

HP Integrity rx2800 i2 Server User Service Guide

Abstract

This document contains specific information that is intended for users of this HP product.

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Revision history

The publishing history table identifies the publication 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 online or CD documentation.

The document printing date and part number indicate the current edition. The printing date changes when a new edition is printed. Minor changes might be made at reprint without changing the printing date. The document part number changes when extensive changes are made. The latest version of this document can be found online at:

http://www.hp.com/go/Integrity_Servers-docs

Table 1 Publishing history details

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1 Overview

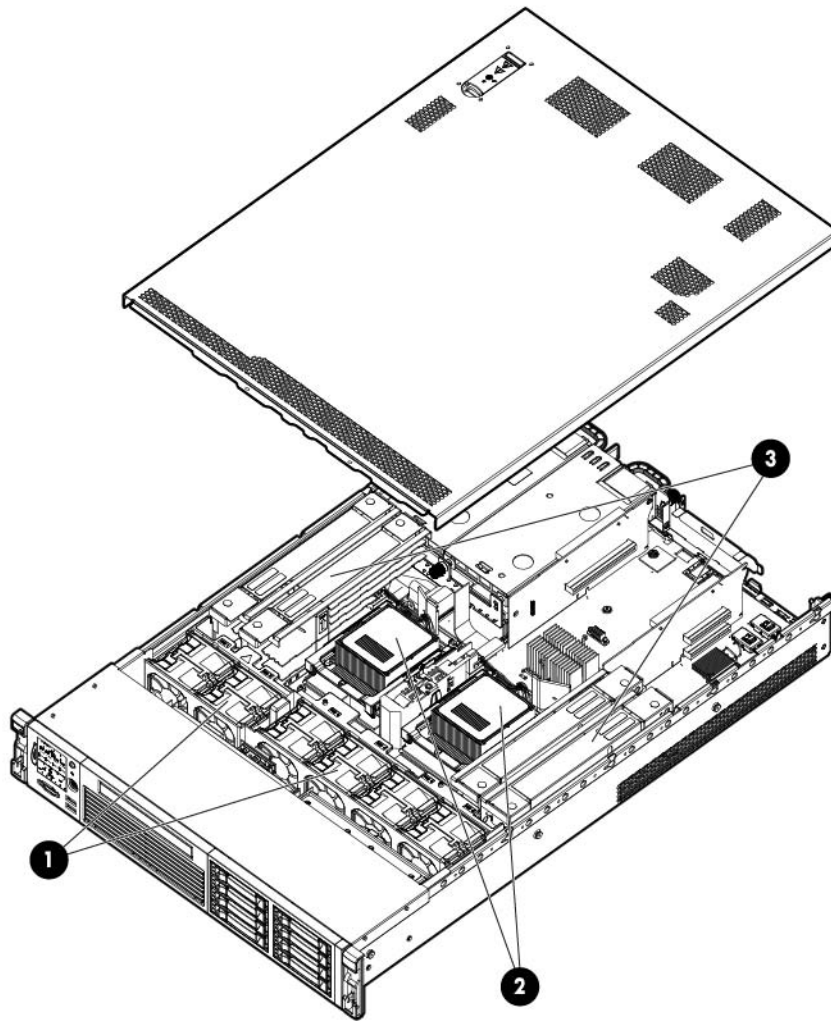
Table 2 Hardware specifications for the server

Component	Server
Processors	One or two Itanium dual-core or quad-core processors: <ul style="list-style-type: none">• 1.6-GHz Dual-core Processor 10-MB cache• 1.46-GHz Quad-core Processor 16-MB cache• 1.73-GHz Quad-core Processor 20-MB cache
Memory	Supports up to twenty-four Double Data Rate 3 (DDR3) DIMMs mounted on expansion boards that attach to the system board. Supported DIMM sizes are as follows: <ul style="list-style-type: none">• 2 GB• 4 GB• 8 GB• 16 GB Minimum memory configuration is 4 GB (2 x 2-GB DIMMs). Maximum memory configuration is 384 GB (24 x 16 GB DIMMs). NOTE: For additional restrictions on memory configuration, see Installing DIMMS “Installing DIMMs” (page 56).
Disk drives	One to eight hot-plug SAS hard drives
PCI slots	I/O riser options: <ul style="list-style-type: none">• One full height full length PCIe x8 and two low profile PCIe x4 slots• One full height full length PCIe x8 and one low profile PCIe x8 slots
SAS controller	Eight port SAS controller or eight port SAS controller with internal RAID
LAN ports	Four GigE LAN ports
Management ports	One serial port, four USB 2.0 ports, one 1G/100/10 LAN port, and two VGA ports NOTE: The serial port is intended primarily for use as a serial console port. It can be configured through iLO 3 for use with other serial devices (subject to OS and device limitations and dependencies). The serial port reverts to console mode settings if the server is disconnected from AC power or if the iLO is reset by the iLO Physical Presence button.
Optical drive	One SATA DVD+RW drive
Power supply	One (AH395A) or two power supplies (AH396A) are standard. Supplies are dual range input: 100-120VAC & 200-240VAC capable. 1+1 redundancy is possible with the second supply. IMPORTANT: 100-120 VAC input limits configuration and redundancy options. For details, see “Removing and replacing a hot-swap power supply” (page 112).

Server subsystems

Internal components

Figure 1 Internal components

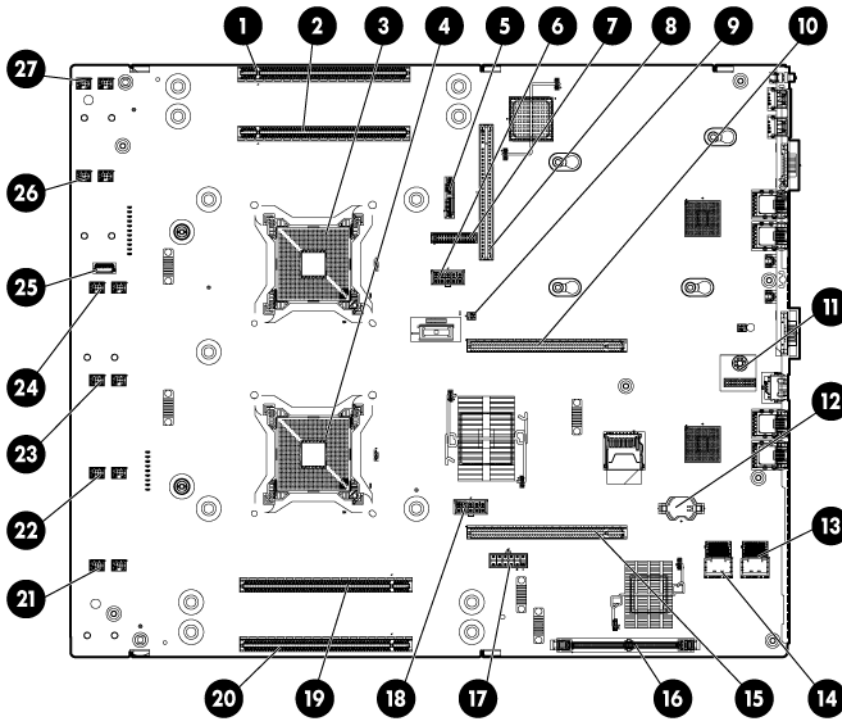


1 Fans

2 Processors

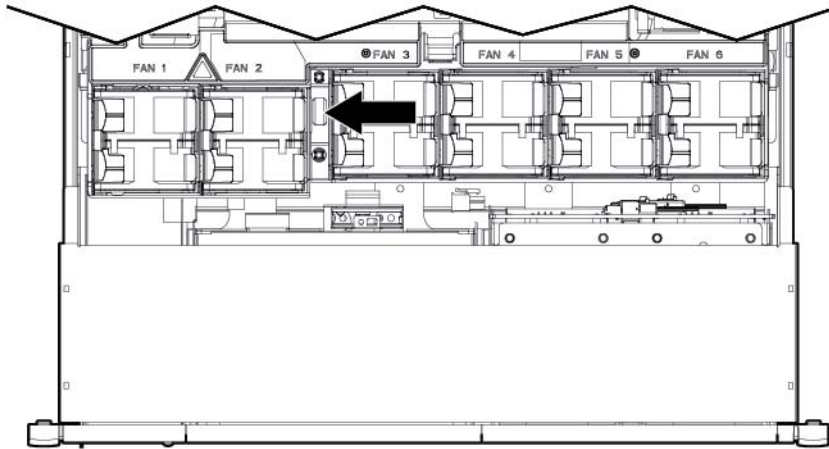
3 DIMM expansion boards

Figure 2 System board components



- | | | |
|---|--------------------------------------|--|
| 1 Memory expansion board connector 1 | 10 Primary riser connector | 19 Memory expansion board connector 3 |
| 2 Memory expansion board connector 2 | 11 TPM connector | 20 Memory expansion board connector 4 |
| 3 Processor socket 0 | 12 System battery | 21 Fan 6 connector |
| 4 Processor socket 1 | 13 SAS B connector | 22 Fan 5 connector |
| 5 SATA optical drive connector | 14 SAS A connector | 23 Fan 4 connector |
| 6 CPU 0 power connector | 15 Secondary riser connector | 24 Fan 3 connector |
| 7 Front I/O connector | 16 SAS cache module connector | 25 Internal USB connector |
| 8 Power supply backplane connector | 17 SAS power connector | 26 Fan 2 connector |
| 9 Intrusion switch connector | 18 CPU 1 power connector | 27 Fan 1 connector |

Figure 3 Internal USB location



I/O subsystem

The I/O subsystem consists of the core I/O and two optional I/O riser boards. Wake-on-LAN is not enabled on any PCIe Public slots. The server does not support PCI Hot Plug (PHP).

The standard I/O Riser supports one full-height, full-length PCIe x8 and two full-height, half-length PCIe x4 add-in cards. The second riser option supports one full-height, full-length PCIe x8, and one full-height, half-length PCIe x8 add-in cards.

NOTE: All PCIe x8 slots are electrically connected as x8 slots but are physically loaded with x16 connectors.

The secondary I/O riser position can either be a riser that supports one full-height, full-length PCIe x8 and two low-profile PCIe x4 add-in cards or a riser that supports one full-height, full-length PCIe x8 and one low profile PCIe x8.

RAID support

The following levels of RAID support are offered:

- Zero memory
 - RAID 0, 1, 10
 - Maximum 8 drives, 2 logical volumes
 - No cache or super capacitor needed. Performance improved with cache.

NOTE: To use all 8 disks with the zero memory option, the following RAID configurations are supported:

- RAID 0: 1 or 2 LUNs striped with up to 8 disks
- RAID 10: 1 or 2 LUNs striped and mirrored with even number of up to 8 disks
- RAID 1: 1 LUN using 2 mirrored disks, and one additional LUN in RAID 0 or 10

Example configurations of eight disks with zero memory

- LUN 1: RAID 1 bays 1 and 2
 - LUN 2: RAID 0 bays 3, 4, 5, 6, and 7
 - Hot Spare: bay 8
 - LUN 1: RAID 10 bays 1, 2, 3, and 4
 - LUN 2: RAID 10 bays 5, 6, 7, and 8
 - LUN 1: RAID 0 bays 1, 2, and 3
 - LUN 2: RAID 10 bays 5, 6, 7, and 8
 - Hot Spare: bay 4
-

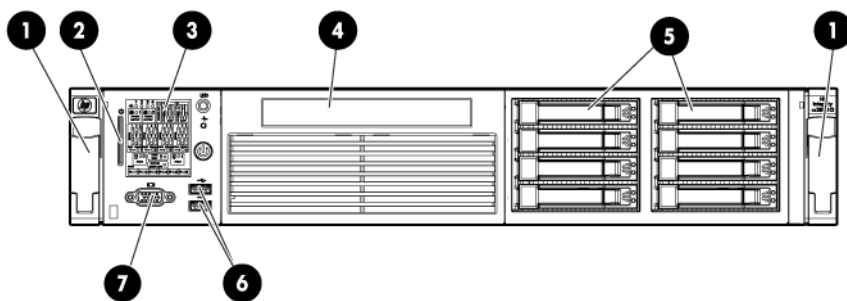
- Full feature
 - RAID 0, 10, 5
 - Cache needed and installing it automatically enables the full feature firmware stack. Super capacitor is optional.
- Advanced pack
 - RAID 6, 50, 60
 - Cache needed. Advanced Pack license must be entered to enable. Super capacitor is required.

To enable Advanced Pack licensing, see [“Adding a RAID Advanced Pack license key”](#) (page 148).

Controls and ports

Front panel controls and ports

Figure 4 Front panel components

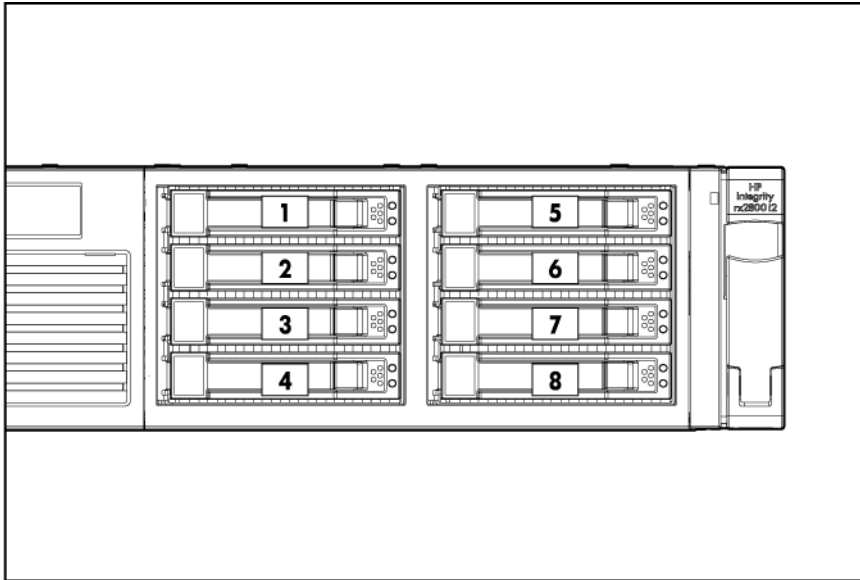


- | | |
|-------------------------------------|--------------------------|
| 1 Quick release levers | 5 Hard drive bays |
| 2 iLO 3 information pull tab | 6 USB connectors |
| 3 SID | 7 Video connector |
| 4 Optical drive bay | |

Storage and media devices

The server supports up to eight hot-plug SAS HDDs, and one optical (SATA DVD+RW) drive, with LEDs that indicate activity and device statuses.

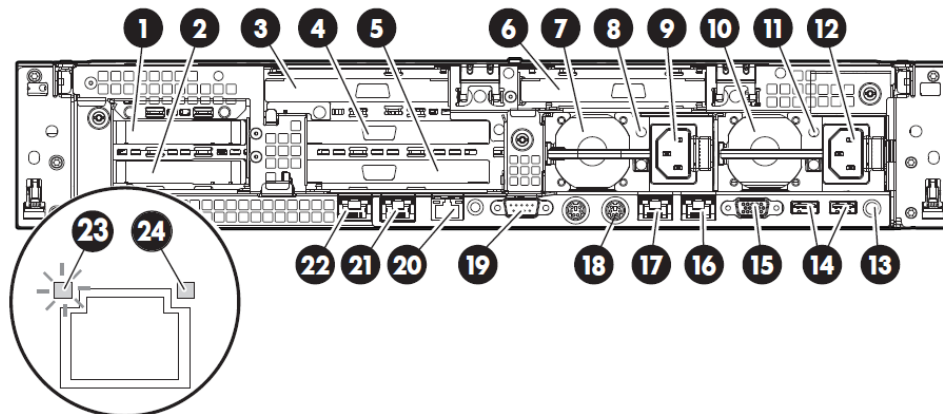
Figure 5 SAS device numbers



Rear panel controls and ports

The server rear panel includes communication ports, I/O ports, USB ports, AC power connectors, and the locator LED and button. LEDs located on the rear panel of the server signal the operational status of the rear panel components.

Figure 6 Rear panel components



1	PCI 5	9	Power supply 2 power connector	17	NIC 2 connector
2	PCI 6	10	Power supply 1	18	iLO 3 physical presence pinhole button
3	PCI 4	11	Power supply 1 LED	19	Serial connector
4	PCI 2	12	Power supply 1 power connector	20	iLO 3 connector
5	PCI 3	13	UID LED button	21	NIC 3 connector
6	PCI 1	14	USB connectors (2)	22	NIC 4 connector
7	Power supply 2	15	Video connector	23	NIC link LED
8	Power supply 2 LED	16	NIC 1 connector	24	NIC activity LED

2 Site preparation

For information on general computer room site preparation, see the *HP Generalized Site Preparation Guide* on the HP website:

http://www.hp.com/go/Integrity_Servers-docs

- ① **IMPORTANT:** To avoid hardware damage, allow the thermal mass of the product to equalize to the temperature and humidity of the installation facility after removing the shipping materials. A minimum of one hour per 10° C (50° F) of temperature difference between the shipping facility and installation facility is required.

Server dimensions and weight

Table 3 Rack or pedestal-mounted server dimensions

Dimensions and weight	Value
Data center server dimensions	
Depth	69.2 cm (27.25 in)
Width	48.3 cm (19 in)
Height	8.9 cm (3.5 in)
Weight	Maximum configuration – 30 kg (66 lb)
Rack unit	2U

Grounding

The site building must provide a safety ground/protective earth for each AC service entrance to all cabinets.

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

Server electrical specifications

System power specifications

Available power (output) is the maximum DC power that the power supply can supply to the system.

Maximum input power is what the power supply requires from the AC line to deliver that maximum DC output (given worst case efficiency and maximum loading).

Maximum input current is the worst case/highest current given the lowest input voltage and the maximum input power.

Table 4 System power specifications

Parameter			
Input voltage	100 V AC	110 - 120 V AC	200 - 240 V AC
Input current (maximum)	9.3 A	9.5 A	6.6 A
Input frequency	47 to 63 Hz	47 to 53 Hz	57 to 63 Hz
Power supply maximum output power	800 W (MAX) +12V /66.7A MAX	900 W (MAX) +12V /75A MAX	1200 W (MAX) +12V /100A MAX

Table 4 System power specifications (continued)

Parameter			
	+12VSB /2.5A MAX	+12VSB /2.5A MAX	+12VSB /2.5A MAX

If an overload triggers the power supply overload protection, the system is immediately powered off. To reset the power supply unit:

1. Disconnect the power cord.
2. Determine what caused the overload by contacting an HP support representative.
3. Reconnect the power cord.
4. Reboot the system.

NOTE: If an overload occurs twice, an undetected short circuit exists.

When you use the front panel power button to turn off the server, power consumption falls below the low power consumption, but does not reach zero. To reach zero power consumption in "off" mode, either unplug the server or use a power block with a switch.

Power consumption and cooling

The power consumptions listed in [Table 5 \(page 17\)](#) are valid for a standard configuration as shipped.

All information in this section is based on primary power consumptions with one power supply installed.

Table 5 Standard configuration power consumption

Standard configuration	Power consumption	
One 1.46 GHz quad-core processor, 4 GB memory, one 1200 W power supply, and one SAS disk drive	360 W (maximum)	1228 Btu/h (maximum)

Table 6 Additional component power consumption

Additional component	Power consumption	
Processor	130 W	443.6 Btu/h
SAS disk drive (with I/O access)	23 W	78.4 Btu/h
SAS disk (idle)	16 W	54.5 Btu/h
PCIe card	10 to 25 W	34.12 Btu/h to 85.30 Btu/h

Server physical and environmental specifications

Operating temperature and humidity ranges might vary, depending on the installed mass storage devices. High humidity levels can cause improper disk operation. Low humidity levels can aggravate static electricity issues and cause excessive wear of the disk surface.

NOTE: De-rate maximum dry bulb temperature 1°/300 m (1000 ft) above 900 m (3000 ft).

Table 7 Environmental specifications (system processing unit with hard disk)

Parameter	Value	
	Data Center Server	Office Friendly Server
Operating temperature (up to 1524 m/5000 ft) ¹	+5° C to +35° C (+41° F to +95° F)	
Non-operating temperature	- 40° C to +70° C (40° F to 158° F)	

Table 7 Environmental specifications (system processing unit with hard disk) (continued)

Parameter		Value	
		Data Center Server	Office Friendly Server
Over-temperature shutdown		+38° C (+100° F)	
Operating humidity		15% to 80% RH noncondensing	
Non-operating humidity		8% to 90% RH at 65° C noncondensing	
Acoustic Noise Emission (ISO 9296)			
Sound Power Level	Maximum configuration (disk active) ²	LwAd = 7.0 B	LwAd = 6.0 B
Sound Pressure Level		LpAm = 52.7 dB	LpAm = 42.4 dB
Altitude			
Operating altitude		0 to 3000 m (10,000 ft) maximum	
Non-operating altitude		0 to 4,600 m (15,000 ft) maximum	

¹ Maximum operating temperature range up to 1524 m (5000 ft) For higher altitudes, de-rate the maximum temperature by 2° C/300 m (1000 ft) above 1524 m (5000 ft)

- ²
- Two processor modules (quad-core)
 - Twenty-four DIMMs on four memory expansion boards
 - Eight hard disk drive
 - Six cards on two risers
 - Two power supplies

Unpacking and inspecting the server

This section describes pre installation procedures. Ensure that you have adequately prepared your environment for installing the new server, received the components that you ordered, and verified that the server and the containers are in good condition after shipment.

Verifying site preparation

- Gather LAN information. The MAC addresses for the iLO 3 MP LAN and the system LAN are located on the iLO Network Information Tag.
- Establish a method to connect to the server console.
- Verify electrical requirements. Ensure that grounding specifications and power requirements are met.
- Validate server physical space requirements.
- Confirm environmental requirements.

For server-specific information on electrical, physical space, and environmental requirements, see the site prep guide. For general site preparation information, see the *HP Generalized Site Preparation Guide* on the HP website at http://www.hp.com/go/Integrity_Servers-docs.

Inspecting the shipping containers for damage

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

Unpacking the server

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

① **IMPORTANT:** Inspect each carton for shipping damage as you unpack the server.

Verifying the inventory

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

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

Returning damaged equipment

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

Unloading the server with a lifter



WARNING!

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

NOTE: HP recommends that you follow your local guidelines when lifting equipment.

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

3 Installing the server

Safety information

Follow the instructions carefully to prevent injury and equipment damage when performing removal and replacement procedures. Voltage might be present within the server. Many assemblies are sensitive to damage by ESD.

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

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

⚠ WARNING! Ensure that the system is powered off and all power sources are disconnected from the server before removing or installing server hardware (unless you are removing or installing a hot-swappable or hot-pluggable component). Voltage is present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is off. Failure to observe this warning might result in personal injury or equipment damage.

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

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor might damage system boards or other static-sensitive devices. This type of damage might reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Installation sequence and checklist

Step	Description	Completed
1	Perform site preparation (see “Site preparation” (page 16)).	
2	Install the server into a rack or pedestal.	

Step	Description	Completed
3	Connect cables to the server.	
	a. Connect the AC input power cable.	
	b. Connect LAN core I/O cable.	
	c. Connect the iLO 3 MP LAN cable.	
4	Connect and set up the console for access.	
5	Power on the server.	
6	From iLO MP, access UEFI.	
7	Boot the operating system.	
8	Using HP Smart Update Manager, download the latest firmware.	

Installing the server into a rack or pedestal

Rack installation

HP rack

HP servers that are installed into racks are shipped with equipment-mounting slides. The *HP 2U Quick Deploy Rail System Installation Instructions for HP Products* ships with each set of slides. Follow the steps in this installation guide to determine where and how to install the server into the rack.

For more information on rack deployment, stabilization and transportation, see the *10000 Series G2 Rack Best Practices Guide*.

<http://www.hp.com/go/rackandpower>

Non-HP rack

For information on installing a rx2800 i2 server in a third party rack, see the QuickSpecs located on the HP Integrity rx2800 i2 Server product page.

<http://h20341.www2.hp.com/integrity/us/en/entry-class/rx2800-i2-overview.html>

To view the QuickSpecs, click the **HTML** or **PDF** link under **Quick Specs**.

Pedestal kit installation

If you order the rackless configuration option, the server ships with a pedestal mount. The pedestal mount is packaged in a separate carton that is attached to the server carton.

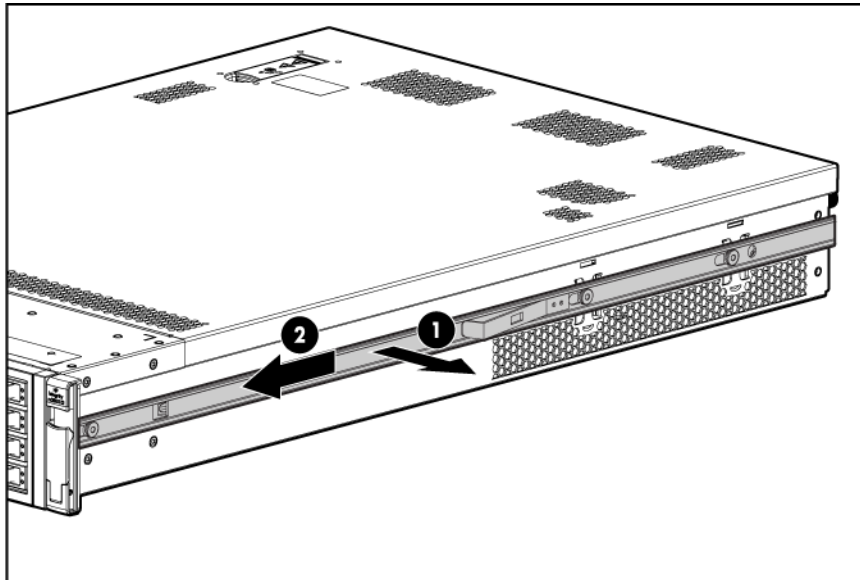
Remove the rails from the server

If your server has rails when you receive it, you need to remove the rails before mounting it in the pedestal kit. To remove the component:

1. Slightly pull the rail lock away from the rail to unlock the rail. See [Figure 7 \(page 22\)](#).
2. Slide the rail toward the front of the server to disengage the rail from the posts on the server.

3. Repeat these steps for the rail on the other side of the server.

Figure 7 Removing the rails from the server



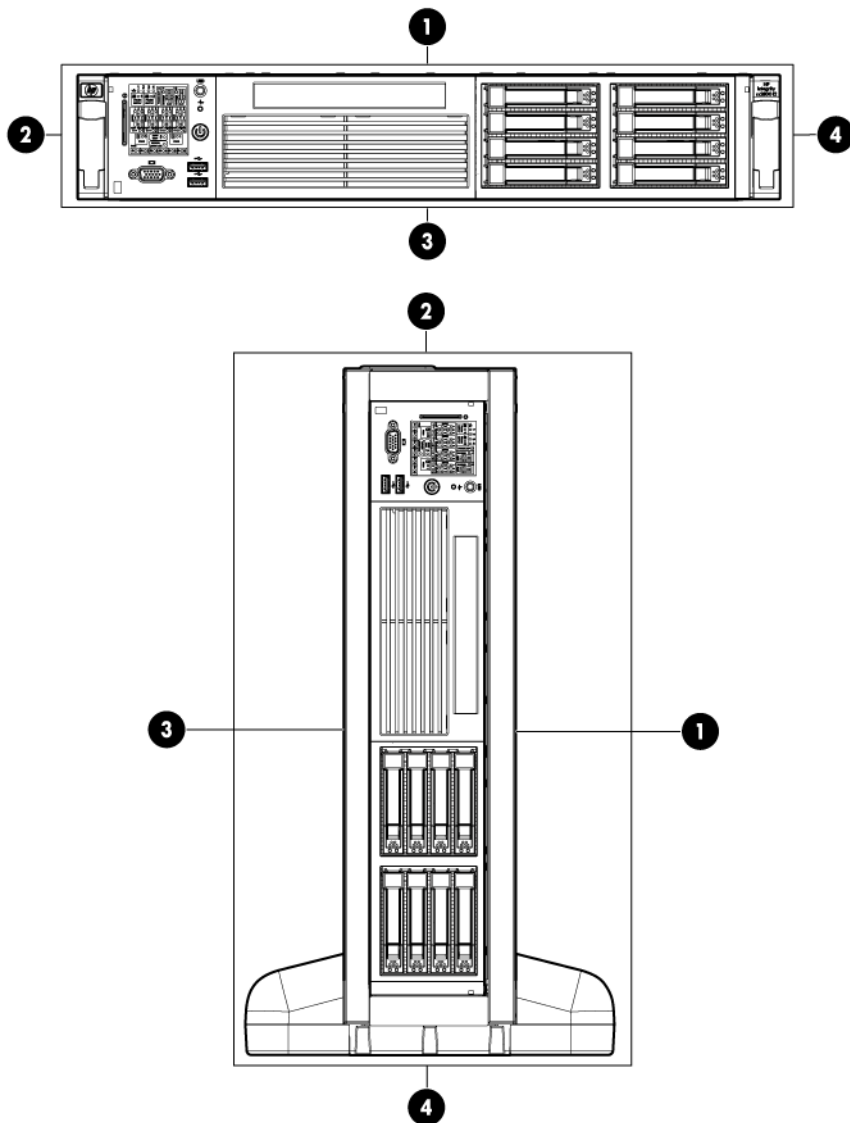
Attaching the pedestal kit top and bottom



IMPORTANT:

In this document the server top, bottom, right and left refer to the server as faced from the front with the server in a horizontal orientation. The pedestal kit components are referred to by the final position with the server in a vertical orientation. For example, the pedestal kit bottom attaches to the server right side.

Figure 8 Front of server



- | | |
|-----------------------------|--------------------------------|
| 1 Server top/pedestal right | 3 Server bottom/pedestal left |
| 2 Server left/pedestal top | 4 Server right/pedestal bottom |

The pedestal kit bottom attaches to the right side of the server when the server is in the horizontal position. The pedestal kit top attaches to the left side of the server when in the server is in the horizontal position. The pedestal bottom can be distinguished from the pedestal top by the pedestal feet slots.

NOTE: The bottom piece of the pedestal is taller than the server, so try to position the server so the right side (in the horizontal position) of the server hangs off the edge of the work surface by a few inches to allow the bottom piece to be attached to the server chassis. If that is not possible, then raise up the server approximately three inches from the work surface to enable the pedestal kit bottom piece to be attached to the server right side.

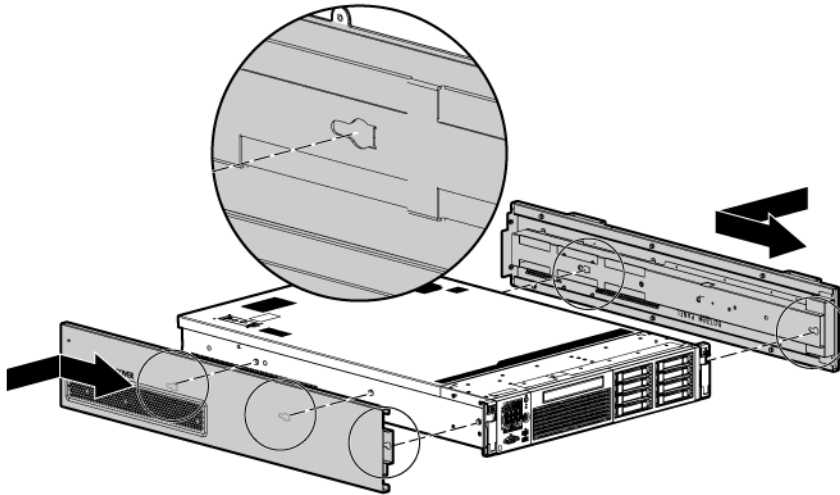
To attach the components.

1. Align the holes in the pedestal component with the posts on the server. See [Figure 9 \(page 24\)](#).

NOTE: One of the holes in the pedestal component contains the locking mechanism. This makes the hole appear partially blocked.

2. Hold the pedestal component flush against the server.
3. Slide the pedestal component forward until it locks into place.

Figure 9 Installing the pedestal bottom piece



4. Stand the server up on the bottom piece of the pedestal kit that was just installed so the server is in the vertical position.

⚠ CAUTION: The server is heavy. Be careful when lifting it to the vertical position. Without the feet installed, the server might tip over easily. Be careful when working near the server to avoid tipping it over.

5. Align the holes in the pedestal top piece with the posts on the server.

NOTE: One of the holes in the pedestal component contains the locking mechanism. This makes the hole appear partially blocked.

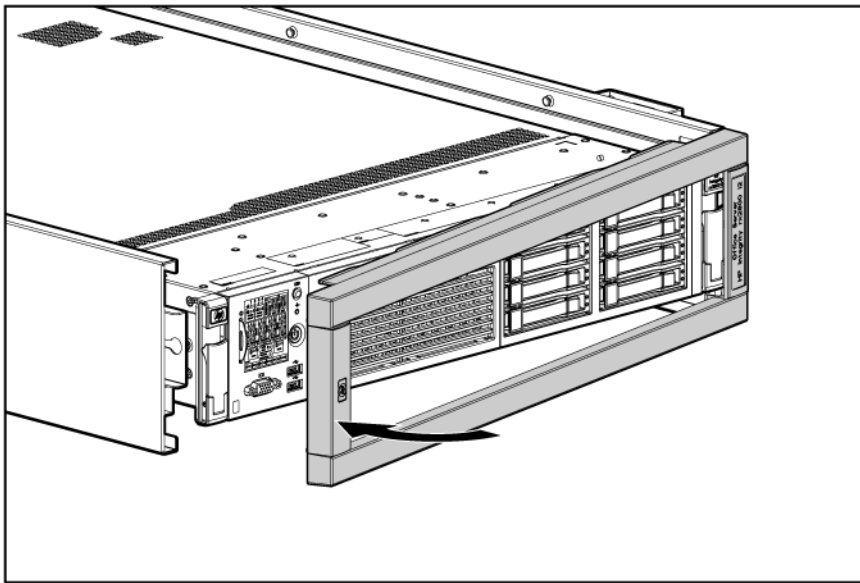
6. Hold the pedestal top piece flush against the server.
7. Slide the pedestal top piece forward until it locks into place.
8. The top and bottom pedestal kit pieces are now in place.

Attaching the bezel cover

To attach the bezel cover:

1. Attach the bezel cover to the front of the server starting from the bottom of the pedestal kit.
2. Push the bezel cover into place against the pedestal kit top piece until the tabs on the bezel cover snap into place.

Figure 10 Attaching the bezel Cover



Attaching the pedestal kit side pieces

The pedestal kit right side piece attaches to the top of the server. The top cover of the server might have ventilation holes in it to enable proper air flow and cooling. The right side piece of the pedestal kit also has ventilation holes in it to enable the proper cooling and air flow. Follow these steps to attach the pedestal kit right side piece.

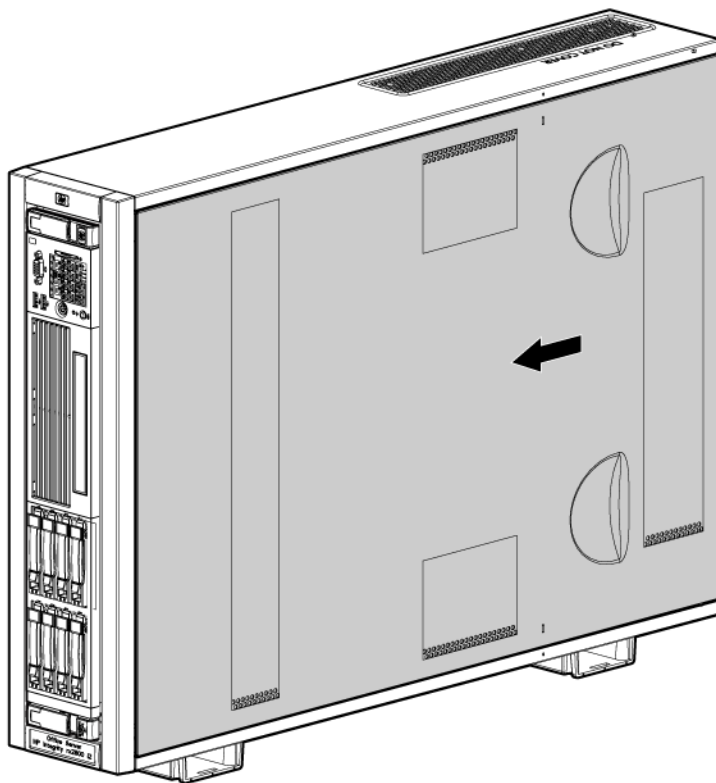


WARNING! The ventilation holes in the pedestal kit right side piece **must** be matched up with the ventilation holes on the top cover of the HP Integrity rx2800 i2 Server to enable proper cooling and air flow. Failure to heed this warning causes the server to shut down with an overtemp condition.

To attach the component:

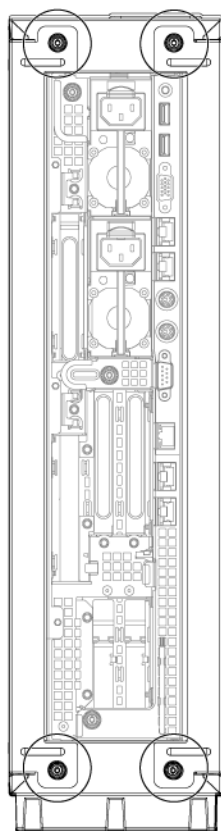
1. Align the posts on the pedestal kit right side piece with the slots in the pedestal kit top and bottom.
2. Hold the pedestal side flush against the server and slide it toward the front of the server.

Figure 11 Attaching the pedestal kit side piece



3. Secure the pedestal side by hand tightening the captive thumb screws on the rear of the server.

Figure 12 Thumb screw locations

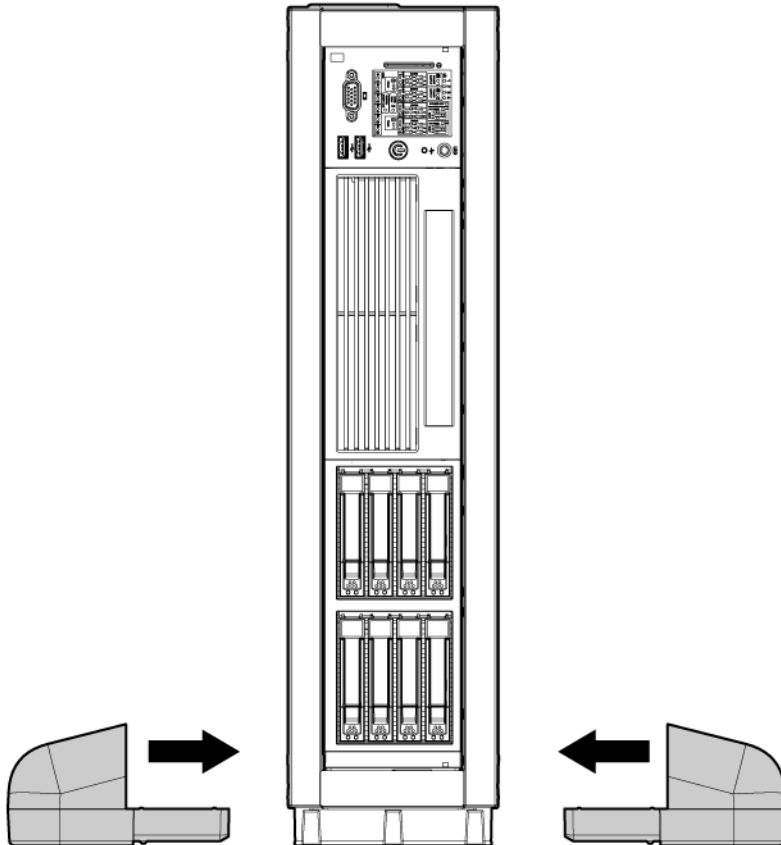


Repeat these steps to install the left side piece.

Attaching the pedestal feet

The pedestal feet slide into the slots on the pedestal bottom, two on each side. The feet are all the same and can be mounted in any slot on the bottom piece of the pedestal kit.

Figure 13 Attaching the feet



Connecting server cables

AC input power

The server can receive AC input from two different AC power sources. The power receptacles are located at the rear of the server.

A maximum of two power supplies can be installed in the server. Installing two power supplies in the server provides 1+1 redundancy, meaning that if one power supply fails, there is still enough power supplied to the server to operate. You must promptly replace the failed power supply to restore 1+1 functionality.

All high-line (220 V) configurations are capable of 1+1 redundancy. Low-line (110 V) configurations can maintain 1+1 redundancy as long as the total power consumed does not exceed 800 W.

A minimum of one power supply is required to power the server. If only one power supply is installed in the server, there is no 1+1 capability.

Power states

The server has the following power states:

- Standby power
- Full power
- Off

Table 8 Power states

Power states	Power cable plugged into receptacle?	Power activated through the iLO 3 ^{PC} command; or front panel power button activated?	Standby DC voltage applied?	DC voltage applied?
Standby power	Yes	No	Yes	No
Full power	Yes	Yes	Yes	Yes
Off	No	No	No	No

CAUTION: If the server is expected to remain in standby mode for more than 30 minutes, HP recommends completely removing AC power from the server. You can do this by switching off the circuit breakers that are part of the building installation, disconnecting or switching off a power distribution unit, or by physically removing the power cords from the server.

Be aware that removing AC power from the server for an extended period can drain the system battery.

NOTE: If the power restore feature is set to **Always On** through the iLO 3 ^{MP} ^{PR} command, the server automatically powers on to the full power state when the power cord is plugged in to the server.

Figure 6 (page 15) shows the ports and power supplies located on the rear panel of the server.

Applying standby power to the server

1. Plug the power cord into the receptacle in power supply.
2. Plug the other end of the power cord into an AC outlet.

NOTE: The LED on the power supply does not illuminate in the standby power state. The LED is green when the server is powered on to full power.

If the power restore feature is set to **Always On** through the iLO 3 ^{MP} ^{PR} command, the server automatically powers on to the full power state when the power cord is plugged into the server.

3. If the server has two power supplies, plug the second power cord into the power supply.
4. Plug the other end of the power cord into an AC outlet.

Connecting to the LAN

The server has four LAN ports that provide network connectivity. Figure 6 (page 15) shows the available LAN ports for the server.

1. Obtain valid IP addresses for each LAN port you plan to activate.
2. Connect the LAN cable from an available LAN port into a live connection on the network.

Setting up the system

For more information on using the iLO 3 ^{MP}, see the *HP Integrity iLO 3 Operations Guide*.

Setup checklist

Use the checklist in Table 9 while setting up the Integrity iLO 3.

Table 9 Setup checklist

Step	Action	Procedure	Status
Standard setup			
1	Preparation	<ol style="list-style-type: none">1. Determine an access method to select and connect the cables.2. Determine a LAN configuration method and assign an IP address if necessary.	
2	Configure the iLO 3 MP LAN	Select one of the three methods to configure the LAN for iLO 3 MP access: <ul style="list-style-type: none">• DHCP with DNS• RS-232 serial port• Static IP address	
3	Log on to the iLO 3 MP	Log on to the iLO 3 MP from a supported web browser or command line using the default user name and password.	
4	Change default user name and password	Change the default user name and password on the administrator account to your predefined selections.	
5	Set up user accounts	Set up the user accounts if you are using the local accounts feature.	
6	Set up security access	Set up the security access settings.	

Accessing UEFI or the OS from iLO MP

The Unified Extensible Firmware Interface is an architecture that provides an interface between the server OS and the server firmware. UEFI provides a standard environment for booting an OS and running preboot applications.

Use this procedure to access UEFI or the OS from the iLO MP. Your security parameters were set regarding remote access.

NOTE: Commands are case-insensitive.

1. From the MP Main Menu, enter `co` to access the Console.

NOTE: Terminal windows must be set to a window size of 80 columns x 25 rows for optimal viewing of the console at UEFI.

2. After memory test and CPU late self test the following message appears:

Press `Ctrl-C` now to bypass loading option ROM UEFI drivers.

The prompt times out if **Ctrl-C** is not pressed within a few seconds. If **Ctrl-C** is pressed, you are presented with two options:

- Bypass loading from I/O slots.
- Bypass loading from I/O slots and core I/O.

The Bypass loading from I/O slots and core I/O option may be useful if a bad core I/O UEFI driver is preventing system boot. USB drives can still be used at the UEFI shell to update core I/O drivers.

⚠ CAUTION: Pressing **Ctrl-C** before the prompt does not work and might disable this feature. Therefore, be sure to wait for the prompt before pressing **Ctrl-C**.

NOTE: The prompt might take several minutes to appear, and the period that you can press **Ctrl-C** is very short. For typical boots, HP recommends that you let the prompt time out.

After selecting an option, the boot proceeds.

NOTE: If no option is selected, the boot proceeds after ten seconds.

- Depending on how the server was configured from the factory and if the OS is installed at the time of purchase, you are taken to:
 - UEFI shell prompt
 - OS login prompt

If the server has a factory-installed OS, you can interrupt the boot process to configure your specific UEFI parameters.

If you are at the UEFI shell prompt, go to [“UEFI Front Page”](#) (page 30).

If you are at the OS login prompt, go to [“OS login prompt”](#) (page 32).

UEFI Front Page

If you are at the UEFI shell prompt, enter **exit** to navigate to the UEFI Front Page.

```
,947AA7BF-ED02-457A-9B8F-55161DF41DC2)
blk8 :Removable HardDisk - Alias (null)
      :PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x1)/HD(2,GPT
,6FE8C9E0-3CAE-11DE-8000-D6217B60E588)
blk9 :Removable HardDisk - Alias (null)
      :PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x1)/HD(3,GPT
,6FE8C9F4-3CAE-11DE-8000-D6217B60E588)
blkA :Removable HardDisk - Alias (null)
      :PcieRoot(0x30314352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0)/HD(2,GPT
,95C8557A-DF43-11D4-8000-D6217B60E588)
blkB :Removable HardDisk - Alias (null)
      :PcieRoot(0x30314352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x1)/HD(2,GPT
,1842AE78-E941-11DE-8000-D6217B60E588)
blkC :Removable BlockDevice - Alias (null)
      :PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0)
blkD :Removable BlockDevice - Alias (null)
      :PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x1)
blkE :Removable BlockDevice - Alias (null)
      :PcieRoot(0x30304352)/Pci(0x1D,0x7)/USB(0x3,0x0)
blkF :Removable BlockDevice - Alias (null)
      :PcieRoot(0x30314352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0)
blk10 :Removable BlockDevice - Alias (null)
      :PcieRoot(0x30314352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x1)

Shell> exit
```

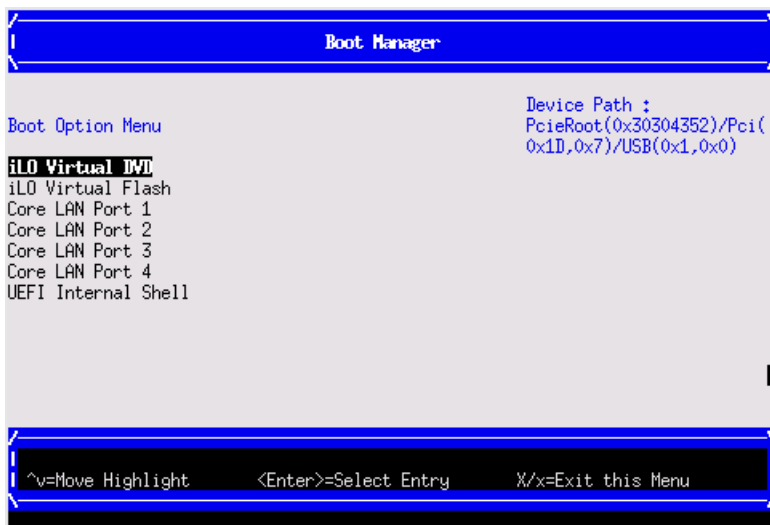
```
Note, menu interfaces might only display on the primary console device.
The current primary console device is:
Serial PcieRoot(0x30304352)/Pci(0x1,0x0)/Pci(0x0,0x5)
The primary console can be changed via the 'conconfig' UEFI shell command.

Press: ENTER - Start boot entry execution
      B / b - Launch Boot Manager (menu interface)
      D / d - Launch Device Manager (menu interface)
      M / m - Launch Boot Maintenance Manager (menu interface)
      S / s - Launch UEFI Shell (command line interface)
      I / i - Launch iLO Setup Tool (command line interface)

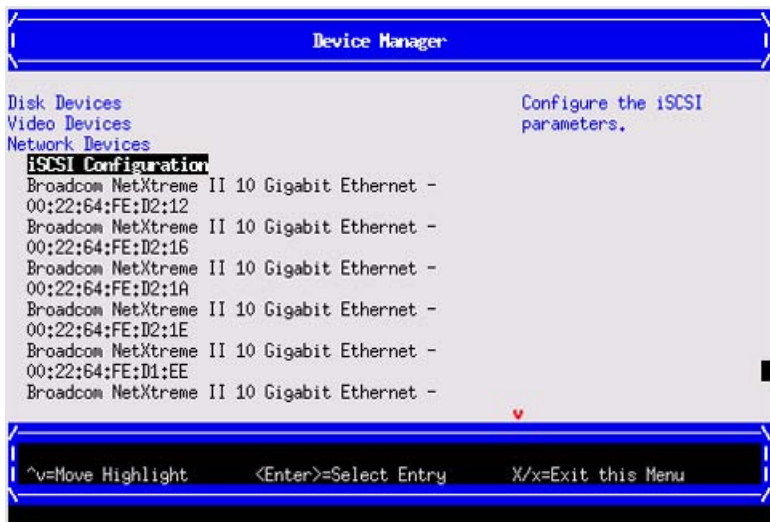
*** User input can now be provided ***

Waiting for user input.
```

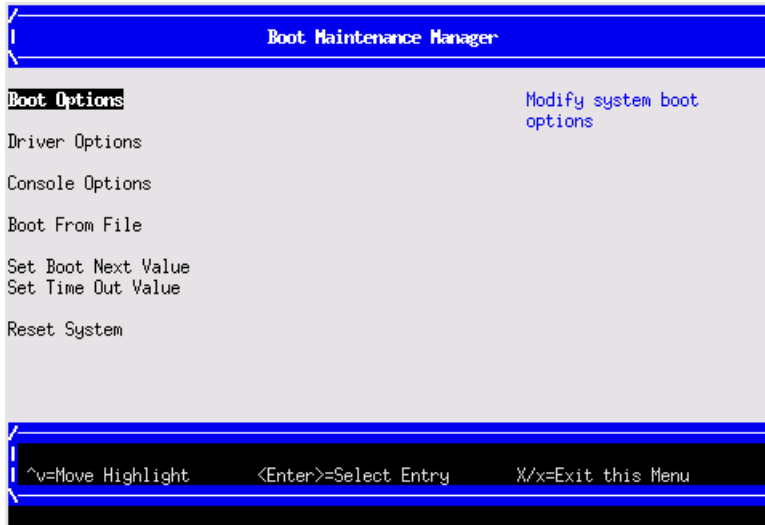
To view boot options, or launch a specific boot option, press **B** to launch the Boot Manager.



To configure specific devices, press **D** to launch the Device Manager. This is an advanced feature and must only be performed when directed.



To perform maintenance on the system such as adding, deleting, or reordering boot options, press **M** to launch the Boot Maintenance Manager.



To perform more advanced operations, press **S** to launch the UEFI Shell.
To view the iLO LAN configuration, press **I** to launch the iLO Setup Tool.

Saving UEFI configuration settings

You can configure other UEFI settings at this time. For more UEFI configuration options, see [Appendix A \(page 145\)](#).

Boot and installing the operating system

From the **UEFI Front Page** prompt, you can boot and install in either of two manners:

- If your OS is loaded onto your server, see [“Operating system is loaded onto the server” \(page 32\)](#).
- If the OS is not installed onto your server, see [“Operating system is not loaded onto the server” \(page 32\)](#).

Operating system is loaded onto the server

If the OS is loaded on your server, normally UEFI automatically boots to the OS. If the UEFI Front Page is loaded, press **ENTER** to start auto boot, or **B** to select a specific boot option for your OS.

- Use your standard OS login procedures, or see your OS documentation to log in to your OS.

Operating system is not loaded onto the server

There are three options on how to load the OS if it is not loaded onto your server.

- To load the OS from a DVD, see [“Installing the operating system from the DVD drive or tape drive” \(page 36\)](#).
- To load the OS using Ignite-UX, see [“Installing the operating system using HP Ignite-UX” \(page 37\)](#).
- To load the OS using vMedia, see [“Installing the operating system with Virtual Media” \(page 38\)](#).

OS login prompt

If your server is at the OS login prompt after you establish a connection to the server, use your standard OS log in procedures, or see your OS documentation for the next steps.

Powering on and powering off the server

Power states

The server has the following power states:

- Standby power
- Full power
- Off

For details about server power states, see [Table 8 \(page 28\)](#).

NOTE: If the power restore feature is set to **Always On** through the iLO 3 MP `PR` command, the server automatically powers on to the full power state when the power cord is plugged in to 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 3 MP `PC` command
- Power button

Powering on the server using the iLO 3 MP

NOTE: If the power restore feature is set to **Always On** through the iLO 3 MP `PR` command, the server automatically powers on to the full power state when the power cord is plugged in to the server.

1. Plug all power cables into the receptacles on the rear panel of the server.
2. Initiate a console session, and access the 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.

For more information, see the operating system documentation.

Powering on the server manually

NOTE: If the power restore feature is set to **Always On** through the iLO 3 MP `PR` command, the server automatically powers on to the full power state when the power cord is plugged in to 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. For more information, see the operating system documentation.

Powering off the server

If the server is in the standby or full power state, power off the server by using either of the following methods:

- iLO 3 MP `PC` command
- Power button

Powering off the server using the iLO 3 MP

1. Gracefully shut down the operating system. See the operating system documentation for more information.
2. Initiate a console session, and access the 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 system. 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

1. Gracefully shut down the operating system. For more information, see the operating system documentation.
2. To power off the server, press the power button.

⚠ CAUTION: The main DC voltage is now removed from the system. However, AC voltage for standby power is still present in the server.

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

Installing the latest firmware using HP Smart Update Manager

The HP Smart Update Manager utility enables you to deploy firmware components from either an easy-to-use interface or a command line. It has an integrated hardware discovery engine that discovers the installed hardware and the current versions of firmware in use on target servers. This prevents extraneous network traffic by only sending the required components to the target. HP Smart Update Manager also has logic to install updates in the correct order and ensure all dependencies are met before deployment of a firmware update. It also contains logic to prevent version-based dependencies from preventing a successful installation and ensures updates are handled in a manner that reduces any downtime required for the update process. HP Smart Update Manager does not require an agent for remote installations. After the installation is complete, HP Smart Update Manager also removes all remote files associated with the installation.

Key features of HP Smart Update Manager are:

- GUI and CLI
- Dependency checking, which ensures appropriate installation order and dependency checking between components
- Intelligent deployment of only required updates
- Improved deployment performance
- Remote command-line deployment
- Windows X86 or Linux X86 support

At this time, firmware updates on Integrity systems through HPSUM are done remotely. For example, HP SUM runs on an x86 Linux or Windows management system and updates targeted Integrity systems through the network. HP Smart Update Manager supports firmware updates on rx2800 i2 servers. Firmware bundles for these servers are available and can be downloaded from the HP website at <http://www.hp.com>.

For more information about HP Smart Update Manager, see the *HP Smart Update Manager User Guide* (<http://www.hp.com/go/hpsum/documentation>).

Troubleshooting installation issues

To troubleshoot issues that might occur during server installation, see [“Installation troubleshooting”](#) (page 85).

4 Operating system procedures

Operating systems supported on the server

- HP-UX 11i v3 HWE 1009 or later
- HP OpenVMS v8.4 with VMS84I_UPDATE-V0500, rx2800 i2 enablement kit
- Windows Server 2008 Itanium Edition R2

NOTE: Wake-On-LAN (WOL) is supported with Integrity rx2800 i2 Servers running HP-UX 11i v3. WOL is not supported with Integrity servers running Windows or OpenVMS environments. The supported remote power-on solution for Windows and OpenVMS environments is iLO 3.

Installing the operating system onto the server

The following procedures describe generalized operating system installation. For more details, see the operating system documentation.

Installing the operating system from the DVD drive or tape drive

NOTE: Commands are not case-sensitive.

NOTE: Tapeboot requires rx2800 i2 system firmware bundle 26.12 or later and an additional AM311A Integrity Smart Array P411/256 HBA running 5.06 firmware or later.

1. Insert the OS Media into the DVD (internal to system) or tape drive (external to system).
2. Power on the server and boot to UEFI. If the server is already powered on, use the `reset` command at the UEFI prompt to reboot to UEFI.
3. From the UEFI front page, press **S** to launch the UEFI Shell.

NOTE: If the device is already selected or you already know the device name, skip the following step.

If you are using a tape device. When the UEFI shell comes up, you should see a message similar to the following on the console:

```
HP Smart Array P411 Controller      (version 5.06)
  Tape Drive(s) Detected:
    Port: 2E, box:0, bay:  5 (SAS)
```

NOTE:

If you do not see a line starting with `Port` and ending with `(SAS)`, the tape is not connected correctly or it is not responding.

4. Locate the device you want to boot from.
 - a. For DVD, locate the device:
 - i. To list all device names from the UEFI Shell prompt, use the `map` command.
 - ii. From the list generated by the `map` command, locate the device name (in this example, `fs6`).

```
fs2:\> map
Device mapping table

fs6      :Removable CDRom - Alias cd66d0a blk6
         PciRoot(0x30304352)/Pci(0x1D,0x7)/USB(0x3,0x0)/CDROM(0x0)
```

NOTE: Your DVD drive might not be named `fs6`. Make sure you verify the ID appropriate to your DVD device.

- iii. At the UEFI shell prompt, specify the device name for the DVD-ROM.
- iv. Enter the appropriate UEFI `install` command, as in the following example:

HP-UX

```
Shell> fs6:
fs6:\> install
```

OpenVMS

```
Shell> fs0:
fs0:\> cd efi\boot
fs0:\efi\boot> bootia64
```

- b. For tape, locate the device:
 - To boot from tape once you are at the UEFI shell:

```
Shell> tapeboot select
01
PciRoot(0x30304352)/Pci(0x8,0x0)/Pci(0x0,0x0)/SAS(0x50060B00007F6FFC,0x0,0x1,NoTopology,0,0,0,0x0)
Select Desired Tape: 01 <<input 01
```

- If the correct media is installed, it will boot from tape when you enter the index number.
- If there is no media in the SAS tape drive and you select 1, the following message appears:

```
tapeboot: Could not load tapeboot image
```

The operating system starts loading onto the server.

5. To complete the OS installation, follow the on-screen instructions.
6. Once the installation has completed, review the “[Configuring system boot options](#)” (page 38).

NOTE: For OpenVMS installation, see the *VMS84I_UPDATE-V0500.RELEASE_NOTES* document available on the HPSC at <http://www.hp.com/go/hpsc>.

Installing the operating system using HP Ignite-UX

Ignite-UX is an HP-UX administration toolset that enables:

- Simultaneous installation of HP-UX on multiple clients
- The creation and use of custom installations
- The creation of recovery media
- The remote recovery of clients

To install the OS onto the server using Ignite-UX, go to <http://www.hp.com/go/ignite-ux>.

Installing HP OpenVMS with Infoserver Utility

Infoserver Utility enables OpenVMS installations and upgrades over the network. To install the OS using Infoserver, see the "Setting Up and Performing Network Booting" section in *HP OpenVMS Version 8.4 Upgrade and Installation Manual* on the HP website:

http://h71000.www7.hp.com/doc/84final/ba322_90087/ba322_90087.pdf

Installing the operating system with Virtual Media

NOTE: Installing the OS with Virtual Media (vMedia) might be significantly slower than installing using other methods.

Using vMedia enables connections of a DVD physical device or image file from the local client system to the remote server. The virtual device or image file can be used to boot the server with an operating system that supports USB devices.

Using vMedia depends on a reliable network with good bandwidth, which is especially important when you are performing tasks such as large file transfers or OS installations.

For more information regarding loading the OS with vMedia, see the *HP Integrity iLO 3 Operations Guide*.

NOTE: After the OS is loaded, to preserve boot entries in case of failure, make sure to save your nonvolatile memory settings.

Configuring system boot options

- **Boot Manager**

Contains the list of boot options available. Ordinarily, the boot options list includes the UEFI Internal Shell and one or more operating system loaders.

To manage the boot options list for each server, use the UEFI Shell, the Boot Maintenance Manager, or operating system utilities.

- **Autoboot setting**

The `autoboot` setting determines whether a server automatically loads the first item in the boot options list or remains at the UEFI Front Page menu. With autoboot enabled, UEFI loads the first item in the boot options list after a designated timeout period.

Configure the autoboot setting for an HP Integrity server using either the UEFI Shell `autoboot` command or the Set Time Out Value menu item from the Boot Maintenance Manager.

Examples of autoboot commands for HP-UX:

- Disable autoboot from the UEFI Shell by issuing `autoboot off`
- Enable autoboot with the default timeout value by issuing `autoboot on`
- Enable autoboot with a timeout of 60 seconds by issuing `autoboot 60`
- Set autoboot from HP-UX using `setboot`
- Enable autoboot from HP-UX using `setboot -b on`
- Disable autoboot from HP-UX using `setboot -b off`

For more information on the `autoboot` command, enter `help autoboot`.

Booting and shutting down HP-UX

- To add an HP-UX entry to the boot options list, see “Adding HP-UX to the boot options list” (page 39).
- To boot HP-UX, use one of the following procedures:
 - To boot HP-UX in the standard mode, see “HP-UX standard boot” (page 40). HP-UX boots in multi-user mode.
 - To boot HP-UX in single-user mode, see “Booting HP-UX in single-user mode” (page 41).
 - To boot HP-UX in LVM-maintenance mode, see “Booting HP-UX in LVM-maintenance mode” (page 41).
- To shut down the HP-UX operating system, see “Shutting down HP-UX” (page 41).

Adding HP-UX to the boot options list

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the UEFI Shell or the Boot Maintenance Manager.

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

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

To add HP-UX to the list:

NOTE: Commands are not case-sensitive.

1. Access the UEFI Shell environment.
 - a. Log in to iLO for Integrity, and then to access the system console, enter `CO`.
When accessing the console, confirm that you are at the UEFI Front Page.
If you are at another UEFI menu, then choose the **Exit** option, or press **X** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers.
 - b. To launch the UEFI shell, press **S**.
2. Access the UEFI System Partition (`fsX:` where `X` is the file system number) for the device from which you want to boot HP-UX.
For example, to access the UEFI System Partition for the bootable file system number `2`, enter `fs2:`. The UEFI Shell prompt changes to reflect the file system currently accessed.
The full path for the HP-UX loader is `\EFI\HPUX\HPUX.EFI` and is on the device you are accessing.
3. At the UEFI 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 v3"` adds an HP-UX 11i v3 item as the first.

For details, see the `help bcfg` command.

4. Exit the console and iLO MP interfaces.

Press **Ctrl-B** to exit the system console and return to the iLO 3 MP Main Menu. To exit the MP, at the Main Menu, enter **x**.

HP-UX standard boot

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

- [“Booting HP-UX from the UEFI Boot Manager” \(page 40\)](#)
- [“Booting HP-UX from the UEFI Shell” \(page 40\)](#)

Booting HP-UX from the UEFI Boot Manager

1. From the UEFI Boot Manager menu, choose an item from the boot options list to boot HP-UX.
2. Access the UEFI Boot Manager menu for the server on which you want to boot HP-UX.
3. Log in to iLO MP, and then to choose the system console, enter `CO`.
4. Confirm you are at the UEFI Front Page. If you are at another UEFI menu, then to exit the menu, choose the **Exit** option or press **X**. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers. To launch the Boot Manager, press **B**.
5. At the UEFI 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.

6. To initiate booting using your chosen boot option, press **Enter**.
7. Exit the console and iLO MP interfaces.
8. To exit the system console and return to the MP Main Menu, press **Ctrl-B**. To exit the MP Main Menu, enter **x** at the MP Main Menu.

Booting HP-UX from the UEFI Shell

1. Access the UEFI Shell.
2. From the UEFI Front Page, press `s` to launch the UEFI shell.
3. Use the `map` command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.
4. To select a file system to use, enter the mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs0`, at the UEFI Shell prompt, enter `fs0:`.
5. To launch the `HPUX.EFI` loader from the currently selected boot device, at the UEFI Shell command prompt, enter `HPUX`.

If needed, specify the full path of loader by entering `\EFI\HPUX\HPUX` at the UEFI Shell command prompt.

6. Allow the `HPUX.EFI` loader to proceed with the `boot` command specified in the `AUTO` file, or manually specify the `boot` command.
By default, the `HPUX.EFI` loader boots using the loader commands found in the `\EFI\HPUX\AUTO` file on the UEFI System Partition of the selected boot device. The `AUTO` file typically contains the `boot vmunix` command.
To interact with the `HPUX.EFI` loader, interrupt the boot process (for example, enter a **space**) within the time-out period provided by the loader. To exit the loader, use the `exit` command, which returns you to UEFI.

Booting HP-UX in single-user mode

1. Use steps 1–5 from “[Booting HP-UX from the UEFI Shell](#)” (page 40) to access the UEFI shell, and launch the `HPUX.UEFI` loader.
2. Access 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 step 3.
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 UEFI Shell, enter `exit`.
3. 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.

Booting HP-UX in LVM-maintenance mode

The procedure for booting HP-UX into LVM Maintenance Mode is the same as for booting into single user mode (“[Booting HP-UX in single-user mode](#)” (page 41)), except use the `-lm` boot option instead of the `-is` boot option:

```
HPUX> boot -lm vmunix
```

Shutting down HP-UX

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

To shut down HP-UX running on a server:

1. Log in to HP-UX running on the server that you want to shut down, or log in to iLO MP for the server and use the Console menu to access the system console. Accessing the console through iLO MP enables you to maintain console access to the server after HP-UX has shut down.
2. Use the `shutdown` command with the appropriate command-line options.

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

Choose an HP-UX shutdown option for your server:

- To shut down HP-UX and halt (power off) the server, use the `shutdown -h` command.
To reboot a halted server, power on the server by using the `PC` command at the iLO MP Command menu.
- To shut down HP-UX and reboot the server, use the `shutdown -r` command.

Booting and shutting down HP OpenVMS

Adding OpenVMS to the Boot Options list

NOTE: If OpenVMS is already installed on the server, add OpenVMS to the boot options list by using the `SYS$MANAGER:BOOT_OPTIONS.COM` command procedure, and follow the on-screen instructions.

NOTE: Commands are not case-sensitive.

1. Access the UEFI Shell environment.
 - a. Log in to iLO for Integrity, and then to access the system console, enter `CO`.
When accessing the console, confirm that you are at the UEFI Front Page.
If you are at another UEFI menu, choose the **Exit** option or press **X** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers.
 - b. To launch the UEFI shell, press **S**.
2. Access the UEFI System Partition (fsX: where X is the file system number) for the device from which you want to boot OpenVMS.
For example, to access the UEFI System Partition for the bootable file system number 2, enter `fs2:`. The UEFI Shell prompt changes to reflect the file system currently accessed.
The full path for the loader is `\EFI\VMS\VMS_LOADER.EFI` and is on the device you are accessing.
3. At the UEFI Shell environment, to manage the boot options list, use the `bcfg` command.
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\VMS\VMS_LOADER.EFI "OpenVMS V8.4"` 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.
5. Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP Main Menu, press **X**.

For more details, see the *HP OpenVMS 8.4 Upgrade and Installation Manual*.

Booting OpenVMS

To boot OpenVMS, use either of the following procedures:

- “Booting OpenVMS from the UEFI Boot Manager” (page 43)
- “Booting HP OpenVMS from the UEFI Shell” (page 43)

Booting OpenVMS from the UEFI Boot Manager

1. From the UEFI Boot Manager menu, using the chosen boot option, choose an item from the boot options list to boot OpenVMS.
2. Access the UEFI Boot Manager menu for the server on which you want to boot OpenVMS.
3. Log in to the iLO MP, and then to choose the system console, enter `CO`.
4. Confirm that you are at the UEFI Front Page. If you are at another UEFI menu, then to exit the menu, choose the **Exit** option or press **X**. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers. Press **B** to launch the Boot Manager.
5. At the EFI Boot Manager menu, choose an item from the boot options list.
Each item in the boot options list refers to a specific boot device and provides a specific set of boot options or arguments to use when booting the device.
6. To initiate booting using the chosen boot option, press **Enter**.
7. Exit the console and iLO MP interfaces.
8. Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP Main Menu, press **X**.

Booting HP OpenVMS from the UEFI Shell

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

1. Access the UEFI Shell.
2. From the UEFI Front Page, press **S** to launch the UEFI shell.
3. Use the `map` command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.
4. To select a file system to use, enter the mapped name followed by a colon (:). For example, to operate with the boot device that is mapped as `fs0`, at the UEFI Shell prompt, enter `fs0:.`
5. When accessing the bootable 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
fs5:> \efi\vms\vms_loader.efi
HP OpenVMS Industry Standard 64 Operating System, Version V8.4
© Copyright 1976-2010 Hewlett-Packard Development Company, L.P.
```
6. Exit the console and iLO MP interfaces.
7. Press **Ctrl-B** to exit the system console and return to the MP Main Menu. To exit the MP Main Menu, press **X**.

Shutting down OpenVMS

1. Log in to OpenVMS running on the server that you want to shut down.
Log in to the iLO MP for the server, and then to access the system console, use the Console menu. Accessing the console through the iLO MP enables you to maintain console access to the server after HP OpenVMS has shut down.

2. At the OpenVMS DCL prompt, enter the @SYS\$SYSTEM:SHUTDOWN command, and then specify the shutdown options in response to the prompts given.

NOTE: Use the command in step 2 when you shut down OpenVMS for the first time. If you have shut down OpenVMS more than once, use the \$ shutdown command.

```
$ @sys$system:shutdown
```

```
SHUTDOWN -- Perform an Orderly System Shutdown
              on node OVMS
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]?
When will the system be rebooted [later]:
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
BIB_STATE             Request console to reboot all CPUs to the Itanium BIB state

Shutdown options [NONE]:
```

Booting and shutting down Microsoft Windows operating systems

Adding Microsoft Windows operating systems to the boot options list

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

NOTE: Commands are not case-sensitive.

1. Access the UEFI Shell environment.
 - a. Log in to iLO for Integrity, and then to access the system console, enter CO.
When accessing the console, confirm that you are at the UEFI Front Page.
If you are at another UEFI menu, then to exit the menu, choose the **Exit** option or press **X**. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers.
 - b. Press **S** to launch the UEFI shell.
2. Access the UEFI System Partition (fsX: where X is the file system number) for the device from which you want to boot your Windows operating system.
For example, to access the UEFI System Partition for the bootable file system number 2, enter **fs2:**. The UEFI 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 is on the device you are accessing.
3. Use the `ls` command to 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 Boot 0001
      1 File(s)      354 bytes
      2 Dir(s)
```

```
fs0:\>
```

4. Use 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 Windows 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
```

NOTE: Your output might not exactly match the output shown here.

6. Enter **Q** to quit the NVRBOOT utility.
7. Exit the console and iLO MP interfaces. Press **Ctrl-B** to exit the system console and return to the iLO MP Main Menu. To exit the MP, enter **X** at the Main Menu.

Booting the Microsoft Windows operating system

Use UEFI Boot Manager menu to choose the appropriate Windows item from the boot options list. See [“Shutting down Microsoft Windows” \(page 46\)](#) for details on shutting down the Windows operating system.

1. From the UEFI Boot Manager choose an item from the boot options list to boot Windows.
2. Access the UEFI Boot Manager menu for the server on which you want to boot Windows.
3. Log in to the iLO MP, and then to choose the system console, enter `CO`.
4. Confirm that you are at the UEFI Boot Manager menu (the main UEFI menu). If you are at another UEFI menu, choose the **Exit** option from the submenus until you return to the screen with the UEFI Boot Manager heading.
5. At the UEFI 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.
6. Press **Enter** to initiate booting using the chosen boot option.
7. After the Windows operating system begins loading, wait for the 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>

NOTE: Your output might not exactly match the output shown here.

8. Exit the console and iLO MP interfaces when finished using them.
Enter **Ctrl-B** to exit the console and return to the iLO MP Main menu. To exit the iLO MP, enter **X** at the Main menu.

Shutting down Microsoft Windows

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

- ⚠ CAUTION:** Do not shut down Windows using `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 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.

Shutting down Windows operating systems from the command line

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

1. Log in to your Windows operating system running on the server that you want to shut down.
For example, access the system console and use the Windows Special Administration Console 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 of the server.

5 Optional components

This section describes how to install components into the server that are not factory-installed. If you have additional components to install, be sure to install the additional components before installing the server into your rack or pedestal configuration. Most servers are pre-configured with all components installed before shipping from the HP factory.

Externally accessible components:

- SAS hard drives
- Power supplies

Internal components:

- Memory DIMMs
- Processors
- PCIe cards
- SAS cache module and super capacitor pack

⚠ WARNING! Ensure that the system is powered off and all power sources are disconnected from the server prior to removing or installing server hardware (unless you are removing or installing a hot-swappable or hot-pluggable component). Voltage is present at various locations within the server whenever an AC power source is connected. This voltage is present even when the main power switch is turned off. Failure to observe this warning can result in personal injury or damage to the equipment.

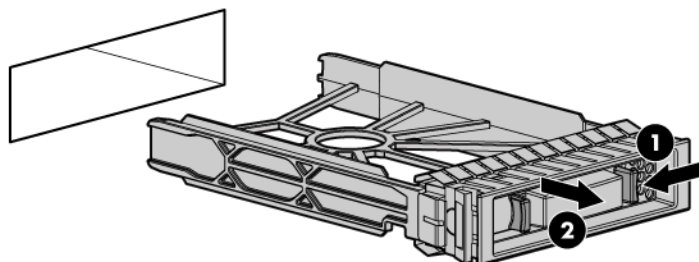
Installing a hot-pluggable SAS hard drive

The front of the server has eight hot-plug SAS hard drive slots. Slots without hard drives installed have slot fillers installed for cooling purposes.

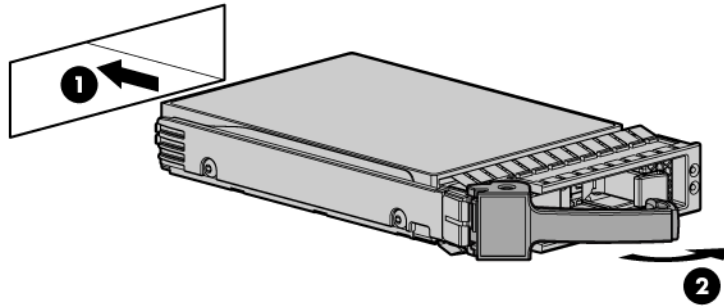
ⓘ IMPORTANT: SAS hard drives are loaded in sequence, starting with the top left slot and proceeding down filling slots 1, 2, 3, 4 in order; and then filling the right side top to bottom 5, 6, 7, 8. See [Figure 5 \(page 15\)](#).

Save the hard drive filler for future use. For airflow purposes, place hard drive fillers in slots that do not contain hard drives.

1. To remove the hard drive filler, squeeze the tab and then pull out the filler.



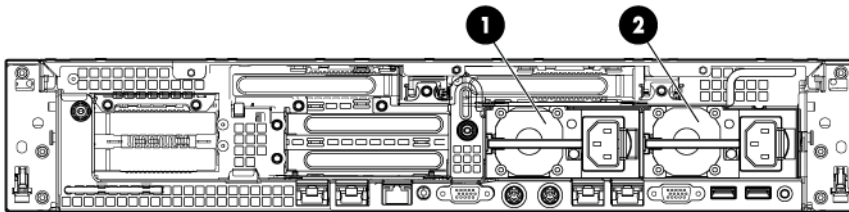
2. To install the hard drive, push in the drive and then close the locking lever.



Installing a hot-swappable power supply

The server has at least one hot-swappable power supply installed before shipping. This power supply is located at the rear of the server. You can install a second, optional power supply to provide 1+1 capability.

Figure 14 Power supply loading guidelines



1 Power supply bay 2

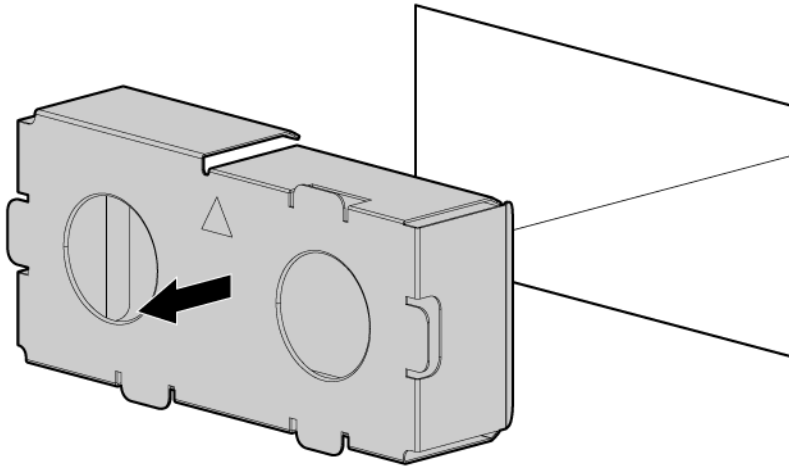
2 Power supply bay 1

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

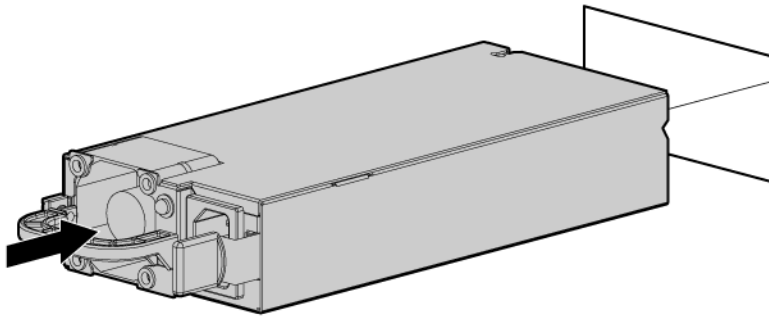
CAUTION: If you do not purchase a second power supply, the empty power supply slot must remain covered with the supplied power supply blank. Failure to observe this caution might result in server shutdown due to overheating.

NOTE: The power supply is a hot-swappable device. You do not have to interact with the operating system to add a power supply to the server.

1. Remove the power supply blank.



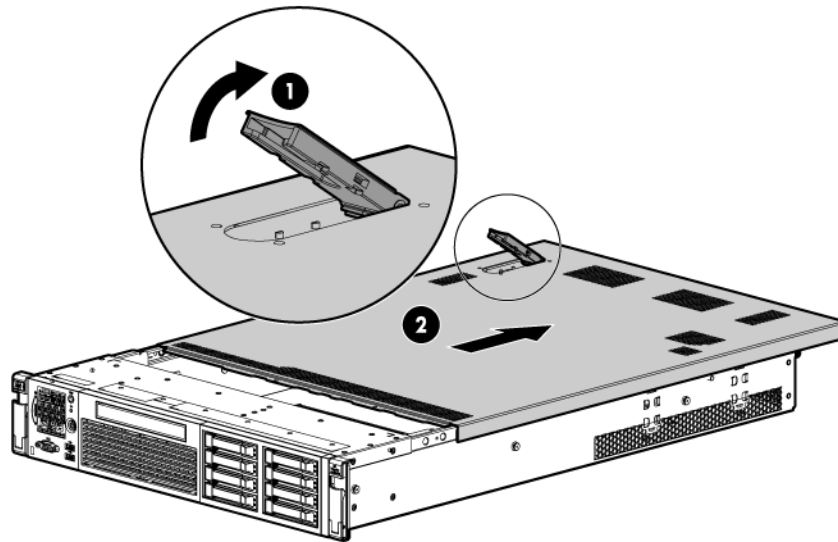
2. Install the power supply.



Removing the access panel

1. Use the T-15 Torx screwdriver attached to the rear of the server to loosen the security screw on the hood latch.

2. Lift the hood latch handle, and then remove the access panel.

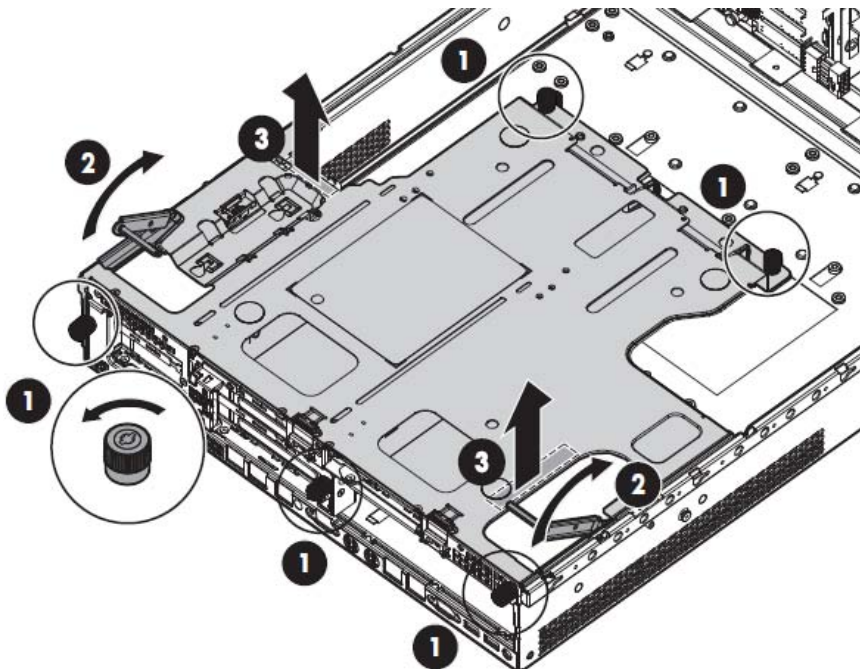


To replace the component, reverse the removal procedure.

Removing the PCI riser cage

- CAUTION:** For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-pluggable components, minimize the amount of time the access panel is open.

1. Disconnect any cables connected to optional I/O cards before removing cage.
2. Remove the PCI riser cage.



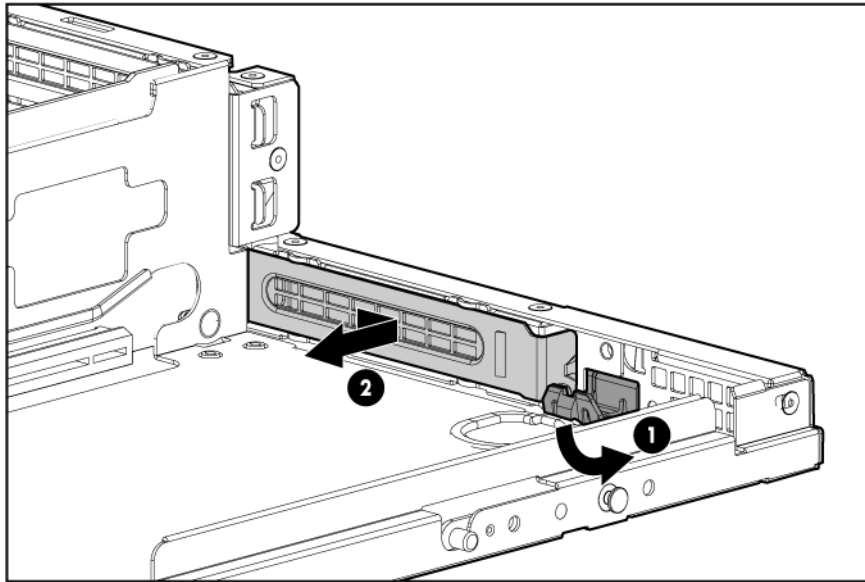
To replace the component, reverse the removal procedure. When replacing the PCI riser cage, to ensure that it has properly seated into the system board, push down on the top of the component where the riser is located.

Removing expansion slot covers

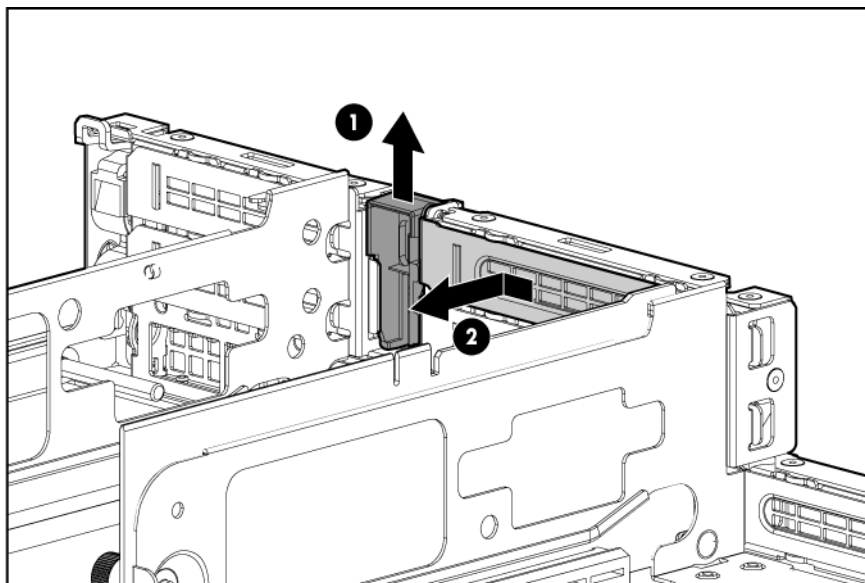
CAUTION: To prevent damage to the server or expansion boards, power off the server, and then remove all AC power cords before removing or installing the PCI riser cage.

CAUTION: For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

1. Remove the access panel (“Removing the access panel” (page 50)).
2. Remove the PCI riser cage (“Removing the PCI riser cage” (page 51)).
3. Remove the expansion slot cover.
 - To remove slot cover 1 or 4, push the retainer to release it, and then slide out the cover.



- To remove slot covers 2 and 3, lift up and remove the latch, and then remove the cover.



- To remove slot covers 5 and 6, push down on the latch, rotate the latch down, and then remove the cover.

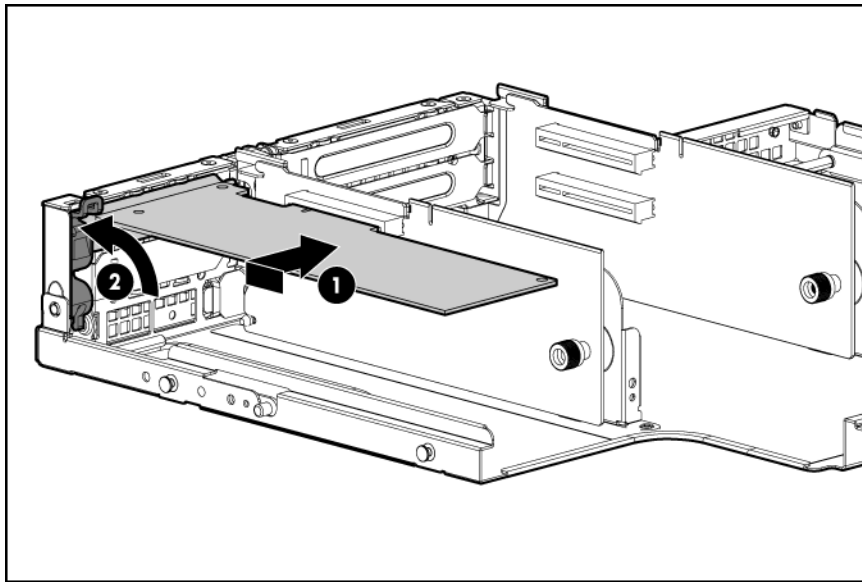
Installing expansion boards

The server supports up to two PCIe riser boards. Each PCIe riser board holds up to three PCIe cards. The standard riser board configuration contains one riser board with one full-length, full-height PCIe x8 slot, and two half-length, full-height PCIe x4 slots. The second board contains one full-length, full-height PCIe x8 slot, and two half-length, half-height PCIe x4 slots.

Optionally, you can purchase a riser board that contains two full-length PCIe x8 slots.

Installing a half-length expansion board

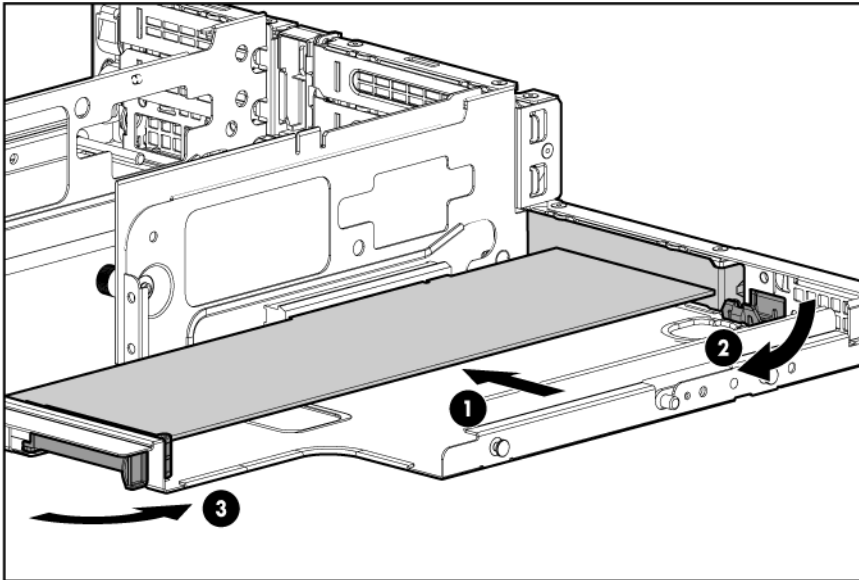
1. Remove the access panel. See [“Removing the access panel”](#) (page 50).
2. Remove the PCI riser cage. See [“Removing the PCI riser cage”](#) (page 51).
3. Remove the expansion slot cover. See [“Removing expansion slot covers”](#) (page 52).
4. Install the expansion board.



5. Connect any required internal cables to the expansion board.
6. Reinsert the PCI riser cage into the chassis.
7. Connect any required external cables to the expansion board.

Installing a full-length expansion board

1. Remove the access panel. See [“Removing the access panel”](#) (page 50).
2. Remove the PCI riser cage. See [“Removing the PCI riser cage”](#) (page 51).
3. Remove the expansion slot cover. See [“Removing expansion slot covers”](#) (page 52).
4. Install the expansion board.



5. Connect any required internal cables to the expansion board.
6. Reinsert the PCI riser cage into the chassis.
7. Connect any required external cables to the expansion board.

Installing DIMMs

Memory configurations

The server has 24 system memory DIMM slots located on 4 memory expansion boards (6 DIMMs per expansion board). You can access the memory expansion boards without removing the airflow guide or the I/O card cage.

The DIMMs are partitioned by the number of processors installed in the server. If you have only one processor installed in the system, you can only use 12 of the 24 memory slots.

- ⚠ CAUTION:** Observe all ESD safety precautions before attempting this procedure. Failure to follow ESD safety precautions might result in damage to the server.

Memory expansion board locations and slot IDs

Install DIMMs into the expansion boards attached to the system board. Each slot has a unique ID. For memory expansion board locations, see [Figure 2 \(page 12\)](#).

Figure 15 DIMM slot IDs

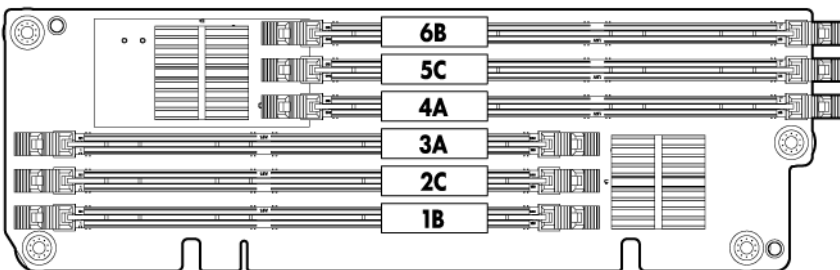


Table 10 Memory Load Order

Pair number	2 Processor system (socket 0 and 1)		1 Processor system (socket 0)	
	Memory expansion board	Memory slots	Memory expansion board	Memory slots
1	Memory expansion board 1	3A and 4A	Memory expansion board 1	3A and 4A
2	Memory expansion board 3	3A and 4A	Memory expansion board 2	3A and 4A
3	Memory expansion board 2	3A and 4A	Memory expansion board 1	1B and 6B
4	Memory expansion board 4	3A and 4A	Memory expansion board 2	1B and 6B
5	Memory expansion board 1	1B and 6B	Memory expansion board 1	2C and 5C
6	Memory expansion board 3	1B and 6B	Memory expansion board 2	2C and 5C
7	Memory expansion board 2	1B and 6B	—	—
8	Memory expansion board 4	1B and 6B	—	—
9	Memory expansion board 1	2C and 5C	—	—
10	Memory expansion board 3	2C and 5C	—	—
11	Memory expansion board 2	2C and 5C	—	—
12	Memory expansion board 4	2C and 5C	—	—



TIP: You can load DIMM pairs on a single expansion board at a time, but this option reduces system performance.

Supported DIMM sizes

DIMMs seat onto the four memory expansion boards that seat on the system board. The minimum server configuration requires that at least one memory pair (group of two DIMMs) is installed on memory expansion board 1.

Supported DIMM sizes:

- 2 GB
- 4 GB
- 8 GB
- 16 GB

△ CAUTION: Failure to observe the following cautions results in system degradation or failure:

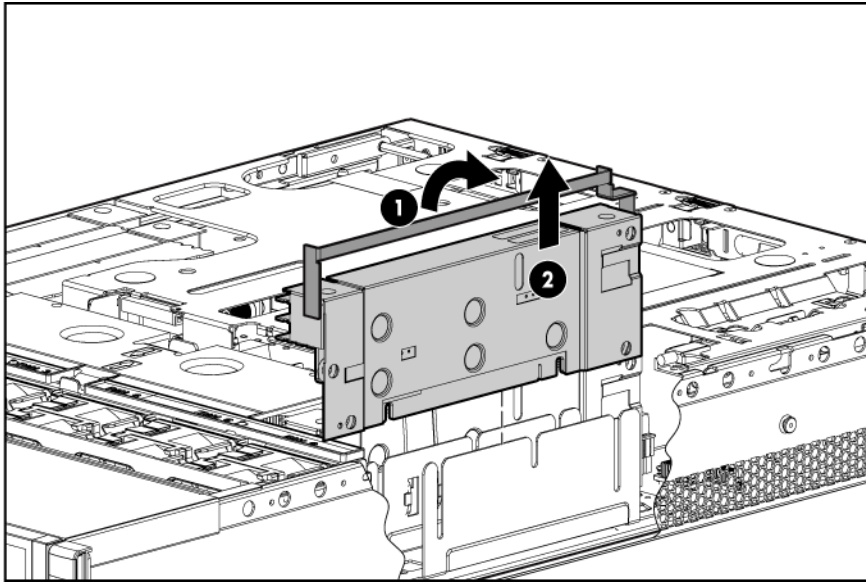
- Only ECC DIMMs are supported.
- Load DIMM pairs from largest to smallest capacity. For example, if you have a pair of 4 GB DIMMs and a pair of 2 GB DIMMs, install the pair of 4 GB DIMMs first.

NOTE: Faster DIMMs and slower DIMMs can be installed on different slots within the same channel, but faster DIMMs operate at the timing of the slowest DIMM populated.

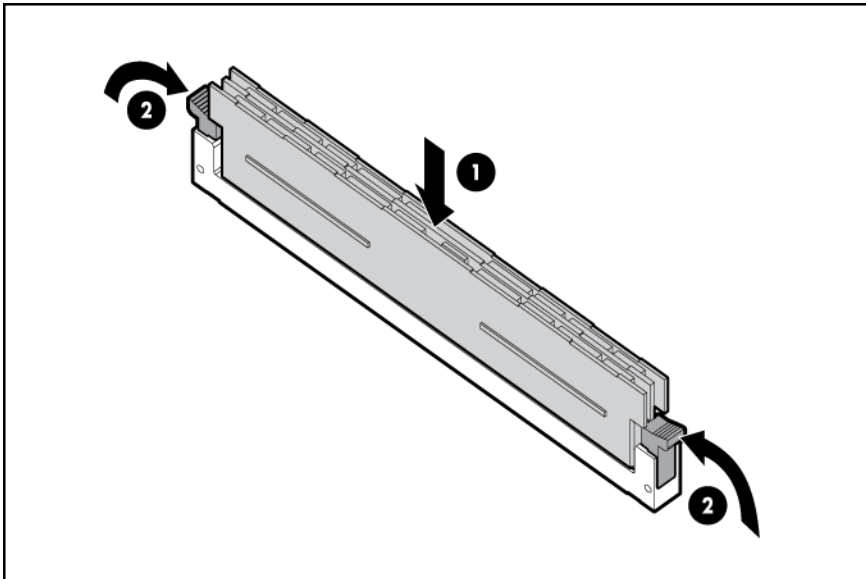
- Alternate loading between installed processors. Do not install DIMMs if the corresponding processor is not installed.
- Spread DIMMs evenly between processors.
- Load DIMMs in pairs by increasing letter.
- For best performance, install DIMM pairs in the specified sequence shown in [Table 10](#). DIMMs can be loaded in an economic order, for example, loading the first expansion board full before loading DIMMs on other memory expansion boards, but the DIMMs must still follow the basic DIMM load sequence.
 - Load highest density DIMMs first.
 - Load DIMMs in pairs by increasing letter.
- Mixed DIMM types are supported with the following qualifications:
 - DIMMs with x4 and x8 modes can be mixed.
 - DIMMs with different sizes can be mixed.
 - DIMMs with different rows, columns, bank, and rank numbers can be mixed.
 - Do not mix unbuffered DIMMs with registered DIMMs.
 - A maximum of two unbuffered DIMMs per channel can be installed.
 - If quad-rank DIMMs are installed for a processor, a maximum of two DIMMs can be installed on each channel for that processor.
 - If a channel contains quad-rank DIMMs, the quad-rank DIMM must be installed first on the channel.
- A maximum of 8 DIMMs are supported in a configuration with low line AC voltage and 2 processors. For more information on power configurations, see [Table 43 \(page 112\)](#).

Installing DIMMs

1. Remove the access panel. See [“Removing the access panel” \(page 50\)](#).
2. Lift the memory expansion board handle and remove the component.

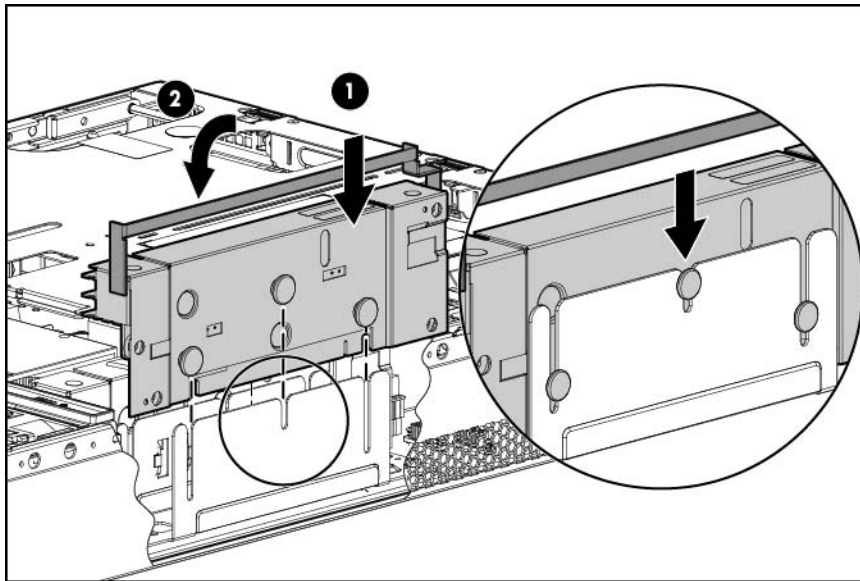


3. Install the DIMM.



4. Replace the memory expansion board.

CAUTION: Be sure to align the three stand-offs in the alignment slots.



TIP: If you see abnormal error lights after installing DIMMs, try uninstalling and reinstalling the DIMMs and the memory expansion board to make sure the DIMMs and memory expansion board are correctly seated.

Installing a processor

The server can use dual-core or quad-core processors. Dual-core processors contain two cores that function as separate processors. Dual-core processors double the processing power of the processor while maintaining the physical dimensions of a single processor. Quad-core processors contain four cores that function as separate processors. Quad-core processors quadruple the processing power of the processor while maintaining the physical dimensions of a single processor.

The server holds one or two dual or quad-core processors that provide the following configuration options:

Dual-core processors:

- 1P/2C (one processor/2 cores)
- 2P/4C

Quad-core processors:

- 1P/4C
- 2P/8C

The first processor must be installed in socket 0, and the second processor in socket 1.



CAUTION: Intel quad-core processors cannot be intermixed with similar dual-core processors. Processor speed and cache size must be identical for all processors in a server. To ensure compatibility, whether upgrading, replacing, or adding an additional processor, use processors with identical part numbers.

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

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

Processor load order

The server holds up to two dual-core or quad-core processors on the system board. The sockets on the system board are labeled Module 0 and Module 1. If the server has only one processor, it is installed in socket 0. Install the second processor in socket 1.

See [Figure 2 \(page 12\)](#) for the processor socket numbers.

Table 11 Processor load order

Processor	Socket
0	Module 0
1	Module 1

Installing a processor and heat sink module

CAUTION: The pins on the processor socket are very fragile. Any damage to them might require replacing the system board.

CAUTION: To avoid damage to the processor, verify that the plastic tabs on the processor are pulled fully out before installation.

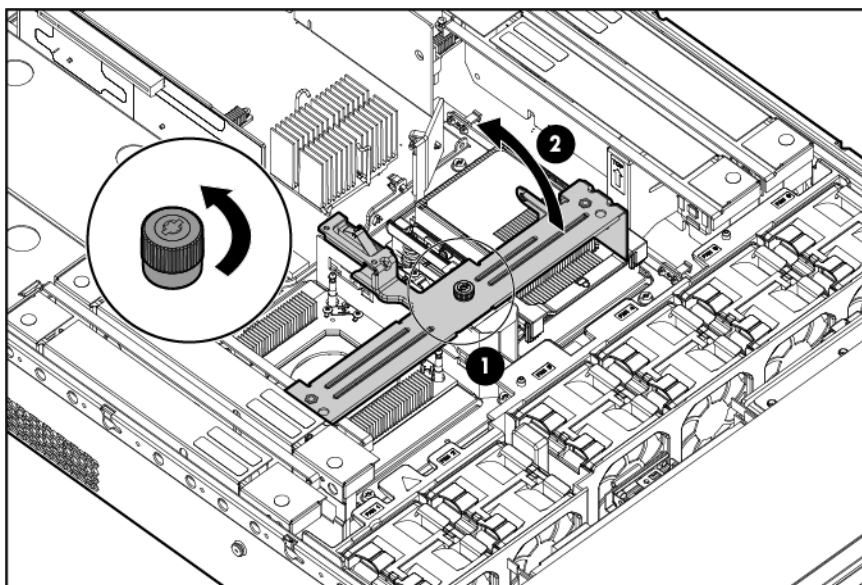
CAUTION: To avoid damage to the processor, handle the processor only by the edges. Do not touch the bottom of the processor, especially the contact area.

CAUTION: To prevent possible server malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

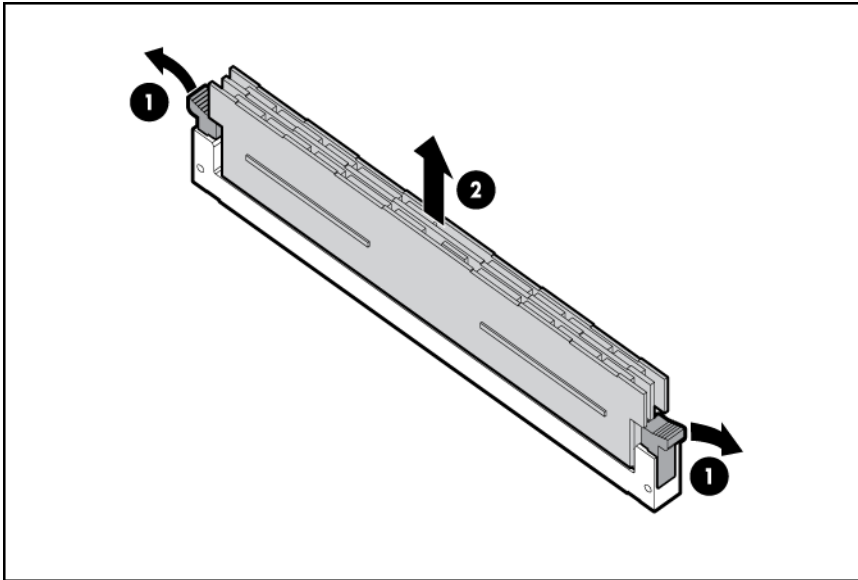
CAUTION: To prevent thermal instability and damage to the server, do not separate the processor from the heat sink after assembling.

The processor and heat sink ship as separate units and are coupled during installation into the server.

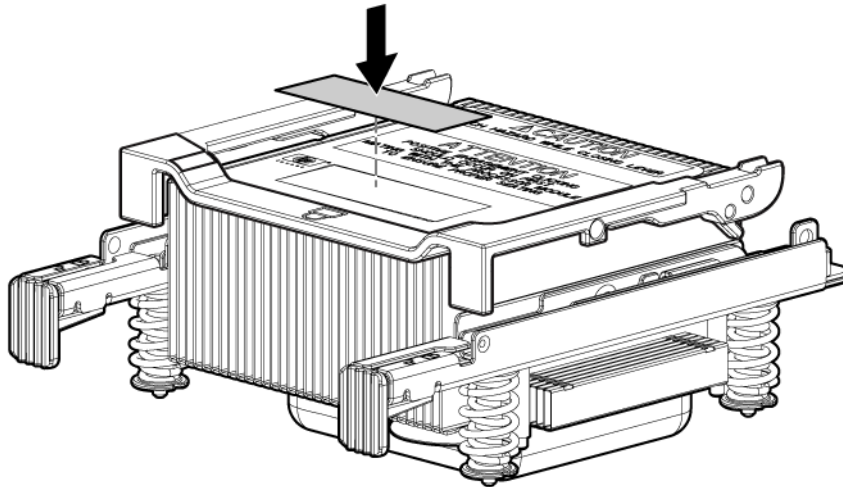
1. Open the processor cage.



2. Remove the processor airflow baffle.



3. Transfer the duplicate part/serial numbers label from the processor module to the processor heat sink:
 - a. Remove the duplicate tear-away label that lists the part and serial numbers from the processor module.
 - b. Place the label on the top of the heat sink.

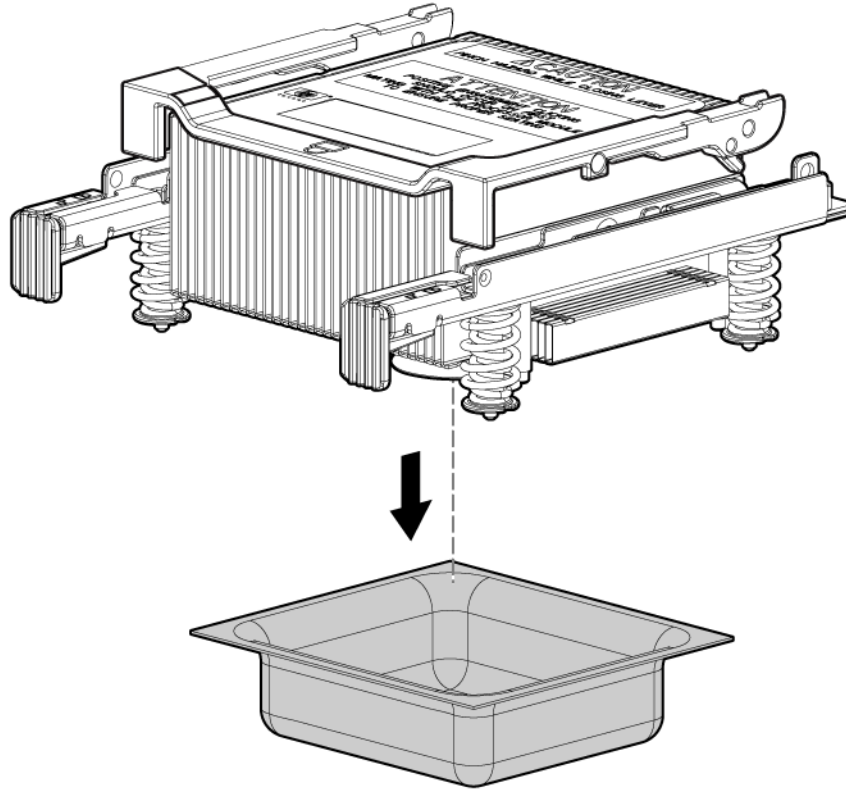


4. Install the processor over the load posts.

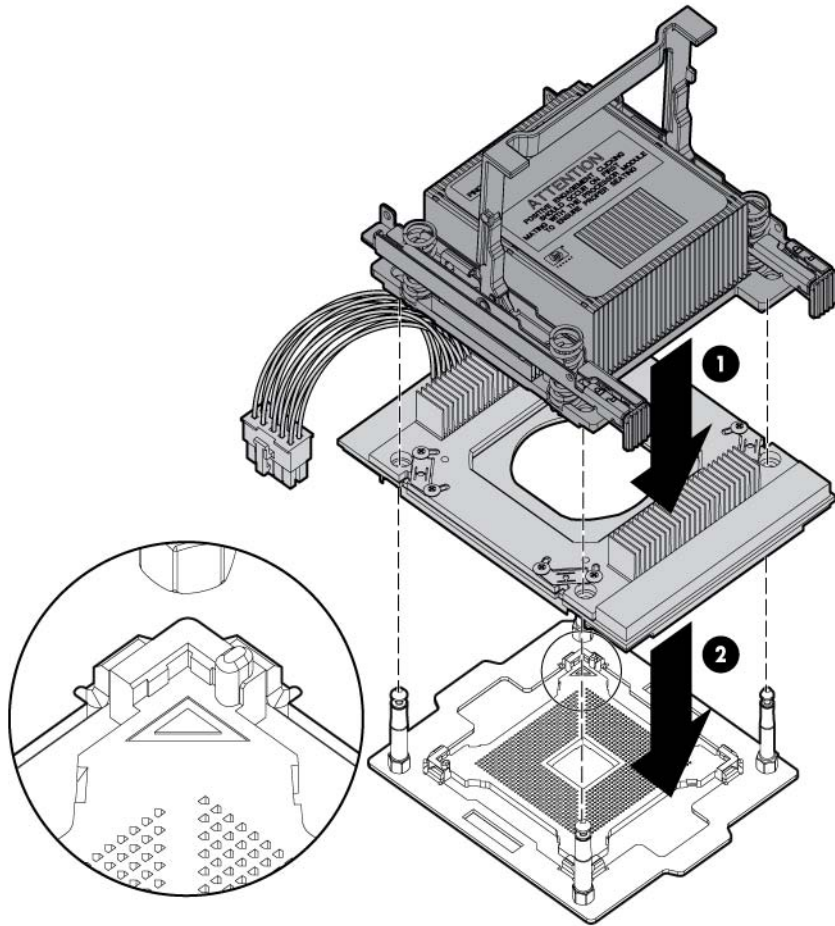
NOTE: Ensure pin 1, indicated on the empty socket with an embossed triangle, matches the pin 1 marker on the processor module, the chamfered corner of its attached voltage regulator heat sink.

5. Remove the heat sink cover.

- ⚠ CAUTION:** During installation, after removing the protective cover from the heat sink:
- Do not touch or come into contact with the thermal interface material.
 - Immediately install the heat sink.
-



-
- ⚠ **CAUTION:** To avoid damage to the server and processor, ensure the processor heat sink locking handle is fully back against the stops, rotated approximately 120° back. Also, verify that the plastic tabs on the processor heat sink are fully pulled out before installation.
-
6. Install the heat sink over the load posts.
-
- ⚠ **CAUTION:** Do not lower the heat sink locking handle before pushing the plastic locking tabs into place.
-



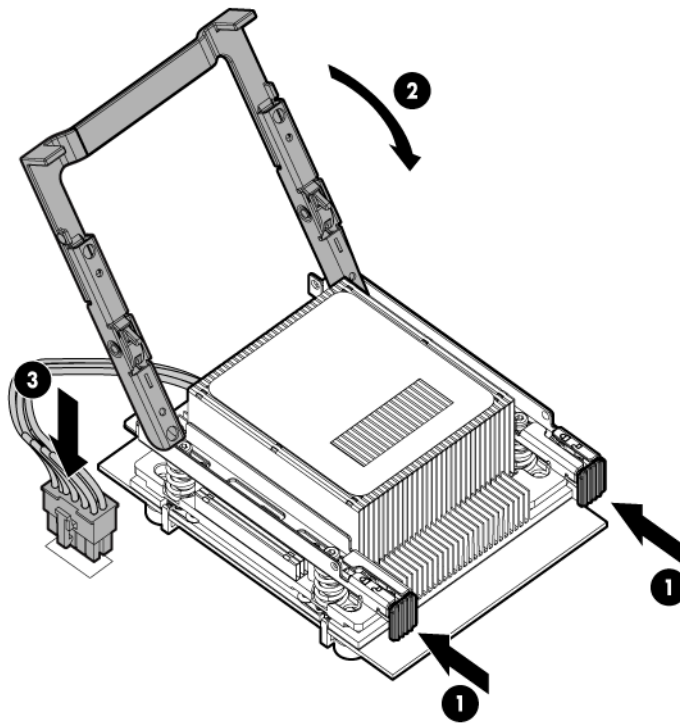
CAUTION: To prevent thermal instability and damage to the server, do not separate the processor module from the processor heat sink after they have been coupled.

NOTE: Positive engagement clicking must occur during engaging of the processor heat sink and processor module onto the socket to ensure proper seating.

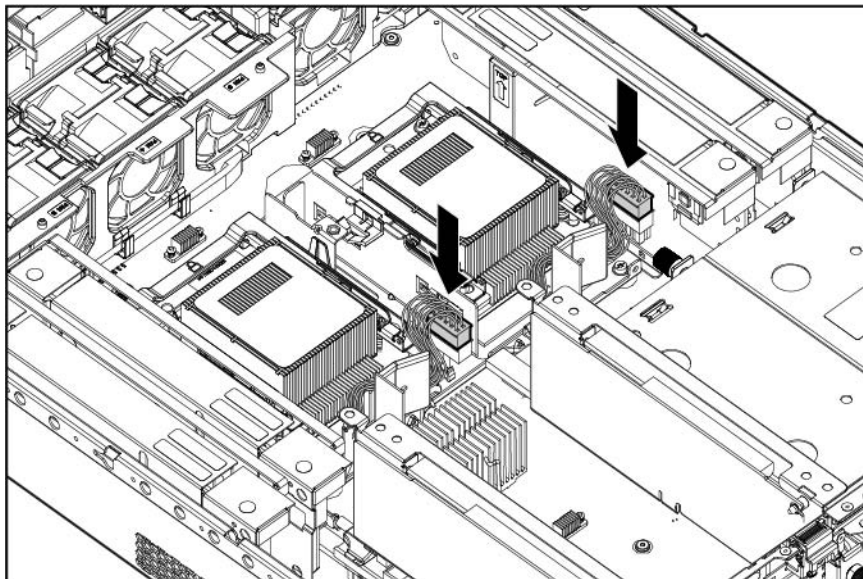
7. Secure the heat sink to the processor.
 - a. Slide both plastic locking tabs into place. See callout 1 in the following figure.
 - b. Flip the latch down. See callout 2 in the following figure.

⚠ WARNING! The heat sink locking lever can constitute a pinch hazard. Keep your hands on top of the lever during installation to avoid personal injury.

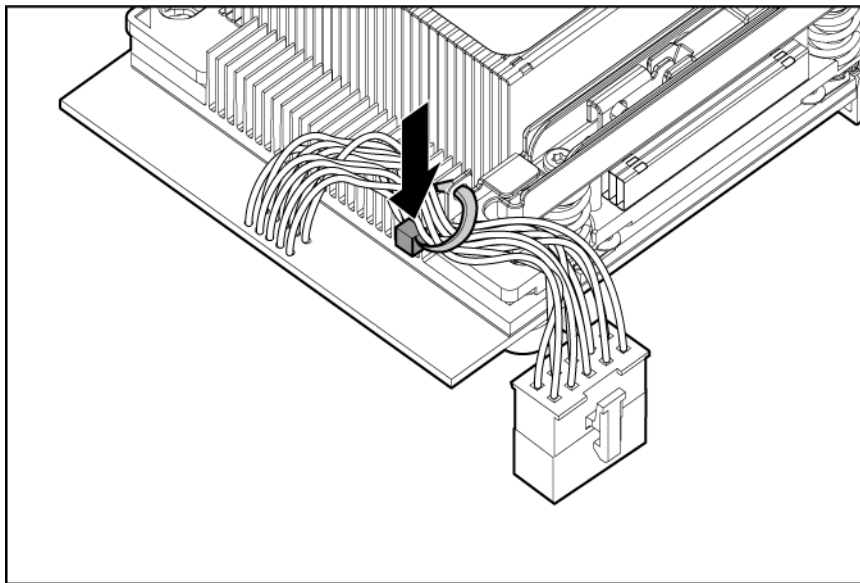
⚠ CAUTION: To prevent thermal instability and damage to the server, do not separate the processor module from the processor heat sink after they have been coupled.



8. Route and connect the power cord.



9. Tie wrap the processor cable to the right tie point on the processor assembly.



CAUTION: When the processor is installed, dress all slack in the power cable to the connector end of the cable. Failure to do so can result in pinched or damaged processor power cables.

NOTE: If you are adding an additional processor to your server, the DIMMs in the server must be reconfigured to support both processors. For more information, see [“Memory configurations”](#) (page 54).

HP Trusted Platform Module (TPM)

The TPM is not a customer-serviceable part.

CAUTION: Any attempt to remove an installed TPM from the system board breaks or disfigures the TPM security rivet. Upon locating a broken or disfigured rivet on an installed TPM, administrators should consider the system compromised and take appropriate measures to ensure the integrity of the system data.

If you suspect a TPM board failure, leave the TPM installed and remove the system board ([“Removing and replacing the system board”](#) (page 134)). Contact an HP authorized service provider for a replacement system board and TPM board.

Verifying installed components in the server

Use the following procedure to verify that the components you have installed into the server are recognized by the server:

1. Press **S** to enter the UEFI shell.
2. Wait for the `UEFI Shell` prompt to appear.

3. Enter **info all** from the UEFI Shell prompt. The following appears:

NOTE: Your display might not match the display shown.

```
info all
```

```
SYSTEM INFORMATION
```

```
Date/Time: Oct 14, 2010 19:27:21 (20:10:14:19:27:21)
Timezone: GMT+00:00
DST: Not Affected
```

```
Manufacturer: hp
Product Name: Integrity rx2800 i2
Product Number: AH395A
Serial Number: SGH010XTFW
UUID: 136EE0A3-5481-11DF-AA77-FAE232322A00
Physical Serial Number: SGH010XTFW
Physical UUID: 136EE0A3-5481-11DF-AA77-FAE232322A00
```

```
CPU INFORMATION
```

CPU Socket	Active Cores/ Logical CPUs	Speed	Core L3 Cache Size	Family/ Model (hex.)	Rev	CPU State
0	4/8	1.6 GHz	5 MB	20/02	E0	Active
1	4/8	1.6 GHz	5 MB	20/02	E0	Active

```
CPU threads are turned on.
Total Active Logical CPUs : 16
```

```
BOOT CPU INFORMATION
```

```
CPU Socket/
Core
-----
0/0
```

```
MEMORY INFORMATION
```

Memory Board	DIMMS grouped by loading order	Capacities	DIMM State
1	3A/4A	4GB/4GB	Active
1	1B/6B	-----	-----
1	2C/5C	-----	-----
2	3A/4A	-----	-----
2	1B/6B	-----	-----
2	2C/5C	-----	-----
3	3A/4A	4GB/4GB	Active
3	1B/6B	-----	-----
3	2C/5C	-----	-----
4	3A/4A	-----	-----
4	1B/6B	-----	-----
4	2C/5C	-----	-----

```
Total Installed Memory : 16 GB
Total Active Memory : 16 GB
```

```
Fast initialization: Enabled
```

```
BOOT INFORMATION
```

```
Boot CPU:

CPU Socket/
Core
-----
0/0
```

```
AutoBoot: ON - Timeout: 10 sec - Retries:0
```

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
M 001 Mac(00237D447E94) 7D447E94,0x0)	PcieRoot(0x30304352)/Pci(0x1C,0x0)/Pci(0x0,0x0)/MAC(00237D447E94,0x0)
002 Mac0(0237D447E95) 7D447E95,0x0)	PcieRoot(0x30304352)/Pci(0x1C,0x0)/Pci(0x0,0x0)/MAC(00237D447E95,0x0)
003 Mac0(0237D448E5E) 7D448E5E,0x0)	PcieRoot(0x30304352)/Pci(0x1C,0x2)/Pci(0x0,0x0)/MAC(00237D448E5E,0x0)
004 Mac0(0237D448E5F) 7D448E5F,0x0)	PcieRoot(0x30304352)/Pci(0x1C,0x2)/Pci(0x0,0x1)/MAC(00237D448E5F,0x0)

FIRMWARE INFORMATION

System Firmware A Revision: 01.03			
PAL_A:	4.29	SAL Spec:	3.20
PAL_B:	4.29	SAL_A:	2.00
UEFI Spec:	2.10	SAL_B:	3.01
UEFI Shell:	1.00	SMBIOS:	2.4

SYSTEM SECURITY CONFIGURATION

TPM:	Present
------	---------

Shell>

Completing installation

After all components are installed:

1. Close the processor cage.
2. Install the PCI riser cage.
3. Install the access panel.
4. Install the server into the rack or pedestal.
5. Connect all cables.
6. Power on the server.

6 Troubleshooting

The purpose of this chapter is to provide a preferred methodology (strategies and procedures) and tools for troubleshooting the server error and fault conditions.

How to contact HP

For information on how to contact HP, see “Contacting HP” (page 139).

Methodology

General troubleshooting methodology

There are multiple entry points to the troubleshooting process, dependent upon your level of troubleshooting expertise, the tools/processes/procedures which you have at your disposal, and the nature of the system fault or failure.

Typically, you select from a set of symptoms, ranging from very simple (system LED is blinking) to the most difficult (Machine Check Abort (MCA)) has occurred. The following is a list of symptom examples:

NOTE: Your output might differ from the output in the examples in this book depending on your server and its configuration.

- Front panel LED blinking
- System alert present on console
- System will not power-up
- System will not boot
- Error/Event Message received
- Machine Check Abort (MCA) occurred

Narrow down the observed issue to the specific troubleshooting procedure required. Isolate the failure to a specific part of the server, so you can perform more detailed troubleshooting. For example:

- Issue- Front panel LED blinking

NOTE: The front panel health LEDs flash amber with a warning indication, or flash red with a fault indication.

- System Alert on console?

Analyze the alert by using the system event log (SEL) and forward progress log (FPL), to identify the last error logged by the server. Use the iLO 3 MP commands to view the SEL and FPL, either through the iLO 3 MP serial text interface, or through Secure Shell, or through the web GUI on the iLO 3 MP LAN.

You can now determine which area of the system requires further analysis. For example, if the symptom was "system will not power-up", the initial troubleshooting procedure might indicate a issue with the DC power rail not coming up after the power switch was turned on.

You have now reached the point where the failed CRU has been identified and needs to be replaced. Perform the specific removal and replacement procedure, and verification steps.

NOTE: If multiple CRUs are identified as part of the solution, a fix cannot be guaranteed unless all identified failed CRUs are replaced.

You might have to perform specific recovery procedures to finish the repair. For example, if the system board is replaced, you need to restore customer specific information.

Should a failure occur, the System Insight Display LEDs, SEL and FPL help you identify the issue or CRU:

- LEDs. The front panel LEDs and LAN LEDs of the server change color and blink to help identify specific issues.
- The System Event Log (SEL) provides detailed information about the errors identified by the LEDs.
- The Forward Progress Log (FPL) provides details about the boot progress of the server.

The System Insight Display LEDs are cleared after the issue is corrected or the CRU is replaced and by cycling AC power.

If the LEDs, SEL and FPL do not give you enough information to identify the issue, HP also provides diagnostic tools with each operating system (see [“Troubleshooting tools” \(page 72\)](#) for more details).

NOTE: Always check the iLO 3 MP SEL in the case of a blinking yellow or red front panel LED, before replacing any hardware. The default display mode is **Keyword** mode. You can also view the error messages in **Text** mode.

Recommended troubleshooting methodology

The recommended methodology for troubleshooting a server error or fault is as follows:

1. Consult the system console for any messages, emails, etc., pertaining to a server error or fault.
2. View the front panel LEDs (power, SID, and system health), either locally, or remotely through the iLO 3 MP `vrfp` command.
3. Compare the state of the server LEDs (off; flashing or steady; red, green, or amber) with the LED states listed in the LED Panel State Table in this section.
4. Go to the step number of the Basic Low End Troubleshooting Table, as specified in the right column of the LED Panel State Table, located in the row which corresponds to your front panel LED display state.
5. Read the symptom/condition information in the left column of the Basic Low End Troubleshooting Table.
6. Perform the actions specified in the Action column.
7. If you need more details, see the appropriate subsection of this chapter, where this information is provided in the Action column. You might be directed to access and read one or more error logs (SEL and/or FPL).

While HP suggests that all users follow the recommended troubleshooting methodology and use the Basic and Advanced Troubleshooting Tables in the next subsection, as a more experienced troubleshooter, you might elect to go directly to the subsection which corresponds to your own entry point of choice.

[Table 12](#) provides the corresponding subsection or location title for these different entry points (for example, if you would prefer to start by examining the logs, you can go directly to the subsection entitled [“Errors and reading error logs” \(page 82\)](#)):

Table 12 Troubleshooting entry points

Entry point	Subsection or location
Front panel/System Insight Display LEDs	“Basic and advanced troubleshooting tables” (page 69) and “Troubleshooting tools” (page 72)
System Event Log and Forward Progress Logs	“Errors and reading error logs” (page 82)

Table 12 Troubleshooting entry points (continued)

Entry point	Subsection or location
Offline and Online Diagnostics/INIT button	"Troubleshooting tools" (page 72)
System Event Analyzer	"Troubleshooting tools" (page 72) (see also http://www.compaq.com/support/svctools/webes/ for more information about this tool)

Basic and advanced troubleshooting tables

The following troubleshooting tables are designed for use by both trained and untrained support personnel. The tables are the first tools used to determine the symptoms or condition of a suspect server. Be aware that the state of the front panel LEDs can be viewed locally or remotely (using the `vfp` command from the iLO 3 MP).

The tables are designed to cover troubleshooting symptoms from AC power-on up to booting the operating system (OS), specifically in Steps 1-5. In most cases begin with Step 1 in Table 13, sequencing through the table steps to locate the symptom/condition most descriptive of your current server status; this becomes the first step in your troubleshooting procedure. Where appropriate, an action or actions prescribed in the "Action" column of Table 13 is followed by a reference to the corresponding subsection of this chapter for further information.

Table 13 Basic low end troubleshooting

Step	Condition	Action
1	Server appears "dead" - no front panel LEDs are on, and no fans are running.	Nothing is logged for this condition. 1. For new server installations, review the install procedures. 2. Verify that the power cords are connected to both the power supplies and to the AC receptacles. 3. Verify that AC power, at the proper AC voltage levels, is available to the receptacles. 4. Check the front panel connector and the cable to the rest of the system. 5. If the integrated power button LED on front panel remains off, then re-seat the power supplies, replace the power cords, and replace the bulk power supplies, in that order (see "Troubleshooting the power subsystem" (page 91) for details). The preceding issue is fixed when the front panel LED states are as follows: system health LED is off; and power is steady amber.
2a	Server does not power on after front panel power button is momentarily pressed (less than four seconds). NOTE: This step assumes iLO 3 is running. If iLO 3 is not running, proceed to step 4a.	A fatal fault has been detected and logged, attempting to power on the server (system health is off, and power is steady amber). 1. Examine each power supply LED - if not solid green, then replace power supply (see "Troubleshooting the power subsystem" (page 91) for more details). 2. Examine the iLO 3 MP logs for events related to bulk power supplies (see "Troubleshooting the power subsystem" (page 91) for details). The preceding issue is fixed when the front panel LEDs are as follows: system health is off, and power is solid green.
2b	System health LED is flashing amber.	A warning or critical failure has been detected and logged after server powers on (system health is flashing amber, and power is steady green). Examine each power supply LED. If not solid

Table 13 Basic low end troubleshooting *(continued)*

Step	Condition	Action
		<p>green, replace power supply (see “Troubleshooting the power subsystem” (page 91)for details).</p> <p>The preceding issue is fixed when the failure condition is corrected, and the front panel LED states are as follows: system health is steady green, and power is steady green.</p>
3	System health LED is flashing red.	<p>A fatal fault has been detected and logged after attempting to power on the server (system health is flashing red, SEL is red, and power is steady green).</p> <ol style="list-style-type: none"> 1. Examine each power supply LED. If not solid green, replace power supply (see “Troubleshooting the power subsystem” (page 91)for details). 2. Check SID LED panel to identify failed or faulty internal CRU (see “Troubleshooting tools” (page 72) for details). <p>The preceding issue is fixed when a redundant, internal CRU is replaced, and the front panel LED states are as follows: system health is off, SEL is off and power is steady green.</p>
4a	Cannot see iLO 3 MP prompt on system console -- server power is off/on.	<p>Front panel LEDs indicate that the server is either booting or running system firmware, or is booting or running the OS (system health is steady green, and power is steady green). Nothing might be logged for this condition.</p> <ol style="list-style-type: none"> 1. The most common reasons for this are local console device cabling issues, local console device configuration issues, etc. Check these issues first. 2. Be sure that that the RS-232 configuration matches between the server and the local console (see “Troubleshooting the system console” (page 98) for more details). 3. Reset iLO 3 MP, by using the iLO 3 physical presence pinhole button on the rear panel of the server. 4. If no change, replace the system board (see “Removing and replacing the system board” (page 134) for details). <p>The preceding issue is fixed when the iLO 3 prompt can be seen and the system health LED is steady green.</p>
4a (cont.)	Still no iLO 3 MP prompt on system console.	<p>Nothing might be logged for this condition (NOTE: if the iLO 3 MP is off, the system health LED is off as well).</p> <p>Front panel LEDs indicate that the server is either booting or running the OS (see “Troubleshooting the boot process” (page 96) for details).</p> <ol style="list-style-type: none"> 1. Verify that the proper terminal type is set: Supported settings are hpterm, VT100+ (default), and VTUTF8. 2. Verify that the RS-232C configuration matches between the server and the local console or modem (see “Troubleshooting the system console” (page 98) for details). 3. Look for loose, damaged, or disconnected power and signal cables on the I/O riser.

Table 13 Basic low end troubleshooting *(continued)*

Step	Condition	Action
		<p>The preceding issue is fixed when iLO 3 MP menu appears on the system console, and the system health is steady green.</p>
4b	<p>Cannot see UEFI prompt on system console.</p>	<p>Nothing might be logged for this condition (system health is steady green, and power is steady green).</p> <ol style="list-style-type: none"> 1. Examine the SID LEDs for any faults. 2. Examine the iLO 3 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see “Errors and reading error logs” (page 82) for details). 3. As a last resort, restart the server by cycling AC power. <p>The preceding issue is fixed when UEFI menu appears on the system console, and system firmware booting completes.</p>
4c	<p>Cannot find a boot disk or removable media drive.</p>	<p>Nothing might be logged for this condition (system health is green, and power is steady green).</p> <ol style="list-style-type: none"> 1. Examine the boot device, to determine if it is plugged into its drive bay properly. 2. Examine the drive cabling for any issues. 3. Examine the boot path settings. 4. Examine the iLO 3 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see “Errors and reading error logs” (page 82) for more details). <p>The preceding issue is fixed, when all boot devices are found.</p>
4d	<p>There are RAID channel redundancy failures.</p>	<p>Nothing is logged for this condition (system health is off or steady green, and power is steady green). Examine the LED next to each RAID connector, and replace the RAID HBA (if this LED is either steady amber or steady red, it indicates RAID drives are degraded or corrupted, respectively).</p> <p>The preceding issue is fixed when all of these LEDs remain off, after next power on.</p>
5	<p>Cannot see OS prompt on system console.</p>	<p>Front panel LEDs indicate that the server power is turned on, and that the server is either booting or running the OS. Nothing might be logged for this condition (system health is steady green, and power is steady green). Examine the iLO 3 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see “Errors and reading error logs” (page 82) for details).</p> <p>NOTE: Be sure to check the console settings from the Boot Manager for your OS.</p> <p>The preceding issue is fixed when OS prompt appears on the system console.</p>

Table 14 Advanced low end troubleshooting

Step	Symptom/Condition	Action
6	Cannot read System Event Log from the iLO console.	<p>System event logging has stopped and a iLO MP malfunction is assumed (system health is steady green, and power is steady green).</p> <ol style="list-style-type: none"> 1. Examine console messages for any UEFI errors or warnings about iLO operation or communications. 2. Test the operation of the iLO MP by toggling the UID locator switch LED on the front panel - the blue LED is turned on/off by the iLO, when this switch is toggled. 3. Reset iLO 3 MP, by using the iLO 3 physical presence pinhole button on the rear panel of the server. <p>The preceding issue is fixed when the SEL resumes logging.</p>
7	OS is non-responsive (hung).	<p>Front panel LEDs indicate that the server power is turned on, and it is either booting or running the OS (system health is steady green, and power is steady green). Nothing might be logged for this condition.</p> <ol style="list-style-type: none"> 1. Use the iLO 3 MP Command Menu to initiate a ToC, using the <code>tc</code> command. 2. Reboot the OS and escalate. 3. Obtain the system hardware status dump for root cause analysis. 4. Examine the iLO 3 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see “Errors and reading error logs” (page 82) for details). <p>The preceding issue is fixed when the root cause has been determined.</p>
8a	MCA occurs during server operation; the server reboots the OS. (NOTE: Server reboots OS, if enabled)	<p>Front panel LEDs indicate that the server detected a fatal error that it cannot recover from through OS recovery routines (system health is flashing red, SEL is red, and power is steady green).</p> <ol style="list-style-type: none"> 1. Capture the MCA dump with the UEFI <code>errdump mca</code> command. If the system can boot the OS, you can capture binary MCA dump files online. 2. Examine the iLO 3 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see “Errors and reading error logs” (page 82) for more details). <p>The preceding issue is fixed when the MCA does not repeat, or the source of the MCA has been determined and dealt with.</p>
8b	MCA occurs during server operation; server reboot of OS is prevented. NOTE: The troubleshooting actions for this step are identical to those in Step 8a, except that the server in this step must be hard reset to begin the booting process. You must hard reset the server to clear the fatal condition and boot the OS	<p>Front panel LEDs indicate that the server detected a fatal, front side bus error, caused by DIMMs; or by any parity in the I/O path between SBA, LBA, or HBA (system health is flashing red, SEL is red, power is steady green). System firmware is running to gather and log all error data for this MCA event.</p> <ol style="list-style-type: none"> 1. Examine the iLO 3 MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (See “Errors and reading error logs” (page 82) for details). <p>The preceding issue is fixed when the MCA does not repeat.</p>

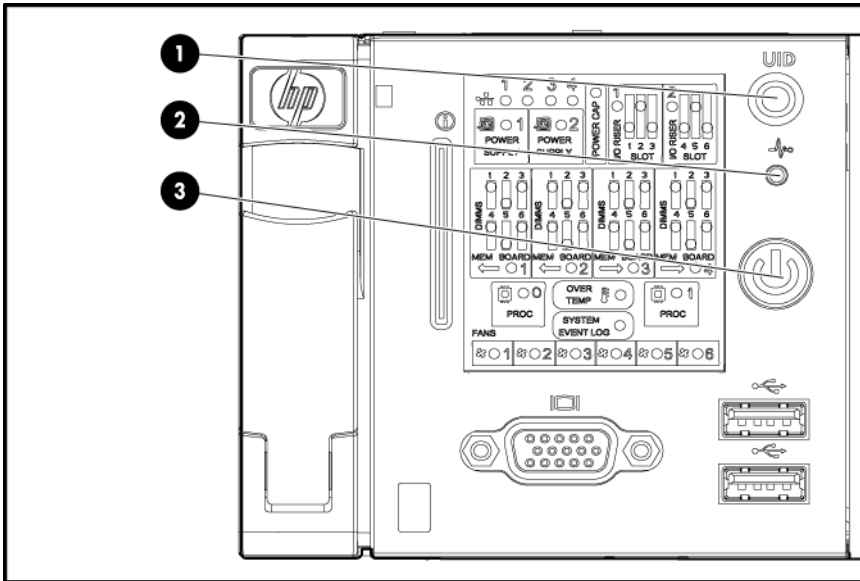
Troubleshooting tools

Use the following tools to aid in troubleshooting the server.

LEDs

Front panel LEDs

Figure 16 Front panel LEDs and buttons



1 UID LED and button

2 System health LED

3 Power button

Table 15 Front panel controls

Name	Function	Status
UID button	This button helps locate a particular server within a rack of servers. You can remotely activate this function through various system utilities.	<ul style="list-style-type: none"> Blue = Identification Flashing blue = Remote iLO session or a firmware flash update is in progress Off = Off
System health LED	This LED provides information about the system status.	<ul style="list-style-type: none"> Green = Health good on all internal FRUs and system firmware has passed "BOOT_START" Flashing Amber = A FRU or subsystem has failed, or a fatal fault has occurred (system is on or in standby mode). Flashing Red = A fatal fault has been detected and a FRU or subsystem has failed. View the SID, other LEDs, and the logs for information. Off = Health good on all internal FRUs and system off <p>NOTE: The System Health LED does not change status if AC power is removed from a single power supply in a rx2800 i2 system with power redundancy.</p>
Power button	This button manually powers the server on and off.	<ul style="list-style-type: none"> Green = System on Amber = System is powered off, but standby power is on Off = System power and standby power is off

The front panel of the system contains the power button/system power LED, health LED, System Event Log LED, and locator switch/LED. The server use flashing states (for example, flashing amber or red) on these LEDs to indicate a warning or an error.

There are a total of three LEDs, arranged vertically, with the UID button and the power button each having an integrated LED. In addition to the two integrated button/LEDs, there is a health LED.

System health LED

The front panel health LED indicates the status of the components that are externally serviceable. Whenever the system health LED illuminates, the corresponding CRU illuminates for the failed component.

Table 16 System health LED states

Definition	Flash Rate	LED Color
Health good on all CRUs and system power is off.	LED Off	Off
System power is on and serviceable components (usually accessible from front or back, such as fans and power supplies) are okay.	Steady	Green
An accessible CRU failed (system is on or in standby mode). Usually, this is a power supply or fan failure. Check SID LEDs for failed component.	Flash 1 Hz	Amber
A fatal fault has been detected and logged. View the SID, other LEDs, and the logs for information.	Flash 1 Hz	Red

Red supersedes green. This LED is cleared when all failed externally accessible entities are repaired and report that they are good, or on any AC or standby power cycle.

The iLO 3 MP displays the following strings in its Virtual Front Panel for the three states of this LED:

Table 17 VFP health description

Off	<none>
On green	External parts, including fans and power supplies, okay
Flashing red	A redundant, externally accessible CRU failed (check SID LEDs)

Locator Switch/LED (UID)

The locator switch/LED enables a specific system to be identified in a rack or data center environment. One locator switch/LED is located in the front panel, and a second is located in the rear of the server. LEDs are incorporated inside the push-button to minimize space. Both switches are toggle switches, meaning you push it once to turn on the LED, and you push it again to turn off the LED. Pressing the front panel Switch/LED, or entering the iLO 3 MP and `LOC` commands, illuminates the rear panel LED, and vice versa.

- Off = Off
- Blue (Not flashing) = Identification

SID LEDs

The SID consists of several LEDs that can be lit to show the health or failure of various server components. The layout mimics the physical placement of components as viewed from the top of the server.

Figure 17 System Insight Display LEDs

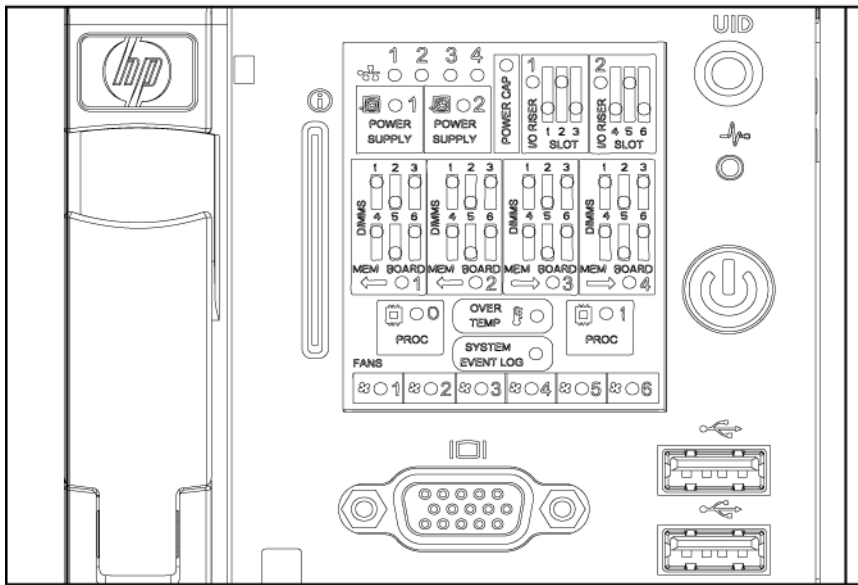


Table 18 SID LED states

LED	State
NICs	<ul style="list-style-type: none"> • Off = No link to network • Flashing green = Network link and activity • Green = Network link
Power Cap	<p>NOTE: This LED is not used. Power capping operation can be observed through iLO 3. For more information, see the <i>HP Integrity iLO 3 Operations Guide</i>.</p>
Over Temp	<ul style="list-style-type: none"> • Off = Server temperature good • Amber = Server temperature too high, attention required
System Event Log	<ul style="list-style-type: none"> • Green = Normal • Red = System fatal
Component LEDs	<ul style="list-style-type: none"> • Off = Component health is assumed good • Amber = Component health last known to be bad <p>NOTE: The Power Supply LED is lit only when a failure or fault is detected in a power supply. Loss of AC power to a power supply generates a SEL entry, but does not result in the Power Supply LED becoming lit.</p>

The System Insight Display improves serviceability by enabling you to look in a single location for the LEDs that provide failing CRU locating/mapping information. These amber LEDs are only lit when a failure occurs; otherwise, they are off. The System Insight Display is located on the front panel of the server. A diagnostic LED exists for each CRU in the system, including all DIMMs. [Figure 17](#) shows the System Insight Display LEDs.

Table 19 SID LED States

Definition	Flash Rate	LED Color
CRU health is assumed good.	LED Off	Off
CRU health last known to be bad.	Steady	Amber

NOTE: The Power Supply LED illuminates only when a failure or fault is detected in a power supply. Loss of AC power to a power supply will generate a SEL entry, but does not result in the Power Supply LED illuminating.

FRU and CRU health LEDs

In addition to the front panel diagnostic LEDs, CRUs provide additional diagnostic capability through LEDs, whose order or layout is product dependent.

NOTE: If multiple error conditions occur, all applicable CRU lights are activated. In such a case, the most critical error determines the front panel color.

System Event Log LED

The server has this LED for the following reasons:

- To carry forward the ATTENTION functionality of legacy Integrity and HP9000 front panel designs
- To give the customer an indication of whether the system is up or down (the health LED does not tell the user if the system is booted.)
- To cover the wide range of faults for which software/firmware is not 100% sure that a CRU must be re-seated/replaced. (The system health LED does not illuminate unless software/firmware can make a solid determination that a CRU must be re-seated/replaced.)

This LED indicates the overall health state of the system, including the state of system firmware and the OS. If the LED is red, the system needs attention, and the event logs must be examined for details of the issue.

Table 20 SEL LED states

Definition	Flash Rate	LED Color
System is off, or system is booting firmware with no failures, since SEL logs last examined.	LED Off	
System has left the firmware boot, and an OS is booting or running with no failures, since SEL logs last examined.	Steady	Green
A fatal fault has been detected and logged.	Flash 2 Hz	Red

The iLO 3 MP displays the following strings in its Virtual Front Panel for the states of this LED:

Table 21 VFP health description

Off	<none>
On green	OS booting or running
Flashing red	Fatal fault – system crashed or cannot boot: check logs for details

Hard drive LEDs

The hard drives have two LEDs per drive. See [Figure 18](#):

Drive activity LED

The drive activity LED is solid green during normal operation and flashes green when a drive is accessed.

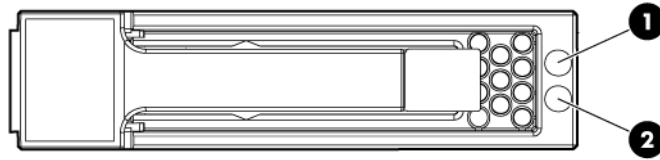
Drive status LED

The drive status LED can appear amber or blue.

- Amber indicates a warning, or failure condition.
- Blue is a locator LED that identifies a particular disk drive.

Various software utilities, such as online diagnostics or SAS disk drive configuration tools, can activate the locator LED.

Figure 18 Hot-plug SAS disk drive LEDs



1 Drive activity LED

2 Drive status LED

Table 22 SAS disk drive LEDs

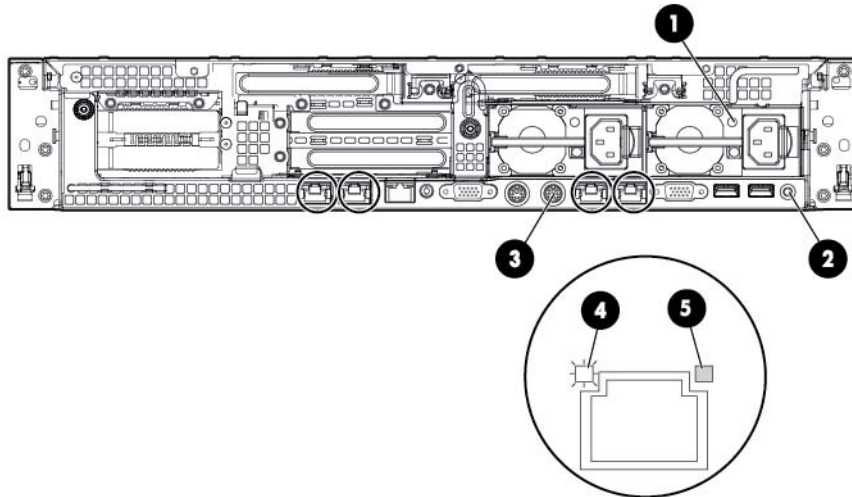
Drive activity LED status	Drive status LED status	Indication
On, off, or flashing	Alternating amber and blue	The drive has failed, or a predictive failure alert has been received for this drive; it also has been selected by a management application.
On, off, or flashing	Blue	The drive is operating normally, and it has been selected by a management application.
On	Regularly flashing amber (1 Hz)	A predictive failure alert has been received for this drive. IMPORTANT: Replace the drive as soon as possible.
On	Off	The drive is online, but it is not active currently.
Flashing regularly (1 Hz)	Regularly flashing amber (1 Hz)	CAUTION: Do not remove the drive. Removing a drive might terminate the current operation and cause data loss. The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not replace the drive until the expansion or migration is complete.
Flashing regularly (1 Hz)	Off	CAUTION: Do not remove the drive. Removing a drive might terminate the current operation and cause data loss. The drive is rebuilding, erasing, or it is part of an array that is undergoing capacity expansion or stripe migration.
Flashing irregularly	Regularly flashing amber (1 Hz)	The drive is active, but a predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Flashing irregularly	Off	The drive is active, and it is operating normally.
Off	Amber	A critical fault condition has been identified for this drive, and the controller has placed it offline. Replace the drive as soon as possible.
Off	Regularly flashing amber (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or not configured as part of an array.

Optical drive

The server has one SATA DVD+RW drive. This device has one activity LED.

Rear panel LEDs

Figure 19 Rear panel LEDs and buttons



1 Power supply LED

2 UID LED/button

3 iLO 3 physical presence
pinhole button

4 NIC/iLO 3 activity LED

5 NIC/iLO 3 link LED

Table 23 Rear panel LEDs and buttons

Name	Status
Power supply LED	<ul style="list-style-type: none">Green = NormalOff = System is off or power supply has failed
UID LED/button	<ul style="list-style-type: none">Blue = IdentificationFlashing blue = Remote iLO session or a firmware flash update is in progressOff = Off
NIC/iLO 3 activity LED	<ul style="list-style-type: none">Green = Network activityFlashing green = Network activityOff = No network activity
NIC/iLO 3 link LED	<ul style="list-style-type: none">Green = Network linkOff = No network link
iLO 3 physical presence pinhole button	<p>The iLO 3 physical presence button enables you to reset iLO 3 and gain access to the system if all iLO passwords are lost. A momentary press causes a soft reset of iLO 3 when the button is released. The iLO 3 Physical Presence button enables you to reset iLO, enter TPM physical presence mode, and enter security override mode.</p> <ul style="list-style-type: none">A momentary press of the button resets iLO, clears any security override or TPM physical presence mode that were initiated by this button, and returns the serial port to iLO mode.A greater than 4-second and less than 8-second press of the button places the system in physical presence mode for up to 15 minutes.

Table 23 Rear panel LEDs and buttons *(continued)*

Name	Status
	<ul style="list-style-type: none">• A greater than 8-second and less than 12-second press of this button places iLO into security override mode for up to 15 minutes. Security override mode enables you to enter iLO without being challenged for a password enabling you to set up users.• The UID LED blinks once after holding the button for 4 seconds and once after holding the button for 8 seconds to help you gauge how long the button press has been held. <p>NOTE: The iLO 3 physical presence pinhole button is located behind the sheet metal grill and the circular punch-out in the rear panel.</p>

Power supply

The server is equipped with one or two power supplies, labeled PS1 and PS2. Each power supply has an AC power input receptacle and an LED that indicates the power state of the server.

The server has the following power states: standby power, full power, and off. To achieve the standby power state, plug the power cord into the appropriate receptacle at the rear of the server. To achieve full power, plug the power cord into the appropriate receptacle, and either push the power button or enter the iLO 3 MP PC command. In the off state, the power cords are not connected to a power source.

Table 24 Power supply LED states

LED state	Indication
Off	No AC power
Green	Full power on; normal operation

Diagnostics

A suite of offline and online support tools are available to enable manufacturing, field support personnel, and the customer to troubleshoot system issues. In general, if the operating system is already running, then HP recommends that you do not shut it down and instead, use the online support tools.

If the operating system cannot be booted, then use the offline support tools to help resolve the issue. The offline support tools are available either from the UEFI partition, or from the IPF Offline Diagnostics and Utilities CD (IPF systems only). After the issue preventing booting has been resolved, boot the operating system, and then use the online support tools for any further testing.

If you cannot reach UEFI from either the main disk or from a CD, 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 available which permit centralized error archiving, and which provide hardware inventory tools, as long as the agents/providers that support them are installed on the managed server.

On HP-UX systems, the legacy tools within OnlineDiag are supported. The online support tools, on the HP-UX 11.23 and greater operating systems, include the WBEM features added by SysFaultMgmt.

Verifiers quickly determine whether or not a specific device is operational by performing tasks similar in nature to the way applications use the device. No license is required to run the verifiers.

Diagnostics are tools designed to identify faulty or failed CRUs.

Exercisers stress devices in order to facilitate the reproduction of intermittent issues.

Information modules create a log of information specific to one device, including:

- The product identifier
- A description of the device
- The hardware path to the device
- The vendor
- Onboard log information (if applicable)
- Miscellaneous information associated with the device
- The firmware revision code, if firmware is present in the device, is also displayed

Expert tools are device-specific troubleshooting utilities for use by sophisticated users. Their functionality varies from tool to tool, but they are intended to be interactive, and rely on users to provide information necessary to perform a particular task. These tools require users to have the appropriate license, if they wish to run them.

Online support tool availability

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

Online support tools list

The following online support tools are available on HP-UX 11.31 hosted systems. 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 25 Online Support Tools List

Functional Area	Information	Verify	Exercise	Diagnose	Expert
System	Yes	No	No	No	No
Processor/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 support tools list

Table 26 Offline Support Tools List

Offline Tool	Functional Area
DFDUTIL	SAS/SCSI Disk Firmware Update Utility
COPYUTIL	Data Copy Utility

Fault management overview

The goal of fault management and monitoring is to increase system availability, by moving from a reactive fault detection, diagnosis, and repair strategy to a proactive fault detection, diagnosis, and repair strategy. The objectives are as follows:

- To detect issues automatically, as nearly as possible to when they actually occur.
- To diagnose issues automatically, at the time of detection.
- To automatically report in understandable text a description of the issue, the likely causes of the issue, the recommended actions to resolve the issue, and detailed information about the issue.
- 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. WBEM provides frameworks for monitoring and reporting events.

SysFaultMgmt WBEM indication providers enable 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 system operation or cause data loss.

WBEM indication providers

Hardware monitors are available to monitor the following components (These monitors are distributed free on the OE media):

- Server/fans/environment
- CPU monitor
- UPS monitor*
- FC hub monitor*
- FC switch monitor*
- Memory monitor
- Core electronics components
- Disk drives
- Ha_disk_array

NOTE: No SysFaultMgmt WBEM indication provider is currently available for components followed by an asterisk.

OpenVMS fault management and monitoring

HP WBEM Provider software enables monitoring the health of HP Integrity servers running OpenVMS. More information on the HP WBEM providers is available at <http://h71000.www7.hp.com/doc/wbem.html>.

Web Based Enterprise Services (WEBES) suite of tools aids monitoring and diagnosing the HP OpenVMS systems.

<http://www.compaq.com/support/svctools/webes/index.html>

See the HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems document for OpenVMS specific monitoring tips available at http://h71000.www7.hp.com/doc/os84_index.html.

Errors and reading error logs

Event log definitions

Often the underlying root cause of an MCA event is captured by system or iLO MP firmware in both the System Event and Forward Progress Logs (SEL and FPL, respectively). These errors are easily matched with MCA events by their timestamps. For example, the loss of a processor VRM might cause a processor fault. Decoding the MCA error logs would only identify the failed processor as the most likely faulty CRU. Following are some important points to remember about events and event logs:

- Event logs are the equivalent of the old server logs for status or error information output.
- Symbolic names are used in the source code; for example, `MC_CACHE_CHECK`.
- The hex code for each event log is 128 bits long with an architected format:
 - Some enumerated fields can be mapped to defined text strings.
 - All can be displayed in hex, keyword, or text mode.
- Events are created by firmware or OS code, and are sent over the PDH bus to the iLO MP for storage in either or both of the SEL and FPL logs (HP-UX shows an I/O path for the iLO MP).
- The iLO 3 MP can display event logs: SEL events are sent over the IPMB.
- Event logs can also be read back over the PDH bus by software (for example, the IPMI driver or agent) for storage on disk.

Using event logs

To consult the event logs:

1. Connect to the system console.
2. Use **Ctrl-B** to access the iLO 3 MP menu.
3. Use the `sl` command to view event logs: System Event (E) and Forward Progress (F) logs are very useful in determining the context of an error (see the following figure for an example):

NOTE: Remember that:

- `E` shows only event logs for Warning, Critical, or Fatal faults by default; `F` shows all event log outputs.
 - System Event Logs are never overwritten, unless they are first manually cleared. When the SEL is filled, no more events are logged. Forward Progress Logs (FPL) are circular and contain additional, non-critical information.
 - The alert threshold can be changed.
-

iLO 3 MP event logs

The iLO 3 MP provides diagnostic and configuration capabilities. See the *HP Integrity iLO 3 Operations Guide* for details on the iLO 3 MP commands.

http://www.hp.com/go/integrity_servers-docs

To access the iLO 3 MP:

NOTE: The iLO 3 MP must be accessed from a terminal console which has access to the iLO 3 MP.

1. Log in with proper username and password.
2. Press `cl` to display the console history log. This log displays console history from oldest to newest.

3. Press `s1` to display the status logs. The status logs consist of:
 - System Event
 - Forward Progress
 - iLO Event
 - Clear SEL and FPL
 - Live Events
4. For a more information on configuring the iLO 3 MP and using the iLO 3 MP commands, see the *HP Integrity iLO 3 MP Operations Guides*.

System event log review

See the *HP Integrity iLO 3 Operations Guide* for this procedure.

http://www.hp.com/go/integrity_servers-docs

Supported configurations

This subsection provides a system build-up procedure.

System build-up troubleshooting procedure

Use this procedure only when the system powers on and remain powered on but does not enter into or pass power-on self test (POST) or does not boot to the UEFI menu.

1. Remove the AC power cord from each power supply and extend the server, if racked.
2. Remove all of the SAS disk drives from the front of the server.
3. Remove the top cover to gain access to, and remove all CRUs, except the system board.

NOTE: In the following steps, CRU and FRU are used interchangeably.

4. Plug in the AC power cords. The iLO 3 MP and system console appears. At the console, execute the `MP DF` command. The following CRU IDs appear. Your display might not exactly match the display shown:

FRU IDs:

00-System Board 02-Display Board 05-Power Supply 1 42-Virtual Connect

If you do not see all of the above CRU IDs then concentrate on the missing CRU IDs.

5. Remove the AC power cords. Add a processor in the CPU 0 socket and add a memory expansion board with DIMMs populated in slots 4A and 3A. Plug in the AC power cords and check for the processor, memory expansion board, and DIMM FRU IDs.

The following is an example of the `MP DF` command that appears with a processor, memory expansion board, and two DIMMs installed.

NOTE: Your display might not exactly match the display shown.

FRU IDs:

00-System Board 02-Display Board 05-Power Supply 1
 0C-Memory Riser 1 20-Processor 0 24-Processor 0 RAM
 42-Virtual Connect 82-DIMM CPU0-R1 3A 83-DIMM CPU0-R1 4A

If you do not see all of the above CRU IDs then concentrate on the missing CRU IDs.

6. Power on the server and check the SEL for any IPMI alerts related to the processor.

NOTE: Your display might not exactly match the display shown.

Log Entry 4: 01 Aug 2012 17:22:00
Alert Level 7: Fatal
Keyword: BOOT_NOT_DETECTED
No events were received from system firmware
Logged by: integrated Lights Out
Sensor: Processor
Data: FRB2/Hang in POST failure
20501965B8020006 FFFF036F00070400

If the above Level 7 IPMI alert appears, verify the installation of your processor and if necessary replace the processor.

7. If the processor is installed and functioning properly, check the SEL for the following IPMI event after powering on the server to verify that POST has started.

NOTE: Your display might not exactly match the display shown.

Log Entry 3: 02 Aug 2012 11:28:16
Alert Level 2: Informational
Keyword: BOOT_START
CPU starting boot
Logged by: System Firmware located in socket 0,cpu 2,thread 0
Data: Major change in system state - Boot Start
5480006309E10005 0000000000000000

8. Check the SEL for any memory-related IPMI alerts.

NOTE: Your display might not exactly match the display shown.

Log Entry 1: 01 Aug 2012 17:20:38
Alert Level 5: Critical
Keyword: INSUFFICIENT_SYSTEM_MEMORY
This HW configuration does not have enough memory for the OS to boot.
Logged by: integrated Lights Out
Data: Data field unused
A080274200E10001 0000000000000000

Log Entry 11: 02 Aug 2012 11:28:38
Alert Level 7: Fatal
Keyword: MEM_NO_MEM_FOUND
No memory found
Logged by: System Firmware located in socket 0,cpu 2,thread 0
Data: Location - Blade (Blade Board)
E48000D109E10010 FFFFFFFFFFFFFFFF94

If either of the above IPMI alerts appear in the SEL, verify that the memory expansion board and DIMMs are installed properly and if necessary, replace the memory expansion board and DIMMs.

If any of the previous Level 5 or 7 IPMI alerts appear in the SEL after the processor, memory expansion board and DIMMs have been replaced, then replace the system board.

9. If the processor, memory expansion board, and DIMMs are all installed and functioning correctly, the system boots to UEFI. The following messages appear in the SEL.

NOTE: Your display might not exactly match the display shown.

```
Log Entry 11: 03 Aug 2012 11:04:58
Alert Level 2: Informational
Keyword: EFI_START
CPU starting to boot EFI
Logged by: System Firmware located in socket 0,cpu 2,thread 0
Data: Major change in system state - State Change
5480020709E1000F 000000000011000C
```

```
Log Entry 12: 03 Aug 2012 11:05:20
Alert Level 2: Informational
Keyword: EFI_LAUNCH_BOOT_MANAGER
Launching EFI boot manager
Logged by: System Firmware located in socket 0,cpu 2,thread 0
Data: Major change in system state - EFI
5480020B09E10011 0000000000000006
```

If these events do not appear and the system does not boot, then seek assistance.

Installation troubleshooting

Installation troubleshooting methodology

A server is tested before shipping. Failures encountered during installation can be due to damage that occurred in transit. Re-seating connectors can resolve issues that result from rough handling. If you are installing components or assemblies, you might encounter compatibility issues or incorrect installations. If you are installing components or assemblies, verify that items are correctly installed and that all connectors are fully engaged. If the unit does not power on, verify the power source before proceeding.

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

Troubleshooting is based on observation of server status indications and error messages, and by reviewing system event logs. You can observe the LED indicators on the front and rear of the server. Error messages appear on local and remote consoles. System history (console, event, and history logs) is available through the iLO 3 MP, and is accessed through the console. Additional information about troubleshooting is available on the CD provided with the server.

Installation troubleshooting using the server power button

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

Table 27 Server power button functions when server is on and at UEFI

Action	Reaction
1-3 seconds	System power turns off immediately (hard power off)
5 seconds or longer	System power turns off immediately (hard power off)

Table 28 Server power button functions when server is on and OS is running

Action	Reaction
1-3 seconds	System power turns off (software-controlled power off)
5 seconds or longer	System power turns off immediately (hard power off)

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

If the server is off, and power is connected to server power supplies, the front panel power LED flashes at a 1 Hz rate. In this state, standby power is available to server circuits, but main power is off.

Table 29 Server power button functions when server is off

Action	Reaction
1-3 seconds	System power turns on

Server does not power on

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

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

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

- If the AC power LED on the power supply on the rear panel of the server is lit, power is available to the server.
- If the AC power LED is not lit, the server is either in standby power mode, or an issue may have occurred. Re-seat the power supply. If the issue persists, remove and re-seat the board within the server. If the issue still persists, replace the power supply or the power supply interface board.

UEFI menu is not available

If you cannot access the UEFI from either the main disk partition or the CD, use the following tools to resolve the issue:

- Front panel LEDs
- iLO 3 MP
 - Console messages
 - SEL
 - FPL

Operating system does not boot

If the operating system does not boot, boot to UEFI, and use the following tools to view the system logs. Analyze any error messages to resolve the issue.

- UEFI Shell
- iLO 3

Operating system boots with issues

If the operating system is running and you are experiencing issues, use the following tools to resolve the issue:

- LEDs
- Error Messages and event logs

Intermittent server issues

You can usually trace intermittent issues that occur during installation to power source issues, a loose connector, or some other hardware issue. If you are experiencing intermittent issues:

1. View iLO 3 MP logs and analyze the issue. Determine if there is more than one symptom and if the issue is random.
2. Verify that the AC power source is stable.
3. Re-seat all rear panel connectors.
4. Re-seat all hot-swap fans and power supplies.
5. Re-seat all main memory DIMMs.
6. Re-seat all cable harnesses and board connectors.

SATA DVD+RW drive issues

SATA DVD+RW drive issues that occur during installation are usually related to faulty connections. If you are experiencing DVD drive issues:

1. Remove and reinsert the media.
2. Replace the media.
3. Remove and reinstall the DVD drive. Verify that connectors are fully engaged.
4. Replace the DVD drive.
5. Re-seat cables.

SAS disk drive issues

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

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

Console issues

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

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

Troubleshooting the processor and memory

All of the processor and memory controller functions are integrated into the processor. DIMMs reside on the memory expansion boards, and PCIe bus controller chips reside on the I/O riser and the system board. This section discusses the roles of logical processors, and physical memory ranks.

Troubleshooting the server processor

The server supports both dual-core and quad-core processors. Each server supports one or two processor modules. The dual-core processor modules contain two individual processor cores. When two processor modules are installed in the server, the server contains four physical processors.

Furthermore, each physical processor core contains logic to support two physical threads. When two dual-core processor modules are installed and enabled in the server, the server supports up to eight threads, or the equivalent of eight logical processors.

Processor load order

For a minimally loaded server, one processor module must be installed in processor socket 0 on the system board, and the threads must be enabled by user actions. Additional processor modules of the same revision are installed in processor socket 1 for the server.

Processor module behaviors

Local MCA events can cause the physical processor core and one or both of the logical processors within that processor module to fail while all other physical and their logical processors continue operating. Double-bit data cache errors in any physical processor core causes a Global MCA event, which, in turn, causes all logical and physical processors in the server to fail and reboot the operating system.

Customer messaging policy

- A diagnostic LED only illuminates for physical processor core errors, when isolation is to a specific IPF processor module. If there is any uncertainty about a specific processor, then the customer is pointed to the SEL for any action, and the suspect IPF processor module CRU LED on the System Insight Display does not illuminate.
- For configuration-type errors (for example, when no IPF processor module is installed in processor slot 0) all of the CRU LEDs on the diagnostic LED panel illuminate for all of the IPF processors that are missing.
- No diagnostic messages are reported for single-bit errors that are corrected in both instruction and data caches, during CMC events to any physical processor core. Diagnostic messages are reported for CMC events when thresholds are exceeded for single-bit errors; fatal processor errors cause global / local MCA events.

Table 30 Processor events that illuminate SID LEDs

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
Processors	Type E0h, 39d:04d BOOT_DECONFIG_CPU	Processor failed and deconfigured	SFW	This event follows other failed processors
Processors	Type E0h, 5823d:26d PFM_CACHE_ERR_PROC	Too many cache errors detected by processor	WIN Agent	Threshold exceeded for cache parity errors on processor
Processors	Type E0h, 5824d:26d PFM_CORR_ERROR_MEM	Too many corrected	WIN Agent	Threshold exceeded for

Table 30 Processor events that illuminate SID LEDs (continued)

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
		errors detected by platform		cache errors from processor corrected by ICH10
Processors	Type 02h, 02h:07h:03h VOLTAGE_DEGRADES_TO_NON_RECOVERABLE	Voltage on CRU is inadequate	iLO MP	Power Pod voltage is out of range (likely too low)

Table 31 Processor events that might illuminate SID LEDs

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
Processors	Type E0h, 734d:26d BOOT_CPU_LOADING_ERROR	Installed processors are not compatible	SFW	
Processors	Type E0h, 2953d:26d BOOT_CPU_LOADING_ERROR	Processors and/or termination out of order	SFW	
Processors	Type E0h, 36d:26d BOOT_CPU_LATE_TEST_FAIL	A logical processor (thread) failed late self test	SFW	
Processors	Type E0h, 677d:26d MC_RENDEZVOUS_SLAVES_FAIL	A logical processor (thread) slave failed to rendezvous	SFW	
Processors	Type E0h, 30d:26d BOOT_CPU_CONFIG_FAIL	A processor core failed the configuration process	SFW	
Processor	Type E0h, 790d:26d BOOT_CPU_BAD_CORE_FIXED_RATIO	A processor fixed core frequency ratio is incompatible with bus frequency	SFW	
Processor	Type E0h, 745d:26d BOOT_FINAL_RENDEZ_WATCHDOG_FAIL	A watchdog timer expired and determined that a monarch processor is not responding.	SFW	
Processors	Type E0h, 83d:26d BOOT_RENDEZ_FAILURE	A logical processor (thread) rendezvous failure	SFW	Bad or slow processor
Processors	Type E0h, 67d:26d BOOT_MONARCH_TIMEOUT	The logical monarch	SFW	

Table 31 Processor events that might illuminate SID LEDs *(continued)*

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
		processor (thread) has timed out		
Processors	Type E0h, 57d:26d BOOT_INCOMPATIBLE_SLAVE	A logical slave processor (thread) is incompatible with logical monarch processor	SFW	
Processor	Type E0h, 56d:26d BOOT_INCOMPATIBLE_PAL	Processor PAL incompatible with processor	SFW	
Processors	Type E0h, 34d:26d BOOT_CPU_FAILED	A processor failed	SFW	
Processors	Type E0h, 33d:26d BOOT_CPU_EARLY_TEST_FAIL	A logical processor (thread) failed early self test	SFW	
Processors	Type 02h, 25h:71h:80h MISSING_FRU_DEVICE	No physical processor cores present	iLO MP	Possible seating or failed processor

Troubleshooting the server memory

Memory DIMM load order

For a minimally loaded server, two equal-size DIMMs must be installed in the DIMM slots. For more information, see [Table 10 \(page 55\)](#).

Memory subsystem behaviors

The processor and the integrated memory controller provides increased reliability of DIMMs. The memory controller built into the 9300 series processor doubles memory rank error correction from 4 bytes to 8 bytes of a 128 byte cache line, during cache line misses initiated by processor cache controllers and by DMA operations initiated by I/O devices. This feature is called double DRAM sparing, since 2 of 72 DRAMs in any DIMM pair can fail without any loss of server performance. Corrective action, such as DIMM/memory expander replacement, is required when a threshold is reached for multiple double-byte errors from one or more DRAM chips in the same rank. All other causes of memory DIMM errors are corrected by the processor and reported to the CMC and CPE error logs / SID LED panel.

Customer messaging policy

- The diagnostic LED illuminates only for memory DIMM errors when isolated to a specific DIMM. If there is uncertainty about a specific DIMM, then the customer is pointed to the SEL for any

actions, and the DIMM CRU LED for the suspect DIMM on the System Insight Display is not lit.

- For configuration-type errors, for example, the CRU LEDs on the SID LED panel illuminate for all DIMMs that are not installed.
- No diagnostic messages are reported for single-byte errors that are corrected in both ICH10 caches and DIMMs during CPE events. Diagnostic messages are reported for CPE events when thresholds are exceeded for both single-byte and double byte errors; all fatal memory subsystem errors cause global MCA events.

Table 32 Memory subsystem events that illuminate SID LEDs

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
DIMMs	Type E0h, 208d:04d MEM_NO_DIMMS_INSTALLED	No DIMMs installed on one or more processors	SFW	
DIMMs	Type E0h, 172d:04d MEM_DIMM_SPD_CHECKSUM	A DIMM has a serial presence detect (SPD) EEPROM with a bad checksum	SFW	Either EEPROM is misprogrammed or this DIMM is incompatible
DIMMs	Type E0h, 4652d:26d WIN_AGT_PREDICT_MEM_FAIL	This memory rank is correcting too many single-bit errors	WIN Agent	Memory rank is about to fail or environmental conditions are causing more errors than usual

Table 33 Memory subsystem events that might illuminate SID LEDs

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
DIMMs	Type E0h, 174d:26d MEM_DIMM_TYPE_INCOMPATIBLE	DIMM type is not compatible with current DIMMs for this platform	SFW	

Troubleshooting the power subsystem

The two power supply CRUs for the server provides N+1 redundancy for the server. Each power supply CRU is identified by the server as 1 and 2 for logging purposes. The power supplies have corresponding LEDs on the diagnostic LED panel.

Power supply CRU failures are identified visually by a single green LED that is turned off when one or both of the power supplies fail; logged as an IPMI event by voltage sensor logic; and identified as a power supply CRU failure by iLO3 turning on the appropriate LEDs on the front LED panel.

NOTE: The Power Supply LED on the SID panel illuminates only when a failure or fault is detected in a power supply. Loss of AC power to a power supply generates an SEL entry, but does not result in the Power Supply LED becoming illuminated.

The System Health LED does not change status if AC power is removed from a single power supply in a rx2800 i2 system with power redundancy.

Power subsystem behavior

For the server, each bulk power supply CRU provides 800 watts of DC power from a nominal 120 VAC, 50-60 Hz; and 1200 watts from a nominal 240 VAC, 50-60 Hz. The iLO MP chip located on the system board controls the flow of +12 V DC power to the server CRUs. You can control and display power supply status remotely with the iLO 3 MP `pc` and `ps` commands, respectively.

Typical power up sequence of the server is as follows:

1. Power LED on front panel glows steady amber when one or two bulk power supplies are plugged into nominal AC voltage and the +3.3 VDC housekeeping voltage comes on and stays on whenever AC power is present.
2. The iLO 3 MP, Flash memory, and server intrusion circuits are reset after the +3.3 V DC housekeeping voltage stabilizes.
3. The iLO 3 MP monitors the power button on the front panel.
4. When the power button is pressed, iLO 3 signals the bulk power supplies to fully power up.
5. The +12 V DC rail comes up and all of the cooling fans and the various Voltage Regulators come up sequentially.
6. The iLO 3 MP signals when the server is ready to come out of reset (clocks are programmed and stable, etc.).
7. The server is brought out of reset, and begins the boot process.

Power LED button

The front panel system power LED indicates the status of system power. The LED is incorporated inside the power button itself.

The power button has a momentary switch (as opposed to a latching switch) that is recessed or covered to prevent accidental activation or deactivation.

If the OS is up, pressing the power button for less than four seconds results in a graceful shutdown of the operating system and a subsequent removal of system power. Pressing the power button for greater than four seconds results in a hard shutdown (system power removed). While the server is booting (before the system has passed `UEFI_EXIT_BOOT_SERVICES`), the iLO MP immediately powers the server off on a button press, since there is no concept of soft shutdown in this state.

In the event that the OS is absent or hung, or that the manageability subsystem (specifically the iLO MP) in the server is not responding, a greater than four second press of the power button is required to power off the system (a less than four second press on the power button has no effect).

To ensure that the system powers up in a deterministic fashion, the power button must be masked for four seconds after a power-down.

Table 34 Power LED States

Definition	Flash rate	LED color
No AC power to the system	LED Off	
System power is turned on	Steady	Green
System is shut down, but AC and housekeeping (standby) power are active.	Steady	Amber

For high availability and safety reasons, this LED runs off the power rails, rather than under firmware control.

Troubleshooting the cooling subsystem

The fans located within the server provide N+1 redundancy for the server using six identical dual fan assembly CRUs. In turn, each dual fan assembly CRU provides additional N+1 redundancy for the fan cooling zone it controls. Each dual fan assembly CRU is identified by the server as fans 1 through 6 both for logging purposes and for fault identification on the diagnostic LED panel.

Cooling fan CRU failures are identified visually by a single green LED on the dual fan assembly CRU that is turned on when one or both of the fans fail; logged as an IPMI event by fan sensor logic; and identified as a fan assembly CRU failure by iLO 3 turning on the appropriate LEDs on the System Insight Display panel.

Cooling subsystem behavior

The iLO 3 MP controls fan speed on ambient air temperatures, chip temperatures, server configuration, and fan operation or failure. Air is drawn through the front of the server and pushed out the rear by the cooling fans. You can display fan status remotely with the iLO 3 MP `ps` command. Within the server, temperature sensors report server temperatures to iLO 3, which controls fan speed based on this information.

Table 35 Cooling subsystem events that illuminate SID LEDs

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
Fans (1-6)	Type 02h, 0Ah:07h:01h COOLING_UNIT_WARNING	Fan has either previously failed or is degrading	iLO 3	Cleared when fan is replaced
Fans (1-6)	Type 02h, 0Ah:07h:02h COOLING_UNIT_FAILURE	Fan has failed and no longer meets minimum requirements	iLO 3	Cleared when fan is replaced

Troubleshooting the I/O

This subsection provides information on troubleshooting issues with the public PCIe slots.

I/O subsystem behaviors

The main role of the I/O subsystem is to transfer blocks of data and instruction words between physical shared memory and virtual memory (system disks or disk array). The system boot is the first time blocks of data and instructions are transferred into physical memory from a local disk or DVD or over the network. This process is referred to as Direct Memory Access (DMA) and is initiated by I/O devices located in I/O or on Host Bus Adapter (HBA) I/O cards and does not involve any logical processors.

Customer messaging policy

- See the SEL for any action from low level I/O subsystem faults, because the System Insight Display may not have any illuminated LEDs.
- For configuration-type errors, for example, no iLO 3 MP or core I/O HBAs installed or working, see “Supported configurations” (page 83) for actions.
- Some diagnostic messages are reported for high level I/O subsystem errors. All fatal I/O subsystem errors cause global MCAs.

Table 36 I/O subsystem events that light SID LEDs

Diagnostic LEDs	Sample IPMI events	Cause	Source	Notes
I/O Card	Type 02h, 03h:05h:01h CURRENT_LIMIT_EXCEEDED	Over-current on PCI slot	iLO MP	Likely a short on I/O card or I/O slot.
I/O Riser	Type 02h, 02h:07h:03h VOLTAGE_DEGRADES_TO_NON_RECOVERABLE	Voltage on CRU is inadequate	iLO MP	A voltage on the I/O riser is out of range (likely too low)
Disk Backplane	Type 02h, 02h:07h:03h VOLTAGE_DEGRADES_TO_NON_RECOVERABLE	Voltage on CRU is inadequate	iLO MP	A voltage on the disk backplane is out of range (likely too low)

Table 37 I/O card events that might illuminate SID LEDs

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
I/O Card	Type E0h, 4658d:26d IO_PCI_POWER_OVERLOAD_ERR	A non hot plug I/O slot power consumption increases the total I/O power consumption beyond the supported limit	SFW	Disallow O/S boot and display the following UEFI error message, "I/O configuration exceed"
I/O Card	Type E0h, 137d:26d IO_NOT_ENOUGH_POWER_ERROR	Insufficient power to power on a hot-plug PCI-X slot	SFW	Display UEFI warning message "Failed I/O slots deconfigured"
I/O Card	Type E0h, 147d:26d IO_SLOT_STANDBY_POWER_ERROR	PCI slot standby power failed	SFW	Either a card / slot issue. Re-seat card first.
I/O Card	Type E0h, 131d:26d IO_HOT_PLUG_CTRL_FAILED	PCI-X hot-plug controller failed	SFW	Either a card / slot issue. Re-seat card first.
I/O Card	Type E0h, 139d:26d IO_PCI_MAPPING_TOO_BIG	PCI bus walk (I/O discovery) resources exceeded	SFW	Remove any unsupported I/O cards. Move I/O card to an unused PCI slot
I/O Card	Type E0h, 148d:26d IO_UNKNOWN_PCIXCAP_VAL	Found invalid PCIXCAP value	SFW	
I/O Card	Type E0h, 141d:26d IO_PCIXCAP_SAMPLE_ERROR	PCIXCAP sampling error	SFW	
I/O Card	Type E0h, 123d:26d IO_CHECK_LBA_MISSING_ERR	Expected I/O host bridge (Lower Bus Adapter) is missing	SFW	
I/O Card	Type E0h, 619d:26d IO_CHECK_LBA_DECONFIG_ERR	Expected I/O host bridge (Lower Bus Adapter) is deconfigured	SFW	
I/O Card	Type E0h, 133d:26d IO_LBA_CLEAR_ERR_FAILED	I/O LBA clear error failed	SFW	
I/O Card	Type E0h, 144d:26d IO_SBA_CLEAR_ERR_FAILED	I/O SBA clear error failed	SFW	
I/O Card	Type E0h, 146d:26d IO_SLOT_POWER_ON_ERROR	PCI-X slot power on error	SFW	
I/O Card	Type E0h, 145d:26d IO_SLOT_POWER_DEFAULT_ERROR	PCI-X slot has incorrect default power state	SFW	
I/O Card	Type E0h, 136d:26d IO_LBA_RESET_ERROR	I/O host bridge (Lower Bus Adapter) is inaccessible because rope reset failed to complete	SFW	
I/O Card	Type E0h, 130d:26d IO_DLL_ERROR	PCI clock DLL error	SFW	

Table 37 I/O card events that might illuminate SID LEDs (continued)

Diagnostic LEDs	Sample IPMI Events	Cause	Source	Notes
I/O Card	Type E0h, 143d:26d IO_ROPE_RESET_ERROR	I/O rope reset failed to complete	SFW	
I/O Card	Type E0h, 7346d CC_IODISC_LBA_LINK_TRAIN_ERR	PCIe link failed to train	SFW	
I/O Card	Type E0h, 7356d IO_PCIE_LINK_SUBOPTIMAL	PCIe link is not running at max capable bandwidth	SFW	

Troubleshooting the iLO 3 MP subsystem

This subsection provides information on troubleshooting issues with the iLO 3 MP subsystem.

iLO 3 MP LAN LED on the rear panel

The iLO 3 MP LAN supports two LEDs, viewable from the rear of the system:

- iLO 3 LAN link LED, which indicates link speed
- iLO 3 LAN activity, which indicates link activity

Table 38 iLO 3 MP LAN Activity LED states

Link status	LED state
Activity	Flashing green
Link with no activity	Steady green
No link	Off

NOTE: For information on the LAN LED, see “System LAN LEDs” (page 96).

Troubleshooting the I/O subsystem

This subsection provides information on troubleshooting issues with the I/O subsystem.

Verifying SAS hard drive operation

Each SAS disk drive has an activity LED indicator on the front of the drive.

NOTE: On the server, only the activity LED is used. The status LED is not monitored by the OS.

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 SAS disk drive.
The LED quickly cycles from amber to green. The LED stays steady green until the drive spins up.
3. If the activity LED stays illuminated steady green on any SAS disk drives (after the drive spins up), the drive might not be seated correctly. Check installation as follows:
 - a. Turn off the server power button and unplug the AC power cords and any cables.
 - b. Re-seat all of the SAS disk drives installed in the server.
 - c. 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.

System LAN LEDs

Four system LANs are located on the rear bulkhead of the server. These LANs are connected to the system board.

Table 39 Gb LAN connector LEDs

LED	Description
Link (left)	Green: link
	Off: no link
Activity (right)	Green: link
	Off: No link

Troubleshooting the boot process

Table 40 Normal boot process LED states

Step	System Event Log	Health	Power	SID	Normal power-up through OS boot
1	Off	Off	Off	Off	No AC power to the system.
2	Off	Off	Steady amber	Off	System is shut down, but AC power and standby power is active.
3	Off	Off	Steady green	Off	System power rails are on when power switch is toggled.
4	Off	Steady green	Steady green	Off	System power rails are on; iLO MP drives system health LED.
5	Off	Steady green	Steady green	Off	System is booting firmware (has passed BOOT_START in firmware).
6	Steady green	Steady green	Steady green	Off	System has finished booting firmware and an OS is either booting or running.

NOTE: In the standard boot process, shown in the preceding table, even though the iLO MP is running while the system is shut down (power LED is steady amber), it does not drive the system health LED to steady green until +12 V DC power from the Bulk Power Supplies is applied.

The following list itemizes the steps that characterize basic platform boot flow. Step numbers provided correspond to the steps in [Table 40 \(page 96\)](#).

3. System power switch turns on bulk power supplies and fans, and releases RESET on all processors simultaneously, when toggled on.

5. Initial processor firmware code fetch is PAL code from EEPROM in PDH, retrieved 4 bytes at a time by DMDC in ICH10 (No shared memory or I/O devices are available at this time; for example they are not initially configured).

5. Firmware code stack is initially in BBRAM in PDH, retrieved 4 bytes at a time, through PDH and DMD buses.

5. PAL code configures all processors.

5. SAL code configures all platform ICH10 chips, including shared memory and all responding I/O devices.

5. Firmware code and stack are relocated to shared memory, after all x4 DIMM ranks in shared memory are configured and tested.

5. UEFI Shell is launched from shared memory, and cache lines are retrieved 128 bytes at a time by MEMC in ICH10.
6. OS loader is launched using the UEFI device driver.
6. OS boots and starts its own device drivers.
6. OS can use runtime PAL and SAL calls, and APCI features (these abstraction layers enable platform independence).

Troubleshooting the firmware

The server has the following sets of firmware installed:

- System firmware
- iLO 3 firmware
- I/O card firmware
 - Fibre Channel cards
 - SAS HBA cards
 - LAN cards
- SAS controller firmware
- SAS HDD firmware
- LOM firmware

System firmware and iLO 3 firmware must be from the same release. Independent updates are not supported. Details about a specific release are available in the associated Release Notes.

Firmware updates are available from the HP website at <http://www.hp.com> under "Support and Drivers".

Identifying and troubleshooting firmware issues

Erratic system operation, or the fact that the server might not boot successfully to the UEFI Boot Manager or to the UEFI Shell, are symptoms of possible firmware issues.

Firmware issues are relatively rare, and, therefore, look for other causes first.

If you are attempting to resolve a firmware issue, the possible failure areas are as follows:

- Unsupported firmware installation
- Corrupt firmware installation

To troubleshoot firmware issues:

1. Verify that all system and iLO firmware components are from the same release (use the iLO 3 `sr` command).
2. Reinstall all firmware.

-
- ❗ **IMPORTANT:** If firmware reinstallation does not resolve the issue, processor or system board replacement might be required.
-

Updating firmware

System firmware updates are available from the HP Business Support Center:

<http://www.hp.com/go/bizsupport>

To update your firmware:

1. To determine the current system firmware and iLO firmware versions, use the iLO `sr` command.

2. Choose the appropriate firmware package from the choices available on the HP Support Center web page at <http://www.hp.com/go/bizsupport>. To verify the firmware version, see the Release Notes or Installation Instructions.

To update firmware by using HP Smart Update Manager, see “Installing the latest firmware using HP Smart Update Manager” (page 34).

Troubleshooting the system console

All system console connections (VGA, USB, local RS-232 and iLO 3 MP LAN) are located on the rear panel of the server.

HP-UX uses the RS-232 serial text connection to a terminal or terminal emulator software to control server operations locally.

HP-UX alternatively uses the iLO 3 LAN connection over a network to control server operations locally through Secure Shell, and remotely over a network through web GUI.

The Windows operating systems uses the VGA (monitor) and USB (keyboard and mouse) connections to control server operations locally.

NOTE: RS-232 connection: If a dummy terminal/PC running terminal emulation software is attached to the iLO MP local port and does not respond to a Ctrl-B key sequence then it is possible that the iLO MP is not operational/functional.

Troubleshooting the server environment

Ambient intake air temperature is often different from ambient room temperature. Measure the operating temperature and humidity directly in front of the cabinet cooling air intakes, rather than measure only ambient room conditions.

Within the server, temperature sensors report server temperature to the iLO, which controls fan speed, based on this information.

Temperature sensors are found on:

- Display panel, where a thermal sensor detects the ambient room temperature. This sensor reading is the main parameter used to regulate fan speed, under normal conditions.

See “Server physical and environmental specifications” (page 17) for server environmental specifications.

7 Removal and replacement procedures

Server components list

- ❗ **IMPORTANT:** Part numbers are found by using the part nomenclature from this list to select the correct part from HP Partsurfer (<http://www.partsurfer.hp.com/search.aspx>). To select a replacement part from the full component list, enter the product number for your system.

Table 41 CRU list

Description	Spare part number
Processors	
Intel Itanium 1.6-GHz Dual-core processor 10-MB cache	AH339-6914A
Intel Itanium 1.46-GHz Quad-core processor 16-MB cache	AH339-6915A
Intel Itanium 1.73-GHz Quad-core processor 20-MB cache	AH339-6917A
Replacement, Processor heat sink ¹	AH395-67004
Memory (DIMMs)	
DDR3 Memory Module 2 GB	AM326-69001
DDR3 Memory Module 4 GB	AM327-69001
DDR3 Memory Module 8 GB	AM328-69001
DDR3 Memory Module 16 GB	AM363-69001
SAS Cache Memory Module 512 MB	578882-001
Power supply	
Power Supply 1200 W	579229-001
Internal disks and removable media	
72-GB/15K 2.5" SAS hard disk drive	512743-001
146-GB/10K 2.5" SAS hard disk drive	507283-001
146-GB/15K 2.5" SAS hard disk drive	512744-001
300-GB/10K 2.5" SAS hard disk drive	507284-001
450-GB/10k 2.5" SAS 6Gb Hard Disk Drive	581310-001
600-GB/10k 2.5" SAS 6Gb Hard Disk Drive	581311-001
HP DVD ROM slimline	AM242-6700A
HP DVD+RW slimline	AM243-6700A
Risers	
PCIe IO Riser, 3 PCI-Express slots; 1 x8, 2 x4	496057-001
PCIe IO Riser, 2 x8 PCI-Express slots	507688-001
PCA, Memory Riser	AH395-69002
Boards	
PCA rx2800 i2 System board	AH395-69001
PCA, Diagnostic and Front IO Board	AH395-69003

Table 41 CRU list *(continued)*

Description	Spare part number
SAS Disk Backplane	507690-001
Power Supply Backplane	496062-001
Fans	
Replacement, Fan Module Assembly	AH395-67003
Cables	
Replacement Cable Kit, includes: <ul style="list-style-type: none"> • Intrusion Switch and Cable • SID Ribbon Cable • SAS Backplane Power Cable 	AH395-67002
SATA optical drive power/signal combo cable	496071-001
Cache super capacitor and cable	587324-001
Mini SAS connector and cable x2	498425-001
I/O	
PCA, PCIe 2D FireMV2250 Graphics <i>(Future release for HP OpenVMS)</i>	AH423-67001
HP AD337A PCIe, 1000BASE-T 2P adapter	AD337-60001
HP AD338A PCIe, 1000BASE-SX 2P adapter	AD338-60001
HP AD339A PS-BD, PCIe, 1000Base-T, 4p Adptr	AD339-67101
HP AD221A PCIe 1p 4 GB FC and 1P 100	AD221-67001
HP AD222A PCIe 2p 4 GB FC and 2P 100	AD222-67001
HPAD393A PCIe 2p 4 GB FC and 2P 100	AD393-67001
HP Integrity 10GbE AM225A AM232A AM233A	456096-001
HP Integrity PCIe 2p P411/256 MB SAS Controller	462918-001
HP AH400A 1-port 8 Gb PCIe FC SR QLogic HBA	489190-001
HP AH401A 2-port 8 Gb PCIe FC SR QLogic HBA	489191-001
HP AH402A 1-port 8 Gb PCIe FC Emulex HBA NOTE: Not supported on HP OpenVMS.	489192-001
HP AH403A 2-port 8 Gb PCIe FC Emulex HBA NOTE: Not supported on HP OpenVMS.	489193-001
HP AM312A (P812) 6 Gb SAS and SAS RAID Controller	587224-001
HP AT083A IB 4X QDR CX-2 PCIe Dual Port HCA NOTE: Not supported on HP OpenVMS.	593412-001
Miscellaneous	
Rack Mount Kit	574765-001
Replacement, Air Baffle	AH395-67001

Table 41 CRU list *(continued)*

Description	Spare part number
Replacement, Air Blocker Cover	AH395-67005
DVD Blank	496058-001
SAS Cache Memory Module 512 MB	578882-001
HDD cage and bezel	496074-001
System battery (CR2032)	153099-001

¹ Must be replaced with a new processor.

- ⚠ CAUTION:** FRU components are not customer-serviceable. You must contact an HP authorized service provider to install or replace these components.

Table 42 FRU list

Description	Spare part number
Boards	
HP Integrity TPM Security Chip	505836-001

Required tools

- T-10/T-15 wrench (attached to the outside of the server)

Safety considerations

Before performing service procedures, review all the safety and electrostatic discharge information.

- For information on general safety procedures, see [“Safety information”](#) (page 20).
- For information on electrostatic discharge prevention, see [“Preventing electrostatic discharge”](#) (page 20).

Server warnings and cautions

Before installing a server, be sure that you understand the following warnings and cautions.

- ⚠ WARNING!** To reduce the risk of electric shock or damage to the equipment:
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
 - Unplug the power cord from the power supply to disconnect power to the equipment.
 - Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

⚠ WARNING! To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

- ⚠ CAUTION:** Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

Preparation procedures

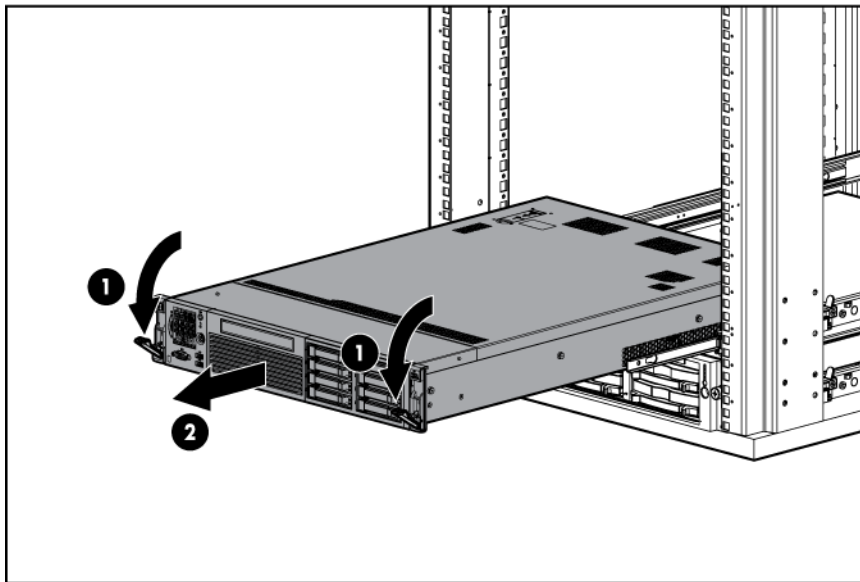
To access some components and perform certain service procedures, you must perform one or more of the following procedures:

- Extend the server from the rack (“[Extending the server from the rack](#)” (page 102)).
If you are performing service procedures in an HP, Compaq branded, Telco, or third-party rack cabinet, you can use the locking feature of the rack rails to support the server and gain access to internal components.
For more information about Telco rack solutions, see the HP infrastructure website (<http://h18004.www1.hp.com/products/servers/platforms/rackandpower.html>).
- Power off the server (“[Powering off the server](#)” (page 106)).
If you must remove a server from a rack or a non-hot-plug component from a server, power off the server.
- Remove the server from the rack (“[Removing the server from the rack](#)” (page 106)).
If the rack environment, cabling configuration, or the server location in the rack creates awkward conditions, remove the server from the rack.

Extending the server from the rack

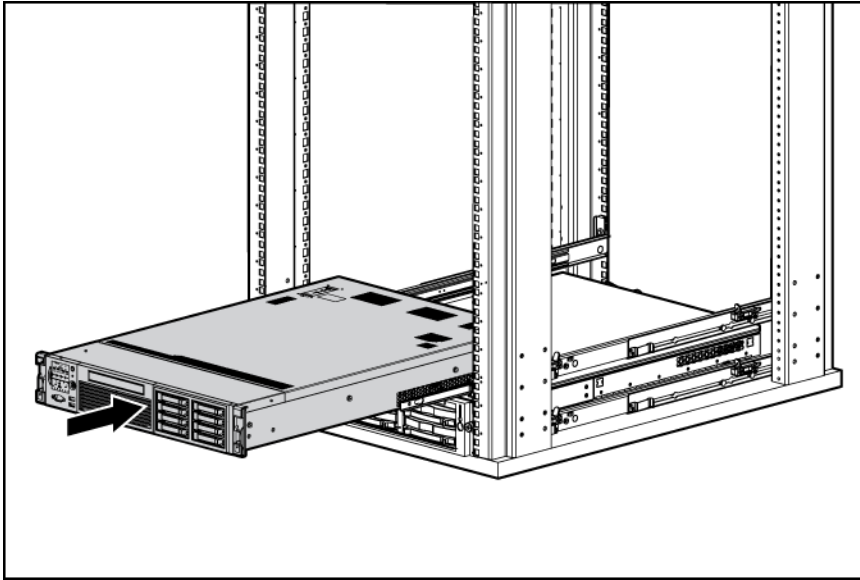
1. Pull down the quick release levers on each side of the server.
2. Extend the server from the rack.

⚠ WARNING! To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.



3. After performing the installation or maintenance procedure, slide the server back into the rack, and then press the server firmly into the rack to secure it in place.

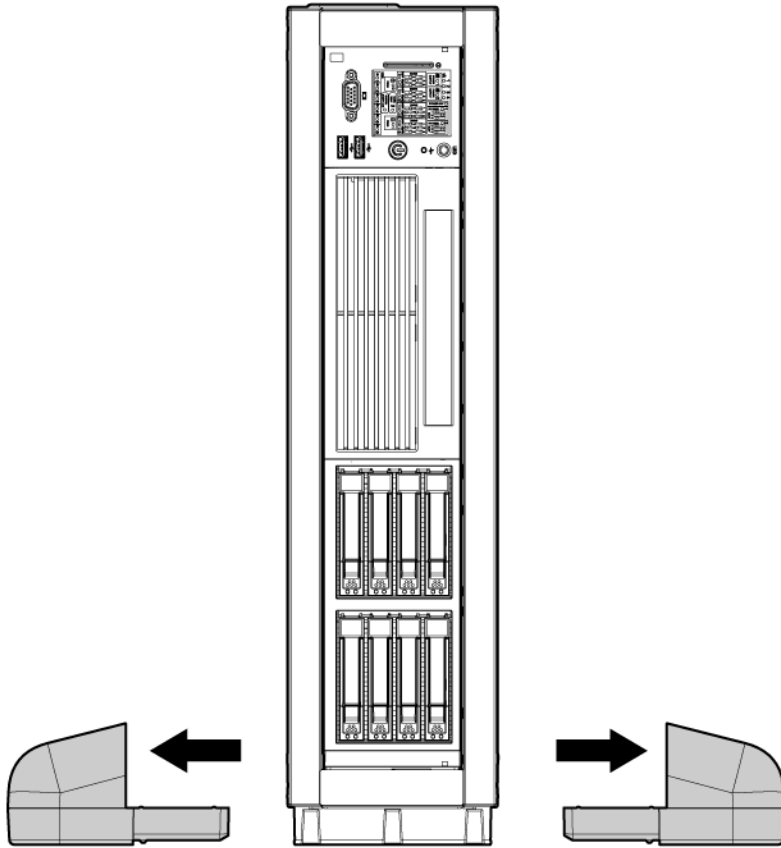
⚠ WARNING! To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails might pinch your fingers.



Accessing internal components for a pedestal-mounted server

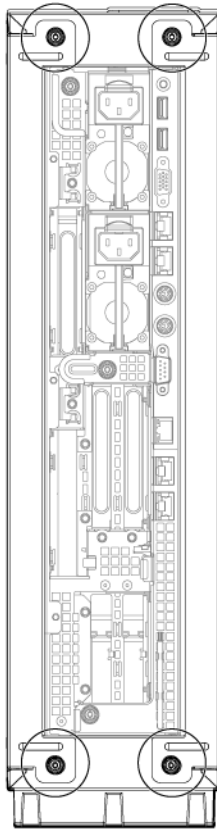
1. Power off the server and remove all cables.
2. Remove the pedestal kit feet.

Figure 20 Removing the pedestal kit feet



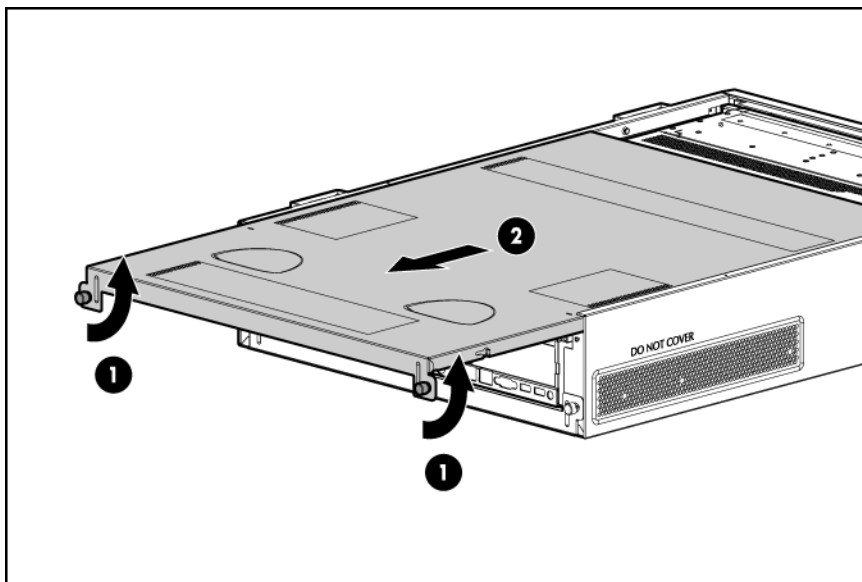
3. Lay the server on the left side (facing the front of the server). The right side of the pedestal kit (with the ventilation holes) must face up.
4. Unscrew the captive thumbscrews on the rear of the pedestal kit for the right side pedestal kit piece.

Figure 21 Thumbscrew locations



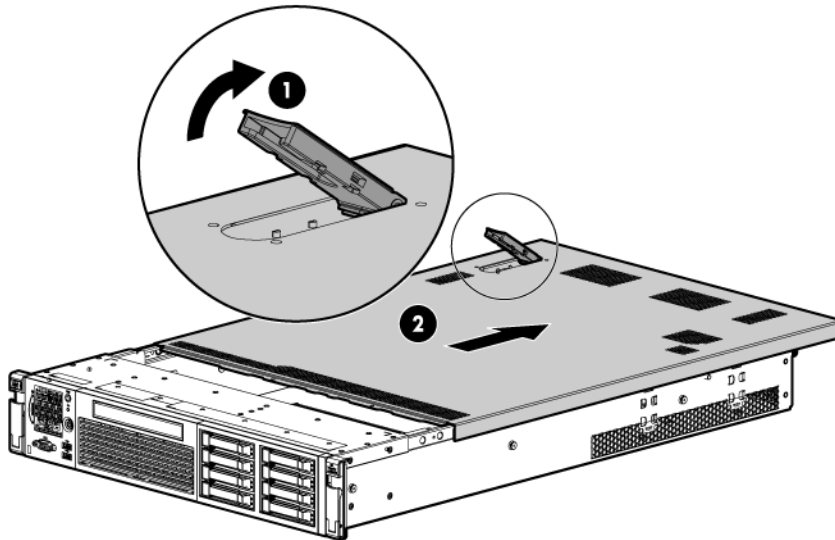
5. To remove the pedestal kit piece from the pedestal, slide the right side piece toward the back of the server, and then lift it.

Figure 22 Removing the side piece



6. Remove the server access panel.

Figure 23 Access panel removal



Powering off the server



WARNING! To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

NOTE: If installing a hot-plug device, you do not have to power off the server.

1. Back up the server data.
2. Shut down the operating system as directed by the operating system documentation.

NOTE: If the operating system automatically places the server in Standby mode, omit the next step.

3. Press the Power On/Standby button to place the server in Standby mode. When the server activates Standby power mode, the system power LED changes to amber.

NOTE: Pressing the UID button illuminates the blue UID LEDs on the front and rear panels. In a rack environment, this feature facilitates locating a server when moving between the front and rear of the rack.

4. Disconnect the power cords.
The system is now without power.

Removing the server from the rack

To remove the server from an HP, Compaq branded, Telco, or third-party rack:

1. Power off the server (“Powering off the server” (page 106)).
2. Extend the server from the rack (“Extending the server from the rack” (page 102)).
3. Disconnect the cabling and remove the server from the rack. For more information, see the documentation that ships with the rack mounting option.
4. Place the server on a sturdy, level surface.

Removing the server from the pedestal kit

Required tools

No tools are required for disassembling the pedestal kit.

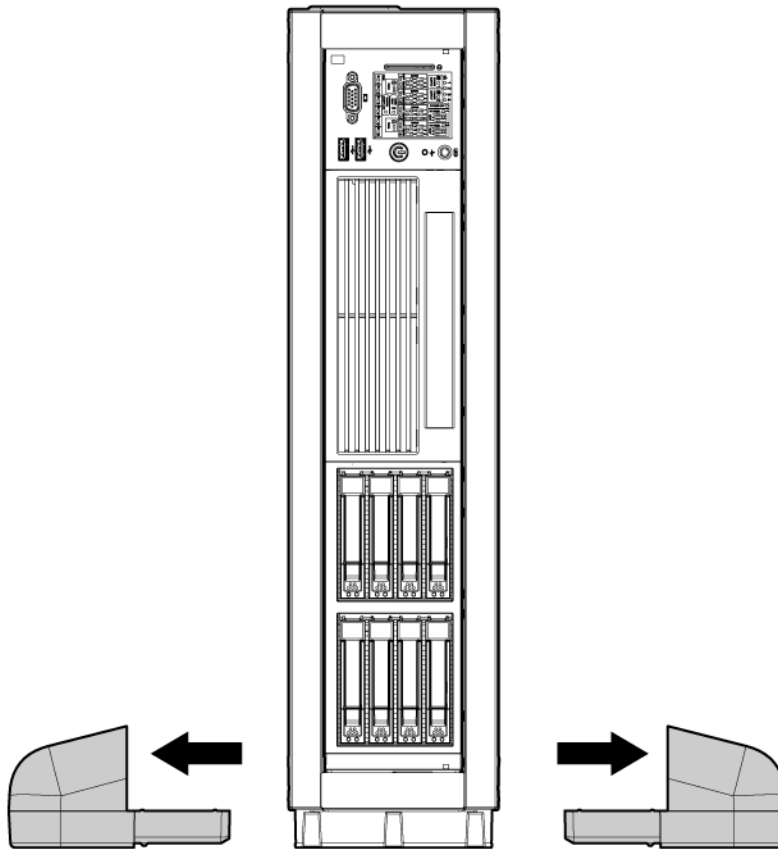
Power off the server and remove cables

1. Power off the server (“Powering off the server” (page 106)).
2. Disconnect the power and LAN cables connected to the server.

Removing the pedestal kit

1. Remove pedestal feet.

Figure 24 Removing the pedestal kit feet



2. Remove the pedestal side pieces by unscrewing the captive thumbscrews on the rear of the pedestal kit, and sliding the side pedestal kit pieces toward the back of the server.

Figure 25 Thumbscrew locations

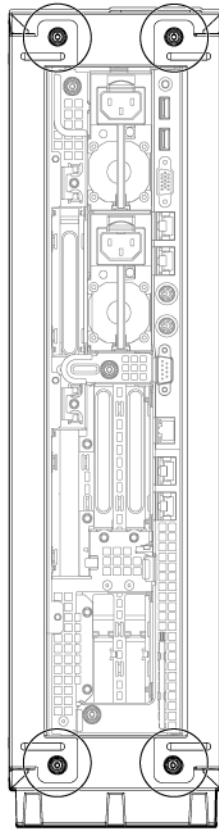
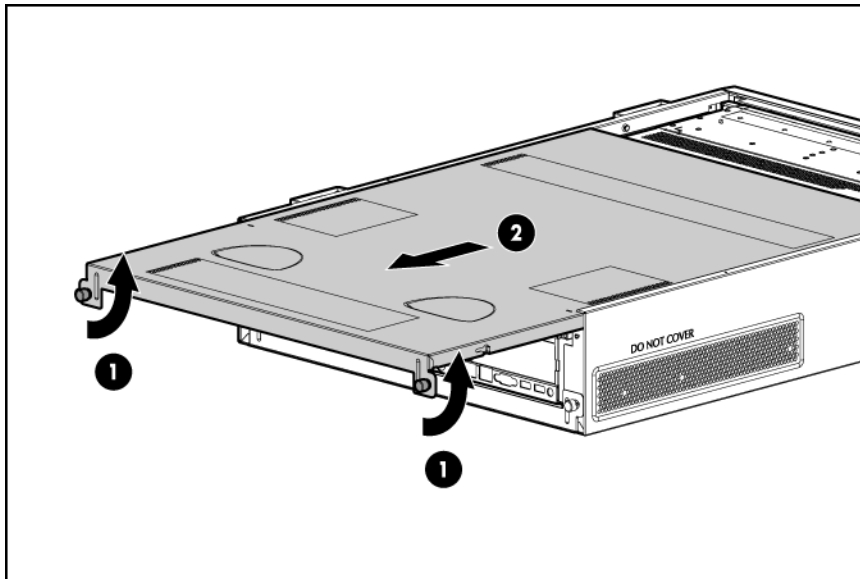
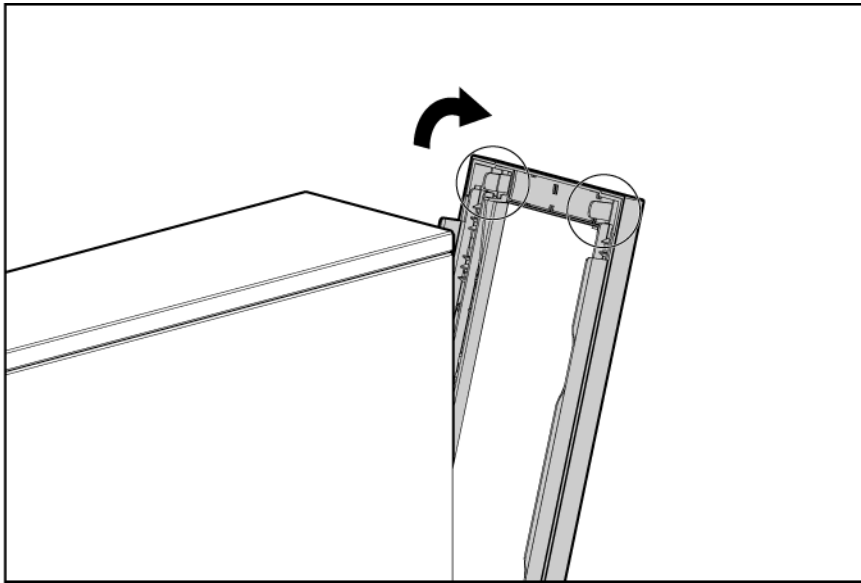


Figure 26 Removing the side piece



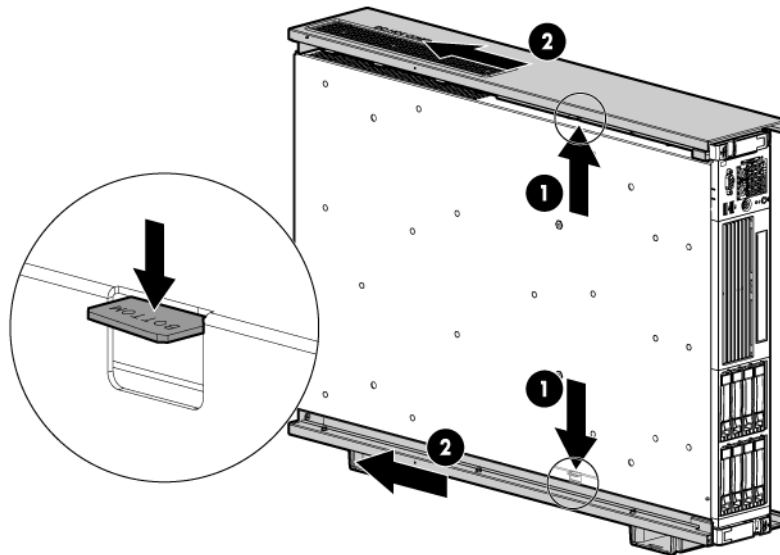
3. Release the locking tabs behind the top corners of the bezel cover and remove the component.

Figure 27 Removing the bezel cover



4. Remove the pedestal top piece.
 - a. With the server still in the vertical position, look at the left side of the server (server bottom) to locate the lock release tab.
 - b. Press the lock release tab on the pedestal top piece away from the chassis to unlock the pedestal top piece from the server. See [Figure 28](#) for the pedestal top and bottom piece lock release locations.

Figure 28 Removing the pedestal top piece

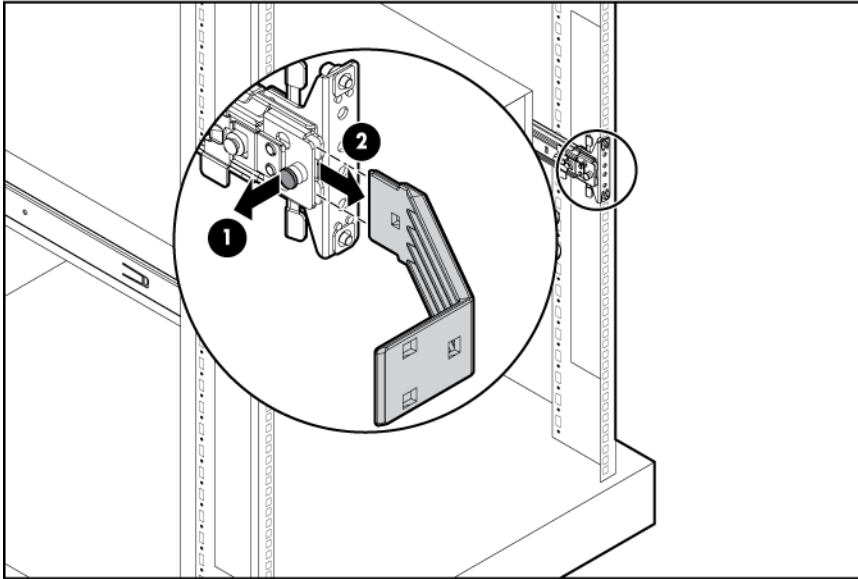


- c. Slide the pedestal top piece toward the back of the server to release it from the server.
- d. Once the pedestal component has moved about 1/4 inch, the lock releases, and you can release the tab.
- e. Pull the pedestal kit top piece away from the server.
- f. Repeat these steps for the bottom piece.

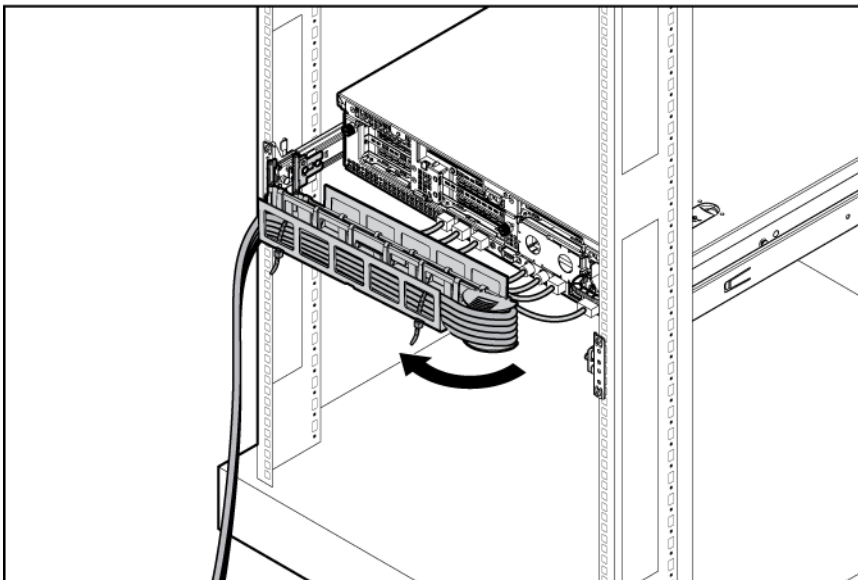
Accessing the product rear panel

Cable management arm with left-hand swing

1. Remove the cable arm retainer.



2. Open the cable management arm.



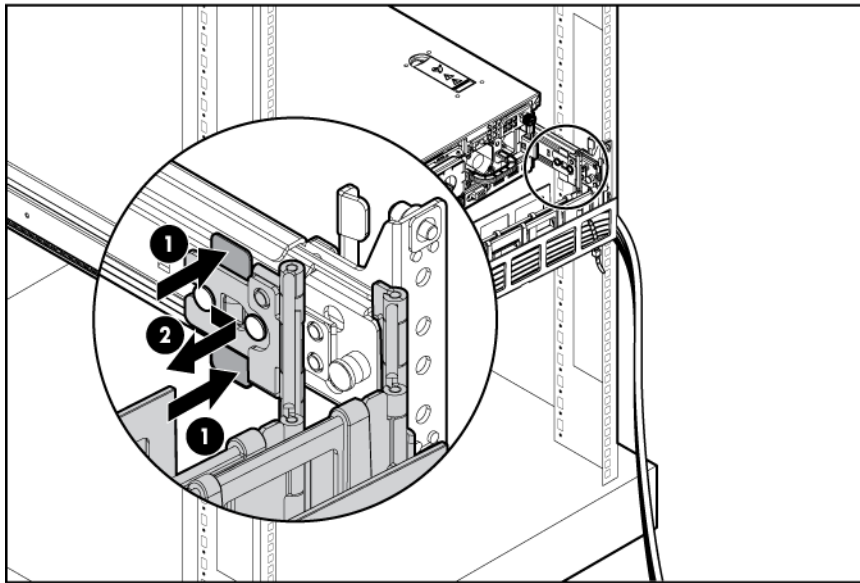
Cable management arm with right-hand swing

NOTE: To access some components, you might have to remove the cable management arm.

To access the product rear panel components, open the cable management arm:

1. Power off the server (“[Powering off the server](#)” (page 106)).
2. Swing open the cable management arm.
3. Remove the cables from the cable trough.

4. Remove the cable management arm.

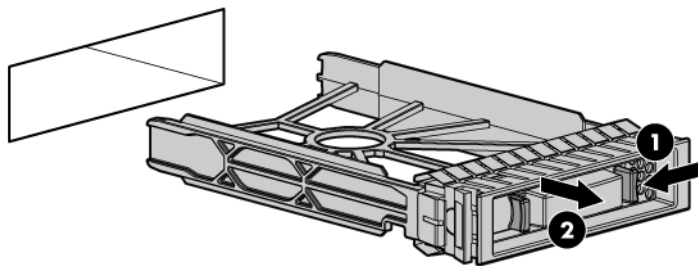


Removing and replacing a SAS hard drive blank

- CAUTION:** For proper cooling do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

Remove the component as indicated.

Figure 29 Hard drive filler removal



To replace the blank, slide the blank into the bay until it locks into place.

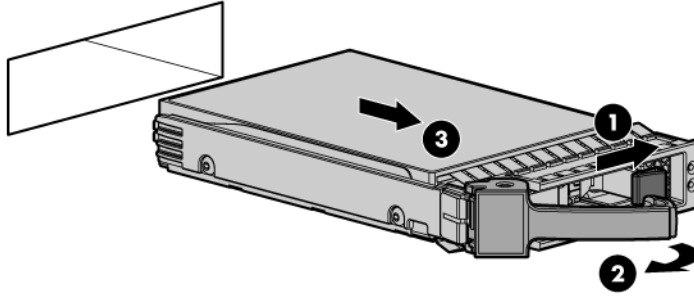
Removing and replacing a hot-plug SAS hard drive

The server supports up to eight SFF, 2.5-inch SAS hard drives. Each drive is equipped with two LEDs that indicate activity and device status.

To remove the component:

- CAUTION:** For proper cooling do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.
1. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations.
 2. Back up all server data on the hard drive.

3. Remove the hard drive.



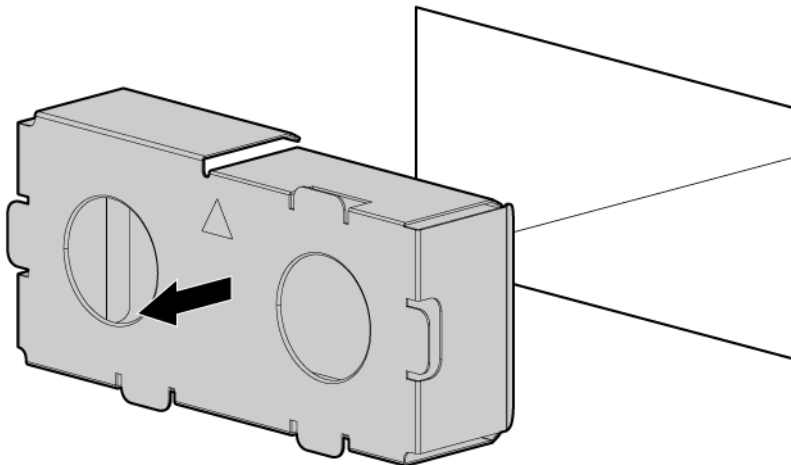
To replace the component, see “Installing a hot-pluggable SAS hard drive” (page 48).

Removing and replacing a power supply blank

- CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

To remove the component:

Figure 30 Removing the blank



To replace the component, reverse the removal procedure.

Removing and replacing a hot-swap power supply

The server supports 1+1 redundant power supply for high line (1200W/200~240VAC) and low line (800W/100~120VAC) in the data center and office-friendly server versions.

Table 43 Power redundancy configurations

Line voltage	Power supply count	Processor count	DIMM count	Redundancy
High Line (200-240)	1	1 or 2	2 to 24	No
High Line (200-240)	2	1 or 2	2 to 24	Yes
Low Line (100-120)	1	1 or 2	2 to 12	No
Low Line (100-120)	2	1	2 to 12	Yes
Low Line (100-120)	2	2	2 to 8 ¹	Yes

¹ A maximum of 8 DIMMs are supported in a configuration with low line AC voltage and 2 processors.

NOTE: Configurations other than those listed in [Table 43 \(page 112\)](#) do not have 1+1 power redundancy and are not supported.

Power redundancy is dependent on the number of power supplies, processors, and DIMMs in a system. Additional components, such as HDDs or PCIe cards, do not impact power redundancy.

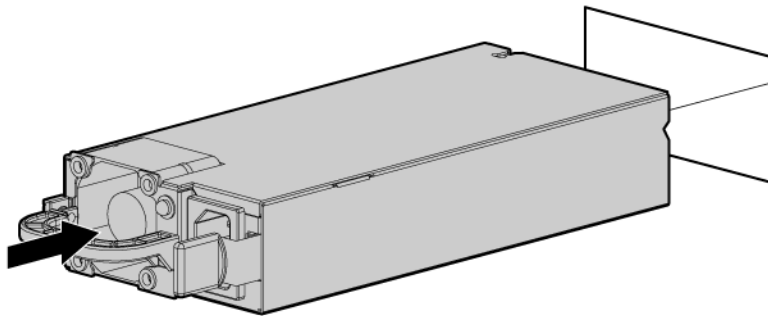
The server also supports power capping. Power capping operation can be observed through iLO 3. For more information, see the *HP Integrity iLO 3 Operations Guide*.

⚠ WARNING! To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching it.

⚠ CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

To remove the component:

1. Determine how many hot-swap power supplies are installed:
 - If only one hot-swap power supply is installed, power off and remove the power cord from the server ([“Powering off the server” \(page 106\)](#)).
 - If more than one hot-swap power supply is installed, continue with the next step.
2. Access the product rear panel ([“Accessing the product rear panel” \(page 110\)](#)).
3. Disconnect the power cord from the power supply.
4. Remove the hot-swap power supply.



⚠ WARNING! To reduce the risk of electric shock or damage to the equipment, do not connect the power cord to the power supply until the power supply is installed.

To replace the component, see [“Installing a hot-swappable power supply” \(page 49\)](#).

Removing and replacing the access panel

To remove the access panel see [“Removing the access panel” \(page 50\)](#).

To replace the component, reverse the removal procedure.

Removing and replacing the optical drive filler

To remove the component:

- CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Power off the server (“Powering off the server” (page 106)).
2. Extend or remove the server from the rack.
3. Remove the access panel. See “Removing the access panel” (page 50).
4. Remove the fans 2 and 3. See “Removing and replacing a hot-swap fan” (page 115).
5. Push out the drive filler.

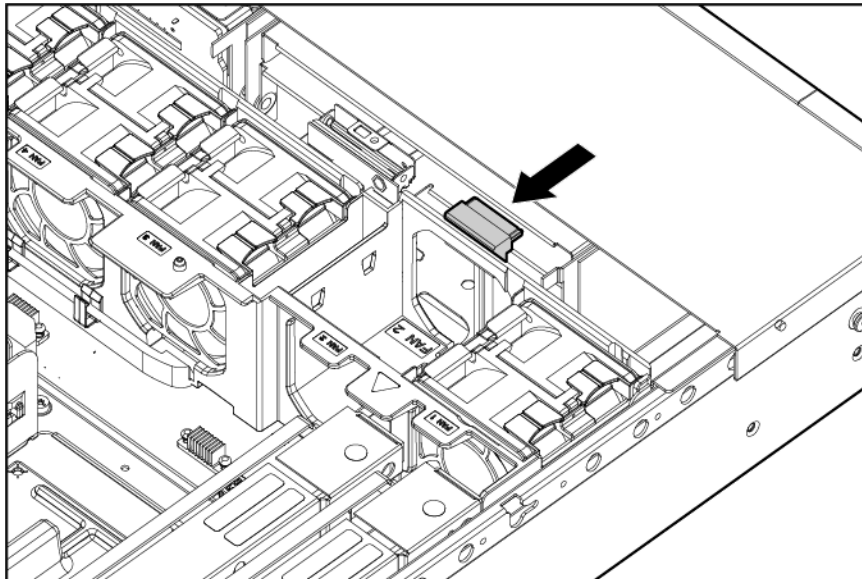
NOTE: You might have to use a nonconductive tool with a length of at least 20 cm and a thickness of about 1 mm to push out the drive filler. HP recommends using a ruler or similar tool.

To replace the component, reverse the removal procedure.

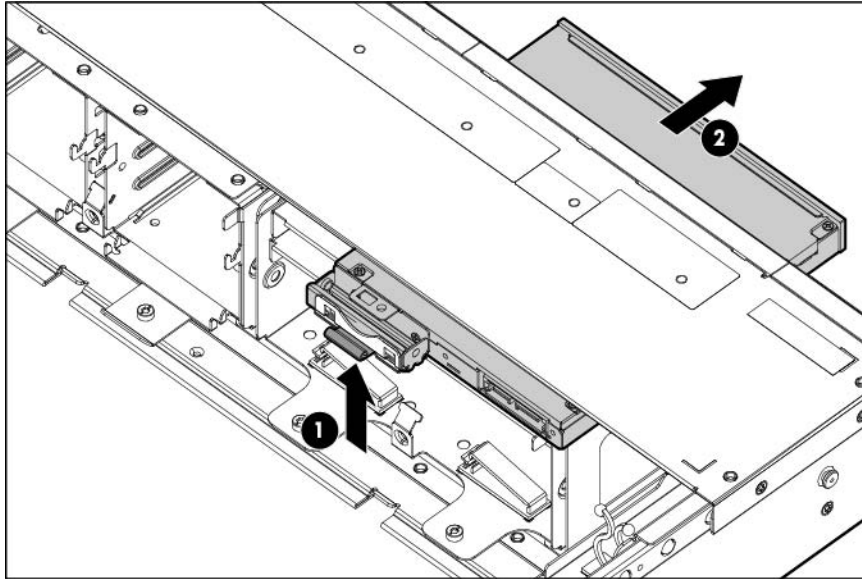
Removing and replacing the optical drive

- CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

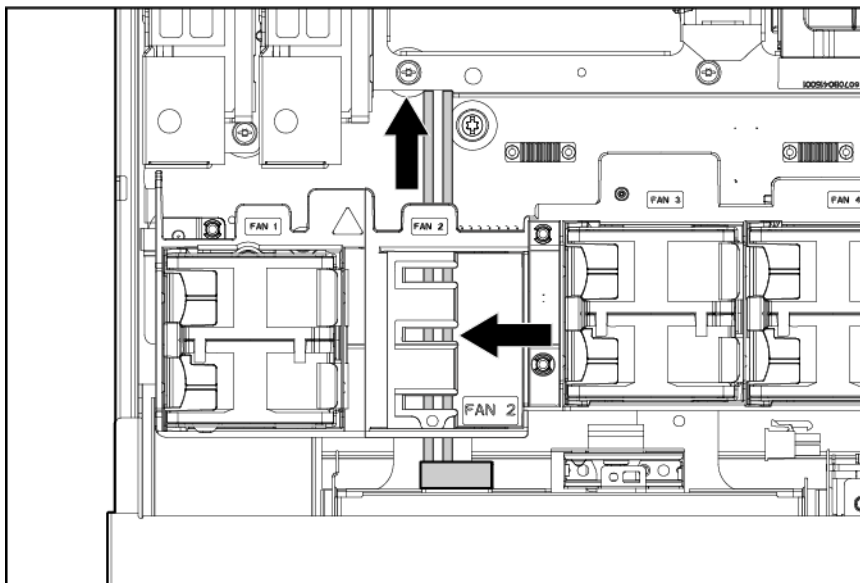
1. Power off the server (“Powering off the server” (page 106)).
2. Extend or remove the server from the rack. See “Removing the server from the rack” (page 106).
3. Remove the access panel. See “Removing the access panel” (page 50).
4. Remove the fans 2 and 3. See “Removing and replacing a hot-swap fan” (page 115).
5. Disconnect the drive cable.



6. Lift the DVD release tab, and push out the drive. Then pull the drive straight out to remove it from the server.



To replace the component, reverse the removal procedure.
The optical drive cable routes beneath fan 2.

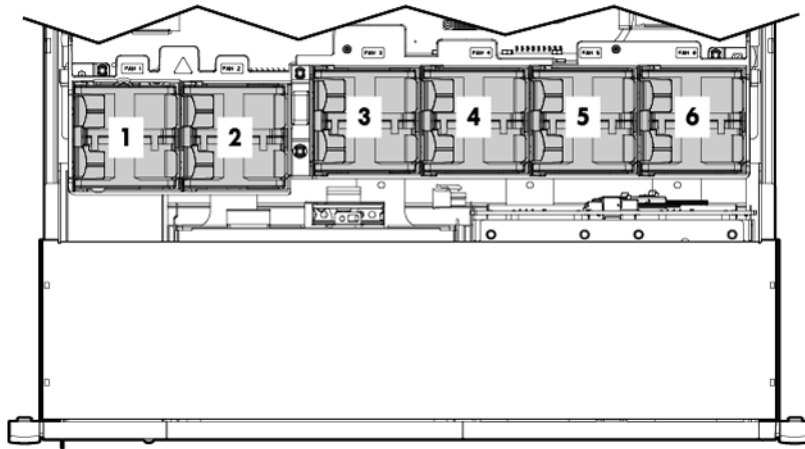


Removing and replacing a hot-swap fan

Six fans cool the server. The fans are all redundant, hot-swappable, and interchangeable. If one fan unit fails, then the other fans increase speed to compensate. The fan units are N+1 redundant, meaning that the server has six fan units, but can operate with five fan units running.

-
- △ CAUTION:** If more than one fan is removed or fails, the system does not shut down. If the temperature sensors detect conditions outside of operating limits, the system shuts down.
-

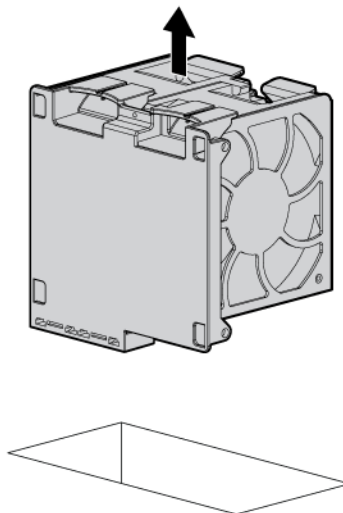
Figure 31 Fan identification



The power supplies have built-in fans and are not controlled by the iLO MP.

For fan identification, see [Figure 31](#) (page 116).

1. Extend or remove the server from the rack (“[Removing the server from the rack](#)” (page 106) or “[Extending the server from the rack](#)” (page 102)).
2. Remove the access panel (“[Removing and replacing the access panel](#)” (page 113)).
3. Remove the fan.



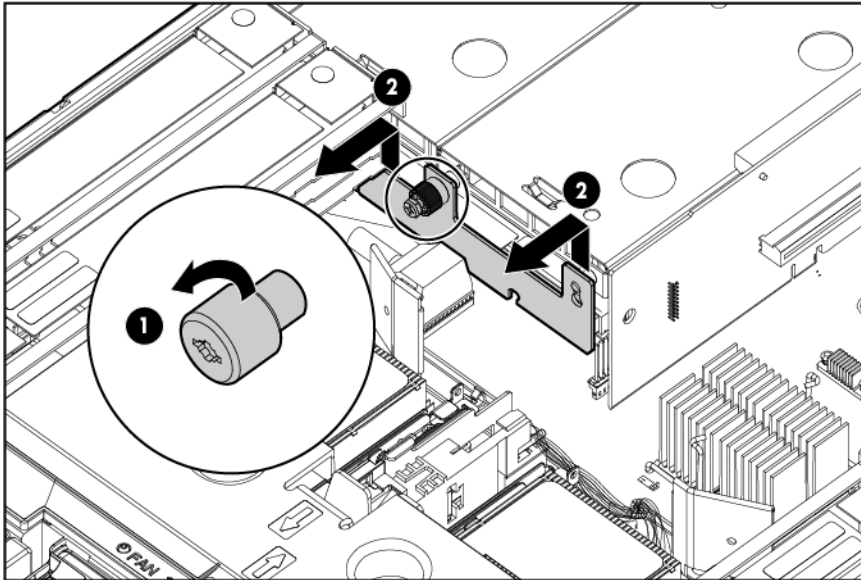
⚠ CAUTION: Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

To replace the component, reverse the removal procedure.

Removing and replacing the power supply backplane

1. Power off the server (“[Powering off the server](#)” (page 106)).
2. Remove all power supplies (“[Removing and replacing a hot-swap power supply](#)” (page 112)).

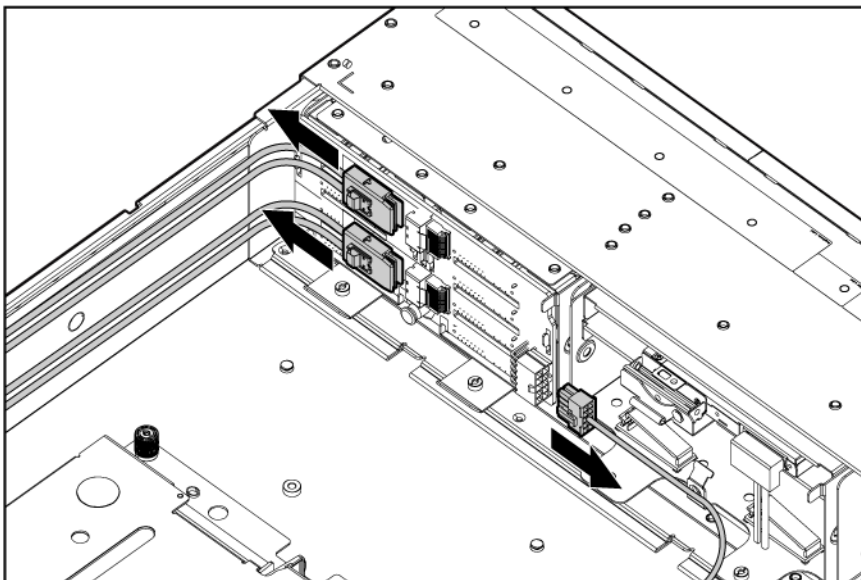
3. Extend or remove the server from the rack (“Removing the server from the rack” (page 106)) or “Extending the server from the rack” (page 102)).
4. Remove the access panel (“Removing the access panel” (page 50)).
5. Remove the PCI cage (“Removing the PCI riser cage” (page 51)).
6. Remove the necessary memory expansion boards (“Installing DIMMs” (page 56)).
7. Remove the power supply backplane.



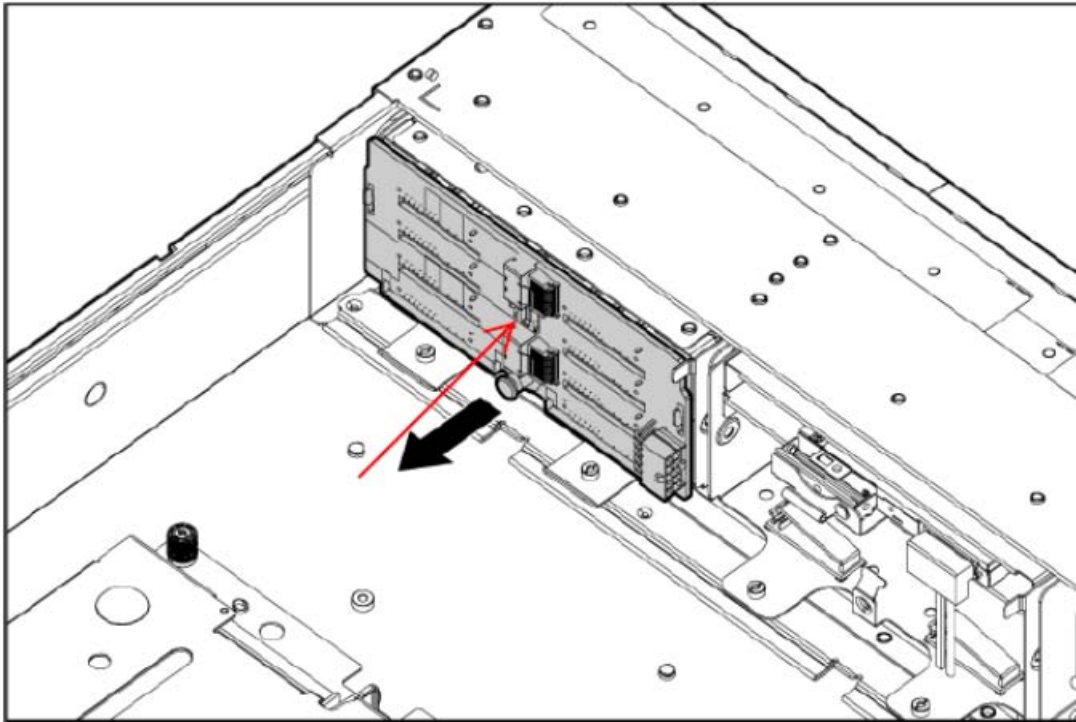
To replace the component, reverse the removal procedure.

Removing and replacing the hard drive backplane

1. Power off the server (“Powering off the server” (page 106)).
2. Extend or remove the server from the rack (“Removing the server from the rack” (page 106)) or “Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing the access panel” (page 50)).
4. Remove all hot-plug hard drives (“Removing and replacing a hot-plug SAS hard drive” (page 111)).
5. Disconnect the SAS cable from the hard drive backplane.



- Remove the hard drive backplane.



To replace the component, reverse the removal procedure.

- CAUTION:** Carefully align the backplane center through-holes with the chassis mounting posts or you might damage components on the backplane.

Removing and replacing the PCI riser cage

To remove the component, see “Removing the PCI riser cage” (page 51).

To replace the component, reverse the removal procedure.

Removing and replacing expansion slot covers

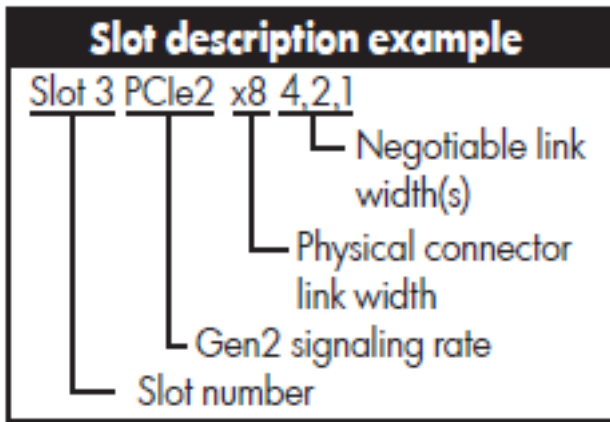
To remove the component see “Removing expansion slot covers” (page 52).

To replace the component, reverse the removal procedure.

Removing and replacing expansion boards

Table 44 PCI slot descriptions

	3-slot PCIe riser	2-slot PCIe riser
Primary riser connector		
1 — Full length, full height	PCIe2 x16 (8, 4, 2, 1)	PCIe2 x16 (8, 4, 2, 1)
2 — Half length, full height	PCIe2 x8 (4, 2, 1)	PCIe2 x16 (8, 4, 2, 1)
3 — Half length, full height	PCIe2 x8 (4, 2, 1)	—
Secondary riser connector		
4 — Full length, full height	PCIe2 x16 (8, 4, 2, 1)	PCIe2 x16 (8, 4, 2, 1)
5 — Low profile	PCIe2 x8 (4, 2, 1)	PCIe2 x16 (8, 4, 2, 1)
6 — Low profile	PCIe2 x8 (4, 2, 1)	—

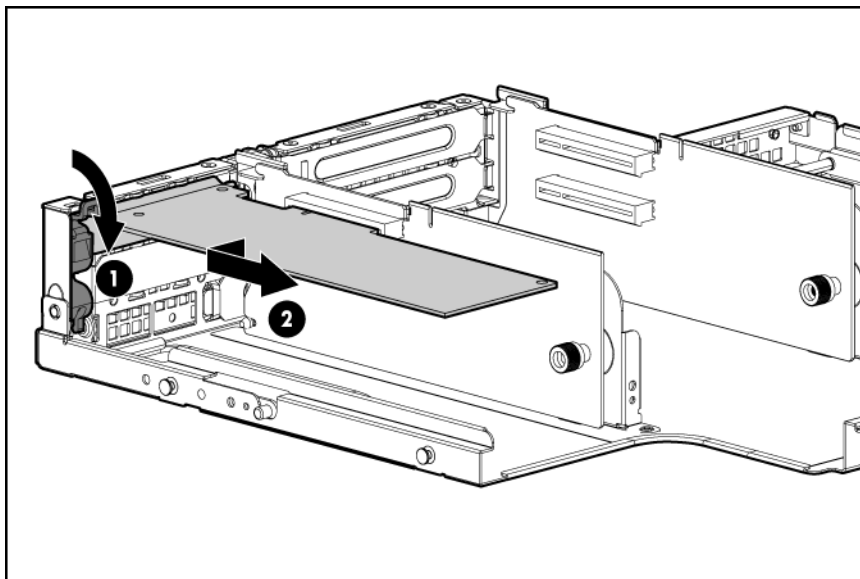


The server supports up to two PCIe riser boards. Each PCIe riser board holds up to three PCIe cards each. The standard riser board configuration contains one riser board with one full-length, full-height PCIe x8 slot, and two half-length, full-height PCIe x4 slots. The second board contains one full-length, full-height PCIe x8 slot, and two half-length, half-height PCIe x4 slots.

The optional riser board configuration contains one riser board with one full-length, full-height PCIe x8 slot, and two half-length, full-height PCIe x4 slots. The second board contains one full-length, full-height PCIe x16 slot.

Removing and replacing a half-length expansion board

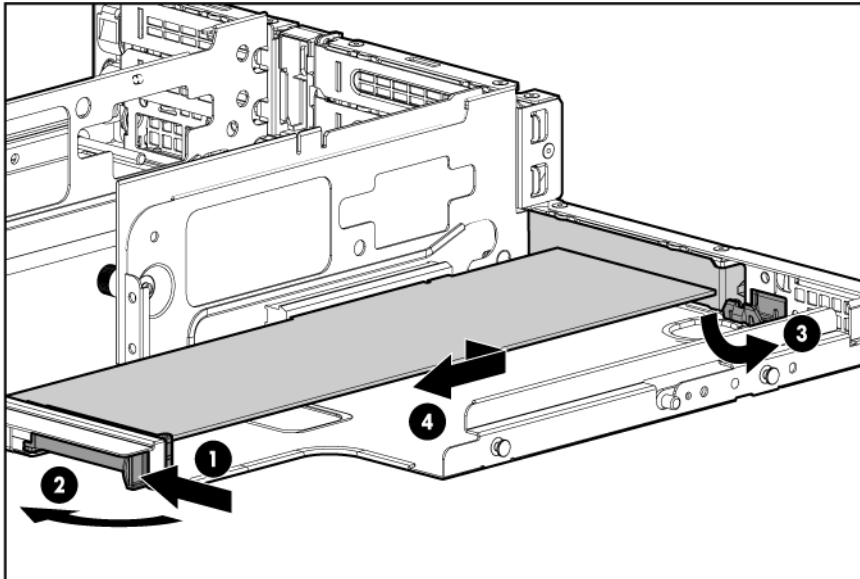
1. Power off the server (“Powering off the server” (page 106)).
2. Extend the server from the rack (“Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing and replacing the access panel” (page 113)).
4. Disconnect any external cables that are connected to the expansion board.
5. Remove the PCI riser cage (“Removing and replacing the PCI riser cage” (page 118)).
6. Disconnect any internal cables that are connected to the expansion board.
7. Remove expansion board.



To replace the component, see “Installing expansion boards” (page 53).

Removing and replacing a full-length expansion board

1. Power off the server (“Powering off the server” (page 106)).
2. Extend the server from the rack (“Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing and replacing the access panel” (page 113)).
4. Disconnect any external cables that are connected to the expansion board.
5. Remove the PCI riser cage (“Removing and replacing the PCI riser cage” (page 118)).
6. Disconnect any internal cables that are connected to the expansion board.
7. Remove the expansion board.



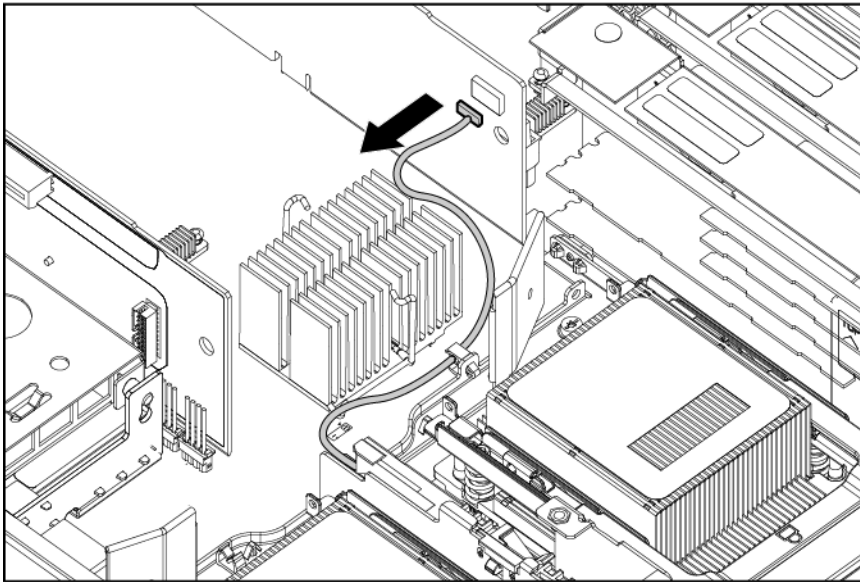
To replace the component, see “Installing expansion boards” (page 53).

Removing and replacing the cache module

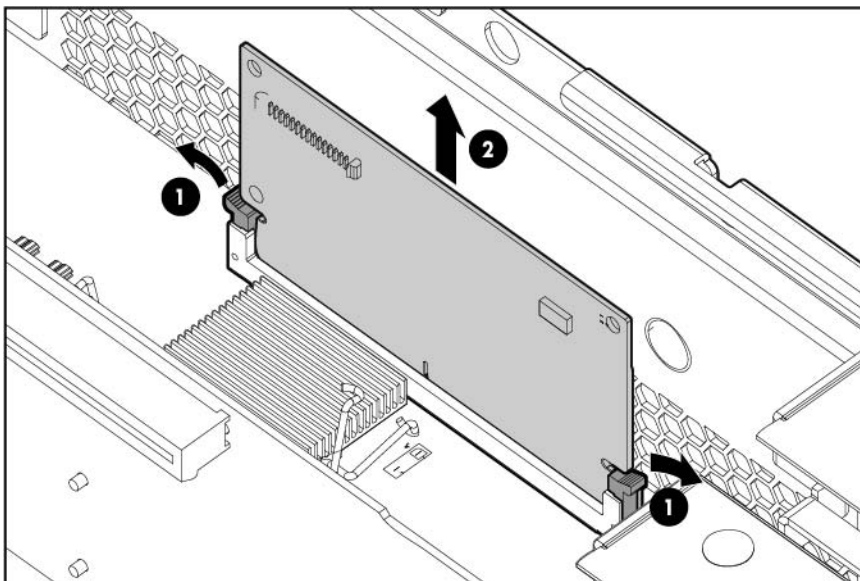
NOTE: The cache module is required to enable the full feature firmware stack for RAID support, and certain levels of RAID support also require the super capacitor module and a Advanced Pack license key.

To enable Advanced Pack licensing, see “Adding a RAID Advanced Pack license key” (page 148).

1. Power off the server (“Powering off the server” (page 106)).
2. Extend or remove the server from the rack (“Removing the server from the rack” (page 106)) or “Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing and replacing the access panel” (page 113)).
4. Remove the PCI riser cage (“Removing and replacing the PCI riser cage” (page 118)).
5. Disconnect the cable to the super capacitor pack.



6. Remove the cache module.

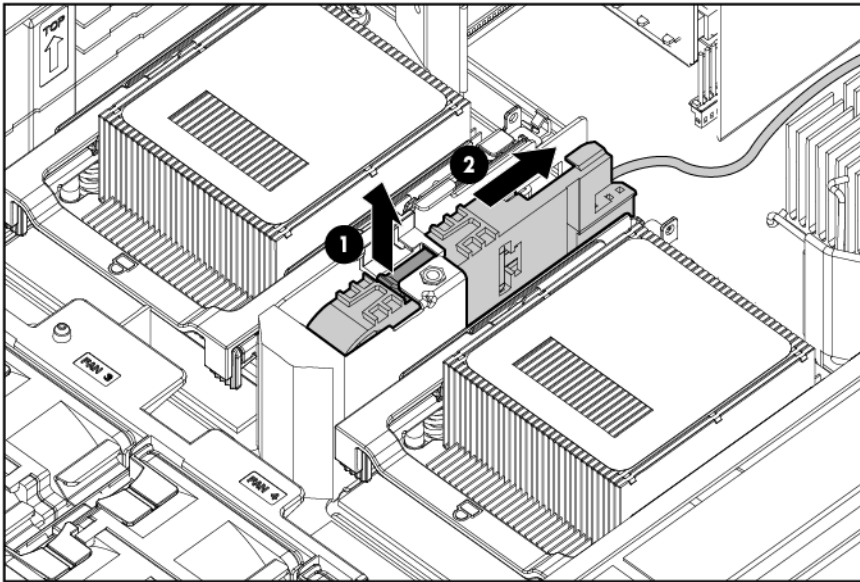


To replace the component, reverse the removal procedure.

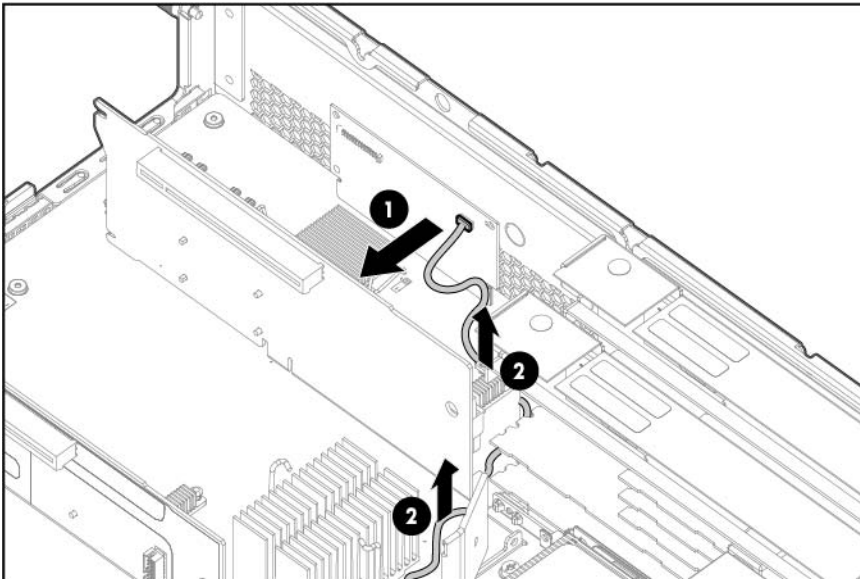
- ⚠ CAUTION:** To prevent damage to the cache module during installation, be sure the cache module is fully inserted before pressing down.

Removing and replacing the super capacitor pack

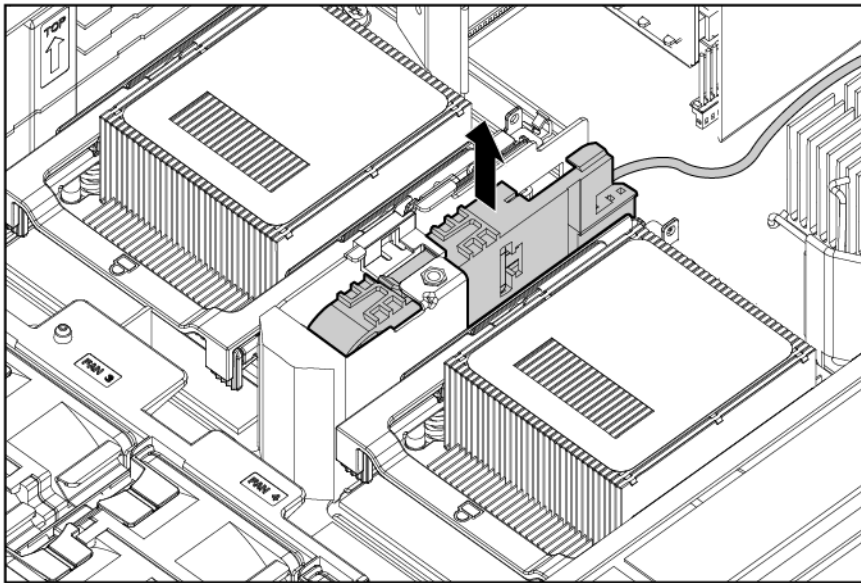
1. Power off the server (“Powering off the server” (page 106)).
2. Extend or remove the server from the rack (“Removing the server from the rack” (page 106)) or “Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing and replacing the access panel” (page 113)).
4. Remove the PCI riser cage (“Removing and replacing the PCI riser cage” (page 118)).
5. Pull up the latch and push the super capacitor pack to the rear of the server.



6. Disconnect the super capacitor pack cable from the board and system board clips.



7. Remove the super capacitor pack.



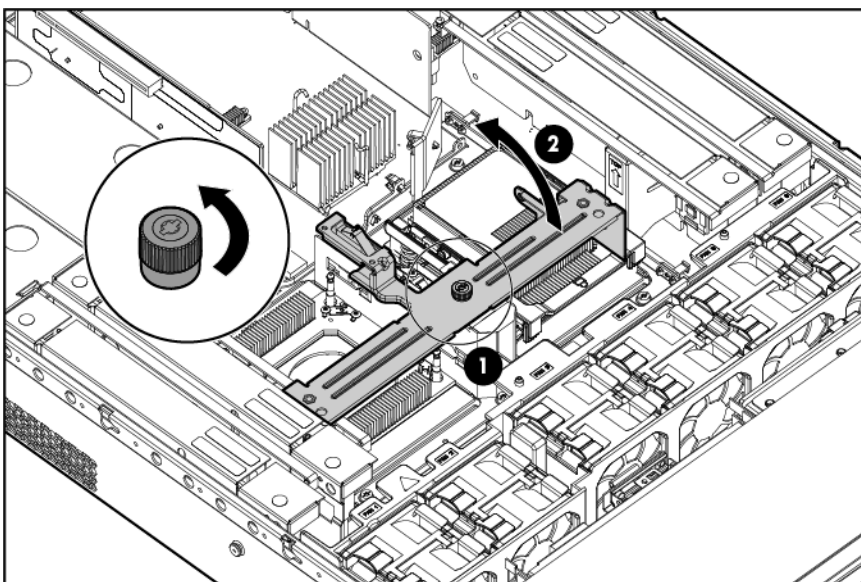
To replace the component, reverse the removal procedure.

Removing and replacing the processor baffle

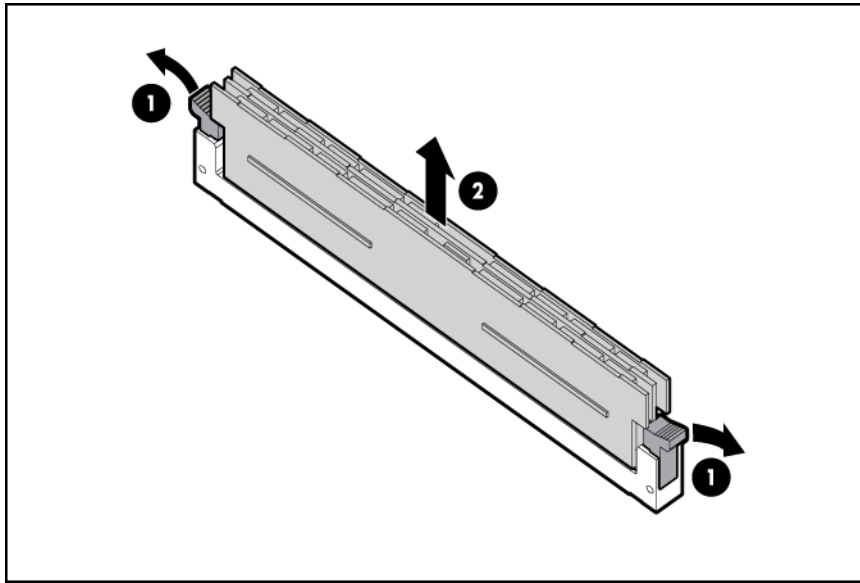
△ CAUTION: To prevent damage to the server, never power on a server without a processor baffle or processor in each processor socket. The processor baffle is needed for proper system cooling.

CAUTION: Immediately install a processor baffle in an empty processor socket. To avoid damage to the socket pins, the socket must never be uncovered for more than 5 seconds. If the socket is damaged, the entire system board must be replaced.

1. Power off the server and remove it from the rack (“Powering off the server” (page 106) and “Removing the server from the rack” (page 106)).
2. Remove the access panel (“Removing the access panel”).
3. Open the processor cage.



4. Pull the processor baffle straight up and out.



To replace the processor baffle:

1. Line the processor baffle up with 4 load posts on each corner of the socket.
2. Guide the processor baffle straight down into place.

Removing and replacing a processor and heat sink module

The server processor subsystem supports one or two Dual-Core or Quad-Core Itanium processors. When two processors are installed, the speeds must be identical.

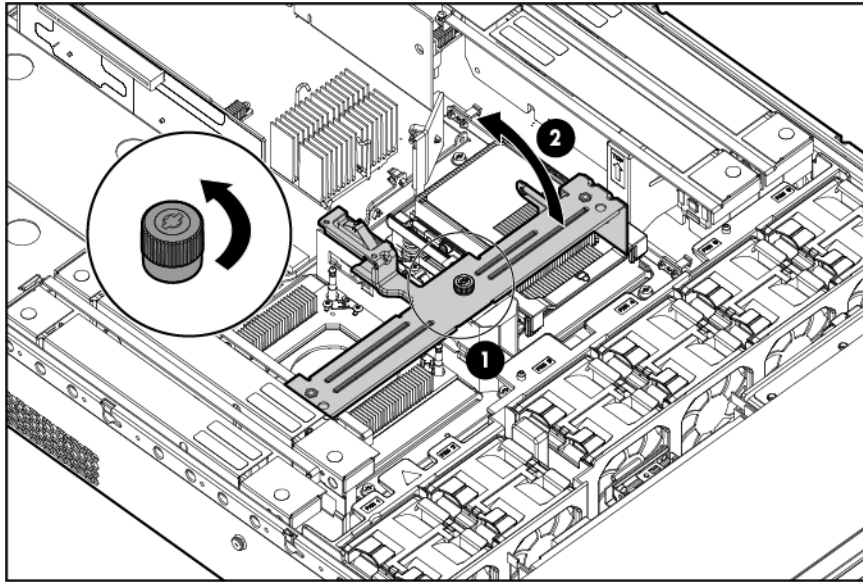
⚠ WARNING! To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

⚠ CAUTION: To prevent possible server malfunction, do not mix processors of different speeds or cache sizes.

CAUTION: Removing a processor will cause the DIMM loading rules to change. See [“Memory configurations” \(page 54\)](#) and use the loading rules for two processors. If you do not perform these procedures, then any memory associated with the removed processor will not be seen by the system.

⚠ CAUTION: To prevent thermal instability and damage to the server, do not separate the processor module from the heat sink.

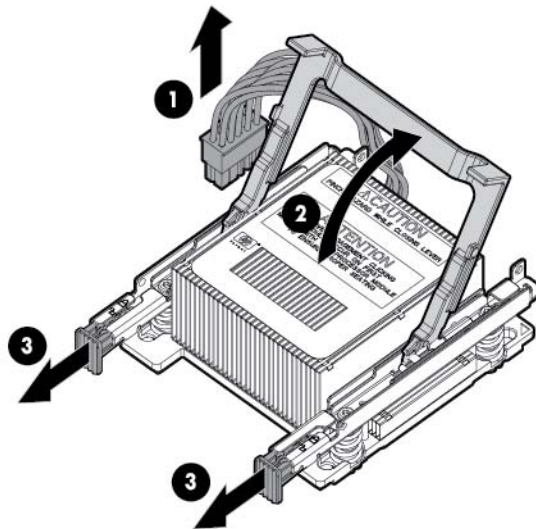
1. Power off the server and remove it from the rack ([“Powering off the server” \(page 106\)](#) and [“Removing the server from the rack” \(page 106\)](#)).
2. Remove the access panel ([“Removing the access panel” \(page 50\)](#)).
3. Open the processor cage.



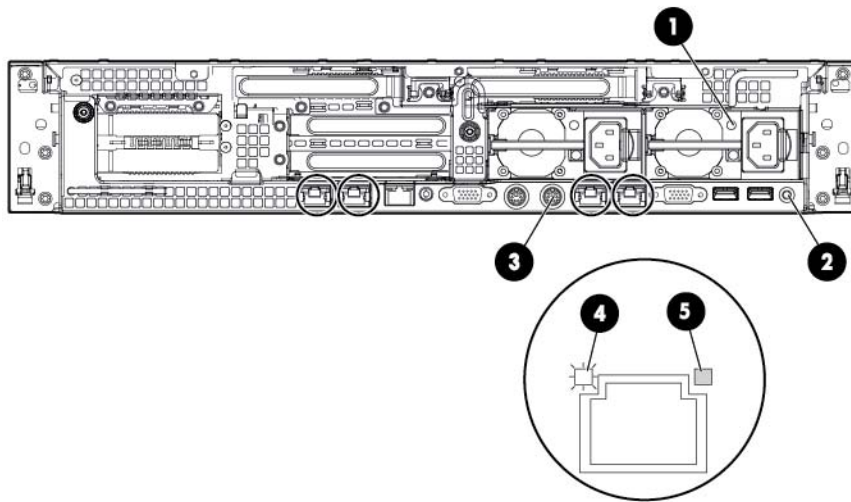
4. Disconnect the power cord (see 1 below).
5. Rotate the processor locking handle up and back until it reaches a hard stop (see 2 below).

⚠ WARNING! The heat sink locking lever can constitute a pinch hazard, keep your hands on top of the lever during installation to avoid personal injury.

6. Pull both plastic tabs out (see 3 below).



7. Lift the processor and heat sink off of the socket, pulling straight up.



8. If the processor is not being replaced, install a processor baffle (“[Removing and replacing the processor baffle](#)” (page 123)).

⚠ CAUTION: To avoid damage to processor socket pins and ensure proper system cooling, install a processor baffle in an empty processor socket.

To replace a processor that is not defective, reverse the removal procedure.

The replacement processor module is shipped from HP without a heat sink. You will need to order and attach a heat sink to the processor module before installing them for repair.

Refer to “Installing a processor and heat sink module” (page 59) for more information on the installation procedure.

⚠ WARNING!

DO NOT SEPARATE THE HEATSINK FROM THE PROCESSOR MODULE.

Damage to the assembly will occur! Only Factory-Repair is authorized to separate assembly. Return the assembly in the heatsink box using the processor's defective return label.

When the processor/heatsink assembly is removed from the server:

- **Do NOT separate** the heatsink from the processor.
- Place the intact processor/heatsink assembly, **with the handle in the up position**, into the extra ESD bag provided in the heatsink box (if necessary re-use the ESD bag from the processor box).
- To receive credit for **both** the processor and the heatsink:
 - Package the processor/heatsink assembly into the **heatsink box**.
 - Place the paper work originally shipped with the processor in the heatsink box.
 - Apply the processor defective return label to the heatsink box.

Global Customer Services and Support (GCSS) case coding recommendations:

- If the new processor/heatsink assembly is used – (solves the issue or is left in the server for any reason) – return the defective assembly using the normal process; for example a part failure code of 74, 75, etc...
- Once assembled, the parts cannot be returned as “Unused”.

In some scenarios assembled parts will not fix an issue, for example:

- The new assembly is removed and the original is re-installed in the server.
- The wrong speed processor or heatsink combination is assembled.

In these cases:

- Use the defective label (B label) from the processor box and apply to the heatsink box.
- Use a Parts Failure Code of **“AI”** on both parts.

NOTE: After replacing the processor and heat sink module use the `cpuconfig` from UEFI to verify the that the processor socket has been reconfigured.

Removing and replacing DIMMs

The server supports up to 24 memory DIMMs that attach to the system board through 4 memory expansion board boards (6 DIMMs per board). The minimum amount of memory supported is 4 GB (two 2 GB DIMMs). The maximum memory supported is 384 GB (twenty-four 16 GB DIMMs). The supported DIMMs are industry-standard, 30 mm (1.18 inch) high, DDR3 PC3 DIMMs. The server does not support hot-spare and hot-plug functionality.

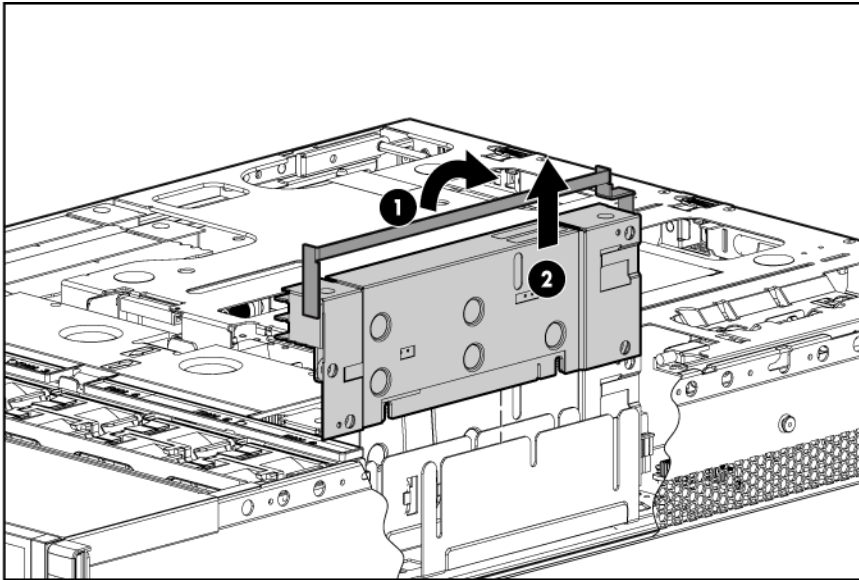
The server supports the following DIMM sizes:

- 2 GB
- 4 GB

- 8 GB
- 16 GB

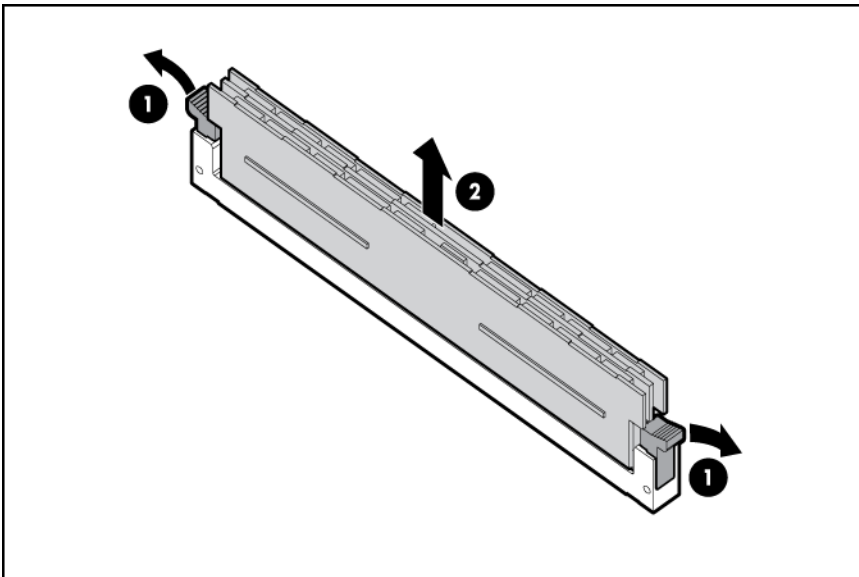
For memory configurations see “Installing DIMMs” (page 54).

1. Power off the server (“Powering off the server” (page 106)).
2. Extend or remove the server from the rack (“Removing the server from the rack” (page 106) or “Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing the access panel” (page 50)).
4. Remove the memory expansion board.



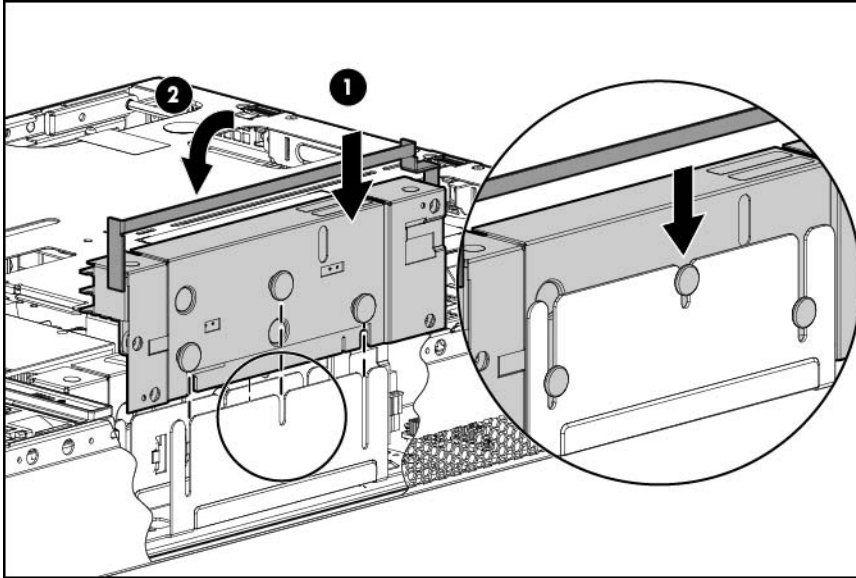
NOTE: You can access the memory expansion board boards without removing the airflow guides. Airflow guides are only required for memory expansion board slots 2 and 3.

5. Remove the DIMM.



To replace the component, reverse the procedure. Ensure that you follow the memory loading order when you replace DIMMs. For memory configuration information, see [“Memory configurations”](#) (page 54).

- ⚠ CAUTION:** Before inserting the memory expansion board, the three stand-off posts on the expansion board must be aligned with the alignment slots on the system board. Failure to align the stand-off posts correctly might result in damage to the expansion board.



Removing and replacing the PDH battery (system battery)

If the server no longer automatically displays the correct date and time, you might have to replace the battery that provides power to the real-time clock.

- ⚠ WARNING!** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. If the battery pack is not properly handled, a risk of fire and burns exists. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the spare designated for this product.

1. Power off the server ([“Powering off the server”](#) (page 106)).
2. Extend the server from the rack ([“Extending the server from the rack”](#) (page 102)).
3. Remove the access panel ([“Removing and replacing the access panel”](#) (page 113)).
4. Remove the PCI riser cage ([“Removing and replacing the PCI riser cage”](#) (page 118)).

- ⚠ WARNING!** Do not attempt to remove the battery by hand. Doing so can cause the battery holder to separate from the system board.

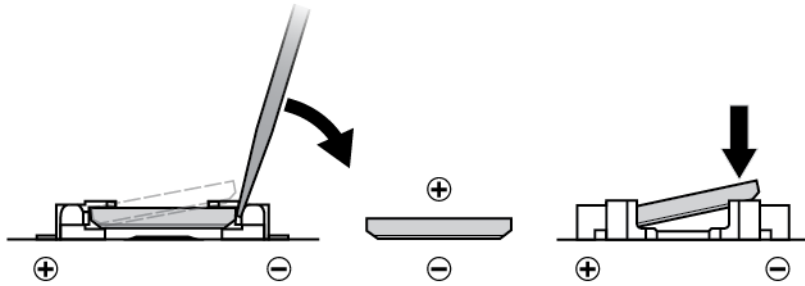
WARNING! Do not attempt to remove the battery from the side marked “+” first. If your battery holder does not have the “+” marking, the side of the holder with springs will be the “+” end.

5. Using a nonconductive tool small enough to fit into the battery slot as leverage, gently remove the battery from the holder from the end marked “-”.

NOTE: HP recommends using ESD safe, non-conductive tweezers or a similar tool.

To replace the component, reverse the removal procedure.

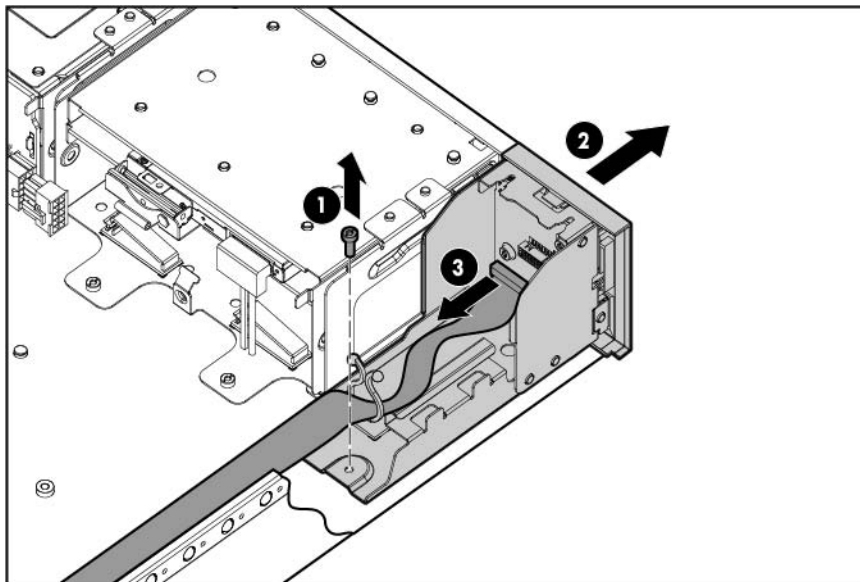
- ⓘ **IMPORTANT:** Ensure that the new battery is fully seated and that all locking tabs are correctly engaged.



For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Removing and replacing the SID

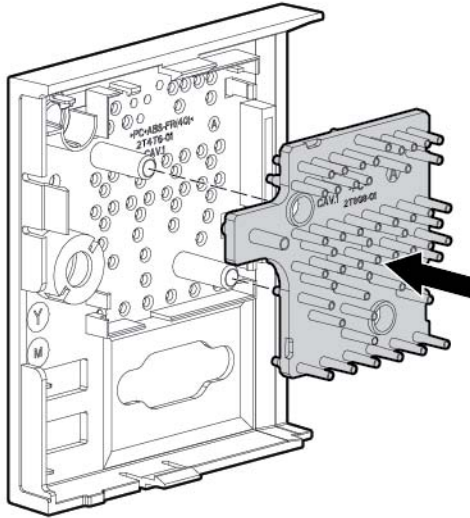
1. Power off the server (“Powering off the server” (page 106)).
2. Extend the server from the rack (“Extending the server from the rack” (page 102)).
3. Remove the access panel (“Removing and replacing the access panel” (page 113)).
4. Remove necessary fans 1 and 2.
5. Remove the screw securing the SID inside the chassis.
6. Disconnect the cable clip.
7. Pull the Systems Insight Display module halfway out of the server.
8. Disconnect the Systems Insight Display cable.
9. Remove the Systems Insight Display module.



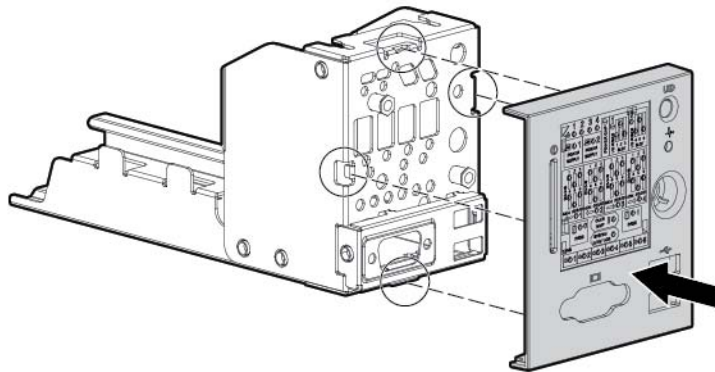
To replace the component, reverse the removal procedure.

If installing a replacement SID module:

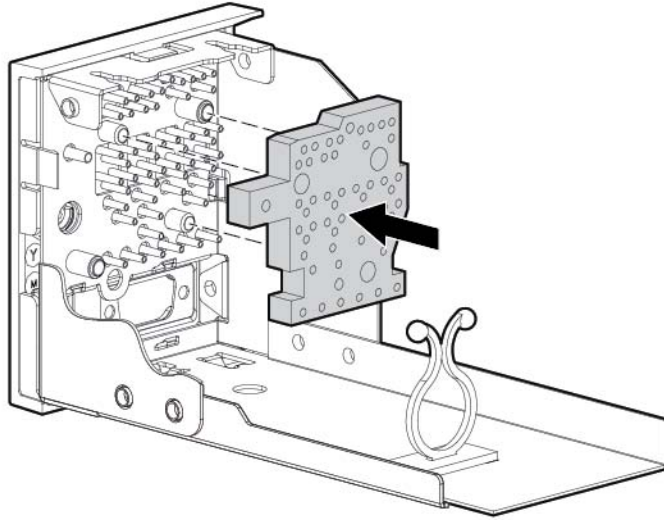
1. Retain the SID bezel, the transparent light pipe, and the black rubber light pipe.
2. Install the transparent plastic light pipe onto the SID bezel.



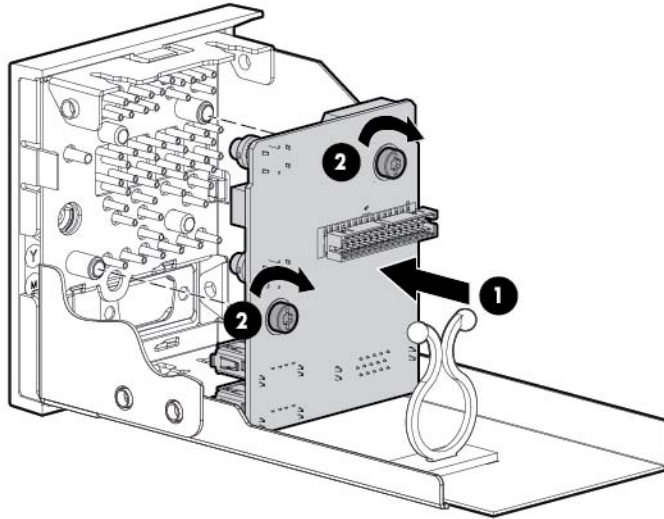
3. Install the SID bezel onto the metal chassis, ensuring the four latches all lock.



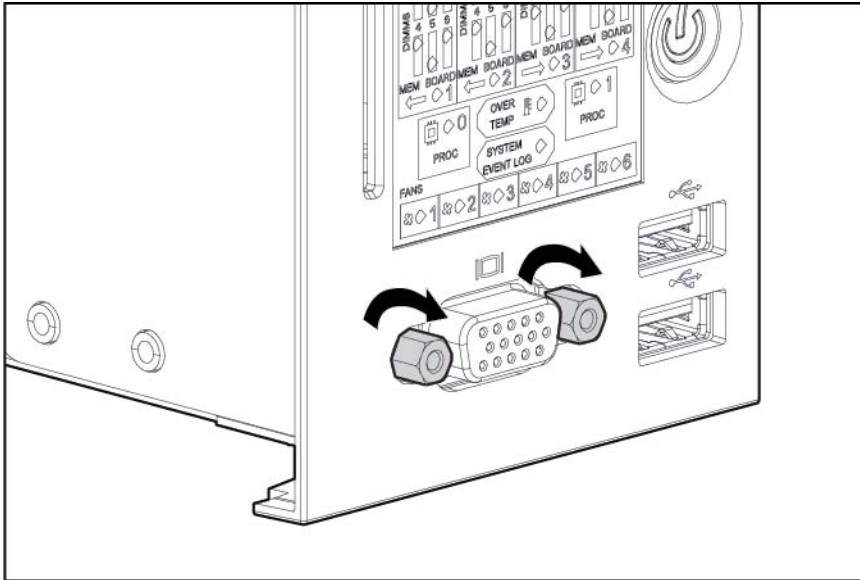
4. Put the black rubber light pipe onto the plastic light pipe.



5. Install the SID board by securing it with the two screws.



6. Fasten the two hexagon screws on the front of SID bezel to the VGA port.

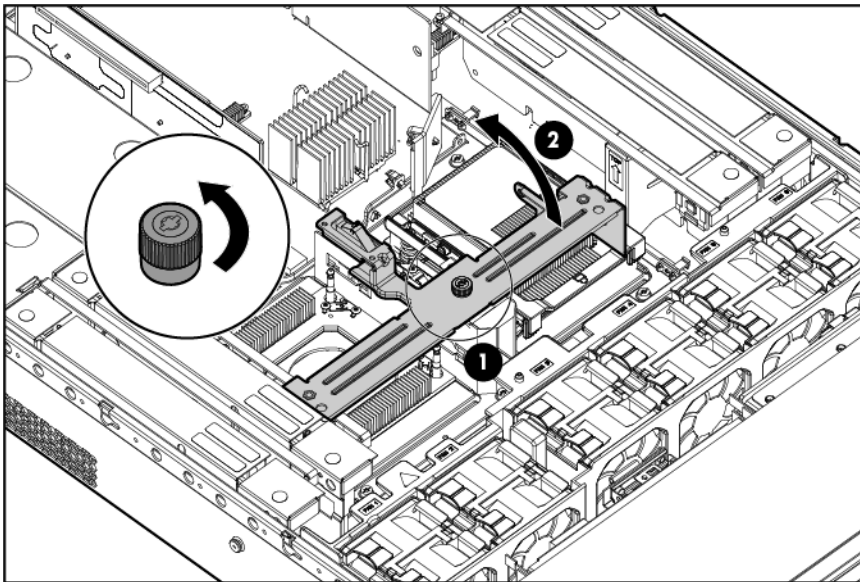


7. Install the component as described above.

Removing and replacing the intrusion switch cable

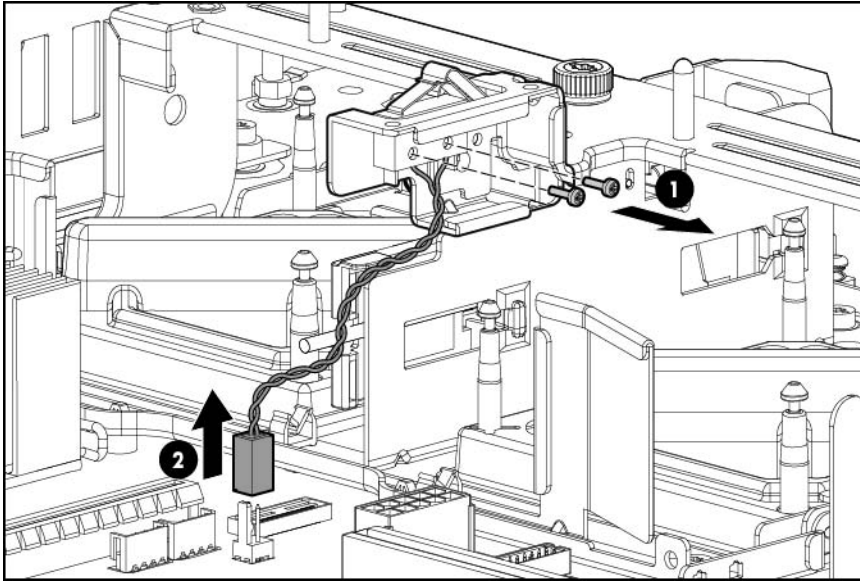
The intrusion switch screws face CPU 0.

1. Power off the server (“Powering off the server” (page 106)).
2. Remove the access panel (“Removing and replacing the access panel” (page 113)).
3. Remove the PCI riser cage (“Removing and replacing the PCI riser cage” (page 118)).
4. Open the processor cage.



5. Using a screwdriver, remove the switch.

6. Unplug the mating connector.



To replace the component, reverse the removal procedure.

Removing and replacing the system board

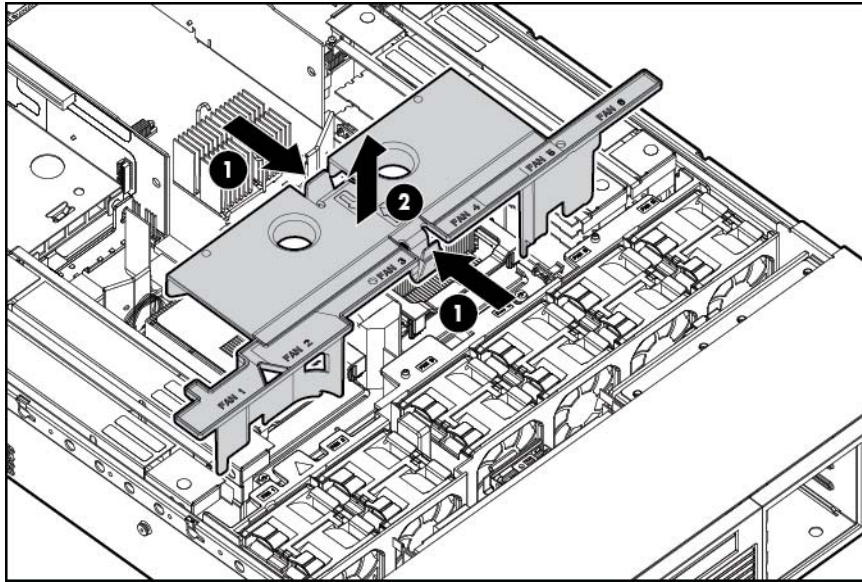
- ⓘ **IMPORTANT:** If your system board has a TPM installed, you must order a new TPM when you order a replacement system board.

Before replacing the system board, you must first back up the current TPM settings. See the HP-UX operating system documentation for more information.

The TPM is not a customer-installable component. If you need to replace a TPM on a replacement system board, contact an HP authorized service provider.

- ⚠ **WARNING!** Once the TPM is installed on your system board, it cannot be removed. If the TPM fails, the system board needs to be replaced. Attempting to remove the TPM from the system board will void any existing HP service contract and cause the server to fail.

1. Power off the server (“Powering off the server” (page 106)).
2. Remove all power supplies (“Removing and replacing a hot-swap power supply” (page 112)).
3. Remove all hot-plug hard drives (“Removing and replacing a hot-plug SAS hard drive” (page 111)).
4. Extend or remove the server from the rack (“Removing the server from the rack” (page 106)) or “Extending the server from the rack” (page 102)).
5. Remove the access panel (“Removing and replacing the access panel” (page 113)).
6. Remove the air baffle.



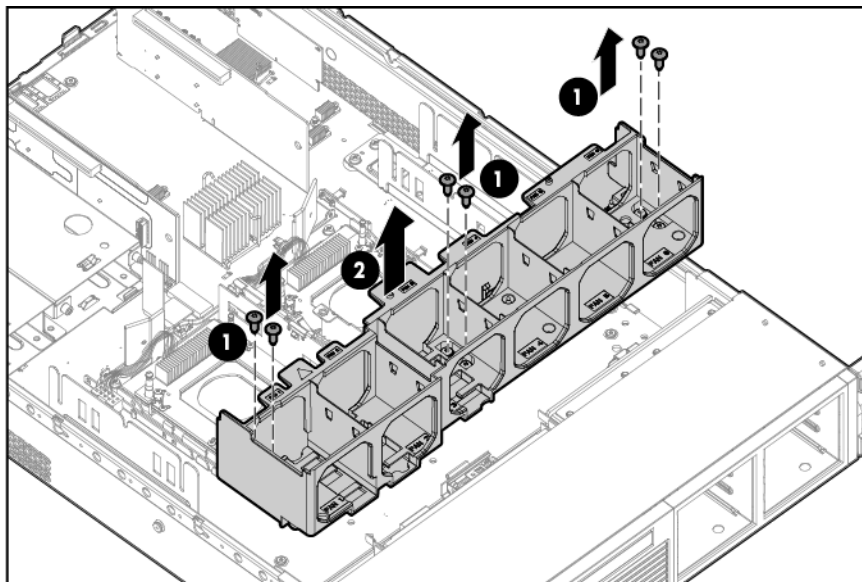
7. Remove the PCI riser cage (“Removing and replacing the PCI riser cage” (page 118)).

⚠ CAUTION: To prevent damage to the server or expansion boards, power off the server and remove all AC power cords before removing or installing the PCI riser cage.

8. Remove all DIMM expansion boards (“Removing and replacing DIMMs” (page 127)).
9. Remove all processor heat sink modules (“Removing and replacing a processor and heat sink module” (page 124)).

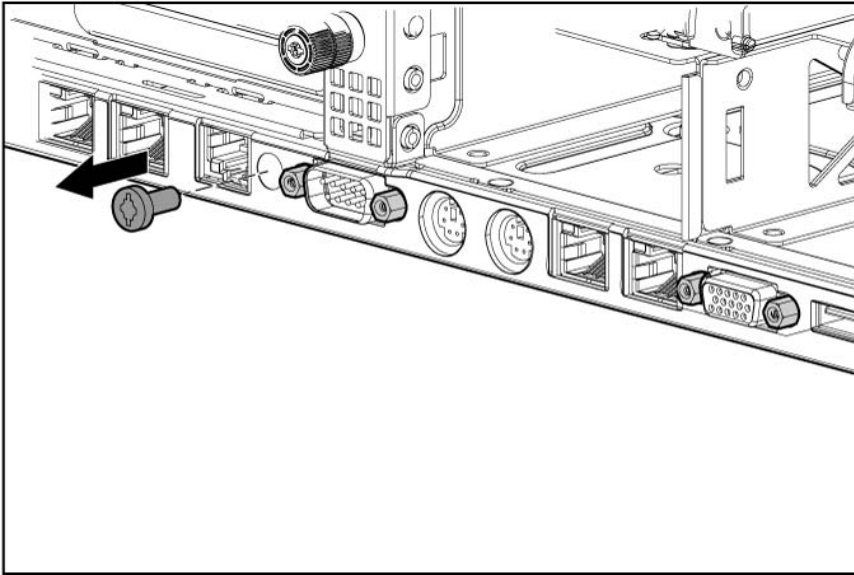
ⓘ IMPORTANT: Place processor pin covers over the sockets to protect the pins.

10. Disconnect all cables connected to the system board.
11. Remove the hot-swap fans from the fan cage (“Removing and replacing a hot-swap fan” (page 115)).
12. Remove the fan cage.

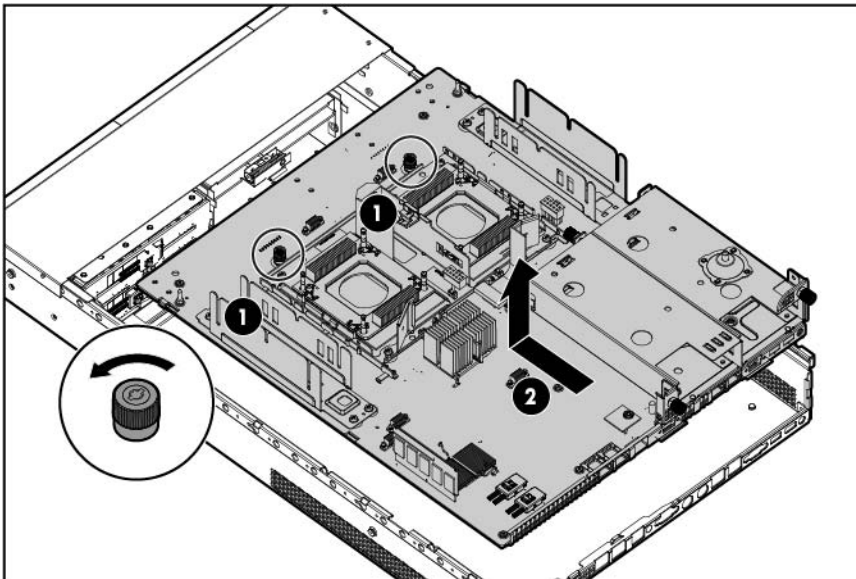


13. Remove the SAS cache module (“Removing and replacing the cache module” (page 120)).
14. Remove the super capacitor pack, if present (“Removing and replacing the super capacitor pack” (page 121)).

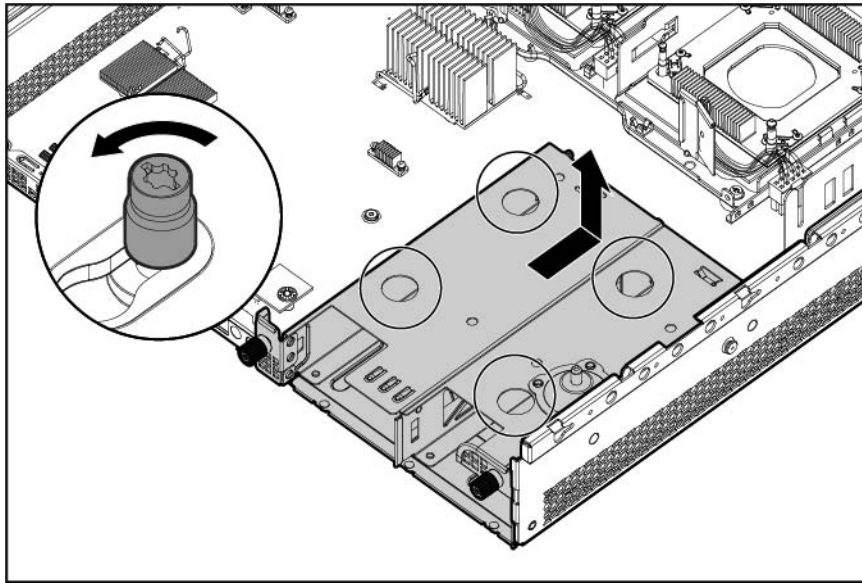
15. Remove the power supply backplane (“Removing and replacing the power supply backplane” (page 116)).
16. Remove the rear retaining screw.



17. Loosen the two system board thumbscrews.
18. Remove the system board from the chassis by pushing it toward the front and then lifting it.



19. Remove four screws on the power supply cage, and remove power supply cage.



To migrate the processor to the spare system board:

1. Take the iLO label off the system board information label and place it over the iLO information pull tab on the front panel.
2. Install the spare system board.
3. Remove the battery insulator strip from the system board battery.

CAUTION: The pins on the processor socket are very fragile. Any damage to them may require replacing the system board.

4. Install the processors and heat sink or processor heat sink module the system board (“[Installing a processor](#)” (page 58)).
5. Install all components removed from the failed system board.

CAUTION: Do not replace hot-plug hard drives until you have configured the RAID controller as detailed below.

6. Install the access panel (“[Removing and replacing the access panel](#)” (page 113)).
7. Install the power supplies (“[Removing and replacing a hot-swap power supply](#)” (page 112)).
8. Power up the server.

NOTE: Install all components with the same configuration that was used on the failed system board.

CAUTION: Replacement system boards are shipped with the RAID controller in HBA mode by default. When the original components are re-installed on the replacement board and the system is booted to UEFI, the `saupdate` utility must be used to re-enable the RAID configuration if the original server was using the RAID functionality. See “[SAS disk setup](#)” (page 145) for instructions on using the `saupdate` utility.

After you replace the system board, you must to set the SAS mode to RAID if that was your previous configuration.

1. During the server startup, wait for UEFI Front Page, press **S** to launch the UEFI Shell.
2. Get the `saupdate.efi` utility tool.
3. Enter `saupdate.efi set_mode 0:1:0:0 raid` to change the SAS mode to RAID.

4. Enter `saupdate.efi get_mode 0:1:0:0` to verify the SAS mode is set to RAID.

After you replace the system board, you must port over the server serial number, product number and UUID. Labels on the server indicates these numbers.

1. Log in to iLO 3 MP, by using SSH, for example.
2. Access the MP Main Menu.
3. Enter `CM` at the `hpiLO->` prompt.
4. Enter `sysset` at the `CM:hpiLO>` prompt, and it will show the system information.

```
CM:hpiLO-> sysset
```

```
SYSSET
```

```
Current System Information Parameters:
```

```
Manufacturer           : HP
Product Name (prodname) : Uninitialized
Secondary Product Name  : Integrity rx2800 i2
Product Number (prodnum) : Uninitialized
Secondary Product Number : AH395A
Serial number (serial)   : Uninitialized
Secondary Serial Number  : USE1056FED
UUID (uuid)             : FFFFFFFF-FFFF-FFFF-FFFF-FFFFFFFFFFFFFF
Secondary UUID          : 371DABDA-491F-11E0-B2B9-7067579B3784
Product ID              : 0x801
```

Primary and secondary system parameters values do not match.

Copy secondary parameters to primary? (Y/[N]):

5. Enter `Y` to the prompt to copy the serial number, product number, and UUID to the replacement system board.
6. Reset iLO MP by entering `xd -r -nc` at the `CM:hpiLO->` prompt.

8 Support and other resources

Contacting HP

Information to collect before you contact HP

NOTE: HP recommends that you record any changes that you make to your system, as well as how the changes affect system behavior.

1. Collect the following information:
 - Technical support registration number (if applicable)
 - Failure symptoms and error indications (LEDs and messages)
 - A log of the current SEL and FPL contents
 - The `sysrev` output from the iLO 3 MP, and the output using the `iLO df -all -nc` command
 - The model number of your server (for example, rx2800 i2)
 - The product number of your server, which is on the identification label at the front of the unit
 - The serial number of your server, which is on the identification label.
 - Add-on boards or additional hardware installed in the server
2. Be familiar with your system 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?
3. Determine the following:
 - Which firmware versions are in use?
 - When did the issue start?
 - Have recent changes been made to the system?
 - Which OS and revision level is in use?

HP contact information

For the name of the nearest HP authorized reseller:

- See the Contact HP worldwide (in English) webpage (<http://www.hp.com/country/us/en/wwcontact.html>).

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage (http://welcome.hp.com/country/us/en/contact_us.html). To contact HP by phone:
 - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
 - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (<http://www.hp.com/go/carepack>).
- In other locations, see the Contact HP worldwide (in English) webpage (<http://welcome.hp.com/country/us/en/wwcontact.html>).

Online support

To contact HP Customer Support online, see the Worldwide Limited Warranty and Technical Support Guide or visit us at <http://www.hp.com/go/bizsupport>. On our web page, enter the server model number (rx2800 i2) in the search box.

The following information is available on this website:

- Software and firmware updates
- The latest drivers and utilities
- Additional documentation

Phone support

To contact HP customer support by phone, go to the HP Support Center (HPSC), at: <http://www.hp.com/go/hpsc>. Local phone numbers are listed in your native language for help.

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website: http://www.hp.com/country/us/en/contact_us.html.

After registering, you will receive email notification of product enhancements, new driver versions, firmware updates, and other product resources.

HP Insight Remote Support Software

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable enhanced delivery of your HP Warranty, HP Care Pack Service or HP contractual support agreement. HP Insight Remote Support supplements your monitoring, 24x7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The software is available in two variants:

- HP Insight Remote Support Standard: This software supports server and storage devices and is optimized for environments with 1-50 servers. Ideal for customers who can benefit from

proactive notification, but do not need proactive service delivery and integration with a management platform.

- **HP Insight Remote Support Advanced:** This software provides comprehensive remote monitoring and proactive service support for nearly all HP servers, storage, network, and SAN environments, plus selected non-HP servers that have a support obligation with HP. It is integrated with HP Systems Insight Manager. A dedicated server is recommended to host both HP Systems Insight Manager and HP Insight Remote Support Advanced.

Details for both versions are available at:

<http://www.hp.com/go/insightremotesupport>

Go to Software Depot to download the software:

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

Select **Insight Remote Support** from the menu on the right.

New and changed information in this edition

The following additions and changes have been made for this edition:

- The following information has been updated:
 - Updated references to memory expansion boards throughout the document
 - Provided detailed information on replacement cable kit in “[Server components list](#)” (page 99)

Related information

Documentation feedback

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 HP sales representative for details.

The latest version of this document can be found online at: http://www.hp.com/go/Integrity_Servers-docs


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


Please send comments to: docsfeedback@hp.com.


Please include title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document. Also, please include what we did right so we can incorporate it into other documents.

Typographic conventions

This document uses the following conventions.

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

 -  **CAUTION:** A caution provides information required to avoid losing data or avoid losing server functionality.

 -  **IMPORTANT:** This alert provides essential information to explain a concept or to complete a task.

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

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

HP-UX release name and release identifier

Each HP-UX 11i release has an associated release name and release identifier. The `uname(1)` command with the `-r` option returns the release identifier.

Table 45 HP-UX 11i Releases

Release identifier	Release name	Supported processor architecture
B.11.31	HP-UX 11i v 3.0	Intel Itanium

Related documents

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

HP Integrity servers documentation:

http://www.hp.com/go/integrity_servers-docs

Diagnostics and Event Monitoring: Hardware support tools

<http://www.hp.com/go/diagnostics>

Customer self repair

This section details the customer self repair components, and the estimated repair time it takes to replace a component. If during the diagnosis period HP (or HP service providers or service partners) identifies that the repair can be accomplished by the use of a CRU part, HP will ship that part directly to you for replacement. There are three categories of CRU parts:

- Yes Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- Optional Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there might be additional charges, depending on the type of warranty service designated for your product.

No Parts that are not designed for customer self repair. To satisfy the customer warranty, HP requires that an authorized service provider replace the part.

Based on availability and where geography permits, CRU parts are shipped for next business day delivery. Same-day or four-hour delivery might be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone.

HP specifies in the materials shipped with a replacement CRU part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part might result in HP billing you for the replacement. With a CRU, HP pays for all the shipping and part return costs and determines the courier to be used.

For more information about HP's Customer Self Repair program, contact your local service provider. For the North American program, see the HP website:

<http://www.hp.com/go/selfrepair>

Standard terms, abbreviations and acronyms

ACPI	Advanced Configuration and Power Interface.
BBWC	Battery Backed Write Cache.
CMC	Corrected machine check.
Cold-swappable	A component that requires the operating system be shut down and the server powered off before it can be removed. Cold-swappable components are signified with blue touch points.
CPE	Corrected platform error.
CRU	Customer Replaceable Unit.
DDNS	Dynamic DNS.
DHCP	Dynamic Host Configuration Protocol.
DMA	Direct memory access.
ESD	Electrostatic discharge.
FBWC	Flash Backed Write Cache.
FRU	Field Replaceable Unit.
HDD	Hard disk drive.
Hot-pluggable	A component that can be removed from the server while the server remains operational, but software intervention is required prior to removing the component. Hot-pluggable components are signified with red touch points.
Hot-swappable	A component that can be removed from the server while the server remains operational and requires no software intervention prior to removing the component. Hot-swappable components are signified with red touch points.
iLO 3	Integrated Lights Out 3.
LOM	LAN-on-motherboard.
MAC	Media Access Control.
PAL	Processor Abstraction Layer.
PDT	Page deallocation table.
PE	Protective earthing.
RDIMM	Registered DIMM.
SAL	System Abstraction Layer.
SAS	Serial-attached SCSI.
SEL	System event log.
SFF	Small form factor.
SFW	System firmware.
SID	System Insight Display.
UDIMM	Unbuffered DIMM.
UEFI	Unified Extensible Firmware Interface.
UID	Unit identification.
WBEM	Web-Based Enterprise Management.

A Utilities

SAS disk setup

Using the saupdate command

The saupdate command is used to query or change the mode of the Smart Array P410i and Smart Array P411 controllers to HBA or RAID. Querying or changing modes is not supported for other controllers.

The newly added commands to SAUPDATE are:

- Get Mode
- Set Mode

Get mode

This command displays the current mode of the controllers.

Syntax

```
saupdate get_mode <controller>
```

<controller> can be any one of the following strings.

Table 46 <controller> strings

<controller>	Meaning
<seg:bus:dev:func>	A controller having the PCI segment id, bus id, device id and function id is addressed
all	Addresses all controllers in the system
<model>	Controllers of a particular type indicated by the <model> string are addressed

```
fs2:\> saupdate get_mode 0:2:0:0
The controller at 0:2:0:0 is in HBA mode
fs2:\> saupdate get_mode p410i
The controller at 0:2:0:0 is in HBA mode
The controller at 0:42:0:0 is in HBA mode
The controller at 0:82:0:0 is in HBA mode
The controller at 0:C2:0:0 is in HBA mode
fs2:\> saupdate get_mode all
The controller at 0:2:0:0 is in HBA mode
The controller at 0:42:0:0 is in HBA mode
The controller at 0:82:0:0 is in HBA mode
The controller at 0:C2:0:0 is in HBA mode
fs2:\> █
```

Set mode

- ❗ **IMPORTANT:** If you are using HBA mode, do not install any disk that has previously been a part of a RAID volume into the system.

Set mode is used to change the mode of the controller. If the controller is already in the required mode the following message appears:

The controller at `seg:bus:dev:func` is already in HBA|RAID mode.

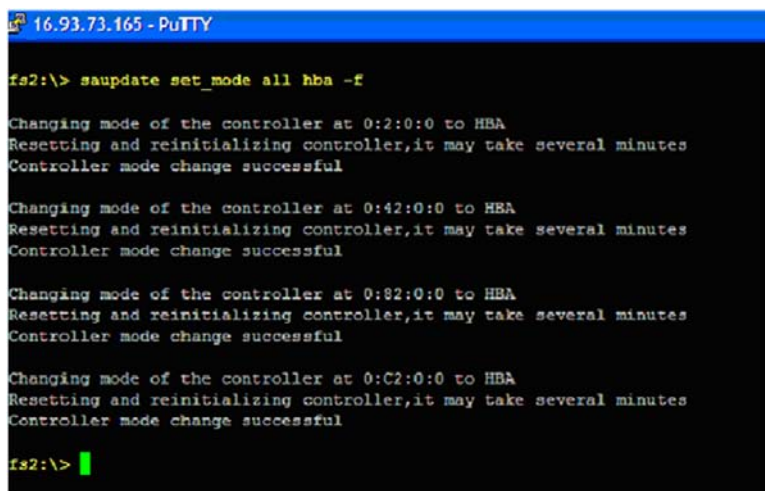
Syntax

```
saupdate set mode <controller> <hba | raid> [-f]
```

<controller> can be any one of the strings listed in [Table 46 \(page 145\)](#).

An alert message about the possible data loss is displayed when a mode change command is issued. A confirmation is required before the actual mode change is made. This ensures unintentional change of mode does not happen.

The `-f` option indicates the user is aware of the changes that are being made and does not require a warning message or a confirmation regarding the mode change.



```
16.93.73.165 - PuTTY

fs2:\> saupdate set_mode all hba -f

Changing mode of the controller at 0:2:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

Changing mode of the controller at 0:42:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

Changing mode of the controller at 0:82:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

Changing mode of the controller at 0:C2:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

fs2:\>
```

- ❗ **IMPORTANT:** After changing the mode, perform a `reconnect -r` command at UEFI.

NOTE: Commands are not case-sensitive.

Updating the firmware using saupdate

1. Download the firmware image file into the system UEFI partition.
2. Boot the system to the UEFI Shell and change directories to the UEFI partition.
3. Use the `saupdate list` to display all detected Smart Array controllers along with the active firmware versions, the identification information from this list is used to designate which controller is to be updated.
4. Use `saupdate update <seg:bus:dev:func:index> <firmware image>` to update the firmware.
5. Restart the system.

To query the current mode of the controller use `saupdate get_mode <controller>`. The <controller> could be any one of the strings:

- `<seg:bus:dev:func>` A controller having the PCI segment id, bus id, device id and function id is addressed
- `all` Addresses all controllers in the system
- `<model>` Controllers of a particular type indicated by the <model> string are addressed.

To change the mode of the controller use `saupdate set_mode <controller> <hba | raid> [-f]`.

NOTE: A system reset or a `reconnect-r` is required after changing from HBA to RAID mode.

An alert message about the possible data loss is displayed when a mode change command is issued. A confirmation is required before the actual mode change is made. This ensures unintentional change of mode does not happen.

The `-f` option indicates the user is aware of the changes that are being made and does not require a warning message or a confirmation regarding the mode change.

NOTE: Commands are not case-sensitive. A system reset or `reconnect-r` followed by `map -r` is required when changing from HBA mode to RAID mode.

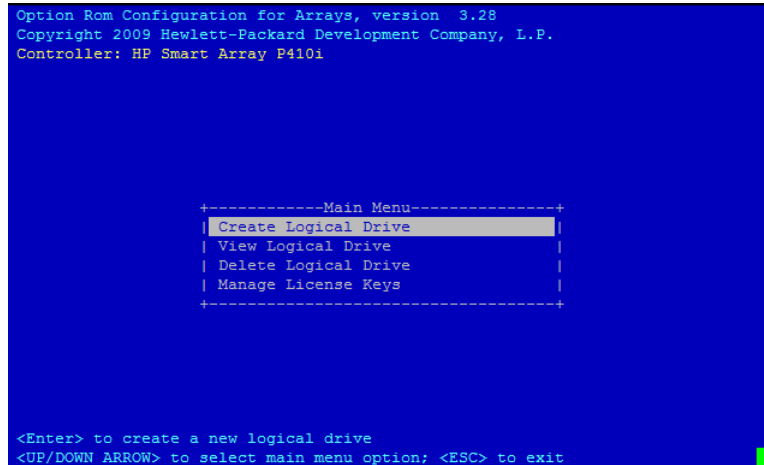
Determining the Driver ID and CTRL ID

Use the `drvcfg` utility and UEFI shell commands to find the Driver ID corresponding Ctrl ID for the SAS Host Bus Adapter.

1. At the UEFI shell, use the `drivers` command.
2. Find the SAS Host Bus Adapter in the list of drivers, and make a note of the Driver ID from the left column.
3. Use the `drvcfg` command.
4. Find the SAS Host Bus Adapter's Driver ID in the list, and make a note of the corresponding Ctrl ID.

Using the ORCA menu-driven interface

From the UEFI Shell, enter `drvcfg -s <Driver ID> <Ctrl ID>`. The ORCA main menu appears.



```
Option Rom Configuration for Arrays, version 3.28
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

-----Main Menu-----
| Create Logical Drive |
| View Logical Drive  |
| Delete Logical Drive|
| Manage License Keys |
+-----+

<Enter> to create a new logical drive
<UP/DOWN ARROW> to select main menu option; <ESC> to exit
```

The ORCA main menu contains the following options:

- Create Logical Drive
- View Logical Drive
- Delete Logical Drive
- Manage License Keys

Creating a logical drive

1. At the ORCA main menu, select Create Logical Drive.
2. Select the physical disks to be included in the logical drive in the Available Physical Drives section.

3. To select the Raid Configurations section and select the RAID type for the logical drive, press **Tab**.
4. To select the Spare section and assign spare disks, as needed, press **Tab**.
5. To create the logical drive, press **Enter**. A summary of your choices appears.
6. To save the configuration, press **F8**.
If the function keys are disabled, press **Esc** and then press **8**.
7. To acknowledge that the configuration was saved and return to the ORCA Main Menu, press **Enter**.

Deleting a logical drive

⚠ WARNING! Back up all necessary data before deleting the logical drive. When you delete a logical drive, data on the drive is not preserved.

1. At the ORCA main menu, select **Delete Logical Drive**.
2. Select a logical drive to be deleted.
3. Press **F3** to delete the logical drive.
If the function keys are disabled, press **Esc** and then press **3**.
4. To acknowledge that the configuration was saved and return to the ORCA Main Menu, press **Enter**.

Adding a RAID Advanced Pack license key

1. At the ORCA main menu, select **Manage License Keys**.

```
Option Rom Configuration for Arrays, version 3.28
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

+-----Main Menu-----+
| Create Logical Drive   |
| View Logical Drive    |
| Delete Logical Drive   |
| Manage License Keys    |
+-----+

<Enter> to manage license keys
<UP/DOWN ARROW> to select main menu option; <ESC> to exit
```

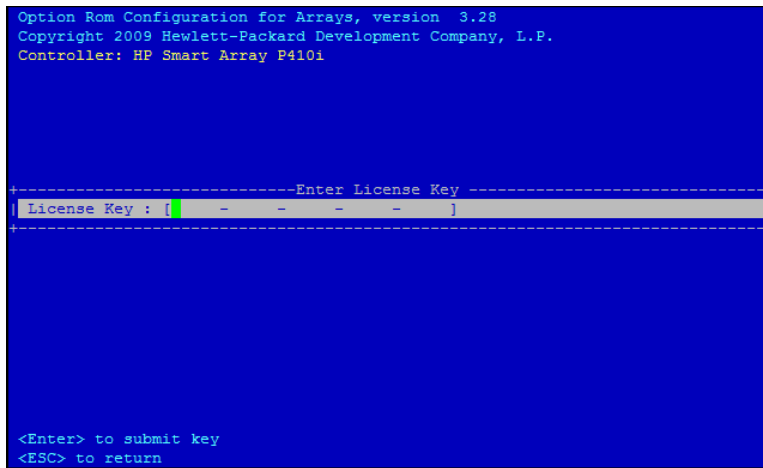
2. Select **Add License Key**.

```
Option Rom Configuration for Arrays, version 3.28
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

+-----License Key Menu-----+
| Add License Key        |
| View License Key(s)   |
| Delete License Key(s) |
+-----+

<Enter> to add a new license key
<UP/DOWN ARROW> to select option; <ESC> to go back to main menu
```

3. Enter the license key and press **Enter**.



4. Verify your license key. See “Viewing RAID advanced pack license keys” (page 149).

Viewing RAID advanced pack license keys

1. At the ORCA main menu, select **Manage License Keys**.
2. Select **View License Key(s)**.
3. All advanced pack license keys are displayed. Press **Esc** to return to the License Keys Menu.

UEFI

UEFI is an OS and platform-independent boot and preboot interface. UEFI resides between the OS and platform firmware, enabling the OS to boot without having details about the underlying hardware and firmware. UEFI supports boot devices, uses a flat memory model, and hides platform and firmware details from the OS.

NOTE: Unified UEFI Forum, Inc. defines the specification used to implement UEFI. POSSE is an HP extension to UEFI, which provides a common user interface architecture to better serve HP customers, service, and manufacturing.

UEFI consolidates boot utilities similar to those found in PA-RISC based servers, such as the BCH, and platform firmware into a single platform firmware. UEFI enables the selection of any UEFI OS loader from any boot medium that is supported by UEFI boot services. An UEFI OS loader supports multiple options on the user interface.

UEFI supports booting from media that contain an UEFI OS loader or an UEFI-defined server partition. An UEFI-defined system partition is required by UEFI to boot from a block device.

The UEFI boot manager loads UEFI applications (including the OS first stage loader) and UEFI drivers from an UEFI-defined file system or image loading service. NVRAM variables point to the file to be loaded. These variables contain application-specific data that is passed directly to the UEFI application. UEFI variables provides system firmware a boot menu that points to all the operating systems, even multiple versions of the same operating systems.

The UEFI boot manager enables you to control the server booting environment. Depending on how you have configured the boot options, after the server is powered up the boot manager presents you with different ways to bring up the server. For example, you can boot to the UEFI shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance Manager. See “Using the boot maintenance manager” (page 153) for more information.

UEFI shell and HP POSSE commands

For details on these commands, enter `help command` at the UEFI Shell prompt.

Table 47 UEFI shell commands

UEFI shell command	Definition
?	Displays the UEFI Shell command list or verbose command help
alias	Displays, creates, or deletes UEFI Shell aliases
attrib	Displays or changes the attributes of files or directories
autoboot	Set/View autoboot timeout and retries
bcfg	Display/Modify the driver/boot configuration
boottest	Turn specific speedyboot bits on or off
cd	Displays or changes the current directory
cls	Clears standard output and optionally changes background color
comp	Compares the contents of two files
conconfig	Configure consoles and set/view primary operating system console
connect	Connects one or more UEFI drivers to a device
cp	Copies one or more files or directories to another location
cpuconfig	Deconfigure/Reconfigure processor sockets and threads
date	Displays or changes the current system date
dblk	Displays one or more blocks from a block device
dbprofile	Manage direct boot profiles
default	Set default values
devices	Displays the list of devices managed by UEFI drivers
devtree	Displays the UEFI Driver Model compliant device tree
dh	Displays UEFI handle information
disconnect	Disconnects one or more UEFI drivers from a device
dmem	Displays the contents of memory
dmpstore	Displays, stores, and restores all UEFI NVRAM variables
drivers	Displays the UEFI driver list
drvcfg	Invokes the Driver Configuration Protocol
drvdiag	Invokes the Driver Diagnostics Protocol
echo	Controls batch file command echoing or displays a message
edit	Full screen editor for ASCII or UNICODE files
eficompress	Compress a file
efidecompress	Decompress a file
errdump	View/Clear logs
exit	Exits the UEFI Shell environment
for	Executes commands for each item in a set of items
ftp	Perform FTP operation
goto	Forces batch file execution to jump to specified location
guid	Displays all registered UEFI GUIDs

Table 47 UEFI shell commands *(continued)*

UEFI shell command	Definition
help	Displays the UEFI Shell command list or verbose command help
hexedit	Full screen hex editor
if	Executes commands in specified conditions
ifconfig	Modify the default IP address of UEFI network stack
info	Display hardware information
input	Take user input and place in UEFI variable
ioconfig	Deconfigure/Reconfigure IO components or settings
lanaddress	Display LAN devices
lanboot	LAN boot
load	Loads and optionally connects one or more UEFI drivers
loadpcirom	Loads a PCI Option ROM
ls	Displays a list of files and subdirectories in a directory
map	Displays or defines mappings
memconfig	Set/View memory configuration settings
memmap	Displays the memory map
mkdir	Creates one or more directories
mm	Displays or modifies MEM/MMIO/IO/PCI/PCIE address space
mode	Displays or changes the console output device mode
mount	Mounts a file system on a block device
mv	one or more files or directories to another location
openinfo	Displays the protocols and agents associated with a handle
palproc	Make a PAL procedure call
pause	Prints a message and waits for keyboard input
pci	Displays PCI device list or PCI function configuration space
ping	Ping a target machine with UEFI network stack
reconnect	Reconnects one or more UEFI drivers to a device
reset	Resets the system
rm	Deletes one or more files or directories
salproc	Make a SAL procedure call
search	Connect drivers for bootable devices
seconfig	View/configure system security features
sermode	Sets serial port attributes
set	Displays or modifies UEFI Shell environment variables
setsize	Set the size of a file
shift	Shifts batch file input parameter positions
smbiosview	Displays SMBIOS information

Table 47 UEFI shell commands (continued)

UEFI shell command	Definition
stall	Stalls the processor for the specified number of microseconds
tapeboot	Boot from tape
tftp	Perform TFTP operation
time	Displays or changes the current system time
timezone	Displays or sets time zone information
touch	Updates filename timestamp with current system date and time
type	Displays file contents
unload	Unloads a UEFI driver
ver	Displays UEFI Firmware version information
vol	Displays or changes a file system volume label
xchar	Turn on/off extended character features

Drive paths in UEFI

Devices in the server are represented by device paths in the UEFI shell. Each internal SAS drive could be configured either as:

- RAID mode
- HBA (raw) mode

NOTE: A SAS drive in RAID mode is identified by "Scsi" in the device path. A SAS drive in HBA mode is identified by "SAS" in the device path.

NOTE: Unlike parallel SCSI, you cannot correlate UEFI device paths to internal SAS disk drive bays with SAS regardless of RAID/HBA mode. The UEFI device paths currently do not contain any information that could be used to determine the physical location of the drives.

Device	Path format	Path example
PCIe root bridge device path node	UID	PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0) (RAID mode)
		PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/SAS(0x5000C500037688B9,0x0,0x1,NoTopology,0,0,0,0x0) (HBA mode)
Hard drive partition device path	HD (Partition,Type,Signature)	PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0)/HD(1,GPT,27C34F01-9F1E-11DE-A0BB-AA000400FEFF) (RAID mode)
		PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/SAS(0x5000C500037688B9,0x0,0x1,NoTopology,0,0,0,0x0)/HD(1,GPT,27C34F01-9F1E-11DE-A0BB-AA000400FEFF) (HBA mode)
CD-ROM / DVD-ROM partition device path	CDROM(Entry)	PcieRoot(0x30304352)/Pci(0x1D,0x7)/USB(0x3,0x0)/CDROM(0x1)

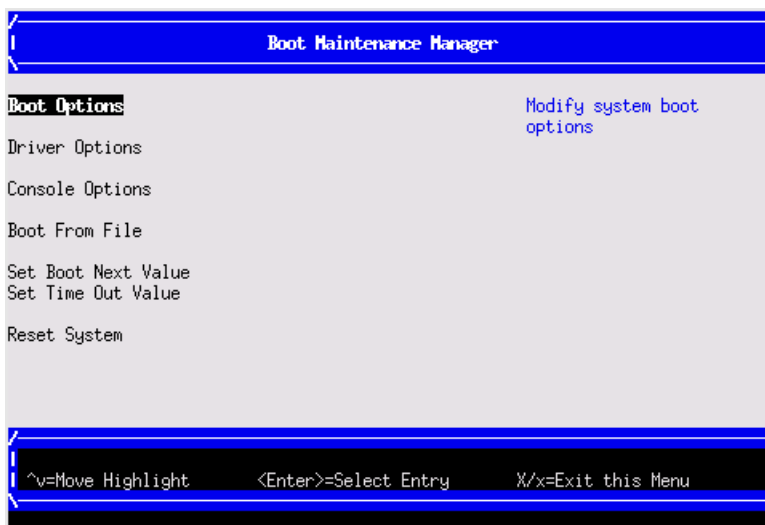
NOTE: Everything after "Scsi" or "SAS" in the output can vary because each SAS drive/partition is unique

Using the boot maintenance manager

This menu enables you to change various boot options. The Boot Maintenance Manager Contains the following submenus:

- Boot Options
- Driver Options
- Console Options
- Boot From File
- Set Boot Next Value
- Set Time Out Value
- Reset System

NOTE: Use the `dmpstore` command to back up these settings.



Boot options

The Boot Options menu contains the following options:

- Add Boot Option
- Delete Boot Option
- Change Boot Order



Add boot option

Use this option to add items to the Boot Options list.

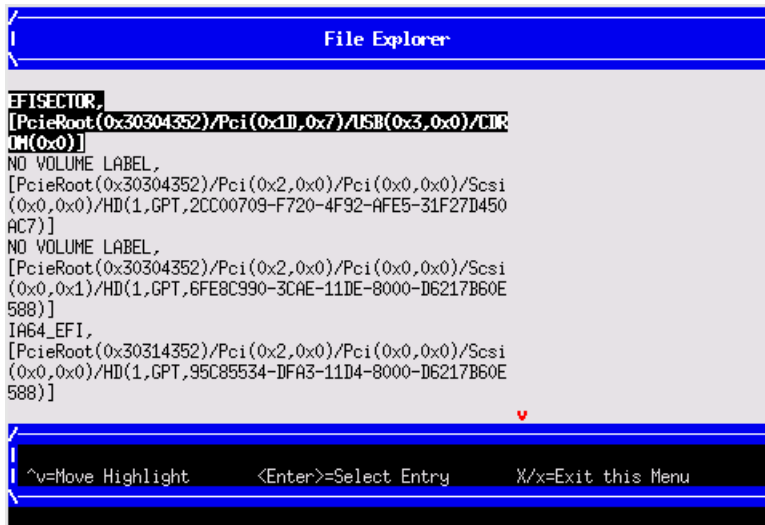
To add a boot option:

1. Select a boot device type.



2. Use the File Explorer menu to locate the correct boot device.

NOTE: File Explorer loads with the appropriate devices for the selected boot device.



Delete boot option

Use this option to remove boot options from the Boot Options list.

NOTE: This does not delete any files, applications or drivers from your server.

To remove items from the boot list:



1. Press **spacebar** to toggle the checkbox for each boot options that you want to delete.
2. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

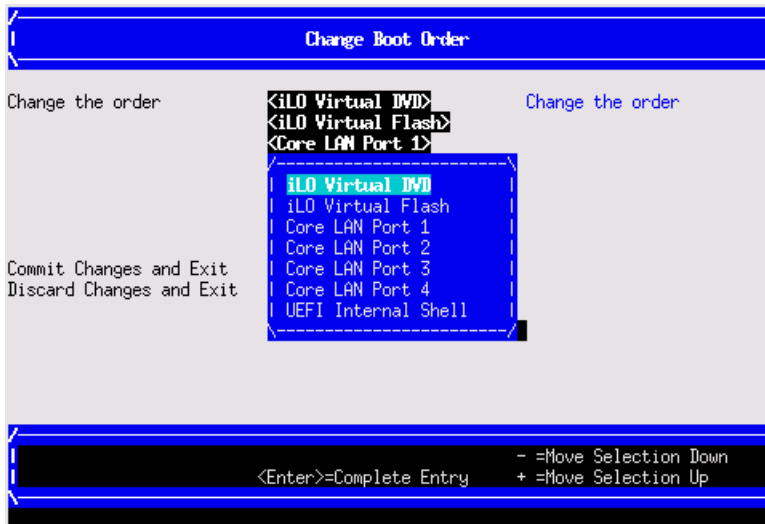
Change boot order

Use this option to change the order of boot options. 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.

To change the boot order:

1. Select an item on the boot order list.
2. Using the + and - keys, move the selection to the desired position in the boot order list.



3. Press **Enter** when the item is in the desired position.
4. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

Driver options

The Driver Options menu contains the following options:

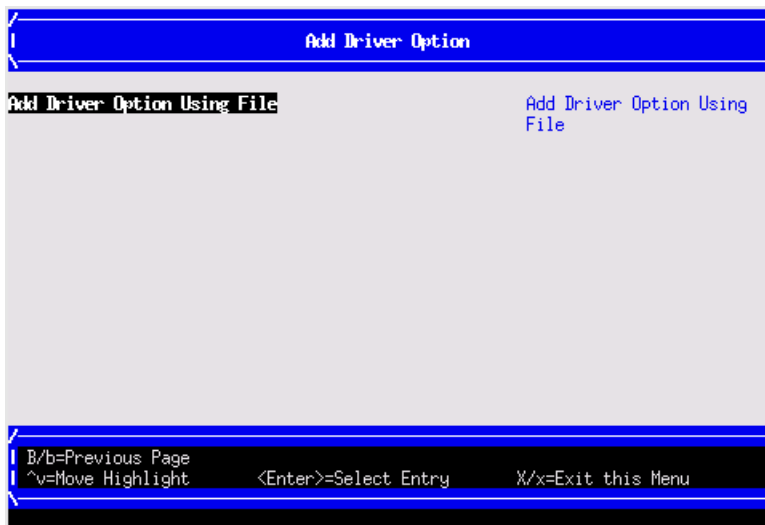
- Add Driver Option
- Delete Driver Option
- Change Driver Order



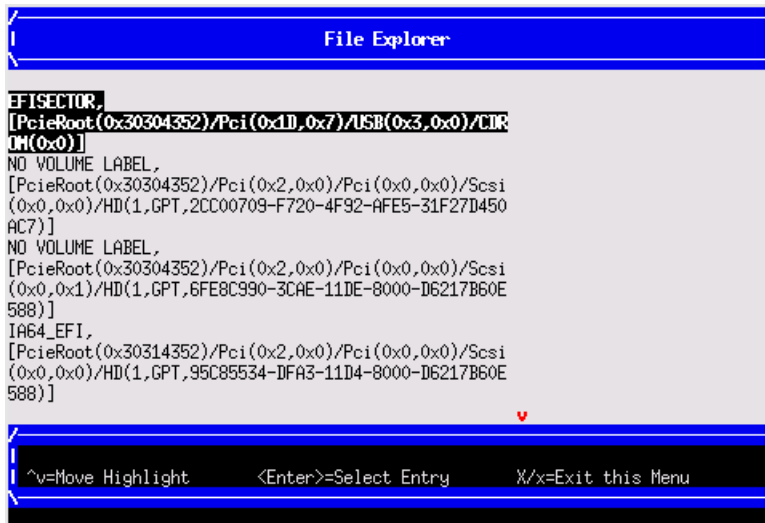
Add driver option

Use this option to add driver options.

1. Select **Add Driver Using File**.



2. Use the File Explorer menu to locate the correct driver.



Delete driver option

Use this option to remove driver options.

NOTE: This does not delete any files, applications or drivers from your server.

To remove driver options:

1. Press **spacebar** to toggle the checkbox for each driver that you want to delete.
2. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

Change driver order

Use this option to change the load order of driver options.

To change the driver load order:

1. Select an item on the driver list.
2. Using the + and - keys, move the selection to the desired position in the book order list.
3. Press **Enter** when the item is in the desired position.

4. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

Console options

The Console Options menu is not currently supported. Use the `conconfig` command from the UEFI Shell to set console options.

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.

1. Select a boot device type.



2. Use the File Explorer menu to locate the correct driver or file.

Set boot next value

Use this option to run the selected boot option immediately upon entering the main Boot Manager menu. This option is useful for booting an option that only needs to be booted once, without changing any other setting in the main Boot Manager menu. This is a one-time operation and does not change the permanent server boot settings.



Set time out value

Use this option to set the amount of time the server pauses before attempting to launch the first item in the Boot Options list.

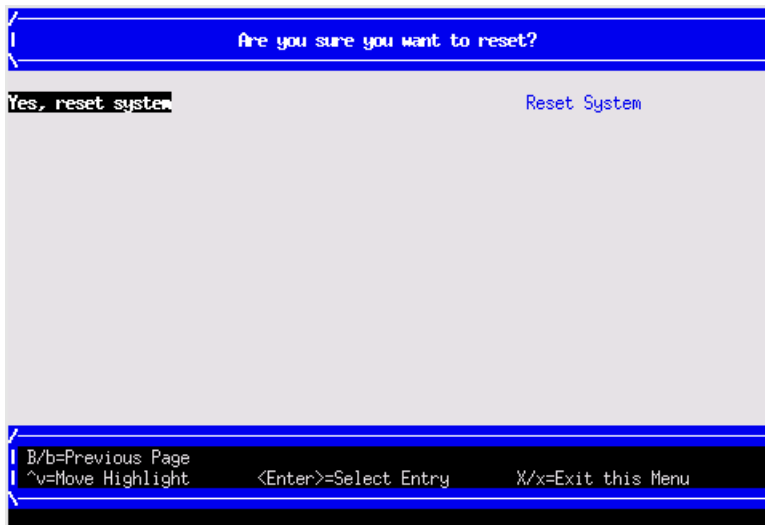
Interrupting the timeout during the countdown stops the Boot Manager from loading any boot options automatically. If there is no countdown, boot options must be selected manually.

To set the auto boot timeout value, in seconds, select Set Timeout Value and enter the desired value.



Reset system

Use this option to perform a system reset.



iLO MP

The iLO MP is an independent support system for the server. It provides a way for you to connect to a server and perform administration or monitoring tasks for the server hardware.

The iLO MP controls power, reset, ToC capabilities, provides console access, displays and records system events, and displays detailed information about the various internal subsystems. The iLO MP also provides a virtual front panel used to monitor server status and the state of front panel LEDs. All iLO MP functions are available through the LAN and the local RS-232 port.

The iLO MP is available whenever the server is connected to a power source, even if the server main power switch is off.

Access to the iLO MP can be restricted by user accounts. User accounts are password protected and provide a specific level of access to the server and MP commands.

For more information regarding the iLO MP, see the *HP Integrity iLO 3 Operations Guide*.

http://www.hp.com/go/integrity_servers-docs

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