

Compaq StorageWorksTM

RAID Array 3000 Cluster Solutions for Microsoft Windows

Installation Guide

Third Edition (January 2001)
Part Number EK-NT03K-IG. C01
Compaq Computer Corporation

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About This Guide

Purpose and Scope

This guide is designed to provide an overview of the Compaq *StorageWorks™ RAID Array 3000 Cluster Solutions for Microsoft Windows*.

Intended Audience

This document is written for installers and operators.

Document Structure

This guide contains the following information:

Chapter 1: Getting Started

- Overview of RAID Array 3000 Cluster Solutions for Windows NT and Windows 2000

Chapter 2: Pre-Installation Steps

- Verify the (RA3000) Cluster System Requirements
- Inventory the RAID SCSI Connection Kit
- Perform a System Backup
- Plan the RAID Cluster Component UltraSCSI Bus Interconnect
- Preparing the SCSI Host Adapters

Chapter 3: Cabling the RAID Subsystem Cluster Components

- Connecting RAID Cluster Components through the UltraSCSI Bus
- UltraSCSI Bus Interconnect for RAID Array 3000 Pedestal
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Chapter 4: Software Setup Requirements for Windows NT

- Designating Servers as Host A and Host B
- Software Setup Summary for a Cluster
- Checklist for Preparing Host A and Host B for a Cluster
- Installing and Configuring Windows NT Cluster Software on Both Host Servers

Chapter 5: Software Setup Requirements for Windows 2000

- Designating Servers as Host A and Host B
- Software Setup Summary for a Cluster
- Checklist for Preparing Host A and Host B for a Cluster
- Installing and Configuring Windows 2000 Cluster Software on Both Host Servers

Related Documents

In addition to this guide, the following documentation can be useful.

Table 1
Related Documents

Document Title	Part Number
RAID Array 3000 Subsystem Second Controller Option Installation Guide	EK-SM3KC-IG E01
Getting Started RAID Array 3000 for Microsoft Windows Installation Guide	AA-RACZD-TE
Command Console V2.2 for the RAID Array 3000 (Pedestal and Rack Mount Models) User's Guide	AA-RBF2C-TE
RAID Array 3000 Controller Shelf Hardware User's Guide	EK-SMCPQ-UG.D01
RAID Array 3000 Pedestal Storage Subsystem Hardware User's Guide	EK-SMCPQ-UG.C01

Text Conventions

This document uses the following conventions to distinguish elements of text:

Keys	Keys appear in boldface. A plus sign (+) between two keys indicates that they should be pressed simultaneously.
USER INPUT	User input appears in a different typeface and in uppercase.
<i>FILENAMES</i>	File names appear in uppercase italics.
Menu Options, Command Names, Dialog Box Names	These elements appear in initial capital letters.
COMMANDS, DIRECTORY NAMES, and DRIVE NAMES	These elements appear in uppercase, unless case sensitive.
Type	When you are instructed to <i>type</i> information, type the information without pressing the Enter key.
Enter	When you are instructed to <i>enter</i> information, type the information and then press the Enter key.

Symbols in Text

The following symbols are found in the text of this guide to indicate different types of information.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Symbols on Equipment

The following symbols are placed on equipment to indicate the presence of potentially hazardous conditions:



This symbol in conjunction with any of the following symbols indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.



This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.



This symbol on an RJ-45 receptacle indicates a Network Interface Connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.



These symbols on power supplies or systems indicate the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.



This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single rack installation.
 - The racks are coupled together in multiple rack installations.
 - Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.
-

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Compaq Technical Support

In North America, call the Compaq Technical Phone Support Center at 1-800-OK-COMPAQ. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

Outside North America, call the nearest Compaq Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the Compaq website. Access the Compaq website:

<http://www.compaq.com>

Be sure to have the following information available before you call Compaq:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

Compaq Website

The Compaq website has information on this product as well as the latest drivers and Flash ROM images. Access the Compaq website:

<http://www.compaq.com/storage>

Compaq Authorized Reseller

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the Compaq website for locations and telephone numbers.

Chapter 1

Getting Started

This chapter contains a roadmap to serve as a master guide for establishing a cluster between two Intel host servers and a shared RAID Array 3000 subsystem. This roadmap presides over all other documentation supplied with your equipment, and refers to those resources, as more technical depth is required.

NOTE: Depending on your current system environment, you may not need to perform all tasks in this roadmap.

Overview of RAID 3000 Cluster Solutions for Windows NT and Windows 2000

A RAID Array 3000 Cluster enables two host servers of the same architecture, (Intel), to share a RAID 3000 storage subsystem through an UltraSCSI bus, with Windows NT and Windows 2000 Cluster software. Should a failure on a server occur, the failure is detected and the storage I/O is re-routed through to the functioning server. This process, called failover, requires no resource downtime—ensuring the high availability of data. The failed components can be hot-plugged or serviced while functioning components remain active.

Figure 1-1 shows the RAID Array 3000 for Windows NT and Windows 2000 cluster concept.

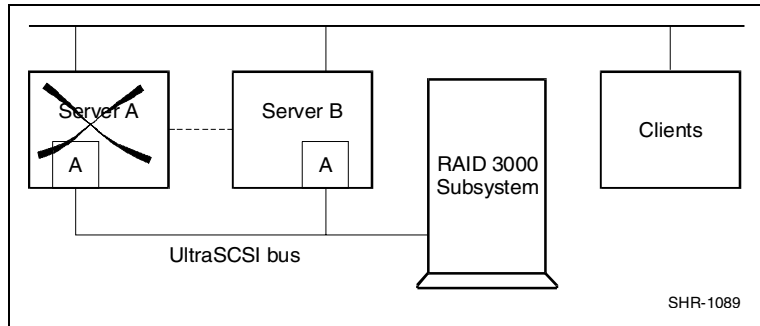


Figure 1-1. RAID Array 3000 Windows NT and Windows 2000 cluster concept

**Table 1-1
Roadmap**

Step	Perform this Procedure	Described In
1	All pre-installation steps Including: <ul style="list-style-type: none"> ■ Verify system requirements ■ Verify SCSI connection kit contents ■ Perform a system backup ■ Plan RAID subsystem/bus layout ■ Prepare the host adapters 	RAID Array 3000 Cluster Solutions for Microsoft Windows Installation Guide Chapter 2 "Pre-Installation Steps"
2	Unpack and setup the RAID subsystem	<i>Getting Started RAID Array 3000 for Microsoft Windows Installation Guide</i> Chapter 2 "Unpacking and Setting Up RAID Array 3000 Pedestal"
3	Cable/terminate the RAID subsystem components	RAID Array 3000 Cluster Solutions for Microsoft Windows Installation Guide Chapter 3 "Cabling the RAID Subsystem Cluster Components"
4	Install RAID manager (SWCC) software and create the RAID StorageSets	<i>Getting Started RAID Array 3000 for Microsoft Windows Installation Guide</i> Chapter 5 "Preparing Host for Use with Your Raid Array 3000"
5	Perform software setups required for a cluster Including: <ul style="list-style-type: none"> ■ Prepare host A for a cluster ■ Prepare host B for a cluster ■ Install and configure cluster software 	RAID Array 3000 Cluster Solutions for Microsoft Windows Installation Guide Chapter 4 "Software Setup Requirements for Windows NT" and Chapter 5 "Software Setup Requirements for Windows 2000"

After steps have been successfully completed in sequence, your cluster will be established.

Chapter **2**

Pre-Installation Steps

This chapter describes the preparation needed before installing and configuring the RAID Array 3000/Cluster components.

The pre-installation steps required to support clustering follow:

- Verify the (RA3000) Cluster System Requirements
- Inventory the RAID SCSI Connection Kit
- Perform System Backups
- Plan the RAID Subsystem Cluster Component Layout (for example, the UltraSCSI Bus Interconnect)
- Prepare the SCSI Host Adapter Boards

Verify the (RA3000) Cluster System Requirements

Please verify that the cluster requirements listed in Table 2-1 is met.

Table 2-1
RAID Array 3000 Cluster Prerequisites

Host Feature	Requirement
Platform	Two host servers of the same architecture
Operating system	Microsoft Windows NT and Windows 2000
Cluster software	MSCS Cluster software
Storage subsystem	StorageWorks RAID Array 3000 storage subsystem
RAID controller	One (min) StorageWorks RAID controller
SCSI host adapters	Two identical HD 68-pin SCSI host adapters (one per server). Supported host adapter is: Adaptec AHA-2944UW (for X86 servers)
RAID storage class driver	HSZDisk.sys (Windows NT only)
Additional Items	Requirement
RAID SCSI connection kit	Complete RAID SCSI connection kit (Figure 2-1)
RAID hardware	Cables supplied with RAID subsystem (kit DS-SWXRA-xx)
Service tools	Appropriate tools to service your equipment
Technical documentation	The reference guides for the StorageWorks RAID Array 3000 subsystem, the host servers, and the Windows NT Cluster software supplement this installation guide.

NOTE: 1. All of the host features that are supported by the platform kit are also supported in the cluster environment.

2. The installation of a SCSI hub requires a 3.5-inch SSB slot available in your StorageWorks pedestal or shelf.

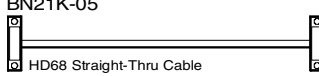
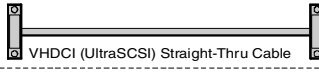
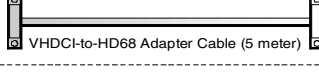
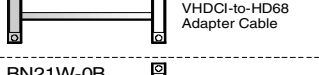
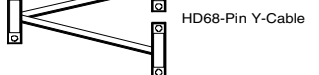
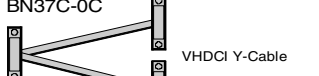
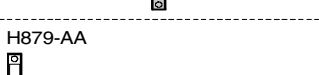
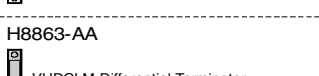
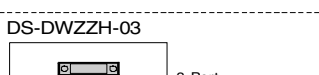
Inventory the RAID SCSI Connection Kit

Three types of RAID SCSI Connection Kits exist. The part numbers and purpose served by each kit follows:

- **SWXKT-DE** connects the RAID subsystem to servers having HD 68-pin host adapters
- **SWXKT-EA** connects the RAID subsystem through a SCSI hub to servers having either HD 68-pin or VHDCI host adapters (both adapters must be the same type)
- **SWXKT-DF*** connects the RAID subsystem to servers having VHDCI (UltraSCSI) host adapters

*This kit not applicable to RAID Array 3000/Clusters

Please verify that the RAID SCSI Connection Kit you have received is specific to your clustering needs, and use Figure 2-1 to inventory its contents. Also, reference the note following Figure 2-1 to locate the components supplied with your RAID Array 3000 subsystem that supplement the RAID SCSI Connection Kit. If you are missing any hardware component required for clustering, please contact your local sales representative or call the StorageWorks Hotline at 1-800-STORWOR (786-7967).

RAID SCSI Connection Kit Parts Identification	Kit SWXKT-DE	Kit SWXKT-EA	Kit SWXKT-DF
 <p>BN21K-05 HD68 Straight-Thru Cable</p>	1		
 <p>BN37A-05 VHDCI (UltraSCSI) Straight-Thru Cable</p>		2	1
 <p>BN38C-05 VHDCI-to-HD68 Adapter Cable (5 meter)</p>	1	1	1
 <p>BN38E-0B VHDCI-to-HD68 Adapter Cable</p>		2	1
 <p>BN21W-0B HD68-Pin Y-Cable</p>	2		
 <p>BN37C-0C VHDCI Y-Cable</p>			2
 <p>H879-AA HD68 M Differential Terminator</p>	2		
 <p>H8863-AA VHDCI M Differential Terminator</p>			2
 <p>DS-DWZZH-03 3-Port Differential Hub</p>		1	

SHR-1026

Figure 2-1. Raid SCSI connection kit contents (listed by kit number)

NOTE: To supplement the RAID SCSI Connection Kit, please locate the following parts supplied with your RAID Array 3000 subsystem:

- One BN37A-05 VHDCI UltraSCSI/ straight-thru cable
- One BN38E-0B VHDCI-to-HD 68-Pin Technology Adapter cable

Perform a System Backup

Follow normal procedures to backup your systems before installing the RAID subsystem cluster components.

Plan the RAID Cluster Component UltraSCSI Bus Interconnect

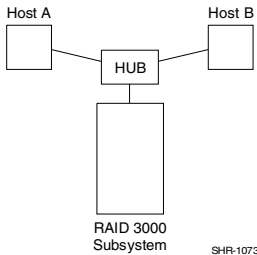
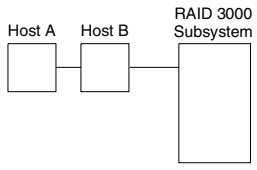
To plan the layout of the RAID subsystem cluster components through the UltraSCSI bus, first define the two ends of the UltraSCSI bus. Select where you want to locate the RAID subsystem on the bus relative to the other components (the two host servers and, if applicable, the SCSI hub). Determining the RAID location depends on your preference or any physical limitations of your facility. You can locate the RAID 3000 subsystem:

- Radiating from a SCSI Hub - (Hub-Radiant RAID)
- On an end of the UltraSCSI bus - (End-Bus RAID)
- On each end of a split UltraSCSI bus - (Mid-Bus RAID)

NOTE: The maximum bus length for an end-bus RAID cluster layout is 82 feet (25m) (including the Y-cable).

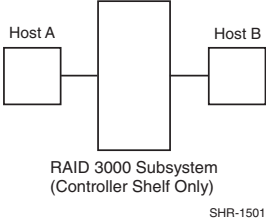
For a hub-radiant RAID cluster layout, the maximum distance of each radial arm (from the hub to a device) is 82 ft (25 m).

**Table 2-2
RAID Subsystem Cluster UltraSCSI Bus Layout Options**

For This RAID Cluster Layout Option ...▼	And This Type of Host Adapter	Reference This Section and Figure	
Hub-Radiant RAID	HD68-Pin	Chapter 3 “Cabling the RAID Subsystem Cluster Components” see UltraSCSI Bus Interconnect for RAID Array 3000 Pedestal”	Chapter 3 “Cabling the RAID Subsystem Cluster Components” Figure 3-1
 <p style="text-align: center;">SHR-1073</p> <p style="text-align: right;">Hub-Radiant RAID</p>			
End-Bus RAID	HD68-Pin	Chapter 3 “Cabling the RAID Subsystem Cluster Components” see UltraSCSI Bus Interconnect for “RAID Array 3000 Controller Shelf”	Chapter 3 “Cabling the RAID Subsystem Cluster Components” Figure 3-2
 <p style="text-align: center;">SHR-1072</p> <p style="text-align: right;">End-Bus RAID</p>			

continued

Table 2-2
RAID Subsystem Cluster UltraSCSI Bus Layout Options *continued*

For This RAID Cluster Layout Option ... ▼	And This Type of Host Adapter	Reference This Section & Figure
	 <p data-bbox="444 632 610 667">RAID 3000 Subsystem (Controller Shelf Only)</p> <p data-bbox="602 674 659 688">SHR-1501</p>	Mid-Bus RAID

See Table 2-2 to select the RAID cluster layout that best suits your environment. Prepare and install the SCSI host adapters into your servers (Chapter 3, "Cabling the RAID Subsystem Cluster Components" see "Prepare the SCSI Host Adapters" to proceed with the cluster installation.

Preparing the SCSI Host Adapters

Each host server in a cluster requires that one HD-68-Pin SCSI host adapter is installed. The two SCSI host adapters used in the cluster must be identical. The host adapter product supported for a RAID Array 3000 cluster is as follows:

INTEL Servers Adaptec AHA-2944UW

Prior to installing the SCSI host adapters (as described in the *Adaptec AHA-2944UW Installation Guide*, the SCSI host adapter must be prepared for the cluster environment, which includes:

- Setting SCSI Host Adapter Termination
- Setting Unique SCSI Host Adapter IDs
- Disabling SCSI Bus Reset
- Disabling SCSI Host Adapter BIOS

The preparation procedures for preparing both SCSI host adapter products are provided in the following sections.

Setting SCSI Host Adapter Termination

Adaptec AHA-2944UW Termination Procedures

Termination on the Adaptec AHA-2944UW host adapter is controlled by software commands via the SCSISelect utility. The default setting is automatic, which is not supported in a StorageWorks RAID Array 3000 cluster. Using the SCSISelect utility (as described in the Adaptec AHA-2944UW Installation Guide), change the default settings for both SCSI host adapters in your cluster as follows:

For Host Adapters in this RAID UltraSCSI Layout	Set the AHA-2944UW Termination to
Hub-Radiant RAID	ON/ON
End-Bus RAID	OFF/OFF

NOTE: In SCSI hub configurations (for example, a hub-radiant RAID cluster layout), termination is internal to the SCSI hub, which necessitates the ON/ON termination setting.

Setting Unique SCSI Host Adapter IDs

A cluster requires that each server has a unique SCSI host adapter ID (target ID). Set the SCSI ID of one of your host servers to 6 and the other to 7.

Setting SCSI Bus Reset to Disable

Refer to your Adaptec host adapter reference manual and follow the procedure to set the SCSI Bus Reset option to Disable on both host adapters. (For the SWXA3-BD, 1 = disable).

Setting SCSI Host Adapter BIOS to Disable

NOTE: This procedure applies to Adaptec SCSI host adapters only.

Refer to your Adaptec SCSI host adapter reference manual and follow the procedure to set the Adapter BIOS option to Disable on both host adapters. The Adapter BIOS setting is not applicable to the SWXA3-BD host adapter.

The SCSI host adapters are now prepared for a cluster environment.

Chapter 3

Cabling the RAID Subsystem Cluster Components

This chapter provides the procedures for interconnecting two host servers and a shared StorageWorks RAID Array 3000 subsystem through the UltraSCSI bus, and externally terminating the bus as applicable. Interconnection procedures for locating the RAID subsystem in a Hub-Radiant and End-Bus cluster layout for the pedestal are provided. A mid-bus layout is provided for the RA3000 rackmount controller shelf.

Connecting RAID Cluster Components through the UltraSCSI Bus

Based on the RAID subsystem cluster layout option you have selected, see Chapter 2, “Pre-Installation Steps”. Locate the procedures in this section to cable and terminate the cluster components through the UltraSCSI bus.

NOTE: Follow normal procedures to power off both of the host servers prior to cabling.

Cables and terminators supplied with your RAID Array 3000 subsystem supplement the components in your RAID SCSI Connection Kit.

The following procedures assume that the SCSI host adapters are installed and have been prepared as described in Chapter 2, “Pre-Installation Steps”.

UltraSCSI Bus Interconnect for RAID Array 3000 Pedestal

This section describes the HUB-radiant cluster layouts for the RAID Array 3000 freestanding pedestal.

Pedestal HUB-Radiant RAID Cluster Layout

Perform the following steps to connect two (Intel) host servers equipped with HD 68-pin host adapters to the pedestal subsystem using a SCSI hub (Figure 3-1):

1. Attach (compatible) end of adapter cable BN38E-0B to the HD 68-pin host adapter on Host A.
2. Connect the other end of the adapter cable to a convenient SCSI hub port.
3. Attach the compatible end of the short adapter cable (BN38E-0B) to the HD 68-pin host adapter on Host B.
4. Connect the other end of the short adapter cable to the end of an UltraSCSI cable (BN37A-05).
5. Attach the remaining end of the cable to a convenient SCSI hub port.
6. Connect one end of an UltraSCSI cable (BN37A-05) into either Host Port 0 or Host Port 1 in the back of the RAID subsystem. Only one host port is used in a cluster.

NOTE: The host port used must correspond to that specified in your storage set configuration

- Attach the other end of the UltraSCSI cable to the remaining SCSI hub port.

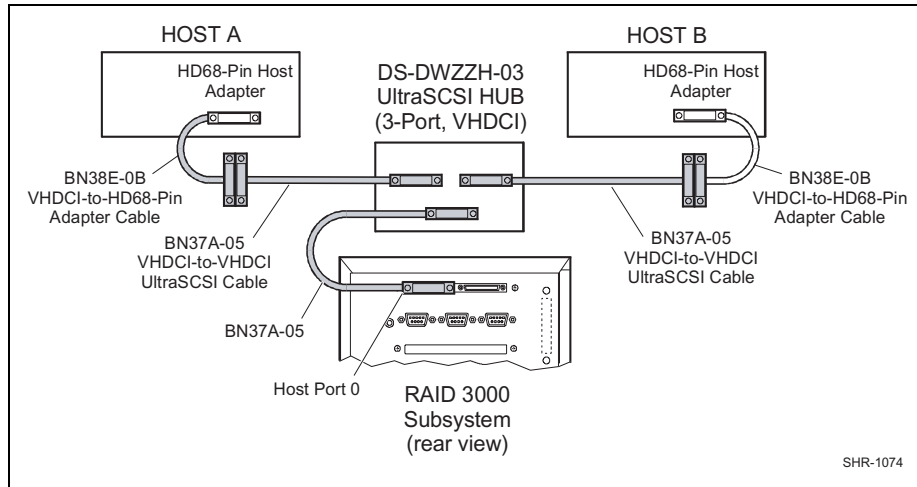


Figure 3-1. Pedestal hub-radiant raid cluster layout

NOTE: In this cluster layout, termination is internal to the SCSI hub.

Pedestal End-Bus RAID Cluster Layout

Perform the following steps to connect two (Intel) host servers equipped with HD-68-pin host adapters to the pedestal subsystem located on the end of the UltraSCSI bus (Figure 3–2):

1. Attach a Y-cable (BN21W-0B) to the HD 68-pin host adapter on Host A.
2. Attach a Y-cable (BN21W-0B) to the HD 68-pin host adapter on Host B.
3. Attach one end of the HD 68-pin straight-thru cable (BN21K-05) to a convenient end of the Y-cable attached to Host A.
4. Connect the other end of the cable to a convenient end of the Y-cable attached to Host B.
5. Attach the compatible end of adapter cable (BN38E-0B) to the available end of the HD 68-pin Y-cable attached to Host B.
6. Connect the other (VHDCI compatible) end of the adapter cable to either Host Port 0 or Host Port 1 in the back of the RAID subsystem. Only one host port is used in a cluster.

NOTE: The host port used must correspond to that specified in your storage set configuration.

7. Connect terminator H879-AA to the available end of the Y-cable attached to Host A.

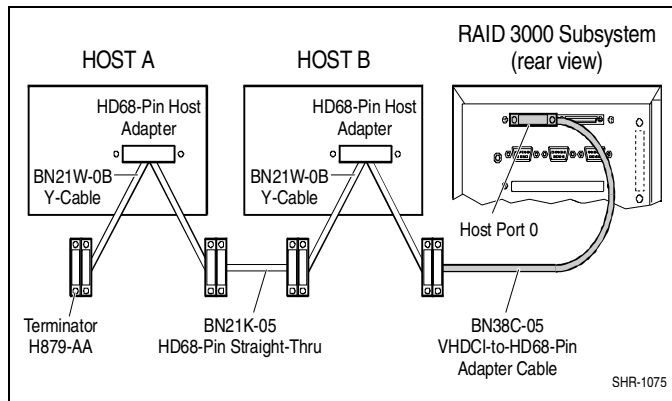


Figure 3-2. Pedestal end-bus RAID cluster layout

NOTE: SCSI termination must be disabled on both adapters.

UltraSCSI Bus Interconnect for RAID Array 3000 Controller Shelf

This section describes how to connect two host servers equipped with HD 68-pin host adapters to the RA3000 controller shelf using an UltraSCSI hub. Three hub-layout configurations are covered: hub-radiant, mid-bus, and end-bus.

Controller Shelf Hub-Radiant RAID Cluster Layout

For a hub-radiant cluster layout, perform the following steps to connect the two host servers to the controller shelf subsystem using a SCSI hub (see Figure 3-3):

1. Connect one end of a short adapter cable (BN38E-0B) to the HD 68-pin host adapter on Host A.
2. Connect the other end of the cable to a convenient port on the SCSI hub.
3. Connect one end of a second short adapter cable (BN38E-0B) to the HD-68-pin host adapter on Host B.
4. Connect the other end of the short adapter cable to the end of an UltraSCSI cable (BN37A-05).
5. Connect the remaining end of the cable to a convenient SCSI hub port.
6. Connect one end of an UltraSCSI cable (BN37A-05) to Host In Port 0 on the Host I/O module on the front of the controller shelf. Only one host port is used in a cluster.

NOTE: The host port used must correspond to that specified in your storage set configuration.

7. Connect the other end of the cable to the SCSI hub.

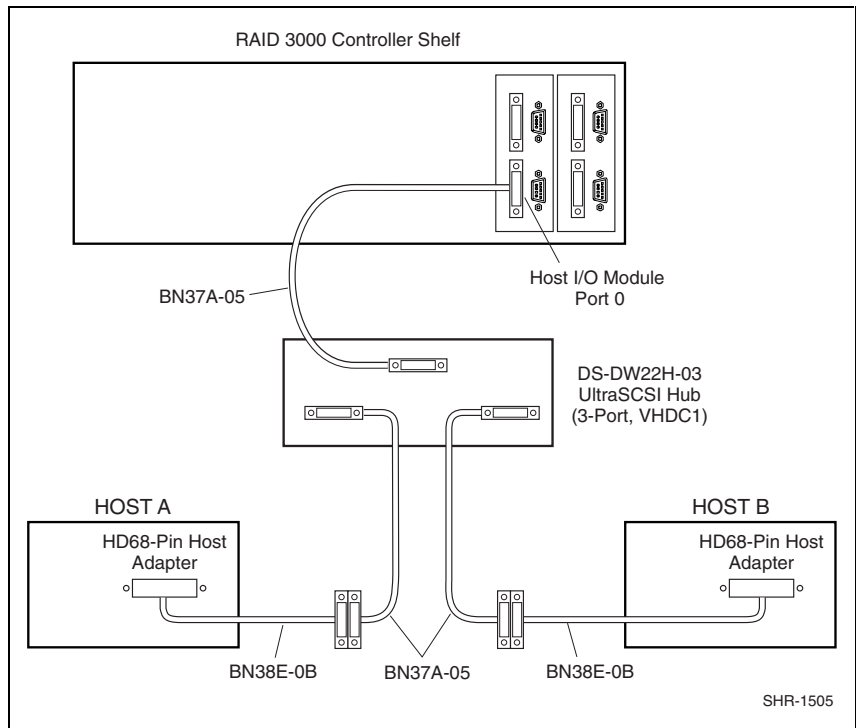


Figure 3-3. Controller shelf hub-radiant RAID cluster layout

NOTE: SCSI termination must be enabled on both adapters.

Controller Shelf Mid-Bus RAID Cluster Layout

For a mid-bus cluster layout, perform the following steps to connect the two host servers to the controller shelf (Figure 3-4):

1. Attach a Y-cable (BN21W-0B) to the HD 68-pin host adapter on Host A.
2. Connect the compatible end of the adapter cable (BN38E-0B) to the available end of the Y-cable attached to Host A.
3. Connect the other (VHDCI-compatible) end to a BN37A-05 UltraSCSI adapter cable.
4. Connect the other end of the SCSI cable to port 0 IN connector of the host I/O module on the controller shelf.

Repeat steps 1 through 3 above to connect Host B to port OUT connector of the host I/O module on the controller shelf.

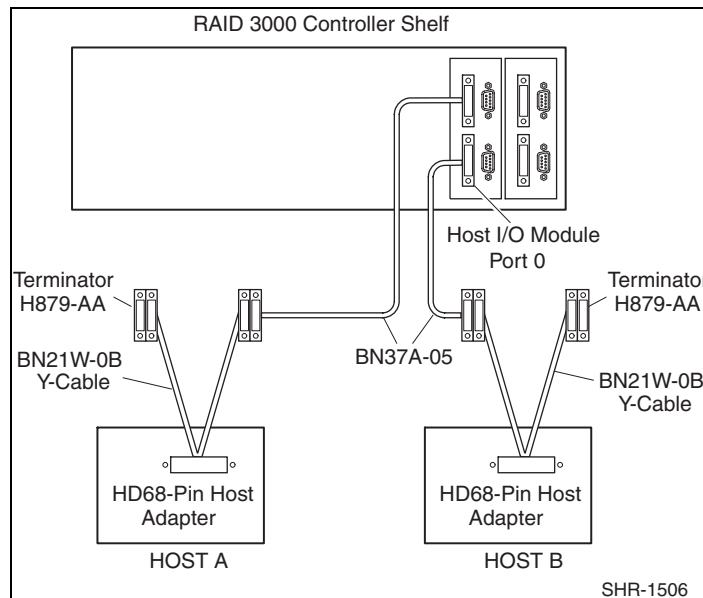


Figure 3-4. Controller shelf mid-bus RAID cluster layout

NOTE: SCSI termination must be enabled on both adapters.

Controller Shelf End-Bus RAID Cluster Layout

For an end-bus cluster layout, perform the following steps to connect the two host servers to the controller shelf subsystem (Figure 3-5):

1. Attach a Y-cable (BN21W-0B) to the HD 68-pin host adapter on Host A.
2. Attach a Y-cable (BN21W-0B) to the HD 68-pin host adapter on Host B.
3. Attach one end of the HD 68-pin straight-thru cable (BN21K-05) to a convenient end of the Y-cable attached to Host A.
4. Connect the other end of the cable to a convenient end of the Y-cable attached to Host B.
5. Attach the compatible end of adapter cable BN38E-0B to the available end of the HD 68-pin Y-cable attached to Host B.
6. Connect the other (VHDCI-compatible) end of the adapter cable to either Host Port 0 or Host Port 1 in back of the RAID subsystem. Only one host port is used in a cluster.

NOTE: The host port used must correspond to that specified in your storage set configuration.

7. Connect terminator H879-AA to the end of the Y-cable attached to Host A.

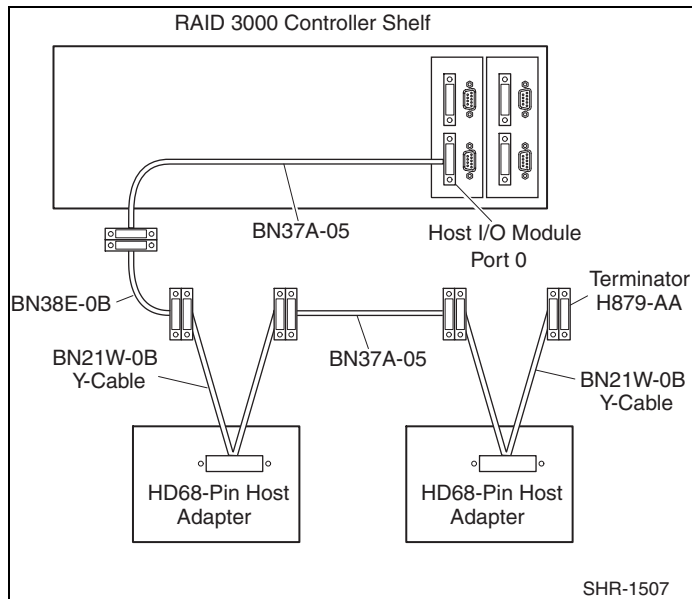


Figure 3-5. Controller shelf end-bus RAID cluster layout

NOTE: SCSI termination must be disabled on both adapters.

Chapter **4**

Software Setup Requirements for a Cluster

This chapter describes the software setups, in sequence, required to prepare the RAID Array 3000 subsystem and two host servers for a cluster environment.

Designating Servers as Host A and Host B

A cluster environment requires sets of software procedures to be performed one host server at a time. Therefore, the servers must be clearly designated in your mind as Host A and Host B prior to the setup process. If both servers are new, either one can be designated as Host A, and the other, Host B.

However, if you are adding a second server (only) to an existing RAID subsystem environment, this documentation assumes it will be designated as Host B, and the existing server as Host A.

Server designation must remain constant through the configuration process.

Software Setup Summary for a Cluster

The software setup procedures required for a cluster are presented in this section in the order that they must occur, which is as follows:

- Prepare Host A for a Cluster
- Prepare Host B for a Cluster
- Install and Configure Windows NT Cluster Software on both host servers

After completing these three main procedures in sequence you will have successfully established a cluster between the shared RAID subsystem and two host servers.

Checklist for Preparing Host A and Host B for a Cluster

The procedures for preparing each host server for a cluster are provided in the following checklist format.

Host A:

On Host A (With Host B powered down):

- Install the SCSI Host Adapter Device Driver
- Prepare for HSZDisk Class Driver Installation (only if NTFS partition drive letters have been previously assigned for your subsystem)
- Install the HSZDisk Class Driver
- Reboot the server (Host A)
- Verify HSZDisk Class Driver Installation
- Reassign Previous NTFS Partition Drive Letters or Create New NTFS Partition Drive Letters

Host B:

On Host B (Host A can remain powered up):

- Install the SCSI Host Adapter Device Driver
- Prepare for HSZDisk Class Driver Installation (temporarily de-assign NTFS partition drive letters)
- Install the HSZDisk Class Driver
- Reboot the server (Host B)
- Verify HSZDisk Class Driver Installation
- Reassign NTFS Partition Drive Letters

Procedures for Preparing Both Host Servers for a Cluster

Perform all of the steps in this section on Host A, while host B is powered down. When finished, power up Host B and repeat all of the steps on Host B.

NOTE: Follow normal procedures to power down Host B before preparing Host A for a cluster.

Installing the SCSI Host Adapter Device Driver

The SCSI host adapter device driver (software module) is provided with your newly installed SCSI host adapter. Install the SCSI host adapter device driver specific to your server platform as follows:

- For the Adaptec AHA-2944UW host adapter (supported on Intel servers), install the Adaptec host adapter device driver as described in the *Adaptec AHA-2944UW User's Guide*.

Preparing for the HSZDisk Class Driver Installation

NOTE: This procedure is required only if NTFS drive letter assignments have already *been* created for the RAID subsystem. If NTFS drive letters have not yet been created, please ignore this step and proceed to "Installing the HSZDisk Class Device Driver".

Installing the HSZDisk class driver when NTFS partitions exist on the RAID subsystem causes Windows NT to reassign the drive letters. (HSZDisk inserts all RAID array-based partitions ahead of any local (non-shared bus) partitions. Windows NT would, for example, reassign drive letter C from your system disk to the first NTFS formatted storageset partition, Disk 0.)

Since drive letter reassignments by the HSZDisk class driver could invalidate your drive mappings, you must temporarily remove NTFS drive letter assignments for all partitions on the RAID Array prior to installing the HSZDisk driver.



CAUTION: Do not remove the drive letters for local drives or the boot partition.

To remove drive letter assignments temporarily, follow these steps:

1. Start Disk Administrator. Figure 4-1 shows the Disk Administrator window displaying current partitions.

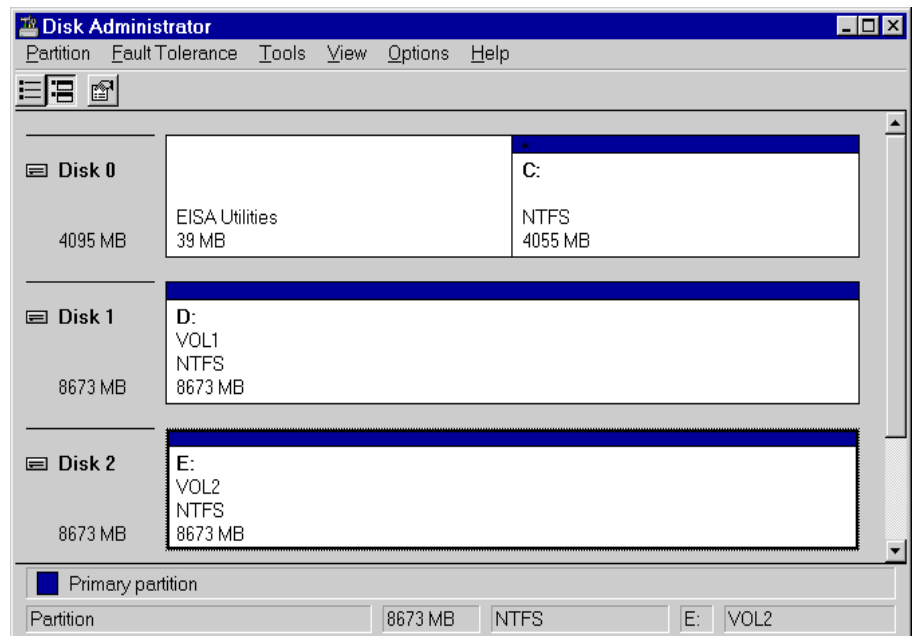


Figure 4-1. Current partitions

2. Label your partitions, if they are not already labeled, so that you can distinguish each one.
3. Record the drive letters currently associated with each of the partition labels.
4. Click **RAID Array-based partition**, select **Assign Drive Letter**.

The Assign Drive Letter dialog box appears, similar to Figure 4–2.

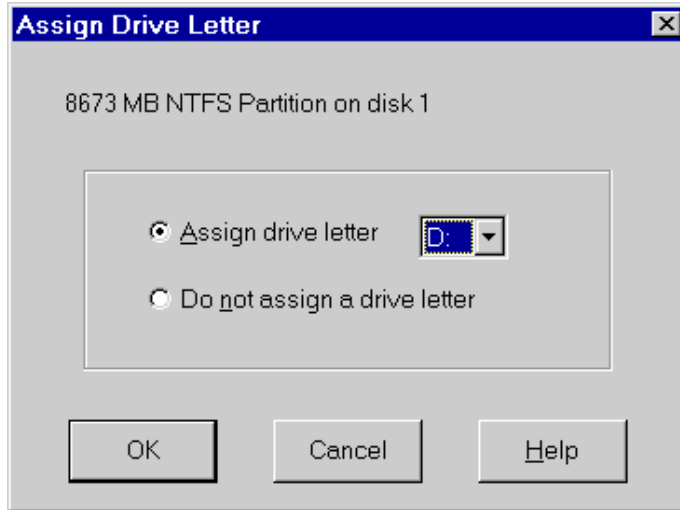


Figure 4-2. Assign Drive Letter

5. Click the **Do not assign a drive letter** button and click **OK** (Figure 4-3).

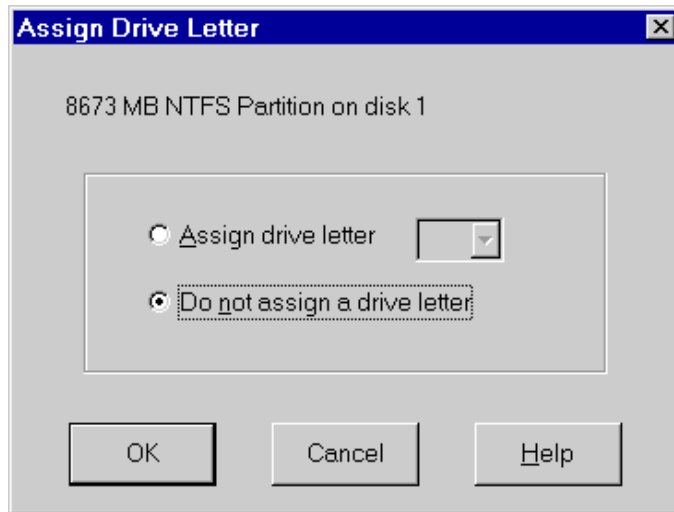


Figure 4-3. Do not assign a drive letter

A confirmation dialog box appears as shown in Figure 4-4.

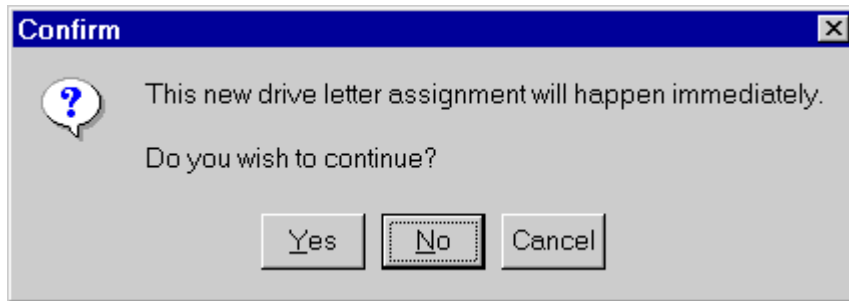


Figure 4-4. Drive letter confirmation

- Click **Yes**. The partition now appears without a drive letter designator similar to Figure 4-5.

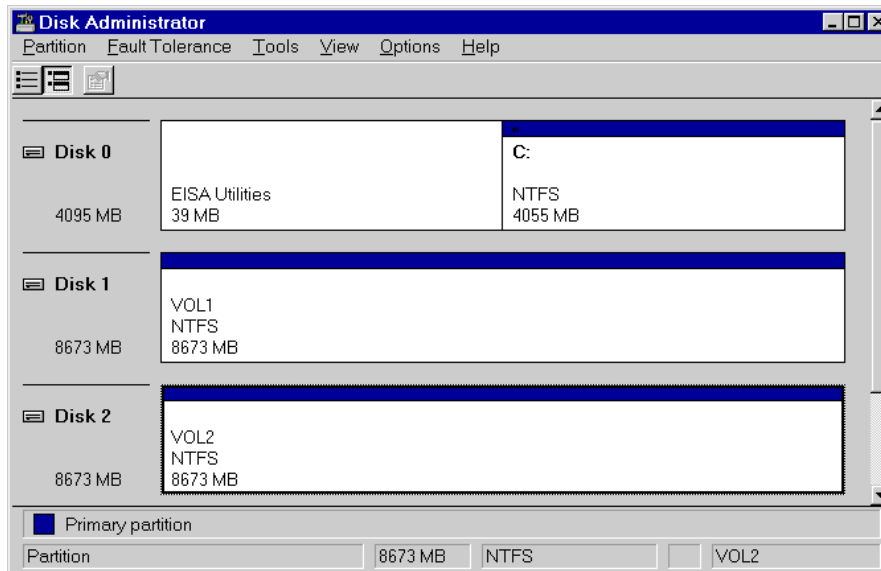


Figure 4-5. No drive letter assignments

- Repeat steps 4 through 6 for each of your partitions except the local and boot partitions.

Installing the HSZDisk Class Driver

Locate the CD-ROM disk labeled RAID Array 3000 Solution Software for Windows NT, which contains the HSZDisk driver (HSZDisk.sys).

The HSZDisk.sys driver is installed using the HSZ utility. The HSZ utility installs the driver, checks the event log for miniport and class driver errors, and also checks the SCSI adapter driver version.

Install the HSZDisk class driver on Host A by performing the following steps:

1. Insert the CD-ROM into your CD-ROM drive.
2. Run File Manager or Windows Explorer.
3. Navigate to the folder: CD\DRIVERS\HZINSTAL\
4. Double-click **Setup**.
5. Follow the instructions in the setup program to complete the installation. The installation process copies the driver into the proper subdirectory and creates the necessary registry entries.
6. Reboot the system.

Verifying Successful HSZDisk Class Driver Installation

Once the host server is rebooted, verify that the HSZDisk class driver installed successfully. To verify the HSZDisk installation, follow these steps:

1. Open the Event Viewer from the Administrative Tools group.
2. Locate an information icon in the Event Viewer window with HSZDisk for the Source.
3. Double-click the **HSZDisk entry** and an entry detail screen appears.

The message in the detail screen indicates whether the HSZDisk class driver was successfully installed.

If any driver installation errors appear in the Event Viewer window, a connectivity problem may exist on the shared SCSI-bus. HSZDisk will not load while these problems exist. Check for the following:

- Correct termination
- Faulty cables or connections
- Proper adapter seating in the system backplane
- SCSI ID conflicts

Upon successful HSZDisk class driver installation, proceed to the section below to reassign NTFS partition drive letters or create new drive letters if none have yet been created.

NTFS Partition Drive Letter Reassignment or Creation

If preparing Host A and you have not yet created any NTFS partitions on the RAID subsystem, create them now by running the Disk Administrator utility on Host A. After doing so, you will have successfully prepared Host A for a cluster. Return to “Procedures for Preparing Both Host Servers for a Cluster” to repeat the preceding software setups on Host B.

If preparing Host B, the shared drive letters must be identical on both host servers in a cluster environment. Reassign the same drive letters to Host B that you assigned to Host A, using the following the procedures.

Reassigning Previous NTFS Partition Drive Letters

This section describes how to reassign drive letters to NTFS partitions on a host if they were temporarily de-assigned as described in “Preparing for the HSZDisk Class Driver Installation”.

To reassign drive letters:

1. Start Disk Administrator. The disk administrator displays all the existing partitions, similar to the window in Figure 4-6. (The only partitions with drive letters are the boot partition and any non-disk devices, such as a CD-ROM drive).

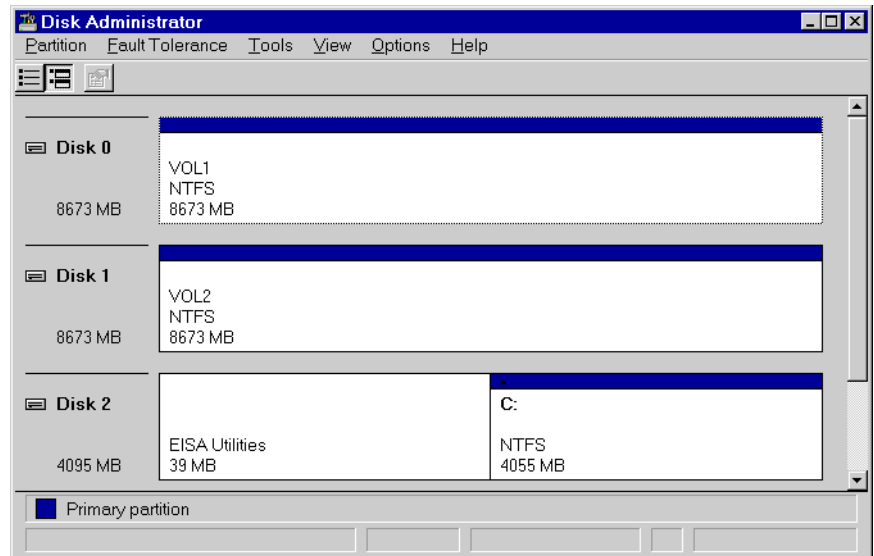


Figure 4-6. Partition appearance (post HSZDisk driver installation)

- Highlight a (RAID Array) partition and select **Assign Drive Letter**.
The Assign Drive Letter window appears displaying the next available drive letter, similar to the window in Figure 4-7.

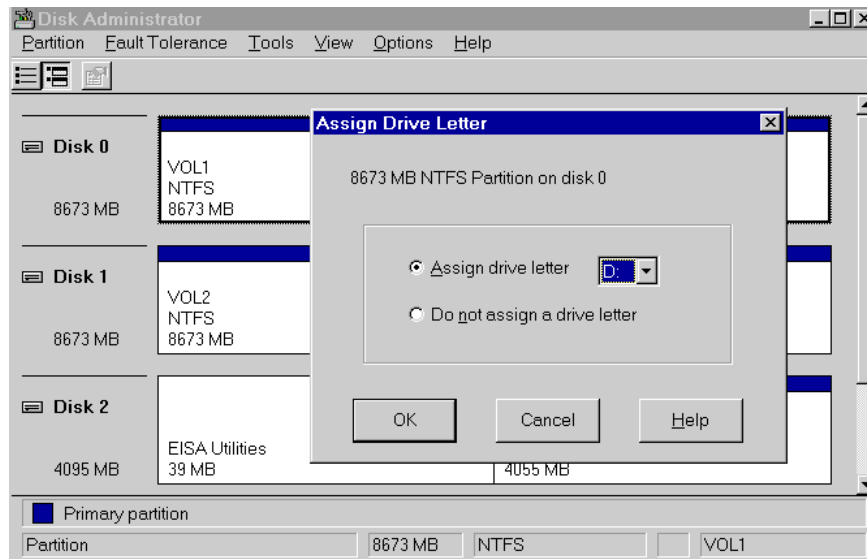


Figure 4-7. Driver letter availability

- Click **OK** if you want to assign the selected drive letter. Otherwise, click the **Assign drive letter** radio button. Select another drive letter from the pick list and click **OK**. If the letter you want to assign does not appear in the list, Windows NT may have already assigned that letter to the CD-ROM drive. You can unassign that letter from the CD-ROM to free it for use.
- At the Confirmation dialog box, Click **Yes**. The partition now appears with the specified drive letter designator.

- Repeat steps 2 through 4 until you have assigned drive letters to all of the partitions that need one, similar to the window in Figure 4-8.

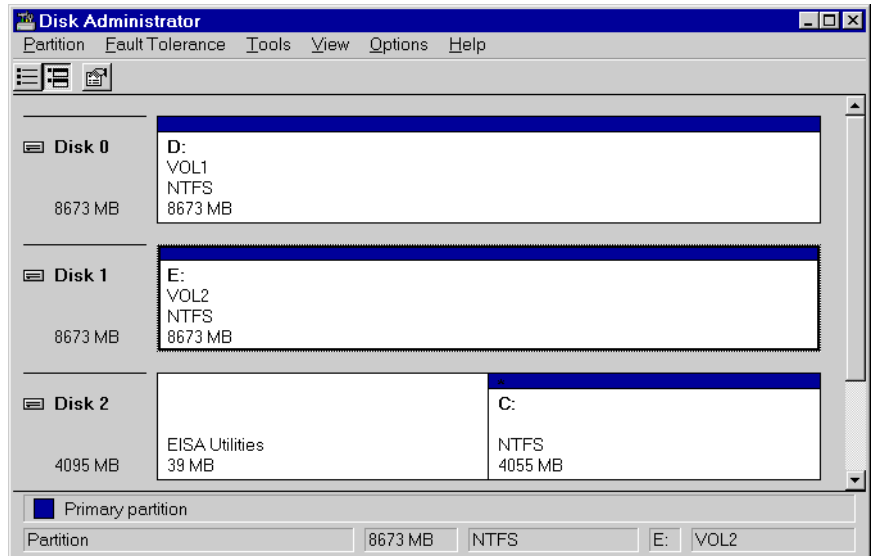


Figure 4-8. All the drive letters reassigned

If preparing Host A with the NTFS partition drive letters successfully reassigned or newly created, as applicable, Host A is prepared for a cluster. To prepare Host B, return to “Procedures for Preparing Both Host Servers for a Cluster” and repeat all of the preceding steps on Host B.

IF PREPARING HOST B

If preparing Host B with the NTFS partition drive letters successfully reassigned, Host B is prepared for a cluster then proceeds.

Installing and Configuring Windows NT Cluster Software on Both Host Servers

NOTE: Host A and Host B must be prepared see “Checklist for Preparing Host A and Host B for a Cluster” before installing Windows NT Cluster software.

You are now ready to install and configure Windows NT Cluster software on both of your host servers, as described in the manual provided with your cluster software. You can begin with Host A or Host B.

Chapter **5**

Software Setup Requirements for Windows 2000

This chapter describes the software setups, in sequence, required to prepare the RAID Array 3000 subsystem and two host servers for a cluster environment with Windows 2000. There are no major differences when installing clusters with Windows 2000 and Window NT.

Designating Servers as Host A and Host B

A cluster environment requires sets of software procedures to be performed one host server at a time. Therefore, the servers must be clearly designated in your mind as Host A and Host B prior to the setup process. If both servers are new, either one can be designated as Host A, and the other, Host B.

Server designation must remain constant through the configuration process.

Software Setup Summary for a Cluster

The software setup procedures required for a cluster are presented in this section in the order that they must occur, which is as follows:

- Prepare Host A for a Cluster
- Prepare Host B for a Cluster
- Install and Configure Windows 2000 Cluster Software on both host servers

Checklist for Preparing Host A and Host B for a Cluster

The procedures for preparing each host server for a cluster are provided in the following checklist format.

Host A:

On Host A (with Host B powered down):

- Ensure Windows 2000 Operating System has been properly installed
- Reboot the server (Host A)
- Reassign Previous NTFS Partition Drive Letters or Create New NTFS Partition Drive Letters

Host B:

On Host B (Host A can remain powered up):

- Ensure Windows 2000 Operating System has been properly installed
- Reboot the server (Host B)
- Reassign Previous NTFS Partition Drive Letters or Create New NTFS Partition Drive Letters

Procedures for Preparing Both Host Servers for a Cluster

Perform all of the steps in this section on Host A, while host B is powered down. When finished, power up Host B and repeat all of the steps on Host B.

NOTE: Follow normal procedures to power down Host B before preparing Host A for a cluster.

Installing the SCSI Host Adapter Device Driver

The SCSI host adapter device driver is provided with Windows 2000. Upon boot, the operating system will identify the host adapter and load the proper driver. No other driver for the AHA-2944UW is supported with Windows 2000.

Preparing for the HSZDisk Class Driver Installation

NOTE: HSZDisk class device driver is not required for Windows 2000.

Dynamic disks are not supported with the RA3000 subsystem.

1. Start Disk Manager from the Computer Management window in Figure 5-1.

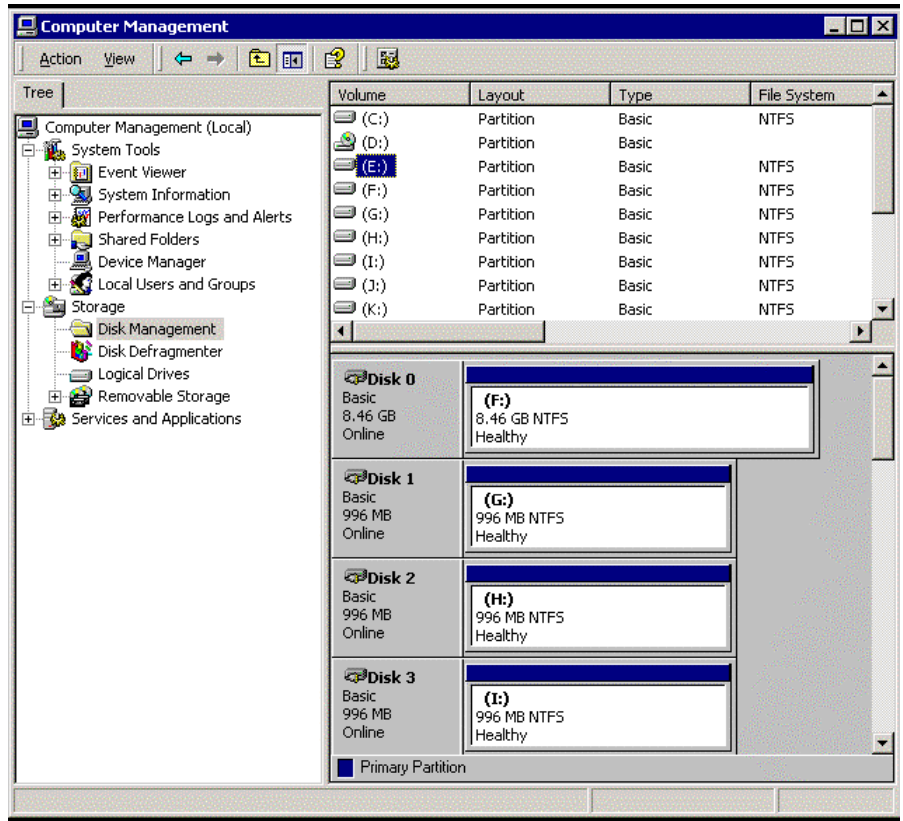


Figure 5-1. Computer Management disk manager window

2. Click (RAID Array) partition, select **Change drive letter and path**.
The Change Drive Letter dialog box appears. (Figure 5-2).

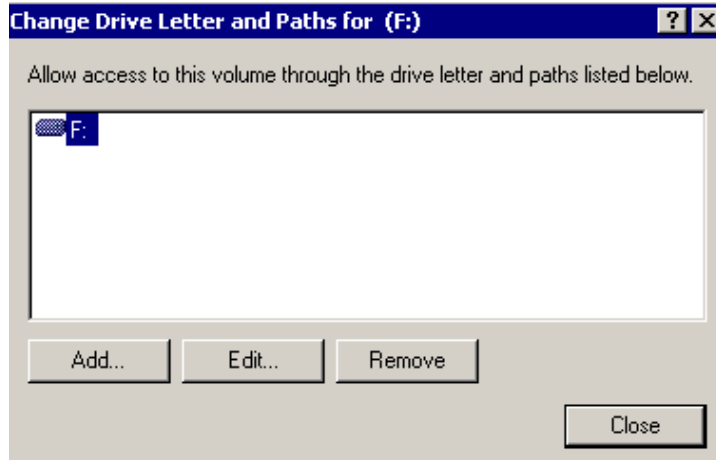


Figure 5-2. Change Drive Letter and Paths dialog box

3. Click **Add** after assigning the desired drive letter and click **OK** (Figure 5-3).

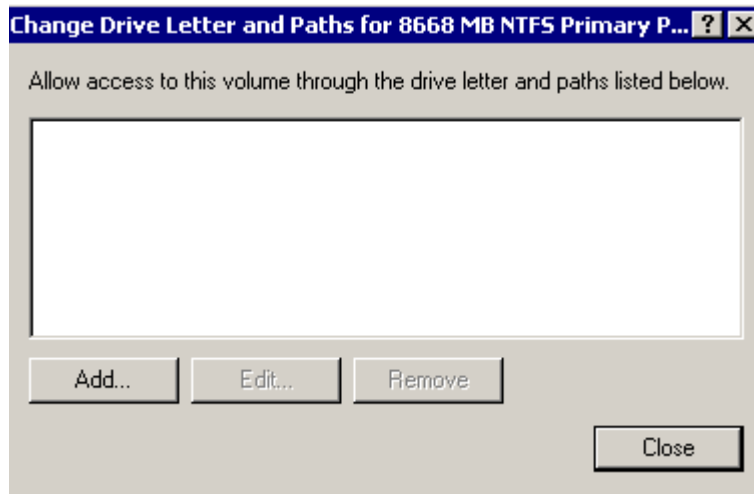


Figure 5-3. Changing drive letter and paths

- Repeat steps 2 and 3 for each of your partitions except for the disk partition as shown in Figure 5-4.

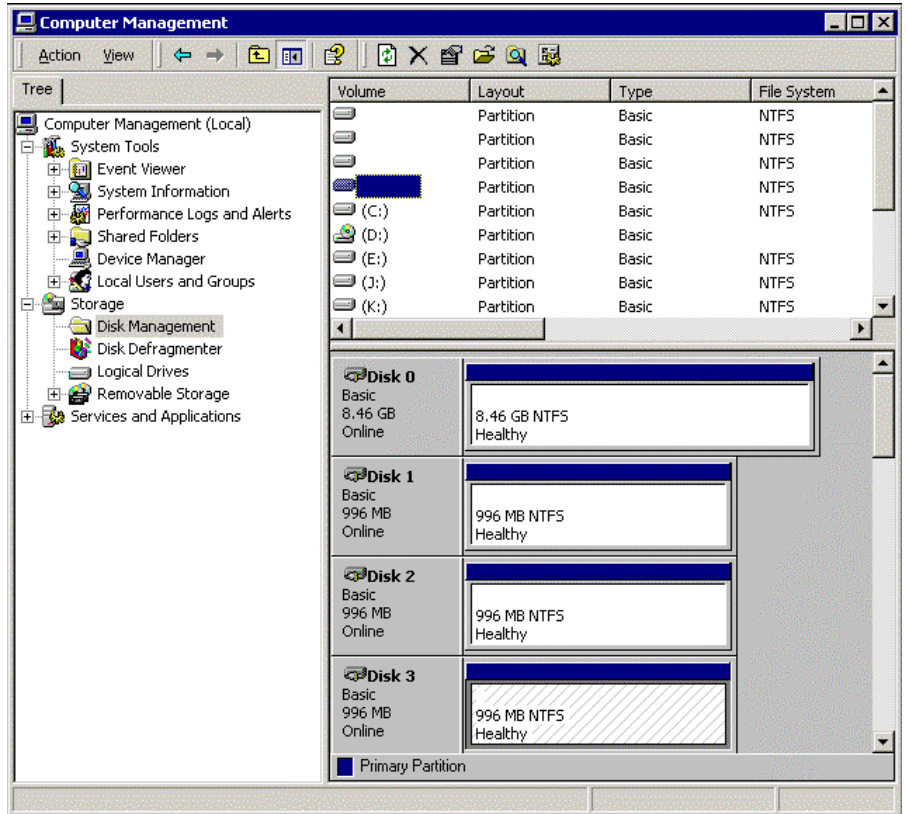


Figure 5-4. Disk partitions

NTFS Partition Drive Letter Reassignment *or* Creation

If preparing Host A and you have not created any NTFS partitions on the RAID subsystem, create them now by running the Disk Management utility on Host A. You will have successfully prepared Host A for a cluster, and must return to “Procedures for Preparing Both Host Servers for a Cluster” to repeat the preceding software setups on Host B.

If preparing Host B, the shared drive letters must be identical on both host servers in a cluster environment. Reassign the same drive letters to HOST B that you assigned to Host A, using the following the procedures.

Reassigning Previous NTFS Partition Drive Letters

To reassign drive letters, follow the steps outlined in “NTFS Partition Drive Letter Reassignment *or* Creation”.

Installing and Configuring Windows 2000 Cluster Software on Both Host Servers

NOTE: Host A and Host B must be prepared see “Checklist for Preparing Host A and Host B for a Cluster” before installing Windows 2000 Cluster software.

You are now ready to install and configure Windows 2000 Cluster software on both of your host servers, as described in the manual provided with your cluster software. You can begin with Host A or Host B.

