HP ProLiant DL385 Server Maintenance and Service Guide

September 2006 (Sixth Edition)
Part Number 376533-006

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Audience assumptions

This guide is for an experienced service technician. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

Contents

Illustrated parts catalog

In this section

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.

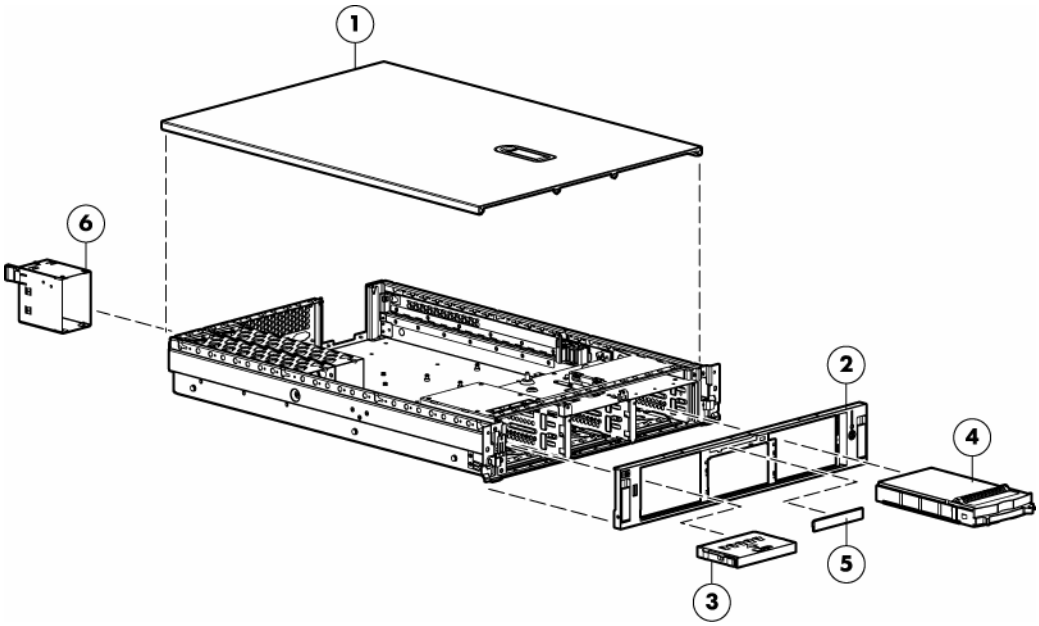
A convenient, easy-to-use program:

- 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.
- Replacement parts are express-shipped. Most in-stock parts are shipped the very same day you contact HP. You may be required to send the defective part back to HP, unless otherwise instructed.
- Available for most HP products currently under warranty or contract. For information on the warranty service, refer to the HP website (http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html).

For more information about HP's customer self-repair program, contact your local service provider. For the North American program, refer to the HP website (http://www.hp.com/go/selfrepair).

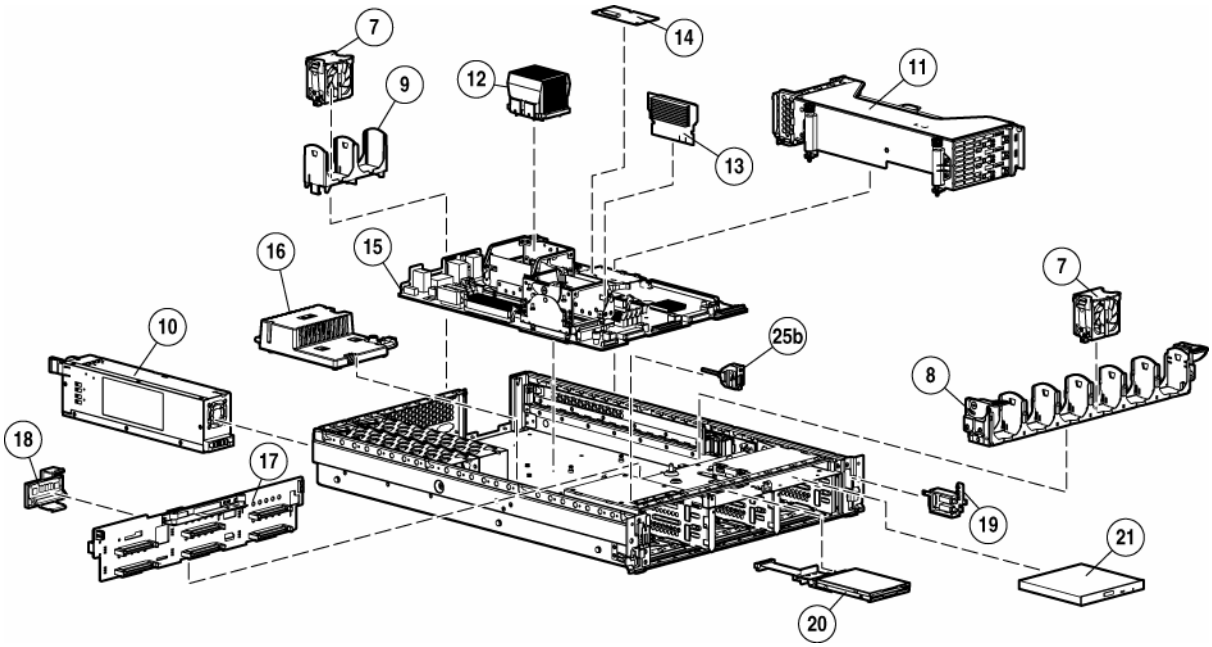
Customer replaceable parts are identified in the following tables.

Mechanical components (SCSI model)



Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
1	Access panel	359244-001	—	Yes
2	Front bezel	378906-001	—	Yes
3	Multibay media blank	367666-001	—	Yes
4	Hard drive blank	122759-001	—	Yes
5	Diskette drive slot cover (see "Plastics Kit," Item 30K)	—	—	—
6	Power supply blank	359246-001	—	Yes

System components (SCSI model)



Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
	System components			
7	Hot-plug fan, 60-mm	289544-001	—	Yes
8	Front fan bracket, 6-bay	371148-001	—	Yes
9	Rear fan bracket, 2-bay	391778-001	—	Yes
10	Hot-plug power supply, 575-W	338022-001‡ See requirement	406393-001	Yes
11	PCI riser cage, with non-hot-plug PCI-X	378907-001	—	Yes
12	Processor assemblies	—	—	—
	a) 2.4-GHz, single-core AMD Opteron™ Model 250	378908-001	—	Yes
	b) 2.6-GHz, single-core AMD Opteron™ Model 252 *	378909-001	—	Yes
	c) 2.8-GHz, single-core AMD Opteron™ Model 254 *	403007-001	—	Yes
	d) 1.8-GHz, dual-core AMD Opteron™ Model 265 *	393369-001	—	Yes
	e) 2.0-GHz, dual-core AMD Opteron™ Model 270 *	393370-001	—	Yes
	f) 2.2-GHz, dual-core AMD Opteron™ Model 275 *	393371-001	—	Yes
	g) 2.4-GHz, dual-core AMD Opteron™ Model 280 *	403008-001	—	Yes

Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
	h) 2.6-GHz, dual-core AMD Opteron™ Model 285 *	413485-001	—	Yes
	i) Processor heatsink, with thermal grease and alcohol pads *	378910-001	—	Yes
13	Processor power module, 12-V, 105-A	383337-001	—	Yes
14	Smart Array 6i Cache Module (optional)	351518-001	—	Yes
15	System board, with processor cages, system battery, thermal grease, and alcohol pads	378911-001‡ See requirement	411248-001	Yes
16	Power converter module	378912-001	—	Yes
17	SCSI backplane, 6-bay	359253-001‡ See requirement	411023-001	Yes
18	SCSI terminator (optional)	289563-001‡ See requirement	411025-001	Yes
19	Power button/LED board	366300-001‡ See requirement	411026-001	Yes
	Media devices			
20	Diskette drive, slimline, 1.44-MB (optional)	289550-00‡ See requirement	399311-001	Yes
21	CD-ROM drive, removable slimline, IDE, 24X	228508-00‡ See requirement	399401-001	Yes
22	DVD-ROM drive, removable slimline, 8X *	268795-001‡ See requirement	397928-001	Yes
23	CD-RW/DVD-ROM combo drive, 24X *	337273-001	—	Yes
	Cables			
24	SCSI cable kit *	289567-001	—	
	a) SCSI cable, short, 68-pin	—	—	Yes
	b) SCSI cable, long, 68-pin	—	—	Yes
	c) System cable, SCSI, 50-pin	—	—	Yes
25	Signal cable kit	228518-001	—	
	a) Power button/LED board cable, 14-pin *	—	—	Yes
	b) PCI Hot Plug LED board cable	—	—	Yes
26	Miscellaneous cable kit *	366063-001	—	
	a) Diskette drive cable	—	—	Yes
	b) USB cable and connector	—	—	Yes
	c) Universal media bay cable, 50-pin	—	—	Yes
	Rack mounting hardware			

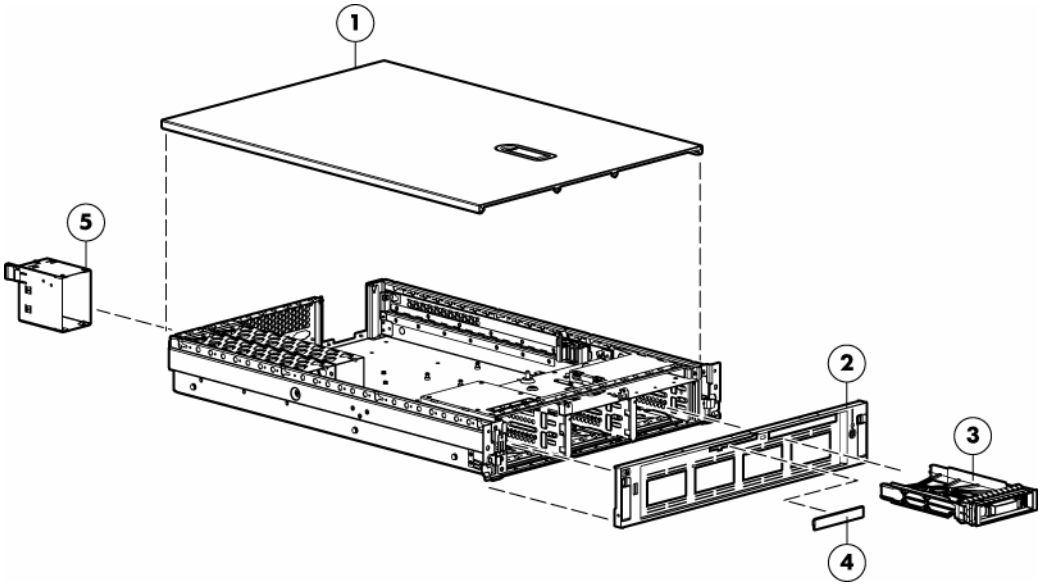
Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
27	2U Quick Deploy Rail System *	359254-001	—	Yes
	Miscellaneous			
28	Air baffle *	391779-001	—	Yes
29	Hardware kit *	228527-001	—	—
	a) Screws, T-15, flat-head	—	—	Yes
	b) Expansion slot cover	—	—	Yes
	c) Screws, 6-32	—	—	Yes
30	Plastics kit *	359720-001	—	—
	a) PCI slot release lever	—	—	Yes
	b) PCI lightpipe, rear	—	—	Yes
	c) PCI lightpipe, cover	—	—	Yes
	d) PCI riser cage door latch	—	—	Yes
	e) Thumbscrew with molded cap, PCI slot 1	—	—	Yes
	f) Standoff	—	—	Yes
	g) Plastic standoff, 3.4-mm (0.134 in)	—	—	Yes
	h) Battery clip	—	—	Yes
	i) PCI card guide retainer	—	—	Yes
	j) Thumbscrew knob	—	—	Yes
	k) Diskette drive slot cover	—	—	Yes
31	AC power cord, 1.8-m (6-ft) *	187335-001	—	Yes
32	DVD/CD-ROM drive ejector assembly *	371114-001	—	Yes
33	Battery, 3.3-V, lithium *	234556-001	—	Yes
34	Return kit, pack box, and cushions *	289545-001	—	Yes
35	T-15 Torx screwdriver *	199630-001	—	Yes
	Memory			
36	DIMM, 512-MB, PC3200 DDR1-400 *	378913-001‡ See requirement	416105-001	Yes
37	DIMM, 1-GB, PC3200 DDR1-400 *	378914-001‡ See requirement	416106-001	Yes
38	DIMM, 2-GB, PC3200 DDR1-400 *	378915-001‡ See requirement	416107-001	Yes
39	DIMM, 4-GB, PC2700 DDR1 *	395547-001‡ See requirement	416258-001	Yes
	Options			
40	Battery-Backed Write Cache battery pack *	307132-001	—	Yes

Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
41	Battery-Backed Write Cache battery bracket *	349989-001	—	Yes
42	SCSI Ultra320 universal hot-plug hard drive *	—	—	—
	a) 36.4-GB, 10,000-rpm	289041-001	—	Yes
	b) 72.8-GB, 10,000-rpm	289042-001	—	Yes
	c) 146.8-GB, 10,000-rpm	289044-001	—	Yes
	d) 300-GB, 10,000-rpm	351126-001	—	Yes
	e) 18.2-GB, 15,000-rpm	289240-001	—	Yes
	f) 36.4-GB, 15,000-rpm	289241-001	—	Yes
	g) 72.8-GB, 15,000-rpm	289243-001	—	Yes
	h) 146.8-GB, 15,000-rpm	347779-001	—	Yes

*Not shown

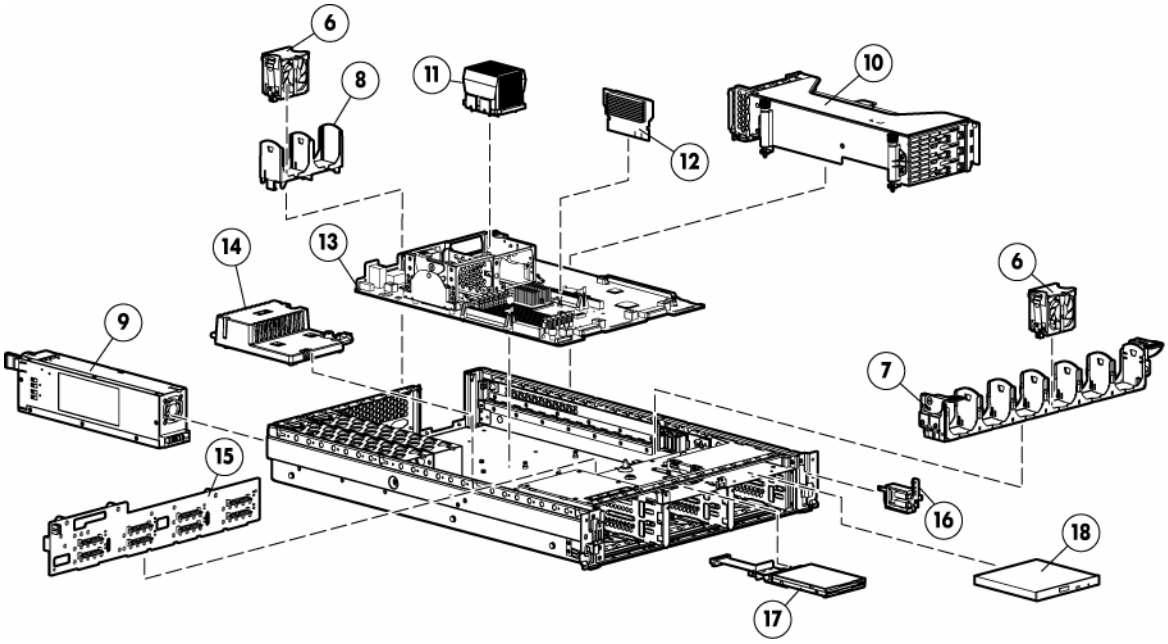
‡**REQUIREMENT:**
For Customers in the EU only.
The use of the Original Spare part is regulated by RoHS legislation§.
If your unit contains a part that is labelled with the Modified Spare number, the Modified Spare must be ordered as the replacement part in the EU.
If your unit contains a part that is labelled with the Original Spare number, please order the Original Spare as the replacement part in the EU. In this case either the Original Spare or the Modified Spare may be shipped which will not affect performance or functionality of the unit.
§*Directive 2002/95/EC restricts the use of lead, mercury, cadmium, hexavalent chromium, PBBs and PBDEs in electronic products.*

Mechanical components (SAS model)



Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
1	Access panel	359244-001	—	Yes
2	Front bezel	392616-001	—	Yes
3	Hard drive blank	392613-001	—	Yes
4	Diskette drive slot cover (see "Plastics Kit," Item 25k)	—	—	
5	Power supply blank	359246-001	—	Yes

System components (SAS model)



Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
	System components			
6	Hot-plug fan, 60 mm	289544-001	—	Yes
7	Front fan bracket, 6 bay	371148-001	—	Yes
8	Rear fan bracket, 2 bay	391778-001	—	Yes
9	Hot-plug power supply, 575 W	338022-001‡ See requirement	406393-001	Yes
10	PCI riser cage, with non-hot-plug PCI-X (standard)	378907-001	—	Yes
11	Processor assemblies			
	a) 2.4-GHz, single-core AMD Opteron™ Model 250	378908-001	—	Yes

Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
	b) 2.6-GHz, single-core AMD Opteron™ Model 252 *	378909-001	—	Yes
	c) 2.8-GHz, single-core AMD Opteron™ Model 254 *	403007-001	—	Yes
	d) 1.8-GHz, dual-core AMD Opteron™ Model 265 *	393369-001	—	Yes
	e) 2.0-GHz, dual-core AMD Opteron™ Model 270 *	393370-001	—	Yes
	f) 2.2-GHz, dual-core AMD Opteron™ Model 275 *	393371-001	—	Yes
	g) 2.4-GHz, dual-core AMD Opteron™ Model 280 *	403008-001	—	Yes
	h) 2.6-GHz, dual-core AMD Opteron™ Model 285 *	413485-001	—	Yes
	i) Processor heatsink, with thermal grease and alcohol pads *	378910-001	—	Yes
	Boards			
12	PPM, 12 V, 81 A	383337-001	—	Yes
13	System board, with processor cages and system battery	378911-001‡ See requirement	411248-001	Yes
14	Power converter module	392615-001	—	Yes
15	SAS backplane, 8 bay	392610-001‡ See requirement	411024-001	Yes
16	Power button/LED board	366300-001‡ See requirement	411026-001	Yes
	Media devices			
17	Diskette drive, slimline, 1.44 MB (optional)	289550-001‡ See requirement	399311-001	Yes
18	CD-ROM drive, removable slimline, IDE, 24X	228508-001‡ See requirement	399401-001	Yes
19	DVD-ROM drive, removable slimline, 8X *	268795-001‡ See requirement	397928-001	Yes
20	CD-RW/DVD-ROM combo drive, 24X	337273-001	—	Yes
	Cables			
21	SAS options cable kit *	392612-001	—	
	a) Drive cage cable	—	—	Yes
	b) CD multibay cable	—	—	Yes
	c) USB cable	—	—	Yes

Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
22	SAS option cable *	389952-001	—	Yes
23	Signal cable kit *	228518-001	—	
	a) Power button/LED board cable, 14 pin	—	—	Yes
	b) PCI Hot Plug LED board cable	—	—	Yes
	Rack mounting hardware			
24	2U Quick Deploy Rail System *	359254-001	—	Yes
	Miscellaneous			
25	Baffle, foam, rear fan bracket *	391778-001	—	Yes
26	Air baffle, processor*	391779-001	—	Yes
27	Hardware kit *	228527-001	—	
	a) Screws, T-15, flat-head	—	—	Yes
	b) Expansion slot cover	—	—	Yes
	c) Screws, 6-32	—	—	Yes
28	Plastics kit *	359720-001	—	
	a) PCI slot release lever	—	—	Yes
	b) PCI lightpipe, rear	—	—	Yes
	c) PCI lightpipe, cover	—	—	Yes
	d) PCI riser cage door latch	—	—	Yes
	e) Thumbscrew with molded cap, PCI slot 1	—	—	Yes
	f) Standoff	—	—	Yes
	g) Plastic standoff, 3.4 mm (0.134 in)	—	—	Yes
	h) Battery clip	—	—	Yes
	i) PCI card guide retainer	—	—	Yes
	j) Thumbscrew knob	—	—	Yes
	k) Diskette drive slot cover	—	—	Yes
29	AC power cord, 0.9 m (3 ft) *	142766-001	—	Yes
30	DVD/CD-ROM drive ejector assembly *	371114-001	—	Yes
31	Battery, 3.3 V, lithium *	234556-001	—	Yes
32	Return kit, pack box, and cushions *	289545-001	—	Yes
33	T-15 Torx screwdriver *	199630-001	—	Yes
	Memory			
34	DIMM, 512 MB, PC3200 DDR1-400 *	378913-001‡ See requirement	416105-001	Yes

Item	Description	Original spare part number	Modified spare part number	Customer self repair (on page 6)
35	DIMM, 1 GB, PC3200 DDR1-400 *	378914-001‡ See requirement	416106-001	Yes
36	DIMM, 2 GB, PC3200 DDR1-400 *	378915-001‡ See requirement	416107-001	Yes
37	DIMM, 4 GB, PC2700 DDR1 *	395547-001‡ See requirement	416258-001	Yes
	Options			
38	Smart Array P600 Controller *	370855-001	—	Yes
39	SAS hot-plug hard drive *			
	a) 36-GB 10,000-rpm SAS 2.5 hard drive	376596-001	—	Yes
	b) 72-GB 10,000-rpm SAS 2.5 hard drive	376597-001	—	Yes
	c) 60-GB 5,400-rpm SFF SATA hard drive	382264-001	—	Yes

*Not shown

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Removal and replacement procedures

In this section

Introduction

The SCSI model and SAS model servers look different. The procedures in this section apply to either server model unless otherwise noted.

Required tools

You need the following items for some procedures:

- T-15 Torx screwdriver (provided inside the server)
- HP Insight Diagnostics software ("HP Insight Diagnostics" on page 66)

Safety considerations

Before performing service procedures, review all the safety information.

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.

Server warnings and cautions

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

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

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

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

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

Preparation procedures

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

- Extend the server from the rack (on page 18).

  If you are performing service procedures in an HP, Compaq branded, telco, or third-party rack cabinet, you can use the locking feature of the rack rails to support the server and gain access to internal components.

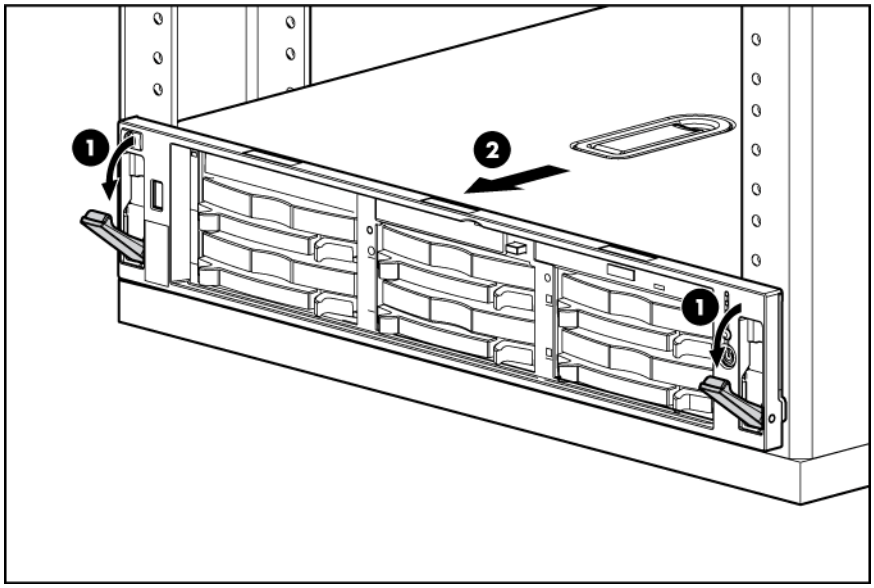
  For more information about telco rack solutions, refer to the RackSolutions.com website (http://www.racksolutions.com/hp).
- Power down the server (on page 19).

  If you must remove a server from a rack or a non-hot-plug component from a server, power down the server.
- Remove the server from the rack (on page 19).

  If the rack environment, cabling configuration, or the server location in the rack creates awkward conditions, remove the server from the rack.

Extend the server from the rack

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

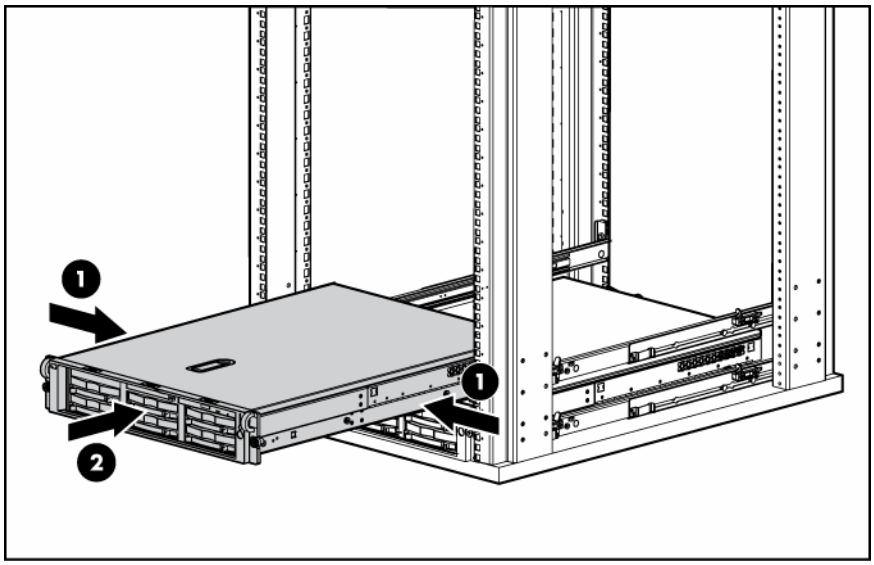


2. Extend the server on the rack rails until the server rail-release latches engage.

⚠ 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:
   a. Press the server rail-release latches and slide the server fully into rack.



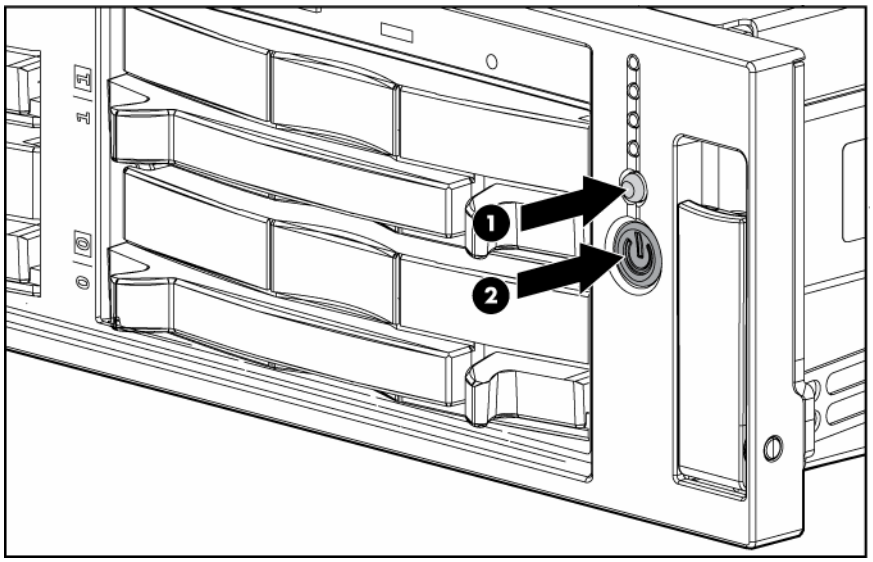
   b. Press the server firmly into the rack to secure it in place.

Power 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. Back up the server data.
2. Shut down the operating system as directed by the operating system documentation.
3. If the server is installed in a rack, press the UID LED button on the front panel (1). Blue LEDs illuminate on the front and rear panels of the server.
4. Press the Power On/Standby button to place the server in standby mode (2). When the server activates standby power mode, the system power LED changes to amber.



5. If the server is installed in a rack, locate the server by identifying the illuminated rear UID LED button.
6. Disconnect the power cords.

The system is now without power.

Remove the server from the rack

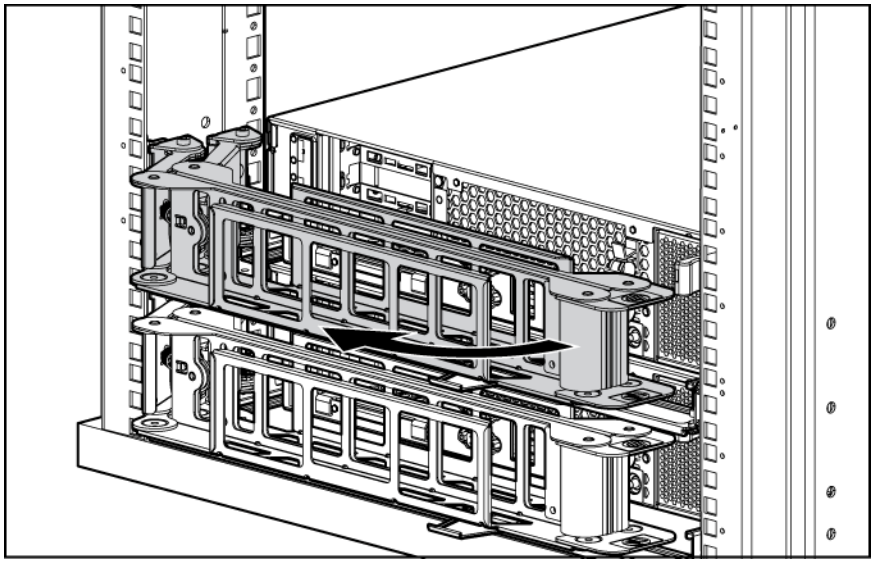
To remove the server from an HP, Compaq branded, telco, or third-party rack:

1. Power down the server (on page 19).
2. Extend the server from the rack (on page 18).
3. Disconnect the cabling and remove the server from the rack. For more information, refer to the documentation that ships with the rack mounting option.
4. Place the server on a sturdy, level surface.

Access the product rear panel

Cable management arm with left-hand swing

To access the server rear panel, open the cable management arm.



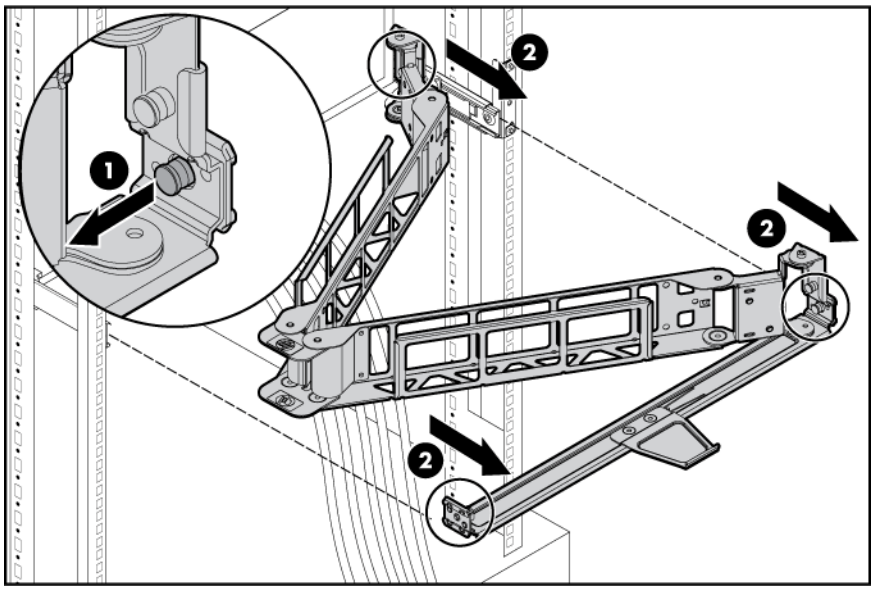
To close the cable management arm, reverse this procedure.

Cable management arm with right-hand swing

NOTE: To access some components, you may need to remove the cable management arm.

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

1. Power down the server (on page 19).
2. Swing open the cable management arm.
3. Remove the cables from the cable trough.
4. Remove the cable management arm.



To close the cable management arm, reverse this procedure.

Non-hot-plug procedures

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.

To remove the component:

1. Power down the server if performing a non-hot-plug installation or maintenance procedure ("Power down the server" on page 19).
2. Extend the server from the rack, if applicable ("Extend the server from the rack" on page 18).
3. Lift up on the hood latch handle and remove the access panel.

To replace the component, reverse the removal procedure.

DVD/CD-ROM drive

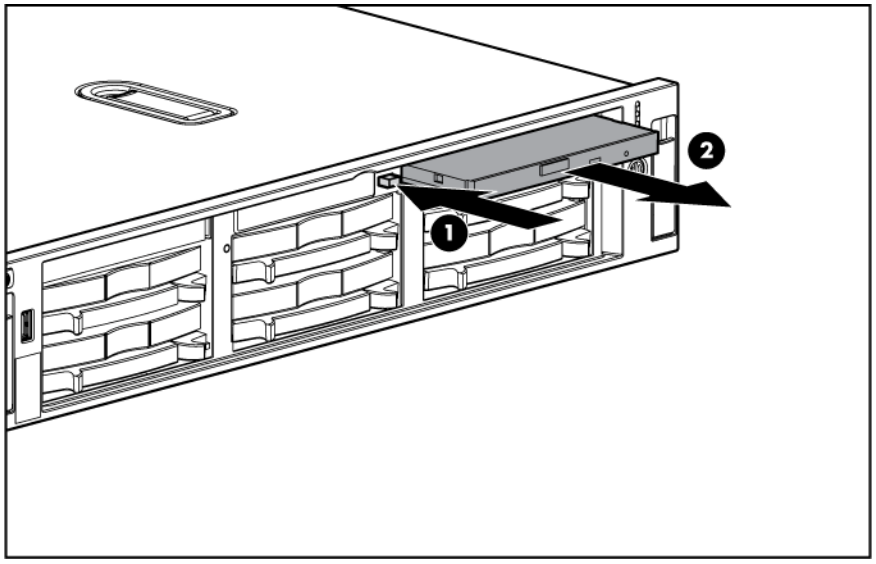
To remove the component:

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

1. Power down the server (on page 19).

IMPORTANT: The ejector button is recessed to prevent accidental ejection; it may be helpful to use a pen or similar shaped object to access the button.

2. Remove the drive.



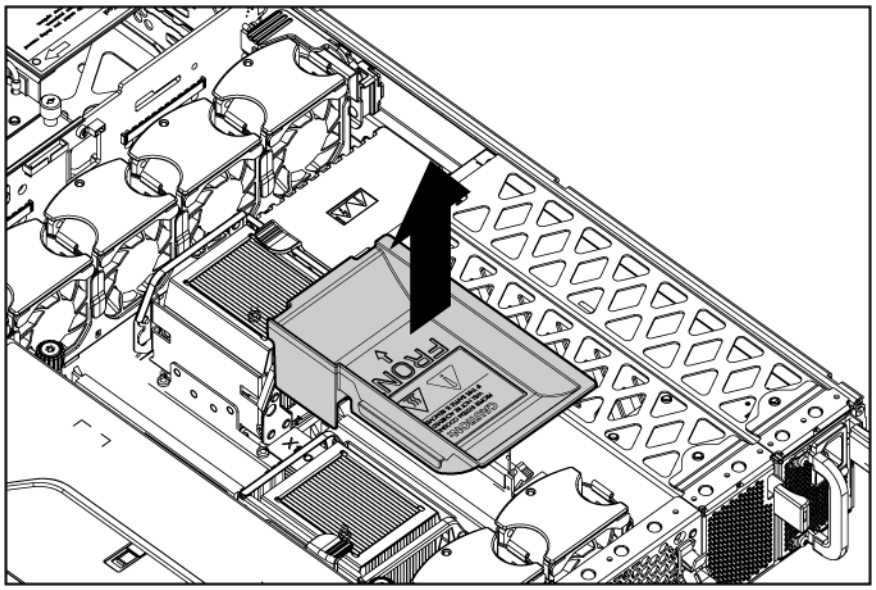
To replace the drive, slide the drive into the bay until the drive is fully seated.

Air baffle

IMPORTANT: To maintain proper airflow and prevent thermal damage, always install the air baffle.

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the air baffle.



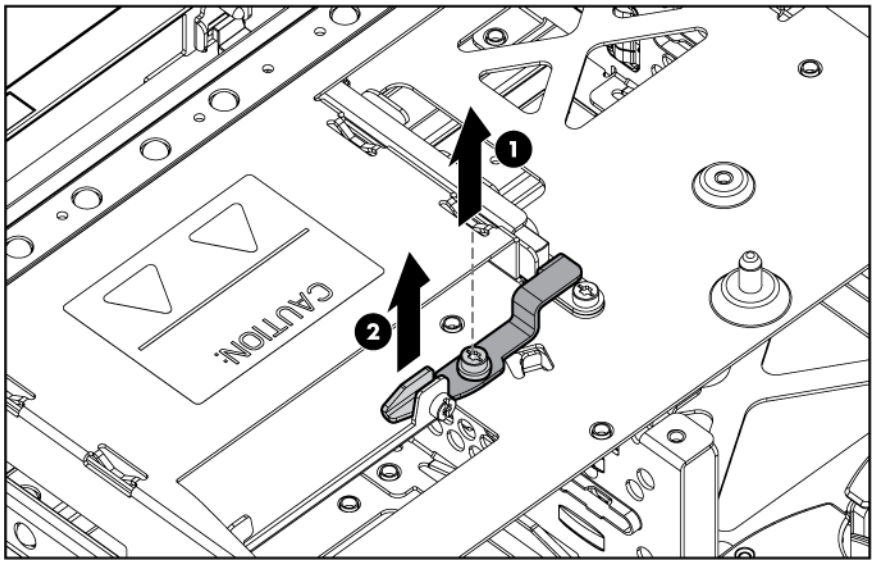
To replace the component, reverse the removal procedure.

DVD/CD-ROM drive ejector assembly

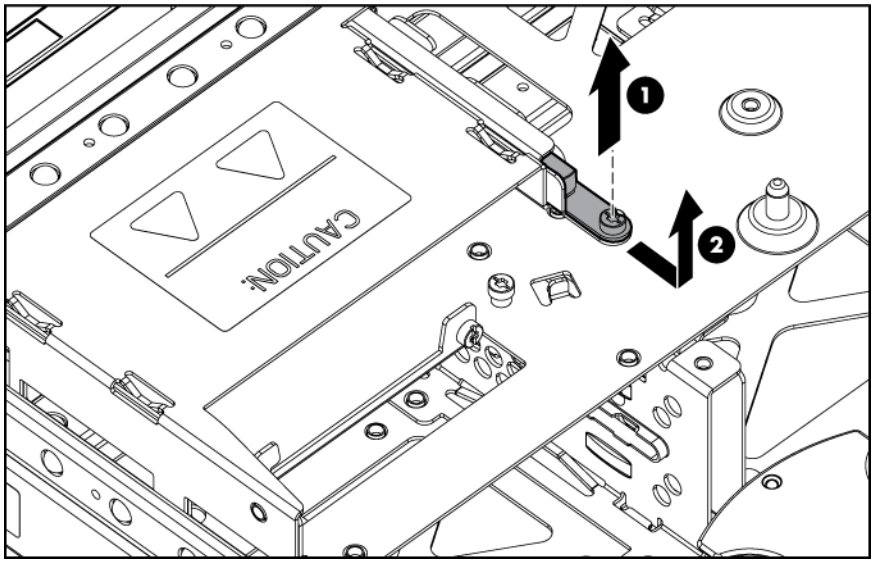
To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the DVD/CD-ROM drive, if installed ("DVD/CD-ROM drive" on page 21).
5. Remove the diskette drive ("Diskette drive option" on page 23).

6. Remove the ejector lever.



7. Press and hold the ejector button.
8. Remove the ejector assembly.



To replace the component, reverse the removal procedure.

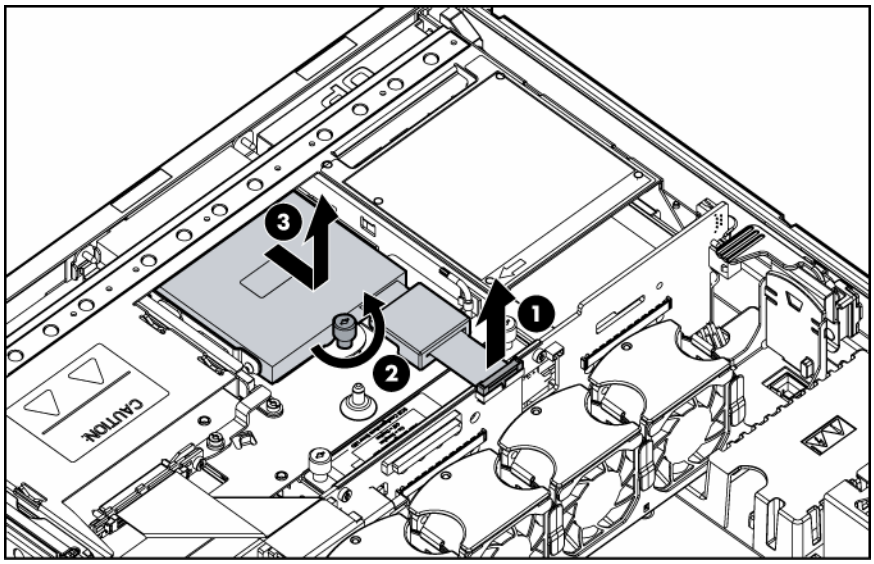
Diskette drive option

To remove the component:

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

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

4. Remove the diskette drive.

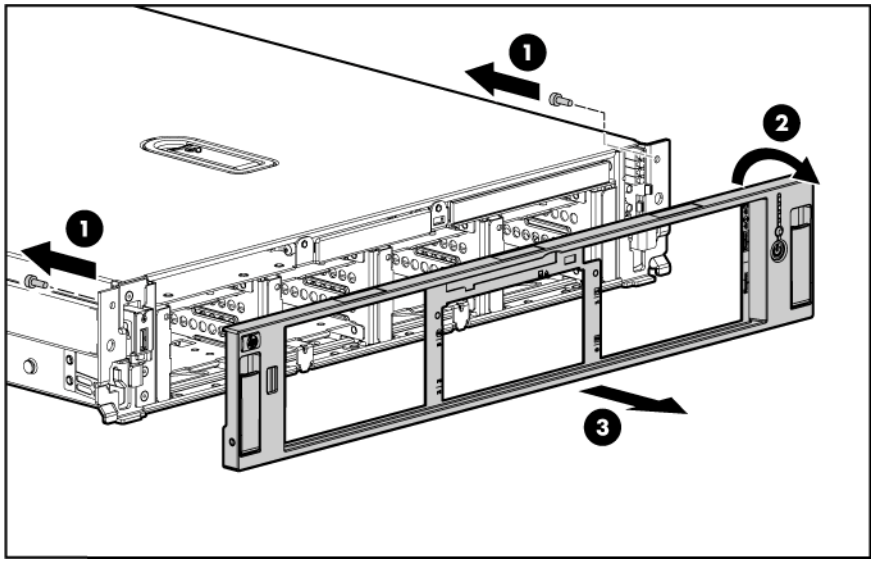


To replace the component, reverse the removal procedure.

Front bezel

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the two screws and detach the front bezel.



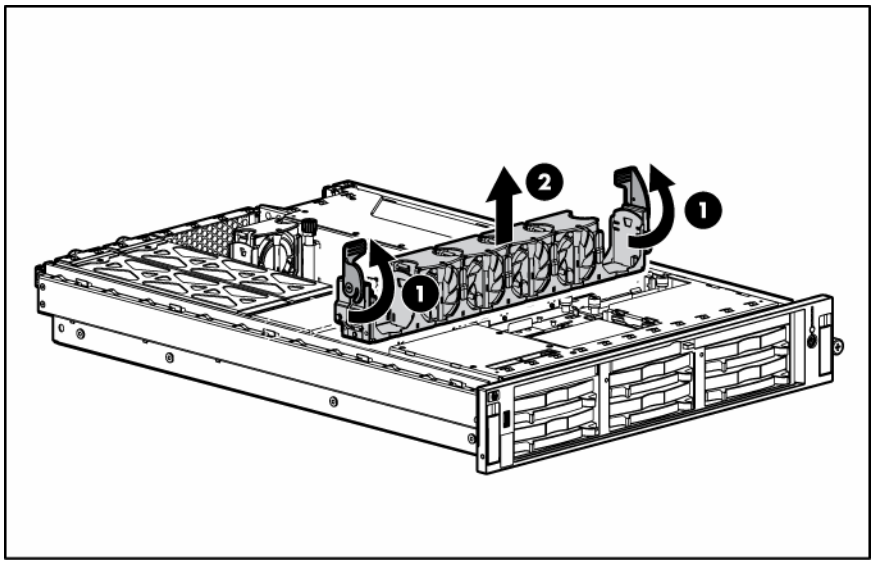
To replace the component, reverse the removal procedure.

Front fan bracket

To remove the component:

1. Power down the server (on page 19).

2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the front fan bracket.



5. Remove all hot-plug fans from the front fan bracket ("Hot-plug fan" on page 47).

To replace the front fan bracket, reverse the removal steps and press down on the top of each fan to be sure it is seated properly.

Rear fan bracket

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

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.

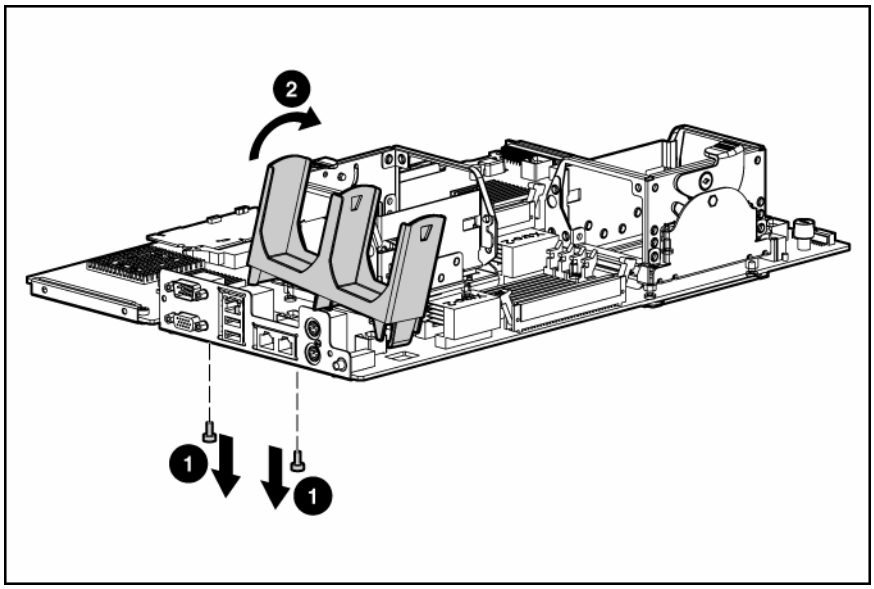
4. Remove the PCI riser cage ("PCI riser cage" on page 30).
5. Remove the front fan bracket ("Front fan bracket" on page 24).

IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

6. Remove the hot-plug fans from the rear fan bracket ("Hot-plug fan" on page 47).
7. Remove the system board ("System board" on page 40).

NOTE: When removing the system board, you may leave the DIMMs, the processors, the PPMs, the Smart Array 6i memory module, and the system battery on the system board, unless you are replacing them as failed items.

8. Remove the rear fan bracket.



To replace the component, reverse the removal procedure.

Battery-backed write cache procedures

NOTE: This feature applies only to SCSI models.

Two types of procedures are provided for the BBWC option:

- Removal and replacement of failed components:
  - Removing the Smart Array 6i cache module
  - Removing the BBWC battery pack
- Recovery of cached data from a failed server ("Recovering data from the battery-backed write cache" on page 28)

CAUTION: Do not detach the cable that connects the battery pack to the cache module. Detaching the cable causes any unsaved data in the cache module to be lost.

Smart Array 6i cache module

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

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 PCI riser cage.

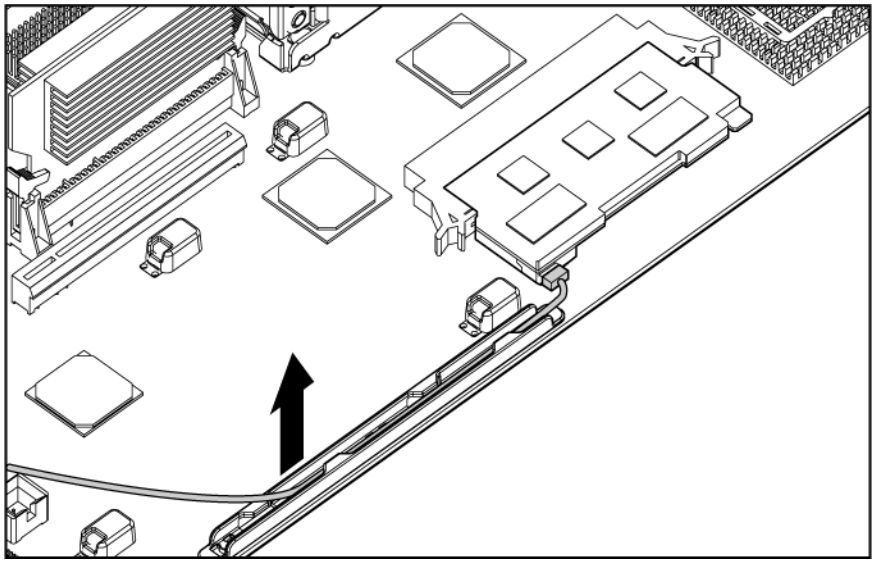
4. Remove the PCI riser cage ("PCI riser cage" on page 30).

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.

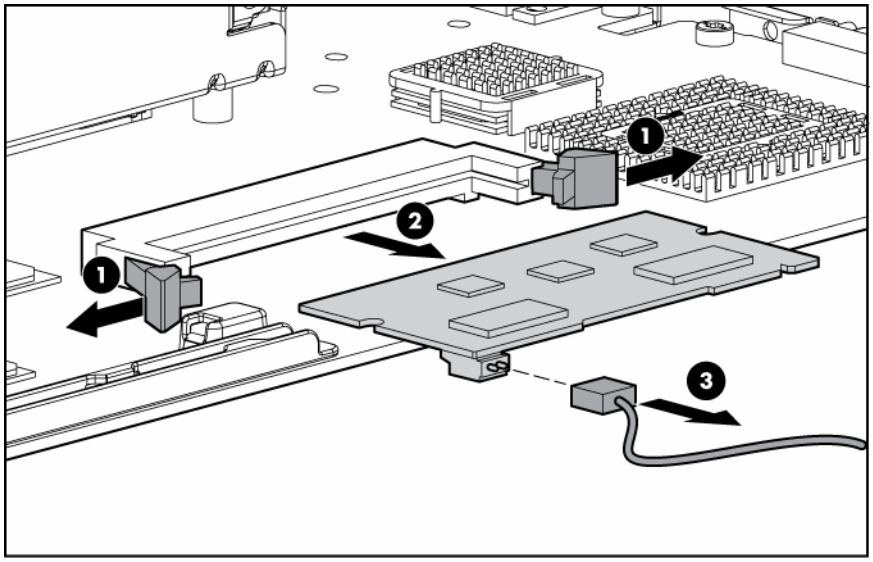
CAUTION: After the server is powered down, wait 15 seconds and then check the amber LED before unplugging the cable from the cache module. If the amber LED blinks after 15 seconds, do not remove the

cable from the cache module. The cache module is backing up data, and data is lost if the cable is detached.

5. Remove the cable from the plastic retainer.



6. Remove the Smart Array 6i cache module.
7. Disconnect the cable.



To replace the component, reverse the removal procedure.

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

Battery-backed write cache battery pack

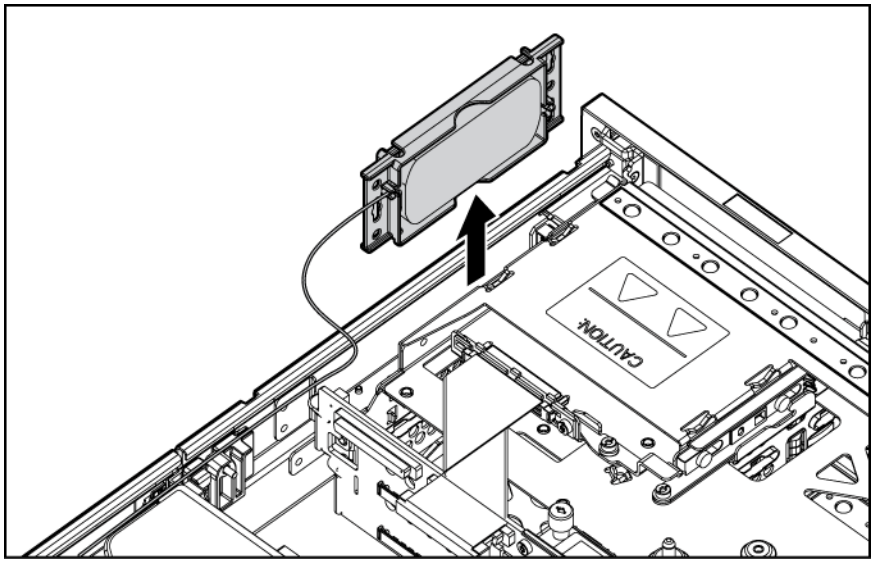
To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

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 is lost if the cable is detached.

4. Remove the front fan bracket ("Front fan bracket" on page 24).
5. Remove the Smart Array 6i cache module.
6. Remove the BBWC enabler, also known as the battery pack.



To replace the component, reverse the removal procedure.

IMPORTANT: The battery pack might 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 might take up to four hours. During this time, the cache module functions 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.

Recovering data from the battery-backed write cache

If the server fails, you can recover any data temporarily trapped in the BBWC by using the following procedure.

CAUTION: Before starting this procedure, read the information about protecting against electrostatic discharge ("Preventing electrostatic discharge" on page 16).

1. Perform one of the following:
   - Set up a recovery server station using an identical server model. Do not install any internal drives or BBWC in this server. (This is the preferred option.)
   - Find a server that has enough empty drive bays to accommodate all the drives from the failed server and that meets all the other requirements for drive and array migration.
2. Power down the failed server ("Power down the server" on page 19). If any data is trapped in the cache module, an amber LED on the module blinks every 15 seconds.

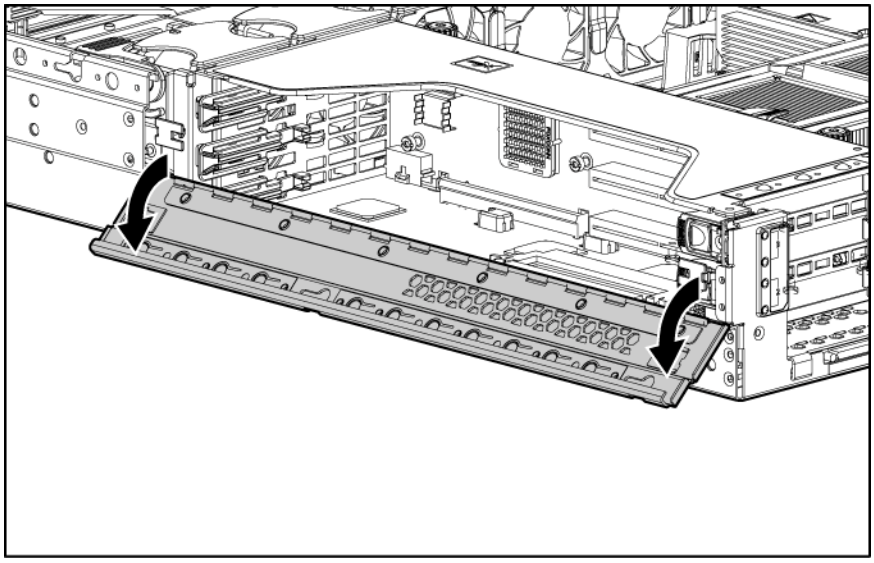
CAUTION: Do not detach the cable that connects the battery pack to the cache module. Detaching the cable causes any unsaved data in the cache module to be lost.

3. Transfer the hard drives from the failed server to the recovery server station.
4. Remove the BBWC [cache module and battery pack] from the failed server.
5. Perform one of the following:
   - Install the BBWC into an empty BBWC DIMM socket on the system board of the recovery server.
   - Install the BBWC into an empty BBWC DIMM socket on any Smart Array 641 or 642 Controller in the recovery server.
6. Power up the recovery server. A 1759 POST message is displayed, stating that valid data was flushed from the cache. This data is now stored on the drives in the recovery server. You can now transfer the drives (and controller, if one was used) to another server.

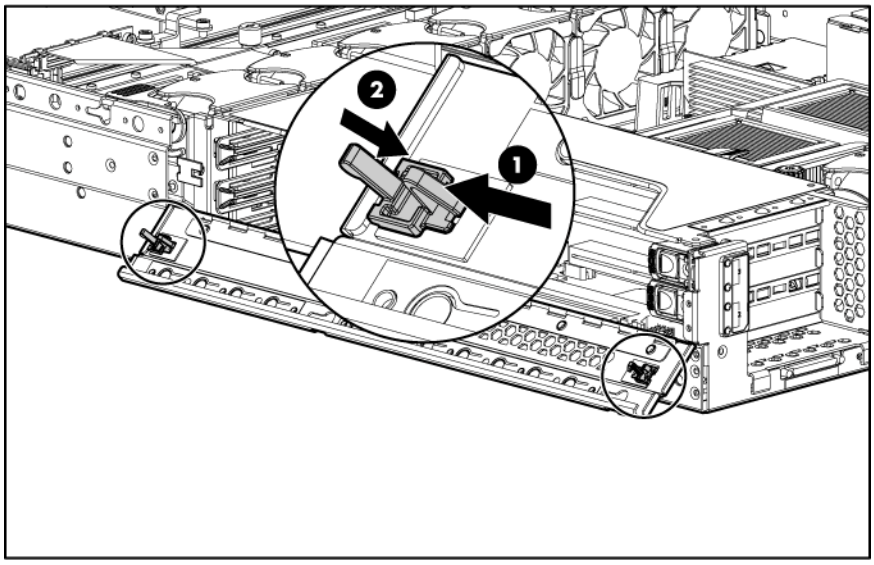
PCI riser cage door latch

To remove the component:

1. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
2. Remove the access panel ("Access panel" on page 21).
3. Open the PCI riser cage door.



4. Remove the PCI riser cage door latch.



To replace the component, reverse the removal procedure.

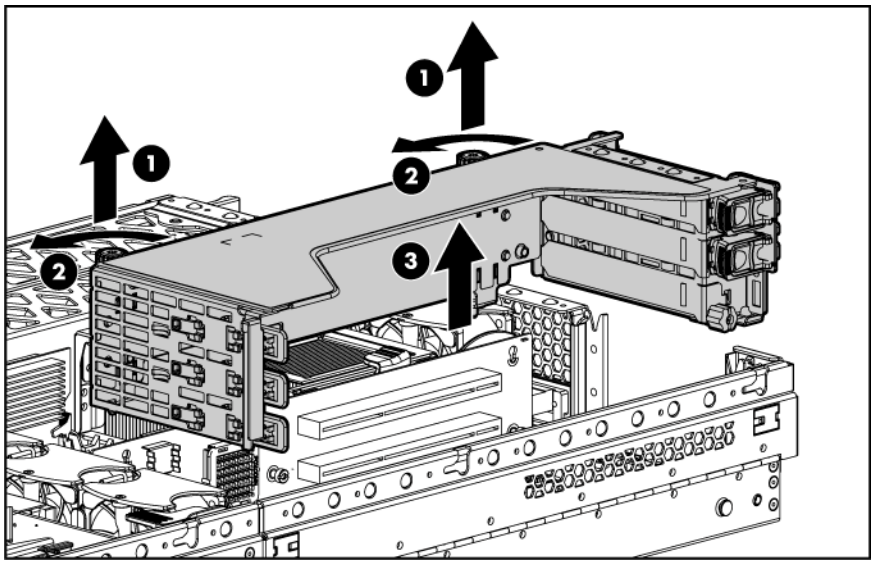
PCI riser cage

To remove the component:

1. Power down the server (on page 19).
2. Extend the server from the rack, if applicable ("Extend the server from the rack" on page 18).
3. Remove the access panel ("Access panel" on page 21).

△ **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 PCI riser cage.

4. Disconnect any internal or external cables connected to any existing expansion boards.
5. Lift the PCI riser cage thumbscrews and turn them counter-clockwise.
6. Remove the PCI riser cage.



To replace the component, reverse the removal procedure.

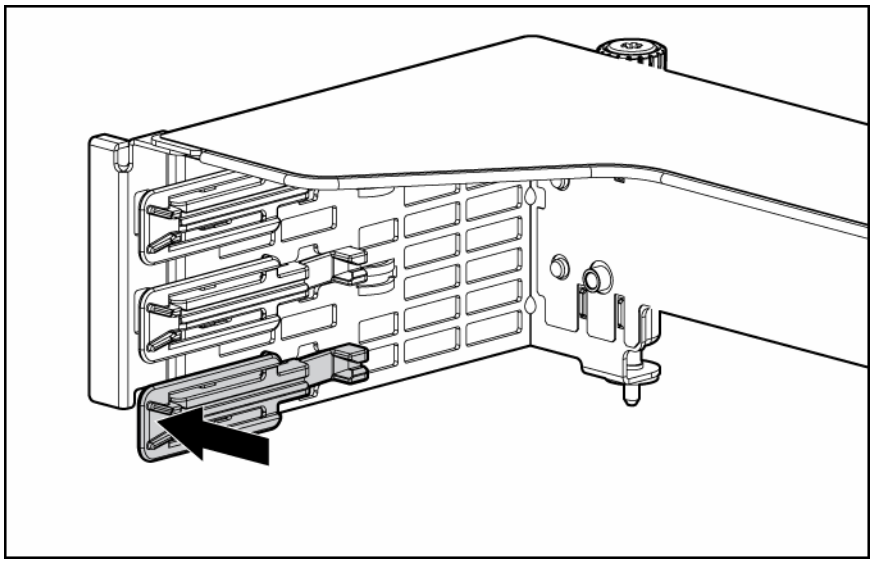
Expansion board

To remove the component:

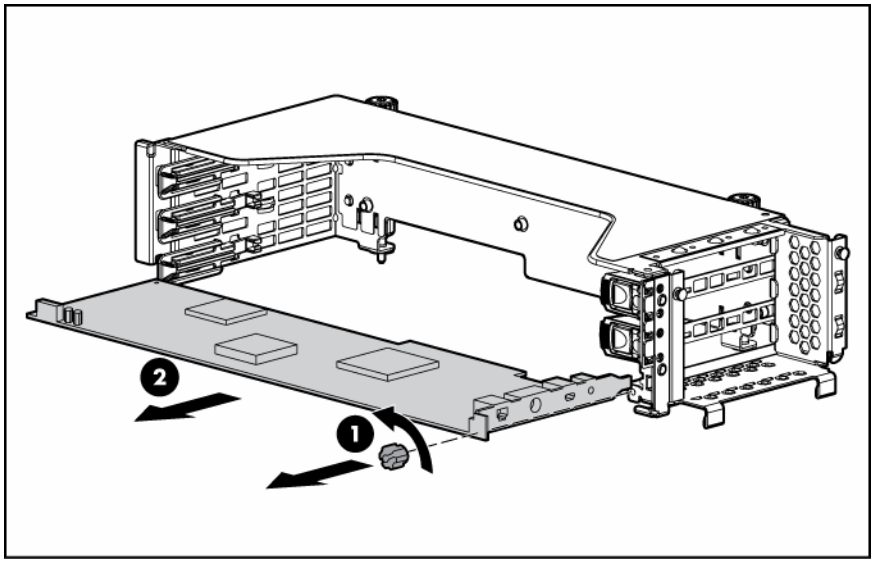
1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

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 PCI riser cage.

4. Disconnect any cables connecting the expansion board to the PCI riser cage.
5. Remove the PCI riser cage ("PCI riser cage" on page 30).
6. Unlock the PCI retaining clip.



7. Remove the expansion board.



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

To replace the component, reverse the removal procedure.

Expansion slot cover

To remove the component:

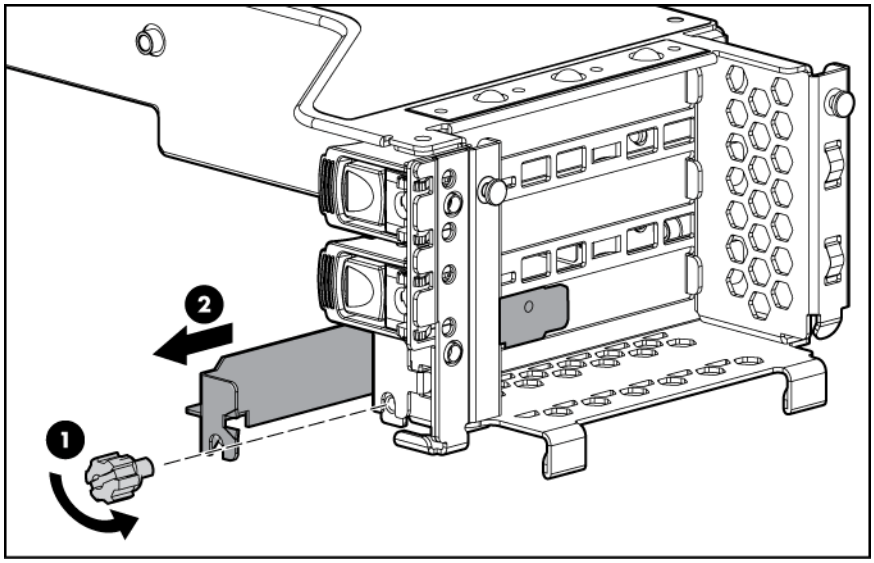
1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

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 PCI riser cage.

4. Remove the PCI riser cage ("PCI riser cage" on page 30).

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

5. Remove the expansion slot cover.



To replace the component, reverse the removal procedure.

PCI slot release lever

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).

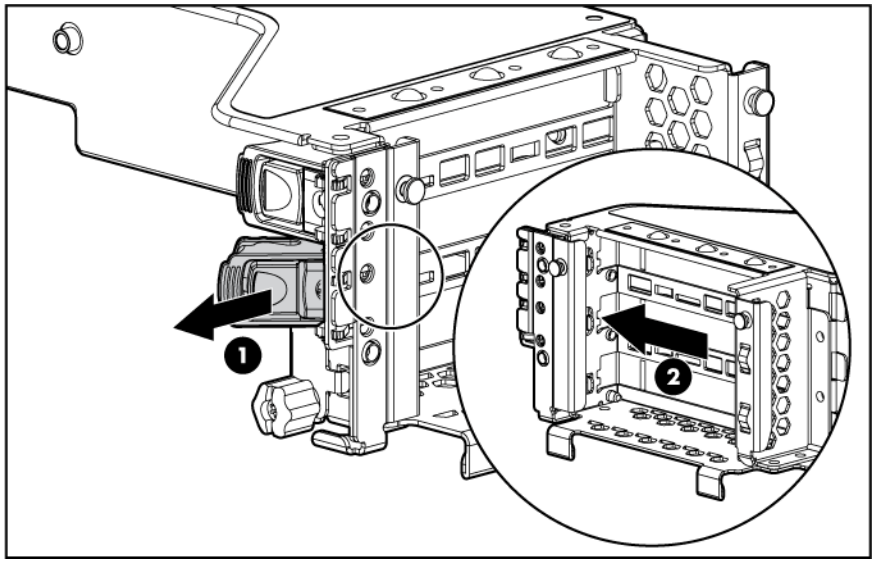
CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

4. Remove the PCI riser cage ("PCI riser cage" on page 30).

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.

5. Remove the expansion board from the slot, if installed ("Expansion board" on page 31).

6. Remove the expansion slot cover from the slot, if installed ("Expansion board" on page 31).
7. Remove the PCI slot release lever.



To replace the component, reverse the removal procedure.

Power converter module

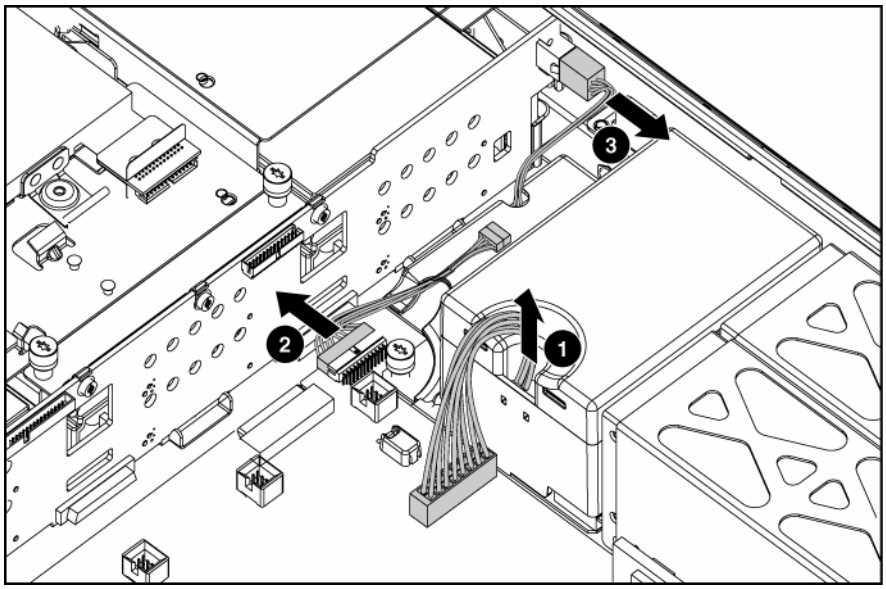
To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the front fan bracket ("Front fan bracket" on page 24).

IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

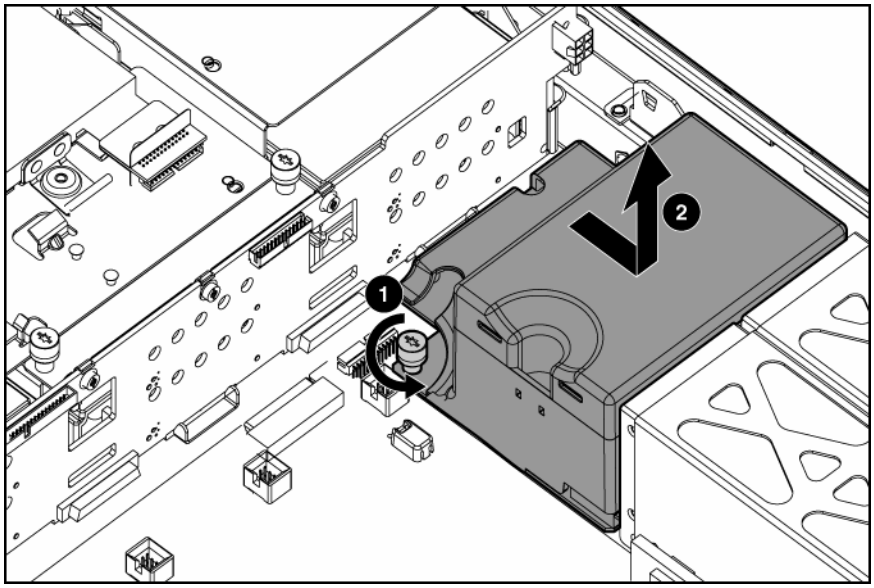
5. Remove all hot-plug power supplies ("Hot-plug power supply" on page 45).

6. Disconnect all power cables.



7. Remove the power converter module.

NOTE: Cables are removed for clarity.



To replace the component, reverse the removal procedure.

NOTE: The replacement (spare) power converter module may have an 8-pin connector. This connector will plug into the 6-pin header on models which support SCSI drives.

Power button/LED board

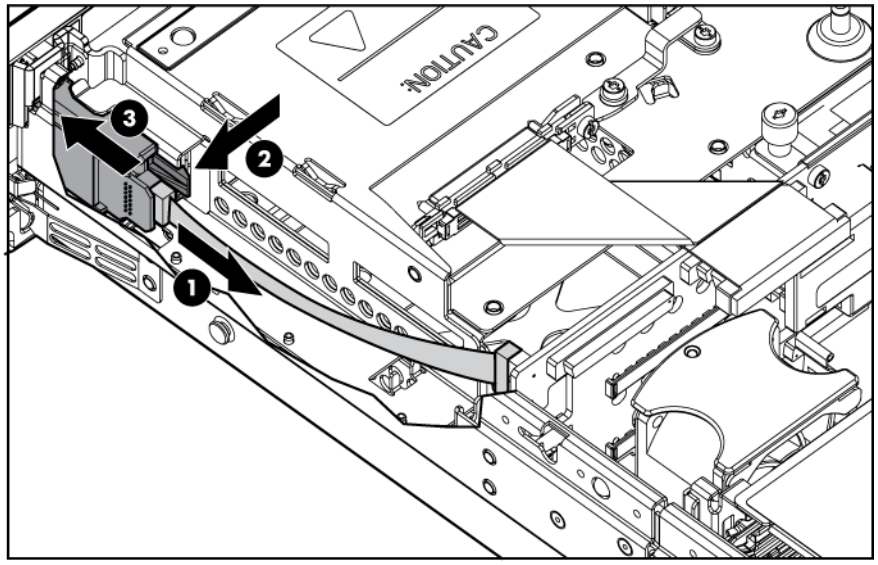
To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the front bezel.

4. Remove the access panel ("Access panel" on page 21).
5. Remove the BBWC battery pack.

NOTE: This feature applies only to SCSI models.

6. Remove the power button/LED board.



To replace the component, reverse the removal procedure.

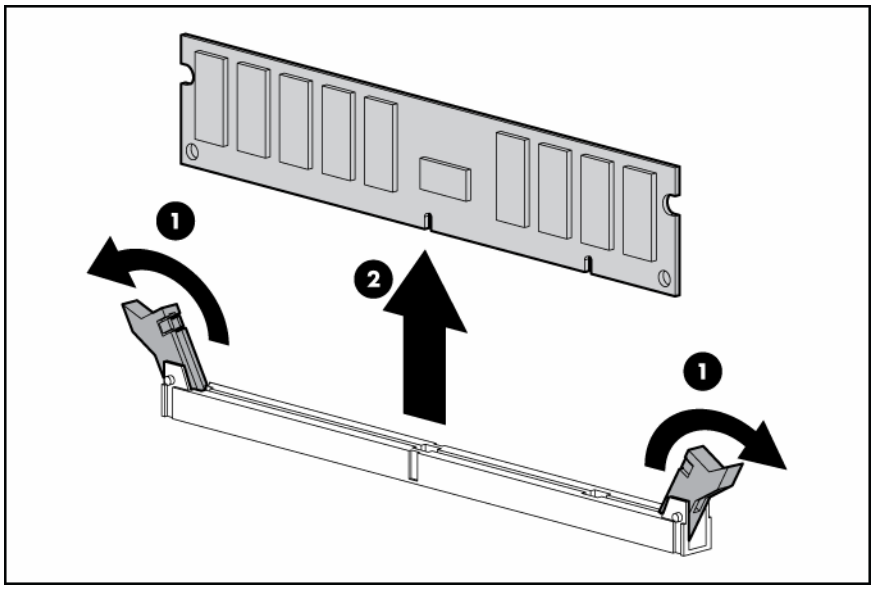
DIMMs

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the air baffle ("Air baffle" on page 22).

NOTE: The server ships with at least two DIMMs installed in DIMM slots 3B and 4B.

5. Remove the DIMM.



CAUTION: Be sure to install DIMMs in the proper configuration. Refer to the Documentation CD.

CAUTION: Use only Compaq branded or HP DIMMs. DIMMs from other sources may adversely affect data integrity.

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

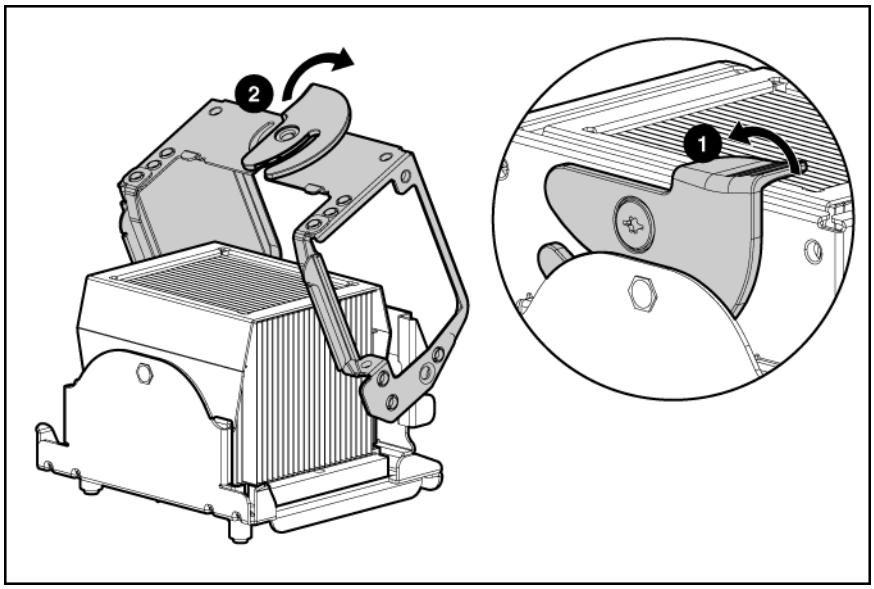
To replace a DIMM, align the DIMM with the slot and insert the DIMM firmly. When fully seated, the DIMM slot latches lock into place.

Processor

To remove the component:

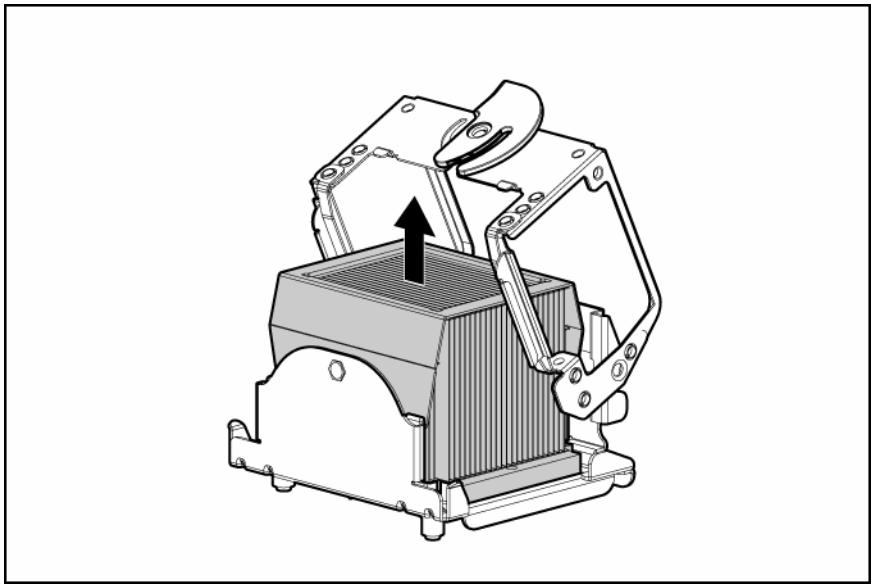
1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the air baffle ("Air baffle" on page 22).
5. If an optional redundant fan is located next to the processor, remove the fan ("Hot-plug fan" on page 47).

6. Open the processor retaining bracket.



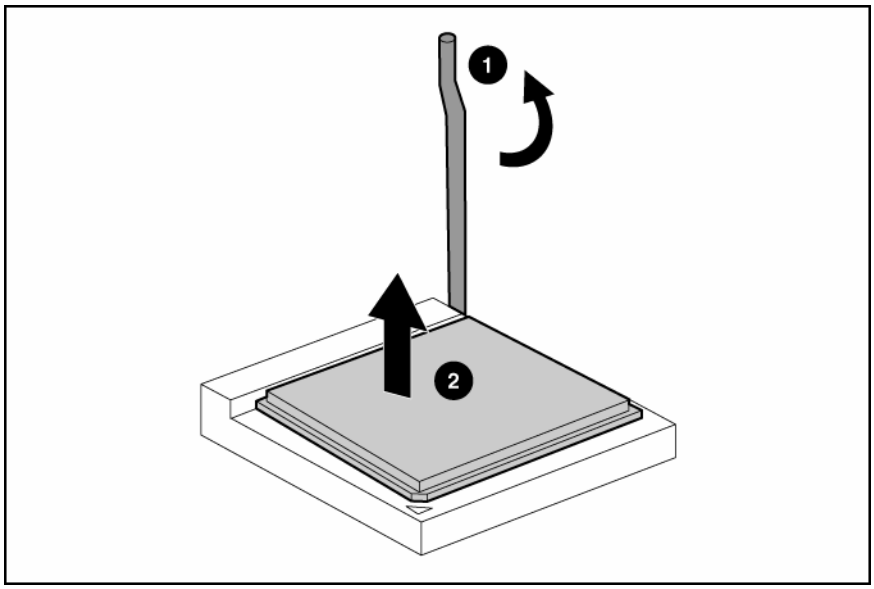
7. Remove the heatsink.

   To loosen the bond created by the thermal grease, use a rocking motion toward the front and rear of the server while lifting the heatsink.



8. Open the processor locking lever.

9. Remove the processor.



Before installing the reusable heatsink, clean the heatsink and prepare the processor:

1. Use the alcohol prep pads provided to remove all thermal grease from the heatsink.
2. After installing the processor, and before installing the heatsink, apply the provided thermal grease in an even layer to the top of the processor.

To replace the component, reverse the removal procedure.

CAUTION: Always wear an antistatic wrist strap when working inside the server.

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

CAUTION: When installing a processor, be sure to secure the processor using the processor socket lever before closing the processor retaining bracket. Failure to do so will result in physical damage to the processor and server.

CAUTION: To prevent possible server malfunction, do not mix processors of different types.

CAUTION: To prevent possible server malfunction or damage to the equipment, be sure to align the processor pins with the corresponding holes in the socket.

IMPORTANT: If upgrading processor speed, 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 does not function properly.

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

IMPORTANT: If you replace a failed processor or processors, clear the status log in RBSU after powering up the server. For RBSU procedures, refer to the Documentation CD.

PPM

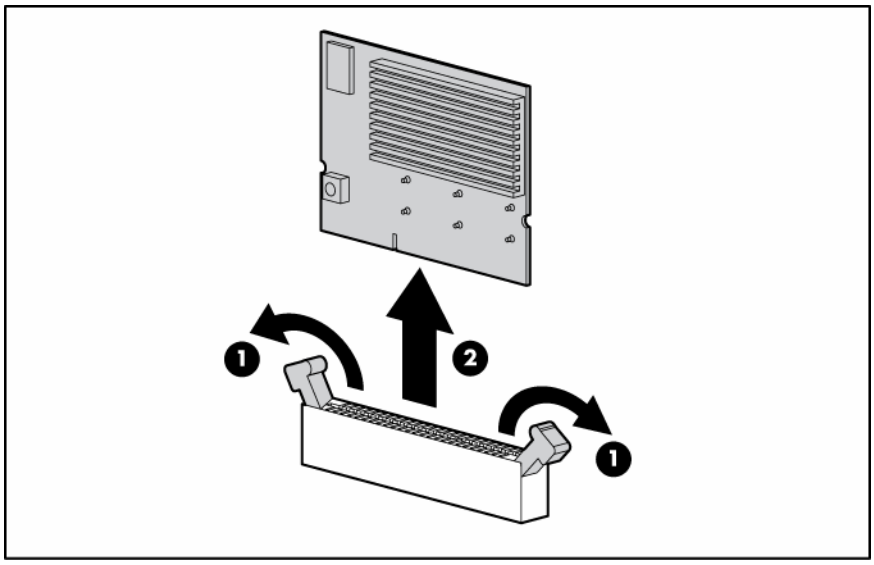
To remove the component:

1. Power down the server (on page 19).

2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the air baffle ("Air baffle" on page 22).

NOTE: The appearance of compatible PPMs may vary.

5. Remove the PPM.



IMPORTANT: PPM slots must be populated when processors are installed. If PPM slots are not populated, the server halts during POST or does not boot.

To replace the component, reverse the removal procedure.

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.

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:

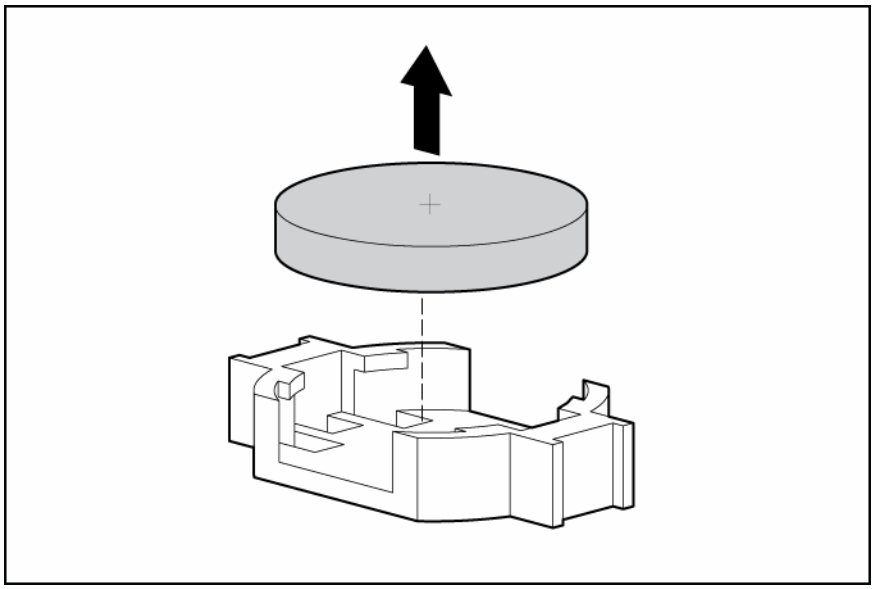
- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the PCI riser cage ("PCI riser cage" on page 30).

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 PCI riser cage.

5. Remove the battery.



IMPORTANT: Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through RBSU.

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.

System board

To remove the component:

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the air baffle ("Air baffle" on page 22).

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.

5. Remove the PCI riser cage ("PCI riser cage" on page 30).
6. Remove the front fan bracket ("Front fan bracket" on page 24).

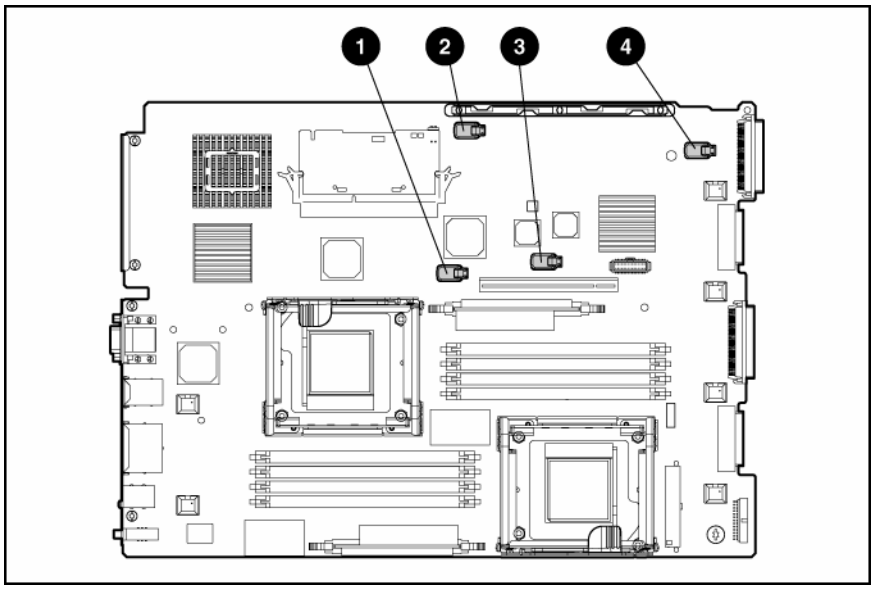
IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

7. Remove the hot-plug fans from the rear fan bracket ("Hot-plug fan" on page 47).
8. Remove any DDR SDRAM DIMMs ("DIMMs" on page 35).
9. Remove the processors and heatsinks ("Processor" on page 36).
10. Remove the PPMs ("PPM" on page 38).
11. Remove the Smart Array 6i cache module.

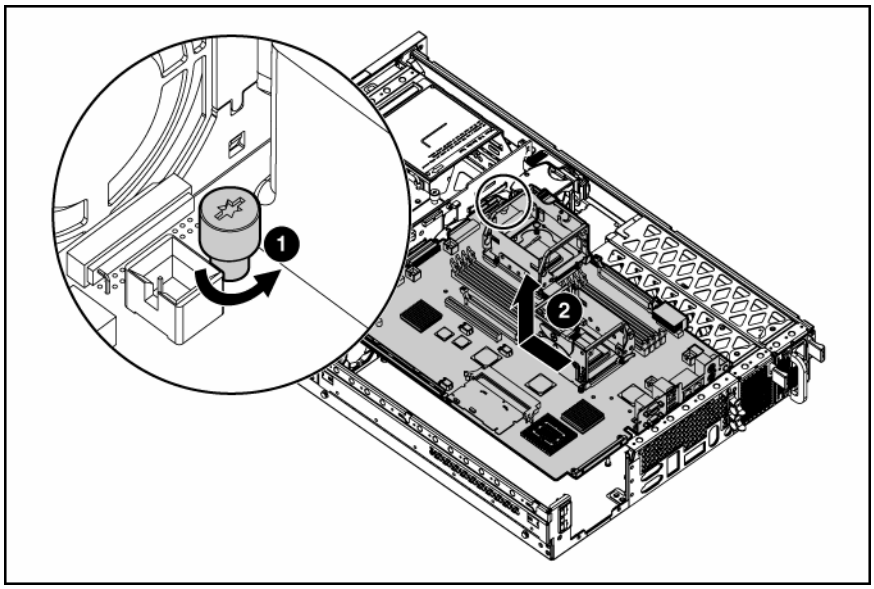
NOTE: This feature applies only to SCSI models.

12. Disconnect all cables connected to the system board.

13. Identify the alignment keys and keyhole locations, 1 through 4.



14. Loosen the system board thumbscrew.
15. Remove the system board.



16. Remove the rear fan bracket.

IMPORTANT: If replacing the system board or clearing NVRAM, you must re-enter the server serial number through RBSU ("Re-entering the server serial number and product ID" on page 41).

To replace the component, reverse the removal procedure.

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 **System Options** menu.
3. Select **Serial Number**. The following warning is displayed:

```
WARNING! WARNING! WARNING! The serial number is loaded into the system
during the manufacturing process and should NOT be modified. This option
should only be used by qualified service personnel. This value should
always match the serial number sticker located on the chassis.
```

4. Press the **Enter** key to clear the warning.
5. Enter the serial number and press the **Enter** key.
6. Select **Product ID**.
7. Enter the product ID and press the **Enter** key.
8. Press the **Esc** key to close the menu.
9. Press the **Esc** key to exit RBSU.
10. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

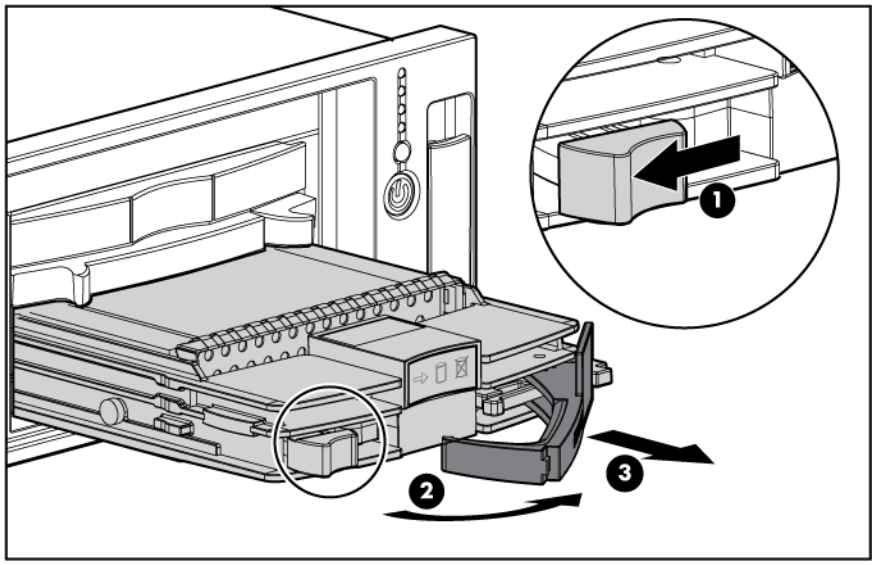
Hot-plug procedures

Hot-plug SCSI hard drive

To remove the component:

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

1. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LEDs" on page 79).
2. Back up all server data on the hard drive.
3. Remove the hard drive.



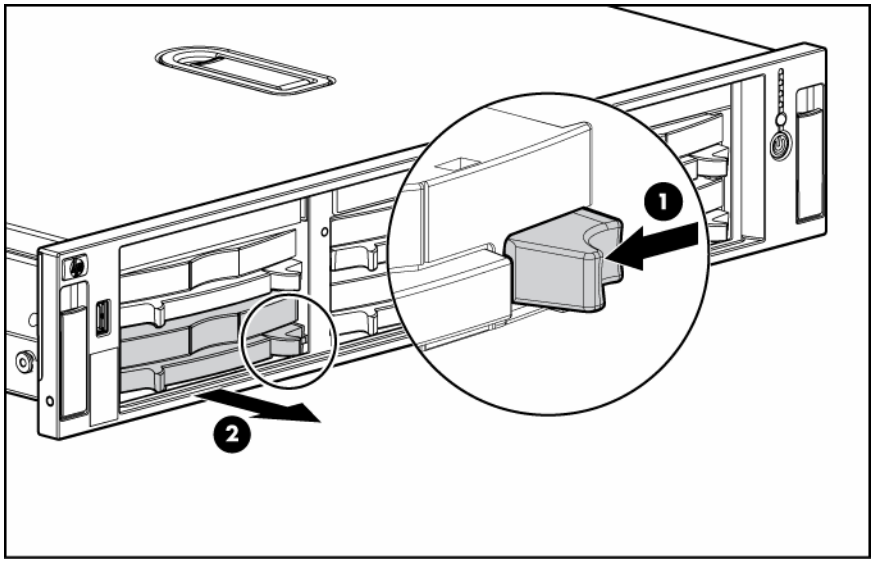
To replace the component, reverse the removal procedure.

SCSI hard drive blank

To remove the component:

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

NOTE: The server ships standard with five hard drive blanks.



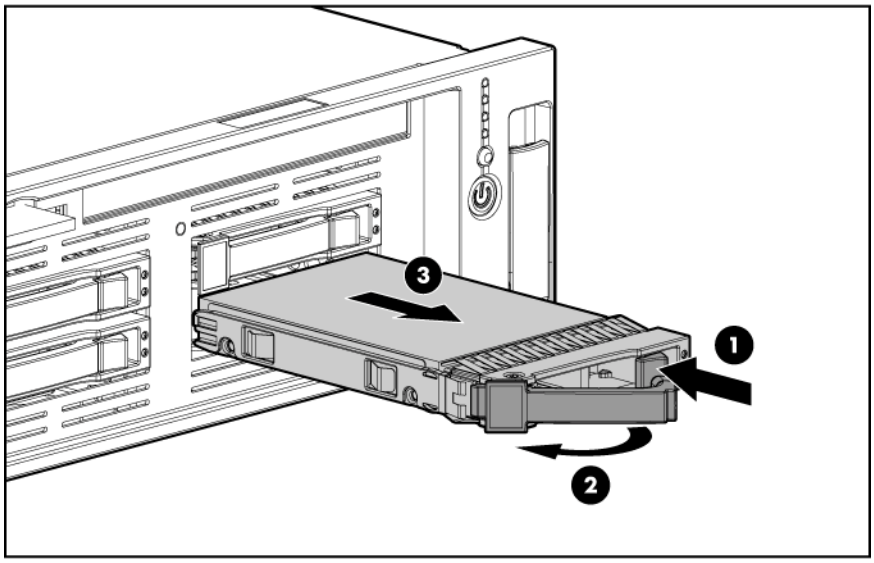
To replace the blank, slide the blank into the bay until it locks into place.

Hot-plug SAS hard drive

To remove the component:

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

1. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations (on page 81).
2. Back up all server data on the hard drive.
3. Remove the hard drive.

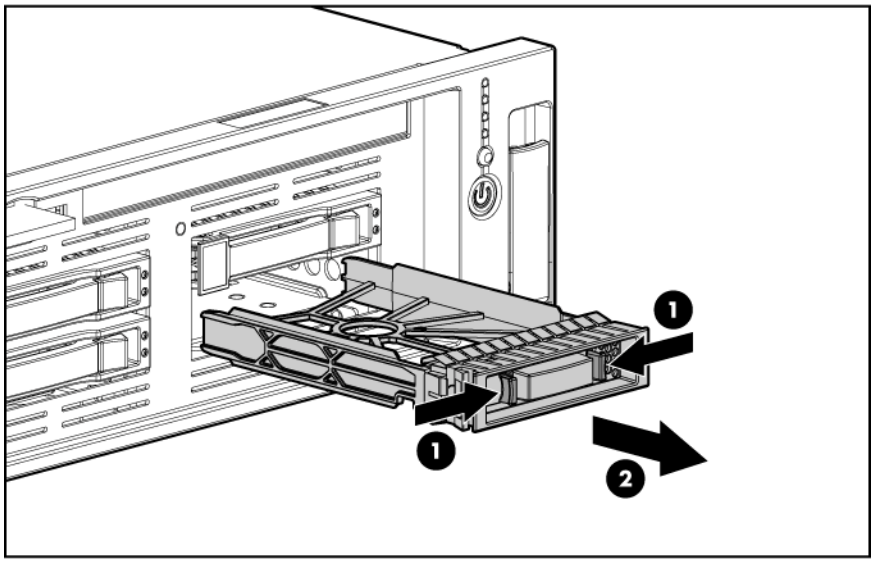


To replace the component, reverse the removal procedure.

SAS hard drive blank

To remove the component:

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



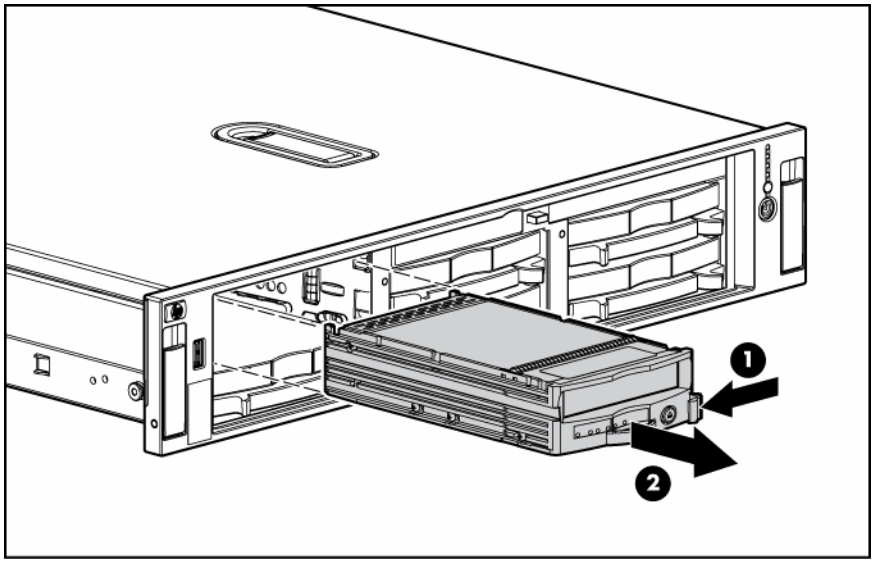
To replace the blank, slide the blank into the bay until it locks into place.

Universal hot-plug tape drive

NOTE: This feature applies only to SCSI models.

To remove the component:

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



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

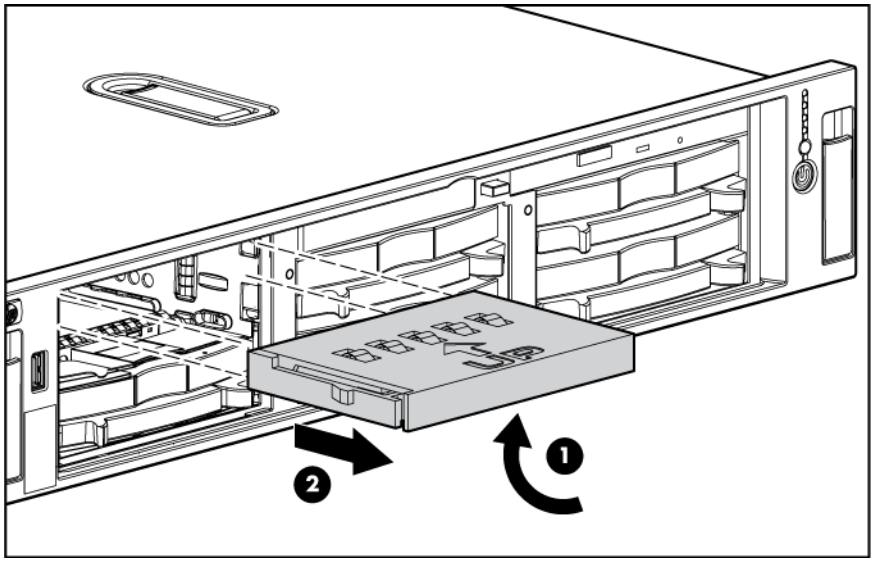
Tape drive blank

NOTE: This feature applies only to SCSI models.

To remove the component:

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

1. Reach underneath and squeeze the middle of the tape drive blank.
2. Pull the blank out of the bay.



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

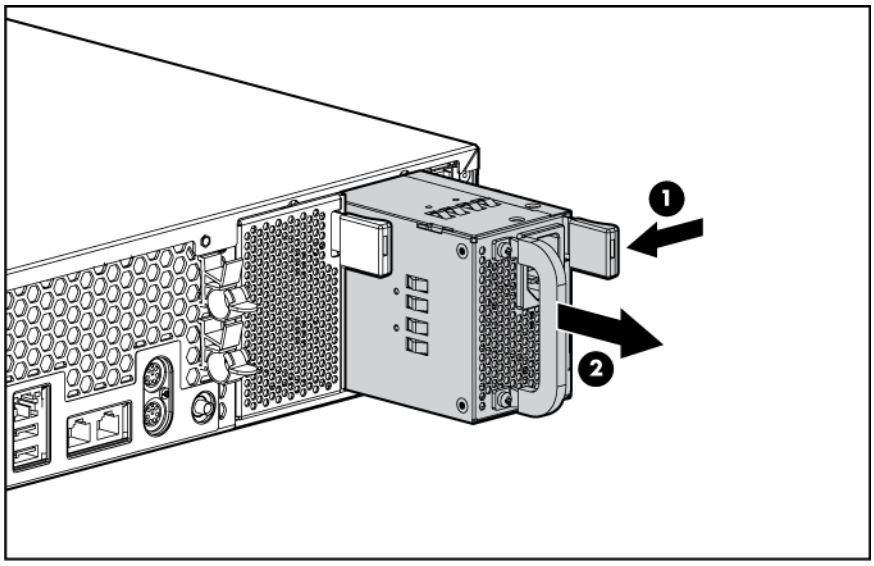
Hot-plug power supply

To remove the component:

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

1. Determine how many hot-plug power supplies are installed:
   - If only one hot-plug power supply is installed, power down and remove the power cord from the server ("Power down the server" on page 19).
   - If more than one hot-plug power supply is installed, continue with the next step.
2. Do one of the following:
   - If the cable management arm is hinged on the left side, proceed by opening the cable management arm ("Cable management arm with left-hand swing" on page 20).
   - If the cable management arm is hinged on the right side, proceed by removing the cable management arm ("Non-hot-plug procedures" on page 21).

3. Remove the hot-plug power supply.



To replace the component:

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

1. Slide the hot-plug power supply into the power supply bay.
2. Connect the power cord to the power supply.
3. Install the cable management arm, if removed. ("Access the product rear panel" on page 20)
4. Route the power cord through the cable management arm or power cord anchor.

NOTE: If using the power cord anchor, be sure to leave enough slack in the power cord so that the redundant power supply can be removed without disconnecting the power cord from the primary power supply.

5. Close the cable management arm.
6. Connect the power cord to the power source.
7. Be sure that the power supply LED is green.
8. Be sure that the front panel external health LED is green ("Front panel LEDs and buttons" on page 69).

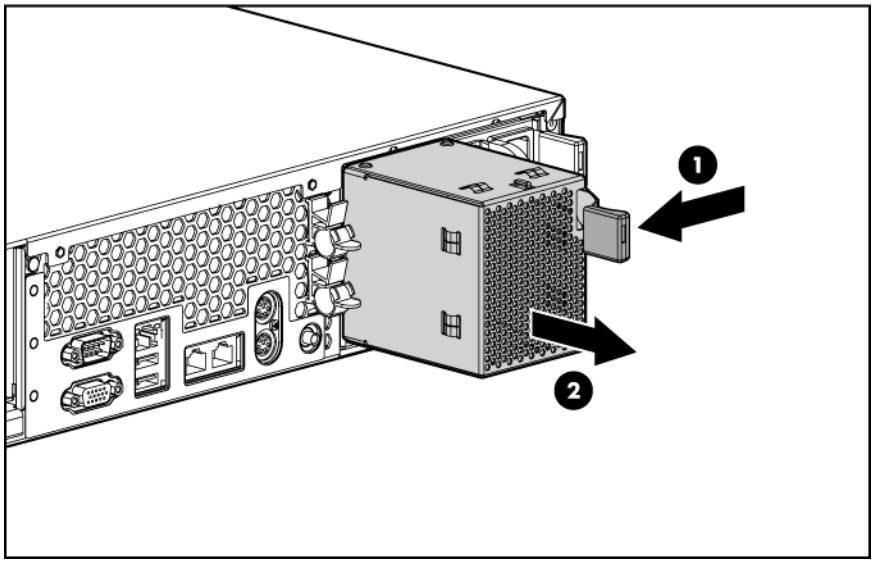
Power supply blank

To remove the component:

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

1. Do one of the following:
   - If the cable management arm is hinged on the left side, proceed by opening the cable management arm ("Cable management arm with left-hand swing" on page 20).
   - If the cable management arm is hinged on the right side, proceed by removing the cable management arm ("Non-hot-plug procedures" on page 21).
2. Remove the power supply blank.

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



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

Hot-plug fan

⚠ **WARNING: To reduce the risk of electric shock, personal injury, and damage to the equipment:**

- **Do not attempt to service any parts of the equipment other than those specified in the following procedure. Any other activities may require that you shut down the server and remove the power cord.**
- **Installation and maintenance of this product must be performed by individuals who are knowledgeable about the procedures, precautions and hazards associated with the product.**

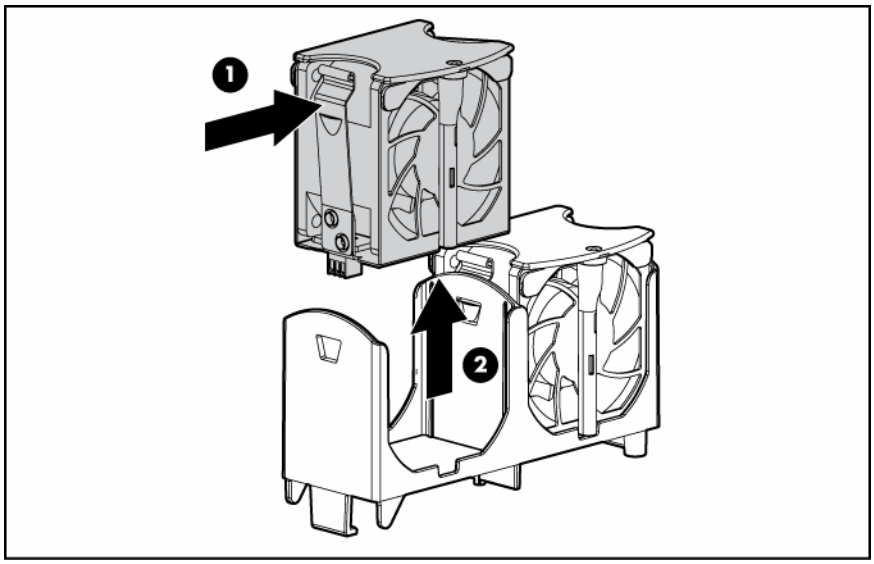
You must observe the following requirements when installing redundant hot-plug fans:

- To ensure optimum cooling, populate the primary fan locations, 2, 4, 5, 6, and 7, before populating the redundant locations ("Identifying hot-plug fans" on page 83).
- If a primary fan fails, replace the non-functioning fan before installing fans in redundant locations ("Identifying hot-plug fans" on page 83).

To remove the component:

1. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
2. Remove the access panel ("Access panel" on page 21).
3. If the server is operating with less than seven functional fans, power down the server (on page 19), then continue with the next step.

4. Remove the non-functioning fan.



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

IMPORTANT: For optimum cooling, install fans in all primary fan locations. For more information, refer to the fan locations table ("Identifying hot-plug fans" on page 83).

To replace the component, reverse the removal procedure.

Server cabling

In this section

Cabling

This section provides guidelines that help you make informed decisions about cabling the server and hardware options to optimize performance.

For information on cabling the optional RILOE II board, refer to the *HP Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.

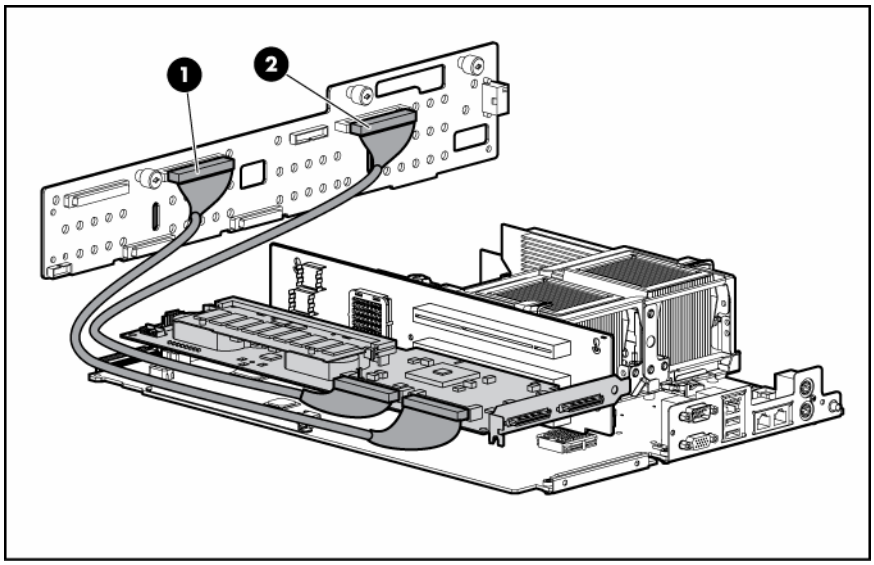
For information on cabling peripheral components, refer to the white paper on high-density deployment in HP or Compaq branded racks on the HP website (http://www.hp.com).

SAS model cabling

SAS hard drive cabling

The HP ProLiant DL385 Server SAS model uses a serial attached SCSI bus to connect SAS hard drives on a SAS backplane to a PCI SAS controller. In a SAS environment, each hard drive has a direct connection to the SAS controller. Two cables connect the PCI SAS controller to the SAS backplane. Each cable controls four SAS drives.

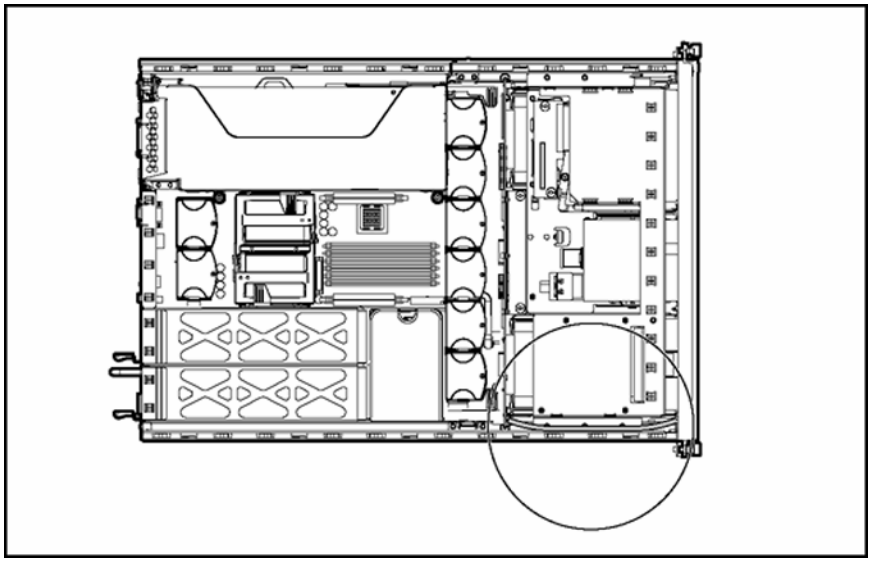
NOTE: If storage devices are connected to both the internal (1I) and external (1E) SAS connectors, the SAS controller recognizes only the devices connected to the internal connector. To attach devices to the external connector, disconnect the internal connector. Refer to the documentation that documentation that ships with the controller.



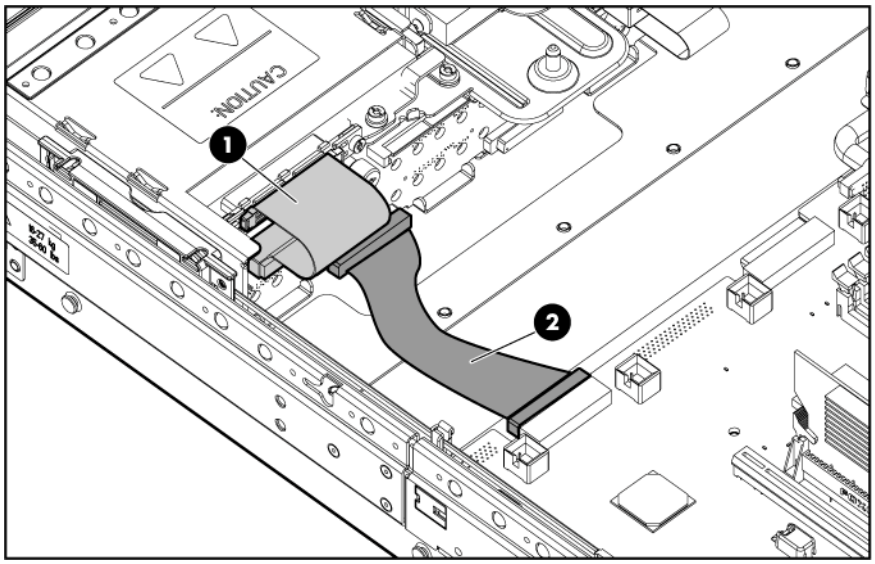
Item	Description
1	SAS connector 1
2	SAS connector 2

USB cabling

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

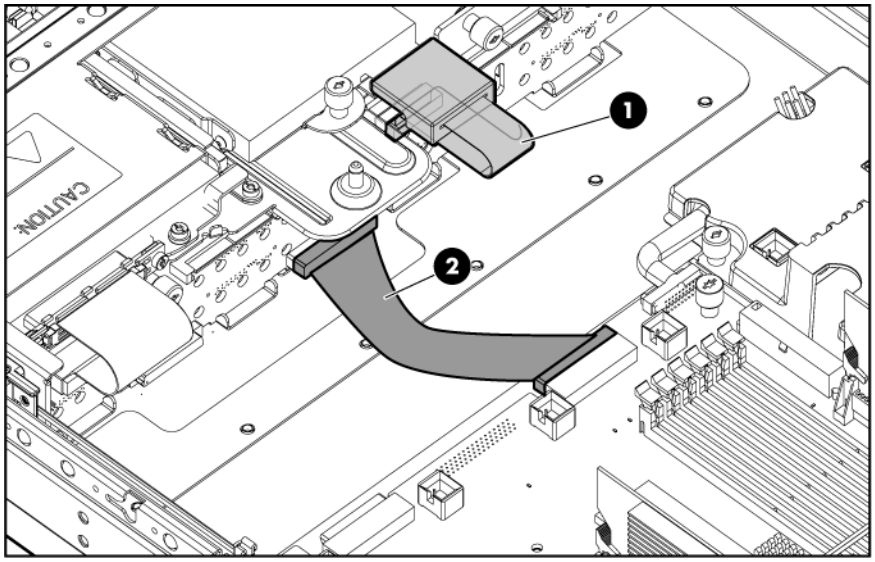


DVD/CD-ROM drive cabling



Item	Cable description
1	DVD/CD-ROM drive cable
2	DVD/CD-ROM drive system cable

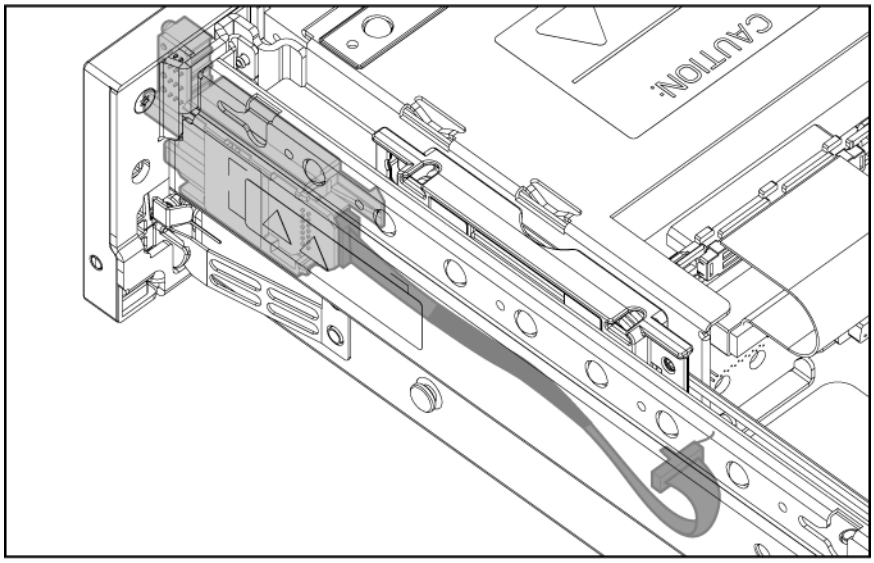
Diskette drive cabling



Item	Cable description
1	Diskette drive cable
2	Diskette drive system cable

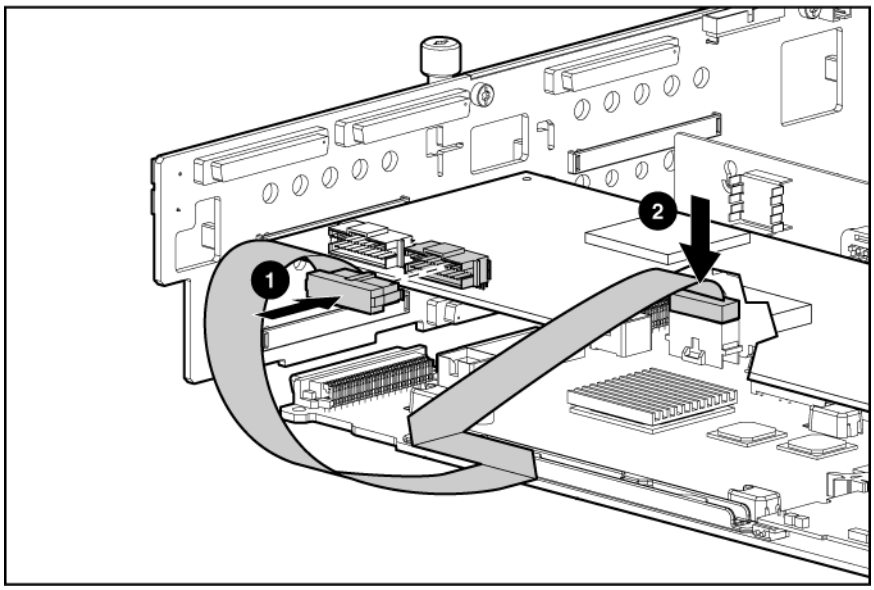
Power button/LED cabling

The power button/LED cable connects the power button/LED board to the SAS backplane.

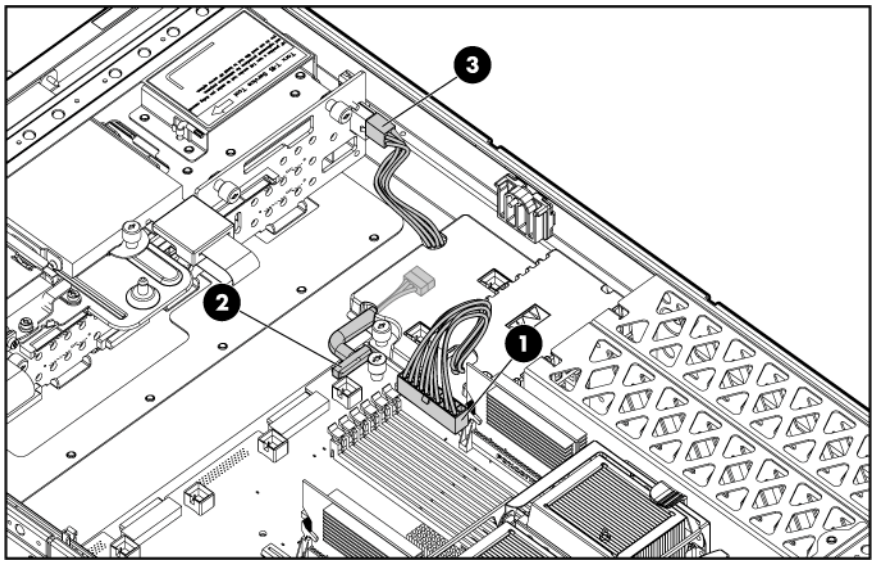


RILOE cabling (SAS)

The 30-pin Remote Insight cable ships with the RILOE II cable kit. For more information, refer to the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



Internal power cabling



Item	Description
1	System power cable
2	Power supply signal cable
3	SAS power cable

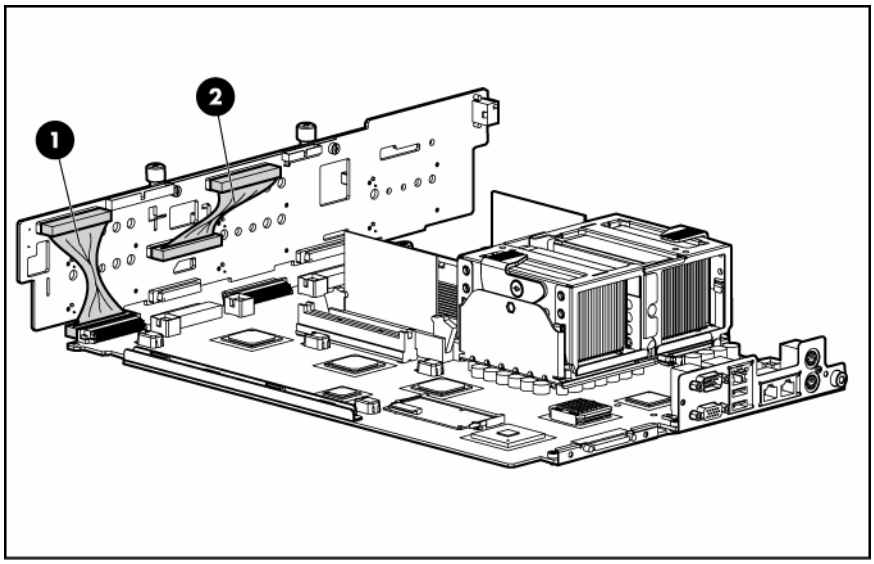
SCSI model cabling

IMPORTANT: If a simplex or duplex cabling configuration is not cabled correctly, the SCSI configuration error LED will illuminate. Refer to "SCSI Backplane LEDs (on page 79)" to locate the LED.

NOTE: The server ships with two identical short SCSI cables. Two optional long SCSI cables may be obtained for PCI Array Controllers. One optional terminator board may be obtained to support duplex SCSI configurations.

Embedded simplex SCSI cabling

In the embedded simplex cabling configuration, the embedded Smart Array 6i Controller controls up to six hard drives through one SCSI bus. The server ships standard with this configuration.



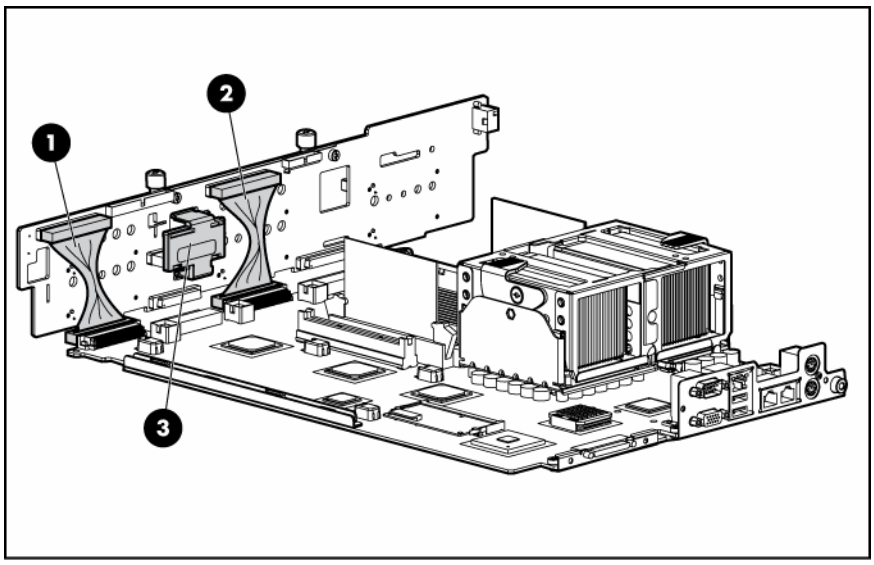
NOTE: The short SCSI cables are identical.

Item	Component description	SCSI IDs managed
1	Short SCSI cable	0, 1, 2, 3, 4, 5
2	Short SCSI cable used to jumper the two SCSI buses together	N/A

Embedded duplex SCSI cabling

In the embedded duplex cabling configuration, the embedded Smart Array 6i Controller controls up to six hard drives through two SCSI buses: one bus with up to two drives and the other bus with up to four drives.

NOTE: This specific cabling configuration does not support external VHDCI.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

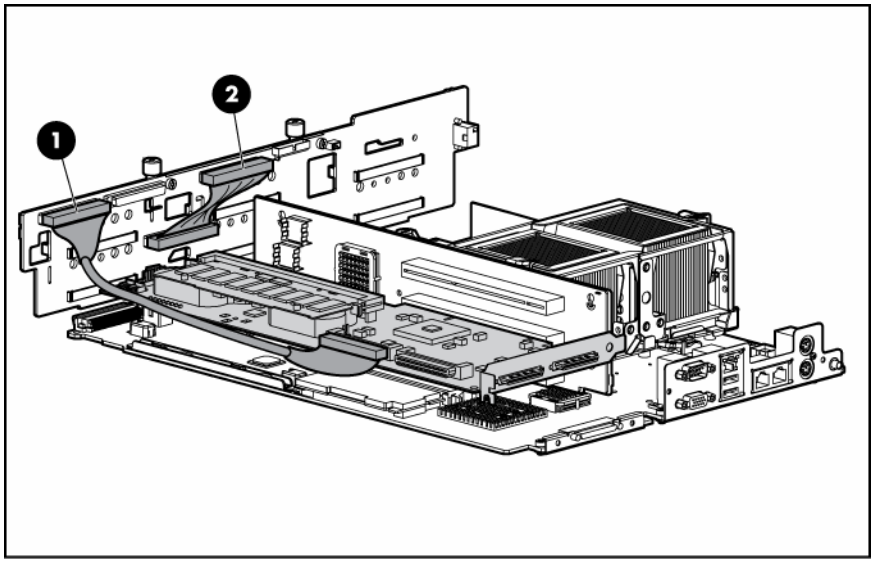
NOTE: The short SCSI cables are identical.

Item	Component description	SCSI IDs managed
1	Short SCSI cable	0, 1
2	Short SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

Refer to "Installing the SCSI terminator board (on page 58)" for SCSI terminator board installation procedures.

PCI simplex SCSI cabling

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

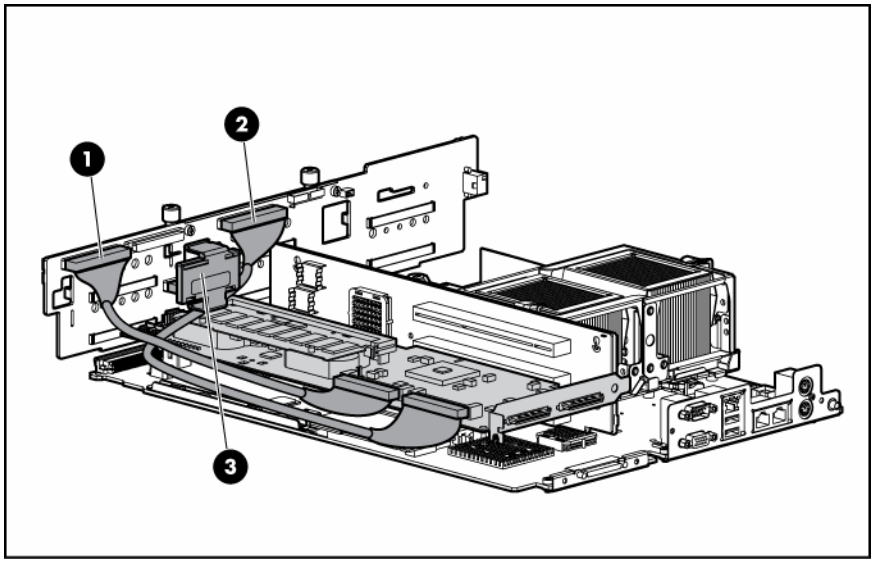


NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

Item	Component description	SCSI IDs managed
1	Optional long SCSI cable	0, 1, 2, 3, 4, 5
2	Short SCSI cable used to jumper the two SCSI buses together	N/A

PCI duplex SCSI cabling

In the PCI duplex cabling configuration, an optional PCI array controller controls up to six hard drives through two SCSI buses: one bus with up to two drives and one bus with up to four drives.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

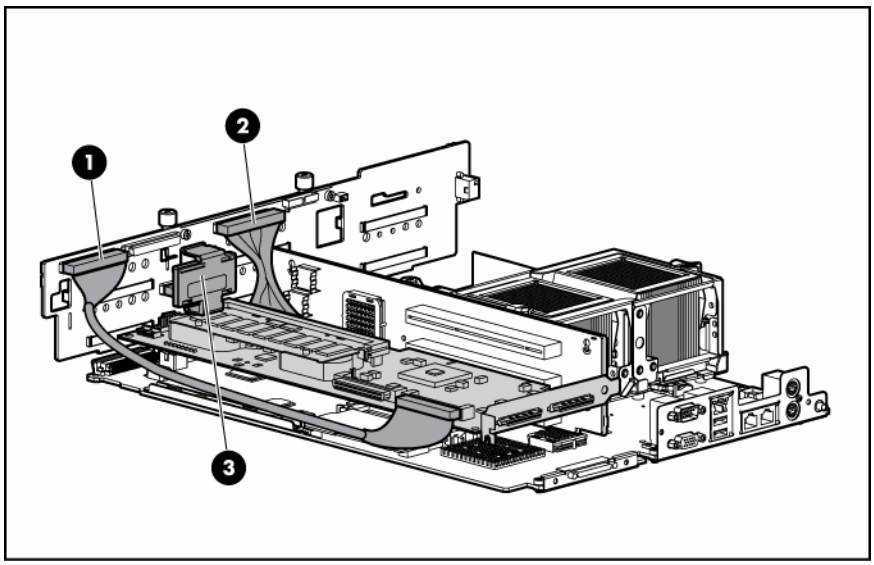
Item	Component description	SCSI IDs managed
1	Optional long SCSI cable	0, 1
2	Optional long SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

Refer to "Installing the SCSI terminator board (on page 58)" for SCSI terminator board installation procedures.

Mixed duplex SCSI cabling

In the mixed duplex SCSI cabling configuration, an optional PCI array controller controls up to six hard drives through two SCSI buses: one bus with up to two drives and one bus with up to four drives. Two configuration options are available for mixed duplex SCSI cabling.

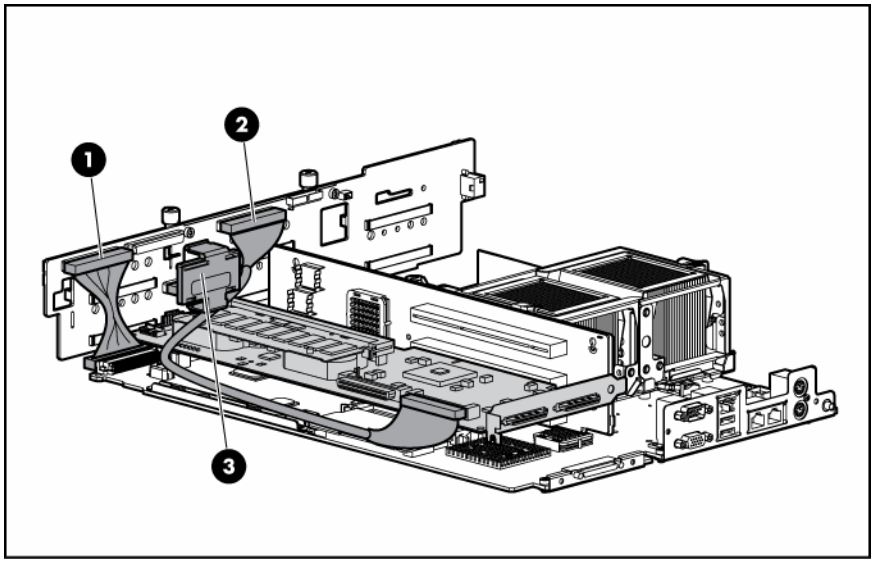
NOTE: This specific cabling configuration does not support external VHDCI.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

Item	Component description	SCSI IDs managed
1	Optional long SCSI cable	0, 1
2	Short SCSI cable	2, 3, 4, 5
3	Optional terminator board	N/A

NOTE: This specific cabling configuration supports external VHDCI.



NOTE: Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

Item	Component description	SCSI IDs managed
1	Short SCSI cable	0, 1
2	Optional long SCSI cable	2, 3, 4, 5

Item	Component description	SCSI IDs managed
3	Optional terminator board	N/A

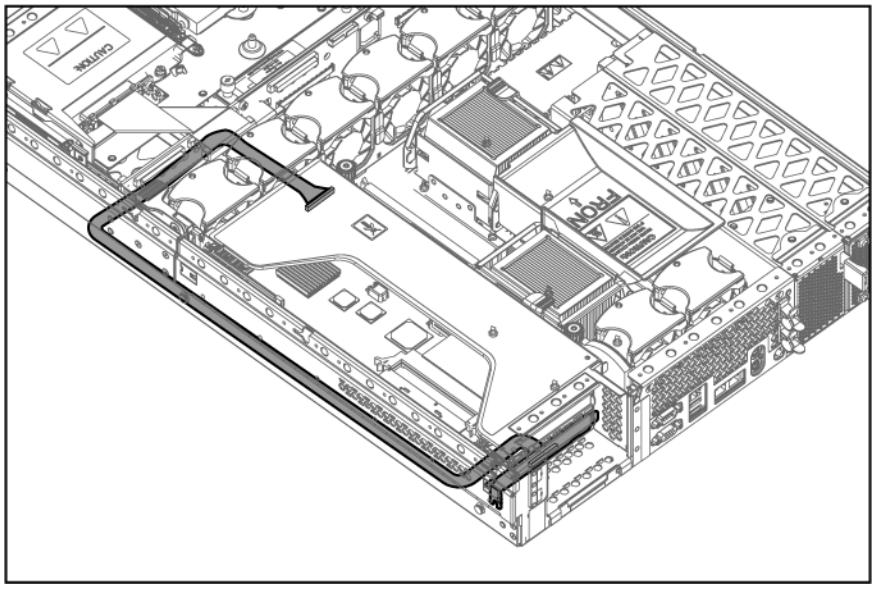
Refer to "Installing the SCSI Terminator Board (on page 58)" for SCSI terminator board installation procedures.

External simplex SCSI cabling

The external SCSI cable configuration allows the unused SCSI port on the system board to be routed externally through a PCI slot. This option is only available if the server is operating in simplex mode.

CAUTION: Always route the optional external simplex SCSI cable to avoid interference with the fan assembly or PCI riser cage installation.

CAUTION: To maintain proper airflow and to prevent thermal damage, do not block the fans with server cabling.



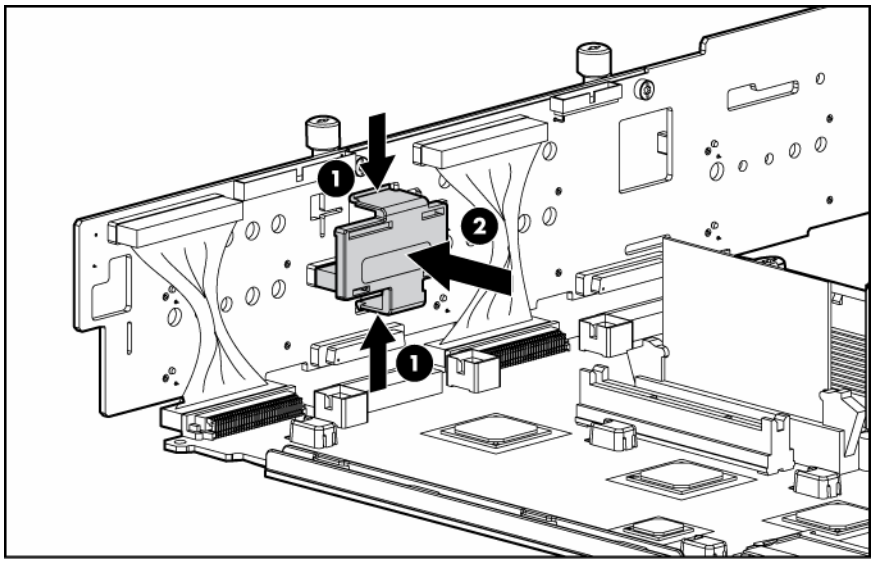
Installing the SCSI terminator board

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the front fan bracket ("Front fan bracket" on page 24).

IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

NOTE: For more information on preparing the server for installation or removal procedures, refer to the Documentation CD.

5. Install the SCSI terminator board.



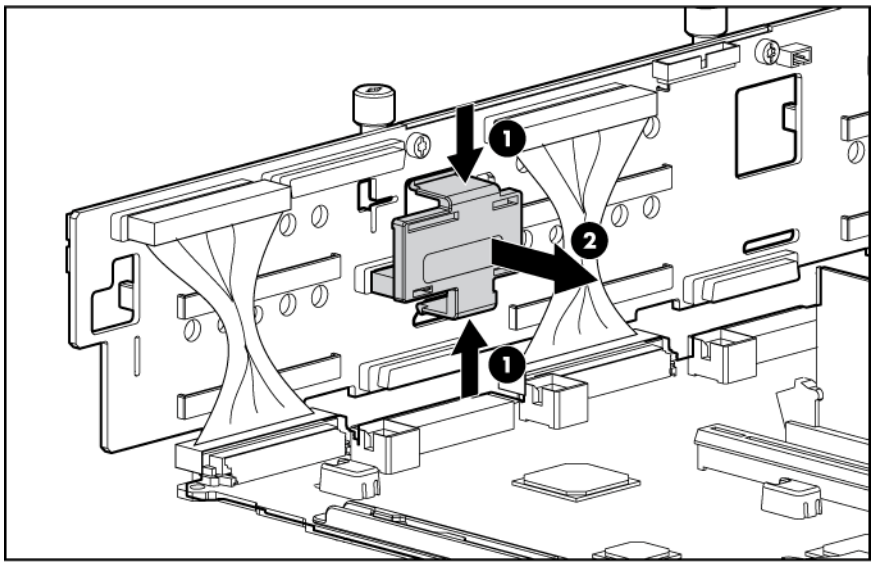
Removing the SCSI terminator board

1. Power down the server (on page 19).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 18, "Remove the server from the rack" on page 19).
3. Remove the access panel ("Access panel" on page 21).
4. Remove the front fan bracket ("Front fan bracket" on page 24).

IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

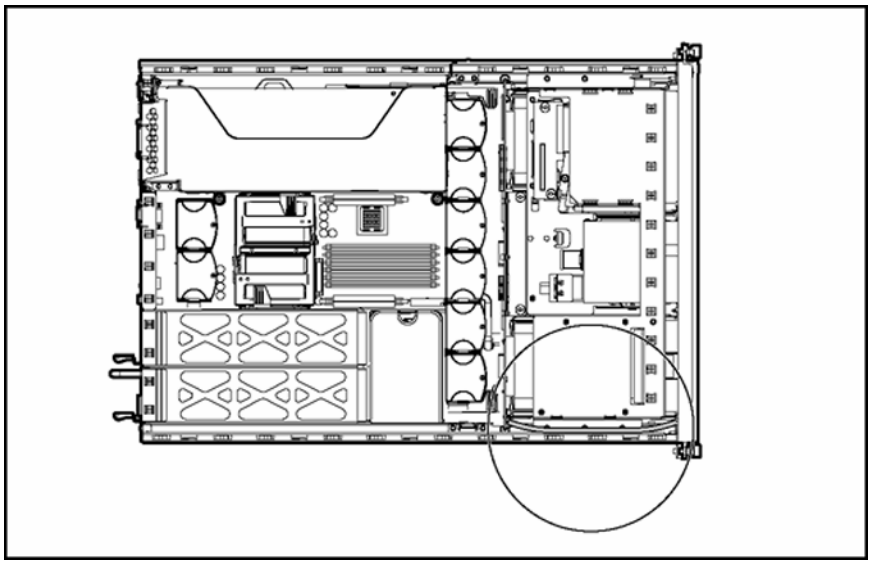
NOTE: For more information on preparing the server for installation or removal procedures, refer to the Documentation CD.

5. Remove the SCSI terminator board.

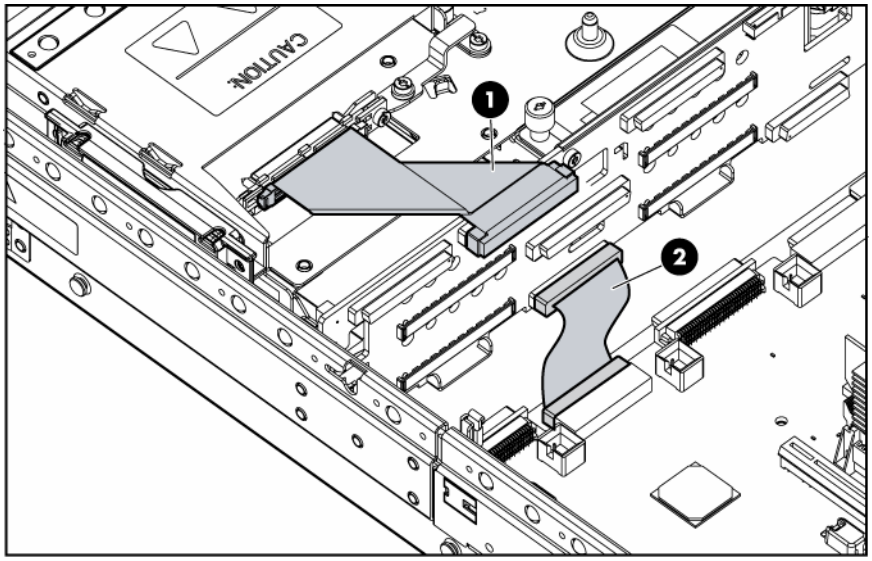


USB cabling

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

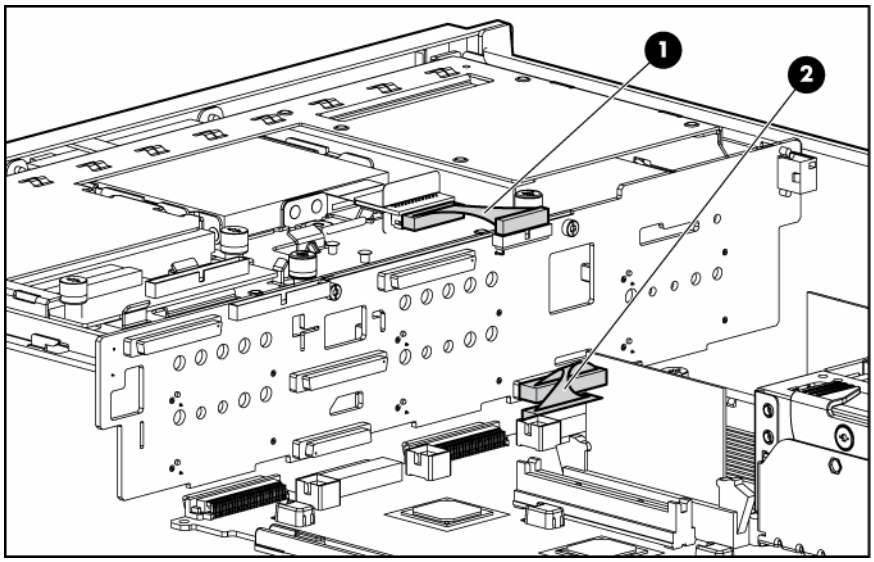


DVD/CD-ROM drive cabling



Item	Cable description
1	DVD/CD-ROM drive cable
2	DVD/CD-ROM drive system cable

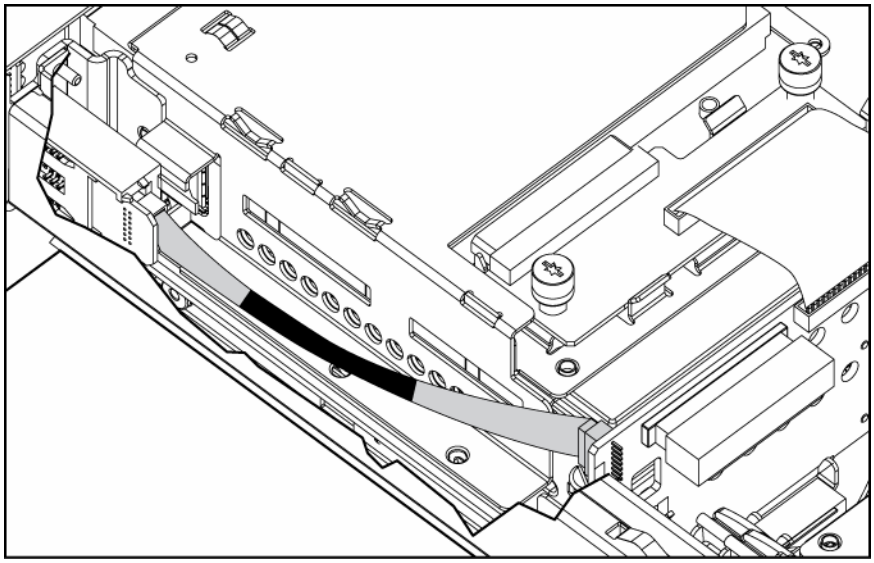
Diskette drive cabling



Item	Cable description
1	Diskette drive cable
2	Diskette drive system cable

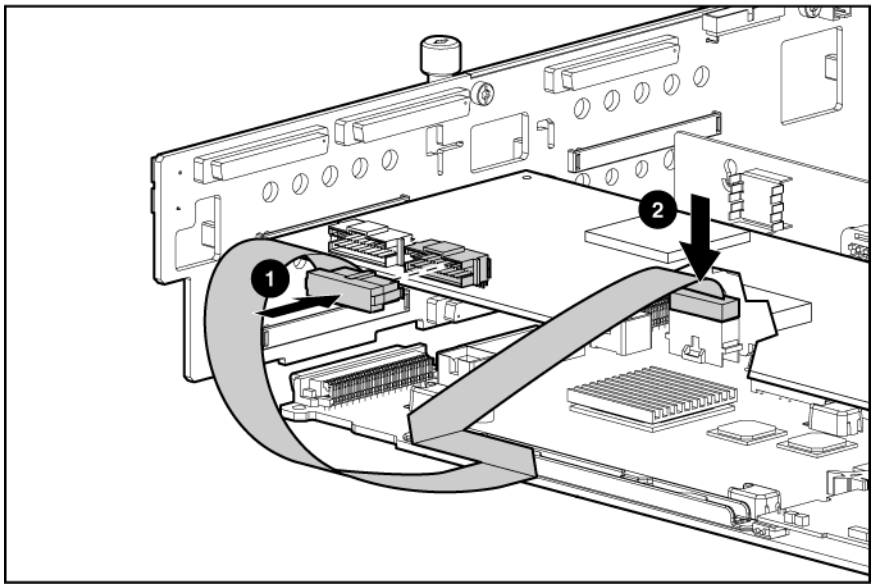
Power button/LED cabling

The power button/LED cable connects the power button/LED board to the SCSI backplane.

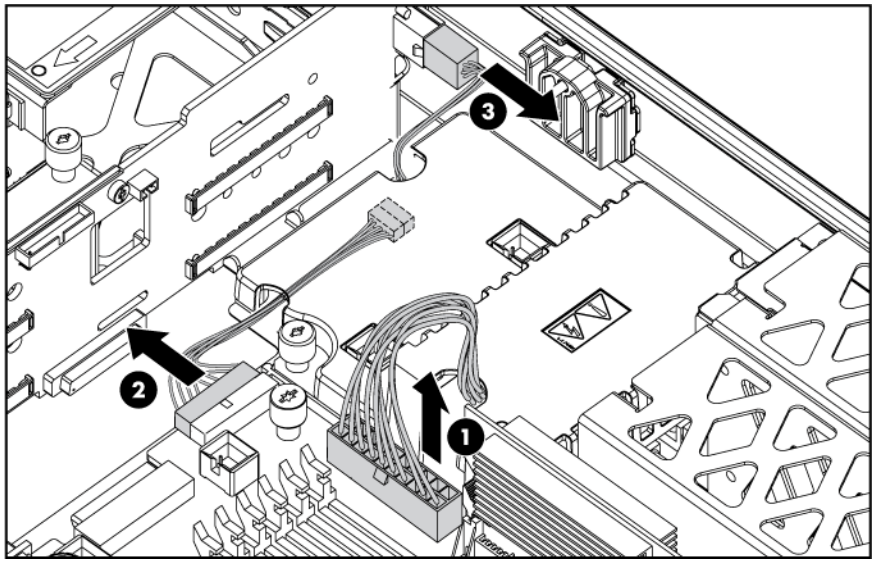


RILOE cabling (SCSI)

The 30-pin Remote Insight cable ships with the RILOE II cable kit. For more information, refer to the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



Internal power cabling



Item	Description
1	System power cable
2	Power supply signal cable
3	SCSI power cable

Diagnostic tools

In this section

Troubleshooting resources

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). Navigate to the server technical support page. Under self-help resources, select **ProLiant Troubleshooting Guide**.
- The Technical Documentation website (http://www.docs.hp.com). Select **Enterprise Servers, Workstations and Systems Hardware,** and then the appropriate server.

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.

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, SAS and SCSI 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).

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 Systems Insight Manager" on page 64)
- From within Survey Utility
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows®: IML Viewer
  - For Linux: IML Viewer Application
- From within the iLO user interface
- From within HP Insight Diagnostics (on page 66)

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

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 iLO documentation on the Documentation CD or on the HP website (http://www.hp.com/servers/lights-out).

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.

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).

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).

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 ("HP Insight Diagnostics" on page 66)

- 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, Array Diagnostic Utility, and Erase Utility

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).

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).

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.

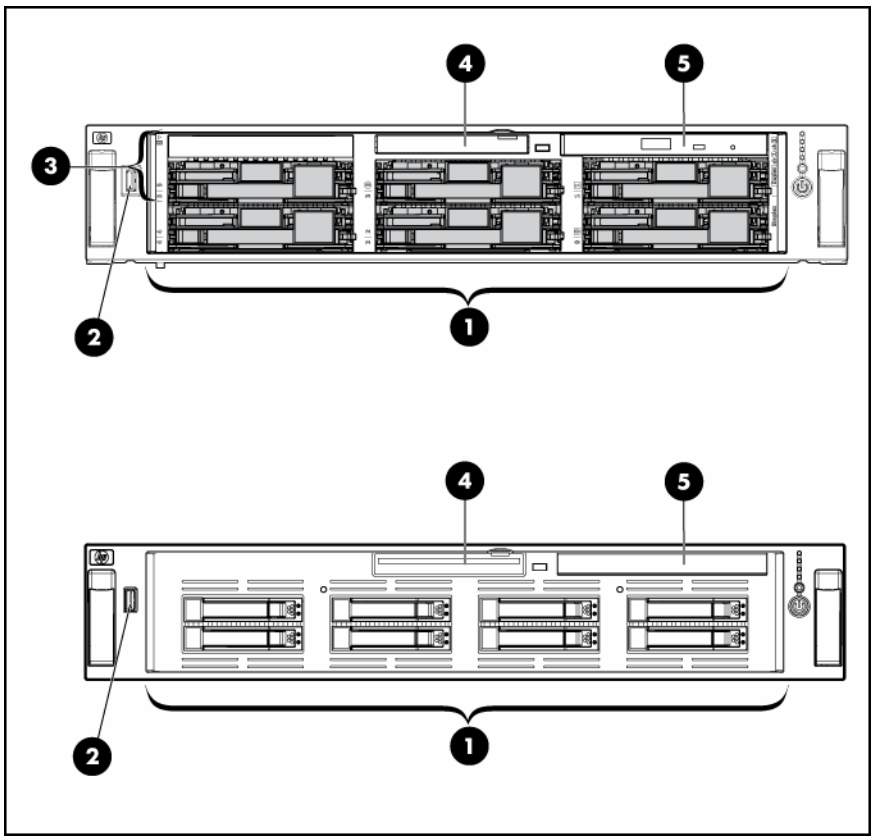
HP Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server management. Available in Microsoft® Windows® and Linux versions, the utility helps to ensure proper system operation.

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

Server component identification

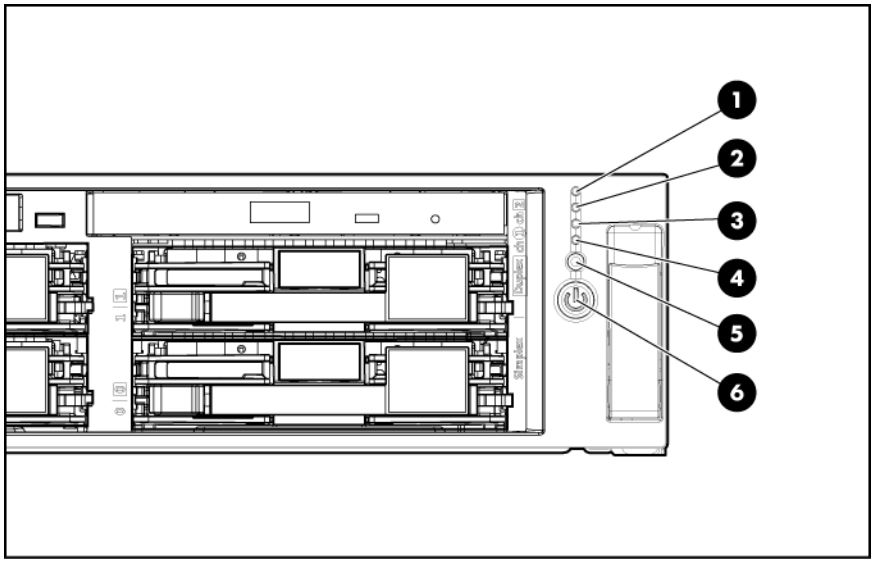
In this section

Front panel components



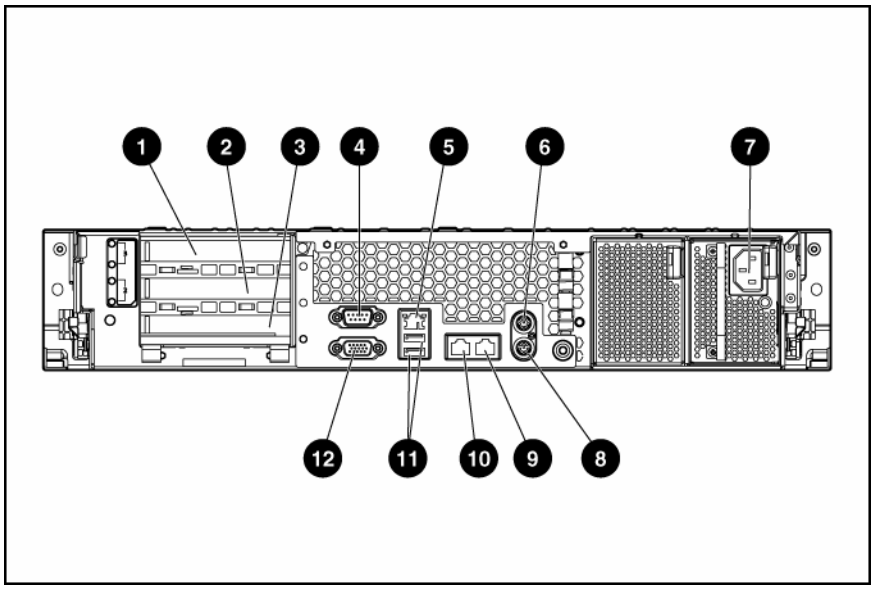
Item	SCSI model (top)	SAS model (bottom)
1	Hard drive bays	Hard drive bays
2	USB port	USB port
3	Bay for tape drive or hard drive with tape drive blank	—
4	Diskette drive bay	Diskette drive bay
5	DVD/CD-ROM drive	DVD/CD-ROM drive

Front panel LEDs and buttons



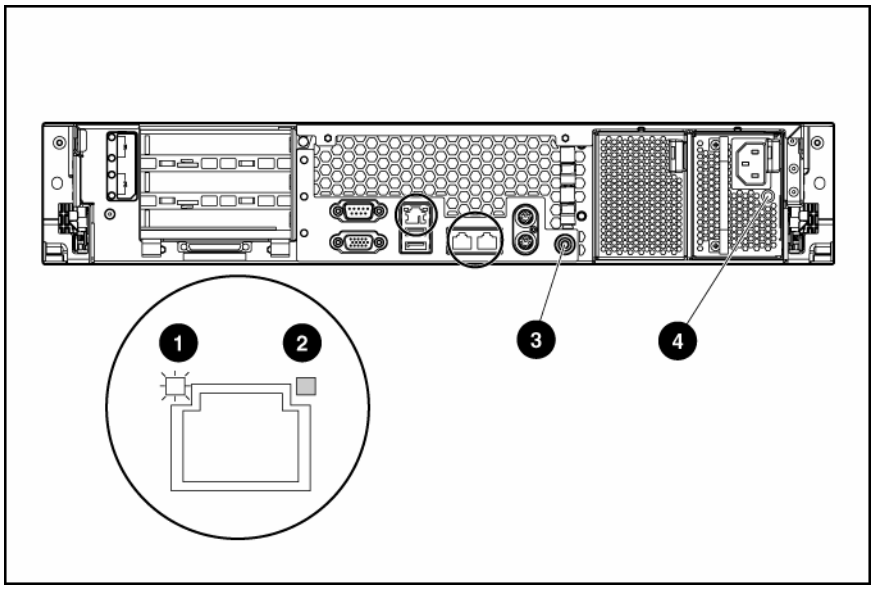
Item	Description	Status
1	Internal health LED	Green = Normal Amber (flashing) = System degraded. Refer to system board LEDs to identify component in degraded state. Red (flashing) = System critical. Refer to system board LEDs to identify component in critical state.
2	External health LED (power supply)	Green = Normal Amber (flashing) = Power redundancy failure Red (flashing) = Critical power supply failure
3	NIC 1 link/activity LED	Green = Network link Green (flashing) = Network link and activity Off = No link to network. If power is off, view the rear panel RJ-45 LEDs for status.
4	NIC 2 link/activity LED	Green = Network link Green (flashing) = Network link and activity Off = No link to network. If power is off, view the rear panel RJ-45 LEDs for status.
5	UID LED button	Blue = Activated Blue (flashing) = System being remotely managed Off = Deactivated
6	Power On/Standby button/system power LED	Green = System on Amber = System shut down, but power still applied Off = Power cord not attached or power supply failure

Rear panel components



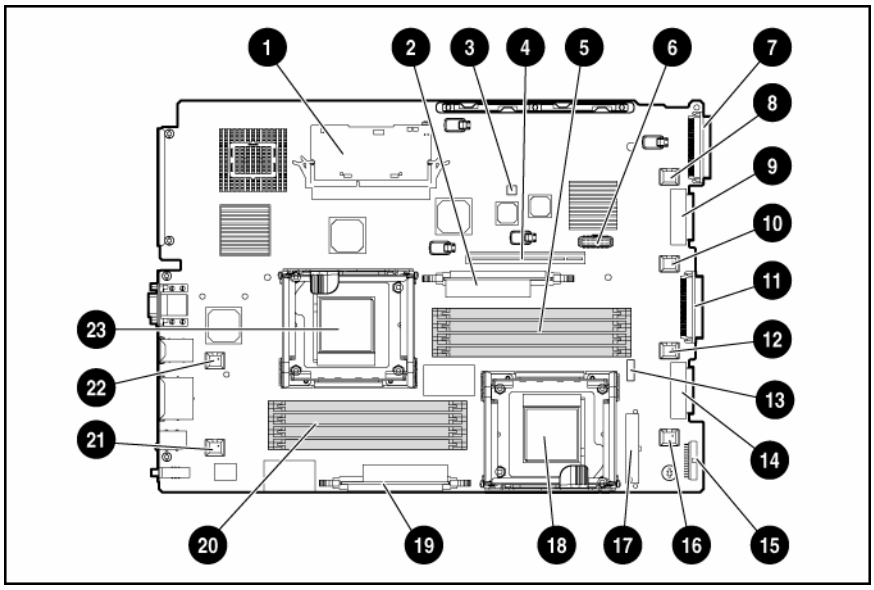
Item	Description	Connector color
1	PCI-X expansion slot 1, 64 bit/100 MHz, Bus A	N/A
2	PCI-X expansion slot 2, 64 bit/100 MHz, Bus A	N/A
3	PCI-X expansion slot 3, 64 bit/133 MHz, Bus B	N/A
4	Serial connector	Teal
5	iLO connector	N/A
6	Mouse connector	Green
7	Power cord connector	N/A
8	Keyboard connector	Purple
9	NIC 1 connector	N/A
10	NIC 2 connector	N/A
11	USB connectors (2)	Black
12	Video connector	Blue

Rear panel LEDs and buttons



Item	Description	LED color	Status
1	RJ-45 activity LED	Green	On or flashing = Network activity Off = No network activity
2	RJ-45 link LED	Green	On = Linked to network Off = Not linked to network
3	UID LED button	Blue	On = Activated Flashing = System remotely managed Off = Deactivated
4	Power supply LED	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit

System board components



Item	Description
1	Smart Array 6i Cache Module Option
2	PPM for processor 1
3	NMI header
4	PCI riser cage connector
5	DIMM slots (5-8)
6	Remote management connector
7	SCSI connector (port 2)
8	Fan connector
9	DVD/CD-ROM drive system connector
10	Fan connector
11	SCSI connector (port 1)
12	Fan connector
13	System maintenance switch
14	Diskette drive system connector
15	Power supply signal connector
16	Fan connector
17	System power connector
18	Processor socket 2
19	PPM for processor 2
20	DIMM slots (1-4)
21	Fan connector
22	Fan connector
23	Processor socket 1

System maintenance switch

Position	Default	Function
S1	Off	Off = iLO security is enabled. On = iLO security is disabled.
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = No function On = Clears power-on password and administrator password
S6	Off	Off = No function On = Clear NVRAM.
S7	Off	Reserved
S8	Off	Reserved

When the system maintenance switch position 6 is set to the On position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM.

△ **CAUTION:** Clearing CMOS and/or NVRAM deletes configuration information. Be sure to properly configure the server or data loss could occur.

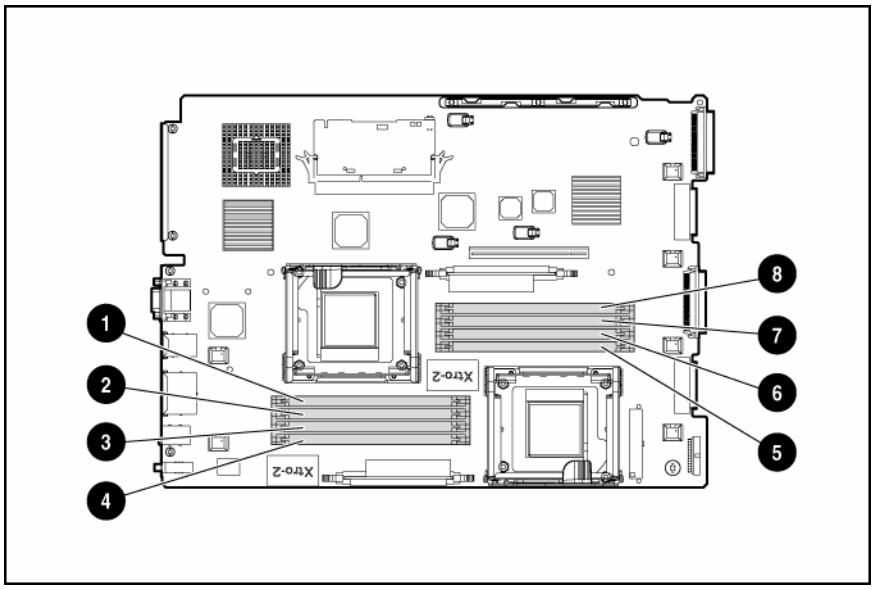
NMI jumper

The NMI jumper allows administrators to perform a memory dump before performing a hard reset. Crash dump analysis is an essential part of eliminating reliability problems, such as hangs or crashes in OSs, device drivers, and applications. Many crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that would support root cause analysis.

Systems running Microsoft® Windows® experience a blue-screen trap when the OS crashes. When this happens, Microsoft® recommends that system administrators perform an NMI event by temporarily shorting the NMI header with a jumper. The NMI event enables a hung system to become responsive again.

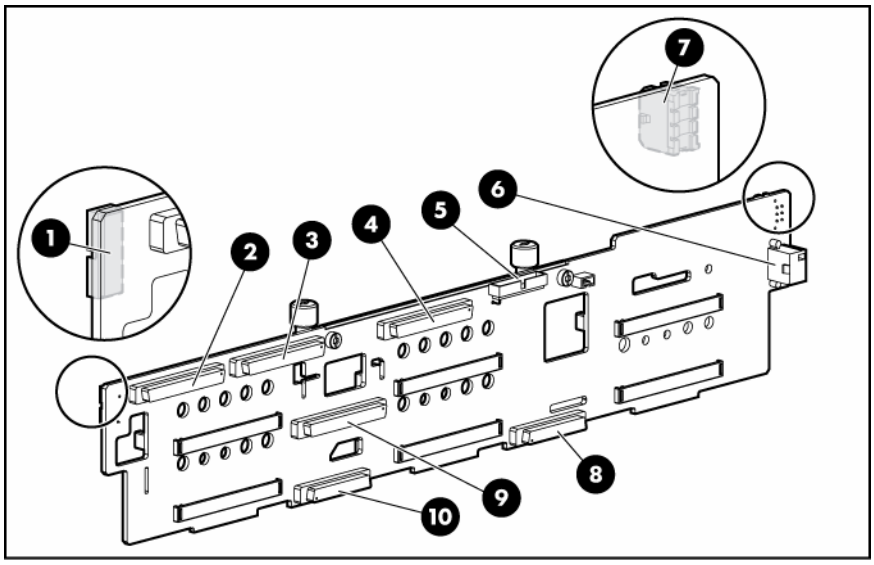
DIMM slots

DIMM slots are numbered sequentially (1 through 8) and the paired banks are identified by the letters A, B, C, and D.



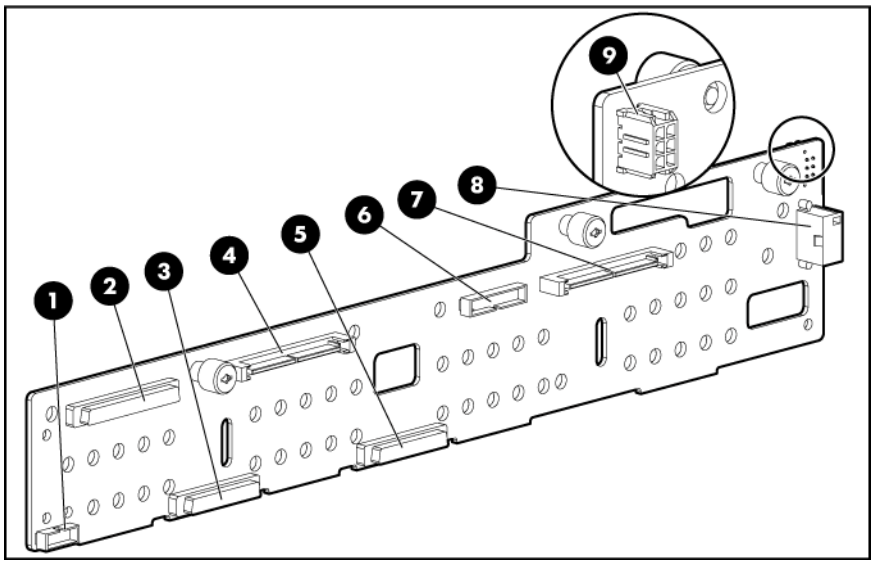
Item	Description
1	DIMM slot 1A
2	DIMM slot 2A
3	DIMM slot 3B
4	DIMM slot 4B
5	DIMM slot 5C
6	DIMM slot 6C
7	DIMM slot 7D
8	DIMM slot 8D

SCSI backplane components



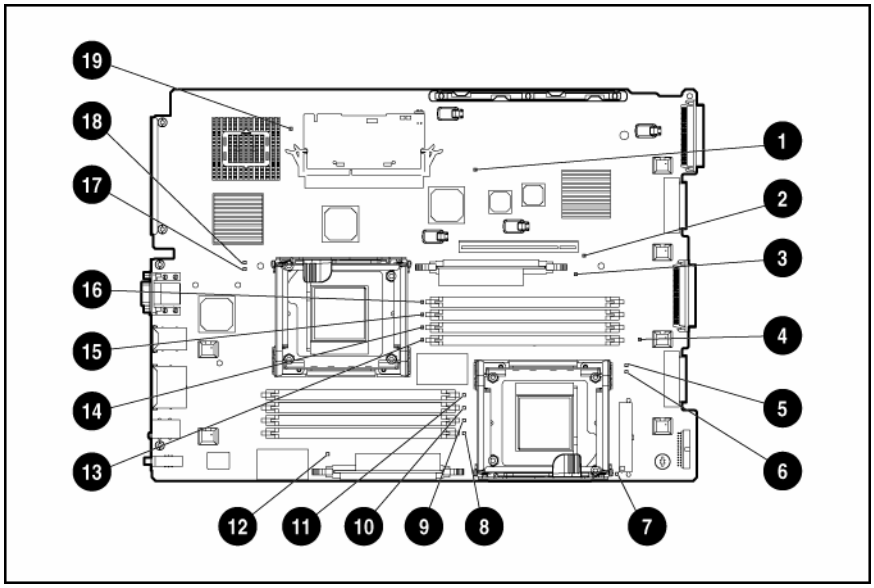
Item	Description
1	Power button/LED connector
2	SCSI connector (port 2)
3	DVD/CD-ROM drive connector
4	SCSI connector (port 1)
5	Diskette drive connector
6	Power connector
7	USB connector
8	Diskette drive system connector
9	SCSI connector (used with a jumper cable in simplex mode or terminator board in duplex mode)
10	DVD/CD-ROM drive system connector

SAS backplane components



Item	Description
1	Power button/LED connector
2	DVD/CD-ROM drive connector
3	DVD/CD-ROM drive system connector
4	SAS connector
5	Diskette drive system connector
6	Diskette drive connector
7	SAS connector
8	Power connector
9	USB connector

System board LEDs



Item	LED description	Status
1	Power good	Green = Normal Off = Power failure
2	Riser interlock	Amber = PCI riser cage not seated Off = PCI riser cage is seated
3	PPM 1 failure	Amber = PPM failure Off = Normal
4	System overtemperature	Amber = Cautionary or critical temperature level detected Off = Temperature OK
5	Processor 2 overtemperature	Amber = Cautionary or critical temperature level detected Off = Temperature OK
6	Processor 2 failure	Amber = Processor failure Off = Normal
7	Auxiliary power good	Green = Normal Off = Power failed
8	DIMM 4B failure	Amber = Memory failure Off = Normal
9	DIMM 3B failure	Amber = Memory failure Off = Normal
10	DIMM 2A failure	Amber = Memory failure Off = Normal
11	DIMM 1A failure	Amber = Memory failure Off = Normal
12	PPM 2 failure	Amber = PPM failure Off = Normal
13	DIMM 5C failure	Amber = Memory failure Off = Normal
14	DIMM 6C failure	Amber = Memory failure Off = Normal
15	DIMM 7D failure	Amber = Memory failure Off = Normal
16	DIMM 8D failure	Amber = Memory failure Off = Normal
17	Processor 1 failure	Amber = Processor failure Off = Normal
18	Processor 1 overtemperature	Amber = Cautionary or critical temperature level detected Off = Temperature OK
19	SCSI failure*	Amber = SCSI interface failure Off = Normal

*This feature applies only to SCSI models.

System LEDs and internal health LED combinations

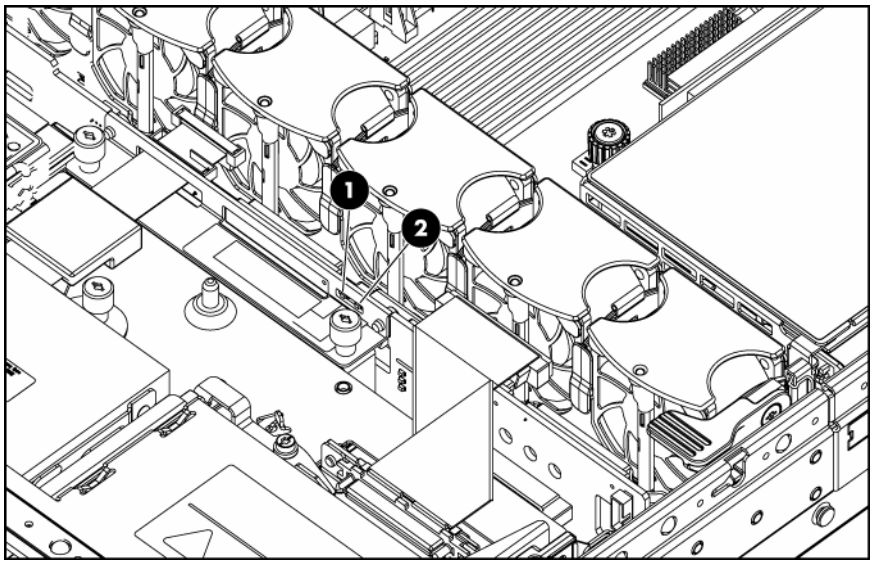
When the internal health LED on the front panel illuminates either amber or red, the server is experiencing a health event. Combinations of illuminated system LEDs and the internal health LED indicate system status.

The front panel health LEDs indicate only the current hardware status. In some situations, HP SIM ("HP Systems Insight Manager" on page 64) may report server status differently than the health LEDs because the software tracks more system attributes.

System LED and color	Internal Health LED color	Status
Processor failure, socket *X* (amber)	Red (flashing)	One or more of the following conditions may exist: • Processor in socket *X* has failed. • Processor *X* is not installed in the socket. • Processor *X* is unsupported. • ROM detects a failed processor during POST.
	Amber (flashing)	Processor in socket *X* is in a pre-failure condition.
PPM failure, slot *X* (amber)	Red (flashing)	• PPM in slot *X* has failed. • PPM is not installed in slot *X*, but the corresponding processor is installed.
DIMM failure, slot *X* (amber)	Red (flashing)	• DIMM in slot *X* has failed.
	Amber (flashing)	• DIMM in slot *X* is in a pre-failure condition.
DIMM failure, all slots in one bank (amber)	Red (flashing)	No valid or usable memory is installed in the system.
Overtemperature (amber)	Red (flashing)	• The Health Driver has detected a cautionary temperature level. • The server has detected a hardware critical temperature level.
Riser interlock (amber)	Red (flashing)	PCI riser cage is not seated.
Power converter module (amber)	Red (flashing)	Power converter module has failed.
Fan (amber)	Amber (flashing)	Redundant fan has failed.
	Red (flashing)	The minimum fan requirements are not being met. One or more fans have failed or are missing.
SCSI configuration error (amber) *	Red (flashing)	SCSI cabling or terminator configuration is incorrect for SCSI backplane.

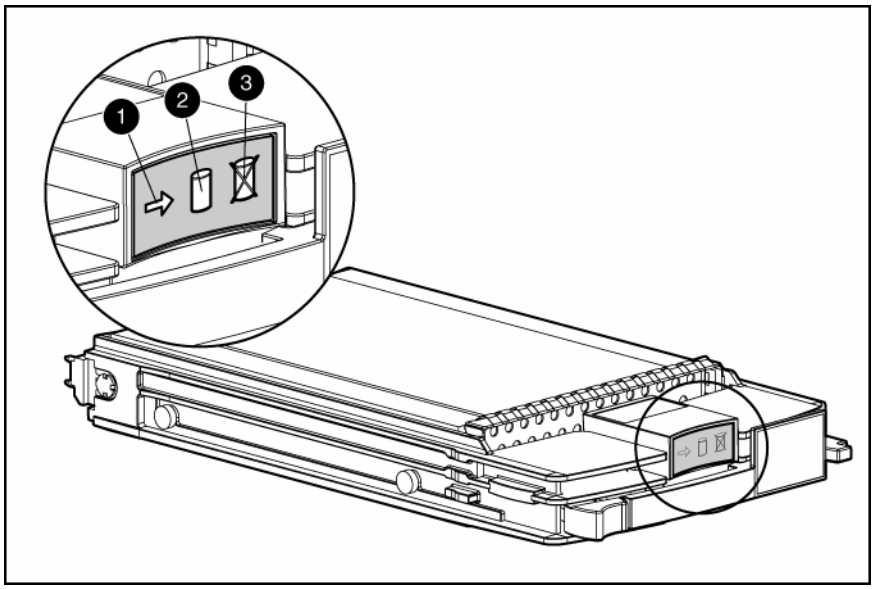
*This feature applies only to SCSI models.

SCSI backplane LEDs



Item	LED description	Status
1	SCSI configuration	On = Simplex Off = Duplex
2	SCSI configuration error	On = SCSI cabling or terminator configuration is incorrect Off = SCSI cabling or terminator configuration is correct

Hot-plug SCSI hard drive LEDs



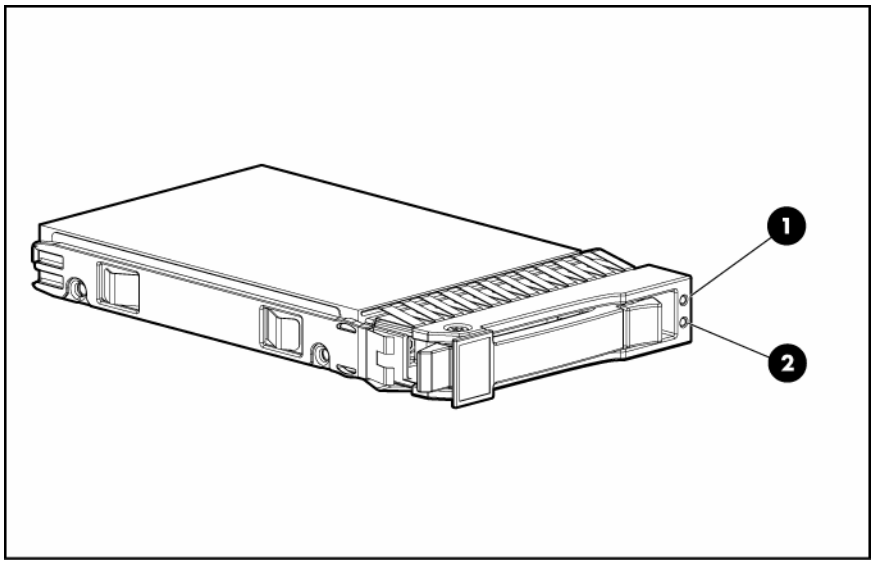
Item	LED description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is 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	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** The drive is rebuilding or undergoing capacity expansion.
On	Off	Off	**Do not remove the drive.** 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.
Flashing	Flashing	Flashing	**Do not remove the drive. Removing a drive may cause data loss in non-fault-tolerant configurations.** One or more of the following conditions may exist: • The drive is part of an array being selected by an array configuration utility • Drive Identification has been selected in HP SIM • The drive firmware is being updated
Off	Off	On	The drive has been placed offline due to hard disk drive failure or subsystem communication failure. You may need to replace the drive.

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
Off	Off	Off	One or more of the following conditions may exist: • The drive is not configured as part of an array • The drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet • The drive is configured as an online spare If the drive is connected to an array controller, you may replace the drive online.

Hot-plug SAS hard drive LEDs



Item	Description
1	Fault/UID LED (amber/blue)
2	Online LED (green)

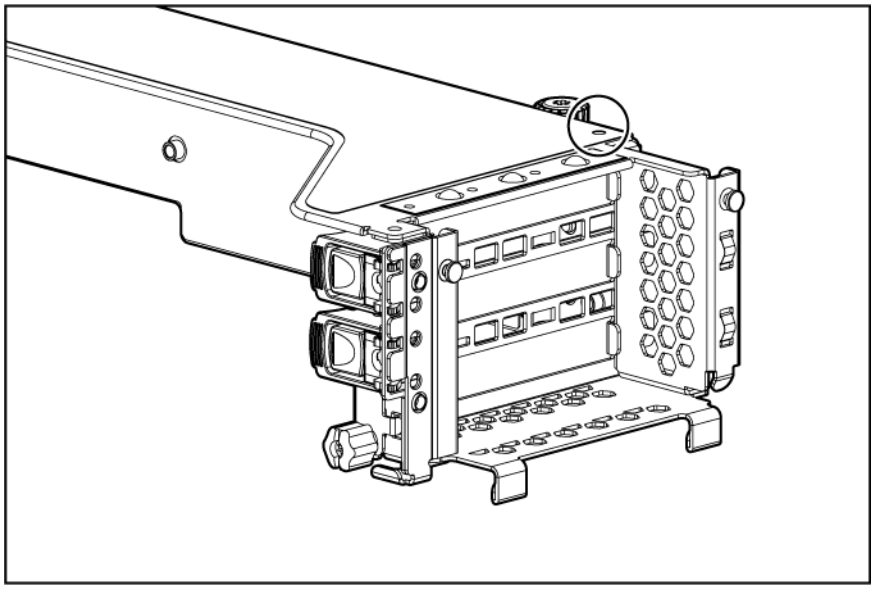
Hot-plug SAS hard drive LED combinations

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.

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
Flashing regularly (1 Hz)	Amber, flashing regularly (1 Hz)	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not replace the drive until the expansion or migration is complete.
Flashing regularly (1 Hz)	Off	**Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.** 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.
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.

PCI riser cage LED

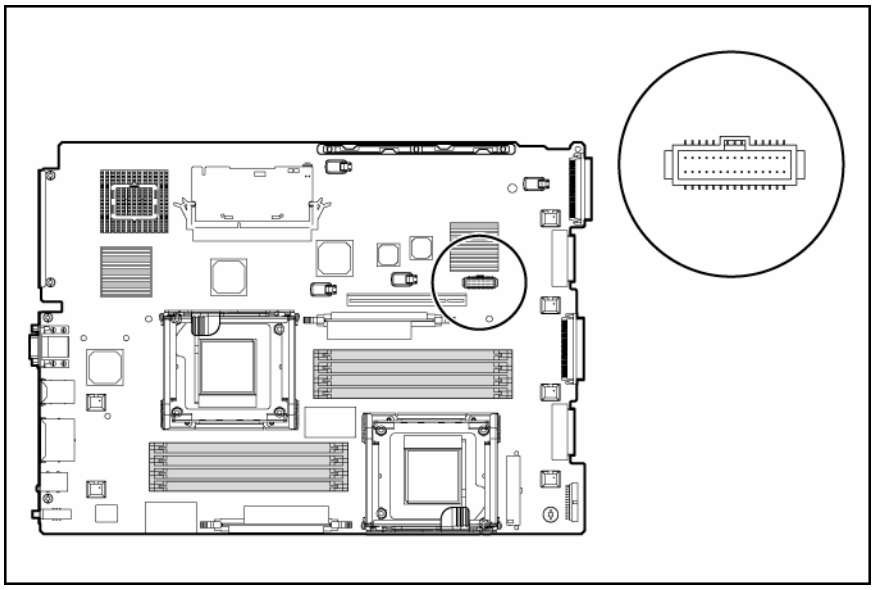
△ **CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the expansion boards.



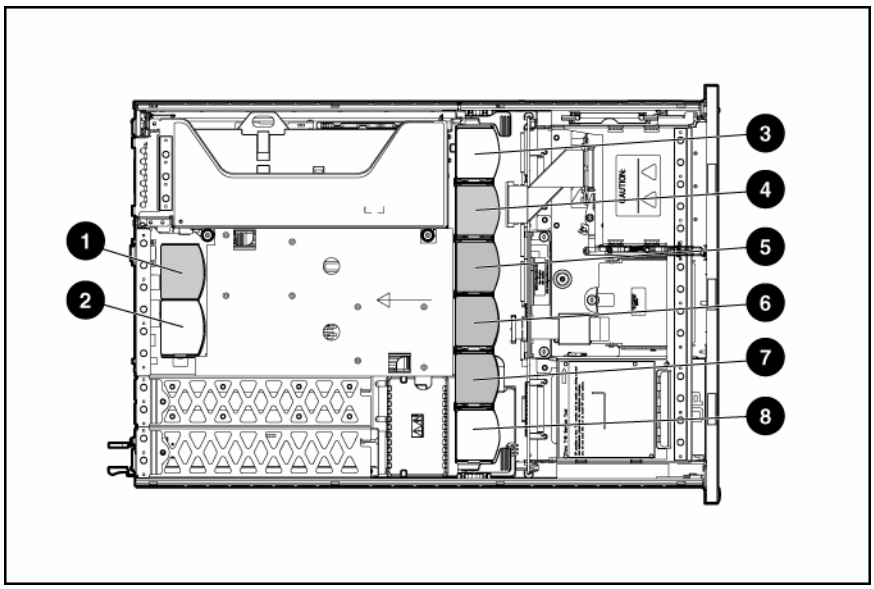
Status
On = AC power connected
Off = AC power disconnected

Remote management connector

The 30-pin remote management connector, located on the system board, is used to cable the RILOE II option. For more information, refer to "SAS RILOE II Cabling ("RILOE cabling (SAS)" on page 52)," "SCSI RILOE II Cabling ("RILOE cabling (SCSI)" on page 62)," or the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



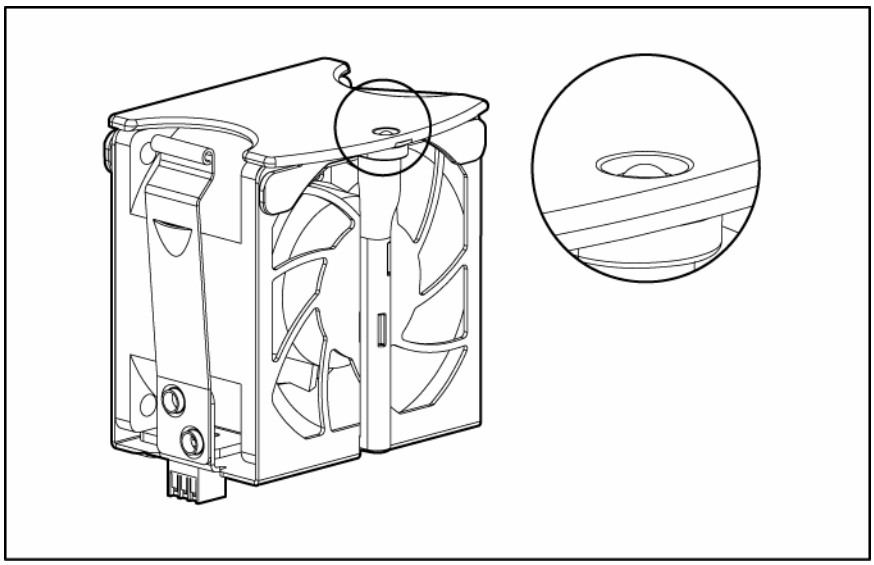
Identifying hot-plug fans



Item	Description	Configuration
1	Fan 1	Primary
2	Fan 2	Redundant
3	Fan 3	Redundant
4	Fan 4	Primary
5	Fan 5	Primary

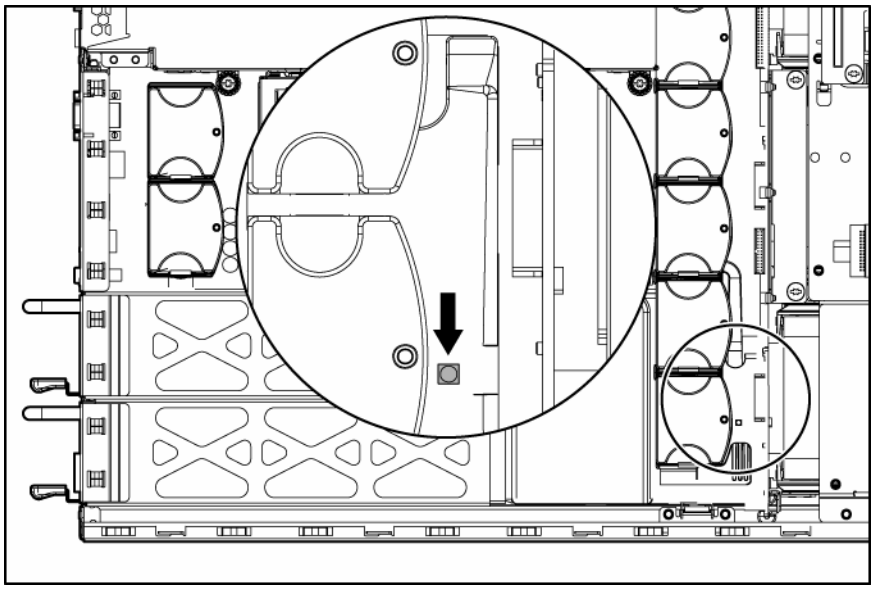
Item	Description	Configuration
6	Fan 6	Primary
7	Fan 7	Primary
8	Fan 8	Redundant

Hot-plug fan LED



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

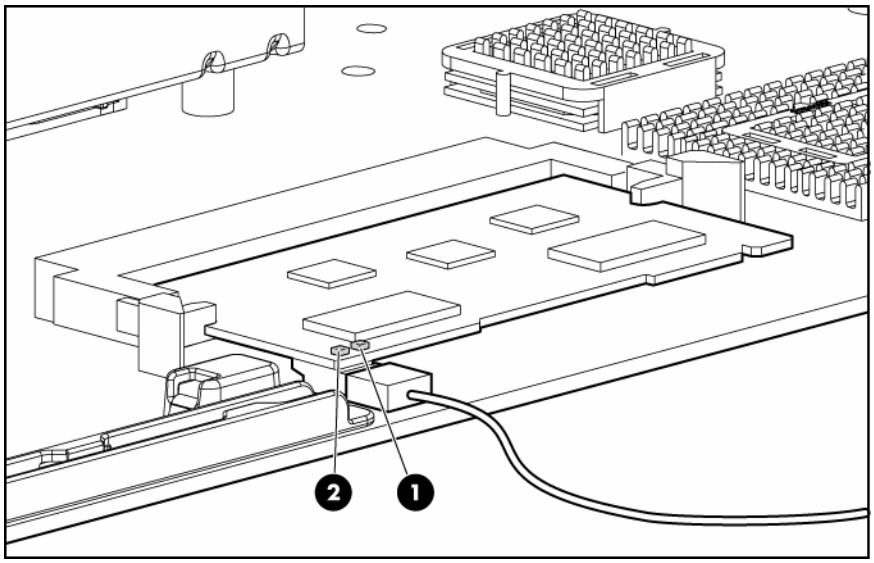
Power converter module LED



Status
Amber = Failed
Off = Operating normally

Battery-backed write cache LEDs

NOTE: This feature applies only to SCSI models.



Item	LED color
1	Amber
2	Green

For LED status information, refer to "Battery-backed write cache LED statuses (on page 85)."

Battery-backed write cache LED statuses

NOTE: This feature applies only to SCSI models.

Server status	LED status	Battery module status
Server is on and has normal run time	Green = On	Fast charging
	Green = Flashing	The microcontroller is waiting for communication from the host controller.
	Green = Off	The battery is fully charged.
	Amber = On	A short exists in the connection of one or more of the three button cells within the battery module.
	Amber = Flashing	An open exists in the circuit between the positive and negative terminals of the battery module.
	Amber = Off	Normal

Server status	LED status	Battery module status
Server is off and is in data retention mode	Amber = Flashing every 15 seconds	User data held in the write cache is being backed up.

Specifications

In this section

Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-30°C to 50°C (-22°F to 122°F)
Storage	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
Relative humidity (noncondensing)**	
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
Dimensions	
Height	8.59 cm (3.38 in)
Depth	66.07 cm (26.01 in)
Width	44.54 cm (17.54 in)
Weight (maximum)	27.22 kg (60 lb)
Weight (no drives installed)	20.41 kg (47.18 lb)
Input requirements	

Specification	Value
Rated input voltage	100 to 132 VAC, 200 to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	7.5 A (100 VAC), 3.8 A (200 VAC)
Rated input power	735 W
BTUs per hour	2508
Power supply output	
Rated steady-state power	575 W
Maximum peak power	575 W

Hot-plug power supply calculations

For hot-plug power supply specifications and calculators to determine electrical and heat loading for the server, refer to the HP Enterprise Configurator website (http://h30099.www3.hp.com/configurator/).

DDR1 SDRAM DIMM specifications

CAUTION: Be sure to install DIMMs in the proper configuration. Refer to the Documentation CD.

Specification	Value
Size	512 MB, 1 GB, 2 GB, 4 GB
Width	72 bits
Upgrade requirement *	Any combination of like-paired DDR1 DIMMs that provide a minimum of 512 MB

*Use only 512-MB, 1-GB, 2-GB, or 4-GB 72-bit wide, 1.8-V, PC3200 or PC2700 Registered ECC DDR1. Use HP DDR1 only.

1.44-MB diskette drive specifications

Specification	Value
Dimensions	
Height	12.7 mm (0.5 in)
Width	96 mm (3.8 in)
Depth	130 mm (5.1 in)
LEDs (front panel)	Green = On
Read/write capacity per diskette	
High density	1.44 MB
Low density	720 KB
Drives supported	1
Drive height	One-third height
Drive rotation	300 rpm

Specification	Value
Transfer rate	
High	500 Kb/s
Low	250 Kb/s
Bytes/sector	512
Sectors per track (high/low)	18/9
Tracks per side (high/low)	80/80
Access times	
Track-to-track (high/low)	3 ms/6 ms
Average (high/low)	169 ms/94 ms
Setting time	15 ms
Latency average	100 ms
Cylinders (high/low)	80/80
Read/write heads	2

CD-ROM drive specifications

Specification	Value
Disk formats	CD-ROM (modes 1 and 2); mixed mode (audio and data combined); CD-DA; Photo CD (single/multiple-session), CD-XA ready; CDi ready
Capacity	550 MB (mode 1, 12 cm)
	640 MB (mode 2, 12 cm)
Block size	2368, 2352 bytes (mode 0)
	2352, 2340, 2336, 2048 bytes (mode 1)
	2352, 2340, 2336, 2048 bytes (mode 2)
Dimensions	
Height	12.7 mm (0.50 in)
Depth	132.08 mm (5.20 in)
Width	132.08 mm (5.20 in)
Weight	0.34 kg (0.75 lb)
Data transfer rate	
Sustained	150 KB/s (sustained 1X), 1500/3600 KB/s (10X to 24X)
Burst	16.6 MB/s
Access times (typical)	
Full stroke	300 ms
Random	140 ms
Diameter	12 cm, 8 cm (4.70 in, 3.15 in)
Thickness	1.2 mm (0.05 in)
Track pitch	1.6 μm (6.3×10^{-7} in)
Cache/buffer	128 KB
Startup time	< 10 s

Specification	Value
Stop time	< 5 s (single); < 30 s (multisession)
Laser parameters	
Type	Semiconductor laser GaAs
Wave length	700 ± 25 nm
Divergence angle	53.5° ± 1.5°
Output power	0.14 mW
Operating conditions	
Temperature	5°C to 45°C (41°F to 118°F)
Humidity	5% to 90%

DVD-ROM drive specifications

Specification	Value
Disk formats	DVD (single and double layer), DVD-5, DVD-9, DVD-10, DVD-R, CD-ROM Mode 1 & 2, CD-DA, CD-XA (Mode 2, Form 1 & 2), CD-I (Mode 2, Form 1 & 2), CD-I ready, CD-Bridge, CD-R, PhotoCD (single and multi-session)
Capacity	4.7 GB (DVD-5), 8.5 GB (DVD-9), 9.4 GB (DVD10), 550 Mb (Mode 1, 12 cm), 640 Mb (Mode 2, 12 cm), 180 Mb (8 cm)
Block size	2352 bytes (mode 0) 2352, 2340, 2336, 2048 bytes (mode 1) 2352, 2340, 2336, 2048 bytes (mode 2) 2048 bytes (DVD)
Dimensions	
Height	12.7 mm (0.50 in)
Depth	132.08 mm (5.20 in)
Width	132.08 mm (5.20 in)
Weight	0.34 kg (0.75 lb)
Data transfer rate	
Sustained	4463 - 10,800 KB/s (8X CAV DVD mode), 150 KB/s (sustained 1X CD-ROM), 1552 3600 KB/s (24X CAV CD-ROM)
Burst	16.6 MB/s with DMA support
Access times (typical)	
Full stroke	<200 ms CD <300 ms DVD
Random	<110 ms CD <180 ms DVD
Diameter	12 cm, 8 cm (4.70 in, 3.15 in)
Thickness	1.2 mm (0.05 in)
Track pitch	0.74 μm (3.15 × 10^{-7} in) DVD-ROM 1.6 μm (6.3 × 10^{-7} in) CD-ROM
Cache/buffer	128 KB
Startup time	< 10 s

Specification	Value
Stop time	< 5 s (single); < 30 s (multisession)
Laser parameters	
Type	Semiconductor laser GaAs
Wave length	700 ± 25 nm
Divergence angle	53.5° ± 1.5°
Output power	0.14 mW
Operating conditions	
Temperature	5°C to 45°C (41°F to 118°F)
Humidity	5% to 90%

Ultra320 SCSI hard drive specifications

Ultra320 SCSI hard drive specifications (10 K rpm)

Item	72.8 GB	146.8 GB	300 GB
Capacity	72,837.2 MB	146,815.74 MB	300,000 MB
Height	1.0 in (One-third height)	1.0 in (One-third height)	1.0 in (One-third height)
Width	4.0 in	4.0 in	4.0 in
Interface	Ultra320 SCSI	Ultra320 SCSI	Ultra320SCSI
Transfer rate	320 MB/sec	320 MB/sec	320 MB/sec
Rotational speed	10,000 rpm	10,000 rpm	10,000 rpm
Bytes per sector	512	512	512
Logical blocks	142,264,000	286,749,488	585,937,500
Operating temperature	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)

Ultra320 SCSI hard drive specifications (15 K rpm)

Item	36.4 GB	72.8 GB	146.8 GB
Capacity	36,419.6 MB	72,837.2 MB	146,815.74 MB
Height	1.0 in (One-third height)	1.0 in (One-third height)	1.0 in (One-third height)
Width	4.0 in	4.0 in	4.0 in
Interface	Ultra320 SCSI	Ultra320 SCSI	Ultra320 SCSI
Transfer rate	320 MB/sec	320 Mb/sec	320 MB/sec
Rotational speed	15,000 rpm	15,000 rpm	15,000 rpm
Bytes per sector	512	512	512
Logical blocks	71,132,000	142,264,000	286,749,488

Item	36.4 GB	72.8 GB	146.8 GB
Operating temperature	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)

SAS and SATA hard drive specifications

Item	36-GB SAS drive	72-GB SAS drive	60-GB SATA drive
Capacity	36,420 MB	73,408 MB	60,022 MB
Height	15 mm	15 mm	9 mm
Interface	SAS	SAS	Serial ATA
Transfer rate	3 GB/sec	3 GB/sec	1.5 GB/sec
Rotational speed	10,000 rpm	10,000 rpm	5,400 rpm
Bytes per sector	512	512	512
Logical blocks	71,132,960	143,374,737	117,231,408
Operating temperature	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)	10°C to 35°C (50°F to 95°F)

Acronyms and abbreviations

ABEND

abnormal end

ASR

Automatic Server Recovery

BBWC

battery-backed write cache

BIOS

Basic Input/Output System

DDR

double data rate

DIMM

dual inline memory module

IDE

integrated device electronics

iLO

Integrated Lights-Out

IML

Integrated Management Log

LED

light-emitting diode

NMI

non-maskable interrupt

NVRAM

non-volatile memory

ORCA

Option ROM Configuration for Arrays

PCI

peripheral component interface

PCI Express

Peripheral Component Interconnect Express

PCI-X

peripheral component interconnect extended

POST

Power-On Self Test

PPM

processor power module

RBSU

ROM-Based Setup Utility

RDP

Remote Desktop Protocol

RILOE II

Remote Insight Lights-Out Edition II

SAS

serial attached SCSI

SATA

serial ATA

SCSI

small computer system interface

SDRAM

synchronous dynamic RAM

SNMP

Simple Network Management Protocol

UID

unit identification

USB

universal serial bus

VHDCI

very high density cable interconnect

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