Service Handbook
B Class
Model B132L/B132L+/B160L/B180L

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Safety and Regulatory Statements

This section contains safety and regulatory statements pertaining to your B132L/B132L+/B160L/B180L workstation. 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.

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 2 ITE

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取り扱い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. GSGV7

Lpa <70dB	Lpa<70dB
operator position	am Arbeitsplatz
normal operation	nomaler 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.

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Product Information

This chapter introduces the HP 9000 B132L/B132L+/ B160L/B180L workstation. Its purpose is to familiarize you with your workstation and its controls and indicators. The information is presented in the following sections:

- Product Description
- System unit front panel controls and LEDs
- System unit rear panel connectors
- Monitors
- Keyboard
- Pointing devices
- Operating system overview
- Important information you need to note
- Networking overview

Product Description

The B Class workstations have the following key features:

- Processor Performance
  Model B132L   - 132 Mhz (33 Mhz GSC)
  Model B132L+ - 132 Mhz (33 Mhz GSC)
  Model B160L   - 160 Mhz (40 Mhz GSC)
  Model B180L   - 180 Mhz (36 Mhz GSC)

- Operating System
  Model B132L/B160L - Native HP-UX (version 10.20 or greater)
  Model B132L+/B180L - Native HP-UX (version 10.20 with ACE or greater)

- 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:
  Model 132L/160L - HP VISUALIZE-24Z, 24-plane graphics
  HP VISUALIZE-8/24, Accelerated 8-plane or 24-plane 3D graphics
  Model 132L+/180L - HP VISUALIZE-8/24/48/48XP
  HP VISUALIZE-EG/DualEG

- Main Memory
    Model B132L/B160L - 6 slots of main memory allowing from 32 to 384 MBytes

    Model B132L+/B180L - 6 slots of main memory allowing from 32 to 768 MBytes

- Second Level Cache
    2 slots allowing 1 MB of second level cache

- Internal Storage Devices
    Fast, Wide Differential SCSI Hard Disk Drives
      (requires optional FW SCSI adapter)
    Single-Ended SCSI Hard Disks (up to two)
    Single-Ended SCSI CD-ROM Drive
    Single-Ended SCSI 2.0/4.0/8.0 GB, 4-mm
      DDS-Format Tape Drive
    3.5-inch Slimline Floppy Disk Drive
      (not a SCSI Device)
    Models B132L+/B180L only - Ultra, Wide Single-Ended SCSI 2.0/4.0/9.0 GB Hard Disks

- Standard Network
    Ethernet IEEE 802.3 AUI
    RJ45, UTP Twisted Pair
    Models B132L+/B180L only - 100Base T/10Base T

- Standard I/O
    SE SCSI Connector - 8-bit, 5 MB/sec synchronous
      1.5 MB/sec asynchronous 50-pin, high density
      SCSI connector
    Models B132L+/B180L only - Ultra, Wide Single-Ended SCSI
      Connector - 68 pin, high density SCSI connector.
    Two Serial Interfaces RS232C, 9-pin male
    One Parallel Interface, Centronics, BUSY handshake
      25 pin female
    Audio Line-in, Line-out, Mic, and Headphone
    Two PS/2 ports (Keyboard and Mouse)

- EISA/PCI/GSC Option Slots
  Slot 1 - GSC or PCI
  Slot 2 - EISA, GSC, or PCI

- User I/O
  PS/2 Keyboard
  PS/2 Mouse

System Unit Front Panel Controls and LEDs

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

Figure 1 shows the system unit front panel controls.
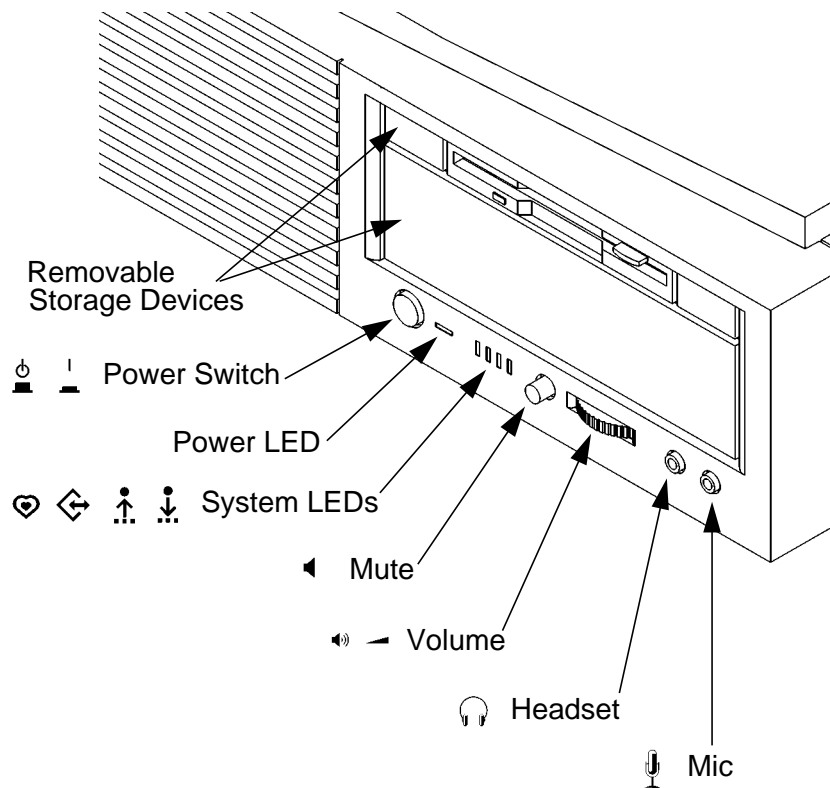
Figure 1   **System Unit Front Panel Controls**

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 system LEDs indicate the status of your workstation. In the event of a system problem, the LEDs are lighted in different patterns to indicate error codes. See Chapter 6 for a complete list of the system LED error codes.

      ♥   LED 4 - System Heartbeat

      ⇐   LED 3 - SCSI Bus Activity

      ↑   LED 2 - Network Receive

      ↓   LED 1 - Network Transmit

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 jack or line out.
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.

NOTICE: The Volume Control, Headphone Jack, and Mic (microphone) Jack features of the CD-ROM are supported through software applications only.

For more information on the features and electrical specifications, see "Audio Connectors" later in this chapter.

Removable Storage Devices

The Models B132L/B132L+/B160L/B180L support
the following removable storage devices:

- CD-ROM Disc Drive

- DDS-Format Tape Drive

- Floppy Diskette Drive

NOTICE: 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.

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

System Unit Rear Panel Connectors

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

NOTICE: To maintain electro-magnetic and radio frequency emissions compliance, verify that all cables are fully seated and properly fastened.

Figure 2 shows the locations of the connectors on the system unit's rear panel.
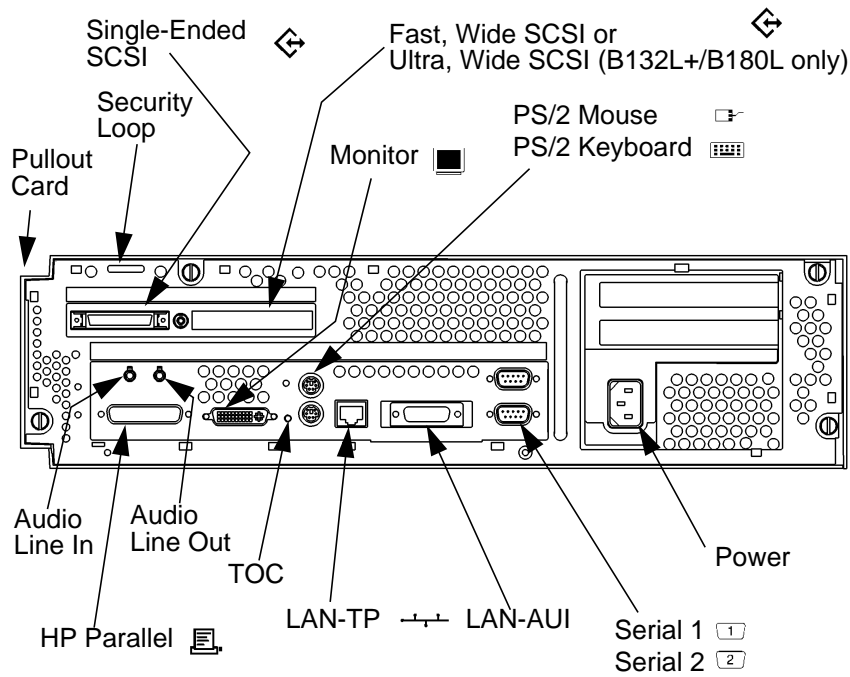
Figure 2 **System Unit Rear Panel Connectors**

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

Your workstation has audio input and output capability through external input and output connectors on the rear panel and through an internal speaker. The rear panel contains the Audio IN (stereo line-in) and Audio 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 for best quality recording and playback through the external connectors. The following is a summary of the workstation audio features:

- 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 Input
    Line In
    Mono microphone (on the front panel) compati-
    ble with
        1.5V phantom supply (bias voltage supplied
        by the system).
    CD-ROM audio (if internal CD-ROM is in-
    stalled)
- Audio Output
    Line-out
    Headphone (on the front panel)
    Built-in mono speaker
- Audio CODEC
    Crystal CS4215

The audio electrical specification for this workstation
are summarized in Table 1

Table 1   **Audio Electrical Specifications**

Frequency Response	25-20,000 Hz
Input Sensitivity/Impedance	
Line In	2.0Vpk/47k ohm
Microphone	22mVpk/1k ohm
Max Output Level/Impedance	
Line Out	2.8Vpp/47k ohm
Headphone	2.75Vpp/50 ohm
Speaker (internal)	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:

$$'n = \left(\frac{dB}{[20\log 10]} \approx \frac{dB}{6} \right)$$

For example, for 61dB S/N then n=61/6 or approx. 10 significant bits, or in other words, about 6 bits of noise.

Keyboard Connectors

PS/2 Keyboard and Mouse Connectors

The PS/2 connectors provide an interface for a keyboard and a mouse to the system. Consult the documentation that accompanies each input device for specific information concerning its use.

HP Parallel I/O Connector

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

802.3 Network Connectors

Your workstation has built-in ThickNet LAN-AUI and LAN-TP (Twisted Pair) connectors for the 802.3 (ETHERNET) network. Connections to ThinLAN networks require an external transceiver. Your workstation will autoselect the correct network setting.

NOTE:	Only one of the network connectors can be used at one time.

Serial I/O Connectors

You can attach a variety of pointing devices (such as a mouse or trackball), or peripheral devices to the Serial Input/Output (SIO) ports on the B132L/B132L+/ B160L/B180L workstation. Peripheral devices include printers, plotters, modems, and scanners. Consult the documentation that accompanies each pointing or peripheral device for specific information concerning its use.

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

Table 2 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 2   **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 single-ended and fast, wide 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.

NOTICE:	When attaching external SCSI devices, be sure to terminate the last device on the external SCSI bus. If there are no external SCSI devices, attach a SCSI terminator to the back of the system.

TOC Button

The TOC (transfer of control) 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

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

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

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

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

Keyboard

The B132L/B132L+/B160L/B180L uses a PS/2 keyboard which connects to the PS/2 interface connector on the rear of your workstation.

Pointing Devices

You can use an HP three-button mouse, a trackball, or other options as pointing devices using the PS/2 connector or the Serial ports. For instructions on using your particular pointing device, see the manual that came with it.

Operating System Overview

Your workstation uses the HP-UX operating system, version 10.20 or greater. 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.

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

If you have any questions about Instant Ignition, refer to *Using Your HP Workstation* for more information.

NOTICE: When you power on your workstation, a self-test is performed before the system boots.

Important Information You Need to Note

Before you begin using your workstation, take a moment to gather the following important information and note it in the appropriate subsection for future use:

- LANIC ID

- SCSI device ID(s)

- Device file used for each SCSI device

- Internet Protocol (IP) address

- Subnetwork mask

NOTICE: For help with these, refer to *Using your HP Workstation*.

LANIC ID

Locate the contents label that comes with the workstation shipping carton. Find the LANIC ID listed there and write it down in the space provided:

LANIC ID

_____

You can also get your LANIC ID by using the lanscan command in a terminal window. To do this, follow these steps:

1 Turn your workstation and monitor on, if you have not already done so. Figure 1 of this chapter shows the location of the power switch on the workstation. See the documentation that came with your monitor for the location of the monitor power switch.

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2   In a terminal window, enter the following at the prompt:

/usr/sbin/lanscan

You will see a table similar to Table 3.

Table 3   **Sample LANSCAN COMMAND TABLE**

Hardware Path	Station Address	Dev lu	Hardware State	Net-Interface Name Unit State	NetMgt ID	Encapsulation Methods
2.0.2	0x0800091595EE	0	UP	lan0 UP	4	ETHER IEEE8023

The LANIC ID in this example is 0800091595EE.

At alternative method for listing the system's LANIC ID is to enter the following command at the information menu of the Boot Console Handler:

lanaddress

IP Address and Subnetwork Mask Information

Get the IP address and the subnet mask information for your workstation from either your System Administrator or your Network Administrator and note them here:

IP address

_____

subnet mask

_____

_____

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Networking Overview

Your workstation is capable of many more tasks than are described in this owner's guide. This section gives an overview of some of the networking capabilities of your system and directs you to the appropriate source for more information.

Mail

Electronic mail allows you to send and receive mail messages on your workstation. For information on setting up and using electronic mail on your workstation, contact your system administrator and also see the *Using Your HP Workstation* manual that came with your workstation.

telnet

The telnet application uses the TELNET protocol to communicate with another computer system on the network. The telnet application allows you to log on to the remote system from your workstation. If your system has man pages installed, you may read the on-line **telnet** man page by entering the following at a command-line prompt:

man telnet

rlogin

The rlogin application also allows you to log on to another computer system on the network from your workstation. For more information on rlogin, see the *Using Your HP Workstation* manual that came with your workstation and read the on-line man page by entering the following at a command-line prompt:

man rlogin

ftp

The ftp application is a user interface to the File Transfer Protocol. Use ftp to copy files between your workstation and another computer system on the network. For more information, see the *Using Your HP Workstation* manual that came with your workstation and read the on-line man page by entering the following at a command-line prompt:

man ftp

rcp

The rcp application allows you to remotely copy files from another computer system on a network to your workstation. For more information, see the *Using Your HP Workstation* manual that came with your workstation and read the on-line man page by entering the following at a command-line prompt:

man rcp

NFS

The Network File System (NFS) allows your workstation to access files on remote computer systems as if they were on your local system. The file system on the remote computer system does not have to be compatible with your workstation's file system. For more information, see Installing and *Administering NFS Servers* and *HP-UX System Administration Tasks* manuals.

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**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 4 lists the environmental specifications for this workstation.

Table 4   **Environmental Specifications**

Type	Specifications
Altitude	
Operating	0-10,000 ft
Non-operating	15,000 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	0-15 kV, no effect
Contact discharge	0-3 kv, no effect
Humidity (Non-condensing)	
Operating	95%
Leakage Current	less than 3.5 mA
Temperature	
Operating	0 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
Vibration	

Table 4   **Environmental Specifications**

Type	Specifications
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 the *Hardware Install Card Model B132L/B160L, (*Part Number A4190-90010) 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 B132L/B132L+/B160L/B180L *Owner's Guide* (Part Number A4190-90023) for more information.

3

Configuration

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

Workstation Configurations

Refer to the *HP 9000 B Class Configuration Guide* for a complete list of supported accessories, peripherals, and operating systems for this 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 3 and Table 5 to determine which disk tray position is correct for your device.

Figure 3 shows the storage device positions in the disk tray. Table 5 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 3.
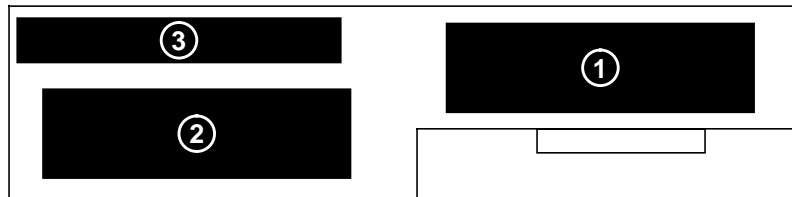
Figure 3 **Disk Tray Positions**

Table 5   **Storage Configurations**

Disk Tray Position	Supported Devices	Conditions
3	Floppy Drive	The floppy drive is not a SCSI device.
2	CD-ROM DDS-Tape Single-Ended SCSI Disk Fast Wide SCSI Disk * Ultra Wide SCSI Disk**	The CD-ROM drive and the DDS tape drive are single-ended SCSI devices.
1	Single-Ended SCSI Disk Fast Wide SCSI Disk * Ultra Wide SCSI Disk**	
* Fast Wide SCSI devices are supported only with the optional Fast Wide SCSI controller. **Ultra Wide SCSI is built-in on SPU board on B132L+ and B180L only.		

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Table 6 lists the recommended SCSI IDs for internal storage devices.

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.

Table 6   **Default SCSI IDs**

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

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

The following figures show the CD-ROM and DDS tape drive SCSI address and jumper settings. For jumper settings for other types of drives, refer to the label on your hard drive for specific jumper information for that device.

NOTE: Remove or disable the terminators on all drives (disk, CD-ROM, and DDS).
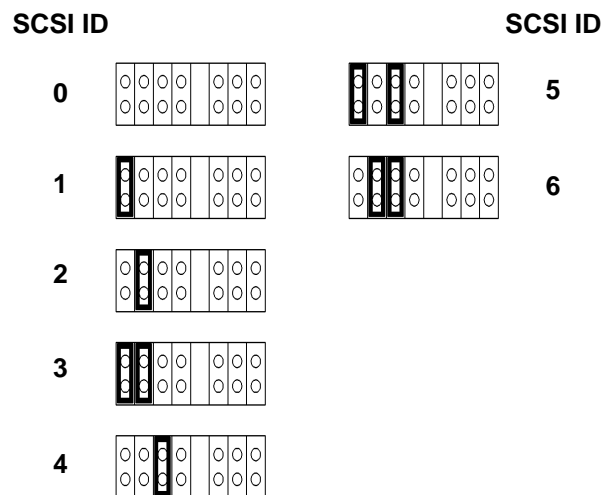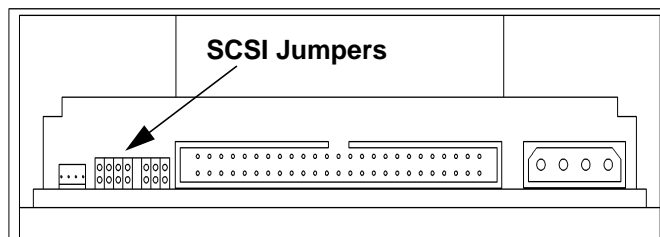
Figure 4   **Early Model CD-ROM Drive
SCSI Address/Jumper Settings**

Figure 5 **Later Model CD-ROM Drive
SCSI Address/Jumper Settings**

Figure 6   **Early Model DDS-DC Tape Drive**
                    SCSI Address/Jumper Settings
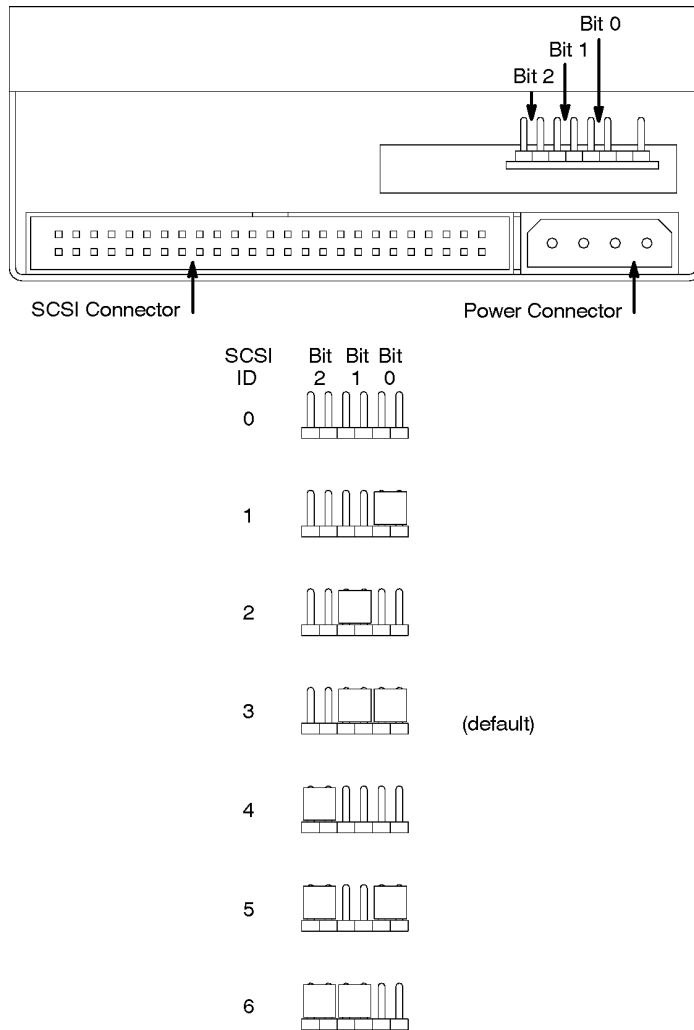
Figure 7   **Later Model DDS-DC Tape Drive**
SCSI Address/Jumper Settings
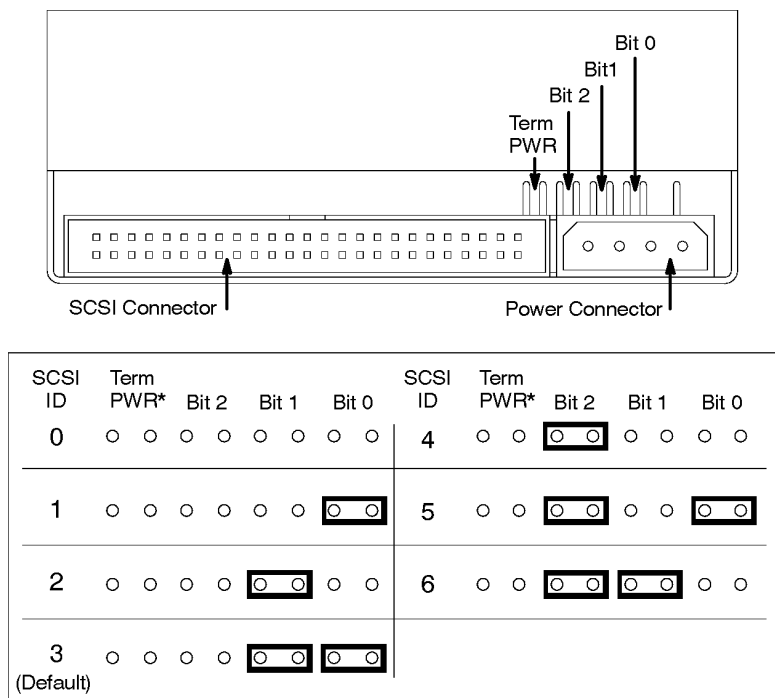
Figure 8   DDS-2 Tape Drive SCSI Address/Jumper Settings
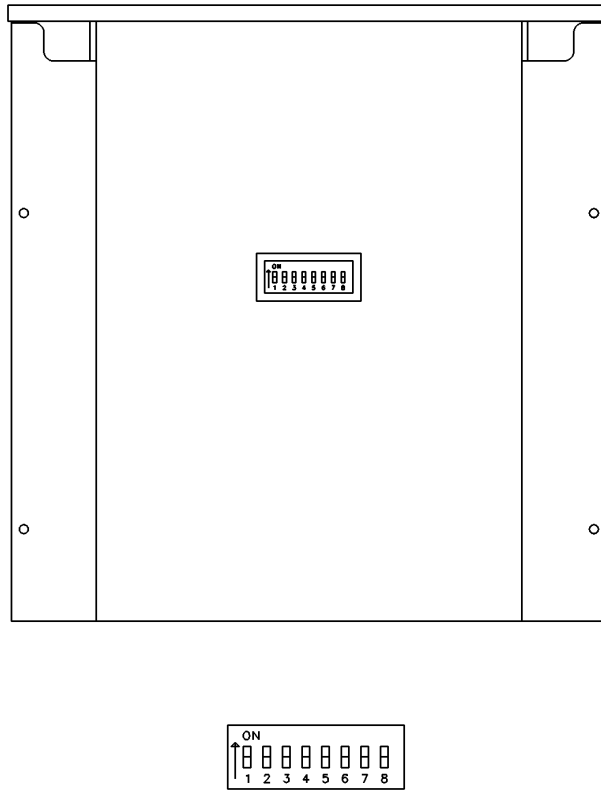
Figure 9   **DDS Drive Switch Settings for Data Compression Operation Mode**

Allowable Memory Configurations

This workstation has 6 memory slots, labeled 0A, 0B, 1A, 1B, and 2A, 2B. The memory configuration is 32 MB to 768 MB installed in pairs of 16 MB, 32MB, 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 32 MB memory modules, first install the pair of 32 MB memory modules in slots 0A and 0B, then install the 16 MB modules in slots 1A and 1B.

Figure 10 shows the position of the memory connectors on the Main Tray.

Memory Module Connectors

White Ejector Tabs

0B
0A
1B
1A
2B
2A
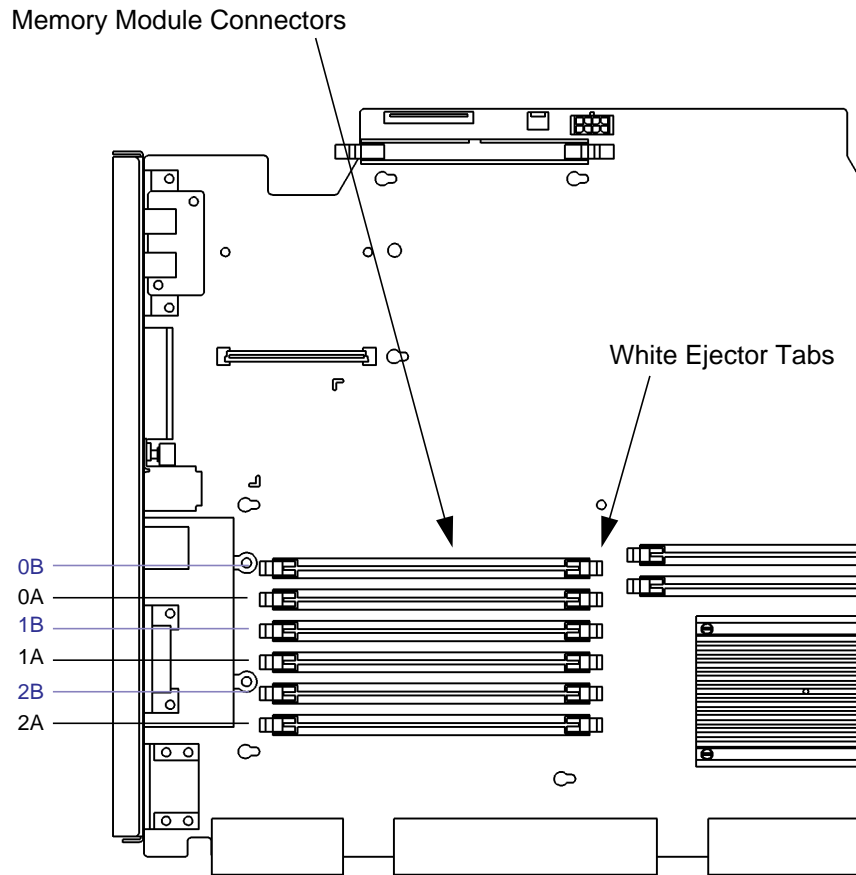
Figure 10   Memory Connectors

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

Monitor-Type Selection

The built-in graphics in the Model B132L/B132L+/
B160L/B180L workstation supports the following two
monitors:

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

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

The monitor type does not have to be changed on this
workstation since the workstation is set up to support
these monitors. However, if for some reason the moni-
tor 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.

Graphics Configuration Consideration

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

Special Video Configuration Statements

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

For EN55022 or CISPR 22 Applications:

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

For FCC Applications:

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

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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(NA)* and the video connector on the right is *graphics(NB)*. 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 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. Installing two of these cards accounts 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.

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 B Class workstations.

4

Troubleshooting

This chapter provides information about isolating a failing component, known as a Field Replaceable Unit (FRU), in a Model B132L/B132L+/B160L/B180L workstation.

Getting Ready to Troubleshoot

To troubleshoot a B132L/B132L+/B160L/B180L 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 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 Support Tools Manager online tests.

For a complete description of using ISL diagnostics and Support Tools Manager, see the *Precision Architecture RISC HP 9000 Series 700 Diagnostics Manual*.

In the following flowcharts, use Figure 11 (flowchart 1) and Figure 12 (flowchart 2) to troubleshoot based on whether or not the LEDs light. Use Figure 13 (flowchart 3) and Figure 14 to troubleshoot the HP-UX environment.

Flowchart 1

Figure 11   Power On Troubleshooting
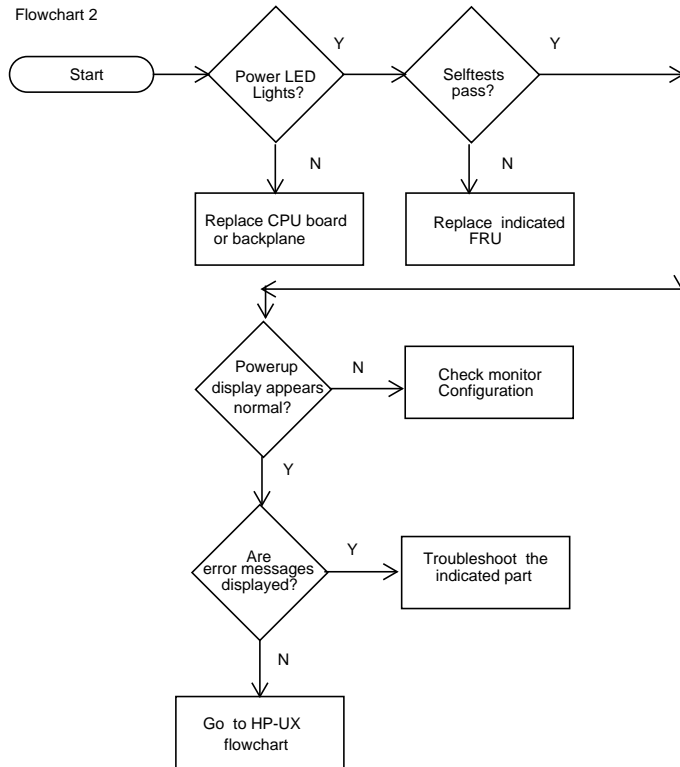
Flowchart 2

Figure 12   **Selftests Troubleshooting**

Flowchart 3

```
                    Start
                      │
                      ▼
         ┌──────────────────────────┐
         │ Go to Boot Administration│◄──( A )
         │       environment        │
         └──────────────────────────┘
                      │
                      ▼
                  ╱Boot╲        Y          ╱Does  ╲      Y      ( B )
                 ╱Over LAN?╲──────────────►╱Boot List╲──────────► │
                 ╲         ╱               ╲appear?  ╱            ▼
                  ╲       ╱                 ╲       ╱      ┌──────────────┐
                      │ N                       │ N      │Select OS to  │──( C )
                      ▼                         ▼        │    boot      │
                  ╱Does ╲                  ╱Do other ╲   └──────────────┘
                 ╱Boot List╲──( B )       ╱system units╲       ╱System ╲    Y
                 ╲appear?  ╱              ╲get Boot List?╲─────╱with LAN  ╲────►
                  ╲       ╱                ╲           ╱      ╲cable & I/O╱
                      │ N                       │ N           ╲  ok?    ╱
                      ▼                         ▼                 │ N
         ┌─────────────────────┐    ┌─────────────────┐          ▼
         │Check the following: │    │Check the following:│  ┌──────────────┐
         │                     │    │                  │  │Replace system│
         │1. Interface cables  │    │1. System LAN     │  │    board     │
         │                     │    │   cables         │  └──────────────┘
         │2. Mass storage      │    │                  │         │
         │   devices and their │    │2. Server and its │         ▼
         │   files             │    │   mass storage   │       ( A )
         │                     │    └─────────────────┘
         │3. System unit       │
         │   interfaces        │    ┌──────────────────┐
         └─────────────────────┘    │Run ISL diagnostics│◄────────
                                    └──────────────────┘
```

Figure 13   HP-UX Compatible Mode Troubleshooting

Flowchart 4
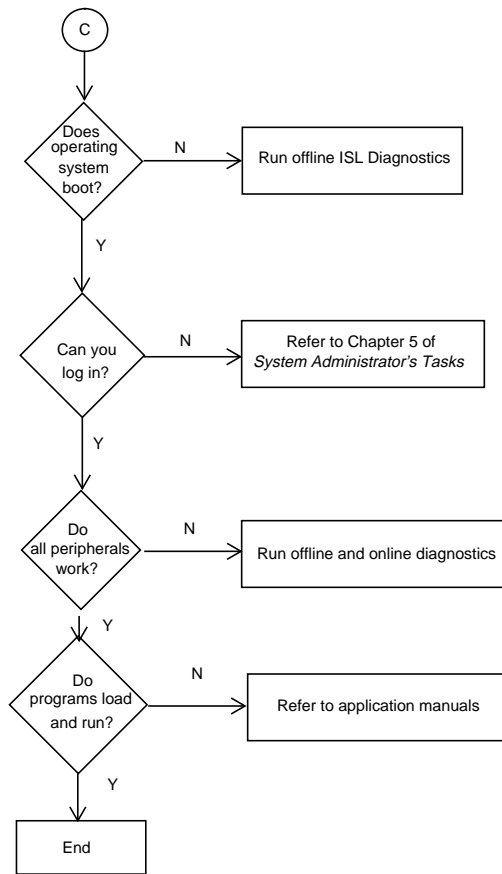
Figure 14   **HP-UX Compatible Mode Troubleshooting (Continued)**

Dealing with a Boot Failure

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

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

    boot scsi.1.0

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

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

    boot *<device>*

  You are prompted:

  ```
  Interact with ISL (Y or N) >
  ```

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

```
ISL>
```

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

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

> **hpux /stand/vmunix.prev**

- 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 following:

fwscsi is the built-in fast, wide differential SCSI bus or the built-in ultra, wide single-ended SCSI bus

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

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

lan is 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 built-in SCSI or optional Fast, Wide SCSI bus. 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.
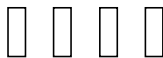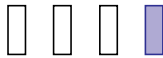
Selftest Failures

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 7, 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.
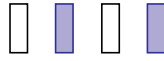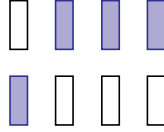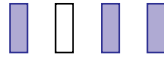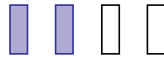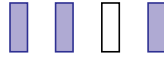
In the following table, shaded LEDs indicate that they are lit.

Table 7   **LED Error Codes**
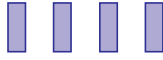
LED Value	RS-232 Chassis Code Range	Description
□ □ □ □	N/A	Reserved
□ □ □ ▪	7401	No memory found FAULT *Likely cause: SIMMs or processor board*
□ □ ▪ □	N/A	Reserved
□ □ ▪ ▪	7000-7F00	Memory Error FAULT *Likely cause: Memory SIMMs. System Console indicates which SIMM.*
□ ▪ □ □	1030 - 4099	Processor board FAULT

Table 7   **LED Error Codes**

LED Value	RS-232 Chassis Code Range	Description
▯ ▮ ▯ ▮	5000 - 500F 8000 - 8FFF CD00 - CDff*	I/O System FAULT *Except backplane faults listed below
▯ ▮ ▮ ▯	8500, 8501 8C00-8CFF	Backplane FAULT PCI 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 1000-101C	Unknown FAULT
▮ ▯ ▮ ▯	CBF0 - CBFF 1001	HPMC FAULT
▮ ▯ ▮ ▮	A088 - A0FF	No console/IPL error FAULT
▮ ▮ ▯ ▯	N/A	Reserved
▮ ▮ ▯ ▮	N/A	Reserved
▮ ▮ ▮ ▯	N/A	Reserved

Table 7 **LED Error Codes**

LED Value	RS-232 Chassis Code Range	Description
▮ ▮ ▮ ▮	N/A	Power on value (processor board fault when this value remains for more than one second)

Chassis Codes

Below are definitions for all L2 chassis display codes. The codes are organized in approximate numerical order for ease of reference.

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)

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 reg-
ister
0008    DINO_IO_FBB_EN_INIT         ars io_fbb_en regis-
ter
0009    DINO_IIO_ADDR_EN_ZERO_TEST ars io_addr_en reg-
ister
000A    DINO_CONFIG_ADDR_ONES_TEST ars config_addr reg-
ister
000B    DINO_CONFIG_ADDR_ZERO_TEST ars config_addr reg-
ister
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 reg-
ister
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
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 protec-
tion 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 protection
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 trans-
fer trap*
1x18       UNEXPECTED_INTERRUPT   Lower-privilege trans-
fer trap*
1x19       UNEXPECTED_INTERRUPT   Taken branch trap*
1x1A       UNEXPECTED_INTERRUPT   Data memory access
rights trap*
1x1B       UNEXPECTED_INTERRUPT   Data memory protection
id trap*
1x1C       UNEXPECTED_INTERRUPT   Unaligned data ref
trap*

Code       Name                             Meaning
1000       UNEXPECTED_INTERRUPT   Interrupt occurred dur-
ing PDC execution
1030       STARTING_EST             Starting Early Selftest
1031       EST_SKIPPED              Early Selftest skipped
1032       BAD_CPU_TEST_MODE
103C       CPU_INIT                 Initialize the CPU
103E       EXITING_EST              Exiting Early Selftest
103F       CACHE_LOAD_ERROR
1040-1048 CPU_BASIC                 CPU basic selftest
1049-1050 CPU_ALU                   CPU ALU selftest
1051-1058 CPU_BR                    CPU branch selftest
1059-105A CPU_SIDE_EFF              CPU side effect selft-
est
1061-1066 CPU_CB
1067-1075 CPU_ARITH_COND            CPU arithmetic condi-
tion selftest
1076-1077 CPU_BIT_OP                CPU bit operation self-
test
```

```
1078-1079 CPU_SAR                CPU SAR selftest
107A-1080 CPU_EX_DEP
1081-1083 CPU_BB
1084-1089 CPU_CR
108B-108D CPU_EXT_INT            CPU external interrupt
selftest
108E-1093 CPU_ITIME             CPU itimer selftest
1094-1097 CPU_SHADOW            CPU Shadow register
selftest
1098-1099 CPU_DIAGS             CPU Diagnose register
selftest
10A0      COPROC                Starting CPU COPROC
selftest
10A1      COPROC_REG            COPROC register selft-
est
10A2      COPROC_INSTR          COPROC instruction
selftest
10A3      COPROC_TRAPS 10A4     COPROC_MISC
10AF      FPU_S_DISABLED        FPUs are disabled
10B0      TLB_INIT              Initialize the TLB
10B3-10B4 TLB_ADDR
10B6-10B7 TLB_PROT
10C0      BAD_PDH_SPEED
10CE      CPU_EXTINGUISH        CPU was extinguished
via PDC_PROC call
10D1      EEH_CONSOLE_PATH_FAILED
10D2      EEH_CPATH_NOT_IN_SYS_MAP
10D3      EEH_STI_PTR_NULL
10D4      EEH_GR_INIT_FAILED
10D5      EEH_HALT_CPU
10D6      INVALID_USEC_WAIT_PARM
10D7      INVALID_EUSEC_WAIT_PARM
10D8      INVALID_SPEED_IN_PDH
10EF      ST_WARNING            Selftests returned a
warning
10FF      MONARCH_ST_FLT        Selftest returned a
failure

Code      Name                       Meaning
2000      ICACHE_ALINE          Icache Address line
selftest
2001      ICACHE_ALINE_0100     Icache aline control
failure
2002      ICACHE_ALINE_0105     Icache aline shorts
failure
2003      ICACHE_ALINE_0110     Icache aline opens
failure
2010      ICACHE_DLINE          Icache Data line selt-
est
2011      ICACHE_DLINE_0100     Icache dline tag error
2012      ICACHE_DLINE_0105     Icache dline data error
2020      ICACHE_RAM            Icache RAM selftest
2021      ICACHE_RAM_DATA_ERR   Icache RAM data error
2022      ICACHE_RAM_TAG_ERR    Icache RAM tag error
2023      ICACHE_RAM_LOAD_ERR   Icache RAM load error
2030-2x34 ITAG                  Icache tag selftest
2040-2x45 CACHE_IERR
2050      DCACHE_ALINE          Dcache Address line
selftest
2051      DCACHE_ALINE_0100     Dcache aline control
failure
2052      DCACHE_ALINE_0105     Dcache aline shorts
failure
2053      DCACHE_ALINE_0110     Dcache aline opens
failure
2060      DCACHE_DLINE          Dcache Data line selt-
est
2061      DCACHE_DLINE_0100     Dcache dline tag error
2062      DCACHE_DLINE_0105     Dcache dline data error
```

```
2070      DCACHE_RAM              Dcache RAM selftest
2071      DCACHE_RAM_DATA_ERR     Dcache RAM date error
2072      DCACHE_RAM_TAG_ERR      Dcache RAM tag error
2073      DCACHE_RAM_LOAD_ERR     Dcache RAM load error
2080-2x84 DTAG                    Dcache tag selftest
2090-2x95 CACHE_DERR
20A0-2xA8 CACHE_BIST
20B0      DCACHE_PARITY           Dcache parity error
20B1      DCACHE_TAG_PARITY       Dcache parity error in
the tag
20B2      DCACHE_WORD0_PARITY     Dcache parity error in
word 0
20B3      DCACHE_WORD1_PARITY     Dcache parity error in
word 1
20C0      ICACHE_PARITY           Icache parity error
20C1      ICACHE_TAG_PARITY     Icache tag parity error
20C2      ICACHE_WORD0_PARITY    Icache word0 parity er-
ror
20C3      ICACHE_WORD1_PARITY    Icache word1 parity er-
ror

21..   second level cache Code

Name                            Meaning
2100-2102 SLC_ALINE
2110-2111 SLC_DLINE 2120    SLC_RAM
2121      SLC_RAM                 P1 data error in SLC
card B
2122      SLC_RAM                 P1 data error in SLC
card B
2123      SLC_RAM                 P1 data miss from SLC
2124      SLC_RAM                 P1 STTEADD address mis-
match
2125      SLC_RAM                 P2 data error in SLC
card B
2126      SLC_RAM                 P2 data error in SLC
card A
2127      SLC_RAM                 P2 data hit error from
SLC
2128      SLC_RAM                 P2 STTEADD address mis-
match
2131      SLC_TAG_COMP_DATA_ERR
          FLT extended info Expected address[0:15]
                            Expected address[16:31]
                            Actual address (Sl-
teAdd)[0:15]
                            Actual address (Sl-
teAdd)[16:31]
                            Expected data[0:15]
                            Expected data[16:31]
                            Actual data[0:15]
                            Actual data[16:31]
                            Expected SlteStat[0:15]
                            Expected SlteStat[16:31]
                            Actual SlteStat[0:15]
                            Actual SlteStat[16:31]

2132      SLC_TAG_COMPU_NO_HIT
          FLT extended info same as 2131

2133      SLC_TAG_COMP_ADDR_ERR
          FLT extended info same as 2131

2134      SLC_TAG_COMP_TAG_ERR
          FLT extended info same as 2131

2135      SLC_TAG_PATT_DATA_ERR
          FLT extended info same as 2131

2136      SLC_TAG_PATT_NO_HIT
```

```
                 FLT extended info same as 2131

2137       SLC_TAG_PATT_ADDR_ERR
                 FLT extended info same as 2131

2138       SLC_TAG_PATT_TAG_ERR
                 FLT extended info same as 2131

2140       SLC_MISS

2141       SLC_TAG_MISS_DATA_ERR
                 FLT extended info same as 2131

2142       SLC_TAG_MISS_NO_MISS
                 FLT extended info same as 2131

2143       SLC_TAG_MISS_ADDR_ERR
                 FLT extended info same as 2131

2144       SLC_TAG_MISS_TAG_ERR
                 FLT extended info same as 2131

2150       SLC_INV

2151       SLC_INV_UNEXP_SLC_SIZE

2152       SLC_INV_LDCSETUP_SLCSTAT_ERR
                 FLT extended info Actual SLTESTAT[0:15]
                                   Actual SLTESTAT[16:31]
                                   Expected SLTESTAT[0:15]
                                   Expected SLTESTAT[16:31]

2153       SLC_INV_LDCLEAR_SLCSTAT_ERR
                 FLT extended info same as 2152

2154       SLC_INV_LDCLOAD_SLCSTAT_ERR
                 FLT extended info same as 2152

2155       SLC_INV_UBITSETUP_SLCSTAT_ERR
                 FLT extended info same as 2152

2156       SLC_INV_UBITEST_SLCSTAT_ERR
                 FLT extended info same as 2152

2157       SLC_INV_LDCLEAR_DATA_ERR
                 FLT extended info Actual data[0:15]
                                   Actual data[16:31]
                                   Expected data[0:15]
                                   Expected data[16:31]

2158       SLC_INV_LDCLOAD_DATA_ERR
                 FLT extended info same as 2157

2159       SLC_INV_UBIT_DATA_ERR
                 FLT extended info same as 2157

2160       SLC_ERR

2161       SLC_ERR_NML_HPMC_ERR
                 FLT extended info Actual MIOC status[0:15]
                                   Actual MIOC status[16:31]

2162       SLC_ERR_MISS_HPMC_ERR
                 FLT extended info same as 2161

2163       SLC_ERR_UNEXP_SLC_SIZE
2164       SLC_ERR_MEM_NO_HPMC_ERR
2165       SLC_ERR_INV_NO_HPMC_ERR
2166       SLC_ERR_SLC_NO_HPMC_ERR

2167       SLC_ERR_NML_RD_CHK_ERR
                 FLT extended info Actual data[0:15]
                                   Actual data[16:31]
                                   Expected data[0:15]
                                   Expected data[16:31]
```

```
                              Actual M_RD_CHK[0:15]
                              Actual M_RD_CHK[16:31]
                              Expected M_RD_CHK[0:15]
                              Expected M_RD_CHK[16:31]
2168       SLC_ERR_NML_DATA_ERR
            FLT extended info same as 2167

2169       SLC_ERR_MEM_RD_CHK_ERR
            FLT extended info same as 2167

216A       SLC_ERR_SLC_RD_CHK_ERR
            FLT extended info same as 2167

216B       SLC_ERR_NML_SLCSTAT_ERR
            FLT extended info same as 2152

216C       SLC_ERR_MEM_SLCSTAT_ERR
            FLT extended info same as 2152

216D       SLC_ERR_INV_SLCSTAT_ERR
            FLT extended info same as 2152

216E       SLC_ERR_SLC_SLCSTAT_ERR
            FLT extended info same as 2152

216F       SLC_ERR_MISS_SLCSTAT_ERR
            FLT extended info same as 2152

2170       SLC_ERR_MEM_MIOCSTAT_ERR
            FLT extended info Actual MIOC_STATUS[0:15]
                              Actual MIOC_STATUS[16:31]
                              Expected MIOC_STATUS[0:15]
                              Expected MIOC_STATUS[16:31]

2171       SLC_ERR_SLC_MIOCSTAT_ERR
            FLT extended info same as 2170

2172       SLC_ERR_MEM_EWORD0_ERR
            FLT extended info Actual DR0_M_ERR0[0:15]
                              Actual DR0_M_ERR0[16:31]
                              Expected DR0_M_ERR0[0:15]
                              Expected DR0_M_ERR0[16:31]

2173       SLC_ERR_MEM_EWORD1_ERR
            FLT extended info Actual DR0_M_ERR1[0:15]
                              Actual DR0_M_ERR1[16:31]
                              Expected DR0_M_ERR1[0:15]
                              Expected DR0_M_ERR1[16:31]

2174       SLC_ERR_SLC_EWORD0_ERR
            FLT extended info same as 2172

2175       SLC_ERR_SLC_EWORD1_ERR
            FLT extended info same as 2173

2176       SLC_ERR_MEM_ERRADDR_ERR
            FLT extended info Actual MDERRADD[0:15]
                              Actual MDERRADD[16:31]
                              Expected MDERRADD[0:15]
                              Expected MDERRADD[16:31]

2177       SLC_ERR_SLC_ERRADDR_ERR
            FLT extended info same as 2176

2190       SLC_DMA

2191       SLC_SCSI_INIT_FAILED
            FLT extended info SCSI ENTRY_INIT return val-
ue[0:15]
                              SCSI ENTRY_INIT return val-
ue[16:31]

2192       SLC_DMA_SETUP_SLCSTAT_ERR
```

```
          FLT extended info same as 2152

2193      SLC_DMA_TEST_SLCSTAT_ERR
           FLT extended info same as 2152

2194      SLC_DMA_UNEXP_SLC_SIZE

2195      SLC_DMA_SETUP_DATA_ERR
           FLT extended info same as 2157

2196      SLC_DMA_TEST_DATA_ERR
           FLT extended info same as 2157

21F0      SLC_INIT

Code        Name                          Meaning
3000      ROM_XSUM                  checksuming the FEPROM
3001      PDH_CNTRL                 PDH_CONTROL_REGISTER
3002      SCR_SELFTEST              Scratch RAM under test
3003      SS_ERROR                  Error reading Stable
Storage
3004      ERR_WRITING_EEPROM        Error writing to the
EEPROM
3005      EEPROM_WRITE_LIMIT        Write limit exceeded
3006      ERR_READING_EEPROM        Error reading EEPROM
3006      FATAL_ERR_READING_EEPROM  Fatal error reading
EEPROM
3007      INVOKE_LDB                Entering LDB
3008      BAD_SYS_BRD_BYTE          Invalid
SYSTEM_BOARD_BYTE
3009      BAD_SYS_MODE_BYTE         Invalid
SYSTEM_MODE_BYTE
300A      BAD_SYS_MFG_TEST_BYTE     Invalid
SYSTEM_MFG_TEST_BYTE
300B      PDH_IO_CNTRL
301A      HVERSION_MISMATCH         Stable Store value <>
calculated value
301B      MODEL_STRING              Model String check
301C      SW_ID                     Check Software ID
30BC      CPU_CLOCKS                Sets clock speeds
30C4      CLEARING_EEPROM           Clearing and revalidat-
ing EEPROM
30CD      CHECK_DEFAULTS            Checking Stable Store
is valid
30D4      DEFAULTING_EEPROM2        Setting EEPROM2 de-
faults
30F4      EEPROM_BOOT_LIMIT         Number of boots exceed-
ed 95,000
30FC      BAD_PROC_BD_ID            Bad processor board ID
or backplane or combo
30FD      BAD_SYS_BD_ID             Bad System Board ID
30FF      FAN_FAILURE               Failure of one or more
fans

Code        Name                          Meaning
4x00      STARTING_LST              Starting Late Selftest
4x01      LST_SKIPPED               Skipping Late Selftest
4x0E      EXITING_LST               Exiting Late Selftest
4x10      CACHE_PM_BYTE             PM cache byte selftest
4x20-4x27 CACHE_BYTE                Cache byte selftest
4x30      CACHE_PM_FLUSH            PM cache flush selftest
4x40-4x47 CACHE_FLUSH               Cache flush selftest
4x50-4x56 ICACHE_MISS               Icache miss selftest
4x60-4x69 DCACHE_MISS               Dcache miss selftest
4x70-4x71 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
5xy7      DIR_ERROR               Runway Directed Error
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
504F      BUS_PMAE_HPMC           memory access error
(unconfigured mem space)
505F      US_PIOAE_HPMC           proc transaction to IO
timed out
506F      BUS_DMDP_HPMC           data parity detected
on GSC from L2 slave
507F      BUS_PMDP                data parity detected
on GSC from L2 master
58C0      GENERAL_PCI_HPMC        {Dino/PCI} bus error
detected
5xyF      TLB_FAULT               U2 TLB fault or in-
valid PDIR entry

Code      Name                           Meaning
7000      MEM_HPMC_ERR            HPMC in memory system
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 error
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 compare
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
```

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7406        HPMC_SLC_ACCESS_ERR
7407        HPMC_SLC_TAG_ERR 7500      NO_RAM_FOUND
7501        GOOD_MEM_FAILED          Not enough good memory
to run OS
7502        BCH_MEM_FAILED           Not enough good memory
to run BCH
7604        BAD_MCT_MEM_TEST_STATUS No bits set in Test
Status
7701        USING_ALT_CONFIG         Using Alternate memory
config
7702        MEMORY_INIT_ONLY         Memory not tested, ini-
tialized only
7703        SIM_LOADING_WARNING
7704        RAM_BUS_WARNING
7705        GOOD_MEM_GOOFY           GOOD_MEM > memory size
770F        SMC_REV_1_WARNING        REV 1 SMC search rou-
tine 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

Code        Name                           Meaning
7C00        MIOC_ERR_NML_HPMC_ERR
             FLT extended info same as 2161

7C01        MIOC_ERR_MEM_NO_HPMC_ERR

7C02        MIOC_ERR_NML_RD_CHK_ERR
             FLT extended info same as 2167

7C03        MIOC_ERR_NML_DATA_ERR
             FLT extended info same as 2167

7C04        MIOC_ERR_MEM_RD_CHK_ERR
             FLT extended info same as 2167

7C05        MIOC_ERR_MEM_MIOCSTAT_ERR
             FLT extended info same as 2170

7C06        MIOC_ERR_MEM_EWORD0_ERR
             FLT extended info same as 2172

7C07        MIOC_ERR_MEM_EWORD1_ERR
             FLT extended info same as 2173

7C08        MIOC_ERR_MEM_ERRADDR_ERR
             FLT extended info same as 2176

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 error
7D09        HPMC_SINGLE_BIT_ERROR    Single-bit memory error
7D0A        HPMC_BAD_ADDR            Address did not map to
bank
7Fww        MEM_FRU_ID               ww = SIMM number from
the following list:
                                        0A 0B 1A 1B 2A
2B 3A 3B

        Memory FLT extended info 7XXX (one of the
above error chassis codes)
                                    MEM_FRU_ID
                                    Address in er-
ror[0:15]
                                    Address in er-
ror[16:31]
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                                          Expected data[0:15]
                                          Expected data[16:31]
                                          Actual data[0:15]
                                          Actual data[16:31]
7FFF       CATASTROPHIC_MEM_ERR

Code          Name                           Meaning
8000-8004 GECKOBOA_REG
802B      IO_BUS_OVERLAP          Most likely graphics
on core and carrier
803D      TOO_MANY_GRAPHICS       Graphics cards space
overlap
80F3      ERR_READING_IODC_BYTES  PDC_IODC failed to re-
trieve header info
80F4      ERR_READING_EINIT       PDC_IODC failed to re-
turn entry_init
80F5      ERR_EXEC_EINIT          Error executing
entry_init
80F6      ERR_READING_EIO         PDC_IODC failed to re-
turn 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 re-
turn entry_test
80FA      ERR_EXEC_ETEST          Error executing
ENTRY_TEST
80FC      INVALID_DEVICE          Probably internal PDC
structure error
811A      HOT_SWAP_RETRY

Code          Name                           Meaning
8400      LASI_TEST               Begin LASI tests, on
an "arbitrary" GSC bus
8404      LASI_RS232
8405      LASI_SCSI
8406      LASI_LAN
8407      LASI_KYBD

Code          Name                           Meaning
8410      LASI_TEST               Begin LASI tests on
the (sole) GSC bus, #1
8414      LASI_RS232
8415      LASI_SCSI
8416      LASI_LAN
8417      LASI_KYBD

Code          Name                           Meaning
84FF      FLT_NO_LASI             No LASI present
8500      WAX_EISA_MAP
8501      WAX_EISA_ID
8FFF      LATE_ST_FLT             Late Monarch selftest
failure (I/O)

Code          Name                           Meaning
8w00      ERR_IOA_RAM_TEST        w = IOA; 8 = IOA0, A =
IOA1
8w01      ERR_IOA_TLB_TEST        w = IOA; 8 = IOA0, A =
IOA1
8w02      ERR_IOA_DMA_TEST        w = IOA; 8 = IOA0, A =
IOA1
8xyA      HOT_SWAP_RETRY          Hot Swap retry due to
spin up time
8xyA      GECKOBOA_NIO_0120
8xyB      GECKOBOA_NIO_0125

For the following section of PCI-related chassis codes:
          The "0" (in codes of the form 8C0y) may be re-
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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 er-
ror
8C09    PCI_MEM_MANAGER_ERR     Memory manager error
8C0A    PCI_MEM_TYPE_ERR        Dev wanted mem below
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     Raven interrupt kludge
for flawed labproto BP

For the following section of PCI-related chassis codes:
          The "1" is the GSC bus number that DINO is at-
tached to.
Code         Name                        Meaning
8C10    INIT_PCI                DINO tests & PCI init
begins
8C11    TEST_PCI_COMPLETE       DINO tests completed
8C12    INIT_PCI_COMPLETE       PCI init finished for
DINO
8C13    PCI_NOT_FOUND           No DINO's found on GSC
bus
8C14    PCI_TEST_ERR            A DINO test failed

8CCC    OLD_PARISC_CODE_TYPE    Need to get a new STI
ROM rev in PCI graphics

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

Code         Name                        Meaning
A088    NO_BOOT_NO_CONS         No console, unable to
boot
A008    NO_BOOT_SELECTION       No bootable device
found
A00F    RETRIEVE_PATH_FAILED
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_WARNING Program GSC slot off-
sets to proper values
C200    RAM_CONFIG              Starting memory config-
uration
C201    BEG_DESTR_MEM_INIT      Starting detructive
memory test
C202    BEG_NONDESTR_MEM_INIT   Starting non-destruc-
tive 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
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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
C2C3      MIOC_ERR                  Starting MIOC error
test
C2E0      MEM_STUFF_DONE
C300      MONARCH_TEST              Monarch is executing
extended s
C3FF      LATE_MONARCH_TEST         Monarch has finished
extended selftests
C400      GET_SS_CONS               Retrieving the SS con-
sole path
C40A      GET_SPECIAL_CONS          Retrieving special con-
sole path
C440      INIT_SS_CONS              Initializing the SS
console path
C44A      INIT_SPECIAL_CONS         Initializing the spe-
cial console path
C4CC      INIT_CCP                  Initialize Close Con-
sole
C4CD      NO_CCP                    Close Console not found
C4CF      CCP_FOUND                 Found the Close Console
C500      GET_PRI_PATH              Retrieving the primary
boot path
C540      INIT_PRI_PATH             Initializing the prima-
ry 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 read-
ing IPL
C5F1      BAD_IPL_ADDR_PRI          LIF address is zero or
not 2K byte aligned
C5F2      BAD_LIF_MAGIC_PRI         LIF file not present
on media
C5F3      BAD_IPL_SIZE_PRI          LIF file is zero, not
n*2K bytes, or > 256Kb
C5F4      BAD_IPL_ENTRY_PRI         LIF entry point 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
the primary boot device
C600      GET_DEFAULT_CONS          Retrieving default con-
sole path
C601      GET_GRAPHICS_CONS
C602      GET_KEYBOARD_CONS
C640      INIT_DEFAULT_CONS         Initialize default con-
sole path
C641      INIT_GRAPHICS_CONS
C642      INIT_KEYBOARD_CONS
C64F      RESET_MONITOR_TYPE        retrying bad monitor
type
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
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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 the other
boot path
C750      TEST_OTHR_PATH         Execute ENTRY_TEST for
other boot path
C780      LOAD_IPL_OTHR_PATH     Loading IPL from non-
primary boot path
C7F0      OTHR_IPL_FAULT_        An error occurred read-
ing IPL
C7F1      BAD_IPL_ADDR_OTHR      LIF address is zero or
not 2K byte aligned
C7F2      BAD_LIF_MAGIC_OTHR     LIF file not present
on media
C7F3      BAD_IPL_SIZE_OTHR      LIF file is zero, not
n*2K bytes, or > 256Kb
C7F4      BAD_IPL_ENTRY_OTHR     LIF entry point not
word aligned or >= size
C7F8      BAD_IPL_CHKSUM_OTHR    The arithmetic sum of
the words in IPL <> 0
C7FF      LAUNCH_IPL_OTHR        Branching to IPL from
non-primary boot device
CB00      TOC_INITIATED          TOC handling initiated
CB01      NO_OS_TOC              No OS_TOC vector
CB02      BAD_OS_TOC_ADDRESS     Invalid OS_TOC vector
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 entered
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 initiated
CB15      ULPMC                  Runway LPMC error
CB19      LPMC_SEED_IVA          Seed Error LPMC entered
CB1B      BR_TO_OS_LPMC          Branching to OS_LPMC
handler
CB1F      OS_LPMC_FAILED         Branch to OS_LPMC re-
turned
CB99      SEED_IVA_HANDLER       PDC_SEED_ERROR iva ta-
ble HPMC hndlr entered
CB9A      HPMC_OVERWRITE         HPMC PIM overwritten
CBF0      HPMC_INITIATED         HPMC handling initiated
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 completed
CBF9      BC_NOT_CONFIGURED      PDC IO found BC in un-
configured 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 rea-
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CBFE      HPMC_DURING_TOC          HPMC interrupted a TOC
CBFF      MULTIPLE_HPMCS           Nested HPMC occurred
CC0x      OS_RENDEZVOUS CC1x       EARLY_CPU_RENDEZVOUS
CC2x      CPU_RENDEZVOUS CC3x       CACHE_CPU_RENDEZVOUS
CC4x      MEM_CPU_RENDEZVOUS

Code        Name                         Meaning
CD00      INITIALIZE_IO            Beginning IO bus walk
CD08      IOA0_INIT                Init GSC bus

For the following section of chassis codes:
          The "1" (in codes of the form CD1x) refers to
the (sole) GSC bus, #1
          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      DINO                     Dino GSC to PCI bus
bridge
CD11      SLOT1                    Bluefish (or ATM or
??) card in GSC slot 1
CD12      SLOT2                    Bluefish (or ATM or
??) card in GSC slot 2
CD13      ZALON                    Builtin FWSCSI inter-
face
CD14      OFFSET4                  (No hardware expected
at GSC offset 4)
CD15      OFFSET5                  (No hardware expected
at GSC offset 5)
CD1A      F4_GRAPHICS              GSC graphics in slot
2, HPA 0xF4000000
CD1B      FA_GRAPHICS              GSC graphics in slot
1, HPA 0xFA000000
CD1C      F8_GRAPHICS              Possibly built-in
graphics
CD1C      F8_GRAPHICS              Possibly GSC head 2,
slot 1, HPA 0xF8000000
CD1D      F6_GRAPHICS              Possibly built-in
graphics
CD1D      F6_GRAPHICS              Possibly GSC head 2,
slot 2, HPA 0xF6000000
CD1E      WAX initialization       (Expected in EISA-capa-
ble system only)
CD1F      LASI initialization

Code        Name                            Meaning
CDE0      INIT_EISA_COMPLETE       (Expected in EISA-capa-
ble system only)
CDE1      EISA_SLOT_INIT           (Expected in EISA-capa-
ble system only)
CDEA      INIT_EISA                (Expected in EISA-capa-
ble system only)
CDEB      EISA_CHECKING_FOR_CARDS (Expected in EISA-capa-
ble system only)
CDEC      EISA_NO_CFG_DATA         (Expected in EISA-capa-
ble system only)
CDED      EISA_CFGID_NE_CARDID     (Expected in EISA-capa-
ble system only)
CDEE      EISA_CARD_INIT_ERROR     (Expected in EISA-capa-
ble system only)
CDEF      NO_EISA_FOUND            (Expected in EISA-capa-
ble system only)
CDFF      INIT_SYSTEM_MAP_TABLE    Building the system
map table
```

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

For information on the enhanced online diagnostics, see the *Precision Architecture RISC HP 9000 Series 700 Diagnostics Manual.*

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

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

> **# cstm**

2 The following message appears:

```
Support Tool Manager  Version A.01.00
Type 'help' for a list of available com-
mands:
CSTM>
```

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

> **CSTM> verify all**

Messages similar to the following appear:

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

4 Press <u>Enter</u> to return to the CTSM> after all test results are reported.

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

> **CTSM> 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.

Dealing with HPMC (Uncorrectable Error)

The power-on sequence follows this path:

Power-on -> Selftest -> Console Path -> Boot Admin Mode -> Boot Path -> ISL Mode -> HP-UX Mode

When the hardware detects an unrecoverable (HPMC) error in the HP-UX environment, an error message, referred to as an HP-UX Kernal Tombstone is displayed on the monitor. The state of the system is written to main memory and the entire contents of main memory is dumped (written) to the swap area on the system disk.

HPMC error information is logged into Stable Storage; this information is referred to as PIM (Processor Internal Memory). The HPMC error information is available from the Boot Administration environment using the **PIM_INFO** command.

To identify the failed FRU(s) after an HPMC, follow these steps:

1 Examine the first line of the data returned from a PIM_INFO command to display the latest error information from the last TOC, LPMC, or HPMC interruption detected.

2 Compare the values from the PIM_INFO command with those shown in Table 8 and take the appropriate action.

Table 8   **PIM_INFO Action Table**

Check Type Word	Cache Check Word	Bus Check Word	System Responder Word	Action * See Note 1
0x80000000	0x40000000	N/A	N/A	See Note 2
0x20000000	N/A	0x00210003	0x00000000 0xEFFFFFFF	Replace SIMM
0x20000000	N/A	0x00310007	0xF0000000 0xF7FFFFFF	Replace CPU board
0x20000000	N/A	0x00310007	0xF8000000 0xFBFFFFFF	Replace Optional Graphics Card in EISA slot
0x20000000	N/A	0x00310007	0xFC000000 0xFFBFDFFF	See Note 3
0x20000000	N/A	0x00310007	0xFFFBE000 0xFFFBEFFF	See Note 2
0x20000000	N/A	0x00310007	0xFFFBF000 0xFFFFFFFFF	Replace CPU board
Note 1	When more than one failed FRU is identified, run the appropriate diagnostics to isolate the failed FRU.			
Note 2	Replace the CPU board. See "HPMC Caused by a Data Cache Parity Error" on page 90. for more information			
Note 3	There are two possible sources of failure. First, replace the EISA controller. If the error occurs again, replace the CPU board.			

HPMC Caused by a Multi-Bit Memory Parity Error

An HPMC interruption is forced when a multi-bit memory parity error is detected during a "DMA read" operation of fetching an I/D cache line (32 bytes).

Table 9 shows an example of the HPMC error information retrieved from Stable Storage by the PIM_INFO command during the Boot Administration environment.

Table 9   **Multi-Bit Memory Parity Error**

Word	Value
Check Type	0x20000000
CPU State	0x9e000004
Cache Check	0x00000000
TLB check	0x00000000
Bus Check	0x00210004
Assists Check	0x00000000
Assists State	0x00000000
System Responder Address	0x00nnnnnn
System Requester Address	0x00000000
System Controller Status	0x00000nnn

Interpreting the Table

The values in the Bus Check and System Responder Address words indicate that a multi-bit memory parity error was detected by logic in the memory module. Ignore the value in the System Controller Status word.

The System Responder contains the SPA of the faulty SIMM pair. To determine the pair, you need to know the following:

- The SIMM pair sizes and their locations (for example, 16 MB SIMMs in Pair 1 and 8 MB SIMMs in Pair 0)

- The total memory size in HEX

Determining the Faulty SIMM Pair

The address given by the System Responder Address is contiguous, even though empty slots are permitted. Memory boards are installed in pairs of the same memory capacity. The operating system starts mapping memory at Pair 3, if it exists. In other words, it maps starting with the highest numbered pair through to the Pair 0. To determine the faulty pair of SIMMs, perform the following steps.

1   Using Table 10, determine the HEX value address range for each SIMM pair in the system.

Table 10   **Memory Address Ranges**

Pair (3 thru 0)	Memory Size (MB)	Address Range
_____	0-8	0x00000000 - 0x007FFFFF
_____	8-16	0x00800000 - 0x00FFFFFF
_____	16-24	0x01000000 - 0x017FFFFF
_____	24-32	0x01800000 - 0x01FFFFFF
_____	32-40	0x02000000 - 0x027FFFFF
_____	40-48	0x02800000 - 0x02FFFFFF
_____	48-56	0x03000000 - 0x037FFFFF
_____	56-64	0x38000000 - 0x03FFFFFF
_____	64-72	0x04000000 - 0x047FFFFF
_____	72-80	0,048000000 - 0x04FFFFFF
_____	80-88	0x05000000 - 0x057FFFFF
_____	88-96	0x05800000 - 0x05FFFFFF
_____	96-104	0x06000000 - 0x067FFFFF

Table 10   **Memory Address Ranges**

Pair (3 thru 0)	Memory Size (MB)	Address Range
_____	104-112	0x06800000 - 0x06FFFFFF
_____	112-120	0x07000000 - 0x077FFFFF
_____	120-128	0x07800000 - 0x07FFFFFF
_____	128-136	0x08000000 - 0x87FFFFFF
_____	136-144	0x08800000 - 0x08FFFFFF
_____	144-152	0x09000000 - 0x097FFFFF
_____	152-160	0x09800000 - 0x09FFFFFF
_____	160-168	0x0A000000 - 0x0A7FFFFF
_____	168-176	0x0A800000 - 0x0AFFFFFF
_____	176-184	0x0B000000 - 0x0B7FFFFF
_____	184-192	0x0B800000 - 0x0BFFFFFF
_____	192-208	0x0C000000 - 0x0CFFFFFF
_____	208-224	0x0D000000 - 0x0DFFFFFF
_____	224-240	0x0E000000 - 0x0EFFFFFF
_____	240-256	0x0F000000 - 0x0FFFFFFFF

For example, if the system configuration is:

Pair 3:   32 MB SIMMs = 64 MB total for pair

Pair 2:   16 MB SIMMs = 32 MB total for pair

Pair 1:   32 MB SIMMS = 64 MB total for pair

Pair 0:   8 MB SIMMs = 16 MB total for pair

The SIMM address ranges are:

Pair 3:   Addresses 0x00000000 - 0x03FFFFFF

Pair 2:   Addresses 0x04000000 - 0x05FFFFFF

Pair 1:   Addresses 0x06000000 - 0x09FFFFFF

Pair 0:   Addresses 0x0A000000 - 0x0AFFFFFF

Table 11   **Example Table**

	Pair (3 thru 0)	Memory Size (MB)	Address Range
	____3____	0-8	0x00000000 - 0x007FFFFF
	____3____	8-16	0x00800000 - 0x00FFFFFF
	____3____	16-24	0x01000000 - 0x017FFFFF
Pair 3 (32 MB SIMMs)	____3____	24-32	0x01800000 - 0x01FFFFFF
	____3____	32-40	0x02000000 - 0x027FFFFF
	____3____	40-48	0x02800000 - 0x02FFFFFF
	____3____	48-56	0x03000000 - 0x037FFFFF
	____3____	56-64	0x38000000 - 0x03FFFFFF
	____2____	64-72	0x04000000 - 0x047FFFFF
Pair 2 (32MB SIMMs)	____2____	72-80	0,048000000 - 0x04FFFFFF
	____2____	80-88	0x05000000 - 0x057FFFFF
	____2____	88-96	0x05800000 - 0x05FFFFFF

Table 11   **Example Table**

Pair (3 thru 0)	Memory Size (MB)	Address Range
____1____	96-104	0x06000000 - 0x067FFFFF
____1____	104-112	0x06800000 - 0x06FFFFFF
____1____	112-120	0x07000000 - 0x077FFFFF
____1____	120-128	0x07800000 - 0x07FFFFFF
____1____	128-136	0x08000000 - 0x87FFFFFF
____1____	136-144	0x08800000 - 0x08FFFFFF
____1____	144-152	0x09000000 - 0x097FFFFF
____1____	152-160	0x09800000 - 0x09FFFFFF
____0____	160-168	0x0A000000 - 0x0A7FFFFF
____0____	168-176	0x0A800000 - 0x0AFFFFFF
_____	176-184	0x0B000000 - 0x0B7FFFFF
_____	184-192	0x0B800000 - 0x0BFFFFFF
_____	192-208	0x0C000000 - 0x0CFFFFFF
_____	208-224	0x0D000000 - 0x0DFFFFFF
_____	224-240	0x0E000000 - 0x0EFFFFFF
_____	240-256	0x0F000000 - 0x0FFFFFFFF

Pair 1 (32 MB SIMMs)

Pair 0 (8 MB SIMMs)

2 Determine the SIMM pair that contains the System Responder Address (as shown using the PIM_INFO command) within its range. Evaluate the SIMM pairs as follows:

NOTICE: Addressing starts at Pair 3, not Pair 0.

A   If the System Responder Address (as shown using the PIM_INFO command) is between 0x000000 and 0x03FFFFFF:

Error in Pair 3

B   If the System Responder Address (as shown using the PIM_INFO command) is between 0x04000000 and 0x05FFFFFF:

Error in Pair 2

C   If the System Responder Address is between 0x06000000 and 0x09FFFFFF:

Error in Pair 1

D   If the System Responder Address is between 0x0A000000 and 0x0AFFFFFF:

Error in Pair 0

E   If the Responder Address is between 0x0B00000 and 0x0FFFFFFF:

Address Space Not Filled; (Probable) CPU board Failure

F   If the Responder Address is between 0x0100000 and 0x0EFFFFFF:

Invalid Address Space; (Probable) CPU board Failure

3   Without the actual failed bit number, the failed pair number is as close a determination as possible. To try to locate the faulty (individual) SIMM, reboot the system. Turn FASTBOOT OFF at the BOOT_ADMIN prompt, set FASTSIZE to ALL OF MEMORY (0F), and power cycle again.

If the (destructive) memory selftest locates the faulty SIMM, the corresponding Chassis Code is shown on the LEDs. Replace the faulty SIMM, otherwise, replace the

SIMM pair identified in this procedure. Return the system state (for example, FASTBOOT) to the original condition.

HPMC Caused by a Data Cache Parity Error

An HPMC interruption is forced when a data parity error is detected during a Load instruction to the memory address space or during a data cache flush operation.

Table 12 shows an example of the HPMC error information retrieved from Stable Storage by the PIM_INFO command during the Boot Administration environment.

Table 12   **Processor Module Error (Data Cache Parity)**

Word	Value
Check Type	0x80000000
CPU State	0x9e000004
Cache Check	0x40000000
TLB Check	0x00000000
Bus Check	0x00000000
Assists Check	0x00000000
Assists State	0x00000000
System Responder Address	0x00000000
System Requester Address	0x00000000
System Controller Status	0x00000nnn

The value in the CPU State word indicates that register values and addresses stored in Stable Storage at the time of the HPMC were saved.

The value on the Cache Check word identifies that logic in the processor module detected a (data) cache parity error. Ignore the value in the System Controller Status word.

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.

5

Field Replaceable Units

This chapter lists the B132L/B132L+/B160L/B180L 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 or T10 Torx driver.

- 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. Wait for the system to completely shutdown and power off before disconnecting the power cord.
	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 tightening 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.
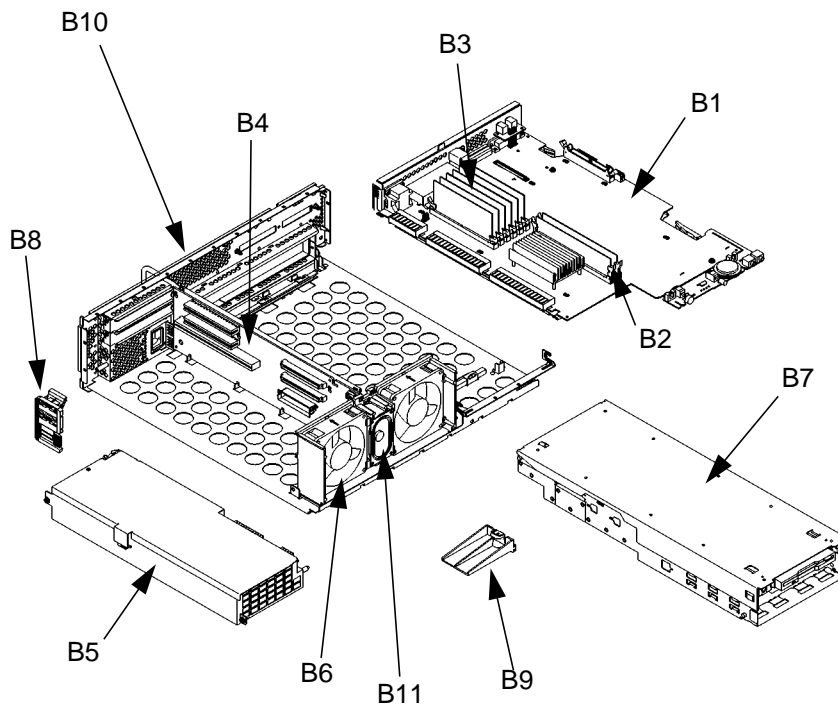
Figure 15 shows the major components of the system unit.
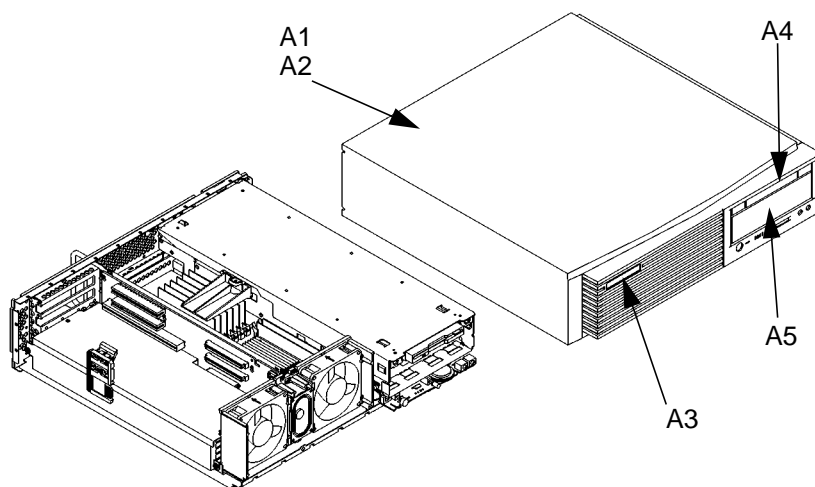
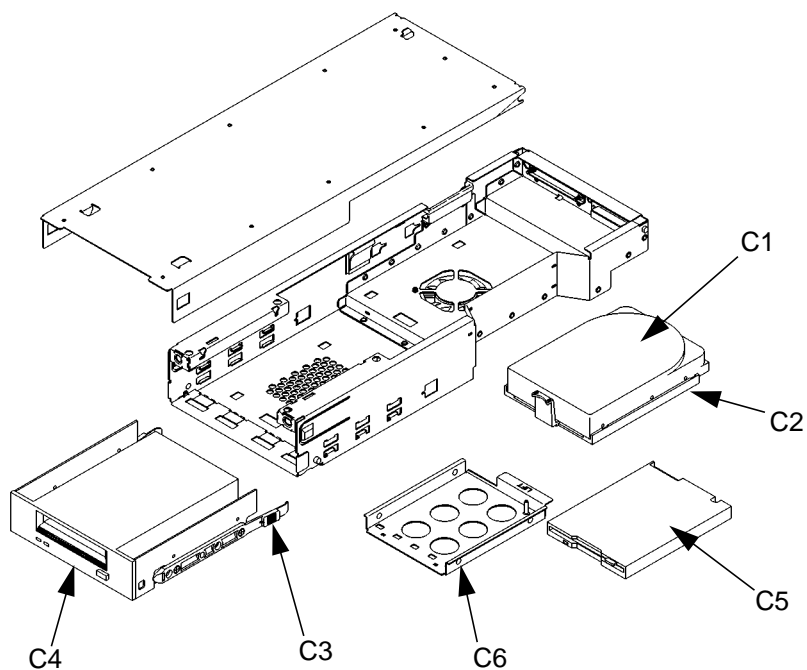**Figure 15**   **B132L/B132L+/B160L/B180L Major Components**

Figure 16 shows the Main Tray FRUs for the B132L/
B132L+/B160L/B180L workstation. The numbers
correspond to item numbers in Table 13 and Table 14.

Figure 16   Main Tray FRUs

Figure 17 shows the Storage Tray FRUs for the
B132L/B132L+/B160L/B180L workstation. The
numbers correspond to item numbers in Table 13 and
Table 14.

Figure 17   **Storage Tray FRUs**

Table 13 lists the exchange parts, and Table 14 lists the
nonexchange parts in the B132L/B132L+/B160L/
B180L workstation.

Table 13 **Exchange Parts FRU List**

Figure Number	Part Number	Description
B1	A4190-69028 A4190-69013 A4190-69016 A4190-69032	180 MHz CPU Assy 132 MHz CPU Assy 160 MHz CPU Assy 132 MHz CPU/New I/O Assy
C1	A1658-69009 A2084-69016 A1658-69010 A1658-69020 A4081-69003 A1658-69021 A4218-69016 A1658-69022	2 GB SE SCSI Disk 2 GB FW SCSI Disk 2 GB W/Diff SCSI2 Disk 2 GB Ultra Wide SE disk 4 GB W/Diff SCSI2 Disk 4 GB Ultra Wide SE disk 9 GB W/Diff SCSI2 Disk 9 GB Ultra Wide SE disk
C4	C1536-69201 C1539-69201 C1537-69201	DDS1 Tape Drive DDS2 Tape Drive DDS3 Tape Drive
C4	A1648-60015 A1658-60019	CD-ROM Drive 12X CD-ROM-Flint Gray
B2	A4200-69040 A4200-69045	512KB CACHE-83 MHZ 512KB CACHE-100 MHZ
B3	A2579-69001 A2580-69001 A1236-69001 A3828-69001 A3829-69001 A3830-69001	16 MByte SIMM 64 MByte SIMM 2x32 MByte DIMM 32 MByte EDO DIMM 64 MByte EDO DIMM 128 MByte EDO DIMM

Table 14   **Nonexchange Parts FRU List**

Figure Number	Part Number	Description
B4	A4190-66500 A4190-66523	PCI Backplane PCI -5V/EISA Backplane
B5	0950-3021	Power Supply
Not Shown	A4190-66501	Fast Wide SCSI PCA
Not Shown	A4190-61601	Single-Ended SCSI Cable
Not Shown	A4190-61602	Fast-Wide SCSI Cable
Not Shown	A4323-63001	Ultra-Wide SE SCSI Cable
C2	A4190-62020	Disk Drive Bracket
B6	A4190-62030	System Fan
Not Shown	A4190-62022	Disk Tray Fan/Power Cable
A5	A4190-62025	Disk Filler Panel
A1	A4190-62043	Chassis (includes Main Tray and Disk Tray)
B7	A4190-62048	Disk Tray Assembly (sheet metal only)
B8	A4190-62051	PCA Retainer Clip Assembly
Not Shown	A4190-40013	Tower Stand
A4	A4190-40018	Floppy Filler
B9	A4190-40023	Memory Retainer
C3	A4200-62914	Disk Ski Bracket (2 required)
	A4200-61607	CD Audio Cable

Table 14   **Nonexchange Parts FRU List**

Figure Number	Part Number	Description
Not Shown	A2263-40042	Rubber Foot
Not Shown	A4190-00049	Thumbscrew 6-32
A3	A4190-84009 A4578-84001 A4190-84010 A4190-84012	Model Number Plate B132 Model Number Plate B132L+ Model Number Plate B160L Model Number Plate B180L
Not Shown	A4190-61603	Floppy Cable
B11	A4081-62021	Speaker
C5	A4190-60010	Slim Line Floppy Drive
C6	A4190-62024	Floppy Carrier Assy
Not Shown	8120-6861	EVC Video Adapter Cable
Not Shown	A4452-66501	EG RAM Card
B6	A4190-40016	Fan Shroud
Not Shown	0624-0727	6-32 Disk/Pwr holding screw
Not Shown	5180-1344	SE SCSI Jackscrew
Not Shown	A1658-62016	SE SCSI Terminator
Not Shown	1252-4367	FW SCSI Jackscrew
Not Shown	A1658-62024	FW SCSI Terminator
Not Shown	A1658-62070	SE WIDE 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 power 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   When the system has completely shut down and powered off, 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   Disconnect any external cables from the connectors on the front and rear of the system unit.

5   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.

6   If installed, remove the floor stand as shown in Figure 18.
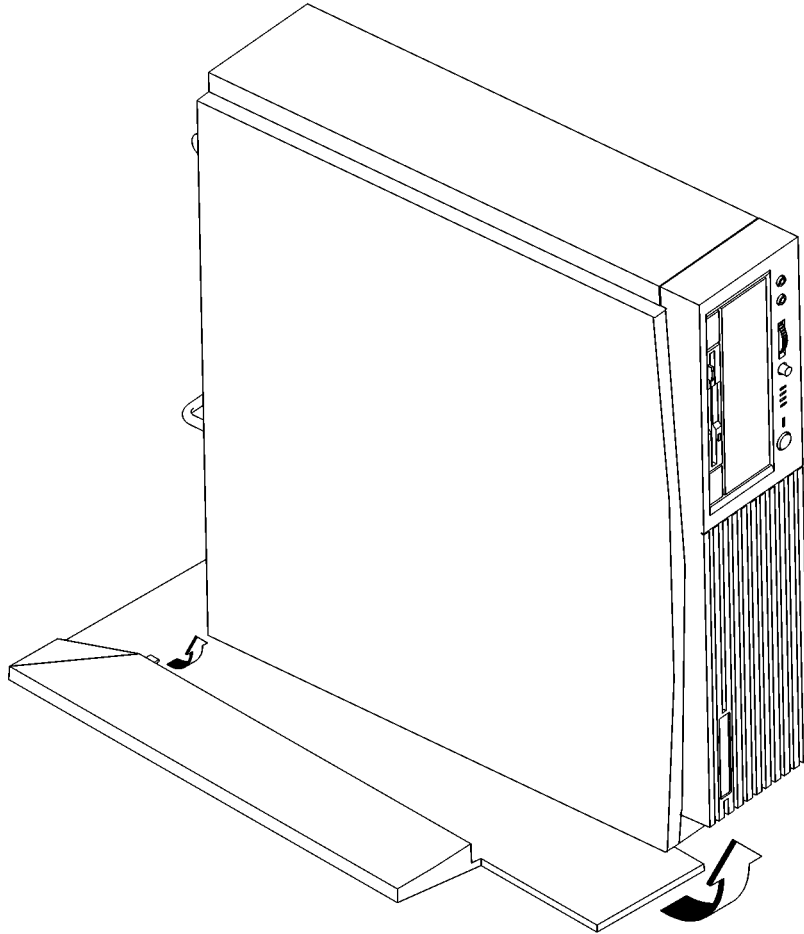
Figure 18 **Removing the Floor Stand**

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.

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

8 If installed, remove any locking device from the storage tray security tab on the rear of the system unit.

Main Tray Assembly

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

1 Completely loosen the four thumb screws on the rear of
the system unit, as shown in Figure 19.
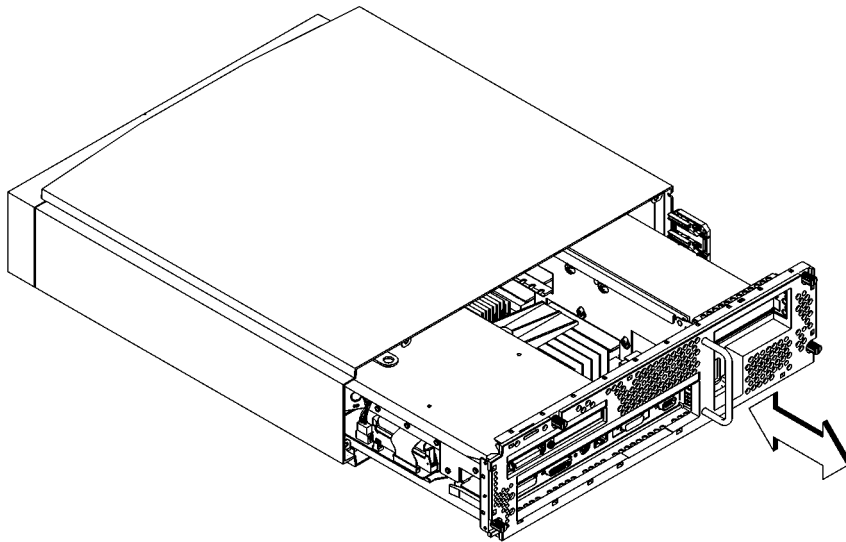
Figure 19   **Removing the Main Tray Assembly**

2 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 19.

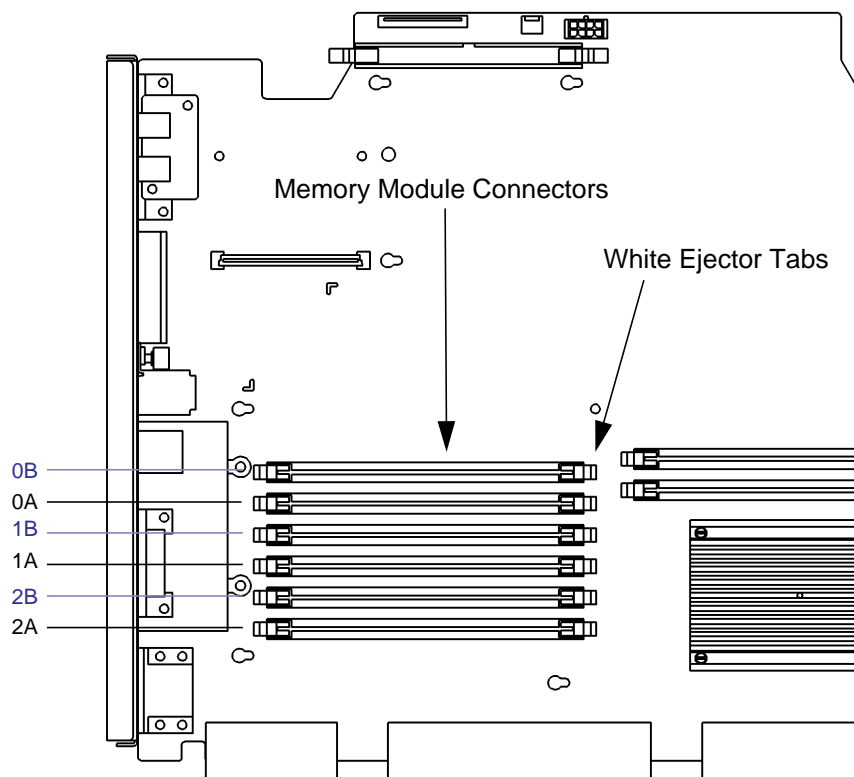**3** Slide the main tray assembly out of the chassis.

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.

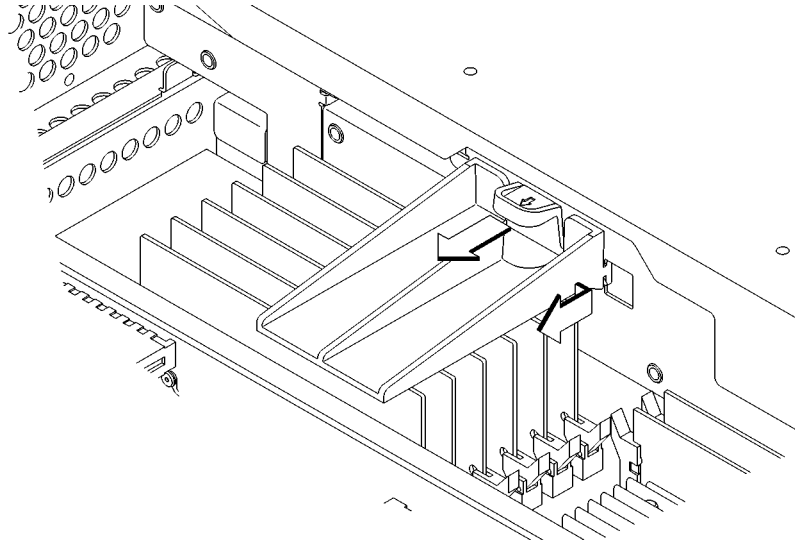Perform the following steps to remove memory modules:

1   Locate the memory modules on the CPU board, as shown in Figure 20.

Memory Module Connectors

White Ejector Tabs

0B
0A
1B
1A
2B
2A

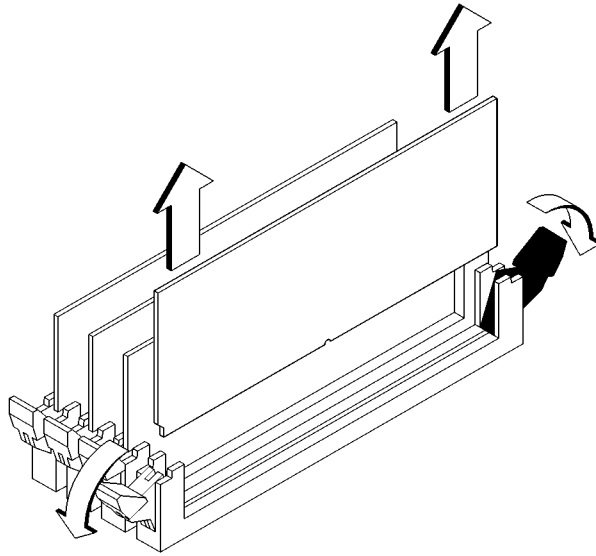**Figure 20**   **Memory Module Location**

2 Pull the tab on the memory retainer and slide it toward
the front of the main tray to remove it, as shown in
Figure 21

Figure 21   **Removing the Memory Retainer**

3 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 22 shows how to remove a memory module.

Figure 22   **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 Figure 23.
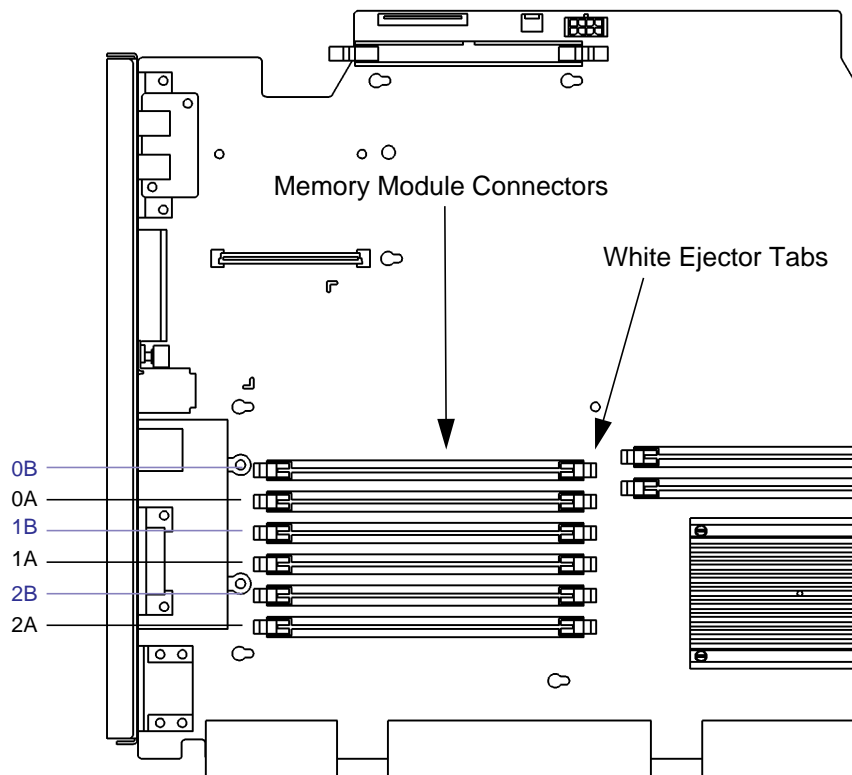
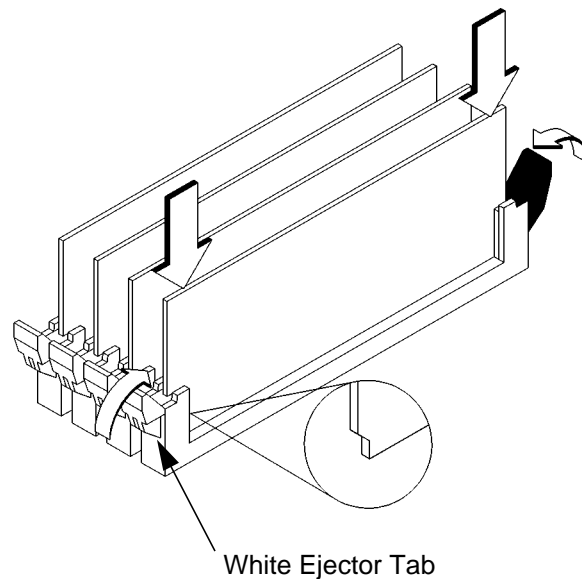**Figure 23**   **Memory Module Location**

2 Pull the tab on the memory retainer and slide it toward
the front of the main tray to remove it, as shown in
Figure 21
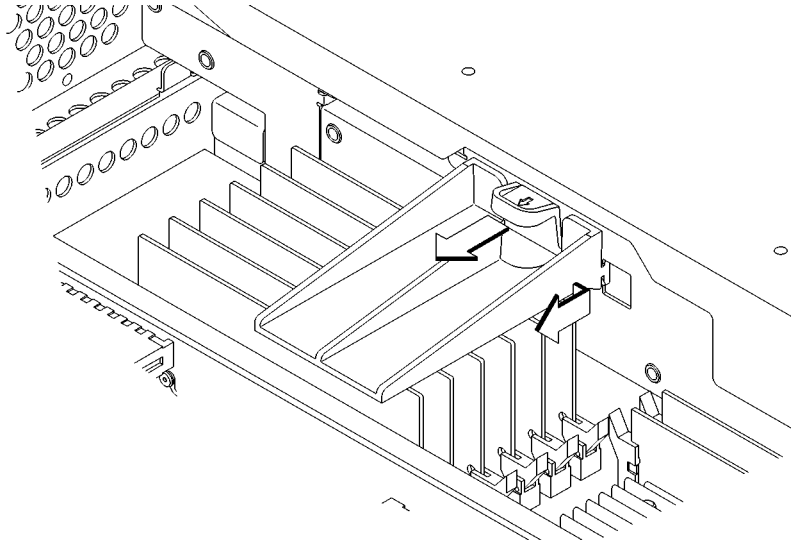
Figure 24   **Removing the Memory Retainer**

3 Close the ejector tabs on each side of the memory con-
nector to lessen the force required to seat the memory
module.

4   Line up the memory module with the guides making sure
     that the notched end of the memory module is toward the
     white ejector tabs (front of the main tray), as shown in
     Figure 25.

White Ejector Tab

Figure 25   **Installing Memory Modules**

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

6   To verify that this installation was successful, display the
     current memory information using the Boot Console In-
     terface.

     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).

Second Level Cache Boards

Before removing second level cache boards, remove
the main tray assembly.

1 Locate the cache board connectors on the CPU board, as
shown in Figure 26.

Cache Board Connectors
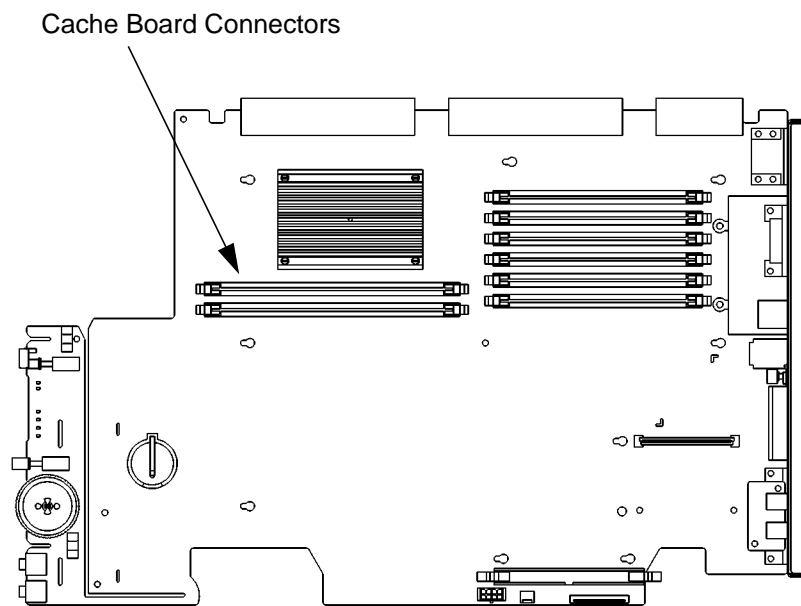
Figure 26   **Cache Boards Location**

2   To remove a second level cache board, swing the ejector
tabs on each side of the board out and away from the
board, as shown in Figure 27. Lift the board up and out
of the connector and place it on a static-free surface.
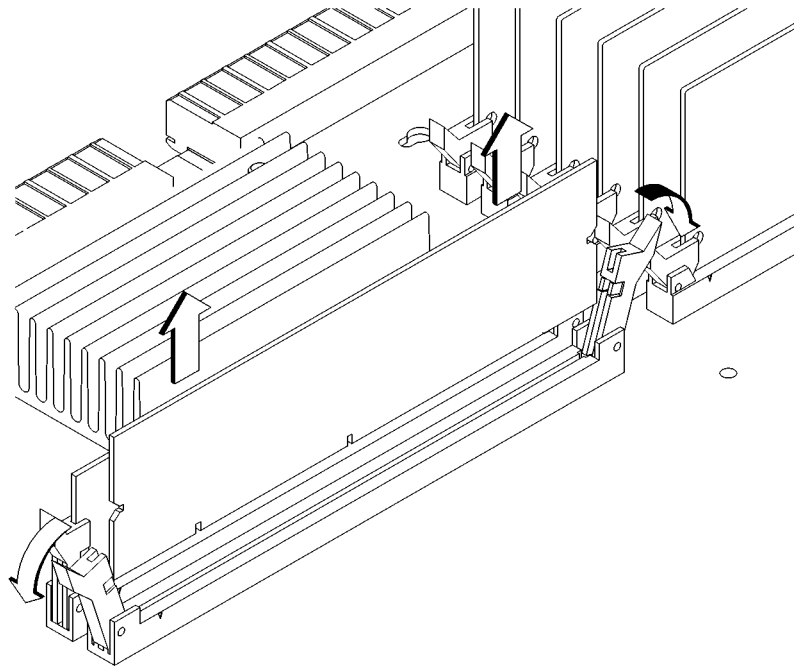
Figure 27   **Removing Second Level Cache Boards**

NOTICE: You must install cache boards in pairs of equal
size. When installing cache boards, line the cache
board up with the guides making sure that the
keying notches along the connector edge of the
board are away from the memory modules

Storage Tray Assembly

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

NOTICE: The Storage Tray Assembly does not have to be removed from the system unit to access a hard disk drive or the 3.5-inch floppy drive.

Perform the following steps to remove the storage tray assembly from the Main Tray:

1   Pull the tab on the memory retainer and slide it toward the front of the main tray to remove it, as shown in Figure 28
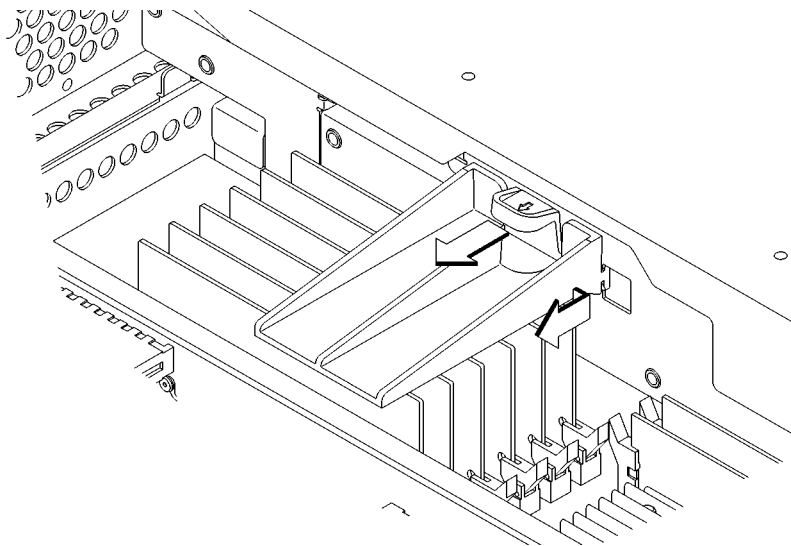
Figure 28   Removing the Memory Retainer

2 Remove the storage tray retaining screw, as shown in Figure 29.

3 Disconnect the cables from the system board and the backplane, as shown in Figure 29.

FWSCSI

Storage Tray
Power

SESCSI

CD Audio

Retaining Screw

Floppy Connector
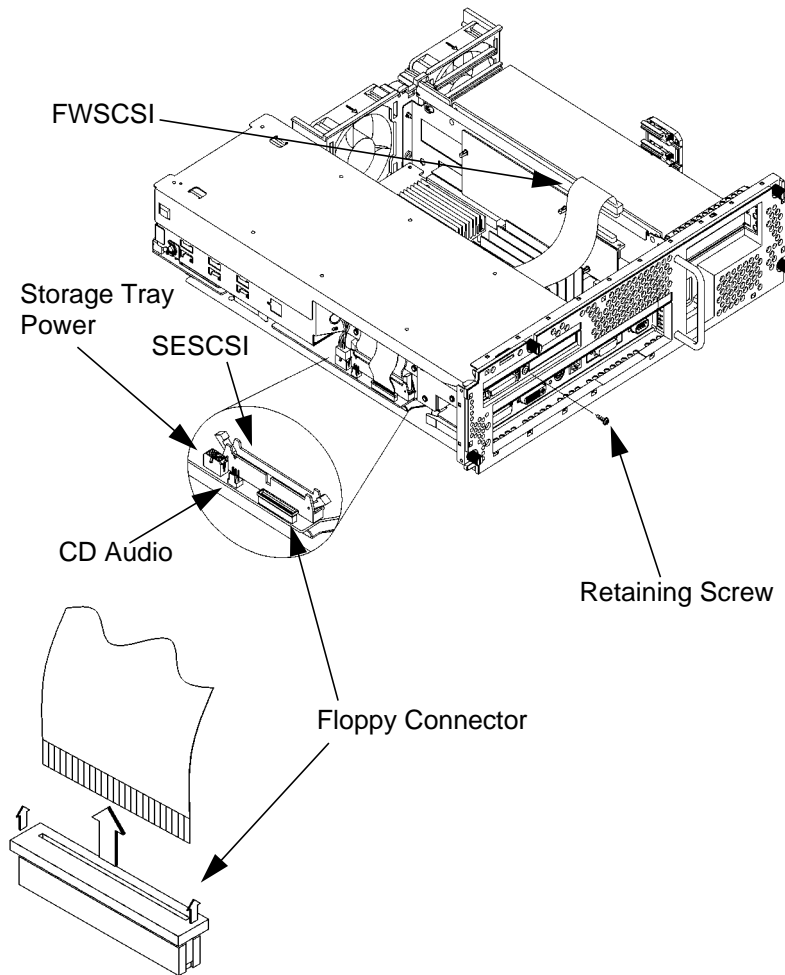
Figure 29 **Disconnecting the Storage Tray Assembly**

4 Hold the storage tray with both hands and slide it toward the front of the main tray approximately an inch, then lift it straight up to remove it.
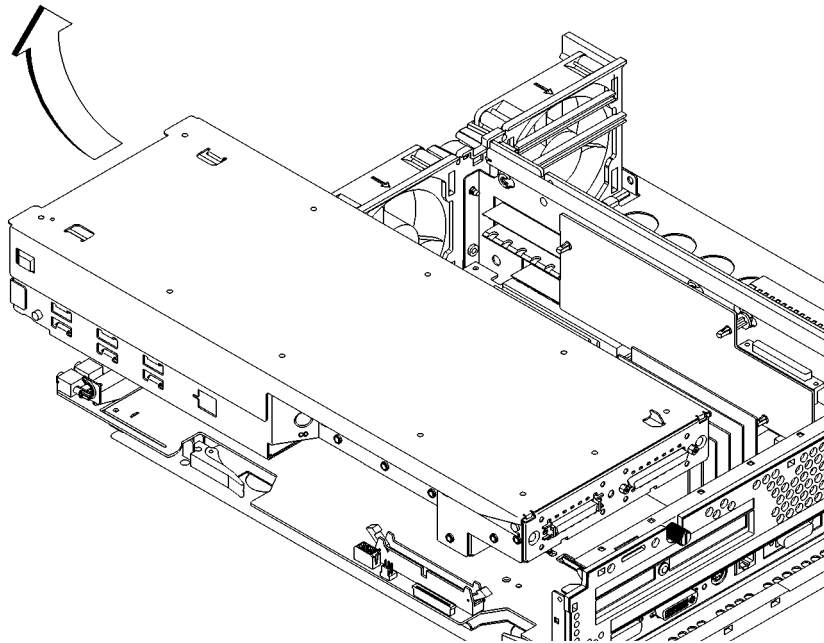
Figure 30 **Removing the Storage Tray Assembly**

NOTICE: When replacing the storage tray, use the following procedure:

a Align the pins on the backpanel of the main tray with the holes on the rear of the storage tray and slide the storage tray onto the pins. See Figure 30.

b Lower the front of the storage tray and move it slightly forward or backward to align the pins on its side with the slots on the main tray.

c Slide the storage tray towards the rear of the main tray until the pins are fully seated in the main tray slots.

d Replace and tighten the storage tray retaining screw.

Storage Tray Cover

To remove the storage tray cover press in the two cover locking tabs then lift the front end of the cover and slide it forward off of the pins in the rear, as shown in Figure 31.
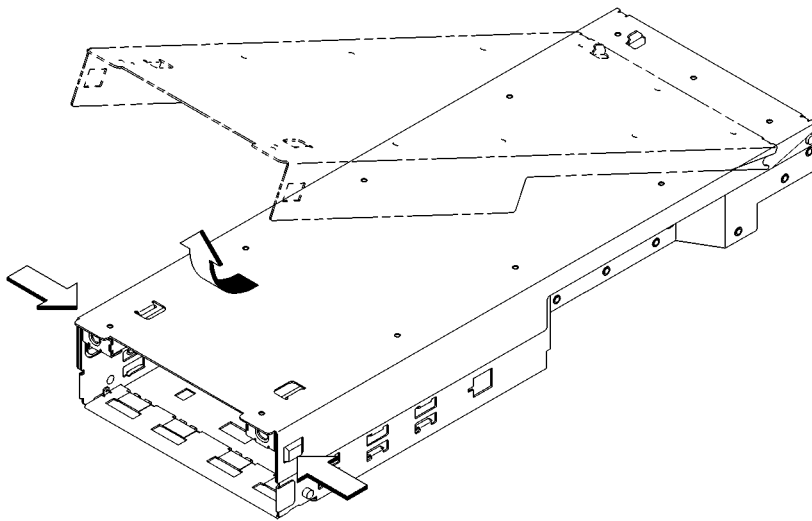
Figure 31   **Removing the Storage Tray Cover**

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 32.
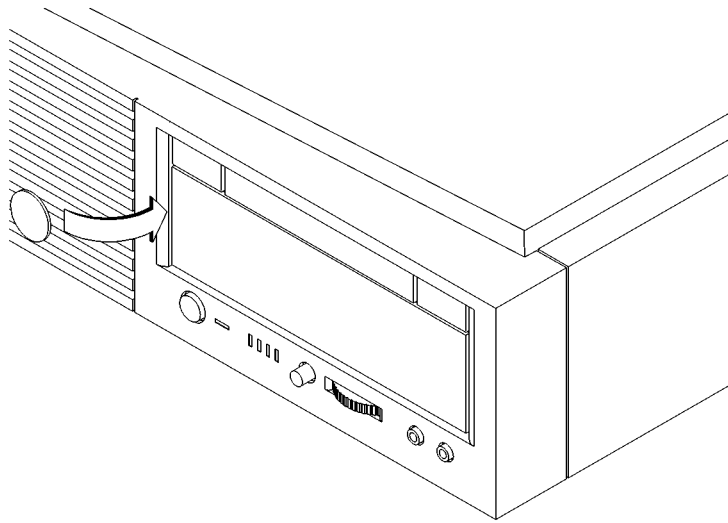
Figure 32   **Removing a Disk Filler Panel**

CD-ROM Drive or DDS Tape Drive

Before removing the CD-ROM drive or DDS Tape drive, perform the following procedures:

- Remove the Main Tray Assembly.
- Remove the Storage Tray Assembly.
- Remove the Storage Tray Cover.

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

Perform the following steps to remove a CD-ROM drive or DDS tape drive:

1 Push in the locking tabs on each side of the disk tray and slide the device out approximately two inches, as shown in Figure 33.
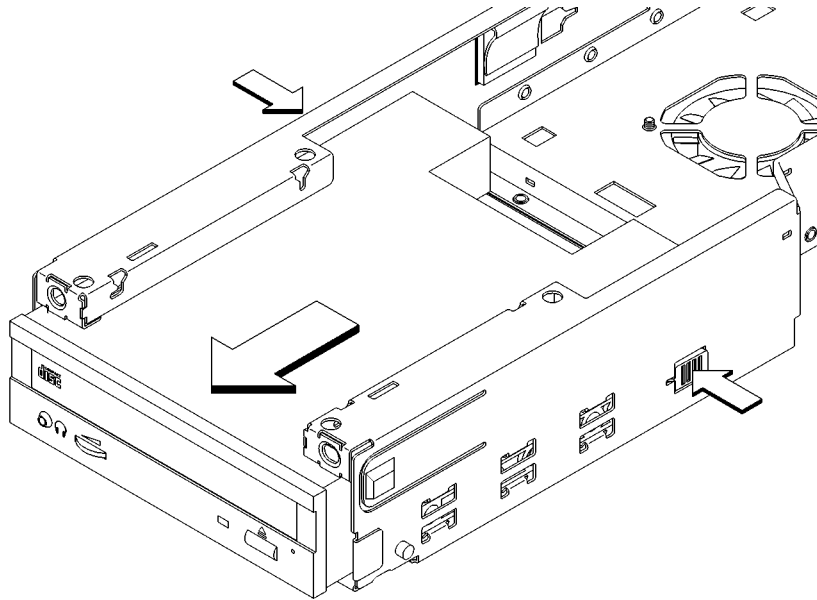
Figure 33   **Removing a CD-ROM Drive or DDS Tape Drive**

2 Disconnect the power and data cables from the device.

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

3.5-Inch Floppy Disk Drive

Perform the following procedures before removing a floppy disk drive:

- Remove the Main Tray Assembly from the system unit.

- Remove the Storage Tray Cover.

NOTICE: The Storage Tray Assembly does not have to be removed from the Main Tray to access a hard disk drive or the 3.5-inch floppy drive.

Refer to chapter 3 for supported storage tray configurations.

Perform the following steps to remove a floppy disk drive from the system unit:

1   Disconnect the cable from the floppy disk drive, as shown in Figure 34.
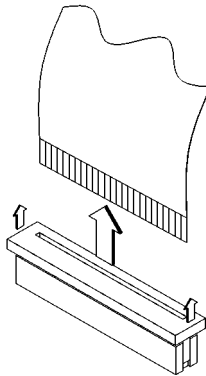
Figure 34   **Disconnecting the Floppy Drive Cable**

2 Lift the rear of the floppy disk carrier, push the carrier to-
ward the rear of the disk tray, then lift the front of the
floppy disk carrier from the Storage Tray, as shown in
Figure 35.
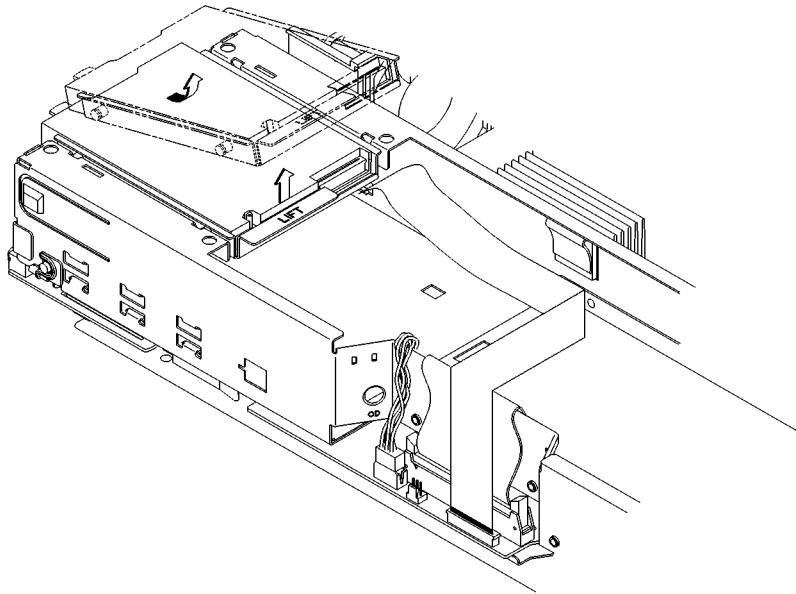
Figure 35   **Removing the Floppy Disk Carrier**

3 Lift the floppy drive straight up to remove it from the floppy carrier, as shown in Figure 36.
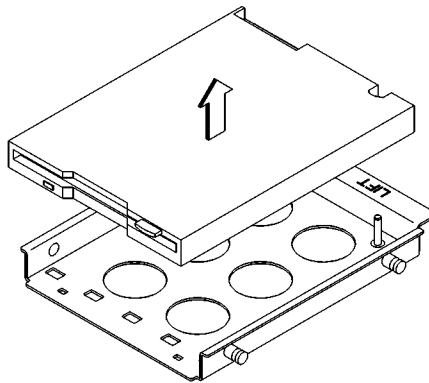
Figure 36   **Removing the Floppy Disk Drive**

NOTICE:

When replacing the floppy drive in the carrier, make sure to align the pin in the carrier with the hole in the floppy drive. See Figure 33.

When replacing the floppy carrier in the storage tray, set the mounting pins near the front of the storage tray in place first, then push the carrier toward the front of the storage tray slightly and set the rear mounting pins in place. Push down firmly on the rear of the carrier to ensure that the carrier is fully locked in place.

Hard Disk Drive

Perform the following procedures before removing a hard disk drive.

- Remove the Main Tray Assembly from the system unit.

- Remove the Storage Tray Cover.

- Remove the floppy disk drive if you are removing a hard disk drive in the front position of the Storage Tray.

NOTICE: The Storage Tray Assembly does not have to be removed from the Main Tray to access a hard disk drive in the rear position or the 3.5-inch floppy drive.

Refer to Chapter 3 for supported storage tray configurations.

Perform the following steps to remove a hard disk drive from the storage tray:

1 Disconnect the power and data cables from the disk drive.

2 Push the locking tab toward the drive and hold it there while simultaneously sliding the drive toward the front of the storage tray, as shown in Figure 37.
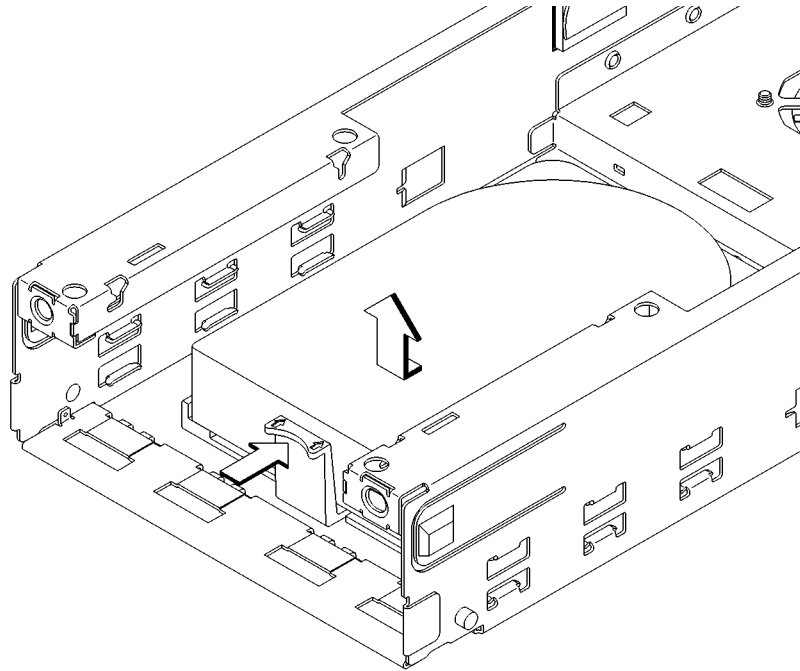
Figure 37   **Removing a Hard Disk Drive**

3 Lift the drive straight up to remove it from the Storage Tray.

Removing EISA, GSC, and PCI Option Boards

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

NOTE: Slot 1 supports GSC or PCI option boards; slot 2 supports
EISA, GSC, or PCI option boards.

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

1   Push in the locking tab and slide the option board support
    bracket toward the rear of the main tray to remove it, as
    shown in Figure 38.
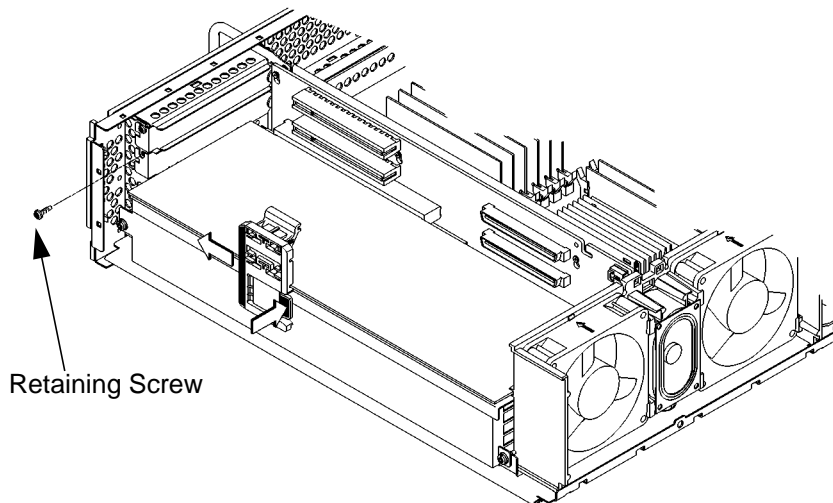
Retaining Screw

Figure 38   Removing an EISA, GSC, or PCI Option Board

2   Remove the option board retaining screw, as shown in
    Figure 38.

3   Grasp the option board by the edge with both hands and
    pull it straight out.

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

    a   Install a blank plate in the rear panel, as shown in Figure 39

    b   Perform Steps 2 through 1 in reverse order.
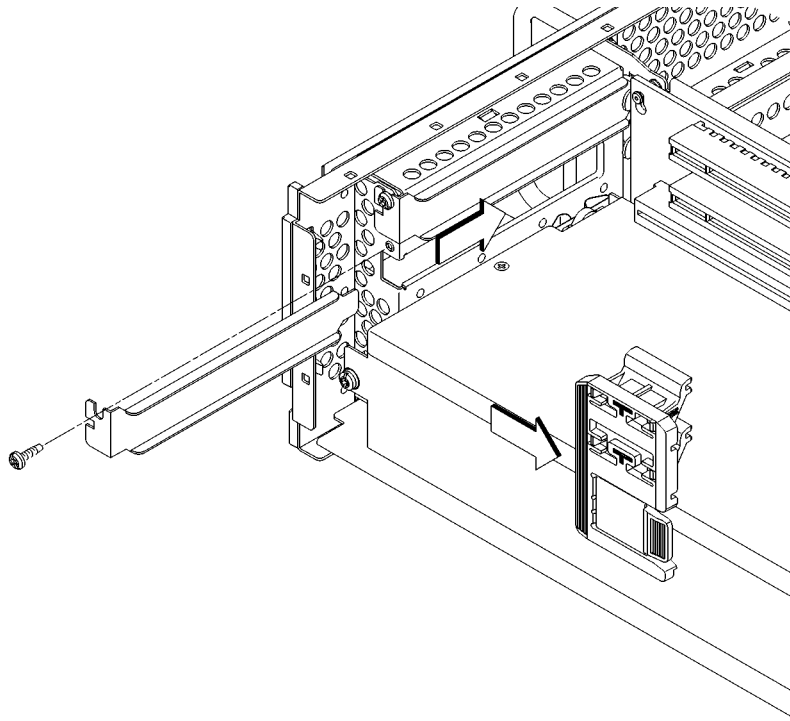
Figure 39   **Installing an Option Slot Blank Plate**

CPU Board Assembly

Before removing the CPU board assembly perform the following procedures:

- Remove the Main Tray Assembly from the system unit.

- Remove the Storage Tray Assembly from the Main Tray Assembly.

If you are replacing the original CPU board with a new one, refer to the section, "Determining LAN ID" below **before** removing the board.

Determining LAN ID

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
```

An alternative way to find the system's LAN ID is to use the following command at the information menu of the Boot Console Handler:

lanaddress

The "Station Address" represents the EtherLAN ID (ignore the "0x" in the number).

After you install the new CPU 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 _____-_____

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

Removing the CPU Board

Perform the following steps to remove the CPU board from the main tray:

1   Pull the two ejector handles at the same time, as shown in Figure 40.
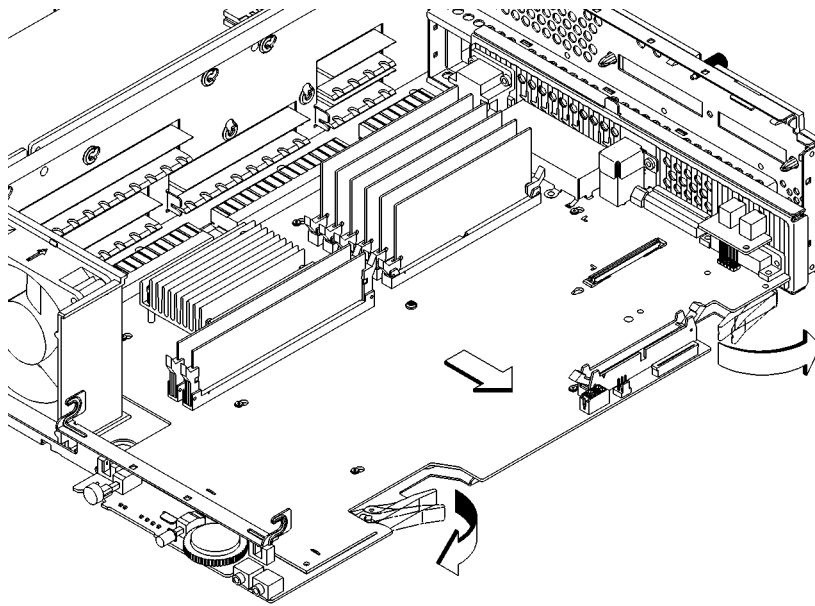
Figure 40   **Removing the CPU Board**

2   Slide the CPU board out of the main tray.

NOTICE: Before installing a CPU board assembly, swing the card ejectors out to the fully open position. After sliding the CPU assembly into place, push firmly on the ejector handles to fully seat the CPU board connector in the backplane.

Optional EGRAM Module

Before removing the optional EGRAM (System Graphics RAM) module, perform the following procedures:

• Remove the Main Tray Assembly from the system unit.

• Remove the Storage Tray Assembly from the Main Tray Assembly.

• Remove the CPU board assembly from the Main Tray.

Perform the following procedure to remove the EGRAM module:

1 To release the EGRAM module from the standoffs, use a pair of needle-nose pliers to squeeze the tabs on the standoffs while lifting the corner of the EGRAM module slightly, as shown in Figure 41.
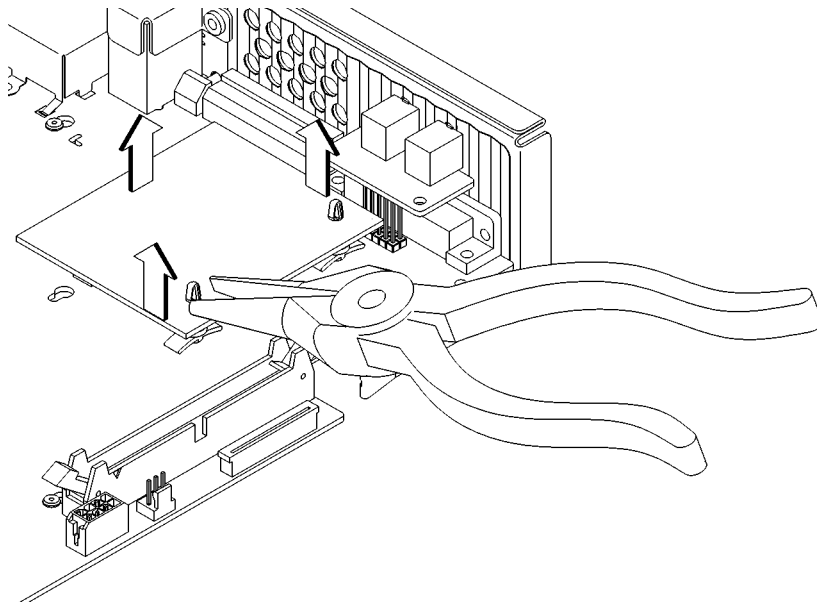
Figure 41   **Removing the Optional EGRAM Module**

2 Grasp the EGRAM module from the sides and pull it straight up to disconnect it from the CPU board connector, as shown in Figure 41.

NOTICE: When replacing the EGRAM module make sure that its connector is correctly aligned with the connector on the CPU board and press down firmly to make sure that it is fully connected. Press down on the corners of the module to make sure that the standoffs are fully engaged.

If you are moving the EGRAM module to a new CPU board assembly, from the underside of the CPU board assembly use a pair of needle-nose pliers to squeeze the tabs on the standoffs and push them out of the CPU board. Transfer the standoffs to the new CPU board.

System Fans and Speaker

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

Perform the following steps to remove the system fans:

1   Locate the desired fan or speaker connector on the backplane, push in the tab on the connector and disconnect it from the backplane, as shown in Figure 42.
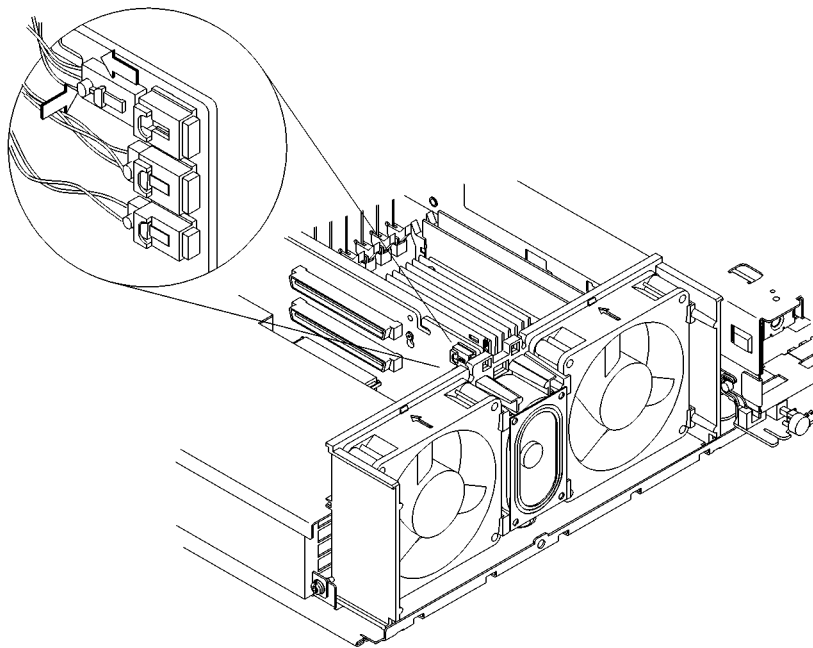
Figure 42   **Disconnecting the Fan and Speaker Connectors**

2   Pull up on the fan or speaker wire to remove it from the slot in the backplane or fan shroud.

3 Lift the fan out of the top of the fan shroud, or pull the speaker out of the front of the fan shroud, as shown in Figure 43.
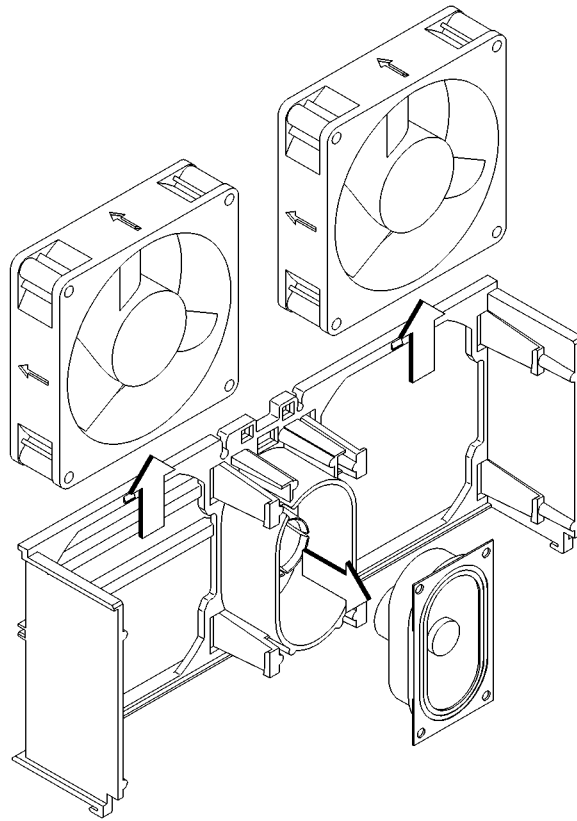
Figure 43   **Removing the System Fans and Speaker**

Battery

Before removing the battery, perform the following
procedures:

• Remove the Main Tray

• Remove the Storage Tray

Lift the clip and slip the battery out of its holder, as
shown in Figure 44.
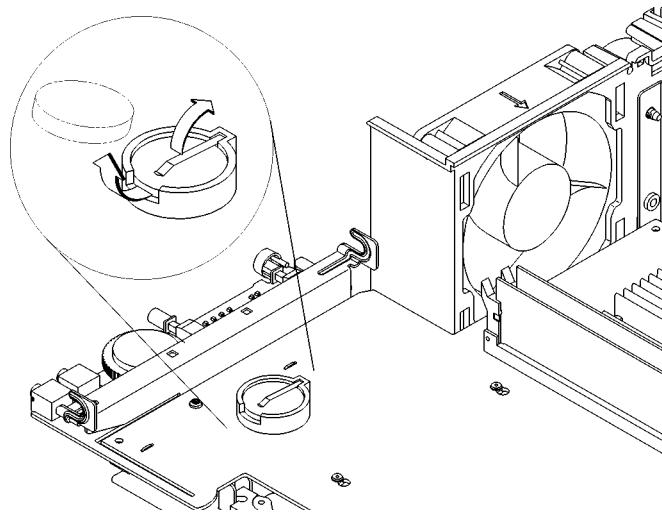
Figure 44   **Removing the Battery**

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

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

Power Supply

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

1 Remove the option board support bracket by pushing in
on the locking tab and sliding it toward the rear of the
main tray, as shown in Figure 45.
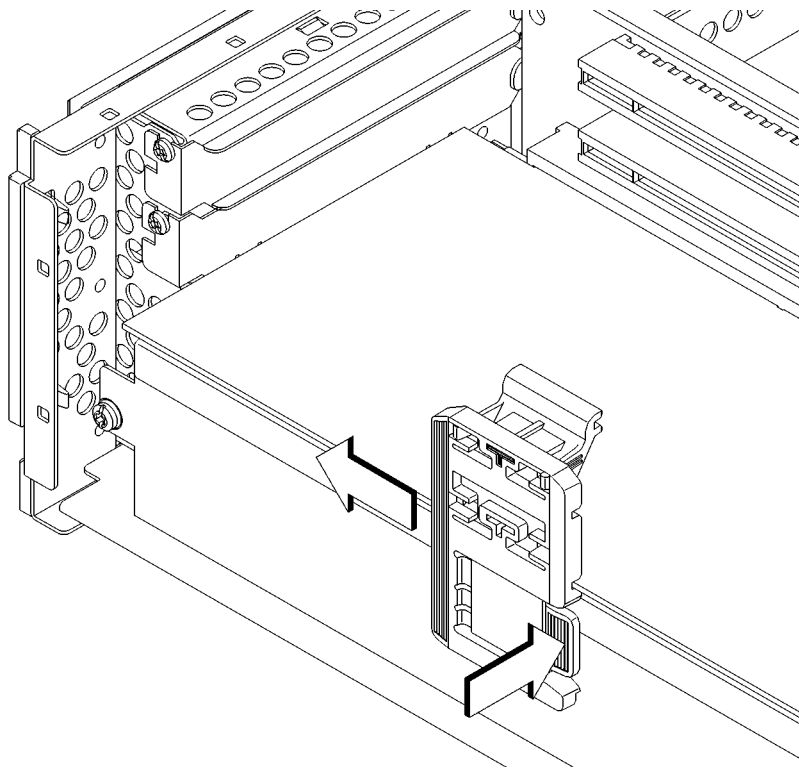
Figure 45   **Removing the Option Board Support Bracket**

2 Remove the two power supply retaining screws, as shown in Figure 46.

Power Supply Retaining Screws
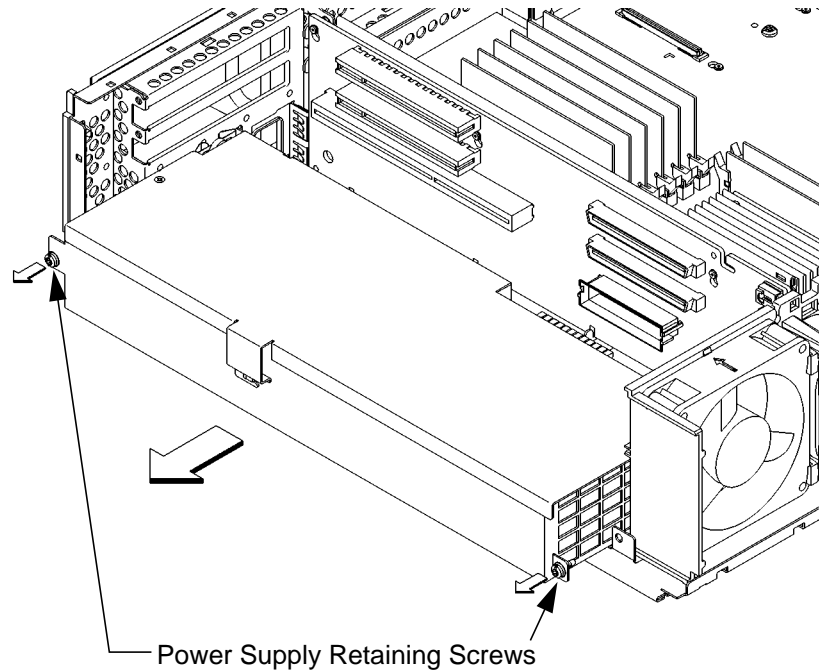
Figure 46 **Removing the Power Supply**

3 Pull the power supply out of the side of the main tray, as shown in Figure 46.

CAUTION: To avoid damage, be sure to use two hands to remove the power supply and pull it straight out.

Fast Wide SCSI Controller

Before removing the FW SCSI controller, remove the
main tray assembly.

To remove the FW SCSI controller, use a pair of nee-
dle-nose pliers to squeeze the tabs on the standoffs so
that they will pass through the board and pull the
board straight out from the backplane to disconnect it.
See Figure 47.
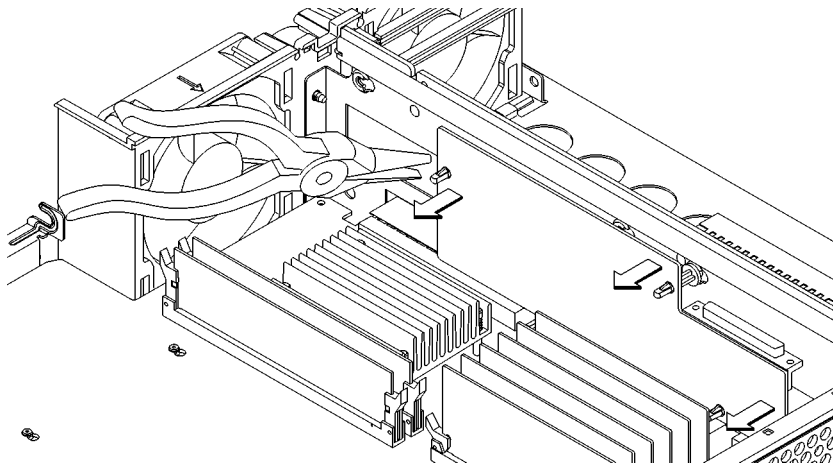
Figure 47   **Removing the FW SCSI Controller**

Backplane

Before removing the backplane, perform the following procedures:

- Remove the Main Tray Assembly
- Remove the Mass Storage Tray
- Remove the CPU Board
- Remove any EISA, GSC, or PCI option boards
- Remove (optional) Fast Wide SCSCI board.
- Remove the Power Supply

Perform the following steps to remove the backplane:

1 Disconnect the two fan connectors and the speaker connector by pushing in on the connectors locking tab and pulling the connector, as shown in Figure 48.
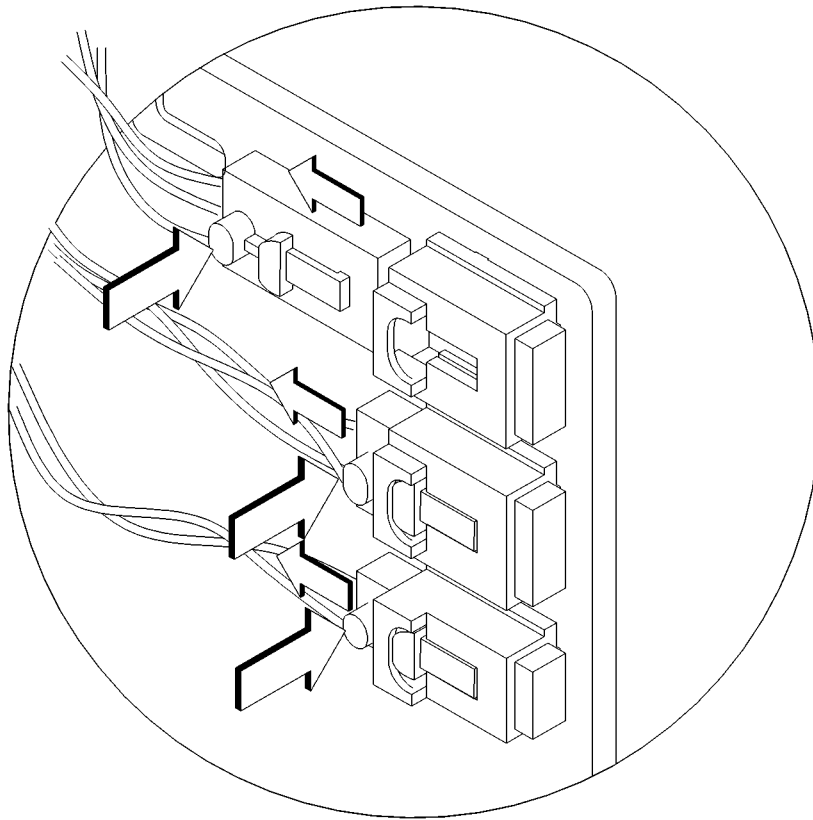
Figure 48   **Disconnecting the Speaker and Fan Connectors**

2 Pull the fan and speaker cables out of the slots in the backplane and fan shroud and move them so that they are away from the backplane.

3 Lift the backplane on its standoffs and swing the right end out away from the backplane support, as shown in Figure 49.
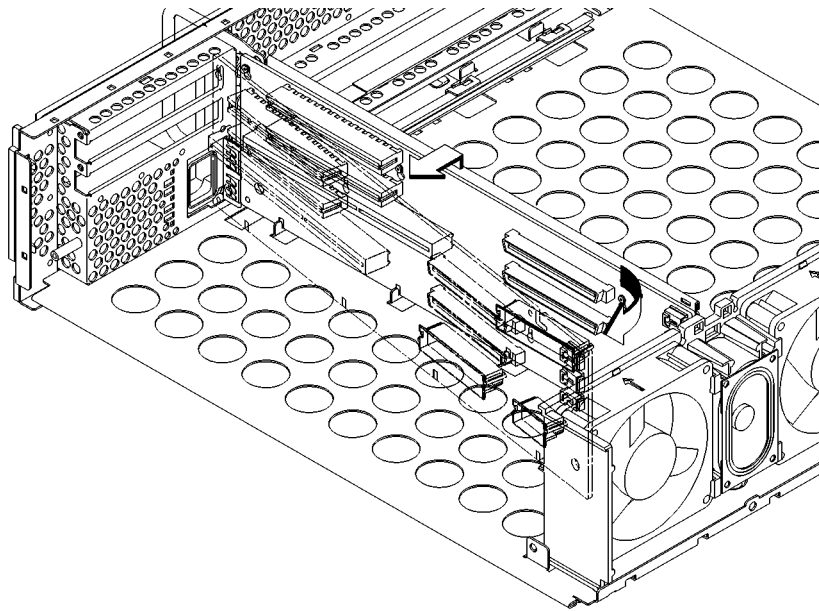
Figure 49   **Removing the Backplane**

6

Diagrams and Pinouts

This chapter provides functional information about the system including tables which list pinouts for the following connectors:

- Backplane to System Board connector

- Backplane PCI connector

- FWSCSI board backplane connector

- Backplane EISA slot connector

- Backplane PCI slot connector (5.0V environment)

- Backplane GSC slot connector

- Backplane Fan connector

- Backplane Speaker connector

- System board DRAMM DIMM connector

- System board Cache DIMM connector

- System board Disk Tray SCSI connector

- System board Disk Tray power connector

- System board Disk Tray CD-ROM Audio connector

- Optional FWSCSI board to Disk Tray FWSCSI connector

- System Fan connector

- Parallel Port connector

- Single-Ended SCSI connector

- SGRAM connector

- AUI connector

- Serial Port connector

- PS/2 connector

System Power

This section provides information on the connectors and pinouts in the B132L/B132L+/B160L/B180L workstation.

Table 15 lists the pinouts for the Backplane to System Board primary connector.

Table 15   **Backplane to System Board Connector**

Pin Number	Row A	Row B	Row C	Row D
1	P12v_aud	spare(0)	bp_id(0)	speaker(0)
2	N12v_aud	gnd	bp_id(1)	speaker(1)
3	spare(1)	spare(3)	gnd	VDL
4	spare(2)	spare(4)	vfan_ps_minus	+5V
5	gnd	vfan_plus	fan_ps_pulse	VDL
6	gsc_syncH_sl1	VDL	vfan_cpu_minus	+5V
7	gsc_syncL_sl1	supply_onL	fan_cpu_pulse	VDL
8	gnd	buf_lasi_brL	gnd	+5V
9	gsc_syncH_sl2	gsc_brL_sl1	gsc_brL_fwscsi	VDL
10	gsc_syncL_sl2	gnd	gsc_bgL_fwscsi	+5V
11	gnd	gsc_bgL-sl1	gsc_brL_wax	VDL
12	gsc_syncH_fwscsi	gs_brL_sl2	gnd	+5V
13	gsc_syncL_fwscsi	gnd	gsc_bgL_wax	VDL
14	gnd	gsc_bgL_sl2	gsc_interruptL	+5V
15	gsc_syncH_wax	gsc_lsL	gsc_brL_dino	VDL
16	gsc_syncL_wax	gnd	gnd	+5V
17	gnd	gsc_addvL	gsc_bgL_dino	VDL
18	gsc_syncH_dino	gsc_errorL	gsc_type(0)	+5V
19	gsc_syncL_dino	gnd	gsc_type(1)	VDL
20	gnd	gsc_readyL	gnd	+5V
21	gsc_resetL_sl1	gnd	gsc_type(2)	VDL
22	gsc_resetL_sl2	gsc_parity	gsc_type(3)	gnd

Table 15   **Backplane to System Board Connector**

Pin Number	Row A	Row B	Row C	Row D
23	gnd	gnd	gsc_ad(31)	VDL
24	gsc_resetL_fwscsi	gsc_ad(30)	gnd sense	+5V_sense
25	gsc_resetL_wax	gnd	gsc_ad(29)	VDL_sense
26	gsc_resetL_dino	gsc_ad(28)	gnd	VDL
27	gnd	gnd	gsc_ad(27)	gnd
28	gsc_ad(26)	gsc_ad(25)	gsc_ad(24)	VDL
29	gsc_ad(23)	gnd	gsc_ad(22)	+5VSTBY
30	gsc_ad(21)	gsc_ad(20)	gnd	VDL
31	gsc_ad(19)	gnd	gsc_ad(18)	+5V
32	gnd	gsc_ad(17)	gsc_ad(16)	VDL
33	gsc_ad(15)	GND	gsc_ad(14)	+5V
34	gsc_ad(13)	gsc_ad(12)	gnd	VDL
35	gsc_ad(11)	gnd	gsc_ad(10)	+5V
36	gnd	gsc_ad(9)	gsc_ad(8)	VDL
37	gsc_ad(7)	gnd	gsc_ad(6)	+5V
38	gsc_ad(5)	gsc_ad(4)	gnd	VDL
39	gsc_ad(3)	gnd	gsc_ad(2)	+5V
40	gnd	gsc_ad(1)	gsc_ad(0)	VDL
41	gsc_retryL	gnd	gsc_packL	+5V
42	gsc_gscL	gsc_drrL	gnd	VDL
43	clk_40Mhz	VDL	gsc_pendL	hil_si
44	gnd	pon_resetL	gsc_xqL	VDL
45	serial2_txd	serial2_rts	gnd	hil_si
46	serial2_rxd	serial2_ri	serial2_dtr	-12V
47	+12V	gnd	serial2_dsr	+12V
48	+12V	serial2_cts	serial2_dcd	+12V

Table 16 lists the pinouts for the Backplane PCI con-
nector.

Table 16 **Backplane PCI Connector**

Pin Number	Row A	Row B	Row C	Row D
1	pci_par	GND	pci_spar(0)	VDL
2	pci_serrL	pci_ad(0)	pci_ad(1)	VDD
3	GND	pci_ad(2)	pci_ad(3)	VDL
4	pci_sboL	GND	pci_ad(4)	pci_rstL
5	pci_sdone	pci_ad(5)	pci_ad(6)	VDD
6	GND	pci_ad(7)	pci_cbeL(0)	VDL
7	pci_perrL	GND	pci_ad(8)	pci_intdL
8	pci_lockL	pci_ad(9)	pci_ad(10)	VDL
9	pci_stopL	GND	pci_ad(11)	VDD
10	GND	pci_ad(12)	pci_ad(13)	VDL
11	pci_clk(3)	pci_ad(14)	pci_ad(15)	VDD
12	pci_clk(4)	GND	pci_cbeL(1)	pci_intcL
13	pci_clk(5)	pci_ad(16)	pci_ad(17)	VDD
14	GND	pci_ad(18)	pci_ad(19)	VDL
15	pci_devselL	GND	pci_ad(20)	pci_intbL
16	pci_trdyL	pci_ad(21)	pci_ad(22)	VDD
17	pci_trdyL	GND	pci_ad(23)	pci_intaL(5)
18	GND	pci_cbeL(2)	pci_ad(24)	VDL
19	pci_frameL	pci_ad(25)	pci_ad(26)	VDD
20	pci_ad(27)	GND	pci_ad(28)	pci_intaL(4)
21	pci_ad(29)	pci_ad(30)	pci_ad(31)	VDL
22	GND	pci_reqL(3)	pci_cbeL(3)	VDD
23	pci_reqL(4)	GND	pci_reqL(5)	pci_intaL(3)
24	pci_gntL(3)	pci_gntL(4)	pci_gntL(5)	VDD

Table 17 lists the pinouts for the Backplane Optional
Fast-Wide SCSI board connector.

Table 17   **FWSCSI Board Backplane Connector**

Pin Number	Row A	Row B	Row C	Row D
1	VDD	VDD	gsc_syncH	gsc_syncL
2	gsc_resetL	GND	VDL	VDL
3	GND	init_addr(1)	VDD	gsc_lsL
4	gsc_brL	VDD	GND	gsc_bgL
5	gsc_addvL	gsc_errorL	VDD	gsc_readyL
6	gsc_parity	GND	gsc_type(0)	gsc_type(1)
7	GND	gsc_type(2)	gsc_type(3)	VDD
8	gsc_ad(31)	gsc_ad(30)	VDD	gsc_ad(29)
9	gsc_ad(28)	GND	gsc_ad(27)	gsc_ad(26)
10	GND	gsc_ad(25)	gsc_ad(24)	VDD
11	gsc_ad(23)	gsc_ad(22)	VDD	gsc_ad(21)
12	gsc_ad(20)	GND	gsc_ad(19)	gsc_ad(18)
13	GND	gsc_ad(17)	gsc_ad(16)	VDD
14	gsc_ad(15)	gsc_ad(14)	VDD	gsc_ad(13)
15	gsc_ad(12)	GND	gsc_ad(11)	gsc_ad(10)
16	GND	gsc_ad(9)	gsc_ad(8)	VDD
17	gsc_ad(7)	gsc_ad(6)	VDD	gsc_ad(5)
18	gsc_ad(4)	GND	gsc_ad(3)	gsc_ad(2)
19	GND	gsc_ad(1)	gsc_ad(0)	VDD
20	gsc_retryL	gsc_packL	VDD	gsc_pendL
21	gsc_drrL	gsc_xqL	GND	GND
22	init_addr(0)	pwr_rsL	GND	init_addr(2)
23	VDL	VDL	gsc_gscL	init_addr(3)
24	clk33Mhz	GND	GND	clk40Mhz

Table 18 lists the pinouts for the Backplane to EISA Slot connector for rows F, B, E, and A. Table 18 lists the pinouts for rows H, D, G, and C.

NOTE: Rows A, C, F, and H are Upper (ISA) contacts. Rows B, D, E, and G are Lower (EISA) contacts.

Table 18 **Backplane EISA Slot Connector (Rows F, B, E, and A)**

Pin	Row F	Row B	Row E	Row A
1	GND	GND	CMD	IOCHK
2	+5V	RESDRV	START	D<7>
3	+5V	+5V	EXRDY	D<6>
4	X	IRQ<9>	EX32	D<5>
5	X	-5V	GND	D<4>
6	ACCESS KEY	DRQ<2>	ACCESS KEY	D<3>
7	X	-12V	EX16	D<2>
8	X	NOWS	SLBURST	D<1>
9	+12V	+12V	MSBURST	D<0>
10	M-IO	GND	W-R	CHRDY
11	LOCK	SMWTC	GND	AENx
12	RESERVED	SMRDC	RESERVED	SA<19>
13	GND	IOWC	RESERVED	SA<18>
14	RESERVED	IORC	RESERVED	SA<17>
15	BE<3>	DAK<3>	GND	SA<16>
16	ACCESS KEY	DRQ<3>	ACCESS KEY	SA<15>
17	BE<2>	DAK<1>	BE<1>	SA<14>
18	BE<0>	DRQ<1>	LA<31>	SA<13>
19	GND	REFRESH	GND	SA<12>
20	+5V	BCLK	LA<30>	SA<11>
21	LA<29>	IRQ<7>	LA<28>	SA<10>

Table 18   **Backplane EISA Slot Connector (Rows F, B, E, and A)**

Pin	Row F	Row B	Row E	Row A
22	GND	IRQ<6>	LA<27>	SA<9>
23	LA<26>	IRQ<5>	LA<25>	SA<8>
24	LA<24>	IRQ<4>	GND	SA<7>
25	ACCESS KEY	IRQ<3>	ACCESS KEY	SA<6>
26	LA<16>	DAK<2>	LA<15>	SA<5>
27	LA<14>	T-C	LA<13>	SA<4>
28	+5V	BALE	LA<12>	SA<3>
29	+5V	+5V	LA<11>	SA<2>
30	GND	OSC	GND	SA<1>
31	LA<10>	GND	LA<9>	SA<0>

Table 19   **Backplane EISA Slot Connector (Rows H, D, G, and C)**

Pin	Row H	Row D	Row G	Row C
1	LA<8>	M16	LA<7>	SHBE
2	LA<6>	IO16	GND	LA<23>
3	LA<5>	IRQ<10>	LA<4>	LA<22>
4	+5V	IRQ<11>	LA<3>	LA<21>
5	LA<2>	IRQ<12>	GND	LA<20>
6	ACCESS KEY	IRQ<15>	ACCESS KEY	LA<19>
7	D<16>	IRQ<14>	D<17>	LA<18>
8	D<18>	DAK<0>	D<19>	LA<17>
9	GND	DRQ<0>	D<20>	MRDC
10	D<21>	DAK<5>	D<22>	MWTC
11	D<23>	DRQ<5>	GND	D<8>
12	D<24>	DAK<6>	D<25>	D<9>

Table 19 **Backplane EISA Slot Connector (Rows H, D, G, and C)**

Pin	Row H	Row D	Row G	Row C
13	GND	DAK<6>	D<26>	D<10>
14	D<27>	DAK<7>	D<28>	D<11>
15	ACCESS KEY	DRQ<7>	ACCESS KEY	D<12>
16	D<29>	+5V	GND	D<13>
17	+5V	MASTER16	D<30>	D<14>
18	+5V	GND	D<31>	D<15>
19	MAKx		MREQx	

Table 20 lists the pinouts for the Backplane PCI slot
connector in a 5.0V environment.

Table 20   Backplane PCI Slot Connector (5.0V Environment)

Pin	Side B	Side A	Pin	Side B	Side A
1	-12V	TRST#	32	AD[17]	AD[16]
2	TCK	+12V	33	C/BE[2]#	+3.3V
3	Ground	TMS	34	Ground	FRAME#
4	TDO	TDI	35	IRDY#	Ground
5	+5V	+5V	36	+3.3V	TRDY#
6	+5V	INTA#	37	DEVSEL#	Ground
7	INTB#	INTC#	38	Ground	STOP#
8	INTD#	+5V	39	LOCK#	+3.3V
9	PRSNT1#	Reserved	40	PERR#	SDONE
10	Reserved	+5.0V (I/O)	41	+3.3V	SBO#
11	PRSNT2#	Reserved	42	SERR#	Ground
12	Ground	Ground	43	+3.3V	PAR
13	Ground	Ground	44	C/BE[1]#	AD[15]
14	Reserved	Reserved	45	AD[14]	+3.3V
15	Ground	RST#	46	Ground	AD[13]
16	CLK	+5.0V (I/O)	47	AD[12]	AD[11]
17	Ground	GNT#	48	AD[10]	Ground
18	REQ#	Ground	49	Ground	AD[09]
19	+5.0V (I/O)	Reserved	50	Connector key	Connector key
20	AD[31]	AD[30]	51	Connector key	Connector key
21	AD[29]	AD[28]	52	AD[08]	C/BE[0]#
22	Ground	Ground	53	AD[07]	+3.3V
23	AD[27]	AD[26]	54	+3.3V	AD[06]

Table 20   **Backplane PCI Slot Connector (5.0V Environment)**

Pin	Side B	Side A	Pin	Side B	Side A
24	AD[25]	Ground	55	AD[05]	AD[04]
25	+3.3V	AD[24]	56	AD[03]	Ground
26	C/BE[3]#	IDSEL	57	Ground	AD[02]
27	AD[23]	+3.3V	58	AD[01]	AD[00]
28	Ground	AD[22]	59	+5.0V (I/O)	+5.0V (I/O
29	AD[21]	AD[20]	60	ACK64#	REQ64#
30	AD[19]	Ground	61	+5V	+5V
31	+3.3V	AD[18]	62	+5V	+5V

Table 21 lists the power pinouts for the Backplane
GSC Slot Connector.

Table 21   **Backplane GSC Slot Connector**

Pin	Signal	Pin	Signal
1	+12V	51	-12V
2	+5V	52	+5V
3	GSC_SYNC	53	GSC_SYNCL
4	GND	54	GND
5	+3.3v	55	+3.3V
6	GSC_RESET_L	56	GSC_INT_L
7	+5V	57	GSC_LS_L
8	GSC_BR_L(1)	58	+5V
9	GND	59	GSC_BG_L
10	GSC_ADDV_L	60	GSC_ERROR_L
11	+5V	61	GSC_READY_L
12	GSC_PARITY	62	GND

Table 21   **Backplane GSC Slot Connector**

Pin	Signal	Pin	Signal
13	GSC_TYPE_(0)	63	GSC_TYPE(1)
14	GND	64	GSC_TYPE(2)
15	GSC_TYPE(3)	65	+5V
16	GSC_AD(31)	66	GSC_AD(30)
17	+5V	67	GSC_AD(29)
18	GSC_AD(28)	68	GND
19	GSC_AD(27)	69	GSC_AD(26)
20	gnd	70	GSC_AD(25)
21	GSC_AD(24)	71	+5V
22	GSC_AD(23)	72	GSC_AD(22)
23	+5V	73	GSC_AD(21)
24	GSC_AD(20)	74	GND
25	GSC_AD(19)	75	GSC_AD(18)
26	GND	76	GSC_AD(17)
27	GSC_AD(16)	77	+5V
28	GSC_AD(15)	78	GSC_AD(14)
29	+5V	79	GSC_AD(13)
30	GSC_AD(12)	80	GND
31	GSC_AD(11)	81	GSC_AD(10)
32	GND	82	GSC_AD(9)
33	GSC_AD(8)	83	+5V
34	GSC_AD(7)	84	GSC_AD(6)
35	+5V	85	GSC_AD(5)
36	GSC_AD(4)	86	GND
37	GSC_AD(3)	87	GSC_AD(2)
38	GND	88	GSC_AD(1)

Table 21   **Backplane GSC Slot Connector**

Pin	Signal	Pin	Signal
39	GSC_AD(0)	89	+5V
40	GSC_RETRY_L	90	GSC_PACK_L
41	+5V	91	GSC_PEND_L
42	GSC_DRR_L	92	GSC_XQ_L
43	GND	93	GND
44	GSC_TDO	94	TDI
45	TMS	95	PON_RESET_L
46	GND	96	TCK
47	+3.3V	97	+5V
48	GSC_GSC_L	98	GSC_PWRFAIL
49	OFFSET(?)	99	OFFSET(?)
50	OFFSET(?)	100	OFFSET(?)

Table 22 lists the Backplane Fan connector pinouts.

Table 22   **Backplane Fan Connector**

Pin	Signal
1	FAN_PS_PULSE
2	VFAN
3	SAFETY+12V

Table 23 lists pinouts for the Backplane Speaker connector.

Table 23   **Backplane Speaker Connector**

Pin	Signal
1	SPEAKER 0
2	SPEAKER 1

Table 24 lists the pinouts for the System Board DRAMM DIMM connector.

Table 24   **System Board DRAMM DIMM Connector**

Pin	Signal	Pin	Signal
1	GND	73	+5V
2	AD_0(1)	74	AD_0(2)
3	AD_0(3)	75	AD_0(4)
4	AD_0(5)	76	GND
5	AD_0(7)	77	AD_0(6)
6	GND	78	AD_0(8)
7	AD_0(9)	79	AD_0(10)
8	AD_0(11)	80	AD_0(12)
9	AD_0(13)	81	+5V
10	GND	82	D(1)/D(65)
11	D(0)/D(64)	83	D(3)/D(67
12	+5V	84	D(5)/D(69)
13	D(2)/D(66)	85	D(7)/D(71)
14	D(4)/D(68)	86	GND
15	D(6)/D(70)	87	D(9)/D(73)
16	GND	88	D(11)/D(77)

Table 24   **System Board DRAMM DIMM Connector**

Pin	Signal	Pin	Signal
17	D(8)/D(72)	89	D(13)/D(77)
18	D(10)/D(74)	90	D(15)/D(79)
19	D(12)/D(76)	91	GND
20	D(14)/D(78)	92	D(17)/D(81)
21	GND	93	D(19)/D(83)
22	D(16)/D(80)	94	D(21)/D(85)
23	D(18)/D(82)	95	D(23)/D(87)
24	D(20)/D(84)	96	GND
25	D(22)/D(86)	97	D(25)/D(89)
26	GND	98	D(27)/D(91)
27	D(24)/D(88)	99	+5V
28	D(26)/D(90)	100	D(29)/D(93)
29	D(28)/D(92)	101	GND
30	D(30)/D(94)	102	D(31)/D(95)
31	GND	103	ECC(1)/ECC(9)
32	ECC(0)/ECC(8)	104	ECC(3)/ECC(11)
33	ECC(2)/ECC(10)	105	GND
34	GND	106	RAS_0
35	CAS_0	107	CAS_1
36	MOE_0	108	STD_L
37	EDO_L	109	MOE
38	MWE	110	CAS_1
39	RAS_1	111	GND
40	GND	112	D(33)/D(97)
41	D(32)/D(96)	113	D(35)/D(99)
42	+5V	114	D(37)/D(101)

Table 24   **System Board DRAMM DIMM Connector**

Pin	Signal	Pin	Signal
43	D(34)/D(98)	115	D(39)/D(103)
44	D(36)/D(100)	116	GND
45	D(38)/D(102)	117	D(41)/D(105)
46	GND	118	D(43)/D(107)
47	D(40)/D(104)	119	D(45)/D(119)
48	D(42)/D(106)	120	D(47)/D(111)
49	D(44)/D(108)	121	GND
50	D(46)/D(110)	122	D(49)/D(113)
51	GND	123	D(51)/D(115)
52	D(48)/D(112)	124	GND
53	D(50)/D(114)	125	D(53)/D(117)
54	D(52)/D(116)	126	GND
55	D(54)/D(118)	127	D(55)/D(119)
56	GND	128	D(57)/D(121)
57	D(56)/D(120)	129	D(59)/D(123)
58	D(58)/D(122)	130	D(61)/D(125)
59	D(60)/D(124)	131	GND
60	D(62)/D(126)	132	D(63)/D(127)
61	GND	133	ECC(5)/ECC(13)
62	ECC(4)	134	ECC(6)/ECC(14)
63	GND	135	ECC(7)/ECC(15)
64	AD_1(13)	136	GND
65	AD_1(11)	137	AD_1(12)
66	AD_1(9)	138	AD_1(10)
67	GND	139	AD_1(8)
68	AD_1(7)	140	AD_1(6)

Table 24   **System Board DRAMM DIMM Connector**

Pin	Signal	Pin	Signal
69	AD_1(5)	141	GND
70	AD_1(3)	142	AD_1(4)
71	AD_1(1)	143	AD_1(2)
72	GND	144	+5V

Table 25 lists the power pinouts for the System Board Cache DIMM connector.

Table 25   **System Board Cache DIMM Connector**

Pin	Signal	Pin	Signal
1	Cache ID(0)	85	Cache ID(1)
2	D(0)/D(64)	86	GND
3	D(2)/D(66)	87	D(1)/D(65)
4	+3V	88	D(3)/D(67)
5	D(4)/D(68)	89	GND
6	D(6)/D(70)	90	D(5)/D(69)
7	+3V	91	D(7)/D(71)
8	D(8)/D(72)	92	GND
9	D(10)/D(74)	93	D(9)/D(73)
10	+3V	94	D(11)/D(75)
11	D(12)/D(76)	95	GND
12	D(14)/D(78)	96	D(13)/D(77)
13	+3V	97	D(15)/D(79)
14	D(16)/D(80)	98	GND
15	D(18)/D(82)	99	D(17)/D(81)
16	+3V	100	D(19)/D(83)

Table 25   **System Board Cache DIMM Connector**

Pin	Signal	Pin	Signal
17	D(20)/D(84)	101	GND
18	D(22)/D(86)	102	D(21)/D(85)
19	+3V	103	D(23)/D(87)
20	D(24)/D(88)	104	GND
21	D(26)/D(90)	105	D(25)/D(89)
22	+3V	106	D(27)/D(91)
23	D(28)/D(92)	107	GND
24	D(30)/D(94)	108	D(29)/D(93)
25	+3V	109	D(31)/D(95)
26	ECC(0)/ECC(8)	110	GND
27	ECC(2)/ECC(10)	111	ECC(1)/ECC(9)
28	+3V	112	ECC(3)/ECC(11)
29	SLTWCK	113	GND
30	SLT(0)/SLT(8)	114	SLT(1)/SLT(9)
31	+3V	115	SLA(14)
32	SLA(20)	116	GND
33	SLA(18)	117	SLA(26)
34	+3V	118	SLA(12)
35	SLA(22)	119	GND
36	SLA(14)	120	SLA(23)
37	+3V	121	SLA(10)
38	SLA(16)	122	GND
39	SLA(27)	123	SLA(15)
40	+3V	124	SLA(25)
41	+3V	125	GND
42	SLDWCK	126	SLDOE

Table 25 **System Board Cache DIMM Connector**

Pin	Signal	Pin	Signal
43	+3V	127	SLTW
44	SLATV(13)	128	GND
45	SLA(8)	129	SLTOE
46	+3V	130	SLA(9)
47	SLA(17)	131	GND
48	SLA(6)	132	SLA(21)
49	+3V	133	SLA(11)
50	SLA(19)	134	GND
51	SLA(13)	135	SLATV_13
52	+3V	136	SLA(7)
53	SLT(2)/SLT(10)	137	GND
54	SLT(4)/SLT(14)	138	SLT(3)/SLT(11)
55	+3V	139	SLT(5)/SLT(13)
56	SLT(6)/SLT(14)	140	GND
57	D(32)/D(96)	141	SLT(7)/SLT(15)
58	+3V	142	D(33)/D(97)
59	D(34)/D(98)	143	GND
60	D(36)/D(100)	144	D(35)/D(99)
61	+3V	145	D(37)/D(101)
62	D(38)/D(102)	146	GND
63	D(40)/D(104)	147	D(39)/D(103)
64	+3V	148	D(41)/D(105)
65	D(42)/D(106)	149	GND
66	D(44)/D(108)	150	D(43)/D(107)
67	+3V	151	D(45)/D(109)
68	D(46)/D(110)	152	GND

Table 25   **System Board Cache DIMM Connector**

Pin	Signal	Pin	Signal
69	D(48)/D(112)	153	D(47)/D(111)
70	+3V	154	D(49)/D(113)
71	D(50)/D(114)	155	GND
72	D(52)/D(116)	156	D(51)/D(115)
73	+3V	157	D(53)/D(117)
74	D(54)/D(118)	158	GND
75	D(56)/D(120)	159	D(55)/D(119)
76	+3V	160	D(57)/D(121)
77	D(58)/D(122)	161	GND
78	D(60)/D(124)	162	D(59)/D(123)
79	+3V	163	D(61)/D(125)
80	D(62)/D(126)	164	GND
81	ECC(4)/ECC(12)	165	D(63)/D(127)
82	+3V	166	ECC(5)/ECC(13)
83	ECC(6)/ECC(14)	167	GND
84	Cache ID(2)	168	ECC(7)/ECC(15)

Table 26 lists the pinouts for the Hard Disk Drive.

Table 26   **Hard Disk Drive Power Pinouts**

Pin Number	Description	Wire Color
1	+12V	red
2	GROUND	black
3	GROUND	black
4	+5V	orange

Table 27 lists the pinouts for the System Board Disk
Tray SCSI connector.

Table 27   **System Board Disk Tray SCSI Connector**

Pin	Signal	Pin	Signal
1	GND	26	TERMPWR
2	D(0)	27	GND
3	GND	28	N/C
4	D(1)	29	GND
5	GND	30	GND
6	D(2)	31	GND
7	GND	32	ATN
8	D(3)	33	GND
9	GND	34	GND
10	D(4)	35	GND
11	GND	36	BUSY
12	D(5)	37	GND
13	GND	38	ACK
14	D(6)	39	GND
15	GND	40	RST
16	D(7)	41	GND
17	GND	42	MSG
18	DP	43	GND
19	GND	44	SEL
20	GND	45	GND
21	GND	46	CD
22	GND	47	GND
23	GND	48	REQ

Table 27   **System Board Disk Tray SCSI Connector**

Pin	Signal	Pin	Signal
24	N/C	49	GND
25	GND	50	IO

Table 28 lists the pinouts for the System Board Disk Tray connector.

Table 28   **System Board Disk Tray Power Connector**

Pin	Signal	Pin	Signal
1	+5V	5	GND
2	+12V	6	GND
3	Safety +12V	7	VDISKFAN
4	N/C	8	N/C

Table 29 lists the pinouts for the System Board Disk Tray CD-ROM Audio connector.

Table 29   **System Board Disk Tray CD-ROM Audio Connector**

Pin	Signal
1	GND
2	Right
3	Left

Table 30 lists the pinouts for the Optional Fast Wide SCSI Board to the Disk Tray Fast Wide SCSI connector.

Table 30 **Optional FWSCSI Board to Disc Tray FWSCSI Connector**

Pin	Signal	Pin	Signal
1	PDB(12)	35	NBDB(12)
2	PDB(13)	36	NDB(13)
3	PDB(14)	37	NDB(14)
4	PDB(15)	38	NDB(15)
5	PPDP(1)	39	NDP(1)
6	GND	40	GND
7	PDB(0)	41	NDB(0)
8	PDB(1)	42	NDB(1)
9	PDB(2)	43	NDB(2)
10	PDB(3)	44	NDB(3)
11	PDB(4)	45	NDB(4)
12	PDB(5)	46	NDB(5)
13	PDB(6)	47	NDB(6)
14	PDB(7)	48	NDB(7)
15	PDP(0)	49	NDP(0)
16	DIFFSENS	50	EXT_SCSI_ON
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	N/C	53	N/C
20	PATN	54	NATN
21	GND	55	GND
22	PBSY	56	NBSY

Table 30   **Optional FWSCSI Board to Disc Tray FWSCSI
Connector**

Pin	Signal	Pin	Signal
23	PACK	57	NACK
24	PRST	58	NRST
25	PMSG	59	NMSG
26	PSEL	60	NSEL
27	PCD	61	NCD
28	PREQ	62	NREQ
29	PIO	63	NIO
30	GND	64	GND
31	PDB(8)	65	NDB(8)
32	PDB(9)	66	NDB(9)
33	PDB(10)	67	NDB(10)
34	PDB(11)	68	NDB(11)

Table 31 lists the power pinouts for the System Fan.

Table 31   **System Fan Power Pinouts**

Pin Number	Description	Wire Color
1	Power	N/A
2	GROUND	N/A

Table 32 lists the pinouts for the Parallel Port connector.

Table 32   **Parallel Port Connector Pinouts**

Pin	Description	Pin	Description
1	Strobe	14	AFD
2	D[0]	15	ERR
3	D[1]	16	INIT
4	D[2]	17	SLIN
5	D[3]	18	GROUND
6	D[4]	19	GROUND
7	D[5]	20	GROUND
8	D[6]	21	GROUND
9	D[7]	22	GROUND
10	ACK	23	GROUND
11	BUSY	24	GROUND
12	PE	25	GROUND
13	SLCT		

Table 33 lists the pinouts for the Single-Ended SCSI connector.

Table 33 **Single-Ended SCSI Connector Pinouts**

Pin	Description	Pin	Description
1	Ground	26	D[0]
2	Ground	27	D[1]
3	Ground	28	D[2]
4	Ground	29	D[3]
5	Ground	30	D[4]
6	Ground	31	D[5]
7	Ground	32	D[6]
8	Ground	33	D[7]
9	Ground	34	Data Parity
10	Ground	35	Ground
11	Ground	36	Ground
12	Ground	37	Ground
13	NC	38	Term Power
14	Ground	39	Ground
15	Ground	40	Ground
16	Ground	41	ATN
17	Ground	42	Ground
18	Ground	43	BUSY
19	Ground	44	ACK
20	Ground	45	Ground
21	Ground	46	RST
22	Ground	47	SEL
23	Ground	48	CD

Table 33   **Single-Ended SCSI Connector Pinouts**

Pin	Description	Pin	Description
24	Ground	49	REQ
25	Ground	50	IO

Table 34 lists the pinouts for the SGRAM connector.

Table 34   **EGRAM Connector**

Pin	Description	Pin	Description
1	Audio Out, Right	18	USB/1394 Sheild
2	Audio Out, Left	19	P1394 Return
3	Audio Out, Ret	20	P1394 Power
4	Sync Return	21	Audio In, Left
5	Horizontal Sync	22	Audio In, Right
6	Vertical Sync	23	Audio In, Return
7	Reserved	24	Stereo Sync
8	Reserved	25	DDC Return
9	P1394, A-	26	DDC Data
10	P1394, A+	27	DDC Clock
11	Power Charge +	28	+5 VDC
12	Power Charge -	29	P1394 B+
13	Video In, Y	30	P1394 B-
14	Video In, Return	C1	Red Video Output
15	Video In, C	C2	Green Video Output
16	USB+	C3	Pixel Clock Output
17	USB-	C4	Blue Video Output

Table 35 lists the pinouts for the AUI connector.

Table 35   **AUI Connector Pinouts**

Pin	Description	Pin	Description
1	GND	9	CLSNn
2	CLSN	10	TRMTn
3	TRMT	11	GND
4	GND	12	RCVn
5	RCV	13	+12V
6	GND	14	GND
7	N/C	15	N/C
8	GND		

Table 36 lists the pinouts for the Serial Port connector.

Table 36   **Serial Port Connector Pinouts**

Pin	Description	Pin	Description
1	DCD - Carrier Detect	6	DSR - Data Set Ready
2	RXD - Receive Data	7	RTS - Request to Send
3	TXD - Transmit Data	8	CTS - Clear to Send
4	DTR - Data Terminal Ready	9	RI - Ring Indicator
5	Ground		

Table 37 lists the pinouts for the P/S2 connector.

Table 37   **PS/2 Connector**

Pin	Description
1	Data
2	(HIL_SI/HIL_SO or N/C)
3	Ground
4	+5V
5	Clock
6	(+12V/Ground or N/C)

System Block Diagrams

Figure 50 shows the system unit block diagram for
B132L and B160L.
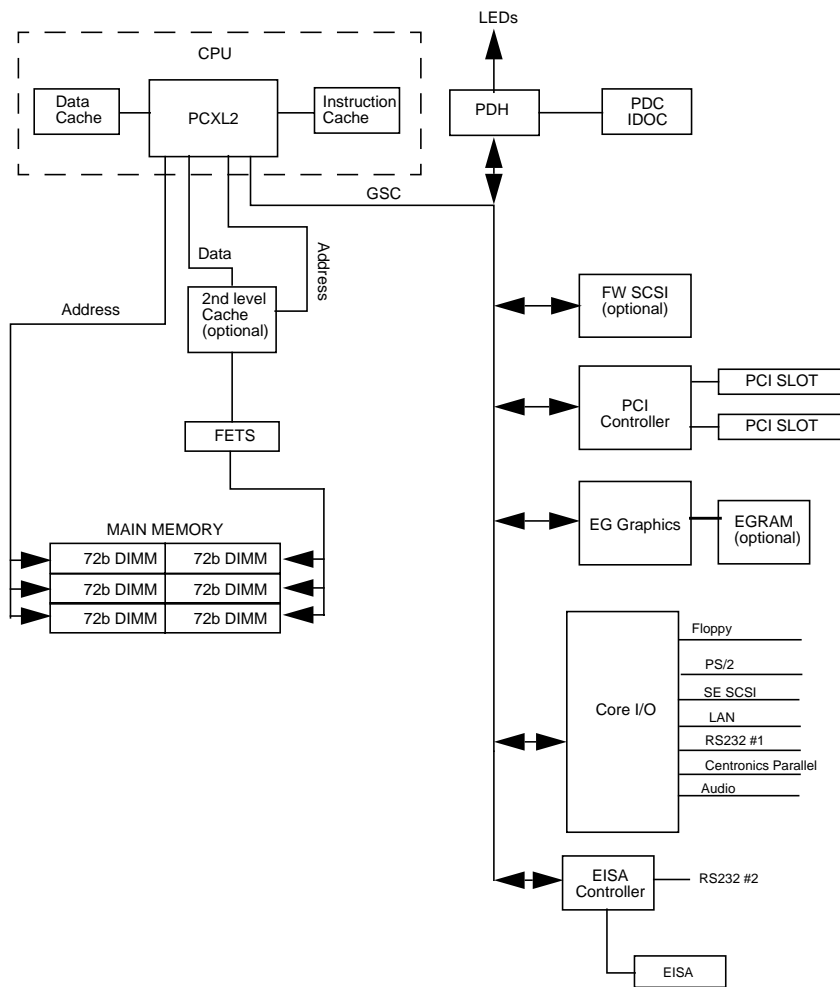
Figure 50   System Unit Functional Block Diagram (B132L/ B160L)

Figure 51 shows the system unit block diagram for B180L systems.
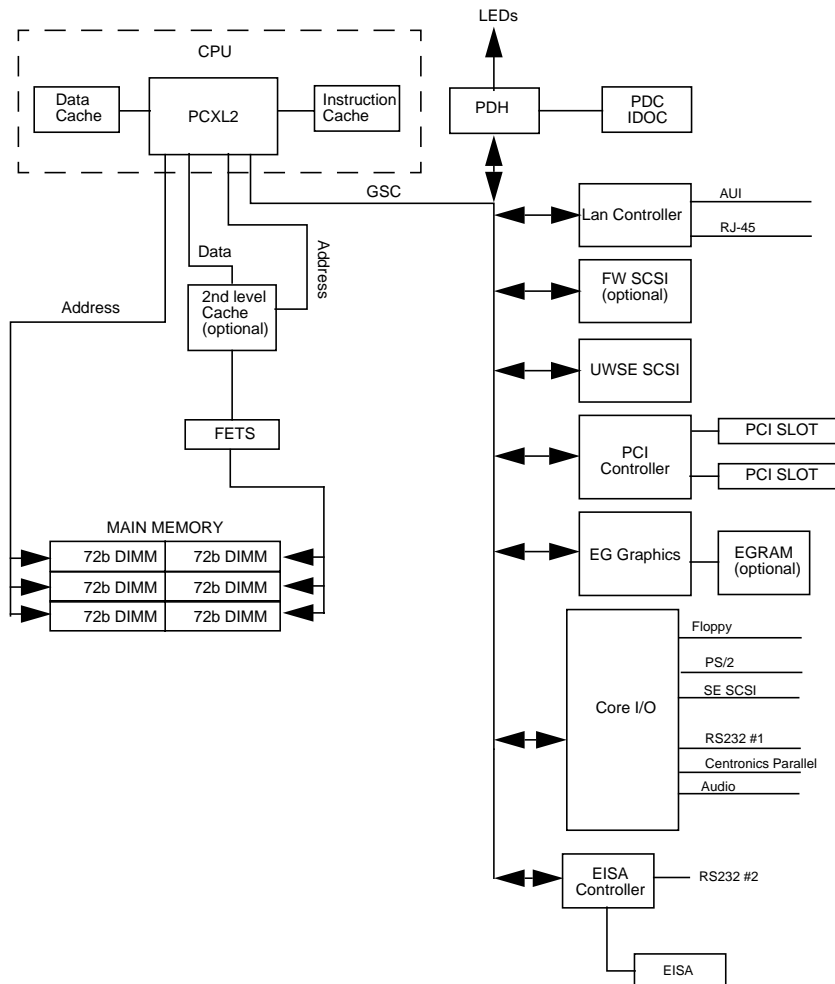
Figure 51   **System Unit Functional Block Diagram (B132L+/ B180L)**

7

Reference

This chapter provides part numbers and titles to reference documents.

Installation Manual

Hardware Install Card Model B132L/B160L
A4190-90010

Service Manuals

Service Handbook B132L/B132L+/B160L/B180L
Workstations (this handbook) A4190-90041

Precision Architecture RISC HP 9000 Series 700
Diagnostics Manual 92453-90010

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

Reference Manuals

B132L/B132L+/B160L/B180L Owner's Guide A4190-
90023

Installing the B132L/B160L CPU Upgrade
A4190-90012

Installing the B132L/B160L to B180L CPU Upgrade
A4190-90018

Reference
Reference Manuals

8

Service Notes

Service Notes

9

Boot Console Interface

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 avail-
able device.To discontinue, press any
key within 10 seconds.
```

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

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

```
Boot terminated
```

The Main Menu of the boot console appears.

Booting Your Workstation

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

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

Here are some situations and examples:

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

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

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

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

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

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

- If you wish to interact with the Initial System Loader

(ISL) before booting your workstation, follow the directions in "Accessing the Boot Console Interface" earlier in this appendix, and then type the following at the prompt

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

You are prompted:

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

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

```
ISL>
```

ISL is the program that actually controls the loading of the operating system. By interacting with ISL, you can choose to load an alternate version of the HP-UX operating system. If you do not want ISL to be loaded, you must enter **no**.

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

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

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

Searching for Bootable Media

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

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

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

- To hold the display temporarily, press **Ctrl** **S**

- To continue the display, press **Ctrl** **Q**

- To halt the search, press any other key

These flow-control commands do not work with a 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 differential SCSI bus or the built-in ultra, wide single-ended SCSI bus

sescsi is the built-in single-ended SCSI bus

lan is all connections to the built-in LAN

gscn is an optional FW 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, fol-
low 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 fol-
lowing at the prompt:

```
Config Menu:Enter command> default
```

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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 38.

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

Table 38   **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 39.

Table 39   **Mnemonic Style Notation**

I/O Type	Specification Format
Built-in FWSCSI	**fwsci.***scsi_address***.***logical_unit_number*
Built-in UWSCSI	**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 38.

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 38 and *path* is the specification of the path in Mnemonic Style Notation (as described in Table 39).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 the 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 the section "Changing Your Monitor Type" in Appendix B.

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

monitor

The correct usage for setting the graphics configuration is:

monitor *graphics_path type*

where valid *graphics_path* parameters are:

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

graphics(1) - Graphics adapter installed in option slot 1.

graphics(2) - Graphics adapter installed in option slot 2.

and *type* is the numerical monitor type as shown with the **monitor list** command.

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

For example, a Dual Visualize Enhanced Graphics Card (A4451A) installed in option slot 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, see the subsection "Graphics Configuration Restrictions" in Appendix B.

Displaying the Current Monitor Configuration

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

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

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

> `Config 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  72Hz    12

Configuration Menu: Enter command >
```

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

Setting the Monitor Type

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

`Config 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;

`Config 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  72Hz
GRAPHICS(0)    0    1   13 1280x1024  72Hz  Double buffered
GRAPHICS(0)    0    1   14   640x480  60Hz
GRAPHICS(0)    0    1   15 --------user defined-------


Configuration Menu: Enter command >
```

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

```
Config Menu: Enter command>
```
 monitor graphics(0) 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.

```
This will take effect on the next reboot.

MONITOR INFORMATION

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

The boot console also displays the new monitor infor-
mation.

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:

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.

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 enter-
ing 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 laptop computer serial port to the workstation.

Displaying the Current Memory Configuration

The following sample screen output using the **memory** command shows a sample memory configuration table.

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

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

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

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

The screen displays status and configuration information for the memory DIMMs installed in your workstation.

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

```
MEMORY INFORMATION

   MEMORY STATUS TABLE

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

        Memory
   HVERSION  SVERSION
   --------  ----------
    0x0710   0x0900
```

Setting the Auto Boot and Auto Search Flags

auto boot and **auto search** are variables stored in your workstation's nonvolatile memory. If you reset these flags to a 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:

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

or

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

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

Autosearch searches for devices in the following order:

Primary Boot Path

Alternate Boot Path

Built-in Fast, Wide SCSI Devices

SCSI card in slot 1

SCSI card in slot 2

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

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

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

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

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

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

```
Config Menu: Enter command > fastboot
```

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

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

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

```
Config Menu: Enter command > 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 prompt:

```
Info Menu: Enter command > lanaddress
```

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

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

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

Configure and Display LAN Settings (B132L+/B180L Only)

The LanConfig command configures and displays the current LAN settings. The hardware system supports 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, (this is the default and recommended setting) type the following at the prompt:

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

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:

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```
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 prompt:

```
Information Menu: Enter command > 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 prompt:

`ServiceMenu:Entercommand>` **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 the PA-RISC processor module. Stable storage is used by the processor (CPU) to store

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

ISL Environment

The ISL environment provides the means to load the operating system (HP-UX) environment. The ISL environment also provides an offline platform to execute 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,or Q) >  y
```

2 Answering yes (**y**) causes the ISL to be loaded from the specified device. After a short time, the following prompt appears on 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 (**/stand/vmunix**) on your root disk (**fwscsi.6.0**) has become corrupted, and you wish to boot your workstation from the backup kernel (**/stand/vmunix.prev**), type the following at the ISL> prompt:

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

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>`.

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 confir-
  mation 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 mem-
ory, it asks if you want to continue the update process,

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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.

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