

# **HP Netserver Ultra3 SCSI Host Bus Adapter Installation and Configuration Guide**



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## Audience Assumptions

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This Installation and Configuration Guide is for the person who installs, administers, and troubleshoots LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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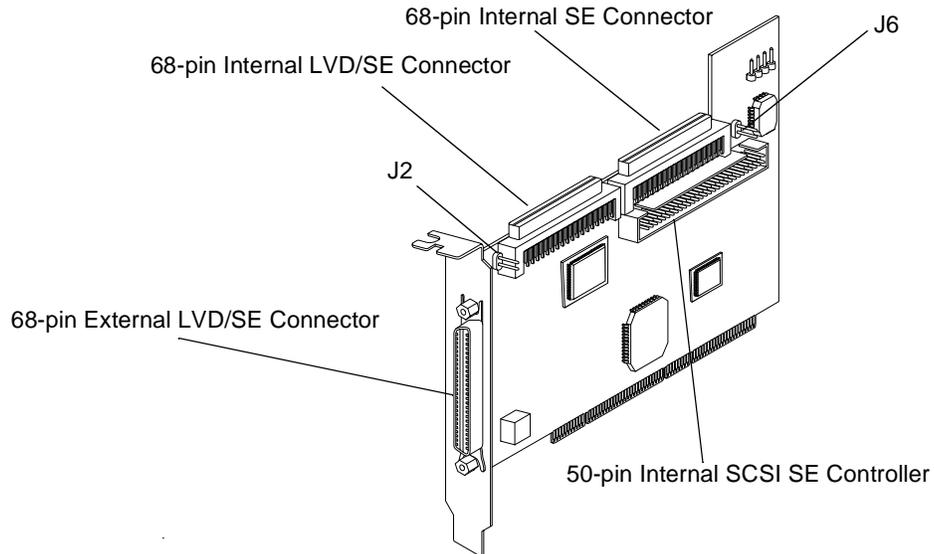
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# 1 Installation and Setup

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The HP Ultra3 Single Channel SCSI Host Bus Adapter enables you to connect up to 15 SCSI devices—such as hard disk drives, scanners, and CD-ROM drives—to HP Netervers with 32-bit or 64-bit PCI expansion slots. You can connect newer Ultra3 and Ultra2 SCSI devices to the two 68-pin Low Voltage Differential/Single-Ended (LVD/SE) connectors. You can also connect legacy SCSI devices to the 68-pin and 50-pin internal Single-Ended (SE) connectors.



**Figure 1-1. HP Ultra3 Single Channel SCSI Host Bus Adapter**

Although the HP Ultra3 SCSI Host Bus Adapter is a 64-bit PCI host bus adapter, it also works in a 32-bit PCI slot. When installed in a 32-bit PCI slot, the host bus adapter automatically runs in the slower 32-bit mode. This installation guide explains how to:

- Install the HP Ultra3 SCSI host bus adapter
- Set up SCSI devices
- Connect SCSI devices

## Bus Segments on the HP Ultra3 SCSI Host Adapter

The HP Ultra3 SCSI host bus adapter features technology that ensures you get the best performance from your Ultra3 and Ultra2 SCSI devices by electronically isolating the primary LVD/SE segment from the secondary SE segment on the SCSI bus. This allows the HP Ultra3 SCSI host bus adapter to support newer Ultra3 and Ultra2 SCSI devices at speeds up to 160 MBytes/sec on the primary LVD/SE segment while at the same time supporting Ultra (legacy) devices at speeds up to 40 MBytes/sec on the secondary SE segment. The following figure shows the two SCSI segments.

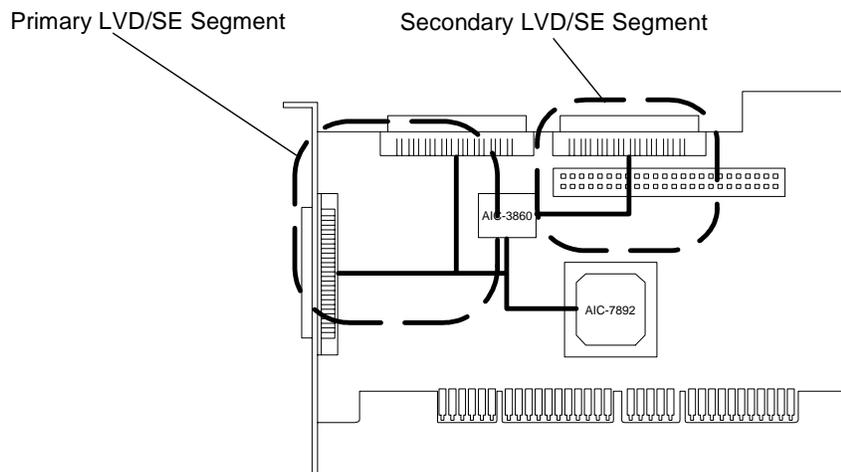


Figure 1-2. Primary and Secondary Bus Segments

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**NOTE** If you attach Wide Ultra or Ultra SCSI devices to the LVD/SE connector(s), the data transfer rate for all attached Ultra3 and Ultra2 SCSI devices will drop to Ultra SCSI performance levels. However, if you attach only Ultra3 and Ultra2 SCSI devices to the LVD/SE connector(s), data will be transferred at the maximum possible rate (80 MBytes/sec for Ultra2 devices and 160 MBytes/sec for Ultra3 devices).

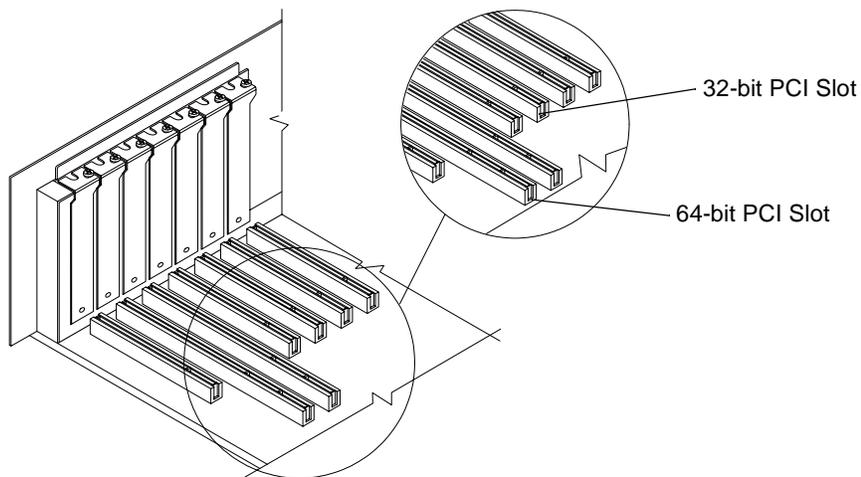
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## Installing the HP Ultra3 SCSI Host Bus Adapter

1. Discharge any static electricity build-up before handling the SCSI host bus adapter by touching a grounded metal object (like the exposed metal parts on the back of your HP Netserver).

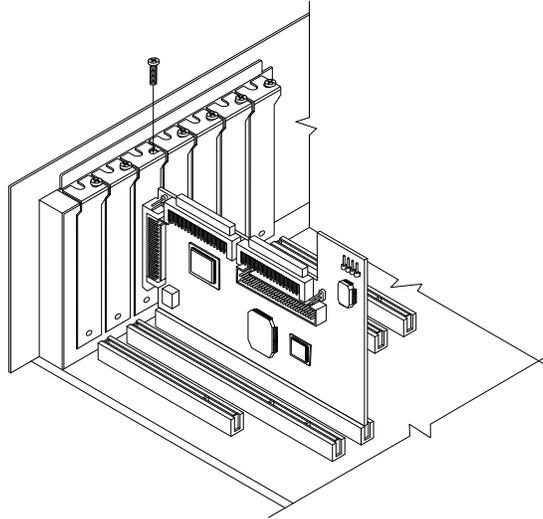
**WARNING** Turn OFF power to the HP Netserver and disconnect the power cord.

2. After you turn off your HP Netserver and unplug the power cord, remove the cover from the Netserver.



**Figure 1-3. 32-bit and 64-bit Expansion Slots**

3. Locate an unused 64-bit PCI expansion slot and remove the expansion slot cover. If the HP Netserver does not have a 64-bit slot, you can install the host adapter in a 32-bit PCI slot. (The expansion slot must be compliant with PCI Rev. 2.1 or higher and must support Bus Mastering.)



**Figure 1-4. Host Bus Adapter Installed in 64-bit Slot**

HP Netservers may have vertical or horizontal expansion slots. Refer to your HP Netserver manual to locate the PCI slots.

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**NOTE** Be careful when inserting the HP Ultra3 SCSI host bus adapter in a PCI slot. Some 32-bit slots will not accommodate it, and the host adapter may break if you force it into the slot.

---

4. Insert the HP Ultra3 SCSI host bus adapter into the PCI expansion slot; press down firmly until the host adapter clicks into place, then replace the slot cover screw. When installed properly, the host adapter should appear level with the expansion slot, as shown above.

## Setting Up SCSI Devices

There are several things you may need to do to your SCSI devices before you connect them to the HP Ultra3 SCSI host bus adapter:

- Check the SCSI IDs
- Set the termination
- Connect the power cables.

Since setup can vary from device to device, always refer to the device's documentation for specific instructions.

Below are some guidelines for setting SCSI IDs and termination on your devices.

### Check the SCSI IDs

The HP Ultra3 SCSI host bus adapter and each device you connect to it must have a unique SCSI ID number ranging from 0 to 15. No two devices can have the same ID number. The HP Ultra3 SCSI host bus adapter is preset to SCSI ID 7 and should not be changed. If your HP Netserver will boot from a SCSI hard disk, make sure the SCSI ID of that hard disk is set to 0. (Most SCSI hard disks are preset to SCSI ID 0 at the factory.) The SCSI IDs for internal devices are usually set with jumpers; SCSI IDs for external devices are usually set with a switch on the back of the device.

### Terminate the Ends

To ensure reliable communication on the SCSI bus, the device at the end of each cable, or the end of the cable itself, must have a terminator installed (or enabled). Terminators must be removed, or termination must be disabled, on devices between the ends of each cable.

### Choosing SCSI Cables

The Ultra3 SCSI Host Adapter kit does not include cables. Any Ultra3 drives attached to HP Ultra3 host bus adapters inside a HP Netserver require the use of a special Ultra3 twisted pair cable. The HP Ultra3 cable upgrade kit part number is P3469A. These cables can be purchased from an authorized Hewlett-Packard reseller, or on HP Order Assistant (available on the Internet at <http://netserver.hp.com/netserver/>)

See Table 1-1 that follows to determine the correct cable for your HP Netserver and SCSI configuration.

**Table 1-1. Netserver SCSI Cables**

<b>HP Netserver</b>	<b>SCSI Devices</b>	<b>Interface</b>	<b>Cable Product Number</b>
All Models	HP Netserver Rack Storage/12 (RS/12)	External	D3636C - HDTS68 to HDTS68, 2.5m
All Models	HP SureStore H/A TapeArray 5500	External	D3637C - HDTS68 to VHDC1, 2.5m
All Models	HP SureStore DLT80e/80k & DAT 40e/40k	External	C5666A – HDTS68 to HDTS68, 0.9m C5667A – HDTS68 to HDTS68, 1.5m C5699A – HDTS68 to HDTS68, 2.5m
E 800	LVD non-hot-swap Device	Internal	P3469A – 47.5” Terminated SCSI twisted-pair*
LH 3000/6000	LVD non-hot-swap Device	Internal	P3469A – 47.5” Terminated SCSI twisted-pair*
LH 3000/6000	LVD hot-swap Cage (right side)	Internal	P3469A – 45” Point to point SCSI twisted-pair*
LH 3000/6000	LVD hot-swap Cage (left side)	Internal	Use existing twisted-pair cable in Netserver
All Models (except E 800, LH 3000/6000)	LVD non-hot-swap Device	Internal	Use existing twisted-pair cable in Netserver
All Models (except E 800, LH 3000/6000)	LVD hot-swap Cage	Internal	Use existing twisted-pair cable in Netserver
* The P3469A Cable Kit contains both Terminated and Point-to-Point SCSI cables.			

## Connecting SCSI Devices

You can connect up to 15 SCSI devices to the HP Ultra3 SCSI host bus adapter. Before connecting devices, be sure to review *Setting Up SCSI Devices* on page 5.

### Connecting the SCSI Host Adapter to the Common Tray

Connect internal Ultra3 and Ultra2 SCSI devices to the internal LVD/SE connector on the HP Ultra3 SCSI host bus adapter. To do this, see Table 1-1 to determine the correct cable for your HP Netserver. Follow these steps to connect the devices:

---

**NOTE** We recommend that you keep your Ultra3 and Ultra2 SCSI devices separate from your Ultra SCSI devices. This allows the newer Ultra3 and Ultra2 SCSI devices to transfer data at their maximum speed. (See *Bus Segments on the HP Ultra3 SCSI Host Adapter* on page 2.)

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1. Use a terminated twisted-pair SCSI cable.
2. Plug the non-terminated end of the twisted-pair cable to the internal LVD/SE connector.

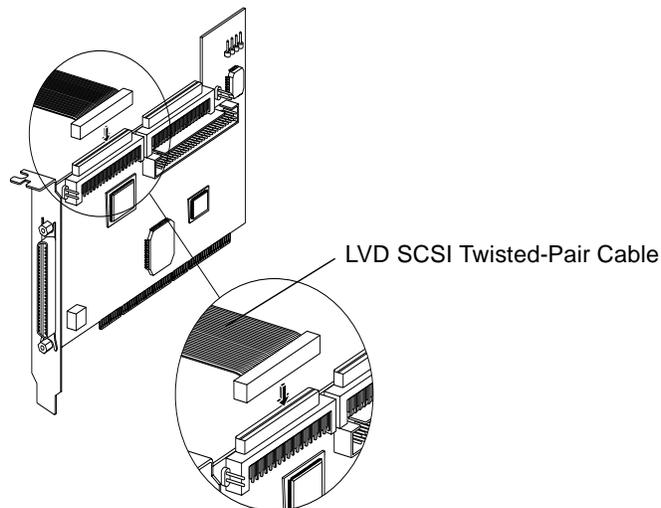
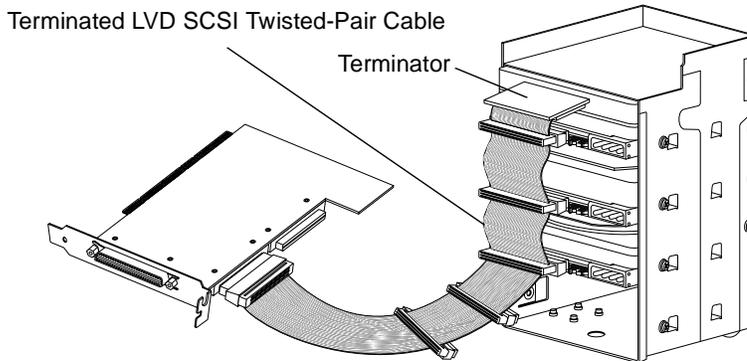


Figure 1-5. LVD SCSI Twisted-Pair Cable

3. Plug the internal Ultra2 or Ultra3 SCSI devices to the other cable connectors, starting with the connector at the terminated end of the cable.



**Figure 1-6. Common Tray Cable Connection**

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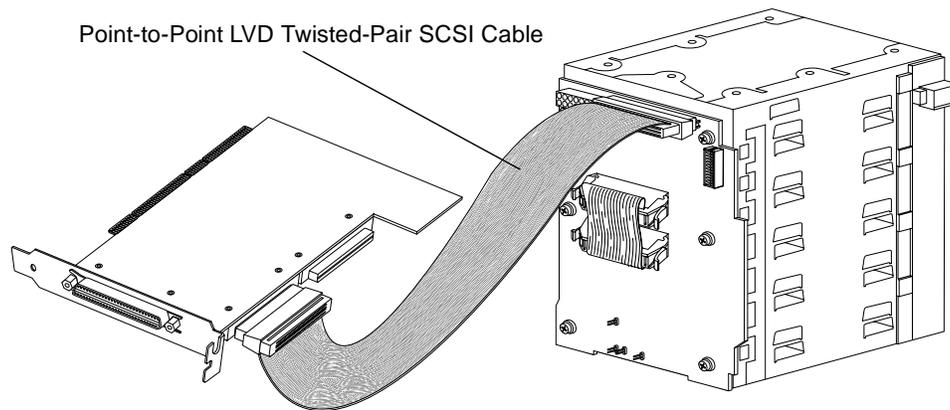
**NOTE** Internal Ultra2 and Ultra3 SCSI devices come from the factory with termination disabled and cannot be changed. Proper SCSI bus termination is provided by the terminator at the end of the LVD SCSI cable.

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4. Connect a power cable from your HP Netserver's internal power supply to each internal SCSI device.

### Connecting the SCSI Host Adapter to a Hot-Plug Cage

1. Use the point-to-point twisted-pair cable.
2. Plug one end of the twisted-pair cable to the internal LVD/SE connector.
3. Plug the other end of the twisted-pair cable to the 68-pin connector on the hot-plug cage.

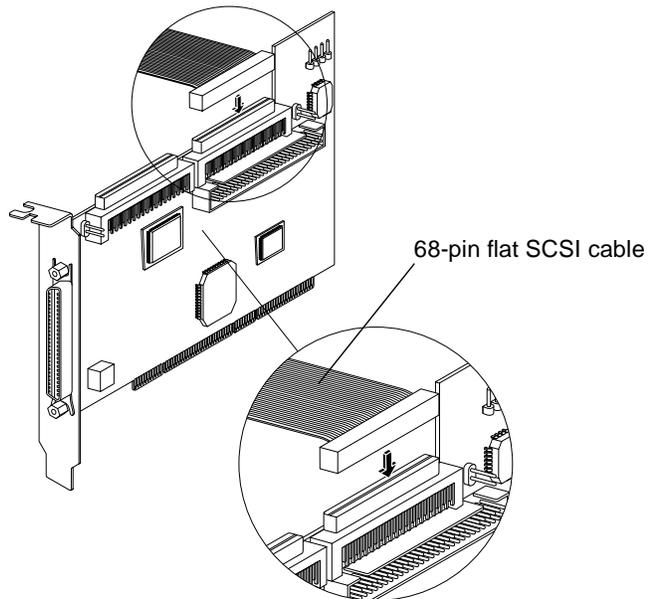


**Figure 1-7. Hot-Plug Cage Cable Connections**

### **Connecting Ultra/Fast Wide SCSI Devices**

Connect internal Ultra/Fast Wide SCSI devices to the 68-pin internal SE Wide SCSI connector. To do this, use a flat 68-pin Wide SCSI cable. Follow these steps to connect the devices:

1. Plug one end of the cable to the Ultra/Fast Wide SCSI connector on the HP Ultra3 SCSI host bus adapter.



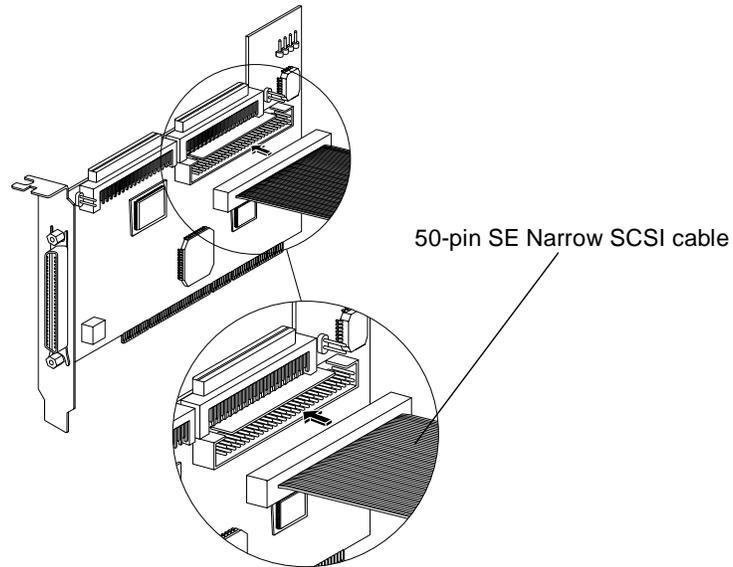
**Figure 1-8. Connecting Ultra/Fast Wide SCSI Devices**

2. Plug the other end of the cable to a terminated Ultra/Fast Wide SCSI device.
3. If you have other Ultra/Fast Wide SCSI devices, attach them to the connectors between the two ends of the cable. Be sure these other devices are unterminated.
4. Connect a power cable from your HP Netserver's internal power supply to each internal device.

### **Connecting Internal Ultra/Fast Narrow Devices**

Connect internal Ultra/Fast Narrow SCSI devices that have standard 50-pin connectors to the 50-pin internal SE Narrow SCSI connector. To do this, use a 50-pin internal SCSI cable. Follow these steps to connect the devices:

1. Plug one end of the cable to the 50-pin internal SE Narrow SCSI connector on the HP Ultra3 SCSI host bus adapter.



**Figure 1-9. Connecting Ultra/Fast Narrow Devices**

2. Plug the other end of the cable to a terminated Ultra/Fast Narrow SCSI device.
3. If you have other Ultra/Fast Narrow SCSI devices, attach them to the connectors between the two ends of the cable. Be sure these other devices are *unterminated*.
4. Connect a power cable from your HP Netserver's internal power supply to each internal device.

### **Connecting External SCSI Devices**

Connect external Ultra2 and Ultra3 SCSI devices to the 68-pin external LVD/SE SCSI connector. Each external device will require a high density 68-pin external LVD SCSI cable.

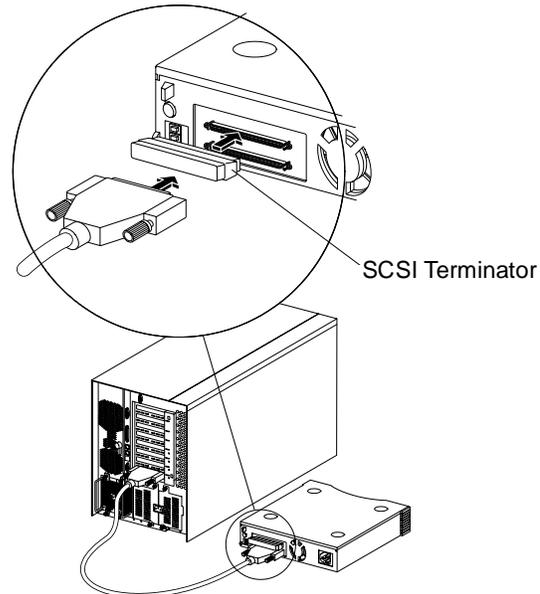
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**NOTE** We recommend that you connect *only* Ultra3 and Ultra2 SCSI devices to the external SCSI connector. If you also attach older Ultra SCSI devices, the data transfer speed of the Ultra3 and Ultra2 SCSI devices will drop to the speed of the older devices. (See *Bus Segments on the HP Ultra3 SCSI Host Adapter* on page 2.)

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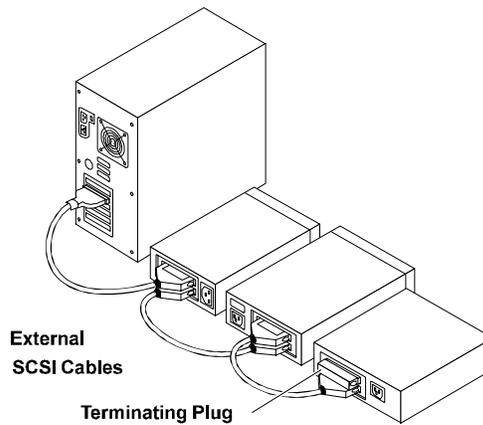
Follow these steps to connect the external devices:

1. Connect one end of the external LVD SCSI cable to the external LVD/SE connector on the HP Ultra3 SCSI host bus adapter.



**Figure 1-10. Connecting External SCSI Devices**

2. Connect the other end of the external SCSI cable to a SCSI connector on the back of an external SCSI device. If you are installing only one external device, terminate the device and skip to Step 4.
3. Connect other external devices by cabling each device to the previous one, as shown below.



**Figure 1-11. Terminating the Last External SCSI Device**

4. Terminate only the device at the end of the chain. (Use of an external multi-mode SCSI terminator is required.)
5. Connect power cables to all external devices and to the HP Netserver.

## HP Ultra3 SCSI Host Adapter Driver Software

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**NOTE** To use the HP Ultra3 SCSI host bus adapter, driver software must be installed for your operating system.

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### Preloaded Ultra3 Drivers

If the HP Ultra3 SCSI host bus adapter was included as part of a HP Netserver you purchased, then the appropriate HP driver has already been pre-installed by HP and you do not need to install it.

### Embedded Ultra3 Drivers

Some operating systems have embedded driver support for the HP Ultra3 SCSI host bus adapter. To determine if the host adapter is supported by the operating system you are using, read the operating system manual or contact the operating system vendor for information.

## Troubleshooting

If you have any problems while installing the HP Ultra3 SCSI host bus adapter, check the following items first:

- Are all SCSI devices powered on?
- Are all SCSI cables and power cables properly connected?
- Does each device on the SCSI bus have a unique SCSI ID?
- Does the total SCSI cable length exceed the maximum allowable length?  
(The maximum cable length for the Ultra3 SCSI host adapter cannot exceed 12 meters.)
- Is the SCSI bus properly terminated?

If you are still unable to resolve a problem, contact HP Technical Support for help.

## 2 Configuration with SCSISelect

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SCSISelect, included with the HP Ultra3 SCSI Host Bus Adapter, enables you to change SCSI settings without opening the computer or handling the host bus adapter. SCSISelect also enables you to low-level format or verify the disk media of your SCSI hard disk drives. The following table lists the available and default settings for each SCSISelect option.

**NOTE** The default settings are appropriate for most systems. Run SCSISelect if you need to change or view current settings, or if you would like to run the SCSI disk utilities. See the descriptions of each option starting on page 17.

---

SCSISelect Options	Available Settings	Default Setting
<b>SCSI Bus Interface Definitions:</b>		
Host Adapter SCSI ID	0-15	7
SCSI Parity Checking	Enabled, Disabled	Enabled
Host Adapter SCSI Termination		
LVD/SE Connectors	Automatic, Enabled, Disabled	Automatic
SE Connectors	Automatic Low ON/High ON Low OFF/High OFF Low OFF/High ON	Automatic
<b>Boot Device Options:</b>		
Boot SCSI ID	0-15	0
Boot LUN Number <sup>1</sup>	0-7	0
<b>SCSI Device Configuration:</b>		
Sync Transfer Rate (MBytes/sec)	160, 80.0, 53.4, 40.0, 32.0, 26.8, 20.0, 16.0, 13.4, 10.0, ASYN	160

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<b>SCSISelect Options</b>	<b>Available Settings</b>	<b>Default Setting</b>
Initiate Wide Negotiation	Yes, No	Yes (Enabled)
Enable Disconnection	Yes, No	Yes (Enabled)
Send Start Unit Command	Yes, No	Yes (Enabled)
Enable Write Back Cache <sup>1</sup>	N/C (No Change) Yes, No	N/C (No Change)
BIOS Multiple LUN Support <sup>2</sup>	Yes, No	No (Disabled)
Include in BIOS Scan <sup>2</sup>	Yes, No	Yes (Enabled)
<b>Advanced Configuration Options:</b>		
Reset SCSI Bus at IC Initialization	Enabled, Disabled	Enabled
Display <Ctrl> <A> Messages during BIOS Initialization	Enabled, Disabled	Enabled
Extended BIOS Translation for DOS Drives > 1 GByte	Enabled, Disabled	Enabled
Verbose/Silent Mode	Verbose, Silent	Verbose
Host Adapter BIOS	Enabled Disabled: Not Scan Disabled: Scan Bus	Enabled
Domain Validation <sup>2</sup>	Enabled, Disabled	Enabled
Support Removable Disks Under BIOS as Fixed Disks <sup>2</sup>	Disabled, Boot Only, All Disks	Disabled
BIOS Support for Bootable CD-ROM <sup>2</sup>	Enabled, Disabled	Enabled
BIOS Support for Int 13 Extensions <sup>2</sup>	Enabled, Disabled	Enabled

<sup>1</sup>Setting is valid only if Multiple LUN Support is enabled

<sup>2</sup>Settings are valid only if host adapter BIOS is enabled

## Starting SCSISelect

Follow these steps to start SCSISelect:

1. Turn on or restart your system.

During the startup process, pay careful attention to the messages that appear on your screen.

2. When the following message appears on your screen, press the **Ctrl-A** keys simultaneously (this message appears for only a few seconds):

**Press <Ctrl><A> for SCSISelect (TM) Utility!**

3. From the menu that appears, use the arrow keys to move the cursor to the option you want to select, then press **Enter**.

---

**NOTE** If you have difficulty viewing the display, press **F5** to toggle between color and monochrome modes. (This feature may not work on some monitors.)

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## Exiting SCSISelect

Follow these steps to exit *SCSISelect*:

1. Press **Esc** until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).
2. At the prompt, select **Yes** to exit, then press any key to reboot the computer. Any changes made in *SCSISelect* will take effect the next time the computer is booted.

## Using SCSISelect Settings

To select an option, use the arrow keys to move the cursor to the option, then press **Enter**.

In some cases, selecting an option displays another menu. You can return to the previous menu at any time by pressing **Esc**.

To restore the original *SCSISelect* default values, press **F6** from the main *SCSISelect* screen.

## SCSI Bus Interface Definitions

- **Host Adapter SCSI ID**—(Default: 7) Sets the SCSI ID for the SCSI host bus adapter. The Ultra3 SCSI Host Bus Adapter is set at 7, which

gives it the highest priority on the SCSI bus. We recommend that you do not change this setting.

- **SCSI Parity Checking**—(Default: *Enabled*) When set to **Enabled**, verifies the accuracy of data transfer on the SCSI bus. Leave this setting enabled unless any SCSI device connected to the Ultra3 SCSI Host Bus Adapter does not support SCSI parity.
- **Host Adapter SCSI Termination**—(Default: *Automatic*) Determines the termination setting for the SCSI host bus adapter. The default setting for both the LVD/SE and SE connectors is *Automatic*, which allows the SCSI host bus adapter to adjust the termination as needed depending on the configuration of the connected SCSI devices. We recommend that you do not change this setting.

## Boot Device Options

- **Boot SCSI ID**—(Default: *0*) Specifies the SCSI ID of your boot device. We recommend that you do not change the default setting.
- **Boot LUN Number**—(Default: *0*) Specifies which LUN (Logical Unit Number) to boot from on your boot device. This setting is not valid unless Multiple LUN Support is **Enabled** (see “Advanced Configuration Options” on page 19).

## SCSI Device Configuration

SCSI Device Configuration options can be set individually for each connected SCSI device.

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**NOTE** To configure settings for a SCSI device, you must know its SCSI ID (see “Using SCSI Disk Utilities” on page 22).

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- **Sync Transfer Rate**—(Default: *160*) Determines the maximum synchronous data transfer rate that the SCSI host adapter supports. Use the maximum value of 160 MBytes/sec. If a device is not Ultra160, select the transfer rate of the device (80, 53, 40, ...).
- **Initiate Wide Negotiation**—(Default: *Yes*) When set to **Yes**, the SCSI host bus adapter attempts 16-bit data transfer (wide negotiation). When

set to **No**, the SCSI host bus adapter uses 8-bit data transfer unless the SCSI device requests wide negotiation.

---

**NOTE** Set Initiate Wide Negotiation to **No** if you are using an 8-bit SCSI device that hangs or exhibits other performance problems with 16-bit data transfer rate enabled.

---

- **Enable Disconnection**—(Default: *Yes*) When set to **Yes**, allows the SCSI device to disconnect from the SCSI bus. Leave the setting at **Yes** if two or more SCSI devices are connected to the SCSI host bus adapter. If only one SCSI device is connected, changing the setting to **No** results in slightly better performance.
- **Send Start Unit Command**—(Default: *Yes*) When set to **Yes**, the Start Unit Command is sent to the SCSI device at bootup.

The following three options have no effect when the SCSI host bus adapter BIOS is disabled. (The SCSI host bus adapter BIOS is normally enabled by default.)

- **Enable Write Back Cache**—(Default: *N/C*) Can be used to enable or disable the write-back cache on SCSI disk drives connected to the host adapter. Leave this option at its default setting of *N/C* (no change), which usually allows for optimum drive performance.
- **BIOS Multiple LUN Support**—(Default: *No*) Leave this setting at **No** if the device does not have multiple Logical Unit Numbers (LUNs). When set to **Yes**, the SCSI host bus adapter BIOS provides boot support for a SCSI device with multiple LUNs (for example, a CD “juke box” device in which multiple CDs can be accessed simultaneously).
- **Include in BIOS Scan**—(Default: *Yes*) When set to **Yes**, the SCSI host bus adapter BIOS includes the device as part of its BIOS scan at bootup.

## Advanced Configuration Options

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**NOTE** Do not change the Advanced Configuration Options unless absolutely necessary.

---

- **Reset SCSI Bus at IC Initialization**—(Default: *Enabled*) When set to **Enabled**, the SCSI host bus adapter generates a SCSI bus reset during its power-on initialization and after a hard reset.
- **Display <Ctrl> <A> Messages during BIOS Initialization**—(Default: *Enabled*) When set to **Enabled**, the SCSI host bus adapter BIOS displays the Press <Ctrl> <A> for SCSISelect (TM) Utility! message on your screen during system bootup. If this setting is disabled, you can still invoke the SCSISelect Utility by pressing <Ctrl> <A> after the SCSI host bus adapter BIOS banner appears.
- **Extended BIOS Translation for DOS Drives > 1 GByte**—(Default: *Enabled*) When set to **Enabled**, provides an extended translation scheme for SCSI hard disks with capacities greater than 1 GByte. This setting is necessary only for MS-DOS 5.0 or above; it is not required for other operating systems, such as NetWare or UNIX.

**CAUTION** Changing the translation scheme destroys all data on the drive. Be sure to back up the data before changing the translation scheme.

Use the MS-DOS Fdisk command to partition a disk larger than 1 GByte controlled by the SCSI host bus adapter BIOS, when using DOS, Windows 3.1.x, or Windows 95/98.

- **Verbose/Silent Mode**—(Default: *Verbose*) When set Verbose, the SCSI host bus adapter BIOS displays the host adapter model on the screen during system bootup. When set to Silent, the message will not be displayed during bootup.
- **Host Adapter BIOS (Configuration Utility Reserves BIOS Space)**—(Default: *Enabled*) Enables or disables the SCSI host bus adapter BIOS.
  - ◆ Leave at **Enabled** to allow the SCSI host bus adapter BIOS to scan and initialize all SCSI devices.
  - ◆ Set to **Disabled: Not scan** if the devices on the SCSI bus (for example, CD-ROM drives) are controlled by software drivers and do not need the BIOS, and you do not want the BIOS to scan the SCSI bus.
  - ◆ Set to **Disabled: Scan Bus** if you do not need the BIOS, but you want it to scan the SCSI devices on the bus.

The following four options have no effect when the SCSI host bus adapter BIOS is disabled. (The SCSI host bus adapter BIOS is normally enabled by default.)

- **Domain Validation**—(Default: *Enabled*) Determines the kinds of SCSI devices connected and reduces data transfer speed when legacy SCSI devices are detected. Displays the resulting data transfer rate.
- **Support Removable Disks Under BIOS as Fixed Disks**—(Default: *Disabled*) Determines which removable-media drives are supported by the SCSI host bus adapter BIOS. Choices are as follows:
  - ◆ **Disabled**— No removable-media drives are treated as hard disk drives. Software drivers are required because the drives are not controlled by the BIOS.

**CAUTION** *You may lose data* if you remove a removable-media cartridge from a SCSI drive controlled by the SCSI host bus adapter BIOS while the drive is on. If you want to be able to remove the media while the drive is on, install the removable-media software driver and set Support Removable Disks Under BIOS as Fixed Disks to **Disabled**.

- ◆ **Boot Only**—Only the removable-media drive designated as the boot device is treated as a hard disk drive.
- ◆ **All Disks**—All removable-media drives supported by the BIOS are treated as hard disk drives.
- **BIOS Support for Bootable CD-ROMs**—(Default: *Enabled*) When set to **Enabled**, the SCSI host bus adapter BIOS allows the computer to boot from a CD-ROM drive.
- **BIOS Support for Int 13 Extensions**—(Default: *Enabled*) When set to **Enabled**, the SCSI host bus adapter BIOS supports Int 13h extensions as required by Plug-and-Play. The setting can be either enabled or disabled if your system is not Plug-and-Play.

## Using SCSI Disk Utilities

To access the SCSI disk utilities, follow these steps:

1. Select the **SCSI Disk Utilities** option from the menu that appears after starting *SCSISelect*. *SCSISelect* scans the SCSI bus (to determine the devices installed) and displays a list of all SCSI IDs and the devices assigned to each ID.
2. Use the arrow keys to move the cursor to a specific ID and device, then press **Enter**.
3. A small menu appears, displaying the options **Format Disk** and **Verify Disk Media**.
  - ◆ **Format Disk**—Allows you to perform a low-level format on a hard disk drive. *Most SCSI disk devices are preformatted at the factory and do not need to be formatted again.*

<p><b>CAUTION</b> A low-level format destroys all data on the drive. Be sure to back up your data before performing this operation. You <i>cannot</i> abort a low-level format once it has started.</p>
---

- ◆ **Verify Disk Media**—Allows you to scan the media of a hard disk drive for defects. If the utility finds bad blocks on the media, it prompts you to reassign them; if you select *yes*, those blocks are no longer used. Pressing **Esc** at any time aborts the utility.

## 3 Microsoft Windows NT Installation

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This chapter explains how to install the HP Ultra3 Family Manager Set driver *adpu160m.sys* for Windows NT.

If you are performing a first time Windows NT installation, see “Installing the Driver When Installing Windows NT” in the next section. If Windows NT is already installed in your system, see “Installing the Driver When Windows NT is Already Installed” on page 24.

### Installing the Driver When Installing Windows NT

The *adpu160m.sys* driver is not embedded on the Windows NT 4.0 installation disks (or CD-ROM) and must be added during Windows NT installation.

### Completing a Fresh Windows NT 4.0 Installation From Floppy Disk

1. Start your system with the Windows NT Boot Disk in the floppy disk drive.
2. When prompted, insert disk #2 in your floppy disk drive. After a few moments you will see a blue screen. To setup Windows NT now, press Enter.
3. Press S to skip auto-detection of your SCSI host adapter.
4. Press S again to specify an additional device.
5. Press Enter to select Others; insert the HP Ultra3 Family Manager Set disk for Windows NT into your floppy disk drive.
6. Using the arrow keys, select the following driver and press Enter:  
Adaptec Ultra3 PCI SCSI Controller (NT4.0)
7. To add other host adapters, press S and repeat from Step 5 for each additional adapter and insert the appropriate driver disk.

8. Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions on-screen and in the Windows NT documentation to complete the installation.

## Completing a Fresh Windows NT 4.0 Installation From CD-ROM

1. Insert the Windows NT 4.0 CD into the CD-ROM drive.
2. Start your system. Press the **F6** key when you see the following message:  
“Setup is inspecting your computer’s hardware configuration...”
3. If you do not see this message, your system may not be setup to boot from a CD-ROM. You will need to install from floppy disks. See “Completing a Fresh Windows NT 4.0 Installation From Floppy Disk” on page 23.
4. When prompted, press **S** to specify an additional device.
5. Press **Enter** to select **Others**; insert the HP Ultra3 Family Manager Set disk for Windows NT into your floppy disk drive.
6. Using the arrow keys, select the following driver and press **Enter**:  
Adaptec Ultra3 PCI SCSI Controller (NT4.0)
7. To add other host adapters, press **S** and repeat from Step 4 for each additional adapter and insert the appropriate driver disk.
8. Press **Enter** to continue with the Windows NT operating system setup. Follow the instructions on-screen and in the Windows NT documentation to complete the installation.

## Installing the Driver When Windows NT is Already Installed

To update or install the *adpu160m.sys* driver if Windows NT 4.0 is already installed, follow the instructions below.

## Updating Windows NT 4.0

1. Start Windows NT.
2. Click the **Start** button on the Windows NT task bar, and then point to **Settings**.
3. Click the **Control Panel**.
4. Double-click the **SCSI Adapters** icon.
5. Click the **Drivers** tab, and then click the **Add** button.
6. In the Install Driver window, click the **Have Disk** button.
7. Insert the HP Ultra3 Family Manager Set disk for Windows NT into drive A.
8. From the Copy Manufacturer's File From text box, type a:\nt4, and click **OK**.
9. In the Install Driver window, Click **OK**.
10. Click the **New** button when asked if you want to use the currently installed driver(s) or install new one(s).
11. Type a:\nt4 again, and click **Continue**. The driver is now installed.
12. You must restart your computer for the changes to take effect. Click **Yes** to restart your computer. Click **No** to return to the SCSI Adapters window.

## Using Advanced Configuration Parameters

Advanced users may use software parameters to alter the configuration of the Windows NT device drivers supplied by HP. All Windows NT configuration information is stored in a data structure called the *Registry*. You can edit this information through a tool called the *Registry Editor*.

<p><b>CAUTION</b> <i>Do not</i> edit your registry unless it is absolutely necessary. If there is an error in your registry, your computer may become nonfunctional.</p>
--

## Using Windows NT SCSI Parameters

Follow the instructions below to enter the registry values that affect how the Windows NT SCSI manager interprets the generic configuration information of SCSI device drivers. All SCSI host adapters installed in your system are affected by the values you enter here. A list of valid values follows:

---

**NOTE** The following value keys are case-sensitive and must be entered exactly as shown.

---

- **DisableTaggedQueuing** — A nonzero value indicates that the SCSI host adapter disables tagged queuing for SCSI devices. The data type for this value is REG\_SZ.
- **DisableSynchronousTransfers** — A nonzero value indicates that the SCSI host adapter is not to initiate synchronous negotiations (but it may still accept negotiations initiated by a SCSI target). The data type for this value is REG\_SZ.
- **DisableDisconnects** — A nonzero value indicates that targets are not permitted to disconnect during the execution of a SCSI command. The data type for this value is REG\_DWORD.
- **MaximumLogicalUnit** — This can limit the scan for connected devices on the SCSI bus. Valid values are 1 to 8. If 1 is specified, the Windows NT SCSI manager assumes that no SCSI targets support LUNs other than 0. Otherwise, LUNs from 0 to 8 are scanned during system initialization. The data type for this value is REG\_DWORD.
- **Maximum SGList** — Specifies the maximum number of Scatter/Gather elements. Valid values are 17-255. The data type for this value is REG\_DWORD.

To enter Windows NT parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type `regedt32` and press **Enter**.
3. Open the registry list to the following location:  
`\HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\adpu160m\Parameters\Device`

If the Parameters Device keys already exist, skip to Step 8 below to begin entering values. If the keys do not yet exist, you will need to create them by continuing with Step 4.

4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; Type **Parameters** in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; Type **Device** in the Key Name edit box. Leave the Class edit box blank.
8. To specify a certain host adapter, append **Device** with the number of the host adapter. For example, type **Device0** for the first host adapter, **Device1** for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra3 Family host adapters.
9. Click on the **Device** key.
10. Select **Add Value** from the Edit menu. In the Value Name edit box, enter one of the valid parameter values. Make sure to enter the appropriate data type for the value. To enter additional values, repeat Steps 8 and 9.

---

**NOTE** Changes made with the Registry Editor do not take effect until you shut down and then restart your system.

---

## Using Driver-specific Parameters

To use the Registry Editor to enter *adpu160m.sys* driver-specific parameters that affect the configuration information for SCSI PCI device drivers, follow the instructions below. A list of valid parameters follows:

---

**NOTE** The following parameters are case-sensitive and must be entered exactly as shown. When entering multiple parameters, each parameter must be separated by a space.

---

- **/INSTRUMENTATION**—enables recording of I/O statistics and errors. If this option is not specified, instrumentation defaults to disabled. The data type for this value is **REG\_SZ**.
- **/INSTR\_ERRLOG\_Z=nnn**—sets the maximum number of error log entries, if **/INSTRUMENTATION** is enabled. If a number is not specified, the maximum number of error log entries defaults to 32. Valid values are 0-128. The data type for this value is **REG\_SZ**.
- **/MAXTAGS=nnn**—specifies the tagged command queue depth. If a number is not specified, the tagged queue depth defaults to 128. Valid values are 1-255. The data type for this value is **REG\_SZ**.
- **/HOTPLUG** —enables Hot-Plug PCI feature. If this option is not specified, Hot-Plug PCI feature defaults to disabled.

To enter driver-specific parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type **regedt32** and press **Enter**.
3. Open the registry list to the following location:

```
\HKEY_LOCAL_MACHINE\System\CurrentControlSet\
  Services\adpu160m\Parameters\Device\DriverParameters
```

If the Parameters, Device, and Driver Parameters keys already exist, skip to Step 10 below to begin entering parameters. If the keys do not yet exist, you will need to create them by continuing with Step 4.

4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; Type **Parameters** in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; Type **Device** in the Key Name edit box. Leave the Class edit box blank.

To specify a certain host adapter, append **Device** with the number of the host adapter. For example, type **Device0** for the first host adapter, **Device1** for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra3 host adapters.

8. Click on the **Device** key.
9. Select **Add Value** from the Edit menu; type **Driver Parameters** in the Key Name edit box. Enter **REG\_SZ** as the data type and press **Enter**.
10. A String Editor text box appears. Enter valid parameters in the text box. When entering multiple parameters, each parameter must be separated by a space.

---

**NOTE** Changes made with the Registry Editor do not take effect until you shut down and then restart your system.

---

## Hot-Plug PCI Feature

Hot-Plug PCI is supported by the Windows NT 4.0 driver *adpu160m.sys*. You will need a system that supports Hot-Plug PCI as well as associated Hot-Plug PCI application software in order for Hot-Plug PCI to work. *Do not* enable the Hot-Plug PCI feature unless your system is Hot-Plug PCI capable and you wish to use the Hot-Plug PCI feature.

Follow the instructions below to enable Hot-Plug PCI support in the driver:

1. Insert the HP Ultra3 Family Manager Set disk for Windows NT into drive A.
2. Select **Run** from the Start menu.
3. Type **a:\nt4\hotp160m.reg** and press **Enter**.
4. Click **OK**.
5. Reboot the system.
6. See the note following these instructions.

---

**NOTE** The file *hotp160m.reg* adds Hot-Plug related entries into the NT Registry, including the driver-specific registry value */HOTPLUG*. Running *hotp160m.reg* will overwrite your current driver-specific registry values located at:

\HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\  
Services\adpu160m\Parameters\Device\DriverParameters

If you have previously added other driver specific registry values, you should note them before running the *hotp160m.reg* file. After running *hotp160m.reg*, you may verify and restore those previously added driver-specific registry values, if needed.

---

## Using Windows NT and the Host Adapter

This section contains useful information on using Windows NT and your host adapter.

### Removing a Host Adapter

Removing a host adapter can be as simple as physically removing it from the slot when your computer is shut down. Windows NT boots and functions properly in this configuration, but a Warning message is generated every time you boot Windows NT.

<p><b>CAUTION</b> If you have removed a host adapter but still have other host adapters of the same type installed in your computer, <i>do not</i> use Windows NT Setup to remove the device driver.</p>
--

To eliminate the Warning message, you must update the Windows NT software configuration, as described below:

## Removing a Host Adapter in Windows NT 4.0

1. From the Control Panel, double-click the **SCSI Adapters** icon.
2. Click the **Drivers** tab.
3. Using the arrow keys select the following driver:  
Adaptec 29160(N), 29160, 39160, AHA-3960D, AIC-7892/7899  
Ultra160 PCI SCSI Controller (NT 4.0)
4. Click the **Remove** button.
5. If you are sure you are removing the correct host adapter type, click **Yes**.
6. Click **Yes** to restart the computer and initialize changes. Click **No** to return to the SCSI Adapters window.

---

**NOTE** Windows NT Setup does not delete the device driver from your system disk; it only updates Windows NT software configuration information so that the device driver is no longer loaded during system bootup.

---

## Troubleshooting

### Problems and Solutions

#### **I made changes to the host adapter configuration and Windows NT no longer boots!**

The boot manager for Windows NT contains recovery logic to allow you to return to the last known good configuration. If you have changed your host adapter configuration and Windows NT no longer boots, follow these steps to recover:

1. Undo any hardware changes you have made to the computer since it was last operational.
2. Reboot the computer. Watch the display carefully during bootup. If the following message appears, press the **Spacebar** and follow the instructions on-screen to continue booting with the last known good configuration:

Press spacebar NOW to invoke the Last Known Good menu

3. Once your computer is operational again, check all of the hardware and software configuration changes you want to make. Look specifically for conflicts with parts of the existing system configuration that are not being changed.

## Error Messages

Error messages generated by the *adpu160m.sys* driver can be viewed by opening the Windows NT Event Viewer error logs.

To view events generated by the driver, follow these steps:

1. Double-click the **Event Viewer** icon in the Administrative Tools program group.

Error messages generated by the driver show up as Event ID 11. Error messages generated by the SCSI port show up as Event ID 9.

2. To view event details, select **System** from the Log menu. Double-click the *adpu160m.sys* driver event that has an Event ID of 11. (There may be none or multiple driver events.)

The top portion of the Event Detail dialog box displays information such as the time that the event was generated, the computer on which the event occurred (in case of remote monitoring) and the description of the event. The Data section of the Event Details dialog box displays the error messages generated.

3. Click the **Words** radio button.

In the Data section of the dialog box, the entry in the second row and second column (to the right of the 0010: entry) lists the error message generated by the driver. The common error messages for the driver are described below.

---

**NOTE** The entry in the third row of the last column identifies the SCSI ID of the device originating the error.

---

## ***adpu160m.sys* Error Messages**

The following error messages are listed sequentially according to the last three digits of the error message. For example, [xxxxx010], [xxxxx011], [xxxxx012], etc.

---

**NOTE** When reporting problems to HP Customer Support, be sure to include the complete error message in your problem description.

---

### **[xxxxx004] Command completed with error**

### **[xxxxx005] Command completed with error**

### **[xxxxx006] Command completed with error**

A request issued to a target device completed with indication that there is an error. In most cases, the error is recovered and normal operations continues.

### **[xxxxx010] Error issuing command**

An error has occurred while the driver was setting up its internal data structures.

### **[xxxxx011] Error issuing command**

The requested command is not supported by this driver.

### **[xxxxx012] Error issuing command**

### **[xxxxxx99] Error issuing command**

The driver does not recognize the target device.

### **[xxxxx021] Target device protocol error**

An unexpected event occurred during data transfer between the adapter and target device. Normally, this indicates a faulty or non-compliant target device.

### **[xxxxx022] Adapter or target device protocol error**

The adapter or target device has broken the communication protocol. A badly behaving device could cause this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time,

it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

**[xxxxx023] Target device parity error**

The driver has detected a parity error by the target device.

**[xxxxx024] Data overrun or underrun**

The adapter was given more or less data than the expected amount of data.

**[xxxxx031] Target device queue full**

The target device internal buffer is full.

**[xxxxx032] Target device busy**

The target device reports a Busy status. Another program may already be using this device.

**[xxxxx050] Host adapter failure**

**[xxxxxx9A] Host adapter failure**

Your host adapter may not be properly installed or is defective. Try resetting the adapter in the PCI slot, or try installing it a different PCI slot.

**[xxxxx081] Adapter initialization failure**

**[xxxxxx8A] Adapter initialization failure**

**[xxxxxx83] Adapter initialization failure**

An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

**[xxxxx089] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx096] Adapter hardware initialization failure—possible resource conflict**

The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with another board installed in your system.

**[xxxxx097] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx0af] Unable to de-allocate memory that was allocated for a target device**

Normally, this is not a serious problem, unless you get this message frequently over a short period of time. The memory can be reclaimed by rebooting the system.

**[xxxxx0ce] Scatter/gather limit exceeded**

An I/O request packet from the system contained a Scatter/Gather element list that contained more elements than are supported by the miniport. Scatter/Gather is a list of data segments that define the entire data transfer. Scatter/Gather is a means to improve total data throughput. This error might be caused by a component external to the miniport driver, such as the operating system or an ASPI application.

**[xxxxxd4] Adapter hardware failure - adapter reset**

The host adapter hardware failed and the miniport has to reset the hardware.

**[xxxxx0d6] Internal driver error**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site located at <http://netserver.hp.com/netserver/>



## 4 Microsoft Windows 2000 Installation

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This chapter explains how to install the HP Ultra3 Family Manager Set driver for Windows 2000.

If you are performing a first-time Windows 2000 installation, see *Installing the Driver When Installing Windows 2000*. If Windows 2000 is already installed in your system, see *To Update the Driver When Windows 2000 is Already Installed* on page 37.)

### Installing the Driver When Installing Windows 2000

1. Start your system with the Windows 2000 Operating System CD-ROM disc in your CD-ROM drive.

---

**NOTE** When using a CD-ROM drive to install Windows 2000 from the bootable CD-ROM, make sure Bootable CD-ROM support is enabled in either the system or SCSI BIOS setup utility. If these options are not available, boot from the Windows 2000 floppy disks.

---

2. You may see a message:  
Press any key to boot from CD.
3. After Windows 2000 has completed installation, please reinstall your SCSI driver from the Device Manager. Follow the steps in “Installing the Driver When Windows 2000 is Already Installed” on page 37 to ensure the desired driver is installed.

### Installing the Driver When Windows 2000 is Already Installed

To update or install the driver if Windows 2000 is already installed, follow these instructions:

1. Start Windows 2000.
2. Click the **Start** button on the Windows 2000 task bar, and then point to **Settings**.
3. Click the **Control Panel**.
4. Double-click the **System** icon.
5. Select the **Hardware** tab and click the **Device Manager** button.
6. Under SCSI and RAID Controllers, click on the + sign to the left. This will display the SCSI adapters currently installed. Right-click on the device you wish to update and select **Properties**.
7. Click the **Driver** tab and click the **Update Driver** button. The Update Device Driver Wizard will start. Click **Next**.
8. Select the **Search for a suitable driver** option and click **Next**.
9. Select the location where the updated driver is installed and click **Next**.
10. At this step, Windows 2000 will recommend one of two choices. If it recommends using the driver found on the driver disk, then click **Next** and skip to Step 12. It might recommend that you keep the existing driver and mention that it found other suitable drivers. If this is the case, select **Install one of the other drivers** and click **Next**.
11. You may be asked to enter the path for the driver.
12. \win2000\ultra160\adpu160m.sys
13. Click **Finish**. You may be required to reboot your system.

## Upgrading an Existing Windows NT Version 4 Installation to Windows 2000

1. With your operating system started, insert your Windows 2000 CD-ROM and choose to upgrade your system. Your system will reboot.
2. The Windows 2000 Setup program will start. Press **F6** when this message is displayed:  
Press F6 if you need to install a third party SCSI or RAID driver...

3. Follow the directions from “Installing the Driver When Installing Windows 2000” on page 37.

## Using Advanced Configuration Parameters

Advanced users may use software parameters to alter the configuration of the Windows 2000 device drivers supplied by HP. All Windows 2000 configuration information is stored in a data structure supplied by Windows 2000, called the Registry. You can edit this information through a tool called the Registry Editor.

**CAUTION** *Do not* edit your registry unless it is absolutely necessary. If there is an error in your registry, your computer may become nonfunctional

## Using Windows 2000 SCSI Parameters

Follow the instructions below to enter the registry values that affect how the Windows 2000 SCSI manager interprets the generic configuration information of SCSI device drivers. Each driver has its own key reference in the registry. In this example, the Ultra160 key is used (*adpu160m*). The other keys are *aic78xx*, *aic78u2*, *adf6u160*, and *2930u2*. All SCSI host adapters supported by the modified key are affected by the values you enter here. A list of valid values follows:

---

**NOTE** The following value keys are case-sensitive and must be entered exactly as shown.

---

- **DisableTaggedQueuing** — A nonzero value indicates that the SCSI host adapter disables tagged queuing for SCSI devices. The data type for this value is REG\_SZ.
- **DisableDisconnects** — A nonzero value indicates that targets are not allowed to disconnect during the execution of a SCSI command. The data type for this value is REG\_DWORD.

- **DisableMultipleRequests**— This limits the number of commands to each logical device to one. The data type for this value is REG\_DWORD.
- **MaximumLogicalUnit** — This can limit the scan for connected devices on the SCSI bus. Valid values are 0 to 7. If 1 is specified, the Windows 2000 SCSI manager assumes that no SCSI targets support LUNs other than 0. Otherwise, LUNs from 0 to 7 are scanned during system initialization. The data type for this value is REG\_DWORD.
- **MaximumSGList** — Specifies the maximum number of Scatter/Gather elements. Valid values are 17-255. The data type for this value is REG\_DWORD.

To enter Windows 2000 parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type `regedt32` and press **Enter**.
3. Open the registry list to the following location:

```
\HKEY_LOCAL_MACHINE\System\CurrentControlSet\
Services\adpu160m\Parameters\Device
```

If the `Parameters\Device` keys already exist, skip to Step 8 below to begin entering values. If the keys do not yet exist, you will need to create them by continuing with Step 4.

4. Click on the `adpu160m` key.
5. Select **Add Key** from the Edit menu; type `Parameters` in the Key Name edit box. Leave the Class edit box blank.
6. Click on the `Parameters` key.
7. Select **Add Key** from the Edit menu; type `Device` in the Key Name edit box. Leave the Class edit box blank.
8. To specify a certain host adapter, append `Device` with the number of the host adapter. For example, type `Device0` for the first host adapter, `Device1` for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra3 host adapters.
9. Click on the `Device` key.

10. Select Add Value from the Edit menu. In the Value Name edit box, enter one of the valid parameter values. Make sure to enter the appropriate data type for the value. To enter additional values, repeat Steps 8 and 9.

---

**NOTE** Changes made with the Registry Editor do not take effect until you restart your system.

---

## Using Driver-specific Parameters

Follow the instructions below to enter the registry values that affect the configuration information for SCSI PCI device drivers. Each driver has its own key reference in the registry. In this example, the Ultra160 key is used (*adpu160m*). The other keys are *aic78xx*, *aic78u2*, *adf6u160*, and *2930u2*. All SCSI host adapters supported by the modified key are affected by the values you enter here. A list of valid parameters follows:

---

**NOTE** The following parameters are case-sensitive and must be entered exactly as shown. When entering multiple parameters, each parameter must be separated by a space.

---

- **/MAXTAGS=*nnn***—specifies the tagged command queue depth. If a number is not specified, the tagged queue depth defaults to 128. Valid values are 1-255. The data type for this value is REG\_SZ.
- **/MEMMAP**—when set, the SCSI manager is memory mapped. If this key is not used, the default is I/O mapped. There are no *valid values* or *default values*. The data type for this value is REG\_SZ.
- **/BUS\_FAIRNESS**—when set, the SCSI bus avoids device starvation. There are no *valid values* or *default values*. The data type for this value is REG\_SZ.

To enter driver-specific parameters, follow these steps:

1. Select **Run** from the Start button.
2. Type `regedt32` and press **Enter**.
3. Open the registry list to the following location:

\HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\  
Services\adpu160m\Parameters\Device

If the **Parameters\Device** keys already exist, skip to Step 10 below to begin entering parameters. If the keys do not yet exist, you will need to create them by continuing with Step 4.

4. Click on the **adpu160m** key.
5. Select **Add Key** from the Edit menu; Type **Parameters** in the Key Name edit box. Leave the Class edit box blank.
6. Click on the **Parameters** key.
7. Select **Add Key** from the Edit menu; Type **Device** in the Key Name edit box. Leave the Class edit box blank.

To specify a certain host adapter, append **Device** with the number of the host adapter. For example, type **Device0** for the first host adapter, **Device1** for the second, etc. If you omit the host adapter number, the configuration information applies to all Ultra3 host adapters.

8. Click on the **Device** key.
9. Select **Add Value** from the Edit menu; type **DriverParameters** in the Value Name edit box. Enter **REG\_SZ** as the data type and press **Enter**.
10. A String Editor text box appears. Enter valid parameters in the text box. When entering multiple parameters, each parameter must be separated by a space.

---

**NOTE** Changes made with the Registry Editor do not take effect until you restart your system.

---

## Troubleshooting

Most problems can be resolved by following the recommendations in the “Problems and Solutions” below. If you still experience problems after following the recommendations, continue with the rest of this section.

## Problems and Solutions

### **I made changes to the host adapter configuration and Windows 2000 no longer boots!**

The boot manager for Windows 2000 contains recovery logic to allow you to return to the last known good configuration. If you have changed your host adapter configuration and Windows 2000 no longer boots, follow these steps to recover:

1. Undo any hardware changes you have made to the computer since it was last operational.
2. Reboot the computer. Watch the display carefully during bootup. When you see the message **Starting Windows...** appear at the bottom of the screen, press **F8**. This opens the Windows 2000 Advanced Options menu. Select the **Last Known Good Configuration** option and select a boot profile.
3. Once your computer is operational again, check all of the hardware and software configuration changes you want to make. Look specifically for conflicts with parts of the existing system configuration that are not being changed.

## Error Messages

Error messages generated by the Windows 2000 Driver Set can be viewed by opening the Windows 2000 Event Viewer error logs.

To view events generated by the driver, follow these steps:

1. Double-click the **Event Viewer** icon in the Administrative Tools program group.

Error messages generated by the driver show up as Event ID 11. Error messages generated by the SCSI port show up as Event ID 9.

2. To view event details, select **System Log** from the Event Viewer tree. Double-click the appropriate Windows 2000 driver event that has an Event ID of 11. (There may be none or multiple driver events.)

The top portion of the Event Detail dialog box displays information such as the time that the event was generated, the computer on which the event occurred (in case of remote monitoring), and the description of the event. The Data section of the Event Details dialog box displays the error messages generated.

3. Click on the **Words** option.

In the Data section of the dialog box, the entry in the second row and second column (to the right of the 0010: entry) lists the error message generated by the driver. The common error messages for the driver are described below.

---

**NOTE** The entry in the third row of the last column identifies the SCSI ID of the device originating the error.

---

## Driver Error Messages

The following error messages are listed sequentially according to the last three digits of the error message. For example, [xxxxx010], [xxxxx011], [xxxxx012], etc.

---

**NOTE** When reporting problems to HP Customer Support, be sure to include the complete error message in your problem description.

---

### **[xxxxx004] Command completed with error**

### **[xxxxx005] Command completed with error**

### **[xxxxx006] Command completed with error**

A request issued to a target device completed with indication that there is an error. In most cases, the error is recovered and normal operations continue.

### **[xxxxx010] Error issuing command**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site at <http://netserver.hp.com/netserver/>

### **[xxxxx011] Error issuing command**

The requested command is not supported by this driver.

**[xxxxx012] Error issuing command**

**[xxxxxx99] Error issuing command**

The driver does not recognize the target device.

**[xxxxx021] Target device protocol error**

An unexpected event occurred during data transfer between the adapter and target device. Normally, this indicates a faulty or non-compliant target device.

**[xxxxx022] Adapter or target device protocol error**

The adapter or target device has broken the communication protocol. A badly behaving device could cause this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time, it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

**[xxxxx023] Target device parity error**

The driver has detected a parity error by the target device.

**[xxxxx024] Data overrun or underrun**

The adapter was given more or less data than the expected amount of data.

**[xxxxx031] Target device queue full**

The target device internal buffer is full.

**[xxxxx032] Target device busy**

The target device reports a Busy status. Another program may already be using this device.

**[xxxxx050] Host adapter failure**

**[xxxxxx9A] Host adapter failure**

Your host adapter may not be properly installed or is defective. Try resetting the adapter in the PCI slot, or try installing it a different PCI slot.

**[xxxxx081] Adapter initialization failure**  
**[xxxxxx8A] Adapter initialization failure**  
**[xxxxxx83] Adapter initialization failure**

An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

**[xxxxx089] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx096] Adapter hardware initialization failure—possible resource conflict**

The driver has attempted to initialize the adapter hardware but failed. This might suggest that an adapter resource (for example, an IRQ) conflicts with another board installed in your system.

**[xxxxx097] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx0af] Unable to de-allocate memory that was allocated for a target device**

Normally, this is not a serious problem, unless you get this message frequently over a short period of time. The memory can be reclaimed by rebooting the system.

**[xxxxx0ce] Scatter/gather limit exceeded**

An I/O request packet from the system contained a Scatter/Gather element list that contained more elements than are supported by the miniport. Scatter/Gather is a list of data segments that define the entire data transfer. Scatter/Gather is a means to improve total data throughput. This error might be caused by a com-

ponent external to the miniport driver, such as the operating system or an ASPI application.

**[xxxxxd4] Adapter hardware failure - adapter reset**

The host adapter hardware failed and the miniport driver has to reset the hardware.

**[xxxxx0d6] Internal driver error**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site at <http://netserver.hp.com/netserver/>



## 5 Novell NetWare Installation

---

This chapter explains how to install the HP Ultra3 Family Manager Set driver *adpt160m.ham* for Novell NetWare— NetWare 3.3, 4.2, and 5.0.

If you are performing a first time NetWare installation, see “Installing the Driver When Installing NetWare” in the next section. If NetWare is already installed in your system, see “Installing the Driver When NetWare is Already Installed” on page 54.

### Installing the Driver When Installing NetWare

To install the *adpt160m.ham* driver when you install NetWare, follow the instructions below for the version of NetWare you are installing.

#### NetWare 3.12/3.2

Follow these instructions only if you are installing NetWare 3.12/3.2 for the first time:

1. To complete the NetWare 3.12/3.2 installation, you must go to the Novell Web site at:

*<http://developer.novell.com/devres/sas/certinfo.htm>*

and then download the *nwpa\_up.exe* update patch from the link at the message:

Download the NWPA Update Package.

2. Create the DOS partition on the boot hard disk drive.
3. If you are installing NetWare 3.12/3.2 from a CD-ROM attached to an HP Ultra3 host adapter, follow the instructions in “*Install CD-ROM Drivers on a DOS Bootable Hard Disk*” on page 53 to configure your computer for CD-ROM access.

If you are installing NetWare 3.12/3.2 from a CD-ROM attached to a host adapter other than an HP Ultra3 host adapter, refer to your CD-ROM or computer documentation for instructions on configuring your computer for CD-ROM access.

4. Reboot your computer after configuring for CD-ROM access.
5. Follow the instructions in your NetWare documentation for installing a new server.
6. After NetWare installs the DOS portion of the software, *down* and *exit* to DOS from the server prompt.
7. Copy the *adpt160m.ham* and *adpt160m.ddi* from the NetWare directory of the Ultra3 Family Manager Set disk for NetWare to the *c:\server.312* directory.
8. Change directory to *c:\server.312*, and copy the *nwpa\_up.exe* patch file to the directory.
9. Run *nwpa\_up.exe* (this will create another file, *312ptd.exe*. Answer **Y** to the prompt to overwrite *cdrom.nlm*.)
10. Run *312ptd.exe*.
11. Create the directory *c:\server.312\cdsave*.
12. Copy *cdrom.nlm* to *c:\server.312\cdsave*
13. Execute the following command lines to swap the server's loader:  
    *cd 312ptd\native\loader*  
    *lswap loader.exe \server.312\server.exe*  
    *cd \server.312*
14. Create the *startup.ncf* file in the *c:\server.312* directory using Edit or a text editor with the following lines:  
    *load c:\server.312\312ptd\native\start\npapatch*  
    *load c:\server.312\mmattrfx*  
    *load c:\server.312\nbi31x*  
    *load c:\server.312\adpt160m*  
    Add any additional driver load lines for dual-channel or multiple-channel host adapters.
15. Run *server.exe*.
16. Note the slot number detected for the HP Ultra3 SCSI host bus adapter.

The slot number can be added to the *startup.ncf* file, as described in Step 21 below, to automate driver load using the parameter *slot=x*, where *x* is the detected slot number (for example, load c:\server.312\adpt160m slot=2).

17. Load Install. Create the NetWare partition, SYS volume, and mount the volume. Complete the installation of the System and Public Files.
18. Create the *autoexec.ncf* file. Add the following lines and then save the file.  
load after311  
load c:\server.312\nwpsload  
search add 1 c:\server.312\cdsave  
load cdrom
19. Load the following command from the console prompt:  
load c:\server.312\312ptd\patch312
20. Install the patches from the *c:\server.312\312ptd* directory.
21. Edit the driver load command in the *startup.ncf* file to include the slot number detected in Step 16 above (for example, load c:\server.312\adpt160m slot=2).
22. Install any recommended vendor specific patches. See the Novell Web site for details.
23. Down and Exit the server.
24. Run *server.exe*.
25. Installation of the driver for NetWare 3.12/3.2 is complete.

## NetWare 4.12/4.2

Follow these instructions only if you are installing NetWare 4.12/4.2 for the first time:

1. Begin installation of NetWare 4.12/4.2 on your server as instructed in your NetWare documentation.
2. When a screen appears that asks you to select a disk driver, press **Insert**.
3. Insert the HP Ultra3 Family Manager Set disk for NetWare into your floppy disk drive.

4. Press **F3** and enter `a:\netware` as the path to the *adpt160m.ham* driver for NetWare.
5. Select **adpt160m.ham** and press **Enter**.
6. Select **No** not to save existing file, **Yes** to save existing file *cdrom.nlm*.
7. Select **No** not to save existing file, **Yes** to save existing file *nbi.nlm*.
8. Select **No** not to save existing file, **Yes** to save existing file *nwpa.nlm*.
9. Select **No** not to save existing file, **Yes** to save existing file *nwpaoad.nlm*.
10. Select **Save parameter and continue**, and press **Enter**.
11. To install additional adapters, follow the procedures from Step 5.
12. When complete, select **Continue the installation** to complete the installation.

## NetWare 5.0

Follow these instructions only if you are installing NetWare 5.0 for the first time:

1. Begin installation of NetWare 5.0 on your server as instructed in your NetWare documentation.
2. When a screen appears that asks you to add device drivers, select **Modify** and press **Enter**.
3. Select **Storage adapters**, and press **Enter**.
4. Press **Insert** to add storage drivers.
5. Press **Insert** to add an unlisted driver.
6. Insert the HP Ultra3 Family Manager Set disk for NetWare into your floppy disk drive.
7. Press **F3** and enter `a:\netware\v5_xx` as the path to the *adpt160m.ham* driver for NetWare.
8. Select **adpt160m.ham** and press **Enter**.
9. Select **Return to driver list**, and press **Enter**.

10. To install additional adapters, follow the procedures from Step 4.
11. When complete, select **Continue** to complete the installation.

## DOS Drivers for CD-ROM Access

The CD-ROM drivers need to be installed only if DOS access to a CD-ROM drive attached to a SCSI host adapter is required. If NetWare is already installed, or if the CD-ROM drive is not connected to a SCSI adapter, these drivers do not need to be copied or installed. However, you may choose to install these drivers if you are having trouble accessing your CD-ROM from Netware.

---

**NOTE** You do not need these drivers for Windows NT or UNIX.

---

### Install CD-ROM Drivers on a DOS Bootable Hard Disk

The following systems files should be modified:

- config.sys
- autoexec.bat

1. Copy the files *aspi8u2.sys* and *aspicd.sys* from the DOS directory of the Ultra3 Family Manager Set disk to your C drive. At the DOS prompt, type the following lines and press **Enter** after each line:

```
mkdir c:\scsi
copy a:\dos\*. * c:\scsi
```

2. Modify *config.sys* for loading *aspi8u2.sys* and *aspicd.sys*, which is necessary for connecting a CD-ROM. Either create this file in C:\ if you do not currently have a *config.sys*, or add these lines to the existing *config.sys* file. Note that you may need to change the path for the drivers.

```
device=c:\scsi\aspi8u2.sys /d
device=c:\scsi\aspicd.sys /d:aspicd0
```

3. Modify *autoexec.bat* for loading *mscdex.exe*. Either create this file in C:\ if you do not currently have *autoexec.bat*, or add these lines to the existing *autoexec.bat* file: c:\dos\mscdex.exe /d:aspicd0 /m:12

---

**NOTE** This will assign the CD-ROM to the next available drive letter, typically *D* if there is only one DOS drive. If you are using MS-DOS 5.0 and do not already have *mscdex.exe*, you will need to either upgrade to MS-DOS 6.0 or above, or download *mscdex.exe* from Microsoft BBS or CompuServe forum.

---

4. Reboot your system. You are now able to access your CD-ROM drive from the command line and from Windows.

## Installing the Driver When NetWare is Already Installed

To update or install the *adpt160m.ham* driver when NetWare is already installed, follow the instructions in this section. The procedures are similar for all versions of NetWare. Procedures that are specific to a NetWare version are noted when necessary.

1. Make a backup copy of the old driver (if it exists) before installing the new driver.
2. Copy the *adpt160m.ham* driver from the HP Ultra3 Family Manager Set disk for NetWare into the server's startup directory (e.g., *c:\nwserver*, *c:\server.40*) on your hard disk. This overwrites any existing version of the driver in the directory.

---

**NOTE** For NetWare 3.12/3.2 and 4.12/4.2, the file is in *\netware*. For NetWare 5.0, the file is in *\netware\lv5\_xx*.

---

3. If necessary, modify the *load* command line in the *startup.ncf* file so that the proper path to the driver and all appropriate command line options are specified. See "Loading the Driver at Server Bootup" on page 55.

The correct syntax to load the Ultra3 Family driver is

```
load [pathname]adpt160m [options].
```

Command line options are *not* case sensitive. Placing commas between command line options is optional. See "Loading the Driver at Server Bootup" on page 55 for possible values.

## Loading the Driver at Server Bootup

To automatically load the *adpt160m.ham* at server bootup, the *startup.ncf* file (usually located in your server's startup directory) must contain a **load** command line that specifies the location of the driver and any appropriate command line options (see "Using the Load Command Line Options" on this page). For additional information on the *startup.ncf* file, refer to your NetWare documentation.

The correct syntax to load the driver is:

```
load [pathname]adpt160m.ham [options]
```

For example, the command line to load the driver from the *c:\nwserver* directory, with the **verbose=** option *on* is:

```
load c:\nwserver\adpt160m verbose=y
```

Command line options are *not* case sensitive. Placing commas between command line options is optional. See "Using the Load Command Line Options" on page 55 for possible values.

To modify the *startup.ncf* file, follow these steps:

---

**NOTE** You can also use your DOS text editor to modify the *startup.ncf* file.

---

1. Type **load install** at the NetWare prompt and press **Enter**.
2. Select the appropriate menu choice that allows you to edit the *startup.ncf* file.
3. Make the necessary changes. When you are done, press **Esc**.

## Using the Load Command Line Options

You can specify several command line options when the driver is loaded. The available options are described in the table below. This table describes command line options for the *adpt160m.ham* driver for Ultra3 SCSI host bus adapter.

## adpt160m.ham Command Line Options

Option	Values	Default	Description
auto_disable_tagq=	on, off	off	Enables/disables auto disable tagged queuing algorithm.
dev_enable=	0-FFFF	FFFF	Allows you to enable the driver's registration of SCSI devices on a per target basis. By default, all targets are scanned. A bit value of 0 causes the target not to register under the operating system. These devices are still accessible via ASPI. This enable bit mask is entered in hex (see "Bit Mask Options" on page 58).
flush_diskreq=	0-FFFF	0	A bit mask to send occasionally ordered tags to specific targets. By default, no targets receive occasionally ordered tags. This bit mask is entered in hex (see "Bit Mask Options" on page 58).
instr=	on, off	off	Enables/disables recording of I/O statistics.
lun_enable= <sup>a</sup>	0-FF	01	A bit mask to enable scanning for specific LUNs on all targets. The default value of 01 causes the driver to scan LUN 0 only. This enable bit mask is entered in hex (see "Bit Mask Options" on page 58.)
max_tags=	1-128	16	Specifies maximum number of tagged commands per device.

Option	Values	Default	Description
multlun_targets=	0-FFFF	FFFF	A bit mask to enable LUNs on selected targets. By default, LUNs on all targets are enabled. This bit mask is entered in hex (see “Bit Mask Options” on page 58).
slot=	0-xxxx <sup>b</sup>	0	Defines a physical slot number for the host adapter. If 0 is specified, or if this option is not specified, then the driver loads for all Ultra3 host adapters.
verbose=	yes, no	no	Displays host adapter configuration information at load time.

a. Many multiple-LUN and removable-media devices are changers or magazines. Some of these are only supported by the driver through an ASPI driver provided by the hardware vendor.

b. The values can vary and are dependent on the system configuration.

## Bit Mask Options

Use the example below as an aid for calculating Bit Mask option hex values. Each SCSI device is enabled by a 1 in its corresponding bit position. The table that follows the figure, lists the binary-to-hex conversions. Using this example, if you want to enable scanning for LUNs 0, 2, and 6 on all targets, then use the command line option of `lun_enable=0045`.

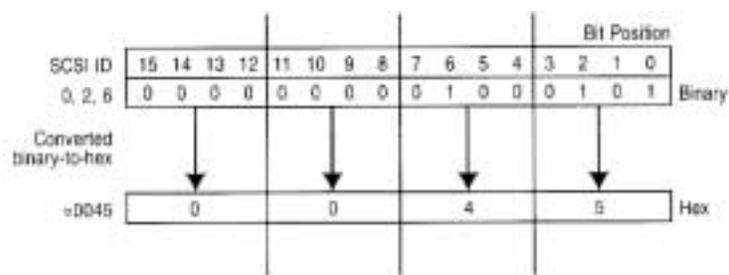


Figure 5-1. Bit Mask Options

Binary	Hex	Binary	Hex
0000	0	1000	8
0001	1	1001	9
0010	2	1010	A
0011	3	1011	B
0100	4	1100	C
0101	5	1101	D
0110	6	1110	E
0111	7	1111	F

## Sample Load Commands

Here is a simple load command with no option switches (if loaded from drive A):

```
load a:\netware\adpt160m.ham
```

If an error message appears when attempting to load the driver, refer to “*Troubleshooting*” on page 63.

Here is an example of the *adpt160m.ham* driver being loaded with command line options (if loaded from drive A):

```
load a:\netware\adpt160m.ham verbose=y slot=2
```

## Using NetWare and the Host Adapter

This section contains useful information on using NetWare and your host adapter.

### Using Removable Media

The *adpt160m.ham* driver module fully supports removable-media disk drives, including magneto-optical drives. Removable media is treated as a standard SCSI hard disk, with some exceptions:

- The driver only recognizes and registers media with 512 bytes/sector.
- NetWare allows you to mount/dismount the media, and to lock/unlock the media.

NetWare’s *monitor.nlm* program supports several removable-media options. Follow these steps to view and configure these options:

1. Load *monitor.nlm* to display the various options.
2. Select **Disk Information**. All system disk drives appear.
3. Select the removable-media device. The following drive status items appear:

Menu Choice	Default Value
1. Volume Segments On Drive <sup>1</sup>	(select for list)
2. Read After Write Verify <sup>1</sup>	Hardware Level
3. Drive Light Status <sup>1</sup>	Not Supported
4. Driver Operating Status <sup>1</sup>	Active
5. Removable Drive Mount Status <sup>2</sup>	Mounted
6. Removable Drive Lock Status <sup>2</sup>	Not Locked

<sup>1</sup>Valid for both removable and non-removable types of SCSI disk drives.

<sup>2</sup>Valid for removable media only.

### Mount Status

Mounting causes a drive to come on-line as a NetWare storage device. Dismounted drives are inactive and cannot be accessed.

Before you eject your current media, you should first *Dismount* it (menu choice 5). When the media status is *Dismounted*, you can eject the media. However, NetWare does not allow you to dismount it if the media is locked.

To insert your new media, wait for the drive to spin-up, and then select the **Drive Mount** option.

### Lock Status

If your removable-media device supports the Lock/Unlock feature, you can lock the media (menu choice 6). The media must be in the *Not Locked* state before you can eject it. If the media is *Locked*, it cannot be ejected when you press the **Eject** button.

## Using the NetWare Tape Backup

Included with Novell NetWare is a server-based tape backup utility called *sbackup.nlm*. This utility allows you to backup server disk drives to a server tape drive. The utility supports HP host adapters.

Novell NetWare documentation contains instructions for loading the server backup software. Refer to the *NetWare Server Backup Manual* to load the *tapedai*, *tsa*, and *sbackup* modules.

1. Once you have loaded *adpt160m.ham*, load *tsaxxx.nlm* (*tsa312.nlm*, *tsa400.nlm*, *tsa410.nlm*) and *sbackup* with these options:

```
:load scsi2tp.cdm
:load tsaxxx
:load sbackup
```

The appropriate driver that interfaces *sbackup* to ASPI is loaded automatically.

2. When *sbackup* is loaded, it asks for a login name. Enter the appropriate name.
3. If *sbackup* asks you to select the device driver, select the **HP DIBI-2 Tape Driver**, regardless of the type of SCSI tape drive being attached (e.g., even if the tape drive is manufactured by Wangtek, *do not* select the Wangtek driver).

Novell publishes a list of SCSI tape drives supported by *sbackup.nlm*.

## Using a CD-ROM with NetWare

To use a CD-ROM with NetWare, follow these instructions:

1. Load *adpt160m.ham* by entering the following line:  
:load [*pathname*]adpt160m
2. The *scsacd.cdm* driver will auto-load if the device(s) are detected.

---

**NOTE** For multiple LUN CDs, enable multiple LUN scanning with the `lun_enable` switch (e.g., `load adpt160m lun_enable=FF`). The `lun_enable` switch is needed for *adpt160m.ham*.

Enter the following line at the prompt:

```
scan all luns
```

---

1. Enter the following line at the prompt and then note the number and name of the CD:

```
:cd device list
```

2. Enter the number or volume name of the CD at the command line:

```
:cd mount [x] [name]
```

3. Edit the *startup.ncf* file to include the load commands in Step 1 and 2 above, if auto-mounting devices.

4. Edit the driver load command in the *startup.ncf* file to include the slot number (for example, `load c:\server.312\adpt160m slot=2`).

## Optimizing Performance

The HP Ultra3 SCSI Bus Master firmware increases the SCSI performance of the HP Ultra3 host adapters under multitasking environments. The firmware uses a paging mechanism to handle up to 255 simultaneous SCSI commands. The Sequencer can simultaneously manage up to 128 tagged, or 1 nontagged, SCSI commands for each SCSI device, up to a limit of 255 SCSI commands. The firmware can queue as many commands as the operating system is able to send to the host adapter. To set this feature, enter the following command:

```
max_tags=n
```

In general, a low number of `max_tags` gives better sequential performance, and a high number a better random performance.

---

**NOTE** A large number of `max_tags` can also cause starvation problems leading to deactivation with some drives.

---

# Troubleshooting

## Error Messages

The error messages listed below are the messages associated with the *adpt160m.ham* driver. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx080], [xxxxx081], [xxxxx082], etc.

---

**NOTE** When reporting problems to HP Customer Support, be sure to include the complete error code in your problem description.

---

### [xxxxx080] Unable to allocate memory

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

### [xxxxx081] Adapter software initialization failure

An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

### [xxxxx082] Internal driver error

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site located at <http://netserver.hp.com/netserver/>

### [xxxxx083] Adapter not supported by this version of the driver

Your adapter is not supported by the driver on your system. You may have installed a new adapter and have not updated the driver on your system.

**[xxxxx084] Adapter software initialization failure**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site located at <http://netserver.hp.com/netserver/>

**[xxxxx085] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx087] Internal driver error**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site located at <http://netserver.hp.com/netserver/>

**[xxxxx088] Adapter software initialization failure**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP Web site located at <http://netserver.hp.com/netserver/>

**[xxxxx089] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx096] Adapter hardware initialization failure - possible resource conflict**

The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with the resources of another board installed in your system.

**[xxxxx099] Adapter software initialization failure**

**[xxxxx09a] Adapter software initialization failure**

**[xxxxx09b] Adapter software initialization failure**

An error has occurred initializing one of the driver's internal data structures for a device connected to the adapter. This may result in problems accessing the device. Try installing the most up-to-date version of the driver available from the HP Web site located at <http://netserver.hp.com/netserver/>

**[xxxxx0ab] Driver already loaded for this host bus adapter**

The driver is already loaded for this adapter. Verify that the correct adapter is specified in your command line or startup file.

**[xxxxx0ac] Driver already loaded for all host bus adapters**

The driver is already loaded for all the supported adapters in this system.

**[xxxxx0a4] SCSI bus reset by third party hardware**

Hardware such as an array enclosure may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

**[xxxxx0a7] Unable to allocate memory**

**[xxxxx0a8] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx0a9] Possible interrupt conflict**

This indicates that the adapter IRQ conflicts with the IRQ of another board installed in your system. Check your hardware documentation for instructions on setting and changing IRQs.

**[xxxxx0c9] Invalid command line parameter**

A command line option for the driver is invalid. See "Using the Load Command Line Options" on page 55 for valid command line options.

**[xxxxx0ca] Invalid command line syntax**  
**[xxxxx0cb] Invalid command line syntax**  
**[xxxxx0cc] Invalid command line syntax**

The command line syntax for the driver is incorrect. See “Using the Load Command Line Options” on page 55 for entering the correct syntax.

**[xxxxx07c] Unable to allocate memory**  
**[xxxxx07d] Unable to allocate memory**  
**[xxxxx07e] Unable to allocate memory**  
**[xxxxx07f] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

## 6 SCO OpenServer Installation

---

This chapter explains how to install the HP Ultra3 Family Manager Set driver *ad160* for SCO OpenServer 5.0.x. The *ad160* driver supports the HP Ultra3 SCSI host bus adapter.

If you are performing a first time SCO OpenServer installation, see “Installing the Driver When Installing SCO OpenServer” below, to begin driver installation. If SCO OpenServer is already installed in your system, see “Installing the Driver When SCO OpenServer is Already Installed” on page 68.

Set the SCSI IDs of your devices as recommended by SCO:

- If you are installing SCO OpenServer products with a SCSI tape drive, set the tape drive to SCSI ID 2.
- If you are installing with a CD-ROM, set the CD-ROM drive to SCSI ID 5.
- Set the Boot SCSI hard disk drive to SCSI ID 0.

---

**NOTE** SCO OpenServer installation requires that the host bus adapter driver be installed from a disk. Refer to the QuickStart Guide for SCO OpenServer driver disk creation.

---

### Installing the Driver When Installing SCO OpenServer

To install the *ad160* driver at the same time you install SCO OpenServer, follow the instructions below.

#### Installing SCO OpenServer 5.0.x

Follow these instructions only if you are installing SCO OpenServer 5.0.x for the first time.

---

**NOTE** Remember that UNIX commands are case sensitive. Enter the commands exactly as shown in the instructions.

---

1. Insert the SCO OpenServer 5.0.x boot disk into the primary floppy disk drive and turn ON the computer. Alternatively, insert the SCO OpenServer 5.0.x boot CD into the primary CD-ROM drive and turn ON the computer.

When you see these prompts:

```
SCO OpenServer (TM) Release 5
Boot
:
```

Type `ahslink` and press **Enter**. (The boot drive should be ID0 or ID1.)

2. Type `ad160` as the package you want to link to the system and press **Enter**.
3. Insert the requested volume (the Ultra3 Family Manager Set disk for SCO OpenServer) in the floppy disk drive and press **Enter**.
4. If the driver is properly loaded, the following message appears:

```
ad160.ad160>Loading module
fd(52)/ad160/driver/ad160/Driver.o text....
:
:
ad160: Driver "ad160" successfully loaded.
```

5. Follow the procedures in your SCO OpenServer documentation for completing the installation.

## Installing the Driver When SCO OpenServer is Already Installed

To update or install the `ad160` driver if SCO OpenServer is already installed, follow the instructions in this section. The procedures are similar for all versions of SCO OpenServer. Procedures that are specific to a SCO version are noted when necessary.

**CAUTION** Improper or corrupt driver updates might destroy your existing UNIX file system. Back up all important files before proceeding.

Installing or updating the driver involves the following tasks, which must be completed in the order presented:

- Back up the old UNIX kernel and any other important files.
- Use `installpkg` to load the driver.
- Change the primary host bus adapter to an Ultra3 SCSI host bus adapter, if necessary.
- Rebuild the kernel to reflect the new changes.
- Reboot the computer with the new kernel.

---

**NOTE** To update or install the driver, you must first enter the Single User Mode (System Maintenance Mode). Refer to the SCO OpenServer documentation for instructions on how to use the `init(m)` or `shutdown(m)` command to put the system into System Maintenance Mode.

---

## **1** Perform a System Backup

If you have not already done so, back up all important files on the computer by following these steps:

---

**NOTE** To back up the whole system, refer to your SCO OpenServer documentation.

---

- a** Log in as `root`.
- b** To back up the current kernel configuration, type the following and press Enter after each line:

```
umount /stand
```

```
mount /dev/boot /stand
cp /stand/unix /stand/unix.orig
```

---

**NOTE** If you ever need to boot up from the pre-update kernel, load the `unix.orig` backup kernel at the `UNIX boot :` prompt. To do this, type `unix.orig` and press Enter.

---

**C** This step is optional. For extra security, you may back up the `mdevice` file and the `sdevice.d` directory. To perform this backup, type the following and press Enter:

```
copy -rom /etc/conf /etc/conf.bak
```

**2** To load the driver using `installpkg`, follow these steps:

**a** At the UNIX system prompt, type `installpkg` and press Enter. The screen displays the following messages:

```
Confirm
Please insert the floppy disk
:
:
Strike Enter when ready
or Esc to stop.
```

**b** Insert the Ultra3 Family Manager Set disk for SCO OpenServer and press **Enter**. The screen displays the following messages:

Installation is in progress - do not remove the floppy disk. The following packages are on this disk:

```
NAME DESCRIPTION
ad160 Adaptec Ultra 160 Family Driver for SCO OpenServer
5.0.x/dxx
```

Please enter the names of the packages you wish to install, or q to quit:

**C** At this point, type `ad160` and press **Enter**. The screen then displays this message and various installation status prompts:

```
Installing ad160
```

When the driver is loaded, the following message appears, indicating that the `ad160` driver has been loaded into the Link Kit for kernel addition:

```
Installed ad160
#
```

**3** Modify the `mcscli` file, if necessary, to change your primary host bus adapter to an Ultra3 SCSI host bus adapter, using the procedure below:

**a** Enter the following command:

```
cd /etc/conf/cf.d
```

**b** Use a text editor to edit this file. Enter the following command if using the `vi` editor:

```
vi mcscli
```

**C** Search for all entries with the host bus adapter number 0 (zero). The host bus adapter number is the third column in each entry. For example:

Host Adapter Prefix	SCSI Device Type	Host Adapter Number	Target ID	Logical Unit Number	Bus <sup>1</sup>
xx	Stp	0	2	0	0
xx	Sdsk	0	0	0	0
xx	Srom	0	5	0	0

<sup>1</sup>This field applies to SCO OpenServer 5 and later.

- d** Modify the `mcsbi` file according to your hardware setup:
- If you are booting from an Ultra3 SCSI host bus adapter, make sure the host adapter prefix for the host adapter number 0 is `ad160`.
  - If you are not booting from an Ultra3 SCSI host bus adapter, make sure the host adapter prefix for the host adapter number 0 is the appropriate prefix for each device on your primary HP host adapter. See the table above.
- e** Save the file and exit the text editor.

**4** Rebuild the UNIX kernel by following these steps:

- a** Type the following at the `#` prompt and press **Enter** after each line:

```
cd /etc/conf/cf.d
./link_unix
```

Status messages appear on-screen.

- b** When the kernel has been built, shut down the system by typing `shutdown-g0` and pressing **Enter**.
- c** Turn OFF the system power when you are prompted to do so.
- If you need to reconfigure your system, you may do so now.
- d** Add or remove host adapters or devices as needed.

**5** Boot the new kernel by following these steps:

- a** Follow the on-screen instructions to reboot your system, usually by pressing **Enter**.

- b Check the host bus adapter BIOS messages to verify that all your installed SCSI devices are listed.

If some or all of your installed SCSI devices do not appear at this time, your SCSI cables may be loose, or the SCSI device setup may not be complete. If so, go back and correct any problem before proceeding.

- C Wait for UNIX to boot with the new kernel.

See “Troubleshooting” on page 76 if the system crashes or if “panic” (UNIX error) messages are displayed at boot time.

The ad160 driver for your HP Ultra3 SCSI host bus adapter should now be ready for use.

## Using SCO OpenServer and the Host Adapter

This section contains useful information on using SCO OpenServer and your host bus adapter.

### Using Multiple Host Adapters

If you are adding an additional HP Ultra3 SCSI host bus adapter to a system with an Ultra3 SCSI host bus adapter already installed, follow the instructions in the SCO OpenServer documentation for adding devices using the `mkdev` command. When the system asks for the host adapter prefix, type `ad160` and press **Enter**.

## Changing the Boot Disk

If you are changing the boot device from a non-SCSI hard disk to a SCSI hard disk attached to an HP Ultra3 SCSI host bus adapter, you must reinstall SCO OpenServer.

If you are already booting from a SCSI hard disk attached to an HP PCI SCSI host bus adapter, and wish to boot from the same SCSI hard disk attached to an HP Ultra3 host bus adapter, you may elect to either reinstall SCO OpenServer with the new driver, or update SCO OpenServer with the new driver. See “Installing the Driver When Installing SCO OpenServer” on page 67, and “Installing the Driver When SCO OpenServer is Already Installed” on page 68 for instructions.

## Using Wide SCSI Host Adapters and Devices

SCO OpenServer 5.0.x supports SCSI IDs 0 to 15.

## Using Tunable Parameters for the ad160 Driver

For SCO OpenServer, some parameters are defined in the following file:

```
/etc/conf/pack.d/ad160/space.c
```

After modifying the `space.c` file, you must rebuild the kernel for the new parameters to take effect. The following section describes how to set the tunable parameters.

## Setting Parameters

If the `space.c` file has not been modified, all the parameters are set according to the values specified by your `SCSISelect` utility for your HP Ultra3 SCSI host bus adapter. However, you can override the parameters by modifying the `space.c` file. The information you need to change the parameters is included in the `space.c` file. Examples are provided in the following sections.

If you want to change the configured values, the first number indicates whether the default should be changed. If it is set to 0 (zero), the parameter is set to the default. If it is set to 1, the second number is used to override the default. For example:

```
char variable = {1,22};
```

The first number is 1, which overrides the default variable with the value 22.

Examples:

The following specifies whether the host bus adapter checks parity on incoming SCSI data:

```
ad160_parity[SCSI_NAD160]
```

If the second number is set to 0, parity checking is enabled. If it is set to 1, parity checking is disabled.

```
ad160_parity[SCSI_NAD160] = {First number, second number}
```

If, in this example, you want the host bus adapter not to check parity on incoming SCSI data; define parameters as:

```
ad160_parity[SCSI_NAD160] = {1,0};
```

## Changing the Maximum Number of LUNs Supported

The default setting for maximum number of LUNs supported is *Disable*. To enable this setting, you may have to use *vi* to edit the `space.c` file located at: `/etc/conf/patch.d/ad160`. Modify the following line so that `lun=1`:

```
int ad160_scan_lun=0
```

## Enabling Scatter/Gather and Tagged Queuing

The `ad160` driver supports Scatter/Gather and Tagged Queuing; however, the *Sdsk* (SCSI disk module) driver controls whether these features are enabled or disabled. Look for the *Sdsk* driver controls in the `space.c` file located at:

```
/etc/conf/patch.d/Sdsk/space.c
```

## Troubleshooting

### **My computer does not recognize my SCSI devices.**

At boot time, check to see if the BIOS messages for your primary Ultra3 host bus adapter lists all installed SCSI devices. If some or all devices do not appear, check your host bus adapter User's Guide for additional troubleshooting information, and check the following:

- Are all SCSI devices powered on?
- Are all SCSI bus cables and power cables properly connected?
- Do the host bus adapter and all devices on the SCSI bus have unique SCSI IDs?
- Are all devices on the SCSI bus terminated properly?
- Do you have an older SCSI peripheral installed? Some older SCSI peripherals, especially CD-ROM drives, do not properly respond to synchronous negotiation. As a result, these peripherals may lock or reset the SCSI bus. To solve this problem, turn off synchronous negotiation for this device ID through the *SCSISelect* utility for the host adapter.

### **My computer does not recognize my host adapter.**

At boot time, check to see if the BIOS message for your primary Ultra3 SCSI host bus adapter appears. If the messages do not appear, the host bus adapter may not be properly configured; check the following:

- The HP Ultra3 SCSI host bus adapter supports level-triggered interrupts and can share the same interrupt with another HP Ultra3 SCSI host bus adapter or PCI hardware that also supports level-triggered interrupts. Check your host bus adapter User's Guide and the documentation supplied with your computer for information about configuring IRQs and other parameters in the system CMOS setup.
- The boot host bus adapters should be installed into the lowest PCI device number. The device number is determined by the slot number on the PCI bus.

To find out the device number of your HP Ultra3 SCSI host bus adapter(s):

- a** Run the *SCSISelect* utility (by pressing a key combination displayed on-screen at boot time)

**b** Look on the first screen of *SCSISelect* in the upper right hand corner for `Bus:Device xx:xxh` (shown in hexadecimal).

- If the device number is high, power OFF the computer, move the HP Ultra3 SCSI host bus adapter to a PCI slot at the other end of the motherboard, and run *SCSISelect* again to see if the number is lower.

The host bus adapter LED lights during activity. This light helps to determine which adapter *SCSISelect* displays information for. Refer to your system documentation for further details on determining the PCI slot number and slot number order in the system.

### **I am having problems booting the computer from a SCSI drive.**

---

**NOTE** If both SCSI and non-SCSI disk drives (such as IDE) are installed, a non-SCSI disk drive must be the boot device, unless your system supports Bios Boot Specification (BBS). Refer to the documentation supplied with your system for more information.

---

Make sure your host bus adapter is installed and configured correctly, as described in the documentation that came with it. Check the following if the host bus adapter is correctly installed:

- Ensure the Drives setting (in your computer's CMOS Setup program) that corresponds to the SCSI boot drive is set to *None* or *No Drives Installed*, as required for SCSI hard disk drives. See the documentation supplied with your computer for more information.
- Ensure the host bus adapter BIOS setting in the *SCSISelect* utility is *Enabled*.
- Ensure the Extended BIOS Translation feature in the *SCSISelect* utility is *Disabled*. The OS automatically selects the correct translation method as needed.
- Examine the SCO OpenServer `mcski` file to make sure that the correct host bus adapter and device are specified as the boot entry The boot entry is the first `Sdsk` entry in the `mcski` file (see Step 3 on page 71 for additional information).

For SCO OpenServer 5.0.x, the boot entry looks like the example below:

ad160 Sdsk 0 0 0 0

---

**NOTE** Each field is separated by a tab. *Do not* use the spacebar to separate fields.

---

The meanings of the fields are as follows:

**Table 6-1.**

<b>Host Adapter Prefix</b>	<b>SCSI Device Type</b>	<b>Host Adapter Number</b>	<b>Target ID</b>	<b>Logical Unit Number</b>	<b>Bus<sup>1</sup></b>
ad160	Sdsk	0	0	0	0

<sup>1</sup>This field applies to SCO OpenServer 5 only.

- *Host Adapter Prefix*: Identifies the name of the host bus adapter driver. If you are booting from an Ultra3 SCSI host bus adapter, the Host Adapter Prefix must be ad160.
- *SCSI Device Type*: Identifies the type of SCSI device. For example, Sdsk indicates that the device is a hard disk; Srom indicates a CD-ROM drive; and Stp indicates a tape drive.
- *Host Adapter Number*: Identifies the SCSI host bus adapter that the SCSI device is attached to. For example, the first Ultra3 SCSI host bus adapter is 0, the second Ultra3 SCSI host bus adapter is 1.
- *Target ID*: Identifies the SCSI ID of the SCSI device.
- *Logical Unit Number*: Identifies the Logical Unit Number (LUN) of the SCSI device. This field is usually 0.
- *Bus*: Identifies the SCSI bus that the SCSI device is attached to. For most HP host bus adapters, the bus number is 0.

If you need to edit the `m SCSI` file, use the `vi` editor. You must build a new kernel in order for any changes to take effect (see Step 4 on page 72).

If you are booting from an HP Ultra3 SCSI host bus adapter and are using ISA/EISA-based host bus adapters as secondary devices, you must disable the BIOS on all ISA/EISA-based host bus adapters.

If you are booting from ISA/EISA-based host bus adapters and are using an Ultra3 SCSI host bus adapter as a secondary device, see your ISA/EISA-based host bus adapter documentation to ensure that the host bus adapter is at the lowest BIOS base address. ISA/EISA-based host bus adapters boot before the Ultra3 SCSI host bus adapters.

### **My computer crashes or displays panic messages at boot time.**

You may have to boot from the backup kernel created earlier. To boot from the backup kernel, follow these steps:

1. Reboot the system.
2. At the Booting UNIX System... prompt, type `unix.orig` and press **Enter**.
3. Your system should now boot from the backup kernel that you created prior to the driver update.

### **My computer hangs during heavy system load activity.**

You may have to increase the maximum size available for configuration information. To change the maximum size available for configuration information, follow these steps:

1. At the prompt, type the following command and press **Enter**:

```
cd/etc/conf/cf.d
```

2. Type `./configure` and press **Enter**.
3. Under the Configuration tunables, select the **Miscellaneous System Parameters**.
4. Enter the new value for the maximum size of configuration information.
5. After increasing the maximum size of configuration information and then type `q` to quit.
6. Type `Y` to update the system configuration files.
7. Type `./link_unix` and press **Enter** to relink the kernel.
8. Type `Y` to boot from the new kernel by default.

9. Type Y to rebuild the kernel environment.
10. Reboot the system.

## Error Messages

The error messages listed below are the messages associated with the adl60 driver. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx010], [xxxxx011], [xxxxx012], etc.

---

**NOTE** When reporting problems to Customer Support, be sure to include the complete error message in your problem description.

---

### **[xxxxx020] Adapter or target device not responding or not connected**

The target device did not respond to the adapter. If the device is present, refer to your host bus adapter User's Guide for troubleshooting information. If the device is no longer connected to the system, ignore this error.

### **[xxxxx022] Adapter or target device protocol error**

The adapter or target device has broken the communication protocol. A badly behaving device could cause this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time, it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

### **[xxxxx030] Target device busy**

### **[xxxxx032] Target device busy**

The target device reports a Busy status. Another program may already be using this device.

### **[xxxxx09D] Unexpected interrupt**

The HP driver received an interrupt from the system that does not correspond to any adapter supported by the driver. This could be caused by another host bus adapter from a different vendor, such as a video card or network card. The problem can also be caused by malfunctioning hardware.

**[xxxxx0a3] Adapter diagnostic failure - possible resource conflict**

The driver failed the internal software or hardware diagnostic. Refer to your host bus adapter User's Guide for troubleshooting information.

**[xxxxx0ca] Cannot initialize device**

The system, host bus adapter, or target device is busy or is not responding. The target device could not be initialized.

**[xxxxxcb] Unable to allocate memory. Decrease ad160\_instr\_buffersz in space.c**

The driver has requested a larger buffer size than the available RAM. Either add RAM to the system or decrease the user option `ad160_inotr_buffersz` in the `/etc/conf/pack.d/ad160/space.c` file.

**[xxxxx0cc] CONFLICT: Disconnection must be enabled in order for Tagged Queueing to work**

Use the SCSISelect utility of your host bus adapter to enable Disconnection for each device reporting this message. Alternatively, disable Tagged Queueing in the `/etc/conf/pack.d/ad160/space.c` file by setting `ad160_do_tagged=0`. If Tagged Queueing is disabled, performance may be negatively affected.



## 7 SCO UnixWare Installation

---

This chapter explains how to install the HP Ultra3 Family Manager Set drivers *adst21* and *adst70* for UnixWare— UnixWare 2.1x and UnixWare 7.01/7.1.

*adst21* driver (or package) is used with UnixWare 2.1x. The *adst70* driver (or package) is used with UnixWare 7.01/7.1.

If you are performing a first time UnixWare installation, see “Installing the Driver When Installing UnixWare” in the next section to begin driver installation. If UnixWare is already installed in your system, see “Installing the Driver When UnixWare is Already Installed” on page 84.

### Installing the Driver When Installing UnixWare

To install either the *adst21* or *adst70* driver at the same time you install UnixWare, follow the instructions below. The procedures are the same for UnixWare 2.1x and 7.01/7.1.

1. Insert the Install disk of the UnixWare package into the boot floppy disk drive. Reboot your computer.

Wait for the first UnixWare installation screen and prompt to appear, then follow the on-screen instructions.

2. When prompted to either Install Host Bus Adapter Drivers or Continue Installation, first remove the Install disk, then select **Install Host Bus Adapter Driver** and press **Enter**.
3. Insert the HP Ultra3 Family Manager Set disk for UnixWare 2.1x or 7.1 into the primary floppy disk drive and press **Enter** (you cannot load drivers from a secondary floppy disk drive).
4. As the driver loads, a message identifying the installed host adapter briefly appears on screen. The installation process determines which device drivers on the disks are needed.
5. If you have additional HBA disks, insert the next HBA disk, select **Install Another HBA Disk**, and press **Enter**.

If all of your HBA disks have been installed, remove the last HBA disk, select **Continue Installation**, and press **Enter**.

6. If necessary, enter the DCU (Device Configuration Utility) to view/change the UnixWare device driver configuration data.
7. Follow the on-screen instructions to continue with installation. Refer to the UnixWare documentation and on-screen help files for help in selecting options.

---

**NOTE** If your installation fails, *do not* attempt to use the update installation `pkgadd` procedure to fix the installation. Follow the instructions in the UnixWare documentation and in this User's Guide to retry the installation.

---

## Installing the Driver When UnixWare is Already Installed

To update or install the *adst21* driver or *adst70* driver on a system where UnixWare is already installed, follow the instructions in this section. The procedures are similar for UnixWare 2.1x and 7.1. Procedures that are specific to a UnixWare version are noted when necessary.

<p><b>CAUTION</b> Improper or corrupt driver updates might <i>destroy</i> your existing UnixWare file system. Back up all important files before proceeding. Consult your UnixWare documentation for proper backup procedures.</p>
--

Installing or updating the driver involves the following tasks, which must be completed in the following order:

1. *Back Up the Computer*—Backs up the old UnixWare kernel and any other important files.
2. *Load the Package*—Uses `pkgadd` to load the HP Ultra3 Family driver package.
3. *Modify the New System File*—For computers booting from a device connected to HP Ultra3 SCSI host bus adapter, modifies the new driver that

was loaded in the previous procedure. Loading the driver causes the driver to become a permanent part of the new boot kernel on rebuild.

4. *Rebuild the UnixWare Kernel*—Rebuilds the kernel with the new driver.
5. *Boot the New Kernel*—Reboots the computer with the new kernel.

---

**NOTE** Remember that UnixWare commands are *case sensitive*. Enter the commands exactly as shown.

---

## Back Up the Computer

If you have not already done so, back up all important files on the computer. See your UnixWare documentation for proper UnixWare file system backup procedures.

1. Log in as root at the UnixWare # system prompt.
2. To back up the old UnixWare kernel, type the following and press **Enter**:  

```
cp /stand/unix /stand/unix.work
```

## Load the Package

To load the driver, follow these steps:

1. At the system prompt, type the following and press **Enter**:  

```
pkgadd -d diskette1
```

Follow the instructions on-screen to insert the IHV HBA disk (or HP Ultra3 Family Manager Set disk for UnixWare 2.1x or UnixWare 7.01/7.1) into the boot floppy disk drive.

2. Select the *adst21* or the *adst70* package from the on-screen menu and press **Enter**. The package is loaded into your UnixWare operating system.
3. When the package has loaded, you may be prompted to install the disk again.

*Do not* reinsert the IHV HBA disk (or HP Ultra3 Family Manager Set disk for UnixWare 2.1x or UnixWare 7.01/7.1). Instead, type **q** (quit) and press **Enter**.

4. Type **mail** and press **Enter**. The mail messages tell you if the installation was successful.

If a mail message informs you that the installation has failed, turn to “*Troubleshooting*” on page 90.

5. Type `pkginfo -l adstxx` and press **Enter**.
6. Verify that the `adst21` or `adst70` driver is now listed.

If the `adst21` or `adst70` driver does not appear in the `pkginfo` listing, turn to “*Troubleshooting*” on page 90.

The listing should be similar to

```
PKGINST: adst21  
NAME: Ultra160 Driver for UnixWare 2.1x
```

or

```
PKGINST: adst70  
NAME: Ultra160 Driver for UnixWare 7.1
```

## Modify the New System File

1. Display the contents of the `adst21` file by typing the following and pressing **Enter**:

For UnixWare 2.1x:

```
cat /etc/conf/sdevice.d/adst21
```

For UnixWare 7.1:

```
cat /etc/conf/sdevice.d/adst70
```

2. If your computer is to boot from a device connected to a HP Ultra3 SCSI host bus adapter, verify that the line `$static` is present immediately below the line `$version 2`.
3. If your computer is **not** to boot from the HP Ultra3 SCSI host bus adapter, and you wish to leave the driver as a loadable module, edit and verify that the line `$static` is not present directly below the line `$version 2`.

## Rebuild the UnixWare Kernel

To rebuild the UnixWare kernel with the new changes, follow these steps:

1. Type the following at the `#` prompt and press **Enter** after each line:

```
cd /etc/conf/bin
./idbuild -B
```

Status messages appear.

2. When the kernel has been built, type the following and press **Enter** after each line (0 in -g0 is zero, not the letter O):

```
cd /etc/conf/cf.d
cp unix /stand/unix
cd /
shutdown -g0
```

3. Type y and press **Enter** when the computer asks if you really want to shut down. System Is Down should appear on the screen.

The UnixWare kernel is now ready for host adapter operation.

## Boot the New Kernel

To reboot the computer with the new kernel, follow these steps:

1. Follow the on-screen instructions (usually by pressing **Enter**) to reboot your computer.
2. Check the bootup messages to verify that all your installed SCSI devices are listed.

If some or all of your installed SCSI devices do not appear at this time, your SCSI cables may be loose, or the SCSI device setup may not be complete. If so, go back and correct any problems before proceeding.

3. Wait for UnixWare to complete bootup with the new kernel.

Refer to “Troubleshooting” on page 90 if the computer crashes or if panic (UnixWare error) messages appear during bootup.

The updated driver for UnixWare should now be ready to use.

## Using UnixWare and the Host Adapter

This section contains useful information on using UnixWare and your host adapter.

## Using Tunable Parameters

For UnixWare, some parameters are defined in the following files:

```
/etc/conf/pack.d/adst21/space.c
```

or

```
/etc/conf/pack.d/adst70/space.c
```

These parameters can be tuned for either the *adst21* driver or the *adst70* driver. Please refer to the comments in the appropriate *space.c* file for a description of these parameters. After modifying the *space.c* file, you must rebuild the kernel then reboot the system for the new parameters to take effect. To rebuild the kernel, type the following, and press **Enter** after each line:

```
/etc/conf/bin/idbuild -B  
cp /etc/conf/cf.d/unix /stand/unix
```

---

**NOTE** The drivers support tagged queuing and reinitialization.

---

## Using Multiple Host Adapters

When using multiple host adapters, consider the following:

- The host adapter and computer must be configured for multiple host adapters as explained in the host adapter's user's guide.
- To boot from the HP Ultra3 SCSI host bus adapter, make sure the host adapter is installed in the lowest PCI slot number. See your host adapter's user's guide.
- UnixWare 2.1x and UnixWare 7.01/7.1 supports auto-configuration. When adding multiple host adapters to an existing UnixWare 2.1x and 7.01/7.1 system, simply install the board and reboot; the system automatically reconfigures and rebuilds the kernel. If you want to select a host adapter to boot from, simply disable the BIOS on all other host adapters.

## Removing the Driver

If you no longer need the *adst21* or *adst70* driver, you can use the following procedure to remove it completely:

1. Back up all important computer files.
2. At the UnixWare root prompt, type the following:

For UnixWare 2.1x:

```
/etc/conf/bin/idinstall -d adst21
```

The following files will be deleted:

```
/etc/conf/mdevice.d/adst21  
/etc/conf/pack.d/adst21/Driver.o  
/etc/conf/pack.d/adst21/space.c  
/etc/conf/pack.d/adst21/disk.cfg  
/etc/conf/sdevice.d/adst21
```

For UnixWare 7.01/7.1:

```
/etc/conf/bin/idinstall -d adst70
```

The following files will be deleted:

```
/etc/conf/mdevice.d/adst70  
/etc/conf/pack.d/adst70/Driver.o  
/etc/conf/pack.d/adst70/space.c  
/etc/conf/pack.d/adst70/disk.cfg  
/etc/conf/sdevice.d/adst70
```

3. Then, rebuild the kernel (0 in -g0 is zero, not the letter O):

```
/etc/conf/bin/idbuild -B -K  
cp /etc/conf/cf.d/unix /unix  
cd /  
shutdown -g0
```

4. Reconfigure your computer for your alternate or replacement drive controller, and reboot the computer.

# Troubleshooting

## Problems and Solutions

### **My computer crashes or displays panic messages during the bootup procedure!**

You may have to boot from the backup kernel created earlier, and then perform the driver update procedure again.

To boot from the old kernel, follow these steps:

1. Reboot the computer.
2. At the **Booting UNIX System...** prompt or loading UnixWare graphics, press the **Spacebar**.
3. For UnixWare 2.1x: From the **[boot]#** prompt, first type **KERNEL=old kernel** (e.g., **KERNEL=unix.work**) and press **Enter**. Then, type **go** and press **Enter**. Your computer should now boot from the backup kernel created earlier in “Installing the Driver When UnixWare is Already Installed” on page 84.
4. For UnixWare 7.01/7.1: From the **[boot]#** prompt, first type **BOOTPROG=old kernel** (e.g., **BOOTPROG=unix.work**) and press **Enter**. Then, type **go** and press **Enter**. Your computer should now boot from the backup kernel created earlier in “Installing the Driver When UnixWare is Already Installed” on page 84.

To repeat the driver update procedure, follow these steps:

1. Follow the instructions in “*Removing the Driver*” on page 88 to delete the driver from your computer.
2. Perform the driver update procedure again. See “Installing the Driver When UnixWare is Already Installed” on page 84.

## Error Messages

The error messages listed below are the messages associated with the drivers. Messages are listed sequentially according to the last three digits of the error code. For example, [xxxxx020], [xxxxx021], [xxxxx022], etc.

---

**NOTE** When reporting problems to Customer Support, be sure to include the complete error code in your problem description.

---

**[xxxxx003] Command completed with error**

**[xxxxx004] Command completed with error**

**[xxxxx005] Command completed with error**

**[xxxxx006] Command completed with error**

**[xxxxx007] Command completed with error**

**[xxxxx008] Command completed with error**

**[xxxxx009] Command completed with error**

A request issued to a target device completed with an indication that there is an error. In most cases, the error is recovered and normal operation continues.

**[xxxxx010] Error issuing command**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the <http://netserver.hp.com/netserver/>

**[xxxxx011] Error issuing command**

The requested command is not supported by this driver.

**[xxxxx012] Error issuing command**

The driver does not recognize the target device.

**[xxxxx013] Error issuing command**

**[xxxxx014] Error issuing command**

An error has occurred while the driver was setting up its internal data structures. Try installing the most up-to-date version of the driver available from the HP web site located at <http://netserver.hp.com/netserver/>

**[xxxxx015] Error issuing command**

An error has occurred with the driver. Try installing the most up-to-date version of the driver available from the HP web site located at <http://netserver.hp.com/netserver/>

**[xxxxx020] Adapter or target device not responding or not connected**

The target device did not respond to the adapter. If the device is present, refer to your host adapter's user's guide for troubleshooting information. If the device is no longer connected to the system, ignore this error.

**[xxxxx021] Target device protocol error**

An unexpected event occurred during data transfer between the adapter and target device. Normally, this indicates a faulty or non-compliant target device.

**[xxxxx022] Adapter or target device protocol error**

The adapter or target device has broken the communication protocol. A badly behaving device could cause this message to appear. Normally this is not a serious problem. If you get this message frequently over a short period of time, it could indicate that the device or system is malfunctioning. Unplug or power down unused devices to see if the problem persists.

**[xxxxx023] Target device parity error**

The driver has detected a parity error by the target device. Try decreasing the transfer rate or disable the Ultra SCSI speed in *SCSISelect*<sup>®</sup>. Also, make sure you are using twisted-pair SCSI cables.

**[xxxxx024] Data overrun or underrun**

The adapter was given more or less data than was expected.

**[xxxxx030] Target device busy**

The target device reports a Busy status. Another program might already be using this device.

**[xxxxx031] Target device queue full**

The target device internal buffer is full.

**[xxxxx032] Target device busy**

The target device reports a Busy status. Another program may already be using this device.

**[xxxxx041] Command aborted**  
**[xxxxx042] Command aborted**  
**[xxxxx043] Command aborted**  
**[xxxxx044] Command aborted**  
**[xxxxx045] Command aborted**

An internal condition caused the driver to abort the command. In most cases, the command is retried and is recovered, and normal operation continues.

**[xxxxx046] Target device did not respond to abort sequence**

The target device did not abort the command requested by the driver. Some devices do not support the **abort** command properly. Normally, this indicates a faulty or noncompliant target device.

**[xxxxx047] Command aborted**

An internal condition caused the driver to abort the command. In most cases, the command is retried and is recovered, and normal operation continues.

**[xxxxx048] Unable to abort command**

An error occurred while aborting a command. Possibly, the command has already completed and there is nothing to abort.

**[xxxxx049] Command abort in progress**

This indicates an **abort** command has been issued. This is a normal operating condition.

**[xxxxx051] Target device did not respond to reset sequence**

The target device did not reset correctly as requested by the driver. Normally, this indicates a faulty or noncompliant target device.

**[xxxxx081] Adapter initialization failure**

An error has occurred while the driver was setting up its internal data structures. Verify that your adapter is supported by this version of the driver.

**[xxxxx083] Adapter not supported by this version of the driver**

Your adapter is not supported by the driver on your system. You may have installed a new adapter and have not updated the driver on your system.

**[xxxxx096] Adapter hardware initialization failure - possible resource conflict**

The driver has attempted to initialize the adapter hardware but failed. This might suggest that the adapter resources (e.g., IRQ) conflict with another board installed in your system.

**[xxxxx097] Unable to allocate memory**

This indicates that there may be a problem with the amount of memory installed in your system. Verify that your system has at least the minimum amount of memory required by your operating system.

**[xxxxx098] Exceeded maximum number of host bus adapters**

The driver has detected more host bus adapters than is supported by this version of the driver or operating system.

**[xxxxx0a4] SCSI bus reset by third party**

Hardware such as an array enclosure may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

**[xxxxx0a5] SCSI bus reset by host adapter**

The host adapter may have reset the SCSI bus. This is a normal condition unless you receive additional errors.

**[xxxxx0cf] System configuration error**

The driver encountered an error with your hardware. Refer to your host adapter's user's guide for troubleshooting information.

**[xxxxx0d0] Command timeout**

The target device is either busy, not ready, malfunctioning, or is not present. Refer to your host adapter's user's guide for troubleshooting information.

**[xxxxx0d7] Target device scan failed**

The driver encountered an error scanning the target device. Refer to your host adapter's user's guide for troubleshooting information.

## 8 Linux Support

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The HP Ultra3 SCSI host bus adapter supports the following Linux Operating Systems:

<b>Linux Operating System</b>	<b>World Wide Web URL</b>
Caldera Operations eDesktop 2.4	<a href="http://www.caldera.com">www.caldera.com</a>
Debian Linux 2.2	<a href="http://www.debian.com">www.debian.com</a>
RedHat Linux 6.2	<a href="http://www.redhat.com">www.redhat.com</a>
SuSE Linux 6.4	<a href="http://www.suse.com">www.suse.com</a>
TurboLinux Workstation 6.0	<a href="http://www.turbolinux.com">www.turbolinux.com</a>

Installation Guides are available at the web sites listed above.

Refer to your HP Netserver User Guide for additional information on Linux support for your system.



## A Product Specifications

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These specifications list the operating conditions for the Ultra3 SCSI adapter. Check the User Guide for the server containing the adapter, and ensure that the target operating environment is suitable for both the server and adapter.

<b>Electrical</b>	
Power Requirements	5.0V +/- 5% @ 1.2A maximum
Power Consumption	6 W maximum
Bus Type	PCI 2.1
Interface Protocol	Bus Mastering DMA
Host Bus Burst Data Rate	266 MB/second
SCSI Bus	Multimode LVD and SE
Peripheral Bus	64-bit/66.6MHz PCI, 32-bit compatible
SCSI Data Transfer Rate	160 MB/second
Advanced SCSI Features	<ul style="list-style-type: none"><li>• Multimode operation of LVD and SE output</li><li>• Scatter/Gather Operation</li><li>• Disconnect/Reconnect</li><li>• Fully multitasking/multithreading</li><li>• Tagged Queuing support</li><li>• Multiple LUN support</li><li>• Parity handling in Data, Message, Status, Selection/Reselection and Command phases</li><li>• Active negation</li><li>• Fully Disk Array capable</li><li>• Supports OBDR (One Button Disaster Recovery)</li></ul>

<b>Electrical</b>	
Device Support	Up to 15 LVD or SE SCSI devices
Cable Length	25m for a single LVD SCSI device Up to 12m for 15 LVD devices
Electrical Termination	Automatic active, programmable via <i>SCSISelect</i>

<b>Physical</b>	
Dimensions	6.875 x 3.725 x 0.44 inches 174.63 x 94.62 x 11.18 millimeters
Internal Connector	One 68-pin LVD SCSI One 68-pin Ultra Wide SCSI One 50-pin Ultra SCSI
External Connector	One 68-pin LVD SCSI

<b>Environmental</b>	
Operational Temperature	0 to 55 Degrees C (32 to 131 degrees F)
Operational Humidity	10 to 90% Relative Humidity, non-condensing
Operational Altitude	-30 to 3045 Meters (10,000 feet)

<b>Regulatory</b>	
Meets electromagnetic compliance requirements of:	USA: CFR 47 part 15, Class B, C63.4 - 1992 Canada: Industry Canada, ICES-003, CISPR 22, Class B Europe: EN50081, EN 55022, Class B Japan: VCCI, CISPR 22 Class B ITE South Korea: Min. of Information & Communication, Class B Australia: AS/NZS 3548 - EN 55022 New Zealand: AS/NZS 3548 - EN55022
Meets electromagnetic immunity requirements of:	EU Countries: EN50082-1,EU, including: ESD, IEC-801-2:1984, 4KV Contact, 8KV Air Radiated Immunity, IEC-801-3:1984, 3V/m, 80% AM Mod, 27 - 1000 MHz Electric Fast Transients, IEC-801-4:1988 1.0KV Power, 0.5KV I/O lines
Meets safety compliance requirements of:	UL 1950 EN60950 Printed Circuit Board: 94 V-0 material



## B Troubleshooting

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### Troubleshooting Checklist

Most problems that occur with your host adapter result from errors in preparing and connecting devices on the SCSI bus. If you have problems when using your host adapter, check these items first.

- Are all SCSI devices powered?
- Are all SCSI bus cables and power cables properly connected?
- Is the host adapter firmly seated and secured in a PCI slot that is capable of bus mastering?
- Is pin-1 orientation maintained throughout the SCSI bus?
- Does the host adapter and all devices on the SCSI bus have unique SCSI IDs?
- Are all devices on the SCSI bus terminated properly?
- Are the PCI configuration parameters set correctly in your HP Netservers setup program?
- Is parity checking consistently enabled or disabled on all devices on the SCSI bus?

If your problems persist, continue with the following sections.

### Common Error Messages

If the host adapter BIOS is enabled, but it fails to initialize, the system displays a specific error message followed by a BIOS Installation Failure message. Here are some of these error messages and their meanings:

#### **Device connected, but not ready.**

The host adapter received no answer when it requested data from an installed SCSI device. Try setting the Send Start Unit Command to yes for the host adapter.

If the message still appears, follow the drive manufacturer's instructions to make sure the drive is set to spin up when the power is switched ON.

#### **Start unit request failed**

The BIOS was unable to send a Start Unit Command to the device. Run the *SCSISelect* utility and disable Send Start Unit Command for the device.

#### **Time-out failure during ...**

An unexpected time-out occurred. Check SCSI bus termination. Try disconnecting the SCSI peripheral cables from the host adapter and then starting the HP Netserver. If the HP Netserver successfully restarts, check SCSI bus termination and cable connections. One of the devices on the SCSI bus may be defective.

#### **Attention! Too many devices are terminated on the SE connectors**

The SCSI host bus adapter BIOS has detected that more than two devices have been terminated on the narrow SE SCSI segment. Verify the termination on the devices connected to the internal and external connectors. Terminate only the SCSI device at the ends of the cable. Remove or disable the terminators on the SCSI devices between the ends of the cable.

#### **Attention! Insufficient termination detected on the SE connectors**

The SCSI host bus adapter BIOS has detected that either only one or no devices have been terminated on the narrow SE SCSI segment. Verify the termination on the devices connected to the internal and external connectors. Terminate only the SCSI device at the ends of the cable. Remove or disable any terminators on the SCSI devices between the ends of the cable.

---

**NOTE** The termination detection feature is only implemented on the internal narrow SE connectors. The 68-pin LVD/SE connector does not support this feature.

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## C Regulatory Information

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### Regulatory Notices - Electromagnetic Compliance

Electromagnetic Compatibility (EMC) requirements have been established in many countries to regulate the radio frequency energy generated by Information Technology Equipment (ITE). This energy is generated during the normal and intended use of this equipment and so it is limited by country regulations to levels intended to minimize potential interference to other electrical equipment, including public safety services.

Two levels of radio frequency energy are allowed according to the type or use of equipment. Class A levels have been established for use in commercial or business environments. Class B levels are lower than the Class A requirement and have been established for use in residential environments. Class B levels are also suitable when the environment includes electrically sensitive equipment.

The server equipment you have purchased has been provided with a compliance label to indicate where it may be used with reasonable protection to the environment in which it is used. Additional statements are provided below to conform to international and domestic regulations.

---

**NOTE** Check the label on your product to determine the level of operation.

---

#### Notice for United States (Federal Communications Commission)

##### Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio

frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a power circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Hewlett-Packard's system certification tests were conducted with HP-supported peripheral devices and HP shielded cables, such as those you receive with your computer. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment. Cables used with this device must be properly shielded to comply with the requirements of the FCC.

### **Class A Equipment**

This equipment has been tested and found to comply with the limits for Class A digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at their own expense.

### **Class A Accessories**

Installation and use of a Class A accessory creates a system that meets the requirements for industrial and commercial environments. If you are installing a

class A accessory in a system that has been labeled as a class B product, the requirements and notice for class A equipment shall be applied.

### **Notice for Canada (Industry Canada)**

This digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### **Notice for Japan**

The equipment you have purchased may be in either the class A or class B category.

#### **For products labeled as Class B:**

This equipment is in the Class B category information technology equipment based on the rules of Voluntary Control Council For Interference by Information Technology Equipment (VCCI). Although aimed for residential area operation, radio interference may be caused when used near a radio or TV receiver.

Read the instructions for correct operation.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると受信障害を引き起こすことがあります。  
取り扱い説明書に従って正しい取り扱いをして下さい。

#### **For products labeled as Class A:**

This equipment is in the Class A category information technology equipment based on the rules of Voluntary Control Council For Interference by Information Technology Equipment (VCCI). When used in a residential area,

radio interference may be caused. In this case, you may need to take appropriate corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると受信障害を引き起こすことがあります。  
取り扱い説明書に従って正しい取り扱いをして下さい。

## Notice for Korea

The equipment you have purchased may be in either the class A or class B category.

### Class A Equipment:

Please note that this equipment has been approved for business purposes with regard to electromagnetic interference. If purchased in error for use in a residential area, you may wish to exchange the equipment where you purchased it.

사용자 안내문 (A급 기기)

이 기기는 업무용으로 전자파장애검정을 받은 기기이오니, 만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

### Class B Equipment:

Please note that this equipment has been approved for non-business purposes with regards to electromagnetic interference. This equipment can be allowed for use in all areas as well as residential areas.

## Notice for Taiwan

### Class A Warning

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Declaration of Conformity (US, EU, Australia)

DECLARATION OF CONFORMITY  
according to ISO/IEC Guide 22 and EN 45014

**Manufacturer's/Supplier Name:** Hewlett-Packard Company  
**Manufacturer's/Supplier Address:** 10955 Tantau Avenue  
Cupertino, CA 95014 USA

**declares, that the product**

**Product Name:** Ultra3 SCSI Host Bus Adapter  
**Model Number(s):** P3413A  
**Product Options:** ALL

**conforms to the following Product Specifications:**

**Safety:** IEC 950: 1991+A1 + A2 + A3 +A4/ EN 60950: 1992 + A1+ A2 + A3 +A4  
EN 60825 - 1 (+A11); 1996  
GB4943-1995

**EMC:** CISPR 22:1993 / EN 55022:1994 Class A  
GB9254-1988  
EN 50081-1:1992 - Generic Emission  
EN 50082-1:1992 - Generic Immunity  
IEC 801-2:1991, 4 kV CD, 8 kV AD  
IEC 801-3:1984, 3 V/m  
IEC 801-4:1988, 0.5 kV Signal Lines, 1 kV Power Lines  
FCC Title 47 CFR, Part 15

**Supplementary Information:**

- 1) The product was tested in a typical configuration with Hewlett-Packard servers.
  - 2) The product complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
    - This device may not cause harmful interference, and
    - This device must accept any interference received, including interference that may cause undesired operation.
- The product herewith complies with the requirements of the following directives and carries the CE marking accordingly:  
-EMC Directive 89/336/EEC including CE Marking Directive 93/68/EEC  
-Low Voltage Directive 73/23/EEC

Cupertino, October, 2000

North American Contact: Hewlett-Packard Company Product Regulations Manager  
3000 Hanover Street  
Palo Alto, CA 94304  
650-857-1501

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH,  
Department ZQ / Standards Europe, Herrenberger Straße 130, D-7030 Böblingen (FAX: + 49-7031  
Quality Management Services & Systems Phone: ++ 61 3 9272 8355

## D Warranty and Support

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The hardware warranty below applies to components purchased as accessories. If your component was factory installed as part of an HP Netserver model, refer to the *HP Netserver Warranty and Service/Support Booklet* for the warranty limitations, customer responsibilities, and other terms and conditions.

### Hardware Accessories Limited Warranty

#### Hewlett-Packard Hardware Accessories

An HP Netserver Hardware Accessory is an internal HP hardware product that is specifically designated for use with HP Netserver; is added on or integrated into an HP Netserver in order to provide higher performance, capacity, or increased capability; and is listed as a product in HP's Corporate Price List. Upon installation inside an HP Netserver, the HP Netserver Hardware Accessory carries a System-Matching Warranty. This warranty includes a one-year

Return-to-HP warranty or the remainder of the warranty period for the original HP Netserver in which it is installed, whichever is longer.

This accessory may be serviced through expedited part shipment. In this event, HP will prepay shipping charges, duty, and taxes; provide telephone assistance on replacement of the component; and pay shipping charges, duty, and taxes for any part that HP asks to be returned.

HP warrants this HP Netserver Hardware Accessory against defects in material and workmanship, under normal use, for the period specified in the section titled HP Netserver Limited Warranty Coverage. The warranty commences on receipt of this product by Customer from HP or Reseller. If HP or Reseller receives notice of such defects during the warranty period, HP or Reseller will either, at its option, repair or replace products that prove to be defective.

Should HP or Reseller be unable to repair or replace the hardware accessory within a reasonable amount of time, Customer's alternate remedy shall be a refund of the purchase price upon return of the hardware accessory product.

HP products external to the system processor unit, such as external storage subsystems, printers, or other peripherals, are covered by the applicable

warranty for those products. HP SureStore drives are considered external accessories and carry their own warranty.

The customer may be required to run HP-supplied configuration and diagnostic programs before a replacement will be dispatched or an on-site visit is authorized.

### **Third-Party Hardware Products**

HP does not warrant third-party hardware products. Third-party hardware products may be warranted in accordance with the third-party warranty statement accompanying the product. On-site visits caused by third-party hardware products—whether internal to the HP Netserver system processor unit (such as non-HP DIMMs) or external to the system processor unit (such as LAN cabling)—are subject to standard per-incident travel and labor charges.

## **HP Repair and Telephone Support**

### **U.S. and Canada**

For hardware repair or telephone support in the U.S. and Canada contact HP Customer Support Center (Colorado) (970) 635-1000 (24-hours a day, 7-days a week).

### **Other Countries**

Refer to the *HP Netserver Warranty and Service/Support Booklet* supplied with your HP Netserver system documentation for instructions on how to obtain HP repair and telephone support.

## **World Wide Web**

On the World Wide Web go to:  
<http://netserver.hp.com/netserver/>

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