# Compaq ProLiant ML350 Generation 2 Server

## Maintenance and Service Guide

Part Number 236634-002
Spare Part Number 250840-001

May 2002 (Second Edition)

This document provides detailed instructions for maintenance and service personnel. It includes removal and replacement procedures, spare parts information and an overview of diagnostic tools for the Compaq ProLiant ML350 Generation 2 server.

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# Contents

# About This Guide

This maintenance and service guide can be used for reference when servicing Compaq ProLiant ML350 Generation 2 servers.

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

## 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 clarifying information or specific instructions.

**NOTE:** Text set off in this manner presents commentary, sidelights, or interesting points of information.

## ⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

## Compaq Technician Notes

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

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

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

- **Disconnect power from the system by unplugging all power cords from the power supplies.**
- **Do not disable the power cord grounding plug. The grounding plug is an important safety feature.**
- **Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.**

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

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

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

# Where to Go for Additional Help

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

- User documentation
- *Compaq Service Quick Reference Guide*
- Service training guides
- Compaq service advisories and bulletins
- Compaq *QuickFind*™ information services
- Compaq Insight Manager software

For additional copies, visit the Compaq website:

www.compaq.com

## Integrated Management Log

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

## Telephone Numbers

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For Compaq technical support:

- In the United States and Canada, call 1-800-OK COMPAQ.
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website:

  www.compaq.com

# Text Conventions

This document uses the following conventions:

- *Italic type* is used for complete titles of published guides or variables. Variables include information that varies in system output, in command lines, and in command parameters in text.
- **Bold type** is used for emphasis, for onscreen interface components (window titles, menu names and selections, button and icon names, and so on), and for keyboard keys.

- `Monospace typeface` is used for command lines, code examples, screen displays, error messages, and user input.
- Sans serif typeface is used for uniform resource locators (URLs).

# 1

# Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and spare parts lists for the Compaq *ProLiant*™ ML350 Generation 2 server. See Table 1-1, Mechanical Spare Parts List, and Table 1-2, System Components Spare Parts List, for the names of referenced spare parts.

# Mechanical Parts Exploded View

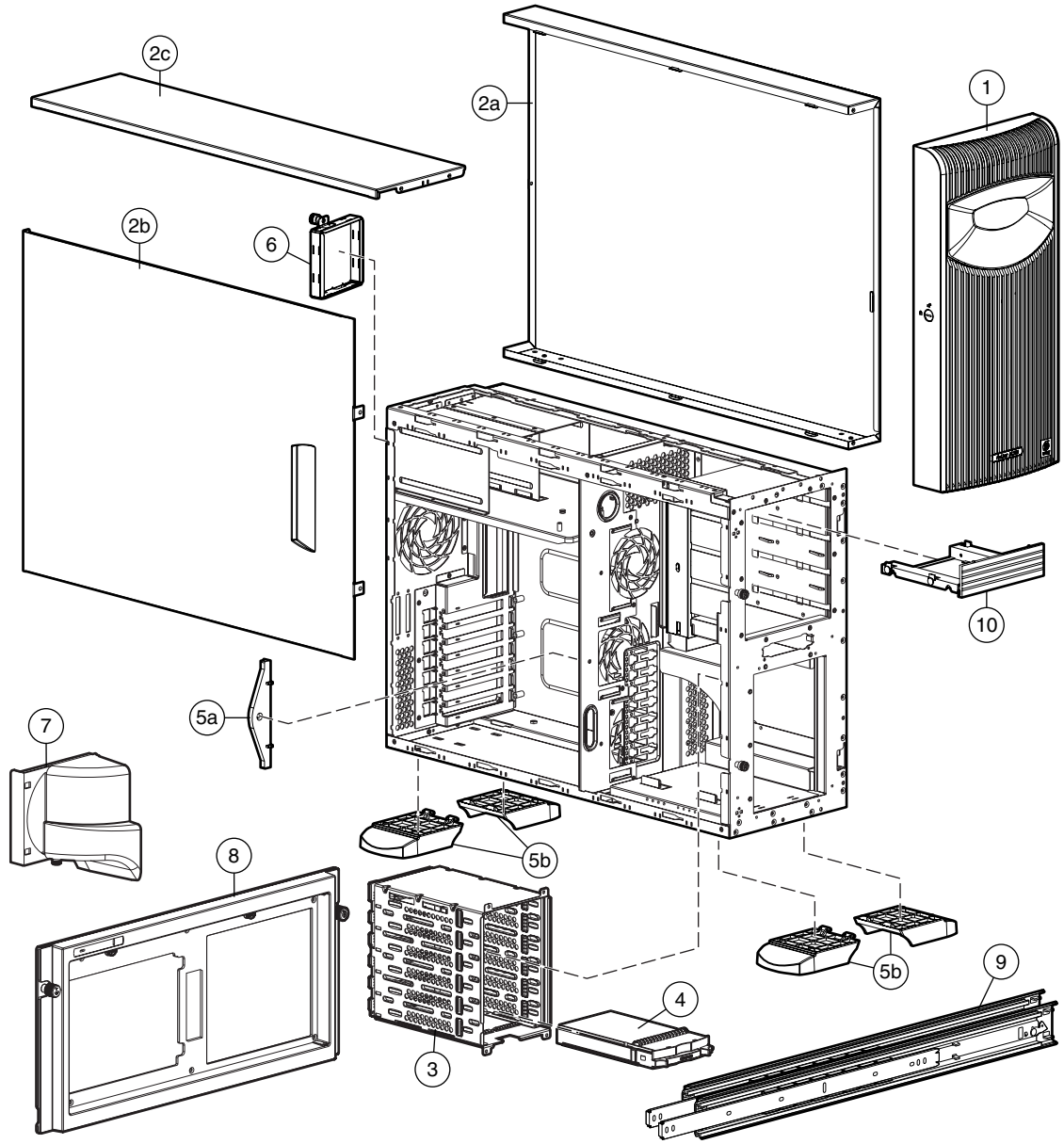


**Figure 1-1: Mechanical parts exploded view**

# Mechanical Spare Parts List

**Table 1-1: Mechanical Spare Parts List**

| Item | Description | Spare Part Number |
|---|---|---|
| | **Chassis** | |
| 1 | Bezel door (tower model only) | 249927-001 |
| 2 | Cover kit | 216104-001 |
| | a) Hood panel (tower model only) | |
| | b) Access panel | |
| | c) Top panel | |
| 3 | Hot-plug hard drive cage | 230995-001 |
| 4 | Hot-plug hard drive blank | 122759-001 |
| 5 | Miscellaneous plastics kit | 250843-001 |
| | a) Expansion board retainer | |
| | b) Feet (4) (tower model only) | |
| | c) Expansion board guide* | |
| | d) Retainer clips* | |
| | e) Power supply backplane board cover (shown in Figure 1-2) | |
| 6 | Power supply blank | 249923-001 |
| 7 | Air baffle | 251235-001 |
| 8 | Front faceplate and bezel (rack model only) | 249928-001 |
| 9 | Rackmount hardware kit with rails | 134699-001 |
| 10 | Removable media device blank | 231212-001 |

*Not shown

# System Components Exploded View

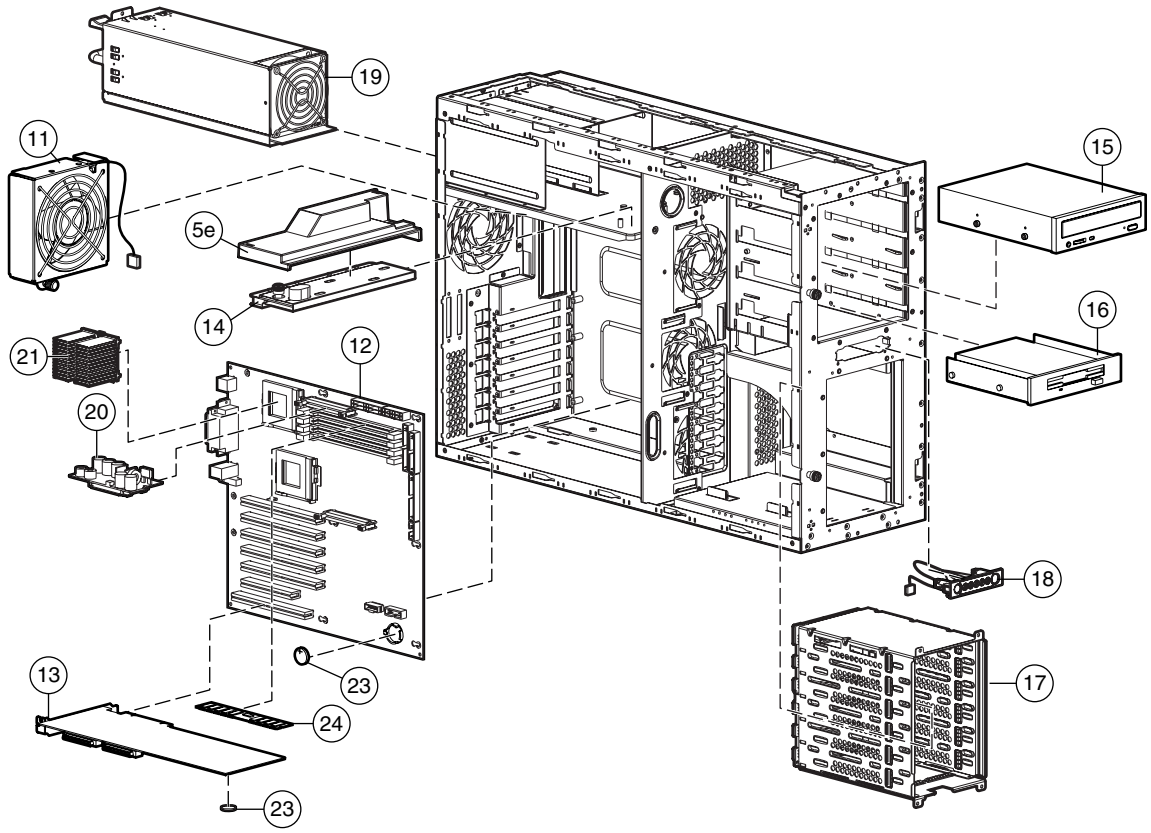


**Figure 1-2: System components exploded view**

# System Components Spare Parts List

**Table 1-2: System Components Spare Parts List**

| Item | Description | Spare Part Number |
|---|---|---|
| 5e | Power supply backplane board cover (part of plastics kit) | 250843-001 |
| 11 | System fan module | 249925-001 |
| | **Boards** | |
| 12 | System board | 249930-001 |
| 13 | Server Feature Board | 249933-001 |
| 14 | Power supply backplane board | 249924-001 |
| | **Mass Storage Devices** | |
| 15 | IDE CD-ROM drive | 233408-001 |
| 16 | Diskette drive | 233409-001 |
| 17 | Hot-plug hard drive cage | 230995-001 |
| | **Power** | |
| 18 | Power switch assembly | 249926-001 |
| 19 | 350-watt power supply with power factor correction (hot-pluggable) | 249687-001 |
| 20 | Processor Power Module (PPM) | 228506-001 |
| | **Options** | |
| 21 | Processor with Heatsink | |
| | a) Intel Pentium III 1.13-GHz/133-MHz processor* | 239324-001 |
| | b) Intel Pentium III 1.26-GHz/133-MHz processor* | 230991-001 |
| | c) Intel Pentium III 1.40-GHz/133-MHz processor* | 259594-001 |
| 23 | CR2032 lithium battery for system board and Server Feature Board | 234556-001 |
| 24 | Memory | |
| | a) PC 133-MHz ECC Registered SDRAM DIMM, 128-MB* | 159226-001 |
| | b) PC 133-MHz ECC Registered SDRAM DIMM, 256-MB* | 159304-001 |
| | c) PC 133-MHz ECC Registered SDRAM DIMM, 512-MB* | 159227-001 |
| | d) PC 133-MHz ECC Registered SDRAM DIMM, 1-GB* | 163902-001 |

*Not shown

*continued*

**Table 1-2: System Components Spare Parts List** *continued*

| Item | Description | Spare Part Number |
|---|---|---|
| | **Miscellaneous** | |
| 28 | Enhanced keyboard (carbon)* | 244000-001 |
| 29 | Signal cable kits* | 163353-001 |
| | a) IDE ribbon cable assembly | |
| | b) Diskette drive cable assembly | |
| | c) Removable media device SCSI cable | |
| 30 | SCSI LVD cable* | 249931-001 |
| 31 | Return kit (tower model only)* | 249929-001 |
| 32 | Return kit (rack model only)* | 250189-001 |
| 33 | Country kit* | 249932-001 |
| 34 | Tower-to-rack conversion kit* | 250841-001 |
| 35 | Maintenance and service guide* | 250840-001 |
| *Not shown | | |

# 2

# Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the Compaq ProLiant ML350 Generation 2 server. Run the diagnostics program to be sure that all components operate properly.

To service the server, you may need a Torx T-15 screwdriver.

# Electrostatic Discharge Information

An electrostatic discharge (ESD) can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface, and properly grounded (earthed) tools and equipment.
- Keep work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Make sure that you are always properly grounded (earthed) when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives with the Printed Circuit Board (PCB) assembly-side down.
- Use conductive field service tools.

# Symbols on Equipment

These symbols may be located on equipment in areas where hazardous conditions may exist.

**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.**

# Preparation Procedures

**WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.**

**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to "Electrostatic Discharge Information" earlier in this chapter for more information.

Before removing any serviceable parts, determine whether the part is hot-pluggable or non-hot-pluggable.

## Non-Hot-Pluggable Device

If the device is non-hot-pluggable, the server must be powered down. Non-hot-pluggable devices in the server include the processor, all boards, memory modules, fans, and drive cages.

## Powering Down the Server

System power in the server does not completely power down when the front panel power button is pressed. The button toggles between on and standby, rather than on and off. The standby position removes power from most electronics and the drives, but some internal circuitry remains active. To completely remove all power from the system, you must disconnect all power cords from the server.

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

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

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

**CAUTION:** The server must always be operated with system unit covers on. Proper cooling is not achieved when the system unit covers are removed.

To power down the server:

1. Press the power button to toggle to standby. This places the server in standby mode, thereby disabling the main power supply output and providing auxiliary power to the server. Standby does not completely disable or remove power from the system.

2. Be sure that the system LED closest to the right on the front panel is amber and that the fan noise has stopped.
3. Disconnect the AC power cord from the AC outlet, and then from the server.
4. Disconnect all external peripheral devices from the server.

## Rack Stability Warning

For stability and safety, properly positioning the server is critical.

**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 connected 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.**

# Bezel Door (Tower)

To remove the bezel door:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. If the keylock is locked, unlock the bezel door using the included key (1).
3. Open the bezel door fully to the right (2).
4. Lift the bezel door, and then pull it away from the chassis (3).

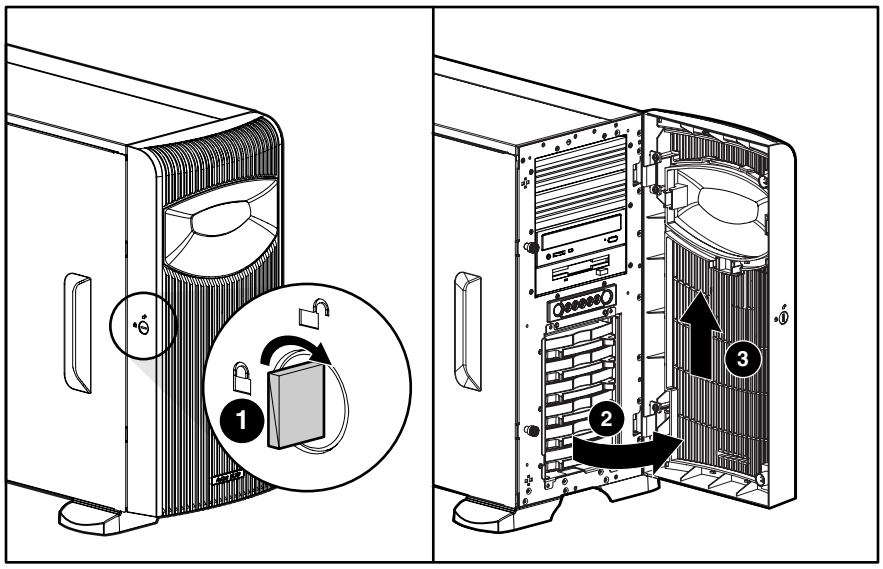


**Figure 2-1: Removing the bezel door (tower model)**

To replace the bezel door, reverse steps 3 and 4.

# Bezel (Rack)

To remove the bezel:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Loosen the two thumbscrews securing the rack bezel to the chassis (1).
3. Pull the bezel up, and then pull the bezel away from the chassis (2).

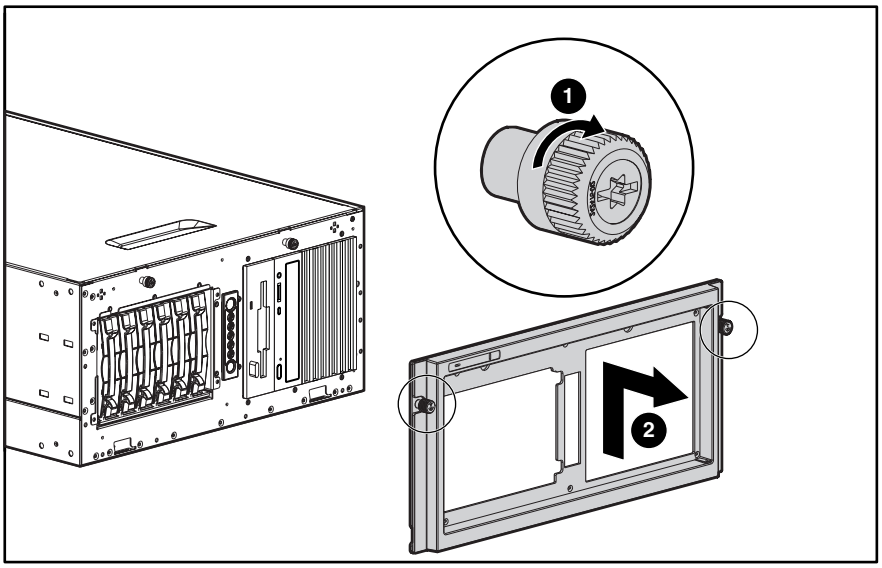


**Figure 2-2: Removing the bezel door (rack model)**

To replace the bezel door, reverse steps 2 and 3.

# Access Panel

To remove the access panel:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door fully to the right. Refer to "Bezel Door" earlier in this chapter.
3. Loosen the two thumbscrews located on the left of the front chassis (1).
4. Slide back the access panel about 1.5 cm (0.5 inch), then lift and remove the panel (2).

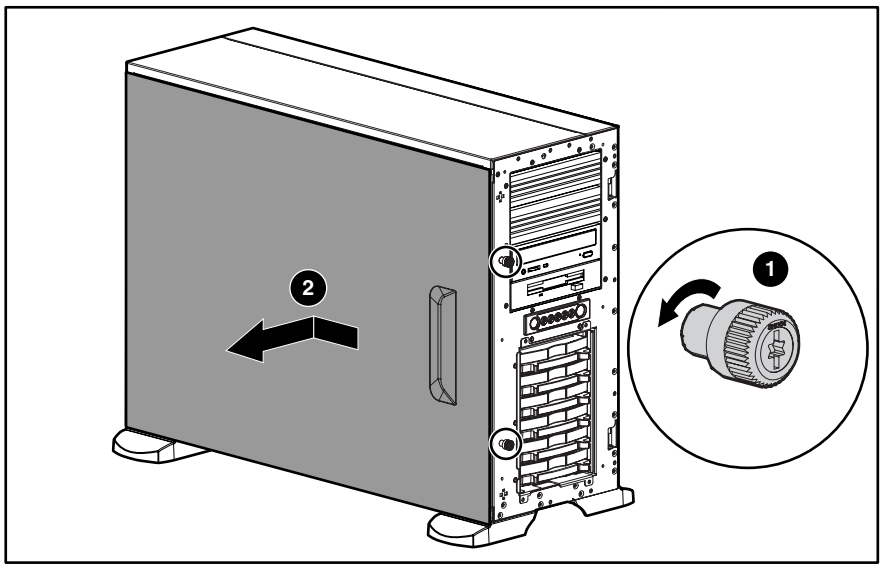


**Figure 2-3: Removing the access panel**

To replace the access panel, reverse steps 2 through 4.

# Removable Media Device Blank

**IMPORTANT:** To install a removable media device or a hard drive for the first time, the removable media device blank must be removed from an available removable media bay.

To remove a removable media device blank from the front chassis:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Push up on the drivelock to release the blanks (1).
5. Gently pull the appropriate blank completely out from the front of the chassis (2).

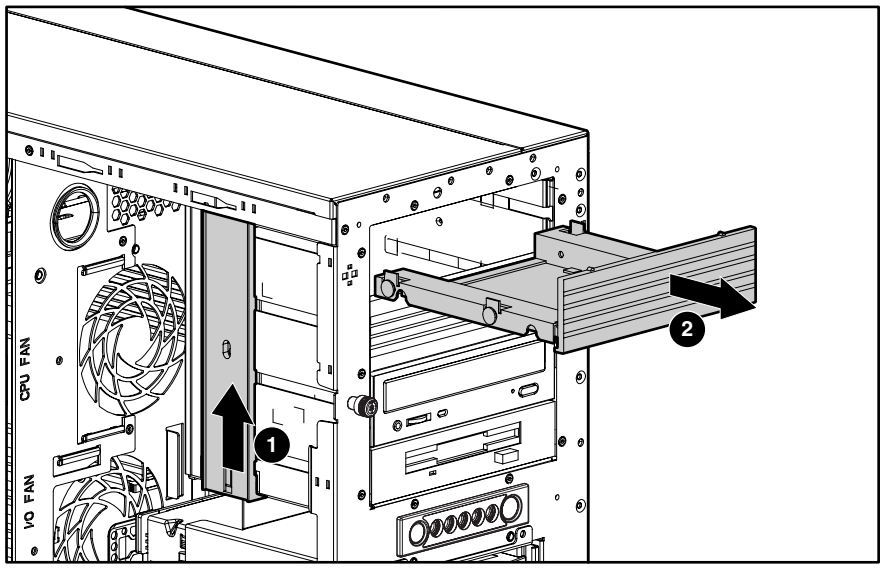


**Figure 2-4: Removing the media device blank**

To replace the media device blank, reverse steps 2 through 5.

# Cable Routing Diagrams

Figure 2-5 through Figure 2-8 illustrate the cable routing for the server.

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

## Diskette Drive Signal Cable

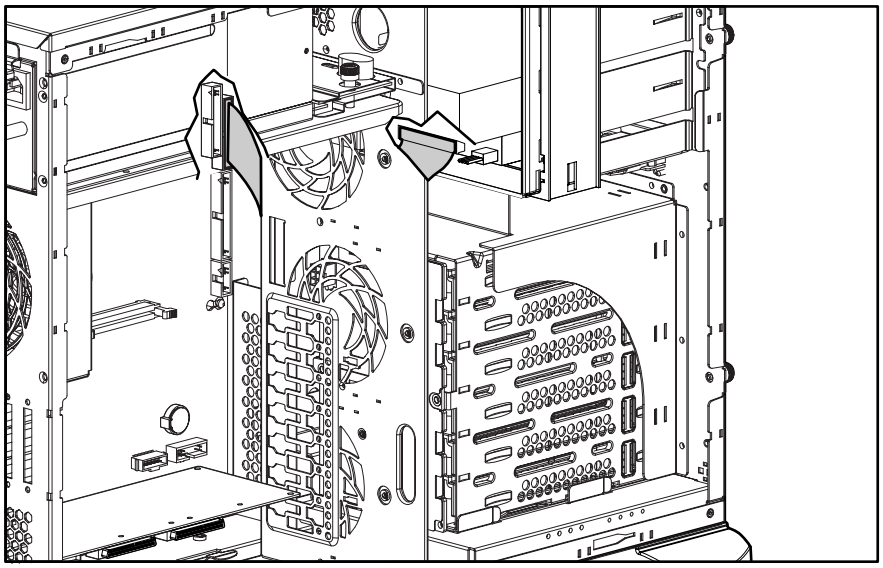

**Figure 2-5: Diskette drive signal cable routing**

## IDE CD-ROM Drive Signal Cable

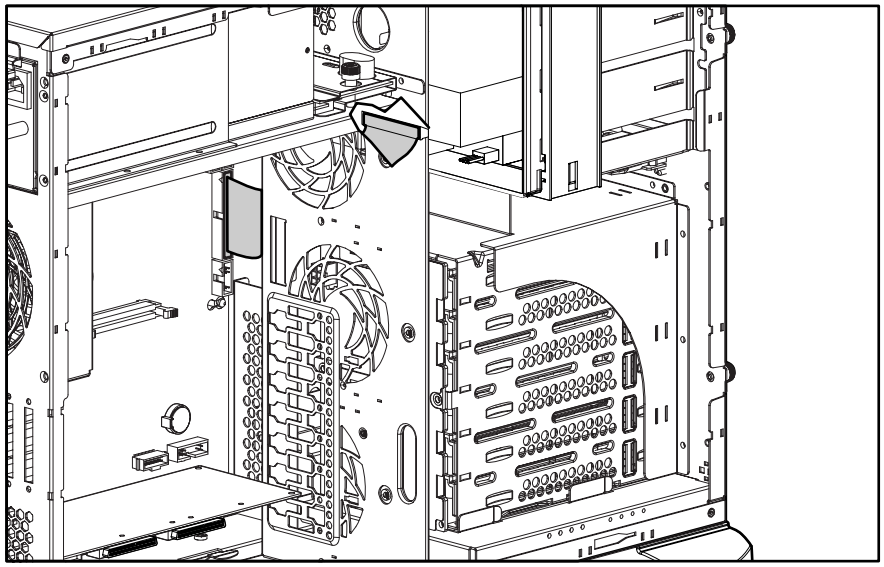

**Figure 2-6: IDE CD-ROM drive signal cable routing**

## Removable Media Device Cable

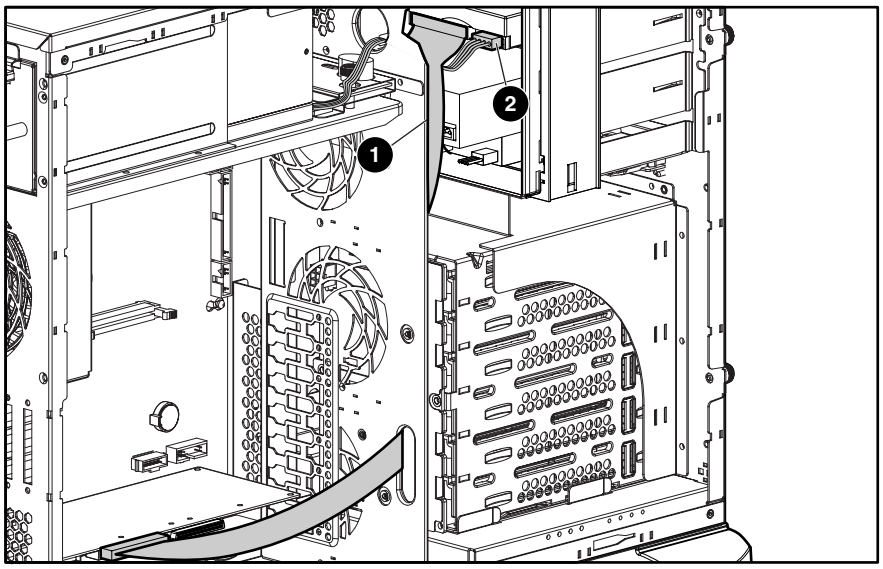


**Figure 2-7: Removable media device cable routing**

**Table 2-1: Removable Media Device Cable Routing**

| Item | Description |
|---|---|
| 1 | Signal cable |
| 2 | Power cable |

## SCSI LVD Cable

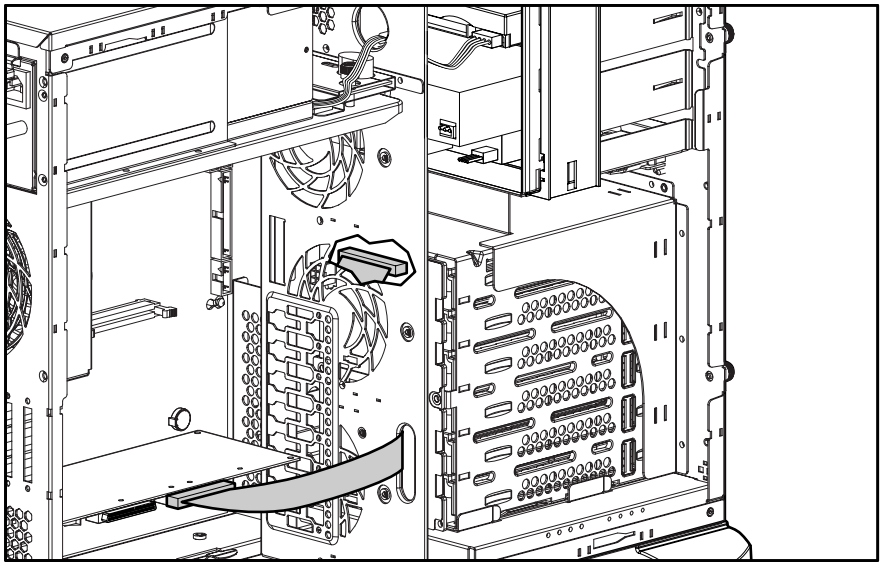

**Figure 2-8: SCSI LVD cable routing**

# Air Baffle

To remove the air baffle:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Loosen the thumbscrew that secures the air baffle to the server chassis (1).
5. Pull the air baffle out of the server (2).

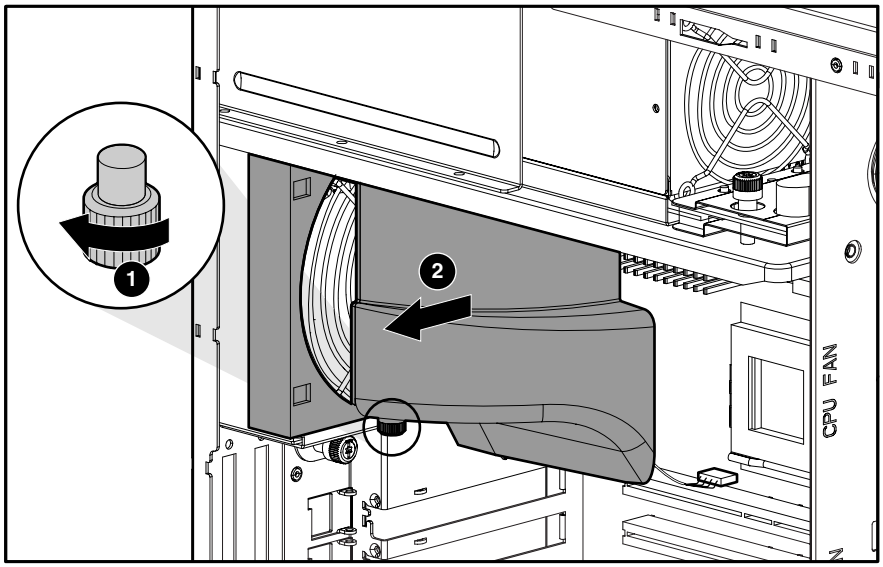


**Figure 2-9: Removing the air baffle**

To replace the air baffle, reverse steps 2 through 5.

# System Fan Module

To remove the system fan module:

1. Complete the preparation procedures. Refer to “Preparation Procedures” earlier in this chapter.
2. Open the bezel door. Refer to “Bezel Door” earlier in this chapter.
3. Remove the access panel. Refer to “Access Panel” earlier in this chapter.
4. Remove the air baffle. Refer to “Air Baffle” earlier in this chapter.
5. Disconnect the fan cable from the system board.

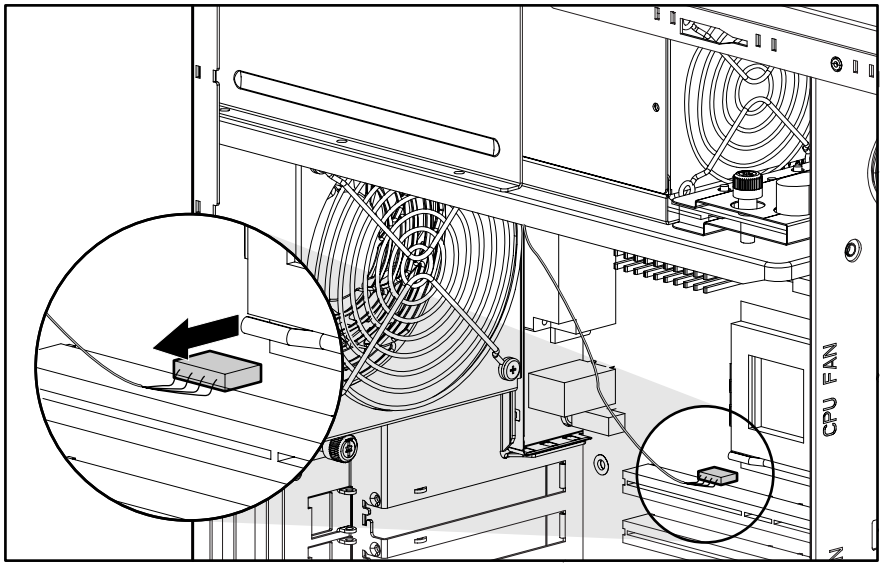


**Figure 2-10: Disconnecting the fan cable from the system board**

6. Loosen the thumbscrew securing the system fan module to the chassis (1).
7. Gently pull the system fan module out and away from the chassis (2).

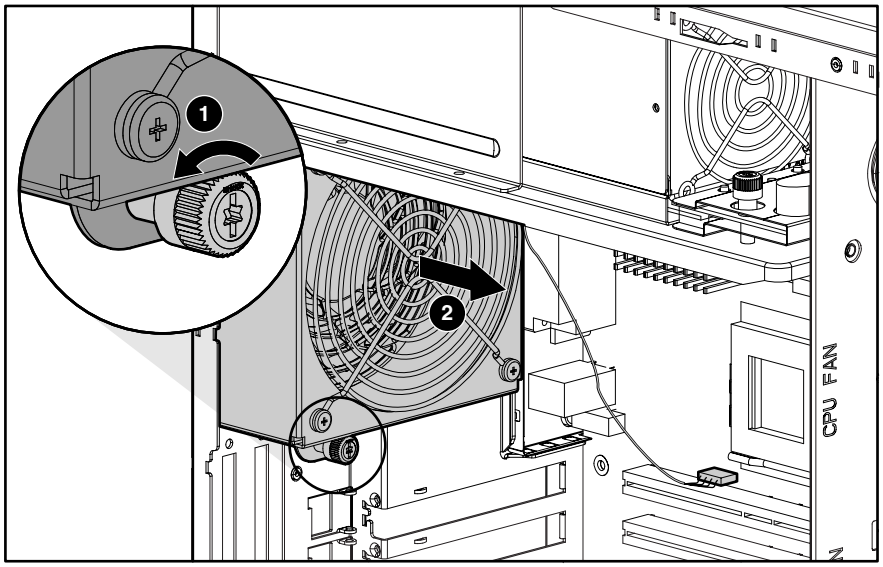


**Figure 2-11: Removing the system fan module**

To replace the system fan module, reverse steps 2 through 7.

# Drive Bay Configuration

The server supports a maximum of ten internal drive bays (four are for removable media devices, six are for hot-plug hard drives). The removable media device bays contain a one-third height, 1.44-MB diskette drive; a one-half height IDE CD-ROM drive; and two half-height open bays. The open bays can be used for a DVD-ROM drive, tape drives, non-hot-plug hard drives, or any SCSI device, including a DLT tape drive that occupies both open bay slots (Figure 2-12 and Table 2-2 show and describe the various drive bay components).

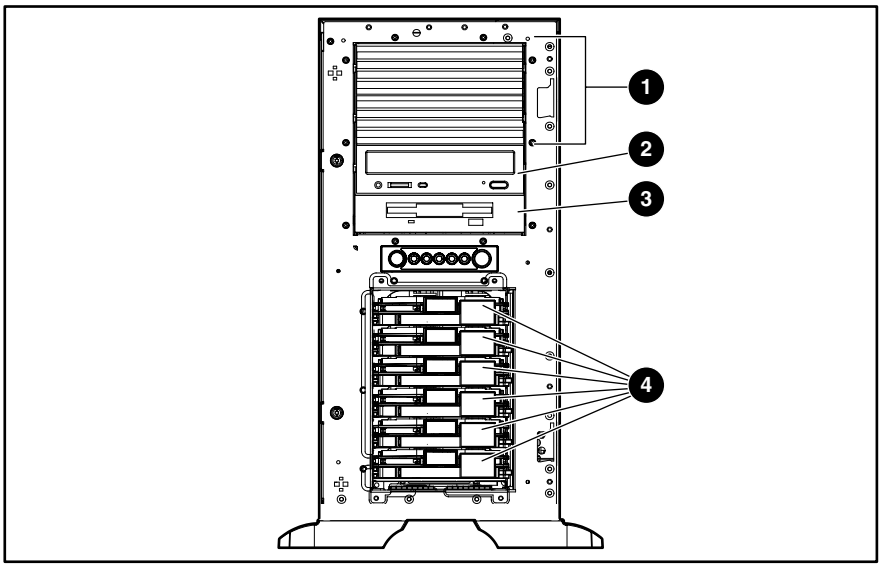


**Figure 2-12: Server drive bay configuration**

**Table 2-2: Drive Bay Configuration**

| Item | Description |
|---|---|
| 1 | Removable media device bays |
| 2 | CD-ROM drive |
| 3 | 1.44-MB diskette drive |
| 4 | Hot-plug hard drive bays |

# Hot-Plug Hard Drive Blank

To remove a hot-plug hard drive blank:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Slide the release latch to the left (1), then pull the drive blank out of the drive bay (2).

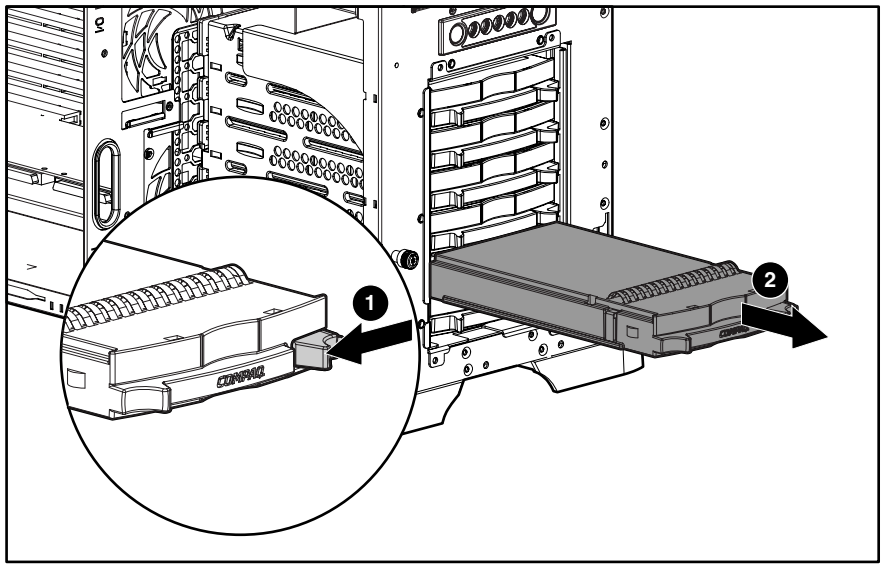


**Figure 2-13: Removing a hot-plug hard drive blank**

To replace a hot-plug hard drive blank, reverse steps 2 and 3.

# Hot-Plug Hard Drive

To remove a hot-plug hard drive:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Slide the hard drive release latch (1) to open the ejector lever (2).
4. Pull the hard drive out of the drive bay.

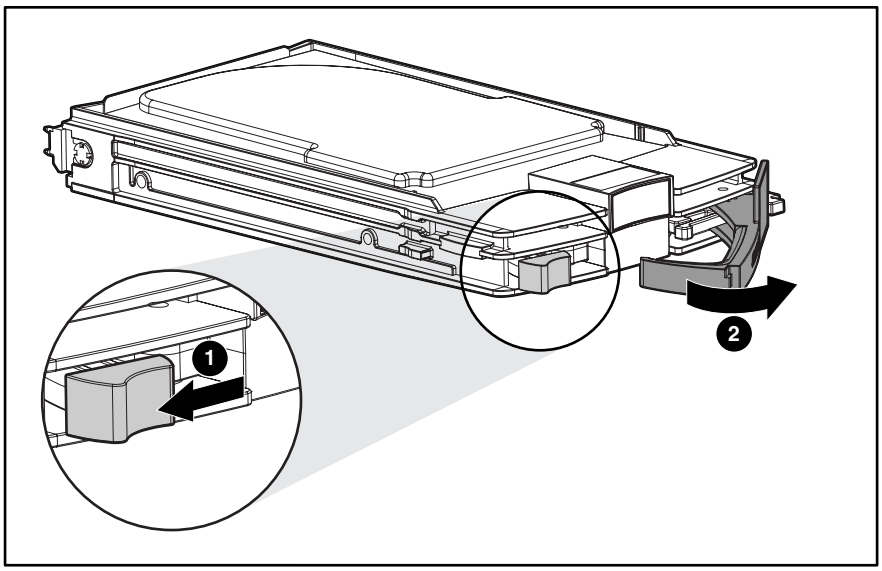


**Figure 2-14: Removing a hot-plug hard drive**

To replace a hot-plug hard drive, push the drive back into the bay, then close the ejector lever to fully seat the drive.

# Hot-Plug Hard Drive Cage

To remove a hot-plug hard drive cage:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Remove the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Disconnect the power cable from the back of the hard drive cage (1).
5. Disconnect the SCSI cable from the back of the hard drive cage (2).

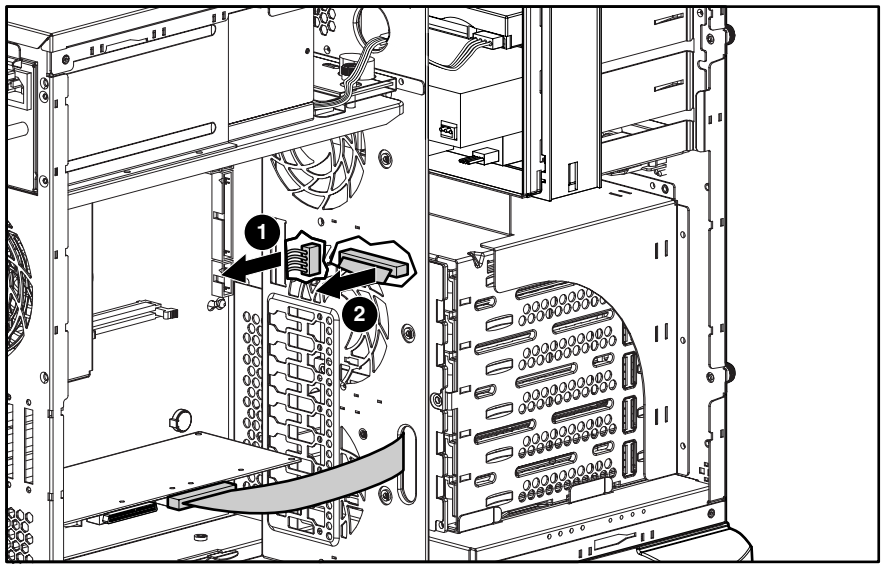


**Figure 2-15: Disconnecting cables from the hot-plug hard drive cage**

6. Remove all hard drives and drive blanks. Refer to "Hot-Plug Hard Drive Blank" earlier in this chapter.
7. With a Torx T-15 screwdriver, remove the four screws securing the drive cage to the chassis (1).
8. Pull the drive cage away from the chassis (2).

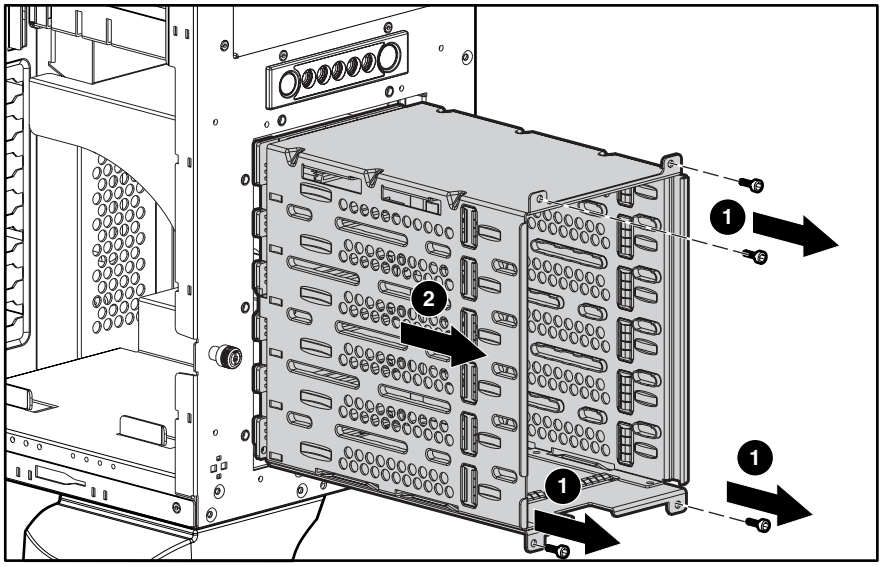


**Figure 2-16: Removing a hot-plug hard drive cage**

To replace a hot-plug hard drive cage, reverse steps 2 through 8.

# Removable Media Device

To remove a removable media device:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Disconnect the cables from the back of the removable media device.

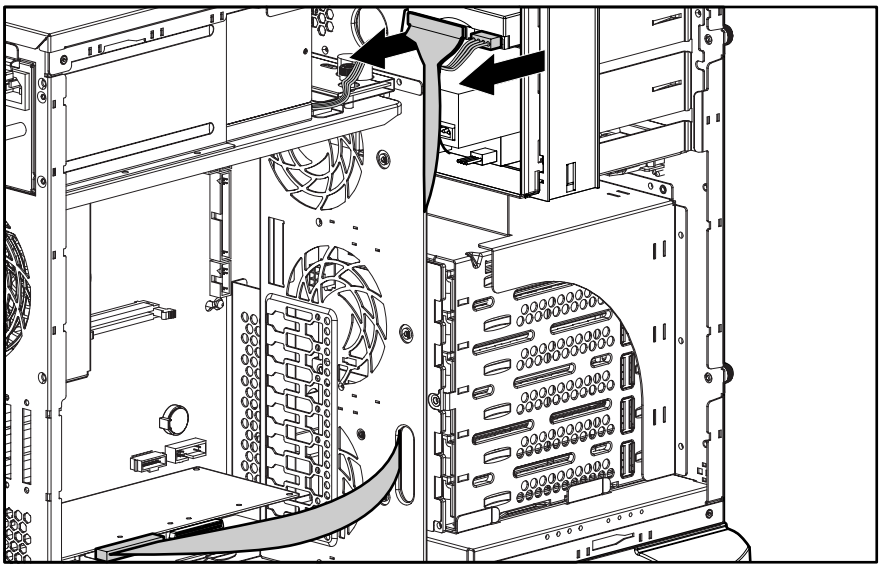

**Figure 2-17: Disconnecting the removable media device cables**

5. While pushing up the drivelock (1), pull the device out of the bay (2).

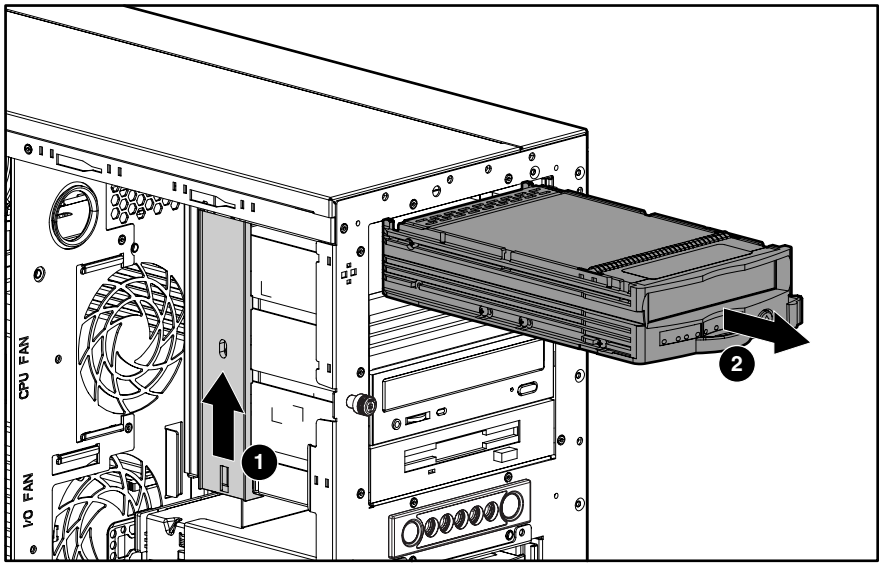


**Figure 2-18: Removing the removable media device**

To replace a removable media device, insert the device into the bay until the device clicks into place.

**NOTE:** It is not necessary to push up on the drivelock when installing a removable media device.

# Expansion Slots

Figure 2-19 and Table 2-3 show and describe the expansion slot locations.

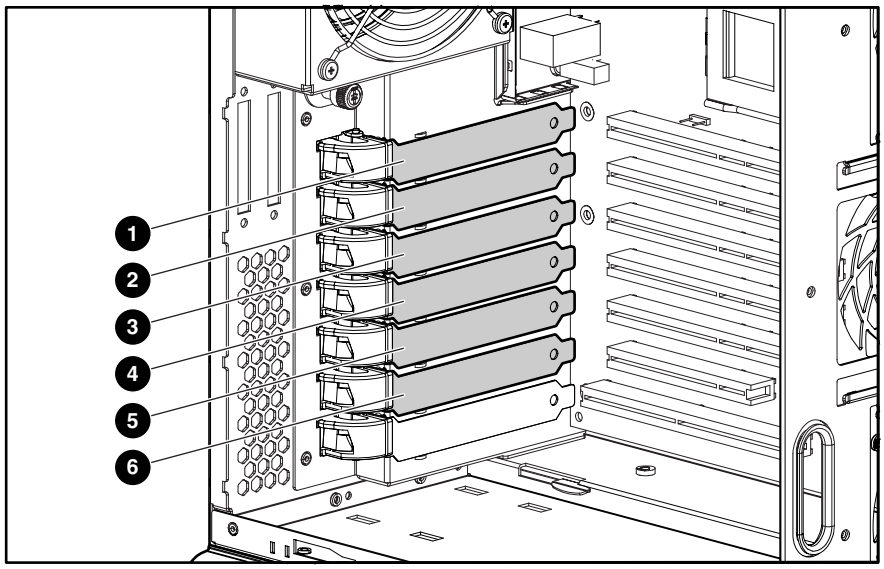


**Figure 2-19: Expansion slot locations**

**Table 2-3: Expansion Slots**

| Item | Slot | Slot Number |
|---|---|---|
| 1 | 64-bit 33-MHz PCI, 3.3 V | 1 |
| 2 | 64-bit 33-MHz PCI, 3.3 V | 2 |
| 3 | 64-bit 33-MHz PCI, 3.3 V | 3 |
| 4 | 64-bit 33-MHz PCI, 3.3 V | 4 |
| 5 | 64-bit 33-MHz PCI, 3.3 V | 5 |
| 6 | 32-bit 33-MHz PCI, 5 V (location for optional Compaq Remote Insight Lights-Out Edition board) | 6 |

**Note:** The slot below slot 6 is reserved for the Server Feature Board and is not shown in this illustration.

# Expansion Board

To remove an expansion board:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Disconnect any cables connected to the expansion board.
5. If an expansion board retainer is in place, loosen the thumbscrew of the expansion board retainer (1), then pull the retainer out and away from the chassis (2).

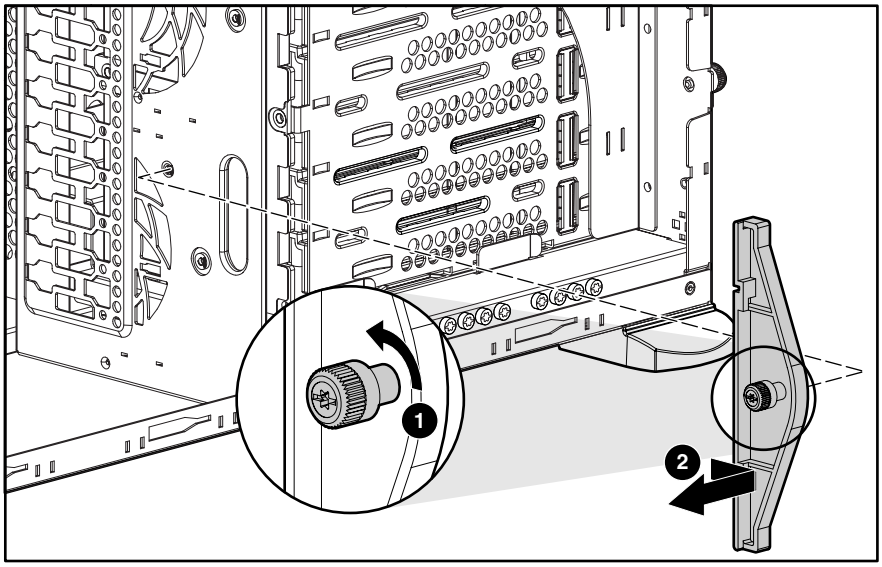


**Figure 2-20: Removing the expansion board retainer**

6. Press on the top of the expansion slot latch (1) and open the latch toward the rear of the chassis (2).
7. Remove the expansion board (3).
8. Close the expansion slot latch.
9. If the expansion board is not immediately being replaced, replace the expansion board retainer.

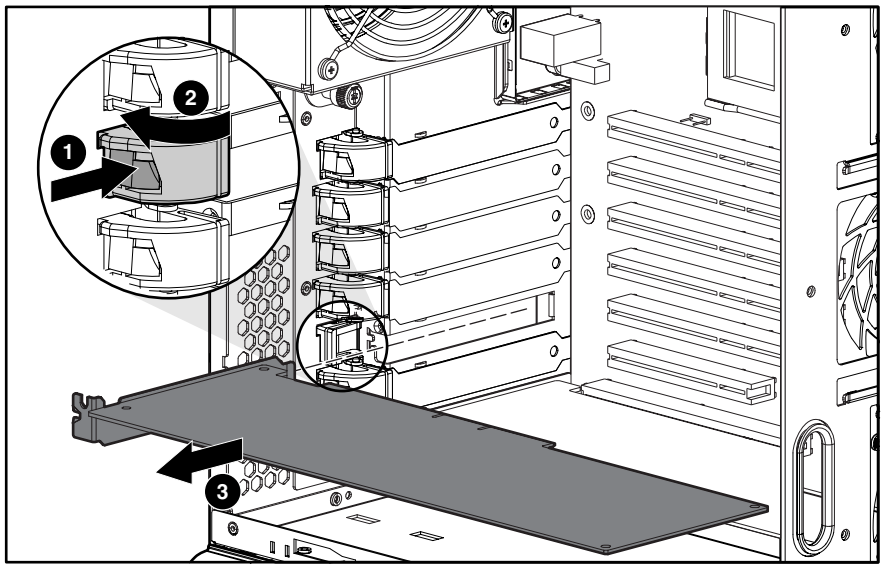


**Figure 2-21: Removing the expansion board**

To replace an expansion board, reverse steps 2 through 9.

# Memory Module Guidelines

**CAUTION:** To prevent damage to equipment or loss of information, make sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the access panel.

**CAUTION:** To prevent damage to the system when handling components, refer to the *Compaq ProLiant ML350 Generation 2 Server Setup and Installation Guide*, Appendix B, "Electrostatic Discharge."

**CAUTION:** When handling a memory module, be careful not to touch any of the contacts. Doing so may damage the module.

**IMPORTANT:** DIMMs do not need to be installed in pairs and can be installed in any sequence

The following guidelines may be helpful when memory modules are being added or replaced:

- DIMMs must be industry-standard 128-MB, 256-MB, 512-MB, or 1-GB, 168-pin PC 133-MHz or faster Registered SDRAM DIMMs. The SDRAM DIMMs must support CAS Latency 2 or 3 (CL=2 or CL=3). They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information.
- Do not mix ECC and non-ECC SDRAM DIMMs. If different types of DIMMs are mixed, the system will not properly function.
- A DIMM can be installed only one way. Be sure to match the two **key slots** on the DIMM with the tabs on the DIMM socket. Push the DIMM down into the DIMM socket, be sure that it is fully inserted and properly seated.

Figure 2-22 shows the locations of the SDRAM DIMM sockets on the system board.

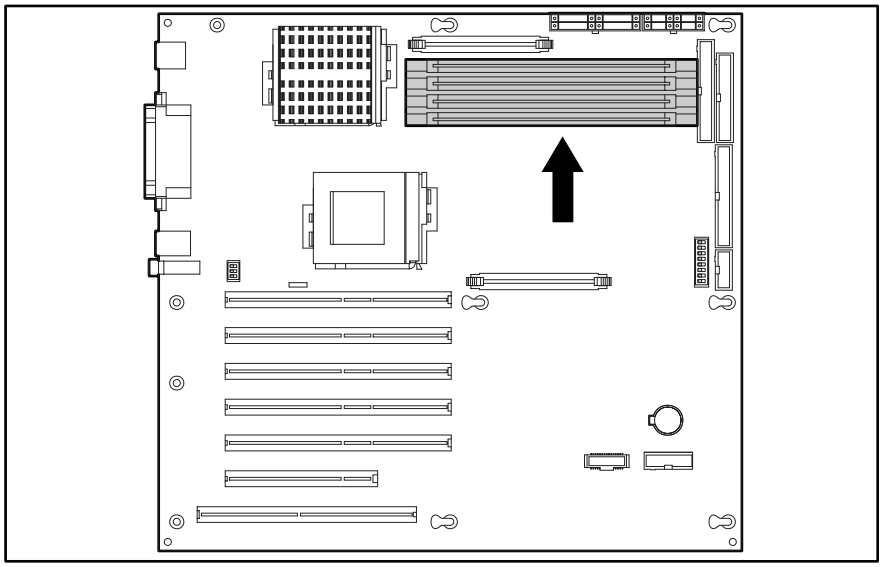

**Figure 2-22: SDRAM DIMM socket locations**

# Memory Modules

**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to "Electrostatic Discharge Information" earlier in this chapter.

To remove a memory module:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Press both memory module socket latches outward (1). This action releases the module and partially pushes it out of the socket.
5. Lift out the memory module (2).

**IMPORTANT:** A memory module can be installed only one way. Be sure to match the key sockets on the module with the tabs on the memory socket. Push the module down into the socket, be sure that the module is fully inserted and properly seated.

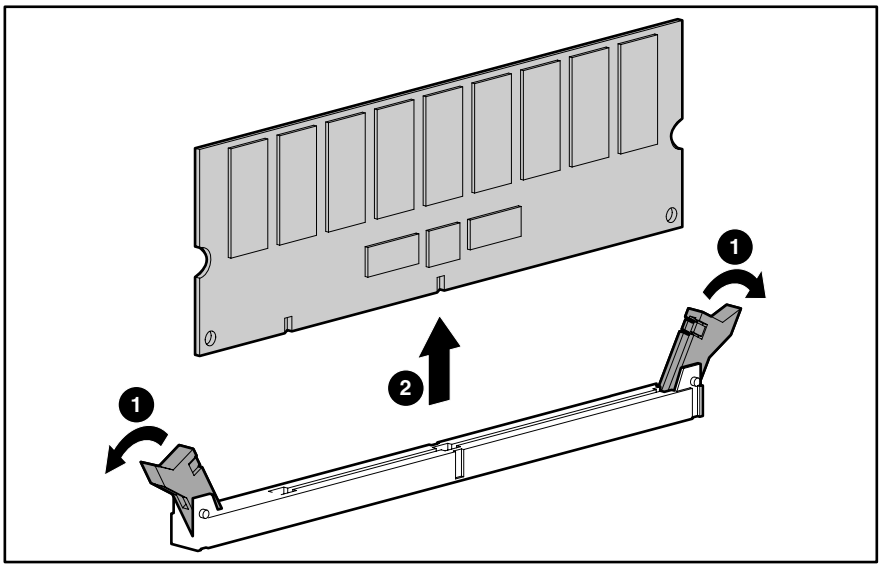


**Figure 2-23: Removing a memory module**

To replace a memory module, reverse steps 2 through 5.

# Processors and Processor Power Modules

Figure 2-24 and Table 2-4 show and describe the locations of the processors and Processor Power Modules (PPMs) on the system board.

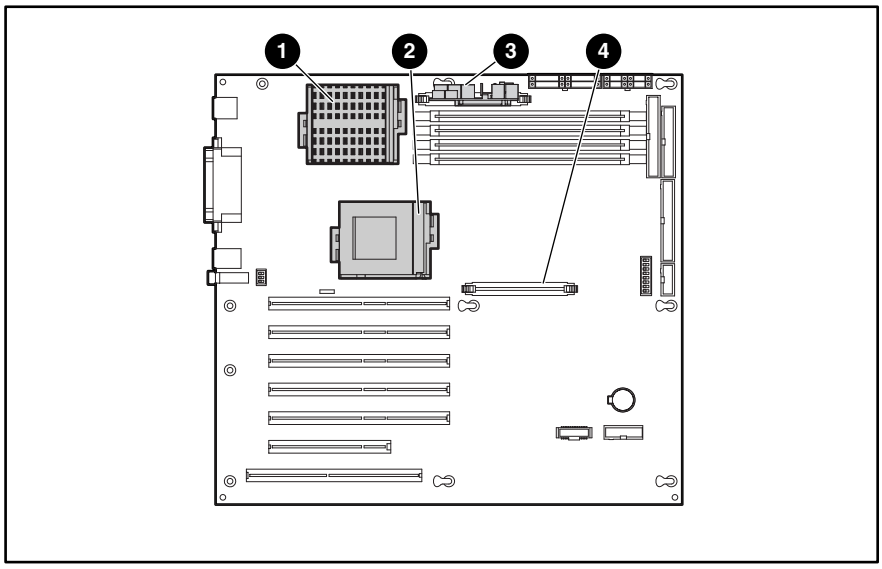


**Figure 2-24: Processor and Processor Power Module (PPM) locations**

**Table 2-4: Processor and Processor Power Module (PPM) Locations**

| Item | Description |
|---|---|
| 1 | Processor socket 1 (populated) |
| 2 | Processor socket 2 |
| 3 | PPM socket 1 (populated) |
| 4 | PPM socket 2 |

## Processor

**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure that you are properly grounded (earthed) before beginning any installation procedure. Refer to "Electrostatic Discharge Information" earlier in this chapter.

To remove a processor:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Remove the air baffle. Refer to "Air Baffle" earlier in this chapter.
5. Release, then pull up the processor latch.

**IMPORTANT:** The lever must be perpendicular to the board or socket for the processor to unlock.

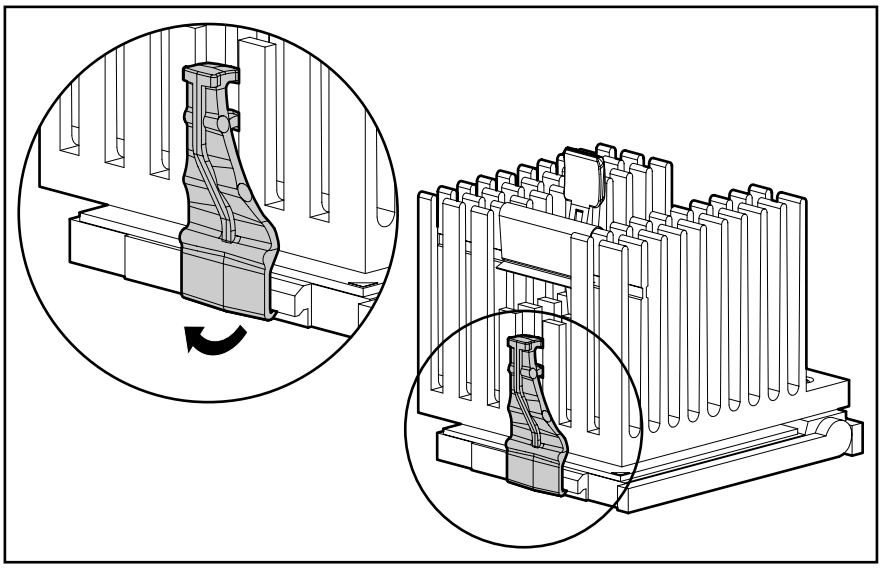

**Figure 2-25: Releasing the processor latch**

6. Lift up the lever on the processor socket until it releases (1).
7. Remove the processor from the processor socket (2).

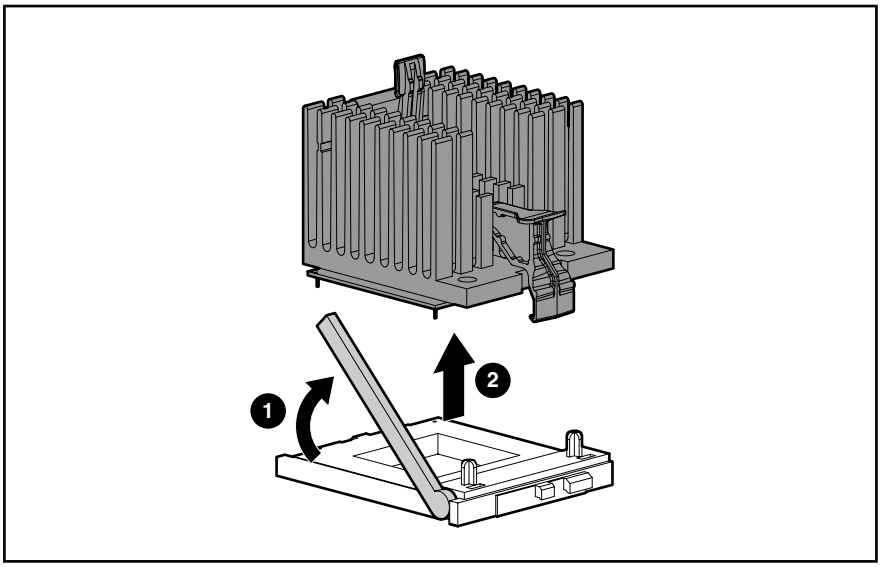


**Figure 2-26: Removing a processor**

To replace the processor, reverse steps 2 through 7.

## Processor Power Module

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

To remove a Processor Power Module (PPM):

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Locate the PPM to be removed.
5. Press the latches outward to release the PPM (1).
6. Pull the PPM away from the socket (2).

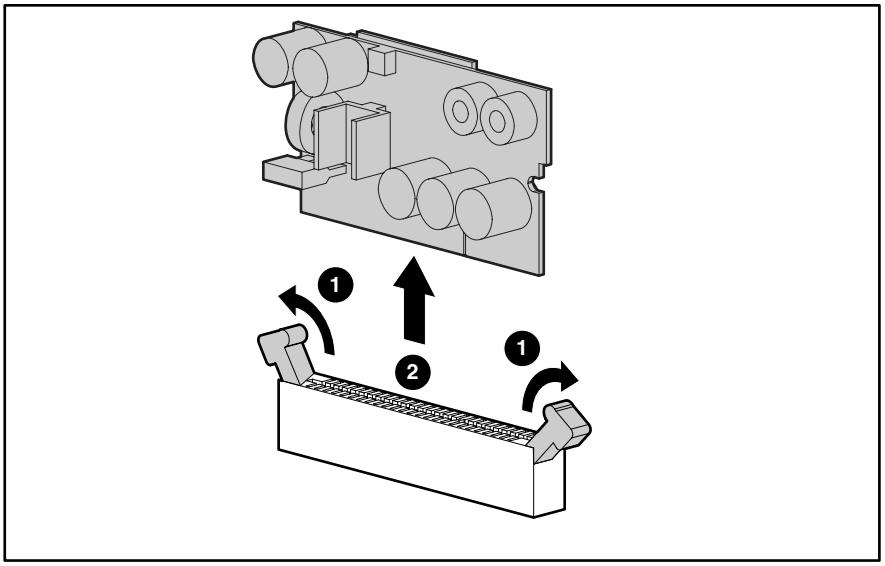


**Figure 2-27: Removing a Processor Power Module (PPM)**

To replace a PPM, reverse steps 2 through 6.

# Server Feature Board

To remove the Server Feature Board:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Remove the expansion board retainer. Refer to "Expansion Board" earlier in this chapter.
5. Push in the Server Feature Board release latch to release the board (1), then rotate the lever outward (2).
6. Remove the Server Feature Board (3).

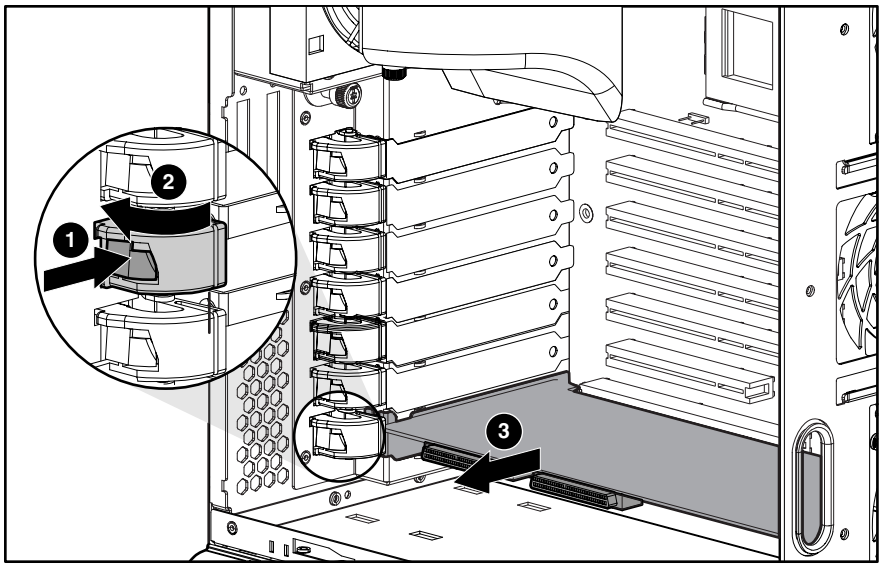


**Figure 2-28: Removing the Server Feature Board**

To replace the Server Feature Board, reverse steps 2 through 6.

# System Board

To remove the system board:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Remove the air baffle. Refer to "Air Baffle" earlier in this chapter.
5. Remove the system fan module. Refer to "System Fan Module" earlier in this chapter.
6. Disconnect all power cables, device cables, and the power button cable from the system board. Refer to "Cable Routing Diagrams" earlier in this chapter.
7. Remove the Server Feature Board. Refer to "Server Feature Board" earlier in this chapter.
8. Remove all expansion board(s) and memory modules. Refer to "Expansion Board" and "Memory Modules" earlier in this chapter.
9. Remove all processors and Processor Power Modules (PPMs). Refer to "Processors and Processor Power Modules" earlier in this chapter.
10. With a Torx T-15 screwdriver, remove the four screws securing the system board to the chassis (1).
11. Push the system board toward the front of the unit until the board stops (2).
12. Holding the system board from the edges, lift up the system board, and then pull it away from the chassis (3).

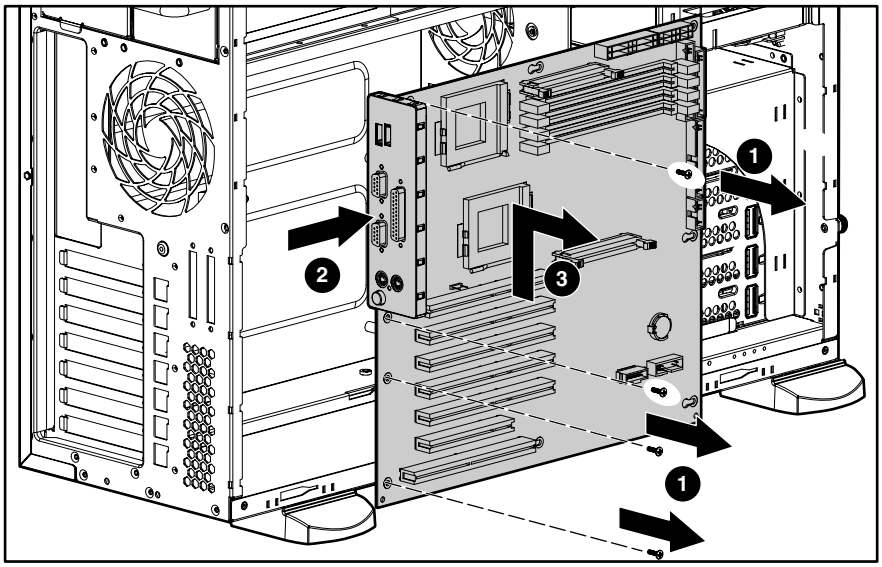


**Figure 2-29: Removing the system board**

To replace the system board, reverse steps 2 through 12.

# System Batteries

The server uses memory that requires two batteries to retain system information. There is a battery on the system board and a battery on the Server Feature Board. These batteries are required to maintain certain system data.

## System Board Battery

If the server no longer automatically displays the correct date and time, you may need to replace the system board battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

**WARNING**: **The system board contains a lithium battery. There is a risk of fire and chemical burn if the battery is improperly handled. Do not disassemble, crush, puncture, or short external contacts, dispose of in water or fire, or expose the battery to temperatures higher than 60°C (140°F).**

**CAUTION:** Static electricity can damage the electronic components of the server. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded (earthed) metal object. Refer to "Electrostatic Discharge Information" earlier in this chapter.

To replace the system board battery:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Remove the Server Feature Board. Refer to "Server Feature Board" earlier in this chapter.

5. Locate the battery on the system board.
6. Slide the battery toward the post at one side of the battery holder (1).
7. Lift the battery up from that side and out of its holder (2).

**IMPORTANT:** The battery should be installed with the positive polarity (+ side) positioned up.

**NOTE:** If expansion boards are installed, you may need to remove them to gain access to the battery.

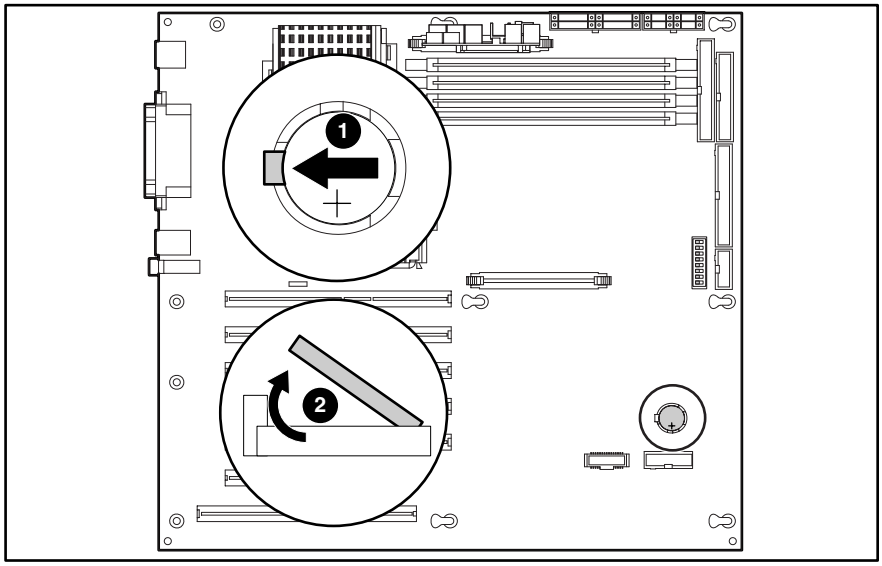


**Figure 2-30: Locating and removing a system board battery**

## Server Feature Board Battery

**WARNING: The Server Feature Board contains a lithium battery. There is a risk of fire and chemical burn if the battery is improperly handled. Do not disassemble, crush, puncture, or short external contacts, dispose of in water or fire, or expose the battery to temperatures higher than 60°C (140°F).**

**CAUTION:** Static electricity can damage the electronic components of the server. Before beginning these procedures, be sure that you are discharged of static electricity by briefly touching a grounded (earthed) metal object. Refer to "Electrostatic Discharge Information" earlier in this chapter.

**NOTE:** It is necessary to remove the Server Feature Board from the unit to access and replace the battery. Refer to "Expansion Slots" earlier in this chapter for instructions on removing and installing expansion boards (including the Server Feature Board).

To replace the Server Feature Board battery:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Open the bezel door. Refer to "Bezel Door" earlier in this chapter.
3. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
4. Locate the battery on the Server Feature Board.
5. Slide the battery toward the post at one side of the battery holder (1).
6. Lift the battery up from that side and out of its holder (2).

**IMPORTANT:** The battery should be installed with the positive polarity (+ side) positioned up.

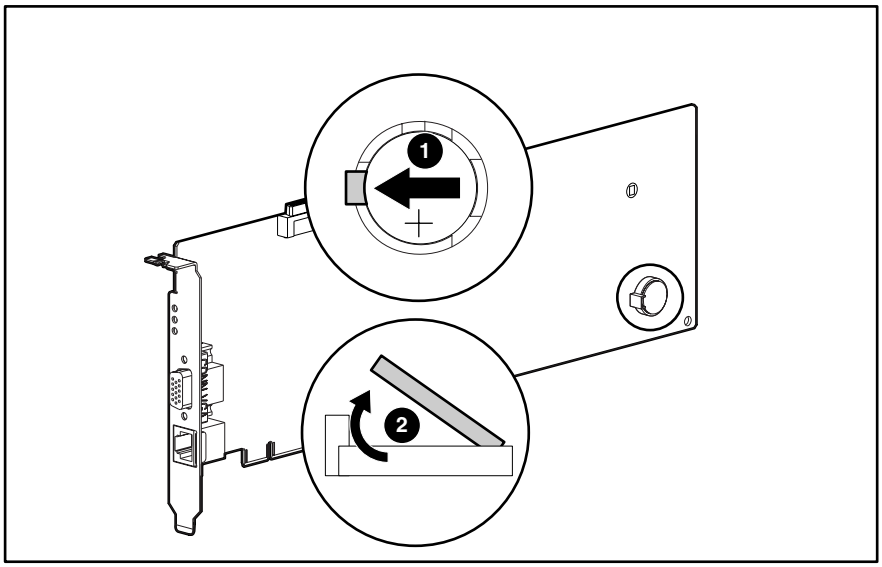


**Figure 2-31: Locating and removing a Server Feature Board battery**

# Power Supply

To remove the power supply:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.

**IMPORTANT:** The power supply of the server is hot-pluggable. When removing a power supply, there is no need to power down the server if the redundant power supply option is used.

2. Push down on the power supply release latch (1).
3. Slide the power supply out of the server (2).

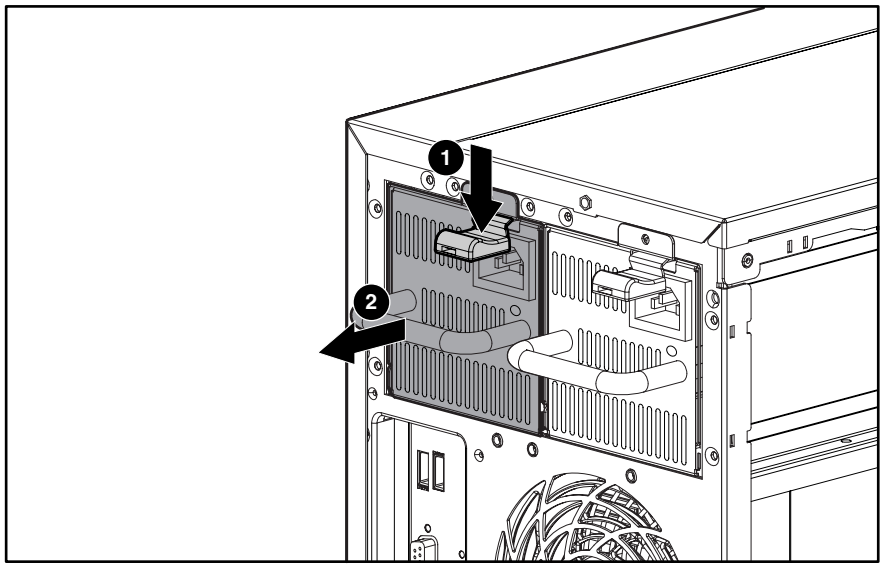


**Figure 2-32: Removing the power supply (shown with optional redundant power supply)**

To replace the power supply, reverse steps 2 and 3.

# Power Supply Backplane Board

To remove the power supply backplane board:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Remove the access panel. Refer to "Access Panel" earlier in this chapter.
3. Remove any installed power supplies.
4. Remove all cables from the power supply backplane board.
5. Loosen the thumbscrew securing the power supply backplane board to the server chassis (1).
6. Slide the power supply backplane board slightly toward the open side of the chassis to release the power supply backplane board from the mounting posts, then pull the board up and out of the chassis (2).

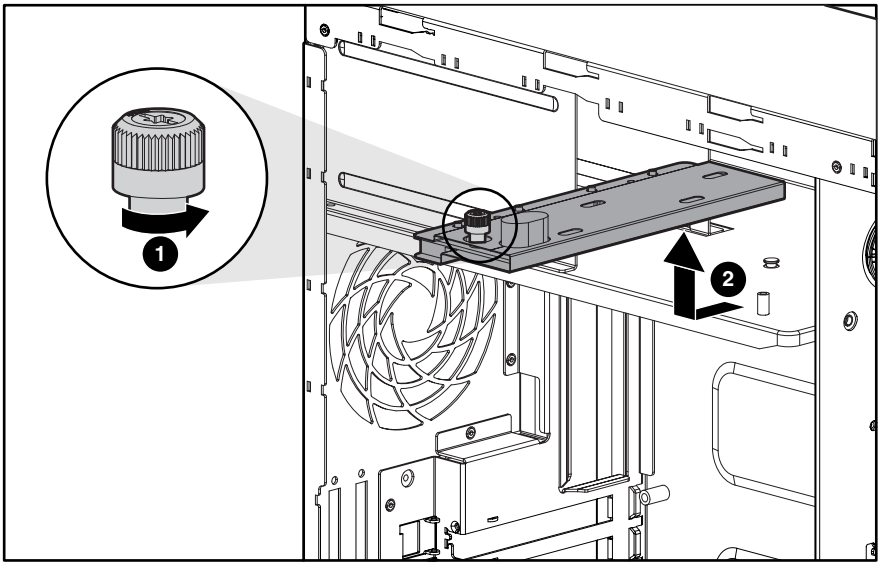


**Figure 2-33: Removing the power supply backplane board**

To replace the power supply backplane board, reverse steps 2 through 6.

# Feet (Tower)

To remove the four feet from the chassis, one at a time:

1. Complete the preparation procedures. Refer to "Preparation Procedures" earlier in this chapter.
2. Place the server upside down.
3. Remove the Torx T-15 screw that secures each foot to the chassis (1).
4. Lift up the other end of each foot (2), and then pull it off the base of the chassis (3).

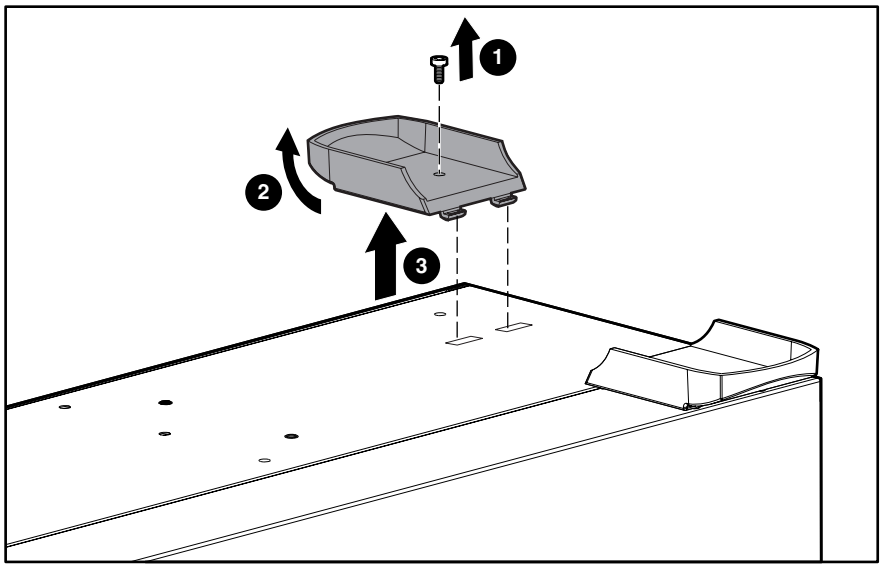


**Figure 2-34: Removing the feet from the chassis**

To replace the feet, reverse steps 2 through 4.

# 3

# Diagnostic Tools

This chapter provides an overview of the software and firmware diagnostic tools available for the Compaq ProLiant ML350 Generation 2 server.

# Diagnostic Tools Utility Overview

The following utilities were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing the server hardware.

**Table 3-1: Diagnostic Tools**

| Tool | What it is | How to run it |
|---|---|---|
| Compaq *SmartStart*™ software | Located on the SmartStart Software for Servers CD, the SmartStart utility is the intelligent way to set up your Compaq server. SmartStart set-up software includes the Compaq *ROMPaq™* utility, driver updates, and assisted operating system installations. | Power up from the SmartStart Software for Servers CD. |
| *Compaq Insight Manager*™ software | A client/server application used to manage Compaq hardware remotely within a network environment. Compaq Insight Manager reports hardware fault conditions (both failure and prefailure) and collects data for reporting and graphing. | For more information, refer to the Compaq Management CD and the *Compaq Insight Manager User Guide*. |
| Compaq Diagnostics | A utility to assist testing and/or verifying operation of Compaq hardware. If problems are found, Compaq Diagnostics isolates failures down to replaceable parts, whenever possible. | Diagnostics and utilities are located on the Compaq system partition on the hard drive and must be accessed when a system configuration error is detected during Power-On Self-Test (POST). The server must be connected to a monitor to allow viewing of error messages. For a complete list of POST error messages, refer to the *Compaq Servers Troubleshooting Guide*. |
| INSPECT | A utility that provides a report detailing system information. | INSPECT can be run from the Compaq Diagnostics program. |

*continued*

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

| Tool | What it is | How to run it |
|---|---|---|
| Compaq Survey utility | Compaq Survey utility is an information-gathering program that runs on servers, gathering critical hardware and software information from various sources. This utility is for servers running Microsoft Windows NT or Novell NetWare.<br><br>If a significant change occurs between data-gathering intervals, previous information is marked and the survey text file is overwritten to reflect the latest configuration and changes since the last configuration. This utility provides a historical record of change events for server hardware and software. | Install the Survey utility from the SmartStart Software for Servers CD, the Compaq Integration Maintenance utility, or the Compaq Management CD. |
| Array Diagnostics Utility (ADU) | A Windows-based tool designed to run on all Compaq systems that support Compaq array controllers. The main functions of ADU are to collect all possible information about the array controllers in the system and to generate a list of detected problems. | Power up the SmartStart Software for Servers CD or use the Diskette Builder (also located on the CD) to create ADU bootable diskettes.<br><br>Use the information provided in the ADU.<br><br>For a complete list of ADU error messages, refer to the *Compaq Servers Troubleshooting Guide*. |
| Integrated Management Log (IML) | A log of system events, such as system failures or nonfatal error conditions. View events in the IML from within:<br>• Compaq Insight Manager<br>• Compaq Survey utility<br>• OS-specific IML utilities | The IML requires Compaq operating system-dependent drivers. Refer to the Compaq Software Support CD for instructions on installing the appropriate drivers. |

*continued*

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

| Tool | What it is | How to run it |
|---|---|---|
| ROM Based Setup Utility (RBSU) | Utility to configure some hardware installed in or connected to the server. Specifically, it can:<br>• Resolve resource conflicts in areas such as memory, port addresses, and interrupts (IRQs)<br>• Configure PCI boards automatically<br>• Provide switch and jumper settings<br>• Manage installation of memory, processor upgrades, and mass storage devices such as hard drives, tape drives, and diskette drives<br>• Store configuration information in nonvolatile memory<br>• Configure the platform for an operating system | Run RBSU directly from the System ROM by pressing the **F9** key when prompted during POST to enter the utility. |
| Automatic Server Recovery 2 (ASR-2) | A tool that restarts the server automatically after a catastrophic operating system failure, including software errors, OS lockups, environmental abnormalities, and some hardware errors.<br>Error information is logged to the IML (Integrated Management Log). The server is reset and restarted within 10 minutes of a system hang or shutdown. | This tool is a function of the hardware/software system through RBSU. Verify that this tool is enabled through RBSU. The systems management drive must be loaded to activate ASR. |
| ROMPaq utility | A utility that upgrades the current system ROM. | Run from the ROMPaq diskette after powering up the system. |
| SmartStart Diskette Builder | Creates a diskette version of the utility from the SmartStart Software for Servers CD. | Run from the SmartStart Software for Servers CD. |

# For More Information

For detailed information about each of these diagnostic tools, see the *Compaq Servers Troubleshooting Guide* on the documentation CD. For the most recent version of this guide, go to

www.compaq.com/support/servers

# 4

# Connectors, Switches and LEDs

This chapter contains illustrations and tables identifying and describing connectors, switches, and LED locations on the front panel, rear panel, system board, hard drives and Server Feature Board for the Compaq ProLiant ML350 Generation 2 server.

# Connectors

This section contains illustrations and tables identifying connector locations on the server rear panel, system board, and Server Feature Board.

## Rear Panel Components

Figure 4-1 and Table 4-1 show and describe the location of connectors on the rear panel of the server.

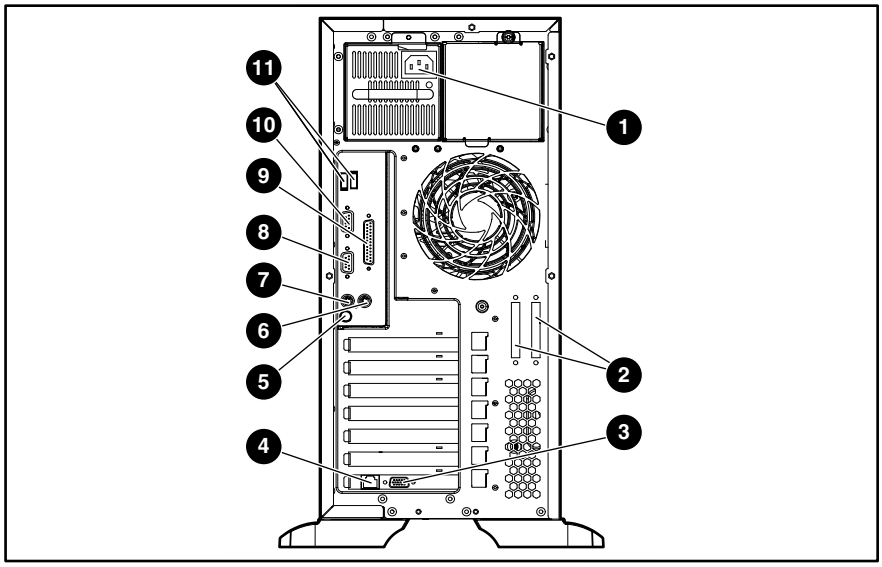


**Figure 4-1: Rear panel connectors**

**Table 4-1: Rear Panel Components**

| Item | Description | Item | Description |
|---|---|---|---|
| 1 | Power cord connector | 7 | Keyboard connector |
| 2 | SCSI connector knockouts | 8 | Serial port B connector |
| 3 | Video connector | 9 | Parallel port connector |
| 4 | RJ-45 Ethernet connector | 10 | Serial port A connector |
| 5 | Unit Identification (UID) LED/button | 11 | USB ports |
| 6 | Mouse connector | | |

## System Board Components

Figure 4-2 and Table 4-2 show and describe the location of components on the system board of the server.

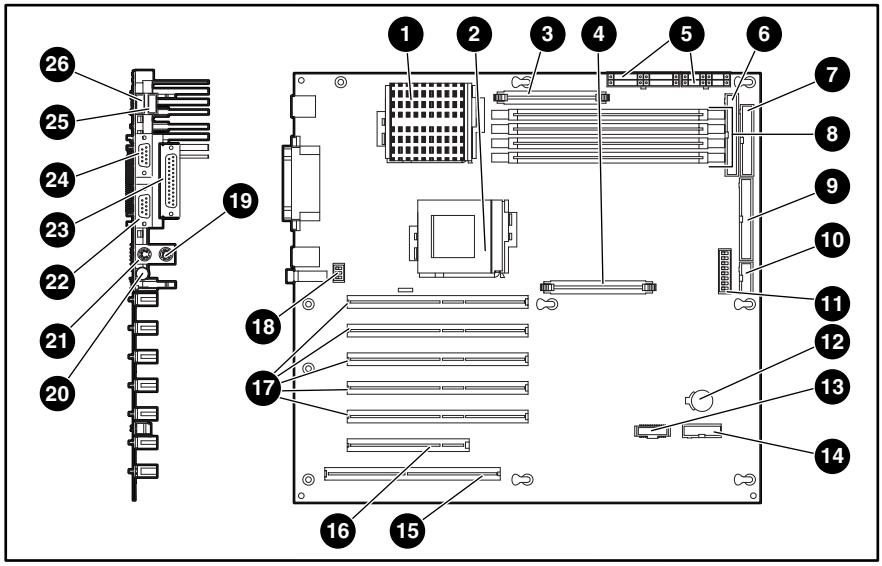


**Figure 4-2: System board components**

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

| Item | Description | Item | Description |
|---|---|---|---|
| 1 | Processor socket 1 (populated) | 14 | 16-pin Remote Insight connector |
| 2 | Processor socket 2 | 15 | Server Feature Board connector |
| 3 | Processor Power Module (PPM) socket 1 (populated) | 16 | 32-bit/33-MHz PCI slot |
| 4 | Processor Power Module (PPM) socket 2 | 17 | 64-bit/33-MHz PCI slots |
| 5 | Power supply connectors | 18 | System fan connector |
| 6 | Secondary IDE connector | 19 | Mouse connector |
| 7 | Diskette drive connector | 20 | Unit ID LED/button |
| 8 | DIMM sockets | 21 | Keyboard connector |
| 9 | Primary IDE connector | 22 | Serial port B connector |
| 10 | Power button connector | 23 | Parallel port connector |
| 11 | System configuration switch | 24 | Serial port A connector |
| 12 | Replaceable lithium battery (CR2032) | 25 | USB port |
| 13 | 30-pin Remote Insight connector | 26 | USB port |

# Server Feature Board Components

Figure 4-3 and Table 4-3 show and describe the Server Feature Board components.

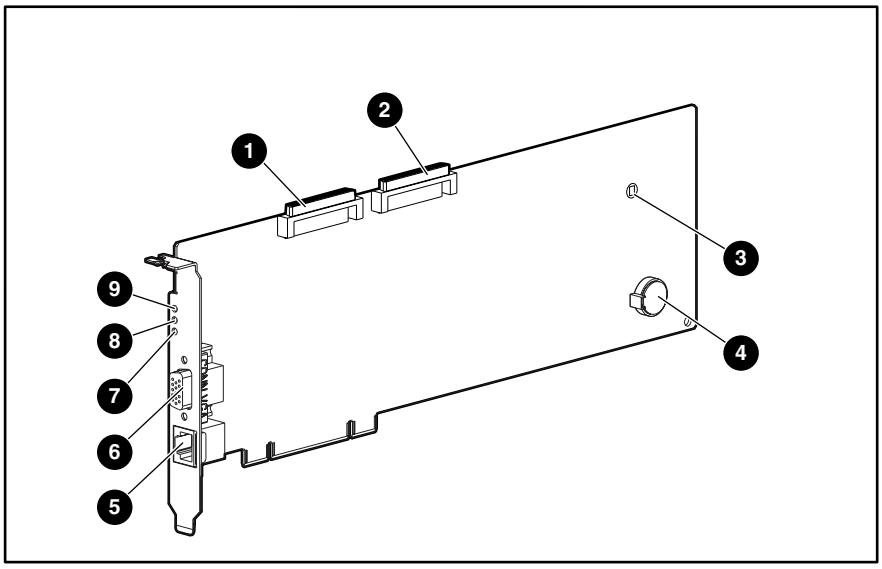


**Figure 4-3: Server Feature Board components**

**Table 4-3: Server Feature Board Components**

| Item | Description | Item | Description |
|---|---|---|---|
| 1 | SCSI controller channel B | 6 | Video connector |
| 2 | SCSI controller channel A | 7 | NIC speed LED |
| 3 | Nonmaskable interrupt (NMI) button | 8 | NIC link LED |
| 4 | Replaceable lithium battery (CR2032) | 9 | NIC activity LED |
| 5 | RJ-45 Ethernet connector | | |

# Switches

## System Configuration Switch Settings

The server system board has one switchbank. Figure 4-4 and Table 4-4 illustrate and describe the use of each switch.

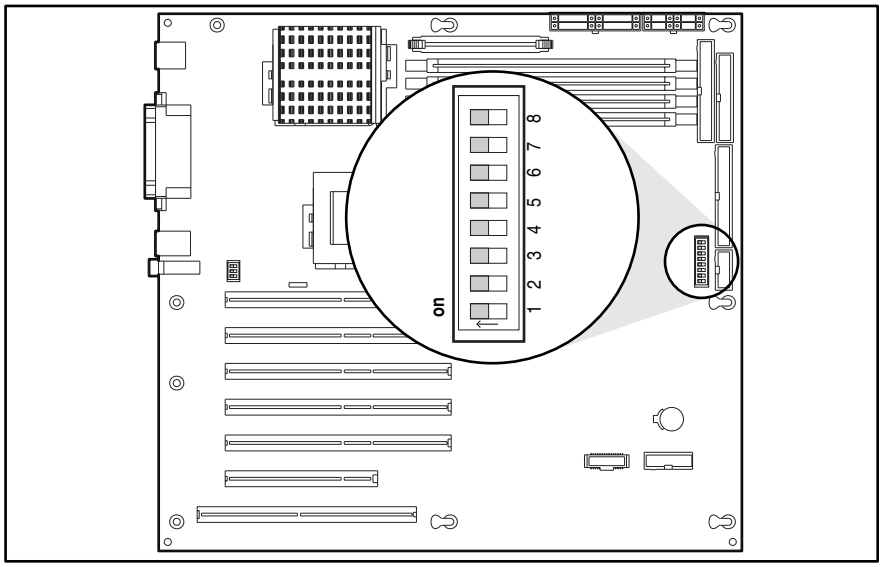


**Figure 4-4: System configuration switch settings**

**Table 4-4: System Configuration Switch Settings**

| Switch | Default Position | Function | Description | Settings |
|---|---|---|---|---|
| 1 | Off | Video disable | Used when ROM does not detect an installed video board | Off = ROM autodetects an optional video board. If one is not detected, then onboard video is enabled.<br>On = Onboard video is disabled. |
| 2 | Off | Lock configuration | Enables or disables the ability to write to NVRAM to reconfigure the system | Off = Configuration can be changed.<br>On = Configuration is locked and cannot be changed. |
| 3 | Off | Tower or rack configuration | Used to specify a tower or rack configuration | Off = Tower configuration<br>On = Rack configuration |
| 4 | Off | Enable diskette boot | Enables or disables booting from the diskette drive | Off = Diskette drive boot is controlled by the configuration.<br>On = Diskette boot is disabled. |
| 5 | Off | Password disable | Used to disable password | Off = Password enabled<br>On = Password disabled |
| 6 | Off | Clear CMOS and NVRAM | Used to clear system configuration settings | Off = Normal<br>On = When server is powered up, all system configuration information is erased. |
| 7 | Off | Reserved | N/A | N/A |
| 8 | Off | Reserved | N/A | N/A |

**Note:** Switch positions 7 and 8 are reserved for Compaq authorized service providers only. Do not change the specified default setting for these positions, unless instructed otherwise.

## Resetting System Configuration Settings

It may be necessary at some time to clear and reset system configuration settings. When the system configuration switch position 6 is set to the **on** position, the system is prepared to erase all system configuration settings from both CMOS and nonvolatile RAM (NVRAM).

**IMPORTANT:** Clearing NVRAM deletes your configuration information. Refer to Chapter 5 of the *Compaq ProLiant ML350 Generation 2 Server Setup and Installation Guide* for complete instructions on configuring the server.

To reset system configuration settings:

1. Power down the server.
2. Set the system configuration switch position 6 to the **on** position.
3. Power up the server. All configuration settings are now erased and all system operations halt.
4. Power down the server.
5. Reset the position 6 switch to the default **off** position.
6. Power up the server.
7. Reset all system configuration settings.

Refer to Chapter 3 of this guide, "Diagnostic Tools," or refer to the *Compaq ROM Based Setup Utility User Guide* found on the server documentation CD, for more information on RBSU.

# LEDs

Several status LEDs and buttons are located on the front and back of the server. The LEDs aid in problem diagnosis by communicating the status of the components and operations of the server. LEDs are also located on the system board. The following server LEDs and buttons are explained in this chapter:

- Power button
- System status LEDs (on the front of the server)
  - Power On/Standby and AC power status
  - Network interface controller (NIC) activity
  - Internal health
  - External health
  - Unit Identification
- Unit identification (UID) button
- System board LEDs
  - Processor failure
  - Processor Power Module failure
  - Memory failure
  - Thermal failure
  - Fan failure
  - Server Feature Board seating failure
- Hot-plug hard drive LEDs
- Network interface controller LEDs (on the back of the server)
  - Network activity status
  - Network link
  - Connection speed

## Power Button, System Status LEDs, and Unit Identification Button

The power button, system status LEDs, and Unit Identification (UID) button are located on the front of the server.

The power button allows you to:

- Power up the server.
- Place the server in standby mode.
- Power down the server.

The following system status LEDs are explained:

- Power On/Standby status
- Network Interface Controller (NIC)
- External health
- Internal health
- Unit Identification (UID)
- Hard drive status

The UID button allows you to:

- Activate identification.
- Deactivate identification.

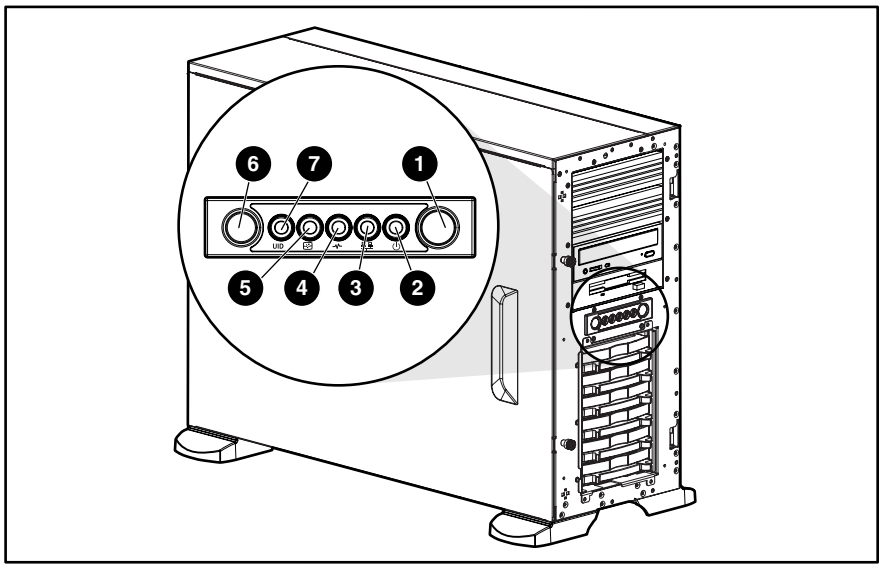


**Figure 4-5: Power button, system status LEDs, and unit identification button**

**Table 4-5: Power Button, System Status LEDs, and Unit Identification Button**

| Item | Description | Status | Description |
|---|---|---|---|
| 1 | Power button | N/A | Allows the user to power up the server, place the server in standby mode, and power down the server. |
| 2 | Power On/Standby and AC power status LED | Off | System off, no AC power |
| | | Green | System on, AC power available. Do not remove power from system. |
| | | Flashing green | System in standby mode. AC power available. Do not remove power from system. |
| | | Amber | System is off; AC power available. |
| 3 | NIC LED | Off | No connection |
| | | Green | Linked to network |
| | | Flashing green | System linked and activity present on network |
| 4 | External health | Off | System off and health good |
| | | Green | System on; AC power available |
| | | Amber | System degraded; on or off with auxiliary power |
| | | Red | System critical; on or off with auxiliary power |
| 5 | Internal health | Off | System off and last health good |
| | | Green | System on, AC power available |
| | | Amber | System degraded; system on or off with auxiliary power |

*continued*

**Table 4-5: Power Button, System Status LEDs, and Unit Identification Button** *continued*

| Item | Description | Status | Description |
|---|---|---|---|
| | | Red | System critical; system on or off with auxiliary power |
| 6 | Unit Identification (UID) button | N/A | Allows the user to activate or deactivate unit identification. Pushing the button activates unit identification, shown by the blue UID LED, so that the onsite administrator can identify a particular server. |
| 7 | Unit Identification (UID) LED | Off | Identification off |
| | | Blue | Identification on |
| | | Flashing blue | Remote console activity |

**CAUTION:** When the power LED is green, it is unsafe to remove AC power from the system.

## System Board LEDs

Figure 4-6 and Table 4-6 illustrate and describe LEDs on the system board of the server that indicate when a processor, Processor Power Module (PPM), memory module, or fan has experienced a failure. System board LEDs also indicate when the Server Feature Board is not properly seated or when a thermal threshold has been exceeded.

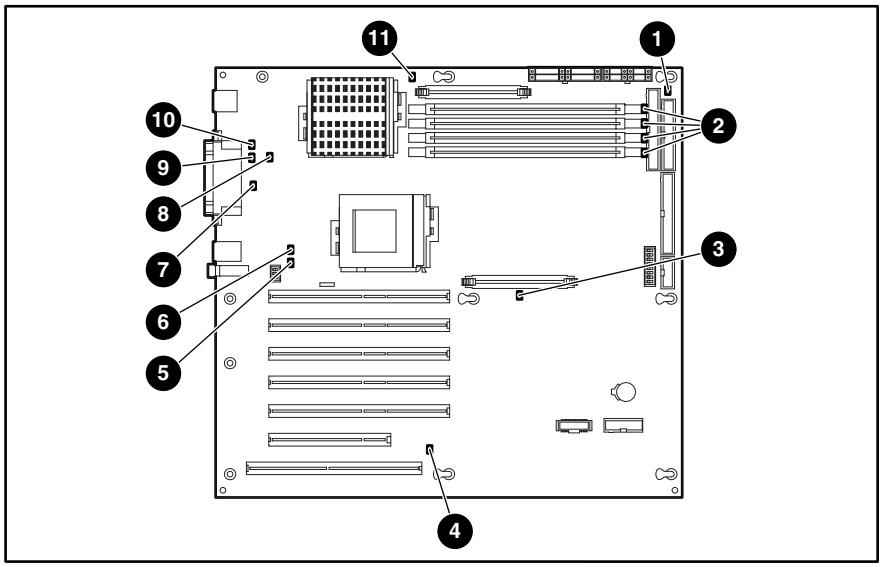


**Figure 4-6: System board LEDs**

**Table 4-6: System Board LEDs**

| Item | Description | Status |
|---|---|---|
| 1 | AC power | Off = No AC power, poor power supply, power supply in standby, or power supply exceeded current limits<br>Green = Power supply is turned on and functioning |
| 2 | DIMM status | Off = DIMM functioning<br>Amber = DIMM failed |
| 3 | Processor Power Module (PPM) 2 status | Off = PPM 2 functioning<br>Amber = PPM 2 failed |
| 4 | Server Feature Board seating status | Off = Server Feature Board is installed correctly<br>Amber = Server Feature Board is not installed correctly |
| 5 | Processor 2 thermal | Off = Normal<br>Amber = Thermal trip detected for processor 2. Refer to the *Compaq ProLiant ML350 Generation 2 Server Setup and Installation Guide*, Appendix C, "Server Error Messages," for appropriate instructions. |
| 6 | Processor 2 status | Off = Processor 2 functioning<br>Green = Processor 2 failed |
| 7 | System fan status | Off = Fan functioning<br>Amber = Fan is not installed or has failed |
| 8 | Temperature threshold | Off = Normal<br>Amber = Temperature threshold exceeded |
| 9 | Processor 1 thermal | Off = Normal<br>Amber = Thermal trip detected for processor 1. Refer to the *Compaq ProLiant ML350 Generation 2 Server Setup and Installation Guide*, Appendix C, "Server Error Messages," for appropriate instructions. |
| 10 | Processor 1 status | Off = Processor 1 functioning<br>Green = Processor 1 failed |
| 11 | PPM 1 status | Off = PPM 1 functioning<br>Amber = PPM 1 failed |

## Hot-Plug Hard Drive LEDs

This section provides the following information about hot-plug hard drive LEDs:

- An illustration detailing the location of each hot-plug hard drive LED
- A table of the possible LED configurations and what each combination means

The hot-plug SCSI hard drive LEDs, located on each physical drive, are visible on the front of the server or external storage unit. They provide status information regarding drive activity, connectivity, and fault status for each corresponding drive when configured as part of an array and connected to an array controller. Their behavior may vary, depending on the status of other drives in the array. Use Figure 4-7 with Tables 4-7 and 4-8 to analyze current status for hot-plug hard drives that are connected to an array controller.

**CAUTION:** To avoid data loss, read "Hot-Plug Hard Drive Replacement Guidelines" in the *Compaq Servers Troubleshooting Guide* before removing a hard drive.

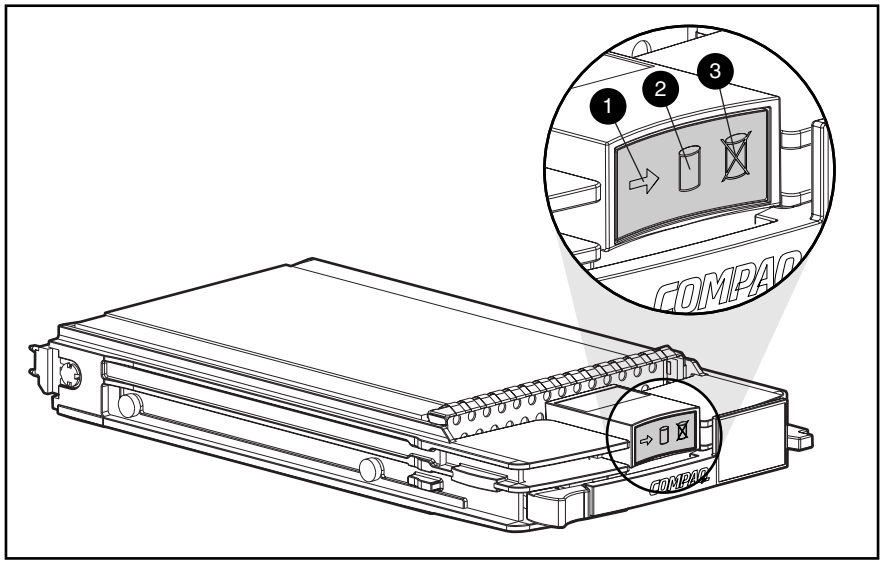


**Figure 4-7: Hot-plug hard drive LEDs**

**Table 4-7: Hot-Plug Activity LEDs:**

| Item | LED Function |
|---|---|
| 1 | Activity |
| 2 | Online |
| 3 | Fault |

For additional information on troubleshooting hard drive problems, refer to "Hard Drive Problems" and "SCSI Device Problems" in the *Compaq Servers Troubleshooting Guide*.

**Table 4-8: Hot-Plug SCSI Hard Drive LED Combinations**

| Activity | Online | Fault | Meaning |
|---|---|---|---|
| On | Off | Off | **Do not remove the drive. Removing a drive during this process causes data loss.**<br>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.**<br>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.**<br>The drive is part of an array being selected by the Array Configuration Utility (ACU).<br>-Or-<br>The Options ROMPaq is upgrading the drive. |
| Off | Off | Off | It is OK to replace the drive online if a predictive failure alert is received (see the "Predictive Failure Alert" section in the *Compaq Servers Troubleshooting Guide* for details) and the drive is connected to an array controller.<br>The drive is not configured as part of an array.<br>-Or-<br>If this drive is part of an array, a powered-up controller is not accessing the drive.<br>-Or-<br>The drive is configured as an online spare. |
| Off | Off | On | It is OK to replace the drive online.<br>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 (refer to the "Predictive Failure Alert" section in the *Compaq Servers Troubleshooting Guide* for details), provided that the array is configured for fault tolerance and all other drives in the array are online.<br>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 (refer to the "Predictive Failure Alert" section in the *Compaq Servers Troubleshooting Guide* for details), provided that the array is configured for fault tolerance and all other drives in the array are online.<br>The drive is online and being accessed. |

## Network Interface Controller LEDs

The network interface controller (NIC) LEDs are located on the back of the server. They provide the following information:

- The speed at which the network is being accessed
- If the server is linked to the network
- If there is current network activity

Refer to the *Compaq Servers Troubleshooting Guide* for more information on troubleshooting network controller problems.

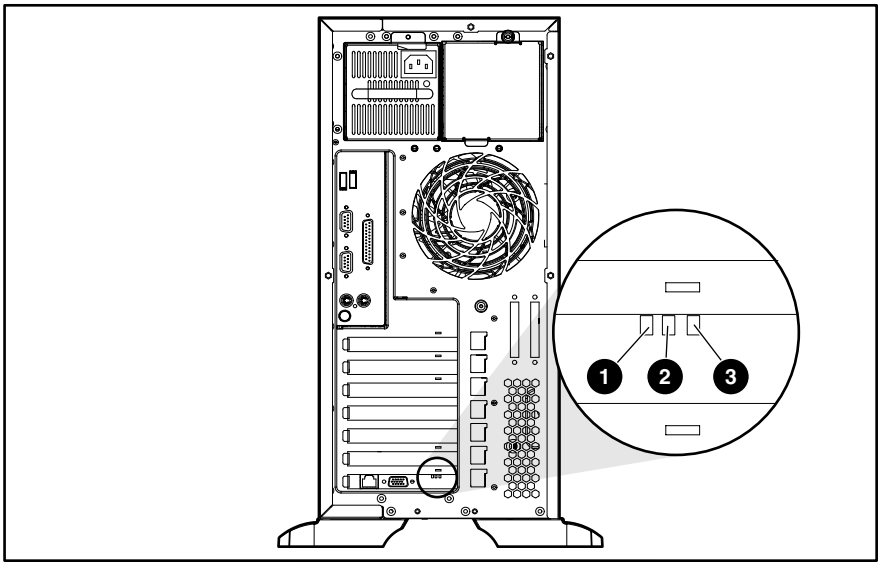


**Figure 4-8: Network interface controller (NIC) LEDs**

**Table 4-9: Network Interface Controller LEDs**

| Item | Description | Status | Condition |
|---|---|---|---|
| 1 | Speed | Off | 10Base-T 10-Mbps (10Base-T Ethernet) |
| | | On | 100Base-T 100-Mbps (100Base-T Ethernet) |
| 2 | Link | Off | No network link |
| | | On | Linked to network |
| 3 | Activity | Off | No network activity |
| | | On or flashing | Network activity |

# 5

# Physical and Operating Specifications

This chapter provides physical and operating specifications for the Compaq ProLiant ML350 Generation 2 server. The following specifications are provided:

- System Unit
- Rack Server System Unit
- Memory
- 1.44-MB Diskette Drive
- IDE CD-ROM Drive
- Wide Ultra3 SCSI Hot-Plug Hard Drives
- Integrated Compaq NC3163 Fast Ethernet 10/100 Autoswitching NIC
- Integrated Dual Channel Wide Ultra3 SCSI Adapter
- Remote Insight Lights-Out Edition Board Option

# System Unit

**Table 5-1: System Unit Specifications**

| Item | Description |
|---|---|
| Height (without feet) | 44.5 cm (17.5 in) |
| Height (with feet) | 46.99 cm (18.5 in) |
| Width | 21.59 cm (8.5 in) |
| Depth (without bezel) | 60.96 cm (24.0 in) |
| Depth (with bezel) | 66.04 cm (26.0 in) |
| Weight (no drives installed) | 27.24 kg (60.0 lb) weight approximate |
| Input requirements | **International Units (English Units)** |
| Rated input voltage | 200 VAC to 240 VAC (100 VAC to 120 VAC) |
| Rated input frequency | 50 Hz to 60 Hz |
| Rated input current | 3 A (6 A) |
| Rated input power | 538 W |
| BTUs per hour | 1,839 |
| Power supply output | |
| Rated steady-state power | 350 W |
| Temperature range | |
| Operating | 10°C to 35°C (50°F to 93°F) |
| Shipping | -29°C to 60°C (-20°F to 140°F) |
| Relative humidity (noncondensing) | |
| Operating | 5% to 80% |
| Nonoperating | 5% to 90% |
| Wet bulb temperature | |
| Maximum | 38.7°C (101.7°F) |
| Acoustic noise | |
| Idle (hard drives spinning) | 6.2 NPEL (BELS)/45 AVERAGE SPL (dba) |
| Operating (random seeks to hard drives) | 6.8 NPEL (BELS)/49 AVERAGE SPL (dba) |

# Rack Server System Unit

**Table 5-2: Rack Server System Unit Specifications**

| Feature | International Units (English Units) |
|---|---|
| Dimensions | |
| Height | 21.87 cm (8.61 in) |
| Depth | 60.96 cm (24 in) |
| Width | 48.26 cm (19.0 in) |
| Weight (no drives installed) | 27.24 kg (60 lb) |
| Input requirements | |
| Rated input voltage | 200 VAC to 240 VAC (100 VAC to 120 VAC) |
| Rated input frequency | 50 Hz to 60 Hz |
| Rated input current | 3A (6A) |
| Rated input power | 538 W |
| BTUs per hour | 1,839 |
| Power supply output | |
| Rated steady-state power | 350 W |
| Temperature range | |
| Operating | 5°C to 50°C (41°F to 122°F) |
| Shipping | -40°C to 85°C (-18°F to 185°F) |
| Relative humidity (noncondensing) | |
| Operating | 5% to 95% |
| Nonoperating | 5% to 95% |
| Wet bulb temperature | |
| Maximum | 38.7°C (101.7°F) |

# Memory

**Table 5-3: Memory Specifications**

| Item | Description |
|---|---|
| Size | 128MB, 256MB, 512MB, and 1GB |
| Speed | PC 133MHz |
| Type | ECC Registered SDRAM DIMMs |
| **Note:** Use 168-pin PC 133-MHz or faster Registered SDRAM DIMMs. The SDRAM DIMMs must support CAS Latency 2 or 3 (CL=2 or CL=3). They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information ECC Registered SDRAM DIMMs. | |

# 1.44-MB Diskette Drive

**Table 5-4: 1.44-MB Diskette Drive Specifications**

| Item | Description |
|---|---|
| Size | 88.9 mm (3.5 in) |
| LED (front panel) | Green |
| Read/write capacity per diskette (high/low density) | 1.44 MB/720 KB |
| Drives supported | 1 |
| Drive height | Third, 1.0 inch, 11 mm |
| Drive rotation | 300 rpm |
| Transfer rate bits/sec (high/low) | 500/250 Kbps |
| Bytes/sector | 512 |
| Sectors/track (high/low) | 18/9 |
| Tracks/side (high/low) | 80/80 |
| Access times | |
| Track-to-track (high/low) | 6 ms/3 ms |
| Average (high/low) | 169 ms/94 ms |
| Settling time | 15 ms |
| Latency average | 100 ms |
| Cylinders (high/low) | 80/80 |
| Read/write heads | 2 |

# IDE CD-ROM Drive

**Table 5-5: IDE CD-ROM Drive Specifications**

| Item | Description |
|---|---|
| Applicable disk | CD-DA, CD-RW, Photo CD (single- and multisession), CD-XA Ready, Cdi Ready |
| Capacity | 540 MB (mode 1, 12 cm) |
| | 650 MB (mode 2, 12 cm) |
| Block size | 2,048 bytes (mode 1); 2,340; 2336 bytes (mode 2); 2,352 bytes (CD-DA); 2,328 (CD-XA) |
| Dimensions | |
| Height | 12.7 mm (0.51 in) |
| Width | 130 mm (5.2 in) |
| Depth | 131 mm (5.24 in) |
| Weight | <1,200 g (<42.4 oz) |
| Data transfer rate | |
| Sustained | 150 KBps (sustained 1X) |
| Burst | 2,500 KBps to 6,000 KBps |
| Bus rate | 40 MBps |
| Access times (typical) | |
| Full stroke | <100 ms |
| Random | <150 ms |
| Disk diameter | 12 cm, 8 cm (4.7 in, 3.15 in) |
| Disk thickness | 1.2 mm, 0.05 cm (0.047 in x 0.20 in) |
| Track pitch | 1.6 µm |
| Cache/buffer | 128 KB |
| Startup time | <7s (single session); <30s (multisession) |
| Stop time | <4s |
| Operating conditions | |
| Temperature | 5°C to 45°C (41°F to 110°F) |
| Humidity | 10% to 80% |

# Wide Ultra3 SCSI Hot-Plug Hard Drives

For information on Wide Ultra3 SCSI hot-plug drive specifications, refer to

www.compaq.com

# Integrated Compaq NC3163 Fast Ethernet 10/100 Autoswitching NIC Specifications

**Table 5-6: Integrated Compaq NC3163 Fast Ethernet 10/100 Autoswitching NIC Specifications**

| Item | Description |
|---|---|
| Network interface | 10Base-T/100Base-TX |
| Compatibility | IEEE 802.2, 802,3, 803.3u |
| Data transfer method | 32-bit, PC 33-MHz bus master |
| Network transfer rate | 10/100 Mbps |
| Connector | RJ-45 |
| I/O address and interrupt | Plug and Play PCI |

# Integrated Dual Channel Wide Ultra3 SCSI Adapter

**Table 5-7: Integrated Dual Channel Wide Ultra3 SCSI Adapter Specifications**

| Item | Description |
|---|---|
| Protocol | Wide Ultra3 SCSI, Wide Ultra SCSI, Fast-Wide SCSI-2, and Fast SCSI-2 |
| Compatibility | All PCI server configurations are backward compatible with Fast, Fast-Wide SCSI-2, Wide Ultra2 SCSI, and Wide Ultra3 SCSI devices |
| Drives supported | Up to 15 SCSI devices per channel |
| Data transfer method | 32-bit PCI bus master |
| Maximum transfer rate per PCI bus (peak) | 133 MBps |
| SCSI channel transfer rate | 160 MBps |
| SCSI termination | Active termination |
| SCSI connectors | 2 internal (68-pin) |
| Capacity | 509.6 GB |
| Height | 1.0 inch |
| Size | 3.5 inches |
| Interface | Wide Ultra3 SCSI |
| Seek time | |
| Single track | 0.8 ms |
| Average | 7.9 ms |
| Full stroke | 17.0 ms |
| Rotational speed | 7,200 rpm |
| Physical configuration | |
| Bytes/sector | 512 |
| Logical blocks | 17,773,524 |
| Operating temperature | 10°C to 35°C (50°F to 95°F) |

# Remote Insight Lights-Out Edition Board Option

**Table 5-8: Remote Insight Lights-Out Edition Board Option Specifications**

| Item | Description |
|---|---|
| Architecture | 32-bit PCI-based remote management board (For the ProLiant ML350 Generation 2 server, Compaq recommends installing the board in the 32-bit PCI slot.) |
| Processor | Intel 960RP embedded |
| Upgradability | Option firmware upgradable via flash ROM |
| Video support | Onboard VGA, 640 x 480 (256 to 16.7M colors), 800 x 600 (256 to 16.7M colors), 1,024 x 768 (256 to 65K colors), 1,280 x 1,024 (256 colors) |
| Interfaces | External power connector, one keyboard/mouse input/output, one video output, one Ethernet network connection (10/100 Mbps) |
| External power adapter memory | 9 VDC, 1 A, 2-MB flash ROM, 16-MB RAM, 4-MB video RAM |
| Remote Insight operating system support | Refer to<br>www.compaq.com |
| Remote Insight client browser support | Microsoft Internet Explorer 4.01 (and later), Netscape Navigator 4.05 (and later), any other Java 1.1-compliant browser software |

# Index

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