HP VISUALIZE J Class Owner's Guide

HP VISUALIZE Workstation

Manufacturing Part Number: A5991-90000
Edition E1299

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Preface

This owner's guide describes how to use your HP VISUALIZE J5xxx or J7xxx computer.

This manual assumes that you have installed your computer as described in the HP VISUALIZE J5 Class and J7 Class Installation Card.

Audience

This guide is intended for HP VISUALIZE J5 Class and J7 Class computer users.

Safety and Regulatory Statements

See Appendix A , “Safety and Regulatory Statements,” on page 177 for the safety and regulatory statements that apply to the HP VISUALIZE J5 Class and J7 Class computer.

Installation Notice

Products designated in the applicable Hewlett-Packard price list as customer-installable can be installed by computer-knowledgeable customers who carefully read and follow the instructions provided. Customers who elect to have the product installed by our field personnel are charged the applicable field installation charge, as covered under the standard terms and conditions. For more information, please contact your local sales representative.

Related Manuals

For more information, refer to one of the following documents:

- *HP VISUALIZE J5 Class and J7 Class Site Prep Guide*
- *HP VISUALIZE J5 Class and J7 Class Installation Card*
- *Using HP-UX*
- *HP CDE Getting Started Guide and User's Guide*
- *Managing Systems and Workgroups*
- *HP-UX System Administration Tasks*

Note that most of the documents listed above can be viewed with a web browser using this URL:

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

Revision History

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

Edition	Revision History
E0299	First Printing

Problems, Questions, and Suggestions

If you have any problems or questions with our hardware, software, or documentation, please contact either your HP Response Center or your local HP representative.

Documentation Conventions

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

Table 1 Documentation Conventions

user-supplied values	Italic words or characters in syntax and command descriptions represent "conceptual variables"—whose values are indicated by the current context and which you must supply. Italics are also used in text for emphasis.
`screen display`	Information that the system displays, commands that you must use literally, and path names appear in this typeface.
Enter	Keycaps are presented with a special keycap font as shown in the left column. (In this document, we refer to the **Enter** key. On your keyboard, the key may be labeled either **Enter** or **Return**.)

Electrostatic Discharge (ESD) Precautions

Electrostatic discharges (static electricity) can damage the integrated circuits on printed circuit boards and other internal devices. 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.

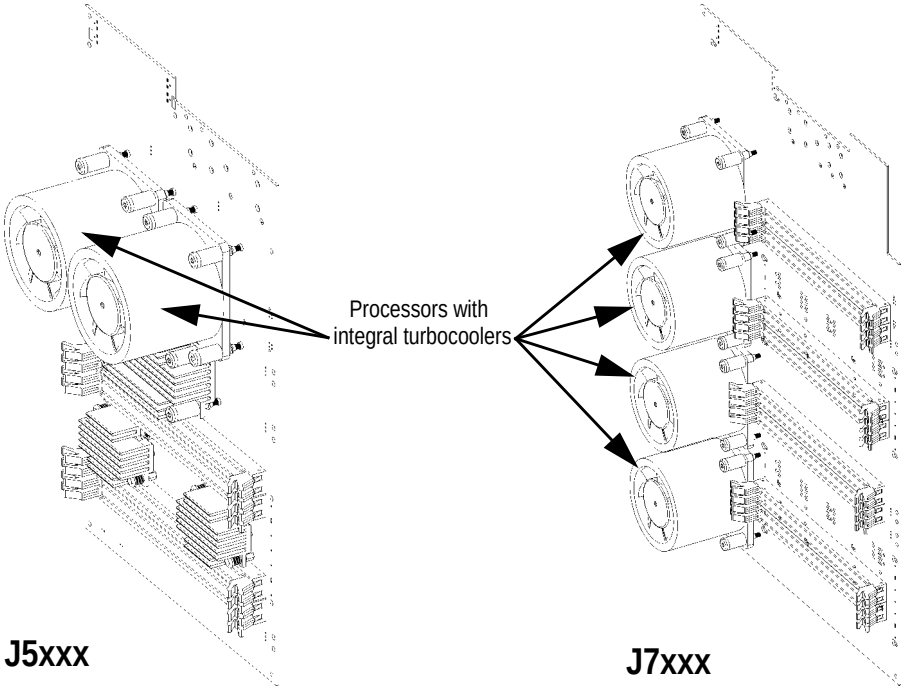
1 System Overview

This chapter introduces the HP VISUALIZE J5xxx and J7xxx computers. Its purpose is to familiarize you with your computer and its controls and indicators.

System Requirements

The HP VISUALIZE J5xxx and J7xxx computers are similar in may ways, but the main way in which they differ is the number of processors: the J5xxx has two, and the J7xxx has four. In addition to the label on the front of the machine, you can also determine which machine you have by counting the processors on the motherboard. Each one is cooled by a cylindrical heat sink (a “turbocooler”) with dozens of airflow slots and an integrated fan. The illustration below shows the two turbocoolers (and hence two processors) of the J5xxx's motherboard; the J7xxx has four:

Figure 1-1 **HP VISUALIZE J5xxx /J7xxx Processor-Count Difference**



Instructions in this chapter assume that you are using the HP-UX 10.20 or HP-UX 11.0 operating system.

Product Description

To help you gain a better understanding of the J5 Class and J7 Class computers, the following table provides the computer's key features.

Table 1-1 HP VISUALIZE J5 Class and J7 Class Features

Computer Feature	Description
Processors	Two (in the J5xxx) or four (in the J7xxx) 440MHz PA8500 microprocessors with 0.5MB on-chip instruction cache and 1.0MB on-chip data cache.
Operating System	HP-UX 10.20 HP-UX 11.0
User Interface	HP CDE graphical user interface
Compatibility	Source- and binary-code compatible with the C-Class and J-Class product families
Monitors	List of compatible monitors: • 19-inch, 1280×1024 color monitor • 20-inch, 1280×1024 color monitor • 21-inch, 1280×1024 color monitor • 21-inch, 1600×1200 color monitor • 18-inch LCD Flat Panel Display
Graphics	Standard graphics: • HP VISUALIZE-FX^2 Pro • HP VISUALIZE-EG • HP VISUALIZE-FX^6 Pro • HP VISUALIZE-Fe

Table 1-1 HP VISUALIZE J5 Class and J7 Class Features

Computer Feature	Description
Main Memory	Using 256-MB DIMMs: • J5xxx: Up to 2GB in 8 slots • J7xxx: Up to 4GB in 16 slots Using 512-MB DIMMs: • J5xxx: Up to 4GB in 8 slots • J7xxx: Up to 8GB in 16 slots
Internal Storage Devices	Four hot-pluggable internal Ultra-2 Low Voltage Differential (LVD) SCSI hard disk drives, a standalone PC CD-ROM drive, and a choice of either a PC floppy drive or a NSE SCSI DDS tape drive.
Standard Network	Ethernet IEEE 802.3 RJ45, UTP Twisted Pair 10/100 BaseT
Standard I/O	More than 2GB/sec I/O bandwidth. Standard computer I/O ports: • Two Universal Serial Bus (USB) ports for keyboard and mouse • Two serial interface ports • One parallel port (IEEE 1284) • Ultra Narrow Single-Ended SCSI • Wide Ultra-2 Low Voltage Differential (LVD) SCSI • Floppy interface • ATAPI interface for CD-ROM • Built-in 44KHz, 16-bit stereo audio ports (line in, line out, microphone in, and headphone out)

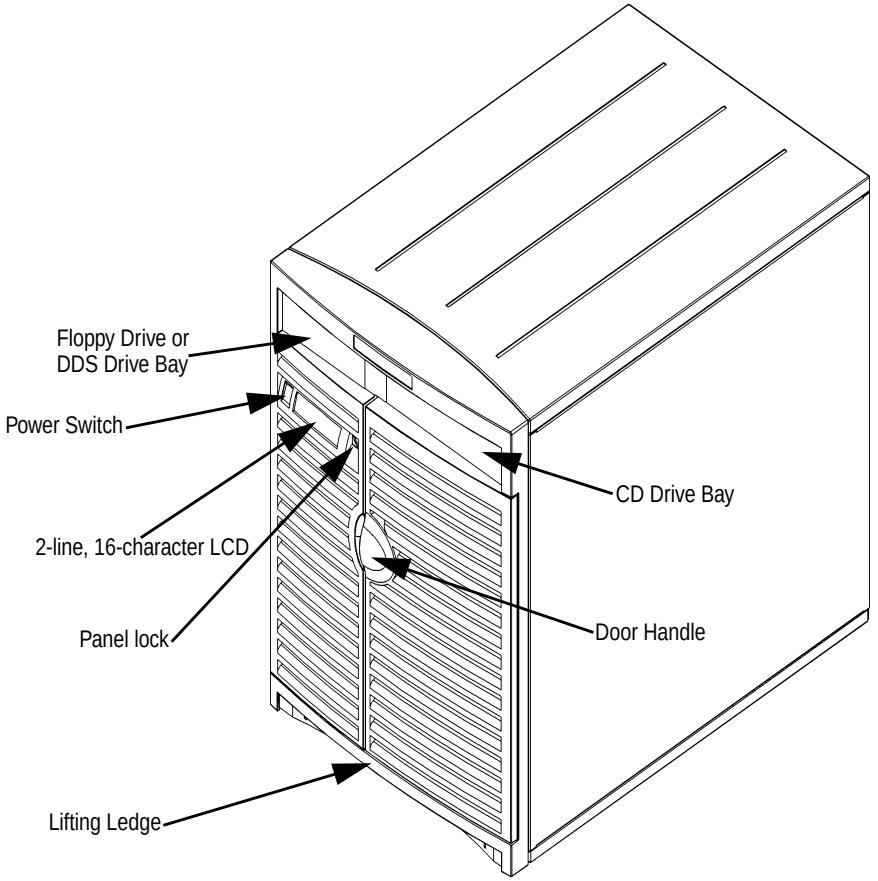
Table 1-1 HP VISUALIZE J5 Class and J7 Class Features

Computer Feature	Description
PCI (Peripheral Connect Interface) slots	Eight 64-bit slots in the following arrangement: 1. 5V, 33MHz, bus 1, top slot (power only) 2. 5V, 33MHz, bus 2 3. 5V, 33MHz, bus 2 4. 3.3V, 66MHz, bus 3 5. 5V, 33MHz, bus 4 6. 5V, 33MHz, bus 4 7. 3.3V, 66MHz, bus 5 8. 5V, 33MHz, bus 4, bottom slot Slot 7 is the primary FX Pro graphics slot, and Slot 4 is the secondary. Both are 66-MHz slots.
Keyboard	Universal Serial Bus (USB) keyboard
Mouse	Universal Serial Bus (USB) mouse

System Unit, Front View

Before powering on your system, you should become familiar with the system unit controls:

Figure 1-2 **HP VISUALIZE J5xxx /J7xxx Front View**

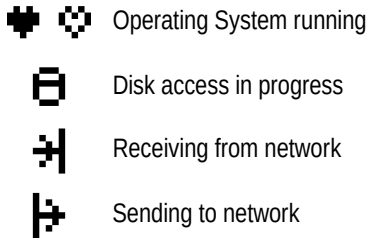


CAUTION The Lifting Ledge is strong enough to use as a handhold when lifting the unit. Note that the computer is designated for two-man lifting; it weighs about 90 lbs. Do not attempt to lift it by yourself, or injury may result.

System LCD

The Liquid Crystal Display (LCD) is located on the left side of the front panel. The LCD displays messages about the state of the system, including error codes (see "LCD-Indicated Problems" in the Troubleshooting chapter for more details). The following symbols appear in the LCD, representing the different system activities shown:

Figure 1-3 **LCD Symbols**



System Power Switch

The power switch is used to turn the system unit on and off. The workstations have a "soft power down" feature that shuts the system down in a controlled manner. Hitting the power switch is identical to logging in as `root`, and executing `shutdown -q`. Note that a soft power down does not occur if you disconnect the power cord on the machine, or if you disengage the power supply (by removing the interlocked thumbscrew on the rear panel of the chassis).

Removable-Media Devices

Depending on your configuration, you can have a CD drive and your choice of either a DDS tape drive or a floppy diskette drive.

NOTE You cannot have two of the same type of internal mass-storage device. That is, you cannot have two CD drives, two floppy drives, or two DDS drives, but you can have a CD drive and a floppy drive or a CD drive and a DDS drive (you cannot have both a floppy drive and a DDS drive).

A description of each drive's controls and indicators is in the chapter describing that device, later in this document.

System Unit Rear Panel Connectors

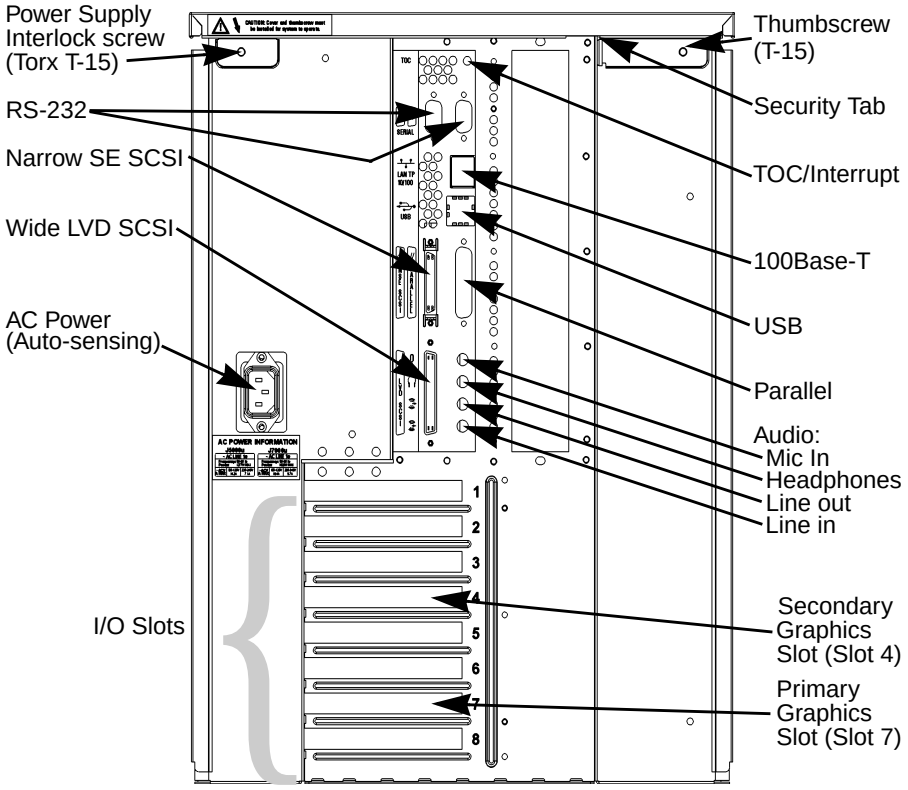
This section describes the following connectors on the system unit's rear panel:

- Audio connectors (line in, line out, microphone and headphones)
- USB keyboard and mouse connectors
- HP parallel Centronics I/O connector
- 802.3 TP (Twisted Pair) LAN connector
- Two RS-232C serial I/O connectors
- Narrow Single-Ended (SE) SCSI connector
- Low-Voltage Differential (LVD) SCSI connector
- TOC (Transfer Of Control, or interrupt) button
- Power cord connector

NOTE To maintain FCC/EMI compliance, verify that all cables are fully seated and properly fastened.

The illustration below shows the locations of the connectors on the system unit's rear panel.

Figure 1-4 **System Unit Rear Panel Connectors**



The two T-15 thumbscrews in the upper corners of the rear panel are the keys to opening the machine: removing these two screws allows the top panel to be removed, which in turn allows the left and right side panels to be removed.

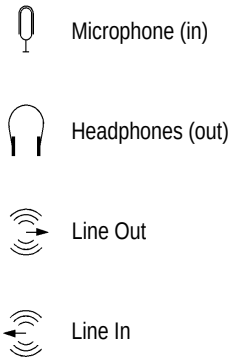
NOTE The upper-left thumbscrew (as seen from the back) is interlocked with the power supply: loosening that screw disengages the power, minimizing the shock danger while servicing. Make sure the interlocked screw is firmly tightened when closing the unit, or the power supply might still be disengaged.

Turning the power off with the power switch executes a clean shutdown, but *disengaging the power supply does not*, so remember to power down with the power switch!

Audio Connectors

Your computer has audio input and -output capability through an internal speaker, as well as external input and output connectors on the rear panel (see diagram of entire rear panel above, plus the close-up of the audio connectors, below). The sound is 16-bit, 44kHz (CD-quality) stereo sound.

Figure 1-5 **Audio Connectors**



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

A summary of the computer audio electrical specifications follows.

Table 1-2 Audio Electrical Specifications

Frequency Response	25Hz to 20kHz
Input Sensitivity/Impedance: Line in Microphone	 2.0Vpk/47Kohm 22mVpk/1Kohm
Max Output Level/Impedance Line out Headphone Speaker (internal)	 2.8Vpp/47Kohm 2.75Vpp/50ohm 5.88Vpp/48ohm
Output Impedance Line out Headphone	 619ohm 118ohm

Keyboard Connectors

The two USB connectors provide an interface for the keyboard and mouse to the system (either connector can be used for either device). Consult the documentation that accompanies each input device for specific information concerning its use. Note that older non-USB keyboards (PS-2 and HP-HIL keyboards) cannot be used with the J5xxx and J7xxx.

HP Parallel I/O Connector

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

802.3 Network Connectors

Your computer has built-in TP (Twisted Pair) connectors for the 802.3 (ethernet) or 100 BaseT network. Connections to ThinLAN networks require an external transceiver. Your computer will automatically select the correct network setting.

RS-232C Serial Input/Output Connectors

You can attach peripheral devices to the RS-232C Serial Input/Output (SIO) ports on this computer. Peripheral devices include printers, plotters, modems, and scanners. Consult the documentation that accompanies each pointing or peripheral device for specific information concerning its use.

The SIO ports are programmable; that is, you can choose attributes such as bit rate, character length, parity, and stop bits either by selecting the corresponding device file (in /dev), or by using SAM (the System Administration Manager). The SIO ports are used as an interface for serial asynchronous devices to the CPU. The ports operate at up to a 115.2Kbaud rate.

The table below 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 1-3 Serial I/O Pins

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

SCSI Connectors

Use the Narrow Single-Ended SCSI connector and/or the Wide LVD (Low-Voltage Differential) SCSI connectors to connect external SCSI devices such as hard disk drives, optical disk drives, DDS-format tape

drives and CD-ROM drives. Consult the documentation that accompanies each SCSI device for specific information concerning its use. Refer to the appendix "SCSI Connections" for information about connecting SCSI devices to your computer.

WARNING **Do *not* attach FWD SCSI devices to the LVD SCSI port, or damage will occur.**

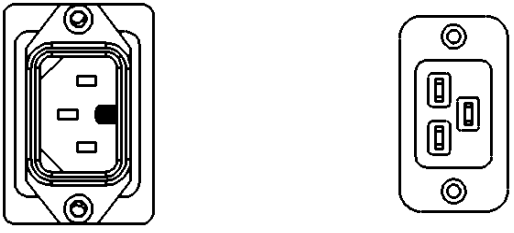
NOTE When attaching external SCSI devices, be sure to terminate the last device on each external SCSI bus. The terminators are included in a small plastic bag that was shipped with your machine. Before powering up your computer, make sure that the last external SCSI device in each SCSI chain has a terminator.

If you have no external SCSI devices, install the terminators directory on the connectors on the rear panel of the computer.

Power Cord Connectors

Plug the workstation's power cord into the power cord connector to provide AC power to the system. Note that the HP VISUALIZE J5xxx and J7xxx have different types of power cords, because of their differing power requirements:

Figure 1-6 **Power Connectors**



The power connector on the left is used on the J5xxx (notice that it is a keyed connector, requiring a 15-amp circuit), and the one on the right is used on the J7xxx because of its greater power demand (20 amps).

Keyboard and Mouse

At this printing, only the HP three-button USB mouse is supported as a pointing device for the J5xxx and J7xxx.

For general information on using three-button mice and on the various cursor shapes associated with different areas of HP CDE while using a mouse or other pointing device, see *Using Your HP Workstation*. Another supported USB device is the HP USB keyboard.

The mouse and keyboard can be plugged into either USB port on the back of the computer.

Operating System Overview

Your computer uses version 10.20 or 11.0 of the HP-UX operating system. Instant Ignition systems (systems with preloaded software) have X-Windows and Hewlett-Packard's graphical user interface HP CDE installed and configured (see the *HP CDE Getting Started Guide* and *User's Guide* for details).

Please refer to the "Instant Ignition System Configuration Information" sheet that came with your system for details on configuration.

If your Instant Ignition system does not have the kernel preconfigured with all of the device drivers, you need to refer to the manual *Managing Systems and Workgroups* to configure your kernel as appropriate for your set of hardware and peripheral devices.

If you have any questions about Instant Ignition, refer to *HP-UX System Administration Tasks* for more information.

Powering Up Your System

After you have connected the various parts of the computer—for details, see the J5 Class and J7 Class Installation Sheet that came with your computer— you are ready to power up the system. At this point, there are two possibilities:

- Your computer has been "ignited;" that is, the HP's Instant Ignition process has installed the operating system already. In this case, when you power up the computer, you will be presented with a series of questions asking you the machine's hostname, IP address, subnet mask, and other basic configuration questions (see next page for details). When these are answered, the CDE login screen will appear.
- Your computer has not been "ignited;" that is, the HP's Instant Ignition process has *not* installed the operating system already. In this case, you will need to install the operating system from the CDs. For details, see the CD Booklet included with the CDs.

Once the CDE login screen appears, and you can log in as `root`—initially, there is no password. When you have logged in, you will be able to create other users' accounts and do whatever other configuration and installations you require to get the machine into its desired state. Use the Help facility of SAM (the System Administration Manager) or see the *HP CDE Getting Started Guide* and *User's Guide* for instructions on typical tasks.

Getting Required Information

The start-up procedure for your workstation will require you to supply the following information. Please have this information available before you turn the workstation on for the first time.

NOTE If you are not the system administrator for your workstation, and therefore do not know the information, ask your system administrator.

Here is the information you will need. You may want to fill in the blanks so the answers will be readily available during the configuration phase.

- *Host name:* _____
  The host name is sometimes called the "system name."
- *IP (Internet Protocol) address:* _____
  You will need this address if you are connecting the workstation to a local area network.
- *Time zone*: _____
  This is the time zone in which the workstation is located.
- *Optional networking parameters*
  Ask your system administrator if you need to configure these parameters.

Table 1-4 Networking Parameters

Subnetwork mask	_____
Network gateway IP address	_____
Local domain name	_____
DNS server host name	_____
DNS server IP address	_____
Network Information Service domain name	_____

- *Optional font server parameters*
  You need to supply these parameters if you want the workstation to obtain its fonts from a network server. Ask your system administrator if you need to configure these parameters.

Table 1-5 Font-Server Parameters

Font server name	_____
Font server IP address	_____

Turning on the Power

1. Turn on the monitor and any external peripherals (for example, printers) connected to the workstation.
2. Turn on the workstation. The workstation will run a series of self-tests.
3. After two or three minutes, a series of messages are displayed as various hardware and software subsystems are activated. Unless something is wrong with your system, you are not asked to respond to these messages.
4. A series of windows appears requesting the information you gathered in the previous section, such as your host name, IP address, and time zone. Enter the information as it is requested.

NOTE

You should enter the host name when requested; otherwise, you will get an error message when you log in.

If you do not have other pieces of information, press Enter to use the default value. You can provide missing information later by logging into a terminal emulator window as superuser and executing this command:

```
/sbin/set_parms
```

5. The next question asks if you want to set a `root` password. The `root` password is the password used for the account of the "superuser"—a special user who has permission to perform all system administration tasks. The username for the superuser is `root`.
6. When you have finished answering all of the questions, the workstation completes its start-up sequence and displays the CDE login screen.
7. Log into your first CDE session as `root`. For information on logging into CDE, see the *Common Desktop Environment User's Guide*.

NOTE

You must log into the first session as `root`. This is because the system contains no other user accounts. Once you are done with system configuration, including the creation of other users' accounts via SAM (the System Administration Manager), you should log out as superuser and log back in as one of the other users.

Documentation

The documentation for your system is located on the Instant Information CD. To access this CD, you need to follow the special mounting instructions that come with it.

Monitors

You can use one of the following HP monitors with your computer:

- 19-inch, 1280×1024 color monitor (A4575A)
- 19-inch, 1600×1200 color monitor (A4575A)
- 21-inch, 1280×1024 color monitor (A4576A)
- 21-inch, 1600×1200 color monitor (A4576A)

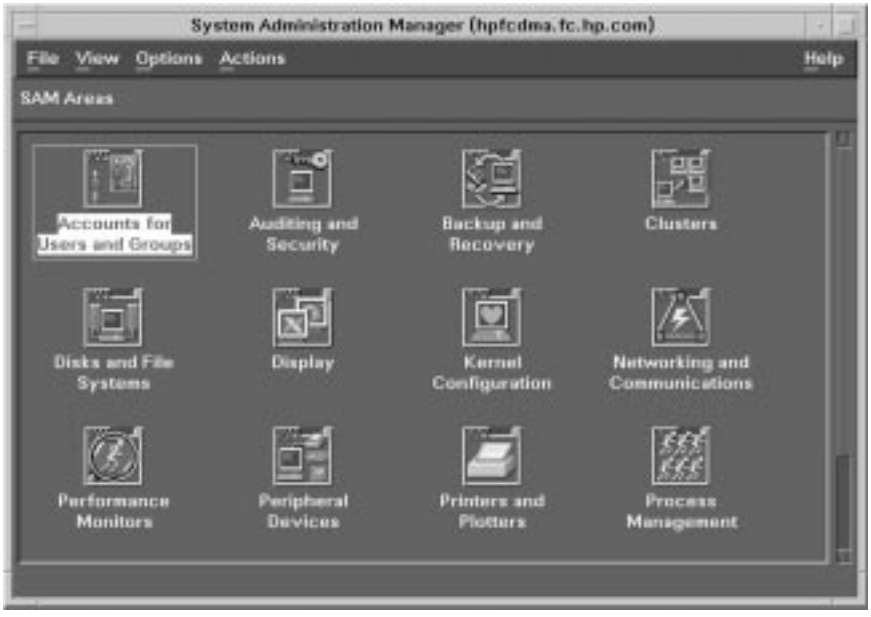
Before using your monitor, you should become familiar with its controls, connectors and indicators. For information on these controls and indicators and on using your monitor, see the documentation that came with the monitor. To confirm your graphics configuration, use SAM (the System Administration Manager) as follows.

As `root`, run `/usr/sbin/sam`, and the following splash screen appears to indicate that SAM is running:

Figure 1-7 SAM's Splash Screen

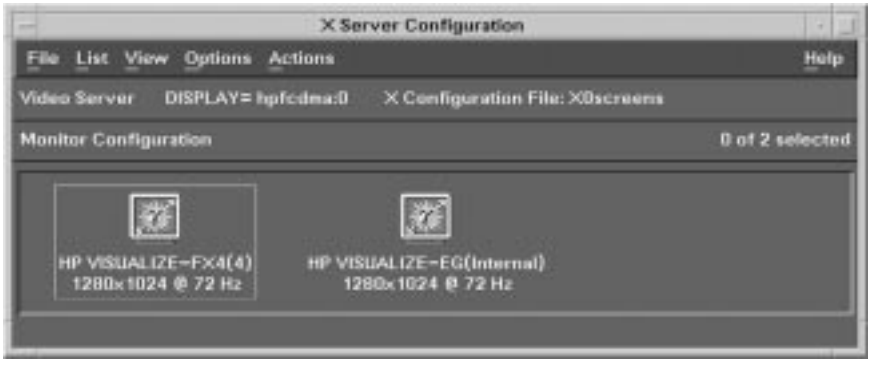
After a few seconds of analyzing your hardware and software configurations, the splash screen disappears, and another window appears, which offers access to the various administration tasks:

Figure 1-8 SAM's Main Menu



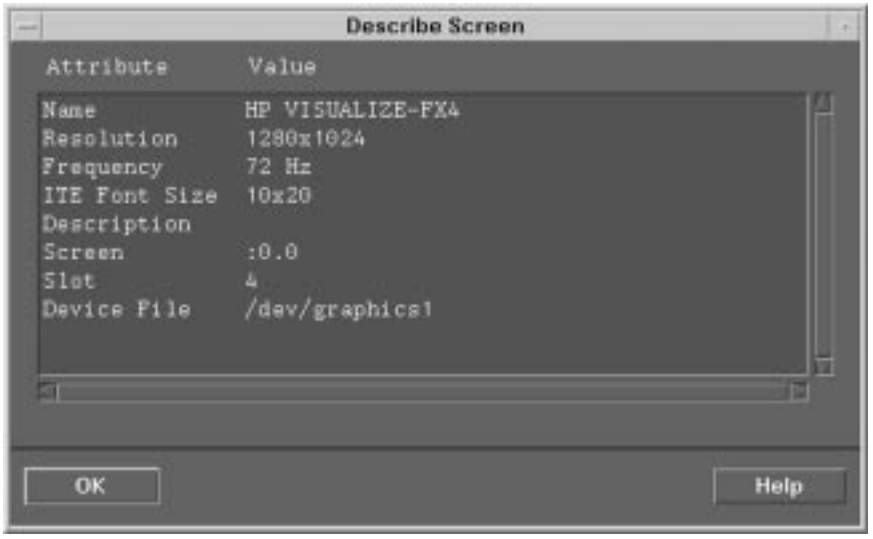
Double-click the "Display" icon, and something like the following appears (of course, the actual devices on your machine are likely to be different):

Figure 1-9 X Server Configuration Screen



Double-clicking on any of the icons that represent graphics devices (or single-clicking and then selecting **Describe...** under the **Actions** menu) will cause a monitor-description window to appear; for example:

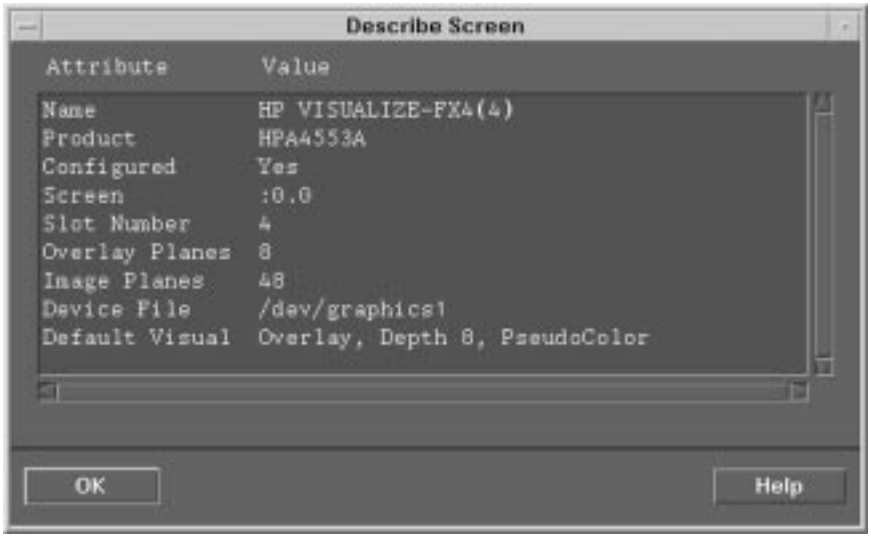
Figure 1-10 Monitor Description Window



Other options under the **Actions** menu allow you to identify the physical monitor associated with the logical monitor (by making the screen image blink), and to change the monitor type and/or gamma-correction value.

By selecting **X Server Configuration** (under the **List** menu), you can see and configure your graphics device in terms of X server parameters. For example, when you double-click on any of the icons that represent X-Windows screens (or single-click and then select **Describe...** under the **Actions** menu), you'll see information similar to the following:

Figure 1-11 **X-Window Screen Description Window**



As before, other options under the **Actions** menu allow you to identify the physical monitor associated with the X-screen definition (again, by making the screen image blink), and to change the default visual, screen options, server options, etc.

2 Changing Your Computer's Hardware Configuration

This chapter describes the procedures required to change your computer's hardware configuration.

The instructions in this chapter assume you are using the HP-UX 10.20 or 11.0 operating system and the HP CDE interface.

CAUTION When installing internal devices, always wear a properly grounded wrist strap to avoid damaging components with electrostatic discharge (static electricity).

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

- Light-duty flat blade screwdriver with a 150mm (6-inch) blade
- Number 1 Posidriv driver
- T10, T15 and T20 Torx drivers
- Needle-nosed pliers

Also, read the ESD Precautions elsewhere in this guide.

NOTE Many of the HP-UX commands in this chapter will require that you become superuser (`root`). If you cannot log in as `root`, contact your system administrator.

To make access to the internal components easier, you may want to place the computer on a table or workbench instead of leaving it on the floor.

CAUTION This computer is designated for two-man lifting; it weighs approximately 90 pounds. Do not attempt to lift it by yourself, or injury may result.

Opening the System Unit

Some hardware-configuration operations, like installing and removing hard disk drives, can be done simply by opening the door on the front of the unit; the disk drives are accessible through the open door. Other operations require a bit more access to the interior of the computer, so more panels will need to be removed. Such operations include the installation and removal of the following devices (along with a list of which panels will need to be removed):

- CD drive (front panel, top cover)
- DDS drive (front panel, top cover)
- Floppy drive (front panel, top cover)
- Memory (top cover, left side)
- I/O cards (top cover, right side)

Before opening the front, top, left, or right panels of the unit, make sure that the system is powered down and unplugged. *Note: **do not** remove the rear thumbscrews before powering down the unit, or the system power will be interrupted due to the interlock.*

1. Power off the system (either by executing `shutdown -h` as `root` and then turning off the power, or by simply hitting the power switch, which accomplishes the same thing), the monitor, and any peripheral devices.
2. Unplug the power cord of the system unit and any peripheral devices from AC wall outlets.
3. 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 back panel of the system unit.

CAUTION

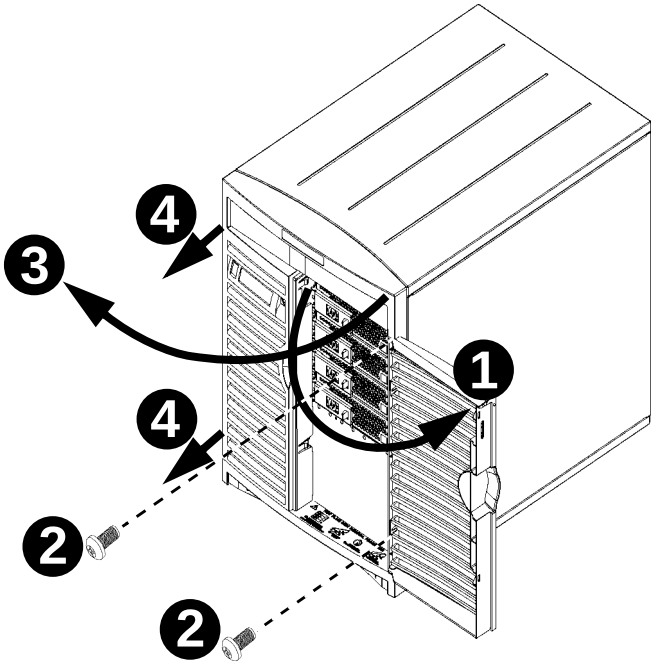
Do not attempt to operate the computer with any of the front, top, or side covers removed. In addition to maintaining FCC/EMI compliance, the covers are needed to ensure proper airflow, and hence, sufficient system cooling. Operating the unit without its covers in place may void the warranty.

Removing the Front Panel

The front panel must be removed in order to install a CD drive, a DDS tape drive, or a floppy drive—see their respective sections later in this chapter for detailed instructions on the installation process for each type of device. If you need to remove the front panel (the panel that contains the door), perform the following steps:

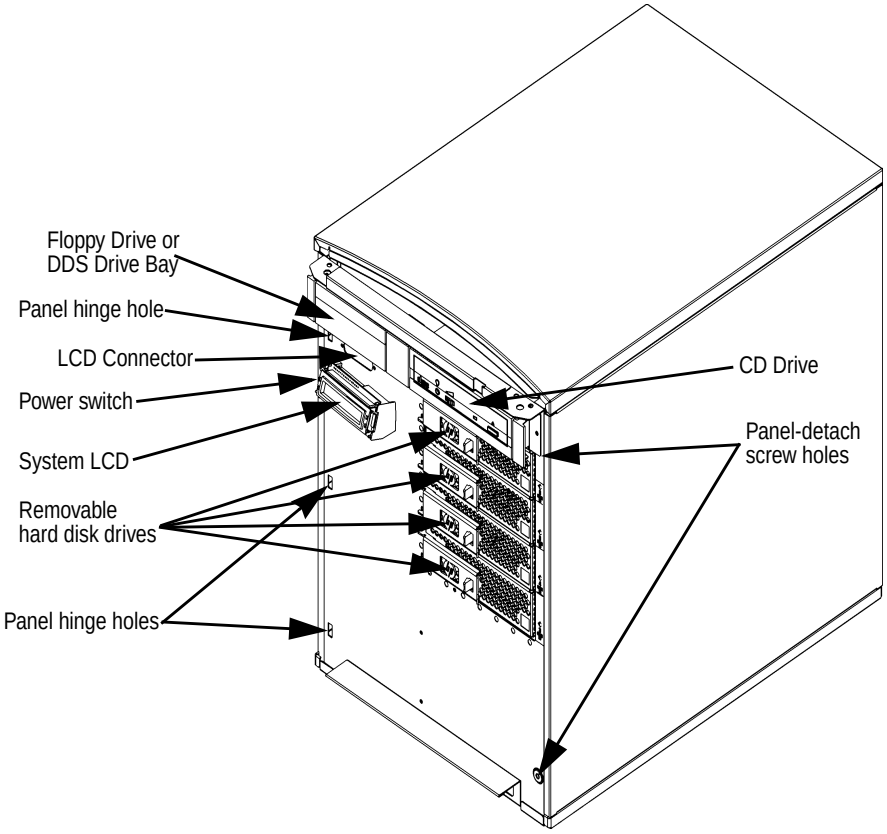
1. Shut down and unplug the system as described above. Unlock the door on the front of the unit, if necessary, and swing it open.
2. Remove the two panel-detach screws on the right edge of the panel, visible after you open the door.
3. Swing (clockwise) the entire front panel open 45 to 90 degrees—the hinges are on the left, as you look at the front of the unit.
4. Once you have swung the panel open on the hinges on the left, pull it straight out to remove it.

Figure 2-1 Removing the Front Panel



To replace the front panel, perform the above steps in the reverse order.

Figure 2-2 System Unit with Front Cover Panel Removed



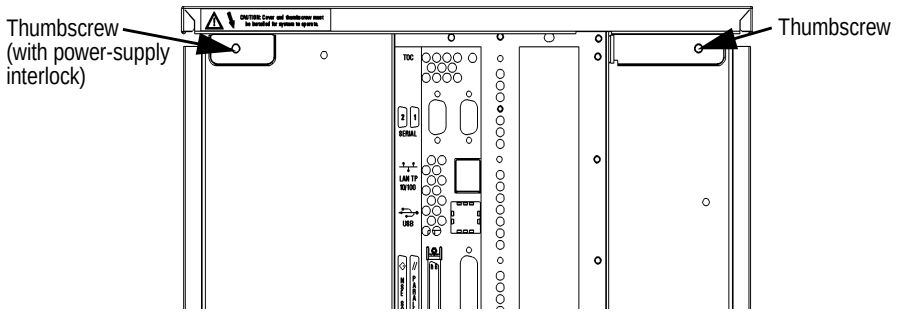
Once the front panel has been removed, a CD drive, DDS drive, and/or a floppy drive can be installed or removed.

Opening the Top Cover

To open the top cover of the unit—to install or remove a removable-media drive (i.e., a CD drive, a DDS tape drive, or a floppy drive), DIMMs, or I/O cards, for example, or for other access to the inside of the unit—follow these steps:

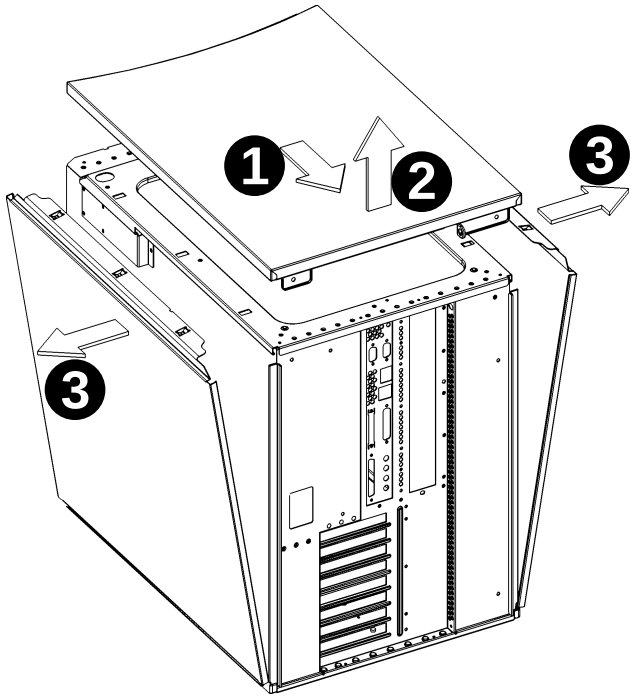
1. Shut down and unplug the system as described in "Opening the System Unit" on page 41.
2. Remove the two thumbscrews in the top corners of the back panel. The upper-left one (when looking at the back of the unit) has a power-supply interlock, and removing the screw disengages the power to the unit, reducing shock hazard during the configuration process. Note that cutting off power via the power-supply interlock does not do a clean shutdown like pressing the power switch does.

Figure 2-3 Removing the Thumbscrews



3. Slide the top panel an inch or two toward the rear of the machine, and then remove it by lifting straight up. The top panel fits snugly, so you may have to get a firm grip on it in order to slide it back.

Figure 2-4 Removing the Top and Side Panels



Removing the Left and/or Right Panels

In order to remove the left and/or right panels, you must first remove the top panel, as described above. Then, the left and right panels are free to tip out and away from the unit. The side panels stay in place after the top panel is removed because of three locations on the friction-fit tab running along the top edge of the side panels. After the desired side panel has been tipped out and away from the chassis, as shown in the illustration above, it can be lifted straight up.

The left panel (which on the right in the illustration above, since you are looking at the back of the machine) must be removed to install or remove memory (DIMMs), and the right panel (which on the left in the illustration above, since you are looking at the back of the machine) must be removed to install or remove I/O cards.

Reinstalling the Cover Panels

To replace the cover panels once you've taken them off, perform the following steps:

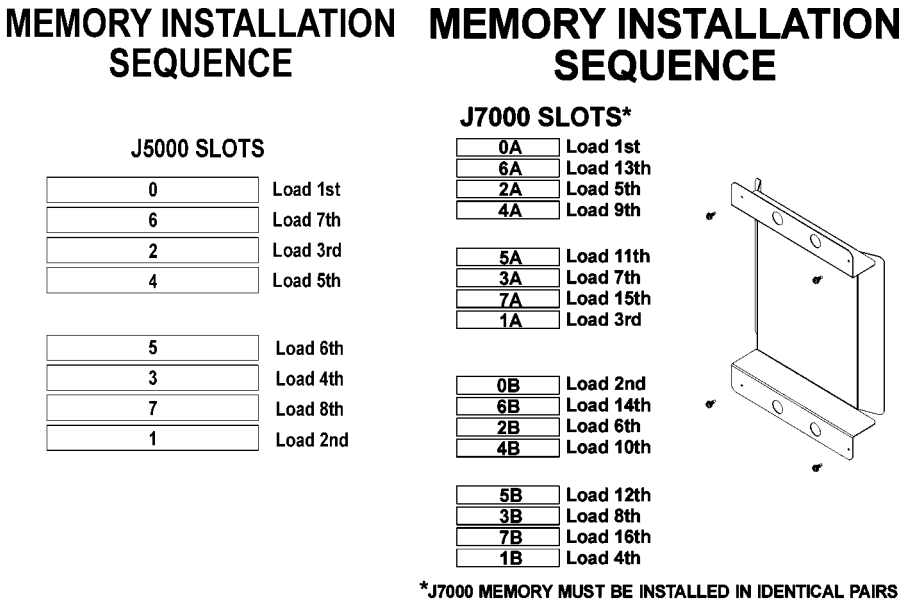
1. Place the left- and right-side panels into their grooves in the bottom edges of the left and right sides of the chassis, and then press the tops of the side panels together firmly.
2. Place the top cover on the top of the chassis, about an inch of its back edge protruding over the rear panel. Then, push it straight forward, so its front edge slides underneath the lip of the front panel's top edge. The top panel fits snugly, so you may have to get a firm grip on it in order to slide it forward.
3. Reinsert the two thumbscrews into the tabs in the upper corners of the back panel of the chassis. Note that the upper left one (as looking at the rear panel) is the power supply interlock screw, so make sure it is tightened snugly, or the power supply may not engage.

Installing Memory

This section contains information regarding the installation of additional memory. However, before continuing with this section, please take time to read the following list of considerations:

- Use the procedure described in the chapter "The Boot Console Interface" to determine the current memory configuration for your computer. This should be done before trying to install additional DIMMs (Dual Inline Memory Modules) into your computer.
- Familiarize yourself with the order in which DIMMs must be inserted; the order differs, depending on whether you have a J5xxx (eight memory slots) or a J7xxx (sixteen memory slots). This information is on a label on the floor of the left side of the J5xxx, and on the main air guide in the J7xxx. The labels look like this:

Figure 2-5 DIMM-Insertion Order for J5xxx and J7xxx



- For the J5xxx—the two-processor model—insert the DIMMs in the sequence indicated in the left illustration above (or on the label inside the left side of the machine). For the J7xxx—the four-processor model—insert the DIMMs in pairs of equal memory size, and in the

order indicated in the right illustration above (or on the label on the air guide). For details on the mechanics of inserting DIMMs, see the following pages.

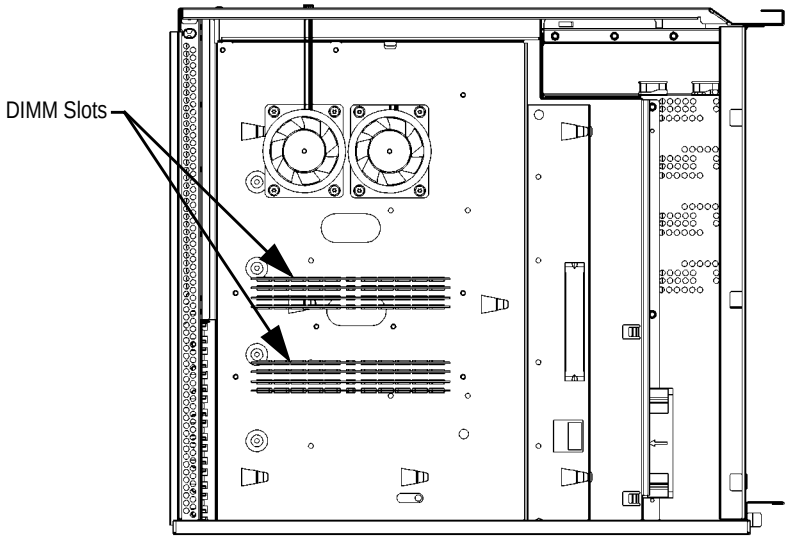
- When you have finished installing the additional DIMMs, use the Boot Console Interface to verify that the computer recognizes them.

Installing DIMMs

Perform the following steps to add DIMMs to your computer.

1. Open the system unit according to the directions in "Opening the System Unit" on page 41. You'll need to remove the top panel and the left side panel (looking from the front). Here is roughly what the inside of a J5xxx looks like: the DIMMs are accessible as soon as you remove the side panel:

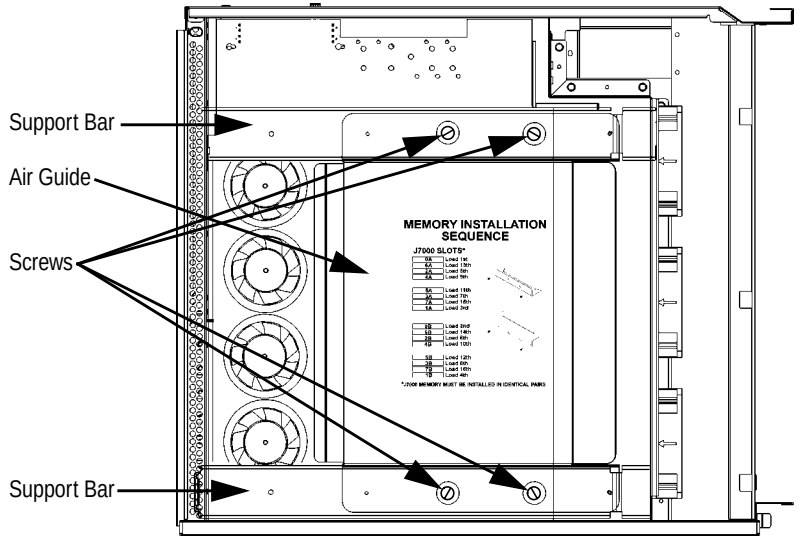
Figure 2-6 The J5xxx DIMM Slots (as seen from the open left side)



The J7xxx, on the other hand, requires one additional step before the DIMMs are accessible. Because it has twice the number of processors as the J5xxx, the J7xxx requires greater cooling capacity to prevent components from overheating. This is effected, in part, by two sheet-metal air guides that channel the airflow directly at the processors' turbocoolers. One of these air guides, in addition to channeling the airflow to the processors, also hides the DIMM slots,

so it must be removed before installing or removing DIMMs. Before the air guide is removed, the open left side of the J7xxx looks like this:

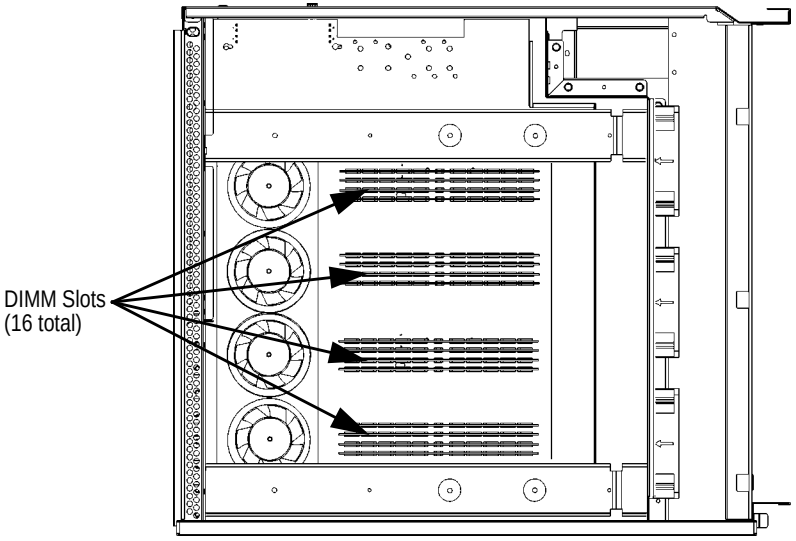
Figure 2-7 The J7xxx's Open Left Side Before Removing Air Guide



Remove the four screws that secure the air guide to the support bars. Be sure, as you remove the last screw, that you hold onto the air guide so it doesn't fall.

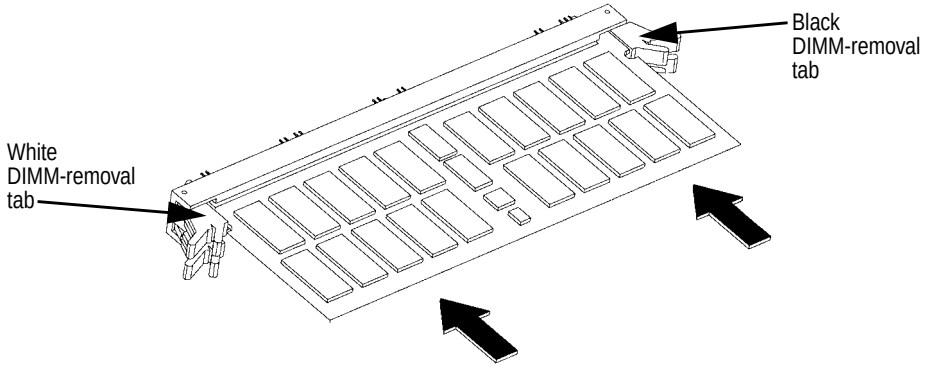
After the air guide is removed, the open left side of the J7xxx looks like this:

Figure 2-8 The J7xxx's Open Left Side After Removing Air Guide



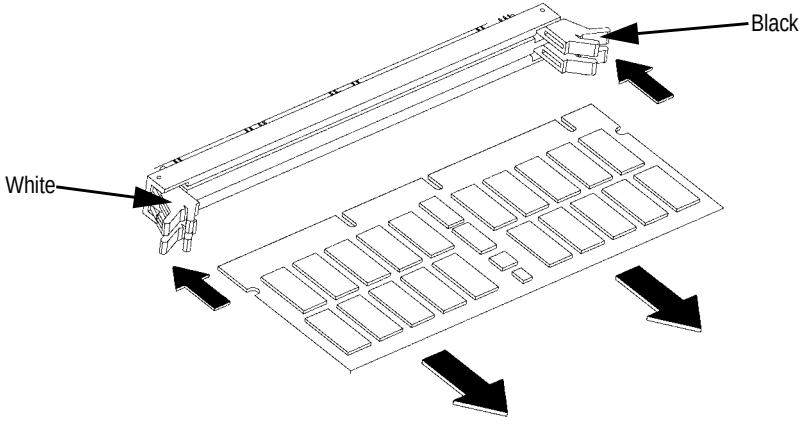
2. Install DIMMs in the order indicated in Figure 2-5 on page 47, or on the label on the floor of the chassis (the J7xxx requires DIMMs to be installed in pairs of the same size). Make sure the DIMM-removal tabs are angled out—away from each other. The DIMMs are keyed; that is, there are notches in the edge (see Figure 2-10, below) that prevent the DIMM from being inserted upside down. Once the DIMM is oriented correctly (the notches in the DIMM lining up with the bumps in the slot), press firmly and evenly on each DIMM to ensure that it seats properly; the DIMM-removal tabs will rotate to become parallel as the DIMM is inserted:

Figure 2-9 Inserting a DIMM



3. To remove a DIMM, push these tabs away from each other, and the DIMM will be removed from its socket.

Figure 2-10 Removing a DIMM



4. Re-install the air guide with the four screws removed earlier (so it again looks like Figure 2-7 on page 49), close the system unit and reconnect all cables.
5. Verify that this installation was successful by following the steps in "Displaying the Memory Configuration" on page 154.

   If you have only replaced a faulty DIMM, you must execute the `pdt clear` command in the service menu of the Boot Console Interface.

   ```
   Answer yes (Y) to the prompt "Continue? (Y/N) >
   ```

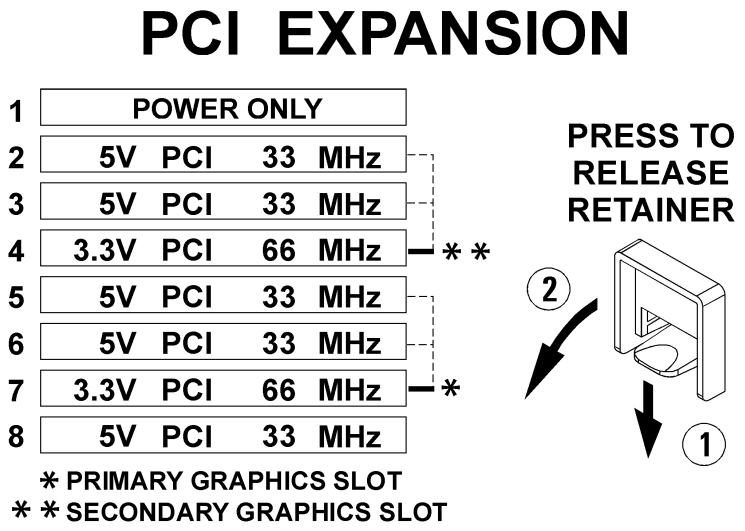
Installing a PCI-Type I/O Board

The J5 Class and J7 Class are extensible by means of I/O cards that offer a variety of functionalities, and the kind of I/O cards supported are called PCI (Peripheral Component Interconnect) cards. PCI cards can be 3.3-volt or 5-volt cards (or both; these are called "universal" cards), and they can also be 32-bit or 64-bit cards, and 33MHz or 66MHz.

The graphics boards supported by the J5 Class and J7 Class computers are the HP VISUALIZE-FX^2 Pro and the HP VISUALIZE-FX^6 Pro. While these are universal cards and will work in any slot, they should be used in slots 4 or 7 to obtain optimal performance.

Your J5 Class and J7 Class computer's PCI assembly has eight 64-bit slots in the following arrangement (this information is also on the label on the floor of the right side of the chassis):

Figure 2-11 The PCI Slot Label



As the illustration above indicates, graphics cards should be inserted into the 66MHz slots in order to deliver maximum performance. Use Slot 7 first, and then Slot 4. Once Slots 7 and 4 are used, graphics cards can be added to any slot that physically has room, except Slot 1. *Slot 1 is a power-only slot; that is, it doesn't offer data communication to the card inserted there.* In other words, a two-board sandwich—main card in Slot

2, drawing power and sending/receiving data, and daughter board in Slot 1, drawing only power—is supported. On the other hand, a standalone card that draws power *and* sends/receives data would be supported in Slot 2 but not Slot 1. Note that a two-card sandwich "in" Slot 7 means that the *bottom* card is in Slot 7, and top card is in Slot 6.

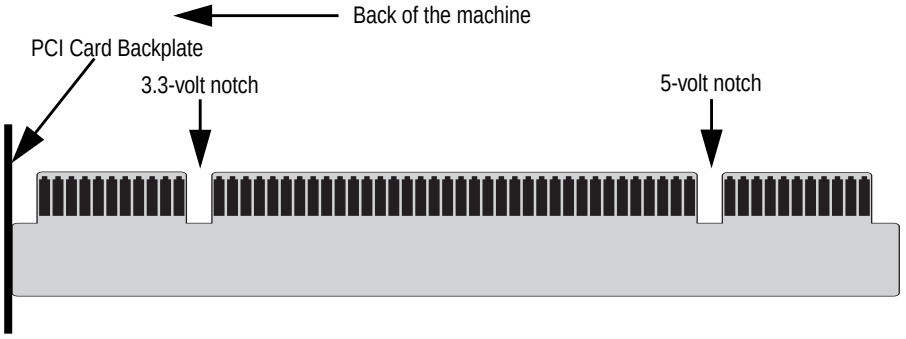
For non-graphics cards, insert them in this order: Slot 2, then 8, 3, 5, and finally 6. If Slots 7 and 4 are not needed for graphics cards, they can be used for very-high-bandwidth general I/O.

CAUTION

The J5xxx and J7xxx supply approximately 264 watts of power to the PCI slots. Thus, if you use three HP VISUALIZE-FX^6 Pro cards simultaneously (in Slots 7, 4, and 2), as in the HP VISUALIZE Center configuration, there are some power constraints imposed on the remaining slots. Each HP VISUALIZE-FX^6 Pro card, while electrically connected to only one slot, takes the physical space of two, and each card draws about 78 watts. So, three FX^6 Pro cards will occupy six of the eight PCI slots and will draw 234 watts altogether, leaving only about 30 watts for the remaining two slots combined, should you choose to use them. Do not insert PCI cards that together draw more than 264 watts, or damage to your computer may result.

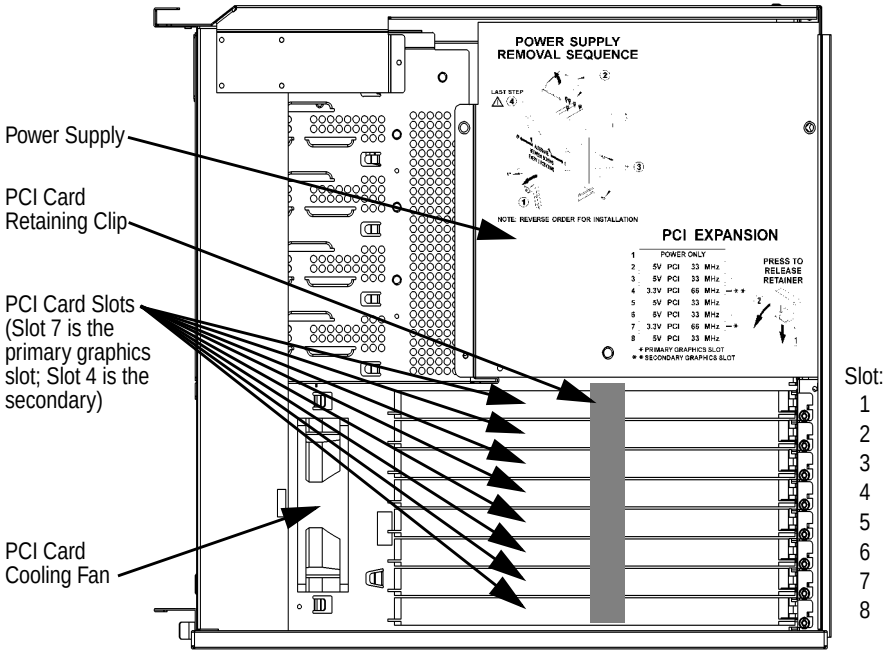
PCI card edge connectors have one or two small notches in them (see illustration below). The 3.3-volt notch indicates that the card can operate properly on 3.3 volts, and the 5-volt notch indicates that the card can operate properly on 5 volts. As you might expect, notches in both locations indicates that the card is a universal PCI card; that is, it will operate properly on either voltage.

Figure 2-12 The PCI Edge Connector



The illustration below shows the physical layout of the PCI slots:

Figure 2-13 PCI Slots in a J5 Class and J7 Class



Follow these steps to install a PCI board into your computer:

1. Remove the top and right-side panels from your computer, as described in the section "Opening the System Unit," earlier in this chapter.
2. Remove the PCI card retaining clip—the instructions for doing so are on the label on the side of the power supply, right above the PCI slots. This is a simple snap-on clip; no tools are required to remove it or install it again. (Note: during re-installation of the retaining clip, make sure the hook on the bottom of the clip fits into the hole on the floor of the chassis.)
3. Determine the appropriate slot(s) for the card you are inserting. Relevant information includes the voltage (3.3 or 5 volts) and the speed (33 or 66 MHz). Again, when multi-card sets are inserted, it's the *bottom* card that goes into the indicated slot. Thus, to insert a VISUALIZE FX^6 card (a two-card sandwich) "into" Slot 7, you'd put the bottom card into Slot 7, and the top card into Slot 6.

4. Remove the screw that secures the filler plate corresponding to the slot into which you are installing the PCI card, and then remove the filler plate itself, saving it for future use. The filler plate must be removed in order for the PCI card's connectors to be accessible from outside the chassis.
5. Place the PCI board you are installing in the board guides and insert firmly into the connector. You may have to push hard to seat the board, but do not rock it from side to side during insertion, as this can damage the connectors. Check to see that the board is evenly inserted for proper seating.
6. Secure the board with the same screw that secured the filler plate.
7. Replace the PCI retainer clip to keep the boards from flexing or vibrating during normal computer operation. If necessary because of the width of the card, remove the black plastic extenders that are attached to the retainer clip before attempting to replace it.
8. Replace the computer's side panel and top cover, and replace the thumbscrews that secure the top panel onto the computer.
9. After bootup, use SAM (the System Administration Manager) to confirm that the computer recognizes the card. See the "Monitors" section of the Overview chapter for an example of doing this for a graphics card.

Changing Your Monitor Type

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

There are two ways to configure your computer to support a different monitor type. They are discussed in the subsequent sections.

Setting the Monitor Type at Power-On

If you replace your computer monitor with a different type of monitor, and you have not set the computer's graphics parameters by using the Boot Console Interface's `monitor` command, you can still configure your computer's new monitor type when you reboot the system.

To set the monitor type, do the following:

1. Press the **Tab** key after your keyboard's lights flash during the boot process to initiate the automatic monitor selection process. Your system will query you for a new monitor type.
2. Select one of the monitor types listed on the screen and press **Enter**.
3. Answer yes (by pressing **Y**), to the system query to confirm your selection. Note that if you do not make a selection, the system cycles through the possible monitor types continuously until you do make your selection.

Setting the Monitor Type from the Boot Console Interface

To change your computer's graphics parameters before you replace your monitor, go to the section "Displaying and Setting the Monitor Type" in the Boot Console Interface chapter.

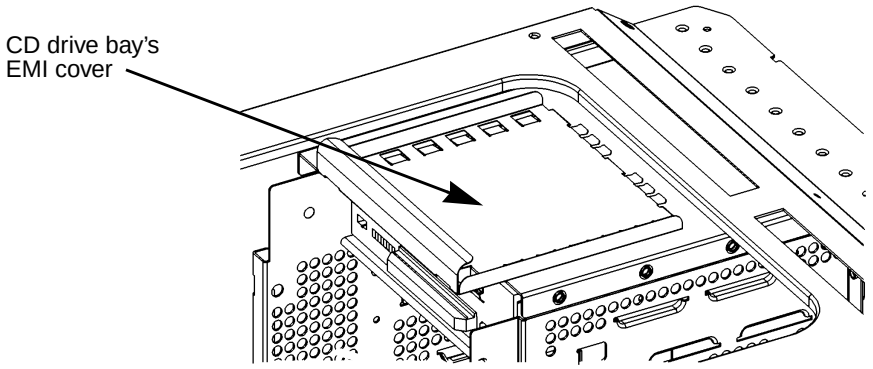
To see how to examine and set your monitor's attributes, see the "Monitor" section in the Overview chapter.

CD Drive Installation

To install a CD drive, follow the steps below:

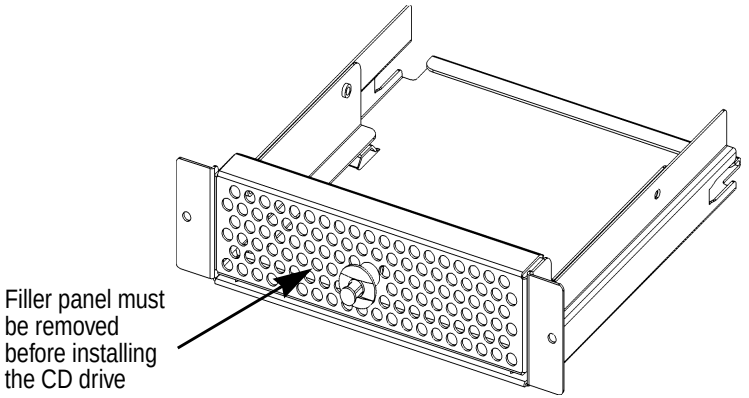
1. Using standard static-suppression practices (described in the Preface of this document), remove the computer's front panel, as described in"Removing the Front Panel" on page 42, and top cover, as described in "Opening the Top Cover" on page 44. Then lift out the CD bay's EMI (electromagnetic interference) cover—the thin piece of metal above the CD drive bay, that is held in place by metal tabs along its edge:

Figure 2-14 Removing the CD Drive Bay's EMI Cover



2. Remove the CD drive bracket from the main chassis.
3. Remove the filler panel from the bracket and save it for future use. The screws will be used the mount the CD drive into the bracket.

Figure 2-15 Removing the CD Drive Filler Panel

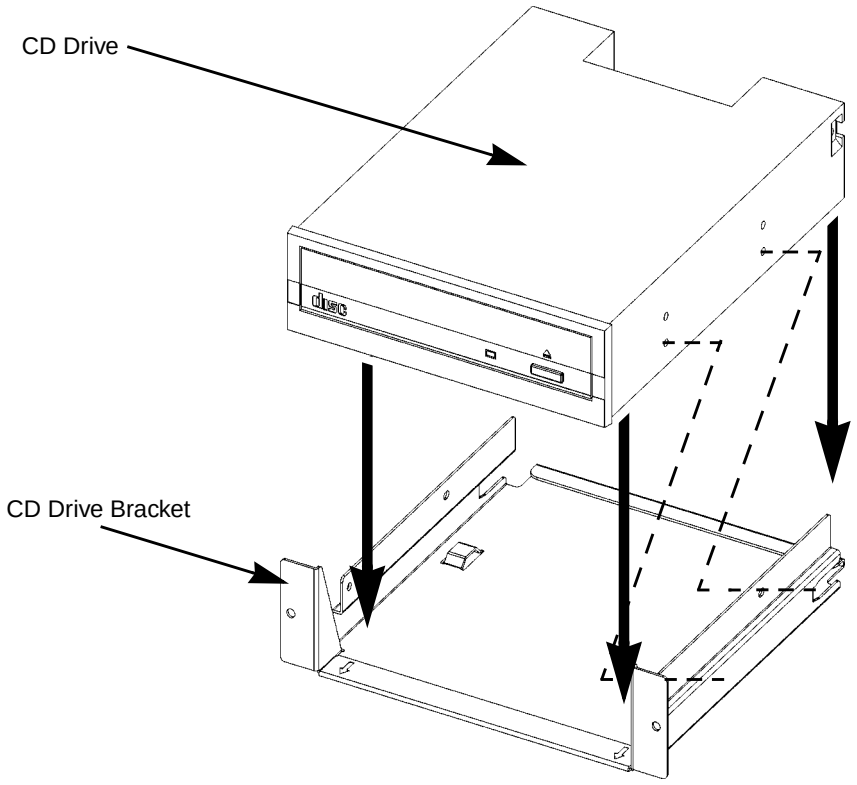


4. Unpack the CD drive, avoiding shocks both mechanical and electrical. That is, never let it drop onto the floor or even onto a desk; always set it down gently. And take ESD (electrostatic discharge) precautions, so static-electric sparks do not damage the electronic components.

CAUTION A drop of just a few inches onto a hard surface such as a desk or the floor can generate large accelerations (hundreds of gees), which may damage the device.

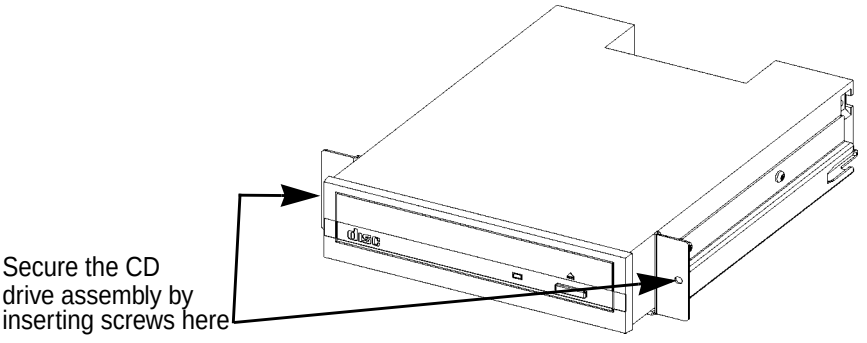
5. Install the CD drive into the bracket: the drive itself must be inserted into the CD drive bracket as shown below, and secured by four Torx T-10 screws (two on each side) driven into the holes indicated by the dashed lines. These screws ship with the filler.

Figure 2-16 Inserting the CD Drive Into its Bracket



The assembly should now appear as follows:

Figure 2-17 The CD Drive in its Bracket



6. Slide the bracket, now containing the CD drive, halfway into the CD drive bay.
7. Connect the power, audio, and ribbon cables into their respective connectors, taking care to fold the ribbon cable neatly, so it won't be crushed during insertion.
8. Finish seating the CD drive bracket into the main chassis, taking care not to pinch the cables as the CD drive is being pushed into the bay. Insert the two screws through the front of the tray to secure the assembly to the main chassis.
9. Replace the CD EMI cover, again taking care not to pinch the cables.
10. Replace the computer's top panel and front panel.
11. After rebooting, use SAM (the System Administration Manager), or the steps in the next section, to confirm that the CD drive is recognized by the system.

For information on normal usage, see the chapter "Using Your CD Drive."

Verifying the CD Drive Operation

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

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

   `/usr/sbin/ioscan -d sdisk` **Return**

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

```
H/W Path       Class                   Description
================================================
10/0/14/0.0.0                  disk    TEAC    CD-532E-B CDROM
10/0/15/1.6.0                  disk    SEAGATE ST39102LC
```

   If `ioscan` does not see your CD drive it returns the following message:

   `ioscan: No hardware found`

2. If the system does not recognize the drive, see the Troubleshooting chapter for hints on how to determine the problem and solve it.

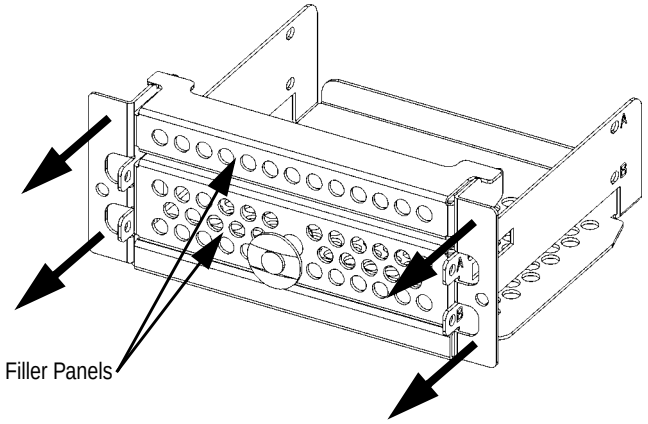
DDS Drive Installation

NOTE Before opening the system unit to install a DDS drive, determine the SCSI IDs currently in use on your computer, so as to avoid SCSI ID conflicts.

To install a DDS drive, follow the steps below:

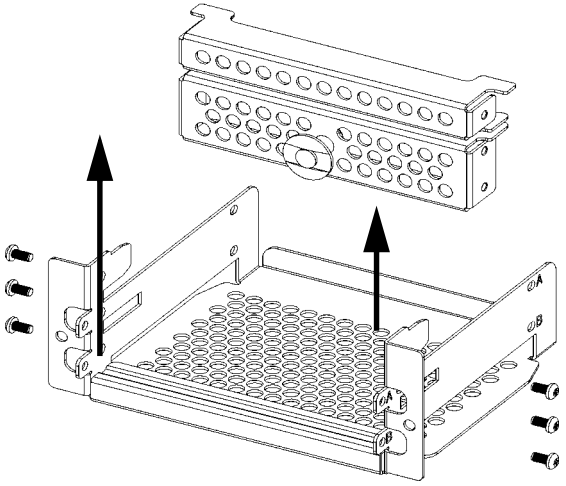
1. Using standard static-suppression practices (described in the Preface of this document), remove the computer's front panel, as described in "Removing the Front Panel" on page 42, and top cover, as described in "Opening the Top Cover" on page 44. Then remove the DDS-drive bay's EMI (electromagnetic interference) cover—the thin metal cover that is snapped in place above the DDS drive bay.
2. Remove the DDS/floppy drive bracket from the main chassis. The bracket is referred to as the "DDS/floppy drive bracket" because the same bracket can house either a DDS drive or a floppy drive (but not both simultaneously).

Figure 2-18 Removing the DDS/Floppy Drive Bracket



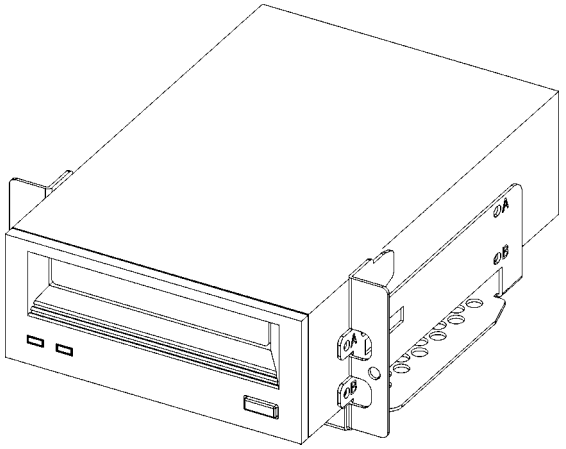
3. Remove the filler panels from the DDS drive bracket and save them for future use. Four of the six screws will be used to secure the DDS drive to its bracket; save the remaining two for future use.

Figure 2-19 Removing the DDS/Floppy Drive Bracket



4. Install the DDS drive into the bracket: the drive itself must be inserted into the DDS drive bracket, and secured by four Torx T-10 screws (two on each side).

Figure 2-20 The DDS Drive Installed Into the DDS/Floppy Drive Bracket



5. Connect the power and ribbon cables to the DDS drive.
6. Slide the bracket, now containing the DDS drive, into the DDS drive bay.

7. Slide the bracket, now containing the DDS drive, into the DDS drive bay. Observing—and manipulating, if necessary—from above, make sure the drive's ribbon cable folds neatly and compactly, and its ferrite bead (the elongated loop of iron-containing material) does not hinder the folding process.
8. Insert the two screws through the front of the tray to secure the assembly to the main chassis.
9. Replace the computer's front panel.
10. After rebooting, use SAM (the System Administration Manager), or the steps described in the next section, to confirm that the DDS drive is recognized by the system.

For information on normal usage, see Chapter 5 , "Using Your Digital Data Storage (DDS) Tape Drive," on page 101.

Verifying the DDS Tape Drive Operation

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

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

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

```
H/W Path       Class                    Description
================================================
10/0/15/0.3.0                   tape    HP      C1533A
```

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

```
ioscan: No hardware found
```

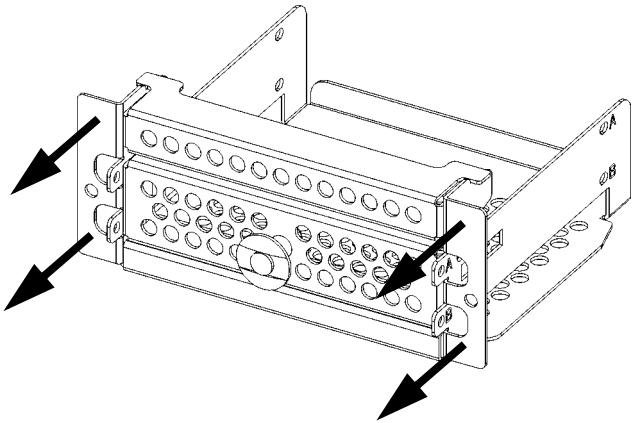
If the system does not recognize the drive, see Chapter 9 , "Troubleshooting," on page 165, for hints on how to determine the problem and solve it.

Floppy Drive Installation

To install a PC floppy drive into the J5 Class and J7 Class, follow the steps below:

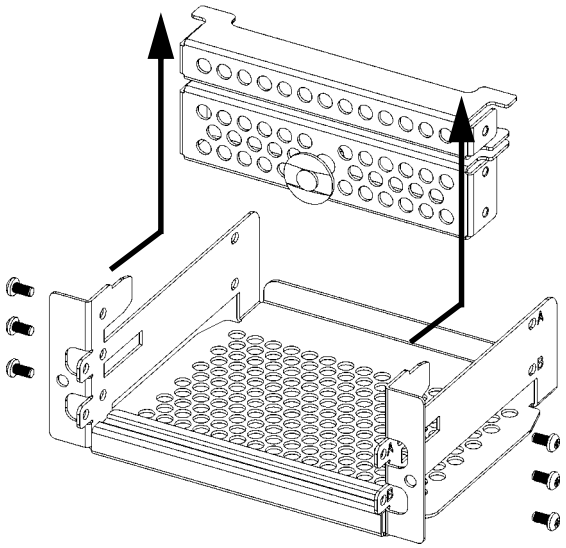
1. Using standard static-suppression practices (described in the Preface to this document), remove the computer's front panel, as described earlier in "Removing the Front Panel" on page 42, and top cover, as described in "Opening the Top Cover" on page 44. Then remove the floppy-drive bay's EMI (electromagnetic interference) cover—the thin metal cover that is snapped in place above the floppy drive bay.
2. Remove the two screws securing the DDS/floppy drive bracket to the main chassis, and pull the bracket straight out. The bracket is referred to as the "DDS/floppy drive bracket" because the same bracket can house either a DDS drive or a floppy drive (but not both simultaneously).

Figure 2-21 Removing the DDS/Floppy Drive Bracket



3. Remove the filler panels from the DDS/floppy drive bracket by removing the screws and sliding the panels back and then up, as indicated in the illustration below. Save the larger of the two filler panels for future use; the smaller of the two will be re-installed after the floppy drive itself has been installed onto the bracket. Four of the six screws will be used to secure the floppy drive to the bracket; the other two screws will be used to re-install the smaller filler panel onto the bracket.

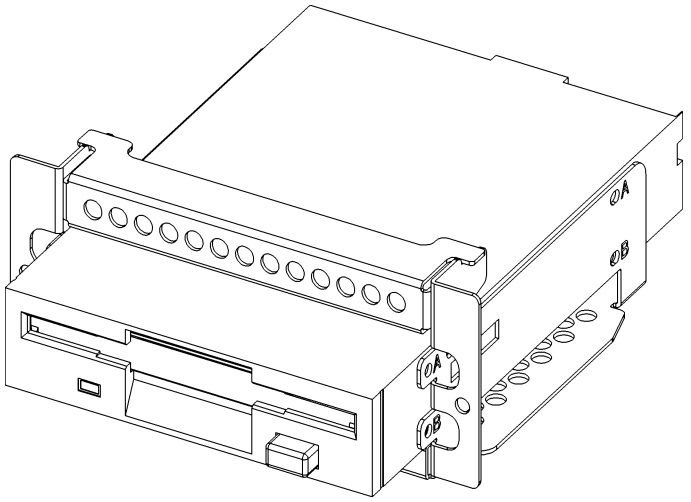
Figure 2-22 Removing the DDS/Floppy Drive Filler Panels



4. Install the floppy drive into the bracket: the drive itself must be inserted into the DDS/floppy drive bracket where the larger of the two fillers had been, and secured by four Torx T-10 screws (two on each side; the four bottom screws in the illustration above).

5. Install the smaller of the two fillers back into the bracket, atop the floppy drive. Secure it with two remaining screws, and the assembly should appear as follows.

Figure 2-23 Floppy Drive, Filler Installed into the DDS/Floppy Drive Bracket



6. Connect the power cable and the data (ribbon) cable to the floppy drive.
7. Slide the bracket, now containing the floppy drive, into the floppy drive bay. Observing—and manipulating, if necessary—from above, make sure the drive's ribbon cable folds neatly and compactly, and its ferrite bead (the elongated loop of iron-containing material) does not hinder the folding process.
8. Seat the bracket into the main chassis, again taking care not to pinch the cables as the floppy drive is being pushed into the bay. Insert the two screws through the front of the tray to secure the assembly to the main chassis.
9. Replace the floppy drive bay's EMI cover, and the computer's top cover and front panel.
10. After rebooting, use SAM (the System Administration Manager) to confirm that the `sioflop` and `siofdc` floppy drivers are in the kernel. If they are not, use SAM to add them to the kernel (after adding drivers to the kernel, rebooting is required in order to put them to use.

For information on normal usage, see the chapter "Using Your 3.5-Inch Floppy Disk Drive."

Verifying the Floppy Drive Configuration

To verify that your workstation can communicate with the floppy drive, use the `ioscan` command in a terminal window to see which devices are currently in use on your system. Note that you will have to be superuser or `root` to use the `ioscan` command.

Enter the following command at the prompt and press **Enter**:

```
/usr/sbin/ioscan -C floppy
```

After a few seconds, the `ioscan` utility lists all of the floppy disk devices it could find. The list appears similar to the following:

```
H/W Path       Class                    Description
=================================================
10/0/14/1/4.1                  floppy  HP_PC_FDC_FLOPPY
```

If `ioscan` does not see any SCSI drives it returns the following message:

```
ioscan: No hardware found
```

If the system does not recognize the drive, see the Troubleshooting chapter for hints on how to determine the problem and solve it.

If the floppy driver is not configured, `ioscan` returns the following message:

```
ioscan: Device driver floppy is not in the kernel
```

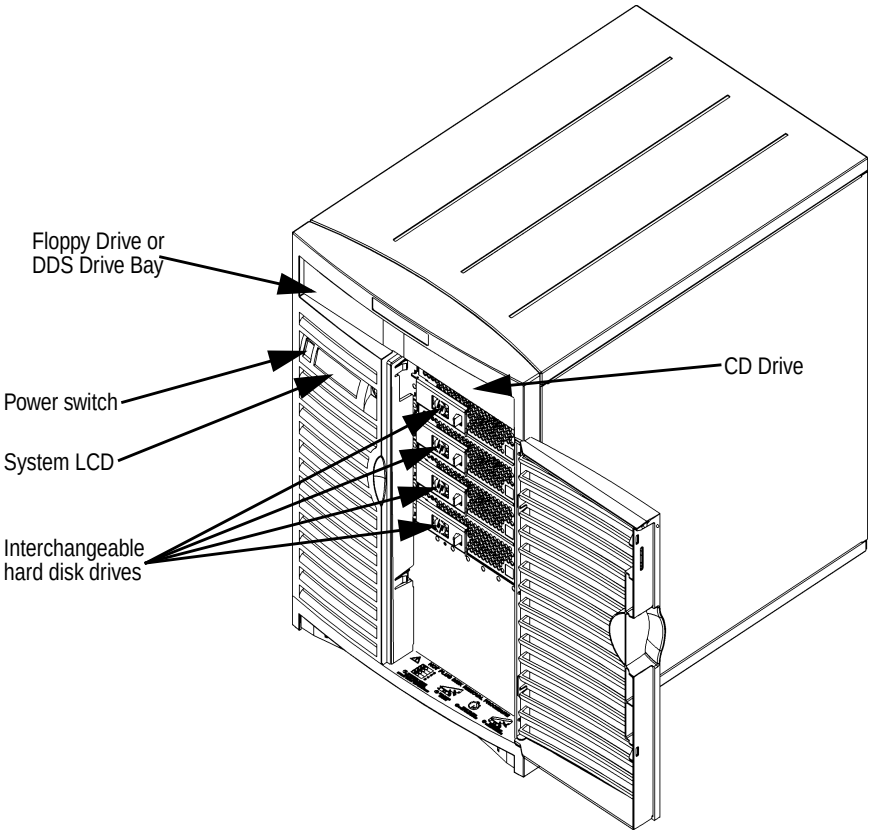
3 Hot-Pluggable Hard Disk Drives

This chapter describes the hot-pluggable hard disk drives, and how to install and remove them.

The Disk Drives

When reconfiguring your computer's internal hardware, always wear a properly grounded wrist strap to avoid damaging components.

Figure 3-1 **System Unit with Front-Panel Door Open**



The above illustration shows that the four hard disk drives are accessible simply by opening the door on the front panel (also known as the "bezel," pronounced "*bezz-ull*"); it is unnecessary to remove the entire panel. From a hardware point of view, these four disk drives are interchangeable: one drive will work as well as any other in any given slot. And, you need not set the SCSI bus addresses for these drives: their

positions in the slots, not switches on the drives themselves, define the SCSI address for each drive. These addresses are labelled on the chassis. Finally, these hard drives are hot-pluggable: that is, you do not need to power down the entire machine to remove or insert a hard disk drive.

CAUTION

However, from a software point of view, there are two restrictions on the interchangeability of these drives:

- The boot device—that disk drive that contains the operating system—must be in drive bay 6, the uppermost bay.
- The boot device must not be removed while the system is running.

For details, see the section “The Hot-Plug Process” later in this chapter.

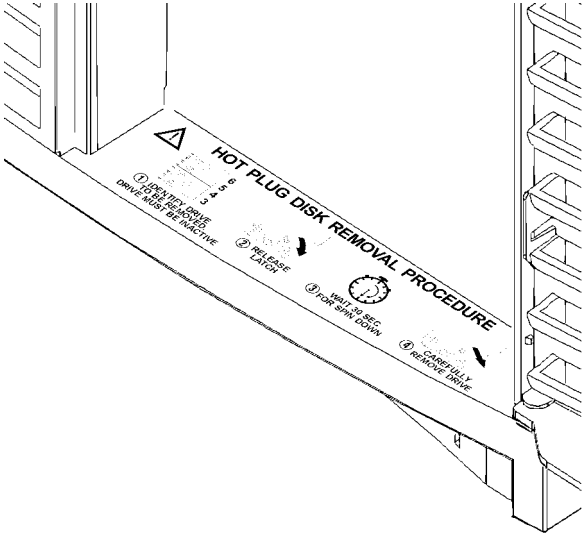
Removing a Hard Disk Drive

The instructions for removing a disk drive from the J5 Class and J7 Class are printed on the front panel, and are visible when the panel door is opened, as shown in the detail below.

CAUTION

If you are removing a hard disk drive while the system is running, you *must* perform the operations outlined in "The Hot-Plug Procedure" on page 81 *before* the physical removal of the drive, or data corruption is likely to occur.

Figure 3-2 Removing a Hard Disk Drive



The instructions are also printed here for your convenience:

1. Identify the drive to be removed, and make sure it is not currently in use. If the machine is to remain powered up, see the section "The Hot-Plug Procedure" on page 81 for the proper preparations.
2. Push the plastic retaining tab to the right, to release the drive-tray's handle. Pull the handle on the drive to unseat it from its power and data connections.

3. Wait about 30 seconds for the drive to spin down (handling of a disk drive while it is still spinning can cause disk damage and/or loss of data).
4. Carefully pull the drive straight out.

If you also need to remove the disk drive from the disk-drive tray—to replace a faulty drive, for example—remove the four screws that secure the drive to the tray. These screws go through rubber grommets; leave the grommets in place as you remove the screws.

Putting a Disk Drive into its Tray

When you receive and unpack a new disk drive, it will not include the tray that is needed in order to insert it into your J5 Class and J7 Class computer; these trays are already in your computer's disk-drive bays. You will need to assemble the disk drive into its tray before you can slide the disk drive and tray assembly into the computer and expect its connections to be made correctly.

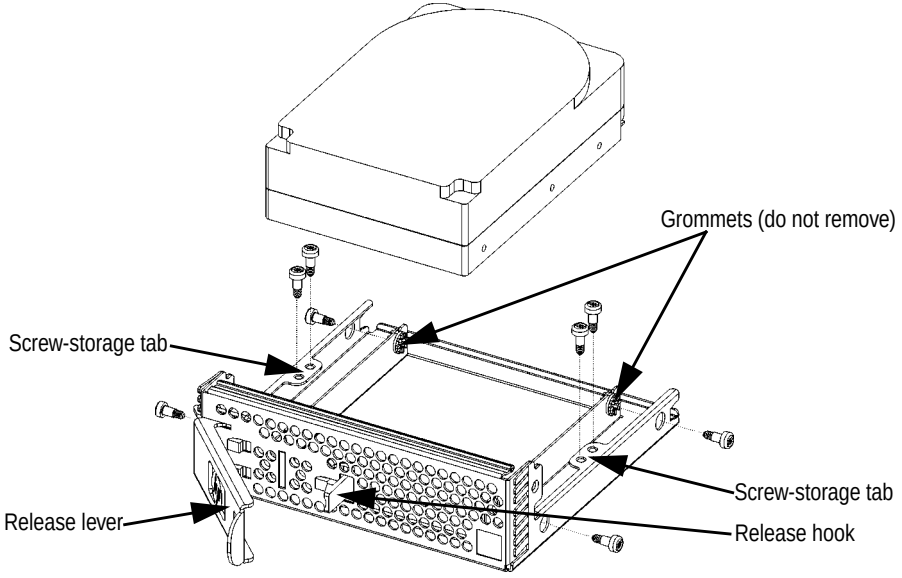
1. Unpack the new disk drive, avoiding both mechanical and electrical shocks; never let it drop onto the floor or onto a desk—always set it down gently—and observe ESD (electrostatic discharge) precautions, as described in the Preface of this document.

CAUTION A drop of just a few inches onto a hard surface such as a desk or the floor can generate large accelerations (hundreds of gees), which may damage the device.

2. Unlock (if necessary) and open the door on the front of the computer. Remove the disk-drive tray from the slot into which you will insert the new drive. To remove the disk-drive tray, release the hook that locks the drive tray's release lever into place (see Figure 3-3, below), and pull the release lever toward you. The tray will come out.
3. If a disk drive was already in the tray (for example, if you're replacing a faulty drive), remove the four screws securing the drive to the tray, and pull the drive straight up out of the tray. If the tray never had a

drive in it, the four screws required to secure the drive to the tray are stored in two tabs on the tray (see illustration below). Remove these four screws from the storage tabs.

Figure 3-3 Installing a Hard Disk Drive into its Tray



4. Insert these four screws through the rubber grommets and into the corresponding holes in the disk drive, and tighten them with a T15 Torx driver. There are four rubber grommets, although only two are visible in the illustration above.

NOTE *Do not* remove the grommets; if they are removed, the drive would not be held securely in the tray and may be damaged as a result.

Once the disk drive is installed into the drive tray, the assembly can be inserted into the desired hard-drive slot.

Inserting a Disk Drive

To insert a drive, the procedure is virtually identical to the “removing” steps above, except in the reverse order:

1. Carefully push the drive, which is already in its tray, straight into the desired slot, making sure the drive-tray's handle is pulled away from the front surface of the tray.
2. When the drive-tray's handle can engage the hooks on the left edge of the slot, push the right end of the handle flush to the front of the drive; this will seat the drive into its power and data connections. When the handle gets flush to the front of the tray, it should engage the retaining tab with a noticeable click.

NOTE The drive tray will not go all the way into the slot if the handle has already been folded flat against the front of the tray. Push the drive tray into the slot firmly, and then push the handle flat against the front of the tray.

The Hot-Plug Process

The physical aspect of inserting and removing a disk drive, as discussed in the previous section, is straightforward. However, the operating system must be prepared for the insertion or removal of a disk, or unexpected and harmful effects may occur.

There is a significant difference between the terms “hot-pluggable” and “hot-swappable.” Hot swapping happens at the device level; that is, a hot-swappable device manages insertion/removal on its own without assistance from HP-UX commands. *The disk drives in the J5xxx and J7xxx are not hot-swappable; they are merely hot-pluggable.* Thus, a manual software procedure must be done in order to safely remove or insert disk drives while the system is running.

The reason the hot-plug process exists is that you might need to replace a defective disk drive in a high-availability system while it is running.

Replacing a Failed Disk Drive

In the context of replacing a failed disk drive, the system administrator must determine which disk has failed. Depending on how the system was set up, the identity of the failed drive may or may not be obvious. This determination may be done in either of two ways:

- Tracking the error messages written by the LVM (Logical Volume Manager) to the system console and/or a log file. For information on LVM commands, see the man pages for `vgdisplay`, `vgchange`, `lvreduce`, `vgcfgrestore`, `lvlnboot`, `lvextend`, etc.
- If installed, run the diagnostic utility Support Tool Manager (`xstm`) to determine disk malfunction.

The removal of a defective disk drive from an active file system is supported through LVM commands if hot-pluggable disks have been configured into the HP-UX file system with LVM. To provide high availability, without impact to users, the disks must also be configured as mirrored disks. Disk-mirroring is accomplished through use of the MirrorDisk/UX software (HP part number B2491A); for information on classes, see `http://www.hp.com/education/courses/h6285s.html`.

No graphical user interface is currently offered through the System Administration Manager (SAM) for doing the required LVM commands,

because manipulation of the LVM requires specialized knowledge that only experienced system administrators are expected to have (see below for details).

Hot-Plug Example

The following example describes a particular system problem where the solution is to replace a hot-plug disk module.

Volume group `/dev/vg00` contains the three disks, with the logical volume configuration as shown:

Table 3-1 Example Configuration

Volume Description	Volume Description	Volume Description
Logical Volume 1	Logical Volume 3	Logical Volume 4
Logical Volume 2	Logical Volume 4	Logical Volume 5
Logical Volume 3	Logical Volume 5	

```
hardware address        10/0/12/0.0  10/0/13/0.0  10/0/14/0.0
device file (/dev/dsk/) c2t6d0        c2t5d0       c2t4d0
```

The system problem for this example is that the disk at hardware address 10/0/14/0.0 has a head crash, and as a result, is unusable. The steps described in the Hot-Plug Procedure section below outline a method that can be used to recover from this state.

1. All of the replaced disk's in-use extents must belong to mirrored logical volumes which were created with the "strict" option (`-s`); see the documentation for MirrorDisk/UX.
2. You must have an up-to-date configuration backup file. This is done automatically each time an LVM command changes LVM configuration.

   The default backup file's path is:
   `/etc/lvmconf/base_vg_name.conf`
3. The replacement disk must be the same product ID as the replaced one.

NOTE HP often uses different manufacturers for disks having the same product number. The hot-plug manual procedure will not update the disk driver's internal information to that of the replaced disk.

The replacement disk will have the same capacity and block size as the defective disk because they have the same product number. The only field that could be incorrect is the string specifying the vendor's name. This will not affect the behavior of the LVM. If it is desired to update the manufacturers' name, the disk's volume group must be deactivated and reactivated. See the *HP-UX System Administration Tasks* manual for details.

The Hot-Plug Procedure

These are the steps required to properly hot-plug a disk drive:

Step 1

- Check if the LVM found the physical volume to be defective when the volume group was activated.
- The "vgchange -ey" would have printed the following message on the console:

```
WARNING:
VGCHANGE:WARNING: COULDN'T ATTACH TO THE VOLUME GROUP
PHYSICAL VOLUME "/DEV/DSK/cXtXdX"

THE PATH OF THE PHYSICAL VOLUME REFERS TO A DEVICE THAT
DOES NOT EXIST, OR IS NOT CONFIGURED INTO THE KERNEL.
```

- If the status of the "vgchange -v vg02" is unknown, you may check if this occurred by doing a vgdisplay command:
  vgdisplay ⟨*VG name*⟩
  For our example:
  vgdisplay /dev/vg00
- If the disk was defective at vgchange time, the following messages will be printed one or more times.

```
WARNING:
VGDISPLAY: WARNING: COULDN'T QUERY PHYSICAL VOLUME
   "/DEV/DSK/cXtXdX"
THE SPECIFIED PATH DOES NOT CORRESPOND TO PHYSICAL VOLUME
ATTACHED TO THE VOLUME GROUP.

VGDISPLAY: WARNING: COULDN'T QUERY ALL OF THE PHYSICAL
VOLUMES
```

- If you see these messages, the disk was defective at the time the volume group was activated.

Otherwise, your disk became defective after the vgchange and you must continue with step 2 of this procedure.

Step 2

- Reduce any logical volumes that have mirror copies on the faulty disk so that they no longer mirror onto that disk (note the `-A n` option):

  `lvreduce -m 0 -A n` ⟨*LV name*⟩ `/dev/dsk/cXtXdX`
  (for 1-way mirroring)

  or

  `lvreduce -m 1 -A n` ⟨*LV name*⟩ `/dev/dsk/cXtXdX`
  (for 2 way mirroring)

For our example:

```
lvreduce -m 0 -A n /dev/vg00/lvol4 /dev/dsk/c2t4d0
lvreduce -m 0 -A n /dev/vg00/lvol5 /dev/dsk/c2t4d0
```

Step 3

- Replace the faulty disk. Refer to the instructions earlier in this chapter for details on how to replace the disk.
- Do an `ioscan` on the replaced disk to insure that it is accessible and also as a double check that it is a proper replacement.

For our example:

```
ioscan /dev/dsk/c2t4d
```

Step 4

- Restore the LVM configuration/headers onto the replaced disk from your backup of the LVM configuration:
  `vgcfgrestore -n` ⟨*volume group name*⟩ `/dev/rdsk/c`*x*`t`*x*`d`*x*

  where *x* is the logical unit number of the disk that has been replaced.

For our example:

```
vgcfgrestore -n /dev/vg00 /dev/rdsk/c2t4d0
```

Step 5

- Attach the new disk to the active volume group with the `vgchange` command.
  `vgchange -a y` ⟨*volume_group_name*⟩

For our example:

```
vgchange -a y /dev/vg00
```

Step 6

- If this disk is not a mirror of a root disk, then skip this step.
- Run the `mkboot` command. For our example:
  ```
  mkboot /dev/rdsk/c2t4d0
  ```
- Run `lvlnboot -R` to relink the replaced disk into the Boot Data Reserved Area of all the Physical Volumes in the Volume Group.
  ```
  lvlnboot -R
  ```

Step 7

- Run `lvextend` to extend the mirrors back onto the replaced disk. This may take several minutes, as it will have to copy all the data from the original copy of the data to the mirrored extents. The logical volume(s) are still accessible to users' applications during this command.
  ```
  lvextend -m 1 ⟨LV name⟩ /dev/dsk/cxtxdx
  ```
  or
  ```
  lvextend -m 2 ⟨LV name⟩ /dev/dsk/cxtxdx (3-way mirroring)
  ```

For our example:

```
lvextend -m 1 /dev/vg02/vg02 /dev/dsk/c3t5d0
lvextend -m 1 /dev/vg00/lvol4 /dev/dsk/c2t4d0
lvextend -m 1 /dev/vg00/lvol5 /dev/dsk/c2t4d0
```

At this stage, your system should be fully functioning; use `xstm` to verify.

Checking the SCSI IDs

To determine which SCSI IDs are currently in use on your system, use the `ioscan` command in a terminal window. Note that you will need to be superuser (`root`) in order to use the `ioscan` command.

Here are the steps necessary for determining SCSI IDs:

1. In a terminal, type the following at the shell prompt and press **Enter**:

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

   After a few moments, the `ioscan` utility lists all of the I/O devices it could find. The list appears similar (but likely not identical) to the following:

```
Class       I  H/W Path       Driver    S/W State   H/W Type     Description
=============================================================================
bc          0                  root      CLAIMED     BUS_NEXUS
bc          1  10              ccio2     CLAIMED     BUS_NEXUS    I/O Adapter
ba          0  10/0            lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
graphics    0  10/0/1/0         graph3    CLAIMED     INTERFACE    PCI(103c1005) -- 1
lan         0  10/0/12/0        btlan3    CLAIMED     INTERFACE    PCI(10110019)
audio       0  10/0/13/0        audio     CLAIMED     INTERFACE    Built-in Audio
ext_bus     0  10/0/14/0        side      CLAIMED     INTERFACE    IDE
target      0  10/0/14/0.0      tgt       CLAIMED     DEVICE
disk        0  10/0/14/0.0.0    sdisk     CLAIMED     DEVICE       TEAC    CD-532E-B CDROM
target      1  10/0/14/0.7      tgt       CLAIMED     DEVICE
ctl         0  10/0/14/0.7.0    sctl      CLAIMED     DEVICE       Initiator
ba          1  10/0/14/1        superio   CLAIMED     BUS_NEXUS    PCI Core I/O Adapter
tty         0  10/0/14/1/1      asio0     CLAIMED     INTERFACE    Built-in RS-232C
tty         1  10/0/14/1/2      asio0     CLAIMED     INTERFACE    Built-in RS-232C
ext_bus     1  10/0/14/1/3    SCentIf   CLAIMED     INTERFACE    Built-in Parallel Interface
pc          0  10/0/14/1/4      siofdc    UNCLAIMED   UNKNOWN      Built-in Floppy Drive
usb         0  10/0/14/2        hcd       CLAIMED     INTERFACE    Built-in USB Interface
usbhub      0  10/0/14/2.1      hub       CLAIMED     DEVICE       USB Root Hub
usbhid      0  10/0/14/2.1.2    hid       CLAIMED     DEVICE       USB HID Kbd(0)
usbhid      1  10/0/14/2.1.3    hid       CLAIMED     DEVICE       USB HID Mouse(1)
ext_bus     2  10/0/15/0        c720      CLAIMED     INTERFACE    Ultra Narrow Single-Ended
                SCSI
target      2  10/0/15/0.7      tgt       CLAIMED     DEVICE
ctl         1  10/0/15/0.7.0    sctl      CLAIMED     DEVICE       Initiator
ext_bus     3  10/0/15/1        c720      CLAIMED     INTERFACE    Ultra2 Wide LVD SCSI
target      3  10/0/15/1.6      tgt       CLAIMED     DEVICE
disk        1  10/0/15/1.6.0    sdisk     CLAIMED     DEVICE       SEAGATE ST39102LC
target      4  10/0/15/1.7      tgt       CLAIMED     DEVICE
ctl         2  10/0/15/1.7.0    sctl      CLAIMED     DEVICE       Initiator
ba          2  10/1              lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
ba          3  10/2              lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
ext_bus     4  10/2/3/0         c720      CLAIMED     INTERFACE    Ultra Wide SCSI
target      5  10/2/3/0.7       tgt       CLAIMED     DEVICE
ctl         3  10/2/3/0.7.0     sctl      CLAIMED     DEVICE       Initiator
```

```
ba          4  10/4          lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
ba          5  10/6          lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
graphics    1  10/6/7/0       graph3    CLAIMED     INTERFACE    PCI(103c1008)
processor   0  32            processor CLAIMED     PROCESSOR    Processor
processor   1  34            processor CLAIMED     PROCESSOR    Processor
memory      0  49            memory    CLAIMED     MEMORY       Memory
```

2. You can determine which SCSI IDs are currently in use by looking under the "H/W Path" heading. In the example display, the H/W Path for the built-in SCSI interface is 8/16/5. For devices connected to the built-in SCSI bus, such as disks, the fourth number is the SCSI ID for that device. For example, the listing 8/16/5.2.0 tells you that there is a SCSI device (a disk) currently using ID 2 on the SCSI bus.

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

Using Device Files

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

NOTE The device file names depend on the naming conventions of your particular system.

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

1. In a terminal window, become root and type the following command at the prompt and press **Enter**:

   ```
   sam
   ```

   The System Administration Manager (SAM) window opens.

2. Double click on the **Disks and File Systems** icon. The Disk and File Systems window opens.
3. Click on a desired disk drive in the list of disk devices to select it.
4. Select the **Actions** menu and then select the menu item **View More**

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

4 Using Your CD Drive

Operating the CD Drive

This section describes how to use your CD drive.

NOTE Be sure you read and understand the information on mounting and unmounting CDs before you begin using your CD drive.

This chapter provides an overview of the optional CD drive and media, and describes how to install and use the CD drive.

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

In this chapter, we use the terms “CD” and “CD drive” rather than “CD-ROM” and “CD-ROM drive” because the CD drives used in the J5xxx and the J7xxx can read the original CD-ROM disks, plus CD-R disks and the newer CD-RW disks (also called “CD-RAM” because they are rewritable). Thus, since not all CDs are ROMs any longer, that portion of the term has been dropped.

The CD drives also are multisession-capable.

Note that this chapter assumes you are running HP-UX 10.20 or 11.0.

The CD Drive

The CD drive is a random-access read-only mass storage device that uses removable CDs.

The drive supports the ISO 9660 and High Sierra format standards. You can access information from the drive like any other disk drive, except that you cannot write to the drive. The drive contains a semiconductor laser for reading data optically, and includes an embedded controller with an ATAPI interface.

Controls and Features

The figure below and the subsequent table illustrate and describe the operating controls and features of the CD drive.

NOTE The Busy Indicator, Emergency Eject Hole, and Eject Button may not be in exactly the locations indicated in the illustration below.

Figure 4-1 The CD Drive's Controls

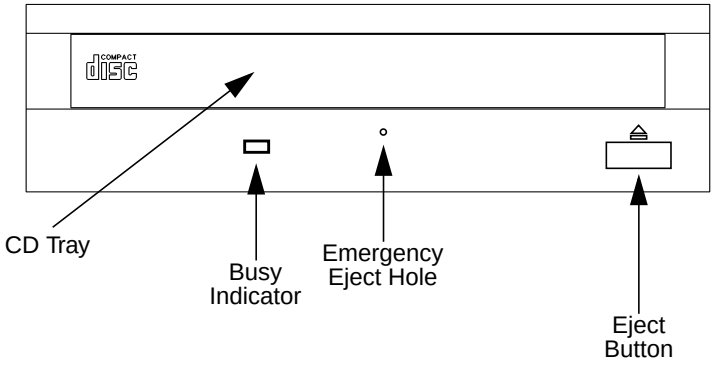


Table 4-1 CD Drive Controls and Indicators

Control/Feature	Purpose
Busy Indicator	The Busy Indicator blinks during various operations of the drive.
Eject Button	Press the Eject Button to open the disk tray to insert or remove a disk. When the drive is in use, you must press the eject button for more than one second to open the disk tray.
Emergency Eject Hole	By inserting the end of a straightened paperclip, you can open the disk tray when the workstation is powered down.
CD Tray	The CD Tray holds the CD. This CD drive does not use a CD caddy.

NOTE There is neither a volume control nor a headphone jack on the front of the CD drive. To listen to an audio CD, use the headphone jack on the rear panel, and control the sound volume via software called "`xmcd`" (for details, see "Audio Control for the CD Drive" on page 93).

CD Media

CDs are 120mm (4.7 in.) in diameter, and use one data surface with a capacity of approximately 600 megabytes. The data surface contains pits and flat spots arranged in a continuous spiral track, which is read at a constant linear speed (and hence a variable rotational speed). Originally, all CDs were CD-ROMs; i.e., you could access files and data stored on them, but could not write files or data to them; it was indeed a CD-ROM; i.e., Read-Only Memory. Since then, writable, and even rewritable CDs ("CD-RAMs") have come available; your workstation can read any of these types of CDs, but you cannot write CDs with your workstation without additional hardware and software.

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

CAUTION Handle CDs by the edges only. Always be sure a CD is either in the CD drive or its protective case or envelope when not in use. If you *must* set it down when it is not in its protective case or envelope, lay it down with the shiny side up (labelled side down); this will lessen the chance of scratch damage to the more-sensitive data side. Putting CDs back into their cases or envelopes will lessen the chance of exposing the disk surface to dust, fingerprints, and objects that could scratch the CD. These factors will reduce the reliability of the read head in the CD drive.

Caring for CDs

Observe the following guidelines to help prevent data loss and prolong the life of your CDs and drive:

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

NOTE You must mount a CD after loading it into the drive. Refer to "Mounting and Unmounting a CD" on page 96 for instructions on mounting a CD.

Loading and Unloading a CD in the disk Tray

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

Loading a CD

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

1. Check that the workstation is powered on.
2. To open the disk tray, press and release the Eject button on the CD drive.
3. Hold the disk by the edges with the label side up and place it in the disk tray.
4. To close the disk tray, push the Eject button again, as it also serves to close the tray.

Unloading a CD

You must unmount the disk before you eject it from the drive. Unmount the CD, using either the `umount` command or the instructions in “Unmounting a CD Using SAM” on page 98. Perform the following steps to unload a disk from the CD drive:

1. Press the eject button to eject the disk tray from the drive. If the drive is in use, you must press the eject button for more than one second to eject the disk tray.
2. Wait until the drive has fully ejected the disk tray. Remove the disk from the tray. Be careful to touch only the edges of the disk.
3. To close the disk tray, push the Eject button, as it also serves to close the tray

Audio Control for the CD Drive

The audio controls for your CD drive are provided through the xmcd utility. This is a third-party CD player utility that runs on an X windows system using the Motif graphical user interface. The xmcd utility is not supported by Hewlett-Packard, and it is one of many audio controllers for CD drives available in the marketplace. Since the xmcd utility is not a part of HP-UX, you will need to download it off the web using your web browser and this URL:

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

Installing the xmcd Utility

Here is the procedure for downloading the xmcd utility to your system:

1. Log in as root.
2. Type the previously given URL into the entry box on your web browser and press **Enter**.
3. Select the menu item labeled **Downloads** found on the xmcd homepage.
4. Scroll down to the section "Select your platform:" on the **Downloads** web page and select the item labeled "HP-UX 9.*x* and later (HP PA-RISC)."
5. Wait for a few seconds for the **Save As...** pop-up window to appear. In this window, click in the Selection entry box and type the following path and file name:

   ```
   /tmp/xmcdbin.tar.gz
   ```

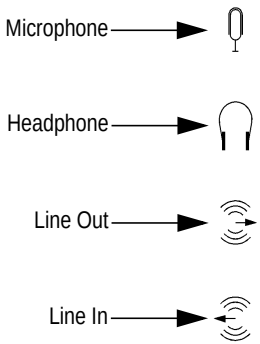
   Next, click the **OK** button. This completes the download of xmcd to your system.
6. Follow the instructions in the section "Instructions to unpack xmcd binary" found on this **Binary Downloads** web page. This will complete the installation of the xmcd utility.

Using the xmcd Utility

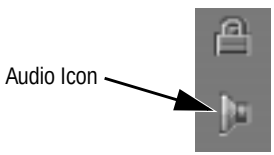
The instructions in the section assume that you are using the HP-UX 10.20 or 11.0 operating system with the HP CDE interface. The xmcd utility must also be installed on your system. See the section “Installing the xmcd Utility” above.

To load and play an audio CD, follow the steps in this procedure.

1. Load the audio CD. See the section “Loading a CD” in this chapter.
2. Insert the headphone plug into the headphone jack located on the back of your system unit.



3. Double-click on the **Audio** icon located on your HP CDE control panel.



4. Click on the **Monitoring** checkbox in the **Audio** window to select it. Then select the **Output** menu and click on the **Headphones** item in the menu list. In the **File** menu select the item **Close**, this will close the **Audio** window and save your settings.

5. Start the utility by typing `xmcd` at the prompt and pressing **Enter**.

Now that you have your audio CD player started, put on your headphones and press the **Play** button to listen to the audio CD. Note that pressing the **Help** button will give you information on how to use the rest of the CD player's buttons.

Mounting and Unmounting a CD

In normal system use—i.e., other than installing the operating system or firmware—you must first mount a CD in order to access information on it (this applies to file system information only: if you wish to load a music CD, you would not need to mount the disk). Mounting a disk with file system information on it gives the disk a pathname that allows your workstation to communicate electronically with it. Similarly, you must unmount the CD before removing it from the drive.

CAUTION

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

To mount a CD as a file system, you can use the `mount` command (see the man page for `mount` for details). Or, you can use SAM (the System Administration Manager) if you prefer; the instructions for using SAM to mount and unmount CDs are in the next section.

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

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

Mounting a CD Using SAM

Use the following procedure to mount a CD:

- Log in as `root`. If you need information on logging in or setting up a user account, see *Using Your HP Workstation*.
- Load the CD into the disk tray and push the Eject button, or gently push the tray a short distance into the drive; the drive will then close the rest of the way by itself.
- In a terminal window, enter the following command:

  `sam` **Enter**

- The System Administration Manager window opens, showing several icons, one of which looks like this:

- Double-click on the Disks and File Systems icon, and the **Disks and File Systems** window appears, showing several more icons, one of which looks like this:

- Double-click the File Systems icon, and a window containing a list of mounted file systems appears. The following screen message appears:

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

  The **File Systems** window opens, containing a list of drives currently mounted on this system.

- From the **Actions** menu, select **Add a Local File System**, and submenu **Not Using Logical Volume Manager**.

- The **Select a Disk to Add...** window opens with a list of unused mass-storage devices. Highlight the CD device containing the CD you want to mount.
- Click on **OK**.
- The **Add CD-ROM Disk** window opens. Enter the desired mount point (the directory under which the CD's contents will appear in your entire file system) and click on **OK**. A typical CD mount point is `/dev/CD`, although you can mount it wherever you want. If the directory you specify does not yet exist, SAM will create it for you.
- The following screen message appears:

  ```
  Mounting file system...
  ```

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

Unmounting a CD Using SAM

Use the following procedure to unmount a CD:

NOTE

Before you unmount a CD, make sure that your working directory (the directory you're currently "in") is not set to any directory on the CD—this goes for all shell windows. If you attempt to unmount a file system when one or more working directories are set somewhere in the file system you're trying to unmount, you'll get an error message something like this:

```
cannot unmount /dev/CD: device busy
```

To avoid this error message, simply `cd` to some directory that is known to *not* be in the file system you want to unmount; for example, the root directory `/` or your home directory. Again, make sure you do this for *all* shell windows.

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

   `sam` **Return**

   The System Administration Manager window opens, showing several

icons, one of which looks like this:

3. Double-click on **Disks and File Systems ->**. The Disks and File Systems window opens, showing several more icons, one of which look like this:

4. Double-click on **File Systems**. A window appears, and at the bottom, the following screen message appears briefly:

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

   The File Systems window opens, containing a list of drives currently configured on this system.

5. Highlight the CD you want to unmount (it has a Type of CDFS) and click on **Remove** from the **Actions** menu. A window with a message, similar to the following, appears:

   ```
   Removing the file system, /dev/CD, means all files in
   the file system will no longer be available. Do you
   want to continue and remove this file system?
   ```

   Note that the mount point of your CD may be different than the /dev/CD in the example above.

6. Click on **Yes**. After a few seconds, the CD entry in the list vanishes, and CD file system is unmounted.

7. Press the eject button on the CD drive and remove the CD from the disk tray.

5 Using Your Digital Data Storage (DDS) Tape Drive

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

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

Note that there is physically not room enough to have both a DDS tape drive and a floppy disk drive in the workstation simultaneously.

DDS Tape Drive and Cassette Descriptions

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

The DDS Drive

The DDS-3 tape drive has a 3.5-inch form factor and a narrow single-ended SCSI interface. It incorporates data-compression capability and is a high-capacity, high-transfer-rate device for data storage on tape. With compression, a DDS-3 drive can store up to 24GB of data on a 125-meter tape.

Storage Capacities

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

Table 5-1 DDS3 Tape Drive Capacities Without Data Compression

Tape Length	DDS3 Capacity
60 meters	1.3 GB
90 meters	2.0 GB
120 meters	4.0 GB
125 meters	12.0GB

DDS3 drives will write DDS1 on 60m and 90m tapes, DDS2 on 120m tapes and DDS3 format on 125m tapes. DDS3 format has the same track density as DDS2 but triples the linear bit density. This yields the non-intuitive native capacity (before compression) of 12Gbytes on a 125m tape.

With compression, the capacities double:

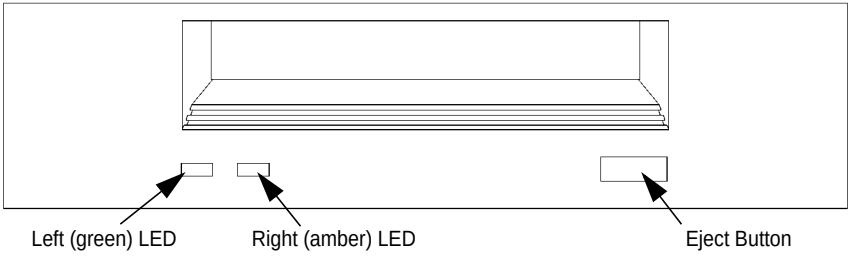
Table 5-2 DDS3 Tape Drive Capacities With Data Compression

Tape Length	DDS3 Tape Drive
60 meters	2.6 GB
90 meters	4.0 GB
120 meters	8.0 GB
125 meters	24.0 GB

Controls and Indicators

The figures below show the LEDs and eject button of the DDS-format tape drives.

Figure 5-1 DDS-3 Drive Controls and Indicators



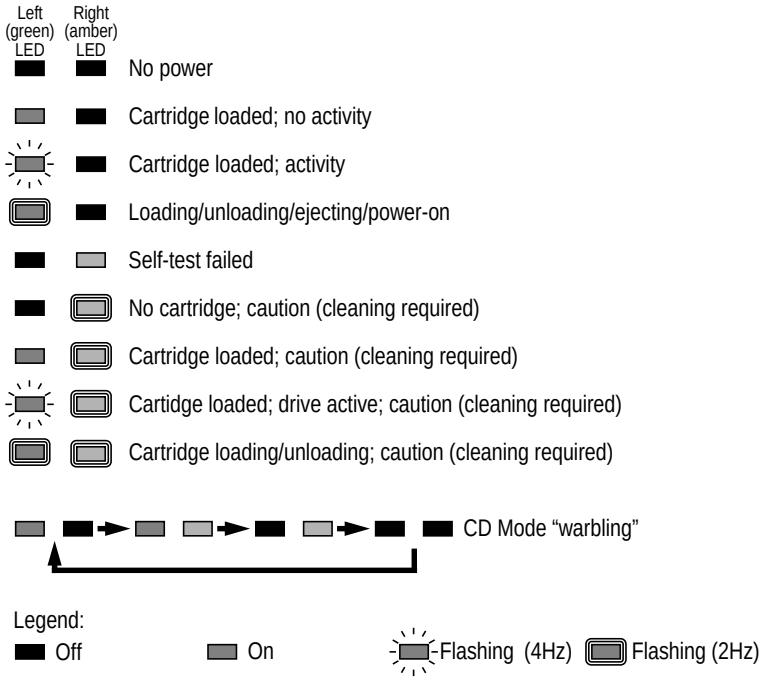
LEDs

This section describes the LED codes that are displayed.

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

The following illustration shows the LED codes and their meanings for the DDS3 drive.

Figure 5-2 **DDS3 Tape Drive LED Display Codes**



LED Warning Conditions

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

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

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

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

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

Data Cassettes

Media Life

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

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

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

Cleaning the Tape Heads

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

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

Follow this procedure to clean the tape heads:

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

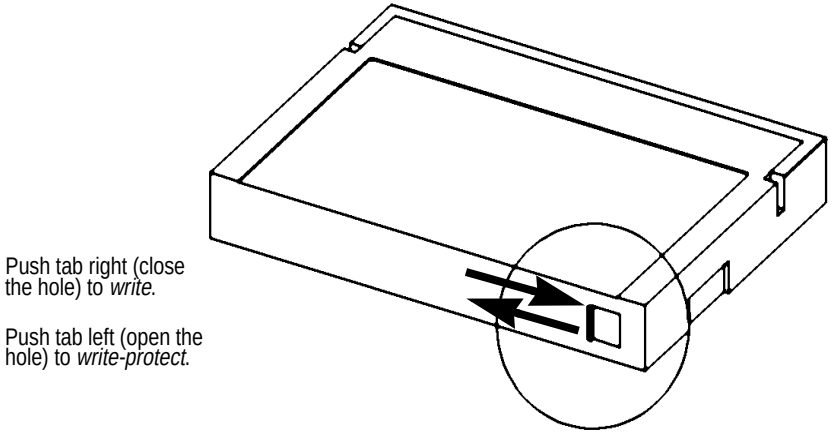
Media Restrictions

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

Setting the Write-Protect Tab on a Data Cassette

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

Figure 5-3 **Setting the Write-Protect Tab on a DDS Tape**



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

NOTE The write-protect tab must be in the write position for transferring data to a cassette.

Operating the DDS Tape Drive

Loading and Unloading a Data Cassette

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

- Insert the data cassette into the drive, the hinged door first, and the write-protect tab visible on the right side of the trailing edge.
- Push the data cassette about three quarters of the way into the drive. The drive automatically pulls the data cassette the rest of the way in. When the LEDs on the front of the drive stop flashing, the drive has loaded the data cassette.
- To remove the data cassette, press and release the eject button on the front of the drive, as shown in Figure 5-1 on page 104. The LEDs on the drive flash on and off, and ten to twenty seconds later, the data cassette slides partway out of the drive. Remove the cassette from the drive.

Using Device Files

Device files are special files that tell your system which system hardware pathway to use when communicating with a specific device, and what kind of device it is. To determine what device files are available for use with your tape drive, use the following procedure:

1. In a terminal window, become `root` and enter the following command:

   `sam` **Return**

   The System Administration Manager window opens.

2. Double-click on **Peripheral Devices ->**. The Peripheral Devices window opens.
3. Double-click on **Tape Drives ->**. The Tape Drives window opens.
4. In the list of tape drives, click on the desired tape drive to select it.
5. From the **Actions** menu, click on **Show Device Files**. A window opens with a list of the device files for the selected tape drive with an explanation of each one.

Archiving Data

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

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

Writing to a Data Cassette

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

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

   `tar -cvf /dev/rmt/`⟨*devicefile*⟩ ⟨*pathname*⟩

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

Restoring Files from a Data Cassette to Your System

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

1. Load the data cassette into the tape drive.
2. In a terminal window, use `cd` to change to the directory in which you want the restored files to reside. (This only works if the tape archive was created using relative pathnames; if absolute pathnames were used, the files from the tape will be placed back into their original locations.)
3. Enter the following command line to restore data:

   `tar -xvf /dev/rmt/`⟨*devicefile*⟩ ⟨*pathname*⟩

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

Listing the Files on a Data Cassette

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

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

   `tar -tvf /dev/rmt/`⟨*devicefile*⟩

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

Further Command Information

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

```
man tar Return
```

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

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

```
man command
```

Ordering Information

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

1. HP 92283A: Box of five 60-meter DDS data cassettes
2. HP 92283B: Box of five 90-meter DDS data cassettes
3. HP 92300A: Box of five 120-meter DDS data cassettes (not supported on the DDS-DC drives)
4. HP C1517A: Box of five 125-meter DDS3 data cassettes
5. HP 92283K: Package of two head-cleaning cassettes
6. HP 92283L: Lockable storage box for 12 cassettes

CAUTION Use only data cassettes labeled as DDS or DDS3 (Digital Data Storage) cassettes. Never use audio cassettes labeled DAT (Digital Audio Tape) in your DDS-format drive.

6 Using Your 3.5-Inch Floppy Disk Drive

This chapter describes how to perform tasks that allow you to archive to or transfer data from the 3.5-inch floppy disk drive.

The instructions in this chapter assume you are using the HP-UX 10.20 or 11.0 operating system, and the HP CDE interface.

NOTE

When examples of user input are given in this chapter, enter them at the command-line prompt in an HP CDE terminal window or HP-UX shell.

Some procedures in this chapter require you to log in as superuser (`root`). If you cannot log in as `root`, contact your system administrator.

To install your floppy disk drive into your computer, the procedure is very similar to that of installing a DDS tape drive (see Chapter 5 , “Using Your Digital Data Storage (DDS) Tape Drive,” on page 101.

Note that there is physically not room enough to have both a floppy disk drive and a DDS tape drive in the machine simultaneously.

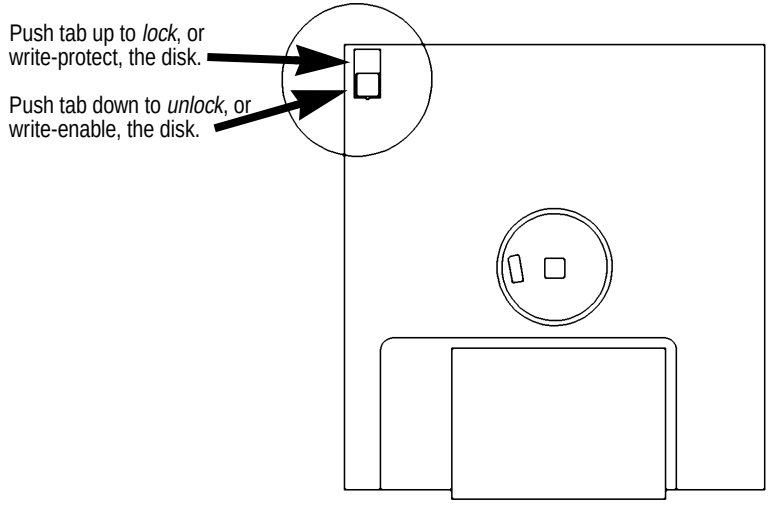
Using the Floppy Diskette

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

Setting the Write-Protect Tab on a Diskette

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

Figure 6-1 **Setting the Write-Protect Tab on a Floppy Diskette**



To protect files on a diskette from being overwritten, set the write-protect tab to the write-protect position.

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

Inserting and Removing a Diskette

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

1. Insert the diskette into the drive, sliding-door edge first, label side up.
2. Push the diskette into the floppy drive until it clicks into place.
3. Remove the diskette by pressing the eject button and taking it out of the drive.

Operating the Floppy Drive

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

Formatting a New Diskette

Unless a floppy disk is preformatted for use on PCs, you must always format a new floppy diskette with the `mediainit` utility before using the diskette. To format a new floppy diskette, follow these steps:

1. Log in as `root`.
2. Make sure that the write-protect tab on the floppy diskette is in the write position, as shown in the illustration two pages back.
3. Insert the diskette into the floppy disk drive.
4. Type the following at the prompt and press **Enter**:

   `mediainit -i 2` ⟨*devicefile*⟩

   where ⟨*devicefile*⟩ is the device file as listed by SAM (double-click the **Peripheral Devices** icon, double-click **Device List** icon, single-click the CD drive from the list, and then select the **Actions** menu item **Show Device Files**).

Transferring Data To and From a Floppy Diskette

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

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

Saving Files to a Floppy Diskette

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

1. Check the write-protect tab on the floppy diskette to ensure that it is in the write position.

2. Load the formatted floppy diskette into the disk drive.
3. Type the following in a terminal window at the prompt and press **Enter**:

   `tar -cvf` ⟨*devicefile*⟩ ⟨*pathname*⟩

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

Restoring Files from a Floppy Diskette to Your System

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

1. Load the floppy diskette into the disk drive.
2. Type the following in a terminal window at the prompt and press **Enter**:

   `cd` ⟨*directory_path*⟩

   This command changes you to the directory in which you want the files to reside.
3. Enter the following command at the prompt and press **Enter**:

   `tar -xvf` ⟨*devicefile*⟩ ⟨*pathname*⟩

   where ⟨*devicefile*⟩ is the device file as listed in SAM and ⟨*pathname*⟩ is the path name of the file or directory containing files that you want to restore from the diskette. If you do not specify ⟨*pathname*⟩, everything on the floppy diskette is restored.

Listing the Files on a Floppy Diskette

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

1. Load the floppy diskette into the disk drive.
2. Enter the following in a terminal window at the prompt and press **Enter**:

   `tar -tvf` ⟨*devicefile*⟩

   where ⟨*devicefile*⟩ is the device file as listed by SAM. Note that this command will list all files on the floppy diskette.

For More Information

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

```
man tar
```

You can mount the floppy drive as a file system using either the `mount` command or the SAM utility. Be sure to unmount the floppy's file system before physically removing the floppy from the drive. For more information about how to mount and unmount the floppy drive, see the man page for `mount`, or the manual *Using HP-UX*.

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

```
man cpio
```

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

```
man doscp
```

For more information on listing DOS directories, refer to the `dosls` man page by typing the following in a terminal window at the prompt and pressing **Enter**:

```
man dosls
```

For more information on using you floppy disk drive and floppy diskettes, refer to the `floppy` man page by typing the following in a terminal window at the prompt and pressing **Enter**:

```
man floppy
```

For more information on using the `mediainit` command, refer to the `mediainit` man page by typing the following in a terminal window at the prompt and press **Enter**:

```
man mediainit
```

Configuring the Floppy Driver

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

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

- *Managing Systems and Workgroups*
- *Using HP-UX*

Ordering Information

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

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

7 SCSI Connections

This chapter provides information about connecting Small Computer System Interface (SCSI) devices to an HP VISUALIZE J5 Class and J7 Class computer.

The instructions in this chapter assume you are using HP-UX 10.20 or 11.0 operating system with HP CDE.

NOTE When attaching external SCSI devices, be sure to terminate the last device on the external SCSI bus. Note that these terminators were shipped with your system.

SCSI Bus Differences

A Small Computer Systems Interface (SCSI) bus is an IEEE standard bus for connecting your workstation to internal and external devices (SCSI devices) running at different speeds. There maybe one device connected to the external SCSI port or several SCSI devices may be daisy chained together and connected to the external SCSI port. Examples of these SCSI devices are 4mm DDS-format tape drives and hard disk drives.

There are two types of SCSI buses available with this workstation—an Ultra Narrow Single-Ended SCSI bus (NSE SCSI), and an Ultra2 Wide Low-Voltage Differential SCSI bus (LVD SCSI). The following table shows the specification differences between these SCSI buses.

CAUTION Currently Hewlett-Packard does not support mixing Ultra Narrow Single-Ended and Ultra2 Wide Low-Voltage Differential devices on any one bus type.

Table 7-1 SCSI Bus Differences

Type	Data Transfer Rate	Data Bus Width	Available SCSI Addresses[1]	Maximum Cable Length	Device Physical Location[2]
Ultra Narrow Single-Ended	Up to 20 Mbytes/sec	8 bits	0 through 6	3.0 meters (9.84 feet)	Internal and external
Ultra2 Wide Low-Voltage Differential	Up to 80 Mbytes/sec	16 bits	0 through 6; 8 through 15	12 meters (39.37 feet)	Internal and external

1. Address 7 is reserved for host controller use on all buses.
2. This information is specific to the HP Visualize B1000/C3000 and J5 Class and J7 Class computers.

SCSI Restrictions

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

- Cables
- Terminators
- Number of Devices Per SCSI Bus
- Considerations for Selecting SCSI Devices

Note that the narrow single-ended SCSI bus supports only 7 devices because address 7 is reserved by the system. The Ultra2 Wide Low-Voltage Differential SCSI bus supports only 15 devices because address 7 is reserved by the system.

Cables

Only SCSI cables approved by HP can be used to connect your workstation to any SCSI devices. HP offers the following SCSI cables for Ultra Narrow Single-Ended SCSI devices:

Table 7-2 Ultra Narrow Single-Ended SCSI Cables

Cable Number	Cable Length	Description
C2955A	0.5m	50-pin HDTS (High-Density Thumbscrew) to 50-pin HDTS
C2908A	1.0m	
C2956A	1.5m	
C2957A	2.0m	

HP offers the following SCSI cables for connecting externally connected devices to the system Ultra2 Wide Low-Voltage Differential port:

Table 7-3 Ultra2 Wide Low-Voltage Differential SCSI Cables

Cable Number	Cable Length	Description
C2978A	0.5m	68-pin HDTS (High-Density Thumbscrew) to 68-pin HDTS
C2911B	1.0m	
C2979A	1.5m	
C2924B	2.5m	
C2361A	1.0m	68-pin VHDCI (Very High Density Cabled Interconnect) to 68-pin HDTS
C2362A	2.5m	
C2365A	5.0m	
C2363A	10.0m	

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

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

NOTE See “SCSI Bus Length Constraints” later in this chapter to determine the total length of your cables.

Terminators

The terminators for Ultra2 Wide Low-Voltage Differential SCSI (LVD SCSI) and Ultra Narrow Single-Ended SCSI (NSE SCSI) are different. The NSE SCSI terminator has 50 pins and will fit on an NSE SCSI connector. The LVD SCSI terminator has 68 pins and will fit on a LVD SCSI connector. Note that these SCSI terminators were shipped with your system.

CAUTION

It is necessary to put a terminator on unused SCSI connectors on the back panel of the system; *these terminators are shipped with your computer.* However, if SCSI devices are attached to the bus via these connectors, the external device connected to the SCSI bus must be terminated with a SCSI terminator. If you do not already have the SCSI terminators, you must order terminator A1658-63012 (for the 50-pin terminator; NSE SCSI) or A4986-63008 (for the 68-pin terminator; LVD SCSI) from Hewlett-Packard.

Number of Devices Per SCSI Bus

The number of SCSI devices per bus is limited (see Table 7-1). Before adding another SCSI device, determine if the system can support the additional device.

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

- Ultra Narrow Single-Ended SCSI bus
- Ultra2 Wide Low-Voltage Differential SCSI bus

Considerations for Selecting SCSI Devices

SCSI devices supported by the Hewlett-Packard Company for the Ultra Narrow Single-Ended (NSE) and Ultra2 Wide Low-Voltage Differential (LVD) SCSI buses have been qualified as SCSI devices which meet NSE and LVD specifications. Contact your local HP sales representative for a current list of SCSI devices supported by HP for use on the Ultra Narrow Single-Ended and Ultra2 Wide Low-Voltage Differential SCSI buses.

If devices other than those supported by HP are connected to the Ultra

Narrow Single-Ended or the Ultra2 Wide Low-Voltage Differential SCSI bus on this system, they must adhere to cabling, termination and bus length restrictions discussed in this chapter to assure functionality of the SCSI busses.

Because Ultra2 Wide Low-Voltage Differential SCSI is a relatively new technology, there can be products which are advertised as LVD compliant, but may not meet LVD specifications. Therefore, additional caution must be exercised when choosing Ultra2 Wide Low-Voltage Differential SCSI devices other than those supported by Hewlett-Packard Company to connect to the Ultra2 Wide Low-Voltage Differential SCSI bus on this system. For example, the cabling inside one of these devices in question may not have a differential impedance between 110 and 135 ohms and it may be constructed in a way such that the device has considerable crosstalk on critical signals, such as Reset, Select and Busy. Failure to strictly adhere to the Ultra2 Wide Low-Voltage Differential SCSI bus specifications will impact the performance of the LVD bus. The Ultra2 Wide Low-Voltage Differential interface is a much higher performance SCSI bus than previous SCSI buses and is more sensitive to adherence to the electrical specifications.

Low-voltage differential signaling specifications are described in the SCSI Parallel Interface-2 (SPI-2) document and in the Electrical Characteristics of Low Voltage Differential Signaling (LVDS) Interface Circuits TIA/EIA-644 document. Both of these documents can be obtained from:

Global Engineering Documents
15 Inverness Way East
Englewood, CO 80112-5704
800-854-7179 or 303-397-7956

SCSI Bus Length Constraints

This section discusses SCSI bus length constraints for the Ultra Narrow Single-Ended SCSI bus and the Ultra2 Wide Low-Voltage Differential SCSI bus.

Ultra Narrow Single-Ended SCSI Bus Length

The maximum cable length for an Ultra Narrow Single-Ended SCSI bus is 3 meters. The HP VISUALIZE J5 Class and J7 Class system uses 0.15 meters of this maximum cable length.

NOTE When calculating the total Ultra Narrow Single-Ended SCSI cable/bus/trace length used externally, remember to account for cables connecting external devices together as well as the bus length internal to those devices.

There are two total cable length specifications that apply to the Ultra Narrow Single-Ended SCSI bus on your computer. Note that these specifications are based on the requirement that the SCSI device being connected to the NSE SCSI bus does not exceed the maximum capacitance of 25 picofarads (pF). Please check with the vendor of your SCSI device if you are not sure of your devices maximum capacitance.

Here are the total cable length specifications:

- For a total of one to four devices being connected to the NSE SCSI bus the total length of cable used should not exceed 3.0 meters.
- For a total of five to eight devices being connected to the NSE SCSI bus the total length of cable used should not exceed 1.5 meters.

Note that the computer is counted as one of the total devices, and the internal length of its cabling is 0.15 meters. This length needs to be considered in your total cable length determination.

Ultra2 Wide Low-Voltage Differential SCSI Bus Length

The maximum cable length for an Ultra2 Wide Low-Voltage Differential SCSI bus is 12 meters. The HP VISUALIZE J5 Class and J7 Class system uses 1 meter of this maximum cable length internally. This means that up to 11 meters of cable can be used for connecting external Ultra2 Wide Low-Voltage Differential SCSI devices to this workstation.

NOTE When calculating the total Ultra2 Wide Low-Voltage Differential SCSI cable/bus/trace length used externally, remember to account for cables connecting external devices together as well as the bus length internal to those devices.

WARNING **Do *not* attach FWD SCSI devices to the LVD SCSI port, or damage will occur.**

Assigning SCSI Device IDs

Before assigning a SCSI device ID to a new SCSI device, you need to determine which SCSI device IDs are available. To view the SCSI IDs already in use, type the following command at the prompt and press Enter:

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

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

```
Class       I  H/W Path       Driver    S/W State   H/W Type     Description
============================================================================
bc          0                  root      CLAIMED     BUS_NEXUS
bc          1  10              ccio2     CLAIMED     BUS_NEXUS    I/O Adapter
ba          0  10/0            lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
graphics    0  10/0/1/0        graph3    CLAIMED     INTERFACE    PCI(103c1005) -- 1
lan         0  10/0/12/0       btlan3    CLAIMED     INTERFACE    PCI(10110019)
audio       0  10/0/13/0       audio     CLAIMED     INTERFACE    Built-in Audio
ext_bus     0  10/0/14/0       side      CLAIMED     INTERFACE    IDE
target      0  10/0/14/0.0     tgt       CLAIMED     DEVICE
disk        0  10/0/14/0.0.0   sdisk     CLAIMED     DEVICE       TEAC    CD-532E-B CDROM
target      1  10/0/14/0.7     tgt       CLAIMED     DEVICE
ctl         0  10/0/14/0.7.0   sctl      CLAIMED     DEVICE       Initiator
ba          1  10/0/14/1       superio   CLAIMED     BUS_NEXUS    PCI Core I/O Adapter
tty         0  10/0/14/1/1     asio0     CLAIMED     INTERFACE    Built-in RS-232C
tty         1  10/0/14/1/2     asio0     CLAIMED     INTERFACE    Built-in RS-232C
ext_bus     1  10/0/14/1/3     SCentIf   CLAIMED     INTERFACE    Built-in Parallel Interface
pc          0  10/0/14/1/4     siofdc    UNCLAIMED   UNKNOWN      Built-in Floppy Drive
usb         0  10/0/14/2       hcd       CLAIMED     INTERFACE    Built-in USB Interface
usbhub      0  10/0/14/2.1     hub       CLAIMED     DEVICE       USB Root Hub
usbhid      0  10/0/14/2.1.2   hid       CLAIMED     DEVICE       USB HID Kbd(0)
usbhid      1  10/0/14/2.1.3   hid       CLAIMED     DEVICE       USB HID Mouse(1)
ext_bus     2  10/0/15/0       c720      CLAIMED     INTERFACE    Ultra Narrow Single-Ended
SCSI
target      2  10/0/15/0.7     tgt       CLAIMED     DEVICE
ctl         1  10/0/15/0.7.0   sctl      CLAIMED     DEVICE       Initiator
ext_bus     3  10/0/15/1       c720      CLAIMED     INTERFACE    Ultra2 Wide LVD SCSI
target      3  10/0/15/1.6     tgt       CLAIMED     DEVICE
disk        1  10/0/15/1.6.0   sdisk     CLAIMED     DEVICE       SEAGATE ST39102LC
target      4  10/0/15/1.7     tgt       CLAIMED     DEVICE
ctl         2  10/0/15/1.7.0   sctl      CLAIMED     DEVICE       Initiator
ba          2  10/1            lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
ba          3  10/2            lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
ext_bus     4  10/2/3/0        c720      CLAIMED     INTERFACE    Ultra Wide SCSI
target      5  10/2/3/0.7      tgt       CLAIMED     DEVICE
```

```
ctl          3  10/2/3/0.7.0   sctl      CLAIMED     DEVICE       Initiator
ba           4  10/4           lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
ba           5  10/6           lba       CLAIMED     BUS_NEXUS    PCI Bus Bridge - lba
graphics     1  10/6/7/0       graph3    CLAIMED     INTERFACE    PCI(103c1008)
processor    0  32             processor CLAIMED     PROCESSOR    Processor
processor    1  34             processor CLAIMED     PROCESSOR    Processor
memory       0  49             memory    CLAIMED     MEMORY       Memory
```

Assigning Ultra Narrow Single-Ended SCSI Device IDs

You can determine which Ultra Narrow Single-Ended SCSI (NSE SCSI) devices are currently in use by reviewing the output from the `ioscan` command discussed above and looking under the “H/W Path” heading. The entry `10/0/15/0` is the built-in Ultra Narrow Single-Ended SCSI bus. For devices connected to the built-in Ultra Narrow Single-Ended SCSI bus, such as disks, the number between the two decimals and after the third “/” in the hardware path specifies the SCSI ID for that device. For example, a hardware path of `10/0/15/0.2.0` specifies a NSE SCSI device at SCSI ID 2. Here is the break down of the hardware path:

SCSI device **10/0/15/**0.2.0

NSE SCSI 10/0/15/**0**.2.0

SCSI ID 2 10/0/15/0.**2**.0

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

Assigning Ultra2 Wide Low-Voltage Differential SCSI Device IDs

You can determine which Ultra2 Wide Low-Voltage Differential SCSI (LVD SCSI) devices are currently in use by reviewing the output from the `ioscan` command discussed above and looking under the "H/W Path" heading. The entry `10/0/15/1` is the built-in Ultra2 Wide Low-Voltage Differential SCSI bus. For devices connected to the built-in Ultra2 Wide Low-Voltage Differential SCSI bus, such as disks, the number between the two decimals and after the third "/" in the hardware path specifies the SCSI ID for that device. For example, a hardware path of `10/0/15/1.5.0` specifies a LVD SCSI device at SCSI ID 5. Here is the break down of the hardware path:

SCSI device	**10/0/15/**1.5.0
LVD SCSI	10/0/15/**1**.5.0
SCSI ID 5	10/0/15/1.**5**.0

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

Connecting to the SCSI Ports

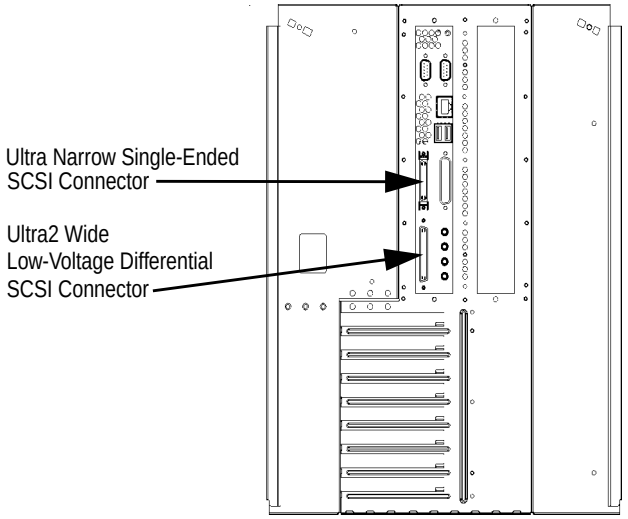
This section describes how to connect to the system SCSI ports (Ultra Narrow Single-Ended and Ultra2 Wide Low-Voltage Differential).

System SCSI Port Connection

The system contains two SCSI connectors:

- Ultra Narrow Single-Ended SCSI (NSE SCSI) connector
- Ultra2 Wide Low-Voltage Differential SCSI (LVD SCSI) connector

The illustration below shows the two SCSI connectors. SCSI cables connect to these ports with a high-density thumbscrew connector.



NOTE It is necessary to put a terminator on unused SCSI connectors on the back panel, or the last device connected to the SCSI bus. Terminators are shipped with the system. Be sure to use a NSE SCSI terminator for the NSE SCSI bus and an LVD terminator for the LVD SCSI bus.

8 The Boot Console Interface

This chapter describes the different features of the boot console interface and how to use them.

Boot Console Interface Features

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

Here are some of the things you can do:

- Boot your computer
- Search for bootable media
- Reset your computer
- Display and set boot paths
- Display and set your 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
- Display PIM information

NOTE All of the tasks in the boot console interface should be performed by a system administrator or superuser (`root`).

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

The shortened version of all commands is indicated by the uppercase letters. Help is available for all the menus and commands by typing either “`help`”, “`he`”, or “`?`”, followed by the menu or command for which you want help.

Here are the menus:

```
------- 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>|<command>]          Display help for menu or command
        RESET                            Restart the system
-------


------- Configuration Menu ----------------------------------------------------

        Command                            Description
        -------                            -----------
        AUto [BOot|SEArch|STart] [ON|OFF] Display or set specified 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 [<params>]               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 the real time clock in GMT

        PreviousPower [ON|OFF]             Set previous power state

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

        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
        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
-------


------- 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
-------
```

Accessing the Boot Console Interface

To access the boot console interface, follow these steps:

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

1. Close any files and applications on your computer.
2. Press the power switch on the front panel of the computer.

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

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

3. Power on your computer after your system has completely shut down.

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

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

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

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

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

   *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, since of that time will be spent during the monitor's warm-up.*

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

   ```
   Boot terminated
   ```

   The Main Menu of the boot console appears.

Booting your Computer

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

For example, you may want to start your computer from an operating system that is stored on a device that is different from your usual boot device. If your normal operating system kernel or the disk on which it resides becomes damaged or unusable, you may wish to boot from a different disk or perhaps another type of device, such as a 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 Interface" above, 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 CD in a 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 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:

```
Main Menu: Enter command > search

Searching for potential boot device(s)...
This may take several minutes.

To discontinue search, press any key (termination may not be immediate).


   Path Number        Device Path              Device Type
   -----------        -----------------        -----------
   P0                 LAN.15.11.162.224.3.254  15.11.162.224   100/Half Dx
   P1                 LAN.15.11.160.173.3.254  15.11.160.173   100/Half Dx
   P2                 LAN.15.11.160.154.3.254  15.11.160.154   100/Half Dx

Search terminated.
```

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 your computer (also see the section "Searching for Bootable Media").

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

  Main Menu: Enter command > 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 your screen:

  ```
  ISL>
  ```

  ISL is the program that actually controls the loading of the operating system. By interacting with ISL, you can choose to load an alternate version of the HP-UX operating system. To interact with the ISL, you must enter no (N).

  For example, if the usual kernel (/stand/vmunix) on your root disk (fwscsi.6.0) has become corrupted, and you wish to boot your

computer 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 you file systems have bootable operating systems, you can find them with the `search ipl` command. See the subsequent section “Searching for Bootable Media.”

Searching for Bootable Media

To list devices that contain bootable media, follow the directions in "Accessing the Boot Console Interface" 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 your display. If you are using a text terminal, you may control the progress of the search from your terminal's keyboard by using these keystrokes:

Ctrl-S	Temporarily suspends the search.
Ctrl-Q	Continues the search.
Any 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 Interface" 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:

`fwscsi`	Is the built-in fast, wide SCSI bus.
`scsi`	Is the built-in single-ended SCSI bus.
`lan`	Is all connections to the built-in LAN.
`pci`*n*	Is an optional fast, wide SCSI interface in slot number *n*.

Resetting Your Computer

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

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

When the Configuration Menu appears, 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 your computer. The `path` command sets the system paths shown in the table below.

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

Table 8-1 System Paths

Path Type	Device
`primary` or `pri`	Your computer's default boot device (usually the root disk)
`alternate` or `alt`	Your computer's alternate boot device (often a CD drive)
`console` or `con`	Your computer's primary display device
`keyboard` or `key`	Your computer's 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 below.

Table 8-2 Mnemonic Style Notation for Boot Paths

I/O Type	Specification Format
Built-in LVD SCSI	`fwscsi`.scsi_address.logical_unit_number
Built-in SCSI	`scsi`.scsi_address.logical_unit_number
Built-in LAN	`lan`.server_address.init_timeout.io_timeout

To display the current setting for a particular system path, follow the directions in "Accessing the Boot Console Interface" on page 139, 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 8-1.

For example, to get the path to the primary boot device, follow the directions in "Accessing the Boot Console Interface" earlier in this chapter, and then type the following at the prompt 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 Interface" on page 139, 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 8-1 and ⟨*path*⟩ is the specification of the path in Mnemonic Style Notation (as described in the table above). 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 Interface" on page 139, and then type the following at the prompt and press **Enter**:

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

Displaying and Setting the Monitor Type

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

The Monitor Command

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

NOTE

The `monitor` command lets you change your computer's graphics configuration before you replace your monitor. For information about changing the configuration after you replace your monitor, refer to "Changing Your Monitor Type" on page 57.

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

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

The correct usage for setting the graphics configuration is:

monitor ⟨*graphics_path*⟩ ⟨*type*⟩

where valid ⟨*graphics_path*⟩ parameters are:

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

`graphics(7)` Graphics card installed in slot 7

and ⟨*type*⟩ is the numerical monitor type.

Displaying the Current Monitor Configuration

To display the current monitor configuration for your system from the Configuration Menu of the boot console interface, follow the directions in "Accessing the Boot Console Interface" earlier in this chapter. Once you are in the Boot Console Interface 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 your display is a list of the current graphics adapters and their monitor types configured for your computer.

```
Configuration Menu: Enter command > monitor

MONITOR INFORMATION

   Path        Slot     HPA       Resolution  Freq  Type  Class
-----------    ----  ----------   ----------  ----  ----  -----
GRAPHICS(4)       4  fff6000000    1280x1024  75Hz     1  VESA,Double buffered
GRAPHICS(7)       7  fff4000000    1280x1024  72Hz     1
```

In this example, only `GRAPHICS(4)` and `GRAPHICS(7)` are configured. The monitor type for `GRAPHICS(4)` is set to type 1, which is a 1280 by 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 your 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:

```
Configuration Menu: Enter command > monitor list

MONITOR INFORMATION

Path         Slot Head Type   Size     Freq  Class
----         ---- ---- ---- ---------  ----  -----
GRAPHICS(4)     4    1    1 1280x1024  75Hz  VESA,Double buffered
GRAPHICS(4)     4    1    2 1280x1024  75Hz  VESA
GRAPHICS(4)     4    1    3 1280x1024  75Hz  VESA,Greyscale
GRAPHICS(4)     4    1    4 1280x1024  75Hz  VESA,Double buffered,Greyscale
GRAPHICS(4)     4    1    5  1024x768  75Hz  VESA
GRAPHICS(4)     4    1    6   800x600  75Hz  VESA
GRAPHICS(4)     4    1    7   640x480  75Hz  VESA
GRAPHICS(4)     4    1    8 1600x1200  75Hz  VESA
GRAPHICS(4)     4    1    9 1600x1200  75Hz  VESA,Greyscale
GRAPHICS(4)     4    1   10 1200x1600  75Hz  VESA
GRAPHICS(4)     4    1   11 1200x1600  75Hz  VESA,Greyscale
GRAPHICS(4)     4    1   12 1280x1024  72Hz
GRAPHICS(4)     4    1   13 1280x1024  72Hz  Double buffered
GRAPHICS(4)     4    1   14   640x480  60Hz
GRAPHICS(4)     4    1   15 --------user defined-------
GRAPHICS(7)     7    1    1 1280x1024  72Hz
GRAPHICS(7)     7    1    2 1280x1024  75Hz  VESA
GRAPHICS(7)     7    1    3  1024x768  75Hz
GRAPHICS(7)     7    1    4       0x0   0Hz  SAM Selection
GRAPHICS(7)     7    1    5 --------user defined-------
```

To set the monitor type for `GRAPHICS(4)` to monitor type 1, type the following at the command prompt and press **Enter**:

```
Configuration Menu: Enter command> monitor graphics(4) 1
```

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

NOTE

You must set the console path to get console messages on the monitor:

```
path con graphics(4)
```

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

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

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

```
No such graphics card.
```

Setting the Monitor Type at Power On

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

Wait two seconds after the **Num Lock** light flashes near the end of the boot sequence, then press **Tab** to initiate the automatic monitor selection process.

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

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

```
Path        Slot  Head  Type     Size        Freq  Class
----------  ----  ----  ---- ------------ ----  -----
GRAPHICS(4)  4     1      n    nnnnxnnnn    nnHz

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

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

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

```
Monitor type not saved.
```

At this point, the new monitor type is active, but not saved. Because you 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.
```

Changing the Console to External Terminal

In the event that your console stops displaying to your graphics device, use the following procedure to display the console to an external serial terminal so that you can configure the graphics console:

1. Turn the system's power off.
2. Disconnect the USB keyboard connector from the system rear panel.
3. Connect a serial terminal to the serial connector 1 on the system rear panel. The serial parameters are: 9600 baud, 8 data bits, no stop bits.
4. Power on the system.

The system will now display the console to the terminal connected to Serial 1 port.

Displaying the Memory Configuration

The following sample screen output uses the `memory` command to show memory configurations both with and without errors.

To display the current memory configuration for you system, from the Information Menu of the boot console interface, follow the directions in "Accessing the Boot Console Interface" earlier in this chapter. Once you are in the Boot Console Interface 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 you computer. For the J5xxx and J7xxx sections below, the first listing below shows the memory information for a system with incorrectly installed or configured memory modules, and the second listing shows the information for a system that has memory modules correctly installed and configured.

Memory Information Examples: 8-Slot J5xxx

The following example, from a J5xxx, shows the Memory Information display when memory modules are improperly installed and configured:

```
MEMORY INFORMATION


  MEMORY STATUS TABLE

  Slot    Size    Status
  ----   ------   -------------
    0     512MB   Active
    1     256MB   Active-MBE
    2     256MB   Active

  TOTAL MEMORY = 1024MB


  MEMORY FAULT TABLE

  Slot    Size    Status
  ----   ------   -------------
    1     256MB   Active-MBE


   Active, Installed Memory          : 1024MB of SDRAM
   Deallocated Pages                 : 1 Page
                                       -----------
   Available Memory                  : 1023MB

   Good Memory Required by OS        :          0 (Not Initialized)

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

The fact that there is an entry beneath the “Memory Fault Table” indicates that there was a problem detected. The “MBE” stands for “Multi-Bit Error,” which means the computer detected a memory defect in one or more 4KB areas of the indicated DIMM, and flagged the defective areas as unusable, although the rest of the DIMM (the huge majority) will still be used properly—compare the “Active Installed Memory” value to the “Available Memory” value.

Displaying the Memory Configuration

Below is a sample from a J5xxx in which the memory checks out fine; note the *lack* of entries in the Memory Fault Table:

```
MEMORY INFORMATION


  MEMORY STATUS TABLE

  Slot    Size    Status
  ----   ------   -------------
    0     512MB   Active
    1     256MB   Active
    2     256MB   Active

  TOTAL MEMORY = 1024MB


  MEMORY FAULT TABLE

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


   Active, Installed Memory          : 1024MB of SDRAM
   Deallocated Pages                 : 0 Pages
                                       -----------
   Available Memory                  : 1024MB

   Good Memory Required by OS        :          0 (Not Initialized)

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

Memory Information Examples: 16-Slot J7xxx

The following sample shows the memory-analysis display when memory modules are not properly installed and configured. In this sample, the DIMM in Slot 4A is of a different size than the DIMM in Slot 4B (they must be equal in size). Also, there is a DIMM in Slot 5A, but none in Slot 5B (they must be added in pairs). This information is shown in the Memory Fault table in the display below.

```
MEMORY INFORMATION


  MEMORY STATUS TABLE

  Slots    Size(A)  Status(A)        Size(B)  Status(B)
  -----    -------  -------------    -------  -------------
  0a/0b     512MB   Active            512MB   Active
  1a/1b     512MB   Active            512MB   Active
  2a/2b     512MB   Active            512MB   Active
  3a/3b     512MB   Active            512MB   Active
  4a/4b     256MB   Mismatch          512MB   Mismatch
  5a/5b     256MB   Mismatch            -     Mismatch

  TOTAL MEMORY = 5120MB


  MEMORY FAULT TABLE

  Slots    Size(A)  Status(A)        Size(B)  Status(B)
  -----    -------  -------------    -------  -------------
  4a/4b     256MB   Mismatch          512MB   Mismatch
  5a/5b     256MB   Mismatch            -     Mismatch


   Active, Installed Memory          : 4096MB of SDRAM
   Deallocated Pages                 : 0 Pages
                                       -----------
   Available Memory                  : 4096MB

   Good Memory Required by OS        :          0 (Not Initialized)

         Memory
   HVERSION  SVERSION
   -------- ----------
    0x0890   0x0900
```

And here is a good memory display; the lack of entries in the Memory Fault Table indicates that the configuration is correct:

```
MEMORY INFORMATION


  MEMORY STATUS TABLE

  Slots    Size(A)  Status(A)        Size(B)  Status(B)
  -----    -------  -------------    -------  -------------
  0a/0b     512MB   Active            512MB   Active
  1a/1b     512MB   Active            512MB   Active
  2a/2b     512MB   Active            512MB   Active
  3a/3b     512MB   Active            512MB   Active
  4a/4b     256MB   Active            256MB   Active
  5a/5b     256MB   Active            256MB   Active

  TOTAL MEMORY = 5120MB


  MEMORY FAULT TABLE

  Slots    Size(A)  Status(A)        Size(B)  Status(B)
  -----    -------  -------------    -------  -------------


   Active, Installed Memory          : 5120MB of SDRAM
   Deallocated Pages                 : 0 Pages
                                       -----------
   Available Memory                  : 5120MB

   Good Memory Required by OS        :          0 (Not Initialized)

         Memory
   HVERSION  SVERSION
   -------- ----------
    0x0890   0x0900
```

Displaying the Status of the System I/O

The I/O 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, 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.

```
Information Menu: Enter command > io

I/O MODULE INFORMATION

                                                                    IODC IODC
Path         Decimal     Type                  Location   HVER SVER  Vers Dep
------------ ----------- --------------------- ---------- ---- ----  ---- ----
LAN          10/0/12/0   Ethernet              built-in   03b0 a200  0x02 0x00
AUDIO        10/0/13/0   Comm Device           built-in
IDE          10/0/14/0   IDE                   built-in   0040 a300  0x00 0x00
SUPERIO MISC 10/0/14/1   Bridge Device         built-in
FLOPPY       10/0/14/1/0 Bridge Device         built-in
SERIAL_1     10/0/14/1/1 RS232 port            built-in   03b0 8c00  0x01 0x00
SERIAL_2     10/0/14/1/2 RS232 port            built-in   03b0 8c00  0x01 0x00
PARALLEL     10/0/14/1/3 Bridge Device         built-in
USB          10/0/14/2   USB                   built-in   0040 a900  0x00 0x00
SCSI         10/0/15/0   SCSI                  built-in   03b0 a300  0x00 0x00
FWSCSI       10/0/15/1   SCSI                  built-in   03b0 a300  0x00 0x00
GRAPHICS(1)  10/1/1/0    Display               slot 1     0040 8500  0x01 0x00
GRAPHICS(3)  10/1/3/0    Display               slot 3     0040 8500  0x01 0x00
```

Setting the Auto Boot and Auto Search Flags

The `auto boot` and `auto search` flags are variables stored in your computer'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 computer.

The auto boot flag boots the operating system whenever your computer is turned on.

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
```

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

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

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

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

or

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

where ⟨*state*⟩ is `on` or `off`.

Autosearch searches for devices in the following order:

Primary boot path

Alternate boot path

Built-in fast, wide SCSI devices

Built-in single-ended SCSI devices

Built-in LAN `bootp` servers

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 computer.

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.

To display the current setting for the SECure flag, enter the following command at the prompt and press **Enter**:

```
secure
```

To set the SECure flag on or off, type one of the following commands at the prompt and press **Enter**:

```
secure on
secure off
```

Displaying and Setting the Fastboot Mode

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

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

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

If you are experiencing difficulty in booting your computer, 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 a LAN station address of your computer to other users. For example, if your computer is to become a member of a cluster, the cluster administrator needs to know your LAN station address in order to add your computer to the cluster.

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

To display your 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 Addresses:        001083-789abc
```

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

Displaying System Information

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

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

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

9 Troubleshooting

This chapter contains information to help you determine what is wrong with your system when you have problems. If you have a problem that is not listed in this chapter, or if your problem persists, contact your designated service representative.

To help speed up your service request, have your system's model number and serial number available. Your service representative will always ask for these numbers.

The instructions in this chapter assume you are using the HP-UX version 10.20 or later operating system with the HP CDE graphical interface. When using HP CDE, you will have to use command line options in a terminal window to perform tests.

NOTE This chapter requires you to log in as `root`. If you cannot log in a `root`, contact your system administrator.

Common Problems and Solutions

The tables in this section list common problems you may encounter with your computer. The tables also tell you what to do to help solve the problems.

Table 9-1 Problems Powering Up the System

Problem	Solution
The power LED does not light.	Make sure all AC power cables are connected securely to the system. Make sure the power cord is plugged into a working AC outlet. Make sure the power switch is set to the On position. Make sure the power-supply interlock screw is sufficiently tightened.
The power LED lights, but the screen is blank or flickers	Adjust the brightness control on the monitor. If the screen is still blank, turn off the system and monitor power switches. When the system is completely powered off, check the video cable connections. Go to the section “Displaying and Setting Your Monitor Type” in the Boot Console Interface chapter for information about displaying and setting your computer’s monitor configuration.
LCD messages	See “LCD-Indicated Problems” later in this chapter.
Boot Failure	Make sure the SCSI terminators are in place, either directly on the back of the machine, or on the last external SCSI device you have attached to each bus.
If problems persist, contact your system administrator or call your designated service representative.	

Table 9-2 Problems Loading and Booting the Operating System

Problem	Solution
The power LED is lit, and text appears on the screen, but more than two minutes have passed with no sign of system activity.	Make sure that all SCSI devices are set to the proper SCSI ID. (See the SCSI chapter for default SCSI ID settings.) Check that all SCSI devices are correctly cabled. Check that each SCSI bus is correctly terminated. (See the SCSI chapter for information on SCSI cabling and termination.)
The system stops or hangs while booting.	If a DIMM failure is indicated by the LCD: • Make sure all DIMMs are securely seated. • In the J7xxx, make sure that all DIMMs are in equal-sized pairs. • Remove DIMMs one at a time, attempting to reboot after every DIMM (or pair of DIMMs, in the J7xxx) is removed. When the DIMM failures cease, the most recently removed DIMM (or pair of DIMMs) was the faulty one. Also, see the instructions in "Dealing with a Boot Failure" later in this chapter.
If problems persist, contact your system administrator or call your designated service representative.	

Table 9-3 Problems with the 802.3 Network

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

Table 9-4 Problems Using a Hard Disk Drive

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

Table 9-5 Problems Using the CD-ROM Drive

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

Table 9-6 Problems Using the DDS Tape Drive

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

Table 9-7 Problems Using the Floppy Disk Drive

Problem	Solution
The floppy drive does not respond to commands.	Re-enter the commands and make sure you have typed them correctly. Make sure you specified the appropriate device file for commands that require a device file name. Make sure the write-protect tab is set to write if you are trying to copy data to a floppy diskette. Follow the instructions in the section “Running System Verification Tests” later in this chapter to verify that the floppy drive is functioning properly.

Table 9-7 Problems Using the Floppy Disk Drive

Problem	Solution
If problems persist, contact your system administrator or call your designated service representative.	

Dealing with a Boot Failure

If your usual boot device (typically a disk) is not responding as it should, you must try to boot from the disk (or another boot device) by selecting it manually. Note that you must be superuser (root) to perform the steps in this section.

To boot a device manually, follow these steps:

1. Follow the directions in Chapter 8 , “The Boot Console Interface,” on page 135.

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

2. At the Main Menu prompt, type the following and press **Enter**:

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

   This causes you computer to search exhaustively for bootable media.

3. Boot from one of the listed devices by typing 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, such as `FWSCSI.5.0`.

4. If your computer still fails to boot, there is either something wrong with the file system or with the hardware. If you suspect a file system failure, see the manual *Using HP-UX* for help on dealing with file system failures (And make sure the SCSI terminators are in place!) If you think that something is wrong with the hardware, continue reading this chapter for more troubleshooting information.

Memory Failures

The J5 Class and J7 Class systems use Memory Page Deallocation, a feature that allows the system to provide information to the operating system about memory failures. Note that you must be superuser (`root`) to use the commands in this section.

HP-UX 10.20 uses Memory Page Deallocation information to map out the 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. To test this command, type

```
/usr/sbin/sysdiag
```

at the shell prompt (#) and press **Enter**. At the `DUI>` prompt, type

```
logtool
```

and press **Enter**. At the `LOGTOOL>` prompt, type

```
memrpt detail
```

and press **Enter**.

To exit the `sysdiag` and `logtool` utilities, use the `exit` command.

The PDT can also be checked using the `pdt` command in the Service menu of the boot console handler. If a failing DIMM is replaced, use the Service menu `pdt clear` command to clear out the PDT.

LCD-Indicated Problems

Your computer 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 the meaning are:

FLT	Fault: A hardware error has been detected
TST	Test: Hardware being tested
INI	Initialize: Hardware being initialized
SHU	Shutdown: System being shutdown
WRN	Warning: A non-optimal operating condition exists
RUN	Running: Computer is running operating system

During a normal boot sequence, a set of “windows” appears. In general, the LCD has the following format:

```
MMM CCCC: FFFFFF   <-- Line 1
DDDDDDDDDDDDDDDD   <-- Line 2
```

MMM	3-character chassis-code mnemonic
CCCC	4-digit hexadecimal code
FFFFFF	6-character FRU (field-replaceable unit) description
DDD. . .	16-character description of chassis code

Running System Verification Tests

HP-UX uses a diagnostics product called the Support Tools Manager that allows system operation verification. If this software is not already on your system, it is available on the System Recovery CD (part of the HP-UX 10.20 media kit).

If the Support Tools Manager is installed, you can access it in a terminal window. If you are using HP CDE as your interface, you can also access the Support Tools Manager through the `sys_admin` directory.

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

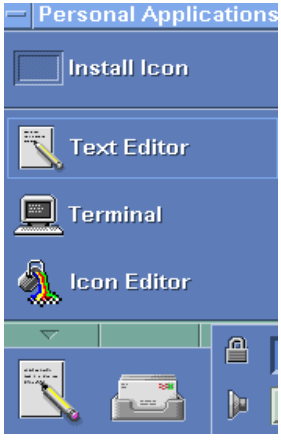
For more information on these user interfaces, see the online man pages by entering one of the following at the command line prompt and pressing **Enter**:

```
man cstm
man mstm
man xstm
```

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

1. Select Terminal from the Personal Applications pop-up menu, which is located on the front panel of your HP CDE workspace.

Figure 9-1 HP CDE Terminal Control in the Personal Application Menu



A terminal window opens.

2. Move the mouse cursor into the terminal window and click the left mouse button.
3. Type the following at the shell prompt and press **Enter**:

   ```
   cstm
   ```

   The following is displayed on the screen:

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

   At the CSTM> prompt, you can enter several commands. To see what commands are available, type the help command.
4. To verify the system operation, type the following at the CSTM> prompt and press **Enter**:

   ```
   CSTM> verify all
   ```

   Messages similar to the following appear:

   ```
   Verification has started on device (CPU)
   Verification has started on device (FPU)
   CSTM>Verification of (FPU) has completed.
   CSTM>Verification of (CPU) has completed.
   ```
5. Press **Enter** to return to the CSTM> prompt after all test results are reported.
6. Exit the Support Tools Manager by typing the following at the CSTM> prompt and pressing **Enter**:

   ```
   CSTM> exit
   ```

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

A Safety and Regulatory Statements

Declaration of Conformity

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: J5000 / J7000
Base Product Number: A4978A / A4981A
Product Options: all

conforms to the following specifications:

Safety: IEC 950:1991+A1+A2+A3 +A4 +A11/ EN 60950:1992+A1+A2+A3+A4 +A11
IEC 60825-1:1993/EN60825-1:1994+A11
USA 21CFR Subpart J - for FC Laser module
China GB4943-1995
Russia GOST R 50377-92

EMC: CISPR 11: 1990 / EN 55011: 1991 Class B
CISPR 22: 1993 / EN 55022: 1994 Class B
EN 50082-1:1992
IEC 1000-3-2: 1995 / EN 61000-3-2: 1995
IEC 1000-3-3: 1995 / EN 61000-3-3: 1995
IEC 1000-4-2: 1995 / EN 61000-4-2: 1995 - 4kV CD, 8 kV AD
IEC 1000-4-3: 1995 / EN 61000-4-3: 1995 - 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
T V Certified to EN60950 2nd edition with A1+A2+A3+A4+A11
HP Fort Collins CCQD HQE

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.

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

Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (determined by turning the equipment off and on), you can correct the interference by one or more of the following measures:

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

Hewlett-Packard's system certification tests were conducted with HP-supported peripheral devices and HP-shielded cables, such as those you receive with your computer. Changes or modifications not expressly approved by Hewlett-Packard could void the user's authority to operate the equipment.

Operation of this device is subject to the following conditions:

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

Special Video Configuration Statements

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

For EN55022 or CISPR 22 Applications:

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

VCCI Class 2 ITE

Figure A-1 **EMI Class A RRL (Korea)**

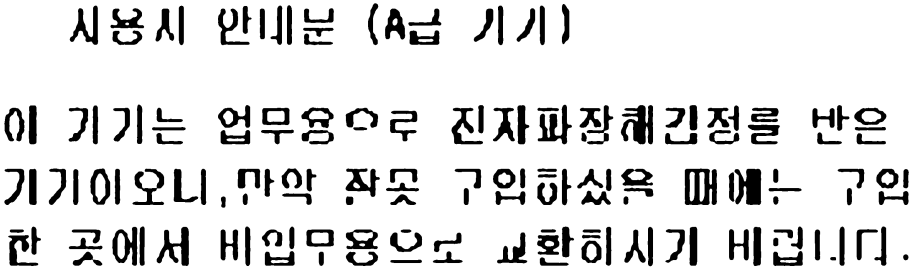
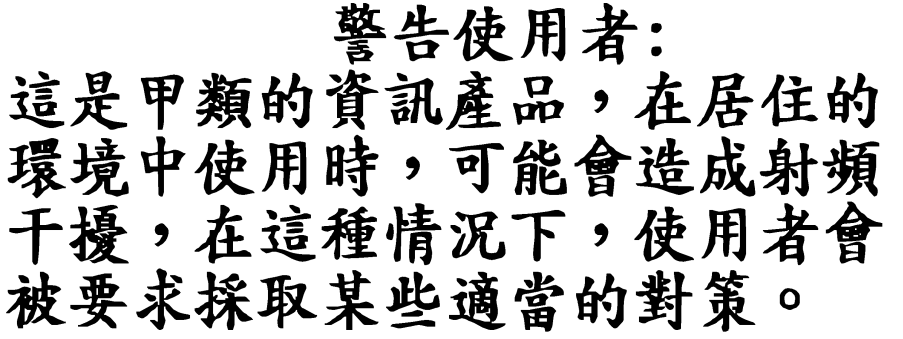


Figure A-2 **VCCI Class B ITE (Japan)**

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。

Figure A-3 **EMI Class A (Taiwan)**



Emissions Regulations Compliance

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

Acoustics

Table A-1 Regulation On Noise Declaration For Machines -3. GSGV

Lpa <70dB operator position normal operation per ISO 7779	Lpa<70dB am Arbeitsplatz normaler Betrieb 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.

Visible LEDs

The visible LED on this product is classified as “Class 1 LED PRODUCT” in accordance with EN 60825-1.

Warnings and Cautions

WARNING:

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

WARNUNG:

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

AVERTISSEMENT:

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

WARNING:

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

WARNUNG:

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

AVERTISSEMENT:

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

B Environmental and Electrical Specifications

Environmental Specifications

Altitude

Operating: 0-10,000 ft. (0-3000m)
Non-operating (storage or shipping): 0-15,000 ft. (0-4500m)

DC Magnetic Field Interference

Operating: <1 Gauss at surface of product

Non-operating: <2 mGauss @ 7 feet

Temperature

Operating: 5 to +40˚ C

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

Humidity (Non-condensing)

Operating: 15 to 80%

Non-operating: 0 to 90% (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 G rms, 5-500 Hz

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

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

Electrical Specifications

Power Requirements

Table B-1 Input Power (Maximum Current RMS)

Voltage	J5xxx	J7xxx
100V	12.2A	19.3A
120V	10.2A	16.0A
200V	6.1A	9.7A
230V	5.4A	8.4A

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 prevent) a user or group of users to read, write, or execute files *See also File Access Permissions.*

Active window The window that is receiving input from the keyboard at the present time. If there is no active window, anything you type is lost. Only one window can be active.

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 to 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

diskless workstations. See also boot ROM.

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

Boot ROM A read-only memory that is incorporated into a workstation for the purpose of 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-ROM Compact Disk Read-Only Memory. See also CD-ROM drive. CD-ROMs are identical to the audio compact disks (CDs) used to record stereo music, except that they store computer data. CD-ROMs 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-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 and answering some networking and 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.

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.

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 Inline Memory Module.*

Dual Inline Memory Module A memory board that contains memory chips on both sides. *See also Single Inline Memory Module*

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. See also diskless workstation, node, partner node, workstation.

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.

Drag and Drop 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 and Drop.*

E

EEPROM. Electronically erasable read-only memory. A non-volatile storage device using a technique similar to the floating gates in EPROMs but with the capability to discharge the floating gate electrically. Usually bytes or words can be erased and reprogrammed individually during system operations.

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.

F

Fast-wide Low-Voltage Differential SCSI A 16-bit-wide bus with high-power receivers and drivers, which allows a cable length of up to 25 meters and a speed of up to 20 MB per second

See also Ultra Narrow Single-Ended SCSI, Small Computer System Interface.

File The basic named unit of data stored on disk *See also Directory, Filename.*

File access permissions The access rights given to a particular file or directory. Every file and directory has a set of access permissions, a code that determines whether a process can perform a requested operation on the file (such as opening the file or writing to it) *See also Access permissions.*

File Manager The HP 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 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 The name of a particular machine, in the context of its identity to the network *See also 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 Company'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.

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

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.

L

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 station 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 frequency at which you want your monitor to operate. The monitor type is selected using the Boot Console Interface. *See the Boot Console Interface chapter.*

Mouse pointer *See pointer.*

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. Synonymous with Hostname *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, and execute/search) 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 memory 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).

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.

The memory contained in the processor chip where instructions are stored.

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.

Pushbutton A graphic control that simulates a real-life pushbutton. Use the pointer and mouse to push the button and start an action or set a state.

R

RAM Random-access memory.

ROM Read-only memory.

Root *See Superuser.*

S

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 the SCSI bus. Addresses one through six are available to the user, and addresses 0 and 7 are for system use only.

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 “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, and scanner, etc., singly or in combination *See also Fast-Wide Low-Voltage Differential SCSI, Narrow Single-Ended 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 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 Same as Hostname or Nodename *See also Internet Protocol Address.*

T

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.

Transceiver A device that transmits and receives signals.

U

Ultra Narrow Single-Ended SCSI An 8-bit-wide SCSI bus with standard receivers and drivers, which limits total cable length to 6 meters *See also Fast-Wide Low-Voltage Differential SCSI, 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 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.*

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.*

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