# HP ProLiant DL380 Generation 4 Server Maintenance and Service Guide

March 2006 (Seventh Edition)
Part Number 359226-007

March 2006 (Seventh Edition)

Part Number 359226-007

## 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.

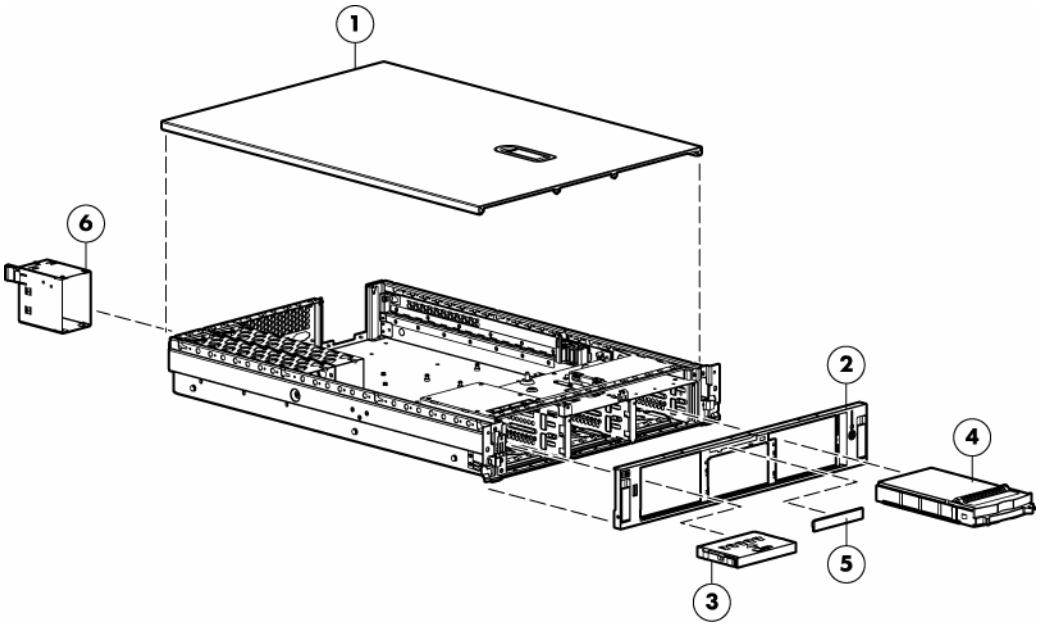
A convenient, easy-to-use program:

- 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).

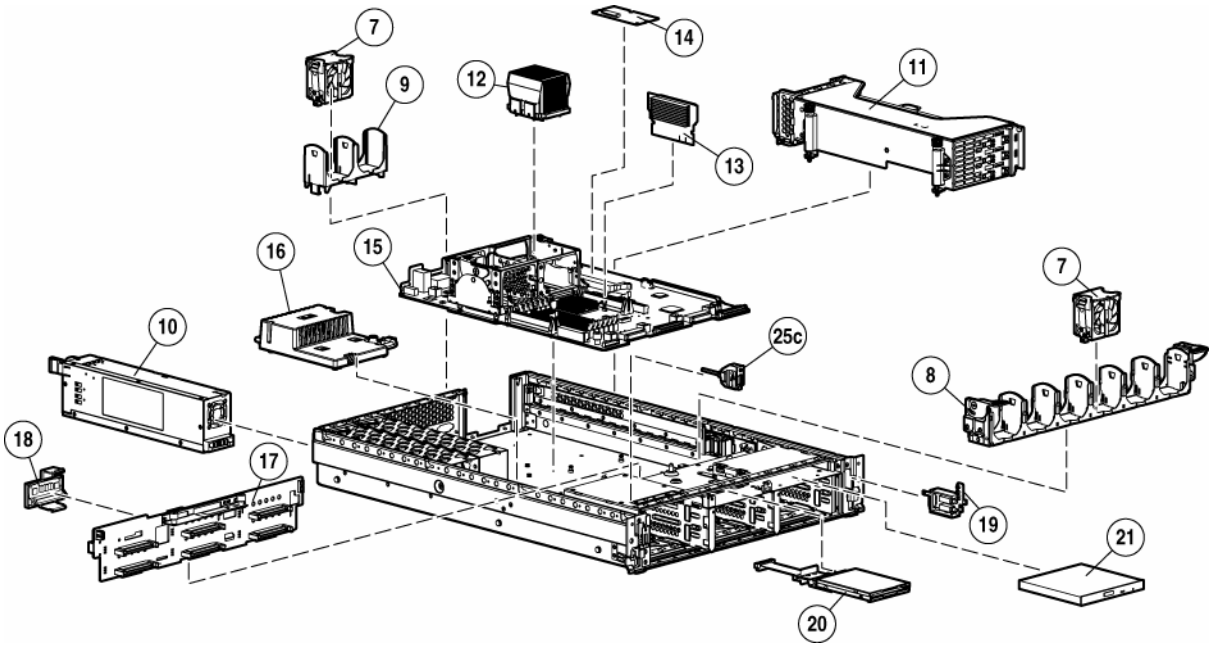
Customer replaceable parts are identified in the following tables.

# Mechanical components (SCSI model)




| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| 1 | Access panel | 359244-001 | — | Yes |
| 2 | Front bezel | 359245-001 | — | Yes |
| 3 | Tape drive blank | 367666-001 | — | Yes |
| 4 | Hard drive blank | 122759-001 | — | Yes |
| 5 | Diskette drive slot cover (see "Plastics Kit," Item 28k) | — | — | |
| 6 | Power supply blank | 359246-001 | — | Yes |

# System components (SCSI model)




| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| | **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 | 289558-001 | — | Yes |
| 10 | Hot-plug power supply, 400 W | 338022-001‡ See requirement | 406393-001 | Yes |
| 11 | PCI riser cages | — | — | — |
| | a) PCI riser cage, with non-hot-plug PCI-X (standard) | 359248-001‡ See requirement | 411020-001 | Yes |
| | b) PCI riser cage, with non-hot-plug PCI Express (optional)* | 359259-001‡ See requirement | 411021-001 | Yes |
| | c) PCI riser cage, with PCI-X hot-plug (optional)* | 359260-001‡ See requirement | 411022-001 | Yes |
| 12 | Processor assemblies | — | — | — |
| | a) 3.0-GHz Intel® Xeon™ 1-MB L2 cache* ** | 378006-001 | — | Yes |
| | b) 3.2-GHz Intel® Xeon™ 1-MB L2 cache* ** | 374233-001 | — | Yes |
| | c) 3.4-GHz Intel® Xeon™ 1-MB L2 cache* ** | 364757-001 | — | Yes |
| | d) 3.6-GHz Intel® Xeon™ 1-MB L2 cache* ** | 364758-001 | — | Yes |

| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| | e) 2.8-GHz Intel® Xeon™ 2-MB L2 cache* ** | 399132-001 | — | Yes |
| | f) 3.0-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379427-001 | — | Yes |
| | g) 3.0-GHz Intel® Xeon™ 2-MB L2 cache LV* ** | 399764-001 | — | Yes |
| | h) 3.2-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379428-001 | — | Yes |
| | i) 3.4-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379429-001 | — | Yes |
| | j) 3.6-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379430-001 | — | Yes |
| | k) 3.8-GHz Intel® Xeon™ 2-MB L2 cache* ** | 399133-001 | — | Yes |
| | l) 2.83-GHz Intel® Xeon™ dual core, 1066-MHz FSB, 4-MB cache (for use with dual-core processor SCSI system board assembly number 012863-001 only)* ** | 403934-001 | — | Yes |
| | **Boards** | | | |
| 13 | PPM, 12 V, 81 A | 347884-001 | — | Yes |
| 14 | Smart Array 6i memory module | 351518-001 | — | Yes |
| 15 | System board | — | — | — |
| | a) System board, single-core processor support, with processor cages and system battery | 359251-001‡ See requirement | 411019-001 | Yes |
| | b) System board, dual-core processor support, SCSI, with processor cages and system battery (for use with Intel® Xeon™ dual-core processor only)* | 404715-001‡ See requirement | 411028-001 | Yes |
| 16 | Power converter module | 361667-001‡ See requirement | 406395-001 | Yes |
| 17 | SCSI backplane, 6 bay | 359253-001‡ See requirement | 411023-001 | Yes |
| 18 | SCSI terminator | 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) | 289550-001‡ See requirement | 399311-001 | Yes |

| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| 21 | CD-ROM drive, removable slimline, IDE, 24X | 228508-001‡ See requirement | 399401-001 | Yes |
| 22 | DVD-ROM drive, removable slimline, 8X* | 268795-001‡ See requirement | 397928-001 | Yes |
| | **Cables** | | | |
| 23 | 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 |
| 24 | Signal cable kit* | 228518-001 | — | — |
| | a) Power button/LED board cable, 14 pin | — | — | Yes |
| | b) PCI hot-plug LED board cable | — | — | Yes |
| 25 | Miscellaneous cable kit | 366063-001 | — | — |
| | a) Diskette drive cable* | — | — | Yes |
| | b) CD multibay adaptor cable* | — | — | Yes |
| | c) USB cable and connector | — | — | Yes |
| | **Rack mounting hardware** | | | |
| 26 | 2U Quick Deploy Rail System* | 359254-001 | — | Yes |
| | **Miscellaneous** | | | |
| 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 0.134 in | — | — | Yes |
| | h) Battery clip | — | — | Yes |
| | i) PCI card guide retainer | — | — | Yes |
| | j) Thumbscrew knob | — | — | Yes |
| | k) Diskette drive cover slot | — | — | Yes |

| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| 29 | AC power cord* | 187335-001 | — | Yes |
| 30 | DVD/CD-ROM drive ejector assembly* | 371114-001 | — | Yes |
| 31 | PCI expansion board ejector* | 359261-001 | — | Yes |
| 32 | Battery, 3.3 V, lithium* | 179322-001 | — | Yes |
| 33 | Country kit* | 359722-001 | — | Yes |
| 34 | Return kit, pack box, and cushions* | 289545-001 | — | Yes |
| 35 | T-15 Torx screwdriver* | 199630-001 | — | Yes |
| | **Memory** | | | |
| 36 | DIMM, 512 MB, registered DDR2 SDRAM* | 359241-001‡ See requirement | 413384-001 | Yes |
| 37 | DIMM, 1 GB, registered DDR2 SDRAM* | 359242-001‡ See requirement | 413385-001 | Yes |
| 38 | DIMM, 2 GB, registered DDR2 SDRAM* | 359243-001‡ See requirement | 413386-001 | Yes |
| 39 | DIMM, 2 GB, registered DDR2 dual-rank SDRAM* | 378021-001‡ See requirement | 413387-001 | Yes |
| 40 | DIMM, 4 GB, registered DDR2 SDRAM* | 379984-001‡ See requirement | 413388-001 | Yes |
| | **Options** | | | |
| 41 | Battery-Backed Write Cache battery pack* | 307132-001 | — | Yes |
| 42 | Battery-Backed Write Cache battery bracket with cable* | 349989-001 | — | Yes |
| 43 | SCSI Ultra320 universal hot-plug hard drive | — | — | — |
| | a) 72.8-GB, 10,000 rpm* | 289042-001‡ See requirement | 404709-001 | Yes |
| | b) 146.8-GB, 10,000 rpm* | 289044-001‡ See requirement | 404708-001 | Yes |
| | c) 300-GB, 10,000 rpm* | 351126-001‡ See requirement | 404701-001 | Yes |
| | d) 36.4-GB, 15,000 rpm* | 289241-001‡ See requirement | 404714-001 | Yes |
| | e) 72.8-GB, 15,000 rpm* | 289243-001‡ See requirement | 404713-001 | Yes |
| | f) 146.8-GB, 15,000 rpm* | 347779-001‡ See requirement | 404712-001 | Yes |

*Not shown

**Do not mix single- and dual-core processors or processors with different speeds or cache sizes.

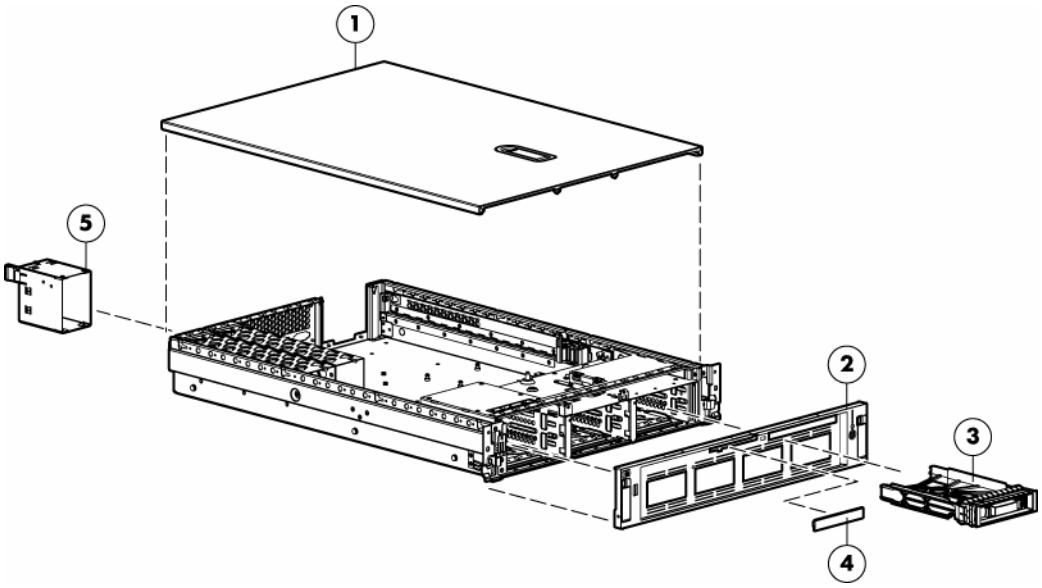
‡**REQUIREMENT:**

**For Customers in the EU only.**

The use of the Original Spare part is regulated by RoHS legislation§.

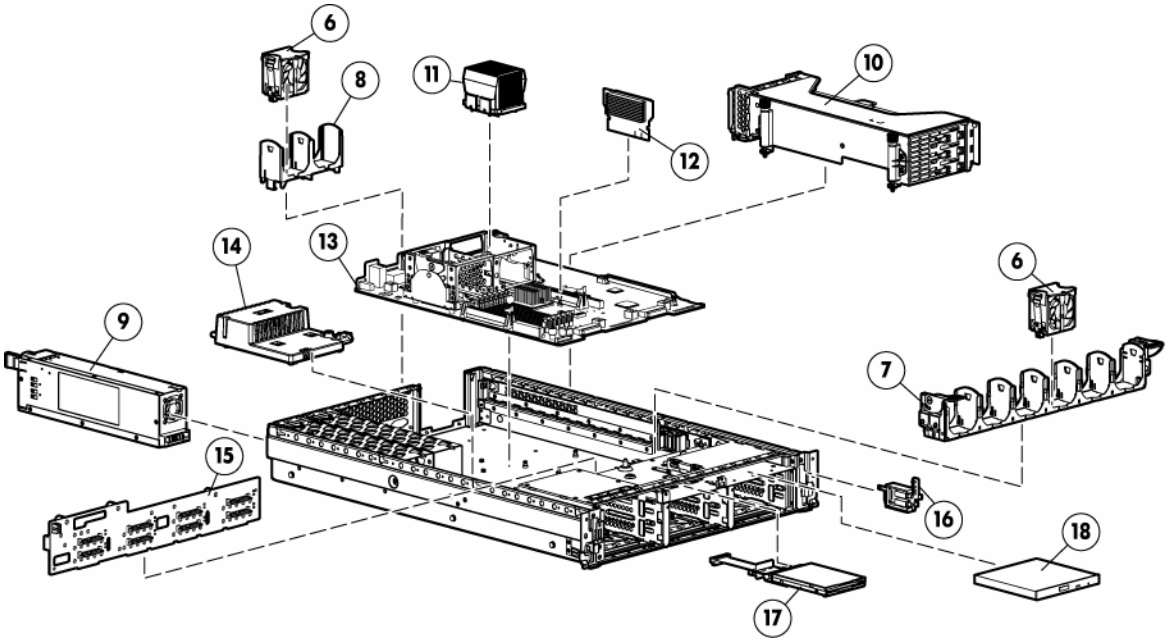
If your unit contains a part that is labelled with the Modified Spare number, the Modified Spare must be ordered as the replacement part in the EU.
If your unit contains a part that is labelled with the Original Spare number, please order the Original Spare as the replacement part in the EU. In this 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 |
|---|---|---|---|---|
| 1 | Access panel | 359244-001 | — | Yes |
| 2 | Front bezel | 392614-001 | — | 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 |
|---|---|---|---|---|
| | **System component** | | | |
| 6 | Hot-plug fan, 60 mm | 289544-001 | — | Yes |
| 7 | Front fan bracket, 6 bay | 371148-001 | — | Yes |
| 8 | Rear fan bracket, 2 bay | 289558-001 | — | Yes |
| 9 | Hot-plug power supply, 400 W | 338022-001‡ See requirement | 406393-001 | Yes |
| 10 | PCI riser cages | — | — | — |
| | a) PCI riser cage, with non-hot-plug PCI-X (standard) | 359248-001‡ See requirement | 411020-001 | Yes |
| | b) PCI riser cage, with PCI-X hot-plug (optional)* | 359260-001‡ See requirement | 411022-001 | Yes |
| 11 | Processor assemblies | — | — | — |
| | a) 3.0-GHz Intel® Xeon™ 1-MB L2 cache* ** | 378006-001 | — | Yes |
| | b) 3.2-GHz Intel® Xeon™ 1-MB L2 cache* ** | 374233-001 | — | Yes |
| | c) 3.4-GHz Intel® Xeon™ 1-MB L2 cache* ** | 364757-001 | — | Yes |
| | d) 3.6-GHz Intel® Xeon™ 1-MB L2 cache* ** | 364758-001 | — | Yes |
| | e) 2.8-GHz Intel® Xeon™ 2-MB L2 cache* ** | 399132-001 | — | Yes |
| | f) 3.0-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379427-001 | — | Yes |

| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| | g) 3.0-GHz Intel® Xeon™ 2-MB L2 cache LV* ** | 399764-001 | — | Yes |
| | h) 3.2-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379428-001 | — | Yes |
| | i) 3.4-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379429-001 | — | Yes |
| | j) 3.6-GHz Intel® Xeon™ 2-MB L2 cache* ** | 379430-001 | — | Yes |
| | k) 3.8-GHz Intel® Xeon™ 2-MB L2 cache* ** | 399133-001 | — | Yes |
| | l) 2.83-GHz Intel® Xeon™ dual-core, 1066-MHz FSB, 4-MB cache (for use with dual-core processor SAS system board assembly number 012977-001 only)* ** | 403934-001 | — | Yes |
| | **Boards** | | | |
| 12 | PPM, 12 V, 81 A | 347884-001 | — | Yes |
| 13 | System board | — | — | — |
| | a) System board, with processor cages and system battery | 392609-001‡ See requirement | 411027-001 | Yes |
| | b) System board, dual-core processor support, SAS, with processor cages and system battery (for use with Intel® Xeon™ dual-core processor only)* | 409160-001‡ See requirement | 411030-001 | Yes |
| 14 | Power converter module | 392611-001 | — | 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 |
| | **Cables** | | | |
| 20 | SAS options cable kit* | 392612-001 | — | — |
| | a) Drive cage cable | — | — | Yes |
| | b) CD multi-bay cable | — | — | Yes |
| 21 | SAS option cable* | 389952-001 | — | Yes |

| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| 22 | Signal cable kit* | 228518-001 | — | — |
| | a) Power button/LED board cable, 14 pin | — | — | Yes |
| | b) PCI hot-plug LED board cable | — | — | Yes |
| | Miscellaneous cable kit* | 366063-001 | — | — |
| | a) Diskette drive cable* | — | — | Yes |
| | b) CD multibay adaptor cable* | — | — | Yes |
| | c) USB cable and connector* | — | — | Yes |
| | **Rack mounting hardware** | | | |
| 23 | 2U Quick Deploy Rail System* | 359254-001 | — | Yes |
| | **Miscellaneous** | | | |
| 24 | Hardware kit* | 228527-001 | — | — |
| | a) Screws, T-15, flat-head | — | — | Yes |
| | b) Expansion slot cover | — | — | Yes |
| | c) Screws, 6-32 | — | — | Yes |
| 25 | 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 0.134 in | — | — | Yes |
| | h) Battery clip | — | — | Yes |
| | i) PCI card guide retainer | — | — | Yes |
| | j) Thumbscrew knob | — | — | Yes |
| | k) Diskette drive slot cover | — | — | Yes |
| 26 | AC power cord* | 187335-001 | — | Yes |
| 27 | DVD/CD-ROM drive ejector assembly* | 371114-001 | — | Yes |
| 28 | PCI expansion board ejector* | 359261-001 | — | Yes |
| 29 | Battery, 3.3 V, lithium* | 179322-001 | — | Yes |
| 30 | Country kit* | 359722-001 | — | Yes |

| Item | Description | Original spare part number | Modified spare part number | Customer self repair |
|---|---|---|---|---|
| 31 | Return kit, pack box, and cushions* | 289545-001 | — | Yes |
| 32 | T-15 Torx screwdriver* | 199630-001 | — | Yes |
| | **Memory** | | | |
| 33 | DIMM, 512 MB, registered DDR2 SDRAM* | 359241-001‡ See requirement | 413384-001 | Yes |
| 34 | DIMM, 1 GB, registered DDR2 SDRAM* | 359242-001‡ See requirement | 413385-001 | Yes |
| 35 | DIMM, 2 GB, registered DDR2 SDRAM* | 359243-001‡ See requirement | 413386-001 | Yes |
| 36 | DIMM, 2 GB, registered DDR2 dual-rank SDRAM* | 378021-001‡ See requirement | 413387-001 | Yes |
| 37 | DIMM, 4 GB, registered DDR2 SDRAM* | 379984-001‡ See requirement | 413388-001 | Yes |
| | **Options** | | | |
| 38 | Smart Array P600 Controller* | 370855-001 | — | Yes |
| 39 | SAS array cache board, 256-MB (with battery)* | 309522-001 | — | Yes |
| 40 | SAS array cache board, 512-MB (with battery)* | 378202-001 | — | Yes |
| 41 | SAS hot-plug hard drive | — | — | — |
| | a) 36-GB, 10,000 rpm, 2.5 in* | 376596-001 | — | Yes |
| | b) 72-GB, 10,000 rpm, 2.5 in* | 376597-001 | — | Yes |
| 42 | 60-GB, 5,4000 rpm, SFF SATA hard drive, 1 yr wty* | 382264-001 | — | Yes |

*Not shown

**Do not mix single- and dual-core processors or processors with different speeds or cache sizes.

‡**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.*

# 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 70)

# 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 19).

  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.

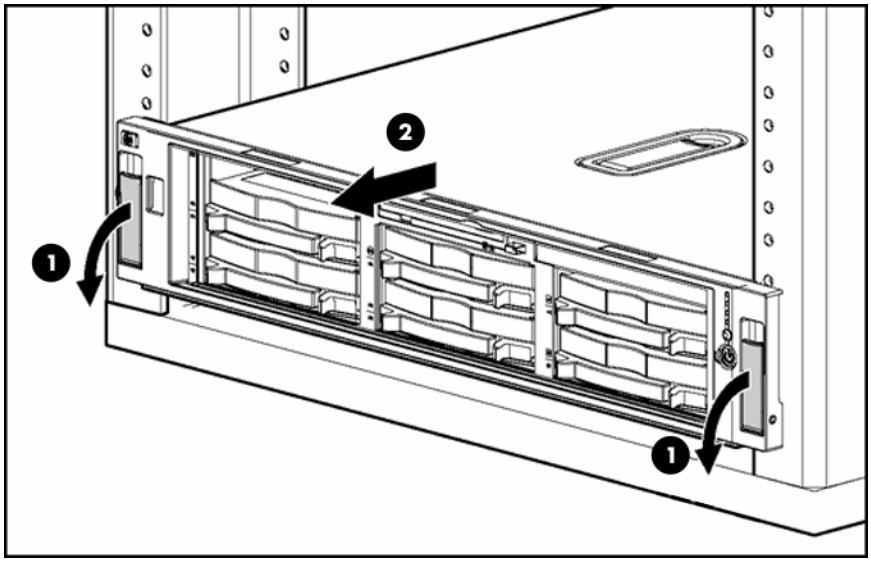
  For more information about telco rack solutions, refer to the RackSolutions.com website (http://www.racksolutions.com/hp).
- Power down the server (on page 20).

  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 20).

  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.

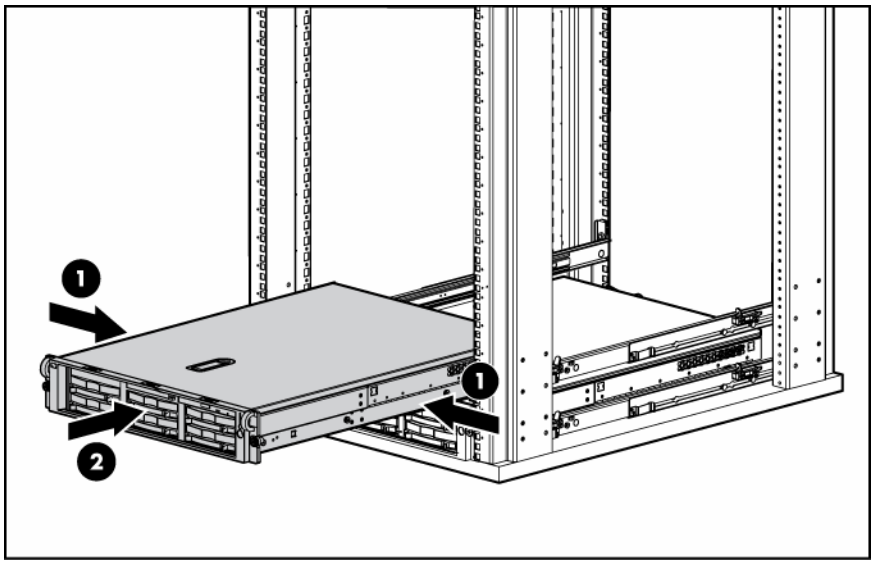



2. Extend the server on the rack rails until the server rail-release latches engage.

**⚠ 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.



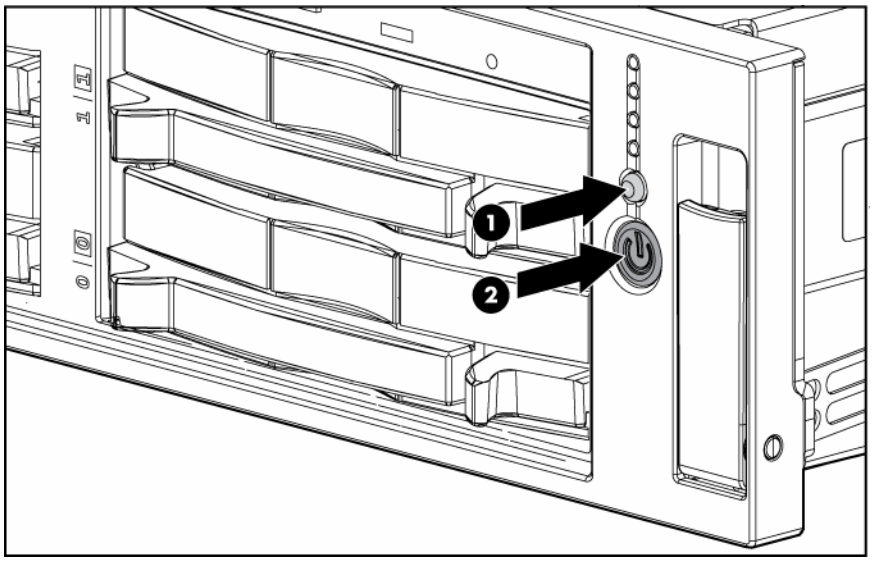

   b. Press the server firmly into the rack to secure it in place.

## 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

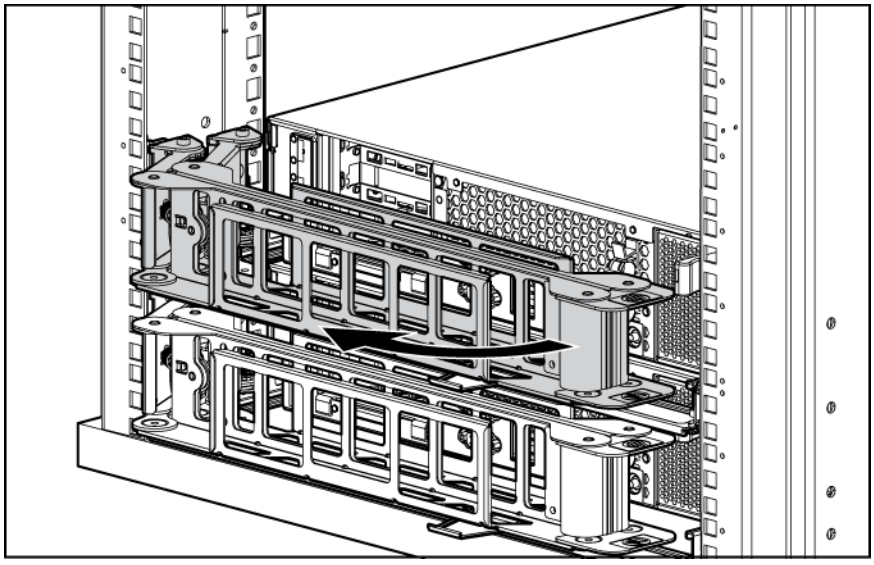
To remove the server from an HP, Compaq branded, telco, or third-party rack:

1. Power down the server (on page 20).
2. Extend the server from the rack (on page 19).
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.



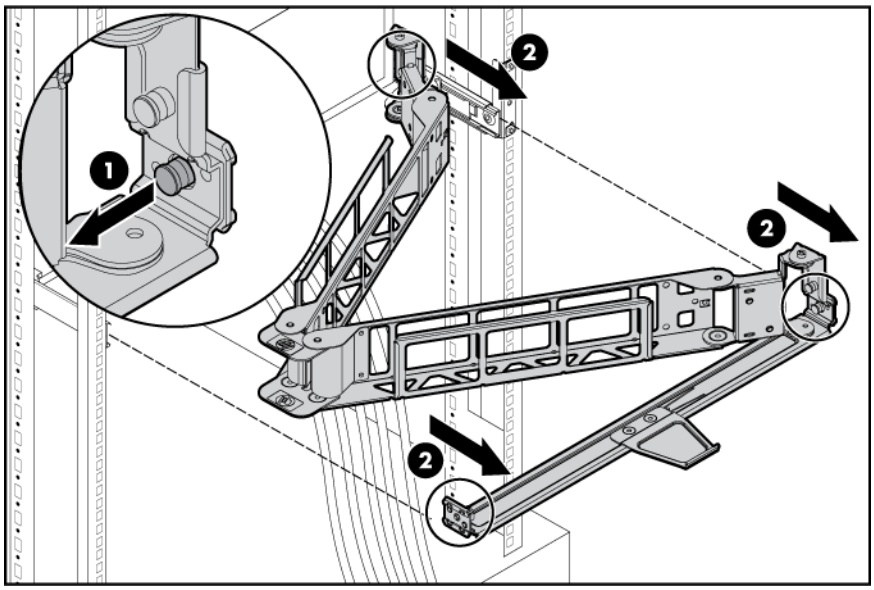
To close the cable management arm, reverse this procedure.

## 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 20).
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 20).
2. Extend the server from the rack, if applicable ("Extend the server from the rack" on page 19).
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

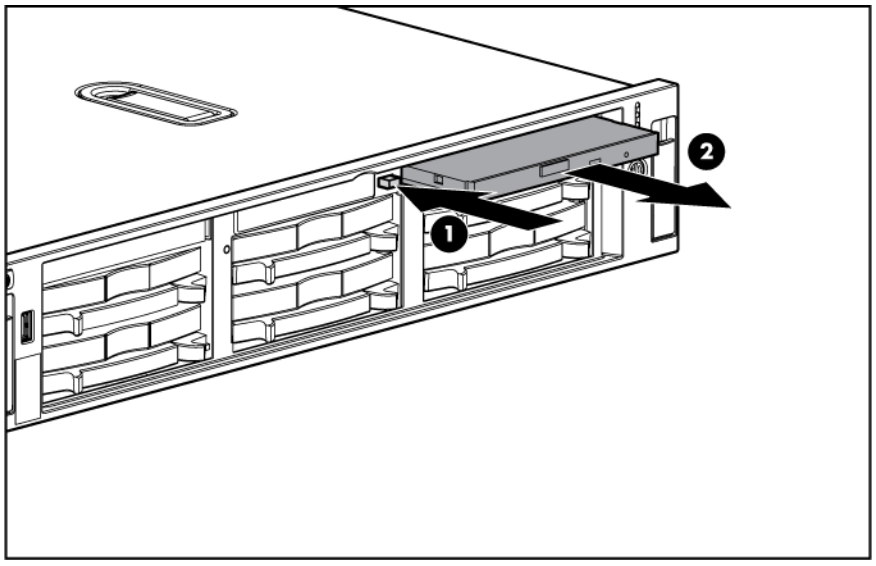
To remove the component:

**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 20).

**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.

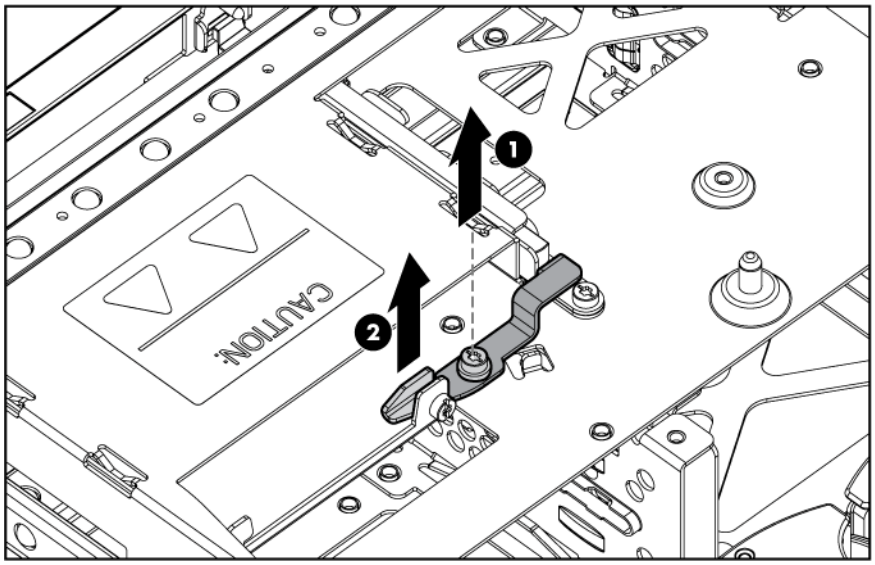



To replace the drive, slide the drive into the bay until the drive is fully seated.

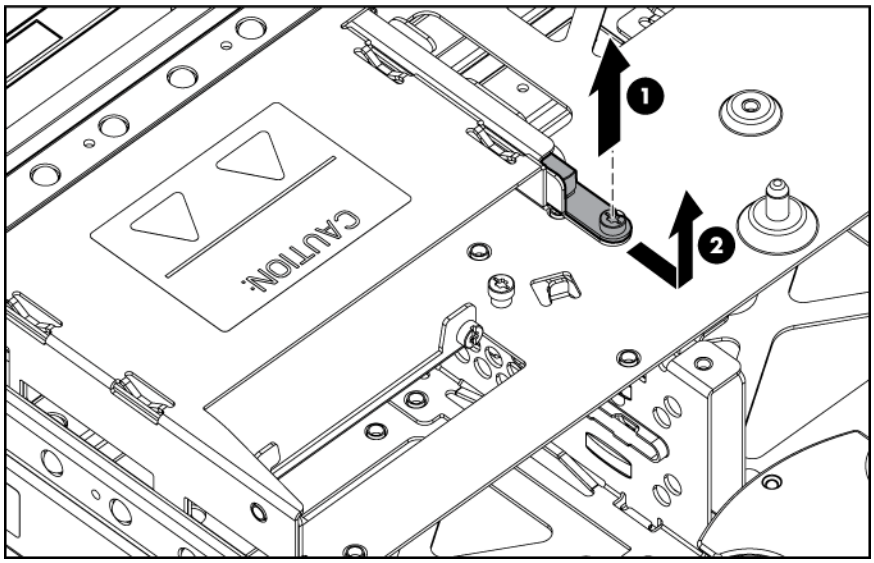
## DVD/CD-ROM drive ejector assembly

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the DVD/CD-ROM drive, if installed ("DVD/CD-ROM drive" on page 22).
5. Remove the diskette drive ("Diskette drive option" on page 24).
6. Remove the ejector lever.




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



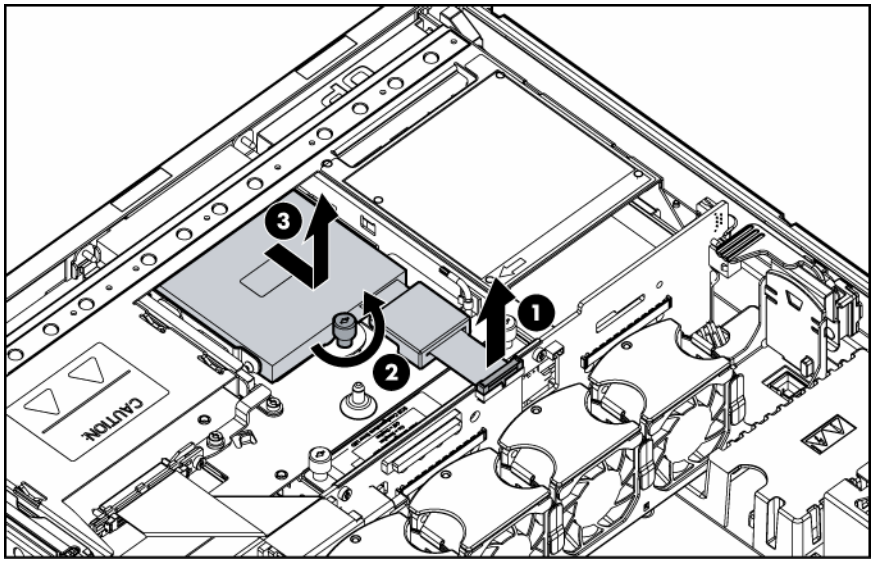

To replace the component, reverse the removal procedure.

## 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 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the diskette drive.



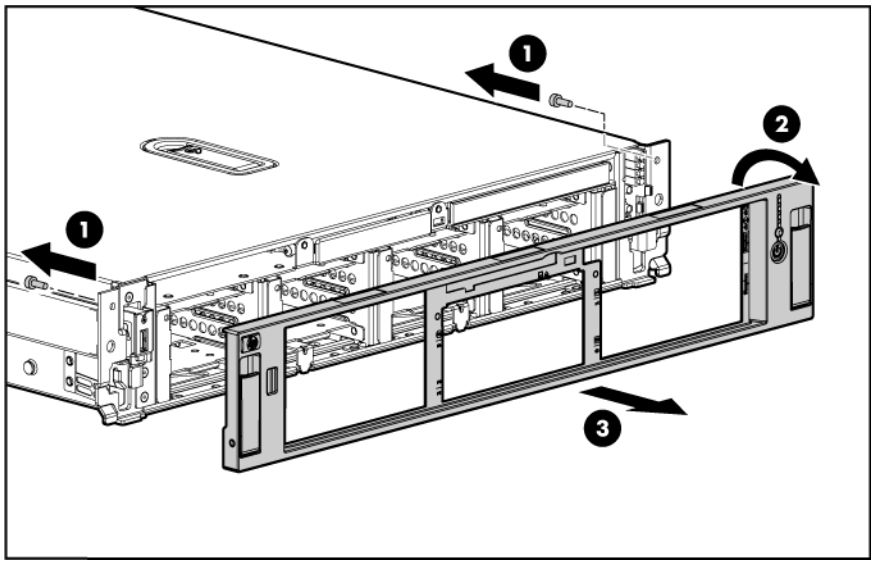

To replace the component, reverse the removal procedure.

## Front bezel

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).

3. Remove the two screws and detach the front bezel.

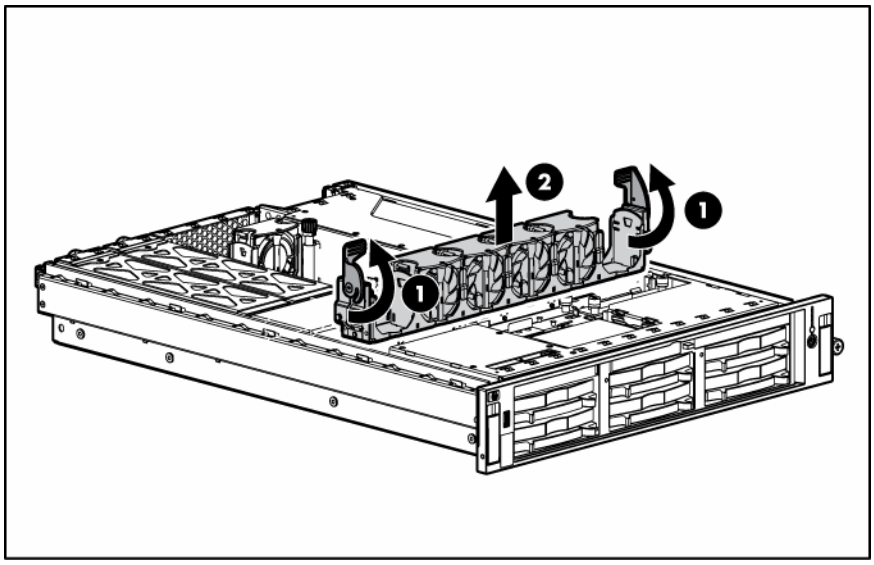



To replace the component, reverse the removal procedure.

## Front fan bracket

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the front fan bracket.




5. Remove all hot-plug fans from the front fan bracket ("Hot-plug fan" on page 49).

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 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" 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 PCI riser cage.

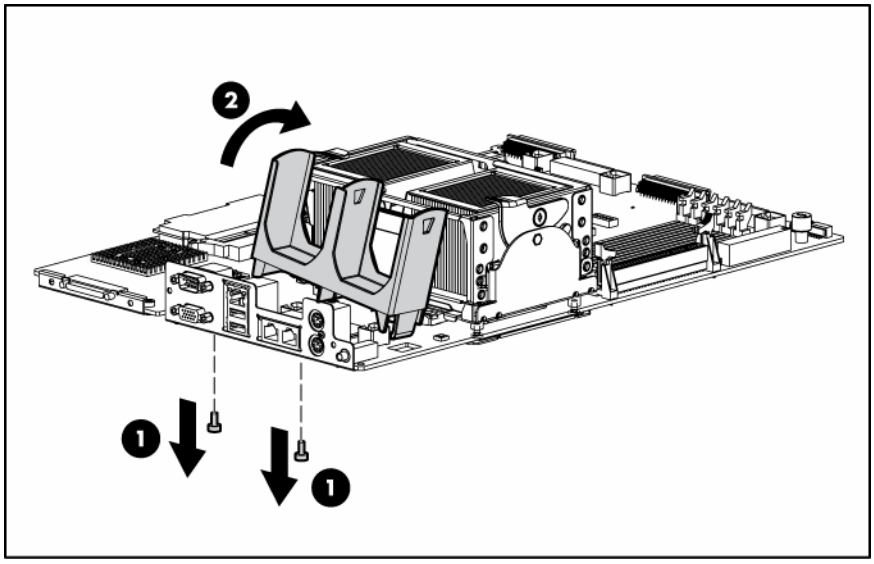
4. Remove the PCI riser cage.
5. Remove the front fan bracket ("Front fan bracket" on page 25).

**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 49).
7. Remove the system board.

**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 29)

**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 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

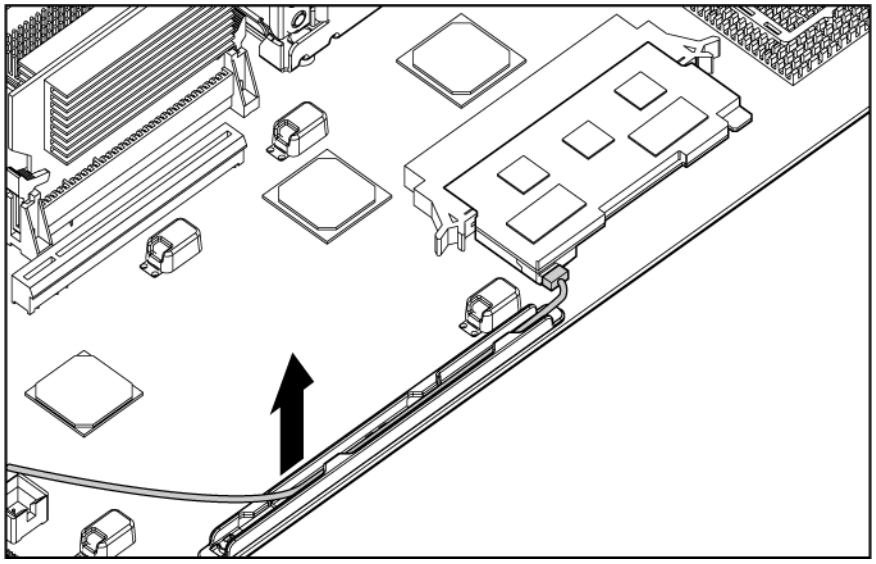
**CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

4. Remove the PCI riser cage.

**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.

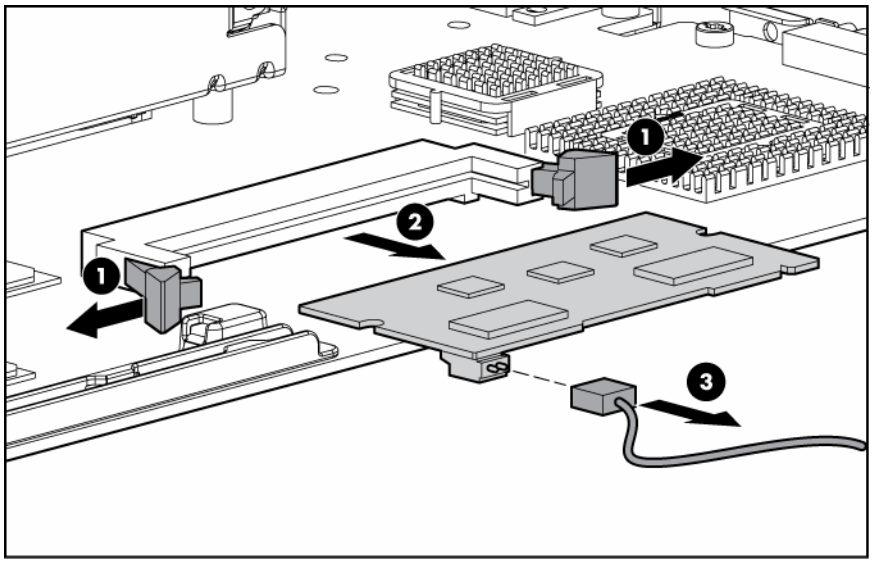
**CAUTION:** After the server is powered down, wait 15 seconds and then check the amber LED before unplugging the cable from the cache module. If the amber LED blinks after 15 seconds, do not remove the cable from the cache module. The cache module is backing up data, and data is lost if the cable is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

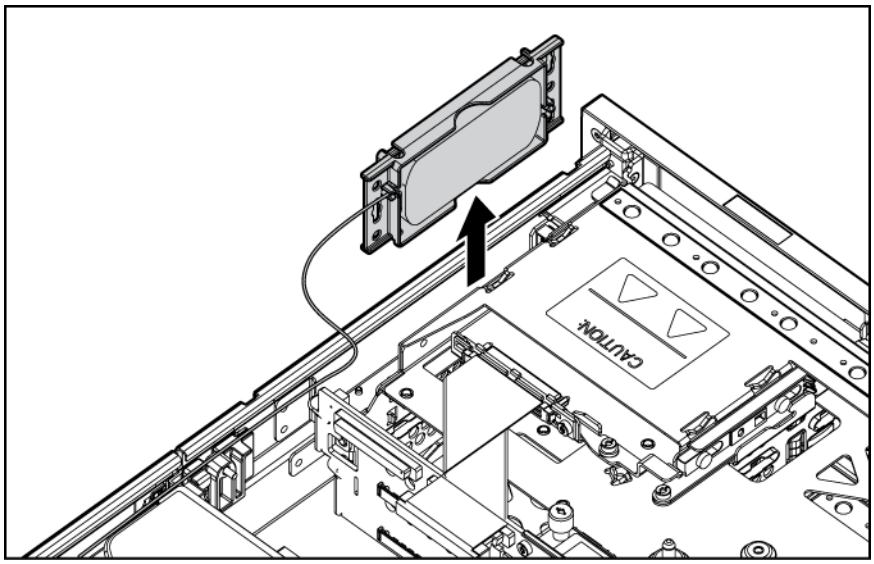
1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

**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 25).
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 17).

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 20). 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.

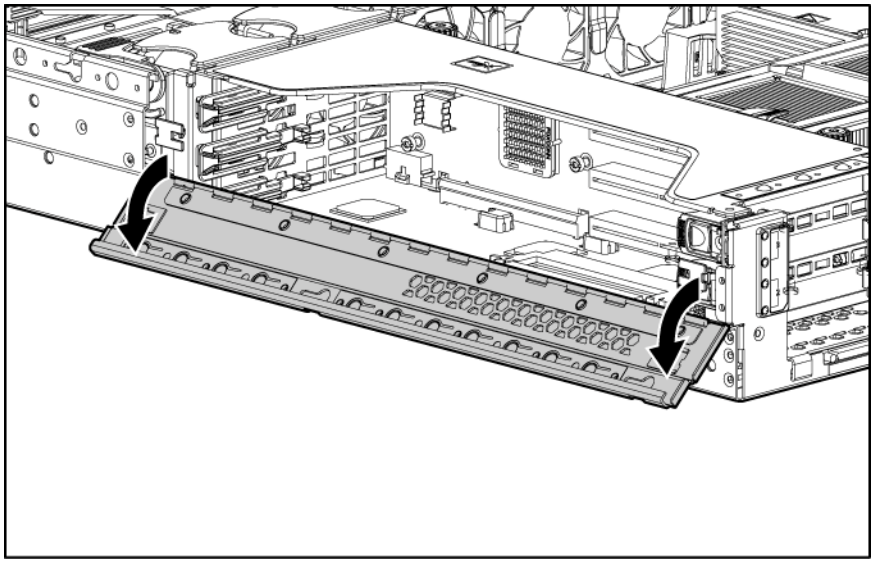
- Install the BBWC into an empty BBWC DIMM socket on any Smart Array 641 or 642 Controller in the recovery server.

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.

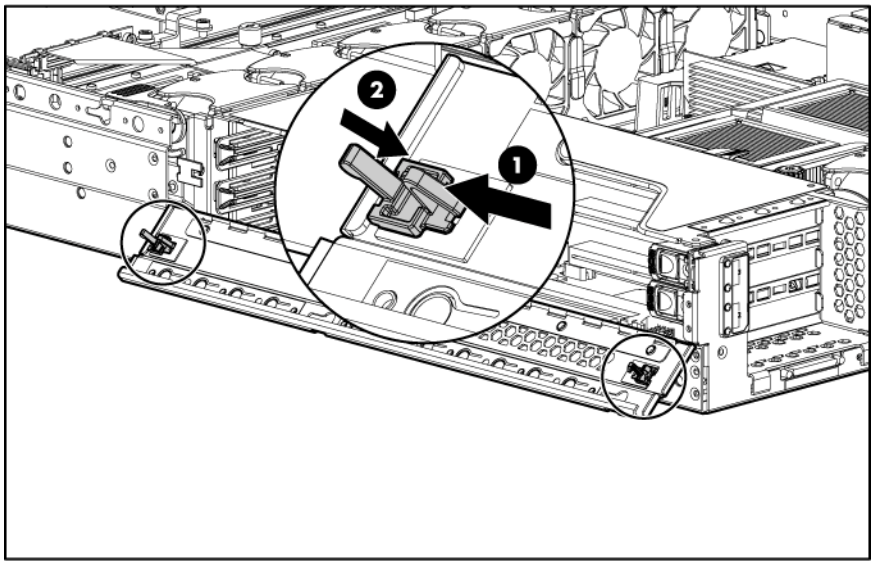
## PCI riser cage door latch

To remove the component:

1. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
2. Remove the access panel ("Access panel" on page 22).
3. Open the PCI riser cage door.



4. Remove the PCI riser cage door latch.




To replace the component, reverse the removal procedure.

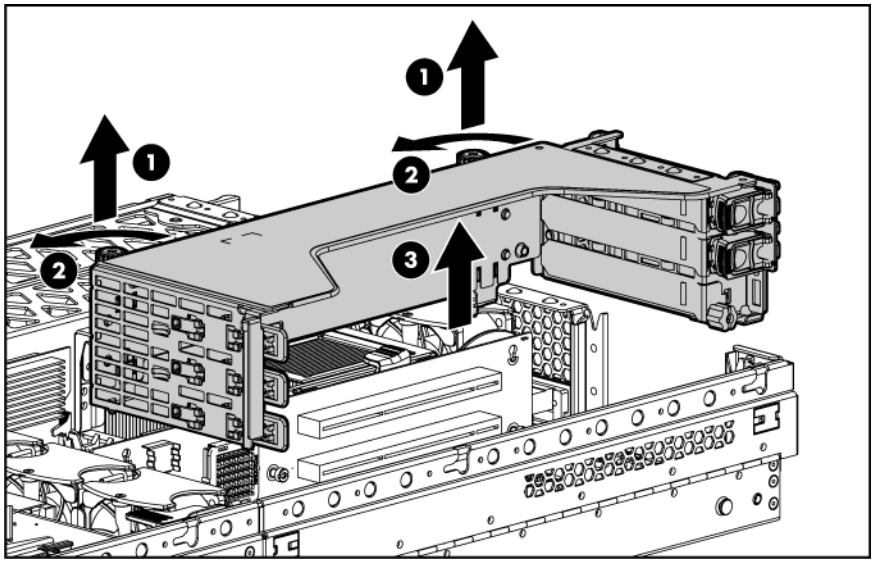
## PCI riser cage

To remove the component:

1. Power down the server (on page 20).
2. Extend the server from the rack, if applicable ("Extend the server from the rack" on page 19).
3. Remove the access panel ("Access panel" 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 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

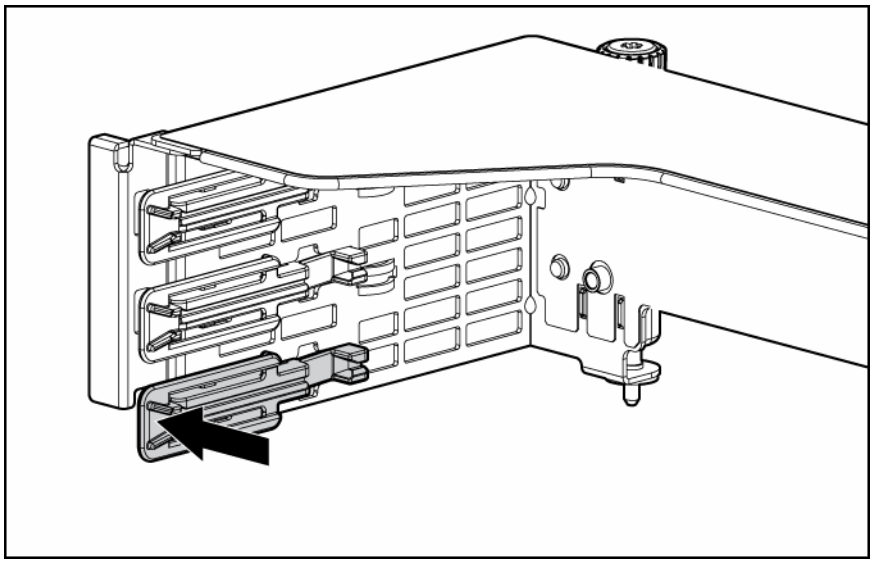
To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

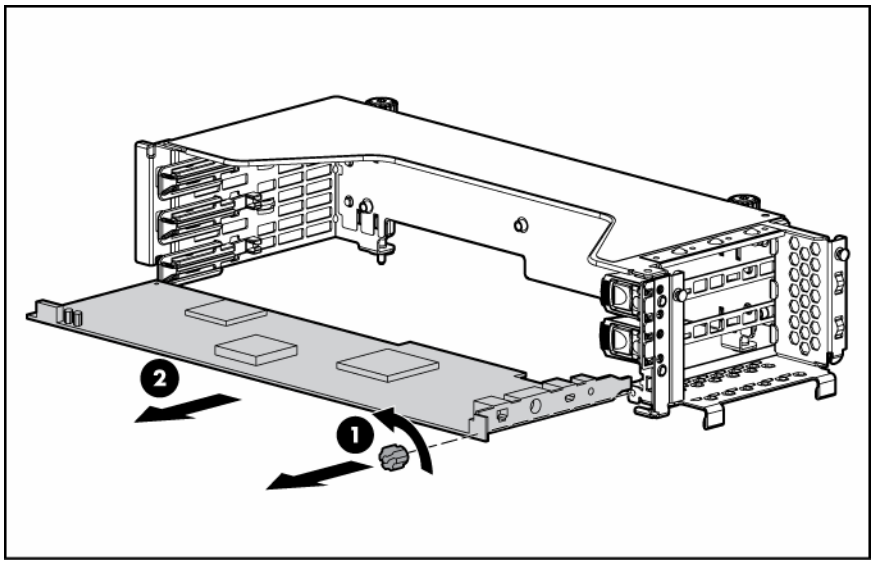
**CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

4. Disconnect any cables connecting the expansion board to the PCI riser cage.
5. Remove the PCI riser cage.

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:

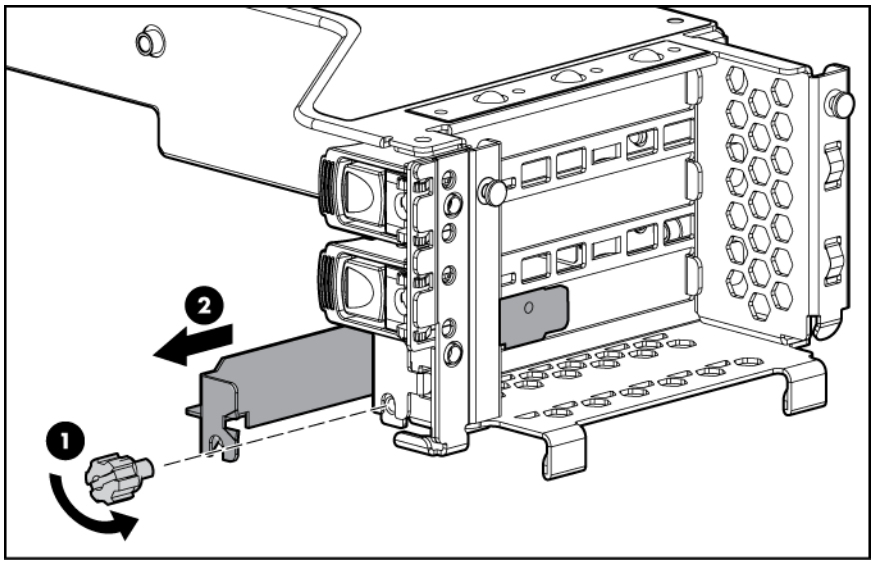
1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

**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 PCI riser cage.

4. Remove the PCI riser cage.

**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.

## Expansion board ejector/divider

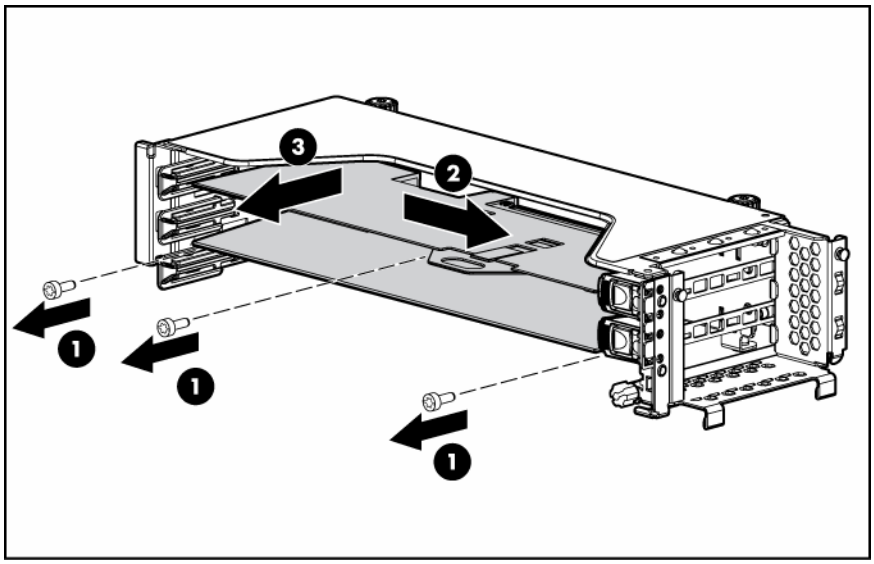
**NOTE:** This component is available only with the optional, hot-plug PCI riser cage.

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the PCI riser cage.

**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 expansion board ejector/divider.




**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.

## PCI slot release lever

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

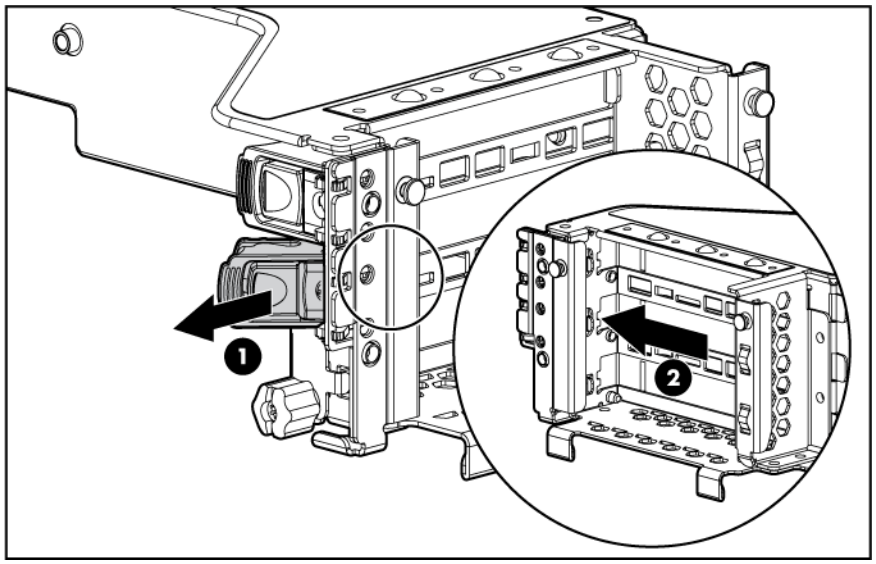
**CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

4. Remove the PCI riser cage.

**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.
6. Remove the expansion slot cover from the slot, if installed.

7. Remove the PCI slot release lever.



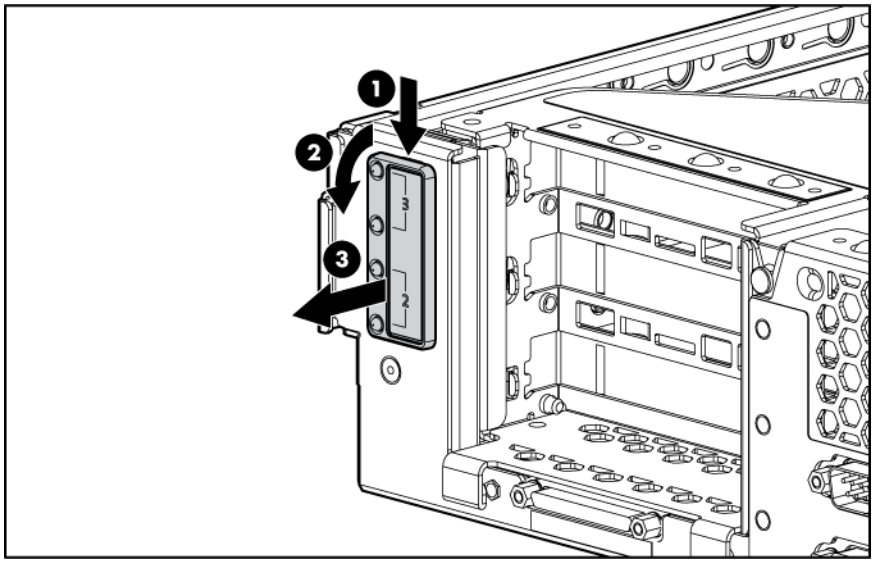

To replace the component, reverse the removal procedure.

## PCI lightpipe and cover

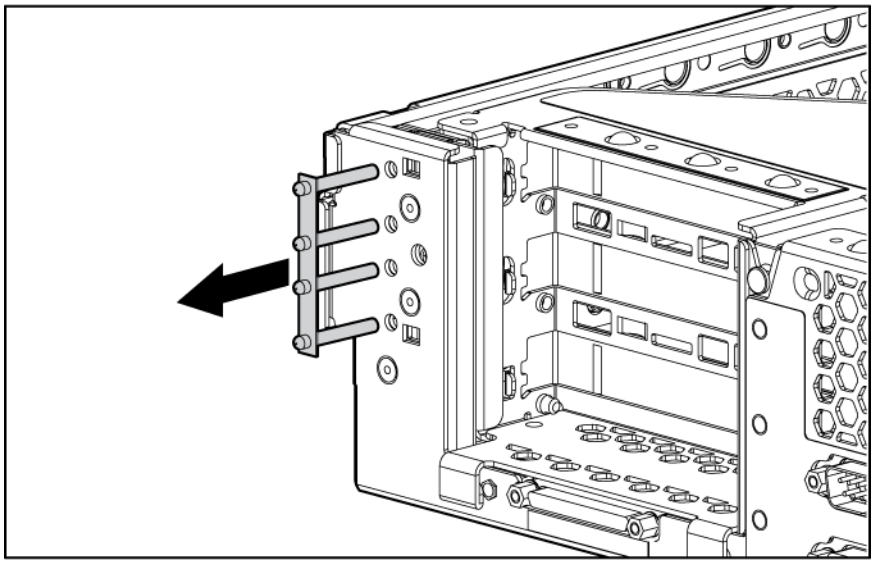
**NOTE:** This component is available only with the optional, hot-plug PCI riser cage.

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the PCI lightpipe cover.



5. Slide the lightpipe out of the chassis.



To replace the component, reverse the removal procedure.

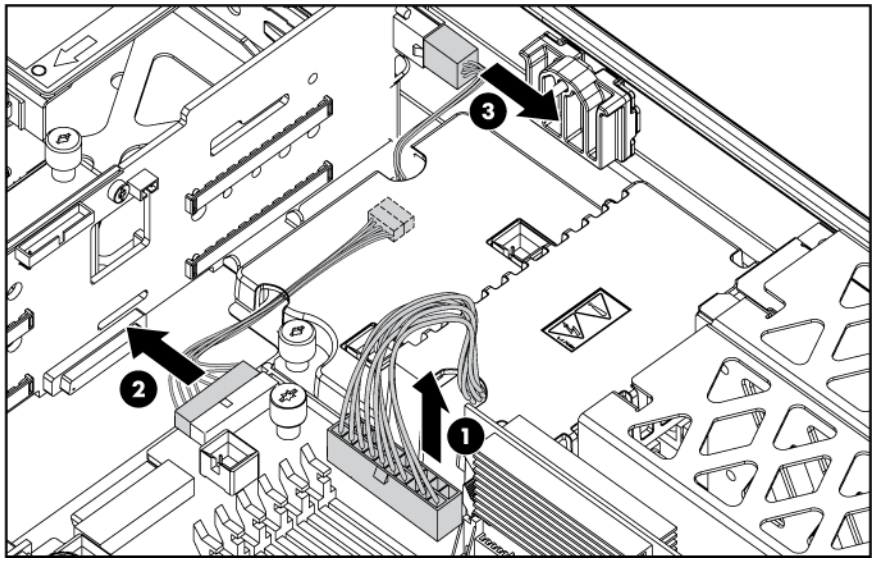
## Power converter module

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the front fan bracket ("Front fan bracket" on page 25).

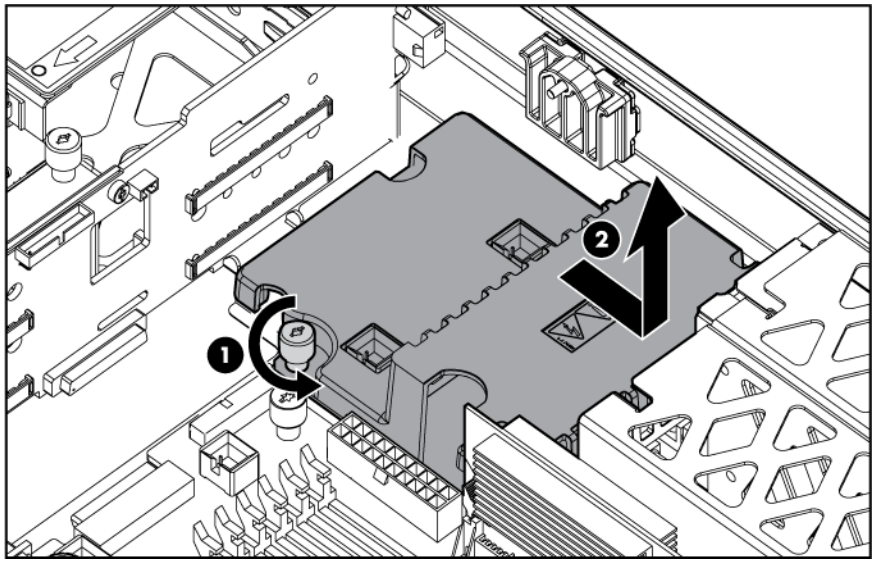
**IMPORTANT:** For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

5. Remove all hot-plug power supplies ("Hot-plug power supply" on page 47).
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.

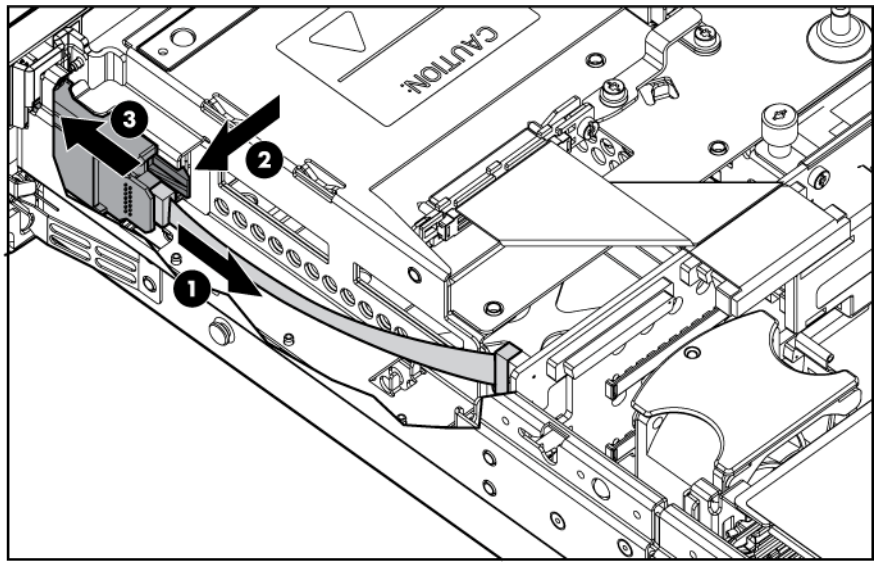
## Power button/LED board

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the front bezel.
4. Remove the access panel ("Access panel" on page 22).
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.

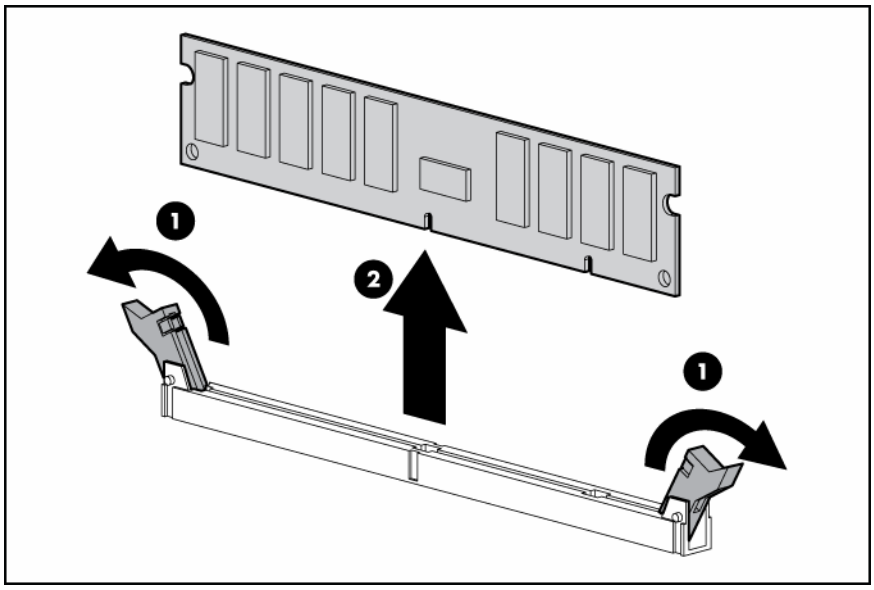
## DIMMs

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

**NOTE:** The server ships with at least two DIMMs installed in DIMM slots 1A and 2A.

4. 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. The following table lists all seven valid combinations of single-rank and dual-rank DIMM configurations.

| Configuration | Bank A | Bank B | Bank C | Notes |
|---|---|---|---|---|
| 1 | Single | | | |
| 2 | Single | Single | | |
| 3 | Single | Single | Single | |
| 4 | Dual | | | Online Spare not supported |
| 5 | Dual | Single | | Online Spare not supported |
| 6 | Dual | Single | Single | Online Spare not supported |
| 7 | Dual | Dual | | Online Spare not supported |

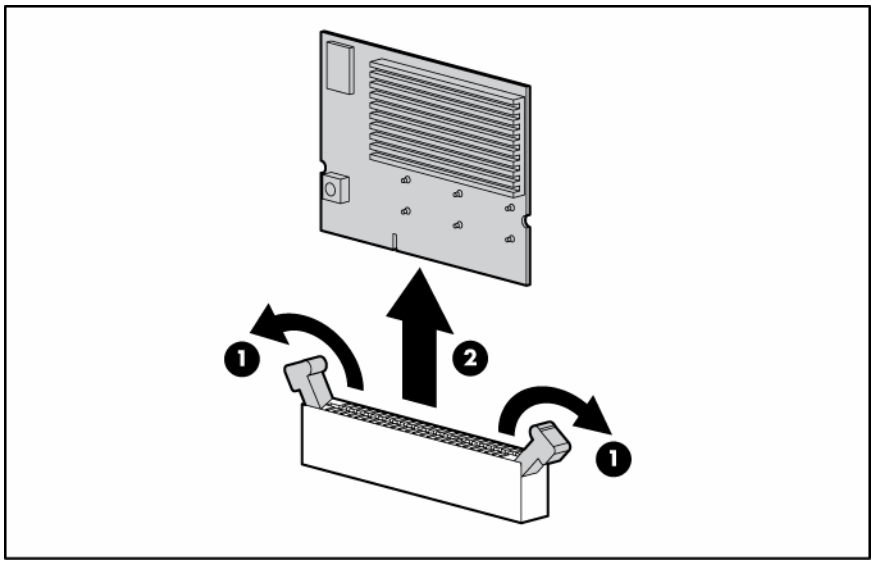
## PPM

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).

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

4. 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.

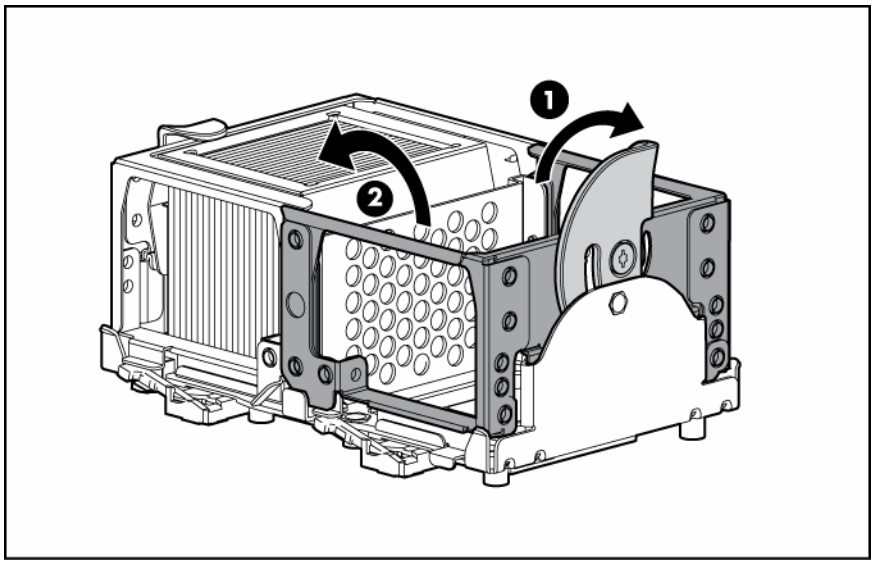
To replace the component, reverse the removal procedure.

## Processor

To remove the component:

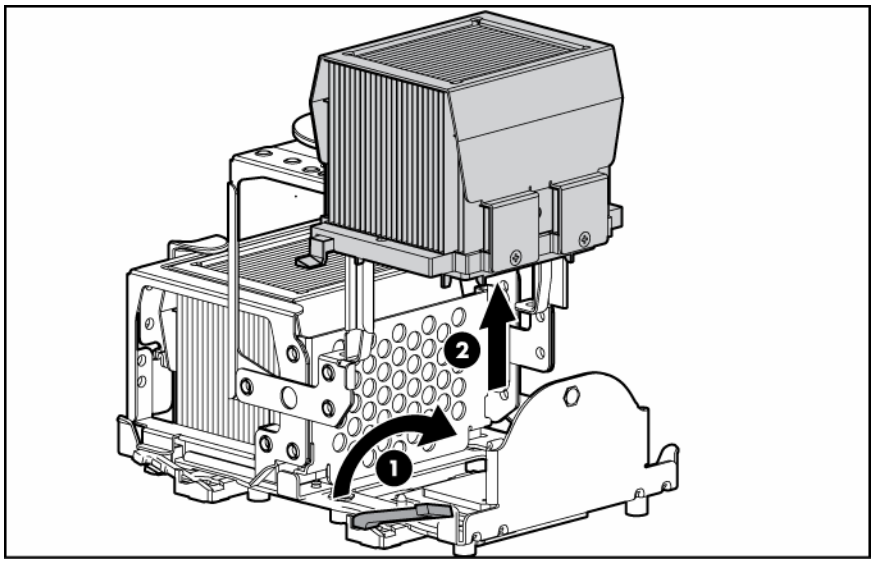
1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. If an optional redundant fan is located next to the processor, remove the fan ("Hot-plug fan" on page 49).

5. Open the processor retaining bracket.




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

6. Remove the processor and heatsink assembly.




**CAUTION:** To prevent possible server malfunction and damage to the equipment, do not mix single- and dual-core processors or processors with different speeds or cache sizes.

**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 or damage to the equipment, be sure to align the processor pins with the corresponding holes in the socket.

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

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

**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.

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:**

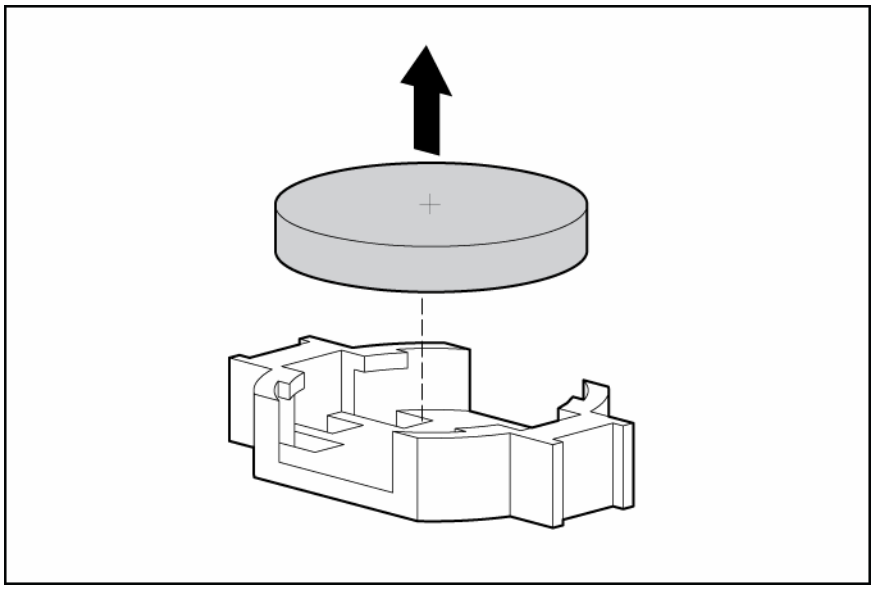
- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

To remove the component:

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the PCI riser cage.

**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 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" 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 PCI riser cage.

4. Remove the PCI riser cage.
5. Remove the front fan bracket ("Front fan bracket" on page 25).

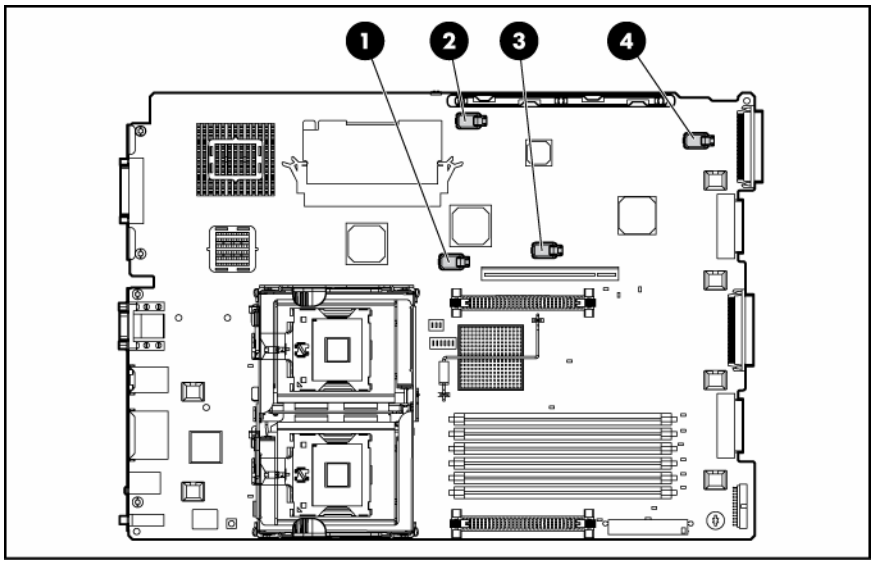
**IMPORTANT:** For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

6. Remove the hot-plug fans from the rear fan bracket ("Hot-plug fan" on page 49).
7. Remove any DDR SDRAM DIMMs ("DIMMs" on page 38).
8. Remove the processors.
9. Remove the PPMs.
10. Remove the Smart Array 6i cache module.

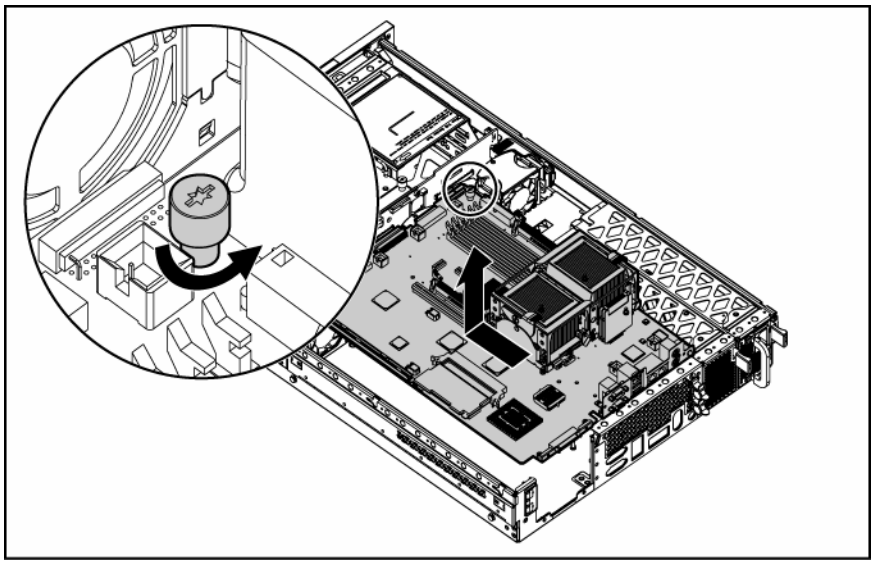
**NOTE:** This feature applies only to SCSI models.

11. Disconnect all cables connected to the system board.

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




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



15. 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 43).

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.

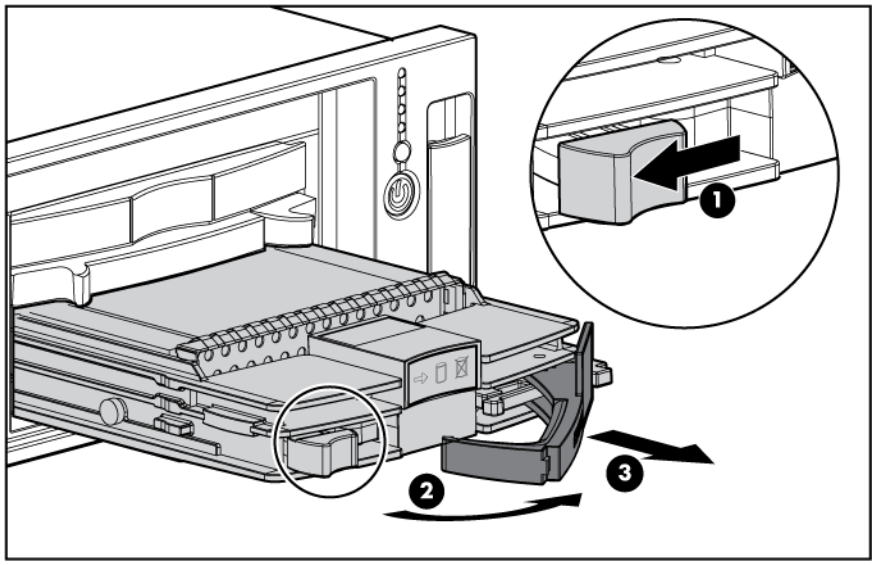
# Hot-plug procedures

## 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 85).
2. Back up all server data on the hard drive.
3. Remove the hard drive.



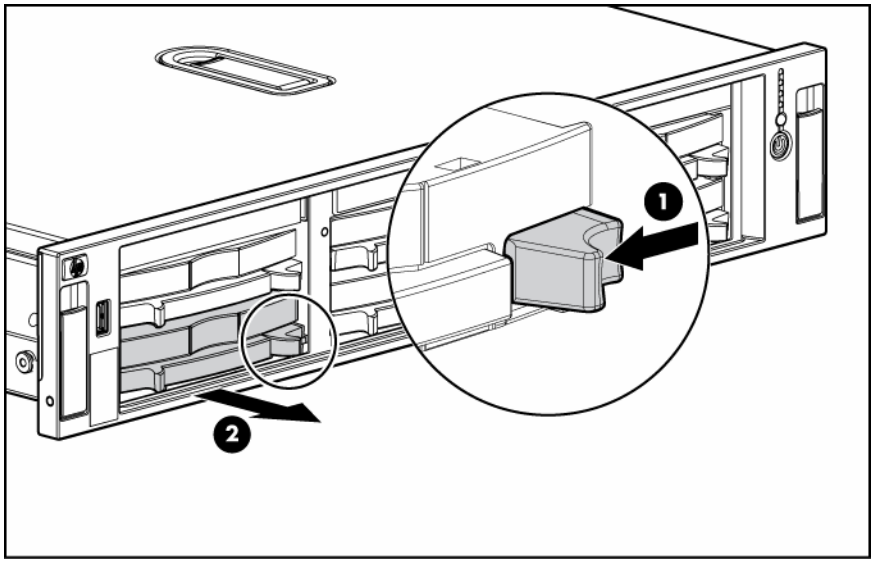

To replace the component, reverse the removal procedure.

## 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.



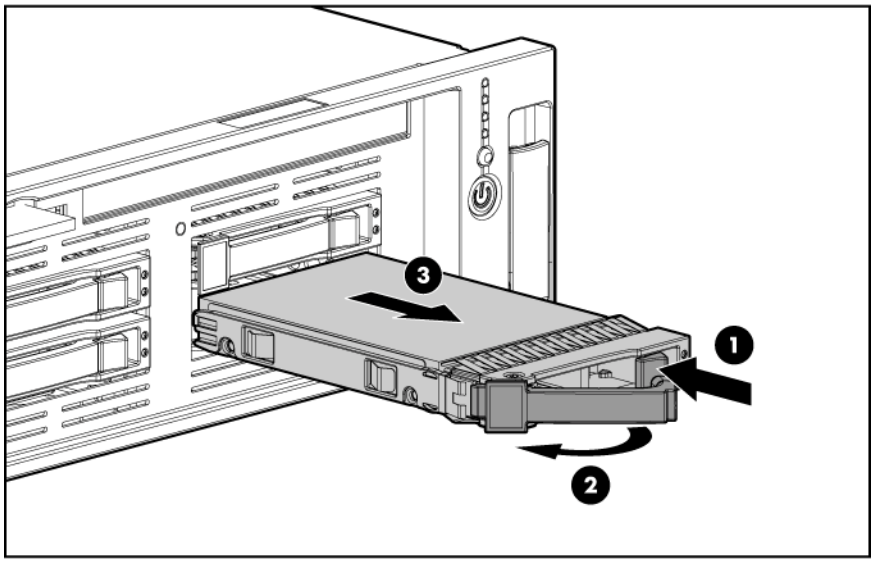

To replace the blank, slide the blank into the bay until it locks into place.

## 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 87).
2. Back up all server data on the hard drive.
3. Remove the hard drive.

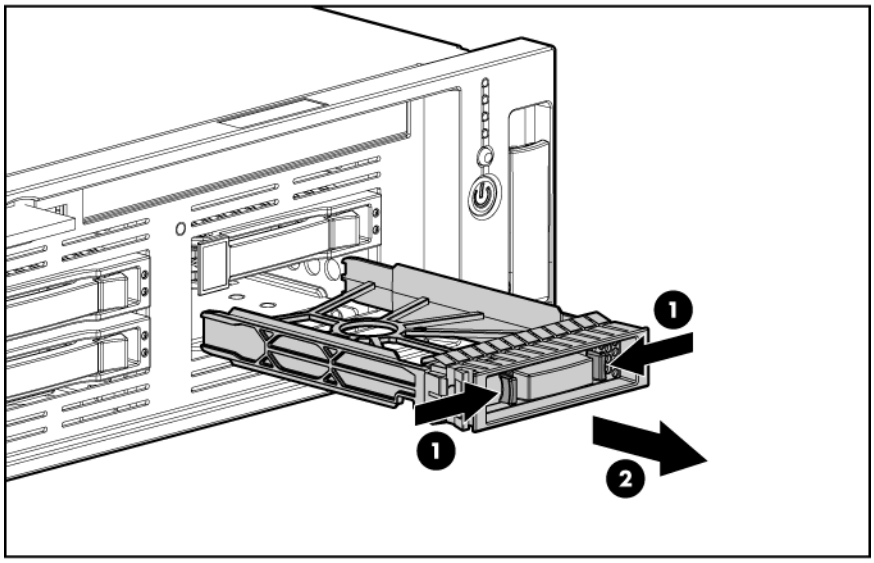



To replace the component, reverse the removal procedure.

## 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.



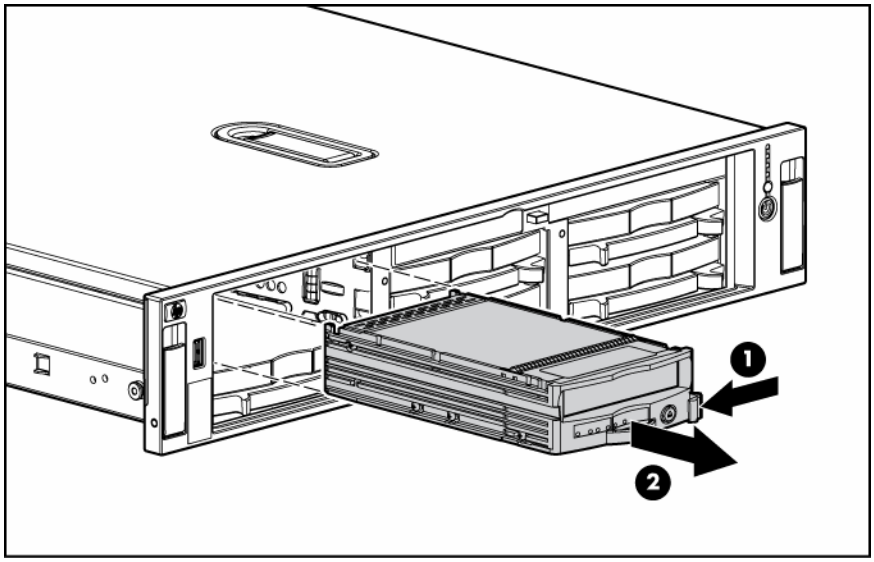

To replace the blank, slide the blank into the bay until it locks into place.

## 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.

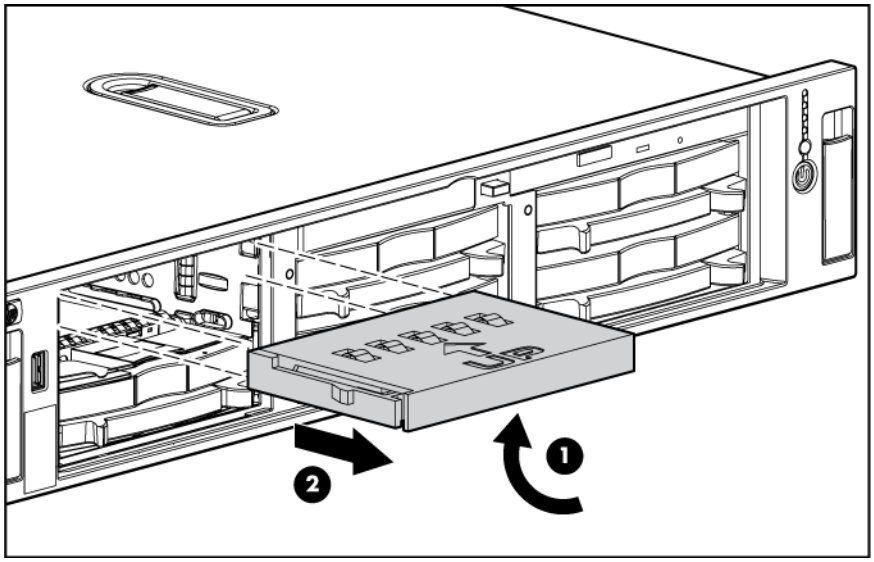
## Tape drive blank

**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.

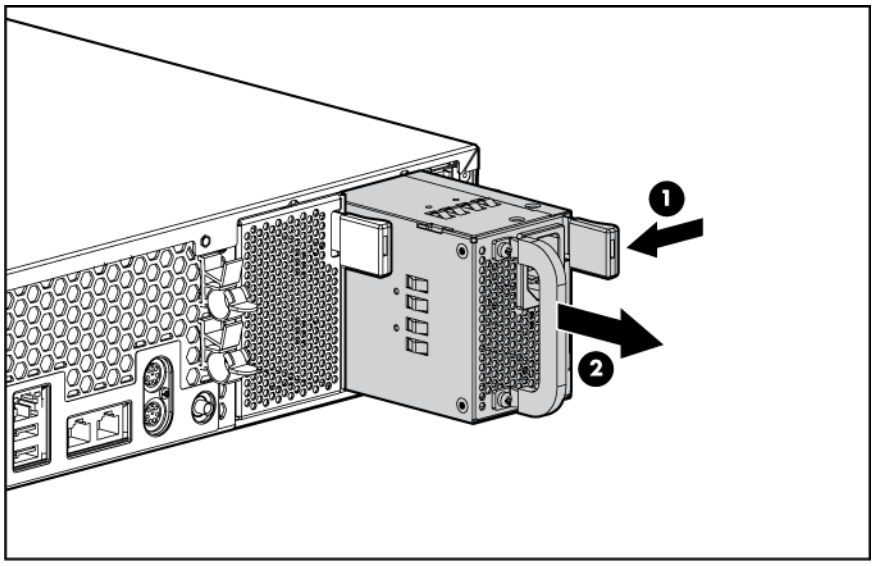
## Hot-plug power supply

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 20).
   - 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 21).
   - If the cable management arm is hinged on the right side, proceed by removing the cable management arm ("Non-hot-plug procedures" on page 22).

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 21)
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 ("Rear panel LEDs and buttons" on page 78).
8. Be sure that the front panel external health LED is green ("Front panel LEDs and buttons" on page 76).

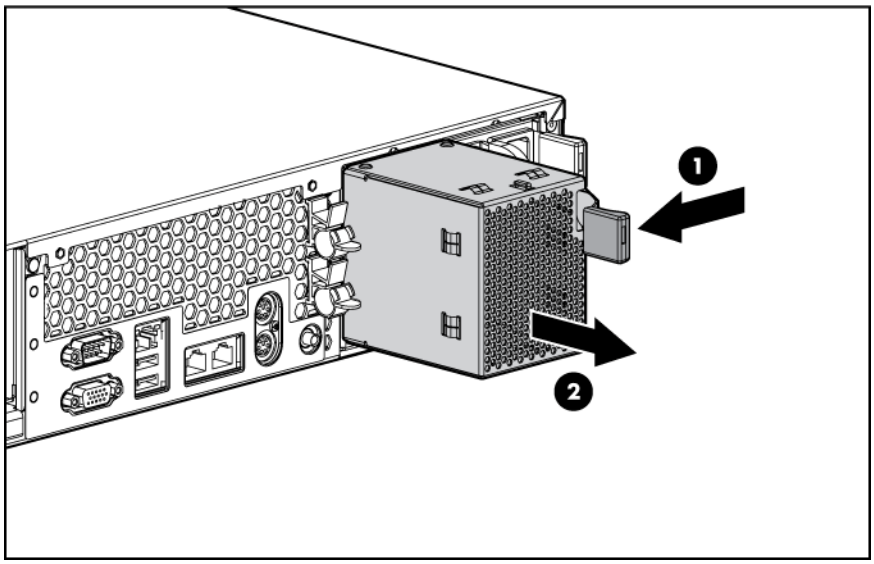
## Power supply blank

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 21).
   - If the cable management arm is hinged on the right side, proceed by removing the cable management arm ("Non-hot-plug procedures" on page 22).
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.**

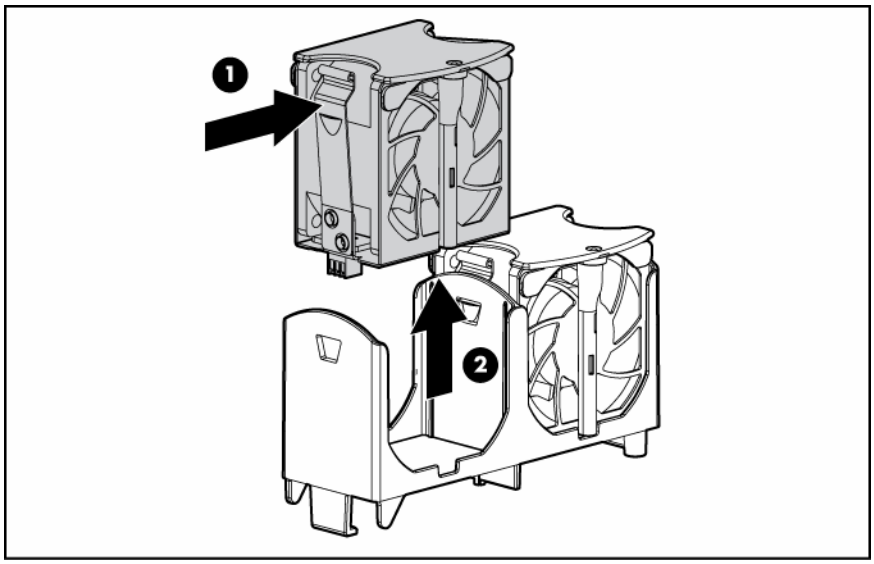
You must observe the following requirements when installing redundant hot-plug fans:

- 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 90).
- If a primary fan fails, replace the non-functioning fan before installing fans in redundant locations ("Identifying hot-plug fans" on page 90).

To remove the component:

1. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
2. Remove the access panel ("Access panel" on page 22).
3. If the server is operating with less than seven functional fans, power down the server (on page 20), 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 90).

To replace the component, reverse the removal procedure.

## PCI Hot Plug expansion board

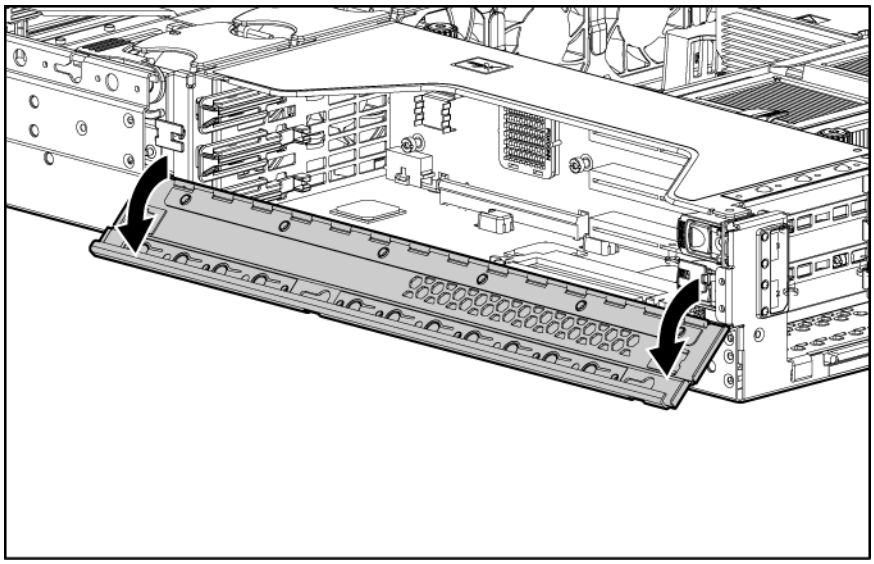
**NOTE:** Hot-plug functionality is supported only under Microsoft® Windows® 2000 and Windows® 2003. Hot-plug drivers are not required.

To remove the component:

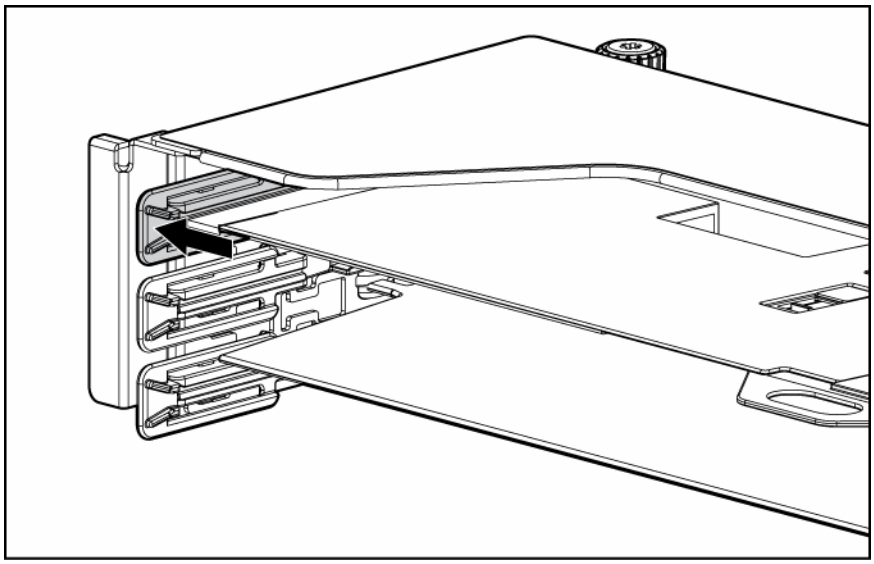
**CAUTION:** If the operating system installed on the server does not support PCI Hot Plug functionality, power down the server before removing expansion boards.

1. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
2. Remove the access panel ("Access panel" on page 22).

3. Open the PCI riser cage door.

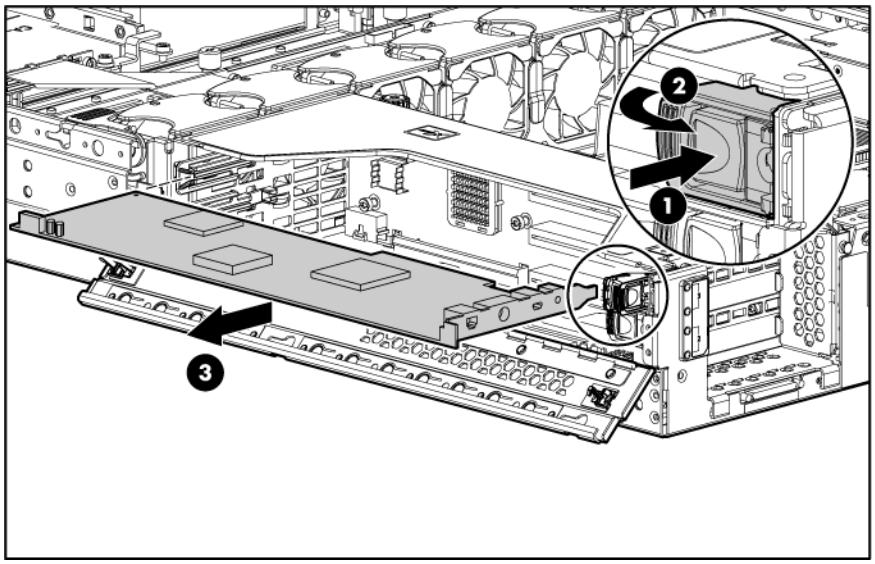


4. Press the PCI Hot Plug button ("Internal PCI Hot Plug LEDs and button" on page 90) to remove power from the slot. When the green power LED on the slot stops flashing, power has been removed from the slot.
5. Unlock the PCI retaining clip.



△ **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.

6. Remove the expansion board.




To replace the component, reverse the removal procedure.

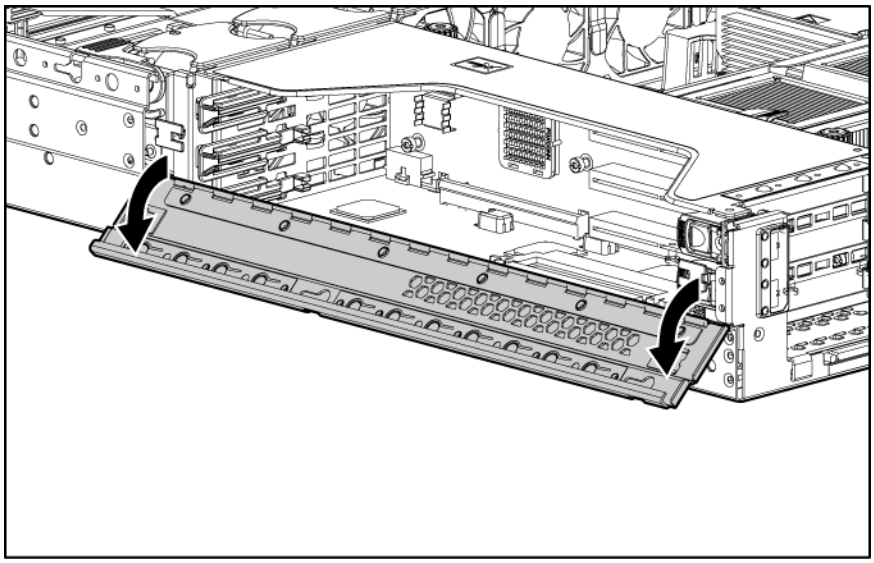
## PCI Hot Plug expansion slot cover

**NOTE:** Hot-plug functionality is supported only under Microsoft® Windows® 2000 and Windows® 2003. Hot-plug drivers are not required.

To remove the component:

**CAUTION:** If the operating system installed on the server does not support PCI Hot Plug functionality, power down the server (on page 20) before removing expansion boards.

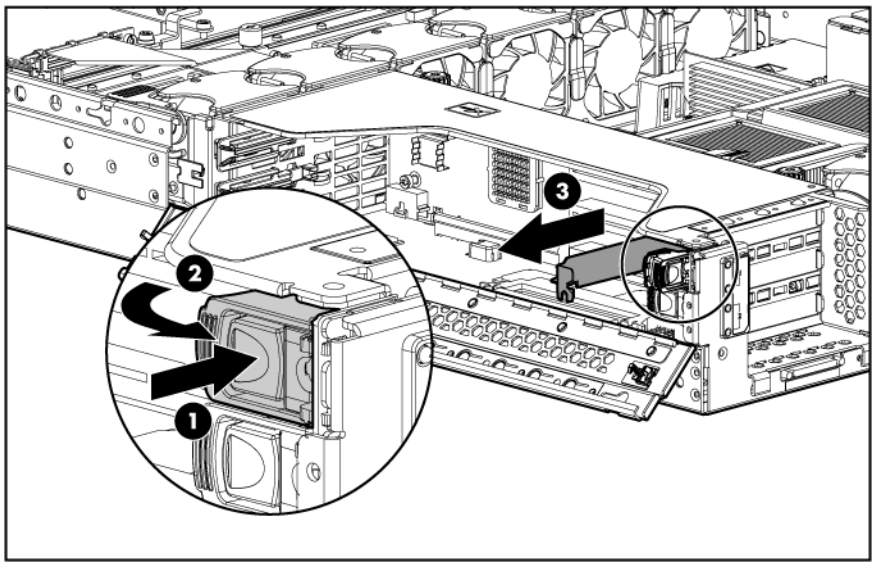
1. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
2. Remove the access panel ("Access panel" on page 22).
3. Open the PCI riser cage door.



4. Press the PCI Hot Plug button ("Internal PCI Hot Plug LEDs and button" on page 90) to remove power from the slot. When the green power LED on the slot stops flashing, power has been removed from the slot.

△ **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.

# 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.

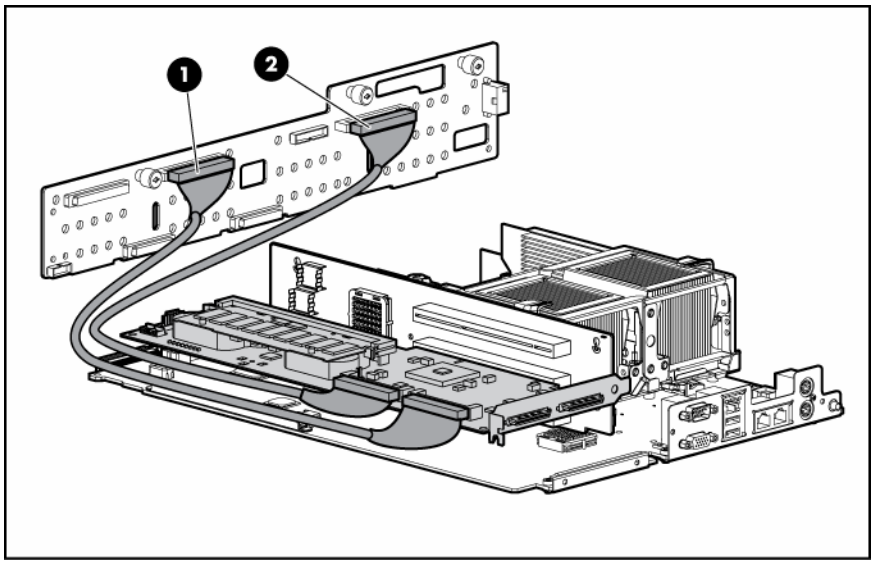
For information on cabling peripheral components, refer to the white paper on high-density deployment in HP or Compaq branded racks on the HP website (http://www.hp.com).

# SAS model cabling

## SAS hard drive cabling

The HP ProLiant DL380 Generation 4 Server Service and Maintenance Guide 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.

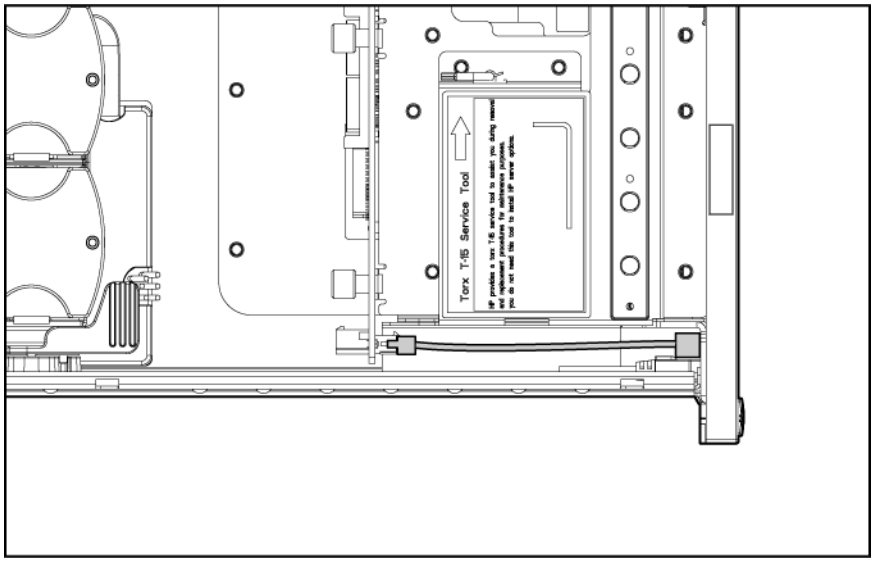
**NOTE:** If storage devices are connected to both the internal (1I) and external (1E) SAS connectors, the SAS controller recognizes only the devices connected to the internal connector. To attach devices to the external connector, disconnect the internal connector. Refer to the documentation that documentation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



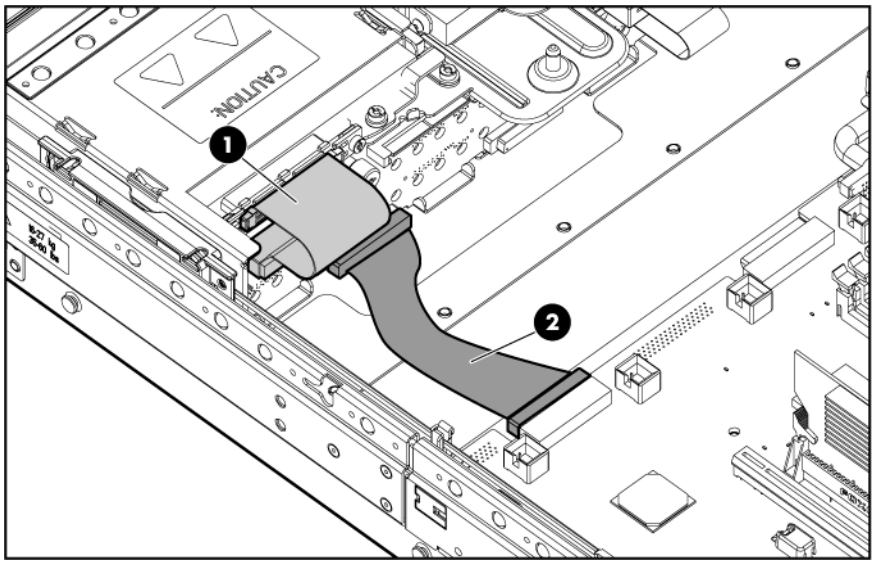

| Item | Description |
|---|---|
| 1 | SAS connector 1 |
| 2 | SAS connector 2 |

## USB cabling

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

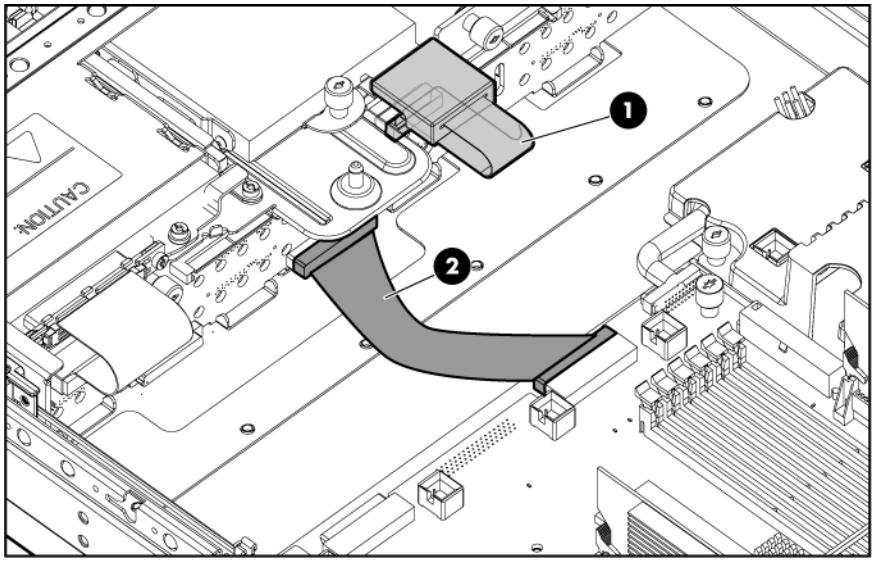


## DVD/CD-ROM drive cabling




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

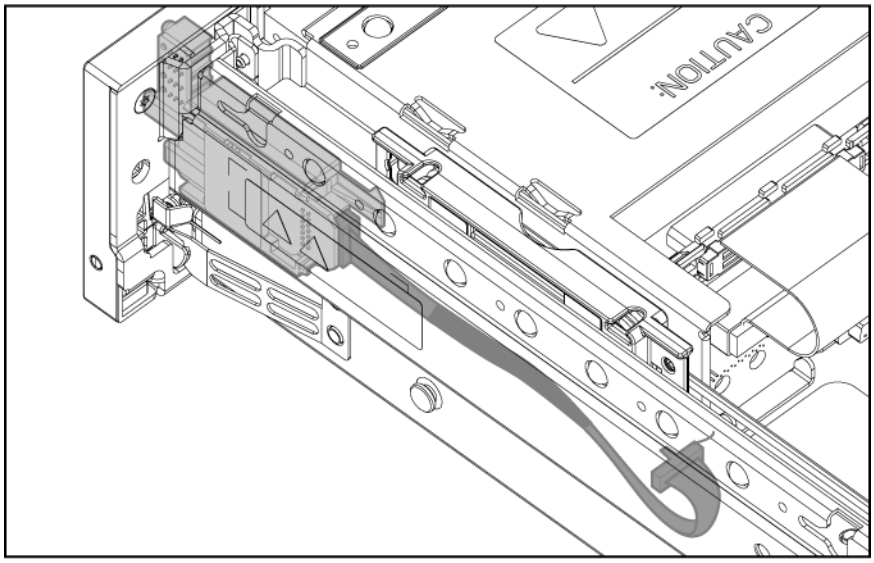
## Diskette drive cabling




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

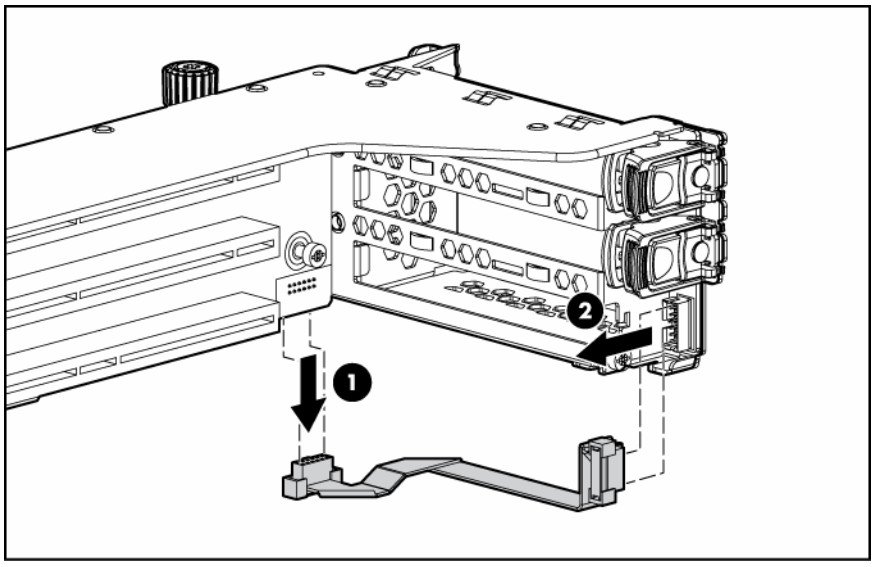
## Power button/LED cabling

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



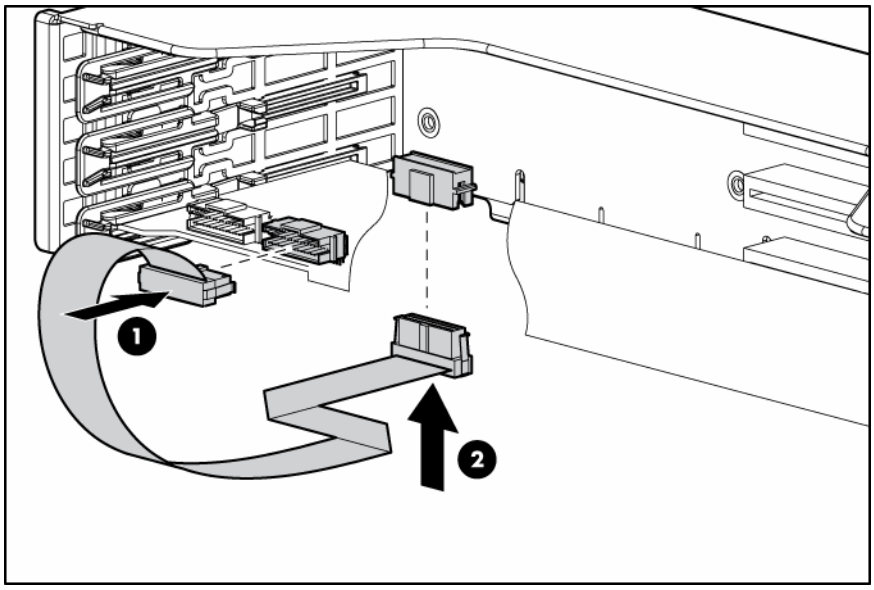

## Optional PCI Hot Plug backplane cabling

The server contains a PCI Hot Plug backplane that is part of the PCI Hot Plug option and provides hot-plug capability for two expansion slots. A ribbon cable connects the PCI Hot Plug backplane to the riser board.

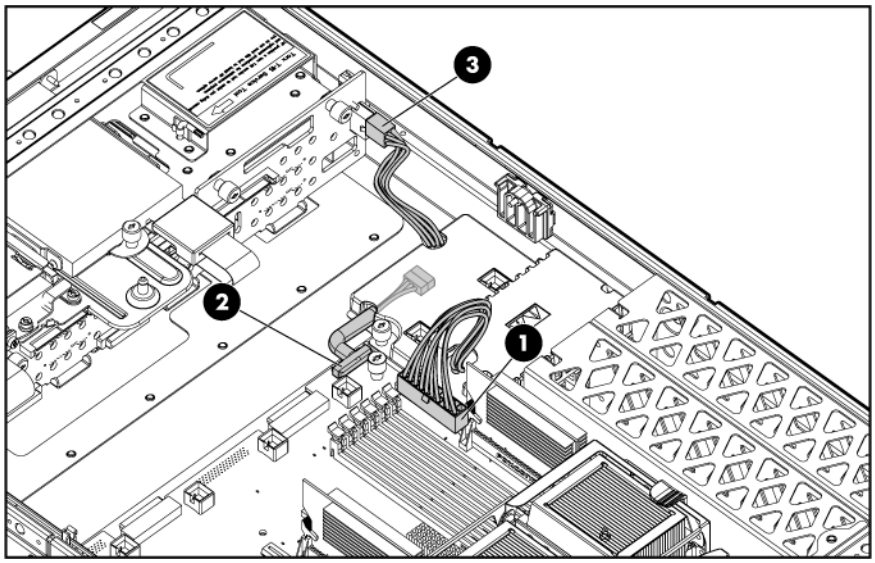


## RILOE II cabling

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 |

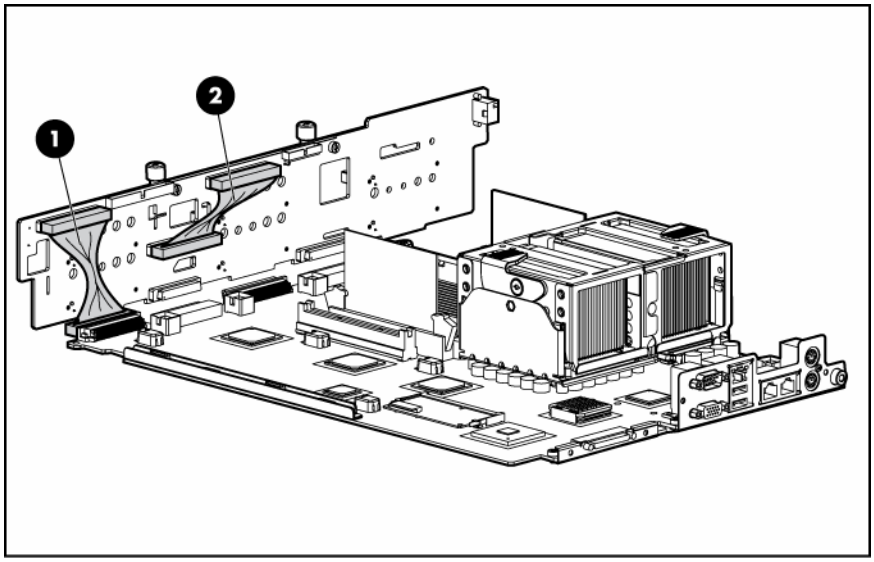
# SCSI model cabling

**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 85)" 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.



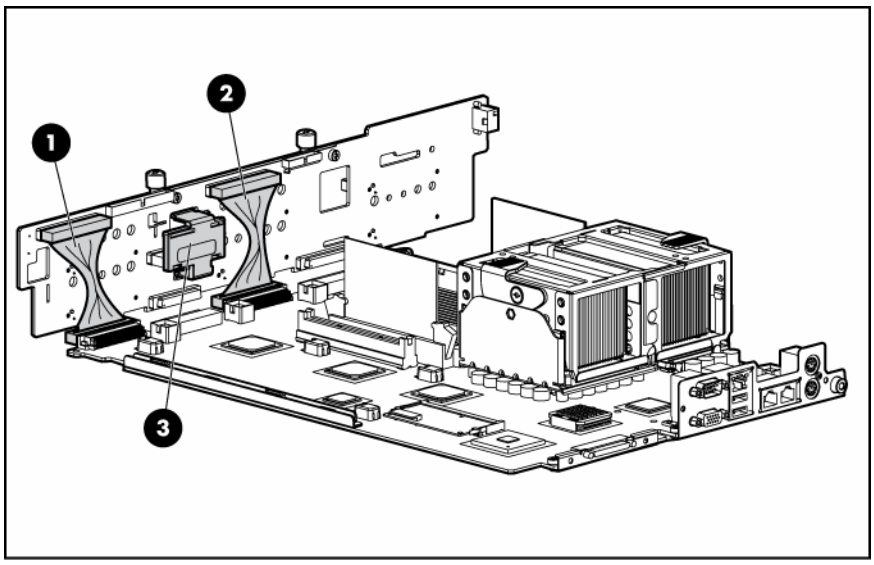

**NOTE:** The short SCSI cables are identical.

| 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.

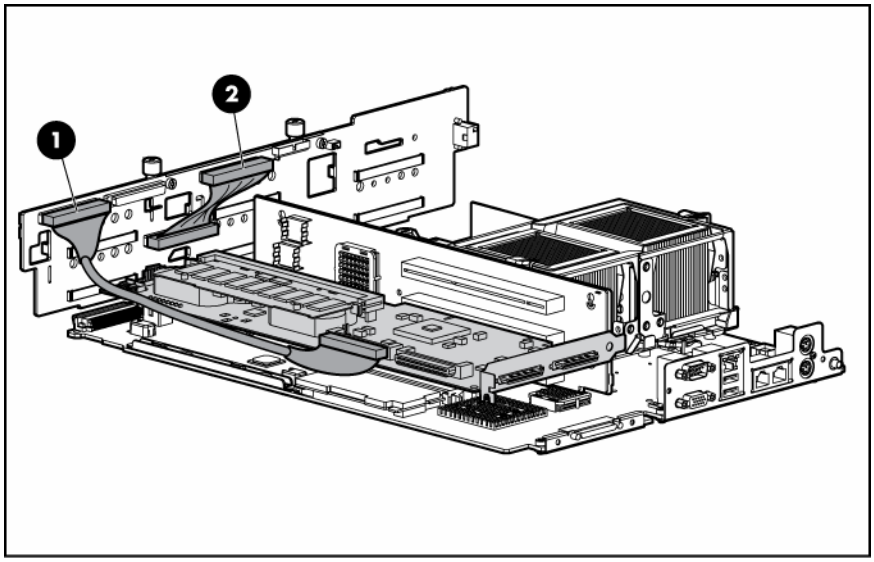
**NOTE:** The short SCSI cables are identical.

| 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 63)" 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.

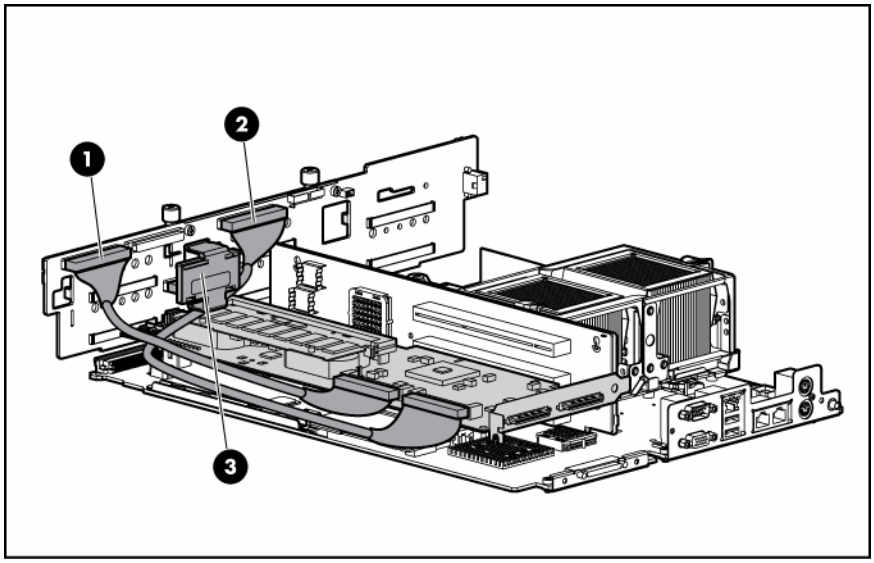


**NOTE:** Optional SCSI terminator board and optional long SCSI cables are available in the SCSI Configuration Option Kit.

| 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.

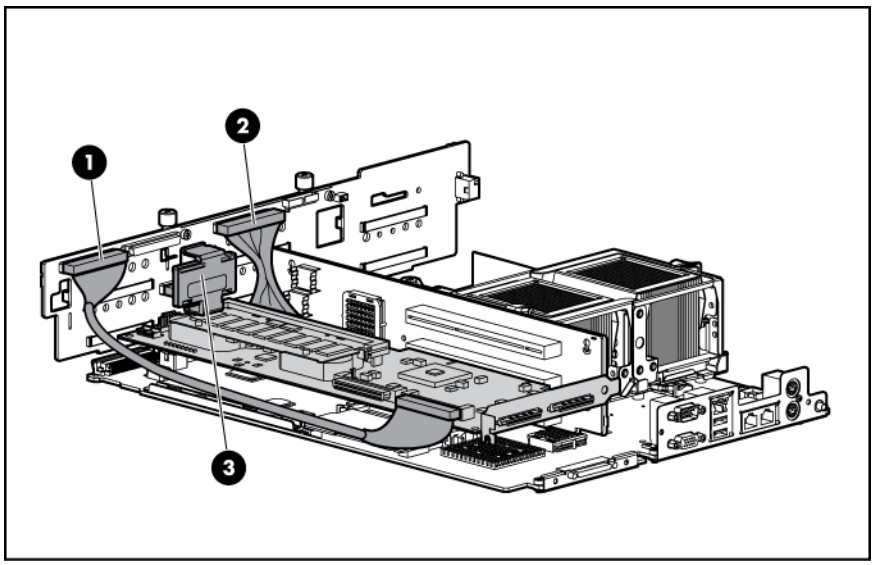
| Item | Component description | SCSI IDs managed |
|---|---|---|
| 1 | Optional long SCSI cable | 0, 1 |
| 2 | Optional long SCSI cable | 2, 3, 4, 5 |
| 3 | Optional terminator board | N/A |

Refer to "Installing the SCSI terminator board (on page 63)" 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.

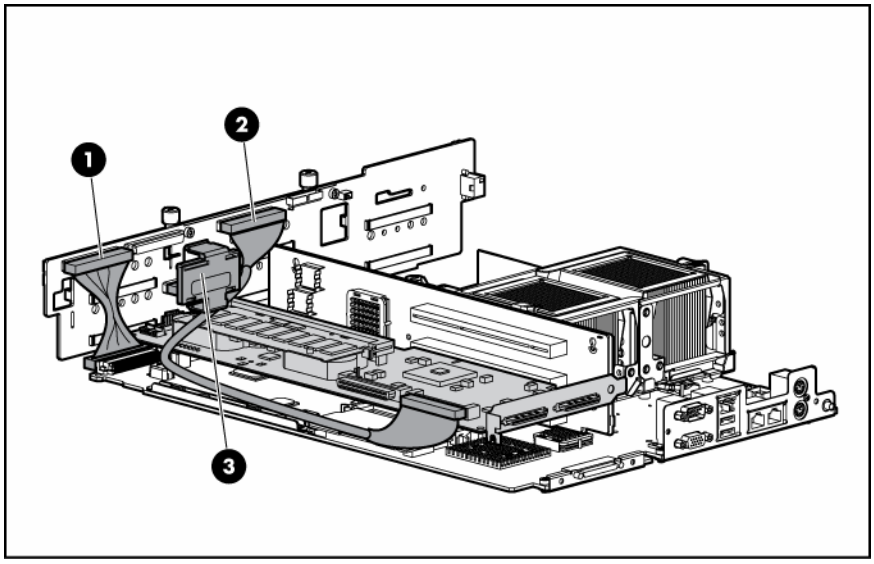
**NOTE:** This specific cabling configuration does not support external VHDCI.




**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 63)" for SCSI terminator board installation procedures.

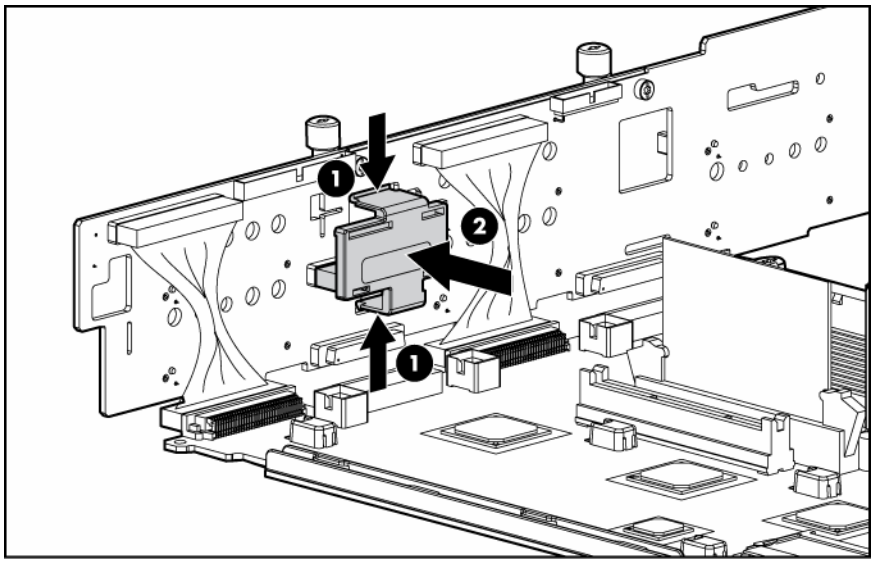
## Installing the SCSI terminator board

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the front fan bracket ("Front fan bracket" on page 25).

**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.



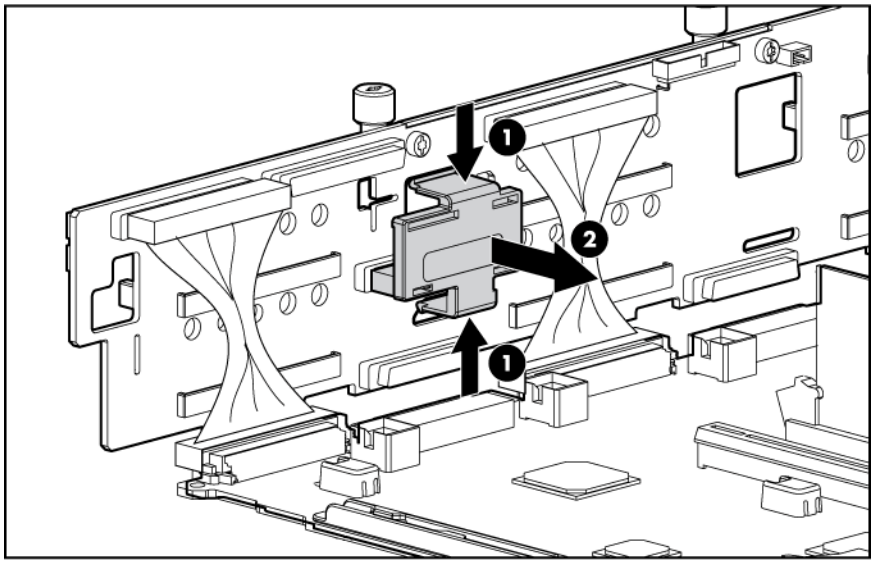

## Removing the SCSI terminator board

1. Power down the server (on page 20).
2. Extend or remove the server from the rack ("Extend the server from the rack" on page 19, "Remove the server from the rack" on page 20).
3. Remove the access panel ("Access panel" on page 22).
4. Remove the front fan bracket ("Front fan bracket" on page 25).

**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.

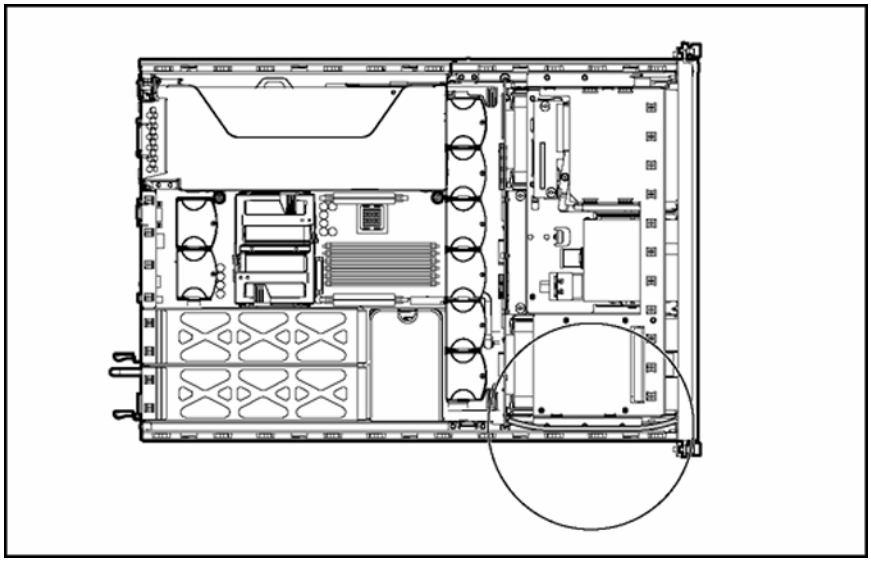
**NOTE:** For more information on preparing the server for installation or removal procedures, refer to the Documentation CD.

5. Remove the SCSI terminator board.

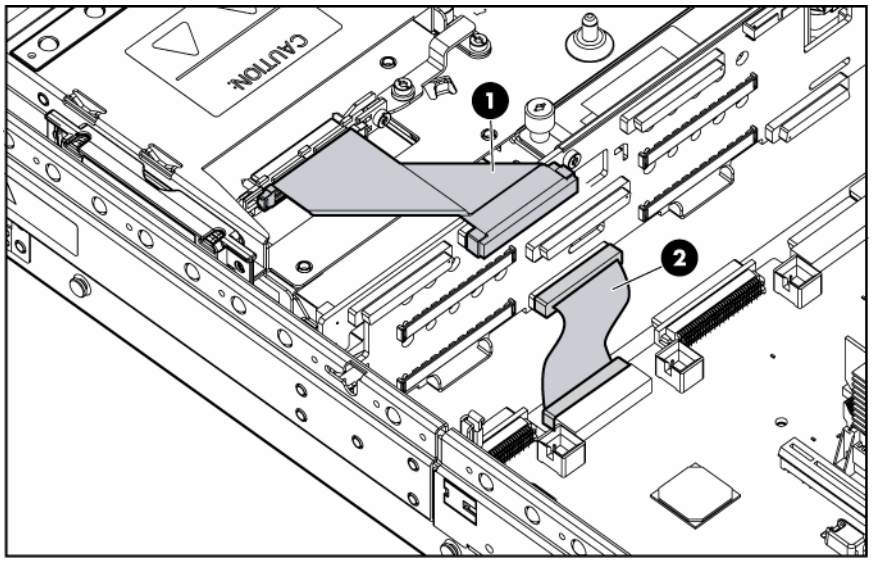



## USB cabling

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

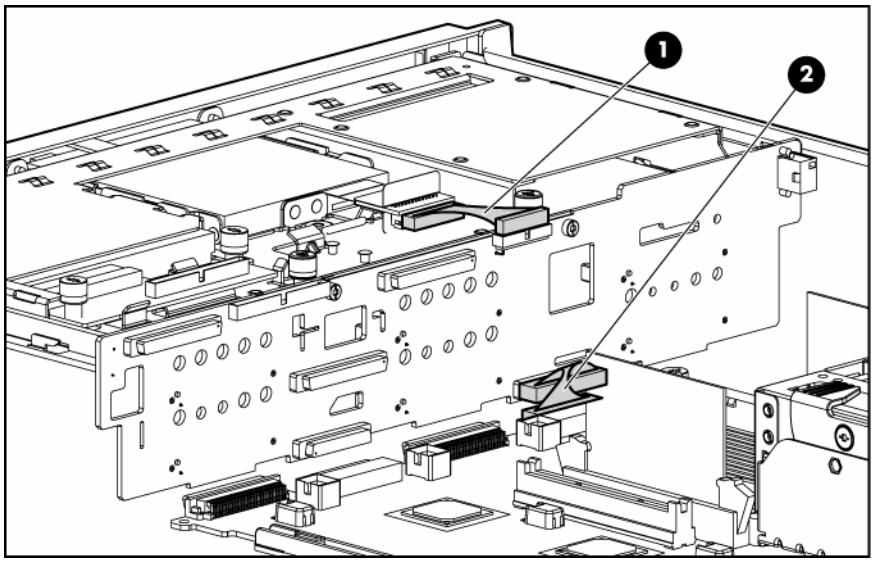


## DVD/CD-ROM drive cabling




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

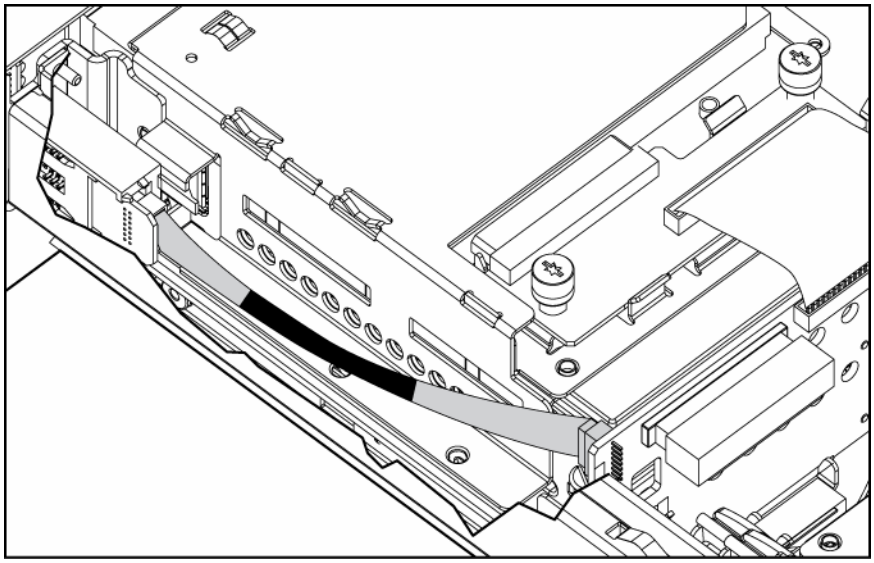
## Diskette drive cabling




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

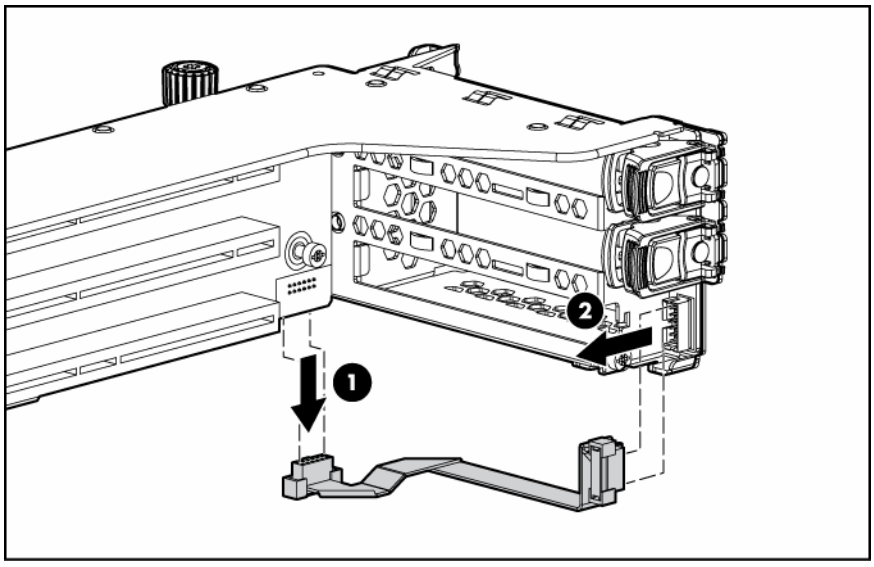
## Power button/LED cabling

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



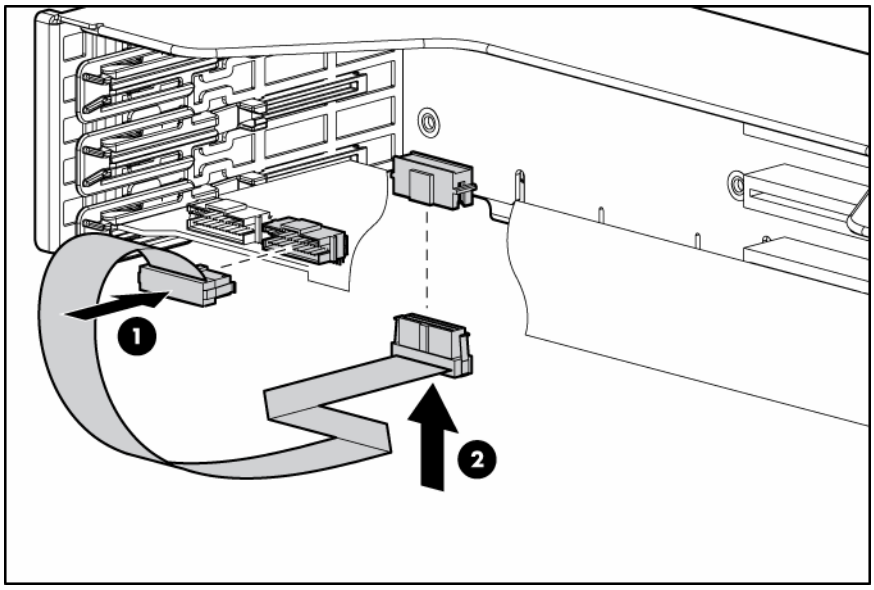
## Optional PCI Hot Plug backplane cabling

The server contains a PCI Hot Plug backplane that is part of the PCI Hot Plug option and provides hot-plug capability for two expansion slots. A ribbon cable connects the PCI Hot Plug backplane to the riser board.

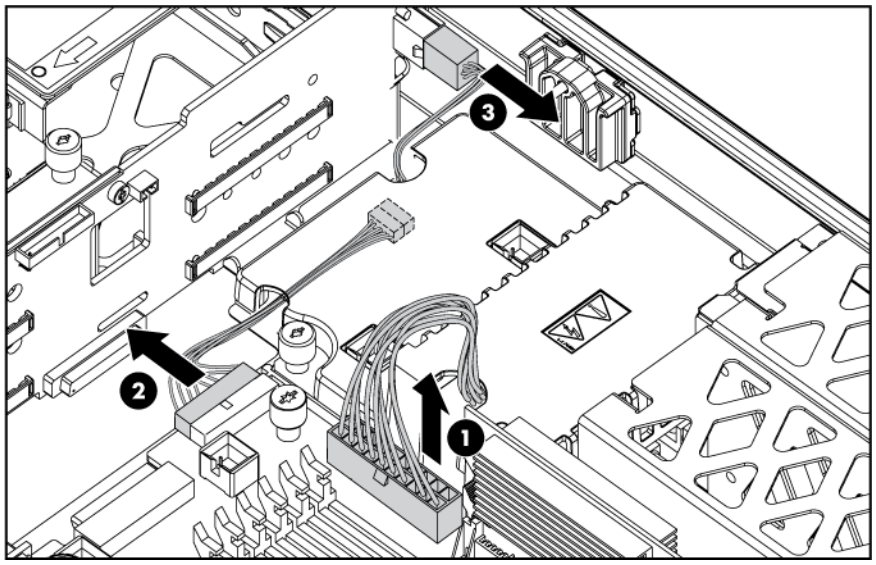


## RILOE II cabling

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.

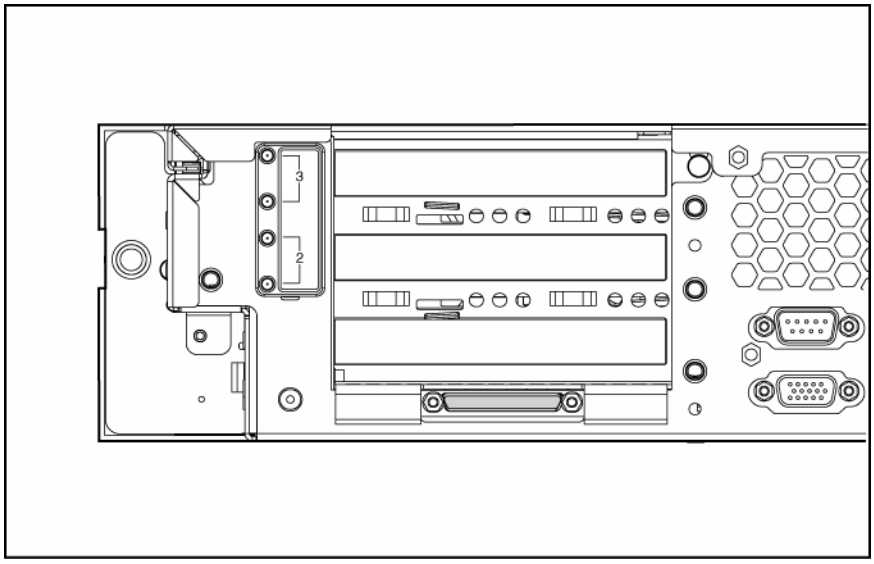



## Internal power cabling




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

# External storage cabling




The external VHDCI SCSI connector (port 1) can only be used in the following SCSI configurations:

- Embedded simplex
- PCI simplex
- PCI duplex
- Mixed duplex (one of two configuration options)

  For more information, refer to "Mixed duplex SCSI cabling ("PCI duplex SCSI cabling" on page 61)".

After cabling external storage options, use the following software utilities:

- RBSU, to configure new hardware in the system

  For more information, refer to "HP ROM-Based Setup Utility (on page 72)" or the *ROM-Based Setup Utility User Guide* on the Documentation CD.
- ORCA, to configure and manage drive arrays

  For more information, refer to the *Smart Array 6i Controller User Guide* on the Documentation CD.

For more information on external cabling, refer to the HP website (http://www.hp.com/products/servers/platforms).

# 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.

# Array Diagnostic Utility

ADU is a tool that collects information about array controllers and generates a list of detected problems. ADU can be accessed from the SmartStart CD ("SmartStart software" on page 72) or downloaded from the HP website (http://www.hp.com).

# 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 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).

# 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 71)
- From within Survey Utility (on page 70)
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows®: IML Viewer
  - For Linux: IML Viewer Application
- From within the RILOE user interface
- From within HP Insight Diagnostics (on page 70)

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

# Survey Utility

Survey Utility, a feature within HP Insight Diagnostics (on page 70), gathers critical hardware and software information on ProLiant servers.

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

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

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP.

# 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).

# Lights Out Manager technology

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

Using RILOE, you can:

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

For more information about RILOE features, refer to the RILOE 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 70)
- 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 (on page 69), 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).

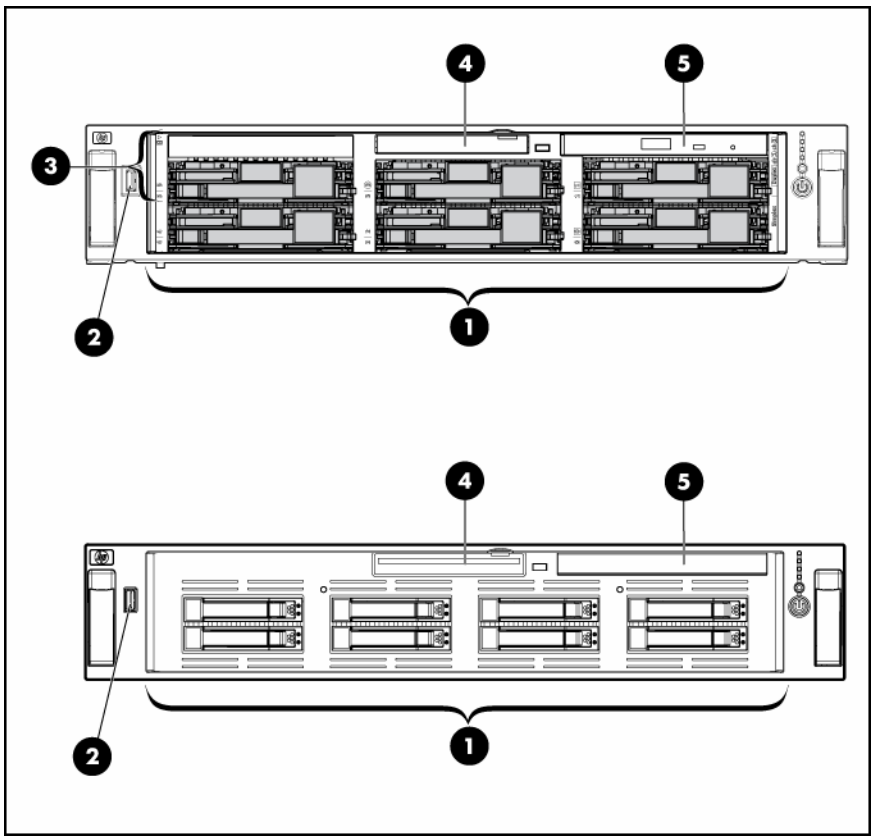
- Integrates with other software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

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

# Server component identification

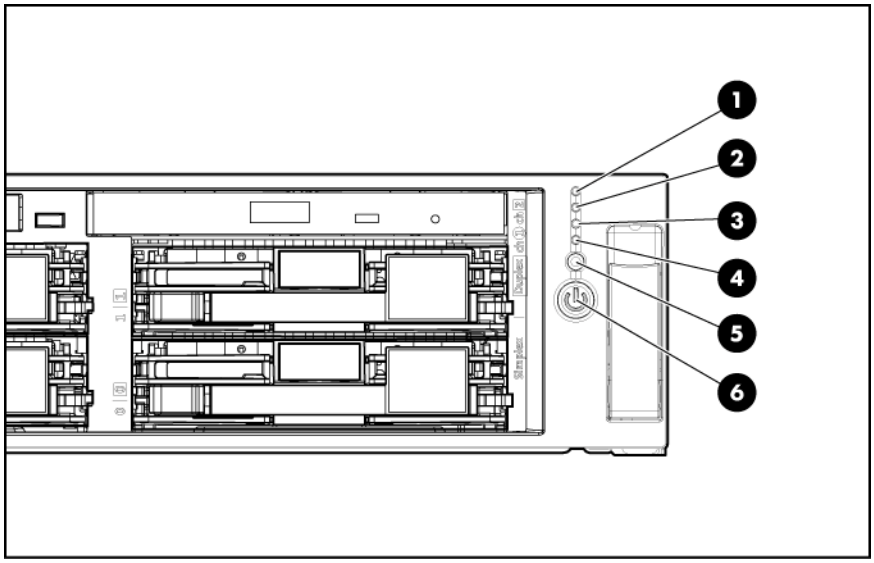
## In this section

# Front panel components



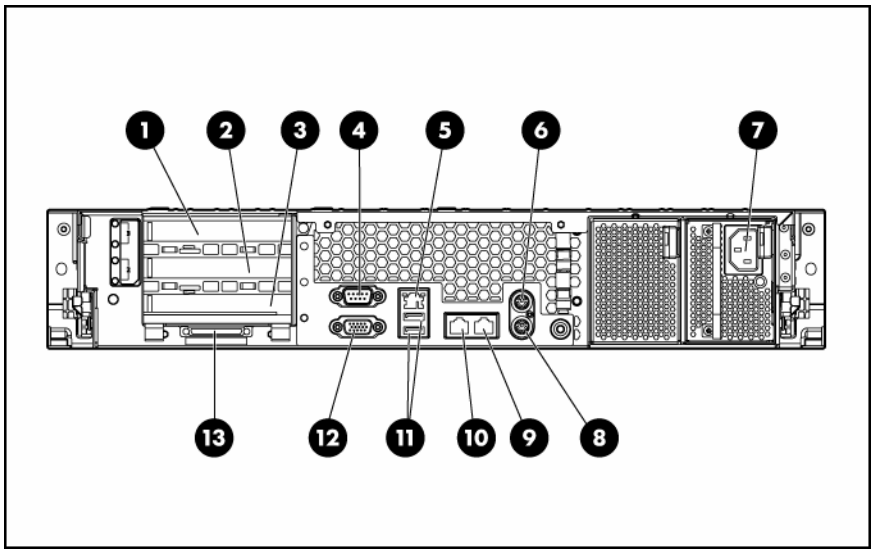

| Item | SCSI model (top) | SAS model (bottom) |
|---|---|---|
| 1 | Hard drive bays | Hard drive bays |
| 2 | USB port | USB port |
| 3 | Bay for tape drive or hard drive with tape drive blank | — |
| 4 | Diskette drive bay | Diskette drive bay |
| 5 | DVD/CD-ROM drive | DVD/CD-ROM drive |

# Front panel LEDs and buttons




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

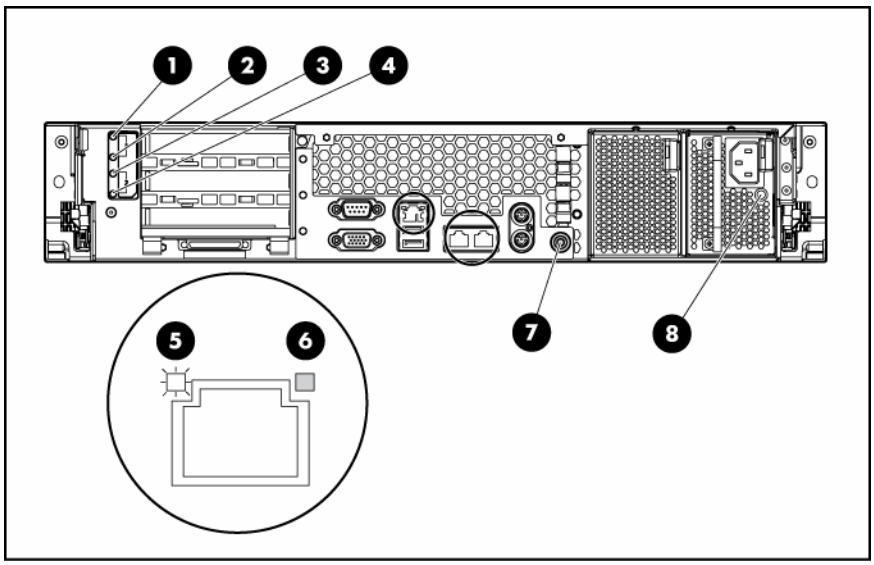
# Rear panel components




| Item | Description | Color |
|---|---|---|
| 1 | • Hot-plug or non-hot-plug PCI-X expansion slot 3, 64 bit/100 MHz, bus B<br>• PCI Express x4 slot 2, bus B* | N/A |
| 2 | • Hot-plug or non-hot-plug PCI-X expansion slot 2, 64 bit/100 MHz, bus B<br>• PCI Express x4 slot 1, bus A* | N/A |
| 3 | Non-hot-plug PCI-X expansion slot 1, 64 bit/133 MHz, bus A | 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 | Black |
| 12 | Video connector | Blue |
| 13 | VHDCI SCSI connector (port 1)** | N/A |

* x8 PCI Express cards are supported on the SCSI models and will run at x4 speeds. SAS models do not support PCI Express cards.
**This feature applies only to SCSI models.

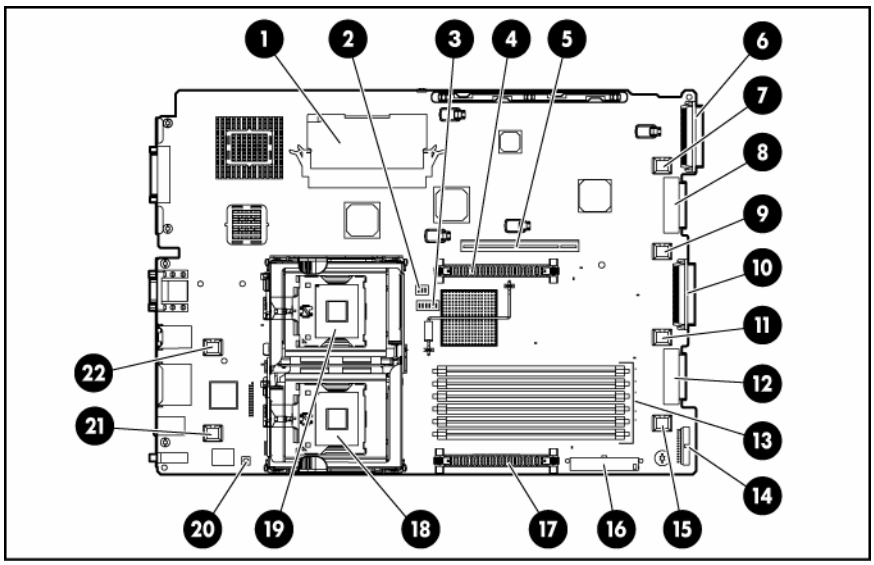
# Rear panel LEDs and buttons




| Item | Description | LED Color | Status |
|---|---|---|---|
| 1 | PCI Hot Plug fault LED (slot 3)* | Amber | On = Expansion board failed<br>Off = Normal |
| 2 | PCI Hot Plug power LED (slot 3)* | Green | On = Power is applied to the slot<br>Flashing = Power is cycling<br>Off = Power is not applied to the slot |
| 3 | PCI Hot Plug fault LED (slot 2)* | Amber | On = Expansion board failed<br>Off = Normal |
| 4 | PCI Hot Plug power LED (slot 2)* | Green | On = Power is applied to the slot<br>Flashing = Power is cycling<br>Off = Power is not applied to the slot |
| 5 | RJ-45 activity LED | Green | On or flashing = Network activity<br>Off = No network activity |
| 6 | RJ-45 link LED | Green | On = Linked to network<br>Off = Not linked to network |
| 7 | UID LED button | Blue | On = Activated<br>Flashing = System remotely managed<br>Off = Deactivated |
| 8 | Power supply LED | Green | On = Power turned on and power supply functioning properly<br>Off = One or more of the following conditions exists:<br>• AC power unavailable<br>• Power supply failed<br>• Power supply in standby mode<br>• Power supply exceeded current limit |

* This LED is only available when using the hot-plug expansion cage option.

# System board components




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

*This feature applies only to SCSI models.

## System maintenance switch

| Position | Default | Function |
|---|---|---|
| S1 | Off | Off = iLO security is enabled.<br>On = iLO security is disabled. |
| S2 | Off | Off = System configuration can be changed.<br>On = System configuration is locked. |
| S3 | Off | Reserved |
| S4 | Off | Off = Booting from diskette is controlled by RBSU.<br>On = Booting from diskette is enabled and RBSU is overridden. |

| Position | Default | Function |
|---|---|---|
| S5 | Off | Off = No function<br>On = Clears power-on password and administrator password. |
| S6 | Off | Off = No function<br>On = Clear NVRAM. |

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 switch

The NMI switch 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 operating systems, device drivers, and applications. Many crashes freeze a system, requiring you to do a hard reset. Resetting the system erases any information that would support root cause analysis.

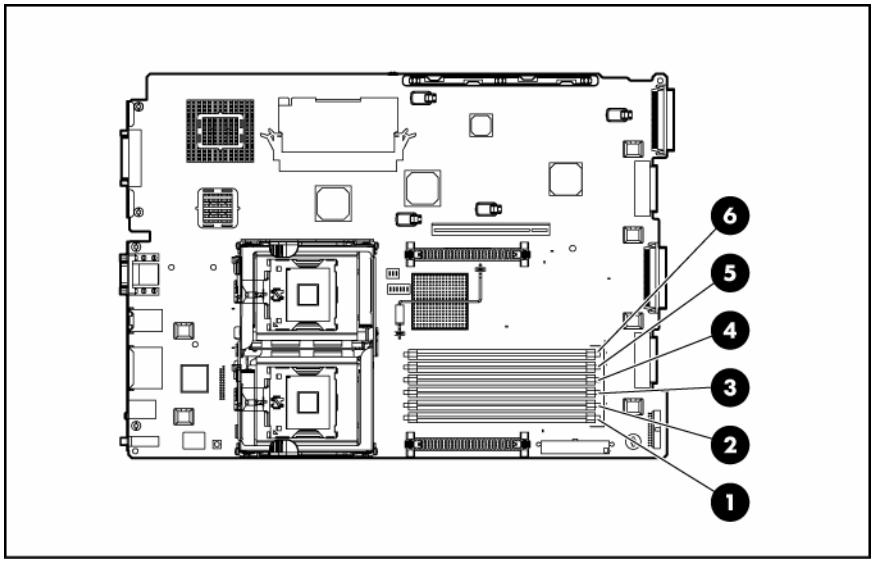
Systems running Microsoft® Windows® operating systems experience a blue screen trap when the operating system crashes. When this happens, Microsoft® recommends that system administrators perform an NMI event by pressing a dump switch. The NMI event enables a hung system to become responsive again.

## Chassis ID switch

The chassis ID switch on the system board is reserved for use by authorized technicians only. Do not modify the switch setting.

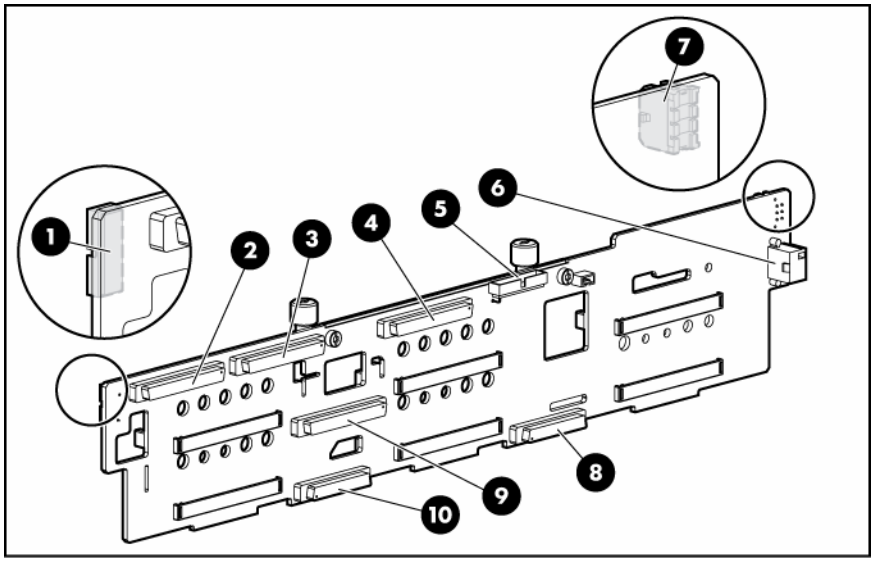
## DIMM slots

DIMM slots are numbered sequentially (1 through 6) and the paired banks are identified by the letters A, B, and C.



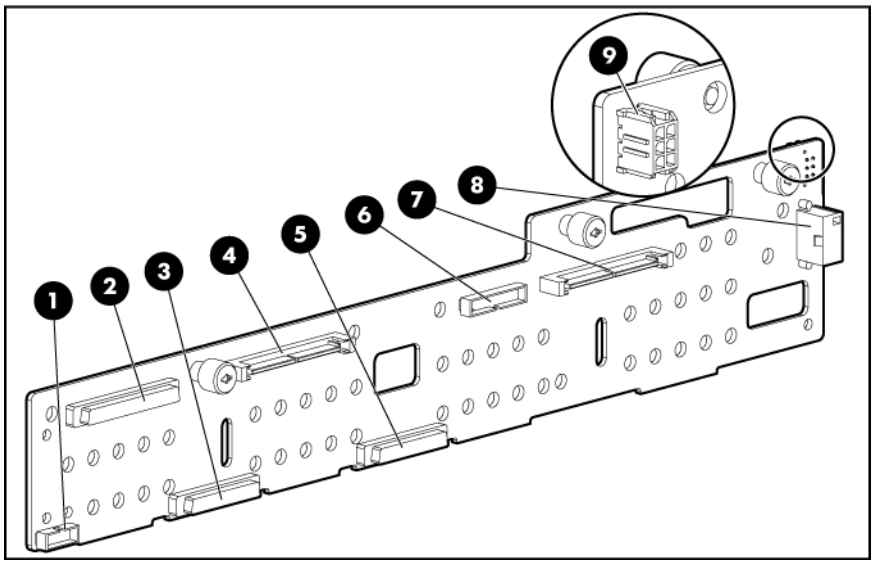
| Item | Description |
|---|---|
| 1 | DIMM slot 1A |
| 2 | DIMM slot 2A |
| 3 | DIMM slot 3B |
| 4 | DIMM slot 4B |
| 5 | DIMM slot 5C |
| 6 | DIMM slot 6C |

# SCSI backplane components



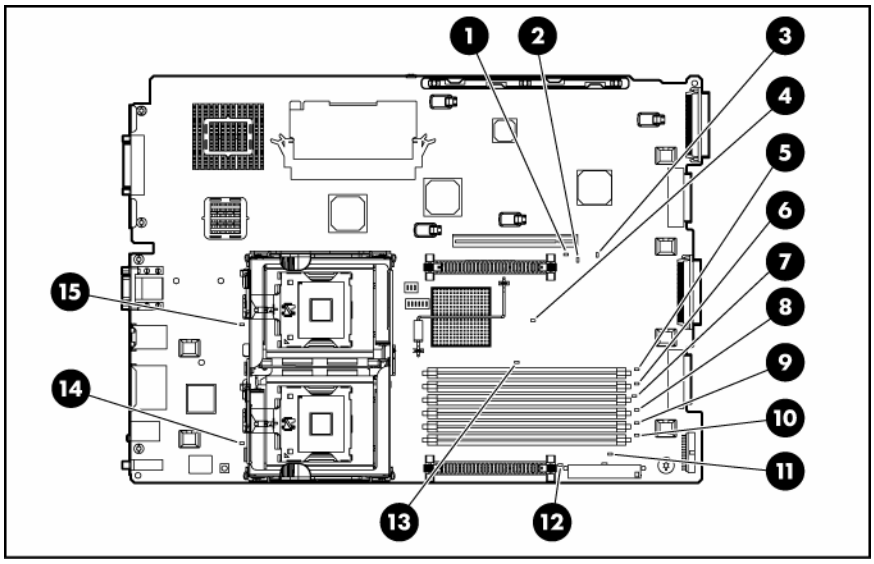

| Item | Description |
|---|---|
| 1 | Power button/LED connector |
| 2 | SCSI connector (port 2) |
| 3 | DVD/CD-ROM drive connector |
| 4 | SCSI connector (port 1) |
| 5 | Diskette drive connector |
| 6 | Power connector |
| 7 | USB connector |
| 8 | Diskette drive system connector |
| 9 | SCSI connector (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 | PPM 2 failure | Amber = PPM failed<br>Off = Normal |
| 2 | Overtemperature | Amber = Cautionary or critical temperature level detected<br>Off = Temperature OK |
| 3 | Riser interlock | Amber = PCI riser cage not seated<br>Off = PCI riser cage is seated |
| 4 | Fan failure LED | Off = Fan is not powered<br>Green = Normal<br>Amber = Failure |
| 5 | DIMM 6C failure | Amber = Memory failed*<br>Off = Normal |
| 6 | DIMM 5C failure | Amber = Memory failed*<br>Off = Normal |
| 7 | DIMM 4B failure | Amber = Memory failed*<br>Off = Normal |
| 8 | DIMM 3B failure | Amber = Memory failed*<br>Off = Normal |
| 9 | DIMM 2A failure | Amber = Memory failed*<br>Off = Normal |
| 10 | DIMM 1A failure | Amber = Memory failed*<br>Off = Normal |
| 11 | Online spare memory | Amber = Failover, online spare memory in use<br>Green = Enabled, but not in use<br>Off = Disabled |
| 12 | PPM 1 failure | Amber = PPM failed<br>Off = Normal |
| 13 | iLO diagnostic LEDs | Refer to the *HP Integrated Lights-Out User Guide* on the Documentation CD. |
| 14 | Processor 1 failure | Amber = Processor failed<br>Off = Normal |
| 15 | Processor 2 failure | Amber = Processor failed<br>Off = Normal |

*If all DIMM failure LEDs are lit, the memory configuration is invalid. Refer to "DIMM Configuration Requirements" for proper memory configuration.

# System LEDs and internal health LED combinations

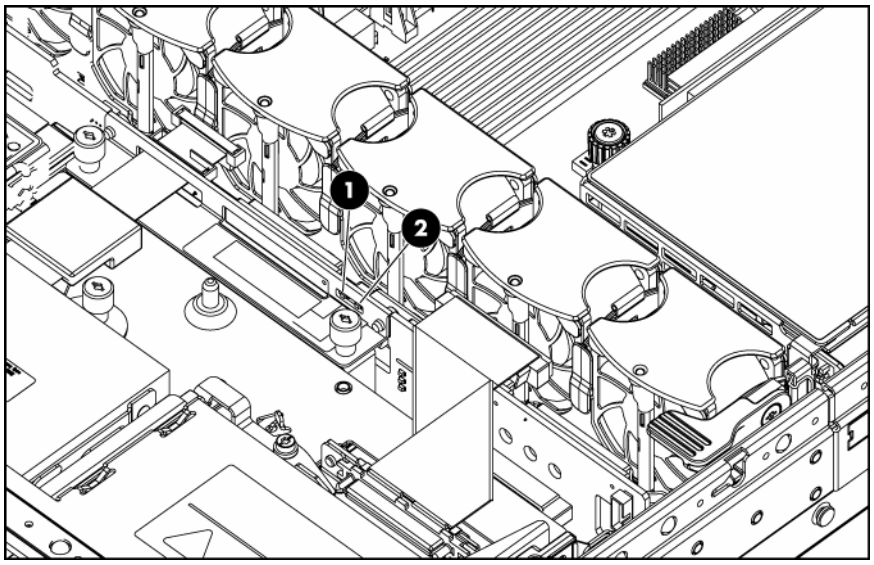
When the internal health LED on the front panel illuminates either amber or red, the server is experiencing a health event. Combinations of illuminated system LEDs and the internal health LED indicate system status.

The front panel health LEDs indicate only the current hardware status. In some situations, HP SIM 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 | One or more of the following conditions may exist:<br>• Processor in socket *X* has failed.<br>• Processor *X* is not installed in the socket.<br>• Processor *X* is unsupported.<br>• ROM detects a failed processor during POST. |
| | Amber | Processor in socket *X* is in a pre-failure condition. |
| PPM failure, slot *X* (amber) | Red | • PPM in slot *X* has failed.<br>• PPM is not installed in slot *X*, but the corresponding processor is installed. |
| DIMM failure, slot *X* (amber) | Red | • DIMM in slot *X* has failed. |
| | Amber | • DIMM in slot *X* is in a pre-failure condition. |
| DIMM failure, all slots in one bank (amber) | Red | No valid or usable memory is installed in the system. |
| Overtemperature (amber) | Red | • The Health Driver has detected a cautionary temperature level.<br>• The server has detected a hardware critical temperature level. |
| Riser interlock (amber) | Red | PCI riser cage is not seated. |
| Online spare memory (amber) | Amber | Bank *X* failed over to the online spare memory bank. |
| Power converter module (amber) | Red | Power converter module has failed. |
| Fan (amber) | Amber | Redundant fan has failed. |
| | Red | The minimum fan requirements are not being met. One or more fans have failed or are missing. |
| SCSI configuration error (amber)* | Red | SCSI cabling or terminator configuration is incorrect for SCSI backplane. |

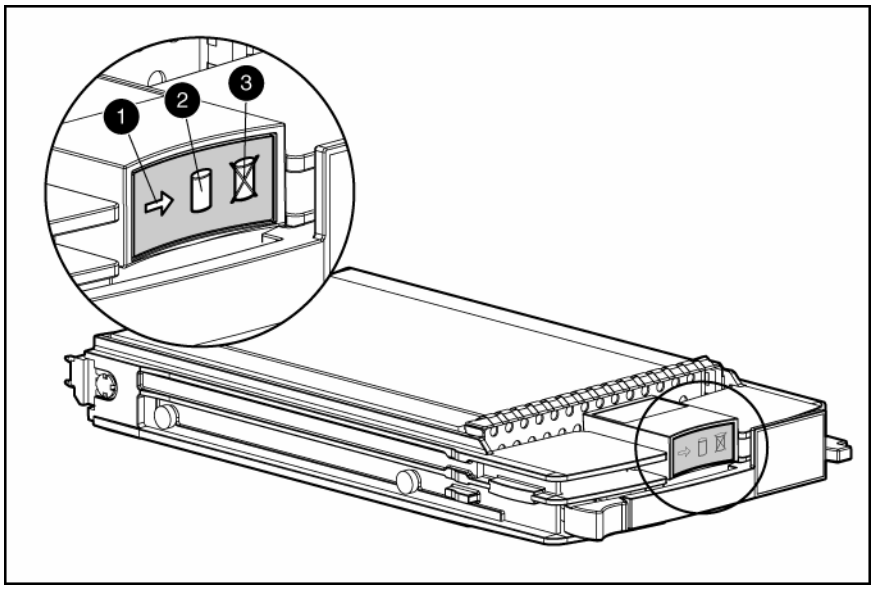
*This feature applies only to SCSI models.

# SCSI backplane LEDs




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

# Hot-plug SCSI hard drive LEDs



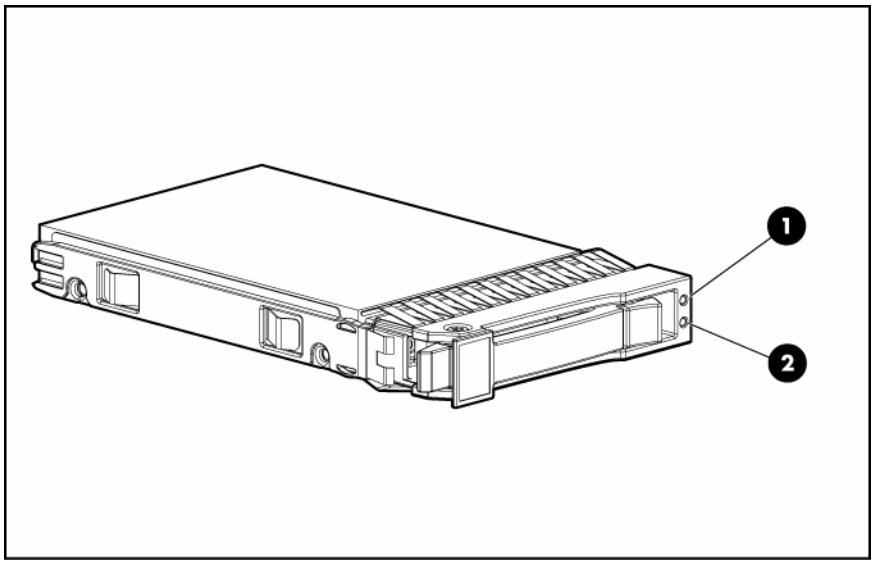
| Item | LED description | Status |
|---|---|---|
| 1 | Activity status | On = Drive activity<br>Flashing = High activity on the drive or drive is being configured as part of an array.<br>Off = No drive activity |
| 2 | Online status | On = Drive is part of an array and is currently working.<br>Flashing = Drive is actively online.<br>Off = Drive is offline. |
| 3 | Fault status | On = Drive failure<br>Flashing = Fault-process activity<br>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.<br>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.<br>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.**<br>The drive is rebuilding or undergoing capacity expansion. |
| On | Off | Off | **Do not remove the drive.**<br>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.**<br>One or more of the following conditions may exist:<br>• The drive is part of an array being selected by an array configuration utility<br>• Drive Identification has been selected in HP SIM<br>• 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.<br>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:<br>• The drive is not configured as part of an array<br>• The drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet<br>• The drive is configured as an online spare<br>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.<br>Replace the drive as soon as possible. |
| On | Off | The drive is online, but it is not active currently. |

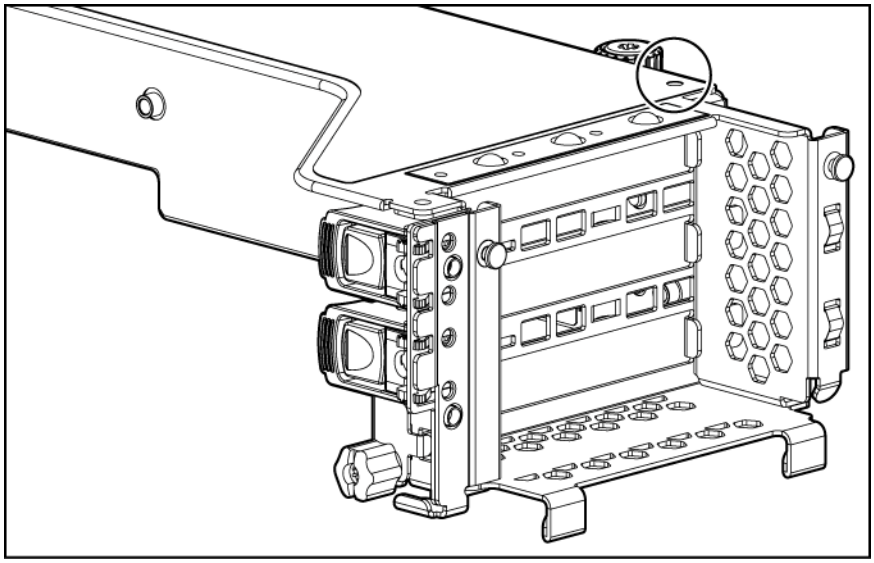
| Online/activity LED (green) | Fault/UID LED (amber/blue) | Interpretation |
|---|---|---|
| Flashing regularly (1 Hz) | Amber, flashing regularly (1 Hz) | **Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.**<br>The drive is part of an array that is 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.**<br>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 Hot Plug LED status combinations

| Power LED (green) | Fault LED (amber) | OK to open? | Slot status |
|---|---|---|---|
| On | Off | No | The power to the slot is on and the slot is functioning normally. **Do NOT open the slot release lever**. |
| On | On | No | The power to the slot is on, but the slot needs attention for a possible problem with the slot, board, or driver. **DO NOT open the slot release lever.**<br>Examine the logs and HP SIM. If the expansion board is faulty, remove or replace the board. |
| Flashing | On or off | No | The power to the slot is being turned off or on, which may take several seconds. **DO NOT open the slot release lever.**<br>To cancel the operation, press the PCI Hot Plug button. |
| Off | On | Yes | The power to the slot is off, but the slot needs attention for a possible problem with the slot, board, or driver. |
| Off | Off | Yes | The power to the slot is off. |

# PCI riser cage LED

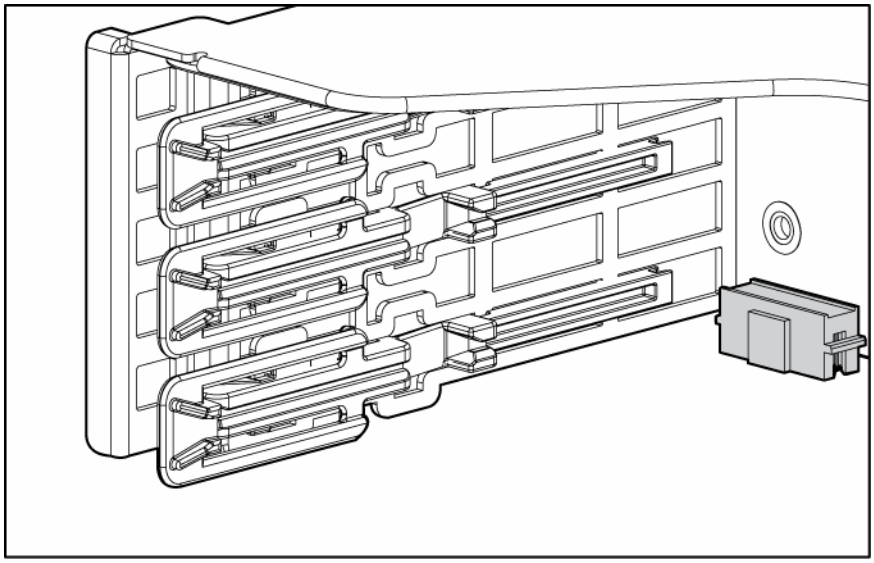
**CAUTION:** To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.



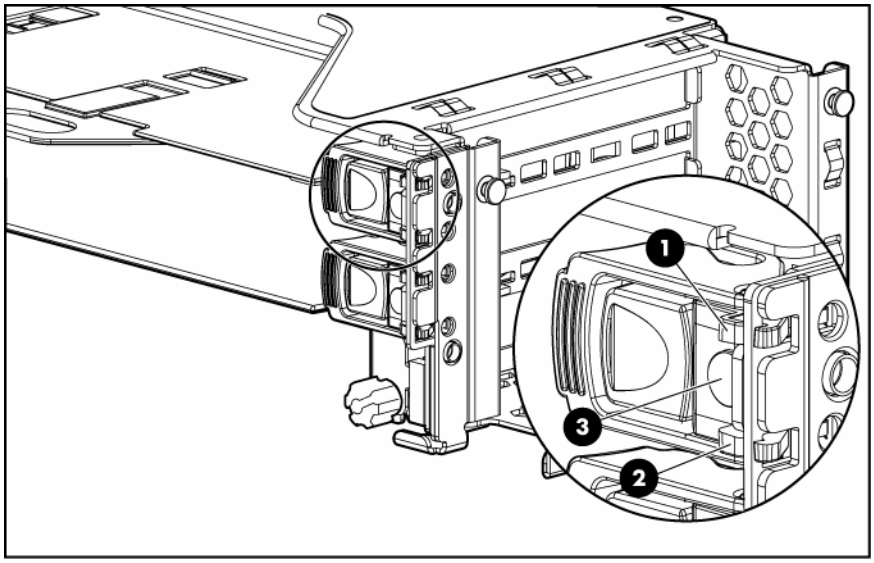
| Status |
| --- |
| On = AC power connected |
| Off = AC power disconnected |

# Remote management connector

The 30-pin remote management connector, located on the PCI riser cage, is used to cable the Remote Insight Lights-Out Edition II option. For more information, refer to "RILOE II cabling (on page 58)" or the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



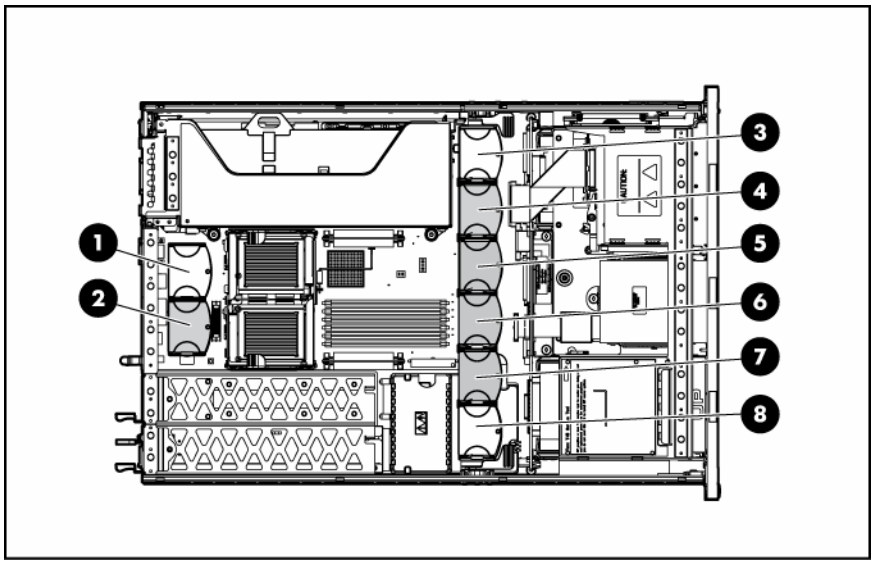
# Internal PCI Hot Plug LEDs and button




**NOTE:** Hot-plug LEDs are available only with the optional hot-plug PCI riser cage.

| Item | Description | Status |
|---|---|---|
| 1 | Fault LED (Amber) | On = Expansion board failed.<br>Off = Normal |
| 2 | Power LED (Green) | On = Power is applied to the slot.<br>Flashing = Power is cycling.<br>Off = Power is not applied to the slot. |
| 3 | PCI Hot Plug button | N/A |

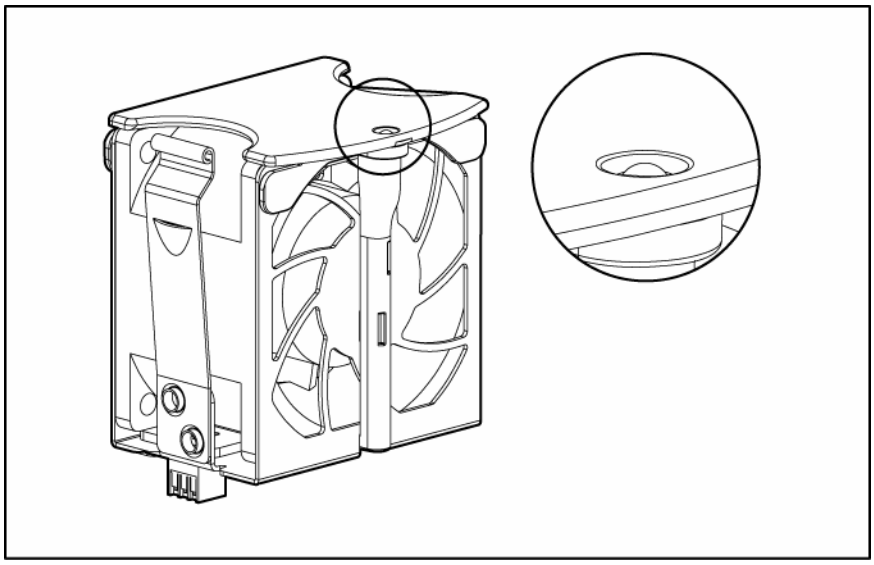
# Identifying hot-plug fans




| Item | Description | Configuration |
|---|---|---|
| 1 | Fan 1 | Redundant |

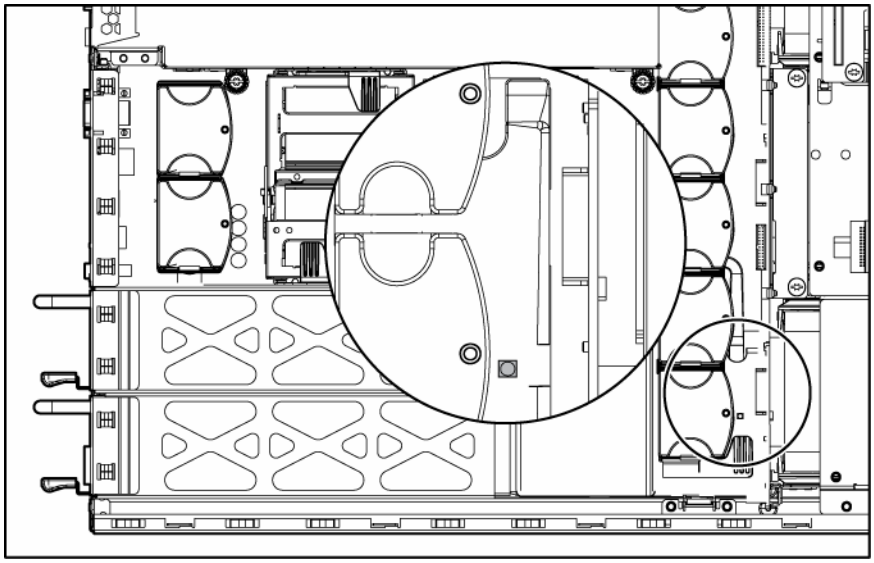
| Item | Description | Configuration |
|---|---|---|
| 2 | Fan 2 | Primary |
| 3 | Fan 3 | Redundant |
| 4 | Fan 4 | Primary |
| 5 | Fan 5 | Primary |
| 6 | Fan 6 | Primary |
| 7 | Fan 7 | Primary |
| 8 | Fan 8 | Redundant |

# Hot-plug fan LED



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

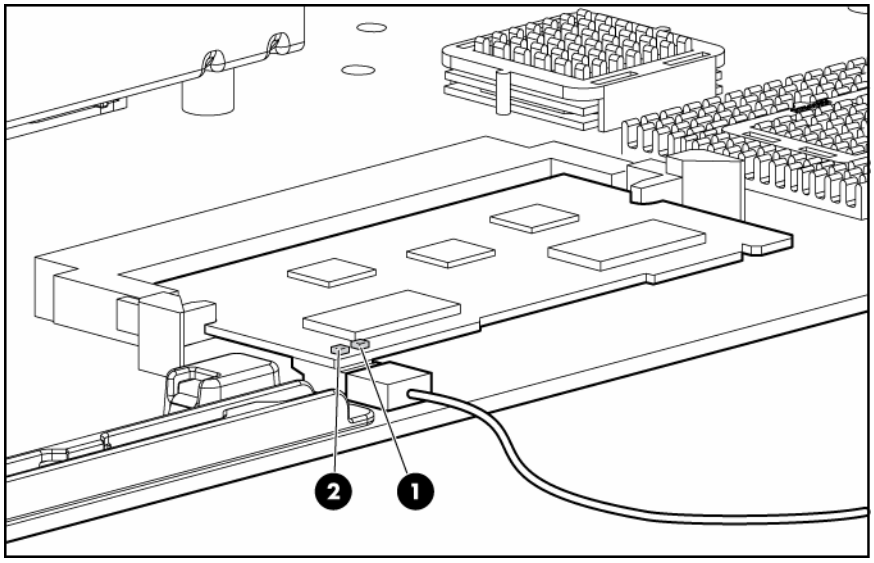
# Power converter module LED



| 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 93)."

# 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 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



# 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** | |
| 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 |

# Environmental specifications

| Specification | Value |
|---|---|
| **Temperature range*** | |
| Operating | 10°C to 35°C (50°F to 95°F) |

| Specification | Value |
|---|---|
| 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.

# 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/).

# DDR2 SDRAM DIMM specifications

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

| Item | Description |
|---|---|
| Size | 512 MB, 1 GB, 2 GB |
| Width | 72 bits |
| Upgrade requirement * | Any combination of like-paired DDR2 DIMMs that provide a minimum of 512 MB |

*Use only 512-MB, 1-GB, or 2-GB, 72-bit wide, 1.8-V, PC2-3200 Registered ECC DDR2. Use HP DDR2 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 |
| **Transfer rate** | |

| Specification | Value |
|---|---|
| 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 $\mu$m ($6.3 \times 10^{-7}$ in) |
| Cache/buffer | 128 KB |
| Startup time | < 10 s |
| Stop time | < 5 s (single); < 30 s (multisession) |

| Specification | Value |
|---|---|
| **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)<br>2352, 2340, 2336, 2048 bytes (mode 1)<br>2352, 2340, 2336, 2048 bytes (mode 2)<br>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<br><300 ms DVD |
| Random | <110 ms CD<br><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<br>1.6 µm (6.3 × $10^{-7}$ in) CD-ROM |
| Cache/buffer | 128 KB |
| Startup time | < 10 s |
| Stop time | < 5 s (single); < 30 s (multisession) |

| Specification | Value |
|---|---|
| **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

| Item | 36.4-GB Ultra320 SCSI drive | 72.8-GB Ultra320 SCSI drive | 72.8-GB Ultra320 SCSI drive | 146.8-GB Ultra320 SCSI drive |
|---|---|---|---|---|
| Capacity | 36,419.6 MB | 72,837.2 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) | One-third, 1.0 in |
| Width | 4.0 in | 4.0 in | 4.0 in | 4.0 in |
| Interface | Ultra320 SCSI | Ultra320 SCSI | Ultra320 SCSI | Ultra320SCSI |
| Transfer rate | 320 MB/sec | 320 MB/sec | 320 MB/sec | 320 MB/sec |
| Rotational speed | 15,000 rpm | 10,000 rpm | 15,000 rpm | 10,000 rpm |
| Bytes per sector | 512 | 512 | 512 | 512 |
| Logical blocks | 71,132,000 | 142,264,000 | 142,264,000 | 286,749,488 |
| 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) | 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

### RoHS

Restriction of Hazardous Substances

### 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

# Index

## K



## L



## M



## N



## O



## P



## R



## S

## T



## U



## V



## W