

# HP ProLiant DL580 Generation 3 Server User Guide



July 2005 (Third Edition)  
Part Number 379044-003

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**Audience assumptions**

This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

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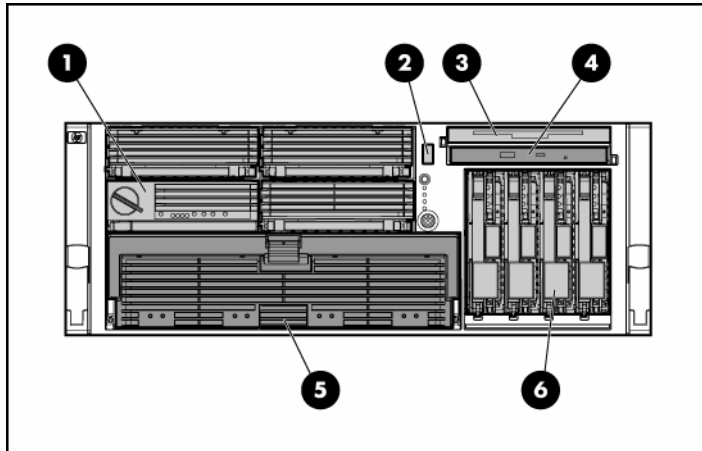
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## Server component identification

### In this section

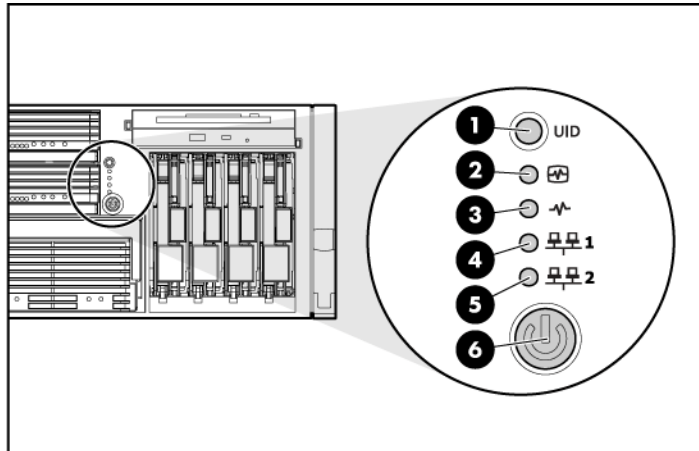
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## Front panel components



Item	Description
1	Memory board or blank
2	USB port
3	Optional multibay drive or blank
4	DVD drive
5	Processor module
6	Hard drive bay

## Front panel LEDs and buttons



Item	Description	Status
1	UID switch and LED	Blue = Activated Flashing blue = Server being managed remotely Off = Deactivated
2	Internal system health LED	Green = Normal (system on) Flashing amber = System health is degraded Flashing red = System health is critical Off = Normal (system off)
3	External system health LED	Green = Normal (system on) Flashing amber = System health is degraded Flashing red = System health is critical Off = Normal (system off)
4	NIC 1 link/activity LED	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection


Item	Description	Status
5	NIC 2 link/activity LED	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection
6	Power on/Standby button and LED	Amber = System has AC power and is in standby mode Green = System has AC power and is turned on Off = System has no AC power

## Memory board components and LEDs

Error indicators remain illuminated when the system is powered off so that the status of the LEDs can still be seen. This behavior matches the behavior of all the other error indicators in the server.

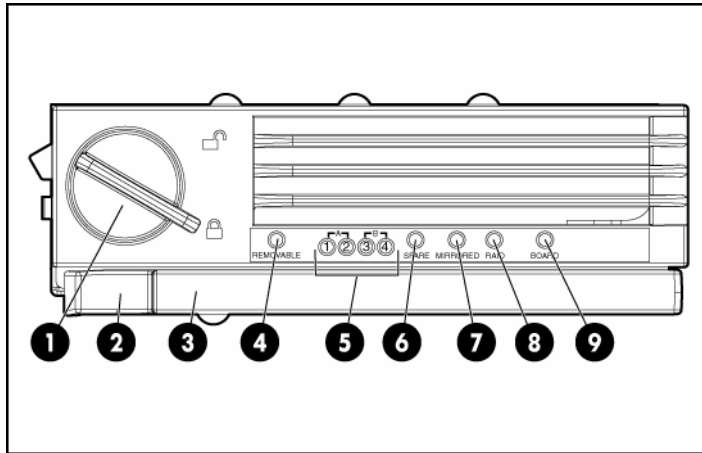
The indicators are only cleared in the following situations:

- If the locking switch is locked after the board is reinstalled
- If the server is rebooted
- If the board is removed from the server

 **CAUTION:** When the memory board locking switch is unlocked in a mode that does not support hot-add or hot-replace capabilities, audio alarms and visual alerts occur. Removing the memory board at this point causes server failure.

To end the audio alarms and visual alerts, move the memory board locking switch back to the locked position. This action does not result in data corruption or server failure.

If removal of a single memory board is required and it is the only memory board, power down the server and make the necessary memory changes.




Item	Description	Status
1	Locking switch	N/A
2	Release latch	N/A
3	Ejector lever	N/A
4	Removable	Off = Do not remove memory board if server is powered on Green = Memory board can be safely removed
5	DIMM LEDs (1–4)	Off = Normal or DIMM not installed Amber = Uncorrectable error detected or correctable error threshold reached Flashing amber = DIMM configuration error

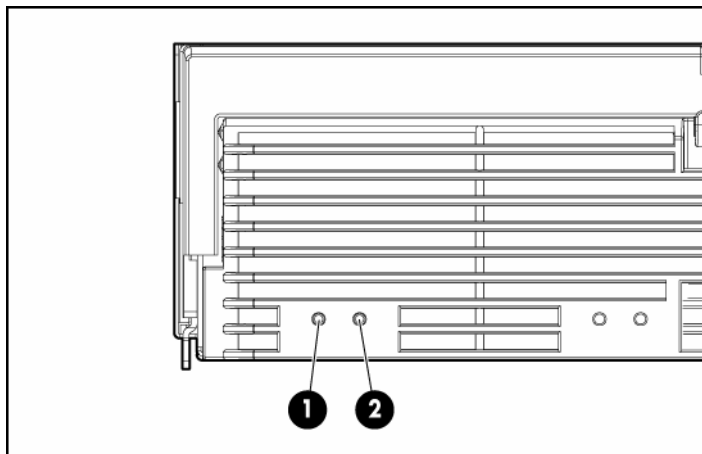
Item	Description	Status
6	Spare	<p>Off = Board not online or board not configured for Online Spare Memory mode</p> <p>Amber = Correctable error threshold reached; server is in degraded Online Spare Memory mode</p> <p>Flashing amber = Memory configuration error*</p> <p>Green = Online Spare Memory mode</p>
7	Mirrored	<p>Off = Board not online or board not configured for Hot-Plug Mirrored Memory mode</p> <p>Amber = Server is in degraded Hot-Plug Mirrored Memory mode</p> <p>Flashing amber = Memory configuration error*</p> <p>Green = Hot-Plug Mirrored Memory mode</p>
8	RAID	<p>Off = Board not online or board not configured for Hot-Plug RAID Memory mode</p> <p>Amber = Server is in degraded Hot-Plug RAID Memory mode</p> <p>Flashing amber = Memory configuration error*</p> <p>Green = Hot-Plug RAID Memory mode</p>
9	Board	<p>Off = Power off or locking switch unlocked</p> <p>Amber = Memory error detected</p> <p>Flashing amber = Memory configuration error*</p> <p>Flashing green = Board is rebuilding</p> <p>Green = Normal</p>

\* AMP configuration errors occur when the current memory configuration is not valid for the configured AMP mode:

- If the mode selected is the desired mode, modify the DIMM or board configuration to support the desired mode. For more information, refer to "Memory Options (on page 95)."
- If the mode selected is not the desired mode, run RBSU and change the AMP mode. For more information, refer to the section "HP ROM-Based Setup Utility (on page 125)."

 **NOTE:** If the Spare, Mirrored, and RAID LEDs are off, the server is in Advanced ECC mode. Refer to "HP ROM-Based Setup Utility (on page 125)" for more information.

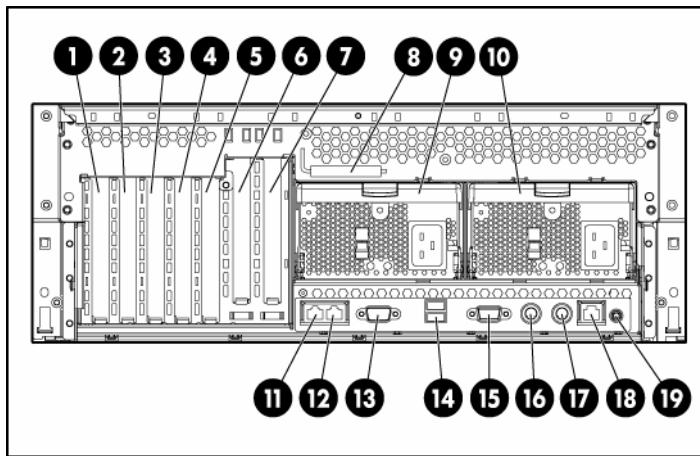
## Processor module LEDs



PPM LED (1)	Processor LED (2)	External health LED	Description
Off	Off	Off	One of the following conditions exist: <ul style="list-style-type: none"> <li>• No AC power present</li> <li>• Normal</li> </ul>
Off	Amber	Flashing amber	Pre-failure error threshold exceeded; LEDs will clear after the next reboot

PPM LED (1)	Processor LED (2)	External health LED	Description
Off	Amber	Flashing red	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>The processor was replaced and the LEDs will clear after the next reboot</li> <li>Processor failed</li> </ul>
Off	Flashing amber	Flashing red	Processor configuration error detected
Amber	Off	Flashing red	PPM failed
Flashing amber	Off	Flashing red	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>PPM not installed</li> <li>PPM configuration error detected</li> </ul>

## Rear panel components

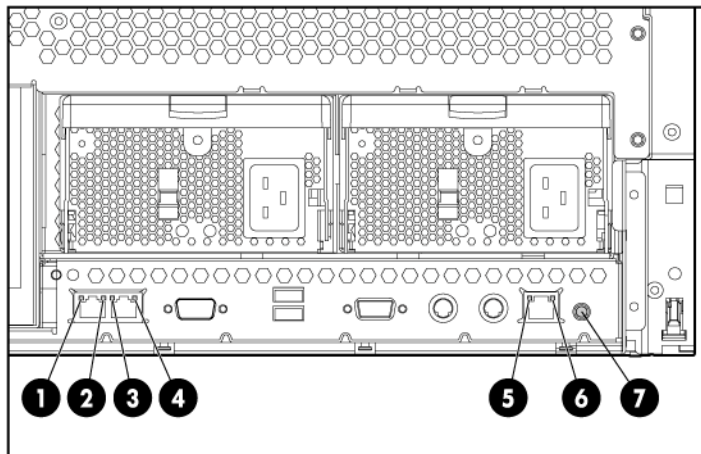


Item	Description	Item	Description
1	PCI-X non-hot-plug slot 7, 64-bit/100-MHz	11	NIC port 2
2	PCI-X non-hot-plug slot 6, 64-bit/100-MHz	12	NIC port 1



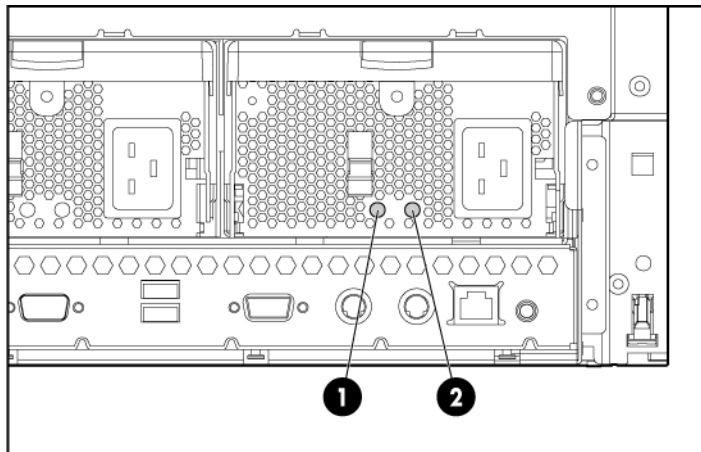
Item	Description	Item	Description
3	PCI-X non-hot-plug slot 5, 64-bit/133-MHz	13	Serial port
4	PCI-X non-hot-plug slot 4, 64-bit/133-MHz	14	USB ports
5	PCI-X non-hot-plug slot 3, 64-bit/133-MHz	15	Video port
6	Optional PCI-X Hot Plug or optional PCI Express non-hot-plug expansion slot 2	16	Keyboard port
7	Optional PCI-X Hot Plug or optional PCI Express non-hot-plug expansion slot 1	17	Mouse port
8	T-15 Torx screwdriver	18	iLO NIC
9	Optional power supply (redundant)	19	UID
10	Power supply (primary)		

## Rear panel LEDs and buttons



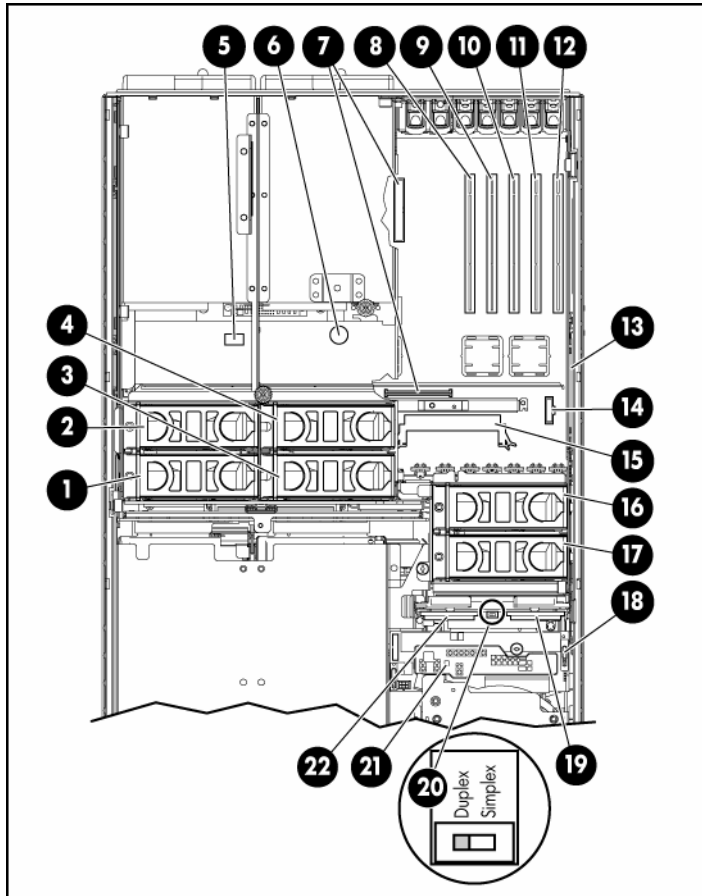
Item	Description	LED color	Status
1	NIC 1 Activity LED	Green	On or flashing = Network activity Off = No network activity
2	NIC 1 Link LED	Green	On = Linked to network Off = Not linked to network
3	NIC 2 Activity LED	Green	On or flashing = Network activity Off = No network activity
4	NIC 2 Link LED	Green	On = Linked to network Off = Not linked to network
5	iLO NIC Activity LED	Green	On or flashing = Network activity Off = No network activity
6	iLO NIC Link LED	Green	On = Linked to network Off = Not linked to network
7	UID LED	Blue	On = Activated Flashing = Server remotely managed Off = Deactivated

## Power supply LEDs



<b>Fail LED 1 (amber)</b>	<b>Power LED 2 (green)</b>	<b>Description</b>
Off	Off	No AC power to any power supply
Flashing	Off	Power supply failure (over current)
On	Off	No AC power to this power supply
Off	Flashing	<ul style="list-style-type: none"><li>• AC power present</li><li>• Standby mode</li></ul>
Off	On	Normal

## System board components



Item	Description	Item	Description
1	Fan 1	12	PCI-X, non-hot-plug slot 7, 64-bit/100-MHz
2	Fan 2	13	BBWC battery pack
3	Fan 3	14	Remote management connector
4	Fan 4	15	BBWC cache module socket

Item	Description	Item	Description
5	System maintenance switch	16	Fan 6
6	System battery	17	Fan 5
7	Connectors for one of the following: <ul style="list-style-type: none"> <li>• PCI-X Hot Plug mezzanine option</li> <li>• PCI Express x4 mezzanine option</li> <li>• PCI Express x8 mezzanine option</li> </ul>	18	Boot device selector switch (default = FLP TOP)
8	PCI-X non-hot-plug slot 3, 64-bit/133-MHz	19	SCSI port A
9	PCI-X, non-hot-plug slot 4, 64-bit/133-MHz	20	SCSI simplex/duplex switch (default = duplex)
10	PCI-X, non-hot-plug slot 5, 64-bit/133-MHz	21	QuickFind diagnostic display
11	PCI-X, non-hot-plug slot 6, 64-bit/100-MHz	22	SCSI port B

## System maintenance switch

The system maintenance switch (SW1) is an eight-position switch that is used for system configuration. The default position for all eight positions is Off.

Position	Description	Function
S1	iLO Security	Off = iLO security is enabled On = iLO security is disabled
S2	Configuration lock	Off = System configuration can be changed On = System configuration is locked
S3	Reserved	Reserved

Position	Description	Function
S4	Reserved	Reserved
S5	Password protection override	Off = No function On = Clears power-on password and administrator password
S6	Invalidate configuration	Off = Normal On = Clears NVRAM
S7	Reserved	Reserved
S8	Reserved	Reserved

## Boot device selector switch

The boot device selector switch setting determines the device access order of the multibay drives in the server. The default setting for the boot device selector switch is FLP TOP.

When the boot device selector switch is set to FLP TOP, the optical drive in the bottom bay is designated as the primary optical drive. The diskette drive in the top bay is bootable. The server cannot boot from a diskette drive in the bottom bay when the boot device selector switch is set to FLP TOP.

When the boot device selector switch is set to FLP BOT, the optical drive in the top bay is designated as the primary optical drive. The diskette drive in the bottom bay is bootable. The server cannot boot from a diskette drive in the top bay when the boot device selector switch is set to FLP BOT.




**NOTE:** If two optical drives are installed in the server, the server will first attempt to boot from the primary optical drive. The boot device selector switch setting determines which drive is the primary optical drive.

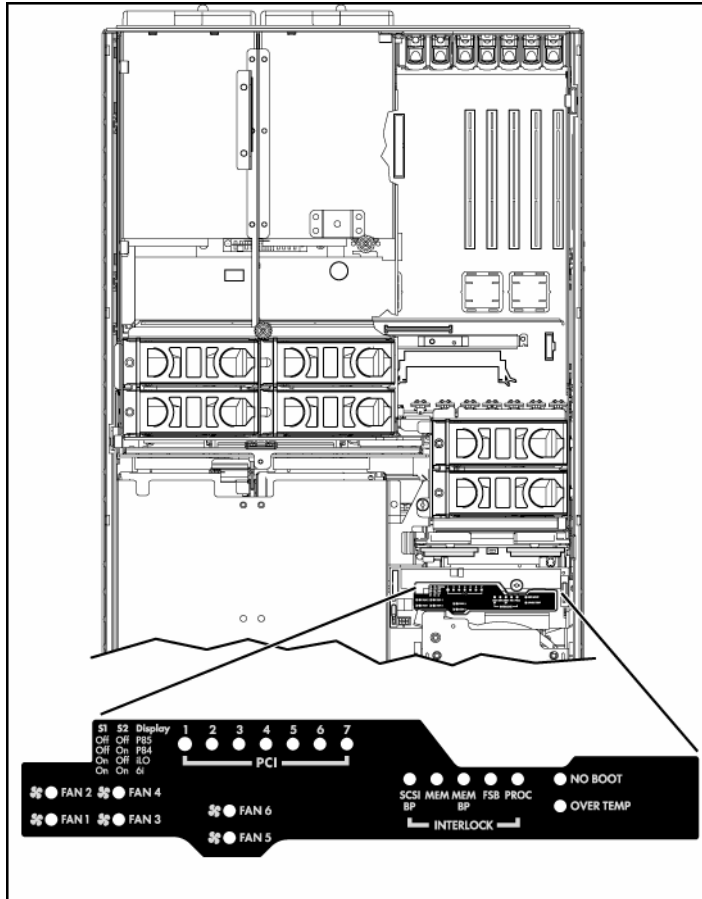
Switch setting	Description
FLP TOP (default)	Diskette drive in top bay is bootable Primary optical drive in bottom bay is bootable
FLP BOT	Primary optical drive in top bay is bootable Diskette drive in bottom bay is bootable

## QuickFind diagnostic display LEDs

The front panel health LEDs indicate only the current hardware status. In some situations, HP SIM might report server status differently than the health LEDs because the software tracks more system attributes.

The amber QuickFind diagnostic display LEDs are located on the media board. In normal operations, all of the LEDs are off unless one of the components fails.

 **NOTE:** The system management driver must be installed for the internal health LED to provide pre-failure and warranty conditions.

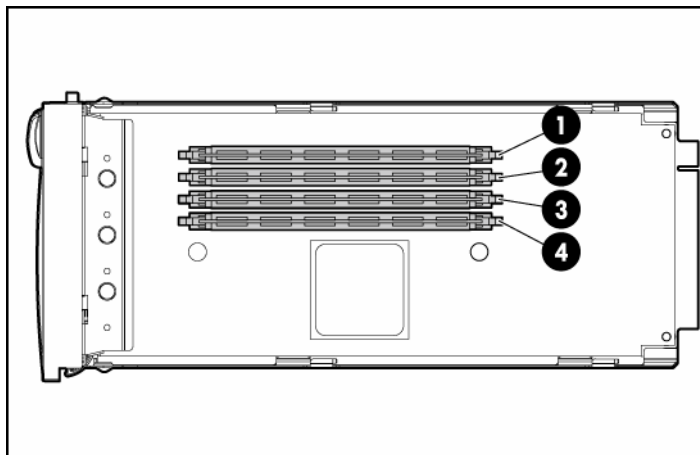


LED	Description
Fan X	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>• A fan is missing or not properly installed.</li> <li>• A fan failed.</li> </ul>
PCI X	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>• A PCI address parity error was detected on the numbered PCI slot.</li> <li>• A PCI data parity error was detected on the numbered PCI slot.</li> </ul>



LED	Description
SCSI BP	The SCSI backplane is missing or not properly installed.
MEM	A memory board is not properly installed.
MEM BP	A memory backplane is missing or not properly installed.
FSB	One or more of the following conditions exist: <ul style="list-style-type: none"> <li>• A processor or PPM is missing or not properly installed.</li> <li>• An FSB configuration error was detected.</li> </ul>
PROC	A processor is missing or not properly installed.
OVER TEMP	The internal temperature has exceeded operating levels.
NO BOOT	A "no boot" condition was detected.
P84	Switch set to display port 84 codes.
P85	Switch set to display port 85 codes.

## DIMM slot locations



Item	Description	Bank
1	DIMM slot 1	A
2	DIMM slot 2	A

Item	Description	Bank
3	DIMM slot 3	B
4	DIMM slot 4	B

## SCSI IDs

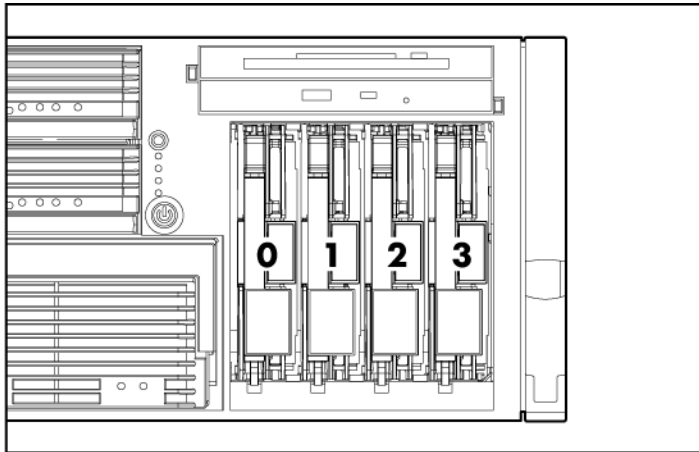
The server supports single- or dual-channel hard drive configurations. The single-channel configuration (simplex mode) supports up to four hard drives on one channel. The dual-channel configuration (duplex mode) supports two hard drives on each channel (SCSI IDs 0 and 1).

The SCSI IDs for both simplex mode and duplex mode are illustrated. Always populate hard drive bays starting with the lowest SCSI ID.

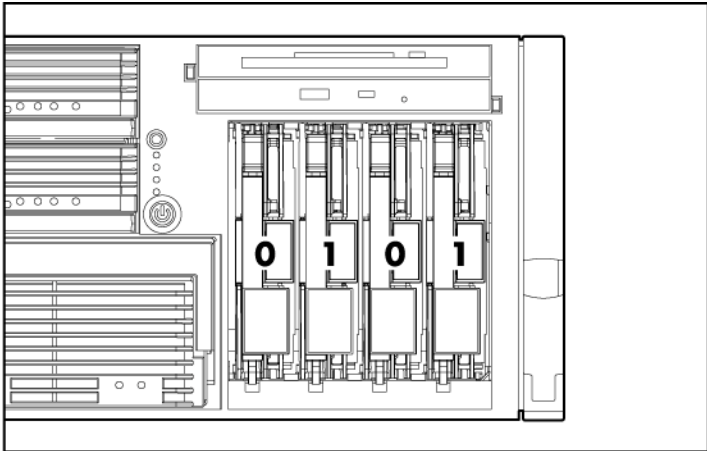


**NOTE:** These SCSI ID designations apply regardless of the controller or the configuration used.

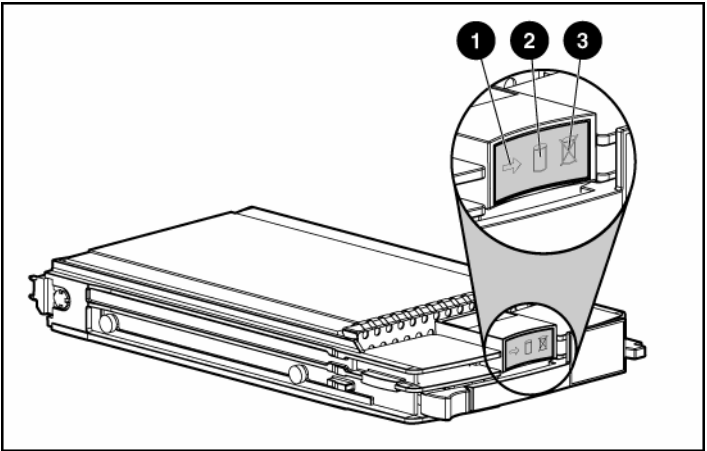
### Simplex mode



Duplex mode



Hot-plug SCSI hard drive LEDs



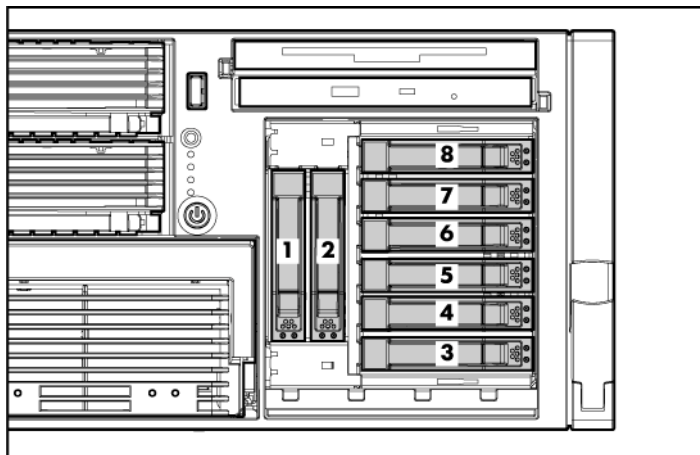
Item	LED description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is offline.
3	Fault status	On = Drive failure Flashing = Fault-process activity Off = No fault-process activity

## Hot-plug SCSI hard drive LED combinations

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On, off, or flashing	On or off	Flashing	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On, off, or flashing	On	Off	The drive is online and is configured as part of an array. If the array is configured for fault tolerance and all other drives in the array are online, and a predictive failure alert is received or a drive capacity upgrade is in progress, you may replace the drive online.
On or flashing	Flashing	Off	<b>Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.</b> The drive is rebuilding or undergoing capacity expansion.
On	Off	Off	<b>Do not remove the drive.</b> The drive is being accessed, but (1) it is not configured as part of an array; (2) it is a replacement drive and rebuild has not yet started; or (3) it is spinning up during the POST sequence.

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
Flashing	Flashing	Flashing	<p><b>Do not remove the drive. Removing a drive may cause data loss in non-fault-tolerant configurations.</b></p> <p>Either (1) the drive is part of an array being selected by an array configuration utility; (2) Drive Identification has been selected in HP SIM; or (3) drive firmware is being updated.</p>
Off	Off	On	<p>The drive has failed and has been placed offline.</p> <p>You may replace the drive.</p>
Off	Off	Off	<p>Either (1) the drive is not configured as part of an array; (2) the drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet; or (3) the drive is configured as an online spare.</p> <p>If the drive is connected to an array controller, you may replace the drive online.</p>


## SATA or SAS IDs



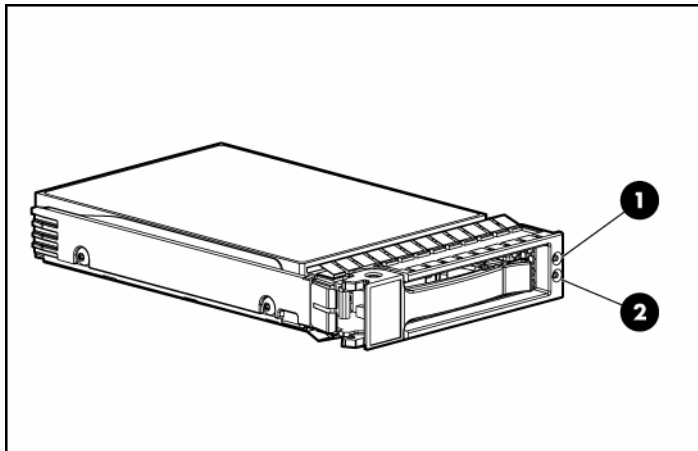
**NOTE:** The server may look different from that shown.

When adding SAS hard drives to the server, observe the following general guidelines:

- The server supports eight SAS or SATA hot-plug hard drives.
- The system automatically sets all drive numbers.
- If only one hard drive is used, install it in the bay with the lowest number.
- Hard drives must be SFF types.
- Drives must be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

 **NOTE:** ACU does not support mixing SAS and SATA drives in the same logical volume.

## SATA or SAS hard drive LEDs



Item	LED Description	Status
1	Fault/UID status	Amber = Drive failure Flashing amber = Fault-process activity Blue = Unit identification is active Off = No fault-process activity

Item	LED Description	Status
2	Online/Activity status	Green = Drive activity Flashing green = High activity on the drive or drive is being configured as part of an array Off = No drive activity

## SAS and SATA hard drive LED combinations

Online/Activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
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	Steadily blue	The drive is operating normally, and it has been selected by a management application.
On	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On	Off	The drive is online, but it is not active currently.
Flashing regularly (1 Hz)	Amber, flashing regularly (1 Hz)	<b>Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.</b> 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	<b>Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.</b> The drive is rebuilding, or it is part of an array that is undergoing capacity expansion or stripe migration.
Flashing irregularly	Amber, flashing regularly (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.

Online/Activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
Off	Steadily 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	Amber, flashing regularly (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.

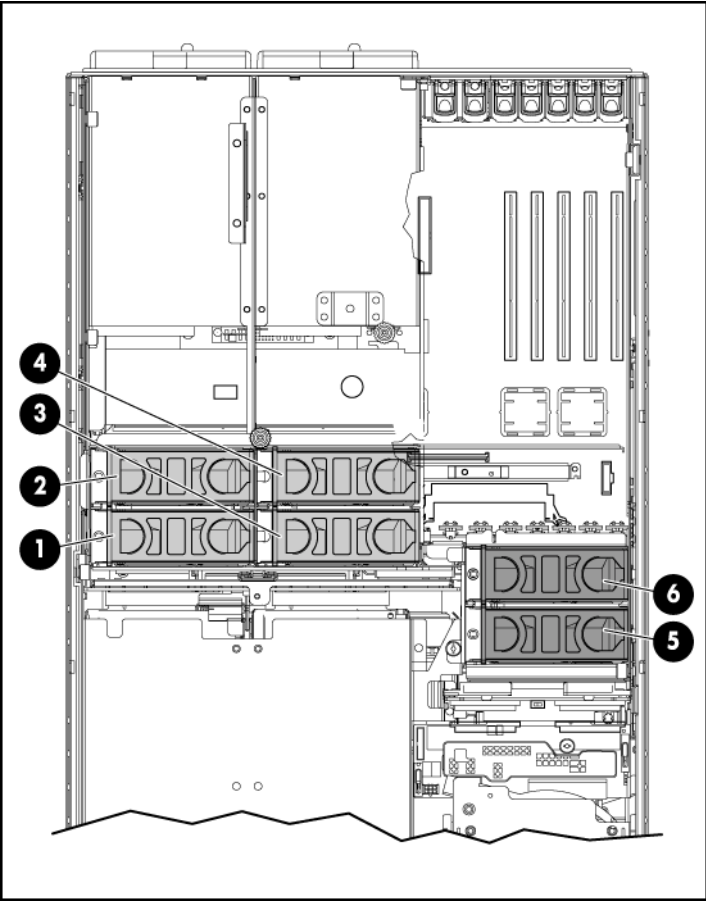
## Fan locations

The server is shipped with six system fans. Each fan is hot-swappable and independently controlled. The fans are distributed into two zones to control thermal conditions within the server.

- Zone 1 contains four fans (three, plus one redundant) to control the temperature in the processor module area.
- Zone 2 contains two fans (one, plus one redundant) to control the temperature in the hard drive bay area.



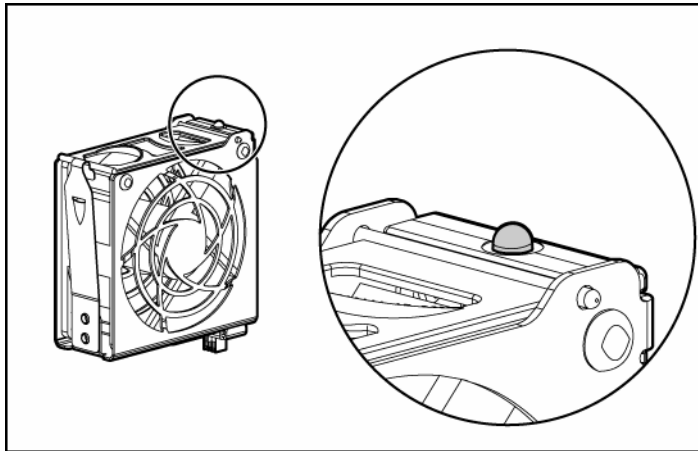
This fan configuration allows the server to continue operating in non-redundant mode if a single fan fails in either zone. If the system detects two fan failures in the same zone, the server shuts down to avoid thermal damage.



Item	Description	Zone
1	Fan 1	1
2	Fan 2	1
3	Fan 3	1
4	Fan 4	1
5	Fan 5	2
6	Fan 6	2

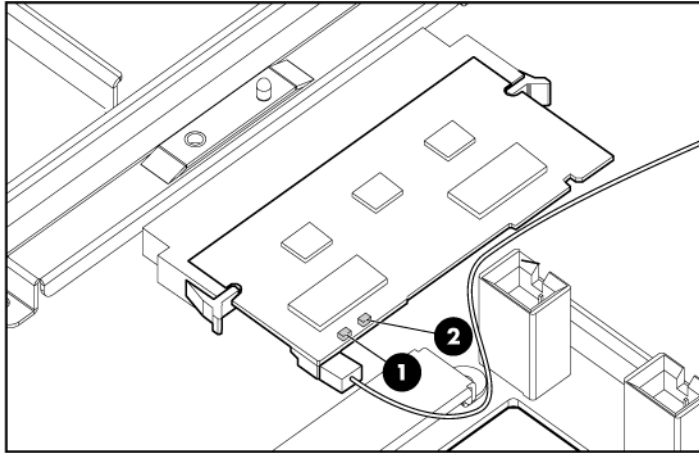
Item	Description	Zone
6	Fan 6	2

## Hot-plug fan LEDs



Status
Green = Operating normally
Amber = Failed
Off = No power

## BBWC LEDs



Server status	LED 1 (amber)	LED 2 (green)	Battery module status
Server is on and has normal run time	Off	On	Fast charging
	Off	Flashing	The microcontroller is waiting for communication from the host controller.
	Off	Off	The battery is fully charged.
	On	Off	A short exists in the connection of one or more of the three button cells within the battery module.
	Flashing	Off	An opening exists in the circuit between the positive and negative terminals of the battery module.
	Off	Off	Normal
Server is off and is in data retention mode	Flashing every 15 seconds	Off	User data held in the write cache is being backed up.



# Server operations


## In this section


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Powering down the server .....	<a href="#">37</a>
Extending the server from the rack.....	<a href="#">38</a>
Removing the access panel.....	<a href="#">40</a>
Replacing hot-plug fans.....	<a href="#">41</a>
Removing the system cage .....	<a href="#">42</a>
Accessing the QuickFind diagnostic display .....	<a href="#">43</a>
Battery .....	<a href="#">44</a>

## Powering up the server

To power up the server, press the Power On/Standby button.

## Powering down 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.

 **IMPORTANT:** If installing a hot-plug device, it is not necessary to power down the server.

1. Shut down the OS as directed by the OS documentation.
2. Press the Power On/Standby button to place the server in standby mode. When the server enters standby power mode, the system power LED changes to amber.
3. Disconnect the power cords.

The system is now without power.

## Extending the server from the rack

The design of the server enables you to access several components through the front of the server. Installing or accessing the following components will not require extending the server from the rack:

- Processors
- Memory boards
- DIMMs
- DVD drive
- Diskette drive
- Hard drives

To extend the server from the rack:

1. Release the two levers on the lower outside corners of the rack.

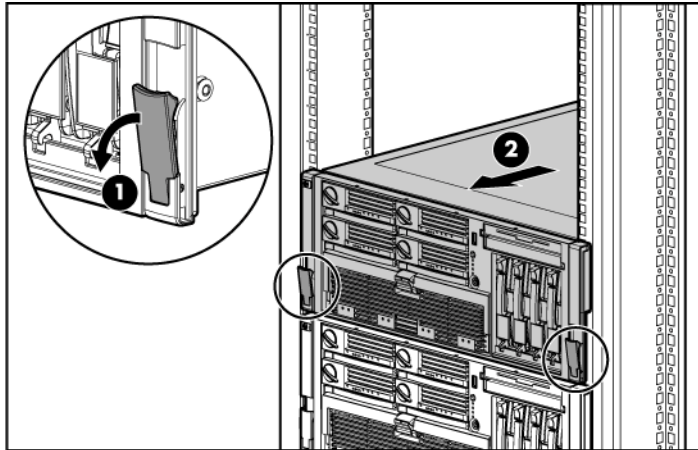


**NOTE:** If the server is in a rack and in the shipping configuration, remove the two shipping screws directly behind the levers.



**IMPORTANT:** If the server is installed in a telco rack, remove the server from the rack to access internal components.


2. Extend the server on the rack rails until the server rail-release latches engage.

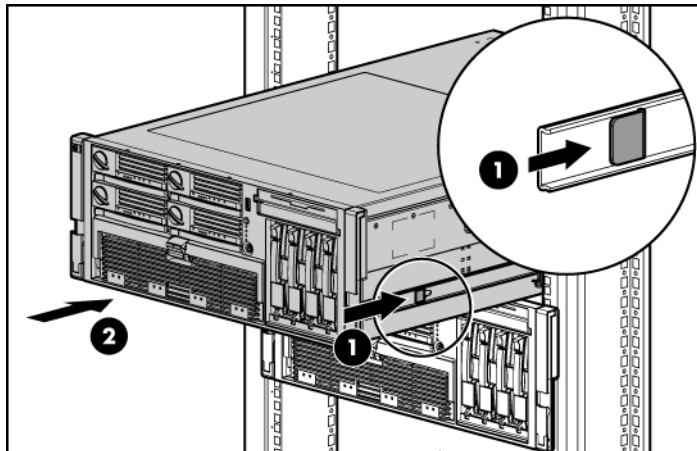


**⚠ WARNING:** To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.


**⚠ 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 could pinch your fingers.


3. After performing the installation or maintenance procedure, slide the server back into the rack by pressing the server rail-release latches.


 **NOTE:** The release latches will lock into place when the rails are fully extended.




## Removing the access panel

 **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.

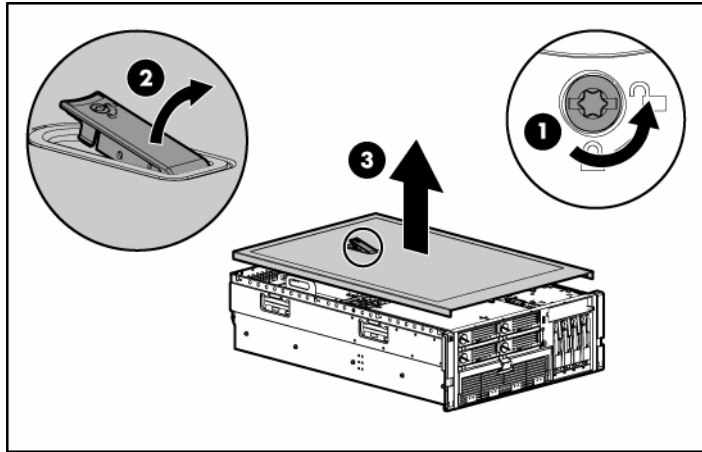
 **IMPORTANT:** When removing the access panel to view QuickFind diagnostic LEDs, leave the server powered on. The QuickFind diagnostic LEDs are cleared when the server is powered off.

1. Extend the server from the rack, if applicable ("Extending the server from the rack" on page [38](#)).
2. If the locking latch is locked, use a Torx T-15 screwdriver to unlock the latch.

 **NOTE:** The T-15 Torx screwdriver is shipped with the server and can be located on the rear panel ("Rear panel components" on page [16](#)).



3. Lift up on the hood latch, and remove the access panel.



4. After installing hardware options, replace the access panel. Be sure that the panel is securely locked into place before powering up the server.

## Replacing hot-plug fans

The server supports redundant hot-plug fans ("Fan locations" on page [32](#)) to provide proper airflow to the server if a primary fan fails.

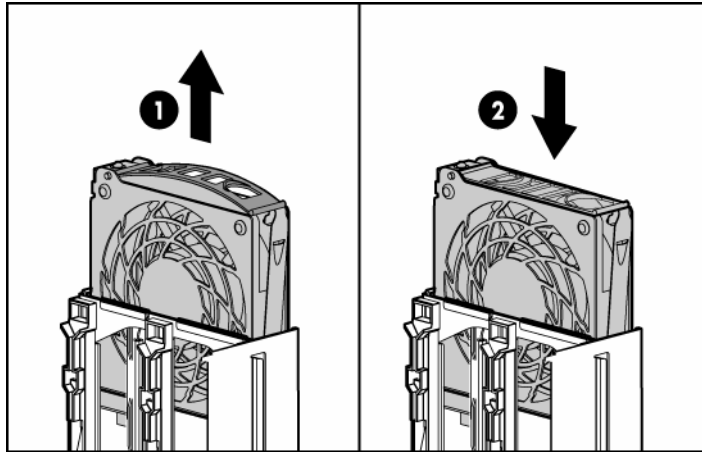
**⚠ WARNING:** To prevent personal injury from hazardous energy:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Do not place tools or metal parts on top of batteries.

**📝 IMPORTANT:** Remove and replace one fan at a time. If the system detects two fan failures in the same zone, the server shuts down to avoid thermal damage.

1. Extend the server from the rack, if applicable ("Extending the server from the rack" on page [38](#)).
2. Remove the access panel ("Removing the access panel" on page [40](#)).
3. Remove the malfunctioning hot-plug fan from the server.

4. Install the replacement fan.



5. Repeat to replace additional fans as needed.
6. Observe the LED on each installed fan to be sure it is illuminated green ("Hot-plug fan LEDs" on page [34](#)).
7. Observe the internal system health LED on the front panel to be sure it is illuminated green ("Front panel LEDs and buttons" on page [11](#)).



**NOTE:** If the front panel internal system health LED is not green after you install hot-plug fans, reseal the hot-plug fan or refer to the troubleshooting section.


## Removing the system cage

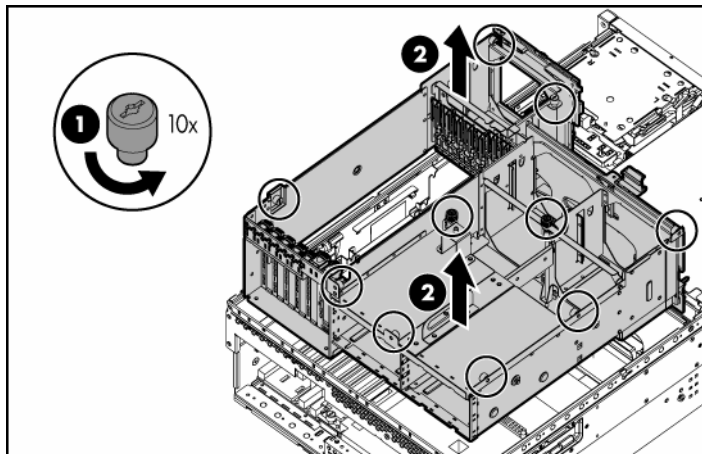
Installing or accessing some options in the server may require removing the system cage. Refer to the instructions for each individual option to determine if removing the system cage is necessary.

To remove the system cage:

1. Power down the server, if applicable ("Powering down the server" on page [37](#)).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page [38](#)).


3. Remove the access panel ("Removing the access panel" on page [40](#)).
4. Remove all expansion boards and expansion slot covers.
5. Remove the PCI-X Hot Plug basket, if applicable.
6. Disconnect the hot-plug board cable from the PCI-X Hot Plug mezzanine board, if applicable.
7. Remove all system fans ("Replacing hot-plug fans" on page [41](#)).
8. Remove all power supplies ("Redundant hot-plug power supply" on page [71](#)).
9. Loosen the thumbscrews, and lift the system cage from the server.

 **NOTE:** The T-15 Torx screwdriver can be used to loosen the thumbscrews. The T-15 Torx screwdriver is shipped with the server and can be located on the rear panel ("Rear panel components" on page [16](#)).

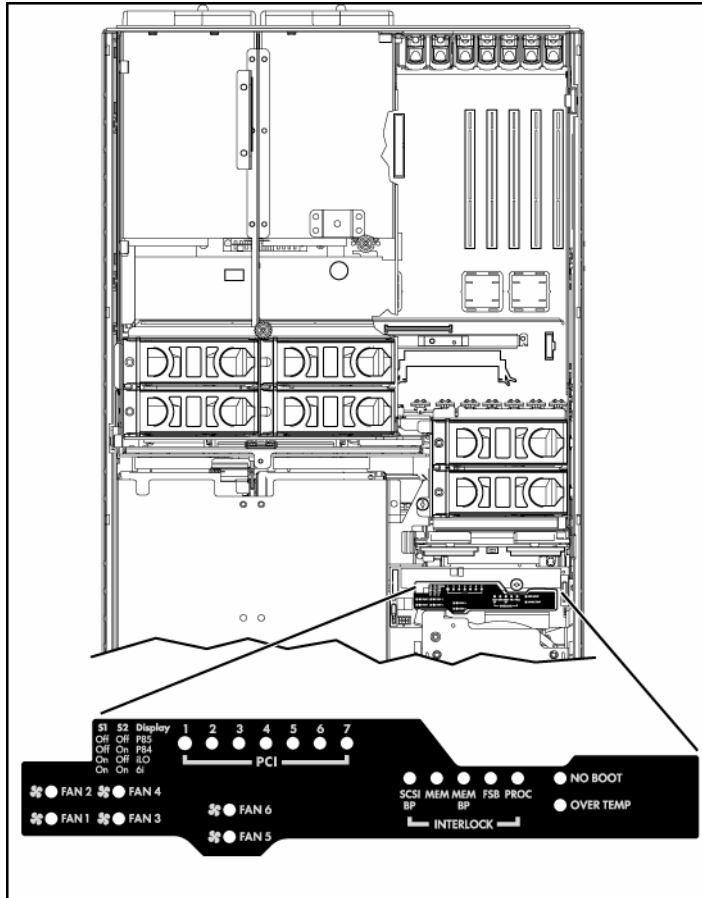


## Accessing the QuickFind diagnostic display

1. Extend the server from the rack, if applicable ("Extending the server from the rack" on page [38](#)).
2. Remove the access panel ("Removing the access panel" on page [40](#)).

 **IMPORTANT:** When removing the access panel to view QuickFind diagnostic LEDs, leave the server powered on. The QuickFind diagnostic LEDs are cleared when the server is powered off.

3. Locate the QuickFind diagnostic display.



## Battery

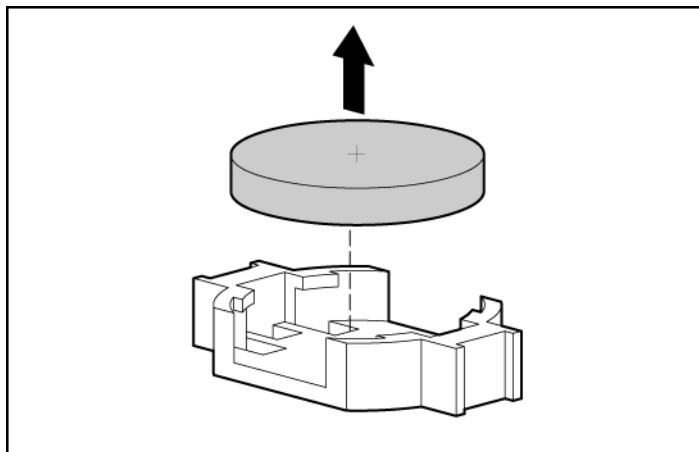
If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

**⚠ WARNING:** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. 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.

To remove the component:

1. Power down the server ("Powering down the server" on page [37](#)).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page [38](#)).
3. Remove the access panel ("Removing the access panel" on page [40](#)).
4. Remove any hardware that will interfere with accessing the battery.
5. Remove the battery.



To replace the component, reverse the removal procedure.

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



## Server setup

### In this section

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Installing the server into the rack .....	<a href="#">54</a>
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## Optional installation services

Delivered by experienced, certified engineers, HP Care Pack services help you keep your servers up and running with support packages tailored specifically for HP ProLiant systems. HP Care Packs let you integrate both hardware and software support into a single package. A number of service level options are available to meet your needs.

HP Care Pack Services offer upgraded service levels to expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Some of the Care Pack services are:

- Hardware support
  - 6-Hour Call-to-Repair
  - 4-Hour 24x7 Same Day
  - 4-Hour Same Business Day
- Software support
  - Microsoft®

- Linux
- HP ProLiant Essentials (HP SIM and RDP)
- VMWare
- Integrated hardware and software support
  - Critical Service
  - Proactive 24
  - Support Plus
  - Support Plus 24
- Startup and implementation services for both hardware and software

For more information on Care Packs, refer to the HP website ([http://www.hp.com/hps/carepack/servers/cp\\_proliant.html](http://www.hp.com/hps/carepack/servers/cp_proliant.html)).

## Rack planning resources

The rack resource kit ships with all HP branded or Compaq branded 9000, 10000, and H9 series racks. A summary of the content of each resource follows:

- Custom Builder is a web-based service for configuring one or many racks. Rack configurations can be created using:
  - A simple, guided interface
  - Build-it-yourself mode

For more information, refer to the HP website (<http://www.hp.com/products/configurator>).

- The Installing Rack Products video provides a visual overview of operations required for configuring a rack with rack-mountable components. It also provides the following important configuration steps:
  - Planning the site
  - Installing rack servers and rack options
  - Cabling servers in a rack
  - Coupling multiple racks



- The Rack Products Documentation CD enables you to view, search, and print documentation for HP and Compaq branded racks and rack options. It also helps you set up and optimize a rack in a manner that best fits your environment.

If you intend to deploy and configure multiple servers in a single rack, refer to the white paper on high-density deployment on the HP website (<http://www.hp.com/products/servers/platforms>).

## Optimum environment


When installing the server, select a location that meets the environmental standards described in this section.

### Space and airflow requirements

To allow for servicing and adequate airflow, observe the following space and airflow requirements when deciding where to install a rack:

- Leave a minimum clearance of 122 cm (48 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 122 cm (48 in) from the back of the rack to the back of another rack when racks are back-to-back.

HP servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

 **CAUTION:** To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.

**△ CAUTION:** Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

The Compaq 9000 and 10000 Series racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation.

**△ CAUTION:** When using a Compaq branded 7000 Series rack, you must install the high airflow rack door insert [P/N 327281-B21 (42U) or P/N 157847-B21 (22U)] to provide proper front-to-back airflow and cooling.

**△ CAUTION:** If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

## Temperature requirements

To ensure continued safe and reliable equipment operation, install or position the system in a well-ventilated, climate-controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).

**△ CAUTION:** To reduce the risk of damage to the equipment when installing third-party options:

- Do not permit optional equipment to impede airflow around the server or to increase the internal rack temperature beyond the maximum allowable limits.
- Do not exceed the manufacturer's TMRA.

## Power requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.

**⚠ WARNING:** To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over wiring and installation requirements of your facility.

**⚠ CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

When installing more than one server, you may need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80 percent of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

## Electrical grounding requirements


The server must be grounded properly for proper operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, HP recommends the use of a PDU that is either permanently wired to the building's branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

## Rack warnings and cautions

 **WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

 **WARNING:** To reduce the risk of personal injury or equipment damage when unloading a rack:

- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and may become unstable when being moved on its casters.
- Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.

**⚠ WARNING:** When installing a server in a telco rack, be sure that the rack frame is adequately secured to the top and bottom of the building structure.


**⚠ WARNING:** This server is very heavy. To reduce the risk of personal injury or damage to the equipment:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
- Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. When the server weighs more than 22.5 kg (50 lb), at least two people must lift the server into the rack together. A third person may be required to help align the server if the server is installed higher than chest level.
- Use caution when installing the server in or removing the server from the rack; it is unstable when not fastened to the rails.

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

**⚠ 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.

**⚠ CAUTION:** Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

 **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.

## Identifying rack server shipping carton contents

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server. All the rack mounting hardware necessary for installing the server into the rack is included with the rack or the server.

The contents of the server shipping carton include:

- Server
- Power cord
- Hardware documentation, Documentation CD, and software products
- Rack mounting hardware

In addition to the supplied items, you may need:

- Hardware options
- Operating system or application software
- PDU

## Installing hardware options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, refer to "Hardware options installation (on page [57](#))."

## Installing the server into the rack

Refer to the installation instructions that ship with the rack kit to install the server into the rack.

## Installing the cable management arm

Refer to the installation instructions that ship with the rack kit to install the cable management arm.

## Powering up and configuring the server

To power up the server, press the Power On/Standby button.

While the server boots, RBSU is automatically configured to prepare the server for OS installation.

To manually configure the utilities, press the **F9** key when prompted during the boot process to change the server settings using RBSU. The system is set up by default for the English language.



**NOTE:** If an array controller has been added or is embedded in the system, the ORCA utility provides a default RAID configuration based on the size and number of hard drives installed.

For more information on the automatic configuration, refer to the *HP ROM-Based Setup Utility User Guide* located on the Documentation CD.

## Installing the operating system

To operate properly, the server must have a supported operating system. For the latest information on supported operating systems, refer to the HP website (<http://www.hp.com/go/supportos>).

Two methods are available to install an operating system on the server:

- SmartStart assisted installation—Insert the SmartStart CD into the CD-ROM drive and reboot the server.
- Manual installation—Insert the operating system CD into the CD-ROM drive and reboot the server. This process may require you to obtain additional drivers from the HP website (<http://www.hp.com/support>).

Follow the on-screen instructions to begin the installation process.

For information on using these installation paths, refer to the SmartStart installation poster in the HP ProLiant Essentials Foundation Pack, included with the server.

## Registering the server

To register a server, refer to the registration card in the HP ProLiant Essentials Foundation Pack or the HP Registration website (<http://register.hp.com>).



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# Hardware options installation

## In this section

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Hot-plug SCSI hard drive options .....	<a href="#">63</a>
SAS and SATA hard drive guidelines .....	<a href="#">66</a>
Redundant hot-plug power supply.....	<a href="#">71</a>
Battery-Backed Write Cache .....	<a href="#">73</a>
DVD, diskette, and CD-RW drives .....	<a href="#">75</a>

## Introduction

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

**⚠ 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 damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

Review "Electrostatic Discharge (on page [141](#))" before installing hardware options into the server.

## Processor options

The server supports up to four processors. Processor socket 1 and PPM slot 1 must be populated at all times or the server will not function properly.

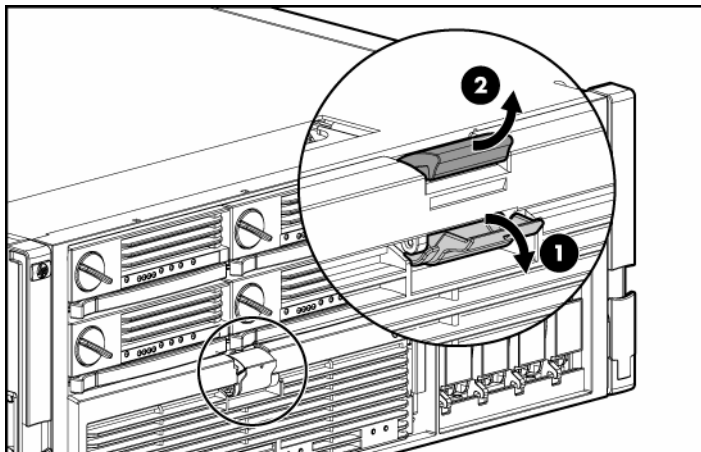
Server PPMs provide the proper power to each processor. Each PPM must be installed in the slot adjacent to its processor.

## Removing the Processor Module

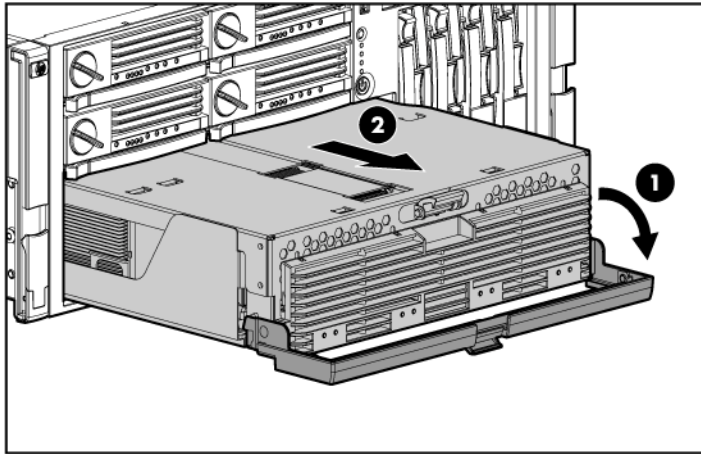
The processors are stored in a module at the front of the server. Access to the processor module is provided through the front panel, eliminating the need to extend the server from the rack to install new or replace existing processors.

To remove the processor module:

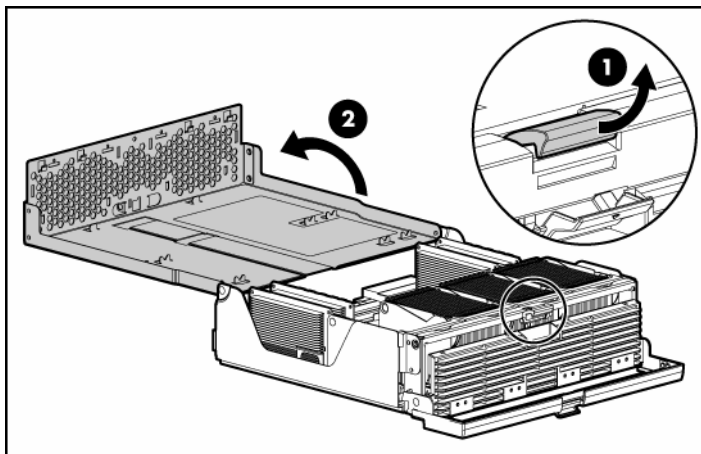
1. Power down the server ("Powering down the server" on page [37](#)).
2. Release the latches to unlock the processor module.



3. Lower the processor module lever, and pull the module out of the server.



4. Release the latch, and open the cover to expose the processors.



## Installing a processor

Processors must be installed in the following order: processor 1, processor 2, processor 4, and processor 3.

Server PPMs provide the proper power to each processor. Each PPM must be installed in the slot adjacent to its processor.

**⚠ CAUTION:** To prevent thermal instability and damage to the server, do not separate the processor from the heatsink. The processor, heatsink, and retaining clip make up a single assembly.

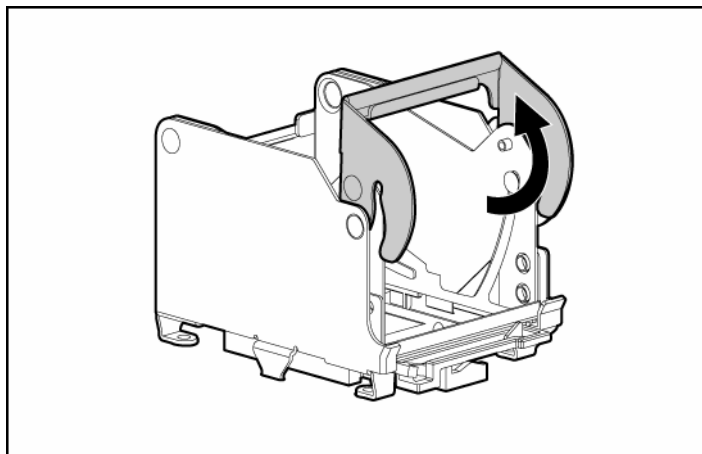
**⚠ CAUTION:** To prevent possible server malfunction and damage to the equipment, do not mix processors of different types.

**📌 IMPORTANT:** If upgrading processor speed or adding additional processors, update the system ROM before installing the processor.

**📌 IMPORTANT:** Processor socket 1 and PPM slot 1 must be populated at all times or the server will not function properly.

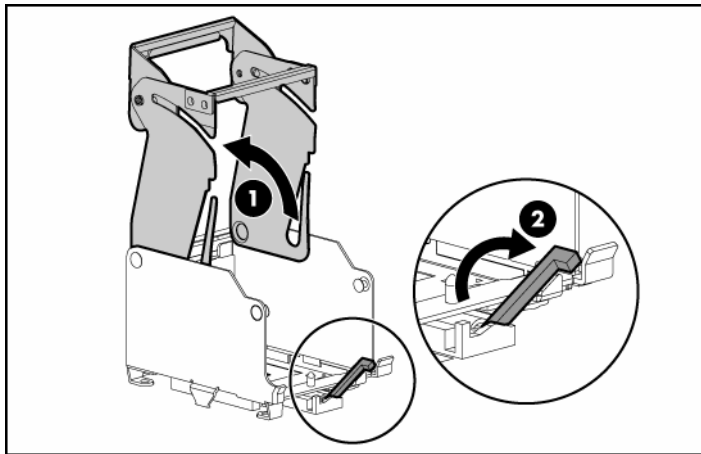
**📌 IMPORTANT:** Always install a PPM when you install a processor. The system fails to boot if the PPM is missing.

1. Power down the server ("Powering down the server" on page [37](#)).
2. Remove the processor module ("Removing the Processor Module" on page [58](#)).
3. Unlock the processor retaining bracket.



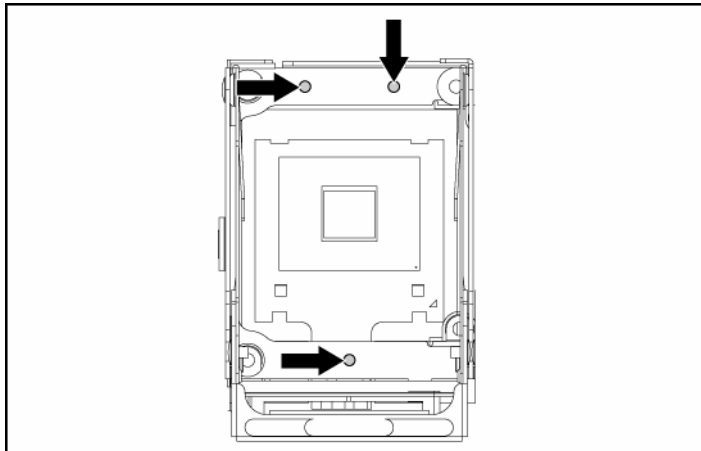
4. Open the processor retaining bracket.
5. Open the processor locking lever.

**⚠ CAUTION:** Failure to completely open the processor locking lever prevents the processor from seating during installation, leading to hardware damage.



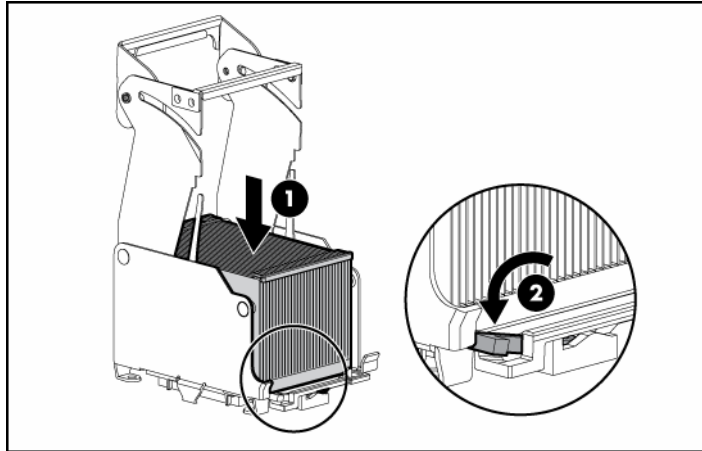
6. Install the processor assembly into the processor socket.

**🔧 IMPORTANT:** Determine the correct processor orientation by observing the guide pins on the base of the processor retaining bracket and the three corresponding guide slots on the processor assembly.

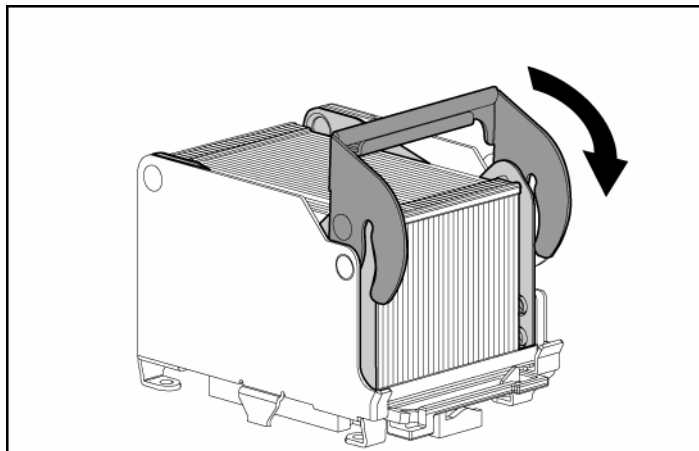


7. Insert the processor assembly into the processor socket, and close the locking lever.


**⚠ CAUTION:** To prevent possible server malfunction or damage to the equipment, be sure to completely close the processor locking lever.

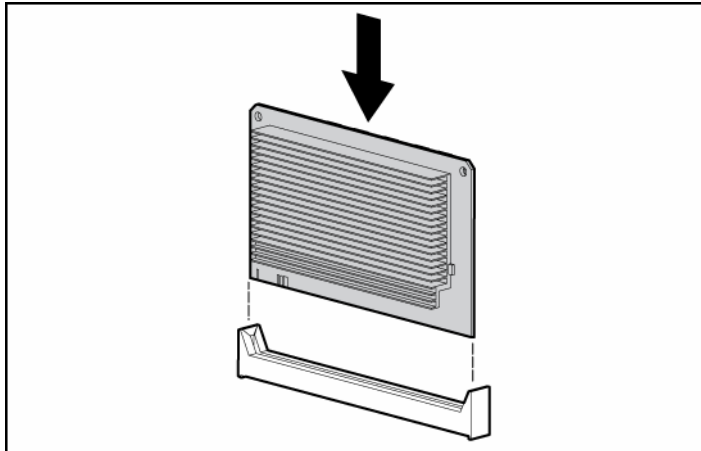



8. Close and lock the processor retaining bracket.



9. Install the PPM.

 **IMPORTANT:** Always install a PPM when you install a processor. The system fails to boot if the corresponding PPM is missing.



 **NOTE:** The appearance of compatible PPMs may vary.


10. Close the cover, and replace the processor module.

## Hot-plug SCSI hard drive options

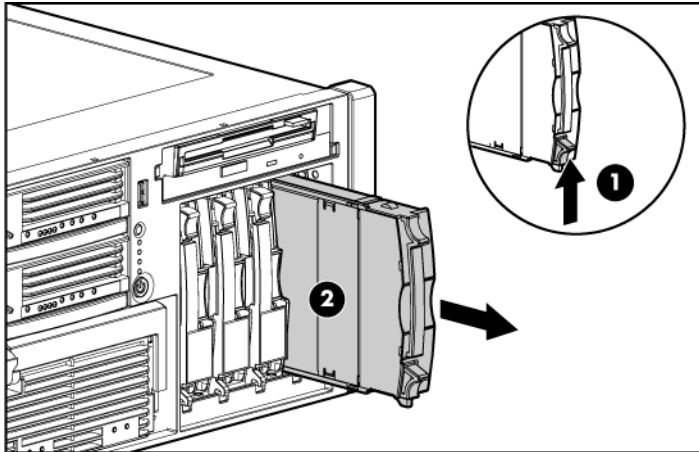
When adding SCSI hard drives to the server, observe the following general guidelines:

- Hot-plug hard drives must be Ultra320 SCSI drives for optimum performance. Mixing Ultra320 SCSI drives other drive types degrades the overall performance of the drive subsystem.
- When drives are grouped together into the same drives array, drives must be the same capacity to provide the greatest storage space efficiency.

## Removing a hard drive 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.

Remove the hard drive blank by squeezing the release buttons, and pulling the blank from the server.



To replace the component, reverse the removal procedure.

## Removing a hot-plug SCSI hard drive

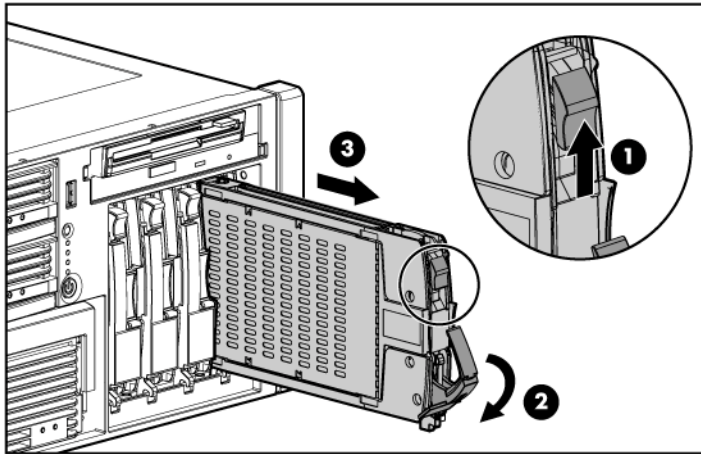
**⚠ CAUTION:** Always power down the server if the boot partition resides on the drive you are replacing or if you are replacing the only drive in the server.

**⚠ 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. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LED combinations" on page [28](#), "Hot-plug SCSI hard drive LEDs" on page [27](#)).
2. Back up all server data on the hard drive to be removed.

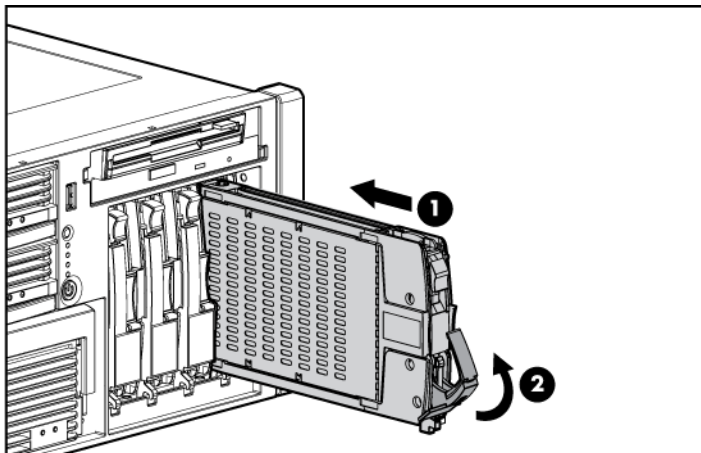


3. Remove the hard drive.



## Installing a hot-plug SCSI hard drive

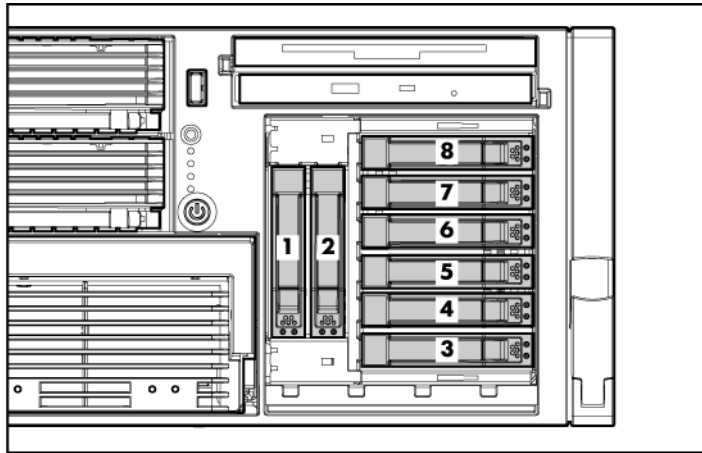
1. Remove the existing hard drive blank or hard drive from the drive bay ("Removing a hard drive blank" on page [63](#)).
2. Install the hard drive, and close the lever.




3. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LED combinations" on page [28](#), "Hot-plug SCSI hard drive LEDs" on page [27](#)).

4. Resume normal server operations.

## SAS and SATA hard drive guidelines




 **NOTE:** The server may look different from that shown.

When adding SAS hard drives to the server, observe the following general guidelines:

- The server supports eight SAS or SATA hot-plug hard drives.
- The system automatically sets all drive numbers.
- If only one hard drive is used, install it in the bay with the lowest number.
- Hard drives must be SFF types.
- Drives must be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

 **NOTE:** ACU does not support mixing SAS and SATA drives in the same logical volume.

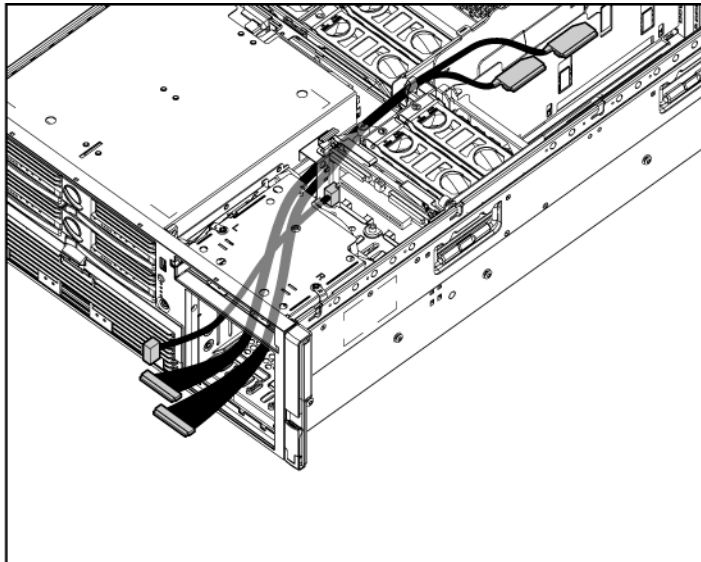
## Installing the SAS hard drive cage

 **NOTE:** You must provide a SAS controller before proceeding with the SAS hard drive cage installation.


1. Power down the server ("Powering down the server" on page [37](#)).
2. Remove all hard drives ("Removing a hot-plug SCSI hard drive" on page [64](#)) and hard drive blanks ("Removing a hard drive blank" on page [63](#)).
3. Extend the server from the rack ("Extending the server from the rack" on page [38](#)).
4. Remove the access panel ("Removing the access panel" on page [40](#)).
5. Install the SAS controller. Refer to the directions provided with the controller for installation instructions.
6. Route and connect the power cable to the power cable connector on the SCSI backplane.

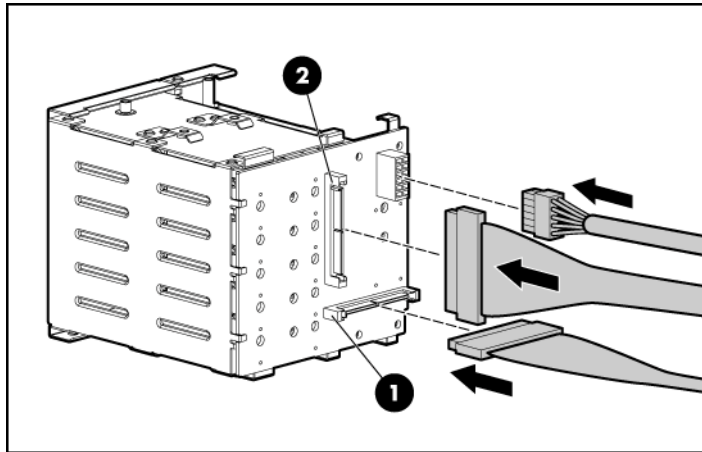
**⚠ CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

7. Route the SAS cables through the opening near the SCSI backplane and over the center wall.

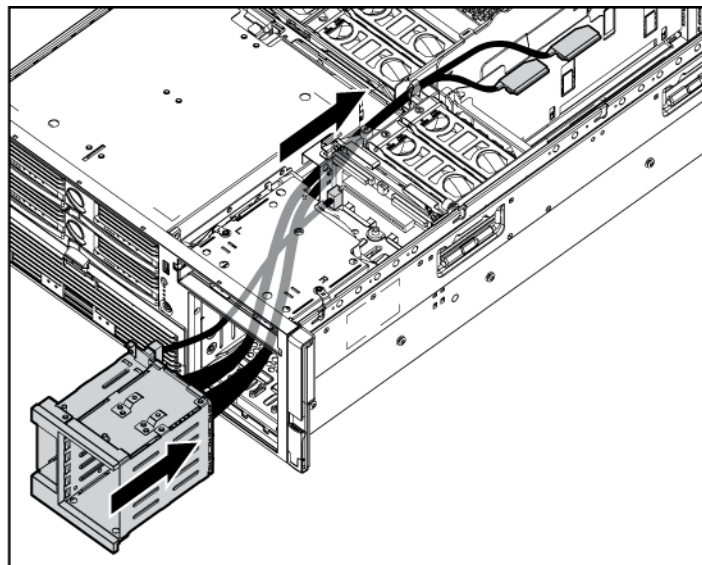


8. Connect the cables to the connectors on the back of the SAS hard drive cage.

 **NOTE:** Port 1 supports hard drives 1 through 4. Port 2 supports hard drives 5 through 8. If you are using a single channel SAS controller, connect the cable to port 1.

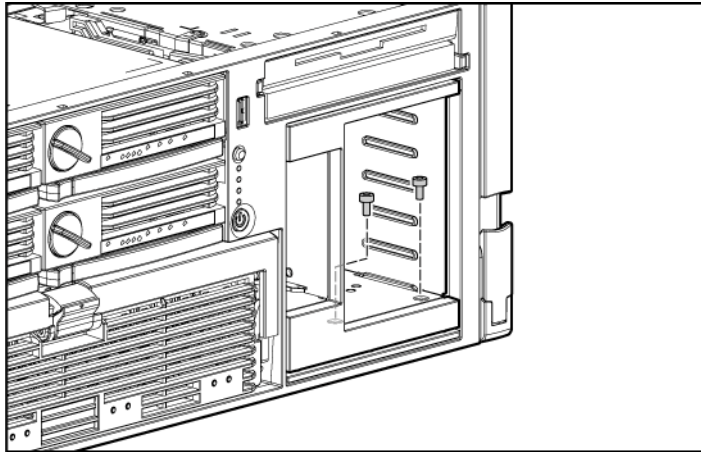


9. Install the SAS hard drive cage, pulling the slack in the SAS cables over the center wall.



10. Connect the SAS cables to the controller.

11. Secure the SAS hard drive cage with the screws provided in the option kit.



12. Install the hot-plug hard drives or hard drive blanks into the SAS hard drive cage.

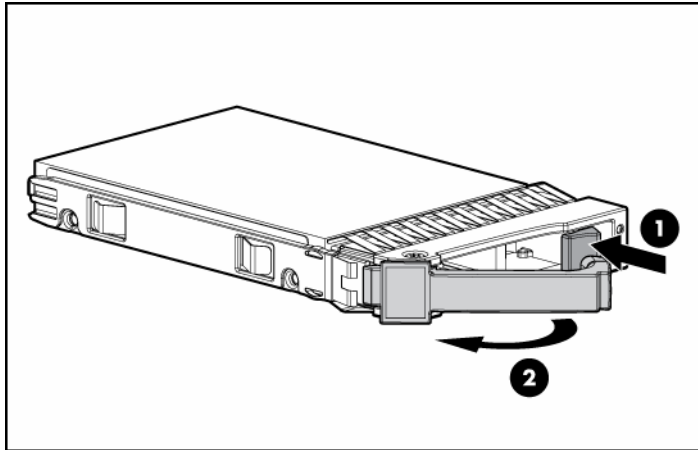
**CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

## Installing a hot-plug SAS hard drive

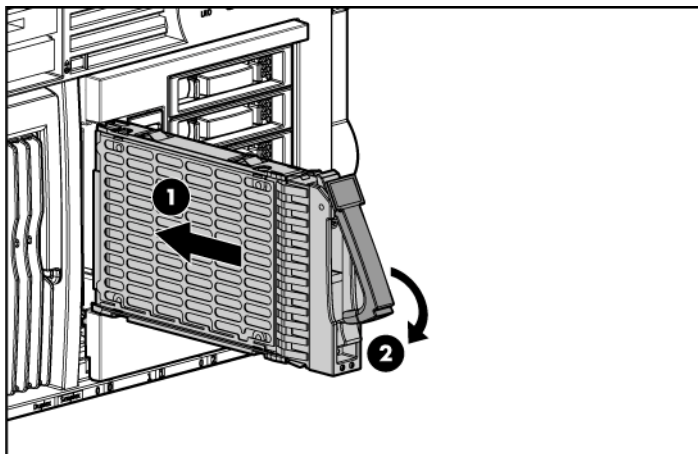
**IMPORTANT:** The SAS hard drive cage ("Installing the SAS hard drive cage" on page [66](#)) must be installed before installing the optional hot-plug SAS or SATA hard drives.

1. Remove the hard drive blank.

2. Prepare the SAS hard drive.



3. Install the hard drive.




4. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations ("SAS and SATA hard drive LED combinations" on page [31](#)).


## Redundant hot-plug power supply

The server supports a second hot-plug power supply to provide redundant power to the server in the event of a failure in the primary power supply. You can install or replace a second hot-plug power supply without powering down the server.

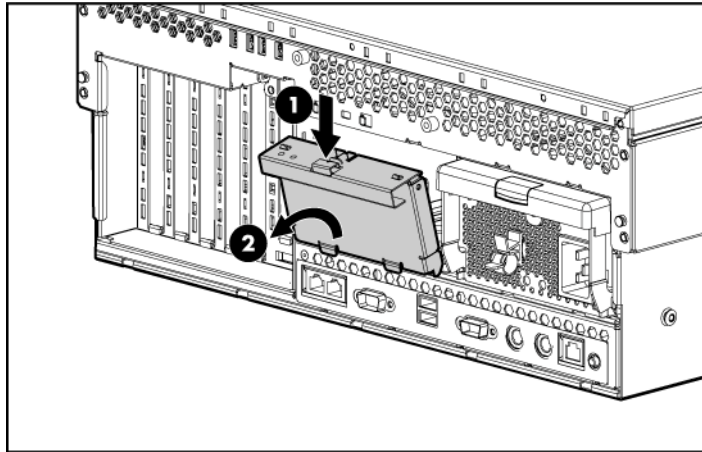
 **WARNING:** To reduce the risk of electric shock or damage to the equipment:

- 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.

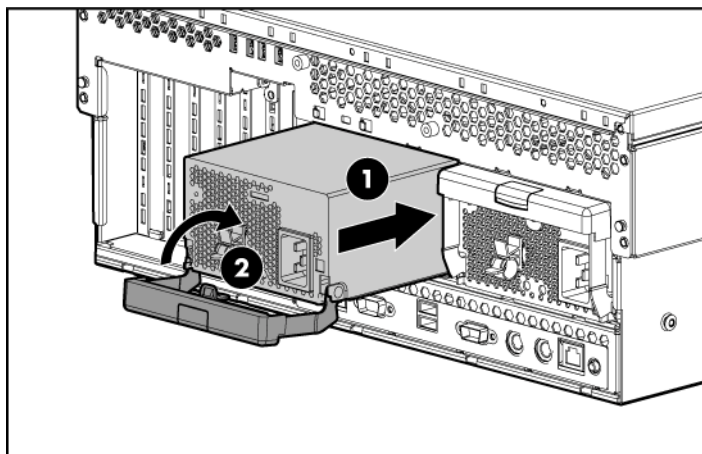
 **CAUTION:** If only one power supply is installed, do not remove the power supply unless the server has been powered down. Removing the only operational power supply will cause an immediate power loss.

 **NOTE:** If you remove or replace the primary hot-plug power supply, use the T-15 Torx screwdriver provided with the server to remove the shipping screw. It is located just under the port-colored plastic handle of the power supply unit.

1. Remove the power supply blank.



2. Install the hot-plug power supply, and lock the lever.



3. Connect the power cord to the redundant power supply.
4. Secure the power cords to the retaining clip.
5. Connect the power cord to the power source.
6. Be sure that the power supply LED is green ("Power supply LEDs" on page [18](#)).



7. Be sure that the front panel external health LED is green ("Front panel LEDs and buttons" on page [11](#)).



**IMPORTANT:** For maximum server availability, be sure that the two power supplies are powered by separate AC power sources.



**NOTE:** If the server will be shipped to another location after configuration, install a shipping screw into each power supply.

## Battery-Backed Write Cache

Along with the cache module, the battery pack provides transportable data protection, increases overall controller performance, and maintains any cached data for up to 72 hours after the server loses power. The NiMH batteries in the battery pack are continuously recharged through a trickle-charging process whenever the system power is on.

For information on BBWC LEDs, refer to "BBWC LEDs (on page [35](#))."



**CAUTION:** To prevent a server malfunction or damage to the equipment, do not add or remove the battery pack while an array capacity expansion, RAID level migration, or stripe size migration is in progress.



**CAUTION:** After the server is powered down, wait 15 seconds and then check the amber LED before unplugging the cable from the cache module. If the amber LED blinks after 15 seconds, do not remove the cable from the cache module. The cache module is backing up data, and data will be lost if the cable is detached.




**IMPORTANT:** The battery pack may have a low charge when installed. In this case, a POST error message is displayed when the server is powered up, indicating that the battery pack is temporarily disabled. No action is necessary on your part. The internal circuitry automatically recharges the batteries and enables the battery pack. This process may take up to 4 hours. During this time, the cache module will function properly, but without the performance advantage of the battery pack.



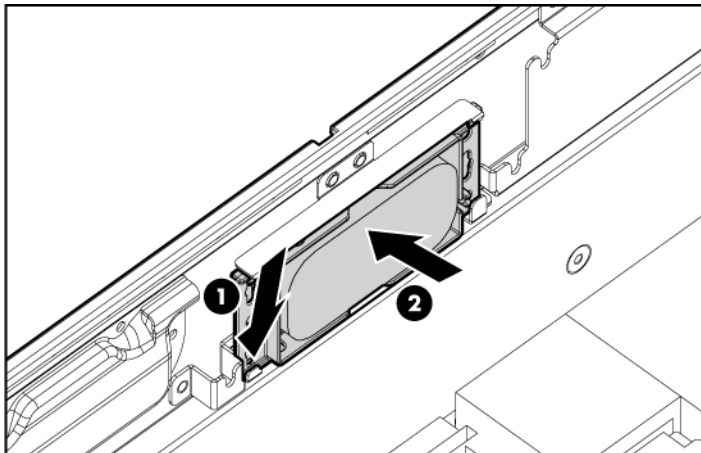
**NOTE:** The data protection and the time limit also apply if a power outage occurs. When power is restored to the system, an initialization process writes the preserved data to the hard drives.

To install the BBWC battery pack and cache module:

1. Power down the server ("Powering down the server" on page [37](#)).
2. Extend the server from the rack, if applicable ("Extending the server from the rack" on page [38](#)).
3. Remove the access panel ("Removing the access panel" on page [40](#)).
4. Remove the system cage ("Removing the system cage" on page [42](#)).

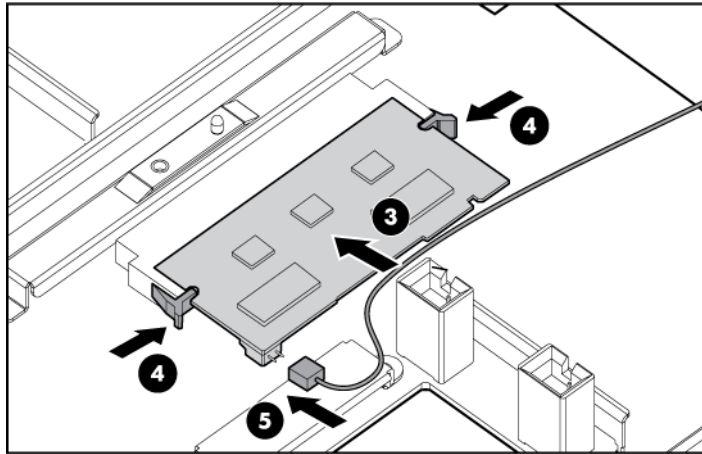
 **IMPORTANT:** The BBWC cable is wound around the battery pack. Unwind the cable to the appropriate length before installing the battery pack assembly into the server.

5. Install the battery pack assembly into the server.



6. Route the cable along the system board.
7. Locate the cache module socket.

8. Install the cache module, and connect the BBWC cable to the cache module.



To reinstall all components, reverse the removal procedures.

## DVD, diskette, and CD-RW drives

The server is shipped with one DVD drive. You can install an optional DVD drive, 3.5-inch diskette drive, or CD-RW drive.

To install an optional media drive:


1. Power down the server ("Powering down the server" on page [37](#)).

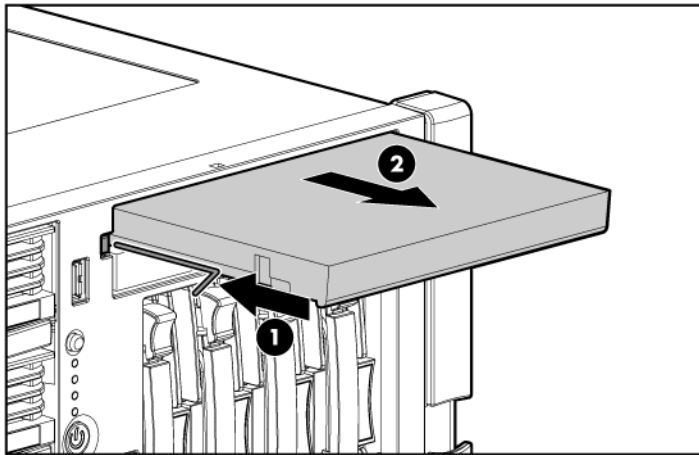
**CAUTION:** Always populate each media bay with either a device or a blank. Proper airflow can only be maintained when the bays are populated. Unpopulated drive bays can lead to improper cooling and thermal damage.

**IMPORTANT:** By default, the DVD drive is installed in the lower drive bay. To boot from a DVD or CD-RW drive in the upper drive bay or to boot from a diskette drive in the lower bay, change the boot device selector switch to FLP BOT.

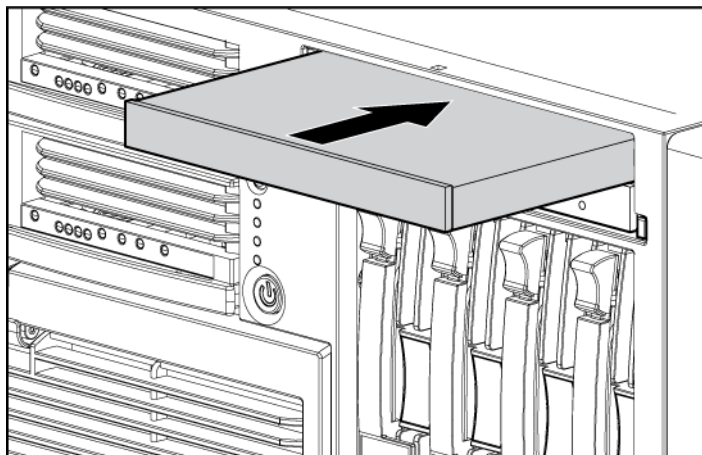
**NOTE:** If two optical drives are installed in the server, the server will first attempt to boot from the primary optical drive. The boot device selector switch setting determines which drive is the primary optical drive.

2. Use the T-15 Torx screwdriver to eject the drive blank, and pull the drive blank out of the server.

 **NOTE:** The T-15 Torx screwdriver is shipped with the server and can be located on the rear panel ("Rear panel components" on page [16](#)).



3. Install the media drive into the server.



4. Power up the server ("Powering up the server" on page [37](#)).

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## Expansion board options

### In this section


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Installing the PCI-X Hot Plug Mezzanine Option.....	<a href="#">81</a>
Installing the PCI Express mezzanine options.....	<a href="#">86</a>
Installing non-hot-plug expansion boards .....	<a href="#">89</a>
Installing hot plug expansion boards .....	<a href="#">91</a>
Removing a PCI-X Hot Plug expansion board.....	<a href="#">92</a>
RILOE II Board.....	<a href="#">93</a>

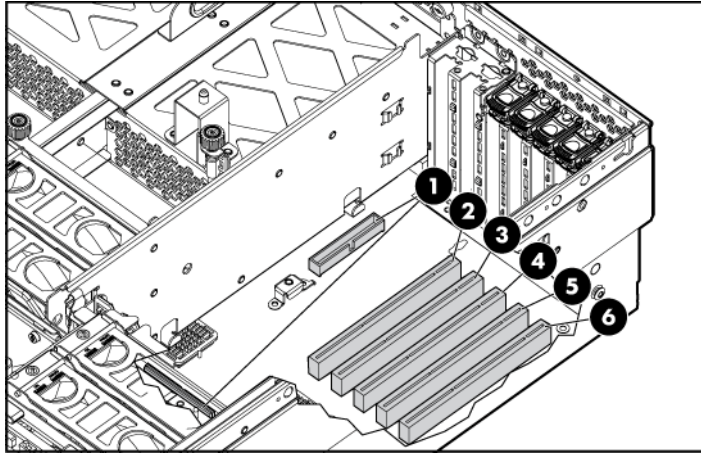
## Expansion slot overview

The server supports up to seven expansion slots. When the server is shipped, it is equipped with five expansion slots (slots 3 through 7) and two connectors to add two optional expansion slots (slots 1 and 2).

To support the optional expansion slots, install one of the following into the server:

- PCI-X Hot Plug mezzanine option (on page [79](#))—Adds two optional PCI-X Hot Plug expansion slots
- PCI Express x4 mezzanine option ("PCI Express mezzanine options" on page [80](#))—Adds two optional PCI Express x4 expansion slots
- PCI Express x8 mezzanine option ("PCI Express mezzanine options" on page [80](#))—Adds one optional PCI Express x8 expansion slot

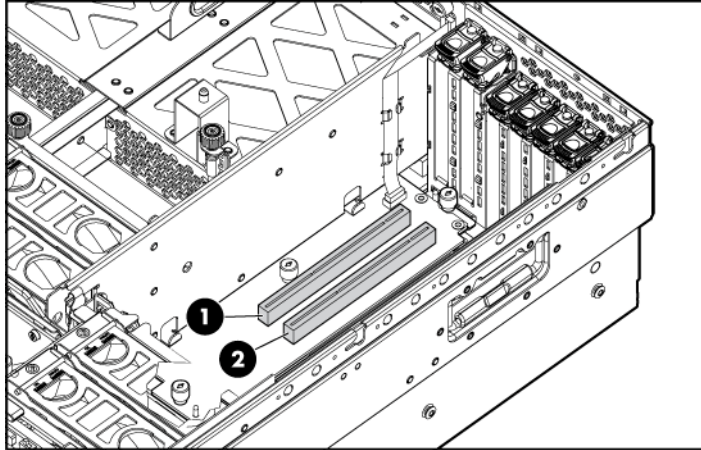
 **NOTE:** Only one mezzanine option can be installed in the server.



Item	Slot	Description
1	1–2	Connectors for one of the following: <ul style="list-style-type: none"> <li>• Optional PCI Express x4 mezzanine board</li> <li>• Optional PCI Express x8 mezzanine board</li> <li>• Optional PCI-X Hot Plug mezzanine board</li> </ul>
2	3	PCI-X non-hot-plug expansion slot, 64-bit/133-MHz
3	4	PCI-X non-hot-plug expansion slot, 64-bit/133-MHz
4	5	PCI-X non-hot-plug expansion slot, 64-bit/133-MHz
5	6	PCI-X non-hot-plug expansion slot, 64-bit/100-MHz
6	7	PCI-X non-hot-plug expansion slot, 64-bit/100-MHz

## PCI-X Hot Plug Mezzanine Option

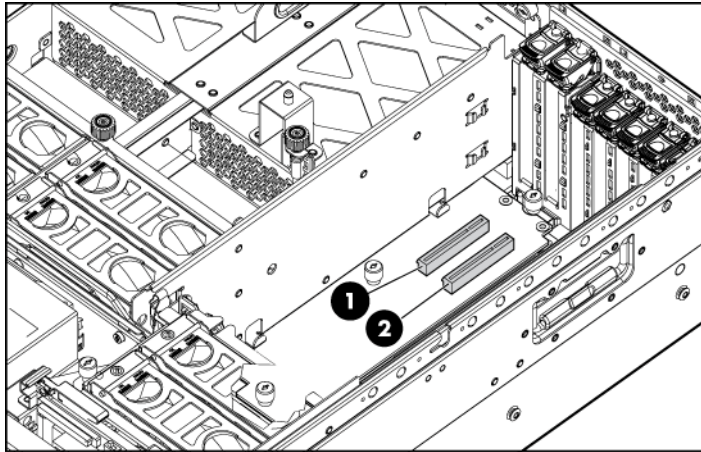
The PCI-X Hot Plug Mezzanine Option adds support for two optional PCI-X Hot Plug expansion slots.



Item	Description
1	PCI-X Hot Plug expansion slot 1, 64-bit/133-MHz
2	PCI-X Hot Plug expansion slot 2, 64-bit/133-MHz

## PCI Express mezzanine options

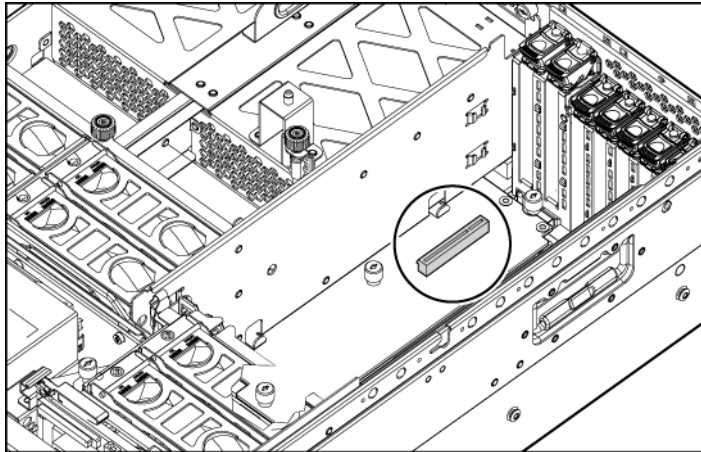
The PCI Express x4 mezzanine option adds support for two optional PCI Express x4 non-hot-plug expansion slots in slots 1 and 2.



Item	Description
1	PCI Express x4 non-hot-plug expansion slot 1
2	PCI Express x4 non-hot-plug expansion slot 2



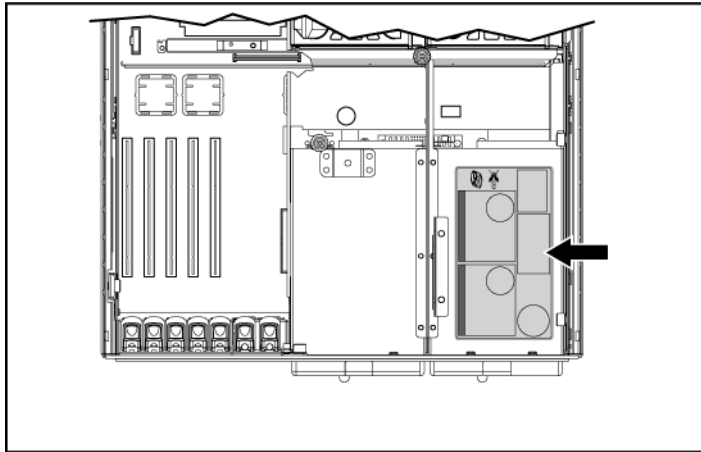
The PCI Express x8 mezzanine option adds support for one optional PCI Express x8 non-hot-plug expansion slot in slot 1.



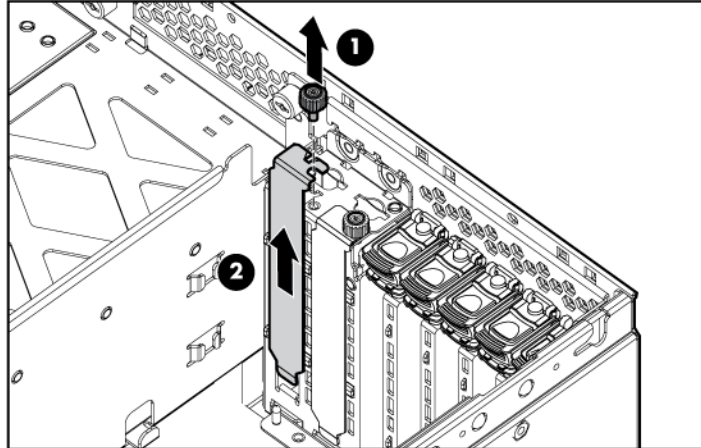
## Installing the PCI-X Hot Plug Mezzanine Option

1. Power down the server ("Powering down the server" on page [37](#)).
2. Extend or remove the server from the rack ("Extending the server from the rack" on page [38](#)).
3. Remove the access panel ("Removing the access panel" on page [40](#)).


4. Adhere the PCI-X Hot Plug label to the power supply cover.

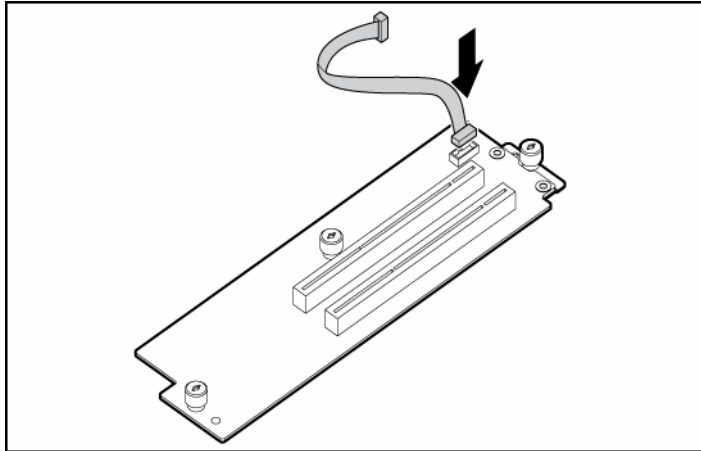


5. Remove the expansion boards from slots 3 and 4, if installed, to gain access to the mezzanine connectors.
6. Remove the expansion slot covers from slots 1 and 2.

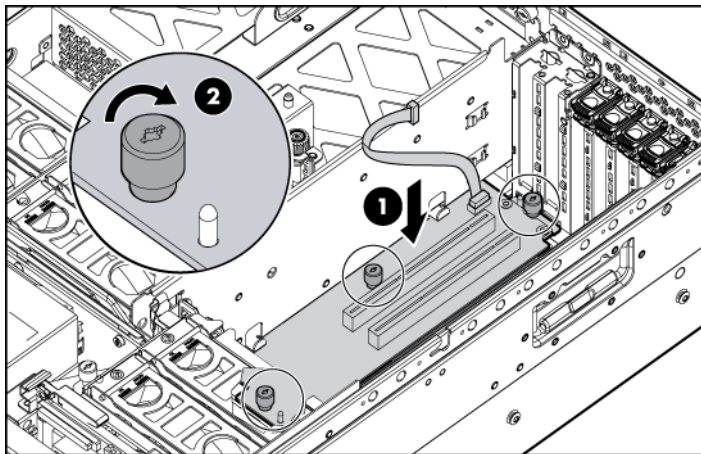


7. Connect the hot-plug cable to the mezzanine board.

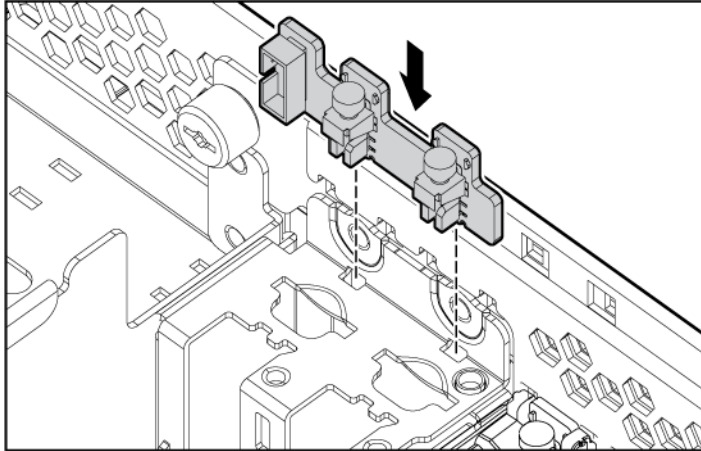
 **NOTE:** The cable connector is keyed at pin 1 for alignment.



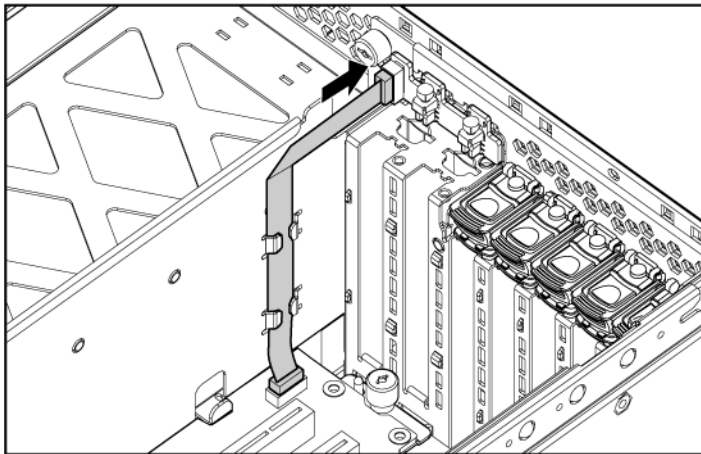
8. Use the guide pins to align the mezzanine board, and seat the mezzanine board onto the system board.
9. Tighten the three thumbscrews to secure the mezzanine board.



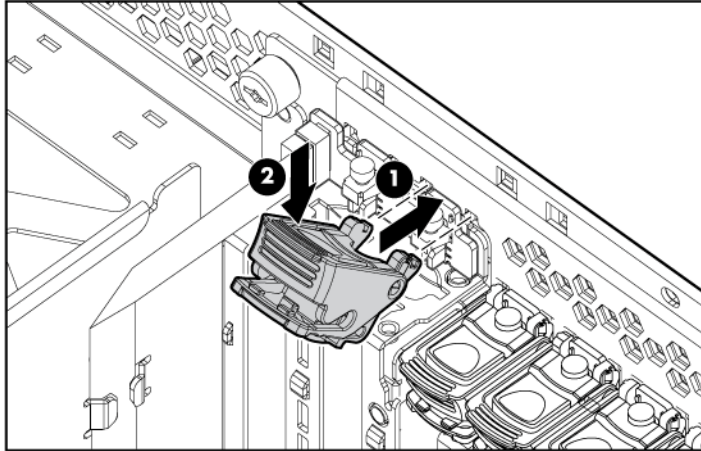
10. Install the PCI-X Hot Plug board.



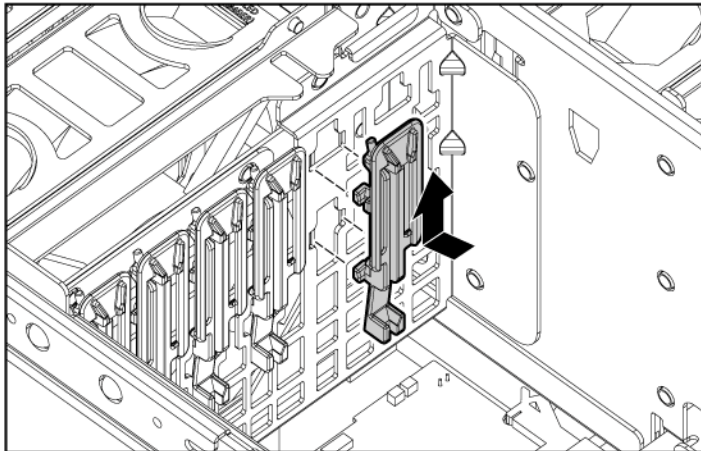
11. Route the cable from the mezzanine board to the hot-plug board, and connect the cable.



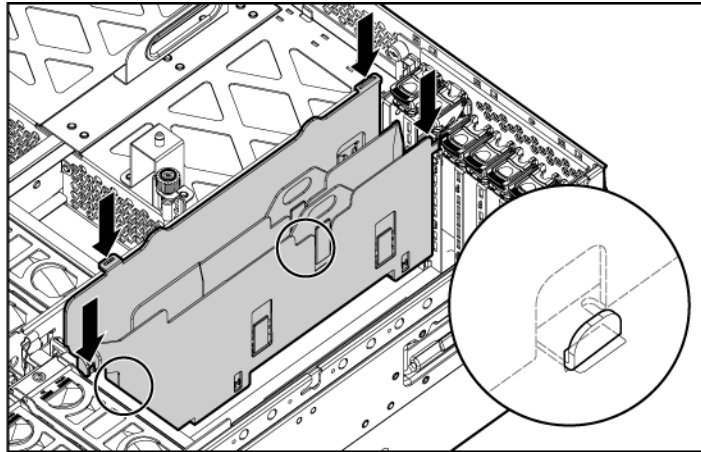
12. Attach the latch to the chassis, and press down until it snaps into place.



13. Install the retaining clips.



14. Install the basket.



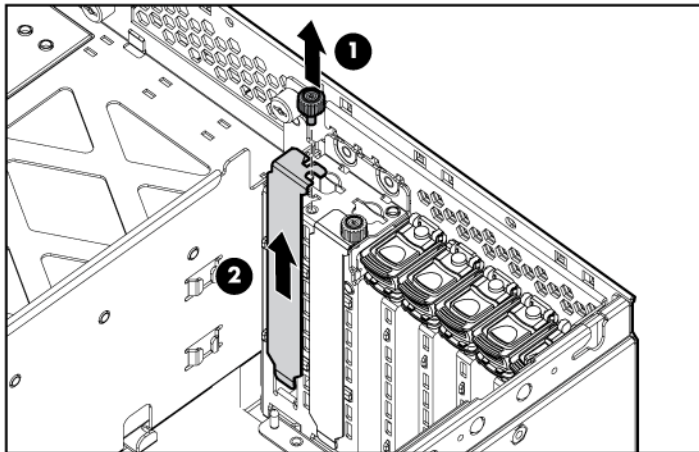
15. Install the PCI-X Hot Plug expansion boards. If the server is powered off, use non-hot-plug procedures ("Installing non-hot-plug expansion boards" on page [89](#)) to install the expansion boards. If the server is running, install PCI-X Hot Plug expansion boards using hot-plug procedures ("Installing hot plug expansion boards" on page [91](#)).
16. Reinstall any expansion boards removed to install the PCI-X Hot Plug Mezzanine Option.
17. Place the expansion slot covers over any remaining empty expansion slots, and close the latches.  

**⚠ CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all expansion slots have either an expansion slot cover or an expansion board installed.
18. Replace the access panel ("Removing the access panel" on page [40](#)).
19. Slide the server back into the rack.
20. Power up the server ("Powering up the server" on page [37](#)).


## Installing the PCI Express mezzanine options

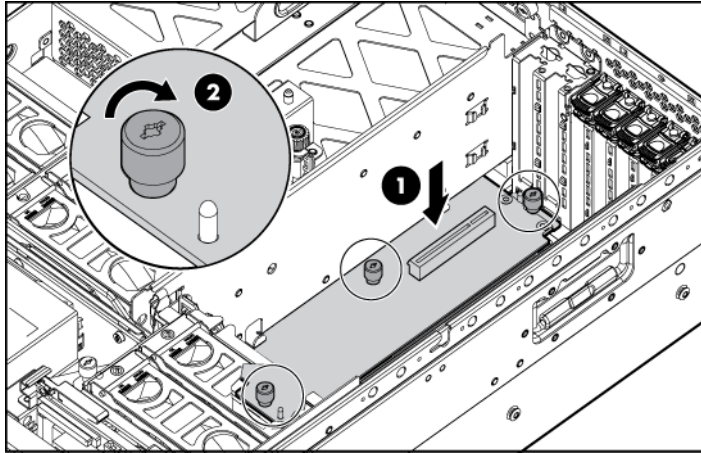
1. Power down the server ("Powering down the server" on page [37](#)).

2. Extend or remove the server from the rack ("Extending the server from the rack" on page [38](#)).
3. Remove the access panel ("Removing the access panel" on page [40](#)).
4. Remove the expansion boards from slots 3 and 4, if installed, to gain access to the mezzanine connectors.
5. Remove the expansion slot covers from slots 1 and 2.

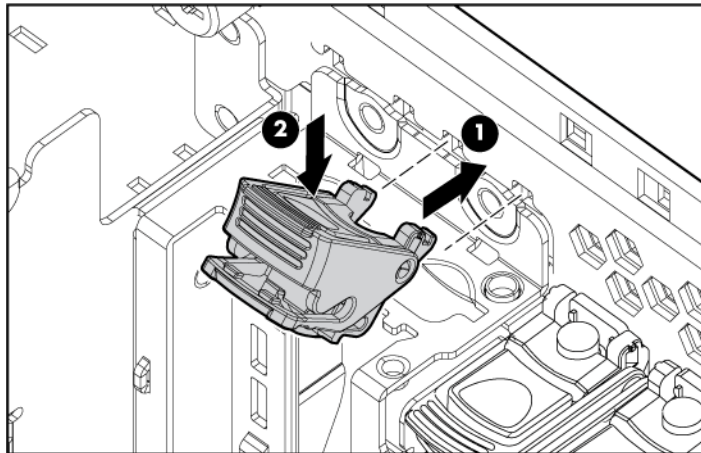


6. Use the guide pins to align the mezzanine board, and seat the mezzanine board onto the system board.
7. Tighten the three thumbscrews to secure the mezzanine board.

 **NOTE:** The PCI Express x8 mezzanine board is shown.

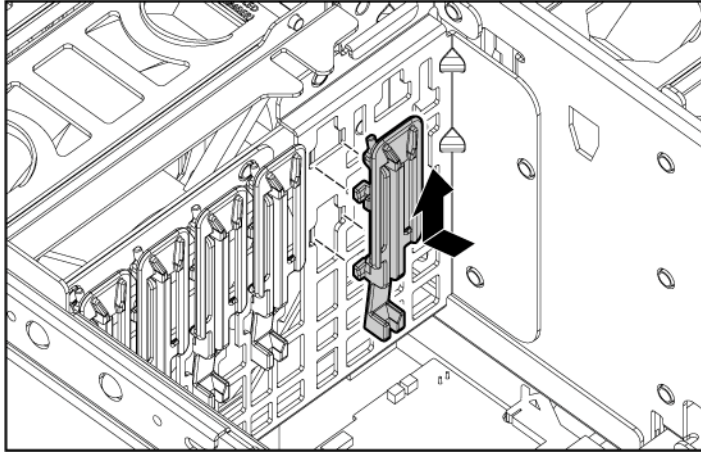


8. Attach the latch to the chassis, and press down until it snaps into place.





9. Install the retaining clip.



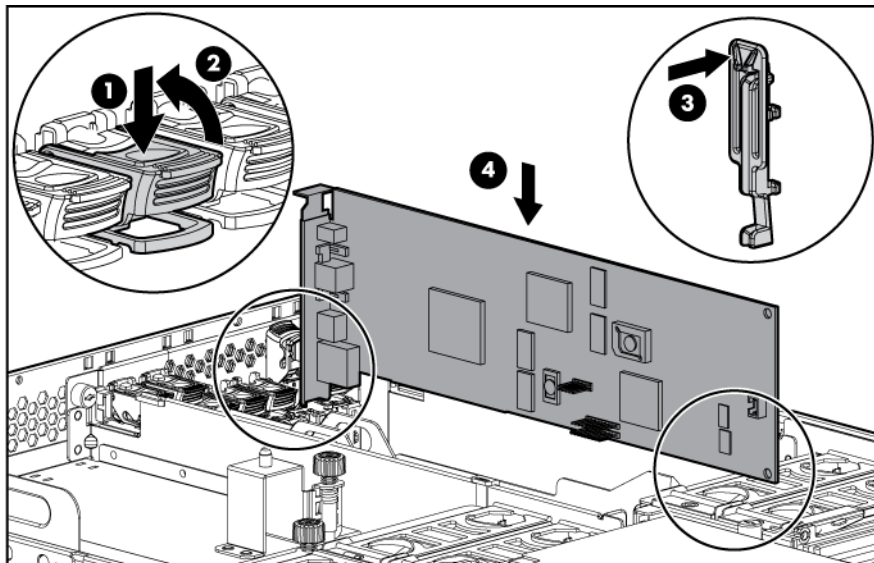
10. Install the PCI Express x8 non-hot-plug expansion board ("Installing non-hot-plug expansion boards" on page [89](#)) into slot 1, if installing the PCI Express x8 mezzanine option. Install the PCI Express x4 non-hot-plug expansion boards into slots 1 and 2, if installing the PCI Express x4 mezzanine option.
11. Place expansion slot covers over any remaining empty slots, and close the latches.  
**⚠ CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all expansion slots have either an expansion slot cover or an expansion board installed.
12. Replace the access panel ("Removing the access panel" on page [40](#)).
13. Slide the server back into the rack.
14. Power up the server ("Powering up the server" on page [37](#)).

## Installing non-hot-plug expansion boards

**⚠ CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the expansion boards.

**⚠ CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all expansion slots have either an expansion slot cover or an expansion board installed.

1. Extend or remove the server from the rack ("Extending the server from the rack" on page [38](#)).
2. Remove the access panel ("Removing the access panel" on page [40](#)).
3. Open the latch, and remove the expansion slot cover.
4. Unlock the retaining clip (for full-length expansion boards), and install the non-hot-plug expansion board.



5. Lock the retaining clip (for full-length expansion boards), and close the latch.
6. Connect any required internal or external cables to the expansion board.
7. Replace the access panel, and resume normal server operations.

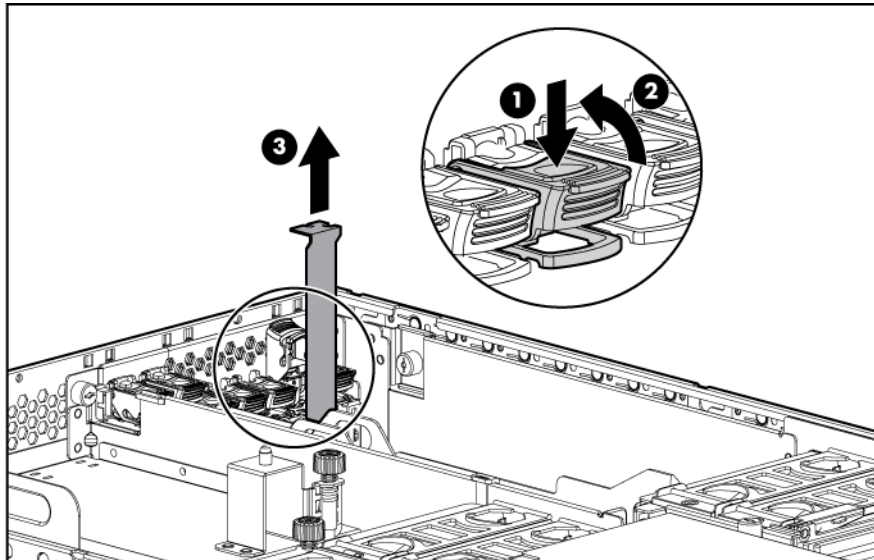
To remove a non-hot-plug expansion board, reverse the installation procedures.

## Installing hot plug expansion boards

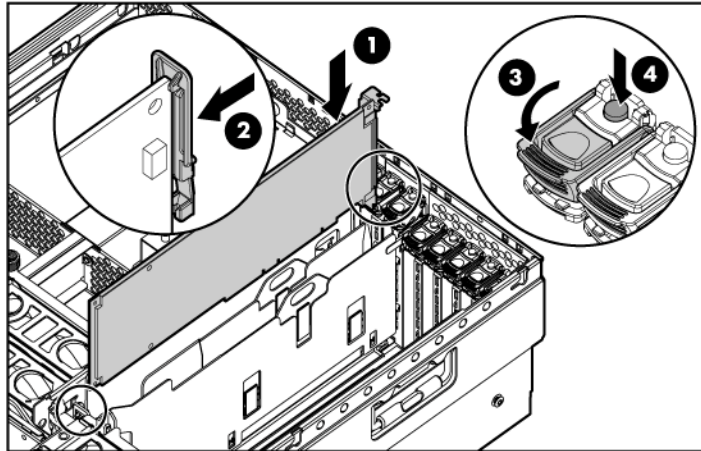
For hot-plug capability, the PCI-X Hot Plug Mezzanine Option (on page [79](#)) must be installed before installing PCI-X Hot Plug expansion boards in the server.

**△ CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all expansion slots have either an expansion slot cover or an expansion board installed.

1. Extend or remove the server from the rack ("Extending the server from the rack" on page [38](#)).
2. Remove the access panel ("Removing the access panel" on page [40](#)).
3. Press the PCI-X Hot Plug button to remove power from the slot. When the green power LED on the slot stops flashing, power has been removed from the slot.
4. Open the latch, and remove the expansion slot cover.



5. Unlock the retaining clip (for full-length expansion boards), and install the PCI-X Hot Plug expansion board.



6. Lock the retaining clip (for full-length expansion boards), and close the latch.
7. Connect any required internal or external cables to the expansion board.
8. Press the PCI-X Hot Plug button, and wait for the power LED to illuminate green without flashing.
9. Replace the access panel, and resume normal server operations.

## Removing a PCI-X Hot Plug expansion board

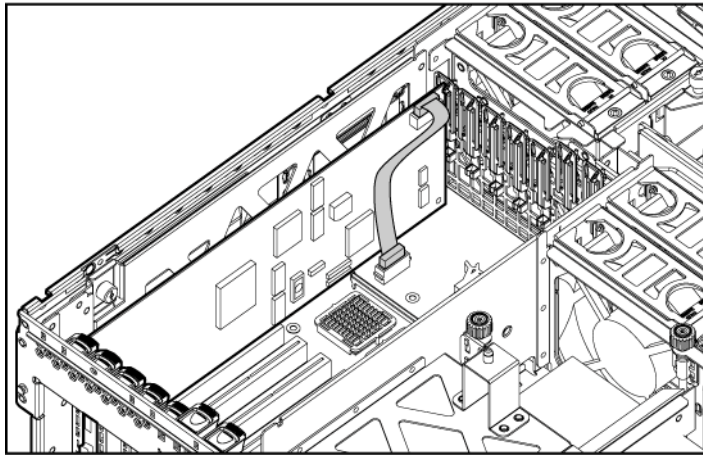
1. Extend or remove the server from the rack ("Extending the server from the rack" on page [38](#)).
2. Remove the access panel ("Removing the access panel" on page [40](#)).
3. Press the PCI-X Hot Plug button to remove power from the slot. When the green power LED on the slot stops flashing, power has been removed from the slot.
4. Unlock the retaining clip (for full-length expansion boards).
5. Lift the latch, and remove the board from the server.

**⚠ CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all expansion slots have either an expansion slot cover or an expansion board installed.

To replace the component, reverse the removal procedure.

## RILOE II Board

The server comes with iLO remote management capability embedded on the system board. The 30-pin remote management connector for the RILOE II board is provided to reduce external cabling. The 30-pin connector provides power, keyboard, mouse, and other peripheral signals directly to the system board; therefore, the external AC power adapter and keyboard/mouse loopback cable are not needed for normal operations.



The RILOE II board provides remote server manageability for ProLiant servers. It can be accessed from a network client using a standard web browser, and it provides a keyboard, mouse, and video capability for a host server, regardless of the state of the host operating system or host server. The RILOE II board features include a faster processor for increased performance, new user interface for easier browsing, and integration with LDAP, Virtual Floppy, and Virtual CD for increased server manageability.

A built-in processor, memory, NIC, ROM, and standard external power supply make the RILOE II board independent of the host server and its operating system. This design allows the RILOE II board to provide remote access to any authorized network client, send alerts, and perform other management functions.

For information about iLO technology, refer to "Integrated Lights-Out Technology (on page [132](#))."

To install the RILOE II board:



**IMPORTANT:** Install the RILOE II board into slot 7 for ease of cabling.

1. Power down the server ("Powering down the server" on page [37](#)).
2. Remove the access panel ("Removing the access panel" on page [40](#)).
3. Install the RILOE II board into slot 7.
4. Connect the RILOE II cable ("RILOE II cabling" on page [117](#)) to the 30-pin connector on the system board.
5. Connect the RILOE II cable to the RILOE II board.

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## Memory options

### In this section

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Online spare memory.....	<a href="#">99</a>
Hot-plug mirrored memory .....	<a href="#">100</a>
Hot-plug RAID memory.....	<a href="#">102</a>
Memory Boards and DIMMs .....	<a href="#">103</a>
Configuring the memory .....	<a href="#">111</a>

## Memory overview

This server supports up to four memory boards. Each memory board contains four DIMM slots for a total of 16 DIMM slots in the server. Memory can be expanded by installing PC2-3200R Registered DDR2 DRAM DIMMs.

The server supports a host of AMP options to optimize server availability:

- Advanced ECC ("Advanced ECC memory" on page [97](#))
- Online spare memory (on page [99](#))
- Hot-plug mirrored memory (dual- and quad-board) ("Hot-plug mirrored memory" on page [100](#))
- Hot-plug RAID memory

Hot-plug operations can be hot-add or hot-replace. Hot-add makes additional memory resources available to the operating system. Hot-replace allows failed or degraded DIMMs to be replaced while the server is running.

The maximum supported total memory for this server is 64 GB using four memory boards. The maximum supported memory per memory board is 16 GB using four 4-GB DIMMs.

For an overview of single- and dual-rank DIMMs, refer to "Single- and Dual-Rank DIMMs."

For DIMM slot locations and bank assignments, refer to "DIMM Slot Locations (on page [25](#))."

## General memory configuration requirements

The following configuration requirements apply regardless of the AMP mode.

- DIMMs must be installed in pairs.
- Dimms pairs in a memory bank must contain DIMMS with the same part number.
- Always populate the DIMMs in sequential order per bank: Bank A and then Bank B.
- Always populate the memory boards in sequential order: Board 1, Board 2, Board 3, and Board 4. Any deviation from this requirement results in the server defaulting to Advanced ECC ("Advanced ECC memory" on page [97](#)) on the next reboot.
- Dual-rank DIMMs must be populated before single-rank DIMMs (dual-rank DIMMs must be in the lower bank).
- The following table lists all valid combinations of single- and dual-rank DIMM configurations for a memory board. "Single" indicates a bank of single-rank DIMMs. "Dual" indicates a bank of dual-rank DIMMs.



**NOTE:** A bank contains 2 DIMMs.

Configuration	Bank A	Bank B
1	Single	
2	Single	Single
3	Dual	
4	Dual	Single
5	Dual	Dual



- The server can be configured for any AMP mode in RBSU. RBSU displays a warning message if the selected AMP mode is not supported by the current DIMM configuration. However, if the DIMM configuration at POST does not match the AMP mode selected in RBSU, the server defaults to Advanced ECC ("Advanced ECC memory" on page [97](#)). When this occurs, a message displays during POST and the status LED for the configured AMP mode flashes amber.
- Unpopulated memory boards (those without any installed DIMMs) can be installed in the server for storing extra memory boards.
- If your server contains more than 4 GB of memory, consult your operating system documentation for additional requirements.

## Single- and dual-rank DIMMs

PC2-3200 DIMMs can either be single- or dual-rank. While it is not normally important for you to differentiate between these two types of DIMMs, certain DIMM configuration requirements are based on these classifications.

Certain configuration requirements exist with single- and dual-rank DIMMs that allow the architecture to optimize performance. A dual-rank DIMM is similar to having two separate DIMMs on the same module. Although only a single DIMM module, a dual-rank DIMM acts as if it were two separate DIMMs. The primary reason for the existence of dual-rank DIMMs is to provide the largest capacity DIMM given the current DIMM technology. If the maximum DIMM technology allows for creating 2-GB single-rank DIMMs, a dual-rank DIMM using the same technology would be 4-GB.

## Advanced ECC memory

Advanced ECC is the default memory protection mode for this server. In Advanced ECC, the server is protected against correctable memory errors. The server will provide notification if the level of correctable errors exceeds a predefined threshold rate. The server does not fail because of correctable memory errors.


Advanced ECC provides additional protection over Standard ECC in that it is possible to correct certain memory errors that would otherwise be uncorrectable and result in a server failure. Whereas Standard ECC can correct single-bit memory errors, Advanced ECC can correct single-bit memory errors and multi-bit memory errors if all failed bits are on the same DRAM device on the DIMM.

The following guidelines apply to Advanced ECC memory:

- All general memory requirements apply.
- Advanced ECC mode is supported with one to four memory boards.
- Board insertions do not convert the AMP mode while the server is running. A server cannot be converted from Advanced ECC to another AMP mode by inserting a board while the server is running. Board insertions in Advanced ECC are solely for making additional memory resources available to the operating system.
- Advanced ECC is the only mode in which hot-add operations are supported, and is the only mode in which the amount of memory available to the operating system can be increased without a reboot.
- If a memory board (which contains DIMMs) is unlocked while in Advanced ECC mode, audio alarms and visual alerts occur.

The following rules apply to hot-add operations. Hot-add is performed by adding a memory board while the server is running, and the additional memory is made available to the operating system without a reboot.

- Boards must be inserted sequentially.
- Multiple hot-add board insertions can be performed one at a time on the same server. For example, if a server has three empty memory board slots, three hot-add board insertions can be performed.
- If multiple hot-add operations are performed, allow one board insertion operation to complete (as indicated by the memory board LEDs ("Memory board components and LEDs" on page [12](#)) and operating system logs) before inserting another memory board.

 **CAUTION:** When the memory board locking switch is unlocked in a mode that does not support hot-add or hot-replace capabilities, audio alarms and visual alerts occur. Removing the memory board at this point causes server failure.

To end the audio alarms and visual alerts, move the memory board locking switch back to the locked position. This action does not result in data corruption or server failure.

If removal of a single memory board is required and it is the only memory board, power down the server and make the necessary memory changes.

## Online spare memory

Online spare memory provides a higher level of memory protection than Advanced ECC ("Advanced ECC memory" on page [97](#)). With online spare memory, the probability of a server failing because of uncorrectable memory errors is reduced.

In this mode, degraded memory that is receiving a high rate of correctable memory errors is automatically disengaged and a replacement set of memory is used in its place. Because DIMMs that are receiving a high rate of correctable memory errors have an increased probability of receiving an uncorrectable memory error (which results in a server failure), the server experiences higher availability. The degraded memory can be replaced during scheduled downtime and poses no additional risk to the server.

Online spare memory is supported with one to four memory boards installed. On this server, each installed memory board is protected by its own spare memory. No operating system support is required.

The following guidelines apply to online spare memory:

- All general memory requirements apply.
- Online spare memory supports 1, 2, 3, or 4 memory boards.
- Each board must have a valid online spare configuration. No dependencies exist for the configuration between different memory boards.
- Each memory board includes its own online spare bank. All boards will operate in online spare memory mode independently. Each board can failover to its online spare bank independent of the other memory boards. Some boards can be in degraded online spare mode while others are still in operational online spare memory mode.

- The minimum valid online spare configuration for a memory board requires at least one bank of dual-rank DIMMs or two banks of single-rank DIMMs. If the server does not meet these requirements, an error message appears during POST and the server defaults to Advanced ECC ("Advanced ECC memory" on page [97](#)).
- The server automatically configures the optimal online spare solution.
- Hot-plug operations are not supported.

HP recommends the following configurations. These configurations result in optimal use of memory. Other configurations are valid, but do not result in the maximum amount of installed memory being available to the operating system.

- If only single-rank DIMMs are used on a memory board, all DIMMs should be of the same size on that memory board.
- If only dual-rank DIMMs are used on a memory board, all DIMMs should be of the same size on that memory board.
- If a mixture of single- and dual-rank DIMMs are used on a memory board, the dual-rank DIMMs should be twice the size of any single-rank DIMM.

After installing DIMMs, use RBSU to configure the server ("Configuring the memory" on page [111](#)) for online spare memory support.

## Hot-plug mirrored memory

Hot-plug mirrored memory provides a higher level of memory protection than either Advanced ECC ("Advanced ECC memory" on page [97](#)) or online spare memory (on page [99](#)). With hot-plug mirrored memory, the server is protected against uncorrectable memory errors that would otherwise result in server failure. Hot-plug mirrored memory allows the server to keep two copies of all memory data on separate memory boards.

If an uncorrectable error is encountered, the proper data is retrieved from the memory board that did not fail. In addition, hot-plug mirrored memory allows failed or degraded DIMMs to be replaced while the server is running without requiring server downtime. The memory board with the failed DIMMs can be removed, failed DIMMs replaced, and the board re-inserted into the server without any interruption to the operating system.

Hot-plug mirrored memory is supported with either two or four memory boards installed. No operating system support is required.

Hot-plug mirrored memory has two configurations: dual-board and quad-board. Single-board mirrored memory is not supported. For either mode, choose "Mirrored Memory with Advanced ECC" in RBSU.

The following guidelines apply to hot-plug mirrored memory:

- All general memory requirements apply.
- Hot-plug mirrored memory is supported with two or four memory boards.
- Memory boards 1 and 2 are populated for dual-board hot-plug mirrored memory. Boards 1, 2, 3, and 4 are populated for quad-board hot-plug mirrored memory. Any deviation from these guidelines results in the server defaulting to Advanced ECC ("Advanced ECC memory" on page [97](#)).
- Memory boards 1 and 2 form a mirrored pair for dual-board hot-plug mirrored memory. For quad-board hot-plug mirrored memory, memory boards 3 and 4 also form a mirrored pair.
- Memory boards within a mirrored pair must have the same amount of total memory. However, each board of the mirrored pair may have different DIMM configurations as long as they have equal total size. For example, memory boards 1 and 2 could each contain 2 GB of physical memory per board with board 1 containing two 1-GB DIMMs and board 2 containing four 512-MB DIMMs.
- The amount of memory between mirrored pairs can be different in quad-board Hot-Plug Mirrored Memory mode. For example, memory pair 1 (boards 1 and 2) can contain 2 GB each while memory pair 2 (boards 3 and 4) contain 4 GB each.
- In quad-board hot-plug mirrored memory, the two pairs of memory boards operate independently. One of the pairs of memory boards can be degraded while the other pair of memory boards can still be fully mirrored.
- Hot-add operations are not supported. Board removals and insertions in Hot-Plug Mirrored Memory mode are solely for the purpose of hot-replace operations.

- For hot-replace to function properly, the memory board must be re-inserted into the location from which it was removed. If the board is placed into the incorrect slot (for example, if board 2 is removed in dual-board mode and re-inserted into memory slots 3 or 4), a configuration error occurs. Attempting to insert a board into the improper position results in audio alarms and visual alerts.
- Replace only one board at a time. That is, if memory boards 2 and 4 both contain memory errors, remove board 2, correct the error, and replace board 2. Wait for the board status LED to stop flashing before proceeding to board 4.
- If a board is inserted into a valid memory slot but with an invalid DIMM configuration (including too much or too little memory), a DIMM configuration error occurs and a visual alert occurs (refer to Memory Board Components and LEDs (on page [12](#))).
- If you remove a board while the server is running and do not replace the board, the server defaults to Advanced ECC ("Advanced ECC memory" on page [97](#)) on the next reboot.

## Hot-plug RAID memory

Hot-plug RAID memory provides a similar level of memory protection as hot-plug mirrored memory (on page [100](#)) but obtains this protection using less total memory. Hot-plug RAID memory protects the server against uncorrectable memory errors that would otherwise result in a server failure.

Although hot-plug mirrored memory keeps two copies of all memory data, hot-plug RAID memory keeps only one copy of all memory data and additional parity information. If an uncorrectable memory error is encountered, the server can create the proper data using the parity information and the information from the other memory boards that contain no failures. In a hot-plug RAID memory configuration, 25% of the installed memory is not available to the operating system. In a hot-plug mirrored memory configuration, however, 50% of the installed memory is not available to the operating system.

As with hot-plug mirrored memory, hot-plug RAID memory allows failed or degraded DIMMs to be replaced while the server is running without requiring server downtime. The memory board with the failed DIMMs can be removed, failed DIMMs replaced, and the board re-inserted into the server without any interruption to the operating system.

Hot-plug RAID memory is only supported if all four memory boards are installed. No operating system support is required.

The following guidelines apply to hot-plug RAID memory:

- All general memory requirements apply.
- Hot-plug RAID memory is only supported with four memory boards.
- All four memory boards must have the same amount of total memory. However, each board can have different DIMM configurations as long as they have equal total size. Any deviation from this rule results in the server defaulting to Advanced ECC ("Advanced ECC memory" on page [97](#)).
- Hot-replace operations are supported.
- If you remove a board while the server is running and do not replace it, the server defaults to Advanced ECC on the next reboot.

## Memory Boards and DIMMs

Memory board and DIMM installation, removal, and replacement procedures can be either hot-plug or non-hot-plug procedures, depending on how the server is configured. Hot-plug operations can be hot-add or hot-replace. Hot-add makes additional memory resources available to the operating system. Hot-replace allows failed or degraded DIMMs to be replaced while the server is running. Hot-add is only supported with Microsoft® Windows® 2003 or later. Hot-replace has no operating system requirements.

The following table illustrates what AMP mode supports hot-plug features.

Advanced Memory Protection Mode	Hot-Replace Supported	Hot-Add Supported
Advanced ECC		X

Advanced Memory Protection Mode	Hot-Replace Supported	Hot-Add Supported
Online Spare Memory		
Hot-Plug Mirrored Memory	X	
Hot-Plug RAID Memory	X	

When the server is configured for hot-plug mirrored memory or hot-plug RAID memory, you can perform a hot-replacement procedure in the following manner without powering down the server or experiencing server downtime:

1. Remove a memory board.
2. Replace failed or degraded DIMMs.
3. Reinstall the memory board in the slot from which it was removed.

The replacement procedures in this section apply to both hot-plug and non-hot-plug memory procedures, except as noted.



**IMPORTANT:** Be sure to power down the server when performing board removal procedures in a server that is not configured for Advanced ECC, hot-plug mirrored memory, or hot-plug RAID memory.

Observe the following warnings when performing a hot-plug replacement procedure.



**WARNING:** Always comply with all electrostatic and thermal guidelines to prevent bodily injury and ensure a properly functioning system when performing hot-plug operations.



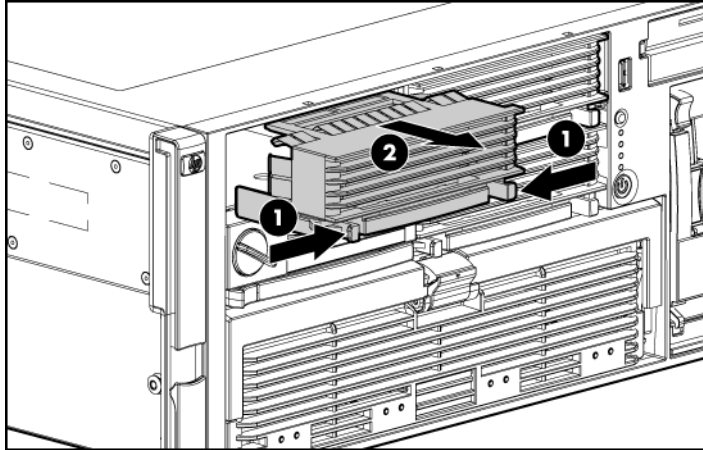
**WARNING:** To prevent personal injury from hazardous energy:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Do not place tools or metal parts on top of batteries.



## Removing a memory board blank

To remove the memory board blank, squeeze the levers and pull the blank out of the server.



## Removing and installing a memory board while the server is running

Memory boards can be installed while the server is running in the following scenarios:

- Memory boards can be hot-added if the server is configured for Advanced ECC and hot-add is enabled in RBSU.
- Memory boards can be hot-replaced if the server is configured for hot-plug mirrored memory or hot-plug RAID memory.



**IMPORTANT:** Be sure to power down the server when performing board removal procedures in a server that is not configured for Advanced ECC, hot-plug mirrored memory, or hot-plug RAID memory.

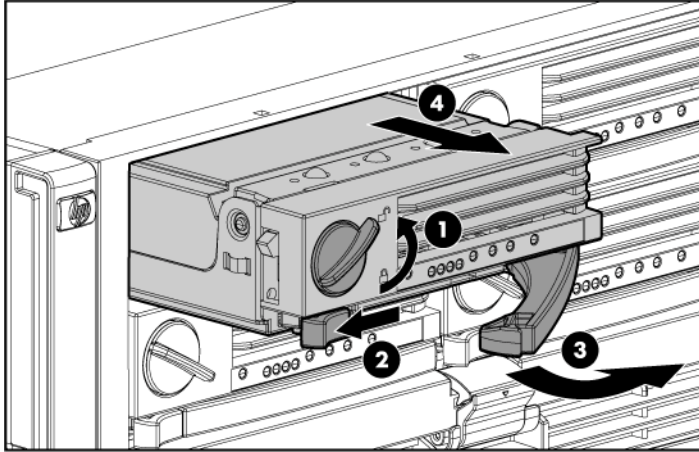
1. Unlock the locking switch, and open the release latch.



**CAUTION:** Only memory boards with a green Removable LED can be removed. Do not attempt to remove any memory board with the Removable LED off.

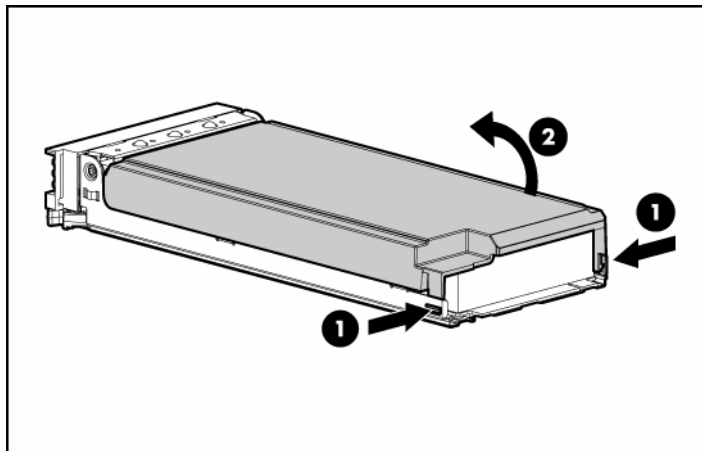
**CAUTION:** To prevent server failure during a hot-plug removal procedure, do not remove the memory board from the server until the board status LED stops flashing.

2. Use the ejector lever to pull the memory board out of the server.

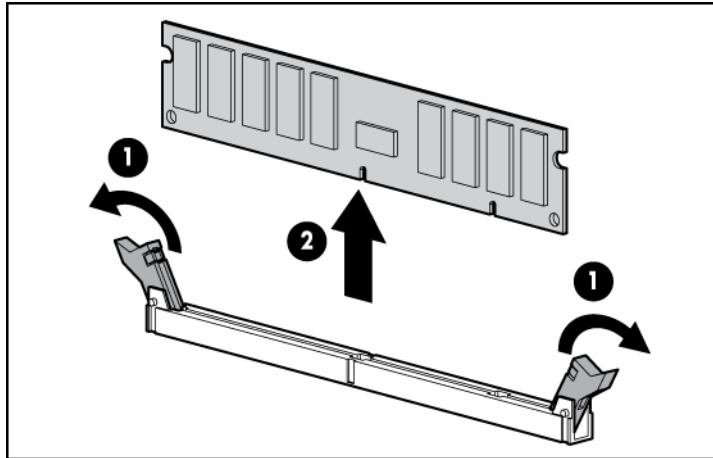


**NOTE:** While the memory board with the failed or degraded DIMM is being replaced, the server continues to read and write from the operational memory board.

3. Open the memory board.

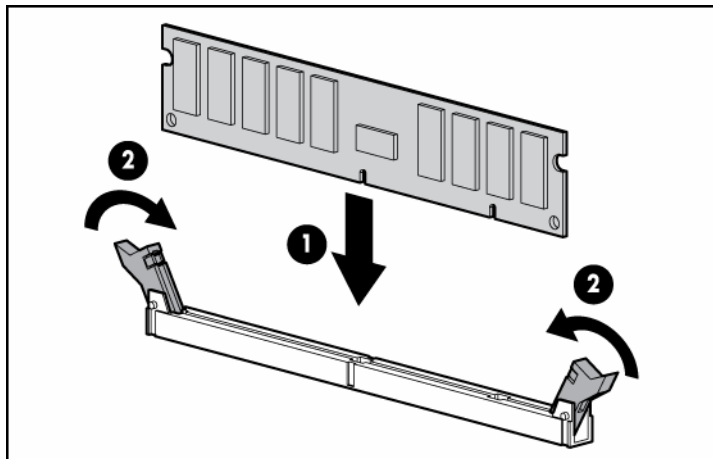


4. Remove or install the DIMM.



**IMPORTANT:** Be sure to observe all DIMM installation requirements for the desired memory mode.

**IMPORTANT:** DIMMs do not seat fully if turned the wrong way.

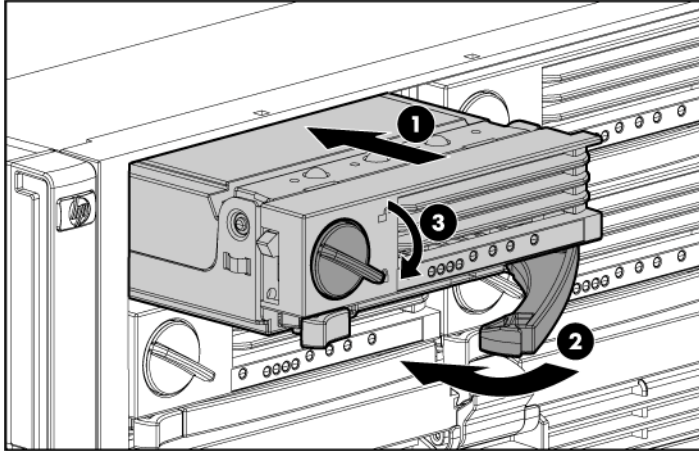



5. Close the memory board.

**IMPORTANT:** Be sure that the locking switch is unlocked. The memory board will not seat in the server if the locking switch is locked.

6. Install the memory board.

7. Close the ejector lever, and lock the locking switch.



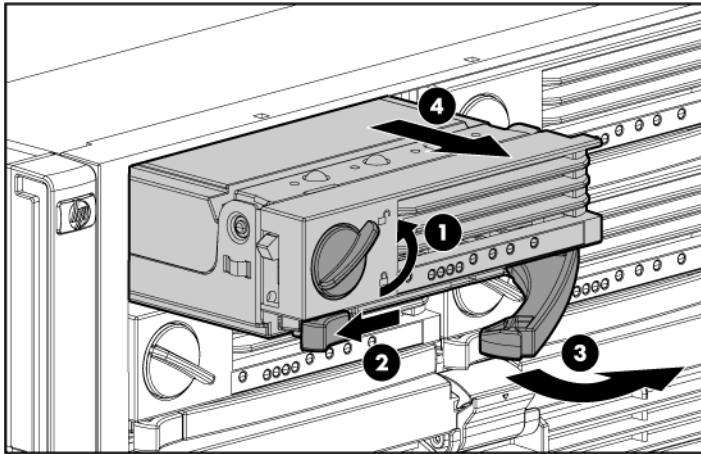
 **NOTE:** The board status LED might flash green for several minutes while the board is rebuilding.

8. Configure the memory ("Configuring the memory" on page [111](#)) if applicable.
9. Reference the memory board LEDs ("Memory board components and LEDs" on page [12](#)) to be sure that the memory board is functioning properly.

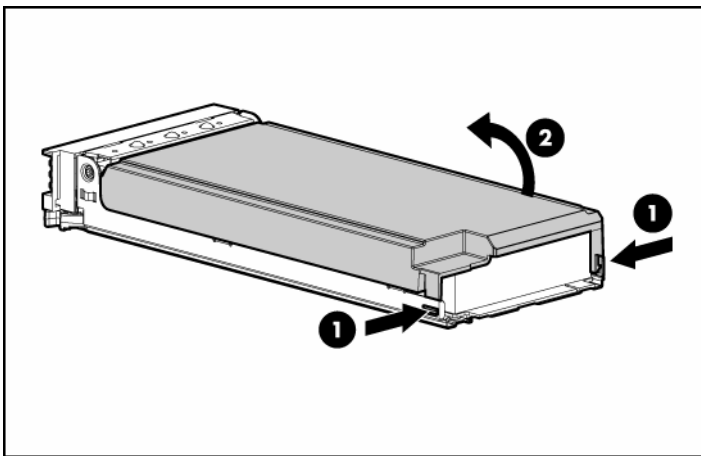
## Removing and installing a memory board (non-hot-plug)

1. Power down the server ("Powering down the server" on page [37](#)).
2. Unlock the locking switch, and open the release latch.

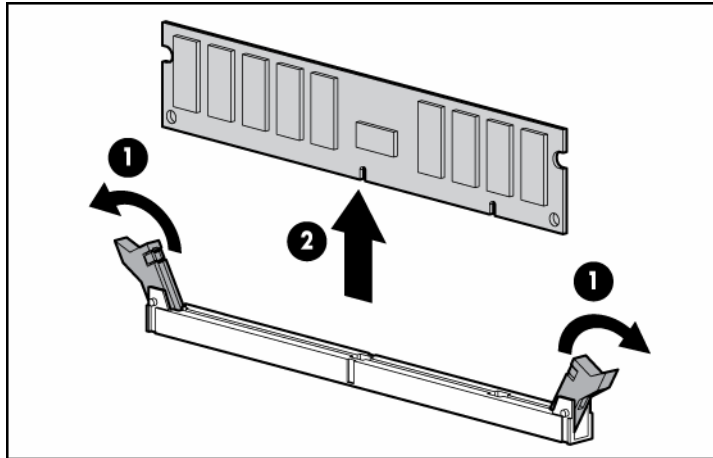
3. Use the ejector lever to pull the memory board out of the server.





4. Open the memory board.

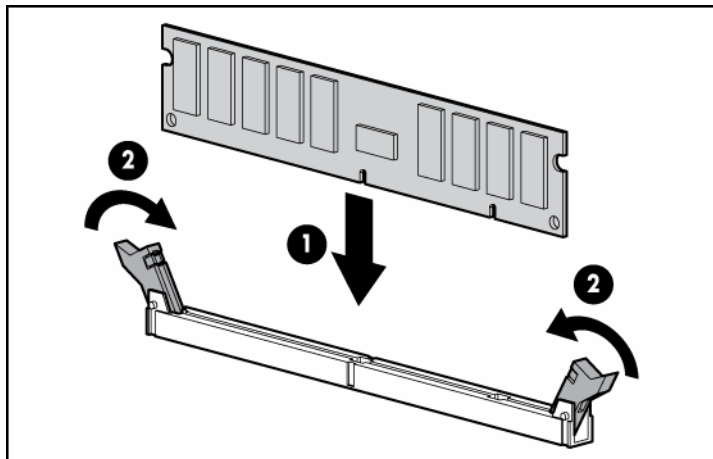


5. Remove or install the DIMM.




 **IMPORTANT:** Be sure to observe all DIMM installation requirements for the desired memory mode.

 **IMPORTANT:** DIMMs do not seat fully if turned the wrong way.

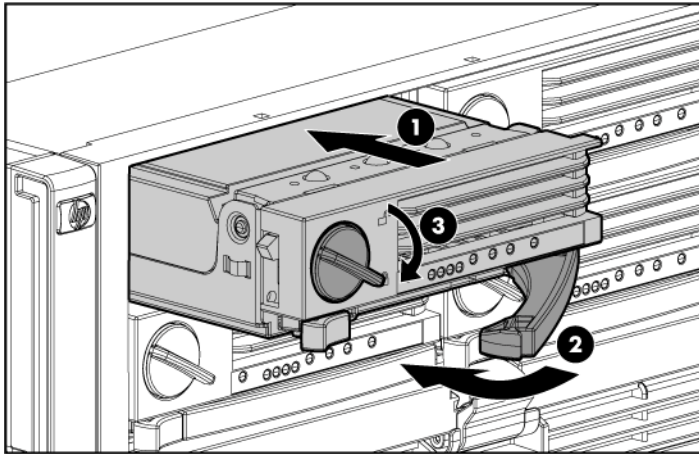


6. Close the memory board.

 **IMPORTANT:** Be sure that the locking switch is unlocked. The memory board will not seat in the server if the locking switch is locked.

7. Install the memory board.

8. Close the ejector lever, and lock the locking switch.



9. Power up the server ("Powering up the server" on page [37](#)).
10. Configure the memory ("Configuring the memory" on page [111](#)).
11. Reference the memory board LEDs ("Memory board components and LEDs" on page [12](#)) to be sure that the memory board is functioning properly.

## Configuring the memory

Configuring the memory system of the server requires configuring both hardware and software.

To configure the memory:

1. Install the correct amount of memory for the desired AMP mode. For a list of AMP options, refer to "Memory Options (on page [95](#)). For more information, refer to "General Memory Configuration Requirements."
2. Test the DIMMs for all AMP modes, except Advanced ECC, before configuring the AMP mode in RBSU. The two testing methods are:
  - POST memory test (on page [112](#))
  - ROM-Based Diagnostics test ("ROM-based diagnostics" on page [112](#))



**NOTE:** If the total amount of memory has changed, the POST Memory Test will run automatically. Additional memory testing is not necessary.

3. Select the AMP mode ("Selecting the AMP mode" on page [112](#)).

## POST memory test

1. Power on the server ("Powering up the server" on page [37](#)).
2. Press the **F9** key, when prompted, to enter RBSU.
3. Select **Advanced Options**.
4. Change POST Speed Up to **Disable**.
5. Press any key to return to the RBSU main menu.
6. Press the **F10** key, when prompted, to exit RBSU. The server reboots and tests all memory in the system.
7. Once the memory has been tested, re-enable POST Speed Up for faster system boot, if desired.

## ROM-based diagnostics

1. Power on the server ("Powering up the server" on page [37](#)).
2. Press the **F10** key, when prompted, to enter the System Maintenance menu.
3. Select **Diagnostics**.
4. Run the **Memory Diagnostics**.
5. Once the memory has been tested, exit the utility and reboot.
6. Select the AMP mode ("Selecting the AMP mode" on page [112](#)).

## Selecting the AMP mode

1. Upon reboot, press the **F9** key, when prompted, to enter RBSU.
2. Select **System Options**.
3. Select **Advanced Memory Protection**.
4. Select the desired memory mode.



- Advanced ECC (hot-add enabled)
  - Advanced ECC (hot-add disabled)
  - Online Spare Memory with Advanced ECC
  - Hot-Plug Mirrored Memory with Advanced ECC
  - Hot-Plug RAID Memory with Advanced ECC
5. Press the **Escape** key twice to go back to the main RBSU menu.
  6. Press the **F10** key, when prompted, to exit RBSU. The server reboots and tests all memory in the system.



**IMPORTANT:** To reconfigure the memory mode after initial setup, you must reboot the system, enter RBSU, and select the desired AMP mode.




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## Server cabling

### In this section

Storage device cabling guidelines .....	<a href="#">115</a>
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BBWC cabling.....	<a href="#">116</a>
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Hot-plug SCSI drive cabling .....	<a href="#">117</a>
Hot-plug SAS hard drive cabling .....	<a href="#">119</a>
USB cable assembly .....	<a href="#">120</a>
Power switch cable assembly .....	<a href="#">121</a>

## Storage device cabling guidelines

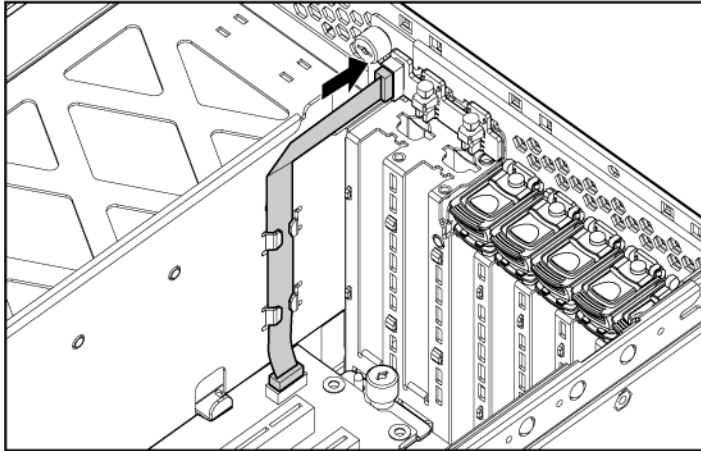
 **CAUTION:** To prevent damage to the equipment, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before installing devices.

 **CAUTION:** To prevent damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

## PCI-X Hot Plug mezzanine cabling

The server supports an optional PCI-X Hot Plug mezzanine board that provides hot-plug capability for two expansion slots. A ribbon cable connects the PCI-X Hot Plug button to the PCI-X Hot Plug mezzanine board.

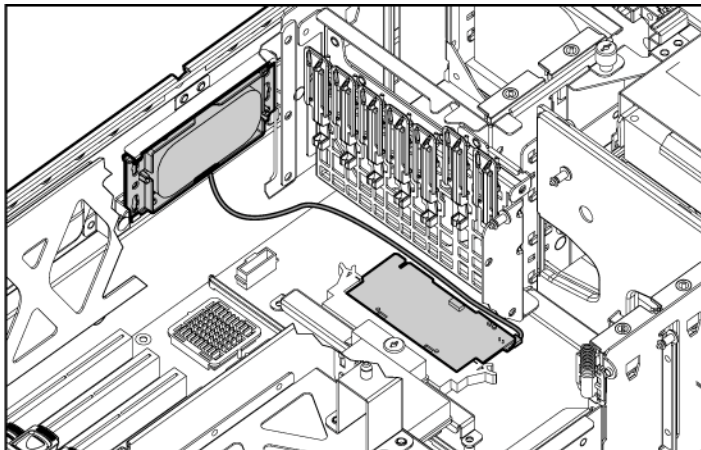
**⚠ CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.



## BBWC cabling

**⚠ CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

**📌 IMPORTANT:** The BBWC cable is wound around the battery pack. Unwind the cable to the appropriate length before installing the battery pack assembly into the server.

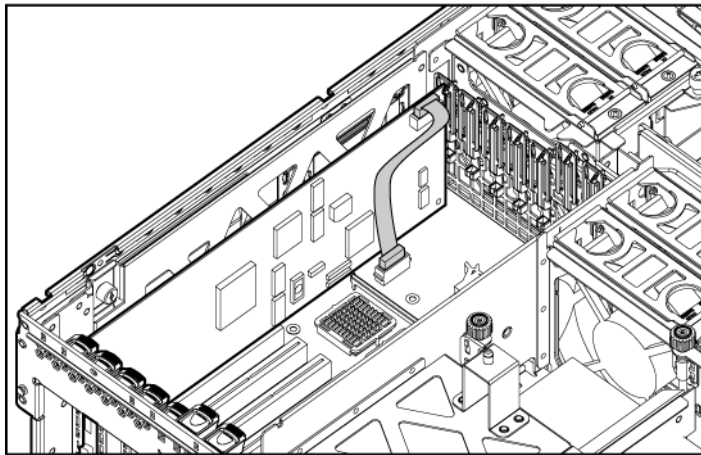


## RILOE II cabling

The 30-pin Remote Insight cable ships with the RILOE II cable kit.

**CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

**IMPORTANT:** Install the RILOE II board into slot 7 for ease of cabling.



## Hot-plug SCSI drive cabling

**CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

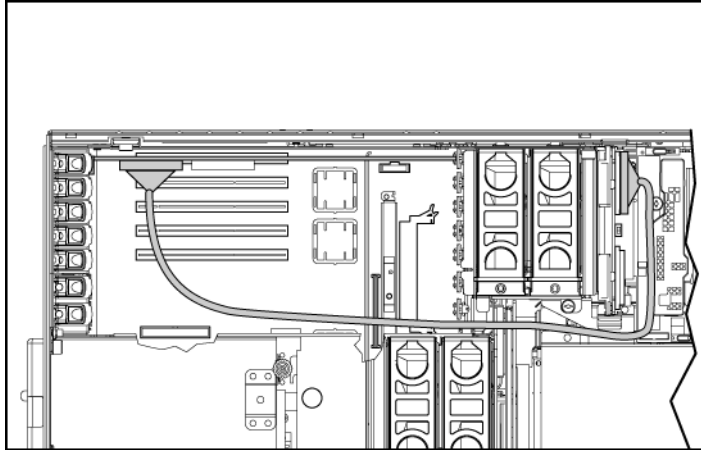
The following are the standard SCSI cabling configurations for this server:

- Single-channel (simplex mode) SCSI cabling to the SCSI ports
- Dual-channel (duplex mode) SCSI cabling to the SCSI ports
- Standard SCSI cabling to an expansion board

**NOTE:** The server ships with the required cables.

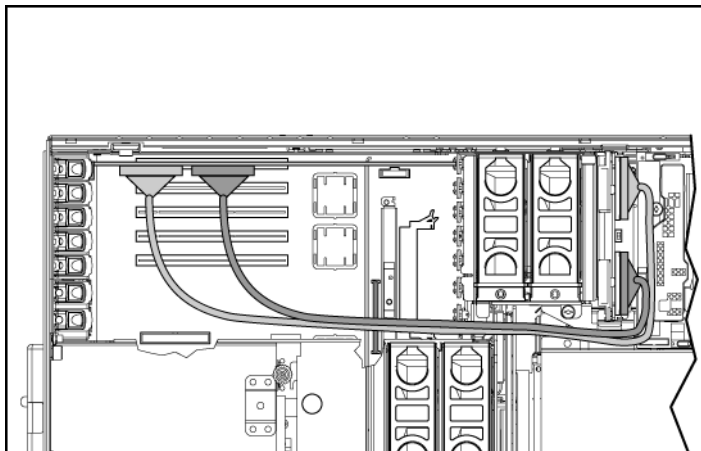
## SCSI simplex mode

In the PCI simplex cabling configuration, an optional PCI array controller controls up to four hard drives through one SCSI bus.



## SCSI duplex mode

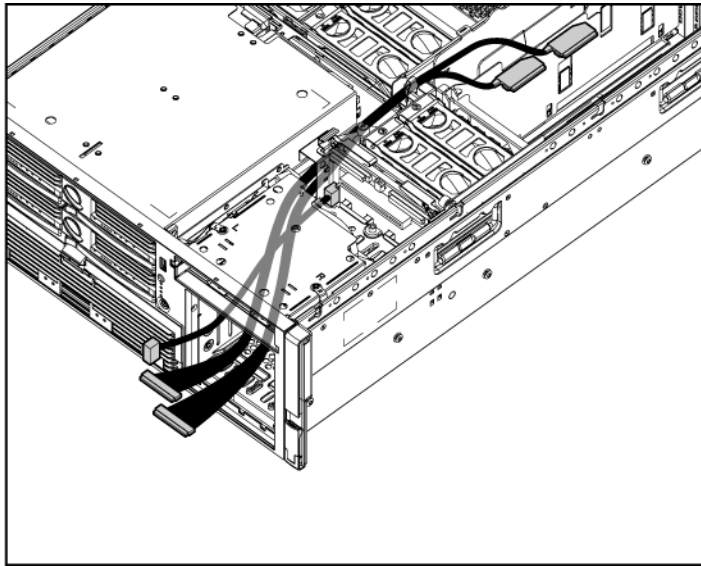
In the PCI duplex cabling configuration, an optional PCI array controller controls up to four hard drives through two SCSI buses. Each bus controls two hard drives.




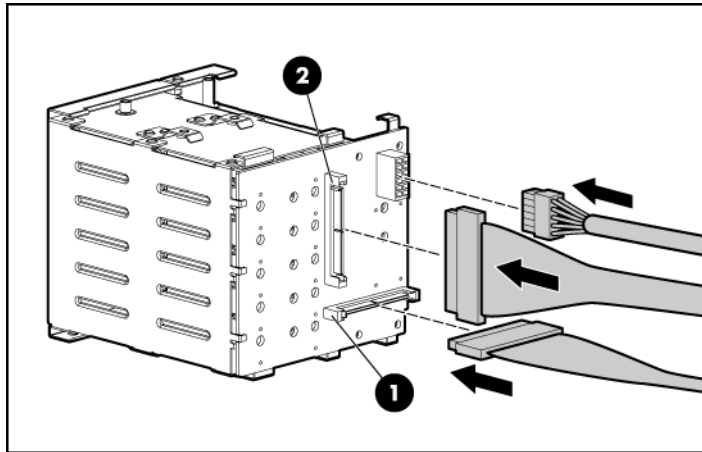
## Hot-plug SAS hard drive cabling

**△ CAUTION:** When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

For ease of cabling, route the cables in the server before connecting the cables to the SAS hard drive cage.



 **NOTE:** Port 1 supports hard drives 1 through 4. Port 2 supports hard drives 5 through 8. If you are using a single channel SAS controller, connect the cable to port 1.



## USB cable assembly

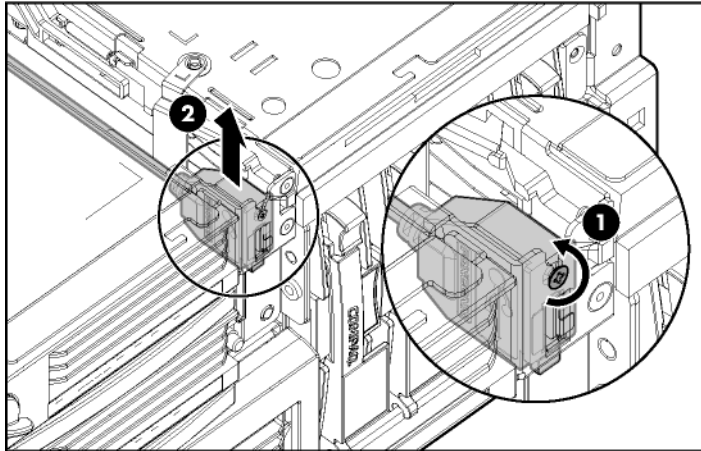
The USB cable connects the front panel USB connector to the SCSI backplane.

To remove the component:

1. Power down the server ("Powering down the server" on page [37](#)).
2. Extend the server from the rack ("Extending the server from the rack" on page [38](#)).
3. Remove the access panel ("Removing the access panel" on page [40](#)).
4. Remove the front bezel.
5. Disconnect all cables from the media board.
6. Remove the media board.



7. Loosen the screw, and slide the USB cable connector up to remove the cable assembly from the server.

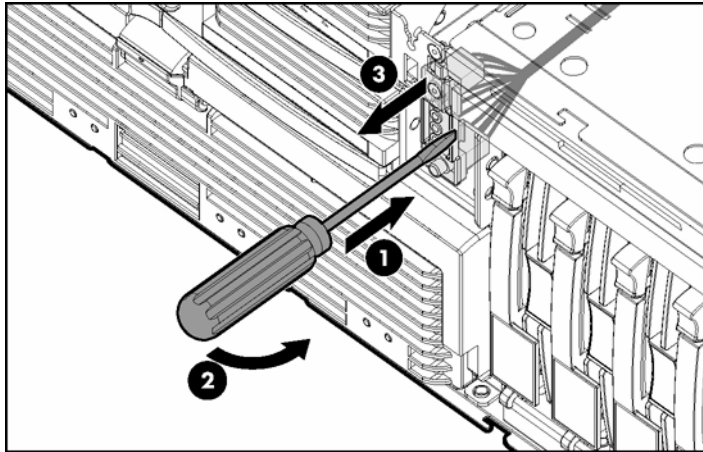


To replace the component, reverse the removal procedure.

## Power switch cable assembly

1. Power down the server ("Powering down the server" on page [37](#)).
2. Extend the server from the rack ("Extending the server from the rack" on page [38](#)).
3. Remove the access panel ("Removing the access panel" on page [40](#)).
4. Remove the front bezel.
5. Disconnect all cables from the media board.
6. Remove the media board.
7. Remove the USB cable assembly.
8. Insert a flat screwdriver into the power switch cable housing next to the middle two LEDs and pry the housing from the chassis.

9. Remove the power switch cable assembly.



To replace the component, reverse the removal procedure.

## Server software and configuration utilities

### In this section

Configuration tools .....	<a href="#">123</a>
HP ProLiant Essentials Rapid Deployment Pack .....	<a href="#">127</a>
Option ROM Configuration for Arrays .....	<a href="#">128</a>
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Re-entering the server serial number and product ID .....	<a href="#">129</a>
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## Configuration tools

### List of tools:

SmartStart software .....	<a href="#">123</a>
SmartStart Scripting Toolkit.....	<a href="#">124</a>
HP ROM-Based Setup Utility .....	<a href="#">125</a>

## SmartStart software

SmartStart is a collection of software that optimizes single-server setup, providing a simple and consistent way to deploy server configuration. SmartStart has been tested on many ProLiant server products, resulting in proven, reliable configurations.

SmartStart assists the deployment process by performing a wide range of configuration activities, including:

- Configuring hardware using embedded configuration utilities, such as RBSU and ORCA

- Preparing the system for installing "off-the-shelf" versions of leading operating system software
- Installing optimized server drivers, management agents, and utilities automatically with every assisted installation
- Testing server hardware using the Insight Diagnostics Utility ("Array Diagnostic Utility" on page [137](#), "HP Insight Diagnostics" on page [136](#))
- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.
- Enabling access to the Array Configuration Utility (on page [128](#)), Array Diagnostic Utility (on page [137](#)), and Erase Utility (on page [133](#))

SmartStart is included in the HP ProLiant Essentials Foundation Pack. For more information about SmartStart software, refer to the HP ProLiant Essentials Foundation Pack or the HP website (<http://www.hp.com/servers/smartstart>).

## SmartStart Scripting Toolkit

The SmartStart Scripting Toolkit is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The SmartStart Scripting Toolkit is designed to support ProLiant BL, ML, and DL servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these new tools to build an automated server deployment process.

Using SmartStart technology, the Scripting Toolkit provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each server deployed, making it possible to scale server deployments to high volumes in a rapid manner.

For more information, and to download the SmartStart Scripting Toolkit, refer to the HP website (<http://www.hp.com/servers/sstoolkit>).

## HP ROM-Based Setup Utility

RBSU, an embedded configuration utility, performs a wide range of configuration activities that may include:

- Configuring system devices and installed options
- Displaying system information
- Selecting the primary boot controller
- Configuring memory options
- Language selection

For more information on RBSU, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (<http://www.hp.com/servers/smartstart>).

### Using RBSU

The first time you power up the server, the system prompts you to enter RBSU and select a language. Default configuration settings are made at this time and can be changed later. Most of the features in RBSU are not required to set up the server.

To navigate RBSU, use the following keys:

- To access RBSU, press the **F9** key during power up when prompted in the upper right corner of the screen.
- To navigate the menu system, use the arrow keys.
- To make selections, press the **Enter** key.



**IMPORTANT:** RBSU automatically saves settings when you press the **Enter** key. The utility does not prompt you for confirmation of settings before you exit the utility. To change a selected setting, you must select a different setting and press the **Enter** key.

## Auto-configuration process

The auto-configuration process automatically runs when you boot the server for the first time. During the power-up sequence, the system ROM automatically configures the entire system without needing any intervention. During this process, the ORCA utility, in most cases, automatically configures the array to a default setting based on the number of drives connected to the server.



**NOTE:** The server may not support all the following examples.



**NOTE:** If the boot drive is not empty or has been written to in the past, ORCA does not automatically configure the array. You must run ORCA to configure the array settings.

Drives installed	Drives used	RAID level
1	1	RAID 0
2	2	RAID 1
3, 4, 5, or 6	3, 4, 5, or 6	RAID 5
More than 6	0	None

To change any ORCA default settings and override the auto-configuration process, press the **F8** key when prompted.

By default, the auto-configuration process configures the system for the English language. To change any default settings in the auto-configuration process (such as the settings for language, operating system, and primary boot controller), execute RBSU by pressing the **F9** key when prompted. After the settings are selected, exit RBSU and allow the server to reboot automatically.

For more information, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (<http://www.hp.com/servers/smartstart>).

## Boot options

After the auto-configuration process completes, or after the server reboots upon exit from RBSU, the POST sequence runs, and then the boot option screen is displayed. This screen is visible for several seconds before the system attempts to boot from either a diskette, CD, or hard drive. During this time, the menu on the screen allows you to install an operating system or make changes to the server configuration in RBSU.

## BIOS Serial Console

BIOS Serial Console allows you to configure the serial port to view POST error messages and run RBSU remotely through a serial connection to the server COM port. The server that you are remotely configuring does not require a keyboard and mouse.

For more information about BIOS Serial Console, refer to the *BIOS Serial Console User Guide* on the Documentation CD or the HP website (<http://www.hp.com/servers/smartstart>).

## HP ProLiant Essentials Rapid Deployment Pack

The RDP software is the preferred method for rapid, high-volume server deployments. The RDP software integrates two powerful products: Altiris Deployment Solution and the HP ProLiant Integration Module.

The intuitive graphical user interface of the Altiris Deployment Solution console provides simplified point-and-click and drag-and-drop operations that enable you to deploy target servers, including server blades, remotely. It enables you to perform imaging or scripting functions and maintain software images.

For more information about the RDP, refer to the HP ProLiant Essentials Rapid Deployment Pack CD or refer to the HP website (<http://www.hp.com/servers/rdp>).

## Option ROM Configuration for Arrays

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility also provides support for the following functions:

- Reconfiguring one or more logical drives
- Viewing the current logical drive configuration
- Deleting a logical drive configuration
- Setting the controller to be the boot controller

If you do not use the utility, ORCA will default to the standard configuration.

For more information regarding array controller configuration, refer to the controller user guide.

For more information regarding the default configurations that ORCA uses, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

## Array Configuration Utility

ACU is a browser-based utility with the following features:

- Runs as a local application or remote service
- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration
- Suggests the optimum configuration for an unconfigured system
- Provides different operating modes, enabling faster configuration or greater control over the configuration options
- Remains available any time that the server is on
- Displays on-screen tips for individual steps of a configuration procedure



For optimum performance, the minimum display settings are 800 × 600 resolution and 256 colors. Servers running Microsoft® operating systems require Internet Explorer 5.5 (with Service Pack 1) or later. For Linux servers, refer to the README.TXT file for additional browser and support information.

For more information, refer to the *HP Array Configuration Utility User Guide* on the Documentation CD or the HP website (<http://www.hp.com>).

## Re-entering the server serial number and product ID

After you replace the system board, you must re-enter the server serial number and the product ID.

1. During the server startup sequence, press the **F9** key to access RBSU.
2. Select the **Advanced Options** menu.
3. Select **Serial Number**. The following warning is displayed:  
Warning: The serial number should ONLY be modified by qualified service personnel. This value should always match the serial number located on the chassis.
4. Press the **Enter** key to clear the warning.
5. Enter the serial number.
6. Select **Product ID**. The following warning is displayed.  
Warning: The Product ID should ONLY be modified by qualified service personnel. This value should always match the Product ID located on the chassis.
7. Enter the product ID and press the **Enter** key.
8. Press the **Escape** key to close the menu.
9. Press the **Escape** key to exit RBSU.
10. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

## Management tools

### List of tools:

Automatic Server Recovery.....	<a href="#">130</a>
ROMPaq utility .....	<a href="#">130</a>
System Online ROM flash component utility .....	<a href="#">131</a>
Remote Insight Lights-Out Edition II.....	<a href="#">132</a>
Integrated Lights-Out technology.....	<a href="#">132</a>
Erase Utility .....	<a href="#">133</a>
StorageWorks library and tape tools.....	<a href="#">133</a>
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Management Agents .....	<a href="#">134</a>
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USB support .....	<a href="#">135</a>

## Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND, or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang or shutdown. At the same time, the HP SIM console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the HP SIM console or through RBSU.

## ROMPaq utility

Flash ROM enables you to upgrade the firmware (BIOS) with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive and boot the system.

The ROMPaq utility checks the system and provides a choice (if more than one exists) of available ROM revisions. This procedure is the same for both system and option ROMPaq utilities.

For more information about the ROMPaq utility, refer to the HP website (<http://www.hp.com/servers/manage>).

## System Online ROM flash component utility

The Online ROM Flash Component Utility enables system administrators to efficiently upgrade system or controller ROM images across a wide range of servers and array controllers. This tool has the following features:

- Works offline and online
- Supports Microsoft® Windows NT®, Windows® 2000, Windows® Server 2003, Novell Netware, and Linux operating systems



**IMPORTANT:** This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (<http://www.hp.com/go/supportos>).

- Integrates with other software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

To download the tool and for more information, refer to the HP website (<http://h18000.www1.hp.com/support/files/index.html>).

## Remote Insight Lights-Out Edition II

RILOE II enables browser access to servers through a hardware-based, OS-independent graphical remote console. Some of the features include virtual diskette drive and power button, server management through any standard browser, dedicated LAN connectivity, automatic network configuration, external power backup, group administration, and functions available with the Remote Insight Board.

For more information about RILOE II features, refer to the *Remote Insight Lights-Out Edition User Guide* on the Documentation CD or on the HP website (<http://www.hp.com/servers/lights-out>).

## Integrated Lights-Out technology

The iLO subsystem is a standard component of selected ProLiant servers that provides server health and remote server manageability. The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the host server and its operating system. The iLO subsystem provides remote access to any authorized network client, sends alerts, and provides other server management functions.

Using iLO, you can:

- Remotely power up, power down, or reboot the host server.
- Send alerts from iLO regardless of the state of the host server.
- Access advanced troubleshooting features through the iLO interface.
- Diagnose iLO using HP SIM through a web browser and SNMP alerting.

For more information about iLO features, refer to the *Integrated Lights-Out User Guide* on the Documentation CD or on the HP website (<http://www.hp.com/servers/lights-out>).

## Erase Utility

**△ CAUTION:** Perform a backup before running the System Erase Utility. The utility sets the system to its original factory state, deletes the current hardware configuration information, including array setup and disk partitioning, and erases all connected hard drives completely. Refer to the instructions for using this utility.

Run the Erase Utility if you need to erase the system for the following reasons:

- You want to install a new operating system on a server with an existing operating system.
- You want to change the operating system selection.
- You encounter a failure-causing error during the SmartStart installation.
- You encounter an error when completing the steps of a factory-installed operating system installation.

The Erase Utility can be accessed from the Software and Drivers Download website (<http://www.hp.com/go/support>) or the **Maintenance Utilities** menu of the SmartStart CD ("SmartStart software" on page [123](#)).

## StorageWorks library and tape tools

HP StorageWorks L&TT provides functionality for firmware downloads, verification of device operation, maintenance procedures, failure analysis, corrective service actions, and some utility functions. It also provides seamless integration with HP hardware support by generating and emailing support tickets that deliver a snapshot of the storage system.

For more information, and to download the utility, refer to the StorageWorks L&TT website (<http://h18006.www1.hp.com/products/storageworks/ltt>).

## HP Systems Insight Manager

HP SIM is a web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a web browser. HP SIM provides device management capabilities that consolidate and integrate management data from HP and third-party devices.



**IMPORTANT:** You must install and use HP SIM to benefit from the Pre-Failure Warranty for processors, hard drives, and memory modules.

For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP SIM website (<http://www.hp.com/go/hpsim>).

## Management Agents

Management Agents provide the information to enable fault, performance, and configuration management. The agents allow easy manageability of the server through HP SIM software, and third-party SNMP management platforms. Management Agents are installed with every SmartStart assisted installation or can be installed through the HP PSP. The Systems Management homepage provides status and direct access to in-depth subsystem information by accessing data reported through the Management Agents. For additional information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack or the HP website (<http://www.hp.com/servers/manage>).

## Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a 4-MB ROM that acts as two, separate 2-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.



**NOTE:** The server ships with the same version programmed on each side of the ROM.

## Safety and security benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

## USB support

HP provides both standard USB support and legacy USB support. Standard support is provided by the operating system through the appropriate USB device drivers. HP provides support for USB devices before the operating system loads through legacy USB support, which is enabled by default in the system ROM. HP hardware supports USB version 1.1 or 2.0, depending on the version of the hardware.

Legacy USB support provides USB functionality in environments where USB support is normally not available. Specifically, HP provides legacy USB functionality for:

- POST
- RBSU
- Diagnostics
- DOS
- Operating environments which do not provide native USB support

For more information on ProLiant USB support, refer to the HP website (<http://h18004.www1.hp.com/products/servers/platforms/usb-support.html>).

## Diagnostic tools

### List of tools:

HP Insight Diagnostics .....	<a href="#">136</a>
Survey Utility .....	<a href="#">136</a>
Integrated Management Log.....	<a href="#">137</a>
Array Diagnostic Utility .....	<a href="#">137</a>

## HP Insight Diagnostics

HP Insight Diagnostics is a proactive server management tool, available in both offline and online versions, that provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server installations, troubleshoot problems, and perform repair validation.

HP Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, launch the SmartStart CD.

HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server management. Available in Microsoft® Windows® and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, refer to the HP website (<http://www.hp.com/servers/diags>).

## Survey Utility

Survey Utility, a feature within HP Insight Diagnostics (on page [136](#)), gathers critical hardware and software information on ProLiant servers.

This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP website (<http://www.hp.com/go/supportos>).

If a significant change occurs between data-gathering intervals, the Survey Utility marks the previous information and overwrites the Survey text files to reflect the latest changes in the configuration.

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP ("ProLiant Support Packs" on page [139](#)).



## Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM ("HP Insight Diagnostics" on page [136](#), "HP Systems Insight Manager" on page [133](#))
- From within Survey Utility (on page [136](#))
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows®: IML Viewer
  - For Linux: IML Viewer Application
- From within HP Insight Diagnostics (on page [136](#))

For more information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack.

## Array Diagnostic Utility

ADU is tool that collects information about array controllers and generates a list of detected problems. ADU can be accessed from the SmartStart CD ("SmartStart software" on page [123](#)) or downloaded from the HP website (<http://www.hp.com>).

## Remote support and analysis tools

### List of tools:

HP Instant Support Enterprise Edition ..... [138](#)

## HP Instant Support Enterprise Edition

ISEE is a proactive remote monitoring and diagnostic tool to help manage your systems and devices, a feature of HP support. ISEE provides continuous hardware event monitoring and automated notification to identify and prevent potential critical problems. Through remote diagnostic scripts and vital system configuration information collected about your systems, ISEE enables fast restoration of your systems. Install ISEE on your systems to help mitigate risk and prevent potential critical problems.

For more information on ISEE, refer to the HP website ([http://www.hp.com/hps/hardware/hw\\_enterprise.html](http://www.hp.com/hps/hardware/hw_enterprise.html)).

To download HP ISEE, visit the HP website ([http://www.hp.com/hps/hardware/hw\\_downloads.html](http://www.hp.com/hps/hardware/hw_downloads.html)).

For installation information, refer to the HP ISEE Client Installation and Upgrade Guide ([ftp://ftp.hp.com/pub/services/hardware/info/isee\\_client.pdf](ftp://ftp.hp.com/pub/services/hardware/info/isee_client.pdf)).

## Keeping the system current

### List of tools:

Drivers .....	<a href="#">138</a>
Resource Paqs .....	<a href="#">139</a>
ProLiant Support Packs .....	<a href="#">139</a>
Operating system version support .....	<a href="#">139</a>
Change control and proactive notification.....	<a href="#">140</a>
Natural language search assistant .....	<a href="#">140</a>
Care Pack.....	<a href="#">140</a>

## Drivers

The server includes new hardware that may not have driver support on all operating system installation media.

If you are installing a SmartStart-supported operating system, use the SmartStart software (on page [123](#)) and its Assisted Path feature to install the operating system and latest driver support.



**NOTE:** If you are installing drivers from the SmartStart CD or the Software Maintenance CD, refer to the SmartStart website (<http://www.hp.com/servers/smartstart>) to be sure that you are using the latest version of SmartStart. For more information, refer to the documentation provided with the SmartStart CD.

If you do not use the SmartStart CD to install an operating system, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded from the HP website (<http://www.hp.com/support>).



**IMPORTANT:** Always perform a backup before installing or updating device drivers.

## Resource Paqs

Resource Paqs are operating system-specific packages of tools, utilities, and information for HP servers running certain Microsoft® or Novell operating systems. The Resource Paqs include utilities to monitor performance, software drivers, customer support information, and white papers on the latest server integration information. Refer to the Enterprise Partnerships website (<http://h18000.www1.hp.com/partners>), select **Microsoft** or **Novell**, depending on the operating system, and follow the link to the appropriate Resource Paq.

## ProLiant Support Packs

PSPs represent operating system-specific bundles of ProLiant optimized drivers, utilities, and management agents. Refer to the PSP website (<http://h18000.www1.hp.com/products/servers/management/psp.html>).

## Operating system version support

Refer to the operating system support matrix (<http://www.hp.com/go/supportos>).

## Change control and proactive notification

HP offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of upcoming hardware and software changes on HP commercial products.

For more information, refer to the HP website (<http://h18023.www1.hp.com/solutions/pcsolutions/pcn.html>).

## Natural language search assistant

The natural language search assistant ([http://www.hp.com/support/natural\\_language\\_search](http://www.hp.com/support/natural_language_search)) is a search engine that finds information on HP products, including ProLiant servers. The search engine responds to queries entered in question form.

## Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Refer to the Care Pack website ([http://www.hp.com/hps/carepack/servers/cp\\_proliant.html](http://www.hp.com/hps/carepack/servers/cp_proliant.html)).

## Electrostatic discharge

### In this section

Preventing electrostatic discharge .....	<a href="#">141</a>
Grounding methods to prevent electrostatic discharge.....	<a href="#">142</a>

## 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 may damage system boards or other static-sensitive devices. This type of damage may 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.

## Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm  $\pm 10$  percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

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# Troubleshooting

## In this section

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## Additional information

The *HP ProLiant Servers Troubleshooting Guide* provides simple procedures for resolving common problems as well as a comprehensive course of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance.

To obtain the guide, refer to any of the following sources and then select the *HP ProLiant Servers Troubleshooting Guide*.

- The server-specific Documentation CD
- The Business Support Center on the HP website (<http://www.hp.com/support>). You can find the guide by using the navigation features on the HP website.
- The Technical Documentation website (<http://www.docs.hp.com>). Select **Enterprise Servers, Workstations and Systems Hardware**, and then the appropriate server.

## Server diagnostic steps

This section covers the steps to take in order to diagnose a problem quickly.

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page [150](#))," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page [152](#))." The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.



**IMPORTANT:** This guide provides information for multiple servers. Some information may not apply to the server you are troubleshooting. Refer to the server documentation for information on procedures, hardware options, software tools, and operating systems supported by the server.



**WARNING:** To avoid potential problems, **ALWAYS** read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.

## Important safety information

Familiarize yourself with the safety information in the following sections before troubleshooting the server.



### Important safety information

Before servicing this product, read the *Important Safety Information* document provided with the server.

## Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.





This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

**WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.



This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

**WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure.



This symbol on an RJ-45 receptacle indicates a network interface connection.

**WARNING:** To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

**WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.



63.5 kg

140 lb

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

**WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.



These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

**WARNING:** To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

## Warnings and cautions

**⚠ WARNING:** Only authorized technicians trained by HP should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

**⚠ WARNING:** To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling feet are extended to the floor.
- The full weight of the rack rests on the leveling feet.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

**⚠ 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.



63.5 kg

140 lb

**WARNING:** To reduce the risk of personal injury or damage to the equipment:


- Observe local occupation health and safety requirements and guidelines for manual handling.
- Obtain adequate assistance to lift and stabilize the chassis during installation or removal.
- The server is unstable when not fastened to the rails.
- When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product.

**△ CAUTION:** To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

**△ CAUTION:** The server is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

## Preparing the server for diagnosis

1. Be sure the server is in the proper operating environment with adequate power, air conditioning, and humidity control. Refer to the server documentation for required environmental conditions.

2. Record any error messages displayed by the system.
3. Remove all diskettes and CDs from the media drives.
4. Power down the server and peripheral devices if you will be diagnosing the server offline. Always perform an orderly shutdown, if possible. This means you must:
  - a. Exit any applications.
  - b. Exit the operating system.
  - c. Power down the server ("Powering down the server" on page [37](#)).
5. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server). Do not disconnect the printer if you want to use it to print error messages.
6. Collect all tools and utilities, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities, necessary to troubleshoot the problem.
  - You must have the appropriate Health Drivers and Management Agents installed on the server.  
 **NOTE:** To verify the server configuration, connect to the System Management homepage and select **Version Control Agent**. The VCA gives you a list of names and versions of all installed HP drivers, Management Agents, and utilities, and whether they are up to date.
  - HP recommends you have access to the SmartStart CD for value-added software and drivers required during the troubleshooting process.
  - HP recommends you have access to the server documentation for server-specific information.

## Symptom information

Before troubleshooting a server problem, collect the following information:

- What events preceded the failure? After which steps does the problem occur?
- What has been changed between the time the server was working and now?

- Did you recently add or remove hardware or software? If so, did you remember to change the appropriate settings in the server setup utility, if necessary?
- Has the server exhibited problem symptoms for a period of time?
- If the problem occurs randomly, what is the duration or frequency?

To answer these questions, the following information may be useful:

- Run HP Insight Diagnostics (on page [136](#)) and use the survey page to view the current configuration or to compare it to previous configurations.
- Refer to your hardware and software records for information.

## Service notifications

To find out the latest service notifications, refer to the HP website (<http://www.hp.com/products/servers/platforms>). Select the appropriate server model, and then click the **Documentation** link on the product page.

## Loose connections

### Action:

- Be sure all power cords are securely connected.
- Be sure all cables are properly aligned and securely connected for all external and internal components.
- Remove and check all data and power cables for damage. Be sure no cables have bent pins or damaged connectors.
- If a fixed cable tray is available for the server, be sure the cords and cables connected to the server are correctly routed through the tray.
- Be sure each device is properly seated.
- If a device has latches, be sure they are completely closed and locked.
- Check any interlock or interconnect LEDs that may indicate a component is not connected properly.

- If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.

## Diagnostic steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page [150](#))," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General diagnosis flowchart (on page [152](#))." The General diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

The available flowcharts include:

- Start diagnosis flowchart (on page [150](#))
- General diagnosis flowchart (on page [152](#))
- Power-on problems flowchart (on page [154](#))
- POST problems flowchart (on page [157](#))
- OS boot problems flowchart (on page [159](#))
- Server fault indications flowchart (on page [161](#))

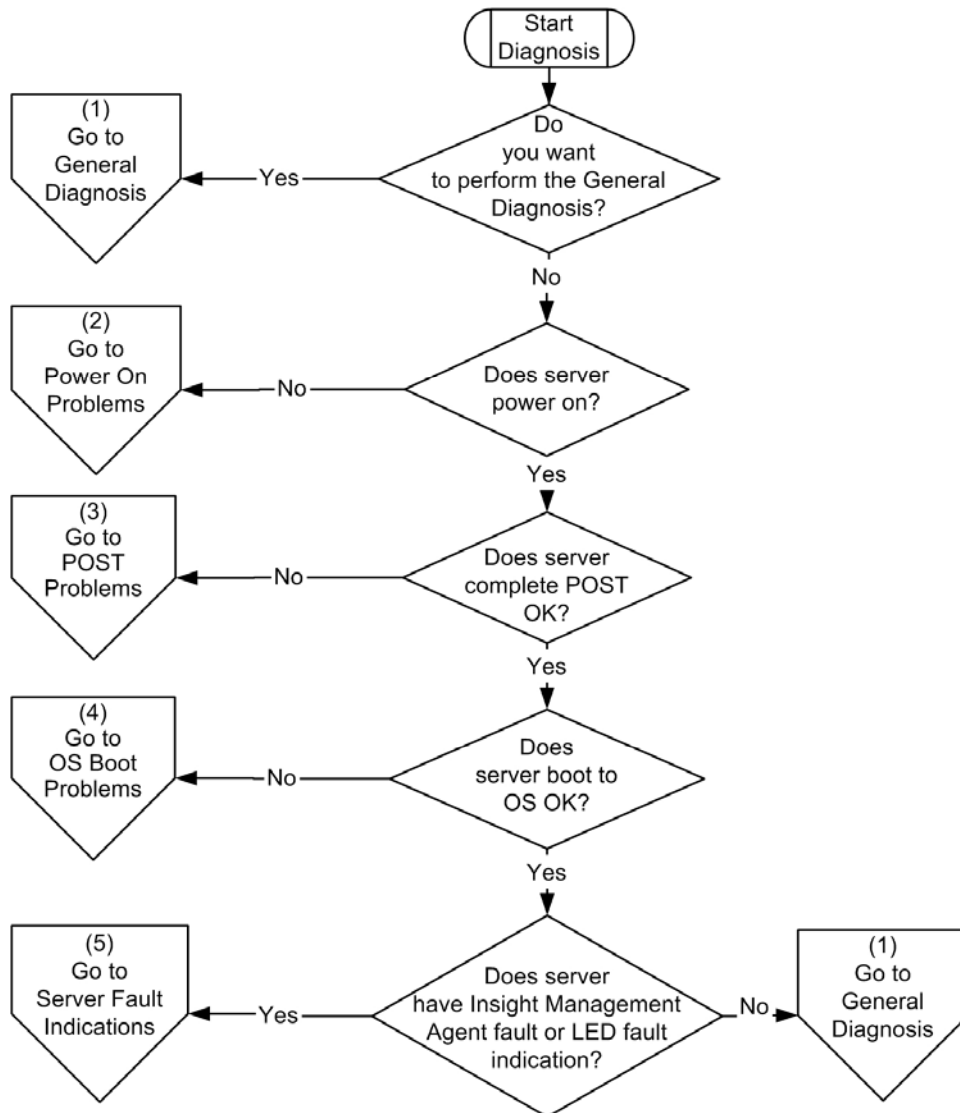
The number contained in parentheses in the flowchart boxes corresponds to a table with references to other detailed documents or troubleshooting instructions.

### Start diagnosis flowchart

Use the following flowchart to start the diagnostic process.

Item	Refer to
1	"General diagnosis flowchart (on page <a href="#">152</a> )"
2	"Power-on problems flowchart (on page <a href="#">154</a> )"
3	"POST problems flowchart (on page <a href="#">157</a> )"
4	"OS boot problems flowchart (on page <a href="#">159</a> )"

Item	Refer to
5	"Server fault indications flowchart (on page 161)"

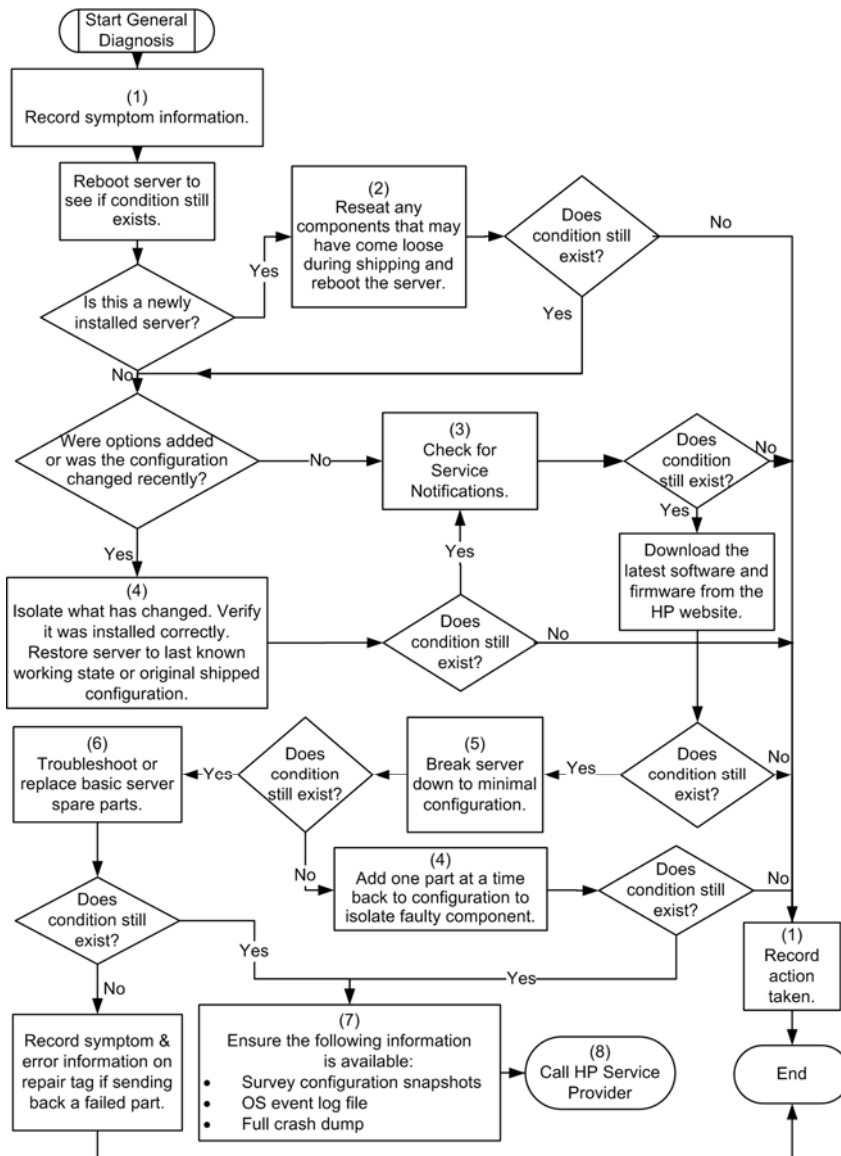


## General diagnosis flowchart

The General Diagnosis flowchart provides a generic approach to troubleshooting. If you are unsure of the problem, or if the other flowcharts do not fix the problem, use the following flowchart.

Item	Refer to
1	"Symptom information (on page <a href="#">148</a> )"
2	"Loose connections (on page <a href="#">149</a> )"
3	"Service notifications (on page <a href="#">149</a> )"
4	Server maintenance and service guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
5	Server user guide or setup and installation guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
6	<ul style="list-style-type: none"><li>• Server maintenance and service guide, located on the Documentation CD or the HP website (<a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a>)</li><li>• "Hardware problems"</li></ul>
7	<ul style="list-style-type: none"><li>• "Server Information you need"</li><li>• "Operating system information you need"</li></ul>
8	"Contacting HP technical support or an authorized reseller"





## Power-on problems flowchart

Symptoms:

- The server does not power on.
- The system power LED is off or amber.
- The external health LED is red or amber.
- The internal health LED is red or amber.



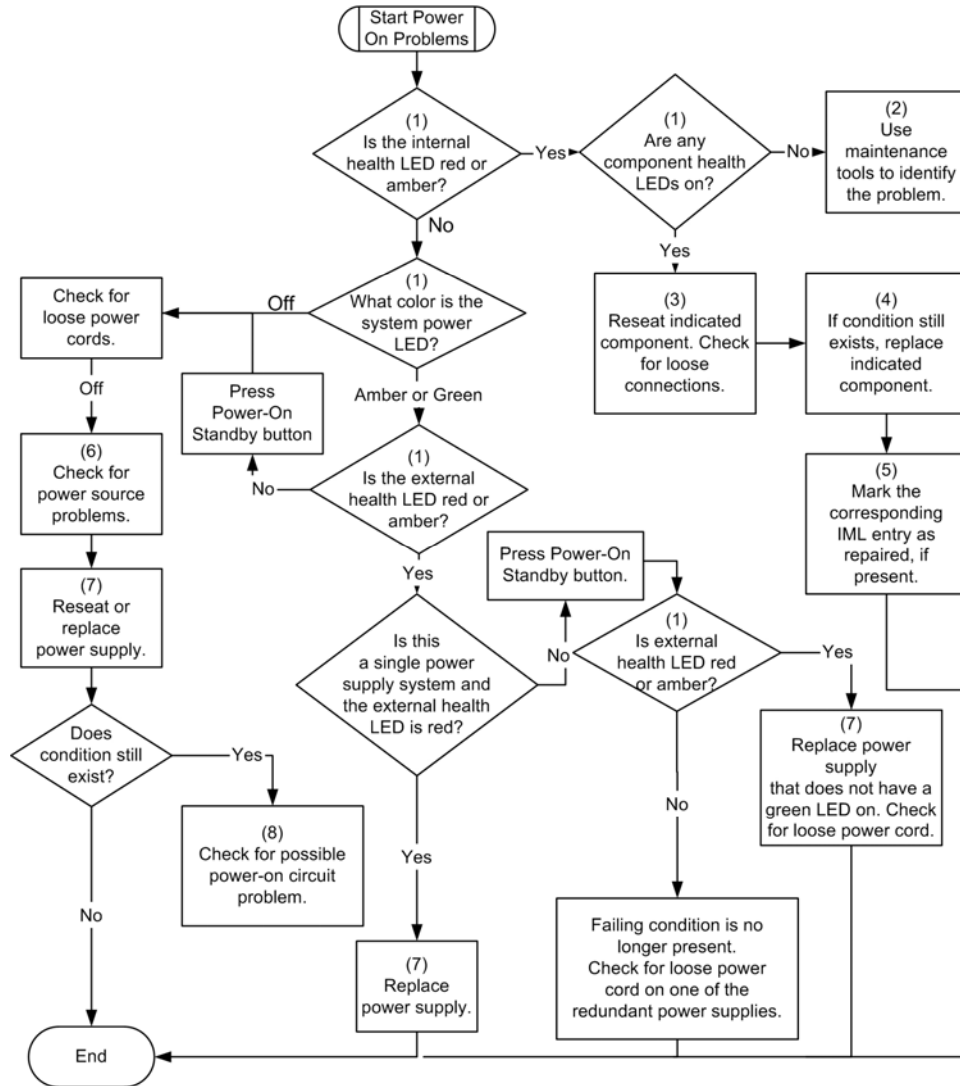
**NOTE:** For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty power supply
- Loose or faulty power cord
- Power source problem
- Power on circuit problem
- Improperly seated component or interlock problem
- Faulty internal component

Item	Refer to
1	Server user guide or setup and installation guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> ).
2	"HP Insight Diagnostics (on page <a href="#">136</a> )"
3	"Loose Connections (on page <a href="#">149</a> )"
4	Server maintenance and service guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
5	"Integrated Management Log (on page <a href="#">137</a> )"
6	"Power Source Problems"

Item	Refer to
7	<ul style="list-style-type: none"><li data-bbox="557 443 862 470">• "Power Supply Problems"</li><li data-bbox="557 485 1162 569">• Server maintenance and service guide, located on the Documentation CD or the HP website (<a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a>)</li></ul>
8	"System Open Circuits and Short Circuits"



## POST problems flowchart

Symptoms:

- Server does not complete POST



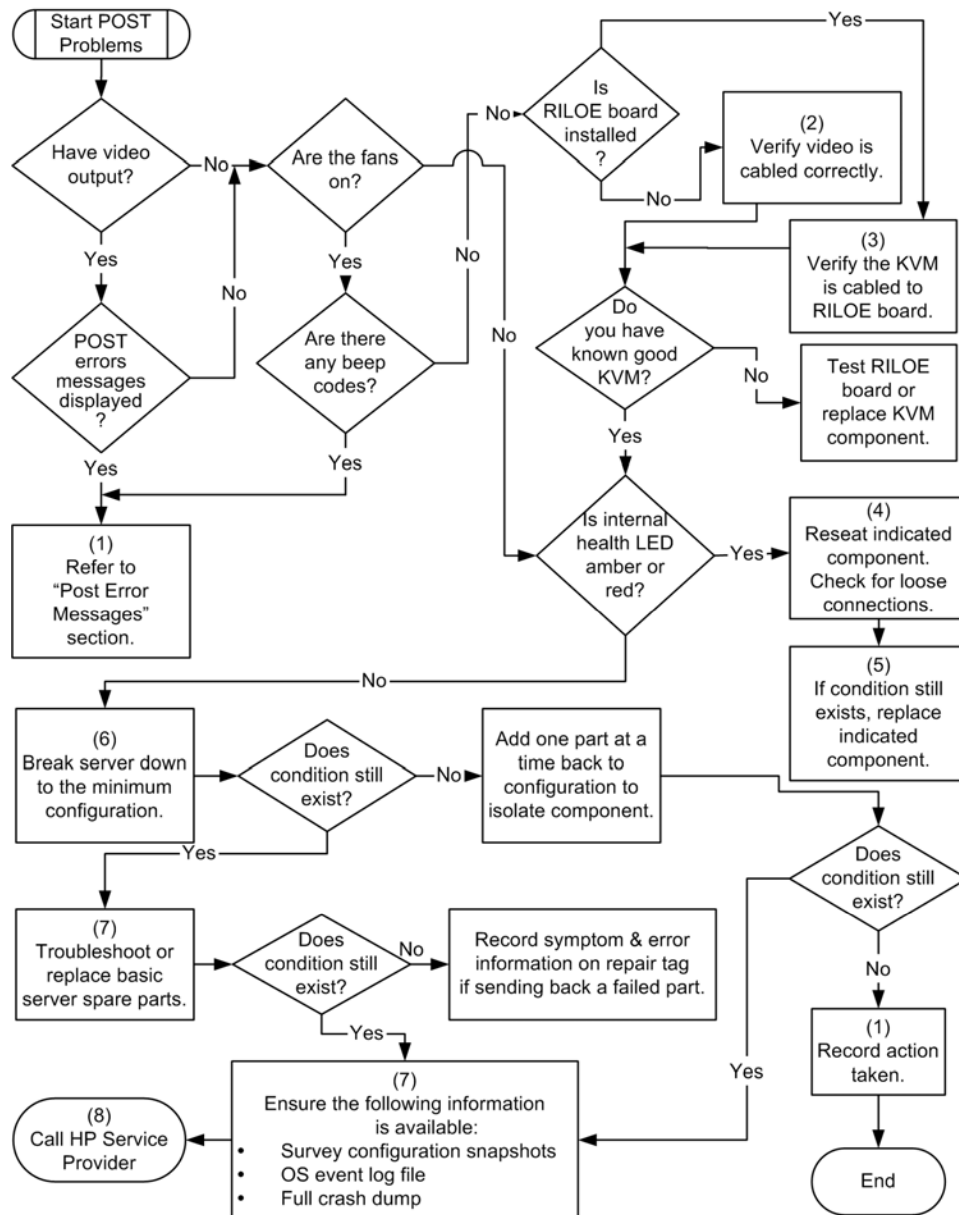
**NOTE:** The server has completed POST when the system attempts to access the boot device.

- Server completes POST with errors

Possible Problems:

- Improperly seated or faulty internal component
- Faulty KVM device
- Faulty video device

Item	Refer to
1	"POST error messages"
2	"Video problems"
3	KVM or RILOE documentation
4	"Loose connections (on page <a href="#">149</a> )"
5	Server maintenance and service guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
7	<ul style="list-style-type: none"> <li>• "Hardware problems"</li> <li>• Server maintenance and service guide, located on the Documentation CD or the HP website (<a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a>)</li> </ul>



## OS boot problems flowchart

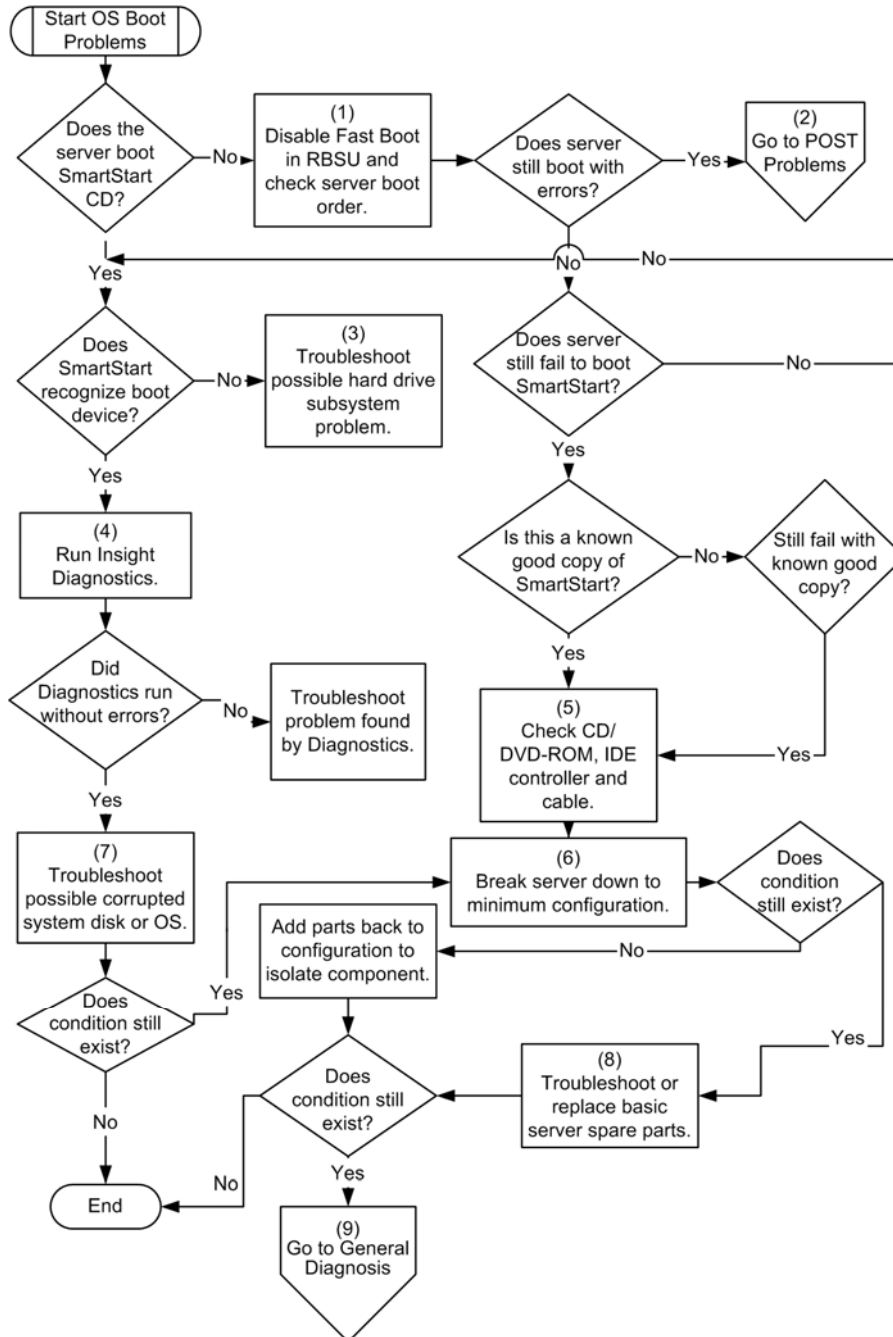
Symptoms:

- Server does not boot a previously installed operating system
- Server does not boot SmartStart

Possible Causes:

- Corrupted operating system
- Hard drive subsystem problem

Item	Refer to
1	<i>HP ROM-Based Setup Utility User Guide</i> ( <a href="http://www.hp.com/servers/smartstart">http://www.hp.com/servers/smartstart</a> )
2	"POST Problems ("POST problems flowchart" on page <a href="#">157</a> )"
3	<ul style="list-style-type: none"> <li>• "Hard Drive Problems"</li> <li>• Controller documentation</li> </ul>
4	" HP Insight Diagnostics (on page <a href="#">136</a> )"
5	<ul style="list-style-type: none"> <li>• "Loose Connections (on page <a href="#">149</a>)"</li> <li>• "CD-ROM and DVD Drive Problems"</li> <li>• Controller documentation</li> </ul>
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
7	<ul style="list-style-type: none"> <li>• "Operating System Problems"</li> <li>• "Contacting HP Technical Support or an Authorized Reseller"</li> </ul>
8	<ul style="list-style-type: none"> <li>• "Hardware Problems"</li> <li>• Server maintenance and service guide, located on the Documentation CD or the HP website (<a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a>)</li> </ul>
9	"General Diagnosis Flowchart (on page <a href="#">152</a> )"





## Server fault indications flowchart

Symptoms:

- Server boots, but a fault event is reported by Insight Management agents (on page [134](#))
- Server boots, but the internal health LED or external health LED is red or amber



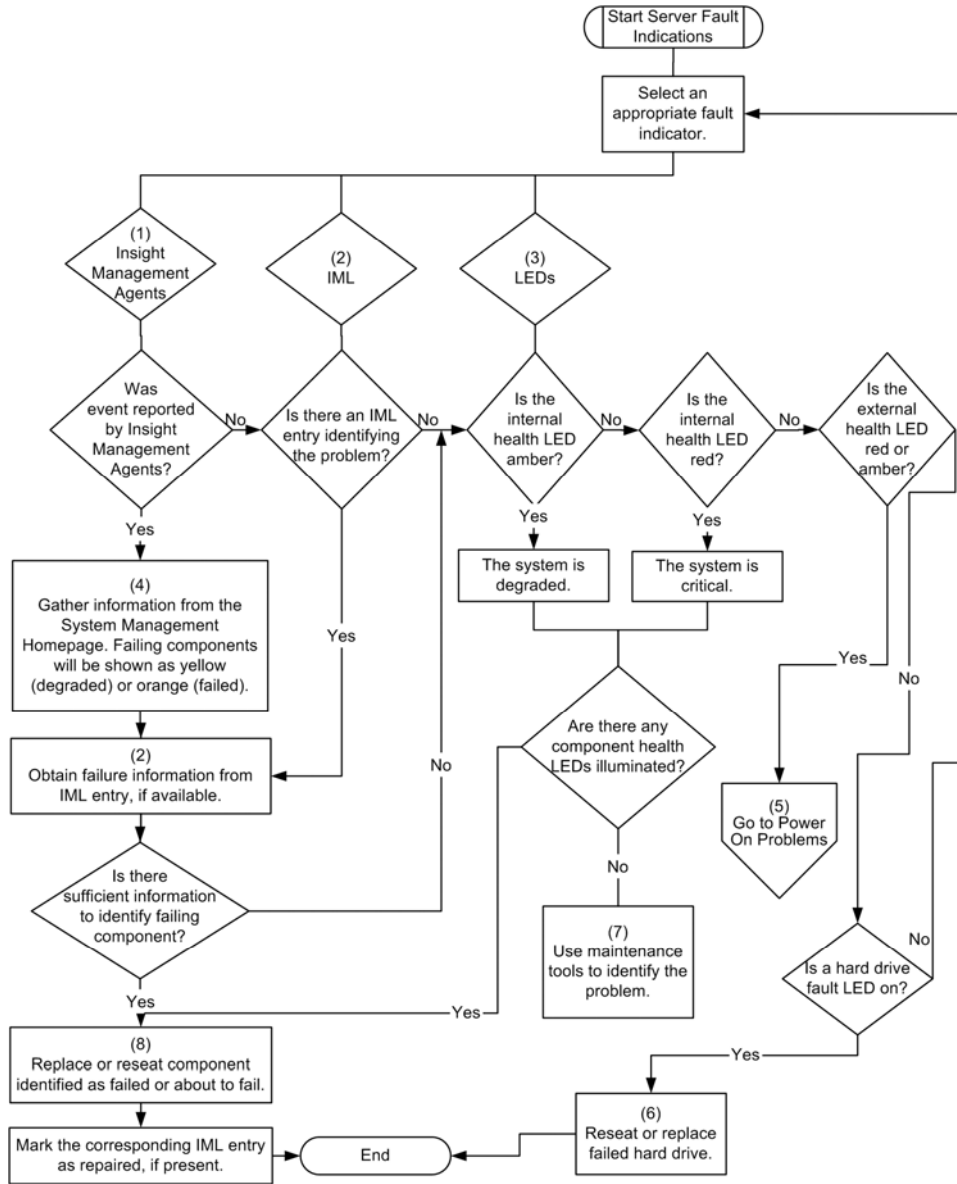
**NOTE:** For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

- Improperly seated or faulty internal or external component
- Unsupported component installed
- Redundancy failure
- System overtemperature condition

Item	Refer to
1	"Management agents (on page <a href="#">134</a> )"
2	<ul style="list-style-type: none"> <li>• "Integrated Management Log (on page <a href="#">137</a>)"</li> <li>• "Event List Error Messages"</li> </ul>
3	Server user guide or setup and installation guide, located on the Documentation CD or the HP website ( <a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a> )
4	System Management Homepage at <a href="https://localhost:2381">https://localhost:2381</a> ( <a href="https://localhost:2381">https://localhost:2381</a> )
5	"Power-on problems ("Power-on problems flowchart" on page <a href="#">154</a> )"
6	<ul style="list-style-type: none"> <li>• "Hard drive problems"</li> <li>• Server maintenance and service guide, located on the Documentation CD or the HP website (<a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a>)</li> </ul>
7	" HP Insight Diagnostics (on page <a href="#">136</a> )"

Item	Refer to
8	<ul style="list-style-type: none"><li data-bbox="557 443 818 470">• "Hardware problems"</li><li data-bbox="557 485 1166 573">• Server maintenance and service guide, located on the Documentation CD or the HP website (<a href="http://www.hp.com/products/servers/platforms">http://www.hp.com/products/servers/platforms</a>)</li></ul>



## POST error messages and beep codes


### List of messages:

Introduction to POST error messages..... [164](#)

### Introduction to POST error messages

The error messages and codes in this section include all new messages generated by this server. Some messages are informational and do not indicate an error. A server generates only the codes that are applicable to its configuration and options.

For a complete listing of error messages, refer to the POST error messages in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (<http://www.hp.com/support>).

 **WARNING:** To avoid potential problems, ALWAYS read the warnings and cautionary information in the server documentation before removing, replacing, reseating, or modifying system components.

#### 209-Hot-add Memory Configuration - Boards must be installed sequentially

**Action:** Install or reinstall DIMMs to support hot-add memory configuration.

#### 209-Mirror Memory Configuration - DIMMs on Both Boards do not Match

**Audible Beeps:** 1 long, 1 short

**Possible Cause:** Memory boards are not populated identically, or a memory board is missing.

**Action:** Be sure four memory boards are installed and DIMMs are populated correctly.

### Processor Reduced Power Mode Enabled in RBSU

**Description:** Processors clocked down

**Action:** If you select the reduced power mode in RBSU, the processor are displayed as their reduced speed during POST. This message indicates that the RBSU reduced power mode has been enabled and also indicates the maximum speed for the installed processors.

### Processor Not Started (Processor Stalled)

**Description:** If processor fails to launch or fails after being launched but before completing its initialization, the processor is not started and this message is displayed. This is likely a defective processor.

### Processor Not Started (Stepping Does Not Match)

**Description:** If a processor has a stepping different than the bootstrap processor, the processor is not started, and this message is displayed.

### Processor Not Started (Unsupported Processor Stepping)

**Description:** If a processor has an unsupported stepping, it is not started, and this message is displayed.

### Processor Not Supported (Unsupported Core Speed)

**Description:** If a processor has a core speed that is incompatible with the other installed processors, the processor is not started, and this message is displayed.

### Unsupported PCI Card Detected Remove PCI Card from Slot

**Audible Beeps:** 2 short

**Possible Cause:** The PCI card installed in the slot referenced in the message is strictly not supported on this system.

**Action:** Remove the card from the slot reported in the message.

### **Unsupported Processor Configuration (Processor Required in Slot #1)**

**Description:** Processor required in slot 1.

**Action:** If you do not install a supported processor in slot 1, this message is displayed, and the system halts.

### **Warning - Mixed Feature Processors Were Detected**

**Description:** Mixed feature processors were detected. The server will boot using the lowest featured processor.

If you install supported processors with different features in the same system, this informational message is displayed.

### **WARNING - Resetting Corrupted CMOS**

**Description:** This informational message displays when the ROM detects that CMOS is corrupted. The default values are restored. This message does not display if a user has intentionally invalidated the configuration through RBSU by erasing NVRAM.

### **WARNING - Resetting Corrupted NVRAM**

**Description:** This informational message displays when the ROM detects that NVRAM is corrupted. The default values are restored. This message does not display if a user has intentionally invalidated the configuration through RBSU by erasing NVRAM.

### **WARNING - Resetting Corrupted System Environment**

**Description:** This informational message is displayed when the System Environment Variables are corrupted. The default values are restored. This message does not display if a user has intentionally invalidated the configuration through RBSU by erasing NVRAM.

### **WARNING - Restoring Default Configurations as Requested**

**Description:** If, on the subsequent power up, you select the option to erase NVRAM in RBSU, this informational message is displayed.

## **Other information resources**

For additional troubleshooting information, refer to the *HP ProLiant Servers Troubleshooting Guide* on the Documentation CD.

For information on warranties and service and support upgrades (Care Pack services), refer to the HP website (<http://www.hp.com/support>).





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## Regulatory compliance notices

### In this section

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## Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

## Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

### FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

### Class A equipment

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

## Class B equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

## Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this product, contact us by mail or telephone:

- Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 530113  
Houston, Texas 77269-2000
- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company  
P. O. Box 692000, Mail Stop 510101  
Houston, Texas 77269-2000
- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

## Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

## Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

## Mouse compliance statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## Canadian notice (Avis Canadien)

### Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### **Class B equipment**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## **European Union regulatory notice**

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:



This marking is valid for non-Telecom products and EU harmonized Telecom products (e.g. Bluetooth).



This marking is valid for EU non-harmonized Telecom products.

\*Notified body number (used only if applicable—refer to the product label)

## Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。  
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## BSMI notice

### 警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Korean notice A&B

### Class A equipment

#### A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

### Class B equipment

#### B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서 주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

## Laser compliance


This product may be provided with an optical storage device (that is, CD or DVD drive) and/or fiber optic transceiver. Each of these devices contains a laser that is classified as a Class 1 Laser Product in accordance with US FDA regulations and the IEC 60825-1. The product does not emit hazardous laser radiation.

**⚠ WARNING: Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:**

- **Do not try to open the module enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only HP Authorized Service technicians to repair the unit.**

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

## Battery replacement notice

 **WARNING:** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. 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.**



Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

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



## Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.



## Power cord statement for Japan

製品には、同梱された電源コードをお使い下さい。  
同梱された電源コードは、他の製品では使用出来ません。



## Server specifications

### In this section

Environmental specifications .....	<a href="#">179</a>
Server specifications.....	<a href="#">179</a>

## Environmental specifications

Specification	Value
<b>Temperature range*</b>	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
<b>Relative humidity (noncondensing)**</b>	
Operating	10% to 90%
Non-operating	5% to 95%

\* All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed.

\*\* Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

## Server specifications

Specification	Value
<b>Dimension</b>	
Height	17.6 cm (6.94 in)
Depth	67.3 cm (26.5 in)

<b>Specification</b>	<b>Value</b>
Width	46.3 cm (19.0 in)
Weight (maximum)	47.6 kg (105 lb)
Weight (no drives installed)	36.3 kg (80 lb)
<b>Input requirement</b>	
Rated input voltage	100-127 VAC 200-240 VAC
Rated input frequency	50-60 Hz
Rated input current	@ 100 VAC–12A @ 200 VAC–8A
Rated input power	@ 100 VAC–1161 W @ 200 VAC–1598 W
BTUs per hour	@ 100 VAC–3960 BTU @ 200 VAC–5450 BTU
<b>Power supply output</b>	
Power supply output	910 W (low line) 1300 W (high line)

## Technical support

### In this section

Before you contact HP.....	<a href="#">181</a>
HP contact information.....	<a href="#">181</a>
Customer self repair.....	<a href="#">182</a>

## Before you contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

## HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- In other locations, refer to the HP website (<http://www.hp.com>).

For HP technical support:

- In North America:

- 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>).
- Outside North America, call the nearest HP Technical Support Phone Center. For telephone numbers for worldwide Technical Support Centers, refer to the HP website (<http://www.hp.com>).

## Customer self repair

What is customer self repair?

HP's customer self-repair program offers you the fastest service under either warranty or contract. It enables HP to ship replacement parts directly to you so that you can replace them. Using this program, you can replace parts at your own convenience.

A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.
- For specific information about customer replaceable parts, refer to the maintenance and service guide on the HP website (<http://www.hp.com/support>).

## Acronyms and abbreviations

**ABEND**

abnormal end

**AMP**

Advanced Memory Protection

**ASR**

Automatic Server Recovery

**BBWC**

battery-backed write cache

**BP**

backplane

**CSA**

Canadian Standards Association

**DDR**

double data rate

**DIMM**

dual inline memory module

**ECC**

error checking and correcting

**G3**

Generation 3

**IEC**

International Electrotechnical Commission

**iLO**

Integrated Lights-Out

**LED**

light-emitting diode

**NEMA**

National Electrical Manufacturers Association

**NFPA**

National Fire Protection Association

**NIC**

network interface controller

**ORCA**

Option ROM Configuration for Arrays

**PCI**

peripheral component interface



**PCI Express**

peripheral component interconnect express

**PCI-X**

peripheral component interconnect extended

**PDU**

power distribution unit

**POST**

Power-On Self Test

**PPM**

Processor Power Module

**PSP**

ProLiant Support Pack

**RAID**

redundant array of inexpensive (or independent) disks

**RBSU**

ROM-Based Setup Utility

**RDP**

Remote Desktop Protocol

**RILOE II**

Remote Insight Lights-Out Edition II

**ROM**

read-only memory

**SCSI**

small computer system interface

**SDRAM**

synchronous dynamic RAM

**SIM**

Systems Insight Manager

**SNMP**

Simple Network Management Protocol

**UID**

unit identification

**USB**

universal serial bus

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