Service Handbook

HP VISUALIZE B2000 UNIX® Workstation

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Model B2000	

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New editions of this manual incorporate all material updated since the previous edition. Update packages may be issued between editions and contain replacement and additional pages to be merged into the manual by the user.

The manual part number and printing date indicate its current edition. The manual part number changes when extensive technical changes are incorporated. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.)

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Contents

Contents

Contents

Contents

Contents

Glossary

Contents

Figures

Figures

Tables

Tables

1   Product Information

This chapter provides general product information about the HP VISUALIZE B2000 workstation. This information is provided to help familiarize you with the main features and components of this workstation.

Chapter Overview

This chapter contains the following main sections:

- Product Description
- Front Panel Components
- Rear Panel Components
- Monitors
- Keyboard and Mouse
- Operating System Overview
- Memory

Product Description

The HP VISUALIZE B2000 is an entry-level HP-UX workstation with a 400 MHz PA-RISC processor in a mid-tower case. It supports 4 memory slots, 4 PCI (Peripheral Connect Interface) I/O slots, and entry-level and mid-level HP VISUALIZE graphics.

Table 1-1 lists the key features of the HP VISUALIZE B2000 workstation.

Table 1-1. Key Features of the B2000 Workstation

Feature	Description
Processor	400 MHz PA-RISC processor with 1.5 MB cache
Operating System	HP-UX version 10.20 with the 9912 Additional Core Enhancements (ACE) software bundle (December 1999)
User Interface	HP Common Desktop Environment (CDE) graphical user interface
Compatibility	Source and binary code compatible with the B- and C-Class product families
Main Memory	Four memory slots supporting 128MB, 256MB, and 512 MB memory DIMMs. Minimum memory configuration is 256 MB, and maximum is 2 GB.
Internal Storage Devices	- One standard 9 GB 7200 RPM Ultra2 Wide Low-Voltage Differential (LVD) SCSI hard disk drive; a second 9 GB 7200 RPM Ultra2 Wide LVD SCSI hard disk drive is optional - One standard ATAPI fast CD drive - One optional 3.5-inch floppy disk drive
Standard Networking	Ethernet IEEE 802.3, RJ45 Twisted Pair 10/100 BaseT

Table 1-1. Key Features of the B2000 Workstation

Feature	Description
Standard I/O	• Two Serial (RS-232) ports • Two USB (Universal Serial Bus) ports • One Parallel (IEEE 1284) port • Four Audio ports (Line In, Line Out, Microphone In, and Headphones Out)
I/O Expansion Capabilities	Four PCI (Peripheral Connect Interface) slots: • Two 64-bit PCI-2X slots at 5V, 33 MHz • Two 32-bit PCI-1X slots at 5V, 33MHz
Monitors Currently Supported	• 21-inch, 1280×1024 (stereo capable) color, 75 Hz, VESA • 21-inch, 1600×1200 color, 75 Hz, VESA • 19-inch, 1280×1024 color, 75 Hz, VESA
Graphics	• Integrated HP VISUALIZE-*fxe* graphics chip on the system board • HP VISUALIZE-*fxe* graphics card (optional)
Keyboard	USB (Universal Serial Bus) HP keyboard
Mouse	USB (Universal Serial Bus) HP three-button mouse (standard), or USB HP scroll-wheel mouse (optional)

Front Panel Components

Figure 1-1 shows the components that are located on the front panel of the B2000 workstation. The following subsections describe the system LCD, power switch, and the internal storage devices (including the standard CD drive and optional floppy disk drive) that are located on the front panel.

Figure 1-1. Front Panel Components
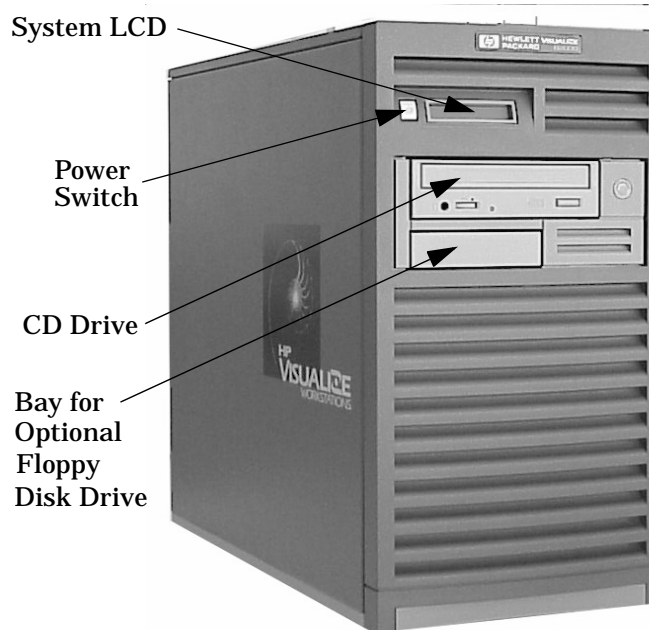
System LCD

The Liquid Crystal Display (LCD) is located on the left side of the front panel as part of the power switch/LCD assembly. The LCD lights when the workstation power is on. The LCD has a 2-line display, with up to 16-characters per line. It displays messages about the state of the system, which are called chassis codes. See the section titled "Selftest Failures" on page 53 in Chapter 3 for a complete listing of the possible chassis codes which can be displayed on the LCD.

The following symbols appear on the LCD, representing different system activities.

Figure 1-2. LCD Symbols

 Operating system running

 Disk Access in progress

 Network Receive in progress

 Network Transmit in progress

Power Switch

The power switch is also located on the left side of the front panel as part of the power switch/LCD assembly. Use the power switch to power the workstation on and off.

When you press the power switch to power off the workstation, the operating system executes an automatic `shutdown -q` command. This prevents any damage to programs and data on the system disk.

Pressing the power switch on again automatically boots up the HP-UX operating system, if the system has been configured to auto boot. For information on setting `auto boot`, refer to the section "Setting the Auto Boot and Auto Search Flags" on page 158.

Internal Storage Devices

The B2000 workstation supports the following internal storage devices:

- Up to two hard disk drives
- One CD drive
- Optionally, one floppy disk drive

The following subsections describe these internal storage devices.

Hard Disk Drives

The B2000 workstation has one 9 GB 7200 RPM Ultra2 Wide Low-Voltage Differential (LVD) SCSI hard disk drive as a standard component. Optionally, the workstation also supports a second 9 GB 7200 RPM Ultra2 Wide LVD SCSI hard disk drive.

CD Drive

The B2000 workstation has one ATAPI fast CD drive as a standard component. Figure 1-3 shows the operating features of the CD drive, and Table 1-2 describes these features.

NOTE   The B2000 workstation supports one CD drive only.

Figure 1-3. CD Drive Features
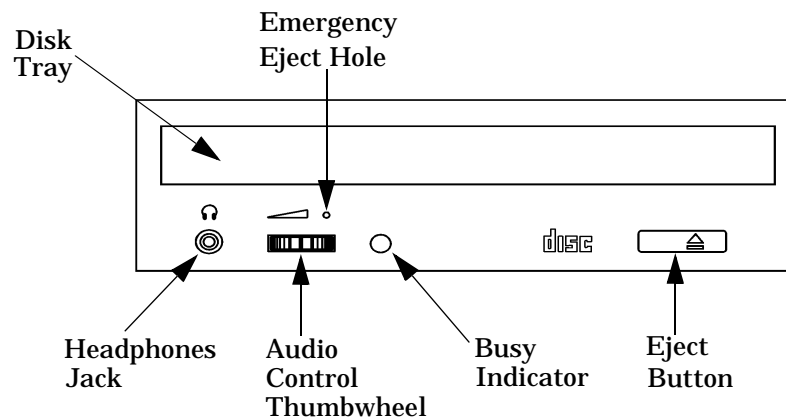
Table 1-2. CD Drive Features

Feature	Purpose
Disk Tray	Holds the CD disk. (Note that this style of CD drive does not use a disk caddy.)
Headphones Jack	Allows headphones to be connected to the CD drive for audio.
Audio Control Thumbwheel	Controls the volume of a CD disk that has audio.
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. • A defective disk • A disk insertion error (for example, an upside down disk) • No disk present
Eject Button	Opens the disk tray so that a CD disk may be inserted in it or removed from it. When the CD drive is in use, press the eject button for more than one second to open the disk tray. (Note that the disk tray does not open if the workstation power is off.) Then press it again to close the disk tray.
Emergency Eject Hole	Opens the disk tray when you insert a paper clip into it. Used when the workstation does not have power and the disk tray cannot be opened by pressing the eject button.

NOTE   The audio features of the CD drive are supported through applications only. One such application is `xmcd`. The `xmcd` utility is not a part of HP-UX; it can be downloaded from the web at this URL:

`http://metalab.unc.edu/tkan/xmcd`

Floppy Disk Drive (Optional)

The optional floppy disk drive is a 3.5-inch form factor device with a PC/AT interface. It connects to the workstation via a 34-pin PC/AT ribbon cable and a 4-pin power cable. The floppy disk drive has up to 1.44 MB capacity depending on the media and format used. Figure 1-4 shows the features of the floppy disk drive, and Table 1-3 describes these features.

NOTE   The B2000 workstation supports one floppy disk drive only.

Figure 1-4. Floppy Disk Drive Features

Activity LED   Eject Button
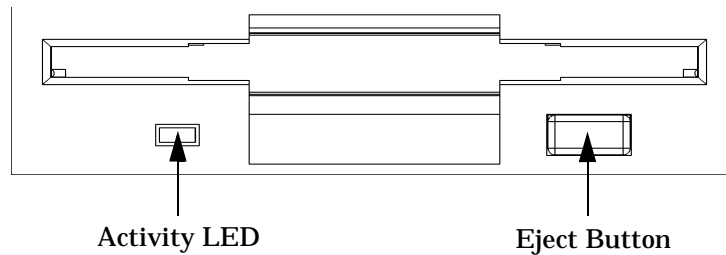
Table 1-3. Floppy Disk Drive Features

Feature	Purpose
Activity LED	Illuminates during a data access operation and blinks during a data transfer.
Eject Button	Ejects a floppy disk from the drive when pressed.

Rear Panel Components

This section describes the following components that are located on the rear panel of the B2000 workstation:

- I/O slots

- Monitor connector

- Serial (RS-232) connectors

- USB (Universal Serial Bus) connectors

- LAN (Ethernet IEEE 802.3, RJ45 Twisted Pair 10/100 BaseT) connector

- Parallel (IEEE 1284) connector

- Audio connectors (Line In, Line Out, Microphone In, and Headphones Out)

- TOC (Transfer Of Control) button

- Security loop

- Power cord connector

Figure 1-5 shows the locations of the components on the rear panel of the B2000 workstation. The following subsections describe each of these components.

Figure 1-5. Rear Panel Components
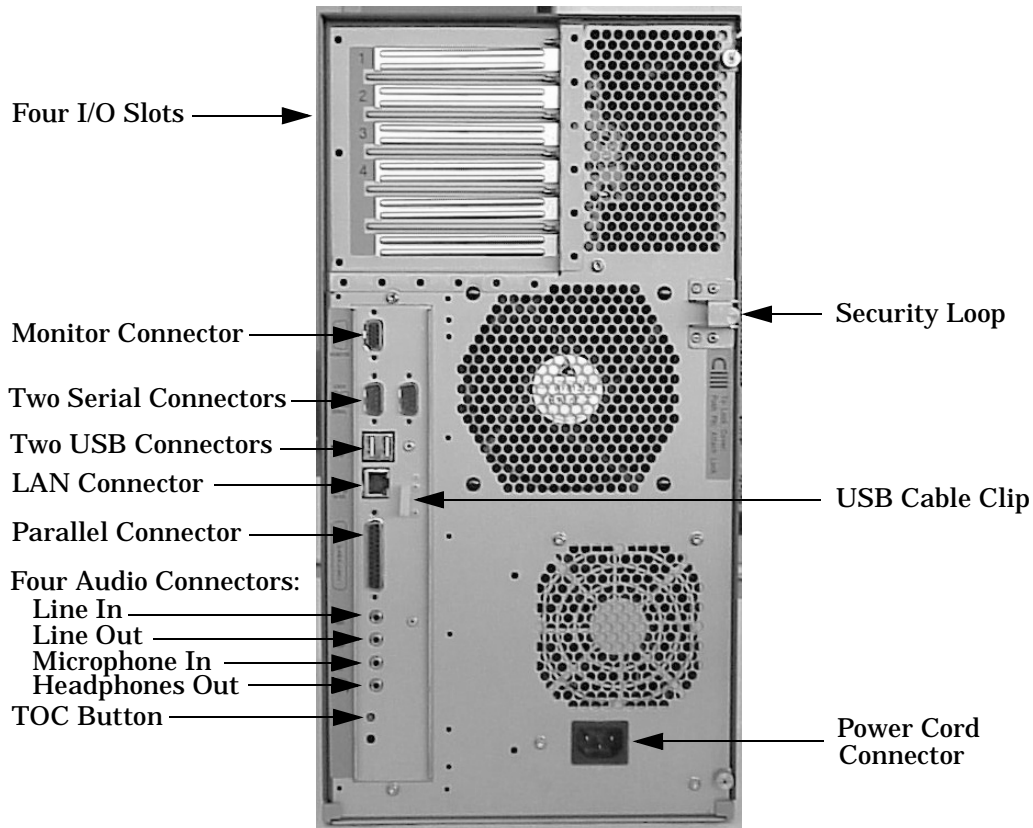
I/O Slots

The four I/O slots located at the top left of the rear panel are PCI (Peripheral Connect Interface) slots, which can be used for add-on I/O interface cards. There are two PCI-2X slots and two PCI-1X slots, which are defined as follows:

Slot 1: 64-bit PCI-2X at 5V, 33 MHz

Slot 2: 64-bit PCI-2X at 5V, 33 MHz

Slot 3: 32-bit PCI-1X at 5V, 33 MHz

Slot 4: 32-bit PCI-1X at 5V, 33 MHz

Monitor Connector

The B2000 workstation has an integrated HP VISUALIZE-*fxe* graphics chip on the system board. Thus, the monitor connector on the rear panel of the workstation connects the monitor to this graphics chip on the system board.

Serial Connectors

There are a variety of pointing devices (such as a mouse or trackball) or peripheral devices (including printers, plotters, modems, and scanners) that can be attached to the two RS-232 Serial Input/Output (SIO) ports on the rear panel of this workstation. Refer to the label on the rear of the workstation to locate serial port 1 and serial port 2. Consult the documentation that accompanies each pointing device or 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. You can set these by using the HP-UX System Administration Manager (SAM) utility, or by selecting a system special device file with the functions already programmed. The SIO ports are used as interfaces for serial asynchronous devices to the CPU.

Table 1-4 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 1-4. 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

Table 1-4. Serial I/O Pins

Pin No.	Signal	Description
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

USB Connectors

The USB connectors located on the rear panel of the workstation provide interfaces for the keyboard and mouse to the system. These USB connectors support only the HP keyboard, HP mouse, USB hub, or other HP-recommended USB devices. The keyboard and mouse may be plugged into either USB connector on the rear of the workstation or plugged into the USB hub. *No* other USB configuration is currently supported. Consult the documentation that accompanies each USB input device for specific information concerning its use.

NOTE	The USB HP keyboard and USB HP three-button mouse are shipped with the B2000 workstation. The USB hub and USB HP scroll-wheel mouse may be ordered separately.

For more information on USB, see the Universal Serial Bus website at the following URL:

```
http://www.usb.org
```

CAUTION	Use of USB devices other than those approved by HP may result in unpredictable functionality and inferior performance of the B2000 workstation.

NOTE	The USB cable clip on the rear of the workstation (see Figure 1-5 on page 22) provides strain relief for USB cables. To secure USB cables, open the cable clip, loop the cables through the clip, and snap it closed.

LAN Connector

The B2000 workstation has one built-in, Ethernet IEEE 802.3, RJ45 Twisted Pair (TP) connector for 802.3 (Ethernet) or 10/100BaseT networking. The workstation automatically selects the correct network setting.

Parallel Connector

The 25-pin HP Parallel I/O interface uses IEEE 1284 I/O 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.

Audio Connectors

The B2000 workstation has audio-input and -output capabilities through external input and output connectors on the rear panel and through an internal speaker. The sound is 16-bit, 44 kHz (CD-quality).

As shown in Figure 1-6, the workstation's rear panel contains four audio connectors: Line In, Line Out, Microphone In, and Headphones Out.

Figure 1-6. Audio Connectors
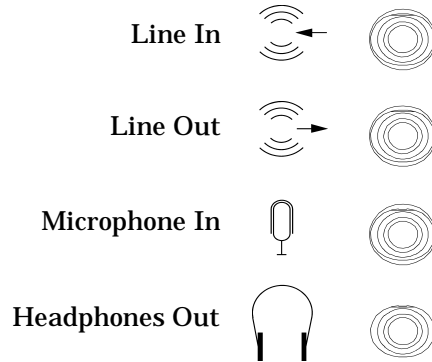
The audio connectors are standard stereo audio mini-jacks. Hewlett-Packard recommends using gold-plated plugs available through audio retailers for best quality recording and playback through the external connectors.

Table 1-5 summarizes the audio electrical specifications for the B2000 workstation.

Table 1-5. Audio Electrical Specifications

Frequency Response	25 Hz to 20 kHz

Input Sensitivity/Impedance:
 	
     Line In
     Microphone In
	
	 2.8Vp-p/10Kohm
	 40mVp-p/47Kohm

Maximum Output Level/Impedance:
 	
     Line Out
     Headphones Out
	
	 2.8Vp-p/920ohm
	 5.6Vp-p/110ohm

TOC Button

The TOC (transfer of control) button interrupts the system and transfers control from the default device to an auxiliary device. A transfer of control saves the state of the processor in Processor Internal Memory (PIM) and begins execution of recovery software at a nonzero location specified by a special location in Page Zero called MEM_TOC. The TOC code is protected by a checksum.

Security Loop

There is also a security loop on the rear panel of the B2000 workstation. The security loop allows you to lock the workstation's left side panel, thus securing the internal components of the workstation. Figure 1-7 provides a view of the security loop.

Figure 1-7. Security Loop Components

Security
Loop Pin
 Hole

Security
Loop Pin
and Spring
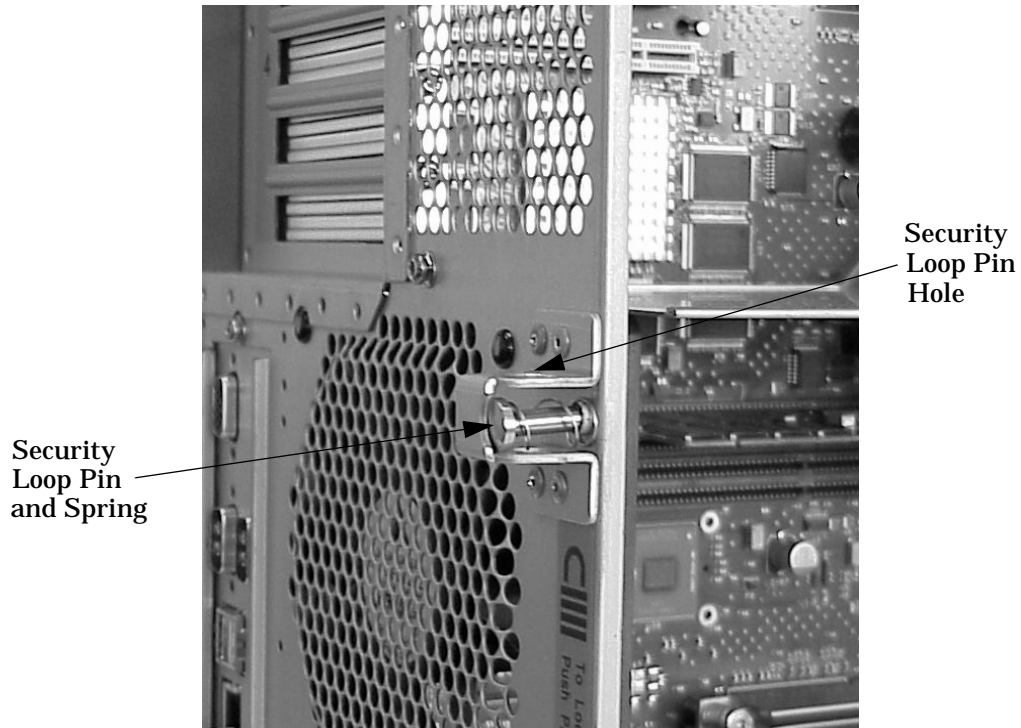
To lock the workstation's left side panel, follow these steps:

1. Make sure the workstation's left side panel is closed, as shown in Figure 1-8.

Figure 1-8. Closed Left Side Panel

Workstation's
Front Panel

Left Side Panel
(Using the Front
 Panel as Reference)
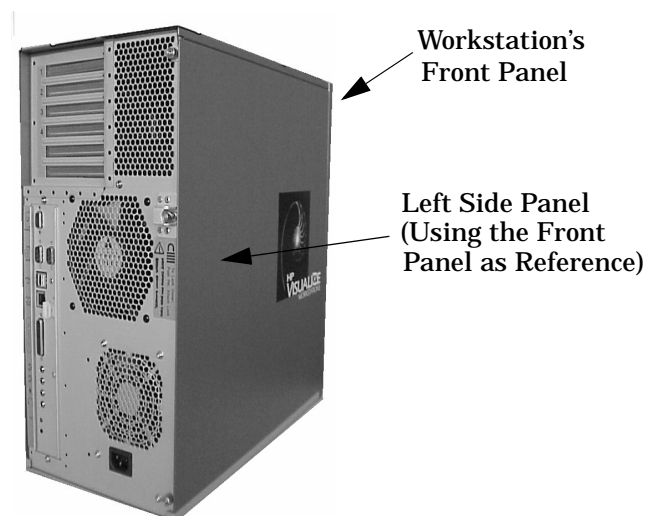
2. Push the security loop's pin into the security loop pin hole, and insert the padlock's latch through the holes at the top and bottom of the security loop. This locks the left side panel.

3. Lock the padlock. The workstation's left side panel is now secure.

Power Cord Connector

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

Monitors

The B2000 workstation supports monitors set to one of the following resolutions:

- 1280×1024 color (stereo capable), 75Hz, VESA

- 1600×1200 color, 75Hz, VESA

- 1280×1024 color, 75 Hz, VESA

The workstation must have either an HP-supported monitor running at 75 Hz with a 1280×1024 resolution, or a full multi-mode color monitor. Monitors with EVC, D-Sub, or 5 BNC connectors (RGB, vertical sync, horizontal sync) will function.

NOTE   The HP VISUALIZE-*fxe* graphics card will not function with older HP monitor types that use a sync on green signal. This includes monitors such as the HP 1097A/B/C/D, A2088A, and A2828A/B that only have 3 BNC connectors.

Note that you can connect the B2000 workstation to earlier HP monitors with 15-pin miniature D-Sub cables using the A4168A adapter shipped with the workstation's accessory kit.

Before using a monitor, you should become familiar with its controls, connectors, and indicators. For information about using a monitor, see the documentation that came with the monitor.

Keyboard and Mouse

USB HP Keyboard

The HP VISUALIZE B2000 workstation supports a USB HP keyboard. The keyboard shipped with the workstation provides a localized PC-104, PC-105, PC-106, or JIS-109 compatible input device for USB-equipped PA-RISC workstations and other USB-compatible computers that support the HP-UX operating system. The keyboard includes a captive cable terminated in a USB Style A connector.

The USB keyboard is designed specifically for use with HP workstations. All keyboard models with the exception of the JIS-109 layout may also be compatible with conventional personal computers.

Some applications may expect to use keycodes generated by keys existing on other types of keyboards. Consult the documentation that accompanies each input device for specific information concerning its use.

NOTE   HIL and PS/2 devices are not supported by the B2000 workstation.

USB HP Mouse

The HP VISUALIZE B2000 workstation supports a USB HP mouse. The USB HP three-button mouse is standard, whereas the USB HP scroll-wheel mouse is optional.

For general information on the various cursor shapes associated with different areas of HP CDE while using a mouse, see the *Using Your HP Workstation* manual.

Operating System Overview

The B2000 workstation runs the HP-UX operating system version 10.20 with the 9912 Additional Core Enhancements (ACE) software bundle (December 1999). To verify which version of the operating system is running on a B2000 workstation, use the command `swlist` in a terminal window. Note that the ACE software bundle releases are also available at the following URL:

```
http://software.hp.com/
```

The B2000 workstation is an Instant Ignition system (that is, a system with preloaded software). It has X-Windows, HP's graphical user interface, and HP CDE (Common Desktop Environment) already installed and configured. If the Instant Ignition system does not have the kernel preconfigured with all of the required device drivers, refer to the *Managing Systems and Workgroups* manual to configure the kernel. If you have any questions about Instant Ignition, refer to the *Using Your HP Workstation* manual.

Note that you can find both of the manuals mentioned in the previous paragraph on HP's documentation website at the following URL:

```
http://www.docs.hp.com/
```

Memory

The B2000 workstation has four slots for memory DIMMs. You can install only 128 MB, 256 MB, or 512 MB DIMMs in these slots. The minimum memory configuration for a B2000 workstation is 256 MB, and the maximum is 2 GB.

To install memory DIMMs, refer to "Replacing or Installing Additional Memory DIMMs" on page 115.

CAUTION   If memory is installed improperly or is defective, the B2000 workstation's operating system will *not* boot-up, and a DIMM error chassis code will appear in the LCD. If an error does occur, refer to Chapter 3, "Troubleshooting."

Memory Failures

The HP VISUALIZE B2000 system (with HP-UX 10.20 and later) uses Memory Page Deallocation, a feature that allows the system to provide information to the operating system about memory failures.

You can use the `memrpt` command with the `detail` switch to obtain information about the Memory Page Deallocation Table (PDT) as well as single bit errors logged by the system, by typing the following:

```
# /usr/sbin/sysdiag  Enter

DUI>logtool  Enter

LOGTOOL>memrpt detail   Enter
```

The PDT can also be checked using the `pdt` command in the Service menu of the Boot Console Handler (refer to Chapter 6). If you replace a defective DIMM, use the Service Menu's `pdt clear` command to clear out the PDT.

2   Configuration

This chapter provides details about setting up and changing the workstation and system hardware configuration for the HP VISUALIZE B2000 workstation.

Chapter Overview

This chapter contains the following main sections:

- Workstation Configurations
- System Hardware Configurations
    - Internal Storage Devices
    - Memory
    - I/O Cards
    - Monitor-Type Selection

Workstation Configurations

Refer to the HP Workstations website for a complete list of supported accessories, peripherals, and operating system versions for the HP VISUALIZE B2000 workstation. The URL for the website is:

```
http://hp.unixworkstations.com
```

System Hardware Configurations

This section provides information for setting up or changing the configuration of the Field Replaceable Units (FRUs) for the B2000 workstation.

Internal Storage Devices

Hard Disk Drive Configuration

The SCSI IDs for hard disk drives are hard-wired into the SCA Ultra2 Wide LVD SCSI interfaces on the system board within the B2000 workstation. Hence, SCSI IDs do not need to be set for the hard disk drives (up to two) installed in this workstation. From top to bottom, the pre-set SCSI IDs for hard disk drives are: 6 and 5.

Similarly, no jumpers are installed at the factory, nor is any jumper installation required at the customer's site, on the hard disk drive model supported with the B2000 workstation. To remove and replace or install a hard disk drive, see the section titled "Hard Disk Drives" on page 104. Also see the next subsection, "Configuring a Hard Disk Drive as a File System," when removing or installing a hard disk drive.

Configuring a Hard Disk Drive as a File System

This section describes how to use SAM to add a hard disk drive to the workstation as a file system and how to remove the hard disk drive from the workstation. For more information about configuring a hard disk drive, refer to the *Managing Systems and Workgroups* manual.

The procedures in this section require you to log in as `root`. If you cannot log in as `root`, contact the system administrator.

Adding a Hard Disk Drive as a File System

To add a hard disk drive as a file system using SAM, do the following:

1. Log in as `root`.

2. Move the mouse pointer to the **Application Manager** control for tools and click the left mouse button. Alternatively you can execute `sam` at a terminal window command prompt and skip to step 5.

3. Double-click on the **System_Admin** icon in the **Application Manager** window.

4. Double-click on the **Sam** icon in the **Application Manager** -- **System_Admin** window. If you are `root`, the System Application Manager (SAM) will appear on the screen.

5. Double-click on the **Disks and File Systems** icon.

6. Double-click on the **Disk Devices** icon.

The following screen message is displayed:

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

The **Disk and File Systems** window opens containing a list of drives installed in this workstation. From the list of devices, choose the hard disk drive you would like to configure as a file system by clicking on the device to highlight it.

7. Click on **Add** in the Actions menu. For this example you will select the item **Not Using the Logical Volume Manager**. However, you can select any appropriate item from the **Actions** menu.

8. Enter the mount directory name (for example, `/disk1`) in the **Mount Directory** field of the **Add Disk without LVM** window.

9. Click on the **OK** button in the **Add Disk without LVM** window. You will need to wait for a short time before the new file system is created and the hard disk drive is mounted. When the **Add Disk without LVM** window disappears and HFS appears in the Use column of the **Disk and File Systems** window, your task will be complete.

Removing a Hard Disk Drive as a File System

To remove a hard disk drive as a file system using SAM, do the following:

1. Log in as `root`.

2. Move the mouse pointer to the **Application Manager** control for tools and click the left mouse button. Alternatively you can execute sam at a terminal window command prompt and skip to step 5.

3. Double-click on the **System_Admin** icon in the **Application Manager** window.

4. Double-click on the **Sam** icon in the **Application Manager** -- **System_Admin** window. If you are `root`, the System Application Manager (SAM) will appear on your screen.

5. Double-click on the **Disks and File Systems** icon.

6. Double-click on the **Disk Devices** icon.

The following screen message is displayed:

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

The **Disk and File Systems** window opens containing a list of devices installed in this workstation. From the list of devices, choose the hard disk drive you would like to remove (unmount) by highlighting that device.

7. Click on **Remove** in the **Actions** menu. In the window that next appears, click on the **Yes** button. This will unmount the file system located on the hard disk drive you are removing from the workstation. You will need to wait for a short time before the new file system is unmounted. The file system is successfully unmounted when you see Unused in the Use column.

CD Drive Configuration

The CD drive connects to the ATAPI (IDE) interface in the CD drive bay backplane within the B2000 workstation via a 40-pin ribbon cable, a 4-pin audio cable, and a 4-pin power cable. No interface addressing is required for the CD drive.

However, as shown in Figure 2-1, the CD drive should have a jumper set on the CSEL (Cable Select) selection pins. (The CD drive should ship from the factory already jumpered for CSEL.)

CAUTION   CD drives are susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static-grounding wrist strap that came in the CD drive kit. Always handle the drive carefully.

Figure 2-1. CD Drive Jumper Setting (Rear View)

Jumpered for CSEL
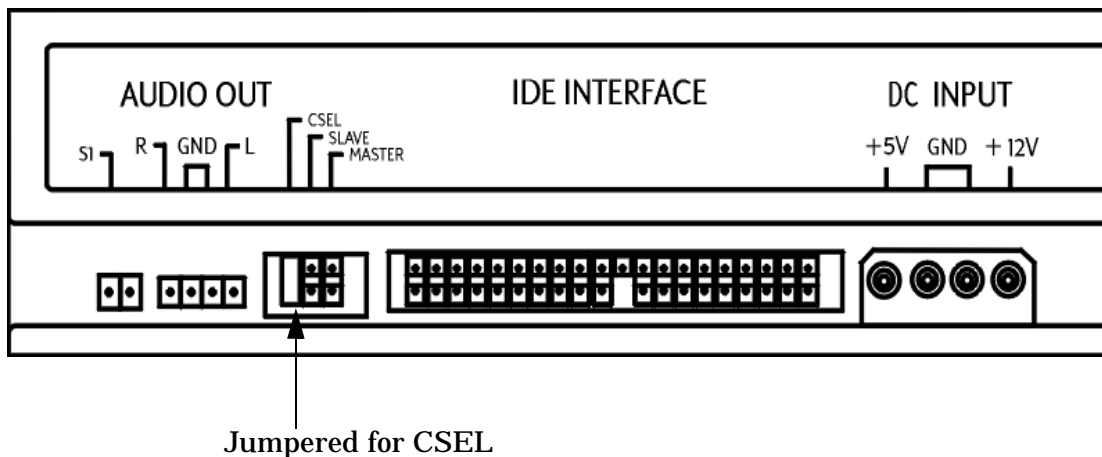
To remove and replace a CD drive in the B2000 workstation, see the section titled "Removing and Replacing a CD Drive" on page 91.

Floppy Disk Drive (Optional) Configuration

The optional 3.5-inch floppy disk drive requires no ID, switch, or jumper settings. To remove a floppy disk drive from the B2000 workstation, see the section titled "Removing a Floppy Disk Drive" on page 96. To replace or install a floppy disk drive, see the section titled "Replacing or Installing a Floppy Disk Drive" on page 99.

CAUTION   Floppy disk drives are susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static-grounding wrist strap that came in the floppy disk drive kit. Always handle the drive carefully.

Memory

The B2000 workstation has 4 memory slots, labeled SL0 through SL3. Memory can be configured from 256 MB to 2 GB for the B2000 workstation. Memory does not have to be configured in pairs for the B2000, but must be loaded in the order shown in Figure 2-2. Notice the alternating load pattern by location on the system board.

Figure 2-2. Memory Slot Numbers and Loading Sequence

SL0	Load 1st
SL3	Load 4th
SL1	Load 2nd
SL2	Load 3rd

Memory Slots
(4 Slots)
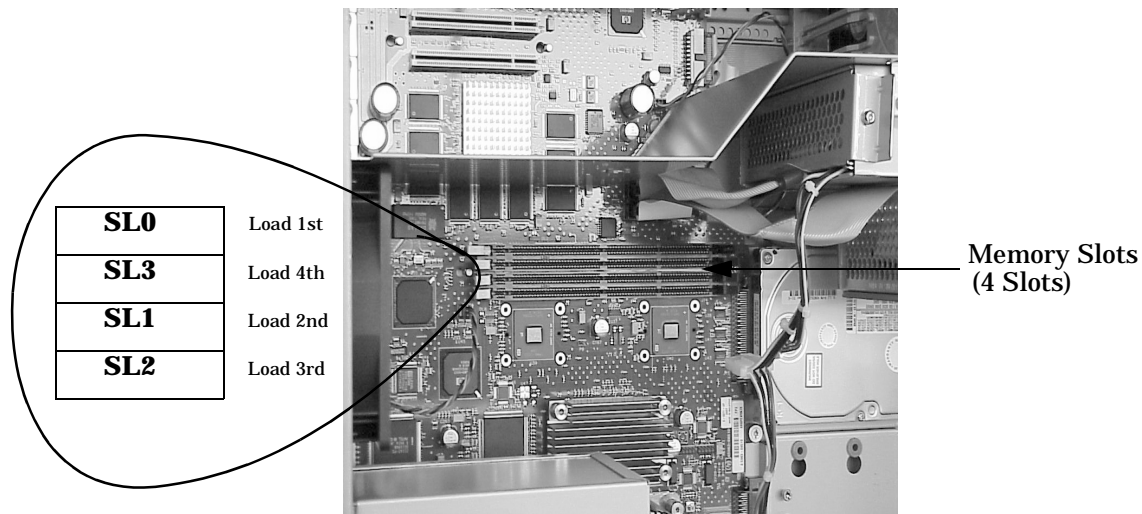
The B2000 workstation supports 128 MB, 256 MB, and 512 MB DIMMs. If you will install different sizes of memory DIMMs in a particular workstation, load the largest size first and then the smaller size for maximum performance. For example, load a 256 MB DIMM in slot 0 (SL0) and then load a 128 MB DIMM in slot 1 (SL1).

CAUTION	The memory DIMMs must be installed in the correct order, else the workstation will not boot properly.

NOTE	Users who wish to achieve both maximum performance and maximum future capacity are advised to use 512 MB DIMMs exclusively.

To remove DIMMs, see the section titled "Removing Memory DIMMs" on page 114. To replace or install DIMMs, see the section titled "Replacing or Installing Additional Memory DIMMs" on page 115. Note that there is a system label on the floor of the workstation's interior showing the memory loading order for the B2000.

Use the Boot Console Handler to verify that the workstation recognizes the installed memory. See "Displaying the Current Memory Configuration" on page 156.

I/O Cards

The B2000 workstation's system board has four Peripheral Connect Interface (PCI) slots for option I/O cards. Slots 1 and 2 are full-size (PCI-2X) slots. Slots 3 and 4 are half-size (PCI-1X) slots. See Figure 2-3 for a brief description of slot capabilities.

Figure 2-3. PCI Card Slot Numbering and Capabilities

Slot 1 | **64-bits, 5V, 33MHz** |

Slot 2 | **64-bits, 5V, 33MHz** |

Slot 3 | **32-bits, 5V, 33MHz** |

Slot 4 | **32-bits, 5V, 33MHz** |

To remove and replace or install I/O cards, see the section titled "I/O Cards" on page 110.

NOTE   If you are installing an additional HP VISUALIZE-*fxe* graphics card, after you connect the monitor to the additional graphics card, you must change the graphics path for that monitor. To do this, see the section "Displaying and Setting the Monitor Type" on page 150.

Monitor-Type Selection

The B2000 workstation supports monitors set to one of the following resolutions:

- 1280×1024 color (stereo capable), 75Hz, VESA

- 1600×1200 color, 75Hz, VESA

- 1280×1024 color, 75 Hz, VESA

The workstation must have either an HP-supported monitor running at 75 Hz with a 1280×1024 resolution, or a full multi-mode color monitor. Monitors with EVC, D-Sub, or 5 BNC connectors (RGB, vertical sync, horizontal sync) will function.

NOTE   The HP VISUALIZE-*fxe* graphics card will not function with older HP monitor types that use a sync on green signal. This includes monitors such as the HP 1097A/B/C/D, A2088A, and A2828A/B that only have 3 BNC connectors.

Note that you can connect the B2000 workstation to earlier HP monitors with 15-pin miniature D-Sub cables using the A4168A adapter shipped with the workstation's accessory kit.

The `monitor type` does not have to change since the B2000 workstation is set up to support the monitors listed above. However, if for some reason the `monitor type` needs to change, refer to Chapter 6, "Boot Console Handler."

3   Troubleshooting

This chapter provides information about isolating a failing component, known as a Field Replaceable Unit (FRU), in the HP VISUALIZE B2000 workstation.

Chapter Overview

This chapter contains the following main sections:

- Flowcharts for Troubleshooting
- Identifying LCD-Indicated Conditions
- Fan Faults and Warnings
- Dealing with a Boot Failure
- Selftest Failures
- Memory Failures
- Running System Verification Tests
- Running ODE-Based Diagnostics
- Using the PIM Dump Tool to Decode HPMCs

To troubleshoot an HP VISUALIZE B2000 workstation, you must be familiar with the HP-UX operating system. You should also be familiar with the boot ROM diagnostics and the Mesa (Support Tools Manager) online tests, which we describe in this chapter.

As a super-user who is troubleshooting an HP-UX system, you should be able to shutdown and reboot a system, start and stop processes, and examine error logs. You should also be able to use systems utilities such as `ioscan` to check device files and configurations, `swlist` to show loaded patches and software bundles, and SAM to configure and show enabled services and configurations. You should also be familiar with STM, the online diagnostics tool. You can view man pages on any of these online utilities or commands.

Note any error or status messages, then run the power-up boot ROM diagnostics, known as Self Test. If the Self Test diagnostics fail, replace the FRU that is indicated. If the tests pass, but you still suspect a problem, run the ISL diagnostics and Mesa (Support Tools Manager) online tests.

For a complete description of using ISL diagnostics and Mesa (Support Tools Manager), refer to the following website URL:

```
http://wojo.rose.hp.com/
```

Flowcharts for Troubleshooting

The following four figures contain troubleshooting flowcharts you can follow to isolate a failing Field Replaceable Unit (FRU). Figure 3-1 contains the main (power on LCD) troubleshooting flowchart. Figures 3-2 through 3-4 then contain flowcharts for console, bootable device, and HP-UX troubleshooting, respectively.

Figure 3-1. Main (Power on LCD) Troubleshooting Flowchart
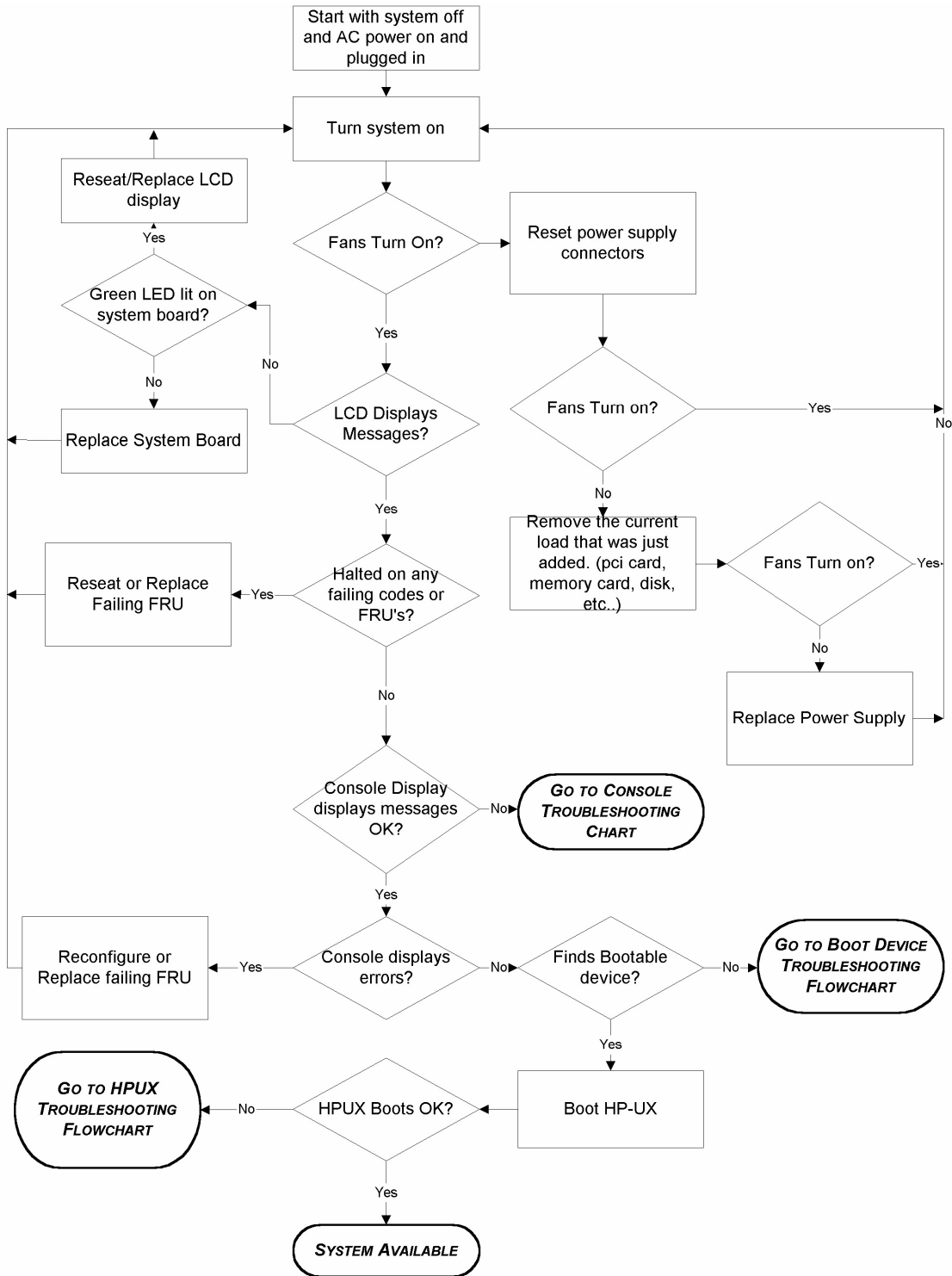
Figure 3-2. Console Troubleshooting Flowchart
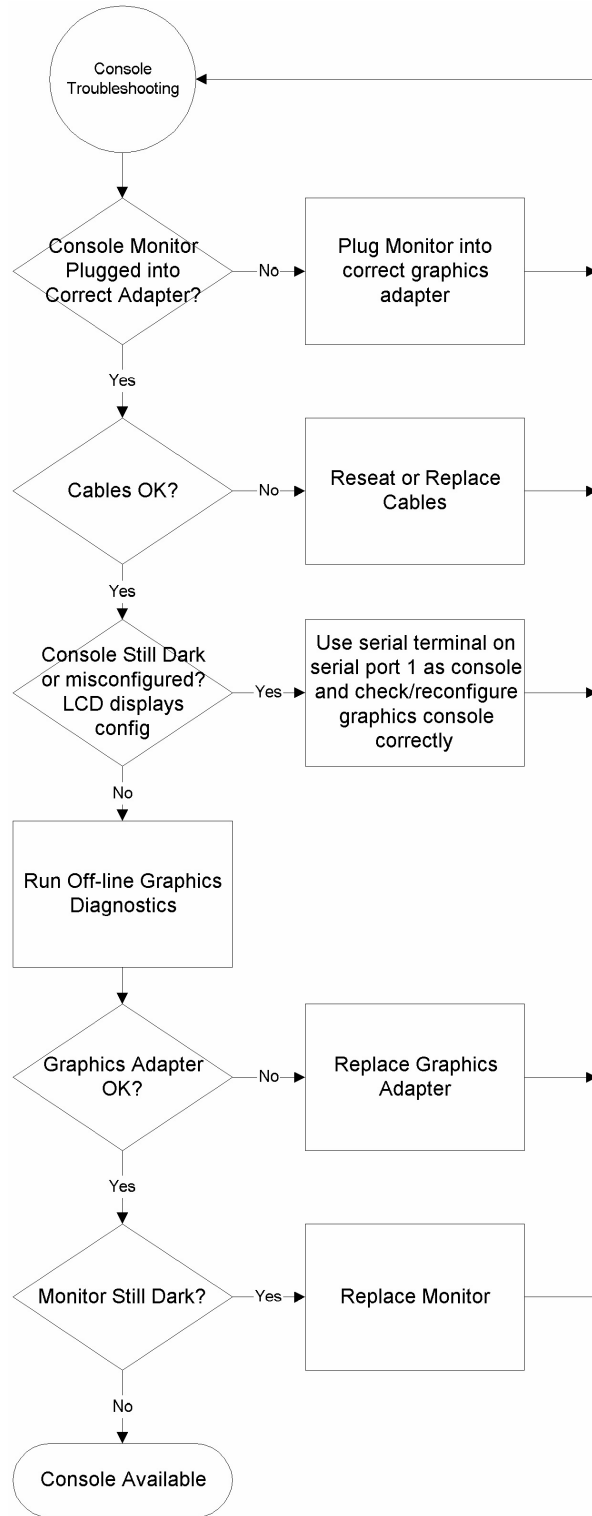
Figure 3-3. Bootable Device Troubleshooting Flowchart
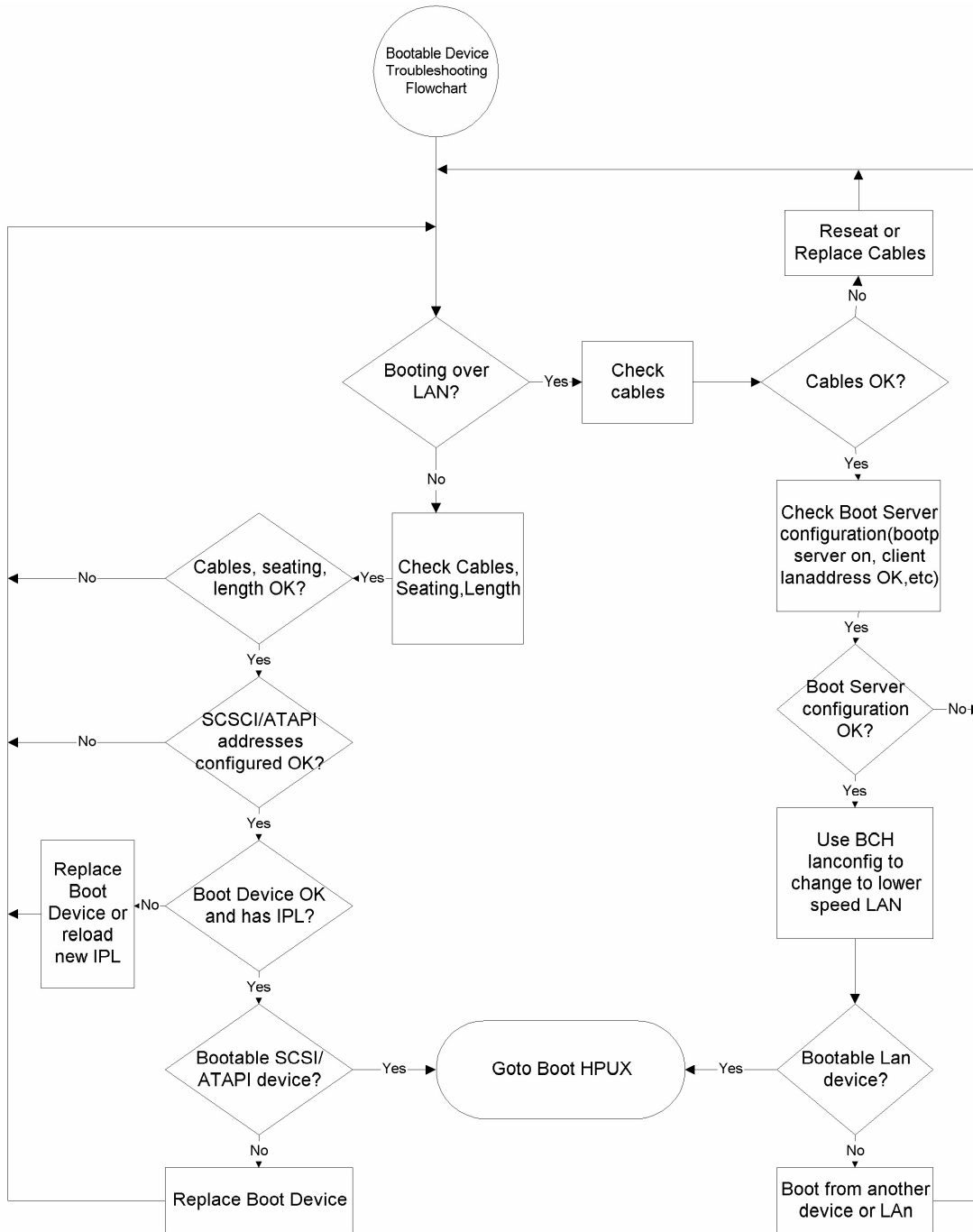
Figure 3-4. HP-UX Troubleshooting Flowchart
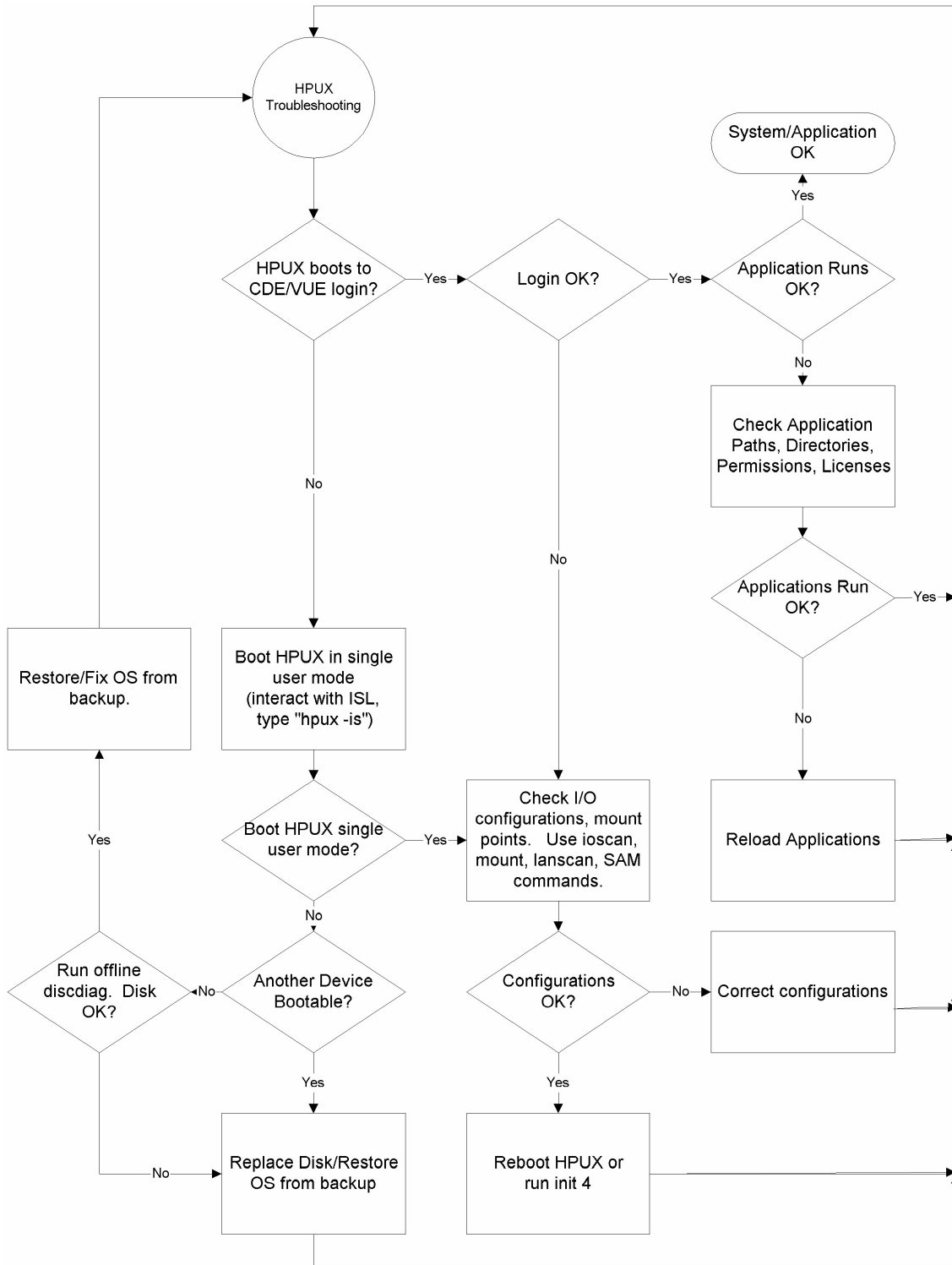
Identifying LCD-Indicated Conditions

The B2000 workstation uses an LCD panel to display firmware/OS progress codes. The codes, referred to as chassis codes, consist of one of the mnemonics listed below, followed by a 4-digit hexadecimal number identifying the code module being executed. The mnemonics and their meanings are:

FLT   A hardware error has been detected

TST   Hardware being tested

INI   Hardware being initialized

SHU   System being shutdown

WRN   A non-optimal or unusual operating condition exists

RUN   Computer is running operating system

In general, the LCD display has the following format:

```
  ┌─────────────────────────────┐
  │                             │
  │   MMM   CCCC:    FFFFFF      │◄────── Line 1
  │                             │
  │                             │
  │   DDDDDDDDDDDDDDDD           │◄────── Line 2
  │                             │
  └─────────────────────────────┘
```
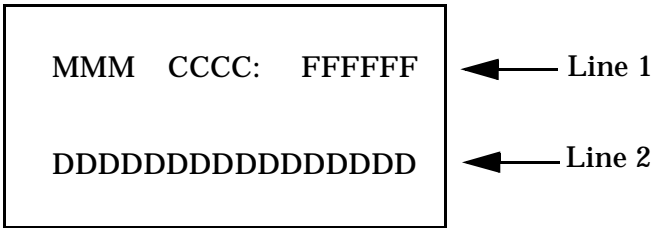
MMM   Three-character chassis code mnemonic

CCCC   Four-digit hexadecimal code

FFFFFF   Six-character Field Replaceable Unit (FRU) description

DDDDDDDDDDDDDDDD Description of the chassis code

If the system encounters an FLT code while the system is booting, the FLT code is interpreted and a message is displayed. For example, you may have information similar to the following in the LCD:

FLT   Three-character chassis code mnemonic

30FC   Four-digit hexadecimal code

SYS BD   Six-character Field Replaceable Unit (FRU) description

bad sys bd id   Description of the chassis code

Fan Faults and Warnings

This section provides the fault (`FLT`) and warning (`WRN`) messages you will see in the LCD if there is a problem with a fan in the B2000 workstation.

A chassis code which indicates that a fan has failed (`FLT D01n`) or is running too slowly (`WRN D02n`) within a B2000 workstation specifies the fan number, n. Table 3-1 lists the fan numbers and their names. To locate the correct fan, see Figure 3-5 on the next page.

Table 3-1. Fan Numbers and Corresponding Names

Fan Number (n)	Name of the Fan
2	I/O fan
4	System fan
5	Processor fan

Here is an example of a fault message for the system fan (4):

```
FLT D014 SYS BD
fan 4: failure!
```

Here is an example of a warning message for the processor fan (5):

```
WRN D025 SYS BD
fan 5: too slow!
```

Figure 3-5. Fan Locations

I/O Fan (2)

System
Fan (4)
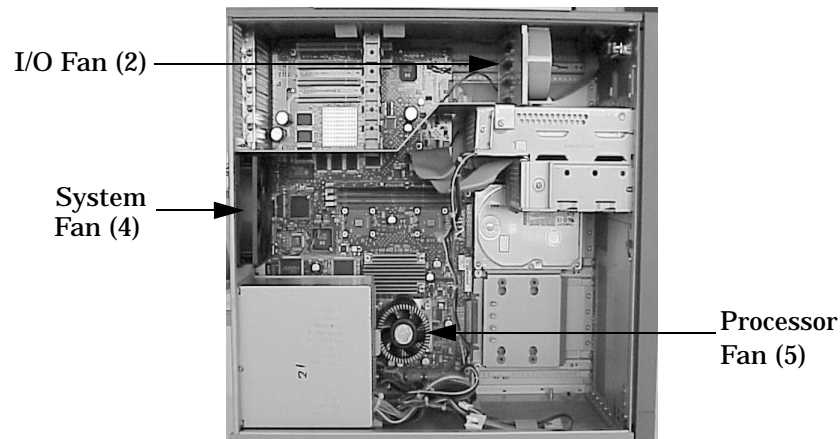
Processor
Fan (5)

In the case of a fan problem, you will need to replace:

• The fan itself, if it is either an I/O fan (2) or a system fan (4).

• The entire system board tray assembly, if it is a processor fan (5) (that is, the fan mounted on the PA-RISC microprocessor on the system board).

See Chapter 4 for the procedures you should follow to remove and replace a fan.

Dealing with a Boot Failure

To start this workstation from an operating system stored on a device different from the usual boot device, to boot from a different disk, or to boot from another type of device (such as an alternate hard disk or CD), see the following situations and examples that use the Boot Console Handler. To access the Boot Console Handler, see Chapter 6.

- To boot from a known device containing a bootable operating system, type the following at the prompt and press **Enter**:

  `Main Menu: Enter a command or a menu > boot` *device*

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

  For example, to boot an operating system stored on a DDS-format tape in a drive located at "`scsi.1.0`," go to the Main Menu of the Boot Console Interface and then type the following command at the prompt and press **Enter**:

  `Main Menu: Enter a command > boot scsi.1.0`

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

- To interact with the Initial System Loader (ISL) before booting the workstation, type the following at the prompt and press **Enter**:

  `Main Menu: Enter a command or a menu > boot` *device*

  You are prompted: `Interact with ISL (Y or N) > y`

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

  For example, if the usual kernel (`/stand/vmunix` for HP-UX 10.20) on the root disk (`scsi.6.0`) has become corrupted, boot the workstation from the backup kernel (`/stand/vmunix.prev` for HP-UX 10.20) by typing the following at the `ISL>` prompt and press **Enter**:

  `ISL> hpux /stand/vmunix.prev`

- To find the location of the bootable operating systems on the various media in the file system, use the `search ipl` command.

Searching for Bootable Media

To list all devices that may contain bootable media, go to the Main Menu of the Boot Console Interface and then type the following at the prompt:

`Main Menu: Enter a command or a menu > search ipl`

The search may turn up more devices than there are lines on the display. If using a text terminal, you can control the progress of the search from the 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 **Esc**

These flow-control commands do not work with a bitmapped display, but such a display can show more than forty lines of text, so they are unnecessary.

To search for devices of just one type that actually contain bootable media, go to the Main Menu of the Boot Console Interface and then type the following at the prompt:

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

where `device_type` is one of the following:

- `scsi` is the built-in fast, Ultra2 Wide LVD (Low Voltage Differential) SCSI bus.

- `lan` is all connections to the built-in LAN.

- `ide` is the built-in CD drive.

- `pci`n is an optional plug-in device in PCI slot number n.

- `disk` is any bootable device other than LAN.

Stable Storage

Stable Storage is non-volatile memory associated with each PA-RISC processor module. Stable storage is used by the processor (CPU) to store device path information, the state of the boot flags, HPMC error information, and operating system initialization data.

Boot Command Notations

The `boot` command supports the following two notations:

- Mnemonic
- Path number

Type `help scsi` or `help lan` for more information on the boot path parameters.

Here are examples of mnemonic notation:

- `boot` with no parameters selects the primary boot path in stable storage.
- `boot` with the `alternate` or `alt` parameter selects the alternate boot path in stable storage.

Here is an example of path number notation:

- `boot p1` attempts to boot from the second path in a list generated by a previous `search` command.

Supported Boot Paths

SCSI devices are bootable when connected to the SCSI port on the system. Diskless workstations can only boot from the LAN port on the system board. The workstation can be booted from the CD-ROM for software installation.

ISL Environment

The ISL environment provides the means to load the operating system (HP-UX) environment. The ISL environment also provides an off-line platform to execute diagnostic and utility programs from a boot device when HP-UX does not load.

The ISL program is the first program loaded into main memory from an external media (LAN, disk, or tape) and launched by the initial program loader (IPL) routine during the Boot Administration environment.

The ISL environment provides the following capabilities:

- Execute user-entered commands to modify boot device paths and boot options in stable storage.
- Run off-line diagnostic programs and utilities.
- Provide automatic booting of the HP-UX operating system after power-on or reset.

The ISL program provides a stand-alone environment for loading off-line diagnostic and utility programs from the LIF directory. The ISL program also provides user commands to configure the boot parameters into Stable Storage.

Selftest Failures

Chassis codes are the key to debugging selftest errors. If a failure is found during selftest, chassis codes are displayed in the LCD. The procedure for using these codes to debug a failure is as follows:

1. Using Table 3-2, which starts on the next page, find the chassis code listed on the LCD.

2. To get additional information about failures from the Boot Console Handler, use the Service Menu's `pim`, `pdt`, and `ChassisCodes` commands.

In the following table, the FRU column shows messages printed on the LCD that refer to system FRUs. Only `FLT` codes have FRUs associated with them. Some `WRN` codes are also device specific, especially to IODC calls; for example, `8xxx` codes. `TST` and `INI` codes do not necessarily correspond to any FRU. All codes are listed in numeric order.

NOTE   Because the B2000 workstation is a single-board system, references to the `I/O BD` (I/O board) in chassis codes displayed on the LCD and listed in Table 3-2 are actually references to the `SYS BD` (system board).

Chassis Codes

Table 3-2. lists all of the chassis codes for the B2000 workstation.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	1n01	SYS BD	HPMC occurred	CPU n detected an unexpected HPMC.
FLT	1n02	SYS BD	powerfail intrpt	CPU n detected an unexpected power fail interrupt.
FLT	1n03	SYS BD	recvry cntr trap	CPU n detected an unexpected recovery counter trap.
FLT	1n04	SYS BD	external intrrpt	CPU n detected an unexpected external interrupt.
FLT	1n05	SYS BD	LPMC occurred	CPU n detected an unexpected LPMC.
FLT	1n06	SYS BD	ITLB mis/Ipg flt	CPU n detected an unexpected ITLB miss or instruction page fault.
FLT	1n07	SYS BD	I mem prot trap	CPU n detected an unexpected instruction memory protection trap.
FLT	1n08	SYS BD	illegal inst trp	CPU n detected an unexpected illegal instruction trap.
FLT	1n09	SYS BD	break instr trap	CPU n detected an unexpected break instruction trap.
FLT	1n0A	SYS BD	privilgd op trap	CPU n detected an unexpected privileged operation trap.
FLT	1n0B	SYS BD	privlgd reg trap	CPU n detected an unexpected privileged register trap.
FLT	1n0C	SYS BD	overflow trap	CPU n detected an unexpected overflow trap.
FLT	1n0D	SYS BD	conditional trap	CPU n detected an unexpected conditional trap.
FLT	1n0E	SYS BD	assist exep trap	CPU n detected an unexpected assist exception trap.
FLT	1n0F	SYS BD	DTLB mis/Dpg flt	CPU n detected an unexpected DTLB miss or data page fault.
FLT	1n10	SYS BD	non-acc ITLB mis	CPU n detected an unexpected non-access ITLB miss fault.
FLT	1n11	SYS BD	non-acc DTLB mis	CPU n detected an unexpected non-access DTLB miss or data page fault.
FLT	1n12	SYS BD	data mem prot tr	CPU n detected an unexpected data memory protection trap.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	1*n*13	SYS BD	data mem brk trp	CPU *n* detected an unexpected data memory break trap.
FLT	1*n*14	SYS BD	TLB dirty bit tr	CPU *n* detected an unexpected TLB dirty bit trap.
FLT	1*n*15	SYS BD	page refrnce trp	CPU *n* detected an unexpected page reference trap.
FLT	1*n*16	SYS BD	assist emul trap	CPU *n* detected an unexpected assist emulation trap.
FLT	1*n*17	SYS BD	hi-priv xfer trp	CPU *n* detected an unexpected higher-privilege transfer trap.
FLT	1*n*18	SYS BD	lo-priv xfer trp	CPU *n* detected an unexpected lower-privilege transfer trap.
FLT	1*n*19	SYS BD	taken branch trp	CPU *n* detected an unexpected taken-branch trap.
FLT	1*n*1A	SYS BD	data mem acc rts	CPU *n* detected an unexpected data memory access rights trap.
FLT	1*n*1B	SYS BD	data mem prot ID	CPU *n* detected an unexpected data memory protection ID trap.
FLT	1*n*1C	SYS BD	unalign data ref	CPU *n* detected an unexpected unaligned data reference trap.
FLT	1*n*1D	SYS BD	perf mon intrrpt	CPU *n* detected an unexpected performance monitor interrupt.
TST	1*n*20	SYS BD	CPU*n* basic test	CPU *n* is starting its basic operations self-test.
TST	1*n*21	SYS BD	CPU*n* alu test	CPU *n* is starting its arithmetic and logical unit self-test.
TST	1*n*22	SYS BD	CPU*n* branch test	CPU *n* is starting its branch instruction self-test.
TST	1*n*23	SYS BD	CPU*n* arith cond	CPU *n* is starting its arthimetic condition self-test.
TST	1*n*24	SYS BD	CPU*n* bit opers	CPU *n* is starting its bit operation instruction self-test.
TST	1*n*25	SYS BD	CPU*n* cntrl regs	CPU *n* is starting its control register self-test.
TST	1*n*26	SYS BD	CPU*n* ext intrpt	CPU *n* is starting its external interrupt self-test.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
TST	1n27	SYS BD	CPUn itimer test	CPU n is starting its interval timer self-test.
TST	1n28	SYS BD	CPUn multi-media	CPU n is starting its multi-media instructions self-test.
TST	1n29	SYS BD	CPUn shadow reg	CPU n is starting its shadow register self-test.
TST	1n2A	SYS BD	CPUn diagnse reg	CPU n is starting its diagnose register self-test.
TST	1n2B	SYS BD	CPUn rdr test	CPU n is starting its remote diagnose register self-test.
TST	1n2C	SYS BD	CPUn bypass test	CPU n is starting its integer bypass operation self-test.
TST	1n30	SYS BD	CPUn start est	CPU n is starting its early (pre-memory) self-tests.
WRN	1n31	SYS BD	CPUn skip est	CPU n is bypassing its early self-tests to save time.
FLT	1n32	SYS BD	CPUn bad tst mod	CPU n detected an unsupported system mode.
INI	1n3C	SYS BD	CPUn initialize	CPU n is initializing after self-tests.
TST	1n3E	SYS BD	CPUn exit est	CPU n finished its early self-tests.
TST	1nA0	SYS BD	CPUn fpu tests	CPU n is starting its floating-point unit self-tests.
TST	1nA1	SYS BD	CPUn fpu reg tst	CPU n is starting its floating-point register self-test.
TST	1nA2	SYS BD	CPUn fpu inst	CPU n is starting its floating-point instruction self-test.
TST	1nA3	SYS BD	CPUn fpu traps	CPU n is starting its floating-point trap self-test.
TST	1nA4	SYS BD	CPUn fpu misc	CPU n is starting its floating-point miscellaneous operations self-test.
TST	1nA5	SYS BD	CPUn fpu bypass	CPU n is starting its floating-point bypassing self-test.
TST	1nB1	SYS BD	CPUn TLB RAM tst	CPU n is starting its TLB register self-test.
TST	1nB2	SYS BD	CPUn TLB trans	CPU n is starting its TLB translation self-test.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	1nBA	SYS BD	monarch CPU *fail*	The monarch CPU failed.
FLT	1nBB	SYS BD	bad CPUn number	The CPU identifier was out of range.
FLT	1nBF	SYS BD	CPUn halt boot	Bootstrap failure--machine halted.
INI	1nCA	SYS BD	CPUn sys bus arb	Monarch CPU is initializing the system bus arbitration.
WRN	1nCD	SYS BD	CPUn deconfig	CPU n deconfigured itself.
WRN	1nCE	SYS BD	CPUn extinguish	PDC_PROC halted CPU n.
FLT	1nCF	SYS BD	slave$n$ failed	Slave CPU n failed self-test.
WRN	1mDs	SYS BD	slaves deconfig	Monarch CPU m deconfigured slave CPU s.
WRN	1nEF	SYS BD	CPUn slftst warn	CPU n detected a non-fatal error during its self-tests.
WRN	1mFs	SYS BD	mon$m$ stop slave$s$	Monarch CPU m halted slave CPU s.
INI	1nFC	SYS BD	CPUn sync'ing	CPU n is synchronizing with the rest of the system.
INI	1nFD	SYS BD	CPUn stat wd tst	CPU n is testing the system status word.
FLT	1nFF	SYS BD	monarch$n$ selftst	Monarch CPU n failed self-test.
TST	2n20	SYS BD	CPUn icache RAM	CPU n is starting its instruction cache RAM self-test.
FLT	2n25	SYS BD	CPUn ic ld d err	CPU n detected a data error during data cache load.
FLT	2n26	SYS BD	CPUn ic ld t err	CPU n detected a tag error during data cache load.
TST	2n30	SYS BD	CPUn icache tag	CPU n is starting its instruction cache tag self-test.
TST	2n40	SYS BD	CPUn icache par	CPU n is starting its instruction cache parity detection self-test.
TST	2n50	SYS BD	CPUn dc stor que	CPU n is starting its data cache store queue self-test.
FLT	2n51	SYS BD	CPUn dc st q err	CPU n detected an error during its data cache store queue self-test.
TST	2n70	SYS BD	CPUn dcache RAM	CPU n is starting its data cache RAM self-test.
TST	2n80	SYS BD	CPUn dcache tag	CPU n is starting its data cache tag self-test.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
TST	2n90	SYS BD	CPUn dcache ECC	CPU n is starting its data cache ECC self-test.
FLT	2BAD	SYS BD	assertion fail	A firmware assertion failed.
TST	3n00	SYS BD	ROM checksum tst	Monarch CPU n is testing the boot ROM integrity.
FLT	3n00	SYS BD	ROM checksum BAD	The boot ROM failed checksum.
INI	3n00	SYS BD	ROM checksum ok	The boot ROM passed checksum.
TST	3n01	SYS BD	PDH control test	Monarch CPU n is testing PDH control register.
INI	3n01	SYS BD	PDH control init	Monarch CPU n is initializing the PDH control register.
FLT	3n01	SYS BD	PDH control err	Monarch CPU n detected an error in the PDH control register.
TST	3n02	SYS BD	scratch RAM test	Monarch CPU n is testing scratch RAM.
INI	3n02	SYS BD	scratch RAM ok	The scratch RAM test failed.
FLT	3n02	SYS BD	scratch RAM bad	The scratch RAM test passed.
WRN	3n03	SYS BD	stbl st read err	CPU n detected a non-fatal error reading the stable store.
FLT	3n03	SYS BD	stbl st read err	CPU n detected a non-fatal error reading the stable store.
INI	3nC4	SYS BD	clearing EEPROM	Monarch CPU n is clearing the EEPROM.
INI	3nD4	SYS BD	deflting EEPROM2	Monarch CPU n is initializing the EEPROM to system defaults.
WRN	3n04	SYS BD	EEPROM write err	CPU n detected a non-fatal error writing the EEPROM.
FLT	3n04	SYS BD	EEPROM write err	CPU n detected a fatal error writing the EEPROM.
FLT	3n05	SYS BD	EEPROM wrt limit	CPU n detected a fatal error writing the EEPROM.
WRN	3n06	SYS BD	EEPROM read err	CPU n detected a non-fatal error reading the EEPROM.
FLT	3n06	SYS BD	EEPROM read err	CPU n detected a fatal error reading the EEPROM.
INI	3n07	SYS BD	**CPUn invoke LDB**	CPU n is starting the low-level debugger.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	3n09	SYS BD	bad sys mde byte	CPU n detected an unsupported system mode.
WRN	3n1A	SYS BD	hversion mismtch	Stable store hardware version doesn't match system.
TST	3n1B	SYS BD	chck model strng	Check model string with version in stable store.
WRN	3n1B	SYS BD	model str msmtch	Model string doesn't match that in stable store.
FLT	3n1B	SYS BD	fatal model str	Error reading model string from stable store.
TST	3n1C	SYS BD	test software ID	Check LANIC address.
WRN	3n1C	SYS BD	update sw ID	Update LANIC address.
FLT	3n1C	SYS BD	update sw ID err	Error updating LANIC address.
INI	3n2s	SYS BD	Invoke LDB: s	CPU n is awaiting the low-level debugger for s more seconds.
TST	3nBC	IO BD	test sys clocks	CPU n is verifying processor clocks with the real-time clock.
INI	3nBC	SYS BD	init sys clocks	CPU n has initialized the processor clocks.
FLT	3nBC	IO BD	RTC tick timeout	The real-time clock is ticking too slowly or not at all.
FLT	3nCD	IO BD	RTC tick timeout	The real time clock is ticking too slowly or not at all.
TST	3nCD	SYS BD	check defaults	CPU n is initializing stable store values to system defaults.
INI	3nCD	SYS BD	init defaults	CPU n finished initializing stable store values.
FLT	3nCD	SYS BD	init EEPROM err	CPU n detected an error writing to stable store.
FLT	3nEC	SYS BD	bad sys config	CPU n detected an illegal CPU board configuration.
FLT	3nF4	SYS BD	EEPROM boot limt	CPU n detected a fatal error writing the EEPROM.
FLT	3nFC	SYS BD	bad sys bd id	CPU n cannot identify CPU board.
TST	4n00	SYS BD	CPUn start lst	CPU n is starting its late (with memory) self-tests.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
WRN	4*n*01	SYS BD	CPU*n* skip lst	CPU *n* is bypassing its late self-tests to save time.
TST	4*n*0E	SYS BD	CPU*n* exit lst	CPU *n* finished its late self-tests.
TST	4*n*20	SYS BD	CPU*n* lst erly st	CPU *n* is re-executing some of its early self-tests from system memory.
TST	4*n*21	SYS BD	CPU*n* lst basic	CPU *n* is re-executing its basic operations self-test.
TST	4*n*22	SYS BD	CPU*n* lst alu	CPU *n* is re-executing its arithmetic and logic unit self-test.
TST	4*n*23	SYS BD	CPU*n* lst branch	CPU *n* is re-executing its branch instruction self-test.
TST	4*n*24	SYS BD	CPU*n* lst arth cd	CPU *n* is re-executing its arithmetic conditions self-test.
TST	4*n*25	SYS BD	CPU*n* lst bit ops	CPU *n* is re-executing its bit operations self-test.
TST	4*n*26	SYS BD	CPU*n* lst ctl reg	CPU *n* is re-executing its control register self-test.
TST	4*n*27	SYS BD	CPU*n* lst ext int	CPU *n* is re-executing its external interrupt self-test.
TST	4*n*28	SYS BD	CPU*n* lst itimer	CPU *n* is re-executing its interval timer self-test.
TST	4*n*29	SYS BD	CPU*n* lst mltimed	CPU *n* is re-executing its multi-media instructions self-test.
TST	4*n*2A	SYS BD	CPU*n* lst shadow	CPU n is re-executing its shadow register self-test.
TST	4*n*2B	SYS BD	CPU*n* lst dg regs	CPU *n* is re-executing its diagnose register self-test.
TST	4*n*2C	SYS BD	CPU*n* lst rdrs	CPU *n* is re-executing its remote diagnose register self-test.
TST	4*n*2D	SYS BD	CPU*n* lst bypass	CPU *n* is re-executing its integer bypass operation self-test.
TST	4*n*30	SYS BD	CPU*n* cache byte	CPU *n* is starting its data cache sub-word operations self-test.
TST	4*n*40	SYS BD	CPU*n* cache flush	CPU *n* is starting its cache flush self-test.
TST	4*n*50	SYS BD	CPU*n* icache miss	CPU *n* is starting its instruction cache miss self-test.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
TST	4n60	SYS BD	CPUn dcache miss	CPU n is starting its data cache miss self-test.
FLT	5n00	SYS BD	unknown bus err	CPU n detected an unknown error on the system bus (Runway).
FLT	5n02	SYS BD	path err assertd	CPU n detected a path error on the system bus (Runway).
FLT	5n04	SYS BD	parity error	CPU n detected a data, address, or control parity error on the system bus (Runway).
FLT	5n07	SYS BD	Runway dir error	CPU n detected a directed error on the system bus (Runway).
FLT	5n08	SYS BD	Runway broad err	CPU n detected a broadcast error on the system bus (Runway).
FLT	5n0A	SYS BD	illegal response	CPU n received data that did not match any outstanding data request.
FLT	5n0B	SYS BD	bus timeout	CPU n timed out before receiving requested data. The responder is logged in the system responder address.
FLT	5n0C	SYS BD	CPU sync failure	CPU n's synchronizer detected a rule violation on the system bus (Runway).
INI	7000	DIMM	start DIMM scan	Start looking for installed DIMMs.
INI	7002	SYS BD	init mem tables	Initialize memory data structures.
FLT	7004	SYS BD	mem plt upd fail	Error updating memory platform data.
FLT	7005	DIMM	insufficient mem	Insufficient memory detected to continue.
TST	7010	DIMM	check DIMM order	Start memory DIMM order check.
WRN	7011	DIMM	skip DIMM ord ck	Bypass memory DIMM order check.
FLT	7012	DIMM	DIMM order error	Memory DIMMs are not in the proper order.
FLT	7013	DIMM	DIMM order error	Memory DIMMs are not in the proper order. As a result, the system cannot access one or more DIMMs and has deallocated all inaccessible DIMMs.
TST	7016	DIMM	DIMM pair check	Start memory DIMM pair check (DIMMs in a pair (e.g. 0a/0b) must match in J7000).
WRN	7017	DIMM	skip mem pair ck	Bypass memory DIMM set check.
FLT	701F	DIMM	no memory found	Memory scan couldn't find any DIMMs.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
TST	7020	SYS BD	search for IMM	Try to find a single memory bank to use for the initial memory module.
TST	703*s*	DIMM	DIMM *s* IMM vrfy	DIMM *s* was the initial memory module last boot. Verify it still works.
FLT	704*s*	DIMM	DIMM *s* IMM fail	DIMM *s* failed the initial memory module test.
TST	705*s*	DIMM	DIMM *s* IMM test	Test DIMM in slot *s* as the initial memory module.
INI	706*s*	DIMM	DIMM *s* is IMM	DIMM *s* chosen as initial memory module.
INI	70F0	DIMM	DIMM scan done	Memory DIMM scan complete.
TST	7100	SYS BD	mem register tst	Start testing registers in memory controller.
WRN	7101	SYS BD	skip mem reg tst	Bypass the memory controller register test.
FLT	7102	SYS BD	mem addr reg tst	Firmware detected an error in the memory controller address registers.
FLT	7103	SYS BD	mem mbat reg tst	Firmware detected an error in the memory controller bank registers.
FLT	7104	SYS BD	mem reg tst fail	Firmware detected an error in the memory controller memory registers.
FLT	7105	SYS BD	mem err reg test	Firmware detected an error in the memory controller error registers.
FLT	7106	SYS BD	mem err clr fail	Firmware was unable to clear the error registers after testing.
INI	7200	DIMM	strt DIMM detect	Start the Serial Presence Detection (SPD) to search for memory DIMMs.
INI	7201	DIMM	DIMM detect *x*%	SPD is *x*% finished.
WRN	7202	SYS BD	skip DIMM detect	Bypass Serial Presence Detection.
FLT	7203	DIMM	unsupp DIMM type	SPD found an unsupported DIMM type.
FLT	7204	DIMM	SPD fatal error	SPD detected an unexpected, fatal error.
INI	7205	DIMM	add HP DIMM type	New HP manufactured DIMM type added to tables.
INI	7206	DIMM	non-HP DIMM type	New non-HP DIMM type added to tables (use at own risk).

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	7207	DIMM	`DIMM table full`	The DIMM table is full--cannot add new type.
FLT	7208	DIMM	`no DIMMs found`	SPD didn't find any memory DIMMs.
INI	721*s*	DIMM	`is DIMM s inst?`	SPD is checking memory slot *s*.
INI	722*s*	DIMM	`???? DIMM in s`	SPD found a DIMM in slot *s*, but can't determine its size. DIMM will not be used.
INI	723*s*	DIMM	`128M DIMM in s`	SPD found a 128MB DIMM in slot *s*.
INI	724*s*	DIMM	`256M DIMM in s`	SPD found a 256MB DIMM in slot *s*.
INI	725*s*	DIMM	`512M DIMM in s`	SPD found a 512MB DIMM in slot *s*.
FLT	72A*s*	DIMM	`DIMM s checksum`	DIMM in slot *s* failed SPD checksum and will not be used.
FLT	72C*s*	DIMM	`DIMM s mismatch`	DIMM in slot *s* didn't match the other in pair. (J7000 only--DIMMs must be in matched pairs.)
FLT	72D*s*	DIMM	`DIMM s load err`	Memory DIMMs are not in the proper order. As a result, the system cannot access DIMM *s* and has deallocated it.
INI	7300	SYS BD	`mem config start`	Starting main memory configuration.
TST	7301	SYS BD	`check mem config`	Checking for memory configuration change since last boot.
WRN	7302	SYS BD	`mem confg changd`	Memory physical configuration changed since last boot.
INI	7303	SYS BD	`use confg change`	Memory physical configuration didn't use saved configuration change. Use stored configuration data.
INI	7304	SYS BD	`build mem intrlv`	Building memory configuration with all DIMMs interleaved.
INI	7305	SYS BD	`save mem config`	Saving memory configuration information in non-volatile memory.
WRN	7306	SYS BD	`use alt mem conf`	Memory will be configured from fixed values, instead of detected DIMMs.
INI	7307	SYS BD	`interleve memory`	Generating the memory interleave.
FLT	7308	SYS BD	`PDT is disabled`	Firmware detected bad memory pages, but the Page Deallocation Table is disabled.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	7309	DIMM	insufficient mem	Insufficient error-free memory to continue.
FLT	730C	SYS BD	mem intrlv fail	Memory interleave generation failed.
INI	730F	SYS BD	mem config done	Main memory configuration complete.
TST	7400	DIMM	non-dest mem tst	Starting non-destructive memory test.
TST	740F	DIMM	non-dst tst done	Non-destructive memory test complete.
INI	7500	SYS BD	memory reset	Resetting memory system.
WRN	7501	SYS BD	mem log clr warn	Memory error logs didn't clear on first try.
FLT	7502	SYS BD	mem err log fail	Firmware could not clear memory error logs.
TST	7600	DIMM	dest mem test	Starting the destructive memory test.
WRN	7601	DIMM	mem init only	Skip the test, just initialize memory to save time.
TST	7602	DIMM	tst 1st mem page	Starting 3-pass test of first memory page.
TST	7603	DIMM	tst rest of mem	Starting 3-pass test of the rest of memory.
TST	7604	DIMM	start 1st pass	Starting 1st pass of memory test (write pseudorandom sequence).
TST	7605	DIMM	1st pass x%	First pass is x% complete.
TST	7606	DIMM	start 2nd pass	Starting 2nd pass of memory test (verify pseudorandom sequence, write inverse).
TST	7607	DIMM	2nd pass x%	Second pass is x% complete.
TST	7608	DIMM	start 3rd pass	Starting 3rd pass of memory test (verify inverse sequence).
TST	7609	DIMM	3rd pass x%	Third pass is x% complete.
TST	760A	DIMM	start mem init	Starting memory initialization. (Initialize to zero to set ECC.)
TST	760B	DIMM	mem init x%	Memory initialization is x% complete.
WRN	760C	DIMM	repeat dest test	Re-execute destructive test for hardware troubleshooting.
FLT	760D	DIMM	mem code cpy err	Firmware tried to copy code from ROM to memory, but the copy didn't match the original.
FLT	7610	DIMM	ECC wrt/read err	Writing and reading back good data caused memory ECC error.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	7611	DIMM	`ECC single data`	Memory ECC test failed to detect single-bit data error.
FLT	7612	DIMM	`ECC single ECC`	Memory ECC test failed to detect single-bit ECC error.
FLT	7613	DIMM	`ECC multipl data`	Memory ECC test failed to detect multiple-bit data error.
FLT	7614	DIMM	`ECC multpl signl`	Memory ECC test failed to signal multiple-bit error.
FLT	7800	SYS BD	`mem err summary`	Printing memory error summary word to RS-232.
FLT	7801	SYS BD	`bus ctrl par err`	System bus (Runway) control parity error detected.
FLT	7802	SYS BD	`bus addr par err`	System bus (Runway) address parity error detected.
FLT	7803	SYS BD	`bus data par err`	System bus (Runway) data parity error detected.
FLT	7804	SYS BD	`mem out of range`	Memory access outside configured memory space.
FLT	7805	SYS BD	`bus broadcst err`	System bus (Runway) broadcast error detected.
FLT	7806	SYS BD	`mem addr par err`	Memory bus address parity error detected.
FLT	7807	SYS BD	`mem ctlr stat wd`	Printing memory controller status word to RS-232.
FLT	781s	SYS BD	`DIMM `$s` uncor err`	Uncorrectable ECC error detected in DIMM s.
FLT	782s	SYS BD	`DIMM `$s` corr err`	Correctable ECC error detected in DIMM s.
FLT	7840	SYS BD	`unexpected HPMC`	Unexpected HPMC detected.
FLT	7841	SYS BD	`mem status invld`	Memory error status word is invalid.
FLT	7842	SYS BD	`mem summ invalid`	Memory summary word is invalid.
FLT	7843	SYS BD	`fwd prog invalid`	Memory forward progress word is invalid.
FLT	7844	SYS BD	`mem HPMC summ wd`	Printing memory error summary word to RS-232.
FLT	7845	SYS BD	`mem ctlr stat wd`	Printing memory controller status word to RS-232.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	7846	SYS BD	mem err overflow	Multiple memory errors detected.
FLT	7848	SYS BD	addr not mapped	Memory address outside configured memory space.
FLT	785*s*	DIMM	MBE in DIMM *s*	Destructive memory test detected an uncorrectable memory error in DIMM *s*.
FLT	786*s*	DIMM	SBE&MBE DIMM *s*	Destructive memory test detected both an uncorrectable and a correctable memory error in DIMM *s*.
FLT	787*s*	DIMM	mem err DIMM *s*	Destructive memory test detected a pattern compare error in DIMM *s*.
FLT	788*s*	DIMM	SBE in DIMM *s*	Destructive memory test detected a correctable memory error in DIMM *s*.
FLT	7890	DIMM	MBE overwrt SBE	Firmware replaced a correctable memory error entry in the PDT with an uncorrectable memory error entry at the same address.
FLT	7891	DIMM	dup entry in PDT	The PDT already contains an entry at that address.
FLT	7892	SYS BD	PDT write error	Error adding the entry to the PDT.
FLT	7893	SYS BD	PDT is full	The PDT is full--cannot add new entry.
FLT	7900	SYS BD	no DMT entry	Internal error--cannot find DIMM entry.
FLT	7901	SYS BD	no rank entry	Internal error--cannot find rank entry.
FLT	7902	SYS BD	bad refrsh intvl	Computed refresh interval is invalid.
FLT	7903	SYS BD	mem intrlv fail	Cannot generate memory interleave.
FLT	7904	SYS BD	mem reloc failed	Cannot interleave with relocated range (3.75GB - 4.0GB).
FLT	7905	SYS BD	mem intrlv error	Undefined memory interleave failure.
FLT	79FF	SYS BD	mem firmware err	Internal error--never expected this to happen.
WRN	80F3	SYS BD	err rd IODC byte	Cannot read IODC from ROM or card.
WRN	80F4	EXT IO	boot read error	Cannot load IODC entry_init for boot device.
WRN	80F5	EXT IO	boot exec error	Error initializing boot device.
WRN	80F6	EXT IO	boot read error	Cannot load IODC entry_io for boot device.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
WRN	80F7	EXT IO	boot IO error	Error detected during boot device I/O.
WRN	80F8	EXT IO	invalid boot dev	Invalid boot device class; bad IODC?
WRN	80FC	EXT IO	invalid boot dev	Unexpected error; bad IODC?
INI	8800	IOCARD	PCI BusWlk start	Starting PCI bus and device discovery.
INI	88r1	IOCARD	PCI Rope r walk	Starting PCI bus and device discovery on Rope r.
INI	8802	IOCARD	PCI BusWalk done	PCI bus and device discovery complete.
INI	8803	SYS BD	PCI alloc done	Done allocating address space for PCI devices.
INI	8804	SYS BD	PCI config done	Done configuring PCI devices.
WRN	881r	IO BD	R2PCIr not found	Rope-to-PCI bridge r not found.
FLT	881r	IO BD	R2PCIr not found	Rope-to-PCI bridge r not found.
WRN	882r	IO BD	R2PCIr not found	Rope-to-PCI bridge r initialization failed.
FLT	882r	IO BD	Rope$r$ init err	Rope-to-PCI bridge r initialization failed.
WRN	883r	IO BD	Rope$r$ config err	PCI configuration failed below Rope-to-PCI bridge r.
FLT	883r	IO BD	Rope$r$ config err	Rope r configuration failed.
INI	884r	EXT IO	Rope$r$ debug tggl	Rope r debug register toggled.
FLT	884r	EXT IO	Rope$r$ tgl fail	Rope r debug register toggle failed.
INI	8850	SYS BD	early rope0 init	Initializing rope 0 for early RS-232 output.
FLT	8850	SYS BD	rope0 init fail	Couldn't initialize rope 0.
INI	8860	SYS BD	rope0 init done	Rope 0 initialization complete.
INI	8870	IO BD	early R2PCI init	Initializing Rope-to-PCI bridge 0 for early RS-232 output.
FLT	8870	IO BD	R2PCI init fail	Couldn't initialize Rope-to-PCI bridge 0.
INI	8880	IO BD	R2PCI init done	Rope-to-PCI bridge 0 initialization complete.
INI	8890	IO BD	early Super init	Initializing Super-I/O for early RS-232 output.
FLT	8890	IO BD	Super init fail	Couldn't initialize Super-I/O.
INI	88A0	IO BD	Super init done	Super-I/O initialization complete.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
WRN	8A03	EXT IO	No graph console	Cannot re-establish communications with the graphics console.
WRN	8A04	EXT IO	No USB keyboard	Cannot re-establish communications with the USB keyboard.
TST	8C06	EXT IO	PCI BIST test	Running PCI Built-In Self-Test
WRN	8C07	EXT IO	PCI BIST error	PCI Built-In Self-Test failed.
WRN	8C08	SYS BD	PCI alloc error	PCI address space allocation failed.
WRN	8C09	IO BD	PCI mem mngr err	Memory allocation for PCI device failed.
WRN	8C0A	EXT IO	PCI mem type err	PCI device requested invalid memory type.
WRN	8C0B	IO BD	PCI max bus dpth	PCI bus depth exceeded maximum supported depth.
WRN	8C0C	EXT IO	PCI dev not cnfg	Unable to configure PCI device.
WRN	8C0F	IO BD	dev tree ovrflow	Data space for PCI devices is full.
WRN	8DEC	IO BD	init LAN SROM	Initializing the core LAN serial EPROM.
SHU	8DEC	IO BD	resetting system	Restarting system after core LAN initialization.
FLT	8E10	IO BD	PARALEL port cfg	Parallel port configuration failed.
FLT	8E11	IO BD	SERIAL1 port cfg	Serial 1 port configuration failed.
FLT	8E12	IO BD	SERIAL2 port cfg	Serial 2 port configuration failed.
FLT	8E13	IO BD	FLOPPY drive cfg	Floppy drive configuration failed.
FLT	8E20	IO BD	bad USB port cfg	USB port configuration failed.
WRN	9001	EXT IO	no console found	Search for console display device failed.
INI	9151	IO BD	init SERIAL_1	Initializing serial 1 port as console display.
INI	9152	IO BD	init SERIAL_2	Initializing serial 2 port as console display.
INI	915F	IO BD	init unknown dev	Initializing unknown device as console display.
INI	9160	EXT IO	builtin GRAPHICS	Initializing built-in graphics as console display.
INI	916s	EXT IO	init PCI slot s	Initializing PCI device in slot s as console display.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
INI	91DB	IO BD	init SERIAL_LDB	Initializing serial LDB port as console display.
INI	9C51	IO BD	consol is SER_1	Console display is on serial port 1.
WRN	9C51	IO BD	bad init SERIAL1	Serial port 1 failed to initialize as a console device.
INI	9C52	IO BD	consol is SER_2	Console display is on serial port 2.
WRN	9C52	IO BD	bad init SERIAL2	Serial port 2 failed to initialize as a console device.
INI	9C6s	EXT IO	consol is GRAPHs	Console display is on graphics card in PCI slot s.
WRN	9C6s	EXT IO	bad PCI slot s	Graphics in PCI slot s failed to initialize as a console device.
INI	9C8t	EXT IO	cnfg mon type t	Set graphics console to monitor type t. (Seen when cycling through types.)
WRN	9C8t	EXT IO	mon type t fail	Failed to configure console to monitor type t.
INI	9CDB	IO BD	consl is SER_LDB	Console display is on serial LDB port.
WRN	9CDB	IO BD	bad init SER_LDB	Serial LDB port failed to initialize as a console device.
FLT	A088	IO BD	consl path fault	Unable to boot--no console device found.
WRN	A008	EXT IO	no boot device	Unable to boot--no bootable device found.
WRN	A0BD	EXT IO	device not ready	Boot device not ready--operation may be retried.
FLT	A0FF	EXT IO	unknown launch	Unable to boot. Explanation may appear on console.
WRN	A50F	EXT IO	init pri pth err	Unable to boot from primary boot device.
WRN	A70F	EXT IO	init otr pth err	Unable to boot from non-primary boot device.
INI	C10m	SYS BD	CPUm is monarch	CPU m was chosen as the monarch processor. (All other CPUs are slaves.)
INI	C30m	SYS BD	monarch$m$ test	CPU m finished the monarch-only tests and system initialization.
INI	C30C	SYS BD	mnrch slv chck	The monarch CPU is checking whether the slaves are in the correct rendezvous.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
INI	C3FF	SYS/IO	late monarch tst	The monarch CPU is starting the late (post-memory) monarch-only tests.
FLT	C3FF	SYS/IO	late monarch flt	The late (post-memory) monarch-only tests failed.
INI	C4CC	SYS BD	initialize ccp	Searching for (lab-only) debugger card.
INI	C4CD	SYS BD	no ccp found	Debugger card not found.
INI	C4CE	SYS BD	ccp disabled	Debugger card disabled.
INI	C4CF	SYS BD	ccp found	Debugger card found.
INI	C500	SYS BD	get primary path	Autoboot is reading primary boot path from stable store.
INI	C540	EXT IO	init pri path	Autoboot is trying to boot from primary boot device.
INI	C580	EXT IO	load IPL pri pth	Loading IPL from primary boot device.
WRN	C5F0	EXT IO	err read pri IPL	Error loading IPL from primary boot device.
FLT	C5F0	EXT IO	pri IPL fault	Error loading IPL from primary boot device.
WRN	C5F1	EXT IO	err read pri IPL	Cannot load IPL from primary boot device--load address invalid.
WRN	C5F2	EXT IO	err read pri IPL	Cannot load IPL from primary boot device--file is not IPL image.
WRN	C5F3	EXT IO	err read pri IPL	Cannot load IPL from primary boot device--IPL image size invalid.
WRN	C5F4	EXT IO	err read pri IPL	Cannot load IPL from primary boot device--IPL entry point address invalid.
WRN	C5F8	EXT IO	err read pri IPL	Cannot load IPL from primary boot device--IPL image checksum failed.
INI	C5FF	<blank>	launch pri IPL	Booting from primary boot path.
INI	C642	EXT IO	init kybrd consl	Try to initialize USB keyboard.
FLT	C642	EXT IO	keyboard error	An error was detected trying to access the keyboard.
WRN	C643	EXT IO	keyboard reinit	Keyboard was re-initialized.
WRN	C64F	EXT IO	reset montr type	The console device failed to initialize with the given monitor type. Try again with type 1.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
TST	C680	SYS BD	builtin graphics	Look for built-in graphics card.
INI	C680	SYS BD	builtin graphics	Successfully initialized built-in graphics card.
WRN	C680	SYS BD	builtin graphics	Built-in graphics initialization failed.
TST	C68*s*	SYS BD	test graph in *s*	Look for graphics card in PCI slot *s*.
INI	C68*s*	SYS BD	init graph in s	Successfully initialized graphics card in PCI slot *s*.
WRN	C68*s*	SYS BD	fail graph in *s*	Card in PCI slot *s* failed graphics initialization or is not a graphics card.
INI	C740	EXT IO	init other path	Autoboot is trying to boot from non-primary boot device.
INI	C780	EXT IO	ld IPL othr path	Loading IPL from non-primary boot device.
WRN	C7F0	EXT IO	other IPL fault	Error loading IPL from non-primary boot device.
WRN	C7F1	EXT IO	bad alt IPL read	Cannot load IPL from non-primary boot device--load address invalid.
WRN	C7F2	EXT IO	bad alt IPL read	Cannot load IPL from non-primary boot device--file is not IPL image.
WRN	C7F3	EXT IO	bad alt IPL read	Cannot load IPL from non-primary boot device--IPL image size invalid.
WRN	C7F4	EXT IO	bad alt IPL read	Cannot load IPL from non-primary boot device--IPL entry point address invalid.
WRN	C7F8	EXT IO	bad alt IPL read	Cannot load IPL from non-primary boot device--IPL image checksum failed.
WRN	C7FF	<blank>	launch IPL other	Booting from a device other than the primary boot path.
INI	CB00	SYS BD	TOC initiated	A Transfer of Control entered the firmware TOC handler.
WRN	CB01	SYS BD	no OS TOC vector	There is no TOC vector for the operating system. Firmware will soft boot the system.
WRN	CB02	SYS BD	bad OS TOC addr	The operating system TOC handler vector is invalid. Firmware will soft boot the system.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
WRN	CB03	SYS BD	bad OS TOC code	The operating system TOC handler is invalid. Firmware will soft boot the system.
WRN	CB04	SYS BD	bad OS TOC len	The size of the operating system TOC handler is invalid. Firmware will soft boot the system.
WRN	CB05	SYS BD	bad OS TOC chksm	The operating system TOC handler failed the checksum test. Firmware will soft boot the system.
WRN	CB0A	SYS BD	prev TOC logged	Firmware detected unread PIM data from a previous TOC and will not overwrite it. (PIM for this TOC is lost.)
INI	CB0B	SYS BD	branch to OS TOC	Branching to the operating system TOC handler.
WRN	CB0C	SYS BD	br OS TOC failed	Branch to the operating system TOC handler failed. Firmware will soft boot the system.
WRN	CB10	SYS BD	LPMC initiated	A Low-Priority Machine Check entered the firmware LPMC handler. The handler should log the error and return to normal operation.
WRN	CB11	SYS BD	icache LPMC err	An instruction cache parity error caused the LPMC.
WRN	CB12	SYS BD	dcache LPMC err	A data cache parity/ECC error caused the LPMC.
WRN	CB13	SYS BD	dcache tag error	The parity error is in the tag portion of the data cache.
WRN	CB14	SYS BD	dcache data err	The parity error is in the data portion of the data cache.
FLT	CB1F	SYS BD	OS LPMC failed	Firmware couldn't branch to the operating system LPMC handler. It will halt the CPU, requiring a power cycle to recover.
WRN	CB71	SYS BD	HPMC occurred	A High-Priority Machine Check caused entry to PDCE_CHECK (the firmware trap handler).
WRN	CB72	SYS BD	LPMC occurred	A Low-Priority Machine Check caused entry to PDCE_CHECK (the firmware trap handler).

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
WRN	CB73	SYS BD	TOC occurred	A Transfer of Control caused entry to PDCE_CHECK (the firmware trap handler).
FLT	CB9*r*	IO BD	Error on rope*r*	An error was detected on rope *r*.
FLT	CB99	SYS BD	seed IVA handler	PDC_SEED_ERROR triggered an HPMC.
FLT	CB9A	SYS BD	HPMC overwrite	Firmware is overwriting PIM data from a previous HPMC.
OFF	CBA1	SYS BD	AIOC int dat err	I/O controller internal error.
OFF	CBA2	IO BD	EtoA rope perr	Parity error between I/O controller and Rope-to-PCI bridge.
OFF	CBA3	SYS BD	access invld TLB	An invalid I/O TLB entry was accessed.
OFF	CBA4	IO BD	EtoA rp cmd perr	Command parity error between I/O controller and Rope-to-PCI bridge.
OFF	CBA5	IO BD	CDF timeout	Rope Command/Data FIFO is backed up.
OFF	CBA6	IO BD	R2PCI resp tmout	Rope-to-PCI bridge timed out. Could be a failure of the PCI card, rope, or R2PCI bridge.
OFF	CBA7	IO BD	Unknown AIOC err	Unknown I/O controller error.
OFF	CBB1	IO BD	PCI timeout	A PCI card requested the bus but failed to use it.
OFF	CBB2	IO BD	PCI timeout; OV	More than once aPCI card requested the bus but failed to use it.
OFF	CBB3	IO BD	R2PCI intrnl err	Rope-to-PCI bridge internal error.
OFF	CBB4	IO BD	R2PCI int err;OV	Multiple Rope-to-PCI bridge internal errors.
OFF	CBB6	IO BD	PCI data req err	PCI bus data requestor error: R2PCI detected PERR# assertion.
OFF	CBB8	IO BD	PCI D req err;OV	Rope-to-PCI bridge detected multiple PERR# assertions.
OFF	CBBA	IO BD	PCI data par err	PCI bus data parity error.
OFF	CBBC	IO BD	PCI Dpar err;OV	Multiple PCI bus data parity errors.
OFF	CBBE	IO BD	R2PCI intrnl err	Error in R2PCI internal data to PCI bus.
OFF	CBC0	IO BD	R2PCI int err;OV	Multiple R2PCI internal data to PCI bus errors.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
OFF	CBC2	IO BD	PCI data parity	PCI data parity error. I/O error log word 3 contains the error address.
OFF	CBC4	IO BD	PCI data par; OV	Multiple PCI data parity errors. I/O error log word 3 contains the error address.
OFF	CBC6	IO BD	R2PCI intrnl err	Rope-to-PCI bridge internal data error: R2PCI detected PERR# assertion.
OFF	CBC8	IO BD	R2PCI int err;OV	Multiple R2PCI internal data errors: R2PCI detected multiple PERR# assertions.
OFF	CBCA	IO BD	PCI data rs err	PCI bus data responder error: R2PCI detected PERR# assertion.
OFF	CBCC	IO BD	PCI D rs err; OV	Multiple PCI bus data responder errors: R2PCI detected multiple PERR# assertions.
OFF	CBCE	IO BD	R2PCI T-Abort	Rope-to-PCI bridge signalled Target Abort.
OFF	CBD0	IO BD	R2PCI T-Abort;OV	Rope-to-PCI bridge signalled multiple Target Aborts.
OFF	CBD2	IO BD	PCI parity err	PCI address/command parity error.
OFF	CBD4	IO BD	PCI par err; OV	Multiple PCI address/command parity errors.
OFF	CBD6	IO BD	PCI no DEVSEL#	No PCI device selected (DEVSEL# assertion). I/O error log word 3 contains the error address.
OFF	CBD8	IO BD	PCI no DEVSEL;OV	Multiple DEVSEL# assertions. I/O error log word 3 contains the error address.
OFF	CBDA	IO BD	PCI target abort	A PCI device signalled Target Abort. I/O error log word 3 contains the error address.
OFF	CBDC	IO BD	PCI T-Abort; OV	A PCI device signalled multiple Target Aborts. I/O error log word 3 contains the error address.
OFF	CBDD	IO BD	PCI assrts LOCK#	A PCI device asserted LOCK#.
OFF	CBDE	IO BD	PCI LOCK#; OV	A PCI device asserted LOCK# multiple times.
OFF	CBE0	IO BD	PCI assrts SERR#	A PCI device asserted SERR#: address parity error or other system error.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
OFF	CBE2	IO BD	PCI SERR#; OV	A PCI device asserted SERR# multiple times.
OFF	CBE3	IO BD	Unknown PCI err	Unknown PCI error detected.
OFF	CBE6	SYS BD	AtoE rope perr	Parity error between system I/O controller and Rope-to-PCI bridge.
OFF	CBE7	IO BD	R2PCI intrnl err	Rope-to-PCI bridge internal data error.
OFF	CBE8	SYS BD	AtoE rope perr	Command parity error between system I/O controller and Rope-to-PCI bridge.
OFF	CBE9	IO BD	Unknown Rope err	Unknown rope error occurred.
FLT	CBF0	SYS BD	HPMC initiated	A High-Priority Machine Check entered the firmware HPMC handler.
FLT	CBF1	SYS BD	no OS HPMC IVA	There is no HPMC vector for the operating system. Firmware will halt the CPU, requiring a power cycle to recover.
FLT	CBF2	SYS BD	bad OS HPMC len	The size of the operating system HPMC handler is invalid. Firmware will halt the CPU, requiring a power cycle to recover.
FLT	CBF3	SYS BD	bad OS HPMC addr	The operating system HPMC handler vector is invalid. Firmware will halt the CPU, requiring a power cycle to recover.
FLT	CBF4	SYS BD	bad OS HPMC cksm	The operating system HPMC handler failed the checksum test. Firmware will halt the CPU, requiring a power cycle to recover.
FLT	CBF5	SYS BD	OS HPMC vector 0	The size of the operating system HPMC handler is zero. Firmware will halt the CPU, requiring a power cycle to recover.
WRN	CBFA	SYS BD	prev HPMC logged	Firmware detected unread PIM data from a previous HPMC and will overwrite it.
FLT	CBFB	SYS BD	brnch to OS HPMC	Branching to the operating system HPMC handler.
FLT	CBFC	SYS BD	OS HPMC br err	Branch to the operating system HPMC handler failed. Firmware will halt the CPU, requiring a power cycle to recover.
FLT	CBFD	SYS BD	unknown check	The firmware trap handler didn't detect an HPMC, LPMC, or TOC.
FLT	CBFE	SYS BD	HPMC during TOC	A High-Priority Machine Check occurred during Transfer of Control processing.

Table 3-2. Chassis Codes for the B2000 Workstation

Ostat	Code	FRU	Message	Description
FLT	CBFF	SYS BD	multiple HPMCs	A High-Priority Machine Check occurred while processing another HPMC.
INI	CC0n	SYS BD	CPUn OS rendezvs	Slave CPU n entering the final rendezvous, waiting for the operating system to awaken it.
INI	CC1n	SYS BD	CPUn early rend	Slave CPU n entering the early rendezvous, waiting for the monarch CPU to initialize scratch RAM and other system state.
INI	CC2n	SYS BD	CPUn rendezvous	Slave CPU n entering rendezvous. Slave CPUs enter this rendezvous numerous times during boot.
INI	CC3n	SYS BD	CPUn cache rend	Slave CPU n entering cached rendezvous, waiting for the monarch CPU to configure the system bus.
INI	CC4n	SYS BD	CPUn mem rendez	Slave CPU n entering memory rendezvous, waiting for the monarch CPU to select a boot device.
TST	D000	SYS BD	micro controller	Firmware is initializing communications with the system controller.
WRN	D004	SYS BD	micro not resp	Firmware detected a communications error with the system controller.
INI	D005	SYS BD	set dom1 fan spd	Firmware is initializing communications with the system controller.
INI	D006	SYS BD	set dom2 fan spd	Firmware is initializing communications with the system controller.
WRN	D007	SYS BD	bad microctl cmd	Firmware detected a communications error with the system controller.
FLT	D01n	SYS/IO	fan n: failure!	Firmware detected fan n stopped.
WRN	D02n	SYS/IO	fan n: too slow!	Firmware detected fan n is running too slowly.

Memory Failures

The B2000 system implements Memory Page Deallocation. This feature allows the workstation to provide information to the operating system about memory failures.

HP-UX 10.20 uses information to map out failing memory areas and continue normal operation. You can use the command `memrpt` with the `detail` switch to obtain information about the Memory Page Deallocation Table (PDT) as well as single-bit errors logged by the system, as follows:

```
# /usr/sbin/sysdiag Enter

DUI > logtool Enter

LOGTOOL> memrpt detail Enter
```

The PDT can also be checked using the `pdt` command in the Service menu of the Boot Console Handler (refer to Chapter 6).

For allowable memory configurations, see the "Memory" section on page 38.

Running System Verification Tests

HP-UX uses an online diagnostics product named Mesa (Support Tools Manager) that allows system operation verification.

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
- A 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 a command line prompt:

 `man cstm` **Enter**

 `man mstm` **Enter**

 `man xstm` **Enter**

For information on the enhanced online diagnostics, see the *Support Media User's Manual* (HP Part Number B3782-90176).

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

1. In a terminal window, type the following at the # prompt to invoke the command line interface:

    `# cstm` **Enter**

2. The following message appears:

    `Support Tools Manager    Version A.01.00`

    Type `help` for a list of available commands:

    `CSTM> help` **Enter**

3. To verify the system operation, type the following at the `CSTM>` prompt:

    `CSTM> verify all` **Enter**

    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` **Enter**

If any tests failed, run Self Test and ISL diagnostics to isolate the problem.

Running ODE-Based Diagnostics

The Offline Diagnostic Environment (ODE) consists of diagnostic modules for testing and verifying system operation. ODE provides all the necessary functions for the user to load specified tests and interact with those tests.

ODE is an ISL utility. To boot ODE:

1. Invoke the ISL environment from the system disk or CD.

2. Type `ode` **Enter** after the `ISL>` prompt to invoke ODE from the LIF directory on the system disk. The prompt changes to `ODE>`.

Not all of the test modules are available on all systems. To see what test modules are available to run on this system, type `ls` at the `ODE>` prompt. The available modules include the following:

- `wdiag` – tests and verifies the basic functionality of the PA-RISC chip. This tool tests the CPU, cache, TLB, and floating point functions.

- `memtest` – tests and verifies the memory arrays. If an error is detected, the diagnostic reports the memory card and its slot number that needs replacement. It also provides a map of the memory configuration so that the user can identify the types of memory and its slot location.

- `mapper` – identifies the configuration of HPPA systems. It displays path, identification, and revision information of I/O components, configuration of memory controllers, processors, co-processors, cache, and TLB, as well as processor board component revisions and values of various HPPA system identifiers, revisions, and capabilities.

- `astrodiag` – tests and verifies the basic functionality of the Astro memory/IO controller chip.

- `siodiag` – tests and verifies the functionality of the super IO multifunction IO chip, including serial, parallel, USB, and so forth.

For further information on the various ODE commands and a complete listing of the command set, type `help` **Enter** at the `ODE>` prompt or at the prompt of one of the test modules.

Using the PIM Dump Tool to Decode HPMCs

If the system HPMC and halts, the Boot Console Handler's Service menu provides a PIM dump tool that can analyze the HPMC dump and attempt to decode it for analysis. It will point to the failing FRU or memory location if it is memory related. For information on using the Boot Console Handler, see Chapter 6.

4 Field Replaceable Units

This chapter lists the HP VISUALIZE B2000 workstation's Field Replaceable Units (FRUs) and provides procedures and illustrations showing their removal and replacement.

Chapter Overview

This chapter contains the following main sections:

- Exchange and Non-Exchange Part Numbers
- FRU Removal and Replacement
    - Front Panel
    - Left Side Panel
    - Power Switch/LCD Assembly
    - Removable Media Devices
        - CD Drive
        - Floppy Disk Drive
    - Hard Disk Drives
    - I/O Cards
    - Battery
    - Memory DIMMs
    - Power Supply
    - Voltage Regulator Modules
    - Fans
        - I/O Fan
        - System Fan
    - Speaker
    - System Board Tray Assembly

WARNING   **For all removal and replacement procedures in this chapter, you must power off the workstation and unplug the workstation's power cord from the AC power outlet.**

NOTE   To maintain FCC/EMI compliance, verify that all covers are replaced, all screws are properly seated, and all gasket material is intact.

Tools Required

Use the following tools to remove or replace FRUs in the B2000 workstation:

- Torx T-15 driver
- Light-duty flat blade screw driver with 6-inch (150 mm) blade
- Needle-nose pliers
- ESD equipment (see "Electrostatic Discharge (ESD) Precautions" on page 177)

Exploded View Diagram

Figure 4-1 shows an exploded view of the FRUs in the B2000 workstation. Refer to this figure for the locations of the various workstation FRUs while performing the FRU removal and replacement procedures in this chapter.

Figure 4-1. Exploded View Diagram of the B2000 Workstation FRUs
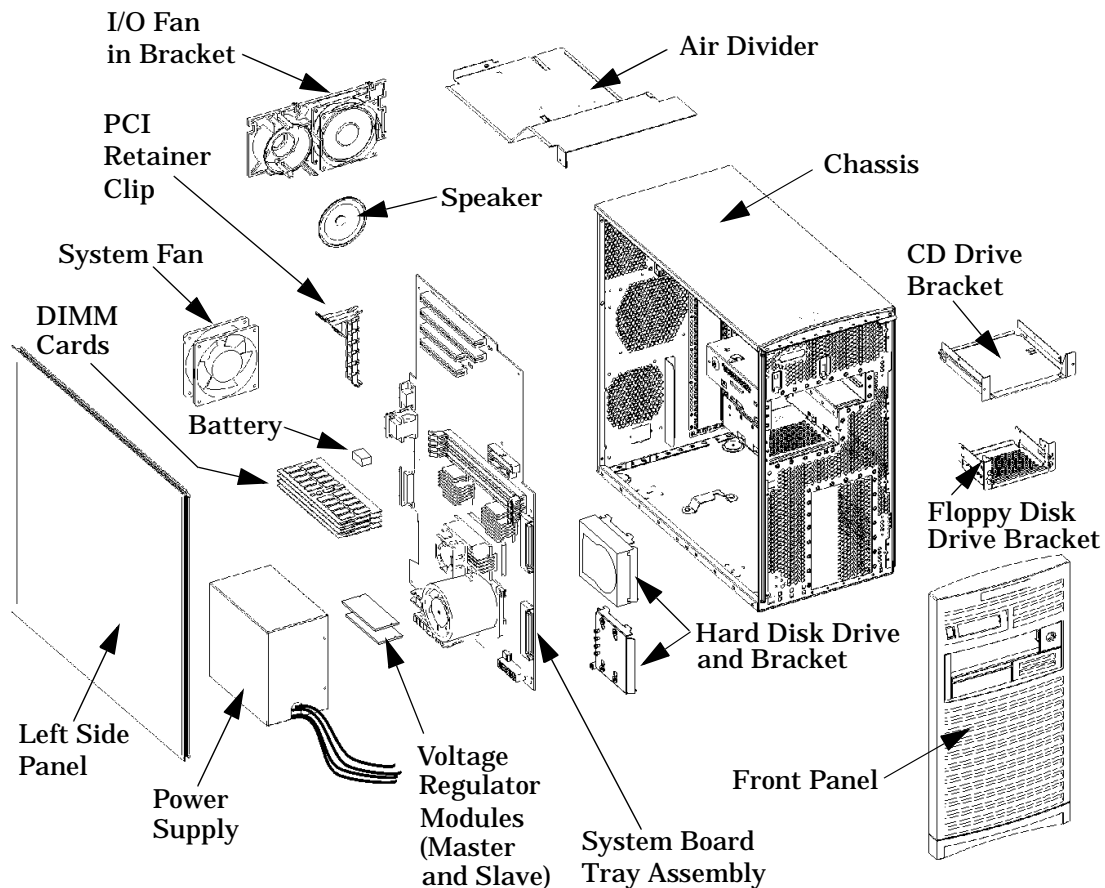
Exchange and Non-Exchange Part Numbers

In this chapter we refer to exchange and non-exchange part numbers.

You must return FRUs with exchange part numbers in exchange for a replacement FRU. Do *not* return FRUs with non-exchange part numbers—you may discard them.

The exploded view diagram (Figure 4-1 on page 83) shows the B2000 workstation's FRUs. Table 4-1 lists the exchange parts, and Table 4-2 lists the non-exchange parts in the B2000 workstation.

Table 4-1. Exchange Part Numbers

Part Number	Description
A5983-69001	400 MHz PA8600 CPU Assembly
A3862-69001	256 MB SDRAM DIMM
A3863-69001	512 MB SDRAM DIMM
A1658-69028	9 GB 7200 RPM LVD Disk

Table 4-2. Non-Exchange Part Numbers

Part Number	Description
A5983-62011	400 W Power Supply
0950-3758	Master Voltage Regulator Module
0950-3759	Slave Voltage Regulator Module
D2035-60391	3.5-inch Floppy Disk Drive
D4389-60021	ATAPI CD Drive
5063-4513	Speaker
A4978-62025	LCD/Power Switch Assembly
A1280-68503	I/O Fan, 92 mm
A1280-68504	System Fan, 120 mm
A4983-60401	USB Keyboard, U.S.
A4983-60111	USB Three-Button Mouse, U.S.
A4983-60101	USB Scroll-Wheel Mouse, U.S.
A4986-62025	PCI Retainer Clip
A5983-62009	Front Bezel with Floppy Disk Bay Filler

Table 4-2. Non-Exchange Part Numbers

Part Number	Description
A5983-63001	CD Signal Cable
5182-1857	CD Audio Cable
A5983-63002	Floppy Disk Drive Signal Cable
A4986-63006	LCD Signal Cable
A5983-62007	Hard Disk Drive Bracket
A5983-62010	CD Drive Bracket Assembly
A4986-62006	Floppy Disk Drive Bracket Assembly
0624-0727	6 - 32 $\times$ 1.437 T-15 Torx Screws
0515-0431	Power Supply Screw
1826-4269	Real Time Clock Module (includes Battery)

FRU Removal and Replacement

The procedures in this section describe how to remove and replace (install) field replaceable units (FRUs). Observe any notices and prerequisites before removing an FRU.

Before performing any FRU removal or replacement procedure, you *must* do the following:

1. Power off the workstation, the monitor, and any peripheral devices.

NOTE	There is no need to manually shutdown the HP-UX operating system on the workstation before switching it off. When the front panel power switch is pressed to off, the workstation automatically shuts down the operating system before terminating the power. Wait for the system to completely shutdown and power off before disconnecting the power cord.

CAUTION	Unplugging the power cord while HP-UX is running can damage system files.

2. Unplug the workstation's power cord and the power cord of any peripheral devices from AC wall outlets.

3. Unplug the workstation's power cord from the AC input connector on the rear of the workstation.

4. Disconnect any external cables from the connectors on the rear of the workstation.

5. Attach a static-grounding wrist strap to your wrist. Attach the sticky end of the wrist strap to bare metal on the rear panel of the workstation.

6. Lay the workstation on a flat stable surface, such as a table top or floor. To protect against scratches, remove miscellaneous debris and preferably use an ESD mat to cushion the workstation.

CAUTION	Follow normal ESD anti-static precautions when handling the workstation or any of its components. (See the section titled "Electrostatic Discharge (ESD) Precautions" on page 177.) Failure to do so can cause component degradation or failure.

7. If installed, remove any locking device from the security loop on the rear of the workstation.

Front Panel

This section explains how to open and close the workstation's front panel.

Opening the Front Panel

Perform the following steps to open the front panel:

1. Power off the workstation and unplug the power cord from the electrical outlet.

2. Attach the static-grounding wrist strap by following the instructions on the package. Attach the sticky end of the wrist strap to bare metal on the rear panel of the workstation.

3. Unlatch the front panel by pressing in on the two latch buttons located on the right side of the front panel, as shown in Figure 4-2.

Figure 4-2. Opening the Front Panel
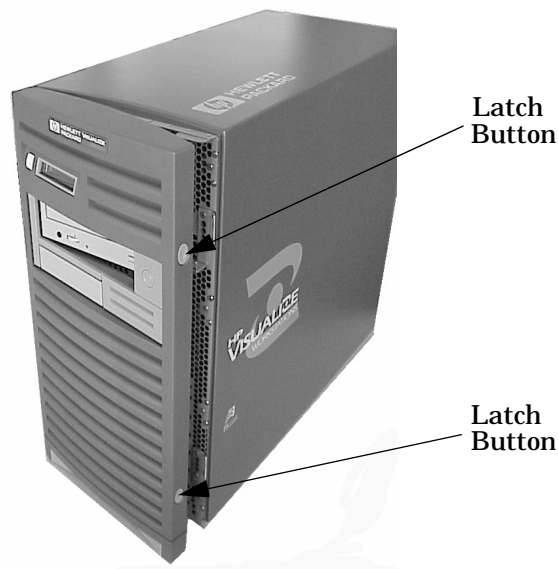
4. Swing the front panel outward on its left hinge hooks until the panel comes free.

5. Place the front panel in a location where it cannot be damaged.

Closing the Front Panel

Perform the following steps to close the front panel:

1. Locate the three hinge hooks on the left side of the front panel and insert them into the rectangular holes located along the front, left edge of the workstation.

2. Rotate the front panel inward until you hear the two latch buttons snap in place. The front panel is now closed.

Left Side Panel

This section explains how to open and close the left side panel. You will need to open this side panel whenever you need to access the internal components of the workstation.

Opening the Left Side Panel

Perform the following steps to open the left side panel:

1. Power off the workstation and unplug the power cord from the electrical outlet.

WARNING   **Always unplug the workstation's power cord from the electrical outlet before opening the workstation.**

---

2. Attach the static-grounding wrist strap by following the instructions on the package. Attach the sticky end of the wrist strap to bare metal on the workstation's rear panel.

3. Remove the two T-15 Torx thumbscrews located on the top and bottom, right edge of the workstation's rear panel, as shown in Figure 4-3.

4. Grasp the rear edge of the left side panel and rotate it outward approximately 30 degrees to the workstation. Next, pull the panel toward you as shown in Figure 4-3. This releases the panel's top and bottom hinge hooks from their hinge slots.

Figure 4-3. Opening the Left Side Panel
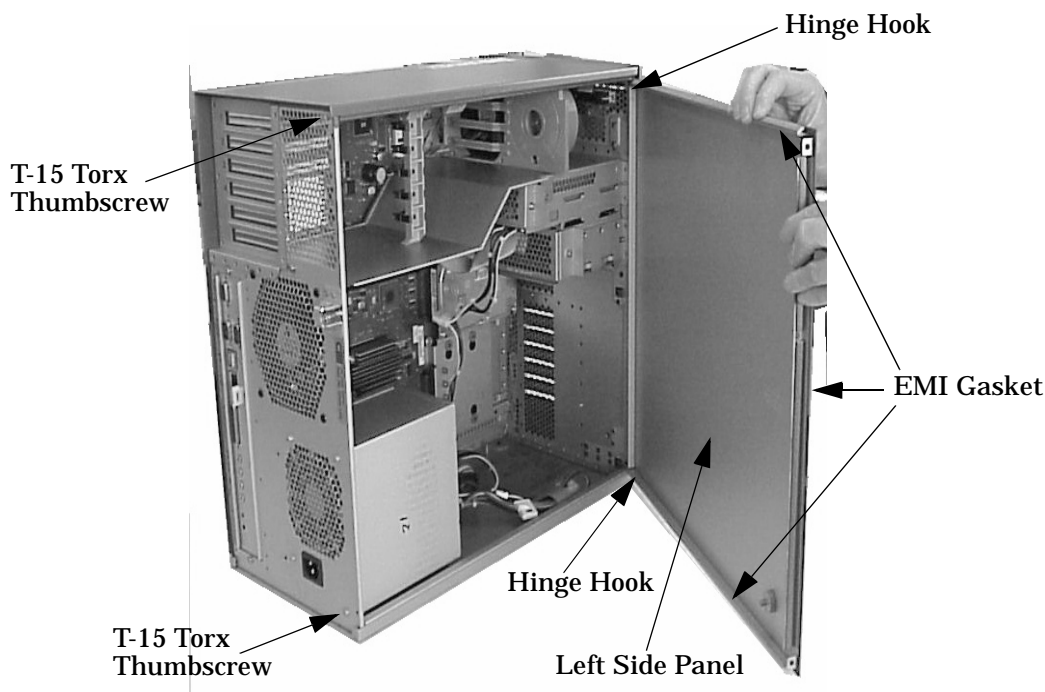
NOTE   The EMI gasket, as shown in Figure 4-3, must *not* be removed from the left side panel.

Closing the Left Side Panel

Perform the following steps to close the left side panel:

1. Hold the left side panel so that the top and bottom hinge hooks can be inserted into their hinge slots. See Figure 4-3. Note that the hinge slots are located on the far right edge of the workstation (using the rear of the workstation as the reference).

2. Swing the rear edge of the left side panel toward the rear of the workstation and press the outside edges of the left side panel tightly against the workstation. This will ensure a tight seal of the EMI gasket.

3. Secure the left side panel in place by tightening the two T-15 Torx thumbscrews you previously removed into the workstation's rear panel.

Power Switch/LCD Assembly

This section explains how to remove and replace the power switch/LCD assembly, which is located on the front panel of the B2000 workstation.

Removing the Power Switch/LCD Assembly

Perform the following steps to remove the power switch/LCD assembly:

1. Open the workstation's front panel as shown in the section "Opening the Front Panel."

2. Unplug the power switch/LCD assembly's connector as shown in Figure 4-4.

Figure 4-4. Removing the Power Switch/LCD Assembly
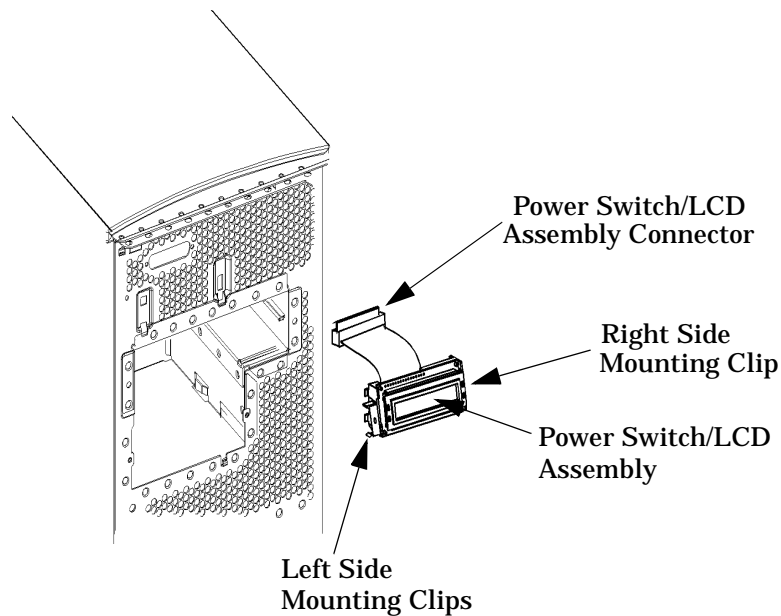
3. Press inward on the mounting clip located on the right side of the power switch/LCD assembly and pull the right side of the assembly outward in a clockwise motion. See Figure 4-4. This action releases the mounting clips on the left side of the power switch/LCD assembly.

Replacing the Power Switch/LCD Assembly

Perform the following steps to replace the power switch/LCD assembly:

1. Open the workstation's front panel as shown in the section "Opening the Front Panel."

2. Insert the mounting clips on the left side of the power switch/LCD assembly into the slots on the workstation chassis. See Figure 4-4.

3. Press inward on the mount clip located on the right side of the power switch/LCD assembly and insert this clip into the hole provided for it on the workstation chassis.

4. Plug in the power switch/LCD assembly's connector.

5. Close the workstation's front panel as shown in the section "Closing the Front Panel."

Removable Media Devices

There are only two removable media devices allowed in a B2000 workstation:

- CD drive (standard component)

- 3.5-inch floppy disk drive (optional component)

The procedures in the following subsections explain how to remove and replace (install) these removable media devices.

Removing and Replacing a CD Drive

WARNING	**Power off the workstation and unplug the power cord before removing and replacing (installing) a CD drive.**

CAUTION	CD drives are susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static-grounding wrist strap that came in the CD drive kit. Always handle the drive carefully.

Perform the following steps to remove and replace a CD drive:

1. Open the front and left side panels of the workstation as shown in the sections "Opening the Front Panel" and "Opening the Left Side Panel."

2. Remove the rear cover of the CD drive bay inside the workstation by unscrewing the T-15 Torx/slotted screw as shown in Figure 4-5. Push the cover handle toward the rear of the CD drive approximately one inch, and then pull the cover handle toward you.

Figure 4-5. Removing the CD Drive Bay's Rear Cover
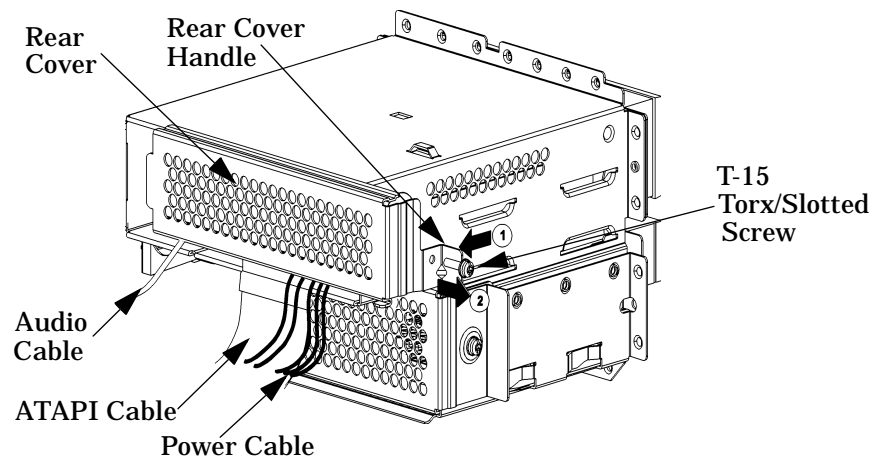
3. Disconnect the audio, ATAPI, and power cables from the rear of the CD drive.

4. Rotate the workstation around until you see the front of the workstation as shown in Figure 4-6.

Figure 4-6. Front of the Workstation with the Front Panel Removed
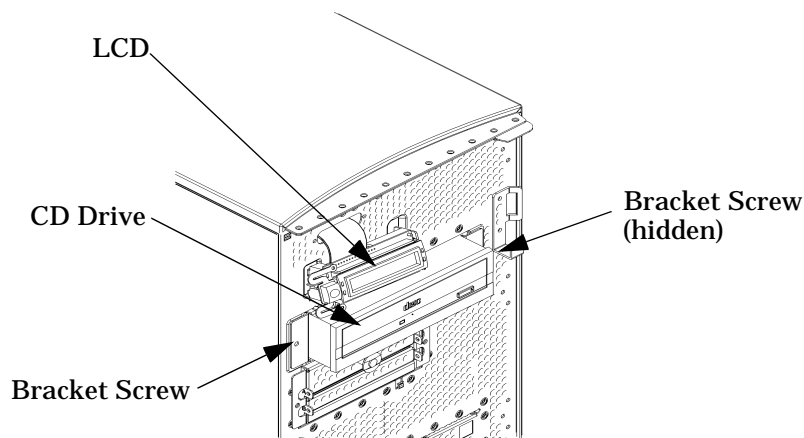
5. Remove both CD drive bracket screws (T-15 Torx/slotted screws) and pull the CD drive out of the workstation chassis as shown in Figure 4-7.

Figure 4-7. Removing the CD Drive
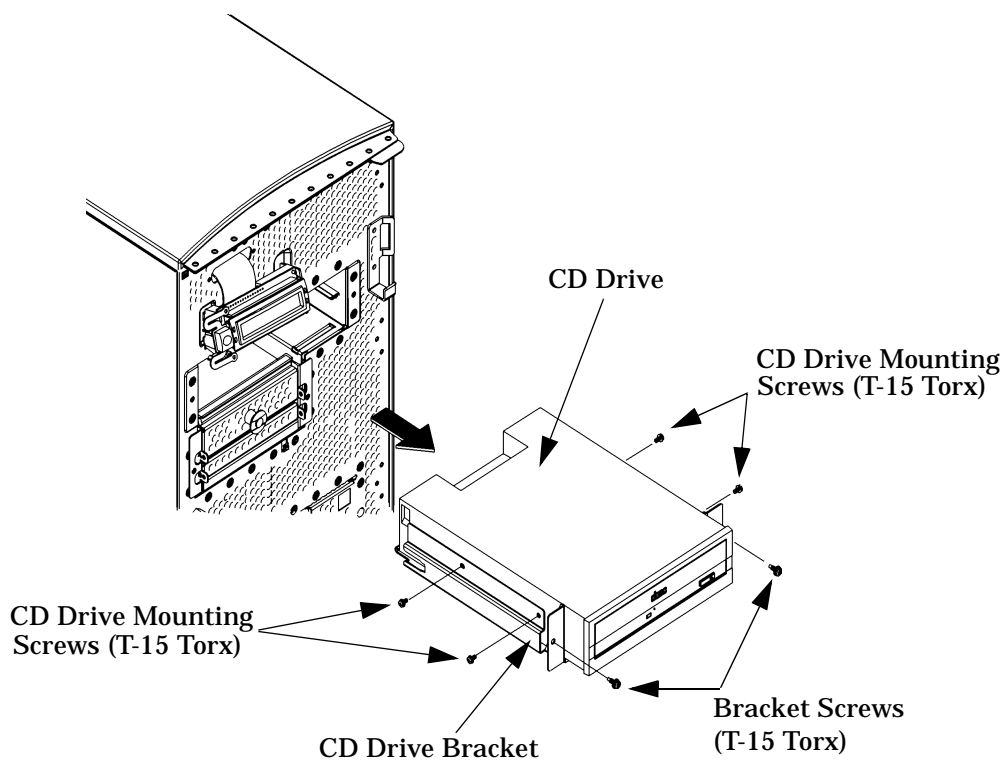
6. Remove the four CD drive mounting screws (T-15 Torx/slotted screws) from the sides of the CD drive bracket as shown in Figure 4-7 and remove the CD drive from the bracket.

7. Remove the new CD drive from its shipping container and check to see that the jumper on the rear of the CD drive is set to the CSEL position.

NOTE   You will have to verify that the master/slave/CSEL jumper is set in the CSEL position on the rear of the new CD drive that you will install. Since different CD drive manufacturers have different locations for the CSEL jumper, look at the documentation that came with the CD drive for the proper location of this jumper.

---

8. Using the four CD drive mounting screws, mount the CD drive to the bracket as shown in Figure 4-8. Note that the CD drive should extend approximately one inch out from the front of the CD drive bracket.

Figure 4-8. Installing the CD Drive
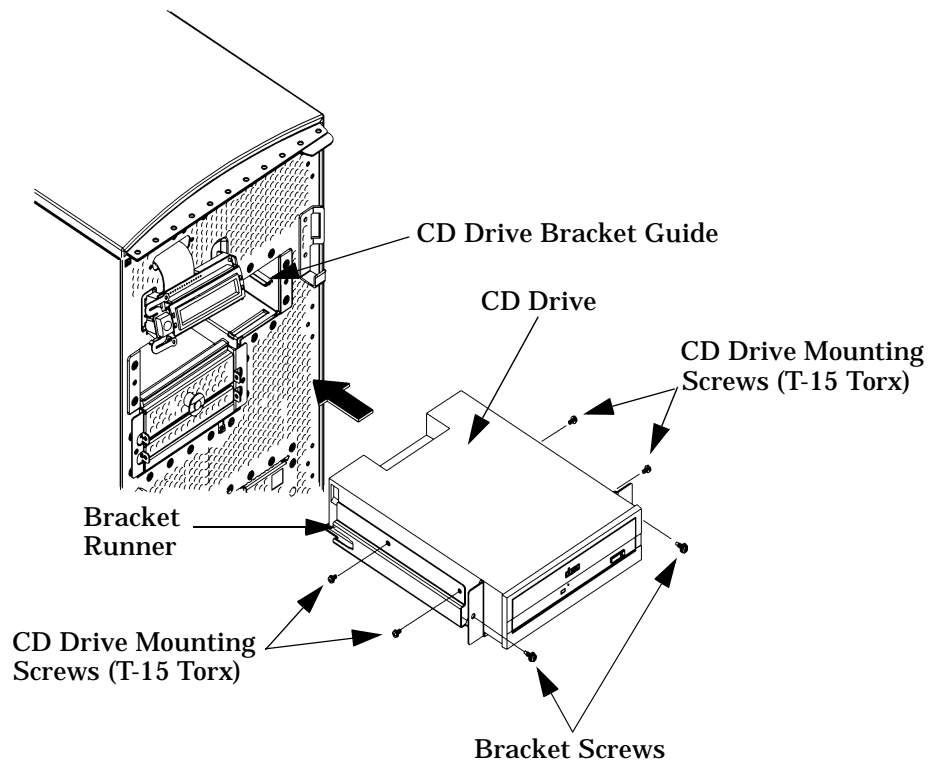
9. Slide the CD drive and its bracket into the workstation chassis as shown in Figure 4-8. There are runners on the sides of the bracket and guides inside the CD drive chassis that will help the CD drive and bracket assembly to slide into place.

10. Tighten the two CD drive bracket screws as shown in Figure 4-9.

Figure 4-9. Tightening the Bracket Screws
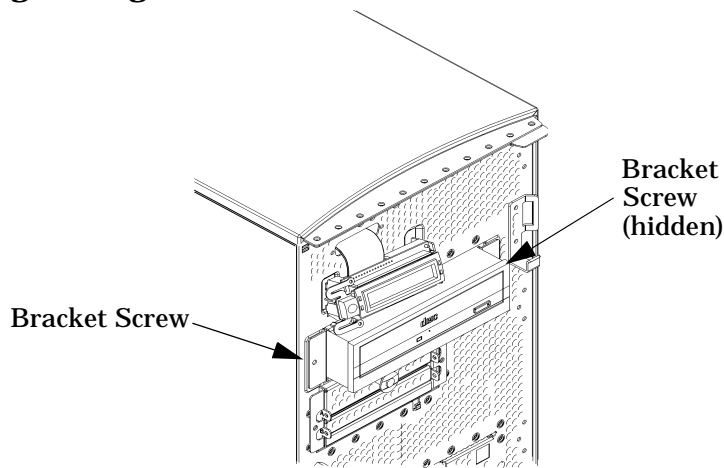
11. Rotate the workstation around until you see the open, left side of the workstation. Plug the audio, ATAPI, and power cables into their appropriate connectors on the rear of the CD drive, as shown in Figure 4-10. Note that the connectors are keyed for proper insertion, and that you should connect the audio cable first.

NOTE   The red striped side of the ATAPI cable should be positioned next to the power cable.

Figure 4-10. Plugging in the Audio, ATAPI, and Power Cables
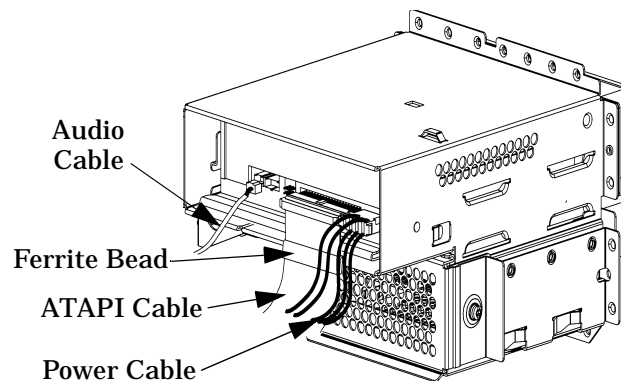
12. Make sure that the audio, ATAPI, and power cables are positioned so that they will come out of the bottom edge of the CD drive bay's rear cover when it is replaced. (Note that the rear cover's bottom edge is rounded to prevent cutting of the cables.) To replace the rear cover, place the end opposite of the rear cover handle into the cover slot and rotate it into place. Tighten the T-15 Torx/slotted screw to secure the rear cover. Note that, when you replace the rear cover, the ferrite bead on the ATAPI cable must remain outside of the CD drive bay's rear cover. See Figure 4-11.

Figure 4-11. Replacing the CD Drive Bay's Rear Cover
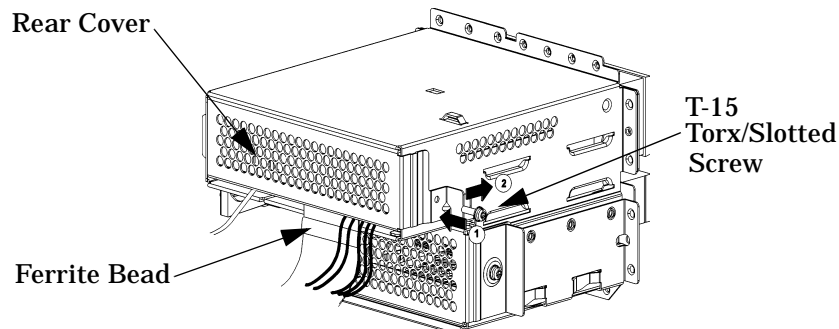
13. Make sure that all cables are positioned within the workstation so that they cannot be damaged. Then close the left side and front panels of the workstation as shown in the sections "Closing the Left Side Panel" and "Closing the Front Panel."

Removing a Floppy Disk Drive

WARNING	**Power off the workstation and unplug the power cord before removing the floppy disk drive.**

CAUTION	Floppy disk drives are susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static-grounding wrist strap that came in the floppy disk drive kit. Always handle the drive carefully.

Perform the following steps to remove a floppy disk drive:

1. Open the front and left side panels of the workstation as shown in the sections "Opening the Front Panel" and "Opening the Left Side Panel."

2. Remove the rear cover of the floppy disk drive bay inside the workstation by unscrewing the T-15 Torx/slotted screw as shown in Figure 4-12. Push the cover handle toward the rear of the floppy disk drive approximately one inch, and then pull the cover handle toward you.

Figure 4-12. Removing the Floppy Disk Drive Bay's Rear Cover
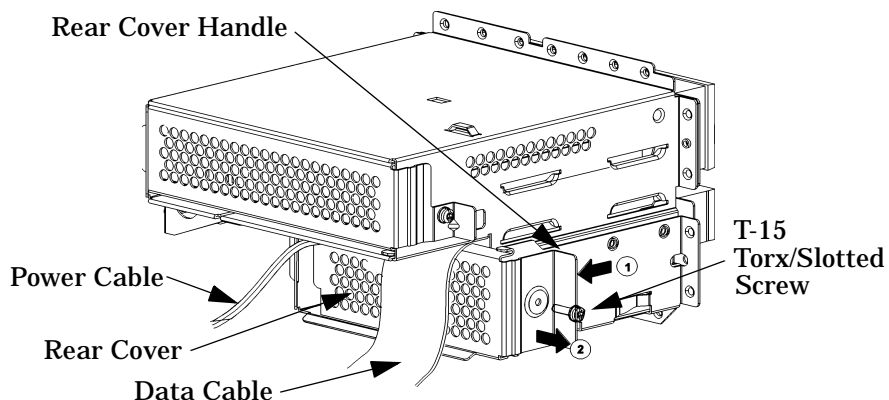
3. Disconnect the power and data cables from the rear of the floppy disk drive.

4. Rotate the workstation around until you can see the front of the workstation as shown in Figure 4-13.

Figure 4-13. Front of Workstation with the Front Panel Removed

LCD

Floppy
Disk Drive

Bracket
Screw
(hidden)
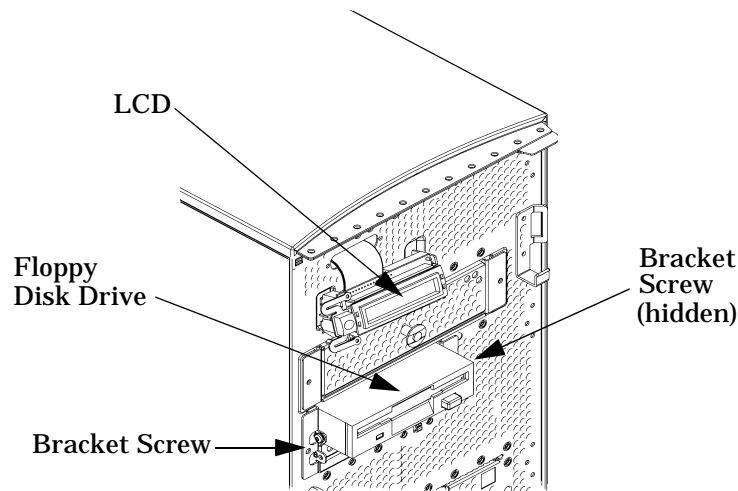
Bracket Screw

5. Remove both floppy disk drive bracket screws (T-15 Torx/slotted screws) and pull the
floppy disk drive out of the workstation chassis as shown in Figure 4-14.
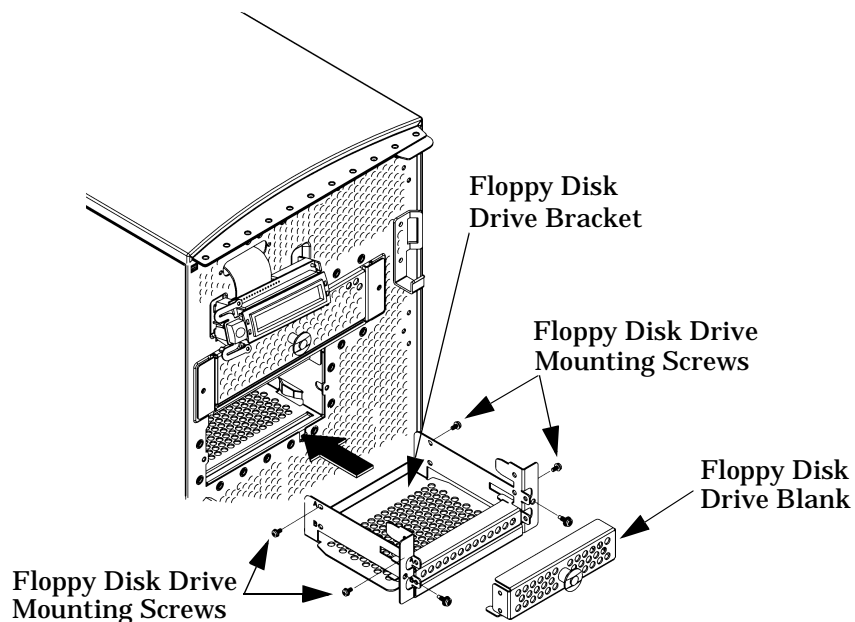
Figure 4-14. Removing the Floppy Disk Drive

Floppy
Disk Drive

Floppy Disk Drive
Mounting Screws
(T-15 Torx)

Floppy Disk Drive
Mounting Screws
(T-15 Torx)

Floppy Disk
Drive Bracket

Bracket Screws
(T-15 Torx)
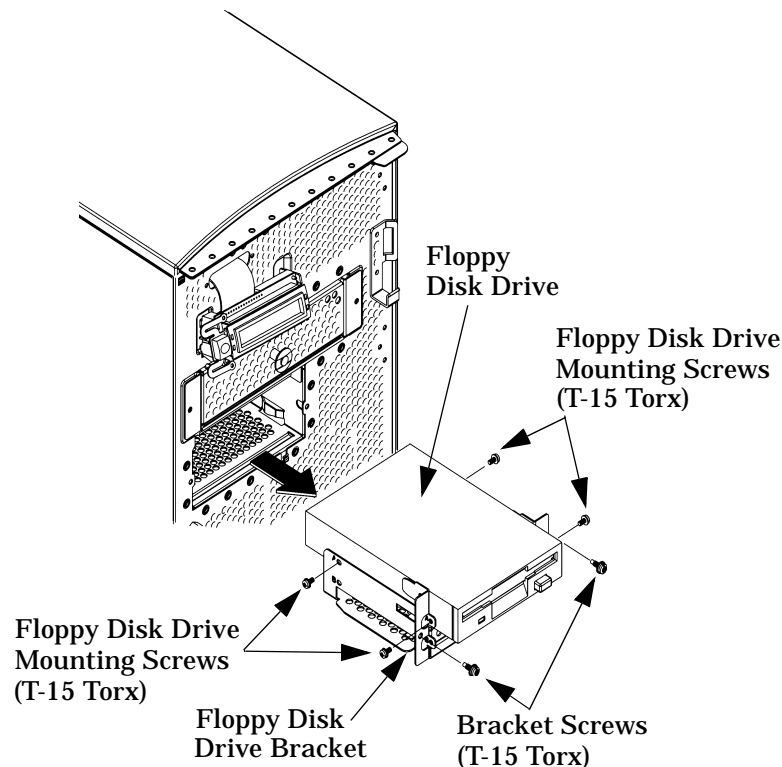
6. Remove the four floppy disk drive mounting screws (T-15 Torx/slotted screws) from the
sides of the floppy disk drive bracket as shown in Figure 4-14 and remove the floppy
disk drive from the bracket.

If you will replace the floppy disk drive with a blank, continue on with step 7 below. However, if you will replace it with a new floppy disk drive, go to step 6 in the section "Replacing or Installing a Floppy Disk Drive" on page 101.

7. Place the floppy disk drive blank in the floppy disk drive bracket and tighten the four floppy disk drive mounting screws (T-15 Torx/slotted screws) into the bracket. See Figure 4-15.

Figure 4-15. Installing the Floppy Disk Drive Blank and Bracket

8. Slide the floppy disk drive blank and its bracket into the workstation chassis as shown in Figure 4-15.

9. Tighten the two floppy disk drive bracket screws as shown in Figure 4-16.

Figure 4-16. Tightening the Bracket Screws
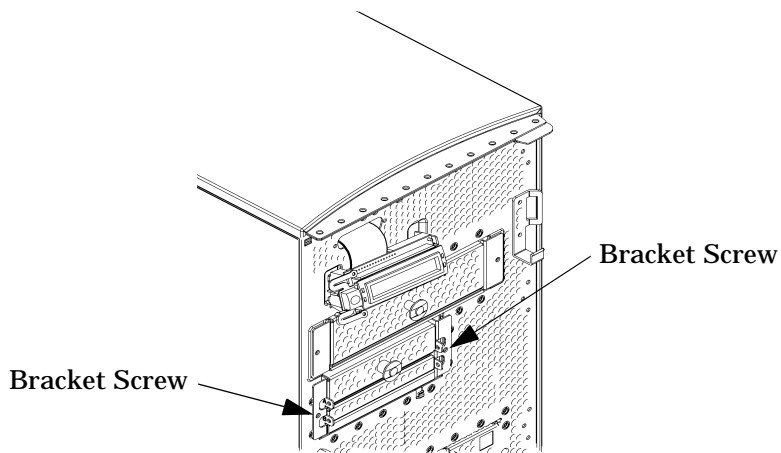
10. Make sure that the floppy disk drive's power and data cables are positioned so that they will come out of the top edge of the floppy disk drive bay's rear cover when it is replaced. (Note that the rear cover's top edge is rounded to prevent cutting of the cables.) Put the rear cover in place and tighten the T-15 Torx/slotted screw. See Figure 4-17.

Figure 4-17. Replacing the Floppy Disk Drive Bay's Rear Cover
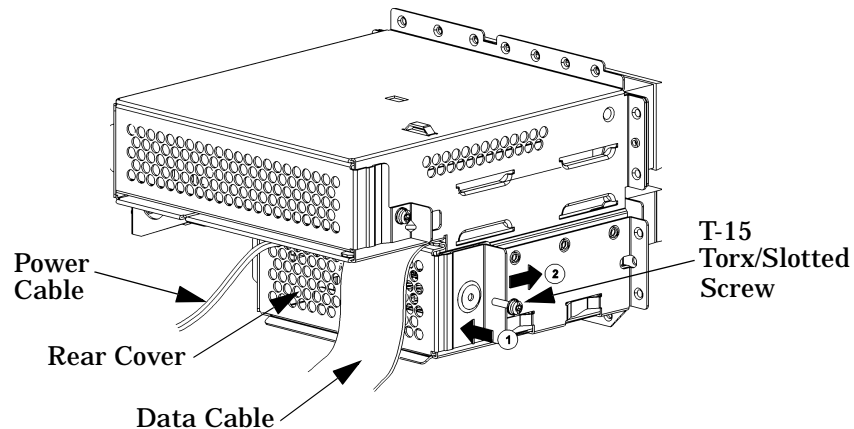
11. Replace the plastic floppy disk drive blank in the workstation's front panel.

12. Make sure that all cables are positioned within the workstation so that they cannot be damaged. Then close the left side and front panels of the workstation as shown in the sections "Closing the Left Side Panel" and "Closing the Front Panel."

Replacing or Installing a Floppy Disk Drive

WARNING	**Power off the workstation and unplug the power cord before replacing (installing) the floppy disk drive.**

CAUTION	Floppy disk drives are susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static-grounding wrist strap that came in the floppy disk drive kit. Always handle the drive carefully.

NOTE	There are no jumper settings required for the installation of the floppy disk drive.

Perform the following steps to replace a floppy disk drive:

1. Open the front and left side panels of the workstation as shown in the sections "Opening the Front Panel" and "Opening the Left Side Panel."
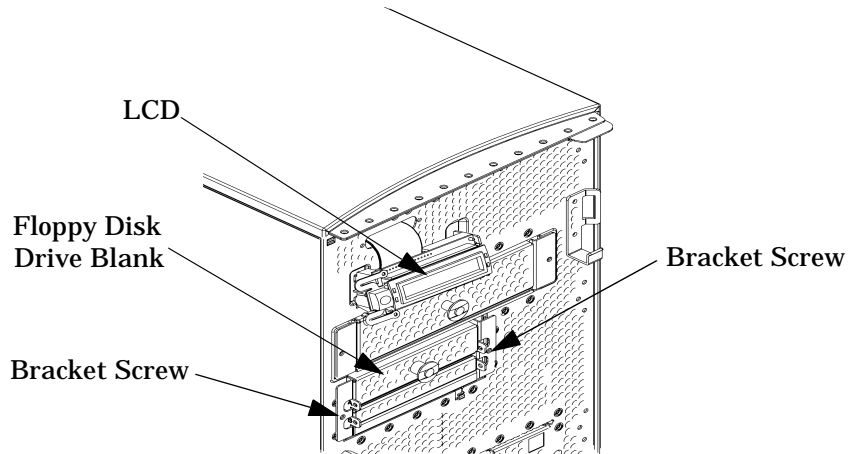
2. Remove the rear cover of the floppy disk drive bay inside the workstation by unscrewing the T-15 Torx/slotted screw as shown in Figure 4-18. Push the cover handle toward the rear of the floppy disk drive approximately one inch, and then pull the cover handle toward you.

**Figure 4-18. Removing the Floppy Disk Drive Bay's Rear Cover**
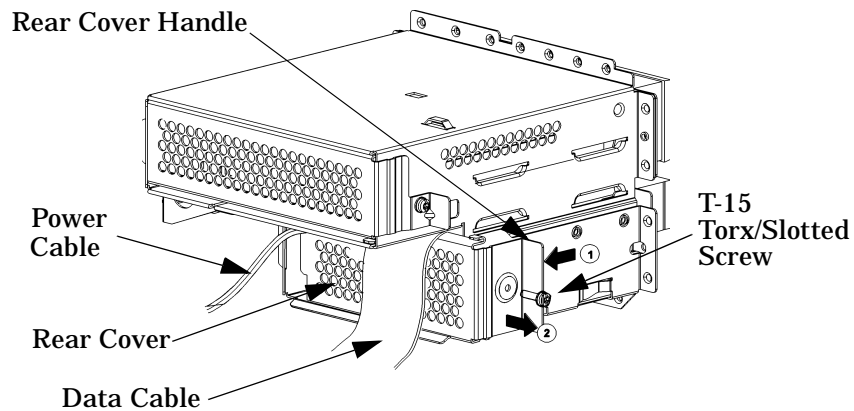
3. Rotate the workstation around until you see the front of the workstation as shown in Figure 4-19.

Figure 4-19. Front of Workstation with the Front Panel Removed

4. Remove both floppy disk drive bracket screws (T-15 Torx/slotted screws) and pull the floppy disk drive bracket out of the workstation chassis as shown in Figure 4-20.

Figure 4-20. Removing the Floppy Disk Drive Bracket and Blank
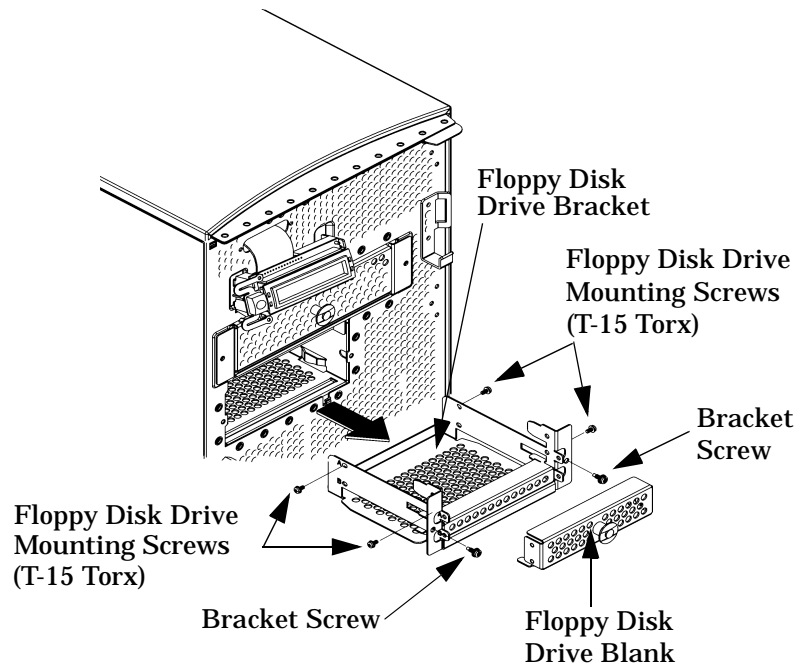
5. Remove the four floppy disk drive mounting screws (T-15 Torx/slotted screws) from the sides of the floppy disk drive bracket as shown in Figure 4-20 and remove the floppy disk drive blank from the bracket.

6. Remove the new floppy disk drive from its shipping container. Using the four T-15 Torx/ slotted mounting screws, mount the floppy disk drive to the bracket as shown in Figure 4-21.

   To help you properly install the floppy disk drive, you need to use the floppy disk drive holes labeled "A" on the bracket sides. The first T-15 Torx screws should be inserted through the tab holes of the floppy disk drive bracket that are located on the front part of both sides of the bracket. These T-15 Torx screws should then be screwed into the screw holes located on both sides of the floppy disk drive. These holes are located near the floppy disk drive's front panel. The remaining T-15 Torx screws should be inserted through the holes labeled "A" at the rear part of the floppy disk drive bracket. These screws should then be screwed into the rear screw holes located on both sides of the floppy disk drive. Note that the front of the floppy disk drive should extend one inch from the front of the floppy disk drive bracket. See Figure 4-21.

Figure 4-21. Installing the Floppy Disk Drive
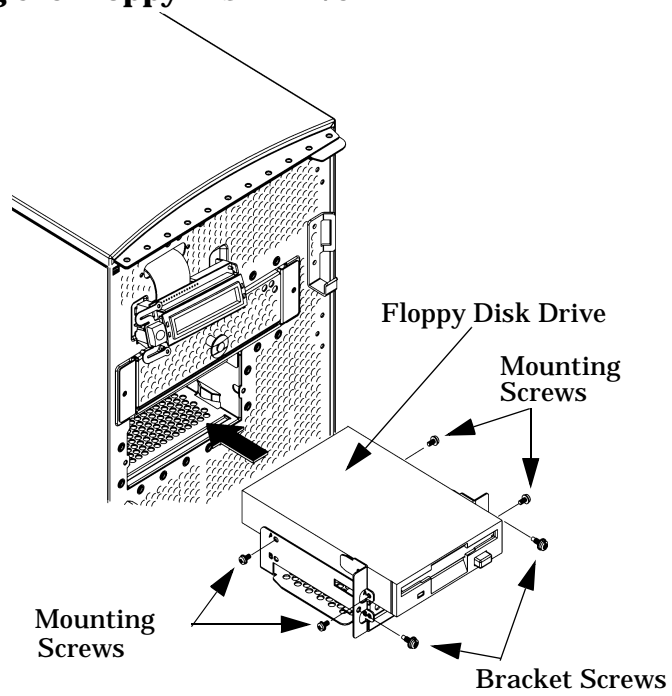
7. Slide the floppy disk drive and its bracket into the workstation chassis as shown in Figure 4-21.

8. Tighten the two floppy disk drive bracket screws as shown in Figure 4-22.

**Figure 4-22. Tightening the Bracket Screws**
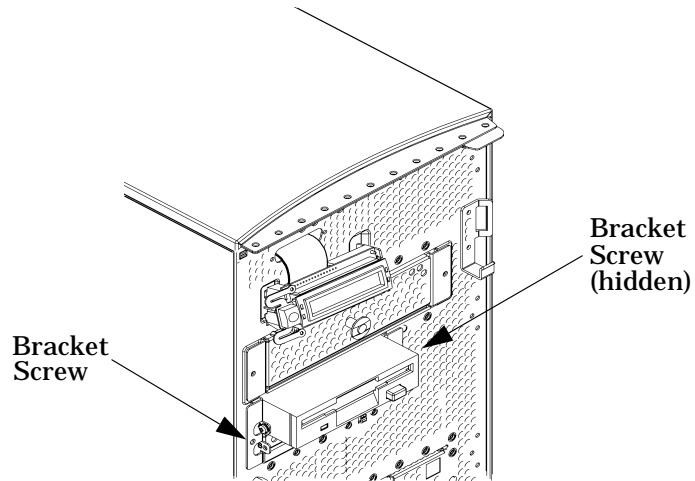
9. Rotate the workstation around until you see the open, left side of the workstation. Plug the power and data cables into their connectors on the rear of the floppy disk drive, as shown in Figure 4-23. Note that the connectors are keyed for proper insertion.

NOTE   The red striped side of the data cable should be positioned toward the power cable.

Figure 4-23. Plugging in the Power and Data Cables
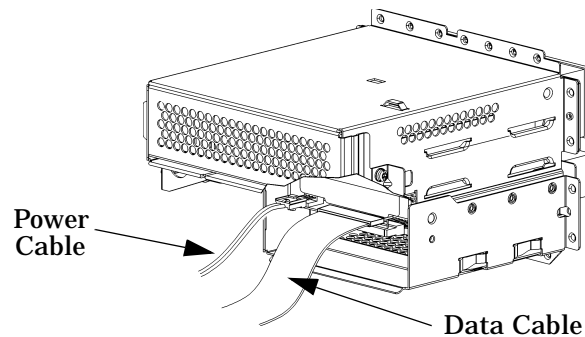
Power Cable

Data Cable

10. Make sure that the floppy disk drive's power and data cables are positioned so that they will come out of the top edge of the floppy disk drive bay's rear cover when it is replaced. (Note that the rear cover's top edge is rounded to prevent cutting of the cables.) Put the rear cover in place and tighten the T-15 Torx/slotted screw. Note that, when you replace the rear cover, the ferrite bead on the data cable must remain inside of the floppy disk drive bay's rear cover. See Figure 4-24.

Figure 4-24. Replacing the Floppy Disk Drive Bay's Rear Cover

Power Cable

Rear Cover

Data Cable

T-15 Torx/Slotted Screw
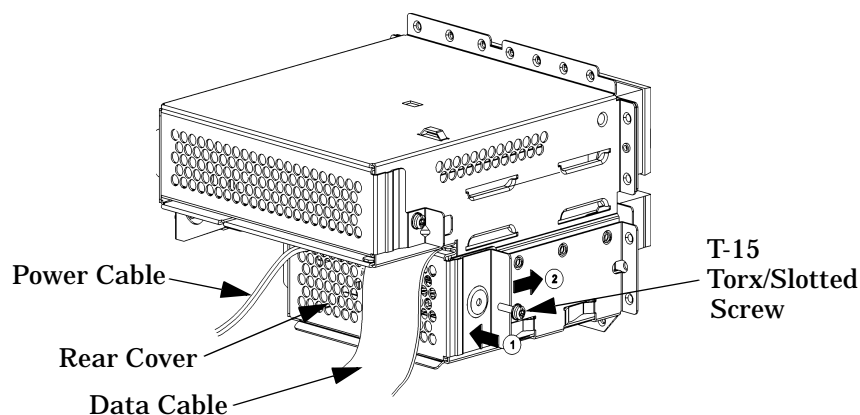
11. Remove the plastic floppy disk drive blank from the workstation's front panel, if present.

12. Make sure that all cables are positioned within the workstation so that they cannot be damaged. Then close the left side and front panels of the workstation as shown in the sections "Closing the Left Side Panel" and "Closing the Front Panel."

Hard Disk Drives

This section explains how to remove and replace (install) a hard disk drive in the B2000 workstation. After replacing or installing a hard disk drive, be sure to follow the procedures in the section "Configuring a Hard Disk Drive as a File System" on page 33 to configure the hard disk drive.

The B2000 workstation can have a maximum of two hard disk drives. These internal hard disk drives are devices on the Ultra2 Wide Low-Voltage Differential SCSI bus. The hard disk drive that came with the workstation was set to SCSI ID 6 on the bus. If you are adding a second hard disk drive, the second hard disk drive will use SCSI ID 5. Note that the two slots for the hard disk drives have SCSI ID numbers 6 and 5 preassigned to them, and that SCSI ID 6 is the system disk. You will not be able to change these SCSI ID numbers.

CAUTION	Hard disk drives are susceptible to mechanical and electrostatic shock. When handling the drive, always wear the static-grounding wrist strap that came in the hard disk drive kit. Always handle the drive carefully.

Removing a Hard Disk Drive

CAUTION	To remove a hard disk drive, the workstation must be turned off.

NOTE	There are no cables to disconnect when removing a hard disk drive.

|	
NOTE	If you are removing a hard disk drive that has a mounted file system on it, you will need to unmount it. This should be done *before* you remove the hard disk drive itself from the workstation.
	To unmount a file system on a hard disk drive, follow the procedure in the section "Removing a Hard Disk Drive as a File System" on page 35.

Perform the following steps to remove a hard disk drive:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel." As you face the open, left side of the workstation, the hard disk drives are on the right side. The lower hard disk drive (SCSI ID 5) is the one discussed in this section. See Figure 4-25.

Figure 4-25. Location of the Hard Disk Drives

Upper Hard Disk Drive
(SCSI ID 6 -- System Disk

Lower Hard Disk Drive
(SCSI ID 5)
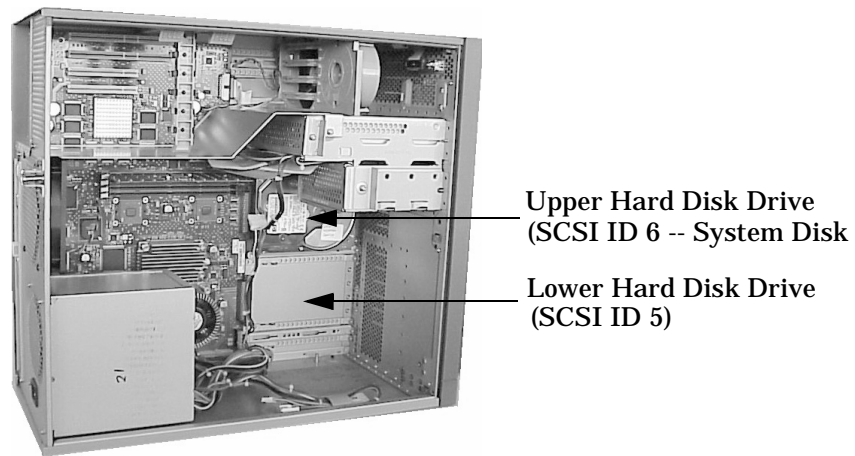
2. Loosen the T-15 Torx thumbscrew securing the hard disk drive assembly to the system board. Grasp the assembly and slide it to the front of the workstation to unseat the bracket from the chassis rail. See Figure 4-26. You may need to angle the hard disk drive assembly slightly to disengage the hooks as you slide it along the rail.

Figure 4-26. Removing the Hard Disk Drive
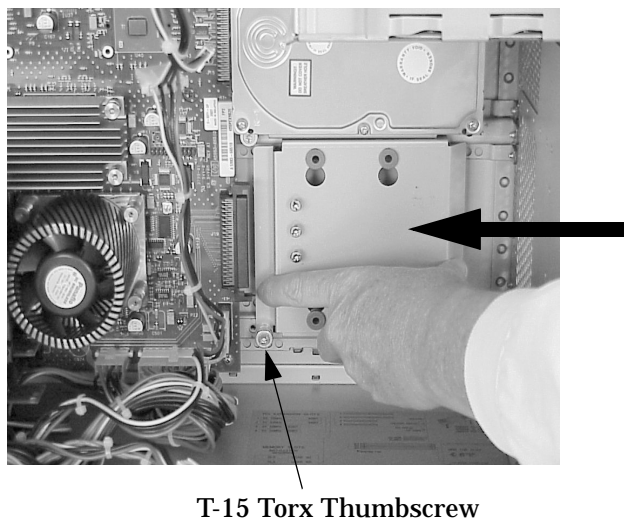

T-15 Torx Thumbscrew
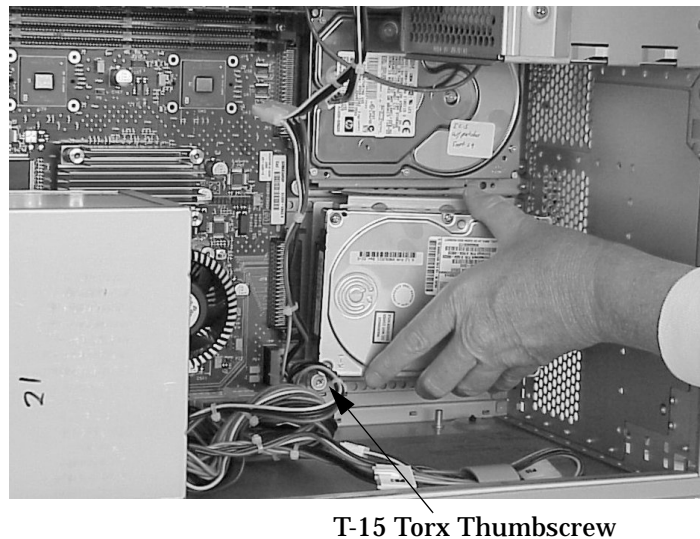
3. Remove the four T-15 Torx mounting screws from the bracket as shown in Figure 4-27. Be careful when removing the hard disk drive from its bracket to avoid damaging it.

Figure 4-27. Removing the Hard Disk Drive from Its Bracket
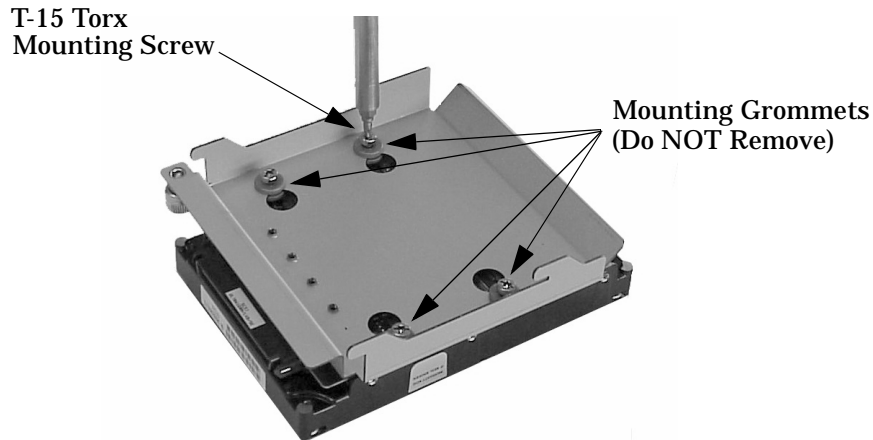
4. Screw the four mounting screws into the four vertical holes on the hard disk drive bracket to store them for future use.

5. Slide the hard disk drive bracket into its slot, and push firmly inward to secure the hard disk drive bracket to the system board connector. See Figure 4-28.

Figure 4-28. Replacing the Hard Disk Drive Bracket

T-15 Torx Thumbscrew

6. Tighten the T-15 Torx thumbscrew to secure the bracket to the system board.

7. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

Replacing or Installing a Hard Disk Drive

NOTE   After replacing or installing a hard disk drive, you will need to mount it and create a file system on it. Follow the procedures in the section "Configuring a Hard Disk Drive as a File System" on page 33.

1. Remove the left side panel of the workstation using the instructions found in the section "Opening the Side Panel." As you face the open, left side of the workstation, the hard disk drives are on the right side. The lower hard disk drive (SCSI ID 5) is the one discussed in this section. Figure 4-29 shows an empty bracket for the lower hard disk drive.

Figure 4-29. Location of the Hard Disk Drives

Upper Hard Disk Drive
(SCSI ID 6 -- System Disk)

Bracket for the Lower
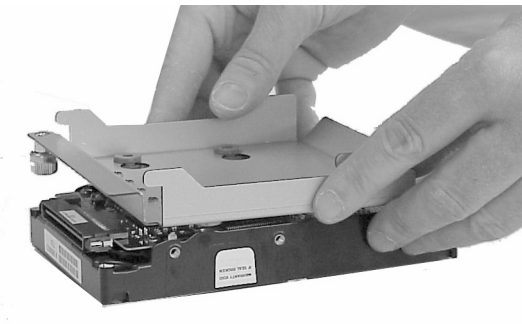Hard Disk Drive (SCSI ID 5)

T-15 Torx Thumbscrew
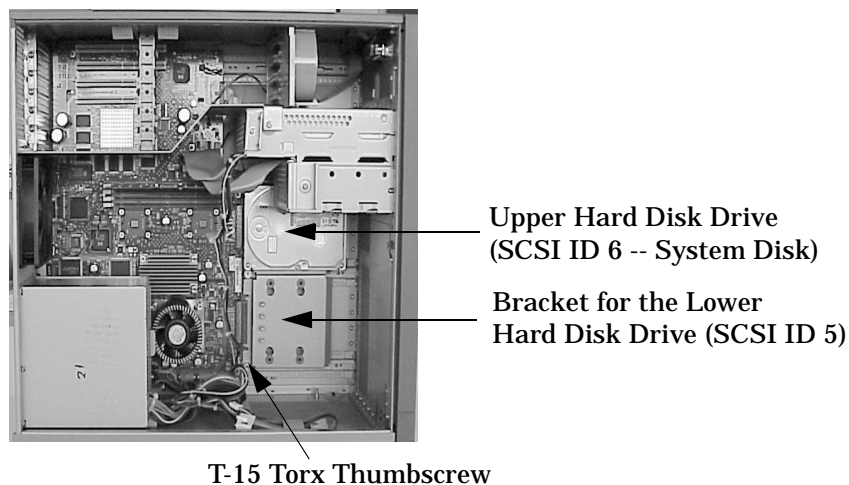
2. Loosen the T-15 Torx thumbscrew securing the hard disk drive bracket to the system board. See Figure 4-29. Grasp the bracket and slide it to the front of the workstation to unseat the bracket from the chassis rail. You may need to angle the hard disk drive bracket slightly to disengage the hooks as you slide it along the rail.

3. Mount the hard disk drive on the hard disk drive bracket using the four T-15 Torx mounting screws that are stored on the bracket. See Figure 4-30 for the location of the mounting screws and Figure 4-31 for positioning the bracket on to the hard disk drive.

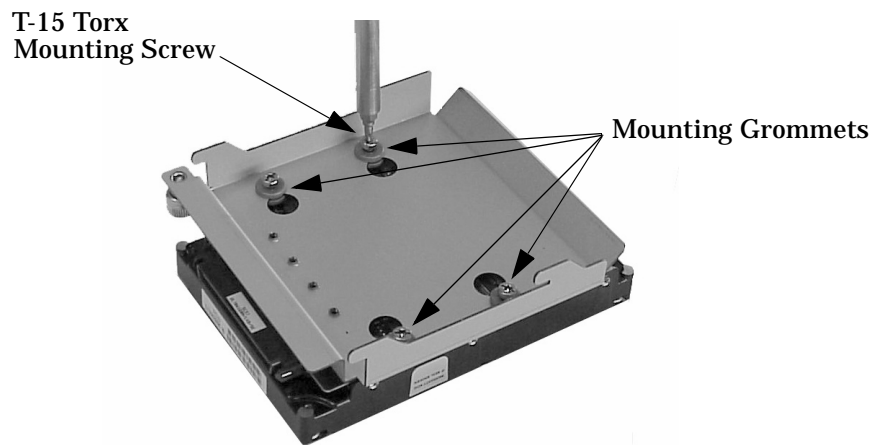**Figure 4-30. Removing the T-15 Torx Mounting Screws**
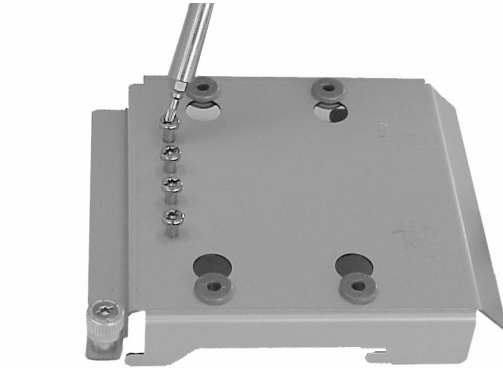
**Figure 4-31. Positioning the Bracket on to the Hard Disk Drive**

4. Insert the T-15 Torx mounting screws through the four rubber mounting grommets and into the screw holes of the hard disk drive. See Figure 4-32.

Figure 4-32. Mounting the Bracket on to the Hard Disk Drive

T-15 Torx
Mounting Screw

Mounting Grommets

5. Slide the hard disk drive assembly into its slot, and push inward firmly until the front of the hard disk drive bracket is flush with the hard disk drive connector on the system board. See Figure 4-33. The bracket hooks will lock into the chassis rail.

Figure 4-33. Positioning the Hard Disk Drive Assembly
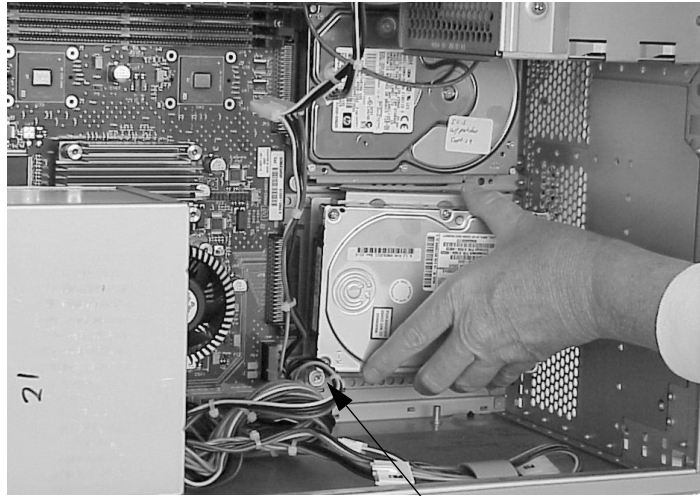
T-15 Torx Thumbscrew

6. Tighten the T-15 Torx thumbscrew to secure the hard disk drive assembly to the system board.

7. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

I/O Cards

This section explains how to remove and replace (or install) I/O cards in the B2000 workstation.

The B2000 workstation's system board has four Peripheral Connect Interface (PCI) slots for option I/O cards. Slots 1 and 2 are full-size (PCI-2X) slots. Slots 3 and 4 are half-size (PCI-1X) slots.

NOTE   The optional graphics cards supported by the B2000 workstation are designed to be electrically compatible with the PCI slots. See Table 1-1 in Chapter 1 for the optional graphics cards supported in the B2000 workstation.


Figure 4-34 provides a brief description of slot capabilities.

Figure 4-34. PCI Card Slot Numbering and Capabilities

Slot 1 | **64-bits, 5V, 33MHz**

Slot 2 | **64-bits, 5V, 33MHz**

Slot 3 | **32-bits, 5V, 33MHz**

Slot 4 | **32-bits, 5V, 33MHz**

The information described in Figure 4-34 is also provided on the B2000 system label on the chassis floor inside the workstation. See Figure 4-35 for the location of the system label.

Figure 4-35. B2000 System Label
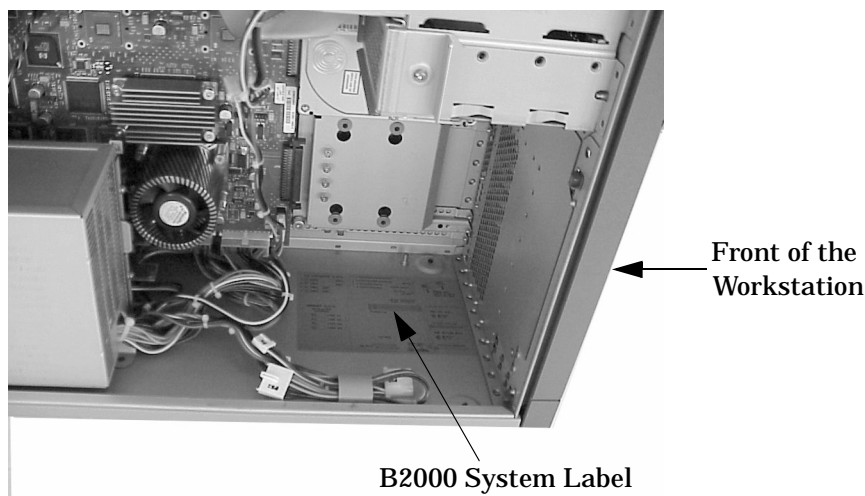
Front of the
Workstation

B2000 System Label

NOTE	If you are installing an additional HP VISUALIZE-*fxe* graphics card, after you connect the monitor to the additional graphics card, you must change the graphics path for the monitor. To do this, see the section "Displaying and Setting the Monitor Type" on page 150.

As shown in Figure 4-36, the four I/O slots as seen from the rear of the workstation are labeled from top to bottom starting with 1.

Figure 4-36. I/O Slot Numbering

I/O Slot 1

I/O Slot 4
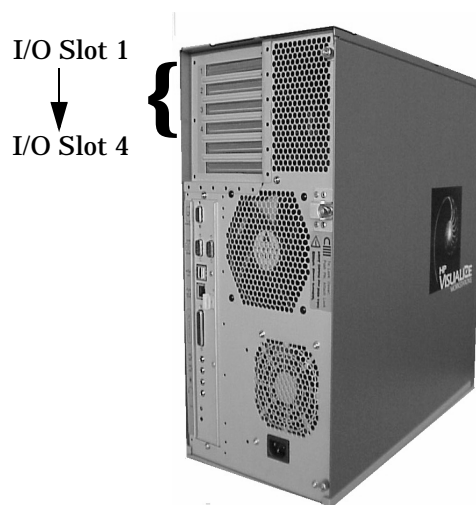
Removing I/O Cards

This subsection assumes that you already have I/O cards loaded in the workstation, and that you need to remove one or more of them.

Perform the following steps to remove an I/O card:

1. Power off the workstation and unplug the power cord from the electrical outlet.

2. Attach the static-grounding wrist strap by following the instructions on the package. Attach the sticky end of the wrist strap to bare metal on the rear panel of the workstation.

3. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

4. Remove the PCI retainer clip by pulling evenly in the direction of the arrow on both PULL tabs.

5. Locate the I/O card you want to remove and, using a T-15 Torx driver or flathead screwdriver, remove the I/O card's bulkhead screw as shown in Figure 4-37.

Figure 4-37. Removing the I/O Card
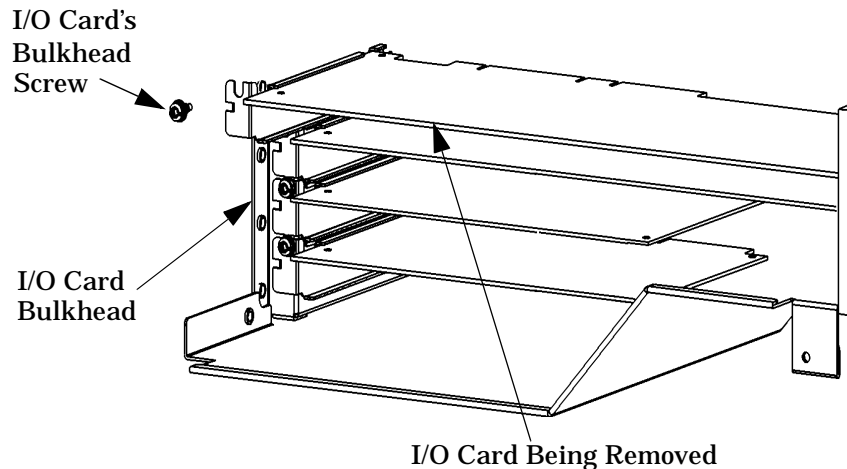
6. Pull evenly on the outside edges of the I/O card to remove it.

Replacing or Installing I/O Cards

Perform the following steps to replace or install a new I/O card:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Locate the appropriate slot for the I/O card that will be installed.

3. Unscrew the T-15 Torx screw from the bulkhead blank of the slot you have chosen and remove the bulkhead blank. If no blank is present, simply go on to step 4.

4. Remove the PCI retainer clip by pulling evenly in the direction of the arrow on both PULL tabs.

5. Insert the I/O card into the slot you have chosen with the bulkhead appropriately positioned. If the card is full-length, the non-bulkhead end of the card should be placed in the I/O card guide. Press firmly and evenly on the I/O card until it is in the connector. Screw the T-15 Torx screw into the I/O card's bulkhead to secure the I/O card.

6. Replace the PCI retainer clip by placing the bottom hook in the slot on the air divider and pushing the PULL tabs until they snap into their slots on the chassis wall.

7. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

NOTE   If you connect the monitor to a graphics I/O card that you have just installed, you must change the graphics path for the monitor. To do this, see the section "Displaying and Setting the Monitor Type" on page 150.
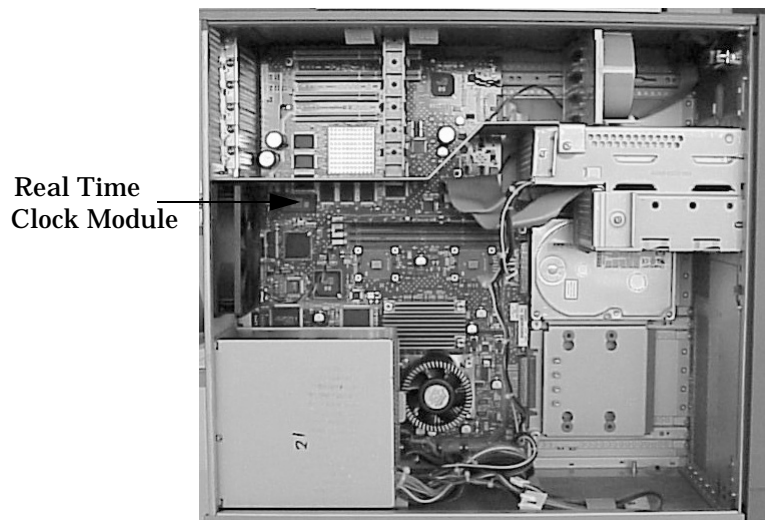

Battery

The battery in the B2000 workstation is contained within the real time clock module (Part Number 1826-4269) on the system board. The component reference designation for the real time clock module is U30 on the system board.

Perform the following steps to remove and replace the battery:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Locate the real time clock module, which has the component reference designation of U30 on the system board. As shown in Figure 4-38, the real time clock module is to the right of the system fan, just under the air flow guide.

Figure 4-38. Location of the Real Time Clock Module

Real Time
Clock Module

3. Carefully remove the defective real time clock module. Note the polarity dot which is silk-screened on the component side of the circuit board.

CAUTION   Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

---

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

---

4. Insert the new real time clock module (Part Number 1826-4269) on the system board with the correct polarity to ensure proper functionality.

5. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

Memory DIMMs

This section explains how to remove and replace (or install additional) memory DIMM cards in the B2000 workstation.
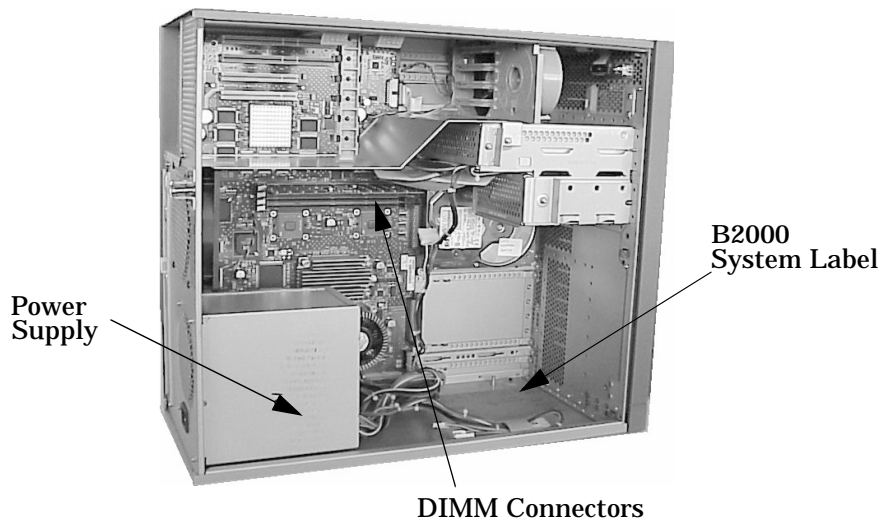
Removing Memory DIMMs

|	
WARNING	**Always unplug the workstation's power cord from the electrical outlet or power source before opening the workstation.**

Perform the following steps to remove memory DIMMs:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."
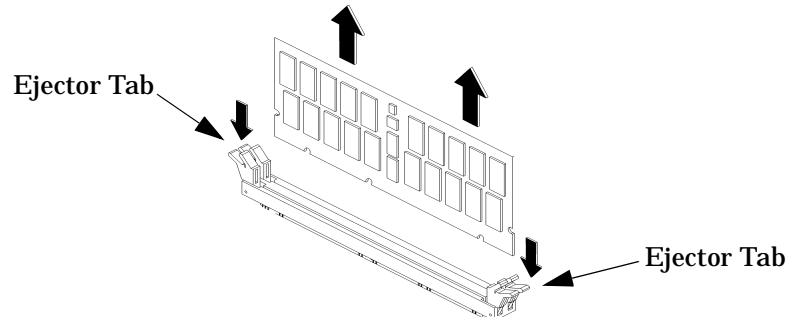
Figure 4-39. System Board View

Power Supply

B2000 System Label

DIMM Connectors

Figure 4-40. DIMM Connectors on the System Board

DIMM Connectors (4 Slots)
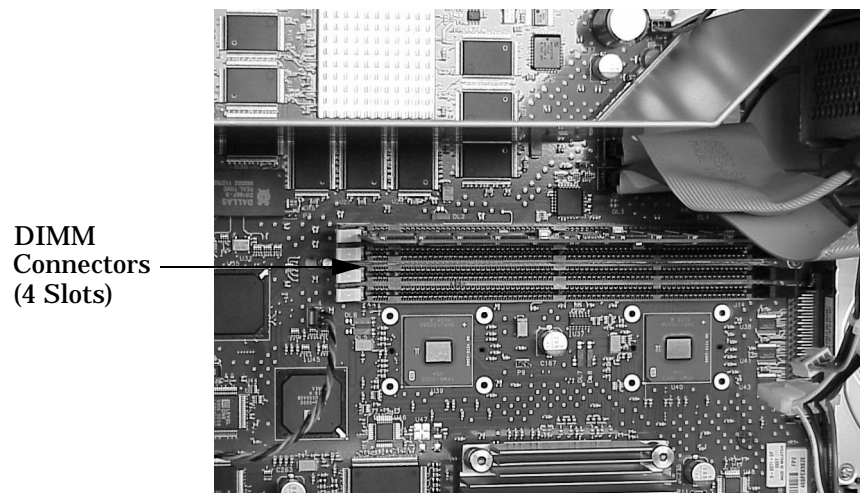
2. Press downward on the ejector tabs located on both sides of the DIMM connector. See Figure 4-41. This raises the DIMM card for easy extraction.

Figure 4-41. Removing Memory Cards

Ejector Tab

Ejector Tab

3. Lift up evenly on the outside edges of the DIMM card to remove it. See Figure 4-41.

4. Reinstall the remaining DIMM cards in the correct order by following the instructions in the next section, "Replacing or Installing Additional Memory DIMMs." Refer to Figure 4-43 or the B2000 system label located on the chassis floor for the proper loading sequence for the DIMM cards.

5. Close the left side panel of the workstation as explained in the section "Closing the Left Side Panel" and plug the workstation's power cord into the electrical outlet.

6. Verify that the reinstallation of the remaining DIMM cards was successful by following the steps in the section "Displaying the Current Memory Configuration" on page 156.

Replacing or Installing Additional Memory DIMMs

Before continuing with this section, carefully read the following list of considerations:

• Use the procedure described in "Displaying the Current Memory Configuration" on page 156 before attempting to install additional memory DIMMs in the workstation.

• Review the steps involved in installing DIMMs before you begin.

• Insert DIMMs in the order shown in Figure 4-43 or in the B2000 system label located on the floor of the workstation chassis.

• Note the proper orientation for DIMMs when inserting them into their connectors.

• Use the Boot Console Handler to verify that the system recognizes the additional DIMMs when you have finished installation.
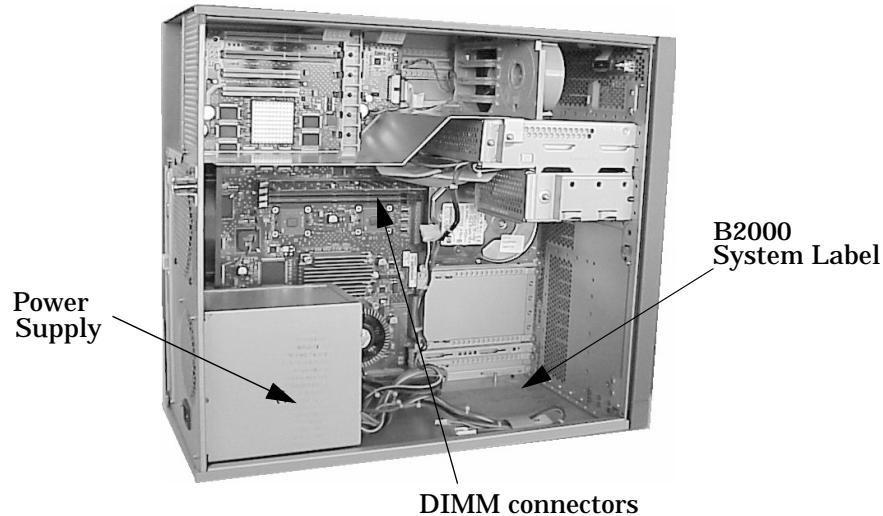
WARNING   **Power off the workstation and unplug the power cord before replacing or installing additional memory DIMMs.**

Perform the following steps to replace or install additional memory DIMMs:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

Figure 4-42. System Board View

Power Supply

B2000 System Label

DIMM connectors

2. Position the workstation so that the DIMM connectors on the system board face you, as shown in Figure 4-43. Note that Figure 4-43 also shows the loading sequence for the DIMM cards. This loading sequence must be maintained when you install the DIMM cards, but the size of the DIMM card put in each slot can vary. For example, you can install a 256 MB card before a 512 MB card, and then follow the installation of the 512 MB card with another 256 MB card. The B2000 workstation supports 128 MB, 256 MB, and 512 MB DIMM cards.

Figure 4-43. Memory Slot Numbers and Loading Sequence

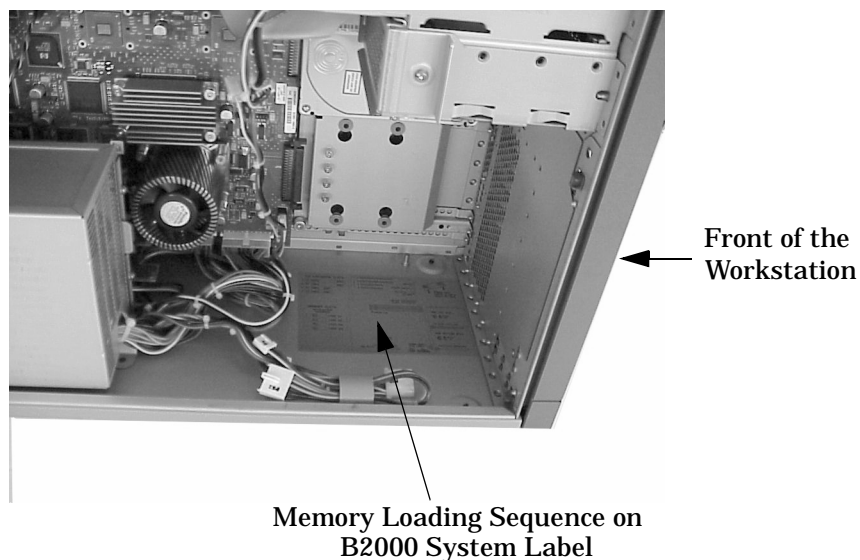| SL0 | Load 1st |
SL3	Load 4th
SL1	Load 2nd
SL2	Load 3rd

Memory Slots (4 Slots)
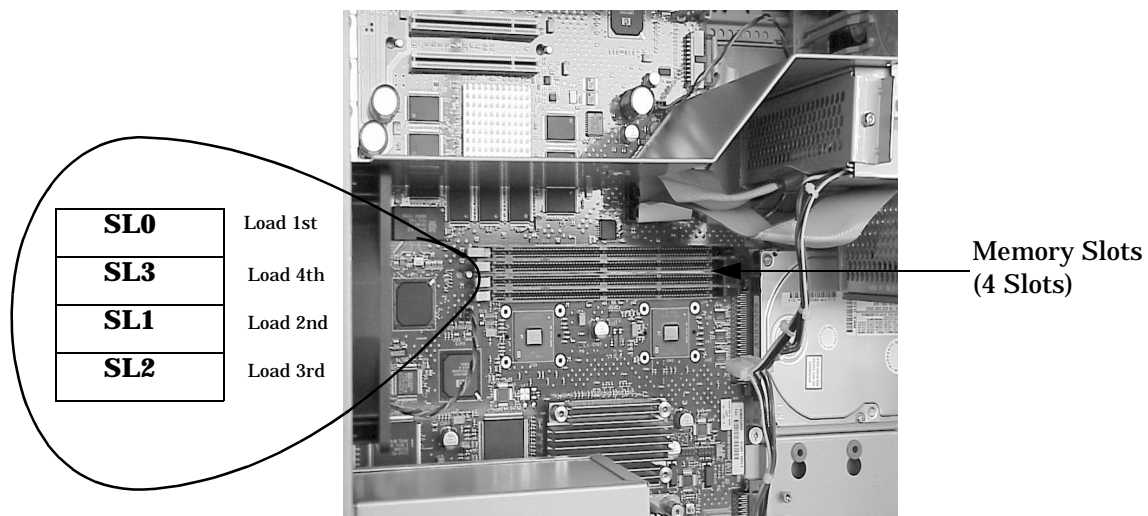
3. Load the DIMM cards in the memory slots using the loading sequence provided in Figure 4-43. Note that the B2000 system label located on the chassis floor also explains the loading sequence for DIMM cards. See Figure 4-44. Follow the steps in Figure 4-45 to install each DIMM card.
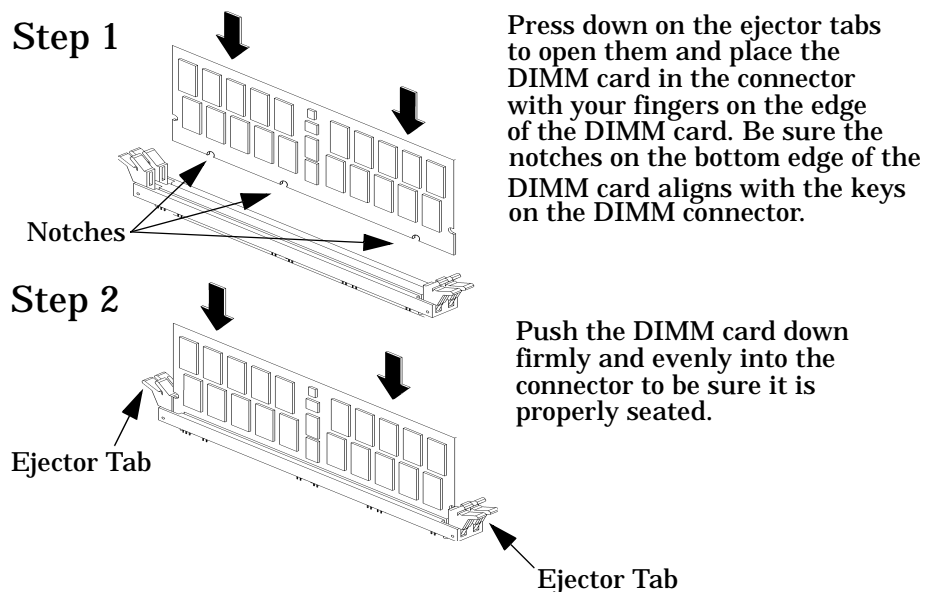

NOTE   When installing memory, you need to orient the notches on the bottom edge of the DIMM card so that they are aligned with the keys on the DIMM connector. See Figure 4-45. The keyed DIMM connectors prevent you from installing the DIMM cards backwards.

Figure 4-44. B2000 System Label

Front of the
Workstation

Memory Loading Sequence on
B2000 System Label

Figure 4-45. Installing a DIMM Card

Step 1

Notches

Press down on the ejector tabs to open them and place the DIMM card in the connector with your fingers on the edge of the DIMM card. Be sure the notches on the bottom edge of the DIMM card aligns with the keys on the DIMM connector.

Step 2

Ejector Tab

Push the DIMM card down firmly and evenly into the connector to be sure it is properly seated.

Ejector Tab

NOTE   The ejector tabs will return to the locked position when the DIMM card is
              fully seated in the connector.

4. Close the left side panel of the workstation as shown in the section "Closing the Left
   Side Panel" and plug the workstation's power cord into the electrical outlet.

5. Verify that this installation was successful by following the steps in the section
   "Displaying the Current Memory Configuration" on page 156.

Power Supply

This section explains how to remove and replace the power supply in the B2000 workstation.
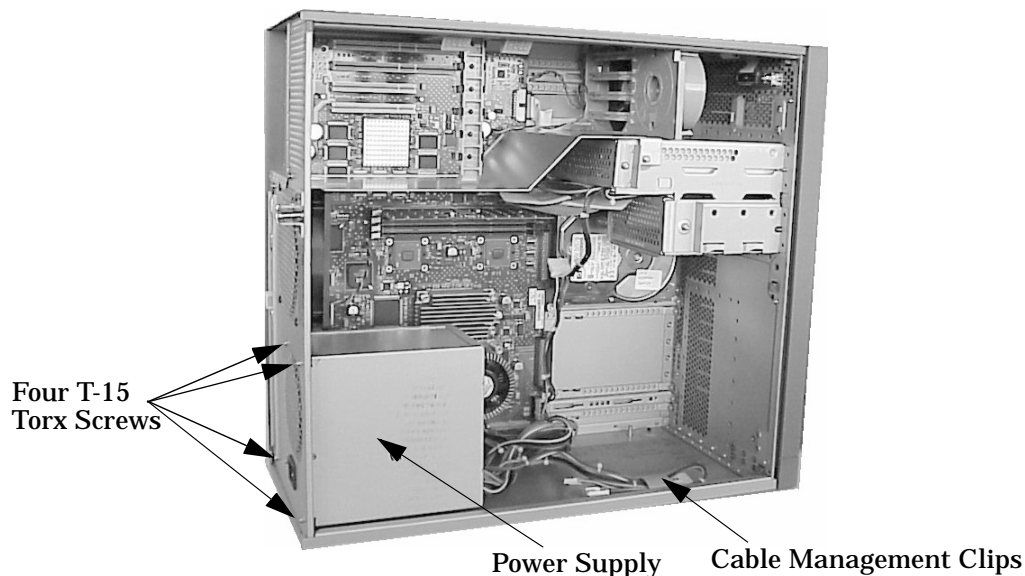
Removing the Power Supply

WARNING	To prevent injury, unplug the workstation's power cord from the electrical outlet before removing the power supply.

Perform the following steps to remove the power supply:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Unplug the three power supply cables from the system board.

3. Remove the rear cover of the CD drive bay and disconnect the power cable. To do this, see the section "Removing and Replacing a CD Drive" on page 91.

4. Remove the rear cover of the floppy disk drive bay and disconnect the power cable, if the optional floppy disk drive is installed. To do this, see the section "Removing a Floppy Disk Drive" on page 96.

5. Detach the bundled power cables from the cable management clips on the chassis floor. See Figure 4-46.

Figure 4-46. Screws Holding the Power Supply in Place

Four T-15 Torx Screws

Power Supply   Cable Management Clips

6. Remove the four T-15 Torx screws from the rear of the chassis that hold the power supply in place, as shown in Figure 4-46.

7. Slide the power supply towards the front of the workstation. You must disengage the hook on the bottom of the power supply from the support strap in the chassis floor. Then remove the power supply from the workstation chassis.

Replacing the Power Supply

WARNING **To prevent injury, unplug the workstation's power cord from the electrical outlet before replacing the power supply.**

Perform the following steps to replace the power supply:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Place the power supply on the floor of the workstation chassis. The power supply must be positioned such that its fan is pointing left toward the rear of the workstation, and its cabling is coming out of the bottom, right side of the power supply.

3. Slide the power supply towards the rear of the workstation. You must engage the hook on the bottom of the power supply into the support strap in the chassis floor.

4. Screw in the four T-15 Torx screws that hold the power supply in place into the rear of the chassis, as shown in Figure 4-46.

5. Reattach the bundled power cables in the cable management clips on the chassis floor. See Figure 4-46.

6. Connect the power cable to the rear of the floppy disk drive, if the optional floppy disk drive is installed. Then replace the cover of the floppy disk drive bay. To do this, see "Replacing or Installing a Floppy Disk Drive" on page 99.

7. Connect the power cable to the rear of the CD drive and then replace the cover of the floppy disk drive bay. To do this, see "Removing and Replacing a CD Drive" on page 91.

8. Plug the two power supply cables into the system board.

9. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

Voltage Regulator Modules

This section explains how to remove and replace the voltage regulator modules (master and slave), which are connected to the system board in the B2000 workstation.

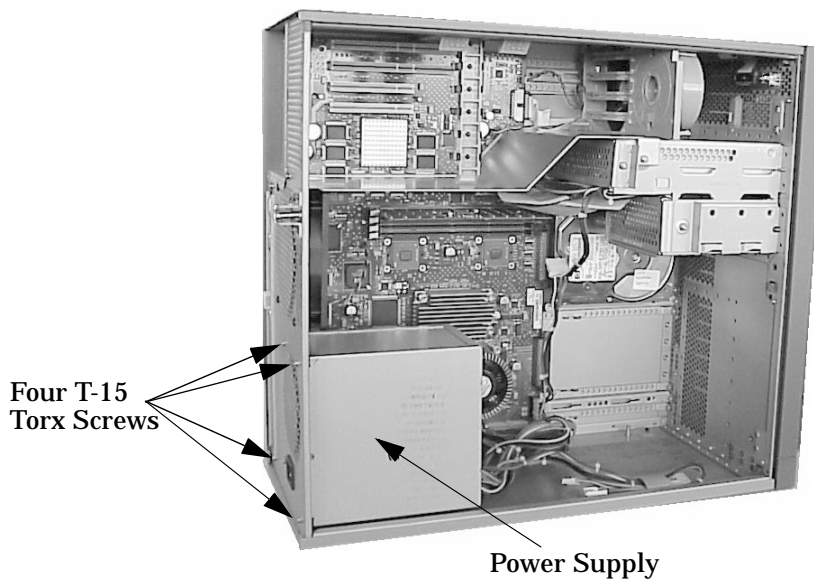### Removing a Voltage Regulator Module

---

WARNING **To prevent injury, unplug the workstation's power cord from the electrical outlet before removing the voltage regulator modules.**

Perform the following steps to remove a voltage regulator module:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Remove the four T-15 Torx screws from the rear of the chassis that hold the power supply in place, as shown in Figure 4-47.

**Figure 4-47. Screws Holding the Power Supply in Place**

Four T-15 Torx Screws

Power Supply

NOTE   The two voltage regulator modules are connected to the bottom of the system board, behind the power supply. So, in the next step, you must move the power supply to the right in order to access the voltage regulator modules. Note that you do *not* need to disconnect the power supply's cables from the system board, *nor* remove the power supply entirely from the workstation chassis in order to access the voltage regulator modules.

---

3. Slide the power supply to the right, towards the front of the workstation, until the hook on the bottom of the power supply disengages from the support strap in the chassis floor. (You do *not* need to disconnect the power supply's power cables from the system board, *nor* remove the power supply entirely from the workstation chassis.)

As shown in Figure 4-48, the top voltage regulator module is the master, and the bottom one nearest the chassis floor is the slave.

Figure 4-48. The Voltage Regulator Modules

Voltage Regulator
Modules:
Master (Top)
Slave (Bottom)
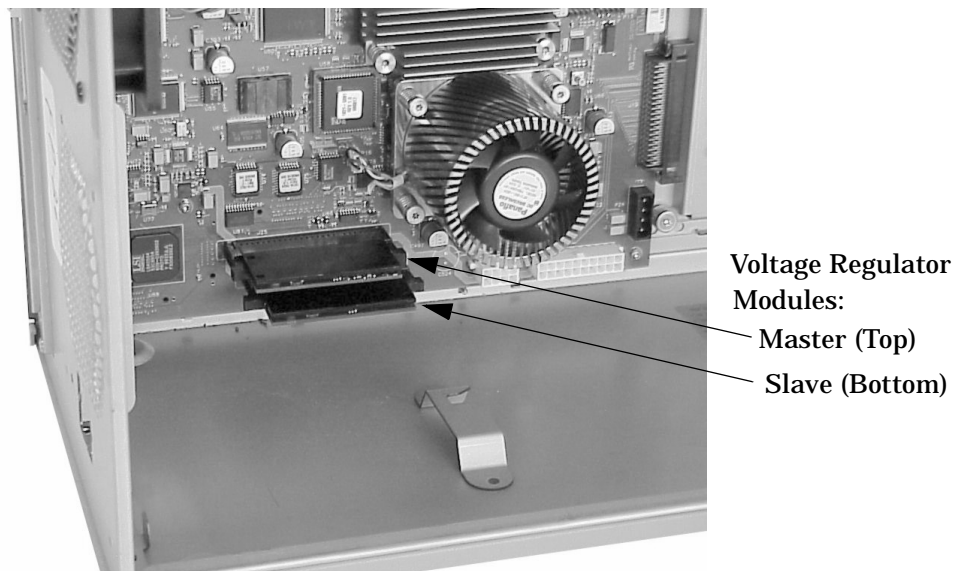
4. Press down on the ejector tabs located on each side of the voltage regulator module (master or slave) to release it from the system board connector.

5. Grasp the voltage regulator module (master or slave) firmly and pull outward to release it from the system board connector.

Replacing a Voltage Regulator Module

| WARNING | **To prevent injury, unplug the workstation's power cord from the electrical outlet before replacing a voltage regulator module.** |

Before replacing a voltage regulator module, ensure that it is the correct one (master or slave) for insertion into the correct connector on the system board. See Figure 4-49 to identify the two different voltage regulator modules (master and slave).

| NOTE | The master and the slave voltage regulator modules differ in the placement of the notch in their gold edge connectors, as shown in Figure 4-49. This notch fits the notch-key of the system board's connector into which each voltage regulator module (master or slave) fits. The notches and notch-keys prevent you from installing a voltage regulator module into the wrong connector. |

Refer to Figure 4-48 for the correct system board connector (the top connector for the master, or the bottom connector nearest the chassis floor for the slave) in which to insert the voltage regulator module you need to replace.

Figure 4-49. Master and Slave Voltage Regulator Modules
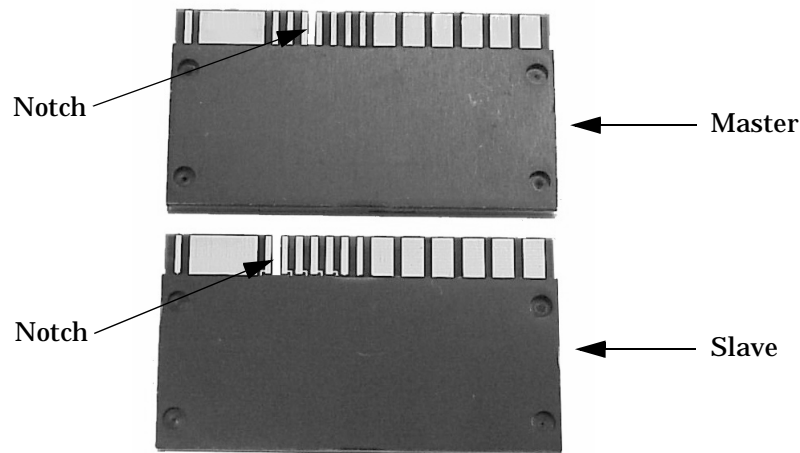
Perform the following steps to replace a voltage regulator module:

1. Press down on the ejector tabs on either side of the system board connector to open them. Be sure that you will be inserting the voltage regulator module into the correct system board connector (the top connector if it is a master voltage regulator module, or the bottom connector nearest the chassis floor if it is a slave).

2. Orient the notch on the gold edge of the voltage regulator module so that it aligns with the notch-key in the system board connector. Push the voltage regulator module into the correct system board connector (the top connector if it is a master voltage regulator module, or the bottom connector nearest the chassis floor if it is a slave) until the voltage regulator module is seated entirely in the connector.

NOTE   The ejector tabs will return to the locked position when the voltage regulator module is fully seated in the connector.

---

3. Slide the power supply towards the rear of the workstation. You must engage the hook on the bottom of the power supply into the support strap in the chassis floor.

4. Screw in the four T-15 Torx screws that hold the power supply in place into the rear of the chassis. See Figure 4-47.

5. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."
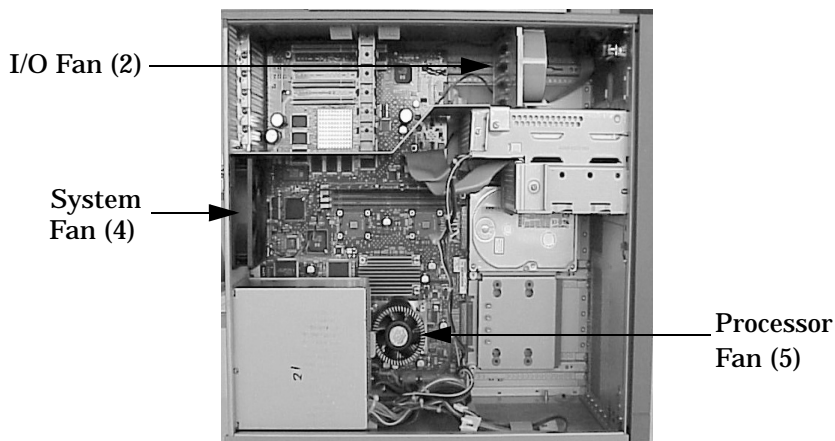
Fans

The B2000 has three fans, which are shown in Figure 4-50: I/O fan, system fan, and processor (turbocooler) fan. A chassis code in the workstation's LCD which indicates that a fan has failed (`FLT D01n`) or is running too slowly (`WRN D02n`) within a B2000 workstation specifies the fan number, *n*. Figure 4-50 notes the number (*n*) for each fan. For more information on identifying either a fan that has failed or one that is running too slowly, see "Fan Faults and Warnings" on page 48.

NOTE	The processor fan (5) is mounted to the processor substrate on the system board tray assembly. Thus, the processor fan itself is *not* replaceable. If the LCD indicates a processor fan failure (`FLT D015`), the entire system board tray assembly must be replaced. In this case, follow the procedures for removing and replacing the system board tray assembly starting on page 129.

Figure 4-50. Fan Locations

If either the I/O fan (2) or the system fan (4) fails, you will need to replace it to ensure no heat damage is caused to the workstation. To remove and replace the fan, see the following subsections for the I/O fan or the system fan, as appropriate.

Removing the I/O Fan

|	
NOTE	The speaker is contained within the same mounting bracket as the I/O fan. For instructions on how to remove and replace the speaker, see page 127.

Perform the following steps to remove the I/O fan:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Remove the PCI retainer clip and all I/O cards. See the section "Removing I/O Cards" on page 111.

3. Unscrew the two T-15 Torx screws that hold the workstation's air divider in place, as shown in Figure 4-51. Then grasp the edge of the air divider and pull it towards you to remove it from the workstation.

Figure 4-51. Removing the Air Divider

T-15 Torx
Screw

T-15 Torx
Screw

Air Divider
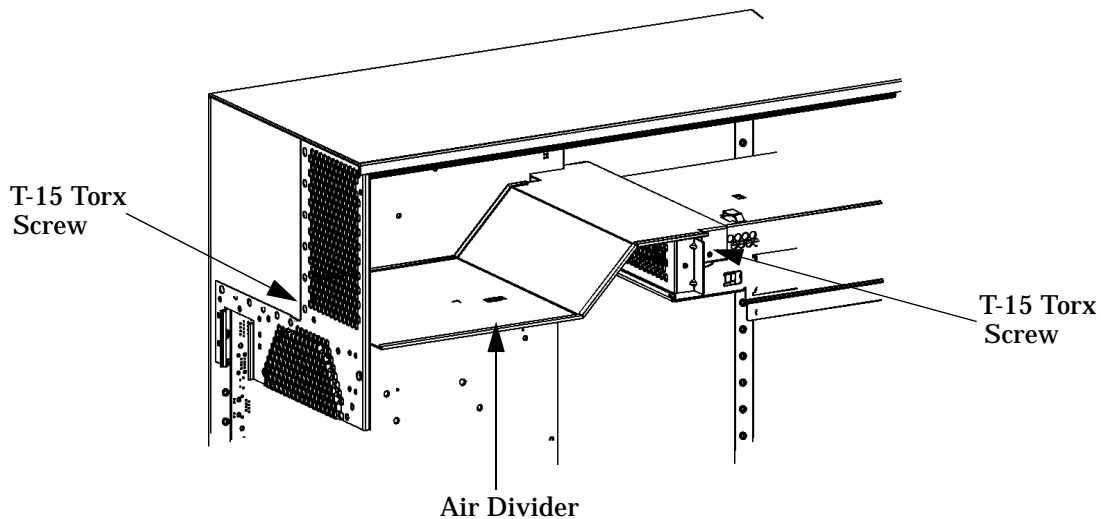
4. Disconnect the I/O fan and speaker cables from the system board.

5. Lift up on the fan/speaker mounting bracket tab from the hole in the drive bay housing. Then rotate the mounting bracket toward the chassis wall and rotate the fan/speaker mounting bracket out of the chassis.

6. Remove the I/O fan from the mounting bracket by slightly pulling the left and right fan mounting clips away from the fan, and then pulling the fan outward. See Figure 4-52.

Figure 4-52. Removing the I/O Fan from the Bracket

I/O Fan

I/O Fan/Speaker
Mounting Bracket

Fan
Mounting
Clip

Speaker

Fan
Mounting
Clip
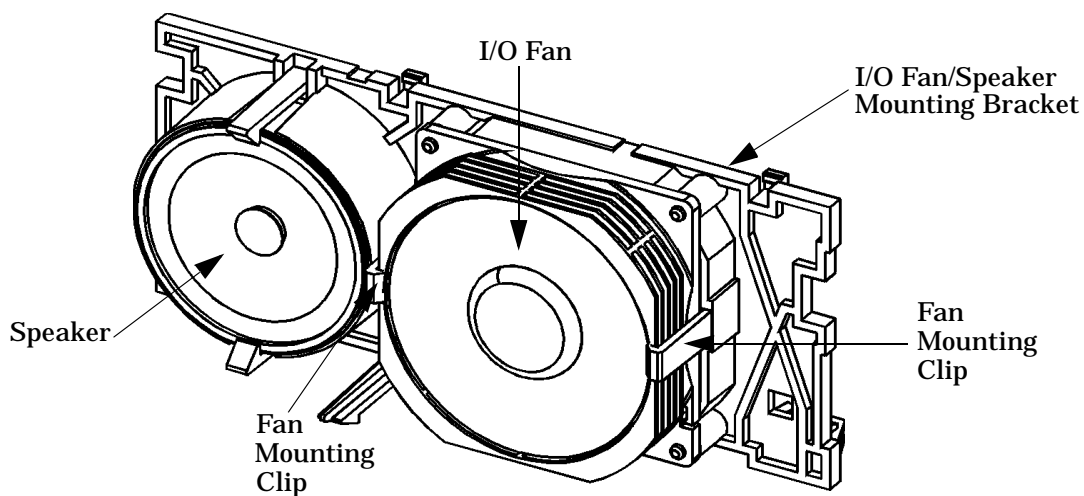
Replacing the I/O Fan

Perform the following steps to replace the I/O fan:

1. Install the I/O fan into the fan/speaker mounting bracket by pulling out on the left and right fan mounting clips, inserting the fan, and then releasing the fan mounting clips so that they hold the fan in place. See Figure 4-52.

2. Align the fan/speaker mounting bracket in the chassis, holding the fan and speaker cable to the card guide edge of the mounting bracket. Then rotate the fan/speaker mounting bracket into place while holding up on the retainer tab.

3. Connect the I/O fan and speaker cables to the system board.

4. Place the air divider within the chassis and screw in the two T-15 Torx screws that hold the air divider in place. See Figure 4-51.

5. Replace all I/O cards and the PCI retainer clip as explained in the section "Replacing or Installing I/O Cards" on page 112.

6. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

Removing the System Fan

Perform the following steps to remove the system fan:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Remove the four plastic pop rivets at the corners of the system fan to release the fan from the rear panel of the workstation chassis.

3. Disconnect the system fan's power cable from the system board and remove the fan.


Replacing the System Fan

Perform the following steps to replace the system fan:

1. Align the flow arrow on the system fan so that it is pointing toward the rear panel of the workstation chassis.

2. Position the fan flush with the rear panel of the workstation and insert the four plastic pop rivets to secure the fan to the rear panel.

3. Connect the system fan's power cable to the system board.

4. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

Speaker

This section explains how to remove and replace the speaker in the B2000 workstation. The speaker is contained in the mounting bracket with the I/O fan. See Figure 4-53.

Figure 4-53. Location of the Speaker
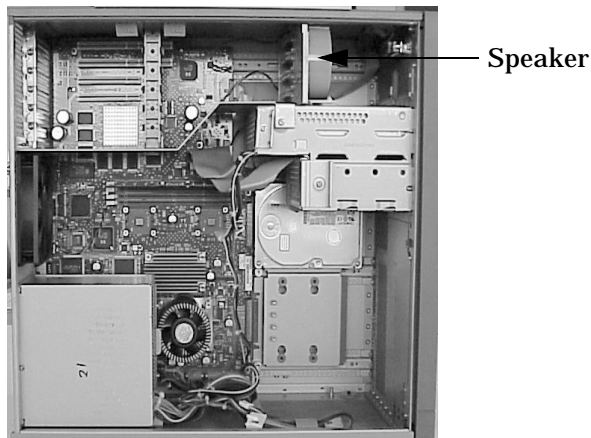
Removing the Speaker

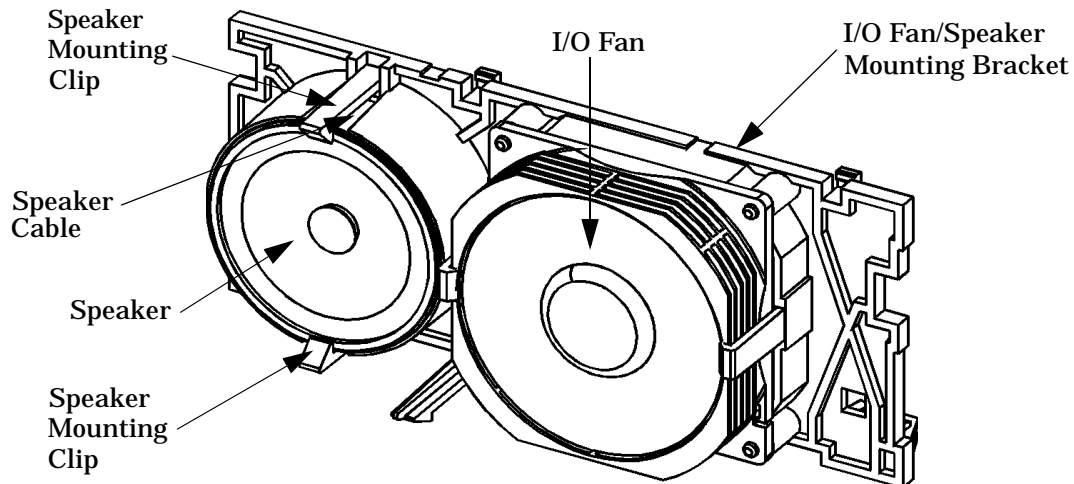Perform the following steps to remove the speaker:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Remove the PCI retainer clip and all I/O cards. See the section "Removing I/O Cards" on page 111.

3. Unscrew the two T-15 Torx screws that hold the workstation's air divider in place, as shown in Figure 4-54. Then grasp the edge of the air divider and pull it towards you to remove it from the workstation.

Figure 4-54. Removing the Air Divider
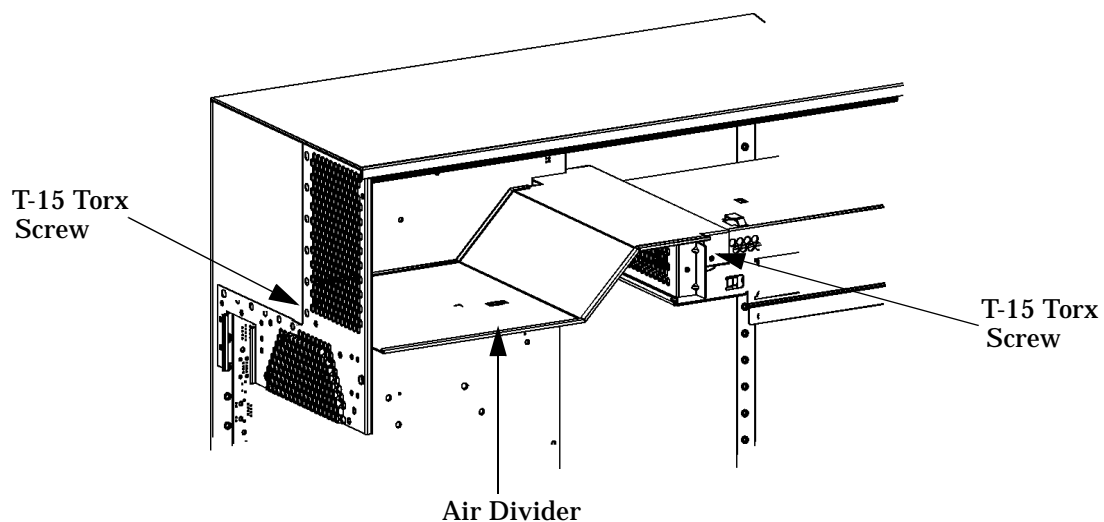
4. Disconnect the speaker and I/O fan cables from the system board.

5. Lift up on the fan/speaker mounting bracket tab from the hole in the drive bay housing. Then rotate the mounting bracket toward the chassis wall and rotate the fan/speaker mounting bracket out of the chassis.

6. Remove the speaker from the mounting bracket by inserting a finger through the access hole and pushing on the speaker until it pops free from the mounting clips on the fan/speaker mounting bracket. See Figure 4-55.

Figure 4-55. Removing the Speaker from the Mounting Bracket

7. Remove the speaker cable from the cable clips and slide the speaker cable out of the notched hole in the fan/speaker mounting bracket.

Replacing the Speaker

Perform the following steps to replace the speaker:

1. Position the speaker so that the speaker cable runs out of the hole in the rear of the I/O fan/speaker mounting bracket. Note that the speaker cable must be held in place on the backside of the mounting bracket by the speaker cable clips.

2. Pull outward on the speaker mounting clips and put the speaker in place. Then release the mounting clips so that they hold the speaker in the mounting bracket.

3. Align the fan/speaker mounting bracket in the chassis, holding the fan and speaker cable to the card guide edge of the mounting bracket. Then rotate the fan/speaker mounting bracket into place while holding up on the retainer tab.

4. Connect the speaker and I/O fan cables to the system board.

5. Place the air divider within the chassis and screw in the two T-15 Torx screws that hold the air divider in place. See Figure 4-54.

6. Replace all I/O cards and the PCI retainer clip as explained in the section "Replacing or Installing I/O Cards" on page 112.

7. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

System Board Tray Assembly

The system board contains the CPU, main memory, I/O section, and all of the circuitry and connections that control how the workstation's hardware and operating system interact with each other. If any of the components on the system board are defective, you must remove and replace the system board.

Because the system board in the B2000 workstation is mounted on a tray, the following procedures explain how to remove and replace the system board tray assembly as a complete unit.
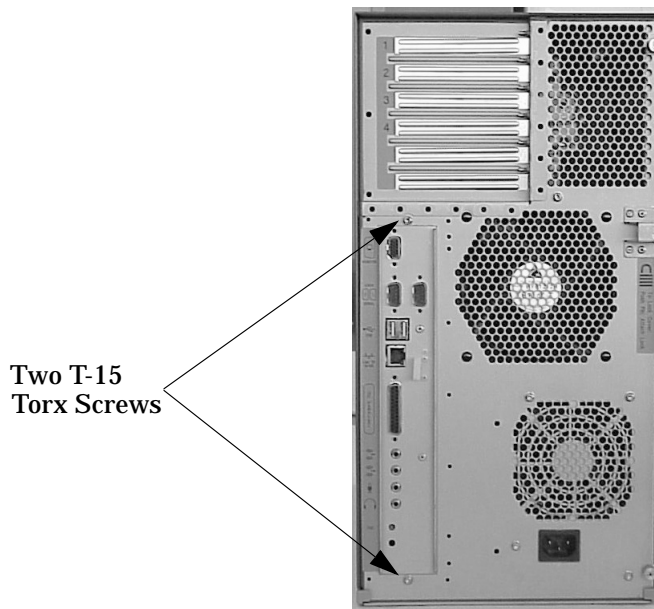
Removing the System Board Tray Assembly

Perform the following steps to remove the system board tray assembly:

1. Open the left side panel of the workstation as shown in the section "Opening the Left Side Panel."

2. Remove the following internal components from the workstation:

   a. Hard disk drive(s) and bracket(s), as shown in the section "Removing a Hard Disk Drive" on page 104.

   b. PCI retainer clip and all I/O cards, as shown in the section "Removing I/O Cards" on page 111.

   c. All memory DIMM cards, as shown in the section "Removing Memory DIMMs" on page 114.

   d. Power supply, as shown in the section "Removing the Power Supply" on page 119.

   e. Both the master and slave voltage regulator modules, as shown in the section "Removing a Voltage Regulator Module" on page 121.

   f. Air divider, as shown in Step 3 of the section "Removing the I/O Fan" on page 125.

3. Disconnect *all* cables from the system board, including the following:

   a. CD drive data and audio cables

   b. Floppy disk drive data cable

   c. I/O fan and speaker cables

   d. System fan cable

   e. LCD ribbon cable

4. Fold back all of the cables to avoid interference or damage when removing the system board tray assembly from the workstation chassis.

5. Remove the two T-15 Torx screws that secure the system board tray assembly to the rear panel of the workstation chassis. See Figure 4-56.

Figure 4-56. Screws Holding the System Board Tray Assembly in Place

Two T-15
Torx Screws

6. Grasp the system board tray assembly and slide the system board tray assembly toward the front of the workstation. The keyholes in the system board tray assembly are unlatched from the chassis wall hooks.

7. Tilt the system board tray assembly up, rotate it clockwise, and lift it out of the chassis.

Replacing the System Board Tray Assembly

Perform the following steps to replace the system board tray assembly:

1. Fold back all cables to avoid interference or damage when installing the system board tray assembly in the workstation chassis.

2. Angle the system board tray assembly diagonally as you begin to put it into the workstation chassis. Then position it flat inside the chassis, against the chassis wall.

3. Slide the system board tray assembly slightly to the front and then to the rear of the workstation to engage the chassis wall hooks into the keyholes.

4. Screw in the two T-15 Torx screws that secure the system board tray assembly to the rear panel of the workstation chassis. See Figure 4-56.

5. Connect all cables to the system board, including the following:

    a. CD drive data and audio cables

    b. Floppy disk drive data cable

    c. I/O fan and speaker cables

    d. System fan cable

    e. LCD ribbon cable

6. Replace the following internal components in the workstation:

    a. Hard disk drive(s) and bracket(s), as shown in the section "Replacing or Installing a Hard Disk Drive" on page 107.

    b. All I/O cards and the PCI retainer clip, as shown in the section "Replacing or Installing I/O Cards" on page 112.

    c. All memory DIMM cards, as shown in the section "Replacing or Installing Additional Memory DIMMs" on page 115.

    d. Both the master and slave voltage regulator modules, as shown in the section "Replacing a Voltage Regulator Module" on page 122.

    e. Power supply, as shown in the section "Replacing the Power Supply" on page 120.

    f. Air divider, as shown in Step 4 of the section "Replacing the I/O Fan" on page 126.

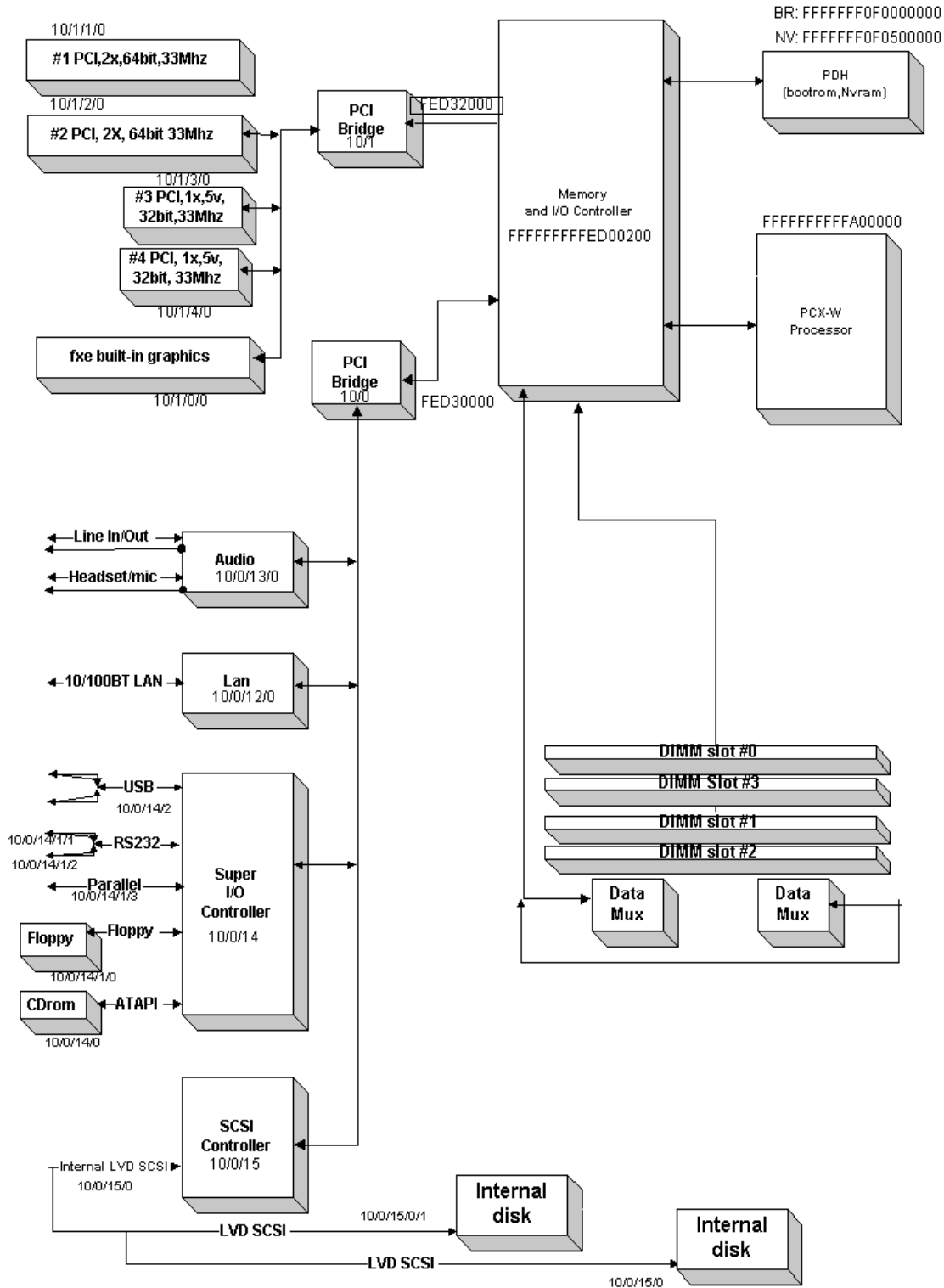7. Close the left side panel of the workstation as shown in the section "Closing the Left Side Panel."

5 Block Diagram

This chapter contains the functional block diagram of the HP VISUALIZE B2000 workstation.

Figure 5-1. Functional Block Diagram of the B2000 Workstation

6 Boot Console Handler

This chapter explains how to use the Boot Console Handler, which provides an interactive environment after the power-on sequence in the HP VISUALIZE B2000 workstation.

Chapter Overview

This chapter contains the following main sections:

- Boot Console Handler Features
- Accessing the Boot Console Handler
- Booting the Workstation
- Searching for Bootable Media
- Resetting the Workstation
- Displaying and Setting Paths
- Displaying and Setting the Monitor Type
- Displaying the Current Memory Configuration
- Displaying the Status of the I/O Slots
- Setting the Auto Boot and Auto Search Flags
- Displaying and Setting the Security Mode
- Displaying and Setting Fastboot Mode
- Displaying the LAN Station Address
- Displaying System Information
- Displaying PIM Information
- Stable Storage
- ISL Environment
- Obtaining and Updating System Firmware

Boot Console Handler Features

There are times when you want to interact directly with the hardware of the B2000 workstation before it boots the operating system. The B2000 workstation provides a menu-driven Boot Console Handler 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 the system
- Search for bootable media
- Reset the system
- Display and set boot paths
- Display and set the monitor type
- Display memory configuration information
- Display the status of the PCI slots
- Set Auto Boot, Auto Search, and Auto Start
- Set Fastboot
- Display LAN information
- Display system information

The Boot Console Handler menus follow, showing the various tasks you can perform and the available information. The shortened version of each command 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 for which you want help.

```
-------------- Main Menu --------------------------------------

        Command                     Description

        -----------                 -----------

        BOot [PRI|ALT|<path>]       Boot from specified path
        PAth [PRI|ALT|CON|KEY|[<path>] Display or modify a path
        SEArch [DIsplay|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>|<commands>]    Display help for menu or command
        RESET                       Restart the system

        -----
        Main Menu: Enter command >
```

```
------ Configuration Menu -----------------------------

Command                         Description
-------                         -----------

AUto [BOot|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
LanConfig                       Display or set LAN Configuration
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
PreviousPower [ON|OFF]          Set previous power state


BOot [<menu>|<command>]         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 >
```

```
      ------ 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
   MEmory                   Display memory information
   PRocessor                Display processor information
   SysConfig                Display the system configuration
   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 >
```

```
------ Service Menu ----------------------------------

Command                         Description
-------                         -----------


ChassisCodes[<proc>|ON|OFF      Display/enable/disable chassis codes
CLEARPIM                        Clear (zero) the contents of PIM
EepromRead [<addr>] {<len>}     Read EEPROM locations
MemRead <addr> [<len>] [<type>] Read memory locations
PCIDelay [<value>]              Display or set PCI delay value
PDT [CLEAR]                     Display or clear
                                the Page Deallocation Table
PIM [<proc> [HPMC|LPMC|TOC]]    Display PIM information
ScRoll [ON|OFF]                 Display or change scrolling ability


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 >
```

Accessing the Boot Console Handler

If the workstation has crashed or power was turned off for some reason, press the power switch and proceed to step 3. Otherwise, to access the Boot Console Handler, follow these steps:

NOTE   This procedure should be done by a system administrator or superuser with `root` login permissions.

---

1. Close any files and applications on the workstation.

2. Press the power switch on the front panel of the workstation.

NOTE   There is no need to login as `root` and execute the `shutdown -q` command to shut down the HP-UX operating system on the workstation before powering it off. When you turn off the power switch, the workstation automatically shuts down the operating system before terminating the power.

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

When the operating system has been properly shut down, the following message will appear:

```
Shutdown complete
```

3. Power on the workstation after the system has completely shut down.

If `auto boot` is turned off, the boot sequence automatically stops at the Boot Console Handler's Main Menu.

If `auto boot` is turned on, you will see the following message:

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

If `auto boot` **and** `auto search` **are both turned on, you will see the following message:**

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

NOTE   **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 Handler appears.

Booting the Workstation

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

For example, you may want to start the system from an operating system that is stored on a device that is different from the usual boot device. If the 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 CD drive.

Here are some possible booting scenarios you may encounter:

- 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 Handler" earlier in this chapter, 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 drive that is located at the hardware path `scsi.1.0`, you would type the following command at the prompt and press **Enter**:

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

- If you do not know which device or the hardware path for the device you want to boot from, then type the following at the prompt and press **Enter**:

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

  A message similar to the following will be displayed:

  ```
  Path Number   Device Path        Device Type

   -----------   ----------------   -----------

   P0            IDE                TEAC CD-532E-B
   P1            SCSI.6.0           SEAGATE ST39102LC
  ```

  At the prompt, you might type the following and press **Enter**:

  ```
  Main Menu: Enter command > boot P1
  ```

  Note that the operating system on the specified device (`P1`) is used to boot the system (also see the section "Searching for Bootable Media").

- If you wish to interact with the Initial System Loader (ISL) before booting the system, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt:

      Main Menu: Enter command > boot *device*

  The following prompt will appear:

      Interact with ISL (Y,N,Q)>

  Answering yes (`Y`) causes the ISL to be loaded from the specified device. After a short time, the following prompt appears on the 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 to interact with ISL, you must enter no (`N`).

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

      ISL> hpux /stand/vmunix.prev

- If you do not know which media in the file systems have bootable operating systems, you can find them with the `search ipl` command. See the next section, "Searching for Bootable Media."

Searching for Bootable Media

To list devices that contain bootable media, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

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

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

Ctrl S   Temporarily suspends the search.

Ctrl Q   Continues the search.

Any Other Key Stops the search.

These flow-control keystrokes 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 Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

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

where *device_type* is one of the following:

scsi   Is the built-in Ultra2 Wide LVD SCSI bus.

lan   Is all connections to the built-in LAN.

pci*n*   Is an optional plug-in device in PCI slot number *n*.

ide   Is the built-in IDE bus.

disk   Is all connections except LAN (for example, PCI cards, etc.)

Resetting the Workstation

To reset the system to its predefined values, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

```
Main Menu: Enter command> co
```

When the Configuration Menu appears, type the following at the prompt and press **Enter**:

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

When the Configuration Menu appears again, type the following at the prompt and press **Enter**:

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

Displaying and Setting Paths

A path is the hardware address of a device that is attached to the I/O system of the system. The `path` command sets the system paths shown in Table 6-1.

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

Table 6-1. System Paths

Path Type	Device
primary or pri	Default boot device (usually the root disk)
alternate or alt	Alternate boot device (usually a DDS-format tape device)
console or con	Primary display device
keyboard or key	Primary input ASCII device

To display the current settings for the system paths, type the following at the prompt and press **Enter**:

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

The paths are displayed in Mnemonic Style Notation, as shown in Table 6-2.

Table 6-2. Mnemonic Style Notation for Boot Paths

I/O Type	Specification Format
Built-in LVD SCSI	`scsi.scsi_address.logical_unit_number`
Plug-in device	`pcin.scsi_address.logical_unit_number`
Built-in LAN	`lan.server_address.init_timeout.io_timeout`
Built-in IDE	`ide`

To display the current setting for a particular system path, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

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

where *path_type* is one of the path types listed in Table 6-1.

For example, to get the path to the primary boot device, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

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

To set a system path to a new value, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

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

where *path_type* is one of the path types listed in Table 6-1 and *path* is the specification of the path in Mnemonic Style Notation (as described in Table 6-2). For example, to set the primary boot path to a SCSI disk with ID of 6.0, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter, and then type the following at the prompt and press **Enter**:

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

NOTE   The default B2000 paths are:

```
pri scsi.6.0

alt scsi.5.0
```

Displaying and Setting the Monitor Type

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

The Monitor Command

The `monitor` command lets you change the system's graphics configuration. This command is available in the Configuration Menu of the Boot Console Handler.

NOTE	The `monitor` command lets you change the system's graphics configuration before you replace a workstation's monitor. For information about changing the configuration after you replace a monitor, refer to "Changing the Monitor Type" in Chapter 4.

To display the current graphics and console information, type the following set of commands and press **Enter** at the prompt:

```
Main Menu: Enter command> configuration

Configuration Menu: Enter command> monitor
```

The correct usage for setting the graphics configuration is:

```
monitor graphics_path type
```

where valid *graphics_path* parameters are:

`graphics(0)`   Built-in (or core) graphics adapter (primary slot)

`graphics(1)`   Graphics adapter installed in slot 1 (secondary slot)

`graphics(2)`   Graphics adapter installed in slot 2

`graphics(3)`   Graphics adapter installed in slot 3

`graphics(4)`   Graphics adapter installed in slot 4

and *type* is the numerical monitor type. See "Setting the Monitor Type" in a subsequent section for a list of types. For example, an HP VISUALIZE-*fxe* graphics card (A4982A) installed in option slot 2 would be `graphics(2)`. Note that you can have `graphics(0)` through `graphics(4)` for the *graphics_path*.

Displaying the Current Monitor Configuration

To display the current monitor configuration for the system from the Configuration Menu of the Boot Console Handler, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter. Once you are in the Boot Console Handler Main Menu, type the following command and press **Enter**:

```
Main Menu: Enter command> configuration
```

This places you in the Configuration Menu. From here, type the following command at the prompt and press **Enter**:

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

The message on the display is a list of the current graphics adapters and their monitor types configured for the workstation.

```
MONITOR INFORMATION

Path        Slot Head  HPA     Resolution Freq Type Class
----------  ---  --- -------  ---------- ----  ---  ---
GRAPHICS(2)  2    1   fffa000000 1280x1024 75Hz  1    PCI

Configuration Menu: Enter command>
```

In this example, only the graphics adapter (located in slot 2) `GRAPHICS(2)` is configured. The monitor type for `GRAPHICS(2)` is set to type 1, which is a 1280×1024 monitor that uses a frequency of 75 Hz.

Setting the Monitor Type

You can set the monitor type for a graphics adapter by typing the following at the prompt and pressing **Enter**:

```
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 that are used by the graphics card, type the following command at the prompt and press **Enter**:

```
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    1024x768  75Hz VESA
GRAPHICS(0)  0    1    3    1600x1200 75Hz VESA
GRAPHICS(0)  0    1    4    1600x1200 75Hz VESA
```

To set the monitor type for `GRAPHICS(2)` to monitor type 1, type the following at the command prompt and press **Enter**:

```
Configuration Menu: Enter command> monitor graphics(2) 1
```

This will take effect on the next reboot or reset of the system.

```
MONITOR INFORMATION

Path        Slot Head  HPA     Resolution Freq Type Class
----------  ---  --- -------  ---------- ----  ---  ---
GRAPHICS(0)  0    1   fffa000000 1280x1024 75Hz  1    VESA

Configuration Menu: Enter command>
```

The Boot Console Handler displays a message that tells you that the new monitor selection will take effect the next time you reboot the system. The Boot Console Handler 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 with SAM

The System Administration Manager (SAM) allows you to change the monitor type after the HP-UX 10.20 operating system with the 9912 Additional Core Enhancements (ACE) software bundle (December 1999) have been installed on the workstation. This section provides a brief explanation on how to set the monitor type using SAM. Note that you will need to be logged in as `root` to run SAM.

Here are the steps for setting the monitor type with SAM:

1. Log in as `root`.

2. Move the mouse pointer to the **Application Manager** control for tools and click the left mouse button. Alternatively you can execute sam at a terminal window command prompt and skip to step 5.

3. Double-click on the **System_Admin** icon in the **Application Manager** window.

4. Double-click on the Sam icon in the **Application Manager** -- **System_Admin** window. If you are root, the **System Application Manager** (SAM) will appear on the screen.

5. Double-click on the **Display** icon.

6. Double-click on the **Monitor Configuration** icon in the **Display** window.

The **Monitor Configuration** window will have a monitor icon(s) in it that is/are associated with the graphics card(s) in the workstation's I/O card slot(s).

7. Click on the monitor icon in the **Monitor Configuration** window whose monitor type you want to set.

8. Select the action **Modify Monitor Type** from the **Actions** menu. You will see a window with a list of monitor type selections in it. Here is an example of a monitor type entry you may see:

```
Entry   Width   Height   Hz   Font    Description
  1      1280    1024     75   10x20      VESA
```

9. Select an entry from the list in the **Modify Monitor** window. In that same window, select the check box labeled **Make monitor type '*n*' the default** where *n* is the number of the entry you selected. To finish the monitor type selection, select the **Modify Monitor** window's **OK** button. A pop-up window will appear to confirm the monitor type selection. Press the **Yes** button in that pop-up window. This causes the monitor to reset, possibly hiding existing windows. You will then be given 15 seconds after the monitor type changes to configure this setting. Press the **OK** button to configure the setting. This completes the process for setting the monitor type. Note that this change takes effect immediately.

10. Connect the monitor cable to the graphics card you selected, and the screen contents will appear. You are now done selecting the monitor type.

Setting the Monitor Type at Power On

If you replace the workstation's monitor with a different monitor type, you need to let the workstation's firmware know you made this change. To do this, reboot the system and use either the automatic monitor selection process or the Boot Console Handler's `monitor` command. The monitor command is described in the section "Setting the Monitor Type" in this chapter. The automatic monitor selection process is described in this section.

Once you have rebooted the system by turning it off, wait for a short time for the hard disk drive's disk to stop spinning. Next, turn the workstation on and watch for the Num Lock light to come on.

NOTE   It takes a short amount of time (approximately 40 seconds) after powering on the workstation before the Num Lock light comes on.

Wait two seconds after the Num Lock light comes on, which is near the end of the boot sequence, then press **Tab** to initiate the automatic monitor selection process. If the screen remains blank after two minutes of waiting for something to be displayed, see the section "Troubleshooting Monitor Problems" in this chapter. Otherwise, if you see information similar to the following displayed on the screen and it is the correct monitor type, press the **Enter** key to select it.

```
Path        Slot  Head  Type     Size      Freq  Class
----------  ----  ----  ----  ------------  ----  -----
GRAPHICS(0)  0     1     n    nnnnxnnnn    nnHz   VESA

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

Note that if you do not select this monitor type, the system cycles through a limited number of monitor types one at a time until you find one that meets your needs.

Once you have made the monitor type selection, the system queries you to confirm the 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 did not 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**.

Troubleshooting Monitor Problems

In the event that the console stops displaying to the graphics device, use the following procedure to set the console for displaying to an external terminal.

Here are the steps to follow:

1. Turn off the workstation.

2. Disconnect the workstation's keyboard connector from the rear panel.

3. Connect a serial terminal emulator to the Serial 1 connector (the left serial connector) on the system rear panel. Configure the terminal for: 9600 baud, No Stop Bits, No Parity, 8 Bits.

4. Power on the system. The system will now display the console to the terminal connected to Serial 1 port. Note that you can use a 9-pin to 9-pin serial cable (HP F1044-80002) to connect an HP OmniBook serial port to the workstation.

5. Set the monitor type and path using the Boot Console Handler. For information on doing this see the section "Setting the Monitor Type with SAM."

Displaying the Current Memory Configuration

The following sample screen output uses the `memory` command to show a memory configuration table with properly-installed and configured memory.

To display the current memory configuration for the system, from the Information Menu of the Boot Console Handler, follow the directions in "Accessing the Boot Console Handler" earlier in this chapter. Once you are in the Boot Console Handler Main Menu, type the following at the prompt and press **Enter**:

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

This places you in the Information Menu. From here, type the following at the prompt and press **Enter**:

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

The screen displays status and configuration information for the memory DIMMs installed in the workstation. See the section "Memory Information Sample."

Memory Information Sample

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

```
MEMORY INFORMATION


  MEMORY STATUS TABLE

  Slot    Size     Status
  ----    ------   ------------
    0     256MB    Active
    1     256MB    Active
    2     128MB    Active

  TOTAL MEMORY = 640MB


  MEMORY FAULT TABLE

  Slot    Size     Status
  ----    ------   ------------


   Active, Installed Memory          : 640MB of SDRAM
   Deallocated Pages                 : 0 Pages
                                       -----------
   Available Memory                  : 640MB

   Good Memory Required by OS        :           0 (Not Initialized)

        Memory
   HVERSION  SVERSION
   -------- ----------
    0x0860   0x0900
```

Displaying the Status of the I/O Slots

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 Handler, type the following command at the prompt and press **Enter**:

```
Information Menu: Enter command> io
```

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

Setting the Auto Boot and Auto Search Flags

The `auto boot` and `auto search` flags are variables stored in the system's nonvolatile memory. (Nonvolatile memory retains its contents even after power is turned off.) If you reset these flags to new values, the change takes effect the next time you reboot the workstation.

The `auto boot` flag boots the operating system whenever the workstation is turned on.

If `auto boot` is set to on, the system automatically attempts to boot the operating system when turned on. If `auto boot` is set to off, the system enters the boot administration mode of the Boot Console Handler's user interface.

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

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

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

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

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

or

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

where *state* is on or off.

The `auto search` command searches for devices in the following order:

Primary boot path (can be set by the user)

Alternate boot path (can be set by the user)

PCI 1 through PCI 4 (plug-in interface cards)

Low-voltage differential SCSI (built-in)

LAN (built-in)

IDE (built-in)

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, auto boot and auto search are enabled and cannot be stopped. The system boots from the default boot paths regardless of user intervention.

Note that the `secure` command must be executed from within the Boot Console Handler. To get into the Boot Console Handler, follow the procedure in the section "Accessing the Boot Console Handler" earlier in this chapter. Once the Main Menu is present, you can type the following command at the prompt and press **Enter**:

```
Main Menu: Enter command > configuration
```

From the Configuration Menu, you can execute the `secure` command and preform the subsequent tasks in this section.

To display the current setting for the `secure` flag, type the following command at the prompt and press **Enter**:

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

To set the `secure` flag on, type the following command at the prompt and press **Enter**:

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

To set the `secure` flag off, you need to disconnect the boot disk to interrupt the boot-up sequence and force the prompt to the Boot Console Handler. Next, type the following command at the prompt and press **Enter**:

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

Displaying and Setting Fastboot Mode

When `fastboot` is enabled (set to on), the system does a quick check of the memory and skips I/O interface testing during its power-on self tests. This enables the system to complete its boot process quicker. The default factory setting is for `fastboot` to be enabled (set to on). Note that `fastboot` can be set using the Boot Console Handler's Configuration Menu.

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 the system, set `fastboot` to off and reboot the system. More extensive testing may reveal the error condition.

To display the status of `fastboot`, type the following at the prompt and press **Enter**:

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

To disable `fastboot`, type the following at the prompt and press **Enter**:

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

To enable `fastboot`, type the following at the prompt and press **Enter**:

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

Displaying the LAN Station Address

It is sometimes necessary to supply the LAN station address of the workstation to other users. For example, if the workstation is to become a member of a cluster, the cluster administrator needs to know the LAN station address in order to add the workstation to the cluster. Note that the LAN station address can be determined using the Boot Console Handler's Information Menu.

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

To display the workstation's LAN station addresses, type the following at the prompt and press **Enter**:

```
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 Address:        001083-000429
```

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 for the Information Menu, type the following at the prompt and press **Enter**:

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

This information is paged to allow you to view it as necessary unless the service `ScRoll` command has been used to disable scrolling.

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 and press **Enter**:

```
Service Menu: Enter command > pim processor_number fault_type
```

You can use `pim` in the following ways:

`pim` - No arguments for the pim command returns the HPMC information for processor **0**

`pim 0` - HPMC information on processor **0**

`pim 0 fault_type` - fault type information on processor **0**

where `fault_type` is `HPMC` (high priority machine check), `LPMC` (low priority machine check), or `TOC` (transfer of control).

Stable Storage

Stable storage is non-volatile memory associated with the PA-RISC processor module. Stable storage is used by the processor (CPU) to store:

- Device path information
- The state of the boot flags
- HPMC error information
- Operating system initialization data

ISL Environment

The ISL environment provides the means to load the operating system (HP-UX) environment. The ISL environment also provides an offline platform to execute optional diagnostic and utility programs from a boot device when HP-UX does not load.

The ISL program is the first program loaded into main memory from an external medium (LAN, disk, or tape) and launched by the initial program loader (IPL) routine from the Boot Administration environment.

The ISL environment provides the following capabilities:

- Execute user-entered commands to modify boot device paths and boot options in stable storage.

- Run offline diagnostic programs and utilities

- Provide automatic booting of the HP-UX operating system after power-on or reset

Invoking ISL from the Boot Console Handler

Perform the following steps to invoke ISL from the Boot Console Handler:

1. Follow the directions in "Accessing the Boot Console Handler" on page 142, and then type the following at the prompt and press **Enter**:

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

   You are prompted:

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

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

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

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

ISL User Commands

The following commands available in the ISL environment allow you to display and modify the boot characteristics of the system.

- `help` - lists ISL command menu and available utilities.

- `display` - displays the boot and console paths in Stable Storage and the current setting of the ISL Boot Flags.

- `primpath` - modifies the primary boot path entry in Stable Storage. The entry in Stable Storage for the primary boot device begins at byte address 0 and ends at 31.

- `altpath` - modifies the alternate boot path entry in Stable Storage. The entry for the alternate boot device begins at byte address 128 and ends at 159.

- `conspath` - modifies the console path entry in Stable Storage. The console device begins at byte address 96 and ends at byte address 127. The entry for the keyboard and mouse devices begins at byte address 160 and ends at 191.

- `listautofl` or `lsautofl` - lists the contents of the (HP-UX) autoboot file.

- `support` - boots the Support Tape from the boot device.

- `readss` - displays 4 bytes (one word) from Stable Storage. The `readss` command requires a decimal number between 0 and 255 to address four bytes in Stable Storage.

Obtaining and Updating System Firmware

To update a system's firmware, obtain the firmware patch from the patch server website at one of the following URLs:

`http://us-external_support.hp.com`

`http://europe-external_support.hp.com`

The patch file is a combined shar'ed file that contains an ASCII cataloging file, a `readme` type ASCII file, and the firmware LIF binary file. The LIF volume is bootable to ODE, which in turn runs the UPDATER utility to download the firmware image files.

To identify the current version of the firmware on the system to be updated, re-boot the system and do the following:

1. Interrupt the boot process and, from the Boot Console Handler prompt, type `<information>` and press **Enter**.

2. Identify the firmware revision. The last two digits in the patch name indicate the revision.

To install the firmware update, follow the directions in the `readme` file.

A new method to update the PA8500/8600 workstation system firmware is available January 2000 as an OS patch. The initial patch is `PHSS_19794` on HP-UX 10.20 ACE 9912 and `PHSS_20146` on HP-UX 11.00 containing revision 3.1 system firmware. It will be superceded with higher revision firmware patches as they are released. You can find the patches by searching for `firmware patch` on the OS patch site.

Perform the installation by using `swinstall` and following the installation process. This will cause a reboot to flash the firmware update and then another reboot to initialize the system hardware with the new firmware revision. This process has the advantage of starting the installation from the operating system, requires no special hardware such as a DAT tape, and requires no user intervention other than waiting for the two reboots.

A Product Specifications

This appendix lists the environmental and electrical specifications for the HP VISUALIZE B2000 workstation.

Environmental Specifications

Altitude

Non-operating (storage or shipping): 0-15,000 ft above sea level (0-4500 m)

DC Magnetic Field Interference

Operating: <1 Gauss at surface of product

Non-operating: <2 mGauss @ 7 feet

Electromagnetic Compatibility (EMC)

Emissions: FCC Class B, CISPR B

Immunity: EN61000-4-2: 1999 - 4KV contact discharge, 8KV air discharge (ESD)

EN61000-4-3: 1996 - 10V/m (radiated immunity)

EN61000-4-4: 1995 - 2kV signal lines, 4kV power lines (EFT)

Temperature

Operating: 5 to +35° C

Non-operating (shipping or storage): -40 to +70° C

Humidity (Non-condensing)

Operating: 15 to 80% RH

Non-operating: 0 to 90% RH (storage or shipping)

Leakage Current

Less than 3 milliamps

Shock

Operating: 20g at 3ms, 1/2 sine in normal axis with no hard errors

Non-operating (shipping): 80g at 3ms, 1/2 sine, normal axis

Vibration

Operating random: 0.21 Grms, 5-500 Hz

Swept sine survival (shipping): 0.5 G (0-peak), 5-500 Hz

Random survival (shipping): 2.09 Grms, 5-500 Hz

Electrical Specifications

Input Power

7.4 Amps RMS max @ 100V
6.2 Amps RMS max @ 120V
3.8 Amps RMS max @ 200V
3.2 Amps RMS max @ 230V

Line Power

AC Frequency: 48-66 Hz
AC Voltage: 90-264V
Maximum Power Input: 805 Watts
Maximum Current Load: 10 Amps

B Regulatory and Safety Statements

This appendix lists the regulatory and safety statements for the HP VISUALIZE B2000 workstation.

Appendix Overview

This appendix contains the following main sections:

- Declaration of Conformity
- Emissions Regulations
- Third-Party Emissions Regulations Compliance
- Special Regulatory and Safety Information
- Electrostatic Discharge (ESD) Precautions
- Warnings

Declaration of Conformity

according to ISO/IEC Guide 22 and EN 45014

Manufacturer: Hewlett-Packard Company
3404 East Harmony Road
Fort Collins, CO   80528
USA

Declares, that the:

    Product Name: HP VISUALIZE Workstation
    Model Numbers: B1000   / B2000/ C3000
    Base Product Number: A4985A /   A5983A/   A4986A
    Product Options: all

conforms to the following specifications:

Safety	IEC 950:1991+A1+A2+A3 +A41/ EN 60950:1992+A1+A2+A3+A4+A11
	IEC 60825-1:1993/EN60825-1:1994+A11 Class 1 for LED's
	USA 21CFR Subpart J - for FC Laser module
	China GB4943-1995
	Russia GOST R 50377-92
EMC	CISPR 11: 1997 / EN 55011: 1998 Class B
	CISPR 22: 1993+A1+A2 / EN 55022: 1994 +A1+A2 Class B
	EN 50082-1:1992

                Also compliant with...
                      IEC 1000-3-2: 1994 / EN 61000-3-2: 1998
                      IEC 1000-4-2: 1995+A1 / EN 61000-4-2: 1999 - 4kV CD, 8 kV AD
                      IEC 1000-4-3: 1995 / EN 61000-4-3: 1996 - 10 V/m
                      IEC 1000-4-4: 1995 / EN 61000-4-4: 1995 - 2 kV Signal, 4 kV Power Lines
        US FCC Part 15, Class B
        Japan VCCI Class B
        Australia/New Zealand AS/NZS 2046.1/2:1992, AS/NZS 3548:1995, and AS/NZS 4251.1:1994
        China GB9254-1988
        Taiwan CNS13438 Class A
        Russia GOST R 29216-94

and is certified by:

        UL Listed to UL1950, 2nd edition, File E146385
        cUL Listed to CSA 22.2 No.950-M93
        TUV Certified to EN60950 2nd edition with A1+A2+A3+A4+A11
        HP Fort Collins CCQD HTC

supplementary information:

The product herewith complies with the requirements of the following Directives and carries the CE marking accordingly:

- the EMC directive 89/336/EEC and 92/31/EEC and 93/68/EEC

- the Low Voltage Directive 73/23/EEC and 93/68/EEC

This product was tested in a typical Hewlett Packard workstation configuration.

Original signed by Ruth Lutes, Site Quality Manager   Fort Collins, CO, USA

For Compliance Information ONLY, contact:

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE Standards Europe, Herrenberger Straße 130, D-71034 Böblingen (FAX: +49-7031-14-3143)

Americas Contact: Hewlett-Packard, Fort Collins Site Quality Manager, mail stop 46, 3404 E. Harmony Rd., Ft. Collins, CO 80528, USA

Emissions Regulations

The HP VISUALIZE B2000 workstation is FCC Class B compliant. Note that if a video out cable is connected to your Video Out card, then your workstation is no longer FCC Class B compliant as stated in the subsequent section "Special Video Configuration Statement."

For FCC B Applications

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 should try to 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 workstation. 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.

EMI Class A RRL (Korea)

시용시 안내분 (A급 기기)

이 기기는 업무용으로 진자파장해긴정를 반은
기기이오니, 마약 잘못 구입하싰읈 때에는 구입
한 곳에서 비입무용으로 교환히시기 비립니다.

VCCI Class B ITE (Japan)

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

EMI Class A (Taiwan)

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

Special Video Configuration Statement

When a Video Out card has a cable connected to its video out connector, the HP VISUALIZE
B2000 workstation no longer meets FCC Class B regulations. The workstation now
becomes FCC Class A compliant. This statement applies only to those applications which
include a cable connected to the video out connector on a Video Out 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 Video Out connector.

Third-Party 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.

Special Regulatory and Safety Information

This section covers regulatory and safety information for acoustics, lasers, and LEDs.

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

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.

LEDs

The LEDs on this product are classified as "Class 1 LED PRODUCT" in accordance with EN 60825-1.

Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuits 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.

Warnings

WARNING:

Removing the device cover may expose sharp edges in the 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 Verietzungen zu vermeiden, seien Sie vorsichtig beim Einbau von zusätzlichen Bauteilen, die vom Kenden selber eingebaut werden können.

AVERTISSEMENT:

Des bords tranchants du châssis de l´équipement peuvent étre 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 the power plug from the wall outlet or power source before moving or removing a 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.

ADVERTISSEMENT:

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.

C Related Documentation

This appendix lists related documentation for the HP VISUALIZE B2000 workstation.

HP CE Training CD-ROM

- CE92-VIS_B2000 - *HP VISUALIZE B2000 Workstation, CE Training*

Service Manuals

- A5983-90039 - *Service Handbook, HP VISUALIZE B2000 UNIX Workstation* (this handbook)
- B2355-90040 - *System Administration Tasks Manual HP 9000 Series 700*
- B3782-90176 - *Support Media User's Manual*

User Manual

- A5983-90001 - *HP VISUALIZE B2000 Owner's Guide*

Glossary

A

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 (or prevents) 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 the active window.

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 A part of a command line or line of source code that identifies the file, directory, or other data to be used; a parameter.

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

B

back up v. To make a copy of one or more files on a tape or disk that can be stored separately from the original files.

backup n. A spare copy of one or more files on a tape or disk that can be used to restore data into its original location.

bitmap Generally speaking, an array of data bits that define a graphical image. Strictly speaking, a bitmap is a pixmap whose depth is one bit, capable of representing two-color (black-and-white) images.

boot Short for "bootstrap," from the phrase "pulling oneself up by one's bootstraps." Indicates the beginning of a process from the lowest possible level. A boot service is provided by a short program, stored in the boot ROM (read-only memory) of your workstation, that loads the operating system (or any complex program) into main memory. Partner workstations provide bootstrap service to

Glossary

diskless workstations. See also boot ROM.

Boot Console Handler The interactive firmware that enables you to interact with the hardware of your workstation before the workstation boots the operating system. The Boot Console Handler 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 loading and starting the operating system, and modifying the configuration or changing the booting behavior.

bootstrap service   *See boot.*

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

C

CD-RAM Compact Disk Random-Access Memory.   *See also CD-RAM disk, CD-RAM drive.*

CD-RAM disk CD-RAM disks are identical to the audio compact disks (CDs) used to record stereo music, except computer data is

read from and written to these disks. CD-RAM disks are 120 mm (4.7 inches) in diameter, use one data surface, and have a capacity of about 650 MB. The data surface contains pits and flat spots arranged in a continuous spiral track, which is read at a constant linear speed.

CD-RAM drive A random-access, read/write, mass-storage device that uses removable CD-RAM disks. The drive contains a semiconductor laser for reading and writing data optically and an embedded controller.

CD-ROM Compact Disk Read-Only Memory.   *See also CD-ROM disk, CD-ROM drive.*

CD-ROM disk CD-ROM disks are identical to the audio compact disks (CDs) used to record stereo music, except that they store computer data. CD-ROM disks are 120 mm (4.7 inches) in diameter, use one data surface, and have a capacity of about 650 MB. The data surface contains pits and flat spots arranged in a continuous spiral track, which is read at a constant linear speed.

Glossary

CD-ROM drive A random-access, read-only, mass-storage device that uses removable CD-ROM disks. The drive contains a semiconductor laser for reading data optically and an embedded controller.

Central Processing Unit (CPU)

The part of a workstation that interprets and executes instructions; the "brain."

child directory *See subdirectory.*

click To press and immediately release a mouse button. The term comes from the fact that pressing and releasing most mouse buttons makes a clicking sound. Compare drag and drop.

cluster A group of workstations connected via a Local Area Network (LAN). One workstation, the cluster server, acts 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, acts as a file server to the other machines in 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.*

cold install A process that requires the booting of an install kernel from an install server over a network or from a CD-ROM and answering some configuration questions.

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 (often a file or directory) to be operated on by the command.

Glossary

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 commands or 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, or mode in which to operate. *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.

console The tty (terminal) the system was booted from. The console is associated with the monitor where all system messages are displayed. The system administrator sends messages to other system users from this tty.

control key sequence A keystroke combination used as a shorthand way of specifying commands. To enter a control key sequence, hold down the "Ctrl" key while pressing another key.

cpu *See Central Processing Unit.*

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 from which a relative-pathname 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, usually blinking, box or underline displayed in whatever screen or window is active at any particular time. The cursor marks your current typing position on the screen and indicates which program (HP CDE terminal window or shell) will receive your typed commands.

Glossary

D

daisy-chaining A method of connecting devices in which 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 CDE screen that contains controls and settings, and with which the user can carry on an interactive "dialog" in the process of setting whatever parameters the dialog box requests. To display an example of a dialog box, click the Style Manager button on the Workspace Manager's front panel, then click on Color.

DIMM *See Dual In-line Memory Module.*

Dual In-line Memory Module A memory board whose connectors

on each side of the board are connected to different chips. This allows for a wider data path as more modules can be accessed at the same time.

directory A special type of "container" 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 or optical surface coating on which data is stored by magnetic or optical means. See also floppy diskette, hard disk, CD-ROM disk.

disked workstation A workstation that has its own hard disk drive.

diskette *See floppy diskette.*

double-click To press and release a mouse button twice in rapid succession. The amount of time that discriminates between a double click and two single clicks is usually user-configurable. Double clicking usually invokes a different, but related, function than single clicking.

Glossary

drag To move the mouse (and hence the pointer on the screen) while holding down one or more of its buttons. This process specifies two separate locations on the screen for those operations that require two: the location when the mouse button is pressed, and the location when it is released. This is used, for example, to initiate a file-copy by pressing the mouse button on the file to be copied, dragging the file's icon to the destination window, and releasing the mouse button there. Another common using of dragging is to specify the upper-left and lower-right corners of a new window or similar rectangle *See also drop.*

drive *See CD-ROM drive, DDS tape drive, floppy drive, hard disk drive*

drop To release the mouse button after having moved the mouse with its button held down, in order to position an icon or other object that has been "dragged" to a new position *See also drag.*

E

EEPROM Electronically erasable read-only memory. Usually bytes or words can be erased and reprogrammed individually during system operations. The EEPROM is used for storing configuration information that will be "remembered" after a reboot and AC power loss.

environment The conditions in which your commands or programs 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, and HOME) that define the conditions in which, or values with which, your commands are executed. These conditions and values 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.

Glossary

F

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 CDE 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 primary 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 via a LAN in order to use the file server to access data.

file system The hierarchically organized set of files and directories on a hard disk.

firmware The control software that is embedded in ROM and is always resident regardless of 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, flexible, disk-shaped sheet of plastic that magnetically stores data on its coated surfaces. Floppies are contained within stiff plastic "envelopes" to protect them from dust, fingerprints, and abrasion. The floppy drive 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 floppy diskette.

H

hard disk A type of disk that is rigid—often aluminum—as opposed to a thin plastic diskette, which is flexible.

hard disk drive A device that stores data on a hard disk. The hard disk can be a permanent part of the drive and thus be unremovable, or it can be removable. If it is removable, it is contained in a protective cover that

Glossary

is opened by the drive when access is needed.

Help Manager The HP CDE application that provides online help.

$HOME The environment variable that contains the name of a user's home directory. This is the directory in which you are placed upon logging in. Typically, this is /home/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 A computer that offers one or more services; may be local or remote (accessible via a network) *See also cluster server.*

host name *See internet protocol address.*

HP CDE *See HP Common Desktop Environment.*

HP Common Desktop 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-UX This is Hewlett-Packard's version of the UNIX® operating system.

HP-UX cluster *See cluster node, cluster server.*

I

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.*

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.

Glossary

input device Any of several pieces of hardware equipment used to give information to a system. Examples include 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.

Instant Ignition When the user's computer is turned on and it automatically boots up and is ready for use. Instant Ignition is the result of the computer's operating system being preloaded at the factory.

install server This is a networked computer from which file sets and operating systems can be installed.

internet protocol address (IP address) A string of characters, in the format nnn.nnn.nnn.nnn, that uniquely identifies a workstation in a network. The nnn in the format specifier above is a one- to three-digit decimal integer between 0 and 255, inclusive, in which leading zeroes are optional. The internet protocol address is also referred to as the "IP address."

invisible filename A filename in which the first character is a period (.). Invisible filenames are not displayed by the listing commands such as ls and ll without additional options, such as -a.

IP address *See internet protocol address.*

ISL *See Initial System Loader.*

K-L

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.

link v. To establish a relationship between two objects such that one of the objects contains only the information required to associate it

with the other, "real," object.

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. This 48-bit number is preassigned by HP on their computers and it must never be changed.

log in v. 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 n. A session. Or, a string of characters that uniquely identifies a user of the system   *See also session, user account, and 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 CDE 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.

M

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 CDE, a push-button on the window frame that turns a screen into an icon. *See also icon, iconize.*

monitor type A monitor path name (graphics(1) through graphics(6)) that is associated with a particular resolution and refresh frequency at which you want your monitor to operate. The monitor type is selected using the Boot Console Interface. See Chapter 6.

mouse pointer   *See pointer.*

Glossary

N

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 computer that is on a network. Each node in the network can use the data, programs, and devices of other network nodes, assuming permissions are set up properly. 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.

O

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 computer and storing them, or making them perceptible by humans. Disks and tapes, computer monitors, printers, plotters are examples of output devices   *See also input device.*

output window The window that displays a process response to your command.

P

parent directory A directory that contains other directories, each of which is then called a subdirectory   *See also subdirectory.*

password The secret word you enter next to the password prompt at login time to permit only authorized access. Keep your password secret and change it occasionally in order to protect your account from unauthorized use   *See also user account.*

path The hardware address of a device that is attached to the I/O system of your workstation.

pathname A slash/separated series of zero or more directory names followed by a filename, that together describe the path within the file system from some starting point to a destination object. Pathnames (other than the degenerate empty case) 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 and how.

PID Process Identifier. Also referred to as a process ID   *See also process ID.*

PIM Processor Internal Memory. The pim command is a command used by the Boot Console Interface for determining specific system faults.   *See also processor internal memory.*

pointer Sometimes called the "mouse pointer," the pointer's location on the display corresponds to the mouse's location. The pointer's shape often depends on the object its hot-spot covers (this is used as a visual feedback mechanism from a program to the user). In the HP CDE Workspace, the default pointer is an X; on a window frame, it is either a simple arrow, or an arrow with one or more straight lines touching it (to indicate any of the eight window-resizing regions).

Glossary

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.

processor internal memory A storage area in a processor (for example, EEPROM) that is set at the time of a high-priority machine check (HPMC), low-priority machine check, soft boot or TOC, and is composed of the architected state save error parameters, and hardware version-dependent regions.

program A unit of executable code, in source-code or binary form. Most HP-UX commands and routines consist of programs.

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 start an

action or set a state.

R-S

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.*

SCSI ID The address of a peripheral device connected to a SCSI bus.

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 programs. Some examples of HP-UX shells are the Bourne, Korn, Key, and C shells. Sometimes referred to as a

Glossary

"command interpreter." *See also command interpreter.*

shell command An instruction you 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.

slider One of the components of a scroll bar. The slider is the object that is dragged along the scroll area to cause the window's contents to move, exposing previously hidden content.

Small Computer System Interface (SCSI) An IEEE standard for interfacing a computer to multiple, disparate high-speed peripherals such as a disk drive, a CD-ROM drive, or a scanner, etc., singly or in combination *See also Ultra2 Wide Low-Voltage Differential SCSI.*

SPA Soft Physical Address. *See also soft physical address.*

soft physical address This is a location in system memory associated with the DIMM cards.

standalone A workstation that is not part of a cluster *See also cluster.*

Style Manager The HP CDE application that provides the ability to customize various user-interface aspects of your system, including colors, fonts, keyboard and mouse attributes, session start-up 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." A subdirectory is also referred to as a "child directory *See also parent directory.*

superuser A user with permission to enter any directory and make changes to files and programs that typical users are not allowed to change. To "become superuser" or "become root" means to let the system know that you are now

Glossary

assuming the role of system administrator. You can do this either by logging into the system as user root, or by typing su (switch user) 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.*

T-U

terminal window A terminal window is a type of HP CDE window that emulates a complete display terminal. Terminal windows are typically used to fool window-dumb 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 Common Desktop Environment.*

title bar The rectangular area, between the top of the window and the window frame, that contains the title of the window object.

TOC *See transfer of control.*

transceiver A device that transmits and receives signals.

transfer of control Saves the state of the processor in Processor Internal Memory (PIM) and pending I/O operations are not disturbed.

Ultra2 Wide Low-Voltage Differential SCSI A 16-bit-wide bus with low-power receivers and drivers, which allows a cable length of up to 12 meters and a data transfer rate of up to 80 MB per second *See also Small Computer System Interface.*

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 is authorized to 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.*

W

window A rectangular area of the screen for viewing information. HP CDE 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, display graphical images, etc.   *See also Workspace Manager.*

Window Manager The HP CDE 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 CDE. 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 top of" the workspace   *See also HP Common Desktop Environment, terminal window.*

Workspace Manager The program that controls the size, placement, and operation of windows on the HP CDE Workspace. The Workspace Manager is a special Window Manager   *See also Window Manager.*

Glossary

workstation A compact, graphics-oriented computer having high speed and high memory capacity. A workstation usually includes a keyboard, a monitor, and a system unit. *See also node, disked workstation, diskless workstation.*

Index

Index

Index

Index

Index

supported, 17
supported, list of, 27
troubleshooting, 155
type selection, 40
Mouse, USB, 28

N

Networking
  LAN connector, 24
  standard supported, 16
Non-exchange FRUs, list of, 84

O

ODE diagnostics, 79
Offline Diagnostic Environment (ODE), 79
Operating system, HP-UX
  overview, 16, 29
  troubleshooting flowchart, 46

P

Panel
  front, 87
  left side, 88
Parallel (IEEE 1284) port, 17
Parallel connector, 24
path command, 148
Paths, displaying or setting, 148
PCI slots, 17
PIM information, displaying, 162
Power cord connector, 27
Power on LCD troubleshooting flowchart, 43
Power specifications, 169
Power supply, removal and replacement of, 119
Power switch
  description of, 19
  removal and replacement, 90

Processor fan
  removal and replacement, 124
  troubleshooting, 48
Product description, 16
Product specifications, 167

R

Real time clock module, removal and
    replacement of, 113
Rear panel
  components, 22
  I/O slots, 23
  security loop, 26
  TOC button, 25
Rear panel connectors
  audio, 25
  LAN, 24
  list of, 22
  locations of, 22
  monitor, 23
  parallel, 24
  power cord, 27
  serial, 23
  USB, 24
Reference documentation, 179
Regulations, emissions, 174
Regulatory and safety information, special, 176
Regulatory statements, 171
Removal and replacement, FRU, 86
reset command, 147
Resetting the workstation, 147
RRL, Korea, 175

Index