HP ProLiant DL360 Generation 4p Server User Guide

February 2005 (First Edition)
Part Number 383861-001

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Audience Assumptions

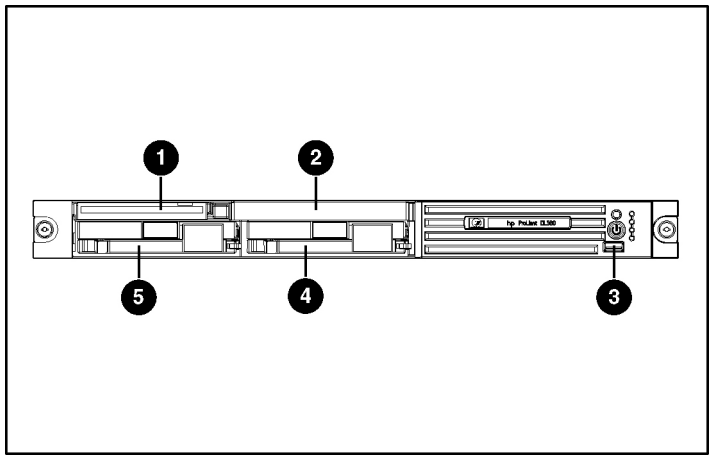
This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Contents

Server Component Identification

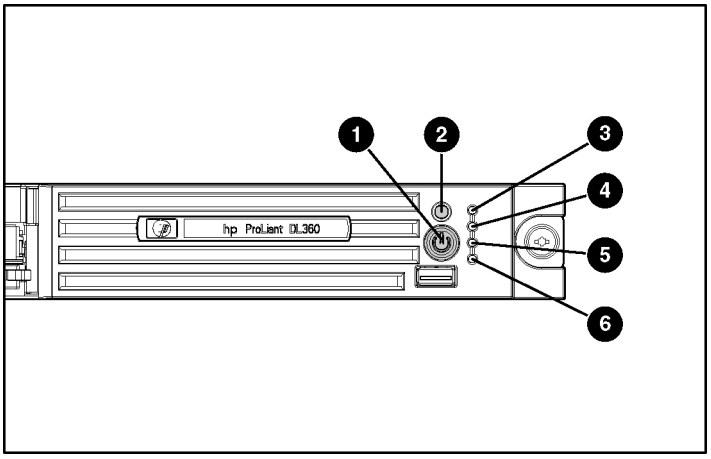
In This Section

Front Panel Components



Item	Description
1	Diskette drive bay
2	Optical device bay
3	Front USB port
4	Hard drive bay 0
5	Hard drive bay 1

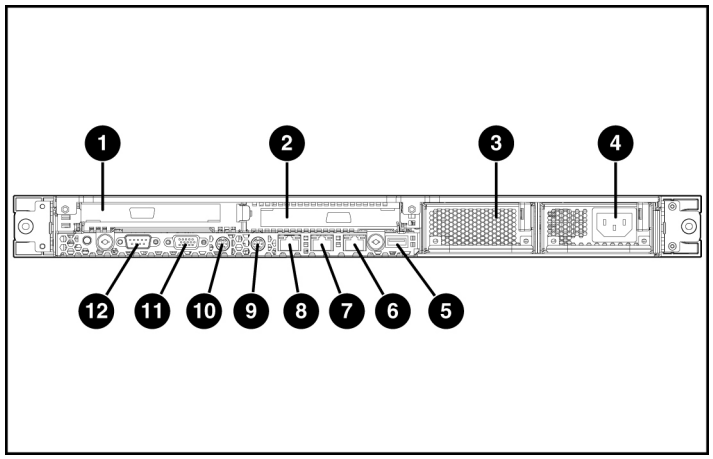
Front Panel LEDs and Buttons



Item	Description	Status
1	Power On/Standby button and system power LED	Green = System is on. Amber = System is shut down, but power is still applied. Off = Power cord is not attached, power supply failure has occurred, no power supplies are installed, facility power is not available, or the DC-to-DC converter is not installed.
2	UID button/LED	Blue = Identification is activated. Flashing blue = System is being remotely managed. Off = Identification is deactivated.

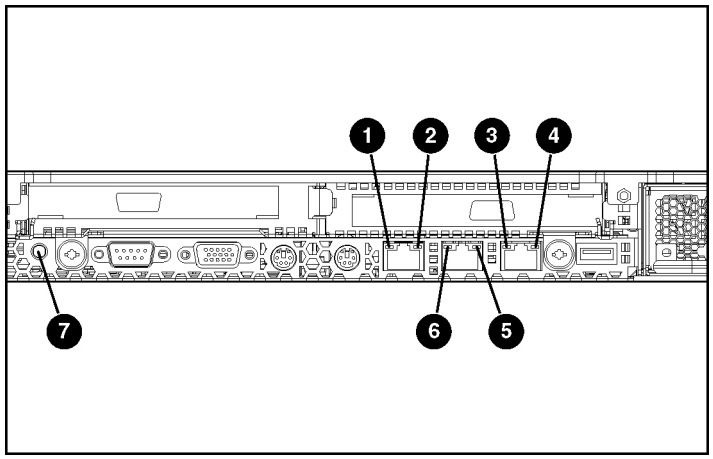
Item	Description	Status
3	Internal health LED	Green = System health is normal. Amber = System is degraded. To identify the component in a degraded state, refer to system board LEDs (on page 14). Red = System critical. To identify the component in a critical state, refer to system board LEDs (on page 14). Off = System health is normal (when in standby mode).
4	External health LED (power supply)	Green = Power supply health is normal. Amber = Power redundancy failure occurred. Off = Power redundancy failure has occurred. When the server is in standby mode, power supply health is normal.
5	NIC 1 link/activity LED	Green = Network link exists. Flashing green = Network link and activity exist. Off = No link to network exists. If power is off, view the LEDs on the RJ-45 connector for status by referring to the rear panel LEDs ("Rear Panel LEDs and Buttons" on page 11).
6	NIC 2 link/activity LED	Green = Network link exists. Flashing green = Network link and activity exist. Off = No link to network exists. If power is off, the front panel LED is not active. View the LEDs on the RJ-45 connector for status by referring to the rear panel LEDs ("Rear Panel LEDs and Buttons" on page 11).

Rear Panel Components



Item	Description
1	PCI-X expansion slot 1, 64-bit/133-MHz 3.3V (optional PCI Express slot 1, x8)
2	PCI-X expansion slot 2, 64-bit/133-MHz 3.3V (optional PCI Express slot 2, x8)
3	Power supply bay 2
4	Power supply bay 1 (populated)
5	Rear USB connector
6	10/100/1000 NIC 2
7	10/100/1000 NIC 1
8	iLO management port
9	Mouse connector
10	Keyboard connector
11	Video connector
12	Serial connector

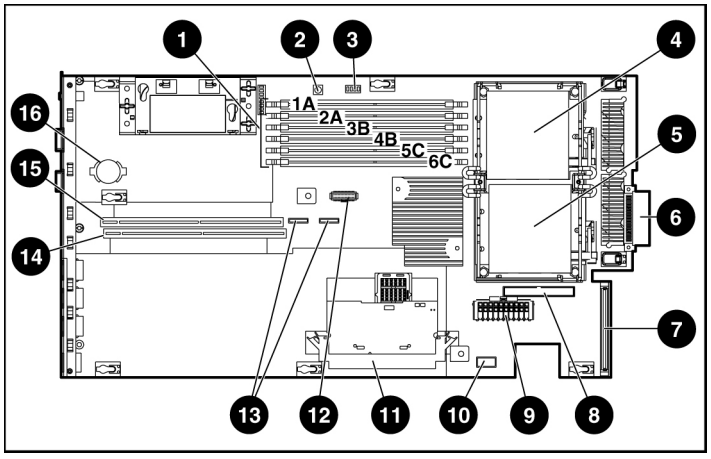
Rear Panel LEDs and Buttons



Item	Description	Status
1	iLO activity	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.
2	iLO link	Green = Link exists. Off = No link exists.
3	10/100/1000 NIC 2 activity	Green = Link exists. Flashing green = Activity exists. Off = No link exists.
4	10/100/1000 NIC 2 link	Green = Link exists. Off = No link exists.
5	10/100/1000 NIC 1 link	Green = Link exists. Off = No link exists.
6	10/100/1000 NIC 1 activity	Green = Activity exists. Flashing green = Activity exists. Off = No activity exists.

Item	Description	Status
7	UID button/LED	Blue = Identification is activated. Flashing blue = System is being managed remotely. Off = Identification is deactivated.

System Board Components



Item	Description	Item	Description
1	DIMM slots (1-6)	9	Power supply connector
2	NMI switch	10	Power supply signal connector
3	System maintenance switch (SW2)	11	Smart Array 6i memory module connector*
4	Processor 1 socket	12	Remote management connector
5	Processor 2 socket	13	SATA connectors (SATA model only)
6	Processor zone fan module connector	14	PCI riser board assembly connector (for slot 2 riser board)

Item	Description	Item	Description
7	SCSI backplane connector*	15	PCI riser board assembly connector (for slot 1 riser board)
8	Optical device connector	16	System battery

* For SCSI models only

System Maintenance Switch

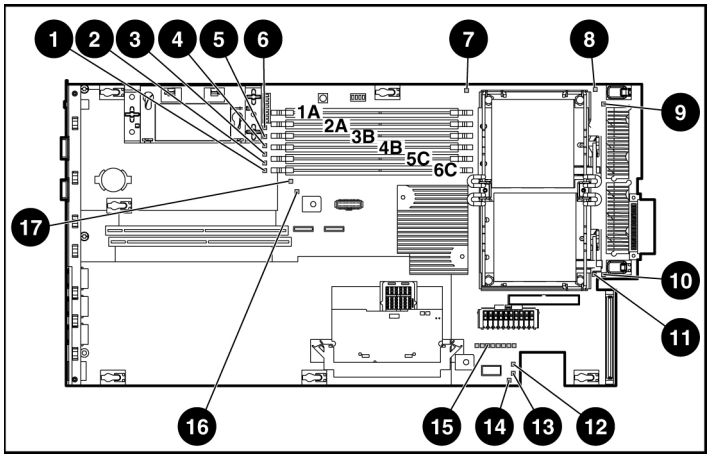
Position	Default	Function
S1	Off	Off = iLO security is enabled. On = iLO security is disabled.
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6	Off	Off = No function On = ROM treats the system configuration as invalid.
S7, S8	Off, Off	Debug LEDs

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.

System Board LEDs



Item	LED Description	Status
1	DIMM 6C failure	Amber = DIMM has failed. Off = DIMM is operating normally.
2	DIMM 5C failure	Amber = DIMM has failed. Off = DIMM is operating normally.

Item	LED Description	Status
3	DIMM 4B failure	Amber = DIMM has failed. Off = DIMM is operating normally.
4	DIMM 3B failure	Amber = DIMM has failed. Off = DIMM is operating normally
5	DIMM 2A failure	Amber = DIMM has failed. Off = DIMM is operating normally.
6	DIMM 1A failure	Amber = DIMM has failed. Off = DIMM is operating normally
7	Overtemperature	Amber = System has reached cautionary or critical temperature level. Off = Temperature is OK.
8	Processor 1 failure	.Amber = Processor has failed. Off = Processor is operating normally.
9	PPM 1 failure	Amber = PPM has failed. Off = PPM is operating normally.
10	PPM 2 failure	Amber = PPM has failed. Off = PPM is operating normally
11	Processor 2 failure	Amber = Processor has failed. Off = Processor is operating normally.
12	Power supply signal connector interlock failure	Amber = Power supply signal cable is not connected. Off = Power supply signal cable is connected.
13	Standby power good	Green = Auxiliary power is applied. Off = Auxiliary power is not applied.
14	Power supply fan module failure	Amber = One fan in this module has failed. Red = Multiple fans in this module have failed. Off = All fans in this module are operating normally.

Item	LED Description	Status
15	System diagnostic	Refer to the *HP Remote Lights-Out Edition II User Guide* on the Documentation CD.
16	Online spare memory	Amber = Failover has occurred. Online spare memory is in use. Green = Online spare memory is enabled, but not in use. Off = Online spare memory is disabled.
17	Riser interlock	Amber = PCI riser assembly is not seated. Off = PCI riser assembly is seated.

System LEDs and Internal Health LED Combinations

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

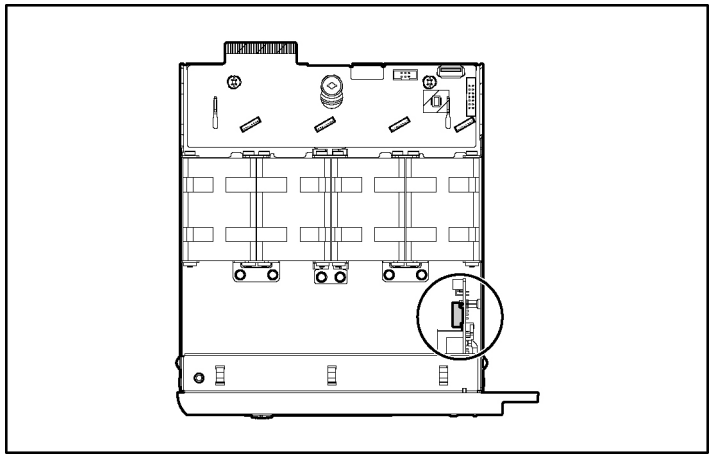
The front panel health LEDs indicate only the current hardware status. In some situations, HP SIM may report server status differently than the health LEDs because the software tracks more system attributes.

System LED and Color	Internal Health LED Color	Status
Processor failure, socket *X* (Amber)	Red	One or more of the following conditions may exist: • Processor in socket *X* has failed. • Processor in socket *X* failed over to the offline spare. • Processor *X* is not installed in the socket. • Processor *X* is unsupported. • ROM detects a failed processor during POST.
	Amber	Processor in socket *X* is in a pre-failure condition.
Processor failure, both sockets (Amber)	Red	Processor types are mismatched.
PPM failure (Amber)	Red	PPM has failed.

System LED and Color	Internal Health LED Color	Status
DIMM failure, slot *X* (Amber)	Red	• DIMM in slot *X* has failed. • DIMM in slot *X* is an unsupported type, and no valid memory exists in another bank.
	Amber	• DIMM in slot *X* has reached single-bit correctable error threshold. • DIMM in slot *X* is in a pre-failure condition. • DIMM in slot *X* is an unsupported type, but valid memory exists in another bank.
DIMM failure, all slots in one bank (Amber)	Red	No valid or usable memory is installed in the system.
Overtemperature (Amber)	Amber	The Health Driver has detected a cautionary temperature level.
	Red	The server has detected a hardware critical temperature level.
Riser interlock (Amber)	Red	The PCI riser board assembly is not seated.
Online spare memory (Amber)	Amber	Bank *X* failed over to the online spare memory bank.
Power converter module interlock (Amber)	Red	The power converter module is not seated.
Fan module (Amber)	Amber	A redundant fan has failed.
Fan module (Red)	Red	The minimum fan requirements are not being met in one or more of the fan modules. One or more fans have failed or are missing.
Power supply signal interlock (Amber)	Red	The power supply signal cable is not connected to the system board.

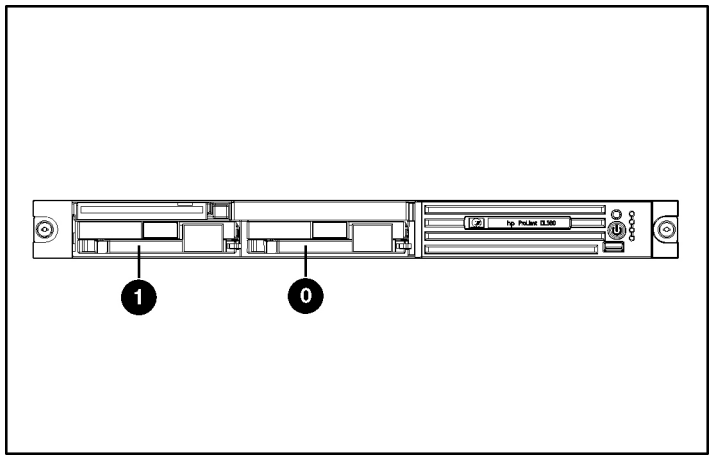
Internal USB Connector

The front internal USB connector is located in the processor zone fan module.

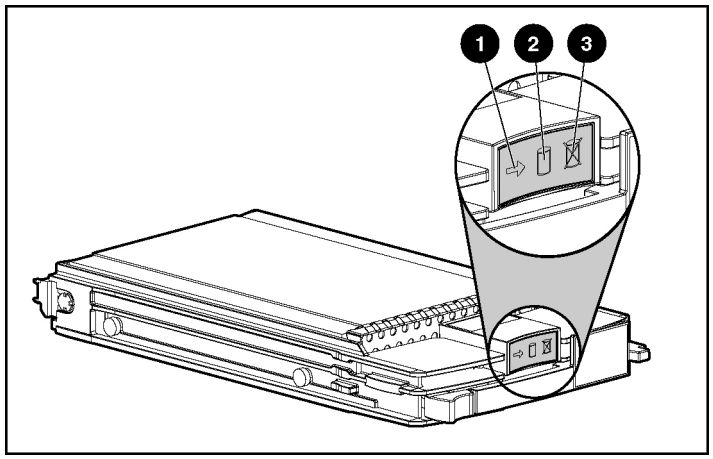


For more information, refer to "Internal USB Functionality (on page 83)."

SCSI IDs and SATA Device Numbers



Hot-Plug SCSI Hard Drive LEDs

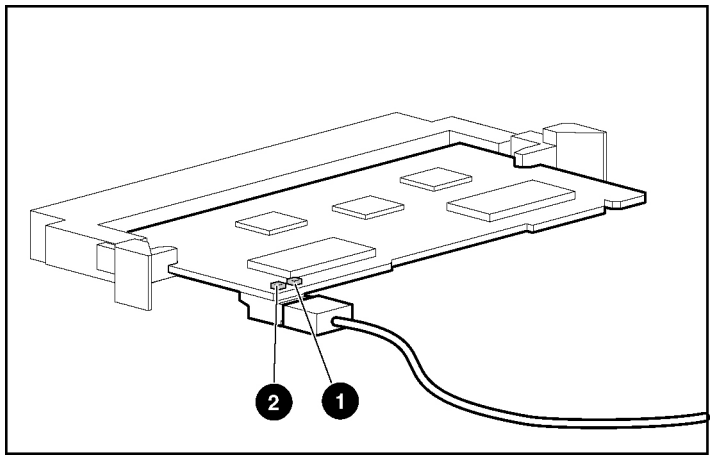


Item	LED Description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is 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 HP SIM; or (3) drive firmware is being updated.
Off	Off	On	The drive has failed and has 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.

Optional Battery-Backed Write Cache Enabler LEDs



Item	LED Color
1	Amber
2	Green

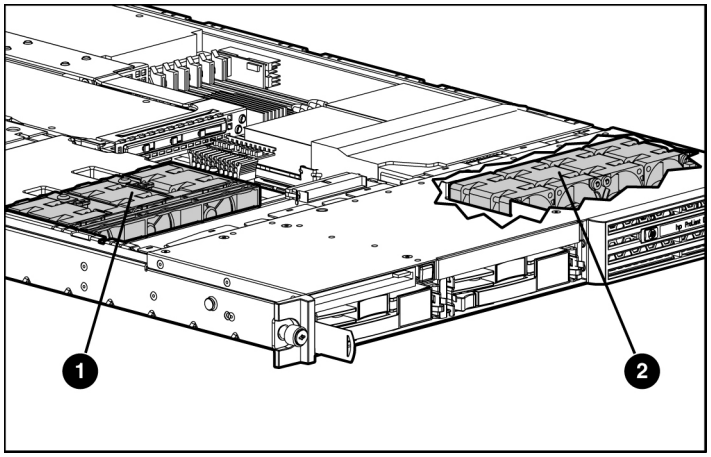
For LED status information, refer to "Battery-Backed Write Cache Enabler LED Statuses (on page 21)."

Battery-Backed Write Cache Enabler LED Statuses

Server Status	LED Status	Battery Module Status
Server is on and has normal run time	Green = On	Fast charging
	Green = Off	Trickle charging
	Amber = On	A short exists in the connection of one or more of the four button cells within the battery module
	Amber = Blinking	An open exists in the circuit between the positive and negative terminals of the battery module
	Amber = Off	Normal

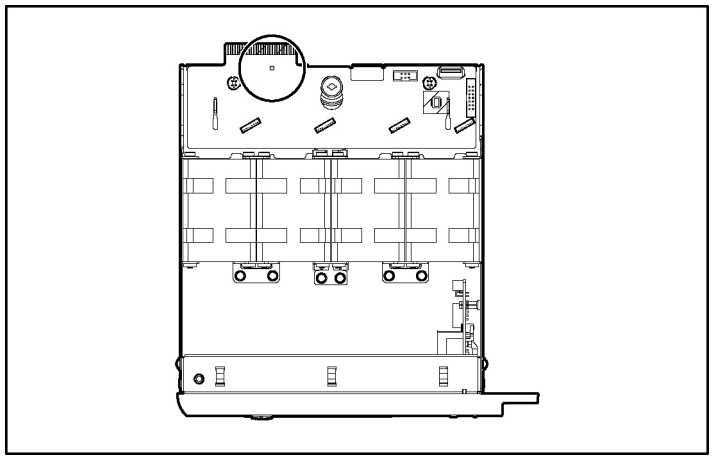
Server Status	LED Status	Battery Module Status
Server is on and is in the first 30 seconds after power up	Green = On Amber = On	Temporary lock-out state; data was lost due to cable being detached
Server is off and is in data retention mode	Amber = Blinking every 15 seconds	User data held in write cache is being backed up

Fan Module Locations



Item	Description
1	Power supply zone fan module
2	Processor zone fan module

Processor Zone Fan Module LED



Status
Amber = One fan in this module has failed.
Red = Multiple fans in this module have failed.
Off = All fans in this module are operating normally.

For power supply zone fan module LED information, refer to System Board LEDs (on page 14).

Server Operations

In This Section

Powering Up the Server

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

Powering Down the Server

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

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

1. 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. 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. 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

NOTE: If the optional cable management arm option is installed, you can extend the server without powering down the server or disconnecting peripheral cables and power cords. These steps are only necessary with the standard cable management solution.

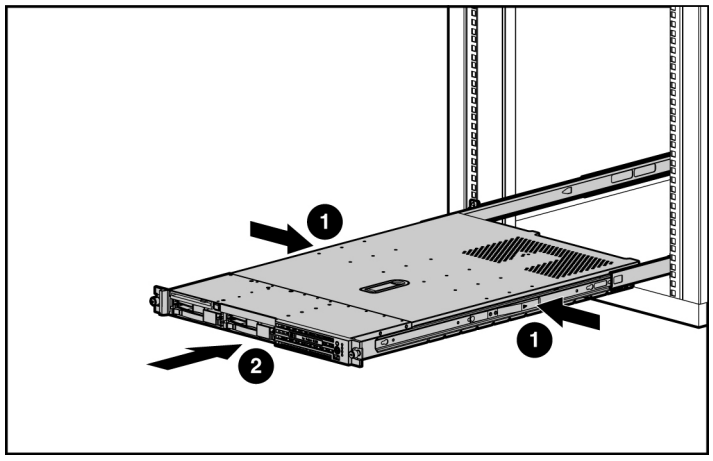
1. Power down the server ("Powering Down the Server" on page 25).
2. Disconnect all peripheral cables and power cords from the server rear panel.
3. Loosen the thumbscrews that secure the server faceplate to the front of the rack.
4. Extend the server on the rack rails until the server rail-release latches 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.

5. 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.

6. Reconnect the peripheral cables and power cords.

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 the standard cable management solution is installed ("Powering Down the Server" on page 25).

   NOTE: If the optional cable management arm is installed, you can extend the server and perform hot-plug installation or maintenance procedures without powering down the server.

2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).

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

Installing the Access Panel

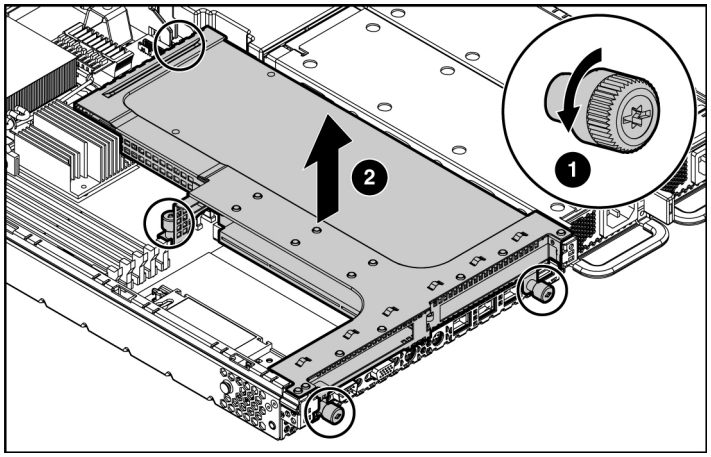
1. Place the access panel on top of the server with the hood latch open. Allow the panel to extend past the rear of the server approximately 8 mm (0.2 in).
2. Engage the anchoring pin with the corresponding hole in the latch.
3. Push down on the hood latch. The access panel slides to a closed position.

Removing PCI Riser Board Assembly

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 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Remove the PCI riser board assembly:
   a. Disconnect any internal or external cables connected to any existing expansion boards.
   b. Loosen the four PCI riser board assembly thumbscrews.

c. Lift the front of the assembly slightly and unseat the riser boards from the PCI riser board connectors.



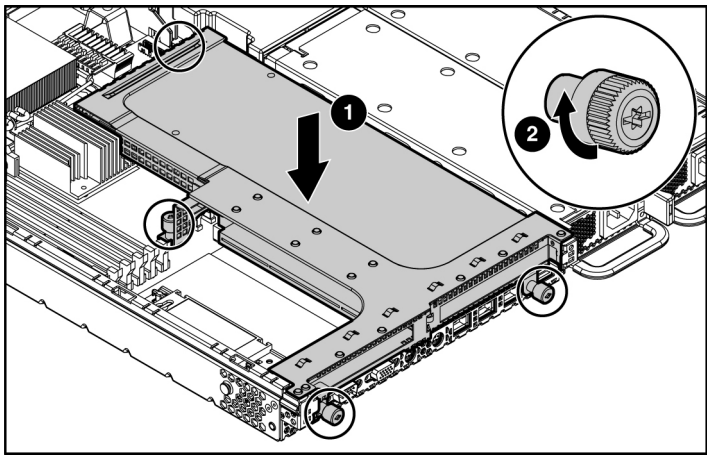
Installing PCI Riser Board Assembly

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 board.

IMPORTANT: Be sure that all DIMM slot latches are closed to provide adequate clearance before installing the PCI riser board assembly with a half-length expansion board.

1. Align the PCI riser boards with the corresponding connectors on the system board and install it into place.

2. Tighten the four PCI riser board assembly thumbscrews.



Server Setup

In This Section

Optional Installation Services

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

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

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

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

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

Rack Planning Resources

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

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

  For more information, refer to the HP website (http://www.hp.com/products/configurator).
- The Installing Rack Products video provides a visual overview of operations required for configuring a rack with rack-mountable components. It also provides the following important configuration steps:
  - Planning the site
  - Installing rack servers and rack options
  - Cabling servers in a rack

  - Coupling multiple racks

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

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

Optimum Environment

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

Space and Airflow Requirements

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

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

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

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

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

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

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

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

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

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

Temperature Requirements

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

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

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

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

Power Requirements

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

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

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

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

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

- Provide a separate electrical circuit for the server.

Electrical Grounding Requirements

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

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

Rack Warnings

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

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

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

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

Identifying the Server Shipping Carton Contents

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

The contents of the server shipping carton include:

- Server
- Printed setup documentation, Documentation CD, and software products
- Power cord
- Rack mounting hardware kit and documentation

In addition to these supplied items, you may need:

- Application software CDs or diskettes
- Options to be installed
- Phillips screwdriver

Installing Hardware Options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, refer to "Hardware Options Installation (on page 43)."

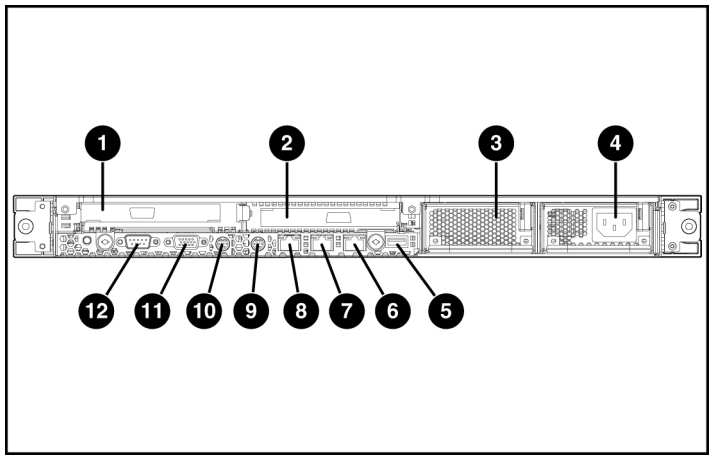
Installing the Server into the Rack

To install the server into a rack with square, round, or threaded holes, refer to the instructions that ship with the rack hardware kit.

If you are installing the server into a telco rack, order the appropriate option kit at the RackSolutions.com website (http://www.racksolutions.com/hp). Follow the server-specific instructions on the website to install the rack brackets.

Use the following information when connecting peripheral cables and power cords to the server.

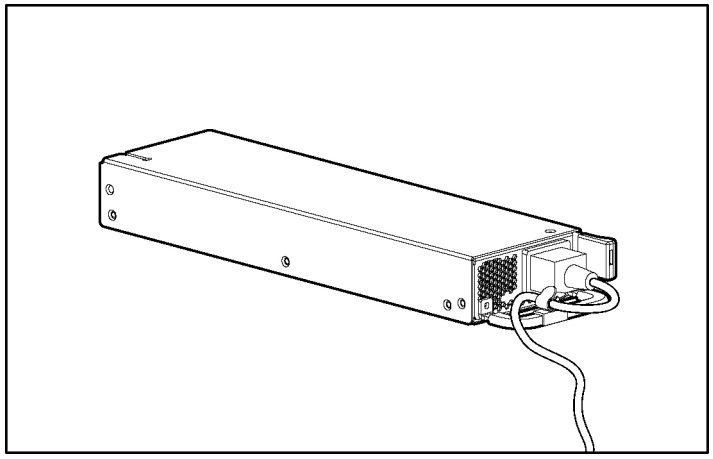
WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.



Item	Description
1	PCI-X expansion slot 1, 64-bit/133-MHz 3.3V (optional PCI Express slot 1, x8)
2	PCI-X expansion slot 2, 64-bit/133-MHz 3.3V (optional PCI Express slot 2, x8)
3	Power supply bay 2

Item	Description
4	Power supply bay 1 (populated)
5	USB connector
6	10/100/1000 NIC 1
7	10/100/1000 NIC 2
8	iLO management port
9	Mouse connector
10	Keyboard connector
11	Video connector
12	Serial connector

Use the strain relief clip from the server hardware kit to secure the power cord, as illustrated.



Powering Up and Configuring the Server

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

While the server boots, RBSU and the ORCA utility are automatically configured to prepare the server for operating system installation. To configure these utilities manually:

- Press the **F8** key when prompted during the array controller initialization to configure the array controller using ORCA.
- Press the **F9** key when prompted during the boot process to change the server settings, such as the settings for language and operating system, using RBSU. The system is set up by default for the English language and a Microsoft® Windows® 2000 installation.

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

Installing the Operating System

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

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

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

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

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

Registering the Server

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

Hardware Options Installation

In This Section

Introduction

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

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

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

Processor Option

The server supports single- and dual-processor operation. With two processors installed, the server supports boot functions through the processor installed in processor socket 1. However, if processor 1 fails, the system automatically boots from processor 2 and provides a processor failure message.

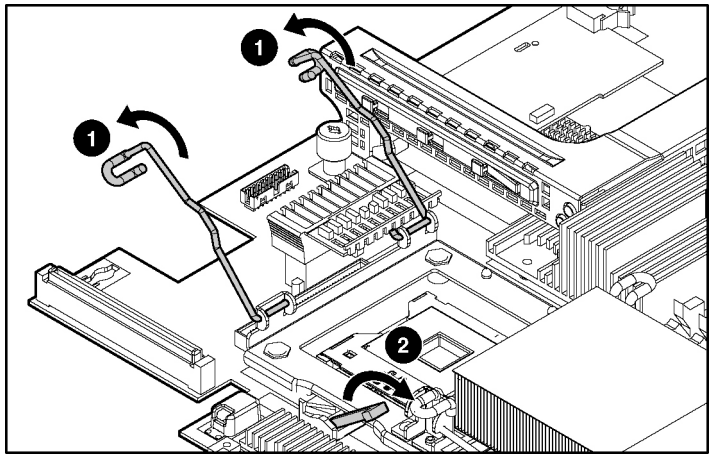
The server uses embedded PPMs as DC-to-DC converters to provide the proper power to each processor.

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

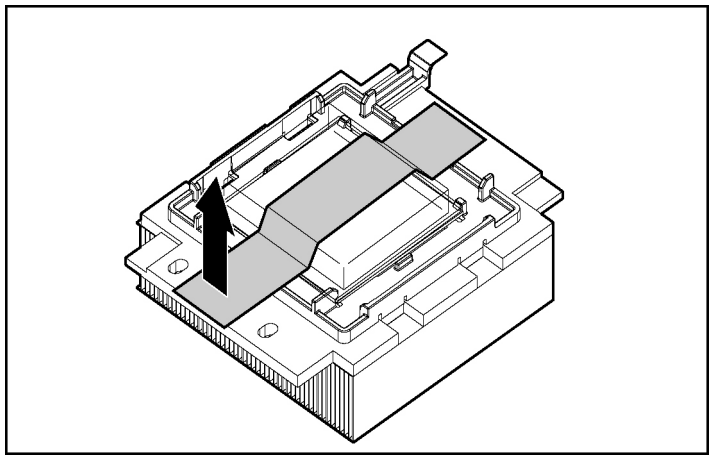
CAUTION: To prevent possible server malfunction and damage to the equipment, do not mix processors of different types.

To install a processor:

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Release the processor retaining clips and processor locking lever.

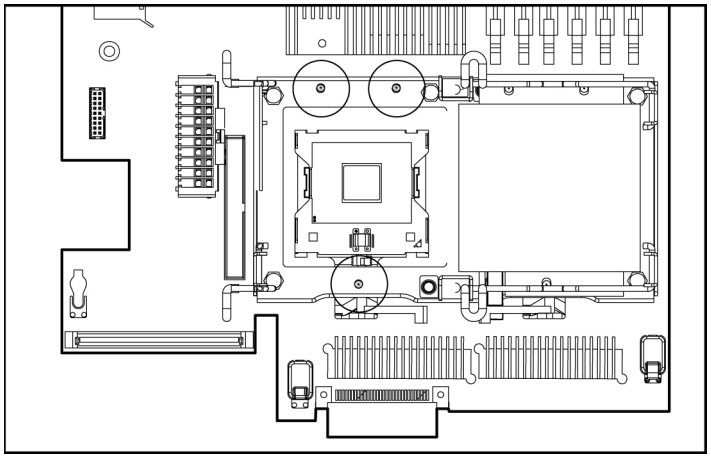


5. Remove the protective cover from the processor.

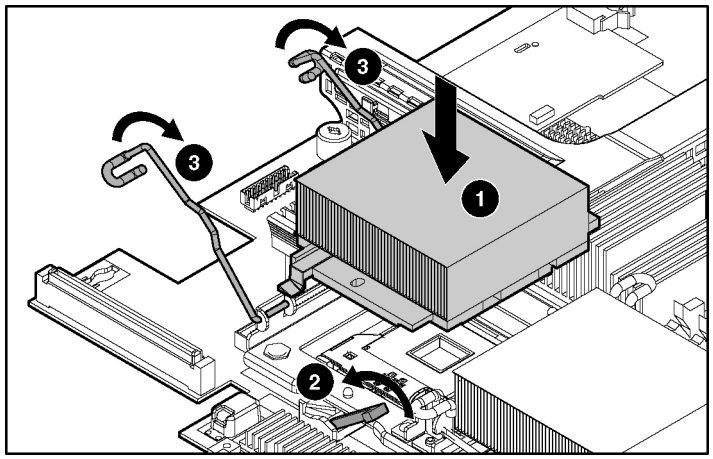


6. Align the holes in the processor assembly with the guiding pins on the mounting bracket.

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.



7. Install the processor assembly and close the processor locking lever and processor retaining clips.



8. Install the access panel ("Installing the Access Panel" on page 28).

Memory Options

You can expand server memory by installing PC2-3200 DDR2 SDRAM DIMMs. The system supports up to six ECC Registered DDR2 SDRAM DIMMs.

> **NOTE:** The Advanced Memory Protection option in RBSU provides additional memory protection beyond Advanced ECC. By default, the server is set to **Advanced ECC Support**. Refer to "ROM-Based Setup Utility ("HP ROM-Based Setup Utility" on page 71)," on the Documentation CD, for more information.

The server supports two types of memory configurations:

- Standard memory configuration for maximum performance with up to 12 GB of active memory (six 2-GB memory modules)
- Online spare memory configuration for maximum availability with up to 6 GB of active memory while simultaneously supporting up to 6 GB of online spare memory

NOTE: When configuring the memory sub-system to run in Online Spare mode, only single rank DIMMs can be installed in the system. Online Spare Mode will not work with dual rank DIMMs installed in the system.

DIMM Installation Guidelines

You must observe the following guidelines when installing additional memory:

- DIMMs installed in the server must be Registered DDR2 DRAM, 2.5 volts, 64 bits wide, and ECC.
- DIMMs in slots 1A and 2A must match and must be installed as a pair.
- DIMMs in slots 3B and 4B must match and must be installed as a pair.
- DIMMs in slots 5C and 6C must match and must be installed as a pair.
- All DIMMs installed must be the same speed. Do not install DIMM modules supporting different speeds.
- Install DIMMs into both slots within a single bank. DIMMs must be installed in order. Upgrade memory by installing DIMM pairs into banks in sequential bank order, starting with bank B.

Online Spare Memory Configuration

With online spare memory, you can configure primary server memory for up to 6 GB of ECC DDR2 SDRAM and configure an additional 6 GB of online spare memory. In this configuration, all six DIMM slots are populated with up to 2-GB Registered ECC DDR2 SDRAM DIMMs.

In the online spare configuration, the ROM automatically configures the last populated bank as the spare memory. If DIMMs in a non-spare bank exceed the limit for the single-bit correctable errors threshold as defined by the Pre-Failure Warranty, the system copies the memory contents of the failing bank to the spare bank. The system then deactivates the failing bank and automatically switches over to the spare bank.

For online spare memory support, you must observe the following guidelines:

- The ROM must be up to date.

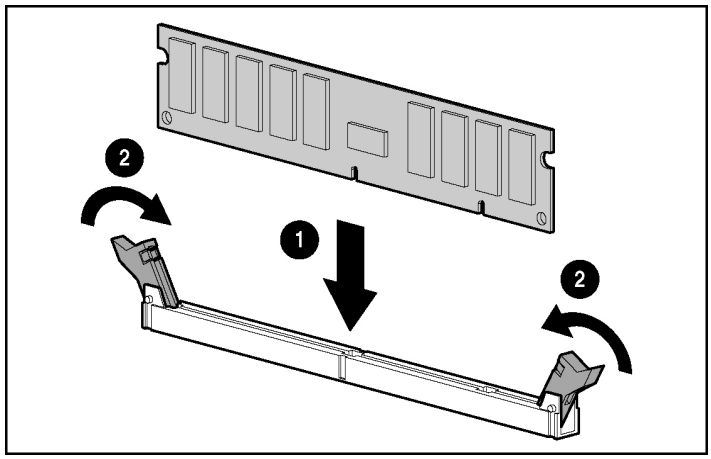
- DIMMs installed in a spare bank must be of equal or greater capacity than the DIMMs installed in other banks.

  For example, if bank A is populated with two 512-MB DIMMs, bank B must be populated with two 512-MB or greater DIMMs in order for online spare memory support to function properly.

After installing DIMMs, use RBSU to configure the system for online spare memory support ("Configuring Online Spare Memory" on page 73).

Installing DIMMs

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. If installed, remove the half-length expansion board ("Expansion Board" on page 58).
5. Open the DIMM slot latches.
6. Install the DIMM.



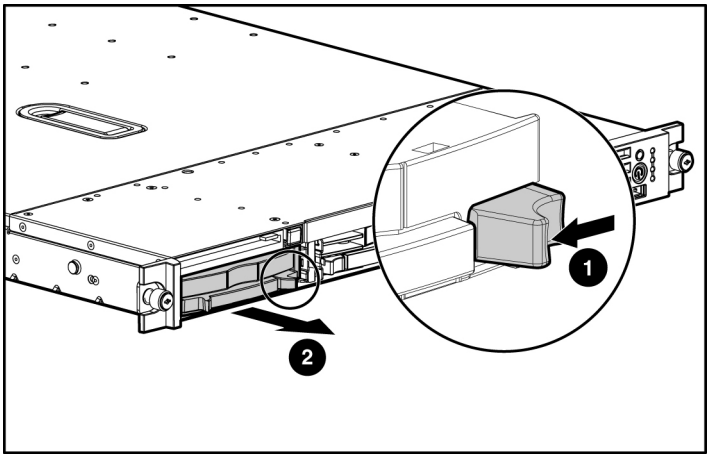
7. If removed, reinstall the half-length expansion board ("Installing an Expansion Board" on page 59).

8. Install the access panel ("Installing the Access Panel" on page 28).
9. If you are installing DIMMs in an online spare configuration, use RBSU to configure this feature ("Configuring Online Spare Memory" on page 73).

Hard Drive Options

Removing a Hard Drive Blank

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



SCSI Hard Drive Guidelines

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

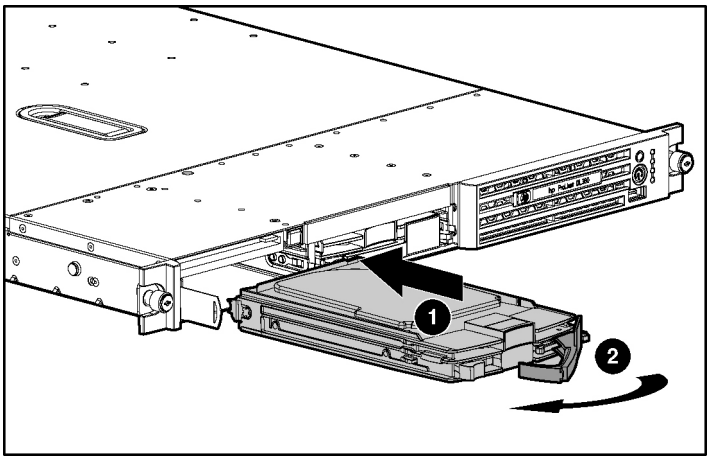
- The server supports two hot-plug SCSI hard drives.
- Each SCSI drive must have a unique ID. The system automatically sets all SCSI IDs.
- The SCSI ID for each hot-plug hard drive is set automatically to the next sequential ID number in a series beginning with ID0.
- If only one SCSI hard drive is used, install it in the bay with the lowest number.
- Hot-plug hard drives must be Ultra320 SCSI types. Mixing these types with other drive standards degrades the overall performance of the drive subsystem.
- Drives must be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

Installing a SCSI or SATA Hard Drive

IMPORTANT: SATA hard drive LED functionality and hot-plug capability are not supported currently.

1. Power down the server ("Powering Down the Server" on page 25).
2. Remove the existing hard drive blank or hard drive from the drive bay.
3. Install the hard drive.

NOTE: Depending on the model purchased, the server or hard drive may look slightly different than the illustration.

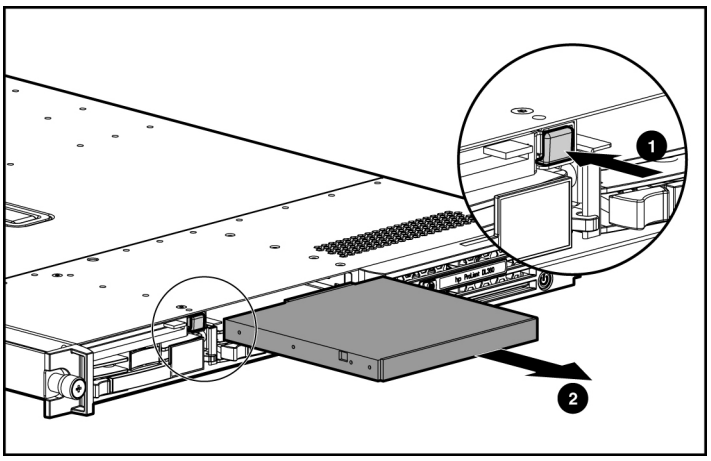


4. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-Plug SCSI Hard Drive LED Combinations" on page 20, "Hot-Plug SCSI Hard Drive LEDs" on page 19).
5. Resume normal server operations.

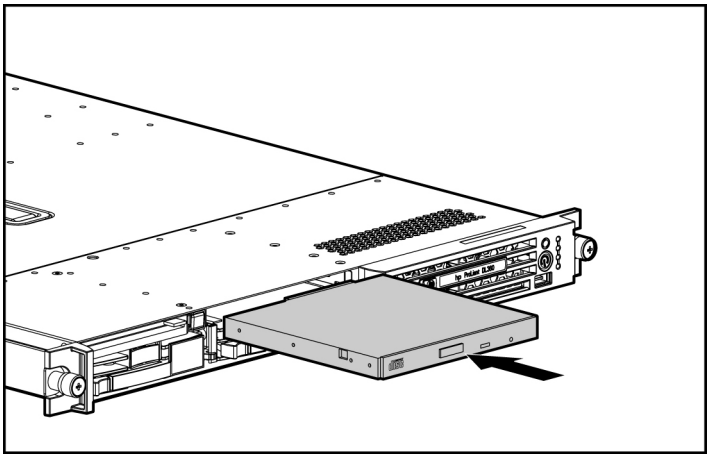
Optical Device Option

1. Push the optical device ejector button and eject the optical device or blank.

NOTE: Access to the ejector button is intentionally restricted. Push the ejector button with a small flat object such as a key or pen to eject the optical device.



2. Install the optical device drive fully into the empty bay until it clicks.



Battery-Backed Write Cache Enabler Option

The Battery-Backed Write Cache Enabler, also called the battery pack, works with the cache module to provide transportable data protection, increase overall controller performance, and maintain any cached data for up to 72 hours. The NiMH batteries in the battery pack are continuously recharged through a trickle-charging process whenever the system power is on. Under normal operating conditions, the battery pack lasts for 3 years before replacement is necessary.

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

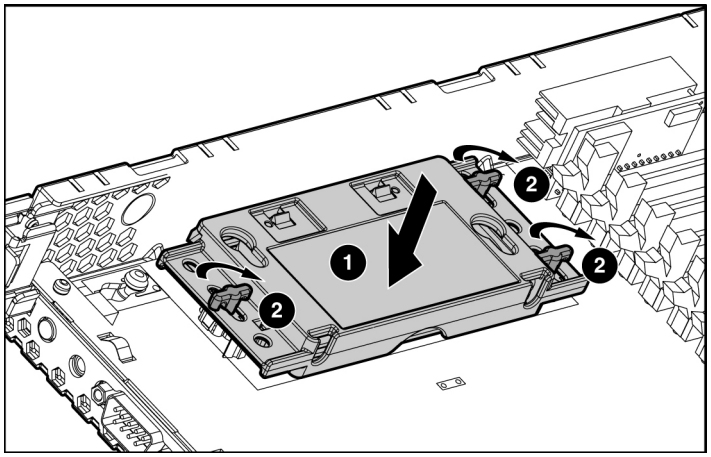
IMPORTANT: The battery module may have a low charge when installed. In this case, a POST error message is displayed when the server is powered up, indicating that the battery module is temporarily disabled. No action is necessary on your part. The internal circuitry automatically recharges the batteries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

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

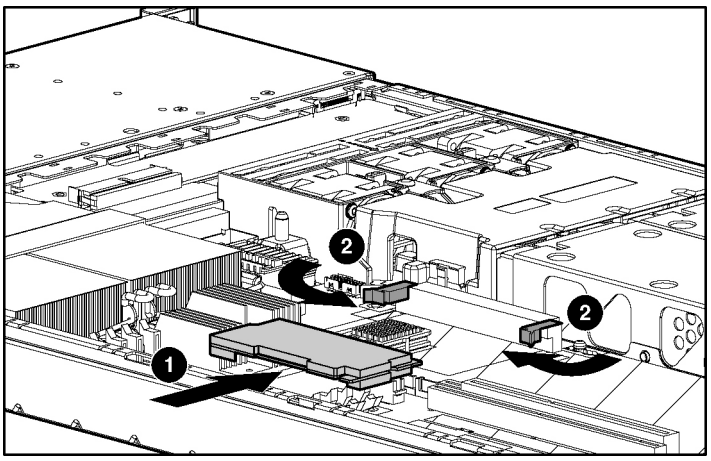
To install the Battery-Backed Write Cache Enabler:

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Align the battery module over the quarter-turn fasteners.

5. Install the battery module over the fasteners and turn the fasteners clockwise to lock the module in place.



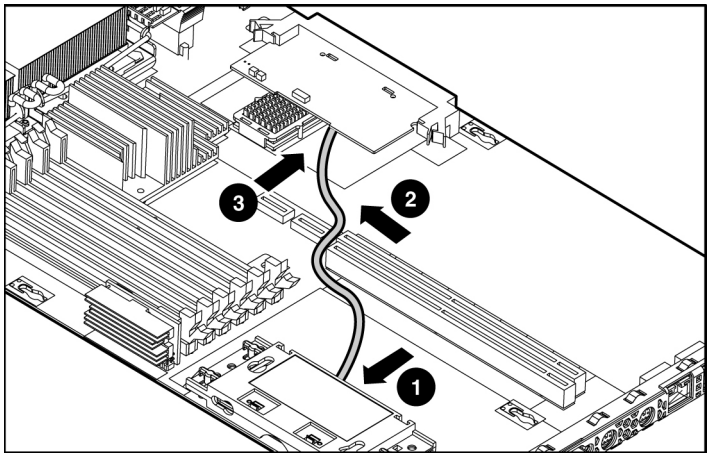
6. Install the Smart Array 6i memory module.



7. Route the battery module cable through the battery-backed write cache cable clip on the system board.

NOTE: To manage internal cabling, wind the excess battery module cable around the batteries.

8. Connect the battery module cable to the battery-backed write cache enabler and to the Smart Array 6i memory connector on the system board.



9. Install the access panel ("Installing the Access Panel" on page 28).
10. Power up the server ("Powering Up the Server" on page 25).

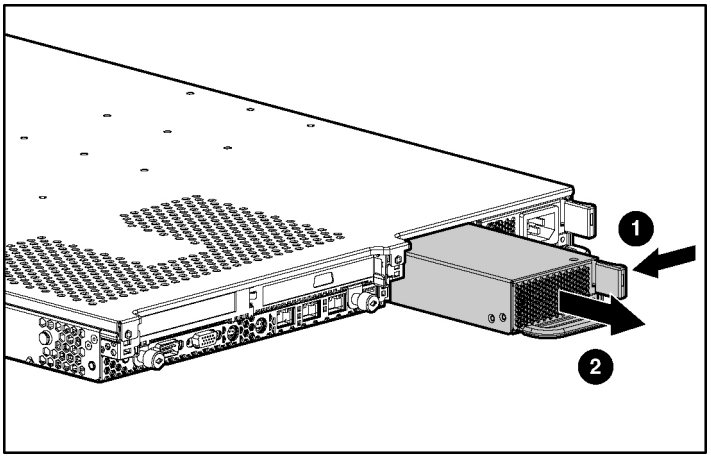
Refer to the option documentation for more information.

Redundant Hot-Plug AC Power Supply Option

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.

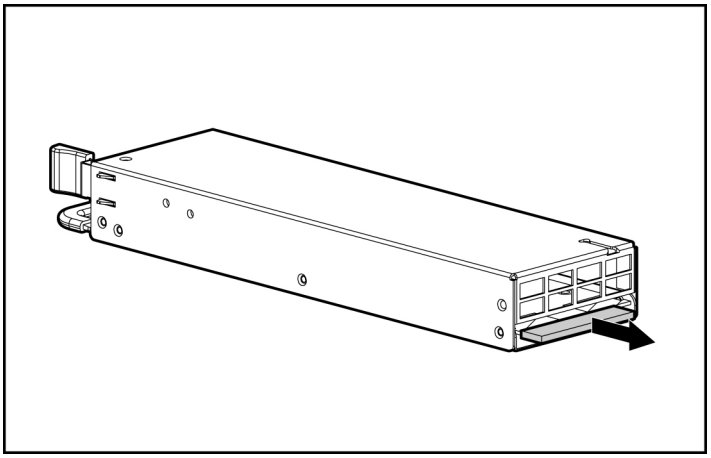
1. Unfasten the cable management solution to access the power supply bays.

2. Remove the power supply blank.

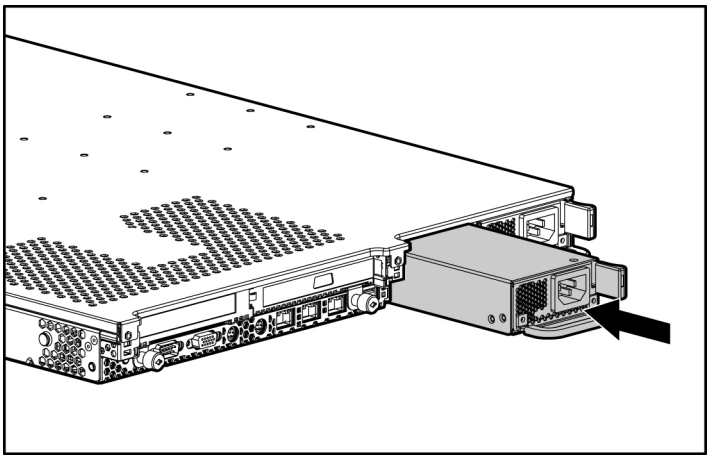


3. Remove the protective cover from the connector pins on the power supply.

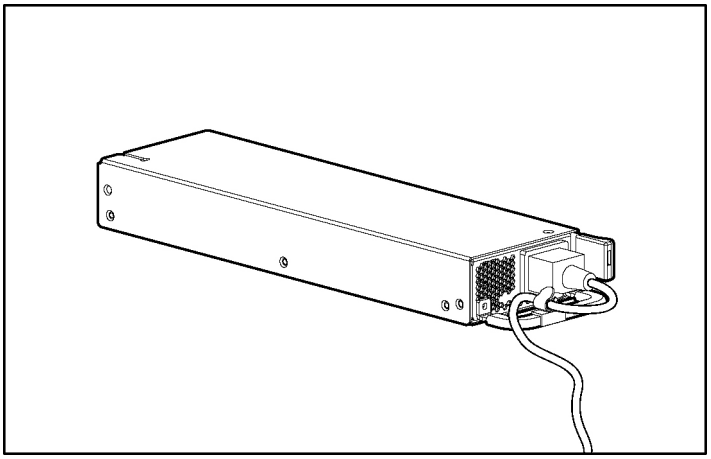
WARNING: To reduce the risk of electric shock or damage to the equipment, do not connect the power cord to the power supply until the power supply is installed.



4. Install the redundant power supply into the bay until it clicks.



5. Connect the power cord to the power supply.
6. Use the strain relief clip from the server hardware kit to secure the power cord, as illustrated.



7. Route the power cords through the cable management solution.
8. Connect the power cord to the power source.
9. Be sure that the power supply LED is green ("Rear Panel LEDs and Buttons" on page 11).

10. Be sure that the front panel external health LED is green ("Front Panel LEDs and Buttons" on page 8).

Expansion Board Options

For instructions on installing a RILOE II board, refer to the *HP Remote Insight Lights-Out Edition II User Guide* on the Documentation CD.

IMPORTANT: The optional RILOE II board can be installed only in slot 2. If you plan to install a RILOE II board in the future, leave slot 2 unpopulated.

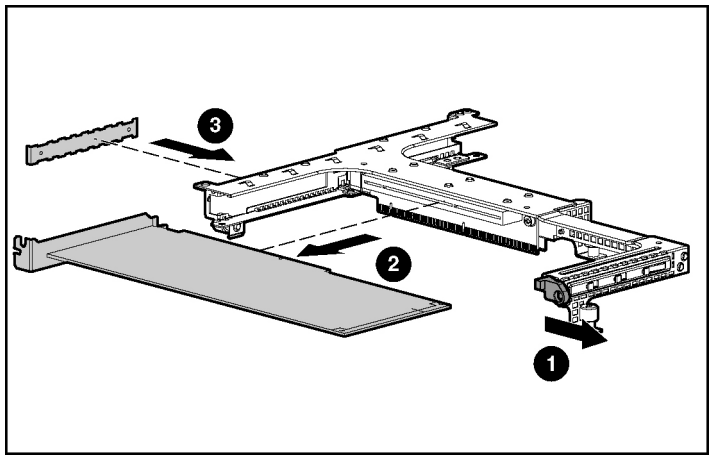
PCI Expansion Slot Definitions

Slot	Board Size	Connector	Interconnect
PCI-X expansion slot 1	Half-length	133 MHz, 3.3 V	64-bit
PCI-X expansion slot 2	Full-length	133 MHz, 3.3 V	64-bit
PCI Express expansion slot 1 (optional)	Half-length	x8	x1, x4, or x8
PCI Express expansion slot 2 (optional)	Full-length	x8	x1, x4, or x8

Expansion Board

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Remove the PCI riser board assembly.

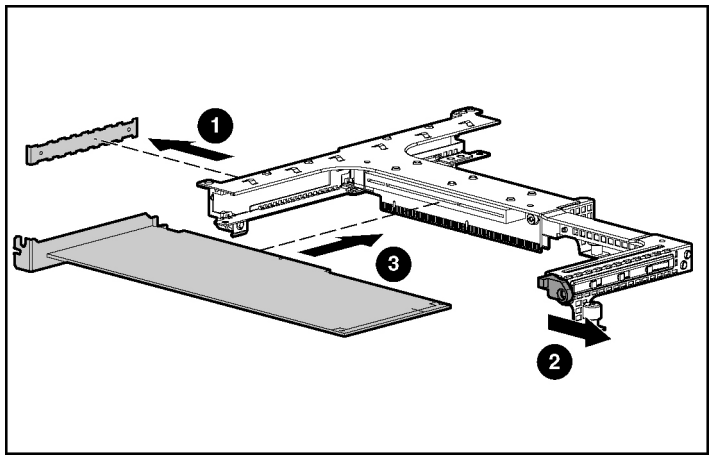
5. Remove the expansion board.



Installing an Expansion Board

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Remove the PCI riser board assembly.
5. Remove the expansion slot cover from the PCI riser board assembly.
6. Align the expansion board with the guiding groove.
7. Press to release the expansion board retainer clip.

8. Install the expansion board into the slot until it seats firmly.



IMPORTANT: If the expansion board ships with an extender bracket, remove it from the expansion board before inserting the board into the expansion slot of the PCI riser board assembly.

IMPORTANT: Be sure that all DIMM slot latches are closed to provide adequate clearance before installing the PCI riser board assembly with a half-length expansion board.

9. Install the PCI riser board assembly.

IMPORTANT: The server will not power up if the PCI riser board assembly is not seated properly.

NOTE: The same procedures apply for installing an expansion board in PCI expansion slot 1.

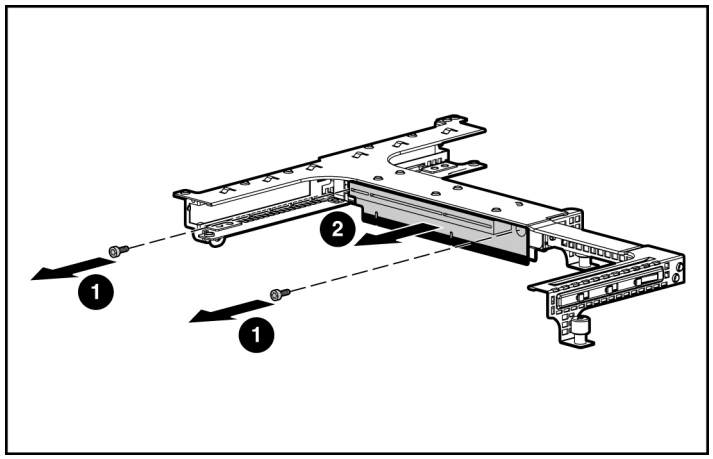
Installing a PCI Express Riser Board

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend the server from the rack, if applicable ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Remove the PCI riser board assembly.
5. Remove the expansion slot cover from the slot, if installed ("Installing an Expansion Board" on page 59).

6. Remove the expansion board from the slot, if installed ("Expansion Board" on page 58).
7. Remove the applicable PCI riser boards from the assembly:

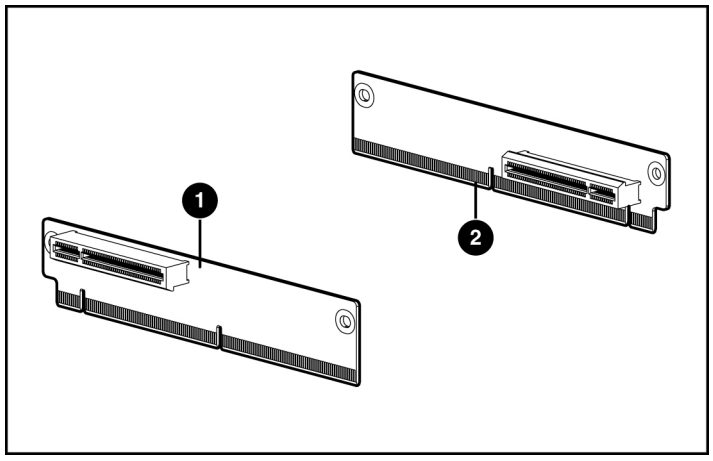
   IMPORTANT: When removing the two parts of the riser board, pay attention to the orientation of the slots on each side. This information is important for subsequent procedures.

   a. Remove the riser board with the slot for full-length expansion boards.



   b. Repeat the previous step for the riser board with the slot for half-length expansion boards, if needed.

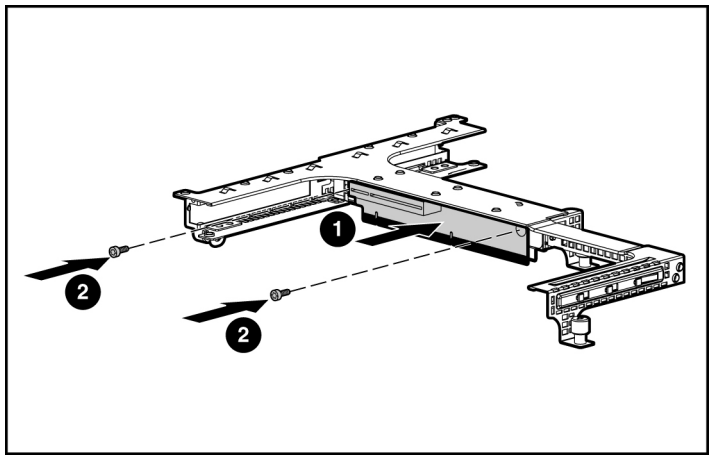
8. Identify the differences between the two PCI Express riser boards.



Item	Description
1	Riser board with x8 connector for full-length expansion boards
2	Riser board with x8 connector for half-length expansion boards

9. Install the PCI Express riser board:

a. Install the riser board with the slot for full-length boards onto the assembly.



b. Repeat the previous step for the riser board with the slot for half-length expansion boards, if needed.

10. Install the PCI Express expansion board ("Installing an Expansion Board" on page 59).
11. Install the PCI riser board assembly.

    IMPORTANT: The server will not power up if the PCI riser board assembly is not seated properly.

12. Connect any internal or external cabling to the expansion boards.
13. Install the access panel ("Installing the Access Panel" on page 28).

Server Cabling

In This Section

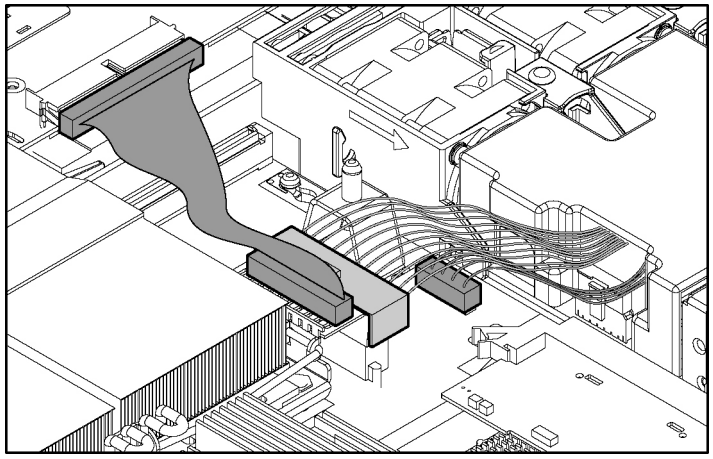
Cabling Overview

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

For information on cabling peripheral components, refer to the white paper on high-density deployment at the HP website (http://www.hp.com/products/servers/platforms).

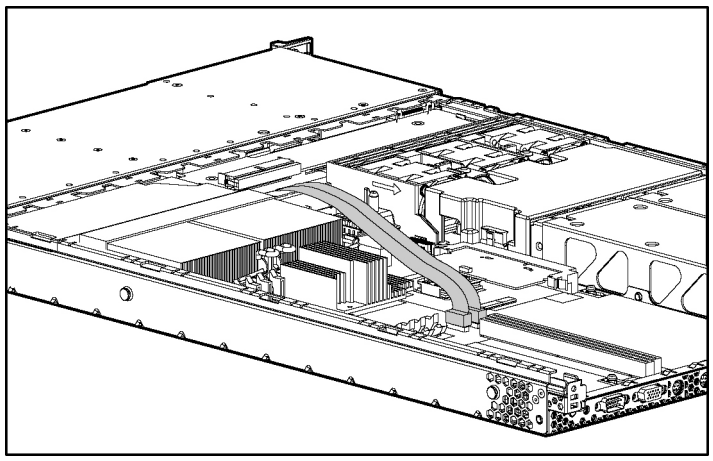
Server Cable Routing

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



SATA Cable Routing

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



Server Software and Configuration Utilities

In This Section

Configuration Tools

List of Tools:

SmartStart Software

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

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

- Configuring hardware using embedded configuration utilities, such as RBSU and ORCA
- Preparing the system for installing "off-the-shelf" versions of leading operating system software

- Installing optimized server drivers, management agents, and utilities automatically with every assisted installation
- Testing server hardware using the Insight Diagnostics Utility ("HP Insight Diagnostics" on page 84)
- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.
- Enabling access to the Array Configuration Utility (on page 74), Array Diagnostic Utility (on page 84), and Erase Utility (on page 79)

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

SmartStart Scripting Toolkit

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

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

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

Configuration Replication Utility

ConRep is shipped in the SmartStart Scripting Toolkit and is a program that works with RBSU to replicate hardware configuration on ProLiant servers. This utility is run during State 0, Run Hardware Configuration Utility, when doing a scripted server deployment. ConRep reads the state of the system environment variables to determine the configuration and then writes the results on an editable script file. This file can then be deployed across multiple servers with similar hardware and software components. For more information, refer to the *SmartStart Scripting Toolkit User Guide* on the HP website (http://h18004.www1.hp.com/products/servers/management/toolkit/documentation.html).

HP ROM-Based Setup Utility

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

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

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

NOTE: Enable the SATA SW RAID option under the Advanced Options menu to enable RAID capability for the server.

Using RBSU

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

To navigate RBSU, use the following keys:

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

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

Auto-Configuration Process

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

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

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

Drives Installed	Drives Used	RAID Level
1	1	RAID 0
2	2	RAID 1
3, 4, 5, or 6	3, 4, 5, or 6	RAID 5
More than 6	0	None

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

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

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

Boot Options

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

BIOS Serial Console

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

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

Configuring Online Spare Memory

1. Install the required DIMMs.
2. Access RBSU by pressing the **F9** key during powerup when the prompt is displayed in the upper right corner of the screen.
3. Select **System Options**.
4. Select **Advanced Memory Protection**.
5. Select **Online Spare with Advanced ECC Support**.
6. Press the **Enter** key.
7. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU.

For more information on online spare memory, refer to the white paper on the HP website (http://www.compaq.com/support/techpubs/whitepapers/tm010301wp.html).

NOTE: When configuring the memory sub-system to run in Online Spare mode, only single rank DIMMs can be installed in the system. Online Spare Mode will not work with dual rank DIMMs installed in the system.

Array Configuration Utility

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

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

The minimum display settings for optimum performance are 800 × 600 resolution and 256 colors. The server must have Microsoft® Internet Explorer 5.5 (with Service Pack 1) installed and be running Microsoft® Windows® 2000, Windows® Server 2003, or Linux. Refer to the *README.TXT* file for further information about browser and Linux support.

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

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 regarding array controller configuration, refer to the controller user guide.

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

HP ProLiant Essentials Rapid Deployment Pack

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

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

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

Re-Entering the Server Serial Number and Product ID

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

1. During the server startup sequence, press the **F9** key to access RBSU.
2. Select the **System Options** menu.
3. Select **Serial Number**. The following warning is displayed:

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

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

Management Tools

List of Tools:

Automatic Server Recovery

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

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

ROMPaq Utility

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

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

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

System Online ROM Flash Component Utility

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

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

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

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

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

Integrated Lights-Out Technology

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

Using iLO, you can:

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

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

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.

Erase Utility

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

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

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

- You encounter an error when completing the steps of a factory-installed operating system installation.

The Erase Utility can be accessed from the Software and Drivers Download website (http://www.hp.com/go/support) or the **Maintenance Utilities** menu of the SmartStart CD ("Configuration Tools" on page 69, "SmartStart Software" on page 69).

Management Agents

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

HP Systems Insight Manager

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

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

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

Redundant ROM Support

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

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

Safety and Security Benefits

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

Access to Redundant ROM Settings

To access the redundant ROM through RBSU:

1. Access RBSU by pressing the **F9** key during powerup when the prompt is displayed in the upper right corner of the screen.
2. Select **Advanced Options**.
3. Select **Redundant ROM Selection**.
4. Select the ROM version.
5. Press the **Enter** key.
6. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU. The server restarts automatically.

To access the redundant ROM manually:

1. Power down the server ("Powering Down the Server" on page 25).
2. Remove the access panel ("Removing the Access Panel" on page 27).
3. Set positions 1, 5, and 6 of the system maintenance switch to On.

4. Install the access panel ("Installing the Access Panel" on page 28).
5. Power up the server ("Powering Up the Server" on page 25).
6. Wait for the server to emit two beeps.
7. Repeat steps 1 and 2.
8. Set positions 1, 5, and 6 of the system maintenance switch to Off.
9. Repeat steps 4 and 5.

When the server boots, the system identifies whether the current ROM bank is corrupt. If a corrupt ROM is detected, the system boots from the backup ROM and alerts you through POST or IML that the ROM bank is corrupt.

If both the current and backup versions of the ROM are corrupt, the server automatically enters ROMPaq disaster recovery mode.

USB Support and Functionality

USB Support (on page 82)

Internal USB Functionality (on page 83)

USB Support

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

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

- POST
- RBSU
- Diagnostics

- DOS
- Operating environments which do not provide native USB support

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

Internal USB Functionality

An internal USB connector is available for use with USB drive keys only. The internal connector shares the same bus with the front external USB connector, and connecting a device to both the front internal and front external USB connectors is not supported. This solution provides for use of a permanent boot drive from a USB drive key installed in the front internal connector, avoiding issues of clearance on the front of the rack and physical access to secure data.

For additional security, you can disable the front USB connectors through RBSU. Disabling external USB ports in RBSU disables both the front external and front internal USB ports.

Diagnostic Tools

List of Tools:

Survey Utility

Survey Utility, a feature within Insight Diagnostics, gathers critical hardware and software information on ProLiant servers.

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

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

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

Array Diagnostic Utility

ADU is a Windows-based tool that collects information about array controllers and generates a list of detected problems. For a list of error messages, refer to "ADU Error Messages."

ADU can be accessed from the SmartStart CD ("Configuration Tools" on page 69, "SmartStart Software" on page 69).

HP Insight Diagnostics

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

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

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

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

Integrated Management Log

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

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

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

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

Keeping the System Current

List of Tools:

Drivers

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

If you are installing a SmartStart-supported operating system, use the SmartStart software ("Configuration Tools" on page 69, on page 69) and its Assisted Path feature to install the operating system and latest driver support.

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

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

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

Resource Paqs

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

ProLiant Support Packs

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

Operating System Version Support

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

Change Control and Proactive Notification

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

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

Care Pack

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

Battery Replacement

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:

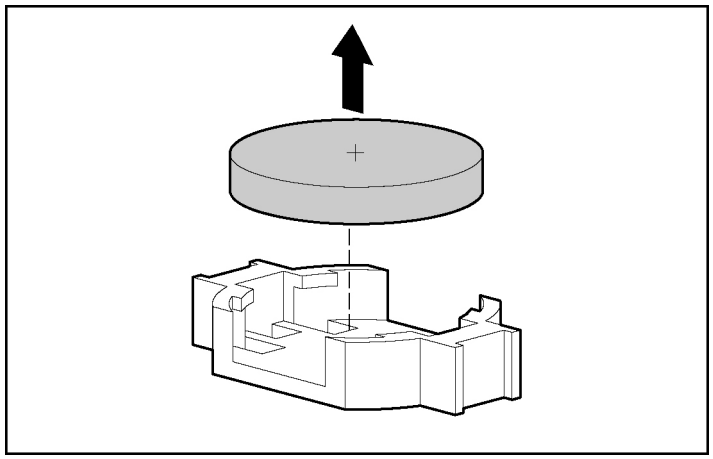
- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

To remove the component:

1. Power down the server ("Powering Down the Server" on page 25).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page 26).
3. Remove the access panel ("Removing the Access Panel" on page 27).
4. Remove the PCI riser cage ("Removing PCI Riser Board Assembly" on page 28).

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

5. Remove the battery.



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

To replace the component, reverse the removal procedure.

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

Troubleshooting

In This Section

Troubleshooting Resources

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

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

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

Server Diagnostic Steps

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

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start Diagnosis Flowchart (on page 99)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General Diagnosis Flowchart (on page 101)." The General Diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

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

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

Important Safety Information

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

Important Safety Information

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

Symbols on Equipment

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

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

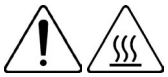
WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

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

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

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

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



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

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

49-109 kg

100-240 lb

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

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

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

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

Warnings and Cautions

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

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

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

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

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

49-109 kg

100-240 lb

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

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

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

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

Preparing the Server for Diagnosis

1. Be sure the server is in the proper operating environment with adequate power, air conditioning, and humidity control. Refer to the server documentation ("Environmental Specifications" on page 127) for required environmental conditions.
2. Record any error messages displayed by the system.
3. Remove all diskettes and CDs from the media drives.
4. Power down the server and peripheral devices if you will be diagnosing the server offline. Always perform an orderly shutdown, if possible. This means you must:
   a. Exit any applications.
   b. Exit the operating system.
   c. Power down the server ("Powering Down the Server" on page 25).
5. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server). Do not disconnect the printer if you want to use it to print error messages.
6. Collect all tools and utilities, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities, necessary to troubleshoot the problem.
   - You must have the appropriate Health Drivers and Management Agents installed on the server.

     NOTE: To verify the server configuration, connect to the System Management homepage and select **Version Control Agent**. The VCA gives you a list of names and versions of all installed HP drivers, Management Agents, and utilities, and whether they are up to date.
   - HP recommends you have access to the SmartStart CD for value-added software and drivers required during the troubleshooting process.
   - HP recommends you have access to the server documentation ("Environmental Specifications" on page 127) for server-specific information.

Symptom Information

Before troubleshooting a server problem, collect the following information:

- What events preceded the failure? After which steps does the problem occur?
- What has been changed between the time the server was working and now?
- Did you recently add or remove hardware or software? If so, did you remember to change the appropriate settings in the server setup utility, if necessary?
- Has the server exhibited problem symptoms for a period of time?
- If the problem occurs randomly, what is the duration or frequency?

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

- Run HP Insight Diagnostics (on page 84) and use the survey page to view the current configuration or to compare it to previous configurations.
- Refer to your hardware and software records for information.

Service Notifications

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

Loose Connections

Action:

- Be sure all power cords are securely connected.
- Be sure all cables are properly aligned and securely connected for all external and internal components.
- Remove and check all data and power cables for damage. Be sure no cables have bent pins or damaged connectors.

- If a fixed cable tray is available for the server, be sure the cords and cables connected to the server are correctly routed through the tray.
- Be sure each device is properly seated.
- If a device has latches, be sure they are completely closed and locked.
- Check any interlock or interconnect LEDs that may indicate a component is not connected properly.
- If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.

Diagnostic Steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start Diagnosis Flowchart (on page 99)," and follow the appropriate diagnostic path. If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in "General Diagnosis Flowchart (on page 101)." The General Diagnosis flowchart is a generic troubleshooting process to be used when the problem is not server-specific or is not easily categorized into the other flowcharts.

The available flowcharts include:

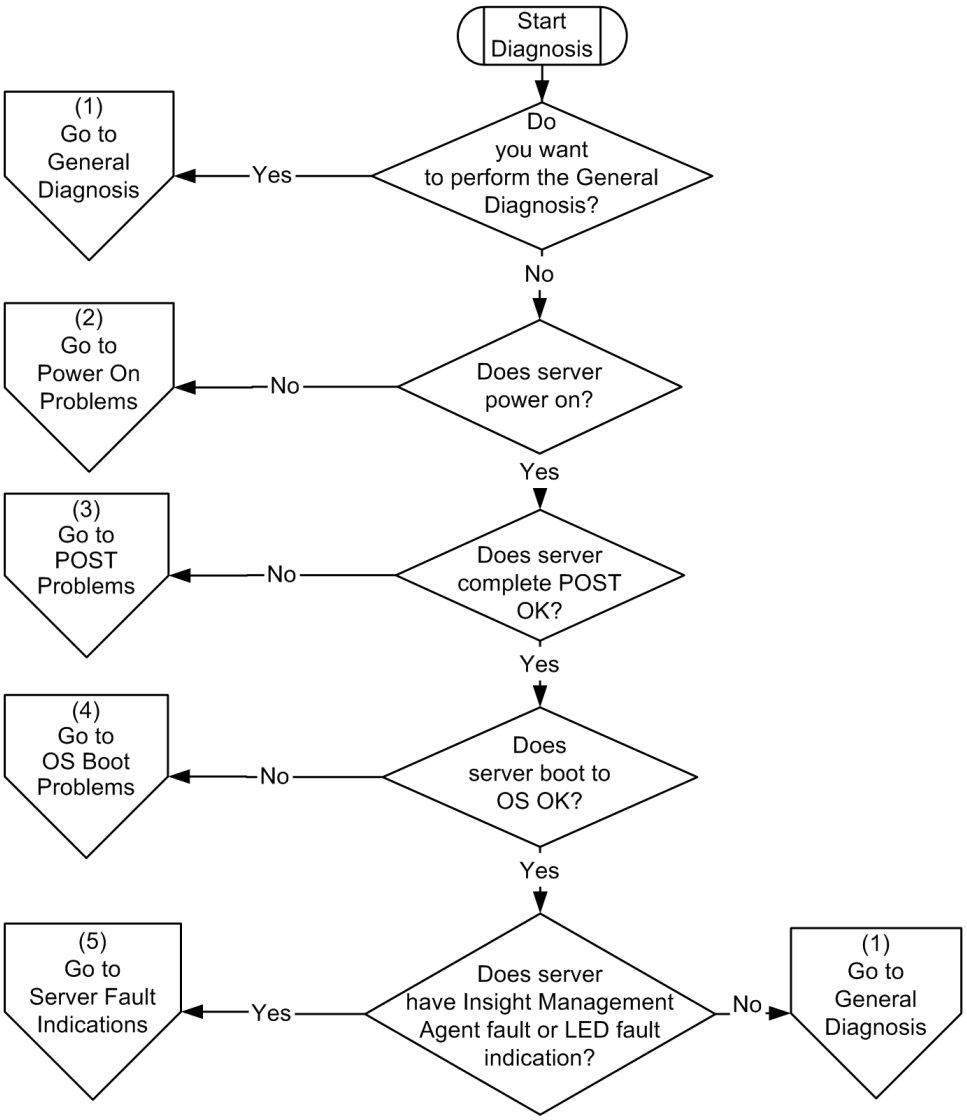
- Start Diagnosis Flowchart (on page 99)
- General Diagnosis Flowchart (on page 101)
- Power-On Problems Flowchart (on page 103)
- POST Problems Flowchart (on page 106)
- OS Boot Problems Flowchart (on page 108)
- Server Fault Indications Flowchart (on page 111)

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

Start Diagnosis Flowchart

Use the following flowchart to start the diagnostic process.

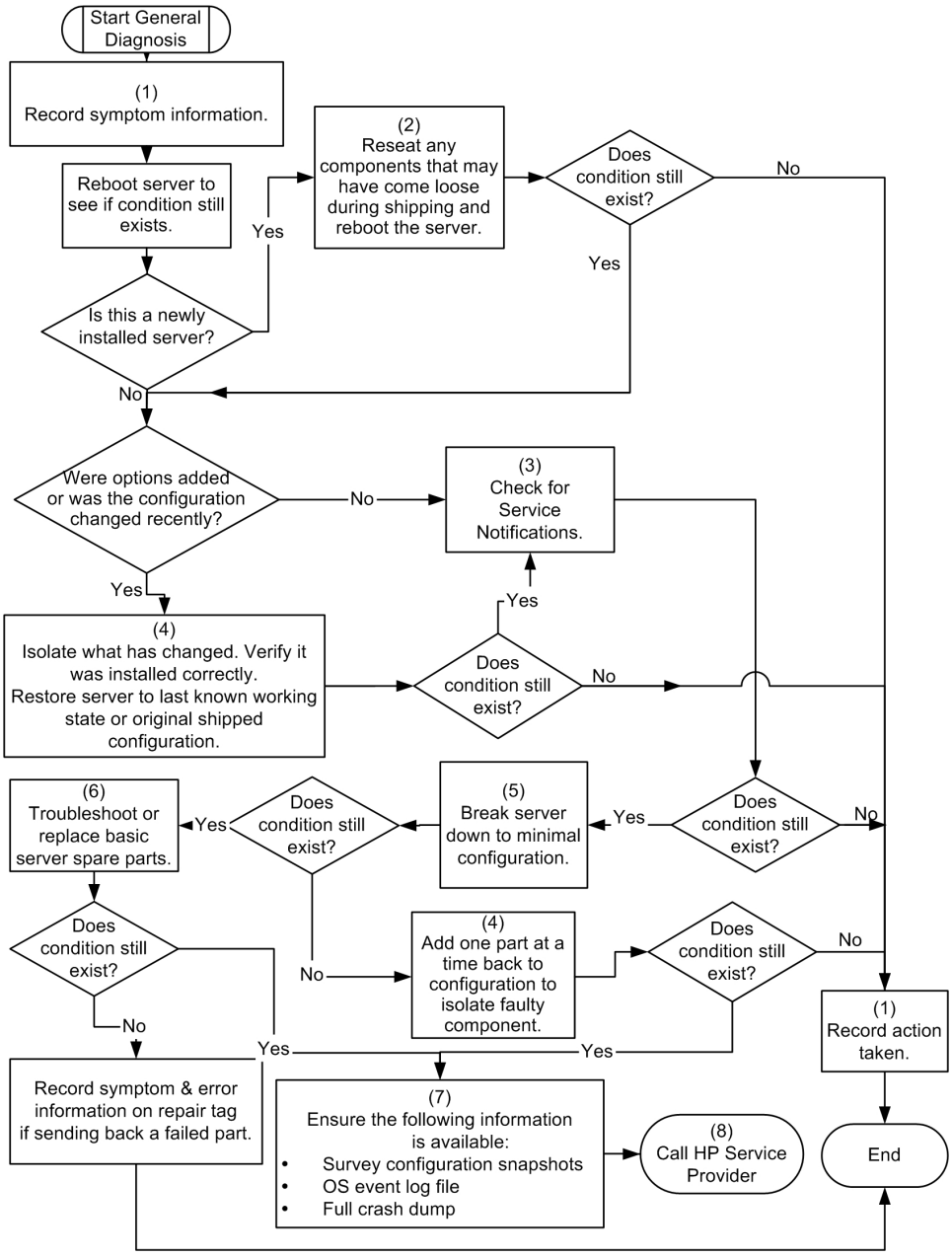
Item	Refer to
1	"General Diagnosis Flowchart (on page 101)"
2	"Power-On Problems Flowchart (on page 103)"
3	"POST Problems Flowchart (on page 106)"
4	"OS Boot Problems Flowchart (on page 108)"
5	"Server Fault Indications Flowchart (on page 111)"


Start Diagnosis
Do you want to perform the General Diagnosis?
Yes
(1) Go to General Diagnosis
No
Does server power on?
No
(2) Go to Power On Problems
Yes
Does server complete POST OK?
No
(3) Go to POST Problems
Yes
Does server boot to OS OK?
No
(4) Go to OS Boot Problems
Yes
Does server have Insight Management Agent fault or LED fault indication?
Yes
(5) Go to Server Fault Indications
No
(1) Go to General Diagnosis

General Diagnosis Flowchart

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

Item	Refer to
1	"Symptom Information (on page 97)"
2	"Loose Connections (on page 97)"
3	"Service Notifications (on page 97)"
4	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
5	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
6	• Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms) • "Hardware Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
7	• "Server Information You Need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Operating System Information You Need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	"Contacting HP Technical Support or an Authorized Reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).


Start General Diagnosis
(1) Record symptom information.
Reboot server to see if condition still exists.
Is this a newly installed server?
Yes
(2) Reseat any components that may have come loose during shipping and reboot the server.
Does condition still exist?
No
Yes
No
Were options added or was the configuration changed recently?
No
(3) Check for Service Notifications.
Yes
(4) Isolate what has changed. Verify it was installed correctly. Restore server to last known working state or original shipped configuration.
Does condition still exist?
Yes
No
(6) Troubleshoot or replace basic server spare parts.
Yes
Does condition still exist?
(5) Break server down to minimal configuration.
Yes
Does condition still exist?
No
Does condition still exist?
No
(4) Add one part at a time back to configuration to isolate faulty component.
Does condition still exist?
No
(1) Record action taken.
No
Yes
Yes
Record symptom & error information on repair tag if sending back a failed part.
(7) Ensure the following information is available:
• Survey configuration snapshots
• OS event log file
• Full crash dump
(8) Call HP Service Provider
End

Power-On Problems Flowchart

Symptoms:

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

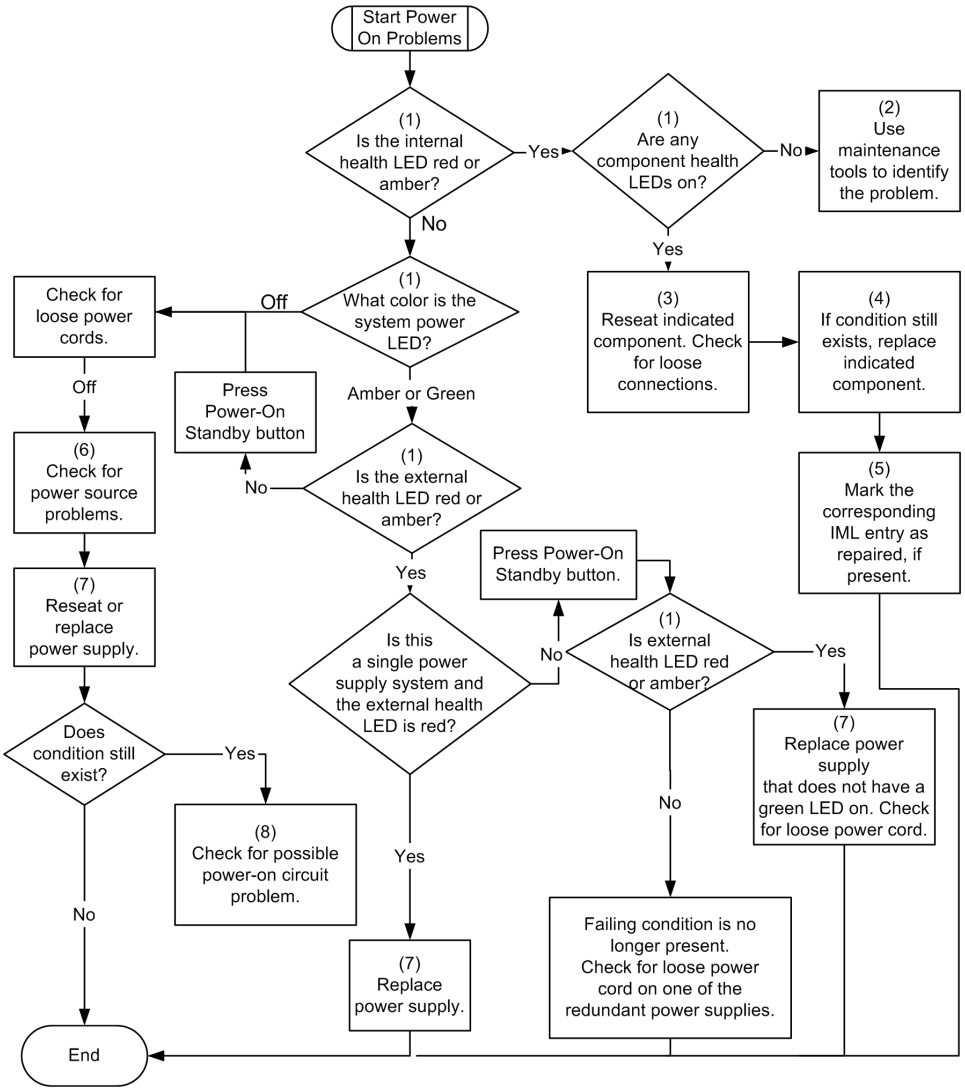
NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

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

Item	Refer to
1	Server user guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms).
2	"HP Insight Diagnostics (on page 84)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	"Loose Connections (on page 97)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
4	Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
5	"Integrated Management Log (on page 85)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

Item	Refer to
6	"Power Source Problems " in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
7	• "Power Supply Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
8	"System Open Circuits and Short Circuits" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).


Start Power On Problems
(1) Is the internal health LED red or amber?
Yes
(1) Are any component health LEDs on?
No
(2) Use maintenance tools to identify the problem.
Yes
(3) Reseat indicated component. Check for loose connections.
(4) If condition still exists, replace indicated component.
(5) Mark the corresponding IML entry as repaired, if present.
No
(1) What color is the system power LED?
Off
Check for loose power cords.
Off
(6) Check for power source problems.
(7) Reseat or replace power supply.
Does condition still exist?
Yes
(8) Check for possible power-on circuit problem.
No
Press Power-On Standby button
Amber or Green
(1) Is the external health LED red or amber?
No
Yes
Is this a single power supply system and the external health LED is red?
No
Press Power-On Standby button.
(1) Is external health LED red or amber?
Yes
(7) Replace power supply that does not have a green LED on. Check for loose power cord.
No
Failing condition is no longer present. Check for loose power cord on one of the redundant power supplies.
Yes
(7) Replace power supply.
End

POST Problems Flowchart

Symptoms:

- Server does not complete POST

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

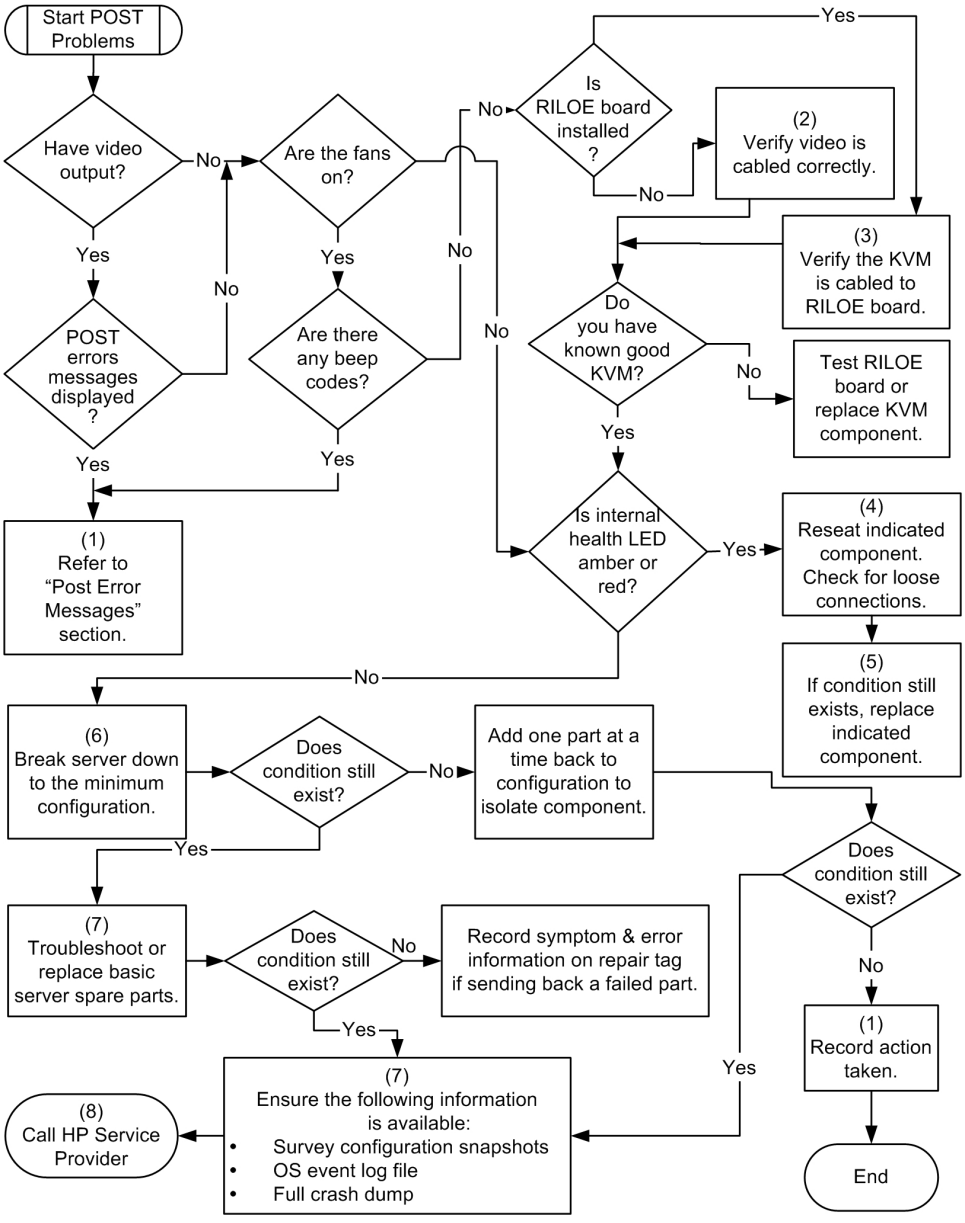
- Server completes POST with errors

Possible Problems:

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

Item	Refer to
1	"POST Error Messages ("POST Error Messages and Beep Codes" on page 114)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	"Video Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	KVM or RILOE documentation
4	"Loose Connections (on page 97)"
5	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
7	• "Hardware Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)

Item	Refer to



OS Boot Problems Flowchart

Symptoms:

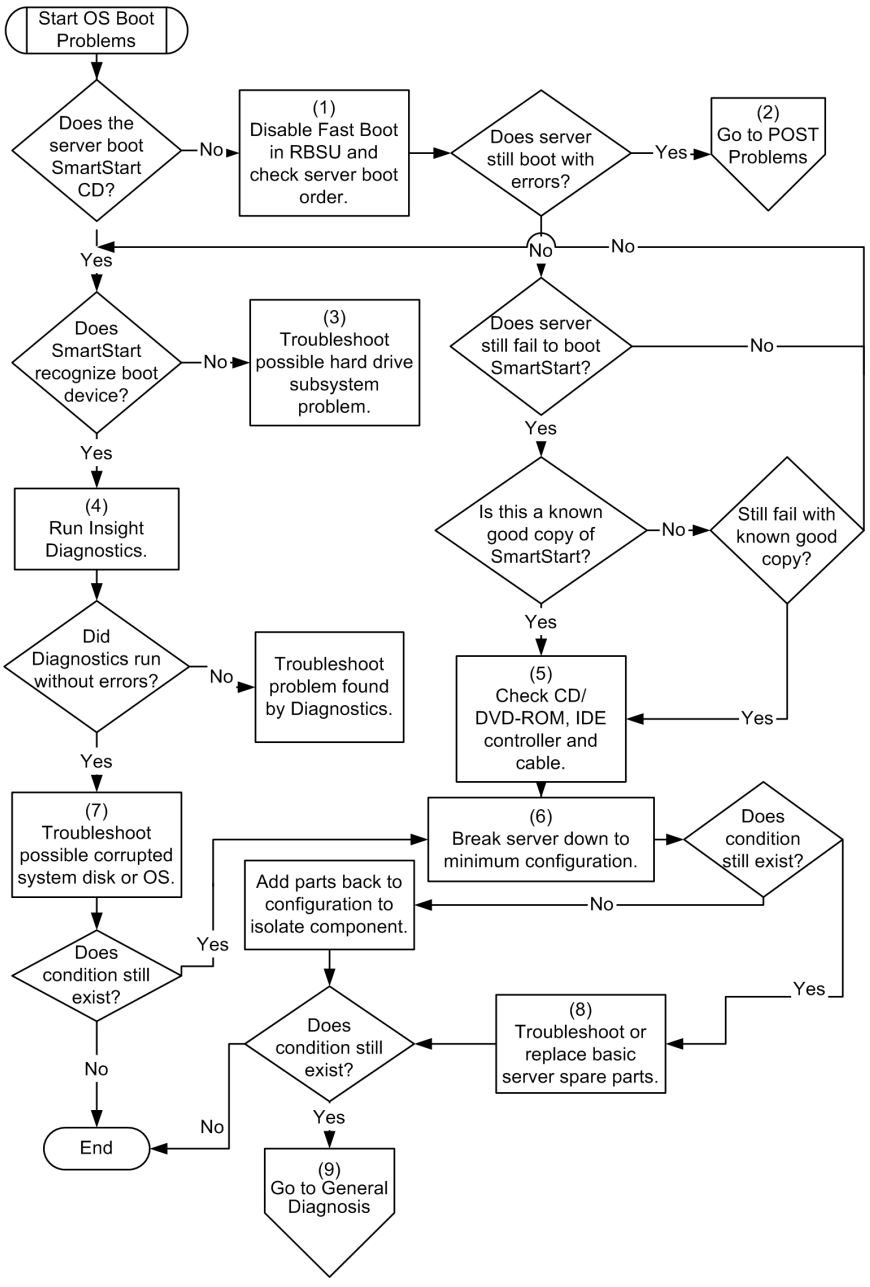
- Server does not boot a previously installed operating system
- Server does not boot SmartStart

Possible Causes:

- Corrupted operating system
- Hard drive subsystem problem

Item	Refer to
1	*HP ROM-Based Setup Utility User Guide* (http://www.hp.com/servers/smartstart)
2	"POST Problems ("POST Problems Flowchart" on page 106)"
3	• "Hard Drive Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
4	"HP Insight Diagnostics (on page 84)"
5	• "Loose Connections (on page 97)" • "CD-ROM and DVD Drive Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)

7	• "Operating System Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Contacting HP Technical Support or an Authorized Reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	• "Hardware Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
9	"General Diagnosis Flowchart (on page 101)"


Start OS Boot Problems
Does the server boot SmartStart CD?
No
(1) Disable Fast Boot in RBSU and check server boot order.
Does server still boot with errors?
Yes
(2) Go to POST Problems
No
Yes
No
Does SmartStart recognize boot device?
No
(3) Troubleshoot possible hard drive subsystem problem.
Does server still fail to boot SmartStart?
No
Yes
Yes
(4) Run Insight Diagnostics.
Is this a known good copy of SmartStart?
No
Still fail with known good copy?
Yes
Did Diagnostics run without errors?
No
Troubleshoot problem found by Diagnostics.
(5) Check CD/ DVD-ROM, IDE controller and cable.
Yes
Yes
(7) Troubleshoot possible corrupted system disk or OS.
(6) Break server down to minimum configuration.
Does condition still exist?
Add parts back to configuration to isolate component.
No
Yes
Does condition still exist?
Yes
(8) Troubleshoot or replace basic server spare parts.
Does condition still exist?
No
No
Yes
End
(9) Go to General Diagnosis

Server Fault Indications Flowchart

Symptoms:

- Server boots, but a fault event is reported by Insight Management Agents (on page 80)
- Server boots, but the internal health LED or external health LED is red or amber

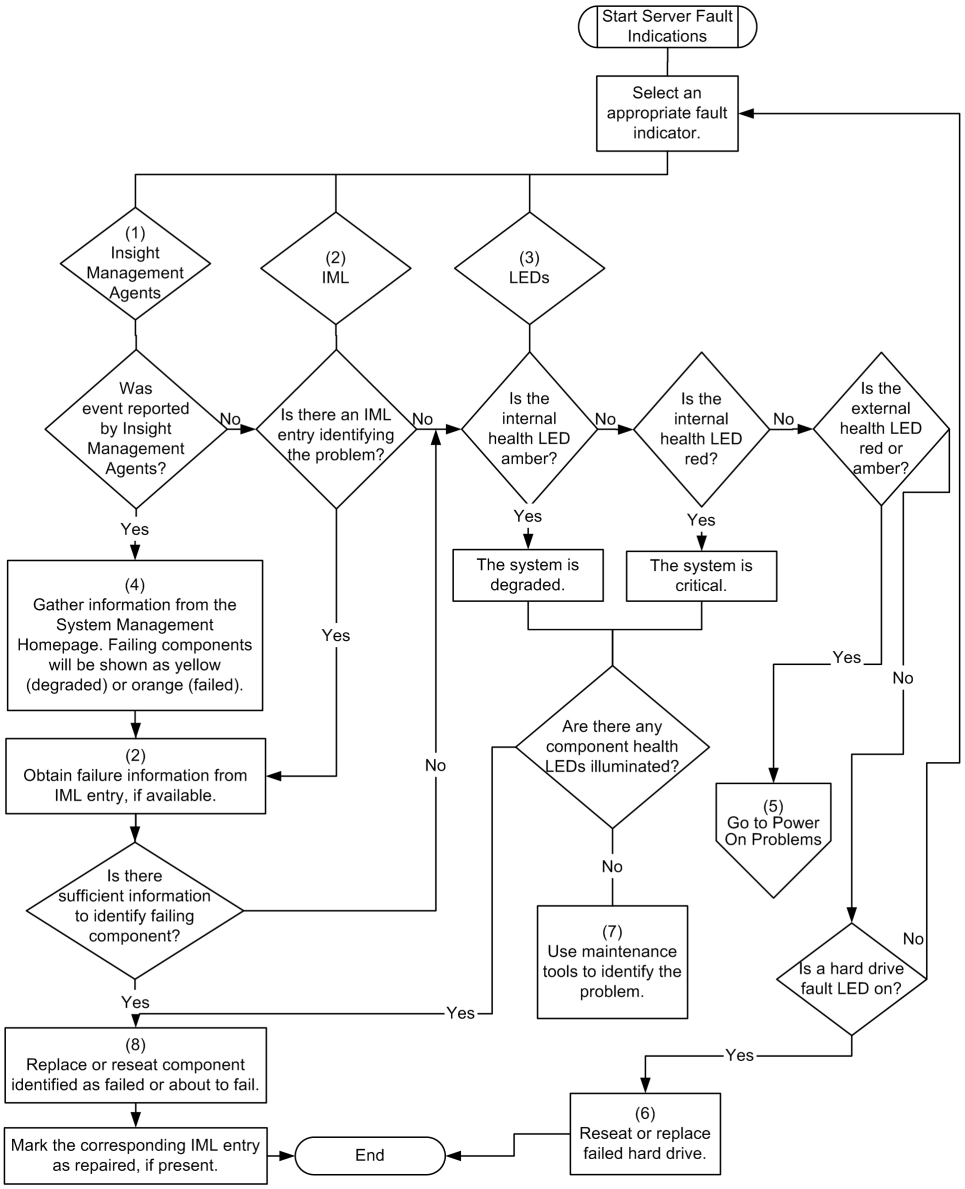
  NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

Possible causes:

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

Item	Refer to
1	"Management Agents (on page 80)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	• "Integrated Management Log (on page 85)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Event List Error Messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	Server user guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
4	System Management Homepage at https://localhost:2381 (https://localhost:2381)
5	"Power-On Problems ("Power-On Problems Flowchart" on page 103)" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

Item	Refer to
6	• "Hard Drive Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)
7	"HP Insight Diagnostics (on page 84)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	• "Hardware Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD, or the HP website (http://www.hp.com/products/servers/platforms)


Start Server Fault Indications
Select an appropriate fault indicator.
(1) Insight Management Agents
(2) IML
(3) LEDs
Was event reported by Insight Management Agents?
No
Is there an IML entry identifying the problem?
No
Is the internal health LED amber?
No
Is the internal health LED red?
No
Is the external health LED red or amber?
Yes
Yes
Yes
Yes
Yes
The system is degraded.
The system is critical.
(4) Gather information from the System Management Homepage. Failing components will be shown as yellow (degraded) or orange (failed).
(2) Obtain failure information from IML entry, if available.
Is there sufficient information to identify failing component?
No
Yes
Are there any component health LEDs illuminated?
No
Yes
(5) Go to Power On Problems
(7) Use maintenance tools to identify the problem.
Is a hard drive fault LED on?
No
Yes
(8) Replace or reseat component identified as failed or about to fail.
Mark the corresponding IML entry as repaired, if present.
End
(6) Reseat or replace failed hard drive.

POST Error Messages and Beep Codes

List of Messages:

Introduction to POST Error Messages

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

HP ProLiant p-Class server blades do not have speakers and thus do not support audio output. Disregard the audible beeps information if the server falls into this category.

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

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

Electrostatic Discharge

In This Section

Preventing Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding Methods to Prevent Electrostatic Discharge

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

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

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

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

Regulatory Compliance Notices

In This Section

Regulatory Compliance Identification Numbers

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

Federal Communications Commission Notice

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

FCC Rating Label

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

Class A Equipment

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

Class B Equipment

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

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

Declaration of Conformity for Products Marked with the FCC Logo, United States Only

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

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

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

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

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

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

Modifications

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

Cables

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

Canadian Notice (Avis Canadien)

Class A Equipment

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

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

Class B Equipment

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

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

European Union Regulatory Notice

This product complies with the following EU Directives:

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

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

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

CE

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

CE(xxxx*)!

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

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

Japanese Notice

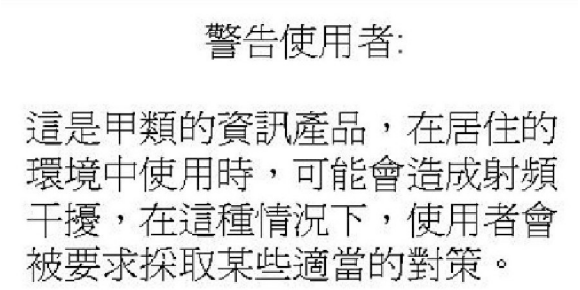
ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

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

VCCIマークが付いていない場合には、次の点にご注意下さい。

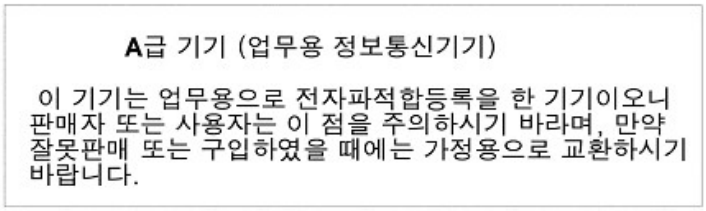
この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI Notice

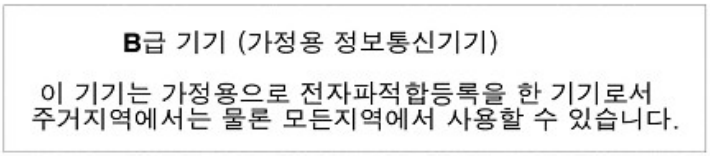


Korean Notices

Class A Equipment



Class B Equipment



Laser Compliance

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

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

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

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

Battery Replacement Notice

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

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

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

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

Taiwan Battery Recycling Notice

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

Server Specifications

In This Section

Environmental Specifications

Temperature range*	Specification
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)
Relative humidity (noncondensing)**	**Specification**
Operating	10% to 90%
Non-operating	5% to 95%

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

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

Server Specifications

Dimension	Specification
Height	4.32 cm (1.70 in)
Depth	69.22 cm (27.25 in)
Width	42.62 cm (16.78 in)
Weight (maximum)	16.78 kg (37 lb)
Weight (no drives installed)	12.47 kg (27.5 lb)

Input requirement	**Specification**
Rated input voltage	100 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	6.0 A (110 V) to 3.0 A (220 V)
Rated input power	580 W
BTUs per hour	1990
Power supply output	**Specification**
Rated steady-state power	460 W

Technical Support

In This Section

Customer Self Repair

What is customer self repair?

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

A convenient, easy-to-use program:

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

Related Documents

For related documentation, refer to the Documentation CD.

HP Contact Information

For the name of the nearest HP authorized reseller:

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

For HP technical support:

- In North America:
  - Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  - If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website (http://www.hp.com).
- Outside North America, call the nearest HP Technical Support Phone Center. For telephone numbers for worldwide Technical Support Centers, refer to the HP website (http://www.hp.com).

Acronyms and Abbreviations

ABEND

abnormal end

ACU

Array Configuration Utility

ASR

Automatic Server Recovery

BBWC

battery-backed write cache

DDR

double data rate

DU

driver update

EFS

Extended Feature Supplement

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

IPL

initial program load

IRQ

interrupt request

MPS

multi-processor specification

NEMA

National Electrical Manufacturers Association

NFPA

National Fire Protection Association

NIC

network interface controller

NVRAM

non-volatile memory

ORCA

Option ROM Configuration for Arrays

PCI Express

peripheral component interconnect express

PCI-X

peripheral component interconnect extended

PDU

power distribution unit

POST

Power-On Self-Test

PPM

Processor Power Module

PSP

ProLiant Support Pack

PXE

preboot eXecution environment

RBSU

ROM-Based Setup Utility

RILOE II

Remote Insight Lights-Out Edition II

SATA

serial advanced technology attachment

SCSI

small computer system interface

SDRAM

synchronous dynamic RAM

SIM

Systems Insight Manager

SIMM

single inline memory module

SPM

system power module

SSD

support software diskette

TMRA

recommended ambient operating temperature

UID

unit identification

USB

universal serial bus

VCA

version control agent

VHDCI

very high density cable interconnect

WOL

Wake-on LAN

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