Hewlett Packard Enterprise

HPE Integrity rx2620 Server User Service Guide

Contents

About This Document

This document provides information and instructions on servicing and troubleshooting the HPE Integrity rx2620 Server.

The document publication date and part number indicate the document's current edition. The date changes when a new edition is published. 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 that you receive the updated or new editions, you should subscribe to the appropriate product support service. See your Hewlett Packard Enterprise sales representative for details.

The latest version of this document can be found on line at http://www.hpe.com/info/Integrity_Servers-docs.

Intended Audience

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

New and Changed Information in This Edition

Update to the instructions for setting the EFI date and time in "Replacing the System Board" (page 73).

Publishing History

The publishing history below identifies the edition dates of this manual. Updates are made to this publication on an unscheduled, *as needed*, basis. The updates will consist of a complete replacement manual and pertinent on-line documentation.

Table 1 Publishing History Details

Document Manufacturing Part Number	Publication Date
AD117-9003A	August 2006
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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.11.11	HP-UX 11i v1	PA-RISC
B.11.20	HP-UX 11i v1.5	Intel® Itanium®

Table 2 HP-UX 11i Releases *(continued)*

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

Document Organization

This guide is divided into the following chapters.

Chapter 1   *Introduction* Use this chapter to learn about the features and specifications of the Integrity rx2620 server.

Chapter 2   *Controls, Ports, and LEDs* Use this chapter to learn about the locations of the external controls, ports, and LEDs on the server.

Chapter 3   *Powering Off and Powering On the Server* Use this chapter to learn about powering the server off and on.

Chapter 4   *Removing and Replacing Components* Use this chapter to learn how to remove and replace the field replaceable components (FRUs) on the server.

Chapter 5   *Troubleshooting* Use this chapter to learn about troubleshooting problems you may encounter with the server.

Appendix A   *Parts Information* Use this appendix to learn the location and part numbers of the server components.

Appendix B   *Operating System Boot and Shutdown* Use this appendix to learn about booting and shutting down the operating system on the server.

Appendix C   *Utilities* Use this appendix for information regarding the utilities available for the server.

Appendix D   *Console Setup and Connection* Use this appendix to learn about the process for setting up a console session and connecting to the server.

1 Introduction

The rx2620 server is a 2-socket server based on the Itanium® processor architecture.

The server supports the following operating systems: Microsoft Windows®, HP-UX, Linux, and OpenVMS®. The server is available in either rack-mount or pedestal configurations. The server accommodates up to 12 DIMMs and internal peripherals including disks and a DVD. Its high availability features include hot-swap fans, power supplies, and hot-plug disk drives.

Server Overview

The rx2620 server chassis is a 2U Electronics Industry Association (EIA) enclosure, which mounts in any standard 19-inch EIA rack. All external cabling connects from the rear of the enclosure. With the server installed in the rack, service access is enhanced by the use of chassis slides. The server has bays to accommodate 1 + 1 redundant, hot-swappable power supplies, accessible from the front of the product. There are three low-profile hot swappable hard drives accessible from the front, and a slim-line optical drive for a CD-R, CD-RW, DVD-R, or DVD+RW. There are N + 1 redundant, hot-swappable server fans, all clearly identified and easily accessible. Server status indication, a power switch, server locator switch, and LED are located in the front within the bezel. A server locator switch and LED is in the back of the server for easy identification in the rack. See Figure 1, Figure 2, and Figure 3 for front and back views of the server.

Figure 1 rx2620 Server (front view)
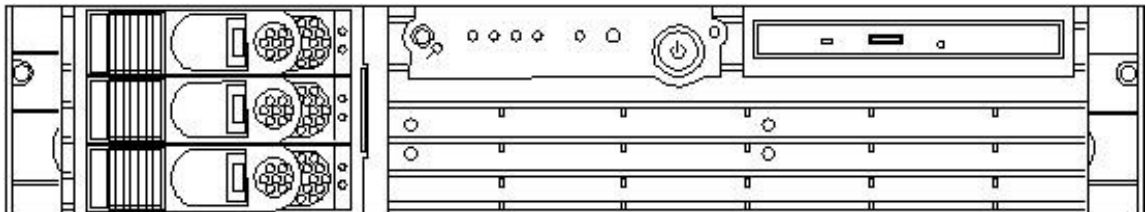
Figure 2 rx2620 Server (front view with bezel removed)
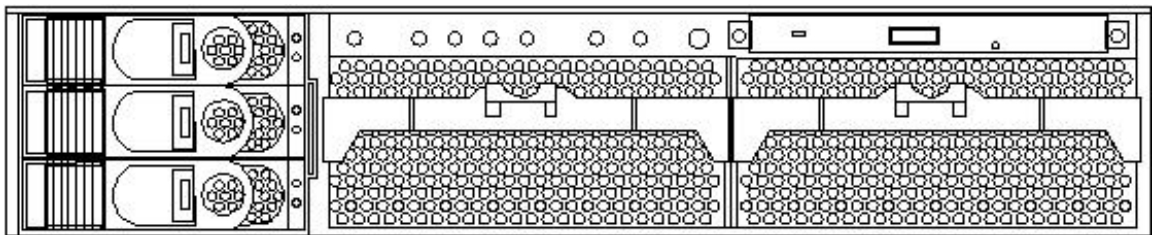
Figure 3 rx2620 Server (rear view)
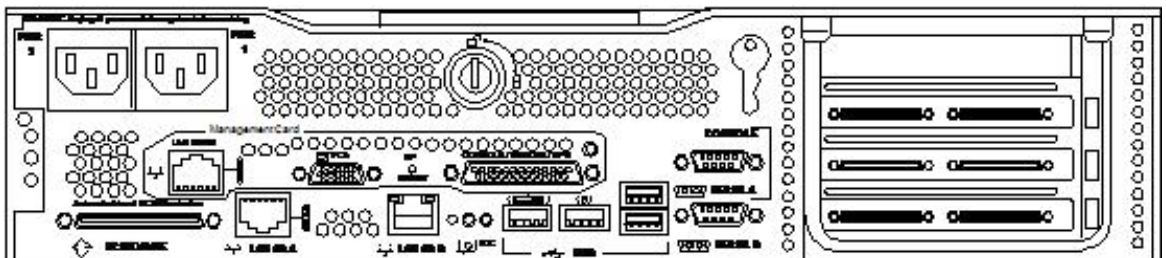
Server Dimensions

Table 3 shows the dimensions and weight of the server.

Table 3 Server Dimensions

Dimensions	Value
Rack units	2U
Height	8.6 cm (3.4 in.)
Width	48.3 cm (19.0 in.)
Depth	67.9 cm (26.8 in.)
Weight • Minimum • Maximum	17.5 kg (38.6 lb.) 22.2 kg (49.0 lb.)

Server Components

The server consists of the following components:

Processor

- 1.4 GHz/12 MB L3 cache dual-core processor
- 1.6 GHz/18 MB L3 cache dual-core processor

Memory

- 12 memory DIMM slots
- 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB standard 184 pins 2.5 V DDR1, CL2, registered, ECC
- 133 MHz memory bus frequency, 266 M transfers/s data, 8.5 Gb/s peak data bandwidth
- Minimum memory size of 1 GB with four 256 MB DIMMs
- Maximum memory size of 32 GB with eight 4 GB DIMMs
- Upgrades must be made by quads of DIMMs
- DIMMs loaded by quads enable interleaved mode and chip spare

PCI Riser

- Four independent PCI-X 133 MHz 64 bit, 3.3 V, 15 W slots. There is no 5 V card or hot-plug support.

NOTE: Some 25 W cards are supported. See the *Server I/O Slot Matrix* on the Hewlett Packard Enterprise website at http://www.hpe.com

For more information regarding specific I/O cards, see http://www.hpe.com/info/hpux-iocards-docs.

Internal Core I/O

- Dual channel SCSI U320 interface, two internal 68-pin connectors, one 68-pin external connector
- Three internal SCSI drive 80-pin type connectors that provide drive electrical hot-plug capability
- One internal IDE connector for a slim-line optical device (CD and DVD)

External Core I/O

- One SCSI U320 68 pin connector
- Two 10/100/1000Base-T Ethernet LAN connectors for twisted-pair cable
- Four USB 2.0 ports
- Two general purpose or 9-pin serial ports, 16550 compatible

Power Supply Unit

- 600 W output power
- Front-end block (the actual power supply case) that converts the line voltage into a high DC voltage.

    Back-end voltage regulation modules (on the system board) that step down the front-end DC voltage to the required voltages
- Redundant and hot-pluggable power supplies (front-end block only)

System Board Manageability

- Baseboard Management Controller (BMC)
- Temperature monitoring and fans regulation by BMC
- BMC manageability console shared with server console and general purpose serial port
- IPMI protocol for communication between BMC/server/MP hardware
- BMC hardware diagnostics display on the front status panel
- E-buzzer remote hardware diagnostics on phone lines for support
- Locator front/rear LEDs
- Field replacement units monitoring by BMC
- Serial port for local and modem console
- Wake-on-LAN and Alert-on-LAN capabilities from the 10/100/1000 BT LAN port

Enhanced Server Manageability Using the Integrated Lights Out Management Processor

The integrated Lights Out Management Processor (iLO MP) provides the following enhancements to server manageability:

- Web-based graphical user interface (GUI)
- LAN telnet console
- Web console
- Serial port for local console
- Serial port for modem console
- Duplication of console screen content across all consoles
- VGA and 2 D graphics display
- Advanced Features:

    ◦ Secure Shell (SSH) access

    ◦   Group actions through the Systems Insight Manager (HPE SIM)

    ◦   Directory-based authentication and authorization (LDAP)

Hard Drives

The server supports the following hard drives:

- 36 GB 15K hot-plug Ultra320 SCSI drive
- 73 GB 15K hot-plug Ultra320 SCSI drive
- 146 GB 10K hot-plug Ultra320 SCSI drive
- 300 GB 10K hot-plug Ultra320 SCSI drive

The server holds up to three hard drives.

System Board Components

This section provides a block diagram of the system board and descriptions of key components (integrated circuits) on the board. Figure 4 shows a block diagram of the server.

Figure 4 System Block Diagram
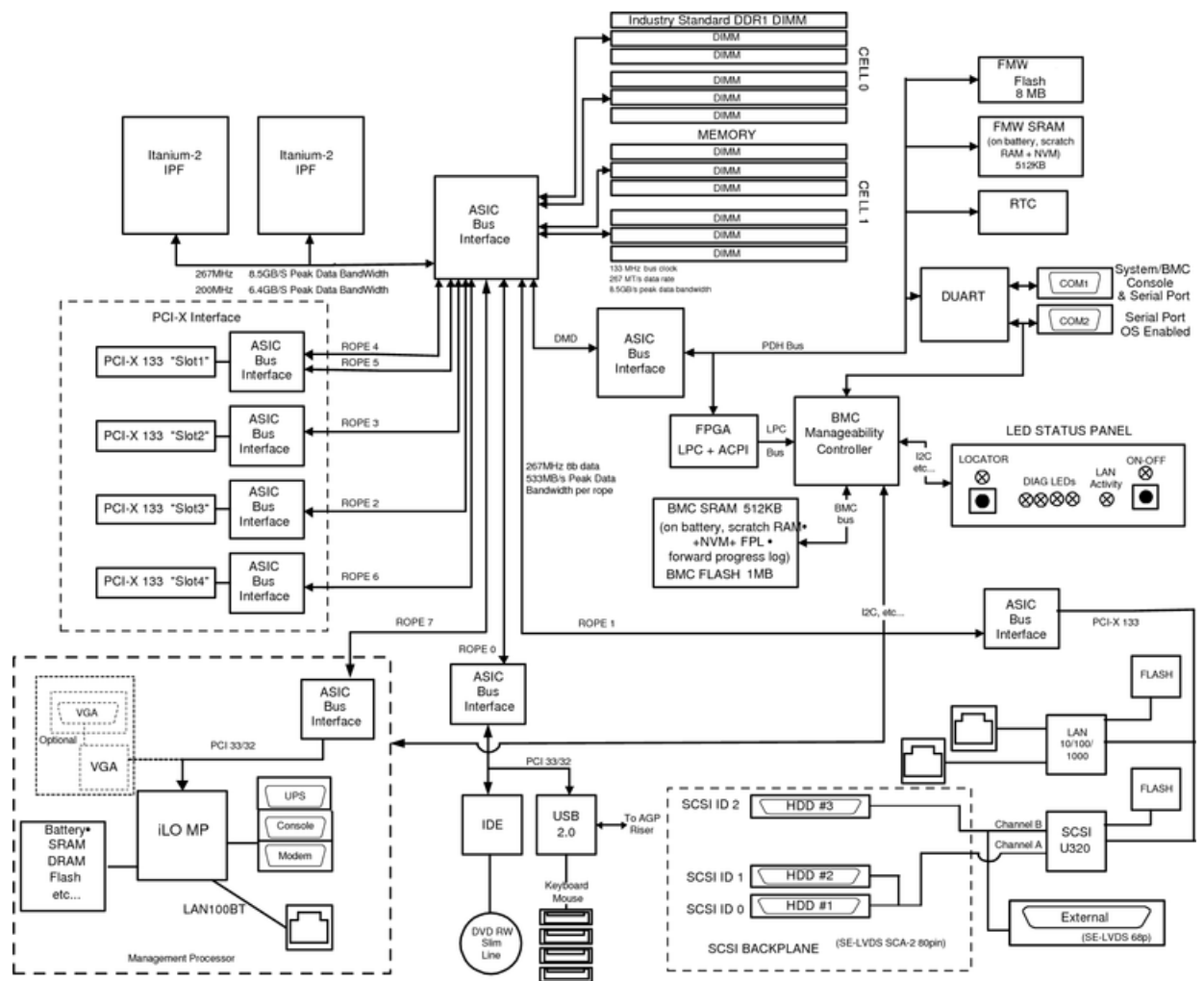
The following describes the main components of the system board:

Processor Sockets

The system board consists of two zero insertion force (ZIF) processor sockets, the core electronic complex (CEC), and circuitry for clock and power generation and distribution, boundary scan, in-target probe, and debug.

The front side bus (FSB) is the IA64 processor bus, based on bus protocol from Intel. Unlike previous PA-RISC microprocessors that utilized Hewlett Packard Enterprise proprietary processor buses, this processor is designed to utilize the FSB. This allows processor field replaceable units (FRUs) to be dropped in, provided that electrical and mechanical compatibility and support circuitry exist. For the purposes of this document, a FRU consists of a single processor with power pod, and the heat sink assembly.

Each processor plugs directly into, and is powered by its own 12 V to 1.2 V power pod. Other power for the system board comes from multiple on-board DC to DC converters. Each processor is attached to the board through a ZIF socket and the entire FRU secured by a heat sink.

Processor Bus

The FSB in this product runs at 200 MHz. Data on the FSB are transferred at a double data rate, which allows a peak FSB bandwidth of 6.4 Gb/s.

ZX1 I/O and Memory Controller

The server supports the following features of the ZX1 I/O and memory controller chip:

- 8.5 Gb/s peak I/O bandwidth
- Seven communication paths
- Peak memory bandwidth of 8.5 Gb/s
- Two memory cells, 144 data bits each

Memory

The memory subsystem provides two memory cells. Each cell is 144 data bits wide. Each cell has six DIMM slots, which means a total of 12 DIMM slots are available. The memory bus clock speed is 133 MHz, and the data transfer rate is 266

Mtransfers/s as data is clocked on both edges of the clock. The peak data bandwidth for this memory subsystem design is 8.5 Gb/s. Load DIMMs in quads with qualified modules. Memory is protected by data ECC, and the hardware implementation supports chip-spare.

The minimum amount of memory supported by the server is 1 GB (four 256 MB modules). The maximum amount of memory supported by the server is 32 GB (eight 4 GB modules).

This design does not support any nonindustry-standard DDR DIMMs. Only qualified DIMMs are supported. Figure 5 shows a block diagram of the server memory.

Figure 5 Memory Block Diagram
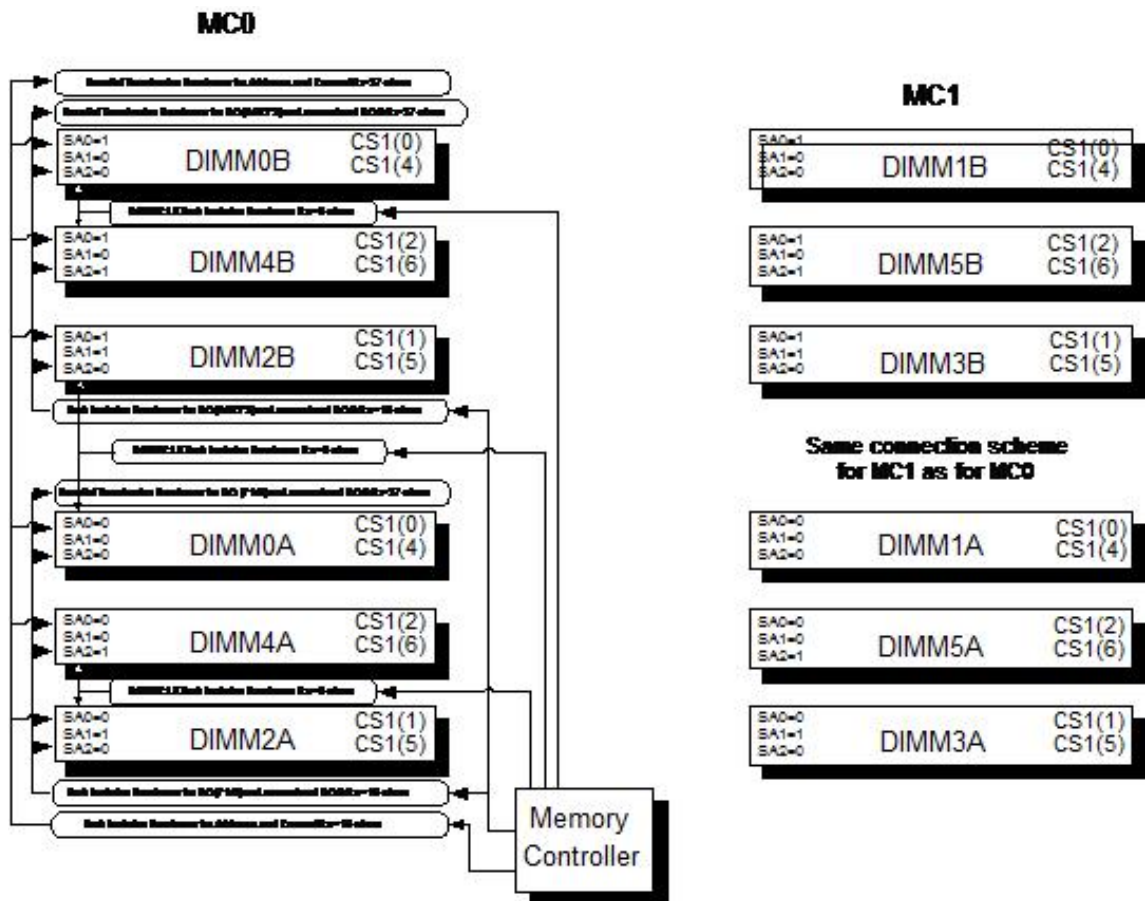
Memory Architecture

The I/O ASIC memory interface supports two DDR cells. Each cell is 144 data bits wide. The memory subsystem physical design uses a comb-filter termination scheme for the data and the address and control buses. This topology is similar to other DDR designs. Clocks are distributed directly from the I/O ASIC. Each clock pair drives two DIMMs.

Memory data is protected by the ECC. Eight ECC bits per DIMM protect 64 bits of data. The use of ECC allows correction of single-bit errors, and detection of multi-bit errors. Only DIMMs with ECC are qualified or supported.

DIMMs

The memory subsystem supports only DDR SDRAM (Double Data Rate Synchronous Dynamic Random Access Memory) technology utilizing industry-standard PC-1600 type DDR SDRAM DIMMs, 1.2" tall. The DIMMs use a 184-pin JEDEC standard connector.

DIMMs are loaded in a group of four, known as a quad. All four DIMMs in a quad must be the same size. Table 4 summarizes the memory solutions.

Table 4 Memory Array Capacities

Mininum/Maximum Memory Size	Single DIMM Size	DDR SDRAM Count, Type, and Technology
1 GB / 3 GB	256 MB DIMM	18 x 32 MB x 4 DDR1 SDRAMs (128 MB)
2 GB / 6 GB	512 MB DIMM	36 x 32 MB x 4 DDR1 SDRAMs (128 MB)
4 GB / 12 GB	1024 MB DIMM	36 x 64 MB x 4 DDR1 SDRAMs (256 MB)
8 GB / 24 GB	2048 MB DIMM	36 x 128 MB x 4 DDR1 SDRAMs (512 MB)
32 GB / 32 GB	4096 MB DIMM	36 x 256 MB x 4 DDR1 SDRAMs (1024 MB)

Chip Spare Functionality

Chip spare enables an entire DDR SDRAM chip on a DIMM to be bypassed in the event that a multi-bit error is detected on the DDR SDRAM. To use the chip spare functionality on your server, use only DIMMs built with ×4 DDR SDRAM parts, and load these DIMMs in quads.

The memory subsystem design supports the I/O ASIC chip spare functionality. Chip spare enables an entire SDRAM chip on a DIMM to be bypassed/replaced in the event that a multi-bit error is detected on that SDRAM. To use the chip spare functionality, use only DIMMs built with x4 SDRAM parts, and load these DIMMs in quads (two DIMMs per memory cell, loaded in the same location in each memory cell). Each DIMM within a quad must be identical to all the other DIMMs in the quad.

Chip spare is achieved if four identical DIMMs are loaded into a quad. If more DIMMs are added, they must be loaded in quads to maintain the chip spare functionality. So, if more DIMMs are added in to the example case, four identical DIMMs (identical to each other, but can be different from the original quad that was loaded) must be loaded into the next quad. However, if you are using 4 GB DIMMS, the only configuration supported is eight 4 GB DIMMS in the first three quads, with no other DIMMs in the remaining quad. For slot and quad locations, see Figure 37 (page 48).

Serial Presence Detect

Each DIMM contains an I2C electronically erasable programmable read-only memory (EEPROM) whose content describes the module characteristics. This feature is called serial presence detect (SPD). Firmware typically uses this information to detect unmatched pairs of DIMMs and configure certain memory subsystem parameters. The SPD information for DIMMs loaded in the server is also accessible to the BMC through the I2C bus.

I/O Bus Interface

The I/O bus interface provides these features:

- Industry-standard PCI 33 MHz and 66 MHz, PCI-X 66 MHz to 133 MHz, 32 or 64 data bit support

- 3.3 V PCI only (does not support 5 V PCI)

- DMA performance optimization

- 3.3 V or Universal keyed PCI card support (not 5 V keyed PCI cards)

- Up to four PCI sockets

Processor Dependent Hardware Controller

The PDH controller provides these features:

- 16-bit PDH bus with reserved address space for the following:

- ○ Flash memory

  - ○ Nonvolatile memory

  - ○ Scratch RAM

  - ○ Real-time Clock

  - ○ UARTs

  - ○ External registers

  - ○ Firmware read/writable registers

  - ○ Two general purpose 32-bit registers

  - ○ Semaphore registers

  - ○ Monarch selection registers

  - ○ Test and Reset register

- Reset and INIT generation

Dual Serial Controller

The dual serial controller is a dual universal asynchronous receiver and transmitter (DUART). This chip provides enhanced UART functions with 16-byte first-in, first-out (FIFO), a modem control interface. Registers on this chip provide onboard error indications and operation status. An internal loopback capability provides onboard diagnostics.

Features include:

- Data rates up to 115.2 kbps

- 16550A fully compatible controller

- A 16-byte transmit FIFO that reduces the bandwidth requirement of the external CPU

- A 16-byte receive FIFO with four selectable interrupt trigger levels and error flags that reduce the bandwidth requirement of the external CPU

- UART control that provides independent transmit and receive

- Modem control signals (-CTS, -RTS, -DSR, -DTR, -RI, -CD, and software controllable line break)

- Programmable character lengths (5, 6, 7, 8) with Even, Odd or No Parity

- A status report register

Field Programmable Gate Array

The field programmable gate array (FPGA) provides ACPI and LPC support for the PDH bus and provides these features:

- ACPI 2.0 interface

- LPC bus interface to support BMC
- Decoding logic for PDH devices

Baseboard Management Controller

The baseboard management controller (BMC) supports the industry-standard Intelligent Platform Management Interface (IPMI) specification. This specification describes the management features that have been built into the system board. These features include: local and remote diagnostics, console support, configuration management, hardware management, and troubleshooting.

The baseboard management controller provides the following:

- Compliance with IPMI 1.0
- Tachometer inputs for fan speed monitoring
- Pulse width modulator outputs for fan speed control
- Push-button inputs for front panel buttons and switches
- One serial port, multiplexed with the server console port
- Remote access and intelligent chassis management bus (ICMB) support
- Three I2C primary/secondary ports (one port is used for IPMB)
- Low pin count (LPC) bus provides access to three keyboard controller style (KCS) and one-block transfer (BT) interface
- 32-bit ARM7 processor
- 160-pin low profile flat pack (LQFP) package
- Firmware is provided for the following interfaces:
    - Intelligent platform management interface (IPMI)
    - Intelligent platform management bus (IPMB)

SCSI Controller

The SCSI controller is an LSI Logic 53C1030 chip. This chip is fully compliant with the SCSI Peripheral Interface-3 Specification (SPI-3). It has two independent SCSI channels supporting devices at speeds up to 320 Mb/s each. The 53C1030 adheres to the PCI-X addendum to the PCI Local Specification and is hard-wired to PCI ID 1, which corresponds to bit 17 of the PCI AD bus.

IDE Interface

The IDE controller (PCI649) supports the ATAPI zero to five modes (from 16 to 100 Mb/s). The usable speed on this server is limited to 16 MHz (ATA-33 mode, 33 Mb/s) because the slimline CD/DVD devices do not support the ATA-66 and 100 modes.

The primary IDE channel is the only channel that is implemented. The IDE cable provides only one drive connector, of the primary type, for the DVD peripheral.

1 Gb System LANs A and B

The 1 Gb system LAN ports A and B provide:

- Main server LANs
- 10/100/1000 Mb capability

USB Connectors

The USB connectors provide:

- High speed 480 Mb/s capability

- Full speed 12 Mb/s

- Low speed 1.5 Mb/s

- USB keyboard and mouse support

- HP-UX support for HPE USB keyboard and mouse

Data Pathing Information

Table 5 shows data path information for the server.

Table 5 Data Pathing

Slot ID	Bus Number	Device Number	Function Number	Device ID	Path
01	80	01	00	0x000B	Acpi(HWP0002,PNP0A03,400)/Pci(1|0)
02	60	01	00	0x1029	Acpi(HWP0002,PNP0A03,300)/Pci(1|0)
03	40	01	00	0x01A7	Acpi(HWP0002,PNP0A03,200)/Pci(1|0)
04	C0	01	00	0x2312	Acpi(HWP0002,PNP0A03,600)/Pci(1|0)

2 Controls, Ports, and LEDs

This chapter describes the controls, ports, and LEDs on the front and rear panels of the server.

Front Panel

The control panel at the front of the server provides the controls and indicators commonly used for operation.   For the location and description of the front panel controls and LEDs, see Figure 6, Figure 7, Table 6, and Table 7.

Figure 6 Front View
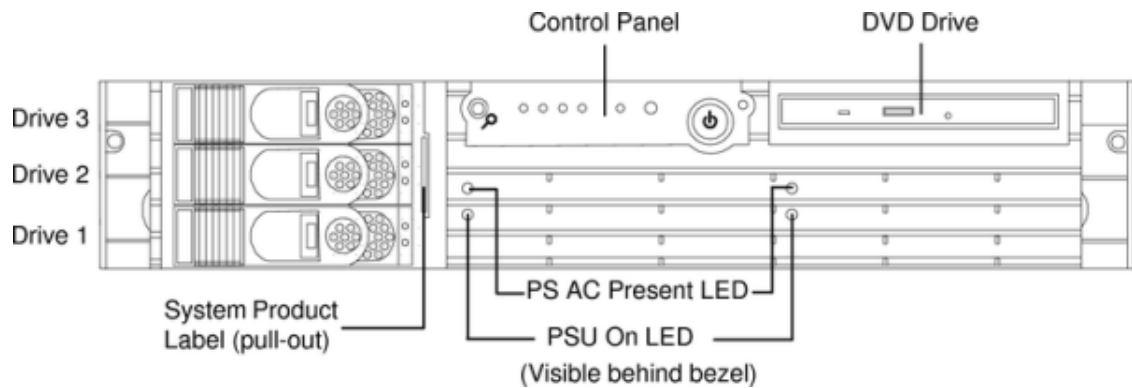
Figure 7 Control Panel
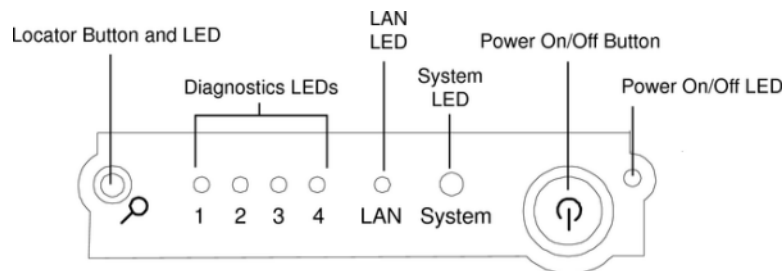
Table 6 Control Panel LEDs and Switches

Name	Function
Power On/Off LED	The green on/off LED illuminates when the power is on.
Power On/Off Button	This button powers the server on and off. See Table 2-2 for detailed operation.
System LED	The System LED provides information about the system status. When operation is normal, the LED is green. When there is a system warning, the LED flashes yellow. When there is a system fault, the LED flashes red.[1]
LAN LED	The LAN LED provides status information about the LAN interface. When the LAN LED flashes, there is activity on the LAN.
Diagnostic LEDs 1 – 4	The four diagnostic LEDs operate in conjunction with the system LED to provide diagnostic information about the system.[1]
Locator Button and LED	The Locator button and LED are used to help locate this server within a rack of servers. When the button is engaged, the blue LED illuminates and an additional blue LED on the rear panel of the server illuminates. This function can be remotely activated.

See Chapter 5: "Troubleshooting" (page 83) for information provided by the system and diagnostic LEDs.

Table 7 Power On/Off Button

Button/Switch	Description
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 power is available to the power supplies, pressing the Power button: • Momentarily (less than 5 seconds) turns on the power supplies and applies power to server circuits. • More than 5 seconds, then released, has no effect. If power is on and the system is at initial system loader, pressing the Power button: • Momentarily (less than one second) has no effect. • More than one second, but less than five seconds—do not use. This initiates e-buzzer functions that are not supported in the server. • More than five seconds, then released, causes an immediate hard power off. If power is on and the system is at BCH, pressing the Power button: • Momentarily (less than one second) causes a immediate and hard power off. • More than one second, but less than five seconds—do not use. This initiates e-buzzer functions that are not supported in the server. • More than five seconds, then released, causes an immediate hard power off. If power is on but the operating system shuts down, pressing the Power button: • Momentarily (less than 5 seconds) causes a system power off. • More than five seconds, then held, causes a system power off. If the OS is running, pressing the Power button: • Momentarily (less than 5 seconds) requests a soft power down by the operating system. The operating system determines if the power off request is to be honored. • More than five seconds, then released, causes an immediate hard power off without allowing the operating system to close open files or flush disk caches possibly resulting in a corrupted disk system or file. This should only be used when the operating system is not responding to user requests.

Hot-Plug Disk Drive Indicators

The hot-plug disk drives have two LEDs per drive. For the location and description of the hard drive LEDs, see Figure 8 and Table 8.

Figure 8 Hot-Plug Disk Drive LED Indicators
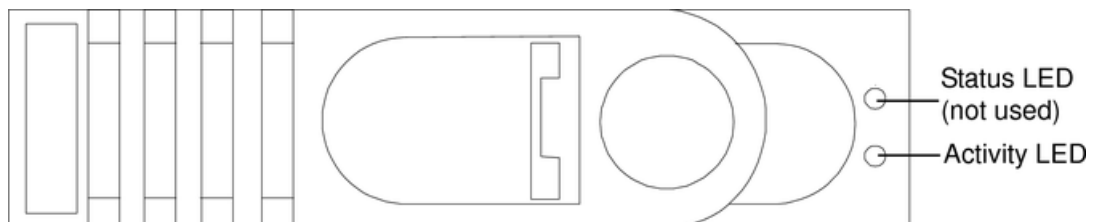
Table 8 Hard Drive LED Definitions

LED	Activity	Description
Status LED	Not used	Not used in the server.
Activity LED	Flashing green	Indicates disk drive activity. This LED is directly controlled by the drive and illuminates when a drive is accessed.

Power Supply LEDs

The server is typically delivered with a single power supply (PS 1). An additional power supply (PS 2) can be installed for redundant (n+1) power capability. For the location and description of the power supply LEDs, see Figure 9 and Table 9.

Figure 9 Power Supply LEDs

PS 1 LEDs
— AC Present LED (upper)
— PSU On LED (lower)

PS 2 LEDs
— AC Present LED (upper)
— PSU On LED (lower)

(Visible behind bezel)
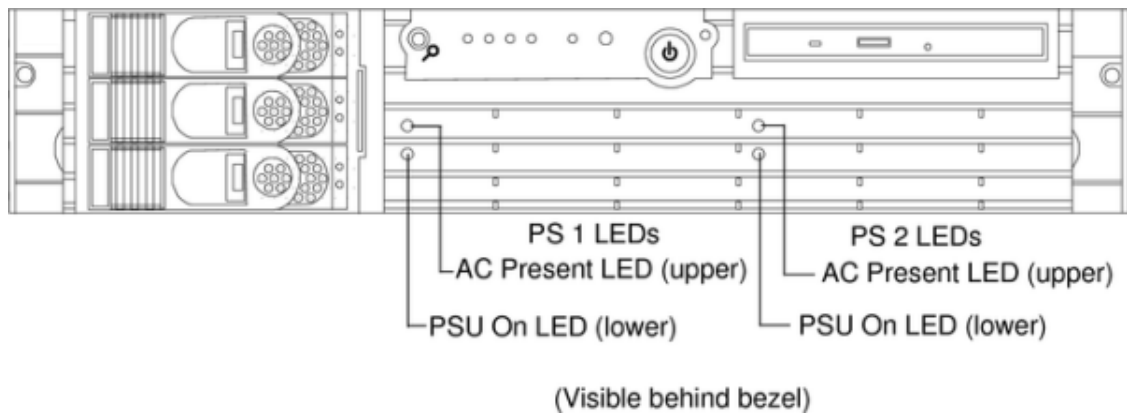
Table 9 Power Supply LED Definitions

LED	State	Description
AC Present LED	Solid green	AC line voltage within the operation voltage specification is present.
PSU On LED	Solid green	DC line voltage within the operation voltage specification is present.

Optional Removable Media Drive

The server is delivered without a removable media drive. Either a DVD or CD-RW/DVD drive can be added. Each of these optional devices has one activity LED. Sor the location and description of the DVD LEDs, see Figure 10 and Table 10.

Figure 10 DVD LEDs

DVD

Activity LED   Eject Button   Emergency Eject
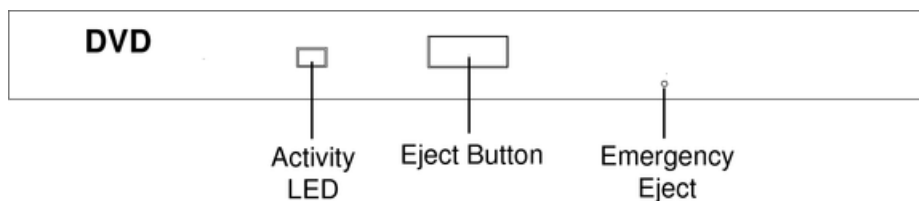
Table 10 DVD Drive LED Definitions

LED	State	Description
Activity LED	Flashing green	Drive activity

Rear Panel

The server rear panel includes communication ports, I/O ports, AC power connectors, and the Locator LED/button. Additional LEDs located on the rear panel of the server signal the operational status of the LAN connector of the optional iLO MP. For the location and description of the ports and connectors, see Figure 11 and Table 11.

Figure 11 Rear View
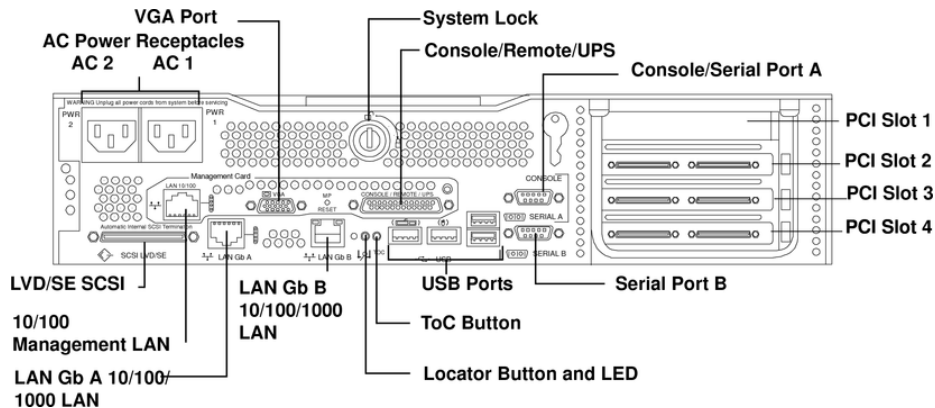
Table 11 Rear Panel Connectors and Switches

Connector/Switch	Function
AC Power	Primary power connection (AC1) for the server. A second connector (AC2) is available for the optional, N+1 redundant power supply.
LVD/SE SCSI	68-pin, low-voltage differential, single-ended U320 SCSI. This connector provides external SCSI connection on Core SCSI Channel B
(LAN Gb A) 10/100/1000 LAN	10/100/1000 base-T Ethernet LAN connector
(LAN Gb B) 10/100/1000 LAN	10/100/1000 base-T Ethernet LAN connector
Serial A (console) and Serial B	9-pin male serial connectors. Serial Port A is used as the console connection when the optional iLO MP is not installed.
USB	Four universal serial bus (USB 2.0) connectors
TOC	Transfer of Control button. Halts all system processing and I/O activity and restarts the computer system preserving system memory contents.
Locator Button and LED	The Locator button and LED are used to help locate a server within a rack of servers. When the button is engaged, the blue LED illuminates and an additional blue LED on the front panel of the server illuminates. This function can be remotely activated by the LOC command of the optional iLO MP.
VGA (optional)[1]	15-pin female video connector. The optional iLO MP provides a connector to support a VGA monitor.
Console/Remote/UPS (optional)	25-pin female serial data bus connector for the optional iLO MP. This connector connects to a three-port breakout cable (HPE P/N A6144-63001) with individual connectors for Console, Remote and UPS. The Console connector becomes the console connection when iLO is installed.
10/100 iLO MP LAN (optional)	10/100 Mb LAN connector for the optional iLO MP. Provides LAN console access allowing Wake-On-LAN, Power-On-LAN, and Alert-On-LAN functions. For details on iLO MP commands, see the *HPE Integrity and HPE 9000 iLO Operations Guide*.

[1] Graphics cards can include a 15-pin connector, an 18-pin connector, or both. Only one connecting cable is needed for each monitor.

Some video cards are preinstalled in the system, while others are packaged separately and shipped with the system. If your system did not ship with a preinstalled graphics card, you must install the card and load the drivers. See the documentation included with your graphics card.

Frequencies of 85Hz and higher provide flicker-free viewing.

If the monitor you select is DDC-2B or DDC-2B+ compliant, the graphics card automatically limits itself to those resolutions and frequencies supported by that monitor.

For a complete and current list of supported cards, see: http://partsurfer.hpe.com.

For detailed information about individual graphics cards, see the respective manufacturer's website.

LAN Gb A Connector

The rear panel 10/100/1000 base-T Ethernet LAN Gb A connector has the following status and activity LEDs. See Figure 12 and Table 12 for the location and description of the LAN Gb A LEDs.

Figure 12 10/100/1000 base-T Ethernet Gb LAN A Connector LEDs
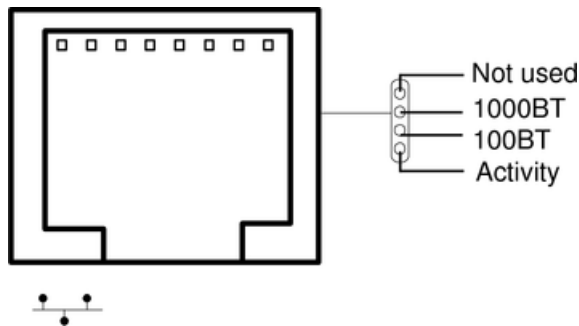
Table 12 10/100/1000 base-T Ethernet Gb LAN A Connector LEDs

LED	State	Color	Description
1000BT	Flashing	Amber	The 1000 MHz with Ethernet protocol and twisted-pair wiring is enabled, off: no link.
100BT	Flashing	Green	The 100 MHz with Ethernet protocol and twisted-pair wiring is enabled, off: no link.
Activity	Flashing	Green	LAN activity. With all other LEDs off, activity is 10BT link.

LAN Gb B Connector

The rear panel 10/100/1000 base-T Ethernet LAN Gb B connector has the following status and activity LEDs. See Figure 13 and Table 13 for the location and description of the LAN Gb B LEDs.

Figure 13 10/100/1000 base-T Ethernet Gb LAN B Connector LEDs
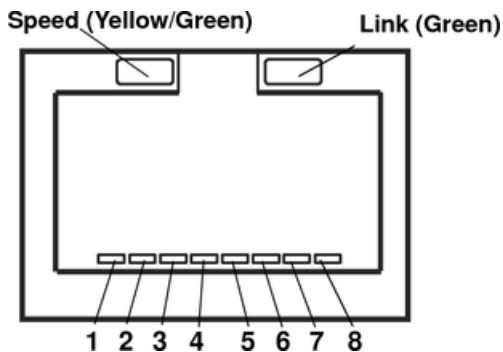
Table 13 10/100/1000 base-T Ethernet Gb LAN B Connector LEDs

Location	Color	Description
Speed (upper left)	Amber	1000 MHz with Ethernet protocol and twisted-pair wiring is enabled
	Green	100 MHz with Ethernet protocol and twisted-pair wiring is enabled
	Off	No link 10 MHz with Ethernet protocol and twisted-pair wiring is enabled
Link (upper right)	Flashing green	LAN activity
	Off	No link

Management Processor LAN LEDs

The LAN port of the optional Integrated Lights Out (iLO) Management Processor (MP) uses an RJ-45 type connector. This connector has four LEDs that signal status and activity. The iLO MP is required for Proactive 24 or Critical Service support. See Figure 14 and Table 14 for the location and description of the MP LAN LEDs.

Figure 14 MP LAN LEDs
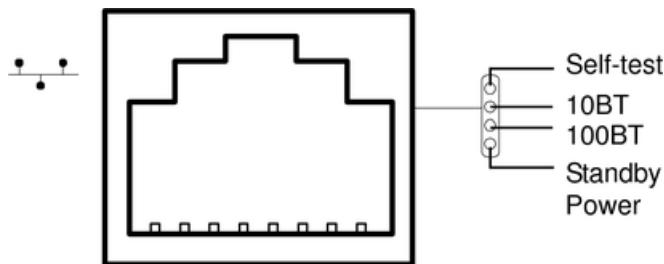
Table 14 iLO MP LAN LEDs

LED	Color	Description
Self-test	Yellow	iLO is running self-test or error detected
10 BT	Green	10 BT link established
	Flashing green	10 BT link activity
		Off: no link
100 BT	Green	100 BT link established
100 BT	Flashing green	100 BT link activity
100 BT		Off: no link
Standby Power	Green	Standby power on
Standby Power		Off: standby power off

3 Powering Off and Powering On the Server

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

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 either the power is activated through the iLO MP `PC` command, or the Power button is activated. In the off state, the power cords are not plugged in. Table 15 shows the server power states.

Table 15 Power States

Power States	Power Cable Plugged Into Receptacle?	Power Activated through the iLO MP `PC` Command; or Front Panel Power Button Activated?	AC Voltage Applied	DC Voltage Applied
Standby power	Yes	No	Yes	No
Full power	Yes	Yes	Yes	Yes
Off	No	No	No	No

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

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 `PC` command

- Power button

Powering Off the Server Using iLO

To power off the server using iLO:

1. Gracefully shut down the operating system. See Appendix B (page 116), or your operating system documentation.
2. Initiate 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.

△ **CAUTION:** The main DC voltage is now removed from the server; however, AC 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 iLO:

1. Gracefully shut down the operating system. See Appendix B (page 116), or your operating system documentation.
2. Press the Power button to power off the server.

ⓘ **IMPORTANT:** The main DC voltage is now removed from the server; 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.

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 `PC` command
- Power button

Powering On the Server Using iLO

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

To power on the server through iLO:

1. Plug all power cables into the receptacles on the rear panel of the server.
2. Initiate 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 Appendix B (page 116), or your operating system documentation.

Powering On the Server Manually

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

To manually power on the server:

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 Appendix B (page 116), or your operating system documentation.

4 Removing and Replacing Components

This chapter describes the procedure for removing and replacing the different components in the server.

ESD Information

Follow the procedures listed below to ensure safe handling of components and to prevent harm to both you and the server:

- Use an anti-static wrist strap and a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit (HPE 9300-1155).

- Handle accessory boards and components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards.

- Do not wear clothing subject to static charge build-up, such as wool or synthetic materials.

Required Tools

Service of this product might require one or more of the following tools:

- IPF CPU Installation Tool Kit (P/N 5069-5441), consisting of:

  - Disposable ESD Kit

  - Label-less CPU install tool (2.5mm hex and T-15 Torx screwdrivers)

- 1/4 inch standard screwdriver

- Phillips No. 1 Screwdriver

- ACX-10 Torx screwdriver

- ACX-15 Torx screwdriver

- ACX-25 Torx screwdriver

Internal Component and Connector Locations

Figure 15 and Table 16 show the locations of the internal server components.

Figure 15 Internal Physical Layout
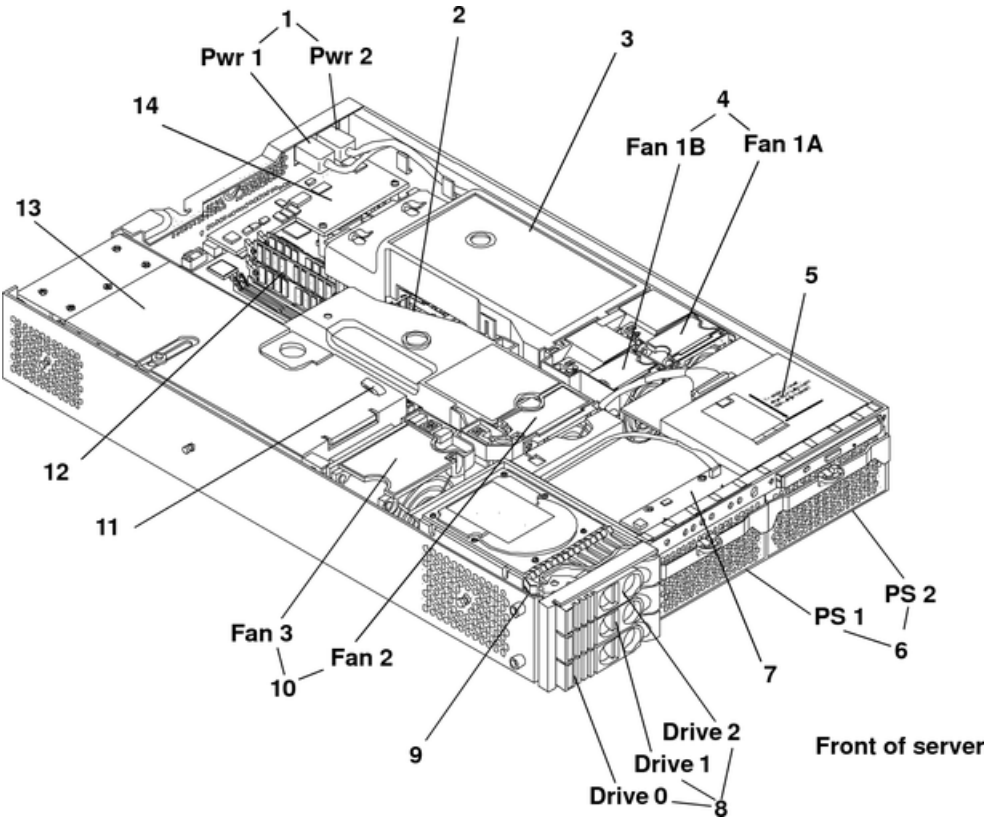
Table 16 Component Locations

1 Power receptacles (PWR 1 right, PWR 2 left)	8 Hot-pluggable hard drives (up to 3)
2 Memory airflow guide	9 Hard disk lock
3 Processor airflow guide	10 System fans (fan 2 - memory, fan 3 - I/O cage)
4 System fans (fan 1A - right, fan 1B - left)	11 Intrusion switch
5 Slimline optical drive	12 Memory sockets
6 Power supplies (PSU1 center; PSU2 to the right)	13 PCI cage
7 Status panel board	14 Management controller (Optional)

Figure 16 shows the location of the connectors and slots on the system board.

Figure 16 System Board Connectors and Slots
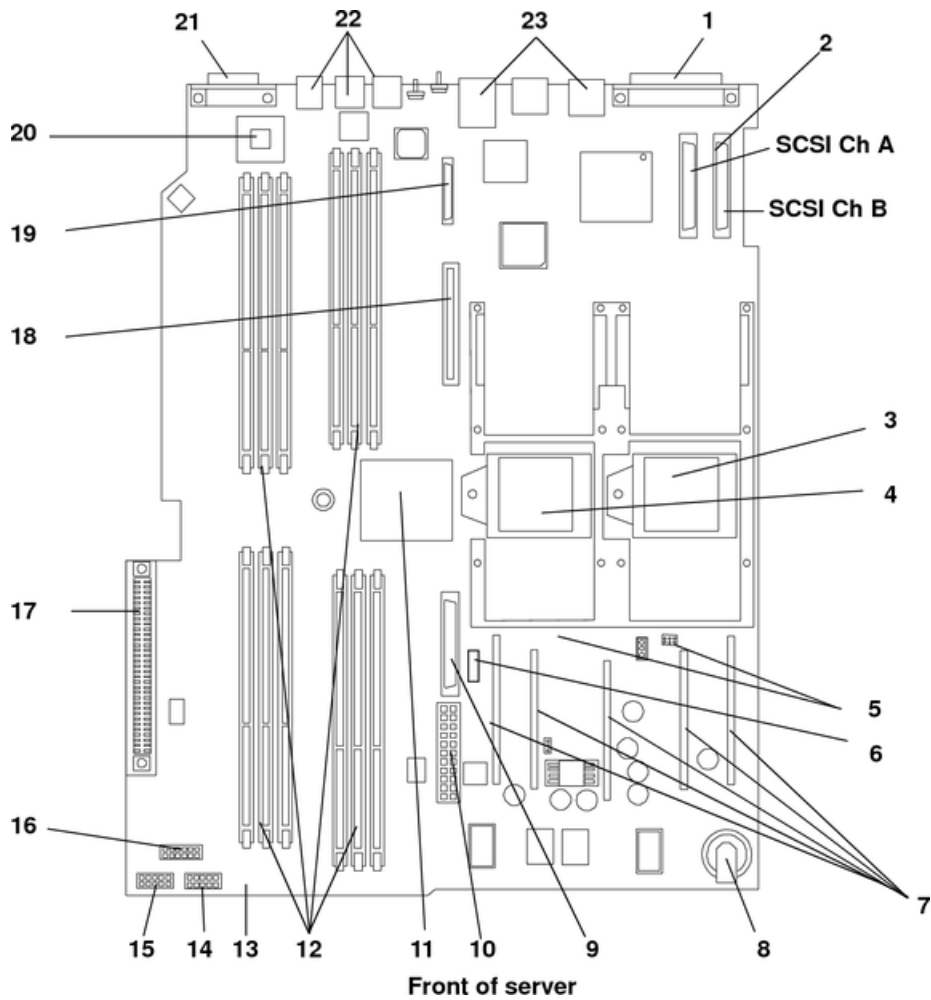
Table 17 Connector Locations

1 External SCSI connector	9 PDH connectors	17 PCI backplane connector
2 SCSI connectors A and B	10 Power module power connector	18 Optical drive connector
3 CPU 0 slot	11 ZX1 memory and I/O controller (under heat sink)	19 iLO hardware connector
4 CPU 1 slot	12 Memory sockets (4)	20 HPE ZX1 I/O adapter
5 Turbo fan power connectors (2)	13 Status panel connector	21 Serial ports (2)
6 Fan Connector	14 Power module auxiliary connector	22 USB connectors (4)
7 VRM cards (5)	15 SCSI backplane power connector	23 LAN connectors (2)
8 Battery	16 PCI/memory fan cable connector	

Removing and Replacing System Top Metal Cover and Bezels

To upgrade, remove, or replace most server components, you must first remove the top metal cover from the server chassis.

⚠ **WARNING!** Do not remove the server covers without powering off the server and unplugging the power cord from the outlet or power protection device unless you are only replacing a hot-swappable fan.

When the server is running, you must replace the top metal cover within 30 minutes to prevent components from overheating. If the top metal cover is not replaced within 30 minutes, the server automatically shuts down. If the server shuts off, always replace the cover before turning the server back on.

Rack-Mount System

This section explains how to remove and replace the cover for the rack-mount configuration.

To access the internal components on a rack-mounted server, pull the server out on the rail guides and remove the top metal cover.

Accessing a Rack Mounted Server

The 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. For rack installation instructions, review the *HPE Integrity rx2620 Server Rack Installation Guide*.

⚠ **WARNING!** Ensure that all anti-tip features (front and rear anti-tip feet installed; adequate ballast properly placed, and so on) are employed before you extend the server.

Extending the Server from the Rack

NOTE: Ensure that there is enough area (approximately 1.5 meters (4.5 ft.)) to fully extend the server and work on it.

To extend the server from the rack:

1. Power off the server and disconnect the power cable and all other cables from the back of the server. See "Powering Off the Server" (page 27).
2. Release the rack latches by rotating them outward. See Figure 17.

Figure 17 Release the Rack Latches

Front of server
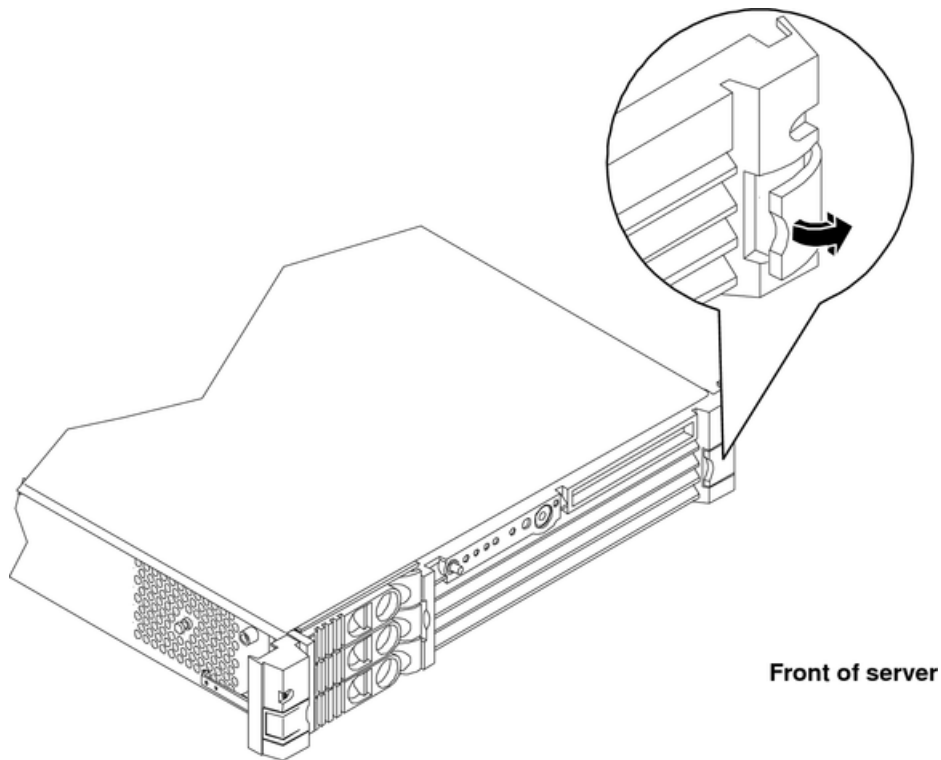
3. Slide the server out of the rack until the guide-rail release clips are visible.

Inserting the Server into the Rack

To insert the server into the rack, perform the following step:

1. Press the rail clips on either side of the server inward and push the server into the rack until it stops.
2. Verify that the rack latches are closed.

Removing and Replacing the Top Metal Cover

The following procedures describe how to remove and replace the top metal cover.

Removing the Top Metal Cover

1. Power off the server and disconnect the power cable and all other cables from the back of the server.

△ **CAUTION:**   When the server is running, you must replace the top metal cover within 30 minutes to prevent components from overheating. If the top metal cover is not replaced within 30 minutes, the server automatically shuts down.

If the server shuts down, replace the top metal cover before you restart the server.

2. Ensure the top metal cover lock keyswitch is in the unlocked position. Rotate the blue release lever toward the back of the server and slide the cover toward the back of the server. See Figure 18.

Figure 18 Removing and Replacing the Top Metal Cover
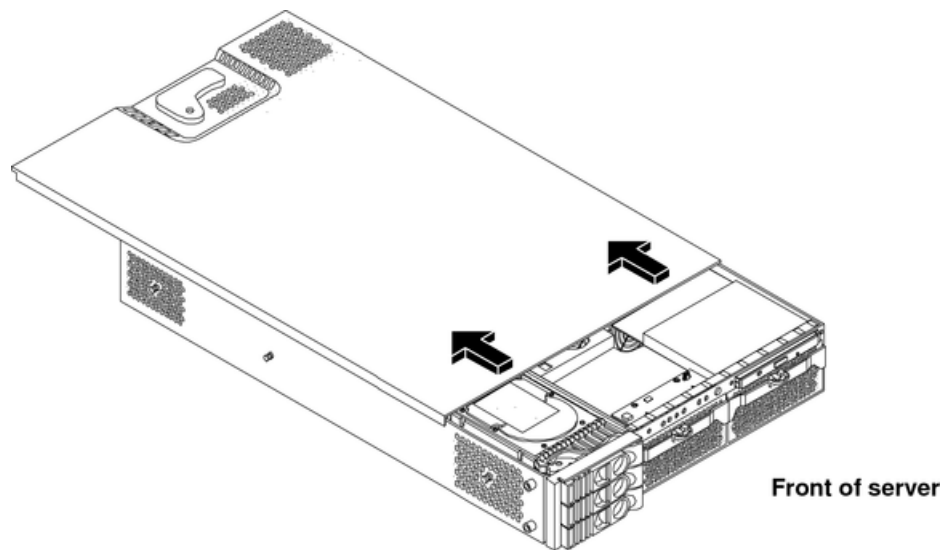
Front of server

3. Lift the top metal cover off the server chassis.

Replacing the Top Metal Cover

⚠ **CAUTION:**   Secure any wires or cables in your server so that they are not cut or interfere with the replacement of the top metal cover.

1. Align the front edge of the top metal cover with the alignment mark on the optical drive bay. See Figure 19.

Figure 19 Aligning the Top Metal Cover

To replace cover, align front edge here then slide forward
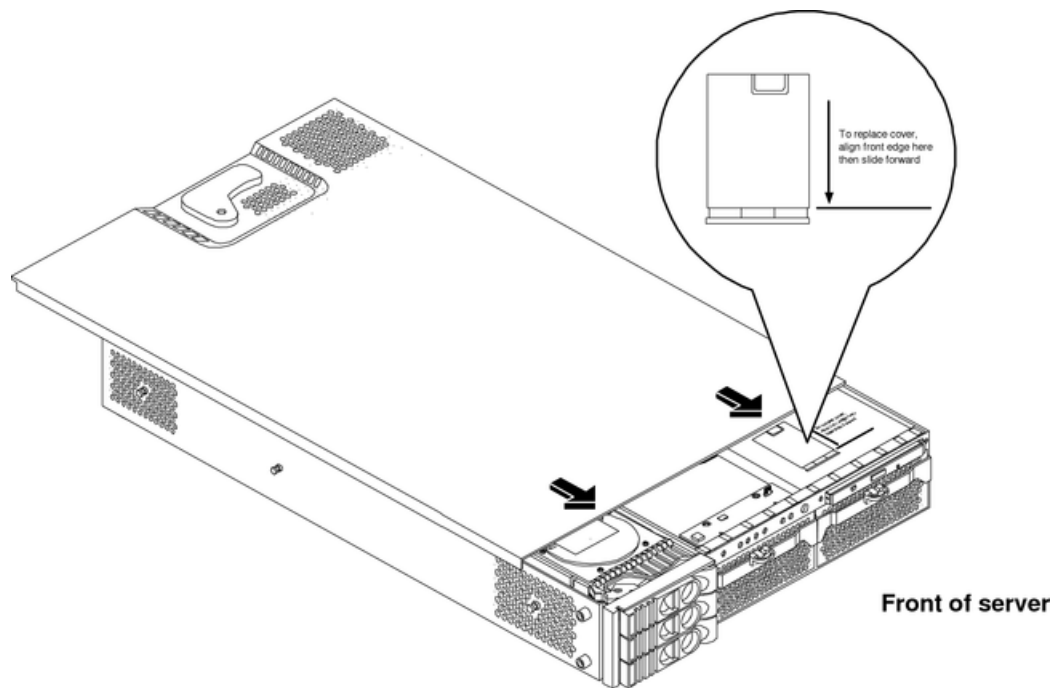
Front of server

2. Grasp the blue release lever and slide the top metal cover toward the front of the server until the lever snaps into place. See Figure 20.

34

Figure 20 Closing the Top Metal Cover

Front of server
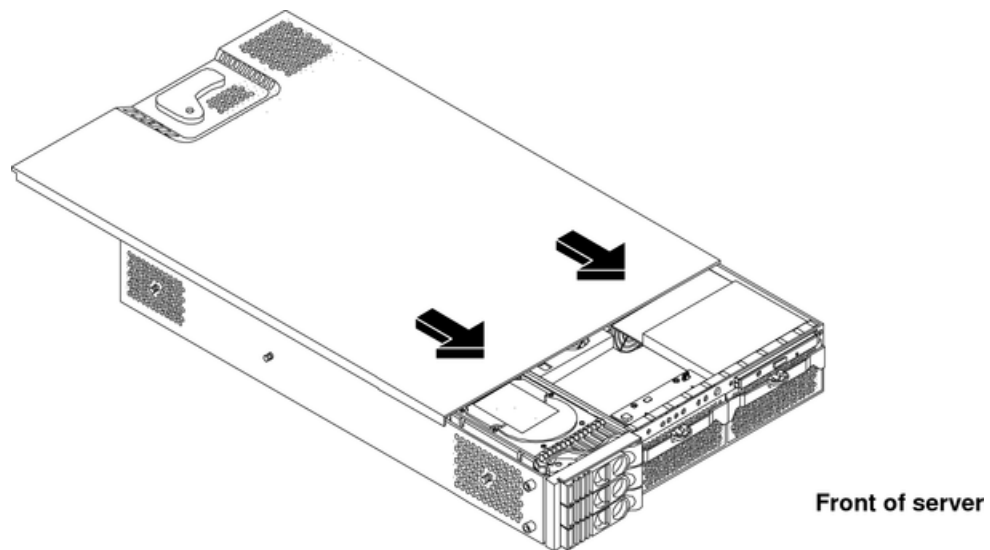
3. Slide the server into the rack enclosure and connect the power cables.

Removing and Replacing the Front Bezel

You must remove the front bezel from the chassis to remove or replace the power supplies or the optical drive.

Removing the Front Bezel

1. Press in the retaining clips located on the right-side of the front panel. See Figure 21.

Figure 21 Front Bezel Retaining Clip
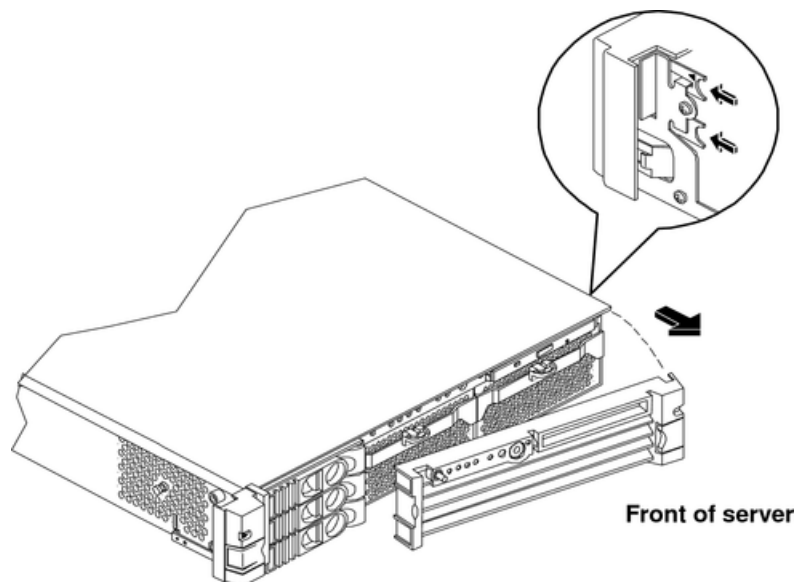
Front of server

2. Rotate the front panel out and lift if away from the server chassis.

Replacing the Front Bezel

1. Insert the bezel latches into the matching slots on the server chassis. See Figure 22 .

2. Swing the bezel and push toward the front of the server until the bezel locks into place.

Figure 22 Replacing the Front Bezel

Front of server
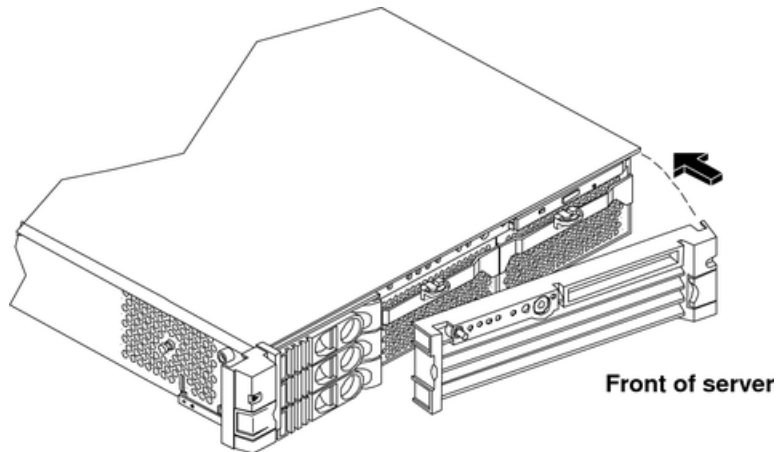
Removing and Replacing Hot-Swap and Hot-Plug Devices

The server has hard drives that are hot-pluggable and power supplies and fans that are hot-swappable. This section explains how to replace the following devices while the server is running:

- System fans
- Power supplies
- Hard drives

There is a significant difference between the terms hot-swap and hot-plug:

- Hot swapping happens at the device level. A hot-swappable device manages insertion or removal on its own without assistance from operating system commands.
- Hot-plugging allows you to replace a defective component in a high-availability server while it is running. However, hot-plugging might require interaction with the operating server to allow the removal and replacement of a hot-plug device.

Removing and Replacing Server Fans

Four server fans keep the server cool. The server fans are hot-swappable, enabling you to replace a fan while the server is running.

△ **CAUTION:**   When the server is running, you must replace the top metal cover to prevent components from overheating. If the top metal cover is not replaced within 30 minutes, the server automatically shuts down.

If the server shuts down, replace the top metal cover before you restart the server.

Removing a Server Fan

1. Extend the server from the rack. See "Extending the Server from the Rack" (page 32).
2. Remove the top metal cover. See "Removing the Top Metal Cover" (page 33).
3. Remove fan 1A, 1B, 2, or 3 from the server by grasping the appropriate fan and lifting it out of the fan socket. See Figure 23, Figure 24, and Figure 25.

Figure 23 Removing Fan 1A or Fan 1B

Fan 1A

Fan 1B

Front of server
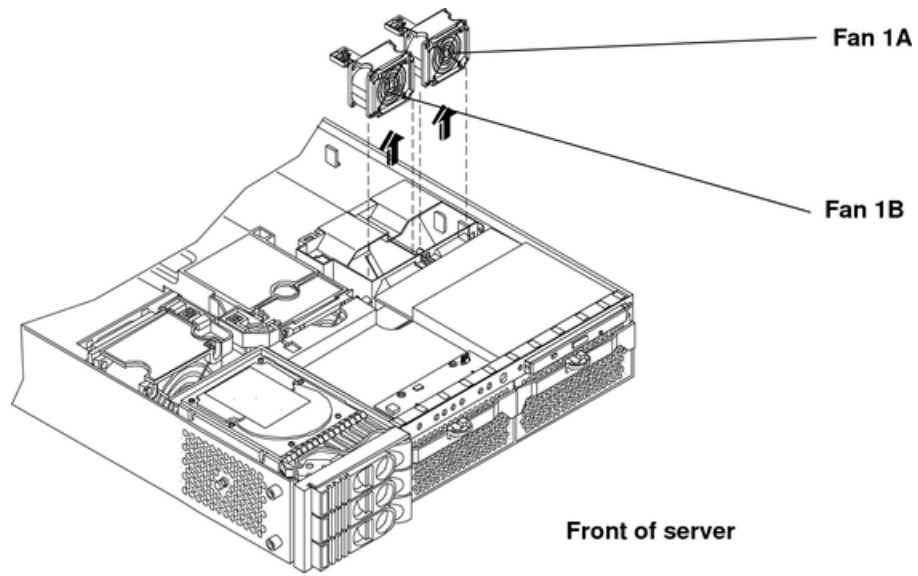
Figure 24 Removing Fan 2

Fan 2

Front of server

37
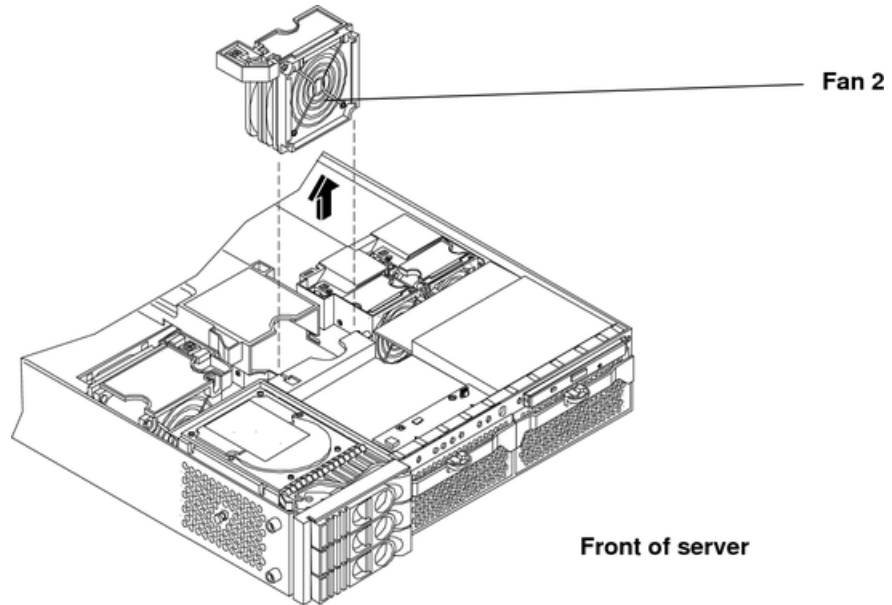
Figure 25 Removing Fan 3
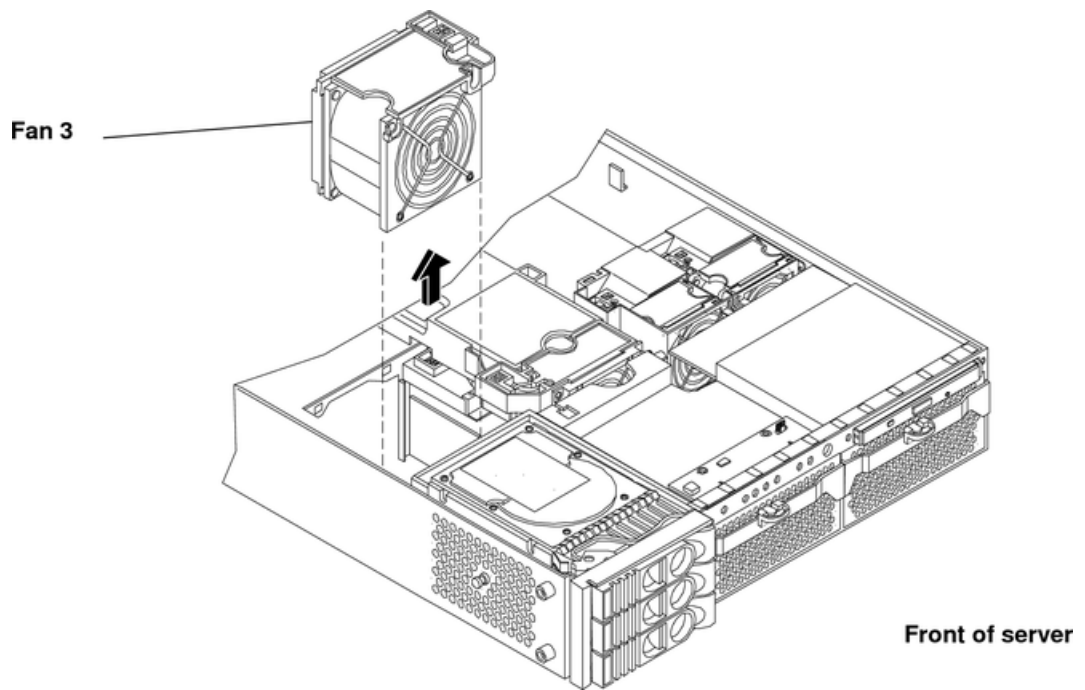
Replacing a Server Fan

1. Remove the top metal cover (if necessary). See "Removing the Top Metal Cover" (page 33).
2. Grasp the replacement fan module and insert it into its fan socket.

⚠ **CAUTION:** If you are hot swapping a fan, replace the top metal cover within 30 minutes to prevent damage to the server components. If the top metal cover is not replaced within 30 minutes, the server automatically shuts down.

If the server shuts down, replace the top metal cover before you restart the server.

3. Check for proper seating of the fan in its socket.
4. Replace the server top metal cover.
5. Verify the fan replacement by using the utilities identified in Appendix C (page 134).
6. To verify fan operation, use the MP `PS` command

Removing and Replacing the Power Supply

The supported configuration of the server requires a minimum of one power supply unit (PSU) to be installed. A second, optional hot-swap PSU, can be installed to provide redundant (N+1) capability.

The power supplies in the server are hot-swappable, that is if one power supply stops working or exhibits voltage problems, the remaining supply can support the server until the failed unit is replaced. A power supply can be removed and replaced without turning off the server on servers with two power supplies.

⚠ **CAUTION:** Before removing a power supply, make sure the second power supply is functioning properly. The two green LEDs inside the supply must be illuminated on the second supply before you can safely remove the failed power supply.

Removing the Power Supply

To remove the power supply:

1. Remove the front bezel from the server. See .
2. Press the power supply retaining clip to unlatch the power supply release lever. See and .

Figure 26 Releasing the Power Supply Retaining Clip
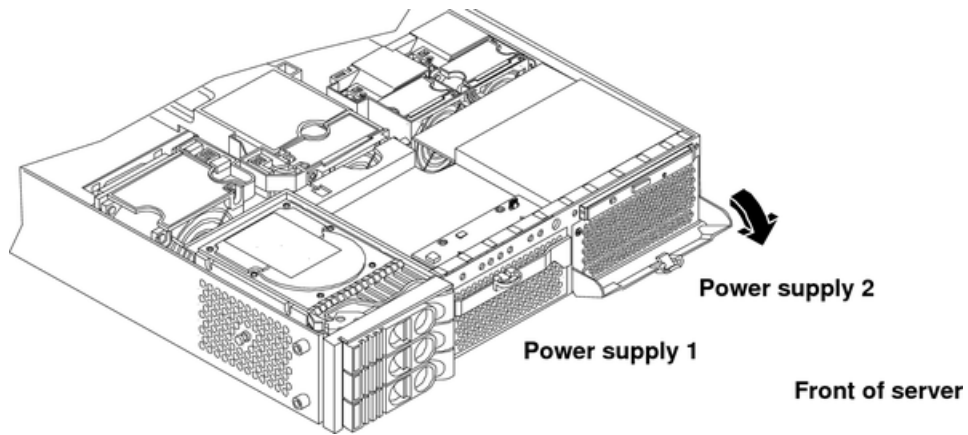
3. Press the power supply release lever and pull the power supply out of the server.

Figure 27 Removing the Power Supply
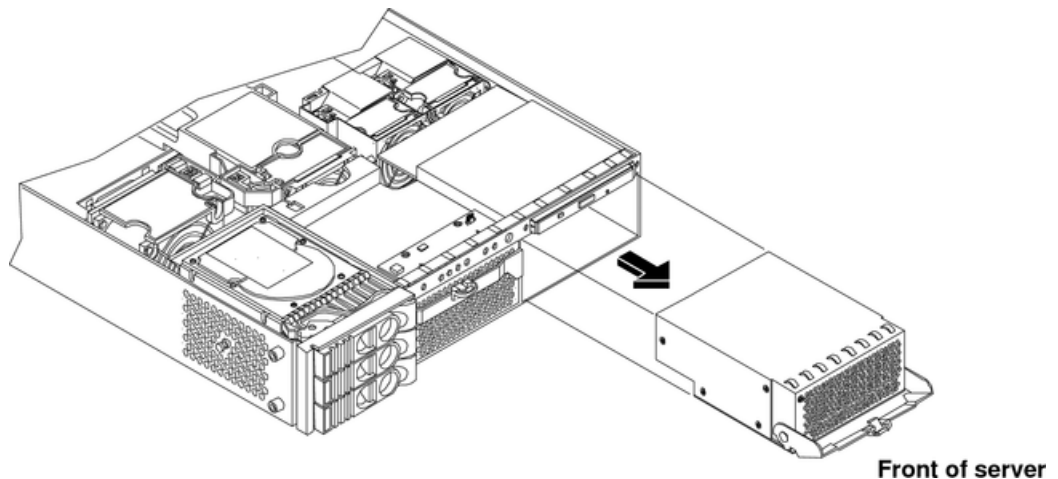
Replacing the Power Supply

To replace the power supply:
1. Remove the front bezel from the server and remove the defective power supply if you have not already done so.
2. Open the power supply release lever on the replacement power supply and push the power supply into place.
3. Push in and up on the power supply release lever to lock the retaining clip in place.

Figure 28 Replacing the Power Supply

Front of server
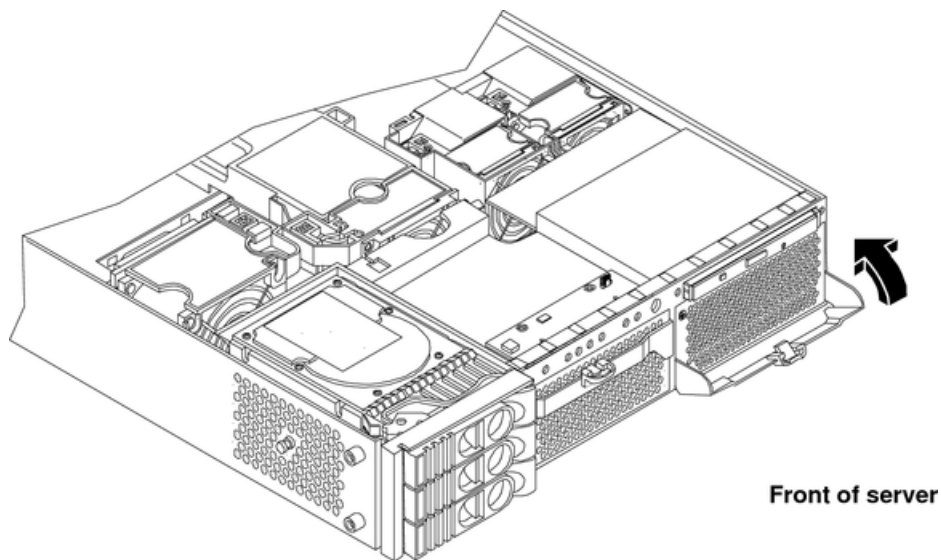
4. Verify that both power supply LEDs, visible through the front of the supply grid, are illuminated.

5. Verify the power supply replacement by using the utilities identified in Appendix C (page 134).

6. To verify power supply operation, use the iLO MP `PS` command.

7. Replace the front bezel.

Removing and Replacing an Internal Hard Drive

This section provides information about removing and replacing internal hard drives.

The server supports up to three hot-pluggable, low-voltage differential (LVD) hard drives. These hard drives are 3.5-inch form factor devices that connect to Ultra 320 Wide LVD SCSI interfaces on the disk cage backplane.

△ **CAUTION:** Verify that the operating system supports installing disk drives while the operating system is running. If the operating system does not support this feature, shut down the operating system before attempting this procedure. Failure to observe this caution results in server failure.

Removing a Hard Drive

To remove a hard drive:

1. If the server is powered on and the operating system is running, prepare the operating system to have the hard drive removed. Shut down your operating system by following your operating system instructions.

2. If you have not locked your hard drives, proceed to step Step 3. If you have locked your hard drives, you must unlock them before removing or replacing a drive:

   a. Remove the top metal cover. See "Removing the Top Metal Cover" (page 33).

   △ **CAUTION:** If you try to remove a hard drive without unlocking it from the server, you will damage the hard drive bay.

b. Press down on the unlock lever to unlock the drive. See Figure 29.

> **NOTE:** If the drive bay is not locked, the procedure for installing additional hard drives can be accomplished without removing the server from the rack and it is not necessary to remove the top cover. Completion of the procedure does not require locking the disk bay, replacing the top metal cover, or replacing the server in the rack.

Figure 29 Unlocking and Releasing the Disk Drive

Front of server
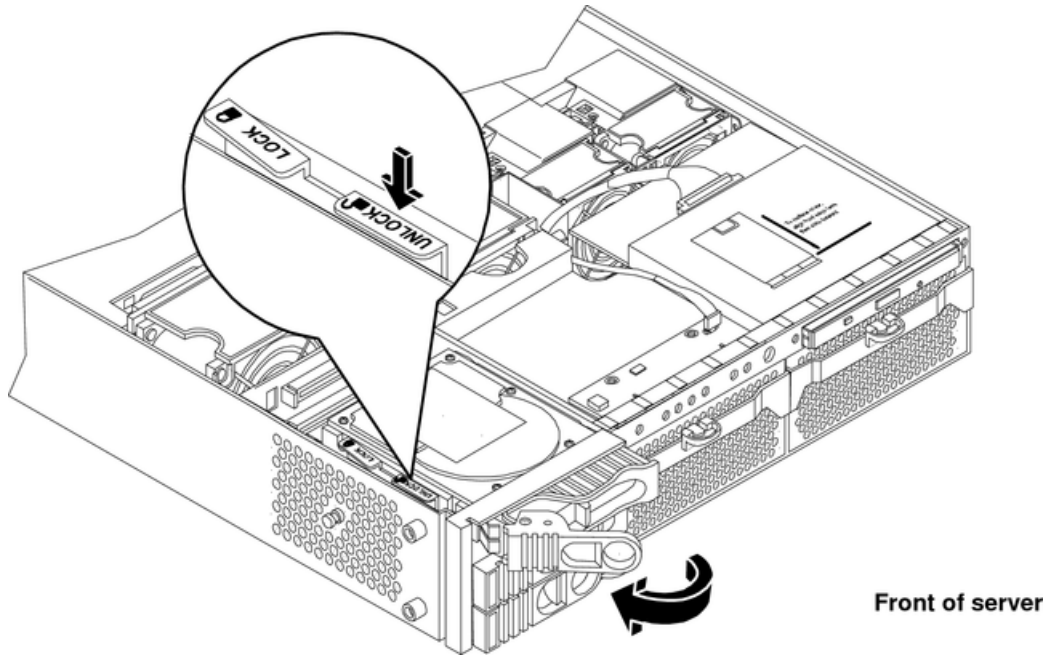
3. Squeeze inward on the colored release clip on the hard drive release lever. See Figure 30.

Figure 30 Releasing the Disk Drive

Front of server
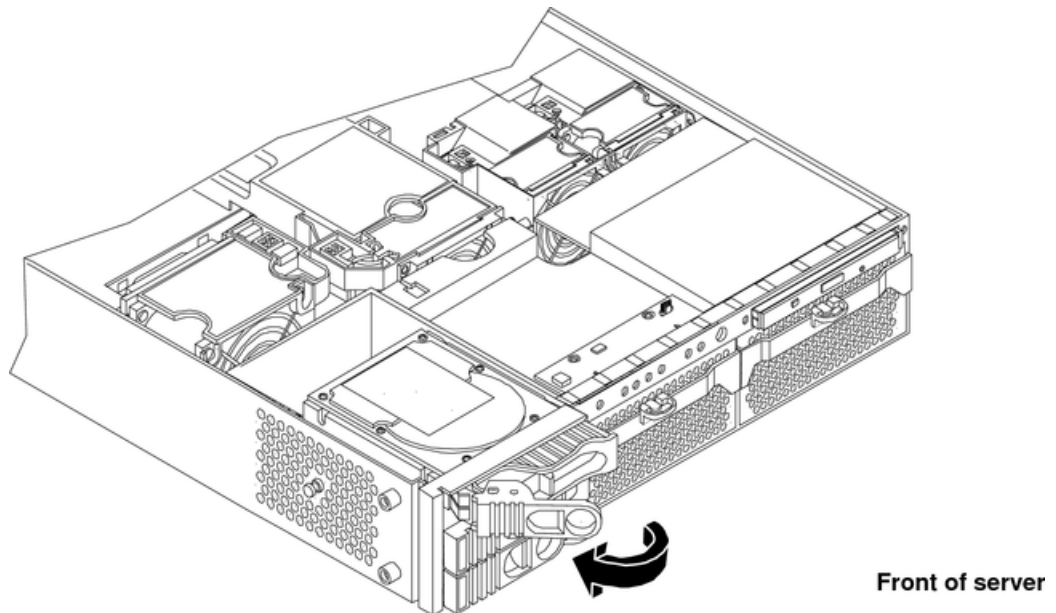
4. Pull outward on the release lever to remove the drive from the server. See Figure 31.

Figure 31 Removing the Disk Drive

Front of server
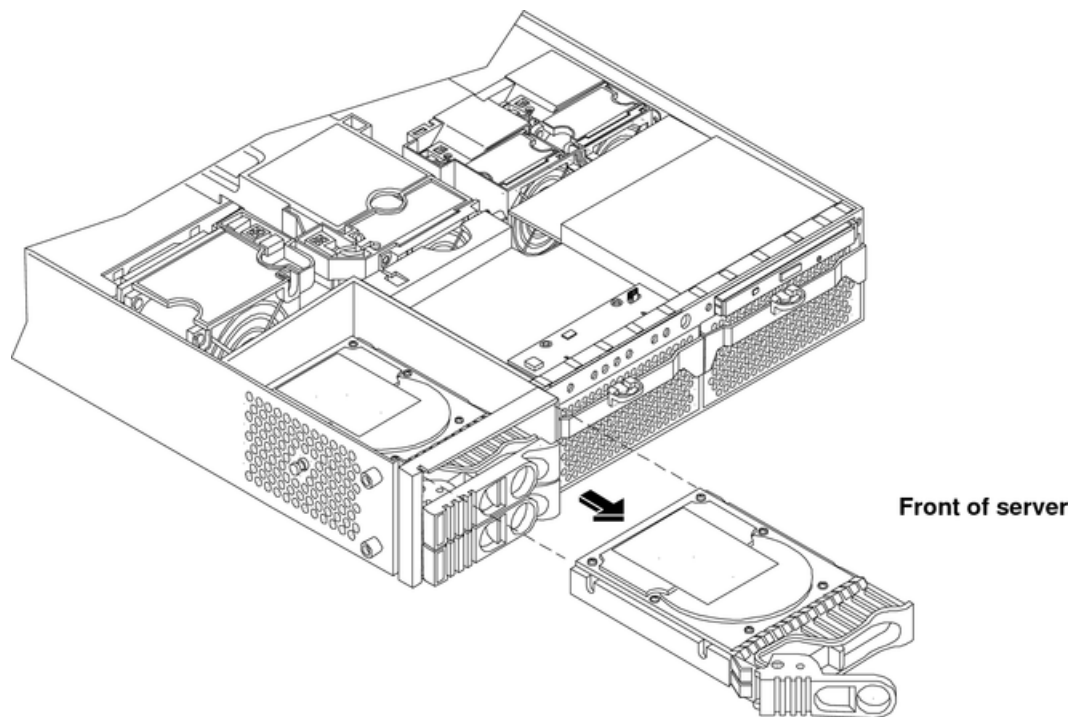
Replacing a Hard Drive

To install or replace a hard drive:

1. Insert the hard drive into the drive bay from which you removed the drive and push inward on the release lever until the drive no long slides forward. You must leave the release lever in the open position when you push the drive into the server.

2. Release the lock on the drive being installed and swing the drive ejection handle to the open position.

3. Slide the hard drive into the slot until it is nearly seated.

4. Lock the hard drives in place. Replace the server top metal cover if it was removed to unlock drives.

5. Validate the hard drive installation by:

    a. If the server does not have MP hardware installed, at the EFI shell prompt, enter `shell> info io` to interrogate the server for proper identification of the drive.

    b. Use the Offline Diagnostic Environment (ODE) `MAPPER` to map the device and path for the drive.

    c. Use the Offline Diagnostic Environment (ODE) `PERFVER` to perform self test on the drive.

6. Reset the server to the EFI Boot Maintenance Menu to rescan the hard drives.

Removing and Replacing Internal Components

To upgrade, remove, or replace most server components, you must first shut down the server, and remove the top metal cover.

⚠ **WARNING!**   Do not remove the server covers without first powering the server off and unplugging the power cord from the outlet or power protection device unless you are replacing a hot-swappable fan.

When the server is running, you must replace the top metal cover within 30 minutes to prevent components from overheating. If the top metal cover is not replaced within 30 minutes, the server automatically shuts down. If the server shuts down, always replace the covers before turning the server back on.

Memory and Processor Airflow Guides

The server has the following airflow guides:

- The processor airflow guide. See Figure 32
- The memory airflow guide. See Figure 32

Air flows through the server from front to back.

Figure 32 Airflow Guides Locations
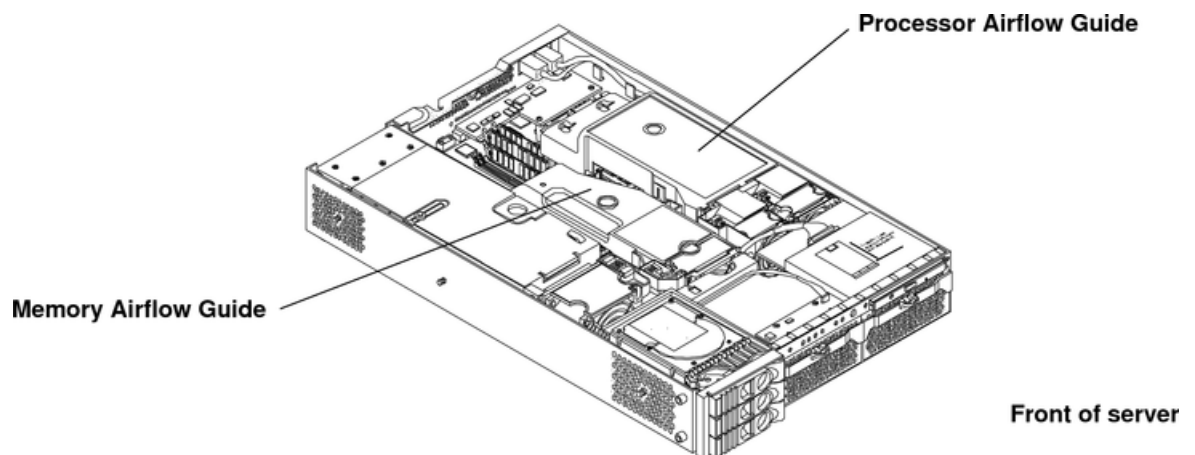
Removing and Replacing the Memory Airflow Guide

The following procedures explain how to remove and replace the memory airflow guide.

Removing the Memory Airflow Guide

1. Power off the server and disconnect all power cables. See "Powering Off the Server" (page 27).
2. Remove the top metal cover. See "Removing the Top Metal Cover" (page 33).
3. Grasp the memory airflow guide and lift it out of the server. See Figure 33.

Figure 33 Removing the Memory Airflow Guide
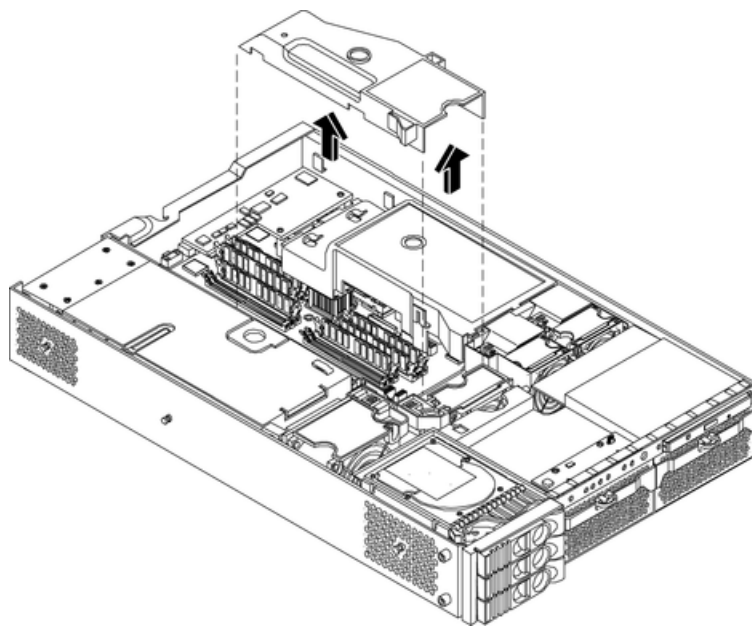
Front of server

Replacing the Memory Airflow Guide

1. Align the guides on both sides of the airflow guide with the slots on the chassis.
2. Insert the memory airflow guide in the slots.
3. Replace the top metal cover and reconnect all of the power cables.

Removing and Replacing the Processor Airflow Guide

The following procedures show how to remove and replace the processor airflow guide.

Removing the Processor Airflow Guide

1. Power off the server and disconnect all power cables. See "Powering Off the Server" (page 27).
2. Remove the top metal cover. See "Removing the Top Metal Cover" (page 33).
3. Remove the IDE cable and power module cables from the processor airflow guide cable clips.
4. Remove the main portion of the airflow guide:
   a. Hold the guide using the opening on top of the guide. See Figure 34.
   b. At the same time, grasp the back end of the airflow guide and lift the guide out of the server.

Figure 34 Removing the Processor Airflow Guide

Front of server
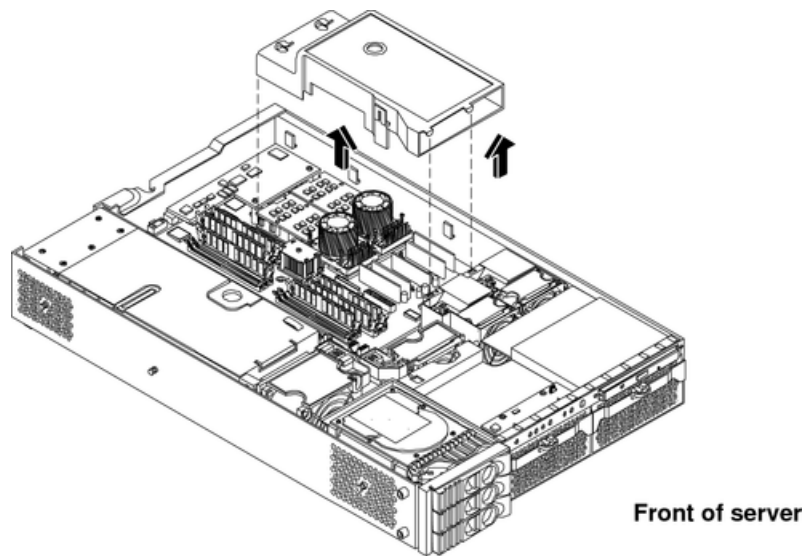
5.   Disconnect the power cable connected to the guide from the system board.
6.   Remove the front portion of the airflow guide by doing the following:
   a.   Remove server fans 1A and 1B.
   b.   Rotate the clip clockwise to release the latch. See Figure 35 and Figure 36.

Figure 35 Opening the Release Clip

Front of server
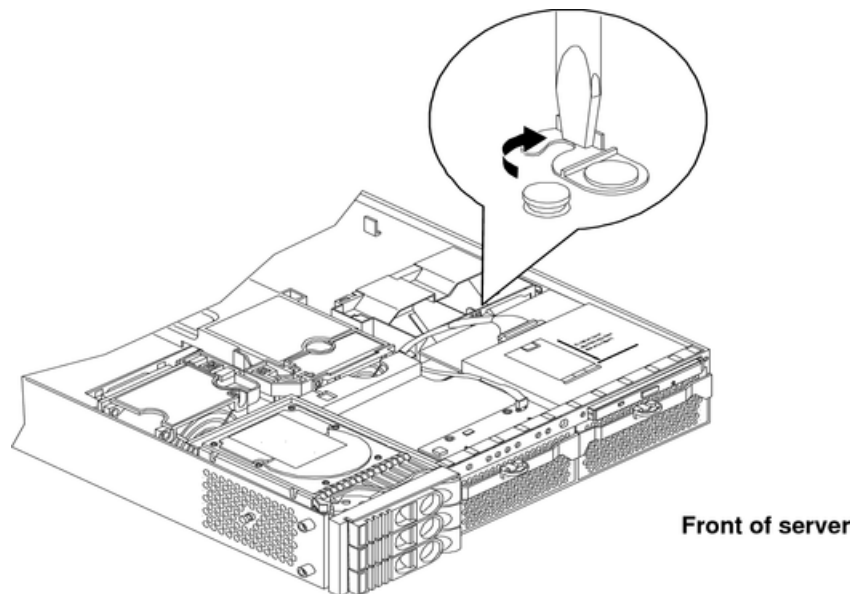
7.   Lift the front portion of the airflow guide out of the server.

Figure 36 Removing the Front Airflow Guide

Front of server
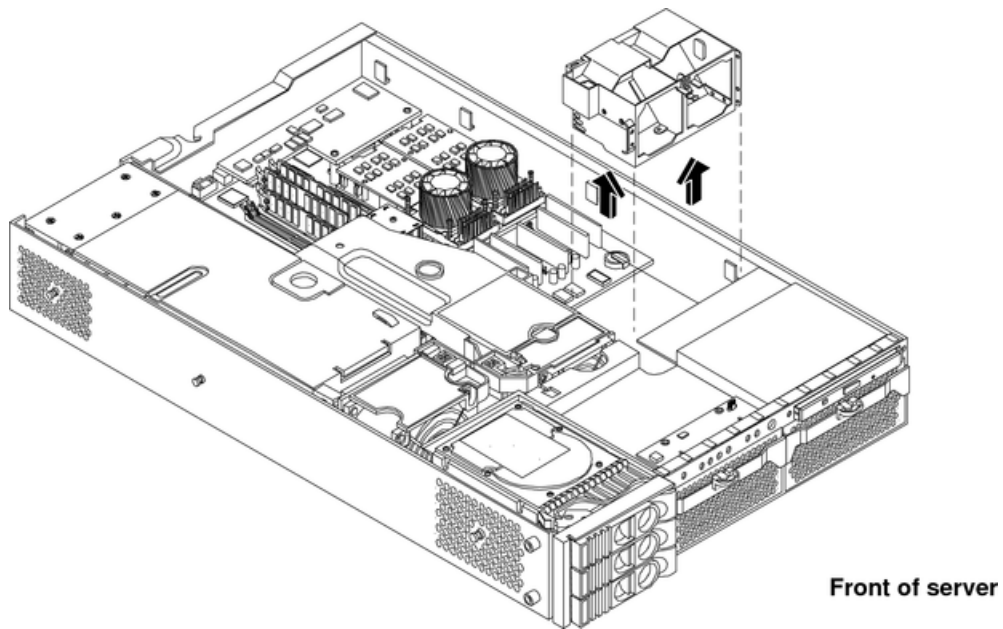
Replacing the Processor Airflow Guide

1. Replace the front portion of the airflow guide:
    a. Align the release latch of the front half of the airflow guide over the release latch post and snap it in place.
    b. Connect power connector on the front portion of the guide to the connector on the system board.
    c. Replace server fans 1A and 1B.
2. Replace the main portion of the airflow guide:
    a. Hold the opening on top of the processor airflow guide.
    b. At the same time, grasp the back end of the airflow guide and insert the airflow guide into the server.
    c. Connect the power module cable and place the power and IDE cables in the cable clips.
    d. Insert the two airflow guide retaining tabs into the two slots on the front half of the airflow guide.
3. Replace the top metal cover. Reconnect cables.

Removing and Replacing Memory DIMMs

Your server has 12 memory sockets for installing DDR SDRAM memory DIMMs. The supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB, or 4 GB. The server supports

combinations from 1 GB up to 32 GB. See Figure 37 for the DIMM slot locations on the system board.

⚠ **WARNING!** Ensure that the server is powered off, and all power sources have been disconnected from the server before removing or replacing server memory.

Voltages are present at various locations within the server when an AC 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 before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Supported DIMM Sizes

Supported DIMM sizes are 256 MB, 512 MB, 1 GB, 2 GB, and 4 GB. Memory in the server is installed in quads. A quad of memory is a set of four matching DIMMs. Quad sizes can differ within the server as long as all DIMMs within a quad match, unless you are installing 4 GB DIMMs. The only set up allowed with 4 GB DIMMs is to install eight 4 GB DIMMs. The server supports combinations from 1 GB (using 256 MB DIMMs) to 32 GB (using eight 4 GB DIMMs). See Figure 37 for the identification of quads.

Figure 37 DIMM Slot Identification

Pair 4 (3A and 3B)
Pair 6 (5A and 5B)
Pair 2 (1A and 1B)

Rear

Cell 1

1A 5A 3A
1B 5B 3B
0B 4B 2B
0A 4A 2A

Cell 0

Pair 1 (0A and 0B)
Pair 5 (4A and 4B)
Pair 3 (2A and 2B)

Front of server

Quad 1 = Pair 1 and Pair 2
Quad 2 = Pair 3 and Pair 4
Quad 3 = Pair 5 and Pair 6
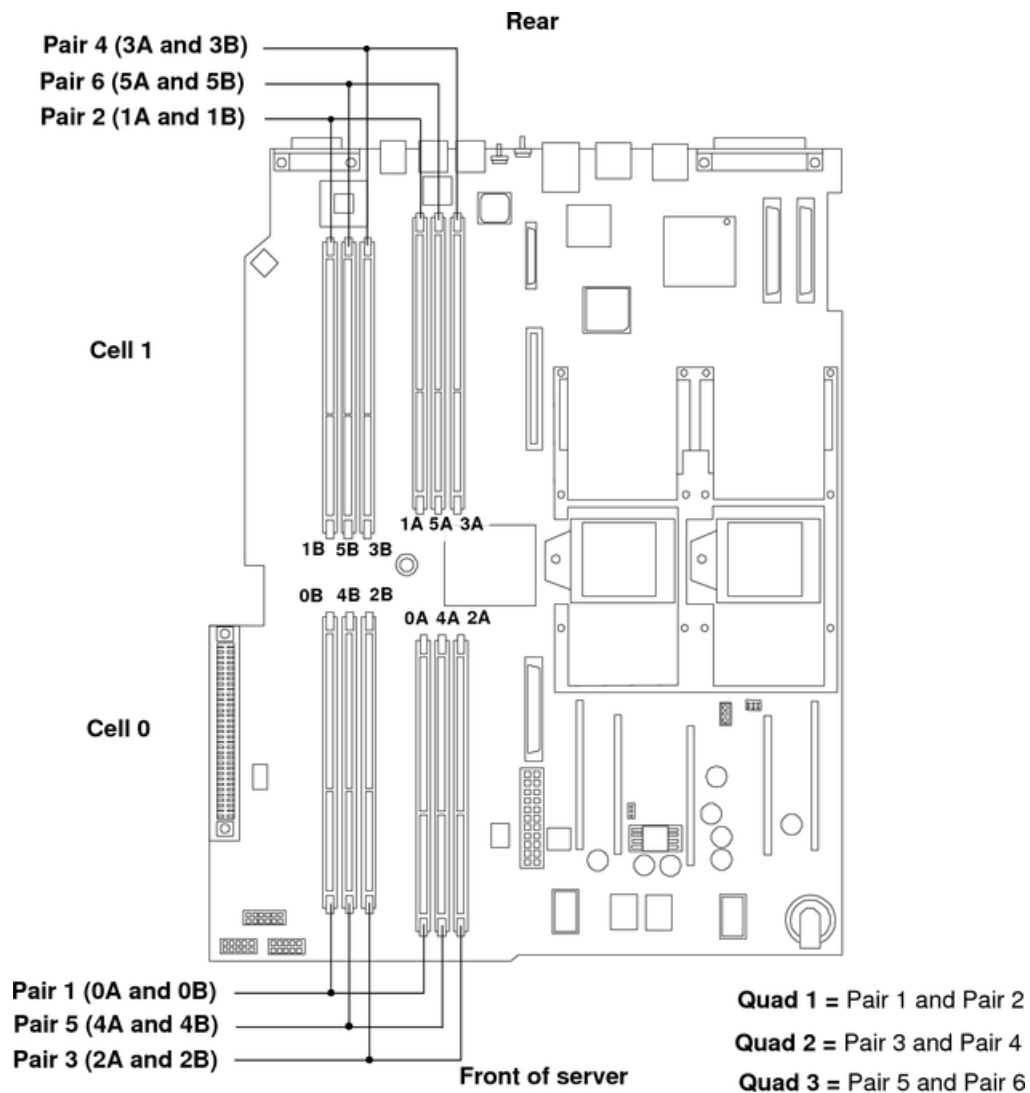
Removing DIMMs

To remove DIMMs:

1. Power off the server and disconnect all cables. See "Powering Off the Server" (page 27).
2. Remove the top metal cover. See "Removing the Top Metal Cover" (page 33).
3. Identify the DIMM to be removed and push the appropriate extraction levers found on either side of the DIMM slot outward to the open position. The DIMM ejects from the slot.
4. Remove the DIMM from the socket. If the removed memory is functional, store it in a static-free container for future use.

Installing DIMMs

You must load DIMMs in the correct order:

- You must install DIMMs in matched quads. Two matched memory card pairs of equal size (that is, four identical DIMMs) must be installed, one pair per memory cell as follows:

  - 0A, 0B and 1A, 1B must be matched pairs of equal size

  - 2A, 2B and 3A, 3B must be matched pairs of equal size

- 4A, 4B and 5A, 5B must be matched pairs of equal size

NOTE: DIMMs match if they have the same Hewlett Packard Enterprise part number. The DIMMs are 184-pin, industry-standard, DDR266, CL2, registered ECC modules. Industry standard means the DIMMs meet specifications detailed in the JDEC Standard No. 21-C, Module 4, titled "PC2100 and PC1600 DDR SDRAM Registered DIMM Design Specification." A complete and current list of acceptable DIMMs is provided on the Hewlett Packard Enterprise parts website at: http://partsurfer.hpe.com.

Module sizes can be mixed, as long as DIMMs in each quad match, except when using 4 GB DIMMs. If you install 4 GB DIMMS, the only configuration allowed is 8 4GB DIMMs. For example:

- It is acceptable to load a quad of 256 MB DIMMs in sockets 0A, 0B, 1A and 1B; and a quad of 1 GB DIMMs in sockets 2A, 2B, 3A and 3B.

- If using 4 GB DIMMs, the only configuration allowed is 4 GB DIMMs in slots 0A, 0B, 1A, 1B, 2A, 2B, 3A, and 3B. Slots 4A, 4B, 5A, and 5B must remain empty.

The memory subsystem supports chip-spare functionality. Chip spare enables an entire SDRAM chip on a DIMM to be bypassed (logically replaced) in the event that a multi-bit error is detected on that SDRAM.

To use the chip spare functionality, only DIMMs built with x4 SDRAM parts can be used, and these DIMMs must be loaded in quads (two DIMMs per memory cell, loaded in the same location in each memory cell).

Each DIMM within a quad must be identical to all the other DIMMs in the quad.

To install DIMMs:

1. Power off the server and disconnect all the cables. See "Powering Off the Server" (page 27).

2. Remove the server top metal cover. See "Removing the Top Metal Cover" (page 33).

△ **CAUTION:** To ensure that memory modules are not damaged during removal or installation, power off the server and unplug the power cord from the AC power outlet. Wait until the LED on the back of the power supply turns off before removing or installing memory.

---

3. Holding the memory module by its left and right edges, insert the module into the socket.

   The memory modules are keyed and can only be inserted in one direction. When the module is correctly seated, the retainer clips return to their fully upright position.

4. Snap the retainer clips firmly into place to ensure the DIMMs are seated properly.

5. Gently and evenly push on each side of the DIMM until it seats in the socket.

6. Ensure the extraction levers are in the closed position. See Figure 38.

7. Replace the server top metal cover, reconnect all cables.

8. Power on the server.

9. Verify that the newly installed memory works:

   - Run the `info mem` command at the EFI shell prompt, or

   - Run the `memdiag` from the Offline Diagnostics CD to ensure that the memory is functional

   - Monitor the System Event Log (SEL) to ensure there are no events showing memory problems.

Figure 38 Inserting DIMM into Slot
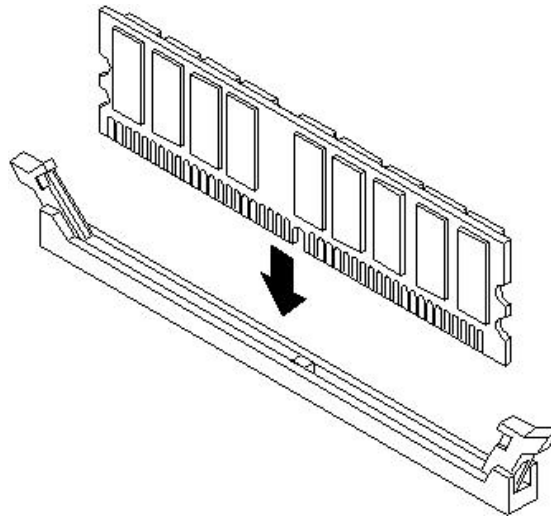
Removing and Replacing a Processor

This section provides information about removing and replacing a processor. The processors are located on the system board, which is accessible by removing the top metal cover.

⚠ **WARNING!** Ensure that the server is powered off, and all power sources have been disconnected from the server before removing or replacing a processor.

Voltages are present at various locations within the server when an AC 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:** Failure to properly complete the steps in this procedure will result in erratic server behavior or server failure.

Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

The processors are located on the system board. The system board can support either one or two processors. The CPU 0 slot is located on the right side of the system board, and the CPU 1 slot is located to the left of CPU 0 near the DIMMs. For the processor locations, see Figure 39.

△ **CAUTION:** Ensure that the cache size is identical for all processors. Failure to observe this caution will result in server failure.

Ensure that all processors are rated for use at the same speed. Failure to observe this caution will result in performance degradation.

Valid processors are identified in Appendix A (page 108).

NOTE: In a single processor configuration, the single processor must be installed in the CPU 0 slot.

Figure 39 Processor Locations on Server

CPU 0

CPU 1
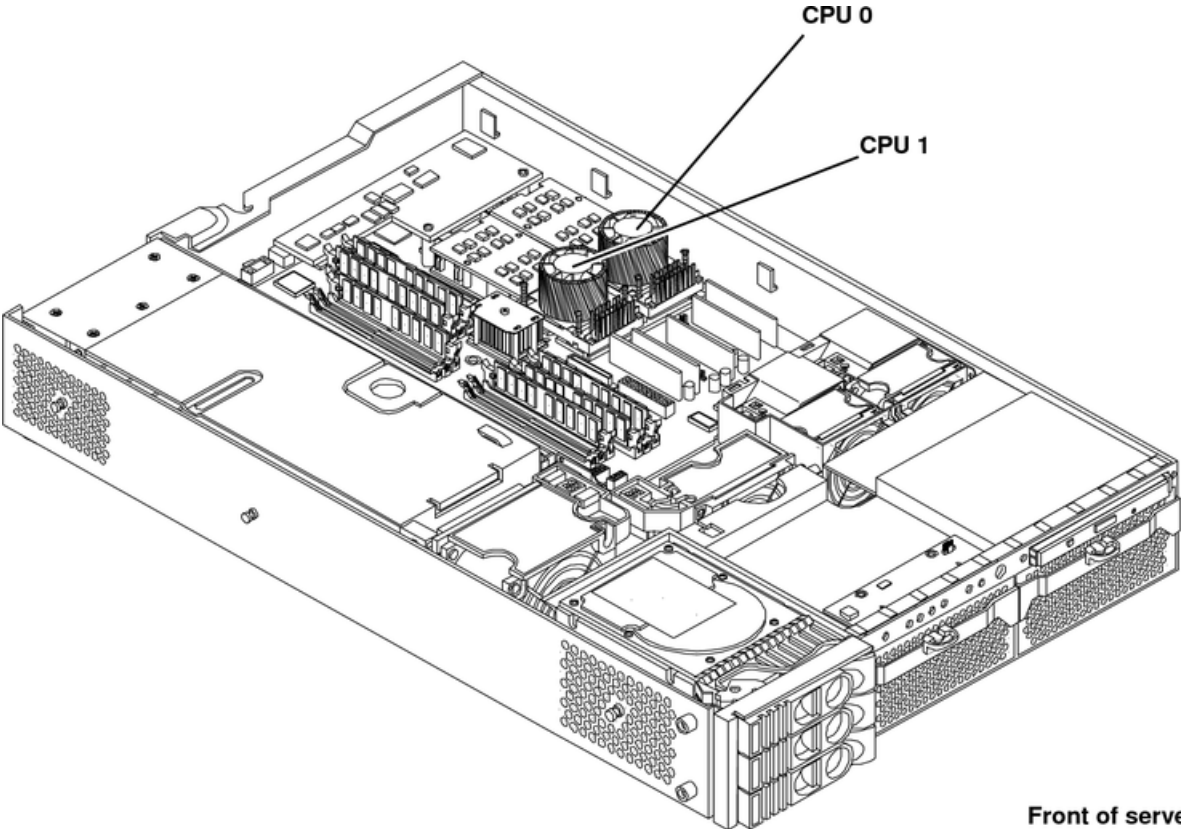
Front of server

Figure 40 Processor Location on System Board

CPU 0
slot

CPU 1
slot
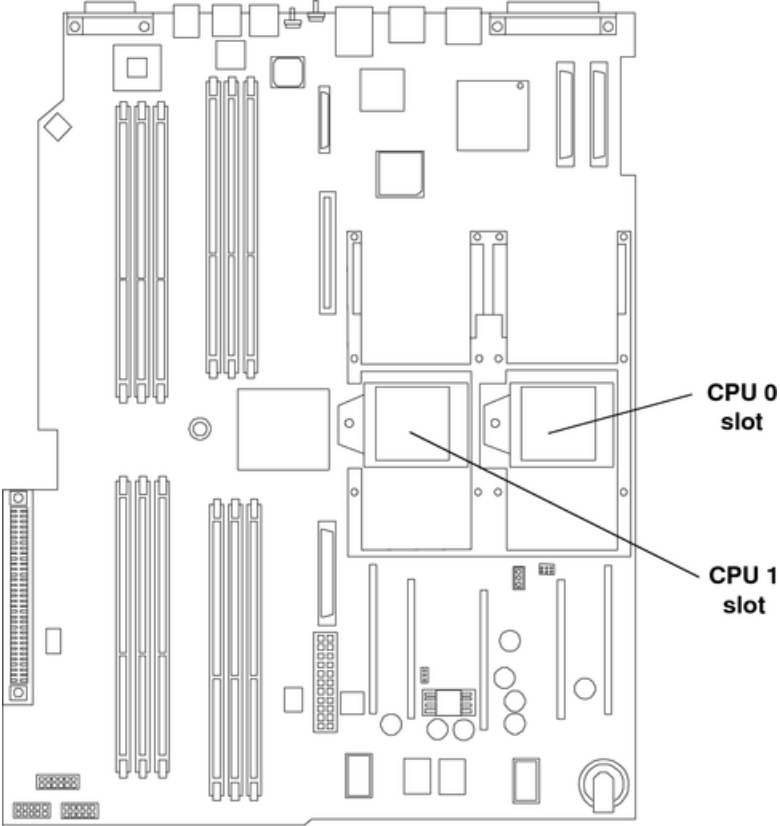
Front of server

Removing a Processor

To remove a processor module:

1. Power off the server and disconnect all cables. See "Powering Off the Server" (page 27).
2. Remove the top metal cover. See "Removing and Replacing the Top Metal Cover" (page 33).
3. Remove the processor airflow guide. See Figure 41.

   a. Remove the IDE cable and power module cables from the processor airflow guide cable clips.

   △ **CAUTION:** Record the cable routing of these cables to ensure the cables are returned to their correct routes.

   ---

   b. Hold the guide using the opening on top of the guide.
   c. At the same time, grasp the back end of the airflow guide and lift the guide out of the server.

Figure 41 Removing the Processor Airflow Guide

Front of server
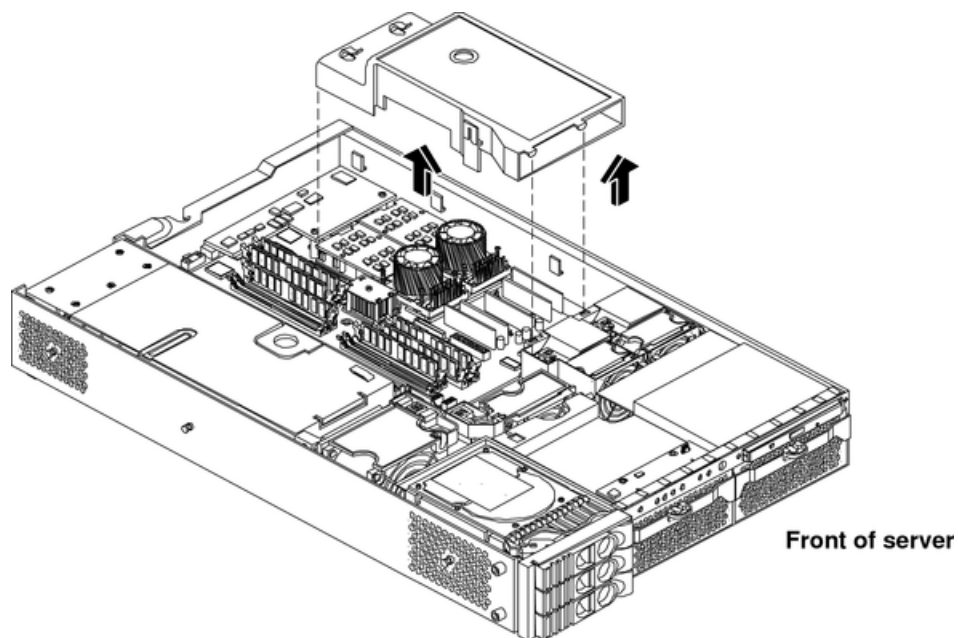
4. Disconnect the processor power cable from the server power cable.
5. Disconnect the turbo fan power cable from the system board.
6. Unscrew the two heat sink captive screws, and the four processor captive screws. See Figure 42.

Figure 42 Unscrewing the Captive Screws
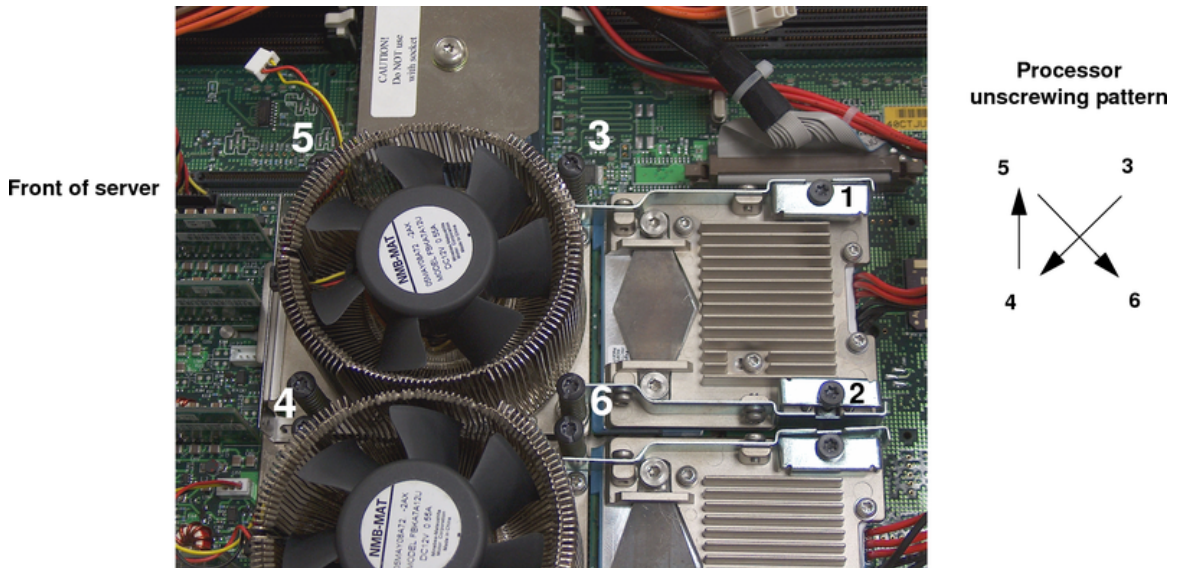
7. Slide the sequencing retainer plate toward the back of the server to open the hole in the edge of the heat sink for insertion of the special processor tool into the processor module locking mechanism. See Figure 43.

Figure 43 Slide Sequencing Retainer Plate
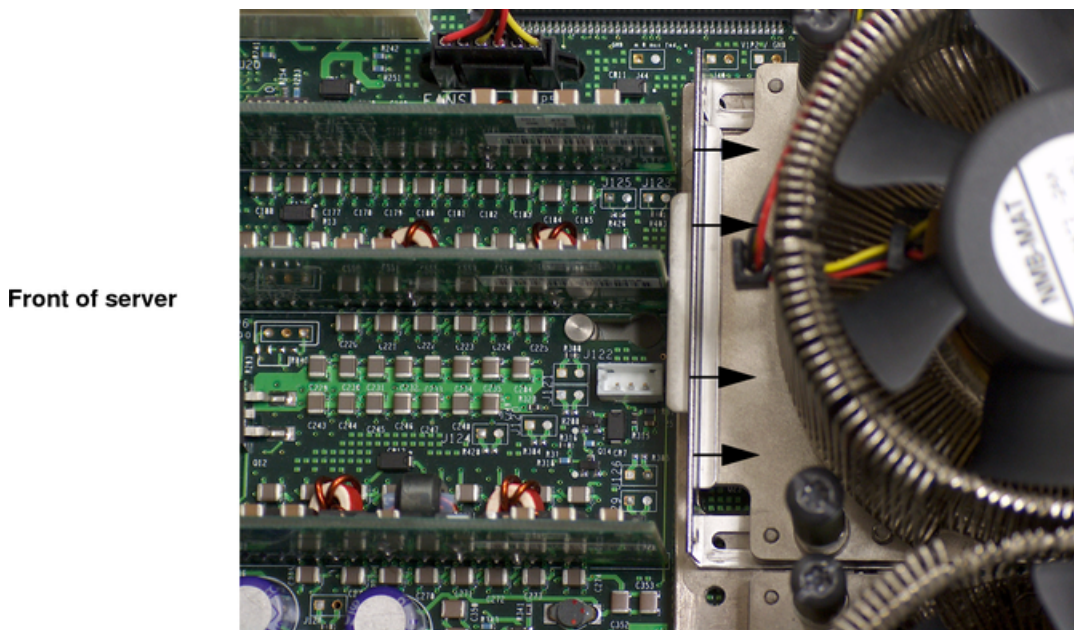
△   **CAUTION:**   The zero insertion force (ZIF) socket for the processor is locked and unlocked by 1/2 of a full turn of the 2.5 mm hex tool. The counterclockwise 180 degree rotation (1/2 turn) unlocks the socket. A clockwise 180 degree rotation locks the socket. Attempting to turn the locking mechanism more that 180 degrees will severely damage the socket.

8. Unlock the processor-locking mechanism using the special processor tool (P/N 5069-5441), or equivalent 2.5 mm hex tool. Insert the tool through the turbo fan blades into the lock and rotate the processor tool 180 degrees counterclockwise. See Figure 44.

Figure 44 Unlocking the Processor Module Locking Mechanism
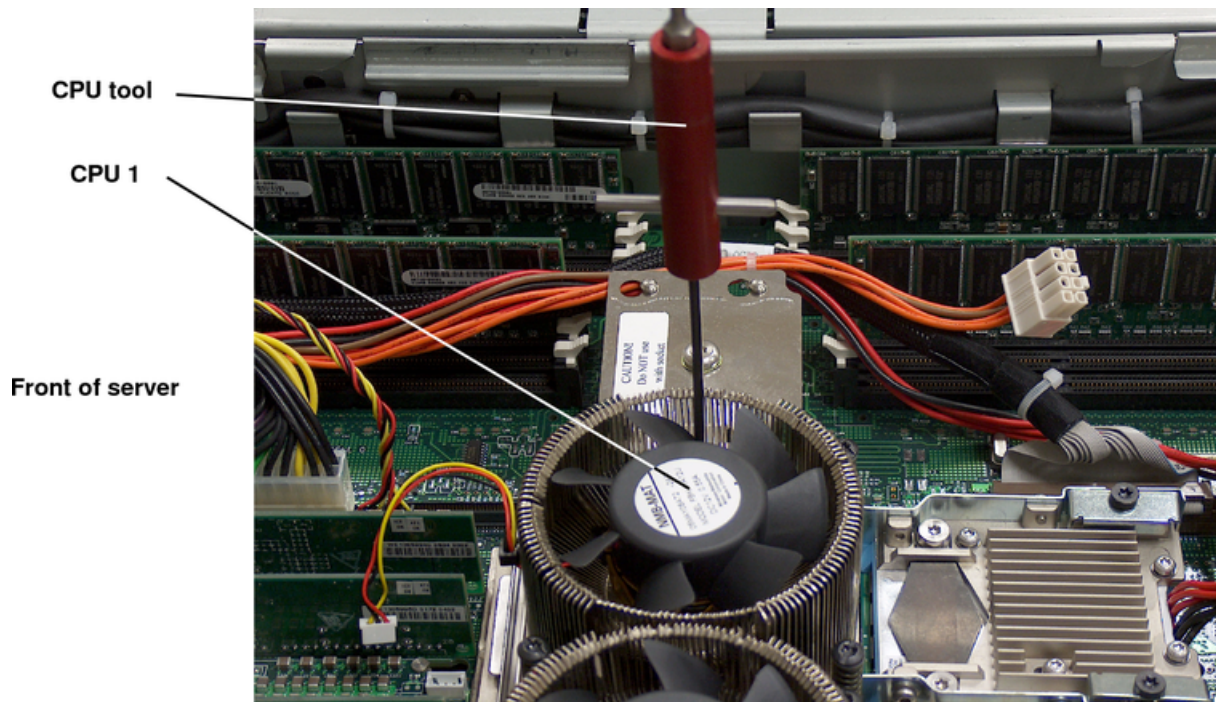
9.   Lift the processor up and out of the chassis. Place the processor module into an anti-static container.

Replacing a Processor

⚠   **CAUTION:**   Do not modify the settings of the DIP switches located on the system board. These switches are for factory use. Failure to observe this caution will result in server failure.

1.   Power off the server and disconnect all cables. See "Powering Off the Server" (page 27).
2.   Remove the top metal cover. See "Removing and Replacing the Top Metal Cover" (page 33).
3.   If you are replacing a processor module, remove the old processor as described in "Removing a Processor" (page 52).
4.   Verify the ZIF socket lock is unlocked. The thicker post on the locking mechanism must be pointed toward the unlock symbol on the ZIF socket. Figure 47 shows the socket unlocked.

Figure 45 Unlocked ZIF Socket Lock

CPU 1 ZIF socket
lock (unlocked)

Front of server
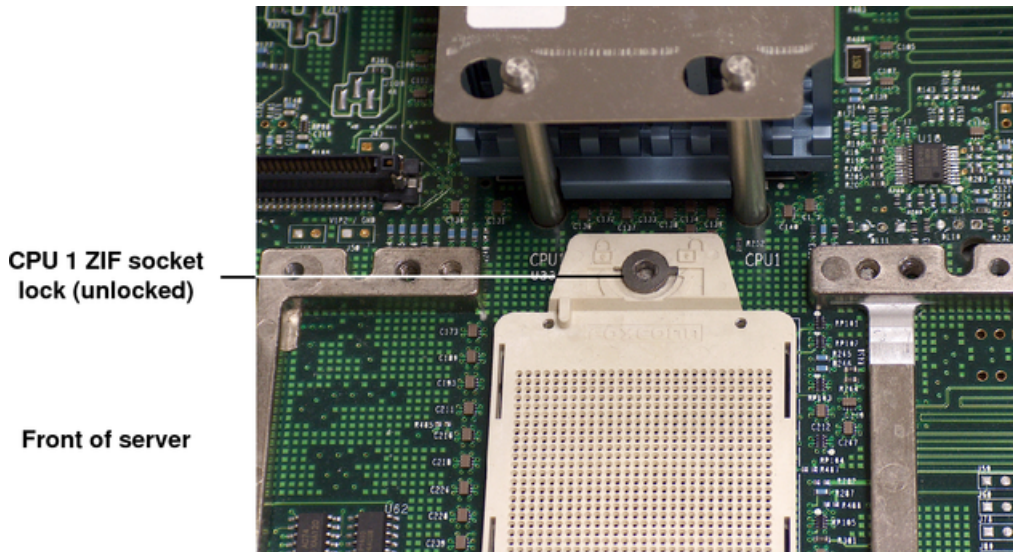
⚠   **CAUTION:**   The zero insertion force (ZIF) socket for the processor is locked
and unlocked by half a turn of the 2.5 mm hex tool. A counterclockwise 180
degree rotation (1/2 turn) unlocks the socket. A clockwise 180 degree rotation
locks the socket. Attempting to turn the locking mechanism more that 180 degrees
in either direction will severely damage the socket.

5.   Use the two alignment pins on the processor to properly align the processor on
the system board. The two alignment pins fit in the alignment holes on the system
board processor mount. Figure 46 shows the location of the alignment pins on
the processor. Figure 47 shows the alignment holes on the system board. The
turbo fan power cable must be positioned so that it is located on the side of the
heat sink that faces the front of the server. Figure 48 shows the processor on the
system board.

Figure 46 Processor Alignment Pins

Front of server
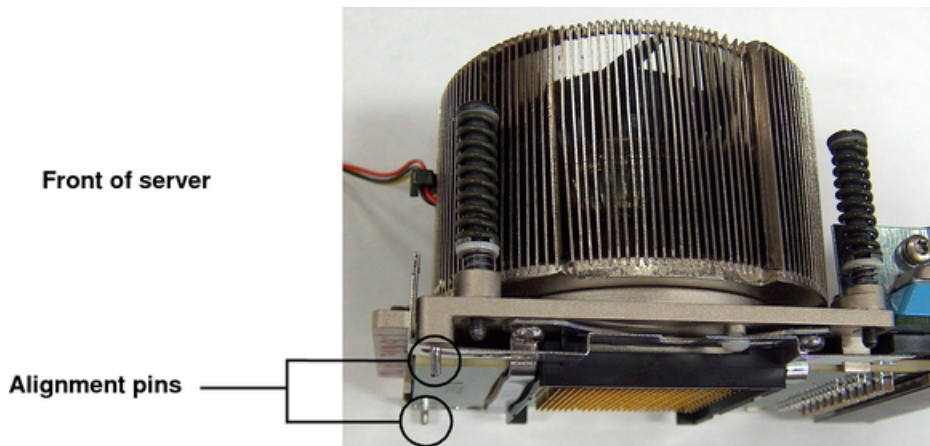
Alignment pins

Figure 47 CPU Slot Alignment Holes
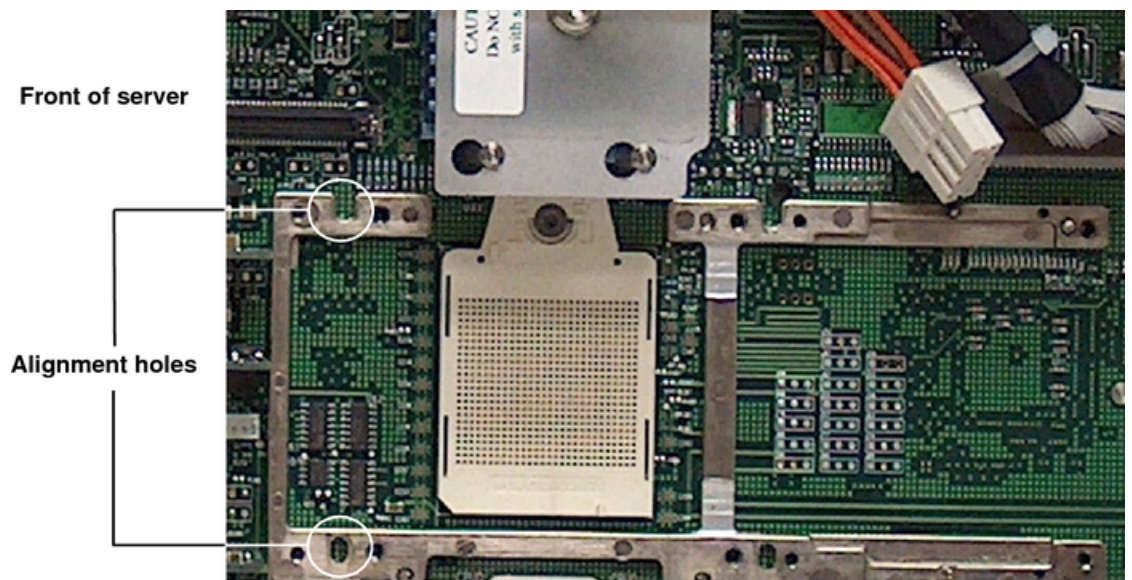
Figure 48 Installing the Processor Module
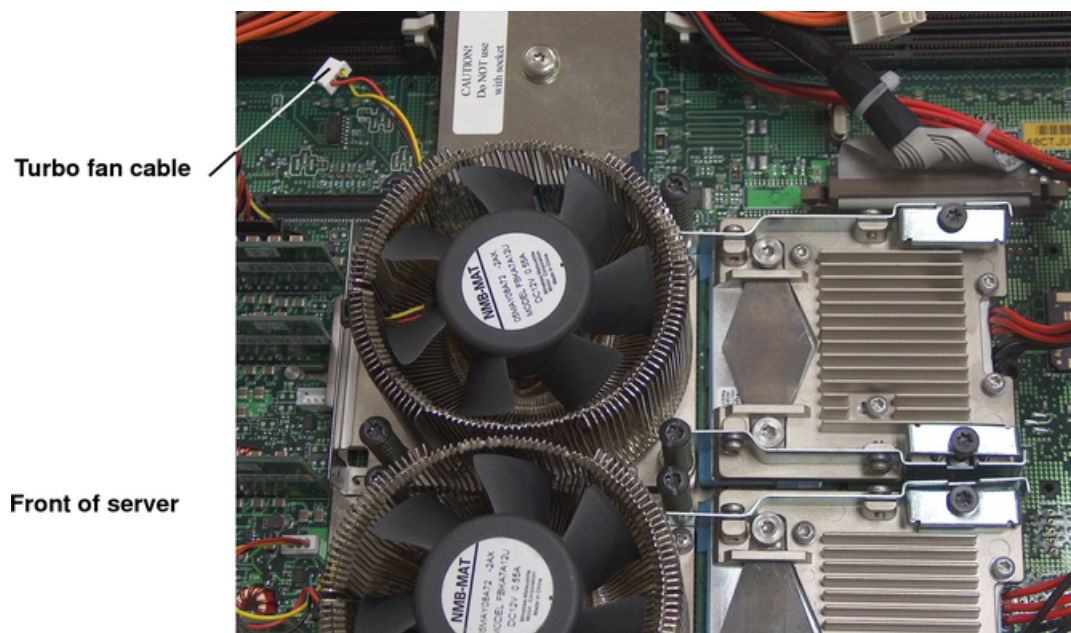
△   **CAUTION:**   Do not press the processor module into the socket. When properly aligned, the processor pins seat into the ZIF socket. No additional pressure is required.

6.   Use the special processor tool shipped with the replacement processor module to lock the processor module in place on the system board. To do this, insert the special processor tool through the turbo fan blades into the ZIF socket. Rotate the tool clockwise 180 degrees. See Figure 49.

Figure 49 Locking the Processor Module in Place

Front of server
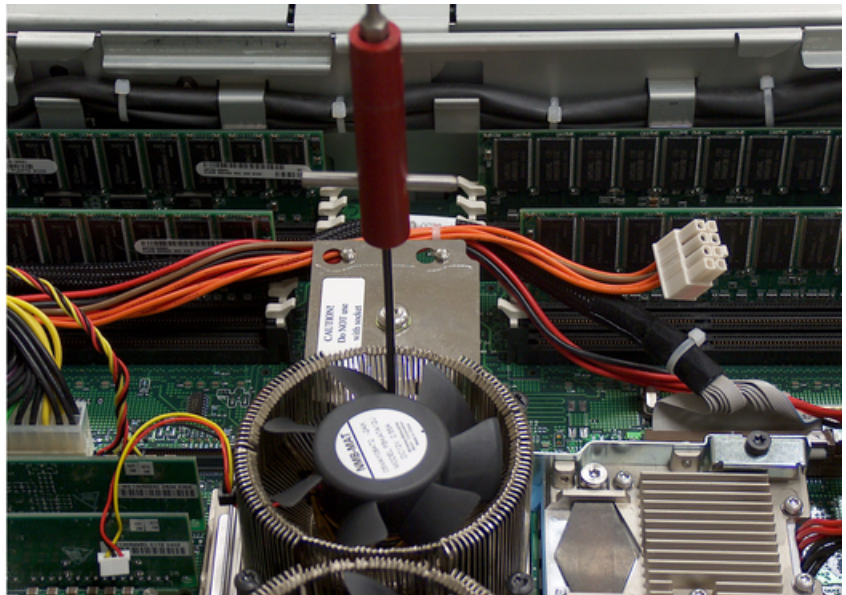
7. Slide the sequencing retainer plate toward the rear of the server.

Figure 50 Sliding the Sequencing Retainer Plate

Front of server
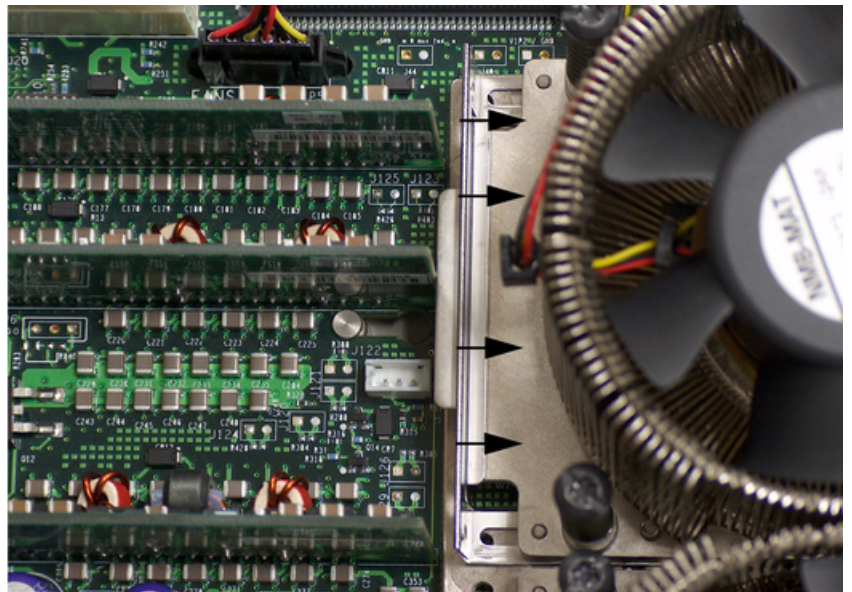
8. Install the four processor captive screws, and the two heat sink captive screws in the order shown here.

Figure 51 Securing the Captive Screws
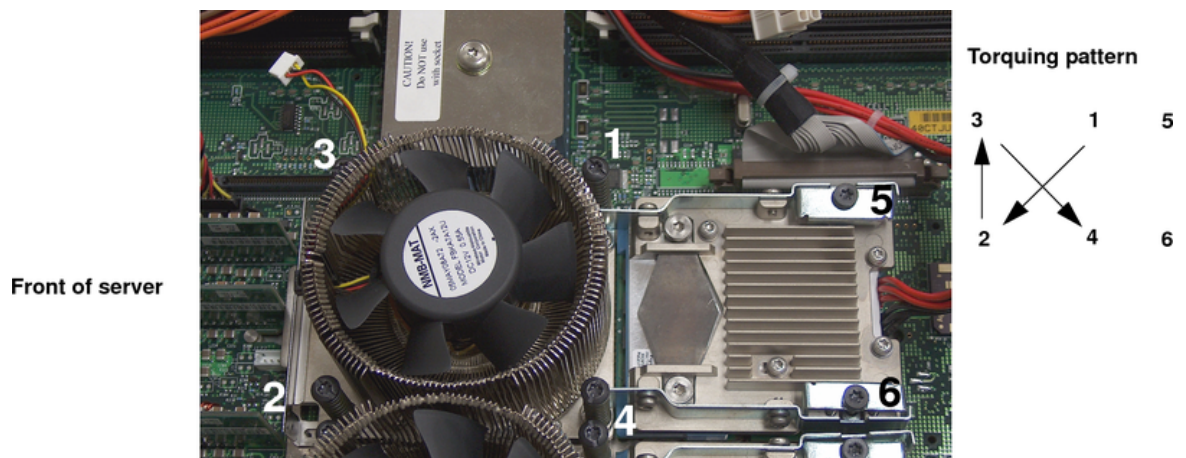
9. Connect the processor module turbo fan power cable to the connector on the system board.
10. Connect the power pod cable to the power cable. Use the 8-pin to 6-pin adapter if necessary.
11. Install the processor airflow guide. See "Removing the Processor Airflow Guide" (page 44).
12. Install the top metal cover. See "Replacing the Top Metal Cover" (page 34).
13. Verify that the newly installed processor works:

    - Run the `info cpu` command at the EFI shell prompt, or

    - Run `cpu diag` from Offline Diagnostic CD for full functional check

    - Monitor the SEL to ensure there are no events showing processor problems

Removing and Replacing the System Battery

The main server battery is located on the system board. Servers with iLO hardware have an additional battery located on the iLO MP card.

Battery Notice

This product contains a Lithium battery.

⚠️ **WARNING!**   Lithium batteries can explode if mishandled. Do not recharge, disassemble, or dispose of the battery in a fire. Failure to observe this warning could result in personal injury or damage to equipment.

Replace the battery with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Removing the System Battery

1. Power off the server and disconnect all cables.
2. Remove the top metal cover. See "Removing and Replacing the Top Metal Cover" (page 33).
3. Lift up on the battery and push on the back of it with a flat-head screwdriver to remove the battery from its holder. See Figure 52 for the battery location on the system board.

⚠️ **CAUTION:**   Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip can damage the clip.

Figure 52 Removing the System Battery

Front of server
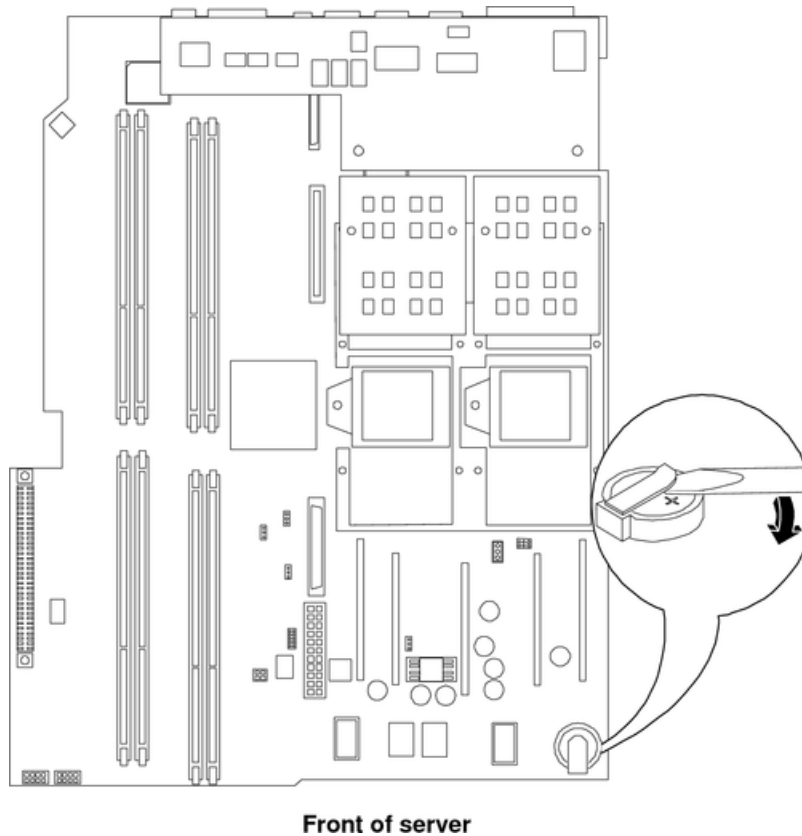
Replacing the System Battery

1. Lift up on the battery holder retaining clip with a flat-head screwdriver and slide the battery into the holder. The positive (+) terminal of the battery faces up.

△ **CAUTION:**   Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip can damage the clip.

---

2. Install the top metal cover. See "Replacing the Top Metal Cover" (page 34).
3. Reconnect all of the power and external cables and power on the server.
4. Verify the battery replacement by using the utilities identified in Appendix C (page 134). To verify operation, use the iLO MP commands.
5. You might need to reset the server time and date using the EFI time and date commands. After you set the time, power off the server, unplug the power cord, and wait for one minute before powering on. Execute the time and date commands again. If the time and date are correct, you have installed the battery correctly.

Removing and Replacing PCI Card Cage

Accessory cards are installed in a removable PCI cage. This section explains how to access the PCI card cage, and how to remove and install accessory cards.

⚠ **WARNING!** Ensure that the server is powered off, and all power sources have been disconnected from the server before removing or replacing a processor module.

Voltages are present at various locations within the server when an AC 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:** Failure to properly complete the steps in this procedure will result in erratic server behavior or server failure.

Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions might result in damage to the server.

Removing the PCI Card Cage

To remove the PCI cage from the server:

1. Power off the server and disconnect the power cable and all other cables from the back of the server. See "Powering Off the Server" (page 27).
2. Remove the top metal cover. See "Removing and Replacing the Top Metal Cover" (page 33).
3. Lift up on the PCI cage release lever and the back edge of the PCI cage and lift the PCI cage out of the server.

Figure 53 Removing the PCI Cage

Front of server
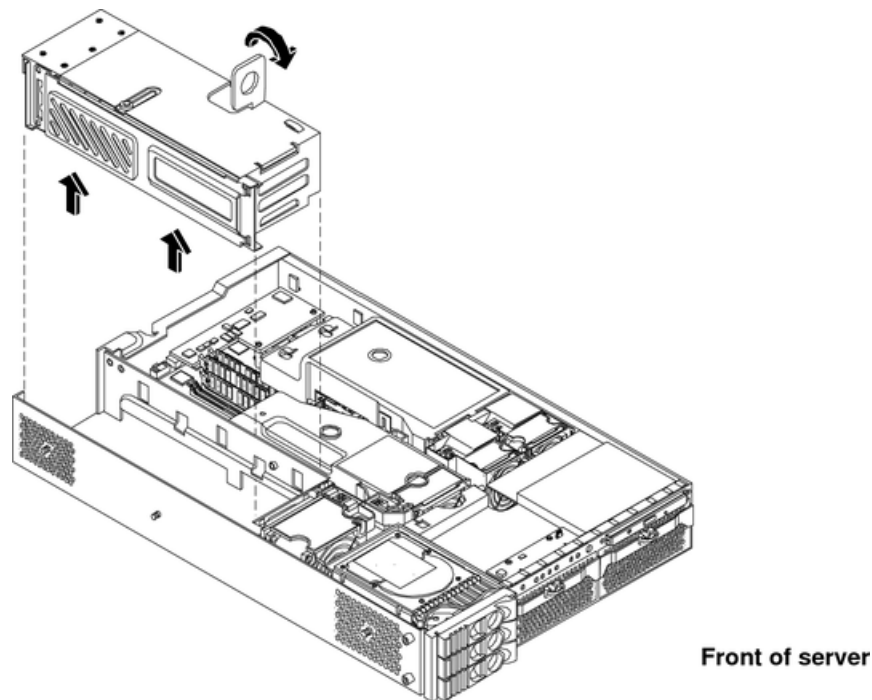
4. Grasp the PCI cage cover and slide it away from the bulkhead end of the cage, then lift the cover off. See Figure 54.

Figure 54 Removing the PCI Cage Cover
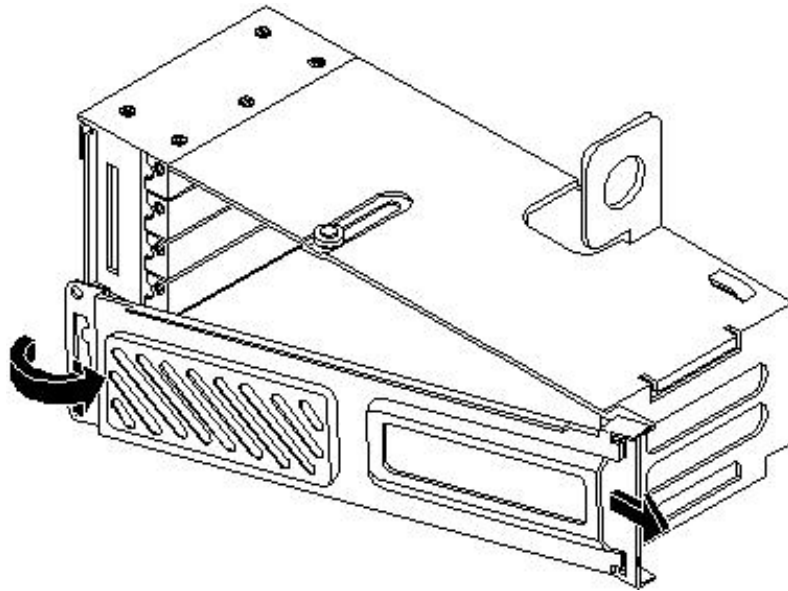
5. Unscrew the bulkhead screw that holds the accessory card in place.
6. The PCI cards are now accessible for removal and replacement.

Replacing the PCI Card Cage

To install the PCI cage into the server:

1. Install the PCI card cover onto the PCI cage. See Figure 54.
2. Slide the PCI card cage into the server, and lock the cage into place by closing the release lever. See Figure 53.
3. Install the top metal cover. See "Replacing the Top Metal Cover" (page 34).
4. Connect all server power, PCI, and LAN cables.

Removing and Replacing PCI Cards

The server can contain up to four PCI cards. PCI cards are located in the PCI cage.

△ **CAUTION:**   There are restrictions on the number of PCI-X cards that can be installed in the server at any given time, depending on the cards being used.

Maximum quantity for any I/O configuration using 337972-B21, AB287A, or A9890A cards:

- Three A9890A cards maximum and one unpopulated slot
- Two 337972-B21 cards maximum and two unpopulated slots
- One AB287A card maximum and three unpopulated slots

Failure to observe this caution results in server degradation or server failure.

The server has the following accessory card sockets:

- Four 64-bit, 133 MHz PCI-X card sockets

⚠ **WARNING!**   Ensure that the server is off, and all power sources have been disconnected from the server before removing or replacing a PCI card.

Voltages are present at various locations within the server when an AC 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 before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server.

Carefully read the following information concerning PCI slot configuration. Inserting a PCI card into a slot that is not configured to accept it, can cause operation failure or the PCI card to operate at less than optimum speed. PCI slots are numbered 1 (top of cage) through 4 (bottom of cage). See the labels on the rear panel of the chassis for correct PCI slot number identification.

Removing a PCI Card

To remove a PCI card from the server:

△ **CAUTION:**   Record the location of all PCI cards as they are installed. Depending on the operating system, replacing the PCI card in a different location might cause boot failure.

1. Power off the server and disconnect the power cable and all other cables from the back of the server. See "Powering Off the Server" (page 27).
2. Remove the top metal cover. See "Removing and Replacing the Top Metal Cover" (page 33).
3. Disconnect any cables that are connected to the PCI card to remove the PCI cage.
4. Perform the procedure for removing the PCI cage described in the previous section.
5. Grasp the edges of the PCI card being removed and gently rock the card releasing the connector from the PCI backplane connector. Place the removed PCI card in an electrostatic container.
6. Install a PCI slot cover in the opening left by the removal of the PCI card. This maintains the proper airflow within the chassis. See Figure 55.

Figure 55 Installing a PCI Slot Cover
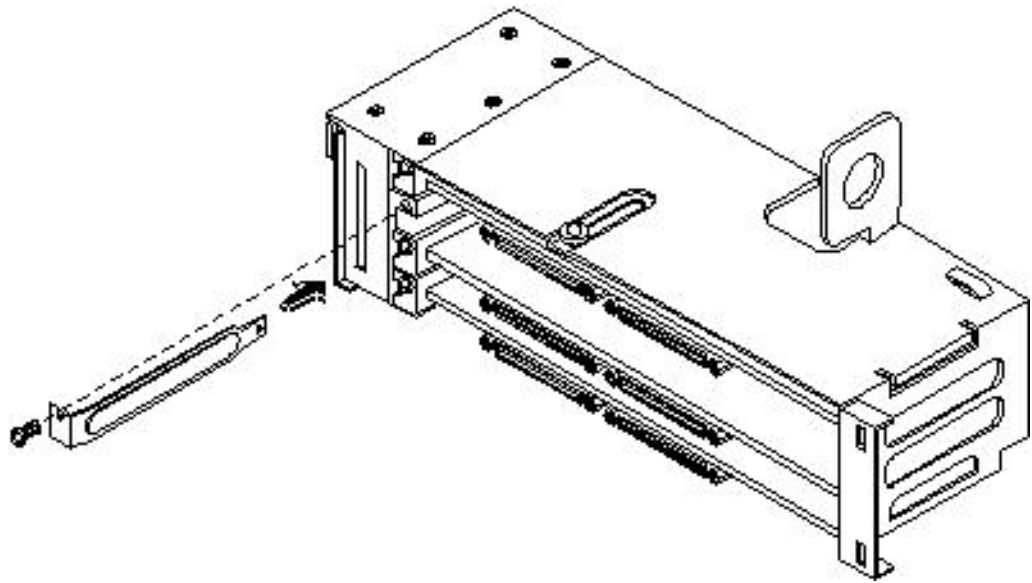
Replacing a PCI or Graphics Card

1. Power off the server and disconnect the power cable and all other cables from the back of the server (if necessary). See "Powering Off the Server" (page 27).
2. Remove the top metal cover (if necessary). See "Removing and Replacing the Top Metal Cover" (page 33).
3. Disconnect any cables that are connected to the PCI card to remove the PCI cage (if necessary).
4. Remove the PCI cage as described in "Removing the PCI Card Cage" (page 60).
5. Open the PCI cage as described in "Removing the PCI Card Cage" (page 60).
6. Grasp the edges of the PCI card to be installed and gently press the card into the PCI backplane connector. See Figure 56.

Figure 56 Installing a PCI Card
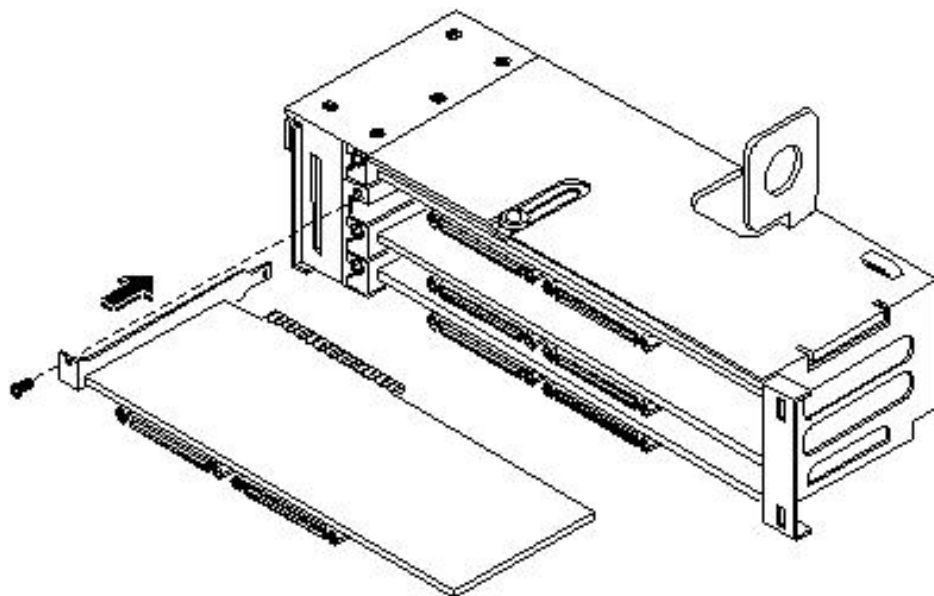
7. Reinstall the PCI cage. See "Replacing the PCI Card Cage" (page 61).
8. Connect any cables that are required by the PCI card.

9. Power on the server. See .
10. Verify the installation of all PCI cards:

- Look at the LEDs of all PCI cards for proper operation. See accessory manuals.

- Run PERFVER from the Offline Diagnostics CD to ensure that all PCI cards are identified.

- Monitor the SEL to ensure there are no events showing peripheral problems.

11. Replace the top metal cover. See .
12. Connect all server power, PCI, and LAN cables.

Removing and Replacing the PCI Backplane

The server backplane is called the PCI backplane and provides four PCI card sockets.

Removing the PCI Backplane

1. Remove all accessory and graphics cards.
2. Unscrew the backplane mounting screws and slide the backplane board toward the bulkhead end of the PCI cage. This unlocks the backplane from its standoffs.
3. Lift the backplane over the top of the standoffs and slide it out of the cage.

Figure 57 Removing the PCI Backplane
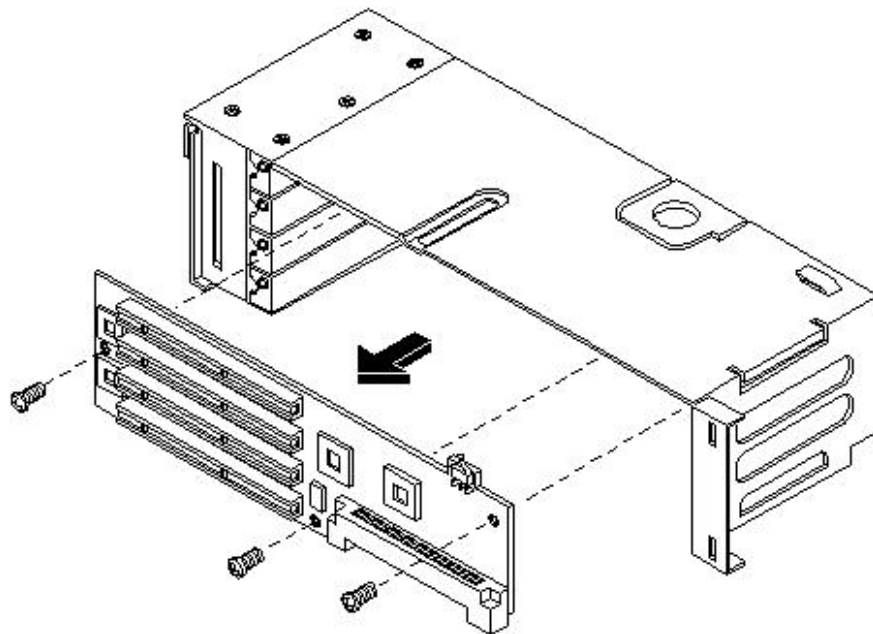
Replacing the PCI Backplane

1. Place the backplane in the cage by aligning the cage standoffs with the holes on the backplane and sliding it into place.
2. Secure the PCI backplane by screwing in its mounting screws.

Figure 58 Replacing the PCI Backplane
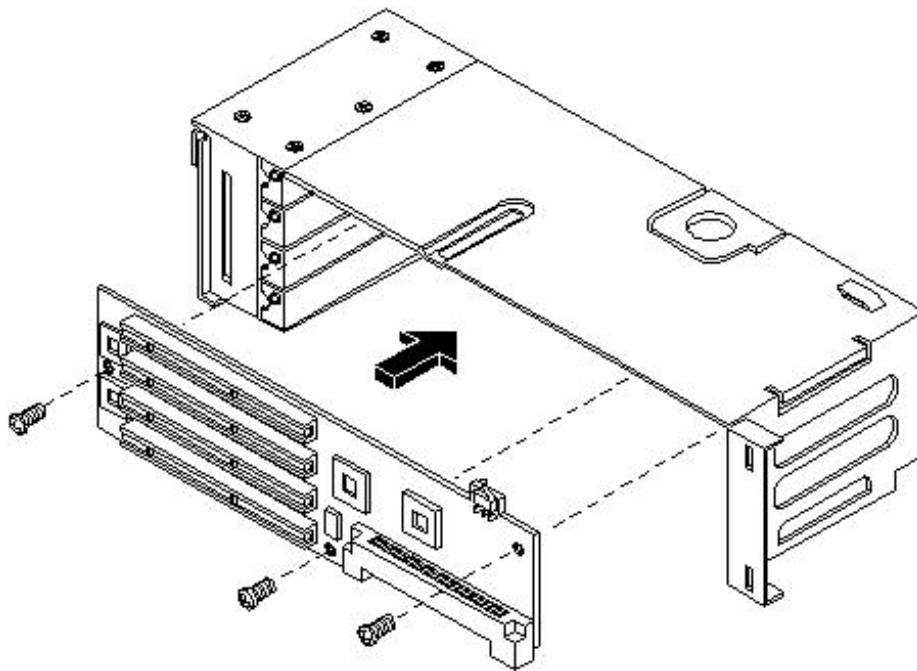
3. Replace any accessory and graphics cards.
4. Connect server power, PCI, and LAN cables.
5. Power on the server. See "Powering On the Server" (page 28).
6. Verify the installation of the PCI backplane:

   • Look at the LEDs of all PCI cards for proper operation.

   • Run `mapper` from the Offline Diagnostics CD to ensure that all PCI cards are identified.

   • Monitor the SEL to ensure there are no events showing peripheral problems.

Removing and Replacing a Removable Media Drive

The removable media drive is located behind the front bezel.

⚠ **WARNING!**   Ensure that the server is off, and all power sources have been disconnected from the server before removing or replacing a removable media drive.

Voltages are present at various locations within the server when an AC 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 before attempting this procedure. Failure to follow ESD safety precautions could result in damage to the server. Failure to properly complete the steps in this procedure will result in erratic server behavior or server failure.

Removing a Removable Media Drive

To remove a removable media drive:

1. Power off the server and disconnect all cables. See "Powering Off the Server" (page 27).

2. Remove the top metal cover. See "Removing and Replacing the Top Metal Cover" (page 33).
3. Disconnect the IDE cable from the back of the drive. See Figure 59.
4. Grasp the front of the DVD drive and squeeze in on the locking tab to release the drive.
5. Pull the drive straight out to remove it from the chassis.

Figure 59 Removing and Replacing Removable Media Drive

Front of server
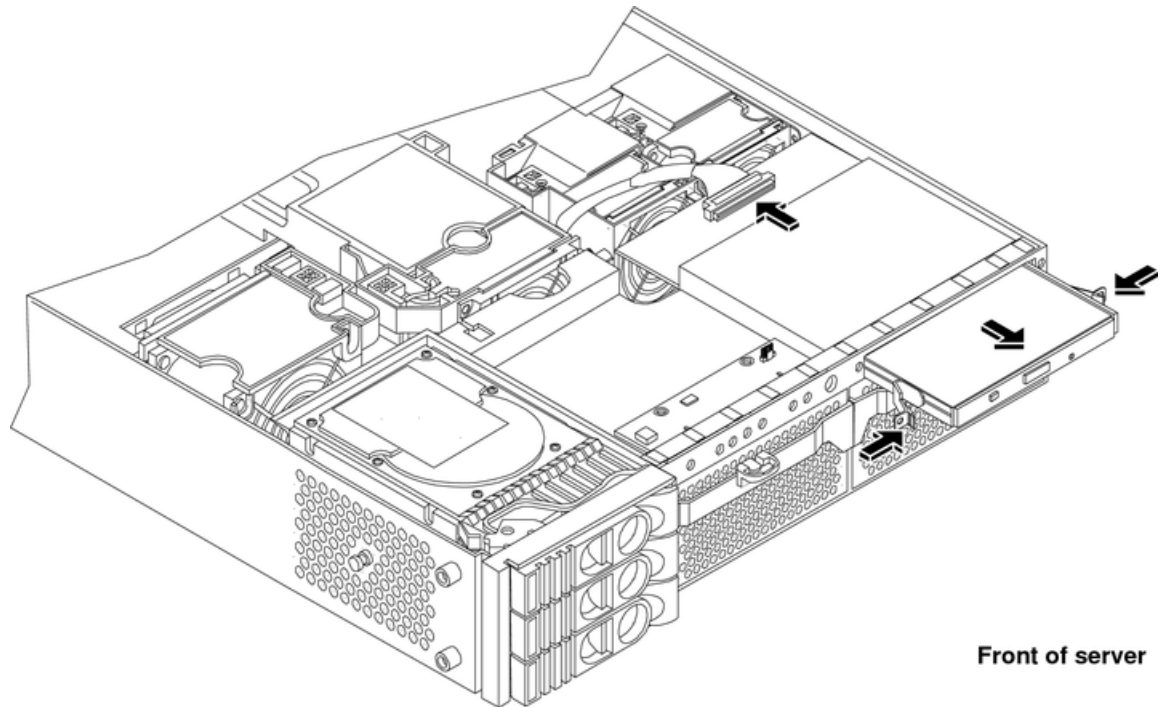
Replacing a Removable Media Drive

To replace the removable DVD drive:
1. If a removable media drive has not previously been installed in the server, the drive slot is covered with a DVD drive blank. Remove the DVD drive blank.
2. Slide the replacement drive into the drive bay until it stops, and the retaining clips on both sides snap into place.
3. Connect the IDE cable to the back of the drive.
4. Replace the top metal cover.
5. Reconnect the power and external cables and power on the server.
6. Verify the drive replacement by using the utilities identified in Appendix C (page 134).

    •   Load removable media and access to verify operation.

    •   To verify operation, use the iLO MP commands.

    •   Use diagnostics provided by the ODE to exercise the module replaced.

Removing and Replacing the MP Card

The MP card is the hardware that provides a way to connect to a server and perform administration or monitoring tasks for the server. The iLO is the firmware that provides the way for the MP to communicate as an independent support system for the server.

Removing the MP Card

1. Record the network settings from your MP card before beginning this task.
2. Power off the server, disconnect all power and external cables and remove the top metal cover.
3. Unscrew the two internal mounting screws that connect the MP card to the internal chassis post.

Figure 60 Removing the MP Card

iLO MP Hardware connector

Front of server
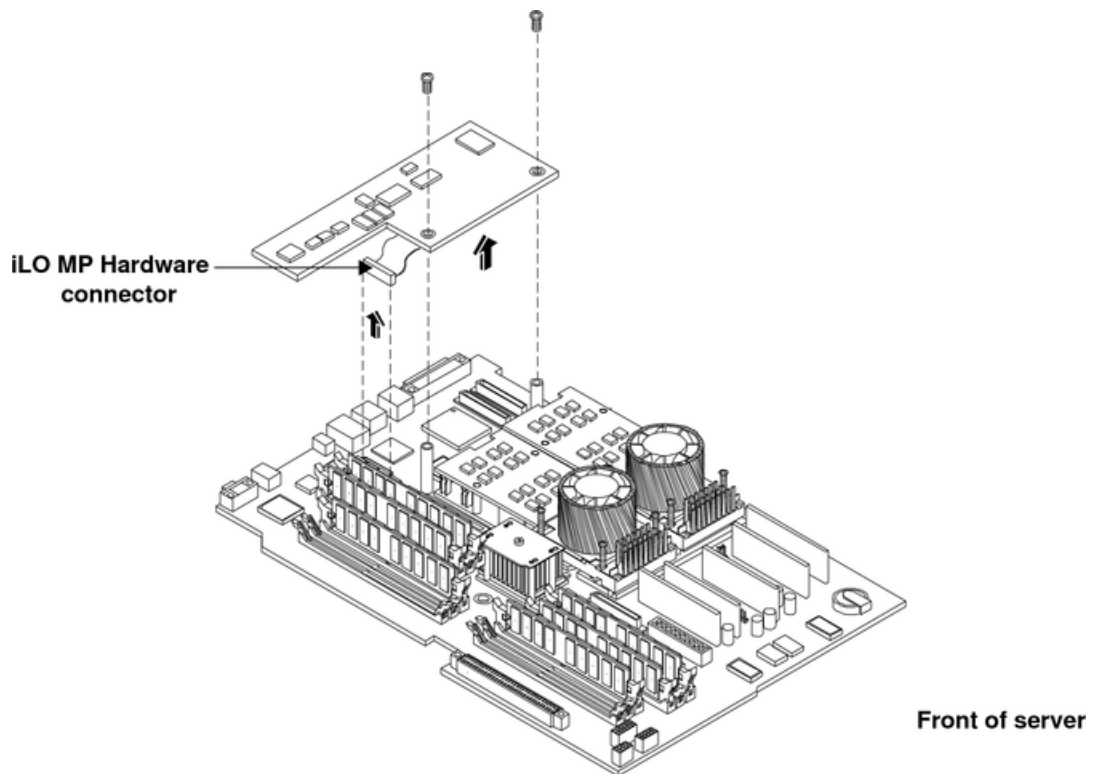
4. Unscrew the two external mounting screws that are located on both sides of the 25-pin serial connector as shown in Figure 61.
5. Disconnect the MP card connector.
6. Remove the MP card from the server by grasping it by its edges.
7. Install the MP blank (if not reinstalling the MP card) on the chassis. This blank is used to fill the holes left by the 10/100 management LAN, 15-pin VGA and 25-pin serial connectors. See Figure 61.

Figure 61 Replacing the MP Blank
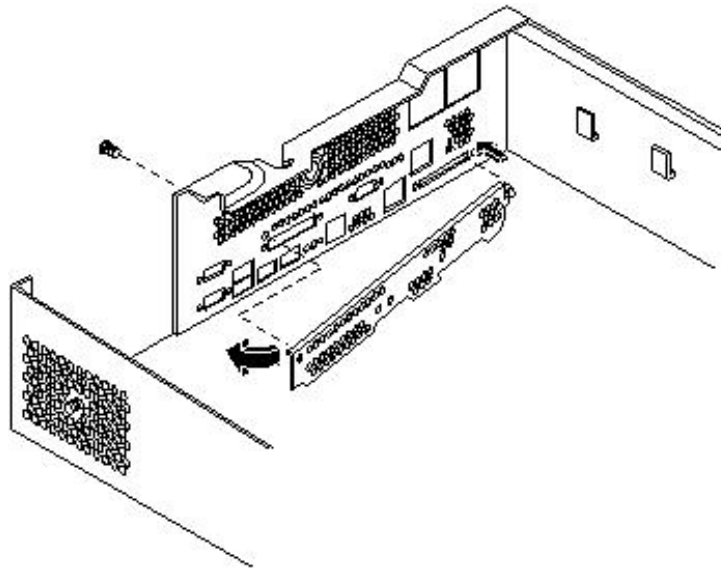
8. Push the MP blank against the inside of the chassis and Install the blank mounting screw on the external connector side of the server chassis.

9. Replace the top metal cover and reconnect the power and external cables.

Replacing the MP Card

1. Record the network settings from your iLO MP before beginning this task.

2. Power off the server, disconnect all power and external cables, and remove the top metal cover.

3. If you are installing a new MP card, remove the MP blank.

4. Unscrew the mounting screw for the MP blank, located on the external connector side of the server chassis.

5. Remove the blank retaining tab from its socket on the server chassis and remove the blank from the server.

6. Insert the MP card in the server.

7. Grasp its edges and place it on the two MP posts.

8. Push the 10/100 management LAN, 15-pin VGA and 25-pin serial connectors through their openings on the back of the server

9. Connect the MP card:

    a. Connect the MP card cable to its connector on the system board.

    b. Install the two mounting screws that connect the MP card to the internal chassis post.

    c. Install the two external mounting screws that are located on both sides of the 25-pin serial connector.

10. Replace the MP hardware connector.

11. Verify the MP card replacement by using the utilities identified in Appendix C (page 134). To verify operation, use the iLO MP commands.

Removing and Replacing the MP Card Battery

Systems with an MP card have two batteries. Systems without MP hardware have only one battery. The main server battery is located on the system board. The MP battery is located on the MP hardware.

Battery Notice

This product contains a Lithium battery.

⚠ **WARNING!** Lithium batteries can explode if mishandled. Do not recharge, disassemble, or dispose of the battery in a fire. Failure to observe this warning might result in personal injury or damage to equipment.

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Removing the MP Card Battery

1. Record the iLO MP configuration settings.
2. Perform all of the steps described in the procedure for "Removing and Replacing the MP Card" (page 66).
3. The battery for the MP card is located on the underside of the board.
4. Lift up on the battery and push on the back of it with a flat-head screwdriver to remove the battery from its holder. See Figure 62.

△ **CAUTION:** Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip can damage the clip.

Figure 62 Removing the MP Card Battery
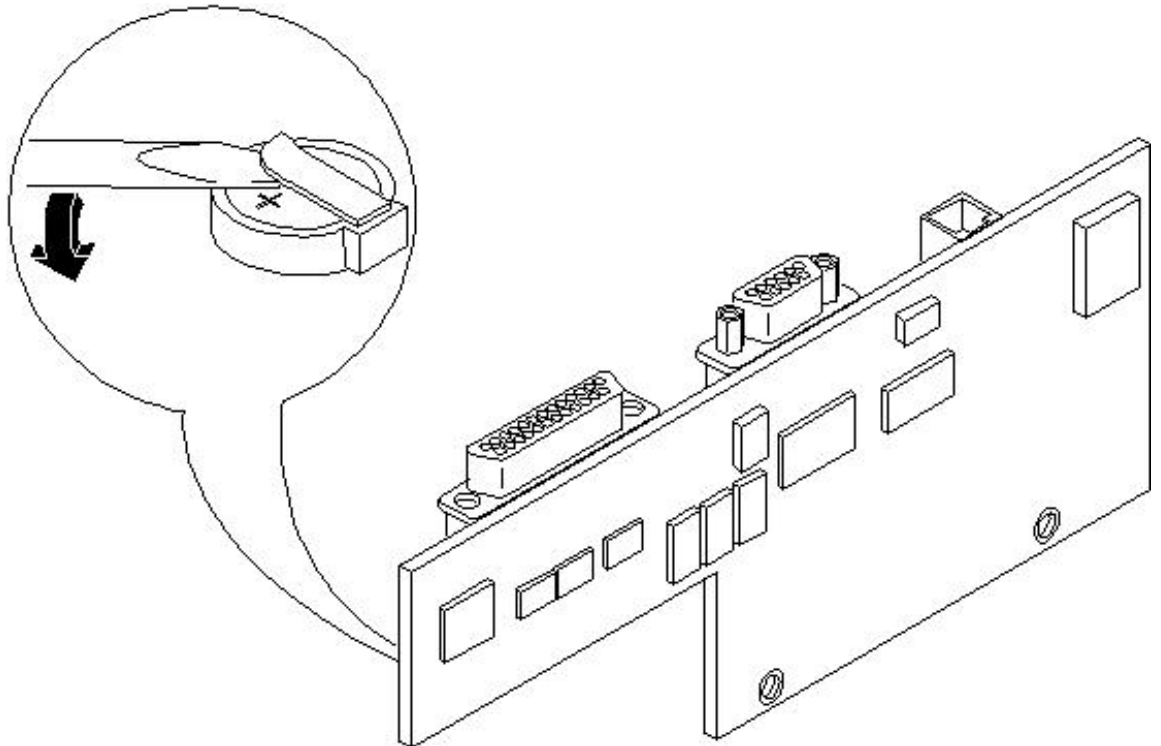
Replacing the MP Card Battery

1. Lift up on the battery holder retaining clip with a flat-head screwdriver and slide the battery into the holder. The positive (+) terminal of the battery faces up.

△ **CAUTION:** Only lift the battery high enough to clear the holder. Excessive stress on the battery holder retaining clip can damage the clip.

2. Perform all of the steps described in the procedure for "Removing and Replacing the MP Card" (page 66)
3. Verify the battery replacement by using the utilities identified in Appendix C (page 134). To verify operation, use the iLO MP commands.

Removing and Replacing the LED Status Panel

The LED status panel card contains the server and diagnostic LEDs.

△ **CAUTION:** Some server settings are saved to the LED status panel. If you are replacing both the LED status panel and the system board, you must replace them one at a time to avoid loss of server settings.

Removing the LED Status Panel

ⓘ **IMPORTANT:** First replace one component, then power on the server and boot to the EFI prompt. After confirming that the first component has been replaced successfully, shut off the server and replace the second component.

1. Power off the server, disconnect all power cables, and remove the top metal cover.
2. Disconnect the LED status panel controller cable.
3. Unscrew the two LED status panel mounting screws and remove the panel. See Figure 63.

Figure 63 Removing the LED Status Panel

Front of server
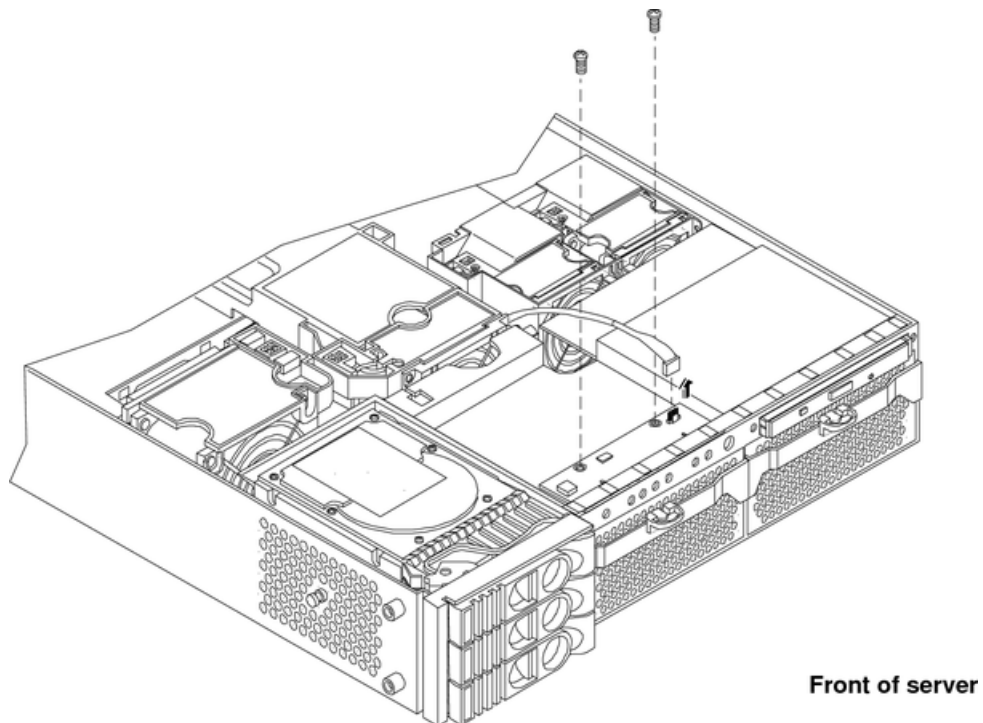
Replacing the LED Status Panel

1. Replace the LED status panel in the server and install the two LED status panel mounting screws.
2. Connect the LED status panel controller cable.
3. Replace the top metal cover and reconnect all power cables. Power on the server and verify that the server and power LEDs illuminate.

4. Copy a valid UUID to the new status panel.

5. Verify the display panel replacement by exercising all front panel controls and observing that the display panel LEDs are operating properly.

Removing and Replacing the System Board

⚠ **CAUTION:** Some server settings are saved to the LED status panel. If you are replacing both the LED status panel and the system board, you must replace them one at a time to avoid loss of server settings.

Removing the System Board

ⓘ **IMPORTANT:** First replace one component, then power on the server and boot to the EFI prompt. After confirming that the first component has been replaced successfully, shut down the server and replace the second component.

1. Power off the server, disconnect all power and external cables and remove the top metal cover.

2. Remove the following components from the system board:

   • Memory airflow guide. See "Removing the Memory Airflow Guide" (page 43)

   • Memory DIMMs. See "Removing DIMMs" (page 48)

   • Processor airflow guide. See "Removing the Processor Airflow Guide" (page 44)

   • Processors. See "Removing a Processor" (page 52)

   • Server fans 1A, 1B, 2, and 3. See "Removing a Server Fan" (page 36)

   • PCI card cage. See "Removing the PCI Card Cage" (page 60)

3. If the server has iLO MP hardware installed, remove it as described in "Removing the MP Card" (page 67).

4. Remove the power connector plate:

   a. Unscrew the two power connector mounting screws on the back of the server.

   b. Remove the power connectors from the socket.

5. Unscrew the six backplane system board mounting screws that connect the system board to the rear of the server chassis. See Figure 64.

Figure 64 Removing the System Board Mounting Screws

Rear of server
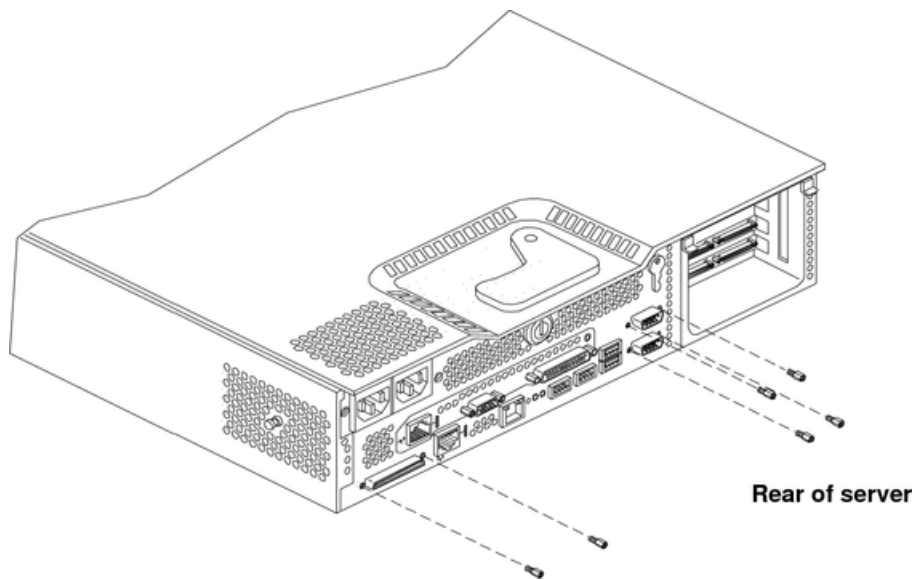
6. Disconnect all cables that are connected to the system board. To help with reassembly, note which cables were connected to which port.

   NOTE: To access the three power cables near the PCI cage, you must lift up the connector bridge for the PCI cage fan.

7. Unscrew the system board mounting screw. A screw symbol is adjacent to the mounting screw. See Figure 65.

Figure 65 Removing the System Board Mounting Screw
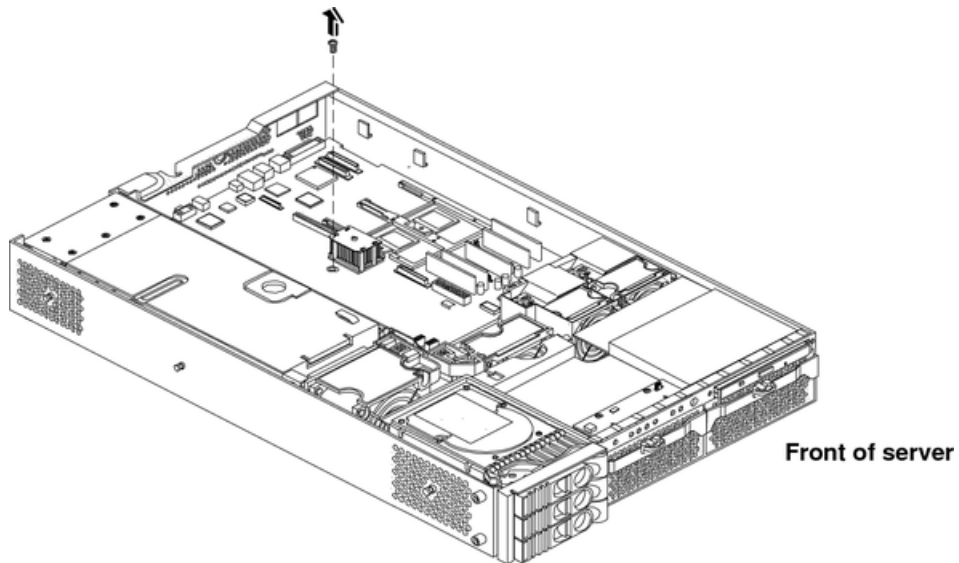
Front of server

8. Remove the system board:
   a. Grasp the memory controller chip heat sink and slide the system board toward the front of the server.

b. Lift up the processor module side of the system board and slide it free of the PCI cage bay. See Figure 66.

Figure 66 Removing the System Board

Front of server
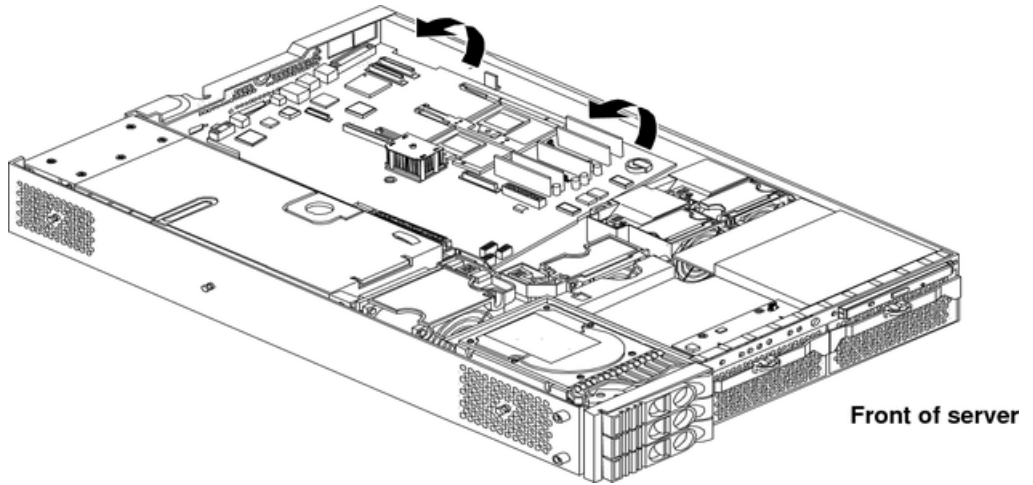
Replacing the System Board

1. Remove the old system board.
2. Grasp the new system board by its edges and carefully align it in the server:
   a. Angle the board to allow the PCI connector to slide into the PCI cage bay area. See Figure 67.

Figure 67 Sliding the System Board into the Chassis

Front of server
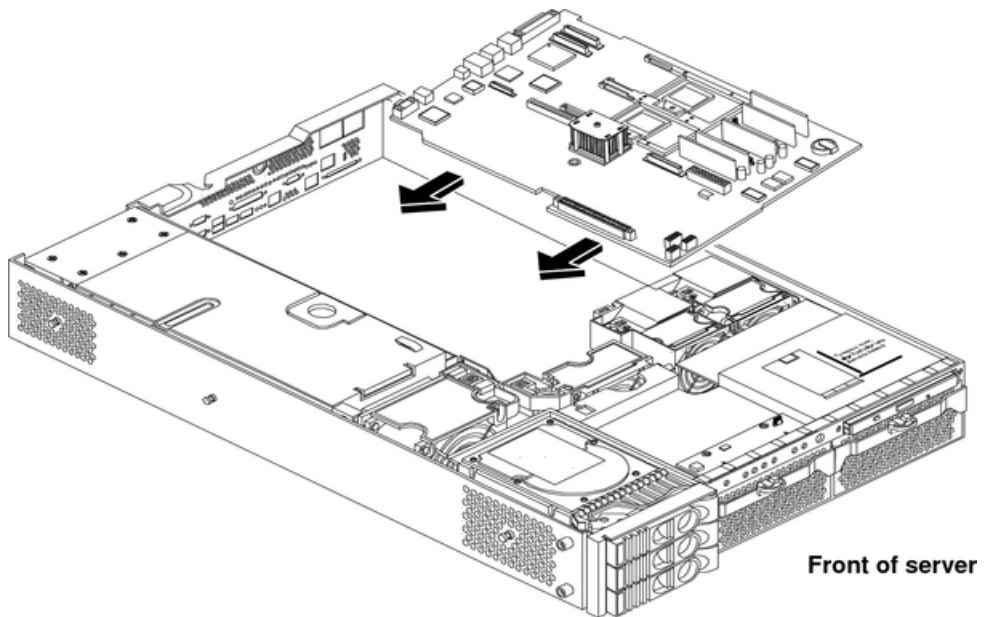
   b. Align the system board keyholes with their standoffs on the chassis.
   c. Slide the PCI connector posts on the system board into their slots on the server chassis.

   NOTE: You must remove the PCI cage from the chassis to install the system board. See "Removing and Replacing PCI Card Cage" (page 60)"Removing the PCI Card Cage" (page 60).

   ---

3. Slide the system board toward the rear of the server to secure the system board on its standoffs. See Figure 68 and Figure 69.

Figure 68 Aligning the System Board PCI Connector

Front of server
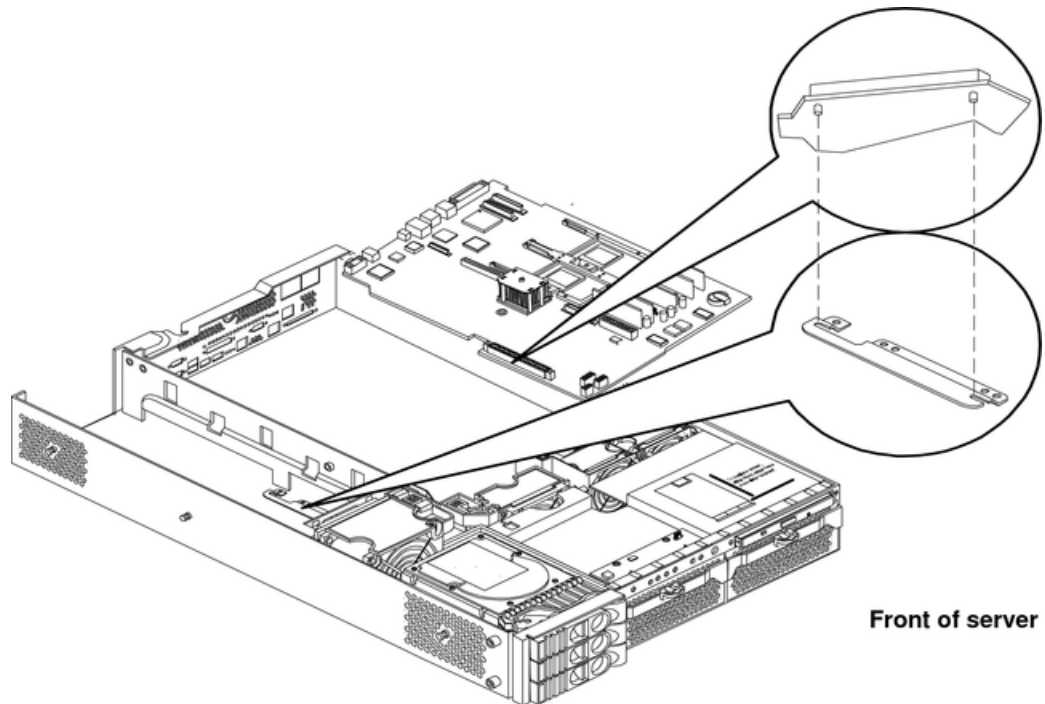
Figure 69 Sliding the System Board into the Chassis

Front of server
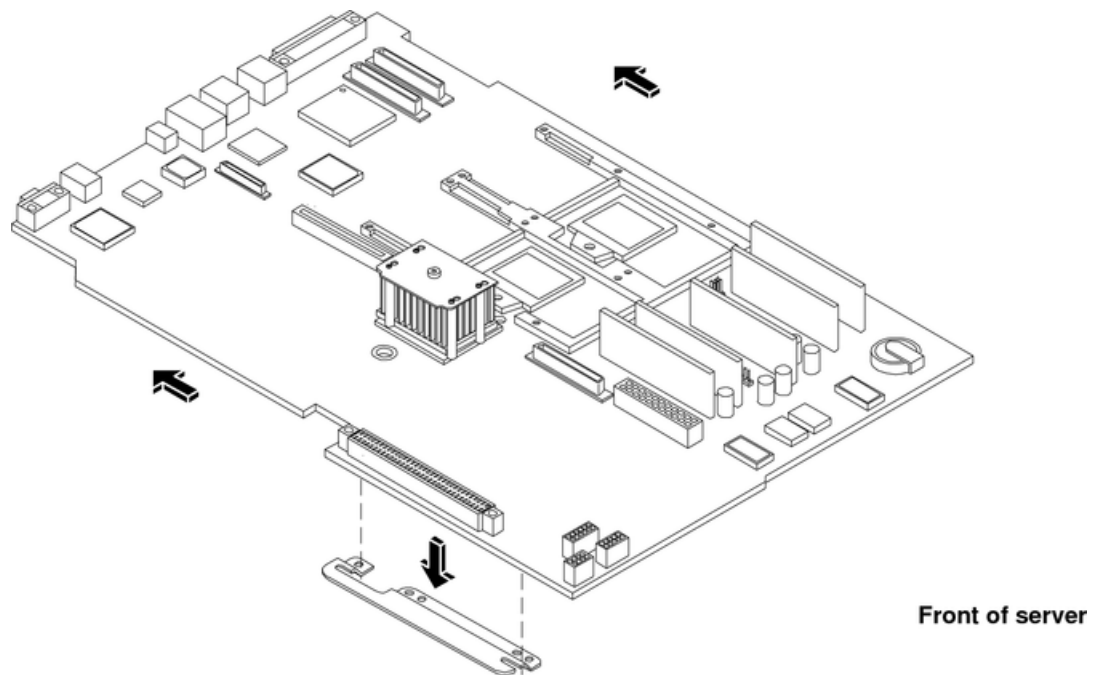
4. Install the system board mounting screw. See Figure 70.
5. Connect all cables to their appropriate connectors on the system board.
6. Install the six rear backplane system board mounting screws.

Figure 70 Installing the Rear Panel Mounting Screws

Rear of server
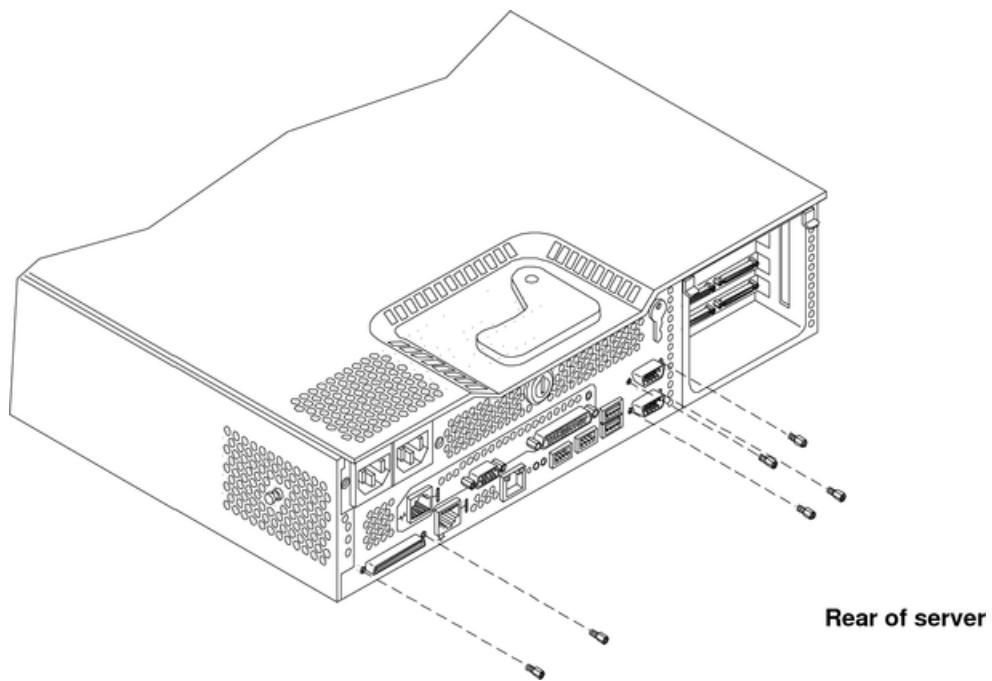
7. If the server has an iLO MP, install it now. See "Replacing the MP Card" (page 68).

8. Replace the power connectors in their slots on the back of the server and install the power connector mounting screws. See Figure 71.

Figure 71 Reinstalling the Power Connectors

Front of server
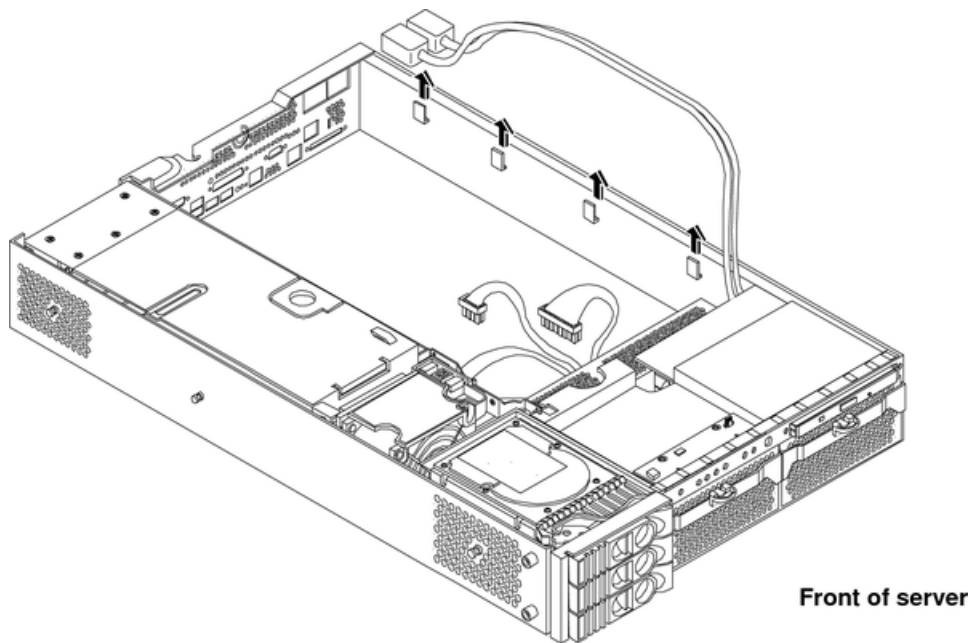
9. Replace the following server components:

    •   PCI card cage. See "Replacing the PCI Card Cage" (page 61)

    •   Server fans. See "Replacing a Server Fan" (page 38)

    •   Processors. See "Replacing a Processor" (page 54)

    •   Processor airflow guide. See "Replacing the Processor Airflow Guide" (page 46)

- Memory DIMMs. See "Installing DIMMs" (page 48)
- Memory airflow guide. See "Replacing the Memory Airflow Guide" (page 44)

10. Replace the top metal cover. See "Replacing the Top Metal Cover" (page 34).
11. Reconnect all of the power and external cables.
12. Power on the server. See "Powering On the Server" (page 28).
13. Boot to EFI.
14. Respond **YES** to prompts regarding copying information onto the new I/O baseboard.

```
Primary system ID values are undefined.
Do you want to copy the valid system ID values to the new board? (y/[n])


Y
```

15. Enter service mode.

```
 Shell> sysmode service
    Current System Mode: ADMIN

    You are now in SERVICE mode.
```

16. Use the **sysset** command to enter the product data:

```
Shell> sysset prodname "server rx2620"
```

17. Use the **sysset**command to verify all values are set:

```
 Shell> sysset
    System Information:
      Manufacturer: hp
      Product Name: server rx2620
      Product Number: AB332A
      Secondary Product Number is Identical
      Serial number: US51884101
      Secondary Serial Number is Identical
      UUID: A8F2D6EC-DBE5-11D9-9172-AE65D056B60F (Valid)
      Secondary UUID is Identical
      Product ID: 0x10A
```

18. Use the EFI date command to set the date to the current date. Use the time command to set the time to GMT. Local time settings are configured in the OS.
19. Review the system configuration in the Boot Configuration Menu or EFI shell and reconfigure settings as necessary.
20. Boot the server and resume normal operation.

Removing and Replacing the Power Supply Interface Module

The power supply interface (PSI) module supports up to two redundant power supplies.

Removing the Power Supply Interface Module

1. Power off the server, disconnect all power and external cables, and remove the top metal cover.
2. Remove the system board. See "Removing and Replacing the System Board" (page 71).
3. Remove the power supply (or supplies). See "Removing the Power Supply" (page 38).
4. Lift the power cables out of their metal holding clips. See Figure 72.

Figure 72 Power Cables and Holding Clips

Front of server
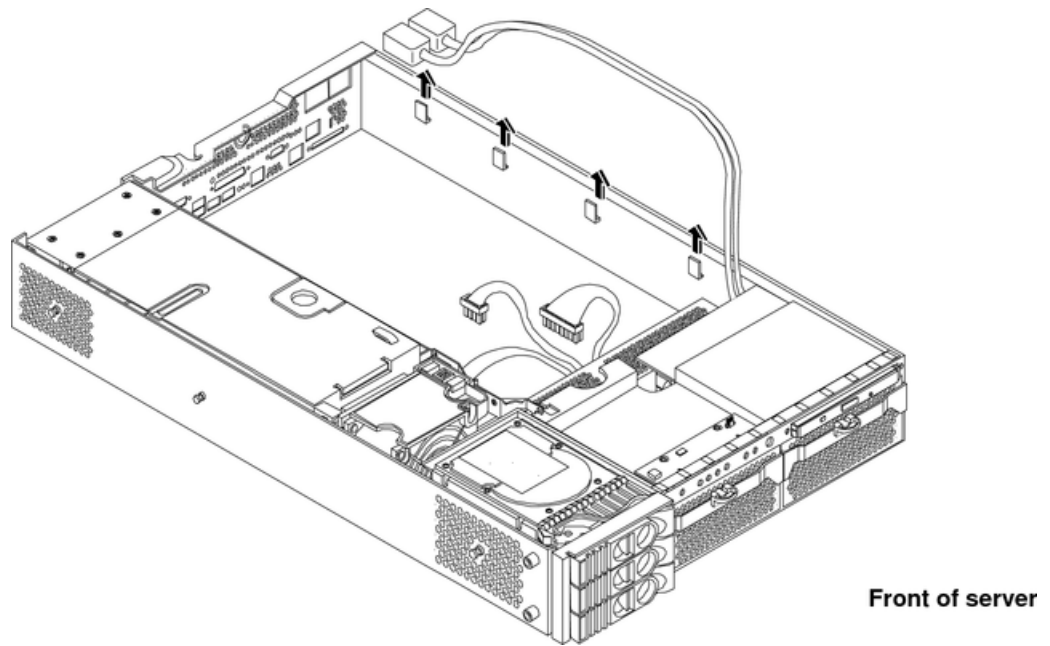
5. Unscrew the PSI mounting screw and remove the PSI module from the server. See Figure 73 and Figure 74.

Figure 73 Removing the Mounting Screw

Front of server
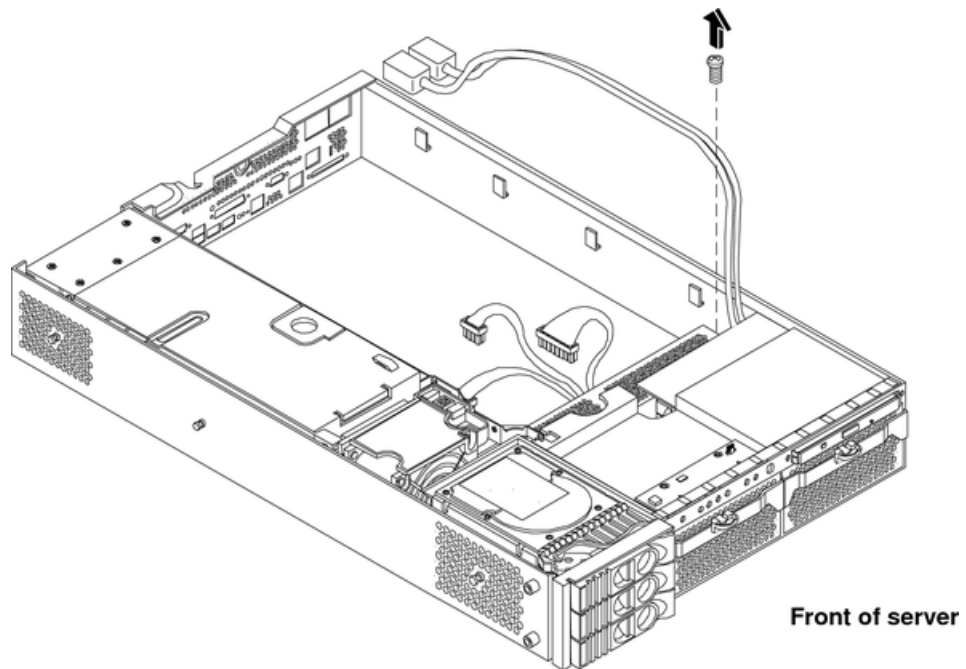
Figure 74 Removing the PSI Interface Module

Front of server
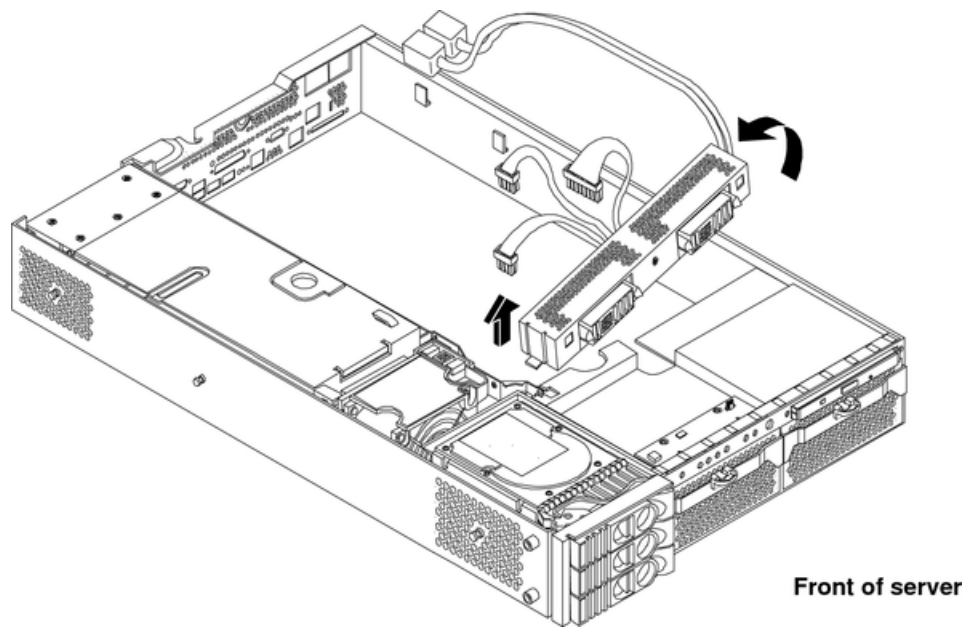
Replacing the Power Supply Interface Module

1. Place the PSI module into the chassis by sliding the module retaining tab into the socket on the hard drive bay wall. See Figure 75.

Figure 75 Replacing the Power Supply Interface Module

Front of server
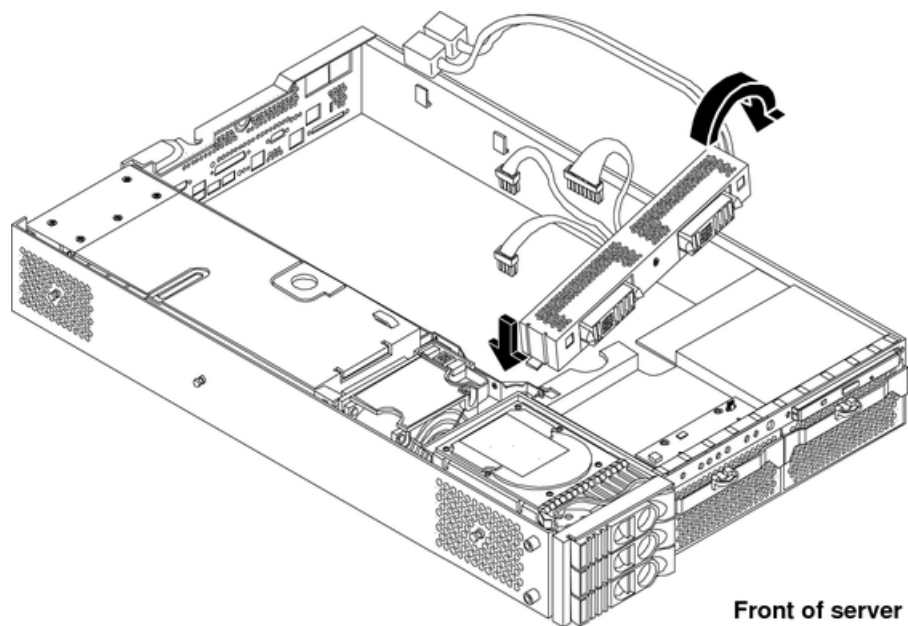
2. Install the PSI module mounting screw and secure the power cables behind the holding clips. See Figure 76.

Figure 76 Securing the Power Supply Interface Module and Cables

Front of server
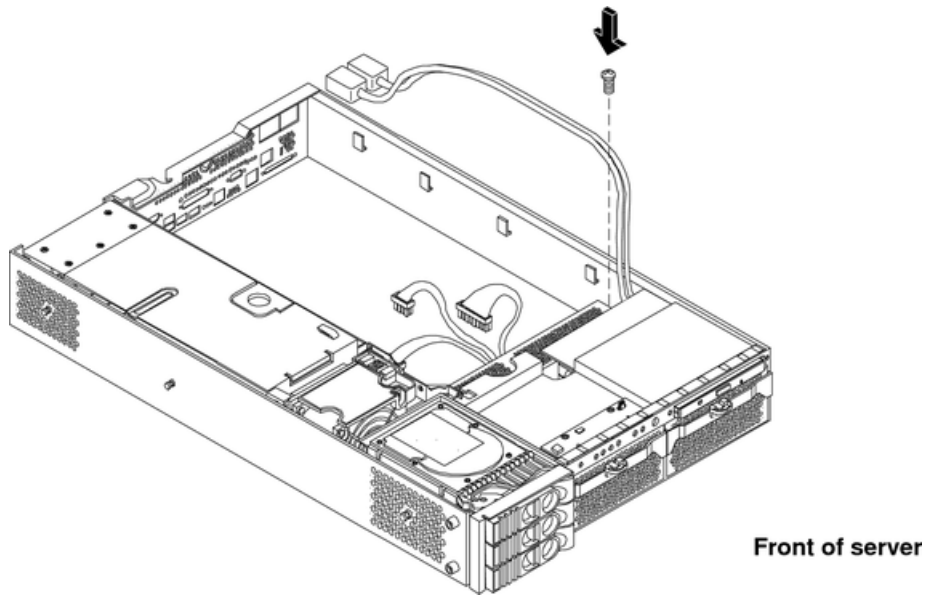
3. Replace the system board.
4. Replace the power supply (or supplies).
5. Replace the top metal cover, and reconnect all of the power and external cables.
6. Verify the PSI replacement by using the utilities identified in Appendix C (page 134). To verify operation, use the iLO MP commands.

Removing and Replacing the Hard Drive SCSI Backplane

Removing the Hard Drive SCSI Backplane

1. Power off the server, disconnect all power and external cables, and remove the top metal cover.
2. Lift up on the PCI cage release lever and the back edge of the PCI cage and lift the PCI cage out of the server.
3. Lift up on the fan power bridge and disconnect the backplane power cable. See Figure 77.

Figure 77 Opening the Fan Power Bridge

Front of server
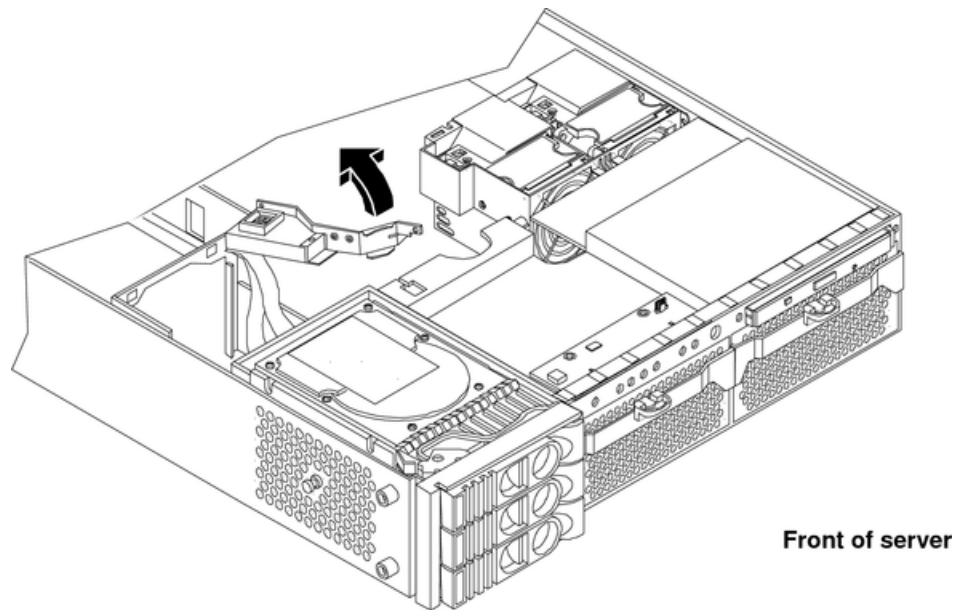
4. Remove any installed hard drives.
5. Disconnect the SCSI cables and unscrew the backplane mounting screws. See
    Figure 78 and Figure 79.

Figure 78 Disconnecting SCSI Cables

Front of server
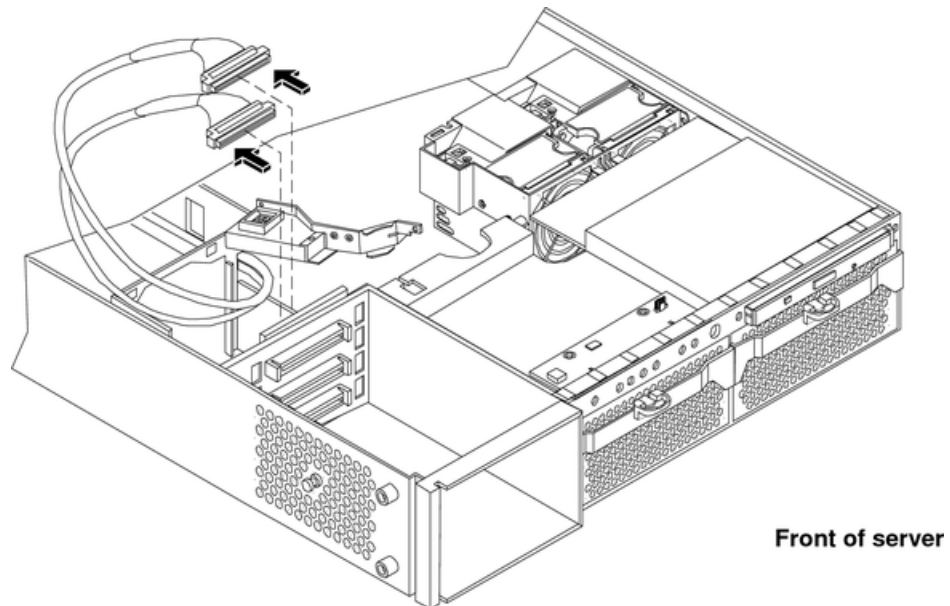
Figure 79 Removing the Mounting Screws

Front of server
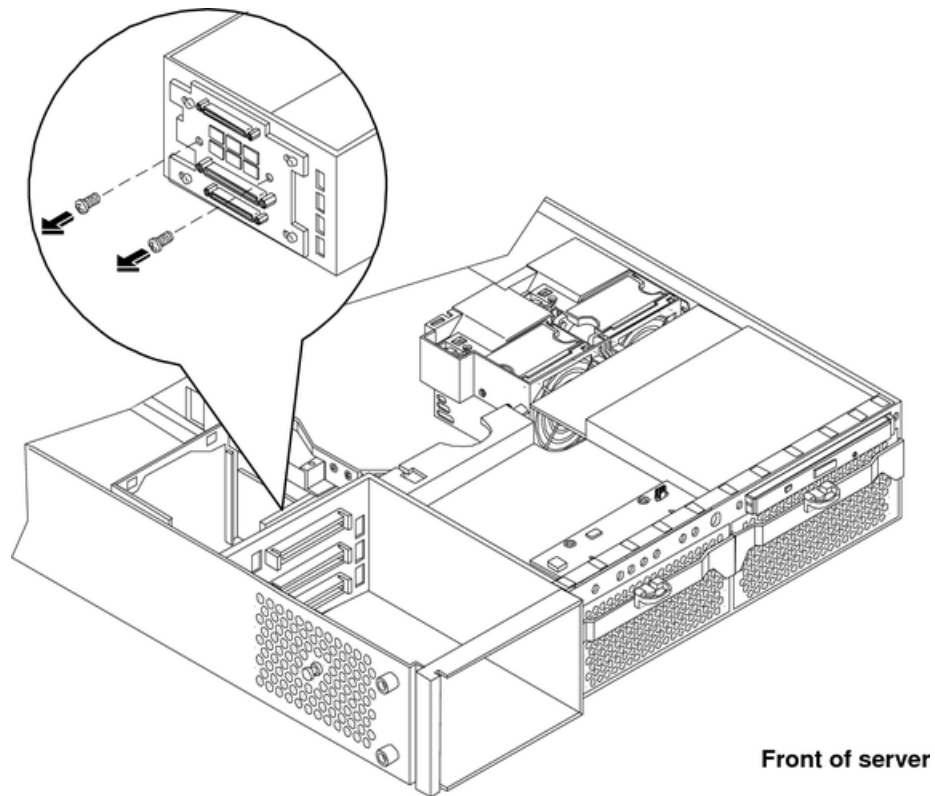
6. Remove the hard drive backplane by sliding it in the direction of the arrow and pulling it outward from its standoff posts. See Figure 80 and Figure 81.

Figure 80 Removing the Backplane

Front of server
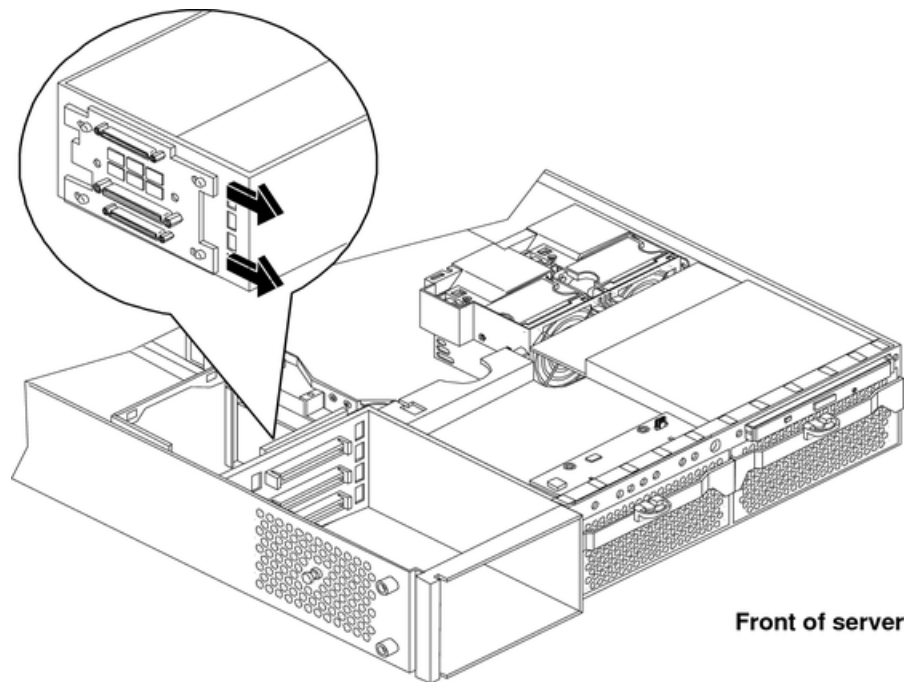
Figure 81 Removing the Backplane from the Chassis

Front of server
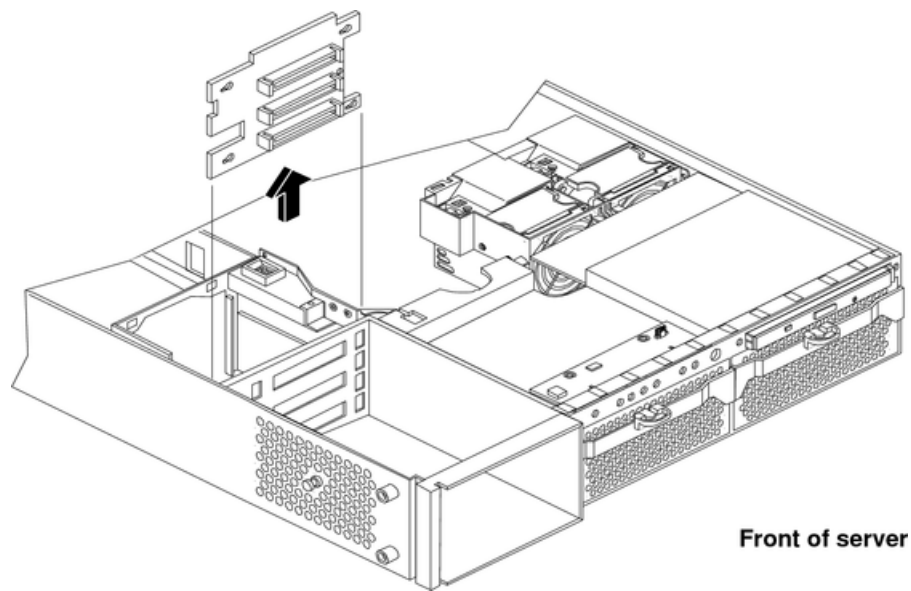
Replacing the Hard Drive SCSI Backplane

1. Insert the hard drive backplane into its four chassis standoffs and slide it to the left. This locks the hard drive backplane in place.
2. Install the two backplane mounting screws and connect the two SCSI cables.
3. Replace any removed hard drives.
4. Connect the backplane power cable and lower the fan power bridge until it snaps in place.
5. Replace the PCI cage in the server and secure it.
6. Replace the top metal cover, and reconnect all of the power and external cables.
7. Verify the backplane replacement by using the utilities identified in Appendix C (page 134). To verify operation, use the iLO MP commands.

5 Troubleshooting

This chapter provides troubleshooting instructions for maintaining the server.

Troubleshooting Tips

⚠ **CAUTION:**   Do not operate the server for more than 30 minutes with any cover (including disk drives) removed. Damage to server components can result due to improper cooling airflow.

If you do not replace the top cover within 30 minutes, the server automatically shuts off.

- For problems with an optional disk array controller board, refer to the appropriate manuals provided with the array controller.

- For general information on Hewlett Packard Enterprise server products, see the Hewlett Packard Enterprise website at http://www.hpe.com.

Possible Issues

This section contains example server problems and their possible solutions. For details on the iLO MP commands, see the *HPE Integrity and HPE 9000 iLO Operations Guide*.

The System Does Not Power-On

1. Review the installation procedures for the server.
2. Check all power connection cables.
3. Verify that the Power On/Off LED on the control panel is illuminated. If not illuminated check the AC power. If the LED is flashing yellow, the server is in DC standby. Check the power status with the iLO MP `PS` command. If the Power On/Off LED is illuminated steady green, the DC power supply is on.
4. Check the normal operation of the power supply and fans. The iLO MP `PS` command interrogates the status of the power subsystem.
5. Check the system board diagnostic LEDs for proper operation. See System Board Diagnostic LEDs later in this chapter.
6. Verify that both LEDs of the power supply (visible behind bezel) are illuminated. The upper LED indicates presence of proper AC voltage, and the lower indicates that the DC power is good.
7. Verify that all cables and modules are correctly connected. Check the display panel connection. Use the iLO MP `VFP` command to verify a match of control panel LED indications.
8. If the server starts to power on and then power off, a voltage rail of the power supply might be out of specification. The BMC monitors voltages and prevents power on when power values are out of specification. If this occurs, check the SEL logs for an alert with a high level (alert level 5 or alert level 7). Also check the power subsystem with the iLO MP `PS` command.

The System Does Not Boot

1. Examine the display panel LEDs for warning or fault indications. The server LED flashes yellow with a warning indication and flashes red with a fault indication. If this occurs, check the SEL logs for additional information on the alert.

2. Examine the four diagnostic LEDs for specific warning or fault indications. The diagnostic LEDs present patterns that categorize the source of the warning or fault. This information is also presented in the SEL.

    NOTE: If MP hardware is installed, the diagnostic LEDs are monitored by iLO. The diagnostic LEDs on the control panel are disabled.

3. Display and examine the SEL and Forward Progress Log (FPL) for more information about warning or fault indication.
4. Use the BMC CLI to cycle the server power, `cli>pc off`, `cli>pc on`. You can also use the iLO MP `PC` command (`pc -cycle -nc`).
5. Remove all power from the server by disconnecting the AC power cords, wait at least twenty seconds, then reconnect the power cords and turn the server back on to see if the failure can be cleared.
6. Check server memory for possible problems. You can also use the EFI `info mem` command.
7. Check server processors for possible problems. You can also use the EFI `info cpu` command. Or, by using the iLO MP `SS` command.
8. Check the boot order in the Boot Configuration menu.
9. If the server still does not boot, you might need to replace the base unit.

The System Has Intermittent Failures

1. Examine the display panel LEDs for warning or fault indications. The server LED flashes yellow with a warning indication and flashes red with a fault indication.
2. Examine the four diagnostic LEDs for specific warning or fault indications. The diagnostic LEDs present patterns that categorize the source of the warning or fault.

    NOTE: If iLO MP hardware is installed, the boot process is monitored by the iLO MP. The diagnostic LEDs are disabled.

3. Display and examine the SEL and FPL for more information about warning or fault indication.
4. Make sure that the server fan assemblies are fully seated.
5. Verify that the server is plugged into a power source that is within specifications described on the label of the power supply.
6. Make sure that the internal SCSI chain is terminated and termination is not enabled on any drive. With LVD SCSI, termination is provided in the cable.
7. Check that the processors are installed in the correct sockets, and terminators are installed in all unused sockets.
8. Reseat the main memory DDR DIMMs.
9. If date and time or customer settings are cleared, you might need to replaced the system board battery.

The System LED or Diagnostic LEDs are Not On, and No Error Messages Appear

If the server does not work (with no LEDs illuminated) and no error messages appear, check the following:

1. Make sure that all cables and the AC power cord are plugged into their proper receptacles.
2. Make sure that the AC outlet is working. If the server is plugged into a switched multiple-outlet box, make sure that the switch on the outlet box is turned on.

3. Make sure that the server is turned on (the power-on light should be green and the fans should be on).

4. Turn the server off, wait at least twenty seconds, then turn the server back on to see if the failure can be cleared.

5. Make sure that all boards are installed properly and the processors are installed in the correct slot. They must be seated firmly in their slots and any cables must be connected firmly.

6. If the server stopped working after you installed a new board, remove the board and power on the server. If your server now works, check the installation instructions received with the new board for correct installation method. If the new board is preventing the server from powering on, a serious electrical problem is likely.

7. If the server still does not work, remove all boards and options that you have installed (do not remove the hard drives) and power on the server.

8. Add the boards and options one at a time to determine which one is causing the problem.

9. If you have added any memory, make sure that the DDR DIMMs are seated properly in the board. Also check the DDR DIMM configuration, and that the DDR DIMMs are matched quads.

The Server Powers Off but Does Not Restart

When certain critical conditions exist, the server shuts off all power.

The critical conditions that can shut off the server include:

- critical temperature fluctuations or changes

- voltage problems (external AC line)

- power supply failure

If the server powers off, and before you try a restart, do the following:

1. Examine the display panel LEDs for warning or fault indications. The server LED flashes yellow with a warning indication and flashes red with a fault indication.

2. Examine the four diagnostic LEDs for indications of specific warning or fault indications. The diagnostic LEDs present patterns that categorize the source of the warning or fault.

   NOTE: If MP hardware is installed, the boot process is monitored by the iLO MP. The diagnostic LEDs are disabled.

3. Display and examine the SEL and FPL for further information about warning or fault indication.

4. Make sure power is getting to the server. Plug a known working device into the power outlet.

5. Check for proper ventilation for the server. The server should have at least three inches of space around the front and rear for proper airflow when installed in a rack.

   NOTE: A fluctuating power supply might cause temperature issues.

6. Check the server specifications and make sure the environmental temperature and voltage are within the specified guidelines.

7. Monitor the server to make sure you are not experiencing further temperature and voltage problems.

Troubleshooting and FRU identification

After you have determined the current server state, you must troubleshoot the server to determine what repair to make.

Use Table 18 to assist you in repairing the server by matching the problem symptom with the appropriate troubleshooting step.

Table 18 Troubleshooting FRUs

Problem or Symptom	Problem Indicators	Normal Functioning Indicators	Troubleshooting Steps	Potential FRUs
No indication of housekeeping voltage present when AC is connected and power switch is in the off position.	Standby LED is off when AC is plugged into server. BMC "heartbeat" not flashing. Both LEDs are located on the system board, see System Board LEDs later in chapter.	Power LED Off. Power LED on iLO MP card (if installed) should be lit solid green. Standby LED on system board is on steady. BMC "heartbeat" LED on system board is flashing.(if installed) should be lit solid green.	1. AC must be present. Check that PDU is plugged in. 2. Ensure there is a working power supply. The LED on the supply should be lit. 3. Check for an EFI shell prompt (CTRL B) at console).	No AC present Power Supply Power Distribution System board Display board
System does not power on when display panel Power switch is turned on.	Display panel Power LED stays off when power is turned on. System LED might be flashing yellow (Attention indication).	Power switch on. Power LED on steady green. System LED is off.	1. Ensure there is a working power supply. The LED on the supply should be lit. 2. Verify that standby voltage is present. Check that the STBY LED on the system board is lit. 3. Verify that the baseboard management controller is functioning. Check the heartbeat (BMC) LED on the system board is lit. 4. Check server event log (SEL). Look for event log detail = Low Voltage DC power. This indicates a failure of one of the CPU power pods	Missing FRU Power Supply CPU power pod System board Intrusion switch on chassis (cover not completely closed)
No EFI Main Menu prompt.	Display panel power LED is not steady green. No server events are	Display panel power LED is steady green. System events are being	1. Check that the console is properly connected and can communicate with the BMC. Press (CTRL B) to access the iLO MP login prompt.	Processors Processor Support Modules Memory System board

Table 18 Troubleshooting FRUs *(continued)*

Problem or Symptom	Problem Indicators	Normal Functioning Indicators	Troubleshooting Steps	Potential FRUs
	being displayed at the console. There is no EFI Main Menu prompt at the console.	displayed at the console. EFI Main Menu prompt.	2. Check SEL. Look for entries related to: • Processors • Processor Support Modules (Also known as power pods). • Memory 3. Check for red LED on the iLO MP card if installed. If red, the problem is with the iLO MP. 4. Reduce to minimum configuration and troubleshoot from there.	Console
Cannot boot to operating system.	Boot error messages. System LED flashing.	Operating system prompt. Operating system boot messages. System LED on steady green.	1. Check console messages. Did server hang? 2. Check SELs for possible problem indication. 3. Run ODE diagnostics.	Corrupt operating system Hard Drive Disk drive cage backplane SCSI interface on system board Processor

Verifying Hard Drive Operation

Each hard drive has an activity LED indicator on the front of the drive. See Figure 82.

NOTE: Only the Activity LED is used. The Status LED is not monitored by HP-UX.

Figure 82 LED Apertures on Hard Drive
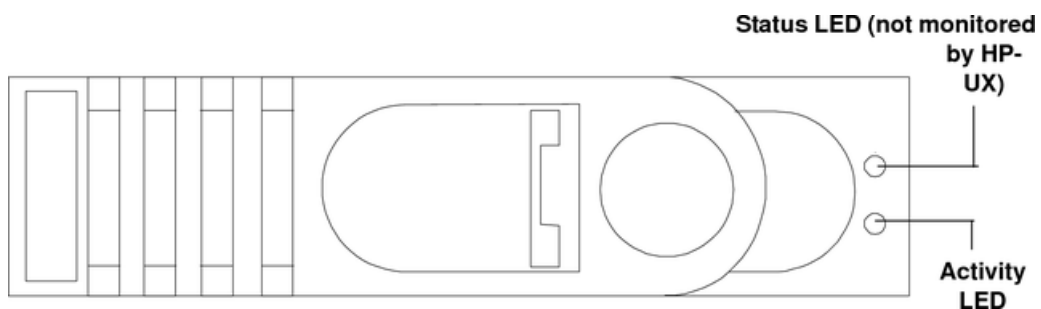
Lightpipes on the disk drive transmit light to these apertures from LEDs on the inside rear of the hot-swap mass storage cage. Verify that the LED shows the correct activity indication for all disk drives that you installed:

1. Turn on power to the server and display monitor.
2. During the boot sequence, watch the Activity LED on each hard drive. The LED quickly cycles from amber to green. The LED stays steady green until the drive spins up.
3. If the activity LED is illuminated on any disk drive, the drive cage might not be correctly installed. Check installation as follows:

    a. Power off the server using the power switch and unplug the AC power cords and any cables.

    b. Disconnect the power distribution cable between the drive cage and the power distribution module and then reconnect it.

    c. Verify that the SCSI interface is correctly installed from SCSI A channel connector on the system board to the connector on the SCSI cage.

    d. Ensure that the SCSI bus is loaded properly.

    e. Reconnect the AC power cords and any cables. Restart the server to determine whether the LEDs now become illuminated during the boot. If not, contact your reseller.

4. If the LED indicator on a single disk drive is not illuminated during boot, the disk drive might be installed incorrectly, or its lightpipes might be damaged.

   Check the lightpipe on the disk drive as follows:

    a. Remove the disk drive.

    b. Inspect the lightpipes for damage. If a lightpipe is damaged, contact your reseller.

> △ **CAUTION:** The lightpipes are fragile. Be careful not to damage them when you inspect them or when you reinsert the disk drive.

    c. Reinstall the disk drive.

    d. Restart the server to determine whether the LED now becomes illuminated during the boot. If not, contact your reseller.

5. Use the EFI shell command `info io` to check the SCSI drives.

Identifying and Diagnosing Hardware Issues

Should a failure occur, the server LEDs, the diagnostic LEDs, and the SEL help you identify the problem.

- The server LED, LAN LED, and diagnostic LEDs on the display panel of the server change color and blink in different patterns to help identify specific problems. LEDs on the front and rear panels of the server display LAN activity.

- The SEL provides detailed information about the errors identified by the LEDs.

If the LEDs and SEL do not give you enough information for you to identify the problem you are experiencing, Hewlett Packard Enterprise also provides diagnostic tools with each operating system.

Power and System LEDs

The power and server LEDs indicate the state of the server. When the server LED is flashing yellow or red, a problem exists.

> **NOTE:** When the optional iLO MP card is installed, the four diagnostic LEDs on the display panel are disabled.

Systems with the Optional Management Processor Installed

Table 19 details the LED states that exist for servers having an optional iLO MP card installed.

Table 19 System LED States

System LED	State
Off	Off
Solid green	Running operating system
Flashing green	Booting or running code other than operating system (boot or diagnostic).
Flashing yellow (1/sec.)	Attention indication: Alerts of levels 3-5 detected in the optional iLO MP logs. The LED turns off after the event log has been read.
Flashing red (2/sec.)	Fault indication: System alert level 7 detected, LED blinks until the problem is resolved and the server boots successfully or until it is manually turned off.

For server alerts of levels 3-5, the attention condition on the server LED can be cleared by accessing the logs using the `sl` command available in the Main Menu mode or the BMC command line interface (CLI) `cli>sel` command through the console (serial A) port. To access the BMC CLI press: **ESC**. To exit BMC CLI press **ESC Q** (Shift Q).

NOTE: Always check the optional iLO MP SELs in the case of a flashing yellow or red System LED before replacing any hardware.

iLO MP Event Logs

The optional iLO MP provides diagnostic and configuration capabilities. For details on the iLO MP commands, see the *HPE Integrity and HPE 9000 iLO Operations Guide*. To access the iLO MP:

1. Login with proper username and password.

   NOTE: Default administrator login and password: login = **Admin** password = **Admin**.

2. To display the console history log, enter `cl`. This log displays console history.
3. To display the status logs, enter `sl`. The status logs consist of:
   - System Event
   - Forward Progress
   - Current Boot
   - Previous Boot
   - Live Events
   - Clear SEL/FPL Logs

For a complete explanation of configuring the iLO MP and using the iLO MP commands, see the *HPE Integrity and HPE 9000 iLO Operations Guide*.

System Event Logs

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 server 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, and a threshold filter number to filter events to the desired level.

```
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.
```

5. Select 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 flashing state of server 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
```

NOTE: More detailed information on the server logs is presented in Appendix C (page 134).

Systems Without an iLO Management Processor

The server LED states operate the same as servers that have the optional iLO MP. See Table 20.

Table 20 Power and System LED States

Power LED	System LED	State
Off (flashing green)	Off	Server is off
On (green)	Solid green	Running
On (green)	Flashing green	Booting or running code other than operating system (boot or diagnostic)
On (green)	Flashing yellow (1/sec.)	Attention indication
On (green)	Flashing red (2/sec.)	Fault indication

Diagnostic LEDs

The server has four diagnostic LEDs. These diagnostic LEDs warn of impending or existing failures and enable you to take preventive or corrective action, such as making a server backup or replacing a component. These diagnostic LEDs are labeled 1, 2, 3, and 4.

- If no iLO MP is installed, the boot progress is monitored by diagnostic LEDs 1 through 4. During the boots, the LEDs turn on in sequence until the EFI prompt is reached.
- If an iLO MP is installed, the boot process is monitored by the iLO MP. The diagnostic LEDs are disabled. For more information, see Figure 83.

Figure 83 Diagnostic LEDs
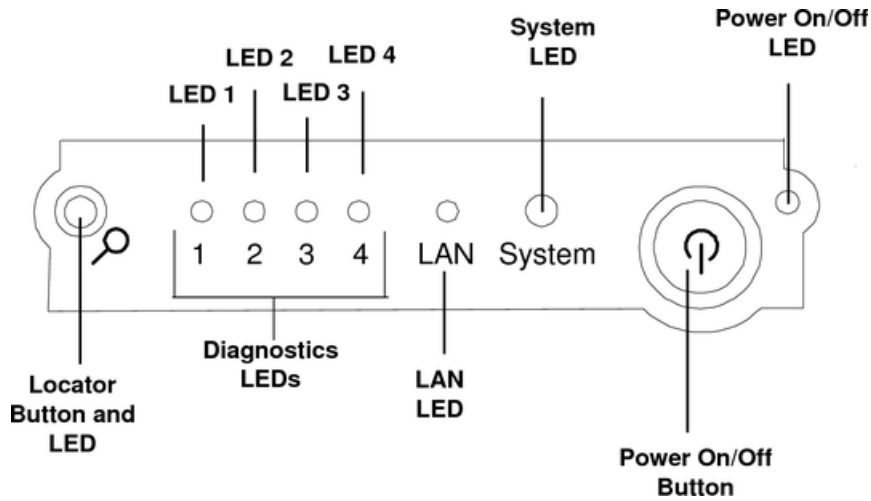
The pattern of illuminated LEDs can be used to identify the category of the fault or warning. For example, if diagnostic LED one is red, there is a problem with memory. However, if diagnostic LEDs one and two are both red, there is a problem with the server processor.

If the diagnostic LEDs indicate an error, check the EFI shell CLI `cli>sl e` to display the SEL for a more detailed explanations of the failure.

- The server LED indicates the severity of the error. Check the server LED before proceeding to analyze the sequence of diagnostic LEDs:
  - System LED flashing YELLOW indicates a WARNING.
  - System LED flashing RED indicates a FAULT.
- The diagnostic LEDs provide details about the specific error:
  - Solid red indicates the failing part or subsystem.
  - Off or solid green diagnostic LEDs provide additional details about the failure.

The faults and warnings fall into several general categories. See Table 21.

Table 21 Diagnostic LEDs Fault and Warning Categories

LED 1	LED 2	LED 3	LED 4	Category
RED	Any[1]	Any[1]	Any[1]	Memory
Any[1]	RED	Any[1]	Any[1]	Firmware
Any[1]	Any[1]	RED	Any[1]	System Board

Table 21 Diagnostic LEDs Fault and Warning Categories *(continued)*

LED 1	LED 2	LED 3	LED 4	Category
Any[1]	Any[1]	Any[1]	RED	Fan
RED	RED	Any[1]	Any[1]	Processor
RED	Any[1]	RED	Any[1]	BMC
RED	Any[1]	Any[1]	RED	Temperature
Any[1]	RED	Any[1]	RED	Power Supply
RED	RED	RED	RED	Unknown

[1] This LED can display any color other than red (for example, green or off).

Warnings

Table 22 through Table 29 provide additional information about each specific warning associated with the various possible LED lighting sequences when the server LED is yellow.

Table 22 Unknown Warning

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	RED	RED	RED	RED	Unknown warning	View the SEL `cli>sl e` for additional information. For further assistance, contact your Hewlett Packard Enterprise Support Engineer.

Table 23 Memory Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	RED	GREEN	OFF	OFF	Mismatched memory pairs	View the SEL for additional information. Review the information on installing memory in the *HPE Integrity rx2620 Installation Guide*.
Flashing yellow	RED	OFF	GREEN	GREEN	Memory thermal load order	View the SEL for additional information.
Flashing yellow	RED	GREEN	GREEN	GREEN	Bad serial presence detect (SPD) information (can't detect type)	View the SEL for additional information. For further assistance, contact your Hewlett Packard Enterprise Support Engineer.

Table 24 System Board Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	GREEN	GREEN	RED	OFF	Battery voltage low	Replace the system board battery.

Table 25 Fan Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	GREEN	OFF	OFF	RED	Fan 1A is not functioning properly	Replace the fan that is not functioning.
Flashing yellow	OFF	GREEN	OFF	RED	Fan 1B is not functioning properly	Replace the fan that is not functioning.
Flashing yellow	OFF	OFF	GREEN	RED	CPU 0-Fan is not functioning properly	Replace the fan that is not functioning.
Flashing yellow	GREEN	GREEN	OFF	RED	CPU 1-Fan is not functioning properly	Replace the fan that is not functioning.
Flashing yellow	OFF	GREEN	GREEN	RED	Fan 2 (memory) is not functioning (one rotor)	Replace the fan that is not functioning.
Flashing yellow	GREEN	GREEN	GREEN	RED	Fan 3 (disks/PCI) is not functioning (one rotor)	Replace the fan that is not functioning.

Table 26 Processor Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	RED	RED	GREEN	OFF	Processor 0 temperature exceeds limit	Make sure nothing is blocking the server airflow and locate your server in an air-conditioned room.
Flashing yellow	RED	RED	OFF	GREEN	Processor 1 temperature exceeds limit	Make sure nothing is blocking the server airflow and locate your server in an air-conditioned room.

Table 27 Temperature Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	RED	GREEN	GREEN	RED	External air temperature too high	Make sure nothing is blocking the server airflow and locate your server in an air-conditioned room.

Table 28 Video Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	OFF	RED	RED	OFF	No video adapter present	Install a video adapter. See the installation instructions that shipped with the video adapter.

Table 29 Power Supply Warnings

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing yellow	GREEN	RED	OFF	RED	Power supply fault	Check the power supply LED. Replace the power supply.

Faults

Table 30 through Table 38 provide additional information about each specific fault associated with the various possible LED lighting sequences when the server LED is red.

Table 30 Unknown Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	RED	RED	RED	RED	Unknown fault	View the SEL for additional information. For further assistance, contact your Hewlett Packard Enterprise Support Engineer.

Table 31 Memory Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	RED	GREEN	OFF	OFF	Mismatched memory pairs	Review the information on installing memory in the *HPE Integrity rx2620 Installation Guide*.
Flashing Red	OFF	OFF	OFF	GREEN	Fatal memory error	Replace memory.
Flashing Red	RED	GREEN	GREEN	OFF	No memory installed	Install memory.
Flashing Red	RED	GREEN	GREEN	GREEN	Bad Memory. One or more DIMMs are bad or not seated properly.	Reseat the DIMMs. If the error persists, replace them.

Table 32 Firmware Errors

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	OFF	RED	OFF	OFF	System firmware hang	View the SEL for additional information.

Table 33 System Board Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	OFF	GREEN	RED	OFF	VRM overvoltage	View the SEL for additional information. For further assistance, contact your Hewlett

Table 33 System Board Faults *(continued)*

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
						Packard Enterprise Support Engineer.
Flashing Red	GREEN	OFF	RED	OFF	VRM undervoltage	View the SEL for additional information. For further assistance, contact your Hewlett Packard Enterprise Support Engineer.

Table 34 Fan Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing red	GREEN	OFF	OFF	RED	Fan 1A fault	Replace the fan that is not functioning.
Flashing red	OFF	GREEN	OFF	RED	Fan 1B fault	Replace the fan that is not functioning.
Flashing red	OFF	OFF	GREEN	RED	CPU 0-Fan fault	Replace the fan that is not functioning.
Flashing red	GREEN	GREEN	OFF	RED	CPU 1-Fan fault	Replace the fan that is not functioning.
Flashing red	OFF	GREEN	GREEN	RED	Fan 2 (memory) fault (both rotors)	Replace the fan that is not functioning.
Flashing red	GREEN	GREEN	GREEN	RED	Fan 3 (disks/PCI) fault (both rotors)	Replace the fan that is not functioning.

Table 35 Processor Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	RED	RED	GREEN	OFF	Processor 0 temperature exceeds limit	Make sure nothing is blocking the server's airflow and locate your server in an air-conditioned room. In a single CPU configuration, verify that the airflow blocker is installed.
Flashing Red	RED	RED	OFF	GREEN	Processor 1 temperature exceeds limit	
Flashing Red	RED	RED	GREEN	GREEN	No processor detected	Verify that the processor or processors are correctly installed.

Table 36 BMC Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	RED	GREEN	RED	OFF	BMC firmware is damaged	Turn off and unplug the server. Wait 20 seconds, then plug in and restart the server. If the error repeats, replace the base unit.
Flashing Red	RED	GREEN	RED	GREEN	System board FRU	View the SEL for additional information.

Table 36 BMC Faults *(continued)*

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
					inventory device inaccessible	

Table 37 Temperature Faults

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	RED	GREEN	GREEN	RED	External air temperature too high	Make sure nothing is blocking the server airflow and locate your server in an air-conditioned room.

Table 38 Power Supply Errors

System LED	LED 1	LED 2	LED 3	LED 4	Problem	Solution
Flashing Red	OFF	RED	OFF	RED	VRM or power pod fault	View the SEL for additional information.
Flashing Red	GREEN	RED	OFF	RED	Power Supply 1 fault	
Flashing Red	OFF	RED	GREEN	RED	Power Supply 2 fault	
Flashing Red	GREEN	RED	GREEN	RED	12V out of range (power supply interface fault)	

Command Line Interface

The baseboard management controller (BMC) is accessable by means of the BMC console commands, or command line interface (CLI). The commands are similar to the iLO MP commands but are slightly less interactive.

Command Line Interface Menu

The CLI provides the following menu selections:

date: Date displayhelp: List available commandsipmi: Send IPMI cmdloc: System locator LEDpasswd: Change passwordpc: Power controlpr: Power restore policyps: Power statusrs: System resetsl: Show logssr: Display firmware revisionstc: System resetexit: Exit

Troubleshooting Example Using CLI

This example uses the CLI and the SEL to display error message indicating that no memory is installed.

```
cli>sl e
#  Sev Generator/Sensor Description  Event ID    Data, Timestamp
---- - ---------------- ------------ -----------
--------------------------

00A0 - SFW             FW error     00-0F:70:40 3F:--  2003-10-31
22:29:06
00B0 7 CPU0            Mem no DIMMs    000D0    DT 00
0000000000000000
```

```
00C0 7 CPU0              Mem no DIMMs    000D0    Time    2003-10-31
22:29:06
00D0 - SFW               FW error     00-0F:70:40 3F:--  2003-10-31
22:29:06
00E0 7 CPU0              Halt boot       00037    DT 04
000000000000000F
00F0 7 CPU0              Halt boot       00037    Time    2003-10-31
22:29:06
```

Troubleshooting Example Using CLI

This example uses the CLI and the SEL to display error message indicating that fan 2 (memory fan) has failed.

```
cli>sl e
#  Sev Generator/Sensor Description  Event ID    Data, Timestamp
---- - ---------------- ------------ -----------
   -------------------------
0010 - BMC               Chass cntrl  00-12:70:A3 81:03  2003-10-31
22:39:02
0020 - BMC               LPC reset    00-12:70:02        2003-10-31
22:39:03
0030 - Fan 1 (PSU)       OK           11-0A:07:00        2003-10-31
22:39:04
0040 - Fan 3 (CPU)       OK           13-0A:07:00        2003-10-31
22:39:04
0050 - ACPI State        S0 (on)      FA-22:6F:00        2003-10-31
22:39:05
0060 - SFW               Boot start   00-1D:0A:00        2003-10-31
22:39:05
0070 2 CPU1              Boot start      00063    DT 04
0000000000000000
0080 2 CPU1              Boot start      00063    Time    2003-10-31
22:39:05
0090 - BMC               LPC reset    00-12:70:02        2003-10-31
22:39:07
00A0 - SEL Time Set      Set          FD-C0:03:01        2003-10-31
22:39:15
00B0 - Fan 2 (Mem)       Fail (crit)  12-0A:07:02        2003-10-31
22:39:24
00C0 - BMC               Chass cntrl  00-12:70:A3 00:E2  2003-10-31
22:39:31
00D0 - ACPI State        S5 (off)     FA-22:6F:05        2003-10-31
22:39:32
```

System Board Diagnostic LEDs

There are three additional LEDs that can help when troubleshooting the server. These LEDs are located on the system board close to the back of the server and can be viewed through the small cooling holes in the server case. See Figure 84 for the STBY, F/W, and BMC LED locations.

Figure 84 STBY, F/W, and BMC LEDs Locations
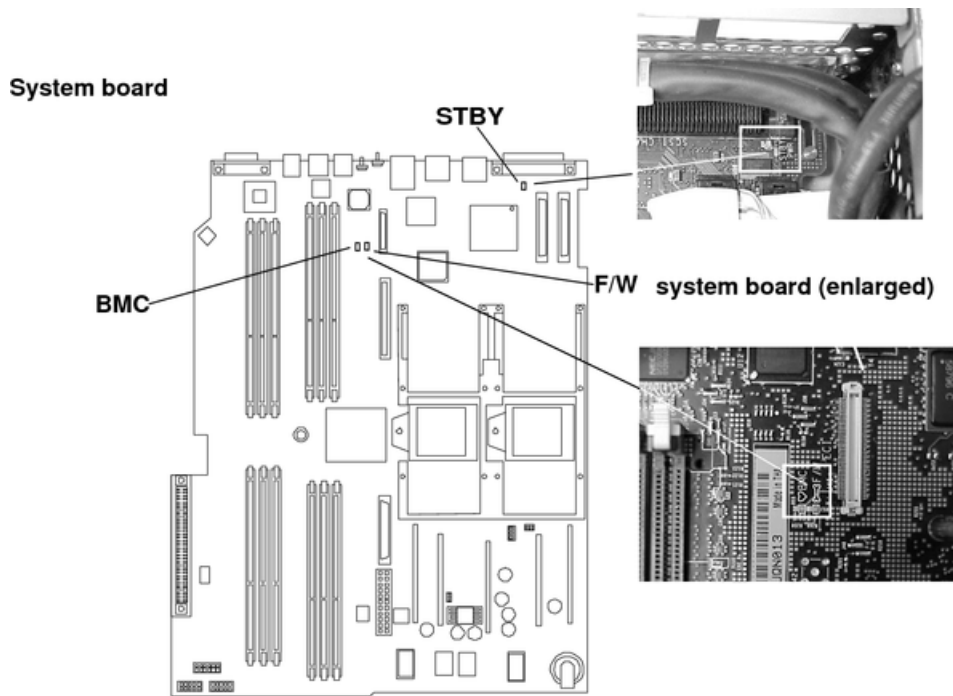
Table 39 details the LED states of the STBY, F/W, and BMC LEDs on the system board.

Table 39 System Board LEDs

LED	Description
STBY (power good)	This green standby LED comes on as soon as the server power cord is plugged in.
BMC (heartbeat)	A few seconds after the server is plugged in this green LED starts flashing indicating the BMC software is operational.
F/W	A few seconds after the server power is turned on, the server firmware code fetch green LED comes on indicating that the firmware has started the boot process.

LAN LEDs

There are front panel and rear panel LAN LEDs on the server.

Front Panel LAN LEDs

There is a diference in the LED display when the server AC power is on and the system DC power is off (or in EFI mode).

With the LAN cable connected, the front panel LAN LED displays as follows:

- LAN LED is off (even if AC power is on)
- Solid green, LAN link is established, no current LAN activity

Rear Panel LAN LEDs

There are two 1 Gb LAN ports on the rear panel. They are LAN A and LAN B.

LAN A Connector LEDs

The 1 Gb LAN A interface provides four LEDs on the rear panel. Table 40 details the LED locations and states for the LAN A connector.

Table 40 Gb LAN A Connector LEDs

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

LAN B Connector LEDs

The 1Gb LAN B interface provides two LEDs on the rear panel (the LED on the left is not used). Table 41 details the LED locations and states for the LAN B connector.

Table 41 Gb LAN B Connector LEDs

Location	Color	Description
Speed (upper left)	Yellow	The 1000 MHz with Ethernet protocol and twisted-pair wiring is enabled, off: no link
Speed (upper left)	Green	The 100 MHz with Ethernet protocol and twisted-pair wiring is enabled, off: no link
Link (upper right)	Green	Link
Link (upper right)		Off: No link

Optional Management Processor LAN LEDs

Four iLO MP LAN LEDs are also on the rear panel if the server has an iLO MP installed. Table 42 details the LED locations and states for the LAN A connector.

Table 42 Optional Management Processor LAN LEDs

LAN LED	Location	Color	State
Self-test	Top	Yellow	Management processor running self test or error
		Off	Management processor has booted
10BT	Second from top	Green	10BT link established
		Flashing green	10BT activity
		Off	No link or 100BT link
100BT	Second from bottom	Green	100BT link established
		Flashing green	100BT activity
		Off	No link or 10BT link
Standby Power	Bottom	Green	Standby power on
		Off	Standby power off

Diagnostics

A suite of offline and online support tools are available to enable you to troubleshoot server problems. In general, if the operating system (HP-UX) is running, do not shut it down. Use the online support tools.

If the operating system cannot be booted, use the offline support tools to resolve the problem. The offline support tools are available from the EFI partition. After you resolve the problem, boot HP-UX, and use the online support tools for any further testing.

You cannot 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.

Online Diagnostics and Exercisers

Online support tools are provided under both operating systems. Centralized error archiving and hardware inventory tools 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 tools include 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 FRUs.

Exercisers stress devices 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 present

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. You must have the appropriate license to run these tools.

Online Support Tool Availability

Online diagnostics are included in the HP-UX OE media, and are installed by default.

Online Support Tools List

The following online support tools are 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 43 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

Offline Diagnostics and Exercisers

Offline Support Tool Availability

Updates to the EFI service partition 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 Hewlett Packard Enterprise website.

Offline Support Tools List

The following offline support tools are available:

Table 44 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

The following tools are currently available for support on other HPE 9000 and Integrity server platforms. The distribution method is through the web.

Table 45 General Diagnostic Tools List

Diagnostic Tool	Description
IPMI Event Decoder	Provides detailed information about the IPMI event (Problem description, cause, action)

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 include:

- 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 causes of the problem, the recommended actions 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). EMS 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 website http://www.hpe.com/info/hpux-diagnostics-docs.

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

Recommended Cleaning Procedures

Suggested cleaning procedures for the server are provided in the following table. Be sure to turn off power to the server when cleaning it. Table 46 details the components and procedures that need cleaning for the server.

Table 46 Cleaning

Component	Time Frame	Procedure
Keyboard	Regularly	Dust with damp, lint-free cloth.
Monitor screen	Regularly	Use HPE Video Screen Cleaning Solution located in the 92193M Master Clean Kit.
Mouse	Regularly	For mouse maintenance procedures, see the mouse's manual.
Cooling fans and grilles	6 Months	Check functions of cooling fans and clean the intake openings on the chassis of dust, lint, and other obstructions to airflow.

△ **CAUTION:** DO NOT use petroleum-based cleaners (such as lighter fluid) or cleaners containing benzene, trichlorethylene, ammonia, dilute ammonia, or acetone. These chemicals could damage all plastic and painted surfaces.

Where to Get Help

Hewlett Packard Enterprise 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 Hewlett Packard Enterprise Support Center (HPESC) near you, go to http://www.hpe.com/support/hpesc.

Information to Collect Before You Contact Support

Before you contact Hewlett Packard Enterprise support, you should:

1. Check the previous sections of this chapter and attempt 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 rx2620).
   - The product number of your server. This can be found on the identification label, which is found on the pull-out label at the front of the server.
   - 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, RS-232, or web interface to monitor the server?
   - How many processors, DIMMs, and PCI cards have been installed?
   - What versions of processor, memory, and PCI cards 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 operating system and version is in use?

Online Support

To contact Hewlett Packard Enterprise Customer Support online, refer to the Worldwide Limited Warranty and Technical Support Guide or visit us at http://www.hpe.com/support/hpesc. On the web page, enter the server model number (rx2620) in the search field.

The following information is available on this website:

- Software and firmware updates

- The latest drivers and utilities

- Additional documentation

Phone Support

To contact Hewlett Packard Enterprise customer support by phone, locate the Hewlett Packard Enterprise Support Center (HPESC) near you, at:http://www.hpe.com/assistance. Local phone numbers are listed in your native language for help.

6 Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

    www.hpe.com/assistance

- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

    www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)

- Product name, model or version, and serial number

- Operating system name and version

- Firmware version

- Error messages

- Product-specific reports and logs

- Add-on products or components

- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.

- To download product updates, go to either of the following:

    ○ Hewlett Packard Enterprise Support Center **Get connected with updates** page:

      www.hpe.com/support/e-updates

    ○ Software Depot website:

      www.hpe.com/support/softwaredepot

- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

    www.hpe.com/support/AccessToSupportMaterials

- ⓘ **IMPORTANT:**   Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Websites

Website	Link
Hewlett Packard Enterprise Information Library	www.hpe.com/info/enterprise/docs
Hewlett Packard Enterprise Support Center	www.hpe.com/support/hpesc
Contact Hewlett Packard Enterprise Worldwide	www.hpe.com/assistance
Subscription Service/Support Alerts	www.hpe.com/support/e-updates
Software Depot	www.hpe.com/support/softwaredepot
Customer Self Repair	www.hpe.com/support/selfrepair
Insight Remote Support	www.hpe.com/info/insightremotesupport/docs
Serviceguard Solutions for HP-UX	www.hpe.com/info/hpux-serviceguard-docs
Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix	www.hpe.com/storage/spock
Storage white papers and analyst reports	www.hpe.com/storage/whitepapers

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:

www.hpe.com/info/insightremotesupport/docs

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (**docsfeedback@hpe.com**). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.

A Parts Information

This appendix provides server part information such as:

- Description
- Manufacturing part number
- Replacement part number
- Exchange part number

Field Replaceable Parts View

The items in this list and the corresponding item numbers are the field replaceable units (FRUs) for the server. See Figure 85 for an exploded view of the server.

Figure 85 Parts Identification
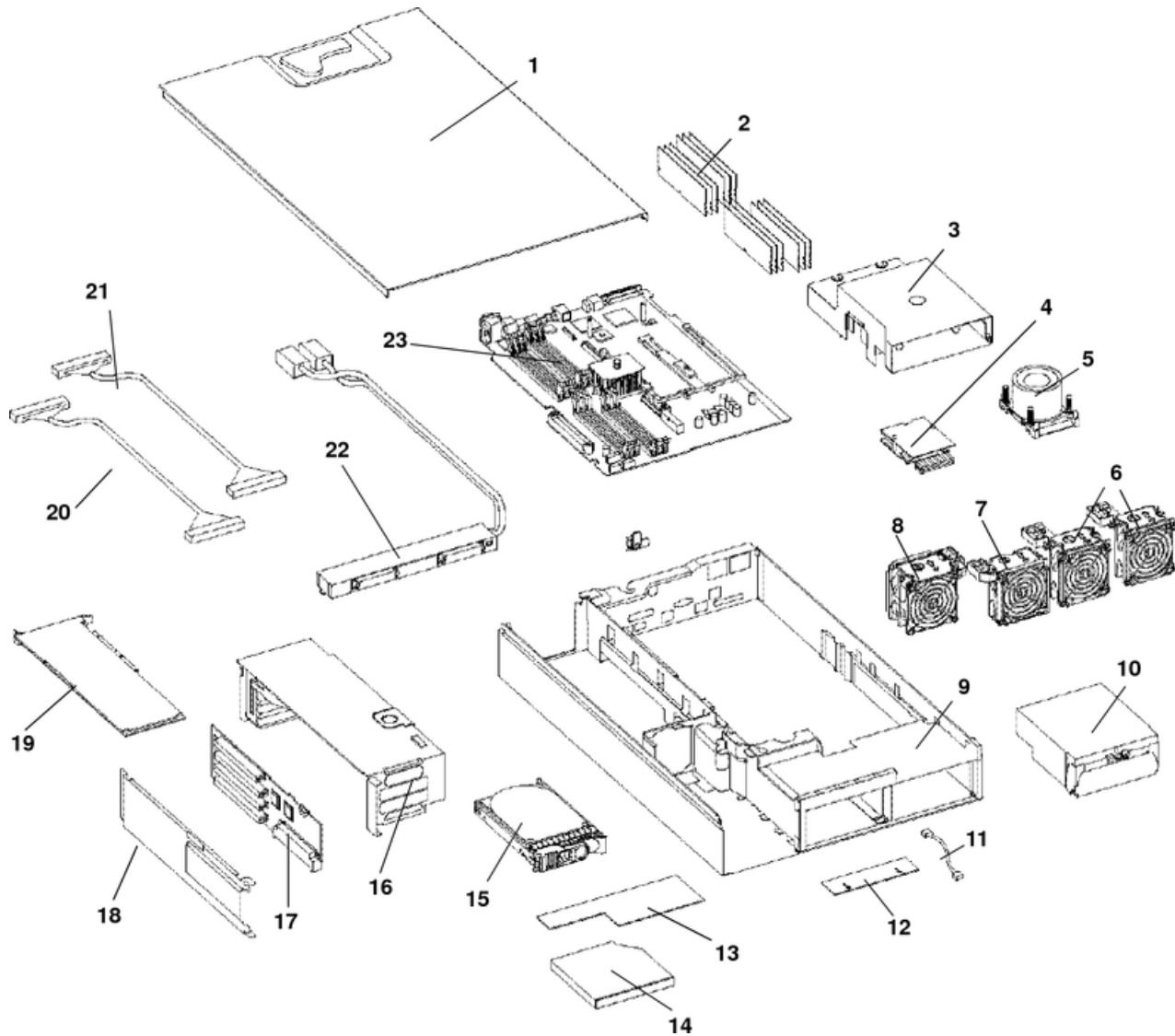
Figure 86 shows the parts used for a tower-mounted server.

Figure 86 Tower Parts
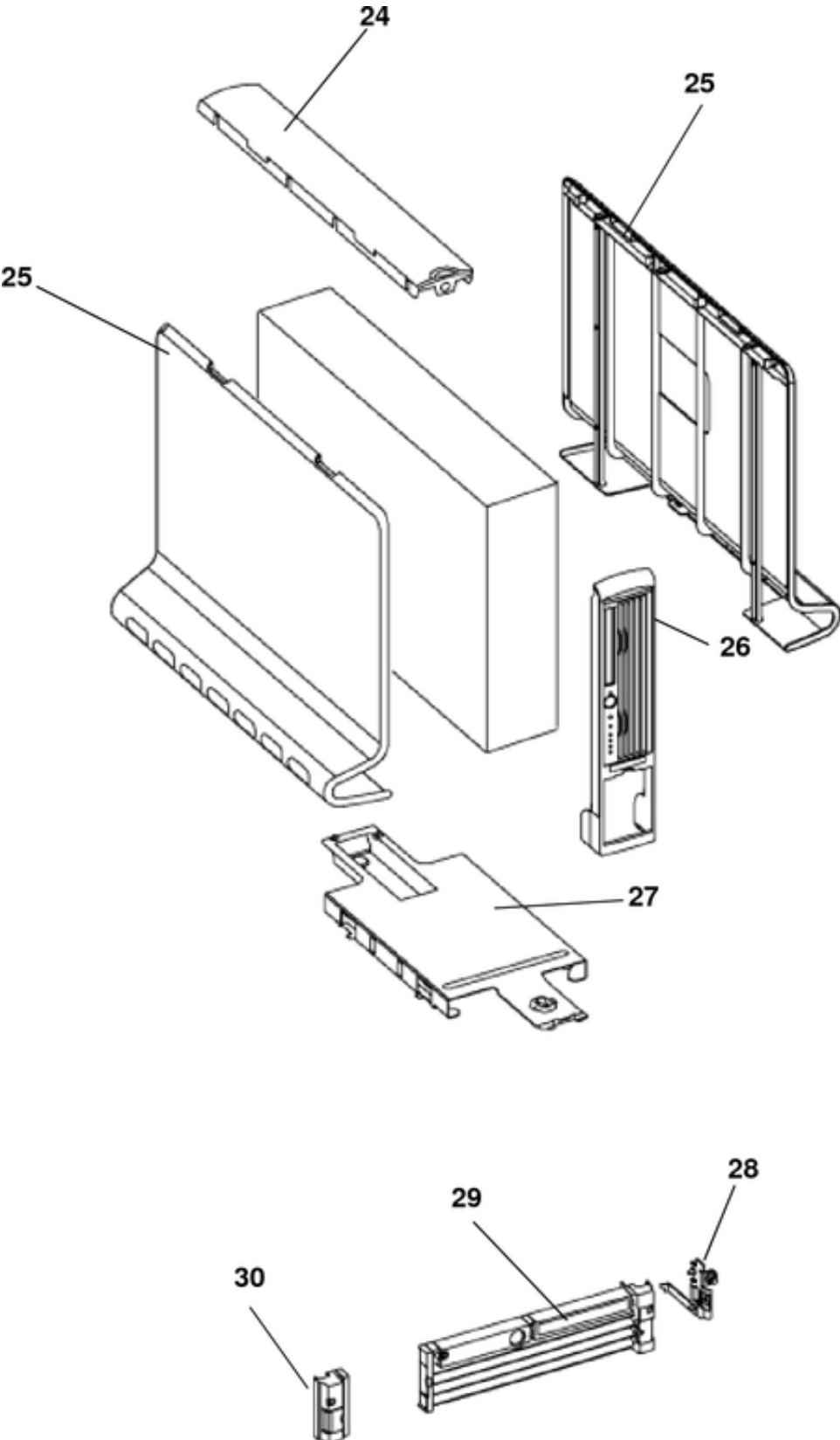
Field Replaceable Parts List

Use the item numbers listed in Table 47 with the part illustrations to identify the nomenclature of the part. Part numbers are found by using the part nomenclature

from this list to select the correct part from the HPE Partsurfer (http://partsurfer.hpe.com).

NOTE: Some part numbers shown in Table 47 have two entries. The second entry is for the Restriction of the Use of Certain Hazardous Substances (RoHS) compliant parts.

Table 47 Parts List

Item No.	Description	Mfg. Part Number	Part Number Replacement	Part Number Exchange
PCA Boards				
22	Power Supply Interface module	A7231-04018	A7231-04018	n/a
	Power Supply Interface module - (RoHS)	A7231-04048	A7231-04048	n/a
	SCSI backplane	A7231-66520	A7231-66520	A7231-69520
	SCSI backplane - (RoHS)	AB587-60005	AB587-60005	n/a
23	System Board	AB331-60001	AB331-67001	AB331-69101
	System Board - (RoHS)	AB331-60101	AB331-67101	AB331-69201
	System Board - (RoHS - for dual-core processors only)	AB331-60101	AB331-67101	AB331-69301
17	PCI backplane	A7231-66530	A7231-66530	n/a
	PCI backplane - (RoHS)	AB587-60004	AB587-60004	n/a
12	Status panel	A7231-66550	A7231-66550	n/a
	Status panel - (RoHS)	AB587-60006	AB587-60006	n/a
Optical Devices				
14	DVD-RW/DVD-ROM Drive, Slimline	AB348A	AB616-62001	AB616-69001
	DVD-RW/DVD-ROM Drive, Slimline - (RoHS)	AB348B	AB348-67001	n/a
14	DVD-ROM Drive, Slimline	A9919A	A7231-62012	A7231-69012
	DVD-ROM Drive, Slimline - (RoHS)	A9919B	A9919-67001	n/a
Memory				
2	PC2100 256 DDR-SDRAM DIMM 1.2"	AB395A	A6967AX	n/a
2	PC2100 512 DDR-SDRAM DIMM 1.2"	AB396A	A6968AX	n/a
2	PC2100 1 GB DDR-SDRAM DIMM 1.2"	AB397A	A6969AX	A6969-69001
2	PC2100 2 GB DDR-SDRAM DIMM 1.2"	AB228A	A6970AX	A6835-69001
2	PC2100 4 GB DDR-SDRAM DIMM 1.2"	AB475A	AD041A	AB475-69001
Internal disks/removable media				

Table 47 Parts List *(continued)*

Item No.	Description	Mfg. Part Number	Part Number Replacement	Part Number Exchange
15	36 GB, 15K RPM Ultra320 SCSI Hot-Plug Disk	A9896A	A9896-64001	A9896-69001
	36 GB, 15K RPM Ultra320 SCSI Hot-Plug Disk - (RoHS)	AB420A	AB420-67001	AB420-69001
15	73 GB, 15K RPM Ultra320 SCSI Hot-Plug Disk	A9897A	A9897-64001	A9897-69001
	73 GB, 15K RPM Ultra320 SCSI Hot-Plug Disk - (RoHS)	AB421A	AB421-67001	AB421-69001
15	146 GB, 10K RPM Ultra320 SCSI Hot-Plug Disk	A9898A	A9898-64001	A9898-69001
	146 GB, 10K RPM Ultra320 SCSI Hot-Plug Disk - (RoHS)	AB422A	AB422-67001	AB422-69001
15	300 GB, 10K RPM Ultra320 SCSI Hot-Plug Disk - (RoHS)	AB423A	AB423-67001	AB423-69001
Fans				
6	Assembly - CPU Fans	AB331-04001	AB331-67002	n/a
	Assembly - CPU Fans - (RoHS)	AB331-04006	AB331-04006	n/a
7	Assembly - Thin 80mm Fan	A7231-04015	A7231-04015	n/a
	Assembly - Thin 80mm Fan - (RoHS)	A7321-04060	A7321-04060	n/a
8	Assembly - Dual fan	A7231-04033	A7231-04033	n/a
	Assembly - Dual fan - (RoHS)	A7231-04059	A7231-04059	n/a
	Assembly - Office friendly CPU fans - (RoHS)	AD117-2000A	A7231-04017	n/a
Processors				
5	Processor, 1.4 GHz, 12 Mb cache, module	AD122A (A2)	AD122AX	AD122-69001
5	Processor, 1.6 GHz, 18 Mb cache, module	AD123A (A2)	AD123AX	AD123-69001
4	Assembly - McPod II (Power Pod)	0950-4294	0950-4294	n/a
	Processor Tool Kit	A9901A	5069-5441	n/a
Power Supply				
10	Power supply, 600 watts, redundant hot swap	0950-4119	A6874-63000	A6874-69000
	Power supply, 600 watts, redundant hot swap - (RoHS)	0950-4621	0950-4621	n/a
Batteries				
	Battery, system board (BR2330)	1420-0386	n/a	
	Battery, iLO/MP (BR2032)	n/a	n/a	
Rack Solution Kits				

Table 47 Parts List *(continued)*

Item No.	Description	Mfg. Part Number	Part Number Replacement	Part Number Exchange
	Field Rack Kit, 19" wide	AB376A	n/a	n/a
	Telco Style rack mounting kit	A8716A	n/a	n/a
	Pedestal server mounting kit	AB377A	n/a	n/a
27	Deskside Pedestal	A7231-04028	A7231-04028	n/a
26	Assembly - Deskside Front Panel	A7231-04054	A7231-04054	n/a
24	Deskside top panel	A7231-04052	A7231-04052	n/a
Rack Server				
28	Server - Assembly - Rack latch right	A7231-04023	A7231-04023	n/a
29	Server - Assembly, Rack bezel right	A7231-04053	A7231-04053	n/a
30	Server - Assembly - Rack left bezel with rack latch	A7231-04055	A7231-04055	n/a
	Server Rack Nameplate (rx2620)	A7136-40002	A7136-40002	n/a
Plastic and Metal Parts				
	Filler, Slimline carbon	A7231-40027	A7231-40027	n/a
	HDD Filler - Carbon	A6198-60003	A6198-60003	n/a
	Assembly - Fan Cage	A7231-04004	A7231-04004	n/a
16	Assembly - PCI Cage	A7231-04006	A7231-04006	n/a
3	Assembly - Plastic turbocooler duct	A7231-04034	A7231-04034	n/a
	Assembly - Plastic turbocooler duct	AD117-3400A	AD117-3400A	n/a
	ECI Cover Plate	A7231-00072	A7231-00072	n/a
1	Assembly - Top Cover	A7231-04003	A7231-04003	n/a
	Assembly- Memory air flow guide	A7231-04049	A7231-04049	n/a
Cables				
	IDE Cable	A7231-63002	A7231-63002	n/a
	IDE Cable - (RoHS)	A7231-63026	A7231-63026	n/a
	Status Panel Cable	A7231-63003	A7231-63003	n/a
	Status Panel Cable - (RoHS)	A7231-63027	A7231-63027	n/a
	Disk Power	A7231-63004	A7231-63004	n/a
	Disk Power - (RoHS)	A7231-63028	A7231-63028	n/a
	SCSI - Channel A	A7231-63017	A7231-63017	n/a
	SCSI - Channel A - (RoHS)	A7231-63038	A7231-63038	n/a
	SCSI - Channel B	A7231-63018	A7231-63018	n/a
	SCSI - Channel B - (RoHS)	A7231-63039	A7231-63039	n/a

Table 47 Parts List *(continued)*

Item No.	Description	Mfg. Part Number	Part Number Replacement	Part Number Exchange
	Single channel SCSI	A7231-63024	A7231-63024	n/a
	Dual channel SCSI	A7231-63025	A7231-63025	n/a
	Super 80 mm Fan	A7231-63005	A7231-63005	n/a
	Super 80 mm Fan - (RoHS)	A7231-63030	A7231-63030	n/a
	80 mm Fan	A7231-63006	A7231-63006	n/a
	80 mm Fan - (RoHS)	A7231-63029	A7231-63029	n/a
	Management Processor M cable	A6144-63001	A6144-63001	n/a
	Management Processor M cable - (RoHS)	A6144-63007	A6144-63007	n/a
	CPU power adapter cable	AD117-2000A	AD117-2000A	n/a
	Flex cable for the MP	A7231-63008	A7231-63008	n/a
	Audio Cable	8121-0808	8121-0808	n/a
	Headphone	5183-9500	5183-9500	n/a
	PWR CORD U.S. CANADA 125 VAC	8120-1378	8120-1378	n/a
	PWR CORD CONT. EUROPE 250 VAC	8120-1689	8120-1689	n/a
	Chinese Power Cord, straight	8120-8376	8120-8376	n/a
	PWR CORD JAPAN 125 VAC	8120-4753	8120-4753	n/a
	PWR CORD SWITZERLAND 250 VAC	8120-2104	8120-2104	n/a
	PWR CORD U.K. 250 VAC	8120-1351	8120-1351	n/a
I/O Cards				
17	Mgmt. Processor with VGA	A9803A	A7231-66580	n/a
17	Mgmt. Processor with VGA - (RoHS)	A9803A	AB587-60002	n/a
17	PCI Single-Channel Ultra 160 Adapter	A6828A	A6828-60101	n/a
17	Windows, Linux 2 port Ultra160 SCSI HBA	A6829A	A6829-60101	n/a
17	Windows, Linux Ultra160 SCSI Adapter (Max. 3)	A7059A	A6828-60101	n/a
17	Windows, Linux 2 port Ultra160 SCSI HBA (Max.3)	A7060A	A6829-60101	n/a
17	2-port U320 SCSI HPUX ()	A7173A	A6961-60011	n/a
17	2-ch U320 RAID Controller Linux, Windows	A9890A	309520-001	n/a
17	4-ch U320 RAID Controller Linux, Windows	A9891A	305920-001	n/a

Table 47 Parts List *(continued)*

Item No.	Description	Mfg. Part Number	Part Number Replacement	Part Number Exchange
17	PCI-X 1-port FCA2404 2 Gb Fibre Channel Adapter	AB232A	313045-002	n/a
17	PCI 10/100Base-T LAN Adapter	A5230A	B5509-66001	n/a
17	PCI 1000Base-T Gigabit Ethernet Adapter	A6825A	A6825-67101	n/a
17	2-port 1000Base-SX HPUX	A7011A	A7011-67001	A7011-69001
17	2-port 1000Base-T HPUX	A7012A	A7012-67001	n/a
17	Windows/Linux 1000Base-T Gigabit Ethernet Adapter	A7061A	A6825-67101	n/a
17	Windows/Linux 1000Base-SX Gigabit Ethernet Adapter	A7073A	A6847-67101	n/a
17	2-port 1000Base-SX Linux, Windows	A9899A	A7011-67001	A7011-69001
17	2-port 1000Base-T Linux, Windows	A9900A	A7012-67001	n/a
17	2-port 4X Infinband Adapter HPUX	AB286A	AB286-60001	AB286-69001
17	PCI ATM 155Mb/s MMF Adapter	A5513A	A5513-60001	A5513-69002
17	PCI Token Ring 4/16/100 Hardware Adapter	A5783A	A5783-60101	A5783-69101
17	Universal PCI FDDI Adapter	A3739B	A3739-60002	A3739-69002
17	2 Port X.25/Frame Relay/SDLC Interface	J3525A	J3525-60001	J3525-69001
17	PCI 8 port serial MUX Adapter	A6748A	A6748-60001	A6748-69001
17	PCI 64 port serial MUX Adapter	A6749A	A6749-60101	A6749-60101
17	Ultra2/100BT combo HPUX	A5838A	A5838-60101	A5838-69101
17	GigE-SX/2G FC Combo Card HPUX	A9782A	A9782-60001	A9782-69001
17	GigE-TX/2G FC Combo Card HPUX	A8784A	A9784-60001	A9784-69001
17	2-port 2 Gb FC HPUX, Linux, Windows	A6826A	A6826-60001	A6826-69001
17	Fibre Channel Card, 2 Gb, Single Port	A6795A	A6795-62001	A6795-69001
17	PCI LAN Adapter, 4 Port 100Base-TX	A5506B	A5506-60102	A5506-69102
17	LAN Adapter, 1000 SX Gigabit, Next Gen	A6847A	A6847-67101	n/a
17	PCI HyperFabric2 Fiber Adapter	A6386A	n/a	A6386-69001
17	USB keyboard and USB scroll mouse	A7861C	n/a	n/a
17	USB to PS/2 Adapter	A7782A	n/a	n/a

Table 47 Parts List *(continued)*

Item No.	Description	Mfg. Part Number	Part Number Replacement	Part Number Exchange
	Monitor/Keyboard/Mouse			
	Console (15" color monitor, keyboard and data cable	AB300A		
	18.1" LCD Flat Panel Display	P9021Y		
	19"/18" viewable color monitor (flat screen)	P9009A		
	19"/18" viewable color monitor (flat screen) Europe	P9009W		

B Booting the Operating System

This chapter covers procedures for booting and shutting down an operating system on the server.

Operating Systems Supported on Integrity Servers

Hewlett Packard Enterprise supports the following operating systems on entry-class Integrity servers.

- **HP-UX 11i Version 2 (B.11.23)**

  For details see "Booting and Shutting Down HP-UX" (page 117).

- **HPE OpenVMS I64**

  For details see "Booting and Shutting Down OpenVMS" (page 123).

- **Microsoft Windows Server 2003**

  For details see "Booting and Shutting Down Microsoft Windows" (page 126).

- **Red Hat Enterprise Linux 4**

  For details see "Booting and Shutting Down Linux" (page 129).

- **SuSE Linux Enterprise Server 10**

  For details see "Booting and Shutting Down Linux" (page 129).

Configuring System Boot Options

This section discusses the server boot options you can configure on entry-class Integrity servers, 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 choose from the EFI Boot Manager menu. The boot options list includes the EFI Shell and one or more operating system loaders.

  The following example includes boot options for OpenVMS, Microsoft Windows, HP-UX, and the EFI Shell. The final item in the EFI Boot Manager menu, the Boot Configuration menu, is not a boot option. The Boot Configuration menu allows server configuration through a maintenance menu.

  ```
  EFI Boot Manager ver 1.10 [14.61]  Please select a boot option

      HP OpenVMS 8.2-1

      EFI Shell [Built-in]

      Windows Server 2003, Enterprise

      HP-UX Primary Boot: 4/0/1/1/0.2.0

      Boot Option Maintenance Menu



      Use ^ and v to change option(s). Use Enter to select an option
  ```

  NOTE: In some versions of EFI, the Boot Configuration Menu is listed as the Boot Option Maintenance Menu.

  To manage the boot options list for each server, 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, except Microsoft Windows. On Integrity servers with Windows installed, the `\MSUtil\nvrboot.efi` utility is provided for managing Windows boot options from the EFI Shell. For Integrity servers with OpenVMS installed, the `\efi\vms\vms_bcfg.efi` and `\efi\vms\vms_show` utilities are provided for managing OpenVMS boot options.

The EFI Boot Configuration Menu provides the Add a Boot Option, Delete Boot Options, 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 and the OpenVMS `@SYS$MANAGER:BOOT_OPTIONS.COM` command.

For details, see the following sections:

- Setting HP-UX boot options (see "Adding HP-UX to the Boot Options List" (page 118))

- Setting OpenVMS boot options (see "Adding OpenVMS to the Boot Options List" (page 123))

- Setting Windows boot options (see "Adding Microsoft Windows to the Boot Options List" (page 126))

- Setting Linux boot options (see "Adding Linux to the Boot Options List" (page 129))

- **Autoboot Setting**

  The `autoboot` setting determines, at startup, whether a server 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 Integrity server using either the `autoboot` EFI Shell command, or the Set Auto Boot TimeOut menu item from the EFI Boot Configuration menu.

  For example, from the EFI Shell to disable autoboot 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 covers booting and shutting down HP-UX on entry-class Integrity servers.

- To add an HP-UX entry to the boot options list, see "Adding HP-UX to the Boot Options List".

- To boot HP-UX, use the following procedures:

  - "Standard HP-UX Booting" (page 119) describes the standard ways to boot HP-UX. Typically this results in booting HP-UX in multiuser mode.

  - "Single-User Mode HP-UX Booting" (page 120) describes how to boot HP-UX in single-user mode.

  - "LVM Maintenance Mode HP-UX Booting" (page 121) describes how to boot HP-UX in Logical Volume Management (LVM) maintenance mode.

- To shut down the HP-UX operating system, see .

Adding HP-UX to the Boot Options List

This section describes how to add an HP-UX entry to the server 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 Option Maintenance Menu).

NOTE: On Integrity servers, the operating system installer automatically adds an entry to the boot options list.

Adding an HP-UX Boot Option

This procedure adds an HP-UX item to the boot options list from the EFI Shell.

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

1. Access the EFI Shell environment.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.

2. Access the EFI System Partition (`fsX:` 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` and it should be 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` — Display all items in the boot options list for the server.

   - `bcfg boot rm #` — Remove the item number specified by *#* from the boot options list.

   - `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.

   - `bcfg boot add # file.efi "Description"` — Add 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.

   For details, see the `help bcfg` command.

4. Exit the console and iLO interfaces if you are finished using them.

   To exit the server console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit iLO, enter `X` at the Main Menu.

Standard HP-UX Booting

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

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-

Procedure 1 Booting HP-UX (EFI Boot Manager)

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

1. Access the EFI Boot Manager Menu for the server on which you want to boot HP-UX.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.
2. At the EFI Boot Manager menu, choose 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 **Enter** to initiate booting using the chosen boot option.
4. Exit the console and iLO MP interfaces when finished using them.

   To exit the server console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit the iLO MP, enter `X` at the Main Menu.

Procedure 2 Booting HP-UX (EFI Shell)

From the EFI Shell environment, boot HP-UX on a device by first accessing the EFI System Partition (for example `fs0:`) for the root device, then entering **HPUX** to initiate the loader.

1. Access the EFI Shell environment for the server on which you want to boot HP-UX.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.
2. At the EFI Shell environment, issue the **map** command to list all currently mapped bootable devices.

   The bootable file systems of interest typically are listed as `fs0:`, `fs1:`, and so on.
3. Access the EFI System Partition (`fsX:` 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 might change each time it is mapped (for example, when the server 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 proceeds to boot 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) enter exit (this returns you to the EFI Shell).

   To boot the HP-UX operating system, do not enter anything during the 10-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 when finished.

   To exit the server console and return to the iLO MP Main Menu, enter **Ctrl+B**. To exit the iLO MP, enter X at the Main Menu.

Single-User Mode HP-UX Booting

Use the following procedure to boot HP-UX in single-user mode.

Booting HP-UX in Single-User Mode (EFI Shell)

From the EFI Shell environment, boot in single-user mode by stopping the boot process at the HPUX.EFI interface (the HP-UX Boot Loader prompt, HPUX>) and entering the boot -is vmunix command.

1. Access the EFI Shell environment for the system on which you want to boot HP-UX in single-user mode.
   a. To access the server console, log in to iLO and enter CO.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.
2. Access the EFI System Partition (fsX: 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 device you are accessing.

4. 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 prompt, `HPUX>`) 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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   All rights reserved

   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 (the HP-UX Boot Loader prompt, `HPUX>`), 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 when finished using them.

   To exit the system console and return to the iLO MP Main Menu, enter **Ctrl+B**. To exit the iLO MP, enter `X` at the Main Menu.

LVM Maintenance Mode HP-UX Booting

Use the following procedure to boot HP-UX in Logical Volume Management (LVM) maintenance mode.

Booting HP-UX in LVM-Maintenance Mode (EFI Shell)

From the EFI Shell environment, boot in LVM-maintenance mode by stopping the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`) and entering the `boot -lm vmunix` command.

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

   a. To access the server console, log in to iLO and enter `CO`.

b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.

c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.

2. Access the EFI System Partition (`fsX:` 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 device you are accessing.

4. Press any key within the 10 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 when finished using them.

   To exit the system console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit the iLO MP, enter `X` at the Main Menu.

Shutting Down HP-UX

To shut down HP-UX running on a system, use the `shutdown` command. You have the following options when shutting 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 details see the *shutdown*(1M) manpage and the following procedure:

Shutting Down HP-UX (`/sbin/shutdown` Command)

From the HP-UX command line, issue the **shutdown** command to shut down the HP-UX operating system.

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

   Log in to iLO for the server and use the Console menu to access the system console. Accessing the console through iLO enables you to maintain console access to the server 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 server is rebooted.

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

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

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

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

Booting and Shutting Down OpenVMS

This section has procedures for booting and shutting down OpenVMS on entry-class Integrity servers, and procedures for adding OpenVMS to the boot options list.

- To add an OpenVMS entry to the boot options list, see .
- To boot OpenVMS on an entry-class Integrity server, see .
- To shut down OpenVMS, see .

Adding OpenVMS to the Boot Options List

On Integrity servers, you can use the following procedures to manage boot options list entries for OpenVMS.

You can add the `\efi\vms\vms_loader.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).

NOTE: On Integrity servers, the operating system installer automatically adds an entry to the boot options list.

Adding an OpenVMS Boot Option

This procedure adds an OpenVMS item to the boot options list from the EFI Shell.

To add an OpenVMS boot option when logged in to OpenVMS, use the `@SYS$MANAGER:BOOT_OPTIONS.COM` command.

1. Access the EFI Shell environment.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.

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

   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 OpenVMS loader is `\efi\vms\vms_loader.efi` and it should be on the device you are accessing.

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

   You can also accomplish this step by using the `\efi\vms\vms_bcfg.efi` and `\efi\vms\vms_show.efi` utilities, which are available on the EFI System Partition for OpenVMS. Both `vms_bcfg` and `vms_show` are unique utilities for OpenVMS I64. The `vms_bcfg` utility differs from the `bcfg` EFI command in that `vms_bcfg` enables you to specify boot devices using VMS-style device names.

   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 server.
   - `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\vms\vms_loader.efi "HP OpenVMS"`adds an OpenVMS item as the first entry in the boot options list.

  For details, see the `help bcfg` command.

4. Exit the console and iLO MP interfaces if you are finished using them.

   To exit the system console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit iLO, enter `X` at the Main Menu.

Booting OpenVMS

To boot OpenVMS on an entry-class Integrity server, use either of the following procedures:

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Booting OpenVMS (EFI Boot Manager)

From the EFI Boot Manager Menu, choose an item from the boot options list to boot OpenVMS using the chosen boot option.

1. Access the EFI Boot Manager menu for the server on which you want to boot OpenVMS.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.

2. At the EFI Boot Manager menu, choose 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 to use when booting the device.

3. To initiate booting using the chosen boot option, press **Enter**.

4. Exit the console and iLO MP interfaces when finished using them.

   To exit the system console and return to the iLO MP Main Menu, enter **Ctrl+B**. To exit the iLO MP, enter `X` at the Main Menu.

Booting OpenVMS (EFI Shell)

From the EFI Shell environment, to boot OpenVMS on a device first access the EFI System Partition (for example `fs0:`) for the root device and enter `\efi\vms\vms_loader` to initiate the OpenVMS loader.

1. Access the EFI Shell environment for the server on which you want to boot OpenVMS.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.

c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.

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

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

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

   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.

   Also, the file system number might change each time it is mapped (for example, when the server boots, or when the `map -r` command is issued).

4. When accessing the EFI System Partition for the desired boot device, issue the `\efi\vms\vms_loader` command to initiate the `vms_loader.efi` loader on the device you are accessing.

   ```
   fs5:> \efi\vms\vms_loader.efi

      HP OpenVMS Industry Standard 64 Operating System, Version
   XAV1-D2Y
        Copyright 1976-2005 Hewlett-Packard Development Company, L.P.

   %PKA0, Copyright (c) 1998 LSI Logic PKW V3.2.20 ROM 4.19
   %PKA0, SCSI Chip is SYM53C1010/66, Operating mode is LVD Ultra3
   SCSI
   %SMP-I-CPUTRN, CPU #01 has joined the active set.
   %SMP-I-CPUTRN, CPU #02 has joined the active set.
   %STDRV-I-STARTUP, OpenVMS startup begun at 13-JUL-2005 14:54:36.25
   %EWA0, Auto-negotiation mode set by console


   ...
   ```

5. Exit the console and iLO MP interfaces when finished using them.

   To exit the server console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit iLO, enter `X` at the Main Menu.

Shutting Down OpenVMS

This section describes how to shut down the OpenVMS operating system on entry-class Integrity servers.

1. From the OpenVMS DCL prompt, issue the `@SYS$SYSTEM:SHUTDOWN` command to shut down the OpenVMS operating system.

2. Log in to OpenVMS running on the server that you want to shut down.

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

3. At the OpenVMS DCL prompt, issue the `@SYS$SYSTEM:SHUTDOWN` command and specify the shutdown options in response to the prompts given.

   ```
   >@SYS$SYSTEM:SHUTDOWN

           SHUTDOWN -- Perform an Orderly System Shutdown
                    on node RSNVMS

   How many minutes until final shutdown [0]:
   Reason for shutdown [Standalone]:
   Do you want to spin down the disk volumes [NO]?
   Do you want to invoke the site-specific shutdown procedure [YES]?
   Should an automatic system reboot be performed [NO]? yes
   ```

```
When will the system be rebooted [shortly via automatic reboot]:
Shutdown options (enter as a comma-separated list):
 REBOOT_CHECK        Check existence of basic system files
 SAVE_FEEDBACK       Save AUTOGEN feedback information from this boot
 DISABLE_AUTOSTART   Disable autostart queues
 POWER_OFF           Request console to power-off the system

Shutdown options [NONE]:

%SHUTDOWN-I-OPERATOR, this terminal is now an operator's console
%%%%%%%%%%  OPCOM  12-JUL-2005 18:47:51.01   %%%%%%%%%%
Operator status for operator _RSNVMS$OPA0:
CENTRAL, PRINTER, TAPES, DISKS, DEVICES, CARDS, NETWORK, CLUSTER,
SECURITY,
...
```

NOTE: OpenVMS I64 currently does not support the `POWER_OFF` shutdown option.

Booting and Shutting Down Microsoft Windows

This section describes how to boot and shut down Microsoft Windows on entry-class Integrity servers and how to add Windows entries to the system boot options list.

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Adding Microsoft Windows to the Boot Options List

To add a Microsoft Windows entry to the system boot options list you must do so from EFI by using the `\MSUtil\nvrboot.efi` utility to import boot options from the `EFI\Microsoft\WINNT50\Boot00...` file on the device from which Windows is loaded.

This procedure adds the Microsoft Windows item to the boot options list.

NOTE: On Integrity servers, the operating system installer automatically adds an entry to the boot options list.

1. Access the EFI Shell environment.
    a. To access the server console, log in to iLO and enter `CO`.
    b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
    c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.
2. Access the EFI System Partition (`fsX:` where *X* is the file system number) for the device from which you want to boot Windows.

    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 Microsoft Windows loader is `\efi\microsoft\winnt50\ia64ldr.efi` and it should be on the device you are accessing. However, you must only initiate this loader from the EFI Boot Menu and not from the EFI Shell.
3. List the contents of the `\EFI\Microsoft\WINNT50` directory to identify the name of the Windows boot option file (`Boot00nn`) that you want to import into the system boot options list.

```
fs0:\> ls EFI\Microsoft\WINNT50
Directory of: fs0:\EFI\Microsoft\WINNT50

  09/18/03  11:58a <DIR>          1,024   .
  09/18/03  11:58a <DIR>          1,024   ..
  12/18/03  08:16a                  354   Boot0001
          1 File(s)        354 bytes
          2 Dir(s)


  fs0:\>
```

4. At the EFI Shell environment, issue the `\MSUtil\nvrboot.efi` command to launch the Microsoft Windows boot options utility.

```
fs0:\> msutil\nvrboot

NVRBOOT: OS Boot Options Maintenance Tool [Version 5.2.3683]

    1. SUSE SLES 10
    2. HP-UX Primary Boot: 0/0/1/0/0.2.0
 * 3. Windows Server 2003, Datacenter
    4. EFI Shell [Built-in]

  * = Windows OS boot option

  (D)isplay (M)odify (C)opy E(x)port (I)mport (E)rase (P)ush (H)elp (Q)uit

Select>
```

5. Use the `Import` command to import the Window boot option file.

```
Select> i
Enter IMPORT file path: \EFI\Microsoft\WINNT50\Boot0001
Imported Boot Options from file: \EFI\Microsoft\WINNT50\Boot0001

Press enter to continue
```

6. To quit the NVRBOOT utility, and exit the console and iLO MP interfaces if you are finished using them, enter **Q**.

   To exit the server console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit iLO, enter X at the Main Menu.

Booting the Microsoft Windows Operating System

Boot the Windows Server 2003 operating system on an Integrity server by using the EFI Boot Manager to choose the appropriate Windows item from the boot options list. For details on shutting down the Windows operating system, see "Shutting Down Microsoft Windows" (page 128).

1. From the EFI Boot Manager menu, choose an item from the boot options list to boot Windows using the chosen boot option.
2. Access the EFI Boot Manager menu for the server on which you want to boot Windows.
   a. To access the server console, log in to iLO and enter CO.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.
3. At the EFI Boot Manager menu, choose 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 to be used when booting the device.
4. Press **Enter** to initiate booting using the chosen boot option.

5. After Windows begins loading, wait for the Special Administration Console (SAC) to become available.

The SAC interface provides a text-based administration tool that is available from the system console. For details see the SAC online help (enter **?** at the `SAC>` prompt).

```
Loading.: Windows Server 2003, Datacenter
Starting: Windows Server 2003, Datacenter

                              Starting Windows...
********************************************************************************

Computer is booting, SAC started and initialized.

Use the "ch -?" command for information about using channels.
Use the "?" command for general help.

SAC>
```

6. Exit the console and iLO MP interfaces when finished using them.

To exit the server console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit iLO, enter `X` at the Main Menu.

Shutting Down Microsoft Windows

Shut down the Windows operating system on Integrity servers by using the Start menu or the `shutdown` command.

△ **CAUTION:**   Do not shut down Windows using Special Administration Console (SAC) `restart` or `shutdown` commands under normal circumstances.

Issuing `restart` or `shutdown` at the `SAC>` prompt causes the server to restart or shutdown immediately and can result in the loss of data.

Instead use the Windows Start menu or the `shutdown` command to shut down gracefully.

To shut down Windows use either of the following methods.

- Choose **Shut Down** from the Start menu and choose either **Restart** or **Shut down** from the pull-down menu.

  The Restart menu item shuts down and restarts the server. The Shut down menu item shuts down the server.

  You can use this method when using a graphical interface to the server.

- Issue the `shutdown` command from the Windows command line.

  You can issue this command from a command prompt through the Special Administration Console (SAC) or from any other command line.

  The Windows `shutdown` command includes the following options:

/s	Shuts down and halts (power off) the server. This is the equivalent of **Start—>Shut Down, Shut down**. To power on the server, use the iLO MP `PC` command.
/r	Shuts down and restarts the server. This is the equivalent of **Start—>Shut Down, Restart**.
/a	Aborts a server shutdown.
/t xxx	Sets the timeout period before shutdown to xxx seconds. The timeout period ranges from 0–600, with a default of 30.

  For details, see the `help shutdown` Windows command.

Windows Shutdown from the Command Line

From the Windows command line, issue the **shutdown** command to shut down the operating system.

1. Log in to Windows running on the server that you want to shut down.

   For example, access the system console and use the Windows SAC interface to start a command prompt, from which you can issue Windows commands to shut down the server.

2. Check to see whether any users are logged in.

   Use the `query user` or `query session` command.

3. Issue the **shutdown** command and the appropriate options to shut down the Windows Server 2003 on the server.

   You have the following options when shutting down Windows:

   - To shut down Windows and reboot:

     shutdown /r or choose the **Start —> Shut Down** action and choose **Restart** from the pull-down menu.

   - To shut down Windows and halt (power off server hardware):

     shutdown /s or choose the **Start —> Shut Down** action and choose **Shut down** from the pull-down menu.

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

   - To abort a shutdown (stop a shutdown that has been initiated): **shutdown /a**

   For example:

   ```
   shutdown /r /t 60 /c "Shut down in one minute."
   ```

   This command initiates a Windows system shutdown and reboot after a timeout period of 60 seconds. The `/c` option specifies a message that is broadcast to any other users.

Booting and Shutting Down Linux

This section covers booting and shutting down Linux on entry-class Hewlett Packard Enterprise servers. Procedures for Red Hat Enterprise Linux and SuSE Linux Enterprise Server are given in this section.

- To add a Linux entry to the boot options list, see "Adding Linux to the Boot Options List" (page 129).

- To boot Linux on entry-class Integrity servers, use the following procedures.

  - For details on Red Hat Enterprise Linux, see "Booting the Red Hat Enterprise Linux Operating System" (page 131) .

  - For details on SuSE Linux Enterprise Server, see "Booting the SuSE Linux Enterprise Server Operating System" (page 132) .

- To shut down either Red Hat Enterprise Linux or SuSE Linux Enterprise Server, see "Shutting Down Linux" (page 132).

Adding Linux to the Boot Options List

This section describes how to add a Linux entry to the system boot options list. The processes for adding both Red Hat Enterprise Linux and SuSE Linux Enterprise Servers are given here.

You can add the `\EFI\redhat\elilo.efi` loader or the `\efi\SuSE\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).

> **NOTE:** On Integrity servers, the operating system installer automatically adds an entry to the boot options list.

1. Access the EFI Shell environment.
   a. To access the server console, log in to iLO and enter `CO`.
   b. When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose **Exit** from the submenus until you return to the screen with the EFI Boot Manager heading.
   c. To access the EFI Shell environment, choose **EFI Shell** from the EFI Boot Manager menu.

2. Access the EFI System Partition (`fsX:` 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 Red Hat Enterprise Linux loader is `\EFI\redhat\elilo.efi` and it should be on the device you are accessing.

   The full path for the SuSE Linux Enterprise Server loader is `\efi\SuSE\elilo.efi` and it should be 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 server.

   - `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 refers to `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.

     Likewise, `bcfg boot add 1 \efi\SuSE\elilo.efi "SLES 10"` adds a SuSE Linux item as the first entry in the boot options list.

   For details, see the `help bcfg` command.

4. Exit the console and iLO interfaces if you are finished using them.

   To exit the server console and return to the iLO MP Main Menu, press **Ctrl+B**. To exit iLO, enter `X` at the Main Menu.

Booting the Red Hat Enterprise Linux Operating System

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

- Choose a Red Hat Enterprise Linux entry from the EFI Boot Manager menu.

  To load the Red Hat Enterprise Linux operating system at the EFI Boot Manager menu, choose its entry from the list of boot options.

  Choosing 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 Red Hat Enterprise Linux boot device EFI System Partition, the full paths to the loader and configuration files are as follows:

  `\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, enter a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Booting Red Hat Enterprise Linux from the EFI Shell

To boot Red Hat Enterprise Linux from the EFI Shell:

1. Access the EFI Shell.

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

2. Access the EFI System Partition for the Red Hat Enterprise 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 choose 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 command prompt to launch the `ELILO.EFI` loader.

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

4. Allow the `ELILO.EFI` loader to proceed with booting the Red Hat Enterprise 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, enter a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Booting the SuSE Linux Enterprise Server Operating System

You can boot the SuSE Linux Enterprise Server 10 operating system on Integrity servers using either of these methods:

- Choose a SuSE Linux Enterprise Server entry from the EFI Boot Manager menu.

  To load the SuSE Linux Enterprise Server operating system at the EFI Boot Manager menu, choose its entry from the list of boot options.

  Choosing 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. See .

  On a SuSE Linux Enterprise Server boot device EFI System Partition, the full paths to the loader and configuration files are as follows:

  `\efi\SuSE\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, enter a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Booting SuSE Linux Enterprise Server from the EFI Shell

To boot SuSE Linux Enterprise Server 10 from the EFI Shell:

1. Access the EFI Shell.

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

2. Access the EFI System Partition for the SuSE Linux Enterprise Server boot device.

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

   To choose 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 command prompt to launch the `ELILO.EFI` loader.

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

4. Allow the `ELILO.EFI` loader to proceed with booting the SuSE 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, enter a space) at the `ELILO boot` prompt. To exit the loader use the `exit` command.

Shutting Down Linux

Use the `shutdown` command to shut down Red Hat Enterprise Linux or SuSE Linux Enterprise Server.

The Red Hat Enterprise Linux and SuSE Linux Enterprise Server `shutdown` command has the following options:

-h   Halts (powers 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   When to shut down. (Required.) You can specify *time* in 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.

- To immediately shut down, use the `now` command; this is equivalent to using +0 to wait zero minutes.

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

1. From the command line for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, issue the **shutdown** command to shut down the operating system.
2. Log in to Linux running on the server you want to shut down.
3. 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 server in 20 minutes.

C Utilities

This appendix describes the utilities that are part of the server. These include the EFI Boot Manager, and Extensible Firmware Interface Pre-OS System Environment (EFI/POSSE).

Extensible Firmware Interface Boot Manager

EFI is an operating system and platform-independent boot and pre-boot interface. EFI resides between the operating system and platform firmware. This allows the operating system 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 operating system.

NOTE: EFI and POSSE are similar. EFI is an Intel specification. POSSE is the Hewlett Packard Enterprise implementation that helps Hewlett Packard Enterprise 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 87 EFI Boot Sequence
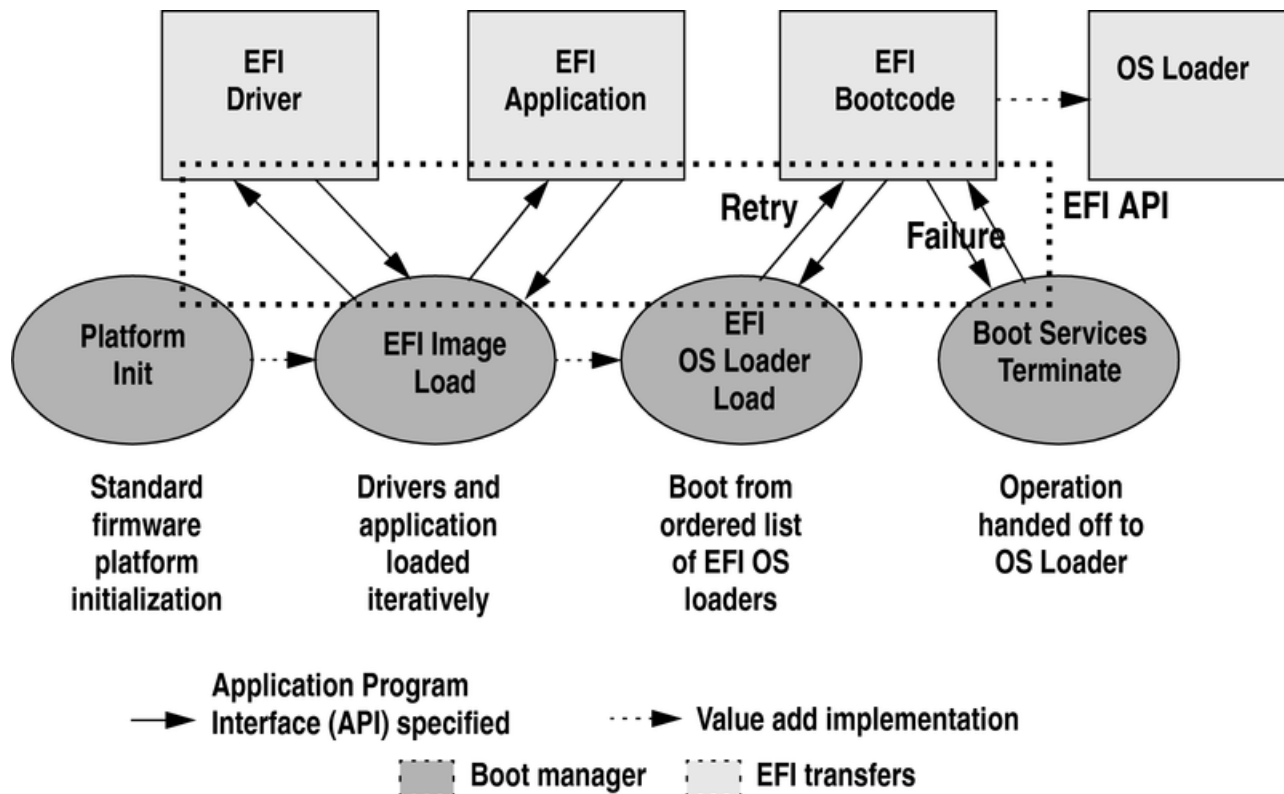
The EFI Boot Manager loads EFI applications (including operating system operating system first stage loader) and EFI drivers from an EFI-defined file system or image loading service. Nonvolatile RAM (NVRAM) variables point to the file to be loaded. These variables contain application-specific data that 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. You can also provide either ASCII or UNICODE arguments. Using the EFI application name and any options, the EFI Boot Manager searches for the executable file in the same directories as 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, 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 157).

EFI Commands

Table 48 lists EFI commands for Integrity servers and the equivalent BCH commands found in PA-RISC based servers.

Table 48 EFI Commands

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
These commands are found in all menus.			
info boot	Boot	[PRI|HAA|ALT|<path>]	Boot from specified path
help <command>	HElp	[<menu>|<command>]	Display help for specified command or menu

135

Table 48 EFI Commands *(continued)*

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
reset	RESET		Reset the server (to allow reconfiguration of complex
exit (at EFI Shell)	MAin		Return to the main menu
MAin			
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>	FRU		Display FRU information

Table 48 EFI Commands *(continued)*

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
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			
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 cmc errdump init	processor internal memory (PIM)	[<proc>] [HPMC|LPMC|TOC|ASIC]]	Display PIM information

EFI/POSSE Commands

This section describes the EFI/POSSE commands developed for the server.

NOTE: EFI/POSSE are similar. EFI is an Intel specification, whereas POSSE is the Hewlett Packard Enterprise implementation that helps Hewlett Packard Enterprise support.

help

Provides information on the EFI Shell commands. It also has an additional feature to help those familiar with the BCH menus of PA-RISC servers to adjust to the 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 command points you to the EFI command that has replaced that BCH functionality, or informs 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 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 commands Type "help" followed by
a class name for a list of commands in that class
Type "help" followed by command name for full documentation
```

Example 2 help bch Command

```
    COnfiguration        help bch co
    INformation          help bch in
    PAth                 help bch pa
    ScRoll               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 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 documentation on that
command.
Type "help -a" to display a list of all commands.
```

Example 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 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 49.

Table 49 Communications Parameters

Parameter	Value
RECEIVE_FIFO_DEPTH	1
TIMEOUT	1000000
PARITY	No parity
DATA_BITS	8

Table 49 Communications Parameters *(continued)*

Parameter	Value
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 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 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

Displays the configured or deconfigured state of processors in the system and enables you 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 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

Deconfigures or reconfigures 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 retains information on the server I/O configuration across reboots. The `ioconfig` file is created by `insf` at installation time, and is modified by `insf`, `rmsf`, and `ioscan` when devices are added or removed. The `ioconfig` file maintains configuration information when the system is not running.

Example 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

Configures the primary console and turns 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 is enabled.

Example 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 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 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 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 for all processors present in the server.

Syntax

```
errdump  [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 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 rx2620
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     1.3 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 ID	Device ID	Slot #	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 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 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 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 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

Example 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 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 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 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 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 can 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:

1. To map the parameters for all PCI cards installed in the server, enter the **shell> info io** command at the EFI Shell prompt.

    A list of all the installed devices in the server and managed by EFI drivers appears. 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 #`: Identifies 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 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 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 handles for the SCSI interface two channels (from the information displayed by the `devtree` command).

NOTE: The EFI driver 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 handle)

- `Ctrl` (the controller handle)

---

4. Using the drivers handle [`Drv`] and the controller 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
```

The EFI SCSI Setup Utility starts and its main menu displays, showing a list of all the EFI capable SCSI interfaces in the system.

5. Move the cursor to highlight the channel of the SCSI interface.

6. Press **Enter** to determine which channel of the interface to highlight, match the PCI Bus, PCI Dev, and PCI 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.

:ϙ: **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

The Adapter Properties screen for this channel of the SCSI interface appears.

7. Be sure the utility is running for the channel of the SCSI interface by comparing the values shown for PCI Bus, PCI Device, and PCI 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.

---

8. Display the SCSI parameters listed below for the channel of the SCSI interface and change the parameters if necessary, or restore the 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

9. Use the arrow keys to navigate to the appropriate SCSI parameter.
10. Use the plus (**+**) and minus (**-**) keys to scroll through the values until the value you want displays.
11. Press **Esc** to exit the Adapter Properties screen.
12. Move the cursor to the action (`cancel`, `save`, or `discard`) you want to take, and press **Enter**.
13. 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 parameters.

If you select `save` or `discard`, the EFI SCSI Setup Utility main menu appears.

△ **CAUTION:**   Do not select the <Global Properties> option on the main menu.

14. Press **Esc** to exit the main menu and the EFI SCSI Setup Utility.
15. Select the option for exiting the utility.
16. When you are prompted, press **Enter** to stop the SCSI interface; you are now at the EFI Shell prompt.
17. At the EFI Shell prompt, enter **Shell> reset**.

The system starts to reboot. This sets the new SCSI setting.

Using the Boot Option Maintenance Menu

This menu enables you to select console output and input devices as well as various boot options. The menu items are described below.

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 might 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 50 Server Sockets

Socket	Path
1 PCI	Acpi(HWP0002,400)/pci(1|0)
2 PCI	Acpi(HWP0002,300)/pci(1|0)
3 PCI	Acpi(HWP0002,200)/pci(1|0)
4 PCI	Acpi(HWP0002,600)/pci(1|0)

Table 51 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 is 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.

Edit Boot Entry

Use this option to edit the boot options on the EFI boot menu.

NOTE: This action 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 can be used as a security device on servers that are accessed remotely.

Delete Boot Options

Use this option to remove boot options from the EFI boot menu.

NOTE: This action 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 attempts 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 operation occurs once 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 it launches 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 operating system documentation to determine how many consoles are supported with your server. Multiple consoles are not supported for HP-UX or Windows (use the Smart Setup CD to switch between COM A and iLO on Windows servers).

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. 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 52 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 are available, depending on the configuration of the server and the options purchased. Device paths can 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, and so on) 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 operating system documentation to determine how many consoles are supported with your server. Multiple consoles are not supported for HP-UX or Windows (use the Smart Setup CD to switch between COM A and iLO on Windows systems).

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. Integrity servers do not support different configurations for Output and Error console. To ensure correct operation:

- When you change either Output or Error console menus, you must make the identical changes in both menus.

- When changing serial devices, you must make changes to Output, Input, and Error menus.

Table 53 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 are available, depending on the configuration of the server and the options purchased. Device paths can 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).

- You can select only one terminal emulation type for each serial console, but you can select multiple serial consoles 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

Enables you to 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

Displays information about server and component configuration.

Set System Time

Modifies the server time.

Set System Date

Modifies the server date.

Set User Interface

Changes the legacy boot manager user interface.

Set System Wake-On LAN

Enables or disables the server Wake-On_LAN settings.

Set System Defaults

Selects 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.

Hewlett Packard Enterprise has used several different names over the years to describe the management functionality embedded in their servers, including "the management processor." In addition, Hewlett Packard Enterprise 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 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 *HPE Integrity and HPE 9000 iLO Operations Guide*.

D Warranty and regulatory information

For important safety, environmental, and regulatory information, see *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at www.hpe.com/support/Safety-Compliance-EnterpriseProducts.

Warranty information

HPE ProLiant and x86 Servers and Options

www.hpe.com/support/ProLiantServers-Warranties

HPE Enterprise Servers

www.hpe.com/support/EnterpriseServers-Warranties

HPE Storage Products

www.hpe.com/support/Storage-Warranties

HPE Networking Products

www.hpe.com/support/Networking-Warranties

Regulatory information

Belarus Kazakhstan Russia marking

EHC

Manufacturer and Local Representative Information

Manufacturer information:

- Hewlett Packard Enterprise Company, 3000 Hanover Street, Palo Alto, CA 94304 U.S.

Local representative information Russian:

- **Russia**:

  ООО «Хьюлетт Паккард Энтерпрайз», Российская Федерация, 125171, г. Москва, Ленинградское шоссе, 16А, стр.3, Телефон/факс: +7 495 797 35 00

- **Belarus**:

  ИООО «Хьюлетт-Паккард Бел», Республика Беларусь, 220030, г. Минск, ул. Интернациональная, 36-1, Телефон/факс: +375 17 392 28 20

- **Kazakhstan**:

  ТОО «Хьюлетт-Паккард (К)», Республика Казахстан, 050040, г. Алматы, Бостандыкский район, проспект Аль-Фараби, 77/7, Телефон/факс: + 7 727 355 35 52

Local representative information Kazakh:

- **Russia**:

  ЖШС "Хьюлетт Паккард Энтерпрайз", Ресей Федерациясы, 125171, Мәскеу, Ленинград тас жолы, 16А блок 3, Телефон/факс: +7 495 797 35 00

- **Belarus**:

  «HEWLETT-PACKARD Bel» ЖШС, Беларусь Республикасы, 220030, Минск қ., Интернациональная көшесі, 36/1, Телефон/факс: +375 17 392 28 20

- **Kazakhstan**:

  ЖШС «Хьюлетт-Паккард (К)», Қазақстан Республикасы, 050040, Алматы к., Бостандык ауданы, Әл-Фараби даңғ ылы, 77/7, Телефон/факс: +7 727 355 35 52

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (serial number format for this product)

Valid date formats include:

- YWW, where Y indicates the year counting from within each new decade, with 2000 as the starting point; for example, 238: 2 for 2002 and 38 for the week of September 9. In addition, 2010 is indicated by 0, 2011 by 1, 2012 by 2, 2013 by 3, and so forth.
- YYWW, where YY indicates the year, using a base year of 2000; for example, 0238: 02 for 2002 and 38 for the week of September 9.

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057

Index