HP ProLiant ML370 Generation 4 Server Reference and Troubleshooting Guide

July 2004 (First Edition)
Part Number 346896-001

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Audience Assumptions

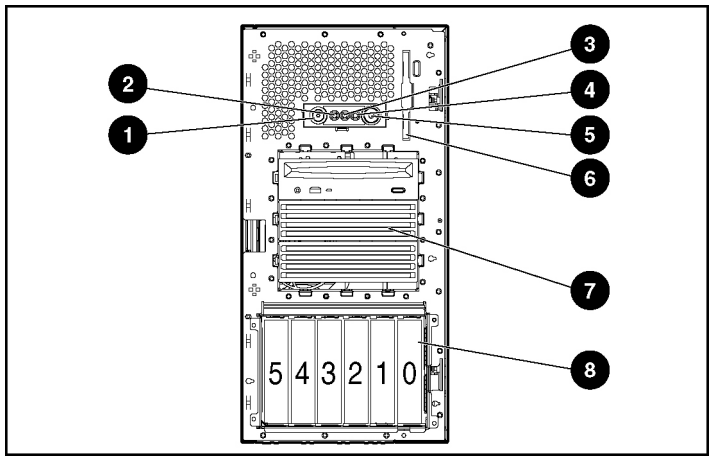
This document is for the person who installs, administers, and troubleshoots servers and storage systems. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Contents

Server Component Identification

In This Section

Front Panel Components

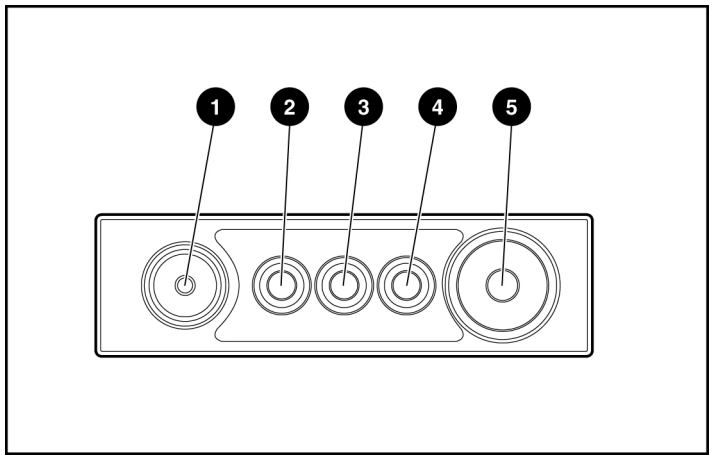


Item	Description
1	UID switch and LED

Item	Description
2	Internal system health LED
3	External system health LED
4	NIC link/activity LED
5	Power on/Standby button/LED assembly
6	Diskette drive*
7	Removable media bays
8	Hot-plug SCSI hard drive bays (SCSI IDs 0 through 5)

* Open the media door on the rack server to access the diskette drive.

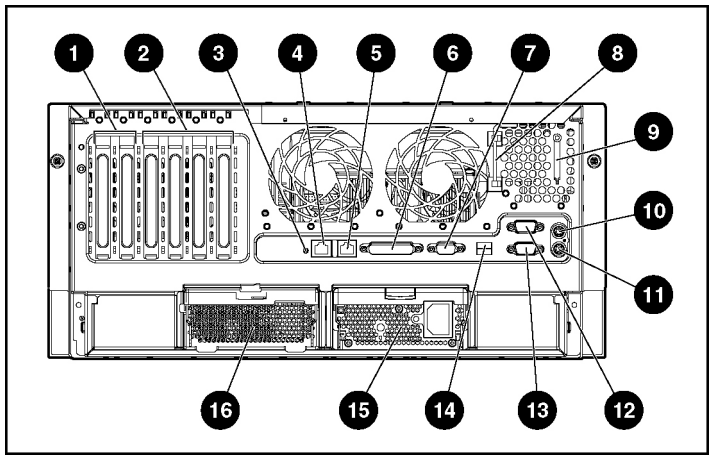
Front Panel LEDs and Buttons



Item	Description	Status
1	UID switch and LED	Blue = Activated Flashing blue = System being managed remotely Off = Deactivated

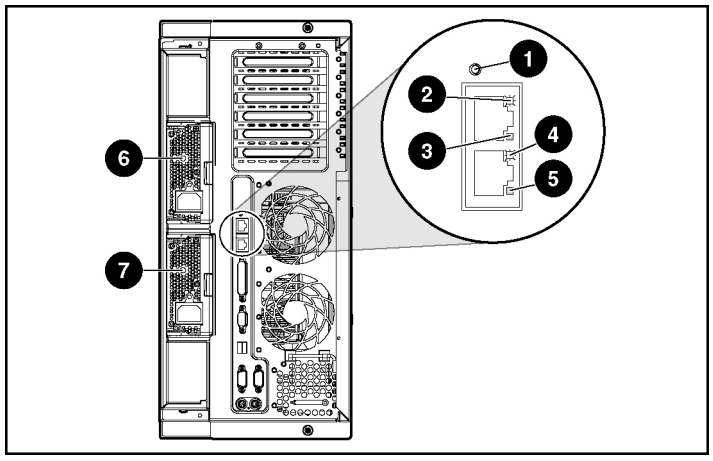
Item	Description	Status
2	Internal system health LED	Green = Normal (system on) Amber = System health is degraded Red = System health is critical Off = Normal (system off)
3	External system health (power supply) LED	Green = Normal (system on) Amber = Redundant power supply failure Red = Power supply failure. No operational power supplies. Off = Normal (system off)
4	NIC link/activity LED (embedded NIC only)	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection
5	Power on/Standby button and LED	Amber = System has AC power and is in standby mode Green = System has AC power and is turned on Off = System has no AC power

Rear Panel Components



Item	Description	Item	Description
1	x4 PCI Express expansion slots	9	Auxillary VHDCI SCSI blank
2	100-MHz PCI-X expansion slots	10	Mouse connector
3	Unit ID LED	11	Keyboard connector
4	Ethernet 10/100/1000 port	12	Serial connector B
5	iLO management port	13	Serial connector A
6	Parallel connector	14	USB connectors
7	Video connector	15	Primary hot-plug power supply
8	T-15 Torx screwdriver	16	Redundant hot-plug power supply

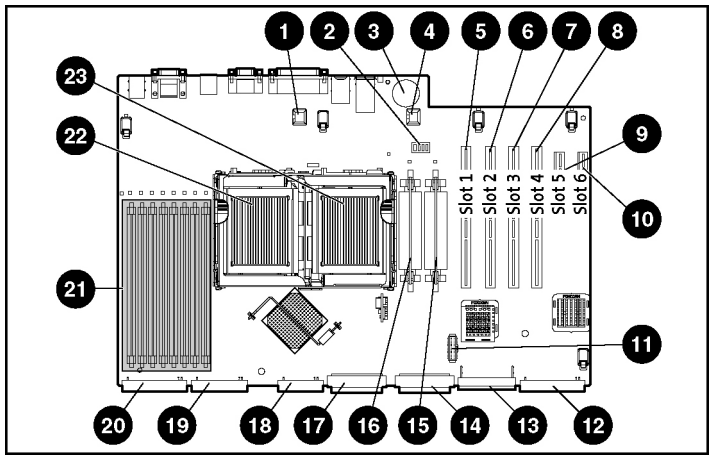
Rear Panel LEDs and Buttons



Item	Description	LED Color	Status
1	Unit ID LED	Blue	On = Activated Flashing = System remotely managed Off = Deactivated
2	NIC Activity LED (Integrated NC7781)	Green	On or flashing = Linked to network Off = Not linked to network

Item	Description	LED Color	Status
3	NIC Link LED (Integrated NC7781)	Green	On = Network activity Off = No network activity
4	iLO NIC Activity LED	Green	On or flashing = Network activity Off = No network activity
5	iLO NIC Link LED	Green	On = Linked to network Off = Not linked to network
6	Power supply LED (redundant)	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit
7	Power Supply LED (primary)	Green	On = Power turned on and power supply functioning properly Off = One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit

System Board Components



Item	Description	Item	Description
1	Redundant fan 2 connector	13	Power supply connector
2	System maintenance switch	14	SCSI port 1
3	System battery	15	PPM socket 2
4	Redundant fan 4 connector	16	PPM socket 1 (populated)
5	64-bit/100-MHz PCI-X slot, bus 3	17	SCSI port 2
6	64-bit/100-MHz PCI-X slot, bus 3	18	Fan cable connector
7	64-bit/100-MHz PCI-X slot, bus 7	19	Diskette drive connector
8	64-bit/100-MHz PCI-X slot, bus 7	20	IDE connector
9	PCI Express x4 slot, bus 11 *	21	DIMM slots
10	PCI Express x4 slot, bus 14 *	22	Processor 1
11	RILOE II connector (install adapter into slot 1) **	23	Processor 2

Item	Description	Item	Description
12	Power supply signal connector		

* x8 PCI Express cards are supported, but will run at x4 speeds.

** The server comes with iLO remote management capability embedded on the system board. The 30-pin remote management connector for the RILOE II board is provided if the server environment requires an upgrade for improved Remote Console performance.

System Maintenance Switch

The system maintenance switch (SW1) is a six-position switch that is used for system configuration. The default position for all six positions is Off.

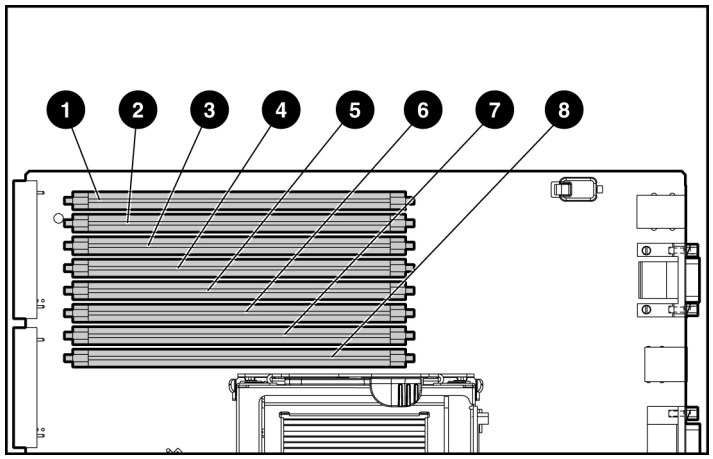
Position	Description	Function
S1	iLO Security	Off = iLO security is enabled On = iLO security is disabled
S2	Configuration lock	Off = System configuration can be changed On = System configuration is locked
S3	Reserved	Reserved
S4	Reserved	Reserved
S5	Password protection override	Off = No function On = Clears power-on password and administrator password
S6	Invalidate configuration	Off = Normal On = ROM treats system configuration as invalid

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

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

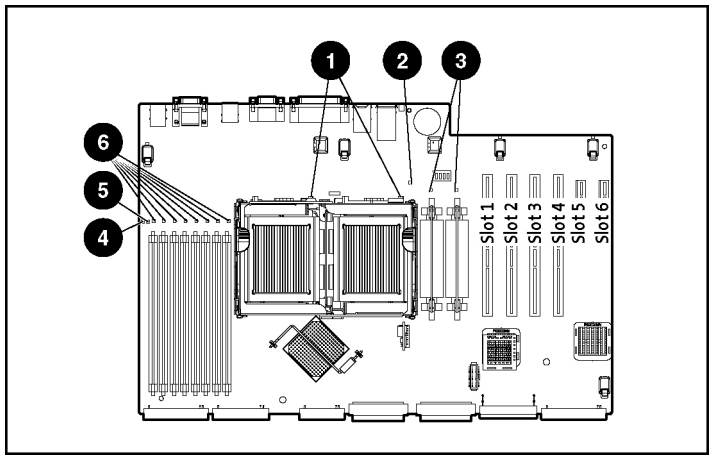
DIMM Slots

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



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

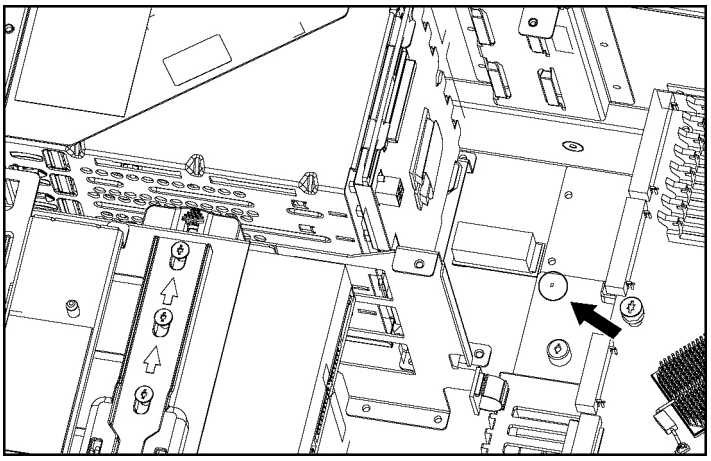
System Board LEDs



Item	LED Description	Status
1	Processor error	Off = Normal Amber = Processor failed or missing
2	System temperature alert	Off = Normal Amber = System temperature has exceeded OS cautionary level
3	PPM error	Off = Normal Amber = PPM failed or missing
4	Memory mode LED	Off = Normal Green = System is in online spare memory mode
5	Online spare memory failover LED	Off = Normal Amber = Online spare memory is in use due to memory failover
6	Memory status	Off = Normal Amber = Memory failed or configuration problem

Power Supply Backplane LED

If the power supply backplane LED is illuminated, then the power supply backplane must be replaced.



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.

> **NOTE:** The system management driver must be installed in order for the internal health LED to provide pre-failure and warranty conditions.

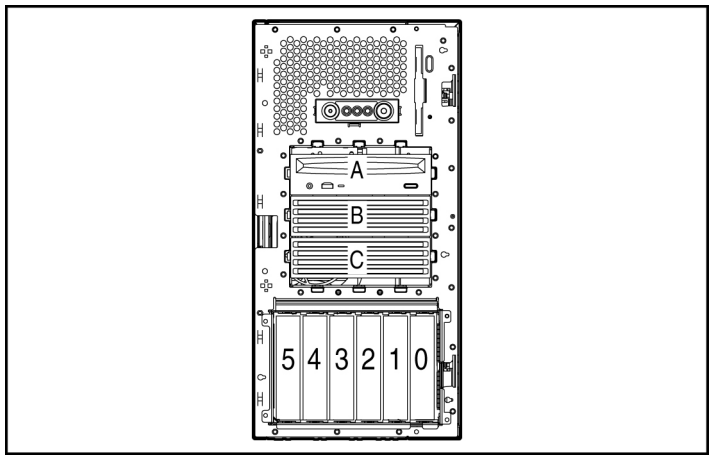
The front panel health LEDs indicate only the current hardware status. In some situations, HP SIM may report server status differently than the health LEDs because the software tracks more system attributes.

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 *X* is not installed in the socket. • ROM detected a failed processor during POST.
	Amber	Processor in socket *X* is in a pre-failure condition.
PPM failure, slot *X* (Amber)	Red	• PPM in slot *X* has failed. • PPM is not installed in slot *X*, but the corresponding processor is installed.
DIMM failure, slot *X* (Amber)	Red	• DIMM in slot *X* has failed. • DIMM has experienced a multi-bit error.
	Amber	• DIMM in slot *X* has reached single-bit correctable error threshold. • DIMM in slot *X* is in a pre-failure condition.
DIMM bank error (all slots in one bank, Amber)	Red	The bank is not populated entirely or DIMMs do not all match within the bank.
DIMM failure (all slots, Amber)	Red	• No valid or usable memory is installed in the system. • The banks are not populated in the correct order.
System temperature alert (Amber)	Red	System temperature has exceeded OS cautionary level or critical hardware level.
Fan (Amber)	Red	A required fan has failed.
	Amber	A redundant fan has failed.
Power supply backplane failure (Amber)	Red	The power supply backplane has failed.

SCSI IDs

The server supports single- or dual-channel hard drive configurations. The single-channel configuration (simplex) supports up to six hard drives on SCSI channel 1. The dual-channel configuration (duplex) supports two hard drives on SCSI channel 2 (SCSI IDs 4 and 5), and up to four hard drives on SCSI channel 1 (SCSI IDs 0 through 3).

The SCSI IDs for both simplex and duplex configurations are illustrated. HP recommends populating hard drive bays starting with the lowest SCSI ID. Refer to "Server Cabling (on page 91)" for cabling information.



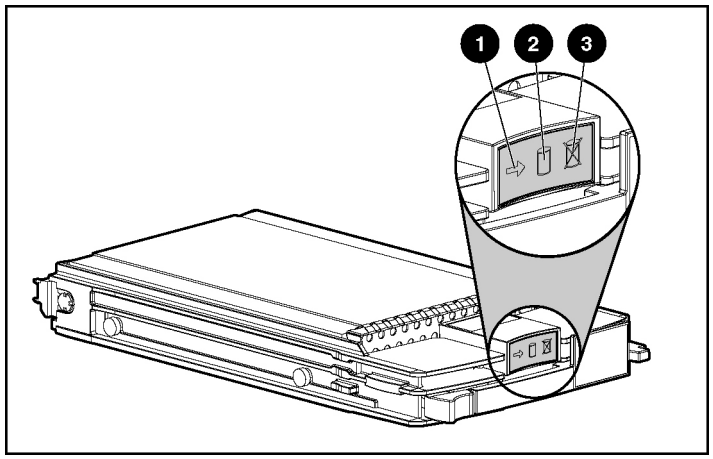
NOTE: These SCSI ID designations apply regardless of the controller or the configuration used.

NOTE: The standard cabling configuration for the server is simplex. Duplex is an option requiring the duplex kit.

Configuration	Channel 1	Channel 2
Simplex	SCSI IDs 0, 1, 2, 3, 4, 5	Unused
Duplex	SCSI IDs 0, 1, 2, 3	SCSI IDs 4, 5

IMPORTANT: After changing any SCSI configuration, be sure the proper boot controller order is set in RBSU.

Hot-Plug SCSI Hard Drive LEDs

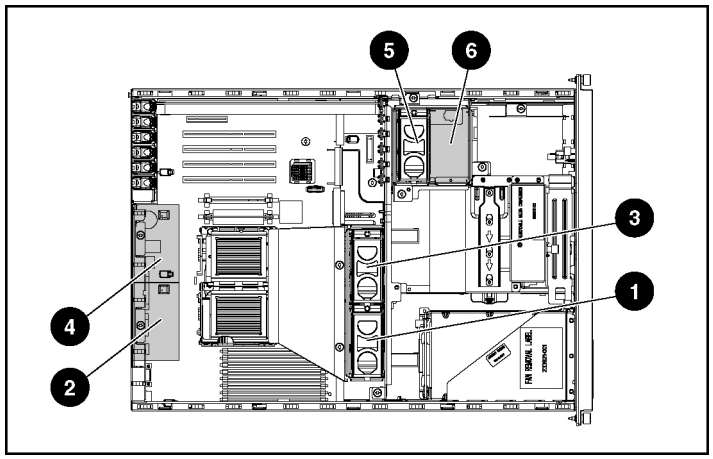


Item	LED Description	Status
1	Activity status	On = Drive activity Flashing = High activity on the drive or drive is being configured as part of an array. Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working. Flashing = Drive is actively online. Off = Drive is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

Identifying Redundant Hot-Plug Fans



NOTE: Fan locations are located in the chassis.

Item	Description	Configuration
1	Fan 1	Primary
2	Fan 2	Redundant
3	Fan 3	Primary
4	Fan 4	Redundant
5	Fan 5	Primary
6	Fan 6	Redundant

Fan failures are indicated by amber LEDs located on each hot-plug fan and by the front panel internal health LED. When a fan failure occurs, the internal health LED illuminates red in non-redundant mode and amber in redundant mode.

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. Shut down the operating system as directed by the operating system documentation.
2. Press the Power On/Standby button to place the server in standby mode (2). When the server activates standby power mode, the system power LED changes to amber.
3. Disconnect the power cords.

The system is now without power.

Extending the Server from the Rack

1. Loosen the thumbscrews that secure the server faceplate to the front of the rack.

   IMPORTANT: If the server is installed in a telco rack, remove the server from the rack to access internal components.

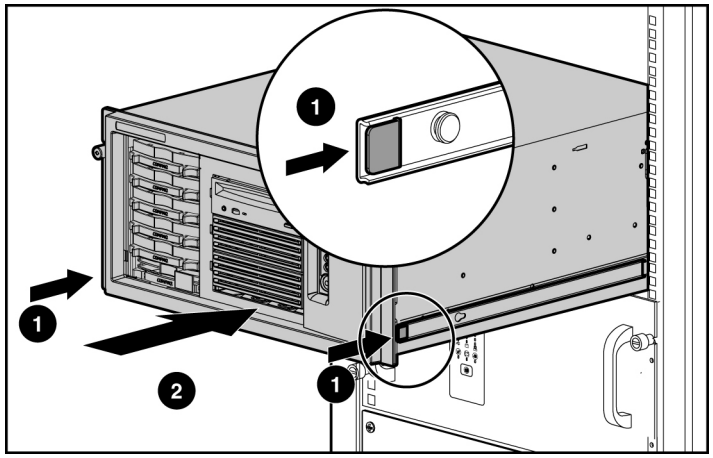
2. Extend the server on the rack rails until the server rail-release latches engage.

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

   WARNING: To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.

3. After performing the installation or maintenance procedure, slide the server back into the rack:

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



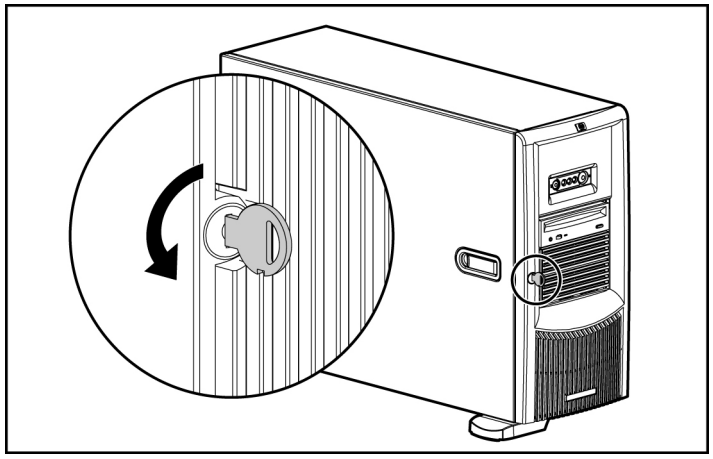
   b. Secure the server by tightening the thumbscrews.

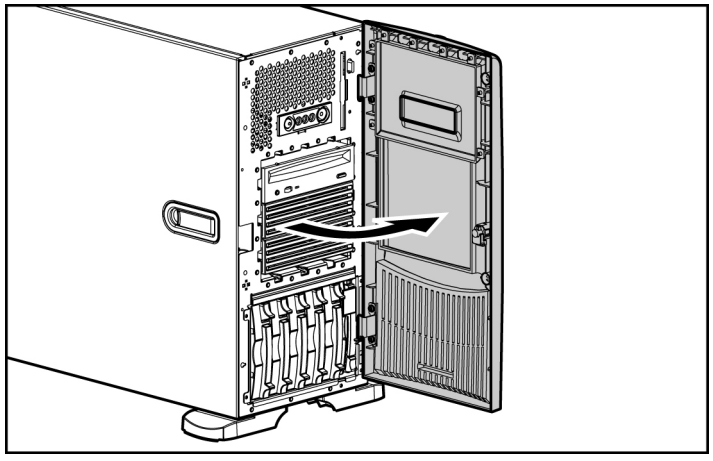
Unlocking the Front Tower Bezel

Tower servers have a removable front bezel that must be unlocked and opened before accessing the hard drive cage, and before removing the access panel. The door must remain closed during normal server operations.

Use the key provided with the server to unlock the bezel with a counterclockwise turn.

If necessary, remove the front bezel.





Removing the Access Panel

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

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

1. Power down the server if performing a non-hot-plug installation or maintenance procedure ("Powering Down the Server" on page 25).
2. Extend or remove the server from the rack ("Extending the Server from the Rack" on page 26).
3. Open the front bezel ("Unlocking the Front Tower Bezel" on page 27).
4. Lift up on the hood latch handle and remove the access panel.

After installing hardware options, replace the access panel. Be sure that the panel is locked into place securely before powering up the server.

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, select a location that meets the environmental standards described in this section.

Space and Airflow Requirements

Tower Server

In a tower configuration, leave at least a 7.6-cm (3-in) clearance space at the front and back of the server for proper ventilation.

Rack Server

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 76.2 cm (30 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

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

The 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).

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.

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 power distribution unit (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 and Cautions

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.**

 **WARNING: When installing a server in a telco rack, be sure that the rack frame is adequately secured to the top and bottom of the building structure.**

 **WARNING: This server is very heavy. To reduce the risk of personal injury or damage to the equipment:**

- **Observe local occupational health and safety requirements and guidelines for manual material handling.**
- **Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. When the server weighs more than 22.5 kg (50 lb), at least two people must lift the server into the rack together. If the server is loaded into the rack above chest level, a third person must assist in aligning the rails while the other two support the server.**
- **Use caution when installing the server in or removing the server from the rack; it is unstable when not fastened to the rails.**

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

 **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.**

 **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.

 **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.

Identifying Rack 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
- Power cord
- Hardware documentation, Documentation CD, and software products
- Rack mounting hardware

In addition to the supplied items, you may need:

- Hardware options
- Operating system or application software
- PDU

Identifying Tower Server Shipping Carton Contents

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server.

The contents of the server shipping carton include:

- Server
- Power cord
- Keyboard
- Mouse
- Hardware documentation, Documentation CD, and software products

In addition to the supplied items, you may need:

- Hardware options

- Operating system or application software
- PDU

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 51)."

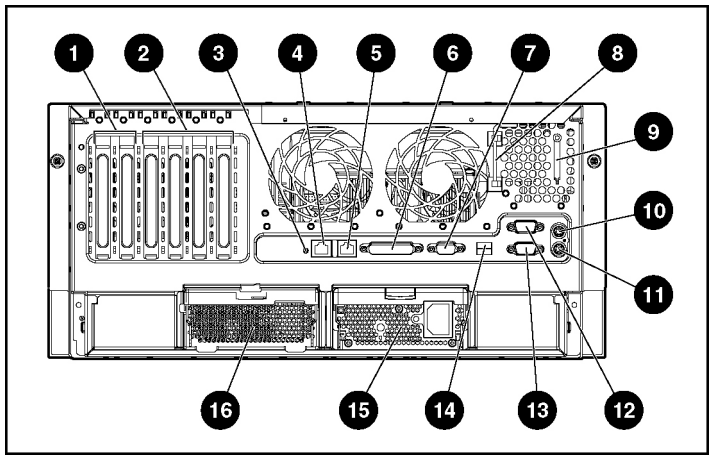
Setting up a Tower Server

Follow the steps in this section to set up a tower model server. If you are going to install the server into a rack, refer to the rack installation ("Installing the Server into the Rack" on page 40) section.

1. Connect peripheral devices 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.

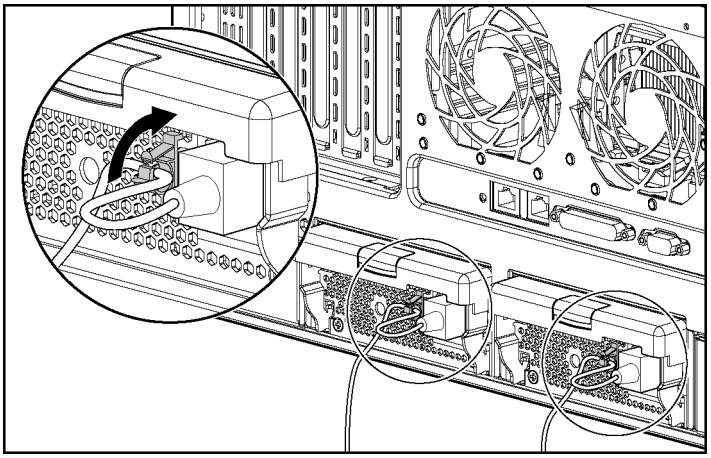
IMPORTANT: If the RILOE II board is installed in the server, be sure that you attach the video cable to the video connector on the rear of the RILOE II board. The standard video connector on the server rear panel is not used when the RILOE II board is installed. For more information, refer to the *HP Remote Insight Lights-Out Edition II User Guide*.



Item	Description	Item	Description
1	x4 PCI Express expansion slots	9	Auxillary VHDCI SCSI blank
2	100-MHz PCI-X expansion slots	10	Mouse connector
3	Unit ID LED	11	Keyboard connector
4	Ethernet 10/100/1000 port	12	Serial connector B
5	iLO management port	13	Serial connector A
6	Parallel connector	14	USB connectors
7	Video connector	15	Primary hot-plug power supply
8	T-15 Torx screwdriver	16	Redundant hot-plug power supply

2. Connect the power cord to the back of the server.
3. Open the power cord retaining clip, and thread the power cord through the retaining clip.

4. Snap the tab into place to secure the power cord.



5. Connect the power cord to the AC power source.

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.

Installing the Server into the Rack

Follow the steps in this section if you are installing the server into a rack with square holes. If you are installing the server into a rack with round holes, order the appropriate rack installation option kit, and then refer to the installation instructions that ship with the option kit for more information.

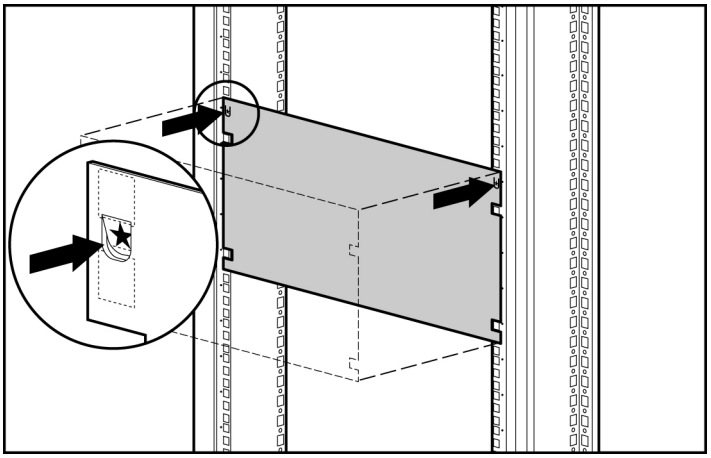
NOTE: The steps in this section work with most third-party racks with square holes. If they do not work with the rack you are using, order the option kit for racks with round holes.

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. After installing the brackets, follow the steps in this section.

WARNING: When installing a server in a telco rack, be sure that the rack frame is adequately secured to the top and bottom of the building structure.

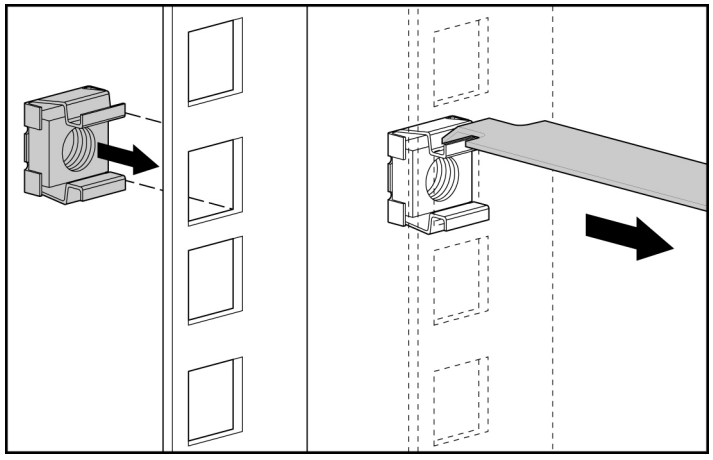
1. Mark the rack.

CAUTION: Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.



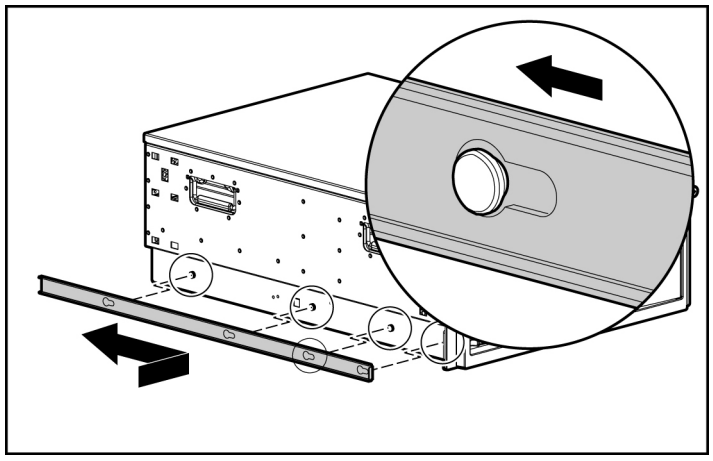
NOTE: Rack components are removed for clarity.

2. Attach cage nuts to the rack.

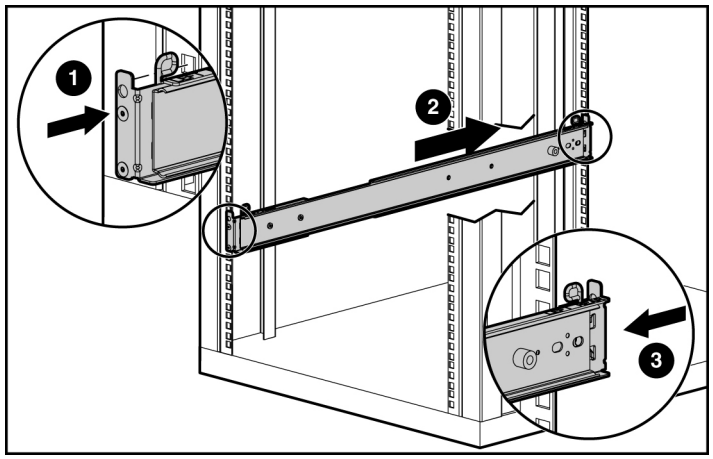


NOTE: Round-hole cage nuts will function the same as the square-hole cage nuts shown.

3. Secure each server rail to the server.



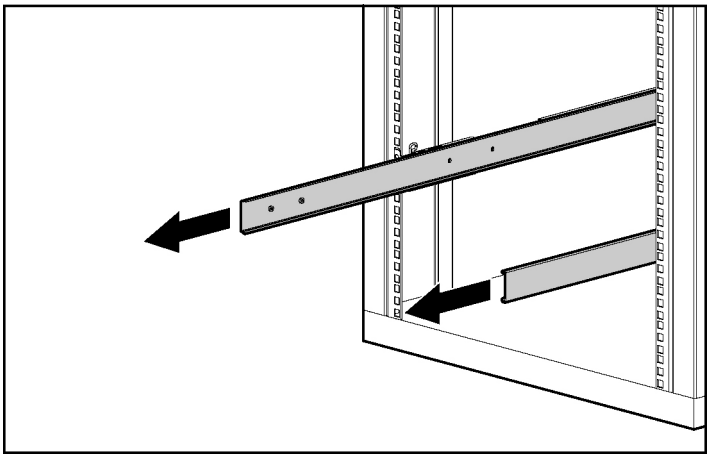
4. Secure the left and right standard rack rails to the appropriate side of the rack.



5. Extend the slides from the standard rack rails, and then slide the server rails into the slides.

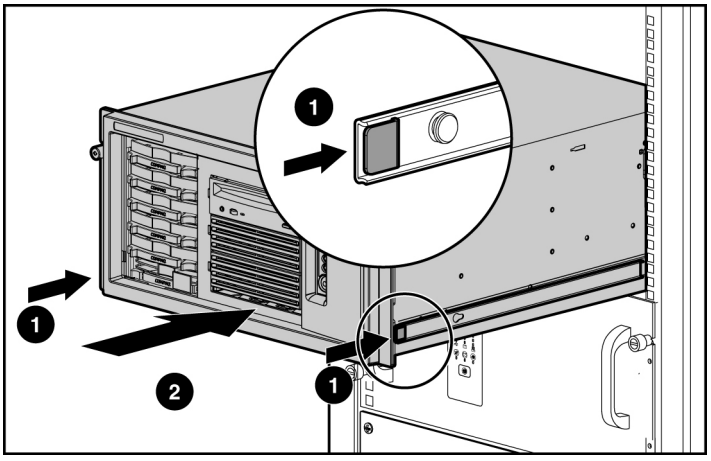
WARNING: To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before sliding the server rails into the rack rails.

CAUTION: Be sure to keep the server parallel to the floor when sliding the server rails into the rack rails. Tilting the server up or down could result in damage to the rails.

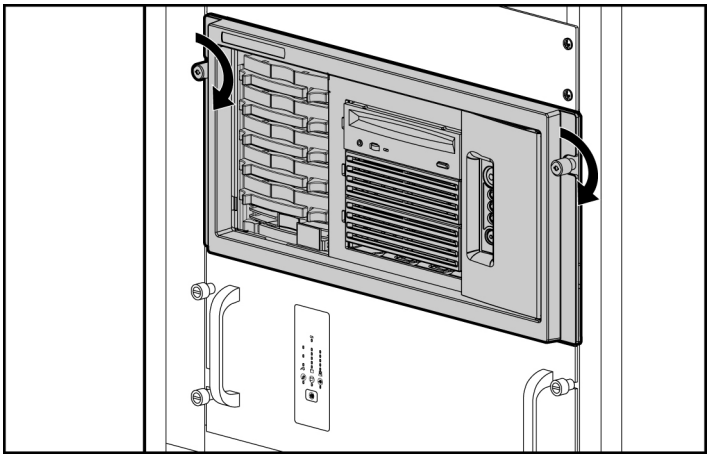


6. Press the rail-release latches and slide the server into the rack.

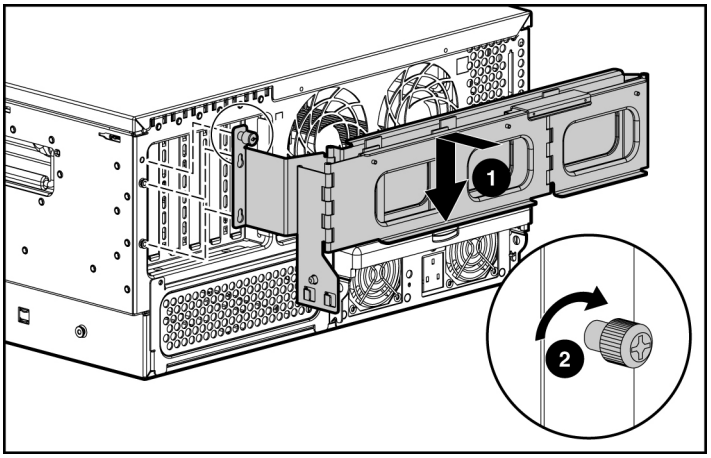
WARNING: To reduce the risk of personal injury, be careful when pressing the server rail-release latches and sliding the server into the rack. The sliding rails could pinch your fingers.



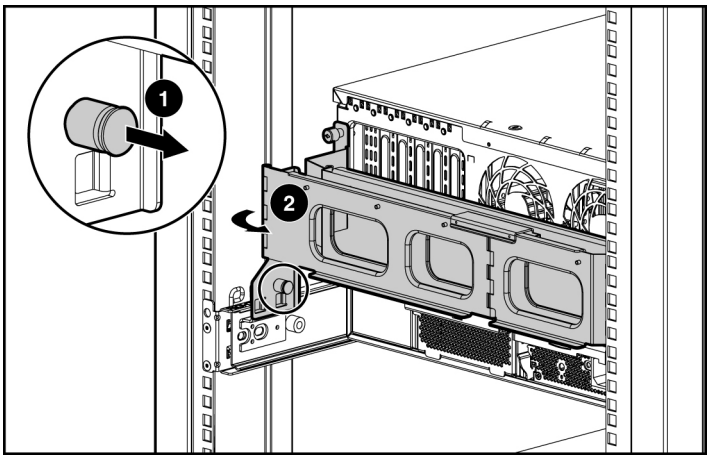
7. Secure the server to the rack.



8. Secure the cable management arm bracket to the server.



9. Secure the cable management arm to the slide rail.



10. Connect peripheral devices to the server. Refer to "Rear Panel Components (on page 11)."

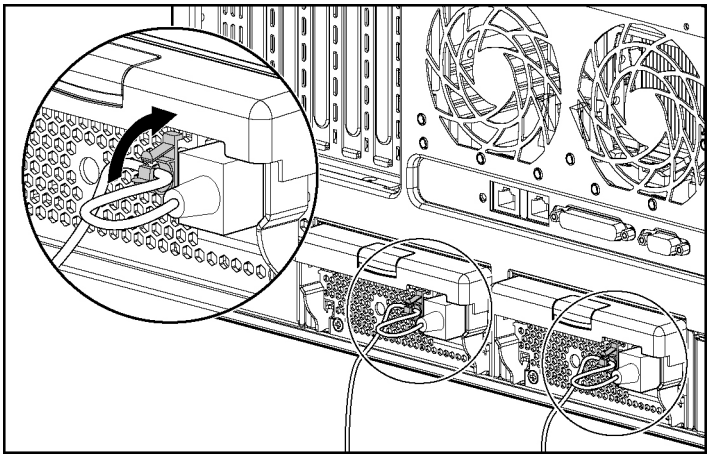
WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.

IMPORTANT: If the RILOE II board is installed in the server, be sure that you attach the video cable to the video connector on the rear of the RILOE II board. The standard video connector on the server rear panel is not used when the RILOE II board is installed. For more information, refer to the *HP Remote Insight Lights-Out Edition II User Guide*.

IMPORTANT: When using cable management arm components, be sure to leave enough slack in each of the cables to prevent damage to the cables when the server is extended from the rack.

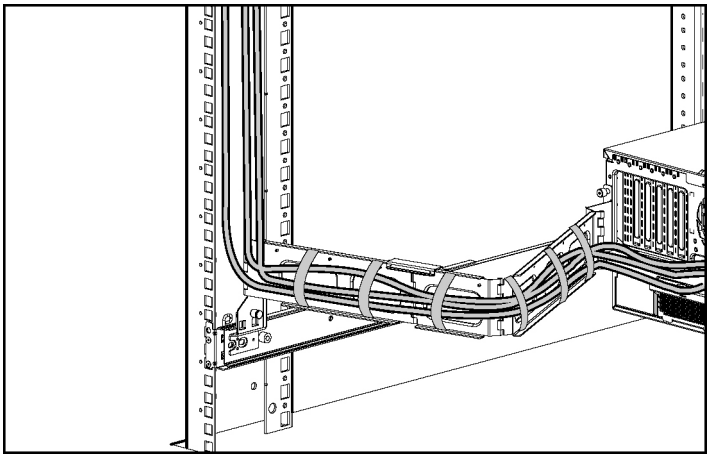
11. Connect the power cord to the back of the server.
12. Open the power cord retaining clip, and thread the power cord through the retaining clip.

13. Snap the tab into place to secure the power cord.



14. Secure cables to the cable management arm.

IMPORTANT: When using cable management arm components, be sure to leave enough slack in each of the cables to prevent damage to the cables when the server is extended from the rack.



15. Connect the power cord to the AC power source.

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.**

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. The array controller defaults to RAID 0 with one drive installed and RAID 1 with more than one drive installed.
- Press the **F9** key when prompted during the boot process to change the server settings using RBSU. The system is set up by default for the English language.

For more information on the automatic configuration, refer to the *HP 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 Options

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 attempts to boot from processor 2 and provides a processor failure message.

The server uses PPMs as DC-to-DC converters to provide the proper power to each processor. Each PPM must be installed in the slot adjacent to its 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.

IMPORTANT: If upgrading processor speed, update the system ROM before installing the processor.

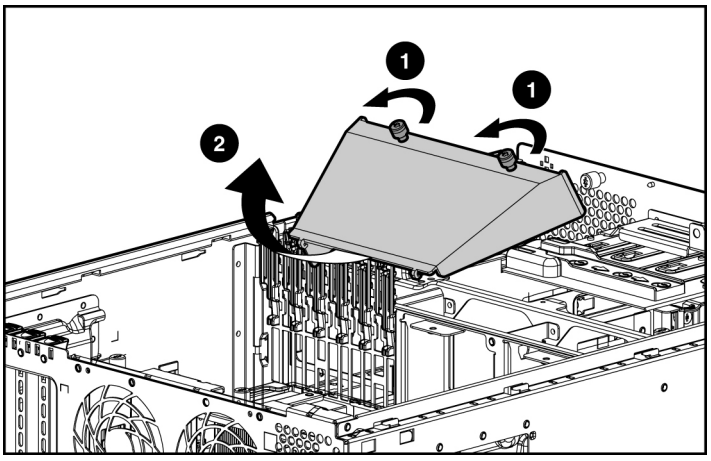
IMPORTANT: Processor socket 1 and PPM slot 1 must be populated at all times or the server will not function properly.

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

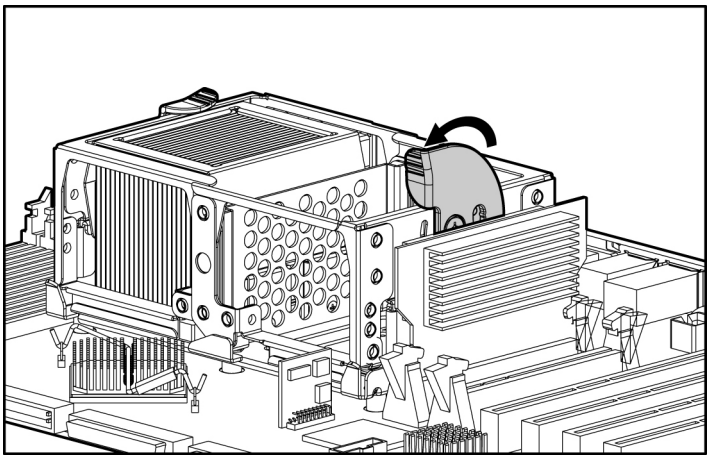
IMPORTANT: To ensure proper cooling, be sure the processor baffle is installed at all times.

To install a processor:

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Remove the processor air baffle using the two thumbscrews.

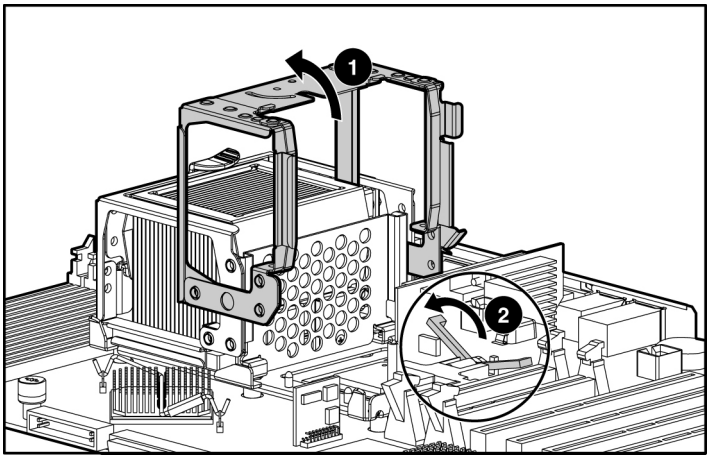


6. Open the processor retaining bracket.



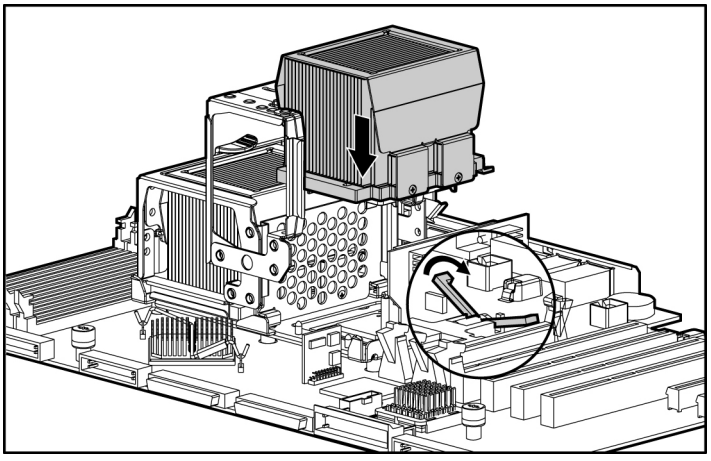
7. Release the processor locking lever.

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

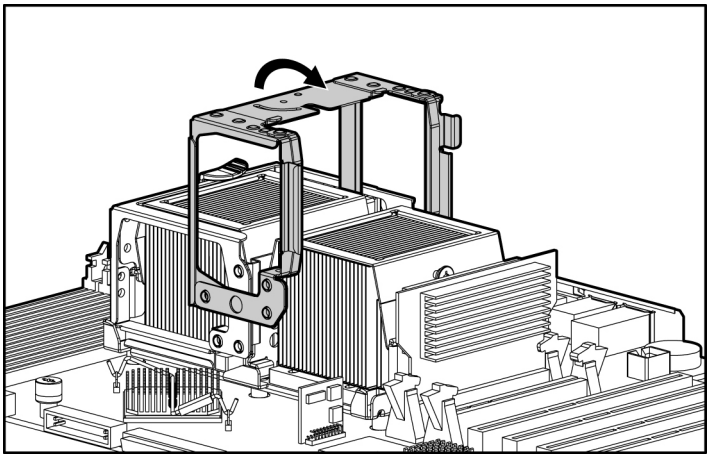


8. Install the processor.

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

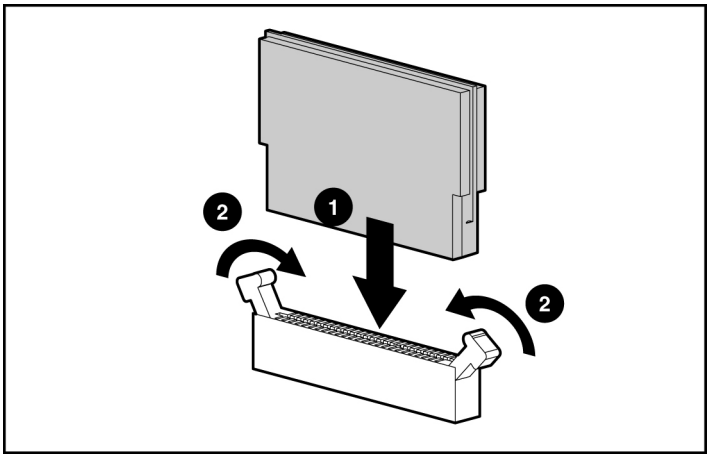


9. Close the processor retaining bracket.



10. Open the latches on the corresponding PPM slot.
11. Install the PPM.

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



NOTE: The appearance of compatible PPMs may vary.

12. Reinstall the processor air baffle.
13. Install the access panel.

Memory Options

You can expand server memory by installing PC2-3200R Registered DDRII DRAM DIMMs. The system supports up to eight DIMMs.

The server supports two types of memory configurations:

- Standard memory configuration (Advanced ECC) for maximum performance, using up to 16 GB of active memory (eight 2-GB memory modules)
- Online spare memory configuration for maximum availability, using up to 12 GB of active memory and 4 GB of online spare memory

Refer to "DIMM Slots (on page 16)" for DIMM slot locations and bank assignments.

Online Spare Memory Configuration

In the online spare configuration, the ROM automatically configures the last populated bank as the spare memory. If only banks A and B are populated, bank B is the spare bank. If banks A, B, C, and D are populated, bank D is the spare bank. 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, DIMMs installed in the 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 and bank B is populated with two 1-GB DIMMs, bank C must be populated with two 1-GB 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 106).

DIMM Installation Guidelines

You must observe the following guidelines when installing additional memory:

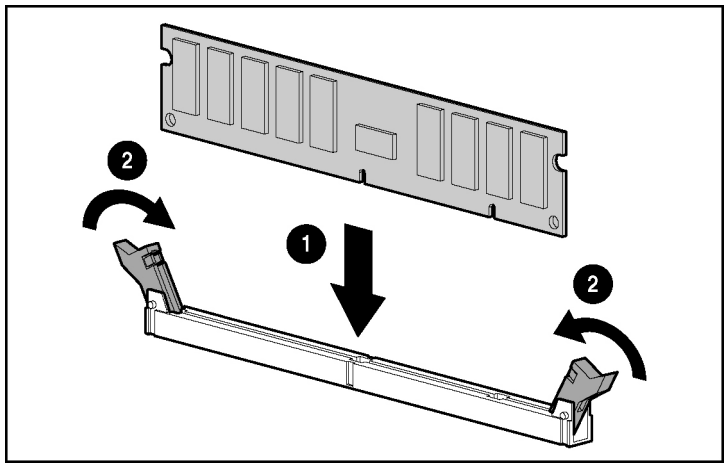
- Always install memory in pairs of equal capacity.
- Install only PC2-3200R DIMMs.
- Install DIMMs into both slots within a single bank.
- Upgrade memory by installing DIMM pairs into banks in sequential bank order, starting with bank B.

For online spare memory support, you must also observe additional guidelines ("Online Spare Memory Configuration" on page 56).

Installing DIMMs

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Open the DIMM slot latches.

6. Install the DIMM.



7. Install the access panel.
8. If you are installing DIMMs in an online spare configuration, use RBSU to configure this feature ("Configuring Online Spare Memory" on page 106).

Hot-Plug SCSI Hard Drive Options

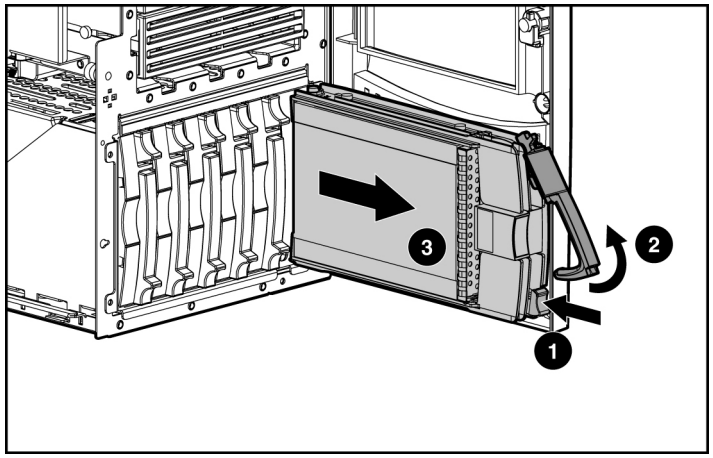
When adding SCSI hard drives to the server, observe the following general guidelines:

- Hot-plug hard drives must be Ultra320 SCSI drives for optimum performance. 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.

Removing a Hot-Plug SCSI Hard Drive

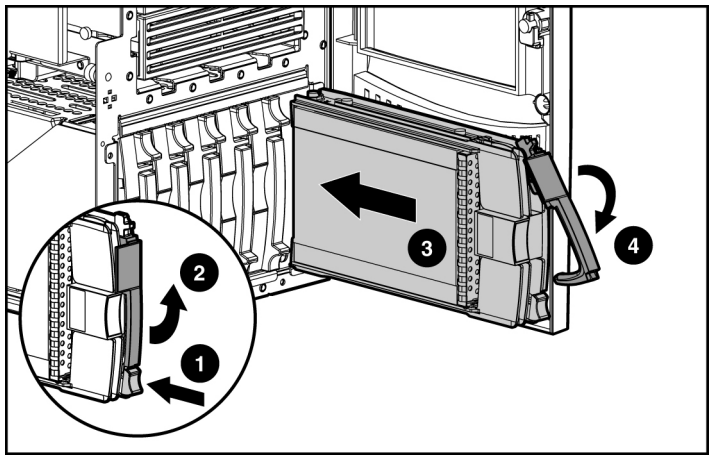
CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-Plug SCSI Hard Drive LEDs" on page 21).
2. Back up all server data on the hard drive.
3. Remove the hard drive.



Installing a Hot-Plug SCSI Hard Drive

1. Remove the existing hard drive blank or hard drive from the drive bay.
2. Install the hard drive.



3. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-Plug SCSI Hard Drive LEDs" on page 21).
4. Resume normal server operations.

Removable Media Devices

Accessing the Removable Media Cage (on page 60)

Half-Height or Full-Height Media Devices ("Installing a Half-Height or Full-Height Media Device" on page 62)

Internal Two-Bay Hot-Plug SCSI Drive Cage ("Installing an Optional Internal Two-Bay Hot-Plug SCSI Drive Cage" on page 65)

Accessing the Removable Media Cage

The server supports installation of an optional SCSI tape backup drive, internal two-bay hot-plug SCSI drive cage, or other devices in the removable media area.

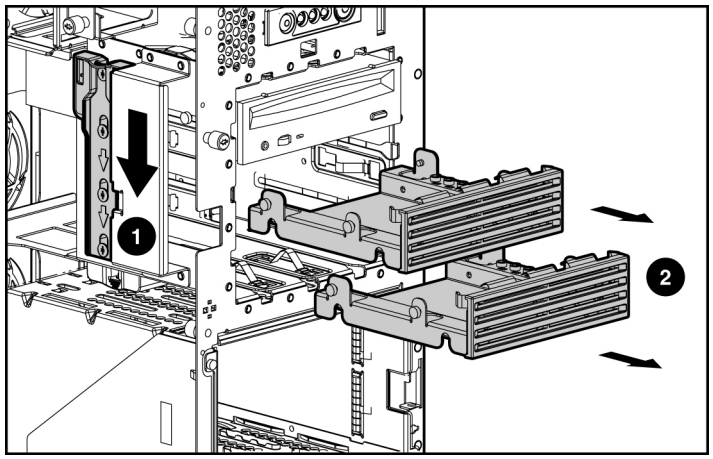
IMPORTANT: HP and Compaq branded SCSI non-hot-plug cables are terminated. Remove all terminating jumpers from third-party SCSI devices before installing them in the server.

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).

CAUTION: Always populate each media bay with either a device or a blank. Proper airflow can only be maintained when the bays are populated. Unpopulated drive bays can lead to improper cooling and thermal damage.

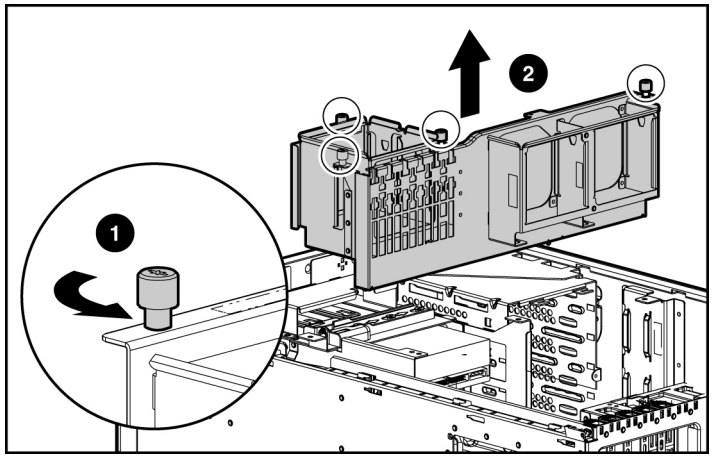
NOTE: HP recommends that you move the CD-ROM drive out of the media cabling area for ease of installation. It is not necessary to disconnect and remove the CD-ROM drive from the server entirely.

5. Press and hold the sliding media latch to release the bezel blanks, while pushing the blanks from behind to remove.

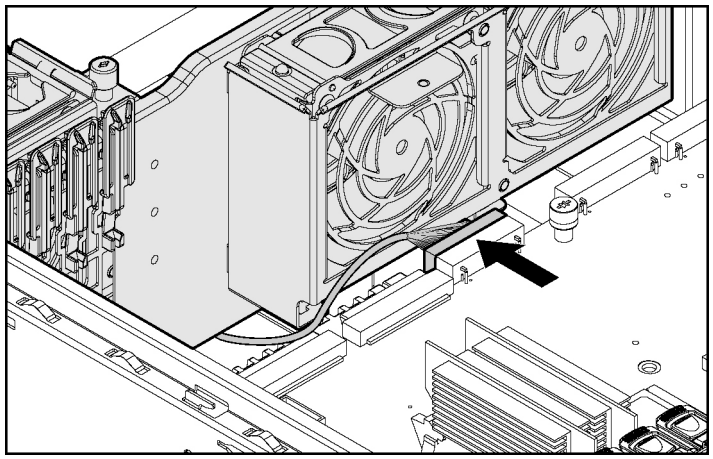


NOTE: HP recommends that you remove all bezel blanks to facilitate drive installation.

6. Store the blanks for later use.
7. Remove all expansion boards.
8. Remove the center wall:
   a. Loosen the four thumbscrews, and lift the wall to access the fan cable.



b. Disconnect the fan cable.



c. Lift the center wall fully out of the chassis.

9. Install the removable media device. ("Installing a Half-Height or Full-Height Media Device" on page 62)
10. When removable media device installation is complete, reinstall the following items:
    - CD-Rom drive, if needed
    - Center wall
    - Expansion boards
    - Processor air baffle
    - Bezel blanks

      NOTE: If the second media bay is populated with an optional drive, store the extra bezel blank for later use.
11. Install other hardware options as needed or reinstall the access panel.
12. Power up the server ("Powering Up the Server" on page 25).

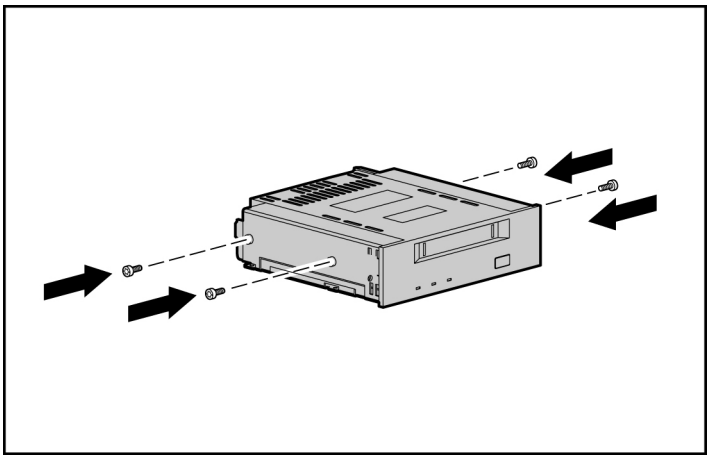
Installing a Half-Height or Full-Height Media Device

You can install up to two half-height or one full-height removable media devices in the removable media cage. To install a half-height or full-height media device:

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Access the removable media cage. ("Accessing the Removable Media Cage" on page 60)

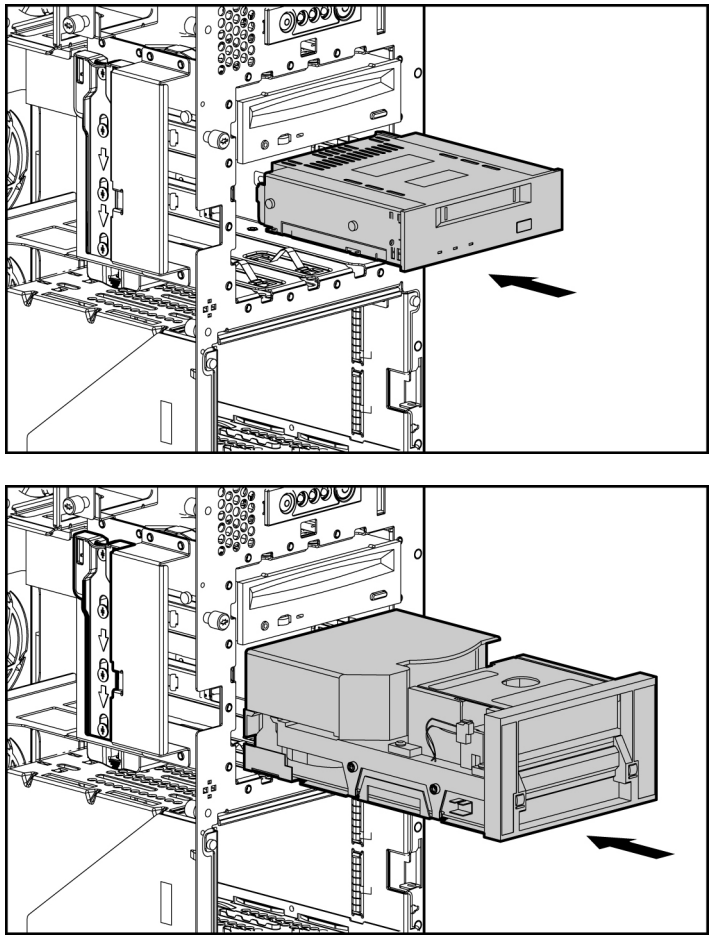
   NOTE: HP recommends that you remove all bezel blanks to facilitate drive installation.

6. Using the T-15 Torx screwdriver attached to the back of the server, remove the screws from the bezel blank and attach them to the tape drive or device.



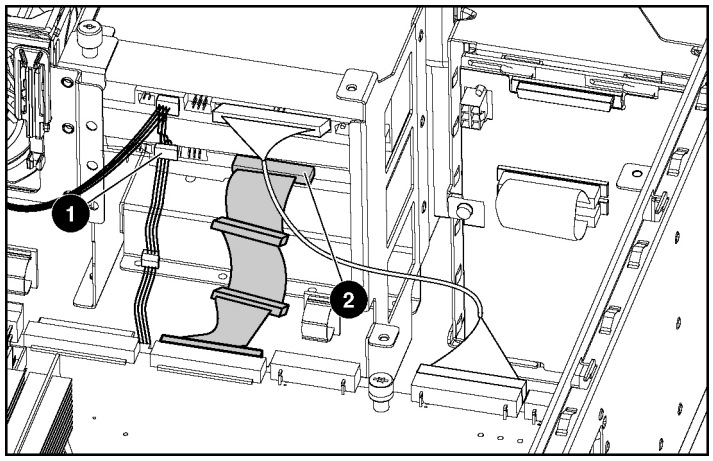
IMPORTANT: Each SCSI device in the server must have a unique address. The server automatically sets all SCSI IDs for hot-plug drives, but you must set the SCSI IDs for devices installed in the media cage.

7. Slide the device part of the way into the bay.



8. Connect the four-pin power cable to the half-height or full-height drive.

9. Connect the SCSI cable that comes with the device to the SCSI device and SCSI port 1 or 2 on the system board, or to an HBA installed in an expansion slot.



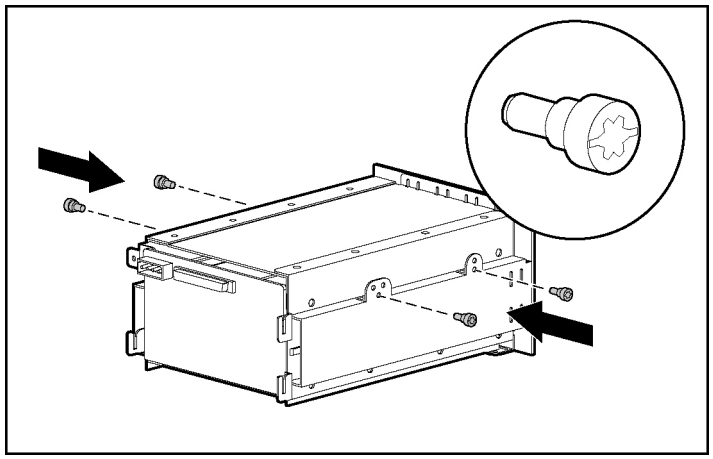
10. Slide the media drive fully into the bay until it is seated securely.

Installing an Optional Internal Two-Bay Hot-Plug SCSI Drive Cage

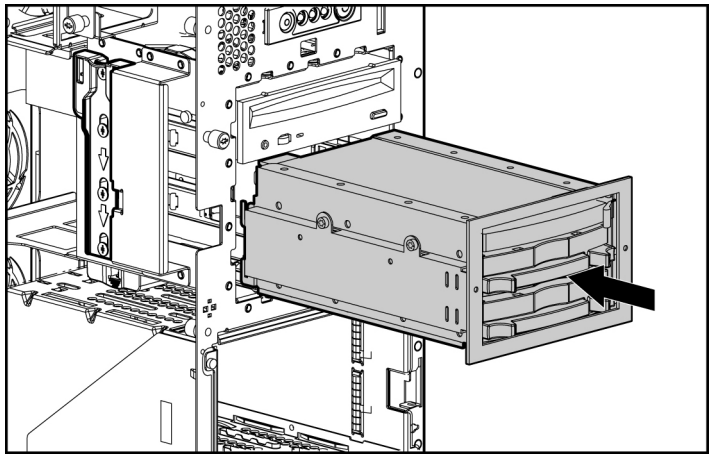
To install the optional two-bay hot-plug SCSI drive cage:

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Access the removable media cage. ("Accessing the Removable Media Cage" on page 60)

6. Using the T-15 Torx screwdriver attached to the back of the server, position two screws in the upper mounting holes on each side of the drive cage.

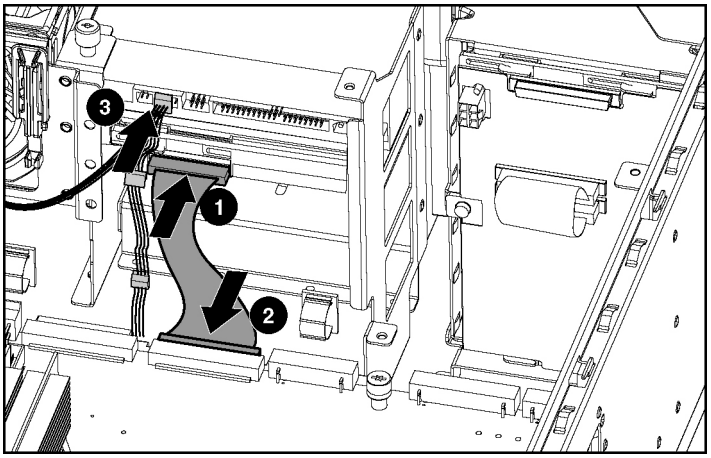


7. Slide the drive cage part of the way into the bay.



IMPORTANT: Be sure that the unit identification numbers (0 and 1) appear on the right side of the drive cage front panel.

8. Connect the SCSI and power cables.



9. Slide the drive cage fully into the bay until it is seated securely.

Refer to the *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions* for additional information.

Redundant Hot-Plug Fans

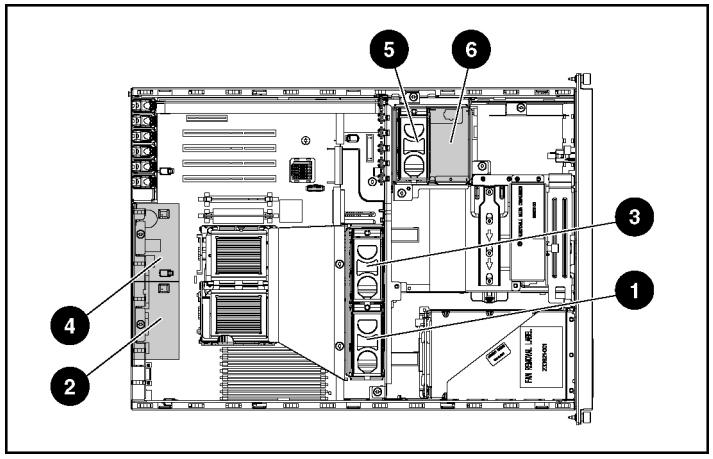
The server supports redundant hot-plug fans to provide proper airflow to the system if a primary fan fails.

In the standard configuration, three fans cool the server: fans 1, 3, and 5.

For the redundant configuration, fans 2, 4, and 6 are added to back up the primary fans. This configuration allows the server to continue operation in non-redundant mode, if a fan failure occurs.

WARNING: To prevent personal injury from hazardous energy:

- **Remove watches, rings, or other metal objects.**
- **Use tools with insulated handles.**
- **Do not place tools or metal parts on top of batteries.**



NOTE: Fan locations are located in the chassis.

Item	Description	Configuration
1	Fan 1	Primary
2	Fan 2	Redundant
3	Fan 3	Primary
4	Fan 4	Redundant
5	Fan 5	Primary
6	Fan 6	Redundant

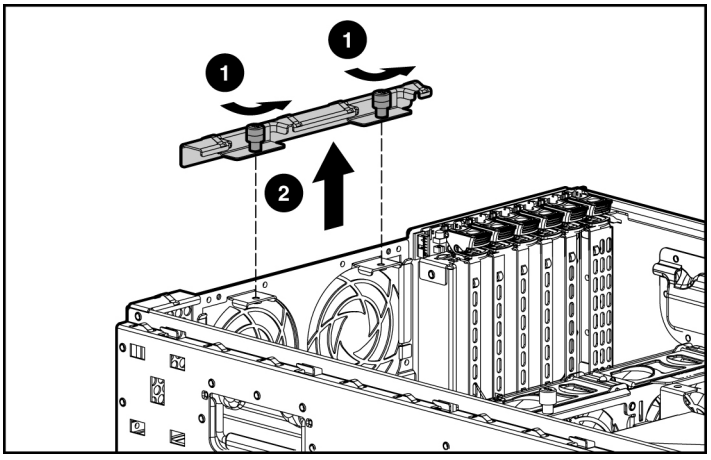
Fan failures are indicated by amber LEDs located on each hot-plug fan and by the front panel internal health LED. When a fan failure occurs, the internal health LED illuminates red in non-redundant mode and amber in redundant mode.

Redundant Hot-Plug Fan Cage Option

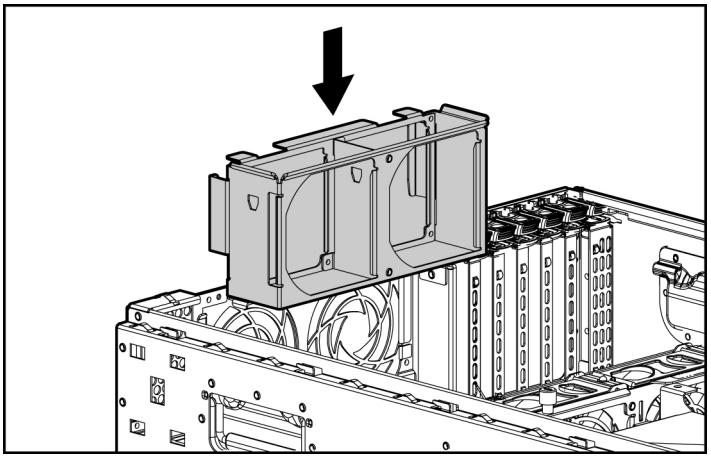
For full redundancy, always install all three fans included in the redundant hot-plug fan cage option kit. To install the redundant hot-plug fan cage:

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Remove the redundant fan cage retaining bracket from the chassis.

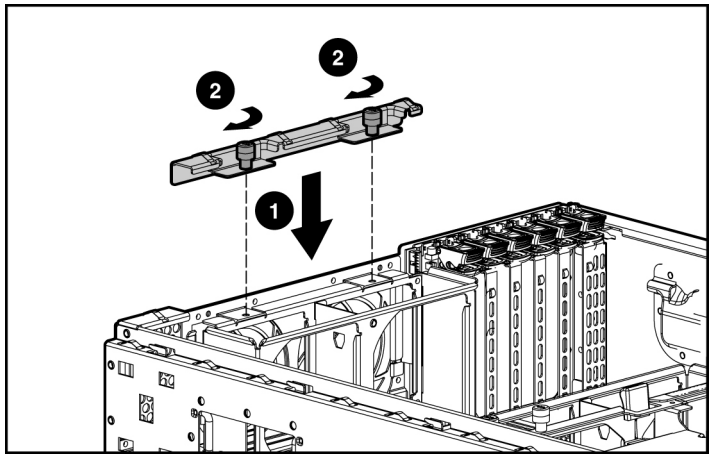
   IMPORTANT: Do not discard the fan cage retaining bracket. The bracket is required for proper fan operation.



6. Slide the redundant fan cage into the slots on the chassis wall.



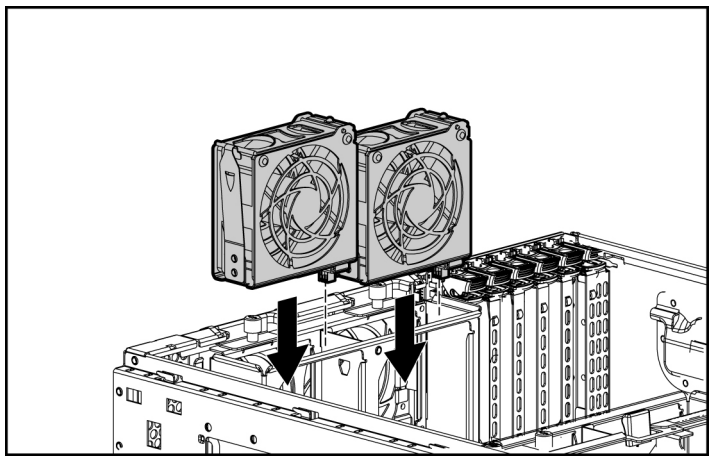
7. Reinstall the redundant fan cage retaining bracket.

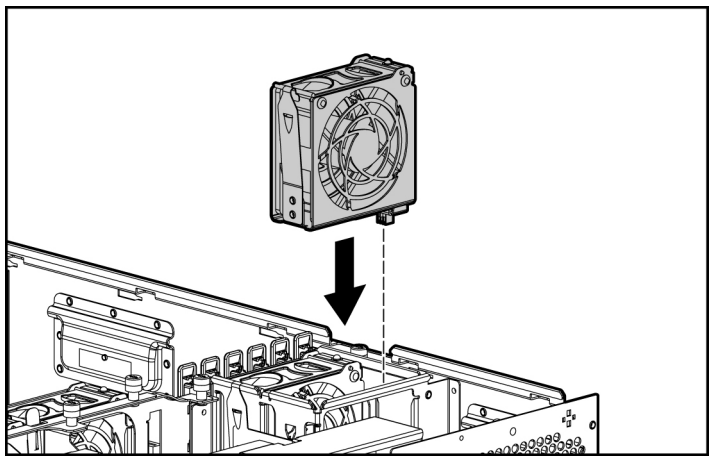


Installing Hot-Plug Fans

1. After installing the redundant fan cage, insert two of the hot-plug fans into the redundant fan cage and one fan into the redundant slot on the fan cage along the center wall.

NOTE: Any hot-plug fan provided in the redundant hot-plug fan cage option kit can be installed in any of the hot-plug fan slots. Fans are keyed to fit only one way in the slot.





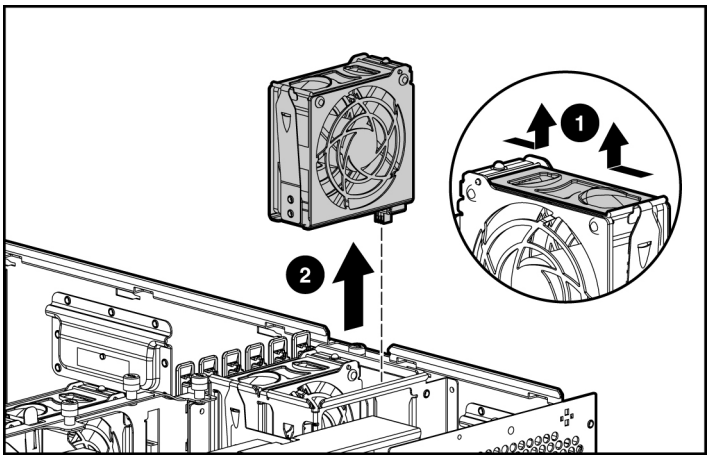
2. Install other hardware options as needed.
3. Power up the server and observe the internal system health LED on the front panel and the LEDs on all installed fans to be sure they are green.

NOTE: If the front panel internal system health LED is not green after you install hot-plug fans, reseat the hot-plug fan or refer to the troubleshooting section.

Replacing Hot-Plug Fans

IMPORTANT: Remove and replace one fan at a time. If the system detects two fan failures in the same zone, the server shuts down to avoid thermal damage.

When the optional fan cage and all three redundant fans are installed, individual fans can be hot-swapped at any time. To replace a hot-plug fan:



1. Install the replacement hot-plug fan, and press down to seat securely.
2. Repeat to replace additional fans as needed.
3. Replace the access panel ("Removing the Access Panel" on page 28).
4. Power up the server and observe the internal system health LED on the front panel and the LEDs on all installed fans to be sure they are green.

NOTE: If the front panel internal system health LED is not green after you install hot-plug fans, reseat the hot-plug fan or refer to the troubleshooting section.

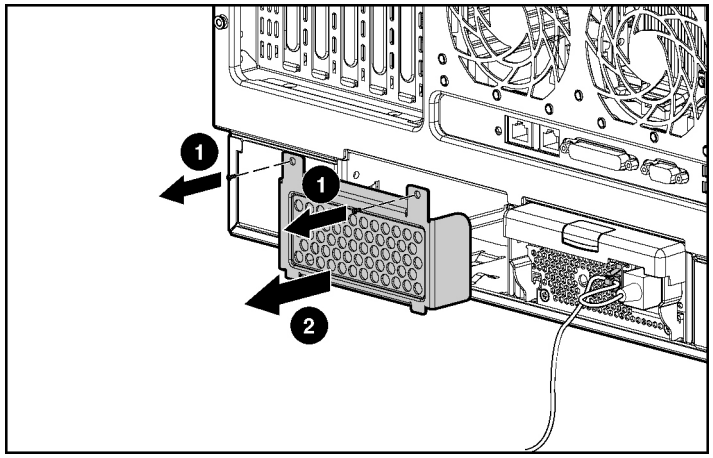
Redundant Hot-Plug Power Supply

The server supports a second hot-plug power supply to provide redundant power to the system in the event of a failure in the primary power supply. You can install or replace a second hot-plug power supply without powering down the server.

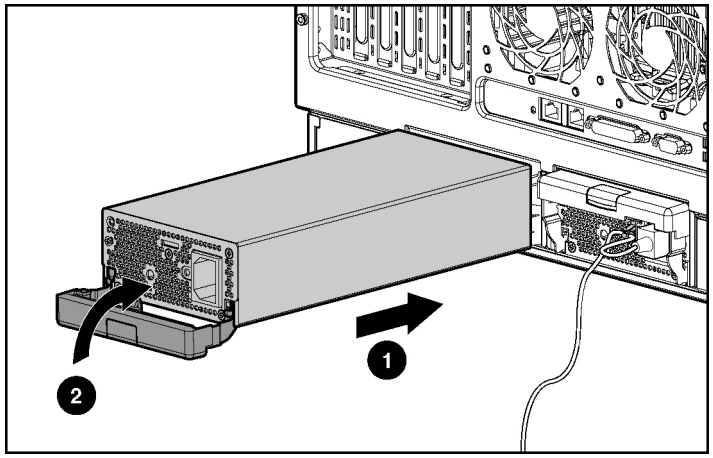
CAUTION: If only one power supply is installed, do not remove the power supply unless the server has been powered down. Removing the only operational power supply will cause an immediate power loss.

1. Remove the T-15 Torx screws. Remove the power supply blank in the secondary hot-plug power supply bay.

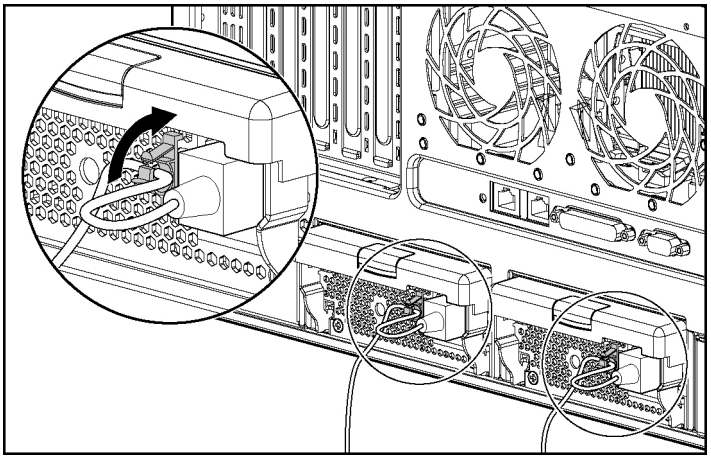
   NOTE: The T-15 Torx screwdriver is clipped to the rear panel of the server.



2. Install the second hot-plug power supply.



3. Connect the power cord to the redundant power supply.
4. Use the power cord management clip on the power supply to secure the cord and form a service loop.



5. Connect the power cord to the power source.
6. Be sure that the power supply LED is green ("Rear Panel LEDs and Buttons" on page 12).
7. Be sure that the front panel external health LED is green ("Front Panel LEDs and Buttons" on page 10).

IMPORTANT: For maximum server availability, be sure that the two power supplies are powered by separate AC power sources.

NOTE: If you remove or replace the primary hot-plug power supply, use the T-15 Torx screwdriver provided with the server to remove the shipping screw from the upper left corner of the power supply unit.

Expansion Boards

The server supports PCI-X and PCI Express expansion boards.

Slot	Expansion card type	Connector	Capable speed
1	PCI-X	64-bit, 3.3-volt	100-MHz
2	PCI-X	64-bit, 3.3-volt	100-MHz

Slot	Expansion card type	Connector	Capable speed
3	PCI-X	64-bit, 3.3-volt	100-MHz
4	PCI-X	64-bit, 3.3-volt	100-MHz
5	PCI Express *	x8	x4
6	PCI Express *	x8	x4

* x8 PCI Express cards are supported, but will run at x4 speeds.

Performance Balancing

Balancing is the paired arrangement of expansion boards for optimal performance based on the bus architecture of the expansion slots. When populating boards on a shared bus, be sure that both boards operate at the same speed (two PCI boards or two PCI-X boards). If boards with different speeds are used, the bus performs at the speed of the slowest board. Performance balancing is not necessary with PCI Express slots.

To balance expansion board performance, populate slots across different buses before populating two slots on the same bus.

NOTE: The population order is only a recommendation. Expansion boards can reside in any slot.

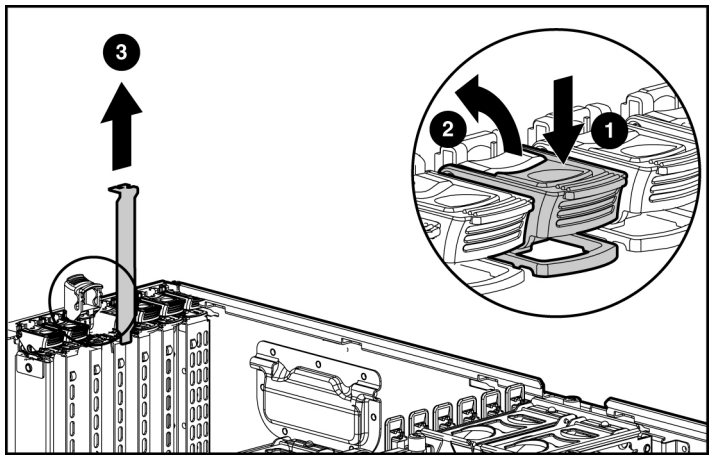
Slot Number	Population Order	PCI-X Bus Sharing
1	1	Slots 1 and 2 shared PCI-X bus
2	3	Slots 1 and 2 shared PCI-X bus
3	2	Slots 3 and 4 shared PCI-X bus
4	4	Slots 3 and 4 shared PCI-X bus

NOTE: The operating system detects expansion devices in the following order: 1-2-3-4-5-6.

Removing Expansion Slot Cover

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Remove the expansion slot cover.



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

To replace the component, reverse the removal procedure.

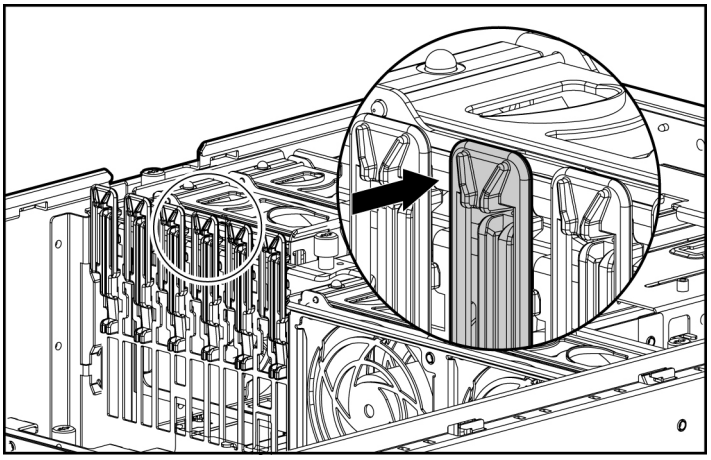
Installing Expansion Boards

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

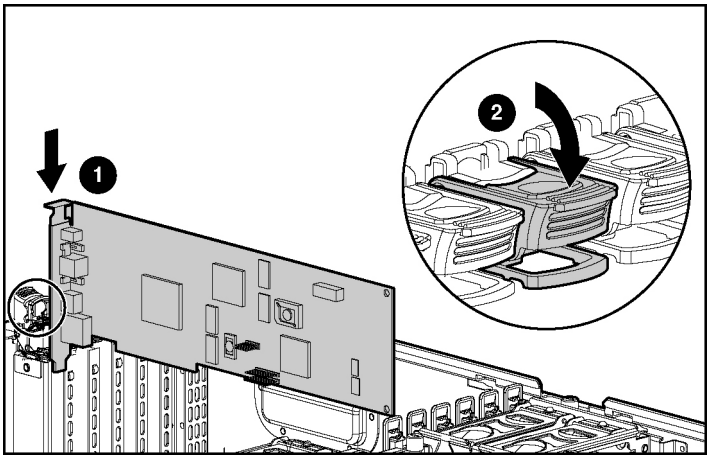
To install an expansion board:

1. Remove the expansion slot cover ("Removing Expansion Slot Cover" on page 75).

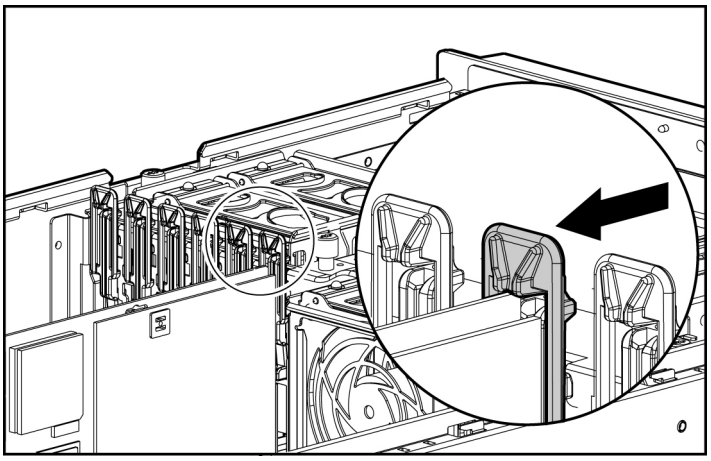
2. Release the retaining clip.



3. Install the expansion board.



4. Lock the retaining clip.



5. Connect any required internal or external cables to the expansion board. Refer to the documentation that ships with the expansion board.

Remote Insight Lights-Out Edition II Board

The server comes with iLO remote management capability embedded on the system board. The 30-pin remote management connector for the RILOE II board is provided to reduce external cabling. The 30-pin connector provides power, keyboard, mouse, and other peripheral signals directly to the system board; therefore, the external AC power adapter and keyboard/mouse loopback cable are not needed for normal operations.

The RILOE II board provides remote server manageability for ProLiant servers. It can be accessed from a network client using a standard web browser and it provides a keyboard, mouse, and video capability for a host server, regardless of the state of the host operating system or host server. The RILOE II board features include a faster processor for increased performance, new user interface for easier browsing, integration with LDAP, Virtual Floppy, and Virtual CD for increased server manageability.

A built-in processor, memory, NIC, ROM, and standard external power supply make the RILOE II board independent of the host server and its operating system. This design allows the RILOE II board to provide remote access to any authorized network client, to send alerts, and to perform other management functions.

For information about iLO technology, refer to "Integrated Lights-Out Technology (on page 112)."

IMPORTANT: Install the RILOE II board into slot 1 for ease of cabling.

For information about RILOE II cabling, refer to "RILOE II Cabling (on page 99)."

VHDCI or HD68 SCSI Cable Option

The VHDCI or HD68 SCSI Cable connects the server to external SCSI-based storage or backup devices. The cabling option kit must be used for internal ports to be used externally.

IMPORTANT: To install the external SCSI option, an internal SCSI port must be dedicated for external use only.

In addition to the VHDCI or HD68 SCSI cable, you will also need:

- T-15 Torx screwdriver
- Flat-head screwdriver

NOTE: A PCI blank included with the optional Internal-to-External SCSI Kit enables the optional HD68 SCSI cable to connect through a PCI-X or PCI Express expansion slot ("Expansion Boards" on page 74). Refer to the Internal-to-External SCSI Kit installation instructions for details.

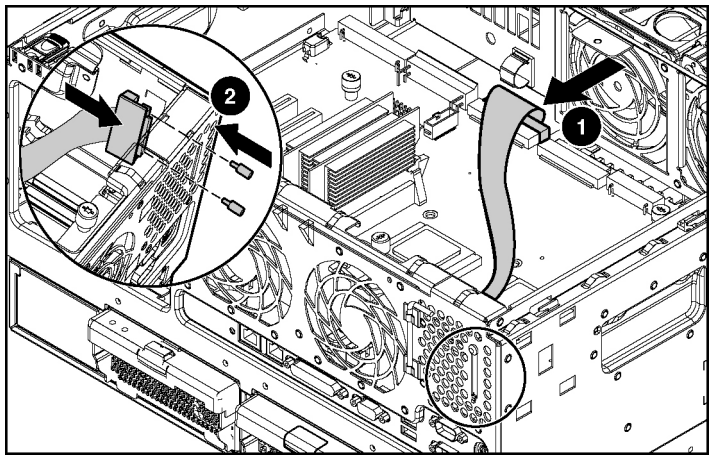
To prepare the server before installing or removing options:

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).

WARNING: To reduce the risk of electric shock or damage to the equipment, disconnect power from the server by unplugging all power cords from the electrical outlets.

CAUTION: Failure to correctly power down the server could result in damage to equipment or loss of information.

5. Using a T-15 Torx screwdriver, remove a SCSI knockout located on the rear of the chassis and retain the screw.
6. Connect the preassembled cable bracket assembly through the external SCSI knockout on the rear of the chassis and secure the cable using the screw retained in step 3.
7. Connect the other end of the VHDCI SCSI cable to an available SCSI port, or the other end of the HD68 SCSI cable to a PCI blank.



NOTE: Refer to the documentation that shipped with the external storage device for more information.

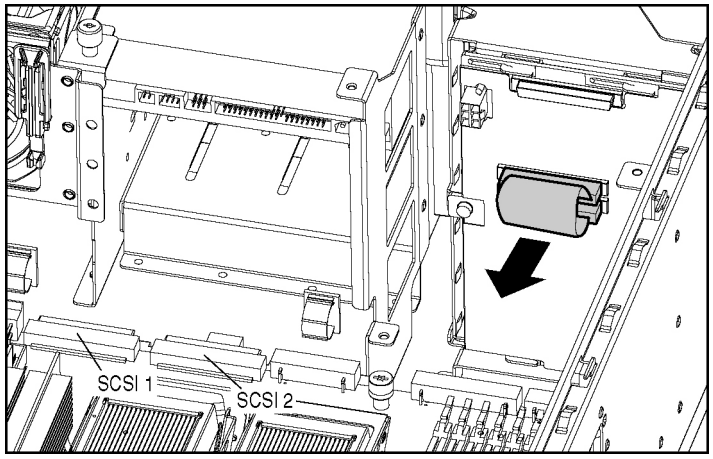
Replace the access panel ("Removing the Access Panel" on page 28).

Duplex SCSI Board Option

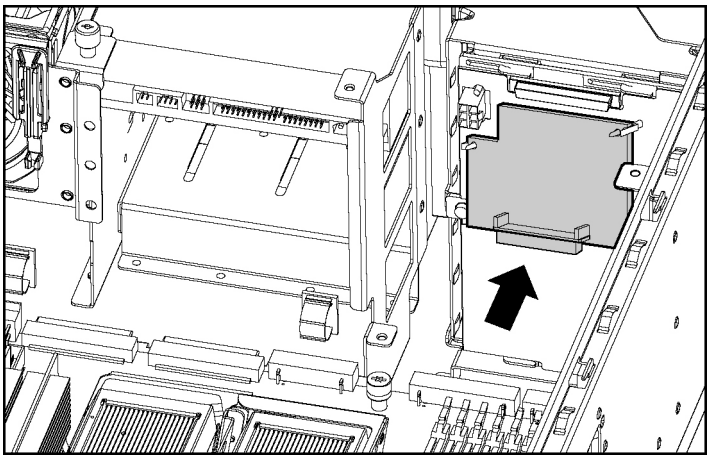
The server supports an optional duplex SCSI board supplied with the Duplex SCSI Backplane Option Kit. The duplex SCSI board allows four hard drives to be supported on one SCSI bus, and two hard drives to be supported on the other SCSI bus. For cabling information, refer to "Server Cabling (on page 91)."

To prepare the server before installing or removing options:

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 front bezel door, if necessary.
4. Remove the access panel ("Removing the Access Panel" on page 28).
5. Remove the SCSI simplex cable.



6. Install the duplex SCSI board.



Tower-to-Rack Conversion Option

Converting a Tower Server to a Rack Server (on page 82)

Installing the Rack Server (on page 89)

Accessing the Server in the Rack (on page 89)

Converting the Tower Server to a Rack Server

The tower-to-rack conversion kit includes all equipment required to convert the tower model server into a rack model server, and to install the server into most square- or round-hole racks.

The tower-to-rack conversion kit includes:

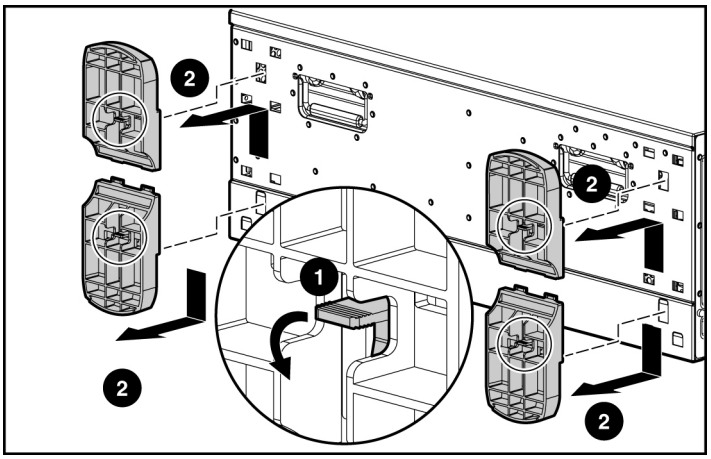
- Rack rails
- Cable management arm
- Server rails
- Screw retaining plate

- Cage nuts
- Rack template
- Server bezel for rack environment

In addition to the supplied items, you may need a T-15 Torx screwdriver, which is attached to the rear of the server.

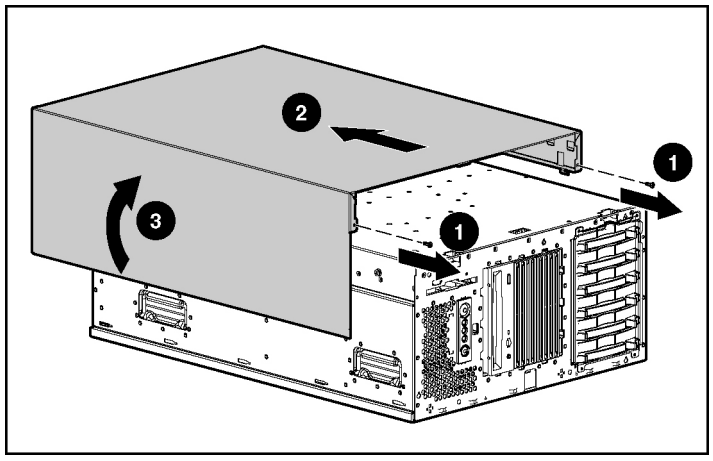
Before converting a tower server to a rack server:

1. Power down the server ("Powering Down the Server" on page 25).
2. Remove the front bezel door, if necessary.
3. Remove the access panel ("Removing the Access Panel" on page 28).
4. Remove the feet.

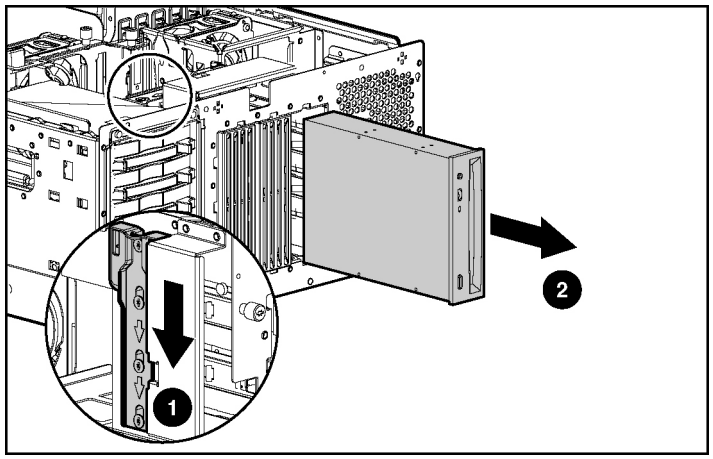


5. Remove the tower configuration panel:
   a. Use the Torx T-15 screwdriver to remove the two front panel screws.

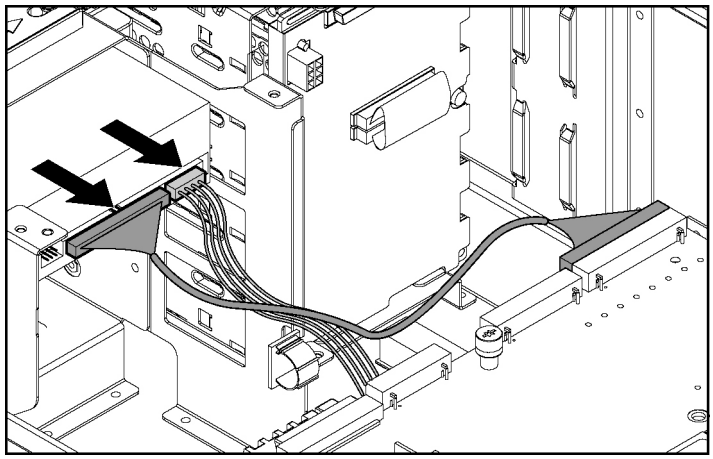
b. Remove the tower configuration panel.



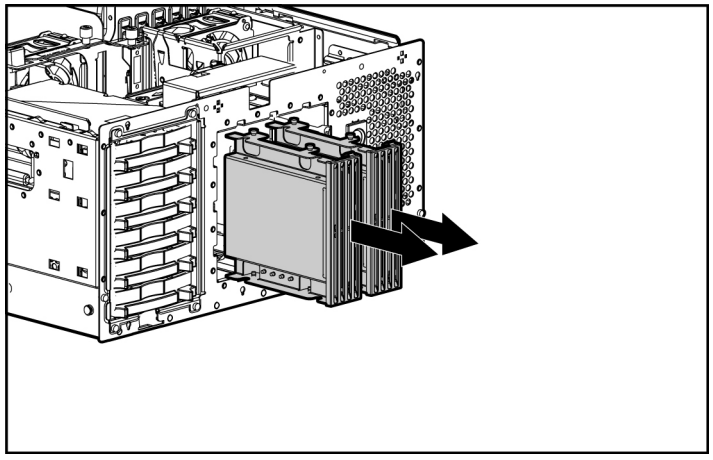
6. Remove the access panel ("Removing the Access Panel" on page 28).
7. Rotate the CD-ROM drive and media drive blanks.
   a. Press and slide the media latch.
   b. Release the CD-ROM drive from the back and push it forward to better access the cables.



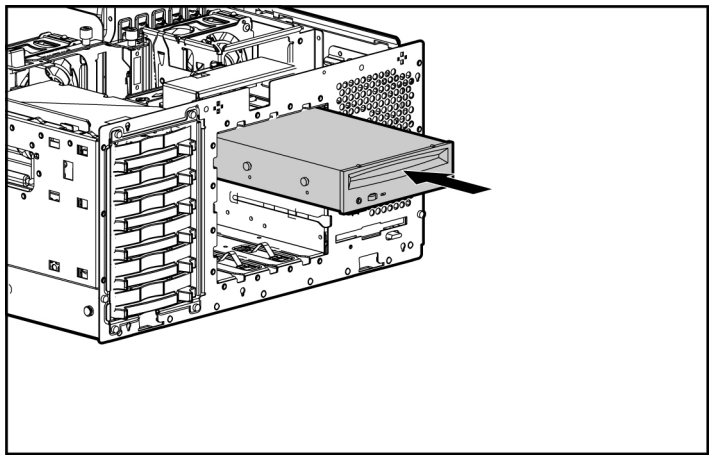
8. Remove the IDE CD-ROM drive cable and power cable from the back of the drive.



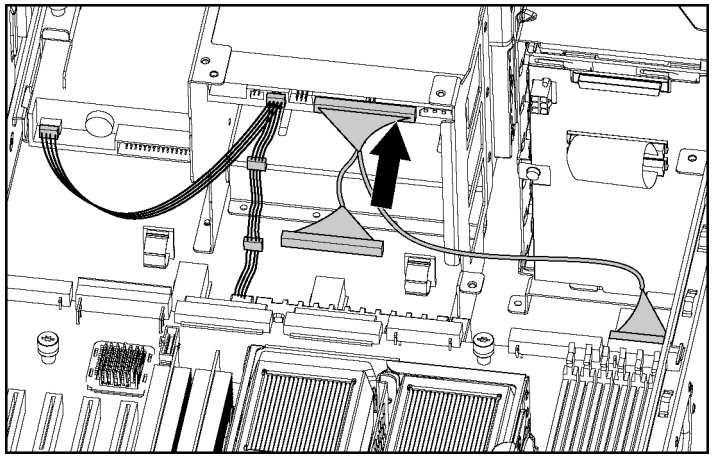
9. Remove the CD-ROM drive.
10. Remove the media blanks by pressing and sliding the media latch for each blank.



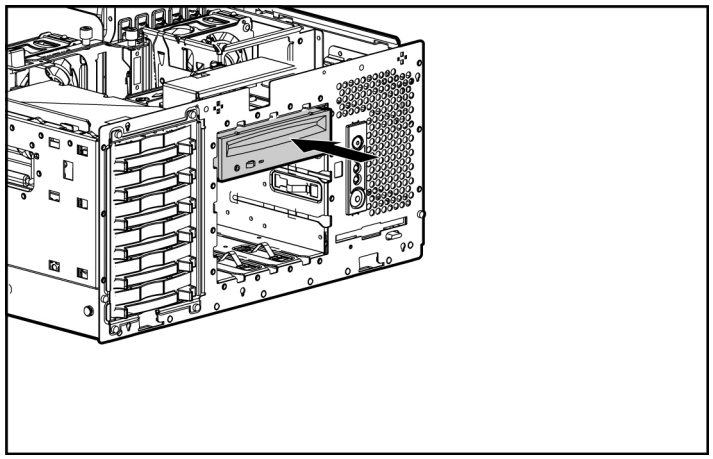
11. Partially reinsert the CD-ROM drive horizontally into the top slot of the bay.



12. Reconnect the IDE CD-ROM drive cable and power cable.

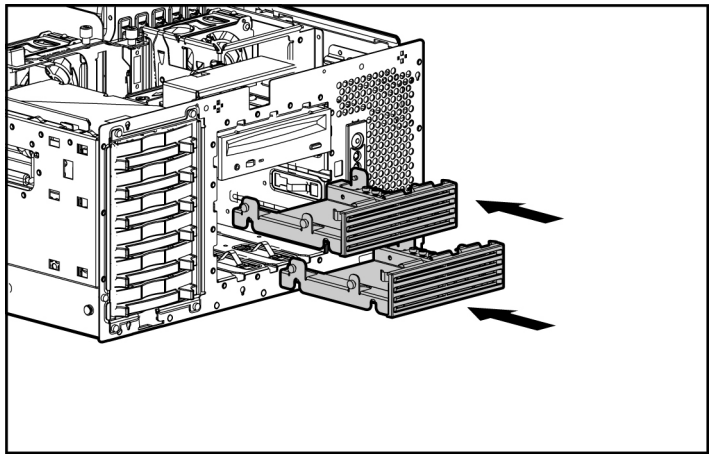


13. Push the CD-ROM drive all the way into the bay until the locking latch clicks into place, securing the drive.

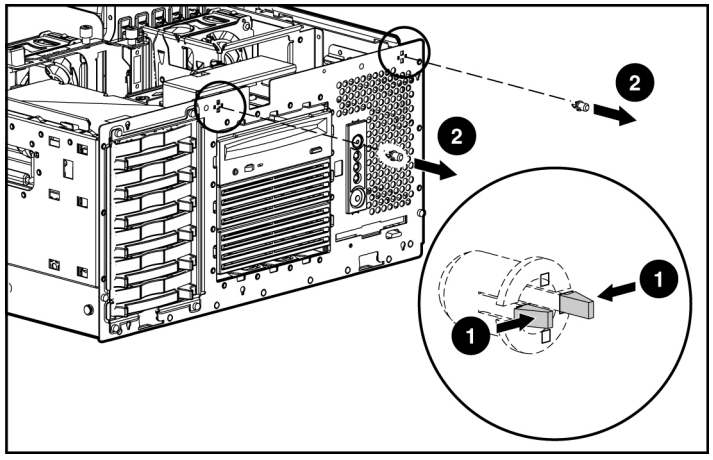


14. Install the media blanks horizontally in the bay below the CD-ROM drive.

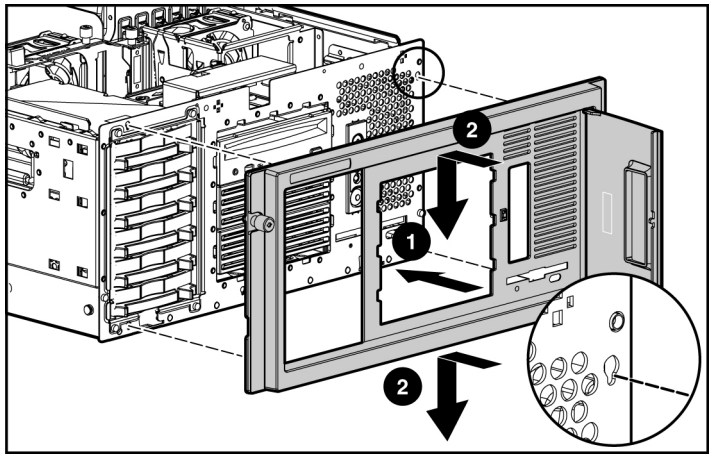
NOTE: Install any optional tape drives ("Installing a Half-Height or Full-Height Media Device" on page 62) instead of the media blanks at this time.



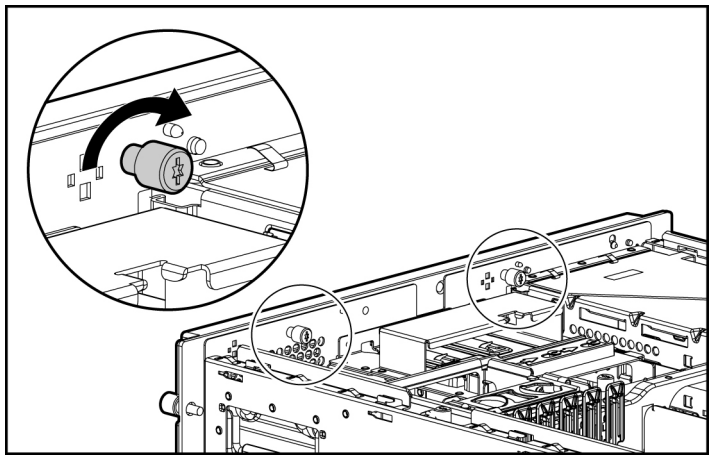
15. Remove the two clips on the server.



16. Align the five spools on the rack bezel with the keyholes on the metal frame, and install the rack bezel.



17. Tighten both internal rack bezel thumbscrews.



18. Replace the access panel ("Removing the Access Panel" on page 28).

Installing the Rack Server

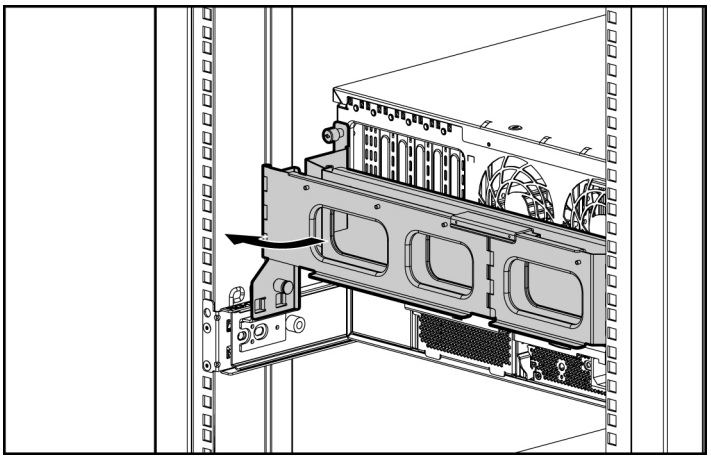
1. Install the server into a rack. ("Installing the Server into the Rack" on page 40)
2. Connect the power cord and peripheral devices. Use the power supply retaining clip to secure the power cord. Refer to "Rear Panel Components (on page 11)" for connector locations.
3. Power up the server ("Powering Up the Server" on page 25).
4. Install the operating system ("Installing the Operating System" on page 48).
5. Register 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).

Accessing the Server in the Rack

Some installation or maintenance procedures may require the server to be extended from the rack ("Extending the Server from the Rack" on page 26) before performing.

If the maintenance procedure requires accessing the server rear panel:

1. Unlock the cable management arm and swing the arm away from the server.



2. Reverse step 1 to secure the cable management arm after the maintenance procedures have been completed.

Server Cabling

In This Section

Storage Device Cabling Guidelines

CAUTION: To prevent damage to the equipment, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before installing devices.

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

Hot-Plug SCSI Cabling

Integrated Simplex SCSI Cabling (on page 92)

Integrated Duplex SCSI Cabling (on page 93)

Array Controller Simplex SCSI Cabling (on page 94)

Array Controller Duplex SCSI Cabling (on page 94)

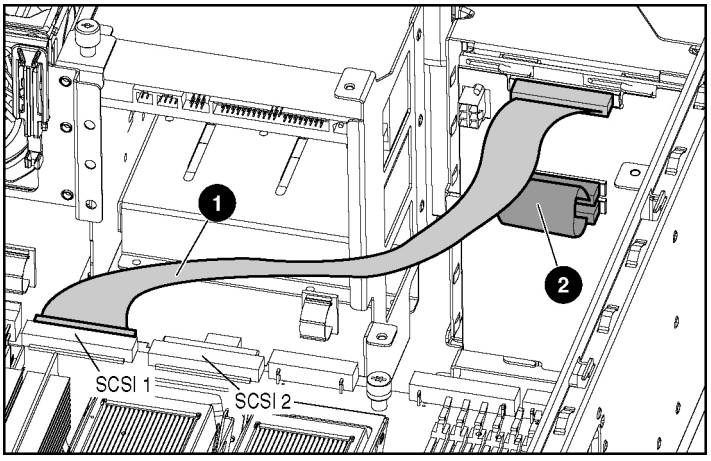
Integrated SCSI Cabling with Optional Internal Two-Bay Hot-Plug SCSI Drive Cage (on page 96)

Array Controller SCSI Cabling with Optional Internal Two-Bay Hot-Plug SCSI Drive Cage ("Array Controller Duplex SCSI Cabling with Optional Internal Two-Bay Hot-Plug SCSI Drive Cage" on page 97)

Integrated Simplex SCSI Cabling

In the integrated simplex cabling configuration, which is the standard shipping configuration, the integrated SCSI controller controls up to six hard drives through one SCSI port.

NOTE: The cables shown ship standard with the server.

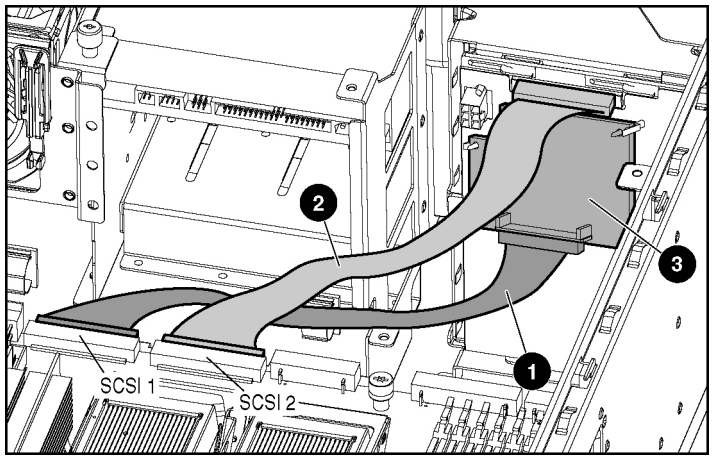


Item	Component description	SCSI IDs managed
1	SCSI cable (SCSI 1)	0, 1, 2, 3, 4, 5
2	simplex SCSI cable	N/A

IMPORTANT: After changing any SCSI configuration, be sure the proper boot controller order is set in RBSU.

Integrated Duplex SCSI Cabling

In the optional integrated duplex cabling configuration, the integrated controller controls up to six hard drives through two SCSI ports: one with up to two drives, and the other with up to four drives.



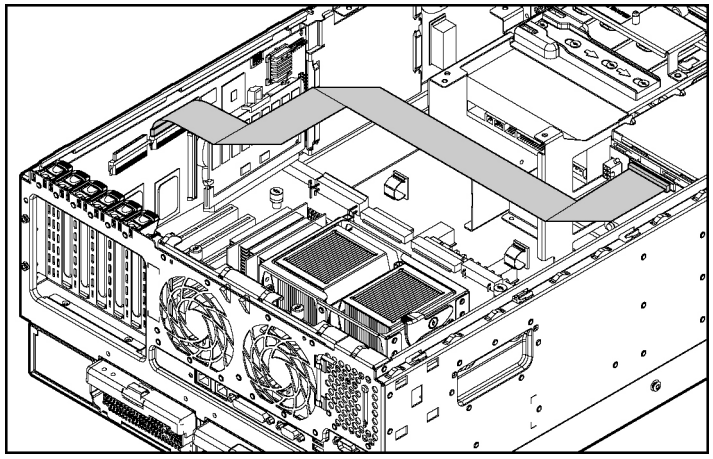
NOTE: The Duplex SCSI Backplane Option Kit is required for duplex cabling configurations. The kit contains a duplex SCSI cable and a duplex SCSI board.

Item	Component description	SCSI IDs managed
1	SCSI cable (SCSI 1)	0, 1, 2, 3
2	SCSI cable (SCSI 2) *	4, 5
3	Duplex SCSI board	N/A

* One SCSI cable is provided with the server.

Array Controller Simplex SCSI Cabling

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



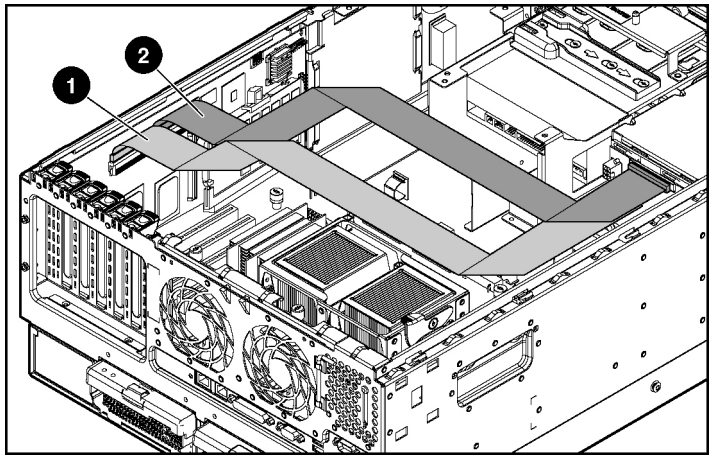
Component description	SCSI IDs managed
SCSI cable *	0, 1, 2, 3, 4, 5

* One SCSI cable is provided with the server.

Array Controller Duplex SCSI Cabling

NOTE: The Duplex SCSI Backplane Option Kit is required for duplex cabling configurations. The kit contains a duplex SCSI cable and a duplex SCSI board.

In the array controller duplex SCSI cabling configuration, the optional PCI array controller controls up to four hard drives on one SCSI bus and two hard drives on the other SCSI bus.

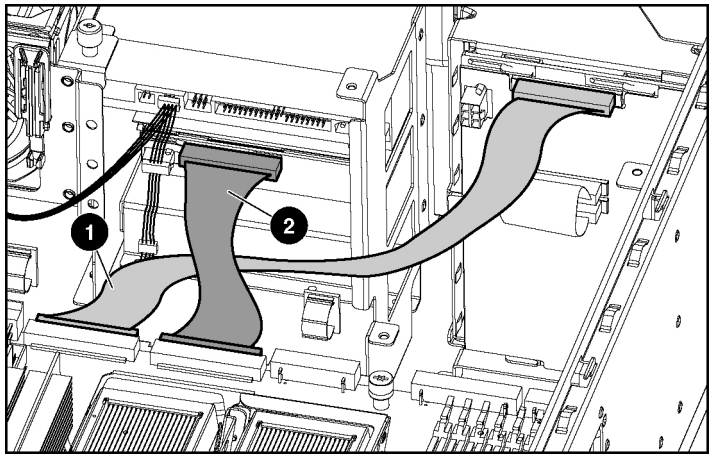


Item	Component description	SCSI IDs managed
1	SCSI cable	0, 1, 2, 3
2	SCSI cable *	4, 5

* One SCSI cable is provided with the server.

Integrated SCSI Cabling with Optional Internal Two-Bay Hot-Plug SCSI Drive Cage

When cabling an optional internal two-bay hot-plug SCSI drive cage with the integrated drive cage, the embedded Integrated SCSI Controller controls up to two hard drives on one SCSI bus and up to six hard drives on the second SCSI bus.



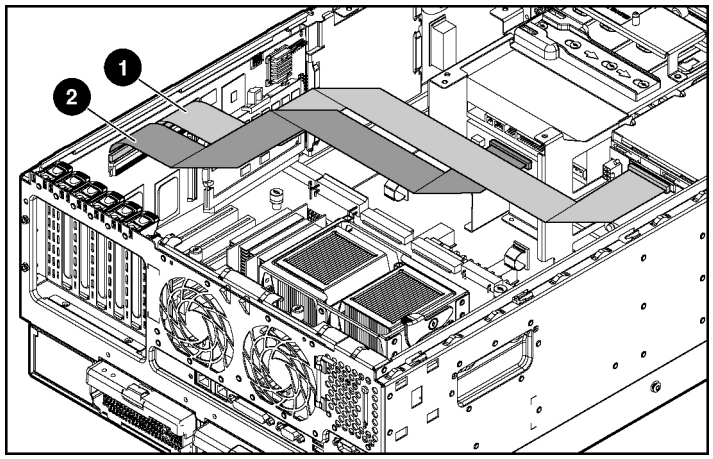
Item	Component description	SCSI IDs managed
1	SCSI cable **	0, 1, 2, 3, 4, 5
2	SCSI cable *	0, 1

* One SCSI cable is provided with the server.

** One SCSI cable is provided with the Internal Two-Bay Hot-Plug SCSI Drive Cage.

Array Controller Duplex SCSI Cabling with Optional Internal Two-Bay Hot-Plug SCSI Drive Cage

When cabling an optional internal two-bay hot-plug SCSI drive cage with the integrated drive cage, the optional PCI Array Controller controls up to two hard drives on one SCSI bus and up to six hard drives on the other SCSI bus.

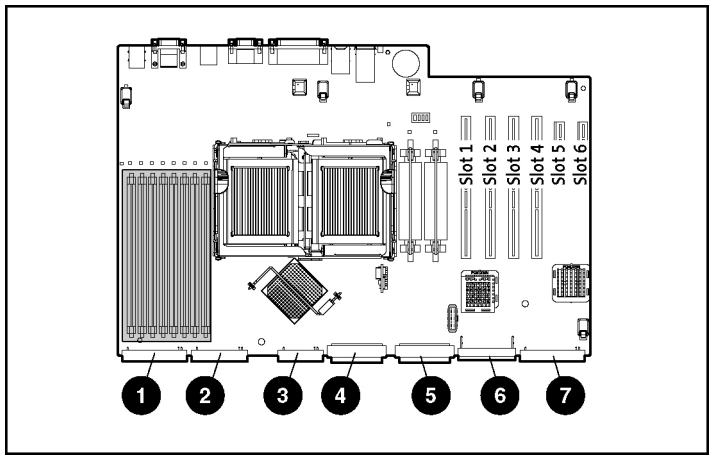


Item	Component description	SCSI IDs managed
1	SCSI cable *	0, 1, 2, 3, 4, 5
2	SCSI cable **	0, 1

* One SCSI cable is provided with the server.

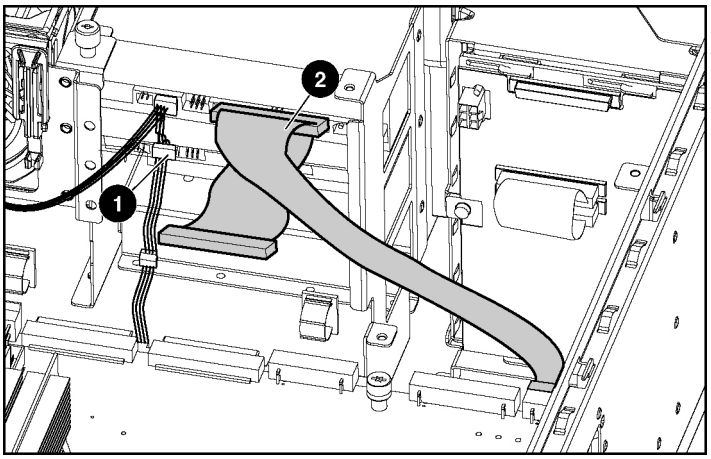
** One SCSI cable is provided with the Internal Two-Bay Hot-Plug SCSI Drive Cage.

Cable Connector Identification



Item	Cable Description
1	IDE connector
2	Diskette drive connector ("Diskette Drive Cabling" on page 100)
3	Fan cable connector
4	SCSI port 2 ("Installing a Half-Height or Full-Height Media Device" on page 62)
5	SCSI port 1 ("Installing a Half-Height or Full-Height Media Device" on page 62)
6	Power supply connector
7	Power supply signal connector

CD-ROM Drive Cabling

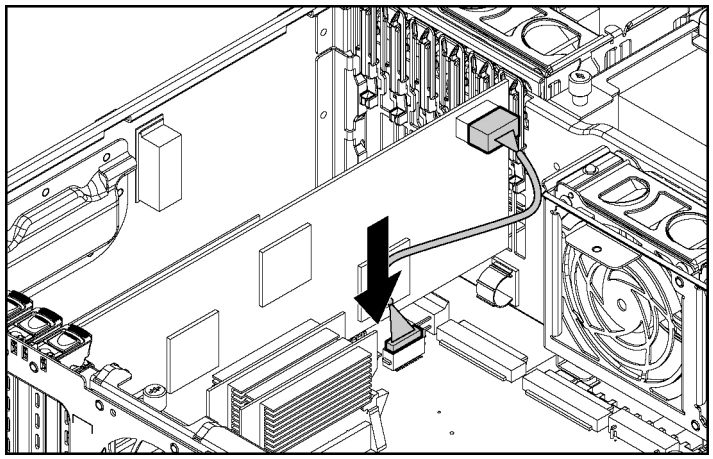


Item	Cable Description
1	CD-ROM drive power cable
2	CD-ROM drive data cable

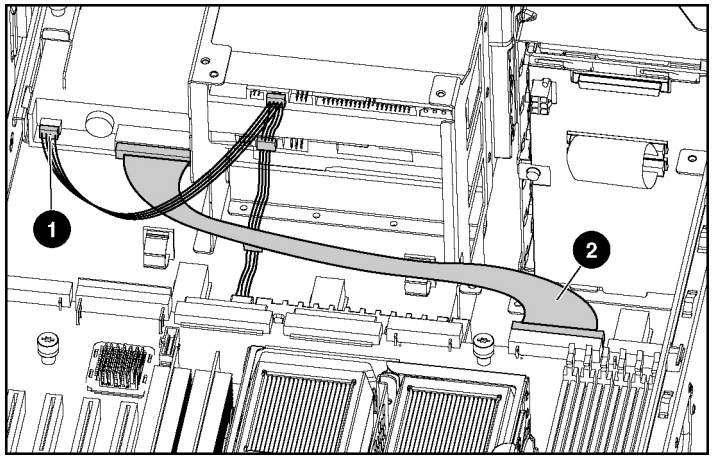
RILOE II Cabling

The 30-pin Remote Insight cable ships with the RILOE II cable kit.

IMPORTANT: Install the RILOE II board into slot 1 for ease of cabling.



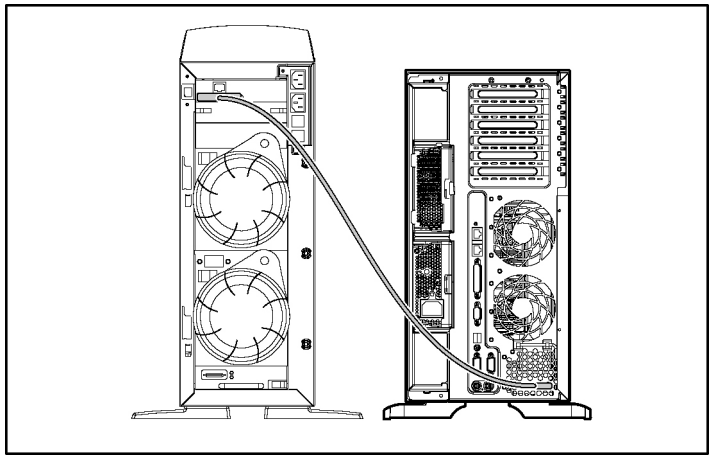
Diskette Drive Cabling



Item	Cable Description
1	Diskette drive power cable
2	Diskette drive data cable

External Storage Cabling

With the optional cable kit, the server supports external storage devices through the Auxillary VHDCI SCSI connector (on page 79) on the rear panel of the server.



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

Server Configuration and 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 117)
- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.
- Enabling access to the Array Configuration Utility, Array Diagnostics Utility ("Array Diagnostic Utility" on page 117), and Erase Utility

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

SmartStart Scripting Toolkit

The SmartStart Scripting Toolkit is a set of Microsoft® MS-DOS-based utilities that enables you to configure and deploy servers in a customized, predictable, and unattended manner. These utilities provide scripted server and array replication for mass server deployment and duplicate the configuration of a source server onto target systems with minimum user interaction.

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).

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 operating system
- Selecting the primary boot controller
- Configuring online spare memory

For more information on RBSU, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (ftp://ftp.compaq.com/pub/products/servers/management/rbsu-whitepaper.pdf).

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.

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

Configuring Online Spare Memory

To configure online spare memory:

1. Install the required DIMMs ("Memory Options" on page 56).
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).

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 about array controller configuration, refer to the controller user guide, or the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.compaq.com/support/techpubs/whitepapers).

Option ROM Configuration for Arrays

NOTE: ORCA is supported with the use of an optional HP Array Controller.

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility provides support for the following functions:

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

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

For more information about array controller configuration, refer to the controller user guide, or the *HP ROM-Based Setup Utility User Guide* on the Documentation CD or the HP website (http://www.compaq.com/support/techpubs/whitepapers).

Auto-Configuration Process

NOTE: ORCA is supported with the use of an optional HP Array Controller.

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

HP ProLiant Essentials RDP

The HP ProLiant Essentials 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's graphical interface 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 HP ProLiant Essentials 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 **Escape** key to close the menu.
9. Press the **Escape** 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.

StorageWorks Library and Tape Tools

HP StorageWorks L&TT provides functionality for firmware downloads, verification of device operation, maintenance procedures, failure analysis, corrective service actions, and some utility functions. It also provides seamless integration with HP hardware support by generating and emailing support tickets that deliver a snapshot of the storage system.

For more information, and to download the utility, refer to the StorageWorks L&TT website (http://h18006.www1.hp.com/products/storageworks/ltt).

Management Agents

Management Agents provide the information to enable fault, performance, and configuration management. The agents allow easy manageability of the server through HP Systems Insight Manager 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 System 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.

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 28).
3. Set positions 1, 5, and 6 of the system maintenance switch to On.
4. Install the access panel.
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

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 prior to 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 at:

- 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).

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).

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 ("SmartStart Software" on page 103).

HP Insight Diagnostics

The HP Insight Diagnostics utility displays information about the server hardware and tests the system to be sure it is operating properly. The utility has online help and can be accessed using the SmartStart CD. Online Diagnostics for Microsoft® Windows® is available for download from the HP website (http://www.hp.com/support).

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®: Event Viewer or IML Viewer
  - For Linux: IML Viewer Application
- From within HP Insight Diagnostics

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

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 (on page 103) 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).

ActiveUpdate

ActiveUpdate is a web-based application that provides information updates, customer advisories, and proactive notification and delivery of the latest software updates. For more information, refer to the ActiveUpdate website. (http://h18000.www1.hp.com/products/servers/management/activeupdate)

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).

Natural Language Search Assistant

The Natural Language Search Assistant (http://askq.compaq.com) is a search engine that finds information on HP products, including ProLiant servers. The search engine responds to queries entered in question form.

Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand your 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).

Troubleshooting

In This Section

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 127)," 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 129)." 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.

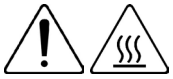
WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

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.

25-41 kg

55-90 lbs

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 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 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.**

25-41 kg

55-90 lbs

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 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 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 117) 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.

Diagnostic Steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start Diagnosis Flowchart (on page 127)," 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 129)." 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:

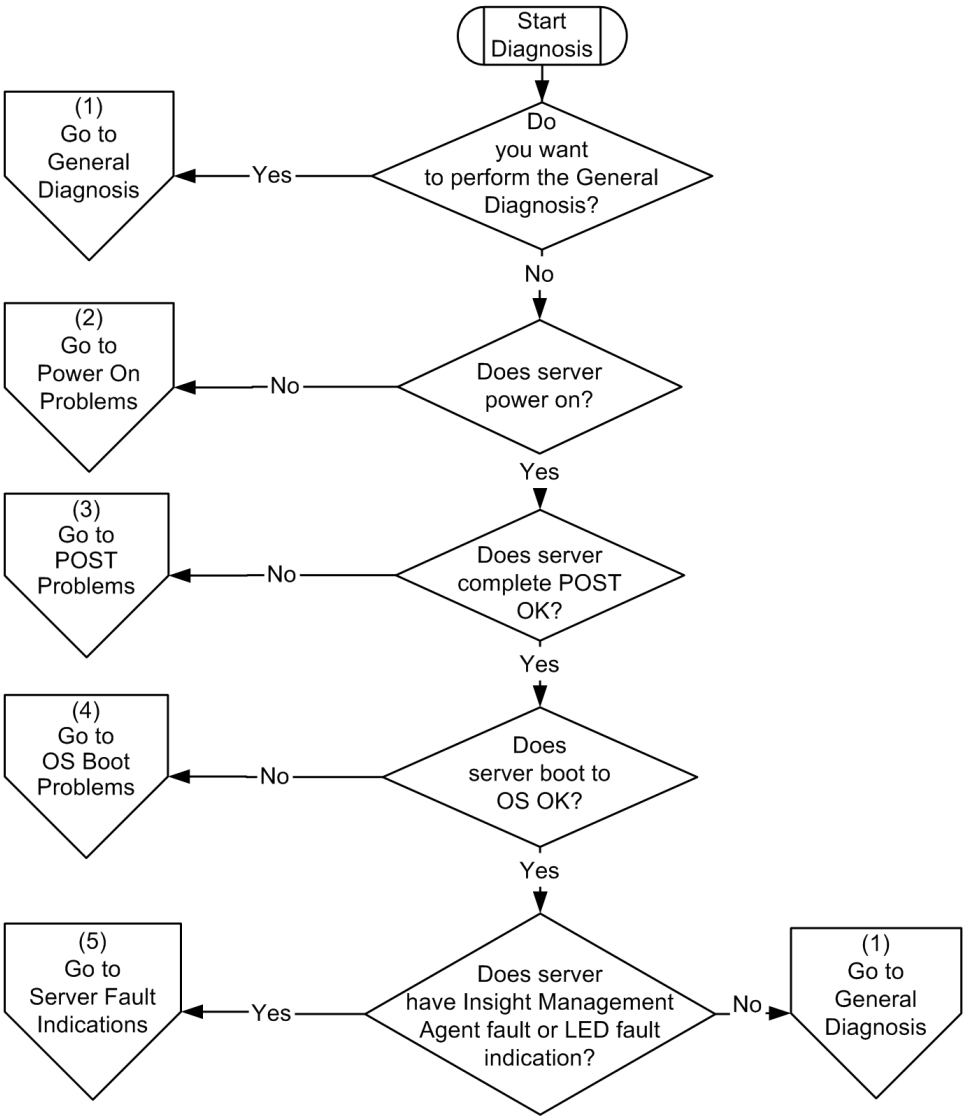
- Start Diagnosis Flowchart (on page 127)
- General Diagnosis Flowchart (on page 129)
- Power-On Problems Flowchart (on page 131)
- POST Problems Flowchart (on page 134)
- OS Boot Problems Flowchart (on page 136)
- Server Fault Indications Flowchart (on page 139)

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.

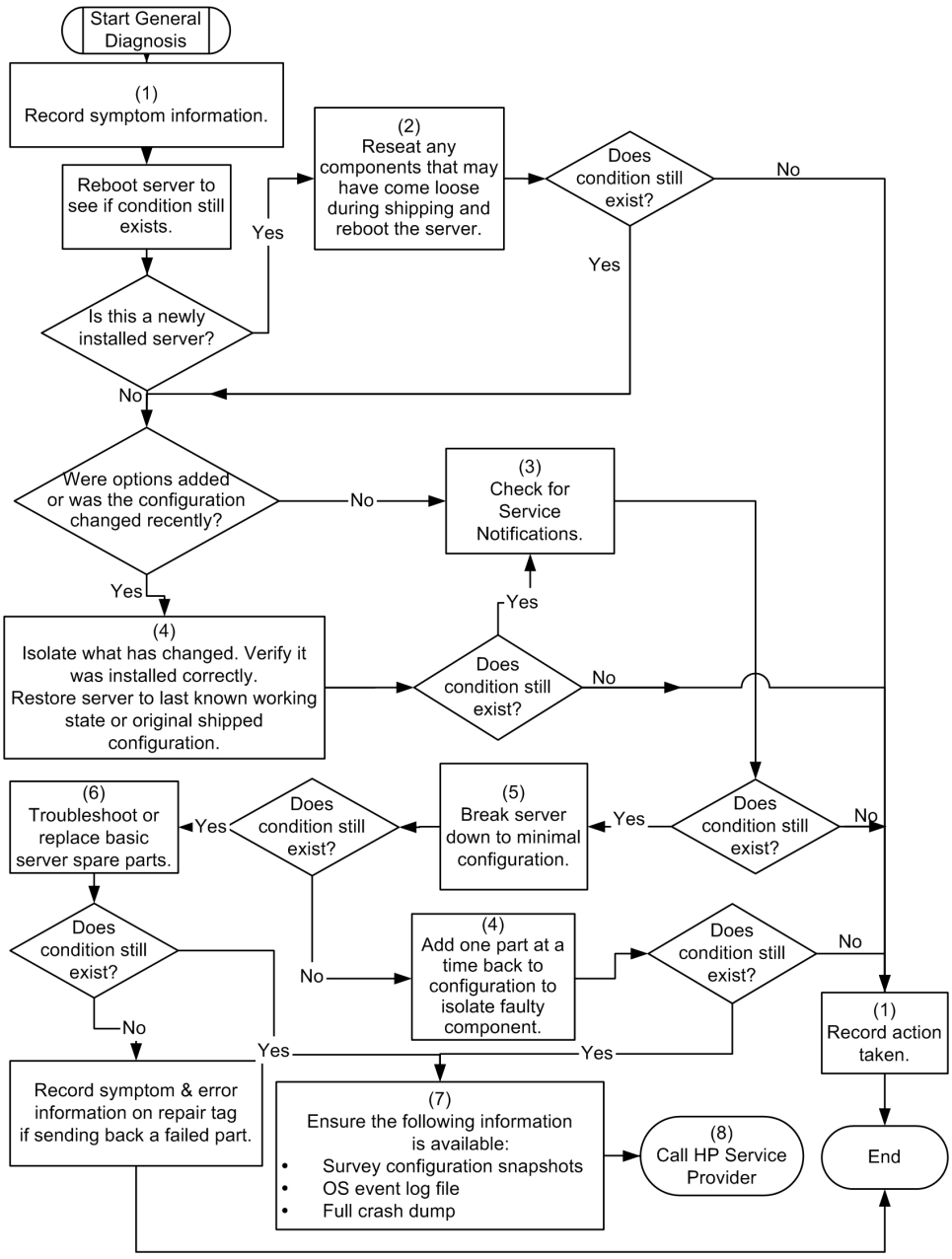
Item	Refer to
1	"General Diagnosis Flowchart (on page 129)"
2	"Power-On Problems Flowchart (on page 131)"
3	"POST Problems Flowchart (on page 134)"
4	"OS Boot Problems Flowchart (on page 136)"
5	"Server Fault Indications Flowchart (on page 139)"


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"
2	"Loose Connections (on page 145)"
3	"Service Notifications"
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 (on page 142)"
7	• "Server Information You Need (on page 178)" • "Operating System Information You Need (on page 179)"
8	"Contacting HP Technical Support or an Authorized Reseller (on page 177)"


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?
No
Yes
(5) Break server down to minimal configuration.
Yes
Does condition still exist?
No
(6) Troubleshoot or replace basic server spare parts.
Yes
Does condition still exist?
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.

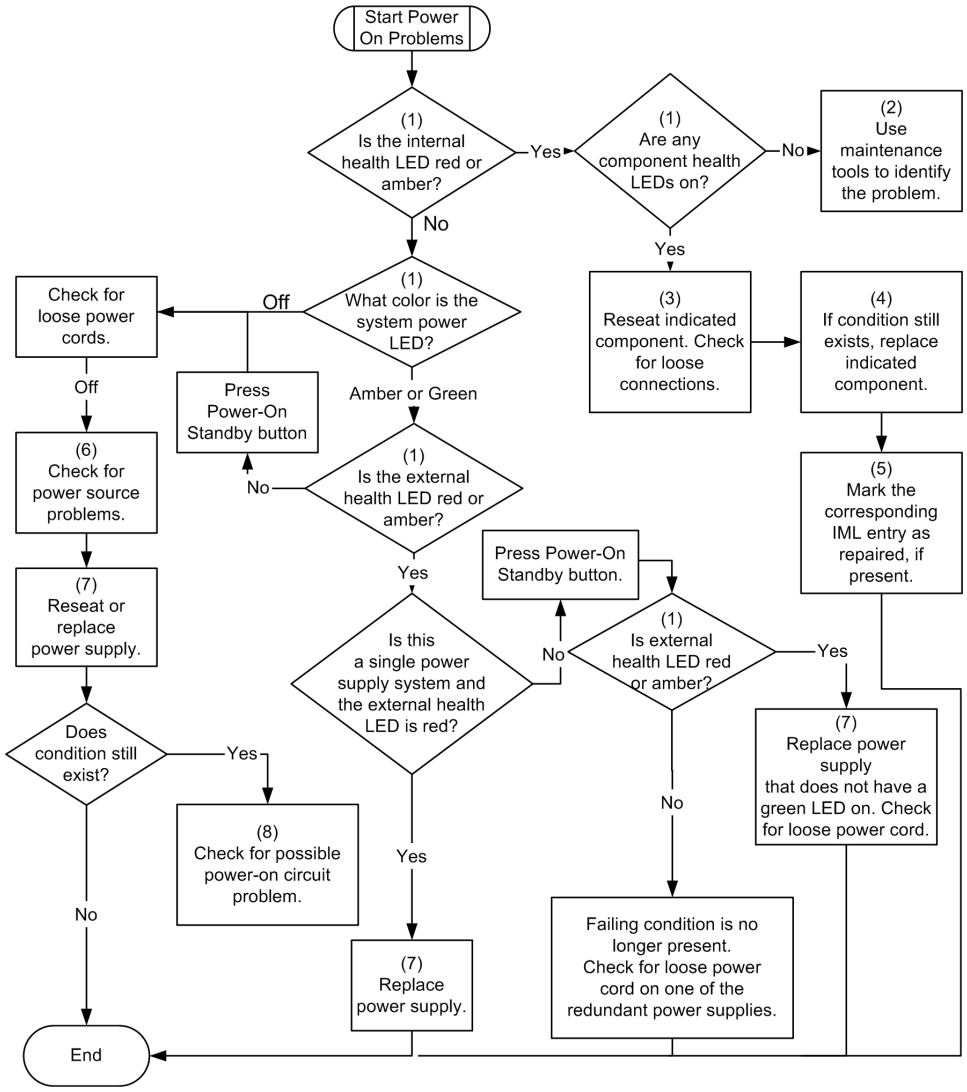
NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

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 or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms).
2	"HP Insight Diagnostics (on page 117)"
3	"Loose Connections (on page 145)"
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 117)"
6	"Power Source Problems (on page 142)"

Item	Refer to
7	• "Power Supply Problems (on page 143)" • 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 (on page 162)"


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

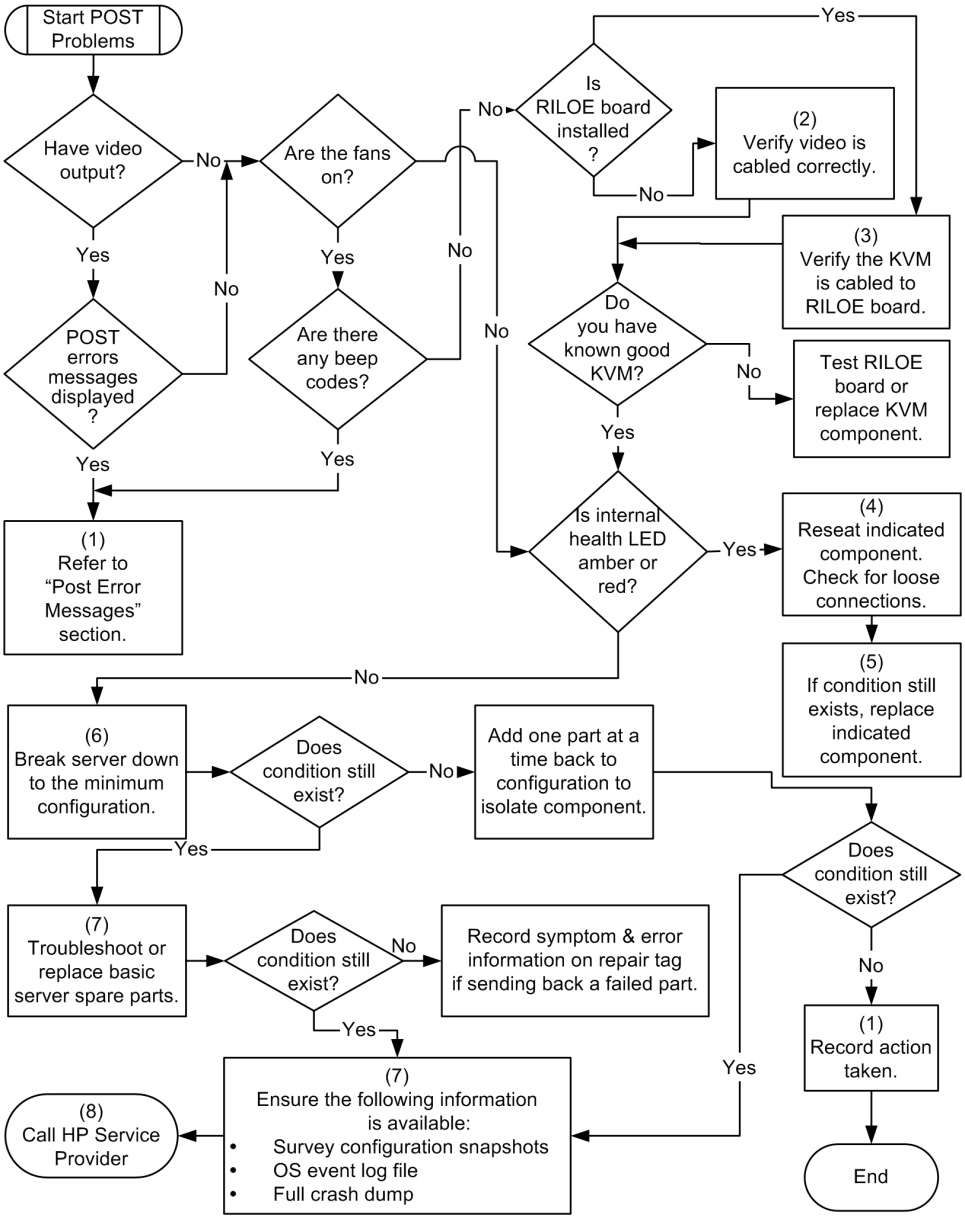
  NOTE: The server has completed POST when the system attempts to access the boot device.

- 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"
2	"Video Problems (on page 163)"
3	KVM or RILOE documentation
4	"Loose Connections (on page 145)"
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 (on page 142)" • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)


Start POST Problems
Have video output?
No
Are the fans on?
No
Is RILOE board installed ?
Yes
No
(2) Verify video is cabled correctly.
(3) Verify the KVM is cabled to RILOE board.
Yes
Yes
No
No
POST errors messages displayed ?
Are there any beep codes?
No
Do you have known good KVM?
No
Test RILOE board or replace KVM component.
Yes
Yes
Yes
(1) Refer to "Post Error Messages" section.
Is internal health LED amber or red?
Yes
(4) Reseat indicated component. Check for loose connections.
(5) If condition still exists, replace indicated component.
No
(6) Break server down to the minimum configuration.
Does condition still exist?
No
Add one part at a time back to configuration to isolate component.
Yes
Does condition still exist?
(7) Troubleshoot or replace basic server spare parts.
Does condition still exist?
No
Record symptom & error information on repair tag if sending back a failed part.
No
(1) Record action taken.
Yes
Yes
(7) Ensure the following information is available:
• Survey configuration snapshots
• OS event log file
• Full crash dump
(8) Call HP Service Provider
End

OS Boot Problems Flowchart

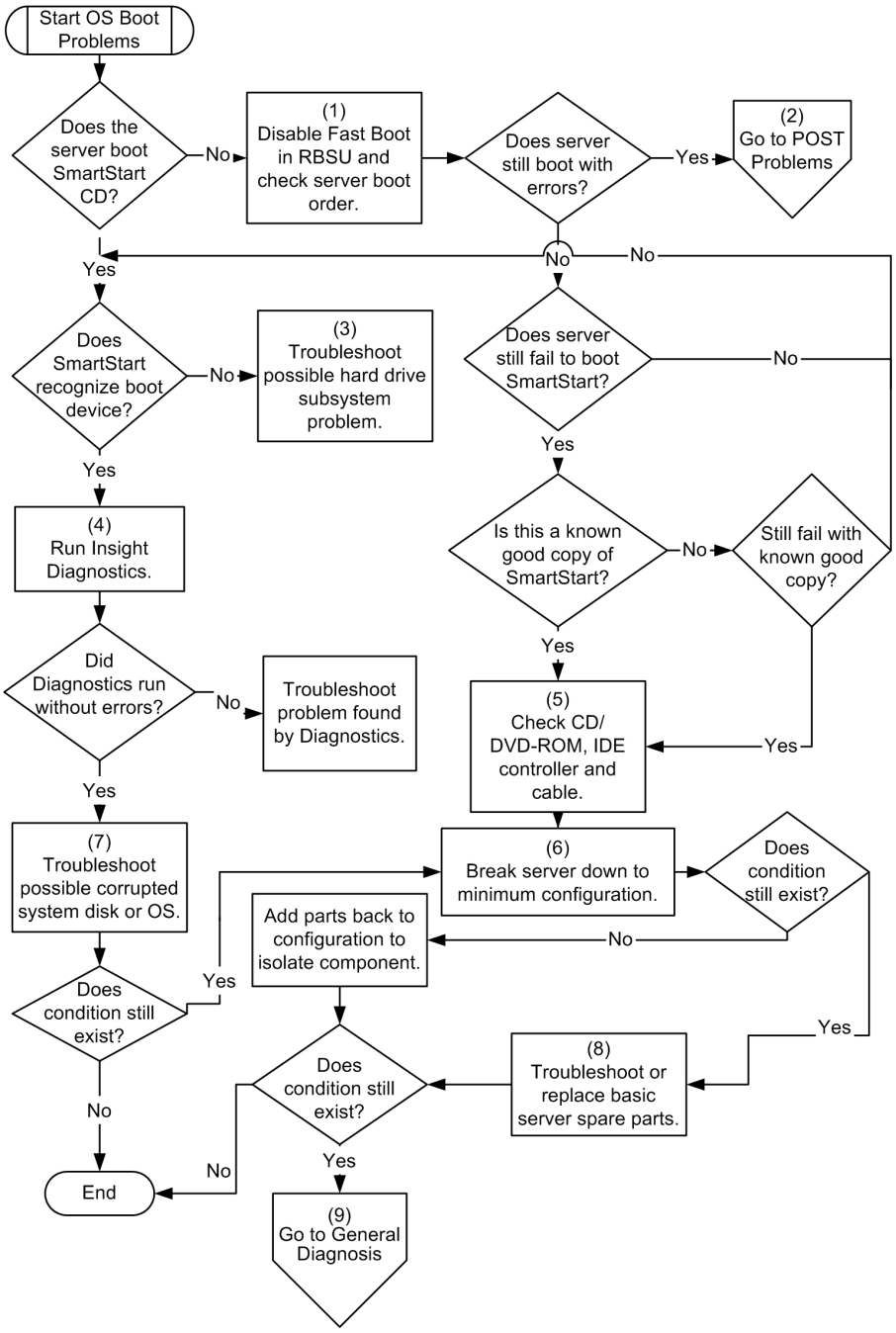
Symptoms:

- 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 134)"
3	• "Hard Drive Problems (on page 156)" • Controller documentation
4	"HP Insight Diagnostics (on page 117)"
5	• "Loose Connections (on page 145)" • "CD-ROM and DVD Drive Problems (on page 149)" • 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 (on page 169)" • "Contacting HP Technical Support or an Authorized Reseller (on page 177)"
8	• "Hardware Problems (on page 142)" • 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 129)"


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
Does SmartStart recognize boot device?
No
(3) Troubleshoot possible hard drive subsystem problem.
Does server still fail to boot SmartStart?
No
Yes
(4) Run Insight Diagnostics.
Is this a known good copy of SmartStart?
No
Still fail with known good copy?
Did Diagnostics run without errors?
No
Troubleshoot problem found by Diagnostics.
Yes
(5) Check CD/ DVD-ROM, IDE controller and cable.
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
Yes
No
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 114)
- Server boots, but the internal health LED or external health LED is red or amber

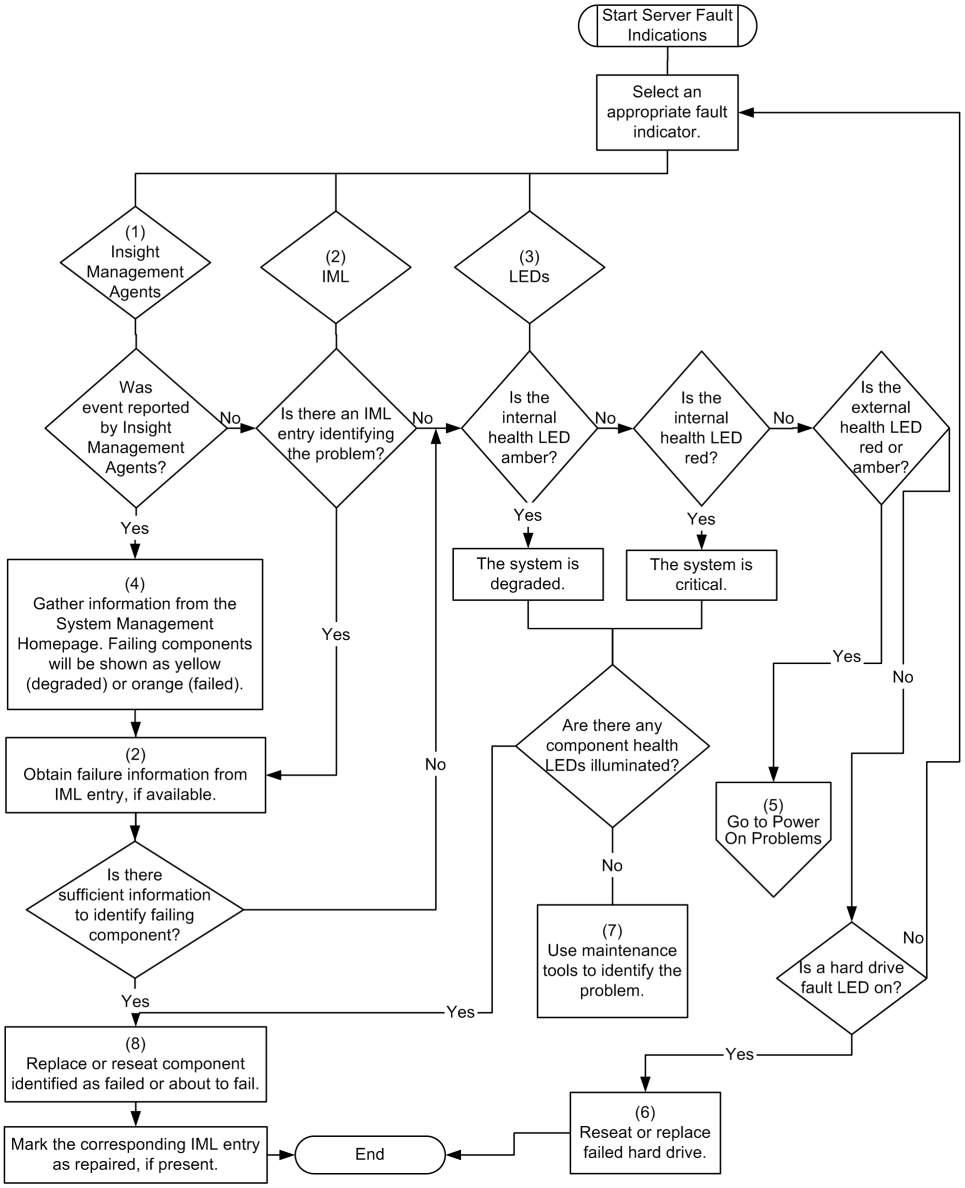
  NOTE: For the location of server LEDs and information on their statuses, refer to the server documentation.

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 114)"
2	• "Integrated Management Log (on page 117)" • "Event List Error Messages"
3	Server user guide or setup and installation 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 131)"
6	• "Hard Drive Problems (on page 156)" • 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 117)"

Item	Refer to
8	• "Hardware Problems (on page 142)" • 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
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).
Yes
Yes
No
(2) Obtain failure information from IML entry, if available.
No
Are there any component health LEDs illuminated?
(5) Go to Power On Problems
Is there sufficient information to identify failing component?
No
(7) Use maintenance tools to identify the problem.
No
Is a hard drive fault LED on?
Yes
Yes
Yes
(8) Replace or reseat component identified as failed or about to fail.
(6) Reseat or replace failed hard drive.
Mark the corresponding IML entry as repaired, if present.
End

Procedures for All ProLiant Servers

The procedures in this section are comprehensive and include steps about or references to hardware features that may not be supported by the server you are troubleshooting.

Hardware Problems

Power Problems (on page 142)

General Hardware Problems (on page 144)

Internal System Problems (on page 148)

External Device Problems (on page 163)

Power Problems

List of Problems:

Power Source Problems

Action:

1. Press the Power On/Standby button to be sure it is on. If the server has a Power On/Standby button that returns to its original position after being pressed, be sure you press the switch firmly.
2. Plug another device into the grounded power outlet to be sure the outlet works. Also, be sure the power source meets applicable standards.
3. Replace the power cord with a known functional power cord to be sure it is not faulty.
4. Replace the power strip with a known functional power strip to be sure it is not faulty.

5. Have a qualified electrician check the line voltage to be sure it meets the required specifications.
6. Be sure the proper circuit breaker is in the On position.

Power Supply Problems

Action:

1. Be sure no loose connections (on page 145) exist.
2. If the power supplies have LEDs, be sure they indicate that each power supply is working properly. Refer to the server documentation. If LEDs indicate a problem with a power supply, replace the power supply.
3. Be sure the system has enough power, particularly if you recently added hardware, such as hard drives. Additional power supplies may be required. Check the system information from the IML and use the server documentation for product-specific information.

UPS Problems

List of Problems:

UPS is not working properly

Action:

1. Be sure the UPS batteries are charged to the proper level for operation. Refer to the UPS documentation for details.
2. Be sure the UPS power switch is in the On position. Refer to the UPS documentation for the location of the switch.
3. Be sure the UPS software is updated to the latest version. Use the Power Management software located on the Power Management CD.
4. Be sure the correct power cord is the correct type for the UPS and the country in which the server is located. Refer to the UPS reference guide for specifications.
5. Be sure the line cord is connected.

6. Be sure each circuit breaker is in the On position, or replace the fuse if needed. If this occurs repeatedly, contact an authorized service provider.
7. Check the UPS LEDs to be sure a battery or site wiring problem has not occurred. Refer to the UPS documentation.
8. If the UPS sleep mode initiated, disable sleep mode for proper operation. The UPS sleep mode can be turned off through the configuration mode on the front panel.
9. Change the battery to be sure damage was not caused by excessive heat, particularly if a recent air conditioning outage has occurred.

   NOTE: The optimal operating temperature for UPS batteries is 25°C (77°F). For approximately every 8°C to 10°C (16°F to 18°F) average increase in ambient temperature above the optimal temperature, battery life is reduced by 50 percent.

Low battery warning is displayed

Action:

1. Plug the UPS into an AC grounded outlet for at least 24 hours to charge the batteries, and then test the batteries. Replace the batteries if necessary.
2. Be sure the alarm is set appropriately by changing the amount of time given before a low battery warning. Refer to the UPS documentation for instructions.

One or more LEDs on the UPS is red

Action: Refer to the UPS documentation for instructions regarding the specific LED to determine the cause of the error.

General Hardware Problems

List of Problems:

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.

Problems with New Hardware

Action:

1. Refer to the server documentation to be sure the hardware being installed is a supported option on the server. Remove unsupported hardware.
2. Refer to the release notes included with the hardware to be sure the problem is not caused by a last minute change to the hardware release. If no documentation is available, refer to the HP support website (http://www.hp.com/support).
3. Be sure the new hardware is installed properly. Refer to the device, server, and operating system documentation to be sure all requirements are met.

   Common problems include:

   – Incomplete population of a memory bank

   – Installation of a processor without a corresponding PPM

- Installation of a SCSI device without termination or without proper ID settings
- Setting of an IDE device to Master/Slave when the other device is set to Cable Select
- Connection of the data cable, but not the power cable, of a new device

4. Be sure no memory, I/O, or interrupt conflicts exist.
5. Be sure no loose connections (on page 145) exist.
6. Be sure all cables are connected to the correct locations and are the correct lengths. For more information, refer to the server documentation.
7. Be sure other components were not unseated accidentally during the installation of the new hardware component.
8. Be sure all necessary software updates, such as device drivers, ROM updates, and patches, are installed and current. For example, if you are using a Smart Array controller, you need the latest Smart Array Controller device driver.
9. Be sure all device drivers are the correct ones for the hardware. Uninstall any incorrect drivers before installing the correct drivers.
10. Run RBSU after boards or other options are installed or replaced to be sure all system components recognize the changes. If you do not run the utility, you may receive a POST error message indicating a configuration error. After you check the settings in RBSU, save and exit the utility, and then restart the server. Refer to the *HP ROM-Based Setup Utility User Guide* for more information.
11. Be sure all switch settings are set correctly. For additional information about required switch settings, refer to the labels located on the inside of the server access panel or the server documentation.
12. Be sure all boards are properly installed in the server.
13. Run Insight Diagnostics ("HP Insight Diagnostics" on page 117) to see if it recognizes and tests the device.
14. Uninstall the new hardware.

Unknown Problem

Action:

1. Disconnect power to the server.
2. Following the guidelines and cautionary information in the server documentation, strip the server to its most basic configuration by removing every card or device that is not necessary to start the server. Keep the monitor connected to view the server startup process.
3. Reconnect power, and then power the system on.
   - If the video does not work, refer to "Video Problems (on page 163)."

     CAUTION: Only authorized technicians trained by HP should attempt to remove the system board. If you believe the system board requires replacement, contact HP Technical Support before proceeding.
   - If the system fails in this minimum configuration, one of the primary components has failed. If you have already verified that the processor, PPM, power supply, and memory are working before getting to this point, replace the system board. If not, be sure each of those components is working.
   - If the system boots and video is working, add each component back to the server one at a time, restarting the server after each component is added to determine if that component is the cause of the problem. When adding each component back to the server, be sure to disconnect power to the server and follow the guidelines and cautionary information in the server documentation.

Third-Party Device Problems

Action:

1. Refer to the server and operating system documentation to be sure the server and operating system support the device.
2. Be sure the latest device drivers are installed.
3. Refer to the device documentation to be sure the device is properly installed. For example, a third-party PCI or PCI-X board may be required to be installed on the primary PCI or PCI-X bus, respectively.

Testing the Device

Action:

1. Uninstall the device.

   If the server works with the device removed and uninstalled, either a problem exists with the device, the server does not support the device, or a conflict exists with another device.

2. If the device is the only device on a bus, be sure the bus works by installing a different device on the bus.
3. Restarting the server each time to determine if the device is working, move the device:

   a. To a different slot on the same bus (not applicable for PCI Express)

   b. To a PCI, PCI-X, or PCI Express slot on a different bus

   c. To the same slot in another working server of the same or similar design

   If the board works in any of these slots, either the original slot is bad or the board was not properly seated. Reinsert the board into the original slot to verify.

4. If you are testing a board (or a device that connects to a board):

   a. Test the board with all other boards removed.

   b. Test the server with only that board removed.

   CAUTION: Clearing NVRAM deletes the configuration information. Refer to the server documentation for complete instructions before performing this operation or data loss could occur.

5. Clearing NVRAM can resolve various problems. Clear the NVRAM, but do not use the backup .SCI file if prompted. Have available any .CFG, .OVL, or .PCF files that are required.

Internal System Problems

List of Problems:

CD-ROM and DVD Drive Problems

List of Problems:

System does not boot from the drive

Action:

1. Be sure the drive boot order in RBSU is set so that the server boots from the CD-ROM drive first.
2. If the CD-ROM drive jumpers are set to Cable Select (the factory default), be sure the CD-ROM drive is installed as device 0 on the cable so that it is in position for the server to boot from the drive.
3. Be sure no loose connections (on page 145) exist.
4. Be sure the media from which you are attempting to boot is not damaged and is a bootable CD.
5. If attempting to boot from a USB CD-ROM drive:
   - Refer to the operating system and server documentation to be sure both support booting from a USB CD-ROM drive.
   - Be sure legacy support for a USB CD-ROM drive is enabled in RBSU.

Data read from the drive is inconsistent, or drive cannot read data

Action:

1. Clean the drive and media.

2. If a paper or plastic label has been applied to the surface of the CD or DVD in use, remove the label and any adhesive residue.
3. Be sure the inserted CD or DVD format is valid for the drive. For example, be sure you are not inserting a DVD into a drive that only supports CDs.

Drive is not detected

Action:

1. Be sure no loose connections (on page 145) exist.
2. Refer to the drive documentation to be sure cables are connected as required.
3. Be sure the cables are working properly. Replace with known functional cables to test whether the original cables were faulty.
4. Be sure the correct, current driver is installed.

DAT Drive Problems

List of Problems:

Sense error codes are displayed

Action: Refer to the *Troubleshooting DAT Drives* white paper for information on DAT drive sense error codes. Search for it on the HP website (http://www.hp.com).

DAT drive error or failure occurs

Action:

1. Be sure drivers, software, and firmware are upgraded to the latest revisions.
2. Clean the drive at least four times to be sure that the heads are clean and to eliminate dirty heads as the possible cause of the failure.

DAT drives require cleaning every 8 to 25 hours of use or they may fail intermittently when using marginal or bad media. Be sure you are following the proper cleaning procedures described in the device and server documentation.

NOTE: New DAT tapes may contain debris that will contaminate the DAT drive read/write head. If using new tapes for backup, clean the DAT drive frequently.

DAT drive is providing poor performance

Action: Be sure the drive is not being used to backup more data than is recommended for the drive. DAT drives are designed with optimum and maximum data backup sizes. Refer to the drive documentation to determine the appropriate data backup size for the drive.

Latest firmware indicates a defective tape, or head clogs occur regularly

Action: Replace the tape.

Other errors are occurring

Action: Replace the drive.

Diskette Drive Problems

List of Problems:

Diskette drive light stays on

Action:

1. Be sure no loose connections (on page 145) exist.
2. Be sure the diskette is not damaged. Run the diskette utility on the diskette (CHKDSK on some systems).

3. Be sure the diskette is properly inserted. Remove the diskette and reinsert correctly into the drive.
4. Be sure the diskette drive is cabled properly. Refer to the server documentation.

A problem has occurred with a diskette transaction

Action: Be sure the directory structure on the diskette is not bad. Run the diskette utility to check for fragmentation (CHKDSK on some systems).

Diskette drive cannot read a diskette

Action:

1. If the diskette is not formatted, format the diskette.
2. Check the type of drive you are using and be sure you are using the correct diskette type.

Drive is not found

Action: Be sure no loose connections (on page 145) exist with the drive.

Non-system disk message is displayed

Action: Remove the non-system diskette from the drive.

Diskette drive cannot write to a diskette

Action:

1. If the diskette is not formatted, format the diskette.
2. Be sure the diskette is not write protected. If it is, use another diskette or remove the write protection.
3. Be sure you are attempting to write to the proper drive by checking the drive letter in the path statement.
4. Be sure enough space is available on the diskette.

DLT Drive Problems

List of Problems:

Server cannot write to tape

Action:

- If the drive cleaning light is on, clean the drive.

  NOTE: DLT cleaning cartridges are good for only 20 uses. If the cleaning cartridge is near that limit and the drive cleaning light is still on after running the cleaning cartridge, use a new cleaning tape to clean the drive.

- If the tape is write protected, remove the write protection. If the tape still does not work, insert another tape into the drive to see if the original tape is faulty.
- Refer to the tape drive documentation to be sure the type of tape being used is supported by the drive.
- Check each tape cartridge that has been used in the drive to verify its condition and inspect its tape leader to verify it is not damaged and is in the correct position. After you locate any bad cartridges, dispose of them. A working tape drive may drop its leader when using bad cartridges, indicating that they need replacing. If bad cartridges are found, you will need to inspect the DLT drives leader assembly.
  - To examine the cartridge take-up leader, tilt the cartridge receiver door on the front of the drive and look inside to see that the drive leader is connected to the buckling link-hook.
  - To examine the drive take-up leader, tilt the cartridge receiver door on the front of the drive and look inside to see that the drive leader is connected to the buckling link-hook, which should be engaged in the leader slot.

DLT drive failure occurs

Action:

- Be sure the power and signal cables are properly connected.
- Be sure the power and signal cable connectors are not damaged.
- If the drive is connected to a nonembedded controller, be sure the controller is properly seated.

DLT drive does not read tape

Action:

- Be sure the drive is seated.
- Be sure the drive is installed properly.
- Check each tape cartridge that has been used in the drive to see if a leader was dropped. After you locate any bad cartridges, dispose of them. A working tape drive will drop the leader of a bad cartridge, indicating that the cartridge needs replacing.
- Refer to the tape drive documentation to be sure the type of tape being used is supported by the drive.

Server cannot find the DLT drive

Action:

- Be sure a device conflict does not exist. Check for duplicate SCSI IDs in use and refer to the documentation of the DLT drive and the array controller to be sure they are compatible.
- Be sure the maximum number of drives per controller has not been exceeded. Refer to the controller documentation to determine the capacity of the controller.

  NOTE: It is recommended that no more than two DLT drives per bus exist.

- If using an external DLT drive that requires a SCSI terminator to be secured to the unused SCSI IN connector on the back of the drive, be sure the SCSI terminator is connected.

DLT drives can be daisy chained, but do not connect more than three units per SCSI controller. The last DLT drive in the chain requires the SCSI terminator.

- Check cables for damaged or bent connectors.

An error occurs during backup, but the backup is completed

Action: Contact the software vendor for more information about the message. If the error does not disrupt the backup, you may be able to ignore the error.

Fan Problems

List of Problems:

General fan problems are occurring

Action:

1. Be sure the fans are properly seated and working.
   a. Follow the procedures and warnings in the server documentation for removing the access panels and accessing and replacing fans.
   b. Unseat, and then reseat, each fan according to the proper procedures.
   c. Replace the access panels, and then attempt to restart the server.
2. Be sure the fan configuration meets the functional requirements of the server. Refer to the server documentation.
3. Be sure no ventilation problems exist. If you have been operating the server for an extended period of time with the access panel removed, airflow may have been impeded, causing thermal damage to components. Refer to the server documentation for further requirements.
4. Be sure no POST error messages are displayed while booting the server that indicate temperature violation or fan failure information. Refer to the server documentation for the temperature requirements for the server.
5. Access the IML to see if any event list error messages are listed relating to fans.

6. Replace any required non-functioning fans and restart the server. Refer to the server documentation for specifications on fan requirements.
7. Be sure all fan slots have fans or blanks installed. Refer to the server documentation for requirements.
8. Verify the fan airflow path is not blocked by cables or other material.

Hot-plug fan problems are occurring

Action:

1. Check the LEDs to be sure the hot-plug fans are working. Refer to the server documentation for LED information.

   NOTE: For servers with redundant fans, backup fans may spin up periodically to test functionality. This is part of normal redundant fan operation.

2. Be sure no POST error messages are displayed.
3. Be sure hot-plug fan requirements are being met. Refer to the server documentation.

Hard Drive Problems

List of Problems:

System completes POST but hard drive fails

Action:

1. Be sure no loose connections (on page 145) exist.
2. Be sure no device conflict exists.
3. Be sure the hard drive is properly cabled and terminated if necessary.
4. Be sure the SCSI cable is working by replacing it with a known functional cable.

5. Run Insight Diagnostics ("HP Insight Diagnostics" on page 117) and replace failed components as indicated.

Hard drive is not recognized by the server

Action:

1. Check the LEDs on the hard drive to be sure they indicate normal function. Refer to the server documentation or the HP website for information on hard drive LEDs.
2. Be sure no loose connections (on page 145) exist.
3. Remove the hard drive and be sure the configuration jumpers are set properly.
4. If using an array controller, be sure the hard drive is configured in an array. Run the array configuration utility.
5. Be sure the drive is properly configured. Refer to the drive documentation to determine the proper configuration.
6. If it is a non-hot-plug drive, be sure a conflict does not exist with another hard drive. Check for SCSI ID conflicts.
7. Be sure the correct drive controller drivers are installed.

You are unable to access data

Action:

1. Be sure the files are not corrupt. Run the repair utility for the operating system.
2. Be sure no viruses exist on the server. Run a current version of a virus scan utility.

Server response time is slower than usual

Action: Be sure the hard drive is not full, and increase the amount of free space on the hard drive, if needed. It is recommended that hard drives should have a minimum of 15 percent free space.

No hard drives are recognized

Action: Be sure no power problems (on page 142) exist.

A new hard drive is not recognized

Action:

1. Be sure the drive bay is not defective by installing the hard drive in another bay.
2. If the drive has just been added, be sure the drive is supported. Refer to the server documentation or the HP website to determine drives support.
3. Run Insight Diagnostics ("HP Insight Diagnostics" on page 117) and replace failed components as indicated.

Memory Problems

List of Problems:

General memory problems are occurring

Action:

- Be sure the memory meets the server requirements and is installed as required by the server. Some servers may require that memory banks be fully populated or that all memory within a memory bank must be the same size, type, and speed. Refer to the server documentation to determine if the memory is installed properly.
- Check any server LEDs that correspond to memory slots.
- If you are unsure which DIMM has failed, test each bank of DIMMs by removing all other DIMMs. Then, isolate the failed DIMM by switching each DIMM in a bank with a known working DIMM.
- Remove any third-party memory.

- Run Insight Diagnostics to test the memory.

Server is out of memory

Action:

1. Be sure the memory is configured properly. Refer to the application documentation to determine the memory configuration requirements.
2. Be sure no operating system errors are indicated.
3. Be sure a memory count error ("Memory count error exists" on page 159) did not occur. Refer to the message displaying memory count during POST.

Memory count error exists

Possible Cause: The memory modules are not installed correctly.

Action:

1. Be sure the memory modules are supported by the server. Refer to the server documentation.
2. Be sure the memory modules have been installed correctly in the right configuration. Refer to the server documentation.
3. Be sure the memory modules are properly seated.
4. Be sure no operating system errors are indicated.
5. Restart the server and check to see if the error message is still displayed.
6. Run Insight Diagnostics ("HP Insight Diagnostics" on page 117) and replace failed components as indicated.

Server fails to recognize existing memory

Action:

1. Reseat the memory.
2. Be sure the memory is configured properly. Refer to the server documentation.
3. Be sure a memory count error ("Memory count error exists" on page 159) did not occur. Refer to the message displaying memory count during POST.

Server fails to recognize new memory

Action:

1. Be sure the memory is the correct type for the server and is installed according to the server requirements. Refer to the server documentation or HP website (http://www.hp.com).
2. Be sure you have not exceeded the memory limits of the server or operating system. Refer to the server documentation.
3. Be sure no Event List error messages are displayed in the IML ("Integrated Management Log" on page 117).
4. Be sure the memory is properly seated.
5. Be sure no conflicts are occurring with existing memory. Run the server setup utility.
6. Test the memory by installing the memory into a known working server. Be sure the memory meets the requirements of the new server on which you are testing the memory.
7. Replace the memory. Refer to the server documentation.

PPM Problems

Action: If the PPMs are not integrated on the system board:

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. If applicable, check the PPM LEDs to identify if a PPM failure occurred. For information on LEDs, refer to the server documentation.
2. Reseat each PPM, and then restart the server.
3. If reseating the PPMs is not effective, remove all but one PPM, restart the server to see if the PPM is working, and then install each PPM individually, cycling power each time. Follow the warnings and cautionary information in the server documentation.

Processor Problems

Action:

Check the processor error LEDs ("System Board LEDs" on page 17) or internal health LED ("System LEDs and Internal Health LED Combinations" on page 18) to identify if a processor failure occurred.

1. If the server does not boot, the internal health LED is red, one processor is installed, and one processor error LED is illuminated:
   a. Verify the VRMs are installed for each processor.
   b. Verify the DIMMs are installed properly.
   c. Remove all adapter boards and restart the server. If the server boots, install adapter boards one at a time to determine which one prevents the server from booting.
   d. Replace processor 1. If the server restarts, the original processor has failed.
   e. If the server does not boot after following these steps, replace the system board.
2. If the server does not boot, the internal health LED is red, two processors are installed, and one processor error LED is illuminated:
   a. Verify the VRMs are installed for each processor.
   b. Verify the DIMMs are installed properly.
   c. Remove all adapter boards and restart the server. If the server boots, install adapter boards one at a time to determine which one prevents the server from booting.
   d. If the processor error LED is for processor 1, replace processor 1 with the processor in socket 2 and restart the server. If the server boots, the original processor 1 has failed and should be replaced.
   e. If the processor error LED is for processor 2, remove it and restart the server. If the server boots, processor 2 has failed and should be replaced.
   f. If the server does not boot after the following these steps, replace the system board.

3. If the server does not boot, the internal health LED is red, the server has two processors installed, and both processor error LEDs are illuminated:
   a. Verify the VRMs are installed for each processor.
   b. Verify the DIMMs are installed properly.
   c. Remove all adapter boards and restart the server. If the server boots, install adapter boards one at a time to determine which one prevents the server from booting.
   d. Remove processor 2 and restart the server. If the server boots, processor 2 has failed and should be replaced.
   e. Replace processor 1 with the processor from socket 2, and restart the server. If the server boots, the original processor 1 has failed and should be replaced.
   f. If the server does not boot after the following these steps, replace the system board.

System Open Circuits and Short Circuits

Action:

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. Check the server LEDs to see if any statuses indicate the source of the problem. For LED information, refer to the server documentation.
2. Remove all power sources to the server.
3. Be sure no loose connections (on page 145) exist in the area.
4. Be sure each component in the area is working. Refer to the section for each component in this guide.

If you cannot determine the problem by checking the specific area, perform each of the following actions. Restart the server after each action to see if the problem has been corrected.

- Reseat all I/O expansion boards.

- Be sure no loose connections (on page 145) exist in the rest of the server, particularly with the cables that connect to the system board.
- Be sure no foreign material exists, such as screws, bits, or slot bracket blanks, that may be short circuiting components.

External Device Problems

List of Problems:

Video Problems

List of Problems:

Screen is blank for more than 60 seconds after you power up the server

Action:

1. Power up the monitor and be sure the monitor light is on, indicating that the monitor is receiving power.
2. Be sure the monitor power cord is plugged into a working grounded (earthed) AC outlet.
3. Be sure the monitor is cabled to the intended server or KVM connection.
4. Be sure no loose connections (on page 145) exist.
   - For rack-mounted servers, check the cables to the KVM switch and be sure the switch is correctly set for the server. You may need to connect the monitor directly to the server to be sure the KVM switch has not failed.
   - For tower-model servers, check the cable connection from the monitor to the server, and then from the server to the power outlet.

5. Press any key, or type the password, and wait a few moments for the screen to activate to be sure the energy saver feature is not in effect.
6. Be sure the video driver is current. Refer to the third-party video adapter documentation for driver requirements.
7. Be sure a video expansion board, such as a Remote Insight Lights Out Edition board, has not been added to replace onboard video, making it seem like the video is not working. Disconnect the video cable from the onboard video, and then reconnect it to the video jack on the expansion board.

   NOTE: All servers automatically bypass onboard video when a video expansion board is present.

8. Press any key, or type the password, and wait a few moments for the screen to activate to be sure the power-on password feature is not in effect. You can also tell if the power-on password is enabled if a key symbol is displayed on the screen when POST completes.

   If you do not have access to the password, you must disable the power-on password by using the Password Disable switch on the system board. Refer to the server documentation.
9. If the video expansion board is installed in a PCI Hot Plug slot, be sure the slot has power by checking the power LED on the slot, if applicable. Refer to the server documentation.
10. Be sure the server and the operating system support the video expansion board.

Monitor does not function properly with energy saver features

Action: Be sure the monitor supports energy saver features, and if it does not, disable the features.

Video colors are wrong

Action:

- Be sure the 15-pin VGA cable is securely connected to the correct VGA port on the server and to the monitor.
- Be sure the monitor and any KVM switch are compatible with the VGA output of the server.

Slow-moving horizontal lines are displayed

Action: Be sure magnetic field interference is not occurring. Move the monitor away from other monitors or power transformers.

Mouse and Keyboard Problems

Action:

1. Be sure no loose connections (on page 145) exist. If a KVM switching device is in use, be sure the server is properly connected to the switch.
   - For rack-mounted servers, check the cables to the switch box and be sure the switch is correctly set for the server.
   - For tower-model servers, check the cable connection from the input device to the server.
2. If a KVM switching device is in use, be sure all cables and connectors are the proper length and are supported by the switch. Refer to the switch documentation.
3. Be sure the current drivers for the operating system are installed.
4. Be sure the device driver is not corrupted by replacing the driver.
5. Restart the system and check whether the input device functions correctly after the server restarts.
6. Replace the device with a known working equivalent device (another similar mouse or keyboard).
   - If the problem still occurs with the new mouse or keyboard, the connector port on the system I/O board is defective. Replace the board.
   - If the problem no longer occurs, the original input device is defective. Replace the device.
7. Be sure the keyboard or mouse is connected to the correct port. Determine whether the keyboard lights flash at POST or the NumLock LED illuminates. If not, change port connections.
8. Be sure the keyboard or mouse is clean.

Network Controller Problems

List of Problems:

Network controller is installed but not working

Action:

1. Check the network controller LEDs to see if any statuses indicate the source of the problem. For LED information, refer to the network controller documentation.
2. Be sure no loose connections (on page 145) exist.
3. Be sure the network cable is working by replacing it with a known functional cable.
4. Be sure a software problem has not caused failure. Refer to the operating system documentation for guidelines on adding or replacing PCI Hot Plug devices, if applicable.
5. Be sure the server and operating system support the controller. Refer to the server and operating system documentation.
6. Be sure the controller is enabled in RBSU.
7. Check the PCI Hot Plug power LED to be sure the PCI slot is receiving power, if applicable.
8. Be sure the server ROM is up to date.
9. Be sure the controller drivers are up to date.
10. Be sure a valid IP address is assigned to the controller and that the configuration settings are correct.
11. Run Insight Diagnostics ("HP Insight Diagnostics" on page 117) and replace failed components as indicated.

Network controller has stopped working

Action:

1. Check the network controller LEDs to see if any statuses indicate the source of the problem. For LED information, refer to the network controller documentation.
2. Be sure the correct network driver is installed for the controller and that the driver file is not corrupted. Reinstall the driver.
3. Be sure no loose connections (on page 145) exist.
4. Be sure the network cable is working by replacing it with a known functional cable.
5. Check the PCI Hot Plug power LED to be sure the PCI slot is receiving power, if applicable.
6. Be sure the network controller is not damaged.
7. Run Insight Diagnostics ("HP Insight Diagnostics" on page 117) and replace failed components as indicated.

Network controller stopped working when an expansion board was added

Action:

1. Be sure no loose connections (on page 145) exist.
2. Be sure the server and operating system support the controller. Refer to the server and operating system documentation.
3. Be sure the new expansion board has not changed the server configuration, requiring reinstallation of the network driver.
   a. Uninstall the network controller driver for the malfunctioning controller in the operating system.
   b. Restart the server, run RBSU, and be sure the server recognizes the controller and resources are available for the controller.
   c. Restart the server, and then reinstall the network driver.
4. Refer to the operating system documentation to be sure the correct drivers are installed.

5. Refer to the operating system documentation to be sure that the driver parameters match the configuration of the network controller.

Problems are occurring with the network interconnect blades

Action: Be sure the network interconnect blades are properly seated and connected.

Software Problems

The best sources of information for software problems are the operating system and application software documentation, which may also point to fault detection tools that report errors and preserve the system configuration.

Other useful resources include HP Insight Diagnostics and HP SIM. Use either utility to gather critical system hardware and software information and to help with problem diagnosis.

> **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.

Refer to "Software and Option Resources" for more information.

Operating Systems

Operating System Problems (on page 169)

Operating System Updates (on page 170)

Restoring to a Backed-Up Version (on page 170)

When to Reconfigure or Reload Software (on page 171)

Linux Operating Systems (on page 172)

Operating System Problems

List of Problems:

Operating system locks up

Action: Scan for viruses with an updated virus scan utility.

Errors are displayed in the error log

Action: Follow the information provided in the error log, and then refer to the operating system documentation.

Problems occur after the installation of a service pack

Action: Follow the instructions for updating the operating system ("Operating System Updates" on page 170).

You are unable to bind NICs during the Protocols Interview with a Factory-Installed Novell NetWare 5 operating system

Action: Be sure the packet receive buffers are set high enough. Toggle over to the console during the Protocols Interview and adjust these values to a higher setting that allows you to bind the NICs. A minimum setting of 50 buffers per port is recommended, and the maximum setting should be 125 more than the minimum. To make the setting changes:

1. Type the following commands at the System Console screen (where *XXX* is the new numeric value):

   Set Minimum Packet Receive Buffers=XXX

   Set Maximum Packet Receive Buffers=XXX

2. Add the commands to the STARTUP.NCF file.

NOTE: When gigabit NICs are installed, the minimum buffers should be set to at least 500, and the maximum to at least 2000.

NetWare attempts to load MEGA4 XX.HAM or 120PCI.HAM during installation, and a RILOE II board is installed

Action: No action is required. This occurrence does not impact the installation of NetWare.

Operating System Updates

Use care when applying operating system updates (Service Packs, hotfixes, and patches). Before updating the operating system, read the release notes for each update. If you do not require specific fixes from the update, it is recommended that you do **not** apply the updates. Some updates overwrite files specific to HP.

If you decide to apply an operating system update:

1. Perform a full system backup.
2. Apply the operating system update, using the instructions provided.
3. Install the current drivers.

If you apply the update and have problems, refer to the Software and Drivers Download website (http://h18007.www1.hp.com/support/files/server) to find files to correct the problems.

Restoring to a Backed-Up Version

If you recently upgraded the operating system or software and cannot resolve the problem, you can try restoring a previously saved version of the system. Before restoring the backup, make a backup of the current system. If restoring the previous system does not correct the problem, you can restore the current set to be sure you do not lose additional functionality.

Refer to the documentation provided with the backup software.

When to Reconfigure or Reload Software

If all other options have not resolved the problem, consider reconfiguring the system. Before you take this step:

1. Weigh the projected downtime of a software reload against the time spent troubleshooting intermittent problems. It may be advantageous to start over by removing and reinstalling the problem software, or in some cases by using the System Erase Utility and reinstalling all system software.

   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.

2. Be sure the server has adequate resources (processor speed, hard drive space, and memory) for the software.
3. Be sure the server ROM is current and the configuration is correct.
4. Be sure you have printed records of all troubleshooting information you have collected to this point.
5. Be sure you have two good backups before you start. Test the backups using a backup utility.
6. Check the operating system and application software resources to be sure you have the latest information.
7. If the last-known functioning configuration does not work, try to recover the system with operating system recovery software:

   – Microsoft® operating systems:

   Windows® 2003—Automated System Recovery Diskette. If the operating system was factory-installed, click **Start>All Programs>Accessories>System Tools** to access the backup utility. Refer to the operating system documentation for more information.

   Windows® 2000—Emergency Repair Diskette. If the operating system was factory-installed, click **Start>Programs>System Tools** to access the Emergency Repair Disk Utility. Refer to the operating system documentation for more information.

- Novell NetWare—Repair traditional volumes with VREPAIR. On NetWare 5.X systems, repair NSS volumes with the NSS menu command, and on NetWare 6 systems, repair NSS volumes using the `NSS/PoolVerify` command followed by the `NSS/PoolRebuild` command, if necessary. Refer to the NetWare documentation for more information.
- Caldera UnixWare and SCO OpenServer from Caldera—Emergency boot diskette. Refer to the Caldera UnixWare or SCO OpenServer from Caldera documentation for more information.
- Linux—Refer to the operating system documentation for information.

Linux Operating Systems

For troubleshooting information specific to Linux operating systems, refer to the Linux for ProLiant website (http://h18000.www1.hp.com/products/servers/linux).

Application Software Problems

List of Problems:

Software locks up

Action:

1. Check the application log and operating system log for entries indicating why the software failed.
2. Check for incompatibility with other software on the server.
3. Check the support website of the software vendor for known problems.
4. Review log files for changes made to the server which may have caused the problem.
5. Scan the server for viruses with an updated virus scan utility.

Errors occur after a software setting is changed

Action: Check the system logs to determine what changes were made, and then change settings to the original configuration.

Errors occur after the system software is changed

Action: Change settings to the original configuration. If more than one setting was changed, change the settings one at a time to isolate the cause of the problem.

Errors occur after an application is installed

Action:

- Check the application log and operating system log for entries indicating why the software failed.
- Check system settings to determine if they are the cause of the error. You may need to obtain the settings from the server setup utility and manually set the software switches. Refer to the application documentation, the vendor website, or both.
- Check for overwritten files. Refer to the application documentation to find out which files are added by the application.
- Reinstall the application.
- Be sure you have the most current drivers.

Clustering Software

If the server uses cluster software, such as Microsoft® Cluster Server or Novell Cluster Services, refer to the documentation provided with the application for cluster troubleshooting information. Check the Microsoft or Novell website for software troubleshooting information and frequently asked questions.

Run the Cluster Monitor integrated with Insight Manager 7 to collect information on cluster configurations.

Refer to the High Availability website (http://h18004.www1.hp.com/solutions/enterprise/highavailability) for a number of technical documents relating to clusters.

Maintaining Current Drivers

Depending on the operating system, drivers are available through individual download or in packages. Refer to the Software and Drivers Download website (http://h18007.www1.hp.com/support/files/server) or the SmartStart CD to find these driver files.

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

NOTE: If you are installing drivers from the SmartStart 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.

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.

Some driver packages are also available through ActiveUpdate (http://h18000.www1.hp.com/products/servers/management/activeupdate).

NOTE: ActiveUpdate can operate only on a system running a Microsoft® Windows® operating system.

- Microsoft® operating systems—PSPs are available for servers running Windows® Server 2003. SSDs are also available for other versions of Microsoft® Windows® operating systems.
- Novell NetWare—PSPs are available for servers running the latest versions of Novell NetWare. SSDs are available for previous versions of the Novell NetWare operating system.
- Caldera UnixWare and SCO OpenServer from Caldera—EFSs are available for servers running Caldera and SCO operating systems.
- Linux—PSPs are available for servers running the latest Linux versions. For versions not supported by PSPs, drivers are available for individual download (http://h18000.www1.hp.com/products/servers/linux/softwaredrivers.html).

Remote ROM Flash Problems

List of Problems:

General remote ROM flash problems are occurring

Action: Be sure you follow these requirements for using the Remote ROM flash utility:

- A local administrative client system that is running the Windows® 2000 or Windows® Server 2003 operating system
- One or more remote servers with system ROMs requiring upgrade
- An administrative user account on each target system. The administrative account must have the same username and password as the local administrative client system.
- All target systems are connected to the same network and use protocols that enable them to be seen from the administrative client.
- Each target system has a system partition that is at least 32 MB in size.
- Verification that the ROM version to which you are upgrading can be used for all the servers or array controllers that you are upgrading.
- Follow the instructions for the Remote ROM Flash procedure that accompany the software.

Command-line syntax error

If the correct command-line syntax is not used, an error message describing the incorrect syntax is displayed and the program exits. Correct the syntax, and then restart the process.

Invalid or incorrect command-line parameters

If incorrect parameters are passed into command-line options, an error message describing the invalid or incorrect parameter is displayed and the program exits (Example: Invalid source path for system configuration or ROMPaq files). Correct the invalid parameter, and then restart the process.

Access denied on target computer

If you specify a networked target computer for which you do not have administrative privileges, an error message is displayed describing the problem, and then the program exits. Obtain administrative privileges for the target computer, and then restart the process. Be sure the remote registry service is running on a Windows®-based system.

Network connection fails on remote communication

Because network connectivity cannot be guaranteed, it is possible for the administrative client to become disconnected from the target server during the ROM flash preparation. If any remote connectivity procedure fails during the ROM flash online preparation, the ROM flash does not occur for the target system. An error message describing the broken connection displays and the program exits. Attempt to ascertain and correct the cause of connection failure, and then restart the process.

Failure occurs during ROM flash

After the online flash preparation has been successfully completed, the system ROM is flashed offline. The flash cannot be interrupted during this process or the ROM image is corrupted and the server does not start. The most likely reason for failure is a loss of power to the system during the flash process. Initiate ROMPaq disaster recovery procedures.

Target system is not supported

If the target system is not listed in the supported servers list, an error message is displayed and the program exits. Only supported systems can be upgraded using the Remote ROM Flash utility. To see if the server is supported, refer to the Software and Drivers Download website (http://h18007.www1.hp.com/support/files/server).

Erasing the System

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 System Erase Utility if you must 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://h18007.www1.hp.com/support/files/server) or the Maintenance Utilities menu of the SmartStart CD.

Contacting HP

Contacting HP Technical Support or an Authorized Reseller (on page 177)

Server Information You Need (on page 178)

Contacting HP Technical Support or an Authorized Reseller

Contact HP only if, after completing the procedures described in this guide, the problem with the server remains.

IMPORTANT: Collect the appropriate server information ("Server Information You Need" on page 178) and operating system information ("Operating System Information You Need" on page 179) before contacting HP for support.

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 the HP Technical Support Phone Center at 1-800-633-3600. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
- 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).

Server Information You Need

Before contacting HP, collect the following:

- All information from any troubleshooting efforts to this point.
- A printed copy of the system and operating environment information and a copy of any historical data that might be relevant. If possible, obtain an electronic copy of this information to send by e-mail to a support specialist. To collect this information, run the Survey Utility (if available) and refer to the server documentation.
- A list of the system components:
  - Product, model, and serial number
  - Hardware configuration
  - Add-on boards
  - Monitor
  - Connected peripherals such as tape drives
- A list of all third-party hardware and software:
  - Complete product name and model
  - Complete company name

  - Product version
  - Driver version
- Any notes describing the details of the problem, including recent changes to the system, the events that triggered or are associated with the problem, and the steps needed to reproduce the problem.
- Notes on anything nonstandard about the server setup.
- Operating system information ("Operating System Information You Need" on page 179)

Operating System Information You Need

Depending on the problem, you may be asked for certain pieces of information. Be prepared to access the information listed in the following sections, based on operating system used.

Microsoft® Operating Systems

Collect the following information:

- Whether the operating system was factory installed
- Operating system version number
- A current copy of the following files:
  - WinMSD (Msinfo32.exe on Microsoft® Windows® 2000 systems)
  - Boot.ini
  - Memory.dmp
  - Event logs
  - Dr. Watson log (drwtsn32.log) if a user mode application, such as the Insight Agents, is having a problem
  - IRQ and I/O address information in text format
- An updated Emergency Repair Diskette
- If HP drivers are installed:
  - Version of the PSP used

  - List of drivers from the PSP
- The drive subsystem and file system information:
  - Number and size of partitions and logical drives
  - File system on each logical drive
- Current level of Microsoft® Windows® Service Packs and Hotfixes installed
- A list of each third-party hardware component installed, with the firmware revision
- A list of each third-party software component installed, with the version
- A detailed description of the problem and any associated error messages

Linux Operating Systems

Collect the following information:

- Operating system distribution and version

  Look for a file named /etc/*distribution*-release (for example, /etc/redhat-release)
- Kernel version in use
- Output from the following commands (performed by root):
  - lspci -v
  - uname -a
  - cat /proc/meminfo
  - cat /proc/cpuinfo
  - rpm -ga
  - dmesg
  - lsmod
  - ps -ef
  - ifconfig -a
  - chkconfig -list

  - mount
- Contents of the following files:
  - /var/log/messages
  - /etc/modules.conf or etc/conf.modules
  - /etc/lilo.conf or /etc/grub.conf
  - /etc/fstab
- If HP drivers are installed:
  - Version of the PSP used
  - List of drivers from the PSP (/var/log/hppldu.log)
- A list of each third-party hardware component installed, with the firmware revisions
- A list of each third-party software component installed, with the versions
- A detailed description of the problem and any associated error messages

Novell NetWare Operating Systems

Collect the following information:

- Whether the operating system was factory installed
- Operating system version number
- Printouts or electronic copies (to e-mail to a support technician) of AUTOEXEC.NCF, STARTUP.NCF, and the system directory
- A list of the modules. Use CONLOG.NLM to identify the modules and to check whether errors occur when the modules attempt to load.
- A list of any SET parameters that are different from the NetWare default settings
- A list of the drivers and NLM files used on the server, including the names, versions, dates, and sizes (can be taken directly from the CONFIG.TXT or SURVEY.TXT files)
- If HP drivers are installed:

  - Version of the PSP used
  - List of drivers from the PSP
- Printouts or electronic copies (to e-mail to a support technician) of:
  - SYS:SYSTEM\SYS$LOG.ERR
  - SYS:SYSTEM\ABEND.LOG
  - SYS:ETC\CPQLOG.LOG
  - SYS:SYSTEM\CONFIG.TXT
  - SYS:SYSTEM\SURVEY.TXT
- Current patch level
- A list of each third-party hardware component installed, with the firmware revisions
- A list of each third-party software component installed, with the versions
- A detailed description of the problem and any associated error messages

SCO Operating Systems

Collect the following information:

- Installed system software versions (TCP/IP, VP/Ix)
- Process status at time of failure, if possible
- Printouts or electronic copies (to e-mail to a support technician) of:
  - Output of `/etc/hwconfig` command
  - Output of `/usr/bin/swconfig` command
  - Output of `/etc/ifconfig` command
  - /etc/conf/cf.d/sdevice
  - /etc/inittab
  - /etc/conf/cf.d/stune
  - /etc/conf/cf.d/config.h

  - /etc/conf/cf.d/sdevice
  - /var/adm/messages (if PANIC messages are displayed)
- If HP drivers are installed:
  - Version of the EFS used
  - List of drivers from the EFS
- If management agents are installed, version number of the agents
- System dumps, if they can be obtained (in case of panics)
- A list of each third-party hardware component installed, with the firmware revisions
- A list of each third-party software component installed, with the versions
- A detailed description of the problem and any associated error messages

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:

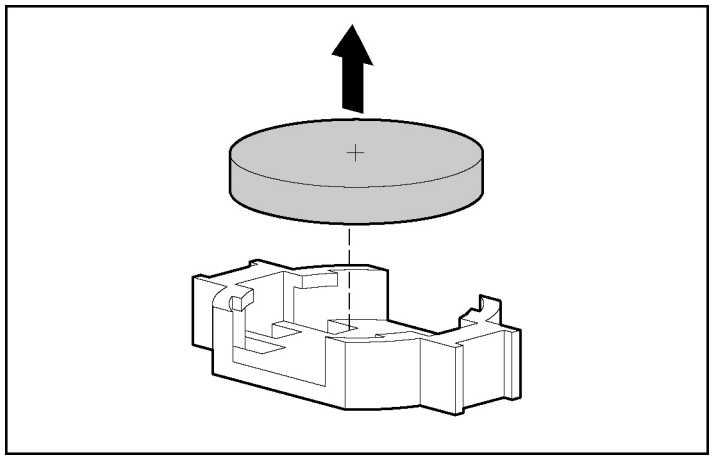
- **Do not attempt to recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

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 28).
4. Remove the PCI riser cage.

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

5. Remove the battery.



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

To replace the component, reverse the removal procedure.

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

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
- 1-800-652-6672 (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.

Mouse Compliance Statement

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.

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 Notice

CE

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and, if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22)—Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11)—Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2)—Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3)—Power Line Flicker
- EN 60950 (IEC60950)—Product Safety

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

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

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:

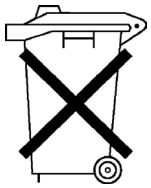
- **Do not try to open the module enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only HP Authorized Service technicians to repair the unit.**

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.

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 your authorized reseller.

Server Specifications

In This Section

Server Specifications

Dimensions	
Height	8.59 cm (3.38 in)
Depth	65.41 cm (25.75 in)
Width	44.45 cm (17.50 in)
Weight (maximum)	40.8 kg (90 lb)
Weight (no drives installed)	24.9 kg (55 lb)
Input requirements	
Rated input voltage	100 VAC to 240 VAC *
Rated input frequency	47 Hz to 63 Hz
Rated input current	10 A (100 V) to 5 A (200 V)
Rated input power	1000 W
BTUs per hour	2730
Power supply output	
Rated steady-state power	400 W
Maximum peak power	800 W

* 100 to 127 VAC is required for 10 A; 200 to 240 VAC is required for 5 A.

Environmental Specifications

Temperature range	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
NOTE: All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed.	
Relative humidity (noncondensing)	
Operating	10% to 90%
Non-operating	5% to 95%
NOTE: Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.	

Technical Support

In This Section

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 the HP Technical Support Phone Center at 1-800-633-3600. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
- 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).

Before You Contact HP

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)

- Product serial number
- Product model name and number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

Acronyms and Abbreviations

ABEND

abnormal end

ACU

Array Configuration Utility

ASR

Automatic Server Recovery

DDR

double data rate

DIMM

dual inline memory module

ECC

error checking and correcting

HBA

host bus adapter

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

IPL

initial program load

IRQ

interrupt request

LDAP

Lightweight Directory Access Protocol

MPS

multi-processor specification

NEMA

National Electrical Manufacturers Association

NFPA

National Fire Protection Association

NIC

network interface controller

NMI

non-maskable interrupt

NVRAM

non-volatile memory

ORCA

Option ROM Configuration for Arrays

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

SDRAM

synchronous dynamic RAM

SIM

Systems Insight Manager

TMRA

recommended ambient operating temperature

UID

unit identification

VHDCI

very high density cable interconnect

WOL

Wake-on LAN

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