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*Storage***Works** 

**RA7000 / ESA10000**  
**Cluster Solutions for Windows NT**

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Installation Guide

EK-NT07K-IG. A01

**Digital Equipment Corporation**  
**Maynard, Massachusetts**

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**1<sup>st</sup> Edition, May 1998**

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## Getting Started

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## *Revision Record*

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*This Revision Record provides a concise publication history of this manual. It lists the manual revision levels, release dates, and reasons for the revisions.*

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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 RA7000 / ESA10000 subsystem, configured with or without a SCSI hub interconnect, to two (both Alpha or Intel) host servers running the Windows NT operating system, and each containing identical, supported HD68-Pin host adapters. The host adapters supported are: Adaptec AHA-2944UW (for Intel or Alpha servers) or DIGITAL KZPBA-CB (for Alpha servers only). NT Cluster software is supported by this publication.

| <b>Revision Level</b> | <b>Date</b> | <b>Summary of Changes</b> |
|-----------------------|-------------|---------------------------|
| EK-NT07K-IG. A01      | May 1998    | Original release.         |



## About This Guide

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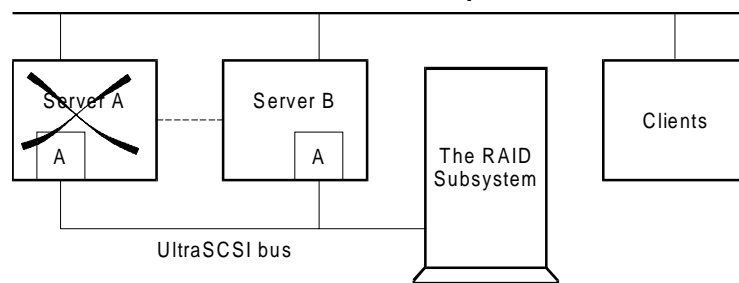
*This section provides an overview of the RA7000 / ESA10000 Cluster Concept for Windows NT, and defines the scope and conventions of this guide. It also identifies the associated reference documentation, and the StorageWorks sales, service, and technical support contacts worldwide.*

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### An Overview of RA7000 / ESA10000 Cluster Solutions for Windows NT

A RAID Windows NT Cluster enables two host servers of the same architecture, (Intel or Alpha), to share an RA7000 or ESA10000 storage subsystem through an UltraSCSI bus, with Windows NT 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 component(s) can be warm-swapped or serviced while functioning components remain active.

**Figure 1 – RA7000 / ESA10000 Cluster Concept**



SHR-1089

### Audience

This guide is intended for administrators and system integrators of Intel or Alpha based host servers and StorageWorks RA7000 or ESA10000 subsystem equipment. Setting up a cluster requires a general understanding of server networks, RAID storage concepts, Windows NT Cluster software and UltraSCSI hardware configurations. Or, contact your service representative for installation assistance.

## **Document Structure**

This guide contains the following chapters:

### **Getting Started**

This section provides a roadmap to serve as the master procedural guide for establishing a cluster.

### **Chapter 1: Pre-Installation Steps**

This chapter addresses the preparation needed before installing and configuring the RAID subsystem cluster components. It provides a guide to your options in planning the layout of the cluster (e.g., the shared RAID subsystem, the two host servers and, if applicable, the SCSI hub), through the UltraSCSI bus. It provides the termination procedures required to permit disconnection of failed components from the bus to occur without disrupting the active bus. This chapter also describes how to prepare the two SCSI host adapter boards for a cluster environment.

### **Chapter 2: Cabling the RAID Subsystem Components in a Cluster**

This chapter describes the procedures for cabling the RA7000 or ESA10000 subsystem cluster components based on the UltraSCSI bus layout selected in *Chapter 1* of this guide. It provides detailed illustrations of the cabling and termination required to support Adaptec AHA-2944UW or DIGITAL KZPBA-CB host adapters, and the use of a SCSI hub.

### **Chapter 3: Software Setup Requirements for a Cluster**

This chapter identifies the three major software setup tasks required to establish a cluster. It describes the steps for preparing the two hosts with host adapter and RAID Windows NT device drivers, as well as NTFS partition drive letter assignments. It also directs you to the procedures for installing and configuring Windows NT Cluster software on each host.



## Associated Documents

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

**Table 1 Associated StorageWorks and Windows NT Documents**

| DIGITAL StorageWorks Document Title                                    | Order Number      |
|--|-------------------|
| Getting Started - HSZ70 Solutions Software V7.0b for Windows NT Server |                   |
| - ( <i>Alpha</i> )   | AA-R84DC-TE       |
| - ( <i>Intel</i> )   | AA-R770C-TE       |
| Release Notes - RAID Array 7000 / ESA10000 for Windows NT              |                   |
| - ( <i>Alpha</i> )   | AA-R84EB-TE       |
| - ( <i>Intel</i> )   | AA-R771B-TE       |
| 16-Bit SCSI Bus Hub (DWXXH)  | EK-DWZZH-UG       |
| Command Console 2.0 User's Guide                                       | AA-R60EA-TE       |
| KZPBA-CB PCI-to-Ultra SCSI Host Adapter User's Guide                   | EK-KZPBC-UG       |
| Adaptec AHA-2944UW User's Guide  | (vendor supplied) |
| Adaptec AHA-2944UW Installation Guide                                  | (vendor supplied) |

## Conventions

In this guide, references to RAID, RAID subsystem, *StorageWorks RAID Array*, *HSZ70*, *controller*, or *subsystem* pertain to the following:

- Raid Array 7000 or
- Enterprise Storage Array (ESA)10000

This guide uses the following documentation conventions:

**Table 2 Style Conventions**

| Style                          | Meaning  |
|--------------------------------|--|
| <b>boldface monospace type</b> | To be input by the user.   |
| <i>italic type</i>             | For emphasis, manual titles, utilities, menus, screens, and filenames. |
| plain monospace type           | Screen text.   |

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## Support and Services

### Who to contact in the Americas

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

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### Who to contact in Europe

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

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### Who to contact in Asia Pacific

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

## *Getting Started*

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*This section contains a roadmap to serve as your master guide for establishing a Cluster between two NT host servers (both Intel or Alpha) and a shared RA7000 or ESA10000 storage 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 on this roadmap.

### **RA7000 / ESA10000 Clusters for Windows NT**

## - - - - - RoadMap - - - - -

| STEP | PERFORM THIS PROCEDURE...  | DESCRIBED IN...   |
|------|--|---|
| ❑ 1  | <b>All Pre-Installation steps,</b><br>Including... <ul style="list-style-type: none"> <li>◇ Verify Cluster Requirements</li> <li>◇ Verify SCSI Connection Kit Contents</li> <li>◇ Perform System Backups</li> <li>◇ Plan the Cluster (UltraSCSI bus) Layout</li> <li>◇ Prepare the SCSI Host Adapters</li> </ul> | <i>RA7000 / ESA10000 Cluster Solutions for Windows NT – Chapter 1</i>                                 |
| ❑ 2  | <b>Unpack and Setup the RAID Subsystem</b>   | <i>Getting Started - HSZ70 Solutions Software for Windows NT Server - (Intel / Alpha) – Chapter 1</i> |
| ❑ 3  | <b>Cable/Terminate the RAID Subsystem Components</b>   | <i>RA7000 / ESA10000 Cluster Solutions for Windows NT – Chapter 2</i>                                 |
| ❑ 4  | <b>Install RAID Manager (SWCC) Software and Create the RAID StorageSets</b>  | <i>Getting Started - HSZ70 Solutions Software for Windows NT Server - (Intel / Alpha) – Chapter 4</i> |
| ❑ 5  | <b>Perform Software Setups Required for a Cluster,</b> Including... <ul style="list-style-type: none"> <li>◇ Prepare Host A for a Cluster</li> <li>◇ Prepare Host B for a Cluster</li> <li>◇ Install and Configure Cluster Software</li> </ul>   | <i>RA7000 / ESA10000 Cluster Solutions for Windows NT – Chapter 3</i>                                 |

After these steps have been successfully completed in sequence, your NT cluster will be operational.



# 1

## *Pre-Installation Steps*

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*This section addresses the preparation needed before installing and configuring the RA7000 / ESA10000 subsystem cluster components.*

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The pre-installation steps required to support clustering are as follows:

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

### **1.1 Verify the (RA7000/ESA10000) Cluster Requirements**

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

**Table 1-1 RA7000 / ESA10000 NT Cluster Prerequisites**

| <b>Host Feature</b>                         | <b>Requirement</b>  |
|---|---|
| Platform                                    | Two host servers of the same architecture (Intel or Alpha)  |
| Operating System                            | Microsoft Windows NT  |
| Cluster Software                            | Windows NT Cluster software   |
| Storage Subsystem                           | StorageWorks RA7000 or ESA10000 storage subsystem   |
| RAID Controllers                            | Two StorageWorks HSZ70 controllers per subsystem  |
| SCSI Host Adapters<br>(and adapter drivers) | Two identical, HD68-Pin SCSI host adapters (one per server). Supported host adapters are: <ul style="list-style-type: none"><li>• Adaptec AHA-2944UW (for Intel or Alpha servers)</li><li>• DIGITAL KZPBA-CB (for Alpha servers only)</li></ul> |
| RAID Storage Class<br>Driver                | HSZdisk.sys   |

**Table 1–1 RA7000 / ESA10000 NT Cluster Prerequisites (cont)**

| Additional Items         | Requirement  |
|--------------------------|--|
| RAID SCSI Connection Kit | Complete RAID SCSI Connection Kit (See Table 1-2)  |
| 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 RA7000 or ESA10000 RAID subsystem, the host servers and the Windows NT Cluster software supplement this installation guide. |

**NOTES**

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 hub requires a 3.5" SSB slot available in your StorageWorks pedestal or shelf.

**1.2 Inventory the RAID SCSI Connection Kit**

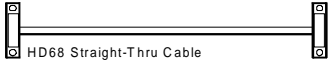
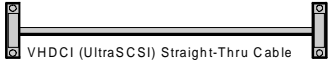
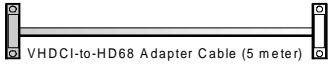

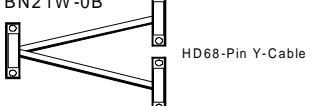

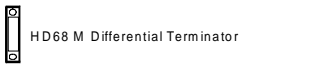
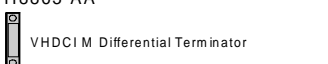
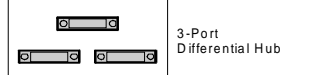
Three types of RAID SCSI Connection Kits exist. The part numbers and purpose served by each kit is as follows:

- **SWXKT-DE** – for connecting the RAID subsystem to servers having *HD68-pin* host adapters
- **SWXKT-EA** – for connecting the RAID subsystem through a SCSI hub to servers having either *HD68-pin or VHDCI* SCSI host adapters (host adapters must be identical)
- **SWXKT-DF\*** – for connecting the RAID subsystem to servers having *VHDCI (UltraSCSI)* host adapters. (This kit not applicable to the RA7000 / ESA10000 Winsows NT cluster)

Please verify that the connection kit you have received is specific to your clustering needs, and use Table 1-2 to inventory its contents. Also, reference the *NOTE* following Table 1-2 to locate the components supplied with your RAID subsystem that supplement the RAID SCSI Connection Kit.

If you are missing any hardware component required for a cluster, please contact your local sales representative or call the StorageWorks Resource Center at 1-800-STORWOR (786-7967).

**Table 1–2 RAID SCSI Connection Kit Contents** (listed by kit number)

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

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

- One BN37A-05 VHDCI UltraSCSI straight-thru cable (RA7000)
- One BN38E-0B VHDCI-to-HD68-Pin Adapter cable (RA7000 / ESA1000)

### 1.3 Perform System Backups

Follow normal procedures to backup both of the host servers that will be connected to the RAID subsystem in the cluster before installing any of the RAID subsystem cluster components.

### 1.4 Plan the RAID Cluster Layout (UltraSCSI Bus Interconnect)

To plan the layout of cluster components through the UltraSCSI bus, first define the two ends of the UltraSCSI bus by selecting *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 (see *NOTE* below for maximum bus lengths). You can locate the RAID RA7000 or ESA10000 subsystem:

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

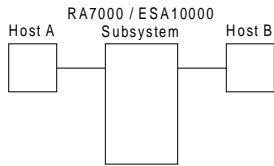
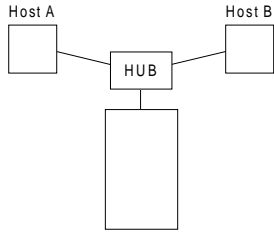
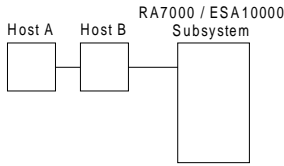
#### NOTE

The maximum bus length for a mid-bus or an end-bus RAID cluster layout is 25M (*include* the Y-cable length when calculating total bus length).

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



**Table 1-3 RAID Subsystem Cluster (UltraSCSI Bus) Layout Options**

| For This RAID Cluster Layout Option... ▼   | And This Type of Host Adapter... | Reference This... Section & Figure |     |
|--|----------------------------------|------------------------------------|-----|
| Mid-Bus RAID   | HD68-Pin                         | 2.2                                | 2-1 |
|  <p>SHR-1021 Mid-Bus RAID</p>       |                                  |                                    |     |
| For This RAID Cluster Layout Option... ▼   | And This Type of Host Adapter... | Reference This... Section & Figure |     |
| Hub-Radiant RAID   | HD68-Pin                         | 2.3                                | 2-2 |
|  <p>SHR-1023 Hub-Radiant RAID</p> |                                  |                                    |     |
| For This RAID Cluster Layout Option ... ▼  | And This Type of Host Adapter... | Reference This... Section & Figure |     |
| End-Bus RAID   | HD68-Pin                         | 2.4                                | 2-3 |
|  <p>SHR-1022 End-Bus RAID</p>     |                                  |                                    |     |

Use Table 1-3 to select the RAID cluster layout that best suits your environment. Prepare and install the SCSI host adapters (as described in see Section 1.5, “Prepare the SCSI Host Adapters”). Then, reference Chapter 2, “Cabling the RAID Subsystem Cluster Components” to proceed with the cluster installation.

## 1.5 Prepare the SCSI Host Adapters

Each host server in a cluster requires one SCSI host adapter be installed. The two SCSI host adapters used in the cluster **must be identical**. The host adapter products supported for an RA7000 or ESA10000 cluster are as follows:

| INTEL Servers      | ALPHA Servers   |
|--------------------|---|
| Adaptec AHA-2944UW | Adaptec AHA-2944UW <i>or</i><br>StorageWorks KZPBA-CB |

Prior to *installing* the SCSI host adapters (as described in the Adaptec AHA-2944UW Installation Guide or KZPBA-CB User's Guide), the SCSI host adapters 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 procedures for preparing both SCSI host adapter products for a cluster environment are provided in the following sections.

### 1.5.1 Setting SCSI Host Adapter Termination

#### 1.5.1.1 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 RA7000 or ESA10000 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 Cluster Layout... | Set the AHA-2944UW Termination to... |
|--|--------------------------------------|
| Mid-Bus RAID                                     | OFF/OFF                              |
| End-Bus RAID                                     | OFF/OFF                              |
| Hub-Radiant RAID                                 | ON/ON                                |

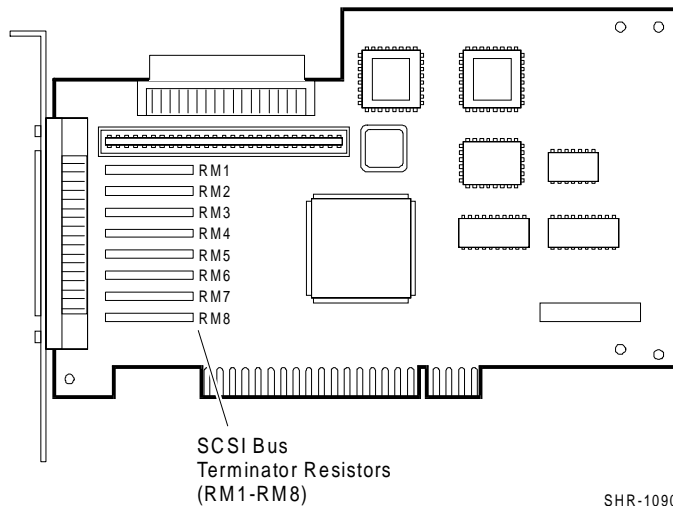
### 1.5.1.2 KZPBA-CB Termination Procedures

If the host adapters are KZPBA-CB **and** part of a *mid-bus* or an *end-bus* RAID cluster layout, the resistor packs (terminators) on-board the host adapters (shown in Figure 1-1) must be removed prior to UltraSCSI bus interconnection.

#### NOTE

Do not remove KZPBA-CB host adapter resistor packs in a *hub-radiant RAID* layout. In SCSI hub configurations, termination is internal to the SCSI hub.

Figure 1-1 Resistor Pack Locations on the KZPBA-CB SCSI Host Adapter



#### To remove resistor packs on KZPBA-CB adapters in *mid-bus* or *end-bus* RAID cluster layouts:

1. Follow normal procedures to shutdown both servers
2. If applicable, consult the system manual to remove the cover of the server cases and remove the KZPBA-CB adapter boards from both host servers.
3. Gently pull to remove resistors RM1 through RM8 from the adapter boards.
4. Replace the host adapter boards into the servers.
5. Reboot the servers and refer to the following section to set unique SCSI host adapter IDs.

### 1.5.2 Setting Unique SCSI Host Adapter IDs

A cluster requires that each server have 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.

### 1.5.3 Setting SCSI Bus Reset to Disable

Refer to your (Adaptec or KZPBA-CB) host adapter user's guide and follow the procedure to set the *SCSI Bus Reset* option to **Disable**. (For the KZPBA-CB, "1" = disable).

### 1.5.4 Setting SCSI Host Adapter BIOS to Disable

**NOTE:**

This procedure applies to Adaptec SCSI host adapters only.

Refer to your Adaptec SCSI host adapter user's guide and follow the procedure to set the *Adapter BIOS* option to **Disable**. (The Adapter BIOS setting is not applicable to the KZPBA-CB host adapter).

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

# 2

## *Cabling the RAID Subsystem Cluster Components*

---

*This chapter provides the procedures for interconnecting two Windows NT host servers and a shared StorageWorks RA7000 or ESA10000 subsystem through the UltraSCSI bus, and terminating the bus as applicable. Interconnection procedures for locating the RAID subsystem in a Mid-Bus, Hub-Radiant and End-Bus cluster layout are provided.*

---

### **2.1 Connecting RAID Cluster Components through the UltraSCSI Bus**

Based on the RAID subsystem cluster layout option you have selected (as cross-referenced in Chapter 1, Table 1-1 of this guide), locate the procedures in this section to cable and terminate the cluster components through the UltraSCSI bus.

#### **NOTES**

Follow normal procedures to power off your two servers prior to cabling.

For clarity in Figures 2-1 through and 2-3 the *VHDCI* UltraSCSI cables and terminators are shaded and the HD68-pin (fast, wide SCSI) components are white.

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

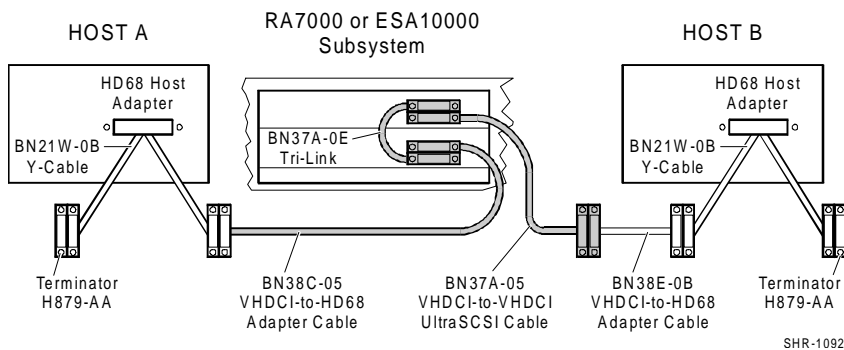
The following procedures assume that the host adapters have been prepared as described in Chapter 1.

## 2.2 Mid-Bus RAID Cluster Layout - (UltraSCSI Bus Interconnect)

To connect two Windows NT host servers (both Alpha or Intel) equipped with HD68-pin host adapters on the two ends of the UltraSCSI bus (e.g., mid-bus RAID layout), with a RAID subsystem, reference Figure 2-1 and follow these steps:

1. Attach a Y-cable (BN21W-0B) to the HD68-pin host adapter on Host A.
2. Attach a Y-cable (BN21W-0B) to the HD68-pin host adapter on Host B.
3. Attach (compatible) end of a 5M adapter cable (BN38C-05) to one end of the Y-cable attached to Host A.
4. Connect the other end (VHDCI compatible) of the adapter cable to the end of a tri-link connector on a subsystem controller.
5. Attach (compatible) end of the short adapter cable (BN38E-0B) to one end of the Y-cable attached to Host B.
6. Connect the other end (VHDCI-compatible) of the adapter cable to the end of UltraSCSI cable BN37A-05.
7. Remove the terminator that occupies the tri-link connector on the subsystem controller.
8. Attach the remaining end of the VHDCI UltraSCSI cable attached to Host A to the available tri-link connector on the subsystem controller.
9. Connect a terminator (H879-AA) to the available end of the Y-cable on Host A, and to the available end of the Y-cable on Host B.

**Figure 2-1 Mid-Bus RAID Cluster Layout - (UltraSCSI Bus Interconnect)**

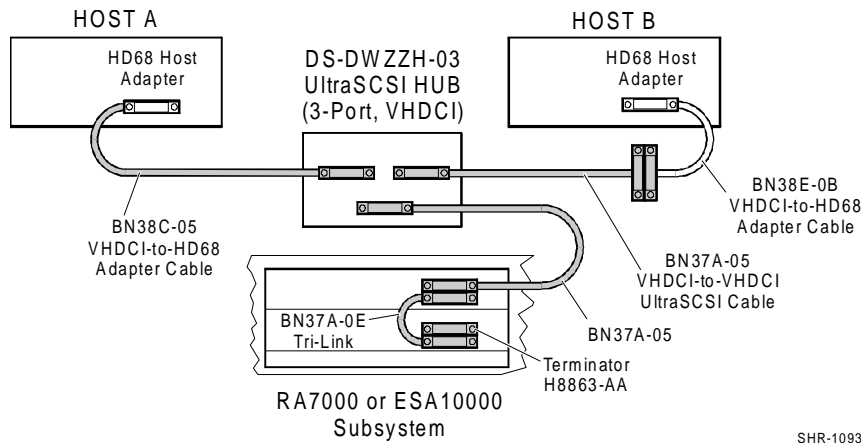


### 2.3 HUB-Radiant RAID Cluster Layout - (UltraSCSI Bus Interconnect)

To connect two Windows NT host servers (both Alpha or Intel) equipped with HD68-pin host adapters to a RAID subsystem via use of a SCSI hub, reference Figure 2-2 and follow these steps:

1. Attach (compatible) end of the 5M adapter cable (BN38C-05) to the HD68-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 HD68-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 UltraSCSI cable to a convenient SCSI hub port.
6. Connect one end of an UltraSCSI cable (BN37A-05) to a subsystem controller.
7. Attach the other end of the UltraSCSI cable to the remaining SCSI hub port.
8. Connect a terminator (H8863-AA) to the remaining tri-link connector on the subsystem controller.

Figure 2-2 Hub-Radiant RAID Cluster Layout - (UltraSCSI Bus Interconnect)



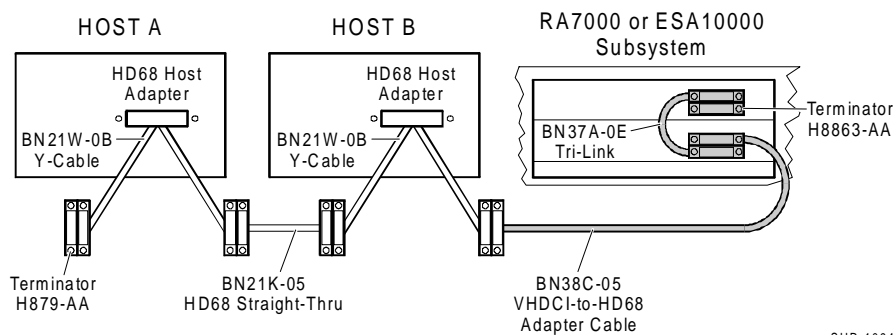
**NOTE:** In hub configurations, termination is internal to the hub.

## 2.4 End-Bus RAID Cluster Layout - (UltraSCSI Bus Interconnect)

To connect two Windows NT host servers (both Alpha or Intel) equipped with HD68-pin host adapters to a RAID subsystem located on the end of the UltraSCSI bus, reference Figure 2-3 and follow these steps:

1. Attach a Y-cable (BN21W-0B) to the HD68-pin host adapter on Host A.
2. Attach a Y-cable (BN21W-0B) to the HD68-pin host adapter on Host B.
3. Attach one end of the HD68-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 the 5M adapter cable (BN38C-05) to the available end of the HD68-pin Y-cable attached to Host B.
6. Connect the other (VHDCI-compatible) end of the adapter cable to the available end of a tri-link connector on a subsystem controller.
7. Connect terminator H8863-AA to the available end of a tri-link connector on a subsystem controller.
8. Connect terminator H879-AA to the available end of the Y-cable attached to Host A.

**Figure 2-3 End-Bus RAID Cluster Layout - (UltraSCSI Bus Interconnect)**





# 3

## *Software Setup Requirements for a Cluster*

---

*This chapter identifies the software setups, in sequence, required to prepare the StorageWorks RA7000 or ESA10000 subsystem and two host servers for a cluster environment.*

---

### **3.1 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.

### **3.2 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, as described in Sections 3.3 through 3.4, you will have successfully established a cluster between the shared RAID subsystem and the two host servers.

### 3.3 Checklist for Preparing Host A and Host B for a Cluster

The procedures for preparing each host server for a cluster are provided in checklist format, below. Detailed procedures follow.

#### **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

### 3.3.1 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.

#### 3.3.1.1 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 or Alpha servers), install the *Adaptec* host adapter device driver as described in the “*Adaptec AHA-2944UW User’s Guide*”.
- For an KZPBA-CB host adapter, (supported on Alpha servers only), install the *KZPBA-CB PCI SCSI* host adapter device driver as described in the “*KZPBA-CB PCI-to-Ultra SCSI Differential Host Adapter -User’s Guide*”.

#### 3.3.1.2 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 Section 3.3.1.3, “*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 storage partition, Disk 0).

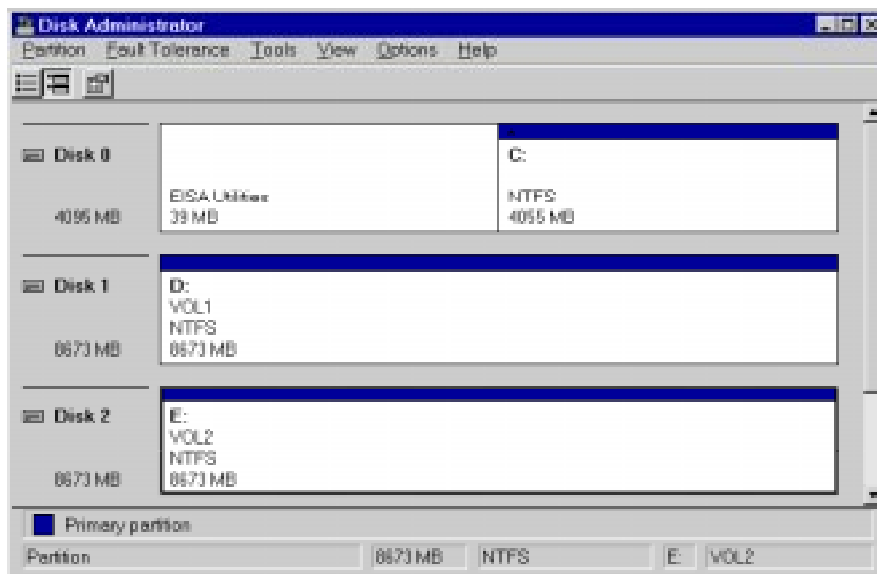
Since drive letter reassignments by the HSZDisk class driver could invalidate your drive mappings, **you must temporarily remove NTFS drive letter assignments** for all partitions on the RAID Array prior to installing the HSZDisk driver.

**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 3–1 shows the Disk Administrator window displaying current partitions.

**Figure 3–1 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 on a (Raid Array-based) partition.
5. From the *Tools* menu select *Assign Drive Letter*.

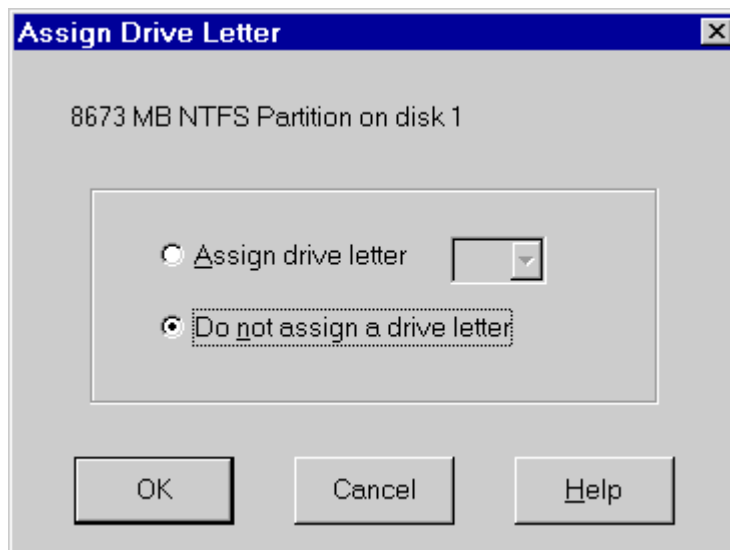
The Assign Drive Letter dialog box appears, similar to Figure 3–2.

Figure 3–2 Assign Drive Letter



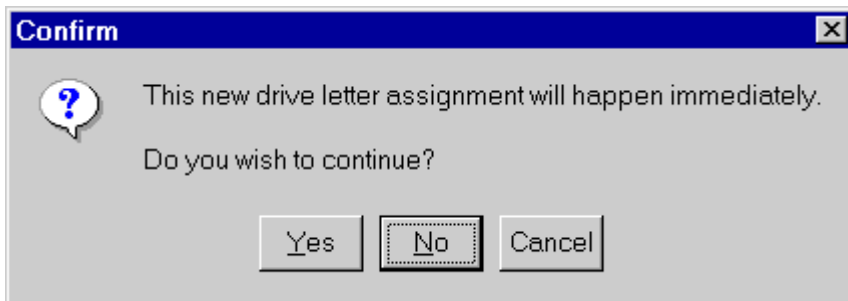
6. Click the *Do not assign a drive letter* button (as shown in Figure 3–3) and then click OK.

Figure 3–3 Do Not Assign a Drive Letter



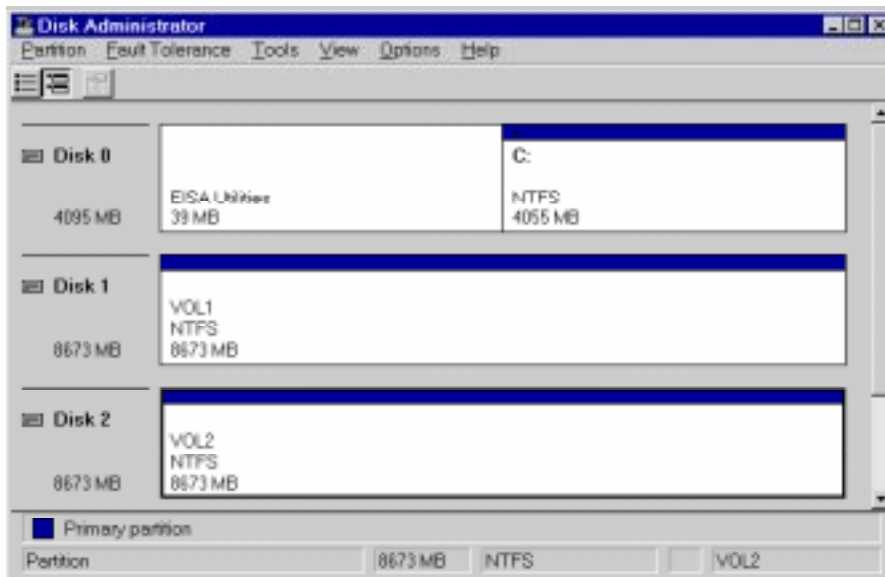
A confirmation dialog box appears as shown in Figure 3–4.

**Figure 3-4 Drive Letter Confirmation**



7. Click Yes. The partition now appears without a drive letter designator similar to the screen shown in Figure 3-5.

**Figure 3-5 No Drive Letter Assignments**



8. Repeat Steps 4 - 7 for each of your partitions except the local and boot partitions.

### 3.3.1.3 Installing the HSZDisk Class Driver

Locate the CD-ROM disk labeled *HSZ70 Solution SW 7.0b for Windows NT (Intel or Alpha)*, 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 on *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.

### 3.3.1.4 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 on 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 section 3.3.1.5 to reassign NTFS partition drive letters or create new drive letters if none have yet been created.

### 3.3.1.5 NTFS Partition Drive Letter Reassignment *or* Creation

#### **IF PREPARING HOST A**

If 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 so doing, you will have successfully prepared Host A for a cluster, and must return to Section 3.3.1, "*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.



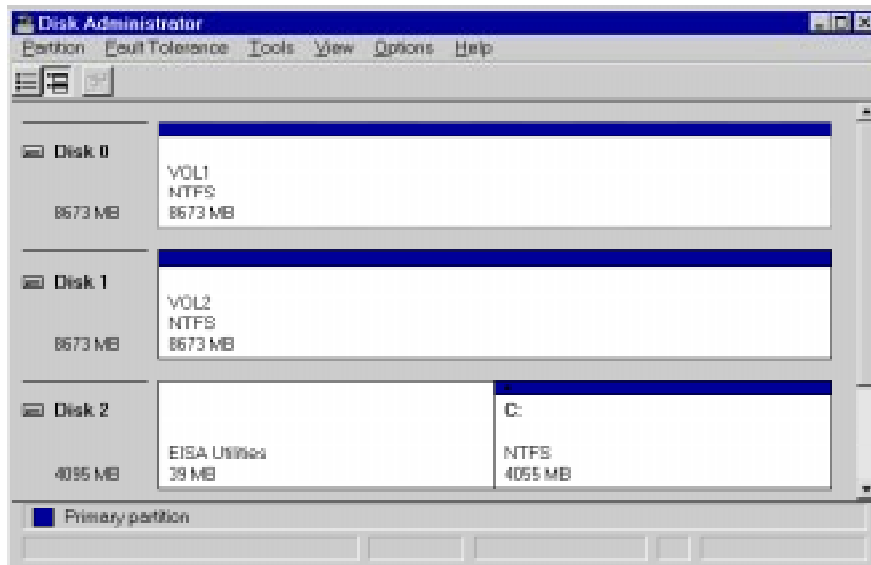
### 3.3.1.5.1 Reassigning Previous NTFS Partition Drive Letters

This section describes how to reassign drive letters to NTFS partitions on a host if they were temporarily de-assigned as described in Section 3.3.1.2, “*Preparing for the HSZDisk Class Driver Installation*”.

To reassign drive letters, follow these steps:

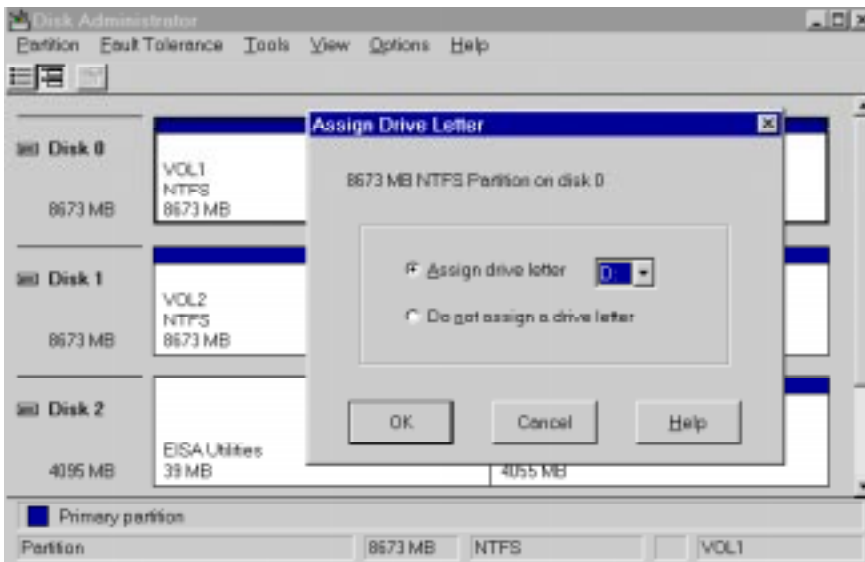
1. Start Disk Administrator. The disk administrator displays all the existing partitions, similar to the window shown in Figure 3-6. (The only partitions with drive letters are the boot partition and any non-disk devices, such as a CD-ROM drive).

**Figure 3-6 Partition Appearance - (post HSZDisk driver installation)**



2. Highlight a (Raid Array ) partition and from the *Tools* menu select *Assign Drive Letter*. The Assign Drive Letter window appears displaying the next available drive letter, similar to the window shown in Figure 3-7.

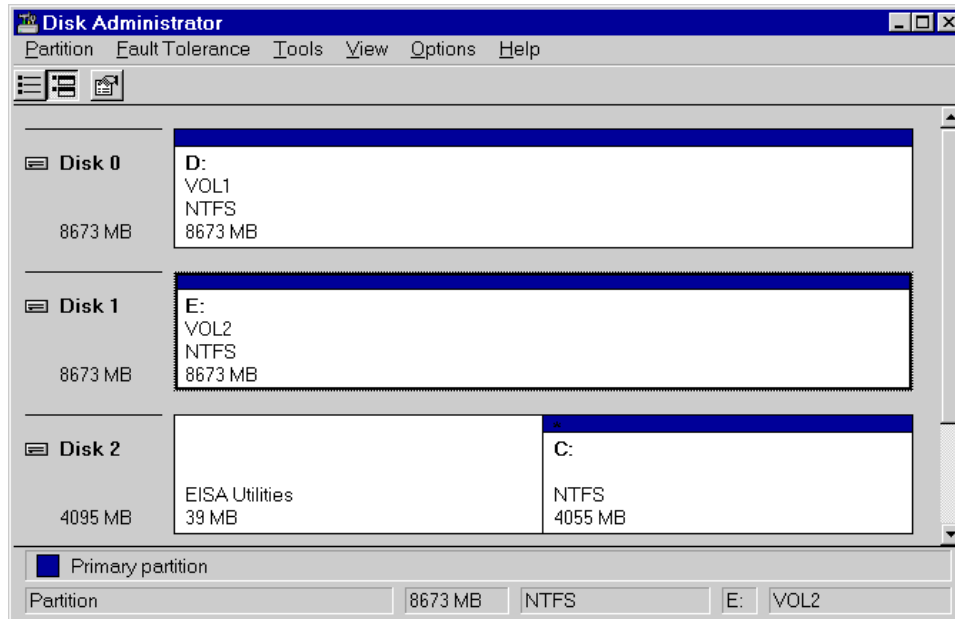
**Figure 3-7 Driver Letter Availability**



3. 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 doesn't appear in the list, Windows NT may have already assigned that letter to the CD-ROM drive. You can de-assign that letter from the CD-ROM to free it for use.
4. 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 shown in Figure 3-8.

**Figure 3-8 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 Section 3.3.1, "Procedures for Preparing Both Host Servers for a Cluster" and repeat all of the preceding steps on Host B.

**IF PREPARING HOST B**

With the NTFS partition drive letters successfully reassigned, Host B is prepared for a cluster. Proceed to Section 3.4.

**3.4 Installing and Configuring Windows NT Cluster Software on Both Host Servers**

**NOTE**

Host A and Host B must be prepared (see Section 3.3) before installing NT Cluster software.

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

## *Reader's Comments*

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