HP Integrity cx2620 User Service Guide

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About This Document

This document provides the following information for the HP Integrity cx2620 server:

- System configuration
- Physical specifications and requirements
- Installation procedures
- Operating system information
- Instructions on how to remove and replace server components
- Basic troubleshooting and diagnostics
- Replacement parts list
- EFI Boot Manager and EFI-POSSE utilities

The document printing date and part number indicate the document's current edition. The printing date changes when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The document part number changes when extensive changes are made.

Document updates may be issued between editions to correct errors or document product changes. To ensure you receive the updated or new editions, subscribe to the appropriate product support service. See your HP sales representative for details.

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

Intended Audience

This document is intended to provide technical product and support information for authorized service providers, system administrators, and HP support personnel.

This document is not a tutorial.

New and Changed Information in This Edition

The following changes are included in this edition.

- Updated formatting throughout the service guide.
- Updated the memory DIMM loading order information.
- Added a physical and environmental specifications table.

Publishing History

Table 1 lists the publishing history details for this document.

Table 1 Publishing History Details

Document Manufacturing Part Number	Operating Systems Supported	Supported Product Versions	Publication Date
AB587-96012	HP-UX 11i v2 Linux	HP Integrity cx2620	January 2007
AB587–96006	HP-UX 11i v2 Linux	HP Integrity cx2620	September 2006

Document Organization

This guide is divided into the following chapters.

Chapter 1 *Overview* Brief introduction to the HP Integrity cx2620 server.

Chapter 2	*System Specifications* Server details such as system configuration, physical specifications, and requirements.
Chapter 3	*Installing the System* Unpacking, installation, and preparation for booting the operating system.
Chapter 4	*Booting and Shutting Down the Operating System* Provides procedures to boot and shut down the operating system.
Chapter 5	*Troubleshooting* Diagnostics and basic troubleshooting methodology.
Chapter 6	*Removing and Replacing Components* Provides instructions and procedures on how to remove and replace server components.
Appendix A	*Replacement Parts* A list of available customer self-repair parts.
Appendix B	*Utility Management Subsystem* Provides information on the utilities on the server such as Extensible Firmware Interface (EFI) Boot Manager.
Appendix C	*Physical and Environmental Specifications* Provides temperature and airflow information for minimum, typical, and maximum configurations for the server. It also lists the server and rack weights and dimensions in a convenient form.

Typographic Conventions

This document uses the following conventions.

WARNING! A warning lists requirements that you must meet to avoid personal injury.

CAUTION: A caution provides information required to avoid losing data or avoid losing system functionality.

IMPORTANT: Important messages provide essential information to explain a concept or to complete a task.

NOTE: A note highlights useful information such as restrictions, recommendations, or important details about HP product features.

TIP: Tips provide you with helpful hints for completing a task. A tip is not used to give essential information, but can be used, for example, to provide an alternate method for completing the task that precedes it.

Book Title	The title of a book. On the Web and on the Instant Information CD, it may be a hot link to the book itself.
KeyCap	The name of a keyboard key or graphical interface item (such as buttons, tabs, and menu items). Note that **Return** and **Enter** both refer to the same key.
Emphasis	Text that is emphasized.
Bold	Text that is strongly emphasized.
Bold	The defined use of an important word or phrase.
`ComputerOut`	Text displayed by the computer.
`UserInput`	Commands and other text that you type.
`Command`	A command name or qualified command phrase.
`Option`	An available option.
`Screen Output`	Example of computer screen output.
[ ]	The contents are optional in formats and command descriptions. If the contents are a list separated by |, you must select one of the items.

{ }	The contents are required in formats and command descriptions. If the contents are a list separated by |, you must select one of the items.
...	The preceding element may be repeated an arbitrary number of times.
|	Separates items in a list of choices.

HP-UX Release Name and Release Identifier

Each HP-UX 11i release has an associated release name and release identifier. The *uname*(1) command with the **-r** option returns the release identifier. This table shows the releases available for HP-UX 11i.

Table 2 HP-UX 11i Releases

Release Identifier	Release Name	Supported Processor Architecture
B.11.20	HP-UX 11i v1.5	Intel® Itanium®
B.11.22	HP-UX 11i v1.6	Intel Itanium
B.11.23	HP-UX 11i v2.0	Intel Itanium

Related Documents

You can find other information on HP server hardware management and diagnostic support tools in the following publications.

Web Site for HP Technical Documentation: `http://docs.hp.com`

Server Hardware Information: `http://docs.hp.com/hpux/hw/`

Diagnostics and Event Monitoring: Hardware Support Tools Complete information about HP's hardware support tools, including online and offline diagnostics and event monitoring tools, is at the `http://docs.hp.com/hpux/diag/` Web site. This site has manuals, tutorials, FAQs, and other reference material.

Web Site for HP Technical Support: `http://us-support2.external.hp.com/`

Web Site for Updating Firmware: `http://www.docs.hp.com/en/hw.html#System%20Firmware`

Books about HP-UX Published by Prentice Hall The `http://www.hp.com/hpbooks/` Web site lists the HP books that Prentice Hall currently publishes, such as HP-UX books including:

- *HP-UX 11i System Administration Handbook*`http://www.hp.com/hpbooks/prentice/ptr_0130600814.html`
- *HP-UX Virtual Partitions* `http://www.hp.com/hpbooks/prentice/ptr_0130352128.html`

HP Books are available worldwide through bookstores, online booksellers, and office and computer stores.

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HP encourages your comments concerning this document. We are truly committed to providing documentation that meets your needs.

Send comments to:

`netinfo_feedback@cup.hp.com`

Include title, manufacturing part number, and any comments, errors found, or suggestions for improvement you have concerning this document. Also, please include what we did right so we can incorporate it into other documents.

1 Overview

The HP Integrity cx2620 server (Regulatory Model Number RSVLA-0303-DC) is a 64-bit, carrier grade server based on the Itanium® processor family architecture. This server is Network Equipment Building System (NEBS) Level-3 compliant and is intended for telco users.

The server accommodates one or two processors, from four to twelve DIMMs (providing 1 to 32 GB of memory), and internal peripherals including up to three disks and a CD/DVD drive. Its high availability features include hot-swappable fans and power supplies, and hot-pluggable disk drives. This server supports HP-UX 11i version 2 and Linux® operating systems.

This chapter addresses the following topics:

HP Integrity cx2620 Server Views

The following figures show the top, front, and rear views of the server.

Figure 1-1 HP Integrity cx2620 Server Top View

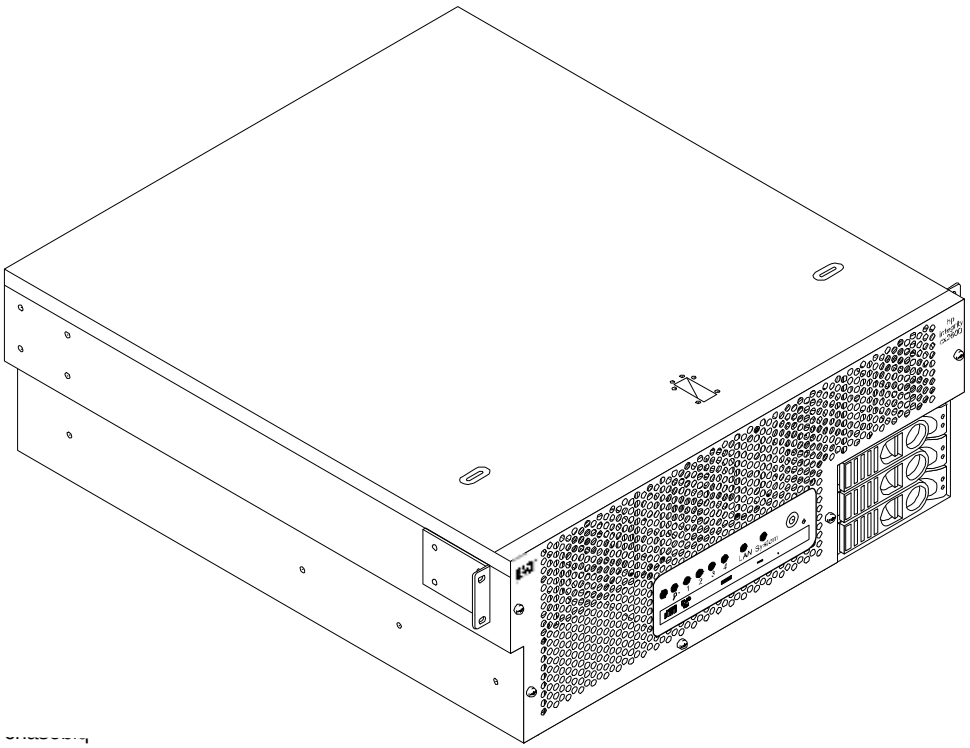


Figure 1-2 HP Integrity cx2620 Server Front View

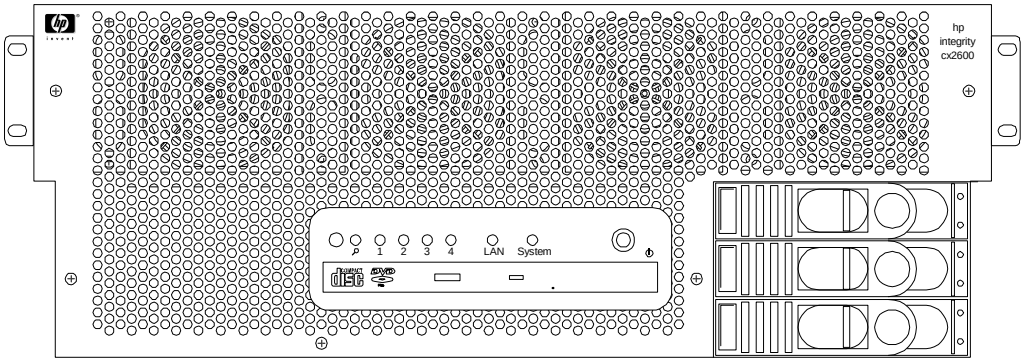
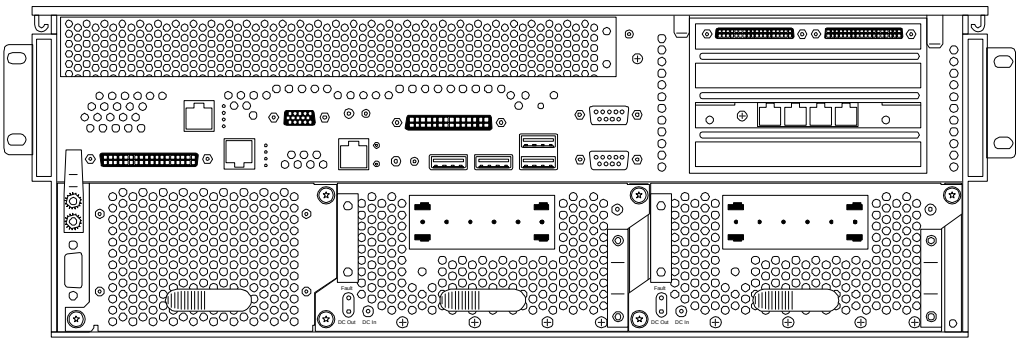


Figure 1-3 HP Integrity cx2620 Server Rear View



Detailed Server Description

The following sections provide information on the main subsystems within the HP Integrity cx2620 server.

I/O Subsystem

The I/O subsystem includes four hot-swappable 64-bit/133 MHz PCI-X slots.

Processors

The server can support one or two of the following processors of the same type and speed.

- Single-core Itanium CPUs (1P/1C). Each CPU is 1.6 GHZ with 3 MB of cache
- Dual-core Itanium CPUs (1P/2C). Each CPU is:
  - 1.4 GHZ with 12 MB of cache
  - 1.6 GHZ with 18 MB of cache

Memory

The server has one set configuration using either 2 GB or 4 GB memory sizes. You must install DIMMs in quads.

Cooling

The server has five dual-rotor hot-swappable fans. The front four fan units are in the same assembly. The rear fan unit is in a separate assembly. The cabinet incorporates front to back airflow across the entire chassis. For more information on cooling and airflow, see "Cooling" (page 50).

Power

The server has two hot-swappable dc input power supply units. The power supplies have two cooling fans and are designed for NEBS temperatures. The power supply plugs directly into the power distribution printed circuit assembly (PCA), called PSI PCA.

Front Display Panel, DVD, and Diagnostic Panel

The LED status display is in the front of the unit directly above the DVD drive. The slimline DVD drive is also in the front of the unit. It is center-mounted in the unit below the LED status display.

Mass Storage

The server has three hot-pluggable disk drives located in the front of the unit.

Firmware

Firmware consists of many individually linked binary images that are bound together by a single framework at run time. Internally, the firmware employs a software database called a device tree to represent the structure of the hardware platform and to provide a means of associating software elements with hardware functionality.

The firmware incorporates Extensible Firmware Interface (EFI) which provides an interface between the operating system and the platform firmware. EFI uses data tables that contain platform-related information, and boot and run-time service calls that are available to the operating system and its loader to provide a standard environment for booting.

The firmware supports the HP-UX 11i version 2 and Linux® operating systems through the Itanium processor family standards and extensions, and has no operating system-specific functionality included. All operating systems are presented with the same interface to system firmware, and all features are available to the operating system.

User Interface

The Itanium processor family firmware employs a user interface called Pre-OS System Startup Environment (POSSE). The POSSE Shell is based on the standard EFI Shell. Several commands were added to the standard EFI Shell to support HP value-added functionality. For more information see the **EFI and EFI/POSSE Commands** at:

http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp

Event IDs for Errors and Events

The server firmware generates event IDs similar to chassis codes for errors, events, and forward progress to the Integrated Light-Out Management Processor (iLO MP) through common shared memory. The iLO MP interprets and stores event IDs. Reviewing these events helps you diagnose and troubleshoot problems with the server.

Preventative Maintenance

The server has an optional air filter assembly that installs over the front grill. The air filter assembly consists of a frame and a separate foam filter element. The air filter assembly is used to filter the air to minimize the amount of dust drawn into the server.

Replacing the foam filter element is performed by the customer as a preventative maintenance measure. When the air filter assembly is installed on a server that is in a typical data center environment (see the *HP Integrity cx2620 Site Preparation Guide* for data center environment information), HP recommends inspecting the foam element every two months and replacing it if necessary. At a minimum, HP recommends that the foam filter element should be replaced no less than every six months.

Dimensions and Weights

Table 1-1 lists the component dimensions and weights for the server.

Table 1-1 HP Integrity cx2620 Server Dimensions and Weights

Dimension	Value
Height	17.8 cm. (7 in.)
Width	44.5 cm. (17.5 in.)
Depth	50.8 cm. (20 in.)
Weight	28.1 kg. (62 lbs.) Unloaded 31.75 kg. (70 lbs.) Fully loaded

Server Specifications

The following configurations are supported on the server:

- Base Chassis
  - — One or two single or dual-core CPUs
  - — Core I/O
  - — iLO MP card
  - — Two power supplies
- Single-core CPUs: 1.6 GHz, 3 MB cache
  - — Two slots
  - — Single-core processor
  - — Minimum: one CPU
  - — Maximum: two CPUs
  - — 400 MT/s front-side-bus (FSB)
  - — 400 MT/s (400 MT/s FSB) DDR2 memory bus)
  - — Processor frequencies cannot be mixed within a system
- Dual-core CPUs: 1.4 GHZ with 12 MB of cache, or 1.6 GHz, 18 MB cache
  - — Two slots
  - — Dual-core processor
  - — Minimum: 1 cpu
  - — Maximum: 2 cpus
  - — 400 MT/s front-side-bus (FSB)
  - — 400 MT/s (400 MT/s FSB) DDR2 memory bus)
  - — Processor frequencies cannot be mixed within a system

IMPORTANT: You cannot mix single-core and dual-core processors within the server.

- DDR1 DIMMs
  - — 2 GB and/or 4 GB DIMMs
  - — 12 DIMM slots (must load in quads)
  - — Minimum load: 1 GB (4 x 256 MB DIMMs)
  - — Maximum load: 32 GB (8 x 4 GB DIMMs)
  - — Supports up to 12 double data rate (DDR) registered ECC memory, in PC2100 DIMMs

NOTE: Except for the 4 GB DIMM. The server supports only a maximum of eight 4 GB DIMMs.

  - Supported DDR1 DIMM sizes: 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB DIMM
- Internal Storage
  - Three slots
  - Minimum: One slot
  - Maximum: Three slots
  - Three capacity/RPM options: 36/15, 73/15, 146/10
  - Diskless operations *not* supported
- Removable Media (Optical Drives)
  - One slot, two options (must order one):
    - DVD drive, slimline
    - DVD+RW drive
- Power Supplies
  - Two slots
  - Minimum: One
  - Maximum: Two
- I/O and Host Bus Adapter Cards
  - Four I/O slots
  - Minimum: Zero
  - Maximum: Four
  - Linux two-port Ultra 160 SCSI Host Bus Adapter
  - Two-port 2 GB fibre channel adapter
  - Smart Array 6402/128 MB cache controller (maximum three)
- Supported Operating Systems
  - HP-UX 11i version 2: pre loaded
  - Linux Debian TE 2.0: not loaded
- Internal Ultra320 SCSI hot-pluggable hard disk drive (HDD)
- All firmware loaded
- Two lithium batteries installed
- Core I/O: 2x Gigabit Ethernet ports with Wake on LAN (Rapid Deployment Enabled)
- Video Monitors, Keyboard/Mouse (optional), System Console
  - A video monitor is not needed if the server is managed remotely, by serial console, or by KVM switch
  - 19″ or 18″ viewable color monitor (visually flat screen)
  - 19″ or 18″ viewable color monitor (visually flat screen Europe and Japan)
  - USB keyboard and USB scroll mouse
  - System console (Reflection for HP) CD media

NOTE: *Reflection for HP* is software you can purchase that provides terminal emulation capabilities. *Reflection for HP* must be installed on a Windows-based PC.

- Rack Mount
  - HP cx2620 2 Post EIA Field Mount Kit (customer installed)
  - HP cx2620 NEBS 2000 Static Cabinet Kit (customer installed)
  - HP cx2620 10K Static Cabinet Kit (customer installed)
- Support Options
  - Packaged factory integration and installation services
  - Basic start-up services
  - Managed start-up services
  - Optimized start-up services
  - Supplemental systems support
  - Additional system support
  - HP critical service

Controls, Ports, and LEDs

This section provides a basic description of the controls, ports, and indicators found on the front and rear panels of your HP Integrity entry class server. For more information on LED functions and descriptions, see Chapter 5 (page 123) Troubleshooting.

This section addresses the following topics:

Front Grill

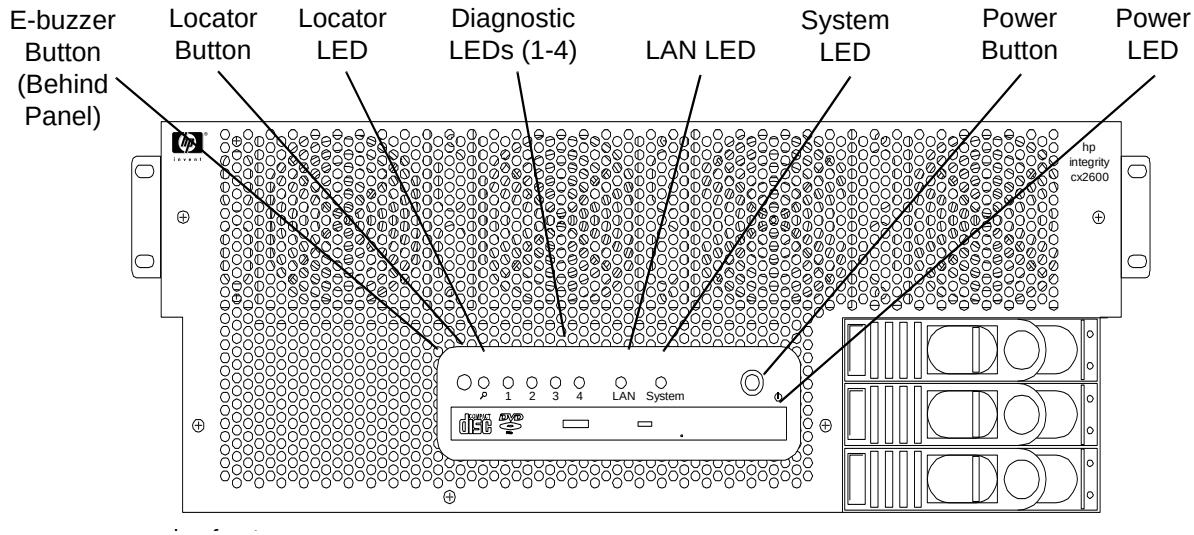
The front grill provides the controls and LEDs commonly used for operation. The front grill also functions as a bezel and provides air vents and electromagnetic interference (EMI) containment.

When the front grill is removed, you have access to the following components:

- Front fan units 1, 2, 3, and 4; all fan units are hot-swappable components
- Fan control board
- System status board
- Internal cabling

You do not need to remove the front grill when sliding the unit out of the rack or when accessing the top cover.

Figure 1-4 Front Grill Controls and LEDs



Switch or Button and LED Definitions

Table 1-2 lists the switch or button LED definitions.

Table 1-2 Switch or Button LED Definitions

Switch or Button	Definition
e-buzzer	Sounds when an error has been detected during boot or operation; or when triggered by the power button. The number of beeps identifies the error as follows: • One beep: Processor absent or failing. • Two beeps: Power supply malfunction. • Three beeps: Memory malfunction. • Four beeps: iLO MP card malfunction. • Five beeps: PCI-X I/O card malfunction. • Six beeps: Critical system failure. • Seven beeps: System board malfunction.
Locator LED and Button	Remotely activate or deactivate the server locator LED through the LAN or locally by pressing the **Locator** button on the front or rear panel. This device is used to help identify or locate a particular server among many.
Diagnostic LEDs (1 thru 4)	These LEDs, together with the server LED, display system error and fault status. The states of the LEDs can be decoded to identify an error or fault condition or the failing customer repair unit (CRU). (See Chapter 5 for more information on the LEDs.)
LAN LED	Shows the activity status of the server LAN as follows: • Off: System power is off. • Lit steady green: LAN link established but LAN is inactive. • Flashing green: LAN is active.
System LED	Shows the server status as follows: • Off: Operating power is not available to the server. • Flashing amber at 1 Hz rate: Attention required. Check the diagnostic LEDs and the iLO MP status log for information. The LED turns off when the iLO MP log is accessed. • Flashing red at a 2 Hz rate: Fault detected. Check the diagnostic LEDs and the iLO MP status log for information. Turn off the LED by using the iLO MP `dc` command, or by correcting the problem. • Flashing green at 0.5 Hz rate: System is booting or running EFI. Lit steady green: System normal. The operating system is up and running.

Table 1-2 Switch or Button LED Definitions *(continued)*

Switch or Button	Definition
Power Button	Controls the power supply (turns system power on or off) if power is available to the power supply. (Controls both power supplies if two are installed.) If power is off but available, pressing the **Power** button: • 1 - 3 seconds turns on the power supplies and applies power to the server. • 3 - 5 seconds causes the e-buzzer to repeat the last stored error message (beep code). If power is on and the server is booting or executing an EFI function, pressing the **Power** button: • 1 - 3 seconds turns off the server power (hard power off). • 3 - 5 seconds causes e-buzzer to repeat the last stored error message (beep code). • 5 seconds or longer turns off the server power (hard power off). If power is on and the operating system is running, pressing the **Power** button: • 1 - 3 seconds turns off system power (software-controlled power off). • 3 - 5 seconds causes the e-buzzer to repeat the last stored error message (beep code). • 5 seconds or longer turns off system power (hard power off).
Power LED	Shows system power status as follows: • Off: Power is not available to the server. • Flashing green: Standby power is available. Power supplies are off. • Lit steady green: At least one power supply is operating normally.

Storage Devices

Storage devices have additional LEDs that show their status.

Hot-Pluggable Disk Drive LEDs

The hot-pluggable disk drives have two LEDs per drive, as described below.

- Drive Status LED: The drive status LED is tri-color and may display green, amber, or yellow at any given time. These colors indicate a normal, warning, or failure condition.
- Drive Activity LED: The drive activity LED is green and indicates disk drive activity. This LED is controlled by the disk drive and turns on when a drive is accessed.

Figure 1-5 Hot-Pluggable Disk Drive LED Indicators

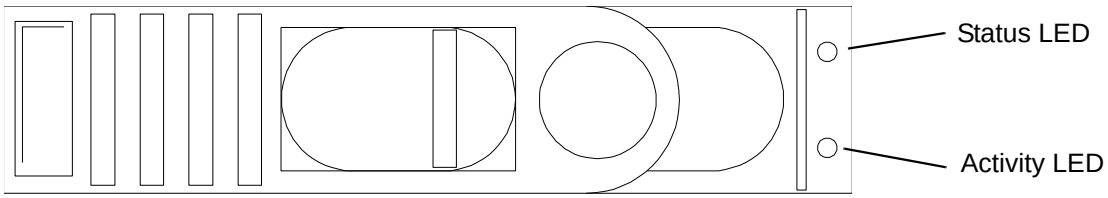


Table 1-3 lists the disk drive LED definitions.

Table 1-3 Hot-Pluggable Disk Drive LED Definitions

LED	Color	Description
Activity LED	Flashing green	Drive access under hard drive control.
Status LED	Green, Amber, Yellow, Blank	Drive or slot normal (drive present). Drive fault. Missing iLO MP card or missing jumper cable. For all HDD on SCSI bus A or B. Pass through mode.

DVD/DVD-R / DVD-RW Drives

The server is delivered with one DVD drive. A CD/DVD-RW and DVD-RW are optional. Each of these devices has one activity LED.

Figure 1-6 DVD Drive

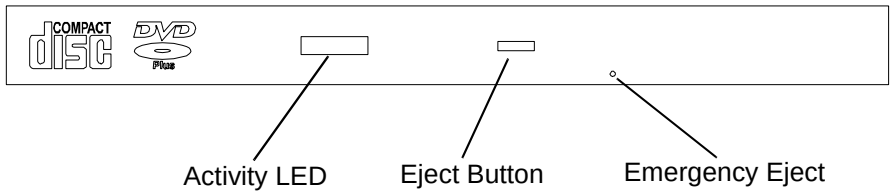


Table 1-4 lists the DVD drive LED definitions.

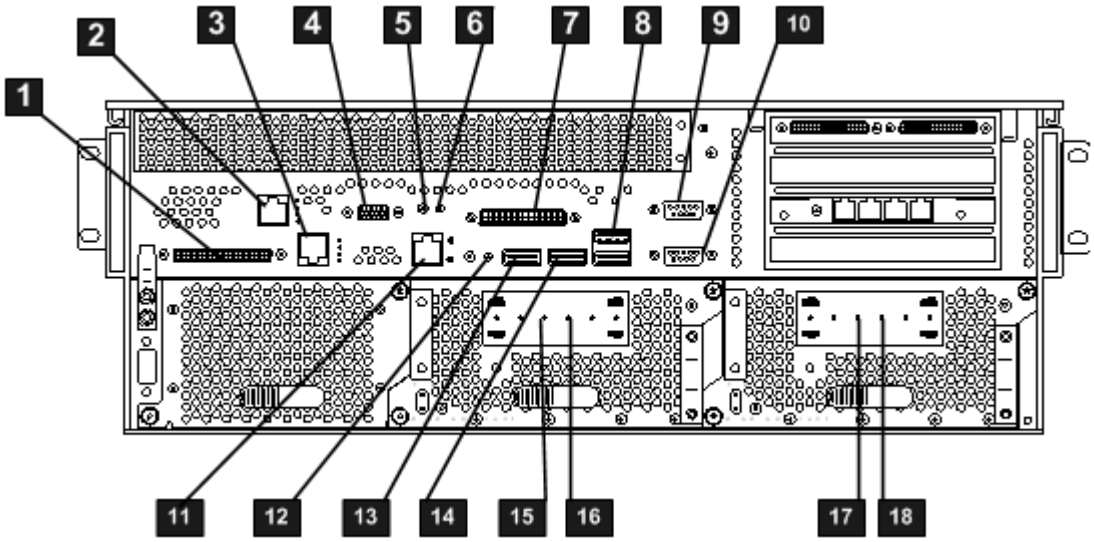
Table 1-4 DVD Drive LED Definitions

LED	State	Description
Activity LED	Flashing green	Drive access under hard drive control.

Rear Panel

The server rear panel includes communications ports, I/O ports, dc power connectors, LEDs, and buttons.

Figure 1-7 HP Integrity cx2620 Server Rear Panel



1. LVD/SE SCSI Port
2. iLO MP LAN (10/100 LAN) Port and LEDs
3. Gigabit Ethernet LAN A (10/100/1000 LAN) Port and LEDs
4. VGA Port
5. iLO MP Reset Button
6. Locator Button & LED
7. RS-232 Serial Console Port (console (iLO MP), remote, UPS)
8. USB Port
9. Serial Port A — This port is disabled.
10. Serial Port B — This port is disabled.
11. System Management LAN B (10/100/1000 LAN) Port and LEDs
12. TOC Button
13. Keyboard USB Port
14. Mouse USB Port
15. dc Power Supply Wire
16. dc Power Supply Wire
17. dc Power Supply Wire
18. dc Power Supply Wire

LVD/SE SCSI

Two Ultra 3, 68-pin SCSI connectors are located on the host bus adapter (HBA) located in PCI-X slot 1. The upper connector supports SCSI channel A and the lower connector supports SCSI channel B.

iLO MP LAN LEDs

The four iLO MP LAN LEDs display the status of the iLO MP LAN.

Table 1-5 iLO MP LAN LEDs

LED	Location	Color	State	Status
Self Test	Top	Yellow	Off/On	Self test is active. iLO MP is running self test.
10BT	2nd from top	Green	Off/Flashing/Lit Steady	No Link detected or 100BT is active. Indicates 10BT LAN activity. 10BT link established.
100BT	2nd from bottom	Green	Off/Flashing/Lit Steady	No Link detected or 10BT is active. Indicates 100BT LAN activity. 100BT link established.
Standby Power	Bottom	Green	Off/On	Standby power is not applied to iLO MP LAN circuits. Power is connected to the server but the server is not on.

Gigabit 10/100/1000 base-T Ethernet LAN A Port LEDs

The rear panel gigabit 10/100/1000 base-T Ethernet LAN A port has the following activity and status LEDs.

Gigabit 10/100/1000 base-T Ethernet LAN A Port Activity LEDs

Figure 1-8 shows the activity LEDs and Table 1-6 lists the activity LED description.

Figure 1-8 Gigabit 10/100/1000 base-T Ethernet LAN A Port Activity LEDs

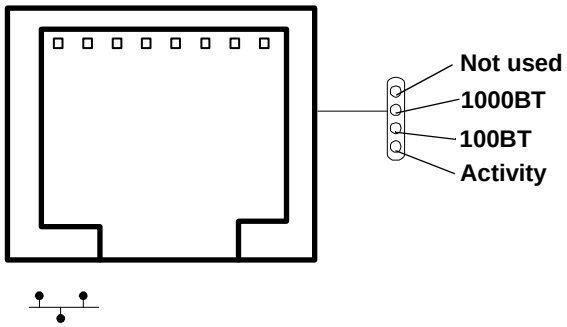


Table 1-6 lists Gigabit 10/100/1000 base-T Ethernet LAN A activity LED information.

Table 1-6 Gigabit 10/100/1000 base-T Ethernet LAN A Port Activity LEDs

LAN LED	Location	Color	State
Not used	Top	None	None
1000BT	2nd from top	Amber	Blinking amber: the 1000 Mbps with Ethernet protocol and twisted-pair wiring is enabled. Off: no link.
100BT	2nd from bottom	Green	Blinking green: the 100 Mbps with Ethernet protocol and twisted-pair wiring is enabled. Off: no link.
Activity	Bottom	Green	Blinking green: the Activity LED lights, and all other LEDs are off for a 10 Mbps connection. Off: no activity.

Gigabit 10/100/1000 base-T Ethernet LAN A Status LEDs

The four Gigabit 10/100/1000 base-T Ethernet LAN A LEDs display the status of the server LAN.

Table 1-7 Gigabit 10/100/1000 base-T Ethernet LAN A Status LEDs

LED	Location	Color	State	Status
1. Gbit	Top	Green	Off/On	No 1000 Mbps link has been detected. Port is linked at 1000 Mbps.
2. 100 Mbit	2nd from top	Green	Off/On	No 100 Mbps link has been detected. Port is linked at 100 Mbps.
3. Link	2nd from bottom	Green	Off/On	No 10 Mbps link has been detected. Port is linked at 10 Mbps.
4. Activity	Bottom	Green	Off/On	No LAN activity has been detected. Flashing or lit solid indicates LAN activity.

VGA Port

VGA is a method you can use to access the graphic console.

NOTE: You cannot access the iLO MP using VGA.

iLO MP Reset Button

The **iLO MP Reset** button resets the iLO MP.

iLO MP Card LEDs

There are two LEDs located on the iLO MP card that can be of assistance when troubleshooting. These LEDs are located close to the rear of the server. You can view these LEDs through cooling holes in the rear panel of the server. The LEDs are located as shown in Figure 1-9 and are described in Table 1-8.

Figure 1-9 iLO MP Card LEDs

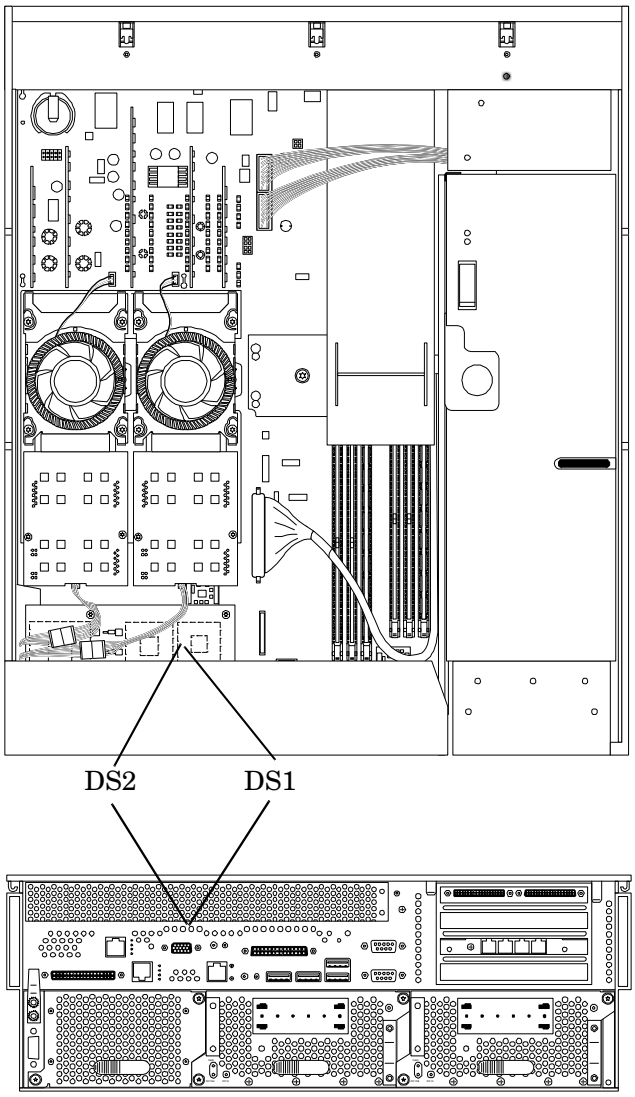


Table 1-8 lists the iLO MP card LEDs.

Table 1-8 iLO MP Card LEDs

LED	Description
DS1	This fault indicator flashes when an iLO MP fault is detected.
DS2	The iLO MP heartbeat indicator flashes when the iLO MP is active.

Locator LEDs and Button

Locator LEDs and buttons are provided on the front and rear panels of the server. The buttons enable or disable the locator function. You can activate the locator LED from a remote location through the LAN. The locator LED is lit to help call attention to locate the server when it is one among many.

RS-232 Serial Console Port (console (iLO MP), remote, UPS)

25–pin female serial data bus connector for the optional iLO MP. This connector connects to a three-port breakout cable (HP P/N A6144-63001) with individual connectors for Console, Remote and UPS. The Console connector becomes the console connection when the iLO MP is installed.

USB

Four universal serial bus (USB 2.0) connectors.

Serial A and Serial B Console Ports

These ports are disabled.

System Management 10/100/1000 Base-T Ethernet LAN B LEDs

The rear panel system management 10/100/1000 base-T Ethernet LAN B port has the following status and activity LEDs.

Figure 1-10 System Management 10/100/1000 Base-T Ethernet LAN B Port LEDs

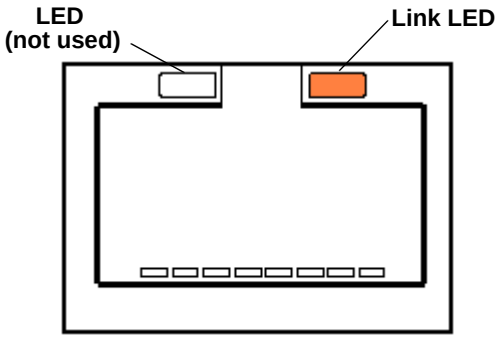


Table 1-9 lists link LED output.

Table 1-9 System Management 10/100/1000 base-T Ethernet LAN B Port LEDs

Link LED	Output
Activity	Blinking Orange
Link with no activity	Solid Orange
No link	Off

TOC Button

The **Transfer of Control** (TOC) button halts all system processing and I/O activity and restarts the computer system preserving system memory contents and leaving the iLO MP in communication with the console.

Power Supply

Primary power connection for the server. The standard configuration of the server includes two power supplies. While only one power supply can be used to power the HP server, N+1 redundancy requires that a second power supply be installed. In normal operations, both power supplies are in use at all times.

A power supply unit has three status LEDs located on the back of the power supply.

Figure 1-11 Rear View of dc Power Supply

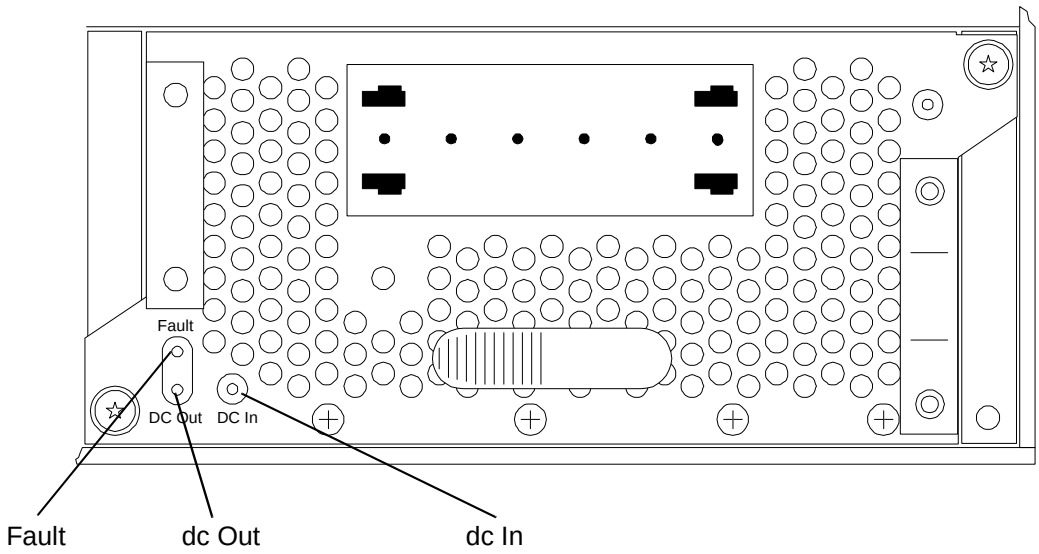


Table 1-10 lists and describes the power supply status LEDs.

Table 1-10 Power Supply Status LEDs

LED	Color	State	Status
dc In	Green	On	dc power (–40 to –72 VDC) is available to the power supply.
dc Out	Green	On	dc power is applied to system circuits.
Fault	Amber	Off	Power is applied to this power supply, and a fault has been detected.

System Board LEDs

There are three LEDs located on the system board that can be of assistance when troubleshooting. These LEDs are located close to the rear of the server. View these LEDs through cooling holes in the rear panel of the server. The LEDs are located as shown in Figure 1-12 and are described in Table 1-11.

Figure 1-12 System Board LEDs

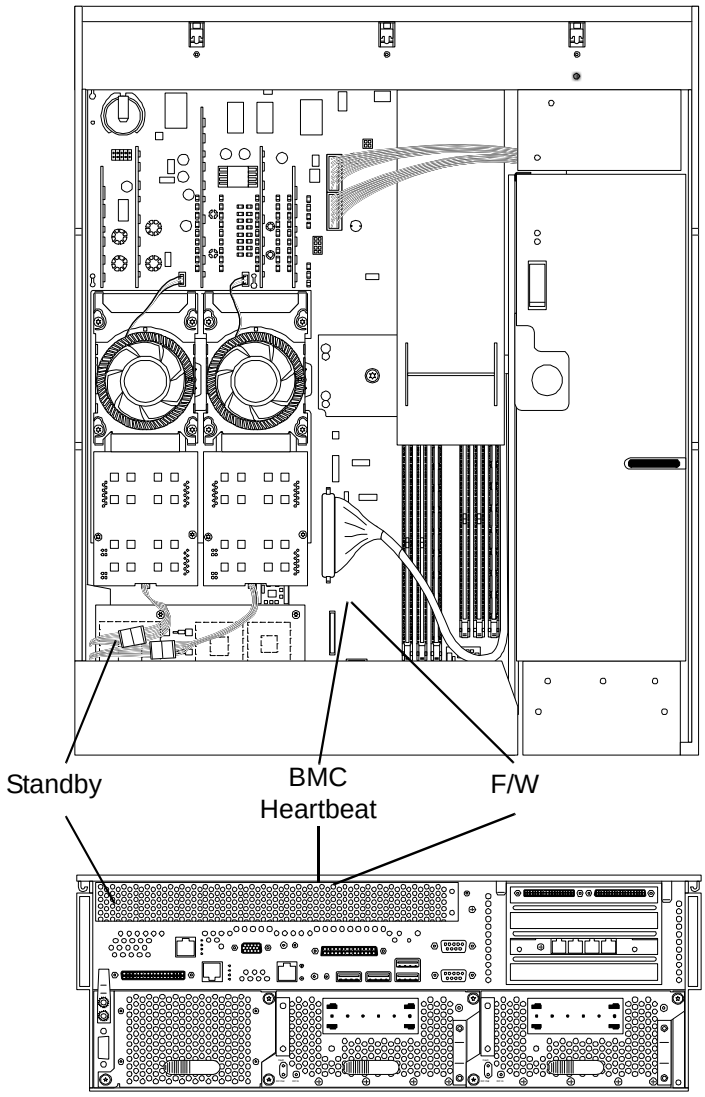


Table 1-11 lists the system board LEDs.

Table 1-11 System Board LEDs

LED	Description
Standby	The standby LED displays the power status of the server. It is lit when power is applied (dc In LED on either power supply is lit). If power is applied and this indicator is off, you may have to replace the system board.
BMC	The baseboard management controller (BMC) heartbeat LED flashes whenever the BMC is active. If this indicator is not blinking when the server is powered on (STBY LED is lit), you may have to replace the system board.
Firmware	The firmware LED lights when the boot process begins. If the server will not boot, and this LED is off, you may have to replace the system board.

External and Cable Connectors

This section provides information on the ports and connectors on the rear panel of the server.

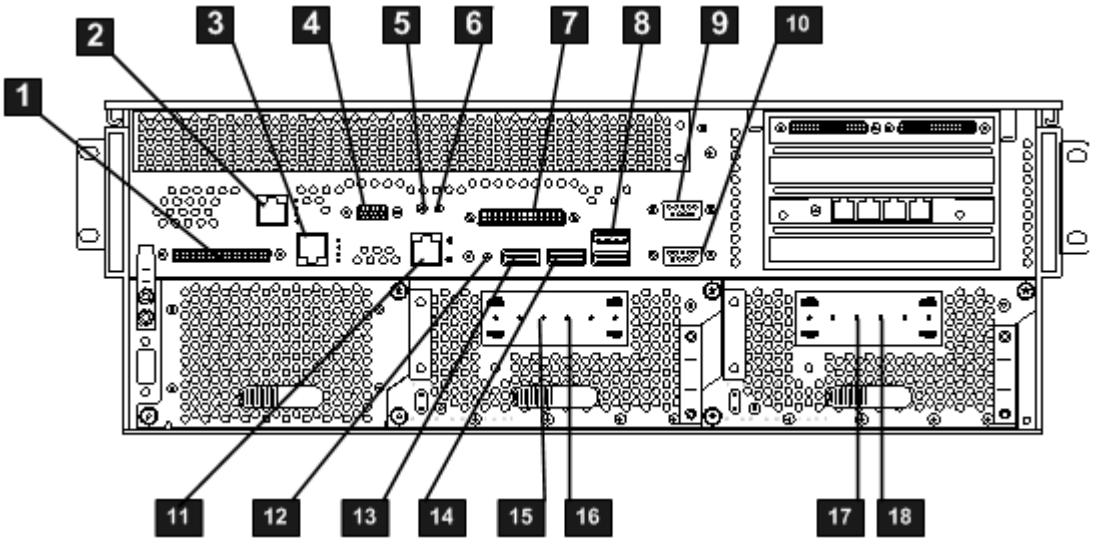
This section addresses the following topics:

- “RS-232 Serial Console Port Connector Pins and Pinouts” (page 41)
- “System Management LAN B (10/100/1000) Port Pins and Pinouts” (page 42)
- “VGA Port Pins and Pinouts” (page 40)
- “iLO MP LAN (10/100) Port and Pinouts” (page 40)

Ports and Connectors

Figure 1-13 displays the ports and connectors on the rear panel of the server.

Figure 1-13 Server Ports and Connectors



1. LVD/SE SCSI Port
2. iLO MP LAN (10/100 LAN) Port
3. Gigabit Ethernet LAN A (10/100/1000) Port
4. VGA Port
5. iLO MP Reset Button
6. Locator Button
7. RS-232 Serial Console Port (console (iLO MP), remote, UPS)
8. USB Port
9. Serial Port A — This port is disabled.
10. Serial Port B — This port is disabled.
11. System Management LAN B (10/100/1000 LAN)
12. TOC Button
13. Keyboard USB Port
14. Mouse USB Port
15. dc Power Supply Wire
16. dc Power Supply Wire
17. dc Power Supply Wire
18. dc Power Supply Wire

CAUTION: To protect against intra-building lighting surges, use shielded cables that are grounded at both ends. Failure to heed this caution can result in equipment damage.

SCSI Port, Ultra 3, 68-Pin

Two Ultra 3, 68-pin SCSI connectors are located on the host bus adapter (HBA) located in PCI-X slot 1. The upper connector supports SCSI channel A and the lower connector supports SCSI channel B. Figure 1-14 and Table 1-12 display the SCSI port Ultra 3, 68-pin and pinouts.

Figure 1-14 SCSI Port, Ultra 3, 68-Pin

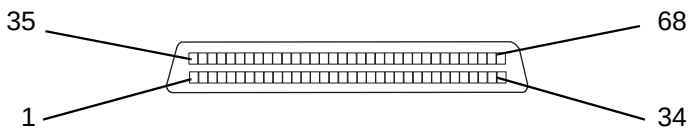


Table 1-12 SCSI Port Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	S1 (+DB 12)	35	S35 (–DB 12)
2	S2 (+DB 13)	36	S36 (–DB 13)
3	S3 (+DB 14)	37	S37 (–DB 14)
4	S4 (+DB 15)	38	S38 (–DB 15)
5	S5 (+DB P1)	39	S39 (–DB P1)
6	S6 (+DB 0)	40	S40 (–DB 0)
7	S7 (+DB 1)	41	S41 (–DB 1)
8	S8 (+DB 2)	42	S42 (–DB 2)
9	S9 (+DB 3)	43	S43 (–DB 3)
10	S10 (+DB 4)	44	S44 (–DB 4)
11	S11 (+DB5)	45	S45 (–DB 5)
12	S12 (+DB 6)	46	S46 (–DB 6)
13	S13 (+DB 7)	47	S47 (–DB 7)
14	S14 (+DB P)	48	S48 (–DB P)
15	S15 (GND)	49	S49 (GND)
16	S16 (DIFFSENS)	50	S50 (GND)
17	S17 (TERMPWR)	51	S51 (TERMPWR)
18	S18 (TERMPWR)	52	S52 (TERMPWR)
19	S19 (RESERVED)	53	S53 (RESERVED)
20	S20 (GND)	54	S54 (GND)
21	S21 (+ATN)	55	S55 (–ATN)
22	S22 (GND)	56	S56 (GND)
23	S23 (+BSY)	57	S57 (–BSY)
24	S24 (+ACK)	58	S58 (–ACK)
25	S25 (+RST)	59	S59 (–RST)
26	S26 (+MSG)	60	S60 (–MSG)
27	S27 (+SEL)	61	S61 (–SEL)
28	S28 (+C/D)	62	S62 (–C/D)
29	S29 (+REQ)	63	S63 (–REQ)
30	S30 (+I/O)	64	S64 (–I/O)
31	S31 (+DB 8)	65	S65 (–DB 8)
32	S32 (+DB 9)	66	S66 (–DB 9)
33	S33 (DB 10)	67	S67 (–DB 10)
34	S34 (DB 11)	68	S68 (–DB 11)

iLO MP LAN (10/100) Port and Pinouts

Figure 1-15 and Table 1-13 display the iLO MP LAN port pins and pinouts.

Table 1-13 iLO MP LAN Port Pinouts

Pin Number	Signal Description
1	TXP
2	TXN
3	RXP
4	Not used
5	Not used
6	RXN
7	Not used
8	Not used

Gigabit Ethernet LAN A (10/100/1000) Port and Pinouts

Figure 1-15 and Table 1-14 display the Gigabit Ethernet LAN A port and pinouts.

Figure 1-15 Gigabit Ethernet LAN A Port and iLO MP LAN Port

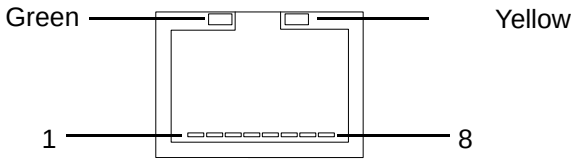


Table 1-14 Gigabit Ethernet LAN A Port Pinouts

Pin Number	Signal Description
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

VGA Port Pins and Pinouts

Figure 1-16 and Table 1-15 display the VGA port pins and pinouts.

Figure 1-16 VGA Port Pins

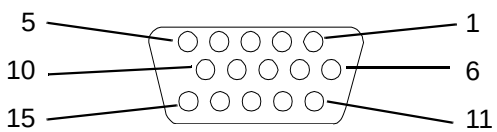


Table 1-15 VGA Port Pinouts

Pin Number	Signal Description	Pin Number	Signal Description
1	Red	9	+5 VDC
2	Green	10	Sync return (ground)
3	Blue/RXP	11	Not used
4	Not used	12	Monitor ID bit 1
5	Video self test (ground)	13	Horizontal sync (+)
6	Red return (ground)	14	Vertical sync (–)
7	Green return (ground)	15	Video ID bit 2
8	Blue return (ground)		

RS-232 Serial Console Port Connector Pins and Pinouts

Figure 1-17 and Table 1-16 display the RS-232 serial console port connector pins and pinouts.

Figure 1-17 RS-232 Serial Console Port Connector Pins

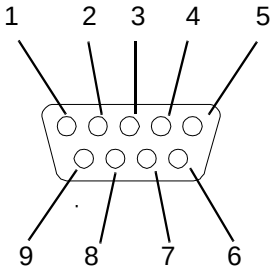


Table 1-16 RS-232 Serial Console Port Pinouts

Pin Number	Signal Description
1	Data carrier detect
2	Receive data
3	Transmit data
4	Data Term ready
5	Ground
6	Ring indicator
7	Clear to send
8	Request to send
9	Data set ready

Universal Serial Bus (USB) Port Connector Pins and Pinouts

Figure 1-18 and Table 1-17 display the USB port connector pins and pinouts.

Figure 1-18 USB Port Connector Pins

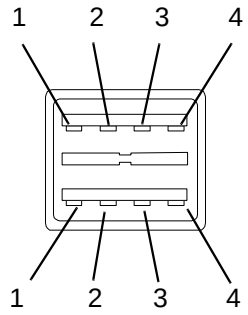


Table 1-17 USB Port Connector Pinouts

Pin Number	Signal Description
1	+5VDC
2	MR
3	PR
4	Ground

System Management LAN B (10/100/1000) Port Pins and Pinouts

Figure 1-19 and Table 1-18 display the system management LAN B port pins and pinouts.

Figure 1-19 System Management LAN B Port Pins

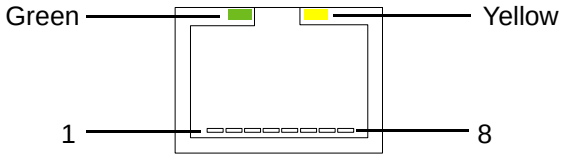


Table 1-18 System Management LAN B Port Pinouts

Pin Number	Signal Description
1	BI_DA+
2	BI_DA-
3	BI_DB+
4	BI_DC+
5	BI_DC-
6	BI_DB-
7	BI_DD+
8	BI_DD-

Cable Connector Locations

Table 1-19 lists the cable connector locations.

Table 1-19 Cable Connector Locations

Cable Part Number	From One PCA Designator	To Another PCA Designator
AB216-63015 IDE	System Board (J47)	DVD
AB216-63016 Power 1	System Board (P4)	Fan Control Board (P1)
AB216-63018 HDD Power	System Board (J5)	SCSI Backplane (J7)
AB216-63017 Power 2	System Board (J6)	Fan Control Board (P2)
AB216-63014 SCSI A&B	System Board (Channel A) (Channel B)	SCSI Backplane (J4 “A”) (J5 “B”)
AB216-63022 Status	Fan Control Board (P8)	Display PCA (J1) System Board (J17)
AB216-63019 Fan 1-4	Fan Control Board (P3)	Chassis (fans 1-4)
AB216-63020 Fan 5	Fan Control Board (P4)	Fifth Fan (chassis bulkhead)
AB216-63009 CPU Power	Power Supply Interface	Power PODs

Power Off and Power On the Server

This section provides information on how to power off and power on the server.

This section addresses the following topics:

Power States

The server has three power states: standby power, full power, and off. You must plug the power cord into a receptacle to achieve the standby power state; the front panel power button is not activated. Full power occurs when the power cord is plugged into a receptacle, and the **Power** button is activated. In the off state, the power cords are not plugged in. The following table describes the server power states:

Table 1-20 Power States

Power States	Power Cable Plugged into Receptacle	Front Panel Power Button Activated	dc Power Applied
Standby power	Yes	No	Yes
Full power	Yes	Yes	Yes
Off	No	No	No

Power Off the Server

The following procedure describes how to power off the server.

1. Gracefully shut down your operating system. See operating system documentation for more information.
2. Press the **Power** button to power off the server.
3. Unplug the power cord.

Power On the Server

The following procedure describes how to power on the server.

1. Plug in the power cord.
2. Press the **Power** button to start the server.
3. Start your operating system.

2 System Specifications

This chapter provides information on the basic system configuration, physical specifications, and requirements for the HP Integrity cx2620 server.

This chapter addresses the following topics:

System Configuration

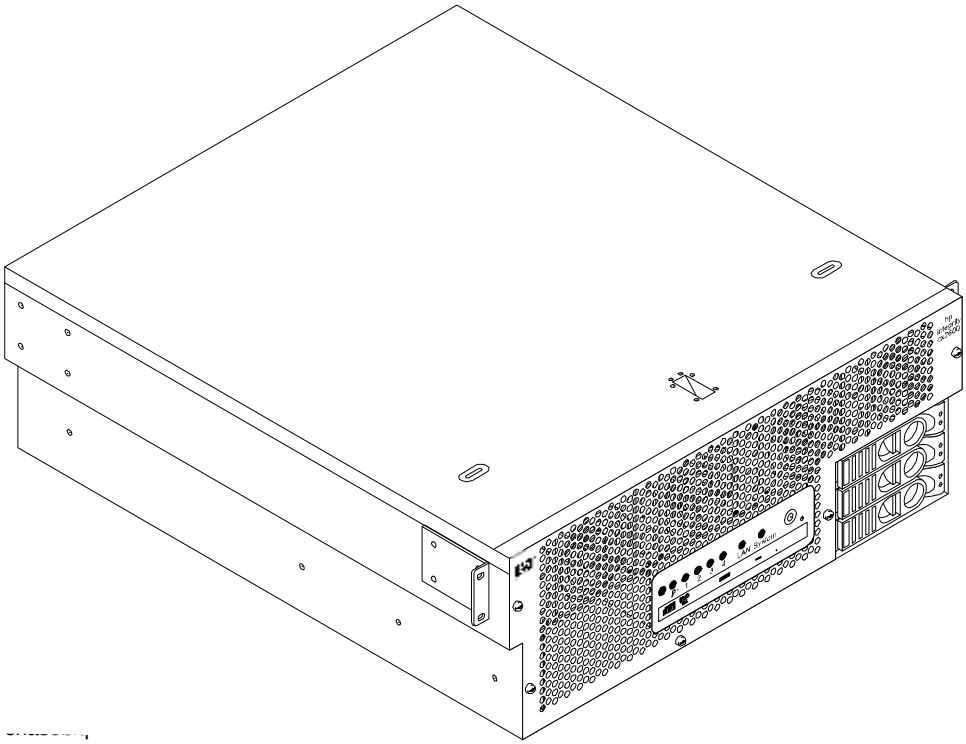
Table 2-1 lists the minimum and maximum configurations for the server.

Table 2-1 Minimum/Maximum Configuration

System Name	Minimum	Maximum
CPU	One	Two
Power Supplies[1]	One	Two
Memory	1 GB (4 X 256 MByte DIMMs)	32 GB (8 X 4 GByte DIMMs)
Optional Internal Disks	One Hot Plug Disk Drive:36 GB 15K Ultra 320 or 73 GB 15K HDD or 146 GB 10K HDD	Three Hot Plug Disk Drives: 36 GB 15K Ultra 320 or 73 GB 15K HDD or 146 GB 10K HDD
Optional Internal Media	One DVD or One CD-RW / DVD	One DVD, or one CD-RW/DVD
Optional I/O	Zero	Four 64-bit, 133 MHz PCI-X slots holding any of the following: Four port 100base TX Ethernet LAN adapter

1 The standard configuration of the server includes two power supplies. While only one power supply can be used to power the HP server, N+1 redundancy requires that a second power supply be installed. In normal operations, both power supplies are in use at all times.

Figure 2-1 HP Integrity cx2620 Server



Dimensions and Weights

This section provides dimensions and weights of the server.

Table 2-2 Server Dimensions and Weights

Dimension	Value
Height	17.8 cm (7 in) (4U)
Width	44.5 cm (17.5 in)
Depth	50.8 cm (20 in)
Weight	28.1 kg (62 lb) Unloaded 31.75 kg (70 lb) Fully loaded

Electrical Specifications

This section provides electrical specifications for the server.

CAUTION: Connection with a dc source should only be performed by trained service personnel.

dc Source and Main dc Power Disconnect

The server with dc input is to be installed in a Restricted Access Location in accordance with articles 110-16, 110-17, and 110-18 of the National Electric Code, ANSI/NFPA 70. The dc source

must be electrically isolated by double or reinforced insulation from any hazardous ac source. The dc source must be capable of providing up to 650 Watts of continuous power per feed pair.

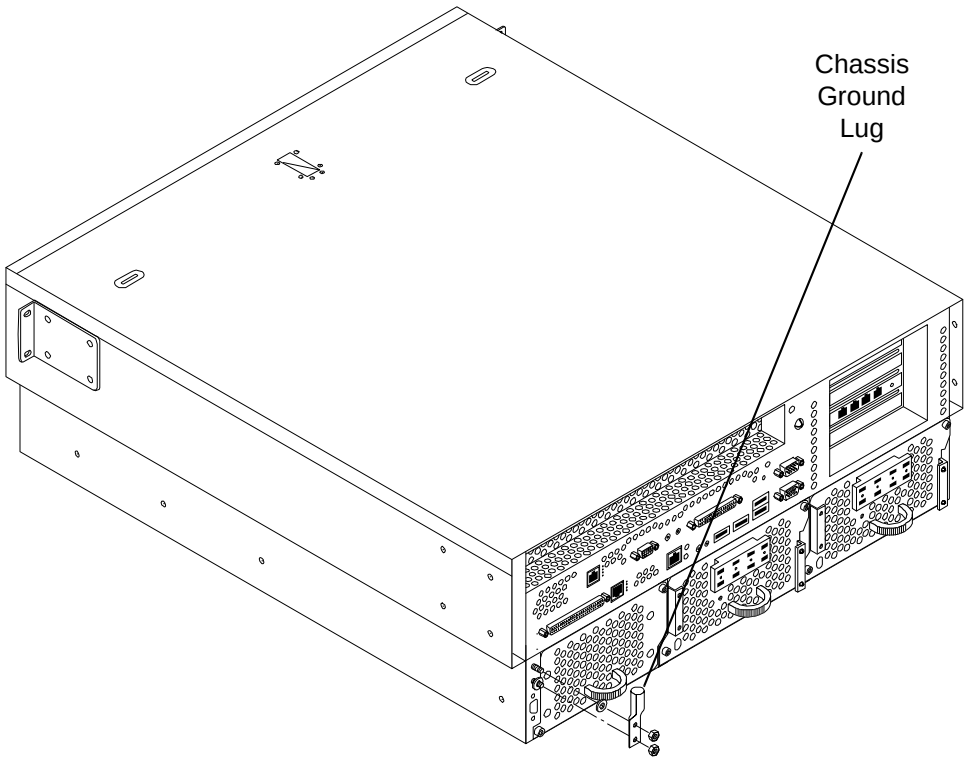
WARNING! You are responsible for installing a properly rated dc power disconnect for the server system. This main disconnect must be readily accessible, and it must be labeled as controlling power to the server. The circuit breaker of a centralized dc power system may be used as a disconnect device when easily accessible and should be rated no more than 10 amps.

Grounding the Server

The site building shall provide a safety ground/protective earth ground to all cabinets. The required chassis grounding lug for NEBS compliance is provided on the server rear panel (Figure 2-2).

WARNING! To avoid the potential for an electrical shock hazard, you must reliably connect an earth grounding conductor to the server. The earth grounding conductor must be a minimum 14AWG connected to the earth ground stud(s) on the rear of the server. The safety ground conductor should be connected to the chassis stud with a Listed closed two-hole crimp terminal with a maximum width of 0.25 inch. The nuts on the chassis earth ground studs should be installed with a 10 in/lbs torque. The safety ground conductor provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Figure 2-2 Chassis Ground Lug



Install a PE (protective earthing) conductor that is identical in size, insulation material, and thickness to the branch-circuit supply conductors. The PE conductor must be green with yellow stripes. The earthing conductor is to be connected from the unit to the building installation earth or, if supplied by a separately derived system, at the supply transformer or motor-generator set grounding point.

Disconnect Device and Branch Circuit Protection

WARNING! Failure to provide an appropriate disconnect device and branch circuit protection may endanger service personnel. Serious injury and equipment damage may result if this warning is not observed.

A suitable disconnect device must be provided as part of the building installation. The purpose of the disconnect device is to provide an easy and accessible means for removing power from the product for servicing.

A suitable branch circuit protection device must be provided as part of the building installation. The purpose of branch circuit protection is to limit current in the case of a fault.

The disconnect device may also provide branch circuit protection (for example, a circuit breaker). Alternately, separate disconnect and branch circuit protection devices (fuses and a disconnect switch) may be employed.

The devices must be rated based on the plate rating of the product in accordance with the applicable local codes and specific customer requirements. Branch circuit protection is commonly selected based on 125% of the product input rating. Such derating is to avoid nuisance tripping due to load surges or power transients and to meet code requirements. Applicable codes and customer requirements will vary.

System Power Specifications

The following tables provide information to help determine the amount of power needed for your computer room.

Table 2-3 list the power specifications for the server.

Table 2-3 System Power Specifications

Specification	Value
Nominal Input Voltage	-48 VDC (-40 to -60 VDC)
Minimum Operating Voltage	-36 VDC
Maximum Operating Voltage	-72 VDC
Input Current	12A DC typical (with V_{IN} -48 VDC)
Input Power	580W typical (@ 85% efficiency)
Maximum Inrush Current	25 A
Maximum Output Current from each Power Supply	49A DC for the 12V output 3.5A DC for the V3.3 sb output
Efficiency	82% (minimum)

Table 2-4 list the system power requirements for the server including CPUs.

Table 2-4 System Power Requirements

Power Required	Watts	Comments
Maximum configuration[1]	650	Maximum Theoretical
Typical configuration	580	

1 Maximum power is the sum of the worst case power consumption values of every subsystem in your server. These worst case values should be used to calculate the worst case power consumption for your facility installation.

The server can support one or two processors of the same type and speed.

Table 2-5 list the power consumption values for the CPUs.

Table 2-5 CPU Power Consumption

Core	CPU	Watts
Single-core Itanium (1P/1C)	1.6 GHz with 3 MB of cache	100
Dual-core Itanium (1P/2C)	1.4 GHZ with 12 MB of cache	100
Dual-core Itanium (1P/2C)	1.6 GHZ with 18 MB of cache	100

Environmental Specifications

This section provides the temperature and humidity requirements, noise emission, and air flow specifications for the server.

Temperature and Humidity

Ambient intake air temperature is often different from ambient room temperature. You should measure the operating temperature and humidity directly in front of the cabinet cooling air intakes rather than just checking ambient room conditions.

Operating Environment

The system is designed to run continuously and meet reliability goals in an ambient temperature of 5°C –40°C at sea level. The maximum allowable temperature is derated 1°C per 1,000 feet of elevation above 5,000 feet above sea level up to 30°C at 10,000 feet. For optimum reliability and performance, the recommended operating range is 20°C to 25°C and 40%-50% relative humidity.

Environmental Temperature Sensor

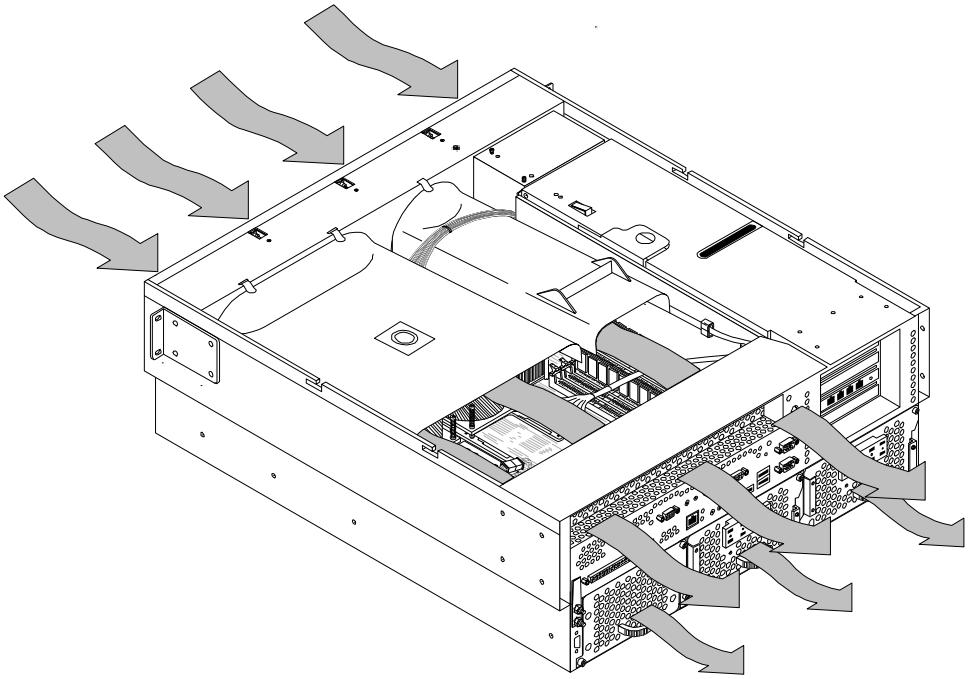
To ensure that the system is operating within the published limits, the ambient operation temperature is measured using a sensor placed on the front panel LED status board. Data from the sensor is used to control the fan speed and also to initiate system overtemp shutdown.

Non-operating Environment

The system is designed to withstand ambient temperatures between –40°C to 70°C under nonoperating conditions.

Cooling

Figure 2-3 Airflow Through the Server



Overall System Cooling

The cabinet incorporates front to back airflow across the entire chassis. Four 80 mm, dual blade fans, mounted vertically in the front of the chassis, push air through the CPU, memory, and PCI-X sections. One 80 mm, dual blade fan and the internal power supply fans cool the lower section of the chassis. The five 80 mm fans are controlled by circuits of the fan control board. The fan control circuits receive fan input from the baseboard management controller (BMC) on the system board, and return fan status information. The fan circuit generate power and the pulse-width-modulated control signals to the fans and monitor the speed indicator signals from each of the fans. Fan failures are reported through the front panel diagnostic LEDs and in error messages. Room ambient air temperature is sensed on the front panel LED status board and provided to the system board.

Table 2-6 lists the minimum and maximum CFM (cubic feet minute) airflow rates.

Table 2-6 Minimum and Maximum Airflow Rates for cx2620 Chassis

With Air Baffle	Without Air Baffle
Minimum: 146 CFM	Minimum: 166 CFM
Maximum: 185 CFM	Maximum: 216 CFM

CPU/Memory Cooling

Cooling for the processors (CPUs) and memory is provided by three 80 mm fans mounted in the front of the server chassis (fans 2, 3, and 4). Fan 2 is controlled by room ambient air temperature and provides air through the memory section of the chassis. Fans 3 and 4 are controlled by room ambient air temperature and processor (CPU) temperature. These two fans direct airflow across processor 1 (fan 4) and 2 (fan 3).

Power Supply Cooling

Cooling for the power supplies is provided by the 60 mm fans mounted in each of the power supply assemblies. Air is pushed through the power supply by the 60 mm fans and exhausted out the rear of the chassis.

PCI-X/Mass Storage Section Cooling

One 80 mm, dual blade fan pushes airflow through the PCI-X card cage. The fan is controlled by the room ambient temperature and runs at the speed necessary to maintain proper internal temperature throughout the PCI-X card cage.

Typical Power Dissipation and Cooling

The system configurations shown in Table 2-7 are typical of most systems and show the power and cooling values required for the listed components. These power and cooling values are considered typical and not maximum for the configurations shown.

Table 2-7 Typical Configuration Power Consumption Values

CPU	Memory	PCI-X Cards (assuming 10 Watts each)	Hard Disk Drives	Typical Power	Typical Cooling
Qty	Gigabytes	Qty	Qty	Watts	BTU/Hr
1	1 GB (4 DIMMs @ 256 MB ea.)	1	1	360	1144
1	32 GB (8 DIMMs @ 4 GB ea.)	2	1	385	1212
2	32 GB (8 DIMMs @ 4 GB ea.)	3	2	575	1809
2	32 GB (8 DIMMs @ 4 GB ea.)	4	2	596	1876
2	32 GB (8 DIMMs @ 4 GB ea.)	1	2	531	1673
2	32 GB (8 DIMMs @ 4 GB ea.)	2	3	574	1809
2	32 GB (8 DIMMs @ 4 GB ea.)	3	3	596	1876
2	32 GB (8 DIMMs @ 4 GB ea.)	4	3	617	1944

Acoustic Noise Specification

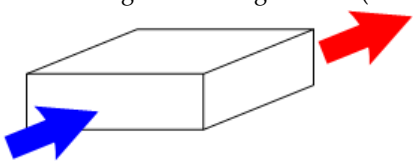
The acoustic noise specification for the server is as follows:

- 55 db LpA (sound pressure level at bystander position in a dedicated computer room environment temperature of <25°C).

Physical and Environmental Specifications

Table 2-8 provides temperature and airflow information for minimum, typical, and maximum configurations for the server. It also lists the server and rack weights and dimensions.

Table 2-8

<table>
<tr><th rowspan="2"></th><th colspan="5">Condition</th><th colspan="2" rowspan="2">Weight</th><th rowspan="2">Overall System (W x D x H)</th></tr>
<tr><th rowspan="2">Typical Heat Release
Voltage -40 to -60 Vdc</th><th colspan="2" rowspan="2">Airflow, Nominal</th><th colspan="2" rowspan="2">Airflow, Maximum at 35°C [1]</th></tr>
<tr><th>Server</th><th>Rack</th><th>Rack</th></tr>
<tr><td>Minimum Config.</td><td>340 Watts</td><td rowspan="3">178 CFM</td><td rowspan="3">302 m³/hr</td><td rowspan="3">216 CFM</td><td rowspan="3">367 m³/hr</td><td rowspan="3">28.1 kg - 31.75 kg (62 lb - 70 lb)</td><td rowspan="3">31.75 kg (70 lb)</td><td rowspan="3">W: 44.5 cm (17.5 in)
D: 50.8 cm (20 in)
H: 17.8 cm (7 in)</td></tr>
<tr><td>Maximum Config.</td><td>650 Watts</td></tr>
<tr><td>Typical Config.</td><td>580 Watts</td></tr>
<tr><td colspan="9"></td></tr>
<tr><td rowspan="3">ASHRAE Class 1</td><td colspan="5" rowspan="3">Air Flow Diagram Cooling Scheme (F - R)
 
Front to Rear (F-R)</td><td>Minimum Config.</td><td colspan="2">One CPU, one power supply, [2] 1 GB DIMM, one DVD or one CD-RW/DVD, zero PCI–X cards, one HDD.</td></tr>
<tr><td>Maximum Config.</td><td colspan="2">Two CPUs, two power supplies, 32 GB DIMMs, one DVD or one CD-RW/DVD, four PCI–X card, three HDDs.</td></tr>
<tr><td>Typical Config.</td><td colspan="2">One CPU, two power supplies, 12 GB DIMMs, one DVD or one CD-RW/DVD, two PCI–X cards, two HDDs.</td></tr>
</table>

1 Derate maximum dry bulb temperature 1oC/300 m above 900 m.

2 While only one power supply can be used, N+1 redundancy requires that a second power supply be installed.

3 Installing the System

Introduction

The HP Integrity cx2620 server (Regulatory Model Number RSVLA-0303-DC) is a 64-bit, carrier grade server based on the Itanium® processor family architecture. This server is Network Equipment Building System (NEBS) level-3 compliant and is intended for telco users. The server accommodates one or two single-core or dual-core processors, from four to twelve DIMMs (providing 1 to 32 GB of memory), and internal peripherals including up to three disks and a CD/DVD. Its high availability features include hot-swappable fans and power supplies, and hot-pluggable disk drives. This server uses HP-UX 11i version 2 and Linux operating systems.

This chapter addresses the following topics:

Server Views

The following figures show the top, front, and rear views of the server.

Figure 3-1 Server Top View

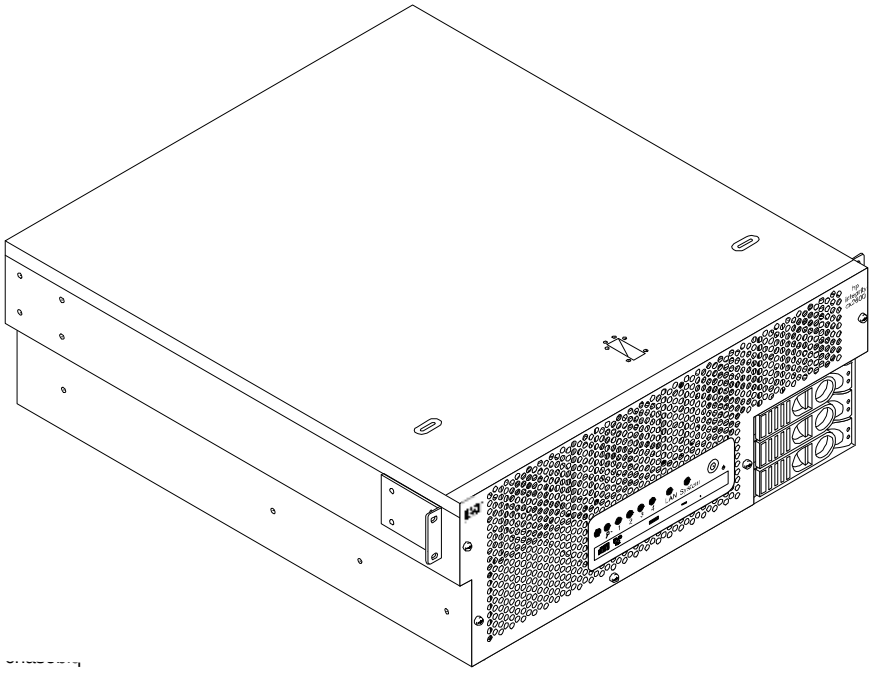


Figure 3-2 Server Front View

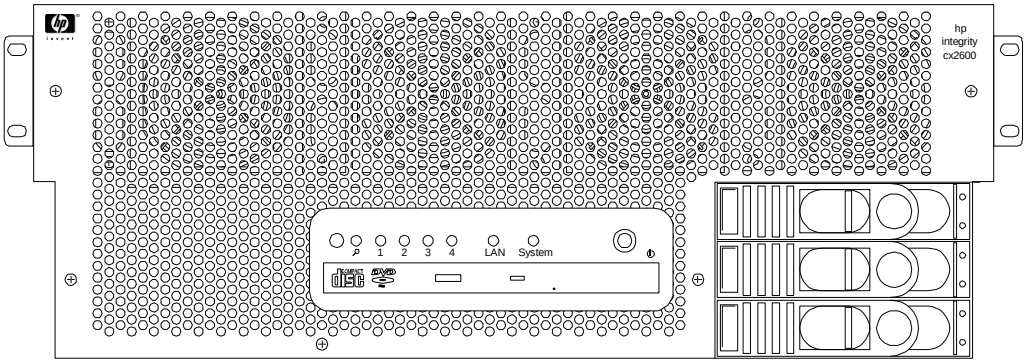
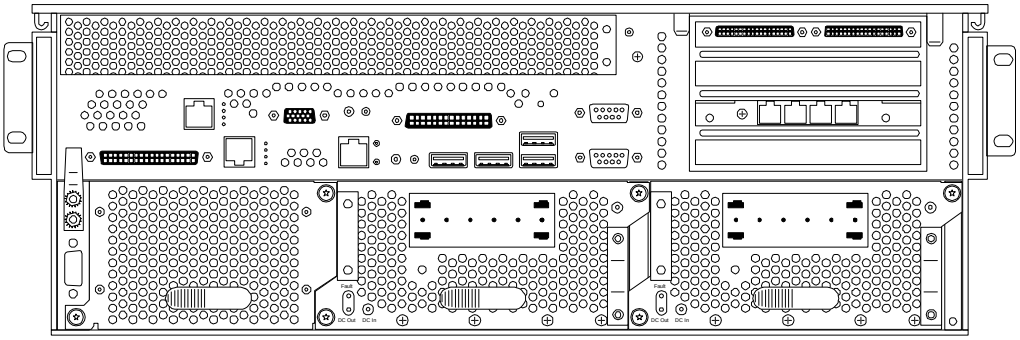


Figure 3-3 Server Rear View



Detailed Server Description

The following sections provide information on the main subsystems within the HP Integrity cx2620 server.

I/O Subsystem

The I/O subsystem provides four hot-swappable 64-bit/133 MHz PCI-X slots.

Processors

The server accommodates one or two single-core or dual-core Itanium CPUs processors.

Memory

The server uses either 2 GB or 4 GB memory sizes. DIMMs must be installed in quads.

Cooling

The server has five dual-rotor hot-swappable fans. The front four fan units are in the same assembly. The rear fan unit has its own assembly.

Power

The server has two hot-swappable dc input power supply units on the middle and right partition. The power supplies have two cooling fans and are designed for NEBS temperatures. The power supply plugs directly into the power distribution Printed Circuit Assembly (PCA) called PSI PCA.

Front Display Panel, DVD, and Diagnostic Panel

The LED status display is in the front of the unit directly above the DVD drive. The slimline DVD drive is also in the front of the unit. It is center-mounted in the unit and below the LED status display.

Mass Storage

The server has three hot-pluggable disk drives located in the front of the unit.

Firmware

Firmware consists of many individually linked binary images that are bound together by a single framework at run time. Internally, the firmware employs a software database called a device tree to represent the structure of the hardware platform and to provide a means of associating software elements with hardware functionality.

The firmware incorporates the Extensible Firmware Interface (EFI). EFI provides an interface between the operating system and the platform firmware. EFI uses data tables that contain platform-related information, and boot and runtime service calls that are available to the operating system and its loader to provide a standard environment for booting.

The firmware supports the HP-UX 11i version 2 and Linux® operating systems through the Itanium processor family standards and extensions, and has no operating system-specific functionality included. All operating systems are presented with the same interface to system firmware, and all features are available to the operating system.

User Interface

The Itanium processor family firmware employs a user interface called Pre-OS System Startup Environment (POSSE). The POSSE shell is based on the EFI standard shell. Several commands were added to the standard EFI Shell to support HP value-added functionality. For more information see the EFI and EFI/POSSE commands at:

http://h20000.www2.hp.com/bizsupport/TechSupport/Home.jsp.

Event IDs for Errors and Events

The system firmware generates event IDs (similar to chassis codes) for errors, events, and forward progress to the Integrated Lights-Out Management Processor (iLO MP) through common shared memory. The iLO MP interprets and stores event IDs. Reviewing these events helps you diagnose and troubleshoot problems with the server.

Dimensions and Weights

Table 3-1 lists the dimensions and weights for the server.

Table 3-1 Server Dimensions and Weights

Dimension	Value
Height	17.8 cm (7 in) (4U)
Width	44.5 cm (17.5 in)
Depth	50.8 cm (20 in)
Weight	28.1 kg (62 lb) Unloaded 31.75 kg (70 lb) Fully loaded

Safety Information

Use care to prevent injury and equipment damage when performing removal and replacement procedures. Voltages might be present within the server. Many assemblies are sensitive to damage by electrostatic discharge.

Follow the safety conventions listed below to ensure safe handling of components, to prevent injury, and to prevent damage to the server:

- When removing or installing any server component, follow the instructions provided in this guide.
- If installing a hot-swappable or hot-pluggable component when power is applied (fans are running), reinstall the server cover immediately to prevent overheating.
- If installing a hot-pluggable component, complete the required software intervention prior to removing the component.
- If installing an assembly that is neither hot-swappable, nor hot-pluggable, disconnect the power cable from the external server power receptacle.

⚠ **WARNING!** Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

- Do not wear loose clothing that can snag or catch on the server or on other items.
- Do not wear clothing subject to static charge build up, such as wool or synthetic materials.
- If installing an internal assembly, wear an antistatic wrist strap and use a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit (HP 9300-1609).
- Handle accessory boards and components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards.

Installation Sequence and Checklist

Follow the steps in Table 3-2 sequentially to ensure successful installation of the server.

Table 3-2 Installation Sequence Checklist

Step	Description	Completed
1	Unpack and inspect the server shipping container; inventory the contents using the packing slip.	
2	Install additional components shipped with the server.	
3	Install the server into a rack or tower mount.	
4	Connect cables to the server.	
	4a Connect dc input power cable.	
	4b. Connect LAN core I/O cable.	
5	Set up the console.	
6	Power on the server.	
7	Access the console.	

Table 3-2 Installation Sequence Checklist *(continued)*

Step	Description	Completed
8	Boot the operating system.	
9	Verify the server configuration.	

Unpacking and Inspecting the Server

This section describes procedures you perform before installation. Ensure that you have adequately prepared your environment for the new server, received the components that you ordered, and verified that the server and its containers are in good condition after shipment. This section addresses the following topics:

Verifying Site Preparation

Verifying site preparation is an essential factor of a successful server installation and includes the following tasks.

1. Gather LAN information and determine the two separate IP addresses for the iLO MP LAN and the system LAN.
2. Establish a method to connect to the server console.
3. Verify electrical requirements and ensure that grounding specifications and power requirements have been met.
4. Validate server physical space requirements.
5. Confirm environmental requirements.

For more information on server electrical, physical space, and environmental requirements, see the *HP Integrity cx2620 Site Preparation Guide*.

Inspecting the Shipping Containers for Damage

HP shipping containers protect their contents under normal shipping conditions. After the equipment arrives, carefully inspect each carton for signs of shipping damage. Shipping damage constitutes moderate to severe damage, such as punctures in the corrugated carton, crushed boxes, or large dents. Normal wear or slight damage to the carton is not considered shipping damage. If you find shipping damage to the carton, contact your HP customer service representative immediately.

Unpacking the Server

To unpack a non racked server, follow these steps.

1. Use the instructions printed on the outside top flap of the carton; remove the banding and the outer carton from the server pallet.
2. Remove all inner accessory cartons and the top foam cushions, leaving only the server.

IMPORTANT: Inspect each carton for shipping damage as you unpack the server.

Checking the Inventory

The sales order packing slip lists all of the equipment shipped from HP. Use this packing slip to verify that all of the equipment has arrived.

NOTE: To identify each item by part number, see the sales order packing slip.

Returning Damaged Equipment

If the equipment is damaged, contact your HP customer service representative immediately. The service representative initiates appropriate action through the transport carrier or the factory and assists you in returning the equipment.

Unloading the Server with a Lifter

WARNING! Use caution when using a lifter. Because of the weight of the server, you must center the server on the lifter forks before lifting it off the pallet to avoid injury.

To unload the server from the pallet using a lifter, follow these steps:

1. Unpack the server.
2. Unroll the bottom corrugated tray corresponding to the side on which the lifter will be placed, and slide the server as close to that edge of the pallet as possible.
3. Break off any foam packaging which could prevent the lifter from being fully inserted under the server. Do not remove the foam packaging from the corners of the server. This foam is required to elevate the server and enable the forks of the lifter to be placed under the server.
4. Insert the lifter forks under the server.
5. Carefully roll the lifters forward until it is fully positioned against the side of the server.
6. Slowly raise the server off the pallet until it clears the pallet cushions.
7. Carefully roll the lifter and server away from the pallet. Do not raise the server any higher than necessary when moving it over to the rack.

Installing Additional Components

This section describes how to install server components that are not installed before delivery.

This section addresses the following topics:

Required Service Tools

The HP Integrity cx2620 server may require one or more of the following tools for service:

- Electrically Conductive Field Service Kit (P/N 9300-1609)
- 1/4 inch flat blade screwdriver
- ACX-15 Torx screwdriver
- ACX-10 Torx screwdriver
- IPF CPU install tool (P/N 5069-4551)

Accessing a Rack-Mounted Server

The HP Integrity cx2620 server is designed to be rack-mounted. The following procedure explains how to gain access to a server that is mounted in an approved rack.

WARNING! Ensure that all anti-tip features (front and rear anti-tip feet installed; adequate ballast properly placed, and so on) are employed prior to extending the server.

Installing Components When the Server Is in a Rack

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

NOTE: Ensure that there is enough area (approximately 1.5 meters [5 ft.]) to fully extend the server out the front of the rack to work on it.

You can install power supplies, disks, and fans when the server is fully inserted into a rack. Only front and rear access is required.

Internal components are accessed by removing the top cover. Proceed as follows.

1. Turn off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Remove or loosen (as appropriate) the screws that fasten the server to the rack.
3. If the server is slide-mounted, slowly pull the chassis forward (or push from the rear) to extend the chassis from the rack. The server is fully extended when the rail clips are locked in place. If the server is tray-mounted, it is not held in the rack and can fall from its mounting. Do not extend the server from the rack, remove it from the rack for internal access.
4. Remove the top cover. See "Removing the Top Cover" (page 64).

Removing the Server from a Rack

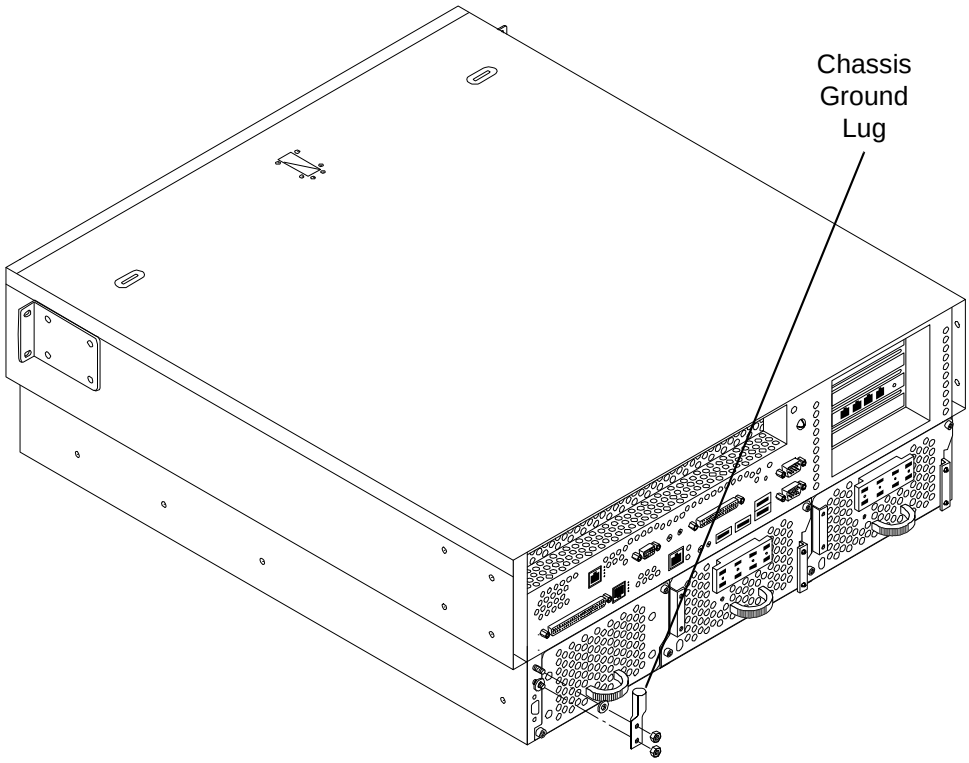
WARNING! The server can weigh as much as 22.7 kilograms (50 lbs.). Use caution when lifting the server.

NOTE: Ensure there is enough area (approximately 1.5 meters [5 ft.]) to fully extend the server from the front of the rack to work on it.

To remove the server from the rack, follow these steps:

1. Turn off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Label and disconnect all cables from the unit rear panel connectors.
3. Remove or loosen (as appropriate) the screws that fasten the server to the rack.
4. Label and disconnect the rack or facility ground cable from the chassis rear panel (Figure 3-4).

Figure 3-4 Chassis Ground Lug



5. If the server is slide-mounted, slowly pull the chassis forward (or push from the rear) to extend the chassis from the rack. The server is fully extended when the rail clips are locked in place. Do not extend tray-mounted servers. Tray-mounted servers are not locked in place and can fall if extended from a rack.
6. Disengage the slides or mounting hardware and take the server to a static-free work station.

Install the Server into a Rack

WARNING! Do not attempt to lift the server alone. The server can weigh as much as 22.7 kilograms (50 lbs.). Serious injury can result if this warning is not observed.

To insert the server into the rack, follow these steps:

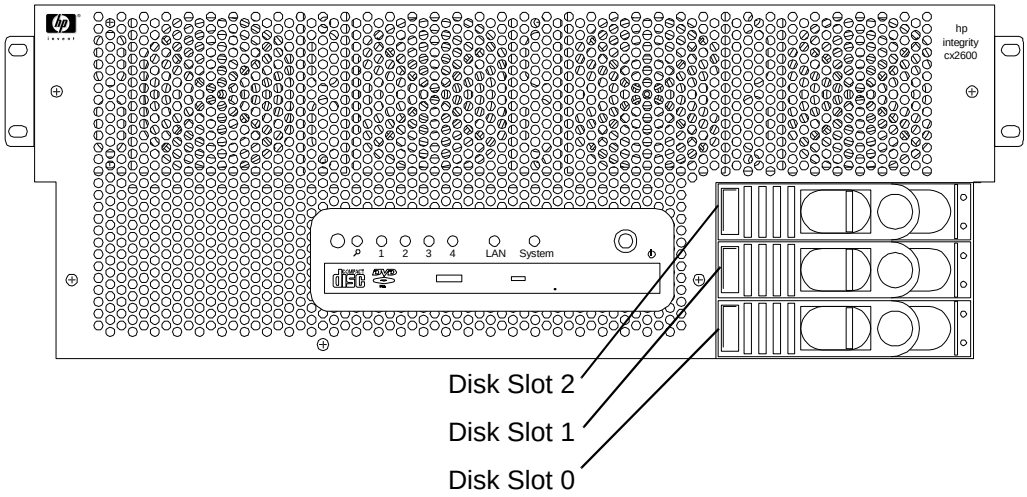
1. Engage the server slides or mounting kit, as appropriate.
2. Slide the server inward and push the server into the rack until it is in position.
3. Connect server cables to rear panel connectors.
4. Connect the rack or facility ground cable to chassis ground lug.
5. Replace or tighten the screws that fasten the server to the rack.

Installing Hot-Pluggable Disk Drives

The supported configuration of a server includes one, two, or three Low-Voltage-Differential (LVD), hot-pluggable disk drives. If any of the three disk drives are not installed, you must install a disk filler in the disk location.

Hot-pluggable disk drives are located at the front of the server (Figure 3-5). The following sections describe how to install a hot-pluggable disk drive.

Figure 3-5 Hot-pluggable Disk Drive Slots



CAUTION: A hot-pluggable device can require interaction with the operating system before you can safely remove or install the device into the server. Determine if the operating system supports replacement of disk drives while the operating system is running. If the operating system does not support this feature, shut down the operating system before performing these procedures. Failure to observe this caution can result in system failure.

The following sections describe how to install a hot-pluggable disk drive.

Installing Hot-Pluggable Disk Drives

Up to three hot-plug disk drives can be installed in the server. Always use low profile disk drives (1.0" height) in the server.

To install a hot-pluggable disk drive, follow these steps:

1. If required, stop the operating system. The OS does not support hot-plugging devices.
2. If a disk filler is installed, remove it by pulling the release lever.
3. With the release lever pulled out, slide a hot-pluggable hard disk into the disk slot until it is seated.
4. Press the release lever until it is flush with the front of the server. The release lever clicks as it locks into position.
5. If the operating system was stopped in step Step 1, reset the system to the **EFI Boot Maintenance Menu** to rescan the hard drives.
6. If the operating system was stopped in step Step 1, use the EFI Shell `map` command to verify that you correctly installed the newly inserted drive.

Installing Hot-Swappable Power Supply Units

The supported configuration of a server requires that two power supplies be installed. During normal operations, the two power supplies share the load. Each provides power through a separate power rail. A single power supply can provide all power needed for normal operations, but a second power supply is installed to provide backup capability.

Hot-swappable power supplies 1 and 2 are located at the rear of the chassis. The power supplies are identical and interchangeable.

NOTE: A hot-swappable device does not require interaction with the operating system before the device is removed from or installed into the server. If the second power supply is functioning correctly, you can power off and remove a power supply with no effect on server operations.

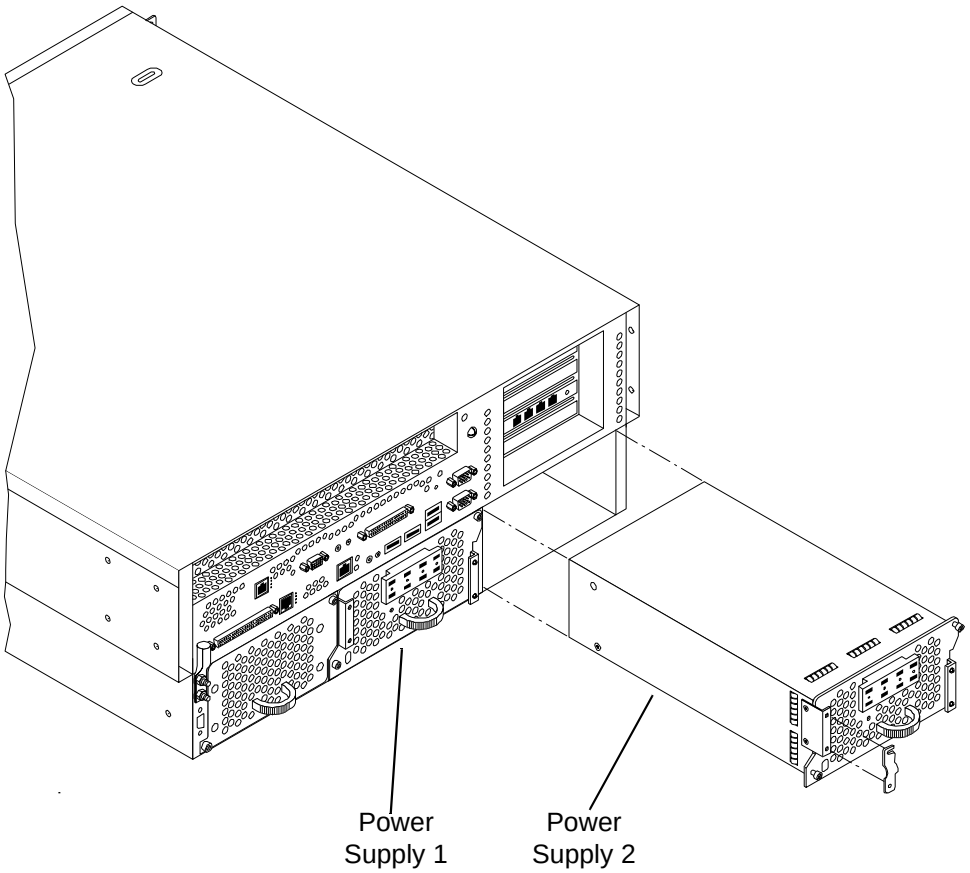
Installing a Hot-Swappable Power Supply

You can install a power supply while the server is installed in a rack.

To install a hot-swappable power supply, follow these steps:

1. If rack-mounted, you may need to extend a slide-mounted server out from the rack for better access. If necessary, slide the server out to the fully extended position.
2. Orient the power supply such that the securing screws are aligned with the corresponding holes in the server chassis. Gently push the power supply into position.

Figure 3-6 Hot-Swappable Power Supplies



3. When the power supply is fully inserted into the server chassis, tighten the two mounting screws to secure the power supply in place.
4. Press up on the two lower tabs on the terminal barrier strip cover to snap off the cover.

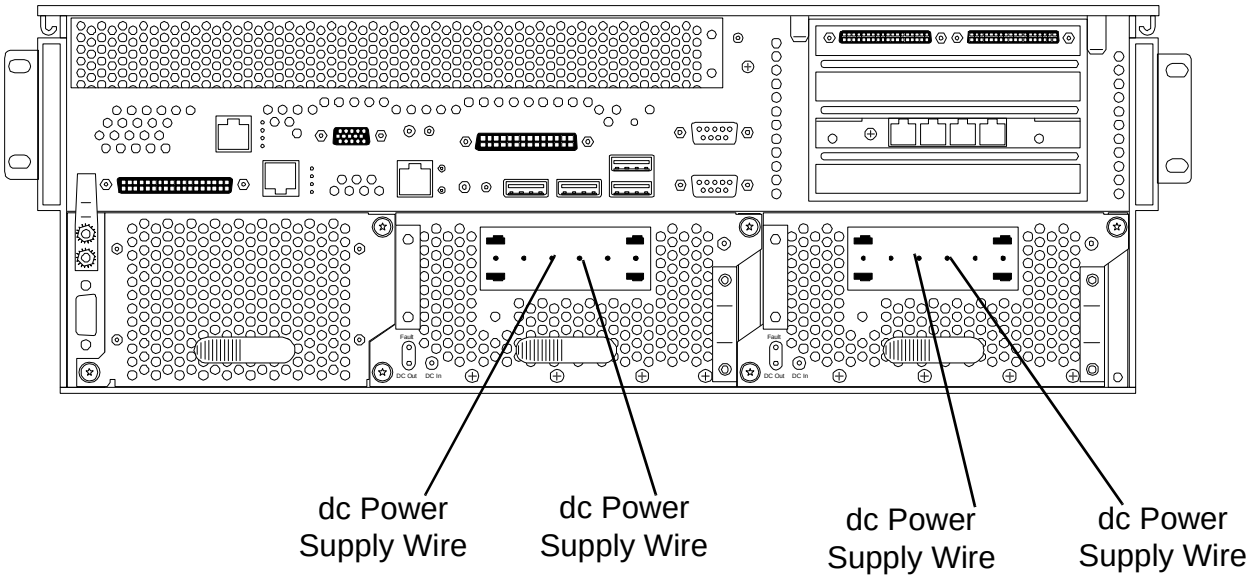
WARNING! Always check that the power cable is not connected to a power source before attempting to connect the power cable to power supply terminals. Failure to observe this warning can result in injury.

5. Connect the power cable leads to the power supply terminals (Figure 3-7).

   For -48V, the most positive wire is 0V.

   For -48V, the most negative wire is -48V.

Figure 3-7 dc Power Supply Wire Connectors



6. Install the terminal barrier strip cover. Hang the cover on the upper tabs and snap the cover into place.
7. Route the power cable through the power supply cable clamp and tighten the two knurled knobs to secure the cable in place.
8. Connect the power cable to the dc power source.

Installing the Front Grill and Top Cover

CAUTION: Operation of the server without the front grill and top cover in place makes the server susceptible to electromagnetic interference (EMI) and overheating problems, which can result in system failure. Keep the front grill and top cover in place during normal operation.

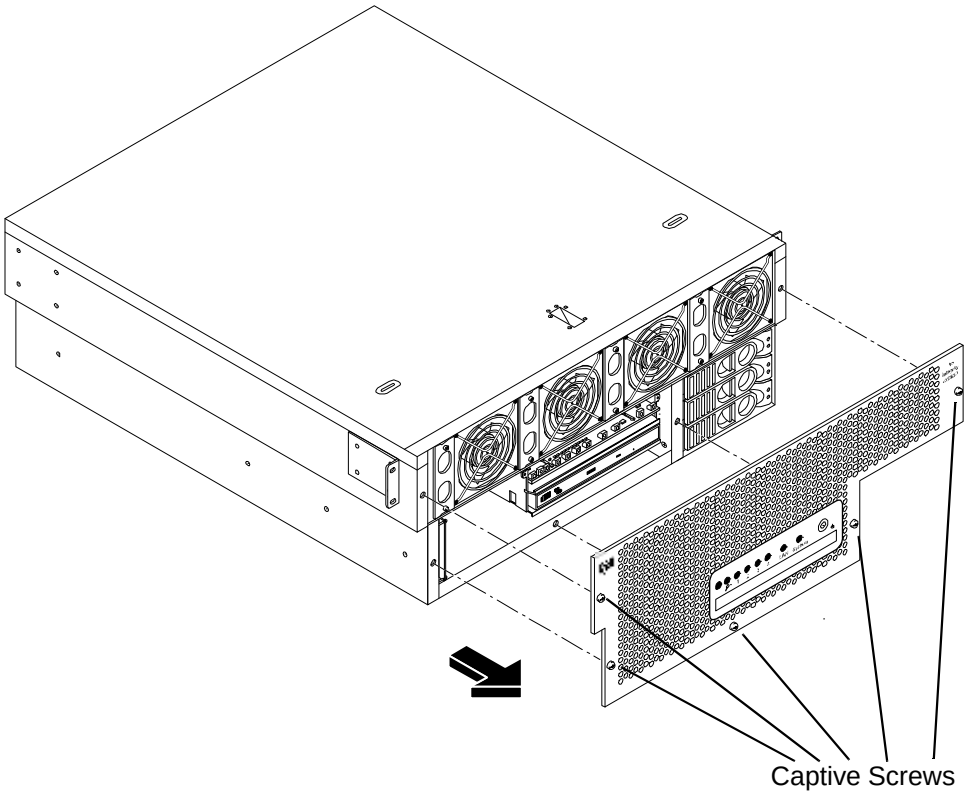
Observe all electrostatic discharge (ESD) safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Installing the Front Grill

To install the front grill, follow these steps:

1. Hold the grill against the front of the server chassis in mounting position.
2. Tighten the five captive screws to secure the grill to the server chassis (Figure 3-8).

Figure 3-8 Installing the Front Grill



Removing the Front Grill

NOTE: If you have an air filter assembly installed, remove the air filter assembly before removing the front grill. To remove the air filter assembly, see "Removing and Replacing the Air Filter Assembly" (page 176).

To remove the front grill, follow these steps:

1. Use the ACX-15 Torx screwdriver to loosen the five captive screws that secure the grill to the chassis.
2. Pull the grill from the front of the server chassis.

Installing the Top Cover

To install the top cover, follow these steps:

1. Align each pair of tabs on the left and right sides of the cover with the corresponding slots in the chassis. Set the cover in place on the chassis.
2. Align the three tabs on the front of the cover with the corresponding apertures at the top front of the chassis and insert the tabs into the slots.
3. Push the cover forward until it seats on the chassis.
4. Tighten the captive screw to secure the cover in place.

Removing the Top Cover

To remove the top cover, follow these steps:

WARNING! Voltages are present within the server when power is applied. Do not remove the server top cover without first turning off and disconnecting power. Always replace the top cover before turning the system on.

1. Power off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Slide the server out from the rack until it stops.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 59).
4. Use the ACX-15 Torx screwdriver to loosen the captive screw that holds the top cover in place.
5. Slide the cover toward the rear of the server chassis and lift it straight up.

Installing Hot-Swappable Chassis Fan Units

There are five hot-swappable chassis fan units in the HP server. Fan units 1, 2, 3 and 4 are accessible from the front of the chassis. Fan unit 5 is accessible from the rear of the chassis. Fan units 1, 2, 3 and 4 are identical and interchangeable.

If a fan failure is total (both rotors), or if the fan has been removed from the chassis for more than 30 seconds, the system logs the event as a critical error. A critical error causes the system LED to flash red, and requires a reboot to reset the error status. A total fan failure (including removal) for more than two minutes results in system shutdown. If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping a fan in less than two minutes enables continued operation and prevents automatic shutdown.

CAUTION: Operating the server with the front grill removed risks EMI. Operate the server with the front grill removed only when hot-swapping a fan. Always replace the front grill immediately after replacing a fan.

Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

NOTE: A hot-swappable device does not require interaction with the operating system before the device is removed from or installed into the server.

The power to the server does not have to be off to remove or replace a hot-swappable chassis fan unit.

Removing and Installing a Front Panel Hot-Swappable Fan

The server does not need to be removed or extended from the rack to enable fan replacement.

To remove and install a hot-swappable fan from the front of the server chassis, follow these steps:

CAUTION: Hot-swapping a fan can interrupt system operation.

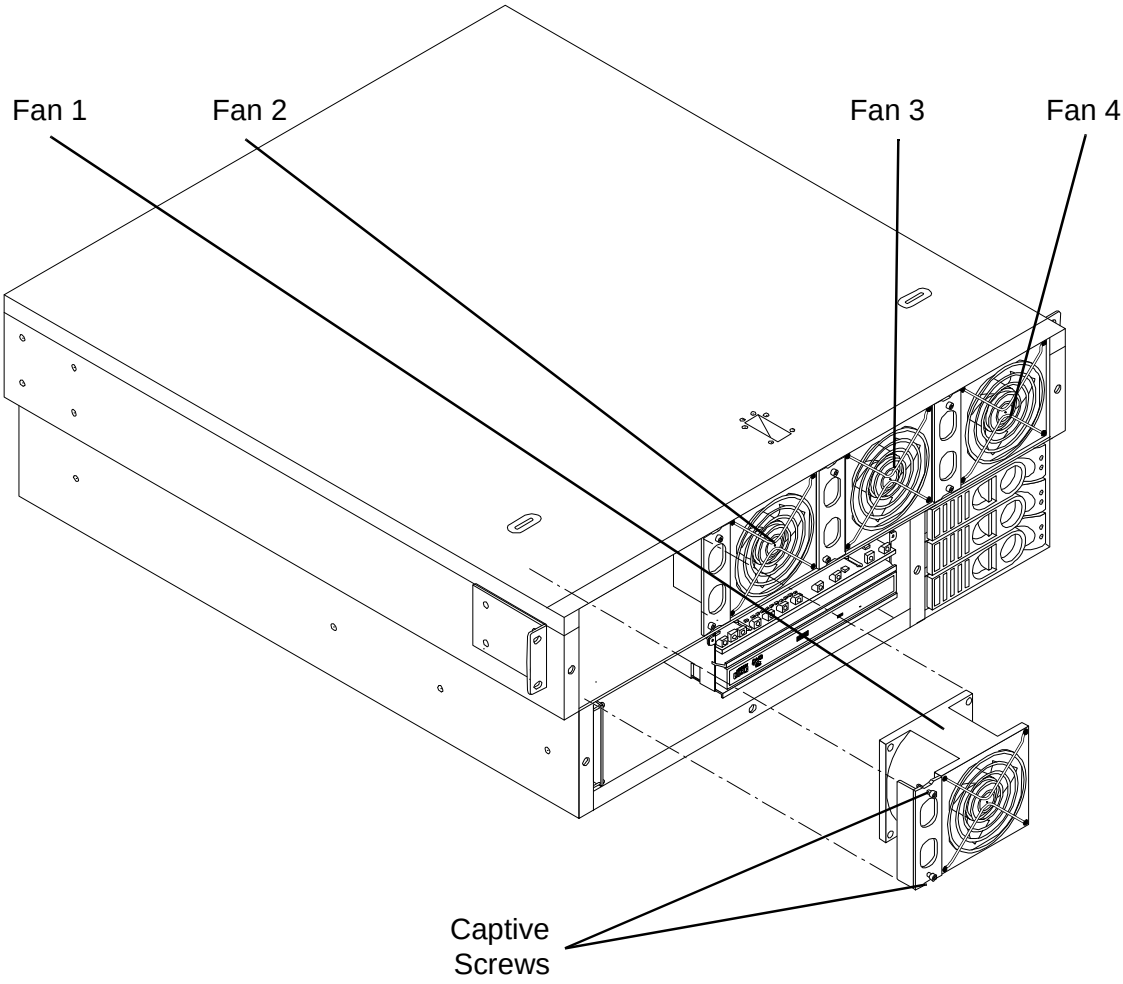
If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot.

Hot-swapping the fan in less than two minutes enables continued operation and prevents automatic shutdown.

1. Remove the front grill. See "Removing the Front Grill" (page 64).
2. Use the ACX-15 Torx screwdriver to loosen the two captive screws on the plastic fan extractor handle (left side of fan) (Figure 3-9).

3. Using the extractor handle, pull the fan from the server chassis.
4. Orient the replacement fan so that the extractor handle is on the left. Insert the fan into the chassis opening and press it firmly into place.
5. Tighten the two captive screws that secure the fan in place.

Figure 3-9 Removing a Front Panel Hot-Swappable Fan



Removing and Installing a Rear Panel Hot-Swappable Fan

To remove and install the hot-swappable fan from the rear of the server chassis, follow these steps:

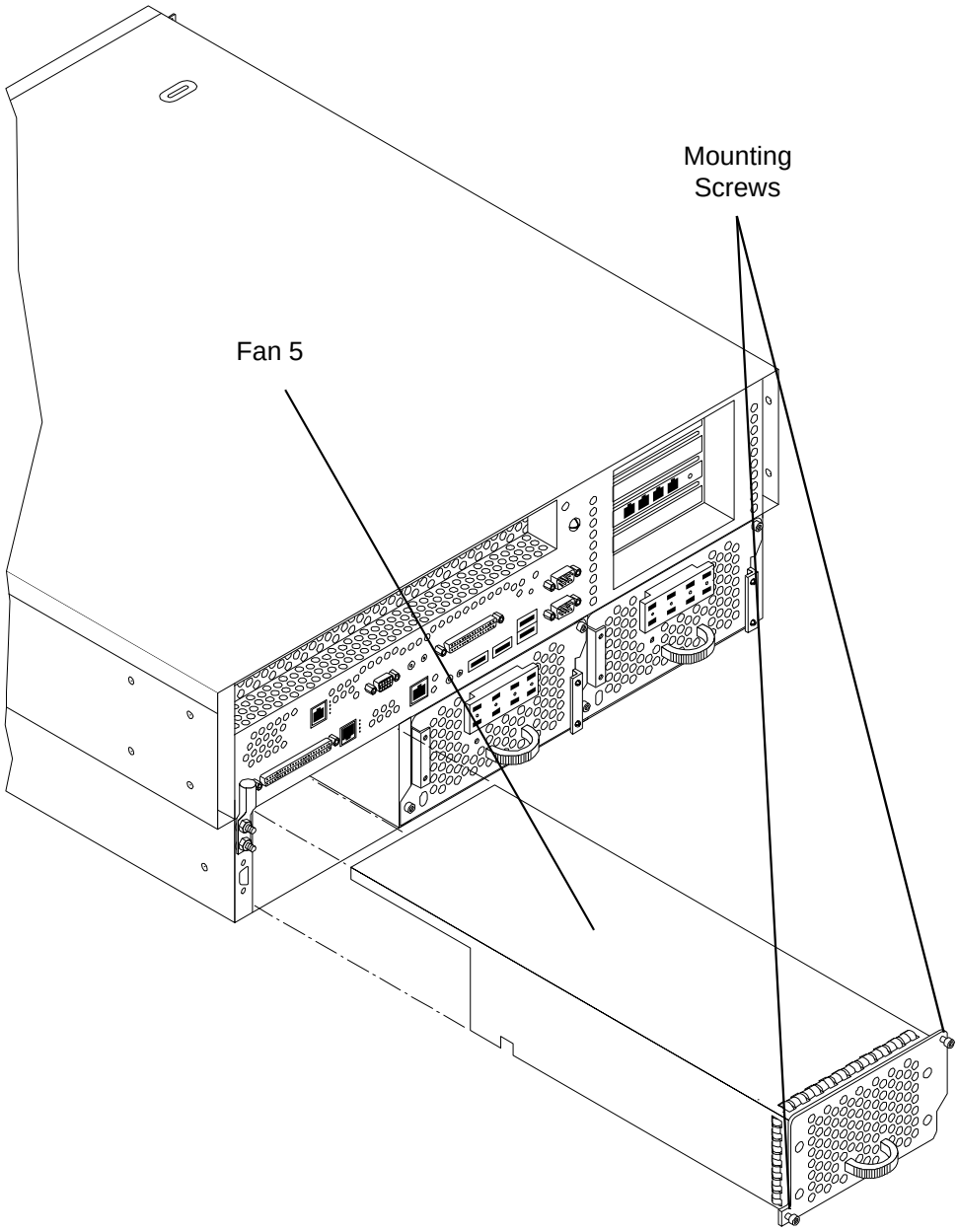
NOTE: The server does not need to be removed from the rack for fan replacement.

1. Use the ACX-15 Torx screwdriver to loosen the two captive mounting screws that secure the fan unit to the server chassis (Figure 3-10).

CAUTION: Hot-swapping a fan can interrupt system operation. If you are hot-swapping a fan assembly and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping the fan in less than two minutes enables continued operation and prevents automatic shutdown.

2. Pull the fan assembly from the server chassis by pulling the curved handle.
3. Orient the replacement fan assembly so that the curved handle is at the bottom. Gently push the fan unit into position.
4. Tighten the two captive screws that secure the fan unit to the server chassis.

Figure 3-10 Removing a Rear Panel Hot-Swappable Fan



PCI-X Card Installation

The server has four 64-bit, 133 MHz PCI-X accessory card sockets located in a removable card cage. You must remove the PCI-X card cage before you can remove or install PCI-X cards. The following sections describes how to remove and open the card cage, install PCI-X cards, and reinstall the PCI-X card cage.

Removing the PCI-X Card Cage Assembly

To remove the PCI-X card cage assembly, follow these steps:

1. If rack-mounted, extend a slide-mounted server out from the rack until it stops. See "Accessing a Rack-Mounted Server" (page 59).
2. Turn off the system. Disconnect all external cables.

3. If desired, remove the server from the rack and place it on an ESD protected work surface. See "Removing the Server from a Rack" (page 59).

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

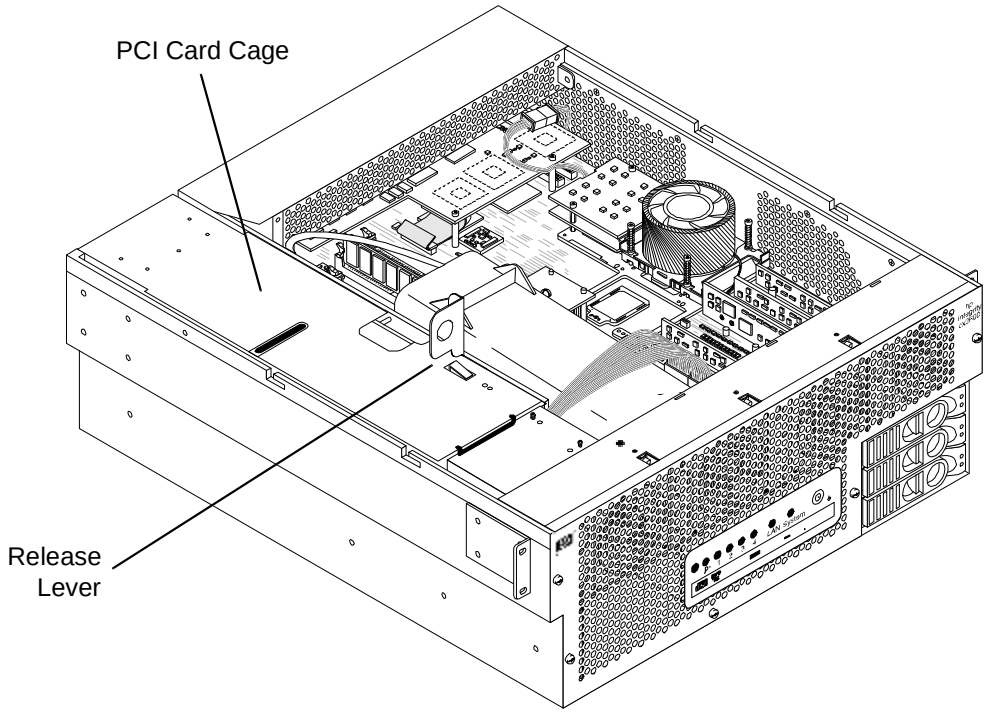
Failure to observe this warning can result in personal injury or damage to equipment.

4. Remove the top cover from the chassis. See "Removing the Top Cover" (page 64).

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

5. Pull up on the PCI-X card cage release lever and the back edge of the card cage, and lift the card cage out of the server chassis (Figure 3-11).

Figure 3-11 Removing the PCI-X Card Cage



6. Place the card cage on an ESD-protected work surface so the PCI-X card connectors (within the card cage) are at the bottom.
7. To remove a card, lift the card from its socket.
8. Remove the cover that is now on top of the card cage by sliding the cover toward the rear of the card cage and lifting the cover. Remove the cover from the card cage.

NOTE: The four connectors within the card cage are identical and have the same capabilities. You can install a compatible PCI-X card in any slot.

Installing a PCI-X Card

NOTE: You must remove the PCI-X card cage from the server chassis to enable installation of PCI-X cards.

The four connectors in the PCI-X card cage are identical and have the same capabilities. You can install a compatible PCI-X card in any slot. You can remove cards by lifting them from the sockets.

To install a PCI-X card, follow these steps:

1. Remove the PCI-X card cage from the server chassis. See "Removing the PCI-X Card Cage Assembly" (page 67).
2. Remove the cover from the PCI-X card cage.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

3. If there is a blank panel installed at the end of the card cage, remove the blank panel.
4. Grasp the card by opposite edges and orient the card so that its connector is aligned with the card cage socket, and the PCI-X interface connector is extended through the opening at the end of the card cage. Insert the card into the desired socket.
5. Secure the card in the card cage using the retaining screw provided.
6. Connect any cables (if appropriate) to the card.

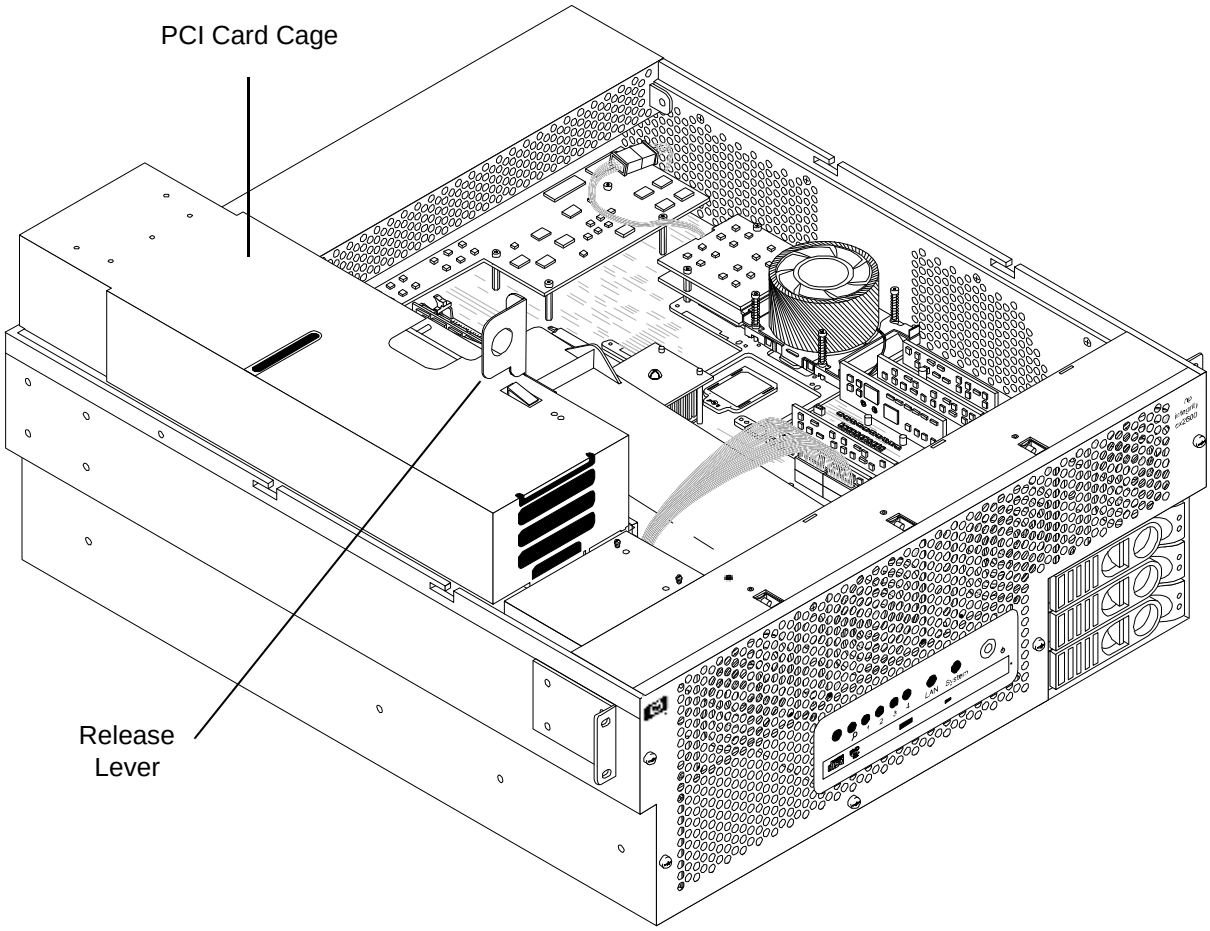
Installing the PCI-X Card Cage Assembly

To install the PCI-X card cage assembly, follow these steps:

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

1. If the card cage cover is removed, insert the cover tabs at the fan end of the cover into the corresponding slots on the card cage, and press the cover into position on the card cage. Slide the cover toward the front of the card cage to secure the cover in place.
2. Orient the PCI-X card cage as shown in Figure 3-12. Lift the release lever and hold it in the open position. Lower the card cage into position and press gently to seat the card cage connectors.

Figure 3-12 Installing the PCI-X Card Cage



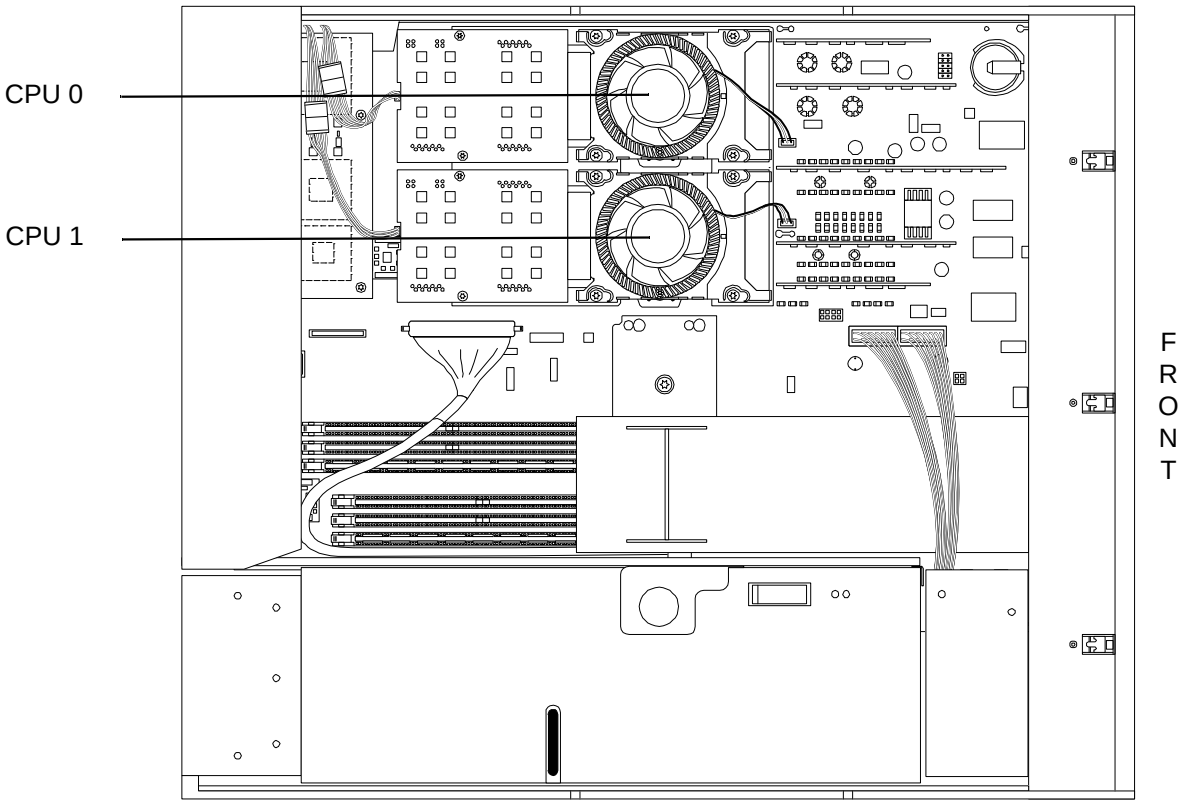
3. Press the release lever down to lock the card cage into place in the chassis.
4. Install the chassis top cover. See "Installing the Top Cover" (page 64).
5. Reconnect rear panel cables, and turn on the system.
6. Run the `info io` command at the EFI Shell to verify that you have correctly installed the PCI-X card.

Installing Single-Core Processors

The single-core processors are located on the system board and are accessible after removing the top cover and air guides. Processor 0 (CPU 0) is located closer to the chassis side panel and processor 1 (CPU 1) is located closer to the DIMM sockets (Figure 3-13).

The server may be delivered with one or two single-core processors installed. You can install the second processor, or replace the processors with newer, compatible processors. The following sections provide detailed procedures for processor installation.

Figure 3-13 Processors in Server Chassis (Top Cover Removed)



The following procedure is applicable to installation of processor 0 or processor 1. You must install processor 0 before installing processor 1.

NOTE: Installation instructions are provided with replacement processors. Read those instructions carefully. Changes in processor design and installation may have occurred since this procedure was written. Always follow the instructions provided with a replacement processor.

To install a single-core processor, follow these steps:

1. If rack-mounted, extend a slide-mounted server out from the rack until it stops. See "Accessing a Rack-Mounted Server" (page 59).

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

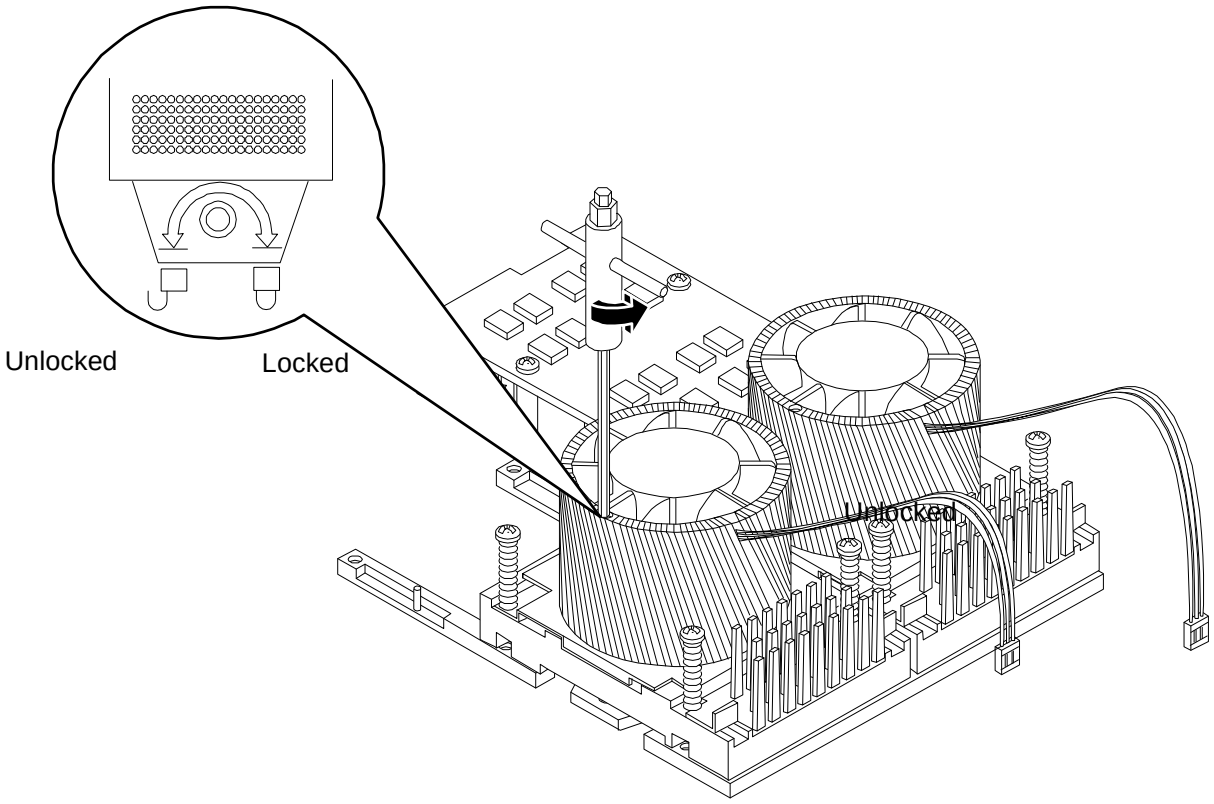
2. Turn off the server.
3. Disconnect all external cables.
4. If desired, remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 59).

5. Remove the chassis top cover. See "Removing the Top Cover" (page 64).

CAUTION: Observe all ESD safety precautions while performing processor installation. Failure to follow ESD safety precautions can result in damage to the server.

6. Remove the processor airflow guide by lifting it up and out of the server.
7. Ensure that the processor locking mechanism is rotated to the unlocked position (Figure 3-14).

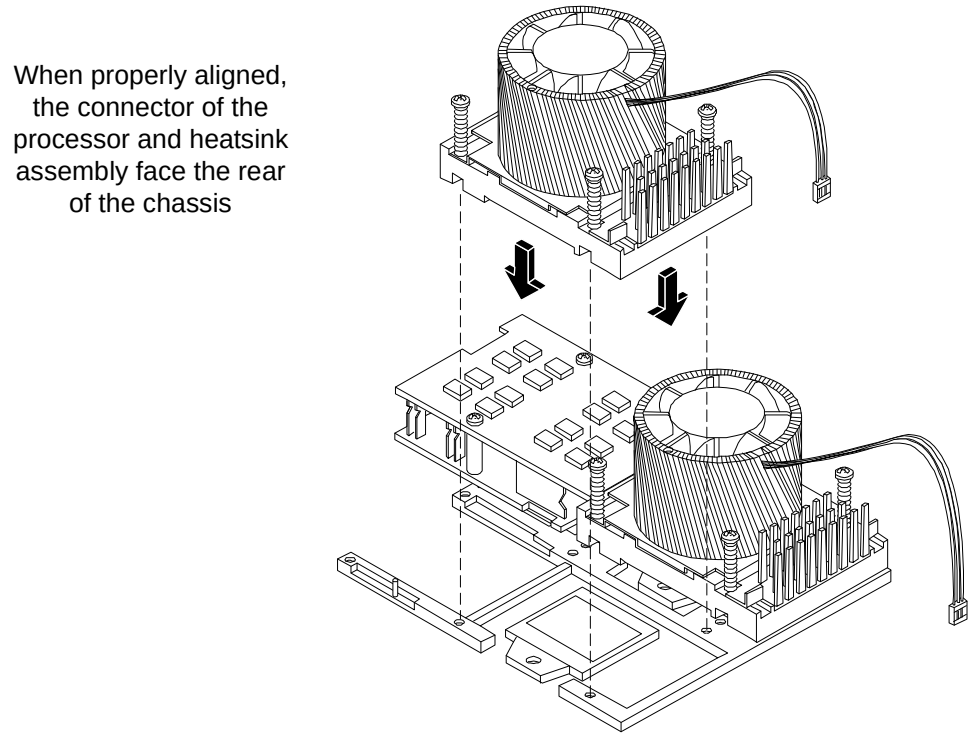
Figure 3-14 Processor Locking Mechanism



8. Inspect the pins of the processor to be installed. Verify that the processor pins are not bent.
9. Insert the Allen side (hex) of the IPF-CPU install tool into the lock access hole that runs down through the edge of the turbo fan heatsink before you place it on the system board. As you place the turbo fan heatsink onto the system board, guide the tool until it connects. With the IPF-CPU tool inserted into the lock access hole, it is easier to place and align the turbo fan heatsink onto the system board.
10. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the fan and processor assembly on the system board (Figure 3-15). The four locator posts fit in locator holes on the processor mount of the system board. Position the turbo fan power cable so that it is located on the side of the heatsink that faces the front of the chassis.

CAUTION: Do not press the processor module into the socket. When properly aligned, the processor pins seat into the socket by themselves. No additional pressure is required. You can damage the pins if you apply pressure.

Figure 3-15 Aligning the Processor Power Module

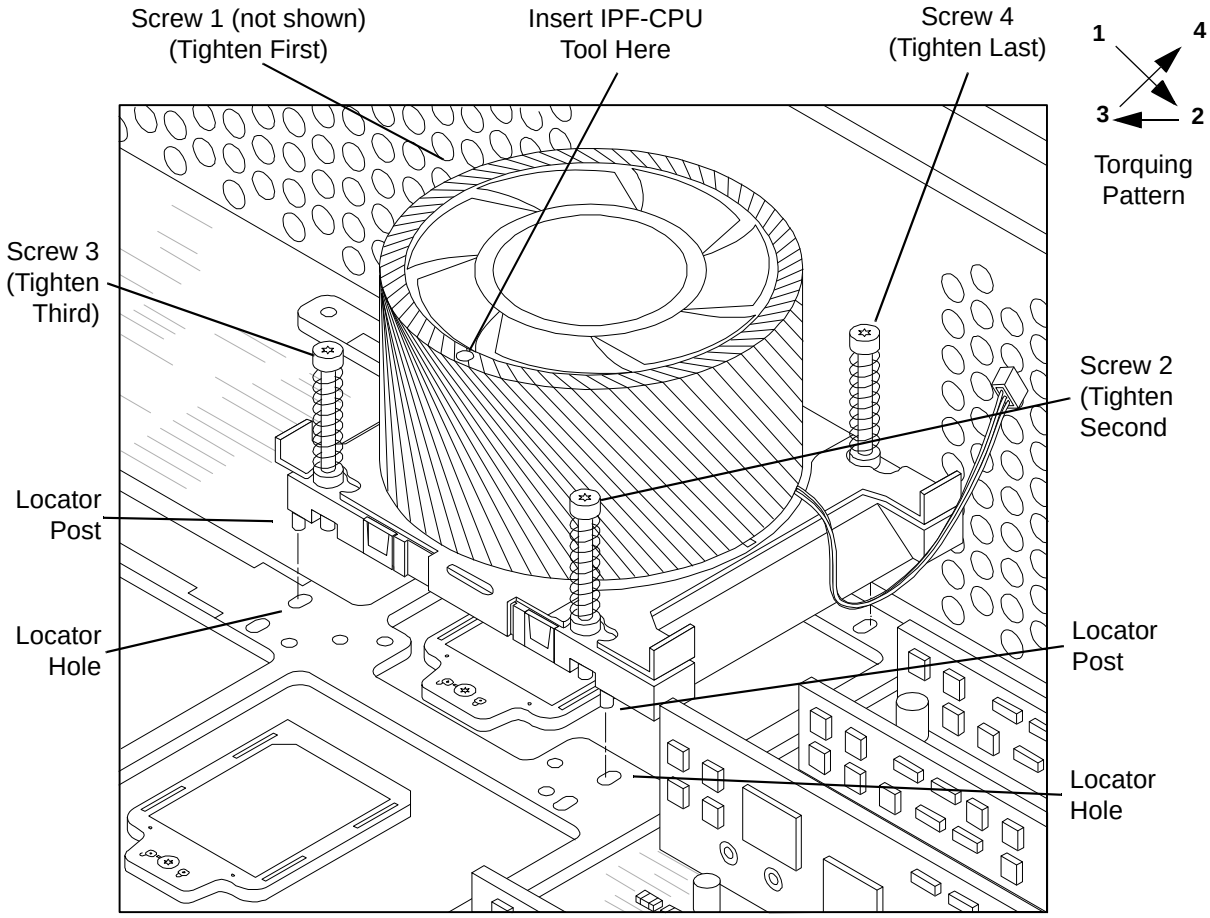


11. Use the Allen side of the IPF-CPU tool to lock the processor in place on the system board. To do this, insert the IPF-CPU tool into the hole that runs down the side of the heatsink and rotate the cam on the processor socket clockwise 180 degrees.

CAUTION: Do not rotate the cam on the processor socket too far or you can cause damage to the locking mechanism.

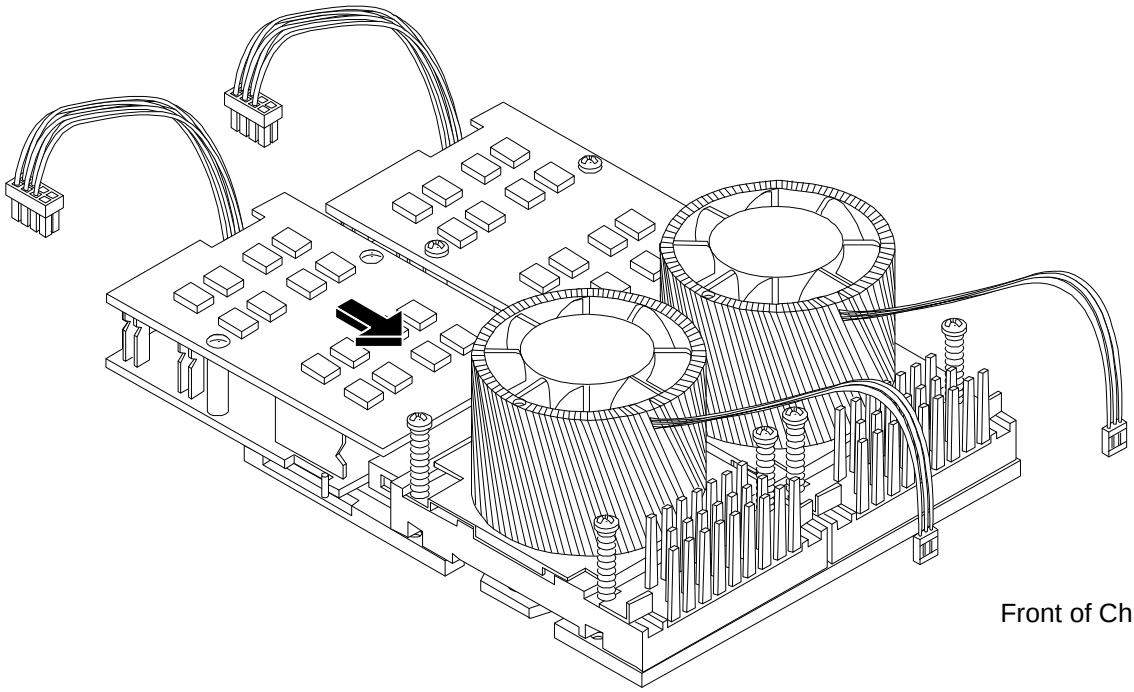
12. Slide the sequencing retainer plate toward the front of the server.
13. Tighten the four captive screws of the heatsink in the order shown in Figure 3-16. Tighten each screw one-half turn, and then tighten the next screw. Continue this sequence until the heatsink is secured to the system board.

Figure 3-16 Securing Heatsink Captive Screws



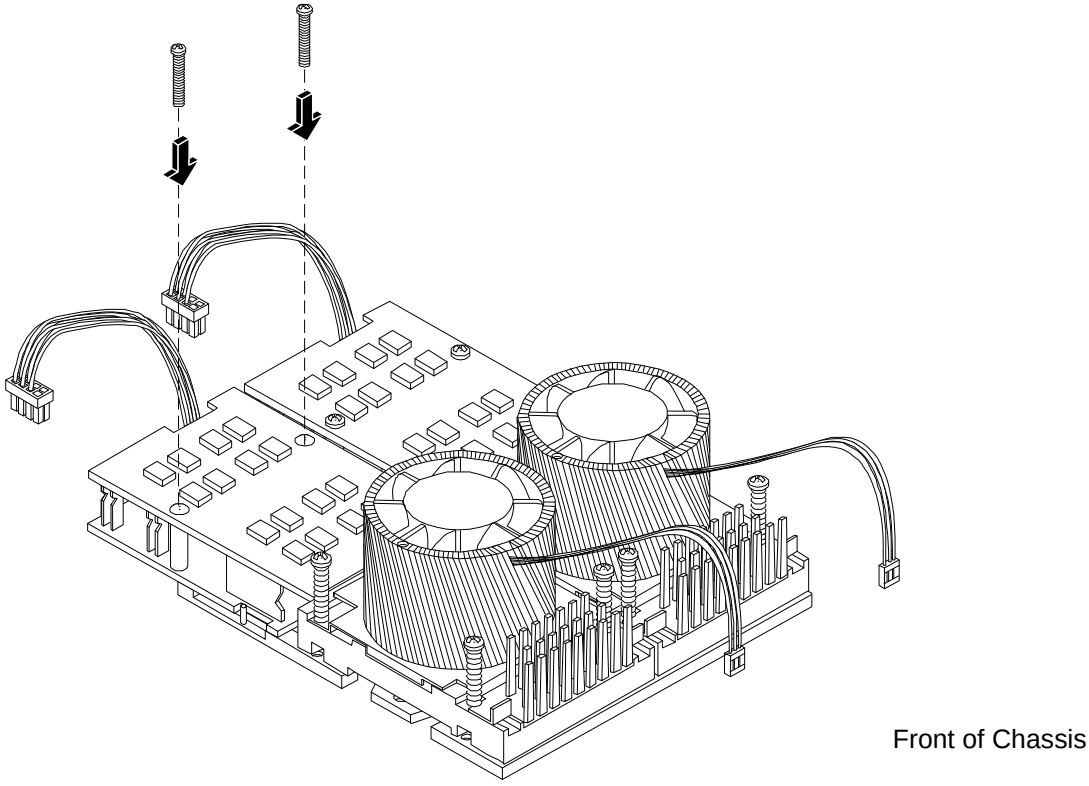
14. Connect the power cable for the processor turbo fan to its connector on the system board.
15. Slide the CPU power module on the system board metal mounting bracket so that the power module connector aligns with the connector on the processor.

Figure 3-17 Sliding the Processor Power Module



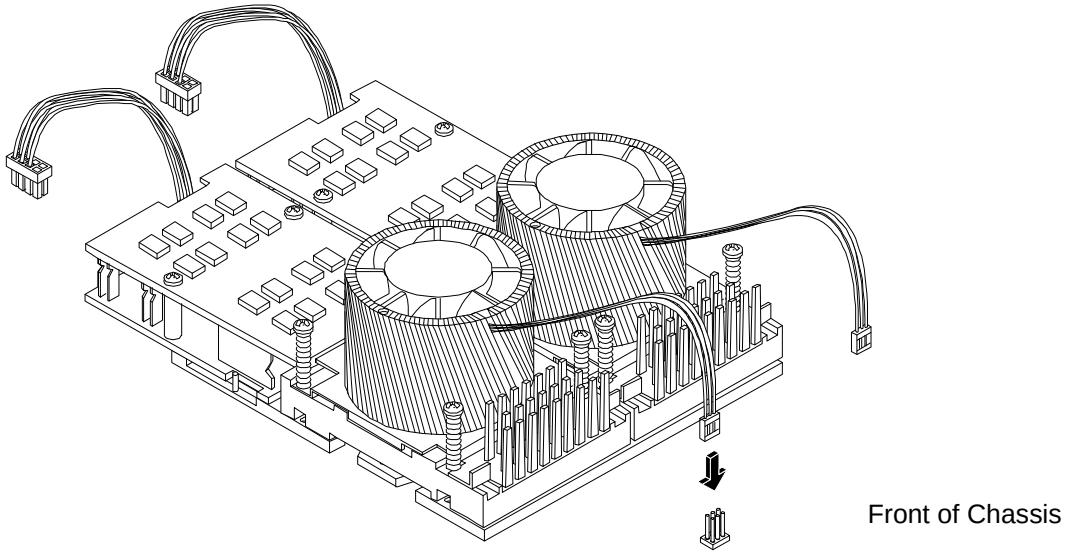
16. Align the two mounting screw holes on the power module with their screw holes on the system board's metal mounting bracket. Screw in the power module mounting screws (M3 x 23mm long pan T15 crest cup stainless steel, two per CPU).

Figure 3-18 Installing the Power Module Mounting Screws



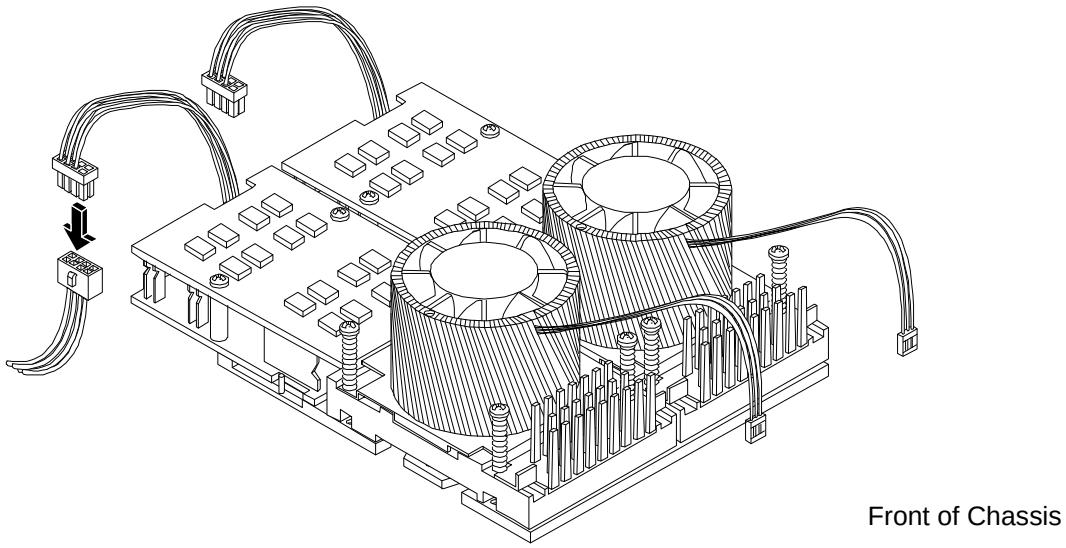
17. Connect the processor module turbo fan power cable to the connector on the system board.

Figure 3-19 Connect the Turbo Fan Cable



18. Connect the CPU power module power cable to the connector on the system board.

Figure 3-20 Connect the Power Module Cable



19. Place the processor airflow guide in position.
20. Install the chassis top cover. See "Installing the Top Cover" (page 64).
21. If necessary, reinstall the chassis in the rack. See "Install the Server into a Rack" (page 60).
22. Reconnect power and system cables to rear panel connectors.
23. Turn on the system.
24. Run the `info cpu` command at the EFI Shell prompt to verify that the processor has been installed correctly.

Installing Dual-Core Processors

The system board can support either one or two dual-core processors. The following procedure is applicable to installation of CPU 0 or CPU 1. CPU 0 is located closer to the chassis side panel and CPU 1 is located closer to the DIMM sockets. You must install CPU 0 before installing CPU 1.

The server may be delivered with one or two dual-core processors installed. You can install the second processor, or replace the processors with newer, compatible processors. The following sections provide detailed procedures for processor installation.

A tool kit is provided with replacement processors. An IPF-CPU tool kit is required for successful completion of these procedures.

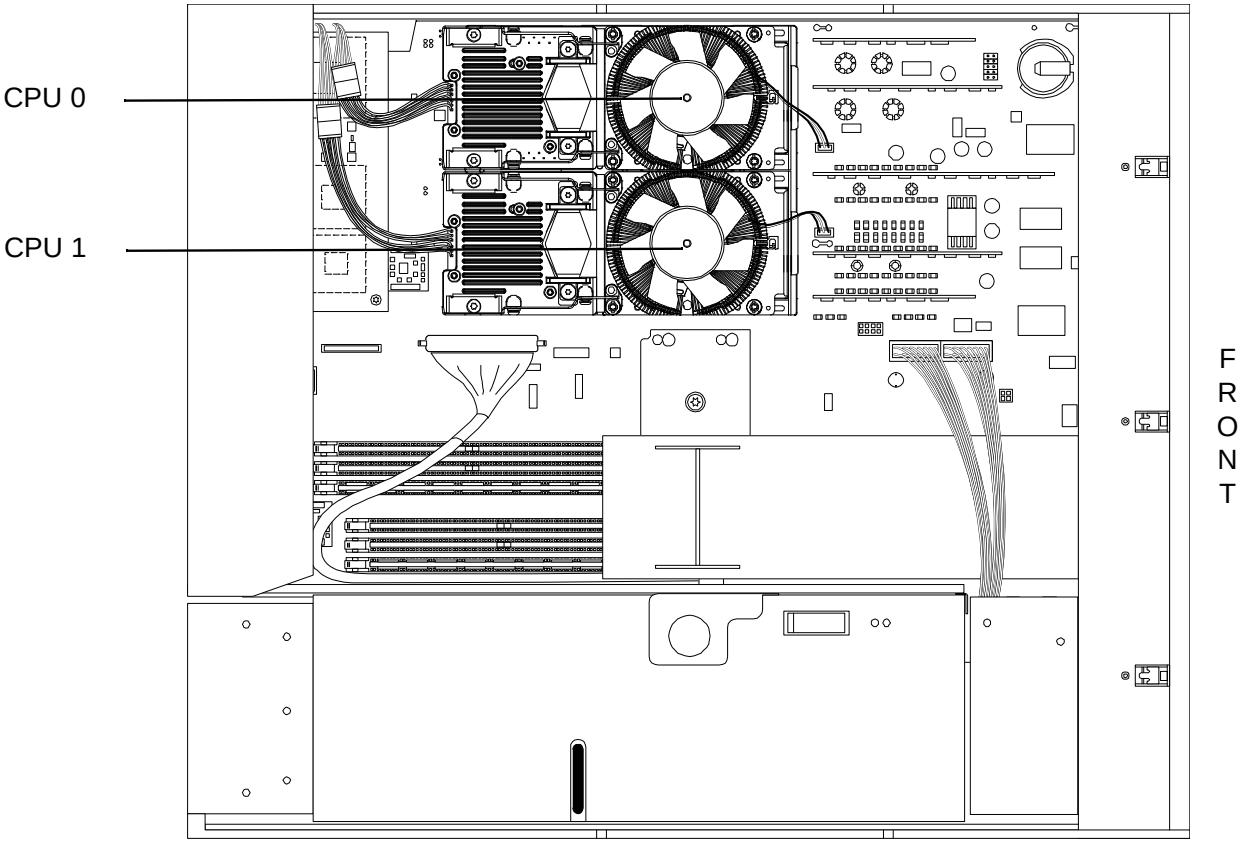
WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing processor removal. Failure to follow ESD safety precautions can result in damage to the server.

Figure 3-21 Dual-Core Processors in Server Chassis



NOTE: Installation instructions are provided with replacement processors. Read those instructions carefully. Changes in processor design and installation may have occurred since this procedure was written. Always follow the instructions provided with a replacement processor.

To replace a dual-core processor, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Accessing a Rack-Mounted Server" (page 59).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 59).

4. Remove the chassis top cover. See "Removing the Top Cover" (page 64).
5. Remove the processor airflow guide by lifting it up and out of the server.
6. Ensure that the processor locking mechanism is rotated to the unlocked position.
7. Inspect the pins of the processor you are installing. Verify that processor pins are not bent.
8. Insert the Allen (hex) side of the IPF-CPU tool into the lock access hole that runs down through the edge of the turbo fan heatsink before you place the heatsink on the system board. As you place the turbo fan heatsink onto the system board, guide the tool until it connects.
9. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the processor on the system board. The four locator posts fit into locator holes on the system board processor mount. Position the turbo fan power cable so that it is located on the side of the heatsink that faces the front of the chassis.

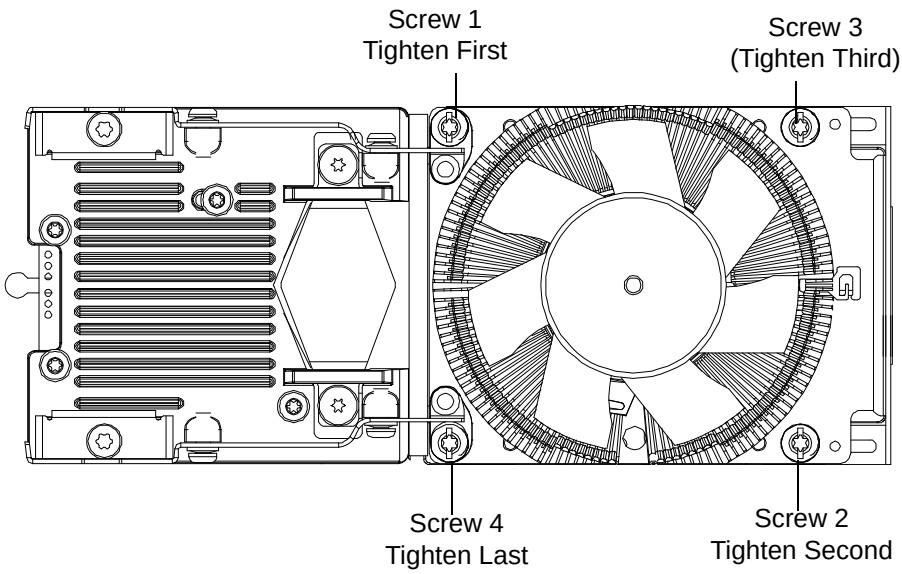
△ **CAUTION:** Do not press the processor module into the socket. When properly aligned, the processor pins seat into the socket. No additional pressure is required. You can damage the pins if you apply too much pressure.

10. Properly align the processor so the processor and heatsink face the rear of the chassis.
11. Use the Allen (hex) side of the IPF-CPU tool to lock the processor in place on the system board. To do this, insert the tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees (Figure 3-14).

△ **CAUTION:** Do not rotate the cam on the processor socket too far. You can damage the locking mechanism.

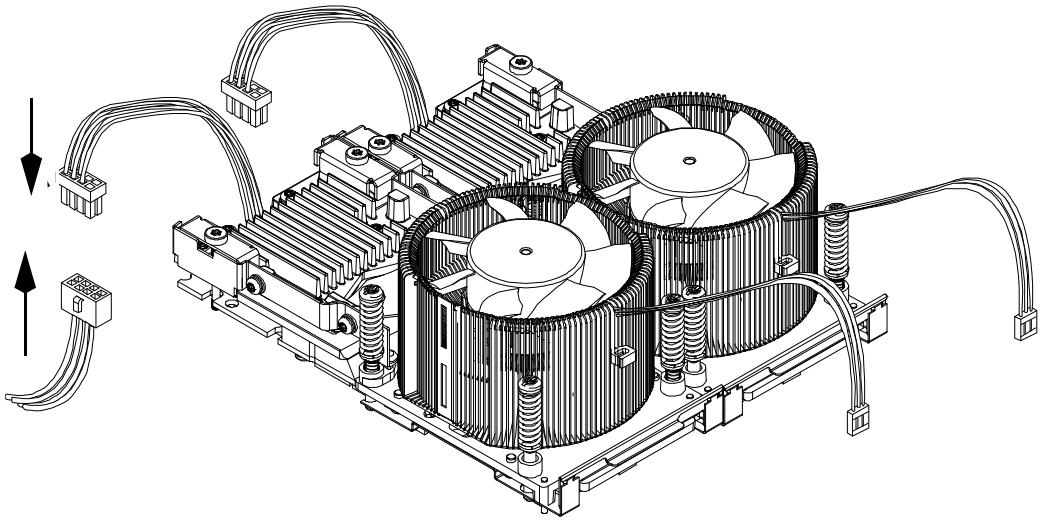
12. Slide the sequencing retainer plate toward the front of the chassis.
13. Tighten the four captive screws of the heatsink as in Figure 3-22. Using a crisscross torquing pattern, alternate tightening each screw one-half turn so as not to completely tighten one screw in before the others. Continue this sequence until the heatsink is secured to the system board.

Figure 3-22 Securing the Heatsink Captive Screws



14. Align the two mounting screw holes on the processor module with the screw holes on the system board metal mounting bracket. Screw in the processor module mounting screws (M3 x 23mm long pan T15 crest cup stainless steel, two per CPU).
15. Connect the CPU power cable and the turbo fan cable to the connectors on the system board.

Figure 3-23 Connecting the Power Cable and Turbo Fan Cable



16. Place the processor airflow guide in position.
17. Install the chassis top cover.
18. If necessary, reinstall the chassis in the rack.
19. Reconnect power and system cables to rear panel connectors.
20. Power on the server.
21. Run the `info cpu` command at the EFI Shell prompt to verify that the processor has been installed correctly.

Installing Memory

The server comes with four, eight, or twelve DIMMs installed. The server is minimally configured with 1 GB of memory (four 256 MB DIMMs loaded in quad 0 (slots 0A, 0B, 1A, and 1B)). The server is maximally configured with 32 GB of memory, eight 4 GB DIMMs loaded in each of quads 0 and 1 (quad 0 slots 0A, 0B, 1A, and 1B, and quad 1 slots 2A, 2B, 3A, 3B).

You can replace these DIMMs or insert DIMMs into unused quads to expand server memory. When adding DIMMs, you must use a minimum of four like-sized DIMMs in the next available quad.

Supported DIMM Sizes

Supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB. You can use different DIMM sizes in the server, but all four DIMMs in a quad must be identical.

Installing DIMMs

DIMMs must be installed in groups of four (quads), and in specific locations. DIMM sockets are shown in Figure 3-24.

- You must install the first quad (four DIMMs) in sockets 0A, 0B, 1A, and 1B.
- You can install the second quad in sockets 2A, 2B, 3A, and 3B.
- You can install the third (and final) quad in sockets 4A, 4B, 5A, and 5B.

If you install DIMMs of different sizes, you must install the largest DIMMs (most memory) in the first quad. DIMMs in the second quad can be equal to or smaller than (less memory) the

DIMMs in the first quad. If you install DIMMs in the third quad, they must be equal to or smaller than the DIMMs in the second quad.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

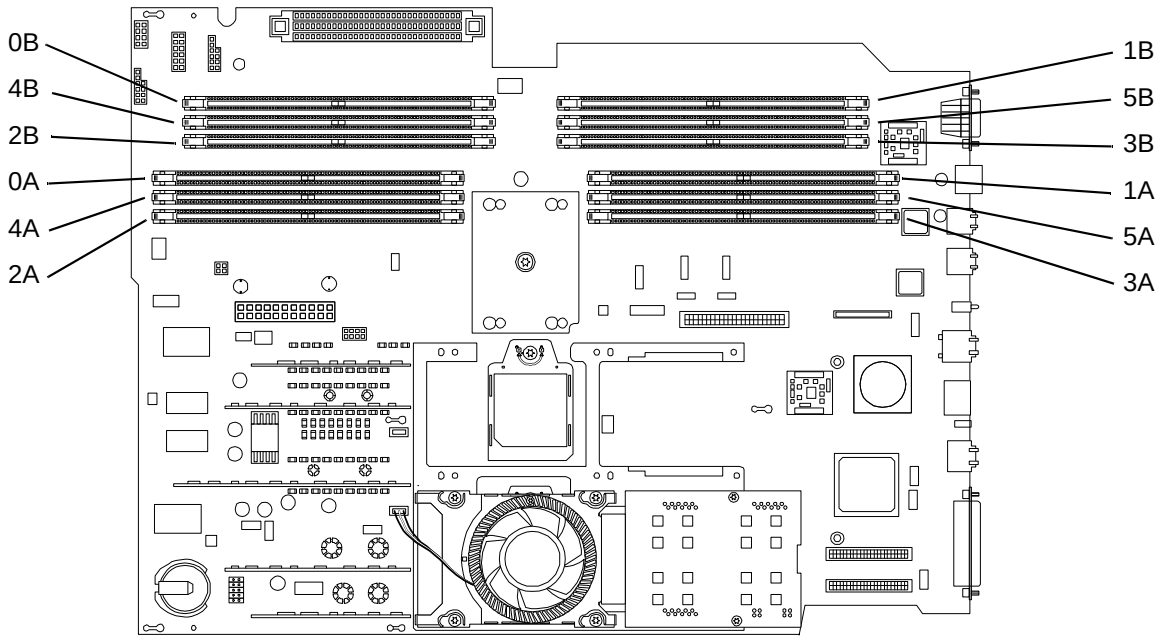
To install DIMMs, follow these steps:

1. Turn off the system.
2. If rack-mounted, extend a slide-mounted server out from the rack until it stops. See "Accessing a Rack-Mounted Server" (page 59).
3. Disconnect all external cables.
4. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 59).
5. Remove the top cover from the chassis. See "Installing the Front Grill and Top Cover" (page 63).

CAUTION: Observe all ESD safety precautions while performing DIMM installation. Failure to follow ESD safety precautions can result in damage to the server.

6. Remove the memory airflow guide.
7. Locate the DIMM sockets where you will install the DIMMs (Figure 3-24).

Figure 3-24 DIMM Slots

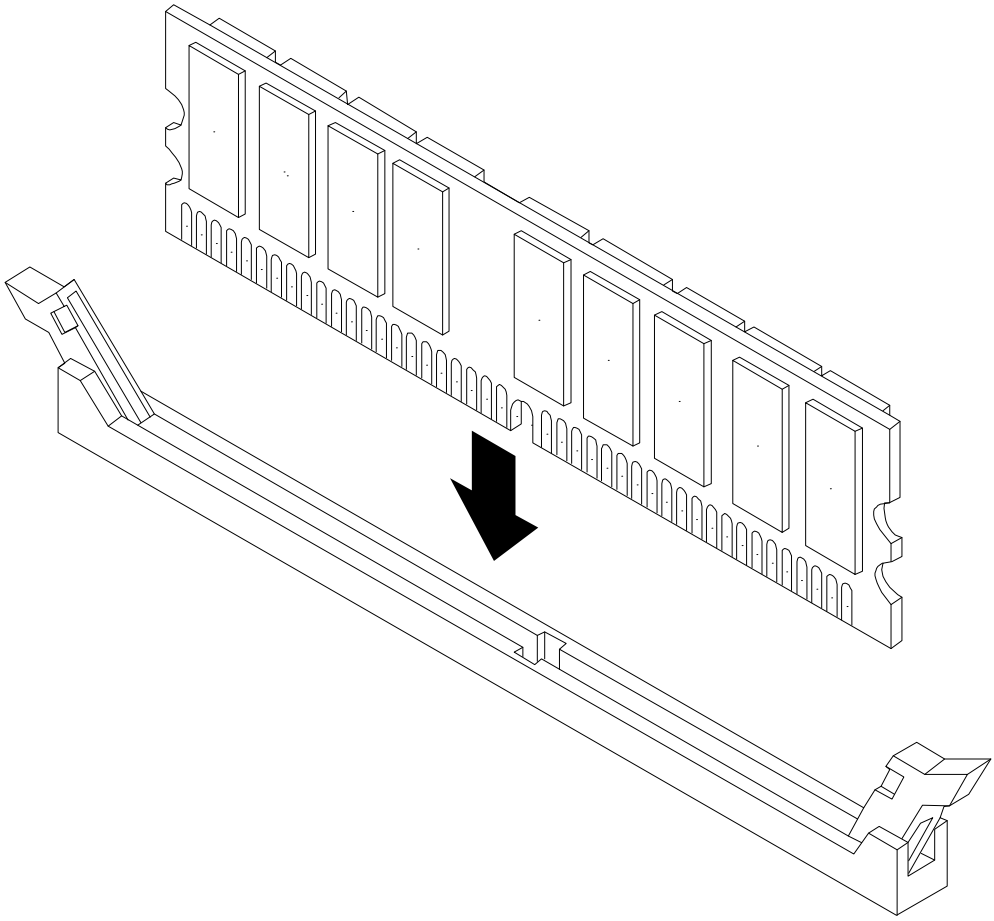


8. Holding the DIMM by its edges, orient the DIMM so the component side is facing the processors, and insert the DIMM into the appropriate socket.

NOTE: DIMM connectors are keyed so they can only be installed in the correct orientation.

9. Firmly and evenly push on each side of the DIMM until it seats in the socket. The socket retainer clips return to the upright position when the DIMM is fully inserted.

Figure 3-25 Inserting a DIMM into a DIMM Socket



10. Snap the socket retainer clips into place, ensuring that the DIMM is locked into the socket.
11. Repeat steps 7 through 10 for each DIMM to be installed.
12. Set the memory airflow guide in position and reinstall the top cover.

Installing the Server Into a Rack

This following information describes how to install the server into an HP rack, or an approved non-HP rack.

HP Rack

HP servers that are installed into racks are shipped with equipment mounting slides. An installation guide comes with each set of slides *Installation Guide, Mid-Weight Slide Kit, 5065-7291*. Follow the steps in this installation guide to determine where and how to install the server into the rack.

Non-HP Rack

The rack mounting guide enables you to evaluate the installation of HP equipment into non-HP racks. Use this guide when you need to qualify whether you can install, maintain, and service any HP equipment in a non-HP rack.

The guide is located on the Web at:

http://www.hp.com/racksolutions

Select *mounting information* from the menu, then select the guide titled *Mounting in non-HP racks*.

Connecting Cables

This section provides information on cables and cable connections.

This section addresses the following topics:

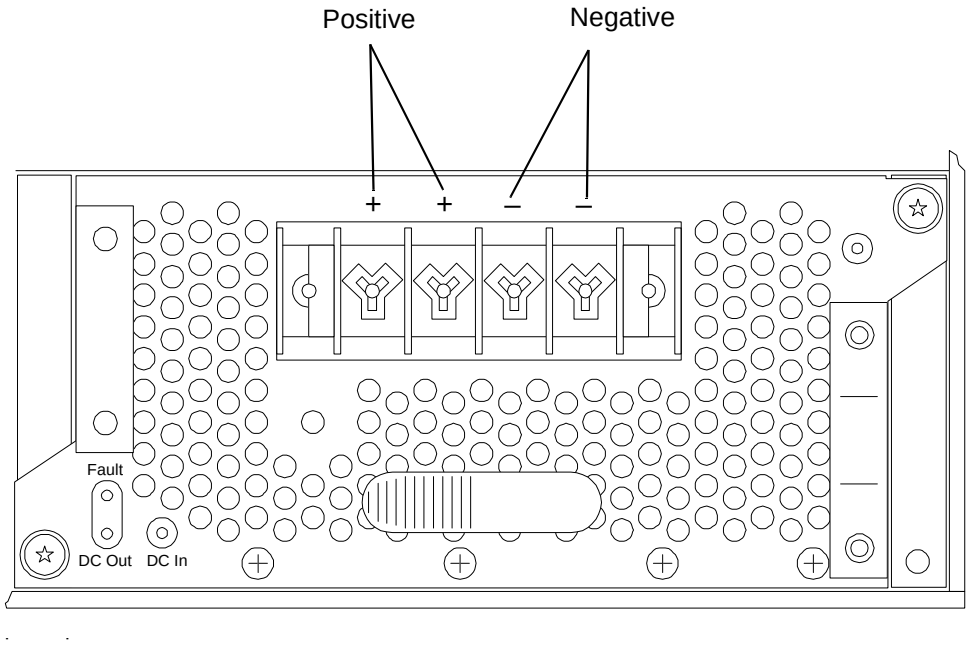
DC Input Power

The server comes with two power supplies installed each powered from its own power cable. The input for each connector is rated for –48 VDC (–40 to –72 VDC) at up to 15 amps maximum.

The server functions normally with only one power supply installed, but N+1 redundancy requires that both power supplies are used during normal operations. Under normal operating conditions, the two power supplies share the load.

Figure 3-26 shows the power supply rear view.

Figure 3-26 Power Supply Rear View



WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

dc Power Terminal and Wire Connection

WARNING! Always check that the power cable is not connected to a power source before attempting to connect the power cable to server power supply terminals. Failure to observe this warning can result in personal injury or damage to equipment.

WARNING! Failure to use the appropriate wire and terminal lugs when connecting dc power to the server can result in personal injury or damage to equipment.

A dc power terminal block is provided at the rear of each dc power supply. You must use all four terminals (2+ and 2-). HP recommends a minimum #12 America wire gauge (AWG) or larger copper conductor be used for connecting dc power. The wire style and insulation type must be appropriately rated for the application.

CAUTION: Do not use aluminum conductors. Aluminum has a coefficient of expansion that differs significantly from that of other metals commonly used in power hardware. Because of this difference, use of aluminum conductors can cause connector hardware to loosen, overheat, and fail.

The terminal lugs used to connect dc power must be rated to handle the expected load of 15A/PSU. The width of the lug can be no larger than 0.3 inches (0.762 cm).

Power States

The server has three power states:

- Standby power
- Full power
- Off

Plug the power cord into the appropriate receptacle on the rear of the chassis to achieve the standby power state; the front panel **Power** button is not turned on. Full power occurs when the power cord is plugged into the appropriate receptacle, and the **Power** button is activated. In the off state, the power cords are not plugged in.

Table 3-3 lists the server power states.

Table 3-3 Power States

Power States	Power Cable Plugged Into Receptacle	Front Panel Power Button Activated	ac Power Applied	dc Power Applied
Standby power	Yes	No	No	Yes
Full power	Yes	Yes	No	Yes
Off	No	No	No	No

Connecting Power Cables and Console Cables

IMPORTANT: HP recommends that a dc electrician should be involved in this procedure.

The following procedure describes how to connect the following:

- dc power supply cables
- M Cable (DB 25)
- Core I/O cards
- RS-232 cable (female to female)

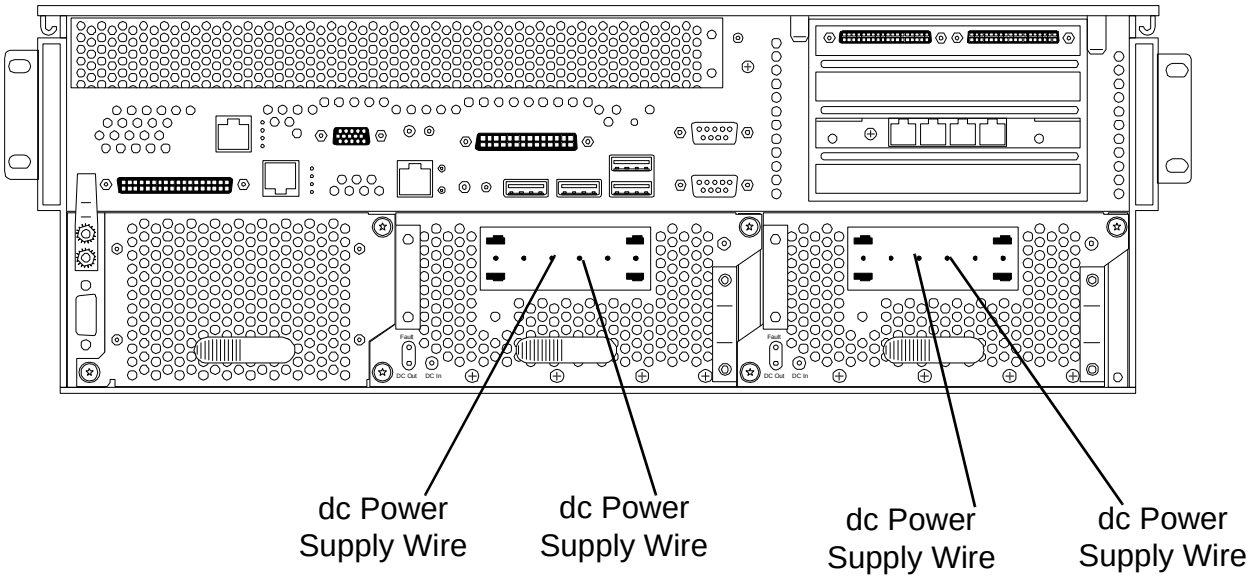
NOTE: The RS-232 cable is not supplied by HP.

1. Connect the dc power supply wires to the dc terminal block at the rear of the dc power supply (Figure 3-27).

   Connect both of the plus (+) terminals to return.

   Connect both of the minus (-) terminals to -48V

Figure 3-27 dc Power Supply Wire Connectors



2. Connect the dc power plugs into the outlet. The server goes into standby power mode as soon as the power cable is connected to the power inlet.

NOTE: If the fans turn on, the system may be in full power-on mode. To exit full power-on mode, press the **Power** button on the front grill until the power goes off and the fans stop running.

3. Attach the M cable (25-pin) to the DB25 port on the server. The M cable has three connectors labeled as follows:
   - Console
   - Remote
   - UPS
4. Connect core I/O connections if needed.
5. Attach the connector labeled **Console** to the RS-232 female-to-female cable.

NOTE: The RS-232 cable is required. The cable is a direct-connect cable (pin 1-to-pin 1, pin 2-to-pin 2).

6. Connect the RS-232 cable to the emulation device.

Applying Standby Power to the Server

IMPORTANT: If the server has one bulk power supply (BPS), plug the power cable into the receptacle labeled PWR 1.

To apply standby power to the server, follow these steps:

1. Locate the appropriate receptacle on the rear of the chassis. Plug the power cord into the receptacle.
2. Observe the following LEDs at two different intervals to ensure the server is in the standby power state.

   Interval One — After you plug the power cord into the server, the bulk power supplies flash amber and an amber light is present on the hard disk drives.

Interval Two	Approximately 30 seconds later, the bulk power supplies flash green and the amber light is still present on the hard disk drives. Standby power is now on.

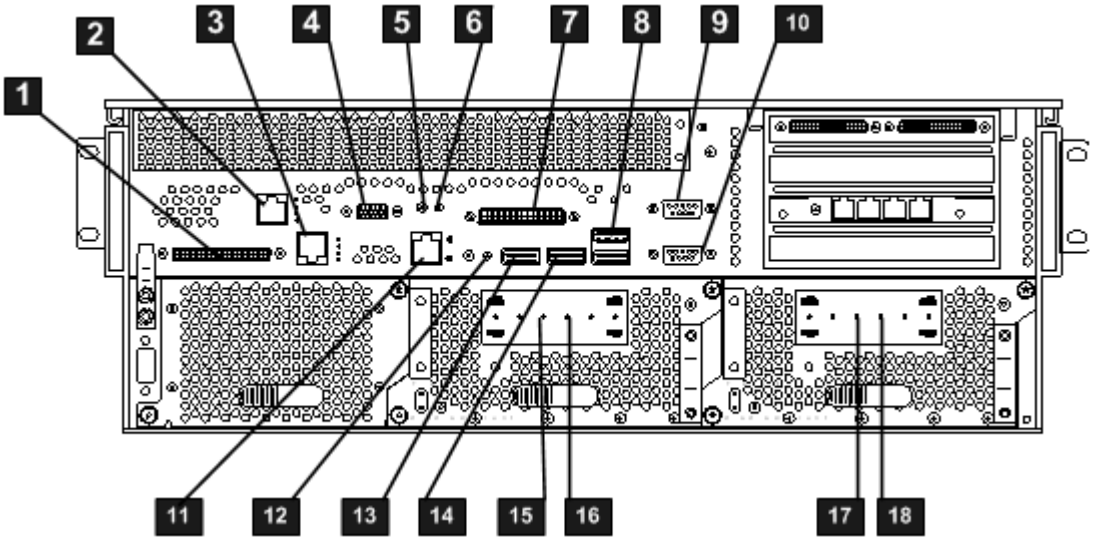
Core I/O Connections

The server has one core I/O card installed. Each core I/O card has an ilO MP. Each core I/O card is oriented vertically and accessed from the back of the server. Use the core I/O board to perform the following:

- Update firmware
- Access the console
- Use other features of the system

Figure 3-28 shows the locations of the cable connections on the server rear panel.

Figure 3-28 Connections, Port, Buttons, & LEDs



1. LVD/SE SCSI Port
2. iLO MP LAN (10/100 LAN) Port and LEDs
3. Gigabit Ethernet LAN A Port and LEDs
4. VGA Port
5. iLO MP Reset Button
6. Locator Button and LED
7. RS-232 Serial Console Port (console (iLO MP), remote, UPS)
8. USB Port
9. Serial Port A — This port is disabled.
10. Serial Port B — This port is disabled.
11. System Management LAN B (10/100/1000 LAN) Port and LEDs
12. TOC Button
13. Keyboard USB Port
14. Mouse USB Port
15. dc Power Supply Wire
16. dc Power Supply Wire
17. dc Power Supply Wire
18. dc Power Supply Wire

The following are the core I/O connections:

- One iLO MP LAN port (10/100 LAN)
- One system management LAN port (10/100/1000 LAN)
- One RS-232 local serial console port (console (iLO MP), remote, UPS)
- One USB keyboard connector
- One USB mouse connector
- Two USB ports
- VGA port (no access to iLO MP; EFI only)

- One 1 Gb LAN-RJ45
- SCSI LVD/SE connector
- Four PCI-X connections (0 to 4 PCI-X cards can be used)
- Two console serial ports (A and B)

Console Setup

Setting up the console involves the following:

- Determining the physical access method to connect cables. There are two physical connections to the Integrity iLO MP: RS-232 and LAN.
- Configuring the Integrity iLO MP and assigning an IP address if necessary. Though there are several methods to configuring the LAN, DHCP with DNS is the preferred one. DHCP with DNS comes preconfigured with default factory settings, including a default user account and password. Other options include:
  - ARP-Ping
  - Local RS-232 serial console port
  - Remote/modem port

This section addresses the following topics:

Setup Checklist

Use the checklist in Table 3-4 to assist you with the Integrity iLO MP setup process.

Table 3-4 Setup Checklist

	Step	Action	X
Standard and Advanced			
1	Preparation	1. Determine access method to select and connect cables. 2. Determine LAN configuration method and assign IP address if necessary.	
2	Configure the iLO MP LAN	There are three methods to configure the LAN for iLO MP access: • DHCP with DNS • ARP Ping • RS-232 serial console port	
3	Log on to the iLO MP	Log in to the iLO MP from a supported Web browser or command line using the default user name and password.	
4	Change default user name and password	Change the default user name and password on the administrator account to your predefined selections.	
5	Set up user accounts	Set up the user accounts if using the local accounts feature.	
6	Set up security access	Set up the security access settings.	
7	Access host console	Access the host console using the method of choice.	

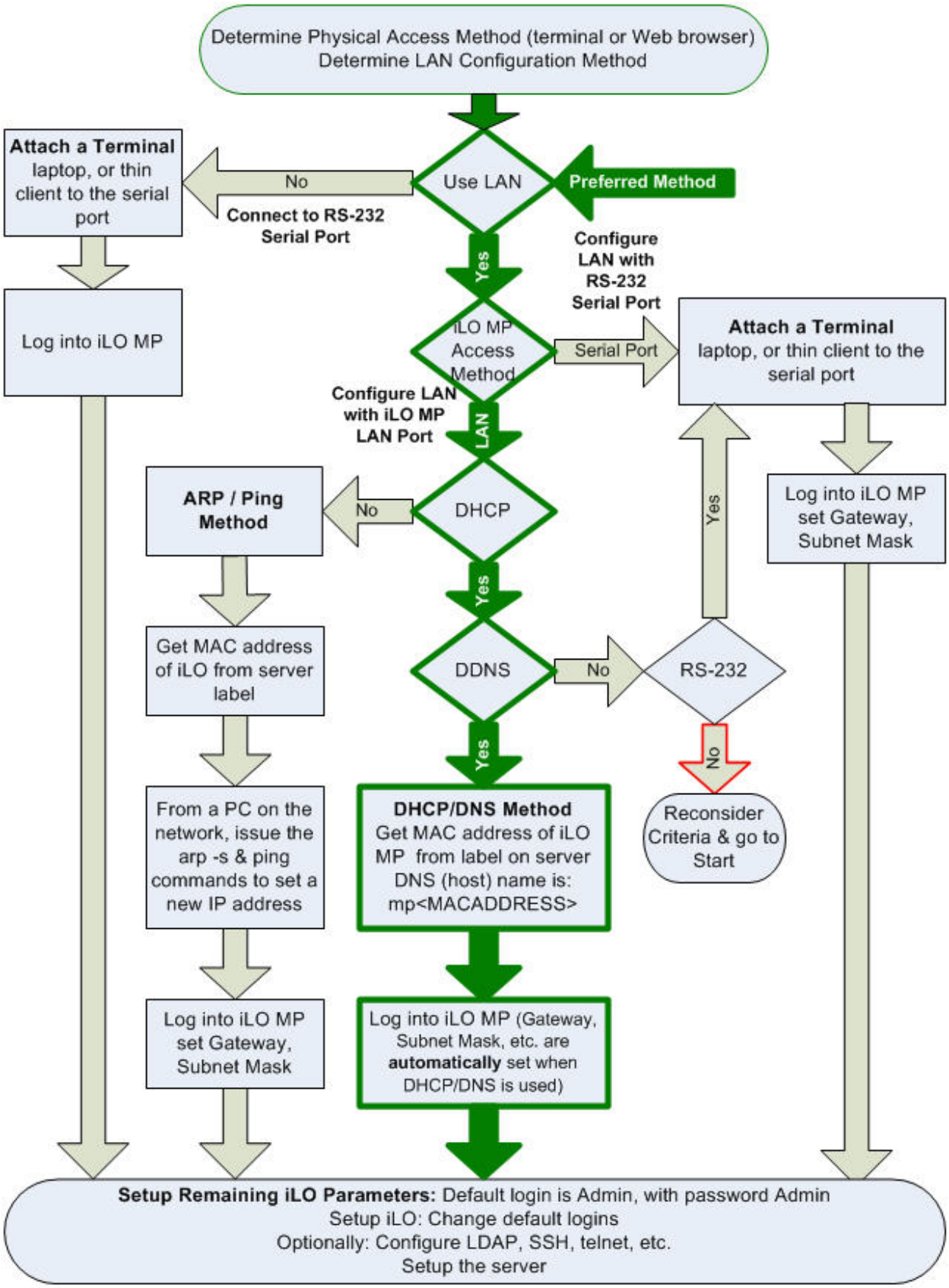
Table 3-4 Setup Checklist *(continued)*

	Step	Action	X
Advanced			
1	Activate Advanced Pack Features	Activate advanced features by entering a license key.	

Setup Flowchart

Use this flowchart as a guide to assist in the setup process.

Figure 3-29 Setup Flowchart



Preparation

There are several tasks to perform before you can configure the iLO MP LAN.

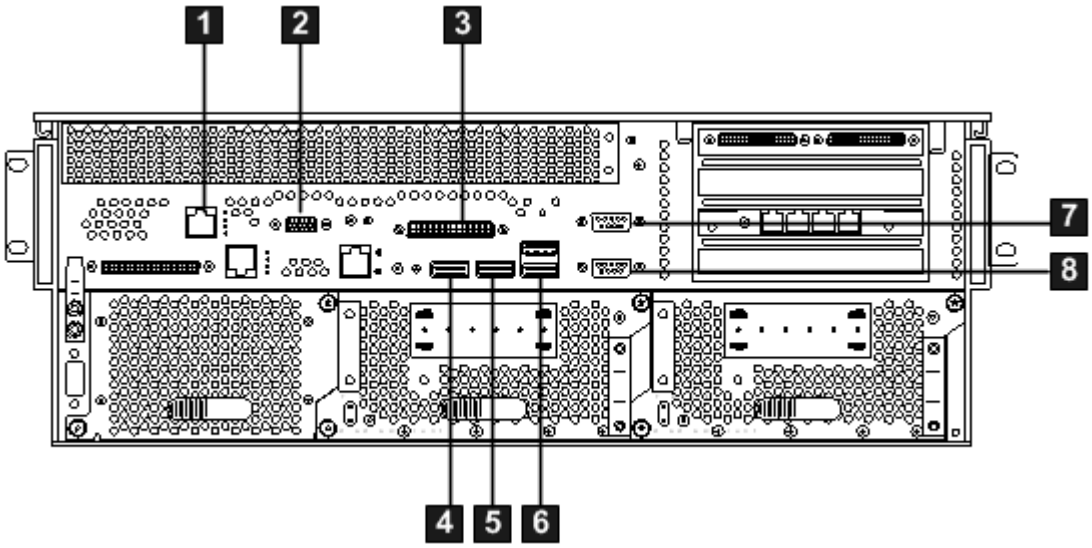
- Determine the physical access method to select and connect cables.
- Determine the iLO MP LAN configuration method and assign an IP address if necessary.

Determining the Physical iLO MP Access Method

Before you can access the iLO MP, you must first determine the correct physical connection method. The iLO MP has a separate LAN port from the system LAN port. It requires a separate LAN drop, IP address, and networking information from that of the port used by the operating system.

Figure 3-30 shows the server rear ports. See the *HP Integrity and HP 9000 iLO Management Processor Operations Guide* for more information on how to access the iLO MP.

Figure 3-30 Server Rear Connection Ports



1. iLO MP LAN Port. (10/100 LAN)
2. VGA Port. EFI Access Only. No iLO MP Access.
3. RS-232 Serial Console Port (Console/Remote/UPS). (M Cable & RS-232 DB-9F to DB-9F Cable)
4. USB Port. (Keyboard)
5. USB Port. (Mouse)
6. USB Port
7. Serial Port A — This port is disabled.
8. Serial Port B — This port is disabled.

Table 3-5 lists the appropriate connection method, required connection components, and connectors to the host console. Use Figure 3-30 andTable 3-5 to determine your physical connection method.

Table 3-5 Console Connection Matrix

Operating System	Console Connection Method	Required Connection Components
HP-UX	Local RS-232 serial console port remote/modem port	1. M-cable: DB25 connector on one end, and three DB-9F connectors on the other end: • Console (ilO MP) • Remote • UPS 2. RS-232 DB-9F to DB-9F cable (modem eliminator cable) 3. Console device (for example, a laptop or ASCII terminal)
	LAN port	10/100 LAN

Table 3-5 Console Connection Matrix *(continued)*

Operating System	Console Connection Method	Required Connection Components
Linux	Local RS-232 serial console port remote/modem port	1. M-cable: DB25 connector on one end, and three DB-9F connectors on the other end: • Console (ilO MP) • Remote • UPS 2. RS-232 DB-9F to DB-9F cable (modem eliminator cable) 3. Console device (for example, a laptop or ASCII terminal)
	LAN port	10/100 LAN

Determining the iLO MP LAN Configuration Method

To access the iLO MP through the iLO MP LAN, the iLO MP must acquire an IP address. The way the iLO MP acquires an IP address is dependent upon whether DHCP is enabled or disabled on the server, and if DHCP and DNS services are available to the server. (See Table 3-6 for possible scenarios.)

Once you have determined the iLO MP access, you must determine how you will configure the iLO MP LAN in order to acquire an IP address using the following methods:

- DHCP/DNS
- ARP Ping
- Local S-232 serial console port
- Remote/modem port

Table 3-6 provides all the possible scenarios to consider. Use this table to help you select the appropriate LAN configuration method to obtain an IP address.

Table 3-6 LAN Configuration Methods

DHCP	DNS	RS-232 Serial Console Port (MP `LC` command)	LAN Configuration Method
Yes	Yes	No	DHCP
Yes	Yes	Yes	DHCP, RS-232 serial console port, or remote/modem port
No	No	No	ARP Ping
No	Yes	No	ARP Ping
No	Yes	Yes	ARP Ping, RS-232 serial console port, or remote/modem port
Yes	No	Yes	RS-232 serial console port, or remote/modem port
No	No	Yes	RS-232 serial console port, remote/modem port, or ARP Ping
Yes	No	No	Cannot set up the LAN. Reconsider your criteria.

Once you have determined how you will configure the iLO MP LAN in order to acquire an IP address, you must configure the iLO MP LAN using the selected method.

Configuring the iLO MP LAN Using DHCP and DNS

DHCP automatically configures all DHCP-enabled servers with IP addresses, subnet masks, and gateway addresses. All HP Integrity entry class servers with the iLO MP are shipped from the factory with DHCP enabled.

HP recommends using the DHCP and DNS method to simplify access to the iLO MP.

When you use DHCP and DNS, you can connect to the iLO MP by typing the default host name in your browser rather than an IP address only if the following applies:

- DHCP must be enabled (DHCP is enabled by default).
- You are using a DHCP server that provides the domain name and the primary DNS server IP address.
- The primary DNS server accepts dynamic DNS (DDNS) updates.
- The primary DNS server IP address has been configured through the DHCP server.

IMPORTANT: You must know the DNS domain name, which is served out by the DHCP server, unless it's domain is local or the same domain.

To configure the iLO MP using DHCP and DNS, follow these steps:

1. Obtain the factory-set host name from the iLO MP Media Access Protocol (MAC) address label on the server. The default host name is 14 characters long, consisting of the letters **mp** followed by the 12 characters of the MAC address (example: mp0014c29c064f). This address is assigned to the MP card. The MP card has a unique MAC address that identifies the hardware on the network.

   IMPORTANT: Make sure you obtain the MAC address to the MP card and not the MAC address to the server core LAN card.

2. Connect the LAN cable from the server to an active network port.
3. Apply dc power to the server.
4. Open a browser, telnet, or SSH client and enter the default host name. The default host name is the letters **mp** followed by the 12 characters of the MAC address. The **iLO MP Log In** window opens.
5. Log in using the default user name and password.

CAUTION: When DHCP is enabled, the system is vulnerable to security risks because anyone can access the iLO MP until you change the default user name and password.

HP strongly recommends you assign user groups and rights before proceeding. See "Modifying User Accounts and Default Password" (page 95).

Configuring the iLO MP LAN Using ARP Ping

The Address Resolution Protocol (ARP) and Packet Internet Grouper (Ping) utility uses ARP packets to ping, or discover, a device on the local network segment. The IP address you assign to the server must use the same network segment, or subnet, as the computer assigning the address. ARP does not work across routed or switched networks.

ARP Ping operational issues:

- You can use ARP Ping regardless of the status of DHCP unless an IP address has ever been acquired using DHCP.
- When ARP Ping is successful, DHCP status is disabled.
- Some DHCP server options can cause the apparent issuance of ARP Ping to the iLO MP which will negate the DHCP/DDNS method.
- The PC and the server must be on the same physical subnet.
- When a new server is first booted, DHCP is automatically available (factory-set default); but ARP Ping does not start for three minutes after the iLO MP is booted. This applies to every subsequent boot of the iLO MP until an IP address is obtained by DHCP or has been assigned by using the `LC` command or ARP Ping succeeds.

There are two methods to use the ARP Ping utility:

1. Connect a PC to the network that is on the same physical subnet as the server and run the ARP Ping commands from the PC.
2. Locate an existing server on the network, log into it, and run the ARP Ping commands from the server.

Table 3-7 lists the ARP Ping commands.

Table 3-7 ARP Ping Commands

ARP Command	Description
`arp -s`	This command assign the IP address to the iLO MP MAC address. This ARP table entry maps the MAC address of the iLO MP LAN interface to the static IP address designated for that interface.
`ping`	This command tests network connections. It verifies the iLO MP LAN port is configured with the appropriate IP address.

The following procedure explains how to use the ARP Ping utility using a PC that is connected to the network that is on the same physical subnet as the server.

To configure a static IP address using the ARP Ping utility, follow these steps:

1. Obtain the iLO MP MAC address. To set the IP address using ARP, you must know the MAC address of the iLO MP LAN. You can find the MAC address of the iLO MP LAN on a label on the server.

IMPORTANT: Make sure you obtain the MAC address to the iLO MP LAN and not the MAC address to the server core LAN.

2. Verify that an active LAN cable on the local subnet is connected to the iLO MP LAN port on the server.
3. Access a PC on the same physical subnet as the server.
4. Open a DOS window on the PC.
5. At the DOS prompt, enter **`arp -s`** to assign the IP address to the iLO MAC address.

   Syntax

   `arp -s` *<IP address you want to assign to the iLO MAC address> <iLO MAC address>*
6. At the DOS prompt, enter **`ping`** followed by the IP address to verify that the iLO MP LAN port is configured with the appropriate IP address. The destination address is the IP address that is mapped to the iLO MAC address. Perform this task from the PC that has the ARP table entry.

   Syntax

   `ping` *<IP address just assigned to the iLO MAC address>*
7. Use this IP address to connect to the iLO MP LAN.
8. Use Web or telnet access to connect to the iLO MP from a host on the local subnet and complete the rest of the LAN parameter (gateway, subnet).

Configuring the iLO MP LAN Using the RS-232 Serial Console Port

To configure the iLO MP LAN using the RS-232 serial console port, follow these steps:

IMPORTANT: Do not configure duplicate IP addresses on different servers within the same network. The duplicate server IP addresses conflict and the servers cannot connect to the network.

The `LC` command enables you to configure an IP address, host name, subnet mask, and gateway address.

IMPORTANT: Ensure you have a console connection through the RS-232 serial console port or a network connection through the LAN to access the iLO MP and use the `LC` command.

To assign a static IP address using the `LC` command, follow these steps:

1. Ensure the emulation software device is properly configured. The terminal emulation device runs software that interfaces with the server. The software emulates console output as it would appear on an ASCII terminal screen and displays it on a console device screen. To ensure the emulation software is correctly configured, follow these steps:
   a. Verify that the communication settings are configured as follows:
      - 8/none (parity)
      - 9600 baud
      - None (receive)
      - None (transmit)
   b. Verify that the terminal type is configured appropriately. Supported terminal types are:
      - hpterm
      - vt100
      - vt100+
      - vt-utf8

   IMPORTANT: Do not mix hpterm and vt100 terminal types at the same time.

   There are many different emulation software applications. Consult the help section of the emulation software application for instructions on how to configure the software options.
2. Use Table 3-5 to determine the required connection components, and the ports used to connect the server to the console device.
3. Connect the cables.
   a. Connect the DB25 end of the M-cable to the console RS-232 serial console port.
   b. Connect the DB–9F end of the RS-232 serial console port female-to-female cable to the M-cable connector labeled **Console**.
   c. Connect the other end of the DB-9F female-to-female cable to the console device.
4. Start the emulation software on the console device.
5. Log in to the iLO MP. See "Logging In to the iLO MP" (page 95).
6. At the **MP Main Menu**, enter **`CM`** and press **Enter** to select command mode.
7. At the command mode prompt, enter **`LS`** and press **Enter**. The screen displays the default LAN configuration values. Write down the default values, or log the information to a file. You may need the information for future troubleshooting.
8. Use the `LC` command to disable DHCP.
   a. From the `LC` command menu, type **`D`** and press **Enter**.
   b. Follow the instructions on the screen to change the DHCP status from Enabled to Disabled.
   c. Enter **`XD -R`** to reset the iLO MP.
9. Use the `LC` command to enter information for the IP address, host, subnet mask, gateway parameters, and so on.
10. Enter **`XD -R`** to reset the iLO MP.
11. After the iLO MP resets, log in to the iLO MP again and enter **`CM`** at the **MP:>** prompt.
12. Enter **`LS`** to confirm that DHCP is disabled and display a list of updated LAN configuration settings.

Logging In to the iLO MP

To log in to the iLO MP, follow these steps:

1. Access the iLO MP using the LAN, RS-232 serial console port, telnet, SSH, or Web method. The iLO MP login prompt displays.
2. Log in using the default the iLO MP user name and password (Admin/Admin). The **MP Main Menu** screen displays.

TIP: For security reasons, HP strongly recommends you modify the default settings during the initial login session. See "Modifying User Accounts and Default Password" (page 95).

Following is the **MP Main Menu** screen:

```
MP MAIN MENU:
       CO: Console
      VFP: Virtual Front Panel
       CM: Command Menu
       CL: Console Logs
       SL: Show Event Logs
       HE: Main Menu Help
        X: Exit Connection
```

This example shows the **MP Main Menu** accessed through the local serial console port. The list of commands displayed on the screen can be different depending on the method of access to the iLO MP.

See the *HP Integrity and HP 9000 Integrated Lights-Out (iLO) Management Processor Operations Guide* for information on the iLO MP menus and commands.

When logging in using the local or remote RS-232 serial console ports, the login prompt may not display if another user is logged in through these ports. Use **Ctrl-B** to access the **MP Main Menu** and the iLO MP prompt (`MP>`).

Additional Setup

This section provides information on how to modify user accounts, create local accounts, and use directory services.

Modifying User Accounts and Default Password

The iLO MP comes preconfigured with default factory settings, including a default user account and password. The two default user accounts on initial login are:

- All Rights (Administrator) level user: login = **`Admin`** password = **`Admin`**
- Console Rights (Operator) level user: login = **`Oper`** password = **`Oper`** Login and password are case sensitive.

TIP: For security reasons, HP strongly recommends you modify the default settings during the initial login session.

Make the following changes using any of the iLO MP user interfaces.

To modify default account configuration settings, follow these steps:

1. Log in as the administrator. You must log in as the administrator in order to modify default user configuration settings
2. To modify default passwords:

a. Access the **MP Main Menu**.
b. Enter **CM** at the MP> prompt.
c. Enter **UC** at the MP:CM> prompt and follow the prompts to modify default passwords.

3. To setup user accounts:
a. Access the **MP Main Menu**.
b. Enter **CM** at the MP> prompt.
c. Enter **UC** at the MP:CM> prompt and follow the prompts to modify user accounts.

Setting Up Security

For greater security and reliability, HP generally recommends that iLO MP management traffic be on a separate dedicated management network and that only administrators be granted access to that network. This not only improves performance by reducing traffic load across the main network, it also acts as the first line of defense against security attacks. A separate network allows administrators to physically control which workstations are connected to the network.

HP strongly recommends you modify the default settings during the initial logon session and determine the security access required and what user accounts and privileges are needed.

Create local accounts or use directory services to control user access. See "Modifying User Accounts and Default Password" (page 95).

Security Access Settings

Determine the security access required and what user accounts and privileges are needed.

The iLO MP provides options to control user access. Select one of the following options to prevent unauthorized access to the iLO MP:

- Change the default user name and password. See "Modifying User Accounts and Default Password" (page 95)).
- Create local accounts. You can store up to 19 user names and passwords to manage iLO MP access. This is ideal for small environments such as labs and small-to-medium sized businesses.
- Use directory services. Use the corporate directory to manage iLO MP user access. This is ideal for environments with a large number of frequently changing users. If you plan to use directory services, HP recommends leaving at least one local account enabled as an alternate method of access.

NOTE: See the *HP Integrity and HP 9000 Integrated Lights-Out (iLO) Management Processor Operations Guide* for more information on how to create local accounts and use directory services.

Accessing the Host Console

There are several ways to access the host console of an HP Integrity server:

- "Accessing the Host Console With the TUI - CO Command" (page 96)
- "Interacting With the iLO MP Using the Web GUI" (page 97)
- "Accessing the Graphic Console Using VGA " (page 98)

Accessing the Host Console With the TUI - CO Command

To access the host console through the iLO MP using the text user interface (TUI), follow these steps:

1. Log in using your user account name and password at the login page.
2. At the iLO MP login prompt (MP>), enter the CO command to switch the console terminal from the **MP Main Menu** to mirrored/redirected console mode. All mirrored data is displayed.
3. To return to the iLO MP command interface, type **Ctrl-B**, or **Esc** and **+**.

Interacting With the iLO MP Using the Web GUI

Web browser access is an embedded feature of the iLO MP.

The iLO MP has a separate LAN port from the system LAN port. It requires a separate LAN drop, IP address, and networking information from that of the port used by the operating system.

IMPORTANT: Make sure you use the MAC address to the iLO MP LAN and not the MAC address to the server core LAN.

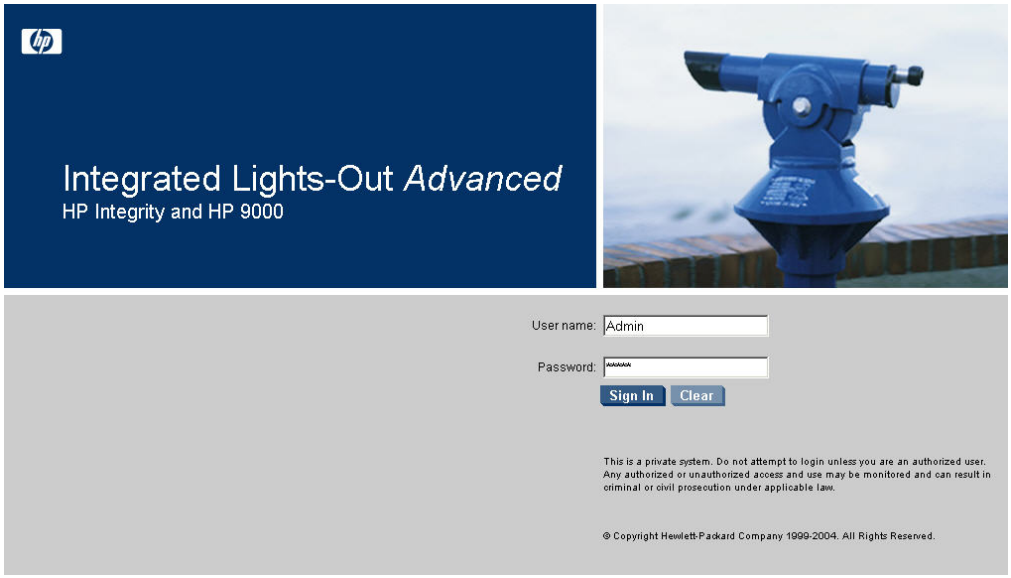
Before starting this procedure, you must have the following information:

- IP address for the iLO MP LAN
- Host name (this is used when messages are logged or printed)

To interact with the iLO MP through the Web GUI, follow these steps:

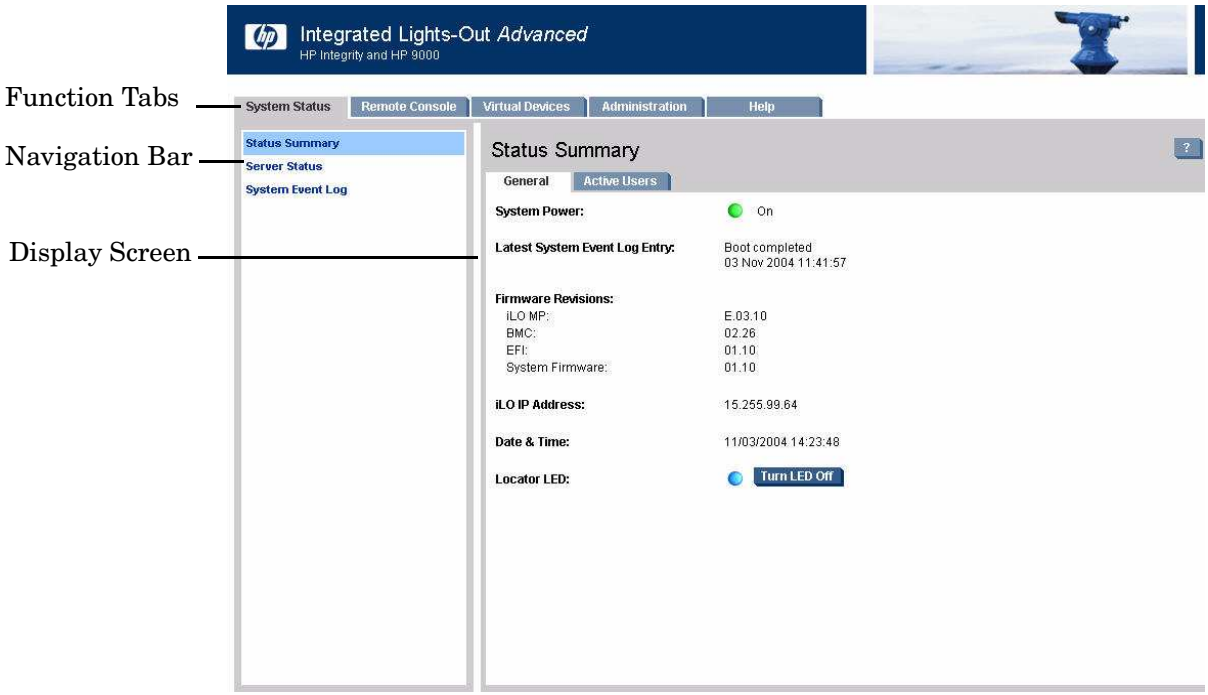
1. Open a Web browser and enter the host name or the IP address for the iLO MP.
2. Log in using your user account name and password at the login page. (Figure 3-31).

Figure 3-31 Web Login Page



3. Click **Sign In**. The **Status Summary** page (Figure 3-32) displays after login.

Figure 3-32 Status Summary Page



1. Select the Web interface functions by clicking the **Function** tabs at the top of the page. Each function lists options in the **Navigation Bar** on the left side of the page.
2. Click an option link to display data in the **Display** screen; and click **Refresh** to update the display.
3. Click the **Remote Console** tab. The remote console provides a serial console that behaves similarly to the TUI.

Help

The iLO MP Web interface has a robust help system. To launch iLO MP help, click the **Help** tab in the **Display** screen or click the **?** at the top right corner of each page to display help about that page.

Accessing the Graphic Console Using VGA

VGA is a method you can use to access the graphic console.

NOTE: You cannot access the iLO MP using VGA.

This method requires three elements:

- Monitor (VGA connector)
- Keyboard (USB connector)
- Mouse (USB connector)

The graphic console output displays on the monitor screen.

IMPORTANT: The server console output does not display on the console device screen until the server boots to the EFI Shell. Start a console session using the RS-232 serial console port method to view console output prior to booting to the EFI Shell or to access the iLO MP. See "Configuring the iLO MP LAN Using the RS-232 Serial Console Port" (page 93).

To access the graphic console with VGA, follow these steps:

1. Perform preparation tasks.
2. Connect the cables.
   a. Connect the monitor VGA cable to the appropriate VGA port on your server.
   b. Connect the keyboard USB cable to the appropriate USB port on your server.
   c. Connect the mouse USB cable to the appropriate USB port on your server.
3. Power on the server. The EFI Shell prompt displays.

Powering OFF and Powering On the Server

This section provides information and procedures for powering off and powering on the server.

Powering On the Server

Power on the server to full power using the following methods if the server is in the standby power state:

- iLO MP, using the `PC` command
- Manually, using the **Power** button

Powering On the Server Using the iLO MP

NOTE: If the power restore feature is set to **Always On** through the iLO MP `PR` command, the server may automatically power on to the full power state.

To power on the server through the iLO MP, follow these steps:

1. Plug all power cables into the receptacles on the rear panel of the server.
2. Start a console session, and access the **iLO MP Main Menu**.
3. Enter **`CM`**. to enable command mode.
4. Enter **`PC`** to use the remote power control command.
5. Enter **`ON`** to power on the server, and enter **`YES`** when prompted to confirm the action.
6. Start the operating system. (See operating system documentation for more information.)

Powering On the Server Manually

NOTE: If the power restore feature is set to **Always On** through the iLO MP `PR` command, the server may automatically power on to the full power state.

To manually power on the server, follow these steps:

1. Plug all power cables into the receptacles on the rear panel of the server.
2. Press the **Power** button to start the server.
3. Start the operating system. (See operating system documentation for more information.)

Powering Off the Server

Power off the server using the following methods if the server is in either the standby or full power state:

- iLO MP, using the `PC` command
- Manually, using the **Power** button

Powering Off the Server Using the iLO MP

To power off the server through the iLO MP, follow these steps:

1. Gracefully shut down the operating system. See operating system documentation for more information.
2. Start a console session, and access the **iLO MP Main Menu**.
3. Enter **CM** to enable command mode.
4. Enter **PC** to use the remote power control command.
5. Enter **OFF** to power off the server, and enter **YES** when prompted to confirm the action.

IMPORTANT: All the dc voltage except for the standby power is now turned off from the server. Therefore, dc voltage for standby power is still present in the server.

6. Unplug all power cables from the receptacles on the rear panel of the server.

Powering Off the Server Manually

To manually power off the server through the iLO MP, follow these steps:

1. Gracefully shut down the operating system. See operating system documentation for more information.
2. Press the **Power** button to power off the server.

IMPORTANT: The main dc voltage is now removed from the system; however, ac voltage for standby power is still present in the server.

3. Unplug all power cables from the receptacles on the rear panel of the server.

Booting the Operating System

This section describes procedures for booting and shutting down operating systems on entry class HP Integrity servers.

This section addresses the following topics:

Supported Operating Systems

Booting the server loads the operating system, which is essential for running all other programs.

You can only run one operating system on the server at one time.

The following operating systems are supported on the server:

- HP-UX 11i version 2
- Linux

NOTE: HP-UX is the only supported operating system for single-core processors.

Documentation and Support for HP-UX and Linux

You can find information about the operating system at the following Web sites:

- http://www.docs.hp.com/
- http://www.docs.hp.com/en/linux.html

Configuring System Boot Options

You can configure system boot options on the server, including the boot options list and the autoboot setting for the server.

- Boot Options List

  The boot options list is a list of loadable items you can select from the **EFI Boot Manager** menu. Ordinarily the boot options list includes the EFI Shell and one or more operating system loaders.

  To manage the boot options list for each system, use the EFI Shell, the EFI **Boot Configuration Menu**, or the operating system utilities.

  At the EFI Shell, the `bcfg` command supports listing and managing the boot options list for all operating systems.

  The EFI **Boot Configuration Menu** provides the **Add a Boot Option**, **Delete Boot Option(s)**, and **Change Boot Order** menu items. Use this method if you must add an EFI Shell entry to the boot options list.

  Operating system utilities for managing the boot options list include the HP-UX `setboot` command.

  For more information, see the following sections:

  — "Adding HP-UX to the Boot Options List" (page 102)
  — "Adding Linux to the Boot Options List" (page 106)

- Autoboot Setting

  At startup, the **autoboot** setting determines whether a system automatically loads the first item in the boot options list, or remains at the **EFI Boot Manager** menu. When autoboot is enabled, EFI loads the first item in the boot options list after a designated timeout period.

  Configure the autoboot setting for an HP Integrity system using either the `autoboot` EFI Shell command, or the **Set Auto Boot TimeOut** menu item from the EFI **Boot Configuration Menu.**

  For example, to disable autoboot from the EFI Shell, issue the **`autoboot off`** command. To enable autoboot with the default timeout value, issue the **`autoboot on`** command. To enable autoboot with a timeout of 60 seconds, issue the **`autoboot time 60`** command.

  Set autoboot from HP-UX using the `setboot` command. Enable autoboot from HP-UX using the **`setboot -b on`** command. Disable autoboot using the **`setboot -b off`** command.

Booting and Shutting Down HP-UX

This section describes booting and shutting down HP-UX on the server.

- To add an HP-UX entry to the boot options list, see "Adding HP-UX to the Boot Options List" (page 102).
- To boot HP-UX, use the following procedures:
  — "Booting HP-UX" (page 102) describes the standard procedures to boot HP-UX. Typically this results in booting HP-UX in multi-user mode.
  — "Booting HP-UX Into Single-User Mode " (page 104) describes how to boot HP-UX in single-user mode.
  — "Booting HP-UX Into LVM-Maintenance Mode" (page 105) describes how to boot HP-UX in LVM-maintenance mode.
- To shut down the HP-UX operating system, see "Shutting Down HP-UX" (page 105).

Adding HP-UX to the Boot Options List

This section describes how to add an HP-UX entry to the system boot options list.

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the EFI Shell or the **EFI Boot Configuration Menu**, (or in some versions of EFI, the **Boot Options Maintenance Menu**). The operating system installer automatically adds an entry to the boot options list.

To add an HP-UX boot option when logged in to HP-UX, use the `setboot` command. For more information see the *setboot*(1M) manpage.

To add an HP-UX item to the boot options list from the EFI Shell, follow these steps:

1. Access the EFI Shell environment.

   Log in to the iLO MP and enter the `CO` command to access the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager** menu. If you are at another EFI menu, select the **Exit** option from the submenus until you return to the screen with the **EFI Boot Manager** title.

   From the **EFI Boot Manager** menu, select EFI Shell to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X* where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the HP-UX loader is `\EFI\HPUX\HPUX.EFI`. It is on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Displays all items in the boot options list for the system.
   - `bcfg boot rm #` — Removes the item number specified by `#` from the boot options list.
   - `bcfg boot mv #a #b` — Moves the item number specified by *#a* to the position specified by *#b* in the boot options list.
   - `bcfg boot add #` *file.efi* `"`*Description*`"` — Adds a new boot option to the position in the boot options list specified by `#`. The new boot option references *file.efi* and is listed with the title specified by *Description*.

     For example, `bcfg boot add 1 \EFI\HPUX\HPUX.EFI "HP-UX 11i"`adds an HP-UX 11i item as the first entry in the boot options list.

   See the `help bcfg` command for more information.

4. Exit the console and iLO MP interfaces.

   To exit the system console and return to the **iLO MP Main Menu**, type **Control-B**. To exit the iLO MP, type **x** at the main menu.

Booting HP-UX

You can use either of the following methods to boot HP-UX:

- From the EFI Boot Manager.
- From the EFI Shell.

Procedure 3-36 Booting HP-UX (EFI Boot Manager)

To boot HP-UX from the **EFI Boot Manager** menu, follow these steps:

1. Access the **EFI Boot Manager** menu for the system on which you want to boot HP-UX.
2. Log in to the iLO MP and enter `CO` to select the system console. When accessing the console, confirm that you are at the **EFI Boot Manager** menu. If you are at another EFI menu, select **Exit** from the sub menus until you return to the screen with the **EFI Boot Manager** titles.
3. At the **EFI Boot Manager** menu, select an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments you use when booting the device.
4. Press **Return** or **Enter** to initiate booting using the chosen boot option.
5. Exit the console and iLO MP interfaces.

   To exit the system console and return to the **iLO MP Main Menu**, type **Control-B**. To exit the iLO MP, type **`X`** at the main menu.

Procedure 3-37 Booting HP-UX (EFI Shell)

To boot HP-UX from the EFI Shell, follow these steps:

1. Access the EFI Shell environment for the system on which you want to boot HP-UX.
2. Log in to the iLO MP and enter `CO` to select the system console. When accessing the console, confirm that you are at the **EFI Boot Manager** menu. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the **EFI Boot Manager** title.
3. From the **EFI Boot Manager** menu, select **EFI Shell** to access the EFI Shell environment.
4. At the EFI Shell environment, issue the **`map`** command to list all currently mapped bootable devices.

   The bootable file systems are listed as `fs0:`, `fs1:`, and so on.
5. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The file system number can change each time it is mapped; for example, when the system boots or when the `map -r` command is issued.
6. When accessing the EFI System Partition for the boot device, issue the **`HPUX`** command to initiate the `HPUX.EFI` loader on the device you are accessing.

   The full path for the loader is `\EFI\HPUX\HPUX.EFI`. When initiated, the loader references the `\EFI\HPUX\AUTO` file and boots HP-UX using the default boot behavior specified in the `AUTO` file.

   You have 10 seconds to interrupt the automatic booting of the default boot behavior. Pressing any key during this 10-second period stops the HP-UX boot process and enables you to interact with the `HPUX.EFI` loader. To exit the loader (the `HPUX>` prompt), type `exit` to return to the EFI Shell.

   To boot the HP-UX operating system, do not type anything during the 10-second period given for stopping at the `HPUX.EFI` loader.

   The following example displays the device mapping table.

```
Shell> map
Device mapping table
  fs0  : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)

  blk0 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk1 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)

  blk2 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part2,Sig72550000)

  blk3 : Acpi(000222F0,2A8)/Pci(0|0)/Scsi(Pun8,Lun0)
```

```
  blk4 : Acpi(000222F0,2A8)/Pci(0|1)/Scsi(Pun2,Lun0)

Shell> fs0:

fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

7. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, type `X` at the main menu.

Booting HP-UX Into Single-User Mode

To boot HP-UX in single-user mode from the EFI Shell follow these steps:

1. Access the EFI Shell environment for the system on which you want to boot HP-UX in single-user mode.
2. Log in to the iLO MP and enter `CO` to select the system console. When accessing the console, confirm that you are at the **EFI Boot Manager** menu. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the **EFI Boot Manager** title.
3. From the **EFI Boot Manager** menu, select **EFI Shell** to access the EFI Shell environment.
4. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.
5. When accessing the EFI System Partition for the boot device, issue the **`HPUX`** command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the chosen device.
6. Boot to the HP-UX Boot Loader prompt (`HPUX>`) by pressing any key within the 10 seconds given for interrupting the HP-UX boot process. Use the `HPUX.EFI` loader to boot HP-UX in single-user mode in the next step.

   After you press a key, the `HPUX.EFI` interface (the HP-UX Boot Loader `HPUX>` prompt) launches. For help using the `HPUX.EFI` loader, issue the `help` command. To return to the EFI Shell, type `exit`.

```
fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

[User Types A Key to Stop the HP-UX Boot Process and Access the HPUX.EFI Loader]

```
   Type 'help' for help

HPUX>
```

7. At the `HPUX>` prompt, issue the `boot -is vmunix` command to boot HP-UX (the `/stand/vmunix` kernel) in single-user (`-is`) mode.

```
HPUX> boot -is vmunix
> System Memory = 4063 MB
loading section 0
.................................................. (complete)
loading section 1
........ (complete)
loading symbol table
loading System Directory(boot.sys) to MFS
....
loading MFSFILES Directory(bootfs) to MFS
......
Launching /stand/vmunix
SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

Console is on a Serial Device
Booting kernel...
```

8. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, type `X` at the main menu.

Booting HP-UX Into LVM-Maintenance Mode

To boot HP-UX into LVM-maintenance mode, follow these steps:

1. Access the EFI Shell environment for the system on which you want to boot HP-UX into LVM-maintenance mode.
2. Log in to the iLO MP and enter `CO` to select the system console. When accessing the console, confirm that you are at the **EFI Boot Manager** menu. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the **EFI Boot Manager** title.
3. From the **EFI Boot Manager** menu, select **EFI Shell** to access the EFI Shell environment
4. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.
5. When accessing the EFI System Partition for the boot device, issue the **`HPUX`** command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the chosen device.
6. Press any key within the 10 seconds to interrupt the HP-UX boot process. This stops the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`).
7. At the `HPUX.EFI` interface, enter the **`boot -lm vmunix`** command to boot HP-UX (the `/stand/vmunix` kernel) in LVM-maintenance (`-lm`) mode.
8. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, type `X` at the main menu.

Shutting Down HP-UX

Use one of the following options to shut down HP-UX:

- To shut down and reboot an HP-UX system, use the **`shutdown -r`** command.
- To shut down and halt (power off) an HP-UX system, use the **`shutdown -h`** command.

For more information, see the *shutdown*(1M) manpage.

To shut down the HP-UX operating system, follow these steps:

1. Log in to HP-UX running on the system that you want to shut down.

   Log in to iLO MP for the server and use the **Console** menu to access the system console. Accessing the console through the iLO MP enables you to maintain console access to the system after HP-UX has shut down.

2. Issue the **`shutdown`** command with the appropriate command-line options.

   The command-line options you specify dictate the way in which HP-UX shuts down, and whether the system is rebooted.

   Use the following list to select an HP-UX shutdown option for the server:

   - To shut down HP-UX and halt (power off) the system, issue the **`shutdown -h`** command.

     To reboot a halted system, you must power on the system using the `PC` command at the iLO MP **Command** menu.

   - To shut down HP-UX and reboot the system, issue the **`shutdown -r`** command.

Booting and Shutting Down Linux

This section describes booting and shutting down the Linux operating system.

- To add a Linux entry to the boot options list, see "Adding Linux to the Boot Options List" (page 106).
- To boot Linux on the HP Integrity server, see "Booting the Linux Operating System" (page 107) for more information.
- To shut down the Linux system, see "Shutting Down Linux" (page 108).

Adding Linux to the Boot Options List

This section describes the process for adding the Linux entry to the system boot options list.

You can add the `\EFI\redhat\elilo.efi` loader to the boot options list from the EFI Shell, the **EFI Boot Configuration Menu** or in some versions of EFI, the **Boot Option Maintenance Menu**. The operating system installed automatically adds an entry to the boot options list.

To add a Linux item to the boot options list, follow these steps:

1. Access the EFI Shell environment.
2. Log in to the management processor and enter `CO` to access the system console. When accessing the console, confirm that you are at the **EFI Boot Manager** menu. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the **EFI Boot Manager** title.
3. From the **EFI Boot Manager** menu, select **EFI Shell** to access the EFI Shell environment.
4. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot Linux.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Linux loader is `\EFI\redhat\elilo.efi`. It is on the device you are accessing.

5. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Displays all items in the boot options list for the system.
   - `bcfg boot rm #` — Removes the item number specified by `#` from the boot options list.

- `bcfg boot mv #a #b` — Moves the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add # file.efi "Description"` — Adds a new boot option to the position in the boot options list specified by #. The new boot option references *file.efi* and is listed with the title specified by *Description*.

  For example, `bcfg boot add 1 \EFI\redhat\elilo.efi "Red Hat Enterprise Linux"`adds a Red Hat Enterprise Linux item as the first entry in the boot options list.

For more information, see the `help bcfg` command.

6. Exit the console and management processor interfaces.

   To exit the system console and return to the **iLO MP Main Menu**, type **Control-B**. To exit the iLO MP, type **x** at the main menu.

Booting the Linux Operating System

You can boot the Linux operating system on HP Integrity servers using either of these methods:

- Select a Linux entry from the **EFI Boot Manager** menu.

  To load the Linux operating system at the **EFI Boot Manager** menu, select its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the operating system using the `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

  See "" (page 107) for more information.

  On a Linux boot device EFI System Partition, the full paths to the loader and configuration files are: `\EFI\redhat\elilo.efi \EFI\redhat\elilo.conf`

  After choosing the file system for the boot device (for example, `fs0:`), you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, issue the `exit` command.

To boot Linux from the EFI Shell, follow these steps:

1. Access the EFI Shell.

   From the system console, select **EFI Shell** from the **EFI Boot Manager** menu to access the shell.

2. Access the EFI System Partition for the Linux boot device.

   Use the `map` EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and mapped.

   To select a file system to use, enter its mapped name followed by a colon (`:`). For example, use the boot device mapped as `fs3`, enter **`fs3:`** at the EFI Shell prompt.

3. Enter **`ELILO`** at the EFI Shell prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader's full path by entering **`\EFI\redhat\elilo`** at the EFI Shell prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

To interact with the ELILO.EFI loader, interrupt the boot process (for example, type a space) at the ELILO boot prompt. To exit the loader, issue the exit command.

Shutting Down Linux

Use the shutdown command to shut down Linux.

The Linux shutdown command has the following options:

-h Halts (powers off) after operating system shutdown.

Use the PC command at the iLO MP **Command** menu to manually power on or power off server hardware as needed.

-r Reboots the server after shutdown.

-c Cancels a running shutdown.

time Required to shut down. You can specify *time* in any of the following ways:

- Absolute time in the format *hh*:*mm*, in which *hh* is the hour (one or two digits) and *mm* is the minute of the hour (two digits).
- Number of minutes to wait in the format +*m*, in which *m* is the number of minutes.
- now to immediately shut down; this is equivalent to using +0 to wait zero minutes.

See the *shutdown*(8) Linux manpage for more information. Also see the Linux manpage for the poweroff command.

To shut down Linux, follow these steps:

1. Log in to Linux on the system you want to shut down.
2. Issue the shutdown command with the command-line options. Include the required *time* argument to specify when the operating system shutdown occurs.

   For example, shutdown -r +20 shuts down and reboots the system in twenty minutes.

Verifying the Server Configuration

To verify the server configuration, follow these steps:

1. To enter the POSSE shell, type CO from the **iLO MP Main Menu**. To list all the categories available in the shell, type **help** .
   - Configuration: The **Configuration** menu, where you can view and modify the system configuration
   - Memory: Memory related commands
2. Verify the parameters.
3. To return to the **iLO MP Main Menu**, use the X command .

Troubleshooting

This section helps you diagnose common issues that can occur during server installation.

This section addresses the following topics:

Troubleshooting Methodology

WARNING! Always disconnect the power cords and unplug telephone cables before removing the server cover. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cords to avoid exposure to high energy levels that can cause burns when parts are short-circuited by metal objects such as tools or jewelry.

CAUTION: Do not operate the server for more than two minutes with any cover (including power supply and disk drive covers) removed. The covers also provide EMI containment and direct airflow within the chassis. Depending on which cover or assembly is missing, the server can shut down, interrupting operations. In addition, damage to system components can result due to overheating.

You can safely remove the front grill while the HP server is running to remove and replace hot-swappable fans. You can replace the hot-swappable power supplies and one hot-swappable fan (accessible from the rear of the chassis) at any time. For any other service activity requiring access to internal components, power off the server and observe all safety precautions.

The server was tested prior to shipping. Failures encountered during installation can be due to damage that occurred in transit. Reseating connectors can clear problems that result from rough handling. If you are installing components or assemblies, compatibility problems or incorrect installations can be the cause of the problems. If you are installing components or assemblies, check that items are correctly installed and that all connectors are fully engaged. If the unit does not power on, check the power source before proceeding.

If a problem is encountered during initial operation, remove any add-in or optional components and retest the server before continuing. Verify basic server operation before installing additional cards and configuring software and hardware for the server requirements.

Troubleshooting is based on observation of server status indications and error messages, and by checking system event logs. You can observe the LED indicators on the front and rear of the server. Error messages are displayed on local and remote consoles. System history (console, event, and history logs) is available through the management processor, and is accessed through the console. Additional information about troubleshooting is available on the CD provided with the server.

Offline troubleshooting programs are available on the resource CD that is shipped with the HP server. To troubleshoot the server, you must be familiar with the Offline Diagnostics Environment (ODE) which runs in the Extensible Firmware Interface (EFI). Descriptions and user information about offline troubleshooting tools are available at:

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

The offline tools are available for downloading at:

http://www.software.hp.com.

Server Does Not Power On

Power problems during installation are usually related to the installation process. If the server does not power on, check the LED indicators on the power supply rear panels and perform the following actions:

- If the dc In indicators are lit, it is assumed that power is available to the server.
- If a fault indicator is lit, reseat the power supply. If the problem persists, remove and reseat boards within the server. If the problem still persists, replace the power supply or the power supply interface board.
- If the dc Out indicators are lit, it is assumed that power is available to the server circuits. If the console shows that the server is powered on, but server LEDs indicate that power is off, remove and reseat connectors on the LED status board. If the problem persists, replace the LED status board. If the console shows that the server is not powered on (server is off), remove and reseat connectors on the system board. If the problem persists, replace the power supply interface board, the iLO MP card, or the system board.

Troubleshooting Using the Front Panel Power Button

The server **Power** button on the front panel operates differently depending on how long the button is held in, and on what the system is doing when the button is pressed. You must be aware of its uses to properly troubleshoot the system.

If the server is off, and power is not connected to server power supplies, pressing the **Power** button has no effect.

If the server is off, and power is connected to server power supplies, the front panel power LED blinks at a 1 Hz rate. In this state, standby power is available to server circuits, but main power is off. Pressing and holding the **Power** button accomplishes the following:

- 1 – 3 seconds: System power turns on.

If the server is on and the system is at the EFI, pressing and holding the **Power** button accomplishes the following:

- 1 – 3 seconds: System power turns off immediately (hard power off).
- 5 seconds or longer: System power turns off immediately (hard power off).

If the server is on and the operating system is running, pressing and holding the **Power** button accomplishes the following:

- 1 – 3 seconds: System power turns off (software controlled power off).
- 5 seconds or longer: System power turns off immediately (hard power off).

EFI Menu is Not Available

If you cannot access the EFI from either the main disk partition or the CD, use the following tools to help solve the problem:

- Front panel LEDs
- iLO MP
  - Console messages
  - System event logs (SEL)

Operating System Does Not Boot

If the operating system does not boot, but you are able to reach the EFI from either the main disk partition or the CD, use the following tools to help solve the problem:

- Using the EFI Shell, check the system logs and analyze any error messages.
- Offline Diagnostic Environment (ODE)

Operating System Boots with Problems

If the operating system is running, you are experiencing problems, use the following tools to help solve the problem:

- LEDs
- Error Messages and event logs

Intermittent Server Problems

You can usually trace intermittent problems that occur during installation to power source problems, a loose connector, or some other hardware problem. If you are experiencing intermittent problems, follow these steps:

1. Check iLO MP logs and analyze the problem. Determine if there is more than one symptom and if the problem is random.
2. Verify that the dc power source is stable and within the –40 to –72 VDC range.
3. Reseat all rear panel connectors.
4. Reseat all hot-swappable fans and power supplies.
5. Reseat all main memory DIMMs.
6. Reseat all cable harnesses and board connectors.

DVD Problems

DVD problems that occur during installation are usually related to faulty connections. If you are experiencing DVD problems, follow these steps:

1. Remove and reinsert the disk.
2. Replace the disk.
3. Remove and reinstall the DVD drive. Check that connectors are fully engaged.
4. Replace the DVD drive.

Hard Drive Problems

Hard drive problems that occur during installation are usually due to rough handling. The drive may not be correctly seated or may have been damaged in transit. If you are experiencing hard drive problems, follow these steps:

1. Remove and reinsert the faulty hard drive.
2. Swap the hard drive with one from another slot or with a known good spare.
3. Remove and reinstall the hard drive backplane. Check that connectors are fully engaged.
4. Replace the hard drive backplane.

Console Problems

Console problems during installations can be caused by faulty interconnections. If you are experiencing monitor, keyboard, or mouse problems, follow these steps:

1. Check the monitor controls. Adjust contrast and brightness as required.
2. Inspect all power and interconnecting cables. Check that all console connectors are fully engaged.
3. Check that all iLO MP card connectors are fully engaged.
4. Exercise the appropriate self-test features of the console software.

Downloading and Installing the Latest Version of the Firmware

HP makes every effort to provide you with the most current version of firmware. However, there can be instances when this is not the case.

To ensure you have the latest version of the firmware running on the server, download the latest version of the firmware from the Web, and create a CD to install the firmware on the server.

You can update firmware by using the HP Firmware Manager (HP FM). HP FM is a set of tools for updating firmware on an HP Integrity system. HP FM is packaged with the firmware and distributed through the web. HP FM provides two methods of updating firmware. The method to use depends on whether or not the operating system is running on the system:

- HP OS-Initiated Firmware Manager (HP OSIFM) – Use HP OSIFM if the HP-UX or Linux operating system is running. HP OSIFM provides a firmware package in a patch or product file for HP-UX and a Smart Component for Linux. You download the patch, product, or Smart Component to a system and then use the operating system to update the firmware.
- HP Offline Firmware Manager (HP OFM) – Use HP OFM if the operating system is not running or to update the firmware for a device in the boot path. HP OFM provides a firmware package as an .ISO image that you download to a system to create a CD. You then use the CD to boot the system and update the firmware.

For more information about downloading and updating firmware using FM, see the *HP Firmware Manager User's Guide* under the System Firmware section of the HP Technical Documentation Web site:

http://www.docs.hp.com/en/hw.html#System%20Firmware

Downloading the Latest Version of the Firmware

To download the latest version of the firmware from the Web, follow these steps:

1. Go to http://www.hp.com/go/bizsupport.
2. Select **download drivers and software**.
3. Select **Itanium-based servers** from the **Server** category.
4. Select your product from the servers listed.
5. Select your operating system.
6. Select the firmware category you want to download.
7. Download the firmware to a CD.

Installing the Latest Version of the Firmware onto the Server

To install the latest version of the firmware on the server, follow these steps:

1. Start a server console session.
2. Insert the CD with the copy of the latest version of the firmware.
3. Using the **EFI Boot Manager** menu, boot to the drive that contains the CD with the updated firmware.
4. Follow the instructions to update the firmware.

4 Booting and Shutting Down the Operating System

This chapter describes procedures for booting and shutting down operating systems on the server.

This chapter addresses the following topics:

Supported Operating Systems

NOTE: You can only run one operating system on the server at one time.

The HP Integrity cx2620 server supports the following operating systems:

- HP-UX 11i version 2
- Linux

NOTE: HP-UX is the only supported operating system for single-core processors.

Documentation and Support for HP-UX and Linux

Documentation for the operating systems is available on the Web at:

- `http://www.docs.hp.com/`
- `http://www.docs.hp.com/en/linux.html`

Configuring System Boot Options

This section discusses the system boot options you can configure on the server, including the boot options list and the `autoboot` setting for the server.

- **Boot Options List** The boot options list is a list of loadable items available for you to select from the **EFI Boot Manager Menu**. Ordinarily the boot options list includes the EFI Shell and one or more operating system loaders.

  To manage the boot options list for each system, use the EFI Shell, the **EFI Boot Configuration Menu**, or operating system utilities.

  At the EFI Shell, the `bcfg` command supports listing and managing the boot options list for all operating systems.

  The **EFI Boot Configuration Menu** includes the **Add a Boot Option**, **Delete Boot Option(s)**, and **Change Boot Order** menu items. Use this menu if you must add an EFI Shell entry to the boot options list.

  Operating system utilities for managing the boot options list include the HP-UX `setboot` command.

  See the following sections for more information:

  — To set HP-UX boot options, see "Adding HP-UX to the Boot Options List" (page 102).
  — To set Linux boot options, see "Adding Linux to the Boot Options List" (page 106).

- **Autoboot Setting** At startup, the `autoboot` setting determines whether a system automatically loads the first item in the boot options list, or remains at the **EFI Boot Manager**

Menu. When `autoboot` is enabled, EFI loads the first item in the boot options list after a designated timeout period.

Configure the `autoboot` setting for an HP Integrity system using either the `autoboot` EFI Shell command, or the **Set Auto Boot TimeOut** menu item from the **EFI Boot Configuration Menu.**

For example, to disable autoboot from the EFI Shell, issue the `autoboot off` command. To enable autoboot with the default timeout value, issue the `autoboot on` command. To enable autoboot with a timeout of 60 seconds, issue the `autoboot time 60` command.

Set `autoboot` from HP-UX using the `setboot` command. Enable `autoboot` from HP-UX using the `setboot -b on` command. Disable `autoboot` using the `setboot -b off` command.

Booting and Shutting Down HP-UX

This section describes how to perform the following procedures:

- Add an HP-UX entry to the boot options list.
- Boot HP-UX. To boot HP-UX, use the following procedures:
  - **Adding HP-UX to the Boot Options List** describes the standard ways to boot HP-UX. Typically this results in booting HP-UX in multi user mode.
  - **Booting HP-UX Into Single User Mode** describes how to boot HP-UX in single-user mode.
  - **Booting HP-UX Into LVM-Maintenance Mode** describes how to boot HP-UX in LVM-maintenance mode.
- To shut down the HP-UX operating system, see "Shutting Down HP-UX" (page 118).

Adding HP-UX to the Boot Options List

This section describes how to add an HP-UX entry to the system boot options list.

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the EFI Shell or **EFI Boot Configuration Menu**, (or in some versions of EFI, the **Boot Options Maintenance Menu**).

To add an HP-UX boot option when logged in to HP-UX, use the `setboot` command. For details, see the *setboot*(1M) manpage.

To add an HP-UX item to the boot options list from the EFI Shell, follow these steps:

1. Access the EFI Shell environment.

   Log in to the iLO MP and enter the `CO` command to access the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager Menu**. If you are at another EFI menu, select the **Exit** option from the submenus until you return to the screen with the **EFI Boot Manager** heading.

   From the **EFI Boot Manager Menu**, select the **EFI Shell** to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the HP-UX loader is `\EFI\HPUX\HPUX.EFI`. It is on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Displays all items in the boot options list for the system.
   - `bcfg boot rm #` — Removes the item number specified by # from the boot options list.
   - `bcfg boot mv #a #b` — Moves the item number specified by *#a* to the position specified by *#b* in the boot options list.
   - `bcfg boot add #` *file.efi* `"`*Description*`"` — Adds a new boot option to the position in the boot options list specified by #. The new boot option references *file.efi* and is listed with the title specified by *Description*.

     For example, `bcfg boot add 1 \EFI\HPUX\HPUX.EFI "HP-UX 11i"`adds an HP-UX 11i item as the first entry in the boot options list.

   See the `help bcfg` command for details.

4. Exit the console and iLO MP interfaces.

   Enter **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, enter `X` at the main menu.

Booting HP-UX

Use either of the following procedures to boot HP-UX:

- Booting HP-UX (EFI Boot Manager)
- Booting HP-UX (EFI Shell)

Procedure 4-2 Booting HP-UX (EFI Boot Manager)

From the **EFI Boot Manager Menu**, select an item from the boot options list to boot HP-UX.

1. Access the **EFI Boot Manager Menu** for the system on which you want to boot HP-UX.

   Log in to the iLO MP and enter `CO` to select the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager Menu**. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the `EFI Boot Manager` heading.

2. At the **EFI Boot Manager Menu**, select an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments you use when booting the device.

3. Press **Return** or **Enter** to initiate booting using the chosen boot option.
4. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, enter `X` at the main menu.

Procedure 4-3 Booting HP-UX From the EFI Shell

To boot HP-US from the EFI Shell environment, follow these steps:

1. Access the EFI Shell environment for the system on which you want to boot HP-UX.

   Log in to the iLO MP and enter `CO` to select the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager Menu**. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the `EFI Boot Manager` heading.

From the **EFI Boot Manager Menu**, select **EFI Shell** to access the EFI Shell environment.

2. At the EFI Shell prompt, issue the **`map`** command to list all currently mapped bootable devices.

   The bootable file systems you need are typically listed as `fs0:`, `fs1:`, and so on.

3. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The file system number can change each time it is mapped, for example, when the system boots or when the `map -r` command is issued.

4. When accessing the EFI System Partition for the desired boot device, issue the **`HPUX`** command to initiate the `HPUX.EFI` loader on the device you are accessing.

   The full path for the loader is `\EFI\HPUX\HPUX.EFI`. When initiated, the loader references the `\EFI\HPUX\AUTO` file and boots HP-UX using the default boot behavior specified in the `AUTO` file.

   You have ten seconds to interrupt the automatic booting of the default boot behavior. Pressing any key during this ten-second period stops the HP-UX boot process and enables you to interact with the `HPUX.EFI` loader. To exit the loader (the `HPUX>` prompt), enter `exit` to return to the EFI Shell.

   To boot the HP-UX operating system, do not type anything during the ten-second period given for stopping at the `HPUX.EFI` loader.

```
Shell> map
Device mapping table
  fs0  : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)

  blk0 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk1 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)

  blk2 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part2,Sig72550000)

  blk3 : Acpi(000222F0,2A8)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk4 : Acpi(000222F0,2A8)/Pci(0|1)/Scsi(Pun2,Lun0)

Shell> fs0:

fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\EFI\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

5. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, enter `X` at the main menu.

Booting in HP-UX Single-User Mode

To boot HP-UX in single-user mode, follow these steps:

1. Access the EFI Shell environment for the system on which you want to boot HP-UX in single-user mode.

   Log in to the iLO MP and enter `CO` to select the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager Menu**. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the **EFI Boot Manager Menu**, select **EFI Shell** to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.
3. When accessing the EFI System Partition for the desired boot device, issue the **`HPUX`** command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the chosen device.
4. Boot to the HP-UX Boot Loader prompt (`HPUX>`) by pressing any key within the ten seconds given for interrupting the HP-UX boot process. Use the `HPUX.EFI` loader to boot HP-UX in single-user mode in the next step.

   After you press a key, the `HPUX.EFI` interface launches. For help using the `HPUX.EFI` loader, enter the `help` command. To return to the EFI Shell, enter `exit`.

```
fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\EFI\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

   [User Types A Key to Stop the HP-UX Boot Process and Access the HPUX.EFI Loader]

```
   Type 'help' for help

HPUX>
```

5. At the `HPUX.EFI` interface, issue enter the `boot -is vmunix` command to boot HP-UX (the `/stand/vmunix` kernel) in single-user (`-is`) mode.

```
HPUX> boot -is vmunix
> System Memory = 4063 MB
loading section 0
................................................. (complete)
loading section 1
........ (complete)
loading symbol table
loading System Directory(boot.sys) to MFS
....
loading MFSFILES Directory(bootfs) to MFS
......
Launching /stand/vmunix
SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

Console is on a Serial Device
Booting kernel...
```

6. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, enter `X` at the main menu.

LVM-Maintenance Mode HP-UX Booting

To boot HP-UX in LVM-maintenance mode, follow these steps from the EFI Shell:

1. Access the EFI Shell environment for the system on which you want to boot HP-UX in LVM-maintenance mode.

   Log in to the iLO MP and enter `CO` to select the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager Menu**. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the **EFI Boot Manager Menu**, select **EFI Shell** to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.
3. When accessing the EFI System Partition for the desired boot device, issue the **`HPUX`** command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the chosen device.
4. Enter any key within the ten seconds given for interrupting the HP-UX boot process. This stops the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt `HPUX>`).
5. At the `HPUX.EFI` interface, enter the **`boot -lm vmunix`** command to boot HP-UX (the `/stand/vmunix` kernel) in LVM-maintenance (`-lm`) mode.
6. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, enter `X` at the main menu.

Shutting Down HP-UX

To shut down HP-UX running on the server, use the `shutdown` command.

For more information, see the *shutdown*(1M) manpage.

To shut down HP-UX, follow these steps:

1. Log in to HP-UX running on the server that you want to shut down.

   Log in to iLO MP for the server and use the **Console** menu to access the system console. Accessing the console through the iLO MP enables you to maintain console access to the system after HP-UX has shut down.

2. Issue the **`shutdown`** command with the appropriate command-line options.

   The command-line options you specify dictate the way in which HP-UX shuts down and whether the system is rebooted.

   Use one of the following HP-UX shutdown options:

   - To shut down HP-UX and halt (power off) the system, issue the **`shutdown -h`** command.

     To reboot a halted system you must power on the system using the `PC` command at the iLO MP **Command** menu.

   - To shut down HP-UX and reboot the system, issue the **`shutdown -r`** command.

Booting and Shutting Down Linux

This section covers booting and shutting down the Linux operating system on the server.

- To add a Linux entry to the boot options list, see "Adding Linux to the Boot Options List" (page 119).
- To boot Linux on the HP Integrity server, see "Booting the Linux Operating System" (page 120) for details on Linux.
- To shut down Linux, see "Shutting Down Linux" (page 120).

Adding Linux to the Boot Options List

This section describes the process for adding a Linux entry to the server boot options list.

You can add the `\EFI\redhat\elilo.efi` loader to the boot options list from the EFI Shell or **EFI Boot Configuration Menu** or in some versions of EFI, the **Boot Option Maintenance Menu**.

To add a Linux item to the boot options list, follow these steps:

1. Access the EFI Shell environment.

   Log in to the iLO MP and enter the `CO` command to access the system console.

   When accessing the console, confirm that you are at the **EFI Boot Manager Menu**. If you are at another EFI menu, select **Exit** from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the **EFI Boot Manager Menu**, select **EFI Shell** to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot Linux.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Linux loader is `\EFI\redhat\elilo.efi` and it is on the device you are accessing.

3. At the EFI Shell prompt, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Displays all items in the boot options list for the system.
   - `bcfg boot rm #` — Removes the item number specified by `#` from the boot options list.
   - `bcfg boot mv #a #b` — Moves the item number specified by *#a* to the position specified by *#b* in the boot options list.
   - `bcfg boot add #` *file.efi* `"`*Description*`"` — Adds a new boot option to the position in the boot options list specified by `#`. The new boot option references *file.efi* and is listed with the title specified by *Description*.

     For example, `bcfg boot add 1 \EFI\redhat\elilo.efi "Red Hat Enterprise Linux"`adds a Red Hat Enterprise Linux item as the first entry in the boot options list.

   See the `help bcfg` command for details.

4. Exit the console and iLO MP interfaces.

   Press **Control-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, enter `X` at the main menu.

Booting the Linux Operating System

You can boot the Linux operating system on HP Integrity servers using either of the following methods:

- Select the Linux entry from the **EFI Boot Manager Menu**.

  To load the Linux operating system at the **EFI Boot Manager Menu**, select its entry from the list of boot options.

  Selecting a Linux entry from the boot options list boots the operating system using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

  On a Linux boot device EFI System Partition, the full paths to the loader and configuration files are: `\EFI\redhat\elilo.efi` `\EFI\redhat\elilo.conf`

  After choosing the file system for the boot device (for example, `fs0:`) you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (press any key) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Procedure 4-8 Booting Linux from the EFI Shell

To boot Linux from the EFI Shell, follow these steps:

1. Access the EFI Shell.

   From the system console, select **EFI Shell** from the **EFI Boot Manager Menu** to access the shell.

2. Access the EFI System Partition for the Linux boot device.

   Use the EFI Shell `map` command to list the file systems (`fs0`, `fs1`, and so on) that are known and mapped.

   To select a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter **`fs3:`** at the EFI Shell prompt.

3. Enter **`ELILO`** at the EFI Shell prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader's full path by entering **`\EFI\redhat\elilo`** at the EFI Shell prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (press any key) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Shutting Down Linux

Use the `shutdown` command to shut down Linux.

The Linux `shutdown` command has the following options:

`-h` Halts (power off) after shutdown.

Use the `PC` command at the iLO MP **Command** menu to manually power on or power off server hardware, as needed.

`-r` Reboots after shutdown.

`-c` Cancels an already running shutdown.

time (Required) When to shut down. You can specify *time* in any of the following ways:

- Absolute time in the format *hh*:*mm*, in which *hh* is the hour (one or two digits) and *mm* is the minute of the hour (two digits).
- Number of minutes to wait in the format +*m*, in which *m* is the number of minutes.
- `now` to immediately shut down; this is equivalent to using `+0` to wait zero minutes.

See the *shutdown*(8) Linux manpage for more information. Also see the Linux `poweroff` manpage.

Procedure 4-9 Shutting Down Linux

To shut down the Linux operating system, follow these steps:

1. Log in to Linux running on the server you want to shut down.
2. Issue the **`shutdown`** command with the desired command-line options, and include the required *time* argument to specify when the operating system shutdown is to occur.

   For example, `shutdown -r +20` shuts down and reboots the system in twenty minutes.

5 Troubleshooting

This chapter provides a preferred methodology (strategies and procedures) and tools for troubleshooting server error and fault conditions.

This chapter addresses the following topics:

Methodology

General Troubleshooting Methodology

There are multiple entry points to the troubleshooting process, dependent upon your level of troubleshooting expertise, the tools, processes, and procedures which you have at your disposal, and the nature of the system fault or failure.

1. Typically, you select from a set of symptoms, ranging from very simple, system LED is blinking; to the most difficult, Machine Check Abort (MCA) has occurred. The following is a list of symptom examples:
   - Front Panel system LED blinking
   - System Alert present on system console
   - Server won't power-up
   - Server won't boot
   - Error/event message received
2. Narrow down the observed problem to the specific troubleshooting procedure required. Isolate the failure to a specific part of the server to perform more detailed troubleshooting. For example:
   - Problem- Front Panel LED blinking

   NOTE: The front panel system LED flashes amber with a warning indication, or flashes red with a fault indication.

   — System Alert on system console?
   — Analyze the alert by using the system event log (SEL), to identify the last error logged by the server. Use the iLO MP commands to view the SEL, through the iLO MP's text interface.
3. You should have a good idea about which area of the server requires further analysis. For example, if the symptom was "server won't power-up", the initial troubleshooting procedure may have indicated a problem with the dc power rail not coming up after the power was turned on.
4. You have now reached the point where the failed Customer Replaceable Unit (CRU or CRUs) has been identified and needs to be replaced. You must now perform the specific removal

and replacement procedure, and verification steps (see Chapter 6: "Removing and Replacing Components" (page 157) for more details).

NOTE: If multiple CRUs are identified as part of the solution, fix all identified failed CRUs to guarantee success.

5. There may be specific recovery procedures you need to perform to finish the repair.

Should a failure occur, the front panel LEDs and the SEL helps you identify the problem or CRU:

- LEDs. The front panel LEDs and LAN LEDs of the server change color and blink to help identify specific problems, and display LAN activity.
- The SEL provides detailed information about the errors identified by the LEDs.

For system alerts of levels 3-5, the attention condition on the system LED can be cleared by accessing the logs using the `sl`command, available in the iLO MP command mode. To access the MP from the serial console port, enter **Ctrl+B**.

If the LEDs and SEL do not give you enough information for you to identify the problem you are experiencing, HP also provides diagnostic tools with each operating system (see "Diagnostics" (page 135) for more details).

NOTE: Always check the iLO MP SEL in the case of a blinking yellow or red front panel system LED, before replacing any hardware.

Troubleshooting Using the Server Power Button

The server **Power** button on the front panel operates differently depending on how long the button is held in, and on what the system is doing when the button is pressed. You must be aware of its uses to properly troubleshoot the system.

Table 5-1 describes what happens when the server is at EFI, and you press the **Power** button.

Table 5-1 Server Power Button Functions When Server is On and at EFI

Action	Reaction
1-3 seconds	System power turns off immediately (hard power off).
5 seconds or longer	System power turns off immediately (hard power off).

Table 5-2 describes what happens when the server is on with the operating system running, and you press the **Power** button.

Table 5-2 Server Power Button Functions When Server is On and OS is Running

Action	Reaction
1-3 seconds	System power turns off (software controlled power off).
5 seconds or longer	System power turns off immediately (hard power off).

If the server is off, and power is not connected to server power supplies, pressing the **Power** button has no effect.

If the server is off, and power is connected to server power supplies, the front panel power LED blinks at a 1 Hz rate. In this state, standby power is available to server circuits, but main power is off. Table 5-3 describes what happens when the server is off, and you press the **Power** button.

Table 5-3 Server Power Button Functions When Server is Off

Action	Reaction
1-3 seconds	System power turns on.

Server Does Not Power On

The server **Power** button on the front panel operates differently depending on how long the button is held in, and on what the system is doing when the button is pressed. You must be aware of its uses to properly troubleshoot the system.

NOTE: If the server is off, and power is not connected to server power supplies, pressing the **Power** button has no effect.

Power problems during installation are usually related to the installation process. If the server does not power on, check the LED indicators on the power supply rear panels and follow these steps.

- If the **dc In** indicators are lit, it is assumed that power is available to the server.
- If a fault indicator is lit, reseat the power supply. If the problem persists, remove and reseat boards within the server. If the problem persists, replace the power supply or the power supply interface board.
- If the **dc Out** indicators are lit, it is assumed that power is available to the server circuits. If the console shows that the server is powered on, but server LEDs indicate that power is off, remove and reseat connectors on the LED status board. If the problem persists, replace the LED status board. If the console shows that the server is not powered on (server is off), remove and reseat connectors on the system board. If the problem persists, replace the power supply interface board, the MP card, or the system board.

EFI Menu is Not Available

If you cannot access the EFI, use the following tools to help solve the problem:

- Front panel LEDs
- iLO MP
  - Console messages
  - System event logs (SEL)
  - `SYSREV` command

Operating System Does Not Boot

If the operating system does not boot, but you are able to reach the EFI, from either the main disk partition or the CD, use the following tools to help solve the problem:

- Using the EFI Shell, check the system logs and analyze any error messages.
- Offline Diagnostic Environment (ODE)

Operating System Boots with Problems

If the operating system is running and you are experiencing problems, use the following tools to help solve the problem:

- LEDs
- Error messages and event logs

Intermittent Server Problems

You can trace intermittent problems that occur during installation to power source problems, a loose connector, or some other hardware problem. If you are experiencing intermittent problems, follow these steps:

1. Check the iLO MP logs and analyze the problem. Determine if there is more than one symptom and if the problem is random.
2. Verify that the dc power source is stable.

3. Reseat all rear panel connectors.
4. Reseat all hot-swappable fans and power supplies.
5. Reseat all main memory DIMMs.
6. Reseat all cable harnesses and board connectors.

DVD Problems

DVD problems that occur during installation are usually related to faulty connections. If you are experiencing DVD problems, follow these steps:

1. Remove and reinsert the disk.
2. Replace the disk.
3. Remove and reinstall the DVD drive. Check that connectors are fully engaged.
4. Replace the DVD drive.

Hard Drive Problems

Hard drive problems that occur during installation are usually due to rough handling. The drive may not be correctly seated or may have been damaged in transit. If you are experiencing hard drive problems, follow these steps:

1. Remove and reinsert the faulty hard drive.
2. Swap the hard drive with one from another slot or with a known good spare.
3. Remove and reinstall the hard drive backplane. Check that connectors are fully engaged.
4. Replace the hard drive backplane.

Console Problems

Console problems during installations can be caused by faulty interconnections. If you are experiencing monitor, keyboard, or mouse problems, follow these steps:

1. Check the monitor controls. Adjust contrast and brightness as required.
2. Inspect all power and interconnecting cables. Check that all console connectors are fully engaged.
3. Check that all iLO MP card connectors are fully engaged.
4. Exercise the appropriate self-test features of the console software.

Troubleshooting Using LED Indicators

The server has LED indicators located on the front and rear of the server which you can use to determine what repair action is required. Descriptions of front and rear panel LEDs are provided in the following sections.

Front Panel LEDs

The front panel LEDs show server status at a glance. They include four diagnostic LEDs, and the system, LAN, and power LEDs. The front panel LEDs are listed in Table 5-4, together with system status or probable cause descriptions of likely system failures.

Figure 5-1 Front Panel LEDs

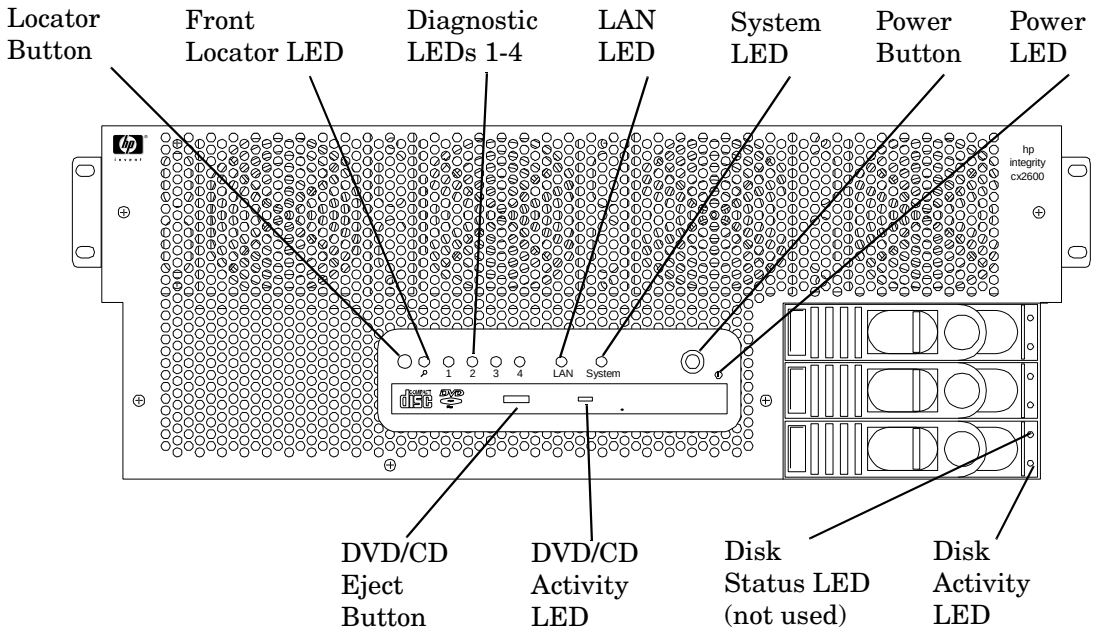


Table 5-4 Front Panel LED Definitions

LED/Button	System State	Flash Rate	Color	Description
System LED	Off	None	N/A	System is off.
System LED	Running	Flashing at 0.5 Hz	Green	System is booting or running EFI.
System LED	Running	Steady	Green	System normal. The operating system is up and running.
System LED	Warning	Flashing at 1 Hz	Amber	Attention required. Check the four diagnostic LEDs and the iLO MP status log for information. The LED turns off when the iLO MP log is accessed.
System LED	Fault	Flashing at 2 Hz	Red	Fault detected. Check the four diagnostic LEDs and the iLO MP status log for information. The LED is turned off by the `MP DC` command, or by correcting the problem.
Diag LEDs (1 thru 4)		None	Yellow or Red	Displays system error condition (when System LED is flashing yellow) or fault condition (when System LED is flashing red). See Table 5-5 for error code information.
LAN LED	Off	None	N/A	The system is off (no power to LAN circuits) or hardware failure.
LAN LED	Active	Steady	Green	LAN link is established but LAN is inactive.
LAN LED	Active	Flashing at rate of LAN activity	Green	LAN is active.
Disk Activity LED	Off	None	N/A	Disk is not active.
Disk Activity LED	Active	Flashing at rate of LAN activity	Green	Disk is active.
Disk Status LED	N/A	N/A	N/A	Not used.

Table 5-4 Front Panel LED Definitions *(continued)*

LED/Button	System State	Flash Rate	Color	Description
CD Activity LED	Active	Flashing at rate of LAN activity	Green	Disk is active.
Locator LED/Button	(Flag)	Flashing at 1 Hz	Blue	System locator LED can be remotely or locally activated or deactivated to call attention to a particular server. It is also a test for a running BMC on the system board.
Power LED	No power	Off	Off	dc power is not available to the server.
Power LED	Standby power	Flashing at 1 Hz	Green	dc power is connected to the server, but power is off. Standby power (3.3V) is applied to some server circuits.
Power LED	Main power on	Steady	Green	Power is applied to all server circuits.

Table 5-5 lists diagnostic LED displays and descriptions.

NOTE: Use the SEL logs for a complete description of an error.

IMPORTANT: If you have iLO MP installed, use the SEL logs instead of the LEDs to troubleshoot any problems.

Table 5-5 Diagnostic LED Displays and Descriptions

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Off	Off	Green	Red	Flashing Yellow	Fan 3 warning. BMC is reporting that one fan rotor is turning more slowly than expected or is stopped. Investigate problem at the first opportunity.
Off	Green	Off	Red	Flashing Yellow	Fan 2 warning. BMC is reporting that one fan rotor is turning more slowly than expected or is stopped. Investigate problem at the first opportunity.
Off	Green	Green	Red	Flashing Yellow	Fan 5 warning. BMC is reporting that one fan rotor is turning more slowly than expected or is stopped. Investigate problem at the first opportunity.
Off	Green	Off	Flashing Red	Flashing Yellow	Fan warning: When you read the log, the system LED turns solid green, noting that the log was read.
Off	Red	Green	Red	Flashing Yellow	Power supply 2 warning. The power supply is functioning but reporting an error condition. Replace the power supply at the first opportunity.
Off	Red	Red	Off	Flashing Yellow	No video warning. No video output is available from the iLO MP. Replace the iLO MP card.
Green	Off	Off	Red	Flashing Yellow	Fan 1 warning. BMC is reporting that one fan rotor is turning more slowly than expected or is stopped. Investigate problem at the first opportunity.
Green	Green	Off	Red	Flashing Yellow	Fan 4 warning. BMC is reporting that one fan rotor is turning more slowly than expected or is stopped. Investigate problem at the first opportunity.
Green	Green	Red	Off	Flashing Yellow	System battery voltage low. Replace the system battery.

Table 5-5 Diagnostic LED Displays and Descriptions *(continued)*

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Green	Red	Off	Red	Flashing Yellow	Power supply 1 warning. The power supply is functioning but reporting an error condition. Replace the power supply at the first opportunity.
Red	Off	Green	Green	Flashing Yellow	Memory load order warning. Verify that DIMMs are correctly installed.
Red	Green	Green	Red	Flashing Yellow	Intake air temperature hot. Check for blockage. Clean air intake openings.
Red	Red	Off	Green	Flashing Yellow	CPU 1 temperature warning. Check for blockages. Investigate the problem at the first opportunity.
Red	Red	Green	Off	Flashing Yellow	CPU 0 temperature warning. Check for blockages. Investigate the problem at the first opportunity.
Red	Red	Red	Red	Flashing Yellow	Undefined error condition (warning only). Check the SEL for information.
Off	Off	Green	Red	Flashing Red	Fan 3 failure. BMC is reporting that both fan rotors are turning more slowly that expected or are stopped. Replace the fan, fan control board, or system board.
Off	Green	Off	Red	Flashing Red	Fan 2 failure. BMC is reporting that both fan rotors are turning more slowly that expected or are stopped. Replace the fan, fan control board, or system board.
Off	Green	Green	Red	Flashing Red	Fan 5 failure. BMC is reporting that both fan rotors are turning more slowly that expected or are stopped. Replace the fan, fan control board, or system board.
Off	Green	Red	Off	Flashing Red	VRM over-voltage fault. Replace the system board.
Off	Red	Off	Off	Flashing Red	System firmware error. Power off the server, wait 20 seconds, and resume operation. If the problem continues, replace the system board.
Off	Red	Off	Red	Flashing Red	VRM fault. Replace the system board.
Off	Red	Green	Red	Flashing Red	Power supply 2 fault. Replace power supply 2, the power supply interface assembly, or the system board.
Green	Off	Off	Red	Flashing Red	Fan 1 failure. BMC is reporting that both fan rotors are turning more slowly that expected or are stopped. Replace the fan, fan control board, or system board.
Green	Off	Green	Red	Flashing Red	CPU 1 turbo fan failure. Replace CPU 1, the CPU power module, or the system board.
Green	Off	Red	Off	Flashing Red	VRM under-voltage fault. Replace the system board.
Green	Green	Off	Red	Flashing Red	Fan 4 failure. BMC is reporting that both fan rotors are turning more slowly that expected or are stopped. Replace the fan, fan control board, or system board.
Green	Green	Green	Red	Flashing Red	CPU 0 turbo fan failure. Replace CPU 0, the CPU power module, or the system board.
Green	Red	Off	Red	Flashing Red	Power supply 1 fault. Replace power supply 1, the power supply interface assembly, or the system board.

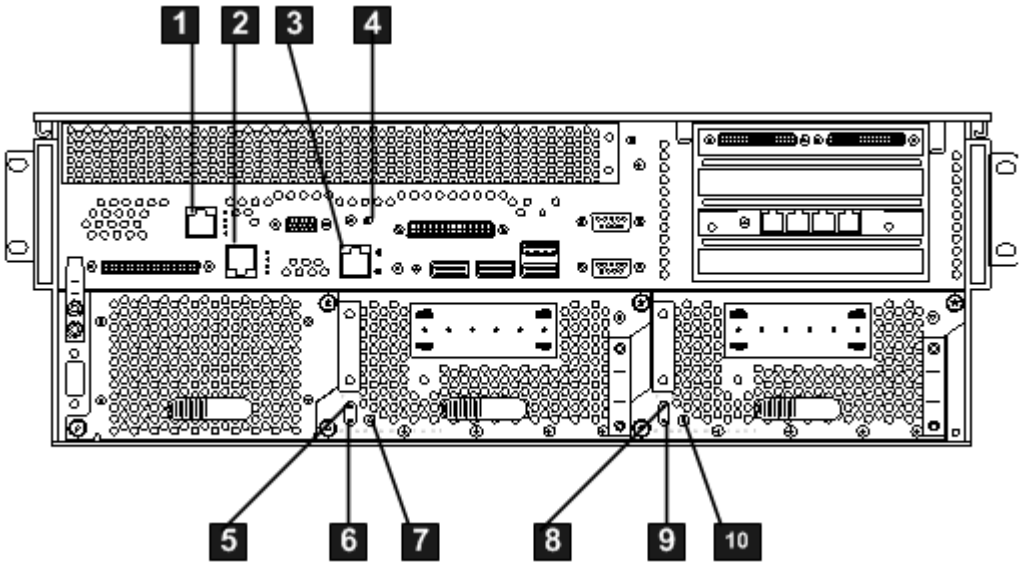
Table 5-5 Diagnostic LED Displays and Descriptions *(continued)*

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Green	Red	Green	Red	Flashing Red	12V range error. Something is loading the 12V source. This can be the power supply, the power supply interface, the system board, or any used circuit. Replace items (one at a time) to identify the cause.
Red	Off	Off	Green	Flashing Red	Memory bank error. Verify that DIMMs are correctly installed.
Red	Green	Off	Off	Flashing Red	Memory mismatch fault. DIMMs of different size are installed in a single quad. Replace DIMMs as required.
Red	Green	Green	Off	Flashing Red	Memory access fault. Check error messages in the SEL. Reseat or replace DIMMs as required.
Red	Green	Green	Green	Flashing Red	Memory error detected. Check error messages in the SEL. Reseat or replace DIMMs as required.
Red	Green	Green	Red	Flashing Red	Intake air over-temperature fault. Check for blockages. Replace the system board.
Red	Green	Red	Off	Flashing Red	BMC firmware error. Power off the server, wait 20 seconds, and resume operation. If the problem continues, replace the system board.
Red	Green	Red	Green	Flashing Red	iLO MP firmware error. Power off the server, wait 20 seconds, and resume operation. If the problem continues, replace the iLO MP.
Red	Red	Off	Green	Flashing Red	CPU 1 over-temperature fault. Check for blockages. Replace CPU 1 or the system board.
Red	Red	Green	Off	Flashing Red	CPU 0 over-temperature fault. Check for blockage. Replace CPU 0 or the system board.
Red	Red	Green	Green	Flashing Red	Either or both CPUs not detected. Check CPU installation and replace CPU, power module, or system board if necessary.
Red	Red	Red	Red	Flashing Red	Undefined error condition (catastrophic failure). Check the SEL for information.

Rear Panel LEDs

The rear panel LEDs show LAN and power supply status at a glance. The rear panel LEDs are shown in Figure 5-2 and listed in Table 5-6, together with descriptions of LAN and power status indications.

Figure 5-2 Rear Panel LEDs



1. iLO MP LAN LEDs
2. Gigabit LAN A (10/100/1000) LEDs
3. System Management LAN B (10/100/1000) LEDs
4. Locator Button LEDs
5. Power Supply Fault LED
6. Power Supply dc Out LED
7. Power Supply dc In LED
8. Power Supply Fault LED
9. Power Supply dc Out LED
10. Power Supply dc In LED

Table 5-6 Rear Panel LED Definitions

LED/Button	Color	Description
iLO MP Self Test LED (top)	Green	When off, self test is not active. When lit, the iLO MP is running self test.
iLO MP 10BT LED (2nd from top)	Green	When off, no link detected or 100 BT link is active. When flashing, indicates 10 BT LAN activity. When lit steady, indicates that 10 BT link has been established.
iLO MP 100BT LED (2nd from bottom)	Green	When off, no link detected or 10 BT link is active. When flashing, indicates 100 BT LAN activity. When lit steady, indicates that 100 BT link has been established.
iLO MP LAN Standby Power LED (bottom)	Green	When off, standby power is not applied to iLO MP LAN circuits. When lit, power is connected to the server but the server is not on.
Gigabit LAN Gbit LED (top)	Green	When off, no 1000 Mbps link has been detected. When lit, port is linked at 1000 Mb/s.
Gigabit LAN 100 Mbit LED (2nd from top)	Green	When off, no 100 Mbps link has been detected. When lit, port is linked at 100 Mb/s.
Gigabit LAN Link LED (2nd from bottom)	Green	When off, no 10 Mbps link has been detected. When lit, port is linked at 10 Mb/s.
Gigabit LAN Activity LED (bottom)	Green	When off, no LAN activity has been detected. When lit, port is linked at 1000 Mb/s.
System Management LAN Activity LED	Green	When lit, shows that port is linked.
System Management LAN Speed LED	Green	When off and Activity LED is lit, shows that port is linked to 10 Mb LAN. When lit, shows that port is linked to 100 Mb LAN.

Table 5-6 Rear Panel LED Definitions *(continued)*

LED/Button	Color	Description
Locator	Blue	Lit by pressing the associated button, by pressing the corresponding button on the front panel, or by command from a remote location. Identifies one server among many. Also tests for a running BMC on the system board.
Power Supply Fault	Amber	Lit when a power supply failure is detected. Indicates that power supply has been cycled down or is not fully functional.
Power Supply dc Out	Green	Lit when a power supply is operating normally. Indicates that dc power is being supplied to server circuits.
Power Supply dc In	Green	Lit when power (–36 to –72 VDC) is supplied to the power supply. Indicates that source power is available.

Building Up the System

Before you can build up the system, you must first identify the failing CRU.

To identify a failing CRU, follow these steps:

1. Reduce the server to the minimum hardware configuration by disconnecting power and removing unwanted assemblies.
2. Install assemblies one-at-a-time and check system status.
3. After each assembly is installed, apply power and observe the server for symptoms and fault indications. If possible, install only known good assemblies.

You must be familiar with error messages, system logs, and accessing logs. See "Event Logs for Troubleshooting Diagnostics" (page 141) for information about accessing and using logs. After each troubleshooting step, clear the logs to ensure that you analyze only valid information.

NOTE: Remove the server top cover during this procedure, so you can observe the system board LEDs and install assemblies. With the top cover removed, the system powers off after two minutes of operation. After installing an assembly, apply power and immediately check for status and symptoms. Use the iLO MP to access error messages after the system has powered off.

To build up the system, follow these steps:

1. Disconnect power from the server power supply either at the cabinet or facility power disconnect device.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

2. If present, remove the following components from the system:
   - Top cover
   - The second power supply
   - iLO MP card
   - CPU and power module (remove both CPUs if two are installed)
   - All DIMMs
   - All hard disks
   - CD/DVD drive

NOTE: At a minimum hardware configuration, the system consists of the following:

- One power supply
- Power supply interface assembly
- System board
- Processor
- Memory
- Front panel status board
- HDD
- Disk drive backplane
- Fan control board
- Five fans

3. Connect power to the power supply; but do not power on the server at this time.
4. On the system board, ensure that the standby power (STBY) LED is lit and the BMC heartbeat LED is flashing.
   - If the STBY LED is not lit, replace the power supply, the power supply interface assembly, or the system board.
   - If the BMC heartbeat LED is not flashing, replace the system board.
5. Press the front panel **Power** button to apply power. Observe the power LED, the diagnostic LEDs, and the system LED.
   - If the fault LED on the power supply is lit, replace the power supply, the power supply interface assembly, or the system board.
   - If the front panel power LED is not lit, replace the power supply interface assembly, the system board, or the front panel status board.
   - Use Table 5-7 to interpret the diagnostic and system LEDs.

Table 5-7 Interpret Diagnostic and System LEDs

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Off	Red	Off	Off	Flashing Red	The BMC is reporting a level 7 error due to the missing server component. Continue with the build up procedure.
Any Other LED Status Display					Replace the system board. See Table 5-5 (page 128) for additional information.

6. Power off the server and disconnect power. (If the system has shut itself down, only disconnect power.) Press the front panel **Power** button to power off the server and disconnect power at the cabinet or facility power disconnect device.
7. Install the iLO MP card.
8. Press the front panel **Power** button to apply power. Observe the power LED, the diagnostic LEDs, and the system LED. Also, observe the LEDs on the iLO MP card.
   - If the fault LED on the power supply is lit, replace the iLO MP card.
   - If the front panel power LED is not lit, replace the iLO MP card.
   - If the iLO MP fault LED (DS1) is lit, replace the iLO MP card or the system board.
   - If the iLO MP heartbeat LED (DS2) is not flashing, replace the iLO MP card or the system board.
   - See the SEL for additional information. The log indicates that no DIMMs are installed.
   - Use Table 5-8 to interpret the diagnostic and system LEDs.

Table 5-8 Interpret Diagnostic and System LEDs

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Off	Red	Off	Off	Flashing Red	The BMC is reporting a fatal error due to missing DIMMs. Continue with the build up procedure.
Any Other LED Status Display					Replace the iLO MP card or the system board. See Table 5-5 (page 128) for additional information.

9. Power off the server and disconnect power. (If the system has shut itself down, only disconnect power.) Press the front panel **Power** button to power off the server and disconnect power at the cabinet or facility power disconnect device.
10. Install a CPU and power module in the CPU 0 position.
11. Press the front panel **Power** button to apply power to the server. Observe the power LED, the diagnostic LEDs, and the system LED.
    - If the fault LED on the power supply is lit, replace the processor power module, the processor, or both.
    - If the front panel power LED is not lit, replace the processor power module, the processor, or both.
    - View the SEL for additional information.
    - Use Table 5-9 to interpret the diagnostic and system LEDs.

Table 5-9 Interpret Diagnostic and System LEDs

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Green	Green	Green	Green	Green or Red	Boot in progress.
When stable					
Red	Off	Off	Green	Flashing Red	The BMC is reporting a fatal error due to missing DIMMs. Continue with the build up procedure.
Any Other LED Status Display					Replace the iLO MP card or the system board. See Table 5-5 (page 128) for additional information.

12. Power off and disconnect power from the server. (If the system has shut itself down, only disconnect power.) Press the front panel **Power** button to power off the server and disconnect power at the cabinet or facility power disconnect device.
13. Install four DIMMs in the first quad.
14. Press the front panel **Power** button to apply power. Observe the power LED, the diagnostic LEDs, and the system LED.
    - If the fault LED on the power supply is lit, replace the faulty DIMMs or the system board.
    - If the front panel power LED is not lit, replace the faulty DIMMs or the system board.
    - View the SEL for additional information.
    - Use Table 5-10 to interpret the diagnostic and system LEDs.

Table 5-10 Interpret Diagnostic and System LEDs

Diag 1 LED	Diag 2 LED	Diag 3 LED	Diag 4 LED	System LED	Description
Green	Green	Green	Green	Green or Red	Boot in progress.
When stable					
Any Other LED Status Display					See Table 5-5 (page 128) for additional information.

15. Power off and disconnect power from the server. (If the system has powered off, you only need to disconnect power.) Press the front panel **Power** button to power off the server, and disconnect power at the cabinet or facility power disconnect device.
16. Install one assembly or four DIMMs.
17. Press the front panel **Power** button to apply power to the server. Observe the power LED, the diagnostic LEDs, and the system LED.
    - If the fault LED on the power supply is lit, replace the newly installed assembly or the system board.
    - If the front panel power LED is not lit, replace the newly installed assembly or the system board.
    - See the SEL for additional information.
    - Interpret the diagnostic and system LEDs. See Table 5-5 (page 128).
18. Repeat steps Step 15, Step 16, and Step 17 as required to build up the server.
19. Install the top cover on the server chassis.
20. Restart the system.

When the system powers on, it pauses at the **Boot Option** screen. Select one of the following options:

- EFI Shell (built in). A command line interface that enables you to operate EFI commands or create and run automounted scripts.
- **EFI Boot Option Maintenance Menu** enables you to select the order of the devices from which you want the firmware to boot the OS. You can also configure the system to boot from a configuration file.
- **Security/Pass Menu** enables you to add, change, and delete system administrator user passwords.

You have seven seconds to change the boot option before the system boots to the default OS. Use the **Up** and **Down** arrow keys to highlight EFI Shell option and press **Enter.**

Diagnostics

A suite of offline and online support tools are available to enable manufacturing, field support personnel, and you to troubleshoot server problems. In general, if the operating system (HP-UX) is already running, it is best not to shut it down. Use the online support tools.

If the OS cannot be booted, use the offline support tools to resolve the problem. The offline support tools are available from the EFI partition. Once you resolve the problem preventing booting, boot HP-UX, and use the online support tools for any further testing.

If it is not possible to reach the EFI from either the main disk or from LAN, you must troubleshoot, using the visual fault indicators, console messages, and system error logs that are available.

Troubleshooting Using Offline Support Tools

You can use offline support tools to troubleshoot the server.

- Offline Diagnostic Environment (ODE): Available on IPF Offline Diagnostics on the resource CD that comes with the server.
- iLO MP event logs: Available by logging on to the iLO MP through the iLO MP LAN or iLO MP remote serial connectors.

Offline Support Tool Availability

Updates to the EFI HP service partition (HPSP) are available through the CD Installer option on the IPF Offline Diagnostics and Utilities CD. At a minimum, an ISO image of the IPF Offline Diagnostics and Utilities CD is available from the HP Web site.

Offline Support Tools List

Table 5-11 lists available offline support tools.

Table 5-11 Offline Support Tools List

Offline Tool	Functional Area
CPUDIAG	Processor Diagnostic
MEMDIAG	Memory Diagnostic
MAPPER	System Mapping Utility
PLUTODIAG	SBA/LBA Chipset
PERFVER	Peripheral Verifier
DFDUTIL	SCSI Disk Firmware Update Utility
DISKUTIL	Disk Test Utility (Non-Destructive)
COPYUTIL	Data Copy Utility
DISKEXPT	Disk Expert Utility
IODIAG	I/O Diagnostics Launch Facility (Executes third party diagnostics and runs BIST, if available)
CIODIAG2	Core I/O Diagnostic
Specific Card I/O Diagnostics	Card-Specific I/O Diagnostics/BIST

General Diagnostic Tools

Table 5-12 lists the tools currently available for support on other HP 9000 and Integrity server platforms. The distribution method is through the Web.

Table 5-12 General Diagnostic Tools List

Diagnostic Tool	Description
IPMI Event Decoder	Provides detailed information about the IPMI event (Problem description, cause, action)

Offline Diagnostic Environment (ODE)

ODE is used to evaluate specific hardware components through a command line interface. To access ODE from the IPF Offline Diagnostics CD, follow these steps:

1. Power on the server and insert the IPF Offline Diagnostics CD into the DVD.
2. Do not permit the server to boot into an operating system. At the EFI Boot Manager, select the EFI Shell.
3. Determine which file system represents the CD. Enter the appropriate command to access the CD.

Fault Management Overview

The goal of fault management and monitoring is to increase server availability, by moving from a reactive fault detection, diagnosis, and repair strategy to a proactive fault detection, diagnosis, and repair strategy. The objectives are:

- To detect problems automatically, as close as possible to the time of occurrence.
- To diagnose problems automatically, at the time of detection.
- To automatically report (in understandable text) a description of the problem, the likely cause(s) of the problem, the recommended action(s) to resolve the problem, and detailed information about the problem.
- To ensure that tools are available to repair or recover from the fault.

HP-UX Fault Management

Proactive fault prediction and notification is provided on HP-UX by SysFaultMgmt WBEM indication providers, as well as by the Event Management Service (EMS). The Event Management Service and WBEM provide frameworks for monitoring and reporting events.

SysFaultMgmt WBEM indication providers and the EMS Hardware Monitors allow users to monitor the operation of a wide variety of hardware products, and alert them immediately if any failure or other unusual event occurs. By using hardware event monitoring, users can virtually eliminate undetected hardware failures that could interrupt server operation or cause data loss.

Complete information on installing and using EMS hardware event monitors, as well as a list of supported hardware, can be found in the *EMS Hardware Monitors Users Guide*. An electronic copy of this book is provided on the Web site at:**http://docs.hp.com/hpux/diag**.

WBEM Indication Providers and EMS Hardware Monitors

Hardware monitors are available to monitor the following components (these monitors are distributed free on the OE media):

- Chassis/Fans/Environment
- CPU monitor
- UPS monitor
- FC Hub monitor
- FC Switch monitor
- Memory monitor
- Core Electronics Components
- Disk drives
- Ha_disk_array

Troubleshooting Using Online Support Tools

Online Diagnostics/Exercisers

Online support tools are provided under both operating systems. Centralized error archiving and hardware inventory tools for both operating system are available as long as the agents/providers that support them are installed on the managed server.

On HP-UX systems, the legacy tools within OnlineDiag continue to be supported. The online support tools, on HP-UX 11.23 and greater, include the Support Tool Manager (STM) tools, and the additional Web-Based Enterprise Management (WBEM) features added by SysFaultMgmt.

The STM suite of tools includes verifiers, diagnostics, exercisers, information modules, and expert tools.

Verifiers quickly determine whether or not a specific device is operational by performing tasks similar in nature to the way applications use the device. No license is required to run the verifiers.

Diagnostics are tools designed to identify faulty or failed CRUs.

Exercisers stress devices in order to facilitate the reproduction of intermittent problems.

Information modules create a log of information specific to one device, including:

- The product identifier
- A description of the device
- The hardware path to the device
- The vendor
- Onboard log information (if applicable)
- Miscellaneous information associated with the device
- The firmware revision code, if firmware is present in the device, is also displayed

Expert tools are device-specific troubleshooting utilities for use by sophisticated users. Their functionality varies from tool to tool, but they are intended to be interactive, and rely on users to provide information necessary to perform a particular task. These tools require users to have the appropriate license, if they wish to run them.

Online Support Tool Availability

Online diagnostics are included in the HP-UX OE media, and are installed by default.

Online Support Tools List

Table 5-13 lists the online support tools available on HP-UX 11.23 hosted servers. In some cases, a tool, such as a disk exerciser, is generic to many types of hardware; in other cases, a tool, such as a tape diagnostic, is specific to a particular technology or type of tape drive.

Table 5-13 Online Support Tools List

Functional Area	Information	Verify	Exercise	Diagnose	Expert
System	Yes	No	No	No	No
CPU/FPU	No	No	Yes	No	Yes
Memory	Yes	No	Yes	No	No
Graphics	Yes	Yes	Yes	No	No
Core I/O LAN	Yes	Yes	Yes	Yes	No
Disk/Arrays	Yes	Yes	Yes	No	No
Tape	Yes	Yes	Yes	Yes	Yes
M/O	Yes	No	No	No	Yes
Add-On Network I/O Cards	Yes	Yes	Yes	No	Yes
Add-On Mass Storage I/O Cards	Yes	No	No	No	No

Error Messages

Server firmware and management features monitor system operation, report errors, and log all significant events.

This section presents error message and log information.

EFI Error and Warning Messages

EFI error and warning messages are displayed on the console as part of the boot process. They can also be retrieved using the EFI `info warnings` command. Table 5-14 lists possible error messages.

Table 5-14 EFI Error and Warning Messages

Error Number	Message	Description/Solution
2	Insufficient resources to assign to one or more I/O devices	Incorrect I/O configuration. Contact the HP Support Center for assistance.
4	Unexpected hardware I/O configuration	Incorrect I/O configuration. Contact the HP Support Center for assistance.
7	No BMC installed on the platform	Update BMC firmware.
8	BMC cannot be accessed	Check system logs for errors. Replace the system board.
9	One or more BMC ports failed	Communication with the BMC failed. Check power. Replace the system board.
10	BMC system event log is full	Clear the SEL.
11	Platform silicon-controlled rectifier (SCR) is bad	Contact the HP Support Center for assistance.
12	Set time to BMC SEL failed	Communication with the BMC failed. Replace the system board.
13	SEL `get info` failed	Communication with the BMC failed. Replace the system board.
14	Initial BMC SEL event failed	Communication with the BMC failed. Replace the system board.
15	Update of BMC buffered data failed	Communication with the BMC failed. Replace the system board.
16	All advanced configuration and power interface (ACPI) BMC ports bad	Communication with the BMC failed. Replace the system board.
17	Read error on BMC token	Communication with the BMC failed. Replace the system board.
18	BMC token transmit `checksum` error	Communication with the BMC failed. Replace the system board.
19	Error writing BMC token on download	Communication with the BMC failed. Replace the system board.
20	Non-volatile Memory (NVM) token access error	Communication with the BMC failed. Replace the system board.
21	BMC token write error during NVM write through	Communication with the BMC failed. Replace the system board.
22	Error reading BMC token on upload to NVM	Communication with the BMC failed. Replace the system board.
23	Error reading BMC first boot token	Communication with the BMC failed. Replace the system board.
24	Primary field interoperability testing (FIT) failed	Reflash firmware.
25	Secondary FIT failed	Reflash firmware.

Table 5-14 EFI Error and Warning Messages *(continued)*

Error Number	Message	Description/Solution
26	Processor abstraction layer (PAL) A warning; One copy of PAL is bad	Reflash firmware.
27	PAL A warning; PAL is not compatible with at least 1 CPU	Update firmware.
28	Memory errors detected and Page Deallocation Table (PDT) is disabled	Reseat DIMMs; if error persists replace bad DIMMs.
30	Memory required reinterleave to get a good page 0	Information only, no action required.
31	One or more ranks have chipspare disabled	Information only, no action required.
33	One or more memory ranks are mismatched or deallocated	Check memory installation. Match DIMM part numbers within each quad.
34	Memory deallocated because of a loading error	Check memory installation. DIMMs must be installed with smallest capacity in the first quad, an equal or larger capacity in the second quad, and an equal or larger capacity in the third quad.
35	Memory load order error	Check memory installation. DIMMs must be installed with smallest capacity in the first quad, an equal or larger capacity in the second quad, and an equal or largest capacity in the third quad.
36	The PDT is full	Clear with `pdt clear` command in the EFI Shell.
37	At least one CPU has bad fixed core ratio	Check processor installation. Verify installation and that identical processors have been installed.
38	All CPUs were slated for compatibility deconfiguration	Processor failure. Verify installation and replace processor. Contact the HP Support Center for assistance.
39	Incompatible CPUs detected	Check processor installation and match CPU part numbers. CPUs must be identical.
40	CPUs installed with mixed cache sizes	Check processor installation. Match CPU part numbers. CPUs must be identical. This always causes a stopboot.
41	CPUs installed with mixed steppings	Check processor installation and match CPU part numbers. CPUs must be identical.
42	All CPUs are overclocked	Check processor installation and match CPU part numbers. CPUs must be identical.
43	At least one (1) CPU is overclocked	Check processor installation and match CPU part numbers. CPUs must be identical.
44	Monarch changed to lowest stepping CPU	Check processor installation and match CPU part numbers. CPUs must be identical.
46	CPUs loaded in wrong order	Reload processors in the correct order.
48	SAL NVM cleared	Information only, no action required.
49	EFI NVM cleared	Information only, no action required.
50	EFI NVM failed	Reboot the server. If the error message is repeated, contact the HP Support Center for assistance.
51	CPU deconfigured by SAL_B	Check and verify processor installation. Replace the processor that was deconfigured.

Table 5-14 EFI Error and Warning Messages *(continued)*

Error Number	Message	Description/Solution
52	A ROM revision is inconsistent with FIT or REVBLOCK	One or more firmware components (FW, BMC, iLO MP) is out of date. Update firmware as appropriate.
53	Error building S MBIOS	Contact the HP Support Center for assistance.
54	Failure constructing the EFI Memory Data Table (MDT)	Contact the HP Support Center for assistance.
55	UUID error	Update with the `sysset` command.
56	Error reading CPU S MBUS information ROM	Reboot the server. If the error message is repeated, replace the failing processor.
57	Error accessing CRU information	Replace the CRU that was reported. If the error message is repeated, contact the HP Support Center for assistance.
58	Checksum error accessing CRU information	Replace the CRU that was reported. If the error message is repeated, contact the HP Support Center for assistance.
59	CRU information version error	Contact the HP Support Center for assistance.

Event Logs for Troubleshooting Diagnostics

This section describes general diagnostic tools that are provided for the server and how to generate other event logs for troubleshooting diagnosis.

- Machine Check Analyzer

NOTE: The Machine Check Analyzer decodes and analyzes Machine Check Abort error logs, and interprets Corrected Machine Checks (CMC) and Corrected Platform Events (CPE).

It also identifies the root cause of the failure and provides a list of CRUs that may have caused the failure.

- Event logs not generated by the iLO MP include:
  - Machine Check Abort log (MCA)
  - Corrected Machine Check log (CMC)
  - Corrected Platform Error log (CPE)

  To access these logs, type the following at the `shell>` command line prompt:
  - **`errdump mca`**
  - **`errdump cmc`**
  - **`errdump cpe`**

Often the underlying root cause of an event is captured by the server or BMC firmware in both the System Event and Forward Progress Event Logs (SEL and FP, respectively). These errors are easily matched with events by their timestamps. For example, the loss of a CPU's VRM might cause a CPU fault. Decoding the error logs would only identify the failed CPU as the most likely faulty CRU. Following are some important points to remember about events and event logs:

- Event logs are the equivalent of the old chassis logs for status or error information output.
- Symbolic names are used in the source code; for example, `MC_CACHE_CHECK`.
- The hex code for each event log is 128 bits long with an architected format:
  - Some enumerated fields can be mapped to defined text strings.
  - All can be displayed in hex, keyword, or text mode.

- Events are created by firmware or OS code, and are sent over the PDH bus to the BMC for storage in either or both of the SEL and FP logs (HP-UX shows an I/O path for the BMC).
- The iLO MP displays event logs: SEL events are sent over the IPMB, between the BMC and the iLO MP.
- Event logs are read back over the PDH bus by software (i.e., the IPMI driver or agent) for storage on disk.

Event Log Usage

To consult the event logs, follow these steps:

1. Connect to the system console.
2. Enter **Ctrl+B** to access the **iLO MP Main Menu**.
3. Enter the `sl` command to view event logs: System Event (`E`) and Forward Progress (`F`) logs are useful to determine the context of an error.

NOTE: `E` shows only event logs with alert level 3 or higher; `F` shows all event log outputs.

Event logs are never overwritten unless they are first manually cleared. Event logs use ring buffering, so oldest logs get overwritten first.

The alert threshold can be changed.

iLO MP Event Logs

The iLO MP provides diagnostic and configuration capabilities. Refer to the *HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide* for details on the iLO MP commands. To access the iLO MP, perform the following:

NOTE: The iLO MP must be accessed from a terminal console which has access to the iLO MP.

1. Log in with the proper username and password.

NOTE: Default operator login and password: login = **`oper`**, password = **`oper`**.

2. Enter `cl` to display the console history log. This log displays console history from oldest to newest.
3. Enter **Ctrl+B** to return to the **iLO MP Main Menu**.
4. Enter `sl` to display the status logs. The status logs consist of:
   - System Event
   - Forward Progress
   - Current Boot
   - Previous Boot
   - Live Events
   - Clear SEL/FPL Logs

System Event Log (SEL) Review

The System Event Log (SEL) and Forward Progress Log (FPL), Live Event Log, and Boot Logs are available through the iLO MP card interface or the BMC CLI. The SEL records system events that are of major importance to system operations. The Live Event Log and Boot Logs record operating events as they occur.

This section provides a quick reference for the IPMI events recorded in the SEL and FPL files.

- All entries from the SEL are forwarded to the FPL. The FPL is a circular log, the newest entries replace the oldest. The FPL contains system events, forward progress messages from the BMC, system firmware, EFI, and the operating system.
- The SEL does not accept new entries once it is full. It contains only those events considered of major importance to system operation.
- Both contain type 02 and E0 messages.
- A triplet is formed from the SensorType, EventType, and the lower portion of the Data1 fields of Type 02 events. iLO MP firmware displays the triplet in the **Keyword** field.

To access the SEL log, follow these steps:

1. Access the iLO MP command prompt.
2. Run the `sl` command. The **Event Log Viewer** menu displays:

```
SL
Event Log Viewer:
Log Name            Entries    % Full         Latest Entry
-------------------------------------------------------------------
E - System Event            9         1 %      29 Oct 2002 19:15:05
F - Forward Progress      129         3 %
B - Current Boot           82
P - Previous Boot           0
L - Live Events
C - Clear All Logs
Enter your choice or [Q] to Quit:
```

3. Select **E** to review the system events. The **Event Log Navigation** menu displays:

```
Enter menu item or [Ctrl-B] to Quit: e

       Log Name            Entries    % Full      Latest Timestamped Entry
-------------------------------------------------------------------------------

   E - System Event           12         1 %      31 Oct 2003 23:37:45

Event Log Navigation Help:

   +       View next block     (forward in time,  e.g. from 3 to 4)
   -       View previous block (backward in time, e.g. from 3 to 2)
   <CR>    Continue to the next or previous block
   D       Dump the entire log
   F       First entry
   L       Last entry
   J       Jump to entry number
   H       View mode configuration - Hex
   K       View mode configuration - Keyword
   T       View mode configuration - Text
   A       Alert Level Filter options
   U       Alert Level Unfiltered
   ?       Display this Help menu
   Q       Quit and return to the Event Log Viewer Menu
   Ctrl-B  Exit command, and return to the MP Main Menu


MP:SL (+,-,<CR>,D, F, L, J, H, K, T, A, U, ? for Help, Q or Ctrl-B to Quit)
 >a
Alert Level Threshold Filter:
   1  : Major Forward Progress
   2  : Informational
   3  : Warning
   5  : Critical
   7  : Fatal
```

```
Enter alert level threshold or [Q] to quit filter setup: 3

   -> Alert threshold level 3 filter will be applied.


Set up alert filter options on this buffer? (Y/[N])

       Log Name            Entries    % Full         Latest Entry
-------------------------------------------------------------------------
E - System Event          410        47 %      18 Feb 2003 09:38:10
Event Log Navigation Help:

   +       View next block     (forward in time,  e.g. from 3 to 4)
   -       View previous block (backward in time, e.g. from 3 to 2)
   <CR>    Continue to the next or previous block
   D       Dump the entire log for capture and analysis
   F       First entry
   L       Last entry
   J       Jump to entry number
   V       View mode configuration (text, keyword, hex)
   ?       Display this Help menu
   Ctrl-B  Quit and return to the Main Menu
```

4. Select **a**, then a threshold filter number to filter events to desired level.

```
MP:SL (+,-,<CR>,D, F, L, J, H, K, T, A, U, ? for Help, Q or Ctrl-B to Quit) >aAlert Level Threshold Filter:   1  : Major
Forward Progress
   2  : Informational
   3  : Warning
   5  : Critical
   7  : Fatal

Enter alert level threshold or [Q] to quit filter setup: 3
   -> Alert threshold level 3 filter will be applied.
```

5. Select **v**, then **t** to change the display to text mode:

```
Display Mode Configuration:
               H - Hex mode
   Current -> K - Keyword mode
               T - Text mode
Enter new value, or [Q] to Quit:
```

6. To decode the blinking state of system LED, review the entire SEL and look at events with alert level 3 and above.

   For example:

```
Log Entry 24: 14 Feb 2003 15:27:02
Alert Level 3: Warning
Keyword: Type-02 1b0800 1771520
Hot Swap Cage: SCSI cable removed
Logged by: BMC;  Sensor: Cable / Interconnect - SCSI ChExt Cable
Data1: Device Removed/Device Absent
0x203E4D0AC6020220 FFFF0008F61B0300

Log Entry 73: 00:00:12
Alert Level 3: Warning
Keyword: Type-02 050301 328449
The server's built-in sensors have detected an open chassis door.
Logged by: BMC;  Sensor: Physical Security - Chassis Open
Data1: State Asserted
0x200000000C020570 FFFF010302050300
```

iLO MP Log Display Modes

The SEL and FPL data can also be accessed from the iLO MP logs using the iLO MP card `SL` command. The `SDM` (set display mode) command determines the format of the display:

- Raw hex mode
- Text mode
- Keyword mode

Hex Mode Example:

```
13   0x203E5F914A0200E0 FFFF010944080300
14   0x5680006300E000F0 010000003E5F914A
14   0x5680006300E000F0 0000000000000000
15   0x203E5F914B020110 FFFF027000120300
```

Hex Text Mode Example for type 02 log:

```
Log Entry 13: 28 Feb 2003 16:41:46
Alert Level 2: Informational
Keyword: Type-02 080901 526593
Power supply turned on
Logged by: BMC;  Sensor: Power Supply - Pwr Spply 1 Ctrl
Data1: Device Enabled
0x203E5F914A0200E0 FFFF010944080300

Log Entry 14: 28 Feb 2003 16:41:46
Alert Level 2: Informational
Keyword: BOOT_START
CPU starting boot
Logged by: System Firmware  0
Data: Implementation dependent data field
0x5680006300E000F0 0000000000000000

Log Entry 15: 28 Feb 2003 16:41:47
Alert Level 2: Informational
Keyword: Type-02 127002 1208322
Soft Reset
Logged by: BMC;  Sensor: System Event
0x203E5F914B020110 FFFF027000120300
```

Keyword Mode Example:

```
13   BMC  2  0x203E5F914A0200E0 FFFF010944080300 Type-02 080901 526593
                                                 28 Feb 2003 16:41:46
14   SFW  0  2  0x5680006300E000F0 0000000000000000 BOOT_START
                                                 28 Feb 2003 16:41:46
15   BMC  2  0x203E5F914B020110 FFFF027000120300 Type-02 127002 1208322
                                                 28 Feb 2003 16:41:47
```

Accessing the Logs With BMC CLI Commands

The `fpl` command displays the forward progress log. For example:

```
Type  1        2     3        4                5         6            7
  02  0000000E -  Pwr Spply 1 Ctrl Enabled 44-08:09:01 2003-02-28 16:41:46
  E0  0000000F 2  CPU0 Boot start 00063 DT 06 0000000000000000
  E0  00000010 2  CPU0 Boot start 00063 Time 2003-02-28 16:41:46
  E0  00000011 0  CPU0 00020 DT 00 0000000000000000
  E0  00000012 0  CPU0 0000E DT 06 0000000000010000
  E0  00000013 1  CPU0 CPU monarch 0000C DT 06 0000000000000000
  E0  00000014 1  CPU0 CPU present 00261 DT 06 0000000000000000
  E0  00000015 0  CPU0 00008 DT 00 0000000000000000
  E0  00000016 0  CPU0 0024B DT 00 0000000000000000
  E0  00000017 0  CPU0 00006 DT 03 0000000000000000
```

```
E0  00000018 0  CPU0 00044 DT 06 02000000002C0400
02  00000019   -  BMC LPC reset 00-12:70:02 2003-02-28 16:41:47
```

The `sel` command displays the system event log. For example:

```
Type  1      2              3                     4                 5           6                  7
  02  00E0 - Pwr Spply 1 Ctrl Enabled 44-08:09:01 2003-02-28 16:41:46
  E0  00F0 2 CPU0 Boot start 00063 DT 06 0000000000000000
  E0  0100 2 CPU0 Boot start 00063 Time 2003-02-28 16:41:46
  02  0110 - BMC LPC reset 00-12:70:02 2003-02-28 16:41:47
```

Each column in the log contains a different data field:

1 Record ID
2 Severity for E0 messages
3 Generator ID or sensor reporting the event
4 Text description of events
5 Sensor number - Sensor Type: Event Type: Data1 fields for type 02 messages (triplet) event ID for E0 messages
6 Data2 and Data3 for type 02 messages (if applicable) or data type for E0 messages
7 Timestamp or extended data specific to the event

Disk and I/O Path Logging

Some failures result in I/O path logging. These paths help to indicate the source of the error and can be included in the error message or logged into console or event logs. Table 5-15 and Table 5-16 describe the disk drive and PCI-X slot paths for the server.

Table 5-15 Disk and DVD Device Paths

Device Slot	Path	Rope	MHz
Slot 0	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)	1	66
Slot 1	Acpi(HWP0002,100)/Pci(1|0))/Scsi(Pun1,Lun0)	1	66
Slot 2	Acpi(HWP0002,100)/Pci(1|1))/Scsi(Pun2,Lun0)	1	66
DVD	Acpi(HWP0002,0)/Pci(2|0))/Ata(Primary,Master)	0	33

Table 5-16 I/O Card Slot Paths

I/O Slot	Path	Rope	MHz
Slot 1	Acpi(HWP0002,400)/Pci(1|0)	4, 5	133
Slot 2	Acpi(HWP0002,300)/Pci(1|0)	3	133
Slot 3	Acpi(HWP0002,200)/Pci(1|0)	2	133
Slot 4	Acpi(HWP0002,600)/Pci(1|0)	6	133
Note: Rope 7 is used to access optional ECI at 33 MHz.			

Fibre Channel Boot Configuration

The following procedure describes how to restore a Fibre Channel (FC) disk to the boot environment.

NOTE: You must be able to navigate in the EFI Shell environment to perform the following procedure.

The screen output shown in this procedure and the bold type that is selected in each of the steps is from a hypothetical test setup; only your screen output shows the actual configuration of your server.

1. Find the driver number for the FC disks. At the EFI Shell, enter the following command to display all devices and their associated drivers:

```
Shell> drivers
            T   D
D           Y C I
R           P F A
V  VERSION  E G G #D #C DRIVER NAME                                IMAGE NAME
== ======== = = = == == ================================= ==================
12 00000010 B - -  6 20 PCI Bus Driver                          PciBus
1D 01020000 B X X  2  3 LSI Logic Ultra160 SCSI Driver      PciRom Seg=00000000
1E 01020000 B X X  1  2 LSI Logic Ultra160 SCSI Driver      PciRom Seg=00000000
23 00000109 D X X  1  - HP Tachyon XL2 Fibre Channel Mass S PciRom Seg=00000000
2A 00000110 D X X  1  - HP Tachyon XL2 Fibre Channel Mass S PciRom Seg=00000000
2E 00000029 D - -  2  - Usb Ohci Driver                         UsbOhci
2F 00000010 B - -  2  3 USB Bus Driver                          UsbBus
30 00001010 D X -  1  - Usb Keyboard Driver                     UsbKb
31 00000010 D - -  2  - Usb Mouse Driver                        UsbMouse
32 00000010 ? - -  -  - Usb Bot Mass Storage Driver             UsbBot
33 00000010 ? - -  -  - Usb Cbi0 Mass Storage Driver            UsbCbi0
34 00000010 ? - -  -  - <UNKNOWN>                               UsbCbi1
35 00000010 ? - -  -  - Generic USB Mass Storage Driver     UsbMassStorage
36 00000010 ? - -  -  - UGA Console Driver                 GraphicsConsole
37 00000000 D - -  1  - PCI VGA Mini Port Driver             PciVgaMiniPort
38 00000010 D - -  1  - VGA Class Driver                    VgaClassDriver
39 00000010 B - -  1  1 Serial 16550 UART Driver               Serial16550
3A 00000010 B - -  1  1 Serial Terminal Driver                 Terminal
3B 00000010 D - -  2  - Platform Console Management Driver     ConPlatform
3C 00000010 D - -  2  - Platform Console Management Driver     ConPlatform
3D 00000010 B - -  2  2 Console Splitter Driver                ConSplitter
3E 00000010 B - -  2  2 Console Splitter Driver                ConSplitter
3F 00000010 B - -  2  2 Console Splitter Driver                ConSplitter
40 00000010 B - -  2  2 Console Splitter Driver                ConSplitter
49 00000010 D - - 14  - Generic Disk I/O Driver               DiskIo
4A 00000010 B - -  3 10 Partition Driver(MBR/GPT/El Torito)   Partition
4B 00000010 D - -  3  - FAT File System Driver                 Fat
4C 00000010 B X X  1  1 PCI IDE/ATAPI Bus Driver               Ide
4D 00000010 ? - -  -  - Intel(R) PRO 100 UNDI Driver           Undi
4E 00030007 B X X  3  3 Broadcom Gigabit Ethernet Driver       b75Undi64
4F 00000010 D - -  3  - Simple Network Protocol Driver         Snp3264
50 00000010 D - -  3  - PXE Base Code Driver                   PxeBc
51 00000010 D - -  3  - PXE DHCPv4 Driver                      PxeDhcp4
```

2. Determine the controller handle associated with each of the two listed drivers (23 and 2A). Enter the following command:

```
Shell> drvcfg -c 23

Configurable Components
  Drv[23]  Ctrl[29]  Lang[eng]Shell> drvcfg -c 2a

Configurable Components
  Drv[2A]  Ctrl[2C]  Lang[eng]
```

3. Set the enumeration option for the driver 23 and controller 29. Enter the following command and select 1 from the enumeration policy menu:

```
Shell> drvcfg –s 23 29

Current policy: Enumerate all Fibre Channel devices

Please select the desired enumeration policy:
  0 : Enumerate all Fibre Channel boot devices in the boot option list
  1 : Enumerate all Fibre Channel devices
 Q : exit with no change

Policy > 1
Drv[23]  Ctrl[29]  Lang[eng] - Options set.  Action Required is None
```

4. Set the enumeration option for the driver 2a and controller 2c. Enter the following command and select 1 from the enumeration policy menu:

```
Shell> drvcfg –s 2a 2c

Current policy: Enumerate all Fibre Channel devices

Please select the desired enumeration policy:
  0 : Enumerate all Fibre Channel boot devices in the boot option list
  1 : Enumerate all Fibre Channel devices
  Q : exit with no change

Policy > 1
Drv[2A]  Ctrl[2C]  Lang[eng] - Options set.  Action Required is None
```

5. Enable the FC devices to be scanned. Enter the following command at the **Shell>** prompt:

   reconnect –r

6. Enable the file systems to be mapped. Enter the following command:

```
Shell> map -r
Device mapping table
  fs0   : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig11D3A260-CDCC-0
1C2-507B-9E5F8078F531)
  fs1   : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part1,Sig55A90000)
  fs2   : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Part1,Si
gF7D00000)
  fs3   : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)/HD(Part1,Si
g7D930000)
  fs4   : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part1,Sig70BEA120-E7EA-0
1C2-507B-9E5F8078F531)
  blk0  : Acpi(HWP0002,0)/Pci(3|0)/Ata(Primary,Master)
  blk1  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
  blk2  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,Sig11D3A260-CDCC-0
1C2-507B-9E5F8078F531)
  blk3  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part2,Sig11E8FF20-CDCC-0
1C2-F1B3-12714F758821)
  blk4  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part3,Sig2173E520-FDD5-0
1C2-A1F4-04622FD5EC6D)
  blk5  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part4,Sig8274F148-6685-1
1D7-8BC4-B6CD81B7B01F)
  blk6  : Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part5,Sig82757488-6685-1
1D7-8BC4-B6CD81B7B01F)
  blk7  : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)
  blk8  : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part1,Sig55A90000)
  blk9  : Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part2,Sig55A90000)
  blkA  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)
  blkB  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Part1,Si
gF7D00000)
```

```
  blkC  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Part2,Si
gF7D00000)
   blkD  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)
  blkE  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)/HD(Part1,Si
g7D930000)
  blkF  : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,Lun0)/HD(Part2,Si
g7D930000)
   blk10 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN210000203760083D,Lun0)
   blk11 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020370FC9C0,Lun0)
   blk12 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN2100002037600863,Lun0)
   blk13 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A61C4,Lun0)
   blk14 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE6C1,Lun0)
   blk15 : Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A6215,Lun0)
   blk16 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)
  blk17 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part1,Sig70BEA120-E7EA-0
1C2-507B-9E5F8078F531)
  blk18 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part2,Sig70EC67E0-E7EA-0
1C2-F1B3-12714F758821)
  blk19 : Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(Part3,Sig7612C3E0-E7EA-0
1C2-D931-F8428177D974)
```

NOTE: Record the path of your FC devices from the file system map for later use in this procedure.

7. Return to the **EFI Boot Manager Menu** interface. Enter the following command at the **Shell>** prompt:

   exit

8. Select **EFI Boot Option Maintenance Menu** from the **EFI Boot Manager Menu**.

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 79.03 [4321]

Please select a boot option
EFI Shell [Built-in]

    Internal Bootable DVD
    Boot Option Maintenance Menu
    System Configuration Menu

Use ^ and v to change option(s). Use Enter to select an option
```

9. Select **Add a Boot Option** from the **EFI Boot Maintenance Manager**.

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Main Menu. Select an Operation

Boot from a File
        Add a Boot Option
        Delete Boot Option(s)
        Change Boot Order

Manage BootNext setting

        Set Auto Boot TimeOut

Select Active Console Output Devices
        Select Active Console Input Devices
        Select Active Standard Error Devices  Cold Reset
        Exit

Timeout-->[7] sec SystemGuid-->[BC3ED547-6466-11D7-B97D-2EC59A23C6E2]
```

```
    SerialNumber-->[A21596378           ]
```

10. Select the volume to add:

```
EFI Boot Maintenance Manager ver 1.10 [14.61]

Add a Boot Option.  Select a Volume

SHULERVOL [Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)/HD(Part1,S

    IA64_EFI [Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun0)/HD(Part1,Si
    IA64_EFI [Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,L
    IA64_EFI [Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375A5E5B,L
    NO VOLUME LABEL [Acpi(HWP0002,600)/Pci(1|0)/Scsi(Pun4,Lun0)/HD(P
    Removable Media Boot [Acpi(HWP0002,0)/Pci(3|0)/Ata(Primary,Maste
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E39115D)]
    Load File [Acpi(HWP0002,200)/Pci(1|0)/Mac(001018042056)]
    Load File [Acpi(HWP0002,500)/Pci(1|0)/Mac(00101804205A)]

Exit
```

11. Select the appropriate files to describe the address of the new FC boot option:

```
Select file or change to new directory:
04/15/03  11:25p <DIR>       4,096 EFI
       [Treat like Removable Media Boot]
    Exit

EFI Boot Maintenance Manager ver 1.10 [14.61]

Select file or change to new directory:
04/15/03  11:25p <DIR>       4,096 .

       04/15/03  11:25p <DIR>           0 ..
       04/15/03  11:25p <DIR>       4,096 HPUX
       04/15/03  11:25p <DIR>       4,096 Intel_Firmware
       04/15/03  11:25p <DIR>       4,096 DIAG
       04/15/03  11:25p <DIR>       4,096 HP
       04/15/03  11:25p <DIR>       4,096 TOOLS
    Exit

EFI Boot Maintenance Manager ver 1.10 [14.61]

Select file or change to new directory:
04/15/03  11:25p <DIR>       4,096 .
       04/15/03  11:25p <DIR>       4,096 ..
       05/05/03  04:54p           425,747 HPUX.EFI
       05/05/03  04:54p            24,576 NBP.EFI
    Exit
```

12. Enter a description of the new FC boot device and the data type:

```
Filename: \EFI\HPUX\HPUX.EFI

  DevicePath: [Acpi(HWP0002,500)/Pci(2|0)/Fibre(WWN21000020375AE714,Lun0)/HD(Par
t1,SigF7D00000)/\EFI\HPUX\HPUX.EFI]
    IA-64 EFI Application 05/05/03  04:54p     425,747 bytes

Enter New Description:  FC Boot Disk

   New BootOption Data. ASCII/Unicode strings only, with max of 240 characters
```

```
        Enter BootOption Data Type [A-Ascii U-Unicode N-No BootOption] : n
        Save changes to NVRAM [Y-Yes N-No]: y
```

The procedure is complete; the FC disk displays in the boot menu as follows:

```
EFI Boot Manager ver 1.10 [14.61]  Firmware ver 79.03 [4321]

Please select a boot option
    EFI Shell [Built-in]
    Internal Bootable DVD
    FC Boot Disk
    Boot Option Maintenance Menu
    System Configuration Menu

Use ^ and v to change option(s). Use Enter to select an option
```

Firmware

The server has two sets of firmware installed:

- Server and BMC firmware
- iLO MP firmware

When upgrading server and BMC firmware, you must upgrade both components on the server from the same release. Details about a specific release are available in the associated Release Notes.

Firmware updates are available on the HP Web at:

http://www.hp.com under “Support and Drivers”.

Identifying and Troubleshooting Firmware Problems

Erratic server operation, or the fact that the server may not boot successfully to the **EFI Boot Manager** or to the EFI Shell, are symptoms of possible firmware problems.

NOTE: Firmware problems are relatively rare. Look for other problem causes first.

Probable firmware failure areas are:

- Unsupported firmware installation
- Corrupt firmware installation

To troubleshoot firmware problems:

1. Verify that all server and BMC firmware components are from the same release (use the MP `sr` command).
2. Reinstall server and BMC firmware.

Downloading and Installing the Latest Version of the Firmware

HP makes every effort to provide you with the most current version of firmware. However, there can be instances when this is not the case.

To ensure you have the latest version of the firmware running on the server, download the latest version of the firmware from the Web, and create a CD to install the firmware on the server.

You can update firmware by using the HP Firmware Manager (HP FM). HP FM is a set of tools for updating firmware on an HP Integrity system. HP FM is packaged with the firmware and distributed through the web. HP FM provides two methods of updating firmware. The method to use depends on whether or not the operating system is running on the system:

- HP OS-Initiated Firmware Manager (HP OSIFM) – Use HP OSIFM if the HP-UX or Linux operating system is running. HP OSIFM provides a firmware package in a patch or product

file for HP-UX and a Smart Component for Linux. You download the patch, product, or Smart Component to a system and then use the operating system to update the firmware.

- HP Offline Firmware Manager (HP OFM) – Use HP OFM if the operating system is not running or to update the firmware for a device in the boot path. HP OFM provides a firmware package as an .ISO image that you download to a system to create a CD. You then use the CD to boot the system and update the firmware.

For more information about downloading and updating firmware using FM, see the *HP Firmware Manager User's Guide* under the System Firmware section of the HP Technical Documentation Web site:

http://www.docs.hp.com/en/hw.html#System%20Firmware

Downloading the Latest Version of the Firmware

To download the latest version of the firmware from the Web, follow these steps:

1. Go to:

   http://www.hp.com/go/bizsupport
2. Select **download drivers and software**.
3. Select **Itanium-based servers** from the Server category.
4. Select your product from the servers listed.
5. Select your operating system.
6. Select the firmware category you want to download.
7. Download the firmware to a CD.

Installing the Latest Version of the Firmware on the Server

To install the latest version of the firmware on the server, follow these steps:

1. Initiate a server console session.
2. Insert the CD with the copy of the latest version of the firmware.
3. Using the EFI Boot Manager menu, boot to the drive that contains the CD with the updated firmware.
4. Follow the instructions to update the firmware.

Server Interface (System Console)

All system console connections (VGA, USB, local RS-232 and iLO MP LAN) are made through the I/O port connector on the front of the server, through the local I/O cable.

HP-UX uses the RS-232 serial text connection to a dumb terminal, or to terminal emulator software running on a PC, to control server operations locally. All other connections are unsupported.

HP-UX alternatively uses the iLO MP's 10/100 BT LAN connection over a private network, to control one or more server operations -- locally through telnet or Secure Shell (SSH), or remotely over a public network through a Web GUI.

Troubleshooting Tips

RS-232 connection: If a dumb terminal/PC running terminal emulation software is attached to the iLO MP "local" port and does not respond to a **Ctrl+B** key sequence (and the terminal is running 9600 baud, 8 data bits, is ONLINE, etc.), it is possible that the iLO MP is not operational or functional.

Telco Alarm

The server uses telco alarm monitoring to help monitor equipment and identify the cause of physical system problems. Alarm processing is managed through the Baseboard Management Controller (BMC). This option is available at an additional cost.

The fan controller provides an interface to a set of three telco alarm signals. Each alarm signal has three pins (normally open, normally closed, and common) that are connected through a cable to a connector on the back bulkhead of the server. The BMC sets off any combination of these three alarm signals as it deems necessary through the use of 12C commands.

NOTE: Although HP provides telco alarm functionality, you design the alarm signal output according to your environment and specifications. See the telco alarm documentation for information on how to program the telco alarm.

Alarm Levels

There are three levels of telco alarms and many sources of alarm condition.

1. Critical Alarm: Attached to the System State LED; triggers when LED is flashing red at 2 Hz.
2. Major Alarm: Attached to the System State LED; triggers when LED is flashing yellow at 1Hz.
3. Power Alarm: The BMC controls this alarm based on the state of system power.

CAUTION: Failure to recognize an alarm condition can result in loss of data or damage to equipment.

Limitations

Telco alarm performance limitation includes:

- You can not clear the red system state LED until you reboot the server.
- You cannot turn off the telco alarm until you reboot the server.
- You can clear the yellow system state LED when the SEL is read, even though the warning condition still exists.

NOTE: The power alarm only mirrors the state of system (main) power. For example, BMC sets the power alarm when system power is off, and clears it when system power is on. Specific operations, such as manually turning the power alarm off when system power is off, depend on the design and automation of the external alarm management device.

- Powering off the system does not affect the system state LED.
- Turning off the main power causes the power LED to flash (as long as dc power remains connected to the server).
- Disconnecting all power cables from the chassis causes all the LEDs to go dark.
- The server does not provide any audio capabilities.
- You cannot turn on or off the generated alarm signals from the server.
- You must mechanize and design the external alarm signal manager provided.

Relay Interface

Table 5-17 lists three dry contact relays, all located on the fan control board. They are identified on the board as K1, K2, or K3 and assigned the following alarm and signal names. The dry contact relays communicate information to the telco alarm monitor, so that any problems that occur on a system are indicated by the LEDs on the alarm panel.

Table 5-17 Relay Numbering

Relay	Alarm	Signal
Relay K1	Critical	(Alarm 0)
Relay K2	Major	(Alarm 1)
Relay K3	Power	(Alarm 2)

Signals Provided from Each Relay

Table 5-18 lists three signals provided from each relay through the DB-9F connector.

Table 5-18 Relay Signals

Signal	Abbreviation	Description
Normally Open	(NO)	This signal must be pulled up to no more than 24V above Return external to the system. • When the alarm *is not activated*, this signal is open (electrically high since pulled up externally). • When the alarm *is activated*, this signal is connected by a dry contact relay to the Return pin. The external pull-up resistor must limit the current to no more than 1 Amp.
Normally Closed	(NC)	This signal must be pulled up to no more than 24V above Return external to the system. When the alarm is not activated, this signal is connected by a dry contact relay in the system to the Return pin. When the alarm is activated, this signal opens (electrically high since pulled up externally). The external pull-up resistor must limit the current to no more than 1 Amp.
Return	(COM)	This is the return path for both the Normally Open and Normally Closed signals.

DB9 Pin-Out

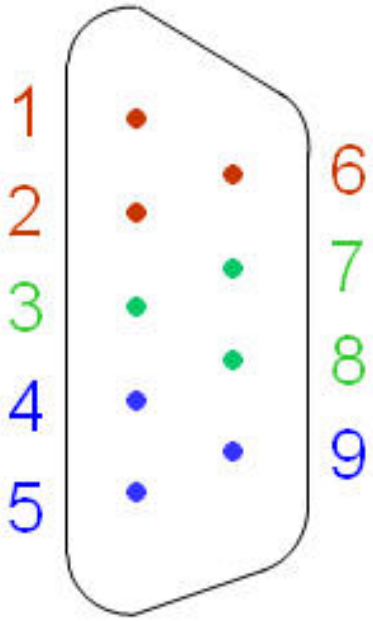
Table 5-19 lists the assigned relay, pin number, alarm, and signal name for each pin of the DB9 connector.

Table 5-19 Relay Numbering

Relay	Pin #	Alarm	Signal
K1	1	Critical Normally_Open	ALARM0_NO
	2	Critical Normally_Closed	ALARM0_NC
	6	Critical Return	ALARM0_COM
K2	7	Major Normally_Open	ALARM1_NO
	8	Major Normally_Closed	ALARM1_NC
	3	Major Return	ALARM1_COM
K3	4	Power Normally_On	ALARM2_NO
	5	Power Normally_Off	ALARM2_NC
	9	Power Return	ALARM2_COM

Figure 5-3 shows the DB9 pins.

Figure 5-3 DB9 Pins



Connections

- Use pins 1 and 6, or 2 and 6, to trigger a Critical Alarm.
- Use pins 7 and 3, or 8 and 3, to trigger a Major Alarm.
- Use pins 4 and 9, or 5 and 9, to trigger a Power Alarm.

IMPORTANT: An alarm can be triggered by identifying a change to either an open or closed circuit, depending on the connections used.

Reporting Your Problems to HP

HP customer care will help you solve server problems and, if necessary, initiate appropriate service procedures. Support is available on the Web and by phone.

For information on contacting the HP IT Resource Center (ITRC) near you, go to:

http://www.itrc.hp.comhttp://www.itrc.hp.com.

Online Support

To contact HP Customer Support online, refer to the Worldwide Limited Warranty and Technical SupportGuide or visit us on the Web at:

http://www.hp.com/go/bizsupport.

On the Web page, enter the server model number (for example, “cx2620”) and search the field.

The following information is available on this Web site:

- Software and firmware updates
- The latest drivers and utilities
- Additional documentation

Phone Support

To contact HP customer support by phone, go to the HP IT Resource Center (ITRC) near you, at:

http://www.itrc.hp.com.

Local phone numbers are listed in your native language for help.

Information to Collect Before you Contact Support

NOTE: It is highly recommended that you keep detailed records of any changes to your server, and of how server behavior has changed over time, or as a result of changes made to your server.

Before you contact HP support, you should:

1. Use the Troubleshooting to solve the problem.
   - Note failure symptoms and error indications (LEDs and messages).
   - Capture and permanently log the current SEL and FPL contents.
   - Try to determine precisely what did or did not happen.
2. Collect the following information:
   - The model number of your server (for example, “cx2620”).
   - The product number of your server. This can be found on the identification label, which is found at the front of the unit. (Typically, of the form “AD000A”)
   - The serial number of your server. This can be found on the identification label.
3. Be familiar with your server configuration.
   - Are you using the LAN, RS232, or Web interface to monitor the server?
   - How many processors and DIMMs have been installed?
   - What versions of processor and memory are used and where are they installed?
   - What accessories are installed?
4. Determine the following
   - Which firmware versions are in use?
   - When did the problem start?
   - Have recent changes been made to the server?
   - Which version of HP-UX is in use?

6 Removing and Replacing Components

This chapter provides procedures for removing and replacing components in the server.

This chapter addresses the following topics:

Required Service Tools

Service of this product requires one or more of the following tools:

- Electrically Conductive Field Service Kit (P/N 9300-1609)
- 1/4 inch flat blade screwdriver
- IPF CPU install tool (P/N 5069-4551)
- ACX-15 Torx screwdriver
- ACX-10 Torx screwdriver

Safety Information

Use care to prevent injury and equipment damage when performing removal and replacement procedures. Voltages can be present within the server. Many assemblies are sensitive to damage by electrostatic discharge.

Follow the listed procedures to ensure safe handling of components, to prevent injury, and to prevent damage to the server:

- If removing or installing a hot-swappable component, follow the instructions provided in this guide.
- If installing a hot-swappable component when power is present (fans are running), reinstall the server cover immediately to prevent overheating.
- If installing an assembly that is not hot-swappable, disconnect the power cables from the server external power connectors.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware unless you are removing or installing a hot-swappable or hot-pluggable component.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

- Do not wear loose clothing that can snag or catch on the server or on other components.
- Do not wear clothing subject to static charge build up, such as wool or synthetic materials.
- If installing an internal assembly, wear an antistatic wrist strap and use a grounding mat, such as those included in the Electrically Conductive Field Service Kit (P/N 9300-1609)
- Handle accessory boards and components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards

Accessing a Rack-Mounted Server

The server is designed to be rack mounted. The following procedure explains how to access a server that is mounted in an approved rack.

WARNING! Ensure that all antitip features (front and rear antitip feet installed; adequate ballast properly placed; and so on) are employed prior to extending the server.

Installing Components When the Server Is in a Rack

Install power supplies, fans, and disks when the server is fully inserted into a rack. Only front and rear access is required.

To install components when the server is in a rack, follow these steps:

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

NOTE: Ensure that there is enough area (approximately 1.5 meters [5 ft.]) to fully extend the server from the front of the rack to work on it.

To access a rack-mounted server, follow these steps:

1. Power off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Label and disconnect all cables from the unit rear panel connectors.
3. Remove or loosen the screws that fasten the server to the rack.

4. If the server is slide-mounted, slowly pull the chassis forward (or push from the rear) to extend the chassis from the rack. The server is fully extended when the rail clips are locked in place. If the server is tray-mounted, the chassis is not locked in place and can fall if extended from the rack. You must remove tray-mounted servers from the rack for internal access.
5. Remove the top cover. See "Removing and Replacing the Top Cover" (page 162).

Removing the Server from a Rack

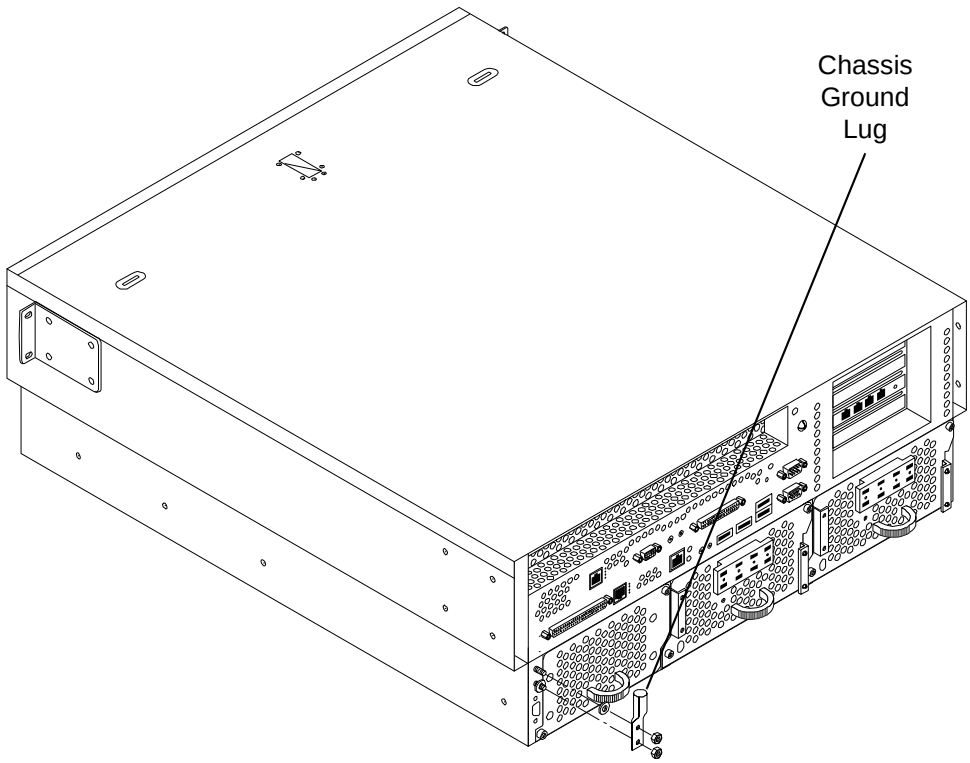
WARNING! Do not attempt to lift the server alone. The server can weight as much as 22.7 kilograms (50 lbs). Serious injury can result if this warning is not observed.

NOTE: Ensure that there is enough area (approximately 1.5 meters [5 ft.]) to fully extend the server from the front of the rack to work on it.

To remove the server from the rack, follow these steps:

1. Power off and disconnect system power. Disconnect power at the dc source end of the power cable, using the disconnect device that is part of the rack or facility power system.
2. Label and disconnect all cables from the unit rear panel connectors.
3. Remove or loosen the screws that fasten the server to the rack.
4. Label and disconnect the rack or facility ground cable from the chassis rear panel (Figure 6-1).

Figure 6-1 Chassis Ground Lug



5. If the server is slide-mounted, slowly pull the chassis forward (or push from the rear) to extend the chassis from the rack. The server is fully extended when the rail clips are locked in place. Do not extend tray-mounted servers. Tray-mounted servers are not locked in place and can fall if extended from the rack.
6. Disengage the slides or mounting hardware and take the server to a static-free work station.

Inserting the Server Into a Rack

To insert the server into a rack, follow these steps:

WARNING! Do not attempt to lift the server alone. The server can weight as much as 22.7 kilograms (50 lbs). Serious injury can result if this warning is not observed.

1. Engage the sever slides or mounting kit.
2. Slide the server inward and push the server into the rack until it is in position.
3. Connect the server cables to the rear-panel connectors.
4. Connect the rack or facility ground cable to the chassis ground lug (Figure 6-1).
5. Replace or tighten the screws that fasten the server to the rack.

Component Classification

The server components are classified into three major categories: hot-swappable, hot-pluggable, and cold-swappable. A brief explanation of each category and the server component classification follow.

Hot-Swappable Components

A component is hot-swappable if you can remove it from the chassis while the server is running. Hot-swappable components require no software intervention prior to removing the component.

NOTE: Hot-swappable components are signified with red touch points.

The following are hot-swappable components:

- Chassis fan units
- Power supplies

Hot-Pluggable Components

A component is defined as hot-pluggable if you can remove it from the chassis while the server is running. Software intervention `is` required prior to removing a hot-pluggable component.

NOTE: Hot-pluggable components are signified with red touch points.

The following are hot-pluggable components:

- Disk drives
- PCI-X cards

Cold-Swappable Components

To remove and replace cold-swappable components, or components that are neither hot-swappable nor hot-pluggable, you must shut down the operating system and power off the server. For complete instructions on shutting down the operating system and powering off the server, see operating system documentation.

NOTE: Cold-swappable components are signified with blue touch points.

The following are cold-swappable components:

- Front grill
- Top cover
- Airflow guides
- CD/DVD drive
- DIMMs

- LED status panel
- CD/DVD optical drive
- Processor board assembly
- Hard disk drive backplane assembly
- Power supply interface assembly
- Fan control board
- iLO MP card
- System processor
- System battery
- System board

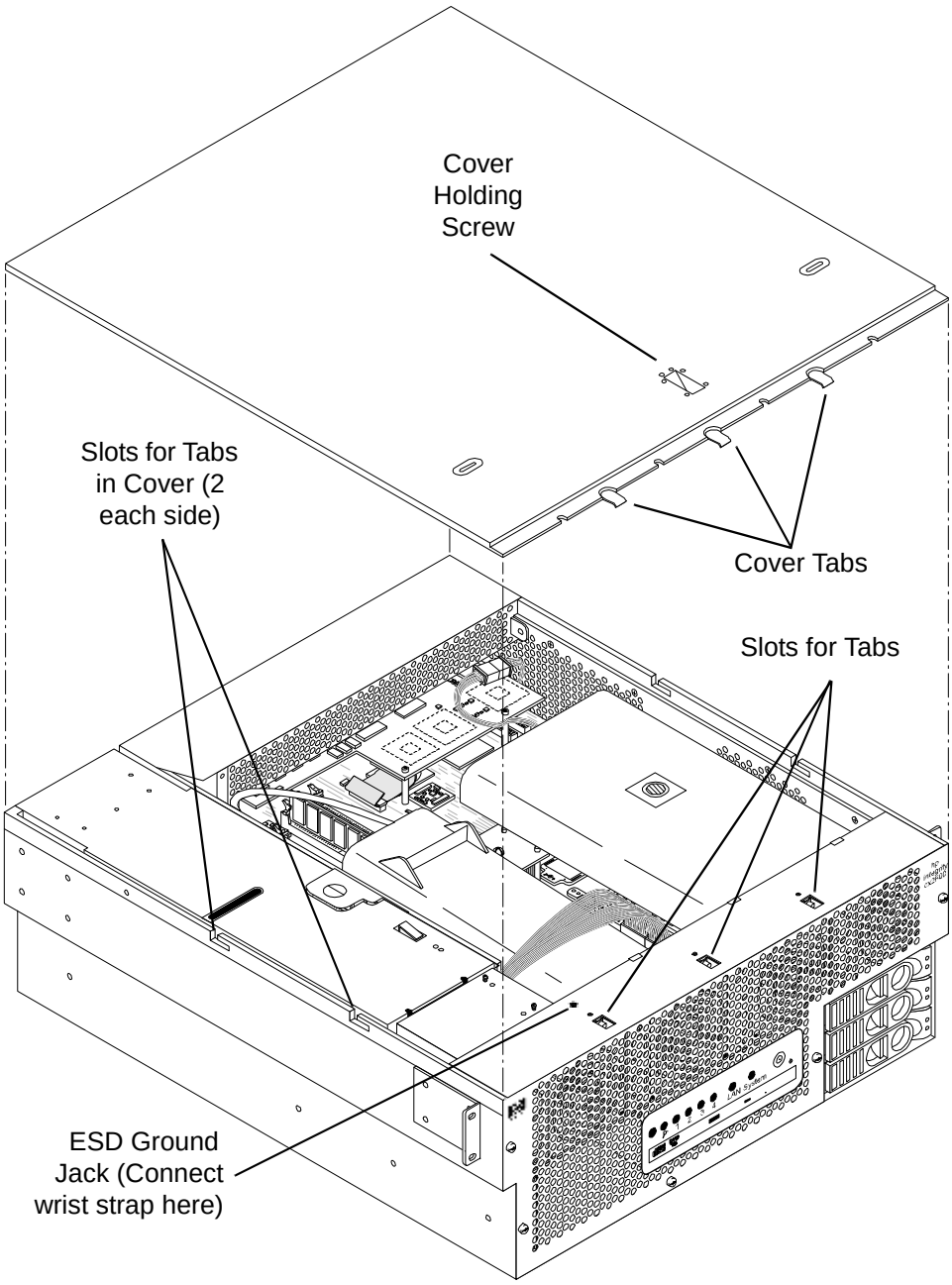
Removing and Replacing the Top Cover

Figure 6-2 shows the server with the top cover removed.

CAUTION: Operation of the server without the top cover in place makes the server susceptible to electromagnetic interference (EMI) and overheating problems, which can result in system failure. Keep the top cover in place during normal operation.

Observe all ESD safety precautions when removing and replacing the top cover. Failure to follow ESD safety precautions can result in damage to the server.

Figure 6-2 Removing the Top Cover



Removing the Top Cover

To remove the top cover, follow these steps:

WARNING! Voltages are present within the server when power is applied. Do not remove the server top cover without first turning off and disconnecting power. Always replace the top cover before turning the system on.

1. Power off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Slide the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Use the ACX-15 Torx screwdriver to loosen the captive screw that holds the top cover in place.
5. Slide the cover toward the rear of the server chassis and lift it straight up.

Replacing the Top Cover

To replace the top cover, follow these steps:

1. Align each pair of tabs on the left and right sides of the cover with the corresponding slots in the chassis. Set the top cover in place on the server chassis.
2. Push the cover forward until it seats on the chassis.
3. Tighten the captive screw to secure the cover in place.

Removing and Replacing Hot-Swappable Chassis Fan Units

There are five hot-swappable chassis fan units in the server. Fan units 1, 2, 3 and 4 are accessible from the front of the chassis. Fan unit 5 is accessible from the rear of the chassis. Fan units 1, 2, 3 and 4 are identical and interchangeable. There are also fans in the power supply assemblies, but the power supplies are not field repairable. If a power supply fan fails, replace the power supply assembly.

If a fan failure is total (both rotors), or if the fan was removed from the chassis for more than 30 seconds, a system logs the event as a critical error. A critical error causes the system LED to flash red and requires a reboot to reset the error status. A total fan failure (including removal) for more than two minutes results in system shutdown. If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping a fan in less than two minutes enables continued operation and prevents automatic shutdown.

CAUTION: Operating the server with the front grill removed risks EMI problems. Run the server with the front grill removed only when hot-swapping a fan. Always replace the front grill immediately after replacing the fan.

Observe all ESD safety precautions when performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

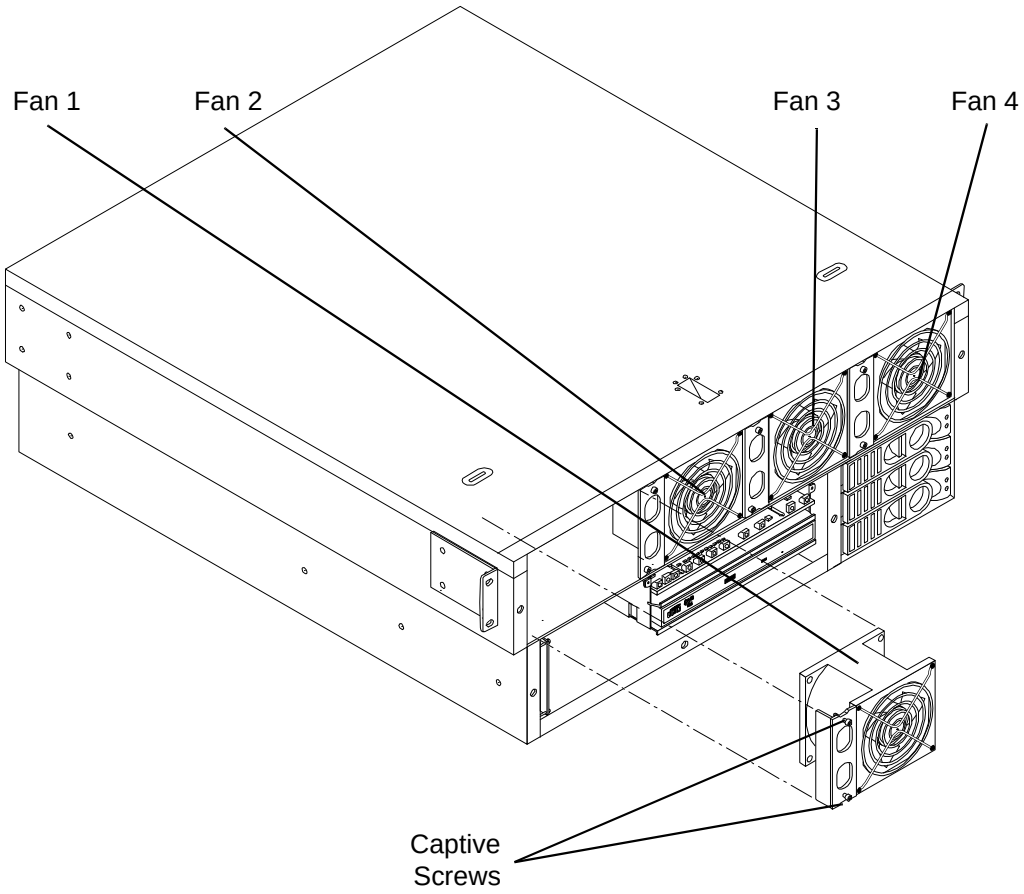
NOTE: A hot-swappable device does not require interaction with the operating system before the device is removed from or installed into the server.

The power to the server does not have to be off to remove or replace a hot-swappable chassis fan unit.

Removing a Front Panel Hot-Swappable Fan

To remove a hot-swappable fan from the front of the server chassis, follow these steps:

Figure 6-3 Removing a Front Panel Hot-Swappable Fan



1. Remove the front grill. See "Removing and Replacing the Front Grill" (page 178).
2. Use the ACX-15 Torx screwdriver to loosen the two captive screws on the plastic extractor handle (left side of fan) until they release.
3. Use the extractor handle to pull the fan from the server chassis.

NOTE: Hot-swapping a fan can interrupt system operation. If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping the fan in less than two minutes enables continued operation and prevents automatic shutdown.

Installing a Front Panel Hot-Swappable Fan

You do not need to remove the server or extend it from the rack to replace a fan. To install a hot-swappable fan in the front of the server chassis, follow these steps:

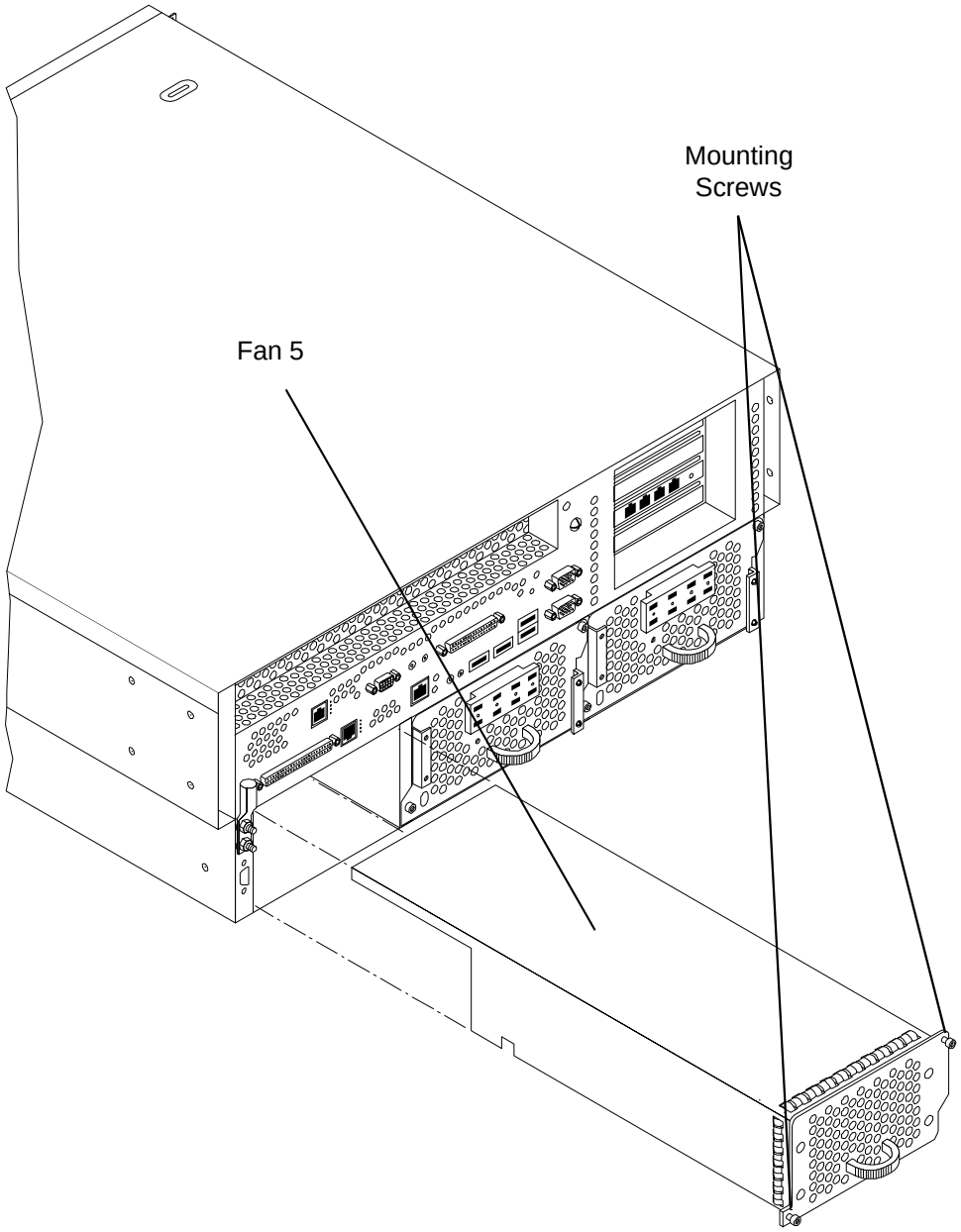
NOTE: Hot-swapping a fan can interrupt system operation. If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping the fan in less than two minutes enables continued operation and prevents automatic shutdown.

1. Remove the front grill. See "Removing and Replacing the Front Grill" (page 178).
2. Orient the replacement fan so that the extractor handle is on the left. Insert the fan into the chassis opening and press it firmly into place.
3. Tighten the two captive screws that secure the fan in place.
4. If the server is running, install the front grill immediately. See "Replacing the Front Grill" (page 178).

Removing a Rear Panel Hot-Swappable Fan

To remove a hot-swappable fan from the rear of the server chassis, follow these steps.

Figure 6-4 Removing a Rear Panel Hot-Swappable Fan



1. If rack-mounted, you may need to extend the server out from the rack for better access. If needed, slide the server out to the fully extended position.
2. Use the ACX-15 Torx screwdriver to loosen the two captive screws that secure the fan unit to the server chassis.
3. Pull the fan assembly from the server chassis by pulling the curved handle.

NOTE: Hot-swapping a fan can interrupt system operation. If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping the fan in less than two minutes enables continued operation and prevents automatic shutdown.

Installing a Rear Panel Hot-Swappable Fan

You do not need to remove the server from the rack to replace a fan. To remove a hot-swappable fan from the rear of the server chassis, follow these steps:

1. Orient the replacement fan assembly so that the curved handle is at the bottom. Gently push the fan unit into position.
2. Tighten the two captive screws that secure the fan unit to the server chassis.

NOTE: Hot-swapping a fan can interrupt system operation. If you are hot-swapping a fan assembly in response to an error message, and the system is operating normally, hot-swapping the fan in less than 30 seconds eliminates the requirement for a system reboot. Hot-swapping the fan in less than two minutes enables continued operation and prevents automatic shutdown.

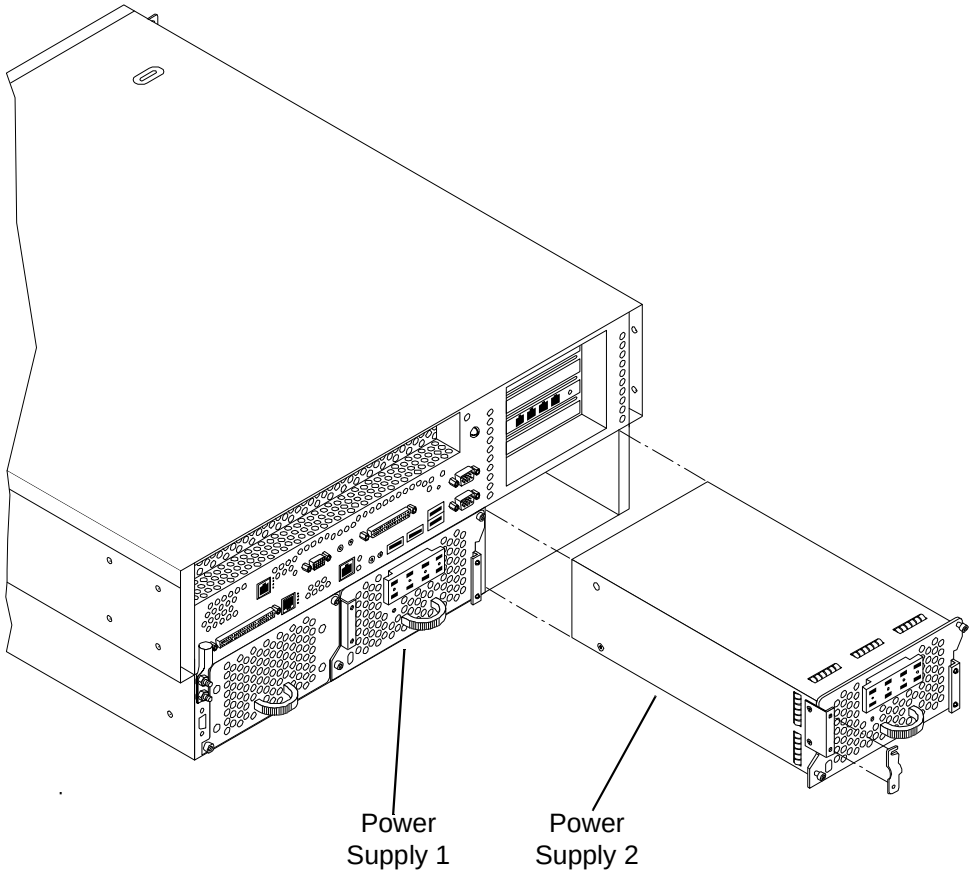
Removing and Replacing Hot-Swappable Power Supplies

Hot-swappable power supplies 1 and 2 are located at the rear of the chassis. These power supplies are identical and interchangeable.

NOTE: A hot-swappable device does not require interaction with the operating system before the device is removed from or installed into the server. If the second power supply is functioning correctly, you can power off and remove a power supply with no effect on server operations.

The power to the server (other power supply) does not have to be off to remove or replace a hot-swappable power supply.

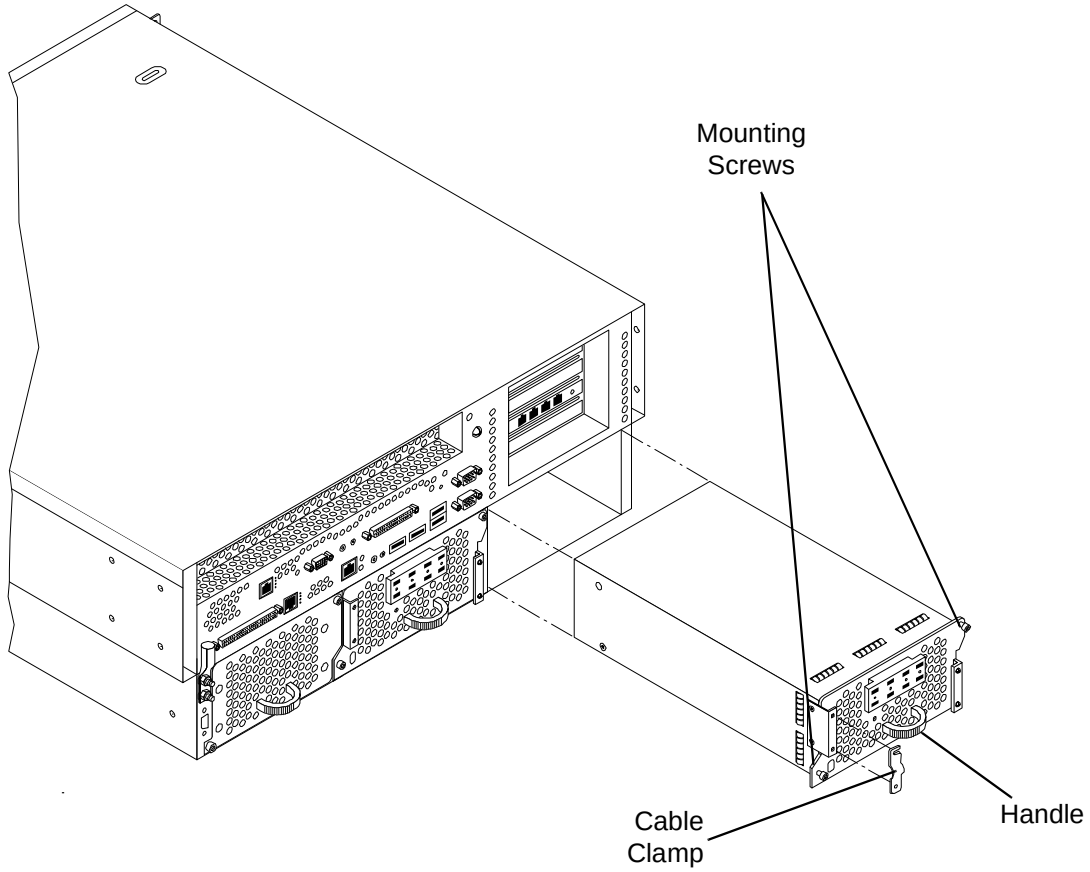
Figure 6-5 Hot-Swappable Power Supply



Removing a Hot-Swappable Power Supply

To remove a hot-swappable power supply, follow these steps:

Figure 6-6 Removing a Hot-Swappable Power Supply



1. If rack-mounted, you may need to extend the server out from the rack for better access. If needed, slide the server out to the fully extended position.
2. Disconnect power from the power supply being removed. Disconnect power at the dc source end of the power cable, using the disconnect device that is part of the rack or facility power system.

WARNING! Always check that the power cable is not connected to a power source before attempting to disconnect the power cable from power supply terminals. Failure to observe this warning can result in injury.

3. Loosen the two knurled knobs on the power supply cable clamp to release the power feed leads.
4. Press up on the two lower tabs of the terminal barrier strip cover to snap off the cover.
5. Loosen or remove the screws that secure the power cable leads to the terminal strip and disconnect the power cable leads from the power supply.
6. Reinstall the terminal strip hardware and the barrier strip cover (removed in steps Step 4 and Step 5) to prevent loss. Hang the cover on the upper tabs and snap the cover into place.
7. Use the ACX-15 Torx screwdriver to loosen the two captive diagonally-mounted mounting screws that secure the power supply to the server chassis.
8. Pull the power supply from the server chassis by pulling the curved handle.

Installing a Hot-Swappable Power Supply

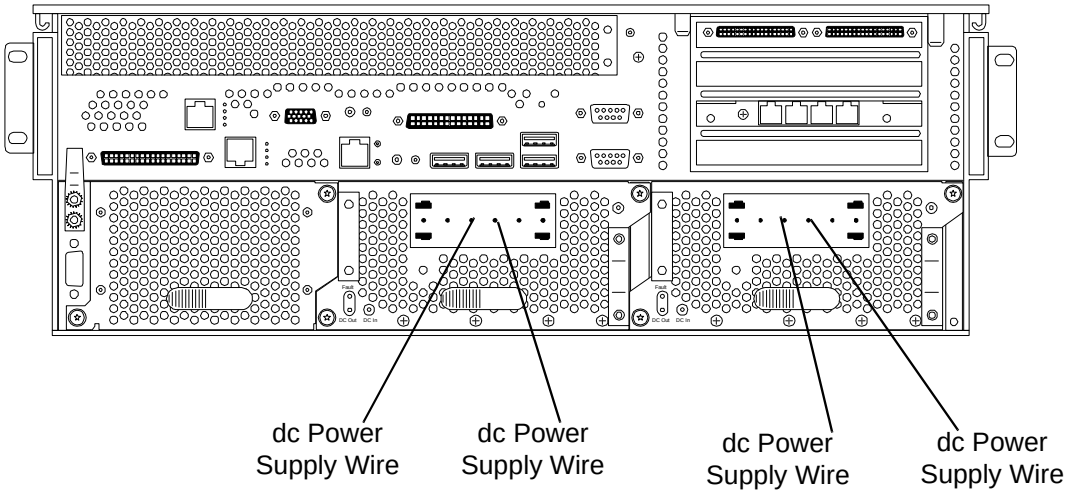
Installation of one power supply has no effect on operations if the other power supply is functioning correctly. To install a hot-swappable power supply, follow these steps:

1. Orient the replacement power supply so that the securing screws are aligned with the corresponding holes in the server chassis. Gently push the power supply into position.
2. When the power supply is fully inserted into the server chassis, tighten the two mounting screws to secure the power supply in place.
3. Press up on the two lower tabs on the terminal barrier strip cover to snap off the cover.

WARNING! Always check that the power cable is not connected to a power source before attempting to connect the power cable to the power supply terminals. Failure to heed this warning can result in injury.

4. Connect the power cable leads to the power supply terminals (Figure 6-7).

Figure 6-7 Power Supply Terminals



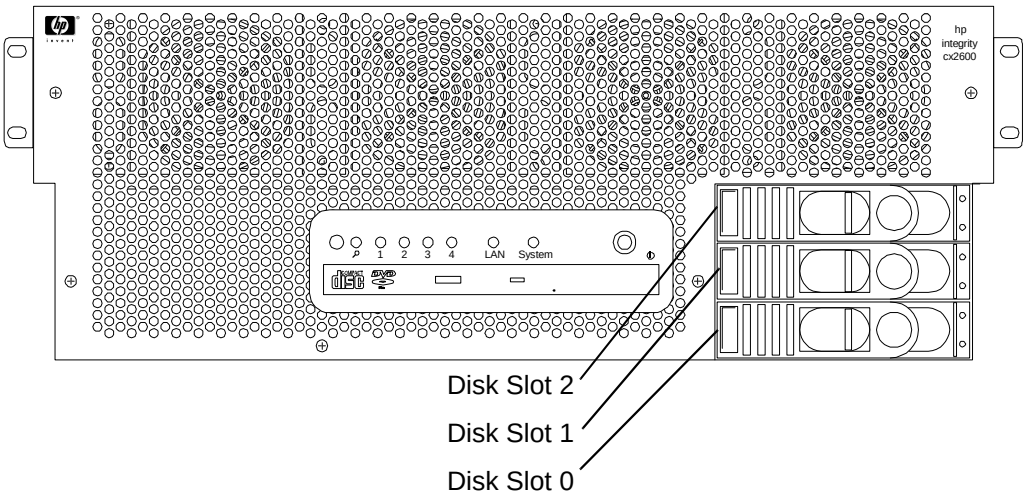
5. Reinstall the terminal barrier strip cover. Hang the cover on the upper tabs and snap the cover into place.
6. Route the power cable through the power supply cable clamp and tighten the two knurled knobs to secure the cable in place.
7. Connect the power cable to the dc power source.

Removing and Replacing Hot-Pluggable Disk Drives

Hot-pluggable disk drives are located at the front of the server. The following sections explain how to remove and reinstall a disk drive.

CAUTION: A hot-pluggable device can require interaction with the operating system before you can safely remove or install the device into the server. Determine whether the operating system supports replacement of disk drives while the operating system is running. If the operating system does not support hot-plugging, shut down the operating system before performing these procedures. Failure to observe this caution can result in system failure.

Figure 6-8 Hot-pluggable Disk Drive Slots



Removing Hot-Pluggable Disk Drives

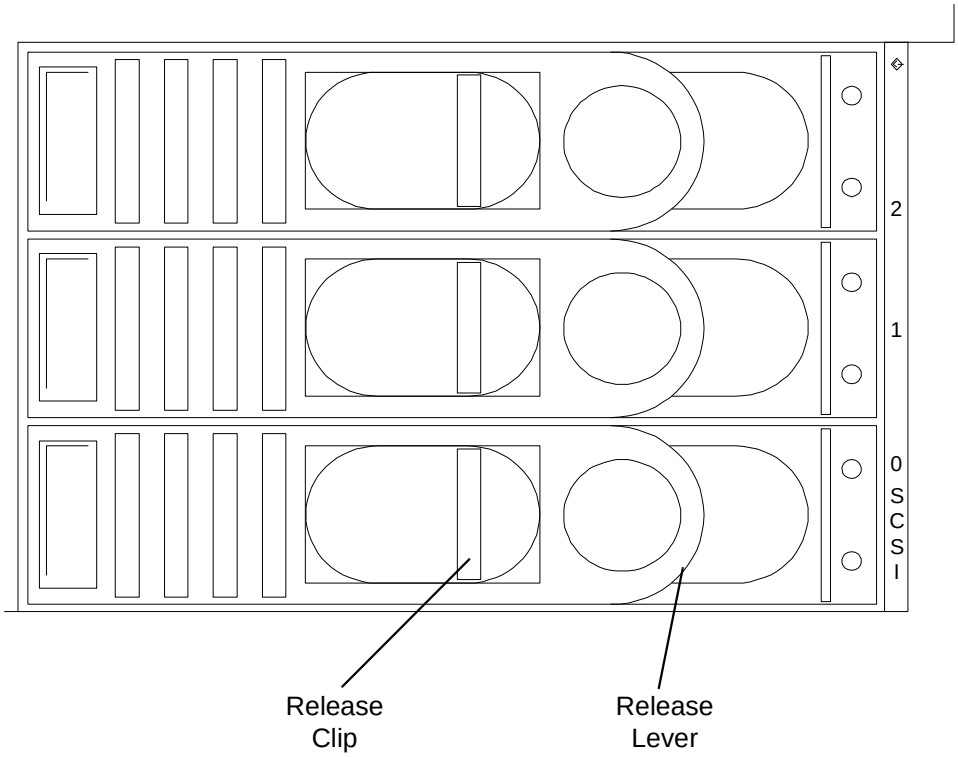
To remove a hot-pluggable disk drive, follow these steps:

CAUTION: The disk drives in the server are not hot-swappable, they are hot-pluggable. A manual software procedure may be required to safely remove or insert disk drives while the server is running. To avoid damage to the hard drives:

- See the documentation provided with the disk drive for more information about removing and inserting a drive.
- See operating system documentation for more information about removing and inserting hot-pluggable assemblies.

1. If required (OS does not support hot-plugging devices), stop the operating system.
2. Squeeze inward on the release clip and pull the release lever to pull the drive from the server chassis.

Figure 6-9 Disk Drives in Server



Installing Hot-Pluggable Disk Drives

To install a hot-pluggable disk drive, follow these steps:

1. If required (OS does not support hot-plugging devices), stop the operating system.
2. If a disk filler is installed, remove it by pulling the release lever.
3. With the release lever pulled out, slide a hot-pluggable hard disk into the disk slot until it is seated.
4. Press the release lever until it is flush with the front of the server. The release lever clicks as it locks into position.
5. If you stopped the operating system in step 1, reset the system to the **EFI Boot Maintenance Menu** to rescan the hard drives.
6. If the operating system was stopped in step Step 1, use the EFI Shell `map` command to verify that you have correctly installed the newly inserted drive.

Removing and Replacing the PCI-X Card Cage

The server has four 64-bit, 133 MHz PCI-X accessory card sockets located in a removable card cage. You must remove the PCI-X card cage before installing or removing accessory cards. The following sections explain how to access the PCI-X card cage, and remove and install the accessory cards.

Removing the PCI-X Card Cage Assembly

To remove the PCI-X card cage assembly, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.

3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

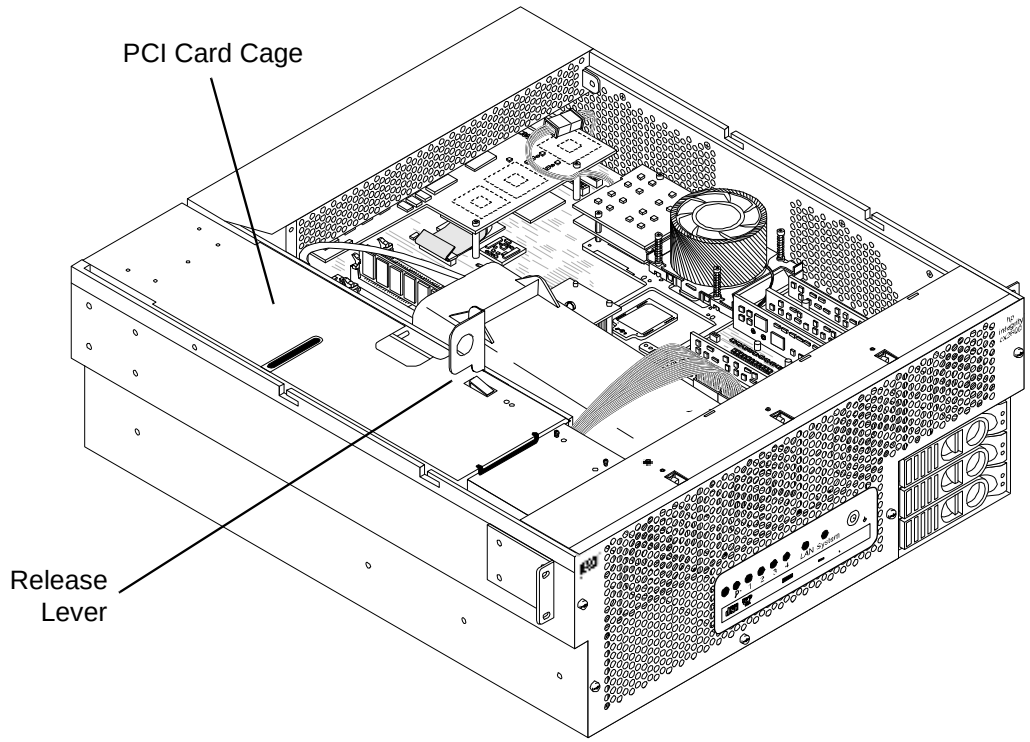
Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

4. Remove the top cover from the chassis. See "Removing and Replacing the Top Cover" (page 162).
5. Pull up on the PCI-X card cage release lever and the back edge of the card cage.

Figure 6-10 Removing the PCI-X Card Cage



6. Lift straight up on the card cage without rocking to remove it from the server chassis.
7. Place the card cage on an ESD-protected work surface.
8. Orient the card cage so that PCI-X card connectors within the card cage are at the bottom, when viewed through the open side of the card cage.
9. Remove the cards by lifting them from the sockets.
10. Remove the cover that is now on top of the PCI-X card cage by sliding the cover toward the rear of the card cage and lifting the cover to remove the cover from the card cage.

NOTE: The four connectors within the PCI-X card cage are identical and have the same capabilities. You can install a compatible PCI-X card in any slot.

Installing the PCI-X Card Cage Assembly

To install the PCI-X card cage assembly, follow these steps:

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

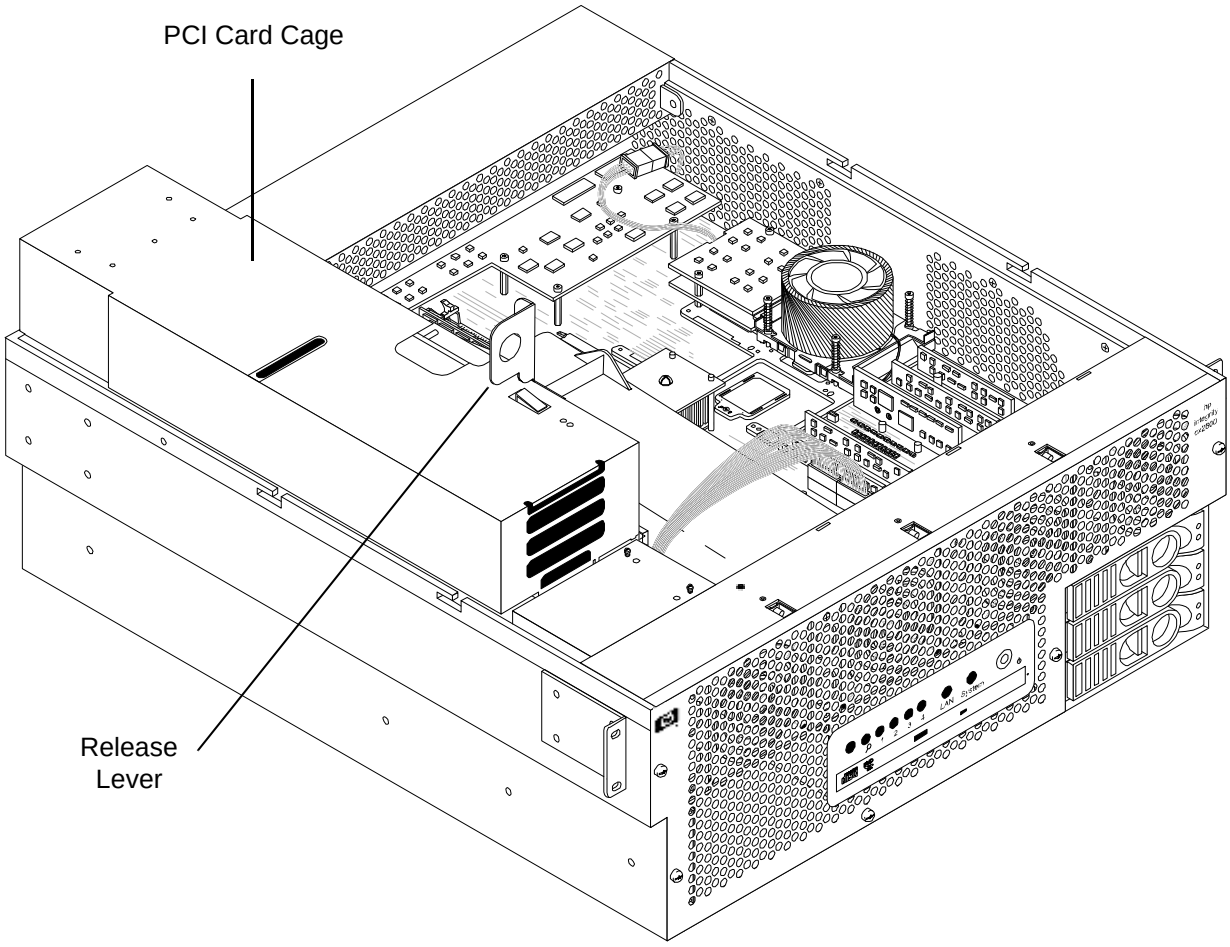
Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

1. If the top cover is installed on the chassis, remove the top cover. See "Removing and Replacing the Top Cover" (page 162).
2. If the PCI-X card cage cover is removed, insert the cover tabs (fan end of cover) into the corresponding slots on the card cage and press the cover into position on the card cage. Slide the cover toward the front of the card cage to secure the cover in place.
3. Orient the PCI-X card cage above the chassis as shown in Figure 6-11. Lift the release lever and hold it in the open position. Lower the card cage into position and press gently to seat the PCI-X card cage connectors.

Figure 6-11 Installing the PCI-X Card Cage



4. Press the release lever down to lock the card cage in place in the chassis.
5. Reinstall the chassis cover. See "Removing and Replacing the Top Cover" (page 162).
6. Reinstall the server in the rack and power on the server. See "Inserting the Server Into a Rack" (page 160).
7. Run the **`info io`** command at the EFI Shell to verify that you have correctly installed the PCI-X cards.

Removing and Replacing Hot-Pluggable PCI-X Cards

The server has four 64-bit, 133 MHz PCI-X accessory card sockets located in a removable card cage. You must remove the PCI-X card cage before removing or installing PCI-X cards. The following sections explain how to remove and install PCI-X cards.

PCI-X Configurations

PCI-X slots are numbered 1 through 4 from the top down in the server; 4 is the outermost slot.

Configuration requirements for slots 1 through 4 are as follows:

- Slot 1: The maximum speed for a card in slot 1 is 133 MHz. If you use different modes, such as PCI-X instead of PCI-X, or different card speeds, the slot automatically downgrades to the lesser mode or speed.
- Slots 2 - 4: The maximum speed for cards in slots 2 - 4 is 133/2 MHz.

NOTE: If the new PCI-X card has a slower capability than the current bus configuration, it will not work. If the new card has a faster capability than the current bus configuration, it only runs at the slower bus mode and frequency of the current bus configuration.

Removing a PCI-X Card

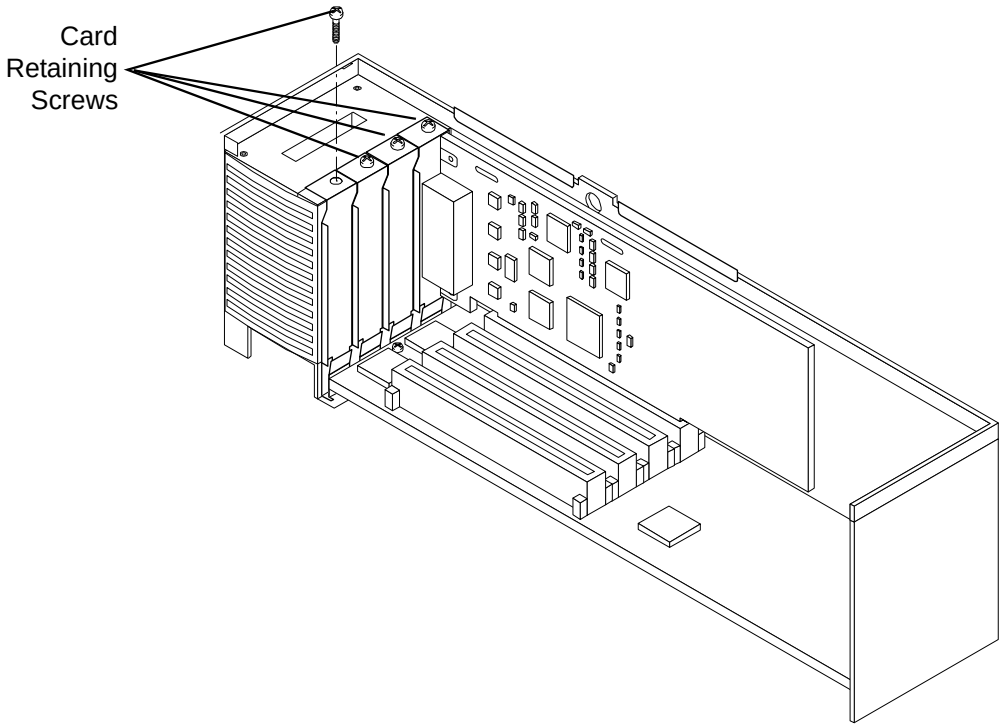
CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

NOTE: You must remove the PCI-X card cage from the server chassis to access the PCI-X cards.

To remove a PCI-X card, follow these steps:

1. Remove the PCI-X card cage from the server chassis. See "Removing the PCI-X Card Cage Assembly" (page 171).
2. Remove the cover from the PCI-X card cage.
3. If a cable blocks card removal, or if it is connected to the card, disconnect the cables from the card connectors.
4. Use the ACX-15 Torx screwdriver to remove the retaining screws (M3 x 6mm long pan T15/slot squire cone stainless steel) that secures the card in place (Figure 6-12).

Figure 6-12 PCI-X Card Retaining Screws



5. Grasp the card by the two opposite edges and lift the card from the socket.
6. If there are any empty sockets in the card cage, install a blank panel in the bulkhead opening at the end of the card cage. The blank panel is necessary to ensure correct airflow when the card cage is installed in a working server.

Installing a PCI-X Card

NOTE: You must remove the PCI-X card cage from the server chassis to install PCI-X cards.

The four connectors in the PCI-X card cage are identical and have the same capabilities. You can install a compatible PCI-X card in any slot.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

To install a PCI-X card, follow these steps:

1. Remove the PCI-X card cage from the server chassis. See "Removing the PCI-X Card Cage Assembly" (page 171).
2. Remove the cover from the PCI-X card cage.
3. If a blank panel is installed at the bulkhead end of the card cage for the card position or socket you want to use, remove the blank panel.
4. Grasp the card by the opposite edges and orient the card so that its connector is aligned with the card cage socket and extend the PCI-X interface connector through the opening at the end of the card cage.
5. Insert the card into the socket.
6. Secure the card in the card cage using the retaining screws provided.
7. Connect the cables to the card sockets.

Removing and Replacing the Air Filter Assembly

The optional air filter assembly consists of a frame and a filter element made of foam. It is used to filter the air to minimize the amount of dust drawn into the server.

You can remove and replace the air filter assembly while the server remains in operation.

Air Filter Maintenance

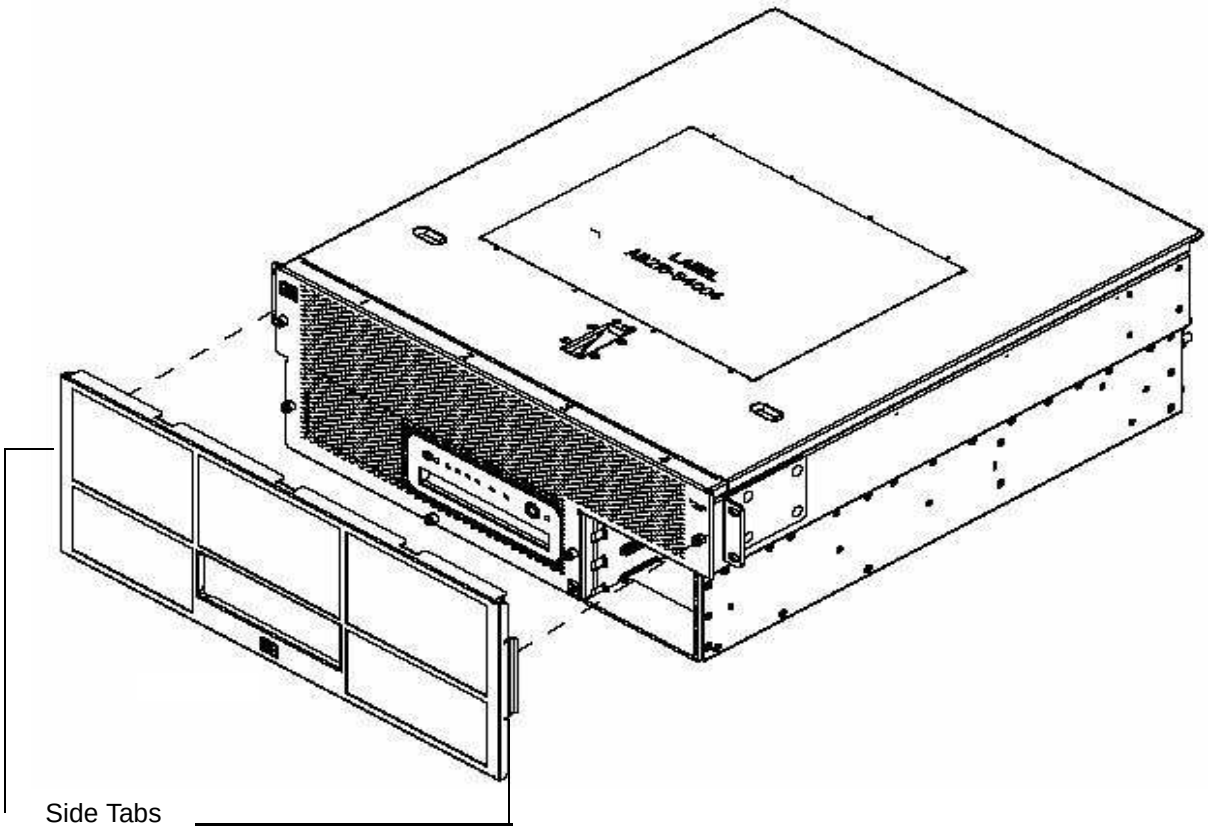
Replacing the foam filter element is performed by the customer as a preventative maintenance measure. When the air filter assembly is installed on a server that is in a typical data center environment (see the *HP Integrity cx2620 Site Preparation Guide* for data center environment information), HP recommends inspecting the foam filter element every two months and replacing it if necessary. At a minimum, HP recommends that the foam element should be replaced no less than every six months.

Removing the Air Filter Assembly

To remove the air filter assembly, follow these steps:

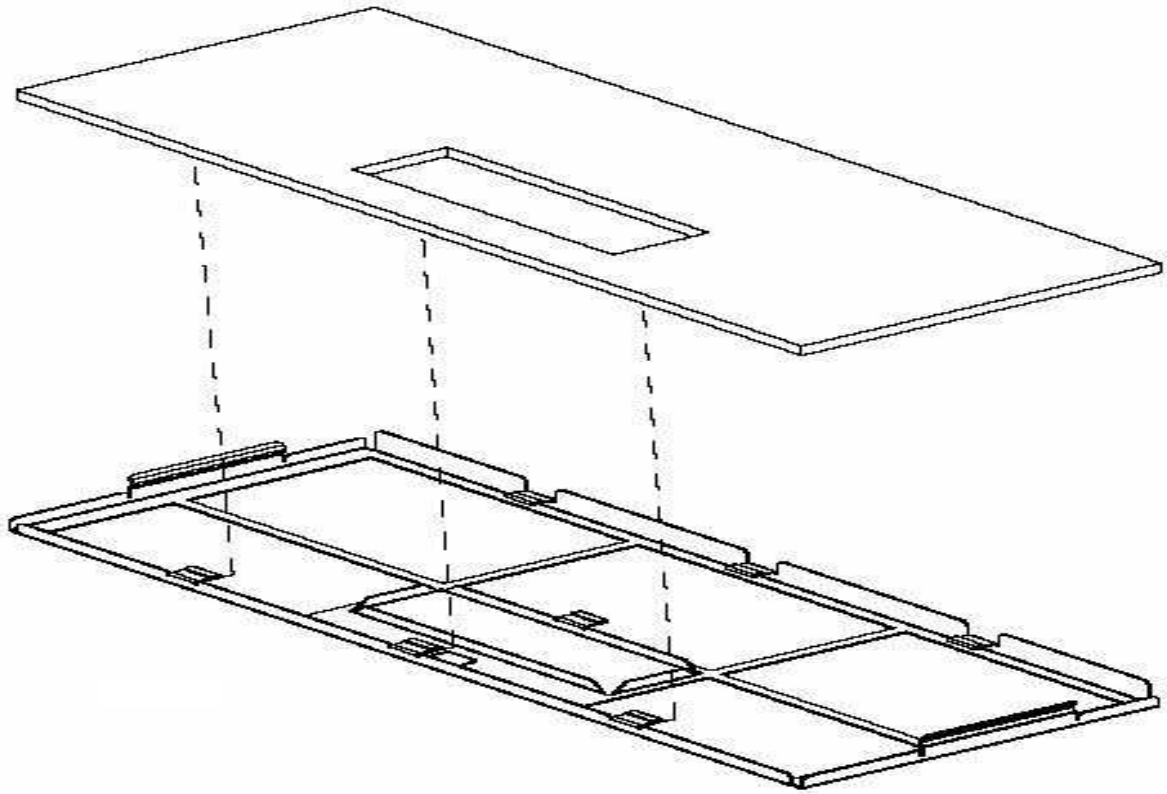
1. Grasp the air filter assembly by the tabs on each side and pull it straight out to detach it from the grill.

Figure 6-13 Removing the Air Filter Assembly



2. Remove the old air filter foam element and replace it with a new element.

Figure 6-14 Removing the Air Filter Element



Replacing the Air Filter Assembly

To install the air filter assembly, follow these steps:

1. Hold the air filter assembly by its sides and align it over the grill.
2. Push it onto the grill until it snaps into place.

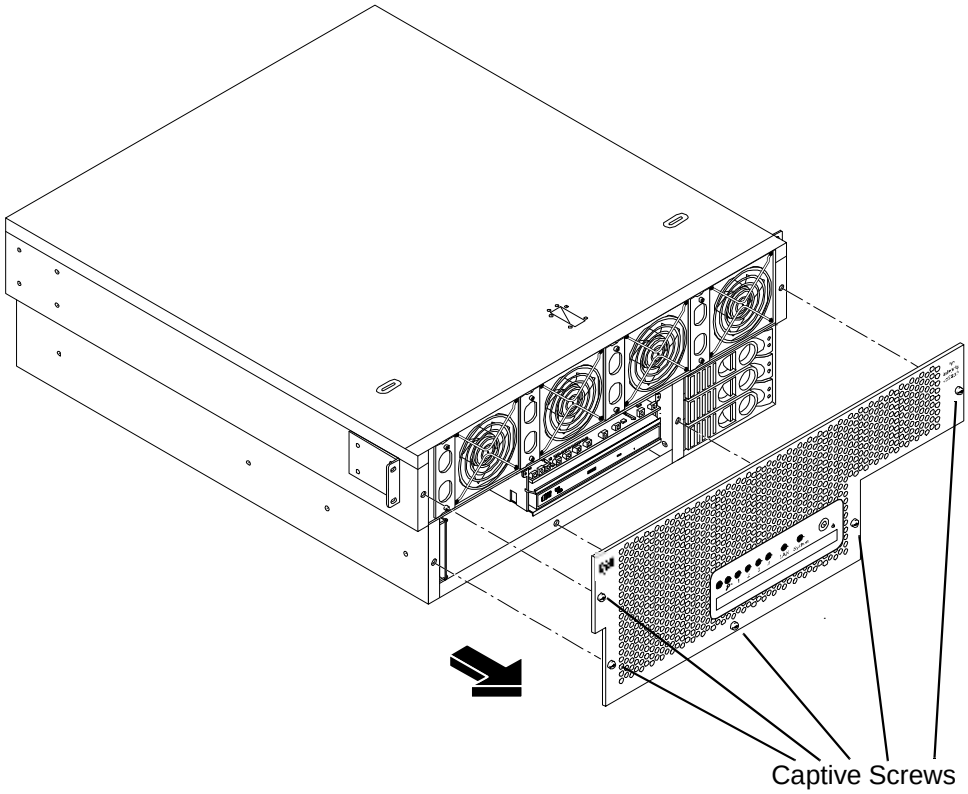
Removing and Replacing the Front Grill

Figure 6-15 shows the server with the front grill removed.

CAUTION: Operation of the server without the front grill in place makes the server susceptible to electromagnetic interference (EMI) problems, which can result in system failure. Keep the front grill in place during normal operation.

Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Figure 6-15 Removing the Front Grill



Removing the Front Grill

To remove the front grill, follow these steps:

1. Use the ACX-15 Torx screwdriver to loosen the five captive screws that secure the grill to the chassis.
2. Pull the grill from the front of the server chassis.

Replacing the Front Grill

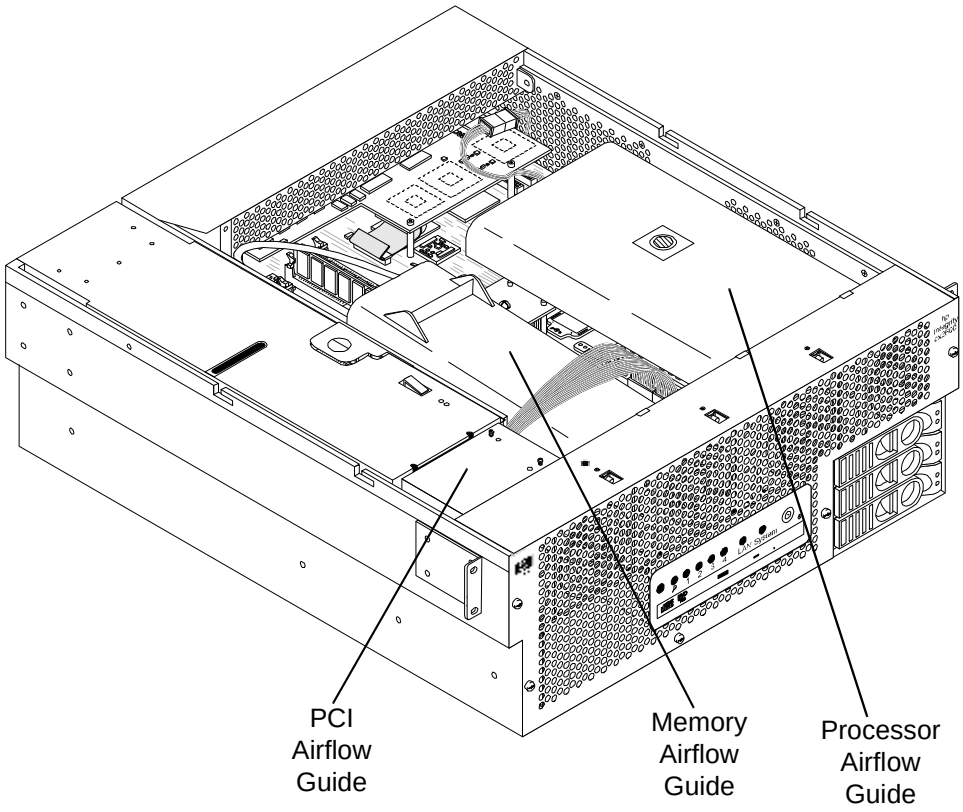
To install the front grill, follow these steps:

1. Hold the grill against the front of the server chassis in mounting position.
2. Tighten the five captive screws to secure the grill to the server chassis.

Removing and Replacing Airflow Guides

The server contains airflow guides that direct air from the front cooling fans across processor and memory circuits, and into the PCI-X card cage. The guides maintain cooling efficiency within the server. You must remove the airflow guides to access processor and memory circuits.

Figure 6-16 Airflow Guides



NOTE: Air flows through the server chassis from front to back.

Removing the Memory Airflow Guide

To remove the memory airflow guide, follow these steps:

1. Power off the server.
2. Remove the top cover. See "Removing and Replacing the Top Cover" (page 162).
3. Grasp the memory airflow guide and lift it from the server chassis.

Installing the Memory Airflow Guide

To install the memory airflow guide, follow these steps:

1. Reposition cables away from the area where you install the airflow guide.
2. Align the tab on the airflow guide with the corresponding slot on the server chassis.
3. Insert the tab into the slot and set the memory airflow guide in place above the DIMMs and DIMM connectors.

Removing the Processor Airflow Guide

To remove the processor airflow guide, follow these steps:

1. Power off the server.
2. Remove the top cover. See "Removing and Replacing the Top Cover" (page 162).
3. Grasp the processor airflow guide and lift it from the server chassis.

Installing the Processor Airflow Guide

To install the processor airflow guide, follow these steps:

1. Align the tabs on the airflow guide with the corresponding slot on the server chassis.
2. Insert the tabs into the slots and set the processor airflow guide in place above the processors.

Removing the PCI-X Airflow Guide

To remove the PCI-X airflow guide, follow these steps:

1. Power off the server.
2. Remove the top cover. See "Removing and Replacing the Top Cover" (page 162).
3. Loosen the three captive screws that secure the PCI-X airflow guide in place. Two screws are elevated and one is on the opposite side of the airflow guide.
4. Grasp the PCI-X airflow guide and lift and twist it from the server chassis.

Installing the PCI-X Airflow Guide

To install the PCI-X airflow guide, follow these steps:

1. Reposition cables away from the area where the airflow guide is to be installed.
2. Position the airflow guide into the opening in front of the PCI-X card cage.
3. Tighten the three captive screws to secure the airflow guide in place. Two screws are elevated and one is on the opposite side of the airflow guide.

Removing and Replacing System Memory DIMMs

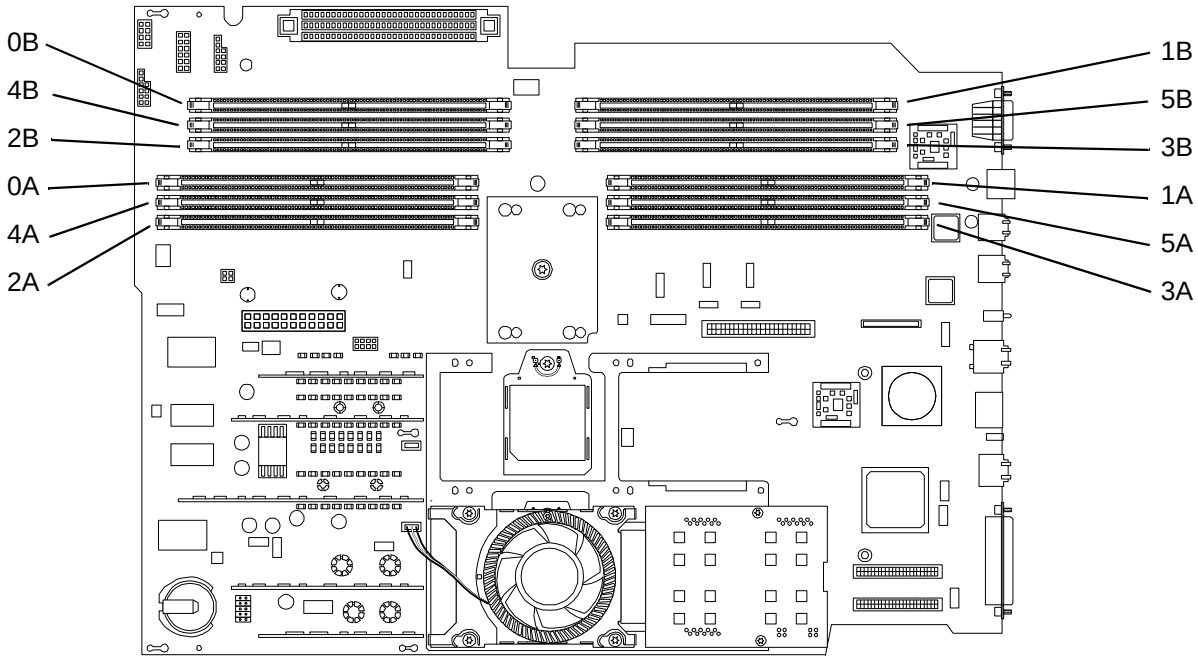
The server comes with four or eight DIMMs installed. The server is minimally configured with 1 GB of memory (four 256 MB DIMMs loaded in quad 0 (slots 0A, 0B, 1A, and 1B). The server is maximally configured with 32 GB of memory, eight 4 GB DIMMs loaded in each of quads 0 and 1 (quad 0 slots 0A, 0B, 1A, and 1B, and quad 1 slots 2A, 2B, 3A, 3B).

You can replace these DIMMs, or insert DIMMs into unused quads if desired. When adding DIMMs, you must use a minimum of four like-sized DIMMs in the next available quad. If you are installing DIMMs of different sizes, you must install the largest DIMMs (most memory) in the first quad. DIMMs in the second quad can be equal to or smaller than (less memory) the DIMMs in the first quad. If you install DIMMs in the third quad, they must be equal to or smaller than the DIMMs in the second quad.

Supported DIMM Sizes

Supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB. You can use dissimilar DIMM sizes in the server, but all four DIMMs in each quad must be identical.

Figure 6-17 DIMM Connectors and Slots on the System Board



Removing DIMMs

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing DIMM removal. Failure to follow ESD safety precautions can result in damage to the server.

To remove a DIMM, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the top cover from the chassis. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the memory airflow guide. See "Removing the Memory Airflow Guide" (page 179).
6. Locate the DIMMs you want to remove (Figure 6-17).
7. Press down on the DIMM socket retainer clips on either end of the DIMM connector until the DIMM ejects from the connector.
8. Lift the DIMM from the system board socket (Figure 6-18). If the removed DIMM is functional, store it for future use. Store DIMMs in static-free containers.
9. Repeat steps Step 6 through Step 8 for each DIMM you want to remove.
10. If you do not install DIMMs immediately, set the memory airflow guide in position and reinstall the top cover. See "Installing the Memory Airflow Guide" (page 179), and to "Removing and Replacing the Top Cover" (page 162).

Installing DIMMs

You must install DIMMs in groups of four (quads), and in specific locations. DIMM sockets are shown in Figure 6-17.

- You must install the first quad (four DIMMs) in sockets 0A, 0B, 1A, and 1B.
- You can install the second quad in sockets 2A, 2B, 3A, and 3B.
- You can install the third and final quad in sockets 4A, 4B, 5A, and 5B.
- If you are installing DIMMs of different sizes, you must install the largest DIMMs (most memory) in the first quad.
- DIMMs in the second quad can be equal to or smaller than (less memory) the DIMMs in the first quad.
- If you install DIMMs in the third quad, they must be equal to or smaller than the DIMMs in the second quad.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

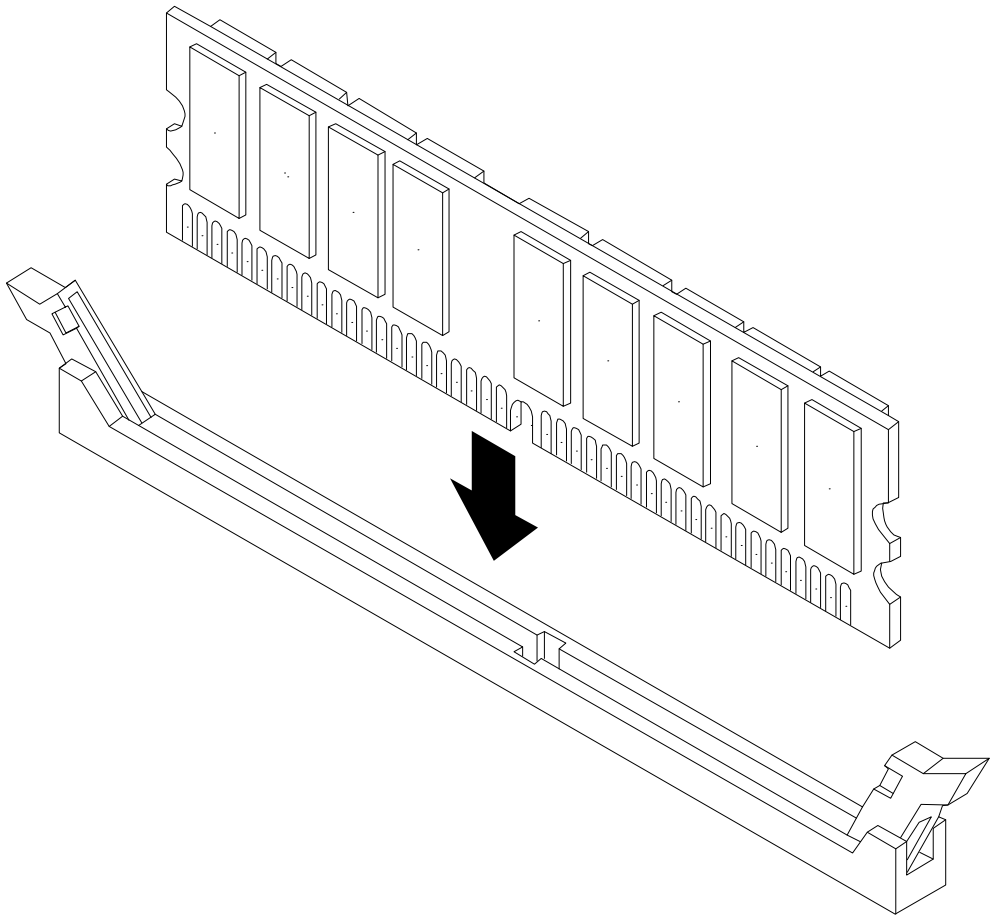
CAUTION: Observe all ESD safety precautions while performing DIMM installation. Failure to follow ESD safety precautions can result in damage to the server.

NOTE: You must install DIMMs in matched groups of four. DIMM sizes can vary between quads, but all DIMMs within a quad must be identical.

To install DIMMs, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the top cover from the chassis. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the memory airflow guide. See "Removing the Memory Airflow Guide" (page 179).
6. Locate the DIMM sockets where you want to install the DIMMs (Figure 6-17).
7. Hold the DIMM by its left and right edges and orient the DIMM so that the component side is facing the processors.
8. Insert the DIMM into the appropriate socket (Figure 6-18).

Figure 6-18 Inserting a DIMM into a DIMM Socket



NOTE: DIMM connectors are keyed so that you can only install them in the correct orientation.

9. Firmly and evenly push down on each side of the DIMM until it seats in the socket. The socket retainer clips snap up and return to the upright position when the DIMM is fully inserted.
10. Make sure the DIMM is locked in the socket.
11. Repeat steps Step 6 through Step 10 for each DIMM to be installed.
12. Set the memory airflow guide in position and reinstall the top cover. See "Installing the Memory Airflow Guide" (page 179) and "Removing and Replacing the Top Cover" (page 162).

Removing and Replacing the LED Status Panel

Remove the LED status panel from the front of the chassis. It is mounted together with the CD/DVD optical drive assembly.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

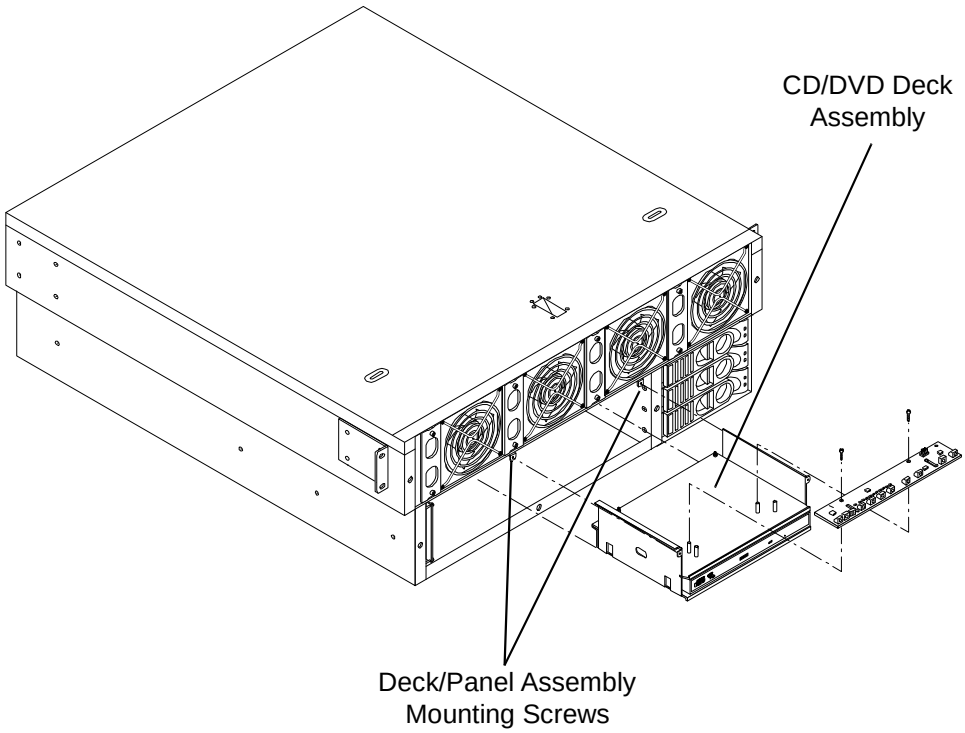
CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Removing the LED Status Panel

To remove the LED status panel, follow these steps:

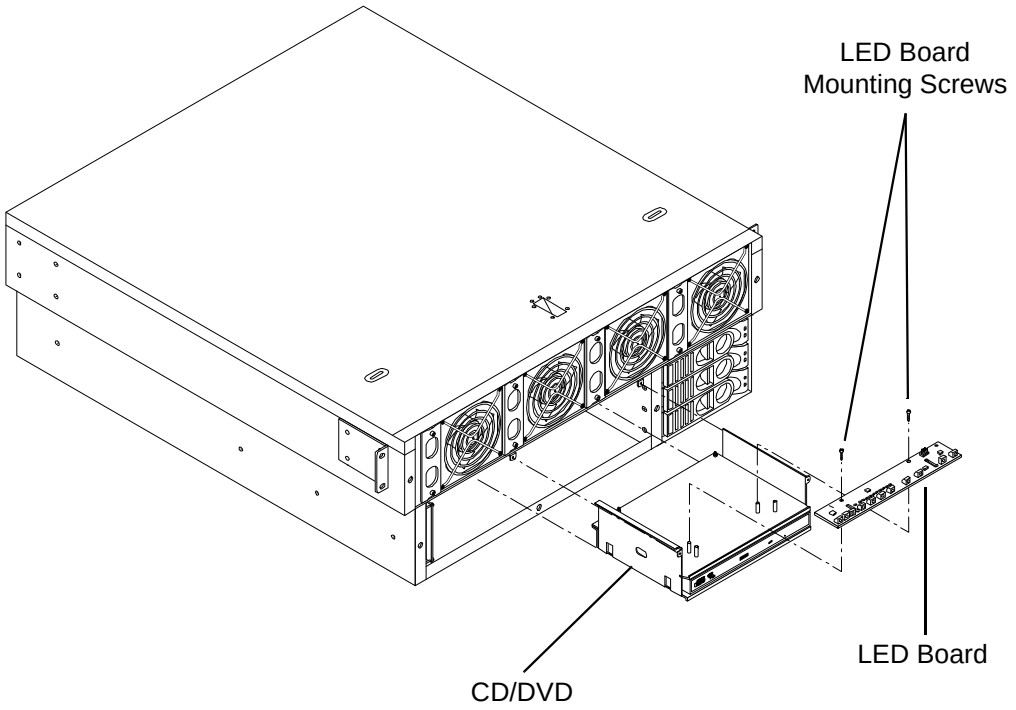
1. Power off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Remove the front grill. See "Removing and Replacing the Front Grill" (page 178).
3. Remove the two noncaptive screws (M3 x 6mm long pan T15/slot square cone stainless steel) that secure the CD/DVD deck and LED status panel assembly to the server chassis. Pull the entire assembly from the chassis.

Figure 6-19 Removing the CD/DVD Deck and LED Status Panel Assembly



4. Disconnect the cable from the small connector on the LED status panel.
5. Remove the two noncaptive screws that secure the LED status panel board to the threaded standoffs on the deck, and slide the board forward to disengage the board lock apertures from the keyed standoffs (two each).
6. Remove the board by lifting it off of the deck assembly.

Figure 6-20 Removing the LED Status Panel



Installing the LED Status Panel

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

To install an LED status panel, follow these steps:

1. Engage the board lock apertures on the keyed standoffs on the deck, and slide the board toward the rear to lock it. Install the two screws securing the board to the threaded standoffs.
2. Connect the cable to the small connector of the LED status panel.
3. Position the CD/DVD deck and LED status panel assembly into the front of the chassis and fasten the two screws that secure it to the chassis (Figure 6-19).

Removing and Replacing the CD/DVD Optical Drive

You can remove the optical drive from the front of the server chassis.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Removing the Optical Drive

The CD/DVD optical drive is accessible from the front of the server chassis. It is mounted in a sheet metal deck that also houses an LED status panel printed wiring board. To remove the optical drive, follow these steps:

1. Power off and disconnect system power. Disconnect power at the dc source end of the power cables, using the disconnect device that is part of the rack or facility power system.
2. Remove the front grill. See "Removing and Replacing the Front Grill" (page 178).
3. Remove the two screws (M3 x 6mm long pan T15/slot square cone stainless steel) that secure the CD/DVD deck and LED status panel assembly to the server chassis (Figure 6-19). Pull the entire assembly from the server chassis.
4. Disconnect the cables from the large connector of the DVD drive and from the small connector of the LED status panel.
5. Remove the LED status panel board. See "Removing the LED Status Panel" (page 184).

NOTE: The entire sheet metal deck with the optical drive element installed in it, minus the LED status panel, constitutes the CD/DVD element of the server.

Installing the Optical Drive

To install an optical drive, follow these steps:

1. Install the LED status panel on its standoffs located on the top surface of the sheet metal deck. See "Installing the LED Status Panel" (page 185).
2. Connect the cables to the large connector of the DVD drive and to the small connector of the LED status panel.
3. Position the DVD deck or LED status panel deck assembly into the front of the chassis and slide it into the slots above the screw mount.
4. Fasten the two noncaptive screws (M3 x 6mm long pan T15/slot square cone stainless steel) securing it to the server chassis (Figure 6-19).

Removing and Replacing the Hard Drive Backplane Assembly

The SCSI hard drive backplane is located on the lower chassis deck. You can see the SCSI hard drive backplane from the rear of the chassis when you remove the rear fan module. Dismantling components for this procedure is extensive; you must budget adequate time for completion of the steps. A flashlight is not required but can be useful in this effort.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

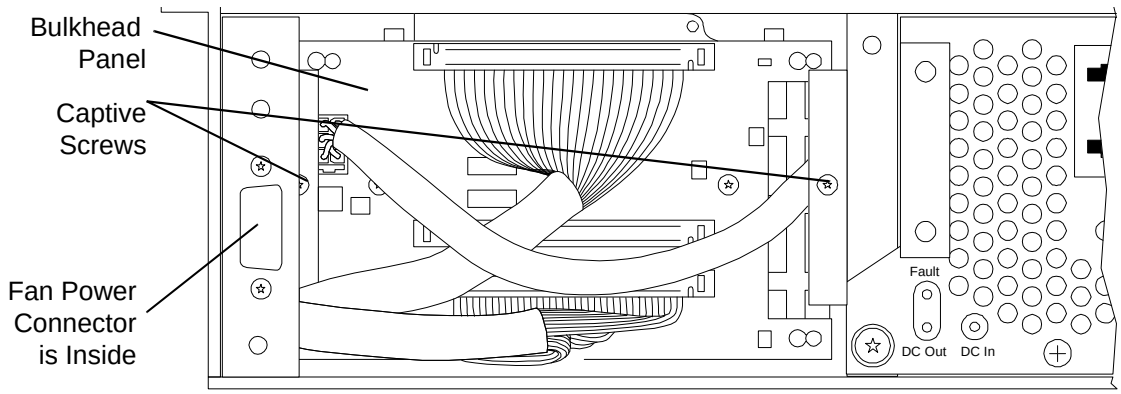
Removing the Hard Drive Backplane

To remove the hard drive backplane, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the rear fan module from the rear of the chassis. See "Removing a Rear Panel Hot-Swappable Fan" (page 165).

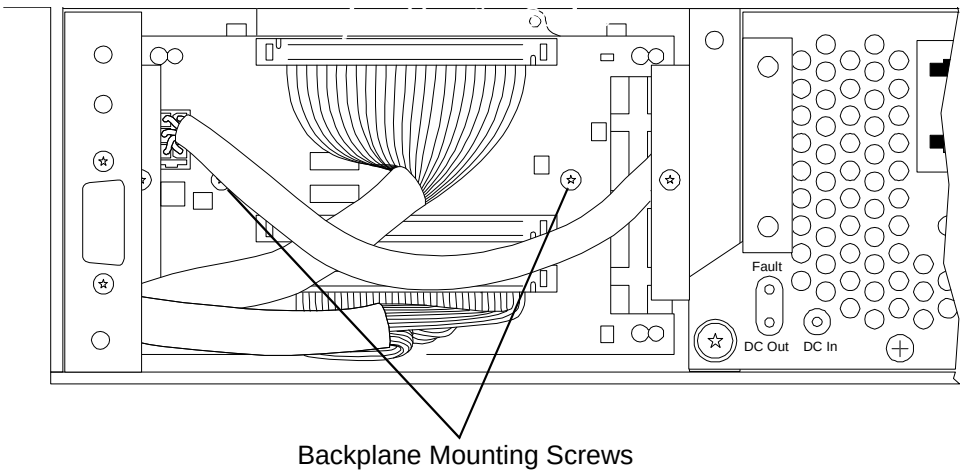
6. Remove all hard disk drives and fillers. See "Removing Hot-Pluggable Disk Drives" (page 170).
7. Remove the system board. See "Removing the System Board" (page 216).
8. From back of unit (looking in the rear fan compartment) locate the inner bulkhead panel with the fan power connector. Loosen the two captive screws securing this panel.

Figure 6-21 Rear Fan Bulkhead Panel



9. Disconnect the fan power connector and remove the bulkhead panel from the chassis.
10. Disconnect the three connectors from the hard drive backplane.
11. Remove the two mounting screws (M3 x 10mm long pan T10 crest cup stainless steel) that secure the hard drive backplane in position (Figure 6-22).

Figure 6-22 Hard Drive Backplane



12. Slide the backplane board to the right to align locking holes in the unlocked position, and remove the board.

Installing the Hard Drive Backplane

To install a hard drive backplane, follow these steps:

1. Insert the hard drive backplane through the fan opening in the chassis rear panel.
2. Position the hard drive backplane on the four locating posts and slide the board to the left until it latches in the locked position.
3. Secure the hard drive backplane in place with the two mounting screws (Figure 6-22).
4. Connect the three cables to the corresponding connectors on the hard drive backplane.
5. Place the inner bulkhead panel in position (Figure 6-21).

6. Reinstall the fan power cable connector onto the bulkhead panel, and position the bulkhead panel in to place in front of the installed hard drive backplane assembly. Tighten the two captive screws to secure the panel.

IMPORTANT: Make sure to reinstall the fan power connector on the bulkhead panel with the arrow pointing down so it can make contact with the connector on the rear fan.

7. Install the system board. See "Installing the System Board" (page 218).
8. Install the rear fan module. See "Installing a Rear Panel Hot-Swappable Fan" (page 166).
9. Install the disk drives or fillers. See "Installing Hot-Pluggable Disk Drives" (page 171).

Removing and Replacing the Power Supply Interface Assembly

The power supply interface (PSI) assembly is located under the top cover. You can see the PSI from the rear of the chassis when the two power supply modules are removed.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

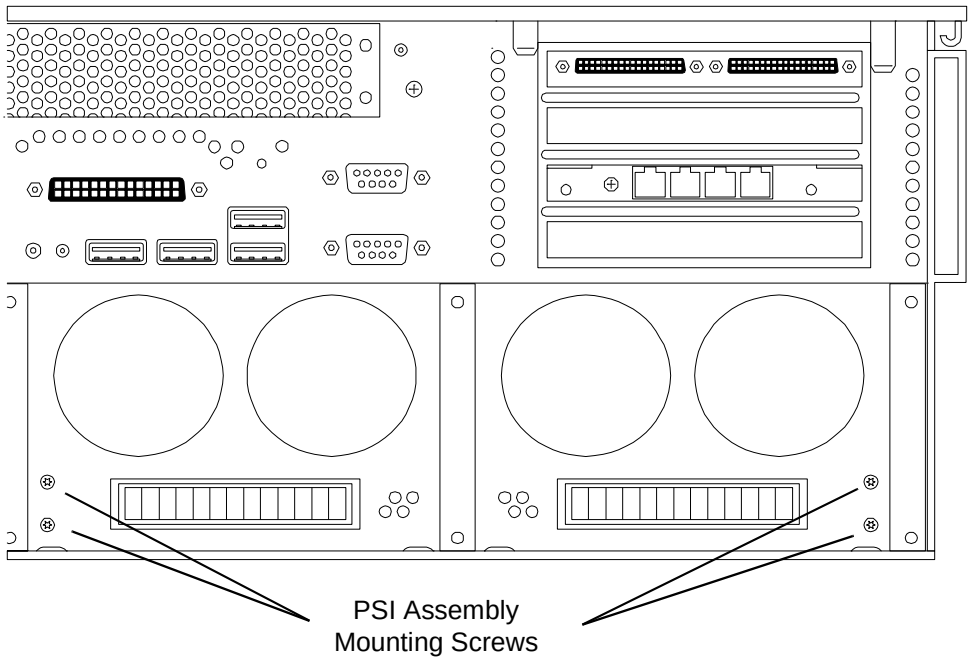
CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Removing the PSI Assembly

To remove the PSI assembly, follow these steps:

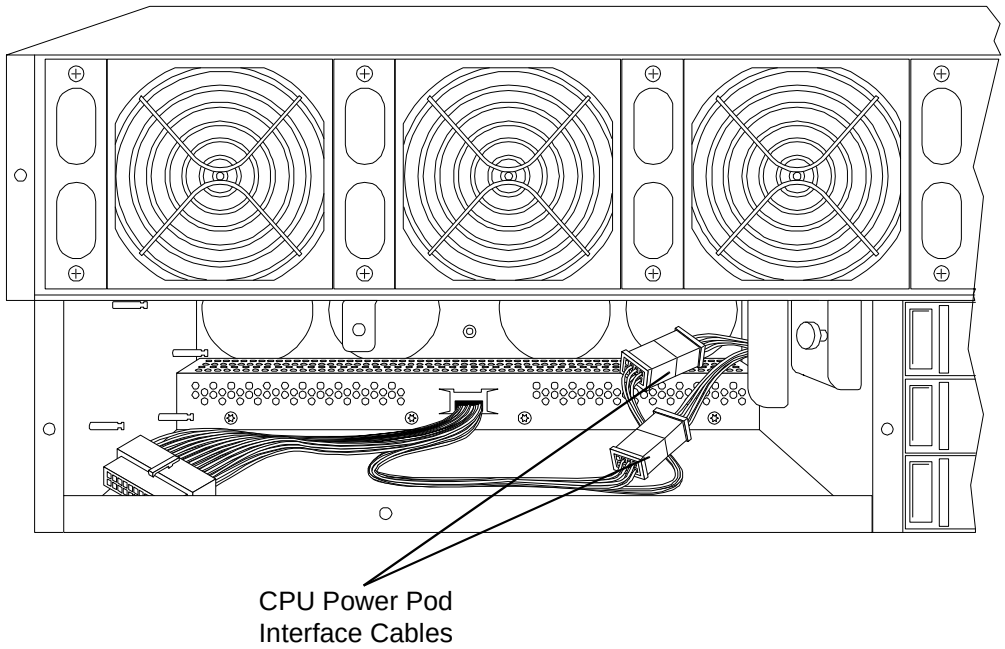
1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the two power supply modules from the rear of the chassis. See "Removing a Hot-Swappable Power Supply" (page 167).
6. Remove the fan control board including the PCI-X airflow guide and the CD/DVD optical drive. See "Removing the Fan Control Board" (page 190).
7. From the rear of the server chassis, locate the four PSI mounting screws (M3 x 6mm long pan T15/slot square cone stainless steel) and remove the screws and washers (flat MTLC 3.7mm ID 11mmOD stainless steel) (Figure 6-23).

Figure 6-23 PSI Module From the Rear



8. From the front of the server, locate the two hard drive backplane cables and disconnect them.

Figure 6-24 PSI Module From the Front



9. Remove the PSI assembly, along with the attaching cables, from the server chassis.

Installing the PSI Assembly

To install a PSI assembly, follow these steps:

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

1. From the front of the chassis, position the power supply interface module against the recessed ventilation panel.
2. Turn the server chassis around 180 degrees on the bench to enable access from the rear.

NOTE: It is assumed that you have removed the fan control board and CD/DVD optical drive from the chassis.

3. From the rear of the chassis, install the four PSI module mounting screws (Figure 6-23).

NOTE: You may need to slightly elevate the module off the floor of the chassis to align the screws with their respective mounting holes, because the two power supply plug-in connectors must float to enable proper engagement when a power supply module is inserted.

4. From the front of the chassis, connect the two hard drive backplane interface cables (Figure 6-24).
5. Reinstall the fan control board including the CD/DVD optical drive. See "Installing the Fan Control Board" (page 192).
6. Reinstall the two power supply modules. See "Installing a Hot-Swappable Power Supply" (page 168).

Removing and Replacing the Fan Control Board

Remove and replace the fan control board with the server powered off and with the top cover and the front grill removed. This circuit board also provides cable distribution to various elements in the chassis, as it is the termination point for seven different connectors.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

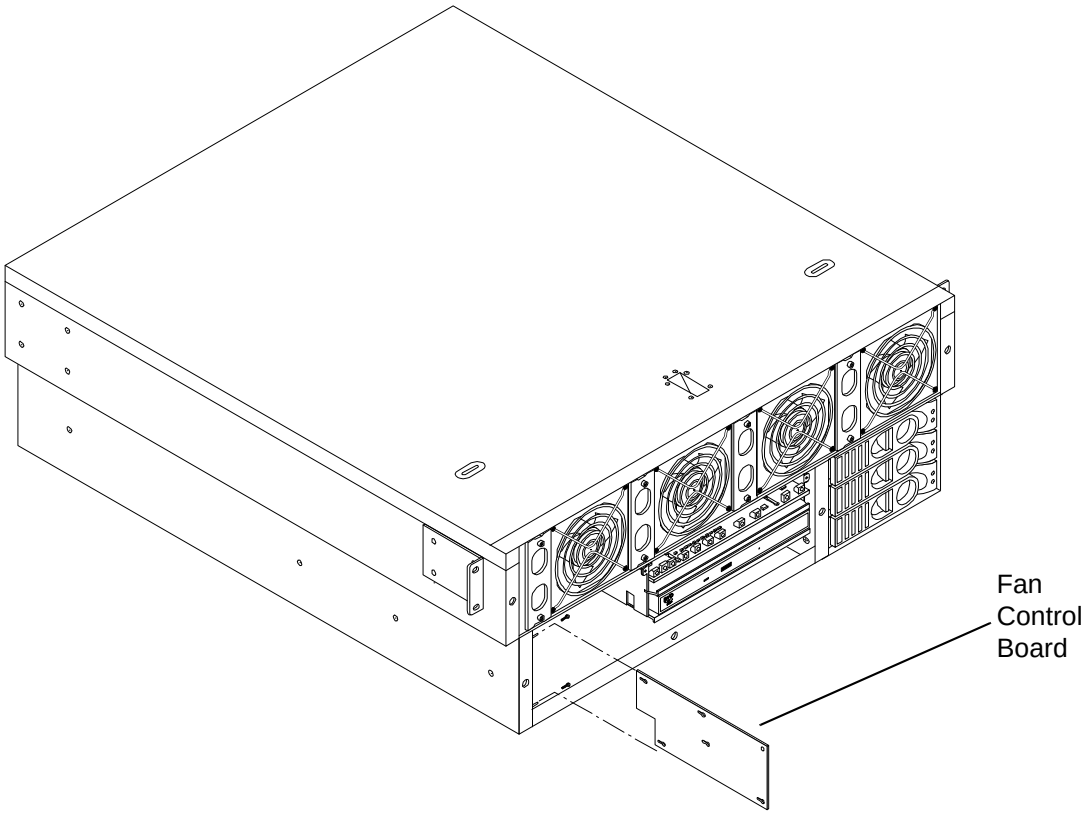
Removing the Fan Control Board

To remove the fan control board, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the top cover and front grill. See "Removing the Front Grill" (page 64) and to "Removing and Replacing the Top Cover" (page 162).
5. Remove the PCI-X airflow guide. See "Removing the PCI-X Airflow Guide" (page 180).

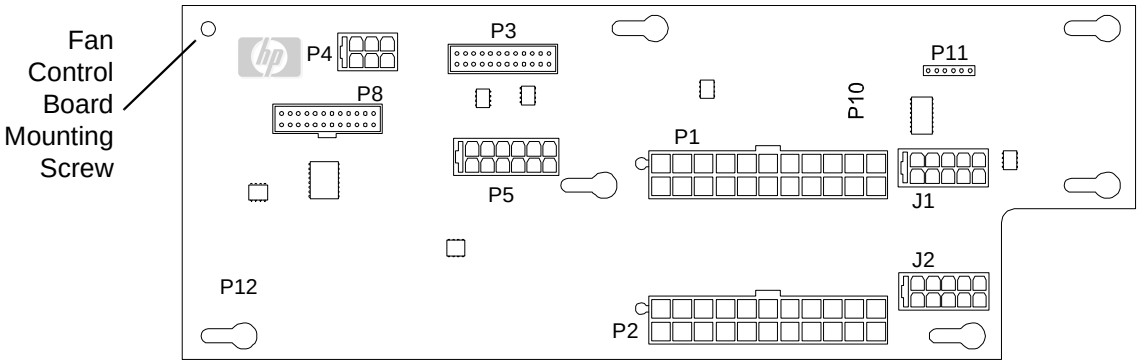
6. Remove the DVD/optical drive. See “Removing the Optical Drive” (page 185).
7. Locate the fan control board (Figure 6-25).

Figure 6-25 Fan Control Board



8. Remove the terminating connectors from the cables (Figure 6-26).

Figure 6-26 Fan Control Board Connectors



9. Remove the single screw (M3 x .5 10mm long pan T10 crest cup stainless steel) located at the top left corner of the fan control board, which secures the board to the standoffs on which it is mounted.
10. Clear a pathway through the cables and slide the fan control board toward the front, until its locking apertures clear the stand-off locks.
11. Remove the fan control board from the chassis.
12. Remove the fan control board from the chassis.

Installing the Fan Control Board

To install a fan control board, follow these steps:

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

1. Clear a pathway of cables and set the fan control board in place, hooking its locking apertures onto the standoff locks.
2. Slide the board toward the rear of the chassis (Figure 6-25 and Figure 6-26).
3. Install and tighten the single screw located at the top-left corner of the fan control board, which secures the board to the standoffs on which it is mounted (Figure 6-26).
4. Install the terminating connectors on the cables (Figure 6-26).
5. Install the PCI-X airflow guide. See "Installing the PCI-X Airflow Guide" (page 180).
6. Install the DVD/optical drive. See "Installing the Optical Drive" (page 186).

Removing and Replacing the iLO MP Card

The iLO MP card is located on the rear of the system board under the top cover. The LAN port on the iLO MP card is configured with pertinent network settings. Capture the settings information

before you power off the server. See the installation instructions for more information on how to configure the iLO MP card using a serial console port connection.

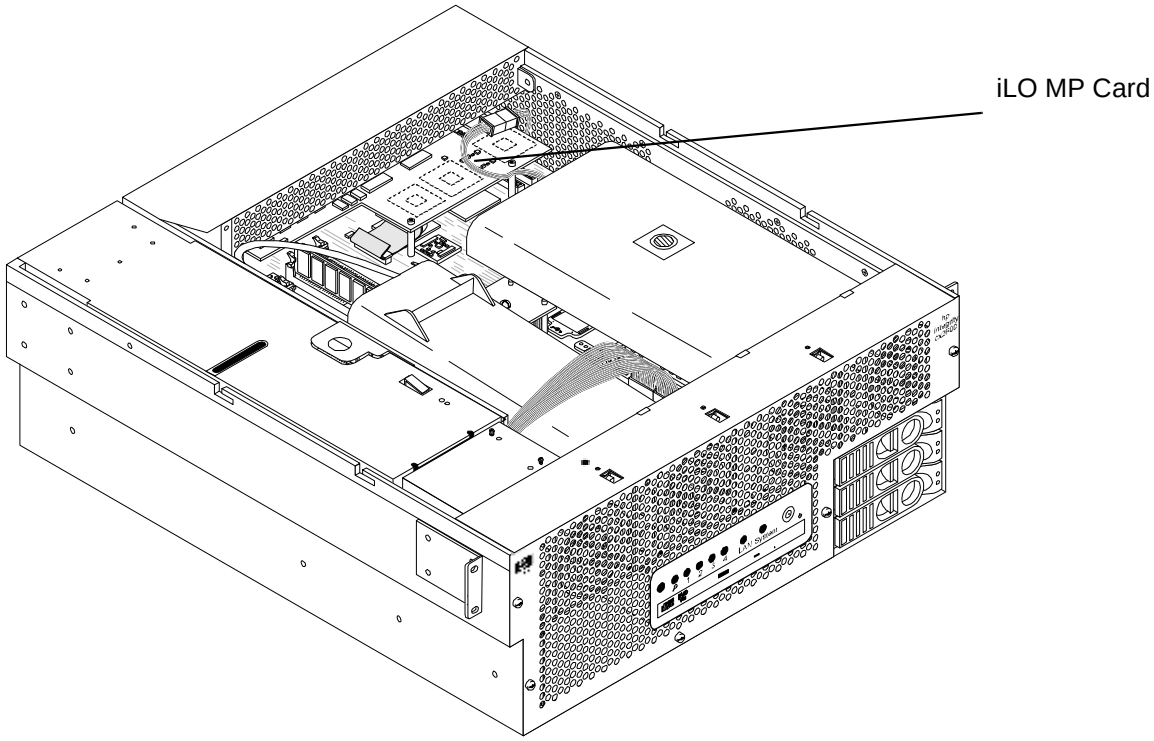
WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Figure 6-27 iLO MP Card

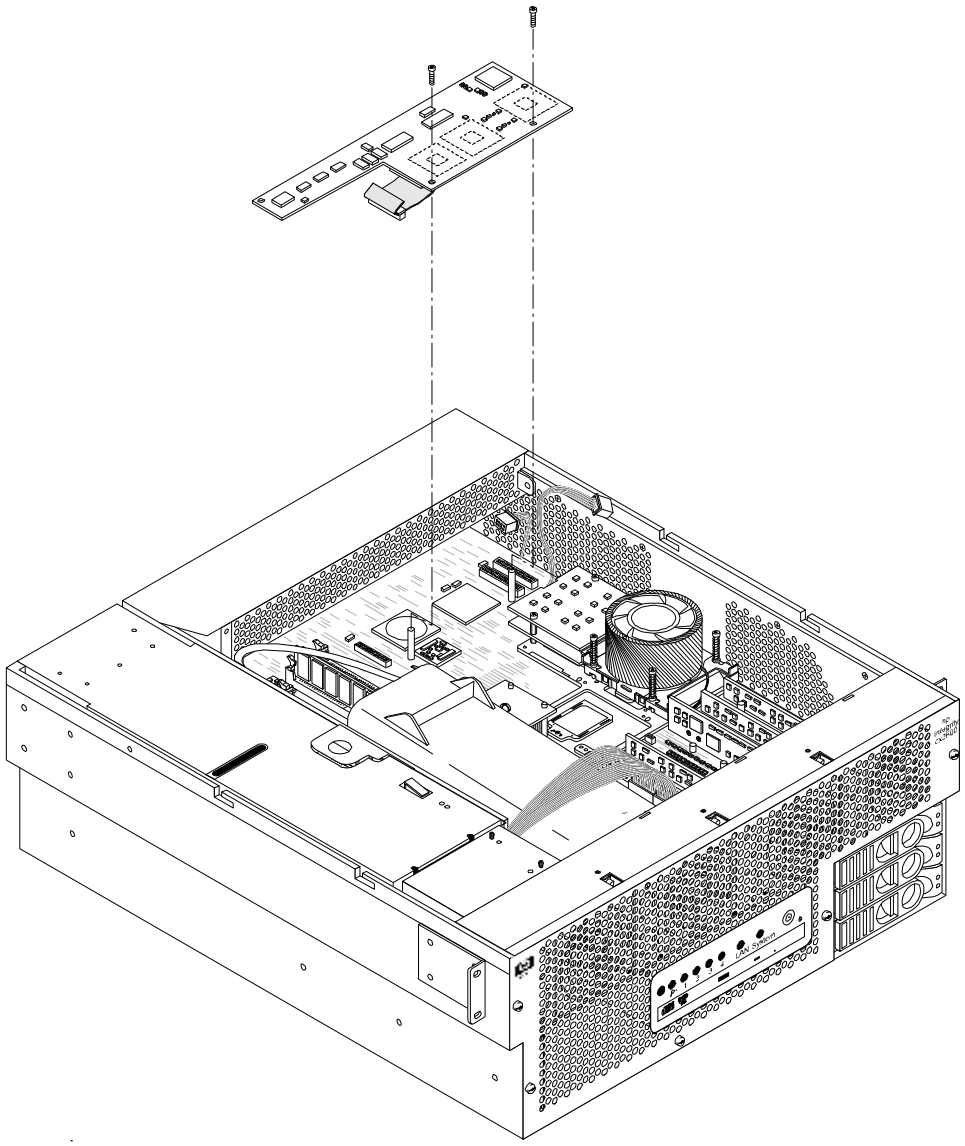


Removing the iLO MP Card

To remove the iLO MP card, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the processor airflow guide. See "Removing the Processor Airflow Guide" (page 179).
6. From the rear of the chassis, remove the two screws (hex 2-56 w/slot stainless steel) securing the 25-pin serial port connector on the back of the iLO MP card to the server chassis.
7. Remove the two noncaptive screws (M3 x 6mm long pan T15/slot square cone stainless steel) on top surface of the iLO MP card, securing the assembly to its mounting standoffs.

Figure 6-28 iLO MP Card Mounting Screws



8. Disconnect the low-profile ribbon connector from the system board.
9. Pull the disconnected iLO MP card toward the front of the server chassis and remove it from the server.

Replacing the iLO MP Card Battery

A battery is located on the underside of the iLO MP card, with a design lifetime of ten years. Access the three-volt CR2032 battery for replacement only when the iLO MP card is removed from the server.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

NOTE: There are two batteries in the server: the iLO MP card battery and the system battery. See the parts list for the iLO MP card battery part number.

To replace the battery, perform these steps:

1. After removing the iLO MP card from the server chassis, locate the battery on the underside of the card.

CAUTION: Do not overstress the battery retaining clip. This clip is easily broken. Lift the battery just high enough to clear the battery holder. Failure to heed this warning can result in damage to the clip.

2. Lift up on the battery retaining clip and push on the back of the battery with a flathead screwdriver to remove it from its holder. Remove the battery.

WARNING! Lithium batteries can explode if mistreated. Do not recharge, disassemble, or dispose of batteries in a fire. When discharged, do not throw batteries away, collect them as small chemical waste. Failure to observe this warning can result in personal injury or damage to equipment.

3. Lift up on the retaining clip and slide the replacement battery into its holder. Make sure the positive side of the battery faces up.

Installing the iLO MP Card

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

To install the iLO MP card, follow these steps:

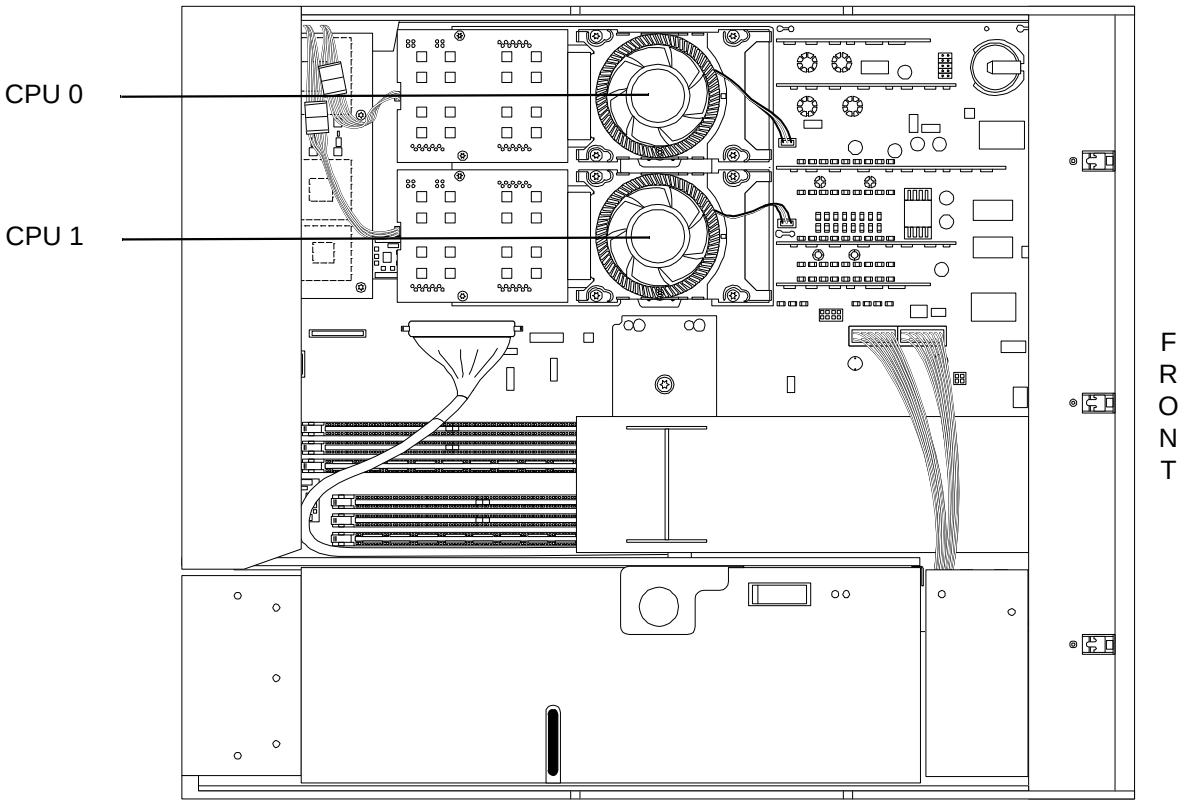
1. Position the iLO MP card onto the three screws with the edge connectors aligned with the corresponding cutouts on the rear section of the chassis (Figure 6-27).
2. Fasten the two screws securing the DB-25 connector to the chassis rear panel.
3. Reconnect the low-profile ribbon connector to the system board.
4. Insert and tighten the two screws that secure the iLO MP card to the three standoffs on the system board.
5. Install the processor airflow guide. See "Installing the Processor Airflow Guide" (page 180).

NOTE: If you are installing a replacement iLO MP card, attach the label with the new Media Access Control address (MAC address) to the rear of the server. A complete description of the iLO MP is provided in the *HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide.*

Removing and Replacing a Single-Core System Processor

The server can include one or two processors. The processors are located on the system board and are accessible after removing the top cover and airflow guides. Processor 0 (CPU 0) is located closer to the chassis side panel and processor 1 (CPU 1) is located closer to the DIMM sockets.

Figure 6-29 Processors in Server Chassis (Top Cover Removed)



A tool kit is provided with replacement processors. An IPF CPU tool kit is required for successful completion of these procedures.

Removing a Single-core Processor

WARNING! Ensure the system is powered down and all power sources have been disconnected from the server prior to removing or replacing components.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is in the off position.

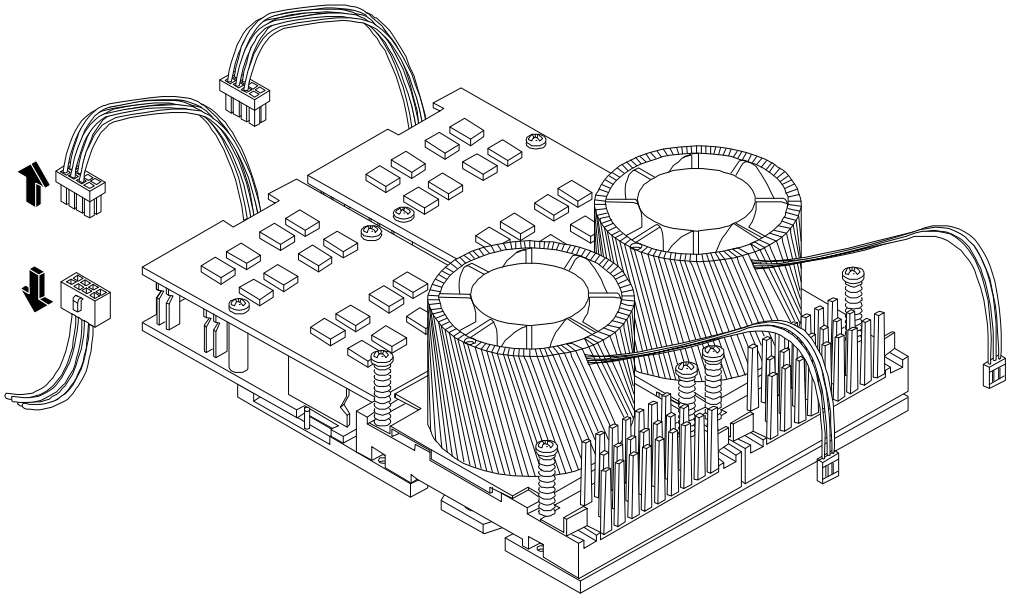
Failure to observe this warning could result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing processor removal. Failure to follow ESD safety precautions could result in damage to the server.

To remove a processor, proceed as follows:

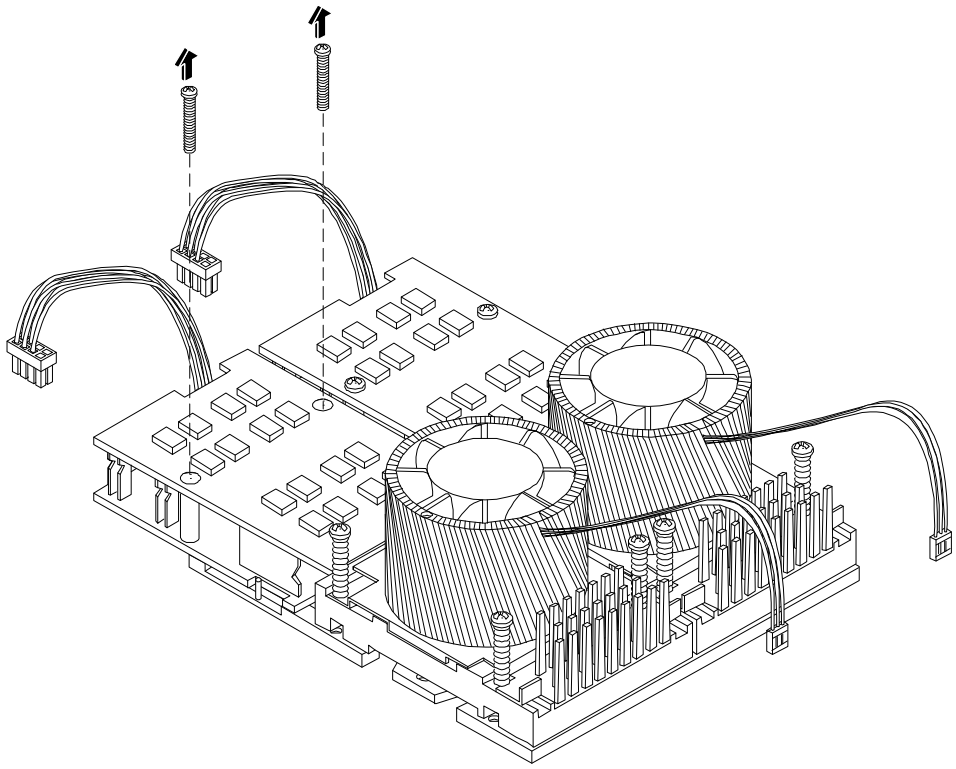
1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Turn off the system. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the processor airflow guide. See "Removing the Processor Airflow Guide" (page 179).
6. Disconnect the CPU power module cable.

Figure 6-30 Disconnect Power Module Cable



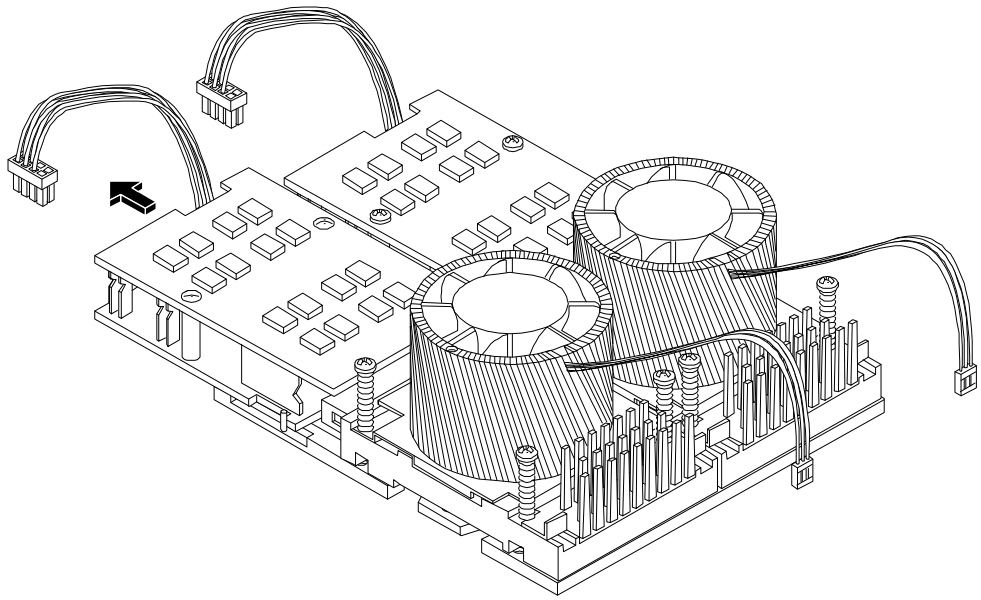
7. Unscrew the power module non-captive mounting screws and disconnect the module from its processor by sliding it toward the back of the chassis.

Figure 6-31 Unscrew Power Module Mounting Screws



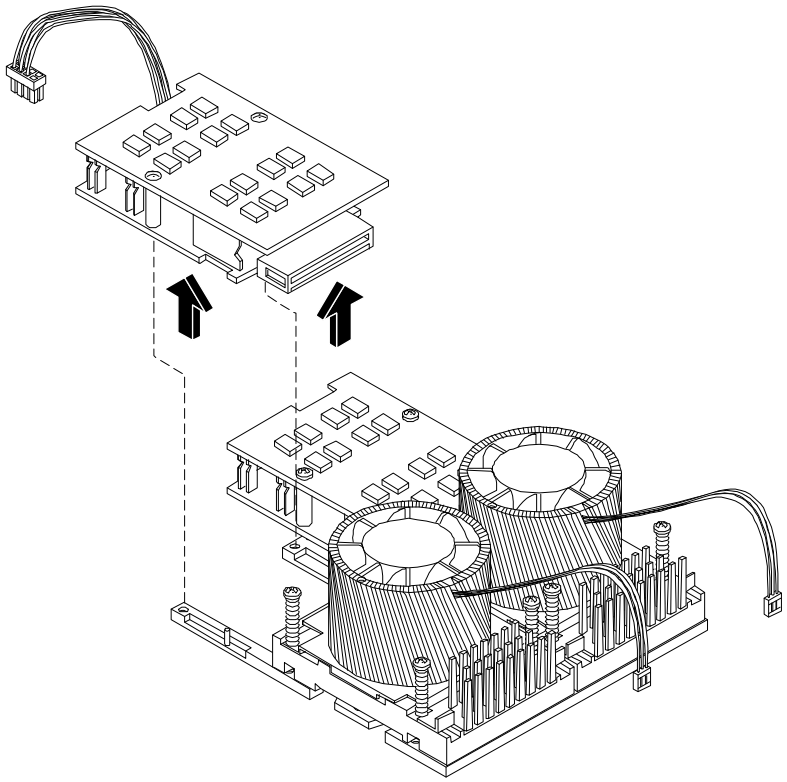
8. Slide the power module toward the rear of the system board disconnecting the power module from the processor module.

Figure 6-32 Disconnect Power Module from Processor Module



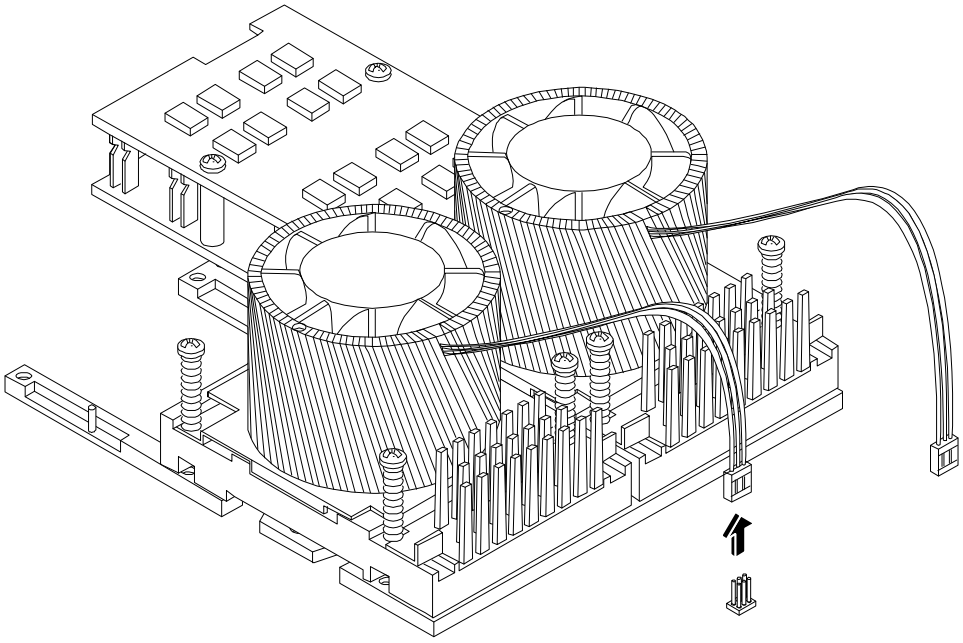
9. Life the power module up and out of the chassis. Place the power module into an anti-static container.

Figure 6-33 Remove Power Module



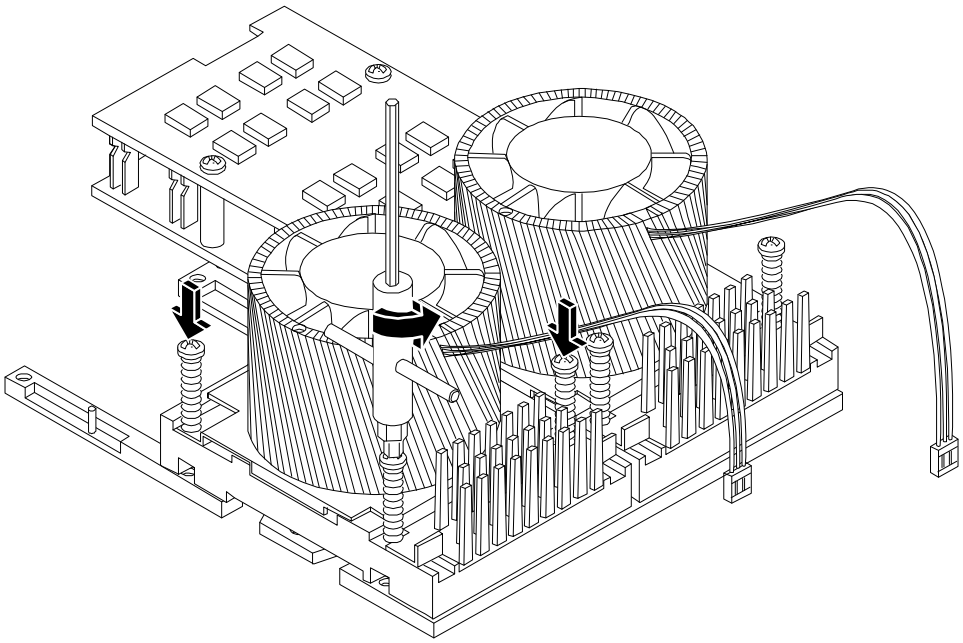
10. Disconnect the processor module turbo fan power cable.

Figure 6-34 Disconnecting the Turbo Fan Cable



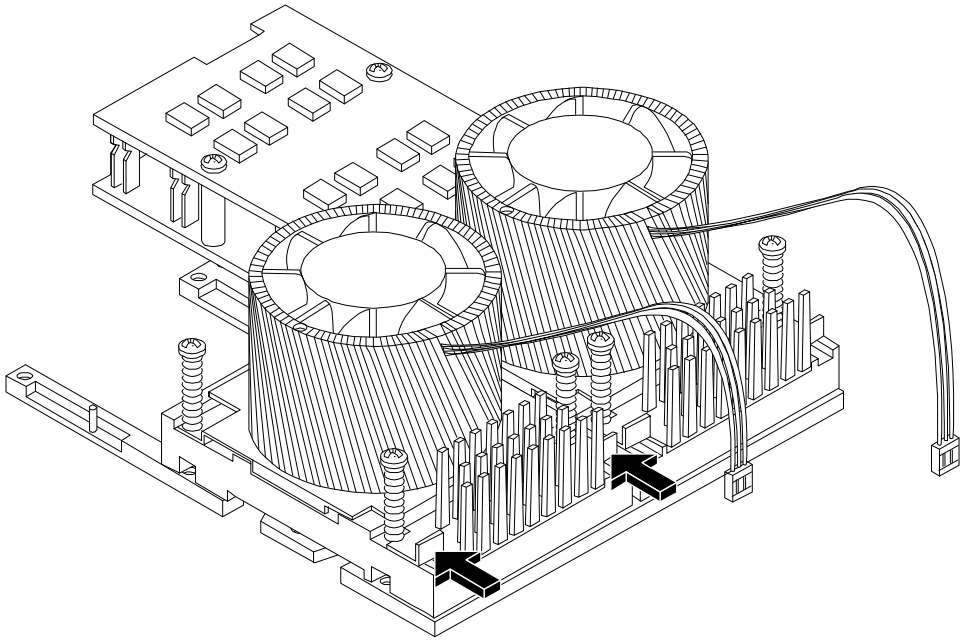
11. Release the four heatsink captive screws using the special processor tool.

Figure 6-35 Releasing Heatsink Captive Screws



12. Slide the sequencing retainer plate toward the back of the chassis to open the hole in the edge of the turbo fan heatsink for insertion of the special processor tool into the processor locking mechanism.

Figure 6-36 Sliding the Sequencing Retainer Plate

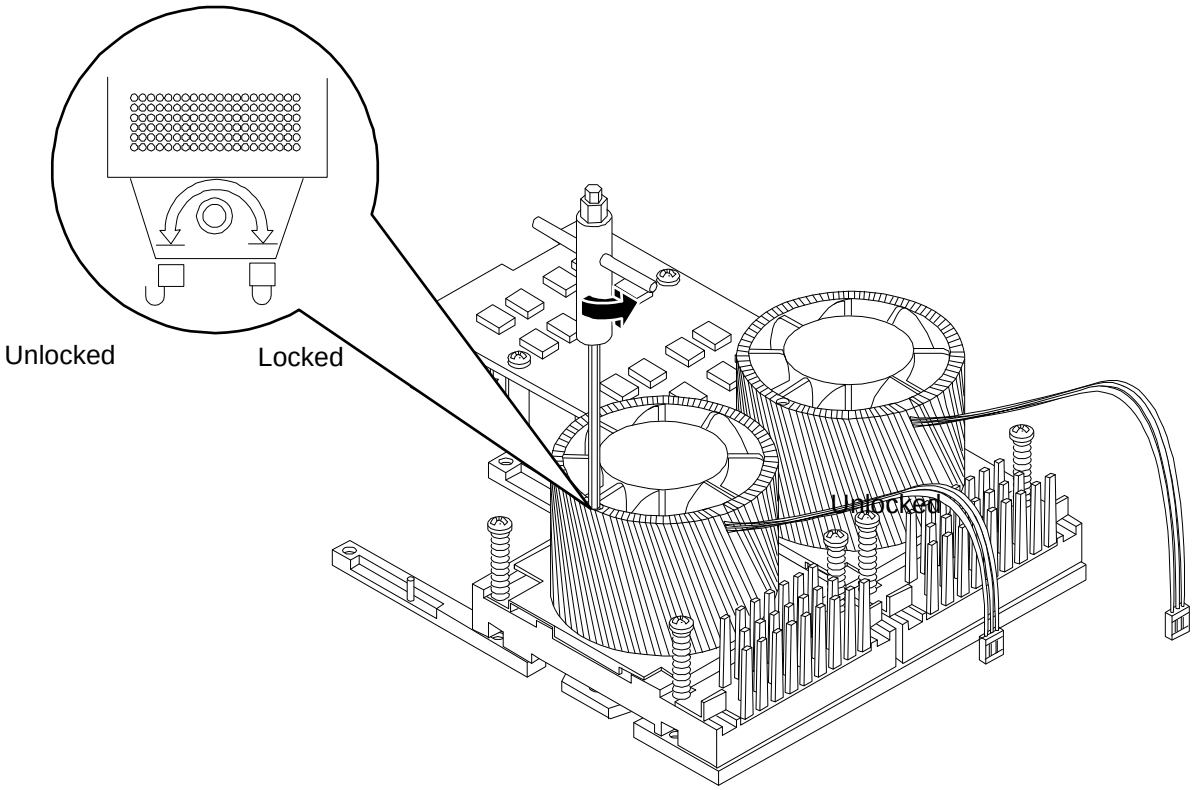


13. Unlock the processor-locking mechanism using the Allen side of the IFP-CPU tool. Insert the Allen side (hex) of the IPF-CPU tool into the lock access hole that runs down through the edge of the turbo fan heatsink. Unlock the processor locking mechanism by rotating the

IPF-CPU tool counterclockwise 180 degrees. Verify that the processor-locking mechanism is rotated into the unlocked position.

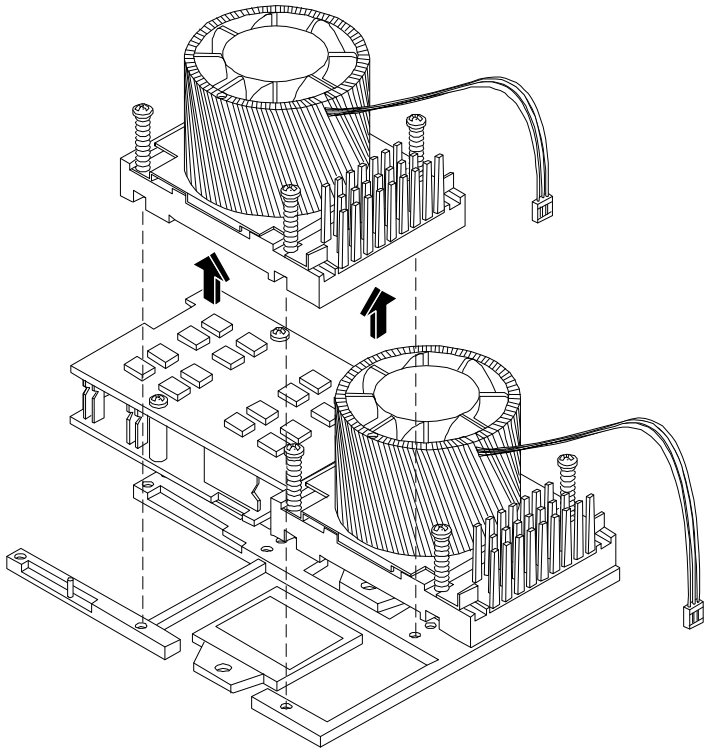
CAUTION: The zero insertion force (ZIF) socket for the processor is locked and unlocked by half of a full turn of the IPF-CPU tool. The counterclockwise 180 degree rotation (half turn) unlocks the socket. A clockwise 180 degree rotation locks the socket. Attempting to turn the locking mechanism more than 180 degrees can severely damage the socket.

Figure 6-37 Unlock Processor Module Locking Mechanism



14. Lift the processor module and the turbo fan assembly straight up and out of the chassis. Place the processor module into an anti-static container.

Figure 6-38 Lift Processor Module and Turbo Fan Straight Up

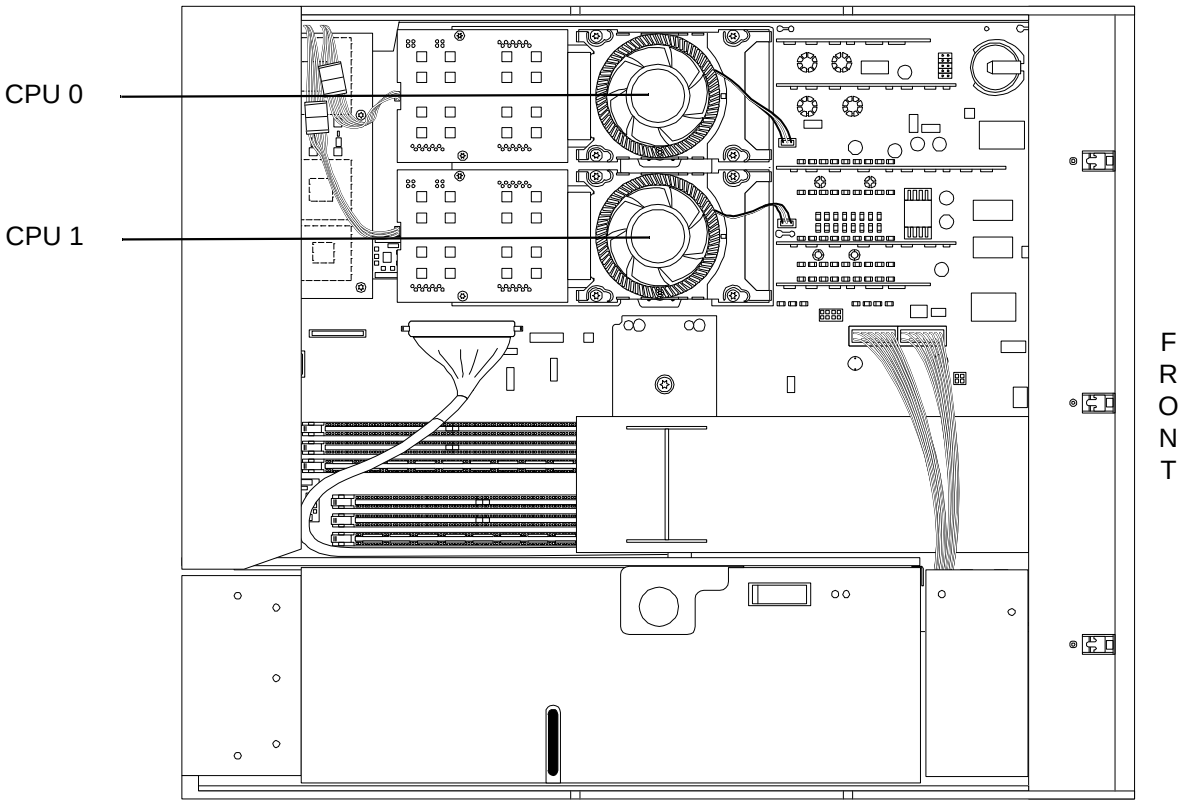


15. Place the turbo fan heatsink upside down to ensure the pins do not get bent.

Replacing a Single-core Processor

The system board can support either one or two processors. The following procedure is applicable to installation of processor 0 or processor 1. Processor 0 (CPU 0) is located closer to the chassis side panel and processor 1 (CPU 1) is located closer to the DIMM sockets. You must install processor 0 before installing processor 1. Proceed as follows:

Figure 6-39 Processors in Server Chassis



WARNING! Ensure the system is powered down and all power sources have been disconnected from the server prior to removing or replacing components.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is in the off position.

Failure to observe this warning could result in personal injury or damage to equipment.

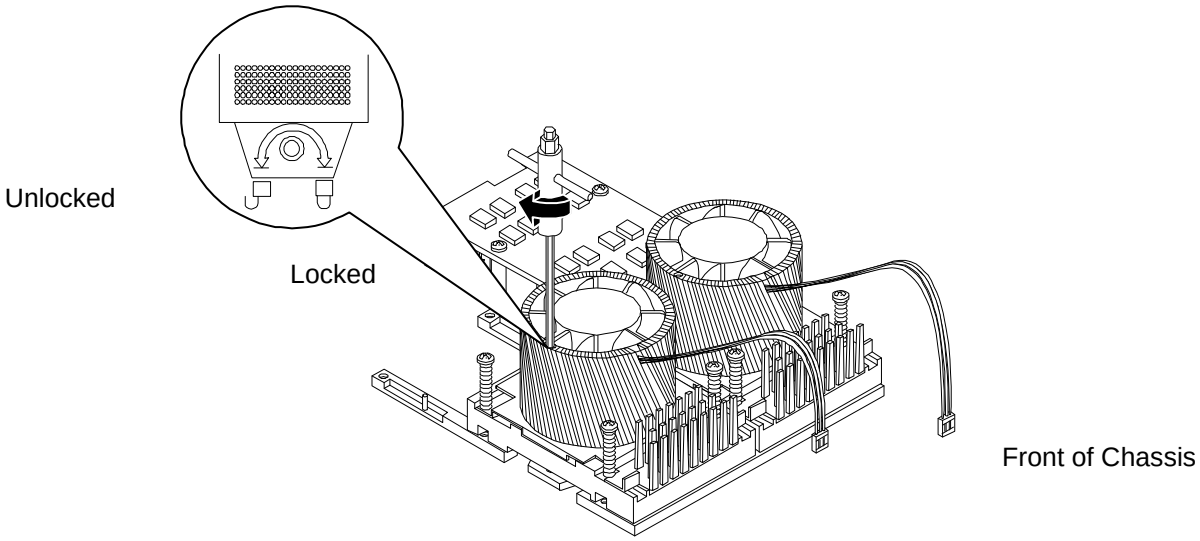
CAUTION: Observe all ESD safety precautions while performing processor removal. Failure to follow ESD safety precautions could result in damage to the server.

NOTE: Installation instructions are provided with replacement processors. Read those instructions carefully. Changes in processor design (and installation) may have occurred since this procedure was written. Always follow the instructions provided with a replacement processor.

To replace a processor, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Turn off the system.
3. Disconnect all external cables.
4. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
5. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
6. Remove the processor airflow guide. See "Removing the Processor Airflow Guide" (page 179).
7. Insert the IPF-CPU tool into the processor locking mechanism and rotate it to the unlocked position (Figure 6-40).

Figure 6-40 Unlocking the Processor Locking Mechanism



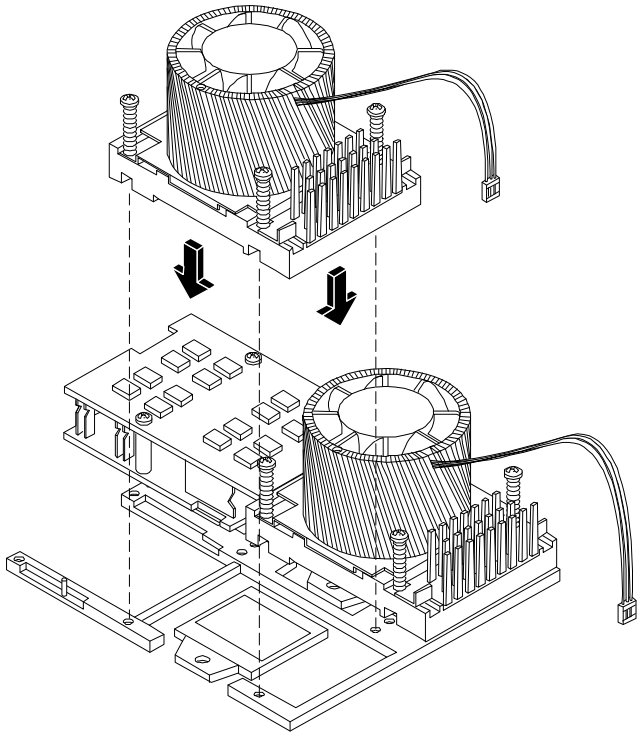
8. Inspect the pins of the processor you are installing. Verify that processor pins are not bent.
9. Insert the Allen side (hex) of the IPF-CPU tool into the lock access hole that runs down through the edge of the turbo fan heatsink before you place it on the system board. As you place the turbo fan heatsink onto the system board, guide the tool until it connects. With the IPF-CPU tool inserted into the lock access hole, it is easier to place and align the turbo fan heatsink onto the system board.
10. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the fan and processor assembly on the system board. The four locator posts fit into locator

holes on the system board processor mount. Position the turbo fan power cable so that it is located on the side of the heatsink that faces the front of the chassis.

CAUTION: Do not press the processor module into the socket. When properly aligned, the processor pins will seat into the socket. No additional pressure is required. You can damage the pins if too much pressure is applied.

Figure 6-41 Aligning the Processor Module

When properly aligned, the connector of the processor and heatsink assembly face the rear of the chassis

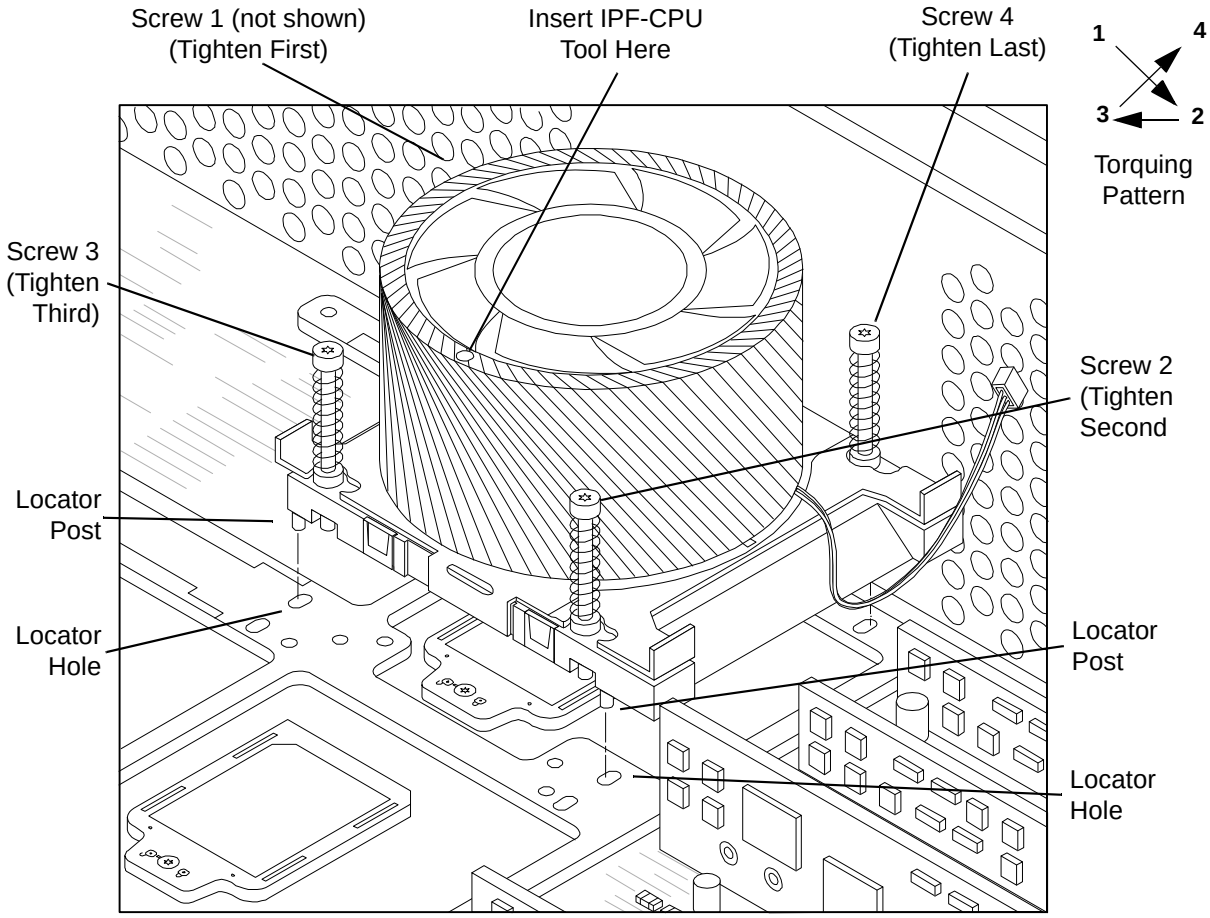


11. Use the Allen side of the IPF-CPU tool to lock the processor in place on the system board. To do this, insert the special processor tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees.

CAUTION: Do not rotate the cam on the processor socket too far or you can cause damage to the locking mechanism.

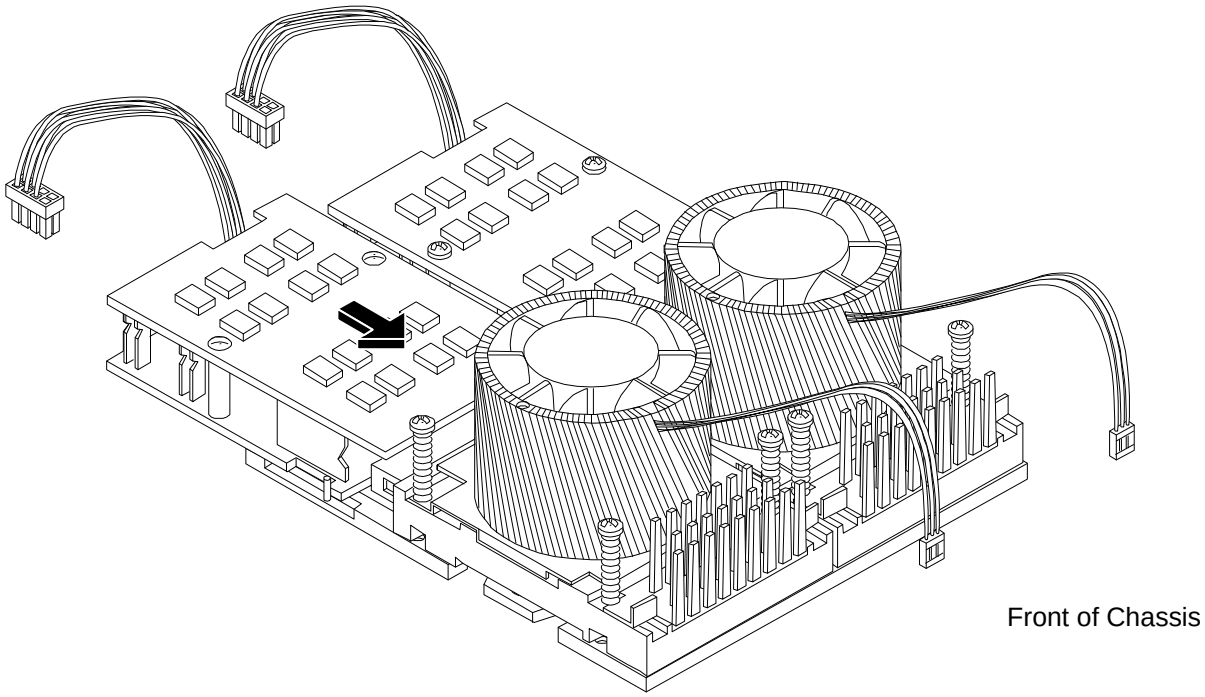
12. Slide the sequencing retainer plate toward the front of the system.
13. Tighten the four captive screws of the heatsink in the order shown in Figure 6-42. Using a criss-cross torquing pattern, alternatively tighten each screw 1/2 turn so as not to completely tighten one screw in before the others. Continue this sequence until the heatsink is secured to the system board.

Figure 6-42 Securing Heatsink Captive Screws



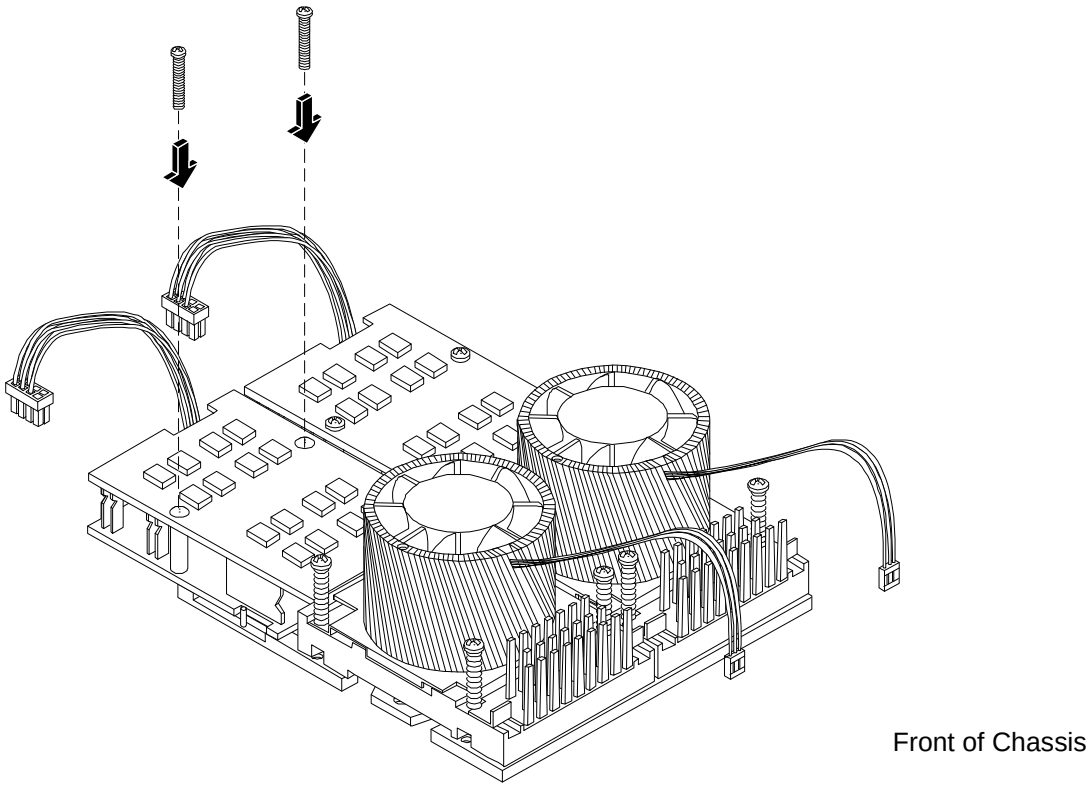
14. Connect the power cable for the processor turbo fan to its connector on the system board.
15. Slide the CPU power module on the system board metal mounting bracket so that the power module connector aligns with its connector on the processor.

Figure 6-43 Aligning the Processor Power Module



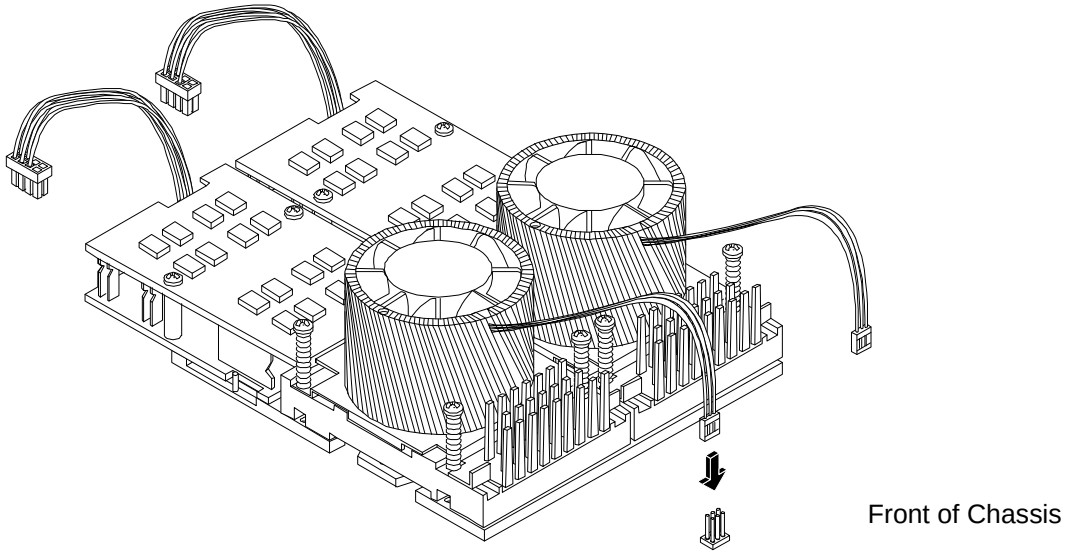
16. Align the two mounting screw holes on the power module with their screw holes on the system board's metal mounting bracket. Screw in the power module mounting screws (M3 x 23mm long pan T15 crest cup stainless steel, 2 per CPU).

Figure 6-44 Installing the Processor Module Power Pod Mounting Screws



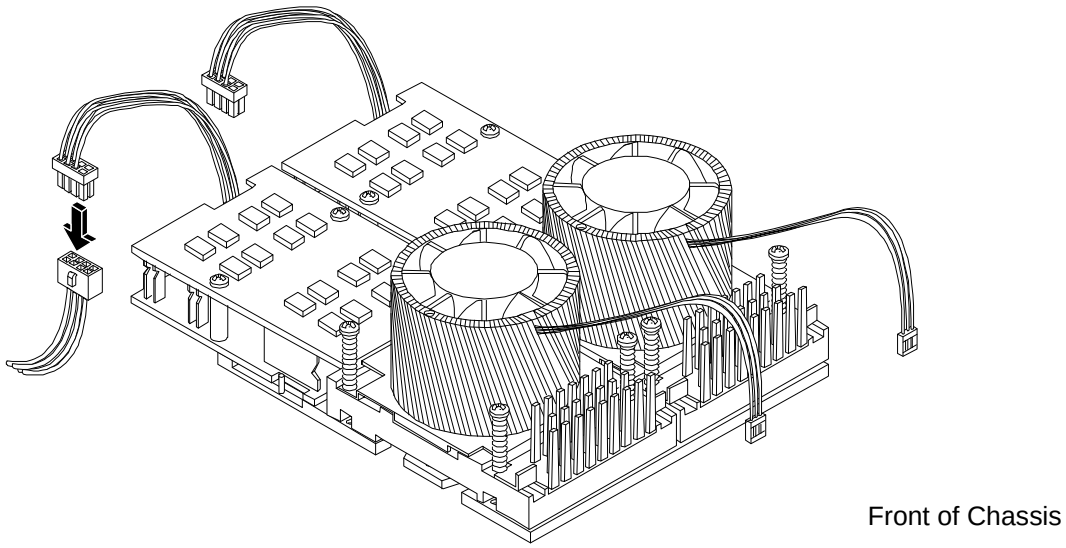
17. Connect the processor module turbo fan power cable to the connector on the system board.

Figure 6-45 Connect the Turbo Fan Cable



18. Connect the power module cable to the connector on the system board.

Figure 6-46 Connect the Power Module Cable



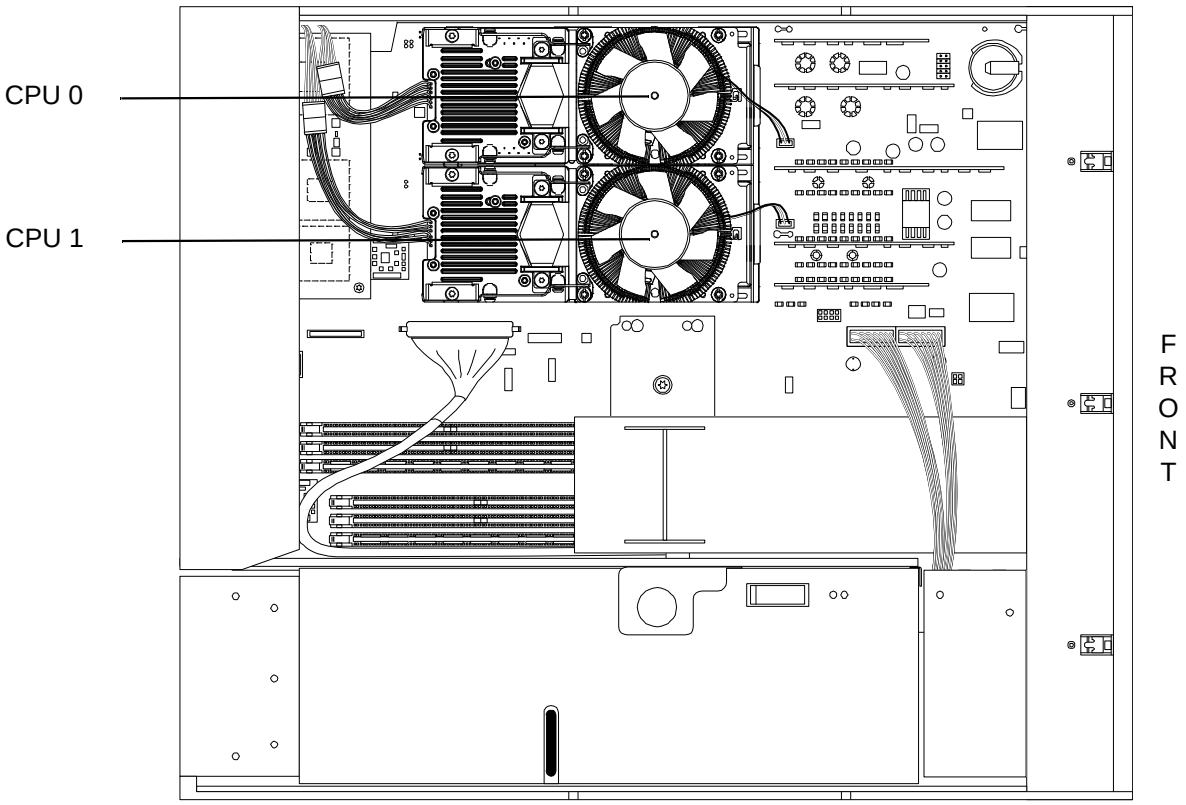
19. Place the processor airflow guide in position. See "Installing the Processor Airflow Guide" (page 180).
20. Install the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
21. If necessary, reinstall the chassis in the rack. See "Inserting the Server Into a Rack" (page 160).
22. Reconnect power and system cables to rear panel connectors.
23. Turn on the system.
24. Run the `info cpu` command at the EFI Shell prompt to verify that the processor has been installed correctly.

Removing and Replacing a Dual-Core System Processor

This section provides information about removing and replacing dual-core processors (CPUs) on the system board. The server can include one or two dual-core processors. The dual-core processors are located on the system board and are accessible after removing the top cover and

airflow guides. CPU 0 is located closer to the chassis side panel and CPU 1 is located closer to the DIMM sockets.

Figure 6-47 Dual-Core Processors in Server Chassis



A tool kit is provided with replacement processors. An IPF-CPU tool kit is required for successful completion of these procedures.

Removing a Dual-Core Processor

To remove a dual-core processor, follow these steps:

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

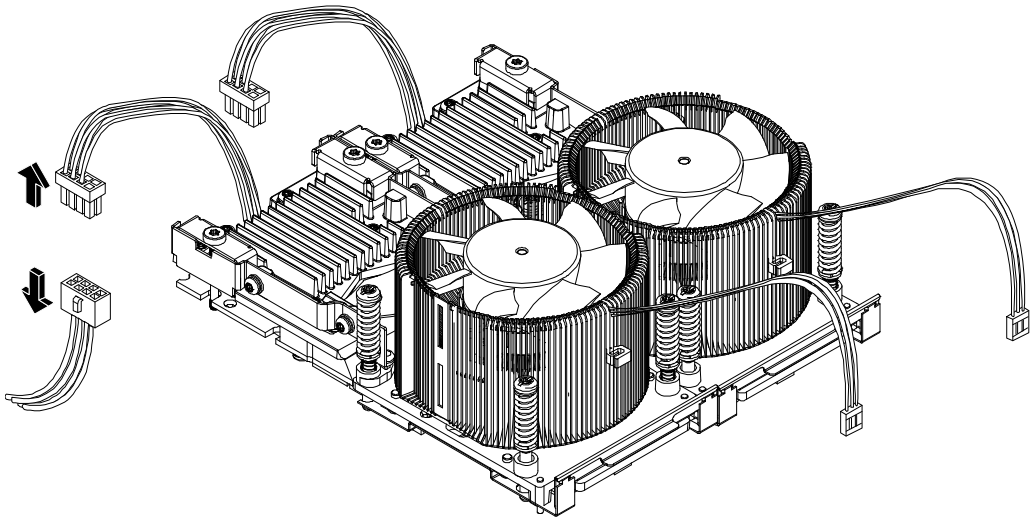
Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing processor removal. Failure to follow ESD safety precautions can result in damage to the server.

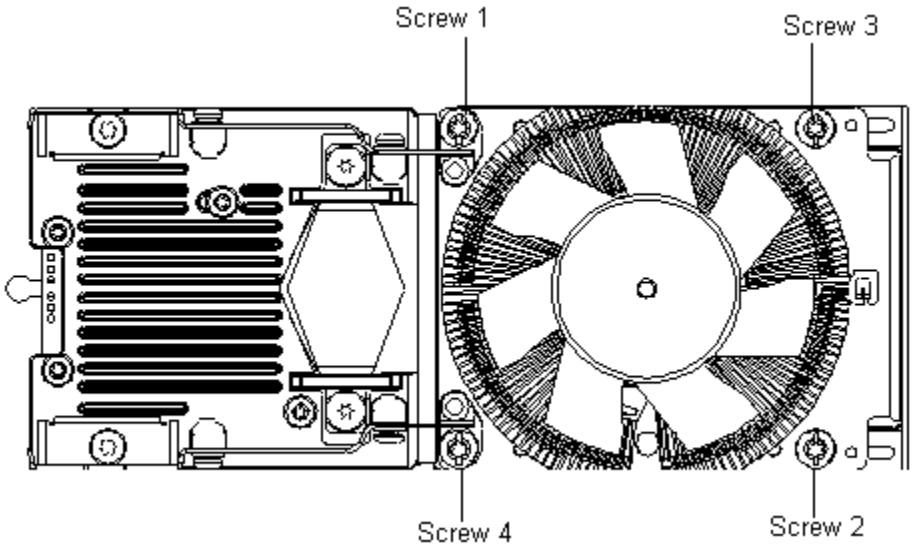
1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the processor airflow guide. See "Removing the Processor Airflow Guide" (page 179).
6. Disconnect the CPU power cable and the turbo fan cable (Figure 6-48).

Figure 6-48 Disconnecting the Power Cable and Turbo Fan Cable



7. Release the two mounting captive screws on the processor module.
8. Release the heatsink captive screws as shown in (Figure 6-49).

Figure 6-49 Releasing the Heatsink Captive Screws



9. Slide the sequencing retainer plate toward the rear of the chassis to open the hole in the edge of the turbo fan heatsink.
10. Insert the IPF-CPU tool into the processor locking mechanism (Figure 6-40).
11. Unlock the processor-locking mechanism using the Allen (hex) side of the IPF-CPU tool. Insert the Allen (hex) side of the IPF-CPU tool into the lock access hole that runs down through the edge of the turbo fan heatsink. Unlock the processor locking mechanism by

rotating the IPF-CPU tool counterclockwise 180 degrees. Verify that the processor-locking mechanism is rotated into the unlocked position.

CAUTION: The zero insertion force (ZIF) socket for the processor is locked and unlocked by half a full turn of the IPF-CPU tool. The counterclockwise 180 degree rotation (half-turn) unlocks the socket. A clockwise 180 degree rotation locks the socket. Attempting to turn the locking mechanism more than 180 degrees can severely damage the socket.

12. Lift the processor straight up and out of the chassis. Place the processor into an antistatic container upside-down to ensure the pins do not get bent.

Replacing a Dual-Core Processor

The system board can support either one or two dual-core processors. The following procedure is applicable to installation of CPU 0 or CPU 1. CPU 0 is located closer to the chassis side panel and CPU 1 is located closer to the DIMM sockets. You must install CPU 0 before installing CPU 1.

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing processor removal. Failure to follow ESD safety precautions can result in damage to the server.

NOTE: Installation instructions are provided with replacement processors. Read those instructions carefully. Changes in processor design and installation may have occurred since this procedure was written. Always follow the instructions provided with a replacement processor.

To replace a dual-core processor, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove the processor airflow guide. See "Removing the Processor Airflow Guide" (page 179).
6. Ensure that the processor locking mechanism is rotated to the unlocked position (Figure 6-40).
7. Inspect the pins of the processor you are installing. Verify that processor pins are not bent.
8. Insert the Allen (hex) side of the IPF-CPU tool into the lock access hole that runs down through the edge of the turbo fan heatsink before you place the heatsink on the system board. As you place the turbo fan heatsink onto the system board, guide the tool until it connects.
9. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the processor on the system board. The four locator posts fit into locator holes on the system

board processor mount. Position the turbo fan power cable so that it is located on the side of the heatsink that faces the front of the chassis.

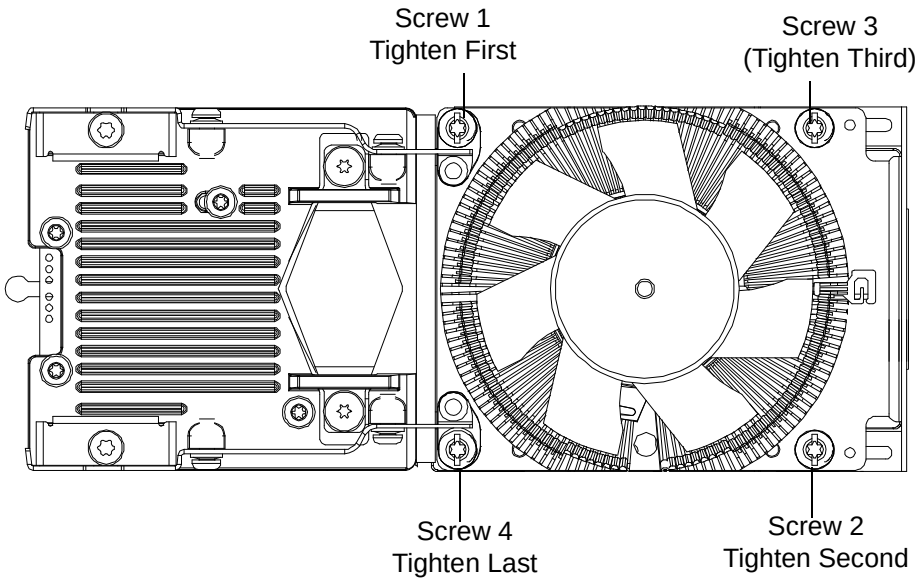
CAUTION: Do not press the processor module into the socket. When properly aligned, the processor pins seat into the socket. No additional pressure is required. You can damage the pins if you apply too much pressure.

10. Properly align the processor so the processor and heatsink face the rear of the chassis.
11. Use the Allen (hex) side of the IPF-CPU tool to lock the processor in place on the system board. To do this, insert the tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees.

CAUTION: Do not rotate the cam on the processor socket too far. You can damage the locking mechanism.

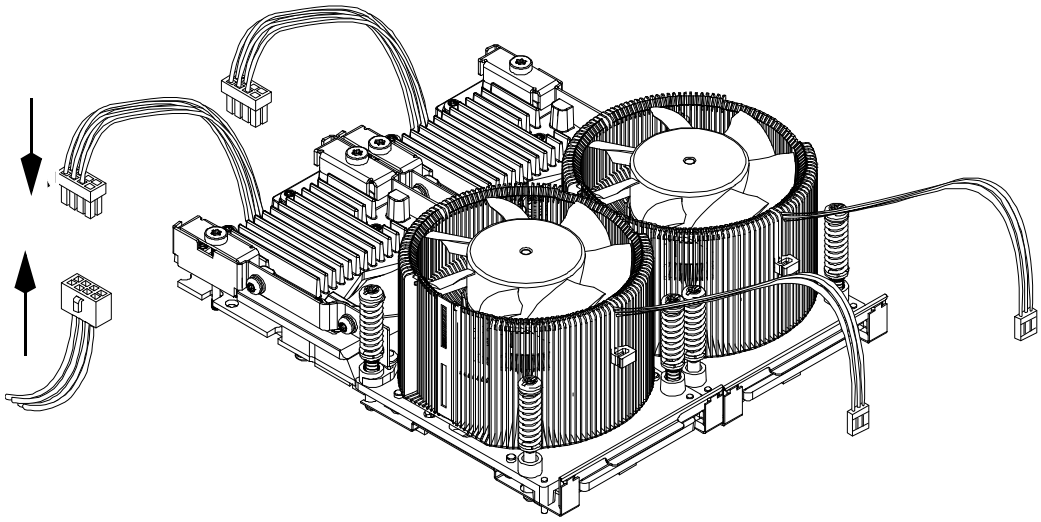
12. Slide the sequencing retainer plate toward the front of the chassis.
13. Tighten the four captive screws of the heatsink in the order shown in Figure 6-50. Using a criss-cross torquing pattern, alternatively tighten each screw 1/2 turn so as not to completely tighten one screw in before the others. Continue this sequence until the heatsink is secured to the system board.

Figure 6-50 Securing the Heatsink Captive Screws



14. Align the two mounting screw holes on the processor module with the screw holes on the system board metal mounting bracket. Screw in the processor module mounting screws (M3 x 23mm long pan T15 crest cup stainless steel, two per CPU).
15. Connect the CPU power cable and the turbo fan cable to the connectors on the system board.

Figure 6-51 Reconnecting the Power Cable and Turbo Fan Cable



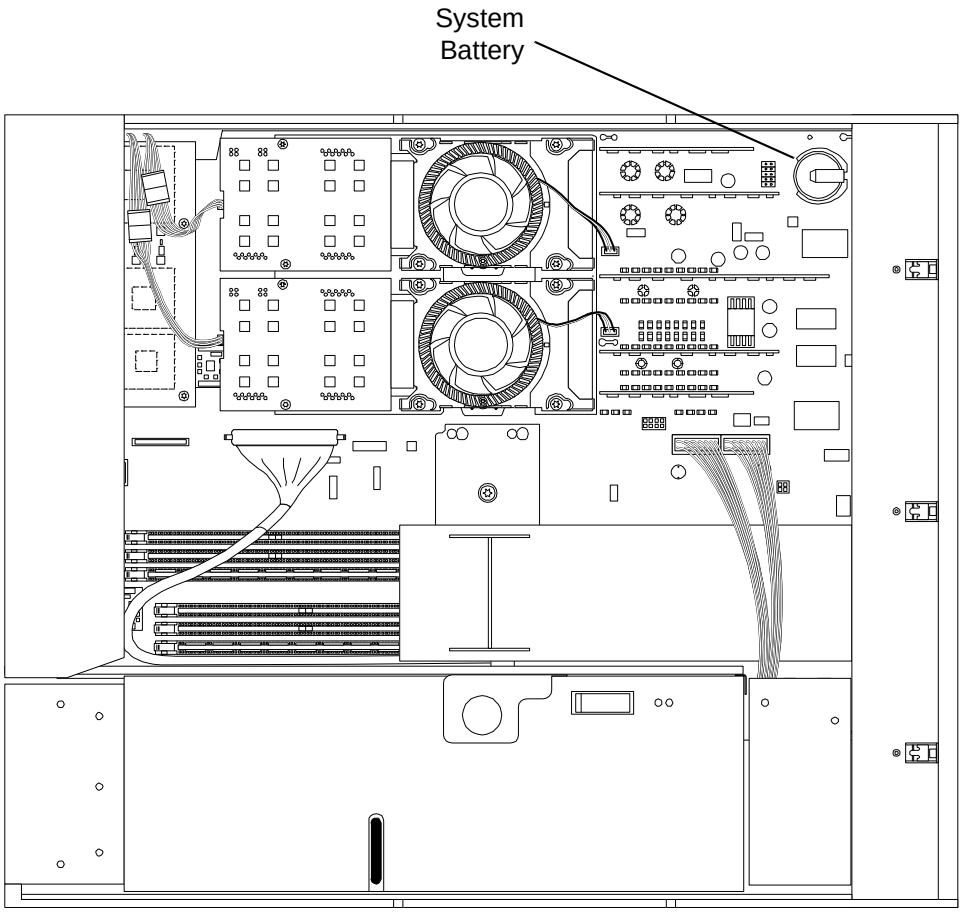
16. Place the processor airflow guide in position. See "Installing the Processor Airflow Guide" (page 180).
17. Install the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
18. If necessary, reinstall the chassis in the rack. See "Inserting the Server Into a Rack" (page 160).
19. Reconnect power and system cables to rear panel connectors.
20. Power on the server.
21. To verify that the processor has been installed correctly, run the `info cpu` command at the EFI Shell prompt.

Removing and Replacing the System Battery

Replace the non-rechargeable system battery by removing the top cover and accessing the system board while the server is mounted in a rack, or after removing it from the rack.

NOTE: There are two batteries in the server: the system battery and the iLO MP card battery. See the parts list for the system battery part number.

Figure 6-52 Battery Location in Server (Top Cover Removed)



Removing the System Battery

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions when working within the server. Failure to follow ESD safety precautions can result in damage to the server.

To remove the system battery, follow these steps:

1. Power off the server.
2. If rack-mounted, slide the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
3. Remove the top cover from the chassis. See "Removing and Replacing the Top Cover" (page 162).

4. Locate the system battery on the system board (Figure 6-52).

CAUTION: Do not overstress the battery retaining clip. This clip is easily broken. Lift the battery just high enough to clear the battery holder. Failure to heed this warning can result in damage to the clip.

5. Remove the battery by lifting the retaining clip and pulling the battery from its socket.

WARNING! Lithium batteries can explode if mistreated. Do not recharge, disassemble, or dispose of batteries in a fire. When discharged, do not throw batteries away; collect them as small chemical waste. Failure to observe this warning can result in personal injury or damage to equipment.

Installing the System Battery

WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions when working inside the server. Failure to follow ESD safety precautions can result in damage to the server.

To install the system battery, follow these steps:

1. Remove the top cover from the chassis. See "Removing and Replacing the Top Cover" (page 162).
2. Locate the system battery on the system board (Figure 6-52).

CAUTION: Do not overstress the battery retaining clip. This clip is easily broken. Lift the battery just high enough to clear the battery holder. Failure to heed this warning can result in damage to the clip.

3. Lift the retaining clip and set the new battery in place. Reposition the retaining clip to secure the battery.

NOTE: The positive terminal of the battery is designated by the + sign. The battery is installed with the + sign facing up.

Removing and Replacing the System Board

The system board is removed through the top of the chassis.

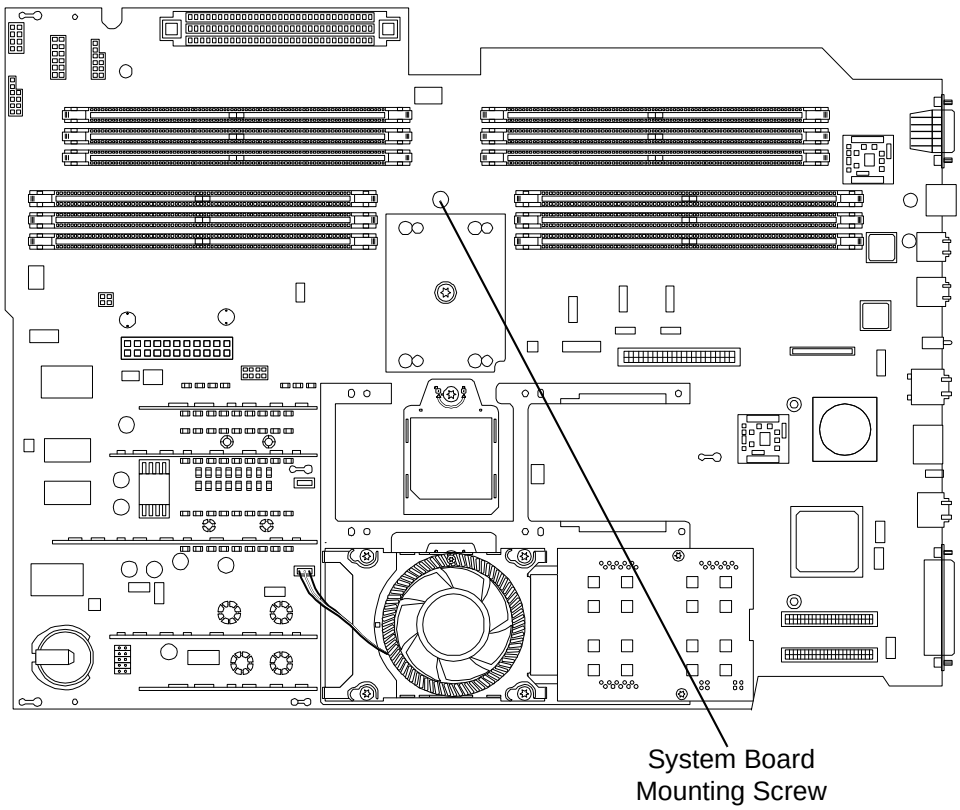
WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware.

Voltages are present at various locations within the server whenever a dc power source is connected. This voltage is present even when the main power switch is turned off.

Failure to observe this warning can result in personal injury or damage to equipment.

CAUTION: Observe all ESD safety precautions while performing this procedure. Failure to follow ESD safety precautions can result in damage to the server.

Figure 6-53 System Board



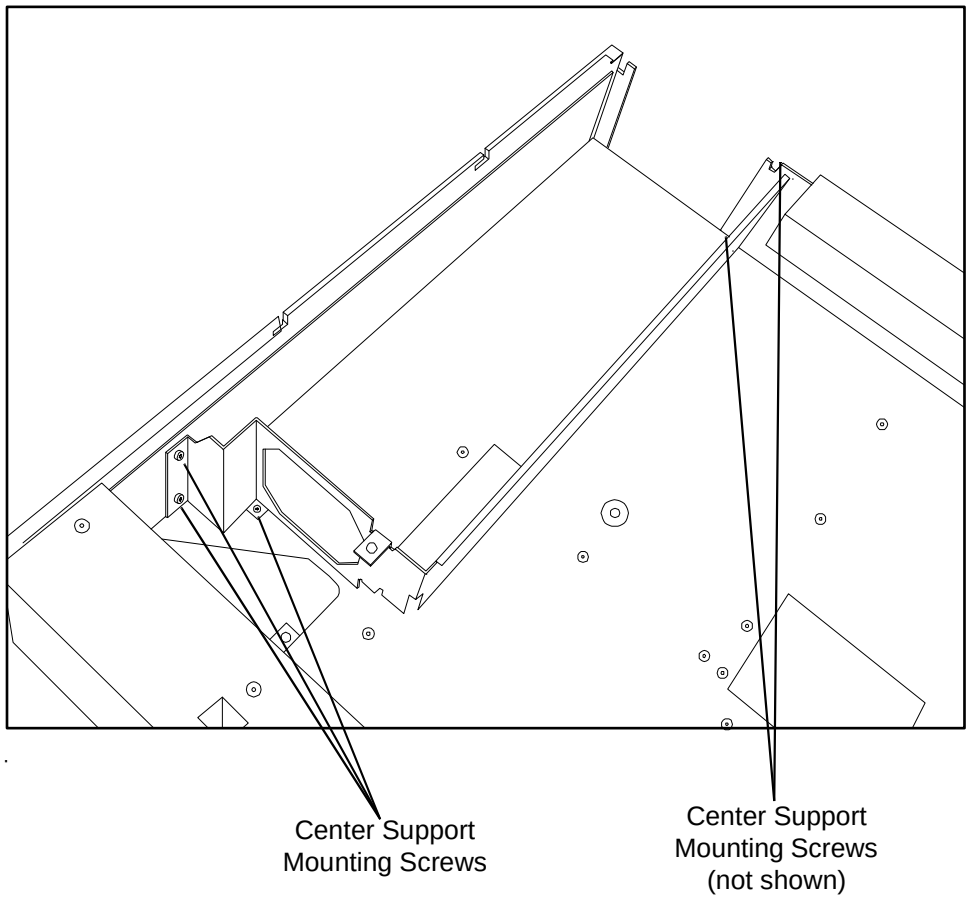
Removing the System Board

To remove a system board, follow these steps:

1. If rack-mounted, extend the server out from the rack until it stops. See "Installing Components When the Server Is in a Rack" (page 158).
2. Power off the server. Disconnect all external cables.
3. Remove the server from the rack and place it on an ESD-protected work surface. See "Removing the Server from a Rack" (page 159).
4. Remove the chassis top cover. See "Removing and Replacing the Top Cover" (page 162).
5. Remove all airflow guides. See "Removing and Replacing Airflow Guides" (page 179).

6. Remove the PCI-X card cage. See “Removing and Replacing the PCI-X Card Cage ” (page 171).
7. Loosen the five captive screws (T-15) that secure the center support member separating the PCI-X cage compartment from the system board area to the chassis (Figure 6-54). Remove the cable harness attached to the support member and remove the support member from the server chassis.

Figure 6-54 Removing the Center Support Member



8. Remove the CPU processors. See “Removing and Replacing a Single-Core System Processor” (page 195)

   or “Removing and Replacing a Dual-Core System Processor” (page 208).
9. Remove the DIMM memory modules. See “Removing and Replacing System Memory DIMMs” (page 180).
10. Remove the iLO MP card. See “Removing the iLO MP Card” (page 193).
11. Label and disconnect all cables connected to the system board.
12. On the rear panel of the server chassis, remove the noncaptive screws and connector hardware securing the following connectors:
    - SCSI LVD (left) (hex 143-IN-LG 4-40 stainless steel)
    - Serial A Console (right) (two screws - hex 2-56 w/slot stainless steel)
    - Serial B (below Serial A console) (two screws - hex 2-56 w/slot stainless steel)
13. Locate the four front fan cables 1-4 near the system board, and remove the common harness from the recession near the board’s edge. Pop the clips on the fan cable by pushing down on the tab. By completely removing the cables, clips, and harness, this enables clearance for removing the system board.
14. Remove the single noncaptive screw (M3 x 6mm long pan T-15/slot square cone stainless steel) that secure the system board to chassis floor (Figure 6-53).

15. Slide the system board toward the front of the chassis to disengage the board locks.
16. Lift the board assembly from the chassis. Place it on an ESD-protected surface.

Installing the System Board

CAUTION: Observe all ESD safety precautions while installing the system board. Failure to follow ESD safety precautions can result in damage to the server.

To install a system board, follow these steps:

1. Position the replacement board assembly on its locating or locking posts (seven places) and slide it toward the rear of the chassis. Use the four screws on the rear of the server to draw the system board toward the EMI gasket until fully engaged.
2. When the system board assembly is fully engaged, replace and tighten the single screw securing the board to the chassis (Figure 6-53).
3. Install the following connectors. (Use the connector hardware removed during board removal.)
   - SCSI LVD (left)
   - Serial A console (right)
   - Serial B (below Serial A console)
4. Return the fan cable 1-4, harness, and clips to their respective locations. Make sure the clips snap into place. The harness fits between the system board and the vertical chassis surface.
5. Reconnect all connectors that were disconnected from the system board during board removal.
6. Replace the center support member that separates the PCI-X cage compartment from the system board (Figure 6-54). Secure the center support in position with five screws. Re-dress the cable harness that attaches to the support member.
7. Install the PCI-X card cage. See “Installing the PCI-X Card Cage Assembly” (page 173).
8. Install all airflow guides. See “Removing and Replacing Airflow Guides” (page 179).
9. Populate the newly installed system board with the following items, which are generally the first removed from the board you are replacing:
   - iLO MP card. See “Removing and Replacing the iLO MP Card” (page 192).
   - DIMM memory modules. See “Removing and Replacing System Memory DIMMs” (page 180).
   - CPU processors. See “Removing and Replacing a Single-Core System Processor” (page 195).
10. Replace the server top cover. See “Removing and Replacing the Top Cover” (page 162).
11. Reconnect all external cables and power on the server.
12. Run the `info cpu` command at the EFI Shell prompt to verify that the processor works.
13. Review the system configuration in the EFI Shell and reconfigure settings as necessary.

A Replacement Parts

This appendix provides the following customer self-repair part information for the HP Integrity cx2620 server. Refer to this appendix whenever ordering parts.

- Manufacturing Part Number
- Description
- Replacement Part Number, if applicable
- Exchange Part Number, if applicable

This appendix addresses the following topic:

- "Replacement Parts List" (page 219)

Replacement Parts List

Part numbers are found by using the part nomenclature from this list to select the correct part from the HP Partsurfer.

NOTE: If you need to replace a system board, remove the processors, DIMMs, and adapter boards and transfer them to the new board.

You must transfer all jumper and switch settings from the old board to the new board.

Table A-1 lists the parts for the server.

Table A-1 Parts List

Manufacturing Part Number	Description	Replacement Part Number	Exchange Part Number
Processors			
AB460B	1.6 GHz 3 M cache MP Itanium 1P/1C	AB460B	AB335-69002
AD122A (A2)	1.4 GHz 12 M cache MP Itanium 1P/1C	AD122AX	AD122-69001
AD123A (A2)	1.6 GHz 18 M cache MP Itanium 1P/1C	AD123AX	AD123-69001
PCI-X/IO Cards			
A6826A	PCI-X Dual Channel 2Gb Fibre Channel HBA	A6826-60001	A6826-69001
AB465A	HP PCI-X 2-port 2Gb FC and 2-port 1000BT Adapter	AB465-60001	AB465-69002
A7173A	HP Dual Channel Ultra 320 SCSI Adapter	A6961-60011	N/A
A9890A	HP Smart Array 6402/128MB Controller (external disk support only	309520-001	N/A
A7012A	PCI-X 2-port 1000Base-T Gigabit Adapter	A7012-67001	N/A
A9900A	Win/Linux 2-port 1000Base-T Gigabit Adapter	A7012-67001	N/A
A6847A	PCI-X 1000Base-SX Gigabit Ethernet Adapter	A6847-67101	N/A
A7073A	Win/Linux 1000Base-SX Gigabit Eth Adapter	A6847-67101	N/A
A7011A	Win/Linux 2-port 1000Base-SX Gigabit Adapter	A7011-67001	A7011-69001
AB545A	HP PCI-X 4-port 1000Base-T Gigabit Adapter	AB545-60001	N/A
AB287A	HP PCI-X 133 MHz 10 GbE SR Fiber Adapter	AB287-67001	AB287-69001
AB145A	HP/Linux 4-port 1000Base-T Gigabit Adapter	AB145-60001	N/A
AB287A	HP/Linux 133 MHz 10 GbE SR Fiber Adapter	AB287-67001	AB287-69001
Memory (DIMMs)			

Table A-1 Parts List *(continued)*

Manufacturing Part Number	Description	Replacement Part Number	Exchange Part Number
AB395A	\256 MB DIMM	A6967AX	N/A
AB396A	512 MB DIMM	A6968AX	N/A
AB397A	1 GB DIMM	A6969AX	A6969-69001
AB228A	2 GB DIMM (includes 4 x 512 MB DIMMs)	A6970AX	A6835-69001
AB475A	4 GB DIMM (includes 4 x 1 GB DIMMs)	AD041A	AB475-69001
Server Subassemblies			
AB587	HP Integrity cx2620 chassis	AB587-04001	N/A
AB587-60008	HP Integrity cx2620 system board	AB587-67008	AB587-69008
AB587-60005	PCA-SCSI backplane	AB587-60005	N/A
AB587-60004	PCI-X riser assembly	AB587-60004	N/A
AB587-60002	Remote iLO MP card	AB587-67002	AB587-69002
AB587-60006	PCA status panel	AB587-60006	N/A
AB587-60003	Fan control board	AB587-60003	N/A
0957-2181	dc power supply	0957-2181	N/A
Fan Assemblies			
AB587-04003	Front fan assembly	AB587-04003	N/A
AB587-04002	Rear fan assembly	AB587-04002	N/A
Miscellaneous Parts			
AB587-04014	PCI-X cage assembly	AB587-04014	N/A
AB587-04015	PSI assembly	AB587-04015	N/A
AB216-04012	Air baffle, 1.6 GHz/3M CPU	AB216-04012	N/A
AB587-04005	Air baffle, 1.4 GHz/12M CPU	N/A	N/A
AB587-04004	Front panel assembly	AB587-04004	N/A
AB587-04011	Baffle, memory	SB587-04011	N/A
AB587-04016	Assembly, air filter	N/A	N/A
AB587-00017	Foam element, air filter, 10 pack	N/A	N/A
AB587-90003	Air filter kit	N/A	N/A
1420–0386	Battery, system board, 3 v.25A HR lithium polycarbon	N/A	N/A
1420–0356	Battery, MP card (ECI card) 3 v.22A HR lithium manganese dioxide	N/A	N/A
Cables			
AB216-63013	Cable, telco alarm	N/A	N/A
AB216-63014	Cable, SCSI A and B	AB216-63014	N/A
AB216-63015	Cable, DVD IDE	AB216-63015	N/A
AB216-63016	Cable, power 1	AB216-63016	N/A
AB216-63017	Cable, power 2	AB216-63017	N/A

Table A-1 Parts List *(continued)*

Manufacturing Part Number	Description	Replacement Part Number	Exchange Part Number
AB216-63018	Cable, HDD power	AB216-63018	N/A
AB216-63019	Cable, fan, 1-4	AB216-63019	N/A
AB216-63020	Cable, fan 5	AB216-63020	N/A
AB587-63002	Cable, CPU MVR power (common)	AB587-63002	N/A
AB216-63022	Cable, status panel	AB587-63002	N/A
A7231-63032	Cable, ECI flex	A7231-63032	N/A

B Utilities

This appendix describes the utilities that are part of the server. These include the EFI Boot Manager, and EFI-POSSE.

This appendix addresses the following topics:

Extensible Firmware Interface Boot Manager

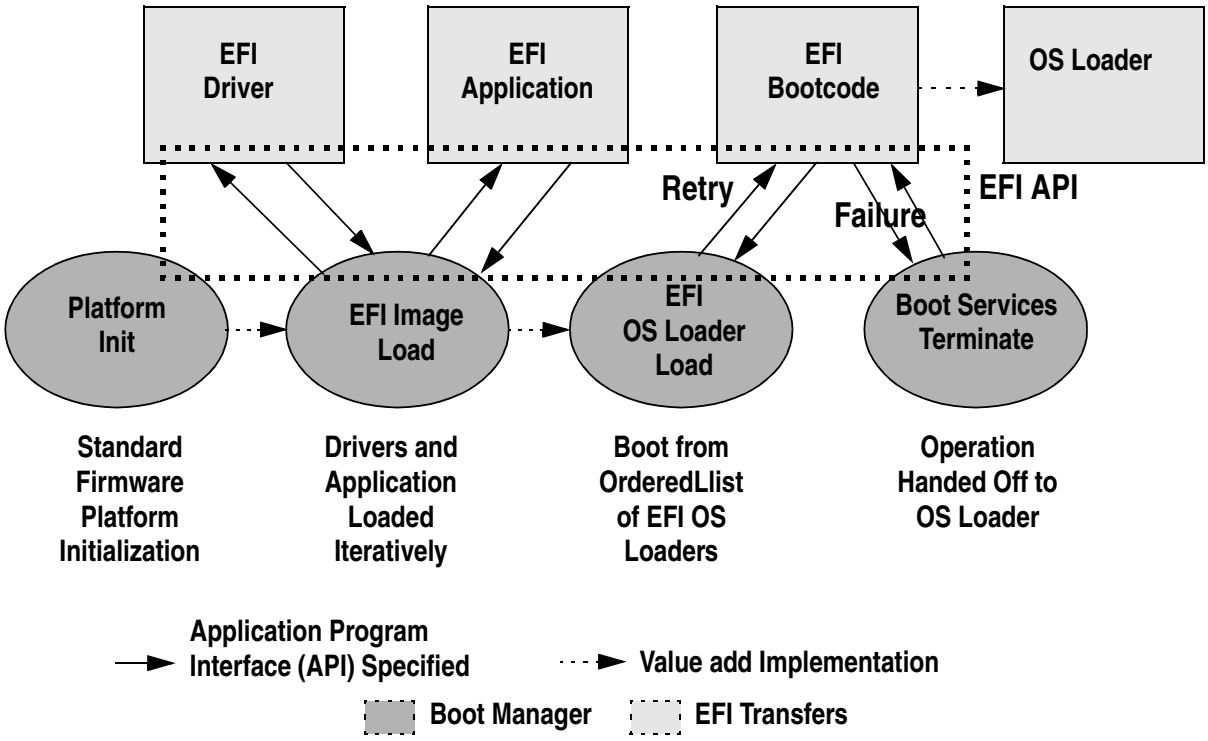
Extensible Firmware Interface (EFI) is an OS and platform-independent boot and pre-boot interface. EFI resides between the OS and platform firmware. This allows the OS to boot without having details about the underlying hardware and firmware. EFI supports boot devices; uses a flat memory model; and hides platform and firmware details from the OS.

NOTE: EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

EFI consolidates boot utilities similar to those found in PA-RISC based servers, such as the Boot Console Handler (BCH), and platform firmware into a single platform firmware. EFI enables the selection of any EFI OS loader from any boot medium that is supported by EFI boot services. An EFI OS loader supports multiple options on the user interface.

EFI supports booting from media that contain an EFI OS loader or an EFI-defined system partition. An EFI-defined system partition is required by EFI to boot from a block device.

Figure B-1 EFI Boot Sequence



The EFI Boot Manager loads EFI applications (including operating system OS first stage loader) and EFI drivers from an EFI-defined file system or image loading service. Non-volatile RAM (NVRAM) variables point to the file to be loaded. These variables contain application-specific

data that is passed directly to the EFI application. EFI variables provides system firmware with a boot menu that points to all the operating systems, even multiple versions of the same operating systems.

The EFI Boot Manager enables you to control the server's booting environment. Depending on boot option configuration after the server is powered up, the Boot Manager presents you with different ways to bring up the system. For example, you can boot to the EFI Shell, to an operating system located on the network or residing on media in the server, or the **EFI Boot Maintenance** menu.

The following options are available in the **EFI Boot Manager** menu

- Boot from a File—Automatically adds EFI applications as boot options or enables you to boot from a specific file. When you select this option, the system searches for an EFI directory. If the EFI directory is found, then it looks in each of the subdirectories below EFI. In each of those subdirectories, it looks for the first file that is an executable EFI application. Each of the EFI applications that meet this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present.

  You can also launch a specific application without adding it as a boot option. In this case, the EFI Boot Manager searches the root directories and the `\EFI\TOOLS` directories of all of the EFI system partitions present in the system for the specified EFI application.
- Add a Boot Option—Adds a boot option to the EFI Boot Manager. Specify the boot option by providing the name of the EFI application. Along with the name, you can also provide either ASCII or UNICODE arguments the file uses. Given the EFI application name and any options, the EFI Boot Manager searches for the executable file in the same directories as described in the Boot from a File option. When the file is found, it is executed.
- Delete Boot Options—Deletes a specific boot option or all boot options.
- Change Boot Order—Controls the relative order in which the EFI Boot Manager attempts to execute boot options. For help on the control key sequences you need for this option, see the help menu.
- Manage BootNext Setting—Selects a boot option to use only once (the next boot operation).
- Set Automatic Boot Timeout—Defines the value in seconds before the system automatically boots without user intervention. Set this value to zero to disable the timeout feature.
- Exit—Returns control to the **EFI Boot Manager** menu. This displays the active boot devices, including a possible integrated shell (if the implementation is so constructed).

For more information, see "Using the Boot Option Maintenance Menu" (page 249).

EFI Commands

Table B-1 lists EFI commands for HP Integrity servers. The equivalent BCH commands found in PA-RISC based servers are also listed.

Table B-1 EFI Commands

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
These commands are found in all other menus			
info boot	Boot	[PRI|HAA|ALT|<path>]	Boot from specified path
help <command>	HElp	[<menu>|<command>]	Display help for specified command or menu
reset	RESET		Reset the server (to allow reconfiguration of complex
exit (at EFI Shell)	MAin		Return to the main menu
MAin			

Table B-1 EFI Commands *(continued)*

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
EFI Boot Manager "change boot order"	PAth	[PRI|HAA|ALT|CON|KEY|<path>]	Display or modify a path
bcfg	SEArch	[ALL]	Search for boot devices
bcfg	SEArch	[DIsplay|IPL] [<path>]	Search for boot devices
many commands offer a [-b] parameter to cause 25 line breaks	ScRoll	[ON|OFF]	Display or change scrolling capability
COnfiguration			
autoboot	AUto	[BOot|SEarch|STart] [ON|OFF]	Display or set the auto start flag
info boot	BootID	[<processor #>[<bootid #>]]	Display or set processor boot identifier
EFI Boot Manager	Boot info		Display boot-related information
autoboot	BootTimer	[0-200]	Seconds allowed for boot attempt
cpuconfig	CPUCONFIG	[<cpu>][ON|OFF]]	Configure or deconfigure processor
ioconfig	IOCONFIG	IOCONFIG [fast_init|wol [on|off]]	Deconfigure or reconfigure I/O components or settings
boottest	FastBoot	[ON|OFF] or [test] [RUN|SKIP]	Display or set boot tests execution
date	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the date
time	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the real time clock
INformation			
info all	ALL		Display all server information
info boot	BootINfo		Display boot-releated information
info cpu	CAche		Display cache information
info chiprev	ChipRevisions		Display revision number of major VLSI
MP command <df>	CRU		Display CRU information
info fw	FwrVersion		Display firmware version for PDC, ICM, and complex
info io	IO		Display firmware version for PDC, ICM, and complex
lanaddress	LanAddress		Display core LAN station address
info mem	Memory		Display memory information
info cpu	PRocessor		Display processor information
SERvice			

Table B-1 EFI Commands *(continued)*

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
errdump clear	CLEARPIM		Clear (zero) the contents of PIM
mm	MemRead	<addr> [<len>] [<type>]	Read memory locations scope of page deallocation
pdt	page deallocation table (pdt)		Display or clear the page deallocation table
errdump mca errdump cmc errdump init	processor internal memory (PIM)	[<proc>] [HPMC|LPMC|TOC|ASIC]]	Display PIM information

EFI/POSSE Commands

This section EFI/POSSE commands developed for the server.describes the

NOTE: EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

help

Provides information on the EFI Shell commands. It also has an additional feature to aid those familiar with the BCH menus of PA-RISC servers to adjust to their equivalent functions in EFI.

Syntax

```
help [-b] <category>
help [-b] <cmd>
help [-b] bch <bchmenu> <bchcmd>
```

Parameters

```
-b              Enable page breaking
category        Category of commands to view help on commands
cmd             Shell command name on which to provide verbose information
bch             Display the list of BCH commands and their corresponding EFI
bchmenu         BCH menu name taken from the top level of the BCH menu
bchcmd          BCH command on which to display information
```

Operation

If help is initiated with no parameters, it displays a list of shell command categories. To list all of the commands within a category, enter **`help <category>`**. If help is issued with the **`-b`** option, any output longer than one page pauses after each page displays. If a shell command name is used as a parameter, verbose help displays for that command.

If you issue the `help` command with the **`bch`** option, it displays a list of BCH commands and their corresponding EFI/POSSE commands. It instructs you to repeat the command line followed by a menu name for more information on that menu. If you issue `help` within the **`bch`** option and a menu name, it displays a list of commands that appear under that BCH menu. You can then issue `help` followed by **`bch`**, the menu name, and a BCH command name to display information about that command. This points you to the EFI command that has taken the place of that BCH functionality, or will inform the user that the functionality no longer exists. Alternately, enter `help` followed by `bch` and a BCH command name to go straight to that command.

Example B-1 `help` Command

```
Shell> help
List of classes of commands:

boot          -- Booting options and disk-related commands
configuration -- Changing and retrieving system information
devices       -- Getting device, driver and handle information
memory        -- Memory related commands
shell         -- Basic shell navigation and customization
scripts       -- EFI shell-script commandsType "help" followed by a class name for a list of commands in that class
Type "help" followed by command name for full documentation
```

Example B-2 help bch Command

```
    COnfiguration          help bch co
    INformation            help bch in
    PAth                   help bch pa
    ScRool                 help bch sr
    SEArch                 help bch sea
    SERvice                help bch ser
    BOot                   help bch bo
    HElp                   help bch he
    RESET                  help bch reset
    MAin                   help bch ma

    For more help on one of the commands above, at the prompt type:
        help bch <bchcmd>
```

Example B-3 `help configuration` Command

```
Shell> help configuration
Configuration commands:

cpuconfig  -- Deconfigure or reconfigure cpus
date       -- Display or set date
err        -- Display or set error level
esiproc    -- Make an ESI call
errdump    -- View/Clear logs
info       -- Display hardware information
monarch    -- View or set the monarch processor
palproc    -- Make a PAL call
salproc    -- Make a SAL call
time       -- Display or set time
ver        -- Displays version info

Type "help" followed by command name for full documentationon that command.
Type "help -a" to display a list of all commands.
```

Example B-4 `help cpuconfig` **Command**

```
Shell> help cpuconfig
Deconfigure or reconfigure cpus

CPUCONFIG [module] | [threads] [on|off]

module  : Specifies which cpu module to configure
threads : Use to display info or configure threads
on|off  : Specifies to configure or deconfigure a cpu module or threads

Note:
   1. Cpu status will not change until next boot.
   2. Specifying a cpu number without a state will display
      configuration status.

Examples:
  * To deconfigure CPU 0
    fs0:\> cpuconfig 0 off
    Cpu will be deconfigured on the next boot.

  * To display configuration status of cpus
    fs0:\> cpuconfig

     PROCESSOR MODULE INFORMATION

            # of                L3      L4      Family/
     CPU    Logical             Cache   Cache   Model          Processor
    Module  CPUs     Speed      Size    Size    (hex.)   Rev   State
    ------  -------  --------   ------  ------  -------  ---   ------------
      0        2      1.1 GHz   4MB     32MB    1F/01    B1       Active
      1        2      1.1 GHz   4MB     32MB    1F/01    B1       Active

  * To display cpu thread status
    fs0:\> cpuconfig threads

    cpuconfig: Threads are turned off.

  * To enable cpu threads
    fs0:\> cpuconfig threads on

    cpuconfig: Threads will be on after a reset

  * To disable cpu threads
    fs0:\> cpuconfig threads off

    cpuconfig: Threads will be off after a reset
```

Example B-5 `help ioconfig`Command

```
Shell> help ioconfig
Deconfigure or reconfigure IO components or settings

IOCONFIG [fast_init|wol [on|off]]

fast_init  Specifies device connection policy setting
wol        Specifies System Wake-On-LAN setting
on|off     Specifies to configure or deconfigure a feature or component

Note:
   1. If fast_init is enabled, firmware will connect only the minimum set of
      devices during boot.  This feature might cause boot failure; disable
this
      feature if failure occurs.

   2. Any pending Wake-On-LAN request will not be cleared until reboot if
      the setting is changed to disabled.

      System will clear pending Wake-On-LAN requests each time the system
      reboots if the setting is disabled.

Examples:
  * To display the current settings
    fs0:\> ioconfig
    Fast initialization: Enabled
    System Wake-On-LAN: Disabled

  * To display the current device connection policy setting
    fs0:\> ioconfig fast_init
    Fast initialization: Enabled

  * To disable fast initialization
    fs0:\> ioconfig fast_init off
    Fast initialization: Disabled

  * To enable the System Wake-On-LAN setting
    fs0:\> ioconfig wol on
    System Wake-On-LAN: Enabled
```

baud

Sets the baud rate and communication settings for a universal asynchronous receiver-transmitter (UART).

Syntax

```
baud <index> <baudrate>
```

Parameters

```
<index> 0 through the total number of UARTS minus one
<baudrate>      baud rate.
```

Operation

Use this command to change the speed for a UART in the system. This command works for all UARTs visible to EFI/POSSE. If the UART is part of processor dependent hardware (PDH) space and is initialized by the core firmware, this command communicates the settings to core firmware so the UART can be initialized with the new settings on the next boot. System default is 9600 baud.

Other Communication parameters are listed in Table B-2.

Table B-2 Communications Parameters

Parameter	Value
RECEIVE_FIFO_DEPTH	1
TIMEOUT	1000000
PARITY	No parity
DATA_BITS	8
STOP_BITS	1
CONTROL_MASK	0

boottest

Interacts with the speedy boot variable allowing it to be set appropriately.

Syntax

```
boottest                        Displays status of all speedy boot bits
boottest on                     Run all tests (for a normal boot time)
boottest off                    Skip all tests (for a faster boot time)
boottest [test]                 Displays status of specific Speedy Boot bit
boottest [test] [on|off]        Sets or clears a specific Speedy Boot bit
```

Parameters

```
[test]  Each test can be set or cleared:
        booting_valid   Enable/disable system firmware response to BOOTING
                        bit. If OS Speedy Boot aware set to on.
        early_cpu       Enable/disable early CPU selftests.
        late_cpu        Enable/disable late CPU selftests.
        platform        Enable/disable system board hardware tests.
        chipset         Enable/disable CEC tests.
        io_hw           Enable/disable EFI driver Core I/O tests.
        mem_init        Enable/disable memory initialization.
        mem_test        Enable/disable full destructive memory tests.
```

Example B-6 `boottest` **Command**

```
Shell> boottest
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    -------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Run this test
   late_cpu         Run this test
   platform         Run this test
   chipset          Run this test
   io_hw            Run this test
   mem_init         Run this test
   mem_test         Run this test
```

Example B-7 `boottest early_cpu off` **Command**

```
Shell> boottest early_cpu off
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    -------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Skip this test
   late_cpu         Run this test
   platform         Run this test
   chipset          Run this test
   io_hw            Run this test
   mem_init         Run this test
   mem_test         Run this test
```

cpuconfig

Use this command to display the configured or deconfigured state of processors in the system and enables the user to configure or reconfigure processors.

Syntax

```
cpuconfig <cpu> <on|off>
```

Parameters

```
<cpu>           specify a processor
<on|off>        state to set the processor to
```

Operation

Issuing `cpuconfig` with no parameters displays the config/deconfig status of all processors. To reconfigure CPUs, specify a CPU number and a state `on` or `off`. If a valid state is entered and is different from the current state of a CPU, its status changes on the next boot.

NOTE: The last remaining configured CPU in a server cannot be deconfigured.

Example B-8 `cpuconfig` **Command**

```
Shell>  cpuconfig
PROCESSOR INFORMATION

                    Proc                          Arch  Processor
CPU     Speed       Rev        Model    Family    Rev   State
---   -------     ---------  -------    -----   ------  -----
 0     1.6Ghz      B1             0       31       0     Sched Deconf
 1     1.6Ghz      B1             0       31       0     Active
```

ioconfig

Use this command to deconfigure or reconfigure I/O components or settings.

Syntax

```
ioconfig <fast_init | wol> <on|off>
```

Parameters

```
<fast_init>     specify device connection policy setting
<wol>           specify system wake-on-lan setting
<on|off>        specify to configure or deconfigure a feature or component
```

Operation

The `ioconfig` file is used to retain information on the server I/O configuration across reboots. The `ioconfig` file is created by `insf` at install time; and is modified by `insf`, `rmsf`, and `ioscan`when devices are added or removed. The only purpose of the `ioconfig`file to maintain configuration information when the system is not running.

Example B-9 `ioconfig`Command

```
Shell> ioconfig
Deconfigure or reconfigure IO components or settings

IOCONFIG [fast_init|wol [on|off]]

fast_init  Specifies device connection policy setting
wol        Specifies System Wake-On-LAN setting
on|off     Specifies to configure or deconfigure a feature or component

Note:
   1. If fast_init is enabled, firmware will connect only the minimum set of
      devices during boot.  This feature might cause boot failure; disable
this
      feature if failure occurs.

   2. Any pending Wake-On-LAN request will not be cleared until reboot if
      the setting is changed to disabled.

      System will clear pending Wake-On-LAN requests each time the system
      reboots if the setting is disabled.

Examples:
  * To display the current settings
    fs0:\> ioconfig
    Fast initialization: Enabled
    System Wake-On-LAN: Disabled

  * To display the current device connection policy setting
    fs0:\> ioconfig fast_init
    Fast initialization: Enabled

  * To disable fast initialization
    fs0:\> ioconfig fast_init off
    Fast initialization: Disabled

  * To enable the System Wake-On-LAN setting
    fs0:\> ioconfig wol on
    System Wake-On-LAN: Enabled
```

conconfig

Use this command to configure the primary console and turn on other consoles for mirroring from the firmware.

Syntax

```
conconfig [index][on|off|primary]
```

Parameters

```
Index        Specifies index of console to set as primary
on           Enables the specified console as a secondary console
off          Puts console into "Not Configured" (NC) state
primary      Sets the specified console as primary
```

Notes

- Primary console setting will take effect after reboot
- **P** in the status column indicates that the console is the primary.
- **S** in the status column indicates that the console is the secondary.

- **NC** in the status column indicates that the console is not configured.
- If a disabled console is set to primary, it will be enabled.

Example B-10 `conconfig` **Command**

To display current primary operating system console

```
Shell> conconfig
CONSOLE CONFIGURATION
Index Status Type     Device Path
----- ------ ----     -----------
1      NC   Serial    Acpi(PNP0501,0)
2      S    Serial    Acpi(HWP0002,0)/Pci(1|1)
3       P    VGA      Acpi(HWP0002,0)/Pci(4|0)
```

Example B-11 `conconfig 2 primary`**Command**

To change primary operating system console

```
Shell> conconfig 2 primary
CONSOLE CONFIGURATION
 Index Status Type     Device Path
 ----- ------ ----     -----------
 1       NC  Serial    Acpi(PNP0501,0)
 2       P   Serial    Acpi(HWP0002,0)/Pci(1|1)
 3       S    VGA     Acpi(HWP0002,0)/Pci(4|0)
```

Example B-12 `conconfig 3 off`**Command**

To disable a console

```
Shell> conconfig 3 off
CONSOLE CONFIGURATION
Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC    Serial   Acpi(PNP0501,0)
 2      P     Serial   Acpi(HWP0002,0)/Pci(1|1
 3      NC    VGA      Acpi(HWP0002,0)/Pci(4|0)
```

Example B-13 `conconfig 3 on`**Command**

To enable a console

```
Shell> conconfig 3 on
CONSOLE CONFIGURATION
Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC    Serial   Acpi(PNP0501,0)
 2      P     Serial   Acpi(HWP0002,0)/Pci(1|1)
 3      S     VGA      Acpi(HWP0002,0)/Pci(4|0)
```

default

Enables you to restore non-volatile memory (NVM) to default values and clear NVM storage values.

Syntax

```
default     [efi|sal]
default      clear [bmc|efi|sal]
```

Parameters

```
clear      clears NVM storage values
```

Operation

Sets NVM and stable store values to predefined default values. Normally only a subset of values are available for default. To reset the system, execute the `default clear` command.

errdump

Displays the contents of processor internal memory logged on the first machine check abort (MCA) for all processors present in the system.

Syntax

```
errdump [mca | cpe | cmc | init | la | clear]
```

Parameters

```
mca                dumps the Machine Check Abort error log
cpe                dumps the Corrected Platform Error log
cmc                dumps the Corrected Machine Check log
init               dumps the Initialization log
la                 dumps the Logic Analyzer log
clear              erases all of the logs (mca, cpe, cmc, init, la)
```

Operation

Enter `errdump` with no parameters to display usage. Otherwise, the specified error log displays. Add `-n` to the clear parameter to disable the confirmation prompt. Access the `errdump` command from the System Configuration menu.

info

Displays most server information.

Syntax

```
info [ -b] [target]
```

Parameters

```
target:          valid targets are:
         all        display everything
         cpu        display information on cpus
         cache      display information on cache
         mem        display information on memory
         io         display information on io
         boot       display boot-related information
         chiprev    display information on chip revisions
         fw         display firmware version information
         sys        display system information
         warning    display warning and stop boot information
```

Example B-14 `info all` **Command**

```
Shell> info all
SYSTEM INFORMATION
Date/Time:  Sep 24, 2004  17:27:17  (20:04:09:24:17:27:17)
Manufacturer:  hp
Product Name:  server cx2620
Product Number:  AB333A
Serial Number:  USR0418201
UUID:  336B81EE-A9AF-11D8-9653-3F6E1533CC31
System Bus Frequency:  200 MHz
PROCESSOR MODULE INFORMATION
           # of                L3      L4      Family/
   CPU     Logical             Cache   Cache   Model          Processor
   Module  CPUs      Speed     Size    Size    (hex.)   Rev   State
   ------  -------  --------  ------  ------  -------  ---  ------------
     0        1      1.6 GHz    3 MB    None   1F/01    B1        Active

MEMORY INFORMATION

      ---- DIMM A -----  ---- DIMM B -----
       DIMM   Current     DIMM   Current
---   ------ ----------  ------ ----------
 0     256MB     Active   256MB     Active
 1     256MB     Active   256MB     Active
 2     ----               ----
 3     ----               ----
 4     ----               ----
 5     ----               ----

   Active Memory    : 1024 MB
   Installed Memory : 1024 MB

I/O INFORMATION

BOOTABLE DEVICES

   Order  Media Type  Path
   -----  ----------  ----------------------------------------
    1    CDROM      Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)


   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|0)
    00   20   02   01  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|1)
    00   40   01   00  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|0)
    00   60   01   00  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|0)
    00   60   01   01  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|1)
    00   80   01   00  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|0)
    00   80   01   01  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|1)
    00   C0   01   00  0x1000  0x0021   04  Acpi(HWP0002,600)/Pci(1|0)
    00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
    00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
    00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)

   System Wake-On-LAN: Enabled
```

```
BOOT INFORMATION

   Monarch CPU:

   Current  Preferred
   Monarch   Monarch
     CPU       CPU
   Module/   Module/
   Logical   Logical   Warnings
   -------  ---------  --------
     0/0       0/0

   AutoBoot: ON - Timeout is : 10 sec

   Boottest:

   BOOTTEST Settings Default Variable

   OS is not speedy boot aware.

   Selftest     Setting
   ---------    --------------
   early_cpu    Run this test
   late_cpu     Run this test
   platform     Run this test
   chipset      Run this test
   io_hw        Run this test
   mem_init     Run this test
   mem_test     Run this test

   LAN Address Information:

   LAN Address        Path
   -----------------  ---------------------------------------
  *Mac(000E7F7E07FA)  Acpi(HWP0002,100)/Pci(2|0)/Mac(000E7F7E07FA))
   Mac(000E7F7E07FB)  Acpi(HWP0002,100)/Pci(2|1)/Mac(000E7F7E07FB))

FIRMWARE INFORMATION

   Firmware Revision: 86.10 [4432]
      PAL_A: 7.31/5.37
      PAL_B: 5.69
      EFI Spec: 1.10
      EFI Intel Drop: 14.62
      EFI Build: 86.10
      SAL Spec: 3.01
      SAL_A: 2.00
      SAL_B: 86.10
      POSSE: 0.10
      ACPI: 7.00
      SMBIOS: 2.3.2a:

   BMC Revision: 3.42
      IPMI: 1.00
   Management Processor Revision: E.03.02
   Updatable EFI Drivers:

  ************ 2nd part **********************

   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
```

```
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|0)
    00   20   02   01  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|1)
    00   40   01   00  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|0)
    00   60   01   00  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|0)
    00   60   01   01  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|1)
    00   80   01   00  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|0)
    00   80   01   01  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|1)
    00   C0   01   00  0x1000  0x0021   04  Acpi(HWP0002,600)/Pci(1|0)
    00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
    00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
    00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)

   System Wake-On-LAN: Enabled

BOOT INFORMATION

   Monarch CPU:

   Current  Preferred
   Monarch   Monarch
     CPU       CPU
   Module/   Module/
   Logical   Logical   Warnings
   -------  ---------  --------
     0/0       0/0

   AutoBoot: ON - Timeout is : 10 sec

   Boottest:

   BOOTTEST Settings Default Variable

   OS is not speedy boot aware.

   Selftest     Setting
   ---------    --------------
   early_cpu    Run this test
   late_cpu     Run this test
   platform     Run this test
   chipset      Run this test
   io_hw        Run this test
   mem_init     Run this test
   mem_test     Run this test

   LAN Address Information:

   LAN Address         Path
   -----------------   ----------------------------------------
  *Mac(000E7F7E07FA)   Acpi(HWP0002,100)/Pci(2|0)/Mac(000E7F7E07FA))
   Mac(000E7F7E07FB)   Acpi(HWP0002,100)/Pci(2|1)/Mac(000E7F7E07FB))

FIRMWARE INFORMATION

   Firmware Revision: 86.10 [4432]
      PAL_A: 7.31/5.37
      PAL_B: 5.69
      EFI Spec: 1.10
      EFI Intel Drop: 14.62
      EFI Build: 86.10
      SAL Spec: 3.01
      SAL_A: 2.00
      SAL_B: 86.10
```

```
      POSSE: 0.10
      ACPI: 7.00
      SMBIOS: 2.3.2a:
   BMC Revision: 3.42
      IPMI: 1.00
   Management Processor Revision: E.03.02
   Updatable EFI Drivers:
      Floating-Point Software Assistance Handler:  00000118
      LSI Logic Ultra320 SCSI Driver:              01030000
      Broadcom Gigabit Ethernet Driver:            00070003
      Intel(R) PRO/1000 Ethernet Driver:           00002160

WARNING AND STOP BOOT INFORMATION

  Error[55]  : Invalid or inaccessible system ID(s)

CHIP REVISION INFORMATION

   Chip                  Logical     Device       Chip
   Type                     ID         ID       Revision
   -------------------   -------     ------     --------
   Memory Controller         0       122b         0023
   Root Bridge               0       1229         0023
     Host Bridge          0000       122e         0032
     Host Bridge          0001       122e         0032
     Host Bridge          0002       122e         0032
     Host Bridge          0003       122e         0032
     Host Bridge          0004       122e         0032
     Host Bridge          0006       122e         0032
     Host Bridge          0007       122e         0032
     Other Bridge            0          0         0002
       Other Bridge          0          0         0009
         Baseboard MC        0          0         0342
```

Example B-15 `info cpu` Command

This example has processor hyperthreading turned on:

```
Shell> info cpu

PROCESSOR MODULE INFORMATION

          # of                L3      L4      Family/
   CPU    Logical             Cache   Cache   Model          Processor
   Module CPUs     Speed      Size    Size    (hex.)   Rev   State
   ------ -------  --------   ------  ------  -------  ---   ------------
     0        4     1.4 GHz     6 MB    None   20/00    B0        Active
     1        4     1.4 GHz     6 MB    None   20/00    B0        Active

CPU threads are turned on.
```

This example has processor hyperthreading turned off:

```
Shell> info cpu

PROCESSOR MODULE INFORMATION

          # of                L3      L4      Family/
   CPU    Logical             Cache   Cache   Model          Processor
   Module CPUs     Speed      Size    Size    (hex.)   Rev   State
   ------ -------  --------   ------  ------  -------  ---   ------------
     0        2     1.4 GHz     6 MB    None   20/00    B0        Active
     1        2     1.4 GHz     6 MB    None   20/00    B0        Active

CPU threads are turned off.
```

Example B-16 `info mem` **Command**

```
Shell> info mem

MEMORY INFORMATION

     ---- DIMM A -----  ---- DIMM B -----
      DIMM   Current     DIMM   Current
---  ------ ----------  ------ ----------
 0    256MB     Active   256MB     Active
 1    256MB     Active   256MB     Active
 2    ----               ----
 3    ----               ----
 4    ----               ----
 5    ----               ----

   Active Memory    : 1024 MB
   Installed Memory : 1024 MB
```

Example B-17 `info io` **Command**

```
Shell> info io

I/O INFORMATION

BOOTABLE DEVICES

   Order  Media Type  Path
   -----  ----------  ------------------------------------
    1    CDROM      Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)


   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|0)
    00   20   02   01  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|1)
    00   40   01   00  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|0)
    00   60   01   00  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|0)
    00   60   01   01  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|1)
    00   80   01   00  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|0)
    00   80   01   01  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|1)
    00   C0   01   00  0x1000  0x0021   04  Acpi(HWP0002,600)/Pci(1|0)
    00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
    00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
    00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
   System Wake-On-LAN: Enabled
```

Example B-18 `info boot` **Command**

```
Shell> info boot

BOOT INFORMATION

   Monarch CPU:

   Current  Preferred
   Monarch   Monarch
     CPU       CPU
   Module/   Module/
   Logical   Logical   Warnings
   -------  ---------  --------
     0/0       0/0

   AutoBoot: ON - Timeout is : 10 sec

   Boottest:

   BOOTTEST Settings Default Variable

   OS is not speedy boot aware.

   Selftest     Setting
   ---------    --------------
   early_cpu    Run this test
   late_cpu     Run this test
   platform     Run this test
   chipset      Run this test
   io_hw        Run this test
   mem_init     Run this test
   mem_test     Run this test

   LAN Address Information:

   LAN Address         Path
   -----------------  ----------------------------------------
  *Mac(000E7F7E07FA)  Acpi(HWP0002,100)/Pci(2|0)/Mac(000E7F7E07FA))
   Mac(000E7F7E07FB)  Acpi(HWP0002,100)/Pci(2|1)/Mac(000E7F7E07FB))
```

lanaddress

Displays the core I/O MAC address.

Syntax:

```
lanaddress
```

Parameters

none

Example B-19 `lanaddress` **Command**

```
LAN Address Information:
   LAN Address        Path
   -----------------  ---------------------------------------
   Mac(00306E4C4F1A)  Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A))
  *Mac(00306E4C0FF2)  Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E4C0FF2))
```

monarch

Displays or modifies the ID of the bootstrap processor. The preferred monarch number is stored in NVM.

Syntax

```
monarch <cpu>
```

Parameters

```
<cpu>      specifies a cpu
```

Operation

If specified with no parameters, `monarch` displays the Monarch processor for the server. Specifying a processor number alters the preferred Monarch processor. None of these changes takes affect until after a reboot.

Example B-20 `monarch` **Command**

```
Shell> monarch
 Current   Preferred
 Monarch    Monarch     Possible Warnings
 -------   ---------    -----------------
       0           0
       0           0

To view monarch: fs0 :\ monarch

                  | Processor
------------------+-----------
current status    |    0
next boot status  |    0

To set the monarch processor to 1: fs0 :\ monarch 1

                  | Processor
------------------+-----------
current status    |    0
next boot status  |    1
```

pdt

Displays or clears the contents of the Page Deallocation Table (PDT).

Syntax

```
pdt (clear)
```

Parameters

```
<clear>      clears the pdt
```

Operation

With no options specified, the command displays the PDT information for the server. The PDT is cleared and a reboot is required for memory reallocation and safe booting.

Example B-21 `pdt` **Command**

```
Shell> pdt
PDT Information for PD

 Last Clear time for PD:  PDT has not been cleared
 Number of total entries in PD PDT:                  100
 Number of used entries in PD PDT:                  0
 Number of free entries in PD PDT:                  50
 Number of permanent correctable (SBE) entries in PD PDT:     0
 Number of permanent uncorrectable (MBE) entries in PD PDT:   0
 Address of first uncorrectable error in PD:   0x0000000000000000
```

Example B-22 `pdt clear` **Command**

```
Shell> pdt clear
Are you sure you want to clear the PDT? [y/N] y
Shell>

Shell> pdt
PDT Information

                Last Clear time: 10/21/01  5:00p
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error: 0x0000000000000000
```

sysmode

Displays or modifies the system mode.

Syntax

```
sysmode <normal | admin| service>
```

Parameters

```
<normal>     sets system mode to normal

<admin>      sets system mode to admin

<service>     sets system mode to service
```

Operation

If specified alone, sysmode displays the system mode. If a mode is specified as a parameter, the system mode changes immediately. The system mode is retained on successive boots.

Example B-23 `sysmode` **Command**

```
Shell> sysmode
System Mode: NORMAL

Shell> sysmode admin
You are now in admin mode.

Shell> sysmode service
You are now in service mode.

Shell> sysmode normal
You are now in normal mode
```

Specifying SCSI Parameters

The following SCSI parameters may be configured for the SCSI board:

- SCSI ID (SCSI initiator ID)
- Maximum data transfer rate (SCSI rate)
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)

Using the SCSI Setup Utility

To use the SCSI Setup Utility to specify SCSI parameters, follow these steps:

1. At the EFI Shell prompt, type the following command to map the parameters for all PCI-X cards installed in the server:

   `shell> info io`

   A list of all the devices that are installed in the server and managed by EFI drivers displays. For example:

```
I/O INFORMATION

BOOTABLE DEVICES

   Order  Media Type  Path
   -----  ----------  ----------------------------------------
     1    CDROM
Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)

   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|0)
    00   20   02   01  0x8086  0x1079   XX  Acpi(HWP0002,100)/Pci(2|1)
    00   40   01   00  0x1000  0x0021   03  Acpi(HWP0002,200)/Pci(1|0)
    00   60   01   00  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|0)
    00   60   01   01  0x1077  0x2312   02  Acpi(HWP0002,300)/Pci(1|1)
    00   80   01   00  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|0)
    00   80   01   01  0x1000  0x000F   01  Acpi(HWP0002,400)/Pci(1|1)
    00   C0   01   00  0x1000  0x0021   04  Acpi(HWP0002,600)/Pci(1|0)
    00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
    00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
    00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
   System Wake-On-LAN: Enabled
```

In this example, a single SCSI interface is listed.

For each channel of the SCSI board, note certain information. For example, look at the information for the SCSI interface. For each channel of *this* SCSI interface, note the following information:

- `Bus #`: Identifies the bus the device is on. This is the same for both channels. In this example, the bus number is `20`.
- `Dev #`: The ID the device is assigned on the bus. This is the same for both channels. In this example, the SCSI interface is device `01`.
- `Fnc #`: Identifies the channel of the device (`00` for channel A, `01` for channel B, and so on). In this example, because the SCSI interface has two channels, one channel is `00` and the other is `01`.
- `Vendor ID`: Shows the device vendor ID. This is the same for both channels. For all SCSI interfaces, the ID is `0x1000`.
- `Device ID`: Shows the device ID. This is the same for both channels. In this example, the SCSI interface the ID is `0x0030`.
- `Slot #`: Identifies the physical card slot in the system where the SCSI interface is installed. This is the same for both channels. In this example, the SCSI interface is on the system board, therefore the slot number is `xx`.
- `Path`: Identifies the device path. In this example, the SCSI interface path is `Acpi(HWP0002,200)/Pci(1|0)` for channel A and `Acpi(HWP0002,200)/Pci(1|1)` for channel B.

Using the SCSI interface information from this example, the combined information that tells you this is a SCSI interface are the following (shown in **bold**, for highlighting purposes):

```
00   20   01   00   0x1000   0x0030   xx   Acpi(HWP0002,200)/Pci(1|0)
00   20   01   01   0x1000   0x0030   xx   Acpi(HWP0002,200)/Pci(1|1)
```

The vendor (**0x1000**) and device (**0x0030**) are the IDs for a SCSI interface. Of the devices with those IDs, this device has two channels (Fnc # of **00** immediately followed by Fnc # of **01**). Also, this SCSI interface has a non-numeric (XX) slot # indicating that it is on the system board.

2. From the EFI Shell prompt, enter the following command to obtain the controller's handle for the SCSI interface:

   `devtree`

   A tree of all EFI-capable devices installed in the system displays. For example:

```
Shell> devtree
Device Tree
  Ctrl[04]
  Ctrl[06] VenHw(SysROM)
  Ctrl[0B] Acpi(HWP0002,0)
    Ctrl[15] Usb Open Host Controller
    Ctrl[16] Usb Open Host Controller
    Ctrl[17] Acpi(HWP0002,0)/Pci(1|2)
    Ctrl[18] PCI IDE/ATAPI Controller
      Ctrl[56] DV-28E-C
        Ctrl[91] FAT File System [FAT32] 118 MB
  Ctrl[0C] Acpi(HWP0002,100)
    Ctrl[1C] LSI Logic Ultra320 SCSI Controller
    Ctrl[1D] LSI Logic Ultra320 SCSI Controller
    Ctrl[1E] Acpi(HWP0002,100)/Pci(2|0)
      Ctrl[57] Acpi(HWP0002,100)/Pci(2|0)/Mac(000E7F7E07FA)
    Ctrl[1F] Acpi(HWP0002,100)/Pci(2|1)
      Ctrl[58] Acpi(HWP0002,100)/Pci(2|1)/Mac(000E7F7E07FB)
  Ctrl[0D] Acpi(HWP0002,200)
    Ctrl[20] Acpi(HWP0002,200)/Pci(1|0)
  Ctrl[0E] Acpi(HWP0002,300)
    Ctrl[22]  HP 2 Gb Dual Port PCI/PCI-X Fibre Channel Adapter ( Port 1)
    Ctrl[23]  HP 2 Gb Dual Port PCI/PCI-X Fibre Channel Adapter ( Port 2)
```

```
Ctrl[0F] Acpi(HWP0002,400)
  Ctrl[24] Acpi(HWP0002,400)/Pci(1|0)
  Ctrl[25] Acpi(HWP0002,400)/Pci(1|1)
Ctrl[10] Acpi(HWP0002,600)
  Ctrl[26] Acpi(HWP0002,600)/Pci(1|0)
Ctrl[11] Acpi(HWP0002,700)
  Ctrl[27] Acpi(HWP0002,700)/Pci(1|0)
  Ctrl[28] Acpi(HWP0002,700)/Pci(1|1)
    Ctrl[43] 16550 Serial UART Driver
      Ctrl[44] VT-100+ Serial Console
        Ctrl[3E] Primary Console Input Device
        Ctrl[3F] Primary Console Output Device
        Ctrl[3D] Primary Standard Error Device
  Ctrl[29] Acpi(HWP0002,700)/Pci(2|0)
Ctrl[40] Acpi(PNP0501,0)
  Ctrl[41] 16550 Serial UART Driver
    Ctrl[42] VT-100+ Serial Console
Ctrl[54] VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
```

This information describes the SCSI interface because the path on the first line, `Acpi(HWP0002,100)`, is the path from the information displayed by the `info io` command. The next two lines describe the SCSI interface two channels, one line for each channel. The lines contain the SCSI interface description [`LSI Logic Ultra160 SCSI Controller`]. The value shown for `Ctrl—17` and `18` at the beginning of each line is the controller's handle for each channel. You need this value for the next step.

NOTE: The controller's handle values change on every boot.

3. From the EFI Shell prompt, enter the following command to obtain the EFI driver's handle for the SCSI interface:

   `Shell> drvcfg`

   A list of all EFI-capable configurable components in the system is displayed. For example:

   ```
   Shell> drvcfg
   Configurable Components
   Drv[3D] Ctrl[15] Lang[eng]
   Drv[3F] Ctrl[19] Lang[eng]
   Drv[45] Ctrl[1C] Lang[eng]
   Drv[45] Ctrl[1D] Lang[eng]
   ```

   This listing shows which driver controls which device (controller). This information describes a SCSI interface because the values shown for `Ctrl—17` and `18`—are the controller's handles for the SCSI interface two channels (from the information displayed by the `devtree` command).

NOTE: The EFI driver's handle values change on every boot.

TIP: From this command (`drvcfg`), record these two pieces of information for each channel of each SCSI interface for parameters to be changed:

- `Drv` (the EFI driver's handle)
- `Ctrl` (the controller's handle)

4. Using the driver's handle [`Drv`] and the controller's handle [`Ctrl`] from the `drvcfg` command, start the EFI SCSI Setup Utility for one channel of this SCSI interface.

   At the EFI Shell prompt, enter:

   `Shell> drvcfg -s drvr_handle cntrl_handle`

   where

- *drvr_handle*. The handle of the driver that controls the channel with the SCSI ID you want to display or change
- *cntrl_handle* . The handle of the controller for the channel with the SCSI ID you want to display or change

For channel A of this SCSI interface, enter:

```
Shell> drvcfg -s 45 18
```

5. The EFI SCSI Setup Utility starts and its main menu displays, showing a list of all the EFI capable SCSI interfaces in the system.

   Move the cursor to highlight the channel of the SCSI interface. Press **Enter** to determine which channel of the interface to highlight, match the `PCI-X Bus`, `PCI-X Dev`, and `PCI-X Func` values on this screen to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command.

CAUTION: Do not select the <**Global Properties**> option on the main menu.

TIP: To move the cursor in the EFI SCSI Setup Utility, use the following keys:

- Arrow keys: ↑ ↓ ← →
- Alternate keys:

  H = left

  J = down

  K = up

  L = right

  I = home

  O = end

6. The **Adapter Properties** screen for this channel of the SCSI interface displays. Be sure the utility is running for the channel of the SCSI interface by comparing the values shown for

PCI-X Bus, PCI-X Device, and PCI-X Function to the Bus #, Dev #, and Fnc # values from the info io command.

CAUTION: Do not change the value for any of these fields on the **Adapter Properties** screen:

- Auto Termination
- SCSI Parity
- SCSI Bus Scan Order
- Spinup Delay (Secs)

Changing any of these fields can cause unpredictable results.

CAUTION: Do not change the value for *any* of these fields on the **Device Properties** screen:

- Scan Id
- Scan LUNs > 0
- Disconnect
- SCSI Timeout
- Queue Tags
- Format
- Verify

Changing any of these fields can cause unpredictable results.

---

7. Display the SCSI parameters listed below for the channel of the SCSI interface and change the parameters if necessary, or restore its SCSI parameters to their default values.
   - SCSI ID
   - Maximum data transfer rate
   - Bus width
   - Whether the SCSI interface is bootable (driver support)
   - Avoid bus resets (secondary cluster server)
   - Restore Defaults
8. Use the arrow keys to navigate to the appropriate SCSI parameter.
9. Use the plus (**+**) and minus (**-**) keys to scroll through the values until the value you want displays.
10. Press **Esc** to exit the **Adapter Properties** screen.
11. Move the cursor to the action (cancel, save, or discard) you want to take, and press **Enter**.Select one of the following options:
    - Cancel the exit to stay on the **Adapter Properties** screen for the channel of the SCSI interface.
    - Save the changes you made, then exit the screen.
    - Discard the changes you made, then exit the screen.

    If you select cancel, you remain in the **Adapter Properties** screen for the channel of the SCSI interface. You can still change the channel's parameters.

    If you select save or discard, you go to the EFI SCSI Setup Utility main menu.

CAUTION: Do not select the <Global Properties> option on the main menu.

---

12. Press **Esc** to exit the main menu and the EFI SCSI Setup Utility.
13. Select the option for exiting the utility.
14. When you are prompted, press **Enter** to stop the SCSI interface; you are now at the EFI Shell prompt.
15. At the EFI Shell prompt, enter the following command:

    Shell> reset

    The system starts to reboot. This is required to cause the new SCSI setting.

Using the Boot Option Maintenance Menu

This menu allows you to select console output and input devices as well as various boot options. It contains the following items:

- Boot From File
- Add Boot Entry
- Edit Boot Entry
- Remove Boot Entry
- Edit OS Boot Order
- AutoBoot Configuration
- BootNext Configuration
- Driver Configuration
- Console Configuration
- System Reset

These items are described in the following sections.

The following selections are available on all menus:

- **Help**: Displays the help available for the command.
- **Exit**: Returns to the main Boot Options Maintenance menu.
- **Enter**: Selects an item after using the arrow keys to highlight the item.
- **Save Settings to NVRAM**: Saves your changes.

NOTE: The options shown here are examples. Your server may have different options available based on the server configuration and installed hardware components.

Paths

All devices in servers are represented by paths in the EFI Shell. To identify the correct slot or disk drive, use the following tables.

Table B-3 Server Sockets

Socket	Path
1 PCI-X	Acpi(HWP0002,400)/pci(1|0)
2 PCI-X	Acpi(HWP0002,300)/pci(1|0)
3 PCI-X	Acpi(HWP0002,200)/pci(1|0)
4 PCI-X	Acpi(HWP0002,600)/pci(1|0)

Table B-4 Server Drives

Drive	Path
SCSI Disk (HDD1)	Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun2,Lun0)
SCSI Disk (HDD2)	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
SCSI Disk (HDD3)	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
Removable Media Boot	Acpi(HWP0002,0)/Pci(2|0)/ATA

Boot From File

Use this option to manually run a specific application or driver.

NOTE: This option boots the selected application or driver one time only. When you exit the application, you return to this menu.

This option displays the file systems that are on your server or workstation and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi`extension. You can also select remote boot (LAN) options that have been configured on your network.

For example:

```
Boot From a File. Select a Volume
    NO VOLUME LABEL [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM
    CD_FORMAT [Acpi(HWP0002,0)/Pci(2|0)/Ata(Secondary,Master)/CDROM
    Removable Media Boot [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,Master)
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)]
    Exit
```

Where:

- `NO VOLUME LABEL`: A hard drive. When you format a hard drive, the EFI tools provide an option to LABEL the disk. In this example, the volume is not labelled.
- `CD_FORMAT`: The label created for the disk currently inside the DVD drive.
- `Removable Media Boot`: Allows you to boot from a removable media drive (CD/DVD drive). This option does not support booting from a specific file on a specific CD.
- `Load Files`: The EFI Shell and the LAN.

Add a Boot Option

Use this option to add items to the EFI boot menu.

This option displays the file systems that are on your system and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi`extension. You can also select remote boot (LAN) options that have been configured on your network. The option you have selected will be added to the EFI boot menu.

If you add a new drive to your system, you must manually add its boot options list if you want to make it a bootable device.

When adding a boot option that already exists in the Boot Manager list of boot options, you can choose whether to create a new option or modify the existing one. If you:

- To modify an existing option, change the boot option name or add boot option arguments to the existing option.

NOTE: If you create a new boot option for an already existing option, multiple instances of the same boot option exist.

For example:

```
Add a Boot Option. Select a Volume
NO VOLUME LABEL [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM
    Removable Media Boot [Acpi(HWP0002,0)/Pci(2|0)/Ata(Secondary,Master)
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)]
    Exit
```

Where:

- NO VOLUME LABEL: A hard drive. You can search through the disk for bootable applications to add to the Boot Manager list of Boot options.
- `Removable Media Boot`: Treats the removable media as a bootable device.

- `Load File EFI Shell`: Adds a new instance to the EFI Shell. Load File with the MAC address adds a network boot option.
- `Load File with the MAC address`: Adds a network boot option.

Edit Boot Entry

Use this option to edit the boot options on the EFI boot menu.

NOTE: This does not delete any files, applications or drivers from your server.

This option displays a list of boot options that are configured on your server. The names will match the options on the main Boot Manager menu.

If you remove a drive from your server, you must manually delete it from the boot options list.

- To delete an item from the list, use the arrow keys to highlight the item and press Enter.
- To remove all of the entries from the EFI boot menu, select Delete All Boot Options. This setting may be used as a security device on servers that are accessed remotely.

Delete Boot Option(s)

Use this option to remove boot options from the EFI boot menu.

NOTE: This does not delete any files, applications, or drivers from your system.

This option displays a list of boot options that are configured on the system. The names match the options on the main Boot Manager menu.

If you remove a drive from the system, you must manually delete it from the boot options list.

- To delete an item from the list, use the arrow keys to highlight the item and press **Enter**.
- To remove all of the entries from the EFI Boot menu, select **Delete All Boot Options**. This setting can be used as a security device on systems that are accessed remotely.

Change Boot Order

Use this option to remove boot options entry. The order in which options are listed in the EFI boot menu also reflects the order in which the server attempts to boot. If the first boot option fails, the server tries booting the second, then the third, and so forth, until a boot option succeeds or until all options have failed.

For example, if you normally boot using a configuration on your LAN but would like to boot from a local hard drive if the LAN is unavailable, move the LAN boot option to the top of the list, followed by the hard drive boot option.

The menu lists boot options that currently exist in the main Boot Manager menu. You can change the priority of the items by moving them up or down in the list:

- Press`U`to move an option up.
- Press`D`to move an option down.
- Select Save Settings to NVRAM to modify the order in the Boot Manager menu, which modifies the order that the Boot Manager will attempt to boot the options.
- The items at the bottom of the screen (shown in bold in these examples) are descriptions of the selected option.

For example:

```
Change boot order. Select an Operation
    EFI Shell [Built-in]
    Current OS
    Save Settings to NVRAM
    Help
    Exit

    VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
    Boot0000
```

Manage BootNext Setting

Use this option to run the selected boot option immediately upon entering the main Boot Manager menu. This option is useful for booting an option that only needs to be booted once, without changing any other setting in the main Boot Manager menu. This is a one-time operation and does not change the permanent system boot settings.

This option displays the file systems that are on your system and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi`extension. You can also select remote boot (LAN) options that have been configured on your network.

To restore the default BootNext setting, select **Reset BootNext Setting**.

For example:

```
Manage BootNext setting. Select an Operation
    EFI Shell [Built-in]
    Current OS
    Reset BootNext Setting
    Save Settings to NVRAM
    Help
    Exit

    VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
    Boot0000
```

Set AutoBoot TimeOut

Use this option to set the amount of time the system pauses before attempting to launch the first item in the Boot Options list.

For example:

```
Set Auto Boot Timeout. Select an Option
    Set Timeout Value
    Delete/Disable Timeout
    Help
    Exit
```

Interrupting the timeout during the countdown stops the Boot Manager from loading any boot options automatically. If there is no countdown set, you must select boot options manually.

- To set the auto boot timeout value, in seconds, select **Set Timeout Value** and enter the desired value.
- To disable the timeout function, select **Delete/Disable Timeout**.

NOTE: When this option is selected, the server does not automatically boot. The server stops at the EFI boot menu and waits for user input.

Select Active Console Output Devices

Use this option to define the devices that display output from the system console. This list includes the VGA monitor and a serial port for directing output to a terminal emulation package.

NOTE: If you install a modem in your server, make sure you disable the modem serial port in both the Active Console Input and Active Console Output device lists.

NOTE: Some operating systems support multiple consoles, such as a simultaneous serial and VGA output. See your OS documentation to determine how many consoles are supported with your server. Multiple consoles are not supported for HP-UX.

For example:

```
Select the Console Output Device(s)
      Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
```

```
* Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
* Acpi(HWP0002,700)/Pci(2|0)
```

* indicates a currently selected device.

This menu is identical to **Console Error Devices**. HP Integrity servers do not support different configurations for Output and Error console. For correct operation:

- When changes are made to either Output or Error console menus, the identical change must be made in both menus.
- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

Table B-5 Console Output Devices

To select:	Choose:
Serial A/Serial 1	Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
iLO MP Serial Console	Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
iLO MP VGA Port	Acpi(HWP0002,700)/Pci(2|0)

- Each option is identified with an EFI device path. Not all options will be available, depending on the configuration of the server and the options purchased. Device paths may differ slightly on different product models.
- On both serial device examples, UART 9600 indicates the current baud rate of the serial device (can be changed with the EFI Shell baud command), VenMsg Vt100+ is the current emulation type (several different terminal emulation protocols are supported, see list above).
- Only one terminal emulation type (PcAnsi, Vt100, etc.) can be selected for each serial console, but multiple serial consoles can be selected at a time.

Select Active Console Input Devices

Use this option to define the devices that are used to provide input to the system console. This list normally includes the VGA monitor and a serial port for directing output to a terminal emulation package.

NOTE: If you install a modem in your server, make sure you disable the modem serial port in both the Active Console Input and Active Console Output device lists.

NOTE: Some operating systems support multiple consoles, such as a simultaneous serial and VGA output. See your OS documentation to determine how many consoles are supported with your server. Multiple consoles are not supported for HP-UX.

For example:

```
Select the Console Output Device(s)
      Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
* Acpi(HWP0002,700)/Pci(2|0)
```

* indicates a currently selected device.

This menu is identical to Console Error Devices. HP Integrity servers do not support different configurations for Output and Error console. For correct operation:

- When changes are made to either Output or Error console menus, the identical change must be made in both menus.
- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

Table B-6 Console Input Devices

To select:	Choose:
Serial A/Serial 1	Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
iLO MP Serial Console	Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
iLO MP VGA Port	Acpi(HWP0002,700)/Pci(2|0)

- Each option is identified with an EFI device path. Not all options will be available, depending on the configuration of the server and the options purchased. Device paths may differ slightly on different product models.
- On both serial device examples, UART 9600 indicates the current baud rate of the serial device (can be changed with the EFI Shell baud command), VenMsg Vt100+ is the current emulation type (several different terminal emulation protocols are supported, see list above).
- Only one terminal emulation type (PcAnsi, Vt100, etc.) can be selected for each serial console, but multiple serial consoles can be selected at a time.

Select Active Standard Error Devices

Use this option to define the devices that display error messages from the system console.

This menu is identical to the Console Output Devices menu. The server does not support different configurations for Output and Error console. When you make changes to either Output or Error console menus, you must make the identical change in the other menu. When you change serial devices, you must make changes to Output, Input, and Error menus for proper operation

Using the System Configuration Menu

The **System Configuration** menu on servers with EFI firmware version 2.0 or higher includes the following options:

- Security/Password Menu: Enables you to change the administrator and user passwords.
- Advanced System Information Menu: Displays information about system and component configuration.
- Set System Date: Enables you to modify the system date.
- Set System Time: Enables you to modify the system time.
- Reset Configuration to Default: Enables you restore system settings to their original configuration.
- Help: Displays additional information about the available options.
- Exit: Returns to the EFI startup menu.

Security/Password Menu

You can set administrator and user passwords to provide different levels of access to the system firmware.

Resetting Passwords

If you forget your passwords, reset them by running using the iLO MP `<Ctrl+N>rs`command. This commando resets the iLO MP and resets the password.

NOTE: You can only run this command when directly connected to the server.

Advanced System Information

The **Advanced System Information** menu displays information about server and component configuration.

Set System Time

Set System Time lets you modify the server time.

Set System Date

Set System Date lets you modify the server date.

Set User Interface

Set User Interface lets the user change the legacy boot manager user interface.

Set System Wake-On LAN

Set System Wake-On LAN lets the user enable/disable the server Wake-On_LAN settings.

Set System Defaults

Set System Defaults lets you select server default settings.

iLO MP

The **Integrated Lights-Out** Management Processor (iLO MP) for entry-level Integrity servers is an autonomous management subsystem embedded directly on the server. It is the foundation of the server's High Availability (HA), embedded server, and fault management. It also provides system administrators secure remote management capabilities regardless of server status or location. The iLO MP is available whenever the system is connected to a power source, even if the server main power switch is in the off position.

HP has used several different names over the years to describe the management functionality embedded in their servers, including "the management processor." In addition, HP uses the term "management processor" to refer to any embedded microprocessor that manages a system. Management processor is a descriptive term (such as "server"), and iLO, is a brand name, or label (such as "Integrity").

Remote access is the key to maximizing efficiency of administration and troubleshooting for enterprise servers. Integrity servers have been designed so all administrative functions that can be performed locally on the machine, can also be performed remotely. iLO enables remote access to the operating system console, control over the server's power and hardware reset functionality, and works with the server to enable remote network booting through a variety of methods.

For complete information on the iLO MP, see the *HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide*.

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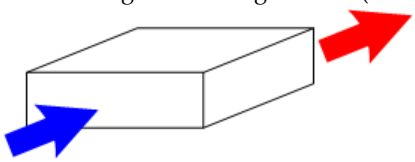
C Physical and Environmental Specifications

Table C-1 provides temperature and airflow information for minimum, typical, and maximum configurations for the server. It also lists the server and rack weights and dimensions. Use this table as a convenient point of reference.

Table C-1

	Condition					Weight		Overall System (W x D x H)
	Typical Heat Release	Airflow, Nominal		Airflow, Maximum at 35°C [1]				
	Voltage -40 to -60 Vdc					Server	Rack	Rack
Minimum Config.	340 Watts	178 CFM	302 m³/hr	216 CFM	367 m³/hr	28.1 kg - 31.75 kg (62 lb - 70 lb)	31.75 kg (70 lb)	W: 44.5 cm (17.5 in) D: 50.8 cm (20 in) H: 17.8 cm (7 in)
Maximum Config.	650 Watts							
Typical Config.	580 Watts							
ASHRAE Class 1	Air Flow Diagram Cooling Scheme (F - R)  Front to Rear (F-R)					Minimum Config.	One CPU, one power supply, [2] 1 GB DIMM, one DVD or one CD-RW/DVD, zero PCI–X cards, one HDD.	
						Maximum Config.	Two CPUs, two power supplies, 32 GB DIMMs, one DVD or one CD-RW/DVD, four PCI–X card, three HDDs.	
						Typical Config.	One CPU, two power supplies, 12 GB DIMMs, one DVD or one CD-RW/DVD, two PCI–X cards, two HDDs.	

1 Derate maximum dry bulb temperature 1oC/300 m above 900 m.

2 While only one power supply can be used, N+1 redundancy requires that a second power supply be installed.