HP ProLiant ML370 Generation 3 Server Setup and Installation Guide

March 2003 (Second Edition)
Part Number 281992-002

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About This Guide

This guide is designed to be used as step-by-step instructions for installation and as a reference for operation, troubleshooting, and future upgrades for the HP ProLiant ML370 Generation 3 server.

Audience Assumptions

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

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

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

WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

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.

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.

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

Weight in kg
Weight in lb

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.

Rack Stability

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.**

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website, www.hp.com.

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

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at www.hp.com.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.

- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to `ServerDocumentation@hp.com`.

1

Server Features

This guide provides information on HP ProLiant ML370 Generation 3 tower and rack servers. Once again, HP pushes the engineering envelope by offering customers an unprecedented combination of performance and Integrated Lights-Out (iLO) server management. The ProLiant ML370 G3 server comes standard with the latest Intel Xeon processor with Hyper-Threading technology (dual-processor capability), a five-peer PCI-X bus architecture, and DDR ECC interleaved memory for maximum data throughput. Additionally, HP gives customers the flexibility to choose only the features and options that best suit specific computing solutions or environments.

Built on the successes of the Generation 2 platform, the ProLiant ML370 G3 server continues to offer rapid deployment solutions, high levels of availability, and tool-free serviceability that continues to differentiate the ProLiant ML370 G3 server from any two-way server in its class.

Overview

The server supports the latest processing and system architecture technology, including:

- Two-way Intel Xeon processors with Hyper-Threading technology
- DDR ECC 2-to-1 interleave memory, expandable to 12 GB (8 GB with redundancy)
- Support for online spare memory
- Peered PCI-X bus architecture
- Six 64-bit/100-MHz, full-length PCI-X slots

- Integrated dual-channel Ultra3 SCSI controller
- Support for up to six internal universal hot-plug SCSI hard drives
- Optional internal two-bay hot-plug SCSI drive cage for the removable media bay
- Embedded NC7781 10/100/1000 network interface controller (NIC) with Wake on LAN (WOL) and preboot execution environment (PXE) support
- 48X IDE CD-ROM drive
- 1.44-MB diskette drive
- Tool-free access to service areas and hot-plug components
- Support for PS/2 keyboard, mouse, serial, parallel, USB, VHDCI SCSI, and video devices through external connectors
- ATI Rage XL video controller with 8 MB integrated video memory
- Redundant ROM support
- Integrated ROM-Based Setup Utility (RBSU) support
- Integrated Lights-Out (iLO) remote management port
- Enhanced system health monitoring
- Support for major operating systems and industry-standard technologies for expandability
- Remote configuration through BIOS Serial Console
- Redundant hot-plug fans (optional)
- 1+1 redundant hot-plug power supplies (optional)
- Support for Remote Insight Lights-Out Edition II (RILOE II) option
- Support for Compaq branded, HP, Telco, and third-party racks
- Comprehensive and flexible customer support programs through HP customer service at

  www.hp.com/support

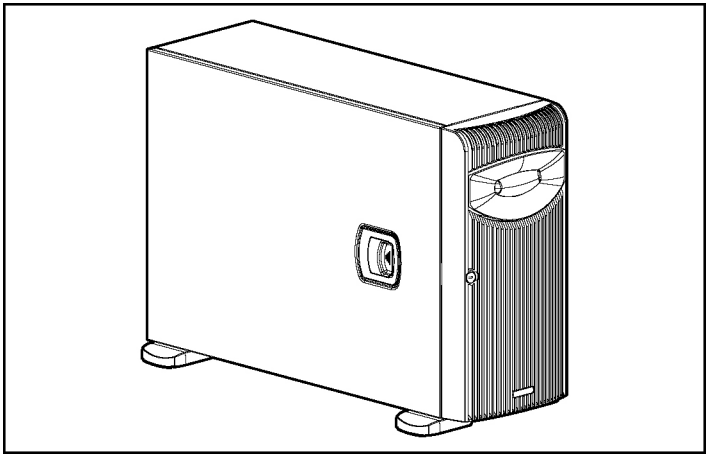

Figure 1-1: Tower server model

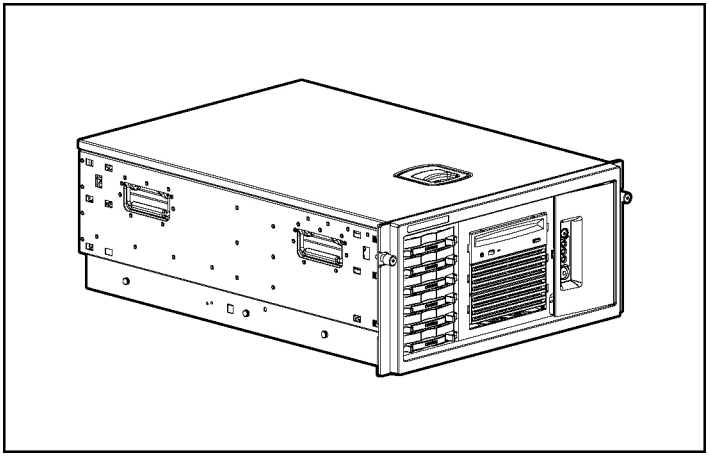

Figure 1-2: Rack server model

Standard Features

The features described in this section are standard on the server, unless otherwise specified.

Processor

The server supports the following advanced processor features:

- Integrated 512-K Level 2 cache
- Hyper-Threading technology
- Processor configurations and models for one or two Intel Xeon processors
- Support for future Intel processor technologies

Memory

The server supports Advanced Memory Protection features including:

- 2-to-1 interleaving memory configuration
- Registered DDR Dual Inline Memory Modules (DIMMs)
- Advanced ECC memory
  - For single-bit memory error correction and multi-bit memory error detection
  - For four-bit memory error detection and correction on a single DRAM device
- System memory expandable to 12 GB (8 GB with redundancy)
- Support for online spare memory

Expansion Slots

The server provides support for installing or connecting peripheral components through six PCI-X expansion slots. The expansion slots on the system board are configured as follows:

- Six 64-bit/100-MHz, full-length PCI-X slots
- Peak transfer rates of 800 MB per second
- Peered PCI-X bus architecture
- Support for peripheral transactions at a clock speed of up to 100 MHz

Integrated SCSI Controller

The server includes a standard Integrated Dual Channel Ultra3 SCSI Controller with:

- 64-bit/66-MHz PCI bus master interface
- Ultra3 SCSI bus transfer rate with peak transfer rate of 160 MB per second per channel
- Two SCSI ports supporting up to six internal hot-plug Wide Ultra2 or Ultra3 SCSI hard drives
- Optional internal two-bay hot-plug SCSI drive cage for the removable media bay
- Support for external tape drives and external storage through a VHDCI SCSI connector on the rear panel
- Support for hot-plug tape drives and hard drives in six hot-plug SCSI drive bays
- Support for non-hot-plug tape drives and hard drives in removable media bays

Network Interface Controller

The NIC provided with the server is an embedded NC7781 Fast Ethernet NIC with the following features:

- 10/100/1000-Mbps data transfer rate integrated
- Auto-sensing LAN capable at either 10, 100, or 1000 Mbps
- Full-duplex Ethernet for two-way transmission
- Support for PXE technology
- Support for WOL functionality

Storage Media

The server houses up to ten internal storage media devices in the removable media drive area and hot-plug SCSI hard drive cage.

Tape, Diskette, and CD-ROM Drives

The standard configuration for the removable media area includes:

- One half-height, removable media drive bay populated with a 48X IDE CD-ROM drive
- One third-height diskette drive bay populated with a 3.5-inch, 1.44-MB diskette drive
- Two available half-height, 5.25-inch, removable media drive bays

Hard Drives

The standard configuration for the hot-plug hard drive cage includes:

- Support for up to six 1-inch, hot-plug Wide Ultra2 or Ultra3 SCSI drives
- Support for combined tape and hard drive configurations with the Integrated Dual Channel Ultra3 SCSI controller
- Support for Wide Ultra2 and Ultra3 SCSI tape drives or hard drives operating at native speeds across a single SCSI channel

Standard Interfaces

The server is equipped with the following standard external and internal device interfaces:

- External
  - VHDCI SCSI
  - Auxiliary VHDCI SCSI slot
  - Serial (teal)
  - Video (blue)
  - Parallel (burgundy)
  - Keyboard (purple)
  - Mouse (green)
  - USB (black)
  - RJ-45 Ethernet
  - iLO management port

  For the location of external interfaces, refer to "Rear Panel Components" in Chapter 3.

- Internal
  - — IDE connector for CD-ROM drive
  - — Processor sockets and Processor Power Module (PPM) slots for dual Intel Xeon processors
  - — DIMM slots
  - — Remote management connectors for RILOE II
  - — Diskette drive connector
  - — Integrated connector for a hot-plug hard drive cage
  - — Integrated connector for a removable media bay
  - — Fan cable connector for redundant hot-plug fans
  - — Power signal connector and power supply connector for redundant hot-plug power supplies

  For the location of internal interfaces, refer to "System Board Components" in Chapter 3.

Video

Standard video integration includes:

- Integrated ATI Rage XL video controller with a maximum resolution of 1280×1024 non-interlaced resolution at 16M colors or up to 1600×1200 resolution at 65K colors
- Support for SVGA, VGA, and EGA graphics resolution
- 8 MB of SDRAM video memory

ROM

ROM features include:

- Redundant ROM support
- Integrated RBSU support
- Upgradeable firmware and diagnostics
- ROMPaq utility used to upgrade the system ROM
- Hardware boot block protection
- Online ROM flash support
- Legacy support for USB devices including keyboard and mouse

For more information on ROM features, refer to Chapter 7, "Server Configuration and Utilities."

Integrated Lights-Out

The primary features of Integrated Lights-Out include:

- Dedicated LAN network connectivity through a dedicated iLO management port
- Remote control of the server regardless of the state of the server operating system
- Remote cycling of server power to initiate a cold reboot
- Server reboot from remote media
- Virtual power button to allow remote powering up or powering down of server
- Browser support for Internet Explorer and Netscape Navigator
- Integration with Insight Manager

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

System Health Monitoring

In the server, system health is monitored by internal and external system health LEDs controlled with hardware and software. Features include:

- Unit Identification (UID) LEDs and switches
- Internal component health LEDs
  - — Processor
  - — PPM
  - — Memory
  - — Fan
  - — System overtemperature monitoring
- External component health LEDs (power supplies)
- Integrated NIC link/activity status
- Hard drives
- Diagnostic support through RBSU, ROM, health driver, and Insight Manager 7 utilities

For the location and functionality of all server LEDs, refer to Appendix E, "LED Indicators and Switches." For initial troubleshooting procedures, refer to Appendix D, "Troubleshooting."

Hot-Plug Fans

The server includes hot-plug fans with:

- Integrated hot-plug capability
- Support for hot-swapping among all fan positions
- Support for optional hot-plug redundant fans
- Support for variable-speed fans with an HP system health driver installed

Hot-Plug Power Supply

The server includes one 500-W hot-plug power supply with:

- 1+1 redundancy when a second 500-W hot-plug power supply is installed
- Auto-sensing input voltage range from 90 VAC to 264 VAC

Warranties

The server is backed by the following standard warranties:

- Three-Year, On-Site, Limited Global Warranty
- Pre-Failure Warranty

Three-Year, On-Site, Limited Global Warranty

HP covers the cost of all necessary parts and labor for onsite or carry-in service during the specified warranty periods. Under the global warranty, product warranty terms at the time of purchase are honored in any country where HP has a service presence. This applies to customers who may purchase a product in one country, then transfer it to another.

IMPORTANT: Customers moving HP products between certain countries or regions are asked to provide information needed to ensure that HP is prepared to provide the required level of warranty service in the destination country. For information on the HP Global Warranty notification process, contact your authorized reseller or refer to

www.hp.com/support

Response time is based on commercially reasonable best efforts. In most cases, next business day response is available. In some regions and under certain supplier restraints, next business day response is not always possible. Contact your local HP service organization for response times in your area or for information about upgrading service response times for the server.

Pre-Failure Warranty

The server includes a Pre-Failure Warranty for processors, hard drives, and memory purchased from HP through authorized resellers. Under the terms of this warranty, supported components are eligible for replacement before they actually fail, provided that you use Insight Manager 7 and that the system determines that the supported components have degraded below predetermined reliability thresholds within the product warranty period.

When Insight Manager 7 alerts you that a component may be eligible for Pre-Failure Warranty replacement, follow the on-screen instructions or contact an HP authorized service provider in your area. A yellow status indicator on the Insight Manager 7 control panel signals that a component is in a pre-failure condition and should be replaced.

Server Configuration and Management

HP offers an extensive set of features and optional tools to support effective server management and configuration. This section provides an overview of the following server management features that are detailed in Chapter 7, "Server Configuration and Utilities."

Integrated Features

- ROM-Based Setup Utility (RBSU)

  RBSU performs a wide range of configuration activities and provides access to system settings for system devices, operating system selection, boot controller order, and online spare memory.

- Redundant ROM support

  The server contains two 1-MB ROMs containing a current version of the ROM and a previous version of the ROM. If the first ROM corrupts, the system defaults to the previous version to maximize server availability and performance.

- ROMPaq Utility

  Flash ROM capability enables you to upgrade the firmware (BIOS) with system or option ROMPaq utilities.

- Online ROM Flash Utility

  Smart Components for the Online ROM Flash Utility enables Microsoft Windows NT 4.0 and Windows 2000 and Linux operating system administrators to efficiently upgrade and manage system and array controller ROMs.

- ROM legacy USB support

  For servers configured with an operating system that provides USB support, the ROM supports USB devices, including keyboard and mouse. For information about operating systems currently providing USB support, refer to

  www.hp.com/products/servers/platforms

For more information about these tools and utilities, refer to Chapter 7, "Server Configuration and Utilities."

Software Tools and Utilities

- SmartStart CD

  The SmartStart CD is the recommended tool for loading system software, achieving a well-integrated server, and ensuring maximum dependability and supportability. The SmartStart CD also contains diagnostic utilities and ROMPaq tools.

- SmartStart Diskette Builder

  The SmartStart Diskette Builder is a utility that uses data stored on the SmartStart CD to create support diskettes. You can create support diskettes for specific configuration needs or for software that cannot be used directly from the SmartStart CD.

- SmartStart Scripting Toolkit

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

- Insight Manager 7

  Insight Manager 7 is installed from the Management CD. It is an easy-to-use, intuitive software utility designed for collecting server information including fault conditions, performance, security, remote management, and recovery services.

- Diagnostics Utility (DIAGS)

  The Diagnostics Utility displays information about the server's hardware and tests the system to ensure that it is operating properly. If you used SmartStart to install the operating system, you can access the Diagnostics Utility from the SmartStart CD.

- Automatic Server Recovery-2 (ASR-2)

  ASR-2 enables the server to boot either automatically from the operating system or from HP utilities. If there is a critical system failure, ASR-2 automatically restarts the server and can be configured to page a designated system administrator.

- Integrated Management Log (IML)

  The IML provides a detailed log of key system events. This log also monitors the server health log and is accessible from Insight Manager 7 and Integrated Lights-Out (iLO).

- Multi-Initiator Configuration Utility

  The Multi-Initiator Configuration Utility enables administrators to configure the Integrated Dual Channel Ultra3 SCSI controller for support of HP and Compaq branded storage and clustering options.

For more information about these tools and utilities, refer to the following sources:

- Chapter 7, "Server Configuration and Utilities"
- ProLiant Essentials Foundation Pack
- Documentation CD

Security Features

Security provisions for the server include both hardware and software features:

- Hardware (tower server only)
  - — Front bezel and access panel key lock
  - — Power supply lock slots

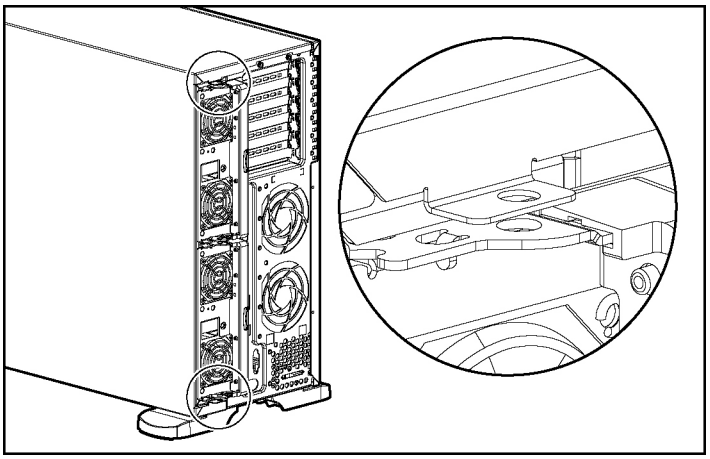

Figure 1-3: Power supply locks

- Software
  - — Power-on password
  - — Administrator password
  - — Network server mode
  - — QuickLock
  - — Diskette drive control
  - — Diskette write control
  - — Diskette boot control

— Serial interface control

— Parallel interface control

— NVRAM write protect

Software security features are configured through RBSU. For additional information about these security features, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

Diagnostic Tools

Software and firmware diagnostic tools available for the server include:

- Power-On Self-Test (POST)
- Diagnostics (DIAGS)
- ROMPaq utilities

For additional information about HP diagnostic tools, refer to the *Servers Troubleshooting Guide* on the Documentation CD.

2

Planning the Server Installation

To achieve maximum performance and availability from a ProLiant ML370 Generation 3 server, plan the operating environment before beginning server installation.

Optional Installation Service

You may choose to have HP install the system. The installation service can be purchased as a CarePaq packaged service or as a customized service agreement to meet your specific requirements. Some of the CarePaq services include:

- Installation services for hardware
- Hardware and operating system installation for ProLiant servers
- Installation and start-up services for Microsoft Windows 2000 and Microsoft Windows NT operating systems
- Installation with start-up and migration services for Novell NetWare operating system
- Installation and start-up services for Insight Manager 7

For detailed descriptions of these CarePaq services, refer to

www.compaq.com/services/carepaq

This optional hardware installation service is available in all countries where HP has a direct or indirect service presence. Service may be ordered from and directly provided by an authorized service reseller or, in the United States only, service may be ordered by calling 1-800-345-1518. In the United States, HP makes all of the arrangements to have the system installed by qualified guaranteed service providers. For ordering information, refer to

www.compaq.com/services/carepaq/us/install/

Rack Planning Resources

The following resource information is available for rack designs and products.

The rack resource kit ships with all Compaq branded racks. A summary of the content of each resource follows:

- Rack Builder Pro Configuration Tool

  This information enables you to simulate potential rack configurations based on your input. Rack Builder Pro provides the following information:

  — Graphical preview of properly configured racks

  — Site planning data, including power requirements, cooling mandates, and physical specifications

  — Ordering information, including required components, part numbers, and appropriate quantities

  For more Rack Builder Pro Configuration Tool information, refer to

  www8.compaq.com/RackBuilderOnline/pages/pg_main.html

- Installing Rack Products video

  This video provides a visual overview of operations required for configuring a rack with rack-mountable components. It also provides the following important configuration steps:

  — Planning the site

  — Installing rack servers and rack options

  — Cabling servers in a rack

  — Coupling multiple racks

- Rack Products Documentation CD

  The resource information on this CD enables you to view, search, and print documentation for Compaq branded racks and rack options. It also helps you set up and optimize a new rack in a manner that best fits the environment.

Optimum Environment

Peak server performance depends in part on the environment you select for installing a server or servers. Select a location that meets standard environmental requirements for the following:

- Space and airflow
- Power
- Electrical grounding
- Temperature

Space and Airflow Requirements

Tower Server

In a tower configuration, leave at least a 7.6-cm (3-inch) 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 spatial requirements when deciding where to install a Compaq branded, Telco, or third-party rack:

- Leave a minimum clearance of 63.5 cm (25 inches) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 inches) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 inches) 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 door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

IMPORTANT: Do not block the ventilation openings.

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

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

The 9000 Series racks provide server cooling from flow-through perforations ensuring 64 percent open area for ventilation. For guidelines on meeting airflow requirements for 7000 Series and third-party racks, refer to the documentation provided with the rack.

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

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 server rack includes closing front and rear doors, you must have 5,350 sq cm (830 square inches) 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 inches).

Power Requirements

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 that has jurisdiction over your facility's wiring and installation requirements.

CAUTION: When you need to disconnect power completely from the server, be sure that you unplug the power cord from the power outlet.

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

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.

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

- The power load must be balanced between available AC supply branch circuits.
- The overall system AC current load must not exceed 80 percent of the branch circuit AC current rating in your facility.
- Using common power outlet strips for this equipment is not recommended.
- Provide a separate electrical circuit for the server.

NOTE: Power strips are not recommended for optimal power distribution and safety.

Electrical Grounding Requirements

WARNING: This equipment is designed for connection to a grounded AC outlet. The grounding type plug is an important safety feature. To reduce the risk of electrical shock or damage to the equipment, do not disable the grounding feature on the plug.

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, the equipment must be installed in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, the installation must follow any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

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

Temperature Requirements

To ensure continued safe and reliable equipment operation, install or place the system in a well-ventilated, climate controlled environment. The maximum recommended ambient operating temperature (TMRA) for most server products is 95°F (35°C). The temperature in the room where the rack is located must not exceed 95°F (35°C).

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.

Warnings and Cautions

Before installing the server, carefully review the following warnings.

WARNING: To reduce the risk of personal injury or equipment damage when installing the server into a rack, be sure that:

- **The leveling jacks are extended to the floor.**
- **The full weight of the rack rests on the leveling jacks.**
- **The stabilizers are attached to the rack for single-rack installation.**
- **The racks are installed 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, at least two people are needed to safely unload a rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), is over 2.1 m (7 feet) 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 the server in a Telco rack, be sure that the rack frame is adequately secured to the top and bottom of the building structure.

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

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

WARNING: Pressing the server Power On/Standby button to power down the server removes power from most areas of the server. This process may take 30 seconds. Portions of the power supply and some internal circuitry remain active until the AC power cord is disconnected.

Disconnect the power cord to remove power completely. If the server has multiple power supplies installed, unplug all power cords to completely remove power from the system.

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

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

Rack Server Shipping Contents

Unpack the server box and locate the materials and documentation necessary for installing the server. All of the rack-mounting hardware necessary for installing the server into a square-holed rack is included with the rack server.

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

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

The contents of the rack server box provided with the server includes the following:

- Server
- Power cord
- Hardware documentation, reference information, and software products
- Rack-mounting hardware

NOTE: A Torx T-15 tool is provided with the server and is located on the rear panel.

Figure 2-1 and Table 2-1 identify all the components and assembly hardware in the rack kit.

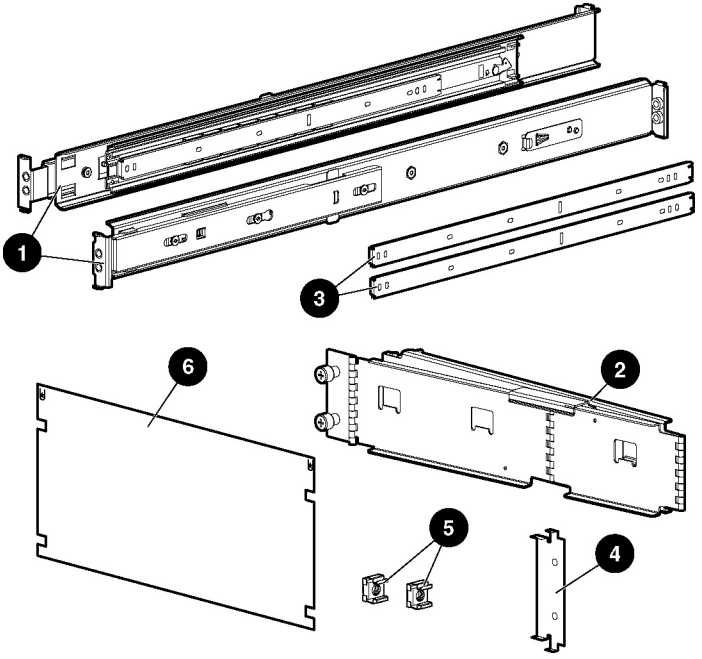

Figure 2-1: Rack kit contents

Table 2-1: Rack Kit Contents

Item	Description
1	Spring-load rack rails
2	Cable management arm
3	Server rails
4	Screw retaining plate
5	Cage nuts (shipped with rack)
6	Rack template

In addition to these supplied items, you may need the following:

- T-15 Torx tool (attached to the back of the server)
- Pencil

Tower Server Shipping Contents

Unpack the server, keyboard, and cables according to the instructions and illustrations printed on the shipping cartons.

The contents of the tower server box includes:

- Server
- Power cord
- Keyboard
- Mouse
- Hardware documentation, reference information, and software products

NOTE: A Torx T-15 tool is provided with the server and is located on the rear panel.

3

Installing Hardware Options

This chapter provides information and procedures for installing hardware options in a ProLiant ML370 Generation 3 server. For more information, refer to the installation documentation that ships with each option kit.

To streamline the installation process if you are installing more than one option, read the installation instructions for all of the hardware options and identify similar steps before installing each component.

After you install hardware options, proceed with the server installation procedures in Chapter 4, "Installing the Rack Server," or Chapter 5, "Installing the Tower Server."

For additional information about installation or troubleshooting procedures, refer to the Documentation CD that ships with the server or contact your authorized reseller.

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

- **Heed all warnings and cautions throughout the installation instructions.**
- **Allow internal system components to cool before touching any surfaces.**
- **Be sure that the power to the server is turned off and that the AC power cord is disconnected before removing the access panel.**

CAUTION: Always be sure that equipment is properly grounded before beginning any installation procedure. Electrostatic discharge resulting from improper grounding can damage electronic components. For more information, refer to Appendix B, "Electrostatic Discharge."

Tower and Rack Server Components

The primary differences between the tower and rack servers are the chassis orientations and front bezel configurations. Figure 3-1 and Table 3-1 identify chassis components. Refer to "Preparing the Server," in this chapter, for instructions on opening the access panel, the media door on the rack server, or the front bezel on the tower server to access server components.

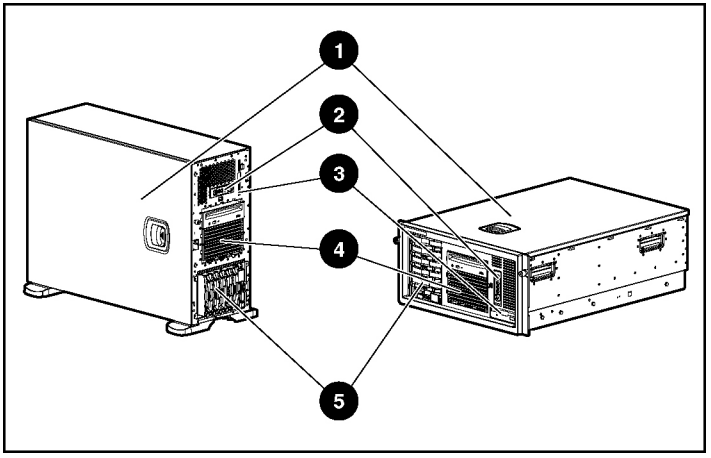

Figure 3-1: Tower and rack chassis components

Table 3-1: Tower and Rack Chassis Components

Item	Description
1	Access panel
2	Power-On/Standby button/LED assembly
3	Diskette drive
4	Removable media bays
5	Hot-plug SCSI hard drive cage

Front Panel Components

Figures 3-2 and 3-3 and Tables 3-2 and 3-3 identify front panel components of tower and rack servers.

Tower Server

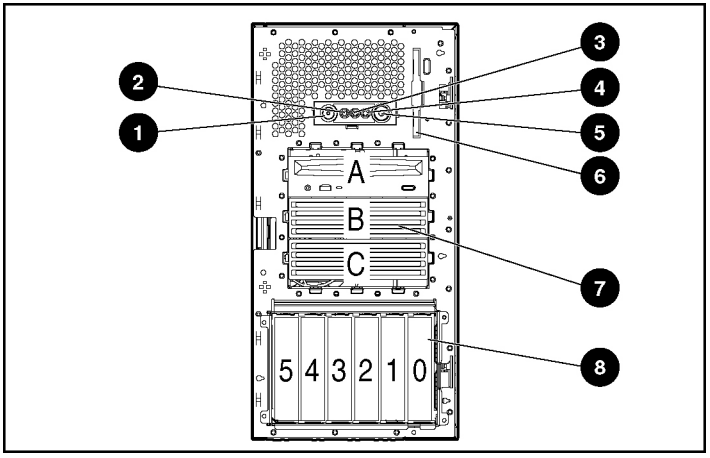

Figure 3-2: Front panel components of the tower server

Table 3-2: Front Panel Components of the Tower Server

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

Rack Server

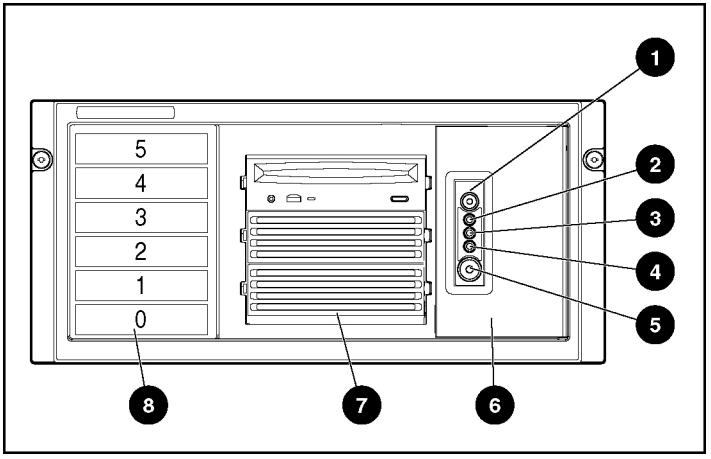

Figure 3-3: Front panel components of the rack server

Table 3-3: Front Panel Components of the Rack Server

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

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

Rear Panel Components

Figures 3-4 and 3-5 and Tables 3-4 and 3-5 identify rear panel components of tower and rack servers.

Tower Server

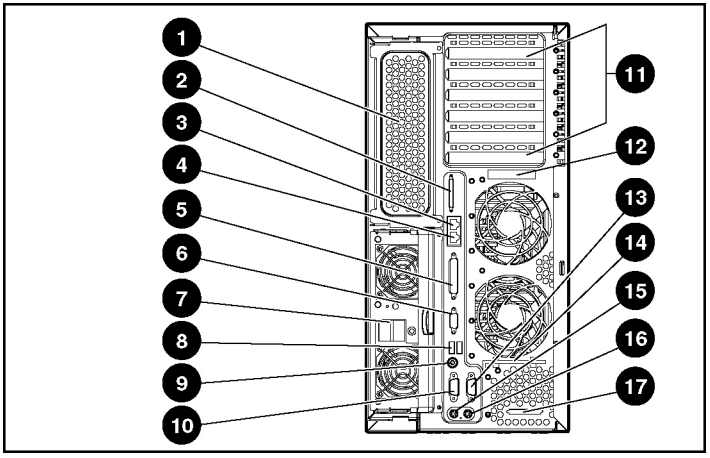

Figure 3-4: Rear panel components of the tower server

Table 3-4: Rear Panel Components of the Tower Server

Item	Description	Item	Description
1	Redundant hot-plug power supply bay	10	Serial connector A
2	VHDCI SCSI port 2 connector	11	PCI-X expansion slots
3	Ethernet 10/100/1000 port	12	Unit serial number
4	iLO management port	13	Serial connector B
5	Parallel connector	14	T-15 Torx tool
6	Video connector	15	Keyboard connector
7	Primary hot-plug power supply	16	Mouse connector
8	USB connectors	17	Auxiliary VHDCI SCSI blank
9	Unit ID switch and LED		

Rack Server

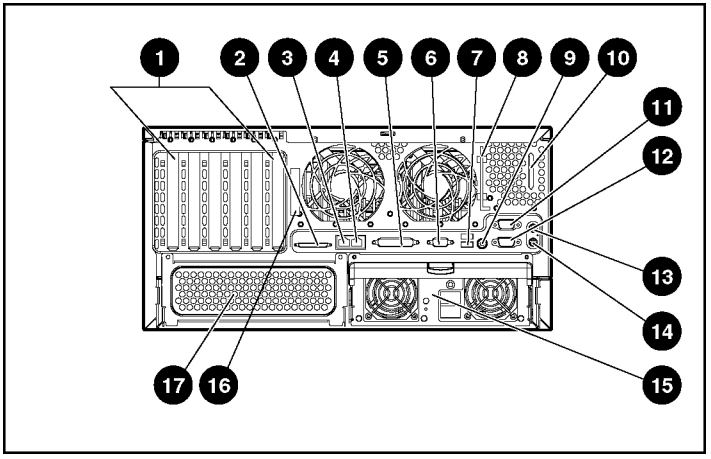

Figure 3-5: Rear panel components of the rack server

Table 3-5: Rear Panel Components of the Rack Server

Item	Description	Item	Description
1	PCI-X expansion slots	10	Auxiliary VHDCI SCSI blank
2	VHDCI SCSI port 2 connector	11	Serial connector B
3	Ethernet 10/100/1000 port	12	Serial connector A
4	iLO management port	13	Mouse connector
5	Parallel connector	14	Keyboard connector
6	Video connector	15	Primary hot-plug power supply
7	USB connectors	16	Unit serial number
8	T-15 Torx tool	17	Redundant hot-plug power supply bay
9	Unit ID switch and LED		

Locating Serial Numbers

The serial number for the server is placed on the front and rear panels for quick reference. Use this number when you contact an authorized service provider. Figure 3-6 and Table 3-6 identify serial number locations.

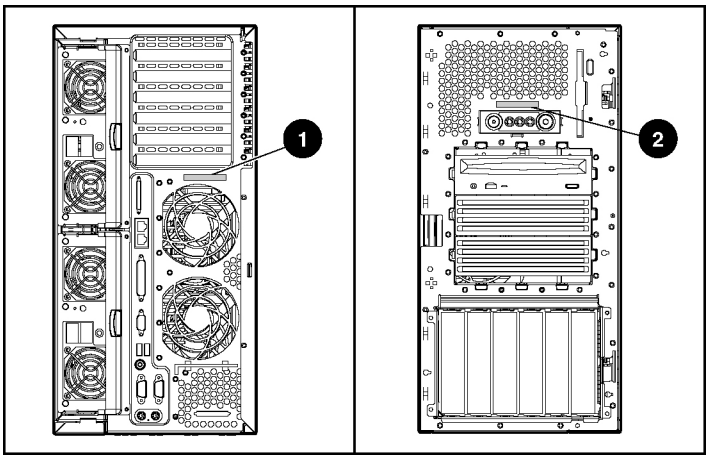

Figure 3-6: Serial number locations (tower server)

Table 3-6: Serial Number Locations

Item	Description
1	Rear panel serial number location
2	Front panel serial number location

Locating Product ID Labels

The product ID label is located on the front bezel. Use this label to identify the proper generation within the server family. Figure 3-7 shows product ID label locations.

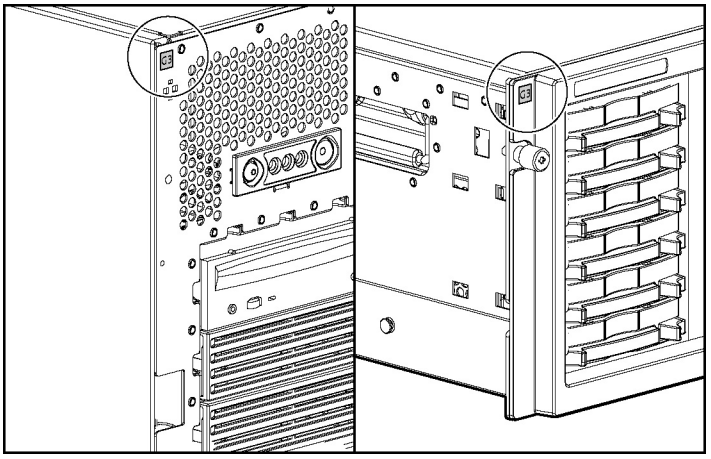

Figure 3-7: Product ID label locations (tower server at left, rack server at right)

Locating the Torx T-15 Tool

A Torx T-15 tool is provided with the tower or rack server and is located on the rear panel. Use this tool to assist with installing options as directed in the option documentation. Specific uses include:

- Removing a power supply blank
- Removing the auxiliary SCSI blank
- Installing an auxiliary VHDCI SCSI cable

Figure 3-8 identifies the Torx T-15 tool location.

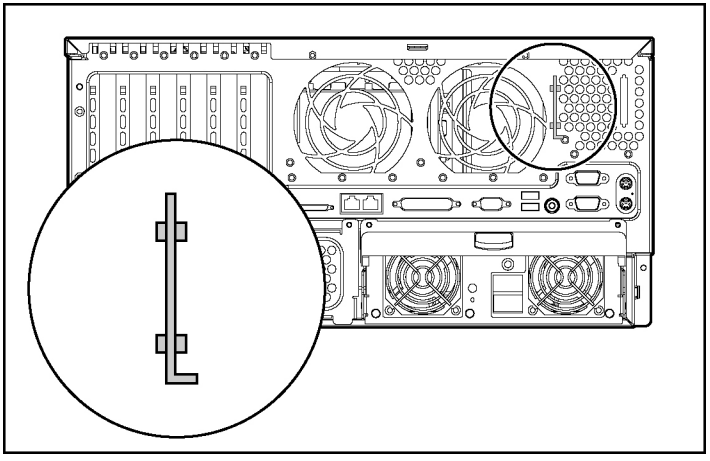

Figure 3-8: Torx T-15 tool location (rack server)

System Board Components

Figure 3-9 and Table 3-7 identify system board components.

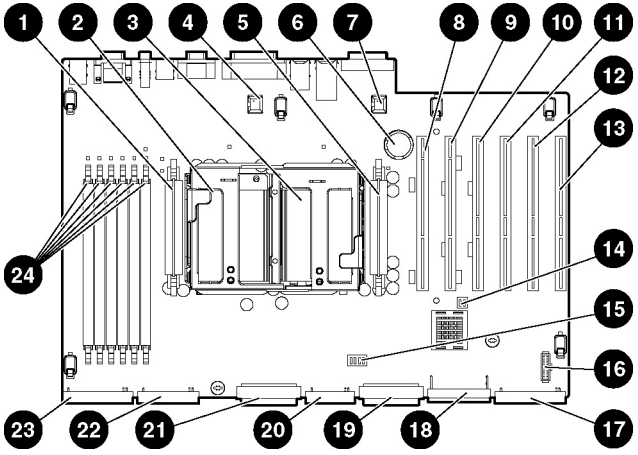

Figure 3-9: System board components

NOTE: The server is configured for the appropriate switch settings at the factory.

Table 3-7: System Board Components

Item	Description	Item	Description
1	PPM slot 2	13	64-bit/100-MHz PCI-X expansion slot 6 (bus 6, 3.3-V signaling)
2	Processor socket 2	14	System identification switch (SW2)
3	Processor socket 1	15	System maintenance switch (SW1)
4	Redundant fan 2 connector	16	30-pin remote management connector *
5	PPM slot 1	17	Power supply signal connector
6	System battery	18	Power supply connector
7	Redundant fan 4 connector	19	SCSI port 2
8	64-bit/100-MHz PCI-X expansion slot 1 (bus 2, 3.3-V signaling)	20	Fan cable connector
9	64-bit/100-MHz PCI-X expansion slot 2 (bus 2, 3.3-V signaling)	21	SCSI port 1
10	64-bit/100-MHz PCI-X expansion slot 3 (bus 10, 3.3-V signaling)	22	Diskette drive connector
11	64-bit/100-MHz PCI-X expansion slot 4 (bus 10, 3.3-V signaling)	23	IDE connector
12	64-bit/100-MHz PCI-X expansion slot 5 (bus 6, 3.3 -V signaling)	24	DIMM slots

***** The server comes with Integrated Lights-Out remote management capability embedded on the system board. The 30-pin remote management connector for the Remote Insight Lights-Out Edition II board is provided if the server environment requires an upgrade for faster speeds.

Preparing the Server

WARNING: To reduce the risk of electrical shock or damage to the equipment, only service parts of the server as instructed in the user documentation.

WARNING: Pressing the Power On/Standby button to power down the server removes power from most areas of the server. This process may take 30 seconds. Portions of the power supply and some internal circuitry remain active until the AC power cord is disconnected.

To remove power completely, disconnect the power cord. If the server has multiple power supplies installed, it is necessary to remove all power cords in order to remove all power from the system.

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

Use the procedures in this chapter and in Chapter 2, "Planning the Server Installation," to prepare the server for hardware option installations.

Unlocking and Opening the Front Bezel

Tower servers have a removable front bezel. To access the hard drive cage and removable media area, first unlock and open the bezel door. You must also unlock the bezel before removing the access panel. During normal operations, the bezel door must remain closed.

Use the key provided with the server to open the bezel lock with a counterclockwise turn as shown in Figure 3-10. Refer to the maintenance and service guide if you need to replace the key or other hardware components, or refer to

www.hp.com/products/servers/platforms

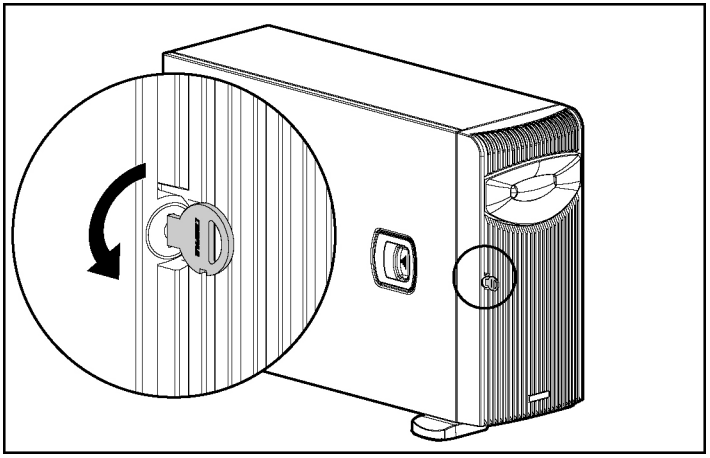

Figure 3-10: Unlocking the front bezel (tower server)

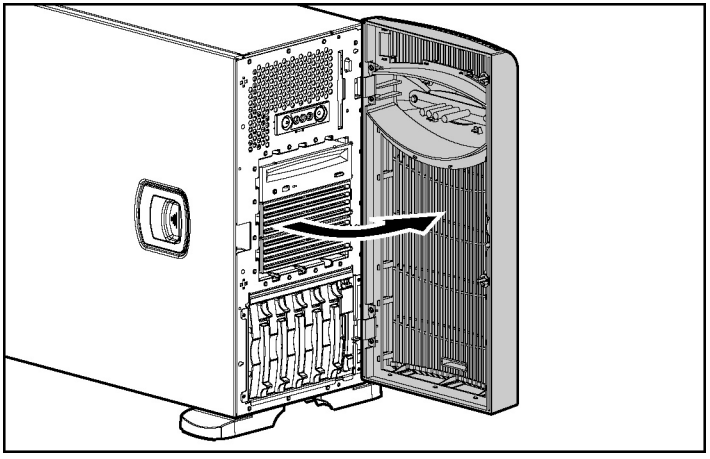

Figure 3-11: Opening the front bezel

Opening the Media Door

The rack server includes a media door on the front bezel. Use this door for quick access to the diskette drive and system serial number.

To open the media door:

1. Press the edge of the media door in toward the server (1).
2. Swing the door open (2).

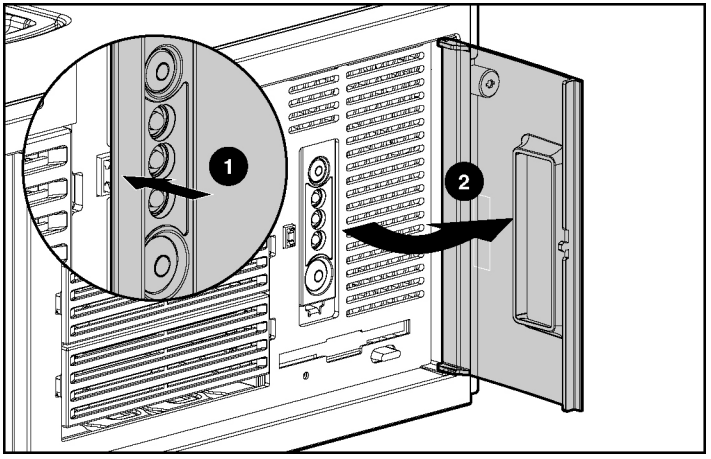

Figure 3-12: Opening the media door (rack server)

Powering Down the Server

If you are adding hardware options to a new server that has not been installed in a rack or work area, install all hardware options before installing and powering up the server.

If the server is already installed, you must power down the system before adding non-hot-plug hardware options.

IMPORTANT: Before upgrading components, back up the server data.

To power down the server:

1. Shut down the operating system as directed by the operating system. This measure enables you to retain system power for use in performing diagnostic or troubleshooting operations.
2. For servers deployed in a rack configuration, press the unit identification (UID) switch on the server front panel to illuminate the blue front and rear UID LEDs.
3. The UID LED remains blue as long as power is connected to the server and until you press the UID switch again. Use this LED to identify a particular server within a multi-server rack configuration.

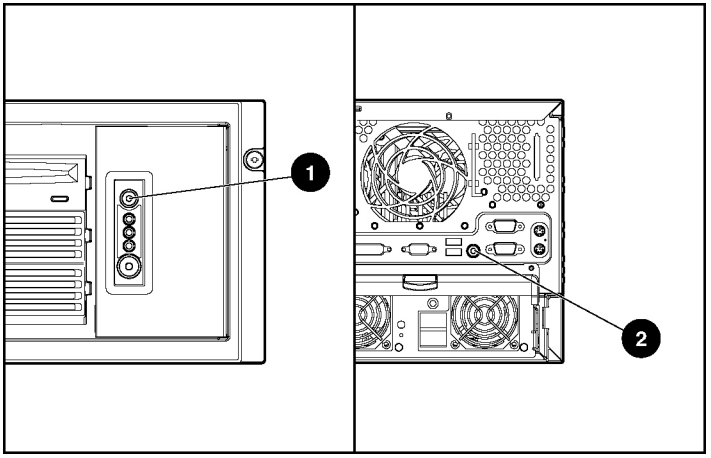

Figure 3-13: Front and rear UID switch and LED locations (rack server)

Table 3-8: Front and Rear UID Switch and LED Locations

Item	Description
1	Front panel UID switch and LED
2	Rear panel UID switch and LED

4. Press the Power On/Standby button.
5. The Power On/Standby LED turns amber when the server is powered down in this manner, indicating that auxiliary power is still present in the system. When you remove power from the system completely by removing all power cords, the LED turns off.

WARNING: Pressing the Power On/Standby button to power down the server removes power from most areas of the server. This process may take 30 seconds. Portions of the power supply and some internal circuitry remain active until the AC power cord is disconnected.

If the server has multiple power supplies installed, it is necessary to remove all power cords to remove all power from the system.

NOTE: On the tower server, open the front bezel to access the Power On/Standby button.

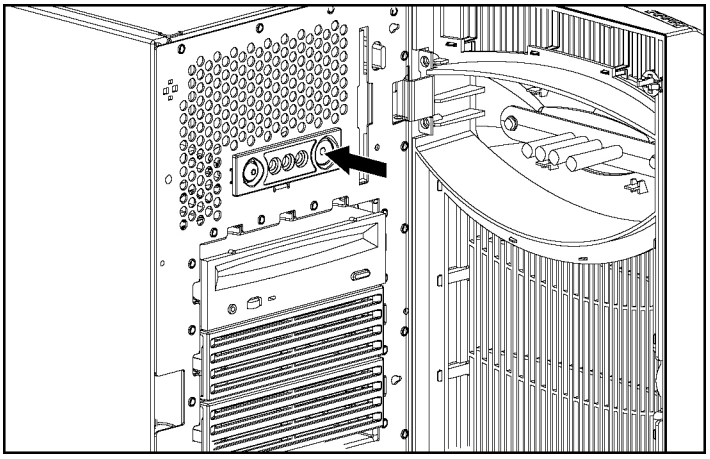

Figure 3-14: Pressing the Power On/Standby button (tower server)

6. Disconnect all power cords from the server.
7. Disconnect all peripheral cables from the server rear panel, including cables extending from external connectors on expansion boards.

The system is now without power and you can safely install all hardware options.

NOTE: It is not necessary to remove power from the server before installing hot-plug components.

Removing the Access Panel

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

CAUTION: Do not operate the server for any length of time without the access panel installed. Operating the server without its access panel results in improper cooling that can lead to thermal damage.

CAUTION: To avoid the risk of damage to the system or optional components, remove all AC power cords before installing or removing non-hot-plug options. When the Power On/Standby button is in the off position, auxiliary power is still present and may damage the system.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure.

Place the tower server on a flat working surface or extend the rack server from the rack before removing the access panel. The system configuration and options labels located on the inside of the access panel provide information on installing hardware options, locating system switches and LEDs, and upgrading system resources.

Be sure that the access panel is securely in place before powering up the server.

Tower Server

To remove the tower server access panel:

1. If the server is operating, power down the server. Refer to "Powering Down the Server" in this chapter.

   NOTE: Some hot-plug hardware options may be installed without powering down the server or removing the access panel.

2. Unlock the front bezel. Refer to "Unlocking and Opening the Front Bezel" in this chapter.
3. Press down on the latch to unlock the access panel (1).
4. Continue to hold the latch down while you slide the access panel toward the rear of the server (2).

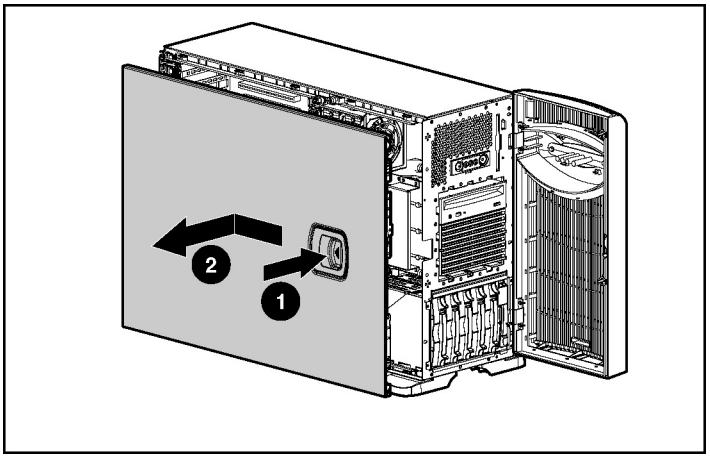

Figure 3-15: Removing the access panel (tower server)

5. Remove the access panel from the server.

   NOTE: Use the system configuration labels on the inside of the access panel to locate system components and settings.

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

Rack Server

To extend the server from the rack and remove the access panel:

1. If the server is operating, power down the server. Refer to "Powering Down the Server" in this chapter.

   NOTE: Some hot-plug hardware options may be installed without powering down the server or removing the access panel.

2. Loosen the two thumbscrews that secure the bezel to the front of the rack (1).
3. Extend the server from the rack until the sliding rails lock (2).

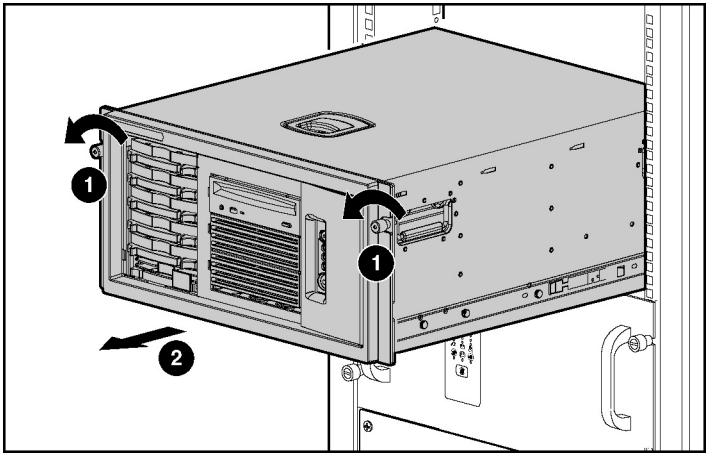

Figure 3-16: Extending the server from the rack

4. Press down on the access panel latch to unlock it (1).
5. Continue to hold the latch down while you slide the access panel toward the rear of the server (2).

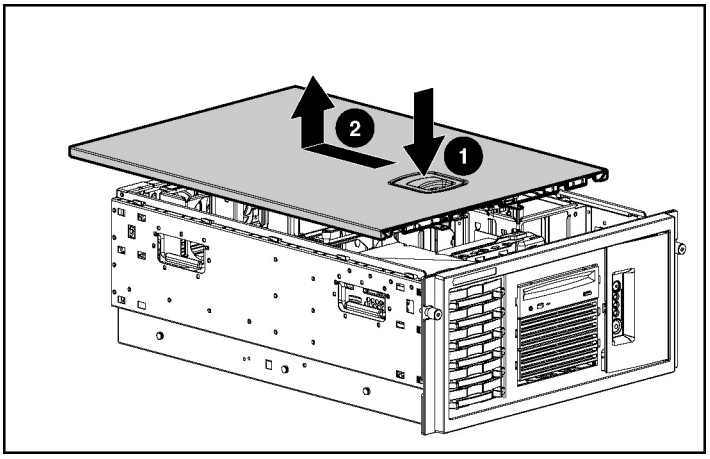

Figure 3-17: Removing the access panel (rack server)

6. Remove the access panel from the server.

NOTE: Use the system configuration labels on the inside of the access panel to locate system components and settings.

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

Installing Hardware Options

This chapter includes step-by-step instructions for installing:

- Processors and PPMs
- Memory
- Hot-plug SCSI hard drives
- Removable media devices
- Optional internal two-bay hot-plug SCSI drive cage
- Redundant hot-plug fans
- Redundant hot-plug power supply
- Expansion boards

For additional instructions for installing and configuring hardware options, refer to the documentation that ships with each option kit.

For information on obtaining hardware options and upgrades for the server, refer to

www.hp.com/products/servers/platforms/

Processors and PPMs

CAUTION: The processor, heatsink, and retaining clip comprise a single assembly. Separating the processor from the heatsink causes thermal instability and damage to the server.

IMPORTANT: If you must replace a failed processor or processors, clear the status log in RBSU after powering up the server. Refer to the maintenance and service guide for replacement instructions or contact your authorized service provider.

Installing a Second Processor and PPM

The server supports the installation of a second Intel Xeon processor for enhanced performance. Processor option kits available for the server include an Intel Xeon processor with heatsink and a processor power module (PPM).

CAUTION: Always install a PPM when you install a processor. The system fails to boot if the processor or PPM are missing.

IMPORTANT: When you install a second processor and PPM, the processor must be the same type and speed as the primary processor. Install only the PPM provided in the option kit with the processor.

NOTE: The appearance of compatible PPMs may vary.

Observe the warnings and cautions provided in the option kit documentation and in this guide. To install the processor assembly:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.
3. Remove the processor air baffle:
   a. Loosen the two thumbscrews that secure the air baffle to the system tray (1).
   b. Lift the air baffle up and out of the server (2).

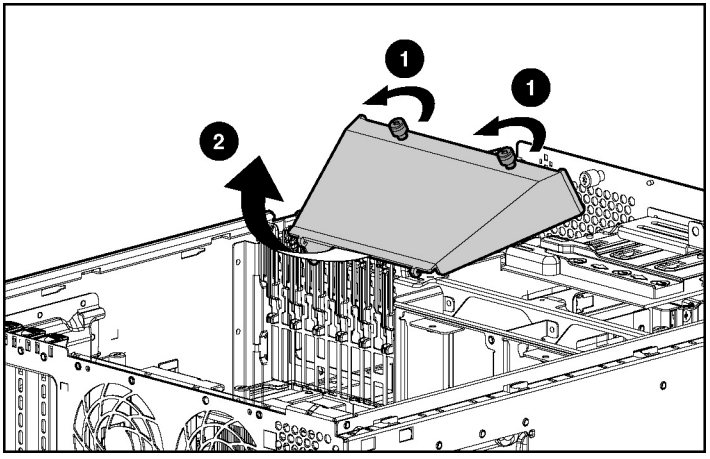

Figure 3-18: Removing the processor air baffle

4. Locate the secondary processor socket and PPM slot on the system board.

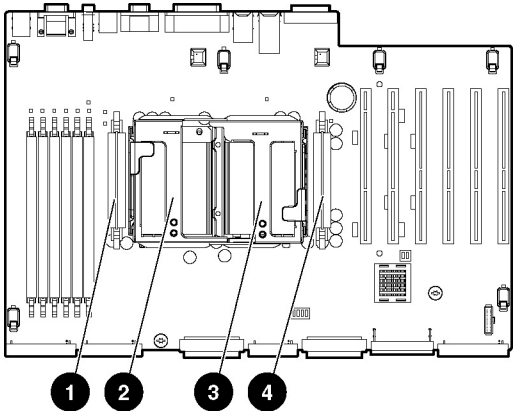

Figure 3-19: Processor sockets and PPM slots

Table 3-9: Processor Sockets and PPM Slots

Item	Description
1	Secondary PPM slot
2	Secondary processor socket
3	Primary processor socket
4	Primary PPM slot

5. Lift the processor retaining bracket lever to release the processor retaining bracket.

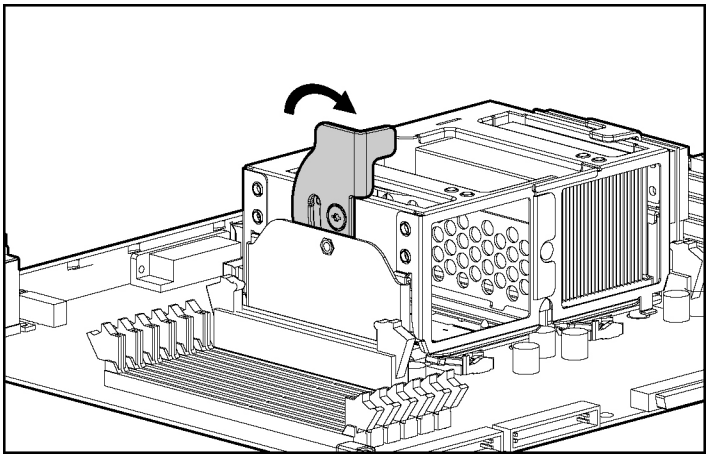

Figure 3-20: Lifting the processor retaining bracket lever

6. Lift the processor retaining bracket (1).
7. Release the processor locking lever (2).

CAUTION: Failure to open the processor locking lever all the way prevents the processor from seating during installation and leads to hardware damage.

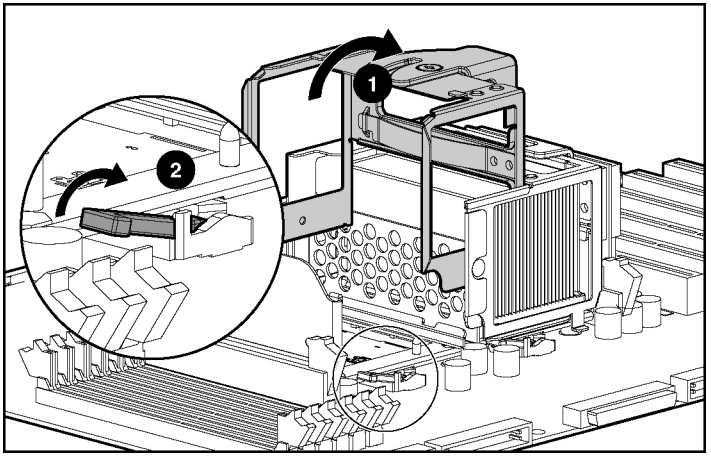

Figure 3-21: Lifting the processor retaining bracket and releasing the processor locking lever

8. Install the processor assembly into the available processor socket:
   a. Determine the correct processor orientation by observing the three guide pins on the processor retaining bracket and the three corresponding guide holes on the processor assembly.

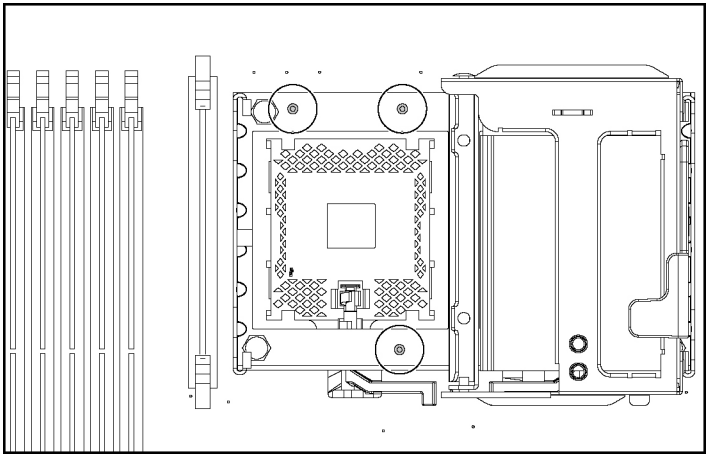

Figure 3-22: Aligning the processor assembly for installation

b. Insert the processor assembly into the processor socket (1).

c. Close the processor locking lever while pressing down on the heatsink(2).

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

IMPORTANT: If the processor locking lever is not secured, the processor retaining bracket does not close properly.

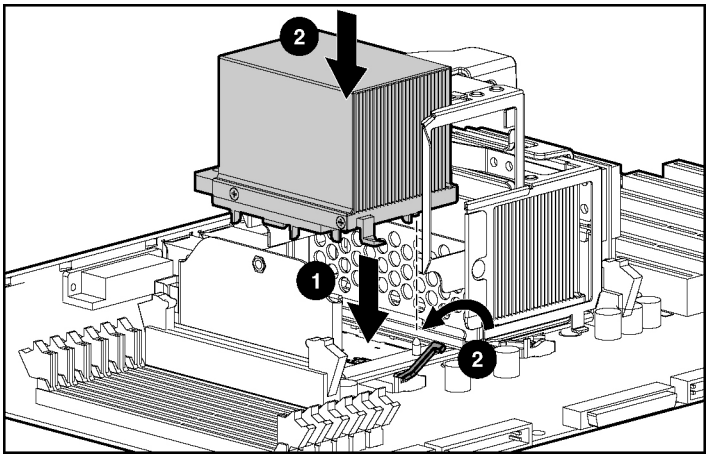

Figure 3-23: Installing the processor assembly and securing the processor locking lever

9. Lower the processor retaining bracket into position over the processor.

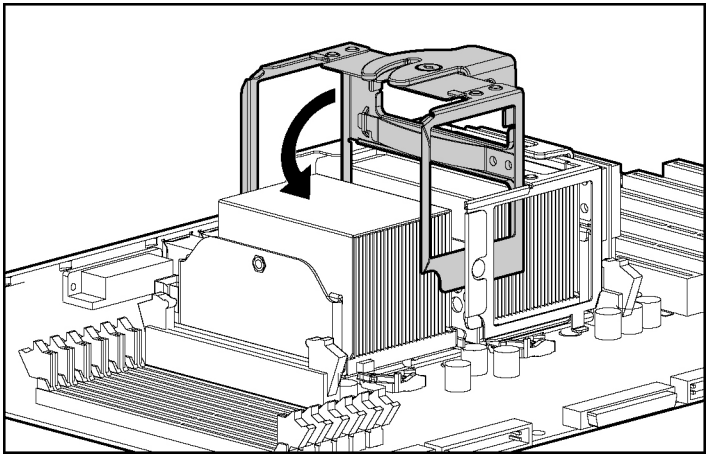

Figure 3-24: Lowering the processor retaining bracket

CAUTION: Before closing the processor retaining bracket, be sure that the processor locking lever is closed. Forcing the bracket shut may damage the processor or the processor socket.

10. Press the processor retaining bracket lever down to secure the processor retaining bracket.

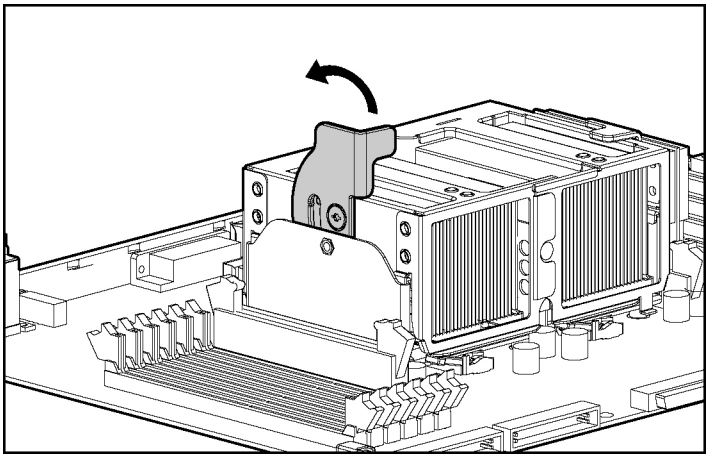

Figure 3-25: Securing the processor retaining bracket lever

NOTE: PPMs may look different from those illustrated in this document.

11. Install the PPM into the available PPM slot:
    a. Align the key slot on the PPM with the PPM slot.
    b. Press firmly to be sure that the PPM is fully seated in the slot (1). When the PPM is fully seated, the slot latches close (2).

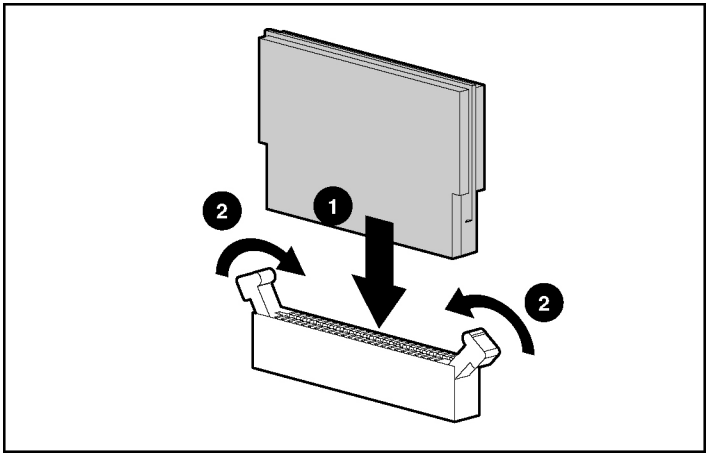

Figure 3-26: Installing a PPM

12. Reinstall the processor air baffle:
    a. Align the screws on the processor air baffle with the screw holes on the center wall.
    b. Tighten the thumbscrews.
13. Reinstall the access panel.

Memory

You can expand server memory by installing HP or Compaq branded DDR DIMMs. The server supports up to six ECC registered DDR DIMMs installed in slots on the system board.

The server supports the Advanced Memory Protection feature through the Advanced ECC feature and online spare memory support. When you power up and configure the server for the first time, use RBSU to enable online spare memory support. For additional information about using RBSU option menus, refer to Chapter 7, "Server Configuration and Utilities

CAUTION: Use only HP or Compaq branded DIMMs. DIMMs from other sources are known to adversely affect data integrity.

IMPORTANT: Always install identical DIMMs in pairs so that both slots in the bank are populated.

IMPORTANT: Always install DIMMs in order (bank A, then bank B, and then bank C) without skipping any slots.

The server supports two types of memory configurations:

- Standard memory configuration for maximum performance with up to 12 GB of active memory
- Online spare memory configuration for maximum availability with up to 8 GB of active memory and up to 4 GB of online spare memory

The following sections explain DIMM slot locations, configuration options, and installation procedures.

Identifying DIMM Slots

Figure 3-27 and Table 3-10 identify DIMM slots on the server system board. The slots are numbered sequentially (1 through 6), and the paired banks are identified by the letters A, B, and C.

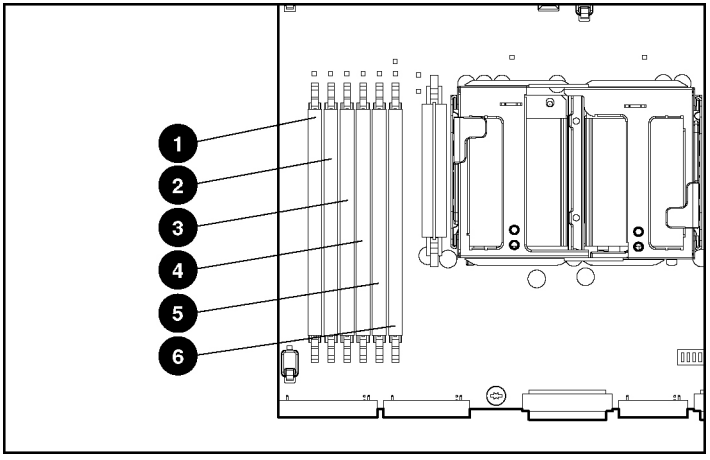

Figure 3-27: DIMM slots on the system board

Table 3-10: DIMM Slot Identification

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

Standard Memory Configurations

You can expand server memory to 12 GB. In the maximum standard memory configuration, all six DIMM slots are populated with 2-GB ECC registered DDR DIMMs.

NOTE: With Advanced ECC protection, the server can detect and correct four-bit errors in a single DRAM DIMM.

Online Spare Memory Configurations

With online spare memory support, you can configure primary server memory for up to 8 GB of ECC DDR memory and configure an additional 4 GB of memory for online spare memory support. In the online spare memory configuration, all six DIMM slots are populated with 2-GB ECC registered DDR DIMMs.

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

After installing DIMMs, use RBSU to configure the system for online spare memory support. Refer to "Configuring Online Spare Memory" in Chapter 7 for additional information about enabling and configuring online spare memory support.

IMPORTANT: For online spare memory configurations, adhere to the guidelines for both standard ECC and online spare DIMM installation. Refer to the sections "Standard ECC DIMM Installation Guidelines" and "Online Spare DIMM Installation Guidelines."

Standard ECC DIMM Installation Guidelines

You **must** observe the following guidelines when installing additional memory:

- Always install memory in pairs of two identical DIMMs.
- DIMMs installed in the server must be registered DDR, 2.5-volts, 72-bits wide, and ECC.

- All DIMMs installed must be the same speed. Do not install DIMM modules supporting different speeds.

  NOTE: The server ships with DIMMs installed in DIMM slots 1A and 2A.

- Install DIMMs into both slots within a single bank. DIMMs must be installed in order. Upgrade memory by installing DIMM pairs into banks in sequential bank order, starting with bank B.

CAUTION: Use only HP or Compaq branded DIMMs. DIMMs from other sources are known to adversely affect data integrity.

Online Spare DIMM Installation Guidelines

For online spare memory support, you **must** observe the "Standard ECC DIMM Installation Guidelines" in this chapter and the following additional guidelines:

- The system ROM must be up-to-date.

  NOTE: If you are installing optional DIMMs before powering up the server for the first time, it is not necessary to update the system ROM.

- Online spare memory support must be enabled through RBSU.
- The health driver must be installed and operating properly.
- DIMMs installed in a spare bank must be of equal or greater capacity than the DIMMs installed in other banks.

  For example, if bank A is populated with two 256-MB DIMMs and bank B is populated with two 512-MB DIMMs, bank C must be populated with two 512-MB or greater DIMMs for online spare memory support to function properly.

Table 3-11 lists the 2-to-1 interleaving DIMM option kits available from HP for use with the server. Use the option kit part number when ordering additional memory for the server. Use the spare and component part numbers for reference when ordering replacement parts or when contacting an authorized service provider.

Table 3-11: DIMM Part Numbers

Description	Option Kit	Spare	Component
512-MB DDR option kit (2×256 MB)	300678-B21	300669-001	261583-031
1-GB DDR option kit (2×512 MB)	300679-B21	300700-001	261584-041
2-GB DDR option kit (2×1 GB)	300680-B21	300701-001	261585-041
4-GB DDR option kit (2×2 GB)	300682-B21	300702-001	261586-051

IMPORTANT: Use only the DIMMs and option kits specified for the server. DIMMs not specified for the server may not support online spare memory configuration.

Installing DIMMs

Before installing DIMMs, review the DIMM installation guidelines in "Standard ECC DIMM Installation Guidelines" and "Online Spare DIMM Installation Guidelines."

CAUTION: Electrostatic discharge can damage electronic components. Properly ground yourself before beginning any installation procedure. Refer to Appendix B, "Electrostatic Discharge," for more information.

To install a DIMM in an available DIMM slot:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.
3. Identify the correct DIMM slots and banks. Refer to "Identifying DIMM Slots" in this chapter.

IMPORTANT: DIMMs must be installed in pairs so that both slots in the bank are populated with identical DIMMs.

4. Open the DIMM slot latches (1).
5. Align the key slot in the bottom edge of the DIMM with the tab in the slot (2).

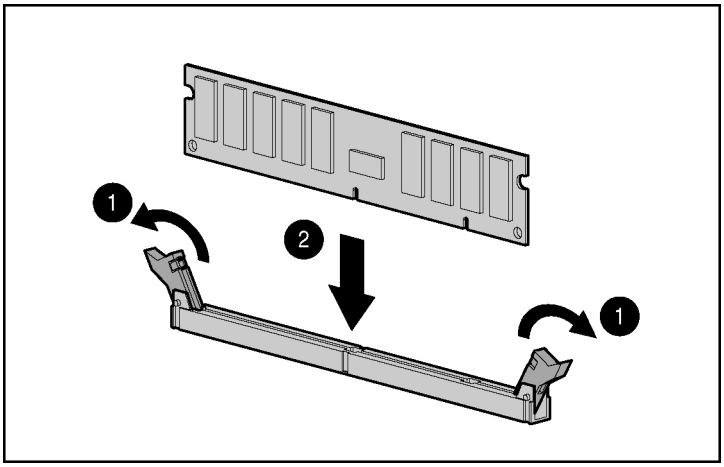

Figure 3-28: Installing a DIMM in a DIMM slot

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

6. Press down evenly on the DIMM until it is seated securely in the slot and the latches close.
7. Repeat steps 4 and 5 to install the second DIMM in the pair.
8. Install other hardware options or replace the access panel before powering up the server.

If you are installing DIMMs for the online spare configuration, use RBSU to configure this feature. Refer to Chapter 7, "Server Configuration and Utilities," for additional information.

Hot-Plug SCSI Hard Drives

The server provides support for up to six internal hot-plug SCSI hard drives or four internal hot-pug SCSI hard drives and one Universal Hot-Plug Tape Drive.

SCSI Hard Drive Installation Guidelines

Observe the following guidelines when adding SCSI hard drives. Refer to Chapter 7, "Server Configuration and Utilities," for additional information.

- The SCSI ID for each hot-plug hard drive is set automatically to the next sequential ID number in a series beginning with ID0.
- If only one SCSI hard drive is used, install it in the bay with the lowest number.
- Refer to the user documentation for configuring internal or external drives.
- Hot-plug hard drives must be either Wide Ultra2 or Ultra3 SCSI types. Mixing these types with other drive standards degrades the overall performance of the drive subsystem.
- Drives must be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

CAUTION: Before removing a hard drive, refer to the *Servers Troubleshooting Guide* for guidelines on hot-plug SCSI hard drive replacement.

- Add up to a maximum of 14 SCSI devices per channel.
- Each SCSI drive must have a unique address. The system automatically sets all SCSI addresses for hot-plug drives.

SCSI IDs

Before installing or configuring additional hard drives, use Figures 3-29 and 3-30 to identify the SCSI ID for each slot.

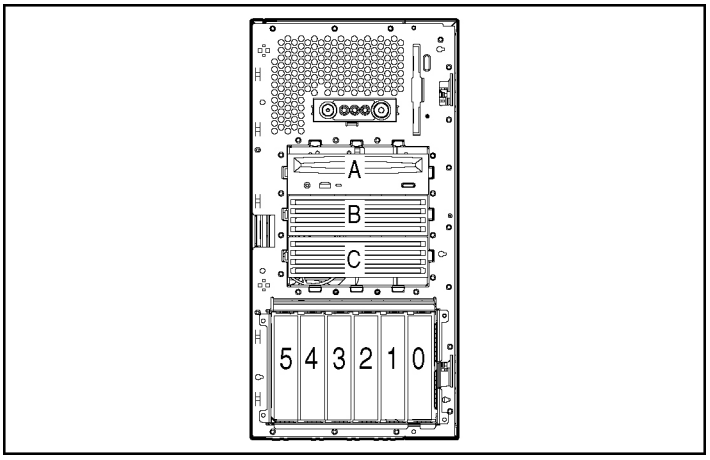

Figure 3-29: SCSI hard drive slot locations and IDs (tower server)

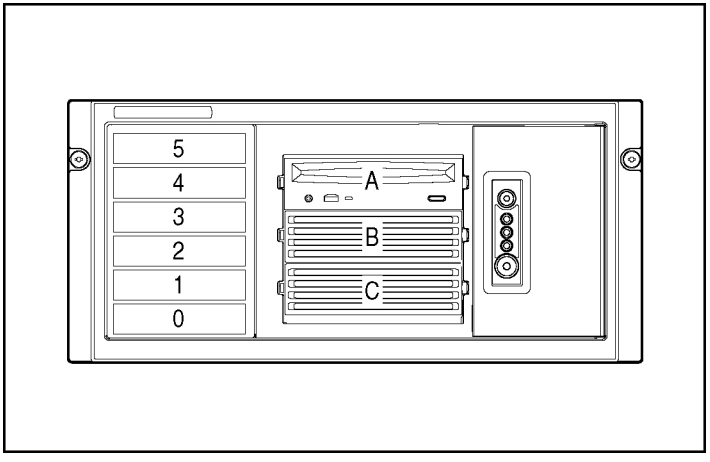

Figure 3-30: SCSI hard drive slot locations and IDs (rack server)

Removing a Hard Drive Blank

The server ships standard with six hot-plug hard drive blanks. Before installing a hot-plug SCSI hard drive, you must remove a blank.

CAUTION: Always populate drive bays with either a hard drive or blank. Proper airflow can only be maintained when the bays are populated. Operating the server with unpopulated drive bays can lead to improper cooling and thermal damage.

To remove a hard drive blank:

1. Grab the two thumb tabs and squeeze them together to release the blank (1).
2. Pull the blank out of the drive bay (2).

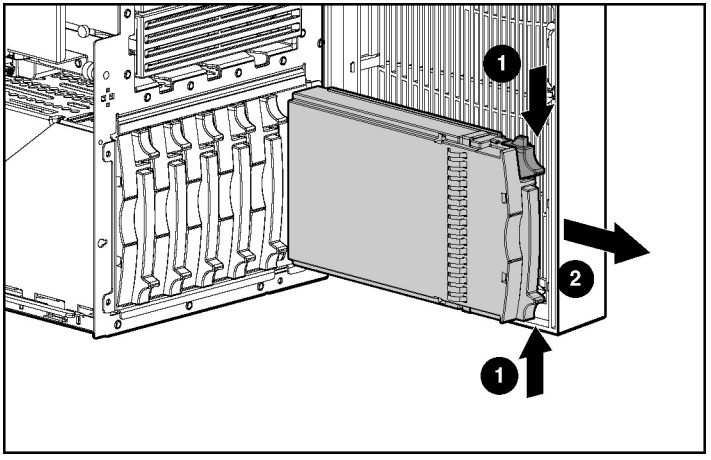

Figure 3-31: Removing a hard drive blank

3. Store the hard drive blank for later use.

To install a blank, align the blank with the empty bay and push the blank inward until it locks into place.

Installing a Hot-Plug SCSI Hard Drive

To install a hot-plug SCSI hard drive:

1. Identify an available slot with the next lowest SCSI ID number. Refer to "SCSI IDs" in this chapter.
2. Press the port-colored release button (1).
3. Open the ejector lever (2).
4. Insert the hard drive into the available drive bay (3). Be sure that the drive seats firmly into the connector on the SCSI backplane.
5. Close the ejector lever to secure the drive in the drive cage (4).

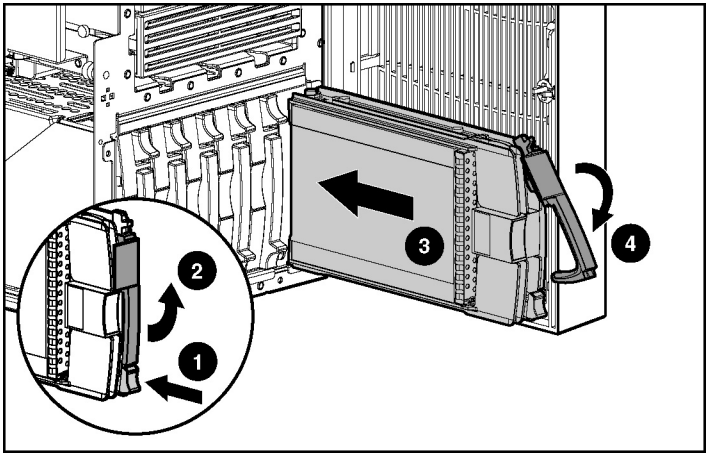

Figure 3-32: Installing a hot-plug SCSI hard drive

NOTE: If you backed up data before replacing a drive, restore the server data from the backup.

6. Use the hot-plug SCSI hard drive LEDs to identify the status of the installed drive. For more information about hard drive LEDs, refer to "Hot-Plug SCSI Hard Drive LEDs" in Appendix E.
7. Resume normal server operations.

Removable Media Devices

The server supports installation of optional internal non-hot-plug SCSI hard drives and other storage devices.

Installing removable media devices consists of several procedures:

- Powering down the server
- Removing the access panel
- Accessing the media bays
  - — Removing bezel blanks
  - — Removing the processor air baffle
  - — Removing the PCI-X expansion boards
  - — Removing the center wall
- Installing the media device

NOTE: This section includes general procedures for installing non-hot-plug SCSI hard drives, half-height tape drives, and full-height tape drives. Refer to the option kit documentation for specific drive instructions or guidelines.

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

Accessing the Removable Media Cage

Before installing an optional internal media device in the removable media cage, you must remove bezel blanks, the thermal baffle, and the center wall.

To access the removable media cage:

IMPORTANT: If you have already powered down the server and removed the access panel, refer to step 3 of this procedure.

1. Power down the server. Refer to “Powering Down the Server” in this chapter.

2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.

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

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

3. Press and hold the sliding media latch to release the bezel blanks (1) while pushing the blanks from behind to remove (2).

NOTE: Removing both bezel blanks is not always necessary, but makes installation and cabling easier.

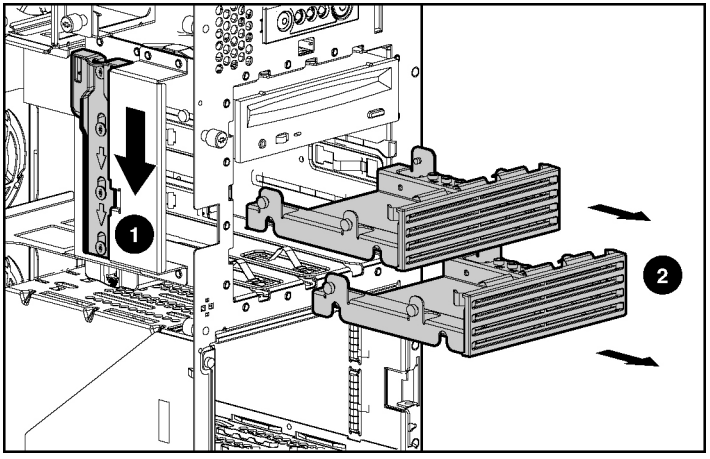

Figure 3-33: Removing bezel blanks

4. Store the blanks for later use.

5. Remove the processor air baffle:
   a. Loosen the two thumbscrews that secure the air baffle to the system tray (1).
   b. Lift the air baffle up and out of the server (2).

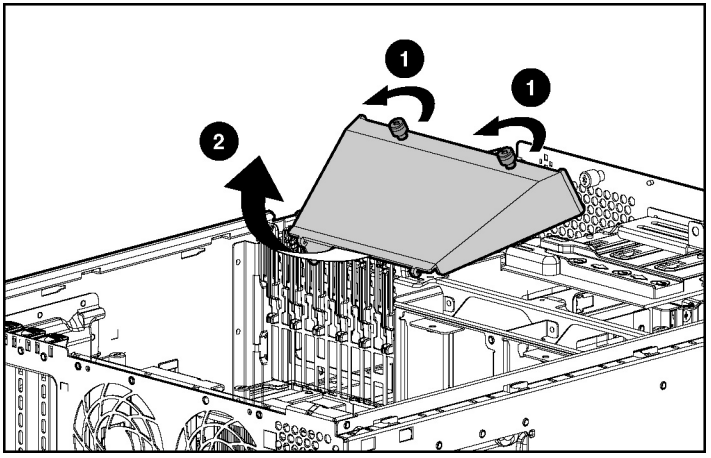

Figure 3-34: Removing the processor air baffle

6. Remove all expansion boards:
   a. Disconnect any cables connected to expansion boards.
   b. Release the PCI-X guide clip.

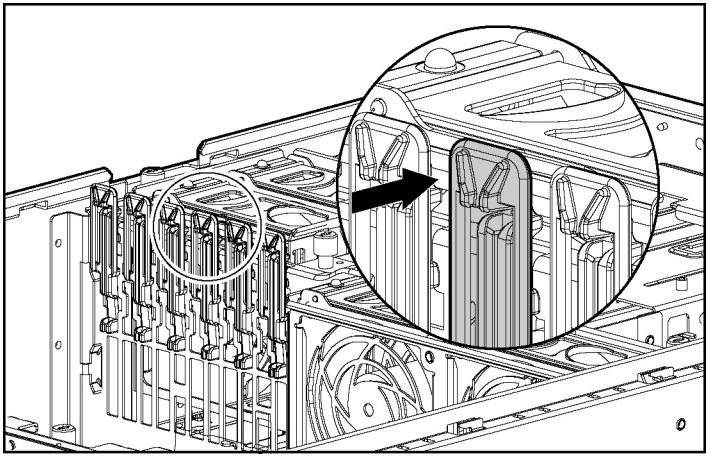

Figure 3-35: Releasing the PCI-X guide clip

c. Press down on the PCI-X slot release lever above the slot to release (1).

d. Flip up the PCI-X slot release lever (2).

e. Lift the expansion board out of the server (3).

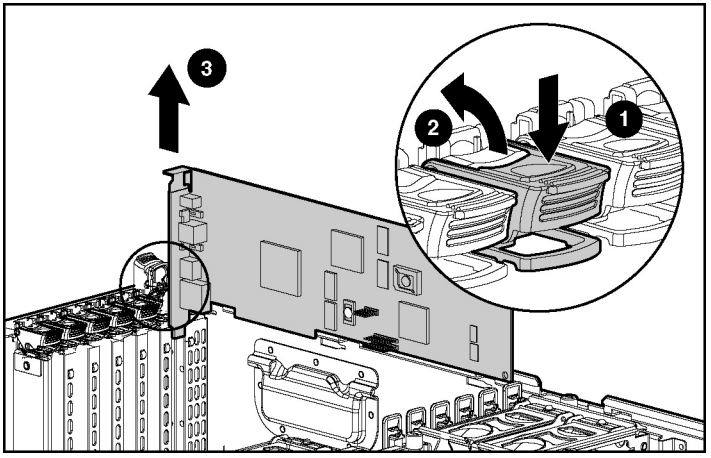

Figure 3-36: Removing an expansion board

7. Remove the center wall:
   a. Loosen the four thumbscrews (1).
   b. Lift the center wall slowly to access the fan cable (2).

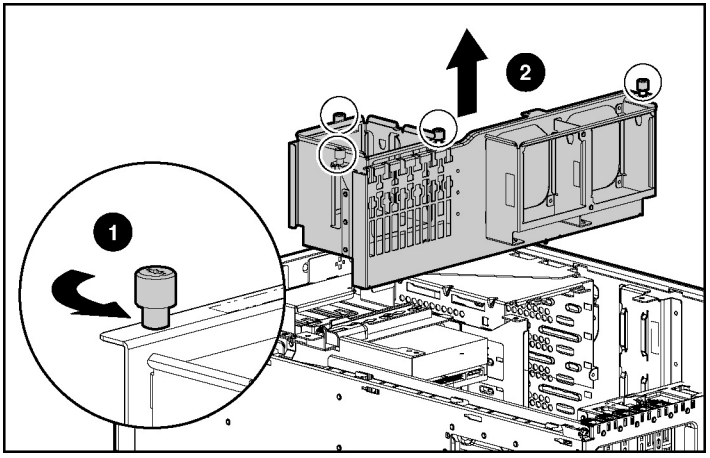

Figure 3-37: Removing the center wall

   c. Disconnect the fan cable.

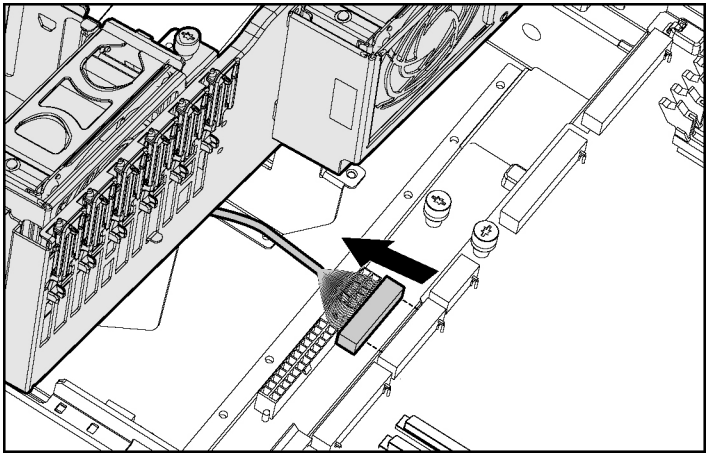

Figure 3-38: Disconnecting the fan cable

d. Lift the center wall out of the chassis.

8. Locate the three-device SCSI cable tie-wrapped to the diskette drive, if you are installing one or more of the following devices:
   - Non-hot-plug SCSI hard drive
   - Half-height media device
   - Full-height media device

Installing a Non-Hot-Plug SCSI Hard Drive

You can install up to two half-height removable devices in the removable media cage. To install a non-hot-plug SCSI hard drive:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.
3. Access the removable media cage. Refer to "Accessing the Removable Media Cage" in this chapter.

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

4. Use the Torx T-15 tool provided with the server to remove the four installation screws from the bezel blanks.

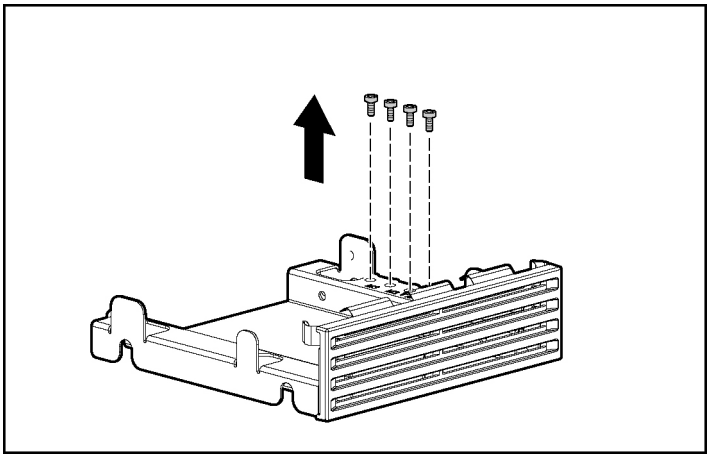

Figure 3-39: Removing installation screws from a bezel blank

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

5. Set the SCSI ID for the non-hot-plug SCSI hard drive. Refer to the documentation that ships with the hard drive.

6. Insert the drive into the bezel blank tray (1).
7. Insert the four installation screws through the bezel tray cutouts and into the hard drive (2). Refer to the option kit documentation for exact screw hole locations on the hard drive.

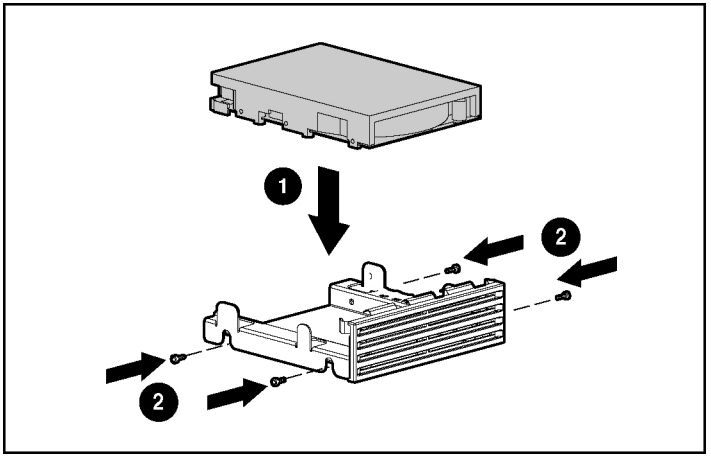

Figure 3-40: Securing a non-hot-plug hard drive to the bezel blank tray

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

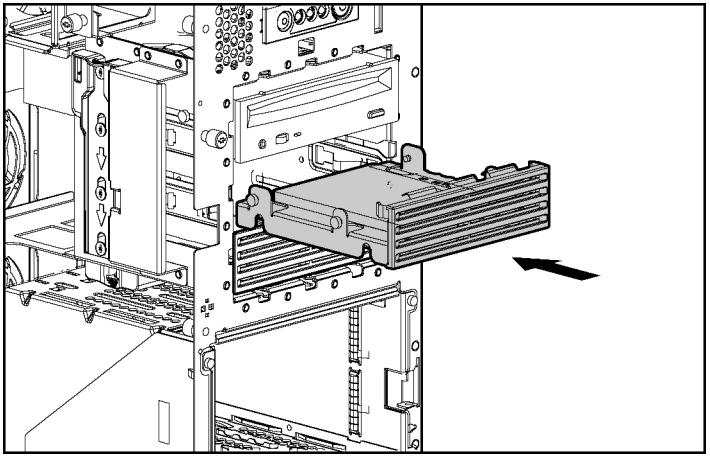

Figure 3-41: Installing the non-hot-plug hard drive in the media area

9. Connect the power cable to the hard drive (1).

IMPORTANT: SCSI port 2 on the system board and the external VHDCI SCSI connector on the rear panel are on the same SCSI channel. This channel supports either internal or external devices, but not both types of devices at the same time. Disconnect external devices from the external VHDCI SCSI connector before connecting an internal device to SCSI port 2 (or the reverse).

10. Connect the three-device SCSI cable to the hard drive and SCSI port 2 on the system board (2).

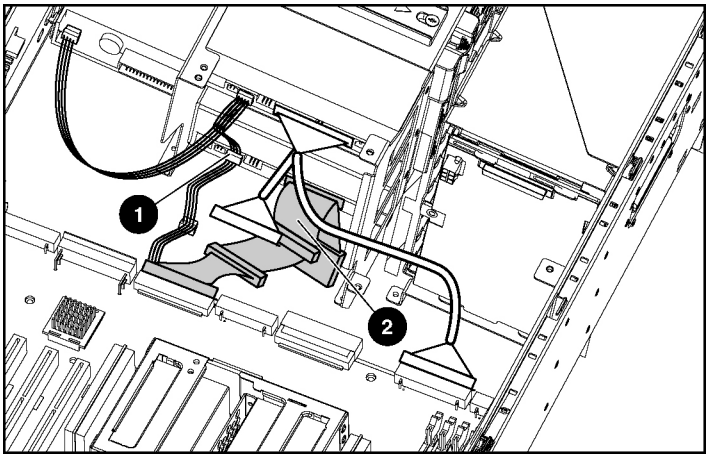

Figure 3-42: Connecting the power and signal cables for a non-hot-plug hard drive

11. Slide the hard drive fully into the bay until it is seated securely.

12. Reinstall the following items:
    - CD-ROM drive, if needed
    - Center wall
    - Expansion boards
    - Processor air baffle
    - Bezel blanks

    NOTE: If the second media bay is already populated with an optional drive, store the extra bezel blank for later use.

13. Install other hardware options as needed or reinstall the access panel.
14. Power up the server.

Installing a Half-Height or Full-Height Media Device

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

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.
3. Access the removable media cage. Refer to "Accessing the Removable Media Cage" in this chapter.

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

4. Remove the Torx T-15 screws from the bezel blank and attach them to the tape drive as described in steps 4 and 5 in "Installing a Non-Hot-Plug SCSI Hard Drive," in this chapter.

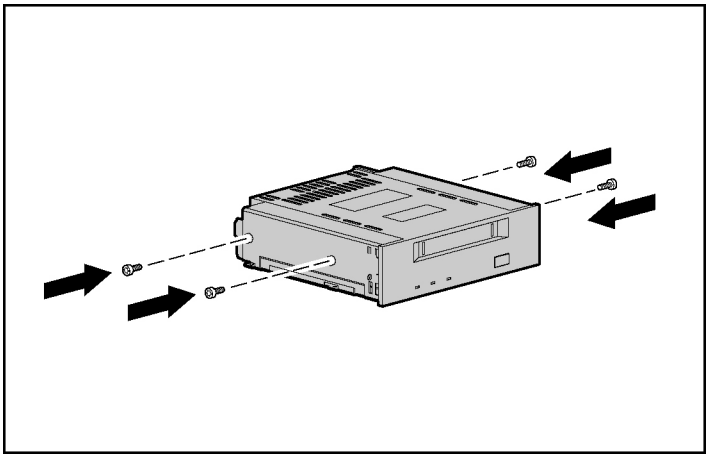

Figure 3-43: Attaching installation screws to a tape drive

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

5. Set the SCSI ID for the non-hot-plug SCSI hard drive. Refer to the documentation that ships with the hard drive.

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

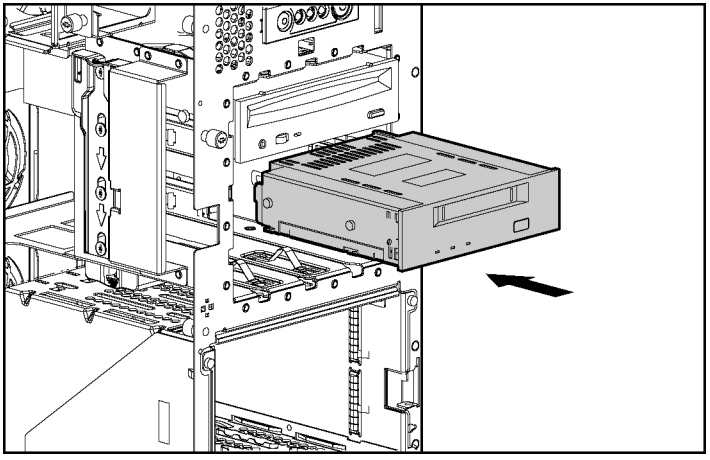

Figure 3-44: Installing a half-height media device

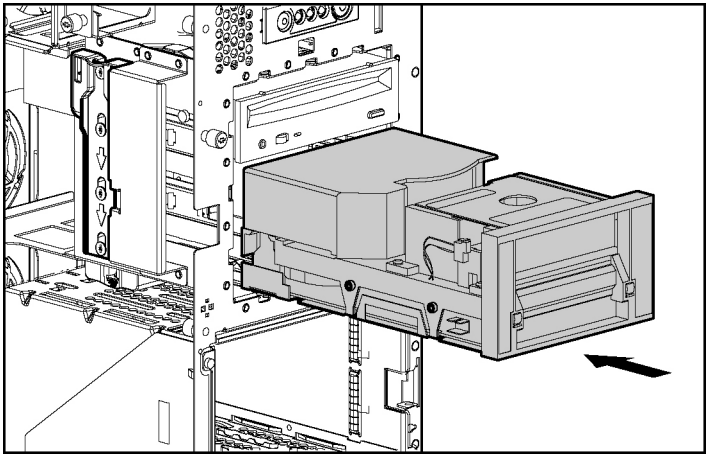

Figure 3-45: Installing a full-height media device

7. Connect the four-pin power cable to the half-height or full-height drive (1).

   IMPORTANT: SCSI port 2 on the system board and the external VHDCI SCSI connector on the rear panel are on the same SCSI channel. This channel supports either internal or external devices, but not both types of devices at the same time. Disconnect external devices from the external VHDCI SCSI connector before connecting an internal device to SCSI port 2 (or the reverse).

8. Connect the three-device SCSI cable to the half-height or full-height drive and SCSI port 2 on the system board (2).

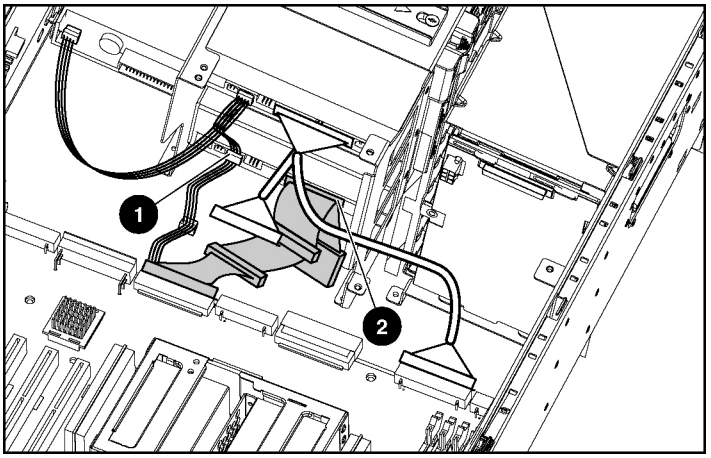

Figure 3-46: Connecting the power and signal cables for a tape drive

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

10. Reinstall the following items:
    - CD-ROM drive, if needed
    - Center wall
    - Expansion boards
    - Processor air baffle
    - Bezel blanks

    NOTE: If the second media bay is populated with an optional drive, store the extra bezel blank for later use.

11. Install other hardware options as needed or reinstall the access panel.
12. Power up the server.

Optional Internal Two-Bay Hot-Plug SCSI Drive Cage

To install an optional internal two-bay hot-plug SCSI drive cage into the removable media bay:

NOTE: For additional information about the two-bay hot-plug SCSI drive cage, refer to the *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions*.

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.
3. Access the removable media cage by removing the following items:
    - bezel blanks
    - processor air baffle
    - expansion boards
    - center wall
4. Refer to "Accessing the Removable Media Cage" in this chapter.

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

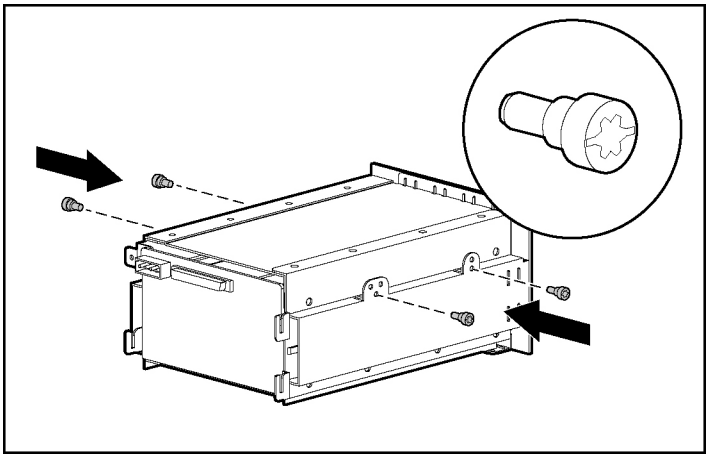

Figure 3-47: Installing screws on the SCSI drive cage

6. Slide the drive cage into the chassis until it locks into place.

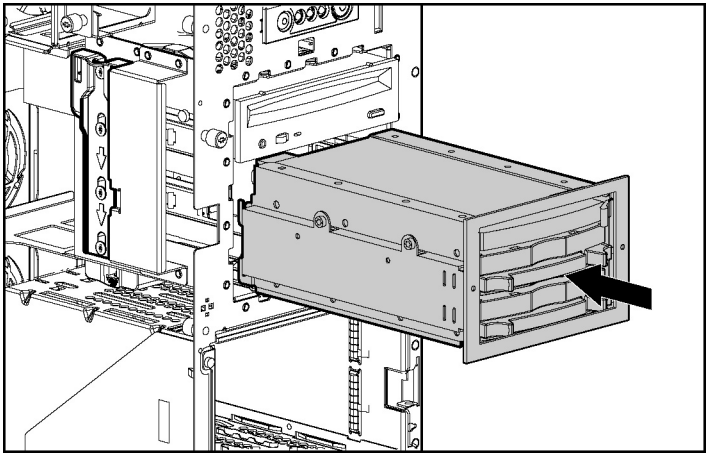

Figure 3-48: Sliding the drive cage into the chassis

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

7. Connect the SCSI and power cables:
   a. Connect the SCSI cable that comes with the SCSI drive cage option kit to the SCSI connector on the back of the SCSI drive cage (1).
   b. Connect the other end of the SCSI cable to one of the internal SCSI connectors on the system board (2).
   c. Locate the power cable inside the server and connect the power cable to the power connector on the SCSI drive cage (3).

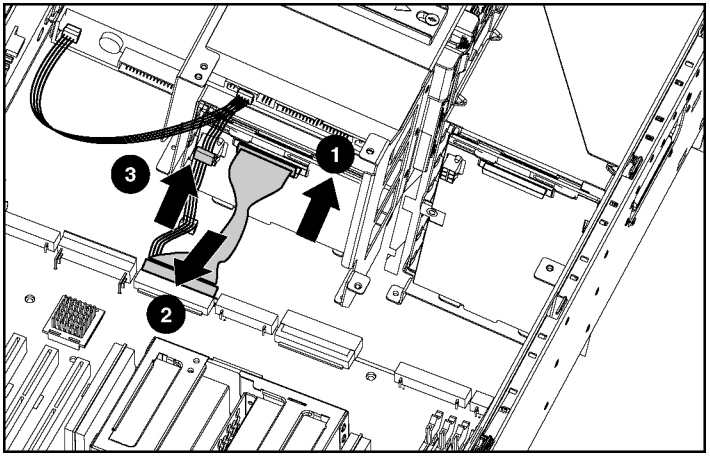

Figure 3-49: Connecting the SCSI and power cables

8. Reinstall the following items:
   — CD-ROM drive, if needed
   — Center wall
   — Expansion boards
   — Processor air baffle

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

Redundant Hot-Plug Fans

The server supports redundant hot-plug fans to provide proper airflow to the system. In the standard configuration, three fans cool the system. If any one of the primary fans fails, the system monitors the fan status and shuts down to prevent any thermal damage to components. When the system is powered up, POST displays an error message.

In the redundant configuration, six fans cool the system. If any one of the primary fans fails, the system detects the paired redundant fan and continues to operate without any interruption or downtime.

WARNING: To reduce the risk of personal injury from hazardous energy or of damage to the equipment when working on energized servers:

- **Remove all watches, rings, and any other loose fitting jewelry.**
- **Avoid the use of conductive tools inside the server that could bridge live parts.**

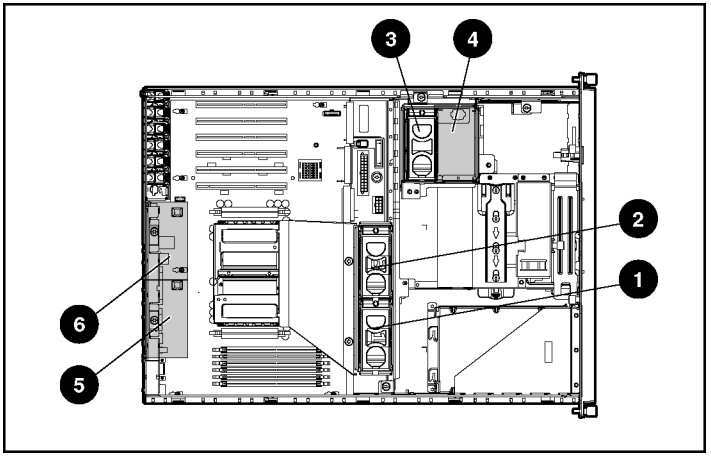

Figure 3-50: System fan locations

Table 3-12: System Fan Locations

Item	Description
1	Processor fan 1
2	Processor fan 3
3	I/O fan 5
4	Redundant I/O fan 6
5	Redundant processor fan 2
6	Redundant processor fan 4

Note: Fan locations are labeled in the chassis.

Fan failure is indicated by amber LEDs located on each hot-plug fan and by the front panel internal health LED. For fan failures, the internal health LED illuminates red in nonredundant mode and amber in redundant mode.

For additional information, refer to Appendix C, "Server Error Messages," and Appendix E, "LED Indicators and Switches."

Installing the Redundant Hot-Plug Fan Cage

The redundant hot-plug fan cage is installed inside the chassis, directly above the primary power supply. For full redundancy, always install all three fans included in the redundant hot-plug fan cage option kit.

To install the redundant hot-plug fan cage:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.
3. Loosen the two thumbscrews on the redundant fan cage retaining bracket (1).
4. Remove the bracket from the chassis (2).

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

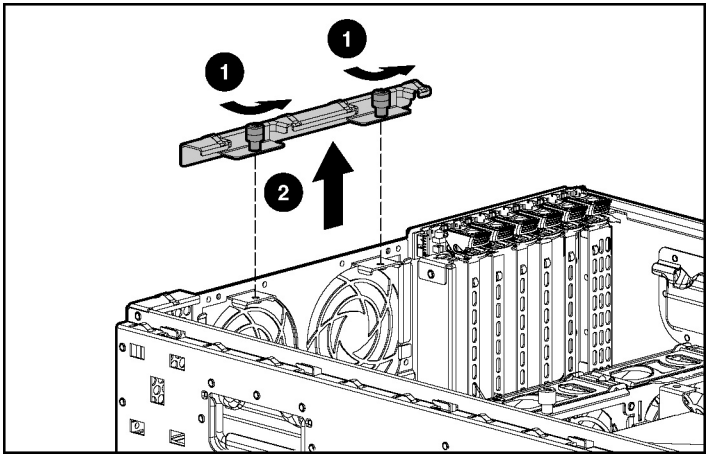

Figure 3-51: Removing the redundant fan cage retaining bracket

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

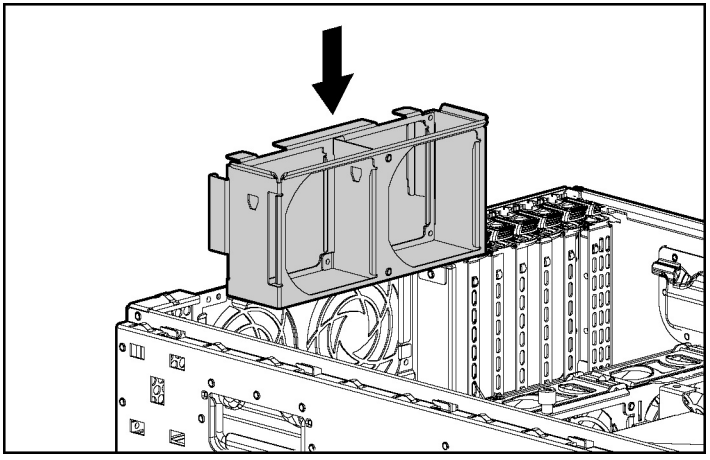

Figure 3-52: Installing the redundant fan cage

6. Reinstall the redundant fan cage retaining bracket (1).
7. Tighten both thumbscrews to secure the bracket and cage (2).

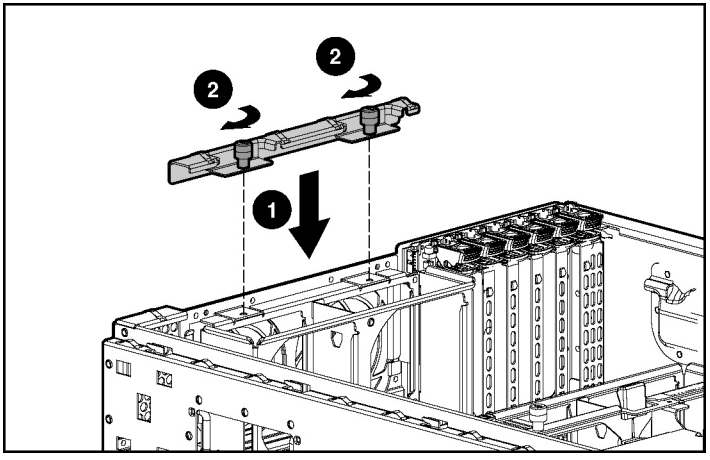

Figure 3-53: Installing the redundant fan cage retaining bracket

Installing Hot-Plug Fans

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

1. Locate the two available slots on the redundant fan cage.
2. Slide one of the hot-plug fans into a fan cage slot and press down until the fan is seated securely.

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

3. Repeat step 2 to install a second hot-plug fan in the redundant fan cage.

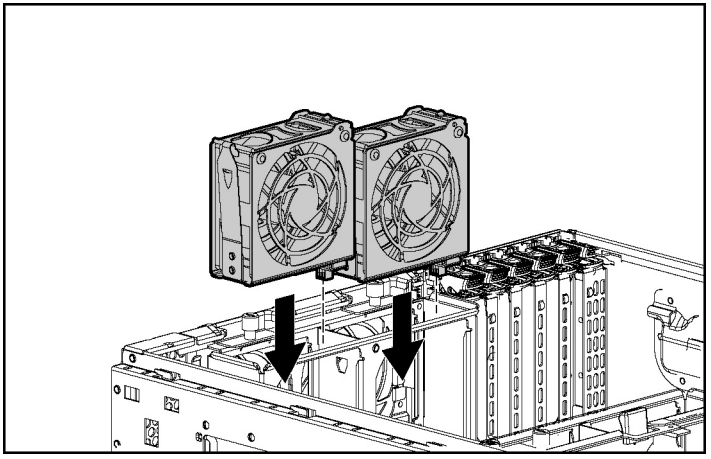

Figure 3-54: Installing hot-plug fans in the redundant fan cage

4. Repeat step 2 to install the third hot-plug fan into the available slot in the fan cage along the center wall.

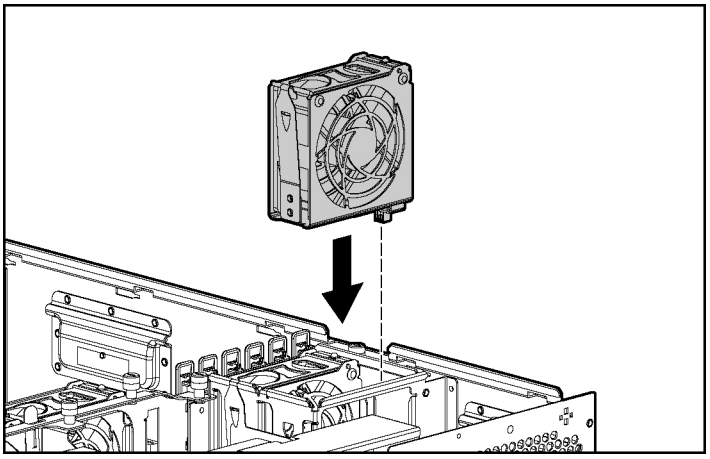

Figure 3-55: Installing a redundant hot-plug fan into the center wall

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

   NOTE: If the front panel internal system health LED is not green after you install hot-plug fans, reseat the hot-plug fan or refer to Appendix D, "Troubleshooting," for diagnosis.

7. Reinstall the access panel.

Replacing Hot-Plug Fans

IMPORTANT: To perform hot-plug fan replacement, remove and replace one fan at a time. If the system detects two fan failures in the same zone, the server shuts down to avoid thermal damage.

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

To replace a hot-plug fan:

1. Squeeze the hot-plug fan handles together (1).
2. Lift the fan out of the fan cage (2).

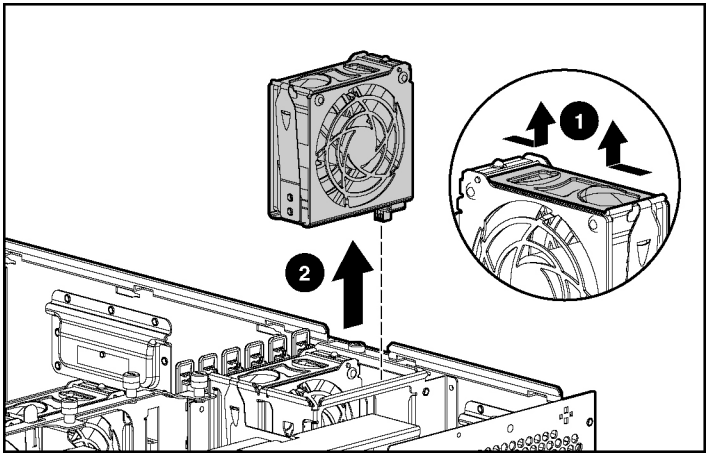

Figure 3-56: Removing a hot-plug fan

3. Slide the replacement hot-plug fan into the open fan cage slot and press down to seat the fan securely.
4. Repeat steps 1 through 3 to replace additional fans as needed.
5. Reinstall the access panel.
6. Power up the server and observe the internal system health LED on the front panel and the LEDs on all installed fans to be sure they are green.

NOTE: If the front panel internal system health LED is not green after you install hot-plug fans, reseat the hot-plug fan or refer to Appendix D, “Troubleshooting,” for diagnosis.

Redundant Hot-Plug Power Supply

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

CAUTION: If only one power supply is installed, do not remove the power supply unless the server has been powered down. Failing to power down before removing a power supply in a non-redundant configuration could cause data loss.

To install a second hot-plug power supply:

1. Locate the secondary hot-plug power supply bay.

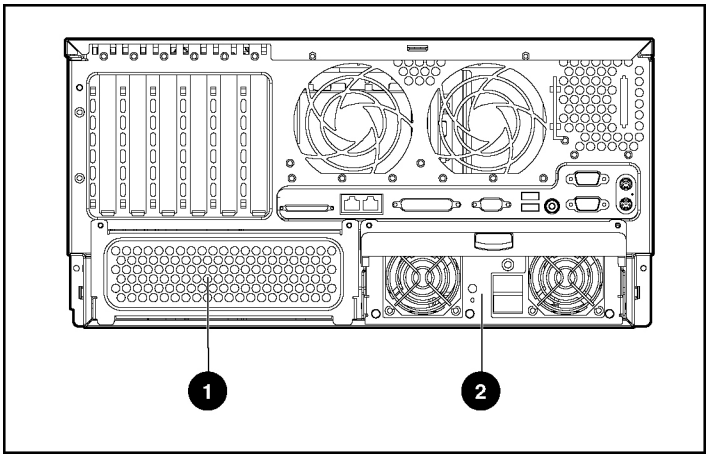

Figure 3-57: Hot-plug power supply bays

Table 3-13: Hot-Plug Power Supply Bays

Item	Description
1	Secondary (redundant) hot-plug power supply blank
2	Primary hot-plug power supply

2. Remove the two Torx T-15 screws (1).
3. Remove the power supply blank (2).

NOTE: The server ships with a Torx T-15 tool attached to the rear panel.

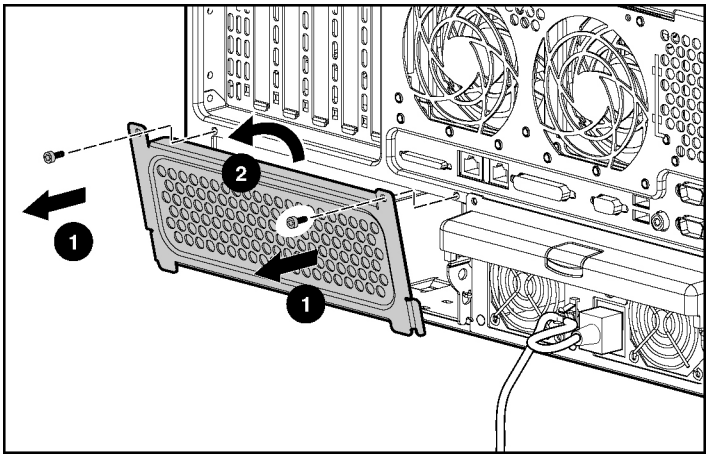

Figure 3-58: Removing a power supply blank

4. Slide the second hot-plug power supply into the bay (1).
5. Raise the handle and press it against the chassis to lock the power supply into the bay (2).

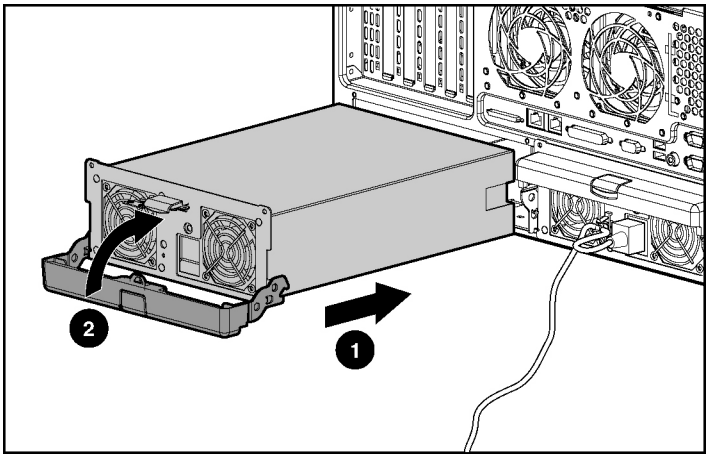

Figure 3-59: Installing a hot-plug power supply

6. Connect the power cord to the redundant power supply.

7. Use the power cord management clip on the power supply to secure the cord and form a service loop.
8. Press up on the lower part of the clip to close and lock.

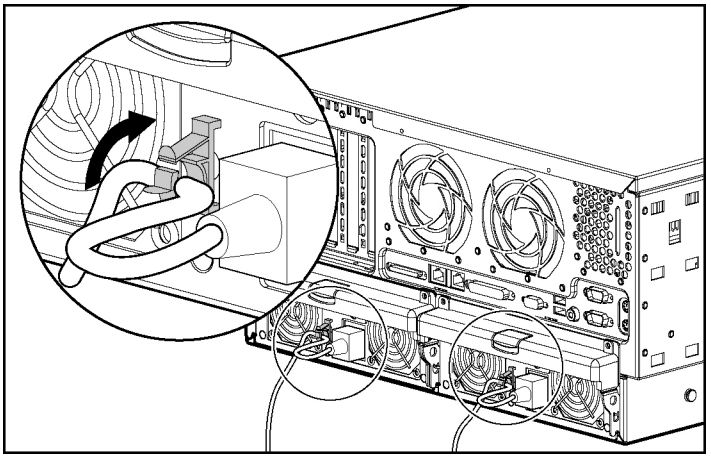

Figure 3-60: Using a management clip to secure the power cord

9. Connect the power cord to the AC power source and observe the power supply LED on the unit to be sure that it is green, indicating the power supply is properly powered and active.

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

NOTE: If you remove or replace the primary hot-plug power supply, use the Torx T-15 tool provided with the server to remove the shipping screws from the upper right and left corners of the power supply unit.

For additional information about power supply LEDs, refer to Appendix E, "LED Indicators and Switches."

Expansion Boards

The server supports the installation of both PCI and PCI-X expansion boards.

- PCI expansion boards are designed to reach a peak frequency of no more than 66 MHz.
- PCI-X expansion boards are designed to reach a peak frequency of at least 100 MHz.
- PCI and PCI-X expansion boards are supported at a 3.3-V signaling level.

Slot Architecture

The server supports installation of up to six expansion boards in the PCI-X slot area. Figure 3-61 and Table 3-14 identify PCI-X expansion slot locations.

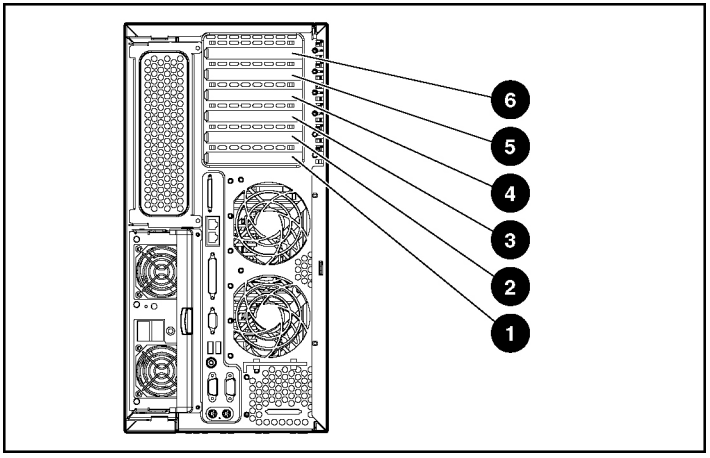

Figure 3-61: PCI-X expansion slots (tower server)

Table 3-14: PCI-X Expansion Slots

Item	Description	Bus	Width	Speed	Signaling
1	PCI-X slot 1	2	64-bit	100-MHz	3.3-V
2	PCI-X slot 2				
3	PCI-X slot 3	10			
4	PCI-X slot 4				
5	PCI-X slot 5	6			
6	PCI-X slot 6 *				

* Install Remote Insight Lights-Out Edition II boards in PCI-X slot 6 only.

Performance Balancing

Balancing is the paired arrangement of expansion boards for optimal performance based on the bus architecture of the expansion slots. When populating boards on a shared bus, be sure that both boards operate at the same speed (two PCI boards or two PCI-X boards). To balance expansion board performance, populate slots across different buses before populating two slots on the same bus. Table 3-15 provides a recommended expansion slot population order.

Table 3-15: Recommended Expansion Slot Population Order

Slot Number	Population Order	PCI-X Bus Sharing
1	1	Shared PCI-X bus
2	4	
3	2	Shared PCI-X bus
4	5	
5	3	Shared PCI-X bus
6	6	

Note: This population order is only a recommendation. Expansion boards can reside in any slot.

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

Removing an Expansion Slot Cover

Before installing an expansion board in an empty expansion slot, remove the metal slot cover.

CAUTION: Always power down the server before installing an expansion board.

CAUTION: Do not remove an expansion slot cover unless you are installing an expansion board. Operating the server without an expansion board or an expansion slot cover installed results in improper airflow and improper cooling, which can lead to thermal damage.

To remove an expansion slot cover:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the access panel. Refer to "Removing the Access Panel" in this chapter.

3. Press down on the PCI-X slot release lever above the slot to release (1).
4. Flip up the PCI-X slot release lever (2).
5. Lift the expansion slot cover out of the chassis (3).

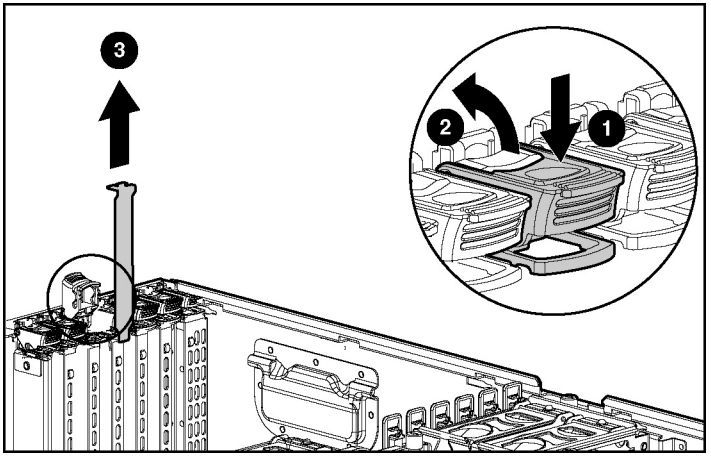

Figure 3-62: Removing an expansion slot cover

IMPORTANT: Retain the slot cover for later use. Expansion slots must be populated with either an expansion board or a slot cover to maintain proper temperature conditions.

Installing an Expansion Board

CAUTION: To avoid the risk of damage to the system or expansion boards, remove all AC power cords before installing or removing expansion boards. Pressing the Power On/Standby button to power down the server still provides auxiliary power to the expansion slot and may damage the board or other system components.

To install an expansion board:

1. Open the PCI-X slot release lever and remove the expansion slot cover. Refer to "Removing an Expansion Slot Cover" in this chapter.
2. Press the PCI-X guide clip out toward the center wall to release. The clip locks into an open position until the board is secured.

   NOTE: The PCI-X guide helps align and secure a full-sized expansion board.

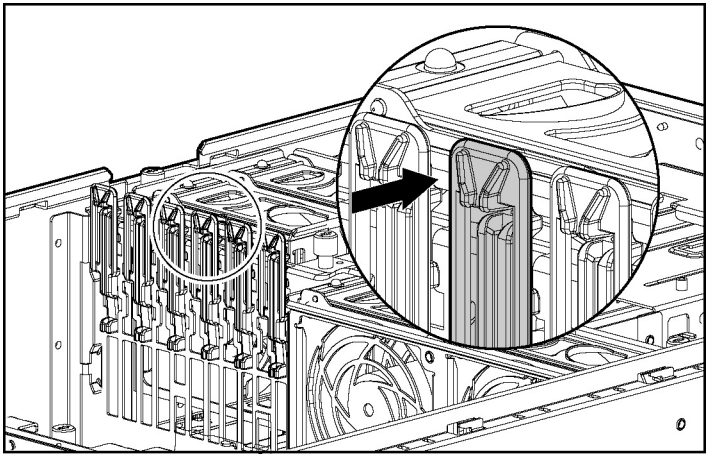

Figure 3-63: Releasing the PCI-X guide clip

3. Position the expansion board above the expansion slot and use the PCI-X guide to align the board with the slot.
4. Press down on the expansion board to seat it in the slot (1).
5. Press the PCI-X slot release lever down until it clicks into place to lock the slot (2).

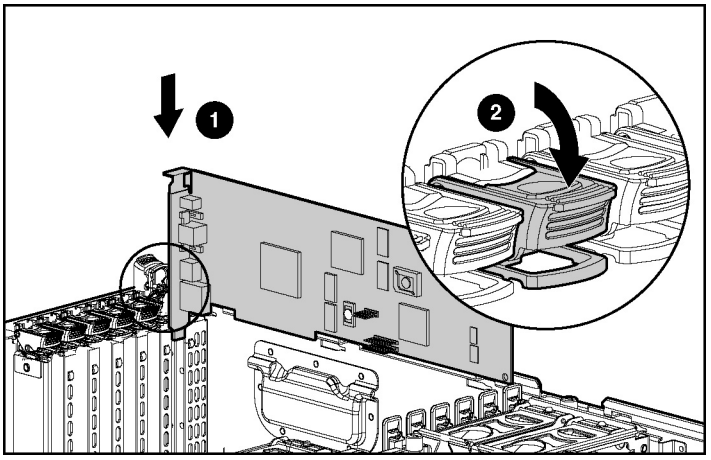

Figure 3-64: Installing an expansion board

6. If the PCI-X guide clip does not snap forward to secure the board, pull it into a locked position manually.

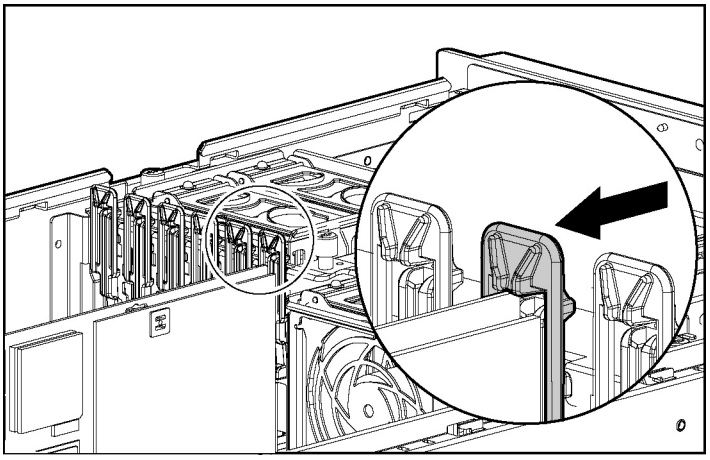

Figure 3-65: Securing the PCI-X guide clip

Refer to the documentation that ships with the expansion board for additional cabling or configuration instructions.

Remote Insight Lights-Out Edition II Board

The server comes with iLO remote management capability embedded on the system board. The 30-pin remote management connector for the Remote Insight Lights-Out Edition II board is provided if the server environment requires an upgrade for faster speeds. The 30-pin connector provides power, keyboard, mouse, and other peripheral signals directly to the system board; therefore, the external AC power adapter and loopback cable are not needed for normal operation.

The Remote Insight Lights-Out Edition II (RILOE II) board provides remote server manageability for ProLiant servers. It can be accessed from a network client using a standard Web browser and it provides keyboard, mouse, and video capability for a host server, regardless of the state of the host operating system or host server. New features for the RILOE II board include a faster processor for increased performance, new user interface for easier browsing and Virtual CD for increased server manageability.

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

For more detailed information and instructions for installing a RILOE II board, refer to the *HP Remote Insight Lights-Out Edition II User Guide* on the Documentation CD or refer to

www.hp.com/servers/lights-out

4

Installing the Rack Server

This chapter provides information and instructions for installing a ProLiant ML370 Generation 3 rack server. The installation sequence includes:

- Measuring with the template
- Installing cage nuts in the rack frame
- Installing server rails
- Installing the spring-load rack rail assembly in the rack
- Installing the server in the rack
- Installing the cable management arm
- Connecting the power cord and peripheral devices
- Securing the power cord
- Securing cables with the cable management arm
- Powering up the server
- Installing an operating system
- Registering the server

Additional information includes routine maintenance guidelines and an overview of optional rack adapter kits available for installing the server in a Telco or round-hole rack. Complete instructions for using adapter kits to install the server in a rack are included with each option kit. For information about obtaining rack option kits, refer to

www.hp.com/products/servers/platforms

Figure 4-1 shows a server installed in a rack. Install heavier devices, such as UPS units, in the lower rack positions.

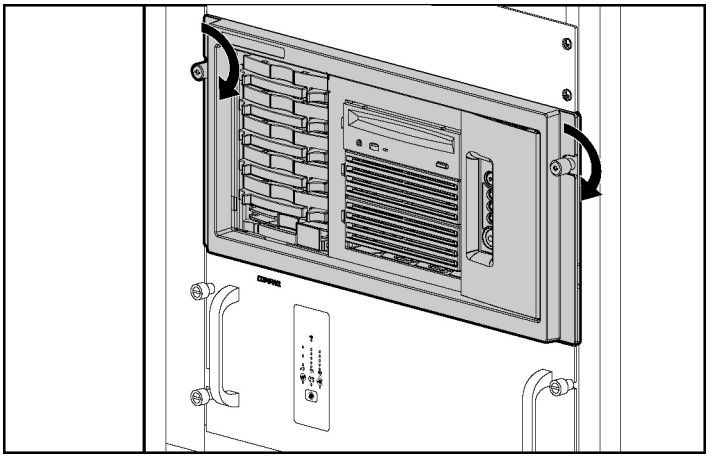

Figure 4-1: Server installed in the rack

You can choose the optional installation service from HP to install rack products. Refer to "Optional Installation Service" in Chapter 2 for additional information.

Rack and Server Installation Guidelines

Follow the guidelines in Chapter 2, "Planning the Server Installation," to plan an optimum environment and to install the server in a rack properly and safely. Be aware of all rack and server warnings listed in the Chapter and throughout this guide.

IMPORTANT: Be sure that the rack meets all recommended space and airflow requirements for the server.

Install any optional hardware components before installing and powering up the server for the first time. Refer to Chapter 3, "Installing Hardware Options," for instructions on installing memory, processors, hot-plug and non-hot-plug expansion boards, and other major hardware options.

Server Installation Procedures

To install the rack server into a rack, complete all of the installation procedures.

CAUTION: For Series 7000 racks, you must install highly ventilated rack door inserts to provide proper front-to-back airflow and cooling.

Measuring with the Template

The rack template provides an easy and reliable way to properly position the fixed rack rails in the rack.

Use the template to identify the proper locations for inserting rack rails. Mark the rack from the top and bottom edges of the template to identify where the server fits and to provide a starting point for installing the next unit.

CAUTION: Always begin by mounting the heaviest item on the bottom of the rack. Continue to populate the rack from the bottom to the top.

IMPORTANT: Determine the server's place in the rack **before** you start installing the rack rails. To remind you of the proper placement of the server in the rack, refer to the Rack Builder report you printed when you planned your rack configuration with the Rack Builder tools provided with the rack.

IMPORTANT: The template is two-sided (front and back) and printed with arrows that show you where to insert rack rails on the front and back of the rack.

Use the rack template to identify the required space and location for the server:

1. Identify the front side of the template.
2. Starting at the bottom of the rack, or at the top of a previously mounted component, match the hole pattern on the template with the holes on the vertical rails of the rack. Secure the template against the front of the rack by pressing the two push tabs through the matching holes.

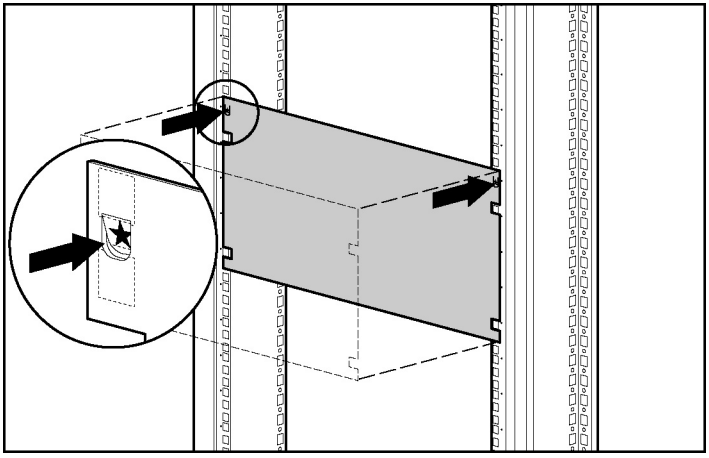

Figure 4-2: Measuring with the template on the front of the rack

3. Place the template against the vertical rails so that the sides of the template are aligned with the sides of the rack.

   NOTE: Tick marks on the rack's vertical rails mark off U-spaces in the rack configuration and help to maintain the proper alignment.

4. Use a pencil to mark the locations on the outside of the front of the rack where the spring-load rack rails must be inserted.
5. Place additional pencil marks on the rack at the top edge of the template to align the template for the next component.
6. Move to the rear of the rack and turn the template over to use the backside of the template.
7. Repeat steps 2 through 5 with the back of the template on the rear of the rack.

   IMPORTANT: On the rear of the rack, make pencil marks on the **inside** of the vertical rails. These markings guide you in installing spring-load rack rails into the interior of the rack frame.

After marking the front and rear of the rack, remove the template from the rack and prepare the rack for installation. Store the template for future use.

Installing Cage Nuts in the Rack Frame

After marking the positions for the fasteners in both the front and back of the rack, insert cage nuts on the inside of the rails at the marked locations. The cage nuts are included in the hardware kit supplied with the rack.

To install the cage nuts:

1. Position one of the cage nuts on the inside of a vertical rail on the front of the rack.
2. Compress the sides of the cage nut and insert both lips into the square cutout on the rail.

NOTE: Use a fitting tool as an aid to help install the cage nuts, if needed.

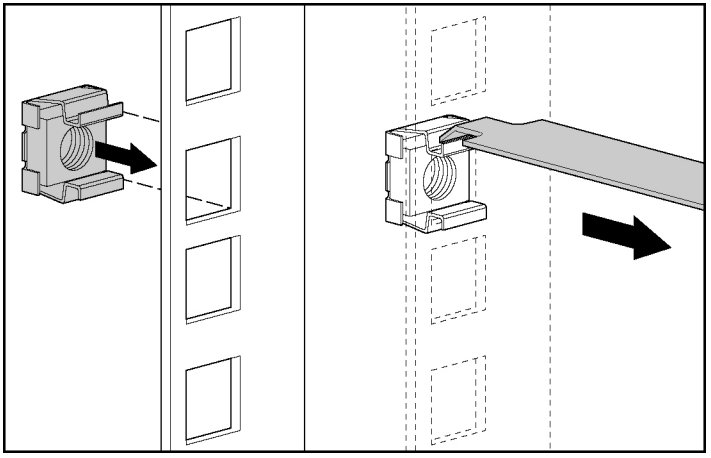

Figure 4-3: Inserting cage nuts

3. Repeat steps 1 and 2 for a second cage nut.

Installing Server Rails

To install the server rails on the server:

IMPORTANT: Install the server rails with the smooth side of the rail against the server chassis.

1. Align the four keyholes on one of the server rails with the four spools on the side of the chassis. The closed, tapered end of the rail points toward the rear panel of the server.

2. Press the rail against the side of the chassis and slide toward the rear of the server to snap and lock the rail into place.

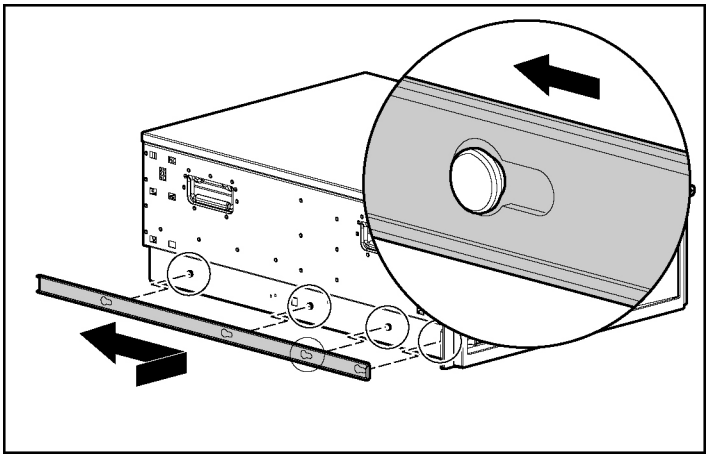

Figure 4-4: Attaching a server rail to the chassis

IMPORTANT: Be sure that the first rail is firmly anchored to the chassis before attaching the second rail.

3. Repeat steps 1 and 2 to secure the second rail to the server.

Installing the Spring-Load Rack Rail Assembly in the Rack

The spring-load rack rail assembly consists of a fixed outer rail and a sliding inner rail. The two rails are shipped as an assembly and do not require additional preparation.

To install the spring-load rack rail assembly in the rack:

1. From the front of the rack, identify the rack holes on the outside of the front of the rack that you marked with the template.

NOTE: Use either spring-load rail on either side of the rack. Be sure that the inner rail in the assembly slides toward the front of the rack.

2. Insert the rail tabs from the spring-loaded end of the assembly into the marked holes on the interior of the vertical rails on the front of the rack (1).

   IMPORTANT: The smooth side of the spring-load rail assembly must face the outside of the rack.

3. Grasp the spring-load rail assembly and squeeze the two spring release tabs in toward the rail to unlock the spring mechanism (2).
4. Grasp the far end of the spring-load assembly with your other hand and pull the rail in toward you until the rack tabs on the fixed end of the assembly clear the interior side of the rear vertical rack rail (3).

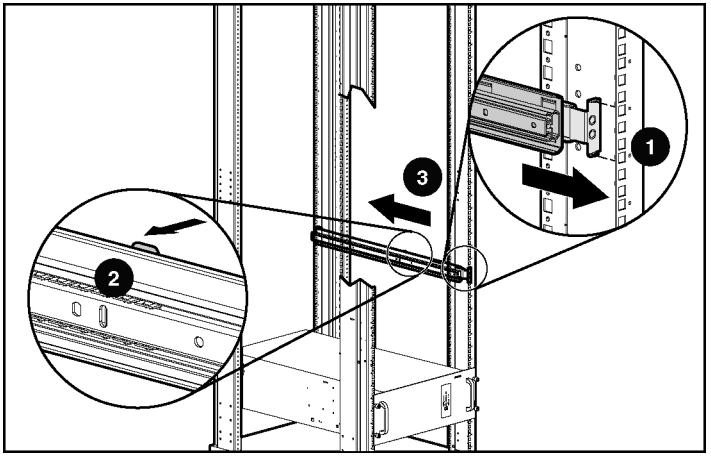

Figure 4-5: Inserting the spring-load rails into the front of the rack

5. Insert the two tabs into the holes that you marked on the inside of the rear of the rack.

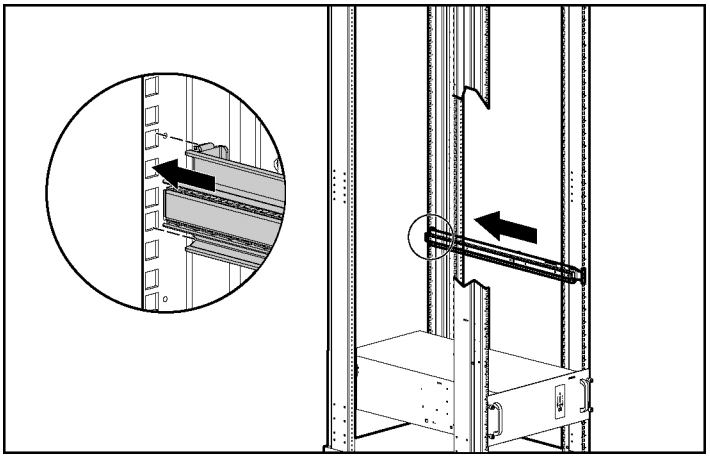

Figure 4-6: Inserting the spring-load rails into the rear of the rack

NOTE: Other rack devices are removed for clarity.

6. When the rail tabs are resting securely in the vertical rail holes, release the rail and spring release tabs. The assembly locking mechanism clicks into place.
7. Repeat steps 2 through 6 for the second spring-load rail assembly.

Installing the Server in the Rack

CAUTION: To avoid destabilizing the rack, install servers starting from the bottom of the rack.

To install the server in the rack:

1. Use the server handles located on both sides of the server to lift it into position.

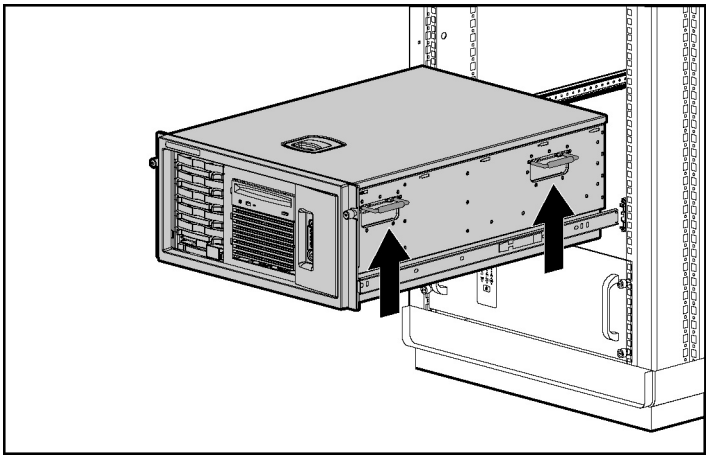

Figure 4-7: Lifting with the server handles

2. Carefully align the tapered ends of the server rails on the rear of the server with the open end of the spring-load rack rail assembly at the front of the rack.
3. Be sure that both server rails are balanced within the spring-load rail assembly and slide the server smoothly to the back of the rack.

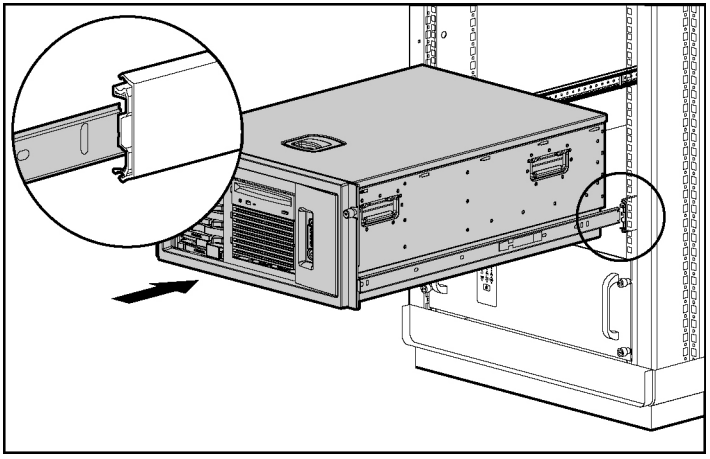

Figure 4-8: Aligning the server rails with the rack rails and inserting the server

CAUTION: Keep the server parallel to the floor when sliding the server rails into the spring-load rack rails. Tilting the server up or down can result in damage to the rails.

IMPORTANT: If the server does not slide into the rack smoothly the first time, remove it completely and reinsert the server rails into the spring-load rail assembly.

4. Once the server reaches the back of the rack, slide it all the way back out of the rack until the spring-load rack assembly is fully extended and the rails lock. This action initializes the rail lock for future use.

5. Press the end tabs on both of the server rails to release the lock (1).
6. Slide the server all the way back into the rack (2).

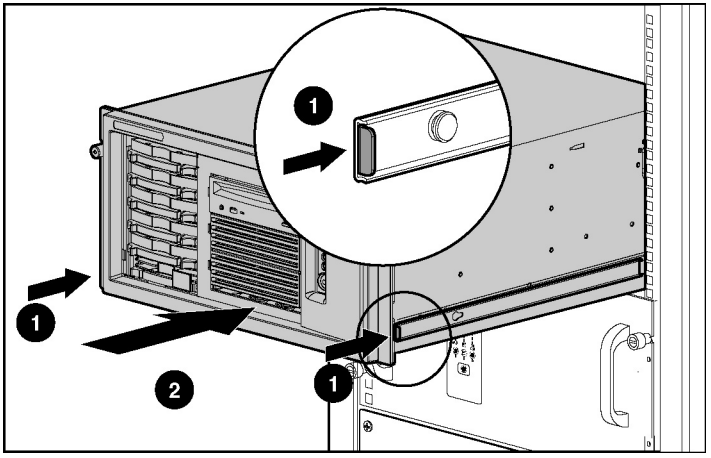

Figure 4-9: Initializing the rail locks

7. Tighten the bezel thumbscrews to secure the server to the front of the rack.

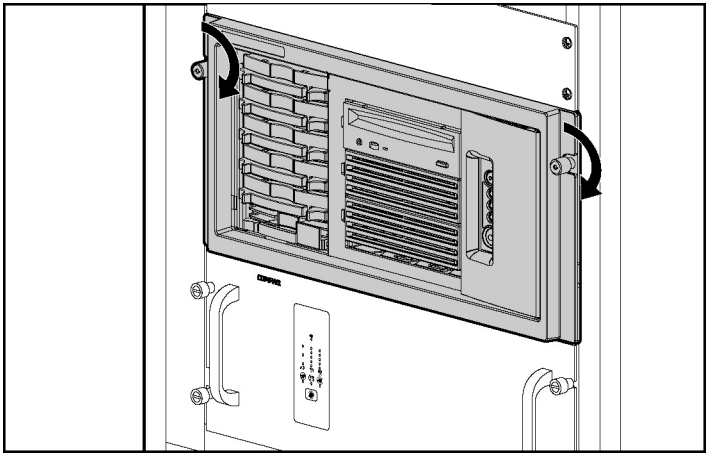

Figure 4-10: Tightening the thumbscrews

Installing the Cable Management Arm

A triple-hinged cable management arm ships with each server. This arm attaches to the server chassis and to the rear frame of the rack. Hook-and-loop straps included with the management arm tie down and manage all cables leading to and from the server.

Two hinges enable the cable management arm and cables to move forward through the rack when the server is extended. A third hinge allows the cable management arm to swing back and out of the way during hot-plug power supply installation and removal procedures.

IMPORTANT: Install the cable management arm after the server is installed in the rack.

To attach the cable management arm to the server and rack:

1. Align the two keyholes on the cable management arm over the spools on the rear panel of the chassis.
2. Slide the arm down (1) to secure the keyholes onto the spools.
3. Tighten the thumbscrew to secure the cable management arm to the server (2).

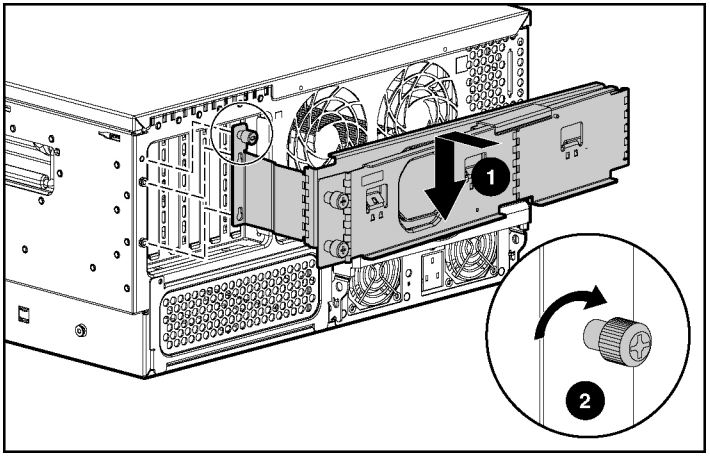

Figure 4-11: Securing the cable management arm to the server

4. Place the screw retaining plate against the inside of the vertical rack rail and at the same time, align the two thumbscrews on the cable management arm with the two screw holes on the retaining plate (1).
5. Tighten both thumbscrews to secure the cable management arm to the rack (2).

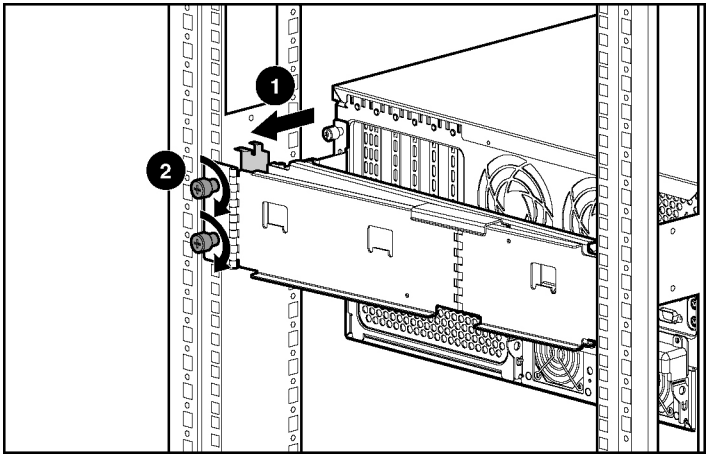

Figure 4-12: Securing the cable management arm to the rack

Connecting the Power Cord and Peripheral Devices

After the server has been installed in the rack, connect the power cord and peripheral devices to the connectors located on the rear panel of the server. Icons on the back of the server identify the function of each connector.

WARNING: To reduce the risk of electrical shock or fire, do not plug telecommunications/telephone connectors into the NIC receptacles.

IMPORTANT: If the Remote Insight Lights-Out Edition II (RILOE II) board is installed in the server, be sure that you connect the video cable to the video connector on the rear of the RILOE II board. The standard video connector on the server rear panel is not used when the RILOE II board is installed.

Refer to "Rear Panel Components" in Chapter 3 to identify connectors on the rear panel of the rack server.

Securing the Power Cord

After you connect power cords to each AC power supply, use the power supply retaining clips to secure the AC power cords. Form a service loop in the power cord that is long enough to prevent the plug from being disengaged accidentally.

To secure the power cord:

1. Push the upper tab of the power supply retaining clip to release the cord loop (1).
2. Flip the lower tab down to open the cord loop (2).

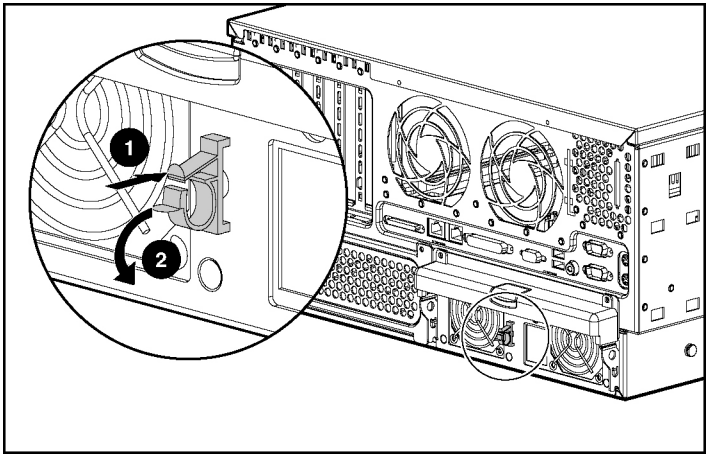

Figure 4-13: Releasing the power cord retaining clip

3. Thread the power cord through the retaining clip.
4. Flip the lower tab up toward the chassis until it snaps into place to secure the power cord.

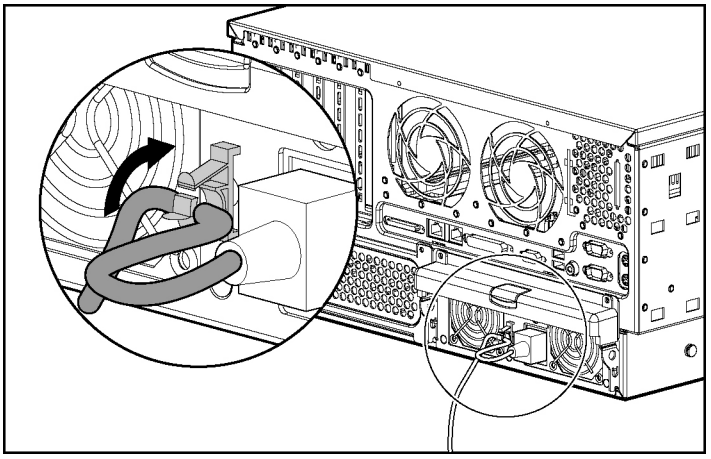

Figure 4-14: Securing the power cord in the retaining clip

CAUTION: After securing the power cord and before powering up the server, always extend and retract the server to be sure that the cords remain connected when the server is at full extension.

Securing Cables with the Cable Management Arm

The cable management arm that ships in the rack kit with the server includes hook-and-loop straps that are used to secure multiple server and peripheral cables to the arm. Using the guidelines in this section enhances cable management among several servers in a rack configuration.

Securing Server Cables

Use the cable management straps attached to the cable management arm to collect and secure external power, network, and peripheral device cables.

IMPORTANT: Extend the server from the rack before routing cables through the cable management arm to allow the proper amount of slack in the cables. Refer to "Extending the Server from the Rack" in this chapter for instructions.

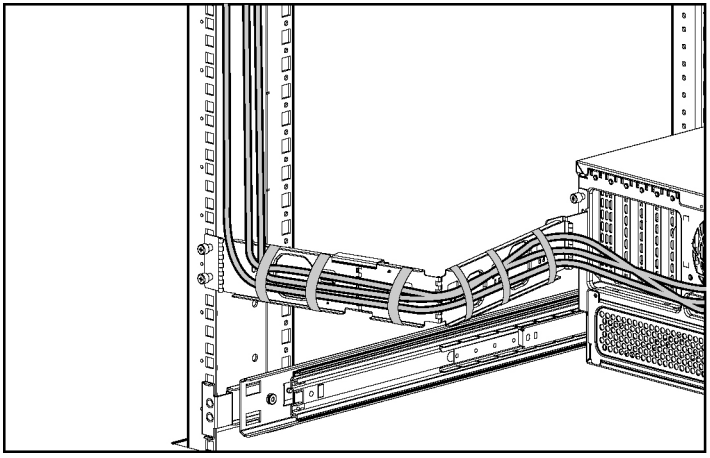

Figure 4-15: Server cables secured to the cable management arm

CAUTION: After securing the cables and before powering up the server, always extend and retract the server to be sure that cables remain connected when the server is at full extension.

Powering Up the Server

Power up the server after the peripheral and power cords are connected to the server.

WARNING: To reduce the risk of electrical 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 each 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 exits from the server.**

To power up the server:

1. Connect the power cords to the AC power source.
2. Press the Power On/Standby button to power up the server.

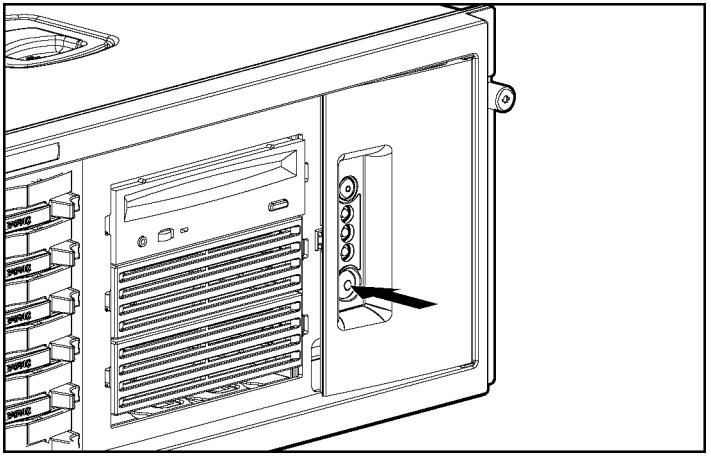

Figure 4-16: Pressing the Power On/Standby button

3. Observe the front panel LEDs for a successful power-up sequence.

Table 4-1 describes a successful power-up sequence.

Table 4-1: Front Panel LED Activity During the Power-Up Sequence

Item	Description
Power On/Standby LED	From amber to green
Internal health LED	From off to green
External health LED	From off to green
NIC LED	From off to green (when linked to the network) From off to flashing green for network activity

Note: For a detailed explanation of all system LEDs, refer to Appendix E, "LED Indicators and Switches."

When the server powers on for the first time, the server performs a POST and launches RBSU. After selecting initial system settings, install the operating system and perform additional configuration tasks. For additional information about configuring the server with RBSU, refer to the *HP ROM-Based Setup Utility User Guide*.

Installing an Operating System

IMPORTANT: Before installing an operating system on a new server or previously unconfigured boot drive, you must configure the server with RBSU.

To configure the server for the first time:

1. Power up the server. The system automatically launches RBSU.
2. When prompted, select a language.
3. Select the operating system you want to install on the server. A dialog box displays, indicating that the system configuration is complete.
4. Press the **F10** key to exit RBSU or press any other key to return to the RBSU main menu.
5. Insert the SmartStart CD or the operating system installation CD.

NOTE: Grasp the CD from the edges, not the flat surfaces of the disc.

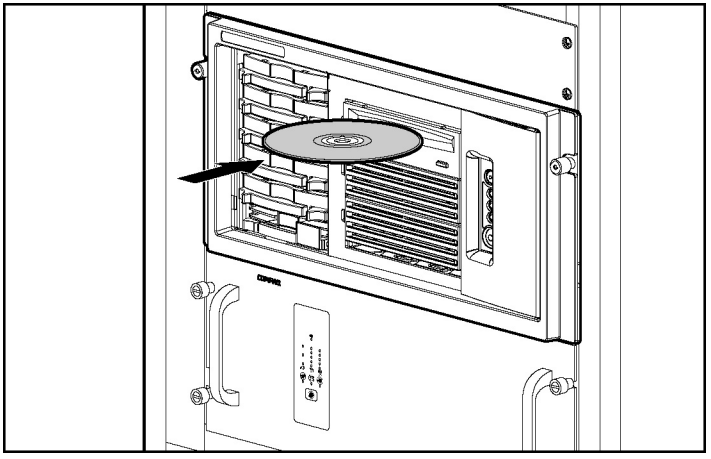

Figure 4-17: Inserting the CD into the rack server

NOTE: The CD-ROM drive may look different from the one shown in this chapter.

6. Reboot the server.
7. Follow the instructions provided by SmartStart or the operating system manufacturer.

For more information about using RBSU or SmartStart to configure the server, refer to Chapter 7, "Server Configuration and Utilities."

After RBSU configures the hardware for the first time, use SmartStart to install an operating system.

The server supports the following operating systems:

- Microsoft Windows NT and Windows 2000
- Linux
- Novell NetWare
- SCO OpenServer and UnixWare
- Sun Solaris Intel Platform Edition
- IBM OS/2

For the most current information about operating system support on the server, refer to

www.hp.com/products/servers/platforms

Registering the Server

You can register the server with the forms included with the server or refer to

www.compaq.com/register

Routine Maintenance and Upgrades

After the initial deployment, you may choose to install additional options or perform maintenance and upgrade procedures. The procedures in this section explain how to extend the server and access the server rear panel in the rack.

For information concerning routine maintenance and safety precautions, refer to the Documentation CD shipped with the server.

Maintenance and Service Procedures

In addition to the material in this guide, the *HP ProLiant ML370 Generation 3 Maintenance and Service Guide* provides specific information required for general maintenance and component replacement, including:

- Spare part numbers
- Removal and replacement procedures
- Diagnostic tools

To access the maintenance and service guide, refer to the Documentation CD or refer to

www.hp.com/products/servers/platforms

Extending the Server from the Rack

To extend the server from the rack:

1. Loosen the thumbscrews that secure the front bezel to the front of the rack (1).
2. Extend the server on the rack rails until the spring-load rail lock engages (2).

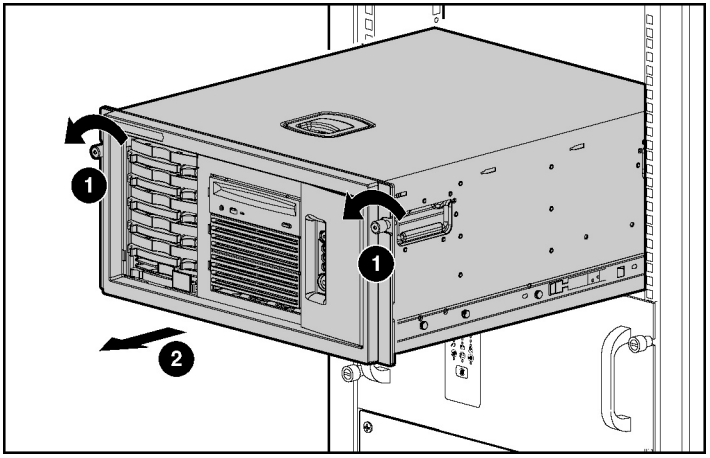

Figure 4-18: Extending the server from the rack

3. After performing the installation or maintenance procedure, press the tabs on the ends of both server rails and slide the server back into the rack.
4. Tighten the thumbscrews to secure the server in the rack.
5. Refer to "Installing the Server in the Rack" in this chapter for detailed instructions.

For information concerning routine maintenance and safety precautions, refer to the Documentation CD provided with the server.

Accessing the Server Rear Panel in the Rack

To access the server rear panel in the rack:

1. Lift the hinge-locking latch to unlock the cable management arm (1).
2. Swing the arm away from the back of the server (2).

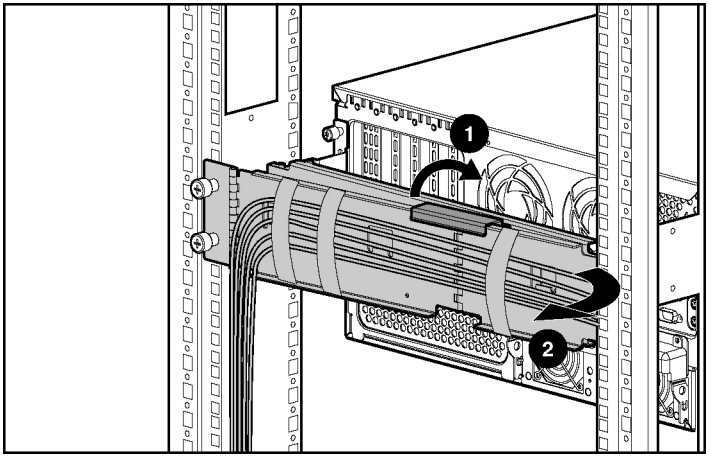

Figure 4-19: Unlocking the cable management arm

Reverse steps 1 and 2 to secure the cable management arm.

Figure 4-20 shows the cable management arm fully open, enabling access to the server rear panel.

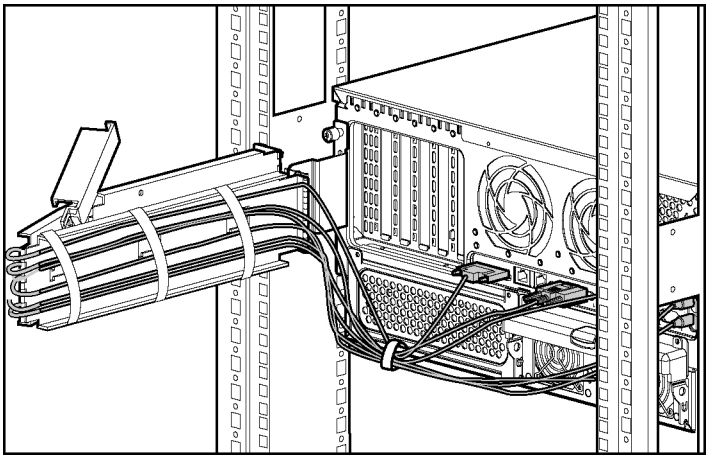

Figure 4-20: Cable management arm fully open

Rack Options

In addition to the rack kit provided with the server, there are rack option kits available that enable you to install the server into a Telco or any round-hole rack.

Telco Rack Option

The Telco rack adapter kit includes rack rails, installation hardware, and instructions for installing a server into a Telco rack. For information about obtaining an optional Telco rack adapter kit, contact your authorized reseller or refer to

www.hp.com/products/servers/platforms

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

Round-Hole Rack Option

The round-hole rack adapter kit includes rack rails, installation hardware, and instructions for installing a server into any four-sided rack with round holes. For information about obtaining an optional round-hole rack adapter kit, contact your authorized reseller or refer to

www.hp.com/products/servers/platforms

5

Installing the Tower Server

This chapter provides information and instructions for installing a ProLiant ML370 Generation 3 tower server. The installation sequence includes:

- Connecting the power cord and peripheral devices
- Powering up the server
- Installing an operating system
- Registering the server

The chapter concludes with routine maintenance guidelines and resources. For additional information, refer to

www.hp.com/products/servers/platforms

Figure 5-1 shows the server in a standard tower configuration.

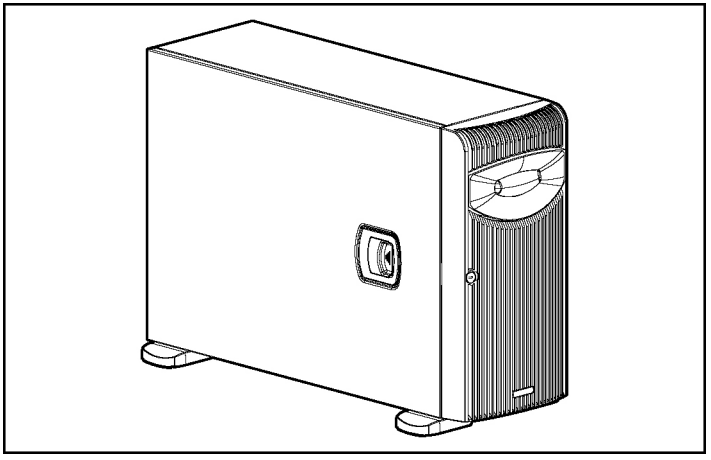

Figure 5-1: Tower server

Server Installation Guidelines

Follow the guidelines in Chapter 2, "Planning the Server Installation," to plan an optimum environment and to install the server properly and safely. Be aware of all server warnings listed in the chapter and throughout this guide.

Install any optional hardware components before installing and powering up the server for the first time. Refer to Chapter 3, "Installing Hardware Options," for instructions on installing expansion boards and other major hardware options.

IMPORTANT: Use the SmartStart CD to install option drivers.

Connecting the Power Cord and Peripheral Devices

After all internal hardware options have been installed in the server, connect external power supplies and peripheral devices to the connectors located on the rear panel of the server. Icons on the back of the server identify the function of each connector.

WARNING: To reduce the risk of electrical shock or fire, do not plug telecommunications/telephone connectors into the NIC receptacles.

IMPORTANT: If the Remote Insight Lights-Out Edition II (RILOE II) board is installed in the server, be sure that you connect the video cable to the video connector on the rear of the RILOE II board. The standard video connector on the server rear panel is not used when the RILOE II board is installed.

Refer to "Rear Panel Components" in Chapter 3 to identify connectors on the rear panel of the tower server.

Power Cord Guidelines

Connect the power cords provided with the server or hot-plug power supply option to each AC power supply and use the power cord retaining clips to secure the AC power cords. Leave a service loop for the plug to prevent the plug from accidentally being disengaged. Refer to Chapter 4, "Installing the Rack Server," for additional power cord instructions.

Powering Up the Server

Power up the server after the peripheral and power cords are connected to the server.

WARNING: To reduce the risk of electrical 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 each 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 exits from the server.**

To power up the server:

1. Connect the power cords to the AC power source.
2. Open the front bezel and press the Power On/Standby button.

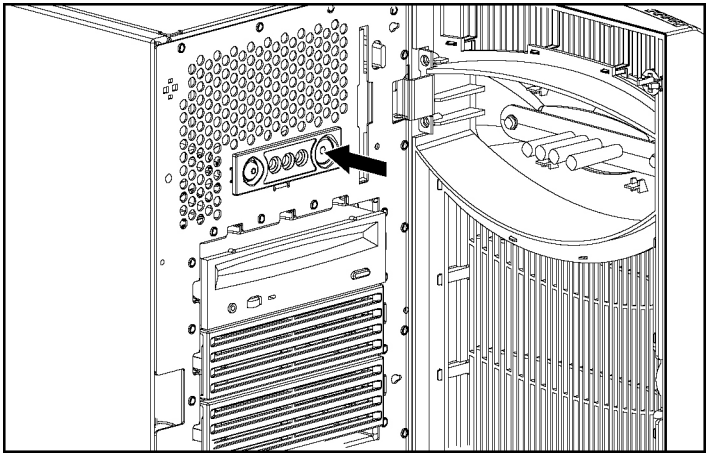

Figure 5-2: Pressing the Power On/Standby button

3. Observe the front panel LEDs for a successful power-up sequence.

Table 5-1 describes a successful power-up sequence.

Table 5-1: Front Panel LED Activity During the Power-Up Sequence

Item	Description
Power On/Standby LED	From amber to green
Internal health LED	From off to green
External health LED	From off to green
NIC LED	From off to green (when linked to the network) From off to flashing green for network activity

Note: For a detailed explanation of all system LEDs, refer to Appendix E, "LED Indicators and Switches."

When the server powers on for the first time, the server performs POST and launches RBSU. Select the initial language and operating system, then insert the SmartStart CD in the CD-ROM to begin configuration.

Installing an Operating System

IMPORTANT: Before installing an operating system on a new server or previously unconfigured boot drive, you must configure the server with RBSU.

To configure the server for the first time:

1. Start the server. The system automatically launches RBSU at initial startup.
2. When prompted, select a language.
3. Select the operating system you want to install on the server. A dialog box displays, indicating that the system configuration is complete.
4. Press the **F10** key to exit RBSU or press any other key to return to the RBSU main menu.

5. Insert the SmartStart CD or the operating system installation CD.

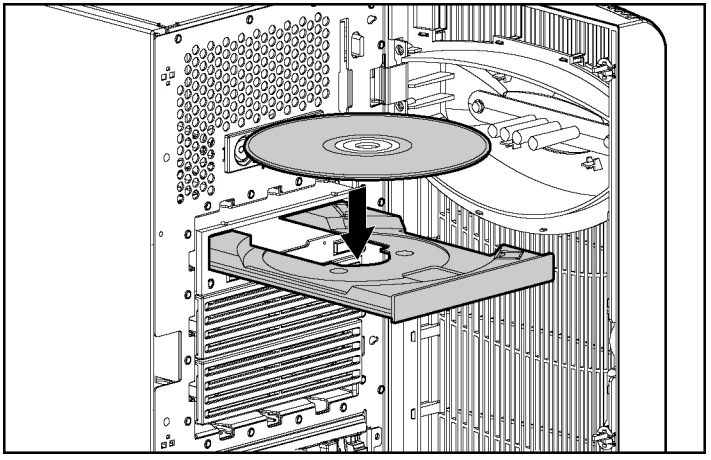

Figure 5-3: Inserting the CD into the tower server

NOTE: The CD-ROM drive may look different from the one shown in this figure.

6. Restart the server.
7. Follow the instructions provided by SmartStart or the operating system manufacturer.

For more information about using RBSU or SmartStart to install an operating system, refer to Chapter 7, "Server Configuration and Utilities."

After RBSU configures the hardware for the first time, use SmartStart to install the operating system of your choice.

The servers support the following operating systems:

- Microsoft Windows NT and Windows 2000
- Linux
- Novell NetWare
- SCO OpenServer and UnixWare
- Sun Solaris Intel Platform Edition
- IBM OS/2

For the most current information about operating system support on the servers, refer to

ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf

Registering the Server

You can register the server with the forms included with the server or refer to

www.compaq.com/products/registration

Routine Maintenance

For information concerning routine maintenance and safety precautions, refer to the Documentation CD provided with the server.

Maintenance and Service Procedures

In addition to the material in this guide, the *HP ProLiant ML370 Generation 3 Maintenance and Service Guide* provides specific information required for general maintenance and component replacement, including:

- Spare part numbers
- Removal and replacement procedures
- Diagnostic tools

To access the maintenance and service guide, refer to the Documentation CD or refer to

www.hp.com/products/servers/platforms

6

Server Cabling

This chapter provides an overview of standard cabling configurations and guidelines to help you make informed decisions about cabling hardware options for optimum performance. For complete and comprehensive information, use this chapter along with the labels attached to the inside of the server access panel and the documentation provided with the hardware options.

Internal Cabling Configurations

The following sections describe internal signal cabling configurations for the server.

Internal Drives and Storage Devices

Internal storage devices in the server require minimum cabling, as described in this section, and include:

- Hot-plug SCSI hard drive
- Diskette drive
- IDE CD-ROM drive
- Tape drives

Hot-Plug SCSI Hard Drives

Figure 6-1 shows standard cable routing from the SCSI backplane on the hard drive cage to SCSI port 1 on the system board.

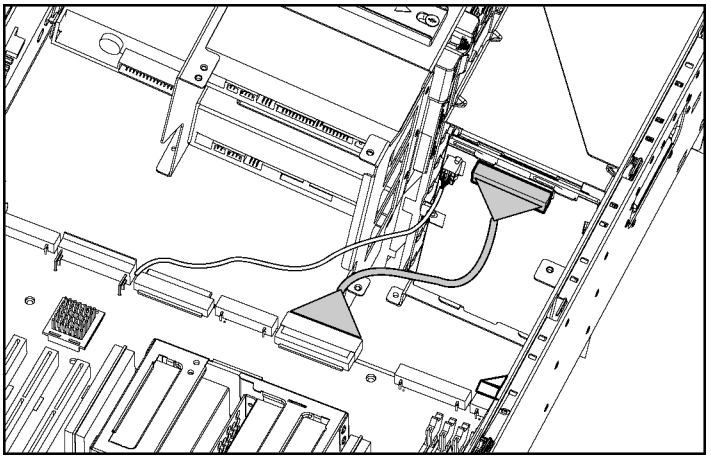

Figure 6-1: Cabling the SCSI hard drive cage to SCSI port 1 (center wall and PPMs removed for clarity)

Diskette Drive

The server includes a diskette drive that is mounted in an area behind the front panel outside the removable media area.

Figure 6-2 shows standard cable routing for a point-to-point diskette cable from the diskette drive to the system board. For information about replacing the diskette drive, refer to the maintenance and service guide.

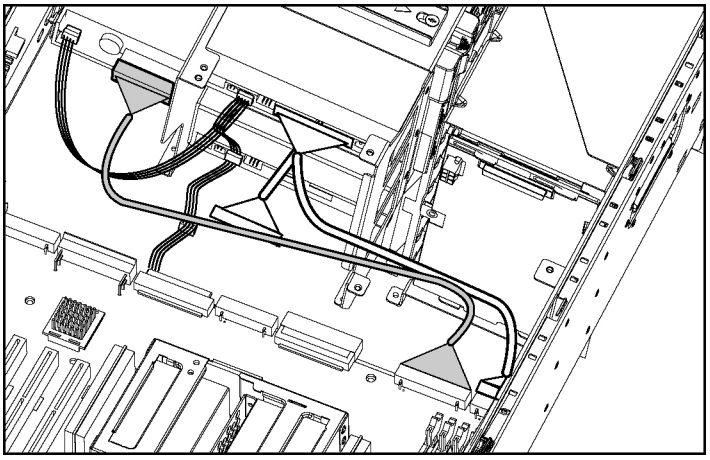

Figure 6-2: Cabling the diskette drive to the system board

IDE CD-ROM Drive

In the server, the CD-ROM drive is mounted in the top bay of the removable media area. Figure 6-3 shows standard cable routing in a rack configuration for a point-to-point IDE cable connecting the CD-ROM drive to the IDE connector on the system board. For information about replacing the CD-ROM drive, refer to the maintenance and service guide.

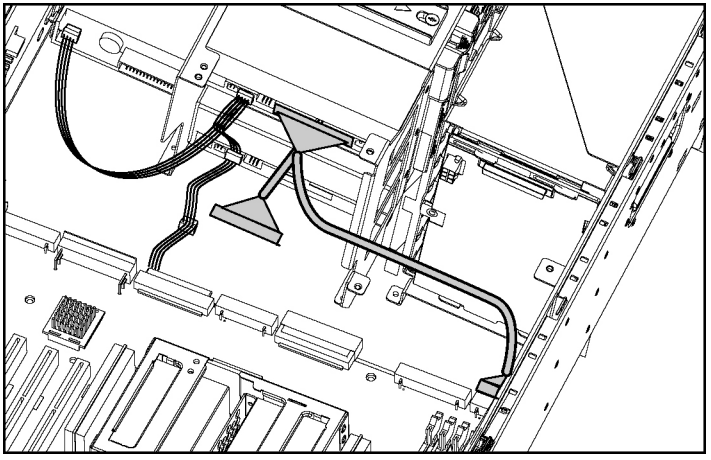

Figure 6-3: Cabling the CD-ROM drive to the system board (rack server)

Internal Tape Drives

The server provides support for up to two internal tape drives including DAT, DLT, or the Universal Hot-Plug Tape Drive. Internal devices installed in the removable media cage are cabled directly to SCSI port 2 on the system board with a three-device terminated cable. Figure 6-4 shows standard cable routing from the removable media cage to the system board with the CD-ROM drive installed.

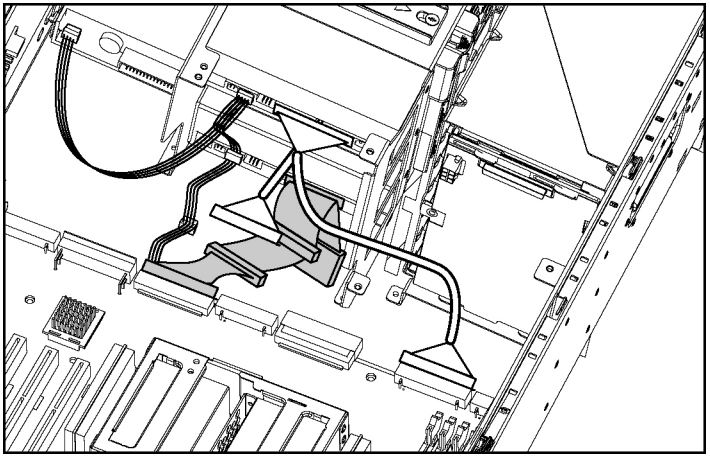

Figure 6-4: Cabling an internal tape drive to SCSI port 2

Cabling a Smart Array or Other RAID Controller

To cable a Smart Array or other RAID controller:

1. Disconnect the SCSI cable from the primary SCSI connector on the system board.

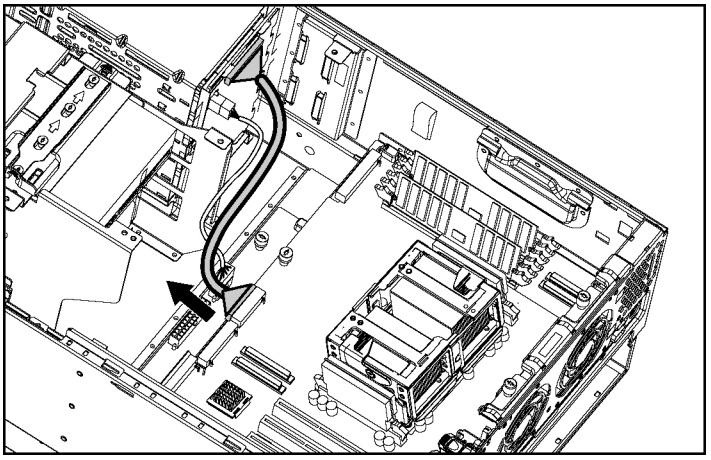

Figure 6-5: Disconnecting the primary SCSI cable

2. Connect the SCSI cable to the Smart Array Controller or other RAID controller.

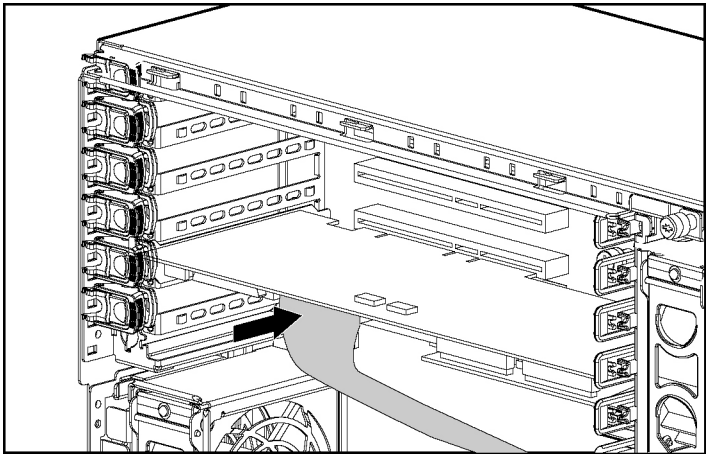

Figure 6-6: Connecting the SCSI cable to the SCSI controller option

NOTE: Both SCSI channels are self-terminating. If you choose to not use one or both SCSI channels, you do not need to terminate the unused channel(s).

Optional Internal Two-Bay Hot-Plug SCSI Drive Cage

The server supports an optional internal two-bay hot-plug SCSI drive cage that is installed in the removable media bay of the server. Figure 6-7 shows standard cable routing with the two-bay drive cage installed. For installation instructions, refer to Chapter 3, “Installing Hardware Options.”

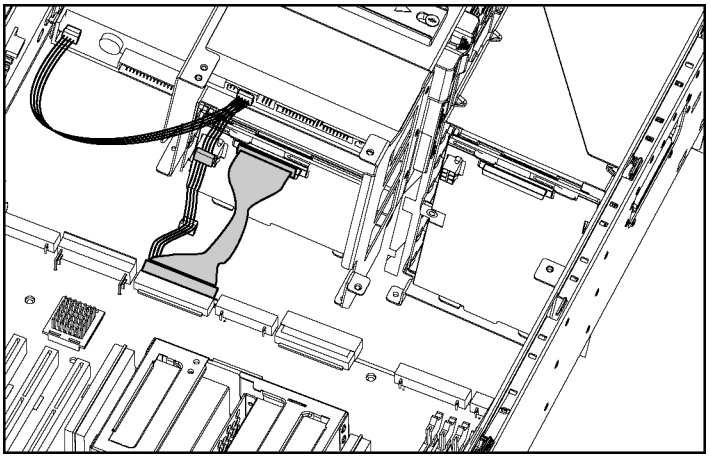

Figure 6-7: Cabling an optional internal two-bay hot-plug SCSI drive cage

Hot-Plug Fans

The server ships with three hot-plug fans installed in the cages attached to the center wall. Fan cables for all fans are bundled and connect to a single fan connector on the system board (Figure 6-8) so that no additional cabling is needed.

For instructions on installing hot-plug fans, refer to Chapter 3, "Installing Hardware Options," or refer to the hardware configuration and installation instructions that ship with the server and the option label on the inside of the access panel.

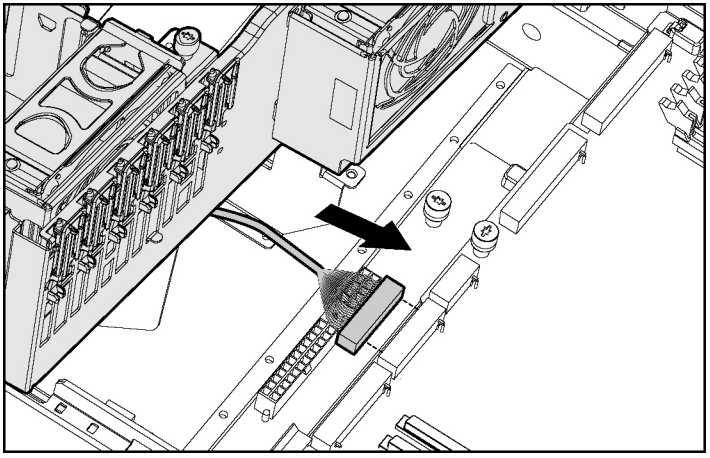

Figure 6-8: Cabling hot-plug fans to the fan connector on the system board

Hot-Plug Power Supplies

The server includes a hot-plug power supply and available power supply bay for 1+1 redundancy. Each power supply connects directly to the power supply backplane.

For instructions on installing a redundant power supply, refer to Chapter 3, "Installing Hardware Options" or refer to the hardware configuration and installation instructions that ship with the server. For information about internal power connections or the power supply backplane, refer the maintenance and service guide for the server.

Power On/Standby Button/LED Assembly

The server includes a Power On/Standby button/LED assembly that connects directly to the system board. For instructions on replacing the Power On/Standby button/LED assembly, refer to the maintenance and service guide for the server.

External Cabling Configurations

The following sections describe cabling configurations for peripheral devices and external storage devices supported by the server.

SCSI Cabling Guidelines

The external VHDCI SCSI connector is located on the rear panel of the server as shown in Figure 6-9. This interface enables you to install and manage external SCSI devices with the system standard Integrated Dual Channel Ultra3 SCSI controller.

IMPORTANT: Connect either external devices to the external VHDCI SCSI connector or internal devices to SCSI port 2. The server does not support both internal and external devices on the same channel at the same time.

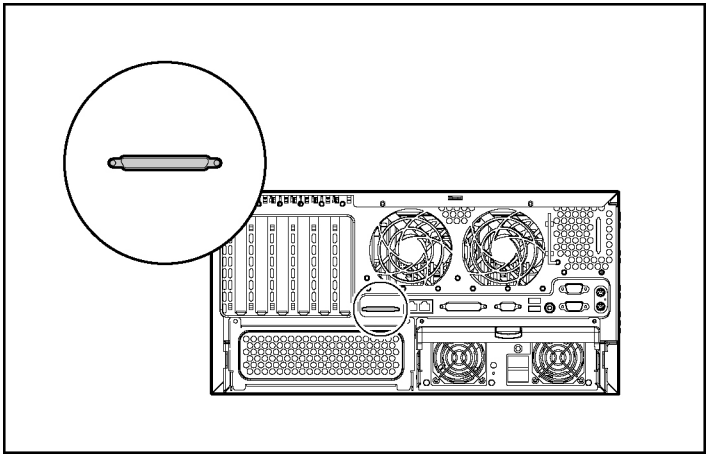

Figure 6-9: External VHDCI SCSI connector on the rear panel

SCSI Cables and Connectors

The server supports different types of SCSI devices, connectors, and cables. In general, SCSI cables have distinguishing characteristics:

- External SCSI cables have a round wire with securable connectors.
- Internal SCSI cables have a flat ribbon wire with push-on connectors.
- HP and Compaq branded SCSI cables are keyed so they cannot be installed incorrectly and are labeled for easy identification and reference.

Determining Cabling Needs

The following guidelines are an overview for first-time cable connections and installation in the server. For detailed information on cable types supported for the server, refer to

www.hp.com/products/servers/platforms

To determine server cabling needs for specific applications:

3. Determine whether cabling needs are for primary storage (hard drive) or for secondary storage (tape drive or CD-ROM drive).
4. Identify the controller type.
5. Identify the drive type to be used:
   - — Ultra2, or Ultra3 SCSI hard drive
   - — CD-ROM storage drive
   - — DAT or DLT tape drive
   - — Universal Hot-Plug Tape Drive

After you finish cabling external storage options, use the SmartStart CD to run the following applications:

- RBSU—enables you to configure new hardware in the system.
- Array configuration utilities—enable you to configure and manage drive arrays for SCSI hard drives.

  IMPORTANT: Use configuration utilities after installing any non-hot-plug option in the server.

External SCSI Hard Drives

Follow these general guidelines when adding external SCSI hard drives:

- A maximum of 14 SCSI devices per port can be supported externally (only six internally).
- Each SCSI drive must have a unique ID.

CAUTION: All data on the hard drive can be lost when you migrate from a non-array controller. Back up all data before migrating drives to an intelligent array configuration.

External Storage Devices

The server supports external storage devices through the SCSI connector on the rear panel of the server.

Figure 6-10 shows a tower server cabled to an external storage device through the rear panel SCSI connector.

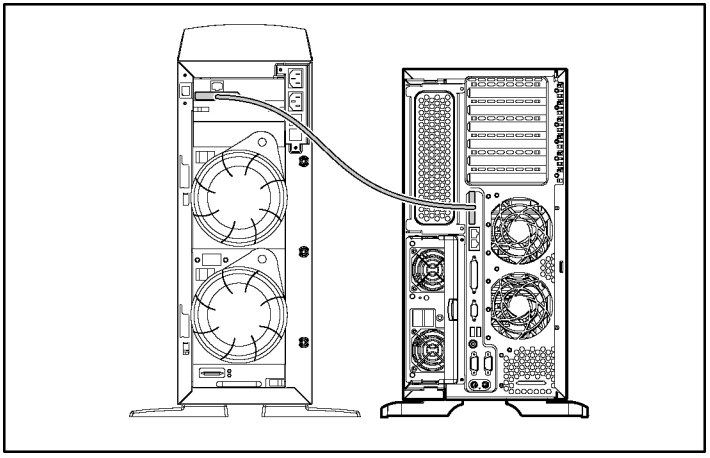

Figure 6-10: Cabling an external storage device through the external SCSI connector (tower server)

For additional information about external cabling with the server, refer to

www.compaq.com/support/storage

External USB Devices

The server supports installation of external USB devices through the two Open Standard USB connectors on the rear panel of the server shown in Figure 6-11.

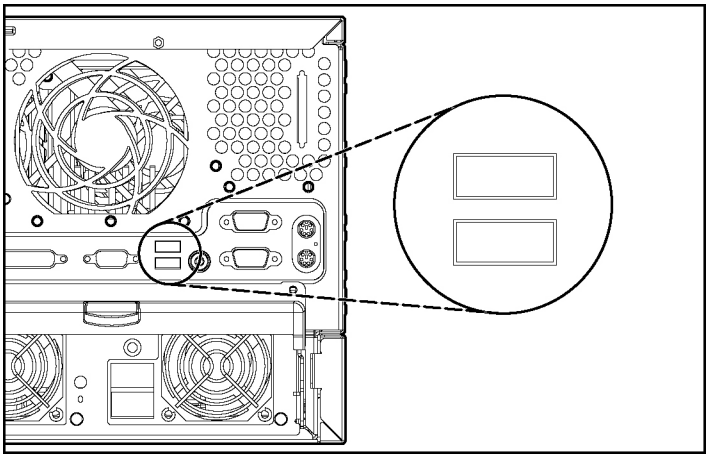

Figure 6-11: Rear panel USB connectors

The system ROM, configurable through RBSU, provides full legacy support for USB keyboard and mouse. Operating systems that currently support USB technology in the servers include:

- Windows 2000
- Linux
- NetWare 6 (keyboard and mouse)

For an updated operating system matrix for USB support, refer to

ftp.compaq.com/pub/products/servers/OS%20Feature%20Matrix%20103000.pdf

Rack Cabling Guidelines

After you have installed all internal options, replaced the server access panel, and configured the server for a rack, you are ready to connect the power cord and peripheral devices.

CAUTION: Always connect peripheral devices before connecting power to the server. An improper cabling connection sequence can result in electrical damage to peripheral devices.

Rear panel connectors on the server include:

- Video (blue)
- Parallel (burgundy)
- RJ-45
- Serial (teal)
- VHDCI SCSI
- Auxiliary VHDCI SCSI slot
- Mouse (green)
- Keyboard (purple)
- USB (black)

For additional rack cabling guidelines and information, refer to the Rack Resources CD provided with the rack.

Routing the Power Cord and Peripheral Device Cables

Cords and cables connected to the server rear panel are routed through a cable management arm that prevents loose cabling in the rear of the rack and protects connectors from damage that results when cables are disconnected improperly.

When multiple servers are installed in a rack, the cable management arm effectively organizes the rear panel cabling.

Refer to Chapter 4, "Installing the Rack Server," for instructions on installing the cable management arm and securing cables. Figure 6-12 shows a properly installed server with cables routed through the cable management arm.

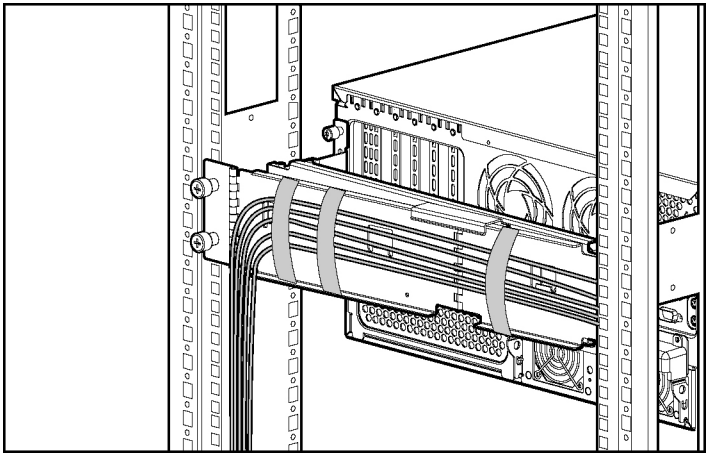

Figure 6-12: Server installed in a rack with properly routed cabling

7

Server Configuration and Utilities

This chapter provides information about the following utilities and support tools:

- ROM-Based Setup Utility (RBSU)
- Redundant ROM Support
- ROMPaq Utility
- Online ROM Flash Utility
- ROM Legacy USB Support
- SmartStart CD
- SmartStart Diskette Builder
- SmartStart Scripting Toolkit
- Insight Manager 7
- Diagnostics Utility
- Automatic Server Recovery (ASR-2)
- Integrated Management Log (IML)
- Multi-Initiator Configuration Utility
- Auto-Configuration Process
- Boot Options
- System Maintenance Menu

ROM-Based Setup Utility

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

- Configuring system devices and installed options
- Viewing system information
- Selecting the operating system
- Selecting the primary boot controller
- Managing storage options
- Configuring online spare memory
- Erasing the current configuration
- Performing diagnostics

In addition, RBSU includes other features, which are outlined in "Using RBSU" in this chapter. For a complete explanation of RBSU features and functions, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

Navigating RBSU

To navigate RBSU, use the following keys:

- To access RBSU, press the **F9** key when prompted during power up.
- To navigate the menu system, use the arrow keys.
- To make selections, press the **Enter** key.
- To return to the previous screen, press the **Esc** key.

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.

Using RBSU

The first time you power up the server, the system prompts you to enter RBSU, select an operating system, and select a language. Default configuration settings are made at this time and can be changed later.

NOTE: Most of the features in RBSU are not required in the setup of the server. The options in this utility are designed to assist with specific server configuration issues.

RBSU is divided into a series of menu selections designed to configure specific areas of the system. The primary menus are as follows:

- System Options
- PCI Devices
- Standard Boot Order (IPL)
- Boot Controller Order
- Date and Time
- Automatic Server Recovery (ASR)
- Server Passwords
- Server Asset Text
- Advanced Options
- BIOS Serial Console
- Utility Language

For a complete explanation of RBSU features and functions, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

System Options

The System Options menu is for overall system configuration settings. The following selections are included on this menu:

- **OS Selection**—prompts you to select the operating system. This option automatically selects appropriate advanced settings for the selected operating system and must be set before the operating system installation.
- **Serial Number**—displays the serial number assigned to the system during the manufacturing process. Only qualified service personnel should use this option.
- **Embedded COM Ports A and B**—allows you to enable or disable the embedded COM ports at the specified resource setting. The default for this setting is **enabled**.
- **Embedded LPT Port**—allows you to enable or disable the embedded LPT port at the specified resource setting. The default for this setting is **enabled**.
- **Integrated Diskette Controller**—allows you to enable or disable the diskette controller. The default for this setting is **enabled**.
- **NUMLOCK Power-On State**—allows you to enable or disable the keyboard NUMLOCK feature at server startup. The default for this setting is **disabled**.
- **Embedded NIC PXE Support**—allows you to enable or disable PXE support for the NIC. The default for this setting is **enabled**.
- **Diskette Write Control**—allows you to configure the write control of the removable media drive. The options are read and write or read only. The default for this setting is **read and write**.
- **Diskette Boot Control**—allows you to have the system boot from the removable media device. The default for this setting is **enabled**.
- **Advanced Memory Protection**—allows you to choose Advanced ECC support or online spare with ECC support. The default setting is **Advanced ECC support**.
  - **Advanced ECC**—sets the system to use the standard paired DIMM configuration. The default for this setting is **enabled**.
  - **Online spare support**—tests the DIMM configuration and sets the system to use the online spare memory feature. The default for this setting is **disabled**.

PCI Devices

The **PCI Devices** menu option enables you to view and assign the IRQs for all PCI devices and to disable certain embedded PCI devices.

Standard Boot Order (IPL)

The **IPL Boot Order** menu option enables you to configure the order of devices used to start an operating system. This feature can be set to select which device the system scans first.

The default order is:

1. CD-ROM
2. Diskette drive
3. Hard drive (refer to "Boot Controller Order")
4. PCI embedded Ethernet network controller

Boot Controller Order

The **Boot Controller Order** menu option enables you to view and assign the current controller order. The default for this setting is to boot from embedded SCSI controller port 1.

Date and Time

The **Date and Time** menu option enables you to set the system date and time.

Automatic Server Recovery (ASR)

The **Automatic Server Recovery** menu option includes the following items:

- **ASR Status**—allows you to enable or disable the **Automatic Server Recovery** option. The default for this setting is **enabled**.
- **ASR Timeout**—allows you to set the length of time that the system waits before it reboots. The default is **five minutes**.
- **Thermal Shutdown**—allows you to enable or disable the system's automatic shutdown feature caused by a thermal caution event. This option is enabled by default. HP does not recommend disabling this feature. The default for this setting is **enabled**.

Server Passwords

The **Server Passwords** menu option enables you to set up passwords to limit access to the system and its setup options. The following selections are available on this menu:

- **Set Power-On Password**—allows you to assign a power-on password. This password prevents unauthorized users from powering on the system. The default for this setting is **disabled**.
- **Set Admin Password**—allows you to assign an administrator password. This password prevents unauthorized users from modifying the setup options. The default for this setting is **disabled**.
- **Network Server Mode**—allows you to disable or enable the system's capability to boot with a locked keyboard or without a keyboard. To unlock the keyboard, enter the power-on password. The default for this setting is **disabled**.
- **QuickLock**—allows you to lock the keyboard and prompts you for the power-on password to unlock the keyboard. The default for this setting is **disabled**.

IMPORTANT: If you forget your password, you can clear all passwords by resetting the system configuration switch. Refer to "System Board Switches" in Appendix E.

Server Asset Text

The **Server Asset Text** menu option enables you to customize system-specific text for the server. The following selections are available on this menu:

- **Set Server Info Text**—allows you to identify the system with an Asset Tracking Number. The default for this setting is **disabled**.
- **Set Administrator Info Text**—allows you to list the name and contact information for the administrator to the system.
- **Set Service Contact Text**—allows you to list the name and contact information for the responsible service contact for the system.

Advanced Options

The **Advanced Options** menu option enables you to configure advanced options of the system. The following selections are available on this menu:

- **MPS Table Mode**—allows you to change the APIC table setting. The APIC table setting is automatically set by **OS Selection**, if **Auto Set Table** is selected. The default for this setting is **Auto Set Table**.
- **Hot Plug Resources**—allows you to select the amount of system resources dedicated to the PCI Hot Plug capabilities. The default setting is **Auto Set**.
- **POST Speed Up**—allows you to increase the POST speed during a system boot by disabling the complete memory test. The default for this setting is **enabled**.
- **POST F1 Prompt**—allows you to select whether the boot process stops, pauses, or proceeds at a ROM initiated **F1** prompt. The default is **enabled** (stop).
- **Redundant ROM Selection**—allows you to use the current ROM or switch to the backup ROM.
- **Erase Non-volatile Memory**—allows you to reset the configuration settings to their factory defaults. The default for this setting is **enabled**.
- **Erase NVRAM**—allows you to reset the configuration settings to their factory defaults and to erase the boot disk. For more information about this feature, refer to the *HP ROM-Based Setup Utility User Guide.* The default for this setting is **enabled**.

- **Set CPU Corrected**—allows you to change the status of the selected processor to "corrected" after a processor failure. Only perform this step after the failed processor has been replaced.
- **Wake on LAN**—allows you to enable or disable **Wake on LAN** support (PME). The default for this setting is **disabled**.
- **Fan Speed**—allows you to configure the default fan speed. The health driver overrides the default setting when loading the operating system to allow maximum flexibility and protection. Settings include:
  - **High**—sets the fan speed on high to provide maximum thermal protection. The default for this setting is **disabled**.
  - **Normal**—sets the fan speed on low for minimum acoustic output. The default for this setting is **enabled**.

CAUTION: Always configure the fan speed control for high speed in high-altitude environments or in fully loaded systems. For maximum protection, always load the health driver.

- **NMI Debug Button**—allows you to enable or disable the NMI debug button. The default is enabled.
- **Custom POST Message**—allows you to display a custom message during POST.
- **Processor Hyper-Threading**—allows you to enable or disable processor Hyper-Threading. The default is **enabled**.

BIOS Serial Console

The **BIOS Serial Console** menu option allows you to view POST error messages and run RBSU remotely through a serial connection to the server COM port. A keyboard and monitor on the machine that you are remotely configuring are not required. For more information about BIOS Serial Console, refer to the *BIOS Serial Console User Guide.*

Utility Language

The **Utility Language** menu option enables you to set the display language for RBSU.

Configuring Online Spare Memory

To configure online spare memory support:

1. Install the required DIMMs. Refer to "Memory" in Chapter 3.

   IMPORTANT: If the DIMM configuration does not meet the criteria for online spare memory support, the system does not allow you to configure this feature.

2. Access RBSU by pressing the **F9** key when prompted during power up.
3. Select **System Options**.
4. Select **Advanced Memory Protection**.
5. Select **Online Spare Memory Support**.
6. Press the **Enter** key.
7. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU.

Saving RBSU Configuration Settings

To save RBSU configuration settings, use the Configuration Replication Utility from the SmartStart Scripting Toolkit. Saving the configuration enables you to restore settings later. Use the Configuration Replication Utility from the SmartStart CD or download the Scripting Toolkit. To download the software, refer to

www.hp.com/servers/sstoolkit

Redundant ROM Support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a 2-MB ROM that acts as two separate 1-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains the backup version.

Safety and Security Benefits

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

Access to Redundant ROM Settings

Use ROMPaq utilities to create a backup ROM image before upgrading the configuration or to restore saved ROM data.

1. Access RBSU by pressing the **F9** key when prompted during power up.
2. Select **Advanced Options**.
3. Select **ROM Selection**.
4. Select one of the ROM banks as the system ROM.
5. Press the **Enter** key.
6. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU.
7. Restart the server.

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

If both the current and backup versions of the ROM are corrupt, the server automatically enters the ROMPaq disaster recovery mode. To perform this procedure, refer to “ROMPaq Disaster Recovery” in Appendix D.

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. By default, the oldest ROM version is updated. This procedure is the same for both system and option ROMPaq utilities.

If a power loss occurs during a firmware upgrade, redundant ROM support enables data recovery.

Online ROM Flash Utility

Online ROM Flash enables Microsoft Windows NT 4.0 and Windows 2000 operating system administrators to efficiently upgrade and manage system and array controller ROMs. This tool includes the following features:

- Works offline and online
- Integrates with other HP 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

For instructions for the Online ROM Flash Utility with Windows operating systems, refer to

www.compaq.com/support/files/server/us/rdcurom.html

For instructions for the Online ROM Flash Utility with Linux operating systems, refer to

www.compaq.com/support/files/server/us/lrominst.html

ROM Legacy USB Support

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 the keyboard and mouse, but not for CD-ROM or diskette drives.

ROM legacy USB support is available during POST, DOS, and while the operating system is running. The ROM does not support hot-plug events for the USB keyboard or USB mouse at any time. The maximum device support is two USB keyboards, two USB mouse devices, and one layer of hubs.

NOTE: The SmartStart Microsoft Windows 95 environment does not support a USB mouse. During the SmartStart process, you must use a legacy PS/2 mouse.

For a list of operating systems supported by the server, refer to

www.hp.com/products/servers/platforms

To determine whether an operating system supports a particular feature, refer to

ftp.compaq.com/pub/products/servers/OS%20Feature%20Matrix%20103000.pdf

SmartStart CD

The SmartStart CD is the recommended method for loading system software, thereby achieving a well-integrated server and ensuring maximum dependability and supportability. The SmartStart CD contains diagnostic utilities and ROMPaq tools.

IMPORTANT: Do not use the SmartStart CD to load system software if you purchased the system with a factory-installed operating system. Refer to the *Factory-Installed Operating System Software User Guide* for software installation guidelines.

SmartStart enables you to perform the following functions:

- Auto-detect and configure the server hardware and drive arrays.
- Install any major server operating system using packaged product CDs.
- Install the latest optimized drivers, ROMPaqs, and management agents.
- Deploy and maintain multiple servers using Integration Server.
- Create and copy standard server configuration scripts using the Scripting Toolkit and Configuration Replication Utility.
- Test server hardware.
- Create support software diskettes that enable you to update the drivers.

For more information about SmartStart, refer to the documentation shipped with the server.

SmartStart Diskette Builder

The SmartStart Diskette Builder is a utility that uses data stored on the SmartStart CD to create support diskettes. You can create support diskettes for specific configuration needs or for software that cannot be used directly from the SmartStart CD. Use the SmartStart Diskette Builder to create the following support diskettes:

- Array Configuration Utility
- Operating system support
- Diagnostic utilities
- Server utilities
- Erase utility
- System and option ROMPaq

To run the Diskette Builder, you need the following:

- A PC with one of the following operating systems:
  - — Microsoft Windows 95
  - — Microsoft Windows 98
  - — Microsoft Windows NT
  - — Microsoft Windows 2000
  - — Microsoft Windows XP
- Several 1.44-MB diskettes

All existing data on the diskettes is overwritten. Insert the SmartStart CD in the workstation drive. The CD automatically runs the Diskette Builder utility.

However, if the PC does not support the auto-run feature, use Windows Explorer and enter the following command line:

```
[CD-ROM DRIVE]:\DSKBLDR\DSKBLDR.EXE
```

SmartStart Scripting Toolkit

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

The Configuration Replication Utility is a stand-alone DOS utility that duplicates the settings of an operating RBSU-configured server by saving the server configuration to a scripted file. You can edit and modify settings in the scripted file at the subset level. For example, you can change ASR-2 settings without having to change settings for boot controller order.

For more information, refer to the *SmartStart Scripting Toolkit User Guide*.

Insight Manager 7

Insight Manager 7 is an application for easily managing network devices. Insight Manager 7 delivers intelligent monitoring and alerting as well as visual control of HP and Compaq branded devices. Documentation for Insight Manager 7 is available on the Management CD in the OVERVIEW.HLP file.

IMPORTANT: You must install and use Insight Manager 7 to benefit from the HP pre-failure warranties on processors, hard drives, and memory modules.

Insight Manager 7 features include:

- **Comprehensive Fault Management**—Insight Manager 7 provides comprehensive fault management for all major subsystems, including pre-failure alerting for disks, memory, and processors.
- **Integration Management**—Insight Manager 7, in conjunction with SmartStart, enables you to effectively deploy and manage configurations throughout the enterprise using the Integration Server and Insight Version Control.

- **Performance Management**—Insight Manager 7 enables you to set performance and capacity thresholds for management variables related to CPU and bus utilization, NIC throughput, logical disk capacity, and more.
- **Workstation Management**—Insight Manager 7 enables you to monitor and manage HP and Compaq branded Professional Workstations.
- **Client Management**—Insight Manager 7 enables you to manage faults and assets on DeskPro computers and Compaq branded portables.
- **Asset Management**—Insight Manager 7 enables you to export asset information from the Insight Manager 7 database to leading database and spreadsheet applications, making asset management easier than ever.
- **Remote Management**—Insight Manager 7 enables you to manage in-band or out-of-band devices online or offline from anywhere.
- **Reporting**—Using Automatic Data Collection, Insight Manager 7 enables you to gather historic performance information for graphing or export purposes, which helps with upgrade performance.
- **Integration with Enterprise Management Platforms**—Insight Manager 7 provides integration with leading management platforms including HP OpenView, IBM NetView, SunNet Manager, and Microsoft Systems Management Server.

Diagnostics Utility

The Diagnostics Utility displays information about the server's hardware and tests the system to be sure that it is operating properly. If you used SmartStart to install the operating system, you can access the Diagnostics Utility from the SmartStart CD or refer to

www.hp.com/servers/manage

Automatic Server Recovery-2

ASR-2 is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue-screen, ABEND (abnormal end), or panic. A system fail-safe timer, the ASR-2 timer, starts when the System Management driver, also known as the health driver, is loaded. While the operating system functions properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR-2 increases server availability by restarting the server within ten minutes after a system hang or shutdown. At the same time, the Insight Manager 7 console notifies you by sending a message to a designated pager number that ASR-2 has restarted the system. You can disable ASR-2 from the Insight Manager 7 console or RBSU.

Integrated Management Log

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

Events listed in the IML are categorized as one of four event severity levels:

- Status—indicates that the message is informational only
- Repaired—indicates that corrective action was taken
- Caution—indicates a non-fatal error condition occurred
- Critical—indicates a component failure has occurred

IML requires operating system-dependent drivers. Refer to the SmartStart CD for instructions on installing the appropriate drivers.

To obtain important drivers and information about using the IML with the Linux operating system, refer to

www.compaq.com/products/servers/linux/compaq-howto.html

Viewing the Log

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

- From within the Insight Manager 7
- From within the Survey Utility
- From within operating system specific IML viewers
  - — For a Windows NT operating system, Event Viewer or IML Viewer
  - — For a NetWare operating system, IML Viewer
  - — For a Linux operating system, IML Viewer Application

Using Insight Manager 7

Insight Manager 7 is a server management tool that provides in-depth fault, configuration, and performance monitoring of hundreds of HP or Compaq branded servers from a single management console. The system parameters that are monitored describe the status of all key server components. By being able to view the events that may occur to these components, you can take immediate action.

Use the instructions in this section to view and print the event list from within Insight Manager 7. You can also mark a critical or caution event as repaired after the affected component has been replaced. For example, when a failed fan is replaced, you can mark the event as repaired, which lowers the severity of the event.

NOTE: You can only view the list from the Recovery/Integrated Management Log screen.

Viewing the Event List

To view the event list:

1. From the Insight Manager 7, select the appropriate server, then select **View Device Data**. The selected server is displayed with buttons around its perimeter.
2. Click **Recovery**.

3. Select **Integrated Management Log**.
4. If a failed component has been replaced, select the event from the list, then select **Mark Repaired**.

Printing the Event List

To print the event list:

1. From the Insight Manager 7, select the appropriate server. The selected server is displayed with buttons around its perimeter.
2. Click **Configuration**.
3. Click **Recovery**.
4. Click **Print**.

Using Survey Utility

The Survey Utility is a serviceability tool available for Microsoft Windows NT, Novell NetWare, Linux, and UnixWare operating systems that delivers configuration capture and comparison to maximize server availability. It is available on the Management CD in the ProLiant Essentials Foundation Pack, or refer to

www.hp.com/servers/manage

Refer to the Management CD for information on installing and running the Survey Utility. After you run the Survey Utility, you can view the IML by loading the output of the utility (typically called SURVEY.TXT) into a text viewer such as Microsoft Notepad. The event list follows the system slot information. After you open the text file, you can print it using the print feature of the viewer.

Multi-Initiator Configuration Utility

The Integrated Dual Channel Ultra3 SCSI Controller can be configured into multi-initiator mode to support HP and Compaq branded storage and clustering options needing this feature. The Multi-Initiator Configuration Utility is available in the system ROM and is accessible directly from the **CTRL-A** prompt at system startup. Refer to the option documentation for additional information and detailed instruction on using this utility.

Auto-Configuration Process

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

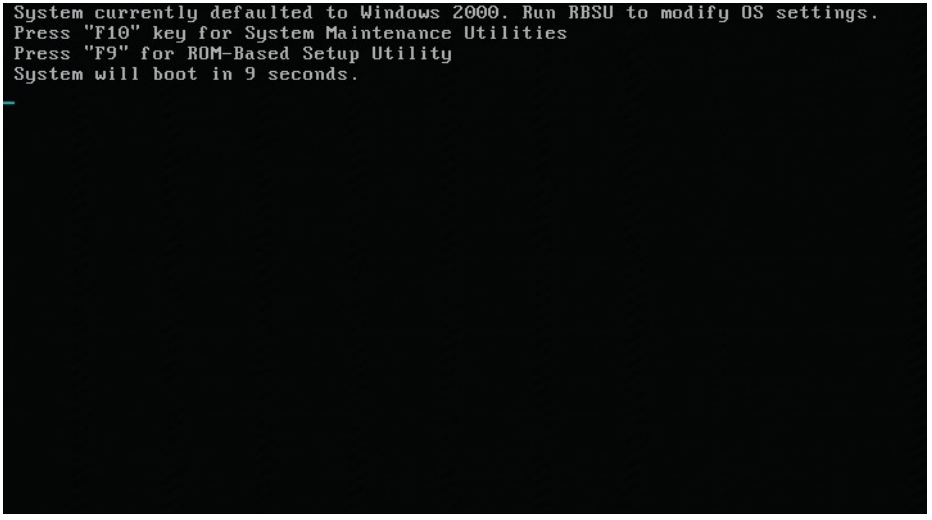

Figure 7-1: Auto-configuration screen

By default, the auto-configuration process configures the system for the Microsoft Windows 2000 operating system, as shown in Figure 7-1. To change any default settings in the auto-configuration process, such as the settings for language, operating system, and primary boot controller, run RBSU by pressing the **F9** key when prompted. After the settings are selected according to your preference, exit RBSU and reboot the server. For more information about this process, refer to the *HP ROM-Based Setup Utility User Guide*.

Boot Options

After the auto-configuration process completes, or after the server reboots upon exit from RBSU, the Power-On Self-Test (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 bootable CD or the hard drive. During this time, the menu on the screen allows you to install an operating system, make changes to the server configuration in RBSU, or run the **System Maintenance Menu**. For detailed information about these options, refer to the *HP ROM-Based Setup Utility User Guide*.

System Maintenance Menu

The **System Maintenance Menu** provides access to server diagnostics, RBSU, and the Inspect utility. Embedded in the system ROM, the menu feature replaces the legacy system-partition functionality supported on some servers.

To access the **System Maintenance Menu**, press the **F10** key when prompted from the boot option screen. For more information on using the features of the **System Maintenance Menu**, refer to the *HP ROM-Based Setup Utility User Guide*.

A

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique series number. The series 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 series number. The series number should not be confused with the marketing name or model number of the product.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations 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 (i.e., 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. The rating label on the device shows the class (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following 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 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 your product, contact:

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

or call 1-800-652-6672 (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact:

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

or call 281-514-3333.

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

Modifications

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

Cables

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

Canadian Notice (Avis Canadien)

Class A Equipment

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

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

Class B Equipment

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

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

European Union Notice

CE

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

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

- EN55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2,3,4,5,6,8,11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN60950 (IEC950) – Product Safety

Japanese Notice

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

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

VCCIマークが付いていない場合には、次の点にご注意下さい。

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

BSMI Notice

警告使用者：

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

Laser Devices

All systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings

WARNING: To reduce the risk of exposure to hazardous radiation:

- **Do not try to open the laser device 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 authorized service technicians to repair the laser device.**

Compliance with CDRH Regulations

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.

Compliance with International Regulations

All systems equipped with laser devices comply with appropriate safety standards including IEC 825.

Laser Product Label

The following label or equivalent is located on the surface of the supplied laser device.

This label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label appears on a laser device installed in your product.

Laser Information

Laser Type	Semiconductor GaAIAs
Wave Length	780 nm +/- 35 nm
Divergence Angle	53.5 degrees +/- 0.5 degrees
Output Power	Less than 0.2 mW or 10,869 W·m-2 sr-1
Polarization	Circular 0.25
Numerical Aperture	0.45 inches +/- 0.04 inches

Battery Replacement Notice

Your computer is equipped with a lithium manganese dioxide, vanadium pentoxide, or alkaline internal battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Replacement is to be done using the spare designated for this product. For more information about battery replacement or proper disposal, contact your authorized reseller or your authorized service provider.

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

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

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, your authorized HP Partners, or their agents.

Power Cords

The power cord set included in the server meets the requirements for use in the country where you purchased the server. If you need use this server in another country, you should purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm² or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet). If you have questions about the type of power cord to use, contact your authorized service provider.

IMPORTANT: Route power cords so that they will not be walked on or pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

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.

B

Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you must 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.

Preventing Electrostatic Discharge

To prevent electrostatic damage, observe the following precautions:

- 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

There are several methods 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 grounding, 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.

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

C

Server Error Messages

Use POST error messages to assist in troubleshooting and performing basic diagnostic functions for the server. Table C-1 contains new and unique error messages that arise during the POST. For a complete listing of error messages and other troubleshooting information, refer to the *Servers Troubleshooting Guide* provided on the Documentation CD or refer to

www.hp.com/products/servers/platforms

Table C-1: POST Error Messages

Error Code	Audible Beeps	Probable Source of Problem	Action
207-Invalid Memory Configuration - Unsupported DIMM In DIMM Socket X Only Registered DDR DIMMs Are Supported.	One long, and one short	DIMM is of an unsupported type.	Replace DIMMs in indicated slots. Refer to “Memory” in Chapter 3.
207-Invalid Memory Configuration - Unsupported DIMM In DIMM Socket X Insufficient Timings on DIMM.	One long, and one short	Installed DIMMs are too slow.	Replace DIMMs in indicated slots. Refer to “Memory” in Chapter 3.

continued

Table C-1: POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Action
207-Invalid Memory Configuration - Unsupported DIMM In DIMM Socket X Only ECC DIMMs Are Supported.	One long, and one short	Installed DIMMs do not have ECC capability.	Replace DIMMs in indicated slots. Refer to “Memory” in Chapter 3.
207-Invalid Memory Configuration - Unsupported DIMM In DIMM Socket X DIMM Size Parameters Not Supported.	One long, and one short	Installed DIMMs in the same bank are of different sizes.	Replace DIMMs in indicated slots. Refer to “Memory” in Chapter 3.
207-Invalid Memory Configuration - DIMMs must be installed sequentially.	One long, and one short	Installed DIMMs are not sequentially ordered.	Reinstall DIMMs in proper order. Refer to “Memory” in Chapter 3.
207-Invalid Memory Configuration - Incomplete bank detected in bank X	One long, and one short	Bank is missing a DIMM.	Install a DIMM to fill the bank. Refer to “Memory” in Chapter 3.
207-Invalid Memory Configuration – Mismatched DIMMs within DIMM Bank Memory in Bank X Not Utilized.	One long, and one short	Installed DIMMs in the same bank are of different sizes.	Replace DIMMs in indicated slots. Refer to “Memory” in Chapter 3.
207-Memory Configuration Warning – DIMM in DIMM Socket X does not have Primary Width of 4 and only supports standard ECC.	One long, and one short	Installed DIMMs have a primary width of x8.	Install DIMMs that have a primary width of x4. Refer to “Memory” in Chapter 3.

continued

Table C-1: POST Error Messages *continued*

Error Code	Audible Beeps	Probable Source of Problem	Action
209-Online Spare Memory Configuration-No valid Banks for Online Spare	One long, and one short	Two valid banks are not available to support online spare.	Install or reinstall DIMMs to support online spare configuration. Refer to “Memory” in Chapter 3.
209-Online Spare Memory Configuration-Spare bank is invalid	One long, and one short	Installed DIMMs for online spare bank are of a size smaller than another bank.	Install or reinstall DIMMs to support online spare configuration. Refer to “Memory” in Chapter 3.
209-Online Spare Memory Configuration-Spare bank is invalid. Mixing of DIMMs with Primary Width of x4 and x8 is not allowed in this mode.	One long, and one short	Installed DIMMs for online spare bank are of a different primary width than the DIMMs in other banks.	Install or reinstall DIMMs to support online spare configuration. Refer to “Memory” in Chapter 3.
WARNING: A Type 2 Header PCI Device has been detected. The BIOS will not configure this card. It must be configured properly by the OS or driver.	Two short	Only Type 0 and Type 1 Header PCI Devices are configured by the system ROM. The device will not work unless the OS or device driver properly configures the card.	Refer to the operating system documentation or the device driver information that ships with the Type 2 PCI device.
Processor packages do not match. Please make sure that all processor packages are the same. - System Halted!	One long, and one short	Installed processors are different types.	Install processors of the same type. Refer to “Processors and PPMs” in Chapter 3.

D

Troubleshooting

This appendix provides specific troubleshooting information for your ProLiant ML370 Generation 3 server. Use it to find details about server startup and operation errors.

For a list of new server error messages specific to this server, refer to Appendix C, "Server Error Messages." For information on LEDs and switches specific to the server, refer to Appendix E, "LED Indicators and Switches."

For information about general troubleshooting techniques, diagnostic tools, error messages, and preventative maintenance, refer to the *Servers Troubleshooting Guide*, also included in your user documentation.

This appendix includes the following topics:

- When the Server Does Not Start

  You are provided with initial instructions on what to try and where to go for help for the most common problems encountered during initial POST. A successful startup requires the server to complete this test each time you power up, before the server can load the operating system and start running software applications.

- Diagnosis Steps

  If the server does not power up after you have performed initial troubleshooting procedures, use the tables in this section to identify possible reasons for the problem, possible solutions, and references to other sources of information.

- Problems After Initial Boot

  Once the server has passed the POST, you may still encounter errors, such as an inability to load your operating system. You are provided with instructions on what to try and where to go for help when you encounter errors after the server completes the POST.

- ROMPaq Disaster Recovery

  During troubleshooting, it may become apparent that your system ROM is corrupted. Because the server has redundant ROM capability, you can use the backup ROM. If both ROMs are corrupted, you must perform the ROMPaq disaster recovery procedure.

- Information Resources

  This section provides a list of reference information available for the server.

For troubleshooting information beyond the scope of this guide, both general and specific to the server, refer to Table D-8 at the end of this appendix.

When the Server Does Not Start

This section provides systematic instructions on what to try and where to go for help for the most common problems encountered during initial Power-On Self-Test (POST). The server must first complete this test each time you power up, before it can load the operating system and start running software applications.

WARNING: There is a risk of personal injury from hazardous energy levels. The installation of options, and the routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

If the server does not start:

1. Be sure that the server and monitor are plugged into working outlets.
2. Be sure that the power source is working properly:
   a. Check the status using the Power On/Standby LED. For the location and explanation of the Power On/Standby LED, refer to "Front Panel LEDs" in Appendix E.
   b. Be sure that the Power On/Standby button was pressed firmly.

   Refer to the *Servers Troubleshooting Guide* for details on power sources and what else to check.
3. Be sure that the power supplies are working properly.
   a. Check the status using the power supply LEDs. For the location and explanation of these LEDs, refer to "Hot-Plug Power Supply LEDs" in Appendix E.
   b. Also refer to the *Servers Troubleshooting Guide* for information about power sources.
4. If the server does not complete POST or start loading an operating system, refer to the *Servers Troubleshooting Guide* for information about general loose connections.
5. If the server is rebooting repeatedly, be sure that the server is not rebooting because of a problem that initiates an Automatic Server Recovery-2 (ASR-2) reboot.

   You can enable ASR-2 to restart the server and automatically load the operating system. Should a critical error occur, ASR-2 logs the error in the IML and restarts the server.

   For more information about ASR-2 and other reasons for repeated booting, refer to the *Servers Troubleshooting Guide*.
6. Restart the server.

IMPORTANT: If the server does not restart, proceed to "Diagnostic Steps" in this appendix.

7. Check the server for the following normal power-up sequence to be sure that the server meets the minimal hardware requirements and is powered up during normal operations:
   a. The front panel Power On/Standby LED turns from amber (standby) to solid green (on).
   b. The fans start up.
   c. The external and internal system health LEDs turn solid green.
8. Check the monitor for the following messages to be sure that the server meets the minimal hardware requirements and is powered up during normal operations:
   a. ProLiant logo
   b. Memory test
   c. BIOS information
   d. Copyright information
   e. Processor initialization

   NOTE: The remaining items in this list pertain to option ROMs. The messages for these items appear only if they are installed and enabled.

   f. Multi-initiator configuration

   IMPORTANT: Select the multi-initiator configuration utility (**CTRL-A**) **only** to support HP or Compaq branded storage and clustering options. Refer to Chapter 7, "Server Configuration and Utilities," for additional information.

   g. SCSI devices
   h. RAID initialization (if a RAID controller is installed)
   i. PXE initialization
9. The operating system loads to complete the boot process.

If the server completes POST and attempts to load the operating system, go to the "Problems After Initial Boot" section in this appendix.

Diagnostic Steps

If the server does not power up, or powers up but does not complete POST, answer the questions in Table D-1 to determine the appropriate actions. The flow of questions reflects the usual flow of events during a power-on sequence. Figure D-1 illustrates the recommended diagnostic steps and decision points.

According to the answers you give, you are directed to the appropriate table in this section. That table outlines possible reasons for the problem, options available to assist in diagnosis, possible solutions, and references to other sources of information.

Table D-1: Diagnostic Steps

Question	Action
Question 1: Is the Power On/Standby LED amber?	If yes, continue to question 2. If no, refer to Table D-2.
Question 2: Is the Power On/Standby LED green?	If yes, continue to question 3. If no, refer to Table D-3.
Question 3: Is the external health LED green?	If yes, continue to question 4. If no, refer to Table D-4.
Question 4: Is the internal health LED green?	If yes, continue to question 5. If no, refer to Table D-5.
Question 5: Is the monitor displaying information?	If yes, use the POST messages for further diagnosis. Refer to Table D-6 for details. If no, refer to Table D-6.

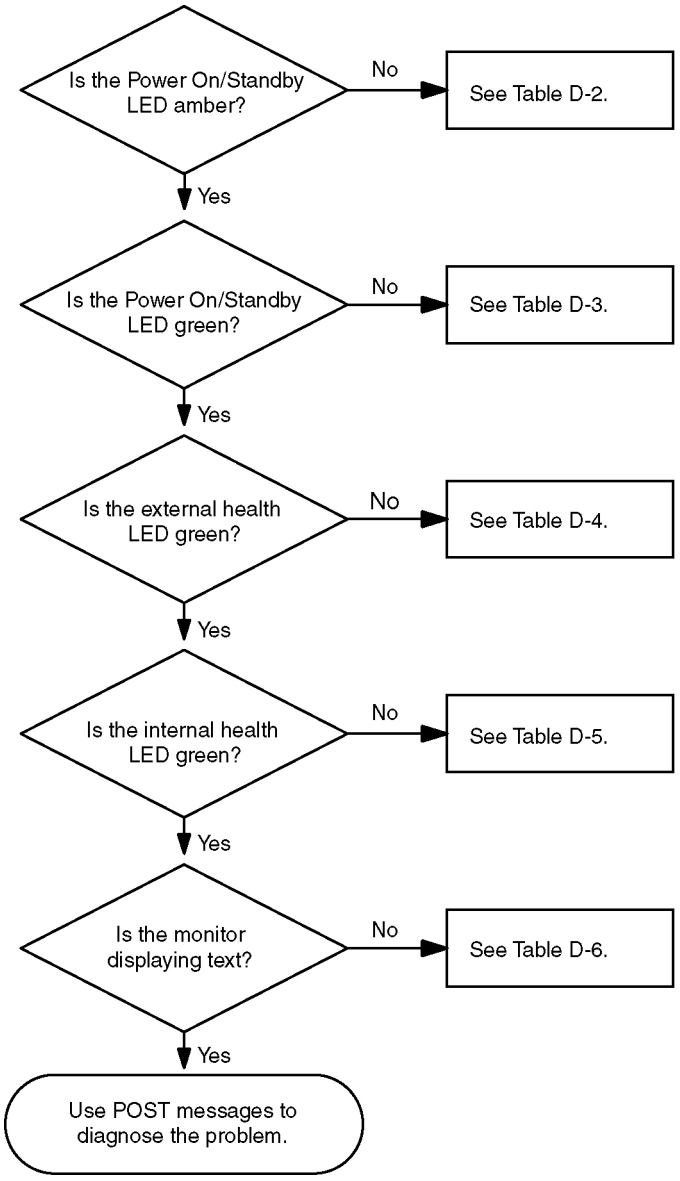

Figure D-1: Diagnostic steps

Table D-2: Is the Power On/Standby LED Amber?

Answer	Possible Reasons	Possible Solutions
No	The server is not connected to AC power, or no AC power is available.	Be sure that the power cord is connected to the power supply.
	A power supply problem exists. The power supply may not be inserted properly, it may have a damaged connector, or it may have failed.	Be sure that the power supply is undamaged and that the power supply is fully seated.
	There is a broken connection between the system board and power button.	Be sure that the system power and power supply signal cables are connected to the system board and power supply backplane.
	The power button/LED assembly has failed.	
	The system board may need to be replaced.	Be sure that the power button/LED cable is connected to the system board.
		Check for bent pins on connectors and components.
		Refer to the *Servers Troubleshooting Guide* for further options regarding power problems and general hardware problems.
		If these solutions do not solve the problem, contact your authorized service provider for assistance.
Yes	If the Power On/Standby LED is amber, do the following:	
	1. Press the Power On/Standby button.	
	2. Refer to Table D-3.	

Note: For LED locations and functions, refer to Appendix E, "LED Indicators and Switches." For cabling configurations, refer to Chapter 6, "Server Cabling."

Table D-3: Is the Power On/Standby LED Green?

Answer	Possible Reasons	Possible Solutions
No	Power On/Standby button has not been pressed firmly.	Firmly press the power button.
	A power supply problem exists. The power supply may not be inserted properly, it may have a damaged connector, or it may have failed.	Be sure that the power supply is undamaged and securely seated, and that the power supply backplane is securely seated.
	The server may have experienced a short.	Check for bent pins on connectors and components.
	The power button/LED assembly has failed.	Check for unseated expansion boards
	Nonvolatile RAM (NVRAM) may be corrupted.	Clear NVRAM. Refer to Appendix E for the correct switch setting.
	The system board may need to be replaced.	If these solutions do not solve the problem, contact your authorized service provider for assistance.
Yes	If the Power On/Standby LED is green when powered up, refer to Table D-4.	

Note: For LED locations and functions, refer to Appendix E, “LED Indicators and Switches.” For cabling configurations, refer to Chapter 6, “Server Cabling.”

Table D-4: Is the External Health LED Green?

Answer	Possible Reasons	Possible Solutions
No, it's amber	One power supply has failed; therefore, power supply redundancy is lost.	Identify the failed power supply (no green LED). Be sure that the power supply is undamaged and securely seated, and that the power supply backplane is securely seated. Contact your authorized service provider for replacement parts and service.
No, it's red	All installed power supplies have failed. The server may have experienced a short.	Contact your authorized service provider for replacement parts and service.
Yes	If the external health LED is green, refer to Table D-5.	

Note: For LED locations and functions, refer to Appendix E, "LED Indicators and Switches." For cabling configurations, refer to Chapter 6, "Server Cabling."

Table D-5: Is the Internal Health LED Green?

Answer	Possible Reasons	Possible Solutions
No, it's amber	A processor is in pre-failure condition. A DIMM is in pre-failure condition. One memory bank is valid, but another bank is missing a DIMM. One memory bank is valid, but another bank has mismatched DIMMs installed. One memory bank is valid, but another bank has an unsupported DIMM type installed. A memory bank has failed, and the online spare memory feature has copied information to the redundant bank. A redundant fan has failed.	Use amber failure LEDs to identify: • Missing components • Degraded components • Failed components • Improperly installed components Contact your authorized service provider for replacement parts and service.

continued

Table D-5: Is the Internal Health LED Green? *continued*

Answer	Possible Reasons	Possible Solutions
No, it's red	A processor has failed. Processor 1 is not installed. A processor is an unsupported type. Processors are mismatched (speed and/or type). A PPM has failed. A PPM is not installed. A processor or PPM is installed, but the corresponding processor or PPM is missing. A DIMM has experienced a multibit error. No valid memory in the server. Populated banks have mismatched DIMMs. No valid memory in the server. Populated banks have missing DIMMs. No valid memory in the server. Populated banks have unsupported DIMM types. Populated DIMMs are not in the correct order. A required fan has failed. An overtemperature condition has occurred.	Use amber failure LEDs to identify: • Missing components • Failed components • Improperly installed components • Overtemperature event Contact your authorized service provider for replacement parts and service.
Yes	If the internal health LED is green, refer to Table D-6.	

Note: For LED locations and functions, refer to Appendix E, "LED Indicators and Switches." For cabling configurations, refer to Chapter 6, "Server Cabling."

Table D-6: Is the Monitor Displaying Information?

Answer	Possible Reasons	Possible Solutions
No	The monitor may not have power. Video may not be connected properly. Nonvolatile RAM (NVRAM) may be corrupted. The system ROM and redundant ROM may be corrupted. The system board may need to be replaced.	Be sure that the monitor power cord is plugged in and that the monitor power button has been pressed. If a video card is installed, be sure that the video cable is properly connected. If a Remote Insight Lights-Out Edition expansion board is installed, be sure that the video cable is connected to the video connector on this expansion board. Check the video connections. Refer to the *Servers Troubleshooting Guide* for information about video problems. Clear NVRAM. Refer to Appendix E for the correct switch setting. Are there any audible indicators, such as a series of beeps? A series of beeps is the audible signal indicating the presence of a POST error message. Refer to the *Servers Troubleshooting Guide* for a complete description of each beep sequence and the corresponding error messages. If these steps do not solve the problem, contact your authorized service provider for assistance.
Yes	Video is available for diagnosis. Determine the next action by observing POST progress and error messages. Refer to the *Servers Troubleshooting Guide* for a complete description of each POST error message.	

Problems After Initial Boot

Once the server has passed POST, you may still encounter errors, such as an inability to load your operating system. Table D-7 identifies possible solutions to help you troubleshoot server installation problems that occur after the initial boot.

Refer to the *Servers Troubleshooting Guide* for more information regarding software problems.

Table D-7: Problems After Initial Boot

Problem	Possible Cause	Possible Solution
Server cannot load SmartStart.	SmartStart requirement not performed.	Check the SmartStart Release Notes provided in the SmartStart Online Reference Information on the SmartStart CD.
	The CD-ROM drive is not working.	Check the IDE signal cable and power cable that connect the CD-ROM drive to the system board for proper connection.
	Insufficient memory is available.	A rare `Insufficient Memory` message may display the **first** time SmartStart is booted on certain unconfigured servers. Simply cold-boot the machine with the SmartStart CD inserted in the CD-ROM drive to correct the problem.
	Existing software is causing conflict.	Run the System Erase Utility. Read the caution in this table. Refer to the instructions in the *Servers Troubleshooting Guide*.

continued

Table D-7: Problems After Initial Boot *continued*

Problem	Possible Cause	Possible Solution
SmartStart fails during installation.	Error occurs during installation.	Follow the error information provided. If it is necessary to reinstall, run the System Erase Utility. Read the caution in this table. Refer to the instructions in the *Servers Troubleshooting Guide*.
	CMOS is not cleared.	Run the System Erase Utility. Read the caution in this table. Refer to the instructions in the *Servers Troubleshooting Guide*.

CAUTION: The System Erase Utility causes loss of all configuration information, as well as loss of existing data on all connected hard drives. Before performing this operation, refer to the *Servers Troubleshooting Guide* for information on running the System Erase Utility.

continued

Table D-7: Problems After Initial Boot *continued*

Problem	Possible Cause	Possible Solution
Server cannot load operating system.	Required operating system step was missed.	Follow these steps: 1. Note at which phase the operating system failed. 2. Remove any loaded operating system. 3. Refer to your operating system documentation. 4. Install the operating system again.
	Installation problem occurred.	Refer to your operating system documentation and to the SmartStart Release Notes on the SmartStart CD. Run RBSU and check the **OS Selection** menu.
	Problem was encountered with the hardware you have added to the server.	Refer to the documentation provided with the hardware. Refer to Chapter 6, "Server Cabling," to identify correct SCSI cabling configuration for the server.
	Problem was encountered with hardware added to a new configure-to-order server (where available).	You must complete the factory-installed operating system software installation before adding new hardware to the server. Be sure you are following the instructions provided in the *Factory-Installed Operating System Software Installation Guide*. Remove the new hardware and complete the software installation. Then, reinstall the new hardware.

Refer to the *Servers Troubleshooting Guide* for the following:

- Information you need to collect when diagnosing software problems and to provide when contacting support
- Instructions on how to upgrade the operating system and its drivers
- Information about available recovery options and advice on minimizing downtime

ROMPaq Disaster Recovery

If both sides of the redundant ROM are corrupted, the server automatically enters the disaster recovery mode and emits three extended beeps.

To perform ROMPaq disaster recovery:

1. After hearing the three beeps, insert a ROMPaq diskette with the latest system ROM from SmartStart.

   IMPORTANT: The ROMPaq flashes both sides of the redundant ROM, and this process may take up to ten minutes.

2. Wait until the server emits three rising beeps, indicating the completion of the ROM flash process.
3. Cycle the system power.

Information Resources

Refer to the following additional information for help.

Table D-8: Troubleshooting Resources

Resource	Description
Servers Troubleshooting Guide	This is a resource for obtaining troubleshooting information that is beyond the scope of this document. It includes general hardware and software troubleshooting information for all ProLiant servers, a complete list of error messages along with explanations of probable causes, and a list of appropriate measures. This guide ships with the server.
HP ProLiant ML370 Generation 3 Server Maintenance and Service Guide	This resource provides a complete list of all replacement parts available, along with instructions on removal and replacement. Find this guide as a link on the Documentation CD or refer to www.hp.com/products/servers/platforms

For additional information on warranties and service upgrades, refer to

www.compaq.com/services/carepaq/

E

LED Indicators and Switches

This appendix provides information about locating and using system LEDs and switches on a ProLiant ML370 Generation 3 server. For additional information about troubleshooting procedures, refer to Appendix D, "Troubleshooting."

System LEDs

The server contains several sets of LEDs that indicate the status and settings of hardware components. This section discusses the following LEDs:

- Front panel
- Hot-plug SCSI hard drive
- RJ-45 connector
- iLO management port
- Unit identification (UID) LEDs and switches
- Hot-plug power supply
- Hot-plug fan
- System board

Information at the end of this section discusses the interactions between external LEDs and system board LEDs in troubleshooting or assessing system status.

Front Panel LEDs

The set of five LEDs on the front of the server indicates system health. Figure E-1 and Table E-1 identify and describe the location and function of each LED.

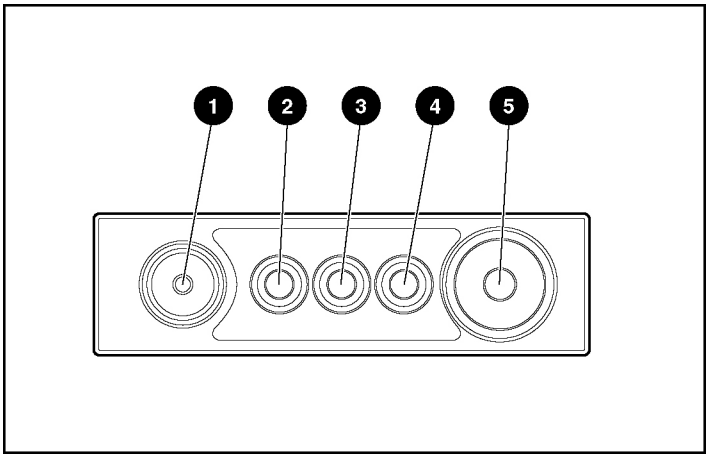

Figure E-1: Front panel LEDs

Table E-1: Front Panel LEDs

Item	Description	Status	Means
1	UID switch and LED	Blue	Activated
		Flashing blue	System being managed remotely
		Off	Deactivated
2	Internal system health LED	Green	Normal (system on)
		Amber	System degraded
		Red	System critical
		Off	Normal (system off)

continued

Table E-1: Front Panel LEDs *continued*

Item	Description	Status	Means
3	External system health (power supply) LED	Green	Normal (system powered on)
		Amber	Redundant power supply failed; system power supply no longer redundant
		Red	Critical power supply failure
		Off	Normal (system off)
4	NIC link/activity LED (embedded NIC only)	Green	Linked to network
		Flashing green	Linked and activity on the network
		Off	No network connection
5	Power On/Standby button and LED	Amber	System has AC power but is in standby mode
		Green	System has AC power and is turned on
		Off	System has no AC power

The internal health LED identifies service events for internal components in a pre-failure or failed condition. Internal components include fans, processors, PPMs, memory, and overtemperature conditions. For a list of these events, refer to Appendix D, "Troubleshooting."

Hot-Plug SCSI Hard Drive LEDs

Each hot-plug SCSI hard drive has three LEDs located on the front of the drive. They provide activity, online, and fault status for each corresponding drive when configured as a part of an array and attached to an active Smart Array Controller. LED behaviors may vary, depending on the status of other drives in the array. Figure E-2 and Tables E-2 and E-3 identify LED locations and status of each hot-plug SCSI hard drive.

CAUTION: Before removing a hard drive, refer to the *Servers Troubleshooting Guide* for information regarding hot-plug hard drive replacement guidelines.

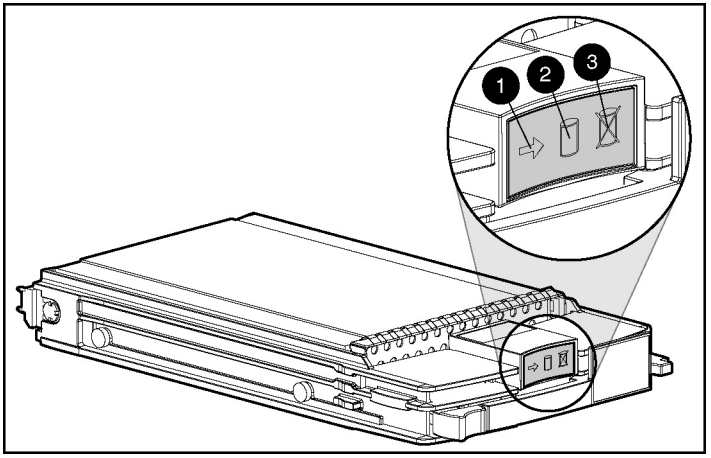

Figure E-2: Hot-plug SCSI hard drive LEDs

Table E-2: Hot-Plug SCSI Hard Drive LEDs

Item	Description	Status	Means
1	Drive activity	On	Drive activity
		Off	No drive activity
2	Online status	Flashing	Online activity
		Off	No online activity
3	Fault status	Flashing	Fault-process activity
		Off	No fault-process activity

Table E-3: Hot-Plug SCSI Hard Drive LED Combinations

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

continued

Table E-3: Hot-Plug SCSI Hard Drive LED Combinations *continued*

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

RJ-45 Connector LEDs

The RJ-45 connectors for the network interface controller (NIC) and iLO management on the server rear panel contains two LEDs. Figure E-3 and Table E-4 identify LED locations and status.

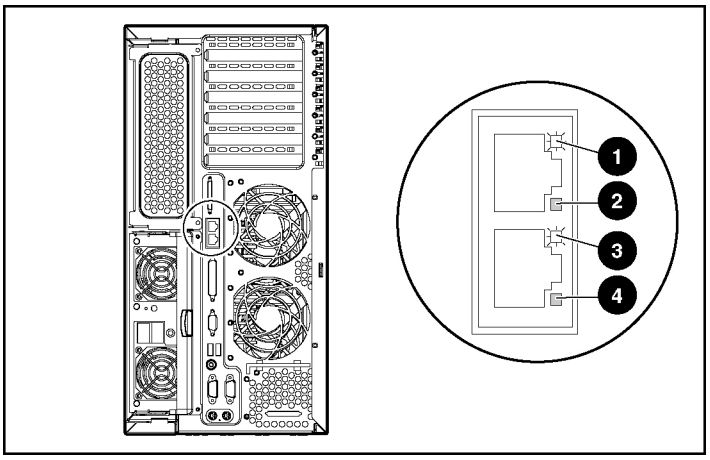

Figure E-3: RJ-45 connector LEDs

Table E-4: RJ-45 Connector LEDs

Item	LED Description	Status	Means
1	NIC activity	On or flashing	Network activity
		Off	No network activity
2	NIC link	On	Linked to network
		Off	No network link
3	iLO activity	On or flashing	Network activity
		Off	No network activity
4	iLO link	On	Linked to network
		Off	No network link

Unit Identification LEDs

The server includes unit identification (UID) LEDs with switches on both the front and rear panels. The UID LEDs indicate activity status and can be toggled on and off by the hardware push button or Insight Manager 7.

The rear UID LED provides a visual reference for locating an individual server in a rack of servers. The rear UID contains an integrated button to activate or deactivate the LED.

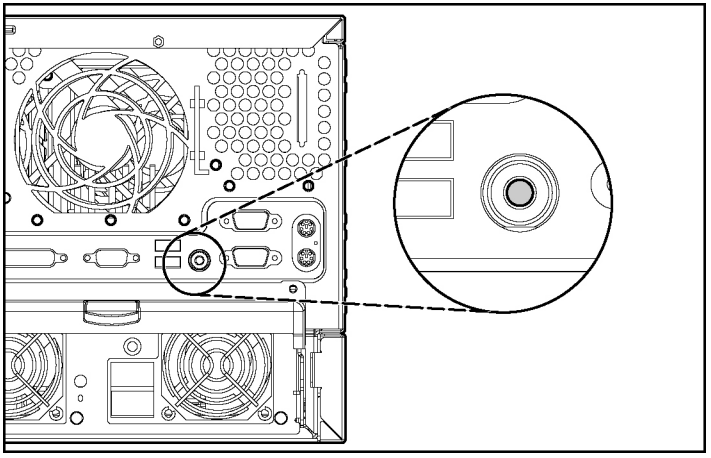

Figure E-4: Rear UID LED and switch (rack model)

The rear UID LED indicates the following states:

- Blue = The switch is activated.
- Blue flashing = The system is being monitored remotely.
- Off = The switch is deactivated.

NOTE: You can activate and deactivate the UID LED from either the front or rear UID switch.

Hot-Plug Power Supply LEDs

Determine the hot-plug power supply status by noting the color of the power supply LED located adjacent to the AC inlet.

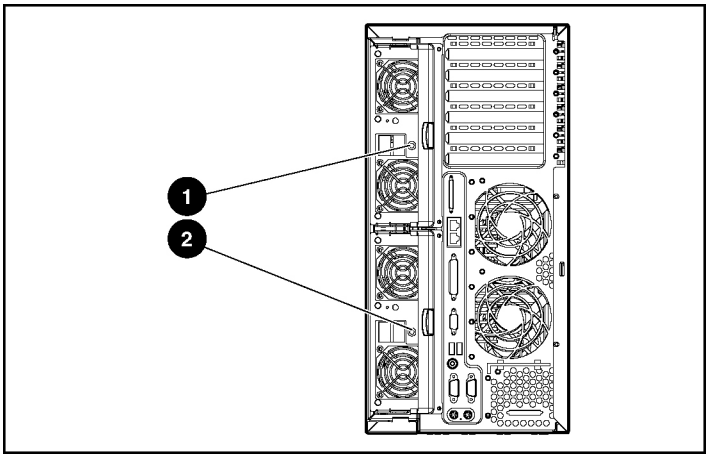

Figure E-5: Hot-plug power supply LEDs

Table E-5: Hot-Plug Power Supply LEDs

Item	Description
1	Secondary (redundant) power supply
2	Primary power supply

When the power supply LED is off, the following conditions may exist:

- No AC power is available.
- The power supply has failed.
- The power supply is in standby mode.
- The power supply has exceeded the current limit.

When the power supply LED is green, power is applied and the power supply is functioning properly.

Hot-Plug Fan LEDs

Each hot-plug fan contains a dual-color LED.

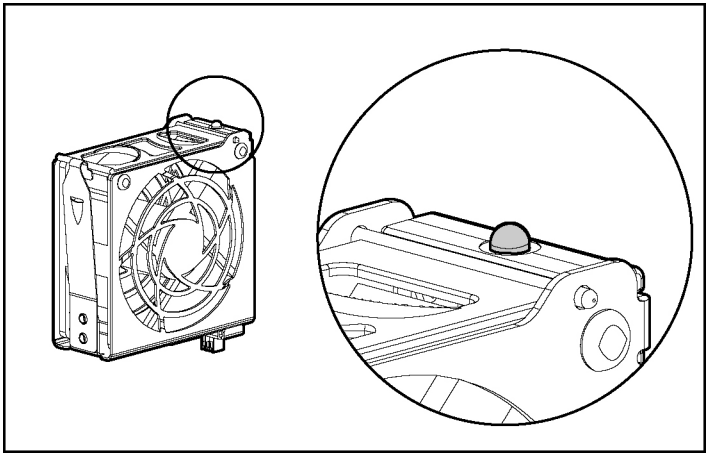

Figure E-6: Hot-plug fan LEDs

The hot-plug fan LED indicates the following conditions:

- Green = The fan is operating normally.
- Amber = The fan has failed.
- Off = The fan is not powered up or is not seated.

System Board LEDs

Several LEDs are located on the system board:

- Processor status
- PPM status
- Memory status
- System overtemperature
- Online spare configuration status

Figure E-7 and Table E-6 identify system board LED locations and status indications.

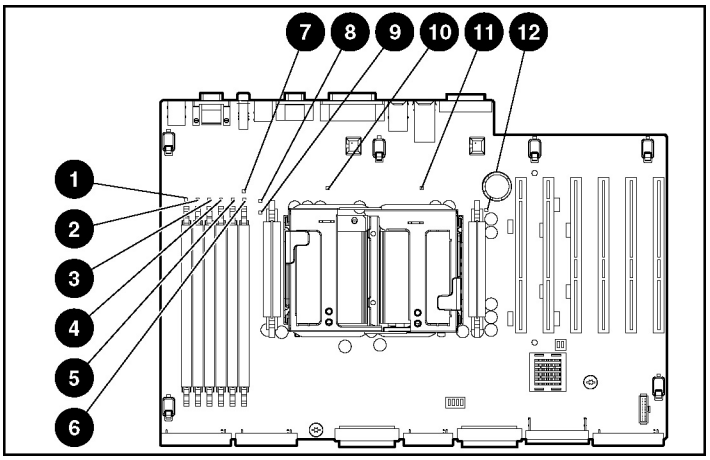

Figure E-7: System board LEDs

Table E-6: System Board LEDs

Item	Description	Status
1	Memory status 1A	Amber = Memory failed
2	Memory status 2A	Off = Normal
3	Memory status 3B	
4	Memory status 4B	
5	Memory status 5C	
6	Memory status 6C	
7	System overtemperature	Amber = System overtemperature event
		Off = Normal

continued

Table E-6: System Board LEDs *continued*

Item	Description	Status
8	Online spare configuration status	Green = Online spare memory feature enabled. System working normally in online spare memory mode. Amber = Working in fail-over mode with online spare memory Off = Normal memory operation. Online spare memory feature not being used.
9	PPM 2	Amber = Processor or PPM failed Off = Normal
10	Processor 2	
11	Processor 1	
12	PPM 1	

System Board LEDs and Internal Health LED Status Combinations

When the internal health LED on the front panel illuminates either amber or red, the server is experiencing a health event. The combinations of illuminated system board LEDs and the internal health LED in Table E-7 indicate system status.

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

The internal system health LEDs on the front panel indicate the current hardware status and are used to assist in initial troubleshooting. Note that in some situations, Insight Manager 7 reports server status differently than the health LEDs because it tracks more system attributes.

Table E-7: System Board LEDs and Internal Health LED Status Combinations

System LED and Status	Internal Health LED Status	Means
Processor failure, socket *X* (amber)	Red	• Processor in socket *X* has failed. • Processor has failed over to offline spare, if the second processor is installed. • Processor is not installed in socket *X*. • ROM detects a failed processor during POST.
	Amber	Processor in socket *X* is in pre-failure condition.
Processor failure, both sockets (amber)	Red	• Processor types do not match. • Processor is not installed, but the corresponding PPM is installed.
PPM failure, slot *X* (amber)	Red	• PPM in slot *X* has failed. • PPM *X* is not installed. • PPM is not installed, 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 has reached single-bit correctable error threshold. • DIMM in slot *X* is in pre-failure condition.

continued

Table E-7: System Board LEDs and Internal Health LED Status Combinations
continued

System LED and Status	Internal Health LED Status	Means
DIMM failure, all slots in one bank (amber)	Red	Interleaving error: 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 overtemperature (amber)	Red	System has exceeded OS cautionary level or critical hardware level.
Fan (amber)	Red	A required fan has failed.
	Amber	A redundant fan has failed.
Power supply (off)	Red	Primary power supply or both power supplies have failed.
	Amber	Secondary power supply has failed.

System Board Switches

Some server operations, including adding or removing a component, changing a security feature, or reconfiguring the server from tower to rack, require that you reconfigure a system switch. If the system configuration is incorrect, the server may not work properly and you may receive error messages on the screen.

This section discusses the following system board switches:

- System maintenance
- System identification

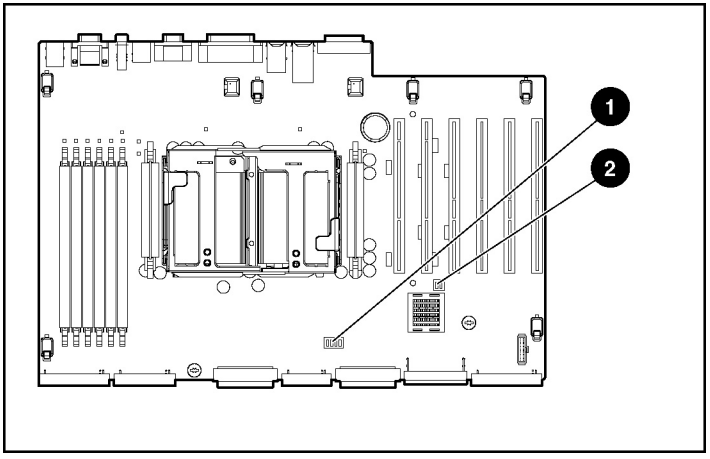

Figure E-8: System board switches

Table E-8: System Board Switches

Item	Description
1	System maintenance switch (SW1)
2	System identification switch (SW2)

System Maintenance Switch

The system maintenance switch (SW1) is a six-position switch that is used for system configuration. The default setting for all six positions is Off. For the proper system maintenance switch settings, refer to Table E-9.

Table E-9: System Maintenance Switch (SW1)

Position	Description	Settings
1	iLO security	Off = iLO security enabled. On = iLO security disabled
2	Configuration lock	Off = System configuration can be changed. On = System configuration is locked and cannot be modified.
3	Rack mount indicator	Off = System is in a tower configuration. On = System is in a rack-mounted configuration.
4	Enable diskette boot	Off = Booting from diskette is controlled by RBSU. On = Booting from diskette is enabled and RBSU setting is overridden.
5	Password disable	Off = Power-on password works normally. On = Power-on password is disabled.
6	Invalidate configuration	Off = Normal On = ROM treats system configuration as invalid.

System Identification Switch

The system identification switch (SW2) is a three-position switch that identifies the operational configuration of the server. This switch is set to the correct configuration for the server by default. Table E-10 identifies switch settings and positions.

CAUTION: Do not alter the default setting for the server. Doing so causes improper server operation.

Table E-10: System Identification Switch (SW2)

Position	Description	Settings for 2.4-GHz and 2.8-GHz models	Settings for 3.06-GHz and above models
1	ID0	Off	Off
2	ID1	Off	Off
3	ID2	Off	On

System Configuration Settings

It may be necessary at some time to clear and reset system configuration settings. 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. For additional information about locating the switch and switch settings, refer to "System Maintenance Switch" in this appendix. The default setting for all positions is Off.

IMPORTANT: Clearing CMOS and/or (NVRAM) deletes configuration information. Refer to Chapter 7, "Server Configuration and Utilities," for complete instructions on configuring the server.

To erase all system configuration settings:

1. Power down the server.
2. Remove the access panel.

3. Set the position 6 lever to the On position.
4. Power up the server.

   All configuration settings are now erased and all system operations halt.
5. Power down the server.
6. Reset the position 6 lever to the default Off position.
7. Power up the server.
8. Press the **F9** key to run RBSU and reset all system configuration settings.

   NOTE: For instructions on using RBSU to reset system configuration settings, refer to Chapter 7, "Server Configuration and Utilities."

ROMPaq Disaster Recovery Mode

A corrupted system ROM requires that you recreate the ROM BIOS by a process called flashing the ROM. This operation can be accomplished only when the system is in disaster recovery (emergency repair boot) mode. When both system ROMs are corrupt, the system defaults into disaster recovery mode automatically. Proceed by following the instructions displayed on a monitor or event log.

IMPORTANT: Before performing this operation, refer to the *Servers Troubleshooting Guide* for complete instructions on disaster recovery.

F

Server Specifications

Server Specifications

This appendix provides operating and performance specifications for tower and rack models of the ProLiant ML370 Generation 3 server, including:

- Server specifications
  - — Dimensions
  - — Power requirements
  - — Temperature requirements
- Minimum hardware configuration
- Supported operating systems
- Drivers

Table F-1: Server Specifications

Dimensions	Tower model	Rack model
Height (with feet)	46.88 cm (18.46 in)	N/A
Height (without feet)	44.45 cm (17.50 in)	22.07 cm (8.69 in)
Depth (without bezel)	63.50 cm (25.00 in)	65.43 cm (25.75 in)
Depth (with bezel)	71.12 cm (28.00 in)	N/A
Width	22.07 cm (8.69 in)	48.26 cm (19.0 in)
Weight (with no drives installed)	33.95 kg (74.70 lb)	33.39 kg (73.46 lb)
Input requirements		
Rated input voltage	90 to 264 VAC	
Rated input frequency	47 to 63 Hz	
Rated input current	7.3 A (110 V) to 3.6 A (220 V)	
Rated input power	800 W	
BTUs per hour	2732	
Power supply output		
Rated steady-state power	500 W	
Maximum peak power	550 W for 2 minutes	
Temperature range *		
Operating	5° to 35°C (41° to 95°F)	
Shipping	-40° to 85°C (-40° to 185°F)	
Maximum wet bulb temperature	38.7°C (101.7°F)	
Relative humidity (noncondensing)		
Operating	5% to 95%	
Non-operating	5% to 95%	

***** All temperature ratings shown are for sea level. There is an altitude derating of 1°C per 300 m (1.8°F per 1,000 ft to 10,000 ft).

Minimum Hardware Configuration

Be sure that the server meets the requirements for minimum hardware configuration. During the troubleshooting process, it may be necessary to reduce your system to its minimum configuration, reinstalling options one at a time to determine the cause of failure.

Table F-2: Minimum Hardware Configuration

Component	Minimum Specifications
Processors and PPMs	Processor socket 1 and PPM slot 1 must be populated.
Fans	Fan connectors 1, 3, and 5 must be populated and the fan cable must be connected to the system board.
Memory *	DIMM slots 1A and 2A must be populated with identical ECC Registered DDR DIMMs.

***** The maximum memory configuration is six 2-GB DIMMs.

For related information, refer to the *HP ProLiant ML370 Generation 3 Server Maintenance and Service Guide* or refer to

www.hp.com/products/servers/platforms

Supported Operating Systems

To operate properly, the server must have a supported operating system. For updated information on supported operating systems, refer to

www.hp.com/products/servers/platforms

For the latest information on Linux operating system versions and support, refer to

www.compaq.com/products/software/linux

CAUTION: If the server has a factory-installed operating system, configure the server using the instructions in the *HP Factory-Installed Operating System Software Installation Guide* or data will be lost.

Drivers

The server features new hardware that does not have driver support on all operating system installation media. It is recommended that you use SmartStart and its Assisted Path feature to install your operating system and the latest driver support. If you do not use SmartStart to install your operating system, drivers for some of the new hardware are required. For these drivers, as well as other option drivers, ROM images, and value-add software, refer to

www.hp.com/servers/manage

For more information on maintaining current drivers, refer to the *Servers Troubleshooting Guide*.

G

System Battery

ProLiant ML370 Generation 3 servers have a memory function that requires a battery for retaining stored information.

System Board Battery Replacement

When 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 usually about five to ten years. Use a 540-milliampere, lithium, 3-volt replacement battery (P/N 179322-001).

To install a new battery:

1. If the server is on, remove power from the system. Refer to "Preparing the Server" in Chapter 3.

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.

WARNING: To reduce the risk of electric shock or damage to the equipment when removing power from the server, unplug the power cord from either the electrical outlet or the server or other product. If there is more than one power cord, all cords must be unplugged before all power is removed from the server.

2. Remove the access panel. Refer to "Removing the Access Panel" in Chapter 3.

3. Locate the system battery on the system board.

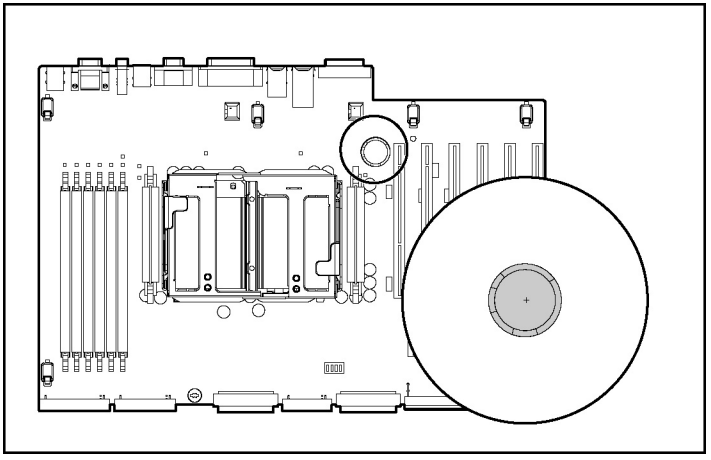

Figure G-1: Locating the system battery

4. Remove the existing battery.

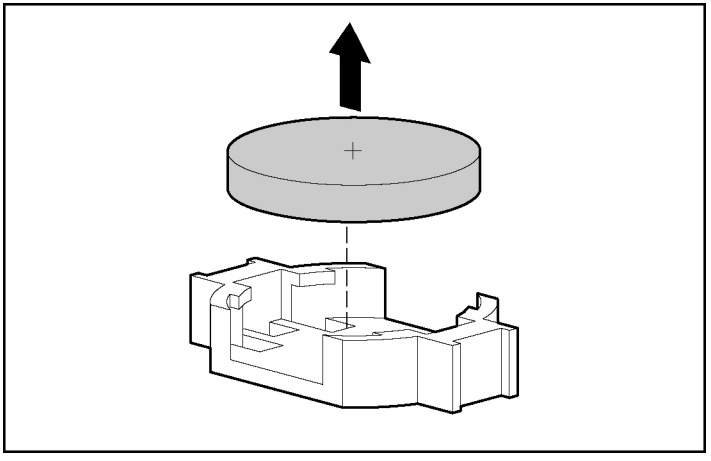

Figure G-2: Removing the battery

5. Install the new battery.

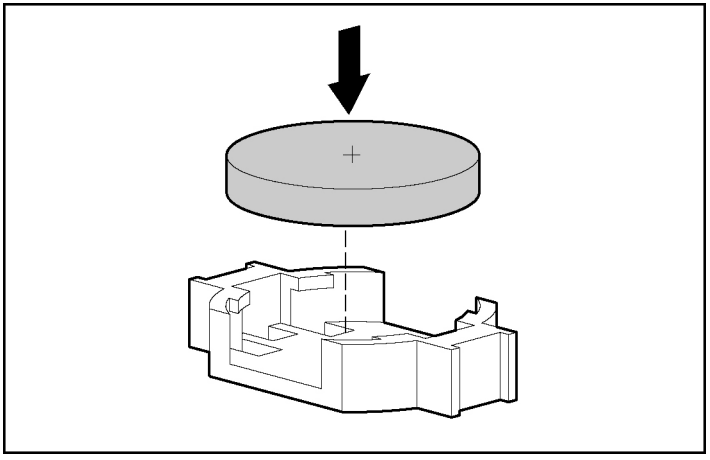

Figure G-3: Installing the battery

6. Install the access panel. Refer to Chapter 3, "Installing Hardware Options."
7. Reconnect the power cord and peripheral devices. Refer to "Connecting the Power Cord and Peripheral Devices" in Chapter 4 or in Chapter 5, "Installing the Tower Server."
8. Power up the server. Refer to "Powering Up the Server" in Chapter 4 or in Chapter 5, "Installing the Tower Server."
9. Run the System Configuration Utility to reconfigure the system with the new battery. Refer to Chapter 7, "Server Configuration and Utilities."

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