

HP ProLiant DL560 Server Maintenance and Service Guide



January 2004 (Third Edition)
Part Number 303206-003

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Audience Assumptions

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

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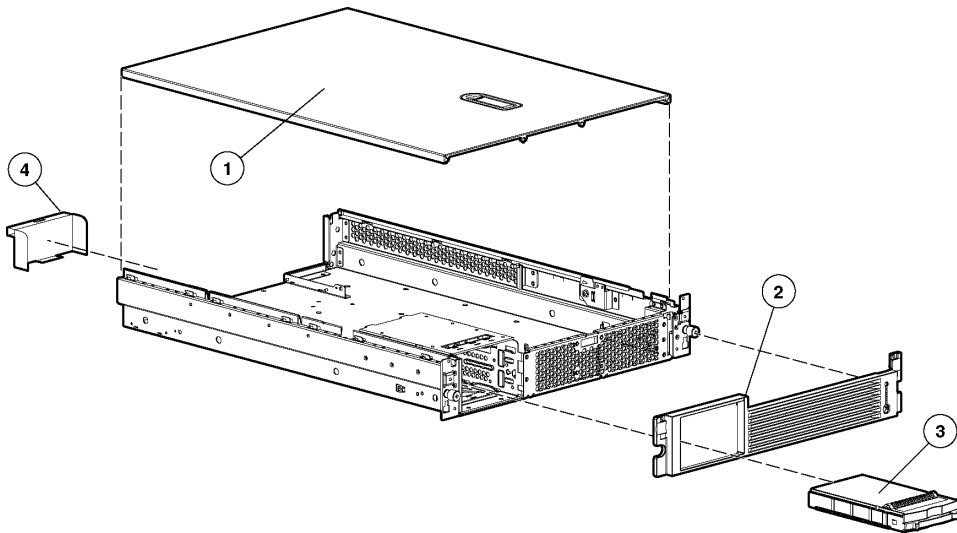
Hot-Plug Fan LED 95

Illustrated Parts Catalog

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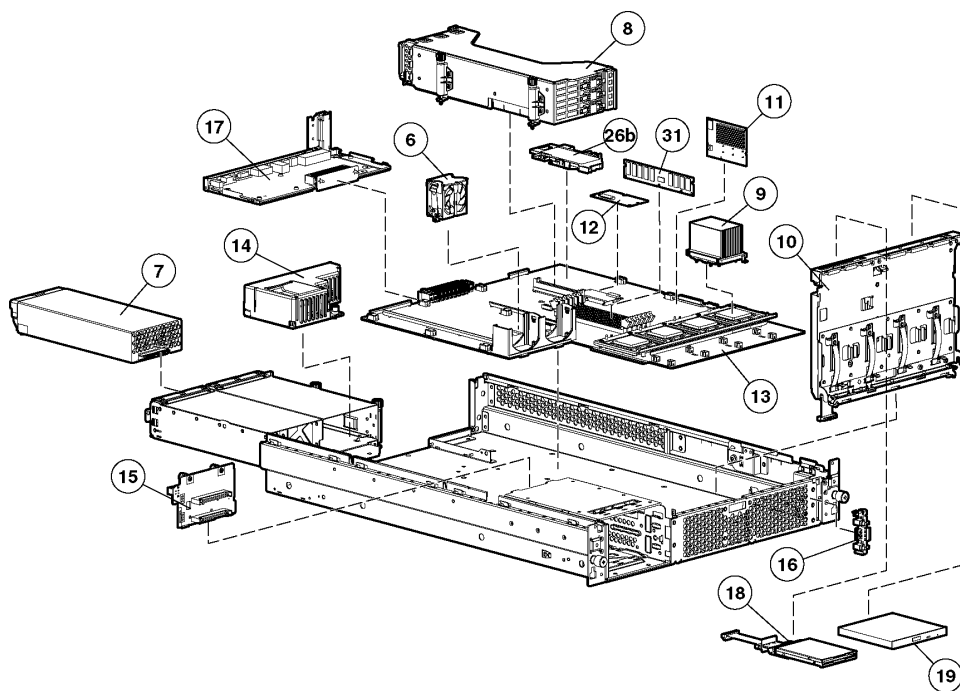
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Mechanical Components



Item	Description	Assembly Part Number	Spare Part Number
1	Access panel	302866-001	310794-001
2	Front bezel	302889-001	310797-001
3	Hard drive blank	—	122759-001
4	Power supply blank	302886-001	310793-001
5	Torx T-15 tool*	107473-001	199630-001
	* Not shown		

System Components



Item	Description	Assembly Part Number	Spare Part Number
System Components			
6	Hot-plug fan, 60 mm	289596-001	310795-001
7	Hot-plug power supply, 550 W	280126-001	300892-001
8	PCI riser cage	313004-001	295012-001
9	Processor assembly		
	a) Intel Pentium processor, Xeon MP, 2.0-GHz/1-MB L3 cache	—	327839-001
	b) Intel Pentium processor, Xeon MP, 2.5-GHz/1-MB L3 cache	—	327840-001

Item	Description	Assembly Part Number	Spare Part Number
	c) Intel Pentium processor, Xeon MP, 2.8-GHz/2-MB L3 cache	—	327841-001
	d) Intel Pentium processor, Xeon MP, 2.2 GHz/2-MB L3*	—	352311-001
	e) Intel Pentium processor, Xeon MP, 2.7 GHz/2-MB L3*	—	352312-001
	f) Intel Pentium processor, Xeon MP, 3.0 GHz/4-MB L3	—	352313-001
10	Removable media tray	313005-001	310796-001
	Boards		
11	PPM (Processor Power Module), 12 V, 81 A	292718-001	289564-001
12	Smart Array 5i Plus memory module	011665-001	260741-001
13	System board, with two-bay fan bracket and system battery	011557-001	295013-001
14	Power converter module	268189-001	292223-001
15	SCSI backplane, 2 bay	011548-001	295011-001
16	Power button/LED board with cable	011563-001	295015-001
17	Peripheral board	011560-001	295014-001
	Media Devices		
18	Diskette drive, slimline, 1.44 MB	279983-001	228507-001
19	CD-ROM drive, removable slimline, IDE, 24X	222837-001	228508-001
20	DVD-ROM drive, removable slimline, 8X *	294766-9D1	337273-001
	Cables		
21	SCSI cable kit *	166298-440	320177-001
22	Smart Array 5i Plus Battery-Backed Write Cache Enabler cable kit*	—	283033-001
	Rack Mounting Hardware		
23	Rack mounting hardware kit *	300605-001	289570-001
24	Rack mounting hardware kit, round-hole*	—	289572-001
	Miscellaneous		

Item	Description	Assembly Part Number	Spare Part Number
25	Hardware kit *	—	228527-001
	a) Screws, T-15, flathead	228213-001	—
	b) Expansion slot cover	228072-001	—
	c) Screws, 6-32	192308-009	—
26	Plastics kit	—	314688-001
	a) PCI slot release lever *	228194-001	—
	b) Battery Backed-Write Cache Enabler bracket	302925-001	—
	c) Blank, tape drive *	218512-001	—
27	AC power cord, IEC-IEC 10 ft. *	142263-003	142258-003
28	Battery, 3.3 V, lithium *	334149-001	153099-001
29	Country kit *	—	320115-001
30	Return kit, pack box, and cushions *	—	320116-001
	Memory		
31	DIMM, 256 MB, registered DDR SDRAM	300678-B21	300699-001
32	DIMM, 512 MB, registered DDR SDRAM *	300679-B21	300700-001
33	DIMM, 1 GB, registered DDR SDRAM *	300680-B21	300701-001
34	DIMM, 2 GB, registered DDR SDRAM *	300682-B21	300702-001
	Options		
35	Round-hole rack rail mounting kit *	293052-B21	289572-001
36	Battery-Backed Write Cache Enabler *	011665-001	260740-001
37	Hard Disk Drives		
	a) 18.2-GB SCSI hard drive, U320, hot-plug, 15K*	—	289240-001
	b) 36.4-GB SCSI Hard drive, U320, hot-plug, 10K*	—	289041-001
	c) 36.4-GB SCSI Hard drive, U320, hot-plug, 15K*	—	289241-001
	d) 72.8-GB SCSI hard drive, U320, hot-plug, 10K*	—	289042-001
	e) 72.8-GB SCSI hard drive, U320, hot-plug, 15K*	—	289243-001
	f) 146.8-GB SCSI hard drive, U320, hot-plug, 10K*	—	289044-001

Item	Description	Assembly Part Number	Spare Part Number
	* Not shown		

Removal and Replacement Procedures

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You need the following items for some procedures:

- Torx T-15 screwdriver (provided with the server)
- Diagnostics Utility

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) electric 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, electric 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 without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

Preparation Procedures

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

- Extend the server from the rack ("Extending the Server from the Rack" on page [17](#)).

If you are performing service procedures in a Compaq branded rack, telco rack, 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 ("Powering Down the Server" on page [16](#)).
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 ("Removing the Server from the Rack" on page [18](#)).

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

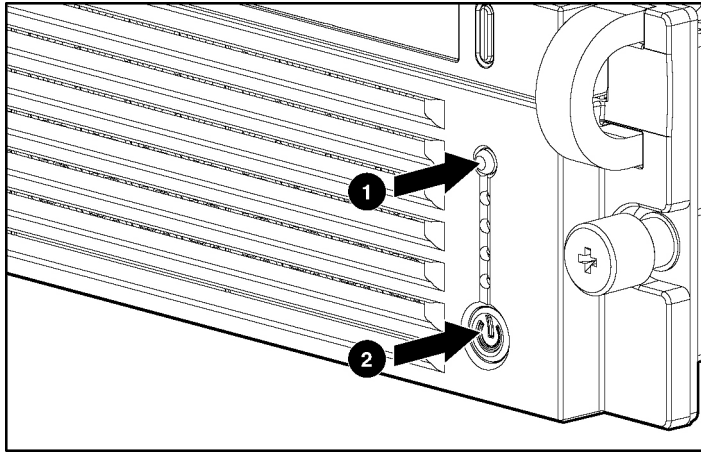
Powering Down the Server



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

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

1. 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.

Extending the Server from the Rack

1. Loosen the thumbscrews that secure the server faceplate to the front of the rack.
2. Grasping the handles on the front bezel, extend the server on the rack rails until the server rail-release latches engage.



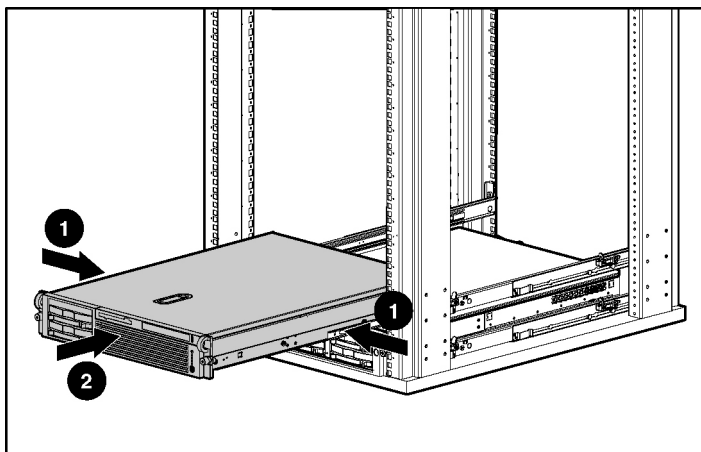
WARNING: To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.



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. Secure the server by tightening the thumbscrews.

Removing the Server from the Rack

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

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Loosen the front panel thumbscrews that secure the server faceplate to the front of the rack.
3. Disconnect the cabling and remove the server from the rack. Reverse the server installation steps in the documentation that ships with the rack-mounting option.
4. Place the server on a sturdy, level surface.

Removing the Access Panel



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



CAUTION: Do not operate the server for long periods without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

1. Power down the server if performing a non-hot-plug installation or maintenance procedure ("Powering Down the Server" on page [16](#)).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page [17](#)).
3. Lift up on the hood latch handle and remove the access panel.

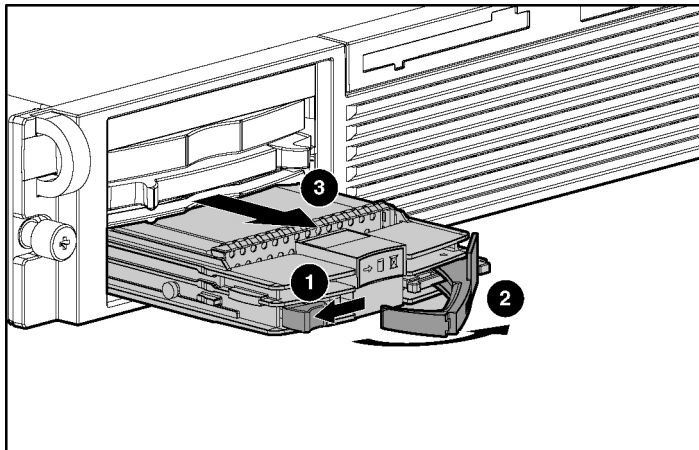
Hot-Plug SCSI Hard Drive

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 [89](#)).
2. Back up all server data on the hard drive.
3. Remove the hard drive.



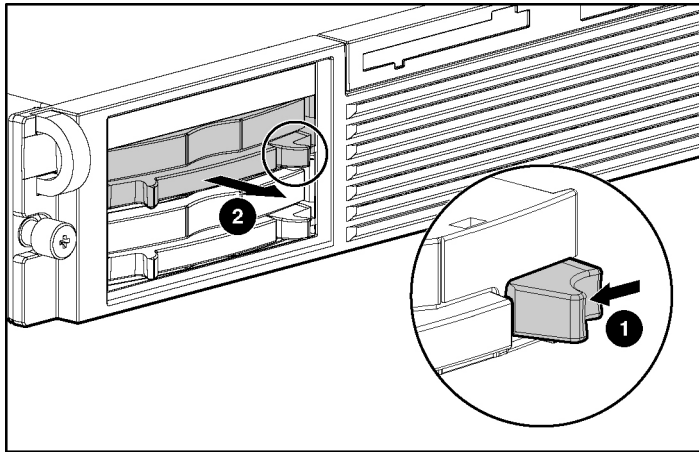
To replace the component, reverse the removal procedure.

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.

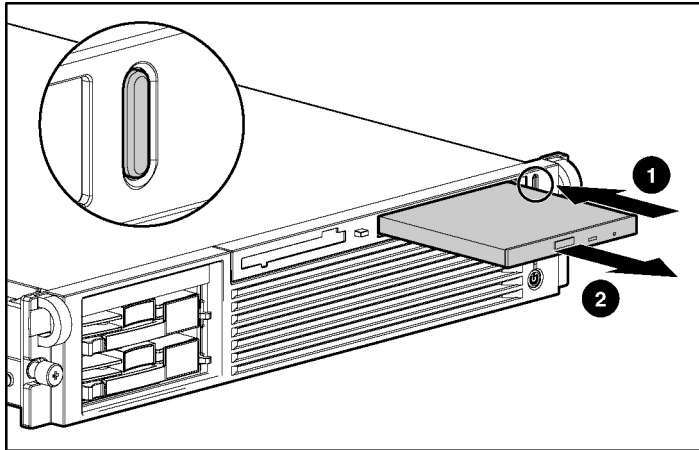
CD-ROM Drive

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).

IMPORTANT: The ejector button is recessed to prevent accidental ejection; it may be helpful to use the Torx T-15 tool on the back of the server or similar shaped object to access the button.

2. Remove the CD-ROM drive.



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

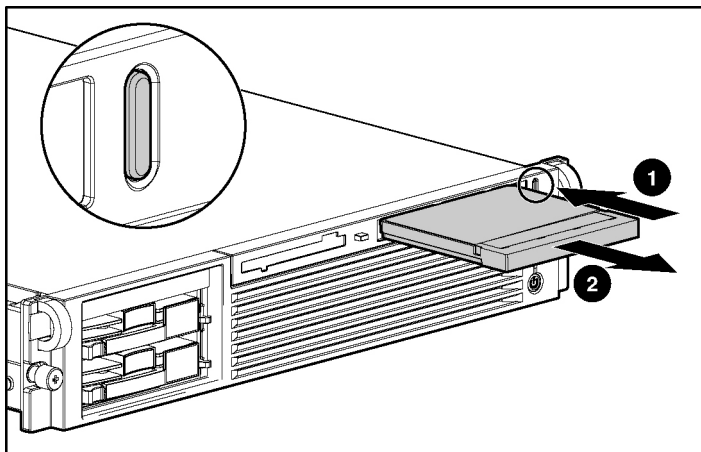
CD-ROM Drive Blank

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.

IMPORTANT: The ejector button is recessed to prevent accidental ejection; it may be helpful to use the Torx T-15 tool on the back of the server or similar shaped object to access the button.



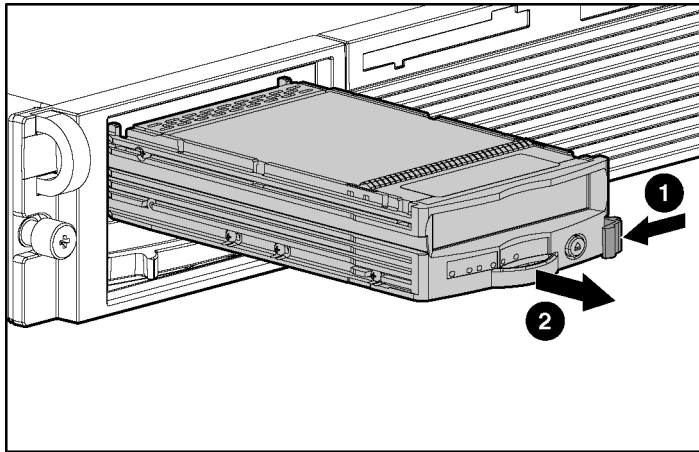
To replace the blank, slide the blank into the bay until it locks into place.

Universal Hot-Plug Tape 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.



To replace the Universal Hot-Plug tape drive, slide the drive into the bay until it locks into place.

Tape Drive Blank

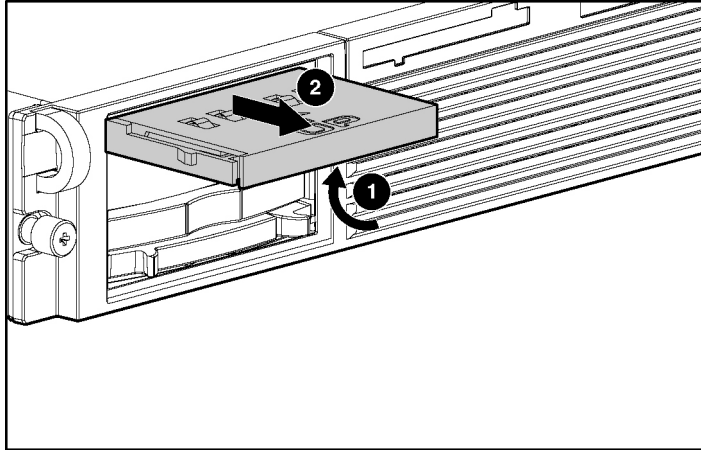
To remove the component:

1. Remove the hot-plug SCSI hard drive, if one is installed, below the tape drive blank ("Hot-Plug SCSI Hard Drive" on page [19](#)).
2. Remove the hard drive blank, if one is installed, below the tape drive blank ("Hard Drive Blank" on page [20](#)).



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.

3. Remove the tape drive blank.
 - a. Reach underneath and squeeze the middle of the tape drive blank (1).
 - b. Pull the blank out of the bay (2).



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

Hot-Plug Power Supply

To remove the component:

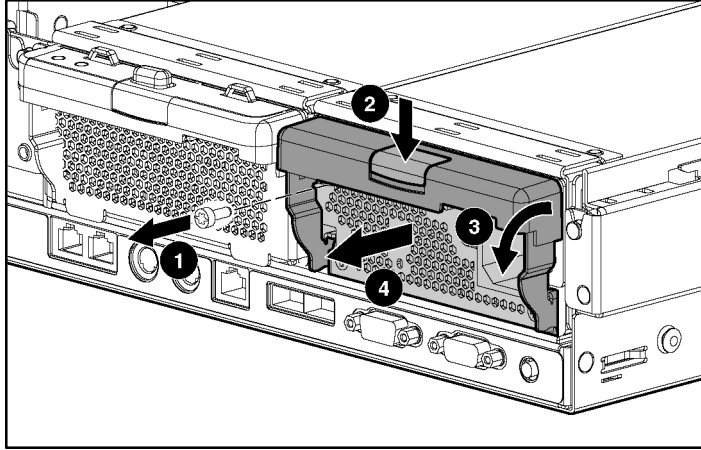
1. Unlock the hinge on the cable management arm and swing the arm away from the power supply area.
2. Determine how many hot-plug power supplies are installed:
 - If only one hot-plug power supply is installed, power down and remove the power cord from the server ("Powering Down the Server" on page [16](#)).
 - If more than one hot-plug power supply is installed, continue with the next step.



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.

3. Remove the shipping screw and then the hot-plug power supply.

IMPORTANT: The power supply shipping screw is not required for server operation. It is only required for shipping.

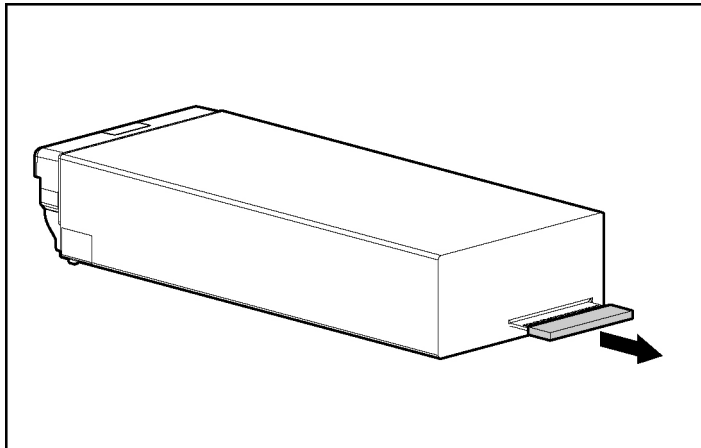


To replace a hot-plug power supply:

1. Remove the protective cover from the connector pins on the power supply.



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



2. Slide the power supply into the power supply bay.
3. Connect the power cord to the power supply.
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. Lock the cable management arm into the operating position.

Power Supply Blank

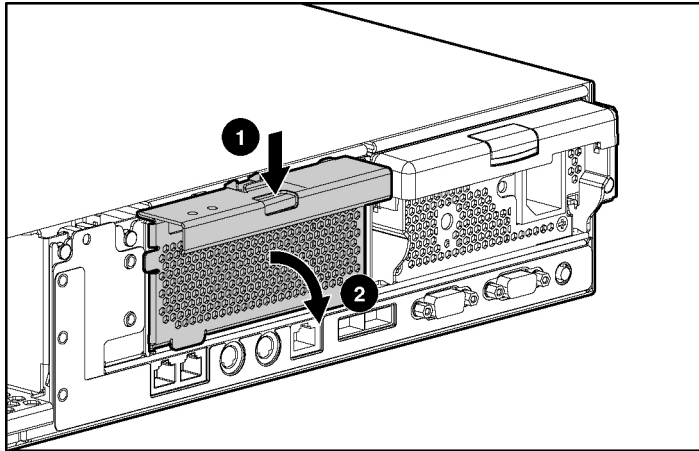
To remove the component:

1. Unlock the hinge on the cable management arm and swing the arm away from the power supply area.



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.

2. Remove the power supply blank.



To replace a power supply blank:

1. Slide the power supply blank into the bay until it locks into place.
2. Swing the cable management arm into place and lock it.

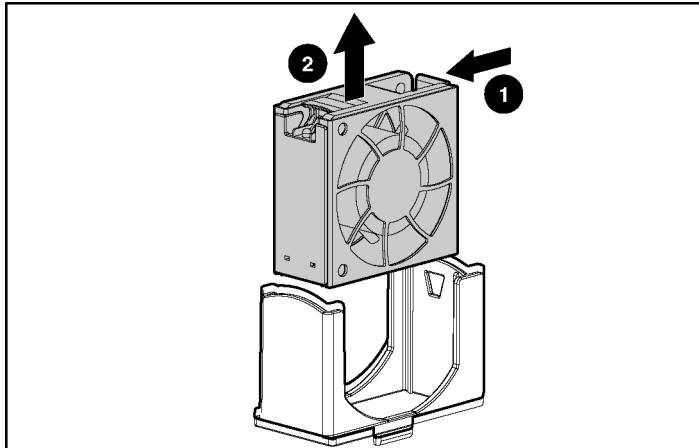
Hot-Plug Fan

To remove the component:

1. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
2. Remove the access panel ("Removing the Access Panel" on page [18](#)).
3. Determine whether the fan is operating with redundancy:
 - If the fan zone is not operating with redundancy, power down the server ("Powering Down the Server" on page [16](#)).
 - If the fan zone is operating with redundancy, continue with the next step.

For information on fan redundancy, refer to "Redundant Hot-Plug Fan Option (on page [93](#))."

4. Remove the fan.





CAUTION: Do not operate the server for long periods without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

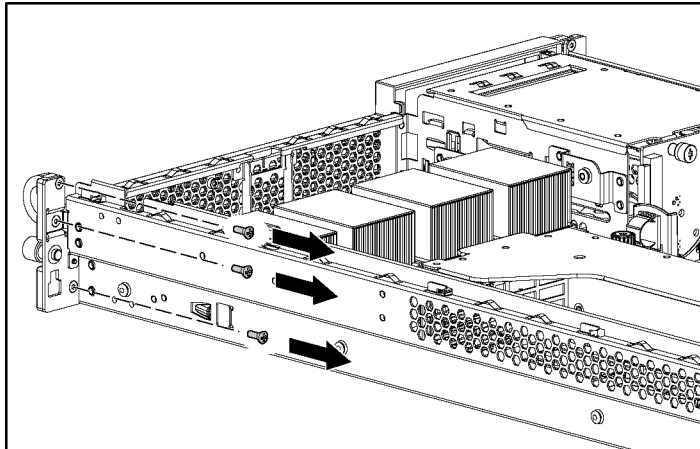
IMPORTANT: For optimum cooling, install fans in all primary fan locations. For more information, refer to the previous fan locations table.

To replace the component, reverse the removal procedure.

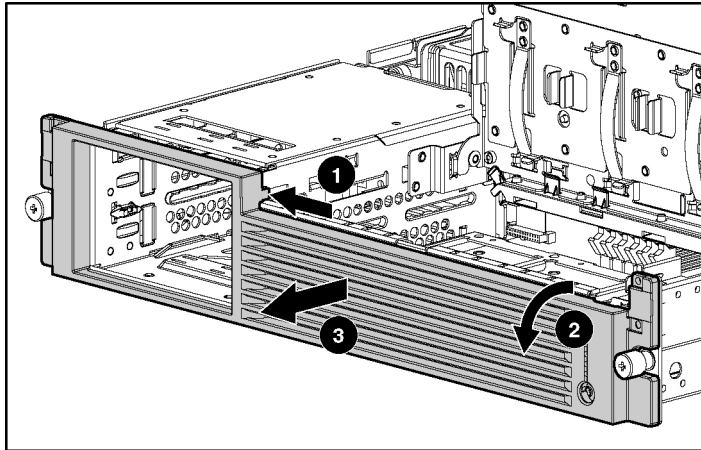
Front Bezel

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove all hard drives ("Hot-Plug SCSI Hard Drive" on page [19](#)).
4. Remove the six screws (three on each side) from the front bezel.



5. Remove the front bezel.



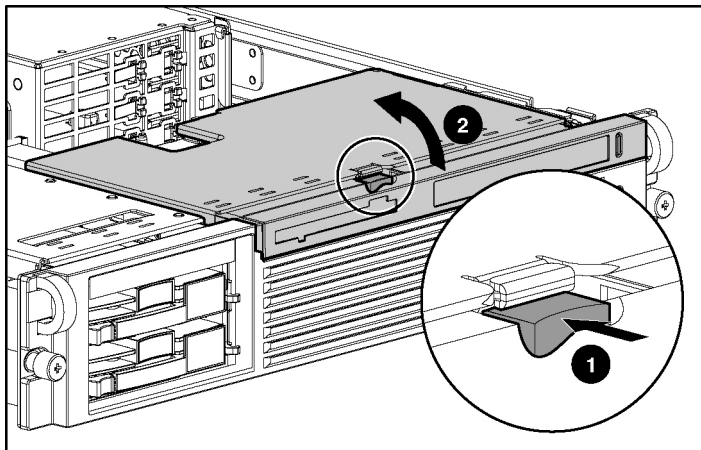
To replace the component, reverse the removal procedure.

Front Fan Module

To remove the component:

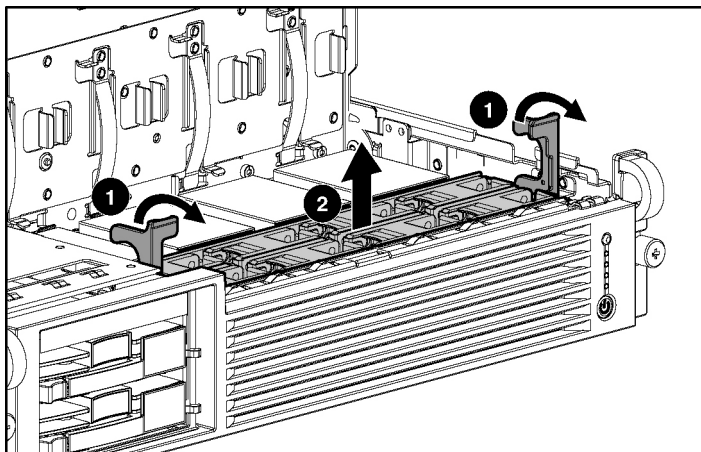
1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).

4. Lift the removable media tray.



5. Remove the fan module.

NOTE: Fans do not have to be removed to install or remove the fan module.



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.

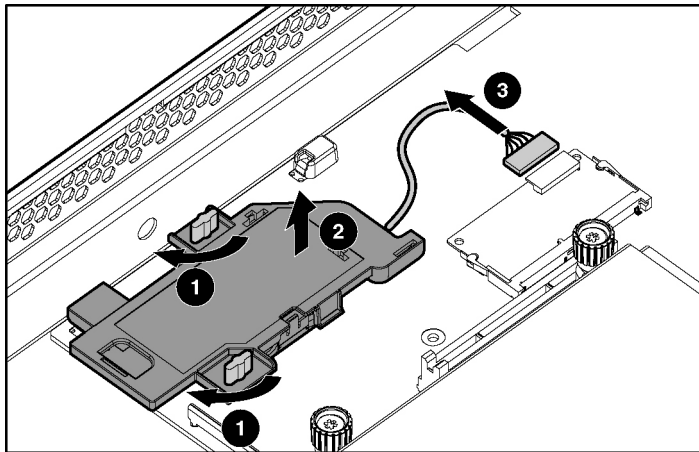
Battery-Backed Write Cache Enabler Bracket

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the battery module bracket:
 - a. Turn the pins on the battery module bracket (1) and lift the battery module bracket from the chassis (2).
 - b. If the battery module is installed, be sure the amber LED on the battery module is not blinking. If the amber LED is blinking, the battery module is backing up data. Wait until the LED stops blinking before continuing to the next step.
 - c. If the battery module is installed, disconnect the cable from the Smart Array 5i Plus memory module (3).



CAUTION: Disconnecting the battery module cable will cause any unsaved data in the memory module to be lost.

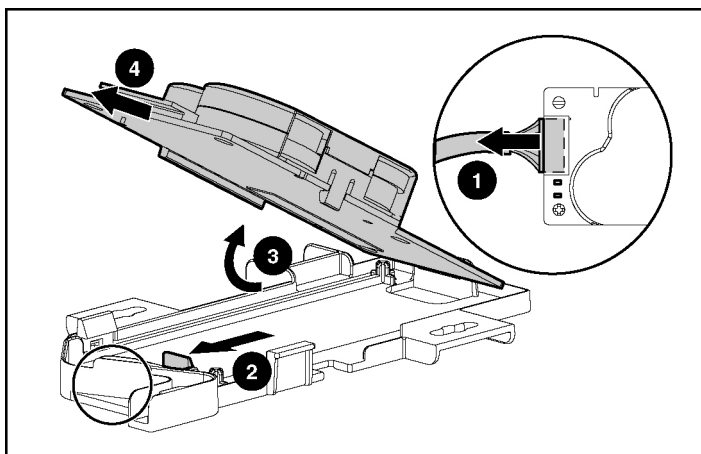


5. To replace the component, reverse the removal procedure.

Battery-Backed Write Cache Enabler

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the Battery-Backed Write Cache Enabler bracket ("Battery-Backed Write Cache Enabler Bracket" on page [31](#)).
5. Remove the battery module from the bracket.



To replace the component, reverse the removal procedure.

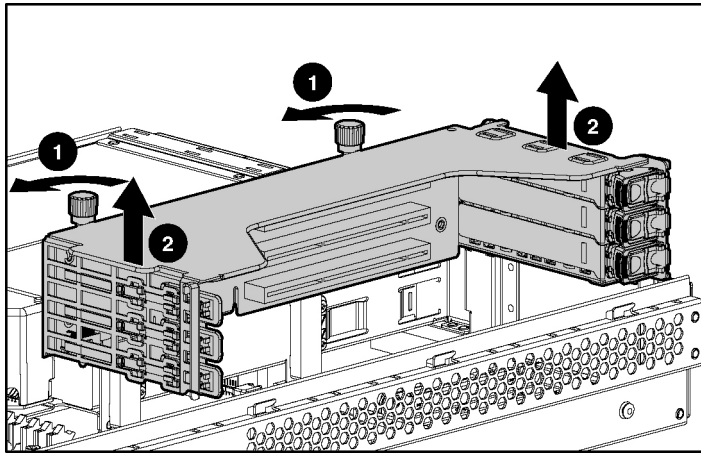
PCI Riser Cage

To remove the component:



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.

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page [17](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Disconnect any internal or external cables connected to any existing expansion boards.
5. Remove the PCI riser cage.



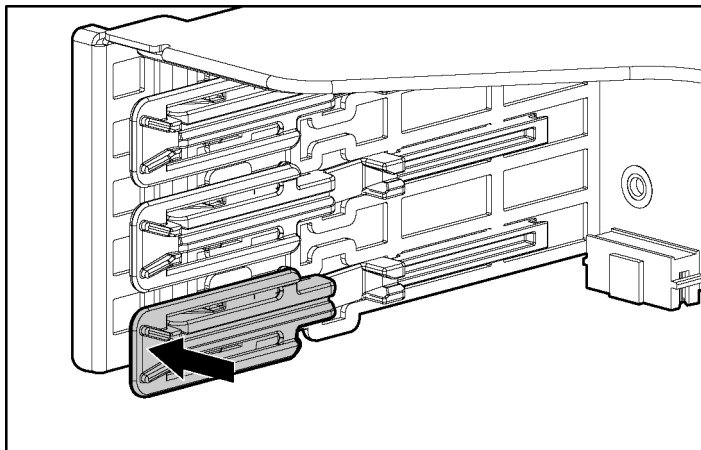
To replace the component, reverse the removal procedure.

Expansion Board

To remove the component:

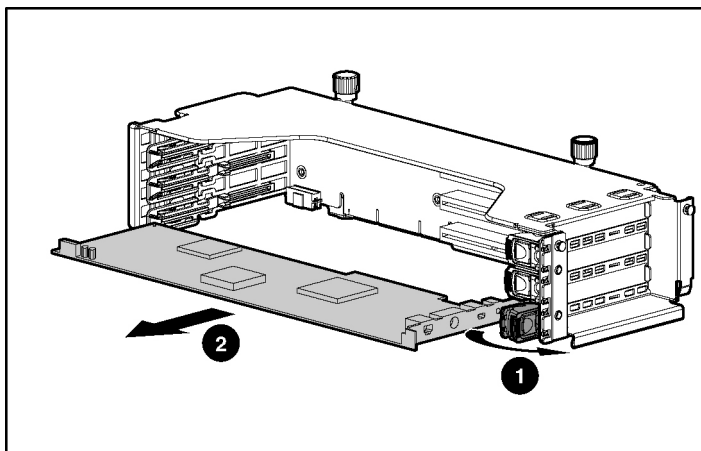
1. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
2. Remove the access panel ("Removing the Access Panel" on page [18](#)).

3. 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.

4. Remove the expansion board.



To replace the component, reverse the removal procedure.

Expansion Slot Cover

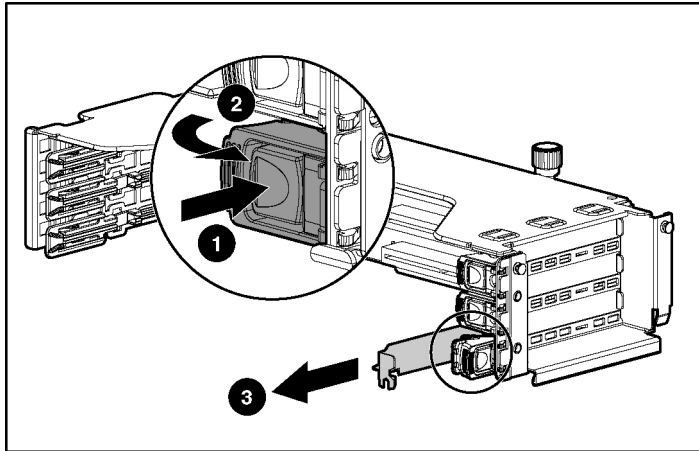
To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the PCI riser cage ("PCI Riser Cage" on page [32](#)).



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 slot cover.



PCI Slot Release Lever

To remove the component:

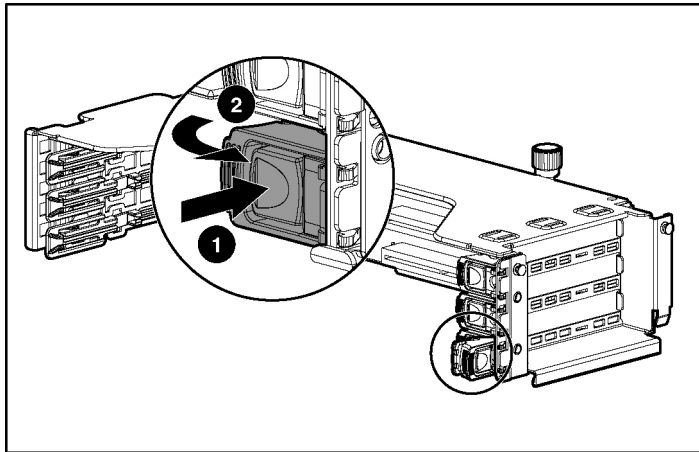
1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).

3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the PCI riser cage ("PCI Riser Cage" on page [32](#)).

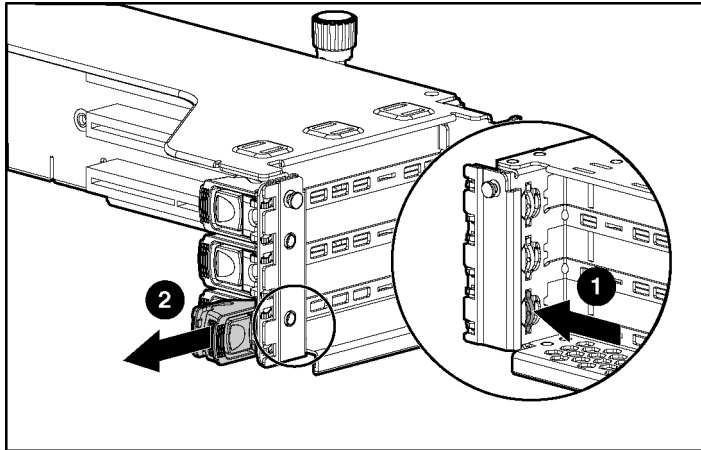


CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

5. Remove the expansion board from the slot, if installed ("Expansion Board" on page [33](#)).
6. Remove the expansion slot cover from the slot, if installed ("Expansion Slot Cover" on page [35](#)).
7. Open the PCI slot release lever.



8. Remove the PCI slot release lever.



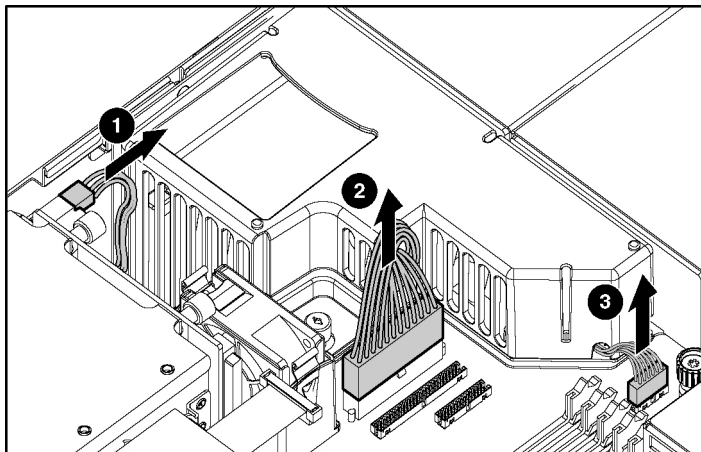
To replace the component, reverse the removal procedure.

Power Module

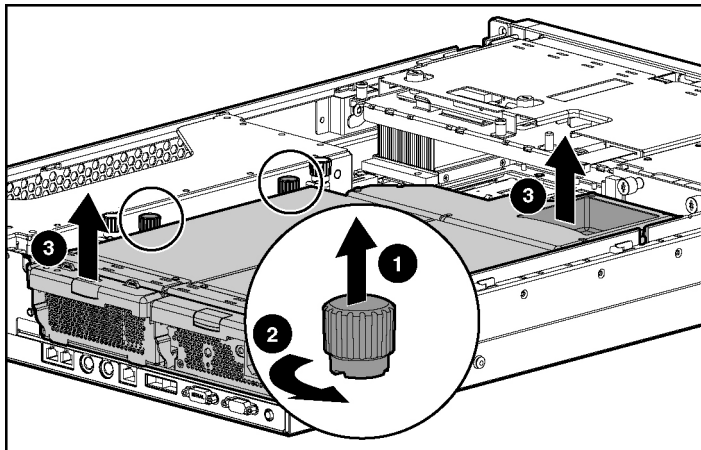
To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).

4. Disconnect internal power cables.



5. Remove power module.



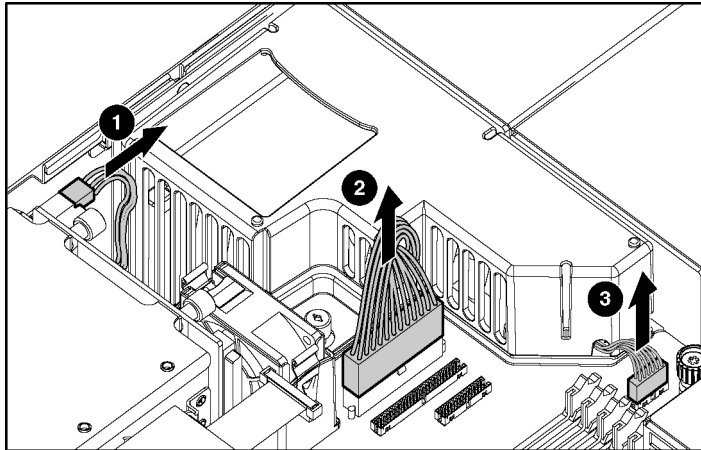
To replace the component, reverse the removal procedure.

DC Converter Module

To remove the component:

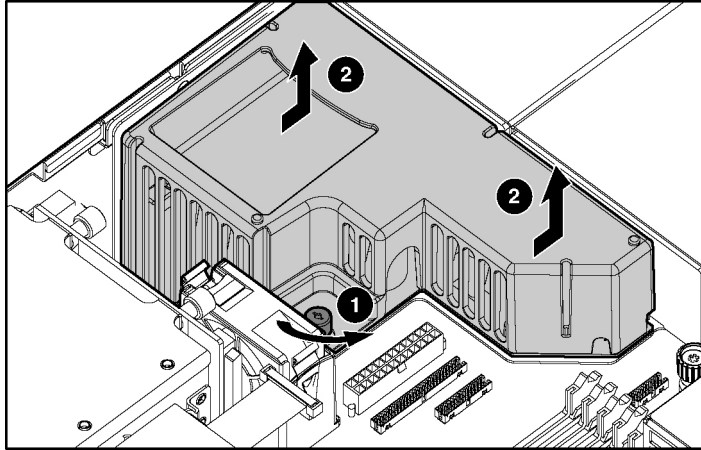
NOTE: You do not have to remove the DC converter module to remove the power module.

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Disconnect internal power cables.



5. Partially remove any installed power supplies ("Hot-Plug Power Supply" on page [24](#)). You do not need to completely remove the power supplies.

6. Remove the DC converter module.

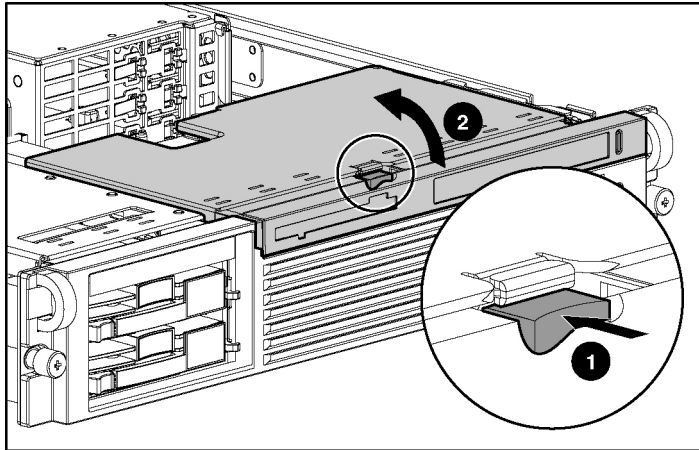


Power Button/LED Board

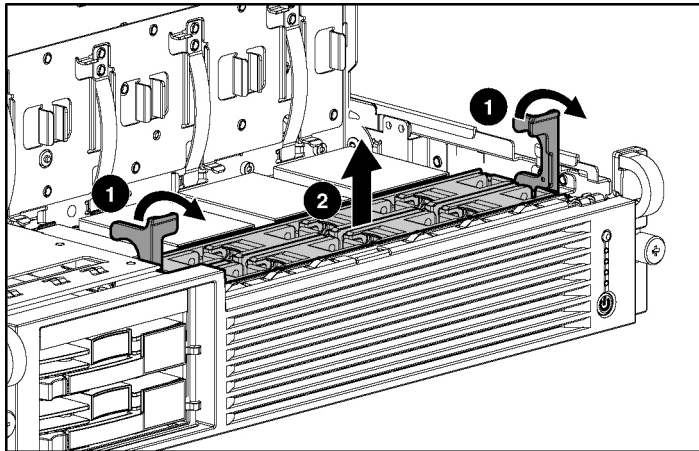
To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).

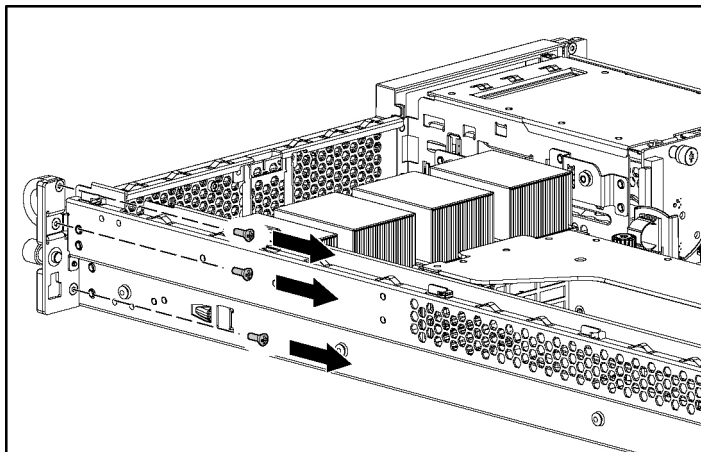
4. Lift the removable media tray.



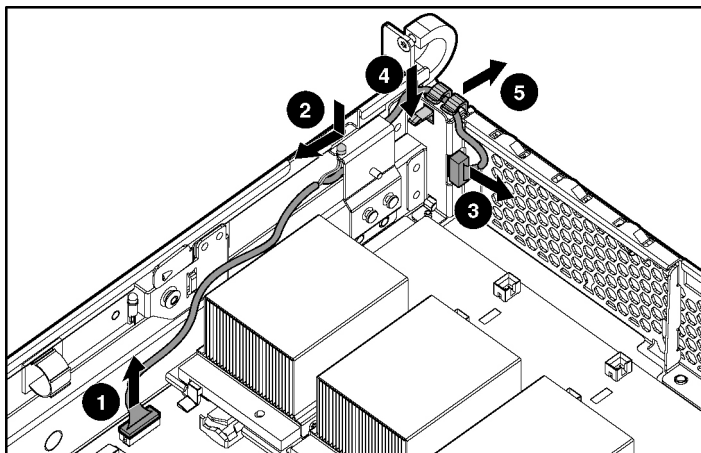
5. Remove the front fan module.



6. Remove the screws from the front bezel to expose the power button/LED board.



7. Remove the power button/LED board.



To replace the component, reverse the removal procedure.

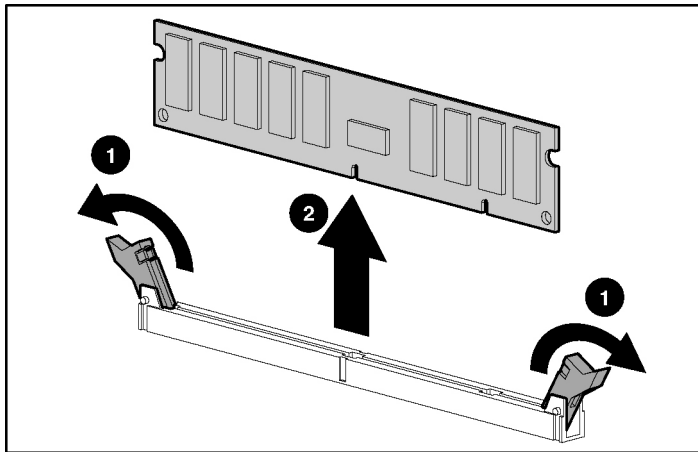
DIMMs

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).

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.

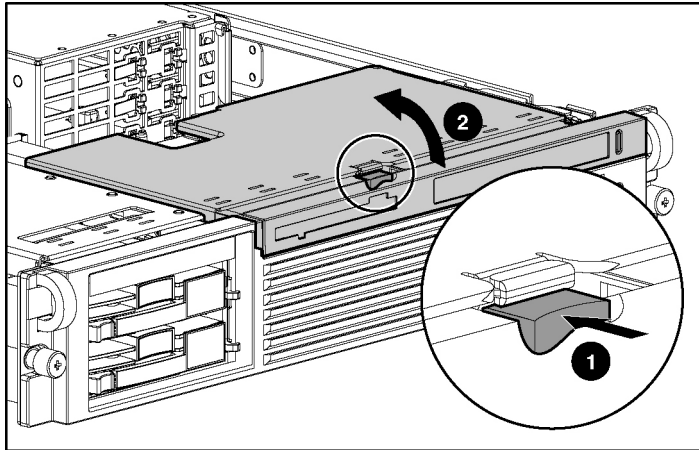
IMPORTANT: DIMMs do not seat fully if turned the wrong way.

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.

Processor

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Lift the removable media tray.

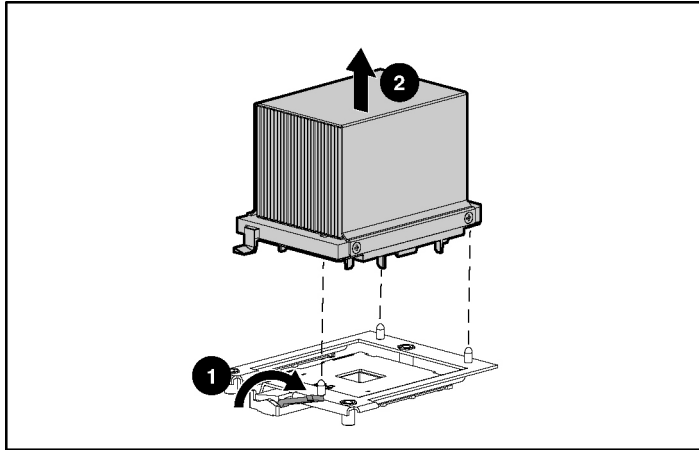


CAUTION: To prevent thermal instability and damage to the server, do not separate the processor from the heatsink. The processor, heatsink, and retaining clip make up a single assembly.

5. Remove the processor and heatsink assembly.



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



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



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

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

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

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.



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

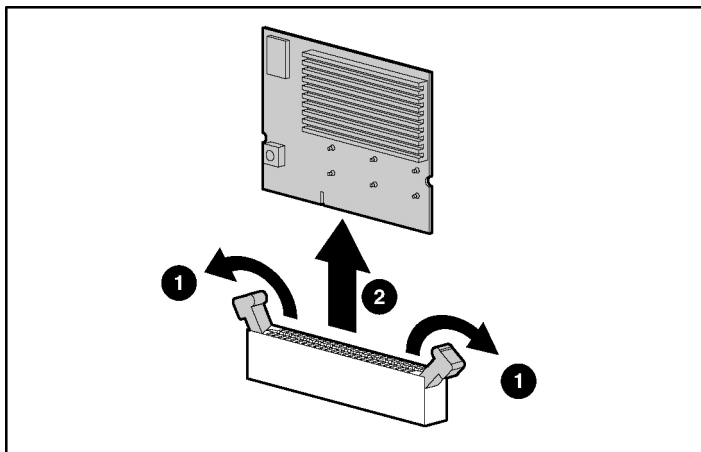
PPM

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).

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 does not boot or halts during POST.

To replace the component, reverse the removal procedure.

Smart Array 5i Plus Memory Module

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the PCI riser cage ("PCI Riser Cage" on page [32](#)).

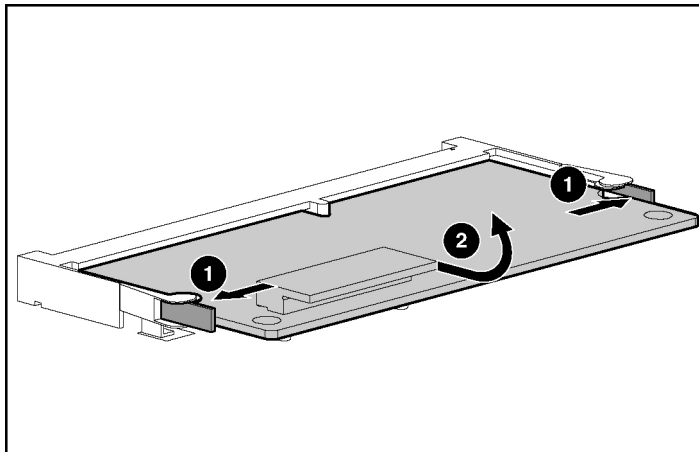


CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.



CAUTION: Disconnecting the battery module cable will cause any unsaved data in the memory module to be lost.

5. Disconnect and remove the Smart Array 5i Plus memory module cable.
6. Remove the Smart Array 5i Plus memory module.



To replace the component, reverse the removal procedure.



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

Battery

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



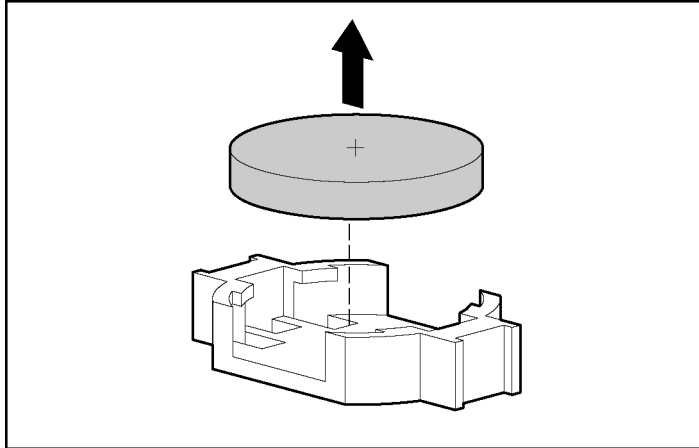
WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

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

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the power module ("Power Module" on page [37](#)).

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.

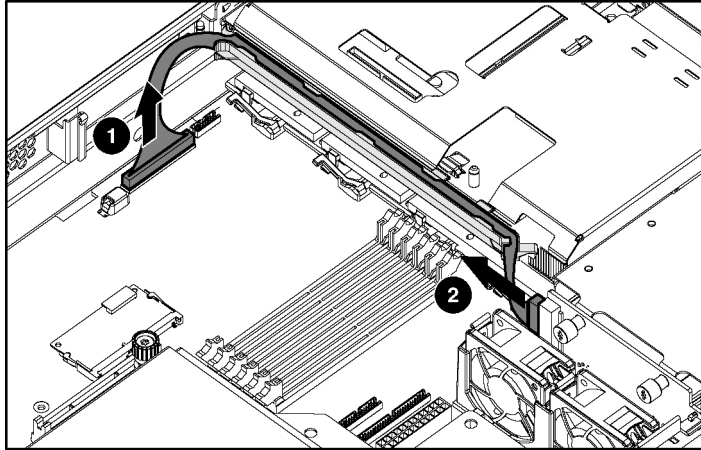
For more information about battery replacement or proper disposal, contact an authorized reseller or authorized service provider.

SCSI Cable

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).

4. Disconnect and remove the SCSI cable.



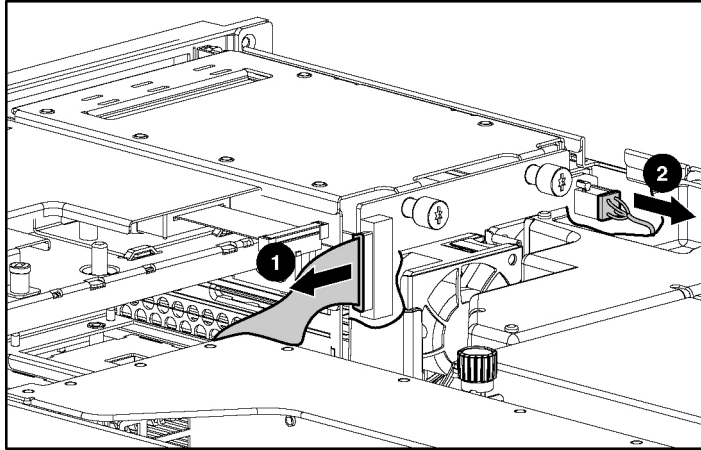
To replace the component, reverse the removal procedure.

SCSI Backplane

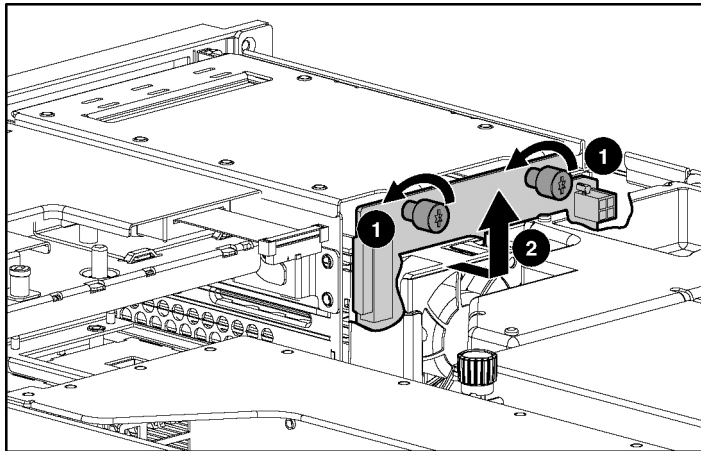
To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove all hot-plug SCSI hard drives ("Hot-Plug SCSI Hard Drive" on page [19](#)).
5. Remove the tape drive, if installed ("Universal Hot-Plug Tape Drive" on page [23](#)).

6. Disconnect cables connected to the SCSI backplane.



7. Remove the SCSI backplane.



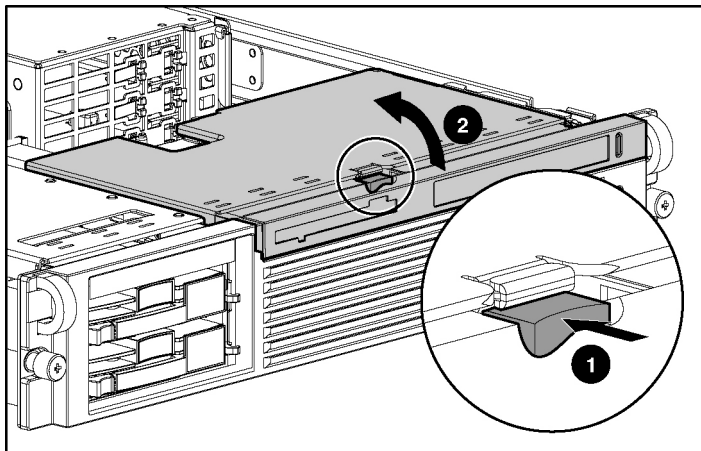
To replace the component, reverse the removal procedure.

Removable Media Tray

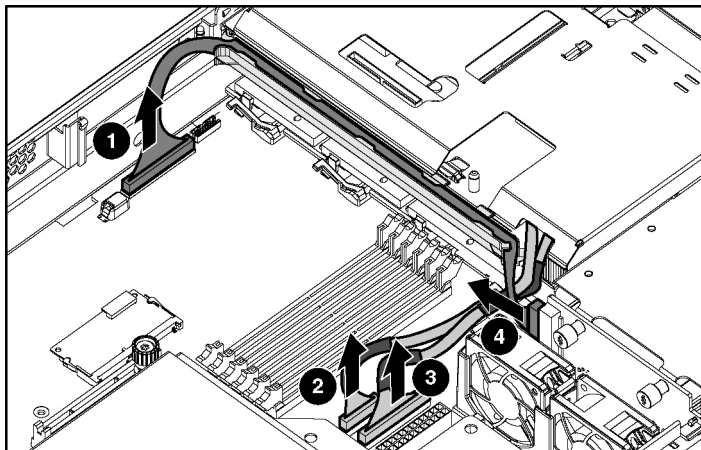
To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).

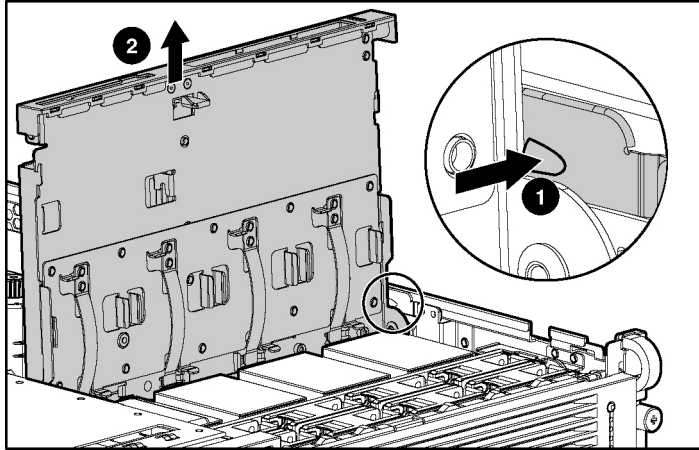
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Lift the removable media tray.



5. Disconnect cables from the system board.



6. Remove the removable media tray.

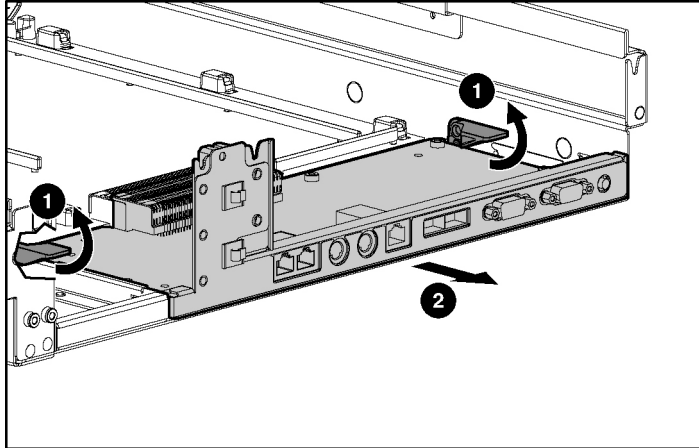


Peripheral Board

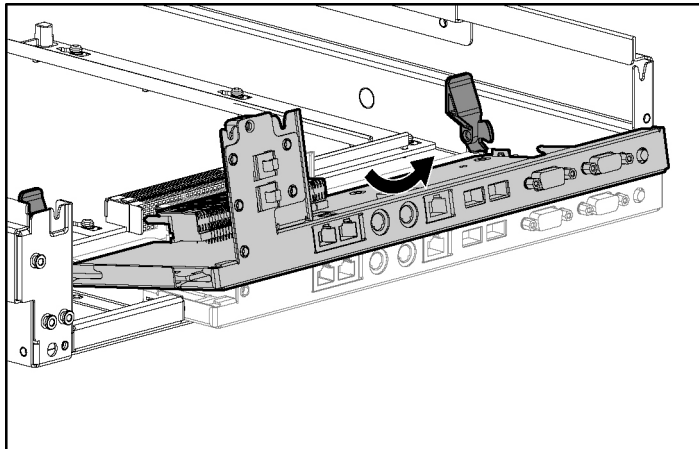
To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the power module ("Power Module" on page [37](#)).
5. Remove the PCI riser cage ("PCI Riser Cage" on page [32](#)).

6. Release the peripheral board from the system board.



7. Remove the peripheral board.



System Board

To remove the component:

1. Power down the server ("Powering Down the Server" on page [16](#)).

2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page [17](#), "Removing the Server from the Rack" on page [18](#)).
3. Remove the access panel ("Removing the Access Panel" on page [18](#)).
4. Remove the PCI riser cage ("PCI Riser Cage" on page [32](#)).



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 power module ("Power Module" on page [37](#)).
6. Remove the peripheral board ("Peripheral Board" on page [53](#)).
7. Remove the removable media tray ("Removable Media Tray" on page [51](#)).
8. Remove the front fan bracket ("Front Fan Module" on page [29](#)).

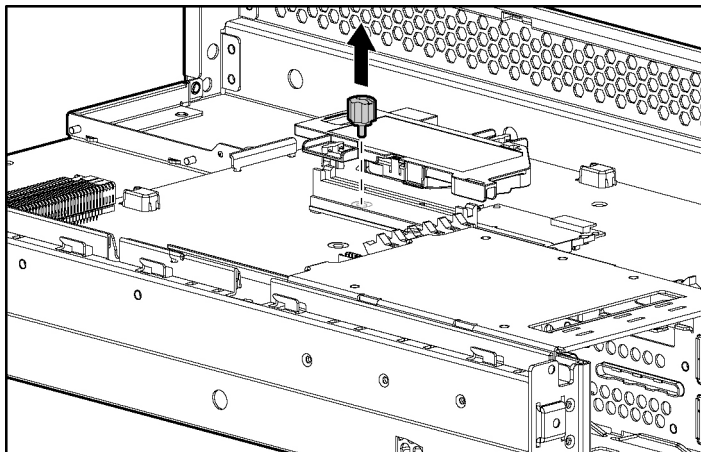
IMPORTANT: For this procedure, you do not need to remove the hot-plug fans from the front fan bracket. When reinstalling the front fan bracket, press the top of each fan to be sure it seats securely.

9. Remove the hot-plug fans from the rear fan bracket ("Hot-Plug Fan" on page [27](#)).
10. Remove the processors ("Processor" on page [44](#)).

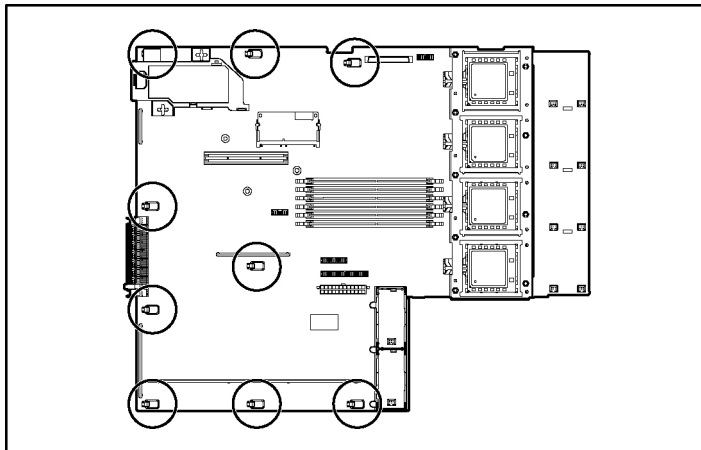
NOTE: When removing the system board, you may leave the DIMMs, the PPMs, the Smart Array 5i memory module, and the system battery on the system board, unless you are replacing them as failed items.

11. Disconnect all cables connected to the system board.

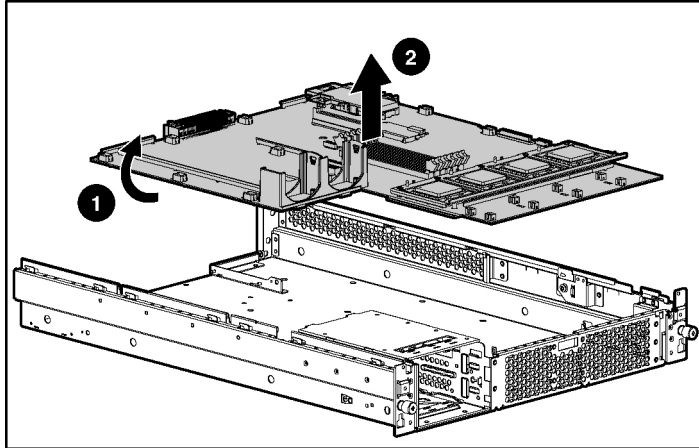
12. Remove the system board thumbscrew.



13. Identify the alignment keys and keyhole locations.



14. Remove the system board.



NOTE: The system board spare kit does not include DIMMs, processors, PPMs, or the Smart Array 5i memory module.

To replace the component, reverse the removal procedure.

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" on page [58](#)).

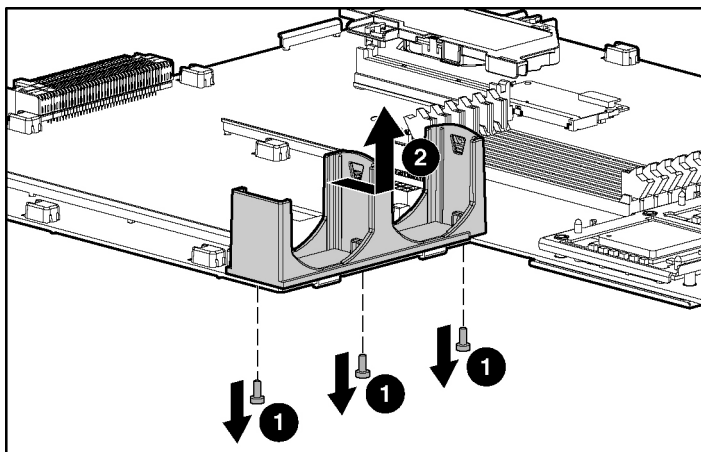
Rear Fan Bracket

To remove the component:

1. Remove the system board ("System Board" on page [54](#)).

NOTE: When removing the system board, you may leave the DIMMs, the PPMs, the Smart Array 5i memory module, and the system battery on the system board, unless you are replacing them as failed items.

2. Remove the rear fan bracket.



To replace the component, reverse the removal procedure.

Re-Entering the Server Serial Number

After you replace the system board or clear NVRAM, you must re-enter the server serial number.

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. Press the **Escape** key to close the menu.
7. Press the **Escape** key to exit RBSU.

8. Press the **F10** key to confirm exiting RBSU. The server will automatically reboot.

Diagnostic Tools

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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 (abnormal end), 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 Insight Manager 7 console notifies you by sending a message to a designated pager number that ASR has restarted the system. You can disable ASR from the Insight Manager 7 console or through RBSU.

Insight Manager 7

Insight Manager 7 is a Web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a Web browser. Insight Manager 7 provides device management capabilities that consolidate and integrate management data from HP and third-party devices.

IMPORTANT: You must install and use Insight Manager 7 to benefit from the Pre-Failure Warranty for processors, hard drives, and memory modules.

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

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 Insight Manager 7
- From within Survey Utility
- From within operating system-specific IML viewers
 - For NetWare: IML Viewer
 - For Windows®: Event Viewer or IML Viewer
 - For Linux: IML Viewer Application
- From within HP Insight Diagnostics

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

Integrated Lights-Out Technology

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

Using iLO, you can:

- Remotely power up, power down, or reboot the host server.
- Send alerts from iLO regardless of the state of the host server.
- Access advanced troubleshooting features through the iLO interface.
- Diagnose iLO using Insight Manager 7 through a Web browser and SNMP alerting.

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

iLO ROM-Based Setup Utility

HP recommends using iLO RBSU to configure and set up iLO. iLO RBSU is designed to assist you with setting up iLO on a network; it is not intended for continued administration.

To run iLO RBSU:

1. Restart or power up the server.
2. Press the **F8** key when prompted during POST. The iLO RBSU runs.
3. Enter a valid iLO user ID and password with the appropriate iLO privileges (**Administer User Accounts, Configure iLO Settings**). Default account information is located on the iLO Default Network Settings tag.
4. Make and save any necessary changes to the iLO configuration.
5. Exit iLO RBSU.

HP recommends using DNS/DHCP with iLO to simplify installation. If DNS/DHCP cannot be used, use the following procedure to disable DNS/DHCP and to configure the IP address and the subnet mask:

1. Restart or power up the server.
2. Press the **F8** key when prompted during POST. The iLO RBSU runs.
3. Enter a valid iLO user ID and password with the appropriate iLO privileges (**Administer User Accounts, Configure iLO Settings**). Default account information is located on the iLO Default Network Settings tag.
4. Select **Network, DNS/DHCP**, press the **Enter** key, and then select **DHCP Enable**. Press the spacebar to turn off DHCP. Be sure that **DHCP Enable** is set to **Off** and save the changes.
5. Select **Network, NIC and TCP/IP**, press the **Enter** key, and type the appropriate information in the **IP Address, Subnet Mask** and **Gateway IP Address** fields.
6. Save the changes. The iLO system automatically resets to use the new setup when you exit iLO RBSU.

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 provides support for the following functions:

- Configuring one or more logical drives using physical drives on one or more SCSI buses
- Viewing the current logical drive configuration
- Deleting a logical drive configuration

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

For more information about array controller configuration, refer to the *Smart Array 5i Plus Controller and Battery-Backed Write Cache Enabler User Guide*, or the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (<http://www.compaq.com/support/techpubs/whitepapers>).

ProLiant Essentials Rapid Deployment Pack

The ProLiant Essentials Rapid Deployment Pack software is the preferred method for rapid, high-volume server deployments. The Rapid Deployment Pack software integrates two powerful products: Altiris eXpress Deployment Server and the ProLiant Integration Module.

The Altiris eXpress Deployment Server console's intuitive graphical user interface provides simplified point-and-click and drag-and-drop solutions that enable you to deploy target servers remotely, perform imaging or scripting functions, and maintain software images.

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

ROM-Based Setup Utility

RBSU performs a wide range of configuration activities including the following:

- Configuring system devices and installed options
- Displaying system information
- Selecting the operating system
- Selecting the primary boot controller
- Configuring online spare memory

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.compaq.com/support/techpubs/whitepapers>).

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>).

Smart Components for Remote ROM Flash

The Smart Components for Remote ROM Flash tool 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, Novell NetWare, and Linux operating systems
- 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://www.hp.com>).

SmartStart Software

SmartStart software is a CD-based, single-server method for installing system software, thereby achieving a well-integrated server and ensuring maximum dependability and supportability. The SmartStart CD contains tools that diagnose problems with the server, configure storage arrays, and update the system ROM.

SmartStart software enables you to:

- Install selected server operating systems using packaged product CDs.
- Install the latest optimized drivers.

- Create and copy standard server configuration scripts using the SmartStart Scripting Toolkit and Configuration Replication Utility.
- Test server hardware using the Insight Diagnostics Utility.
- Update the latest system or option ROM using the ROM Update Utility.
- Install software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to the complete list of ProLiant System Software on the website.
- Access ACU, ADU, and Erase Utility

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

Survey Utility

Survey Utility gathers critical hardware and software information on servers running Microsoft® Windows® 2000, Novell NetWare, SCO OpenServer, or SCO UnixWare 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 (<ftp://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf>).

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.

To install the Survey Utility, use the Management CD in the *HP ProLiant Essentials Foundation Pack* or refer to the HP website (<http://www.hp.com/servers/manage>).

Specifications

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Server Dimensions and Weight

Parameter	Value
Height	8.59 cm (3.38 in)
Depth	65.45 cm (25.75 in)
Width	44.45 cm (17.50 in)
Weight (maximum)	27.22 kg (60 lb)
Weight (no drives installed)	20.41 kg (47.18 lb)

Environmental Specifications

Temperature range	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
NOTE: 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.	

Relative humidity (noncondensing)	
Operating	10% to 90%
Non-operating	5% to 95%
NOTE: 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/>).

DDR SDRAM DIMM Specifications

Item	Description
Size	256 MB, 512 MB, 1 GB, 2 GB
Width	72 bits
Upgrade requirement	Any combination of like-paired DDR SDRAM DIMMs that provide a minimum of 512 MB
Note: Use only 256-, 512-MB, 1-GB or 2-GB, 72-bit wide, 2.5-V, PC2100 Registered ECC DDR SDRAM. Use Compaq branded or HP DDR SDRAM only.	

1.44-MB Diskette Drive Specifications

Item	Description
Dimensions	
Height	12.7 mm (0.5 in)
Width	96 mm (3.8 in)

Item	Description
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	
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

Item	Description
Applicable disk	CD-ROM (modes 1 and 2); mixed mode (audio and data combined); CD-DA; Photo CD (single/multiple-session), CD-XA ready; CDi ready

Item	Description
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 inch)
Depth	132.08 mm (5.20 inch)
Width	132.08 mm (5.20 inch)
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 inch, 3.15 inch)
Thickness	1.2 mm (0.05 inch)
Track pitch	1.6 μm (6.3×10^{-7} inch)
Cache/buffer	128 KB
Startup time	< 10 s
Stop time	< 5 s (single); < 30 s (multisession)
Laser parameters	
Type	Semiconductor laser GaAs
Wave length	700 \pm 25 nm
Divergence angle	53.5° \pm 1.5°
Output power	0.14 mW

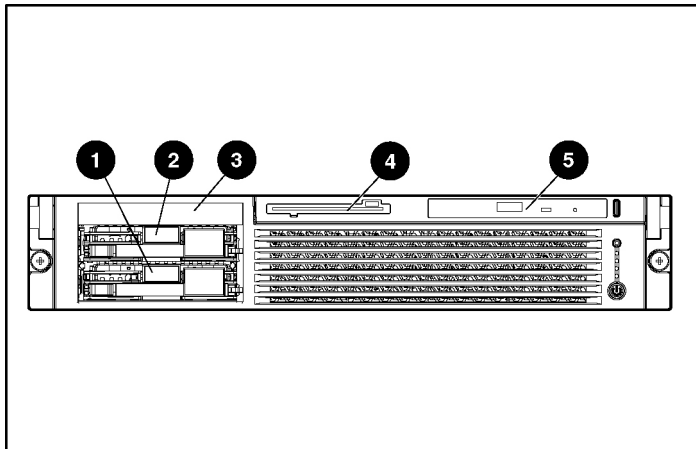
Item	Description
Operating conditions	
Temperature	5°C to 45°C (41°F to 118°F)
Humidity	5% to 90%

Server Component Identification

In This Section

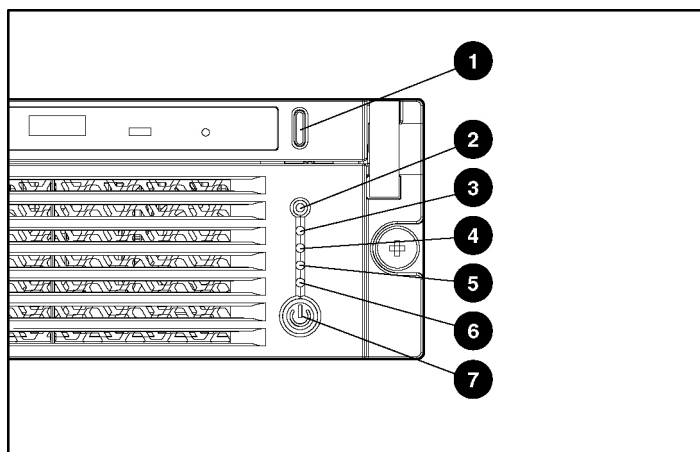
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Front Panel Components



Item	Description
1	SCSI hard drive bay 1 (SCSI ID 0)
2	SCSI hard drive bay 2 (SCSI ID 1)
3	Tape drive blank
4	Diskette drive
5	CD-ROM drive in Universal Media Bay

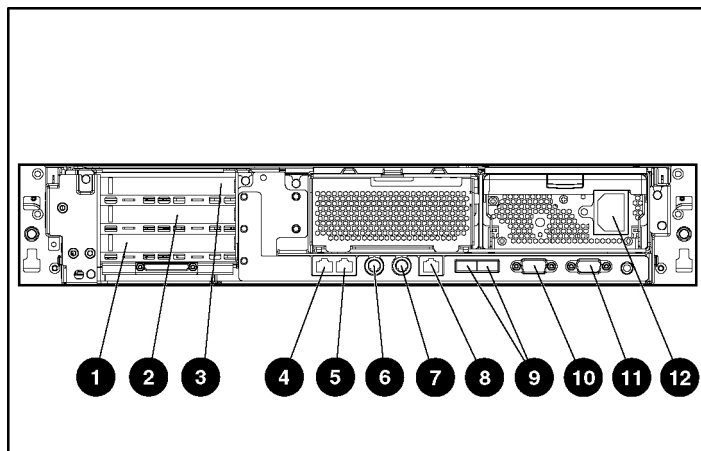
Front Panel LEDs and Buttons



Item	Description	Status
1	CD-ROM drive ejector button	NA
2	UID LED button	Blue = Activated Flashing = System remotely managed Off = Deactivated

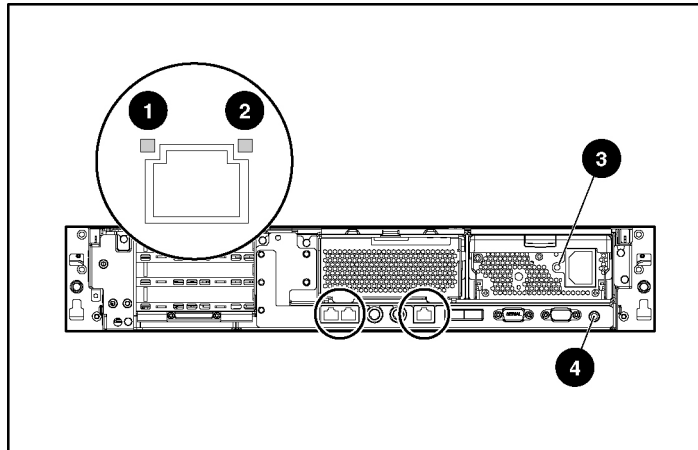
Item	Description	Status
3	Internal health LED	Green = Normal Amber = System degraded. Refer to system board LEDs to identify component in degraded state ("System Board LEDs" on page 84). Red = System critical. Refer to system board LEDs to identify component in critical state ("System Board LEDs" on page 84).
4	External health LED (power supply)	Green = Normal Amber = Power redundancy failure Red = Critical power supply failure
5	NIC 1 link/activity LED	Green = Network link Flashing = Network link and activity Off = No link to network. If power is off, refer to the rear panel NIC LEDs for status ("Rear Panel LEDs and Buttons" on page 79).
6	NIC 2 link/activity LED	Green = Network link Flashing = Network link and activity Off = No link to network. If power is off, refer to the rear panel NIC LEDs for status ("Rear Panel LEDs and Buttons" on page 79).
7	Power On/Standby button/system power LED	Green = Power on Amber = Power standby; auxiliary power still present Off = Power off

Rear Panel Components



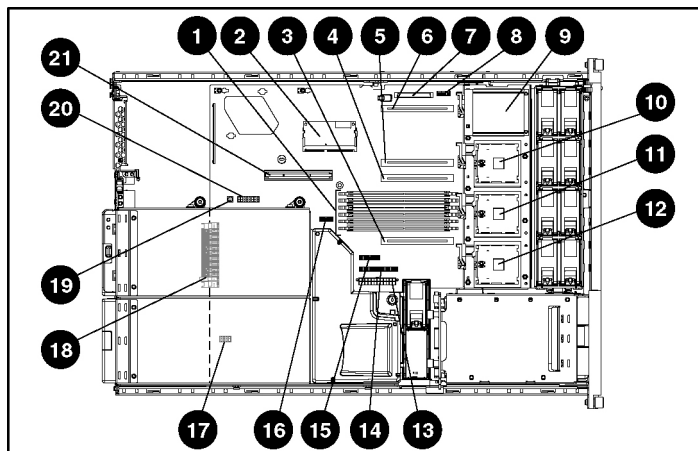
Item	Description	Connector Color
1	Slot 1, 64-bit/133-MHz PCI-X, bus 3	N/A
2	Slot 2, 64-bit/100-MHz PCI-X, bus 6	N/A
3	Slot 3, 64-bit/100-MHz PCI-X, bus 6	N/A
4	NIC 1 RJ-45 connector	N/A
5	NIC 2 RJ-45 connector	N/A
6	Mouse connector	Green
7	Keyboard connector	Purple
8	iLO RJ-45 connector	N/A
9	USB connectors	Black
10	Serial connector	Teal
11	Video connector	Blue
12	AC power supply connector	N/A

Rear Panel LEDs and Buttons



Item	Description	LED Color	Status
1	RJ-45 activity LED	Green	On or flashing = Network activity Off = No network activity
2	RJ-45 link LED	Green	On = Linked to network Off = Not linked to network
3	Power supply LED	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exist: <ul style="list-style-type: none">• AC power unavailable• Power supply failed• Power supply in standby mode• Power supply exceeded current limit
4	UID LED button	Blue	On = Activated Flashing = System remotely managed Off = Deactivated

System Board Components



Item	Description	Item	Description
1	DIMM slots (1-6)	12	Processor socket 4
2	Smart Array 5i Plus Memory Module	13	System power connector
3	PPM slot 4	14	CD-ROM drive system connector
4	PPM slot 3	15	Diskette drive system connector
5	PPM slot 2	16	Power supply signal connector
6	PPM slot 1 (populated)	17	Chassis ID switch (under power module)
7	SCSI connector	18	VHDM connector (under power module)
8	Power On/Standby button/LED cable connector	19	NMI switch
9	Processor socket 1 (populated)	20	System maintenance switch
10	Processor socket 2	21	PCI riser cage connector
11	Processor socket 3	—	—

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.

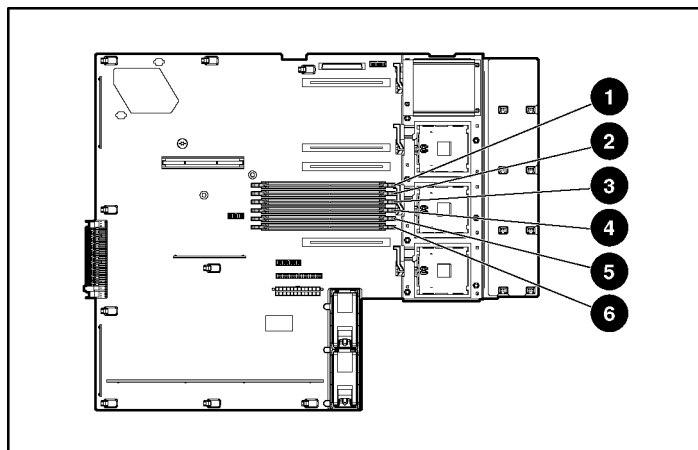
Systems running Microsoft® Windows® operating systems experience a blue screen trap when the operating system crashes. When this happens, Microsoft® recommends that system administrators perform an NMI event by pressing a dump switch. The NMI event enables a hung system to become responsive again.

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.



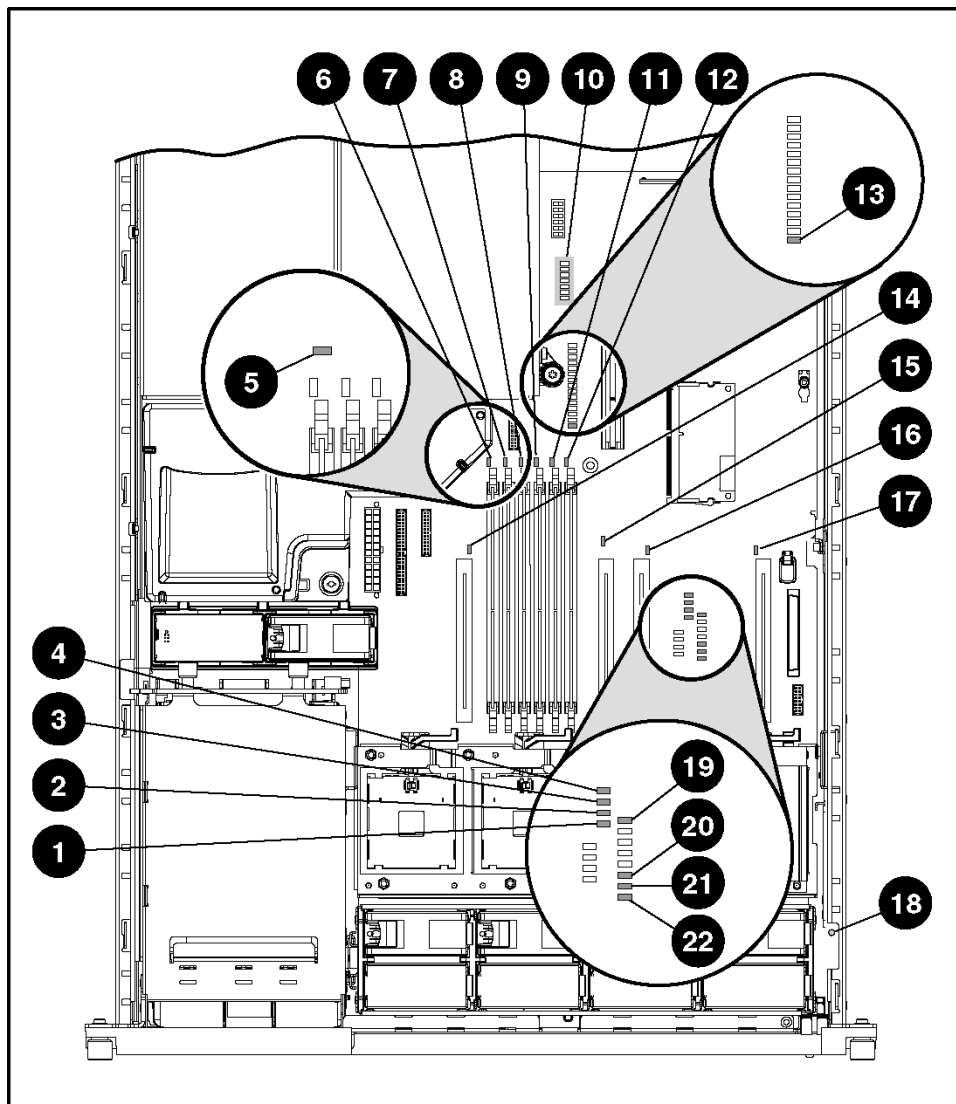
Item	Description
1	DIMM slot 1A
2	DIMM slot 2A
3	DIMM slot 3B
4	DIMM slot 4B
5	DIMM slot 5C
6	DIMM slot 6C

System Maintenance Switch

Position	Default	Function
S1	Off	Reserved
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Off = Booting from diskette is controlled by RBSU. On = Booting from diskette is disabled.

Position	Default	Function
S5	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6	Off	Off = No function. On = Clear NVRAM*.
S7	Off	Off = iLO security is enabled. On = iLO security is disabled.
S8	Off	Off = Processor hot-spare boot is enabled. On = Processor hot-spare boot is disabled.
<p>NOTE: To access the redundant ROM using the system maintenance switch, refer to "Access to Redundant ROM Settings."</p> <p>* If you clear NVRAM, you must re-enter the server serial number through RBSU ("Re-Entering the Server Serial Number" on page 58).</p>		

System Board LEDs



Item	LED Description	Status
1	Processor 1 failure	Amber = Processor failed Off = Normal
2	Processor 2 failure	Amber = Processor failed Off = Normal
3	Processor 3 failure	Amber = Processor failed Off = Normal
4	Processor 4 failure	Amber = Processor failed Off = Normal
5	Online spare memory	Amber = Failover, online spare memory in use Off = Disabled
6	DIMM 6C failure	Amber = Memory failed Off = Normal
7	DIMM 5C failure	Amber = Memory failed Off = Normal
8	DIMM 4B failure	Amber = Memory failed Off = Normal
9	DIMM 3B failure	Amber = Memory failed Off = Normal
10	iLO Diagnostic LEDs	Refer to the <i>Integrated Lights-Out User Guide</i> on the Documentation CD.
11	DIMM 2A failure	Amber = Memory failed Off = Normal
12	DIMM 1A failure	Amber = Memory failed Off = Normal
13	Overtemperature	Amber = Cautionary or critical temperature level is detected Off = Temperature OK

Item	LED Description	Status
14	PPM 4 failure	Amber = PPM failed Off = Normal
15	PPM 3 failure	Amber = PPM failed Off = Normal
16	PPM 2 failure	Amber = PPM failed Off = Normal
17	PPM 1 failure	Amber = PPM failed Off = Normal
18	Fans (1 through 8)	Green = Normal Off = Power off Amber = One or both of the following conditions exist: <ul style="list-style-type: none"> • Fan failed or is not seated • Fan bracket is not seated
19	System power	Green = System power is applied Off = System power is not applied
20	Auxiliary power	Green = Auxiliary power is applied Off = Auxiliary power is not applied
21	Peripheral board interlock	Amber = Peripheral board is not seated Off = Peripheral board is seated
22	Riser interlock	Amber = PCI riser cage is not seated Off = PCI riser cage is seated

System LEDs and Internal Health LED Combinations

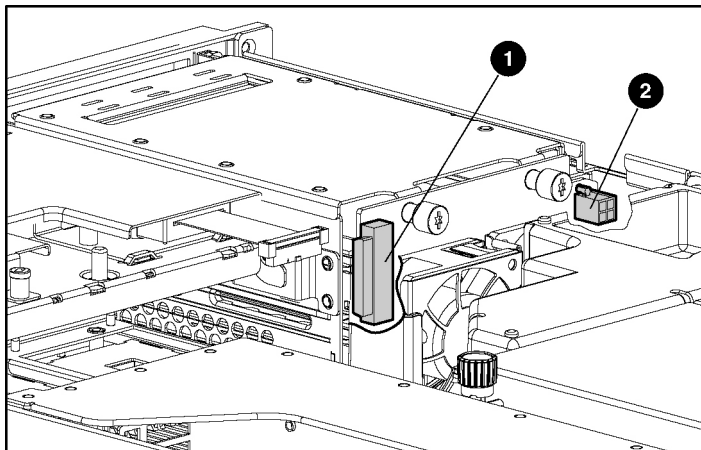
When the internal health LED on the front panel is either amber or red, the server is experiencing a health event. Combinations of illuminated system LEDs and the internal health LED indicate system status.

The front panel health LEDs indicate only the current hardware status. In some situations, Insight Manager 7 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 <i>X</i> (Amber)	Red	<ul style="list-style-type: none"> Processor in socket <i>X</i> has failed. Processor in socket <i>X</i> failed over to the offline spare. Processor <i>X</i> is not installed in the socket. Processor <i>X</i> is unsupported. ROM detects a failed processor during POST.
	Amber	Processor in socket <i>X</i> is in a pre-failure condition.
Processor failure, two or more sockets (Amber)	Red	Processor types are mismatched.
PPM failure, slot <i>X</i> (Amber)	Red	<ul style="list-style-type: none"> PPM in slot <i>X</i> has failed. PPM is not installed in slot <i>X</i>, but the corresponding processor is installed.
DIMM failure, slot <i>X</i> (Amber)	Red	<ul style="list-style-type: none"> DIMM in slot <i>X</i> has failed. DIMM in slot <i>X</i> is an unsupported type, and no valid memory exists in another bank.
	Amber	<ul style="list-style-type: none"> DIMM in slot <i>X</i> has reached single-bit correctable error threshold. DIMM in slot <i>X</i> is in a pre-failure condition. DIMM in slot <i>X</i> is an unsupported type, but valid memory exists in another bank.
Overtemperature (Amber)	Red	<ul style="list-style-type: none"> Health Driver has detected a cautionary temperature level. Server has detected a hardware critical temperature level.
Riser interlock (Amber)	Red	PCI riser cage is not seated.
Peripheral board interlock (Amber)	Red	Peripheral board is not seated.
Fan (Amber)	Amber	Redundant fan has failed.

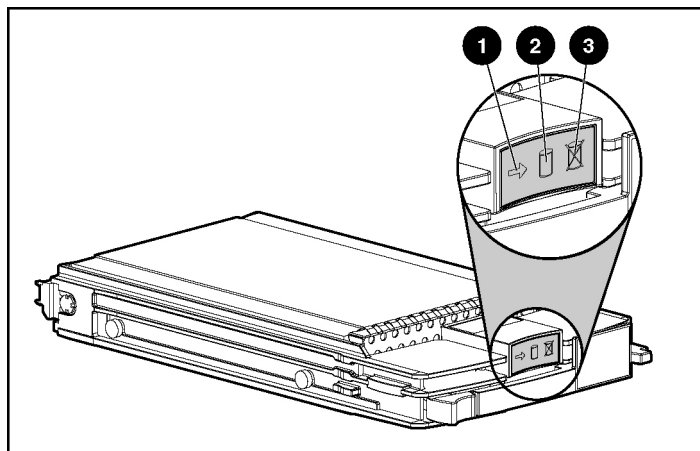
System LED and Color	Internal Health LED Color	Status
	Red	The minimum fan requirements are not being met. One or more fans have failed or are missing.
Online spare memory (Amber)	Amber	Bank X failed over to the online spare memory bank.

SCSI Backplane Components



Item	Description
1	SCSI connector
2	SCSI power connector

Hot-Plug SCSI Hard Drive LEDs

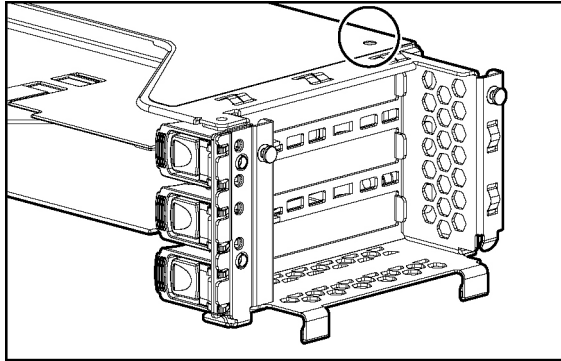


Item	LED Description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is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

Hot-Plug SCSI Hard Drive LED Combinations

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
On, off, or flashing	On or off	Flashing	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On, off, or flashing	On	Off	The drive is online and is configured as part of an array. If the array is configured for fault tolerance and all other drives in the array are online, and a predictive failure alert is received or a drive capacity upgrade is in progress, you may replace the drive online.
On or flashing	Flashing	Off	Do not remove the drive. Removing a drive may terminate the current operation and cause data loss. The drive is rebuilding or undergoing capacity expansion.
On	Off	Off	Do not remove the drive. The drive is being accessed, but (1) it is not configured as part of an array; (2) it is a replacement drive and rebuild has not yet started; or (3) it is spinning up during the POST sequence.
Flashing	Flashing	Flashing	Do not remove the drive. Removing a drive may cause data loss in non-fault-tolerant configurations. Either (1) the drive is part of an array being selected by an array configuration utility; (2) Drive Identification has been selected in Insight Manager; or (3) drive firmware is being updated.
Off	Off	On	The drive has failed and been placed offline. You may replace the drive.
Off	Off	Off	Either (1) the drive is not configured as part of an array; (2) the drive is configured as part of an array, but it is a replacement drive that is not being accessed or being rebuilt yet; or (3) the drive is configured as an online spare. If the drive is connected to an array controller, you may replace the drive online.

PCI Riser Cage LED



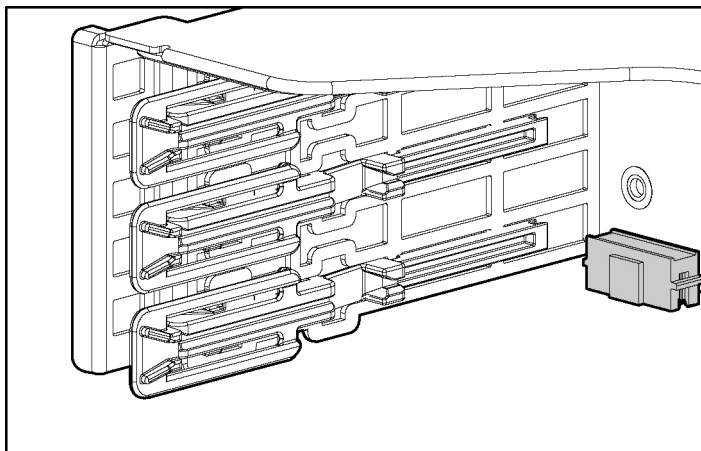
Status
On = system power connected
Off = system power disconnected



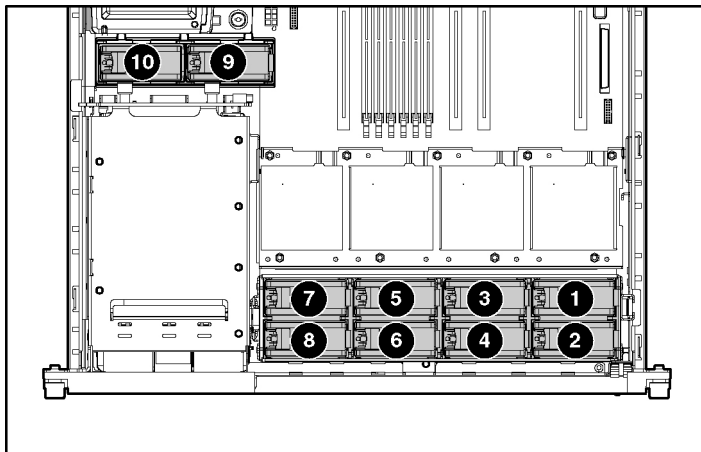
CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCI riser cage.

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" in the user guide or the *Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.



Hot-Plug Fans



Item	Description	Fan Zone
1	Fan 1	Processor
2	Fan 2	Processor
3	Fan 3	Processor
4	Fan 4	Processor

Item	Description	Fan Zone
5	Fan 5	Processor
6	Fan 6	Processor
7	Fan 7	Processor
8	Fan 8	Processor
9	Fan 9	Power supply
10	Fan 10	Power supply
NOTE: For information on fan redundancy, refer to "Redundant Hot-Plug Fan Option (on page 93)."		

Redundant Hot-Plug Fan Option

The server supports redundant hot-plug fans to provide proper airflow to the system if a primary fan fails. The server airflow is divided into two fan zones: processor and power supply.

In the standard configuration, five fans cool the server: fans 1, 3, 5, and 7 in the processor zone, and fan 9 in the power supply zone.

For the redundant configuration, fans 2, 4, 6, 8, and 10 are added to back up the primary fans. This allows the server to continue operation in non-redundant mode with one fan failure in either zone.

The server shuts down in the following scenarios:

- At POST:
 - The BIOS suspends the server for 5 minutes if a cautionary temperature level is detected. If the cautionary temperature level is still detected after 5 minutes, the BIOS performs an orderly shutdown and then restarts. This process repeats until the cautionary temperature level is no longer detected.

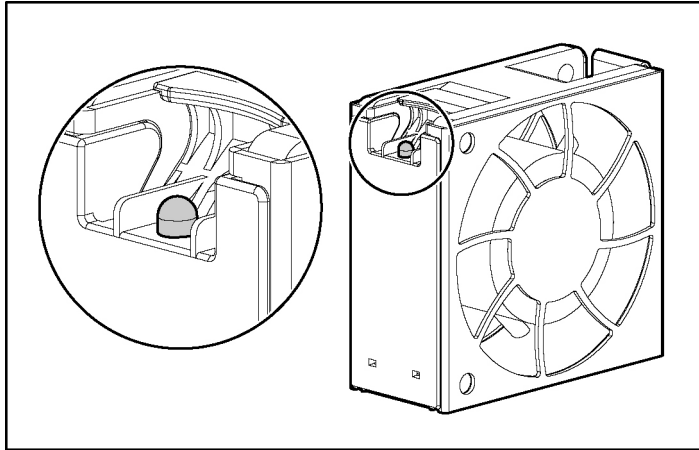
- In a nonredundant configuration, the BIOS performs an orderly shutdown if a fan failure occurs in the processor zone or power supply zone. In a redundant configuration, the BIOS performs an orderly shutdown if two fan failures occur in the processor zone or power supply zone.
- The server performs an immediate shutdown if a critical temperature level is detected.

IMPORTANT: An immediate shutdown is a hardware-controlled function and it overrides any firmware or software actions.

- In the operating system:
 - With the Health Driver loaded and Thermal Shutdown enabled in RBSU, the Health Driver performs an orderly shutdown if a cautionary temperature level is detected. If the server detects a critical temperature level before the orderly shutdown occurs, the server performs an immediate shutdown. Additionally, in a nonredundant configuration, the Health Driver performs an orderly shutdown if a fan failure occurs in the processor zone or power supply zone. In a redundant configuration, the Health Driver performs an orderly shutdown if two fan failures occur in the processor zone or power supply zone.
 - With the Health Driver loaded and Thermal Shutdown disabled in RBSU, the server performs an immediate shutdown if a critical temperature level is detected. The Health Driver will not initiate an orderly shutdown if a cautionary temperature level is detected.
 - Without the Health Driver loaded, the server performs an immediate shutdown if a critical temperature level is detected.

IMPORTANT: An immediate shutdown is a hardware-controlled function and it overrides any firmware or software actions.

Hot-Plug Fan LED



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

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