



Model C160L Owner's Guide



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Preface



This owner's guide describes how to use your HP 9000 C Class workstation. This manual assumes that you have installed your workstation as described in the *C Class Hardware Installation Card*.





Audience

This guide is intended for HP 9000 Model C160L workstation users.

Safety and Regulatory Statements

See Appendix A in the back of this manual for safety and regulatory statements that apply to this workstation.

Release Document(s)

Please refer to the *Release Document(s)* you received with your system or system software for additional information that we may not have been able to include in this guide at the time of its publication.





Related Manuals

Refer to the following manuals for more information:

- *C Class Hardware Installation Card* (A4200-90012)
- *Using Your HP Workstation* (A2615-90003)
- *Installing and Updating HP-UX* (B2355-90050)
- *Configuring HP-UX for Peripherals* (B2355-90053)
- *HP Visual User Environment User's Guide* (B1171-90079)
- *Managing Clusters of HP 9000 Computers: Sharing the HP-UX File System* (B2355-90038)

To order manuals, please contact your local sales office.

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The revision history for each edition of the manual is listed below:

| HP Part No. | Edition | Revision History |
|-------------|---------|------------------|
| A4200-90021 | E0795 | First printing |





Documentation Conventions

Unless otherwise noted in the text, this guide uses the following symbolic conventions.

user-supplied values

Italic words or characters in formats and command descriptions represent values that you must supply.

sample user input

In examples, information that the user enters appears in color.

output

Information that the system displays appears in this typeface.

literal values

Bold words or characters in formats and command descriptions represent commands or keywords that you must use literally. Pathnames are also in bold.

KEY

Text with a line above and a line below denotes a key on your keyboard, or a key or button which is drawn on your workstation's graphic display.

(In this manual we refer to the **Enter** key. On your keyboard the key may be labeled either **Enter** or **Return**.)





Problems, Questions, and Suggestions

If you have any problems, questions, or suggestions with our hardware, software, or documentation, please call 1-888-301-5932 (US & Canada) or contact the HP Response Center for your country.





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1



Product Information





Product Information

This chapter introduces the HP 9000 Model C160L workstation, including its controls and indicators. This chapter discusses the following topics:

- Product description
- System unit front panel controls
- System unit rear panel connectors
- Monitors
- Keyboards
- Operating system overview





Product Description

The Model C160L workstation contains the following key features:

- Processor Performance
160 MHz
- Operating System: Native HP-UX
HP-UX 10.20
- User Interfaces
HP VUE graphical user interface
or
HP CDE graphical user interface
- Compatibility
Source and binary code compatible with the Series 700 product family
- Optional Graphics
Fast 2D color graphics; choice of 1 to 4 displays total
HP VISUALIZE-8/24 - Accelerated 8-plane or 24-plane 3D graphics
HP VISUALIZE-48 - Accelerated 24/24 plane PowerShade graphics
- Memory
32 MB to 512 MB main memory in pairs of 16 MB, 32MB, or 64 MB
modules
Four pairs maximum





Product Information

Product Description

- Internal Storage Devices
 - Fast, Wide SCSI Hard Disk Drives
 - 1-inch Low Profile Drive (up to three)
 - 1.6-inch Full Height Drive (one)
 - Single-Ended SCSI Removable Media
 - CD-ROM Drive
 - or
 - 2.0/4.0 GB, 4-mm DDS Tape Drive
 - 3.5-inch Floppy Disk Drive (not a SCSI Device)
- Standard Network
 - Ethernet IEEE 802.3 AUI
 - RJ45, UTP Twisted Pair
- Standard I/O
 - One Single-Ended, 8-bit , 5 MB/sec synchronous, 1.5 MB/sec asynchronous ALT-1, 50-pin, high-density SCSI connector
 - One Fast, Wide (for hard disk drives) 20 MB/sec synchronous 68-pin, high-density SCSI connector
 - Two Serial Interfaces RS232C, 9-pin male
 - One Parallel Interface, Centronics, BUSY handshake, 25-pin female
 - 16 Bit Audio Line-in and Line-out connectors
 - Two PS/2 ports (keyboard and mouse)
 - One HP-HIL connector
- PCI/EISA/GSC
 - 4 slots total: 2 GSC/EISA, 1 EISA/PCI, and 1 PCI
- Keyboards
 - PS/2 Keyboard (mouse)
 - or
 - ITF Keyboard (also known as HP HIL) (HP HIL mouse)



System Unit Front Panel Controls

Figure 1 shows the location of the system unit front panel controls.

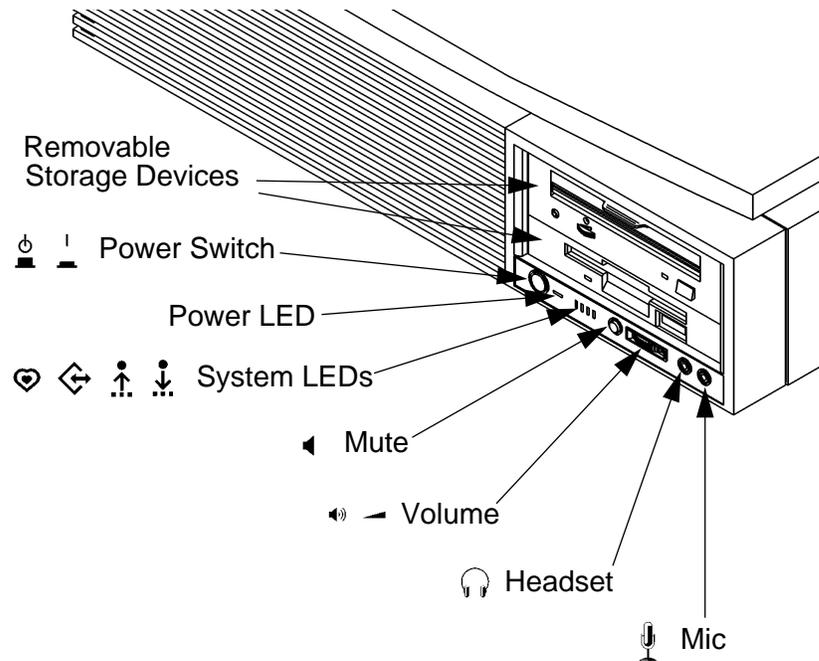


Figure 1 System Unit Front Panel Controls

System Power Switch

Use the power switch to power the system unit on and off.

NOTICE:

There is no need to manually shut down the HP-UX operating system on your workstation before powering it off. When you turn off the power switch, your workstation automatically shuts down the operating system before terminating the power.



Product Information
System Unit Front Panel Controls

Power LED

The power LED is located on the left side of the front panel on the disk tray. It lights when the system unit power is on and flashes until the OS is booted. Once the OS is booted, the LED remains on without flashing, indicating that a soft shutdown is enabled.

System LEDs

The Model C160L workstation has four diagnostic LEDs located next to the system power LED.

 LED 4 - System Heartbeat

 LED 3 - SCSI Bus Activity

 LED 2 - Network Transmit

 LED 1 - Network Receive





Audio Controls

Next to the system LEDs are the following audio controls:

| | |
|----------------|--|
| Headset Jack | Accommodates mini-headphones with a 3.5 mm diameter miniature stereo plug. |
| Volume Control | Adjusts the audio output volume to the headset or lineout. |
| Mic Jack | Accommodates microphones with a 3.5 mm diameter miniature stereo plug. |
| Mute Button | Turns off the audio output to line out and speaker only. |

The volume control, headset jack, and microphone jack features of the CD-ROM are supported through applications only.

For more information on the features and electrical specifications, see the section titled “Security Loop,” later in this chapter.





Product Information
System Unit Front Panel Controls

Storage Device Controls and Features

The Model C160L workstation allows up to two of the following internal storage devices: CD-ROM drive, DDS tape drive, or floppy drive. The following sections describe the controls and features of these devices.

NOTICES:

You may not have two of the same type of device. For example, you can have a CD-ROM device and a floppy device, but not two CD-ROMs.

Due to space limitations, a DDS-format tape drive and a CD-ROM drive cannot both be mounted in the system at the same time.

CD-ROM Drive

Figure 2 shows the operating controls and features of the CD-ROM drive, and Table 1 describes them.

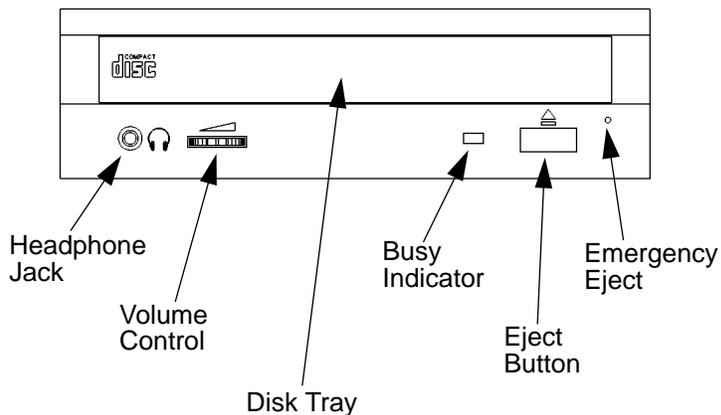


Figure 2 CD-ROM Drive Controls and Features



**Table 1** **CD-ROM Drive Controls and Features**

| Control/Feature | Purpose |
|------------------------|---|
| Busy Indicator | Lights during a data access operation and blinks during a data transfer. The indicator blinks initially and then stays lit when there is one of the following: <ul style="list-style-type: none">• A defective disc• A disc insertion error (for example, an upside-down disc)• No disc present |
| Eject Button | Press to open the disc tray and insert or remove a disc. When the drive is in use, press the eject button for more than one second to open the disc tray. |
| Emergency Eject | Remove the Phillips-type screw and insert the end of a paper clip to open the disc tray when the workstation does not have power. |
| Disc Tray | Holds the CD-ROM disc. This type of CD-ROM drive does not use a disc caddy. The disc tray does not open if the workstation power is off. |
| Headphone Jack | Used to connect headphones with a 1/8-inch connector. |
| Volume Control | Volume control for the headphone jack. |





Product Information
System Unit Front Panel Controls

DDS Tape Drive

Your DDS tape drive is either a DDS-DC (early or later model) or a DDS-2 tape drive with a 3.5-inch form factor, data compression, and a single-ended SCSI interface. Both drives incorporate data compression capability and are high-capacity, high transfer-rate devices for data storage on tape. With compression, the DDS-DC drives can store up to 4 GB of data on a 90 meter tape and the DDS-2 drive can store up to 8 GB of data on a 120 meter tape.

Figure 3, Figure 4, and Figure 5 show the LEDs, and eject button of the DDS-format tape drives.

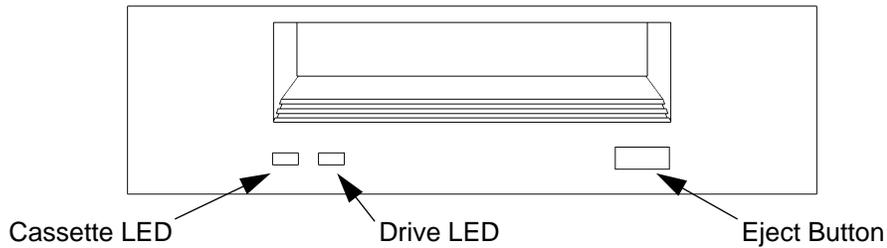


Figure 3 DDS-DC (Early Model) Drive Controls and Indicators

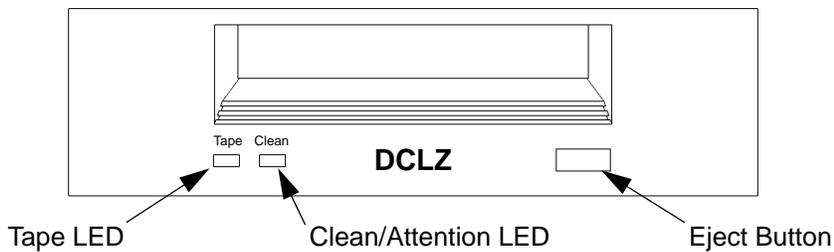


Figure 4 DDS-DC (Later Model) Drive Controls and Indicators



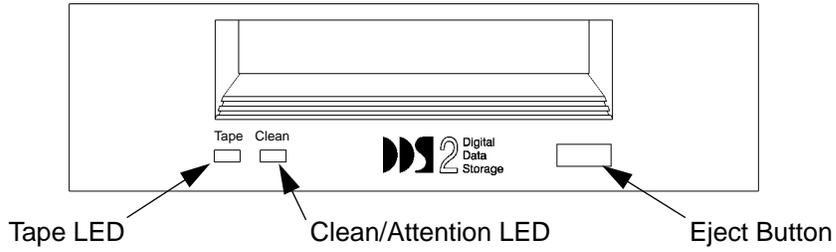


Figure 5 DDS-2 Drive Controls and Indicators

Table 2 DDS Tape Drive Controls and Features

| Control/Feature | Purpose |
|-----------------|---|
| Eject Button | Push the eject button to remove tape cassettes from the drive. |
| Drive LEDs | The DDS drive LEDs light and flash to indicate drive status and error conditions. |



Product Information
System Unit Front Panel Controls

Floppy Disk Drive

Figure 6 shows the operating controls and features of the floppy drive, and Table 3 describes them.

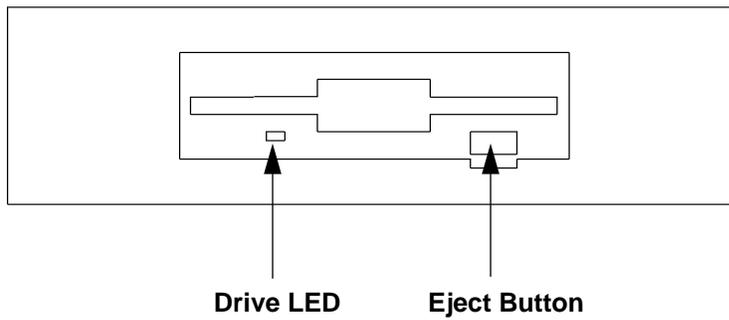


Figure 6 Floppy Drive Controls and Features

Table 3 Floppy Drive Controls and Features

| Control Feature | Purpose |
|-----------------|--|
| Eject Button | Push the eject button to remove floppy diskettes from the drive. |
| Drive LED | The floppy drive LED flashes to indicate the drive is in use. |





System Unit Rear Panel Connectors

This section describes the following connectors on the system unit's rear panel:

- Security loop
- Audio connectors
- Keyboard and mouse connectors
- HP parallel (Centronics) I/O connector
- 802.3 network connectors
- Serial I/O connectors
- SCSI connectors (including Fast, Wide SCSI and single-ended SCSI)
- TOC (Transfer of Control) button
- Power cord connector

NOTICE:

To maintain emissions compliance, verify that all cables are fully seated and properly fastened.

Figure 7 shows the locations of the connectors on the system unit's rear panel.



Product Information
System Unit Rear Panel Connectors

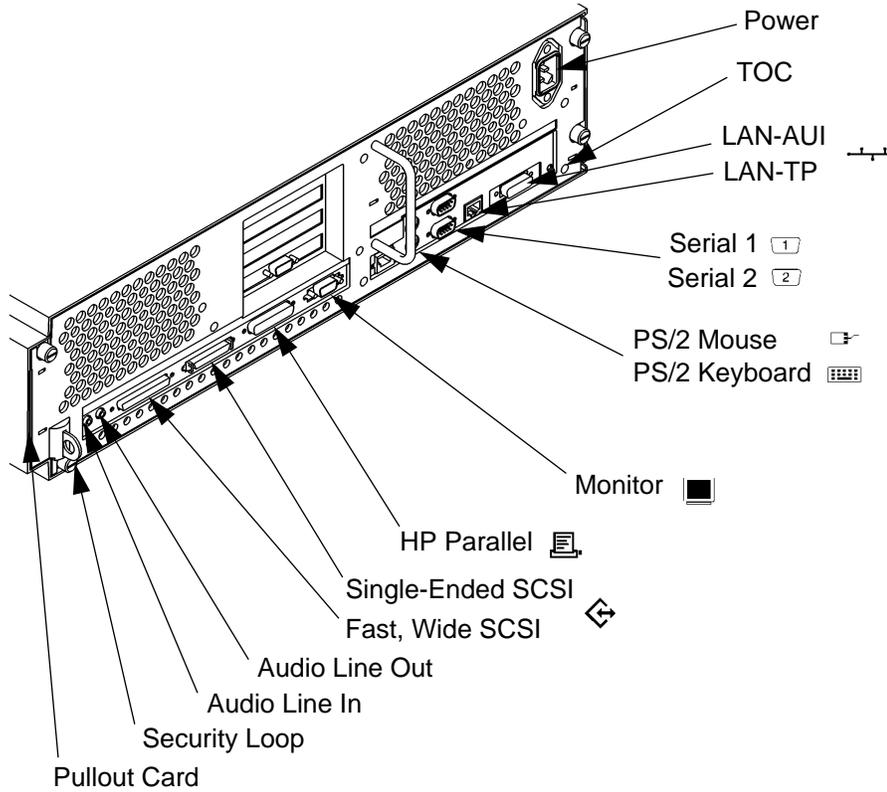


Figure 7 System Unit Rear Panel Connectors

Pullout Card

The pullout card contains serial and model number information along with regulatory agency information.

Security Loop

The security loop provides a means of locking the storage tray with a padlock or other locking device, to prevent unauthorized removal from the system.



Audio Connectors

The Model C160L workstation has audio input and output capability through external input and output connectors on the rear panel and through an internal speaker. The rear panel contains the Line IN (Stereo line-in) and Line OUT (Stereo line-out) connectors.

NOTICE:

To maintain compliance with FCC/CISPR B you must use fully shielded, unbalanced audio cables and plugs.

The audio connectors are standard stereo audio mini-jacks. Hewlett-Packard recommends using gold-plated plugs available through audio retailers. The following summarizes the capabilities of the Model C160L workstation:

- Audio Features

Programmable sample rates:

8kHz, 16kHz, 32kHz, 48kHz,
11.025kHz, 22.05kHz, and 44.1kHz.

Programmable output attenuation:

0 to -96dB in -1.5dB steps

Programmable input gain:

0 to 22.5dB in 1.5dB steps.

Input monitoring:

16-bit linear, 8-bit u-law, or A-law coding

- Audio Inputs

Line-in

Mono microphone compatible with 1.5V phantom supply (bias voltage supplied by the system)

CD-ROM audio (if internal CD-ROM is installed)

- Audio Outputs

Line-out

Headset





Product Information
 System Unit Rear Panel Connectors

Built-in mono speaker

- Audio CODEC

Crystal CS4215

Table 4 summarizes the audio electrical specifications for the Model C160L workstation.

Table 4 Audio Electrical Specifications

| | |
|--|----------------|
| Frequency Response | 25-20,000Hz |
| Input Sensitivity/Impedance | |
| Line Out | 2.0Vpk/47k ohm |
| Microphone | 22mVpk/1k ohm |
| Max Output Level/Impedance | |
| Line Out | 2.8Vpp/47k ohm |
| Headphone | 2.75Vpp/50 ohm |
| Speaker | 5.88Vpp/48 ohm |
| Output Impedance | |
| Line Out | 619 ohm |
| Headphone | 118 ohm |
| Signal to Noise | |
| Line Out | 65 dB |
| Headphone | 61 dB |
| Speaker | 63 dB |
| Line In | 61 dB |
| Microphone | 57 dB |
| THD (w nominal load) | |
| Line Out | -73 dB |
| Headphone | -70 dB |
| Speaker | -68 dB |
| Line In | -75 dB |
| Microphone | -73 dB |
| To convert from dB to number of significant bits, use the formula: $n = dB/20 \log_{10} = dB/6$. For example, for 61dB S/N then $n = 61/6$ 10 significant bits, or in other words, about 6 bits of noise. | |





PS/2 Keyboard and Mouse Connectors

The PS/2 connectors provide an interface to the system for the keyboard, mouse, and a variety of other pointing devices, such as trackballs. Consult the documentation that accompanies each input device for specific information concerning its use.

HP Parallel I/O Connector

The 25-pin HP Parallel I/O interface uses Centronics interface protocols to support peripheral devices such as printers and plotters. Consult the documentation that accompanies each peripheral device for specific information concerning its use.

802.3 Network Connectors

The Model C160L workstation has built-in ThickNet LAN-AUI and LAN-TP (Twisted Pair) connectors for the 802.3 (ETHERNET) network. Connections to ThinLAN networks require an external transceiver. The workstation automatically selects the correct network setting.





Product Information
System Unit Rear Panel Connectors

Serial Input/Output Connectors

There are a variety of pointing devices (mouse or trackball) or peripheral devices that can attach to the Serial Input/Output (SIO) ports on the workstation. Peripheral devices include printers, plotters, modems, and scanners. Consult the documentation that accompanies each peripheral device for specific information concerning its use.

The SIO ports are programmable, allowing functions such as bit rate, character length, parity, and stop bits to be set. The SIO Ports are used as interfaces for serial asynchronous devices to the CPU. The ports operate at up to a 460.8 K baud rate.

Table 5 shows the SIO connector pin listings. The serial connectors are 9-pin D-sub connectors. Signal names are those specified in the EIA RS-232 standard.

Table 5 Serial I/O Pins

| Pin No. | Signal | Description |
|---------|--------|---------------------|
| 1 | DCD | Data Carrier Detect |
| 2 | RXD | Receive Data |
| 3 | TXD | Transmit Data |
| 4 | DTR | Data Terminal Ready |
| 5 | GND | Ground |
| 6 | DSR | Data Set Ready |
| 7 | RTS | Request To Send |
| 8 | CTS | Clear To Send |
| 9 | RI | Ring Indicator |





SCSI Connectors

Use the SCSI connectors to connect external SCSI devices such as DDS-format tape drives and CD-ROM drives. Consult the documentation that accompanies each SCSI device for specific information concerning its use. Refer to Appendix C of this manual for information about connecting SCSI devices to your workstation.

NOTICE:

There must ALWAYS be a terminator at both ends of a SCSI bus. This means one internal terminator and one external terminator. Both the FW SCSI and SE SCSI connectors must have a terminator connected when no external device is connected.

TOC Button

The TOC button resets the system and transfers control from the default device to an auxiliary device.

Power Cord Connector

Plug the workstation's power cord into the power cord connector to provide ac power to the system.





Product Information

Monitors

Monitors

The Model C160L workstation has a graphics controller built-in on the I/O board. The following HP monitors are supported:

- 17-inch, 1280x1024 color monitor (A4330)
- 20-inch, 1280x1024 color monitor (A4331)

Before using your monitor you should become familiar with its controls, connectors, and indicators. For this information, consult the documentation that was packaged with your monitor.

The built-in monitor connector is a new Enhanced Video Connector (EVC). An EVC to DB adapter cable (HP Part No. 8120-6861) is required to use a monitor with a DB-15. type cable





Keyboard

The C160L system uses a PS/2 keyboard which connects to the PS/2 interface connector on the rear of your workstation.

Pointing Devices

The PS/2 connector or the Serial ports support using an HP three-button mouse, a trackball, or other options as pointing devices. For instructions on using a particular device, see the manual that accompanies the device.

For general information on using three-button mice and on the various cursor shapes associated with different areas of HP VUE while using a mouse, see *Using Your HP Workstation*.





Product Information
Operating System Overview

Operating System Overview

The Model C160L workstation uses version 10.20 or later of the HP-UX operating system.

Instant Ignition systems (systems with preloaded software) have X-windows and the Hewlett-Packard HP VUE 3.0 graphical user interface installed and configured.

Refer to *Using Your HP Workstation* for more information on Instant Ignition.





2



Using Your CD-ROM Drive





Using Your CD-ROM Drive

This chapter describes how to use your CD-ROM drive. It is divided into the following sections:

- CD-ROM drive and CD-ROM media descriptions
- Operating the CD-ROM Drive
- Mounting and unmounting a CD-ROM disc
- Troubleshooting

NOTICE

Be sure you read and understand the information on mounting and unmounting CD-ROM discs before you begin using your CD-ROM disc drive.

This chapter provides an overview of the optional CD-ROM drive and media, and describes how to use the CD-ROM drive. We assume the CD-ROM drive is set to the factory default address of SCSI ID 2.

NOTICE

Some procedures in this chapter require you to log in as **root**. If you cannot log in as **root**, contact your system administrator.





CD-ROM Drive and CD-ROM Media Descriptions

This section describes basic information needed for using the CD-ROM drive and CD-ROM discs.

CD-ROM Drive

The CD-ROM drive is a random access read-only mass storage device that uses removable CD-ROM discs. The drive supports the ISO 9660 and High Sierra format standards. You can access information from the drive like any other disk drive, except that you cannot write to the drive. The drive contains a semiconductor laser for reading data optically, and includes an embedded controller with a SCSI interface.





Using Your CD-ROM Drive
CD-ROM Drive and CD-ROM Media Descriptions

Controls and Features

Figure 8 shows and Table 6 describes the operating controls and features of the CD-ROM drives.

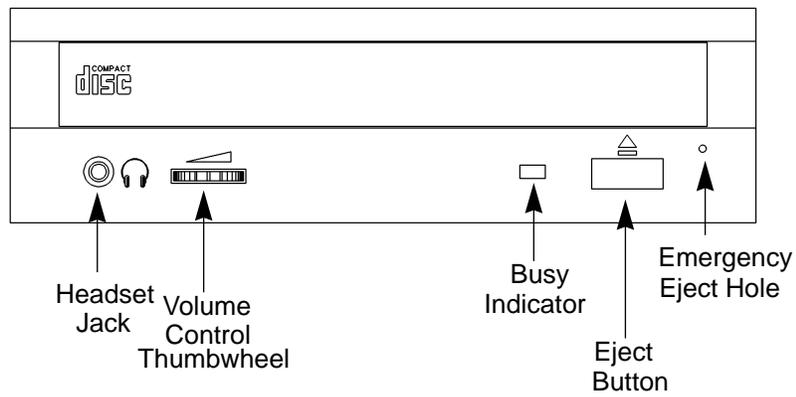


Figure 8 CD-ROM Drive Controls and Features



**Table 6** CD-ROM Drive Operating Controls and Features

| Control/Feature | Purpose |
|-----------------|--|
| Headset Jack | You can plug mini-headphones with a 3.5-mm diameter miniature stereo plug into this jack. |
| Volume Control | Use the volume control to adjust the audio output volume to the headset jack. |
| Busy Indicator | The Busy Indicator lights during a data access operation and blinks during a data transfer. The indicator blinks initially and then stays lit when there is one of the following: <ul style="list-style-type: none">• A defective disc• A disc insertion error (for example, an upside-down disc)• No disc present |
| Eject Button | Press the Eject Button to open the Disc Tray and insert or remove a disc. When the drive is in use, you must press the eject button for more than one second to open the Disc Tray. |
| Emergency Eject | By removing the Phillips type screw and inserting the end of a paper clip, you can open the Disc Tray when the workstation does not have power. |

NOTICE

The Volume Control, Headset Jack, and Audio Jack features of the CD-ROM drive are supported through applications only.





Using Your CD-ROM Drive
CD-ROM Drive and CD-ROM Media Descriptions

CD-ROM Media

CD-ROM discs are 120 mm (4.7 in.) in diameter, and use one data surface with a capacity of approximately 600 megabytes. The data surface contains pits and flat spots arranged in a continuous spiral track, which is read at a constant speed. You may access files and data stored on a CD-ROM disc, but you may not write files or data to a CD-ROM disc.

CD-ROM data discs are identical to audio compact discs (CDs) except that they store computer data and information.

CAUTION:

Handle CD-ROM discs by the edges only. Always be sure a CD-ROM disc is either in the CD-ROM drive or its protective case when not in use. This will lessen the chance of exposing the disc surface to dust. Over time, dust reduces the reliability of the read head in the CD-ROM drive.

Caring for CD-ROM Discs

Observe the following guidelines to help prevent data loss and prolong the life of your CD-ROM discs and drive:

- Use CD-ROM discs in a clean environment to prevent dust particles from scratching disc surfaces.
- Store CD-ROM discs in a cool, dry place to prevent moisture and heat damage.
- Don't try to clean the surface of a CD-ROM disc with cleaning solvents, as some cleaning solvents may damage the disc.

NOTICE:

You must mount the disc after loading it into the drive. Refer to the section "Mounting and Unmounting a CD-ROM Disc," later in this chapter, for instructions about mounting a disc.





Operating the CD-ROM Drive

This section describes how to perform tasks with your CD-ROM drive.

Loading and Unloading a CD-ROM in the Disc Tray

This subsection describes how to load or unload a CD-ROM disc in the CD-ROM drive.

Disc Tray Description

This CD-ROM is designed to be used in either the horizontal or vertical position, depending on whether your system unit is horizontal or vertical (in the floor stand). The disc tray has four spring-loaded disc holders that hold the disc in place when the CD-ROM drive is in the vertical position. When the drive is in the horizontal position, the disc holders are not used and are held out of the way by four disc holder retainers. Figure 9 shows the CD-ROM disc tray, and disc holders.

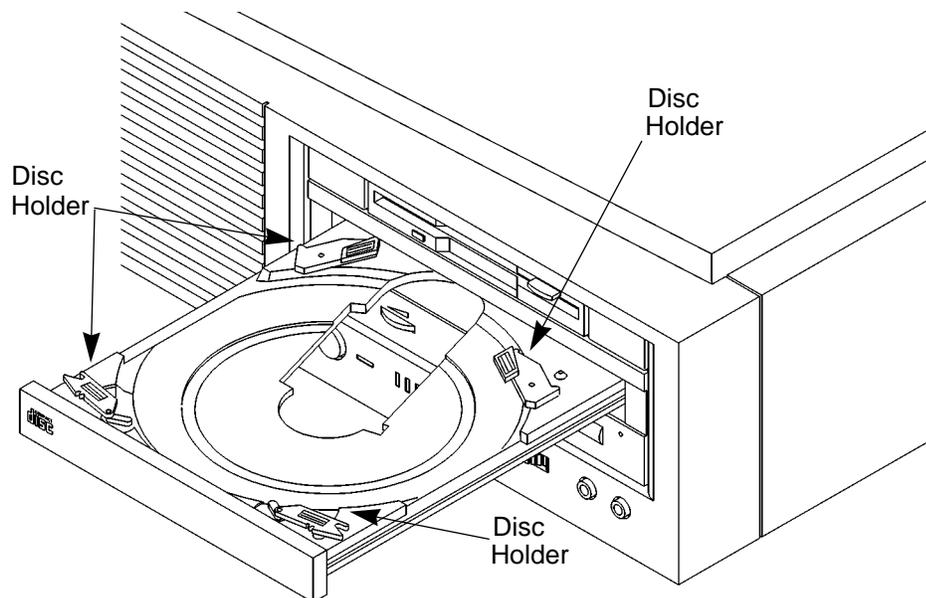


Figure 9

CD-ROM Disc Tray





Using Your CD-ROM Drive
Operating the CD-ROM Drive

Loading a CD-ROM Disc in a Horizontally Mounted Drive

This CD-ROM drive has an automatic loading/ejecting feature. To load a disc in the CD-ROM drive, follow these steps:

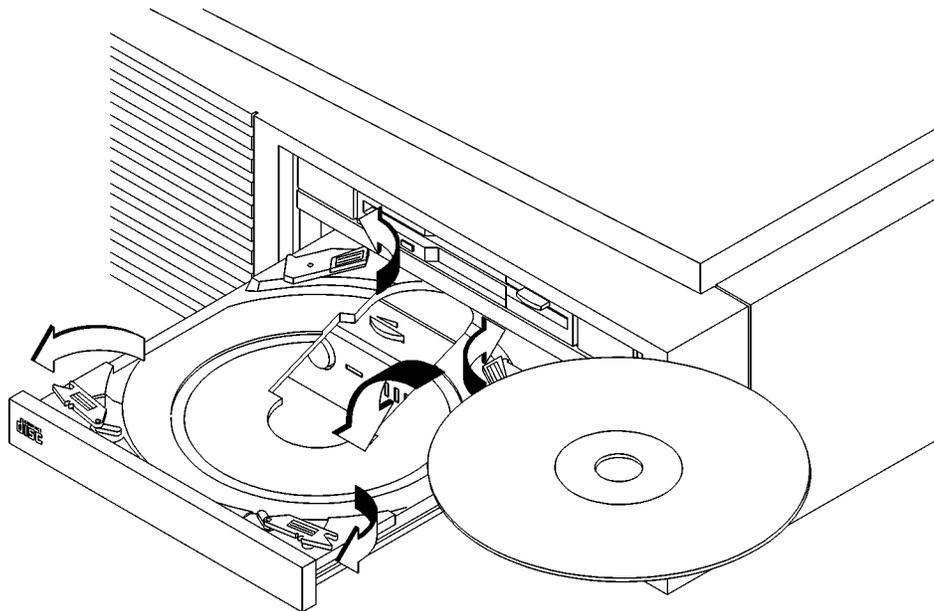


Figure 10

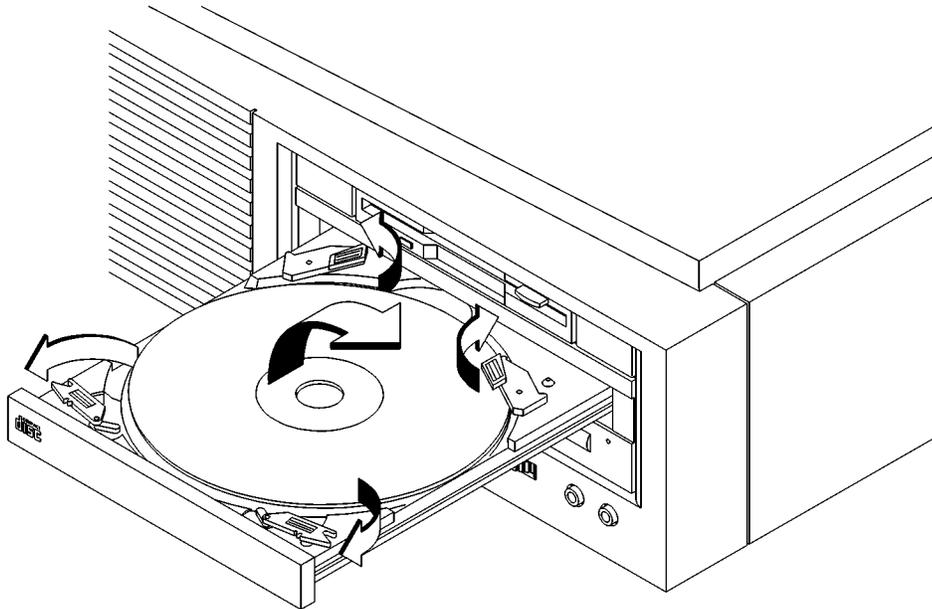
Placing a CD-ROM Disc in a Horizontally Mounted Drive

- 1 Check that the workstation is powered on.
- 2 To open the disc tray, press and release the load/eject button on the CD-ROM drive.
- 3 Be sure the disc holders are held away from the disc by the disc holder retainers.
- 4 Hold the disc by the edges with the label side up and place it in the disc tray as shown in Figure 10.
- 5 To close the disc tray, push the front of the disc tray gently towards the drive until it closes by itself.



Unloading a CD-ROM Disc in a Horizontally Mounted Drive

Perform the following steps to unload a disc from the CD-ROM drive:

**Figure 11****Removing a CD-ROM Disc From a Horizontally Mounted Drive**

- 1 Press the eject button to eject the disc tray from the drive. If the drive is in use, you must press the eject button for more than one second to eject the disc tray.

NOTICE:

You must unmount the disc before eject it from the drive. Refer to the subsection, "Unmounting a CD-ROM Disc Using SAM," for instructions on unmounting a disc.

- 2 Wait until the drive has fully ejected the disc tray. Be sure the disc holders are held away from the disc by the disc holder retainers. Then remove the disc from the tray as shown in Figure 11. Be careful to touch only the edges of the disc.
- 3 To close the Disc Tray, push the front of the disc tray gently towards the drive until it closes by itself.



Using Your CD-ROM Drive
Operating the CD-ROM Drive

Loading a CD-ROM Disc in a Vertically Mounted Drive

To load a disc in the CD-ROM drive, follow these steps:

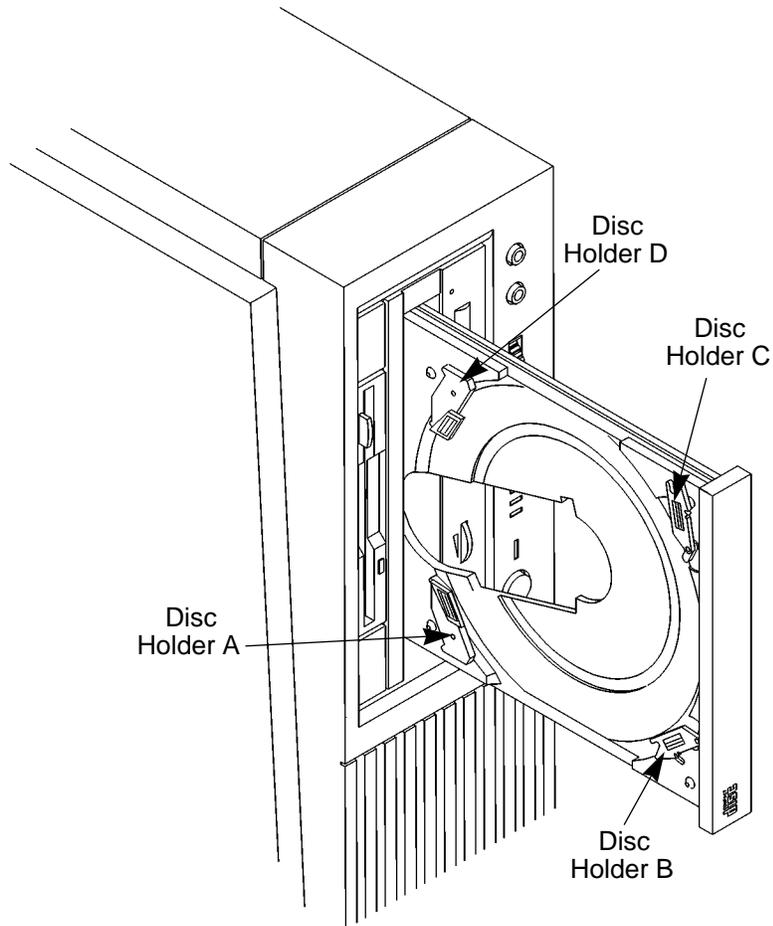


Figure 12

Releasing the Disc Holder Retainers

- 1 Make sure the three disc holders are disengaged from the disc holder retainers, as shown in Figure 12.



Using Your CD-ROM Drive
Operating the CD-ROM Drive

- 2 Hold the disc with the label side away from the tray and place the edge of the disc onto disc holders A and B as shown in Figure 13.

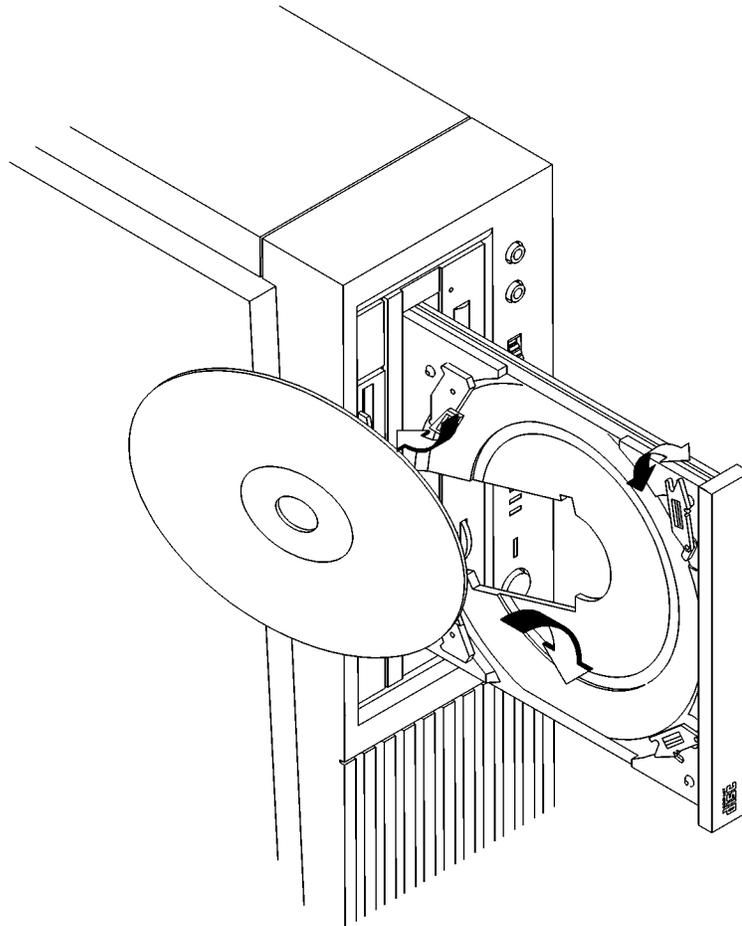


Figure 13

Placing a CD-ROM Disc in a Vertically Mounted Drive

- 3 Press down gently against the spring tension of disc holders A and B, and swing the top of the disc in until it is held by disc holders C and D.
- 4 To close the disc tray, push the front of the disc tray gently towards the drive until it closes by itself.



Using Your CD-ROM Drive
Operating the CD-ROM Drive

Unloading a CD-ROM Disc in a Vertically Mounted Drive

Perform the following steps to unload a disc from the CD-ROM drive:

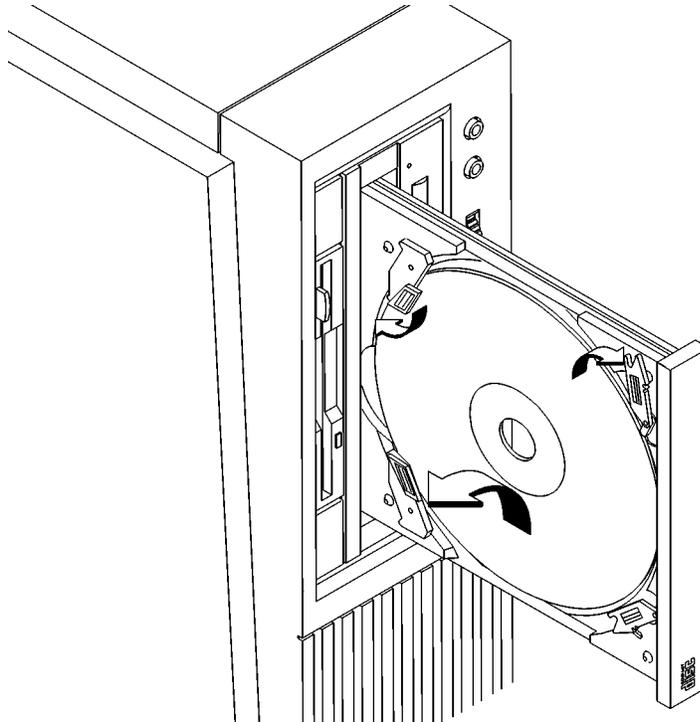


Figure 14

Removing a CD-ROM Disc From a Vertically Mounted Drive

- 1 Press the eject button to eject the disc tray from the drive. If the drive is in use, you must press the eject button for more than one second to eject the disc tray.

NOTICE:

You must unmount the disc before eject it from the drive. Refer to the subsection, "Unmounting a CD-ROM Disc Using SAM," for instruction on unmounting a disc.

- 2 Press down gently against the spring tension of disc holders A and B and swing the top of the disc away from disc holders C and D as shown in Figure 14.
- 3 Remove the disc from disc holders A and B.
- 4 To close the Disc Tray, push the front of the disc tray gently towards the drive until it closes by itself.





Verifying the CD-ROM Drive Operation

To verify that your workstation can communicate with the CD-ROM drive, follow these steps:

- 1 In a terminal window, enter the following command:

```
/usr/sbin/iocan -d sdisk RETURN
```

After a few moments the **iocan** utility lists all of the SCSI I/O devices it could find. The list appears similar to the following:

| H/W Path | Class | Description |
|------------|---------|---------------------------------------|
| ===== | | |
| | bc | |
| 8 | bc | I/O Adapter |
| 8/12 | ext_bus | GSC built-in Fast/Wide SCSI Interface |
| 8/12.0 | target | |
| 8/12.0.0 | disk | QUANTUM LPS1080WD |
| 8/12.5 | target | |
| 8/12.5.0 | disk | DEC DSP3210SW |
| 8/12.6 | target | |
| 8/12.6.0 | disk | DEC DSP3210SW |
| 8/16 | ba | Core I/O Adapter |
| 8/16/5 | ext_bus | Built-in SCSI |
| 8/16/5.2 | target | |
| 8/16/5.2.0 | disk | TOSHIBA CD-ROM XM-4101TA |
| 8/16/5.4 | target | |
| 8/16/5.4.0 | disk | SEAGATE ST3600N |
| 8/16/5.6 | target | |
| 8/16/5.6.0 | disk | MICROP 2112 |
| 10 | bc | I/O Adapter |
| 10/12 | ext_bus | GSC add-on Fast/Wide SCSI Interface |
| 10/12.4 | target | |
| 10/12.4.0 | disk | SEAGATE ST31200W |

If **iocan** does not see your CD-ROM drive it returns the following message:

```
iocan: No hardware found
```

If you receive this message, go to Chapter 6, “Solving Problems.”





Using Your CD-ROM Drive
Mounting and Unmounting a CD-ROM Disc

Mounting and Unmounting a CD-ROM Disc

To access information on a CD-ROM disc, you must first mount the disc. This applies to file system information only. If you wish to load a music CD, for example, you would not need to mount the disc. Mounting a disc with file system information on it gives the disc a pathname that allows your workstation to communicate electronically with it. You must unmount the CD-ROM disc before removing it from the drive.

CAUTION:

To use a CD-ROM disc as a mounted file system, you must mount the CD-ROM disc **every** time you load it into the drive. You must also unmount the CD-ROM disc **every** time you unload it from the drive. Failure to mount or unmount a disc can cause a system error condition that can require rebooting the system.

If your workstation is running HP VUE, follow these instructions to mount and unmount a CD-ROM disc as a file system. If you're using something other than HP VUE, use the instructions for mounting and unmounting a CD-ROM disc that come with that product. For more information on configuring your CD-ROM drive, see the *System Administration Tasks* manual or online help.

The procedures in this chapter require you to log in as **root**. If you cannot log in as **root**, contact your system administrator.

Mounting a CD-ROM Disc Using SAM

Use the following procedure to mount a CD-ROM disc:

- 1 Log in as **root**. If you need information on logging in or setting up a user account, see *Using Your HP Workstation*.
- 2 Load the CD-ROM disc into the disc tray and gently push the tray into the drive.
- 3 In a terminal window, enter the following command:

```
sam RETURN
```





Using Your CD-ROM Drive
Mounting and Unmounting a CD-ROM Disc

- 4 The **System Administration Manager** window opens. Double-click on **Peripheral Devices** ->.
- 5 The **Peripheral Devices** window opens. Double-click on **Disks and File Systems** ->.
- 6 The **Disks and File Systems** window opens. Double-click on **CD-ROM, Floppy, and Hard Disks**.

The following screen message appears:

```
Scanning the system's hardware...
```

The **CD-ROM, Floppy, and Hard Disks** window opens containing a list of drives currently configured on this system. Disks that are unmounted will have the word "unused" in the Use column.

- 7 From the **Actions** menu, click on **Add a Hard Disk Drive**
- 8 The **Select a Disk to Add...** window opens with a list of unused disks. Highlight the CD-ROM disc you want to mount.
- 9 Click on **OK**.
- 10 The **Set Disk Usage and Options...** window opens. Select **File System** and click on **OK**.
- 11 The following screen messages appear:

```
Task started.  
Creating the device file...  
Mounting file system...  
Modifying "/etc/checklist"...  
Task completed.
```

Click on **OK**.

Now you can access the CD-ROM disc as you would any other mounted file system.





Using Your CD-ROM Drive
Mounting and Unmounting a CD-ROM Disc

Unmounting a CD-ROM Disc Using SAM

Use the following procedure to unmount a CD-ROM disc:

NOTICE:

Before you unmount a CD-ROM disc, make sure that your working directory (the directory in which a relative path name search begins) is set to some directory other than the one under which the disc was mounted.

CAUTION:

If you wish to use a CD-ROM disc as a mounted file system, you must mount the CD-ROM disc **every** time you load it into the drive. You must also unmount the CD-ROM disc **every** time you unload it from the drive. Failure to mount or unmount a disc may cause a system error condition that may require rebooting the system.

- 1 Log in as **root**. If you need information on logging in or setting up a user account, see *Using Your HP Workstation*.
- 2 In a terminal window, enter the following command:

sam **RETURN**

- 3 The **System Administration Manager** window opens. Double-click on **Peripheral Devices ->**.
- 4 The **Peripheral Devices window** opens. Double-click on **Disks and File Systems ->**.
- 5 The **Disks and File Systems** window opens. Double-click on **CD-ROM, Floppy, and Hard Disks**.

The following screen message appears:

Scanning the system's hardware...

The **CD-ROM, Floppy, and Hard Disks** window opens containing a list of drives currently configured on this system.

- 6 Highlight the disc you want to unmount and click on **Remove a Hard Disk Drive** from the Actions menu.





Using Your CD-ROM Drive
Mounting and Unmounting a CD-ROM Disc

7 A window with the following message opens:

Do you want to remove the disk?

Click on Yes.

8 Press the eject button on the CD-ROM drive and remove the CD-ROM disc from the disc tray.

Reading the Busy Light

The CD-ROM busy light shows the status of the drive during the self test and during activity with the host system.

The CD-ROM drive performs the self test when one of the following happens:

- You load a disc and close the Disc Tray.
- You turn on the workstation with a disc already loaded in the CD-ROM drive.

For the self test, the busy light operates in the following sequence:

- 1 Light On - The busy light goes on when the disc loads into the drive.
- 2 Light Flashing - The light flashes six times while a read test is performed on the disc.
- 3 Light Off - The light goes off when the self test is complete.





Using Your CD-ROM Drive

Mounting and Unmounting a CD-ROM Disc

The busy light stays on after the self test when one of the following conditions exist:

- A defective disc
- A disc insertion error (for example, an upside-down disc)
- No disc present

The busy light goes off when one of the following conditions exist:

- A CD-ROM drive power failure exists.
- The drive is idle on the SCSI bus.

The busy light flashes during normal activity with the system.





Troubleshooting

If you have trouble with any of these procedures for using your CD-ROM drive, see Chapter 5 of this book, “Solving Problems.”





Using Your CD-ROM Drive
Troubleshooting





3



Using Your Digital Data Storage (DDS) Tape Drive





Using Your Digital Data Storage (DDS) Tape Drive

This chapter describes how to use the optional Digital Data Storage (DDS) tape drive. It also describes how to maintain and care for the drive.

This chapter provides information on the following:

- DDS tape drive and data cassette descriptions
- Operating the DDS tape drive
- Ordering information

CAUTION:

Use only data cassettes labeled DDS (Digital Data Storage). Never use audio cassettes labeled DAT (Digital Audio Tape) in your DDS-format drive.



DDS Tape Drive and Data Cassette Descriptions

This section describes basic information needed for using your DDS tape drive and data cassettes.

DDS Drive

Your DDS tape drive is either a DDS-DC (early or later model) or a DDS-2 tape drive with a 3.5-inch form factor, data compression, and a single-ended SCSI interface. Both drives incorporate data compression capability and are high-capacity, high transfer-rate devices for data storage on tape. With compression, the DDS-DC drives can store up to 4 GB of data on a 90 meter tape and the DDS-2 drive can store up to 8 GB of data on a 120 meter tape.

Storage Capacities

The maximum storage capacities of different DDS drives with and without data compression are shown in the following tables;

Table 7

DDS Tape Drive Capacities Without Data Compression

| Tape Length | Full Height 5 1/4 DDS Tape Drive | DDS-DC Tape Drives | DDS-2 Tape Drive |
|-------------|-------------------------------------|-----------------------|---------------------|
| 60 meter | 1.3 GB | 1.3 GB | 1.3 GB |
| 90 meter | Not Supported | 2.0 GB | 2.0 GB |
| 120 meter | Not Supported | Not Supported | 4.0 GB |

Table 8

DDS Tape Drive Capacities With Data Compression

| Tape Length | Full Height 5 1/4 DDS Tape Drive | DDS-DC Tape Drives | DDS-2 Tape Drive |
|-------------|-------------------------------------|-----------------------|---------------------|
| 60 meter | 2.6 GB | 2.6 GB | 2.6 GB |
| 90 meter | Not Supported | 4.0 GB | 4.0 GB |
| 120 meter | Not Supported | Not Supported | 8.0 GB |



Using Your Digital Data Storage (DDS) Tape Drive DDS Tape Drive and Data Cassette Descriptions

Controls and Indicators

Figure 15, Figure 16, and Figure 17 show the LEDs, and eject button of the DDS-format tape drives.

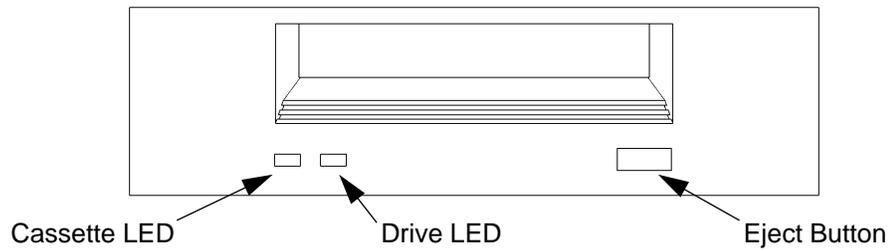


Figure 15 **DDS-DC (Early Model) Drive Controls and Indicators**

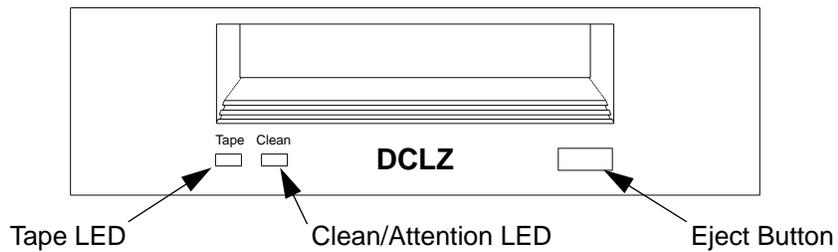


Figure 16 **DDS-DC (Later Model) Drive Controls and Indicators**

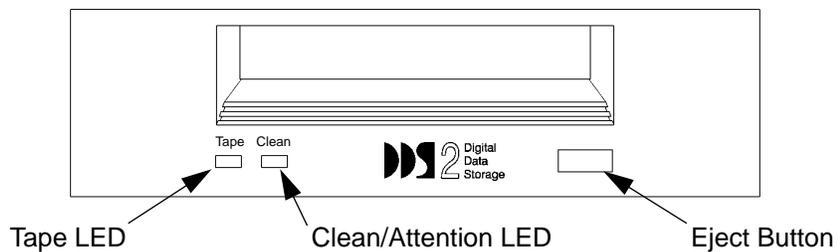


Figure 17 **DDS-2 Drive Controls and Indicators**



LEDs

This section describes the LED codes that are displayed.

The two LEDs on the front panels of the DDS drives indicate different activities or problems that occur.

Figure 18 lists the LED codes and their meanings for the DDS-DC early model drive. Figure 19 lists the LED codes and their meanings for the DDS-DC later model and DDS-2 drives.

| Cassette | Drive | Meaning | Key |
|----------------------|-------|--------------------------|-------------------------|
| Read/Write States | | | |
| | | Cassette (un)loading | OFF |
| | | Cassette loaded/online | Green |
| | | Cassette loaded/activity | Pulsing Green |
| | | Cassette loaded/offline | Amber |
| Write-Protect States | | | |
| | | Cassette (un)loading | Pulsing Green and Amber |
| | | Cassette loaded/online | |
| | | Cassette loaded/activity | |
| | | Cassette loaded/offline | |
| Error States | | | |
| | | Media wear (caution) | |
| | | High humidity | |
| | | Self-test (normal) | |
| | | Self-test (failure) | |

Figure 18

DDS-DC (Early Model) Tape Drive LED Display Codes



Using Your Digital Data Storage (DDS) Tape Drive
 DDS Tape Drive and Data Cassette Descriptions

| Tape | Clean/ Attention | Meaning | Key |
|------|---------------------|---------------------------|--|
| | | Activity — load or unload | OFF |
| | | Activity — read or write | Steady Green |
| | | Cartridge loaded | Steady Amber |
| Any | | Cleaning needed | Flashing Green 1/2 sec on, 1/2 sec off |
| Any | | Fault | Pulsing Amber |
| | | | Fast Flash Green 1/4 sec on 1/4 sec off |

Figure 19 DDS-DC (Later Model) and DDS-2 Tape Drive LED Display Codes

LED Warning Conditions

The following sections describe actions to take if the LEDs indicate a warning condition.

High Humidity If the LEDs display the high humidity signal, the humidity is too high. The drive does not perform any operations until the humidity drops.

Self-Test (Failure) If the LEDs display the self-test (failure) signal, a fault was diagnosed during the self tests. Note the pattern of the pulses and contact your local service representative.

Media Wear (Caution) Hewlett-Packard DDS drives continually monitor the number of errors they have to correct when reading and writing to a tape to determine tape wear and tape head cleanliness. If excessive tape wear or dirty tape heads are suspected, the drive warns you by displaying the Media Wear (Caution) signal on the LED indicators.





Using Your Digital Data Storage (DDS) Tape Drive DDS Tape Drive and Data Cassette Descriptions

If the LED indicators on your DDS-format drive display the Media Wear (Caution) condition, follow this procedure:

- 1 Check the system console for any tape error messages. A hard error during a read or write operation may have occurred.
- 2 Clean the heads with a cleaning cassette (HP92283K) as described in “Cleaning the Tape Heads,” later in this chapter.
- 3 Repeat the operation you performed when the Media Wear (Caution) signal displayed. If the Media Wear (Caution) signal still displays, then the data cassette should be replaced.
- 4 If you are performing a backup from disk to tape, discard the data cassette and back up your files using a new data cassette.
- 5 If you are performing a restore from tape to disk, complete the restore, back up the files to a new data cassette, then discard the data cassette.

Data Cassettes

Media Life

HP DDS data cassettes are currently specified to 2000 passes over any part of the tape under optimal environmental conditions (50% relative humidity, 22 degrees C). During a tape operation, any one area of the tape may have multiple passes over the heads. This translates into approximately 200 to 300 backups or restores.

Under certain conditions, the life of your data cassette is less. Replace your data cassettes after 100 backups or restores if your operating conditions meet any of the following criteria:

- The relative humidity in your operating environment is consistently less than 50%.
- You know that the backup software you are using makes multiple passes over sections of the tape during backups or restores.
- You notice that when you do backups and restores the tape stops and starts frequently.





Using Your Digital Data Storage (DDS) Tape Drive DDS Tape Drive and Data Cassette Descriptions

Cleaning the Tape Heads

Clean the heads of your tape drive after every 25 hours of tape drive use or if the Media Wear (Caution) signal is displayed on the LED.

NOTICE:

Only use HP Cleaning Cassettes (HP92283K) to clean the tape heads. Do not use swabs or other means of cleaning the tape heads.

Follow this procedure to clean the tape heads:

- 1 Insert the cleaning cassette into the drive. The tape automatically loads the cassette and cleans the heads. At the end of the cleaning cycle, the drive ejects the cassette.
- 2 Write the current date on the label on the cleaning cassette so that you know how many times you have used it. Discard the cleaning cassette after you have used it 25 times.

Media Restrictions

If you interchange media between other DDS-format tape drives, note that data cassettes with compressed data can only be read by tape drives that have data compression capabilities. This includes data cassettes that contain both compressed and noncompressed data.



Setting the Write-Protect Tab on a Data Cassette

You can only store or change information on a data cassette when the write-protect tab is in the *write* position. So, before trying to write to the data cassette, make sure that the write-protect tab is in the *write* position, as shown in Figure 20.

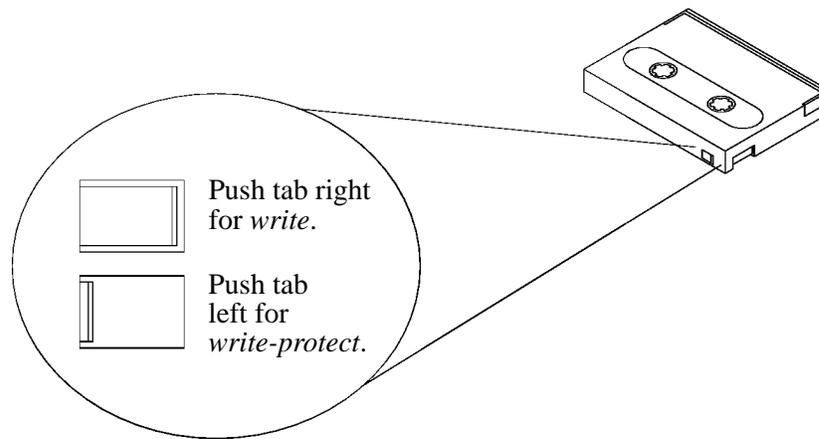


Figure 20 **Setting the Write-Protect Tab on a DDS Tape**

To protect information on a data cassette from being overwritten, set the write-protect tab to the *write-protect* position, as shown in Figure 20.

NOTICE:

The write-protect tab should always be in the *write* position for transferring data to a cassette.



Using Your Digital Data Storage (DDS) Tape Drive Operating the DDS Tape Drive

Operating the DDS Tape Drive

This section describes how to perform tasks with your DDS tape drive.

Loading and Unloading a Data Cassette

Follow these steps to load and unload a data cassette from the DDS tape drive:

- 1 Insert the data cassette into the drive, as shown in Figure 21.

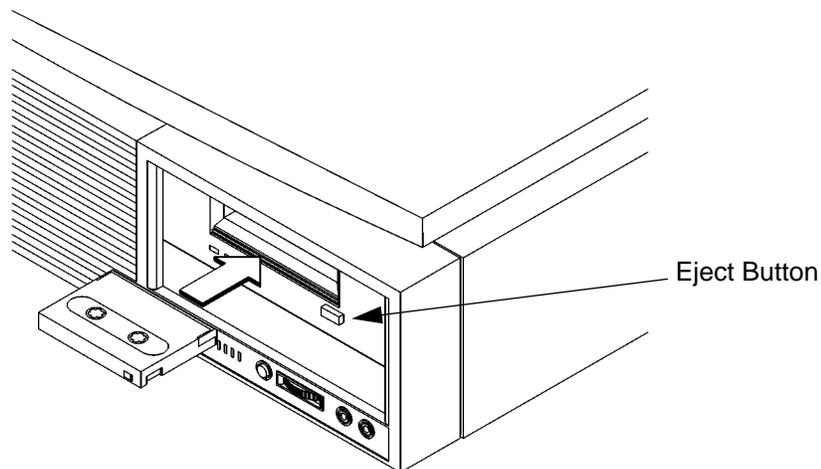


Figure 21

Loading and Unloading a Data Cassette

- 2 Push the data cassette about three quarters of the way into the drive. The drive automatically pulls the data cassette the rest of the way in. When the LEDs on the front of the drive stop flashing, the drive has loaded the data cassette.
- 3 To remove the data cassette, press and release the eject button on the front of the drive, as shown in Figure 21. The LEDs on the drive flash on and off. Ten to twenty seconds later, the data cassette slides partway out of the drive. Remove the cassette from the drive.



Verifying the DDS Tape Drive Operation

To verify that your workstation can communicate with the DDS-format tape drive, enter the following:

```
/usr/sbin/ioscan -d stape
```

After a few moments the **ioscan** utility returns a message similar to the following:

| H/W Path | Class | Description |
|------------|---------|------------------|
| ===== | | |
| | bc | |
| 8 | bc | I/O Adapter |
| 8/16 | ba | Core I/O Adapter |
| 8/16/5 | ext_bus | Built-in SCSI |
| 8/16/5.3 | target | |
| 8/16/5.3.0 | tape | HP HP35480A |

If **ioscan** does not see your tape drive, it will return the following message:

```
ioscan: No hardware found
```

If you receive this message, go to Chapter 5, “Solving Problems.”



Using Your Digital Data Storage (DDS) Tape Drive Operating the DDS Tape Drive

Using Device Files

Device files are special files that tell your system which system hardware pathway to use when communicating with a specific device, and what kind of device it is.

To determine what device files are available for use with your tape drive, use the following procedure:

- 1 In a terminal window, enter the following command:

sam RETURN

- 2 The **System Administration Manager** window opens. Double-click on **Peripheral Devices ->**.
- 3 The **Peripheral Devices** window opens. Double-click on **Tape Drives ->**.
- 4 The **Tape Drives** window opens.
- 5 In the list of tape drives, click on the desired tape drive to select it.
- 6 From the **A**ctions menu, click on **S**how Device Files.

A window opens with a list of the device files for the selected tape drive with an explanation of each one.





Archiving Data

This section describes how to transfer data to and from a DDS-format data cassette (saving and restoring) using the HP-UX **tar** command and your tape drive's device file.

The **tar** command allows you to save files to a data cassette, restore files from a data cassette to your system, or list the files on your data cassette.

Writing to a Data Cassette

Use the following instructions to save files to a data cassette:

- 1 Check that the write-protect tab on the data cassette is in the *write* position.
- 2 Load the data cassette into the tape drive.
- 3 In a terminal window, enter the following command line to write to the tape:

```
tar -cvf /dev/rmt/devicefile pathname
```

where *devicefile* is one of the device files listed from *sam* and *pathname* is the pathname of the file or directory containing files that you want to write to the tape. To use the data compression mode, use one of the device file names that **sam** listed as supporting compression.





Using Your Digital Data Storage (DDS) Tape Drive Operating the DDS Tape Drive

Restoring Files from a Data Cassette to Your System

Use the following instructions to restore files from a data cassette to your system:

- 1 Load the data cassette into the tape drive.
- 2 In a terminal window, use **cd** to change to the directory you want the files to reside in.
- 3 Enter the following command line to restore data:

```
tar -xvf /dev/rmt/devicefile pathname
```

where *devicefile* is one of the device files listed from **sam** and *pathname* is the pathname of the file or directory containing files that you want to restore from the tape. If *pathname* is not specified, everything on the data cassette is restored. If the tape was made using data compression, use one of the device file names that **sam** listed as supporting compression.

Listing the Files on a Data Cassette

Use the following instructions to list the files on a data cassette:

- 1 Load the data cassette into the tape drive.
- 2 In a terminal window, enter the following command line to receive a file listing of the data cassette:

```
tar -tvf /dev/rmt/devicefile
```

where *devicefile* is one of the device files listed from **sam**. If the tape was made with data compression, use one of the device file names that **sam** listed as supporting compression.





Further Command Information

For additional information on using **tar** and a complete list of the command arguments, refer to the **tar** man page by typing the following:

man tar

The **man** utility looks up man pages on the system.

You may also communicate with the tape drive with the **cpio**, **ftio**, **mt**, and **fbackup** commands. For more information on these commands, enter the following in a terminal window:

man command





Using Your Digital Data Storage (DDS) Tape Drive
Troubleshooting

Troubleshooting

If you have trouble with any of these procedures for using your DDS tape drive, see Chapter 5 of this book, "Solving Problems."

Ordering Information

To order Hewlett-Packard data cassettes and cleaning cassettes for use in your DDS tape drive, use the following order numbers:

- HP92283A - Box of five 60-meter DDS data cassettes
- HP92283B - Box of five 90-meter DDS data cassettes
- HP92300A - Box of five 120-meter DDS data cassettes
(not supported on the DDS-DC drives)
- HP92283K - Package of two head-cleaning cassettes
- HP92283L - Lockable storage box for 12 cassettes

CAUTION:

Use only data cassettes labeled as DDS (Digital Data Storage) cassettes. Never use audio cassettes labeled DAT (Digital Audio Tape) in your DDS-format drive.





Using Your 3.5-Inch Floppy Disk Drive

This chapter describes how to perform tasks that allow you to archive to or transfer data from the optional 3.5-inch floppy disk drive. The information is organized into the following sections:

- Using the floppy diskette
- Operating the floppy drive
- Ordering information

NOTICE:

Some procedures in this chapter require you to log in as **root**. If you cannot log in as **root**, contact your system administrator.



Using the Floppy Diskette

This section describes basic information needed for using your floppy diskettes.

Setting the Write-Protect Tab on a Diskette

You can only store or change information on a diskette when the write-protect tab is in the *write* position. So, before trying to write to the diskette, make sure that the write-protect tab is in the *write* position, as shown in Figure 22.

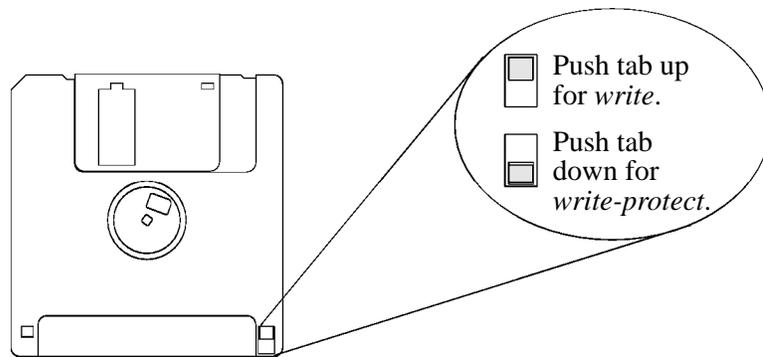


Figure 22

Setting the Write-Protect Tab on a Floppy Diskette

To protect files on a diskette from being overwritten, set the write-protect tab to the *write-protect* position, as shown in Figure 22.

NOTICE:

The write-protect tab should always be in the write position for formatting a new diskette and transferring data to a diskette.



Using Your 3.5-Inch Floppy Disk Drive Using the Floppy Diskette

Inserting and Removing a Diskette

Follow these steps to insert and remove a diskette from the floppy disk drive:

- 1 Insert the diskette into the drive, as shown in Figure 23.

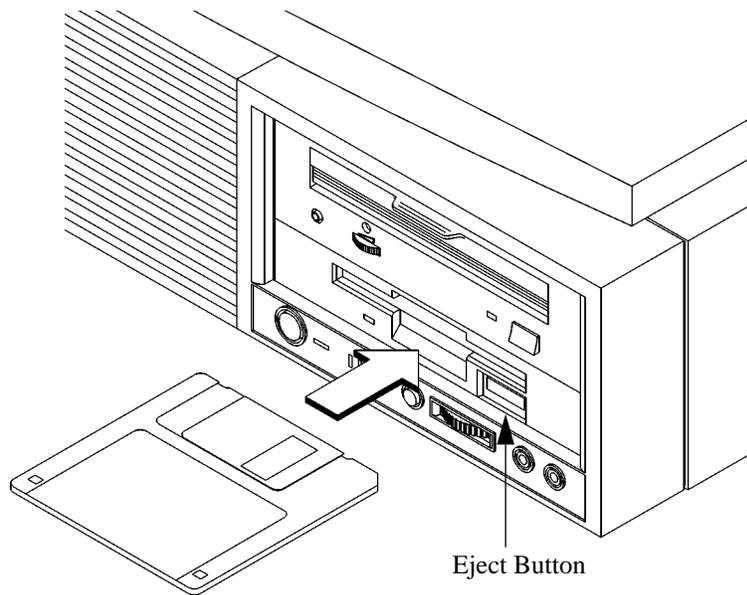


Figure 23

Inserting and Removing a Floppy Diskette

- 2 Push the diskette into the floppy drive until it clicks into place.
- 3 To remove the diskette, push the eject button, as shown in Figure 23, then remove the diskette.





Operating the Floppy Drive

This section describes how to perform tasks with your 3.5-inch floppy disk drive.

Verifying the Floppy Drive Configuration

To verify that your workstation can communicate with the floppy drive, use the **ioscan** command to see which devices are currently in use on your system.

- 1 In a terminal window, enter the following at the prompt:

```
ioscan
```

After a few moments the **ioscan** utility lists all of the I/O devices it could find. If there is a floppy drive in the list, that listing appears similar to the following:

| H/W Path | Class | Description |
|----------|----------|-----------------------|
| 8 | bc | I/O Adapter |
| 8/0 | graphics | Graphics |
| 8/16/10 | unknown | Built-in Floppy Drive |





Using Your 3.5-Inch Floppy Disk Drive Operating the Floppy Drive

Using Device Files

Device files are special files that tell your system which system hardware pathway to use when communicating with a specific device and what kind of device it is.

To determine what device files are available for use with your floppy drive, use the following procedure:

- 1 In a terminal window, enter the following command:

```
sam RETURN
```

- 2 The **System Administration Manager** window opens. Double-click on **Disks and File Systems->**.
- 3 The **Disks and File Systems** window opens.
- 4 In the list of drives, click on the floppy drive listing to select it.
- 5 From the **A**ctions menu, click on **View More Information**.

A window opens with a list of information for the floppy drive, including the device files.





Formatting a New Diskette

You must always format a new floppy diskette with the **mediainit** utility before using it. To format a new floppy diskette follow these steps:

- 1 Log in as **root**.
- 2 Make sure that the write-protect tab on the floppy diskette is in the *write* position, as shown in Figure 22.
- 3 Insert the diskette into the floppy disk drive.
- 4 In a terminal window, execute **mediainit** with an interleave of 2 by entering the following:

```
mediainit -i 2 devicefile
```

where *devicefile* is the device file as listed by **sam** .





Using Your 3.5-Inch Floppy Disk Drive Operating the Floppy Drive

Transferring Data To and From a Floppy Diskette

This section describes how to transfer data to and from your floppy diskette (saving and restoring) using the HP-UX **tar** command with your floppy drive's device file.

The **tar** command saves files to a floppy diskette, restores files from a floppy diskette, or lists files on a floppy diskette.

You need to set the write protect tab to the *write* position to transfer data to the diskette. The write-protect tab can be in either position when restoring data from a diskette or listing the files on a diskette.

Saving Files to a Floppy Diskette

Use the following instructions to save files to a floppy diskette:

- 1 Check that the write-protect tab on the floppy diskette is in the *write* position.
- 2 Load the formatted floppy diskette into the disk drive.
- 3 In a terminal window, enter the following command line to write to the diskette:

```
tar -cvf devicefile pathname
```

where *devicefile* is the device file as listed by **sam** and *pathname* is the pathname of the file or directory containing files that you want to write to the diskette.

Restoring Files from a Floppy Diskette to Your System

Use the following instructions to restore files from a floppy diskette to your system:

- 1 Load the floppy diskette into the disk drive.
- 2 In a terminal window, use the **cd** command to change to the directory you want the files to reside in:

```
cd directory_path
```

where *directory_path* is the pathname of the directory.





- 3 Enter the following command line:

```
tar -xvf devicefile pathname
```

where *devicefile* is the device file as listed by **sam** and *pathname* is the path-name of the file or directory containing files that you want to restore from the diskette. If you don't specify *pathname*, everything on the floppy diskette is restored.

Listing the Files on a Floppy Diskette

Use the following instructions to list the files on a floppy diskette:

- 1 Load the floppy diskette into the disk drive.
- 2 In a terminal window, enter the following command line:

```
tar -tvf devicefile
```

where *devicefile* is the device file as listed by **sam**.

All files on the floppy diskette are listed.





Using Your 3.5-Inch Floppy Disk Drive
Operating the Floppy Drive

For More Information

For more information on using **tar** and a complete list of the command arguments, refer to the **tar** man page by typing the following in a terminal window:

man tar

The man utility looks up man pages on the system.

You can mount the floppy drive as a file system using the SAM utility. Be sure to unmount the drive before removing it as a file system. For more information about how to mount and unmount the floppy drive, see the manual *Using HP-UX* (B2910-90001).

For more information on copying data to or from your system to other media, including your floppy diskette, refer to the **cpio** man page by typing the following in a terminal window:

man cpio

For more information on copying to or from DOS files, refer to the **doscp** man page by typing the following in a terminal window:

man doscp

For more information on listing the contents of DOS directories, refer to the **dosls** man page by typing the following in a terminal window:

man dosls

For more information on using your floppy disk drive and floppy diskettes, refer to the **floppy** man page by typing the following in a terminal window:

man floppy

For more information on using the **mediainit** command, refer to the **mediainit** man page by typing the following in a terminal window:

man mediainit





Configuring the Floppy Driver

If you reload software or rebuild the Instant Ignition system on your workstation, you need to reconfigure the HP-UX Kernel to add the floppy driver. Use the SAM utility to add the **flexible disk** driver and build a new HP-UX kernel.

For more information about how to reconfigure the kernel using SAM, see the following manuals:

- *System Administration Tasks HP 9000 Series 700 Computers* (B2355-90040)
- *Using HP-UX* (B2910-90001)





4



Using Your 3.5-Inch Floppy Disk Drive





Using Your 3.5-Inch Floppy Disk Drive
Troubleshooting

Troubleshooting

If you have trouble with any of these procedures for using your floppy disk drive, see Chapter 5 of this book, "Solving Problems."

Ordering Information

To order Hewlett-Packard micro flexible diskettes for use in your 3.5-inch floppy disk drive, use the following order number:

| | |
|-----------|---|
| HP-92192X | High-Density Micro Flexible Disks (1.44MB Formatted Capacity) - box of ten diskettes |
|-----------|---|





5



Solving Problems





Solving Problems

This chapter contains information to help you determine what's wrong with your system when you have problems. If you have a problem that isn't listed in this chapter, or if your problem persists, contact your designated service representative. When calling for service, always have your system's model number and serial number ready.

This chapter is divided into the following sections

- Common problems and solutions
- Interpreting LED error codes
- Dealing with a boot failure
- Running system verification tests





Solving Problems
Common Problems and Solutions

Problems Loading and Booting the Operating System

Table 10 describes possible problems you may encounter when loading and booting the operating system and offers solutions.

Table 10 Problems Loading and Booting the Operating System

| Problem | Solution |
|--|---|
| The power LED is lit, and text appears on the screen, but more than two minutes have passed with no sign of system activity. | Make sure that all SCSI devices are set to the proper SCSI ID. (See Appendix C for default SCSI ID settings.) Check that all SCSI devices are correctly cabled. Check that the SCSI bus is correctly terminated. (See Appendix C for information on SCSI cabling and termination). |
| The system stops or hangs while booting. | Follow the instructions in “Dealing With a Boot Failure” in this chapter. |
| If problem persists, contact your system administrator or call your designated service representative. | |

Problems with the 802.3 Network

Table 11 describes possible problems you may encounter with the 802.3 network and offers solutions.

Table 11 Problems with the 802.3 Network

| Problem | Solution |
|--|--|
| Cannot reach other systems on the network. Applications that rely on the network will not run. | Check the network connector on the back of the system unit. Make sure that the network cable or transceiver is fastened securely to the connector. |
| If problem persists, contact your system administrator or call your designated service representative. | |





Problems Using a Hard Disk Drive

Table 12 describes possible problems you may encounter using the hard disk drive and offers solutions.

Table 12 **Problems Using a Hard Disk Drive**

| Problem | Solution |
|--|---|
| The disk drive is not accessible or does not respond. | Make sure that all the SCSI devices are set to the proper SCSI ID. (See Appendix C for default SCSI ID settings.) Check that all SCSI devices are correctly cabled. Check that the SCSI bus is correctly terminated. (See Appendix C for information on SCSI cabling and termination.) Make sure that the system can communicate with the drive as described in “Checking the SCSI IDs” in Appendix B. Follow the instructions in “Dealing With a Boot Failure” in this chapter. |
| If problems persist, contact your system administrator or call your designated service representative. | |





Solving Problems
Common Problems and Solutions

Problems Using the CD-ROM Drive

Table 13 describes a possible problem you may encounter when you use the CD-ROM drive and offers a solution.

Table 13 **Problems Using the CD-ROM Drive**

| Problem | Solution |
|---|---|
| The CD-ROM drive does not respond to commands. | Re-enter the commands and make sure that you have typed them correctly. Make sure that the system can communicate with the drive as described in “Checking the SCSI IDs” in Appendix B. Follow the instructions in the section “Running System Verification Tests” in this chapter to verify that the CD-ROM drive is functioning properly. |
| If problems persist, contact your system administrator or call your designated service representative | |



Problems Using the DDS Tape Drive

Table 14 describes a possible problem you may encounter using the DDS tape drive and offers solutions.

Table 14 **Problems Using the DDS Tape Drive**

| Problem | Solution |
|--|---|
| The DDS tape drive does not respond to commands. | Re-enter the commands and make sure that you have typed them correctly. Make sure that you specified the correct device file name for commands that require a device file name. Make sure the write-protect tab is set to <i>write</i> if you are trying to copy data to a data cassette. Make sure that the system can communicate with the drive as described in "Checking the SCSI IDs" in Appendix B. Follow the instructions in the section "Running System Verification Tests" in this chapter to verify that the tape drive is functioning properly. |
| If the problem persists, contact your system administrator or call your designated service representative. | |



Solving Problems
Common Problems and Solutions

Problems Using the Floppy Disk Drive

Table 15 describes a possible problem you may encounter using the floppy disk drive and offers a solution.

Table 15 **Problems Using the Floppy Disk Drive**

| Problem | Solution |
|--|--|
| The floppy drive does not respond to commands. | Re-enter the commands and make sure that you have typed them correctly. Make sure that you specified the correct device file for commands that require a device file name. Make sure that the write-protect tab is set to <i>write</i> if you are trying to copy data to a floppy diskette. Follow the instructions in the section "Running System Verification Tests" in this chapter to verify that the floppy drive is functioning properly. |
| If the problem persists, contact your system administrator or call your designated service representative. | |



LED Error Codes

This section contains information about the error codes displayed by the LEDs on the system's front panel.

If an error occurs during the power-up diagnostics tests, the diagnostics use the front panel LEDs to display a code for the failing component.

Figure 24 shows the location of the system unit's front panel LEDs. The four amber LEDs indicate system status and error codes.

Table 16 shows the LED error codes as they appear on the front panel LEDs. Use these LED codes to determine the failing component.

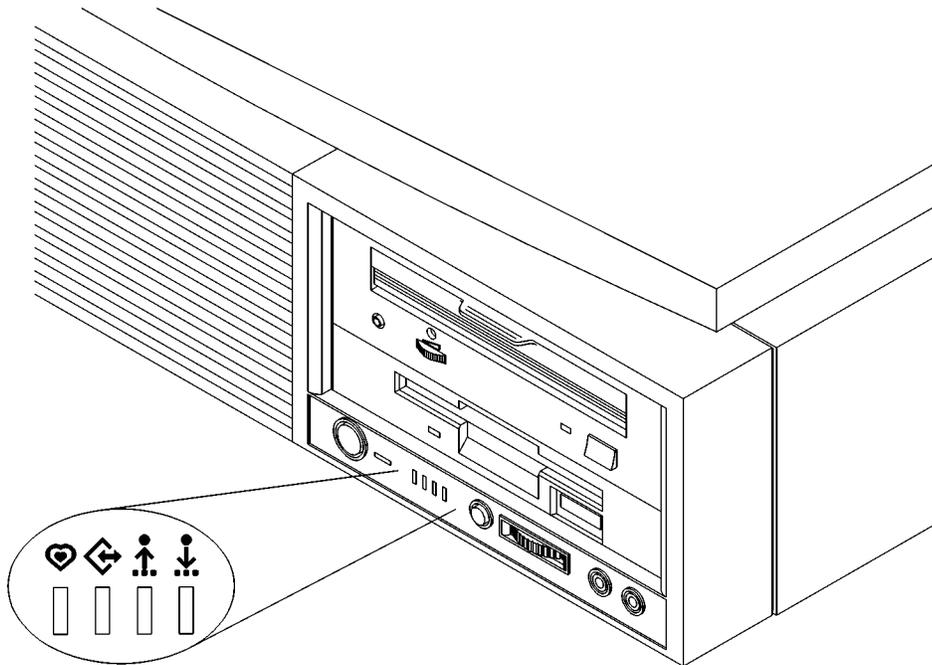


Figure 24

System Unit Front Panel LEDs



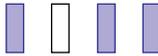
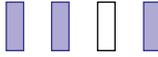
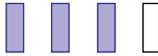
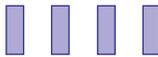
Solving Problems
LED Error Codes

Table 16 LED Error Codes

| LED Value | RS-232 Chassis Code Range | Description |
|-----------|--|---|
| | N/A | Reserved |
| | 7401 | No memory found FAULT <i>Likely cause: SIMMs or processor board</i> |
| | N/A | Reserved |
| | FLT 7000-7F00 | Memory Error Fault <i>Likely Cause: Memory SIMMs</i> <i>System console will indicate which SIMM fault occurred on</i> |
| | FLT 1030-4099 | Processor board FAULT (includes PDH which could be on I/O board.) |
| | FLT 5000 - 500F FLT 8000 - 8FFF FLT CD00 - CDff* | I/O System FAULT *Except backplane faults listed below |
| | FLT 8500, 8501 FLT 8C00-8CFF | Backplane FAULT |
| | Any INIT/TEST code | INITIALIZATION and TESTING <i>Note: These two LED codes will alternate to indicate forward progress: 0111, 1000, 0111...</i> |
| | | Unknown FAULT |
| | Any fault not in this table including FLT 1000-101C | Unknown FAULT |
| | FLT CBF0 - CBFF | HPMC FAULT |



Table 16 **LED Error Codes**

| LED Value | RS-232 Chassis Code Range | Description |
|--|--|--|
|  | FLT A088 - A0FF | No console/IPL error FAULT |
|  | N/A | Reserved |
|  | N/A | Reserved |
|  | N/A | Reserved |
|  | Any call to early_update_chassis_display | Power on value. Indicates processor board fault when this value remains for more than a second following power up. |



Solving Problems
Dealing with a Boot Failure

Dealing with a Boot Failure

If your usual boot device (typically a disk) is not responding as it should, you must try to boot from the disk (or another boot device) by selecting it manually.

To boot a device manually, follow these steps:

- 1 Follow the directions in “Accessing the Boot Console Interface,” in Appendix D of this book.

NOTICE:

Your workstation automatically shuts down the operating system before it terminates the power.

- 2 At the Main Menu prompt, type the following:

Main Menu: Enter a command > **search ipl**

This causes your workstation to search *exhaustively* for bootable media.

The search command looks for bootable media on your workstation.

- 3 Boot from one of the listed devices by typing the following at the prompt:

Main Menu: Enter a command > **boot device**

where *device* is the **hardware path** to the device, specified in mnemonic style notation, such as **sescsi.6.0**.

- 4 If your workstation still fails to boot, there is either something wrong with the file system or with the hardware. If you suspect a file system failure, see the manual *Using HP-UX* for help on dealing with file system failures. If you think that something is wrong with the hardware, continue reading this chapter for more troubleshooting information.





Running System Verification Tests

HP-UX uses an online diagnostics product called the Support Tools Manager that allows system operation verifications.

Three interfaces are available with the Support Tools Manager: a command line interface (accessed through the **cstm** command), a menu-driven interface (accessed through the **mstm** command), and the graphical user interface (accessed through the **xstm** command).

For more information on these user interfaces, see the online man pages by entering the following at the command line prompt:

man cstm

man mstm

man xstm





Solving Problems

Running System Verification Tests

To access the Support Tools Manager, perform the following steps:

- 1 At a command line prompt, enter the following:

cstm

The following message appears:

```
Support Tool Manager Version A.01.00
Type 'help' for a list of available commands.
CSTM>
```

- 2 At the CSTM> prompt, you can enter several commands. To see what commands are available, type the **help** command.
- 3 To verify the system operation, type the following at the CSTM> prompt:

CSTM> **verify all**

Messages similar to the following appear:

```
Verification has started on device (CPU).
Verification has started on device (FPU).

CSTM>Verification of (FPU) has completed.
CSTM>Verification of (CPU) has completed.
```

- 4 Press **Enter** to return to the CSTM> prompt after all test results are reported.
- 5 To exit the Support Tools Manager, enter the following:

CSTM> **exit**

If any tests failed, further diagnosis is necessary by qualified service personnel. Contact your designated service representative.





Safety and Regulatory Statements

This appendix contains safety and regulatory statements pertaining to your C Class workstation. It provides information on the following topics:

- Declaration Of Conformity
- Special video configuration statements
- Emissions regulations
- Emissions regulations compliance
- Datacom users statement
- Acoustics
- Electrostatic discharge (ESD) precautions
- Safety statements
- Laser safety statements
- Warnings and cautions





Safety and Regulatory Statements
Warnings and Cautions

Warnings and Cautions

WARNING:

Removing device cover may expose sharp edges in equipment chassis. To avoid injury, use care when installing customer add-on devices.

WARNUNG:

Das Entfernen der Geräteabdeckung legt die scharfen Kanten im Inneren des Gerätes frei. Um Verletzungen zu vermeiden, seien Sie vorsichtig beim Einbau von zusätzlichen Bauteilen, die vom Kunden selber eingebaut werden können.

AVERTISSEMENT:

Des bords tranchants du châssis de l'équipement peuvent être exposés quand le cache de l'unité n'est pas en place. Pour éviter des blessures, faire très attention lors de l'installation de modules supplémentaires par le client.

WARNING:

Disconnect power plug from wall outlet or source power before moving or removing the device, or installing add-on components.

WARNUNG:

Entfernen Sie die Stromzuführung von der Steckdose oder der Stromquelle bevor Sie das Gerät bewegen, abbauen, oder zusätzliche Bauteile installieren.

AVERTISSEMENT:

Débrancher la fiche de la prise de courant ou de la source d'alimentation électrique avant de déplacer ou de retirer l'unité, ou avant d'installer des modules supplémentaires.

WARNING:

Lithium batteries may explode if mistreated. Do not put lithium batteries in fires or try to recharge or disassemble them.

Replace battery only with Matsushita Electric BR-2325 three-volt lithium battery (HP part number 1420-0314)! Use of any other battery may cause fire or explosion.





Declaration of Conformity



DECLARATION OF CONFORMITY
according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: Hewlett Packard
Manufacturer's Addresses: 100 Domain Drive
Exeter, N.H. 03833
USA

declares that the product

Product Name: Computer Workstation
Model Number: HP 9000 / C160, C160L, C180XP
Base Product Number: A4200A
Product Options: All

conforms to the following Product Specifications:

Safety: IEC 950:1991 + A1, A2 / EN 60950:1992 + A1, A2
EMC: CISPR 11:1990 / EN 55011:1991 Group 1 Class B (1)
CISPR 22:1985 / EN 55022:1994 Class B (1)
EN 50082-1:1992
IEC 1000-4-2: 1995 / EN 61000-4-2:1995 - 4 kV CD, 8 kV AD
IEC 801-3: 1984 / prEN 55024-3:1991 - 3 V/m
IEC 1000-4-4: 1995 / EN 61000-4-4:1995 - 4 kV Power Lines
2 kV Signal Lines

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

(1) The product was tested in a typical Hewlett Packard workstation configuration.

Exeter, May 30, 1996
Date

James Kelly
Quality and Engineering Manager

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ/Standards Europe, Herrenberger Strasse 130, D-71034 Boeblingen (FAX: +49-7031-14-3143)





Safety and Regulatory Statements
Special Video Configuration Statements

Special Video Configuration Statements

The following statements apply only to those applications which include a cable connected to the S-Video connector on the A4248A card. No modification to the regulatory statements is necessary for applications which include cables connected to other connectors on the card but not to the S-Video connector.

For EN55022 or CISPR 22 Applications:

WARNING:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

For FCC Applications:

NOTICE:

This equipment has been tested and found to comply with the limits for a Class A digital device, 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 instruction 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 will be required to correct the interference at his own expense.





Emissions Regulations

Federal Communications Commission (FCC)

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 and the Canadian Department of Communications. 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 (determined by turning the equipment off and on), you can 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 circuit different from that to which the receiver is connected.
- Ask 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.

Operation of this device is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept interference received, including interference that may cause undesired operation.
- Cables used with this device must be properly shielded to comply with the requirements of the FCC.





Safety and Regulatory Statements
Emissions Regulations Compliance

VCCI Class 2 ITE

この装置は、第二種情報処理装置（住宅地域又はその隣接した地域において使用されるべき情報処理装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。
しかし、本装置をラジオ、テレビジョン受信機等に近接してご使用になると、受信障害の原因となることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Emissions Regulations Compliance

Any third-party I/O device installed in HP system(s) must be in accordance with the requirements set forth in the preceding Emissions Regulations statements. In the event that a third-party noncompliant I/O device is installed, the customer assumes all responsibility and liability arising therefrom.

Acoustics

Regulation On Noise Declaration For Machines -3. GSGV

| | |
|-------------------|---------------------|
| Lpa <70dB | Lpa <70dB |
| operator position | am Arbeitsplatz |
| normal operation | normaler Betrieb |
| per ISO 7779 | nach DIN 45635 T.19 |





Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, observe the following precautions during board unpacking and installation:

- Stand on a static-free mat.
- Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to ground.
- Connect all equipment together, including the static-free mat, static strap, routing nodes, and peripheral units.
- Keep uninstalled printed circuit boards in their protective antistatic bags.
- Handle printed circuit boards by their edges, once you have removed them from their protective antistatic bags.





Safety and Regulatory Statements
Safety Statement

Safety Statement

This equipment conforms to the following safety standards:

- UL 1950
- CSA 950
- IEC 950
- EN 60950





Laser Safety Statement (U.S.A. Only)

The CD ROM mass-storage system is certified as a Class-1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968.

This means that the mass-storage system does not produce hazardous laser radiation. Because laser light emitted inside the mass-storage system is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.





A



Safety and Regulatory Statements





B

**Changing Your Workstation's
Hardware Configuration**





Changing Your Workstation's Hardware Configuration

This appendix describes the procedures to change your workstation's hardware configuration. It presents the information in the following sections:

- Checking the SCSI IDs
- Preparing your workstation
- Installing storage devices
- Removing the main tray assembly
- Replacing the main tray assembly
- Installing additional memory
- Installing second level cache boards
- Installing the EGRAM module
- Installing an EISA, PCI, or GSC option board
- Replacing the battery
- Changing your monitor type

CAUTION:

Always wear a properly grounded wrist strap when reconfiguring your workstation.

Use the following tools to remove or replace hardware parts when changing your configuration:

- Light-duty flatblade screwdriver with 150 mm (6 inch) blade
- Needlenose pliers

Also, read the ESD Precautions in Appendix A of this guide.





Checking the SCSI IDs

To determine which SCSI IDs are currently in use on your system, use the **ioscan** command in a terminal window:

- 1 Click on the **Terminal Control** on the **Front Panel** of your Workspace.
A terminal window opens.
- 2 Move the mouse cursor into the terminal window and single-click the left mouse button.
- 3 Enter the following at the prompt:

```
/usr/sbin/ioscan -f
```

After a few moments the **ioscan** utility lists all of the SCSI I/O devices it could find. The list appears similar to the following:

| Class | I | H/W Path | Driver | S/W State | H/W Type | Description |
|-----------|----|------------|-------------|-----------|-----------|---------------------------------------|
| bc | 0 | | root | CLAIMED | BUS_NEXUS | |
| bc | 1 | 8 | ccio | CLAIMED | BUS_NEXUS | I/O Adapter |
| ext_bus | 0 | 8/0 | c720 | CLAIMED | INTERFACE | GSC built-in Fast/Wide SCSI Interface |
| target | 0 | 8/0.0 | tgt | CLAIMED | DEVICE | |
| disk | 3 | 8/0.0.0 | sdisk | CLAIMED | DEVICE | QUANTUM LPS1080WD |
| target | 1 | 8/0.5 | tgt | CLAIMED | DEVICE | |
| disk | 2 | 8/0.5.0 | sdisk | CLAIMED | DEVICE | DEC DSP3210SW |
| target | 2 | 8/0.6 | tgt | CLAIMED | DEVICE | |
| disk | 0 | 8/0.6.0 | sdisk | CLAIMED | DEVICE | DEC DSP3210SW |
| ba | 0 | 8/16 | bus_adapter | CLAIMED | BUS_NEXUS | Core I/O Adapter |
| ext_bus | 2 | 8/16/0 | CentIf | CLAIMED | INTERFACE | Built-in Parallel Interface |
| audio | 0 | 8/16/1 | audio | CLAIMED | INTERFACE | Built-in Audio |
| tty | 0 | 8/16/4 | asio0 | CLAIMED | INTERFACE | Built-in RS-232C |
| ext_bus | 1 | 8/16/5 | c700 | CLAIMED | INTERFACE | Built-in SCSI |
| target | 3 | 8/16/5.2 | tgt | CLAIMED | DEVICE | |
| disk | 1 | 8/16/5.2.0 | sdisk | CLAIMED | DEVICE | TOSHIBA CD-ROM XM-4101TA |
| target | 4 | 8/16/5.3 | tgt | CLAIMED | DEVICE | |
| tape | 0 | 8/16/5.3.0 | stape | CLAIMED | DEVICE | HP HP35480A |
| target | 5 | 8/16/5.4 | tgt | CLAIMED | DEVICE | |
| disk | 10 | 8/16/5.4.0 | sdisk | CLAIMED | DEVICE | SEAGATE ST3600N |
| target | 6 | 8/16/5.6 | tgt | CLAIMED | DEVICE | |
| disk | 5 | 8/16/5.6.0 | sdisk | CLAIMED | DEVICE | MICROP 2112 |
| lan | 0 | 8/16/6 | lan2 | CLAIMED | INTERFACE | Built-in LAN |
| ps2 | 0 | 8/16/7 | ps2 | CLAIMED | INTERFACE | Built-in Keyboard/Mouse |
| bc | 2 | 10 | ccio | CLAIMED | BUS_NEXUS | I/O Adapter |
| ext_bus | 3 | 10/12 | c720 | CLAIMED | INTERFACE | GSC Fast/WideSCSI Interface |
| target | 7 | 10/12.4 | tgt | CLAIMED | DEVICE | |
| disk | 6 | 10/12.4.0 | sdisk | CLAIMED | DEVICE | SEAGATE ST31200W |
| graphics | 2 | 10/16 | graph3 | CLAIMED | INTERFACE | Graphics |
| ba | 1 | 8/20 | bus_adapter | CLAIMED | BUS_NEXUS | Core I/O Adapter |
| hil | 0 | 8/20/1 | hil | CLAIMED | INTERFACE | Built-in HIL |
| tty | 1 | 8/20/2 | asio0 | CLAIMED | INTERFACE | Built-in RS-232C |
| ba | 2 | 8/20/5 | eisa | CLAIMED | BUS_NEXUS | EISA Bus Adapter |
| ext_bus | 4 | 8/20/5/3 | hshpib | CLAIMED | INTERFACE | EISA card HWP0C70 |
| target | 8 | 8/20/5/3.0 | tgt | CLAIMED | DEVICE | |
| target | 9 | 8/20/5/3.1 | tgt | CLAIMED | DEVICE | |
| target | 10 | 8/20/5/3.2 | tgt | CLAIMED | DEVICE | |
| processor | 0 | 32 | processor | CLAIMED | PROCESSOR | Processor |
| memory | 0 | 49 | memory | CLAIMED | MEMORY | Memory |





Changing Your Workstation's Hardware Configuration

Checking the SCSI IDs

- 4 You can determine the SCSI IDs currently in use by looking under the **H/W Path** heading. The listing **2.0.1 scsi** is the built-in SCSI bus controller. For devices connected to the built-in SCSI bus, such as disks, the fourth number is the SCSI ID for that device. For example, the listing **2.0.1.6.0** in the sample device list tells you that there is a SCSI device (a disk) currently using ID 6 on the SCSI bus.

NOTICE:

Never use SCSI address 7 for any device. Address 7 is reserved for the SCSI controller.





Preparing Your Workstation

This section describes how to prepare your workstation for changing its configuration. Use the following procedure to prepare your workstation:

- 1 Power off your workstation by pressing the power button on the front panel.
When you press the power button, the workstation automatically shuts down the operating system before it powers off the system.
- 2 When the workstation has completed shutting down and powering off, power off the monitor, and any peripheral devices connected to the workstation.
- 3 Unplug the power cord of the system unit, the monitor, and any peripheral devices from ac wall outlets.
- 4 Unplug the power cord from the back of the system unit.
- 5 Remove the floor stand from the system unit, as shown in Figure 25.





Changing Your Workstation's Hardware Configuration
Preparing Your Workstation

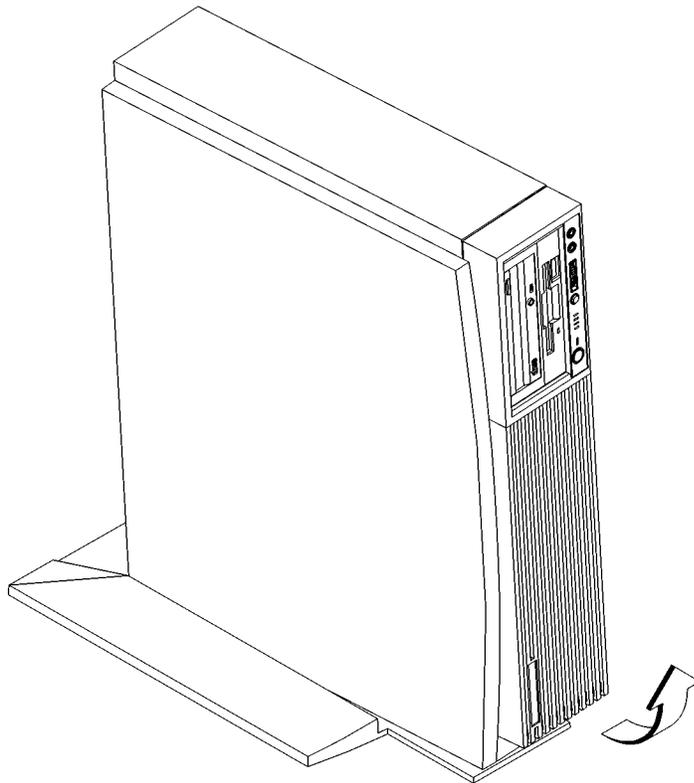


Figure 25 **Removing the Floor Stand**

- 6 Lay the system unit on a flat surface, such as a table top.
- 7 Attach a static-grounding wrist strap to bare metal on the back of the system unit.





Installing Storage Devices

This section describes how to install storage devices in your workstation. Before installing a new storage device, perform the following procedures as described earlier in this appendix:

- Checking the SCSI IDs
- Preparing your workstation

CAUTION:

All storage devices are susceptible to mechanical and electrostatic shock. When handling the devices, always wear the static-grounding wrist strap that came in the storage device kit. Always handle the drive carefully.

NOTICE:

Do not use SCSI ID 7 for any of your storage devices' SCSI addresses. The host SCSI controllers use SCSI ID 7.





Changing Your Workstation's Hardware Configuration

Installing Storage Devices

Preparing to Install Your Storage Device

This section describes information that you need to consider and procedures that you need to perform before installing any storage device.

Configuring your Storage Device

Table 17 lists the recommended SCSI IDs for internal storage devices. If an existing device already uses one of the suggested IDs, select an alternate ID.

Table 17

Default SCSI IDs

| Fast, Wide SCSI Devices | SCSI ID |
|--|----------------|
| 1st Hard Disk Drive | 6 |
| 2nd Hard Disk Drive | 5 |
| 3rd Hard Disk Drive | 4 |
| Single-Ended SCSI Devices | SCSI ID |
| CD-ROM Drive | 2 |
| DDS-Format Tape Drive | 3 |
| NOTE: The floppy drive is not a SCSI device. | |

Set the jumpers and SCSI IDs according to the installation instructions that came with your device.

Determining Your Storage Devices Position

Each storage device is restricted as to where in the storage tray it may be installed. Before installing a storage device, use Figure 26 and Table 18 to determine which disk tray position is correct for your device.

Figure 26 shows the storage device positions in the disk tray. Table 18 lists what devices are supported in the different disk tray positions. The numbers in the table's left column refer to the position numbers in the figure.



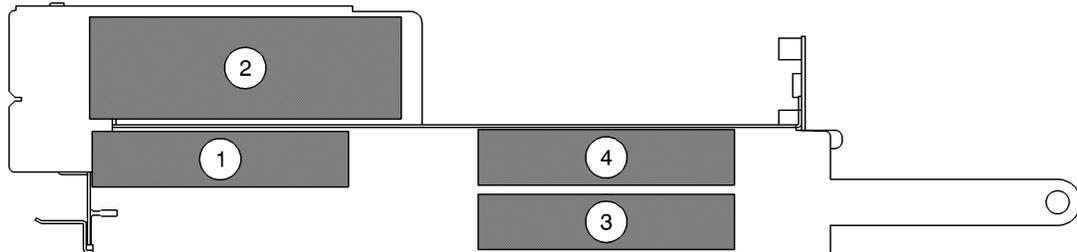


Figure 26 Disk Tray Positions

Table 18 Storage Configurations

| Disk Tray Position | Supported Devices | Conditions |
|---|--|--|
| 1 | Floppy Drive 1-inch Low Profile Disk Drive | |
| 2 | CD-ROM DDS-Tape | |
| 3 | 1-inch Low Profile Disk Drive 1.6-inch Full Height Disk Drive | If a CD-ROM drive is installed, install a 1.6-inch full height disk drive in this position. |
| 4 | 1-inch Low Profile Disk Drive 1.6-inch Full Height Disk Drive | This is the preferred position for a 1.6-inch full height disk drive. If a CD-ROM drive is installed, a 1.6-inch full height disk drive cannot be installed in this position. |
| All hard disk drives are fast, wide SCSI devices. The CD-ROM drive and the DDS tape drive are single-ended SCSI devices. The floppy drive is not a SCSI device. | | |



Changing Your Workstation's Hardware Configuration

Installing Storage Devices

Storage Device Cable Routing

When you install your storage device, be aware of the suggested cable routing paths as indicated in the cable routing label that is affixed to the top of the storage tray.

Removing the Disk Tray

Perform the following procedure to remove the storage tray from the system unit:

- 1 Remove the storage tray retaining screw, as shown in Figure 27.
- 2 If installed, remove any locking device from the storage tray security loop on the rear of the system unit.
- 3 Place your fingertips in the groove on the bottom of the storage tray bezel. See Figure 27.

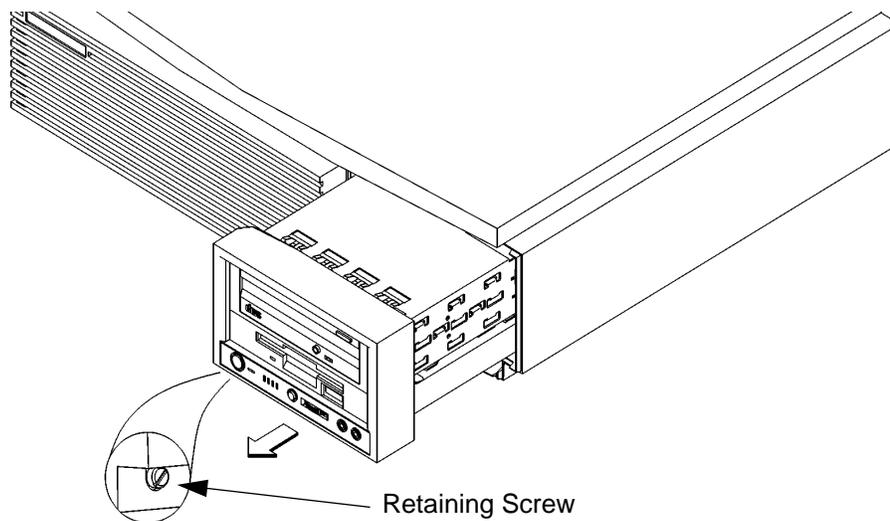


Figure 27 **Removing the Storage Tray**

- 4 Slide the storage tray completely out of the system unit.

CAUTION:

Be sure to support the storage tray from underneath while sliding it out of the system unit.



Changing Your Workstation's Hardware Configuration

Installing Storage Devices

Proceed to one of the following sections in this appendix to install your storage device in the disk tray:

- Installing a CD-ROM or a DDS-Format Tape Drive
- Installing a Floppy Drive
- Installing a Hard Disk Drive in Position 3 or Position 4

Installing a CD-ROM or a DDS-Format Tape Drive

Perform the following procedure to install a CD-ROM or DDS tape drive in the disk tray:

- 1 Remove the disk filler panel from the top location of the bezel by using a coin or other flat, blunt object to pry it from the front, as shown in Figure 28.

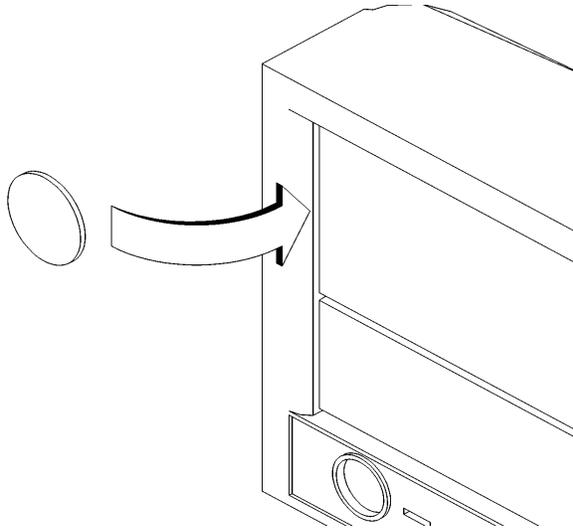


Figure 28

Removing a Disk Filler Panel



Changing Your Workstation's Hardware Configuration

Installing Storage Devices

- 2 From the rear of the storage tray, line up the disk slides on the CD-ROM or DDS tape drive with the position 1 slots in the storage tray chassis, and slide it into place, as shown in Figure 29.

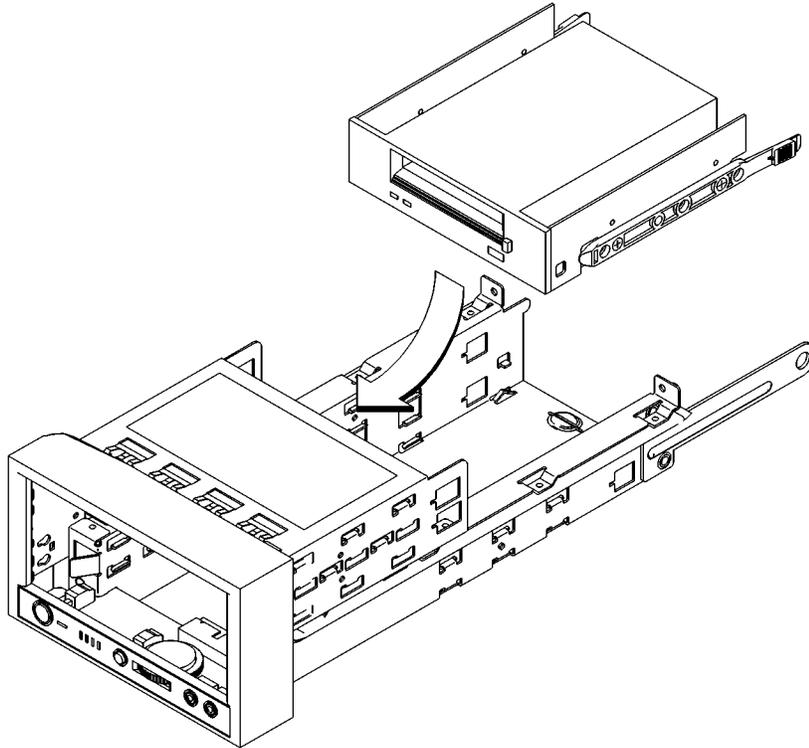


Figure 29

Installing a CD-ROM or DDS Tape

- 3 Push the storage device in until the locking tabs snap into place.
- 4 Connect the single-ended SCSI-2 data cable and the power cable to the drive. Refer to the cable routing label on the storage tray.
- 5 Proceed to the section entitled Replacing the Storage Tray.



Installing a Floppy Drive

Perform the following procedure to install a floppy drive in the disk tray:

- 1 Remove the disk filler panel from the bottom location of the bezel by using a coin or other flat, blunt object to pry it from the front, as shown in Figure 30.

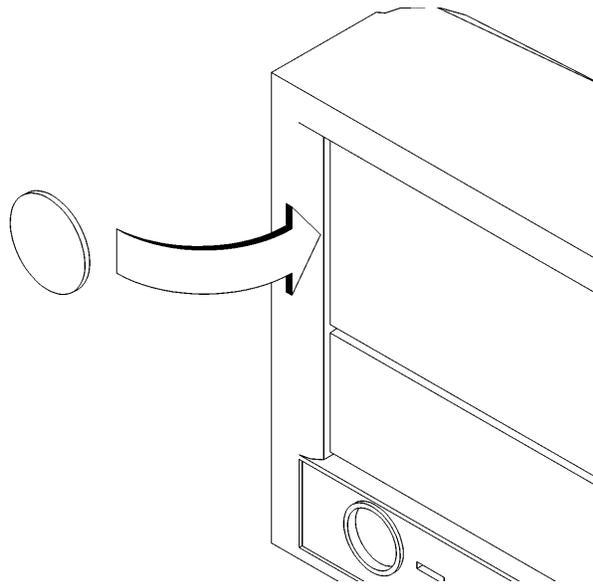


Figure 30

Removing a Disk Filler Panel

- 2 Reach into the storage bay and locate the power and data cables for the floppy drive.
Refer to the cable routing label on the storage tray. See Figure 31.
- 3 Connect the cables to the drive.



Changing Your Workstation's Hardware Configuration Installing Storage Devices

- 4 From the front of the storage tray, line up the disk slides on the floppy drive with the position 2 slots in the storage tray chassis and slide it into place, as shown in Figure 31.

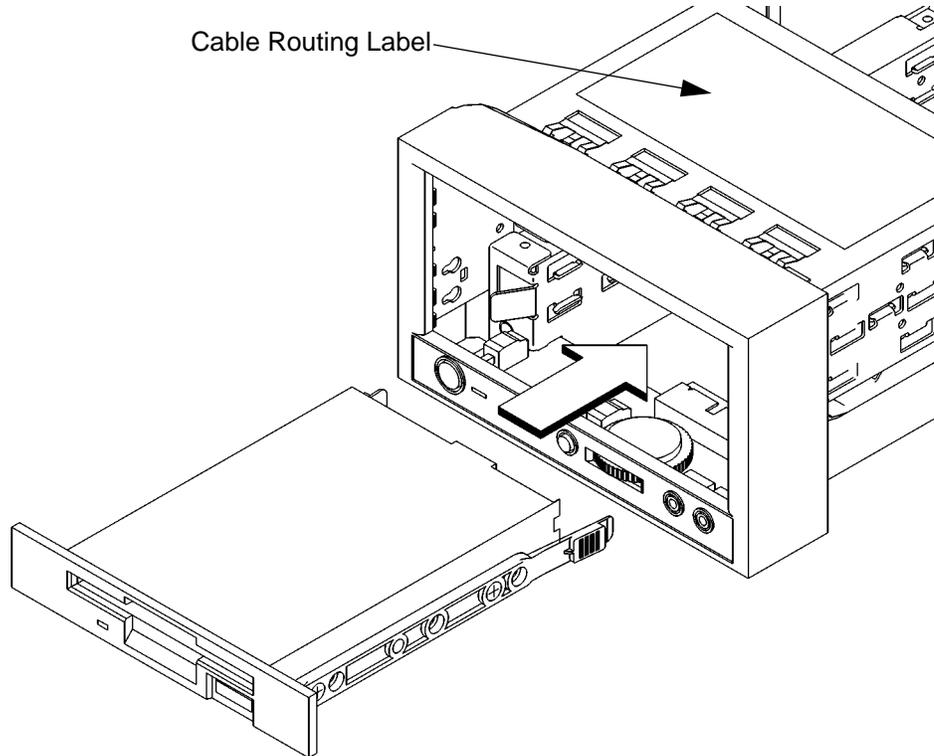


Figure 31 **Installing a Floppy Drive**

- 5 Push the floppy drive in until the locking tabs snap into place.
- 6 Proceed to the section entitled Replacing the Storage Tray.



Installing a Hard Disk Drive in Position 1

Perform the following procedure to install a hard disk drive:

- 1 Remove the disk filler panel from the bottom location of the bezel by using a coin or other flat, blunt object to pry it from the front, as shown in Figure 32.

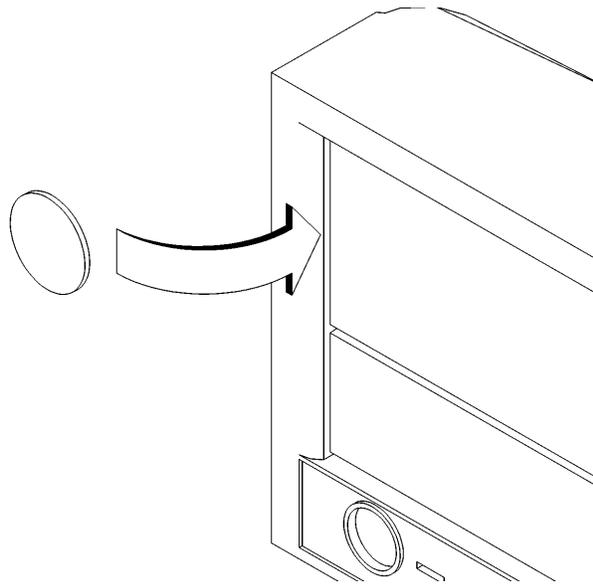


Figure 32

Removing a Disk Filler Panel

- 2 Reach into the storage bay and locate the power and data cables for the disk drive. Refer to the cable routing label on the storage tray. See Figure 33.
- 3 Connect the cables to the drive.
- 4 From the front of the storage tray, line up the disk slides on the hard disk drive with the position 1 slots in the storage tray chassis and slide it into place, as shown in Figure 33.



Changing Your Workstation's Hardware Configuration
Installing Storage Devices

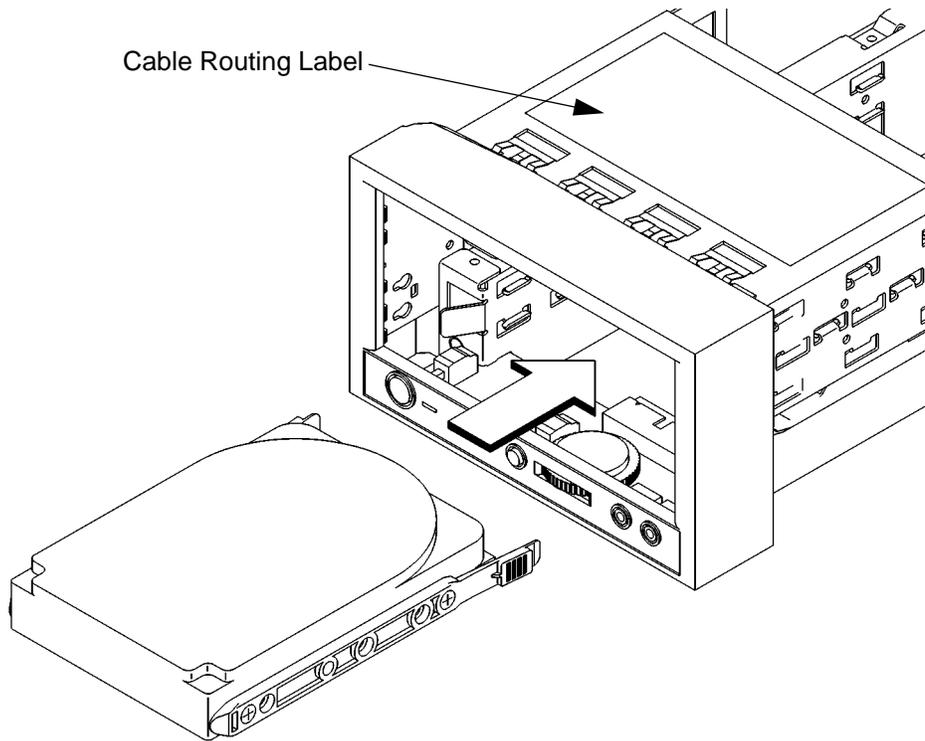


Figure 33

Installing a Hard Disk Drive in Position 1

- 5 Push the drive in until the locking tabs snap into place.
- 6 Snap the disk filler panel into the lower bezel position.
- 7 Proceed to the section entitled Replacing the Storage Tray.



Installing a Hard Disk Drive in Position 3 or Position 4

Perform the following procedure to install a hard disk drive in positions 3 or 4 of the disk tray:

- 1 Remove the two retaining screws from the disk interconnect board, as shown in Figure 34.

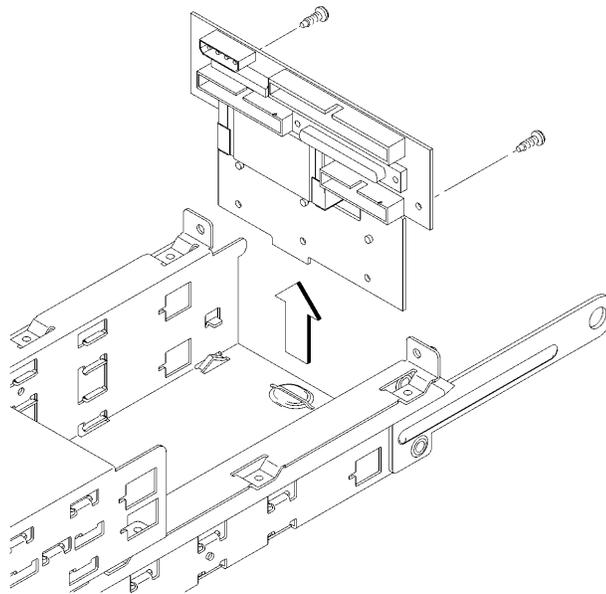


Figure 34

Removing the Disk Interconnect Board

- 2 Disconnect any cables from the disk interconnect board.
- 3 Hold the disk interconnect board on the edges and lift it straight up to remove it, as shown in Figure 34.



Changing Your Workstation's Hardware Configuration Installing Storage Devices

- 4 From the rear of the storage tray, line up the disk slides on the hard disk drive with the position 3 or position 4 slots in the storage tray chassis and slide it into place, as shown in Figure 35.

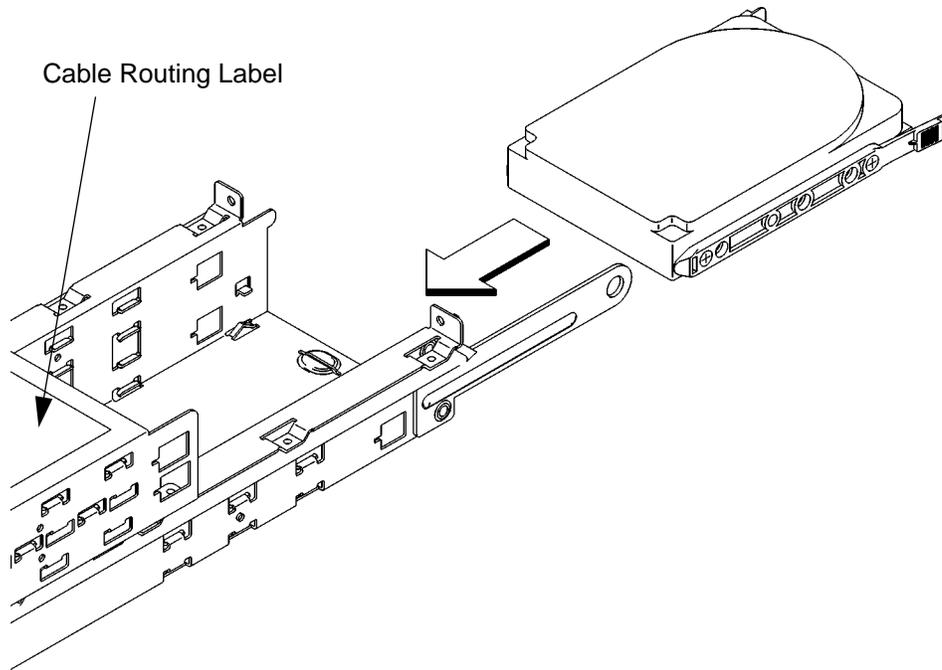


Figure 35 **Installing a Hard Disk Drive**

- 5 Push the storage device in until the locking tabs snap into place.
- 6 Connect the fast, wide SCSI data cable and the power cable to the drive.



Changing Your Workstation's Hardware Configuration
Installing Storage Devices

- 7 Slide the disk interconnect board into the storage tray, as shown in Figure 36.

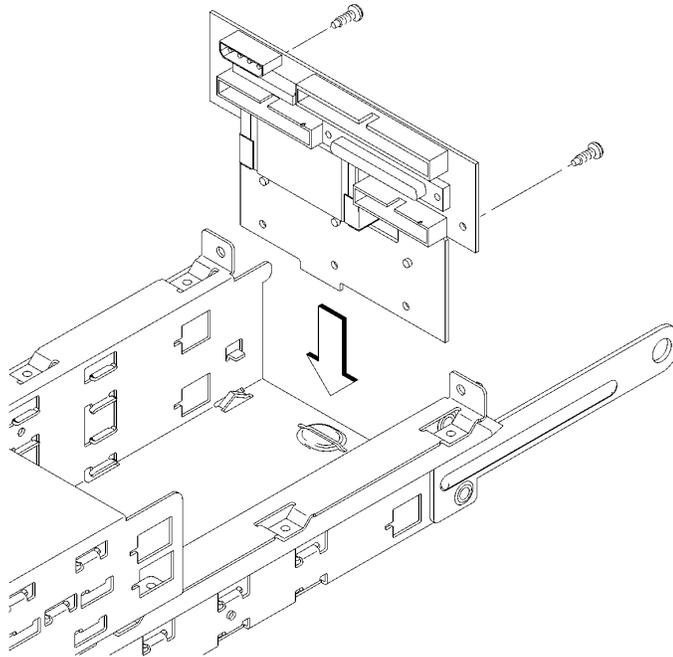


Figure 36

Installing the Disk Interconnect Board

- 8 Reconnect the human interface cable, and the disk drive data and power cables to the disk interconnect board.
- 9 Replace the disk interconnect board retaining screws and tighten them firmly, as shown in Figure 36.
- 10 Proceed to the section entitled "Replacing the Storage Tray."



Changing Your Workstation's Hardware Configuration
Installing Storage Devices

Replacing the Storage Tray

- 1 Slide the storage tray assembly into the system unit chassis, as shown in Figure 37.

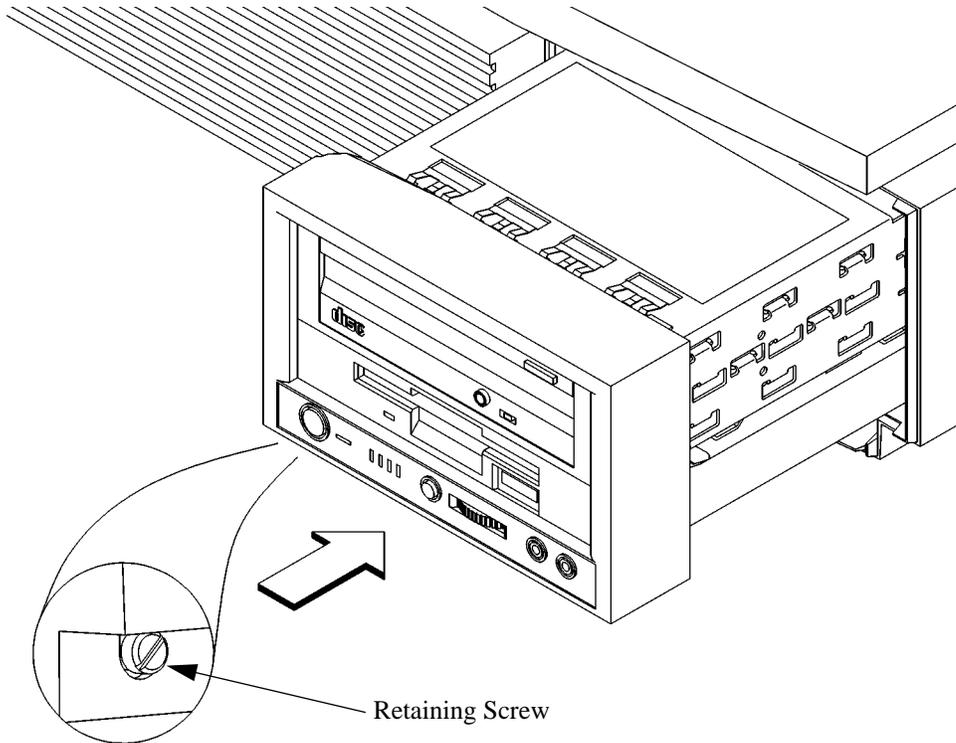


Figure 37

Installing the Storage Tray Assembly

- 2 Tighten the storage tray retaining screw, as shown in Figure 37.
- 3 Reconnect the power cords to the system unit, the monitor, and any peripherals. Connect the power cords to the ac wall outlets.
- 4 Power on any peripherals, the monitor, and the system unit.





Changing Your Workstation's Hardware Configuration
Installing Storage Devices

If you installed a new hard disk drive, proceed to the section entitled "Configuring a Hard Disk Drive."

If you installed a new removable media device, refer to the following chapters for information on using the device:

- Chapter 2 - Using Your CD-ROM Drive
- Chapter 3 - Using Your Digital Data Storage (DDS) Tape Drive
- Chapter 4 - Using Your 3.5-inch Floppy Disk Drive





Changing Your Workstation's Hardware Configuration

Installing Storage Devices

Configuring a Hard Disk Drive

This section describes how to add a hard disk drive to your system as a file system using SAM. If you installed a new hard disk drive, follow these instructions to make your new disk usable as a file system. For more information about configuring a hard disk drive, refer to the *System Administration Tasks* manual.

This procedure requires you to log in as **root**. If you cannot log in as **root**, contact your system administrator.

- 1 Log in as **root**.
- 2 In a terminal window, enter the following command:

```
sam RETURN
```

NOTICE:

SAM (System Administration Manager) is a utility that performs system administration tasks using a windows graphical user interface.

- 3 The **System Administration Manager** window opens. Double-click on **Peripheral Devices ->**.
- 4 The **Peripheral Devices** window opens. Double-click on **Disks and File Systems ->**.
- 5 The **Disks and File Systems** window opens. Double-click on **CD-ROM, Floppy, and Hard Disks**.

The following screen message appears:

```
Scanning the system's hardware...
```

The **CD-ROM, Floppy, and Hard Disks** window opens, containing a list of drives currently configured on this system.

- 6 From the Actions menu, click on **Add a Hard Disk Drive**.
- 7 The **Select a Disk to Add** window opens with a list of unused disks. Highlight the hard disk drive you want to add to your system.
- 8 Click on **OK**.





Changing Your Workstation's Hardware Configuration
Installing Storage Devices

9 The **Set Disk Usage and Options** window opens.

Select **File System** and click on **OK**.

10 The following screen messages appear:

```
Task started.  
Creating the device file...  
Modifying "/etc/checklist"...  
Task completed.
```

Click on **OK**.





Changing Your Workstation's Hardware Configuration

Removing the Main Tray Assembly

Removing the Main Tray Assembly

Perform the following steps to remove the main tray assembly:

- 1 Power off the system, the monitor, and any peripheral devices. Unplug the system unit power cord and the power cord of any peripheral devices from ac wall outlets. Disconnect the power cord from the system unit.

NOTICE:

There is no need to manually shut down the HP-UX operating system on your workstation before powering it off. When you turn off the power switch, your workstation automatically shuts down the operating system before terminating the power.

- 2 Disconnect cables from any peripheral devices.
- 3 Attach a static-grounding wrist strap to bare metal on the back panel of the system unit.
- 4 Completely loosen the four thumb screws on the rear of the system unit, as shown in Figure 38.

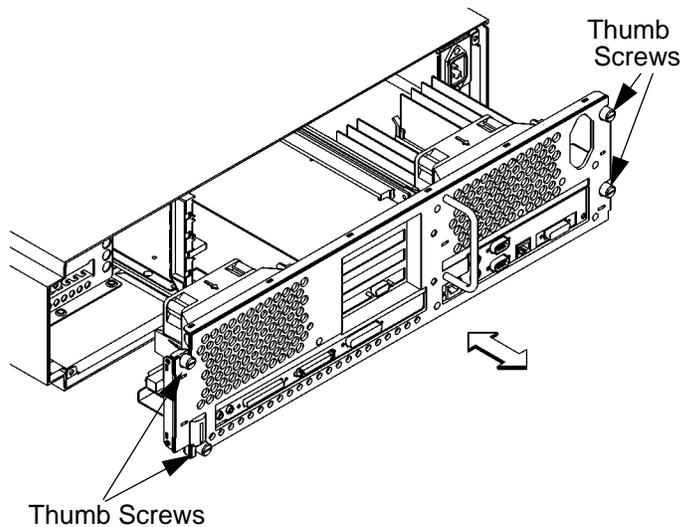


Figure 38

Removing Main Tray Assembly





Changing Your Workstation's Hardware Configuration
Removing the Main Tray Assembly

- 5 Place one hand on the top of the system unit and push, while pulling the handle on the rear panel with your other hand. See Figure 38.
- 6 Slide the main tray assembly out of the chassis.





Changing Your Workstation's Hardware Configuration
Replacing the Main Tray Assembly

Replacing the Main Tray Assembly

Perform the following steps to replace the main tray assembly:

- 1 Align the main tray assembly with the chassis and slide it into place, as shown in Figure 39.

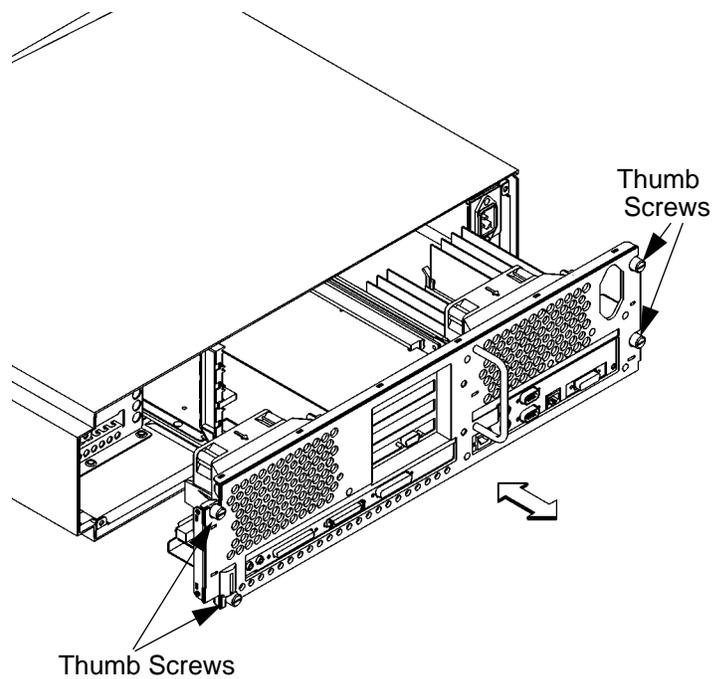


Figure 39

Replacing the Main Tray Assembly

- 2 Slide the main tray in until you feel it make contact with the internal connectors.
- 3 Push firmly and evenly on the main tray assembly to make sure that all connectors are fully seated.
- 4 Start all four thumb screws loosely, then tighten them firmly See Figure 39.

NOTICE:

To maintain FCC/EMI compliance, verify that the main tray is fully seated and all four thumb screws are completely tightened.





Changing Your Workstation's Hardware Configuration
Replacing the Main Tray Assembly

- 5 Reconnect the power cables and any other cables that you disconnected when opening the workstation.
- 6 Power on the monitor, any peripheral devices, and the system unit.





Changing Your Workstation's Hardware Configuration
Installing Additional memory

Installing Additional memory

Take a moment to read over the following important notes about installing memory.

- Before you attempt to install additional memory modules in your C160L workstation, use the procedure described in Appendix D, “The Boot Console Interface,” to determine the current memory configuration for this workstation.
- Read over the steps involved in installing memory modules before you begin.
- You must insert memory modules in pairs of equal size.
- Modules must be inserted in the lowest numbered memory pair first, then in numerical order. For example, install memory in 0A and 0B first, then 1A and 1B, 2A and 2B, and 3A and 3B. Refer to Figure 36 for memory pair numbering and location. Refer to Table 19 for allowable memory configurations.
- When you have finished installing additional memory modules, use the Boot Console Interface to verify that they are seen by the workstation.



Table 19 shows the allowable memory configurations.

Table 19 Allowable Memory Configurations

| Configuration Number | Pair 0 | | Pair 1 | | Pair 2 | | Pair 3 | | Total MB |
|----------------------|--------|----|--------|----|--------|----|--------|----|----------|
| | A | B | A | B | A | B | A | B | |
| 1 | 16 | 16 | | | | | | | 32 |
| 2 | 16 | 16 | 16 | 16 | | | | | 64 |
| 3 | 16 | 16 | 16 | 16 | 16 | 16 | | | 96 |
| 4 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 128 |
| 5 | 32 | 32 | | | | | | | 64 |
| 6 | 32 | 32 | 16 | 16 | | | | | 96 |
| 7 | 32 | 32 | 16 | 16 | 16 | 16 | | | 128 |
| 8 | 32 | 32 | 16 | 16 | 16 | 16 | 16 | 16 | 160 |
| 9 | 32 | 32 | 32 | 32 | | | | | 128 |
| 10 | 32 | 32 | 32 | 32 | 16 | 16 | | | 160 |
| 11 | 32 | 32 | 32 | 32 | 16 | 16 | 16 | 16 | 192 |
| 12 | 32 | 32 | 32 | 32 | 32 | 32 | | | 192 |
| 13 | 32 | 32 | 32 | 32 | 32 | 32 | 16 | 16 | 224 |
| 14 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 256 |
| 15 | 64 | 64 | | | | | | | 128 |
| 16 | 64 | 64 | 16 | 16 | | | | | 160 |
| 17 | 64 | 64 | 16 | 16 | 16 | 16 | 16 | 16 | 192 |
| 18 | 64 | 64 | 32 | 32 | | | | | 192 |
| 19 | 64 | 64 | 32 | 32 | 16 | 16 | | | 224 |
| 20 | 64 | 64 | 32 | 32 | 16 | 16 | 16 | 16 | 256 |

Changing Your Workstation's Hardware Configuration
Installing Additional memory

Table 19 Allowable Memory Configurations

| Configuration Number | Pair 0 | | Pair 1 | | Pair 2 | | Pair 3 | | Total MB |
|----------------------|--------|----|--------|----|--------|----|--------|----|----------|
| | A | B | A | B | A | B | A | B | |
| 21 | 64 | 64 | 32 | 32 | 32 | 32 | | | 256 |
| 22 | 64 | 64 | 32 | 32 | 32 | 32 | 16 | 16 | 288 |
| 23 | 64 | 64 | 32 | 32 | 32 | 32 | 32 | 32 | 320 |
| 24 | 64 | 64 | 64 | 64 | | | | | 256 |
| 25 | 64 | 64 | 64 | 64 | 16 | 16 | | | 288 |
| 26 | 64 | 64 | 64 | 64 | 16 | 16 | 16 | 16 | 320 |
| 27 | 64 | 64 | 64 | 64 | 32 | 32 | | | 320 |
| 28 | 64 | 64 | 64 | 64 | 32 | 32 | 16 | 16 | 352 |
| 29 | 64 | 64 | 64 | 64 | 32 | 32 | 32 | 32 | 384 |
| 30 | 64 | 64 | 64 | 64 | 64 | 64 | | | 384 |
| 31 | 64 | 64 | 64 | 64 | 64 | 64 | 16 | 16 | 416 |
| 32 | 64 | 64 | 64 | 64 | 64 | 64 | 32 | 32 | 448 |
| 33 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 64 | 512 |

Changing Your Workstation's Hardware Configuration

Installing Additional memory

Perform the following steps to add memory modules to your workstation.

- 1 Remove the main tray assembly according to the directions in "Removing the Main Tray Assembly" earlier in this appendix.
- 2 Use Figure 36 to locate the memory modules on the CPU Assembly.

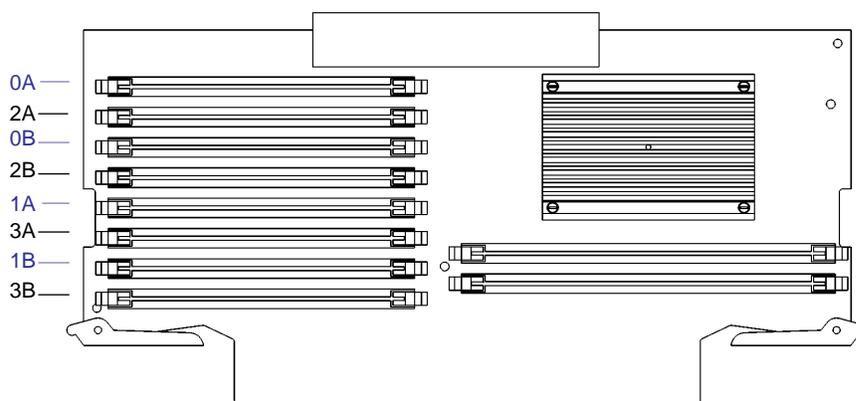


Figure 40 Memory Connectors (Model C160L)

This workstation has 8 memory slots, labeled 0A, 0B through 3A, 3B. The memory configuration is 32 MB to 512 MB installed in pairs of 16 MB, 32 MB, or 64 MB memory modules.

Memory modules must be installed in pairs of equal capacity.

Always install the largest capacity memory modules in the lowest numbered memory slots.

For example, if you have a pair of 16 MB memory modules and a pair of 64 MB memory modules, first install the pair of 64 MB memory modules in slots 0A and 0B, then install the 16 MB modules in slots 1A and 1B.

NOTICE:

Memory slots must be filled in order from 0A and 0B through 3A and 3B.

- 3 Close the ejector tabs on each side of the memory connector to lessen the force needed to seat the memory module. See Figure 41.

Changing Your Workstation's Hardware Configuration
Installing Additional memory

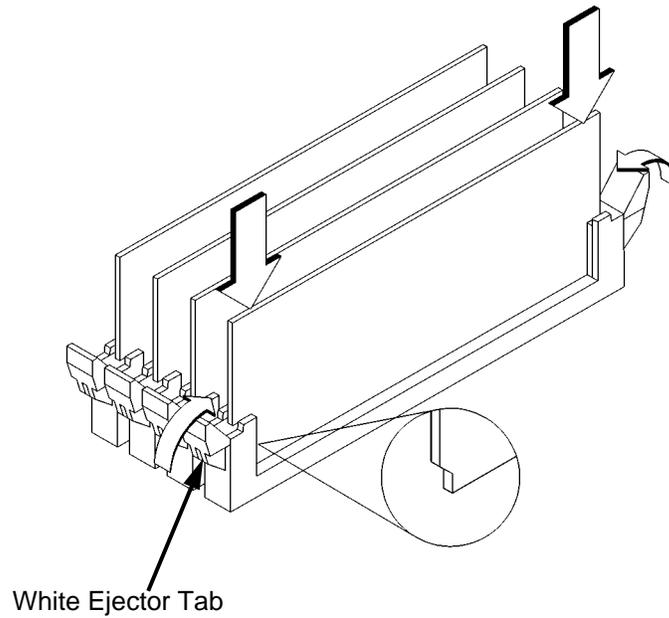


Figure 41

Installing Memory Modules

- 4 Place the memory module in the connector, lining it up with the guides. Make sure to put the notched end toward the white ejector tab (toward the rear of the main tray), as shown in Figure 41.
- 5 Press firmly and evenly on the memory module to ensure that it seats properly.



Changing Your Workstation's Hardware Configuration
Installing Additional memory

- 6 Replace the main tray assembly as described in "Replacing the Main Tray Assembly," earlier in this appendix.

To verify that this installation was successful, follow the steps in Appendix D, "The Boot Console Interface," on displaying memory information. If you have only replaced a faulty memory module, you must issue the **pdt clear** command in the service menu of the Boot Console Interface. Answer yes (**y**) to the prompt "Continue? (Y/N) >."





Changing Your Workstation's Hardware Configuration
Installing Second Level Cache Boards

Installing Second Level Cache Boards

Before installing second level cache boards, perform the procedure in Removing the Main Tray Assembly on page 118.

Follow these steps to install second level cache boards into your C160L workstation.

- 1 Locate the cache board connectors on the CPU board, as shown in Figure 42.

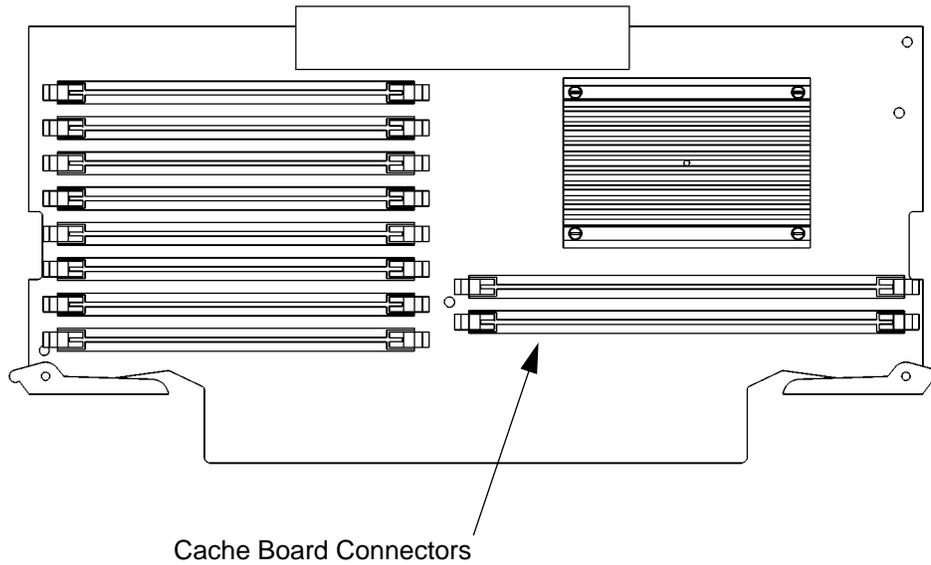


Figure 42 **Cache Boards Location**



Changing Your Workstation's Hardware Configuration Installing Second Level Cache Boards

- 2 Open the ejector tabs on each side of the cache connector and line the cache board up with the guides making sure that the keying notches along the connector edge of the board are away from the memory modules, as shown in Figure 43.

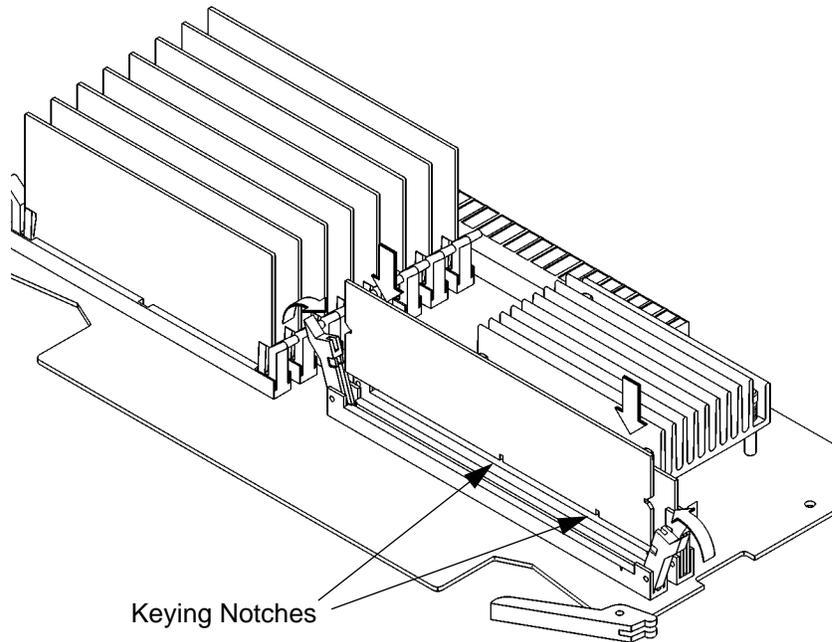


Figure 43 **Installing Cache Boards**

NOTICE: You must install cache boards in pairs of equal size.

- 3 Press firmly and evenly on the cache board to ensure that it is fully seated. The ejector tabs will close and engage the notches on the sides of the cache board as you push down.
- 4 Perform the procedure in Replacing the Main Tray Assembly on page 120.



Changing Your Workstation's Hardware Configuration
Installing the EGRAM (Enhanced Graphics RAM) Module

Installing the EGRAM (Enhanced Graphics RAM) Module

Before installing the EGRAM module, perform the procedure in Removing the Main Tray Assembly on page 118.

Perform the following steps to add the EGRAM module to your workstation:

- 1 Press the release clip and rotate the EISA fan, as shown in Figure 44.

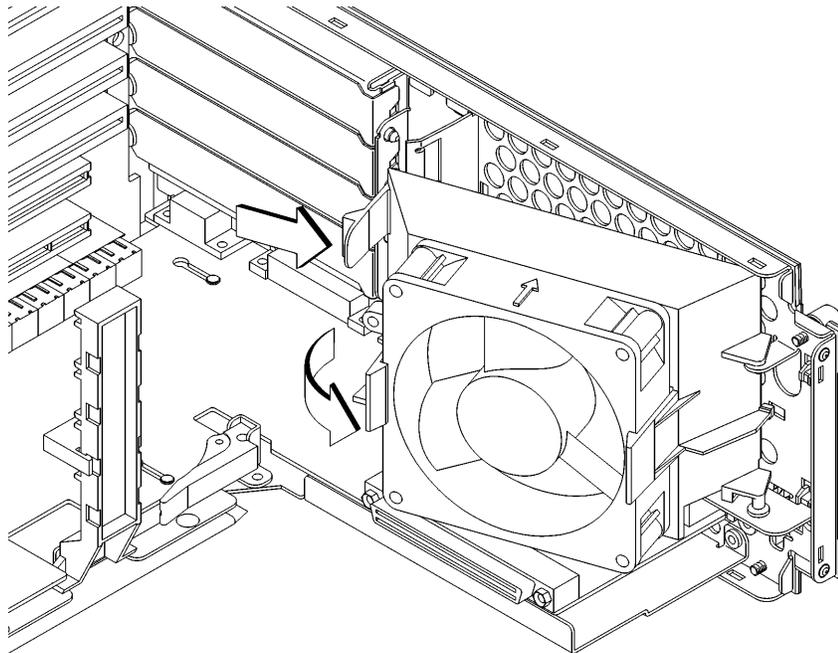


Figure 44 **Rotating the EISA Fan**



Changing Your Workstation's Hardware Configuration
Installing the EGRAM (Enhanced Graphics RAM) Module

- 2 Slide the EISA slider to the side to remove it, as shown in Figure 45.
- 3 Remove the screw from the EISA retainer and remove it, as shown in Figure 45.

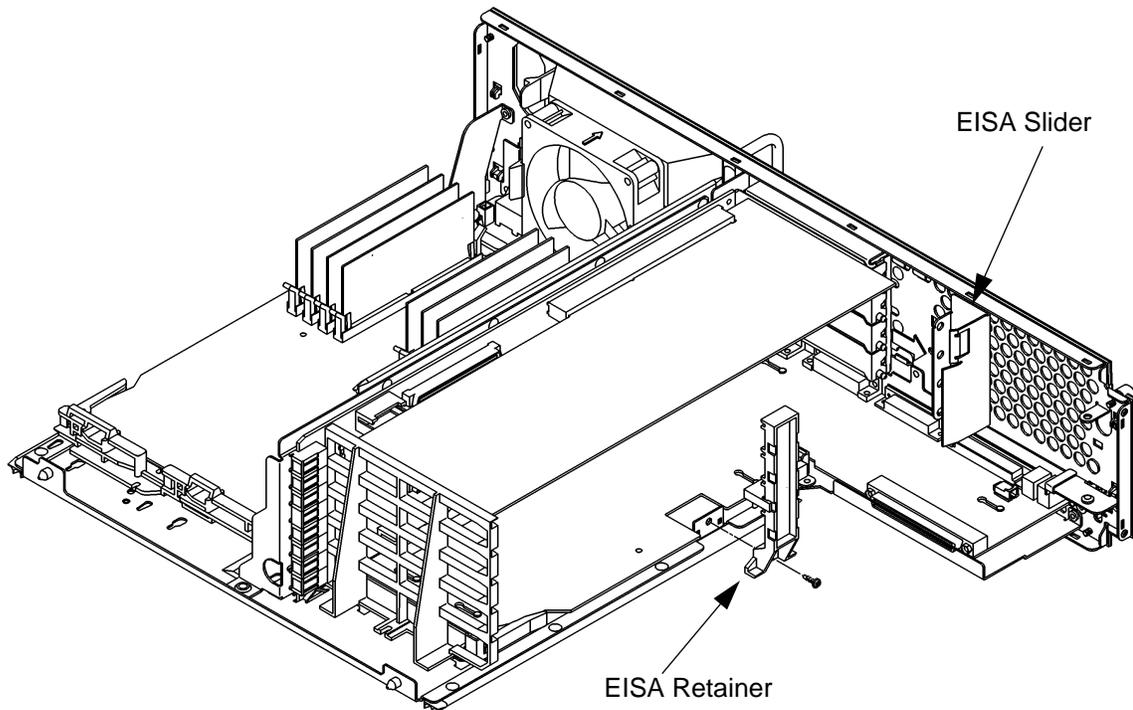


Figure 45 **Removing the EISA Slider and Retainer**

- 4 Grasp the option board by the edge with both hands and pull it straight out.
Remove all option boards, making note of which option slot each one was installed in.

NOTICE

All boards **must** be replaced in their original slots or your system may not run properly.



Changing Your Workstation's Hardware Configuration Installing the EGRAM (Enhanced Graphics RAM) Module

- 5 Install the standoffs into the EGRAM module, as shown in Figure 46. Push the standoffs into the holes on the module until the clips fully engage with the board.
- 6 Align the connector on the EGRAM module with the connector on the I/O board, while aligning the standoffs with les in the EGRAM module with the standoffs. See Figure 46.

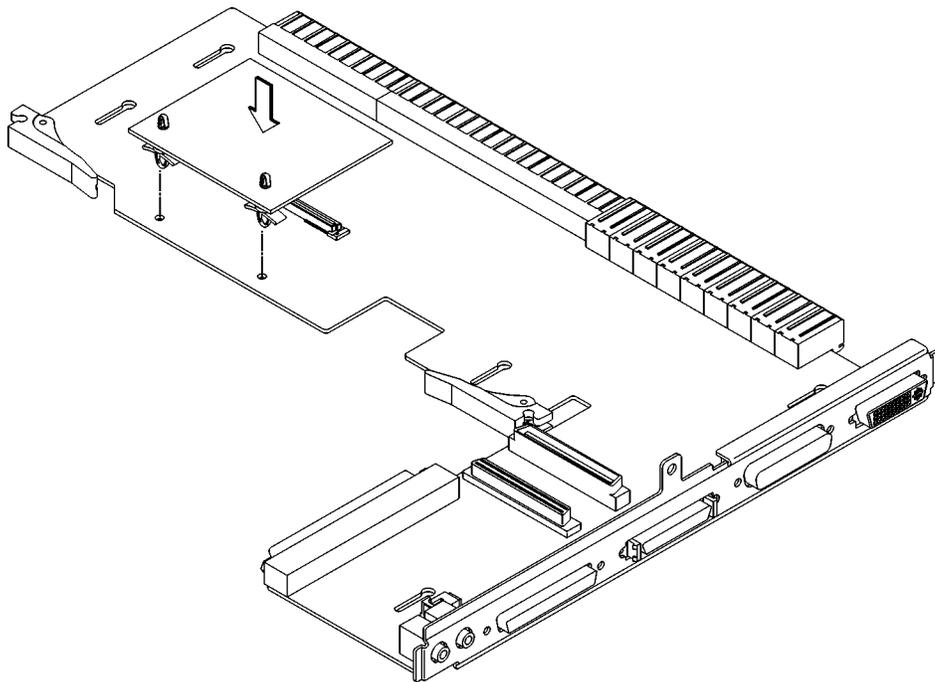


Figure 46 **Installing the EGRAM Module**

- 7 Connect the EGRAM module to the I/O board. Push down firmly on the connector area to make sure it is fully seated. Push firmly near the standoffs to make sure that they are fully engaged with the EGRAM module.



Changing Your Workstation's Hardware Configuration
Installing the EGRAM (Enhanced Graphics RAM) Module

- 8 Make sure that the EISA fan is fully rotated, as shown in Figure 47.

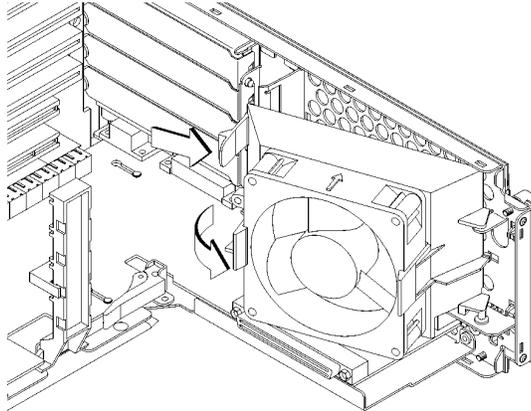


Figure 47 Rotating the EISA Fan

- 9 Slide the option boards into the slots that they came out of, as shown in Figure 48. Make sure that the hole in each board's handle aligns with the pin on the back panel.

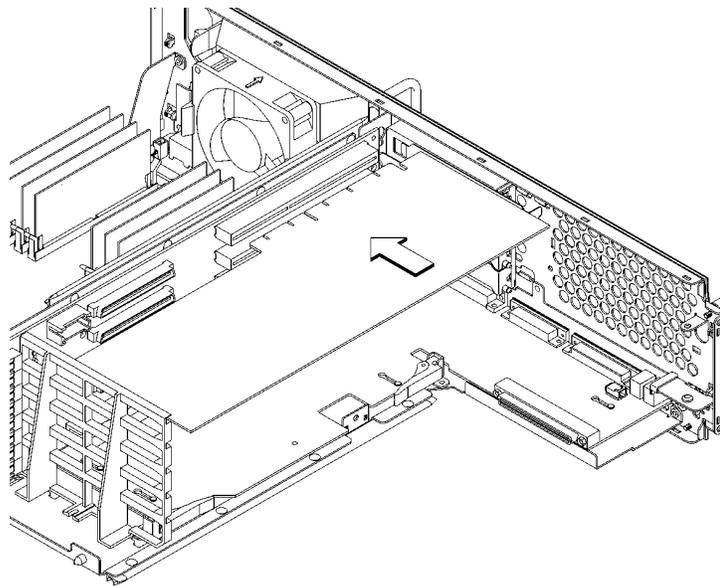


Figure 48 Installing an Option Board



Changing Your Workstation's Hardware Configuration
Installing the EGRAM (Enhanced Graphics RAM) Module

- 10 Press in firmly on both ends of the option board at the same time to make sure that it is firmly seated in the backplane connector.
- 11 Replace the EISA retainer and its screw, as shown in Figure 49.
- 12 Replace the EISA slider, as shown in Figure 49.

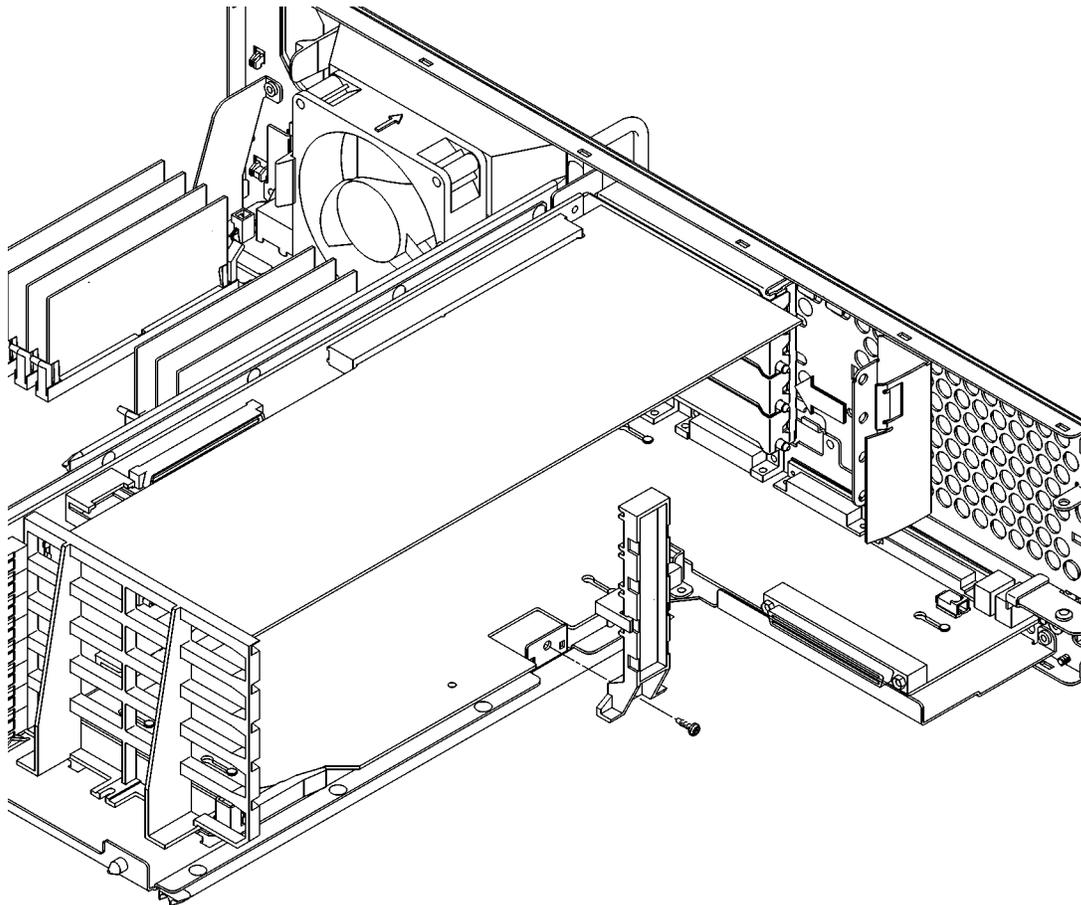


Figure 49 **Installing the EISA Retainer and EISA Slider**



Changing Your Workstation's Hardware Configuration
Installing the EGRAM (Enhanced Graphics RAM) Module

13 Rotate the fan back into place, as shown in Figure 50. Push it into the rear panel firmly until the clip snaps into place.

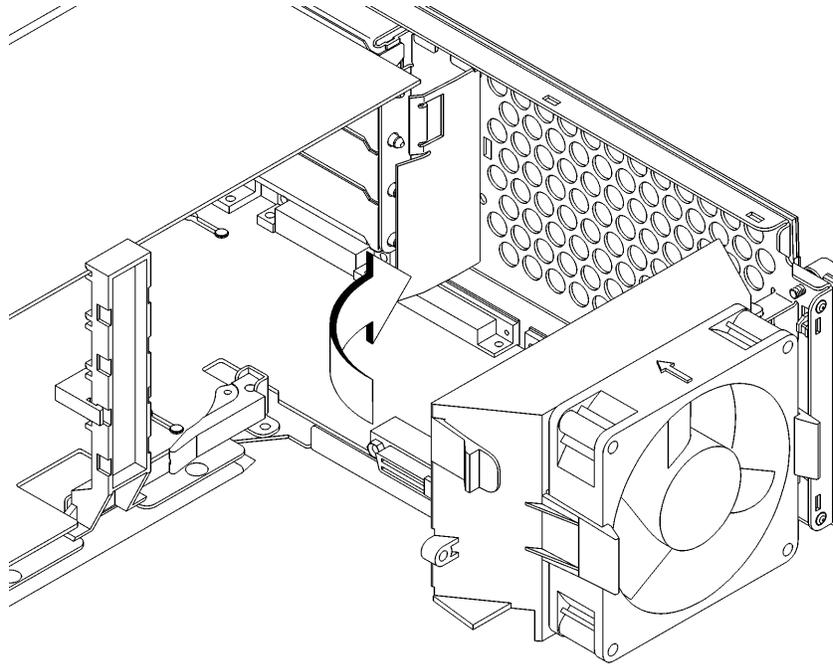


Figure 50 **Securing the Fan**

14 Replace the main tray assembly as described in Replacing the Main Tray Assembly on page 120.



Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

Installing an EISA, PCI, or GSC Option Board

Your workstation has 4 option slots, as shown in Figure 51. Slots 1 and 2 support GSC or EISA boards, slot 3 supports EISA or PCI boards, and slot 4 supports only PCI boards..

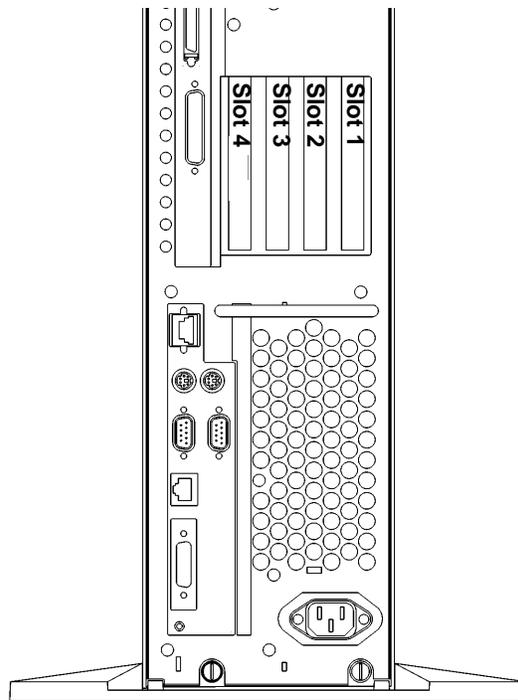


Figure 51 **Option Slots from Outside the System Unit**





Graphics Adapter Considerations

If you are installing a graphics option, read the information in this section first.

Special Video Configuration Statements

The following statements apply only to those applications which include a cable connected to the S-Video connector on the A4248A card. No modification to the regulatory statements is necessary for applications which include cables connected to other connectors on the card but not to the S-Video connector.

For EN55022 or CISPR 22 Applications:

WARNING:

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

For FCC Applications:

NOTICE:

This equipment has been tested and found to comply with the limits for a Class A digital device, 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 instruction 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 will be required to correct the interference at his own expense.





Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

Graphics Paths

graphics(0) is the built-in 8-plane graphics adapter.

graphics(1) and *graphics(2)* are graphics adapters installed in option slots 1 and 2.

When a dual display graphics adapter (an adapter which has two video output connectors) is installed, the video connector on the left (when looking at the system from the rear) is *graphicsNA* and the video connector on the right is *graphicsNB*, where *N* is the slot number in which the graphics adapter is installed.

For example, a Dual Visualize Enhanced Graphics Card (A4451A) installed in option slot 2 would be *graphics(2A)* and *graphics(2B)*.





Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

Graphics Configuration Restrictions

The system supports only four graphics displays at a time. A “display” is a video output port or connector. For example, the Dual Visualize Enhanced Graphics Card (A4451A) is a dual display card. It has two external video connectors so it accounts for two of the maximum of four displays. If you installed one of these cards, and a Visualize Enhanced Graphics Card (A4450A), plus the built-in EG Graphics they would account for the maximum of four displays supported by the system.

The built-in graphics adapter accounts for one graphics display (*graphics(0)*).

NOTICE:

The A4077A Color Graphics Card and A4078A Dual Color Graphics Card are not supported in the Model C160L. Also the older HCRX-8Z (A4079B), and HCRX-24Z (A4071B & A4072A) are not supported.

Optional graphics adapters may only be installed in option slots 1 and 2 since only these 2 slots support GSC boards.





Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

Installing the Option Board

Follow these steps to install a GSC, EISA, or PCI board into your workstation:

- 1 Remove the main tray assembly as described in "Removing the Main Tray Assembly" earlier in this appendix.
- 2 Press the fan release clip and rotate the fan, as shown in Figure 52.

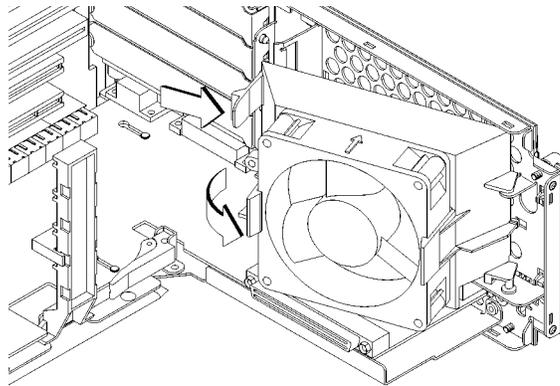


Figure 52

Rotating the Fan

- 3 Remove the screw from the EISA retainer, and remove the EISA retainer, as shown in Figure 53.

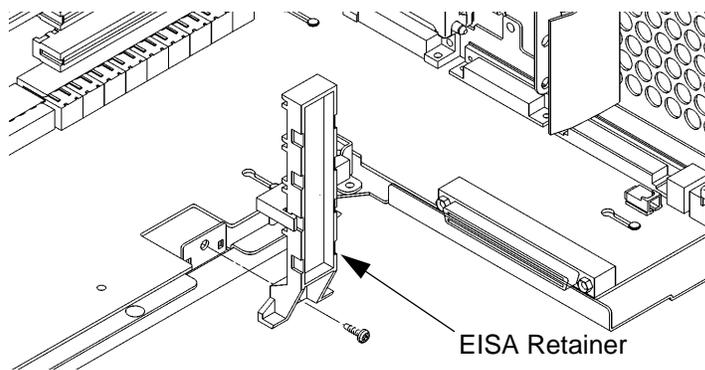


Figure 53

Removing the EISA Retainer



Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

- 4 Remove the EISA slider, as shown in Figure 54.
- 5 In the desired EISA slot, turn the blank plate's locking knob counter-clockwise to unlock the plate, as shown in Figure 54.

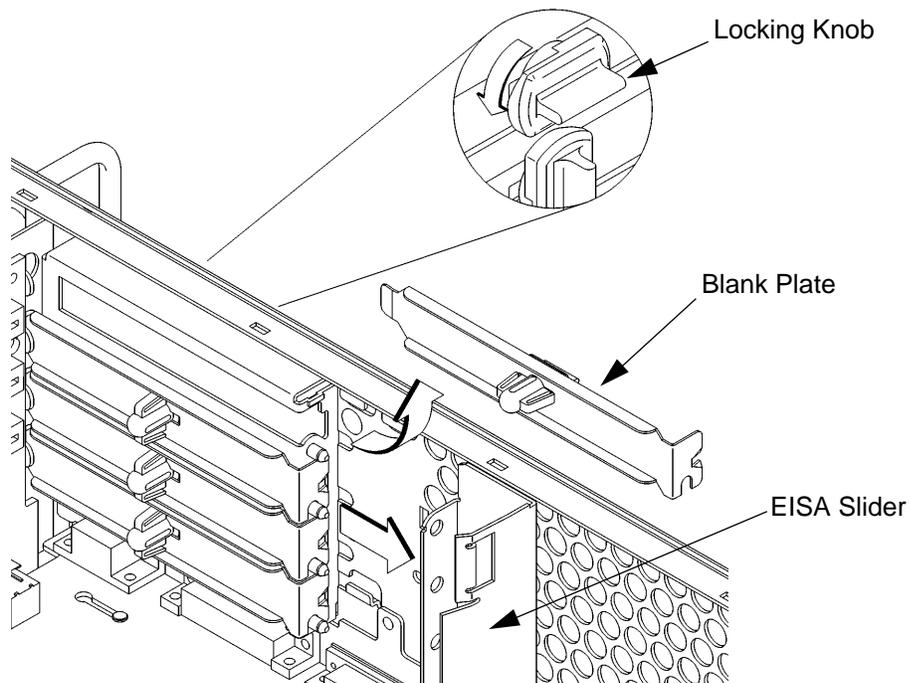


Figure 54 Removing the EISA Slider and Blank Plate

- 6 Remove the blank plate from the slot, as shown in Figure 54.



Changing Your Workstation's Hardware Configuration Installing an EISA, PCI, or GSC Option Board

- 7 Slide the board into the slot, as shown in Figure 55. Make sure that the hole in the board's handle aligns with the pin on the back panel.

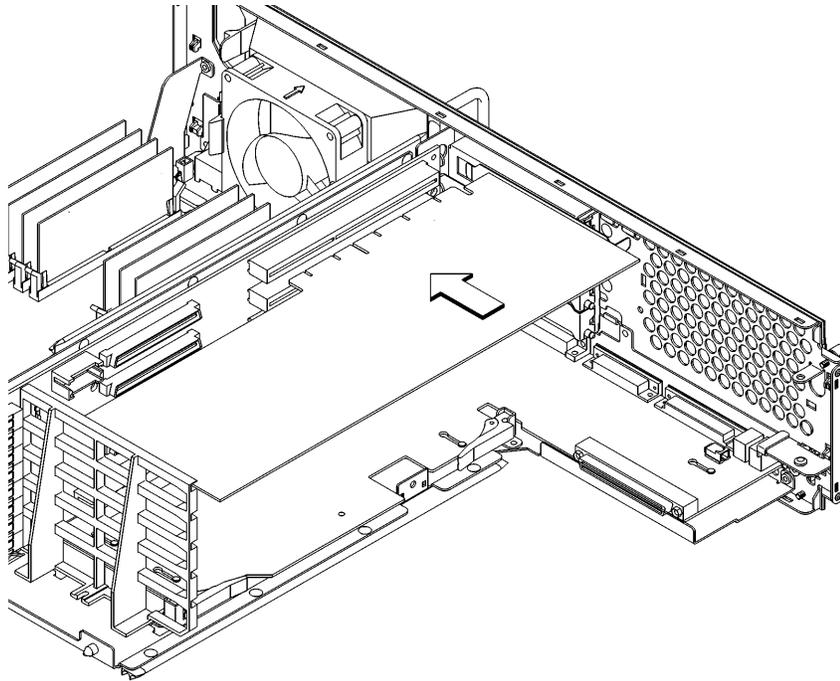


Figure 55 **Installing an Option Board**

- 8 Press in firmly on both ends of the option board at the same time to make sure that it is firmly seated in the backplane connector.



Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

9 Replace the EISA retainer and its screw, as shown in Figure 56.

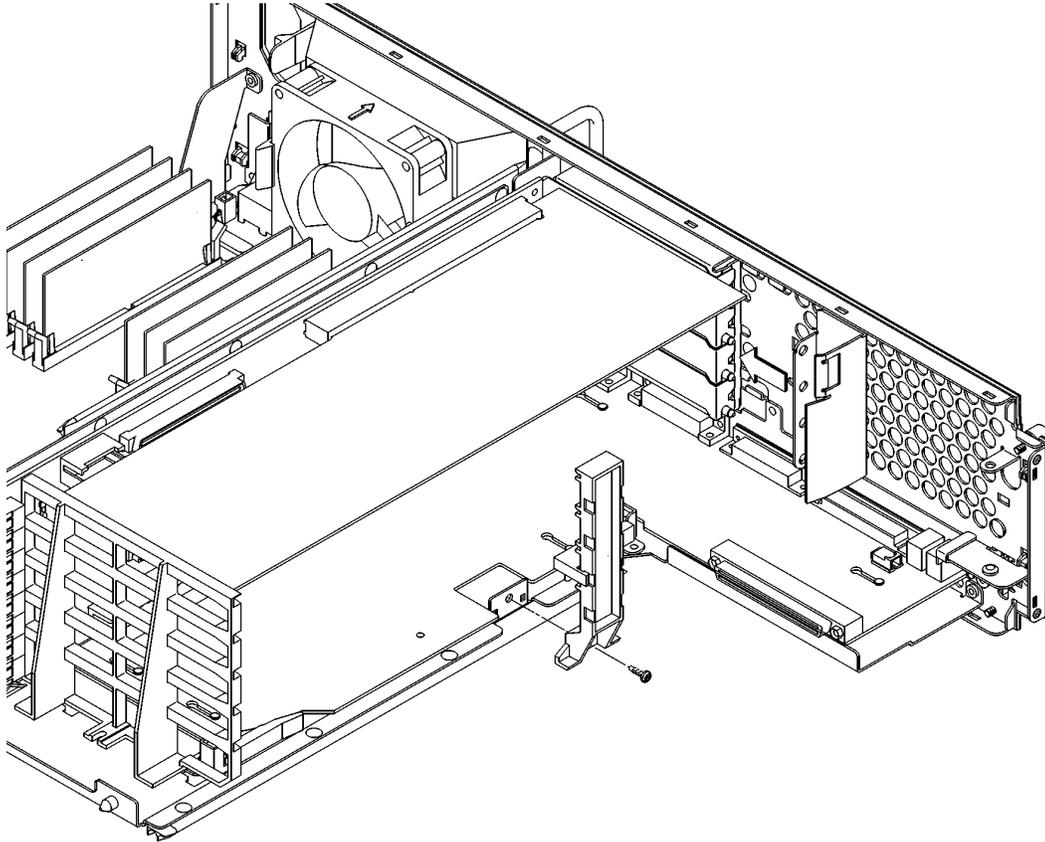


Figure 56 Installing the EISA Retainer and EISA Slider

10 Replace the EISA slider, as shown in Figure 56.

Changing Your Workstation's Hardware Configuration
Installing an EISA, PCI, or GSC Option Board

- 11 Rotate the fan back into place, as shown in Figure 57. Push it into the rear panel firmly until the clip snaps into place.

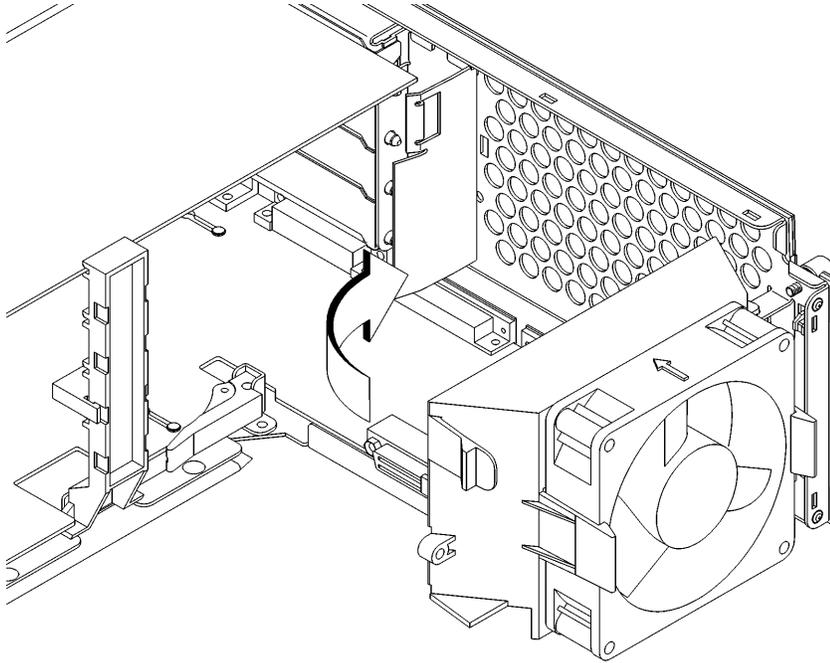


Figure 57 **Securing the Fan**

- 12 Replace the main tray assembly as described in “Replacing the Main Tray Assembly” earlier in this appendix.

Replacing the Battery

- 1 Remove the main tray as described in "Removing the Main Tray Assembly" earlier in this chapter.
- 2 Note the orientation of the battery. Make sure that you put the new battery in place with the positive (+) side facing in the same direction.
- 3 Lift the clip and slip the battery out of its holder, as shown in Figure 42.

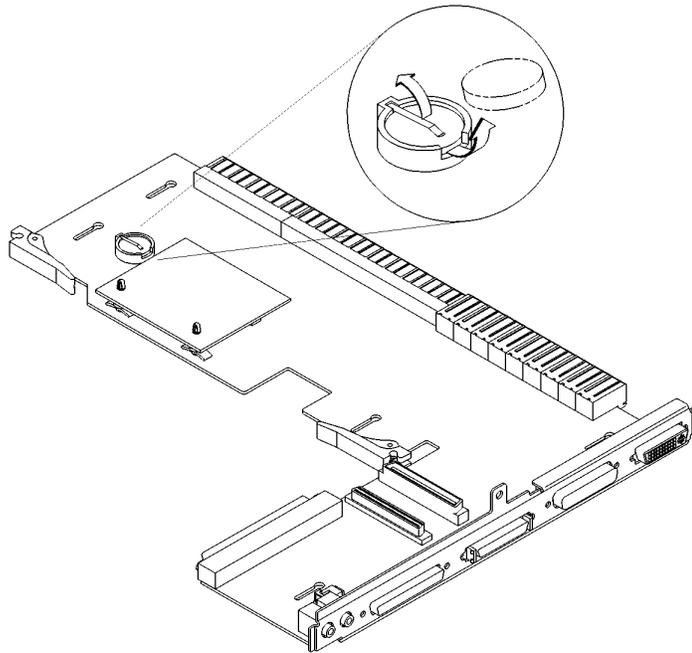


Figure 58 **Removing the Battery**



Changing Your Workstation's Hardware Configuration

Replacing the Battery

- 4 Insert the new battery in the same orientation as the old one. (Use only HP part number 1420-0314 or equivalent.)

NOTICE:

If you cannot gain access to the battery, you may need to remove an option board. Refer to “Installing an EISA, PCI, or GSC Option Board” earlier in this chapter for information on accessing the option boards.

CAUTION:

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

ATTENTION:

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

- 5 Follow the instructions in “Replacing the Main Tray Assembly” earlier in this chapter, to close and restart the system.





Changing Your Monitor Type

Your system ships from the factory preset to use a monitor with a specific resolution and frequency. If you replace your monitor with a different type, you must reconfigure your workstation to support it.

There are two ways to reconfigure your workstation to support a different monitor type:

Setting the Monitor Type from the Boot Console Interface

To change your workstation's graphics parameters *before* you replace your monitor, go to "Displaying and Setting the Monitor Type" in Appendix D.

Setting the Monitor Type at Power On

If you replace your workstation's monitor with a different monitor type, and do not set the workstation's graphics parameters by using the monitor command before doing so, you need to perform the following:

If your keyboard connects to the PS/2 connector on your system, wait 2 seconds after the Num Lock light flashes near the end of the boot sequence, then press **Tab** to initiate the automatic monitor selection process.

If you have a keyboard that connects to the HIL connector on your system, press **Tab** every three seconds during the boot sequence to initiate the automatic monitor selection process.

Your system queries you for the new monitor type. Select the new type by pressing **Enter**. The system queries you to confirm your selection. Press **y** to save this monitor type.

If you don't press **y**, the system stops cycling. You can use the **monitor graphics** command in the configuration menu to change monitor type.





Changing Your Workstation's Hardware Configuration
Changing Your Monitor Type





C



SCSI Connections





SCSI Connections

This appendix provides information about connecting Small Computer System Interface (SCSI) devices to an HP 9000 C100/C110 workstation. It presents the information in the following sections:

- SCSI bus differences
- SCSI restrictions
- Determining SCSI bus length
- Assigning SCSI device IDs
- Connecting to the SCSI ports

The instructions in this chapter assume you are using HP-UX version 9.05 or later operating system with HP VUE version 3.0 or later interface.

NOTICE

When attaching external SCSI devices, be sure to terminate the last device on the external SCSI bus.



SCSI Bus Differences

A Small Computer Systems Interface (SCSI) bus is an IEEE standard bus for connecting your workstation to internal and external devices (SCSI devices) running at different speeds, singly or in combination. Examples of these SCSI devices are 4-mm DDS-format tape drives, CD-ROM drives, and Winchester hard disk drives.

There are two types of SCSI buses available with this workstation - a single-ended SCSI bus (SE SCSI), and a fast, wide SCSI bus (FW SCSI). Table 20 shows the specification differences between these SCSI buses, and Table 21 shows the SCSI addresses, ID numbers, and arbitration priorities for each.

CAUTION:

Do not mix single-ended and fast, wide devices on any one bus type. Doing this will cause a system failure.

Table 20 SCSI Bus Differences

| Transfer Rate | Data Bus Width | Maximum Addresses* | Maximum Cable Length | Device Physical Location | Controller Embedded or Pluggable |
|--|----------------|--------------------|---------------------------|--------------------------|----------------------------------|
| Single-Ended | 8 bits | 8 | 6.0 meters (19.6 feet) | Internal and external | Embedded |
| Up to 5 Mbytes per second | | | | | |
| Fast, Wide | 16 bits | 16 | 25 meters (82 feet) | Internal and external | Embedded |
| Up to 20 Mbytes per second | | | | | |
| * Address 7 is reserved for host controller use on both buses. | | | | | |

SCSI Connections
SCSI Bus Differences

Table 21 SCSI Bus Addresses, ID Numbers, and Arbitration Priorities

| | SCSI Address | SCSI ID Number | | Priority |
|--|--------------|-----------------------|-----------------------|----------|
| | | 15 8 | 7 0 | |
| 8-bit Devices Single-Ended SCSI Bus | 7 | | 1 | 1 |
| | 6 | | . 1 | 2 |
| | 5 | | . . 1 | 3 |
| | 4 | | . . . 1 | 4 |
| | 3 | | 1 | 5 |
| | 2 | | 1 | 6 |
| | 1 | | 1 | 7 |
| | 0 | | 1 | 8 |
| 16-bit Devices Fast, Wide SCSI Bus | 15 | 1 | | 9 |
| | 14 | . 1 | | 10 |
| | 13 | . . 1 | | 11 |
| | 12 | . . . 1 | | 12 |
| | 11 | 1 | | 13 |
| | 10 | 1 | | 14 |
| | 9 | 1 | | 15 |
| | 8 | 1 | | 16 |

SCSI Restrictions

This section describes the SCSI restrictions that apply to your workstation in the following areas:

- Cables
- Connectors and Terminator
- SCSI configuration constraints

Cables

All SCSI devices ship without cables. Only SCSI cables approved by HP can be used to connect your workstation and any SCSI devices. HP offers the following SCSI cables for single-ended SCSI devices:

- K2296 cable with 0.9 meter (3 feet) length
- K2297 cable with 1.5 meter (5 feet) length

HP offers the following SCSI cables for connecting externally connected devices to the system fast, wide port:

- C2911A cable with 0.9 meter (3 feet) length
- C2924A cable with 2.5 meter (8.2 feet) length
- C2925A cable with 10.0 meter (32.8 feet) length
- C2926A cable with 20.0 meter (65.6 feet) length

CAUTION:

SCSI cables approved by HP are designed to function within the SCSI tolerances for HP devices. Use of other cables can result in significant problems with system operation.

The singled-ended SCSI definition limits the total cable length of SE SCSI cables to 6 meters (19.6 feet).

The fast, wide SCSI definition limits the total cable length of FW SCSI cables to 25 meters (82 feet).

Always use the shortest possible cable(s) for your configuration.



SCSI Connections SCSI Restrictions

If you are daisy-chaining SE SCSI devices together, use the following cables:

- 92222A cable with 0.5 meter (1.6 feet) length
- 92222B cable with 1.0 meter (3.2 feet) length
- 92222C cable with 2.0 meter (6.6 feet) length

If you are daisy-chaining FW SCSI devices together, use the following cables:

- C2911A cable with 0.9 meter (3 feet) length
- C2924A cable with 2.5 meter (8.2 feet) length
- C2925A cable with 10.0 meter (32.8 feet) length
- C2926A cable with 20.0 meter (65.6 feet) length

NOTICE

See "Determining SCSI Bus Length" later in this Appendix to determine the total length of your cables.

Connectors and Terminators

Any SE SCSI device connecting to the system must use a 50-pin high-density thumb screw connector on the end connecting to the system board.

Any FW SCSI device connecting to the system must use a 68-pin high-density thumb screw connector on both ends.

It is necessary to put a terminator on empty SCSI connectors on the back panel of the system. Also, a SCSI device attached to the SCSI bus or the last external device connected to the SCSI bus must be terminated with a SCSI terminator. If you do not already have a SCSI terminator, you must order terminator C2904A (for 50-pin connectors) or C2905A (for 68-pin connectors) from Hewlett-Packard.



SCSI Configuration Constraints

You are limited to the number of same-type SCSI devices per system. Before adding another SCSI device, determine if the system can support the additional device.

This workstation offers the following types of SCSI bus, each with its own configuration constraints:

- Single-ended SCSI bus
- Fast, Wide SCSI bus

Single-ended SCSI Bus Configuration Constraints

For the SE SCSI bus, HP-UX supports only one of each type of removable disk drive and two of the same type tape devices per system. Table 22 shows configuration constraints for each SE SCSI device type. If the system has an internal CD-ROM drive or DDS tape drive, you must count them as SE SCSI devices.

Table 22 SE SCSI Bus Configuration Constraints

| SE SCSI Devices | Maximum Number of Each Type of Device Allowed |
|---|---|
| Hard Disk Drives (external only) | 7 |
| CD-ROM Drives (one internal) | 1 |
| 4-mm DDS Tape Drives (one internal) | 2 |
| 9-track Tape Drives | 2 |
| 650-MB Magneto-Optical Drives | 1 |
| Magneto-Optical Autochangers (see notice below) | 1 |
| Maximum Number of SE SCSI Devices | 7 |
| NOTICE: Magneto-Optical Autochangers use three SE SCSI drive address. Each address must be accounted for in the maximum number of SE SCSI devices allowed. | |



SCSI Connections
SCSI Restrictions

CAUTION: Do not mix SE SCSI and FW SCSI peripherals on the same SCSI bus.

FW SCSI Bus Configuration Constraints

FW SCSI does not work with the SE SCSI.

Table 23 shows the configuration constraints for each FW SCSI device type.

Table 23 FW SCSI Bus Configuration Constraints

| FW SCSI Devices | Maximum Number of Each Type of Device Allowed |
|---|---|
| FW SCSI Disk Drive (up to 3 internal) | 15 |
| Fast, Wide SCSI Disk Arrays (addressed as single drive) | 7 |

CAUTION: Do not mix single-ended, fast differential, and fast, wide SCSI peripherals together on the same bus.





Determining SCSI Bus Length

This section helps you to determine the total length of the single-ended SCSI bus and the fast, wide SCSI bus.

Single-Ended SCSI Bus Length

Follow these instructions to calculate your total single-ended SCSI bus length (including the system unit, external SCSI devices, and SCSI interconnect cables) using Table 24:

- 1 Find all of your external SCSI devices in the first column. In the third column, write the SCSI bus lengths (from the second column) that correspond to your devices.

NOTICE

In the third column, the length for the System Unit is already listed. This number must always be used for the system unit.

- 2 In the fourth column, write down the lengths of the SCSI interconnect cables you are using for your installation. (Cable lengths are listed in subsection "Cables" in the section on "SCSI Restrictions.")
- 3 Add all of the numbers in the third column and write that number on the subtotal line at the bottom of the column. Do the same for the fourth column.
- 4 Add the subtotals together and write the total in the Total SCSI Bus Length box.

NOTICE

The total length of the single-ended SCSI bus must not exceed 6 meters (19.6 feet). If the number you write for Total SCSI Bus Length is greater than 6 meters (19.6 feet), try configuring your installation with shorter cables.

If you have problems, call your designated service representative.



SCSI Connections
 Determining SCSI Bus Length

Table 24 Bus Length Worksheet for Single-Ended SCSI Bus

| SCSI Device | Internal SCSI Bus Length meters (feet) | Device Internal Length meters (feet) | External Cable Length meters (feet) |
|-------------|---|---|---|
| System Unit | 1.5 (4.9) | 1.5 (4.9) | N/A |
| A2655A | 0.3 (1.0) | | |
| C1520B | 0.2 (0.7) | | |
| C1521B | 0.2 (0.7) | | |
| C1700C | 1.1 (3.6) | | |
| C1701C | 0.3 (1.0) | | |
| C1704C | 0.0 (0.0) | | |
| C1705C | 0.0 (0.0) | | |
| C2213A | 1.5 (4.9) | | |
| C2217T | 1.3 (4.3) | | |

Subtotals: _____ + _____

Total SCSI Bus Length = _____

(Total single-ended SCSI bus length not to exceed 6 meters [19.6 feet])

Fast, Wide SCSI Bus Length

Follow these instructions to calculate your total bus length for the fast, wide SCSI bus on your system, using Table 25.

- 1 List all of your internal Fast, Wide SCSI devices in the first column.
- 2 In the third column, write the lengths of the internal Fast, Wide SCSI bus that correspond to your devices.
- 3 In the fourth column, write down the lengths of the Fast, Wide SCSI interconnect cables you are using for your installation. (Cable lengths are listed in subsection "Cables" in the section on "SCSI Restrictions.")
- 4 Add all of the numbers in the third column and write the sum on the subtotal line at the bottom of the column. Do the same for the fourth column.
- 5 Add the subtotals together and write the total on the Total Fast, Wide SCSI Bus Length line.

NOTICE:

The total length of the Fast, Wide SCSI bus must not exceed 25 meters (82 feet). If the number you write for Total Fast, Wide SCSI Bus Length is greater than 25 meters, try configuring your installation with shorter cables.

If you have problems, call your designated service representative.

Table 25 Fast, Wide SCSI Bus Length Worksheet for Fast, Wide SCSI Bus

| Fats, Wide Device | Internal Fats, Wide SCSI Bus Length meters(feet) | Device Internal Length meters(feet) | External Cable Length meters(feet) |
|-------------------|--|-------------------------------------|------------------------------------|
| System Unit | 1.5 (4.9) | | N/A |
| C3034T | 1.0 (3.3) | | |
| C3035T | 1.0 (3.3) | | |
| C3036T | 1.0 (3.3) | | |

Subtotals: _____ + _____

Total Fast, Wide SCSI Bus Length = _____

(Total fast, wide SCSI bus length not to exceed total of 25 meters [82 feet])



SCSI Connections

Assigning SCSI Device IDs

Assigning SCSI Device IDs

Before assigning a SCSI device ID to your drive, you need to check your existing SCSI device IDs. To determine which SCSI device IDs are available for your device, use the `ioscan` command in a terminal window:

- 1 Enter the following at a command line prompt:

```
/usr/sbin/ioscan -f
```

After a few moments, the `ioscan` utility lists all of the SCSI I/O devices it could find. The list appears similar to the following:

```

Class      I  H/W Path      Driver      S/W State H/W Type  Description
-----
bc         0                root        CLAIMED   BUS_      NEXUS
bc         1  8                ccio        CLAIMED   BUS_NEXUS I/O Adapter
ext_bus    0  8/12            c720        CLAIMED   INTERFACE GSC built-in Fast/Wide SCSI
target     0  8/12.0          tgt         CLAIMED   DEVICE
disk       3  8/12.0.0        sdisk       CLAIMED   DEVICE     QUANTUM LPS1080WD
target     1  8/12.5          tgt         CLAIMED   DEVICE
disk       2  8/12.5.0        sdisk       CLAIMED   DEVICE     DEC      DSP3210SW
target     2  8/12.6          tgt         CLAIMED   DEVICE
disk       0  8/12.6.0        sdisk       CLAIMED   DEVICE     DEC      DSP3210SW
ba         0  8/16            bus_adapter CLAIMED   BUS_NEXUS Core I/O Adapter
ext_bus    2  8/16/0          CentIf     CLAIMED   INTERFACE Built-in Parallel Interface
audio      0  8/16/1          audio      CLAIMED   INTERFACE Built-in Audio
tty        0  8/16/4          asio0      CLAIMED   INTERFACE Built-in RS-232C
ext_bus    1  8/16/5          c700       CLAIMED   INTERFACE Built-in SCSI
target     3  8/16/5.2        tgt         CLAIMED   DEVICE
disk       1  8/16/5.2.0      sdisk       CLAIMED   DEVICE     TOSHIBA CD-ROM XM-4101TA
target     4  8/16/5.3        tgt         CLAIMED   DEVICE
tape       0  8/16/5.3.0      stape      CLAIMED   DEVICE     HP      HP35480A
target     5  8/16/5.4        tgt         CLAIMED   DEVICE
disk       10 8/16/5.4.0       sdisk       CLAIMED   DEVICE     SEAGATE ST3600N
target     6  8/16/5.6        tgt         CLAIMED   DEVICE
disk       5  8/16/5.6.0      sdisk       CLAIMED   DEVICE     MICROP  2112
lan        0  8/16/6          lan2       CLAIMED   INTERFACE Built-in LAN
ps2        0  8/16/7          ps2        CLAIMED   INTERFACE Built-in Keyboard/Mouse
bc         2  10                ccio        CLAIMED   BUS_NEXUS I/O Adapter
ext_bus    3  10/12           c720       CLAIMED   INTERFACE GSC add on Fast/Wide SCSI
target     7  10/12.4         tgt         CLAIMED   DEVICE
disk       6  10/12.4.0       sdisk       CLAIMED   DEVICE     SEAGATE ST31200W
graphics   2  10/16           graph3     CLAIMED   INTERFACE Graphics
ba         1  10/20           bus_adapter CLAIMED   BUS_NEXUS Core I/O Adapter
hil        0  10/20/1         hil        CLAIMED   INTERFACE Built-in HIL
tty        1  10/20/2         asio0      CLAIMED   INTERFACE Built-in RS-232C
ba         2  10/20/5         eisa       CLAIMED   BUS_NEXUS EISA Bus Adapter
ext_bus    4  10/20/5/3       hshpib     CLAIMED   INTERFACE EISA card HWP0C70
target     8  10/20/5/3.0     tgt         CLAIMED   DEVICE
target     9  10/20/5/3.1     tgt         CLAIMED   DEVICE
target     10 10/20/5/3.2     tgt         CLAIMED   DEVICE
processor  0  32                processor  CLAIMED   PROCESSOR Processor
memory     0  49                memory     CLAIMED   MEMORY     Memory

```





- 2 You tell can which SCSI IDs are currently in use by looking under the H/W Path heading.

System Single-Ended SCSI Device IDs

Before assigning a SCSI device ID to your drive, you need to check your SCSI device IDs. To check what SCSI device IDs are available and assign an ID to your device, follow these instructions which use Table 26:

- 1 Write in the SCSI device ID of any internal drives in Table 26.
- 2 Write in the type of external drives (single-ended, EISA, or fast, wide devices) currently connected to your system under the heading "External Device Drives" and each drive's SCSI device ID under the heading "Device ID."
- 3 Add your new drive to the table if it is an external device. If it is an internal drive, continue to Step 4.

NOTICE:

The C1700A Magneto-Optical Autochanger uses three SCSI addresses, and accounts for three of the seven devices allowed on the SCSI bus.

- 4 Check to see which SCSI device IDs are not used. You can use ID numbers 0 through 6 if they are not already in use. If the default ID on your drive does not conflict with any existing drive IDs, use that ID. If your default address conflicts with an existing drive ID, you need to assign a new SCSI device ID to your drive. See the drive installation documentation for information on changing the device ID.

CAUTION:

Do not use SCSI device ID 7 for any device. It is reserved for the built-in SCSI bus controller.





SCSI Connections
 Assigning SCSI Device IDs

Table 26 Single-Ended SCSI Device IDs

| SCSI Device Drives | Device ID (Address) Number (Only 0 through 6 Available) | |
|---|--|----------|
| | Internal | External |
| Internal System Drives: | | |
| System SCSI Drive(s) | | |
| CD-ROM Drive (if present, uses ID No.2) | _____ | N/A |
| 4-mm DDS Tape Drive (if present, uses ID No.1) | _____ | N/A |
| External Device Drives | | |
| 1st External Device _____ | N/A | _____ |
| 2nd External Device _____ | N/A | _____ |
| 3rd External Device _____ | N/A | _____ |
| 4th External Device _____ | N/A | _____ |
| 5th External Device _____ | N/A | _____ |
| 6th External Device _____ | N/A | _____ |
| 7th External Device _____ | N/A | _____ |
| NOTICE: You can have no more than 7 single-ended SCSI devices (internal and external) connected to the system. | | |

- 5 Write in the SCSI device ID of any internal drives in Table 26.
- 6 Write in the type of external single-ended drives currently connected to your workstation under the heading "External Device Drives" and each drive's SCSI device ID under the heading "Device ID."
- 7 Add your new drive to the table if it is an external device. If it is an internal drive, continue to Step 8.

NOTICE: The C1700A Magneto-Optical Autochanger uses three SCSI IDs, and accounts for three of the seven devices allowed on the SCSI bus.



- 8 Check to see which SCSI device IDs are not used. You may use ID numbers 0 through 6 if they are not already in use. If the default ID on your drive does not conflict with any existing drive IDs, use that ID. If your default address conflicts with an existing drive ID, you need to assign a new SCSI device ID to your drive. Refer to the drive's installation documentation for information on changing the device ID.

CAUTION:

Do not use SCSI device ID 7 for any device. It is reserved for the built-in SCSI bus controller.

Fast, Wide SCSI IDs

Before assigning a SCSI device ID to your drive, you need to check your SCSI device IDs. To check which SCSI device IDs are available and assign an ID to your device, follow these instructions which use Table 27.

- 1 Write in the type of internal drives currently connected to your system under the heading "Fast, Wide SCSI Device Drives" and each drive's SCSI device ID under the heading "Device ID."
- 2 Add your new drive to the table.
- 3 Check to see what SCSI device IDs are not used. You may use ID numbers 0 through 6 and 8 through 15 if they are not already in use. If the default ID on your drive does not conflict with any existing drive IDs, use that ID. If your default address conflicts with an existing drive ID, assign a new fast, wide SCSI device ID to your drive. Refer to the drive's installation documentation for information on changing the device ID.

CAUTION:

Do not use SCSI device ID 7 for any device.

Table 27**Fast, Wide SCSI Device Drives and Device ID**

| Fast, Wide SCSI Device Drives | Device ID (Address) Number (ID 7 not available) |
|---|--|
| 1st Internal Device _____ | 6 |
| 2nd Internal Device _____ | 5 |
| NOTICE: You can have no more than 15 SCSI devices connected to a fast, wide bus. | |

SCSI Connections
Connecting to the SCSI Ports

Connecting to the SCSI Ports

This section describes how to connect to the system SCSI ports (single-ended and fast, wide).

System SCSI Port Connection

The system contains two (2) SCSI connectors:

- System Single-Ended SCSI Connector
- System Fast, Wide SCSI Connector

Figure 59 shows the two SCSI connectors. SCSI cables connect to these ports with a high-density thumb screw connector.

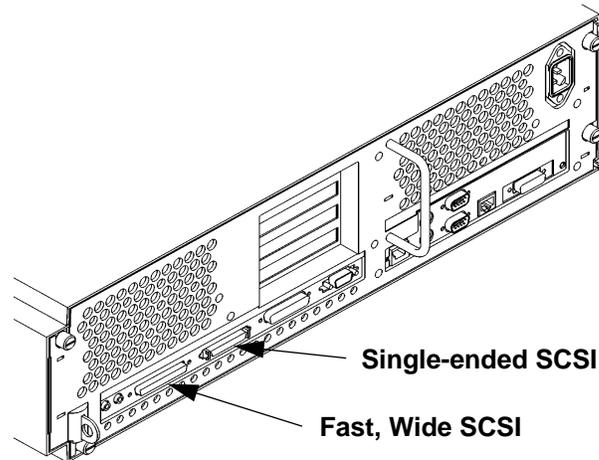


Figure 59 Rear Panel SCSI Connectors without Terminators

NOTICE:

It is necessary to put a terminator on empty SCSI connectors on the backpanel, or the last external device. Terminators are shipped with the system.



D



The Boot Console Interface





The Boot Console Interface

This appendix describes the different features of the boot console interface and how to use them. It presents the information in the following sections:

- Boot console interface features
- Accessing the boot console interface
- Booting your workstation
- Searching for bootable media
- Resetting your workstation
- Displaying and setting paths
- Displaying and setting the monitor type
- Displaying the current memory configuration
- Displaying the status of the System I/O
- Setting the Auto Boot and Auto Search flags
- Displaying and setting the Security mode
- Displaying and setting the Fastboot mode
- Displaying the LAN station address
- Displaying system information
- Displaying PIM information





Boot Console Interface Features

There are times when you want to interact directly with the hardware of your workstation **before** it boots the operating system. Your workstation provides a menu-driven **boot console interface** that allows you to perform special tasks, display information, and set certain system parameters, even if the operating system is unavailable.

Here are some of the things you can do:

- Boot your workstation
- Search for bootable media
- Reset your workstation
- Display and set boot paths
- Display and set your monitor type
- Display memory configuration information
- Display the status of the EISA slots
- Set Auto Boot and Auto Search
- Set Fastboot
- Display LAN information
- Display system information
- Display PIM information

NOTICE:

All of the tasks in the boot console interface should be performed by a system administrator.

The **boot console** menus follow, showing the various tasks you can perform and the information available.

The shortened version of all commands is indicated by the uppercase letters.

Help is available for all the menus and commands by using either **help**, **he**, or **?** and the menu or command you want help on.





The Boot Console Interface

Boot Console Interface Features

```
----- Main Menu -----  
Command                Description  
-----  
BObt [PRI|ALT|<path>]  Boot from specified path  
PAtH [PRI|ALT|CON|KEY][<path>] Display or modify a path  
SEArCh [DIisplay|IPL] [<path>] Search for boot devices  
  
COnfiguration [<command>]  Access Configuration menu/commands  
INformation [<command>]    Access Information menu/commands  
SERvice [<command>]        Access Service menu/commands  
  
DIsplay                Redisplay the current menu  
HElp [<menu>|<command>]  Display help for menu or command  
RESEt                  Restart the system  
-----  
Main Menu: Enter command >
```





The Boot Console Interface

Boot Console Interface Features

```

----- Configuration Menu -----
Command                               Description
-----
AUto [BObt|SEArch] [ON|OFF]           Display or set specified auto flag
BooTID [<proc>] [<boot ID>]           Display or modify processor boot ID
BooTINfo                               Display boot-related information
BooTTimer [0 - 200]                   Seconds allowed for boot attempt
CPUconfig {<proc>} [ON|OFF]           Config/deconfig processor
DEfault                               Set the system to predefined values
FastBooT [ON|OFF]                     Display or set boot tests execution
MOnitor [LIST|<path> <type>]          Change the current monitor type
PAth [PRI|ALT|CON|KEY] [<path>]       Display or modify a path
SEArch [DIsplay|IPL] [<path>]         Search for boot devices
SECure [ON|OFF]                       Set/show security mode
TIme [c:y:m:d:h:m:[s]]                Read or set real time clock in GMT

BooT [PRI|ALT|<path>]                 Boot from specified path
DIsplay                               Redisplay the current menu
HElp [<menu>|<command>]               Display help for menu or command
RESET                                  Restart the system
MAin                                    Return to Main Menu
-----
Configuration Menu: Enter command >

```





The Boot Console Interface

Boot Console Interface Features

```
----- Information Menu -----  
Command          Description  
-----  
ALL              Display all system information  
BootINfo        Display boot-related information  
CAche           Display cache information  
ChipRevisions   Display revisions of VLSI and firmware  
COprocessor      Display coprocessor information  
FwrVersion      Display firmware version  
IO              Display I/O interface information  
LanAddress      Display built-in system LAN address  
MEemory         Display memory information  
PROcessor       Display processor information  
WARNings        Display selftest warning messages  
  
BOot [PRI|ALT|<path>] Boot from specified path  
DISplay         Redisplay the current menu  
HElp [<menu>|<command>] Display help for menu or command  
RESET           Restart the system  
MAin            Return to Main Menu  
-----  
Information Menu: Enter command >
```





The Boot Console Interface Boot Console Interface Features

```
----- Service Menu -----  
Command                Description  
-----  
ChassisCodes [<proc>]  Display chassis codes  
CLEARPIM               Clear (zero) the contents of PIM  
EepromRead [<addr>] {<len>} Read EEPROM locations  
MemRead <addr> [<len>] [a] Read memory locations  
PIM [<proc> [HPMC|LPMC|TOC]] Display PIM information  
  
BOot [PRI|ALT|<path>]  Boot from specified path  
DIsplay                Redisplay the current menu  
HElp [<menu>|<command>] Display help for menu or command  
RESET                 Restart the system  
MAin                  Return to Main Menu  
-----  
Service Menu: Enter command >
```





The Boot Console Interface
Accessing the Boot Console Interface

Accessing the Boot Console Interface

To access the boot console interface, follow these steps:

NOTICE:

This procedure should be done by a system administrator.

- 1 Close any files and applications on your workstation.
- 2 Press the power switch on the front panel of the system unit.

NOTICES:

There is no need to manually shut down the HP-UX operating system on your workstation before powering it off. When you turn off the power switch, your workstation automatically shuts down the operating system before terminating the power.

Make sure that you do not unplug the system's power cord or otherwise interrupt power to the system unit at this time.

- 3 When the system has completely shut down, power on your workstation.

If **Autoboot** is turned off, the boot sequence automatically stops at the boot console Main Menu.

If **Autoboot** is turned on, you will see the following messages:

```
Processor is starting Autoboot process. To discontinue,  
press any key within 10 seconds.
```

If **Autoboot** and **Autosearch** are both turned on, you will see the following messages:

```
Processor is booting from first available device. To  
discontinue, press any key within 10 seconds.
```

NOTICE:

If you are using a power-saving monitor, you will have less than 10 seconds from the time this message appears to press a key.

- 4 Press a key. You will then see the message:

```
Boot terminated
```

The Main Menu of the boot console appears.





Booting Your Workstation

Usually, you start your workstation by turning it on and waiting for HP-UX to boot automatically. However, you may not always want the usual sequence to occur.

For example, you may want to start your workstation from an operating system that is stored on a device that is different from your usual boot device. If your normal operating system kernel or the disk on which it resides becomes damaged or unusable, you may wish to boot from a different disk or perhaps another type of device, such as a DDS-format tape drive.

Here are some situations and examples:

- If you know which device you want to boot from, and you know that it contains a bootable operating system, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

```
Main Menu: Enter command > boot device
```

where *device* is the **hardware path** to the device, specified in Mnemonic Style Notation.

For example, if you wish to boot an operating system that is stored on a DDS-format tape in a drive that is located at “sescsi.1.0”, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following command at the prompt:

```
Main Menu: Enter command > boot sescsi.1.0
```

The operating system on the specified device is used to start your workstation.

- If you wish to interact with the Initial System Loader (ISL) before booting your workstation, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

```
Main Menu: Enter command > boot device
```

You are prompted:

```
Interact with ISL (Y,N,Q)>
```





The Boot Console Interface

Booting Your Workstation

Answering yes (**y**) causes the ISL to be loaded from the specified device. After a short time, the following prompt appears on your screen:

```
ISL>
```

ISL is the program that actually controls the loading of the operating system. By interacting with ISL, you can choose to load an alternate version of the HP-UX operating system. If you do not want ISL to be loaded, you must enter **n**.

For example, if the usual kernel (**/stand/vmunix**) on your root disk (**fwscsi.6.0**) has become corrupted, and you wish to boot your workstation from the backup kernel (**/stand/vmunix.prev**), type the following at the ISL> prompt:

```
ISL> hpux /stand/vmunix.prev
```

- If you do not know which media in your file systems have bootable operating systems, you can find them with the **search IPL** command.





Searching for Bootable Media

To list devices that contain bootable media, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

```
Main Menu: Enter command > search ipl
```

The search command searches all buses. The search may turn up more devices than there are lines on your display. If you are using a text terminal, you may control the progress of the search from your terminal’s keyboard by performing the following steps:

- To hold the display temporarily, press **Ctrl S**.
- To continue the display, press **Ctrl Q**.
- To halt the search, press any other key

These flow-control commands do not work with a bitmapped display, but such a display can show more than forty lines of text, so you are unlikely to need them.

To search for devices of *just one type* that actually contain bootable media, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

```
Main Menu: Enter command > search ipl device_type
```

Where *device_type* is one of the following:

fwscsi is the built-in fast, wide SCSI bus.

sescsi is the built-in single-ended SCSI bus.

lan is all connections to the built-in LAN.

gscn is an optional fast, wide SCSI interface in slot number *n*.





The Boot Console Interface
Resetting Your Workstation

Resetting Your Workstation

To reset your workstation, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

Main Menu: Enter command > **reset**

To reset your workstation to its predefined values, follow the directions in "Accessing the Boot Console Interface" earlier in this appendix, and then type the following at the prompt to access the Configuration Menu:

Main Menu: Enter command > **co**

When the Configuration Menu appears, type the following at the prompt:

Configuration Menu: Enter command > **default**



Displaying and Setting Paths

A **path** is the hardware address of a device that is attached to the I/O system of your workstation. The **path** command sets the system paths shown in Table 28.

The **path** command sets and displays the hardware address of a specified device attached to the I/O bus of your workstation.

Table 28

System Paths

| Path Type | Device |
|--------------------------------|---|
| primary or pri | Your workstation's default boot device (usually the root disk) |
| alternate or alt | Your workstation's alternate boot device (usually a DDS-format tape device) |
| console or con | Your workstation's primary display device |
| keyboard or key | Your workstation's primary ASCII input device |

To display the current settings for the system paths, type the following at the prompt:

```
Main Menu: Enter command > path
```

The Boot Console Interface
Displaying and Setting Paths

The paths are displayed in **Mnemonic Style Notation**, as shown in Table 29.

Table 29

Mnemonic Style Notation

| I/O Type | Specification Format |
|-----------------|--|
| Built-in FWSCSI | fwsci . <i>scsi_address.logical_unit_number</i> |
| Built-in SCSI | sescsi . <i>scsi_address.logical_unit_number</i> |
| Optional | gscn . <i>scsi_address.logical_unit_number</i> |
| Built-in LAN | lan . <i>server_address.init_timeout.io_timeout</i> |

To display the current setting for a particular system path, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

```
Main Menu: Enter command > path path_type
```

where *path_type* is one of the path types listed in Table 28.

For example, to get the path to the primary boot device, follow the directions in “Accessing the Boot Console Interface” earlier in this chapter, and then type the following at the prompt:

```
Main Menu: Enter command > path primary
```

To set a system path to a new value, follow the directions in “Accessing the Boot Console Interface” earlier in this chapter, and then type the following at the prompt:

```
Main Menu: Enter command > path path_type path
```

where *path_type* is one of the path types listed in Table 28 and *path* is the specification of the path in Mnemonic Style Notation (as described in Table 29). For example, to set the primary boot path to a SCSI disk with an ID of 6.0, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

```
Main Menu: Enter command > path pri sescsi.6.0
```



Displaying and Setting the Monitor Type

Your system ships from the factory preset to use a monitor with a specific resolution and frequency. If you replace your workstation's monitor with a different type of monitor, you must reconfigure your workstation to support the new monitor.

The Monitor Command

The **monitor** command lets you change your workstation's graphics configuration. This command is available in Configuration Menu of the boot console interface.

NOTICE:

The monitor command lets you change your workstation's graphics configuration before you replace your monitor. For information about changing the configuration after you replace your monitor, refer to "Changing Your Monitor Type" in Appendix B.

To display the current graphics and console information, enter the following command;

monitor

The correct usage for setting the graphics configuration is:

monitor *graphics_path type*

where valid *graphics_path* parameters are:

graphics(0) - The built-in 8-plane graphics adapter.

graphics(1) through *graphics(4)* - Graphics adapters installed in option slots 1 through 4.

and *type* is the numerical monitor type





The Boot Console Interface

Displaying and Setting the Monitor Type

When a dual display graphics adapter (an adapter which has two video output connectors) is installed, the video connector on the left (when looking at the system from the rear) is *graphics(NA)* and the video connector on the right is *graphics(NB)*. Where *N* is the slot number in which the graphics adapter is installed.

For example, a Dual Visualize Enhanced Graphics Card (A4451A) installed in option slot 3 would be *graphics(3A)* and *graphics(3B)*.

NOTICE:

There are graphics configuration restrictions of which you must be aware when adding graphics adapters or reconfiguring your graphics devices. For details on graphics configuration restrictions, see the subsection “Graphics Configuration Restrictions” in Appendix B.

Displaying the Current Monitor Configuration

To display the current monitor configuration for your system from the Configuration Menu of the boot console interface, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix. Once you are in the Boot Console Interface Main Menu, enter:

Main Menu: Enter command > **configuration**

This places you in the Configuration Menu. From here, enter:

Configuration Menu: Enter command > **monitor**

The screen displays a list of the current graphics adapters and their monitor types configured for your workstation.

MONITOR INFORMATION

| Path | Slot | Head | HPA | Resolution | Freq | Type | Class |
|-------------|------|------|----------|------------|------|------|-------|
| GRAPHICS(0) | 0 | 1 | f8000000 | 1280x1024 | 72Hz | 12 | |

Configuration Menu: Enter command >

In this example, only the built-in graphic adapter *graphics(0)* is configured. The monitor type for *graphics(0)* is set to type 12, which is a 1280 by 1024 monitor that uses a frequency of 72 Hz.





Setting the Monitor Type

You can set the monitor type for a graphics adapter by entering the following:

```
Configuration Menu: Enter command > monitor graphics(n) tt
```

Where *n* is the number of the graphics adapter and *tt* is the monitor type.

To display a list of supported monitors, enter the following command;

```
Configuration Menu: Enter command > monitor list
```

A list of valid monitor types similar to the following is displayed;

MONITOR INFORMATION

| Path | Slot | Head | Type | Size | Freq | Class |
|-------------|------|------|------|------------------------|------|--------------------------------|
| GRAPHICS(0) | 0 | 1 | 1 | 1280x1024 | 75Hz | VESA |
| GRAPHICS(0) | 0 | 1 | 2 | 1280x1024 | 75Hz | VESA,Double buffered |
| GRAPHICS(0) | 0 | 1 | 3 | 1280x1024 | 75Hz | VESA,Greyscale |
| GRAPHICS(0) | 0 | 1 | 4 | 1280x1024 | 75Hz | VESA,Double buffered,Greyscale |
| GRAPHICS(0) | 0 | 1 | 5 | 1024x768 | 75Hz | VESA |
| GRAPHICS(0) | 0 | 1 | 6 | 800x600 | 75Hz | VESA |
| GRAPHICS(0) | 0 | 1 | 7 | 640x480 | 75Hz | VESA |
| GRAPHICS(0) | 0 | 1 | 8 | 1600x1200 | 75Hz | VESA |
| GRAPHICS(0) | 0 | 1 | 9 | 1600x1200 | 75Hz | VESA,Greyscale |
| GRAPHICS(0) | 0 | 1 | 10 | 1200x1600 | 75Hz | VESA |
| GRAPHICS(0) | 0 | 1 | 11 | 1200x1600 | 75Hz | VESA,Greyscale |
| GRAPHICS(0) | 0 | 1 | 12 | 1280x1024 | 72Hz | |
| GRAPHICS(0) | 0 | 1 | 13 | 1280x1024 | 72Hz | Double buffered |
| GRAPHICS(0) | 0 | 1 | 14 | 640x480 | 60Hz | |
| GRAPHICS(0) | 0 | 1 | 15 | -----user defined----- | | |

```
Configuration Menu: Enter command >
```





The Boot Console Interface

Displaying and Setting the Monitor Type

To set the monitor type for graphics(0) to monitor type 2, enter the following;

```
Configuration Menu: Enter command > monitor graphics(0) 2
```

```
Configuration Menu: Enter command > monitor graphics(0) 2
This will take effect on the next reboot.
```

MONITOR INFORMATION

| Path | Slot | Head | HPA | Resolution | Freq | Type | Class |
|-------------|------|------|----------|------------|------|------|-------|
| GRAPHICS(0) | 0 | 1 | f8000000 | 1280x1024 | 72Hz | 2 | |

The boot console displays a message that tells you that your new monitor selection will take affect the next time you reboot your system.

The boot console also displays the new monitor information.

Trying to change the monitor type to a number not listed for that graphics device fails and gives you the following warning message:

```
Value of monitor type n out of range (n - nn)
```

Trying to change the monitor type on an empty slot fails and gives you the following warning message:

```
No such graphics card.
```





Setting the Monitor Type at Power On

If you replace your workstation's monitor with a different monitor type, and do not set the workstation's graphics parameters by using the **monitor** command before doing so, you need to perform the following:

If your keyboard connects to the PS/2 connector on your system, wait 2 seconds after the Num Lock light flashes near the end of the boot sequence, then press **Tab** to initiate the automatic monitor selection process.

NOTICE:

It takes approximately one to two minutes after powering on the workstation before the Num Lock light flashes.

If you have a keyboard that connects to the HIL connector on your system, press **Tab** every three seconds during the boot sequence to initiate the automatic monitor selection process.

The system cycles through all of the available monitor types one at a time. When you can see a message similar to the following clearly and legibly, select that monitor type by pressing **Enter**.

MONITOR INFORMATION

| Path | Slot | Head | Type | Size | Freq | Class |
|-------------|------|------|------|-----------|------|-------|
| GRAPHICS(0) | 0 | 1 | n | nnnnxnxxx | nnHz | |

Press [RETURN] to select this monitor type (type n of n types).

The system queries you to confirm your selection. Press **Y** to save this monitor type.

If you press any key other than **Y**, the following message is displayed:

Monitor type not saved.

At this point, the new monitor type is active, but not saved. Because you didn't save the monitor type, the next time you reboot the system the original monitor type will be used.

Next, the following message is displayed:

To select a new Graphics Monitor Type press the <TAB> key now, otherwise EXIT by entering any other key (or will time out in 15 seconds)...

To restart the monitor selection process, press **TAB**.





The Boot Console Interface
Displaying the Current Memory Configuration

Displaying the Current Memory Configuration

The following sample screen output using the **memory** command shows: first, a memory configuration table with properly-installed and configured memory (Sample Output 1); and second, output when a SIMM has been improperly installed (Sample Output 2).

To display the current memory configuration for your system, from the Information Menu of the boot console interface, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix. Once you are in the Boot Console Interface Main Menu, type:

```
Main Menu: Enter command > information
```

This places you in the Information Menu. From here type:

```
Information Menu: Enter command > memory
```

The screen displays status and configuration information for the memory DIMMs installed in your workstation. The first listing below shows the memory information for a system with correctly installed and configured memory modules. The second listing shows the information for a system that has memory modules incorrectly installed or configured.





The Boot Console Interface
Displaying the Current Memory Configuration

Memory Information Sample 1

The following sample shows the memory information when memory modules are properly installed and configured

MEMORY INFORMATION

MEMORY STATUS TABLE

| Slot | Size(a+b) | Status |
|-------|-----------|------------|
| 0a/b | 64MB | Configured |
| 1a/b | 32MB | Configured |
| 2a/b | 128MB | Configured |
| TOTAL | 224MB | |

DETAILED MEMORY CONFIGURATION TABLE

| SPA | GROUP | SMC | SMC Status | Bank | Bank Status | Size | Slot |
|------------|-------|-----|------------|------|-------------|------|------|
| 0x00000000 | 1 | 0 | Configured | 1 | Configured | 64MB | 2a/b |
| | | 0 | Configured | 3 | Configured | 64MB | 0a/b |
| | | 0 | Configured | 1 | Configured | 64MB | 2a/b |
| 0x0c000000 | 0 | 2 | Configured | 0 | Configured | 16MB | 1a/b |
| | | 2 | Configured | 2 | Configured | 16MB | 1a/b |

Group 1 interleaved 2 ways over 3 banks
Group 0 interleaved 2 ways over 2 banks

BAD MEMORY TABLE

| SMC | SMC Status | Bank | Bank Status | SIMM Size | Slot |
|-----|------------|------|-------------|-----------|------|
| 0 | Present | 0 | Not Present | 0MB | 5a/b |
| | | 2 | Not Present | 0MB | 4a/b |
| 1 | Present | 0 | Not Present | 0MB | 5a/b |
| | | 2 | Not Present | 0MB | 4a/b |
| | | 3 | Not Present | 0MB | 0a/b |
| 2 | Present | 1 | Not Present | 0MB | 3a/b |
| | | 3 | Not Present | 0MB | 3a/b |

Active, installed memory (bytes) : 234881024 of Standard DRAM
Deallocated pages (bytes) : 0

Available Memory (bytes) : 234881024
Good Memory Required by OS (bytes): 0 (Not Set by OS)

Memory
HVERSION SVERSION

0x0710 0x0900





The Boot Console Interface

Displaying the Current Memory Configuration

Memory Information Sample 2

The following sample shows the memory information when memory modules are not properly installed and configured. In this sample the memory module in memory slot 1A is missing.

MEMORY INFORMATION

WARNING: Memory has been reconfigured due to a physical change or because the Page Deallocation Table (PDT) was cleared. This is for information only. No action is required.

MEMORY STATUS TABLE

| Slot | Size(a+b) | Status |
|-------|-----------|---------------------------|
| 0a/b | 64MB | Configured |
| 1a/b | ??MB | SIMM not seated properly. |
| 2a/b | 128MB | Configured |
| TOTAL | 192MB | |

DETAILED MEMORY CONFIGURATION TABLE

| SPA | GROUP | SMC | SMC Status | Bank | Bank Status | Size | Slot |
|------------|-------|-----|------------|------|-------------|------|------|
| 0x00000000 | 0 | 0 | Configured | 1 | Configured | 64MB | 2a/b |
| | | 0 | Configured | 3 | Configured | 64MB | 0a/b |
| | | 1 | Configured | 1 | Configured | 64MB | 2a/b |

Group 0 interleaved 2 ways over 3 banks

BAD MEMORY TABLE

| SMC | SMC Status | Bank | Bank Status | SIMM Size | Slot |
|-----|------------|------|--------------|-----------|------|
| 0 | Present | 0 | Not Present | 0MB | 5a/b |
| | | 2 | Not Present | 0MB | 4a/b |
| 1 | Present | 0 | Not Present | 0MB | 5a/b |
| | | 2 | Not Present | 0MB | 4a/b |
| | | 3 | Not Present | 0MB | 0a/b |
| 2 | Present | 0 | Sizing Error | 0MB | 1a/b |
| | | 1 | Not Present | 0MB | 3a/b |
| | | 2 | Sizing Error | 0MB | 1a/b |
| | | 3 | Not Present | 0MB | 3a/b |

Active, installed memory (bytes) : 201326592 of Standard DRAM

Deallocated pages (bytes) : - 0

Available Memory (bytes) : 201326592

Good Memory Required by OS (bytes): 0 (Not Set by OS)

Memory
HVERSION SVERSION

0x0710 0x0900





Displaying the Status of the System I/O

The **IO** command lets you identify all built-in I/O devices and optional I/O devices installed in the option slots. It is available in the Information Menu.

To use the **IO** command from the Information Menu of the boot console interface, type:

Information Menu: Enter command > **IO**

Information about the built-in and optional I/O devices is displayed.

I/O MODULE INFORMATION

| Path | Decimal | Type | Location | HVER | SVER | IODC Vers | IODC Dep |
|-------------|---------|------------------|----------|------|------|-----------|----------|
| 8/0 | 8/0 | Bus Bridge | built-in | 6800 | 0a00 | 0x00 | 0x00 |
| FWSCSI | 8/12 | A DMA I/O | built-in | 03b0 | 8980 | 0x96 | 0x00 |
| 8/16 | 8/16 | Bus Adapter | built-in | 03b0 | 8100 | 0x00 | 0x00 |
| 8/16/0 | 8/16/0 | Parallel | built-in | 03b0 | 7400 | 0x00 | 0x00 |
| 8/16/1 | 8/16/1 | Audio | built-in | 03b4 | 7b00 | 0x00 | 0x00 |
| SERIAL_1 | 8/16/4 | RS232 | built-in | 03b0 | 8c00 | 0x01 | 0x00 |
| SESCSI | 8/16/5 | SE SCSI | built-in | 03b0 | 8200 | 0x96 | 0x00 |
| LAN | 8/16/6 | LAN | built-in | 03b0 | 8a00 | 0x02 | 0x00 |
| PS2 | 8/16/7 | Keyboard | built-in | 03b0 | 8400 | 0x00 | 0x00 |
| 8/16/8 | 8/16/8 | Mouse | built-in | 03b0 | 8400 | 0x00 | 0x00 |
| 8/16/10 | 8/16/10 | Floppy | built-in | 03b0 | 8300 | 0x00 | 0x00 |
| 8/20 | 8/20 | Bus Adapter | built-in | 0170 | 8e00 | 0x00 | 0x00 |
| HIL | 8/20/1 | HIL | built-in | 0170 | 7300 | 0x00 | 0x00 |
| SERIAL_2 | 8/20/2 | RS232 Port | built-in | 0170 | 8c00 | 0x00 | 0x00 |
| EISA | 8/20/5 | Bus Adapter | built-in | 0170 | 9000 | 0x00 | 0x00 |
| GRAPHICS(0) | 8/24 | INTERNAL_EG_X128 | built-in | 0160 | 8500 | 0x01 | 0x00 |
| 8/63 | 8/63 | Bus Converter | built-in | 5011 | 0c00 | 0x00 | 0x00 |
| 10/63 | 10/63 | Bus Converter | built-in | 5011 | 0c00 | 0x00 | 0x00 |

EISA Cards

| Path | Type | EISA ID |
|----------|--------------------|---------|
| 8/20/5/1 | EISA slot is empty | |
| 8/20/5/2 | EISA slot is empty | |
| 8/20/5/3 | EISA slot is empty | |

PCI Cards

| Slot | Path | Bus | Class |
|------|-------|-----|-------|
| --- | ----- | --- | ----- |





The Boot Console Interface
Setting the Auto Boot and Auto Search Flags

Setting the Auto Boot and Auto Search Flags

auto boot and **auto search** are variables stored in your workstation's non-volatile memory. (Nonvolatile memory retains its contents even after power is turned off.) If you reset these flags to new value, the change takes effect the next time you reboot the workstation.

auto boot boots the operating system whenever your workstation is turned on.

To examine the state of the **auto boot** and **auto search** flags, type the following at the prompt:

```
Configuration Menu: Enter command > auto
```

If **auto boot** is set to **on**, your workstation automatically attempts to boot the operating system when turned on. If **auto boot** is set to **off**, your workstation enters the boot administration mode of the boot console user interface.

The state of the **auto search** flag determines how your workstation seeks a boot device during autoboot. If **auto search** is set to **on**, your workstation will search for other boot devices if the primary boot device is not available. If **auto search** is **off**, your workstation will default to the boot administration mode if it can't see the primary boot device.

To change the state of the **auto boot** or **auto search** flags, type the following at the prompt:

```
Configuration Menu: Enter command > auto boot state
```

or

```
Configuration Menu: Enter command > auto search state
```

where *state* is **on** or **off**.





The Boot Console Interface
Setting the Auto Boot and Auto Search Flags

Autosearch searches for devices in the following order:

- Primary boot path
- Alternate boot path
- Built-in fast, wide SCSI devices
- Built-in single-ended SCSI devices
- Built-in LAN bootp servers

NOTICE:

Fast wide SCSI adapter option cards installed in the option slots are not searched unless they are referenced by the primary or alternate boot paths.

EISA cards are not searched.





The Boot Console Interface
Displaying and Setting the Security Mode

Displaying and Setting the Security Mode

The **SECure** flag is a variable stored in non-volatile memory. (Non-volatile memory retains its contents even after power is turned off.) If you reset this flag to a new value, the change takes effect the next time you reboot the workstation.

When the **SECure** flag is set to **on**, **autoboot** and **autosearch** are enabled and cannot be stopped. The system boots from the default boot paths regardless of user intervention.

To display the current setting for the **SECure** flag, enter the following command:

```
secure
```

To set the **SECure** flag on or off, enter one of the following:

```
secure on
```

```
secure off
```





Displaying and Setting the Fastboot Mode

When **fastboot** is enabled (set to **on**), your workstation does a quick check of the memory and skips I/O interface testing during its power-on self tests. This enables your workstation to complete its boot process quicker. The default factory setting is for **fastboot** to be enabled (**on**).

The **fastboot** mode allows your workstation to boot quickly by performing a less extensive check of the system's memory.

When **fastboot** is disabled (set to **off**), more extensive memory testing and I/O interface testing is performed during the self tests, causing the boot process to take longer.

If you are experiencing difficulty in booting your workstation, set **fastboot** to **off** and reboot the system. The more extensive testing may reveal the error condition.

To display the status of **fastboot**, type the following at the prompt:

```
Configuration Menu: Enter command > fastboot
```

To disable **fastboot**, type the following at the prompt:

```
Configuration Menu: Enter command > fastboot off
```

To enable **fastboot**, type the following at the prompt:

```
Configuration Menu: Enter command > fastboot on
```





The Boot Console Interface
Displaying the LAN Station Address

Displaying the LAN Station Address

It is sometimes necessary to supply a LAN station address of your workstation to other users. For example, if your workstation is to become a member of a cluster, the cluster administrator needs to know your LAN station address in order to add your workstation to the cluster.

A **LAN station address** of your workstation is the label that uniquely identifies the LAN connection for your workstation at the **link level** (the hardware level).

To display your workstation's LAN station addresses, type the following at the prompt:

```
Information Menu: Enter command > lanaddress
```

The LAN station address is displayed as a twelve-digit number in hexadecimal notation, similar to the following:

```
LAN Station Addresses: 080009-789abc
```

The address is for the system's built-in LAN.





Displaying System Information

The **all** command allows you to display the system's processor revision and speed, cache size, memory size, flag settings, and the boot and console paths. To display system information from the Information Menu, type the following at the prompt:

```
Information Menu: Enter command > all
```

This information is paged to allow you to view it as necessary.





The Boot Console Interface
Displaying PIM Information

Displaying PIM Information

The **pim** command allows you to display the most recent PIM information for the specified fault type. To display PIM information for a specific fault, from the Service Menu, type the following at the prompt:

Service Menu: Enter command > **pim** *processor_number*

You can use **pim** in the following ways:

pim - gives all fault types

pim 0 - HPMC information on processor

pim 0 *fault_type* - fault type information on processor





Glossary

absolute pathname The full pathname of a file, including all the directories leading to it, starting with the root directory (“/”) and ending with the filename itself. *See also* **file**, **filename**, **pathname**.

access permissions Settings that allow a user or group of users to read, write, or execute files. *See also* **file access permissions**.

active window The window that is receiving input from the keyboard at the present time. If there is no active window, anything you type is lost. Only one window can be active at a time. The active window is said to have the “keyboard focus.”

ANSI The American National Standards Institute, a non-profit organization, made up of various expert committees, that publishes standards for use by national industries. ANSI has adopted the IEEE standards for local area networks.

argument The part of a command line that identifies the file or directory to be acted on.

attachment unit interface (AUI) A transceiver cable that conforms to IEEE 802.3 specifications.

back up v. To make a copy of the file system on a tape or disk that can be stored separately from the original files. Also called “backing up the system” or simply “system backup.”

bitmap Generally speaking, an array of data bits used for graphic images. Strict-

ly speaking, a pixmap of depth one, capable of representing 2-color images.

boot Short for bootstrap service. A service provided by a short program, stored in the read-only memory of your workstation, that loads the operating system (or any complex program) into main memory. Partner workstations provide bootstrap service to diskless workstations. *See also* **boot ROM**.

boot console interface The interactive firmware that enables you to interact with the hardware of your workstation before the workstation boots the operating system. The boot console interface allows you to perform special tasks, display information, and set certain system parameters.

boot ROM A read-only memory that is incorporated into a workstation for the purpose of starting the operating system, testing the terminal, and producing a standard display.

bootstrap service *See* **boot**.

byte A fundamental character-code unit, usually consisting of 8 bits.

CD-ROM Compact Disc Read-Only Memory. *See also* **CD-ROM disc**, **CD-ROM drive**.

CD-ROM disc CD-ROM discs are identical to the audio compact discs (CDs) used to record stereo music, except that they store data. CD-ROM discs are 120 mm (4.7 inches) in diameter, and use one data surface with a capacity of 600 MB. The data surface contains pits





Glossary

and flat spots arranged in a continuous spiral track, which is read at a constant speed.

CD-ROM drive A random-access, read-only, mass-storage device that uses removable CD-ROM discs. The drive contains a semiconductor laser for reading data optically and an embedded controller with a SCSI interface.

Central Processing Unit (CPU) The part of a workstation that interprets and executes instructions.

child directory *See subdirectory.*

click To press *and release* a mouse button. The term comes from the fact that pressing and releasing most mouse buttons makes a clicking sound.

cluster A group of workstations connected via a Local Area Network (LAN). One workstation, the cluster server, performs as a file-system server for the cluster clients. *See also cluster client, cluster node, cluster server.*

cluster client A cluster node that does not have a local HP-UX file system. Its file system resides on the cluster server. *See also cluster, cluster node, cluster server.*

cluster node A member of a group of workstations connected via a Local Area Network (LAN). One workstation, the cluster server, performs as a server to the cluster. *See also cluster, cluster client, cluster server.*

cluster server A workstation that provides file access, login access, file transfer, printing, and other services across a network to a defined cluster of systems (cluster nodes) connected via a LAN. *See also cluster, cluster client, cluster node, host.*

command An instruction that you enter into the system at a prompt, to execute a program or perform a task. *See also shell command.*

command argument Information you provide on a command line to describe the object (usually a file or directory) to be operated on by the command.

command interpreter A program that reads lines of text from standard input (typed at the keyboard or read from a file) and interprets them as requests to execute other programs. An HP-UX command interpreter is called a shell. *See also shell.*

command option Information you provide on a command line to indicate any special action you want the command to take. *See also default.*

configuration The arrangement of a workstation or network as defined by the nature, number, and chief characteristics of its functional units. More specifically, the term configuration may refer to a hardware configuration or a software configuration.

control key sequence A keystroke combination used as a shorthand way of specifying commands. To enter a control key sequence, you hold down the control





Glossary

key while pressing another key.

cpu *See* **Central Processing Unit**.

CRX color graphics Expanded graphics capability offering 24-plane color, 24-plane Z-buffered color, or 48-plane Z-buffered color capability.

current directory *See* **current working directory**.

current session The work and processes that have been created since you logged into the system (and before you log out again). *See also* **session**.

current working directory The directory in which a relative path name search begins, as well as the directory in which you are currently working. It is also called the working directory or current directory.

cursor The small blinking box displayed in whatever screen is active at a particular time. The cursor marks your current typing position on the screen and indicates which program (HP VUE terminal window or shell) will receive your commands.

daisy-chaining A method of connecting devices where the signal passes from one device to the next in serial fashion along a bus.

DDS tape drive A device that stores data on Digital Data Storage (DDS) cassettes.

default Most commands give you a

choice of one or more options. If you don't specify an option, the command automatically assigns one. This automatic option is called the default. *See also* **command option**.

dialog box A special type of HP VUE screen that is called by the user from a window. Dialog boxes contain controls and settings. To display an example of a dialog box, click the Style Manager button on the Workspace, then click on Color.

directory A special type of object that contains information about the objects beneath it in the HP-UX organizational structure. Basically, it is a file that stores names and links to files and other directories. *See also* **file**.

disk A thin, round plate with a magnetic surface coating on which data is stored by magnetic recording. *See also* **floppy diskette, hard disk, CD-ROM disc**.

disked workstation A workstation that has its own hard disk drive. *See also* **diskless workstation, node, partner node, workstation**.

diskette *See* **floppy diskette**.

diskless booting Loading the operating system into local memory from the disk of a partner workstation.

diskless workstation A workstation that has no disk. A diskless workstation can use the disk of its partner workstation or other workstations. If necessary, it can also use the computational services of the partner workstation or other work-





Glossary

stations. A diskless workstation boots from its partner workstation. *See also* **disked workstation, node, partner node, workstation.**

double click To press and release a mouse button twice in rapid succession.

drag To press and hold down a mouse button while moving the mouse (and the pointer on the screen). *See also* **drop.**

drive *See* **CD-ROM drive, DDS tape drive, floppy drive, hard disk drive.**

drop To release an icon that has been “dragged” to a new position. *See also* **drag.**

EISA (Extended Industry Standard Architecture) An industry standard bus architecture based on and compatible with that used by IBM in their AT series computers.

environment The conditions under which your commands are executed. These conditions include your workstation characteristics, home directory, and default search paths. *See also* **environment variables.**

environment variables The set of defined shell variables (some of which are PATH, TERM, SHELL, EXINIT, HOME) that define the conditions under which your commands are executed. These conditions include your workstation characteristics, home directory, and default search paths. *See also* **environment.**

ETHERNET The LAN developed jointly by Digital Equipment Corporation, Intel, and Xerox Corporation, upon which the IEEE 802.3 network is based.

fast, differential SCSI An 8-bit wide bus with high-power receivers and drivers, which allows a cable length of up to 25 meters and a speed of up to 10 MB per second. *See also* **fast-wide SCSI, single-ended standard SCSI, Small Computer System Interface.**

fast-wide SCSI A 16-bit wide bus with high-power receivers and drivers, which allows a cable length of up to 25 meters and a speed of up to 20 MB per second. *See also* **fast, differential SCSI, single-ended standard SCSI, Small Computer System Interface.**

file The basic named unit of data stored on disk. *See also* **directory, filename.**

file access permissions The access rights given to a particular file or directory. Every file and directory has a set of access permissions, a code that determines whether a process can perform a requested operation on the file (such as opening the file or writing to it). *See also* **access permissions.**

File Manager The HP VUE application that allows you to manage your files and directories, and to set viewing preferences.

filename The name given to a particular file. *See also* **absolute pathname, file, pathname.**

file server A workstation whose prima-





Glossary

ry task is to control the storage and retrieval of data from hard disks. Any number of other workstations can be linked to the file server in order to use it to access data.

file system The organized set of files and directories on a hard disk.

firmware The control software that is embedded in ROM and is always resident despite the status of the operating system. It handles the booting of the system, initialization of I/O, and starts the loading of the operating system.

floppy diskette A thin, record-shaped plate that stores data on its magnetic surfaces. The system uses heads (similar to heads in tape recorders) to read and write data on concentric disk tracks.

floppy drive A device that stores data on a flexible diskette.

hard disk A type of disk that is rigid as opposed to a floppy diskette, which is flexible.

hard disk drive A device that stores data on a hard disk. The hard disk is a permanent part of the drive and cannot be removed.

HCRX color graphics Accelerated 8-plane or 24-plane graphics. *See also* **CRX color graphics**.

Help Manager The HP VUE application that provides online help.

\$HOME The environment variable rep-

resenting the home directory. This is the directory in which you are placed after you log in. Typically, this is `/users/login`, where *login* is your username. *See also* **home directory**.

home directory A shorthand way of referring to a frequently used directory, almost always the login directory.

host *See* **cluster server**.

host name *See* **internet protocol address**.

HP-UX cluster *See* **cluster node, cluster server**.

HP Visual User Environment A user interface that draws a graphical layer over the complexities of the other layers of the system (the hardware, operating system, and X Window system), enabling you to control your workstation by directly manipulating graphical objects instead of by typing commands at a command-line prompt.

HP VUE *See* **HP Visual User Environment**.

icon A small, graphic representation of an object. Objects can be “iconized” (turned into icons) to clear a cluttered workspace. Icons can be restored to their original appearance when needed. Whatever processes are executing in an object continue to execute when the object is iconized.

iconify *See* **iconize**.





Glossary

iconize To turn a window or shell into an icon. *See also* **icon**.

Initial System Loader The program that actually controls the loading of the operating system.

input device Any of several pieces of hardware equipment used to give information to a system. Examples are the keyboard and the mouse. *See also* **output device**.

input window The window that displays a program's prompt and any commands typed but not yet executed.

internet protocol address (IP address) A string of characters that uniquely identifies a workstation in a network. Also referred to as the IP address, the system name, and the host name.

invisible filename A filename in which the first character is a dot (.). Invisible filenames are not displayed by the listing commands such as **ls** and **ll** without add options, such as **-a**.

IP address *See* **internet protocol address**.

ISL *See* **Initial System Loader**.

kernel The part of the operating system that is an executable piece of code responsible for managing the computer's resources. The kernel controls the rest of the operating system.

LAN *See* **local area network**.

LAN station address *See* **local area network station address**.

link n. A special object that contains the name of another object. When you specify a link as a pathname or part of a pathname, the system substitutes the pathname that the link contains.

v. To join together two or more objects.

local area network (LAN) A data communications system that allows a number of independent devices to communicate with each other. The systems and clusters that share data, hardware, and software resources via Networking Services software.

local area network system address The label that uniquely identifies the local area network (LAN) connection for your workstation at the hardware level.

log in To initially sign on to the system so that you may begin to use it. This creates your first user process. *See also* **username**.

login directory The directory in which you are placed when you log in, usually your home directory. *See also* **home directory**.

Login Manager The program that controls the initial startup of HP VUE and accepts the user's username and password.

login script The shell program that runs at each login, and sets the login environment for your system.





Glossary

menu bar An area at the top or bottom of a window that contain the titles of the pull-down or pop-up menus for that application.

minimize button In HP VUE, a push button on the window frame that turns a screen into an icon. *See also* **icon**, **iconize**.

mouse pointer *See* **pointer**.

name A character string associated with a file, directory, or link. A name can include various alphanumeric characters, but never a slash (/) or null character. *See also* **pathname**.

network Two or more workstations sharing information. *See also* **cluster**, **workstation**.

network controller A printed circuit board that passes bit streams between the network and the main memory of the workstation. Coupled with the network transceiver, the controller also handles signal processing, encoding, and network media access.

node A network computer (workstation). Each node in the network can use the data, programs, and devices of other network nodes. Each node contains main memory and has its own disk or shares one with another node. *See also* **disked workstation**, **diskless workstation**, **workstation**.

node name A unique identifying name given to a workstation in a cluster. *See also* **cluster**, **node**.

nonvolatile memory System memory that retains its contents even after workstation power is turned off.

object Any file, directory, or link in the network. *See also* **directory**, **file**, **link**, **pathname**.

operating system The program that supervises the execution of other programs on your workstation. For example, the entire HP-UX system, including the kernel and all HP-UX commands. *See also* **kernel**.

option *See* **command option**.

output device Any of several pieces of hardware used for receiving messages from the workstation. Display screens and printers are examples of output devices. *See also* **input device**.

output window The window that displays a process response to your command.

parent directory A directory that contains other directories, each of which is then called a subdirectory. *See also* **subdirectory**.

partner node A workstation that shares its disk with a diskless node. *See also* **diskless workstation**.

password The word you enter next to the password prompt at login time. Keep your password secret and change it occasionally in order to protect your account from unauthorized use. *See also* **user account**.





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path The hardware address of a device that is attached to the I/O system of your workstation.

pathname A series of names separated by slashes that describe the path of the operating system from some starting point in the network to a destination object. Pathnames begin with the name of the starting point, and include every directory name between the starting point and the destination object. A pathname ends with the name of the destination object. *See also* **name**, **object**.

permissions A set of rights (read, write, execute) associated with an object in the file system. Determines who may use the object.

PID Process Identification. Also referred to as a process ID. *See also* **process ID**.

pointer Sometimes called the “mouse pointer,” the pointer shows the mouse location on the screen. The pointer’s shape depends on its location. In the HP VUE Workspace, the pointer is an X. On a window frame, the pointer is an arrow.

process A computing environment in which you may execute programs; a program currently running in the system.

process ID A unique identification number assigned to all processes by the operating system. Also referred to as a PID. *See also* **PID**.

program A unit of executable code, in binary or “source” form. Most HP-UX commands and routines consist of pro-

grams.

prompt A message or symbol displayed by the system to let you know that it is ready for your input.

push button A graphic control that simulates a real-life push button. Use the pointer and mouse to push the button and immediately start an action.

RAM Random access memory.

ROM Read-only memory.

root *See* **superuser**.

scroll bar A vertical or horizontal bar located on the side or bottom of a window that allows the user to view information that does not fit within the window.

SCSI *See* **Small Computer System Interface**.

server A program that controls all access to input and output devices.

session The time between when you log in and when you log out. Also called a work session or a login session. *See also* **current session**.

shell A command-line interpreter program used to invoke utility programs. Some examples of HP-UX shells are the Bourne, Korn, Key, and C shells. Sometimes referred to as a command interpreter. *See also* **command interpreter**.

shell command An instruction you





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give the system to execute a utility program or shell script. *See also* **shell script, utility program**.

shell script A file that contains commands that the system can interpret and run in a shell.

shutdown The process of taking the system from multi-user state to system administration state.

SIMM *See* **Single In-line Memory Module**.

single-ended standard SCSI An 8-bit wide SCSI bus with standard receivers and drivers, which limits total cable length to 6 meters. *See also* **fast, differential SCSI, fast-wide SCSI, Small Computer System Interface**.

Single In-line Memory Module A memory board.

slider One of the components of a scroll bar. The slider is the object that is dragged along the scroll area to cause a change.

Small Computer System Interface (SCSI) An IEEE standard for interfacing a computer to multiple, disparate high-speed peripherals such as a floppy disk or a CD-ROM, singly or in combination. *See also* **fast, differential SCSI, fast-wide SCSI, single-ended standard SCSI**.

standalone A workstation that is not part of a cluster. *See also* **cluster**.

Style Manager The HP VUE application that provides the ability to customize various aspects of your system, including colors, fonts, the keyboard, the mouse, session startup and termination behavior, and access to other workstations.

subdirectory A directory that is located in, or anywhere on a path below, another directory. The directory above the subdirectory is called the parent directory. The subdirectory is also referred to as the child directory. *See also* **parent directory**.

superuser A user with permission to enter the top-level directory and make changes to files and programs that users are not allowed to change. To “become superuser” or “become **root**” means to let the system know that you are now assuming the role of system administrator. You can do this either by logging into the system as **root**, or by typing **su** at a command-line prompt. You must know the **root** password to become **root**.

system administrator The person responsible for system and network installation, updating, maintenance, and security at your site.

system call Invocation of a kernel process by a user program.

system name *See* **internet protocol address**.

terminal window A terminal window is a type of HP VUE window that emulates a complete display terminal. Terminal windows are typically used to fool





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non-client programs into believing they are running in their favorite terminal. When not running programs or executing operating system commands, terminal windows display the command-line prompt. *See also* **HP Visual User Environment**.

title bar The rectangular area between the top of the window and the window frame, that contains the title of the window object.

transceiver A device that transmits and receives signals.

user account The system administrator defines a user account for every person authorized to use the system. Each user account contains the name the computer uses to identify the person (user ID), and the person's password. User accounts also contain project and organization names, to help the system determine who can use the system and what resources each person or organization can use. *See also* **user ID, password**.

user ID The name the computer uses to identify you. Your system administrator assigns you a user ID. Enter your user ID during the login procedure when the system displays the login prompt. *See also* **user account**.

username The name that the system recognizes as uniquely yours. Also known as your login name. The username is also the name that identifies you to the mail system and other software requiring secure entry.

utility *See* **utility program**.

utility program A program provided with the operating system to perform a frequently required task, such as printing a file or displaying the contents of a directory. *See also* **command, shell command**.

window A rectangular area of the screen for viewing information. HP VUE allows you to create several types of windows on the screen. Each window is a separate computing environment in which you may execute programs, edit text, or read text. *See also* **Workspace Manager**.

Window Manager The HP VUE program that controls the size, placement, and operation of windows.

working directory *See* **current working directory**.

Workspace What the screen becomes when you start HP VUE. Although you can hide the workspace under terminal windows or other graphic objects, you can never position anything behind the workspace. All windows and graphic objects appear stacked on the workspace. *See also* **HP Visual User Environment, terminal window**.

Workspace Manager The program that controls the size, placement, and operation of windows on the HP VUE Workspace. The Workspace Manager is a special Window Manager. *See also* **Window Manager**.

workstation A compact, graphics-oriented computer having high speed and high memory capacity. A workstation





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usually includes a keyboard, a monitor, and a system unit. *See also* **node, disked workstation, diskless workstation.**





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