Service Handbook
C Class

Models
C100, C110, C160L, C160,
C180, C200, C240 and C360

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NOTICE

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HEWLETT-PACKARD WARRANTY STATEMENT

HP PRODUCT	DURATION OF WARRANTY
C160/C180/C200/C240/C360	one year

1. HP warrants HP hardware, accessories and supplies against defects in materials and workmanship for the period specified above. If HP receive notice of such defects during the warranty period, HP will, at its option, either repair or replace products which prove to be defective. Replacement products may be either new or like-new.

2. HP warrants that HP software will not fail to execute its programming instructions, for the period specified above, due to defects in material and workmanship when properly installed and used. If HP receives notice of such defects during the warranty period, HP will replace software media which does not execute its programming instructions due to such defects.

3. HP does not warrant that the operation of HP products will be uninterrupted or error free. If HP is unable, within a reasonable time, to repair or replace any product to a condition as warranted, customer will be entitled to a refund of the purchase price upon prompt return of the product.

4. HP products may contain remanufactured parts equivalent to new in performance or may have been subject to incidental use.

5. The warranty period begins on the date of delivery or on the date of installation if installed by HP. If customer schedules installation or causes installation by HP to be delayed more than 30 days after delivery, warranty begins on the 31st day from delivery.

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Safety and Regulatory Statements

This section contains safety and regulatory statements pertaining to the C100, C110, C160L, C160, C180, C200, C240 and C360 workstations. It provides information on the following topics:

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

Special Video Configuration Statements

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

For EN55022 or CISPR 22 Applications:

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

For FCC Applications:

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

Models C160L/C160/C180/C200/C240/ C360 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.

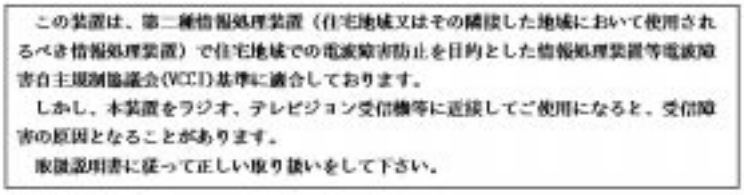
Hewlett-Packard's system certification tests were conducted with HP-supported peripheral devices and HP shielded cables, such as those you receive with your

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.

VCCI Class B ITE (Japan)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しかし、本装置をラジオ、テレビジョン受信機等に近接してご使用になると、受信障害の原因となることがあります。
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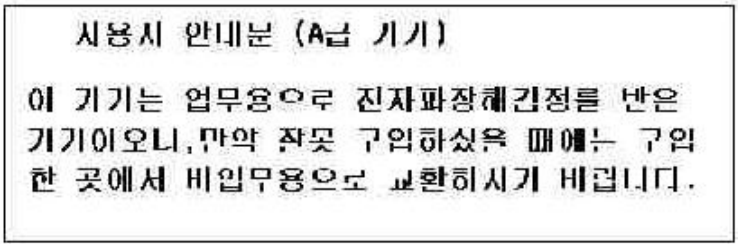
Korea RRL (EMI Class A)



Models C100/C110 Emissions Regulations

Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules 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.

VCCI Class 1 ITE

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取扱説明書に従って正しい取り扱いをして下さい。

Emissions Regulations Compliance

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

Acoustics

Regulation On Noise Declaration For Machines -3. GSGV

Lpa <70dB
Lpa<70dB

operator position	am Arbeitsplatz
normal operation	normaler Betrieb
per ISO 7779	nach DIN 45635 T.19

Electrostatic Discharge (ESD) Precautions

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

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

Safety Statement

This equipment conforms to the following safety standards:

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

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

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

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

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.

WARNING:

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

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

Contents

Contents

Contents

Contents

Contents

Contents

Contents

Contents

Figures

Contents

Figures

Contents

Figures

Contents

Figures

Contents

Tables

Contents

Tables

Contents

1

Product Information

This chapter introduces the HP 9000 C Class workstations, including their controls and indicators. This chapter discusses the following topics:

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

Product Description

The C Class workstations contain the following key features:

- Processor Performance:
  - 100 MHz (Model C100)
  - 120 MHz (Model C110)
  - 160 MHz (Model C160/C160L)
  - 180 MHz (Model C180XP)
  - 200 MHz (Model C200)
  - 236 MHz (Model C240)
  - 367 MHz (Model C360)
- Operating System: Native HP/UX
  - HP-UX 9.05 (Model C100/C110)
  - HP-UX 10.20 (Model C160/C160L)
  - HP-UX 10.20 (Model C180XP)
  - HP-UX 10.20 ACE 9707 (Model C200)
  - HP-UX 10.20 ACE 9707 (Model C240)
  - HP-UX 10.20 ACE 9806, IPR9812 (Model C360)
- User Interface: HP VUE graphical user interface
  HP CDE graphical user interface
- Compatibility: Source and binary code compatible with the Series 700 product family
- Optional Graphics:
  - Fast 2D color graphics; choice of 2 or 3 display
  - HCRX-8Z Fast 8-plane or 24-plane graphics (C100/110 only)
  - HP VISUALIZE-8/24 Accelerated 8-plane or 24-plane 3D graphics
  - HP VISUALIZE-48 24/24 image planes, 8 overlay planes, 24-bit Z buffer 3D graphics
  - A4070A/B + A4242A (HCRX-8Z with the A4443A Upgrade), C200, C240 only
  - A4071A/B + A4242A (HCRX-24Z with the A4443A Upgrade), C200, C240 only
  - HP VISUALIZE EG, FX2, FX4, FX6

- Memory
  - 32 MB to 512 MB Main Memory in pairs of 16 MB, 32MB, or 64 MB modules - four pairs maximum (C100/110/160L)
  - 32 MB to 768 MB Main Memory in pairs of 16 MB, 32MB, or 64 MB modules - six pairs maximum (C160/180)
  - 32 MB to 1.5 GB main memory in pairs of 16 MB, 32MB, 64 MB or 128 MB modules (C200, C240, C360 only - six pairs maximum)
- Internal Storage Devices:
  - Fast, Wide Differential SCSI Hard Disk Drives:
    - 1-inch Low Profile Drive (up to three)
    - 1-inch Low Profile Drive (up to two, C200 upgrade)
    - 1.6-inch Full Height Drive (one, C100/110 only)
  - Narrow, Single-Ended SCSI Removable Media:
    - CD-ROM Drive
    - or
    - 2.0/4.0 GB, 4-mm DDS-DC Tape Drive
    - 2.0/4.0/8.0 GB 4-mm DDS-2 Tape Drive
  - Ultra, Wide Single-Ended SCSI Hard Disk Drives (C200/C240/C360 Only):
    - 1-inch Low Profile Drive (up to two)
  - 3.5-inch Floppy Disk Drive (not a SCSI Device)
- Standard Network:
  - Ethernet IEEE 802.3 AUI
  - RJ45, UTP Twisted Pair (10/100BaseT C200/C240/C360 only)
- Standard I/O:
  - One Single-Ended, 8-bit (for removable devices) 5 MB/sec synchronous, 1.5 MB/sec asynchronous ALT-1, 50-pin, high density SCSI-2 connector
  - One Fast, Wide Differential (for hard disk drives) 20 MB/sec synchronous 68-pin, high-density SCSI connector (C100, C110, C160, C160L, C180, C200 upgrade only)
  - One Ultra Wide Single-Ended (for hard disk drives) 40 MB/sec synchronous 68-pin high density SCSI

connector (C200 new, C240, C360 only)
Two Serial Interfaces RS232C, 9-pin male
One Parallel Interface, Centronics, BUSY hand-shake, 25-pin female
16 Bit Audio Line-in and Line-out connectors
Two PS/2 ports
One HP-HIL connector

- EISA/GSC: 4 slots total

  C100/110

  Slot1 - EISA/GSC (no GSC graphics support)
  Slot 2 - EISA/GSC (no GSC graphics support)
  Slot 3 - EISA/GSC
  Slot 4 - GSC

  C160L

  Slot 1 - EISA/ GSC
  Slot 2 - EISA/GSC
  Slot 3 - EISA/PCI (32-bit, 3.3V)
  Slot 4 - PCI (32-bit, 3.3V)

  C160/180

  Slot 1 - EISA/GSC
  Slot 2 - EISA/GSC
  Slot 3 - EISA/GSC/PCI (32-bit, 3.3V)
  Slot 4 - GSC/PCI (32-bit, 3.3V)

  C200/C240/C360

  Slot 1 - EISA-Optional/GSC/PCI (32-bit, 5V)
  Slot 2 - GSC/PCI (64-bit, 3.3V)
  Slot 3 - GSC/PCI (32-bit, 5V)
  Slot 4 - GSC/PCI (64-bit, 3.3V)

- Keyboards:
  PS/2 Keyboard (mouse)
  or
  ITF Keyboard (also known as HP HIL)
  (HP HIL mouse) (C100/110 only)
  (also available via hidden HIL using PS/2 connection (C200 only))

System Unit Front Panel Controls

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

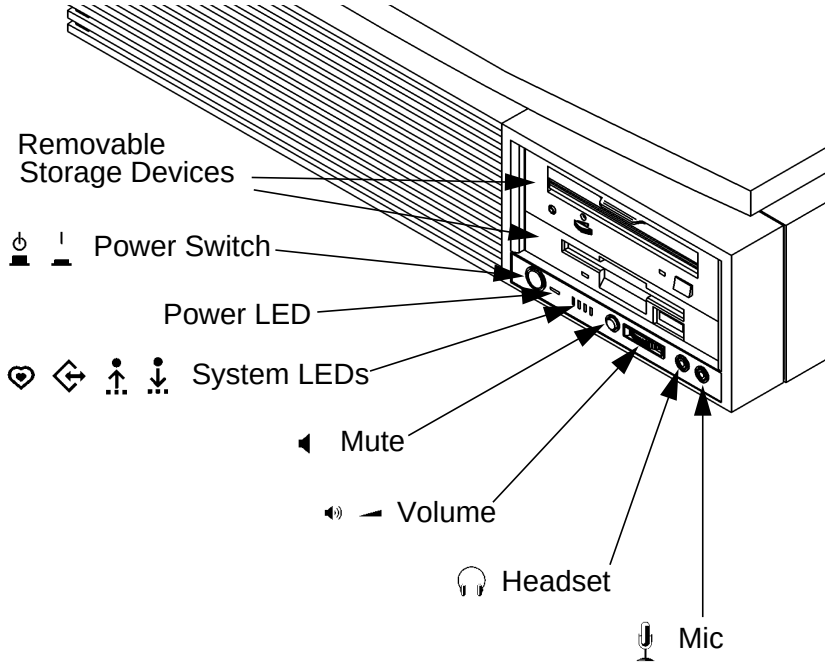


Figure 1 **System Unit Front Panel Controls**

System Power Switch

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

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

Power LED

The Power LED lights when the system unit power is on.

System LEDs

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

Each C Class workstation has four diagnostic LEDs located next to the system power LED.


LED 4 - System Heartbeat


LED 3 - SCSI Bus Activity


LED 2 - Network Transmit


LED 1 - Network Receive

Audio Controls

Next to the system LEDs are the following audio controls:

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

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

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

Storage Device Controls and Features

The C Class workstations allow up to two of the following internal storage devices: CD-ROM drive, DDS tape drive, or floppy drive. The following sections describe the controls and features of these devices.

NOTICES:

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

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

CD-ROM Drive

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

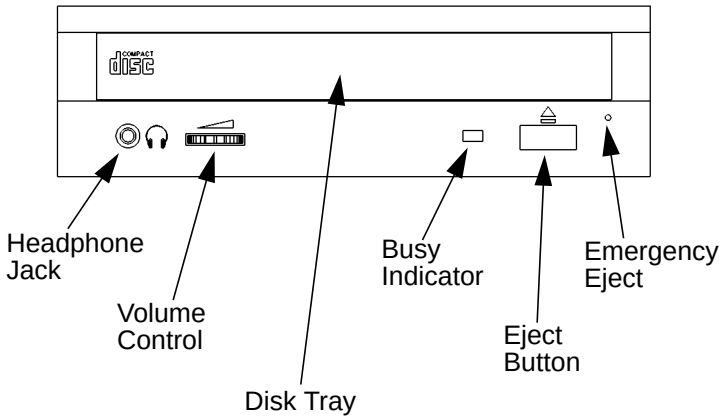


Figure 2 CD-ROM Drive Controls and Features

Table 1 CD-ROM Drive Controls and Features

Control/Feature	Purpose
Busy Indicator	Lights during a data access operation and blinks during a data transfer. The indicator blinks initially and then stays lit when there is one of the following: • A defective disc • A disc insertion error (for example, an upside-down disc) • No disc present

Table 1 CD-ROM Drive Controls and Features

Control/Feature	Purpose
Eject Button	Press to open the disc tray and insert or remove a disc. When the drive is in use, press the eject button for more than one second to open the disc tray.
Emergency Eject	Insert the end of a paper clip to open the disc tray when the workstation does not have power.
Disc Tray	Holds the CD-ROM disc. This type of CD-ROM drive does not use a disc caddy. The disc tray does not open if the workstation power is off.
Headphone Jack	Used to connect headphones with a 1/8-inch connector.
Volume Control	Volume control for the head-phone jack.

DDS Tape Drive

Your DDS tape drive is either a DDS-DC or DDS-2 tape drive with a 3.5-inch form factor, data compression, and a single-ended SCSI interface. Both drives incorporate data compression capability and are high-capacity, high transfer-rate devices for data storage on tape.

Figure 3 and Figure 4 show the LEDs, power on/off button, and eject button of the DDS-format tape drives.

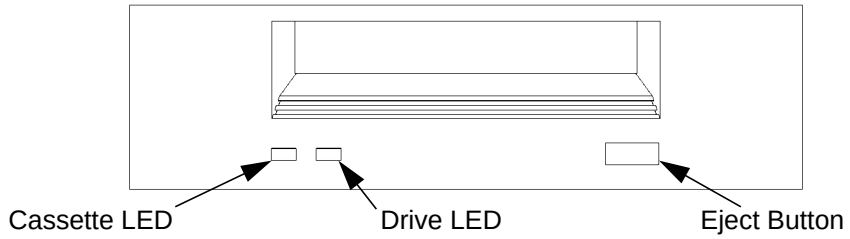


Figure 3 DDS-DC Drive Controls and Indicators

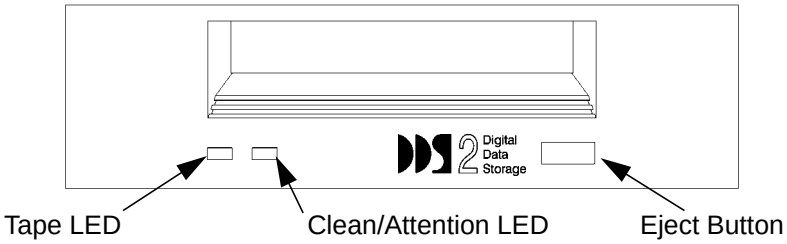


Figure 4 DDS-2 Drive Controls and Indicators

Table 2 DDS Tape Drive Controls and Features

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

Floppy Disk Drive

Figure 5 shows the operating controls and features of the floppy drive, and Table 2 describes them.

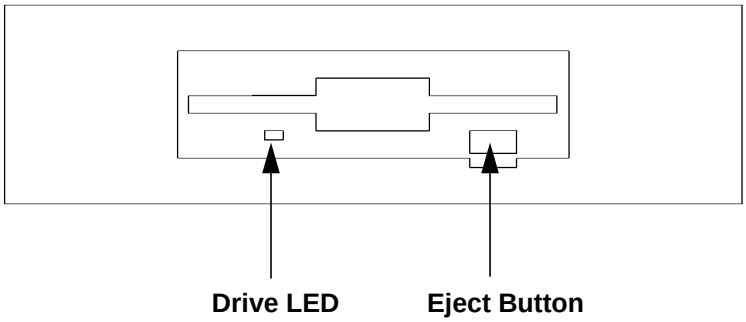


Figure 5 Floppy Drive Controls and Features

Table 3 Floppy Drive Controls and Features

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

System Unit Rear Panel Connectors

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

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

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

Figure 6 shows the locations of the connectors on the system unit's rear panel.

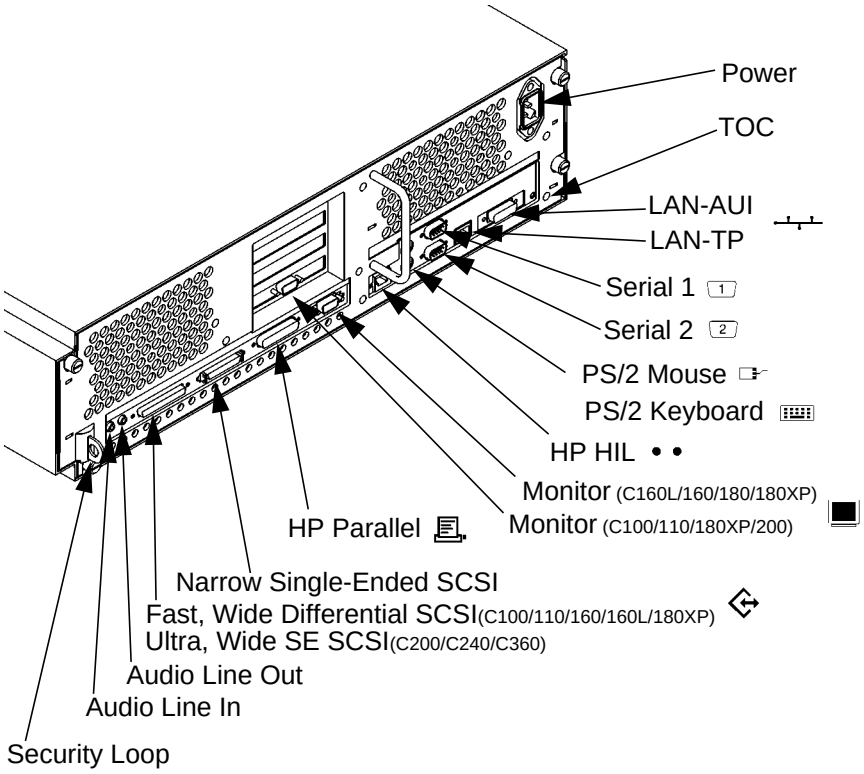


Figure 6 **System Unit Rear Panel Connectors**

Security Loop

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

Audio Connectors

The C Class workstations have audio input and output capability through external input and output connectors on the rear panel and through an internal speaker. The rear panel contains the Line IN (Stereo line-in) and Line OUT (Stereo line-out) connectors.

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

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

- Audio Features

  Programmable sample rates:

  8kHz, 16kHz, 32kHz, 48kHz,

  11.025kHz, 22.05kHz, and 44.1kHz.

  Programmable output attenuation:

  0 to -96dB in -1.5dB steps

  Programmable input gain:

  0 to 22.5dB in 1.5dB steps.

  Input monitoring:

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

- Audio Inputs

  Line-in

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

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

- Audio Outputs
  - Line-out
  - Headset
  - Built-in mono speaker
- Audio CODEC
  - Crystal CS4215

Table 4 summarizes the audio electrical specifications for the C Class workstations.

Table 4 Audio Electrical Specifications

Frequency Response	25-20,000Hz
Input Sensitivity/Impedance	
Line Out	2.0Vpk/47k ohm
Microphone	22mVpk/1k ohm
Max Output Level/Impedance	
Line out	2.8Vpp/47k ohm
Headphone	2.75Vpp/50 ohm
Speaker	5.88Vpp/48 ohm
Output Impedance	
Line Out	619 ohm
Headphone	118 ohm
Signal to Noise	
Line out	65 dB
Headphone	61 dB
Speaker	63 dB
Line in	61 dB
Microphone	57 dB
THD (w nominal load)	
Line out	-73 dB
Headphone	-70 dB
Speaker	-68 dB
Line in	-75 dB
Microphone	-73 dB
To convert from dB to number of significant bits, use the formula: n=*dB*/20 log10 = *dB*/6. For example, for 61dB S/N then n=61/6 10 significant bits, or in other words, about 6 bits of noise.	

Keyboard and Mouse Connectors

PS/2 Keyboard and Mouse Connectors

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

ITF Keyboard Connector

On the C100/C110/C160/C180 systems, the HP HIL connector provides an interface for the ITF Keyboard to the system. Consult the documentation that accompanies each input device for specific information concerning its use. On the C200 systems, ITF is available through the PS/2 connector using a special adaptor and by setting four jumpers on the leg I/O board.

HP Parallel I/O Connector

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

802.3 Network Connectors

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

Serial Input/Output Connectors

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

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

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

Table 5 Serial I/O Pins

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

SCSI Connectors

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

NOTICE: There must ALWAYS be a terminator at the end of a SCSI bus. This means that an external terminator must be connected to the last device on the external SCSI chain, or on the connector on the rear of the system if no external devices are connected.

TOC Button

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

Power Cord Connector

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

Monitors

The Models C100/C110/C200/C240/C360 do not have a built-in graphics controller. A graphics board is installed in on of the option slots. The Models C160L, C160, and C180 have a graphics controller built-in on the I/O board. The Model C180XP also comes with an extended graphics adapter installed in an option slot.

The C Class workstations with built-in graphics supports using one of the following HP monitors:

- 17-inch, 1280x1024 color monitor (A4032)
- 20-inch, 1280x1024 color monitor (A4033)
- 17-inch, 1280x1024 color monitor (A4330)
- 20-inch, 1280x1024 color monitor (A4331)

The built-in monitor connector is a new Enhanced Video connector. An EVC to DB adapter cable (HP Part No. 8120-6861) is required to use monitors not equipped with an EVC connector.

Keyboards

There are two types of Hewlett-Packard keyboards available:

- PS/2 Keyboard (PS/2 interface)
  (All C Class Workstations)
- ITF Keyboard (HP-HIL interface)
  (C100/110/C160/C180 only)

CAUTION: With the HIL interface, use only devices that conform to the HP-HIL specification with Hewlett-Packard computer systems. Devices that are not HP-HIL compatible but have similar connectors may appear to be compatible, but will damage your system.

Keyboard Differences

Aside from the obvious difference in the appearance of the ITF and PS/2 style keyboards due to the arrangement of the keys, there is also a difference in the keys and their output codes. Some keys on the ITF keyboard may not exist on the other keyboard. These keys generate codes that may not exist as output from the other keyboard (or may be generated by a different key). Codes that are generated when a key is pressed are called *keycodes*.

Some applications expect to use keycodes generated by keys existing on the ITF keyboard. Since the keys do not exist on the PS/2 keyboard, an accommodation must be made if the PS/2 keyboard is to be used. In most cases, it is still possible to use some other key that is equivalent (generates the same keycode from a different keycap). To do this, it is necessary to know which keys are equivalent on the two keyboards. Table 6 compares the equivalent keys of the ITF and PS/2 keyboards.

NOTICE: Keyboard keys not mentioned in Table 6 are the same on both keyboards.

Table 6 **PS/2 Keyboard and ITF Keyboard Equivalent Keys**

PS/2 Keycap Symbol	ITF Keycap Symbol
F9	blank1 (left)
F10	blank2
F11	blank3
F12	blank4 (right)
PrintScreen/SysReq	**Menu**
Scroll Lock	**Stop**
Pause/Break	**Break/Reset**
Page Up	**Prev**
Num Lock	**System/User**
End	**Select**
Page Down	**Next**
Enter	**Return**
Alt (left)	**Extend Char** (left)

Table 6 PS/2 Keyboard and ITF Keyboard Equivalent Keys

PS/2 Keycap Symbol	ITF Keycap Symbol
Alt (right)	**Extend Char** (right)
No Equivalent	**Clear Line**
No Equivalent	**Clear Display**
No Equivalent	**Insert Line**
No Equivalent	**Delete Line**
No Equivalent	**Print/Enter**
No Equivalent	**,** (number pad)
No Equivalent	**Tab** (number pad)
Esc	**Esc/Del**
Insert	**Insert Char**
Home	▶
Delete	**Delete Char**
Caps Lock	**Caps**
Esc Shifted	**Esc/Del** Shifted
Pause/Break Shifted	**Break/Reset** Shifted
Num Lock Shifted	**System/User** Shifted
0/Ins (number pad)	**0** (number pad)
1/End (number pad)	**1** (number pad)
2/▼ (number pad)	**2** (number pad)
3/Pg Dn (number pad)	**3** (number pad)
4/◀ (number pad)	**4** (number pad)

Table 6 **PS/2 Keyboard and ITF Keyboard Equivalent Keys**

PS/2 Keycap Symbol	ITF Keycap Symbol
6/ ▶ (number pad)	***6*** (number pad)
7/Home (number pad)	**7** (number pad)
8/▲ (number pad)	**8** (number pad)
9/Pg Up (number pad)	**9** (number pad)
./Del (number pad)	**.** (number pad)
Ctrl (left)	**Ctrl**
Ctrl (right)	No Equivalent

Pointing Devices

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

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

Operating System Overview

The C Class workstations use the HP-UX operating system. The individual models require the following minimum versions:

Model C100/110 - HP-UX 9.05 or later

Model C160L - HP-UX 10.20 or later

Model C160 - HP-UX 10.20 or later

Model C180XP - HP-UX 10.20 or later

Model C200/C240 - HP-UX 10.20 ACE 9707 or later

Model C360 - HP-UX 10.20 ACE 9806 and IPR9812 or later.

Instant Ignition systems (systems with preloaded software) have X-windows and either the HP VUE or the HP CDE graphical user interface installed and configured.

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

2

Environmental/Installation/ PM

This chapter lists the environmental specifications and regulatory requirements for the system. Installation and preventive maintenance information, if applicable, is also provided.

Environmental Specifications

Table 7 lists the environmental specifications for the C Class workstations.

Table 7 Environmental Specifications

Type	Specifications
Altitude	
Operating	0-15,000 ft
Non-operating	40,000 ft
DC magnetic field	
Operating	<5 Gauss
Non-operating	<2 Gauss @ 7 ft
Electromagnetic Interference (EMI)	
Emissions	FCC Class B, CISPR B
Susceptibility	FCC Class B, CISPR B
Electrostatic Discharge	
Air discharge	0-16 kV, no effect
Contact discharge	0-3 kv, no effect
Humidity (Non-condensing)	
Operating	95%
Leakage Current	less than 3.5 mA
Temperature	
Operating	+5 to +40˚ C
Non-operating	-40 to +70˚ C
Shock	
Operating	20g at 3 ms, 1/2 sine in normal axis with no hard errors
Non-operating	80g at 3 ms, 1/2 sine, normal axis

Table 7 Environmental Specifications

Type	Specifications
Vibration	
Operating random	0.21 G rms, 5-50 Hz
Swept sine survival	0.5 G peak, 5-500 Hz
Random survival	2.09 G rms, 5-500 Hz
Acoustics	<5 bels 5-30˚ C
	<6 bels 30-40˚ C

Installation

Refer to *Hardware Installation Card C Class (*Part Number A4200-90012) for system installation information.

Preventive Maintenance

The system unit requires no preventive maintenance. Some removable media storage devices require operator preventive maintenance. Refer to the owner's guide that came with the workstation for more information.

3

Configuration

This chapter provides details about setting up and changing the system configuration.

Workstation Configurations

Refer to the *HP 9000 C Class Configuration Guide* for a complete list of supported accessories, peripherals, and operating systems for your workstation.

FRU Configurations

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

Internal Storage Configurations

Each storage device is restricted as to where in the storage tray it may be installed. Before installing a storage device, use Figure 7 and Table 8 to determine which disk tray position is correct for your device.

Figure 7 shows the storage device positions in the disk tray. Table 8 lists what devices are supported in the different disk tray positions. The numbers in the left column of Table 7 refer to the position numbers in Figure 7.

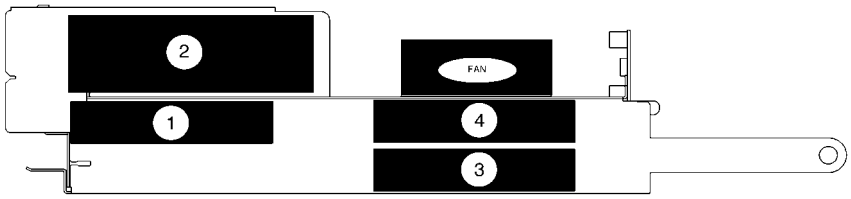


Figure 7 **Disk Tray Positions**

Table 8 Storage Configurations

Disk Tray Position	Supported Devices	Conditions
1	Floppy Drive 1-inch Low Profile Disk Drive	
2	CD-ROM DDS-Tape	
3	1-inch Low Profile Disk Drive 1.6-inch Full Height Disk Drive	If a CD-ROM drive is installed, install a 1.6-inch full height disk drive in this position.
4	1-inch Low Profile Disk Drive 1.6-inch Full Height Disk Drive	This is the preferred position for a 1.6-inch full height disk drive. If a CD-ROM drive is installed, a 1.6-inch full height disk drive cannot be installed in this position.
Hard disk drives are FWD SCSI devices on C100/110/160/180. Hard diskdrives are UWSE SCSI devices on C200/240/360. The CD-ROM drive and the DDS tape drive are single-ended SCSI devices. The floppy drive is not a SCSI device.		

Table 9 lists the recommended SCSI IDs for internal storage devices. Figure 8, Figure 9, and Figure 10 show the FWD SCSI and UWSE SCSI ID settings for the hard disk drives. Figure 11 and Figure 14 show the Narrow Single-Ended SCSI ID settings for the CD-ROM drive and the DDS drive. Figure 16 shows the Operation Mode switches for the DDS drive.

NOTE: There are no jumper settings to change for the floppy drive.

These SCSI IDs are the default IDs for each storage device. If an existing device already uses an ID, select an alternate ID.

NOTICE: The floppy disk drive is not a SCSI device.

Table 9 Default SCSI IDs

Fast, Wide Differential SCSI	
1st Hard Disk Drive	ID 6
2nd Hard Disk Drive	ID 5
3rd Hard Disk Drive	ID 4
Ultra Wide Single-Ended SCSI	
1st Hard Disk Drive	ID 6
2nd Hard Disk Drive	ID 5
3rd Hard Disk Drive	ID 4
Narrow Single-Ended SCSI	
CD-ROM Drive	ID 2
DDS Drive	ID 3
Notes: The floppy drive is NOT a SCSI device. The controller is set to SCSI ID 7.	

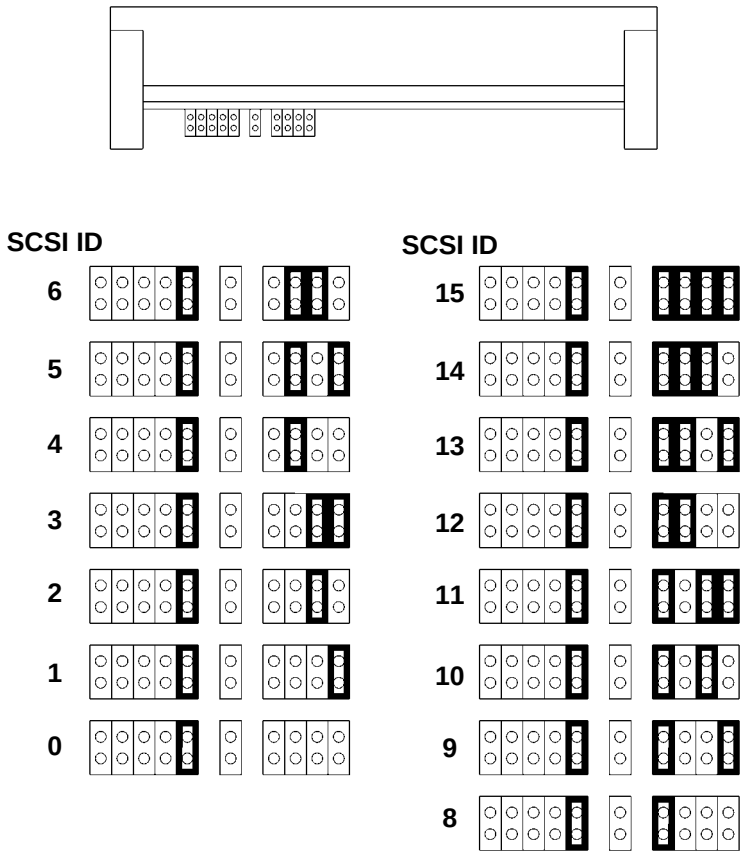


Figure 8 **Hewlett-Packard 2 GB Fast, Wide Differential Disk Drive Jumper Settings (1-inch Low Profile)**

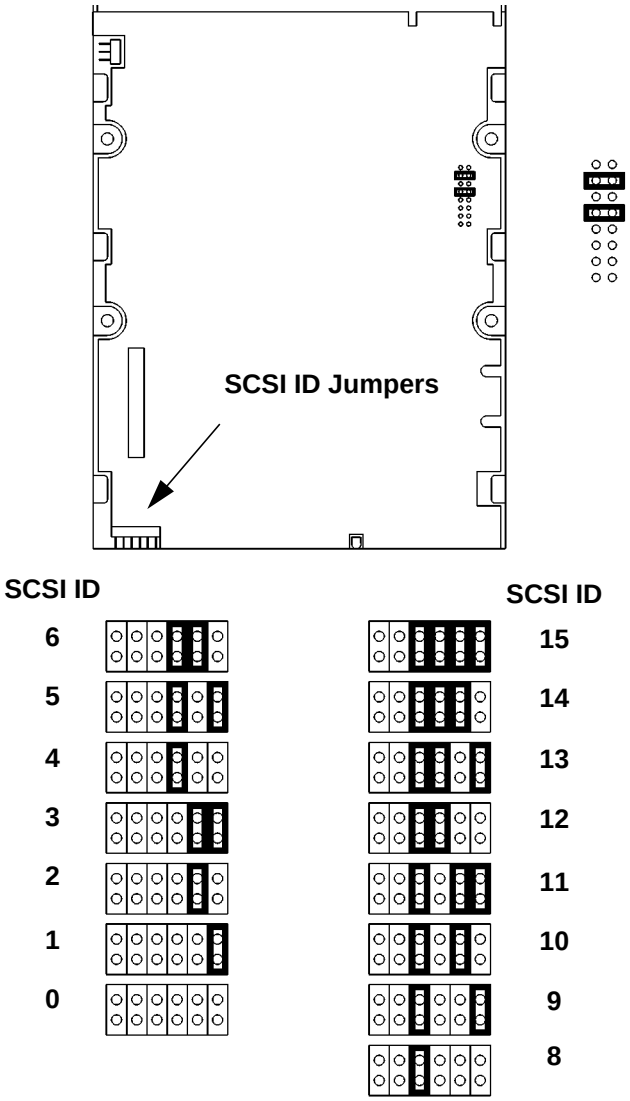


Figure 9 **Seagate 2 GB FWD or UWSE Disk Drive Jumper Settings (1-inch Low Profile)**

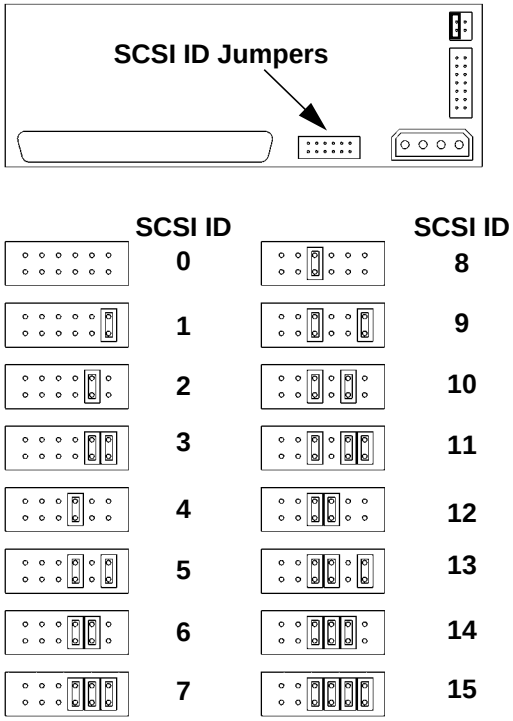


Figure 10 **Seagate 4 GB, FWD or UWSE Disk Drive Jumper Settings (1.6-inch Full Height)**

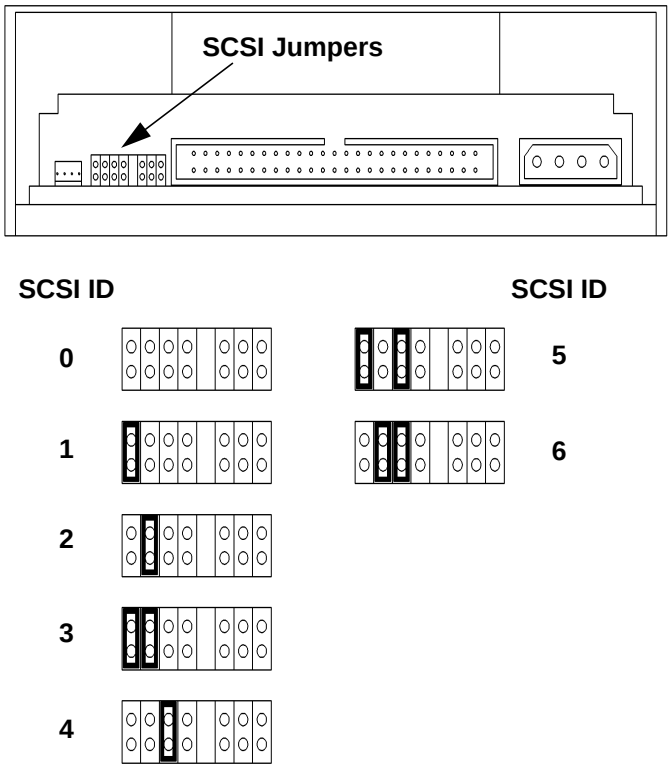


Figure 11 **Early Model CD-ROM Drive SCSI Address/Jumper Settings**

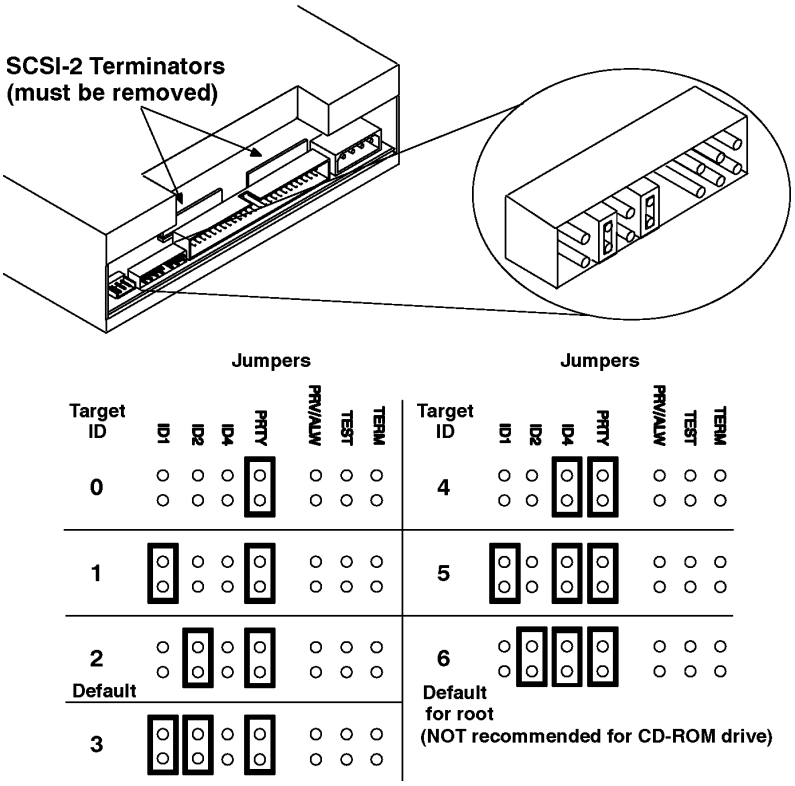


Figure 12 Later Model CD-ROM Drive SCSI Address/Jumper Settings

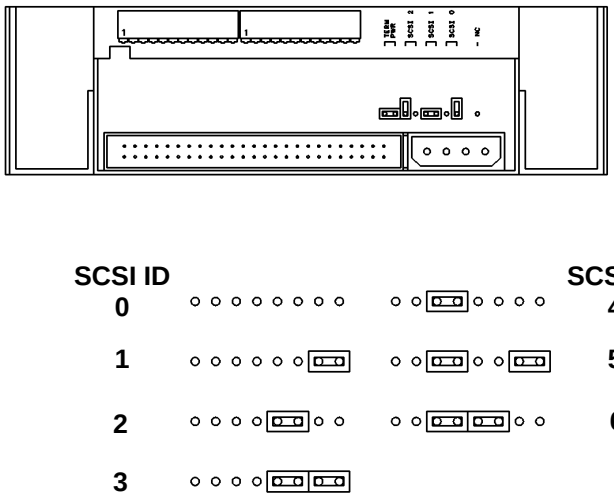


Figure 13 Early Model DDS-DC Tape Drive SCSI Address/Jumper Settings

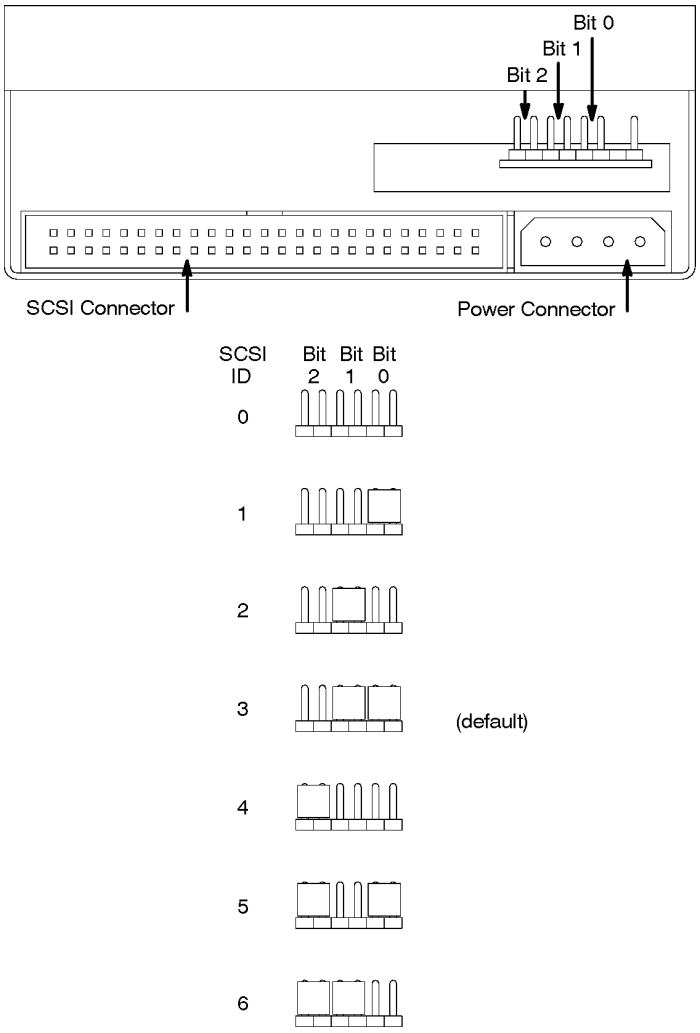


Figure 14 Later Model DDS-DC Tape Drive SCSI Address/Jumper Settings

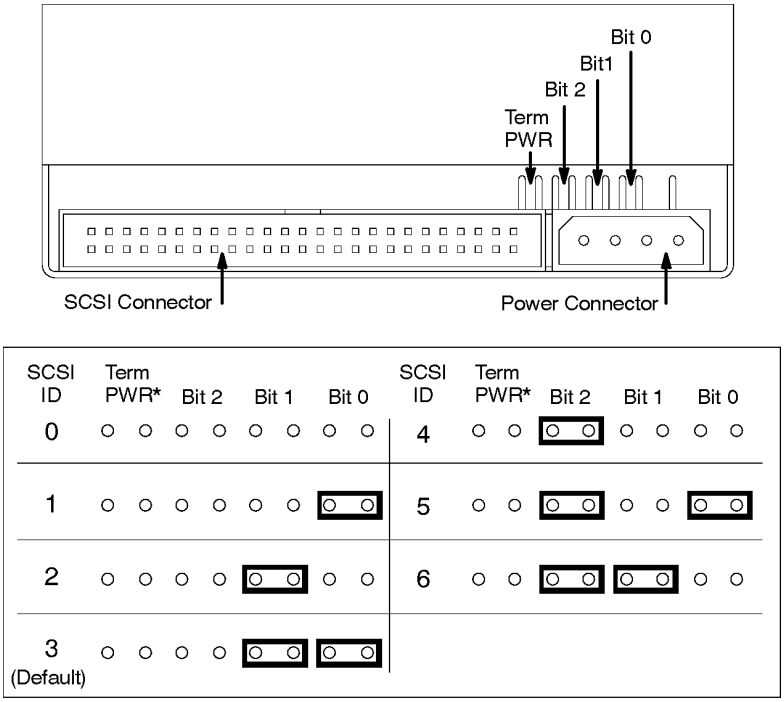
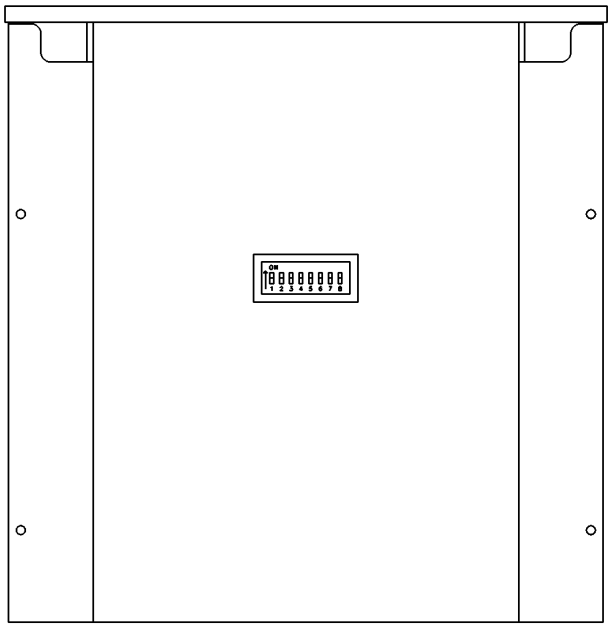


Figure 15 DDS-2 Tape Drive SCSI Address/Jumper Settings



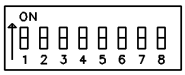


Figure 16 DDS Drive Switch Settings for Data Compression Operation Mode

Allowable Memory Configurations

The Model C100/110/160L workstations have 8 memory slots, labeled 0A, 0B through 3A, 3B. The memory configuration is 32 MB to 512 MB installed in pairs of 16 MB, 32 MB, or 64 MB memory modules.

The Model C160/180XP/200/240/360 workstations have 12 memory slots, labeled 0A, 0B through 5A, 5B. The memory configuration is 32 MB to 1.5 GB installed in pairs of 16 MB, 32 MB, 64 MB or 128 MB memory modules.

Memory modules must be installed in pairs of equal capacity.

Always install the largest capacity memory modules in the lowest numbered memory slots and don't skip any numbers.

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

Figure 17 shows the positions of the memory connectors on the Models C100/110 CPU board.

Figure 18 shows the positions of the memory connectors on the Model C160L CPU board.

Figure 19 shows the positions of the memory connectors on the Models C160/180XP/200/240/360 CPU board.

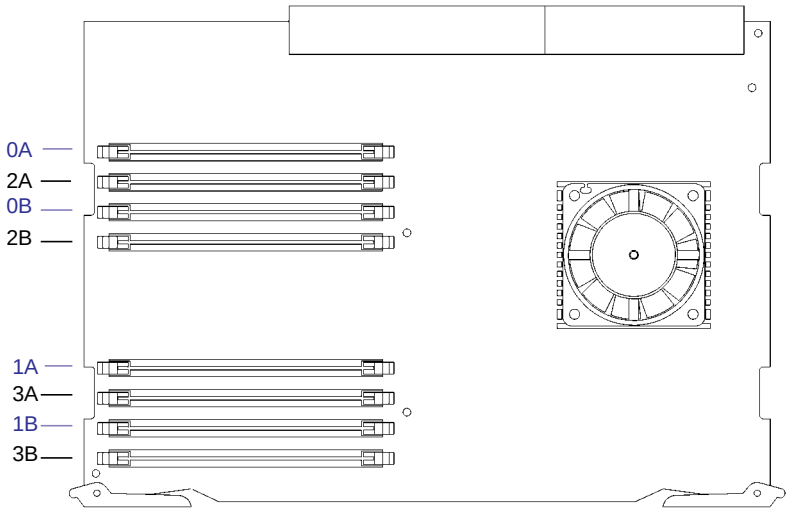


Figure 17 Memory Connectors (Model C100/110)

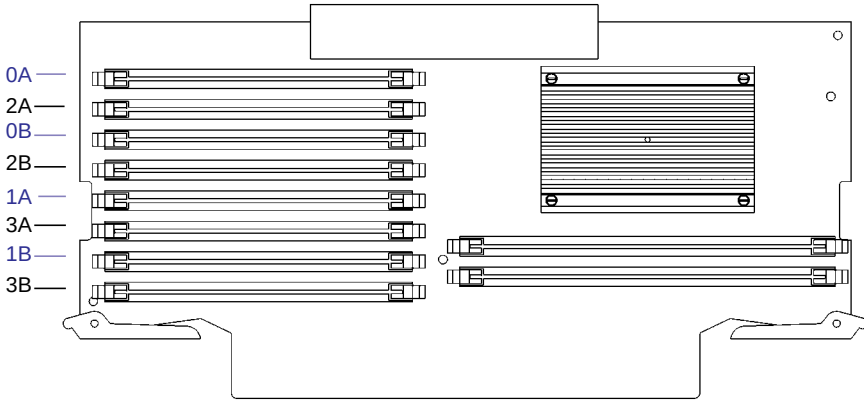


Figure 18 Memory Connectors (Model C160L)

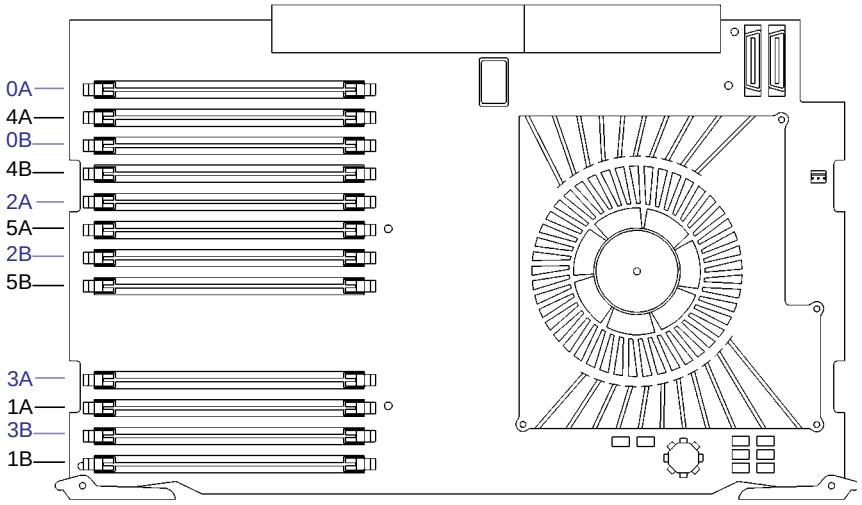


Figure 19 Memory Connectors Model (C160/180XP/200/240/360)

See chapter 5 of this manual for details on installing memory modules.

Monitor-Type Selection

The built-in graphics in the C Class workstations support the following two monitors:

- 17-inch, 1280x1024 color monitor (A4032A)
- 20-inch, 1280x1024 color monitor (A4033A)

The monitor type does not have to be changed on the workstation since the workstation is set up to support these monitors. However, if for some reason the monitor type needs to change, refer to Chapter 9 of this book.

NOTICE: Unsupported monitors may "lock up" if they cannot sync to a scan rate.

Changing the Console to External Terminal

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

1. Turn system power off.
2. Disconnect the PC keyboard connector from the system rear panel.
3. Connect a serial terminal to the Serial 1 connector (the top serial connector) on the system rear panel.
4. Power on the system.

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

Graphics Configurations

This section describes the rules for installing and configuring graphics options in your C Class workstation.

Special Video Configuration Statements for all Systems

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

For EN55022 or CISPR 22 Applications:

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

For FCC Applications:

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

Models C100 and C110

graphics0 through *graphics2* are not supported. If the configuration value is set to "default" *(graphics 0)*, the system console will be *graphics 3, Slot 3*.

graphics3 Graphics device in slot3. If there is a Dual Graphics Card in slot4, this is the port to the right on the card when facing the back of the workstation.

graphics4 Graphics device in slot4. If there is a Dual Graphics Card in slot3 or 4, this is the port to the left on the card when facing the back of the workstation.

NOTICE: If you install a VISUALIZE-48 graphics card (geometry accelerator board installed in slot 3 or slot 4) the system path is *graphics 3*.

If your workstation is running HPUX 9.05, the system console graphics device must be installed in Slot 3.

If your workstation is running HPUX 9.07 or later, the system will find a console graphics device installed in Slot 3 by default. You may install the console graphics device in Slot 4 if you modify your system files as described in *HP Visual User Environment User's Guide* or *HPUX X User Environment User's Guide.*

Models C160 and C180

This subsection describes the graphics configuration rules and restrictions for the Models C160 and C180. Note that a C200 upgraded from a C160/C180 will have these same rules and restrictions.

Graphics Paths

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

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

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

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

Graphics Configuration Restrictions

This subsection describes restrictions on the installation and support of graphics adapters.

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

The built-in graphics adapter accounts for one graphics display
(*graphics(0)*). If four displays are installed in the option slots, the built-in graphics adapter is automatically disabled.

Dual Graphics Adapters You **may not install** a dual display graphics adapter in option slot 1 and option slot 3 at the same time. Installing a dual display graphics adapter in option slot 1 and option slot 3 at the same time results in the graphics adapter in slot 1 being disabled.

You **may not install** a dual display graphics adapter in option slot 2 and option slot 4 at the same time. Installing a dual display graphics adapter in option slot 2 and option slot 4 at the same time results in the graphics adapter in slot 2 being disabled.

Multi-board Graphics Adapters When a Visualize48Z (A4244A) two board graphics adapter is installed, Only one other graphics adapter may be installed in the option slots. If the highest numbered slot used by the Visualize 48Z board set is an even numbered slot, then you may only install a graphics card in the

remaining odd numbered slot. If the highest numbered slot used by the Visualize 48Z board set is an odd numbered slot, then you may only install a graphics card in the remaining even numbered slot. For example; assuming a Visualize 48Z board set is installed in slots 1 and 2, slot two is the highest numbered slot used and it is an even numbered slot. Therefore you may only install an additional graphics adapter in slot 3 which is the remaining odd numbered slot.

NOTICE: The A4077A Color Graphics Card, A4078A Dual Color Graphics Card, A4079B HCRX-8Z graphics adapter, and the A4071B HCRX-24 graphics adapter with the A4072A Z Accelerator attached are **not supported** in the Model C160/C180.

Models C160L

This subsection describes the graphics configuration rules and restrictions for the Models C160L.

Graphics Paths

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

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

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

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

Graphics Configuration Restrictions

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

The built-in graphics adapter accounts for one graphics display (*graphics(0)*). If four displays are installed in the option slots, the built-in graphics adapter is automatically disabled.

NOTICE: The A4077A Color Graphics Card and A4078A Dual Color Graphics Card are not supported in the Model C160L.

The Model C160l only supports the A4211A HP Visualize48 graphics adapter. It does not support the A4244A HP Visualize48 graphics adapter.

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

NOTE: The Model C200 and C240 systems do not have a built-in graphics card, but use an optional graphics card.

4

Troubleshooting

This chapter provides information about isolating a failing component, known as a Field Replaceable Unit (FRU), in the C Class workstations.

Getting Ready to Troubleshoot

To troubleshoot a C Class workstation, you must be familiar with the HP-UX operating system and be able to start and stop processes. You should also be familiar with the boot ROM diagnostics, ISL diagnostics, and the SupportWave and Support Tools Manager online tests, which we describe in this chapter.

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

For a complete description of using ISL diagnostics and SupportWave, see the *Precision Architecture RISC HP Apollo 9000 Series 700 Diagnostics* manual.

In the following flowcharts, use Figure 20 (flowchart 1) and Figure 21 (flowchart 2) to troubleshoot based on whether or not the LEDs light. Use Figure 22 (flowchart 3) and Figure 23 to troubleshoot the HP-UX environment.

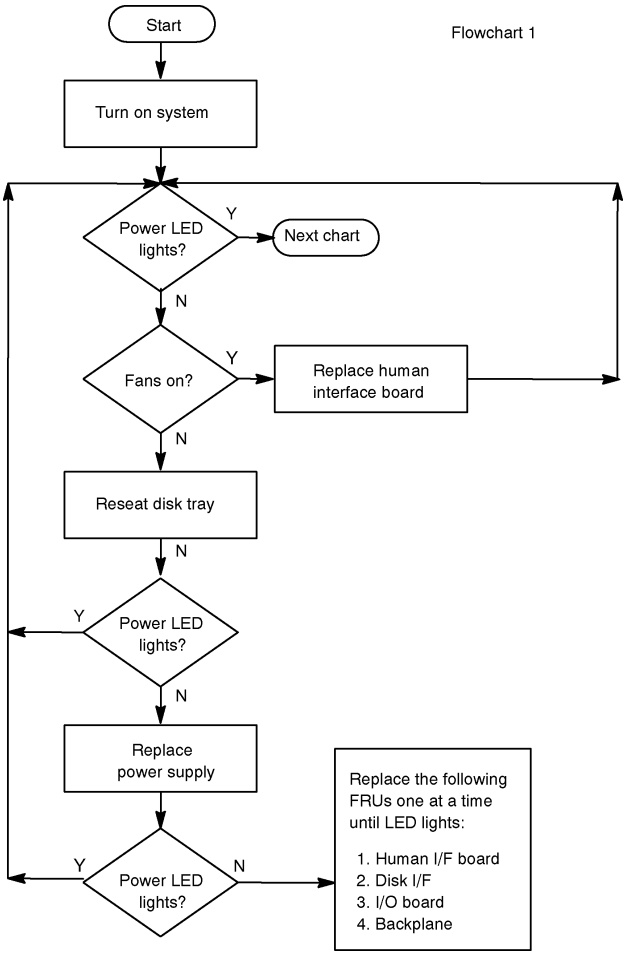


Figure 20 Power On Troubleshooting

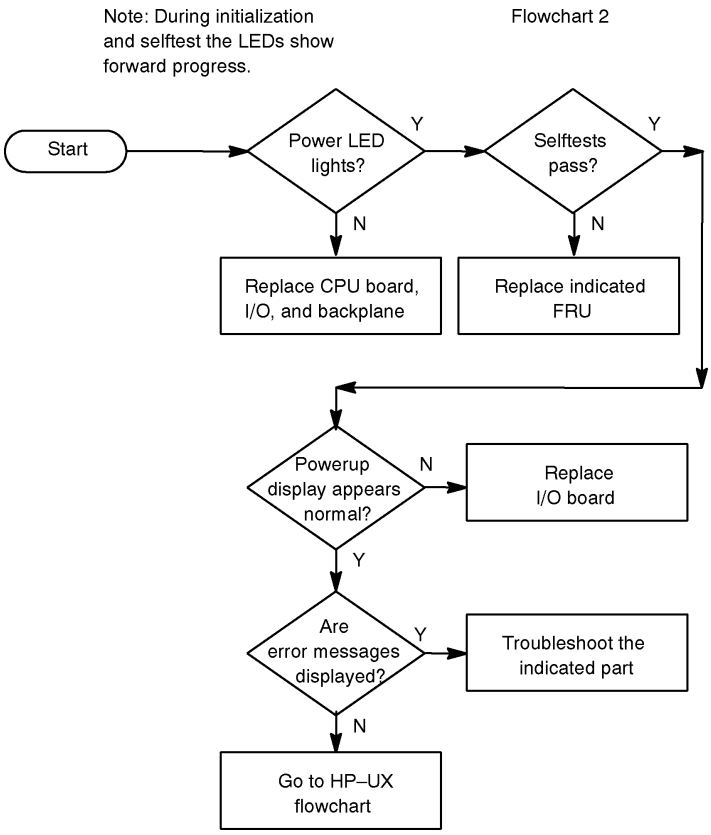


Figure 21 Selftests Troubleshooting

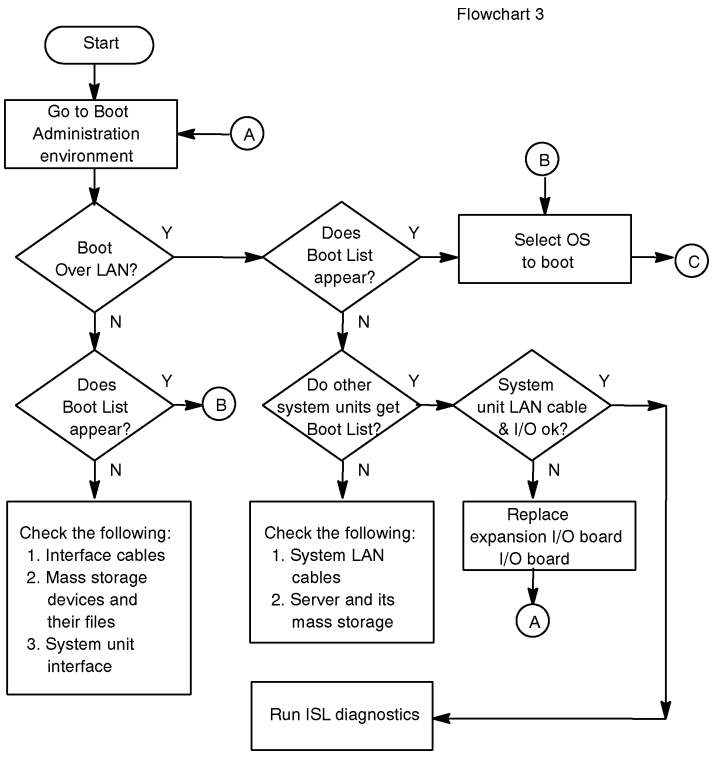


Figure 22 HP-UX Compatible Mode Troubleshooting

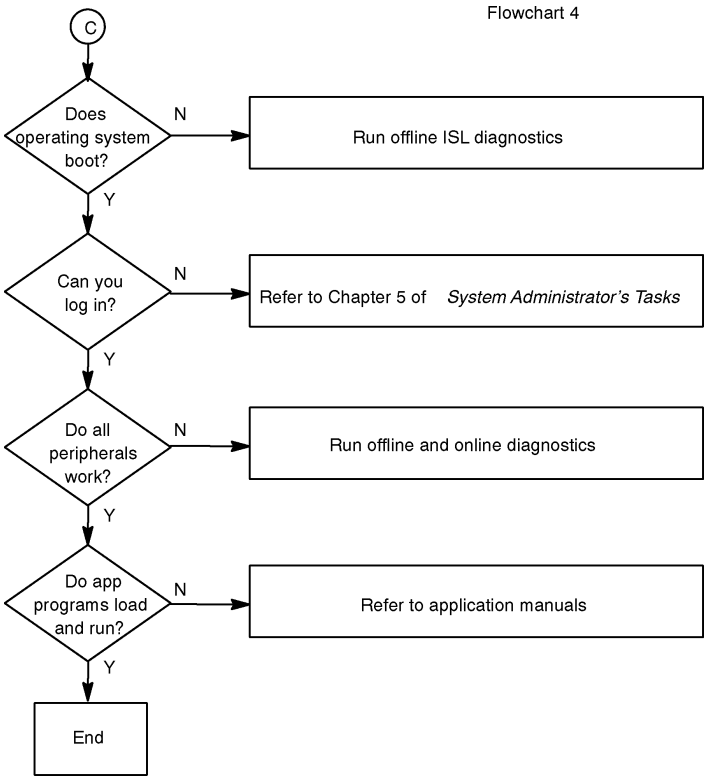


Figure 23 HP-UX Compatible Mode Troubleshooting (Continued)

Dealing with a Boot Failure

To start the workstation from an operating system stored on a device different from the usual boot device, to boot from a different disk, or to boot from another type of device (such as a DDS tape drive), see the following situations and examples that use the Boot Console Interface. To access the Boot Console Interface, see Chapters 9 and 10 of this book.

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

  boot *<device>*

  where *device* is the **hardware path** to the device, specified in Mnemonic Style Notation as listed in the following table:

Table 10 Bootable Device Types

C100/110	C160l/160/180/ 200/240/360	Description
fwscsi	**fwscsi**	built-in FWD or UWSE SCSI bus
slot*n*.fwscsi	**gsc*n***	optional FWD SCSI bus
scsi	**sescsi**	built-in narrow SE SCSI bus
lan	**lan**	all connections to the built-in LAN

For example, to boot an operating system stored on a DDS-format tape in a drive located at Single-ended SCSI ID 1 type the following command at the prompt:

boot sescsi.1.0 (C160L, C160, and C180)

boot scsi.1.0 (C100 and C110)

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

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

  boot <*device*>

  You are prompted:

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

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

  ```
  ISL>
  ```

  ISL is the program that actually controls the loading of the operating system. By interacting with ISL, you can choose to load an alternate version of the HP-UX operating system.

  For example, if the usual kernel (**/hp-ux** for 9.05 and **/stand/vmunix** for 10.0) on the root disk (**fwscsi.6.0**) has become corrupted, boot the workstation from the backup kernel **(/SYSBCKUP** for 9.05, and **/stand/vmunix.prev** for 10.0**)** by typing the following at the `ISL>` prompt:

  hpux /SYSBCKUP (for 9.05)

  hpux /stand/vmunix.prev (for 10.0)

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

Searching for Bootable Media

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

search ipl

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

- To hold the display temporarily, press **Ctrl** **S**
- To continue the display, press **Ctrl** **Q**
- To halt the search, press **Esc**

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

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

search ipl *device_type*

where *device_type* is one of the values listed in the following table:

Table 11 Bootable Device Types

C100/110	C160l/160/180/200/240/360	Description
fwscsi	**fwscsi**	built-in FWD or UWSE SCSI bus
slot*n*.fwscsi	**gsc*n***	optional FWD SCSI bus
scsi	**sescsi**	built-in narrow SE SCSI bus

Table 11 Bootable Device Types

C100/110	C160l/160/180/ 200/240/360	Description
lan	**lan**	all connections to the built-in LAN

Stable Storage

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

Boot Command Notations

The **boot** command supports the following two notations:

- Mnemonic
- Path number

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

Here are examples of mnemonic notation:

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

Here is an example of path number notation:

boot p1 attempts to boot from the second path indicated by the **search** command.

Supported Boot Paths

SCSI devices are bootable when connected to the NSE SCSI and FWD or UWSE SCSI ports on the System card. Diskless workstations can only boot from the LAN port on the System card.

ISL Environment

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

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

The ISL environment provides the following capabilities:

- Execute user-entered commands to modify boot device paths and boot options in stable storage.
- Run offline diagnostic programs (TDIAG, IOMAP).
- Provide automatic booting of the HP-UX O/S after power-on or reset.

The ISL program provides a standalone environment for loading offline diagnostic and utility programs from the LIF directory. The ISL program also provides user commands to configure the boot parameters into Stable Storage.

Selftest Failures

Chassis codes are the key to debugging selftest errors. If a failure is found during selftest, chassis codes are displayed in the diagnostic LEDs. Using Table 13, find the LED error code.

To get additional information about failures from the boot console interface, use the Service menu **pim**, **pdt**, and **Chassis Code** commands.

Table 13 shows the LED error codes as they appear on the front panel LEDs. Use these LED codes to determine a failing component.

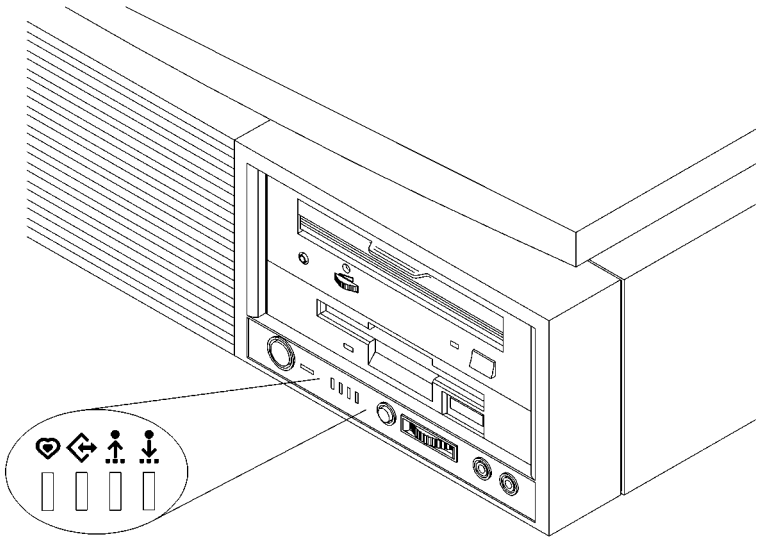


Figure 24 **System Unit Front Panel LEDs**

In the following tables, shaded LEDs indicate that they are lit.

Table 12 LED Error Codes (C100/110)

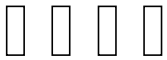
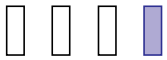
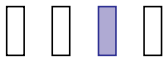
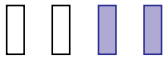
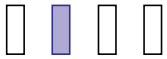
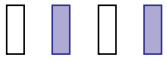
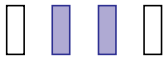
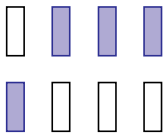
LED Value	RS-232 Chassis Code Range	Description
	N/A	Reserved
	7500	No memory found FAULT *Likely cause: SIMMs or processor board*
	7501, 7502	Not enough memory found FAULT *Likely cause: SIMMS*
	7000 - 7D0A	Processor board/memory FAULT *Likely cause: processor board*
	1030 - 4071	Processor board FAULT
	5000 - 500F 8000 - 8FFF CD00 - CDff*	I/O System FAULT *Except backplane faults listed below
	CD1E CDEF CDD0	Backplane FAULT
	Any INIT/TEST code	INITIALIZATION and TESTING Note: These two LED codes will alternate to indicate forward progress: 0111, 1000, 0111,...

Table 12 LED Error Codes (C100/110)

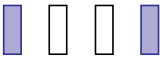
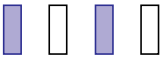
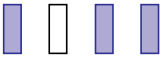
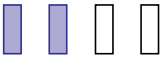
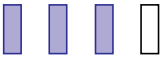
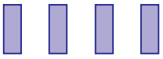
LED Value	RS-232 Chassis Code Range	Description
	Any fault not in this table including 1000-1019	Unknown FAULT
	CBF0 - CBFF	HPMC FAULT
	A000 - A0C0	No console/IPL error FAULT
	N/A	Reserved
	N/A	Reserved
	N/A	Power on value (processor board fault when this value remains for more than one second)

Table 13 LED Error Codes (C160L/160/180)

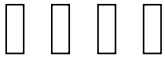
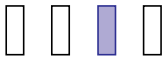
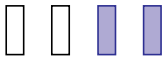
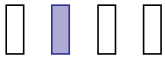
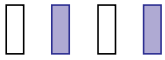
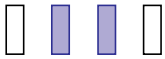
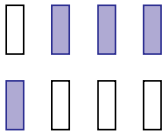
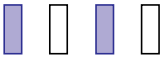
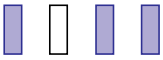
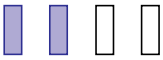
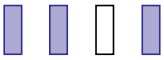
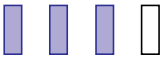
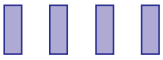
LED Value	RS-232 Chassis Code Range	Description
	N/A	Reserved
	7401	No memory found FAULT *Likely cause: SIMMs or processor board*
	N/A	Reserved
	FLT 7000-7F00	Memory Error Fault *Likely Cause: Memory SIMMs* *System console will indicate which SIMM fault occurred on*
	FLT 1030-4099	Processor board FAULT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

Table 13 LED Error Codes (C160L/160/180)

LED Value	RS-232 Chassis Code Range	Description
	FLT CBF0 - CBFF	HPMC FAULT
	FLT A088 - A0FF	No console/IPL error FAULT
	N/A	Reserved
	N/A	Reserved
	N/A	Reserved
	Any call to early_update_chassis_display	Power on value. Indicates processor board fault when this value remains for more than a second following power up.

Chassis Display Codes

Below are definitions for all Raven-U/U+ chassis display codes. The codes are organized in approximate numerical order for ease of reference. These codes are displayed on the serial console, if enabled.

Below the definitions is a chronological example of emitted chassis codes.

The ‘ostat’ or operating state of the machine have been omitted. Possible values are: OFF, FLT (Fault), TEST, INIT (Initialize), SHUT (Shutdown), WARN (Warning), RUN, and ALL.

Where a number varies, it is represented with:
- v = error number
- w = other (explained in that area)
- x = slot number
- y = bus number (gsc or nio)
- z = cpu number (0 for uniprocessor systems)

For the following section of DINO hardware test error chassis codes:
These appear only after a PCI failure; see

chassis codes “8C0y”.
They are preceded by “TEST “.

Code	Name	Meaning
0001	DINO_IAR0_ONES_TEST	srs iar0 register
0002	DINO_IAR0_ZERO_TEST	srs iar0 register
0003	DINO_IAR1_ONES_TEST	srs iar1 register
0004	DINO_IAR1_ZERO_TEST	srs iar1 register
0005	DINO_IC0_ONES_TEST	srs icr register
0006	DINO_ICR_ZERO_TEST	srs icr register
0007	DINO_IO_CONTROL_INIT	srs io_control register
0008	DINO_IO_FBB_EN_INIT	ars io_fbb_en register
0009	DINO_IIO_ADDR_EN_ZERO_TEST	ars io_addr_en register
000A	DINO_CONFIG_ADDR_ONES_TEST	ars config_addr register
000B	DINO_CONFIG_ADDR_ZERO_TEST	ars config_addr register
000C	DINO_GMAST_ONES_TEST	hvrs gmask register
000D	DINO_GMAST_ZERO_TEST	hvrs gmask register
000E	DINO_PAMR_INIT	hvrs pamr resiter
000F	DINO_PAPR_ONES_INIT	hvrs papr register
0010	DINO_PAPR_ZERO_INIT	hvrs papr register
0011	DINO_DAMODE_ONES_TEST	hvrs dmode register
0012	DINO_DAMODE_ZERO_TEST	hvrs dmode register
0013	DINO_PCICMD_INIT	hvrs pcicmd register
0014	DINO_MLTIM_INIT	hvrs mltim register
0015	DINO_BRDG_FEAT_INIT	hvrs brdg_feat register
0016	DINO_PCIROR_INIT	hvrs pciror register
0017	DINO_PCIWOR_INIT	hvrs pciwor register
0018	DINO_TLTIM_INIT	hvrs tltim register

* = Unexpected interrupts that should never occur in PDC code.

Code	Name	Meaning
1000	UNEXPECTED_INTERRUPT	Interrupt occurred during PDC execution
1x01	UNEXPECTED_INTERRUPT	HPMC
1x02	UNEXPECTED_INTERRUPT	Powerfail interrupt (unused)*
1x03	UNEXPECTED_INTERRUPT	Recovery Counter Trap*
1x04	UNEXPECTED_INTERRUPT	External Interrupt
1x05	UNEXPECTED_INTERRUPT	LPMC
1x06	UNEXPECTED_INTERRUPT	ITLB page fault*
1x07	UNEXPECTED_INTERRUPT	Instruction mem protection trap*
1x08	UNEXPECTED_INTERRUPT	Illegal instruction trap
1x09	UNEXPECTED_INTERRUPT	Break instruction trap
1x0A	UNEXPECTED_INTERRUPT	Privileged instruction trap*
1x0B	UNEXPECTED_INTERRUPT	Privileged register trap*
1x0C	UNEXPECTED_INTERRUPT	Overflow trap*
1x0D	UNEXPECTED_INTERRUPT	Conditional trap*
1x0E	UNEXPECTED_INTERRUPT	Assist exception trap
1x0F	UNEXPECTED_INTERRUPT	DTLB miss/page fault*
1x10	UNEXPECTED_INTERRUPT	Non-access ITLB fault*
1x11	UNEXPECTED_INTERRUPT	Non-access DTLB/ page fault*
1x12	UNEXPECTED_INTERRUPT	Data memory protec-

```
tion trap*
1x13      UNEXPECTED_INTERRUPT       Data memory break
trap*
1x14      UNEXPECTED_INTERRUPT       TLB dirty bit trap*
1x15      UNEXPECTED_INTERRUPT       Page Reference trap*
1x16      UNEXPECTED_INTERRUPT       Assist emulation
trap*
1x17      UNEXPECTED_INTERRUPT       Higher-privilege
transfer trap*
1x18      UNEXPECTED_INTERRUPT       Lower-privilege
transfer trap*
1x19      UNEXPECTED_INTERRUPT       Taken branch trap*
1x1A      UNEXPECTED_INTERRUPT       Data memory access
rights trap*
1x1B      UNEXPECTED_INTERRUPT       Data memory protec-
tion id trap*
1x1C      UNEXPECTED_INTERRUPT       Unaligned data ref
trap*

Code          Name                          Meaning
1z20      CPU_BASIC                  CPU basic selftest
1z21      CPU_ALU                    CPU ALU selftest
1z22      CPU_BR                     CPU branch selftest
1z23      CPU_ARITH_COND             CPU arithmetic con-
dition selftest
1z24      CPU_BIT_OP                 CPU bit operation
selftest
1z25      CPU_CR                     CPU control regis-
ters selftest
1z26      CPU_EXT_INT                CPU external inter-
rupt selftest
1z27      CPU_ITIME                  CPU itimer selftest
1z28      CPU_MULTI_MEDIA            CPU multi-media
selftest
1z29      CPU_SHADOW                 CPU Shadow register
selftest
1z2A      CPU_DIAGS                  CPU Diagnose regis-
ter selftest
1z2B      CPU_RDRS                   CPU Remote Diagnose
register selftest
1z2C      CPU_BYPASS                 CPU bypass selftest
1z30      STARTING_EST               Starting Early Self-
test
1z31      EST_SKIPPED                Early Selftest
skipped
1z32      BAD_CPU_TEST_MODE
1z3C      CPU_INIT                   Initialize the CPU
1z3E      EXITING_EST                Exiting Early Selft-
est
1z3F      CACHE_LOAD_ERROR
1z40-1z7F CPU_RDR_WARN               where 40 = rdr0 ...
7F = rdr 31
1zA0      COPROC                     CPU COPROC selftest
1zA1      COPROC_REG                 COPROC register
selftest
1zA2      COPROC_INSTR               COPROC instruction
selftest
1zA3      COPROC_TRAPS               COPROC trap selftest
1zA4      COPROC_MISC                COPROC miscella-
neous selftest
1xA5      COPROC_BYPASS              COPROC bypass selft-
est
1zAF      FPU_S_DISABLED             FPUs are disabled
1zB0      TLB_INIT                   Initialize the TLB
1zB0      TLB_INIT_ERR               TLB initialization
failure
1zB1      TLB_RAM                    TLB RAM selftest
1xB2      TLB_TRANS                  TLB translation
selftest
```

```
1zBA      BOOT_ABDICATION           Bad monarch CPU
1zBB      BAD_CPU_NUMBER            CPU Number not 0-3
1zBC      BAD_CLOCKS                Bad CPU clock speed
detected
1zBD      BAD_CPU_ORDER             CPUs not installed
in order
1zBF      BOOT_FAILURE              Slave CPU halted
1zCA      RWAY_CPU_ARB              Initializing Runway
CPU arbitration
1zCB      CPU_REV_BAD               Mismatched CPU revi-
sions
1zCC      CPU_CACHE_BAD             Mismatched cache
sizes
1zCD      CPU_DECONFIG             CPU was deconfigured
1zCE      CPU_EXTINGUISH            CPU was extin-
guished via PDC_PROC call
1zCF      SLAVE_FAILED              Slave halted itself
when selftest_status<0
1zDy      MONARCH_DCNF              x = Monarch decon-
figured, y = slave
1zDF      MONARCH_FAIL_DI           Monarch failed dual-
issue test
1zEF      ST_WARNING                Selftests returned
a warning
1zFy      SLAVE_CPU_FAIL            Monarch (x) STOPPED
a failed slave(y)
1zFC      FIND_CPUS                 Synchronizing CPUs
1zFF      MONARCH_ST_FLT            Selftest returned a
failure

10C0      NO_PROCS_IN_MEM           PDC Procs could not
be loaded into memory

Code          Name                          Meaning
2x10      ICACHE_ALINE              Icache Address line
selftest
2x1Y      ICACHE_ALINE              Y = test addr
0xY0000, Y is multiple of 4

2x11      ICACHE_ALINE_SHORT {FLT}, ICACHE_ALT_WRITE
{TEST}
          FLT extended info D005/F005      D=data
short, F=tag short
                            Address in error[0:15]
                            Address in error[16:31]
                            Expected data[0:15]
                            Expected data[16:31]
                            Expected data[32:47]
                            Expected data[48:63]
                            Expected data[64:79]
(data short only)
                            Expected data[80:95]
(data short only)
                            Expected data[96:111]
(data short only)
                            Expected data[112:127]
(data short only)
                            Actual data[0:15]
                            Actual data[16:31]
                            Actual data[32:47]
                            Actual data[48:63]
                            Actual data[64:79]
(data short only)
                            Actual data[80:95]
(data short only)
                            Actual data[96:111]
(data short only)
                            Actual data[112:127]
(data short only)
```

```
2x12      ICACHE_ALINE_OPEN {FLT}, ICACHE_ALT_WRITE
{TEST}
           FLT extended info D000/F000      D=data open,
F=tag open
                             Control Address[0:15]
                             Control Address[16:31]
                             Test Address[0:15]
                             Test Address[16:31]
                             Actual data[0:15]
(expected data is always 0)
                             Actual data[16:31]
                             Actual data[32:47]
                             Actual data[48:63]
                             Actual data[64:79]
(data failure only)
                             Actual data[80:95]
(data failure only)
                             Actual data[96:111]
(data failure only)
                             Actual data[112:127]
(data failure only)

2x20      ICACHE_RAM                Icache RAM selftest
2x2Y      ICACHE_RAM                Y = forward progress

2x21      ICACHE_RAM_DATA_ERR       Icache RAM date er-
ror
           FLT extended info D000
                             Address in error[0:15]
                             Address in error[16:31]
                             Expected data[0:15]
                             Expected data[16:31]
                             Expected data[32:47]
                             Expected data[48:63]
                             Expected data[64:79]
                             Expected data[80:95]
                             Expected data[96:111]
                             Expected data[112:127]
                             Actual data[0:15]
                             Actual data[16:31]
                             Actual data[32:47]
                             Actual data[48:63]
                             Actual data[64:79]
                             Actual data[80:95]
                             Actual data[96:111]
                             Actual data[112:127]

2x22      ICACHE_RAM_TAG_ERR {FLT}, ICACHE_ALT_READ
{TEST}
           FLT extended info
F000                             Address in error[0:15]
                             Address in error[16:31]
                             Expected data[0:15]
                             Expected data[16:31]
                             Expected data[32:47]
                             Expected data[48:63]
                             Actual data[0:15]
                             Actual data[16:31]
                             Actual data[32:47]
                             Actual data[48:63]

2x23-2x24 ICACHE_RAM                Icache RAM selftest

2x25      ICACHE_RAM_LD_D_ERR       Icache RAM load ver-
ify data error
           FLT extended info same as 2x21

2x26      ICACHE_RAM_LD_T_ERR       Icache RAM load ver-
ify tag error
           FLT extended info same as 2x22
```

```
2x30      ITAG                        Icache tag selftest
2x33      DCACHE_ALT_WRITE0
2x40      CACHE_IERR                  Icache parity error
detection selftest
2x44      DCACHE_ALT_READ0
2x50      DCACHE_STORE_QUEUE          Dcache store queue
selftest

2x51      DCACHE_STORE_QUEUE          Dcache store queue
selftest
          FLT extended info D000/F000       D=data,
F=tag
                            Address in error[0:15]
  (even bank errors end in 0)
                            Address in error[16:31]
(odd bank errors end in 8)
                            Expected data[0:15]
                            Expected data[16:31]
                            Expected data[32:47]
                            Expected data[48:63]
                            Actual data[0:15]
                            Actual data[16:31]
                            Actual data[32:47]
                            Actual data[48:63]

2x55      DCACHE_ALT_WRITE1
2x60      DCACHE_ALINE                Dcache Address line
selftest

2x61      DCACHE_ALINE                Dcache Address line
selftest
          FLT extended info same as 2x51

2x62      DCACHE_ALINE                Dcache Address line
selftest
          FLT extended info D000/F000       D=data
open, F=tag open
                            Control Address[0:15]
                            Control Address[16:31]
                            Test Address[0:15]
                            Test Address[16:31]
                            Actual data[0:15]
(expected data is always 0)
                            Actual data[16:31]
                            Actual data[32:47]
                            Actual data[48:63]

Code          Name                           Meaning
2x66      DCACHE_ALT_READ1

2x70      DCACHE_RAM                  Starting Dcache RAM
selftest
2x7Y      DCACHE_RAM                  Y = forward progress

2x71      DCACHE_RAM_DATA_ERR         Dcache RAM date er-
ror
2x72      DCACHE_RAM_TAG_ERR         Dcache RAM tag error
2x77      DCACHE_ALT_WRITE2
2x80      DTAG                        Dcache tag selftest
2x88      DCACHE_ALT_READ20
2x90      CACHE_DERR                  Dcache error selft-
est
2x99      DCACHE_ALT_WRITE3
2xA0      PM_CACHE_TESTS              PM cache selftest
2xAA      DCACHE_ALT_READ3
2xA1-2xA2 PM_RAM_TEST                 PM RAM selftest
2xA3-2xA6 PM_PTR_TEST                 PM Pointer selftest
2xA7-2xA8 PM_CAM_TEST                 PM CAM selftest
2xB0      DCACHE_PARITY               Dcache parity error
2xB1      DCACHE_EVEN_TAG_PARITY
```

```
2xB2      DCACHE_ODD_TAG_PARITY
2xB3      DCACHE_EVEN_DATA_PARITY 2xB4
DCACHE_ODD_DATA_PARITY
2xBB      XTRA_ICACHE_RAM
2xC0      ICACHE_PARITY              Icache parity error
2xC1      ICACHE_TAG_PARITY          Icache tag parity
error
2xC2      ICACHE_WORD0_PARITY        Icache word0 parity
error
2xC3      ICACHE_WORD1_PARITY        Icache word1 parity
error
2xCC      XTRA_DCACHE_RAM 2xD1      LOOP_ON_MEM_READ
2xD2      LOOP_ON_IO_READ 2xD3      LOOP_ON_MEM_WRITES
2xD4      LOOP_ON_IOA_WRITES 2xD5
LOOP_ON_DCACHE_NOISE
2xD6      ERROR_DCACHE_NOISE
2xD7      LOOP_ON_ICACHE_NOISE
2xD8      ERROR_ICACHE_0_NOISE
2xD9      ERROR_ICACHE_F_NOISE

Code          Name                          Meaning
3z00      ROM_XSUM_TEST              Checksuming the
FEPROM
3z01      PDH_CNTRL_TEST             Testing
PDH_CONTROL_REGISTER
3z02      SCR_SELFTEST               Scratch RAM under
test
3z03      SS_ERROR                   Error reading Sta-
ble Storage
3z04      ERR_WRITING_EEPROM         Error writing to
the EEPROM
3z05      EEPROM_WRITE_LIMIT        Write limit exceeded
3z06      ERR_READING_EEPROM        Error reading EEPROM
3z06      FATAL_ERR_READING_EEPROM   Fatal error reading
EEPROM
3z07      INVOKE_LDB                 Entering LDB
3z08      BAD_SYS_BRD_BYTE           Invalid
SYSTEM_BOARD_BYTE
3z09      BAD_SYS_MODE_BYTE          Invalid
SYSTEM_MODE_BYTE
3z0A      BAD_SYS_MFG_TEST_BYTE      Invalid
SYSTEM_MFG_TEST_BYTE
3z0B      PDH_IO_CNTRL_TEST          Testing
PDH_IO_CONTROL_REGISTER
3z1A      HVERSION_MISMATCH          Stable Store value
<> calculated value
3z1B      MODEL_STRING               Model String check
3z1C      TEST_SW_ID                 Check/update Soft-
ware ID
3zBC      TEST_CPU_CLOCKS            Sets clock speeds
3zC4      CLEARING_EEPROM            Clearing and revali-
dating EEPROM
3zD4      DEFAULTING_EEPROM2         Setting EEPROM2 de-
faults
3zCD      CHECK_DEFAULTS             Checking Stable
Store
3zF4      EEPROM_BOOT_LIMIT          Number of boots ex-
ceeded 95,000
30FC      BAD_PROC_BD_ID             Bad processor board
ID
30FD      BAD_SYS_BD_ID              Bad System Board ID
30FF      FAN_FAILURE                Failure of one or
more fans

Code          Name                          Meaning
4z00      STARTING_LST               Starting Late Selft-
est
4z01      LST_SKIPPED                Skipping Late Selft-
est
```

```
4z0E      EXITING_LST               Exiting Late Selft-
est
4z10      CACHE_PM_BYTE             Starting PM cache
byte selftest
4z20      LST_EST                   Early selftests dur-
ing late selftests
4z21      LST_BASIC                 CPU basic selftest
4z22      LST_ALU                   CPU ALU selftest
4z23      LST_BR                    CPU branch selftest
4z24      LST_ARITH_COND            CPU arithmetic con-
dition selftest
4z25      LST_BIT_OPS               CPU bit operation
selftest
4z26      LST_CR                    CPU control regis-
ters selftest
4z27      LST_EXT_INT               CPU external inter-
rupt selftest
4z28      LST_ITIMER                CPU itimer selftest
4z29      LST_MULTI_MEDIA           CPU multi-media
selftest
4z2A      LST_SHADOW                CPU shadow regis-
ters selftest
4z2D      LST_BYPASS                CPU bypass selftest
4z30      CACHE_BYTE                Starting cache byte
selftest
4z40      CACHE_FLUSH               Starting cache
flush selftest
4z50      ICACHE_MISS               Starting Icache
miss selftest
4z60      DCACHE_MISS               Starting Dcache
miss selftest
4z70      DUAL_ISSUE                Dual Issue selftest

Code          Name                          Meaning
5xy0      UNKNOWN_BUS_ERROR 5xy1      INTERNAL_ERROR
5xy2      PATH_ERROR_ASSERTED       Assertion of
PATH_ERROR detected
5xy3      MODE _PHASE_ERROR
5xy4      PARITY_ERROR              Data Parity Error
5xy5      PROTOCOL_ERROR            Bus protocol error
5xy6      NO_SLAVE_ACK              Failure to assert
PATH_SLAVE_ACK
5xy7      DIR_ERROR                 Runway Directed Er-
ror
5xy8      BROAD_ERROR               Runway Broad Error
5xy9      IMPROPER_ACCESS_ERROR
5xyA      ILLEGAL_RESPONSE
5xyB      BUS_TIMEOUT
5xyD      WATCHDOG_TIMEOUT
5xyE      GBOA_TOC                  GeckoBoa TOC Error
5xyF      TLB_FAULT                 U2 TLB fault or in-
valid PDIR entry

Code          Name                          Meaning
7000      MEM_HPMC_ERR              HPMC in memory sys-
tem
7001      ICACHE_PARITY_ERROR       Icache parity error
in memory test
7002      DCACHE_PARITY_ERROR       Dcache parity error
im memory test
7003      MSI_READ_ERROR            MSI read timeout
7004      MSI_WRITE_ERROR           MSI write timeout
7005      RUNWAY_ERROR              Runway parity error
7006      WRITE_BOMB_ERROR          Write bomb error
7007     MEMORY_ADDRESS_ERROR      Memory address error
7008      MULTI_BIT_ERROR           Multi-bit memory er-
ror
7009      SINGLE_BIT_ERROR          Single-bit memory
error
```

```
70FF      UNKNOWN_HPMC 7101      MMC_NOT_RESPONDING
7102      MMC_NOT_READY_ERROR
7103      MMC_FAILED_TO_CLEAR
7104      MMC_STICKY_BITS
7105      MMC_BAD_REV
7106      MMC_REG_ERROR
7107      MMC_ERR_IN_ECC_TEST
7200      NO_SMC_AVAILABLE
721w      SMC_FAILED                  w = SMC number
722w      SMC_BAD_REV                 w = SMC number
7230      SMC_FAILED_TO_RESPOND
7301      SIMM_0_DATA_ERROR           SIMM 0 bytes are
not equal
7302      SIMM_1_DATA_ERROR           SIMM 1 bytes are
not equal
7303      SIMM_MISMATCH_ERROR         SIMM 0 data <> SIMM
1 data
7304      UNKNOWN_SIZING_ERROR        Unknown sizing com-
pare error
7305      SIZING_MBE_ERROR            MBE occurred during
sizing
7306      ADDR_TEST_ERROR             Addr test failed on
bank
7307      ECC_TEST ERROR              Ecc test failed on
bank
7308      MBE_BY_SBE_ERROR            SBE caused an MBE
7401      NO_DRAMS                    No DRAMS installed
7402      MIXED_DRAMS                 Both EDO and STD
DRAMS
7403      BAD_ADDR                    Address did not map
to bank
7404      BAD_GCT_ADDR                Address did not map
in GCT
7405      DUAL_ISSUE_FAILED           Dual issue test
failed
7500      NO_RAM_FOUND
7501      GOOD_MEM_FAILED             Not enough good mem-
ory to run OS
7502      BCH_MEM_FAILED              Not enough good mem-
ory to run BCH
7604      BAD_MCT_MEM_TEST_STATUS     No bits set in Test
Status
7701      USING_ALT_CONFIG            Using Alternate mem-
ory config
7702      MEMORY_INIT_ONLY            Memory not tested,
initialized only
7703      SIM_LOADING_WARNING
7704      RAM_BUS_WARNING
7705      GOOD_MEM_GOOFY              GOOD_MEM > memory
size
7706      MIXED_DRAMS
770F      SMC_REV_1_WARNING           REV 1 SMC search
routine being used
7800      PDT_DISABLED_WARNING
7800      PDT_DISABLED_HALT
7801      UPDATE_SBE_OVRWRT           Overwrite SBE with
MBE
7802      UPDATE_DUP_ENTRY            Duplicate PDT entry
7803      UPDATE_EEPROM_ERR
7804      UPDATE_TABLE_FULL           PDT table is full
7D03      HPMC_MSI_READ_ERROR         MSI read timeout
7D04      HPMC_MSI_WRITE_ERROR        MSI write timeout
7D05      HPMC_RUNWAY_ERROR           Runway parity error
7D06      HPMC_WRITE_BOMB_ERROR       Write bomb error
7D07      HPMC_MEMORY_ADDR_ERROR      Memory address error
7D08      HPMC_MULTI_BIT_ERROR        Multi-bit memory er-
ror
7D09      HPMC_SINGLE_BIT_ERROR       Single-bit memory
```

```
error
7D0A      HPMC_BAD_ADDR              Address did not map
to bank
7F00      MEM_FRU_ID                 D3 = SIMM pair
7FFF      CATASTROPHIC_MEM_ERR

Code          Name                           Meaning
802B      IO_BUS_OVERLAP             Most likely graph-
ics on core and carrier
803D      TOO_MANY_GRAPHICS          Graphics cards
space overlap
80F3      ERR_READING_IODC_BYTES     PDC_IODC failed to
retrieve header info
80F4      ERR_READING_EINIT          PDC_IODC failed to
return entry_init
80F5      ERR_EXEC_EINIT             Error executing
entry_init
80F6      ERR_READING_EIO            PDC_IODC failed to
return entry_io
80F7      ERR_ENTRY_IO_ERR           Error executing
ENTRY_IO
80F8      INVALID_DEVICE_CLASS       must be sequential,
random or tftp
80F9      ERR_READIN_ETEST           PDC_IODC failed to
return entry_test
80FA      ERR_EXEC_ETEST             Error executing
ENTRY_TEST
80FC      INVALID_DEVICE             Probably internal
PDC structure error
8400      LASI_TEST                  Begin LASI tests
8404      LASI_INIT_RS232 8404      LASI_TEST_RS232
8404      LASI_FLT_RS232             Failed LASI RS232
test
8405      LASI_INIT_SCSI 8405      LASI_TEST_SCSI
8405      LASI_FLT_SCSI              Failed LASI SCSI
test
8406      LASI_INIT_LAN 8406      LASI_TEST_LAN
8406      LASI_FLT_LAN               Failed LASI LAN test
8407      LASI_INIT_KYBD 8407      LASI_TEST_KYBD
8407      LASI_FLT_KYBD              Failed LASI Key-
board test
84FF      FLT_NO_LASI                No LASI present
8500      WAX_EISA_MAP_TEST 8500      WAX_EISA_MAP_ERR
8501      WAX_EISA_ID_TEST 8501      WAX_EISA_ID_ERR
8FFF      LATE_ST_FLT                Late Monarch selft-
est failure (I/O)

For the following section of PCI-related chassis codes:
          The “0” (in codes of the form 8C0y) may be re-
placed by the FRU slot number where appropriate.
Code          Name                           Meaning
8C05      PCI_PATH_ERR               PATH error - wrong
HW ?
8C06      PCI_BIST_TEST              Start exec dev’s
BIST test
8C07      PCI_BIST_ERR               Dev’s BIST test
failed
8C08      PCI_ALLOC_ERR              Resource allocation
error
8C09      PCI_MEM_MANAGER_ERR        Memory manager error
8C0A      PCI_MEM_TYPE_ERR           Dev wanted mem be-
low 1Mb
8C0B      PCI_MAX_BUS_EXCEEDED       > max allowed bus
depth
8C0C      PCI_DEV_NOT_CONFIGURED     Dev not configured
8C0D      PDC_SYS_MAP_OVERFLOW       PDC_SYS_MAP is full
(during PCI bus walk)
8C0E      SYS_PCI_MAP_OVERFLOW       SYS_PCI_MAP is full
8C0F      PCI_INT_KLUDGE_WARN        RavenU+ LP intrupt
```

kludge for labproto BP

For the following section of PCI-related chassis codes:
The “1” or “2” is the GSC bus number that the host is attached to.

Code	Name	Meaning
8C10	INIT_PCI	DINO on GSC bus 1; tests & PCI init begin
8C11	TEST_PCI_COMPLETE	DINO tests completed for DINO on GSC bus 1
8C12	INIT_PCI_COMPLETE	PCI init finished for DINO on GSC bus 1
8C13	PCI_NOT_FOUND	No DINO’s (or CUJO’s) found on GSC bus 1
8C14	PCI_TEST_ERR	A DINO test failed on GSC bus 1
8C20	INIT_PCI	CUJO on GSC bus 2; tests & PCI init begin
8C21	TEST_PCI_COMPLETE	CUJO tests completed for CUJO on GSC bus 2
8C22	INIT_PCI_COMPLETE	PCI init finished for CUJO on GSC bus 2
8C23	PCI_NOT_FOUND	No CUJO’s (or DINO’s) found on GSC bus 2
8C24	PCI_TEST_ERR	A CUJO test failed on GSC bus 2

Code	Name	Meaning
8xy0	GECKOBOA_REG	Begin GeckoBOA register tests
8xy1	GECKOBOA_REG_0100	Failures of GeckoBOA register tests
8xy2	GECKOBOA_REG_0105	
8xy3	GECKOBOA_REG_0110	
8xy4	GECKOBOA_REG_0115	
8xyA	HOT_SWAP_RETRY	Hot Swap retry due to spin up time
8xy5	GECKOBOA_NIO	Begin GeckoBOA DMA tests
8xy6	GECKOBOA_NIO_0100	Failures of GeckoBOA DMA tests
8xy7	GECKOBOA_NIO_0105	
8xy8	GECKOBOA_NIO_0110	
8xy9	GECKOBOA_NIO_0115	
8xyA	GECKOBOA_NIO_0120	
8xyB	GECKOBOA_NIO_0125	

Code	Name	Meaning
9000	NO_SS_CONS	Stable Storage console not found
9001	NO_CONS_FOUND	Alternate console(s) not found

Code	Name	Meaning
A008	NO_BOOT_SELECTION	No bootable device found
A00F	RETRIEVE_PATH_FAILED	
A088	NO_BOOT_NO_CONS	No console, unable to boot
A0BD	IODC_DEV_NOT_READY	ENTRY_INIT returned -8, device not ready
A0FF	UNKNOWN_LAUNCH_FLT	
A50F	INIT_PRI_PATH_FAILED	
A70F	INIT_OTHR_PATH_FAILED	

Code	Name	Meaning
C0FF	CHASSIS_GSC_SLOT_TEST	TEST: Check for proper GSC slot offsets
C0FF	CHASSIS_GSC_SLOT_INIT	INIT: Program offsets to proper values
C0FF	CHASSIS_GSC_SLOT_ERROR	FLT: Unable to

```
cause PDH poweron reset
C10x      MONARCH_SELECTION          end of Monarch se-
lection
C200      RAM_CONFIG                 Starting memory con-
figuration
C201      BEG_DESTR_MEM_INIT         Starting detructive
memory test
C202      BEG_NONDESTR_MEM_INIT      Starting non-de-
structive memory test
C20F      RAM_CONFIG_FP              RAM config forward
progress indicator
C210      MEM_RESET_HARD
C220      PHYSICAL_CONFIG
C230      BANK_SIZING
C240      CONFIG_FROM_EEPROM
C250      INTRLV_CONFIG
C252      TEST_DUAL_ISSUE
C260      INTRLV_RAM_TEST
C261      TEST_1ST_PAGES
C263      TEST_WRITE
C264      TEST_READ_WRITE
C265      TEST_READ
C270      UPDATING_CONFIG
C280      CONFIG_TO_EEPROM
C2A0      FLAT_CONFIG
C2B0      FLAT_RAM_TEST
C2C1      MEM_RESET_SOFT
C2C2      NON_DEST_RAM_TEST
C2Dw      CHASSIS_MEM_LOGICAL_BANK   sizing logical bank
'w' of RAM
C2E0      MEM_STUFF_DONE
C300      MONARCH_TEST               Monarch is execut-
ing extended s
C30C      MONARCH_SLAVE_CHECK        Monarch is checking
slave state
C3AA      MONARCH_SLAVE_TEST         Internal test of fi-
nal slave state
C3EE      MONARCH_SLAVE_TEST_END     End of internal
slave test
C3FF      LATE_MONARCH_TEST          Monarch has fin-
ished extended selftests
C400      GET_SS_CONS                Retrieving the SS
console path
C40A      GET_SPECIAL_CONS           Retrieving special
console path
C440      INIT_SS_CONS               Initializing the SS
console path
C44A      INIT_SPECIAL_CONS          Initializing the
special console path
C4CC      INIT_CCP                   Initialize Close
Console
C4CD      NO_CCP                     Close Console not
found
C4CE      CCP_DISABLED               close console dis-
abled
C4CF      CCP_FOUND                  Found the Close Con-
sole
C500      GET_PRI_PATH               Retrieving the pri-
mary boot path
C540      INIT_PRI_PATH              Initializing the
primary boot path
C550      TEST_PRI_PATH              Execute ENTRY_TEST
for primary boot path
C580      LOAD_IPL_PRI_PATH          Loading IPL from
the primary boot path
C5F0      PRI_IPL_FAULT              An error occurred
reading IPL
C5F1      BAD_IPL_ADDR_PRI           LIF address 0 or is
```

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not 2K byte aligned
C5F2      BAD_LIF_MAGIC_PRI          LIF file not
present on media
C5F3      BAD_IPL_SIZE_PRI           LIF file 0; not
n*2K bytes; or >256K bytes
C5F4      BAD_IPL_ENTRY_PRI          LIF file entry not
word aligned or >= size
C5F8      BAD_IPL_CHKSUM_PRI         The arithmetic sum
of the words in IPL <> 0
C5FF      LAUNCH_IPL_PRI             Branching to IPL
from primary boot device
C600      GET_DEFAULT_CONS           Retrieving default
console path
C601      GET_GRAPHICS_CONS
C602      GET_KEYBOARD_CONS
C605      GET_AP_CONS                NIO access port
C640      INIT_DEFAULT_CONS          Initialize default
console path
C641      INIT_GRAPHICS_CONS
C642      INIT_KEYBOARD_CONS         Beginning IODC for
(PS/2 or HIL) keyboard
C645      INIT_AP_CONS               NIO access port
C64F      RESET_MONITOR_TYPE         Retrying bad moni-
tor type; default to “1”
C651      INIT_MONITOR_FA            Initialize GSC or
PCI graphics at HPA FA
C652      INIT_MONITOR_F8            Initialize GSC or
PCI graphics at HPA F8
C653      INIT_MONITOR_F6            Initialize GSC or
PCI graphics at HPA F6
C654      INIT_MONITOR_F4            Initialize GSC or
PCI graphics at HPA F4
C700      GET_MFG_DFLTS
C740      INIT_OTHR_PATH             Initializing a non-
primary boot path
C750      TEST_OTHR_PATH             Execute ENTRY_TEST
for alternate boot path
C770      INIT_MANUF_DFLTS
C780      LOAD_IPL_OTHR_PATH         Loading IPL from
non-primary boot path
C7F0      OTHR_IPL_FAULT_            An error occurred
reading IPL
C7F1      BAD_IPL_ADDR_OTHR          LIF address 0 or
not 2K byte aligned
C7F2      BAD_LIF_MAGIC_OTHR         LIF file not
present on media
C7F3      BAD_IPL_SIZE_OTHR          LIF file 0; not
n*2K bytes; or >256K bytes
C7F4      BAD_IPL_ENTRY_OTHR         LIF file entry not
word aligned or >= size
C7F8      BAD_IPL_CHKSUM_OTHR        Sum of the words in
IPL <> 0
C7FF      LAUNCH_IPL_OTHR            Branching to IPL
from alternate boot device
CB00      TOC_INITIATED              TOC handling initi-
ated
CB01      NO_OS_TOC                  No OS_TOC vector
CB02      BAD_OS_TOC_ADDRESS         Invalid OS_TOC vec-
tor
CB03      BAD_OS_TOC_CODE            Invalid OS_TOC code
CB04      BAD_OS_TOC_LEN             Invalid OS_TOC code
length
CB05      BAD_OS_TOC_CHECKSUM        Invalid checksum
for OS_TOC code
CB09      TOC_SEED_IVA               Seed Error TOC en-
tered
CB0A      PREV_TOC                   Previous TOC PIM
logged
```

```
CB0B      BR_TO_OS_TOC              Branching to OS_TOC
handler
CB0C      OS_TOC_FAILED             Branch to OS_TOC
failed
CB10      LPMC_INITIATED            LPMC handling initi-
ated
CB15      ULPMC                     Runway LPMC error
CB19      LPMC_SEED_IVA             Seed Error LPMC en-
tered
CB1B      BR_TO_OS_LPMC             Branching to
OS_LPMC handler
CB1F      OS_LPMC_FAILED            Branch to OS_LPMC
returned
CB71      HPMC_ENCOUNTERED
CB72      LPMC_ENCOUNTERED
CB73      TOC_ENCOUNTERED
CB99      SEED_IVA_HANDLER          PDC_SEED_ERROR iva
table HPMC hndlr entered
CB9A      HPMC_OVERWRITE           HPMC PIM overwritten
CBF0      HPMC_INITIATED            HPMC handling initi-
ated
CBF1      NO_OS_HPMC_IN_IVA         OS did not replace
PDC IVA
CBF2      BAD_OS_HPMC_LEN           Invalid length for
OS_HPMC code
CBF3      BAD_OS_HPMC_ADDR          Invalid address for
OS_HPMC code
CBF4      BAD_OS_HPMC_CHECKSUM      Invalid checksum
for OS_HPMC code
CBF5      OS_VECTOR_0               IVA + 32 = 0
CBF7      PDC_IO_INITIATED          PDC_IO Proc entered
CBF8      PDC_IO_EXITED             PDC IO Proc complet-
ed
CBF9      BC_NOT_CONFIGURED         PDC IO found BC in
unconfigured state
CBFA      PREV_HPMC                 Previous HPMC PIM
logged
CBFB      BR_TO_OS_HPMC             Branching to the OS
HPMC handler
CBFC      BR_TO_OS_HPMC_FAILED      Failed branc to the
OS HPMC handler
CBFD      UNKNOWN_CHECK             Check for no known
reason
CBFE      HPMC_DURING_TOC           HPMC interrupted a
TOC
CBFF      MULTIPLE_HPMCS            Nested HPMC occurred

Code          Name                          Meaning
CC0x      OS_RENDEZVOUS CC1x      EARLY_CPU_RENDEZVOUS
CC2x      CPU_RENDEZVOUS CC3x      CACHE_CPU_RENDEZVOUS
CC4x      MEM_CPU_RENDEZVOUS CCFx      SLAVE_BIG_ERROR

Code          Name                          Meaning
CD00      INITIALIZE_IO             Beginning Runway
bus walk
CD08      IOA0_INIT                 Init IOA0 (GSC bus
1) half of UTurn IO chip
CD0A      IOA1_INIT                 Init IOA1 (GSC bus
2) half of UTurn IO chip
CD0F      IO_MEM_RESET              Resetting Tower MMC
chip

For the following section of chassis codes:
           The “1” (in codes of the form CD1x) refers to
GSC bus 1 (IOA0).
           TEST: Looking for hardware on GSC bus
           INIT: Found the hardware being looked for
           WARN: Not able to use the hardware even
though it is found
```

```
Code          Name                          Meaning
CD10      BUS1_DINO                 Dino GSC to PCI bus
bridge on GSC bus 1
CD11      BUS1_SLOT1                Bluefish (or ATM or
??) card in GSC slot 1
CD12      BUS1_SLOT2                Bluefish (or ATM or
??) card in GSC slot 2
CD13      BUS1_ZALON                Builtin FWSCSI in-
terface (Raven U only)
CD14      BUS1_OFFSET4              (No hardware expect-
ed at GSC offset 4)
CD15      BUS1_OFFSET5              (No hardware expect-
ed at GSC offset 5)
CD16      BUILTIN_GRAPHICS          Graffiti graphics
on GSC bus 1
CD1A      F4_GRAPHICS               GSC graphics in
slot 2, HPA 0xF4000000
CD1B      F6_GRAPHICS               GSC head 2 in slot
2,   HPA 0xF6000000
CD1C      F8_GRAPHICS               GSC head 2 in slot
1,   HPA 0xF8000000
CD1D      FA_GRAPHICS               GSC graphics in
slot 1, HPA 0xFA000000
CD1E      WAX                       (Expected in EISA-
capable system only)
CD1F      LASI

For the following section of chassis codes:
          The “2” (in codes of the form CD2x) refers to
GSC bus 2 (IOA1).
          TEST: Looking for hardware on GSC bus
          INIT: Found the hardware being looked for
          WARN: Not able to use the hardware even
though it is found
Code          Name                          Meaning
CD20      BUS2_CUJO                 Cujo GSC to PCI bus
bridge on GSC bus 2
CD21      BUS2_OFFSET1              (No hardware expect-
ed at GSC offset 1)
CD22      BUS2_SLOT3_RU             Bluefish (or ??)
card in RavenU GSC slot 3
CD23      BUS2_SLOT4                Bluefish (or ATM or
??) card in GSC slot 4
CD24      BUS2_SLOT3_RU+            Bluefish (or ??)
card in RavenU+ GSC slot 3
CD25      BUS2_OFFSET5              (No hardware expect-
ed at GSC offset 5)
CD2A      F4_GRAPHICS               GSC head 2 in slot
4,   HPA 0xF4000000
CD2B      F6_GRAPHICS               GSC graphics in
slot 4, HPA 0xF6000000
CD2C      F8_GRAPHICS               GSC graphics in
slot 3, HPA 0xF8000000
CD2D      FA_GRAPHICS               GSC head 2 in slot
3,   HPA 0xFA000000

Code          Name                          Meaning
CDE0      INIT_EISA_COMPLETE        (Expected in EISA-
capable system only)
CDE1      EISA_SLOT_INIT            (Expected in EISA-
capable system only)
CDEA      INIT_EISA                 (Expected in EISA-
capable system only)
CDEB      EISA_CHECKING_FOR_CARDS   (Expected in EISA-
capable system only)
CDEC      EISA_NO_CFG_DATA          (Expected in EISA-
capable system only)
CDED      EISA_CFGID_NE_CARDID      (Expected in EISA-
capable system only)
```

```
CDEE      EISA_CARD_INIT_ERROR       (Expected in EISA-
capable system only)
CDEF      NO_EISA_FOUND              (Expected in EISA-
capable system only)
CDFF      INIT_SYSTEM_MAP_TABLE      Building the system
map table
```

CHRONOLOGICAL EXAMPLE

```
C240+
Firmware Version 4.3
Manufacturing Mode
Single-ended FWSCSI/No-Graffiti I/O Board
EISA/550W Backplane Board
Fastboot OFF
1 pair of DIMMs
Not the first time it was booted with this memory config-
uration

INIT 10FC  CHASSIS_FIND_CPUS
INIT C100  CHASSIS_MONARCH_SELECTED
TEST 3000  CHASSIS_ROM_XSUM_TEST
INIT 3000  CHASSIS_ROM_XSUM_TEST
TEST 3001  CHASSIS_PDH_CNTRL_TEST
INIT 3001  CHASSIS_PDH_CNTRL_TEST
INIT C4CC  CHASSIS_INIT_CCP
INIT C4CF  CHASSIS_CCP_FOUND
INIT C4CD  CHASSIS_NO_CCP
INIT 3002  CHASSIS_SCR_SELFTEST
TEST 30BC  CHASSIS_TEST_CPU_CLOCKS
INIT 30BC  CHASSIS_TEST_CPU_CLOCKS
TEST C0FF  CHASSIS_GSC_SLOT_TEST
INIT C30C  CHASSIS_MONARCH_SLAVE_CHECK
INIT 10CA  CHASSIS_RWAY_CPU_ARB
INIT C300  CHASSIS_MONARCH_TEST
TEST 1030  CHASSIS_STARTING_EST
TEST 1020  CHASSIS_CPU_BASIC
TEST 1021  CHASSIS_CPU_ALU
TEST 1022  CHASSIS_CPU_BR
TEST 1023  CHASSIS_CPU_ARITH_COND
TEST 1024  CHASSIS_CPU_BIT_OPS
TEST 1025  CHASSIS_CPU_CR
TEST 1026  CHASSIS_CPU_EXT_INT
TEST 1027  CHASSIS_CPU_ITIMER
TEST 1028  CHASSIS_CPU_MULTI_MEDIA
TEST 1029  CHASSIS_CPU_SHADOW
TEST 102A  CHASSIS_CPU_DRS
TEST 102B  CHASSIS_CPU_RDRS
TEST 102C  CHASSIS_CPU_BYPASS
TEST 2010  CHASSIS_ICACHE_ALINE
TEST 201F  CHASSIS_ICACHE_ALINE               Loop
starting from end of cache
TEST 2014  CHASSIS_ICACHE_ALINE               Next mul-
tiple of 0x40000 addr
TEST 2010  CHASSIS_ICACHE_ALINE               Next mul-
tiple of 0x40000 addr
TEST 2020  CHASSIS_ICACHE_RAM
TEST 2021  CHASSIS_ICACHE_RAM                 Test
first lines done
TEST 2022  CHASSIS_ICACHE_RAM                 Load
first lines done
TEST 2023  CHASSIS_ICACHE_RAM                 Test
rest of cache done
TEST 2023  CHASSIS_ICACHE_RAM                 Test
rest of cache done
TEST 2030  CHASSIS_CACHE_ITAG
TEST 2040  CHASSIS_CACHE_IERR
TEST 2060  CHASSIS_DCACHE_ALINE
TEST 2070  CHASSIS_DCACHE_RAM
```

```
TEST 2071  CHASSIS_DCACHE_RAM
TEST_NORMAL_PATTERNS_EVEN
TEST 2072  CHASSIS_DCACHE_RAM
TEST_INVERSE_PATTERNS_EVEN
TEST 2073  CHASSIS_DCACHE_RAM
TEST_NORMAL_PATTERNS_ODD
TEST 2074  CHASSIS_DCACHE_RAM
TEST_INVERSE_PATTERNS_ODD
TEST 2080  CHASSIS_CACHE_DTAG
TEST 10B1  CHASSIS_TLB_RAM
INIT 103C  CHASSIS_CPU_INIT
TEST 103E  CHASSIS_EXITING_EST
INIT C30C  CHASSIS_MONARCH_SLAVE_CHECK
INIT 10CA  CHASSIS_RWAY_CPU_ARB
INIT C30C  CHASSIS_MONARCH_SLAVE_CHECK
INIT 10CA  CHASSIS_RWAY_CPU_ARB
INIT CD00  CHASSIS_IOA_TEST
INIT CD08  CHASSIS_IOA0_INIT
TEST CD10  CHASSIS_BUS1_DINO
INIT CD10  CHASSIS_BUS1_DINO
TEST CD11  CHASSIS_BUS1_SLOT1
TEST CD12  CHASSIS_BUS1_SLOT2
TEST CD13  CHASSIS_IOA0_ZALON
TEST CD14  CHASSIS_BUS1_OFFSET4
TEST CD15  CHASSIS_BUS1_OFFSET5
TEST CD1F  CHASSIS_LASI
INIT CD1F  CHASSIS_LASI
TEST CD1E  CHASSIS_WAX
INIT CD1E  CHASSIS_WAX
TEST CD1A  CHASSIS_F4_GRAPHICS
TEST CD1B  CHASSIS_F6_GRAPHICS
TEST CD1C  CHASSIS_F8_GRAPHICS
TEST CD1D  CHASSIS_FA_GRAPHICS
TEST CD20  CHASSIS_BUS2_OFFSET0
INIT CD20  CHASSIS_BUS2_OFFSET0
TEST CD21  CHASSIS_BUS2_OFFSET1
TEST CD22  CHASSIS_BUS2_SLOT3
TEST CD23  CHASSIS_BUS2_SLOT4
TEST CD24  CHASSIS_BUS2_OFFSET4
TEST CD25  CHASSIS_BUS2_OFFSET5
TEST CD2A  CHASSIS_F4_GRAPHICS
TEST CD2B  CHASSIS_F6_GRAPHICS
INIT CD2B  CHASSIS_F6_GRAPHICS
TEST CD2C  CHASSIS_F8_GRAPHICS
TEST CD2D  CHASSIS_FA_GRAPHICS
TEST CD16  CHASSIS_BUILTIN_GRAPHICS
INIT CDFF  CHASSIS_INITIALIZE_SYS_MAP
TEST C210  CHASSIS_MEM_RESET_HARD
TEST C220  CHASSIS_PHYSICAL_CONFIG
TEST C230  CHASSIS_BANK_SIZING
TEST C2D3  CHASSIS_BANK_SIZING                    RAM logi-
cal bank 3
TEST C2D7  CHASSIS_BANK_SIZING                    RAM logi-
cal bank 7
TEST C240  CHASSIS_CONFIG_FROM_EEPROM
TEST C260  CHASSIS_INTRLV_RAM_TEST
TEST C261  CHASSIS_TEST_1ST_PAGES
TEST C263  CHASSIS_TEST_WRITE
TEST C264  CHASSIS_TEST_READ_WRITE
TEST C265  CHASSIS_TEST_READ
TEST C2E0  CHASSIS_MEM_STUFF_DONE
INIT C30C  CHASSIS_MONARCH_SLAVE_CHECK
INIT 10CA  CHASSIS_RWAY_CPU_ARB
TEST 4000  CHASSIS_STARTING_LST
TEST 4020  CHASSIS_LST_EST
TEST 4021  CHASSIS_LST_BASIC
TEST 4021  CHASSIS_LST_BASIC
TEST 4022  CHASSIS_LST_ALU
```

```
TEST 4022  CHASSIS_LST_ALU
TEST 4023  CHASSIS_LST_BR
TEST 4023  CHASSIS_LST_BR
TEST 4024  CHASSIS_LST_ARITH_COND
TEST 4024  CHASSIS_LST_ARITH_COND
TEST 4025  CHASSIS_LST_BIT_OPS
TEST 4025  CHASSIS_LST_BIT_OPS
TEST 4026  CHASSIS_LST_CR
TEST 4026  CHASSIS_LST_CR
TEST 4029  CHASSIS_LST_MULTI_MEDIA
TEST 4029  CHASSIS_LST_MULTI_MEDIA
TEST 402A  CHASSIS_LST_SHADOW
TEST 402A  CHASSIS_LST_SHADOW
TEST 402D  CHASSIS_LST_BYPASS
TEST 402D  CHASSIS_LST_BYPASS
TEST 4030  CHASSIS_CACHE_BYTE
TEST 4040  CHASSIS_CACHE_FLUSH
TEST 4050  CHASSIS_ICACHE_MISS
TEST 4060  CHASSIS_DCACHE_MISS
TEST 2090  CHASSIS_CACHE_DERR
TEST 2050  CHASSIS_DCACHE_STORE_QUEUE
TEST 10B2  CHASSIS_TLB_TRANS
TEST 10A0  CHASSIS_COPROC_TESTS
TEST 10A1  CHASSIS_COPROC_REG
TEST 10A2  CHASSIS_COPROC_INSTR
TEST 10A3  CHASSIS_COPROC_TRAPS
TEST 10A4  CHASSIS_COPROC_MISC
TEST 10A5  CHASSIS_COPROC_BYPASS
INIT 103C  CHASSIS_CPU_INIT
TEST 400E  CHASSIS_EXITING_LST
INIT CDEA  CHASSIS_INIT_EISA
INIT CDE0  CHASSIS_INIT_EISA_COMPLETE
INIT C30C  CHASSIS_MONARCH_SLAVE_CHECK
INIT 10CA  CHASSIS_RWAY_CPU_ARB
INIT C3FF  CHASSIS_LATE_MONARCH_TEST
INIT C30C  CHASSIS_MONARCH_SLAVE_CHECK
INIT 10CA  CHASSIS_RWAY_CPU_ARB
INIT 8C20  CHASSIS_INIT_PCI
INIT 8C21  CHASSIS_TEST_PCI_COMPLETE
INIT 8C22  CHASSIS_INIT_PCI_COMPLETE
INIT 8C10  CHASSIS_INIT_PCI
INIT 8C11  CHASSIS_TEST_PCI_COMPLETE
INIT 8C12  CHASSIS_INIT_PCI_COMPLETE
TEST 301B  CHASSIS_CHECK_MODEL_STRING
TEST 301C  CHASSIS_TEST_SW_ID
INIT C653  CHASSIS_INIT_MONITOR_F6
```

Running System Verification Tests

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

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

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

man cstm

man mstm

man xstm

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

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

cstm

The following message appears:

```
Support Tool Manager  Vewrsion n.nn.nn
Type ‘help for a list of available commands.
CSTM>
```

6 To verify the system operation, type the following at the CSTM> prompt:

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.
```

7 When you see the >> prompt, enter **r.** The following messages and graphics test window appear:

```
Verification of (2/0/1.0.0) has completed.  Result status - (Success)
Verification of (2/0/1.5.0) has completed.  Result status - (Success)
Verification of (2/0/1.6.0) has completed.  Result status - (Success)
Verification of (CPU) has completed.  Result status - (Success)
Verification of (FPU) has completed.  Result status - (Success)
Verification of (2/0/2) has completed.  Result status - (Success)
Verification of (0/0/0) has completed.  Result status - (Success)
```

8 Press **ENTER** to return to the CSTM> prompt after all test results are reported.

9 To exit the Support Tools Manager, enter the following:

exit

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

Running ODE-Based Diagnostics

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

ODE is an ISL utility. To boot ODE:

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

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

- **lasidiag**- tests and verifies the core-I/O functionality within the LASI chip. The diagnostics test the SCSI interface, LAN interface logic, parallel interface, audio, RS-232, PS/2 keyboard and mouse interface, real time clock, and the PC floppy interface and drive.
- **memtest** - tests and verifies the memory arrays. If an error is detected, the diagnostic reports the memory card and its slot number that needs replacement. Memtest also provides a map of the memory configuration so that the user can identify the type of memory and its slot location.
- **update** - updates the system's Processor Dependent Code (PDC) firmware on the FEPROM.

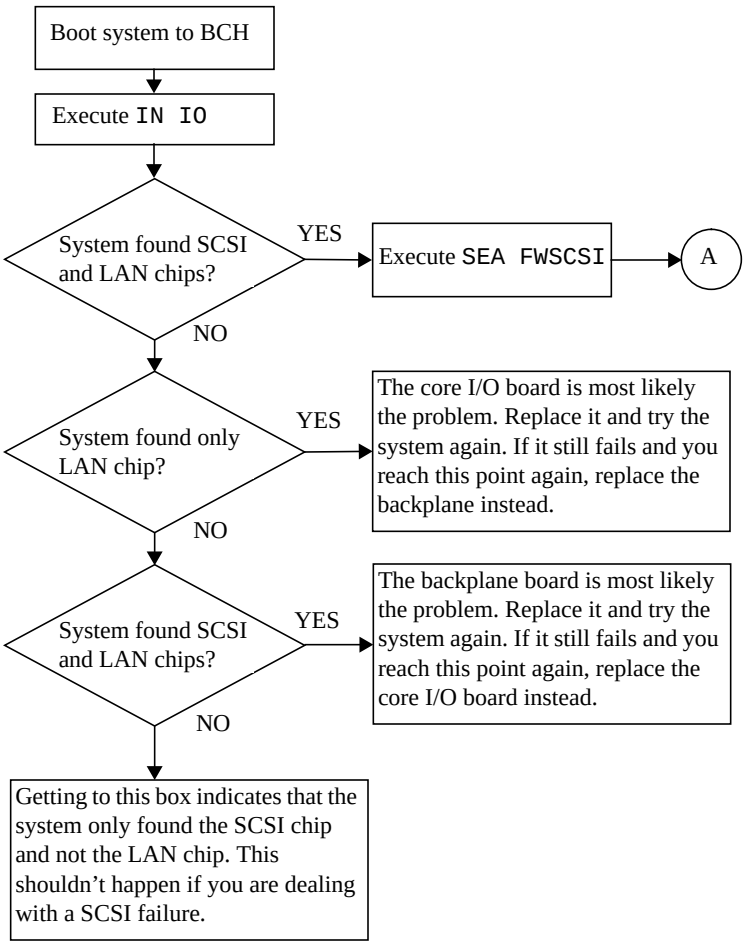
- **mapper** - identifies the configuration of HPPA systems. It displays path, identification, and revision information of I/O components, configuration of memory controllers, processors, co-processors, cache, and TLB, as well as processor board component revisions and values of various HPPA system identifiers,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

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

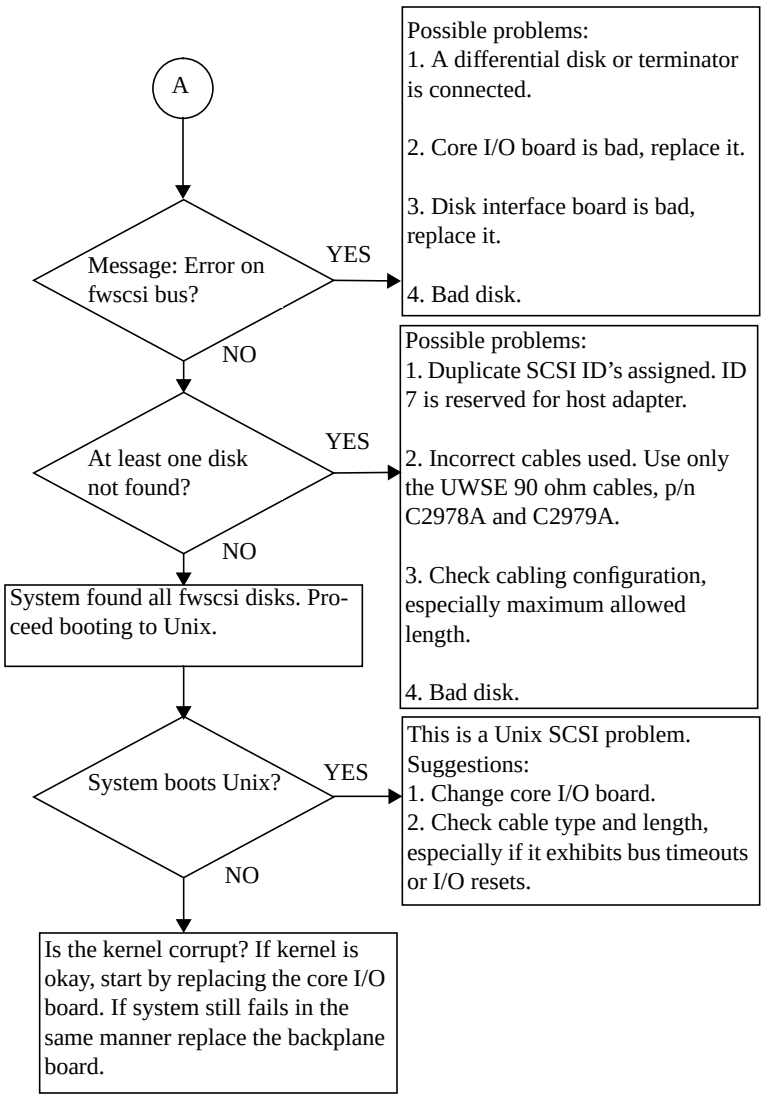
Troubleshooting the SCSI I/O Board

The following flowcharts guide you through trouble-shooting the ultra, wide, single-ended SCSI core I/O board and the fast, wide, differential SCSI core I/O board.

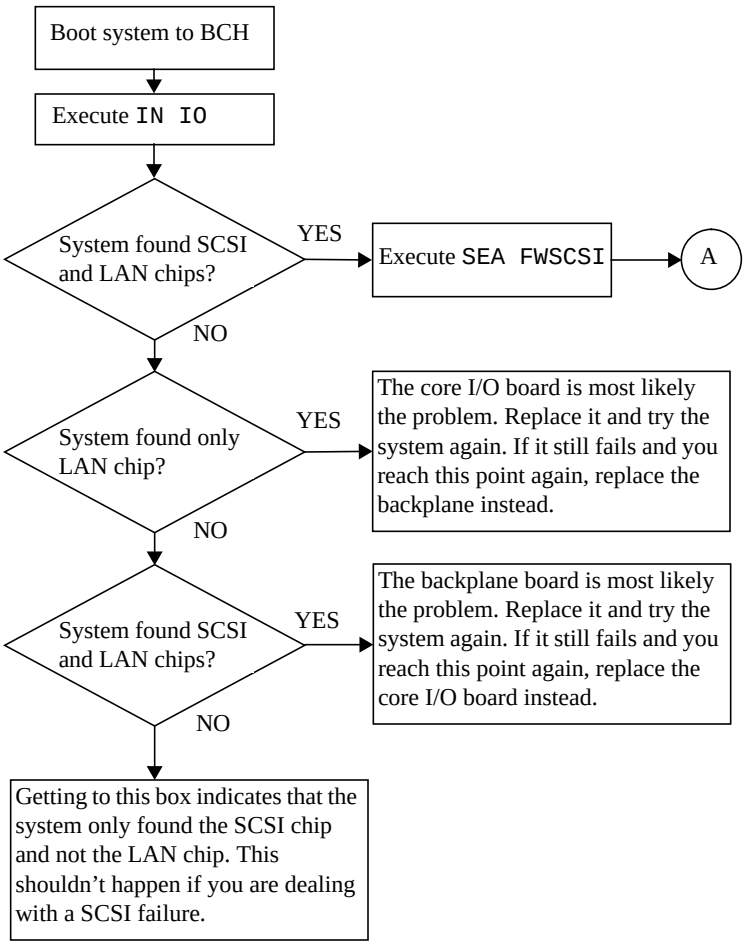
A4125-66521 UWSE Core I/O Board



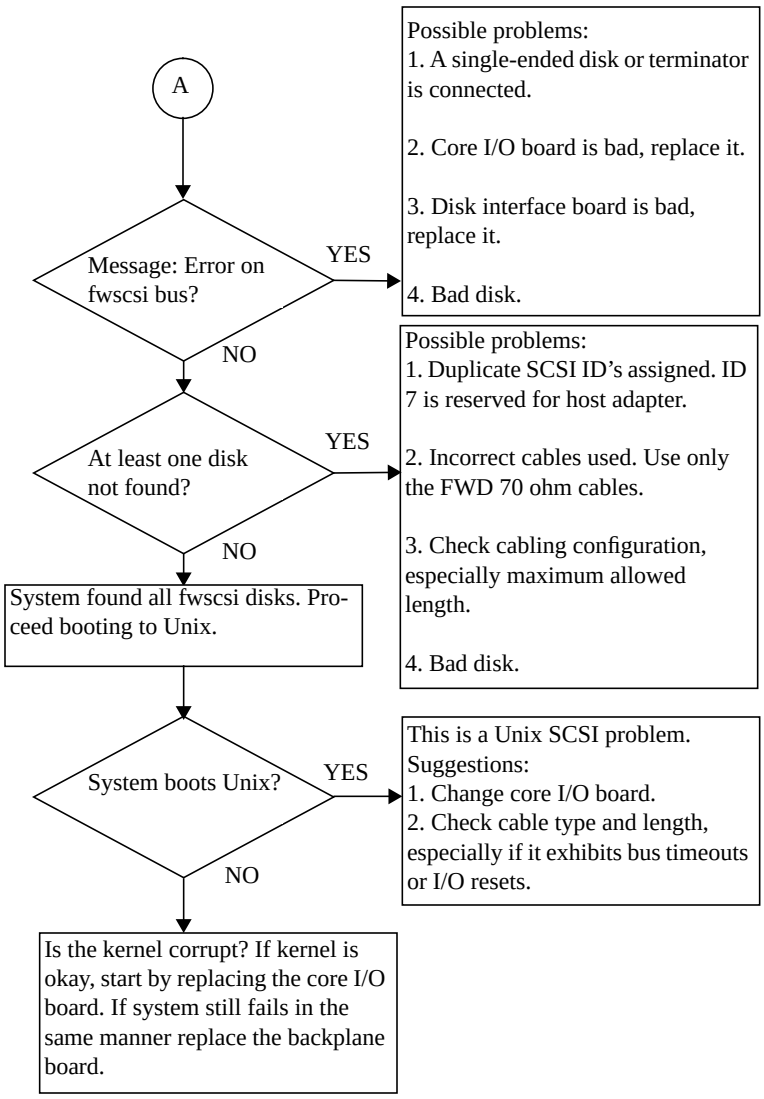
A4125-66521 UWSE Core I/O Board



A4125-66522 FWD Core I/O Board



A4125-66522 FWD Core I/O Board



5

Field Replaceable Units

This chapter lists the C Class Field Replaceable Units (FRUs) and provides procedures and illustrations showing their removal and replacement.

Use the following tools to remove or replace FRUs:

- Light-duty flat blade screwdriver with 150-mm (6-in.) blade
- ESD equipment (see the “ESD Precautions” section in the Preface for detailed information)

WARNING **To avoid electrical shock, you must power off the system and unplug the power cord from the wall outlet, before performing each of the procedures in this chapter.**

NOTICES: There is no need to manually shutdown the HP-UX operating system on the workstation before switching it off. When the power switch is turned off, the workstation automatically shuts down the operating system before terminating the power.

To maintain FCC/EMI compliance, verify that all covers, bezels, and modules are replaced and that all screws are properly seated.

Failing to push the main tray all the way in and tighten the four screws on the back may prevent the system from powering up.

Exchange and Nonexchange Part Numbers

In this chapter we refer to exchange and nonexchange part numbers.

You must return FRUs with exchange part numbers in exchange for a replacement FRU. Do not return FRUs with nonexchange part numbers. You may discard them.

Figure 25 shows the major components of the system unit.

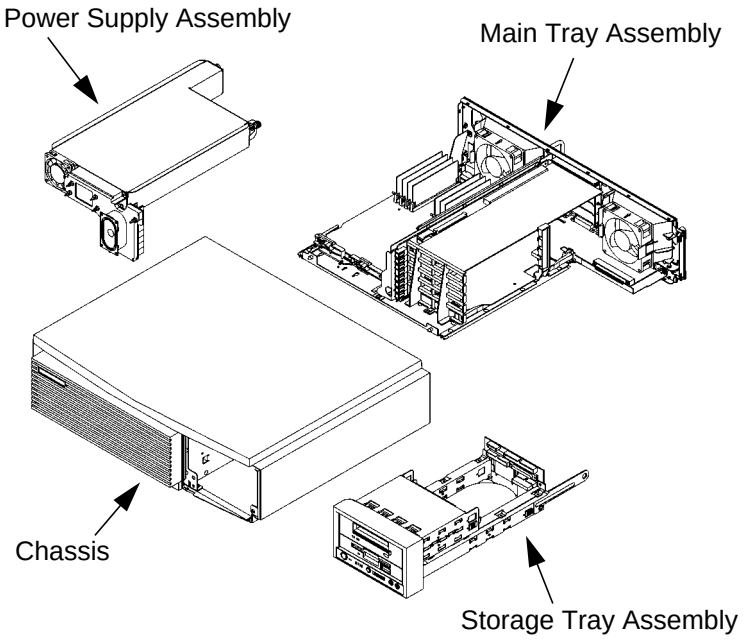


Figure 25 C Class Major Components

Figure 26 shows the Main Tray FRUs for the C Class workstations. The numbers correspond to item numbers in Table 14 and Table 15.

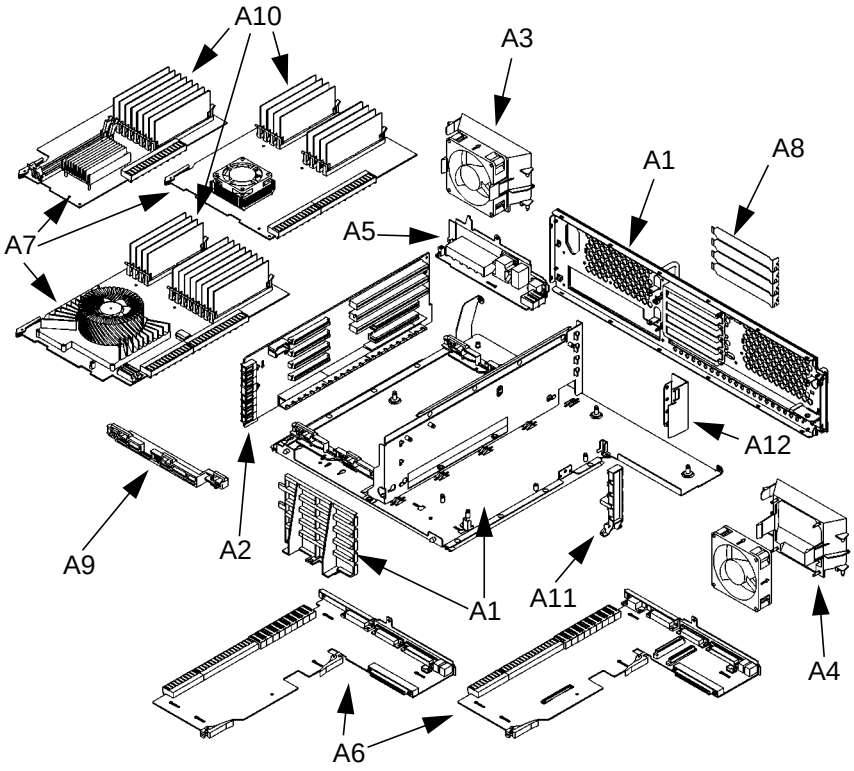


Figure 26 Main Tray FRUs

Figure 27 shows the Storage Tray FRUs for the C Class workstations. The numbers correspond to item numbers in Table 14 and Table 15.

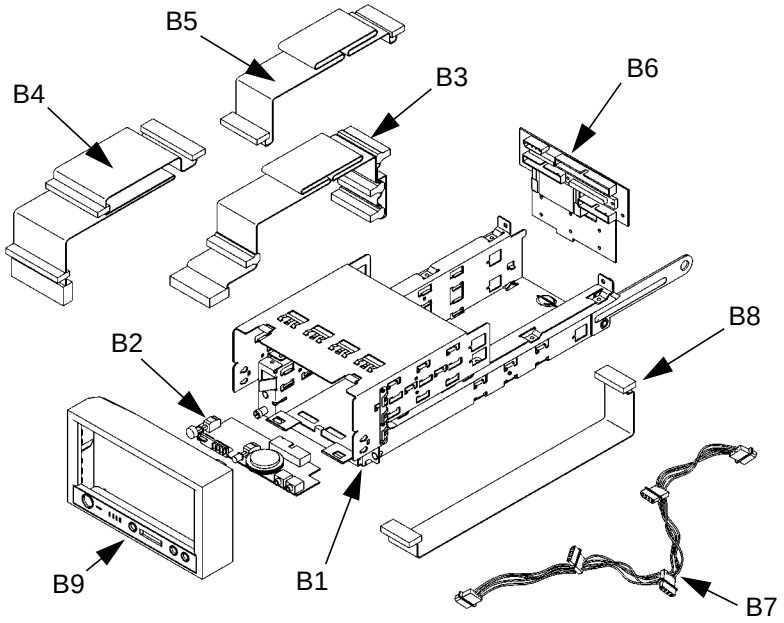


Figure 27 Storage Tray FRUs

Figure 28 shows the Power Supply FRUs for the C Class workstations. The numbers correspond to item numbers in Table 14 and Table 15.

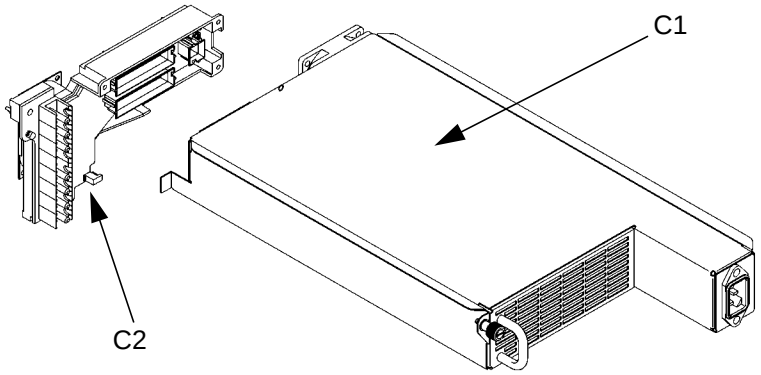


Figure 28 Power Supply FRUs

Table 14 lists the exchange parts, and Table 15 lists the nonexchange parts in the C Class workstations.

Table 14 Exchange Parts FRU List

Figure Number	Part Number	Description
A6	A4200-66521 A4200-69022 A4125-69021	I/O Board (C100, C110) I/O Board (C160L, C160, C180) I/O Board (C200, C240, C360)
A7	A4200-66510 A4200-66512 A4200-69014 A4200-69017 A4200-69018 A4125-69010 A4125-69012 A4125-69016	100 MHz CPU Assy - C100 120 MHz CPU Assy - C110 160 MHz CPU Assy - C160L 160 MHz CPU Assy - C160 180 MHz CPU Assy - C180 200 MHz CPU Assy - C200 236 MHz CPU Assy - C240 367 MHz CPU Assy - C360
Not Shown Not Shown Not Shown Not Shown Not Shown Not Shown Not Shown Not Shown	A2084-69016 A1658-69010 A4081-69003 A1658-69011 A1658-69020 A1658-69021 A1658-69022 A4218-69016	2-GB FWD Disk Drive 2-GB 7200 rpm FWD Disk Drive 4-GB FWD Disk Drive 4-GB 7200 rpm FWD Disk Drive 2-GB Ultra Wide SE disk 4-GB Ultra Wide SE disk 9-GB Ultra Wide SE disk 9-GB 7200 rpm FWD Disk Drive
Not Shown	A4200-69063 C1539-69201 C1537-69201	DDS Tape Drive DDS2 Tape Drive DDS3 Tape Drive
A10	A2579-69001 A1236-69001 A2580-69001 A3828-69001 A3829-69001 A3830-69001	16 MB Memory DIMM 32 MB Memory DIM 64 MB Memory DIMM 32 MB EDO DIMM 64 MB EDO DIMM 128 MB EDO DIMM 256 MB EDO DIMM
C1	A4200-69005 A4125-69001	385W Pwr Sply w/Dist PCA/spk 550W Pwr Sply w/Dist

Table 15 Nonexchange Parts FRU List

Figure Number	Part Number	Description
	A4200-62023 A4200-62059	Chassis (C100/110) Chassis (C160L/160/180/200/240/360)
A1	A4200-62021 A4190-00049	Main Tray Assy Main Tray Thumbscrew 6-35
A2	A4200-66500 A4200-66501	Backplane Board (C100/110) PCI Backplane (C160L/160/180)
A2	A4125-66500	550W Backplane w/EISA
A3	A4200-62030	Fan Assembly
	A4200-62023	Disk Fan Cooling Kit
A4	A4200-40011	Fan Diffuser
A1	A4125-40002	I/O Card Guide/ Fan Bracket
A5	A4200-66520	I/O Extension Board
	A4125-66520	I/O Extension Board-100/10BT
A11	A4200-62046	EISA Expansion Slot Cover
A9	A4200-40010 A4200-40036	CPU Card Guide (C160L) CPU Card Guide (C180)
A11	A4200-40065	EISA Retainer Bracket
A12	A4200-00015	EISA Bulkhead Retainer
B1	A4200-62060	Storage Tray Sheetmetal
B2	A4200-66530	Human Interface Board
B2	A4125-66530	Ultra Wide SE Human I/F PCA

Table 15 Nonexchange Parts FRU List

Figure Number	Part Number	Description
B3	A4200-61603 A4125-63001	FWD SCSI Cable UWSE SCSI Cable
B4	A4200-61602	NSE SCSI Cable
B5	A4200-61604	Floppy Cable
B6	A4200-60004 A4125-66531	Disk Interconnect Board UWSE Disk Interconnect
B7	A4200-61605	Disk Power Cable
B8	A4200-61606	Human Interface Cable
B9	A4200-40004 A4200-40058	Disk Tray Bezel (C100/110) Disk Tray Bezel (C160L/160/180/200/240/360)
C2	A4200-66533	Power Distribution Assy
Not Shown	A4180-62021	Speaker
Not Shown	A4200-40048 A4200-40015	Storage Tray Filler - Large C160L/160/180/200/240/360 C100/110
Not Shown	A4200-40047 A4200-40016	Floppy Filler - Small C160L/160/180/200/240/360 C100/110
Not Shown	A4200-40064 A4200-40018	Tower Stand C160L/160/180/200/240/360 C100/110
Not Shown	A2263-40042	Rubber Foot

Table 15 Nonexchange Parts FRU List

Figure Number	Part Number	Description
Not Shown	A4200-84001 A4200-84019 A4200-84025 A4200-84023 A4200-84028 A4200-84024 A4125-84005 A4125-840xx A4125-84022	Model Number Plate C100 Model Number Plate C110 Model Number Plate C160L Model Number Plate C160 Model Number Plate C180XP Model Number Plate C180 Model Number Plate C200 Model Number Plate C240 Model Number Plate C360
Not Shown	A4200-62914	Pkg, Disk Skis (8)
Not Shown	1420-0314	Battery
Not Shown	A4325-60001 A3146-60001 A1658-60018 A1658-60019 A1658-60025	CD-ROM Drive 4X CD-ROM Drive 12X CD-ROM-Dove Gray 12X CD-ROM-Flint Gray 32X CD-ROM Drive
Not Shown	A4200-00060	Disk EMI Plate
Not Shown	A4200-00092	CD-ROM EMI Plate
Not Shown	A4200-00093	Floppy EMI Plate
Not Shown	A4200-00094	DDS EMI Plate
Not Shown	A4200-61607	CD Audio Cable
Not Shown	A4200-40062	Power Distribution Bracket
Not Shown	A4200-62054	Floppy Bezel
Not Shown	A1658-62070 A1658-62024	SE Wide SCSI Terminator Wide Diff SCSI Terminator

FRU Removal and Replacement

The procedures in this section describe how to remove system unit FRUs. Observe any notices and prerequisites for removing a FRU. Replacement is the reverse of removal, unless noted.

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

NOTICE: There is no need to manually shut down the HP-UX operating system on the workstation before powering it off with the softpower switch. When the power switch is turned off, the workstation automatically shuts down the operating system before terminating the power.

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

2 Unplug the system unit power cord and the power cords of any peripheral devices from ac wall outlets.

3 Unplug the system unit power cord from the ac input connector.

4 Attach a static-grounding wrist strap to your wrist and a location on the system chassis that is bare metal. If you are using a disposable wrist strap, follow the instructions on the package.

5 If installed, remove the floor stand as shown in Figure 29.

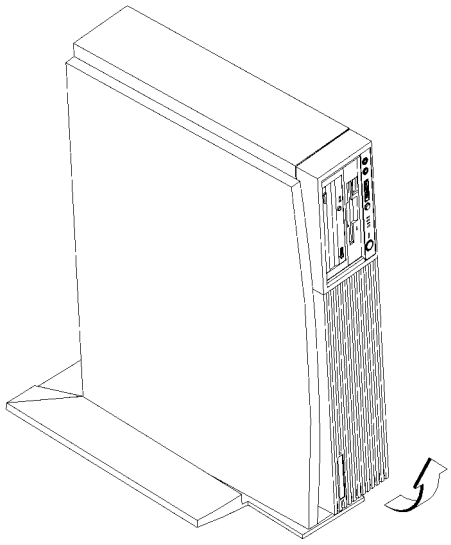


Figure 29 Removing the Floor Stand

6 Lay the workstation on a flat stable surface, such as a table top or floor.

CAUTION: Follow normal ESD, anti-static precautions when handling the workstation or any of its components. Failure to do so can cause component degradation or failure.

Storage Tray Assembly

Perform the following steps to remove the storage tray assembly from the system unit:

1 Remove the storage tray retaining screw, as shown in Figure 30.

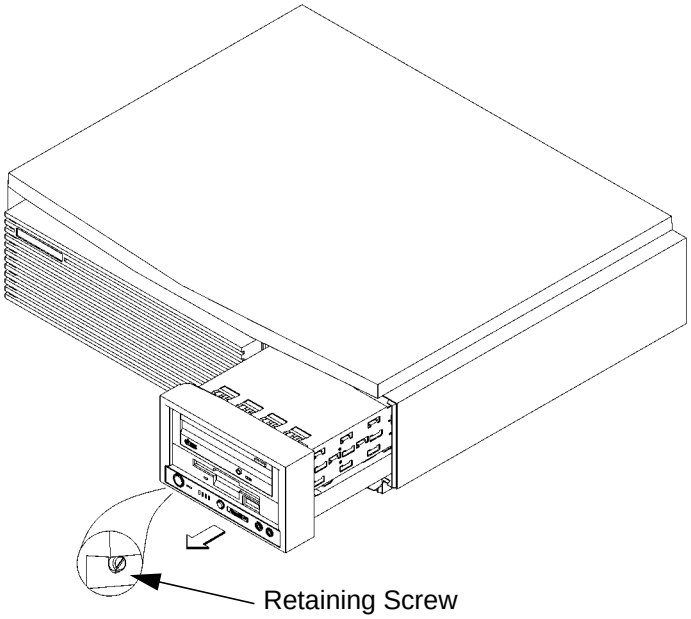


Figure 30 Removing the Storage Tray Assembly

2 If installed, remove any locking device from the security loop on the rear of the system unit.

3 Place your fingertips in the finger groove on the bottom of the storage tray bezel and pull straight, as shown in Figure 30.

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

Disk Interconnect Board

Before removing the disk interconnect board, remove the Storage Tray Assembly from the system unit.

Perform the following steps to remove the disk interconnect board from the system unit:

1. Remove the two retaining screws, as shown in Figure 31.
2. Disconnect the human interface board cable and any storage device data or power cables from the board.
3. Grasp the board and lift it straight up. See Figure 31.

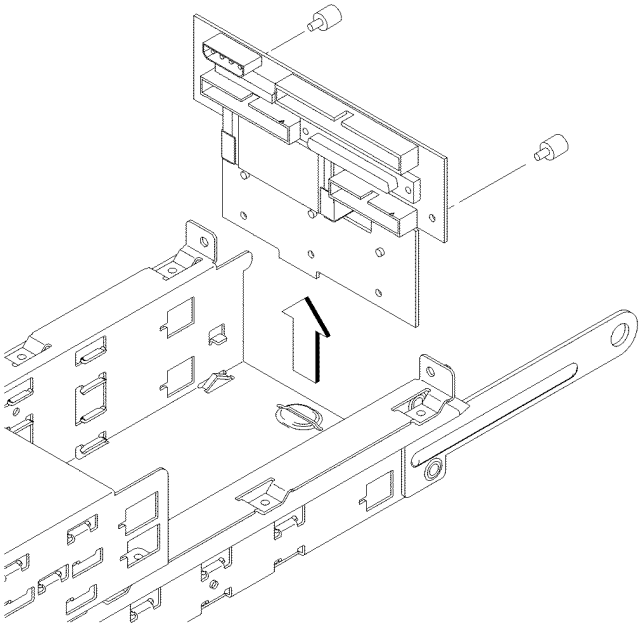


Figure 31 Removing the Disk Interconnect Board

When replacing the disk interconnect board, make sure that the board is completely seated in the bottom slot in the storage tray.

Storage Tray Bezel

Before removing the storage tray bezel, remove the Storage Tray Assembly.

1 To remove the storage tray bezel, lift up on the top rear edge of the bezel and slide it out from the storage tray approximately 1/2-inch, as shown in Figure 32.

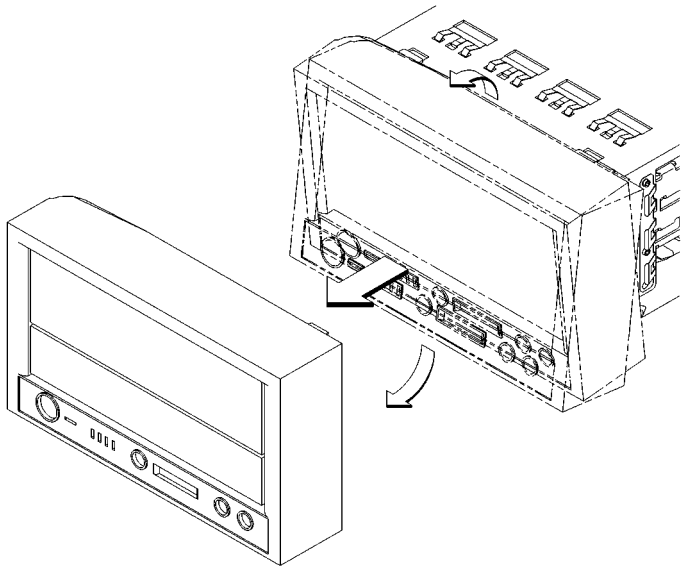


Figure 32 Removing the Storage Tray Bezel

2 Pull down on the bottom rear edge of the bezel and slide it out from the storage tray approximately 1/2-inch, as shown in Figure 32.

3 Pull the bezel straight out from the storage tray, as shown in Figure 32.

Disk Filler Panel

NOTICE: If you remove a disk filler panel, you **must** replace it or install a removable media storage device in its place.

Before removing a disk filler panel, remove the Storage Tray Assembly.

To remove a disk filler panel, insert a coin or other blunt object into the groove where the filler panel meets the bezel and gently pry it out, as shown in Figure 33.

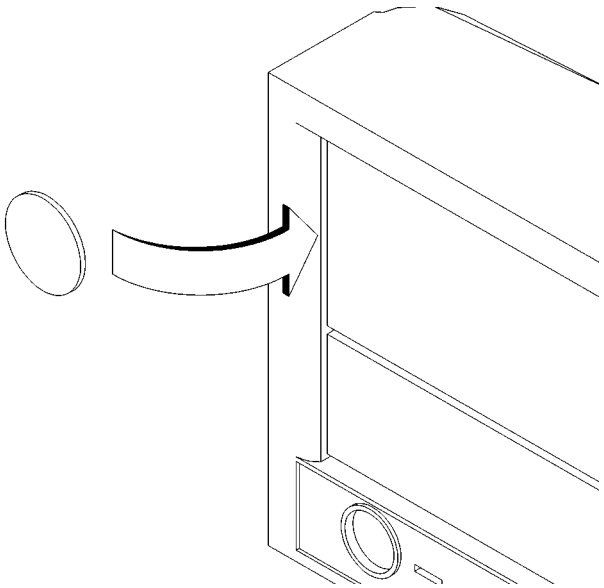


Figure 33 Removing a Disk Filler Panel

Storage Devices

Before removing storage devices, remove the Storage Tray Assembly from the system unit.

Before removing a hard drive in either of the storage tray's rear positions, remove the Disk Interconnect board.

NOTICE: Refer to chapter 3 for supported storage tray configurations.

Perform the following steps to remove a storage device from the system unit:

1 Disconnect the power and data cables from the device you are removing.

NOTICE: If you are removing a floppy drive or a hard disk drive in the lower front position, you should disconnect the cables after performing Step 2.

If you are removing a hard disk drive in the lower front position of the disk tray, you must remove the lower filler panel before removing the drive.

2 Push in the locking tab on each side of the disk tray and slide the device out of the storage tray, as shown in Figure 34.

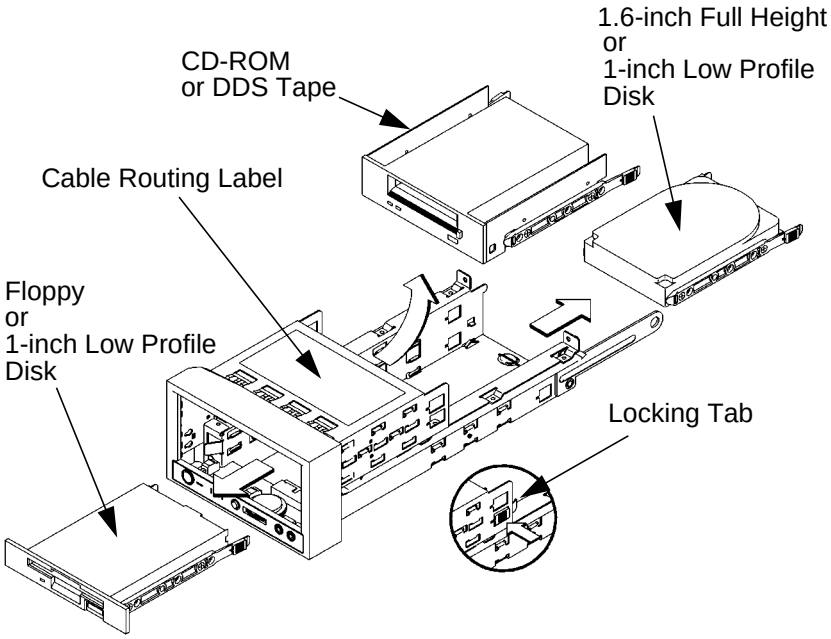


Figure 34 Removing a Storage Device

3 Slide the device completely out of the storage tray and place it on a static-free surface.

When replacing storage devices, refer to the cable routing label on the top of the storage tray.

Human Interface Board

Before removing the human interface board, perform the following procedures:

- Remove the Storage Tray Assembly from the system unit.
- Remove the Storage Tray Bezel

Perform the following steps to remove the human interface board from the system unit:

1 Grasp the human interface board gently on both sides and slide it straight out. See Figure 35.

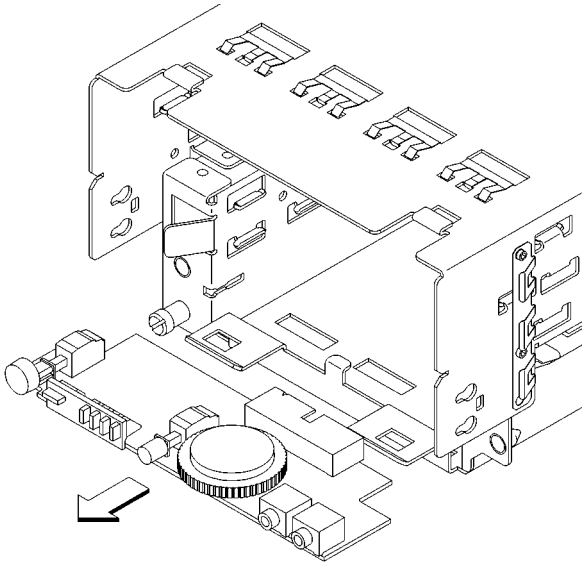


Figure 35 **Removing the Human Interface Board**

2 Disconnect the cable from the rear of the board.

Main Tray Assembly

Perform the following steps to remove the main tray assembly from the system unit:

1. If installed, remove any locking device from the security loop on the rear of the system unit.
2. Completely loosen the four thumb screws on the rear of the system unit, as shown in Figure 36.

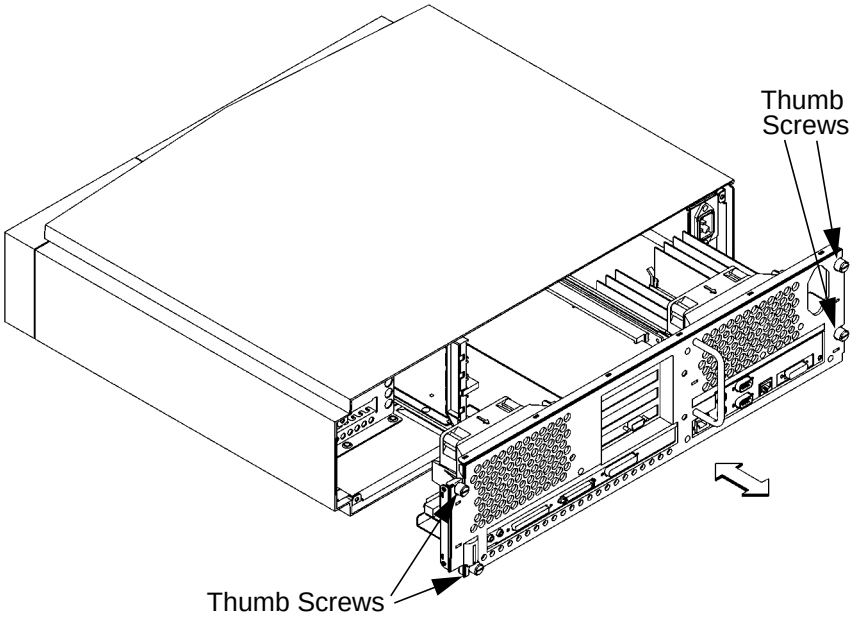


Figure 36 Removing the Main Tray Assembly

3. Place one hand on the top of the system unit and push, while using your other hand to pull on the handle on the rear panel. See Figure 36.
4. Slide the main tray assembly out of the chassis.

Removing Memory Modules

Before removing memory modules, remove the Main Tray Assembly from the system unit.

Refer to Chapter 3 for information about memory configurations.

Perform the following steps to remove memory modules:

1 Locate the memory modules on the CPU board, as shown in Figure 37 through Figure 39.

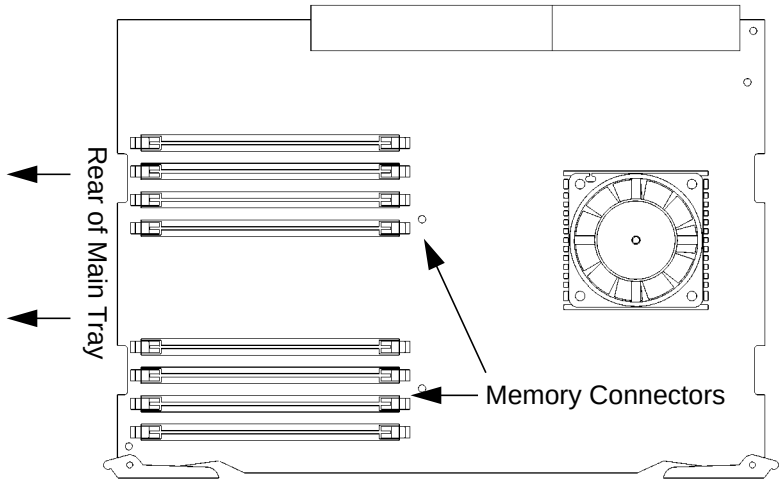


Figure 37 Memory Module Location (C100, C110)

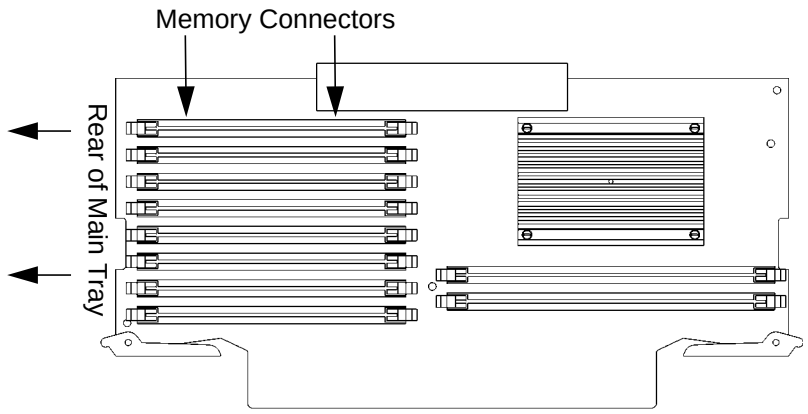


Figure 38 Memory Module Location (C160L)

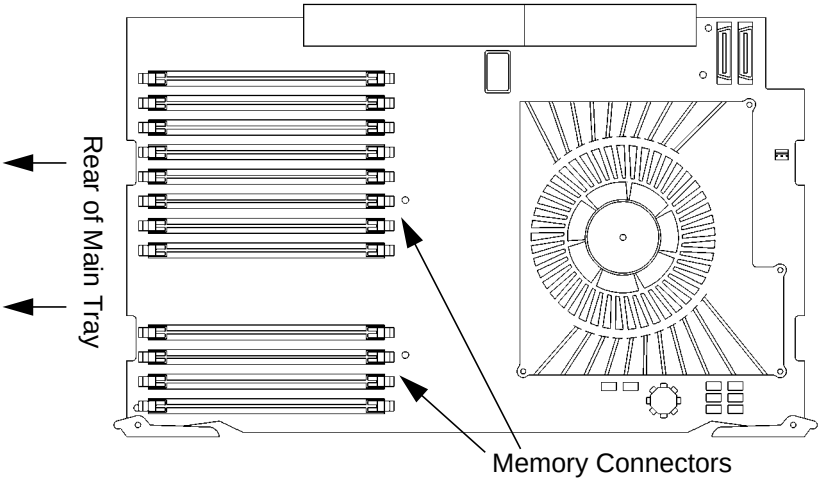


Figure 39 Memory Module Location (C160/180/200/240/360)

2 To remove a memory module, push the ejector tabs on each side of the module. Lift the memory module up and out of the connector and place it on a static-free surface. Figure 40 shows how to remove a memory module.

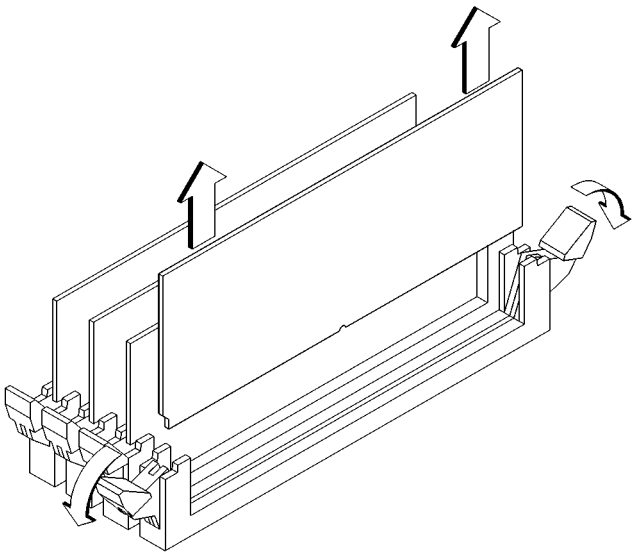


Figure 40 Removing a Memory Module

Installing Memory Modules

Before installing memory modules, remove the Main Tray Assembly from the system unit.

Refer to Chapter 3 for information about memory configurations.

Perform the following steps to install memory modules:

1 Locate the memory connectors on the CPU board, as shown in the figures in the previous section.

2 To install a memory module, close the ejector tabs on each side of the memory connector. This lowers the force needed to seat the memory board.

Line the memory module up with the guides, as shown in Figure 41. Make sure that the notched end of the memory module is to the left, as shown in Figure 41.

NOTE: The C160L memory orientation is rotated 180 degrees from the C160/180/200/240/360.

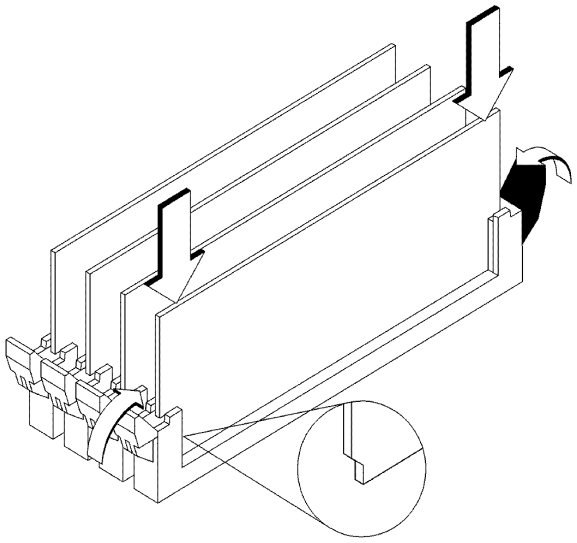


Figure 41 Installing Memory Modules

3 Press firmly and evenly on the memory module to ensure that it is fully seated.

4 To verify that this installation was successful, display the current memory information using the Boot Console Interface.

For more information on the Boot Console Interface, see Chapter 9 of this manual.

If only a faulty memory module is replaced, use the **pdt clear** command in the service menu of the Boot Console Interface. Answer **y** to the prompt `Continue? (Y/N)`.

Removing Second Level Cache Modules (C160L)

Before removing second level cache modules, remove the Main Tray Assembly from the system unit.

NOTICE: Only the C160L CPU board has removable cache modules.

Perform the following steps to remove the cache modules:

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

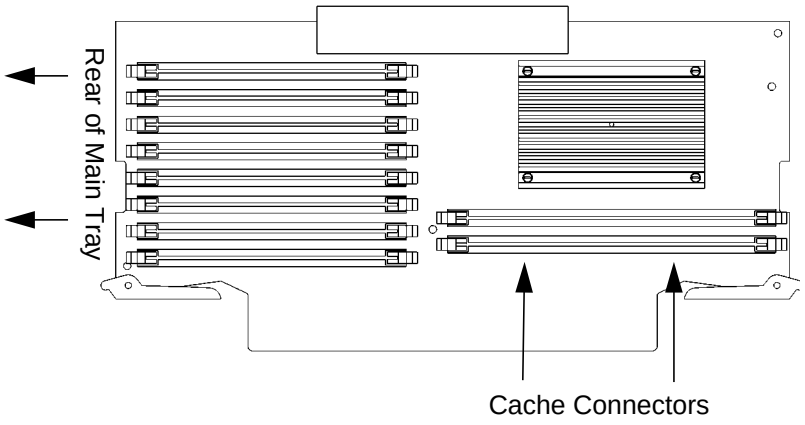


Figure 42 Cache Module Location (C160L)

2 To remove a cache module, push the ejector tabs on each side of the module. Lift the cache module up and out of the connector and place it on a static-free surface. Figure 43 shows how to remove a cache module.

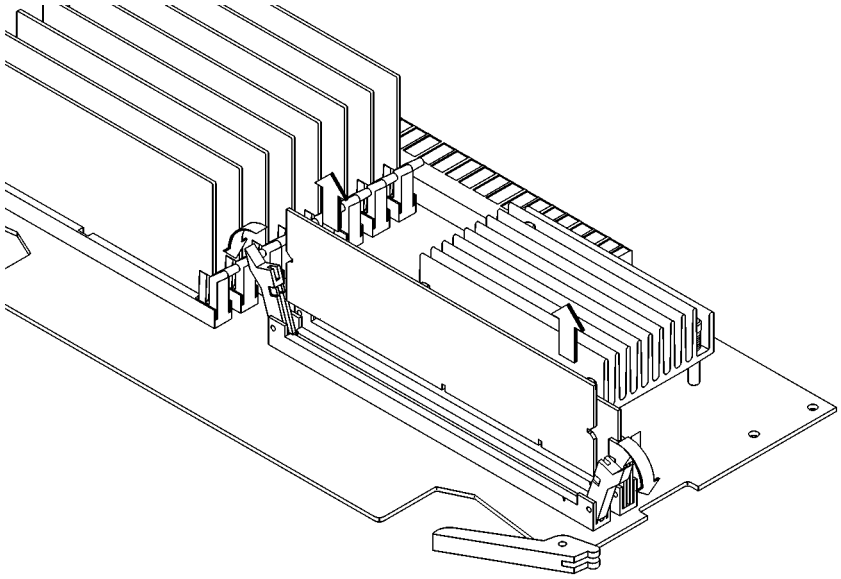


Figure 43 Removing a Cache Module

Installing Cache Modules

Before installing cache modules, remove the Main Tray Assembly from the system unit.

You must install two cache modules.

Perform the following steps to install cache modules:

1. Locate the cache connectors on the CPU board, as shown in the figure in the previous section.
2. To install a cache module, close the ejector tabs on each side of the cache connector. This lowers the force needed to seat the cache board.

   Line the cache module up with the guides, as shown in Figure 44. Make sure that the notched end of the cache module is to the left, as shown in Figure 44.

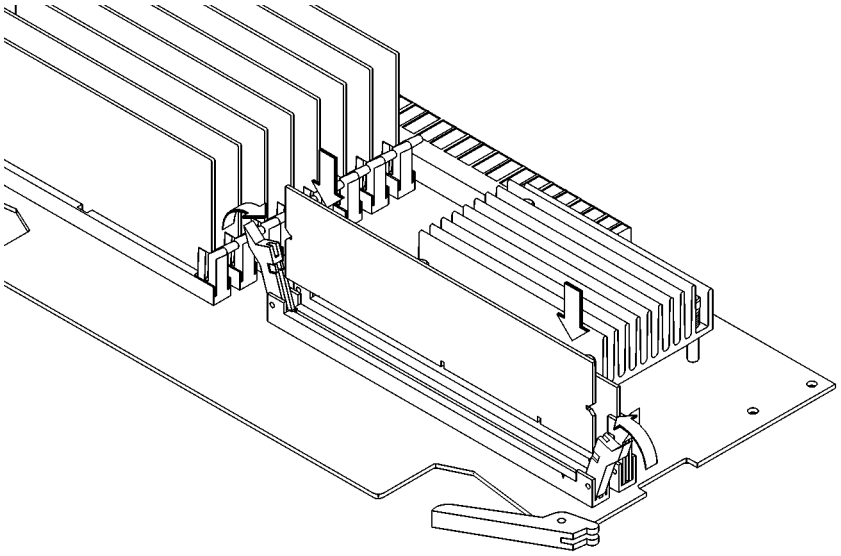


Figure 44 Installing Cache Modules

3 Press firmly and evenly on the cache module to ensure that it is fully seated.

4 To verify that this installation was successful, display the current cache information using the Boot Console Interface.

For more information on the Boot Console Interface, see Chapter 9 of this manual.

If only a faulty cache module is replaced, use the **pdc clear** command in the service menu of the Boot Console Interface. Answer **y** to the prompt `Continue? (Y/N)`.

Removing PCI, EISA, and GSC Option Boards

Before removing PCI, EISA, or GSC option boards from the system unit, remove the Main Tray Assembly from the system unit.

Perform the following steps to remove a PCI, EISA, or GSC option board:

1 Press the release clip and rotate the fan, as shown in Figure 45.

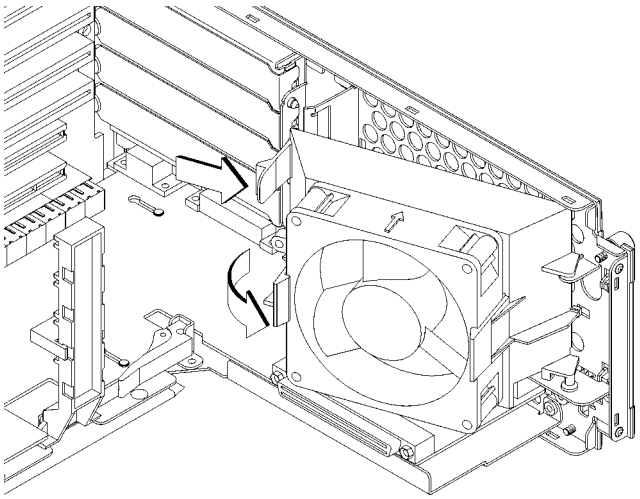


Figure 45 **Rotating the EISA Fan**

2 Slide the EISA slider to the side to remove it, as shown in Figure 45.

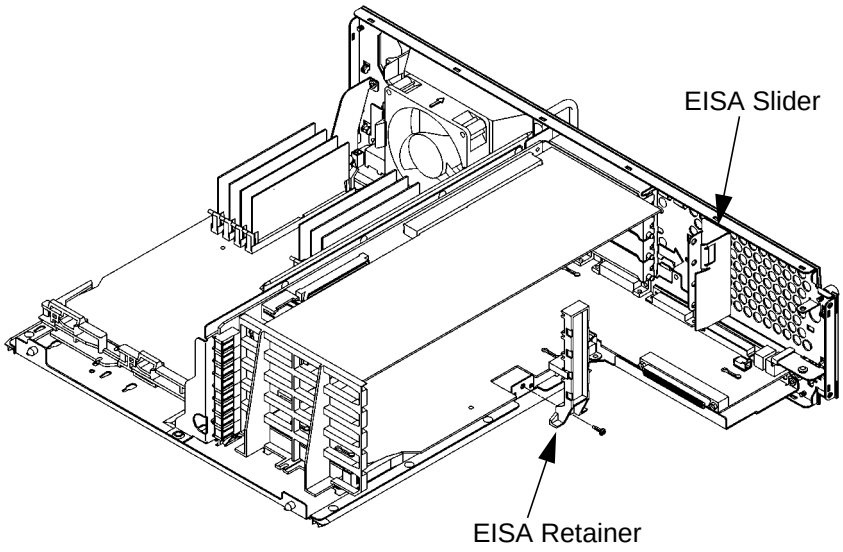


Figure 46 Removing the EISA Slider and Retainer

3 Remove the screw from the EISA retainer and remove it, as shown in Figure 46.

4 If you are removing a PCI, EISA, or GSC board grasp it by the edge with both hands and pull it straight out.

Perform Steps 4 through 1 in reverse order to replace the board.

NOTICE: If you are **not** replacing the board, perform the following procedure:

1. Install a blank plate in the rear panel, as shown in Figure 47
2. Install the EISA retainer, as shown in Figure 47.
3. On the blank plate, turn the locking knob clockwise to secure blank plate, as shown in Figure 47.
4. Perform Steps 3 through 1 in reverse order.

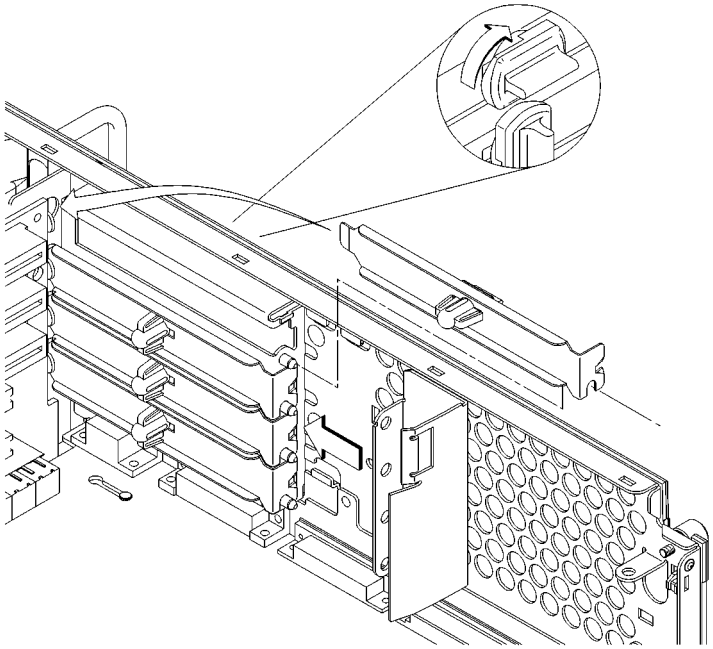


Figure 47 Installing an EISA Slot Blank Plate

EGRAM (Enhanced Graphics RAM) Board

Before removing the EGRAM board from the system unit, perform the following procedures:

- Remove the Main Tray Assembly from the system unit.
- Remove any option boards.

Perform the following steps to remove the EGRAM board:

1 Locate the EGRAM board on the I/O board, as shown in Figure 48.

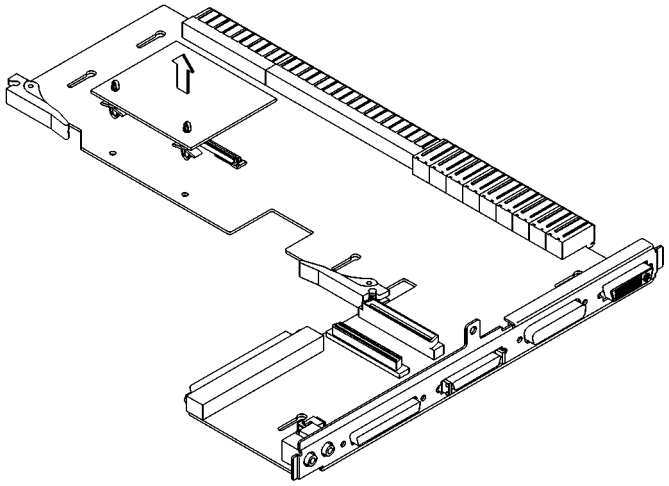


Figure 48 Removing the EGRAM Board

2 Use a small needle nose plier to squeeze the tabs on the standoffs while lifting gently on each end of the EGRAM board until the tabs are disengaged from the top of the board. See Figure 48.

3 Hold the EGRAM board from the ends and pull it straight up to disconnect it from the I/O board connector.

4 If you are installing the EGRAM board in a different I/O board, remove the standoffs from the I/O board by squeezing the tabs on the bottom of the I/O board with a small needle nose plier.

CPU Board

Before removing the CPU board, remove the Main Tray Assembly from the system unit.

Perform the following steps to remove the CPU board from the system unit:

1. Remove the Main Tray Assembly.
2. Remove the CPU board retaining screw, as shown in Figure 49 through Figure 51. (Note that the C160 and C180XP have two retaining screws).
3. Pull the two ejector handles at the same time, as shown in the appropriate figure.

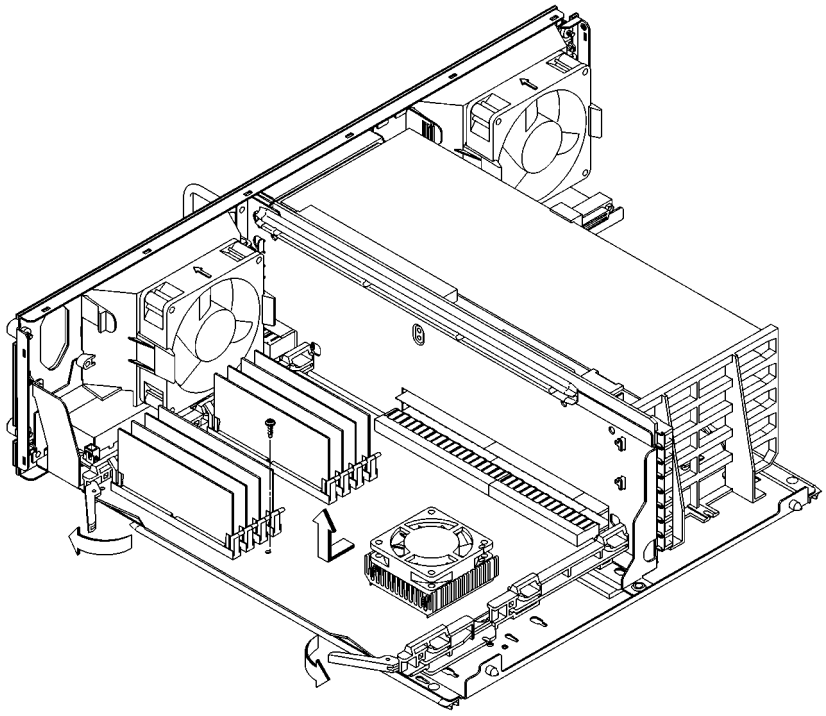


Figure 49 Removing the CPU Board (C100/110)

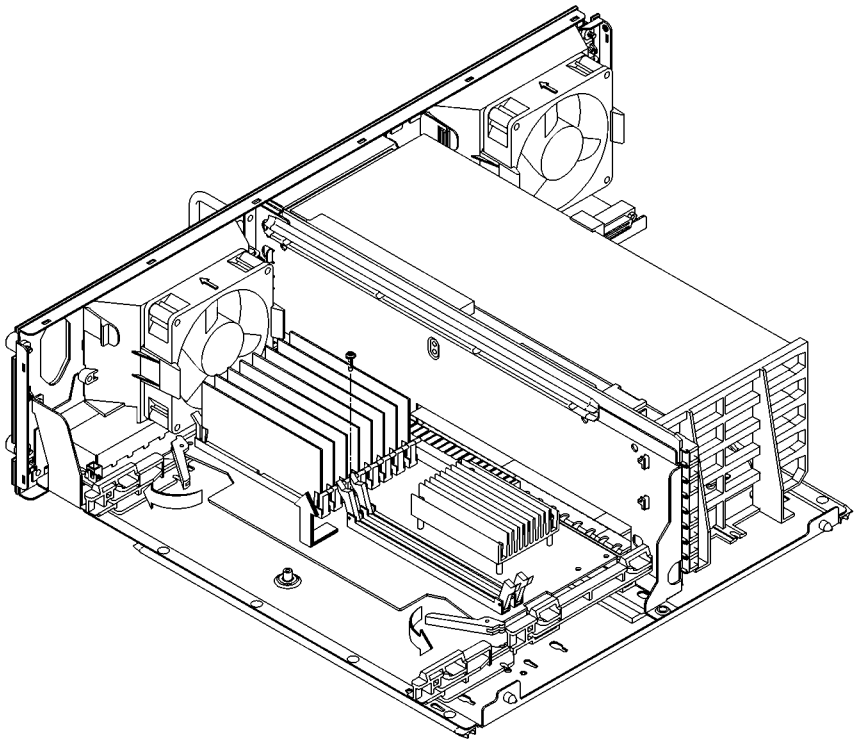


Figure 50 Removing the CPU Board (C160L)

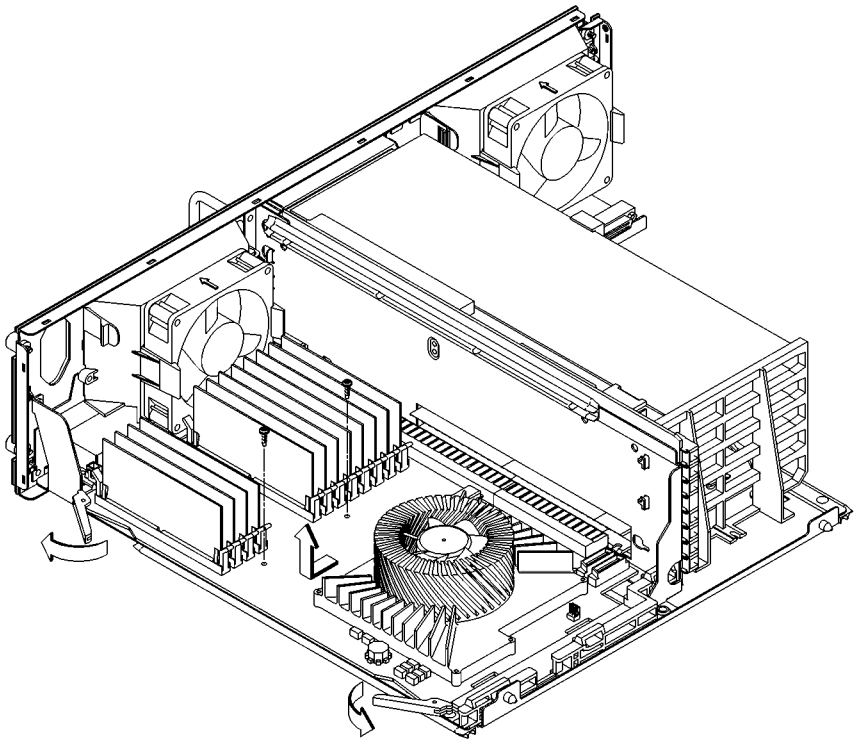


Figure 51 Removing the CPU Board (C160/180/200/240/360)

4 Slide the CPU board out approximately one inch, then lift it straight up to remove it.

   If you are reinstalling the same CPU board in the system, repeat Steps 4 through 1 in reverse order.

   If you are replacing the existing CPU board with a new one, continue with Step 5.

5 Remove all of the Memory Modules from the existing CPU board and install them in the new CPU board.

6 On a C160L CPU board, remove all of the Cache Modules from the existing CPU board and install them in the new CPU board.

7 Repeat Steps 4 through 1 in reverse order.

System Fans

Before removing the fans, remove the Main Tray Assembly from the system unit.

Perform the following steps to remove the system fans.

1. Disconnect the fan connector.
2. Press the retaining clip and swing the fan assembly out from the back panel, as shown in Figure 52 and Figure 53.

NOTICE: When removing the fan on the CPU side, you must first remove the fan retaining screw.

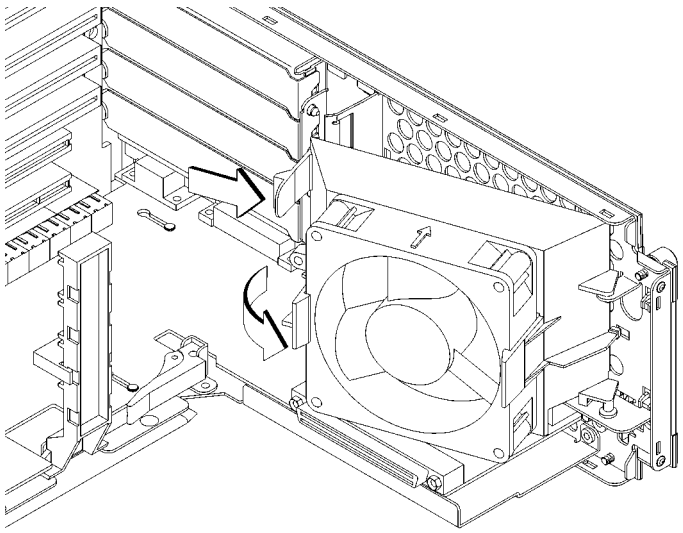


Figure 52 Removing the EISA Area Fan Assembly

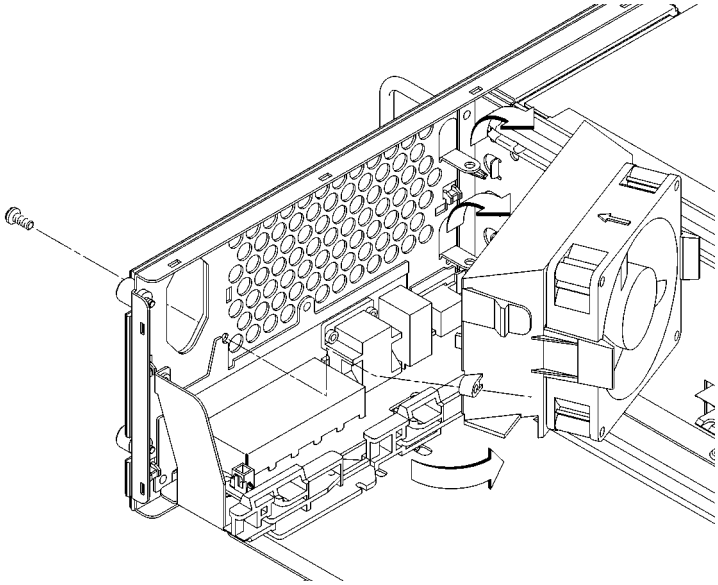


Figure 53 Removing the CPU Area Fan Assembly

3 Lift the fan assembly up off of the pins.

4 Pull the fan retaining clips away from the fan and remove the fan from the fan housing, as shown in Figure 54.

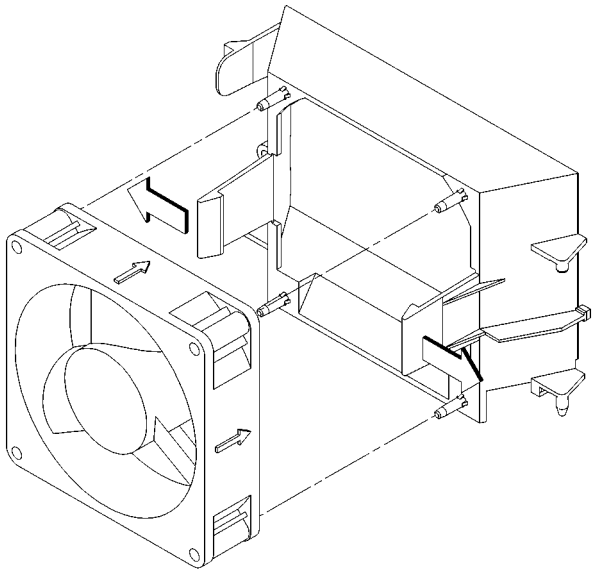


Figure 54 Removing the Fan

Rear Panel

Before removing the Rear Panel, perform the following procedures:

- Remove the Main Tray Assembly from the system unit.
- Remove the System Fans
- Remove any option boards

See the section on Removing PCI, EISA, and GSC Option Boards, earlier in this chapter for more information.

Perform the following steps to remove the rear panel:

1 Remove the 7 screws, as shown in Figure 55.

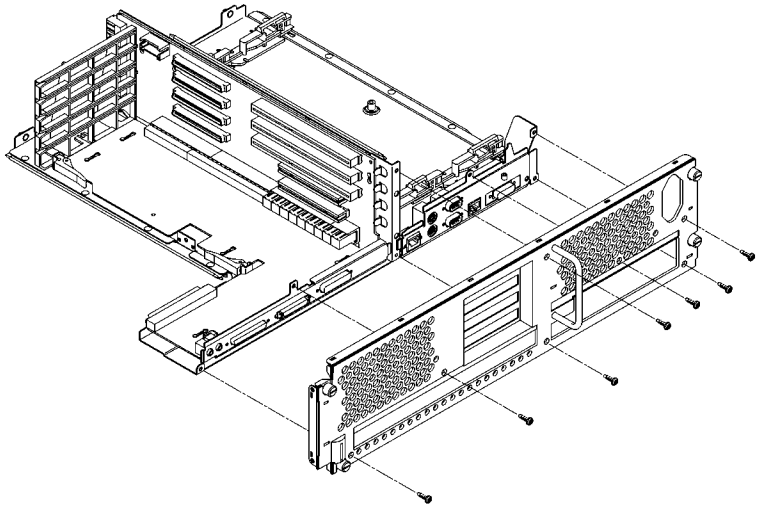


Figure 55 Removing the Rear Panel

2 Move the rear panel away from the main tray until it clears the connectors.

I/O Board

Before removing the I/O board, perform the following procedures:

- If you are replacing the original I/O board with a new one, refer to the section, “Determining LAN ID and FDDI ID” below **before** removing the board.
- Remove the Main Tray Assembly
- Remove all of the PCI, EISA, and GSC option boards
- Remove the Rear Panel

Determining LAN ID and FDDI ID

1 If you are using HP-UX 9.0x, enter the following at the prompt:

/etc/lanscan

If you are using HP-UX 10.x, enter the following at the prompt:

/usr/sbin/lanscan

The output is similar to the following:

```
Hardware Station       Dev Hardware Net-Interface  NM  Encapsulation Mjr
Path     Address       lu  State    NameUnit State ID  Methods       Num
2.0.2    0x08000970ECC0 0   UP       lan0     UP    4   ETHER         52
```

The “Station Address” represents the EtherLAN ID (ignore the “0x” in the number). You must derive the FDDI ID by incrementing the EtherLAN ID by one. For example, the FDDI ID to accompany the number shown above (0800970ECCO) is 0800970ECC1.

After you install the new CPU board or I/O board and power on the system for the first time, you are prompted for the LAN ID. Record the information here so you have a record of it:

EtherLAN ID _____-_____

FDDI ID _____-_____

You must supply the dash (-) between the first six digits and the last six digits.

Removing the I/O Board

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

1 Pull the ejector handles, as shown in Figure 56.

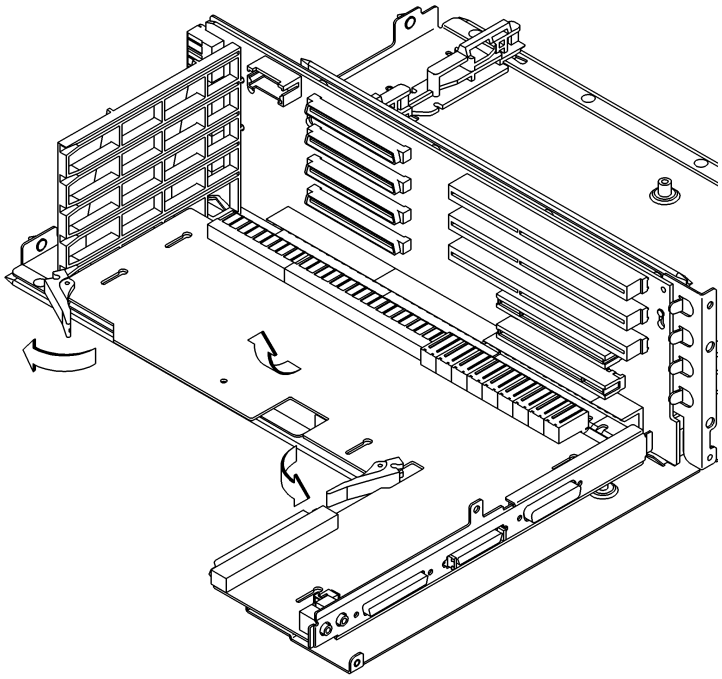


Figure 56 Removing the I/O Board

2 Slide the board out slowly until it stops, then lift it straight up.

When replacing the I/O board, line up the t-shaped standoffs with the large ends of the keyhole slots in the board, then set the board on the standoffs. Make sure that the ejector handles are in the fully open position before sliding the board into place.

I/O Extension Board

Before removing the I/O extension board, remove the Rear Panel.

Perform the following steps to remove the I/O extension board:

1 Remove one screw holding the I/O extension board to the main tray, as shown in Figure 57.

2 Slide the I/O extension board to the side to disconnect it from the backplane, as shown in Figure 57.

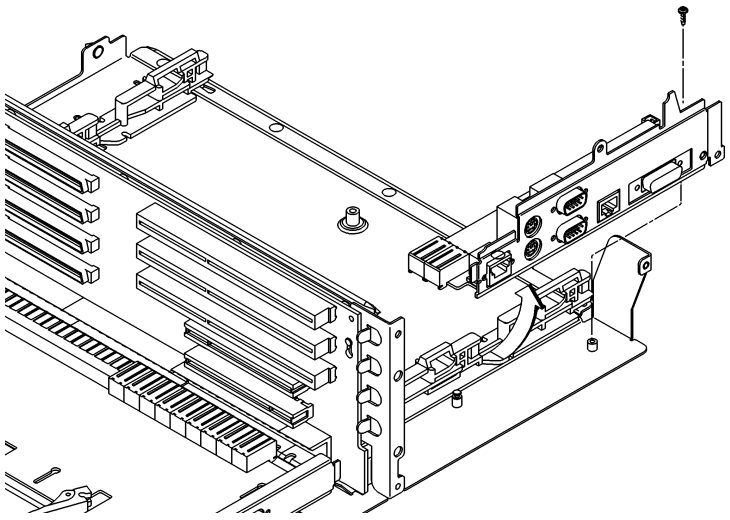


Figure 57 Removing the I/O Extension Board

3 Lift the I/O extension board clear of the Main Tray Assembly.

Battery

Before removing the battery, perform the following procedures:

- Remove the Main Tray Assembly
- Remove all of the PCI, EISA, and GSC option boards

Lift the clip and slip the battery out of its holder, as shown in Figure 58.

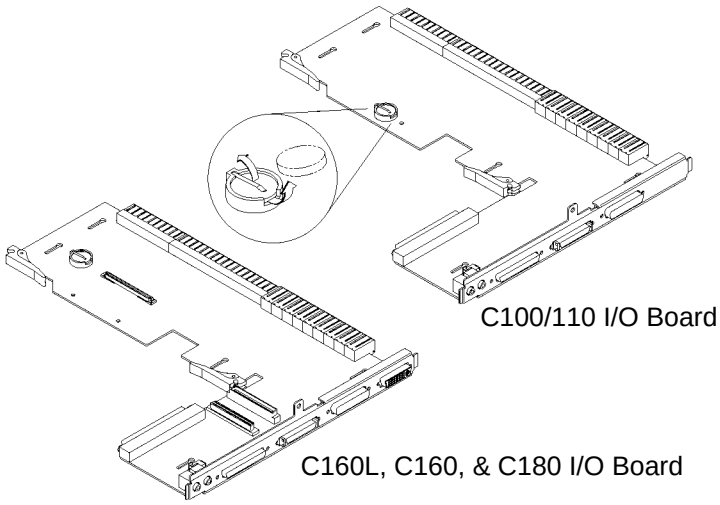


Figure 58 Removing the Battery

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

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

Backplane

Before removing the backplane, perform the following procedures:

- Remove the Main Tray Assembly
- Remove the CPU Board
- Remove the Rear Panel
- Remove the I/O Board
- Remove the I/O Extension Board

Perform the following steps to remove the backplane:

1 Remove the card guide retaining screw, as shown in Figure 59.

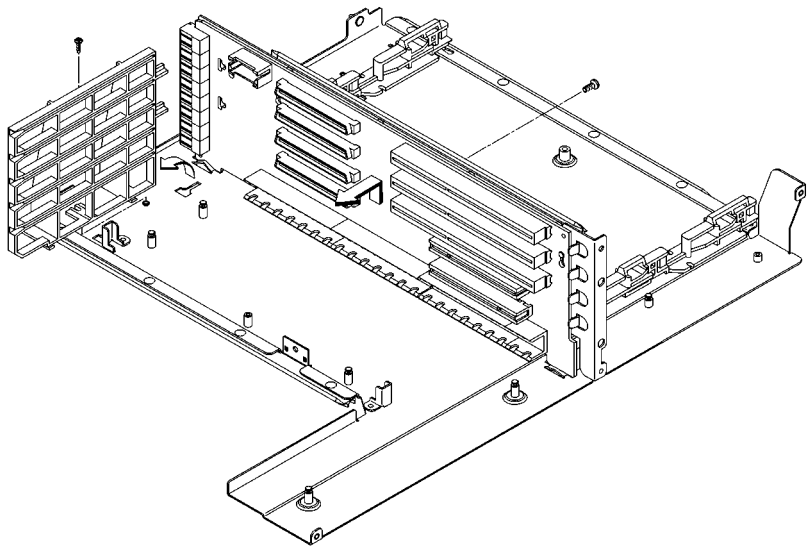


Figure 59 Removing the Backplane

2 Lift the card guide up and out, as shown in Figure 59.

3 Remove the retaining screw from the backplane, as shown in Figure 59.

4 Lift the Backplane up and out, as indicated in Figure 59.

Power Supply

Before removing the power supply, remove the Main Tray Assembly.

To remove the power supply, loosen the captive screw and slide the power supply out of the chassis, as shown in Figure 60.

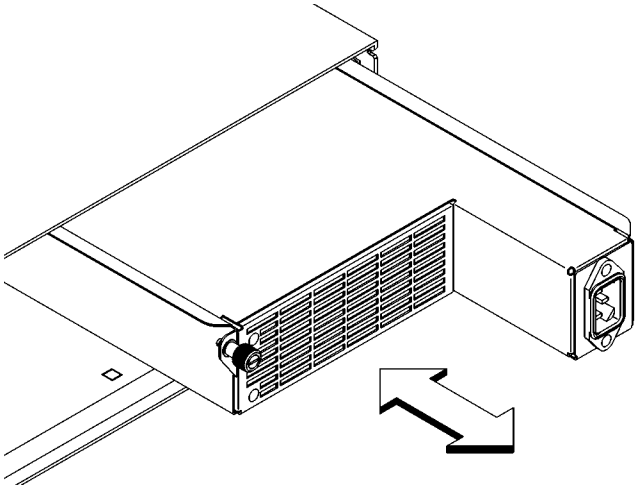


Figure 60 Removing the Power Supply

CAUTION: To avoid damage, be sure to use two hands to remove the power supply. Use one hand to pull the power supply, and one hand to support the power supply from underneath.

Power Interconnect Board

Before removing the power interconnect board, perform the following procedures:

- Remove the Main Tray Assembly
- Remove the Power Supply

Perform the following steps to remove the power interconnect board:

1 Remove the three screws that secure the power interconnect board to the power supply, as shown in Figure 61.

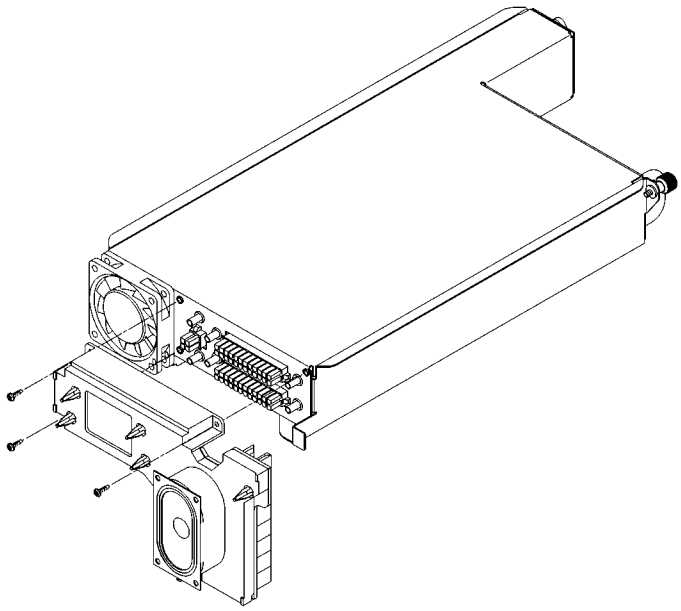


Figure 61 Removing the Power Interconnect Board

2 Pull the power interconnect board straight out from the power supply to disconnect and remove it.

6

Diagrams

This chapter provides functional information about the system.

System Power

Figure 62 shows the power distribution and connections for the C Class power distribution boards.

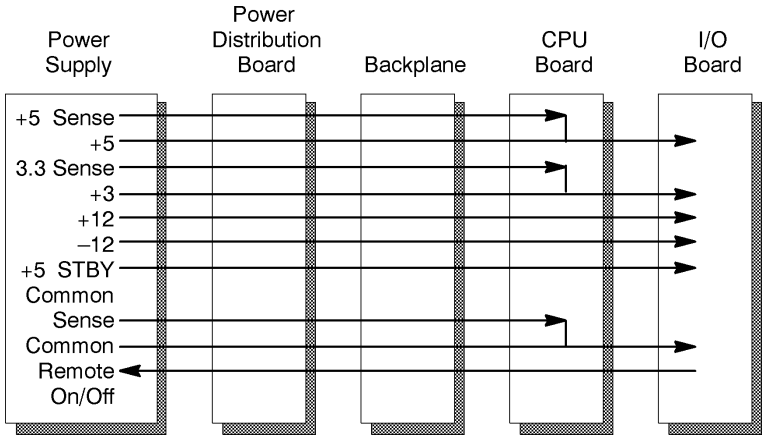


Figure 62 Power Distribution Board

The power supply distributes power through the following connectors:

- CPU Board Connector (11-pin)
- Floppy Drive Connector (2-pin)
- Hard Disk Drive Connector (4-pin)
- Fan Connector on CPU board (2-pin)

Table 16 lists the pinouts for the power supply connector to the CPU board at J10:

Table 16 CPU Board Power Pinouts for J10

Pin Number	Row D	Row C	Row B	Row A
1	GND	GND	PWR_RST_CPU_L	GND
2	FAMILY	N12V	GND	SPARE5
3	P12V	GND_SENSE	GND	SPARE4
4	P12V	VDD_SENSE	GSC_ASYNC	GND
5	VDD	VDL-SENSE	GSC_HI_SPEED	SPARE3
6	VDD	GND	GND	SPARE2
7	VDD	IO_ID(1)	BP_ID(1)	GND
8	VDD	IO_ID(1)	BP_ID(0)	LASI_EBG_L
9	VDD	GND	SPARE1	LASI_EBG_L
10	VDL	N3P2V	GND	TOC_L
11	VDD	P2V	PWR_RESET_L	GND
12	VDL	STRT_PWROFF_L	EPR_CS2_L	EPR_CS1_L
13	VDD	EPR_D(7)	GND	EPR_D(6)
14	VDD	GND	EPR_D(5)	EPR_D(4)
15	VDL	EPR_D(3)	EPR_D(2)	EPR_D(1)
16	VDD	EPR_D(0)	EPR_A(2)	GND
17	VDL	EPR_A(1)	EPR_A(0)	EPR_LEN
18	VDD	GND	GND	EPR_WR_L
19	VDD	EPR_OE_L	FP_DATA	FP_CLK
20	VDL	LCD_EN	LCD_RS	LCD_D(1)
21	VDD	LCD_D(0)	LCD_D(2)	GND
22	VDL	GND	GND	MGSC0_RESET_L
23	VDD	LCD_D(3)	LCD_D(4)	GND
24	VDD	LCD_D(5)	GND	MGSC0_SYNC_L
25	VDL	LCD_D(6)	GND	MGSC0_SYNC_H
26	VDD	LCD_D(7)	GND	GND
27	VDL	GND	GSC_L	GSC0_XQ_L
28	VDD	GSC0_DRR_L	GSC0_PEND_L	GSC0_PACK_L
29	VDD	GSC0_RETRY_L	GSC0_AD(0)	GND
30	VDL	GSC0_AD(1)	GND	GSC0_AD(2)
31	VDD	GND	GSC0_AD(3)	GSC0_AD(4)

Table 16 CPU Board Power Pinouts for J10

Pin Number	Row D	Row C	Row B	Row A
32	VDL	GSC0_AD(5)	GSC0_AD(6)	GSC0_AD(7)
33	VDD	GSC0_AD(8)	GSC0_AD(9)	GSC0_AD(10)
34	VDL	GSC0_AD(11)	GSC0_AD(12)	GND
35	VDD	GSC0_AD(13)	GND	GSC0_AD(14)
36	VDL	GND	GSC0_AD(15)	GSC0_AD(16)
37	VDD	GSC0_AD(17)	GSC0_AD(18)	GSC0_AD(19)
38	VDD	GSC0_AD(20)	GSC0_AD(21)	GSC0_AD(22)
39	VDL	GSC0_AD(23)	GSC0_AD(24)	GND
40	VDL	GSC0_AD(25)	GND	GSC0_AD(26)
41	VDD	GND	GSC0_AD(27)	GSC0_AD(28)
42	VDD	GSC0_AD(29)	GSC0_AD(30)	GSC0_AD(31)
43	VDL	GSC0_TYPE(3)	GSC0_TYPE(2)	GSC0_TYPE(1)
44	VDD	GSC0_TYPE(0)	GSC0_ERROR_L	GND
45	VDL	GSC0_PARITY	GND	GSC0_ADDV_L
46	VDD	GND	GSC0_READY_L	GND
47	VDL	GSC0_BG_L(5)	GSC0_BR_L(5)	GSC0_BG_L(4)
48	VDD	GSC0_BR_L(4)	GSC0_BG_L(3)	GSC0_BR_L(3)
49	VDL	GSC0_BG_L(2)	GSC0_BR_L(2)	GND
50	VDD	GND	GND	GSC0_RESET_L
51	VDD	GSC0_BG_L(1)	GSC0_BR_L(1)	GND
52	VDL	GSC0_BG_L(0)	GND	GSC0_SYNC_L
53	VDD	GSC0_BR_L(0)	GND	GSC0_SYNC_H
54	VDD	GSC0_LS_L	GSC0_INTERRUPT_L	GND

Table 16 lists the pinouts for the power supply connector to the CPU board at J9:

Table 17 CPU Board Power Pinouts for J9

Pin Number	Row D	Row C	Row B	Row A
1	VDLGND	VDD	GSC1_PEND_L	MGSC1_RESET_L
2	VDL	GSC1_XQ_L	GSC1_DRR_L	GND
3	VDL	GSC1_PACK_L	GND	MGSC1_SYNC_L
4	VDL	VDD	GSC1_RETRY_L	MGSC1_SYNC_H
5	VDL	GSC1_AD(0)	GSC1_AD(1)	GND
6	VDL	GSC1_AD(2)	GND	GSC1_AD(3)
7	VDL	GSC1_AD(4)	GSC1_AD(5)	GSC1_AD(6)
8	VDL	VDD	GSC1_AD(7)	GSC1_AD(8)
9	VDL	GSC1_AD(9)	GSC1_AD(10)	GND
10	VDL	GSC1_AD(11)	GND	GSC1_AD(12)
11	VDL	VDD	GSC1_AD(13)	GGSC1_AD(14)
12	VDL	GSC1_AD(15)	GCS1_AD(16)	GND
13	VDL	GSC1_AD(17)	GND	GSC1_AD(18)
14	VDL	GND	GSC1_AD(19)	GSC1_AD(20)
15	VDL	GSC1_AD(21)	GSC1_AD(22)	GND
16	VDL	GSC1_AD(23)	GND	GSC1_AD(24)
17	VDL	GND	GSC1_AD(25)	GSC1_AD(26)
18	VDL	GSC1_AD(27)	GSC1_AD(28)	GND
19	VDL	GSC1_AD(29)	GND	GSC1_AD(30)
20	VDL	GND	GSC1_AD(31)	GSC1_TYPE(3)
21	VDL	GSC1_TYPE(2)	GSC1_TYPE(1)	GND
22	VDL	GSC1_TYPE(0)	GND	GSC1_ERROR_L
23	VDL	VDL	GSC1_PARITY	GSC1_READY_L
24	GCS1_BG_L(3)	GSC1_BG_L(2)	GSC1_BG_L(1)	GND
25	VDL	GSC1_BG_L(0)	GND	GSC1_ADDV_L
26	GSC1_BR_L(3)	VDL	GSC1_BR_L(2)	GND
27	VDL	GSC1_BR_L(1)	GND	GSC1_RESET_L
28	VDL	VDL	GSC1_BR_L(0)	GND

Table 17 CPU Board Power Pinouts for J9

Pin Number	Row D	Row C	Row B	Row A
29	VDL	GSC1_LS_L	GND	GSC1_SYNC_L
30	VDL	GSC1_INTERRUPT_L	GND	GSC1_SYNC_H
31	VDL	VDL	GND	GND
32	VDL	VDL	GND	GND
33	VDL	VDL	GND	GND
34	VDL	VDL	GND	GND
35	VDL	VDL	GND	GND
36	VDL	VDL	GND	GND
37	VDL	VDL	GND	GND
38	VDL	VDL	GND	GND
39	VDL	VDL	GND	GND
40	VDL	VDL	GND	GND
41	VDL	VDL	GND	GND
42	VDL	VDL	GND	GND

Table 18 lists the pinouts for floppy drive power:

Table 18 Floppy Drive Power Pinouts

Pin Number	Description	Wire Color
1	+5V	orange
2	GROUND	black

Table 19 lists the pinouts for hard disk drive power:

Table 19 Hard Disk Drive Power Pinouts

Pin Number	Description	Wire Color
1	+12V	red
2	GROUND	black

Table 19 **Hard Disk Drive Power Pinouts**

Pin Number	Description	Wire Color
3	GROUND	black
4	+5V	orange

Table 20 lists the pinouts for fan power:

Table 20 **Fan Power Pinouts**

Pin Number	Description	Wire Color
1	+12V	N/A
2	GROUND	N/A

Table 21 lists the pinouts for the LED connector:

Table 21 **LED Power Pinouts**

Pin Number	Description	Wire Color
1	Cathode (-)	N/A
2	Anode (-)	N/A

System Block Diagram

The figures in this section show the system unit block diagrams for the C100/110, C160L, and the C160/180 workstations.

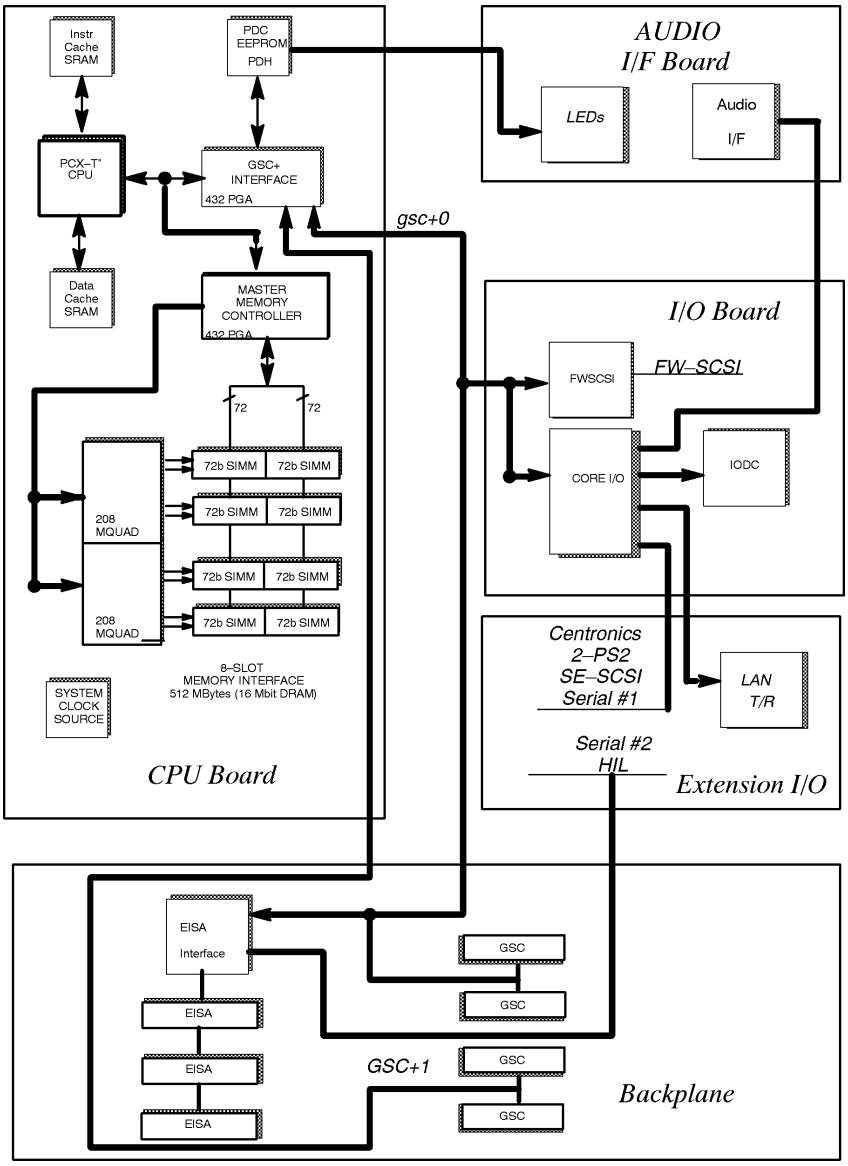


Figure 63 C100/110 System Unit Functional Block Diagram

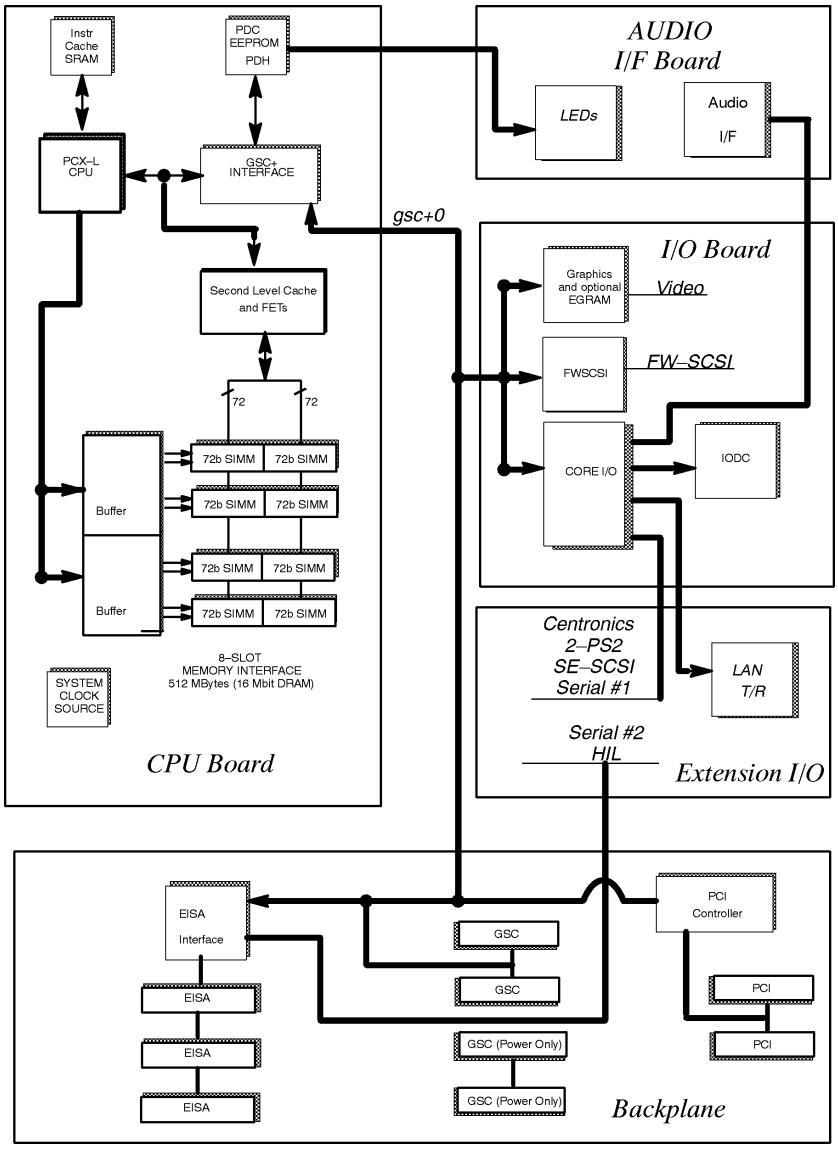


Figure 64 C160L System Unit Functional Block Diagram

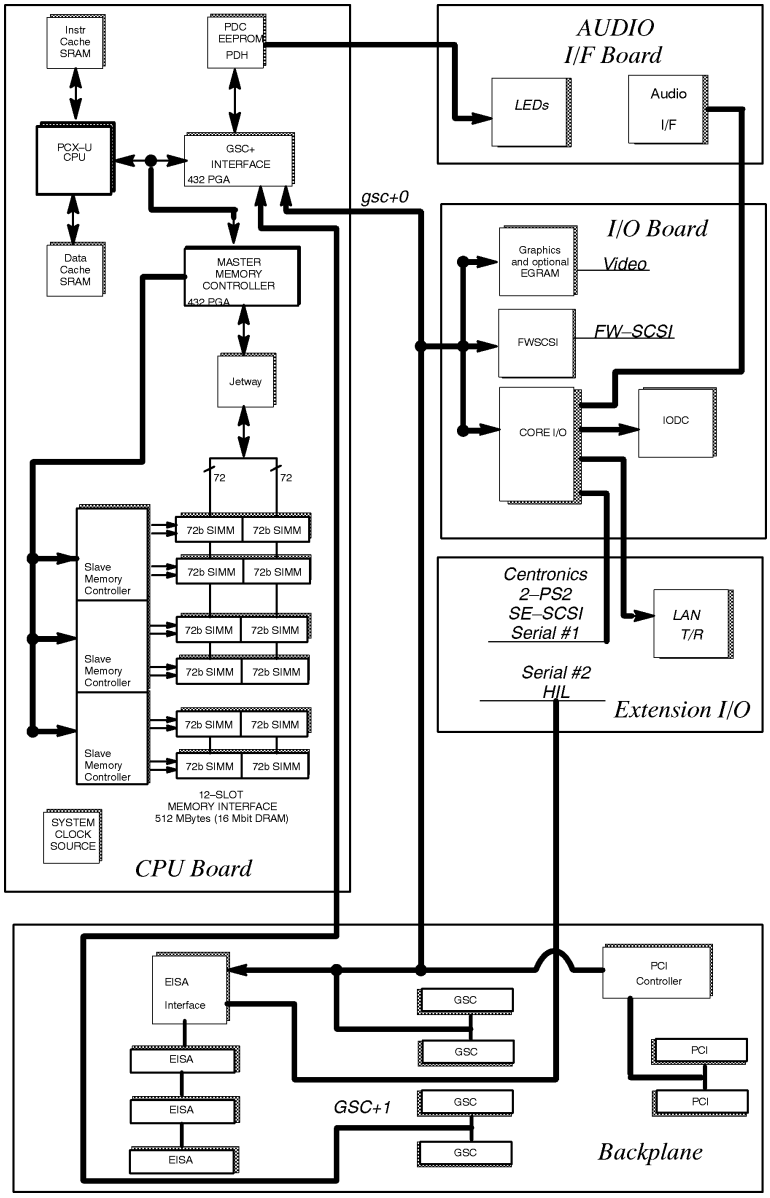


Figure 65 C160/180 System Unit Functional Block Diagram

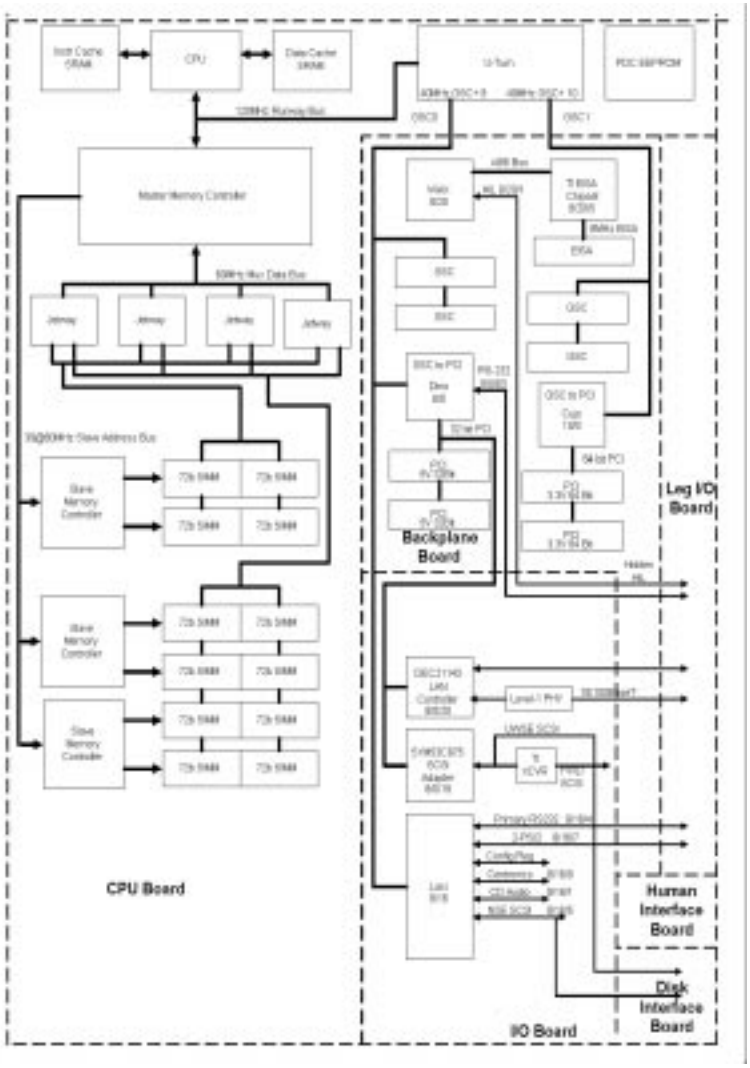


Figure 66 C200/240 System Unit Functional Block Diagram

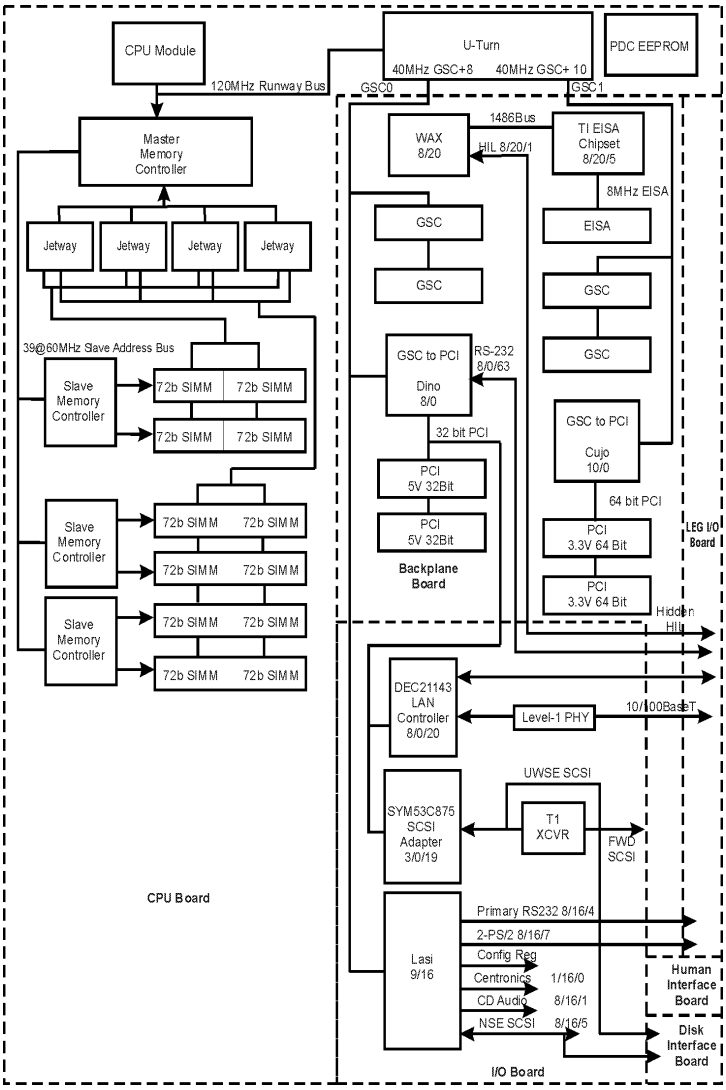


Figure 67 C360 System Unit Functional Block Diagram

7

Reference

This chapter provides part numbers and titles to reference documents.

Installation Manual

Hardware Installation Card C Class A4200-90012

Service Manuals

Service Handbook C Class
Models C100,C110, C160L, C160, C180, C200, C240, C360 Workstations (this handbook) A4200-90042

Precision Architecture RISC: HP Apollo 9000 Series 700 Diagnostic Manual 09740-90041

System Administration Tasks Manual HP Apollo 9000 Series 700 B2355-90040

HP A4032/A4033 Color Monitors CE Handbook A4033-90099

Reference Manuals

Model C100/C110 Owner's Guide A4200-90014

Model C160L Owner's Guide A4200-90015

Model C160 and C180 Owner's Guide A4200-90015

Model C160/C180/C200/C240 Owner's Guide A4200-90027

Model C160/C180/C200/C240/C360 Owner's Guide A4200-90050

8

Service Notes

Place service notes here.

9

Boot Console Interface Model C100/110

The Boot Console Interface provides an “interactive” environment after the power-on sequence.

Accessing the Boot Console Interface

To access the boot console interface, follow these steps:

NOTICE: This procedure should be done by a system administrator.

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

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

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

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

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

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

```
Processor is starting Autoboot pro-
cess. To discontinue, press any key
within 10 seconds.
```

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

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

```
Boot terminated
```

The Main Menu of the boot console appears.

Boot Console Menus

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

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

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

```
------ 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 menu                      Displays or sets boot val-
ues
INformation menu                        Displays hardware informa-
tion
SERvice menu                            Displays service commands

DIsplay                                 Redisplay the current menu
HElp [<menu>|<command>]                 Display help for menu or
command
RESET                                   Restart the system
------
Main Menu: Enter a command or a menu >
```

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

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

```
------ Information Menu ------------------------------------------
---
Command                       Description
-----------                   -----------
ALL                           Display all system information
BootINfo                      Display boot-related information
CAche                         Display cache information
ChipRevisions                 Display revisions of VLSI and firm-
ware
COprocessor                   Display coprocessor information
FwrVersion                    Display firmware version
IO                            Dispay 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
------
Information Menu: Enter command >
```

```
------ Service Menu ------------------------------------------------
---
Command                                 Description
-------                                 -----------
ChassisCodes [<proc>]                   Display chassis codes
CLEARPIM                                Clear (zero) the contents
of PIM
EepromRead [<addr>] {<len>]             Read EEPROM locations
MemRead <address> [<len>]               Read memory locations
PDT [CLEAR]                             Display or clear
                                        the Page Deallocation Table
PIM [<proc> [HPMC|LPMC|TOC]]            Display PIM information

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

Service Menu: Enter command >
```

Searching for Bootable Media

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

search ipl

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 using the following keyboard commands:

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

These flow-control commands do not work with a bit-mapped 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:

search ipl *device_type*

Where *device_type* is one of the following:

fwscsi is the built-in fast, wide SCSI bus

slot*n*.fwscsi is an optional fast, wide SCSI bus

scsi is the built-in single-ended SCSI bus

lan is all connections to the built-in LAN

Resetting the Workstation

To reset your workstation, press the power switch and let the system perform a soft shutdown.

Displaying and Setting Paths

A path is the hardware address of a device that is attached to the I/O system of your workstation. The path command sets the system paths shown in Table 22.

Table 22 System Paths

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

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

```
path
```

The boot paths are displayed in **Mnemonic Style Notation**, as shown in Table 23.

Table 23 Mnemonic Style Notation for Boot Paths

I/O Type	Specification Format
Built-in FW SCSI	**fwscsi.***scsi_address***.***logical_unit_number*
Optional	**slot***n***.***scsi_address***.***logical_unit_number*
Built-in SE 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” earlier in this chapter, and then type the following at the prompt:

path *path_type*

where *path_type* is one of the path types listed in Table 22.

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:

path primary

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

path *path_type path*

where *path_type* is one of the path types listed in Table 22 and *path* is the specification of the path in Mnemonic Style Notation (as described in Table 23).

For example, to set the primary boot path to a FW SCSI disk with an ID of 6.0, follow the directions in “Accessing the Boot Console Interface” earlier in this chapter, and then type the following at the prompt:

path pri fwscsi.6.0

Displaying and Setting the Monitor Type

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

The Monitor Command

The **monitor** command lets you change your workstation's graphics configuration. This command is available in both the Information and Configuration Menus of the boot console interface. However, when you use it in the Information Menu, **monitor** only displays the current graphics and console information. You must use **monitor** in the Configuration Menu to set a monitor type.

The correct usage for this command is:

monitor *graphics_path*

where valid *graphics_path* parameters are:

graphics3

Graphics device in slot3. If there is a Dual Color Graphics Card in slot4, this is the console port to the right on the card when facing the back of the workstation.

graphics4

Graphics device in slot4. If there is a Dual Color Graphics Card in slot4, this is the console port to the left on the card when facing the back of the workstation.

Table 24 shows the possible combinations of graphics cards and slots. Graphics 3, and Graphics 4 refer to the console paths, GRAPHICS3, and GRAPHICS4, respectively. There is no GRAPHICS 1 or GRAPHICS 2 path. Configurations 6 and 7 use the GRAPHICS3 path even though the Geometry Accelerator card is in slot 4.

The abbreviations in the table represent the following:

"S", a color graphics or Hyperdrive series graphics card

"D", a dual color graphics card

"V", a VISUALIZE-48 graphics card

Table 24 Graphics Configurations and Hardware Slots

Config No.	No. of Heads	Graphics3 10/16	Graphics4 10/20	Slot 1	Slot 2	Slot 3	Slot 4
1	1	Y				S	
2	1		Y				S
3	2	Y	Y			S	S
4	2	Y	Y			D	
5	2	Y	Y				D
6	1	Y				V	
7	1	Y					V

NOTICE: HPUX 9.05 requires **path console graphics3**.

Do not put a graphics card into slot 1 or slot 2.

In Table 24, use **path console graphics3** for configuration numbers 6, and 7.

Figure 68 shows the physical layout of the EISA/GSC slots from outside the system unit.

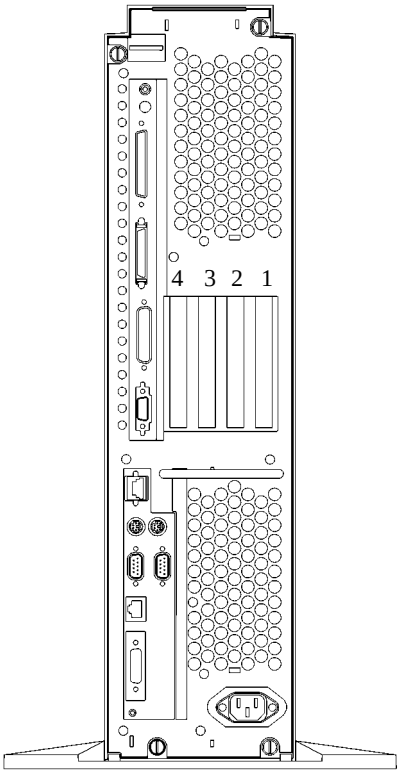


Figure 68 EISA/GSC Slots from Outside the System Unit

Physical slot2 is always reserved for non-graphics cards only.

The **monitor** command lets you change your workstation's graphics configuration before you replace your monitor. For information about changing the configuration after you replace your monitor, see "Setting the Monitor Type at Power On" later in this chapter.

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:

configuration

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

monitor

The screen displays a list of monitors, similar to the following.

```
MONITOR INFORMATION
Slot #           HPA              State    ResolutionFre-
quency     Class
---------        -------          ----     --------------
-----      -------
graphics3        f4000000         Present  Fixed

graphics4        f6000000         Empty


Current Console Path:    core.RS232_.9600.8.none

Stable Store Console Path:GRAPHICS3
```

In this example, the graphics cards are configured as follows:

- Graphics slot3 - CRX48Z
- Graphics slot4 - Empty

Setting the Monitor Type

Using the list in the example above, you can set the monitor type for graphics slot3 by typing the following:

monitor graphics3

NOTICE: You can exit at this point by entering **x**, and the monitor type will not be changed.

The screen displays the choice of supported monitors, similar to the following. Follow the directions in the screen prompts and enter the monitor type you want to configure (in this example, number).

```
MONITOR INFORMATION
Type      ResolutionFrequency
----      -------------------
1         1280x1024 75Hz
2         1024x768  75Hz
3         1024x768  70Hz
4         1024x768  75Hz      Flat Panel
5         1280x1024 60Hz
6         1024X768  60Hz
7          640X480  60Hz
8         1280X1024 75Hz      VESA
9         1024X768  75Hz      VESA
10         800X600  75Hz      VESA
11         640X480  75Hz      VESA
12        1280X1024 75HZ      GrayScale
13        1280X1024 50HZ

Enter monitor type selection from list above (or 'x' to exit): 2
  2       1024x768  75Hz

Press <y> to save monitor type or <x> to exit monitor selection: y
```

The MONITOR INFORMATION table reappears with the new monitor shown in slot0.

```
Slot #      HPA      State    ResolutionFrequency Class
--------- -----------------   ------------------- -------
graphics3 f4000000  Present   Fixed
graphics4 f6000000  Empty

Current Console Path: core.RS232_.9600.8.none

Stable Store Console Path: GRAPHICS3
```

Trying to change the monitor type on a slot that cannot support that monitor results in a warning, as shown in the following example:

```
Config. Menu: Enter command  monitor graphics3
MONITOR INFORMATION

Reminder: SGIC only supports one type of monitor.
   Changing its monitor type will not have any effect.

Slot #   HPA      State    ResolutionFrequency   Class
------   ---      ----     -------------------   -----
graphics3f4000000Present  Fixed
graphics4f6000000Empty

Current Console Path:core.RS232_.9600.8.none

Stable Store Console Path:GRAPHICS3
```

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

```
Configuration Menu: Enter command monitor graphics4
MONITOR INFORMATION

WARNING: Intended graphics hardware does not exist.
  Be sure to install the hardware after you power down the
system.

Slot #   HPA      State    ResolutionFrequency   Class
------   ---      -----    -------------------   -------
graphics3f4000000Present  Fixed
graphics4f6000000Empty

Current Console Path:core.RS232_.9600.8.none

Stable Store Console Path:GRAPHICS3
```

Setting the Monitor Type at Power On

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

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

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

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

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

Changing the Console to External Terminal

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

1. Turn system power off.
2. Disconnect the PC keyboard connector from the system rear panel.
3. Connect a serial terminal to the Serial 1 connector (the top serial connector) on the system rear panel.
4. Power on the system.

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

Displaying the Status of the System I/O

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

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

```
Information Menu: Enter command > IO
```

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

“Slot #” refers to the slot as seen on the back of your workstation; “Slot State” is the current state of any card in each slot; and “Device Information” is the compressed EISA ID, read from an EISA card itself.

Setting the Auto Boot and Auto Search Flags

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

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

```
auto
```

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

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

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

auto boot *state*

or

auto search *state*

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

Displaying and Setting Secure Mode

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

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

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

secure

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

secure on

secure off

Displaying and Setting Fastboot Mode

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

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

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

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

```
fastboot
```

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

```
fastboot  off
```

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

```
fastboot  on
```

Displaying the LAN Station Address

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

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

lanaddress

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

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

Displaying System Information

The **all** command allows you to display all the information shown by the individual Information Menu commands, such as 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:

all

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

Displaying PIM Information

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

pim *processor_number*

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

pim - gives all fault type information

pim 0 - HPMC information

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

NOTICE: The C Class workstations have only processor number 0.

Configure and Display LAN Settings

The **LanConfig** command configures and displays the current LAN settings. The C180, C200 and C240 systems support 10Base-T, 100Base-T and AUI standards.

To automatically select the network speed (100 Mbits/sec or 10 Mbits/sec) and data transfer operation (full or half duplex), operating in compliance with IEEE 802.3u, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig AUTO_detect
```

To select 10 Mbits/sec network speed and half duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 10/Half_dx
```

To select 10 Mbits/sec network speed and full duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 10/Full_dx
```

To select 100 Mbits/sec network speed and half duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 100/Half_dx
```

To select 100 Mbits/sec network speed and full duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 100/Full_dx
```

To select the AUI port (10 Mbits/sec, half duplex only), type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig AUI
```

NOTE: The LAN setting defaults to LAN-TP(RJ45). If that setting fails, the system tries the LAN-AUI setting. Also note that the new lan configuration settings take effect at the next BOot or SEArch command.

Stable Storage

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

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

ISL Environment

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

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

The ISL environment provides the following capabilities:

- Execute user-entered commands to modify boot device paths and boot options in stable storage
- Run offline diagnostic programs and utilities
- Provide automatic booting of the HP-UX O/S after power-on or reset

Invoking ISL from the Boot Console Interface

Perform the following steps to invoke ISL from the boot console interface:

1 Follow the directions in "Accessing the Boot Console Interface" earlier in this chapter, and then type the following at the prompt:

boot *device*

You are prompted:

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

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

For example, if the usual kernel (**/hp-ux** for 9.05, and **/stand/vmunix** for 10.0) on your root disk **(fwscsi.6.0**) has become corrupted, and you wish to boot your workstation from the backup kernel (**/SYSBCKUP** for 9.05, and **/stand/vmunix.prev** for 10.0), type the following at the `ISL>` prompt:

`ISL>` **hpux /SYSBCKUP** (for 9.05)

`ISL>` **hpux /stand/vmunix.prev** (for 10.0)

ISL User Commands

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

- **help** - lists ISL command menu and available utilities.
- **display** - displays the boot and console paths in Stable Storage and the current setting of the ISL Boot Flags.
- **primpath** - modifies the primary boot path entry in Stable Storage. The entry in Stable Storage for the primary boot device begins at byte address 0 and ends at byte address 31.
- **altpath** - modifies the alternate boot path entry in Stable Storage. The entry for the alternate boot device begins at byte address 128 and ends at 159.

- **conspath** - modifies the console path entry in Stable Storage. The entry in Stable Storage for the console device begins at byte address 96 and ends at byte address 127. The entry for the keyboard and mouse devices begins at byte address 160 and ends at 191.
- **listautofl** or **lsautofl** - lists the contents of the (HP-UX) autoboot file.
- **support** - boots the Support Tape from the boot device.
- **readss** - displays 4 bytes (one word) from Stable Storage. The readss command requires a decimal number between 0 and 255 to address four bytes in Stable Storage.

Updating System Firmware with ODE

The Offline Diagnostic Environment (ODE) consists of diagnostic modules for testing and verifying system operation. The update utility of ODE provides the capability of updating the PDC/IODC firmware from the LIF directory onto the EEPROM.

ODE is an ISL utility. To invoke ODE and bring up the update utility:

1. Invoke the ISL environment from the system disk.
2. Type **ode** after the `ISL>` prompt to invoke **ode** from the **LIF** directory on the system disk. The prompt changes to `ODE>`.
3. At the `ODE>` prompt, type **update** to bring up the update utility. The prompt changes to `UPDATE>`.

NOTICE: The update command is available only if the workstation is running HP-UX version 10.0.

The following commands may be entered at the `UPDATE>` prompt:

- **help** - prints a one line description of each of the available commands in the update utility.
- **info** - prints information on how to use the update utility.
- **run** - updates the PDC of the workstation from the LIF directory.
- **image** - allows you to specify which LIF images to use.
- **expert** - enables/disables exit pausing and run confirmation for expert users.
- **exit** - resets the workstation so the new PDC can run.

To run the **update** utility, type **run** at the `UPDATE>` prompt. After **update** loads the new images into memory, it asks if you want to continue the update process, and displays the PDC version of the currently running PDC as well as that of the images that were loaded. If you wish to continue, type **y**.

When the update process has completed, the machine reboots automatically.

If you are using a graphics monitor for the updating procedure, characters may not be printed to the screen correctly because the character set for graphics printing is stored in the machine ROM that is overwritten. We recommend that you use a terminal connected to the first serial port, serial 1, for updating your workstation.

10

Boot Console Interface Model C160L/160/180/200/240/360

The Boot Console Interface provides an “interactive” environment after the power-on sequence.

Accessing the Boot Console Interface

To access the boot console interface, follow these steps:

NOTICE: This procedure should be done by a system administrator.

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

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

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

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

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

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

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

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

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

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

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

```
Boot terminated
```

The Main Menu of the boot console appears.

Boot Console Menus

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

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

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

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

```
------ Configuration Menu-----------------------------------------
Command                       Description
-------                       -----------
AUto [BOot|SEArch] [ON|OFF]   Display or set specified auto flag
BootID [<proc>] [<boot ID>]   Display or modify processor boot ID
BootINfo                      Display boot-related information
BootTimer [0 - 200]           Seconds allowed for boot attempt
CPUconfig {<proc>] [ON|OFF]   Config/deconfig processor
DEfault                       Set the system to predefined values
FastBoot [ON|OFF]             Display or set boot tests execution
LanConfig [<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 real time clock in GMT

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

```
------ Information Menu ------------------------------------------
Command                       Description
-----------                   -----------
ALL                           Display all system information
BootINfo                      Display boot-related information
CAche                         Display cache information
ChipRevisions                 Display revisions of VLSI and firm-
ware
COprocessor                   Display coprocessor information
FwrVersion                    Display firmware version
IO                            Dispay 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
------
Information Menu: Enter command >
```

```
------ Service Menu ------------------------------------------------
Command                                 Description
-------                                 -----------
ChassisCodes [<proc>]                   Display chassis codes
CLEARPIM                                Clear (zero) the contents
of PIM
EepromRead [<addr>] {<len>]             Read EEPROM locations
MemRead <addr> [<len>] [a]              Read memory locations
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

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

Searching for Bootable Media

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

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

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

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

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

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

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

Where *device_type* is one of the following:

fwscsi is the built-in fast, wide SCSI bus
sescsi is the built-in single-ended SCSI bus
lan is all connections to the built-in LAN
gsc*n* is a fast, wide SCSI interface in slot number *n*

Resetting Your Workstation

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

```
Main Menu: Enter command > reset
```

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

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

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

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

Displaying and Setting Paths

A **path** is the hardware address of a device that is attached to the I/O system of your workstation. The **path** command sets the system paths shown in Table 25.

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

Table 25 System Paths

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

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

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

The paths are displayed in **Mnemonic Style Notation,** as shown in Table 26.

Table 26 Mnemonic Style Notation

I/O Type	Specification Format
Built-in FWSCSI	**fwsci.***scsi_address***.***logical_unit_number*
Built-in SCSI	**sescsi.***scsi_address***.***logical_unit_number*
Optional	**gsc***n***.***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" earlier in this appendix, and then type the following at the prompt:

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

where *path_type* is one of the path types listed in Table 25.

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

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

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

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

where *path_type* is one of the path types listed in Table 25 and *path* is the specification of the path in Mnemonic Style Notation (as described in Table 26). For example, to set the primary boot path to a scsi disk with an ID of 6.0, follow the directions in “Accessing the Boot Console Interface” earlier in this appendix, and then type the following at the prompt:

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

Displaying and Setting the Monitor Type

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

The Monitor Command

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

NOTICE: The monitor command lets you change your workstation's graphics configuration before you replace your monitor. For information about changing the configuration after you replace your monitor, go to Chapter 3.

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

monitor

The correct usage for setting the graphics configuration is:

monitor *graphics_path type*

where valid *graphics_path* parameters are:

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

graphics(1) through *graphics(4)* - Graphics adapters installed in option slots 1 through 4. (Models C160 and C180)

graphics(1) and *graphics(2)* - Graphics adapters installed in option slots 1 and 2. (Model C160L)

and *type* is the numerical monitor type

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

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

NOTICE: There are graphics configuration restrictions of which you must be aware when adding graphics adapters or reconfiguring your graphics devices. For details on graphics configuration restrictions the different model workstations, see the appropriate subsection under “Graphics Configurations” in Chapter 3.

Displaying the Current Monitor Configuration

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

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

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

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

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

```
MONITOR INFORMATION

   Path        Slot  Head    HPA      Resolution  Freq  Type  Class
-----------    ----  ----  --------   ----------  ----  ----  -----
GRAPHICS(0)       0     1  f8000000    1280x1024  75Hz    12

Configuration Menu: Enter command >
```

In this example, only the built-in graphic adapter graphics(0) is configured. The monitor type for graphics(0) is set to type 12, which is a 1280 by 1024 monitor that uses a frequency of 75 Hz.

Setting the Monitor Type

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

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

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

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

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

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

```
MONITOR INFORMATION

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

Configuration Menu: Enter command >
```

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

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

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

MONITOR INFORMATION

   Path        Slot  Head    HPA      Resolution  Freq  Type  Class
-----------    ----  ----  --------   ----------  ----  ----  -----
GRAPHICS(0)       0     1  f8000000    1280x1024  75Hz    2
```

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

The boot console also displays the new monitor information.

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

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

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

```
No such graphics card.
```

Setting the Monitor Type at Power On

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

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

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

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

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

```
MONITOR INFORMATION

   Path        Slot  Head   Type      Size     Freq  Class
-----------    ----  ----   ----   ----------  ----  -----
GRAPHICS(0)      0     1     n     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 didn’t save the monitor type, the next time you reboot the system the original monitor type will be used.

Next, the following message is displayed:

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

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

Changing the Console to External Terminal

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

1. Turn system power off.
2. Disconnect the PC keyboard connector from the system rear panel.
3. Connect a serial terminal to the Serial 1 connector (the top serial connector) on the system rear panel.
4. Power on the system.

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

Displaying the Status of the System I/O

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

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

```
Information Menu: Enter command > IO
```

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

```
I/O MODULE INFORMATION


                                                                    IODC IODC
Path         Decimal Type                     Location   HVER SVER Vers Dep
------------ ------- ------------------------ ---------- ---- ---- ---- ----

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


EISA Cards

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


PCI Cards

Slot   Path                             Bus   Class
----   -------------------------------  ---   ------------------
```

Setting the Auto Boot and Auto Search Flags

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

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

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

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

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

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

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

auto boot *state*

or

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

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

EISA cards are not searched.

Displaying and Setting the Fastboot Mode

Access **fastboot** from the configuration menu.

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

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

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

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

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

```
fastboot
```

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

```
fastboot  off
```

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

```
fastboot  on
```

Displaying the LAN Station Address

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

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

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

lanaddress

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

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

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

Configure and Display LAN Settings

The **LanConfig** command configures and displays the current LAN settings. The C180, C200, C240 and C360 systems support 10Base-T, 100Base-T and AUI standards.

To automatically select the network speed (100 Mbits/sec or 10 Mbits/sec) and data transfer operation (full or half duplex), operating in compliance with IEEE 802.3u, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig AUTO_detect
```

To select 10 Mbits/sec network speed and half duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 10/Half_dx
```

To select 10 Mbits/sec network speed and full duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 10/Full_dx
```

To select 100 Mbits/sec network speed and half duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 100/Half_dx
```

To select 100 Mbits/sec network speed and full duplex mode, type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig 100/Full_dx
```

To select the AUI port (10 Mbits/sec, half duplex only), type the following at the prompt:

```
Configuration Menu: Enter command
> LanConfig AUI
```

NOTE: The LAN setting defaults to LAN-TP(RJ45). If that setting fails, the system tries the LAN-AUI setting. Also note that the new lan configuration settings take effect at the next BOot or SEArch command.

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 information menu prompt:

all

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

Displaying PIM Information

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

pim *processor_number*

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

pim - gives all fault types

pim 0 - HPMC information on processor

pim 0 *fault_type* - fault type information on processor

Stable Storage

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

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

ISL Environment

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

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

The ISL environment provides the following capabilities:

- Execute user-entered commands to modify boot device paths and boot options in stable storage
- Run offline diagnostic programs and utilities
- Provide automatic booting of the HP-UX O/S after power-on or reset

Invoking ISL from the Boot Console Interface

Perform the following steps to invoke ISL from the boot console interface:

1 Follow the directions in "Accessing the Boot Console Interface" earlier in this chapter, and then type the following at the prompt:

boot *device*

You are prompted:

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

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

For example, if the usual kernel (**/hp-ux** for 9.05, and **/stand/vmunix** for 10.0) on your root disk **(fwscsi.6.0**) has become corrupted, and you wish to boot your workstation from the backup kernel (**/SYSBCKUP** for 9.05, and **/stand/vmunix.prev** for 10.0), type the following at the `ISL>` prompt:

`ISL>` **hpux /SYSBCKUP** (for 9.05)

`ISL>` **hpux /stand/vmunix.prev** (for 10.20)

ISL User Commands

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

- **help** - lists ISL command menu and available utilities.
- **display** - displays the boot and console paths in Stable Storage and the current setting of the ISL Boot Flags.
- **primpath** - modifies the primary boot path entry in Stable Storage. The entry in Stable Storage for the primary boot device begins at byte address 0 and ends at byte address 31.
- **altpath** - modifies the alternate boot path entry in Stable Storage. The entry for the alternate boot device begins at byte address 128 and ends at 159.

- **conspath** - modifies the console path entry in Stable Storage. The entry in Stable Storage for the console device begins at byte address 96 and ends at byte address 127. The entry for the keyboard and mouse devices begins at byte address 160 and ends at 191.
- **listautofl** or **lsautofl** - lists the contents of the (HP-UX) autoboot file.
- **support** - boots the Support Tape from the boot device.
- **readss** - displays 4 bytes (one word) from Stable Storage. The readss command requires a decimal number between 0 and 255 to address four bytes in Stable Storage.

Updating System Firmware with ODE

The Offline Diagnostic Environment (ODE) consists of diagnostic modules for testing and verifying system operation. The update utility of ODE provides the capability of updating the PDC/IODC firmware from the LIF directory onto the EEPROM.

ODE is an ISL utility. To invoke ODE and bring up the update utility:

1. Invoke the ISL environment from the system disk.
2. Type **ode** after the `ISL>` prompt to invoke **ode** from the **LIF** directory on the system disk. The prompt changes to `ODE>`.
3. At the `ODE>` prompt, type **update** to bring up the update utility. The prompt changes to `UPDATE>`.

NOTICE: The update command is available only if the workstation is running HP-UX version 10.0 or later.

The following commands may be entered at the UPDATE> prompt:

- **help** - prints a one line description of each of the available commands in the update utility.
- **info** - prints information on how to use the update utility.
- **run** - updates the PDC of the workstation from the LIF directory.
- **image** - allows you to specify which LIF images to use.
- **expert** - enables/disables exit pausing and run confirmation for expert users.
- **exit** - resets the workstation so the new PDC can run.

To run the **update** utility, type **run** at the UPDATE> prompt. After **update** loads the new images into memory, it asks if you want to continue the update process, and displays the PDC version of the currently running PDC as well as that of the images that were loaded. If you wish to continue, type **y**.

When the update process has completed, the machine reboots automatically.

If you are using a graphics monitor for the updating procedure, characters may not be printed to the screen correctly because the character set for graphics printing is stored in the machine ROM that is overwritten. We recommend that you use a terminal connected to the first serial port, serial 1, for updating your workstation.

Index

Index

Index

Index