HP ProLiant ML310 Generation 3 Server User Guide

September 2005 (First Edition)
Part Number 393772-001

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Server component identification

In this section

Front panel components

Item	Description
1	Media bays (bezel blanks)
2	Power On/Standby button
3	Hard drive bays
4	USB connectors (2)
5	Bezel lock
6	CD-ROM drive

Front panel LEDs and buttons
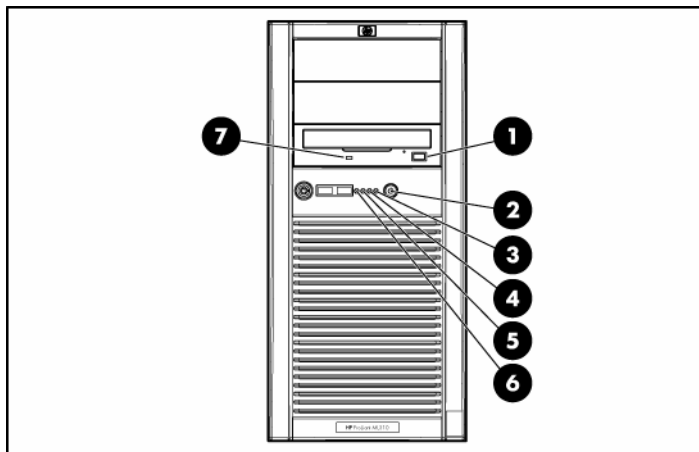
Item	Description	Status
1	CD-ROM drive ejector button	N/A
2	Power On/Standby button	N/A
3	Power on/Standby LED	Amber = System has AC power and is in standby mode Green = System has AC power and is functioning Off = System has no AC power

Item	Description	Status
4	Hard drive activity LED (for non-hot-plug)	Green = Hard drives are properly connected and functioning Off = No hard drive activity
5	NIC link/activity LED	Green = Linked to network Flashing green = Linked with activity on the network Off = No network connection
6	Internal system health LED	Green = Normal (system on) Amber = System health is degraded Red = System health is critical Off = Normal (system off)
7	CD-ROM drive indicator LED	N/A

Rear panel components
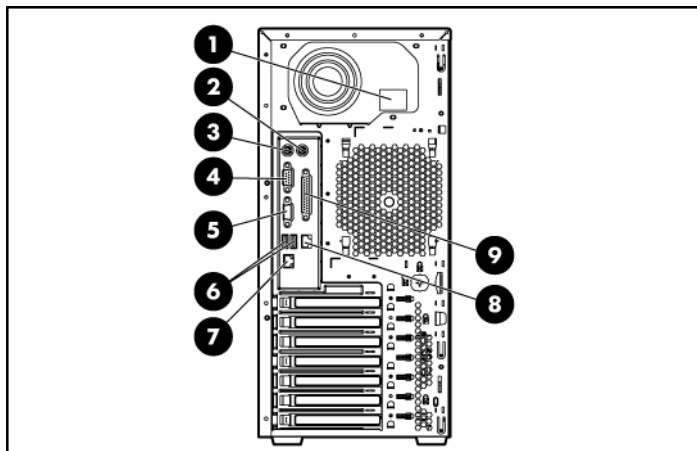
Item	Description
1	Power cord connector
2	Mouse connector
3	Keyboard connector

Item	Description
4	Serial connector
5	Video connector
6	USB connectors (2)
7	RJ-45 Ethernet connector
8	RJ-45 connector (iLO)
9	Parallel connector

Rear panel LEDs
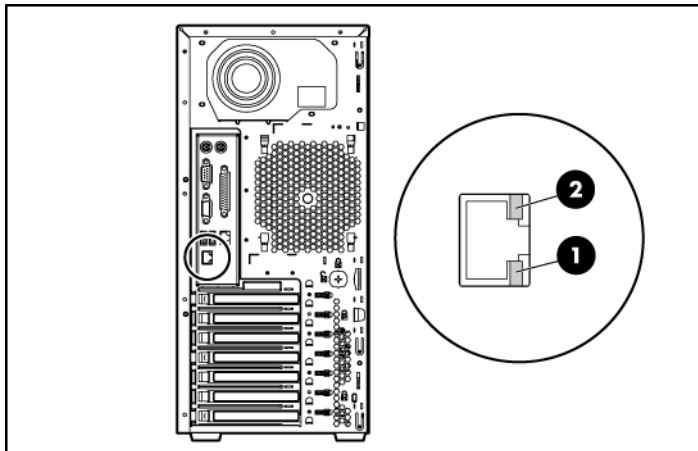
Item	Description	Status
1	NIC link LED	On = Link Off = No link
2	NIC activity LED	Flashing = Activity Off = No activity

System board components
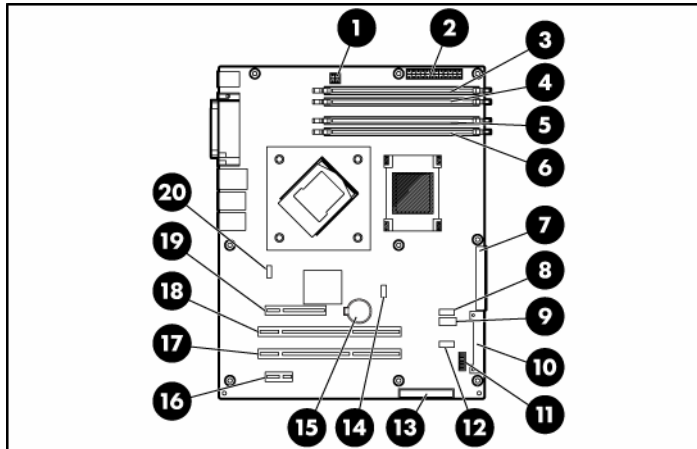
Item	Description
1	Processor power connector
2	System power connector
3	DIMM slot 4 (Channel B)
4	DIMM slot 3 (Channel B)
5	DIMM slot 2 (Channel A)
6	DIMM slot 1 (Channel A)
7	IDE connector
8	Front USB connector
9	USB connector
10	SATA connector
11	System maintenance switch
12	USB tape drive connector
13	Diskette drive connector
14	Processor fan connector
15	System battery

Item	Description
16	Slot 4 PCI Express x1
17	Slot 3 PCI-X
18	Slot 2 PCI-X
19	Slot 1 PCI Express x4*
20	System fan connector

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

System maintenance switch

Position	Default	Function
S1	Off	Off = iLO 2 security is enabled On = iLO 2 security is disabled
S2	Off	Off = System configuration can be changed On = System configuration is locked
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = No function On = Clears power-on password and administrator password
S6	Off	Off = Normal On = ROM treats system configuration as invalid
S7	Off	Reserved
S8	Off	Reserved

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.

For information on emergency ROM backup recovery, refer to ROMPaq disaster recovery (on page).

System board LEDs
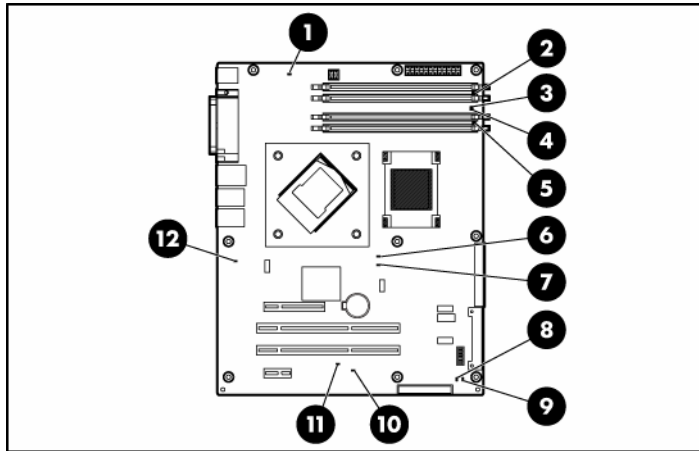
Item	LED description	Status
1	PPM error	Off = Normal Amber = PPM failed or missing
2	DIMM 4 failure	Off = Normal Amber = DIMM 4 has failed or is missing
3	DIMM 3 failure	Off = Normal Amber = DIMM 3 has failed or is missing
4	DIMM 2 failure	Off = Normal Amber = DIMM 2 has failed or is missing

Item	LED description	Status
5	DIMM 1 failure	Off = Normal
		Amber = DIMM 1 has failed or is missing
6	Processor fault	Off = Normal
		Amber = A multibit error has occurred
7	Processor fan failure	Off = Normal
		Amber = Processor fan has failed or is missing
8	AC Power	Off = One of the following conditions exists:
		• No AC power
		• Power supply bad
		• Power supply in standby
		• Power supply exceeded current limits
		Green = Power OK
9	System power	Off = System power off
		Green = system power on
10	System temperature alert	Off = Normal
		Amber = System temperature has exceeded OS cautionary level
11	Single bit error	Off = Normal
		Amber = Single bit error limit has been exceeded
12	System fan failure	Off = Normal
		Amber = System fan has failed or is missing

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 ("Array Diagnostic Utility" on page 72, "HP Insight Diagnostics" on page 72) 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.

SCSI IDs
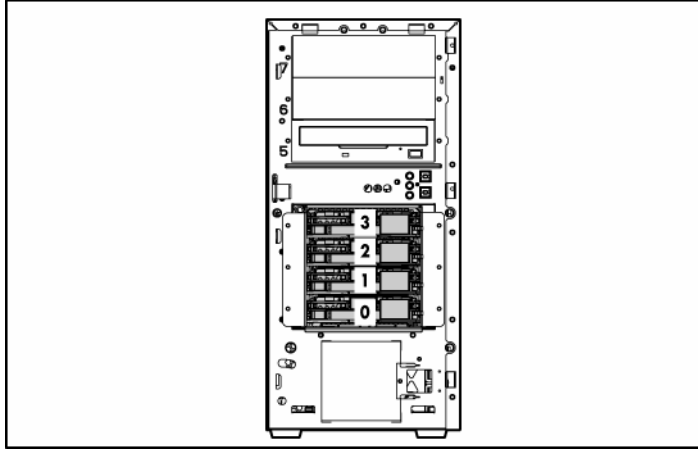
Hot-plug SCSI hard drive LEDs
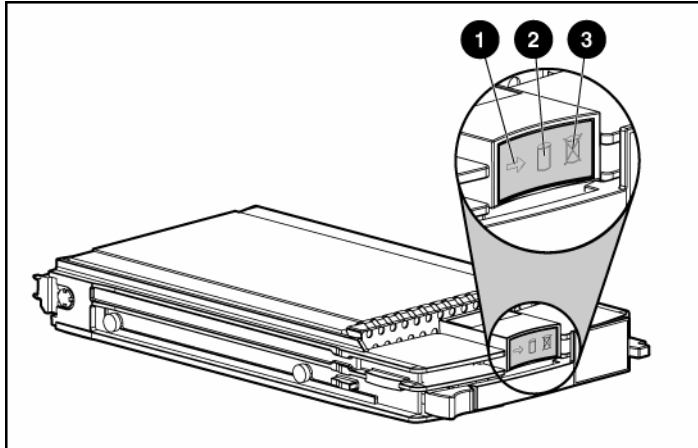
Item	LED description	Status
1	Activity status	On = Drive activity
		Flashing = High activity on the drive or drive is being configured as part of an array.
		Off = No drive activity
2	Online status	On = Drive is part of an array and is currently working.
		Flashing = Drive is actively online.
		Off = 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.

Activity LED (1)	Online LED (2)	Fault LED (3)	Interpretation
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 been placed offline due to hard disk drive failure of subsystem communication failure. You may need 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.

Hot-plug SATA or SAS IDs
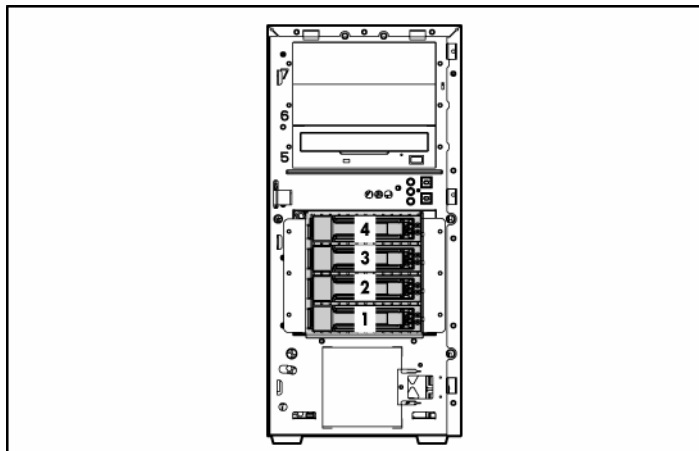
Hot-plug SATA or SAS hard drive LEDs
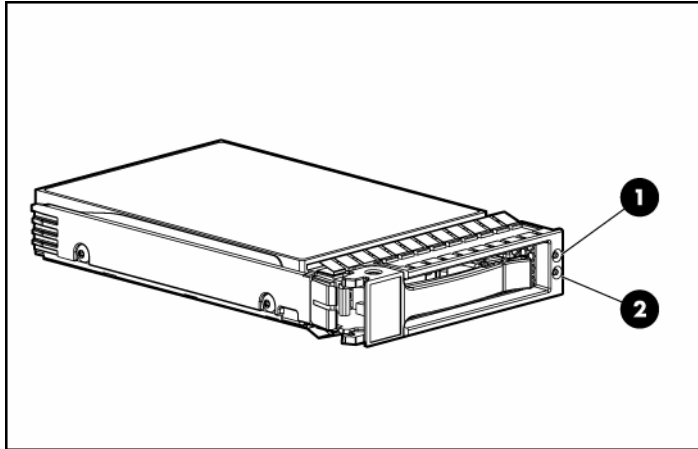
Item	LED Description	Status
1	Fault/UID status	Amber = Drive failure
		Flashing amber = Fault-process activity
		Blue = Unit identification is active
		Off = No fault-process activity
2	Online/Activity status	Green = Drive activity
		Flashing green = High activity on the drive or drive is being configured as part of an array
		Off = No drive activity

Fan locations
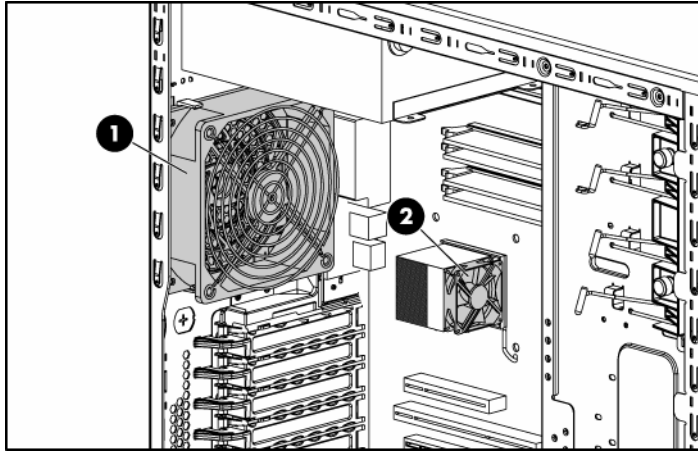
Item	Description
1	System fan
2	Processor fan

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 OS as directed by the OS documentation.

2. Press the Power On/Standby button to place the server in standby mode. When the server enters standby power mode, the system power LED changes to amber.

3. Disconnect the power cords.

The system is now without power.

Unlocking the bezel

The removable bezel must be unlocked and opened before accessing the hard drive cage and before removing the access panel. The bezel must remain closed during normal server operations.
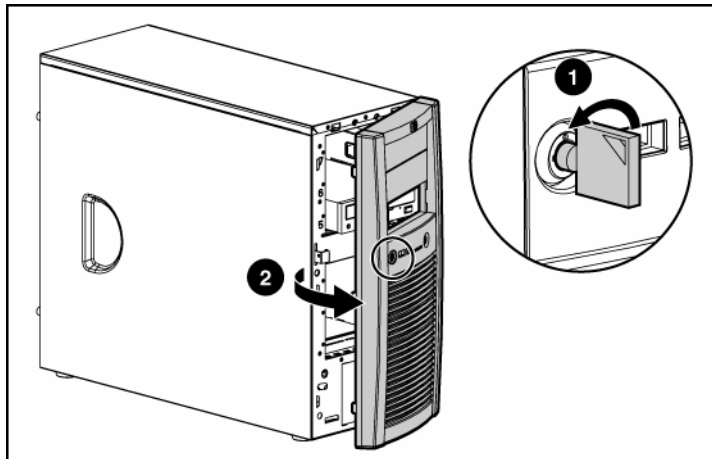
If necessary, remove the bezel.

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 with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

1. Power down the server ("Powering down the server" on page 21).

2. Open the bezel ("Unlocking the bezel" on page 22).

3. Loosen the two thumbscrews.

4. Slide the access panel toward the rear of the server and remove from the server.

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

Installing the access panel

⚠ **CAUTION:** Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

1. Place the access panel on the chassis and slide it toward the front of the server.

2. Tighten the two thumbscrews.

3. Close the bezel ("Unlocking the bezel" on page 22).

📝 **IMPORTANT:** Be sure that the panel is locked into place securely before powering up the server.

4. Power up the server ("Powering up the server" on page 21).

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).

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 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.

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. A third person may be required to help align the server if the server is installed higher than chest level.**

- **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 with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.

Identifying 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 and mouse (not included in all configurations)
- Hardware documentation, Documentation CD, and software media

In addition to the supplied items, you may need:

- Optional hard drives, array controllers, and tape drives
- Operating system or application software
- UPS or 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 35)."

Setting up a server

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.**
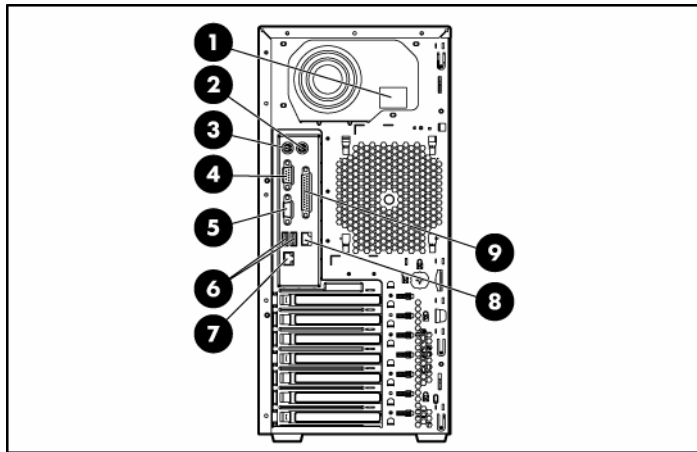
Item	Description
1	Power cord connector
2	Mouse connector
3	Keyboard connector
4	Serial connector
5	Video connector
6	USB connectors (2)
7	RJ-45 Ethernet connector
8	RJ-45 connector (iLO)
9	Parallel connector

2. Connect the power cord to the back of the server.

3. 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.

Press the **F9** key, when prompted during the boot process, to access RBSU ("HP ROM-Based Setup Utility" on page 61) and change the server settings, such as language and operating system. The system is set up by default for the English language.

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

Installing the operating system

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

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

- SmartStart assisted installation—Insert the SmartStart CD into the CD-ROM drive and reboot the server.

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

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

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

Registering the server

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

Hardware options installation

In this section

Introduction

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

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

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

Processor and heatsink

⚠ **CAUTION:** Be sure that you have the current version of the system ROM. Failure to flash the ROM with the correct version before installing or replacing the processor may cause system failure. For the most current version of the ROM, go to the HP website (http://www.hp.com/support).

To install the component:

1. Power down the server ("Powering down the server" on page).

2. Remove the bezel ("Unlocking the bezel" on page).

3. Remove the access panel ("Removing the access panel" on page).

4. Disconnect the fan cable from the system board ("System board components" on page).

5. Open the processor retaining bracket.

6. Place the processor into the processor socket.

7. Close the processor locking lever.

> △ **CAUTION:** To prevent possible server malfunction or damage to the equipment, be sure to completely close the processor locking lever.
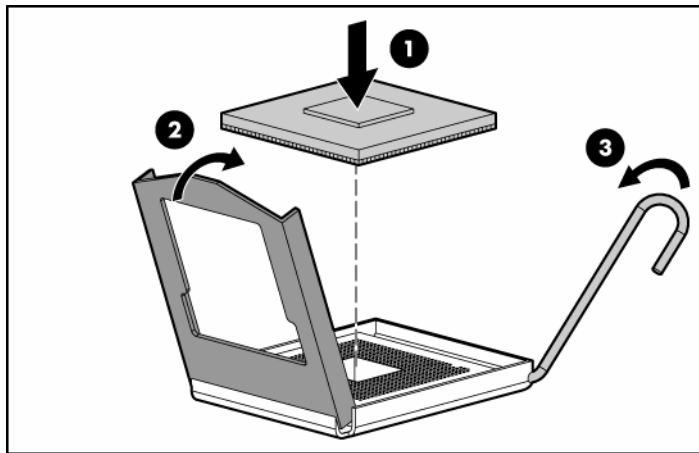
8. Prepare the heatsink for installation:

   – If reusing the heatsink, clean the bottom of the heatsink with the provided alcohol pad, then apply a thin layer of thermal grease to the top of the processor.

   – If installing a new heatsink, remove the protective covering.

9. Install the heatsink fan assembly.

10. Tighten the four heatsink retaining screws.

⚠ **CAUTION:** Heatsink retaining screws should be tightened in diagonally opposite pairs (in an "X" pattern).
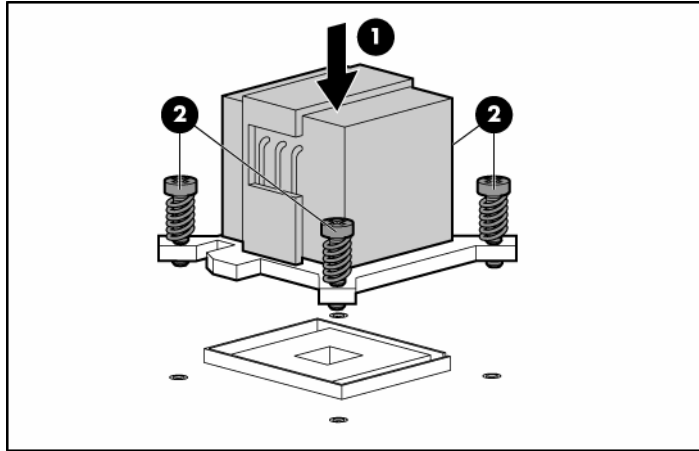
11. Connect the fan cable to the system board ("System board components" on page 11).

12. Install the access panel ("Installing the access panel" on page 23).

13. Install the bezel ("Unlocking the bezel" on page 22).

14. Power up the server ("Powering up the server" on page 21).

Memory

You can expand server memory by installing PC2-4200 DDR2 SDRAM DIMMs. The system supports up to four DIMMs for a maximum of 8 GB.

Refer to "System board components (on page 11)" for DIMM slot locations and bank assignments.

DIMM installation guidelines

Observe the following guidelines when installing additional memory:

• DIMMs installed in the server must be Unbuffered DDR2 DRAM with ECC.

• If only a single DIMM is installed, it must be installed in slot 1A.

- All DIMMs installed must be the same speed.

BIOS detects the DIMM population and sets the system as follows:

- Single-channel mode: DIMMs installed in one channel only.

- Dual-channel asymmetric mode: DIMMs installed in both channels, but of unequal capacities per channel.

- Dual-channel interleaved mode: DIMMs installed in both channels with equal channel capacities.

The following table lists some, but not all, possible configurations. For best performance, HP recommends dual-channel interleaved mode configurations.

Slot 1A	Slot 2A	Slot 3B	Slot 4B	Total memory	Mode
512 MB	—	—	—	512 MB	Single-channel
512 MB	—	512 MB	—	1 GB	Dual-channel interleaved
1 GB	—	—	—	1 GB	Single-channel
1 GB	—	1 GB	—	2 GB	Dual-channel interleaved
2 GB	—	—	—	2 GB	Single-channel
2 GB	—	2 GB	—	4 GB	Dual-channel interleaved
2 GB	2 GB	2 GB	—	6 GB	Dual-channel asymmetric
2 GB	2 GB	2 GB	2 GB	8 GB	Dual-channel interleaved

Installing DIMMs

1. Power down the server ("Powering down the server" on page 21).
2. Remove the bezel ("Unlocking the bezel" on page 22).
3. Remove the access panel ("Removing the access panel" on page 22).
4. Open the DIMM slot latches.

5. Install the DIMM.
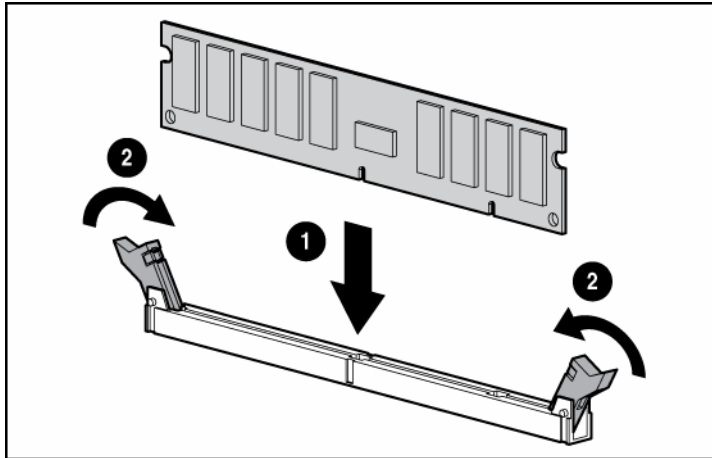
6. Install the access panel ("Installing the access panel" on page).

7. Install the bezel ("Unlocking the bezel" on page).

8. Power up the server ("Powering up the server" on page).

Hard drives

The server supports the following hard drives:

- Non-hot-plug SCSI

- Non-hot-plug SATA

- Hot-plug SCSI

- Hot-plug SAS

- Hot-plug SATA

Hot-plug SATA hard drives are interchangeable with hot-plug SAS hard drives when the optional SAS controller ("SAS controller" on page) is installed.

Server model	Drives supported	Additional required components
Non-hot-plug SATA	SATA	N/A

Server model	Drives supported	Additional required components
Non-hot-plug SCSI	SCSI	N/A
Hot-plug SCSI	SCSI	N/A
Hot-plug SATA/SAS	SATA, SAS	SAS controller required for hot-plug SAS hard drive

Non-hot-plug SCSI and SATA hard drives

1. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

4. Remove the drive cage from the front of the chassis.
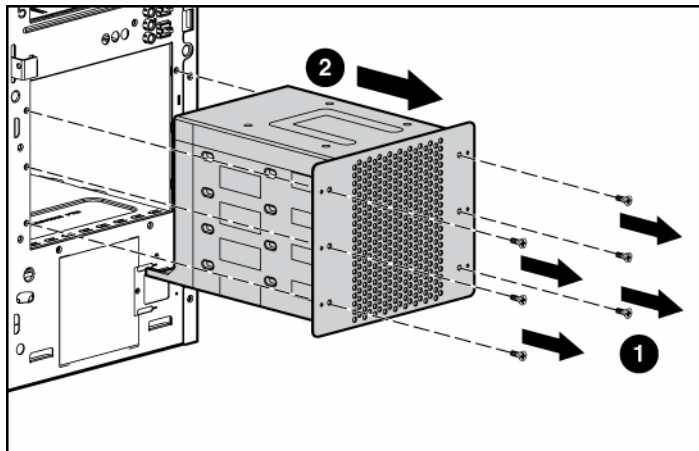
5. Install a non-hot-plug hard drive into the drive cage.

6. Install the drive cage into the front of the chassis.
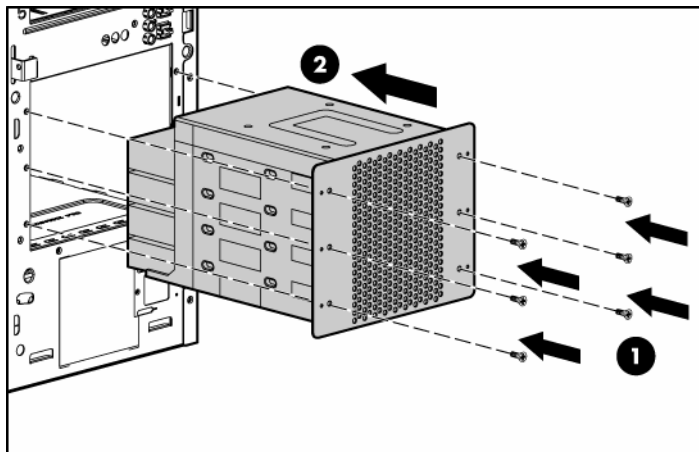
7. Connect the data and power cables:

   – Non-hot-plug SCSI ("Non-hot-plug SCSI cabling" on page)

   – Non-hot-plug SATA ("Non-hot-plug SATA cabling" on page)

8. Replace the access panel ("Removing the access panel" on page).

9. Install the bezel ("Unlocking the bezel" on page).

10. Power up the server ("Powering up the server" on page).

Installing hot-plug SCSI hard drives

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.

> ⚠ **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. Remove the bezel ("Unlocking the bezel" on page).

2. Remove the hard drive blank.

3. Install the hard drive.
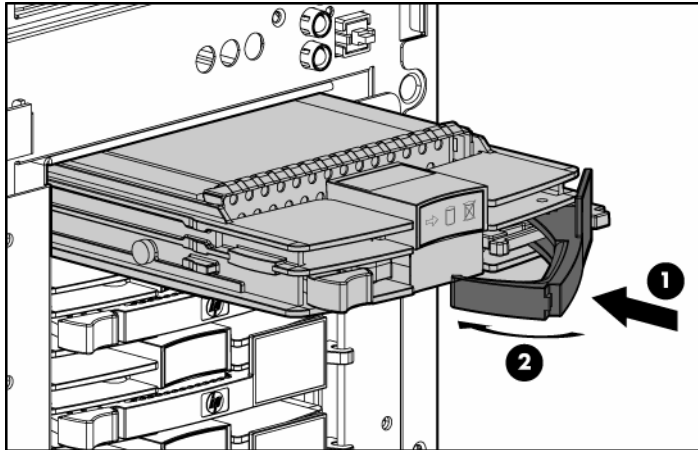
4. Determine the status of the hard drive from the hot-plug hard drive LEDs ("Hot-plug SCSI hard drive LEDs" on page 16).

5. Install the bezel ("Unlocking the bezel" on page 22).

6. Resume normal server operations.

Installing hot-plug SATA or SAS hard drives

Hot-plug SATA and hot-plug SAS hard drives can be used interchangeably when a SAS controller is installed. Before installing a SAS hard drive, you must install a SAS controller ("SAS controller" on page 45). A SATA controller is embedded for use with SATA drives only.

> △ **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. Remove the bezel ("Unlocking the bezel" on page 22).

2.   Remove the hard drive blank.
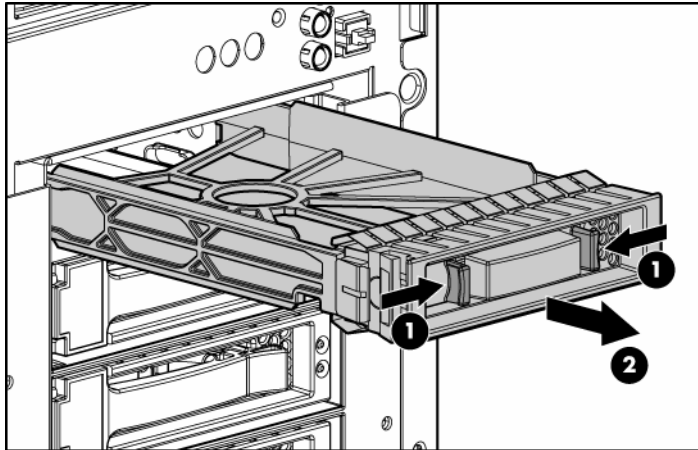
3.   Open the release latch to prepare the drive for installation.
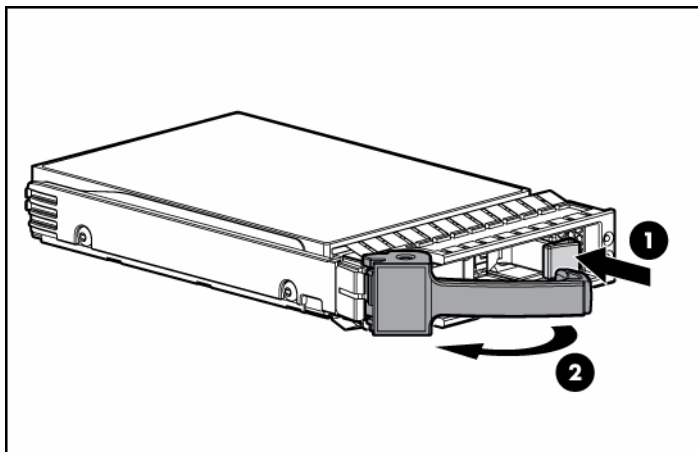
4. Install the hard drive.
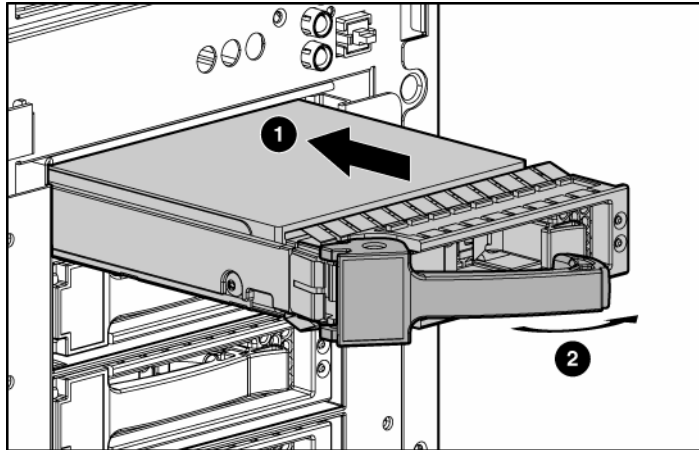
5. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations ("Hot-plug SATA or SAS hard drive LEDs" on page 19).

6. Install the bezel ("Unlocking the bezel" on page 22).

7. Resume normal server operations.

SAS controller

1. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

4. Remove the expansion slot cover.

5. Install the SAS controller, and press it down to seat.
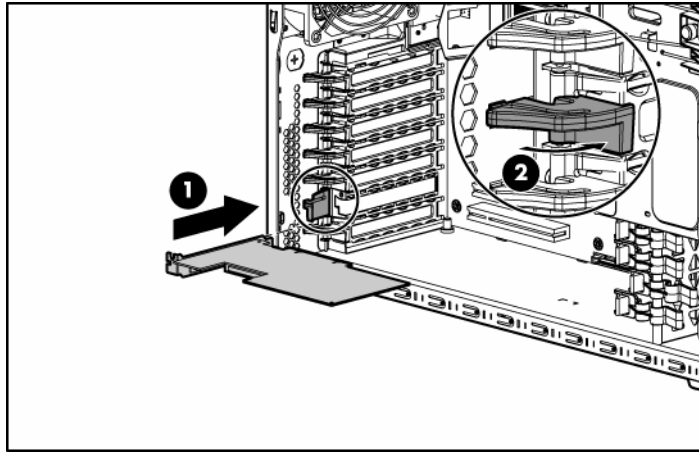
6. Disconnect the SAS cable from the system board and connect it to the SAS controller ("SAS cabling" on page 58).

DVD-ROM 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. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

4. Disconnect the cables from the rear of the CD-ROM drive.

5.   Remove the CD-ROM drive.
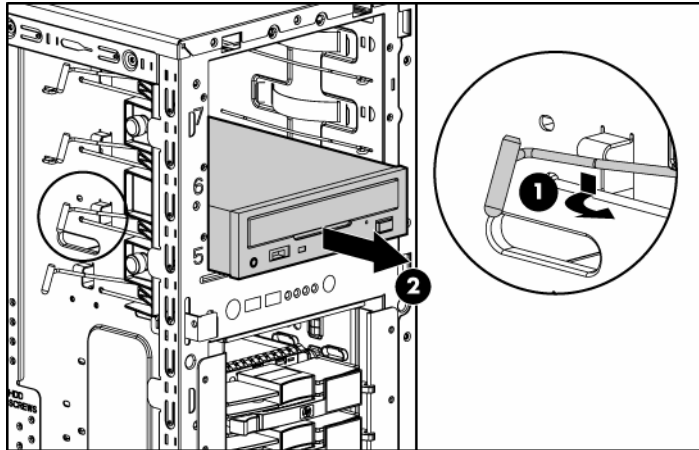
6.   Slide the DVD-ROM drive into the media drive bay.
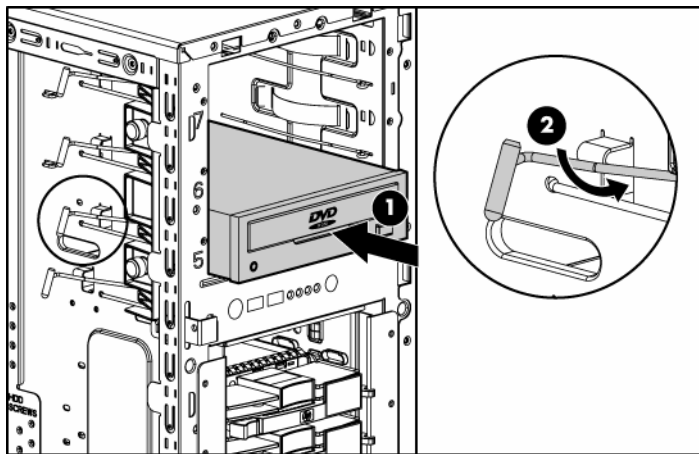
7.   Secure the DVD-ROM drive cable to the DVD-ROM drive cable connector on the system board ("System board components" on page <u>11</u>).

8.   Knock out the applicable bezel blanks.

9.   Replace the access panel ("Removing the access panel" on page <u>22</u>).

10. Install the bezel ("Unlocking the bezel" on page <u>22</u>).

11. Power up the server ("Powering up the server" on page <u>21</u>).

USB tape 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. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

4. Remove the applicable media bay blank.

5. Install the tape drive.
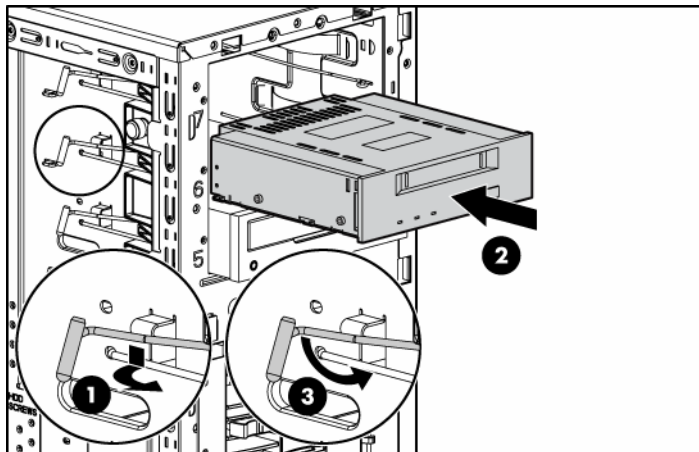
6. Secure the USB tape drive cable to the USB tape drive cable connector on the system board ("System board components" on page 11).

7. Knock out the applicable bezel blanks.

8. Replace the access panel ("Removing the access panel" on page 22).

9. Install the bezel ("Unlocking the bezel" on page 22).

10. Power up the server ("Powering up the server" on page 21).

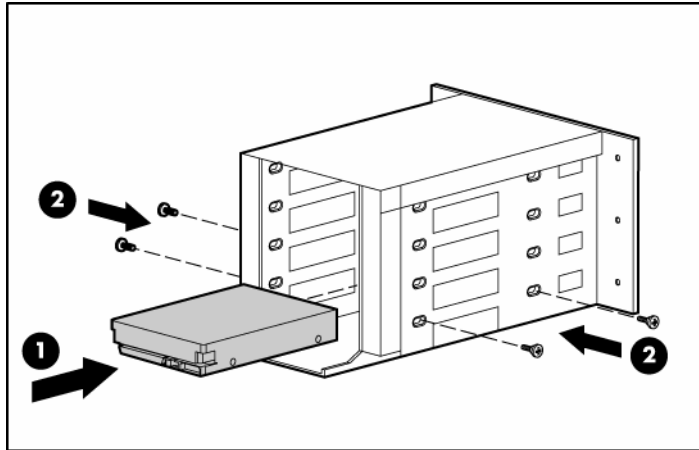# Full-height tape drive

1. Power down the server ("Powering down the server" on page 21).

2.   Remove the bezel ("Unlocking the bezel" on page 22).

3.   Remove the access panel ("Removing the access panel" on page 22).

4.   Remove the media bay blanks ("Front panel components" on page 7).

5.   Use a screwdriver to disengage the two wire supports inside the full-height drive bays.
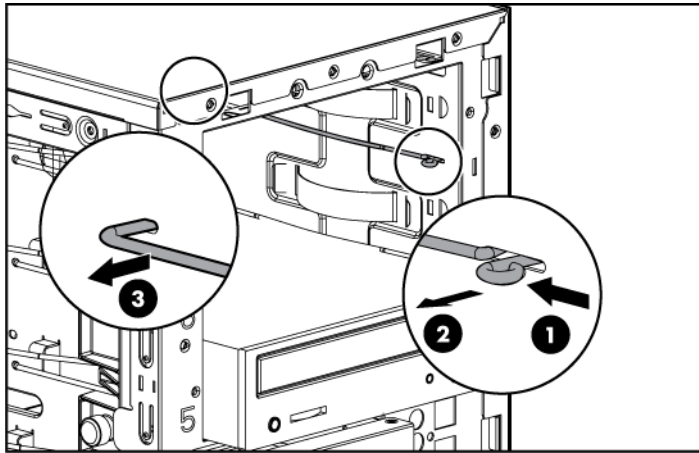
6.   Install the tape drive.
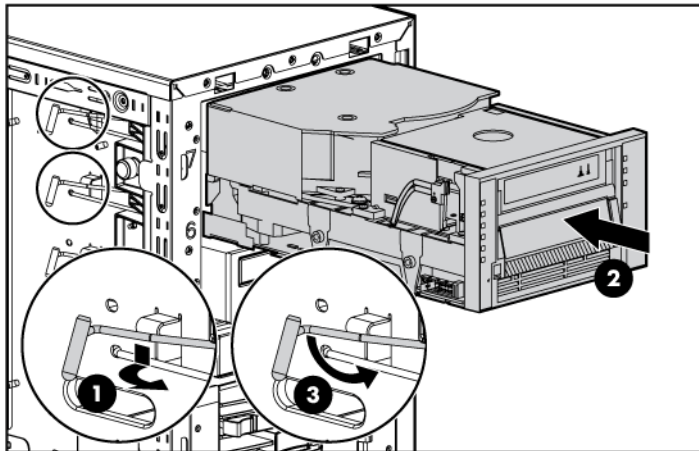
7. Install the retaining screw.
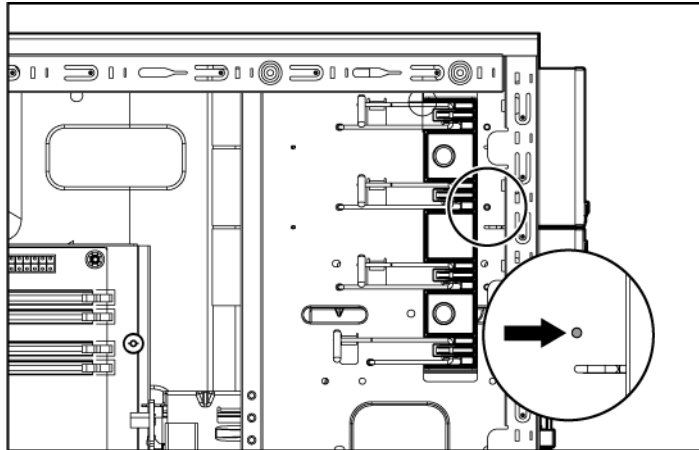
> 📝 **IMPORTANT:** HP recommends installing the tape drive on a separate SCSI cable to avoid a decrease in performance on other SCSI devices.

8. Connect the data and power cables to the back of the tape drive.

9. Connect the data cable into a SCSI controller channel ("System board components" on page 11).

10. Remove the applicable bezel blanks from the bezel ("Front panel components" on page 7).

11. Install the bezel ("Unlocking the bezel" on page 22).

12. Replace the access panel ("Removing the access panel" on page 22).

Diskette drives

A diskette drive can be installed in the server in the following ways:

*   Install a diskette drive in the chassis ("Installing a legacy diskette drive" on page 51)

*   Install a diskette drive using a USB cable (when using operating systems that support USB) ("Installing a USB diskette drive" on page 52)

When using operating systems that support USB, the server supports USB devices, including, but not limited to:

- CD-ROM drives

- Diskette drives

- Keyboard

- Mouse

For other operating systems, the ROM provides USB support for a keyboard, mouse, and diskette drives, which do not support USB, but not for CD-ROM drives.

ROM legacy USB support is available during POST and while the operating system is running. The maximum device support is two USB keyboards, two USB mouse devices, and one layer of hubs.

Installing a legacy diskette drive

1. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

4. Slide the diskette drive into the media drive bay.
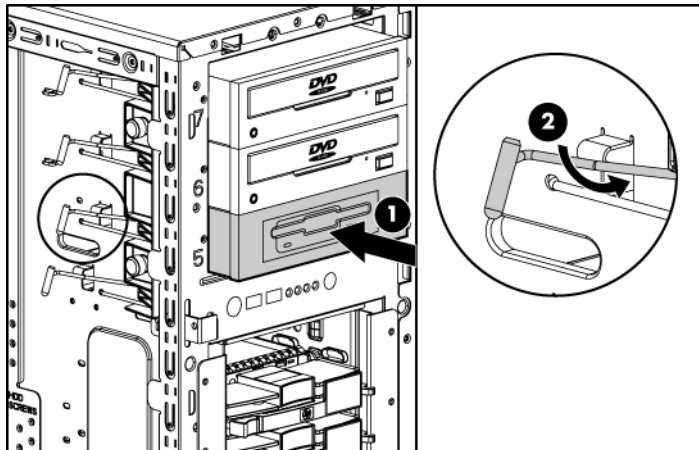
5. Secure the diskette drive cable to the diskette drive cable connector on the system board ("System board components" on page 11).

6. Knock out the applicable bezel blanks.

7. Install the bezel ("Unlocking the bezel" on page 22).

8. Power up the server ("Powering up the server" on page 21).

Installing a USB diskette drive

1. Plug in a USB diskette drive to the USB port on the front of the server.
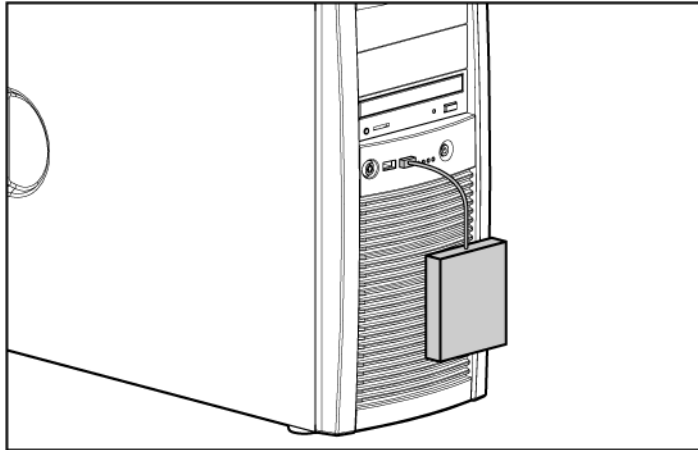
Expansion boards

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

Slot	Expansion card type	Connector	Max capable speed
1	PCI Express	x1	x1
2	PCI-X	64 bit, 3.3 V	100 MHz
3	PCI-X	64 bit, 3.3 V	100 MHz
4	PCI Express	x8	x4

Expansion slot cover

1. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

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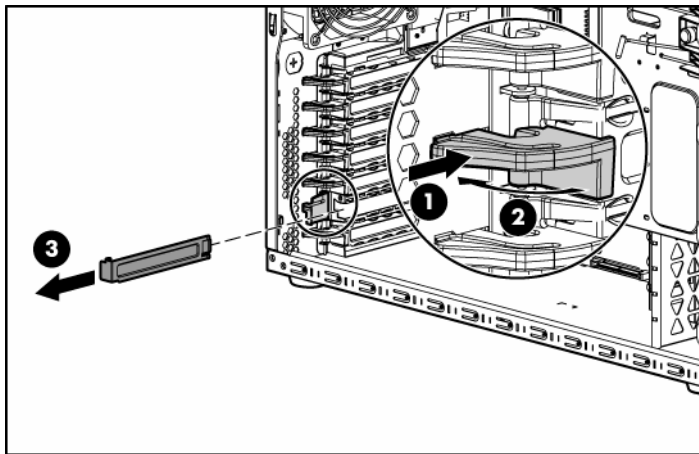
> ⚠ **CAUTION:** To prevent improper cooling and thermal damage, do not operate the server unless all PCI slots have either an expansion slot cover or an expansion board installed.

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.

1. Power down the server ("Powering down the server" on page 21).

2. Remove the bezel ("Unlocking the bezel" on page 22).

3. Remove the access panel ("Removing the access panel" on page 22).

4. Remove the expansion slot cover.

5.   Install the expansion board, and press it down to seat.
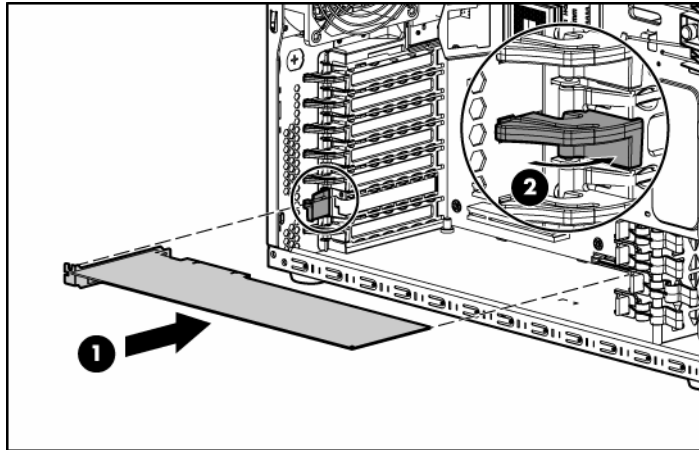
6.   Connect any required internal or external cables to the expansion board. Refer to the documentation that ships with the expansion board.

Server cabling

In this section

Server cabling

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

Non-hot-plug SCSI cabling
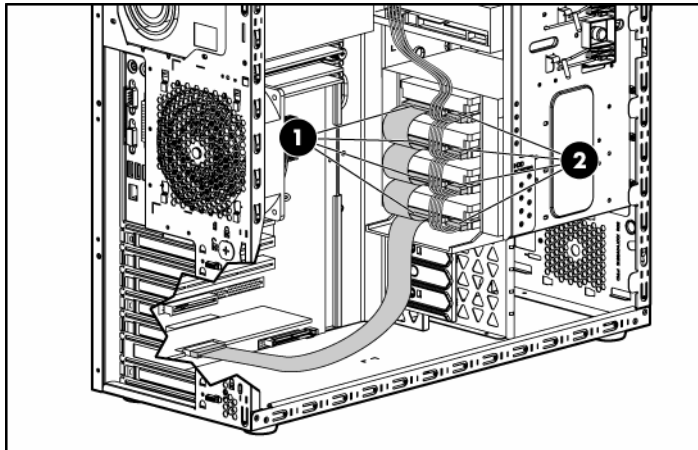
Item	Cable description
1	SCSI cable
2	Power cable

Hot-plug SCSI cabling
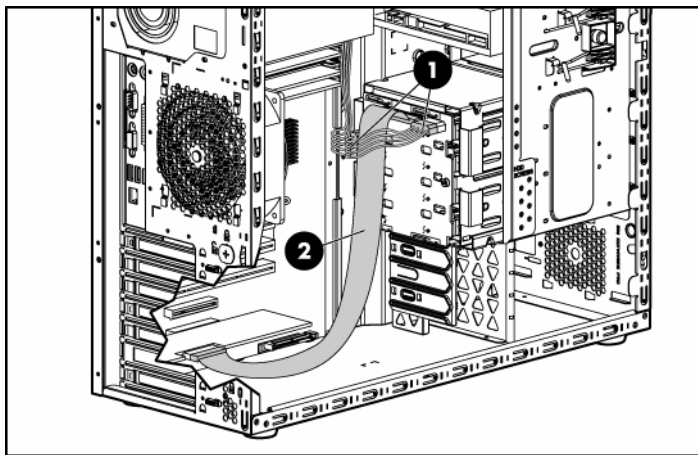
Item	Cable description
1	Power cable
2	SCSI cable

Non-hot-plug SATA cabling
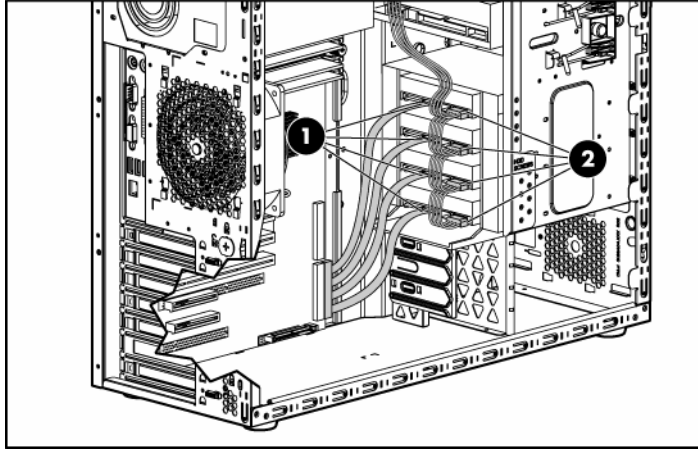
Item	Cable description
1	SATA cable
2	Power cable

Hot-plug SATA cabling
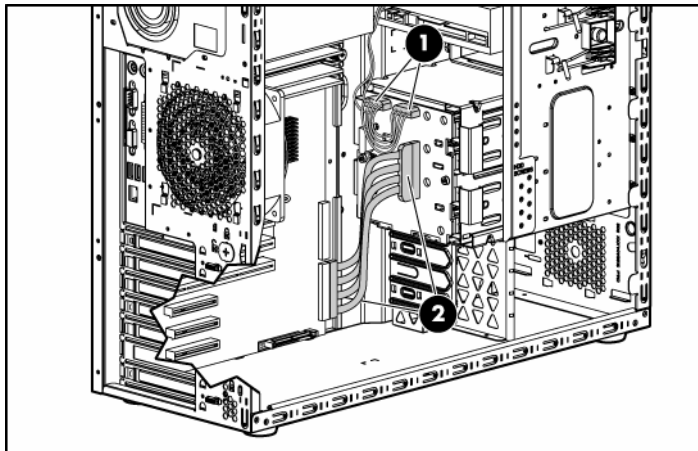
Item	Cable description
1	Power cable
2	SATA cable

SAS cabling
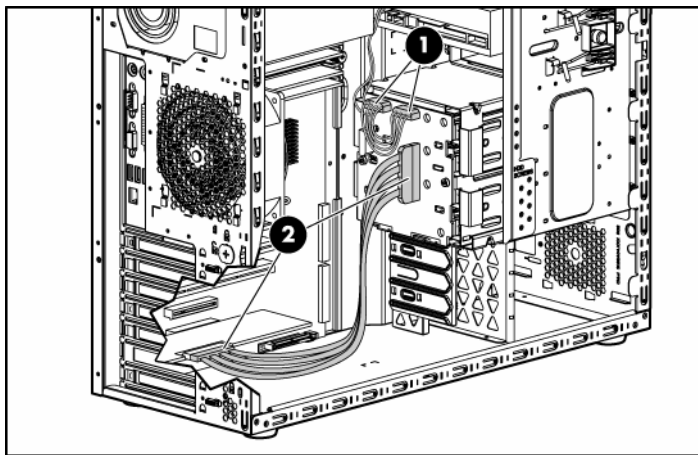
Item	Cable description
1	Power cable
2	SAS cable

Server software and configuration utilities

In this section

Configuration tools

List of tools:

SmartStart software

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

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

- Configuring hardware using embedded configuration utilities, such as RBSU and ORCA

- Preparing the system for installing "off-the-shelf" versions of leading operating system software

- Installing optimized server drivers, management agents, and utilities automatically with every assisted installation

- Testing server hardware using the Insight Diagnostics Utility ("Array Diagnostic Utility" on page 72, "HP Insight Diagnostics" on page 72)

- Installing software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to a complete list of ProLiant system software.

- Enabling access to the Array Configuration Utility (on page 62), Array Diagnostic Utility (on page 72), 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 server deployment product that delivers an unattended automated installation for high-volume server deployments. The SmartStart Scripting Toolkit is designed to support ProLiant BL, ML, and DL servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these new tools to build an automated server deployment process.

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

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 to an editable script file. This file can then be deployed across multiple servers with similar hardware and software components. For more information, refer to the *SmartStart Scripting Toolkit User Guide* on the HP website (http://h18004.www1.hp.com/products/servers/management/toolkit/documentation.html).

HP ROM-Based Setup Utility

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

- Configuring system devices and installed options

- Displaying system information

- Selecting the primary boot controller

- Configuring memory options

- Language selection

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

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.hp.com/servers/smartstart).

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

For optimum performance, the minimum display settings are 800×600 resolution and 256 colors. Servers running Microsoft® operating systems require Internet Explorer 5.5 (with Service Pack 1) or later. For Linux servers, refer to the README.TXT file for additional browser and support information.

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

HP ProLiant Essentials Rapid Deployment Pack

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

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

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

Re-entering the server serial number and product ID

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

1. During the server startup sequence, press the **F9** key to access RBSU.

2. Select the **System Options** menu.

3. Select **Serial Number**. The following warning is displayed:

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

4. Press the **Enter** key to clear the warning.

5. Enter the serial number and press the **Enter** key.

6. Select **Product ID**.

7. Enter the product ID and press the **Enter** key.

8. Press the **Esc** key to close the menu.

9. Press the **Esc** key to exit RBSU.

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

SATA software RAID

HP provides the SATA RAID feature through use of the Adaptec Storage Manager. This feature enables RAID functionality (RAID 0 or RAID 1) for the embedded SATA controller in the system.

Required hardware

Installing the SATA RAID driver requires a diskette drive and CD-ROM drive. Some servers do not ship with these drives as standard hardware.

> **NOTE:** Systems with Microsoft® Windows® Server 2003 and HP embedded drivers do not require additional hardware.

Diskette and CD-ROM drive options

To acquire a diskette drive option or CD-ROM drive option for a server, contact an HP authorized reseller.

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).

USB diskette and CD-ROM drives

For driver installation purposes, a USB diskette drive and USB CD-ROM drive are sufficient.

> **NOTE:** Do not use a USB drive key in place of the diskette drive. The OS does not support driver installation from a USB drive key.

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

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

- POST

- RBSU

- Diagnostics

- DOS

- Operating environments which do not provide native USB support

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

HP Integrated Lights-Out Virtual Floppy and CD-ROM drives

iLO 2 Advanced provides diskette drive and CD-ROM drive functionality through the iLO 2 Virtual Floppy and CD-ROM features.

For detailed information about iLO 2 Advanced, refer to the *HP Integrated Lights-Out User Guide* on the HP website (http://www.hp.com/servers/lights-out).

Configuring the SATA RAID feature

> ⚠ **CAUTION:** Back up any data stored on the hard drives before proceeding. The configuration process erases all data on the hard drives.

1. Power up the server. Press the **F9** key to launch RBSU.

   > 📝 **NOTE:** Enabling the RAID option in RBSU is only necessary for installation of the RAID driver. If this option is not enabled, the OS loads the standard ATA driver from the OS media.

2. Select **Advanced Options>SATA Software RAID>Enable RAID**.

3. Press the **F10** key twice to exit RBSU. The system automatically reboots.

4. After the system reboots, press the **F8** key to activate the embedded SATA RAID controller.

5. Select **Array Configuration Utility** from the Option menu.

6. Select **Configure Drives** from the main menu.

7. Press the **INS** key twice to select the two SATA drives.

8. Press the **Enter** key to complete selection. The system prompts a selection of RAID 0 or RAID 1.

9. Select a RAID level.

10. Enter an Array Label. If RAID 0 is selected, select a Stripe Size.

11. Select **Create RAID**:

RAID options	Description
RAID 0	No Init – Creates array without initialization
RAID 0	Migrate* – Creates RAID 0 from a single drive
RAID 1	Quick Init - Creates array without initialization
RAID 1	Clear* – Writes zeroes to all the array members
RAID 1	Build* – Copies data from source drive to target drive.

*The process can take 30 minutes or more to complete depending on the drive capacity.

12. After the configuration is complete, select **Done**.

13. Press the **Esc** key to exit the utility.

Installing an operating system (Software SATA RAID)

To install an OS, download the SATA RAID driver and create a driver diskette with the software and instructions from the HP website (http://www.hp.com/support).

SmartStart 7.4 does not support assisted installation of an OS on servers configured with SATA RAID.

After inserting the SmartStart CD in the CD-ROM drive, a warning may indicate that the primary controller is not supported by this version of the SmartStart software. When this warning appears, use the following information to install the OS.

Installing a Supported Microsoft Windows OS

> **NOTE:** For systems with Microsoft® Windows® Server 2003 and HP embedded drivers installed, install the OS by booting the server and inserting the OS CD. The server locates and installs the driver.

1. Insert the OS CD and reboot the system.

2. When prompted, press the **F6** key to install a third-party driver.

   > **NOTE:** Press **F6** within 5 seconds to enable the system to recognize the controller. If the system fails to recognize the controller, restart this procedure.

3. Insert the SATA RAID driver diskette created earlier. The system prompts the next action.

4. Press the **S** key to specify the driver from the diskette. Then, press the **Enter** key. The OS searches the diskette for a suitable driver.

5. After locating the Adaptec Embedded Serial ATA HostRAID driver, press **Enter**.

6. Follow the remaining on-screen instructions to complete the installation.

Installing a Supported Linux or NetWare OS

Refer to the instructions for each OS in the *Adaptec Embedded Serial ATA RAID User's Guide*, available from the HP website (http://www.hp.com/support).

Installing Adaptec Storage Manager

The Adaptec Storage Manager utility enables administrators to create and manage arrays without rebooting the server to access the BIOS utility.

To install and run this utility, refer to the instructions for each OS in the *Adaptec Embedded Serial ATA RAID User's Guide*, available from the HP website (http://www.hp.com/support).

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® 2000, Windows® Server 2003, 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).

Management Agents

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

HP Systems Insight Manager

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

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

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

USB support

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

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

- POST

- RBSU

- Diagnostics

- DOS

- Operating environments which do not provide native USB support

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

Diagnostic tools

List of tools:

Survey Utility

Survey Utility, a feature within HP Insight Diagnostics (on page 72), gathers critical hardware and software information on ProLiant servers.

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

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

Survey Utility is installed with every SmartStart-assisted installation or can be installed through the HP PSP ("ProLiant Support Packs" on page 74).

Array Diagnostic Utility

ADU is tool that collects information about array controllers and generates a list of detected problems. ADU can be accessed from the SmartStart CD ("SmartStart software" on page 59) or downloaded from the HP website (http://www.hp.com).

HP Insight Diagnostics

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

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

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

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

Integrated Management Log

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

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

- From within HP SIM ("HP Insight Diagnostics" on page 72)

- From within Survey Utility (on page 71)

- From within operating system-specific IML viewers

- For NetWare: IML Viewer

- For Windows®: IML Viewer

- For Linux: IML Viewer Application

- From within HP Insight Diagnostics (on page)

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) and its Assisted Path feature to install the operating system and latest driver support.

> **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.

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 white papers on the latest server integration information. Refer to the Enterprise Partnerships website (http://h18000.www1.hp.com/partners), select **Microsoft** or **Novell**, depending on the operating system, and follow the link to the appropriate Resource Paq.

ProLiant Support Packs

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

Operating system version support

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

Change control and proactive notification

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

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

Care Pack

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

Battery

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 21).

2. Unlock and open the front bezel ("Unlocking the bezel" on page 22) (tower servers only).

3. Extend or remove the server from the rack.

4. Remove the access panel ("Removing the access panel" on page 22).

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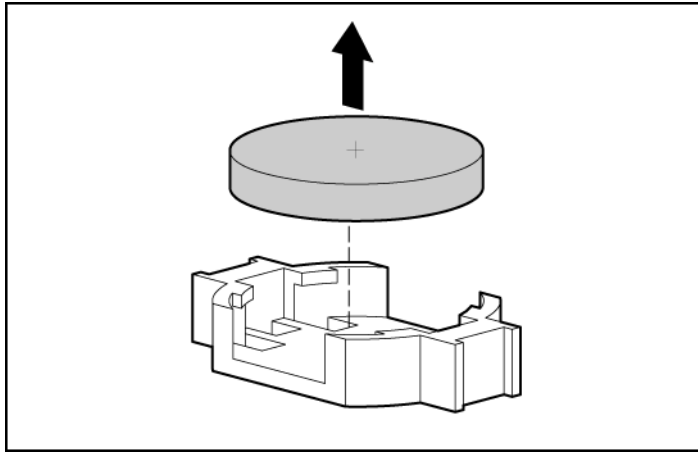
To replace the component, reverse the removal procedure.

Run RBSU to configure the system after replacing the battery. Refer to the *HP ROM-Based Setup Utility User Guide* for more detailed information.

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 84)," 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 86)." 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 feet are extended to the floor.**

• **The full weight of the rack rests on the leveling feet.**

• **The stabilizing feet are attached to the rack if it is a single-rack installation.**

• **The racks are coupled together in multiple-rack installations.**

• **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

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

• **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**

• **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

• **Unplug the power cord from the power supply to disconnect power to the equipment.**

• **Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.**

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 21).

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 72) and use the survey page to view the current configuration or to compare it to previous configurations.

- Refer to your hardware and software records for information.

Service notifications

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

Loose connections

Action:

- Be sure all power cords are securely connected.

- Be sure all cables are properly aligned and securely connected for all external and internal components.

- Remove and check all data and power cables for damage. Be sure no cables have bent pins or damaged connectors.

- If a fixed cable tray is available for the server, be sure the cords and cables connected to the server are correctly routed through the tray.

- Be sure each device is properly seated.

- If a device has latches, be sure they are completely closed and locked.

- Check any interlock or interconnect LEDs that may indicate a component is not connected properly.

- If problems continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.

Diagnostic steps

To effectively troubleshoot a problem, HP recommends that you start with the first flowchart in this section, "Start diagnosis flowchart (on page 84)," 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 86)." 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 84)

- General diagnosis flowchart (on page 86)

- Power-on problems flowchart (on page 88)

- POST problems flowchart

- OS boot problems flowchart (on page 93)

- Server fault indications flowchart (on page 96)

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 86)"
2	"Power-on problems flowchart (on page 88)"
3	"POST problems flowchart"
4	"OS boot problems flowchart (on page 93)"
5	"Server fault indications flowchart (on page 96)"

Start
Diagnosis

Do you want to perform the General Diagnosis?

Yes → (1) Go to General Diagnosis

No ↓

Does server power on?

No → (2) Go to Power On Problems

Yes ↓

Does server complete POST OK?

No → (3) Go to POST Problems

Yes ↓

Does server boot to OS OK?

No → (4) Go to OS Boot Problems

Yes ↓

Does server have Insight Management Agent fault or LED fault indication?

Yes → (5) Go to Server Fault Indications

No → (1) Go to General Diagnosis
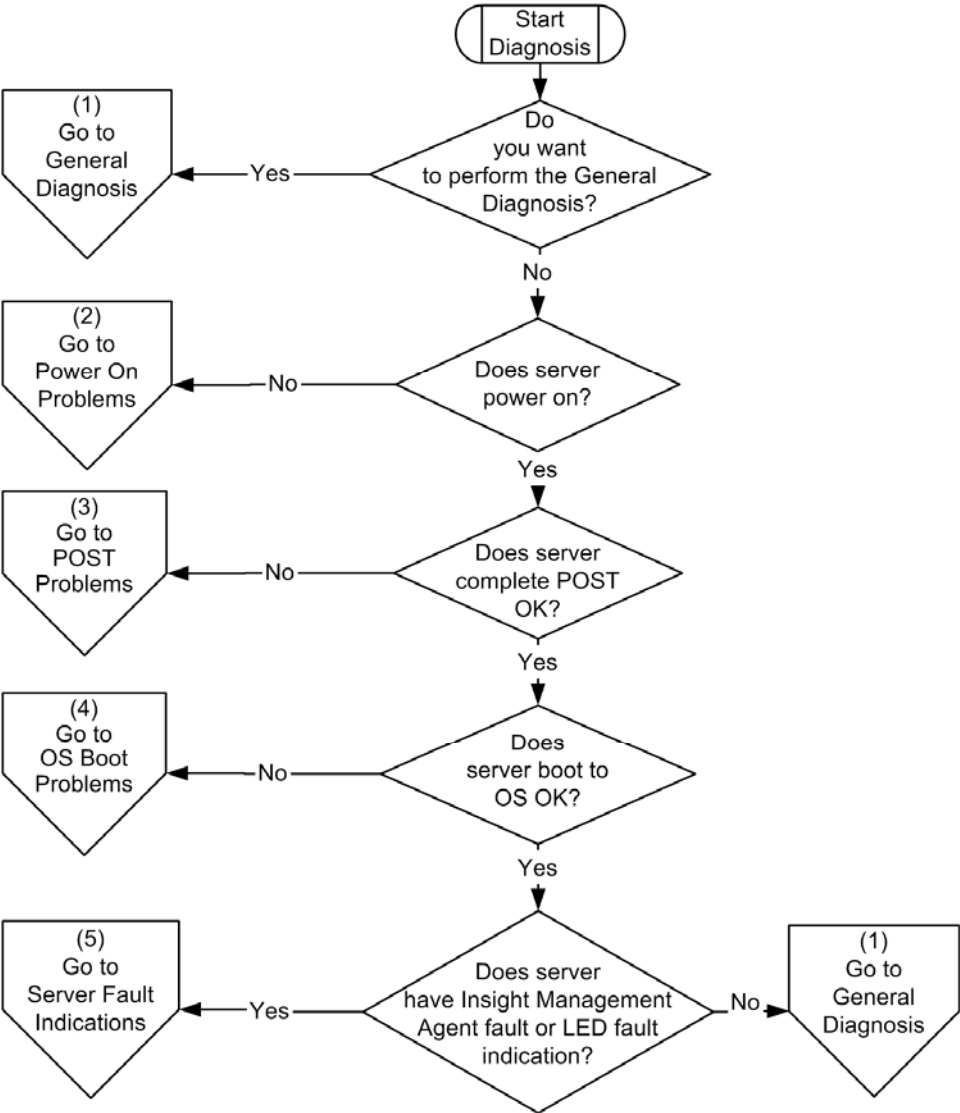
General diagnosis flowchart

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

Item	Refer to
1	"Symptom information (on page 82)"
2	"Loose connections (on page 83)"
3	"Service notifications (on page 82)"
4	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
5	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
6	• Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms) • "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
7	• "Server information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Operating system information you need" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
8	"Contacting HP technical support or an authorized reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

Start General Diagnosis

(1) Record symptom information.

Reboot server to see if condition still exists.

Is this a newly installed server? — Yes →

(2) Reseat any components that may have come loose during shipping and reboot the server.

Does condition still exist? — No →
Yes

No

Were options added or was the configuration changed recently? — No →

(3) Check for Service Notifications.

Yes

(4) Isolate what has changed. Verify it was installed correctly. Restore server to last known working state or original shipped configuration.

Does condition still exist? — No →
Yes

Does condition still exist? — No →

(6) Troubleshoot or replace basic server spare parts. ← Yes —

Does condition still exist?

(5) Break server down to minimal configuration. — Yes →

Does condition still exist? — No →
Yes

Does condition still exist? — No
Yes

No

(4) Add one part at a time back to configuration to isolate faulty component.

Does condition still exist? — No →
Yes

(1) Record action taken.

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 internal health LED is red or amber.

Possible causes:

- Improperly seated or faulty power supply

- Loose or faulty power cord

- Power supply cord improperly seated to system board

- 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 72)"
3	"Loose Connections (on page 83)"
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 72)" or in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
6	"Power Source Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

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

```
                         ┌─────────────┐
                         │ Start Power │
                         │ On Problems │
                         └──────┬──────┘
                                │
                              ◇(1)◇
              Off         What color is the
         ┌─────────────  system power
         │                    LED?
         ▼                     │
   ┌───────────┐          Amber or Green
   │   Press   │               │
   │ Power-On  │               ▼
   │Standby    │            ◇(1)◇
   │ button    │        Is the internal
   └─────┬─────┘        health LED red or
         │          No      amber?
   ┌───────────┐  ◄─────                  Yes
   │ Check for │                     ◇(1)◇
   │loose power│                    Are any
   │  cords.   │              component health        (2)
   └─────┬─────┘                  LEDs on?    No►  Use
      Off│                           │            maintenance
         ▼                         Yes           tools to identify
   ┌───────────┐                    │            the problem.
   │   (6)     │                     ▼
   │ Check for │               ┌───────────┐   ┌───────────┐
   │power      │               │   (3)     │   │   (4)     │
   │source     │               │Reseat     │──►│If condition│
   │problems.  │               │indicated  │   │still       │
   └─────┬─────┘               │component. │   │exists,     │
         │                     │Check      │   │replace     │
         ▼                     │for loose  │   │indicated   │
   ┌───────────┐               │connections│   │component.  │
   │   (7)     │               └───────────┘   └─────┬─────┘
   │ Reseat or │                                     │
   │ replace   │                                     ▼
   │power      │                               ┌───────────┐
   │supply.    │                               │   (5)     │
   └─────┬─────┘                               │Mark the   │
         │                                     │corresponding│
         ▼                                     │IML entry as│
      ◇ Does ◇                                 │repaired, if│
    condition still   Yes                      │present.   │
       exist?    ─────────                     └─────┬─────┘
         │No              │                          │
         │                ▼                          │
         │          ┌───────────┐                    │
         │          │   (8)     │                    │
         │          │Check for  │                    │
         │          │possible   │                    │
         │          │power-on   │                    │
         │          │circuit    │                    │
         │          │problem.   │                    │
         │          └───────────┘                    │
         ▼                                            │
   ┌──────────┐                                       │
   │   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" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
2	"Video problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	KVM or iLO 2 documentation
4	"Loose connections (on page 83)"
5	Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
7	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)

```
                                                                      ┌── Yes ──────────────┐
                                                                      │                     │
                                              ┌─────────┐             │                     │
                                              │   Is    │             │                     │
                                         No ◄─│ RILOE   │        ┌──────────────┐           │
 ╭──────────────╮                             │ board   │────────│     (2)      │           │
 │  Start POST  │                             │installed│   No   │ Verify video │           │
 │  Problems    │                             │    ?    │────┐   │ is cabled    │           │
 ╰──────────────╯                             └─────────┘    │   │ correctly.   │           │
        │                                          │No        │   └──────────────┘           │
        ▼                                          ▼          │         │                   │
   ┌─────────┐       ┌─────────┐            ┌────────────┐    │         ▼                   ▼
   │  Have   │  No   │Are the  │            │    Do      │    │   ┌──────────────┐
   │  video  │──────►│fans on? │            │ you have   │◄───┘   │     (3)      │
   │ output? │       └─────────┘            │ known good │        │ Verify the   │
   └─────────┘            │                 │   KVM?     │── No ─►│ KVM is cabled│
        │                Yes      No        └────────────┘        │ to RILOE     │
       Yes                ▼        │              │               │ board.       │
        │           ┌─────────┐    │             Yes              └──────────────┘
        ▼           │Are there│    │              ▼                     │
   ┌─────────┐      │any beep │    │        ┌────────────┐        ┌──────────────┐
   │  POST   │      │codes?   │    │        │Is internal │        │ Test RILOE   │
   │ errors  │      └─────────┘    │        │health LED  │── Yes ─│ board or     │
   │messages │           │        No        │amber or    │        │ replace KVM  │
   │displayed│          Yes        │        │red?        │        │ component.   │
   │   ?     │           │         │        └────────────┘        └──────────────┘
   └─────────┘           │         │              │
       Yes               │         │             No
        │                ▼         ▼              │
        ▼          ┌──────────────┐               ▼
   ┌──────────────┐│     (1)      │         ┌──────────────┐
   │     (1)      ││ Refer to     │         │     (4)      │
   │ Refer to     ││"Post Error   │         │Reseat        │
   │"Post Error   ││ Messages"    │         │indicated     │
   │ Messages"    ││ section.     │         │component.    │
   │ section.     │└──────────────┘         │Check for     │
   └──────────────┘                         │loose         │
                                            │connections.  │
                                            └──────────────┘
                                                   │
                                                   ▼
                                            ┌──────────────┐
                                            │     (5)      │
                                            │If condition  │
                                            │still exists, │
                                            │replace       │
                                            │indicated     │
                                            │component.    │
                                            └──────────────┘
```

(1) Refer to "Post Error Messages" section.

(6) Break server down to the minimum configuration.

Does condition still exist?

Add one part at a time back to configuration to isolate component.

(2) Verify video is cabled correctly.

(3) Verify the KVM is cabled to RILOE board.

Test RILOE board or replace KVM component.

(4) Reseat indicated component. Check for loose connections.

(5) If condition still exists, replace indicated component.

Does condition still exist?

(7) Troubleshoot or replace basic server spare parts.

Does condition still exist?

Record symptom & error information on repair tag if sending back a failed part.

(1) Record action taken.

(7) Ensure the following information is available:
• Survey configuration snapshots
• OS event log file
• Full crash dump

(8) Call HP Service Provider
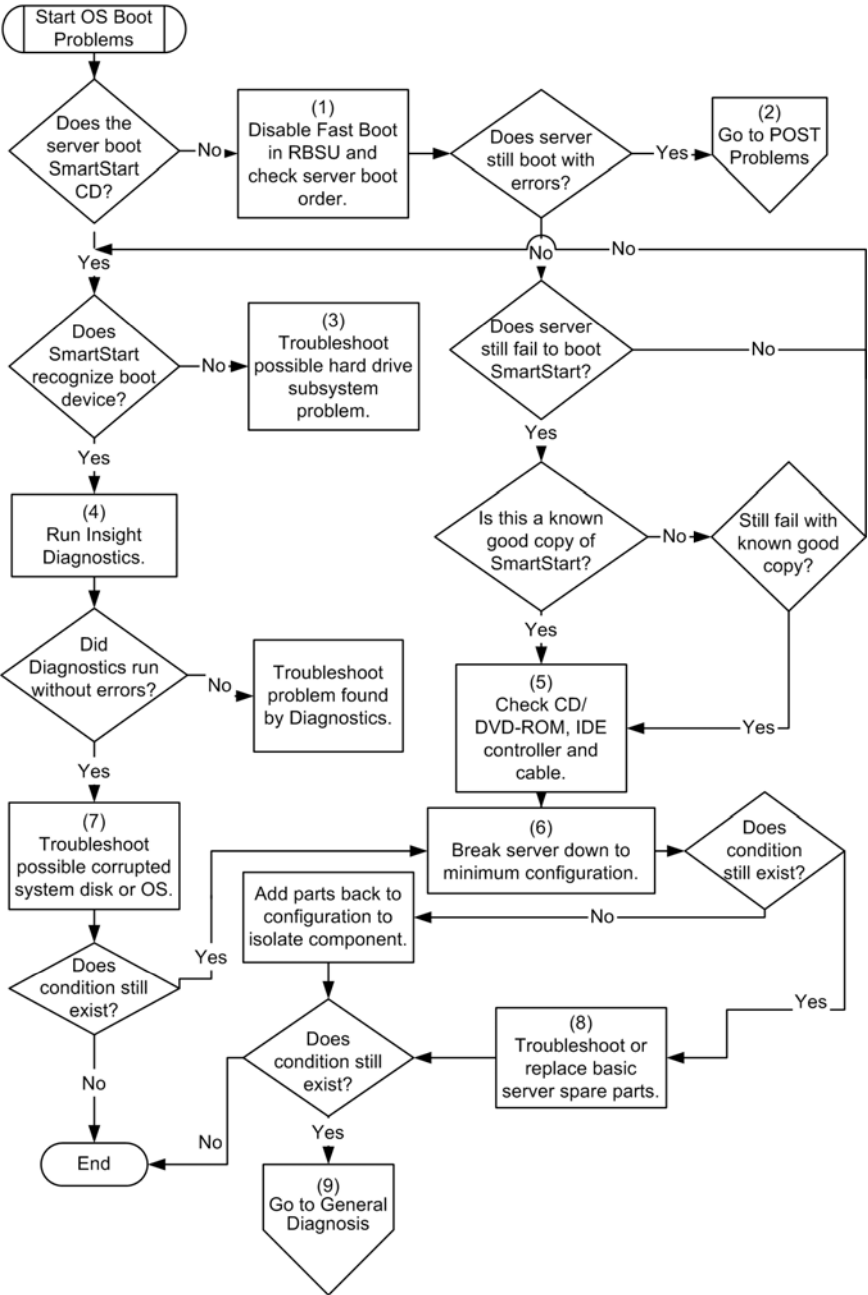
End

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"
3	• "Hard drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
4	"HP Insight Diagnostics (on page 72)"
5	• "Loose connections (on page 83)" • "CD-ROM and DVD drive problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Controller documentation
6	Server user guide or setup and installation guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
7	• "Operating system problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • "Contacting HP technical support or an authorized reseller" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

Item	Refer to
8	• "Hardware problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
9	"General diagnosis flowchart (on page 86)"

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.**

Yes

(4) Run Insight Diagnostics.

Did Diagnostics run without errors? — No → **Troubleshoot problem found by Diagnostics.**

Yes

(7) Troubleshoot possible corrupted system disk or OS.

Does condition still exist? — Yes

No

Does server still fail to boot SmartStart? — No

Yes

Is this a known good copy of SmartStart? — No → **Still fail with known good copy?**

Yes

(5) Check CD/DVD-ROM, IDE controller and cable. ← Yes

(6) Break server down to minimum configuration. → **Does condition still exist?**

No

Add parts back to configuration to isolate component.

Does condition still exist? ← **(8) Troubleshoot or replace basic server spare parts.** ← Yes

No

Yes

(9) Go to General Diagnosis

End

Server fault indications flowchart

Symptoms:

- Server boots, but a fault event is reported by Insight Management Agents (on page 70)

- Server boots, but the internal health LED is red or amber

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 70)"
2	• "Integrated Management Log (on page 72)" • "Event List Error Messages" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).
3	Server user guide 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 (http://h18013.www1.hp.com/products/servers/management/agents/index.html)
5	"Power-On Problems ("Power-On Problems Flowchart" on page 88)"

Item	Refer to
6	• "Hard Drive Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)
7	"HP Insight Diagnostics (on page 72)"
8	• "Hardware Problems" in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support). • Server maintenance and service guide, located on the Documentation CD or the HP website (http://www.hp.com/products/servers/platforms)

POST error messages and beep codes

List of messages:

Introduction

For a complete listing of error messages, refer to the POST error messages in the *HP ProLiant Servers Troubleshooting Guide* located on the Documentation CD or on the HP website (http://www.hp.com/support).

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

ROMPaq disaster recovery

If the current version of the ROM is corrupt, perform ROMPaq disaster recovery procedures:

1. Create a ROMPaq diskette using the Autorun Menu on the SmartStart CD.

2. Power down the server ("Powering down the server" on page 21).

3. Insert the ROMPaq diskette.

4. Power up the server ("Powering up the server" on page 21).

    a. The server generates one long beep and two short beeps to indicate that you are in disaster recovery mode. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.

    b. The ROMPaq diskette flashes the system ROM image. If successful, a sequence of ascending audible beeps is generated. If unsuccessful, a sequence of descending audible beeps is generated and you need to repeat the disaster recovery process.

5. Power down the server ("Powering down the server" on page 21).

6. Remove the ROMPaq diskette.

7. Power up the server ("Powering up the server" on page 21).

Manual recovery

To manually set the server for ROMPaq disaster recovery:

1. Power down the server ("Powering down the server" on page 21).

2. Remove the access panel ("Removing the access panel" on page 22).

3. Set positions 1, 4, 5, and 6 of the system maintenance switch to On.

4. Insert a ROMPaq diskette with the latest system ROM from the SmartStart CD or the HP website (http://www.hp.com/support).

5. Install the access panel ("Installing the access panel" on page 23).

6. Power up the server ("Powering up the server" on page 21).

7. Allow the system to boot completely.

8. Repeat steps 1 and 2.

9. Set positions 1, 4, 5, and 6 of the system maintenance switch to Off.

10. Repeat steps 5 and 6.

Other information resources

For additional troubleshooting information, refer to the *HP ProLiant Servers Troubleshooting Guide* on the Documentation CD.

For information on warranties and service and support upgrades (Care Pack services), refer to the HP website (http://www.hp.com/support).

Regulatory compliance notices

In this section

Regulatory compliance identification numbers

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

Federal Communications Commission notice

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

FCC rating label

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

Class A equipment

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

Class B equipment

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

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.

- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

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

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

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 530113
  Houston, Texas 77269-2000

- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

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

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

- 1-281-514-3333

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

Modifications

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

Cables

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

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 regulatory notice

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC

- EMC Directive 89/336/EEC

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

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

$$\mathsf{C}\,\mathsf{E}$$

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

$$\mathsf{C}\,\mathsf{E}\,(\mathsf{xxxx}_*)\,\textcircled{!}$$

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

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

Disposal of waste equipment by users in private households in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

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。

Korean notice A&B

Class A equipment

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니
판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기
바랍니다.

Class B equipment

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서
주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

Laser compliance

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

> ⚠ **WARNING: Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:**
>
> • **Do not try to open the module enclosure. There are no user-serviceable components inside.**
>
> • **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
>
> • **Allow only HP Authorized Service technicians to repair the unit.**

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

Battery replacement notice

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

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

- **Do not expose the battery to temperatures higher than 60°C (140°F).**

- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**

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

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

Taiwan battery recycling notice

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

廢電池請回收

Power cord statement for Japan

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。

Electrostatic discharge

In this section

Preventing electrostatic discharge

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

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.

- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

- Place parts on a grounded surface before removing them from their containers.

- Avoid touching pins, leads, or circuitry.

- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

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

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.

- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

- Use conductive field service tools.

- Use a portable field service kit with a folding static-dissipating work mat.

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

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

Server specifications

In this section

Server specifications

Specification	Value
Dimension	
Height	43.2 cm (17.0 in)
Depth (without bezel)	50 cm (19.69 in)
Depth (with bezel)	54 cm (21.26 in)
Width	20 cm (7.87 in)
Weight (maximum)	22 kg (47.41 lb)
Weight (no drives installed)	16.5 kg (36.24 lb)
Input requirement	
Rated input voltage	100 VAC to 240 VAC
Rated input frequency	47 Hz to 63 Hz
Rated input current	8 A (100 V) to 4 A (200 V)
Rated input power	1000 W
BTUs per hour	2730
Power supply output	
Rated steady-state power	3.3V/5V 110W 121.12 V CPU 300W
Maximum peak power	370 W

* 100 to 127 VAC is required for 8 A; 200 to 240 VAC is required for 4 A.

Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-10°C to 60°C (14°F to 140°F)
Maximum wet bulb temperature	28°C (82.4°F)
Relative humidity (noncondensing)**	
Operating	20% to 80%
Non-operating	20% to 90%

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

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

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

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

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

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

Customer self repair

What is customer self repair?

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

A convenient, easy-to-use program:

- An HP support specialist will diagnose and assess whether a replacement part is required to address a system problem. The specialist will also determine whether you can replace the part.

- For specific information about customer replaceable parts, refer to the maintenance and service guide on the HP website (http://www.hp.com/support).

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

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

RAID

redundant array of inexpensive (or independent) disks

RBSU

ROM-Based Setup Utility

SAS

serial attached SCSI

SATA

serial ATA

SCSI

small computer system interface

SDRAM

synchronous dynamic RAM

SIM

Systems Insight Manager

TMRA

recommended ambient operating temperature

UID

unit identification

UPS

uninterruptible power system

USB

universal serial bus

VHDCI

very high density cable interconnect

WOL

Wake-on LAN

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