

# HP ProLiant BL20p Generation 3 Server Blade Maintenance and Service Guide



July 2010 (Eleventh Edition)  
Part Number 316078-011c

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# Contents

## About This Guide

Audience Assumptions .....	v
Technician Notes .....	v
Where to Go for Additional Help .....	vii
Integrated Management Log .....	vii
Telephone Numbers .....	vii

## Chapter 1

### Illustrated Parts Catalog

ProLiant BL20p Generation 3 Server Blade Components .....	1-2
System Exploded View .....	1-2
Server Blade Spare Parts List .....	1-3

## Chapter 2

### Removal and Replacement Procedures

Safety Considerations .....	2-1
Electrostatic Discharge Information .....	2-1
Server Blade Warnings and Cautions .....	2-1
Rack Warnings and Cautions .....	2-2
Symbols on Equipment .....	2-3
Server Blade Components .....	2-4
Server Blade Preparation .....	2-4
Access Panel .....	2-7
Hard Drive Blanks .....	2-8
Hot-Plug SCSI Hard Drives .....	2-9
DIMMs .....	2-10
Processors and Heatsinks .....	2-11
Smart Array 6i Controller .....	2-14
Smart Array 6i 128-MB Battery Backed Write Cache Enabler .....	2-16
Fan Assembly .....	2-17
HP ProLiant BL30p Dual Port Fibre Channel Adapter .....	2-18
Standard NIC Mezzanine Card .....	2-19
SCSI Backplane .....	2-20
Power Converter Module .....	2-22
DC Filter Module .....	2-23
Power Button/LED Board .....	2-24
Battery .....	2-26
System Board .....	2-28

Server Blade Blanks .....2-31

**Chapter 3**

**Diagnostic Tools**

ProLiant BL p-Class Diagnostic Tools .....3-1  
Firmware Upgrades for Management Modules .....3-3

**Chapter 4**

**Connectors, LEDs, and Switches**

Connectors .....4-1  
    ProLiant BL20p Generation 3 Server Blade .....4-1  
    Local I/O Cable .....4-4  
LEDs .....4-6  
    ProLiant BL20p Generation 3 Server Blade Front Panel .....4-6  
    Hot-Plug SCSI Hard Drives .....4-7  
Buttons and Switches .....4-10  
    Buttons .....4-10  
    Switches .....4-11

**Chapter 5**

**Server Blade Specifications**

HP ProLiant BL20p Generation 3 Server Blade .....5-1

**Index**

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## About This Guide

This maintenance and service guide can be used for reference when servicing HP ProLiant BL20p Generation 3 Server Blades.



**WARNING:** To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

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## Audience Assumptions

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

## Technician Notes



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

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**WARNING:** To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.

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

Disconnect power from the system by unplugging all power cords from the power supplies.

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.

---



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

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

---

**NOTE:** Any indications of component replacement or printed wiring board modifications may void any warranty.

## Where to Go for Additional Help

In addition to this guide, the following information sources are available:

*HP ProLiant BL System Best Practices Guide*

*HP ProLiant BL System Common Procedures Guide*

*HP ProLiant BL p-Class System Setup and Installation Guide*

*HP ProLiant BL p-Class System Hardware Installation and Configuration Poster*

*HP ProLiant Servers Troubleshooting Guide*

*Altiris eXpress Deployment Server for HP ProLiant Servers User Guide*

*HP Integrated Light-Out User Guide*

*HP RO-Based Setup and Utility User Guide*

White paper: *HP ProLiant BL-Class System Overview and Planning*

White paper: *Configuring a Preboot eXecution Environment (PXE) using Red Hat Linux 7.2 on HP ProLiant Servers*

HP ProLiant BL20p Generation 3 Server Blade QuickSpecs

*Service Quick Reference Guide*

## Integrated Management Log

The server includes an integrated, nonvolatile management log that contains fault and management information. The contents of the Integrated Management Log (IML) can be viewed with Insight Manager.

## Telephone Numbers

For the name of the nearest HP authorized reseller:

In the United States, refer to [http://www.hp.com/service\\_locator](http://www.hp.com/service_locator).

In other locations, refer to <http://www.hp.com>.

For HP technical support:

In North America:

Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to <http://www.hp.com>.

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

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## Illustrated Parts Catalog

This chapter provides illustrated parts and spare parts lists for the HP ProLiant BL20p Generation 3 Server Blade components. Refer to Table 1-1 for the names of referenced spare parts.



# ProLiant BL20p Generation 3 Server Blade Components

## System Exploded View

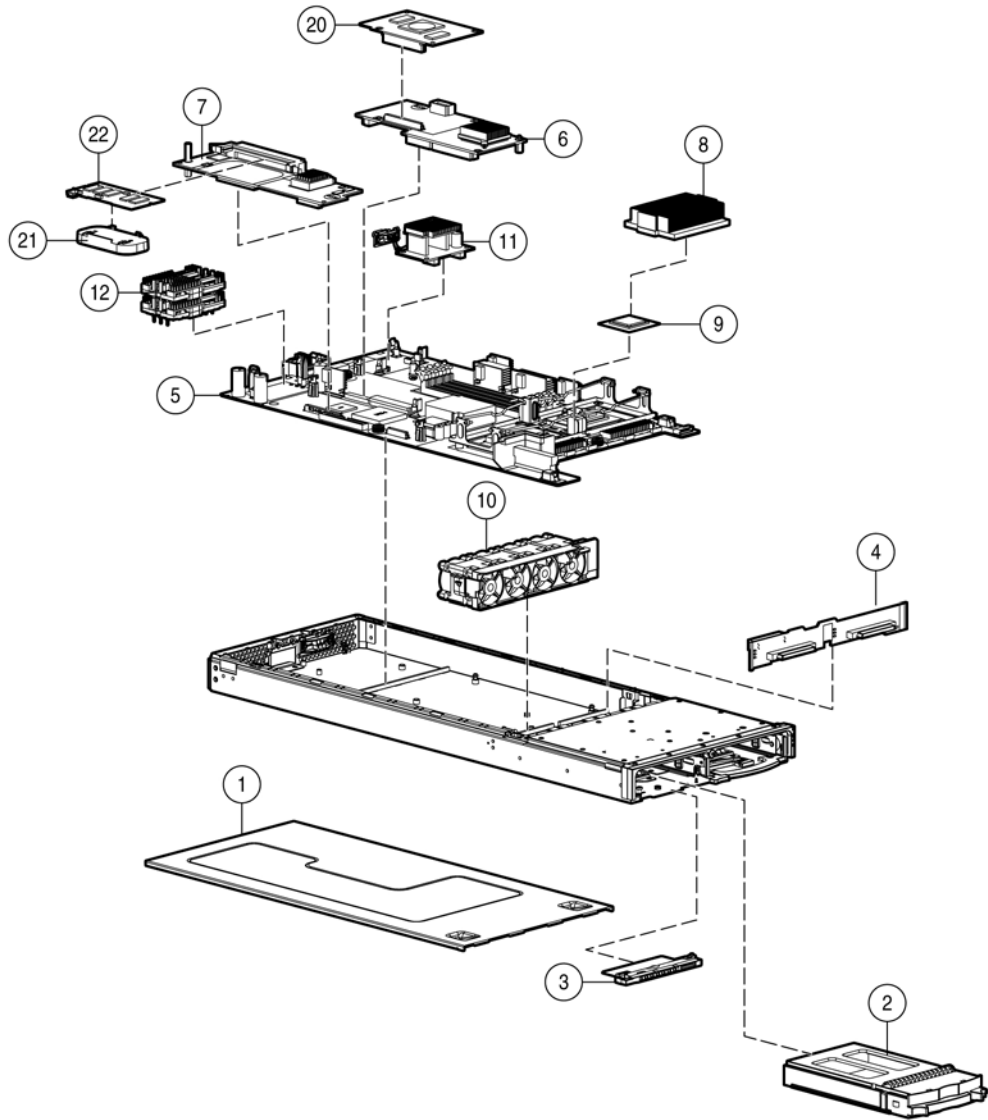


Figure 1-1: System exploded view

## Server Blade Spare Parts List

**Table 1-1: Server Blade Spare Parts List**

Item	Description	Spare Part Number
<b>Mechanical Components</b>		
1	Access panel	371709-001
2	Hard drive blank	122759-001
<b>Boards</b>		
3	Power button/LED board kit with LED cable (cable not shown *)	371706-001
4	SCSI backplane with cables (cables not shown *)	371701-001
5	System board with heatsinks	
	a) System board for single-core processors	371700-001
	b) System board for dual-core processors *	409353-001
6	Standard NIC Mezzanine card	371704-001
7	HP Smart Array 6i Controller	371702-001
<b>System Components</b>		
8	Processor heatsink	
	a) Single-core processor heatsink	371699-001
	b) Dual-core processor heatsink *	409339-001
9	Processor	
	a) 2.8-GHz Intel® Xeon™ processor with 1-MB cache *	392550-001
	b) 3.2-GHz Intel® Xeon™ processor with 1-MB cache *	371696-001
	c) 3.4-GHz Intel® Xeon™ processor with 1-MB cache *	371697-001
	d) 3.6-GHz Intel® Xeon™ processor with 1-MB cache *	371698-001
	e) 3.4-GHz Intel® Xeon™ processor with 2-MB cache *	383037-001
	f) 3.6-GHz Intel® Xeon™ processor with 2-MB cache *	383038-001
	g) 3.8-GHz Intel® Xeon™ processor with 2-MB cache *	398920-001
	h) 2.80-GHz Intel® Xeon™ dual-core processor with 4-MB cache *	
	Note: Dual-core processors cannot be installed on system boards supporting single-core processors.	
10	Fan assembly	371708-001
11	DC filter module	371705-001
12	Power converter module (2)	371754-001
<b>Miscellaneous</b>		
13	Air baffle	409728-001
14	Plastics and hardware kit *	311767-001

Table 1-1: Server Blade Spare Parts List *continued*

Item	Description	Spare Part Number
	a) Bezel assembly	—
	b) Ejector latch assembly	—
	c) Quarter-turn standoffs (2)	—
	d) Rear power connector thumbscrews (2)	—
15	Replacement battery, 3-V lithium *	234556-001
16	Server blade return kit *	237582-001
17	Local I/O cable*	355935-001
<b>Memory</b>		
18	DIMM, 512-MB, ECC registered PC2-3200 DDR SDRAM * **	359241-001
19	DIMM, 1-GB, ECC registered PC2-3200 DDR SDRAM * **	359242-001
20	DIMM, 2-GB, ECC registered PC2-3200 DDR SDRAM * **	378021-001
<b>Options</b>		
21	HP ProLiant BL20p G3 Dual Port Fibre Channel Adapter	371703-001
22	Smart Array 6i 128-MB Battery-Backed Write Cache Enabler battery	307132-001
23	Smart Array 6i Memory Module	351518-001
24	RJ-45 Patch Panel 2, with Fibre Channel support *	322299-001
25	Transceiver, 2-Gb, Fibre Channel *	229204-001

\* Not shown

\*\* DIMMs must be installed in pairs.

---

## Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for system components. After completing all necessary removal and replacement procedures, verify that all components operate properly by running the appropriate diagnostic software:

- For server blade components, run the Server Diagnostics Utility, available at [www.hp.com](http://www.hp.com).
- For server blade enclosure and power enclosure components, run the infrastructure diagnostics. Refer to Chapter 3, “Diagnostic Tools,” for more information.

### Safety Considerations

#### Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Always be properly grounded when touching a static-sensitive component or assembly.
- Use conductive field service tools.

#### Server Blade Warnings and Cautions



**WARNING:** To reduce the risk of shock or injury from high-current electrical energy, do not remove the server blade access panel while the server blade is installed in the server blade enclosure. Do not remove the server blade access panel and then install the server blade into the server blade enclosure.

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**WARNING:** To reduce the risk of injury from high-current electrical energy, do not remove the server blade access panel when power is applied through the HP ProLiant p-Class diagnostic station. Remove all power from the server blade before removing the access panel.

---



**WARNING:** Setting the server blade power button to the standby position removes power from most areas of the server blade. This process may take 30 seconds, during which time some internal circuitry remains active. To remove power completely, remove the server blade from the server blade enclosure.

---



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

---



**CAUTION:** When performing non-hot-plug operations, you must power down the server blade and/or the system. However, it may be necessary to leave the server blade powered up when performing other operations, such as hot-plug installations or troubleshooting.

---

## Rack Warnings and Cautions



**WARNING:** The power supply enclosure and the server blade enclosure are very heavy. To reduce the risk of personal injury or damage to the equipment:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
  - Remove hot-plug power supplies and server blades from their enclosures before installing or removing the enclosures.
  - Use caution and get help to lift and stabilize enclosures during installation or removal, especially when the enclosure is not fastened to the rack.
- 



**WARNING:** Always use at least two people to lift a power supply enclosure or server blade enclosure into the rack. If the enclosure is being loaded into the rack above chest level, a third person **MUST** assist with aligning the enclosure with the rails while the other two people support the weight of the enclosure.

---



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

- The leveling jacks of the rack are extended to the floor.
  - The full weight of the rack rests on the leveling jacks.
  - The stabilizers are attached to the rack if it is a single rack installation.
  - The racks are coupled in multiple rack installations.
- 



**WARNING:** When installing the server blade enclosure in a telco rack, be sure that the rack frame is adequately secured to the building structure.

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**WARNING:** To reduce the risk of personal injury or damage to the equipment, at least two people are needed to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 m (7 ft) tall, and may become unstable when being moved on its casters. Do not stand in front of the rack as it rolls down the ramp from the pallet, but handle the rack from both sides.



**WARNING:** To reduce the risk of shock or injury from high-current electrical energy, do not reach into a server blade enclosure after it is installed in a rack and connected to a working rack bus bar. Do not touch the power or data backplanes within the server blade enclosure after the server blade enclosure is installed.



**WARNING:** To reduce the risk of shock or injury from high-current electrical energy, do not reach into a power supply enclosure once it has been installed in a rack and connected to a power source. Do not touch the connectors within the power supply enclosure once it has been installed.



**WARNING:** To reduce the risk of shock or injury from high-current electrical energy, do not open any access covers on the rack bus bar or power bus box after it has been connected to a power source.



**CAUTION:** Always ensure that equipment is properly grounded before beginning any installation procedure. Electrostatic discharge resulting from improper grounding can damage electronic components. For more information, refer to the setup and installation guide.

## Symbols on Equipment



25 kg  
55 lb

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

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



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component.

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



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

**WARNING:** Any surface or area of the equipment marked with these symbols indicates the presence of electric shock hazards. The enclosed area contains no operator serviceable parts..



Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection (NIC).

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

## Server Blade Components

Use the procedures in this section to perform service events on ProLiant BL20p G3 server blades.

**NOTE:** Slate blue denotes serviceable parts, and port denotes hot-pluggable parts.

## Server Blade Preparation

To service any internal server blade component, power down the server blade and remove it from the server blade enclosure.



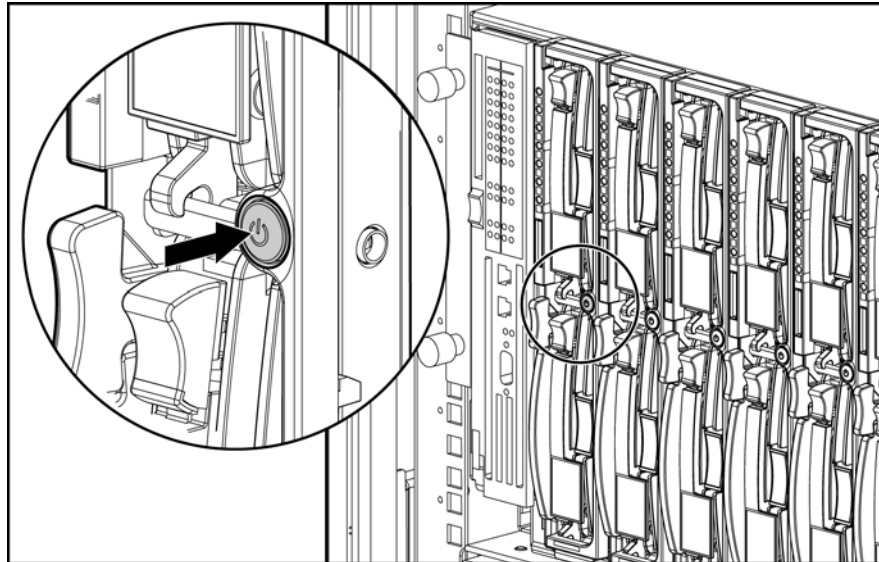
**CAUTION:** Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. For more information, refer to the “Electrostatic Discharge Information” section in this chapter.

---

System power in server blades does not completely shut off with the front panel power switch or Integrated Lights-Out (iLO) Virtual Power Button feature. The function toggles between on and standby modes, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active.

To service internal server blade components:

1. Identify the proper server blade in the server blade enclosure.
2. Remove power from the server blade in one of the following ways:
  - Use the Virtual Power Button feature in the iLO Remote Console to power down the server blade from a remote location. Be sure that the server blade is in standby mode by observing that the power LED is amber.
  - Press the power button on the front of the server blade. Be sure that the server blade is in standby mode by observing that the power LED is amber.



**Figure 2-1: Pressing the power button**



3. Remove the server blade from the server blade enclosure:

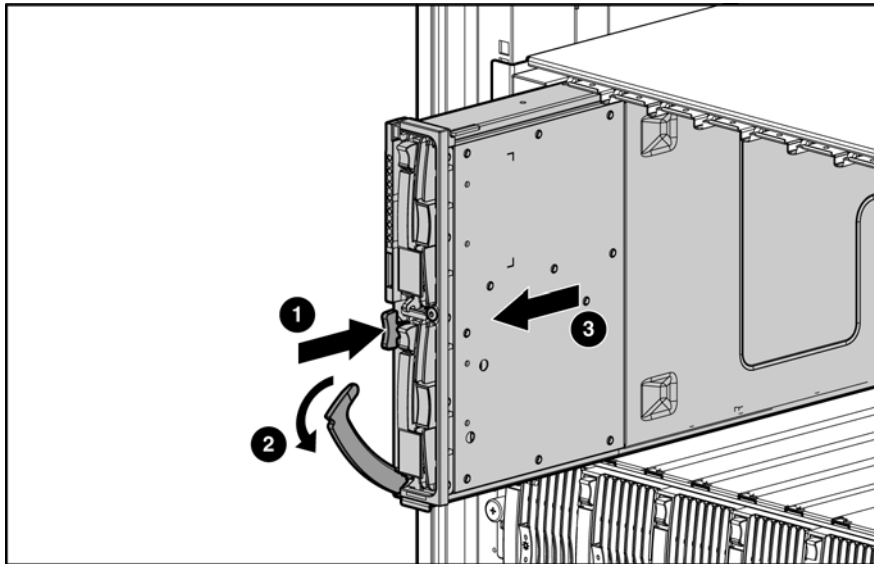
- a. Press the release button (1).



**CAUTION:** After you press the release button, the server blade is unlocked from the enclosure. Use both hands to support the server blade when you remove it from the rack.

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- b. Open the lever (2).
- c. Grasp the lever and slide the server blade from the enclosure (3). Place a hand under the server blade to support it as you remove it from the enclosure.



**Figure 2-2: Removing the server blade from the server blade enclosure**

- d. Place the server blade on a flat, level surface.



**CAUTION:** Always populate server blade enclosure bays with either a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank results in improper airflow and improper cooling that can lead to thermal damage.

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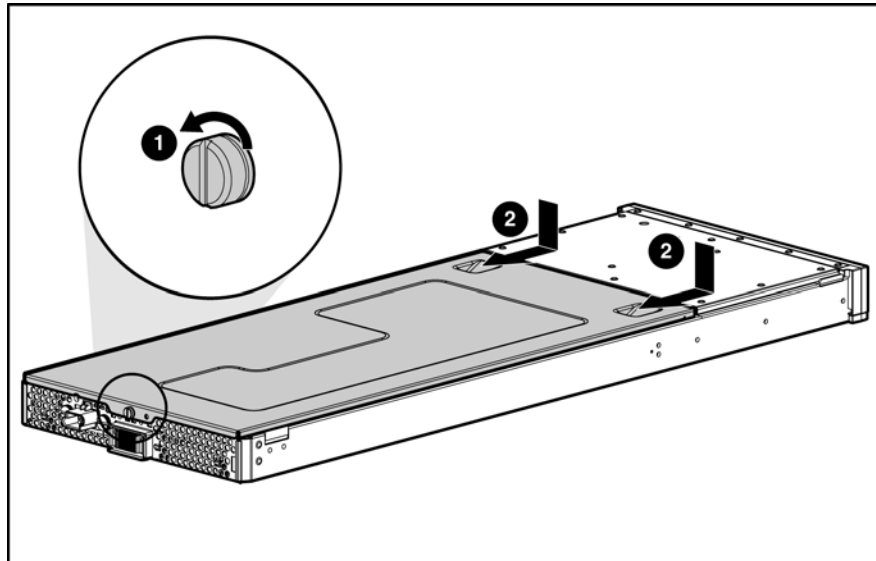
To install and power up a server blade, reverse the removal procedure. Server blades are set to power up automatically upon insertion. If you have changed this setting, use the power button or iLO Virtual Power Button feature to power up the server blade.

For more information about iLO, refer to the *HP Integrated Lights-Out User Guide*.

## Access Panel

To remove the access panel:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Loosen the thumbscrew (1).
3. Press down on the thumb indentations, slide the access panel toward the rear of the unit about 1.25 cm (0.5 in), and lift to remove the panel (2).



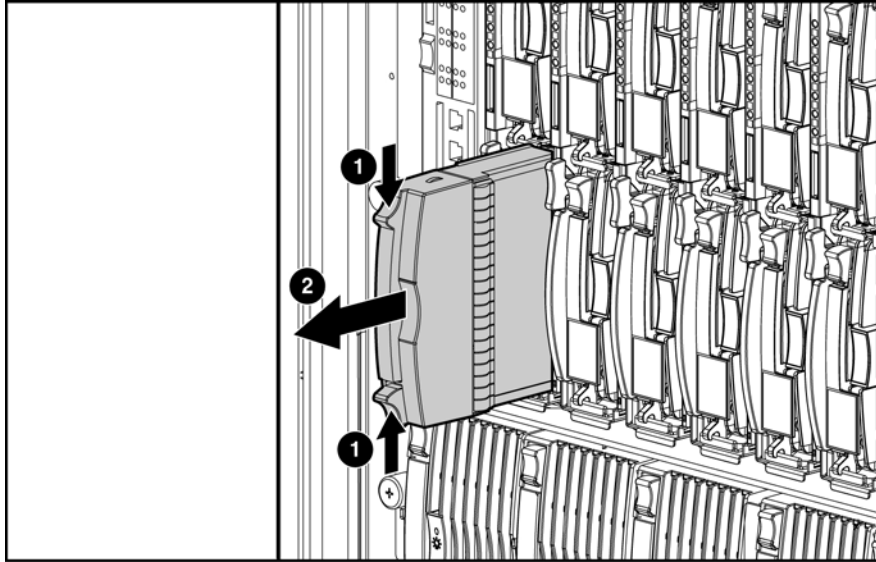
**Figure 2-3: Removing the server blade access panel**

To replace the component, reverse the removal procedure.

## Hard Drive Blanks

To remove a hard drive blank:

1. Press the release buttons simultaneously (1).
2. Pull the blank out of the drive bay (2).



**Figure 2-4: Removing a hard drive blank**



**CAUTION:** Always populate hard drive bays with either a hot-plug SCSI hard drive or hard drive blank. Operating the server blade without a hot-plug SCSI hard drive or hard drive blank results in improper airflow and improper cooling that can lead to thermal damage.

---

To replace the hard drive blank, slide the blank into the bay until it locks into place. The hard drive blank is keyed to fit only one way.

## Hot-Plug SCSI Hard Drives

To assess hard drive status, observe the hot-plug SCSI hard drive status LEDs. For a detailed explanation of these LEDs, refer to Chapter 4, “Connectors, LEDs, and Switches.”



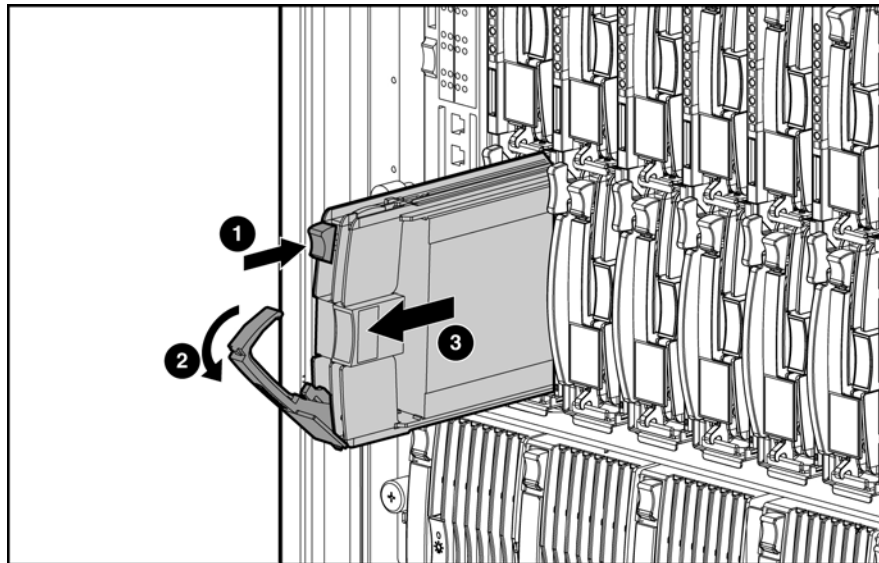
**CAUTION:** Refer to the *HP ProLiant Servers Troubleshooting Guide* before removing a hard drive.

---

**IMPORTANT:** It is not necessary to power down the server blade before removing or replacing a hot-plug SCSI hard drive.

To remove a hot-plug SCSI hard drive:

1. Press the port-colored release button (1).
2. Open the ejector lever (2).
3. Slide the drive out of the drive cage (3).



**Figure 2-5: Removing a hot-plug SCSI hard drive**



**CAUTION:** Always populate hard drive bays with either a hot-plug SCSI hard drive or hard drive blank. Operating the server blade without a hot-plug SCSI hard drive or hard drive blank results in improper airflow and improper cooling that can lead to thermal damage.

---

To replace a hot-plug SCSI hard drive:

1. Slide the drive into the cage until it is fully seated.
2. Close the lever, locking the drive into place.

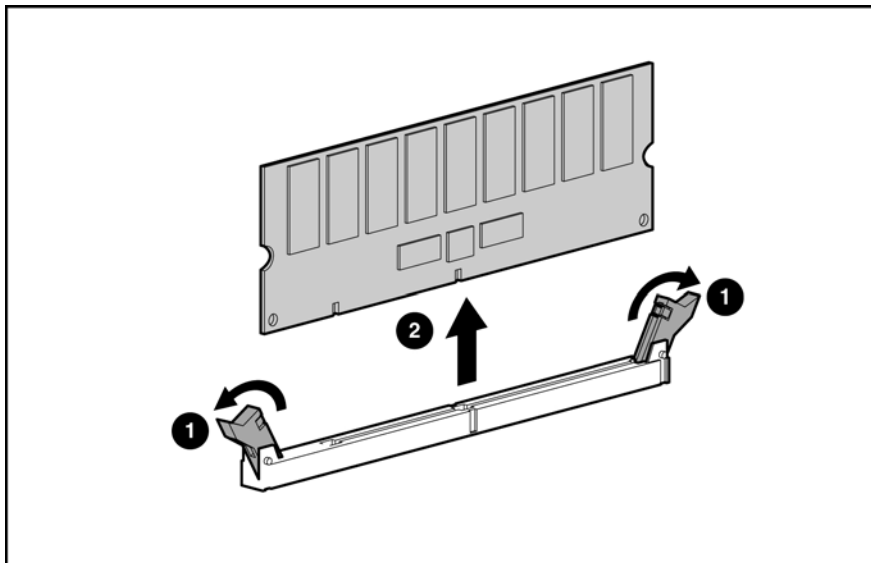
## DIMMs

To remove a DIMM:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.

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

3. Open the DIMM slot latches (1).
4. Remove the DIMM from the slot (2).



**Figure 2-6: Removing a DIMM**



**CAUTION:** For proper DIMM configuration, refer to the setup and installation guide.



**CAUTION:** Use only HP DIMMs. DIMMs from other sources may adversely affect data integrity.

---

**IMPORTANT:** Always install DIMMs in identical pairs.

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

To replace the component, reverse the removal procedure.

## Processors and Heatsinks

To remove a processor:

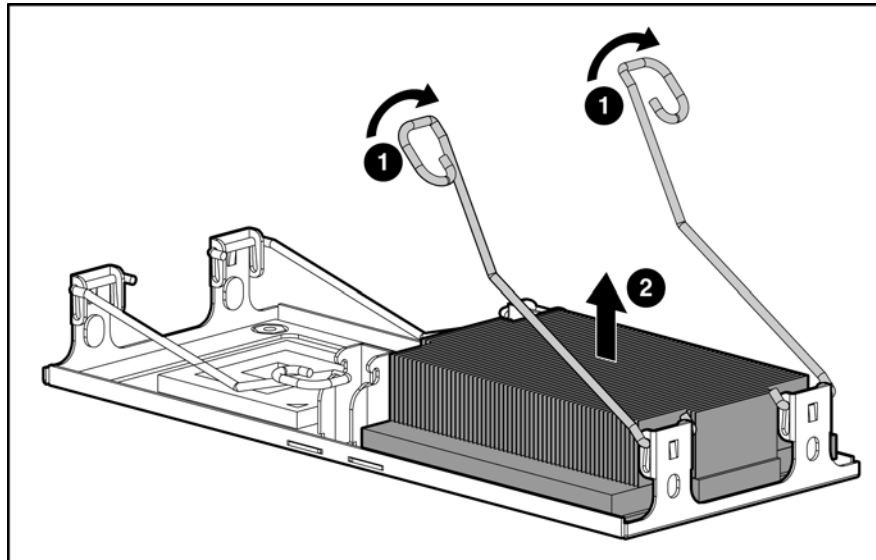
1. Power down the server blade and remove it from the server blade enclosure. Refer to “Server Blade Preparation” in this chapter.
2. Remove the access panel. Refer to “Access Panel” in this chapter.
3. Push down on the slate-blue heatsink locking levers on both sides of the heatsink and then pull them out and up (1).



**CAUTION:** The heatsink is not reusable and must be discarded if removed from the processor after application.

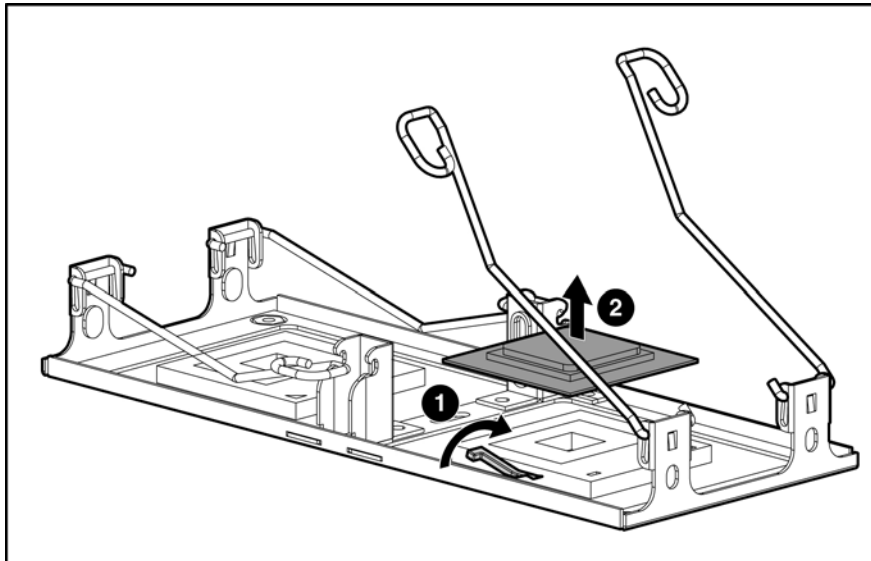
---

4. Remove the heatsink (2).



**Figure 2-7: Unlatching the processor locking levers and removing the heatsink**

5. Raise the processor locking lever to release the processor (1) and remove the processor (2).



**Figure 2-8: Removing the processor**

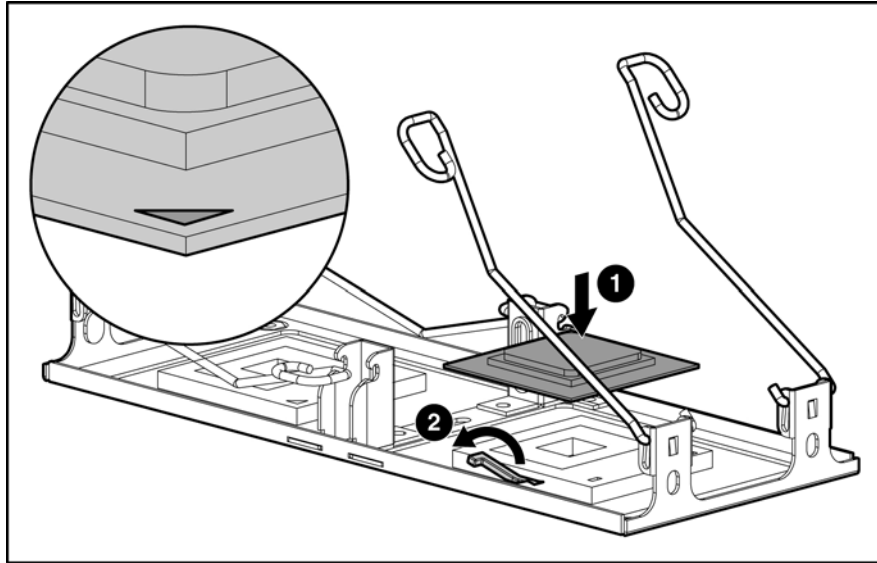
To replace the processor:



**CAUTION:** When installing the processor into the socket, be sure that the locking lever is raised to avoid damaging pins.

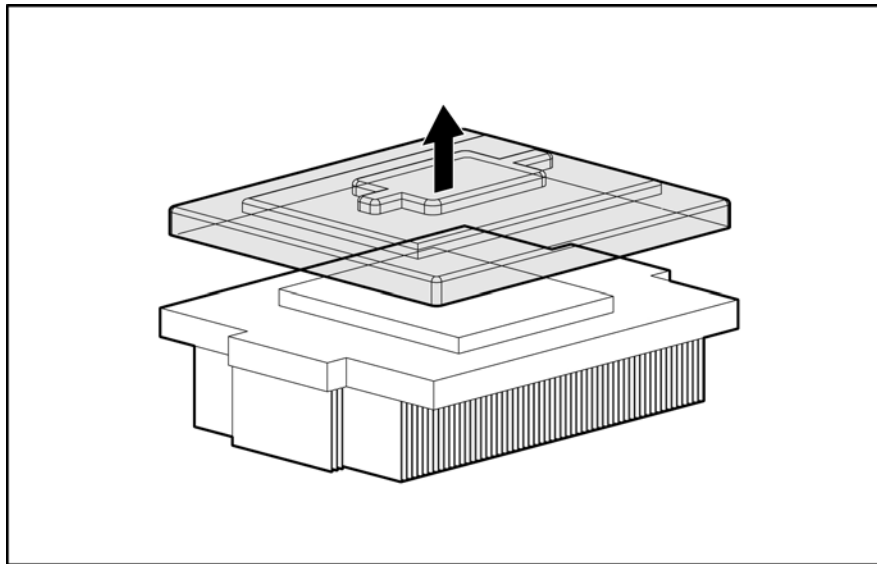
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1. With the processor locking lever raised, insert the processor with the edges properly aligned (1).
2. Lower the processor locking lever (2).



**Figure 2-9: Installing the processor**

3. Remove the thermal interface media cover from the new heatsink.



**Figure 2-10: Removing the thermal interface media cover**



**CAUTION:** After the cover is removed, do not touch the thermal interface media. Touching the thermal interface media could cause processor overheating.



4. Install the heatsink (1) and close the heatsink locking levers (2).



**CAUTION:** The heatsink is not reusable and must be discarded if removed from the processor after application.

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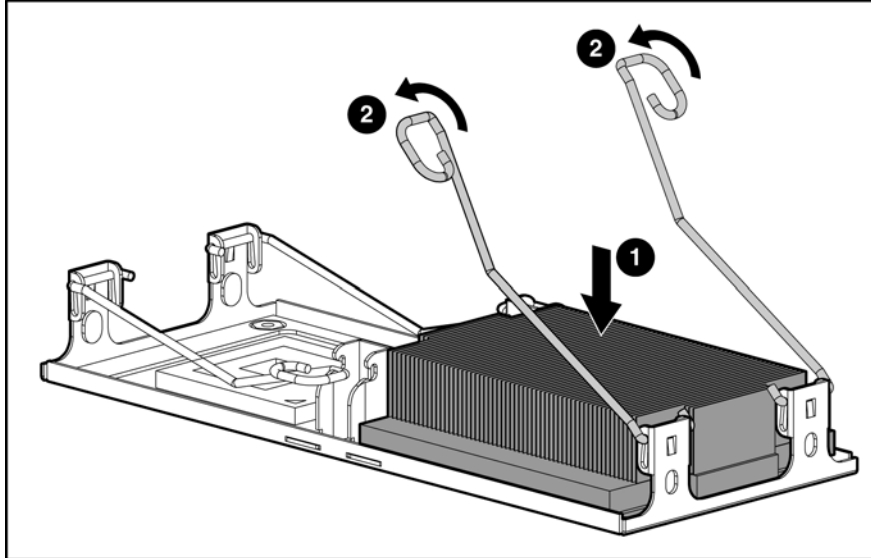


Figure 2-11: Installing the heatsink

## Smart Array 6i Controller

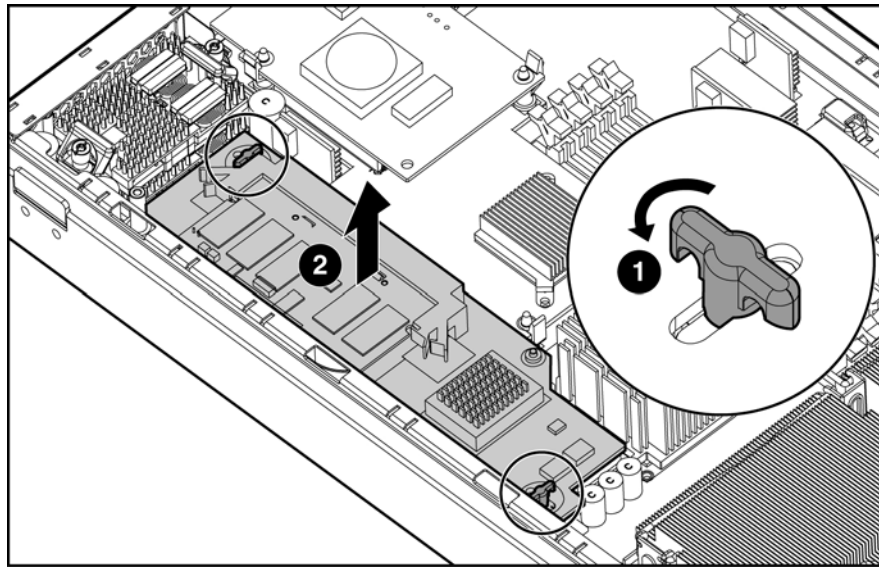
To remove the Smart Array 6i Controller:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.

3. Turn the standoffs one quarter-turn (1).
4. Remove the Smart Array 6i Controller from the server blade (2).

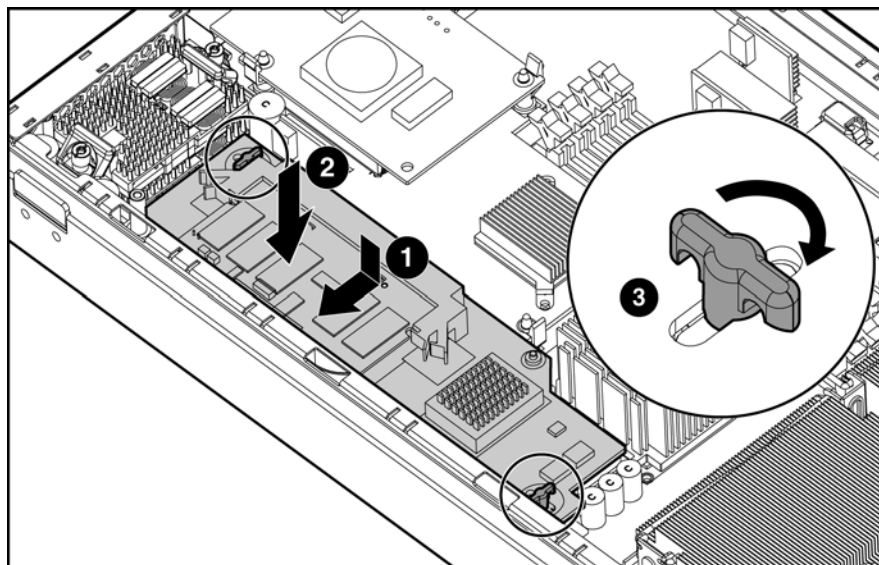


**CAUTION:** Disconnecting the battery module will cause any unsaved data in the memory module to be lost.



**Figure 2-12: Remove the Smart Array 6i Controller**

To replace the component, reverse the removal procedure.



**Figure 2-13: Replacing the Smart Array 6i Controller**

## Smart Array 6i 128-MB Battery Backed Write Cache Enabler

To remove the 128-MB Battery-Backed Write Cache Enabler:

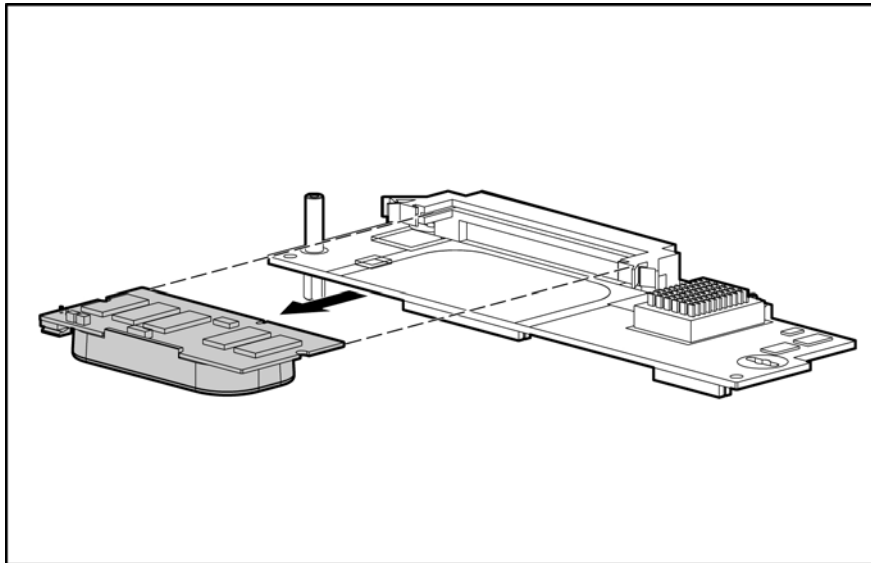
1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.
3. Remove the Smart Array 6i Controller from the server blade. Refer to the “Smart Array 6i Controller” section in this chapter.



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

---

4. Remove the 128-MB Battery-Backed Write Cache Enabler from the Smart Array 6i Controller.



**Figure 2-14: Removing the 128-MB Battery-Backed Write Cache Enabler from the Smart Array 6i Controller**

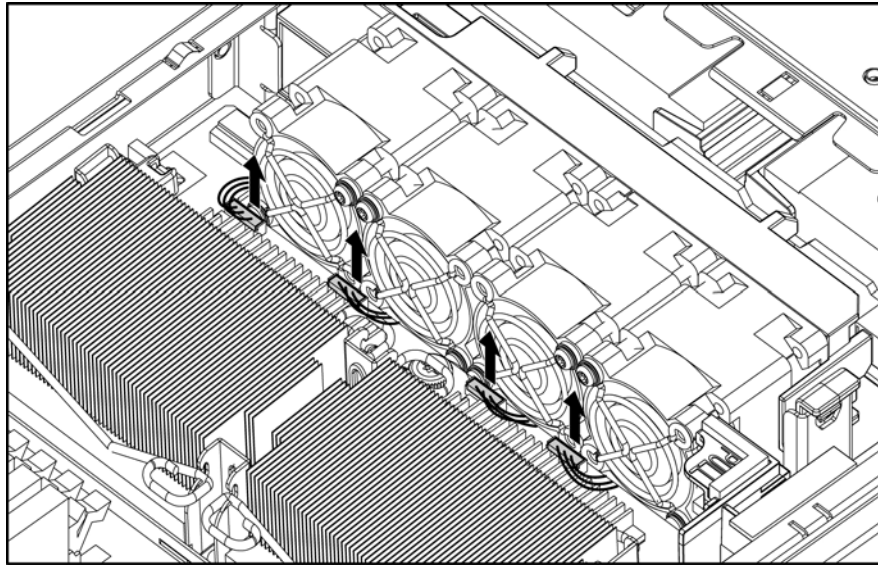
To replace the component, reverse the removal procedure.

## Fan Assembly

To remove the fan assembly:

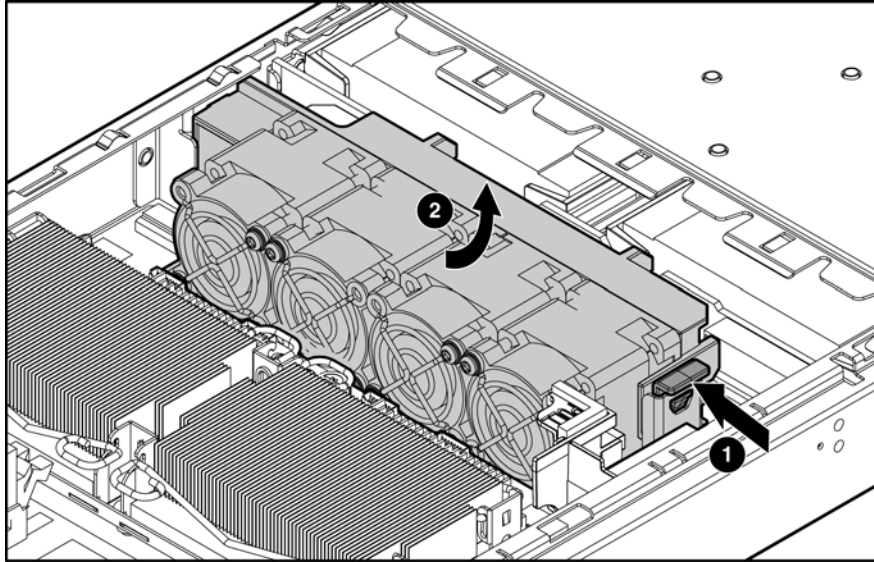
1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.
3. Disconnect the fan assembly cables from the system board.

**IMPORTANT:** Be sure to connect the cables to the same connectors when replacing the fan assembly.



**Figure 2-15: Disconnecting fan cables**

4. Press the fan retention tab (1) and lift up the assembly (2).



**Figure 2-16: Removing a fan assembly**

To replace the component, reverse the removal procedure. If the air baffle becomes loose, reverse the procedure in step 6 of “SCSI Backplane” in this chapter to reinstall the air baffle.

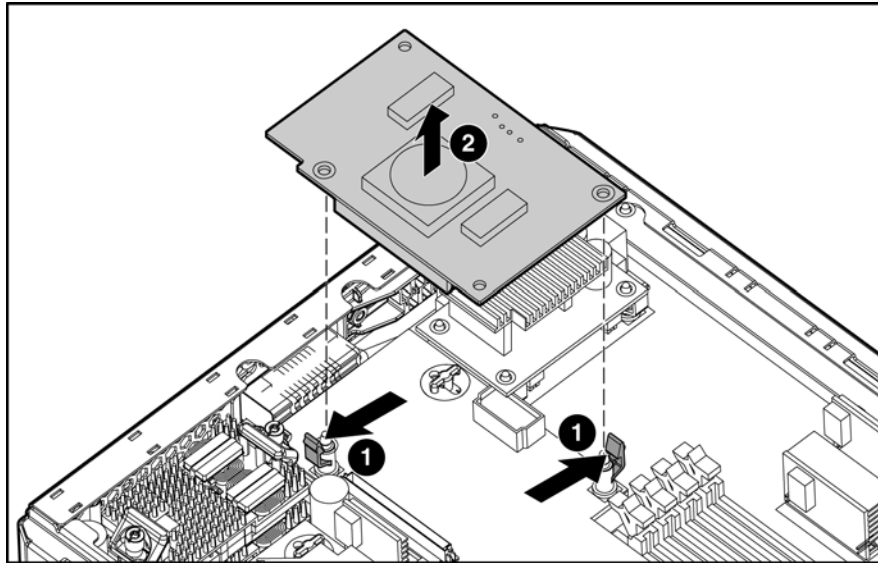
## HP ProLiant BL30p Dual Port Fibre Channel Adapter

An optional ProLiant BL30p Dual Port Fibre Channel (FC) adapter enables FC support (for clustering capabilities) and SAN connection when used in conjunction with the RJ-45 Patch Panel 2 or the GbE2 Interconnect Switch with FC pass-through option. The card is installed on top of the standard NIC mezzanine card. Refer to the *HP ProLiant BL20P Generation 3 Server Blade Setup and Installation Guide* for more information about connecting to a SAN.

To remove the FC adapter:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.

3. Open the retaining latches (1).
4. Lift the FC adapter away from the system board (2).



**Figure 2-17: Removing the FC adapter**

To replace the component, reverse the removal procedure.

## Standard NIC Mezzanine Card

To remove the standard NIC mezzanine card:

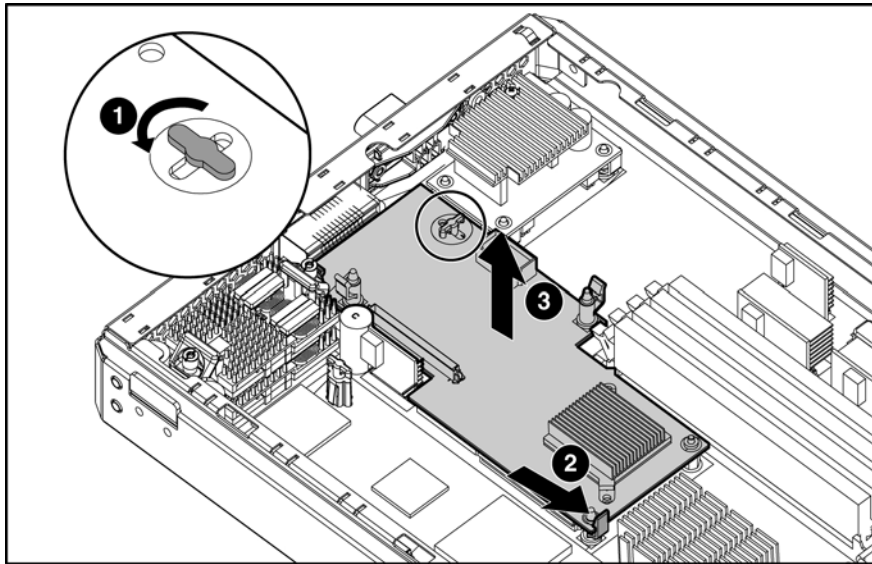
1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.
3. Remove the FC adapter. Refer to “HP ProLiant BL30p Dual Port Fibre Channel Adapter” section in this chapter.

4. Turn the quarter-turn standoff latches on the standard NIC mezzanine card counter-clockwise (1).
5. Open the retaining latch (2) and lift the standard NIC mezzanine card away from the system board (3).



**CAUTION:** Be sure to lift the board straight up. Lifting one edge of the board at a time may damage the connectors.

---



**Figure 2-18: Removing the standard NIC mezzanine card**

To replace the component, reverse the removal procedure.

## SCSI Backplane

To remove the SCSI backplane:

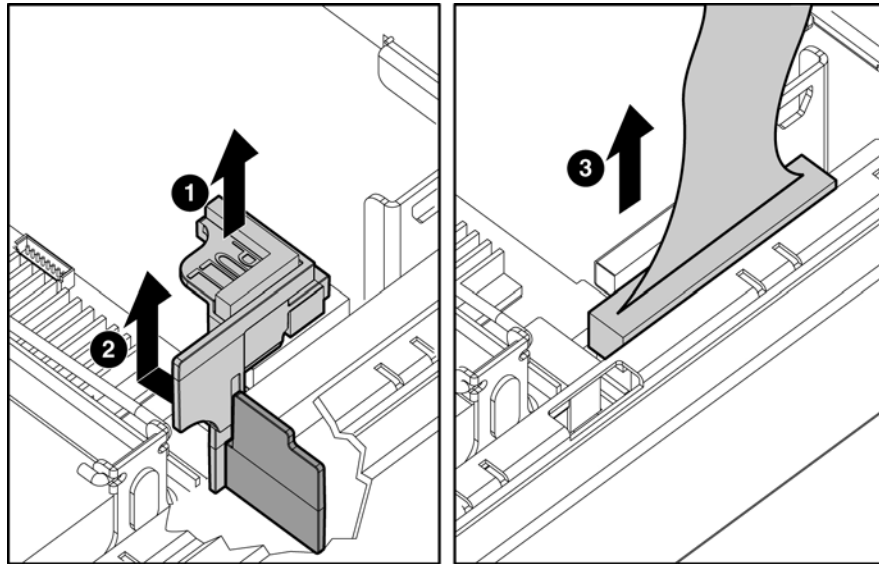
1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to “Access Panel” in this chapter.
3. Remove any hot-plug SCSI hard drives or hard drive blanks:
  - If any hard drive blanks are installed, refer to the “Hard Drive Blanks” section in this chapter.
  - If any hot-plug SCSI hard drives are installed, refer to the “Hot-Plug SCSI Hard Drives” section in this chapter.
4. Remove the fan assembly. Refer to “Fan Assembly” in this chapter.
5. Disconnect the SCSI backplane power cable from the system board.

6. Remove the plastic air baffle (1)(2).
7. Disconnect the SCSI backplane signal cable from the system board (3).



**CAUTION:** Be sure the LED board cable is not disengaged when removing the fan baffle. When reinstalling the fan baffle, be sure cable is fully seated.

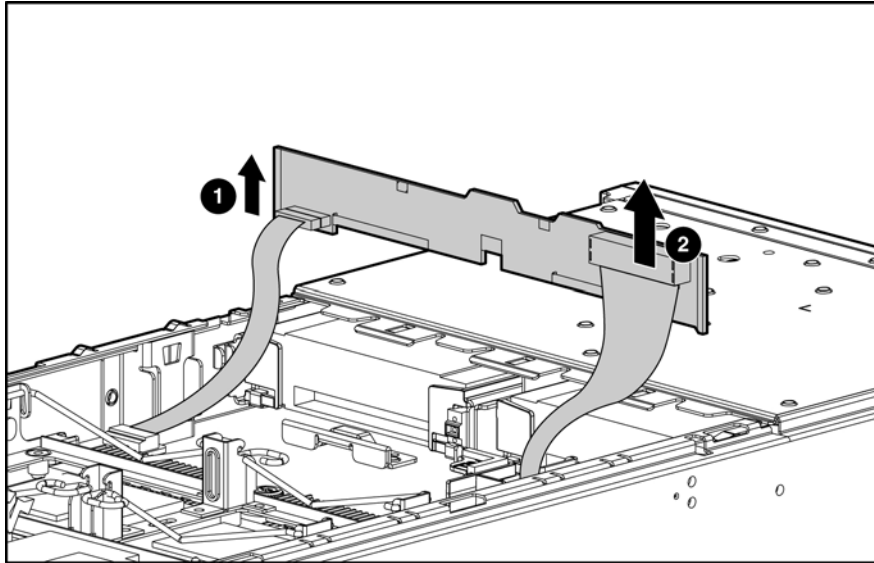
**NOTE:** The fan baffle is most easily removed at a 45° angle.



**Figure 2-19: Removing the fan baffle and disconnecting the SCSI backplane cable**



8. Grasp the SCSI backplane on the left side when facing the rear of the server blade and lift slightly to rotate the SCSI backplane out (1).
9. Lift the SCSI backplane out of the chassis (2).



**Figure 2-20: Removing the SCSI backplane**

To replace the component, reverse the removal procedure.

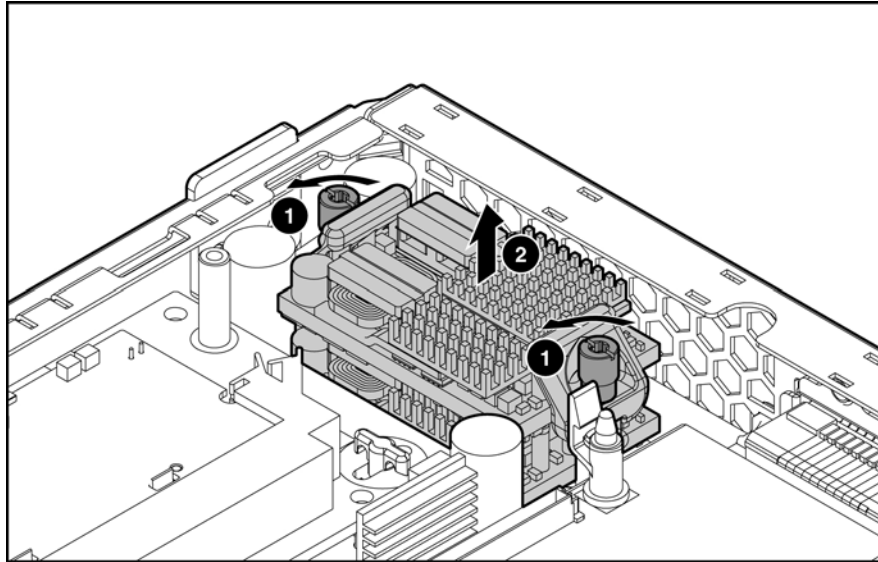
## Power Converter Module

To remove the power converter module:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to “Access Panel” in this chapter.

3. Disengage the thumbscrews (1) and remove the power converter modules (2).
4. Remove the power converter module retainers from the power converter module pair (2) and store for use on the new power converter module.

**NOTE:** The server requires two power converter modules installed one on top of the other. The power converter modules may separate during removal or installation, be sure to align the modules and press together before installing on the system board.



**Figure 2-21: Removing the power converter module**

To replace the component, reverse the removal procedure.

**NOTE:** When replacing a power converter module, be sure to remove the caps from the old power converter module and install the caps on the new power converter module.

## DC Filter Module

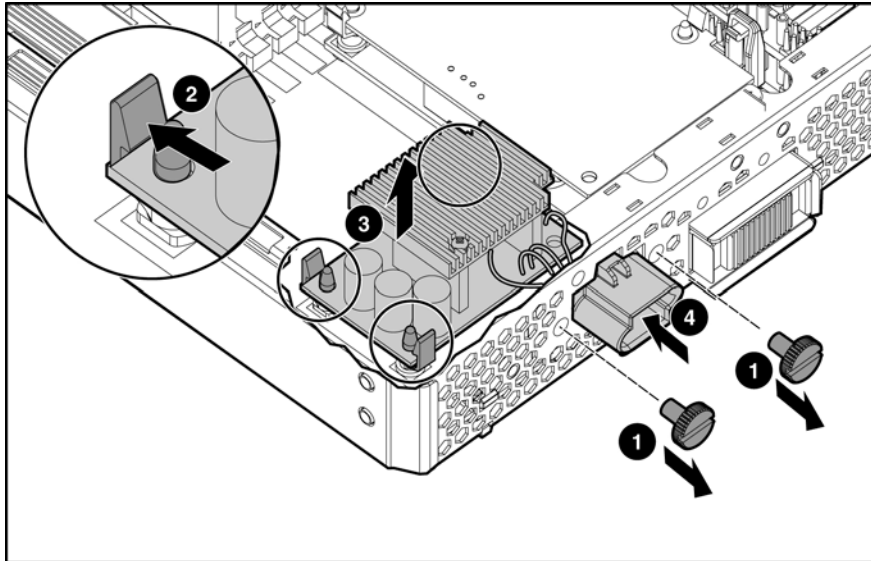
To remove the DC filter module:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to “Access Panel” in this chapter.

3. Remove the thumbscrews on the back of the chassis to release the power connector (1).

**NOTE:** The power connector will not push completely into the chassis until the DC filter module is removed. It may be necessary to push in the power connector while removing the DC filter module.

4. Release the latches (2) and lift the DC filter module away from the system board (3) while pushing the power connector into the chassis (4).



**Figure 2-22: Removing the DC filter module**

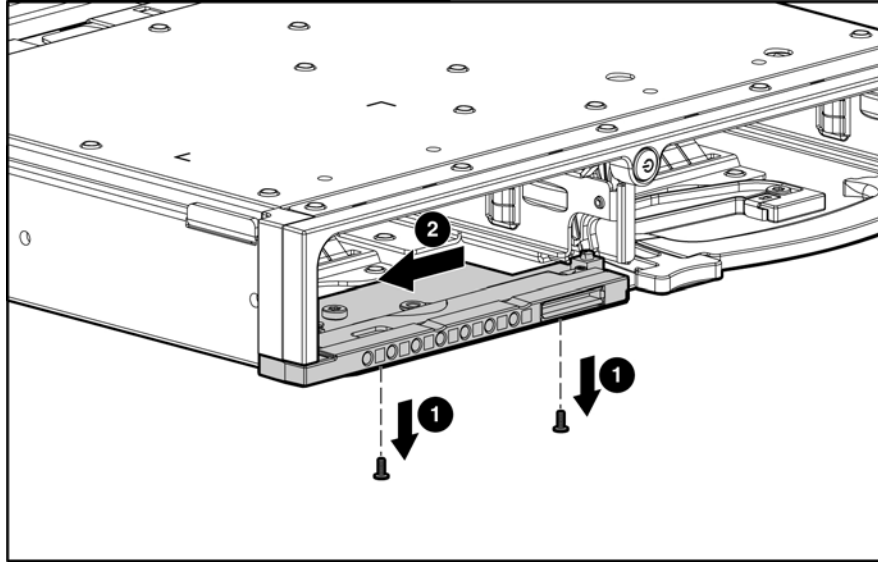
To replace the component, reverse the removal procedure.

## Power Button/LED Board

To remove the power button/LED board:

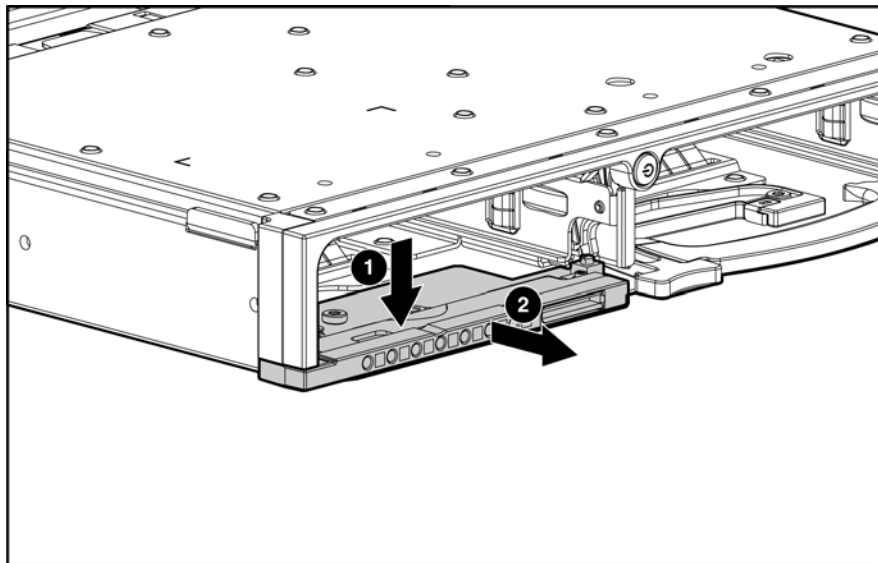
1. Power down the server blade and remove it from the server blade enclosure. Refer to “Server Blade Preparation” in this chapter.
2. Remove the access panel. Refer to “Access Panel” in this chapter.
3. Remove any hot-plug SCSI hard drives or hard drive blanks:
  - If any hard drive blanks are installed, refer to “Hard Drive Blanks” in this chapter.
  - If any hot-plug SCSI hard drives are installed, refer to “Hot-Plug SCSI Hard Drives” in this chapter.

4. With a T-6 Torx screwdriver, remove the two retaining screws from the bottom of the chassis (1).
5. Disconnect the power button/LED cable from the back left side of the power button/LED board.
6. Slide the power button/LED board toward the left outside edge of the chassis (2).



**Figure 2-23: Removing the power button/LED retaining screws**

7. Tilt the front edge of the power button/LED board down until the keyholes on the rear of the board clear the alignment pins (1).
8. Slide the power button/LED board out of the front of the chassis (2).



**Figure 2-24: Removing the power button/LED board**

**IMPORTANT:** Be sure the tab at the end of the power button/LED cable is inserted under the power button/LED board bezel.

To replace the component, reverse the removal procedure.

## Battery

If the server blade 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:** This server blade contains either an internal lithium manganese dioxide or a vanadium pentoxide battery. A risk of fire and burns exists if the battery pack is not handled properly. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
  - Do not expose 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.
- 



**CAUTION:** Loss of BIOS settings occurs if the lithium battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.

---



**CAUTION:** Batteries, battery packs, and accumulators should not be disposed of along with general household waste. In order to forward them for recycling or proper disposal, please use the public collection system, or return them to the authorized partners or their agents.

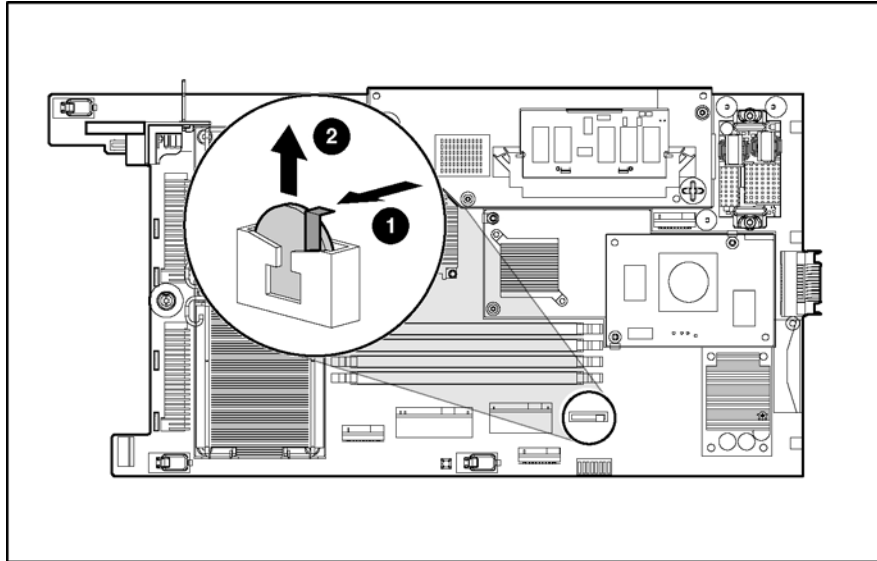
---

**IMPORTANT:** Run the System Utility to configure the system after replacing the battery. Refer to the *HP ProLiant BL p-Class System Setup and Installation Guide* for more information.

To remove the system board battery:

1. Power down the server blade and remove it from the server blade enclosure. Refer to “Server Blade Preparation” in this chapter.
2. Remove the access panel. Refer to “Access Panel” in this chapter.
3. Locate the battery holder on the system board.

4. Remove the existing battery by pushing the tab aside (1) and pulling the battery straight up (2).



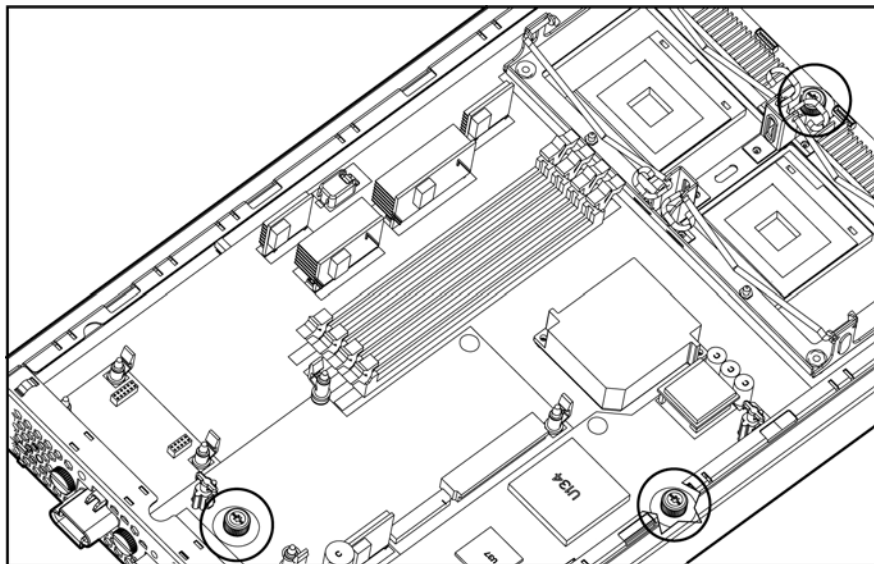
**Figure 2-25: Opening the battery retaining clip**

To install the system board battery, push it into the socket until the tab locks in place.

## System Board

To remove the system board:

1. Power down the server blade and remove it from the server blade enclosure. Refer to the “Server Blade Preparation” section in this chapter.
2. Remove the access panel. Refer to the “Access Panel” section in this chapter.
3. Remove the DIMMs. Refer to the “DIMMs” section in this chapter.
4. Remove the processor and heatsinks. Refer to the “Processors and Heatsinks” section in this chapter.
5. Remove the fan assembly. Refer to the “Fan Assembly” section in this chapter.
6. Remove the Smart Array 6i Controller. Refer to the “Smart Array 6i Controller” section in this chapter.
7. Remove the FC adapter. Refer to the “HP ProLiant BL30p Dual Port Fibre Channel Adapter” section in this chapter.
8. Remove the standard NIC mezzanine card. Refer to the “Standard NIC Mezzanine Card” section in this chapter.
9. Remove the SCSI backplane. Refer to the “SCSI Backplane” section in this chapter.
10. Remove the power converter module. Refer to the “Power Converter Module” section in this chapter.
11. Remove the DC filter module. Refer to the “DC Filter Module” section in this chapter.
12. Loosen the system board thumbscrews.

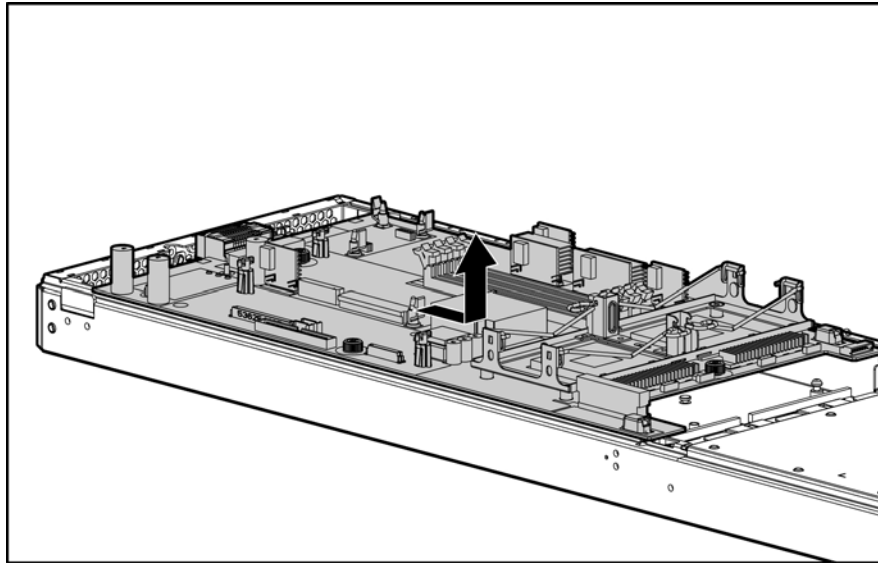


**Figure 2-26: Loosening the system board thumbscrews**

13. Identify the keyhole locations and slide the system board toward the front of the server blade.

**IMPORTANT:** The LED cable should be disconnected from the system board before removing the system board from the server blade.

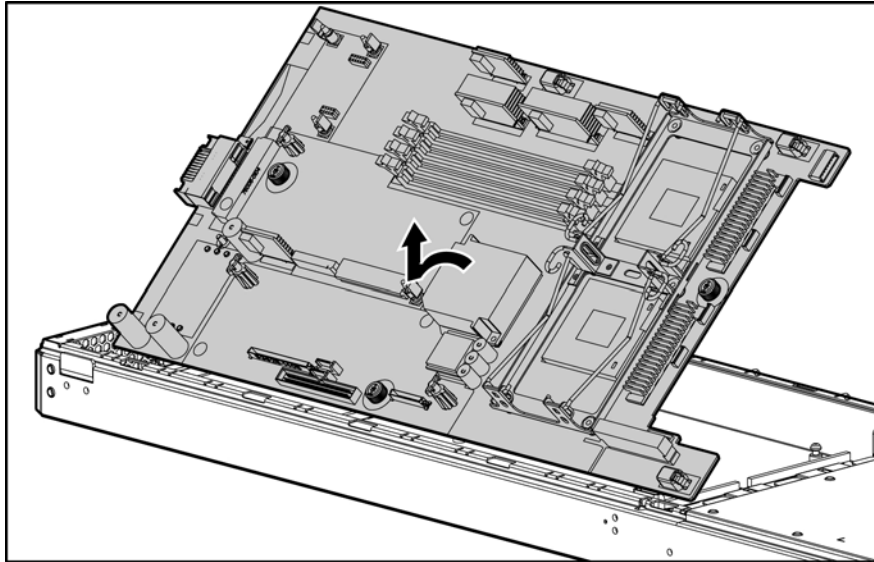
14. Lift the system board until it comes off the alignment keys.



**Figure 2-27: Disengaging the system board**



15. Lift the edge of the system board nearest the system switches. The edge of the system board nearest the Smart Array 6i Controller connectors tilts down into the chassis, and the edge of the system board nearest the system switches tilts up out of the chassis. If necessary, refer to Figure 2-28 for the component locations.
16. Lift the system board out of the chassis.



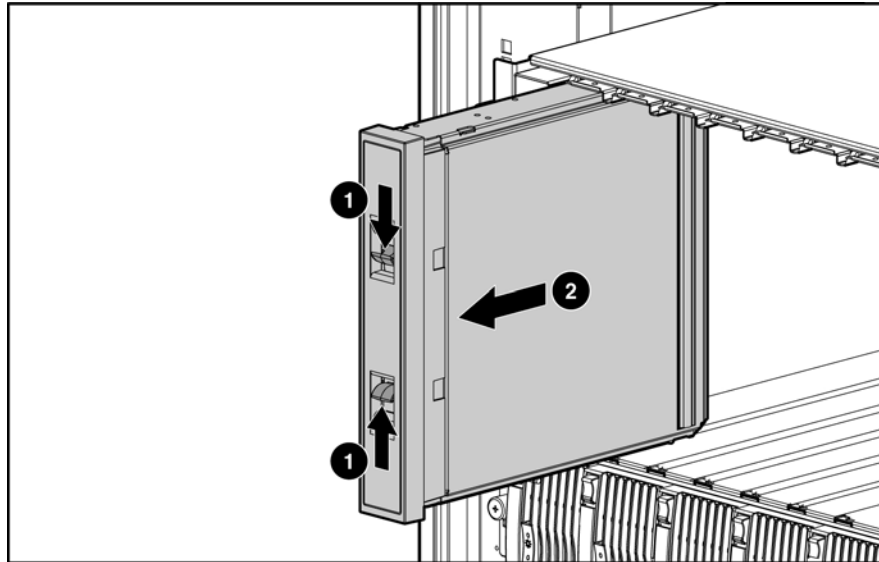
**Figure 2-28: Removing the system board**

To replace the system board, reverse the removal procedure.

## Server Blade Blanks

To remove a server blade blank:

1. Press the release buttons simultaneously (1).
2. Slide the server blade blank from the server blade enclosure (2).



**Figure 2-29: Removing a server blade blank**



**CAUTION:** Always populate server blade enclosure bays with either a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace a server blade blank, align the blank with the empty bay and slide it in until the blank is fully seated.

## Diagnostic Tools

### ProLiant BL p-Class Diagnostic Tools

Use the following tools to diagnose problems, test hardware, and monitor and manage system operations.

**Table 3-1: Diagnostic Tools**

Tool	Description	How to run the tool
Array Diagnostics Utility (ADU)	ADU is designed to run on all HP systems that support HP array controllers. ADU collects information about the array controllers in the system and generates a list of detected problems.	For a complete list of ADU error messages, refer to the <i>HP ProLiant Servers Troubleshooting Guide</i> .
Automatic Server Recovery-2 (ASR-2)	ASR-2 automatically restarts the server blade after a catastrophic operating system failure.  With ASR-2, you have multiple recovery options: <ul style="list-style-type: none"> <li>Available Recovery provides software error recovery and environmental recovery.</li> <li>Unattended Recovery logs the error information to the IML, resets the server blade, and tries to restart the operating system.</li> </ul>	Run RBSU and set ASR-2 to enable this tool.
HP Diagnostics	HP Diagnostics tests and verifies operation of HP hardware. If HP Diagnostics finds a hardware failure, it isolates the replaceable part (if possible).	Access HP Diagnostics when POST detects a system configuration error. For a complete list of POST error messages, refer to the <i>HP ProLiant Servers Troubleshooting Guide</i> . HP Diagnostics can be downloaded from the HP website:  <a href="http://h18000.www1.hp.com/support/files/server/us/download/15446.html">http://h18000.www1.hp.com/support/files/server/us/download/15446.html</a>
HP Systems Insight Manager (HP SIM)	HP SIM is a client/server application used to remotely manage HP hardware in a network environment. HP SIM reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information on viewing and printing the event list, refer to the <i>HP Systems Insight Manager User Guide</i> or the setup and installation guide.

*continued*

**Table 3-1: Diagnostic Tools** *continued*

Tool	Description	How to run the tool
ROMPaq Utility	The ROMPaq Utility checks the system and provides a choice of available ROM revisions and controller firmware.	You can download this utility from the HP website: <a href="http://www.hp.com">www.hp.com</a>
Survey Utility	Survey Utility gathers critical hardware and software information on server blades.  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.	The Survey Utility is available on the HP ProLiant Essential Rapid Deployment Pack CD or on the HP website:  <a href="http://www.hp.com/servers/rdp">www.hp.com/servers/rdp</a>
Integrated Lights-Out ROM-Based Setup Utility (iLO RBSU)	The iLO RBSU is the recommended method to configure and set up the iLO. The iLO RBSU is designed to assist you with setting up an iLO on a network; it is not intended for continued administration.	Run iLO RBSU by pressing the <b>F8</b> key during POST.
Integrated Management Log (IML)	The IML is a log of system events such as system failures or nonfatal error conditions. View events in the IML from within: <ul style="list-style-type: none"> <li>• HP SIM</li> <li>• Survey Utility</li> <li>• Operating system-specific IML utilities</li> </ul>	The IML requires HP operating system management drivers. Refer to the HP ProLiant Essentials Rapid Deployment Pack CD for instructions on installing the appropriate drivers.
Fan Redundancy	The Fan Redundancy Configuration option determines the behavior of the server if one or more of the cooling fans fail.  When the Fan Redundancy option is enabled, the server will not shut down if only one fan fails. If the system experiences multiple fan failures, the HP System Management Driver shuts down the operating system. Additionally, the System ROM will not allow the server to complete POST if any fan fails.  When the Fan Redundancy option is disabled, the server treats all fans as critical and shuts down the server if any fan fails.	This feature requires that the HP System Management driver be installed.
Option ROM Configuration for Arrays (ORCA)	The ORCA Utility is a menu-driven utility that does not require a CD and can be started when the server blade is booting. This utility enables users to perform the following functions: <ul style="list-style-type: none"> <li>• Create, configure, and/or delete logical drives</li> <li>• Specify RAID levels</li> <li>• Assign online spares</li> <li>• Set interrupts and the boot controller order</li> </ul>	Run ORCA by pressing the <b>F8</b> key during POST.

---

HP ProLiant Essentials Rapid Deployment Pack (RDP)	The optional HP ProLiant Essentials RDP is the preferred method for rapid, high-volume server blade deployments. The RDP includes Altiris eXpress Deployment Server and the SmartStart Scripting Toolkit.	Install the CD in the CD-ROM drive of the administrator workstation or client PC and refer to the documentation that ships with the software.
ROM-Based Setup Utility (RBSU)	RBSU configures the hardware installed in the server blade. This utility enables users to perform the following functions: <ul style="list-style-type: none"><li>• Store configuration information in nonvolatile memory</li><li>• Manage memory installation, processor upgrades, network interface cards, and mass storage devices</li><li>• Assist in installing an operating system</li><li>• Configure ports and IRQs, if required</li></ul>	Run RBSU by pressing the <b>F9</b> key during POST.

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## Firmware Upgrades for Management Modules

For information about upgrading server blade management module or power management module firmware, refer to the HP website:

<http://welcome.hp.com/country/us/en/support.html>

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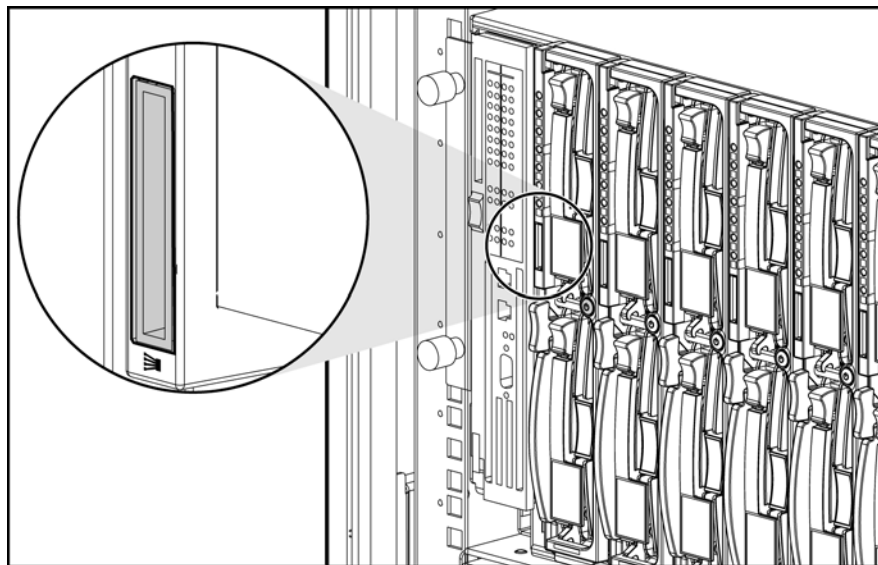
## Connectors, LEDs, and Switches

### Connectors

#### ProLiant BL20p Generation 3 Server Blade

##### Front Panel Connectors

The server blade has one front panel connector, a port that accepts the local I/O cable, for configuration and troubleshooting purposes.



**Figure 4-1: ProLiant BL20p G3 I/O port**



**CAUTION:** Disconnect the local I/O cable from the port when not in use. The port and connector do not provide a permanent connection. Rear iLO connector performance degrades when the local I/O cable is in use, even when the iLO connector on the cable is not in use.

## Rear Panel Connectors

Use Figure 4-2 and Table 4-1 to identify ProLiant BL20p G3 server blade rear panel connectors.

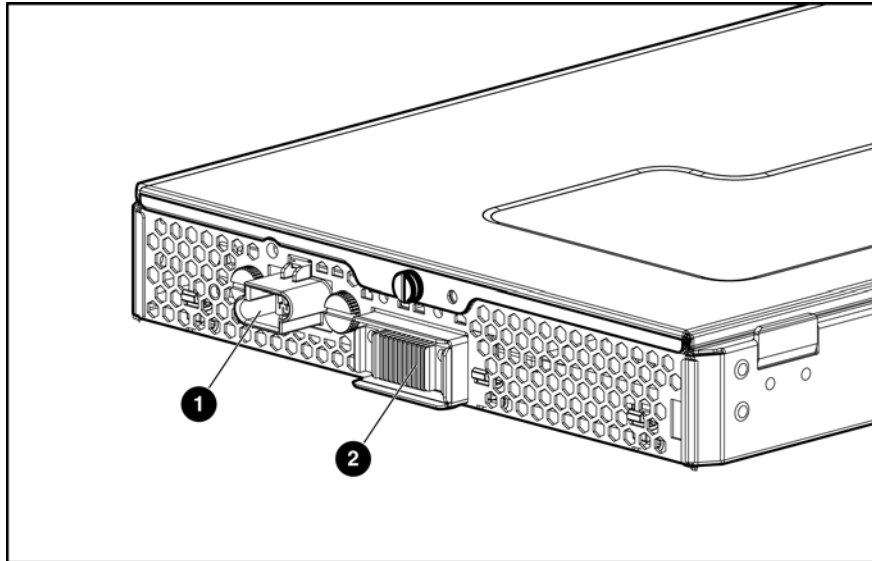


Figure 4-2: ProLiant BL20p G3 server blade rear panel connectors

Table 4-1: ProLiant BL20p G3 Server Blade Rear Panel Connectors

Item	Description
1	Power connector
2	Signal connector

## System Board Components and Connectors

Use Figure 4-3 and Table 4-2 to identify ProLiant BL20p G3 system board components and connectors.

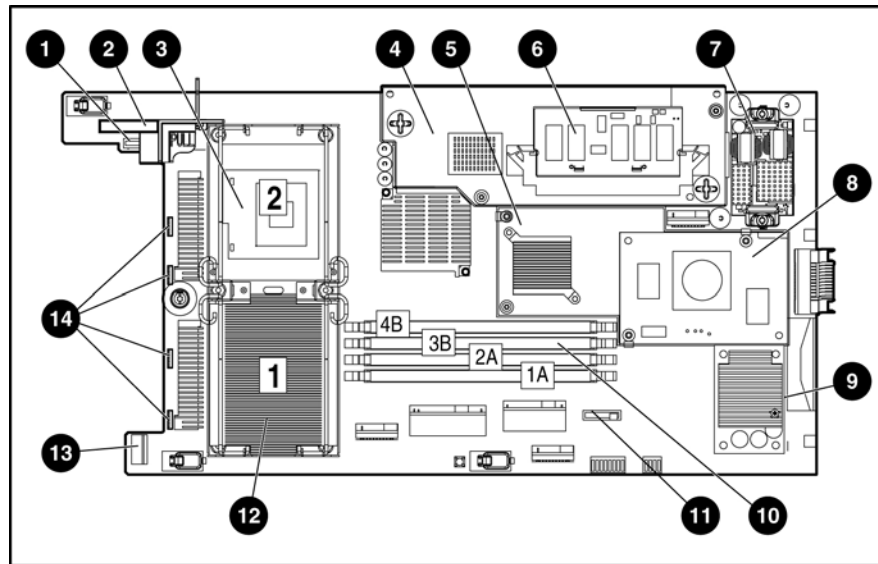


Figure 4-3: ProLiant BL20p G3 system board components and connectors



**Table 4-2: System Board Components and Connectors**

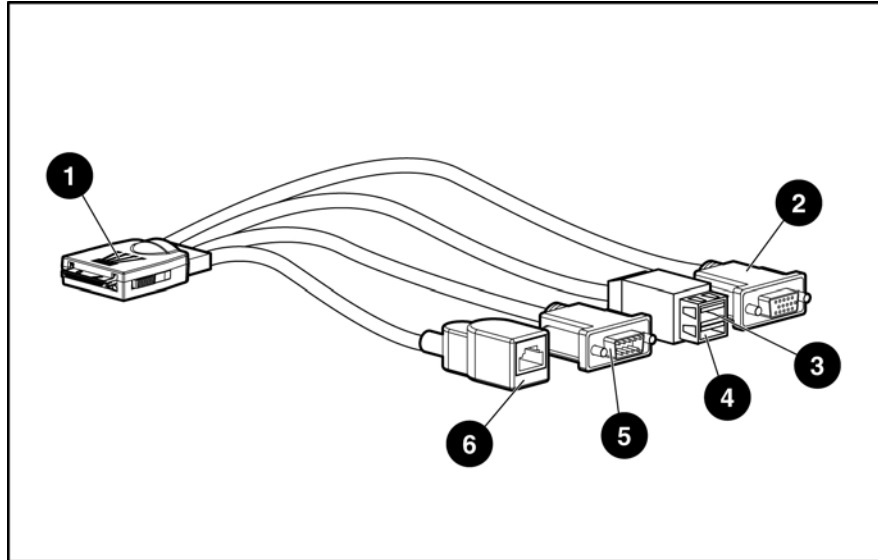
Item	Description
1	Power button/LED board connector
2	SCSI backplane board connector 1
3	Processor socket 2
4	Smart Array 6i Controller
5	Standard NIC Mezzanine card
6	Smart Array 6i 128-MB Battery-Backed Write Cache Enabler (Optional)
7	Power converter module
8	HP ProLiant BL20p G3 Fibre Channel adapter
9	DC filter module
10	DIMM slots (4)
11	System Battery
12	Processor socket 1 (populated)
13	SCSI backplane board connector 2
14	Fan connectors

## Local I/O Cable



**CAUTION:** Disconnect the local I/O cable from the port when not in use. The port and connector do not provide a permanent connection. Rear iLO connector performance degrades when the local I/O cable is in use, even when the iLO connector on the cable is not in use.

Use the local I/O cable to perform some server blade configuration and diagnostic procedures. The I/O port only accepts the local I/O cable.



**Figure 4-4: Local I/O cable connectors**

**Table 4-3: Local I/O Cable Connectors**

Item	Description
1	Server blade connector
2	Video connector
3	USB connector 1
4	USB connector 2
5	Serial connector
6	iLO RJ-45 (10/100 Ethernet) connector

## LEDs

Use the following section to identify LEDs on the following ProLiant BL p-Class system components:

- ProLiant BL20p G3 server blade front panel
- Hot-plug SCSI hard drives

### ProLiant BL20p Generation 3 Server Blade Front Panel

Seven LEDs on the front of the server blade indicate server status. Use Figure 4-5 and Table 4-4 to identify LED locations and functions.

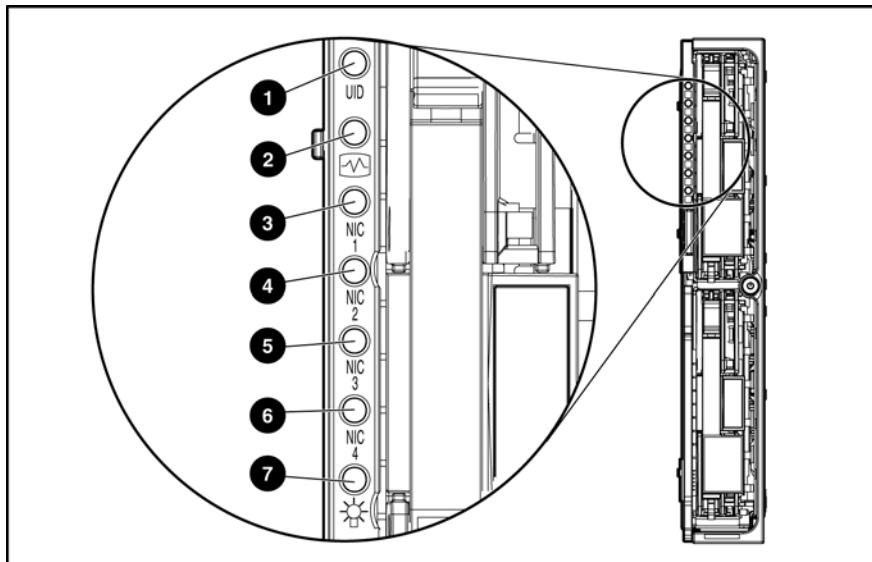


Figure 4-5: ProLiant BL20p G3 server blade front panel LEDs

**Table 4-4: ProLiant BL20p G3 Server Blade Front Panel LEDs**

Item	LED Description	Status
1	Unit identification	Blue = Flagged Blue flashing = Management mode Off = No remote management
2	Health	Green = Normal status Flashing = Booting Amber = Degraded status Red = Critical status
3	NIC 1 *	Green = Linked to network
4	NIC 2 *	Green flashing = Network activity
5	NIC 3 *	Off = No activity
6	NIC 4 *	
7	Power	Green = On Amber = Standby (power available) Off = Unit off

\*Actual NIC numeration depends on factors such as which operating system is installed on the server.

## Hot-Plug SCSI Hard Drives

Each hot-plug SCSI hard drive has three LED indicators located on the front of the drive. The LEDs provide activity, online, and fault status for each corresponding drive when configured as a part of an array and attached to a powered-on Smart Array controller. Their behavior may vary depending on the status of other drives in the array. Use Figure 4-6 and Table 4-5 to identify LED locations and functions.

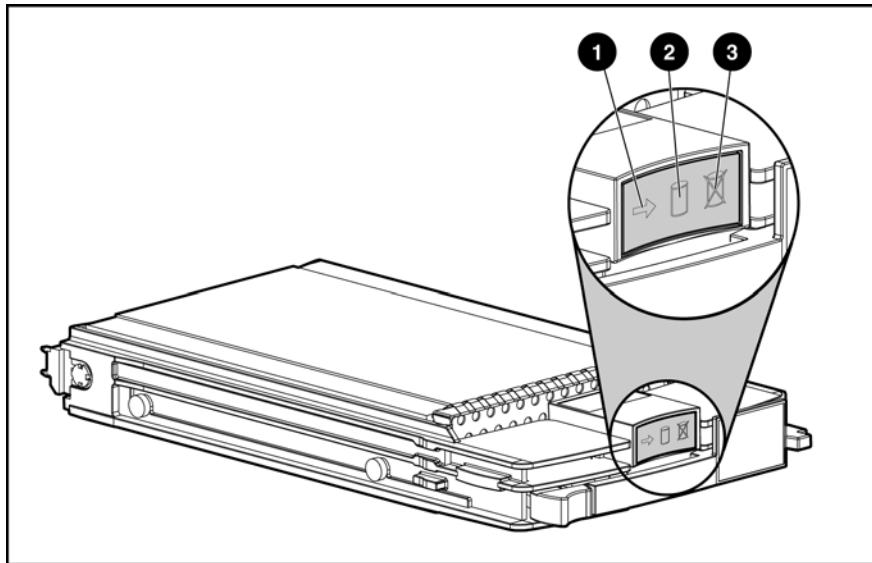


Figure 4-6: Hot-plug SCSI hard drive LEDs

Table 4-5: Hot-Plug SCSI Hard Drive LEDs

1 Activity	2 Online	3 Fault	Means
On	Off	Off	<p><b>Do not remove the drive. Removing a drive during this process causes data loss.</b></p> <p>The drive is being accessed and is not configured as part of an array.</p>
On	Flashing	Off	<p><b>Do not remove the drive. Removing a drive during this process causes data loss.</b></p> <p>The drive is rebuilding or undergoing capacity expansion.</p>
Flashing	Flashing	Flashing	<p><b>Do not remove the drive. Removing a drive during this process causes data loss.</b></p> <p>The drive is part of an array being selected by the Array Configuration Utility.</p> <p>-Or-</p> <p>The Options ROMPaq is upgrading the drive.</p>
Off	Off	Off	<p>OK to replace the drive online if a predictive failure alert is received and the drive is attached to an array controller.</p> <p>The drive is not configured as part of an array.</p> <p>-Or-</p> <p>If this drive is part of an array, a powered-on controller is not accessing the drive.</p> <p>-Or-</p> <p>The drive is configured as an online spare.</p>

*continued*

**Table 4-5: Hot-Plug SCSI Hard Drive LEDs** *continued*

<b>1 Activity</b>	<b>2 Online</b>	<b>3 Fault</b>	<b>Means</b>
Off	Off	On	OK to replace the drive online. The drive has failed and has been placed offline.
Off	On	Off	OK to replace the drive online if a predictive failure alert is received, provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and configured as part of an array.
On or flashing	On	Off	OK to replace the drive online if a predictive failure alert is received, provided that the array is configured for fault tolerance and all other drives in the array are online. The drive is online and being accessed.

## Buttons and Switches

Use the following sections to identify the locations and functions of push-button and system switches.

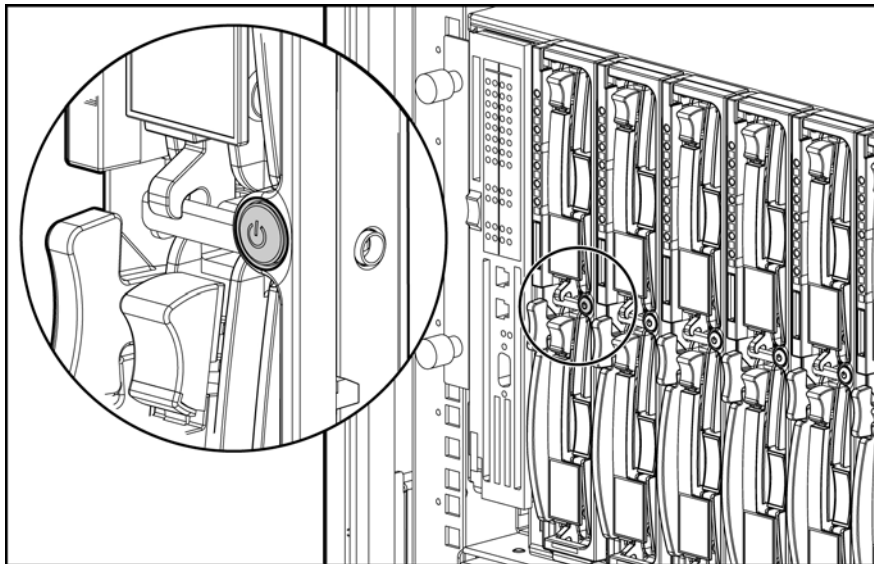
### Buttons

Use the “Power Button” section to identify push-button switches on the system hardware.

#### Power Button

Setting the server blade power button to the standby position removes power from most areas of the server blade. This process may take 30 seconds, during which time some internal circuitry remains active.

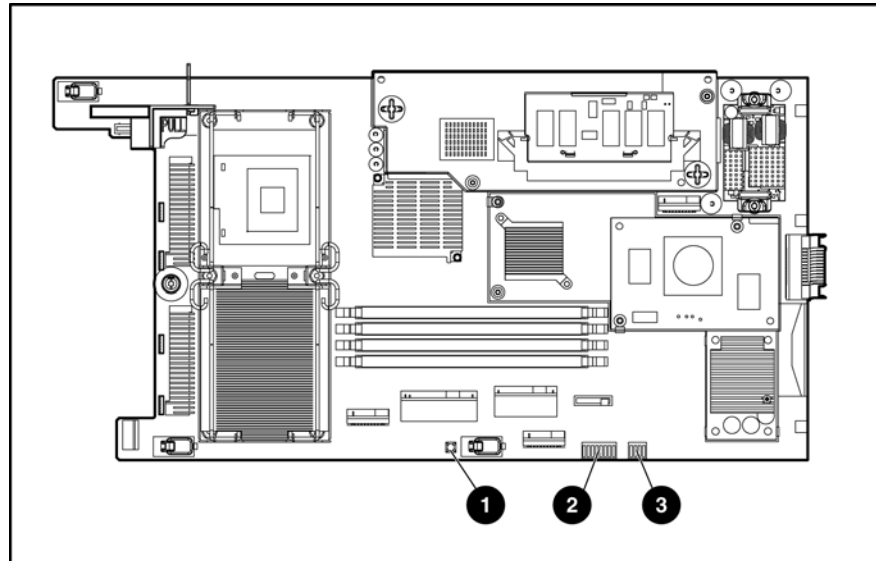
Use Figure 4-7 to identify the button location.



**Figure 4-7: Power button**

## Switches

System switches enable you to change certain settings or to perform advanced diagnostic procedures. The following sections explain the functions of each switch. Use Figure 4-8 and Table 4-6 to identify switch locations and functions.



**Figure 4-8: Server blade system switches**

**Table 4-6: Server Blade System Switches**

Item	Description
1	NMI switch
2	System maintenance switch (SW2)
3	System settings switch (SW1)

Refer to the *HP ProLiant BL20p Generation 3 Setup and Installation Guide* for the switch functions.



## NMI Switch

Crash dump analysis is an essential part of eliminating reliability problems such as hangs or crashes in operating systems, device drivers, and applications. Crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that supports root cause analysis.

Systems running Microsoft® Windows® 2000 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 allows a hung system to become responsive.

The ProLiant BL20p G3 server blade is equipped with an NMI switch that, when pushed, performs a memory dump before performing a hard reset. The NMI switch is for use by trained service personnel only.

## System Maintenance Switch Procedures

When you perform troubleshooting steps, this guide may instruct you to perform the following procedures:

- Clear the system configuration.
- Access the redundant ROM.

To complete these procedures, you must change physical settings on the system maintenance switch (SW2).

### Clearing the System Configuration

To clear the system configuration:

1. Power down the server blade:
  - Press the power button on the front of the server blade.
  - Use the virtual power button feature in the iLO remote console.
2. Disconnect the server blade from all power sources:
  - Remove the server blade from the enclosure and set it on a flat, level surface.
  - Disconnect the server blade from the diagnostic station.
3. Remove the access panel. Refer to the “Access Panel” section in Chapter 2, “Removal and Replacement Procedures.”
4. Change position 6 of SW2 to on.
5. Install the access panel. Refer to the “Access Panel” section in Chapter 2, “Removal and Replacement Procedures.”
6. Connect the server blade to system power:
  - Install the server blade in the enclosure.
  - Connect the server blade to the diagnostic station.

7. Power up the server blade:
  - Press the power button on the front of the server blade.
  - Use the virtual power button feature in the iLO remote console.
8. Wait for the POST message that prompts you to change the switch setting:
  - Maintenance switch detected in the "On" position.
  - Power off the server and turn switch to the "Off" position.
9. Repeat steps 1 through 3.
10. Change position 6 of SW2 to off.
11. Repeat steps 5 through 7.

**IMPORTANT:** When the server blade boots after NVRAM is cleared, a delay of up to 2 minutes is normal. During this delay, the system appears non-functional. Do not attempt any procedures during the delay.

### Accessing the Redundant ROM

If the system ROM is corrupted, you can set the system to use the backup version or redundant ROM.

To use the redundant ROM:

1. Power down the server blade:
  - Press the power button on the front of the server blade.
  - Use the virtual power button feature in the iLO remote console.
2. Disconnect the server blade from all power sources:
  - Remove the server blade from the enclosure and set it on a flat, level surface.
  - Disconnect the server blade from the diagnostic station.
3. Remove the access panel. Refer to the “Access Panel” section in Chapter 2, “Removal and Replacement Procedures.”
4. Change positions 1, 5, and 6 of SW2 to on.
5. Install the access panel. Refer to the “Access Panel” section in Chapter 2, “Removal and Replacement Procedures.”
6. Connect the server blade to system power:
  - Install the server blade in the enclosure.
  - Connect the server blade to the diagnostic station.
7. Power up the server blade:
  - Press the power button on the front of the server blade.
  - Use the virtual power button feature in the iLO remote console.
8. As soon as the server blade powers up, it emits two beeps.

9. Repeat steps 1 through 3.
10. Change positions 1, 5, and 6 of SW2 to off.
11. Repeat steps 5 through 7.

If both the current and backup versions of the ROM are corrupt, you must return the system board for a service replacement. For spare part numbers, refer to Chapter 1, “Illustrated Parts Catalog.”

## Server Blade Specifications

This chapter provides operating and performance specifications for the ProLiant BL20p G3 server blade.

### HP ProLiant BL20p Generation 3 Server Blade

**Table 5-1: Operating and Performance Specifications for the ProLiant BL20p G3 Server Blade**

Dimensions	
Width	26.14 cm (10.29 in)
Depth	71.1 cm (28.00 in)
Height	4.29 cm (1.69 in)
Weight (maximum)	9.43 kg (20.8 lb)
Temperature range <sup>1</sup>	
Operating	10° to 43°C (50° to 109°F)
Non-operating	-40° to 60°C (-40° to 140°F)
Shipping Storage	-20° to 60°C (-4° to 140°F)
Relative humidity <sup>2</sup> (noncondensing)	
Operating	10% to 90%
Non-operating	
Shipping Storage	10% to 90% 10% to 95%
Maximum wet bulb temperature	30°C (86°F)
<sup>1</sup> Operating temperature has an altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft). No direct sunlight. Upper operating limit is 3,048 m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.	
<sup>2</sup> Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage is 70 KPa.	

## 1

- 128-MB Battery-Backed Write Cache Enabler
  - removing 2-16
  - replacing 2-16
  - spare part number 1-4

## A

- access panel
  - removing 2-7
  - replacing 2-7
  - spare part number 1-3
- ADU See Array Diagnostics Utility (ADU)
- alignment keys 2-30
- Array Diagnostics Utility (ADU)
  - access 3-1
  - description 3-1
- ASR-2 See Automatic Server Recovery-2 (ASR-2)
- Automatic Server Recovery-2 (ASR-2)
  - access 3-1
  - description 3-1

## B

- battery
  - disposal 2-26
  - disposal, caution 2-26
  - location 4-4
  - removing 2-26
  - replacing 2-27
  - spare part number 1-4
  - warning 2-26
- BIOS settings
  - caution 2-26
  - reconfiguring 2-26
- buttons, power 2-5, 4-10

## C

- cables
  - I/O 4-5
  - SCSI backplane power cable 2-20
  - SCSI backplane signal cable 2-21

- clearing the system configuration 4-12
- component-level repairs v
- configurations, clearing the system
  - configuration 4-12
- crash dump analysis 4-12

## D

- DC filter module
  - removing 2-23
  - replacing 2-24
  - spare part number 1-3
- DC filter module, location 4-4
- diagnostic tools 3-1
- Diagnostics Utility, description 3-1
- DIMMs
  - removing 2-10
  - replacing 2-10
  - slot locations 4-4
  - spare part number 1-4

## E

- electric shock, warning 2-3
- electrostatic discharge 2-1
- explosion, warning 2-26

## F

- fan assembly
  - removing 2-17
  - replacing 2-18
  - spare part number 1-3
- fan connectors, locations 4-4
- fan redundancy configuration option 3-2
- FC adapter
  - removing 2-18
  - replacing 2-19
  - spare part number 1-4

## G

- grounding vi
  - guidelines 2-1
- grounding plug v

## guides

- HP ProLiant BL p-Class System Setup and Installation Guide 3-1
- HP ProLiant Servers Troubleshooting Guide 3-1

**H**

## hard drive blank

- removing 2-8
- replacing 2-8
- spare part number 1-3

## heatsink, spare part number 1-3

## help resources vii

## hot surfaces, warning 2-3

## hot-plug SCSI hard drives

- LEDs 4-7
- removing 2-9
- replacing 2-9

## HP ProLiant BL p-Class System Setup and Installation Guide 3-1

## HP ProLiant BL30p dual port Fibre Channel adapter 2-18

## HP ProLiant BL30p Fibre Channel adapter, location 4-4

## HP ProLiant Essentials Rapid Deployment Pack

- access 3-3
- description 3-3

## HP Systems Insight Manager

- access 3-1
- description 3-1

**I**

## iLO RBSU See Integrated Lights-Out ROM-Based Setup Utility (iLO RBSU)

## IML See Integrated Management Log (IML)

## Insight Manager See HP Systems Insight Manager

## installing See replacing

## Integrated Lights-Out ROM-Based Setup Utility (iLO RBSU)

- access 3-2
- description 3-2

## Integrated Management Log (IML)

- access 3-2
- description 3-2
- viewing 3-2

**K**

## keys, alignment 2-30

## kits

- plastics and hardware, server blade 1-3
- return, server blade 1-4

**L**

## LEDs

- hot-plug SCSI hard drive 4-7
  - NICs 4-7
  - power 4-7
  - server blade, front panel 4-6
  - server health 4-7
  - unit identification (UID) 4-7
- local I/O cable, spare part number 1-4
- location
- power button/LED board connector 4-4
  - SCSI backplane board connector 4-4
  - standard NIC mezzanine card 4-4

**M**

memory See DIMMs

**N**

NICs, LEDs 4-7

non-maskable interrupt (NMI) switch 4-12

**O**

## Option ROM Configuration for Arrays (ORCA)

- access 3-2
- description 3-2

ORCA See Option ROM Configuration for Arrays (ORCA)

**P**

parts catalog, illustrated 1-1

plastics and hardware kit, spare part number 1-3

power button, definition 4-10

## power button/LED board

- removing 2-24
- replacing 2-26
- spare part number 1-3

## power button/LED board connector

- location 4-4

## power converter module

- location 4-4
- removing 2-22
- replacing 2-23
- spare part number 1-3

powering down, server blade 2-5

## processor

- removing 2-11
- replacing 2-13
- socket locations 4-4
- spare part number 1-3

**R**

## rack

- cautions 2-2
- warnings 2-2
- weight 2-3

## RBSU See ROM-Based Setup Utility

## redundant ROM, accessing 4-13

## removing

- 128-MB Battery-Backed Write Cache
  - Enabler 2-16
- access panel 2-7
- battery 2-26
- DC filter module 2-23
- DIMMs 2-10
- fan assembly 2-17
- FC adapter 2-18
- hard drive blank 2-8
- hot-plug SCSI hard drives 2-9
- power button/LED board 2-24
- power converter module 2-22
- processor 2-11
- SCSI backplane 2-20, 2-22
- server blade blank 2-31
- server blades 2-6
- Smart Array 6i controller 2-14
- standard NIC mezzanine card 2-19
- system board, server blade 2-28

## replacing

- 128-MB Battery-Backed Write Cache
  - Enabler 2-16
- access panel 2-7
- battery 2-27
- DC filter module 2-24
- DIMMs 2-10
- fan assembly 2-18
- FC adapter 2-19
- hard drive blank 2-8
- hot-plug SCSI hard drives 2-9
- power button/LED board 2-26
- power converter module 2-23
- processor 2-13
- SCSI backplane 2-22
- server blade blank 2-31
- server blades 2-6
- Smart Array 6i controller 2-15
- standard NIC mezzanine card 2-20
- system board, server blade 2-30

## return kit, server blade 1-4

## RJ-45 patch panel 2, spare part number 1-4

## ROM-Based Setup Utility (RBSU)

- access 3-3
- description 3-3

## ROMPaq Utility

- access 3-2
- description 3-2

**S**

## SCSI backplane

- part number 1-3
- removing 2-20, 2-22
- replacing 2-22

## SCSI backplane board connector, location 4-4

## SCSI hard drives See hot-plug SCSI hard drives

## server blade

- cautions 2-1
- LEDs 4-6
- powering down 2-4
- removing 2-6
- replacing 2-6
- spare parts list 1-3
- specifications 5-1
- system switches 4-11
- warnings 2-1

## server blade access panel See access panel

## server blade blank

- removing 2-31
- replacing 2-31

## slots, DIMMs 4-4

## Smart Array 6i 128-MB Battery-Backed Write Cache

- enabler See 128-MB Battery-Backed Write Cache enabler
- location 4-4

## Smart Array 6i controller

- location 4-4
- removing 2-14
- replacing 2-15
- spare part number 1-3

## Smart Array 6i memory module, spare part

- number 1-4
- specifications, server blade 5-1

## standard NIC mezzanine card

- location 4-4
- removing 2-19
- replacing 2-20
- spare part number 1-3

## Survey Utility

- access 3-2
- description 3-2

## switches

- NMI 4-11, 4-12
- server blade system 4-11
- system maintenance (SW2) 4-11
- system settings (SW1) 4-11

## symbols, on equipment 2-3

## system board, server blade

- removing 2-28

replacing 2-30  
spare part number 1-3  
system switches, server blade 4-11

## T

technician notes v  
transceiver, spare part number 1-4

## U

unit identification (UID), LEDs 4-7  
utilities  
    Diagnostics 3-1  
    HP ProLiant Essentials Rapid Deployment  
    Pack 3-3  
    HP Systems Insight Manager 3-1

Integrated Lights-Out ROM-Based Setup Utility  
    (iLO RBSU) 3-2  
Option ROM Configuration for Arrays  
    (ORCA) 3-2  
RBSU 3-3  
ROMPaq 3-2  
Survey Utility 3-2

## V

ventilation clearances vi

## W

warranty vi