (Chapter 2)
6. Unpacking and installing the SCSI host adapter and connecting the KZPSA host adapter to the RAID controller (Chapter 3)
7. Installing and configuring the Command Console Agent (Chapter 4)
8. Installing the Command Console Client (Chapter 5)

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-server, with an available PCI slot, that supports KZPSA
- The associated system hardware manual(s)
- Appropriate tools to service your computer
- The OpenVMS V7.1 operating system

Inventory the StorageWorks RAID Array 310 Subsystem and Platform Kit Components

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

- A Host Adapter – Model KZPSA-BB for Alpha-based 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)
- Media containing software to connect KZPSA
- This *Getting Started – RAID Array 310 for OpenVMS Installation Guide*
- Release Notes containing version-specific instructions for system installation

The StorageWorks RAID Array 310 Subsystem provides the following components:

- The StorageWorks Storage Expansion Enclosure
- The RAID Array 310 Deskside Subsystem Enclosure User's Guide
- The RAID Array 310 Configuration and Maintenance Guide
- Serial cable (two 9-pin adapters and two 25-pin adapters) for connecting the maintenance port of the RAID controller to the serial port of your system, PC, or maintenance terminal
- Two power cords
- Enclosure keys
- RAID Array 310 Controller Firmware License 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 system or maintenance terminal.

1.1 Introduction

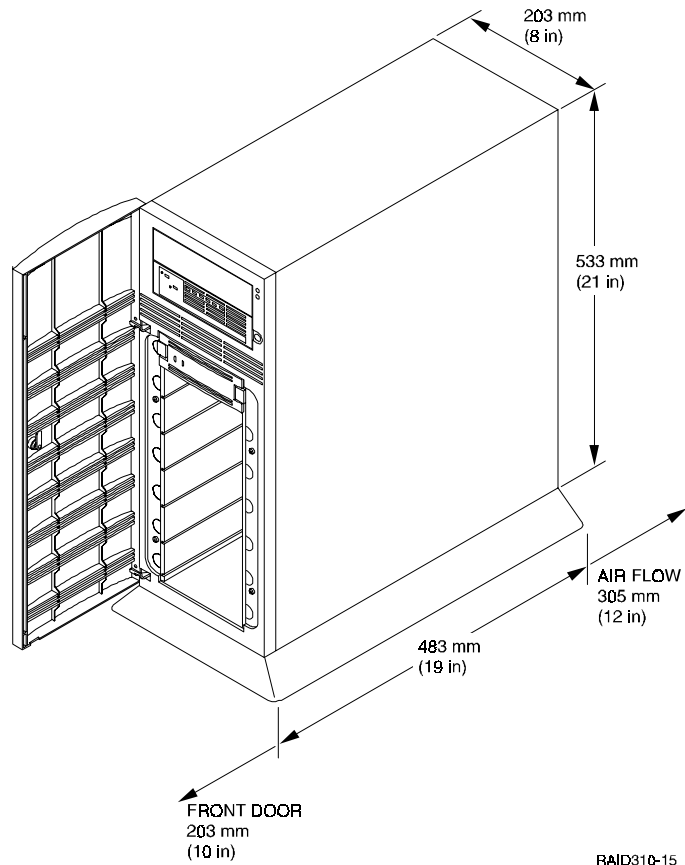
The installation of your RAID Array 310 subsystem is accomplished by performing the major steps as follows:

- Unpacking and setting up the mechanical configuration (*Chapter 1*)
- Connecting ac power and recharging the controller cache battery (*Chapter 1*)
- Making the serial interface connection between the RAID Array 310 and the host system or maintenance terminal (*Chapter 1*)
- Creating an initial RAID array controller configuration (*Chapter 2*)
- Installing the SCSI host adapter and making the SCSI connection to the host (*Chapter 3*)
- Installing and configuring the Command Console Agent (*Chapter 4*)
- Installing the Command Console Client (*Chapter 5*)

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.

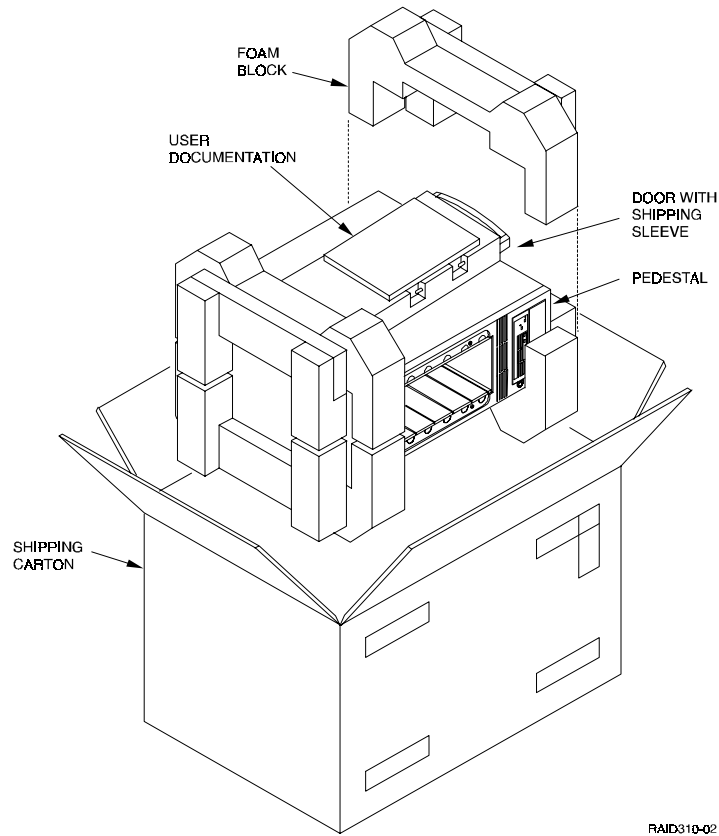
NOTE

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

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 it 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:

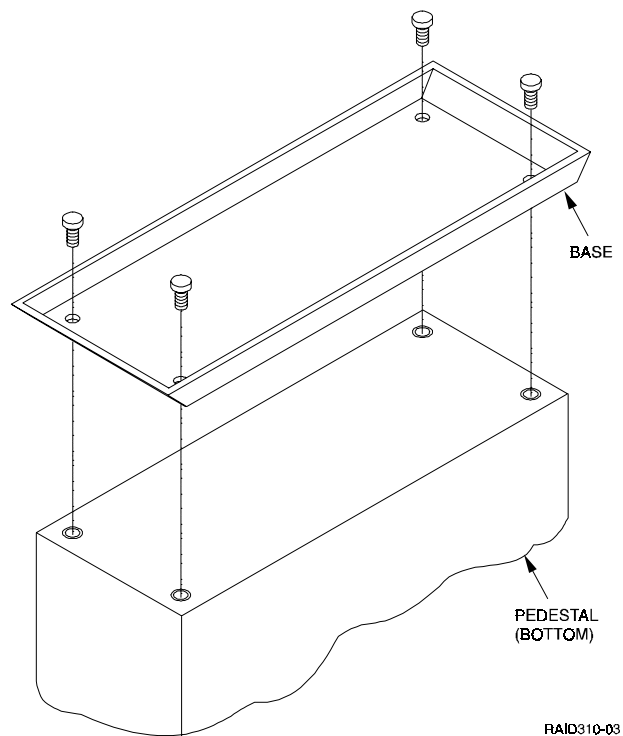
1. Mounting the base as described in Section 1.5.
2. Mounting the door.
3. Installing the disk SBB's.
4. Connecting the power cable, SCSI bus cable, and CLI serial cable.
5. Configuring the RAID Array 310.
6. Charging the controller cache battery.
7. Checking the subsystem for proper operation.

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 screws through the base into the subsystem and tighten the screws using a 3/16 (5 mm) hex-head or flat-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 that provides 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. The power supply automatically senses and switches itself to accommodate either power source. 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).

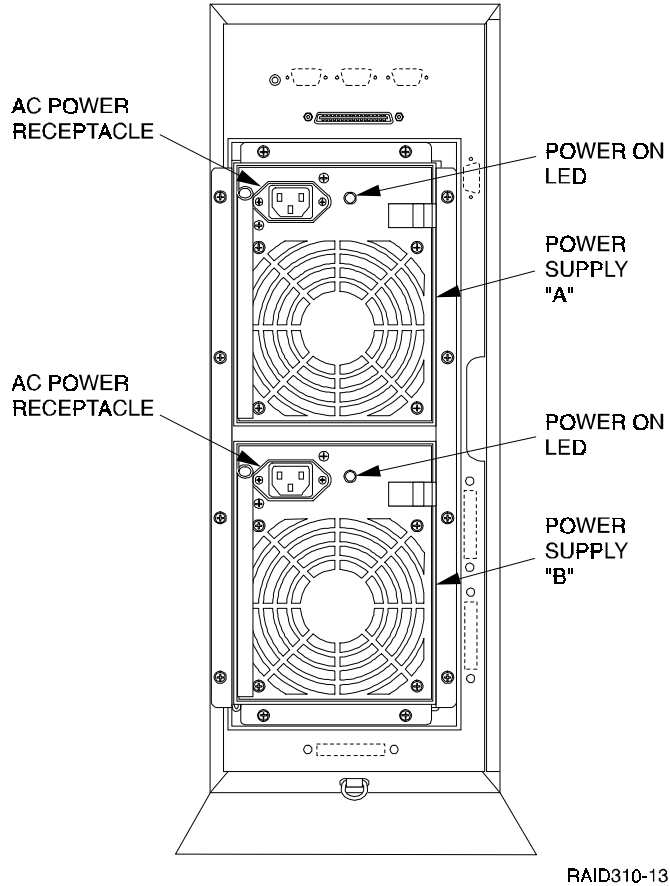
NOTE

There are two power supply units in the cabinet. Both must be connected using their respective power cables. Connect each supply to independent ac sources to provide maximum fault tolerant operation.

Table 1–1 Country-Specific Power Cords

Country	Length	Order No.
Australia	2.5 m	BN19H-2E
C. Europe	2.5 m	BN19C-2E
Denmark	2.5 m	BN19K-2E
India	2.5 m	BN19S-2E
Ireland	2.5 m	BN19A-2E
Israel	2.5 m	BN18L-2E
Italy	2.5 m	BN19M-2E
Japan	2.5 m	BN27S-2E
N. Zealand	2.5 m	BN19H-2E
S. Africa	2.5 m	BN19S-2E
Switzerland	2.5 m	BN19E-2E
U. K.	2.5 m	BN19A-2E
U. S.	2.5 m	BN27S-2E

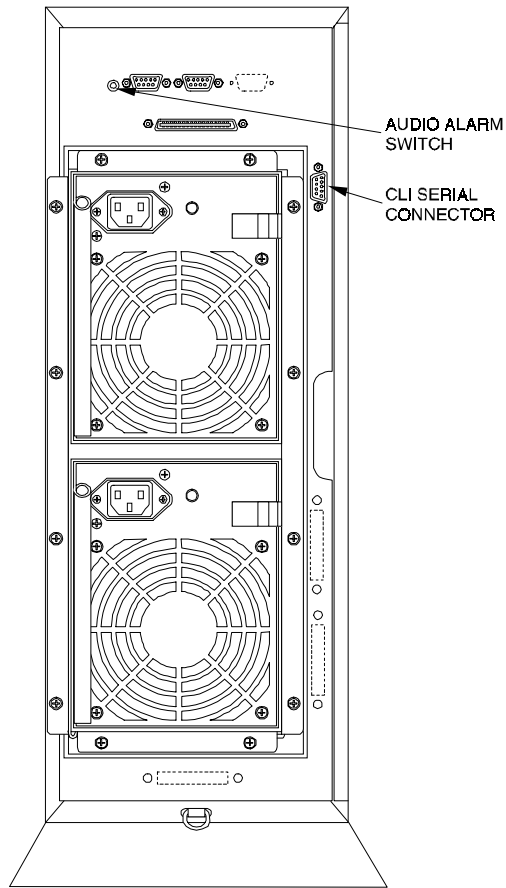
Figure 1-4 Subsystem AC Power Receptacles



1.7 Connecting the CLI Serial Interface

The RAID Array 310 requires a terminal or terminal emulation program connected to the CLI serial connector on the rear panel of the subsystem (see Figure 1-5). The serial interface is set to 9600 baud, with 8 data bits, 1 stop bit, and no parity.

Figure 1 –5 Subsystem CLI Serial Connector



SMRA9-02

1.7.1 Cabling Kit

Locate and open the cabling kit that was shipped with your RAID Array 310 subsystem. The kit should contain the following components:

Table 1–2 Cabling Kit Components

Qty	Digital Part No.	Wiring	Description
1	BC16E-10	NA	10-foot Terminal Cable
2	H8571-J	Straight through	DB-9-pin "J" Female to Cable Connector
1	H8575-A	Straight through	Cable to 25-pin Female Connector
1	H8575-D	Straight through	Cable to 25-pin Male Connector
1	H8575-E	Crossed	Cable to 25-pin Male Connector

1.7.2 Serial Connection

From the components listed in Table 1–2, construct and attach a cable that connects the DB-9 CLI serial connector on the subsystem to your terminal or the host serial port.

1.7.3 Maintenance Terminal Connection

Refer to your terminal or terminal emulator documentation for setup instructions.

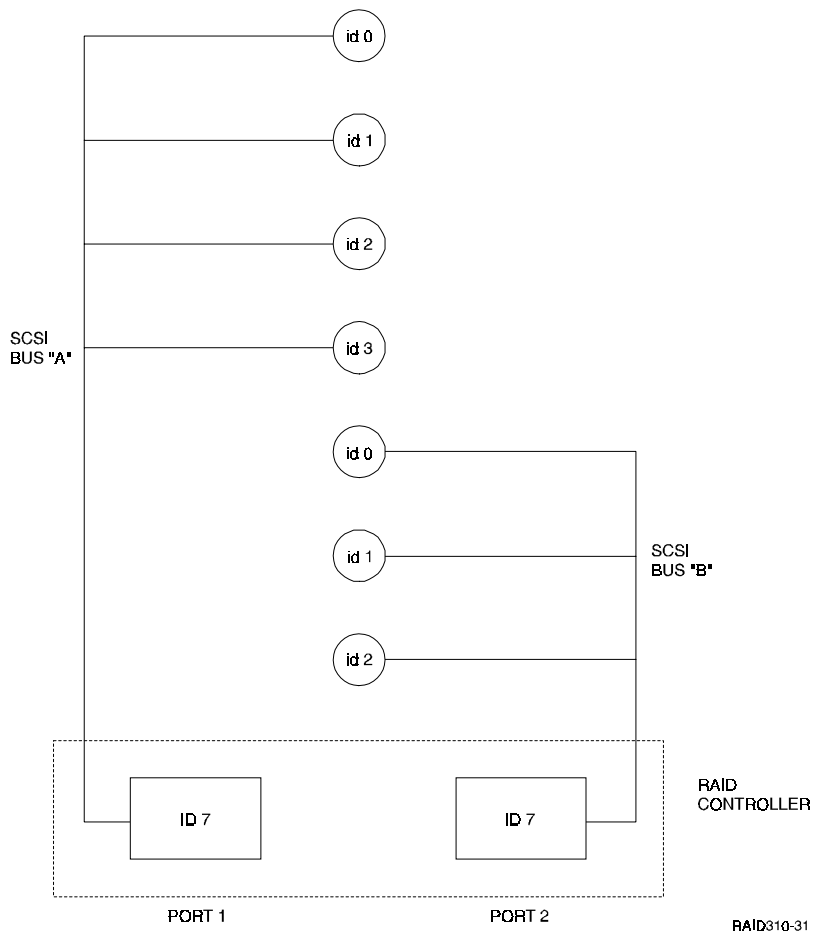
1.7.4 CLI Serial Interface Verification

Entering the CLI command “SHOW THIS_CONTROLLER” causes the controller to display its description banner verifying the serial connection.

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 Default SCSI ID Assignment



1.9 Charging the RAID Array Controller Cache Battery

The 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 one Hz. Power on the subsystem for a minimum of 6 hours. The battery will be fully re-charged in the time specified.

NOTES

The controller cache battery LED will continue to flash after the subsystem is powered off.

If only one power supply is powered, the audible alarm will sound. This can be turned off from the switch shown on Figure 1-5.

Creating an Initial Controller Configuration

This chapter contains instructions for creating an initial configuration for your RAID Array Controller. It also briefly describes the CLI (Command Line Interpreter) and how to access it. The configuration steps include verifying the default configuration, adding drives, creating and initializing RAIDsets, stripesets, mirrorsets, and striped mirrorsets, declaring the storagesets as units to the host, and verifying and recording your final configuration.

2.1 What is the CLI?

The Command Line Interpreter (CLI) is the user interface to the RAID Array Controller. Using a connection between the controller's maintenance port and a Maintenance Terminal, the CLI can be used to view and modify the controller's configuration. The CLI can also be used to access reports and diagnostic tools. This chapter specifies the CLI commands required to create an initial configuration for the controller.

See “*Command Line Interpreter*” in the *RAID Array 310 Configuration and Maintenance Guide* for detailed descriptions of all CLI commands.

NOTE

The Maintenance Terminal can be any VT100 compatible terminal or terminal emulator. For example:

PC with a terminal emulation program, such as the Microsoft Windows Terminal program. You can also use most commercially-available communications programs. DEC VT100 or compatible terminal. On UNIX systems, 'tip' or 'cu' (see man pages) can be used as terminal emulation program.

2.2 Accessing the CLI

Access the CLI using a maintenance terminal. As an example we will describe the use of a PC with a terminal emulation program being used as a maintenance terminal. Refer to Section 1.7 in Chapter 1 of this guide (*Connecting the CLI Interface*) for a description of how to connect the maintenance terminal to the RAID 310 controller if necessary.

2.2.1 Start the Communications Program

1. Start the communications program on your PC.
2. Set the communications program to use the serial port that is connected to the controller.
3. Set the communications parameters to:
 - 9600 baud
 - 8 bits
 - 1 stop bit
 - No parity

2.2.2 Establish the Connection with the Controller

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>
```

2.3 Show Initial Configuration

Enter the following command to verify the controller's parameters:

```
HSZ20> SHOW THIS_CONTROLLER FULL
```

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

```
CONTROLLER:
```

```
    HSZ20 CX44332211 FIRMWARE V32Z-0, HARDWARE A02
```

```
    SCSI ADDRESS 7
```

```
    TIME: NOT SET
```

```
HOST PORT:
```

```
A    SCSI TARGET(S) (0, 1, 2) NO PREFERRED TARGETS
```

```
CACHE:
```

```
    16 MEGABYTE WRITE CACHE, VERSION 2
```

```
B    CACHE IS GOOD
```

```
C    BATTERY IS GOOD
```

```
    NO UNFLUSHED DATA IN CACHE
```

```
    CACHE_FLUSH_TIMER = DEFAULT (10 SECONDS)
```

```
D    CACHE_POLICY=A
```

```
E    HOST FUNCTIONALITY MODE=A
```

```
    LICENSING INFORMATION:
```

```
F    RAID (RAID OPTION) IS ENABLED, LICENSE KEY IS VALID
```

```
G    WBCA (WRITEBACK CACHE OPTION) IS ENABLED, LICENSE KEY IS VALID
```


H 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:0000004 SECURITY STATE CODE:85780

I CONFIGURATION BACKUP DISABLED

Examine the display to verify the following information:

A Controller SCSI target number is recommended to be set to 0

If the target number is not 0, use the following commands to set the SCSI target ID for the controller (ensure that there are no other SCSI devices using the same IDs as configured for the RAID Array 310 controller):

```
HSZ20> SET THIS_CONTROLLER ID=0 or
```

```
HSZ20> SET THIS_CONTROLLER ID=(0, 1, 2)
```

if you want to use multiple SCSI Ids (as is done in the following examples).

B Cache condition should be GOOD

If the Cache condition is BAD then call your sales person for unit service.

C Battery condition should be GOOD

If the battery condition is LOW, allow the battery to charge with the subsystem power on for up to 6 hours. The battery must be fully charged to protect the data in the Write Back Cache. If the battery condition is still LOW after 6 hours of charging, then call your sales person for unit service.

NOTE

The subsystem can be configured with the battery condition LOW, however the Write Back Cache cannot be initialized.

You can use the ADD RAIDSET and ADD MIRRORSET commands, regardless of the write-back cache battery condition. However, if the CACHE_POLICY is set to A and the battery is low, the controller does not allow access to any RAIDsets or mirrorsets. CACHE_POLICY A requires that the cache batteries be fully charged before you can use RAIDsets or mirrorsets.

D CACHE_POLICY should be A

```
HSZ20> SET THIS_CONTROLLER CACHE_POLICY=A
```

E Host function mode must be set to A for OpenVMS

```
HSZ20> SET THIS_CONTROLLER HOST_FUNCTION=A
```

F/G/H License key should be VALID

If the License key is INVALID then enter the following:

```
HSZ20> RUN FLS
```

and follow the menu driven program to enable the license. You will need the WRITE-BACK CACHE, RAID5, and MIRROR License Key page that is provided in the subsystem documentation package.

I Configuration backup can be enabled or disabled

Configuration backup will keep RAID Array controller configuration stored on disk, for detailed information regarding configuration backup see the *RAID Array 310 Configuration and Maintenance User's Guide*.

To cause the changed settings on the controller to take effect, restart the controller by:

```
HSZ20> RESTART THIS_CONTROLLER
```

NOTE

Up to 14 devices can be supported by the RAID Array 310 controller, the controller can represent up to 4 target ID's on the Host SCSI-bus. You can increase the number of addressable units by setting the controller to respond to up to 4 target ID's, as long as those IDs are not used by any other device on the host bus. For example, SET THIS_CONTROLLER ID=(0 , 1 , 2 , 3) would set the controller to respond to any of the four IDs. If you set the controller to more than one ID, you must enclose the numbers with parentheses and separate them with commas.

NOTE

After the RESTART command is initiated, it can take up to 90 seconds for the "CLI" prompt to re-appear.

2.4 Add Disks to the Configuration

The CONFIG utility locates and adds disks to the controller configuration. Run the CONFIG utility whenever you add new disks to the controller. Enter the following command to start the configuration utility:

```
HSZ20> RUN CONFIG
```

The controller responds with a display similar to that shown below. The disk numbers will correspond to the disk locations for your subsystem.

```
Config Local Program InvokedConfig is building its tables and determining what
devices exist on the subsystem. Please be patient.add disk100 1 0 0add disk110
1 1 0add disk120 1 2 0add disk130 1 3 0add disk200 2 0 0add disk210 2 1 0add
disk220 2 2 0 Config - Normal Termination
```

In the previous example, the controller has located 7 new disks. The 3 digit number associated with each disk corresponds to Bus Number, Target Number and Logical Unit Number (LUN). The LUN is always 0. DISK100, in this example, corresponds to the disk located on Bus 1, controller Target 0, and LUN 0. DISK210 corresponds to the disk located on Bus 2, controller Target 1, and LUN 0.

Depending on the type of RAIDsets you want to create, follow the guidelines in the next four sections listed below to create your configuration. Throughout this document, the following references apply:

- Striperset refers to RAID 0 (Section 2.6)
- Mirrorset refers to RAID 1 (Section 2.7)
- Striped Mirrorset refers to RAID 0+1 (Section 2.8)
- RAIDset refers to RAID 5 (Section 2.5)

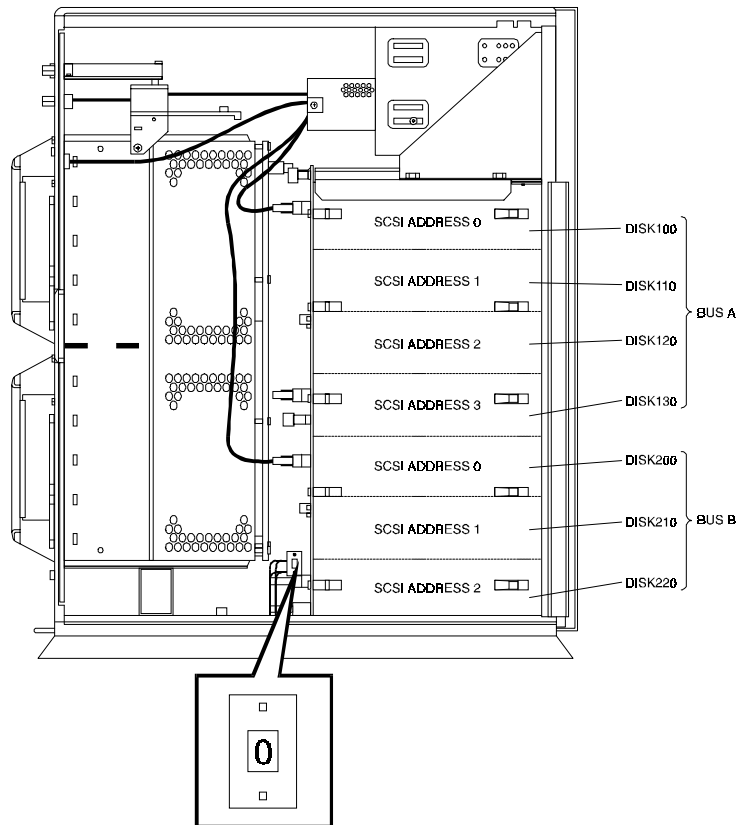
2.5 Create a RAIDset

You must assign disks to each RAIDset. RAIDsets must have at least three members, and can have as many as fourteen. This example creates one 3-member RAIDsets using the ADD RAIDSET command.

```
HSZ20> ADD RAIDSET RAIDS1 DISK100 DISK200 DISK110
```

In this example, “RAIDS1” is the name of the RAIDsets, and they are followed by a list of disks to be included in each RAIDset. The names of the RAIDsets are user-defined. Performance of your RAIDsets will be optimized if each RAIDset includes disks from different buses as shown in the Figure 2–1 below. The example above contains disks from two different buses.

Figure 2–1 RAIDset Configuration Example



RAID310-09

2.5.1 Initialize the RAIDset

You must initialize RAIDsets before you can put them into service.

When you initialize a RAIDset, you can specify a chunksize. A chunksize is the number of blocks of data that is transferred to a raidset member at one time. By using the default chunksize, the controller will select a chunksize that works well for most site requirements. Refer to the *RAID Array 310 Configuration and Maintenance Guide* for the specific default chunksize. When no chunksize is specified, the default value is used.

```
HSZ20> INITIALIZE RAIDS1
```

or if the save configuration option is used,

```
INITIALIZE RAIDS1 CHUNKSIZE=DEFAULT SAVE_CONFIGURATION
```

NOTE

Valid chunksizes are 16–682 blocks. You should use a larger chunksize for applications that make a lot of I/O requests. Use a smaller chunksize for applications that make relatively few I/O requests but need to move large amounts of data with each request. When no CHUNKSIZE is specified, the default value is automatically used. Refer to *the RAID Array 310 Configuration and Maintenance Guide* for more detailed information.

The SAVE_CONFIGURATION option can be used to save the controller configuration on the disk(s) defined in the containerset. In case of a controller failure, it is possible to retrieve the configuration information from the failed controller to the new controller. It is advised to use this option on more than one disk in different containersets so that the information is stored in a redundant manner. For detailed information describing this option and the way of retrieving controller information in case of a controller replacement, refer to the *RAID Array 310 Configuration and Maintenance Guide*.

2.5.2 Add the RAIDset as a Logical Unit

To make a RAIDset available to the host computer, you must add it as a host logical unit with a unique unit number. The unit number is a one or three digit number preceded by “D”, such as “D0” or “D102”. The unit number consists of the controller’s target ID and the Logical Unit (LUN) of the RAIDset for the target. Each target ID can have up to eight LUNs, numbered 0–7.

- Units identified with controller target ID 0 have a single digit number that corresponds to the LUN number. For example, D5 would be target 0, LUN 5.
- Units identified with all other controller targets (1–7) use a three-digit number. The first digit corresponds to the controller target number, the second digit is always 0 and the third digit is the LUN number. For example, D205 would be target 2, LUN 5.

Identify the RAIDsets as host logical units by using the ADD UNIT command.

```
HSZ20> ADD UNIT D0 RAIDS1
```

This example creates LUN 0 for controller target ID 0 (specified earlier with the SET THIS_CONTROLLER command).

2.5.3 Set Writeback Cache

The final step in creating a RAIDset is to enable the writeback cache. A single CLI command enables that feature for the each RAIDset:

```
HSZ20> SET D0 WRITEBACK_CACHE
```

Where D0 represents the host logical units of the RAIDsets created above.

2.5.4 Verify and Record Your Configuration

NOTE

Your configuration may be saved on disk using the SAVE CONFIGURATION command. Refer to the *RAID Array 310 Configuration and Maintenance Guide* for a detailed description of this command.

Installing the SCSI Host Adapter Hardware

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

3.1 Installing the KZPSA, Digital PCI to SCSI Adapter

The PCI to SCSI-2 host adapter (KZPSA) is a PCI to FAST SCSI-2, 16-bit, differential host adapter. You connect your computer to the StorageWorks Raid Array 310 Subsystem through the host adapter and a connection cable.

You need the following to begin:

- The PCI SCSI-2 host adapter board (use precautions to protect the board from static discharge)
- Your computer system hardware manual
- Appropriate tools to service your computer
- The BN21K-03 SCSI cable, three meters long, with a right angle high density 68-pin connector on one end and a straight high density 68-pin connector on the other.

Refer to your system manual and the *KZPSA PCI-to-SCSI Storage Adapter User's Guide* for physical installation of the adapter board into your computer system.

3.1.1 Preparing to Install the Host Adapter

Before performing the installation of the host adapter into your Alpha system, take precautions to protect the board from electrostatic discharge. Then perform the following steps:

CAUTION

To protect the board from static discharge wear an electrostatic discharge (ESD) wrist strap. Do not remove the board from the anti-static protective cover until instructed to do so in the following procedures.

- Perform system backups of your operating system filesystems.
- Shutdown your computer system.

3.2 Installing the KZPSA adapter

This procedure describes how to install the KZPSA adapter and how to verify the correct installation and revision levels for correct functioning of the RAID Array 310 for OpenVMS.

Use following steps to install the adapter hardware and SCSI connection.

- When your system is halted (in the >>> console prompt), power down your system and install the KZPSA adapter as described in the *KZPSA User's Guide*. The *KZPSA User's Guide* is packaged with the adapter.
- Connect the SCSI cable from the KZPSA to the RAID Array 310. (The straight connector attaches to the KZPSA.)

3.2.1 Verifying the KZPSA is installed correctly.

To verify if the KZPSA is installed correctly, power up your system without booting the operating system. (Stay in the >>> console prompt).

NOTE

The SRM and ARC console firmware revisions are noted in the KZPSA release notes and depend upon the type of Alpha system.

The revision of the KZPSA must be rev. A09 or higher. The examples shown regarding verification are taken from an AlphaServer 1000; however, the contents can vary depending upon the system you have.

- Verify the KZPSA adapter is correctly installed, the connection with the RAID Array 310 is correct, and all created units are seen as devices in console mode. The following command (*show device*) will also show the revision levels of the attached devices.

To do so, use the following command.

```
>>> show device
```

The response should be similar to the following. Only the lines regarding KZPSA are listed in the example:

```
dkc0.0.0.11.0      DKC0      HSZ20  V32Z
dkc1.0.0.11.0      DKC1      HSZ20  V32Z
dkc100.1.0.11.0    DKC100    HSZ20  V32Z
dkc2.0.0.11.0     DKC2      HSZ20  V32Z
dkc200.2.0.11.0   DKC200    HSZ20  V32Z
dkc3.0.0.11.0     DKC3      HSZ20  V32Z
dkc300.3.0.11.0   DKC300    HSZ20  V32Z
pkc0.7.0.11.0     PKC0      SCSI Bus ID 7  L01  A09
```


NOTE

The KZPSA in this example system is adapter PKC0 set to SCSI ID=7, hardware rev. L01, and firmware Rev. A09. The example also shows 6 units created; dkc0 refers to D0, dkc1 to D1, dkc2 to D2, dkc3 to D3, dkc100 to D100, dkc200 to D200, and dkc300 to D300).

- Verify that your Alpha system console firmware (SRM and ARC) is at the correct revision level to support the KZPSA; do so by referring to the release notes that are supplied with the KZPSA adapter.
- If the console revision level is too low, call your sales person for unit service to upgrade the console firmware to the required level.
- Use the following procedure to verify the installation and console revision level.

>>>show config

A response, similar as following, will be shown:

```
Firmware
SRM Console: V3.0-12
ARC Console: 4.26
PALcode:      VMS PALcode X5.48-101, OSF PALcode X1.35-66
Serial Rom:   V1.1

Processor
DECchip (tm) 21064-2

MEMORY
  96 Meg of System Memory
  Bank 0 = 64 Mbytes(16 MB Per Simm) Starting at 0x00000000
  Bank 1 = 32 Mbytes(8 MB Per Simm) Starting at 0x04000000
  Bank 2 = No Memory Detected
  Bank 3 = No Memory Detected

PCI Bus
  Bus 00  Slot 06: NCR      810 Scsi Controller
                pka0.7.0.6.0      SCSI Bus ID 7
                dka0.0.0.6.0      RZ28
                dka100.1.0.6.0    RZ26
                dka200.2.0.6.0    RZ29B
                dka400.4.0.6.0    RRD43

  Bus 00  Slot 07: Intel   8275EB PCI to Eisa Bridge

  Bus 00  Slot 11: Digital KZPSA
                pkc0.7.0.11.0     SCSI Bus ID 7
                dkc0.0.0.11.0     HSZ20
                dkc1.0.0.11.0     HSZ20
                dkc100.1.0.11.0   HSZ20
                dkc2.0.0.11.0     HSZ20
                dkc200.2.0.11.0   HSZ20
                dkc3.0.0.11.0     HSZ20
                dkc300.3.0.11.0   HSZ20
```

3.2.2 Boot your system

After successful completion of the previous sections, you may boot the operating system.

Boot the operating system, using a boot command similar to the following:

```
>>> boot dka0
```

(The above command example assumes that the 'dka0' is the boot device.)

Installing and Configuring the Command Console Agent

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

4.1 Introduction

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

Procedure summary:

- Install Command Console software.
- Launch Command Console.
- Establish communications with the controller over the serial port.

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. Paragraph 4.5 of this chapter describes this method.

A note on communicating over a network:

If you are planning to configure and monitor your RAID Array 310 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 5/3 volume as the “communications” volume. RAID 5/3 is highly reliable and provides the most stable communication link. Once the communications logical unit is created, the SXCC Agent can be installed.

4.2 Installing Command Console Software in the Management Station

Command Console installs from the *RAID Array 310 Upgrade* 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 disk in the CD-ROM drive.
2. Open the File menu in the Program Manager.
3. Select the RUN option.
4. In the text box, type
`drive_letter:\client\install` and click OK.
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.

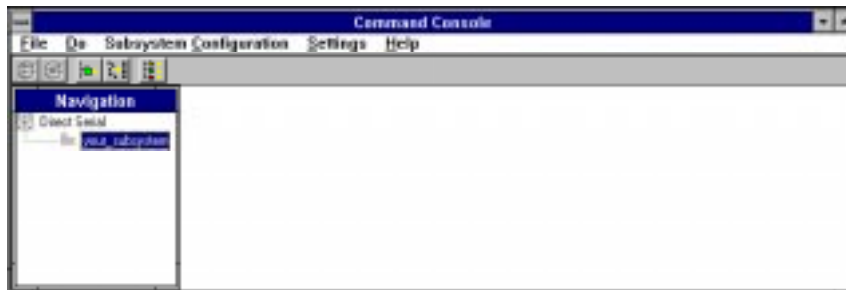
4.3 Launching Command Console

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 4–1).

Figure 4–1 Command Console’s Control Panel



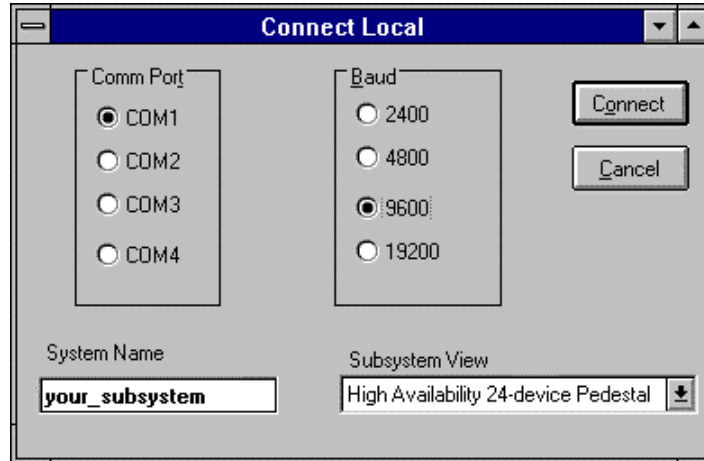
A Divider Bar splits the Control Panel into two smaller windows: the Navigation Window (on the left) and the Subsystem Window (on the right). The Subsystem Window lets you view, configure and monitor the storage subsystem shown in the Navigation Window. The Control Panel also has a Menu Bar and below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

4.4 Establishing Communications with the 310 Array

The simplest connection to your storage subsystem is a direct, cable connection from the Management Station (the host system running Command Console) to one of the storage subsystem's serial maintenance ports. 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 4–2.

Figure 4–2 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. Click on *Connect*.

NOTE

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. If communication problems occur, recheck the connection and the settings.

4.5 Communicating over a Network

To communicate with your RAID Array 310 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 Command Console 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 Command Console (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 Command Console 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.

4.6 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.

4.7 Before You Start

- Your system resources must meet the minimum requirements listed in Table 4–1.

Table 4–1 Minimum Management Station System Requirements

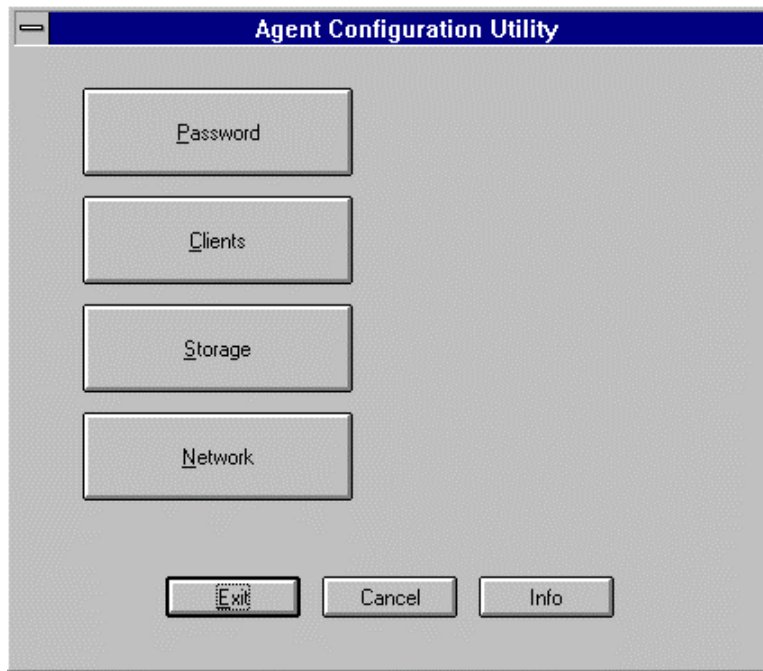
Host Feature	Requirement
PC Requirements	Intel 486, 66 MHz, 16 MB memory, 1 MB free disk space, and CD-ROM drive
Operating System	Microsoft Windows 95, Windows NT 3.51 or NT 4.0
Network Connection	TCP/IP-compatible network card
Controller Compatibility	StorageWorks RAID 310 controller running operating firmware Version 3.2 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 and assigned a Windows NT drive letter to the “communications” volume using the Disk Administrator.

4.8 Installing the Agent

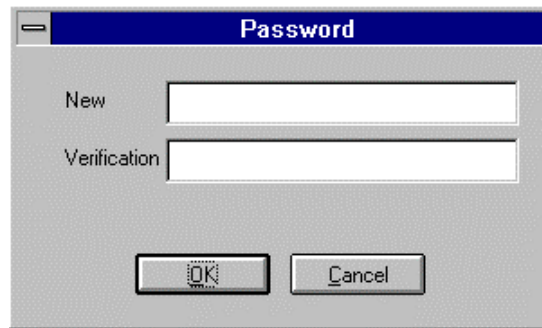
1. Place the RAID Array 310 Software V3.2 CD–ROM in your storage subsystem’s host system CD–ROM drive.
2. Open the \AGENTS subdirectory in File Manager.
3. Double click the `INSTALL.BAT` file. The installation program begins and displays the *Agent Configuration Utility* menu. The menu, shown in Figure 4–3, provides four choices: *Password*, *Clients*, *Storage* and *Network*. If you need more information on configuring the agent, click the *Info* button.

Figure 4–3 Agent Configuration Utility Menu



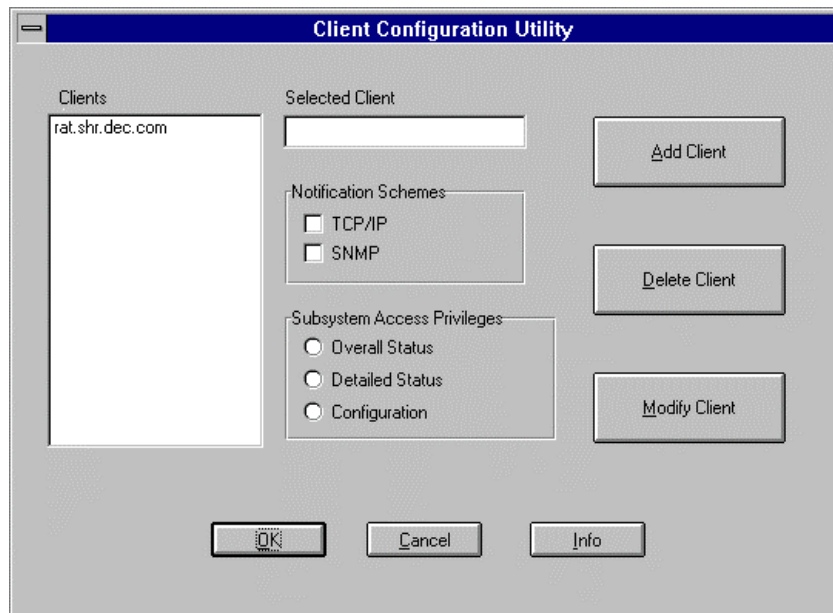
4. Click *Password*, enter a password in the *New* and *Verification* text boxes (Figure 4–4), and click *OK*.

Figure 4–4 Agent Password Dialog Box



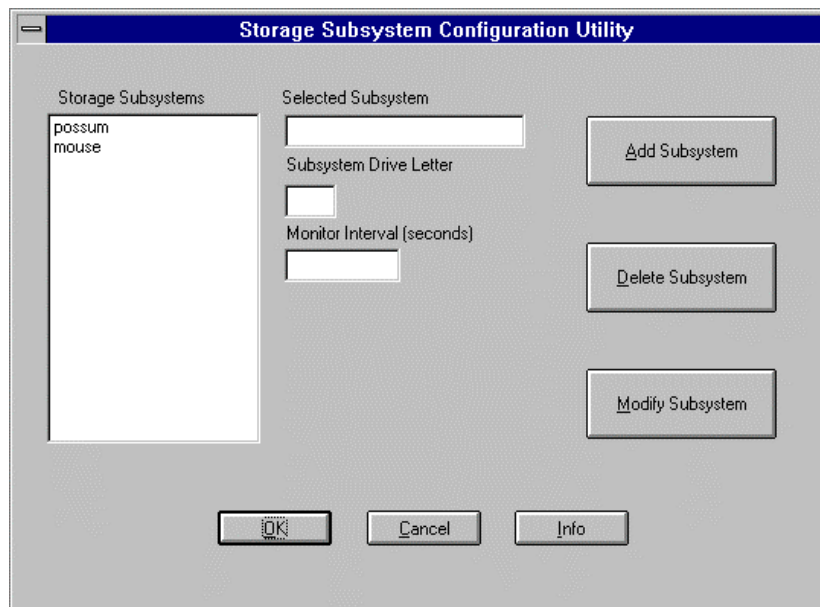
5. Click *Clients* to access the *Client Configuration Utility* (Figure 4–5). Enter the name of Command Console's host system and configure the client. Choose TCP/IP (for Command Console) or SNMP notification. When you are finished click *OK*.

Figure 4–5 Client Configuration Utility Screen



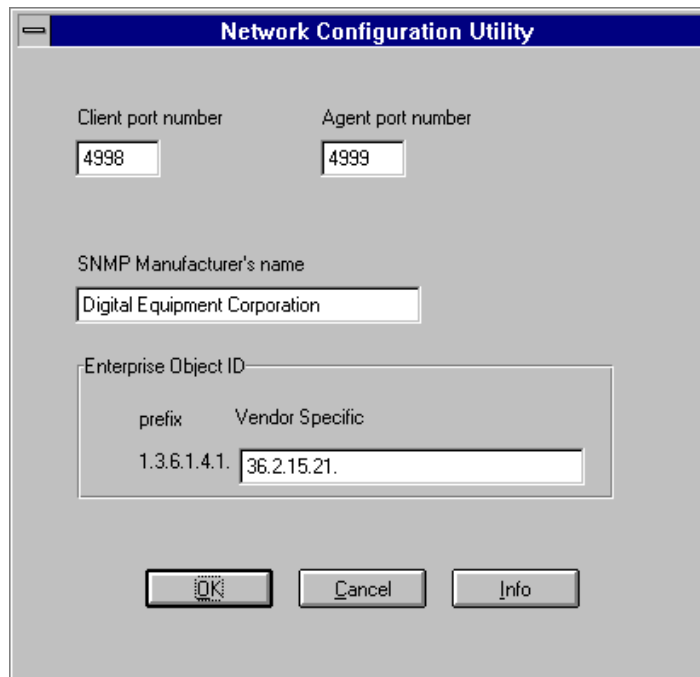
6. Click *Storage* to access the *Storage Subsystem Configuration Utility* (Figure 4–6), assign and enter the name of your storage subsystem, its Window NT drive letter and the monitoring interval in seconds. When you are finished click *OK*.

Figure 4–6 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. For more information on port numbers (windows socket numbers), click on the *Info* button.

Figure 4–7 Network Configuration Utility Screen



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

4.9 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.
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 4-8).

Figure 4–8 Add System Dialog Box

The screenshot shows a dialog box titled "Add System". It contains the following elements:

- System/Subsystems** section:
 - Host Agent System Name:** A text box containing "rat" and a dropdown arrow.
 - Storage Subsystem Name:** An empty text box, a dropdown arrow, and a "Find" button.
- Subsystem View:** A dropdown menu showing "High Availability 24-device Pedestal".
- Numeric Subsystem ID (pager):** A text box containing "2".
- Buttons:** "Add", "Find/Add All", and "Cancel" at the bottom.

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 *High Availability 24-device Pedestal* 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.

Installing the Command Console Client

This chapter describes how to install a copy of the Command Console (CC) Client on each of your client systems.

5.1 Introduction

The Command Console (CC) Client is the Graphical User Interface (GUI) for configuring and monitoring your StorageWorks RAID Array 310 subsystem. It runs only on an Alpha-based Windows 95 or Windows NT system. Install the Client software on your system using the information described below.

5.2 Installing the Client Program

NOTE

The version of Command Console that is bundled with StorageWorks RAID Arrays is licensed to manage a single array on one host server. To manage multiple hosts from a client management station, Command Console Plus must be purchased.

Install a copy of the Command Console Client program on each of the Intel-based systems on your network from which you want to configure or monitor a StorageWorks RAID Array 310 subsystem.

Before you can install Client, make sure that the system you'll be installing it on meets the minimum requirements listed in Table 5-1.

Table 5-1 Minimum CC Client System Requirements

Architecture	Intel 486/66 MHz, 16 MB memory, 10 MB free disk space, CD-ROM drive
Operating system	Windows NT 3.51 (build 1057 or later) or Windows 95 (build 950 or later)
Graphics Subsystem	VGA or better.
Input devices	Keyboard, mouse
Modem	Optional
Serial port (for connection via serial port only)	Standard, PC serial port capable of at least 9600 baud.
Network adapter	TCP/IP-compatible network .
Controller compatibility	Controller running operating firmware Version 3.2 or higher.

NOTE

To ensure a complete installation, uninstall Command Console before replacing it with another version.

To install Command Console on Windows NT:

1. Place the RAID 310 upgrade CD in the CD-ROM drive.
2. Open the File menu in the Program Manager.
3. Select the RUN option.
4. In the text box, type **drive_letter:\client\install** and click OK.
5. Follow the instructions in the setup program to complete the installation.

To install Command Console on Windows 95:

1. Place the CD in the CD-ROM drive.
2. Select “My Computer”.
3. Double click on the CD-ROM drive icon.
4. Double click on the “client” icon.
5. Double click on “install.bat” icon.
6. Follow the instructions in the setup program to complete the installation.

Your Client program is installed!

Repeat these steps to install a copy of CC client on each of the systems from which you want to configure and monitor a StorageWorks RAID Array 310 subsystem.

This completes the installation of the Command Console Client. Refer to Appendix D to start it.

5.3 Uninstalling Command Console

To uninstall Command Console, click the “Remove Command Console” icon in Windows NT. In Windows 95, use the “Add/Remove Programs” utility in the Control Panel.

Configuration Recommendations

This appendix suggests a list of items to optimize the performance of your RAID Array 310 subsystem.

A.1 Recommendations

Use the following guidelines to configure the RAID Array 310 subsystem to achieve optimal performance:

- Configure your RAID Array 310 to contain multiple devices or storagesets rather than one.
- Make use of the controller's two ports (channels). When you add devices to the controller, add some of the devices and storagesets to each of the controller ports. Distributing your devices and storagesets over both controller ports allows parallel activities to occur through the controller.
- Distribute your device or storageset units across the four possible target SCSI IDs for the controller. Specify a unique target SCSI ID for the first four device or storageset units that you configure. Any additional device or storageset units will need to share one of the target SCSI IDs; however, the load will already be fairly balanced.
- Avoid configuring multiple mirrorsets with the first member on the same port. For example:

```
add mirrorset m1 disk100 disk200
add mirrorset m1 disk210 disk110
```
- For write performance dependent applications, turn **on** the writeback cache. (The writeback cache is turned off by default.)
- Set the size of the `maximum_cache_transfer` of each unit to the largest size allowable, 1024, so that all transfers get cached. Otherwise, transfers that exceed the `maximum_cache_transfer` size would not get cached.

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 info by using the command:

```
HSZ20> show this_controller full
```

Record the following information in the blanks below (SCSI Targets, Preferred Targets, Cache Flush Timer, Cache Policy, and Host Functionality Mode):

Fill in the blanks below.

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

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.

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 to highlight **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.

1. 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.

2. Press the Enter key and the `default prompt` appears.
3. 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.

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

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

11. Change the Terminal program's baud rate to match the controller's. Select *Communications* option from the *Settings* menu. When the Communications window appears, set the baud rate to *19200* and click OK.

NOTE

Remember to change the RAID Manager and/or 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\v3.2** 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

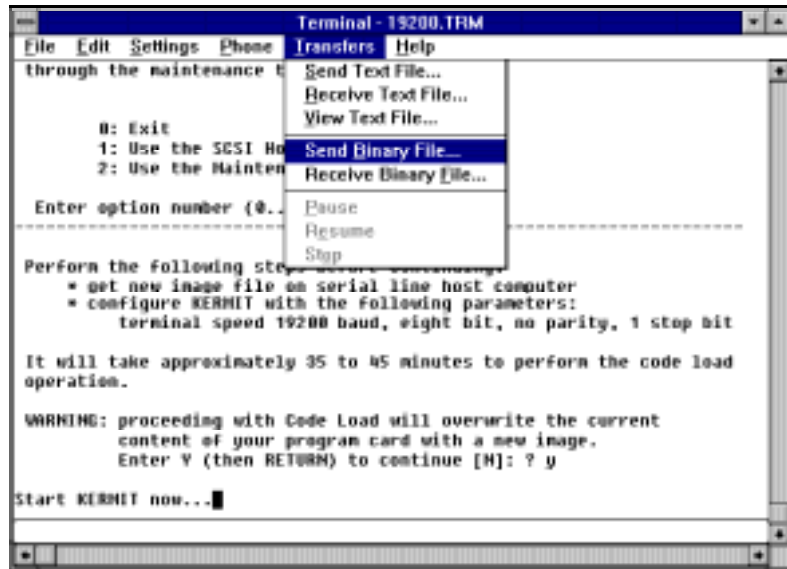
Start KERMIT now...

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 B-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

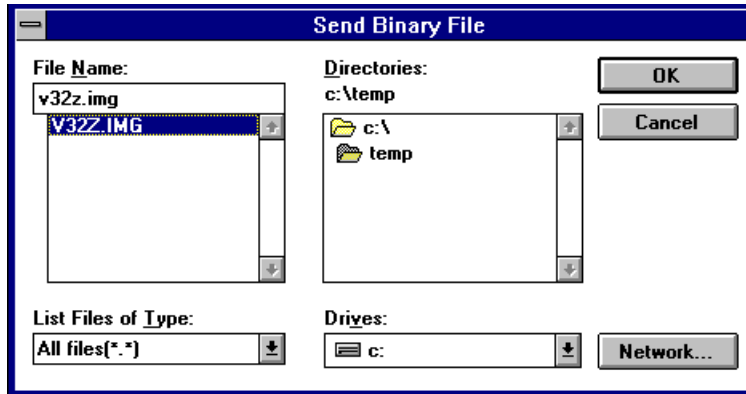


11. Select the V32Z.IMG file and Click OK as shown in figure B-2.

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_FLUSHED_TIMER = 5 (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 setting. Press the Tab key once and select the OK icon.
4. Click the Settings menu and select VT100 emulation.
5. At the “Connect To” menu, change the connection settings for your particular system setup by pressing the Enter key. Choose the appropriate comp port for your system.

NOTE

COM1 is the default connection setting.

6. Change the Port Settings baud rate from 2400 to 9600 bits per second.
7. Select Xon/Xoff or None as the Flow Control setting. Press the Enter key. This will return you to your newly-created Terminal session.
8. 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 ?.

9. Click File at the menu bar. Choose Save, to save the configuration you have just created.
10. 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.

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

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

CAUTION

Remember to change the RAID Manager and/or 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\v3.2** 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.

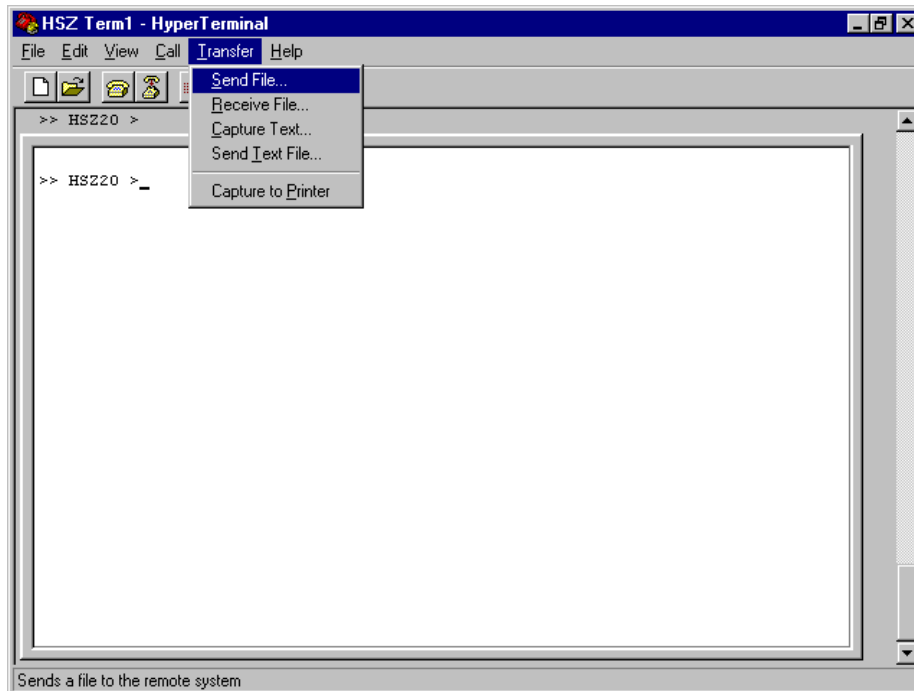
WARNING: proceeding with Code Load will overwrite the current content of your program code with a new image. Enter Y (then RETURN) to continue [N] ? y
 Start KERMIT now...

8. 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 B-3.

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-3 Select Send File from the Transfer Menu

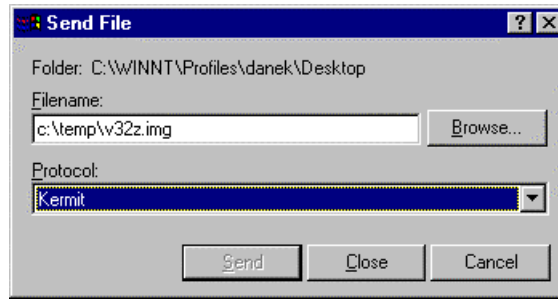


11. Select the V32Z.IMG file and click OK.

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
```

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.
14. 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 = 5 (seconds)
CACHE_POLICY = A
Host Functionality Mode = D.
```

B.6 Reverting to Software Image Version 3.1

For reversions to release V3.1, substitute V31Z.IMG for V32Z.IMG in the previous section (step 2) as the correct software image filename. V31Z.IMG is stored in directory\firmware\V31.

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. In the event that the same storagesets are not accessible after an upgrade, a complete procedure for manual restoration is included in Appendix F.

