

HP ProLiant DL140 Server Maintenance and Service Guide



November 2003 (First Edition)
Part Number 349117-001

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About This Guide

This maintenance and service guide can be used for reference when servicing an HP ProLiant DL140 server.



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.

Audience Assumptions

This guide is for service technicians. HP assumes you are qualified in the servicing of computer equipment, trained in recognizing hazards in products with hazardous energy levels, and familiar with weight and stability precautions for rack installations.

Technician Notes



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



WARNING: To reduce the risk of personal injury 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

- *Service Parts Information (SPI)*
- Service training guides
- Service advisories and bulletins
- OARS (Onsite Agents Reference Set)

IPMI Event Log

The server includes an integrated, nonvolatile management log that contains fault and management information. The contents of the IPMI Event Log can be viewed through BIOS Setup.

Telephone Numbers

For the name of the nearest HP authorized reseller:

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

For HP technical support:

- In the United States and Canada, call 1-800-652-6672.
- Outside the United States and Canada, refer to

www.hp.com

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and spare parts list for the HP ProLiant DL140 server. The table in this chapter provides names and ordering numbers for all referenced spare parts.

Mechanical Parts Exploded View

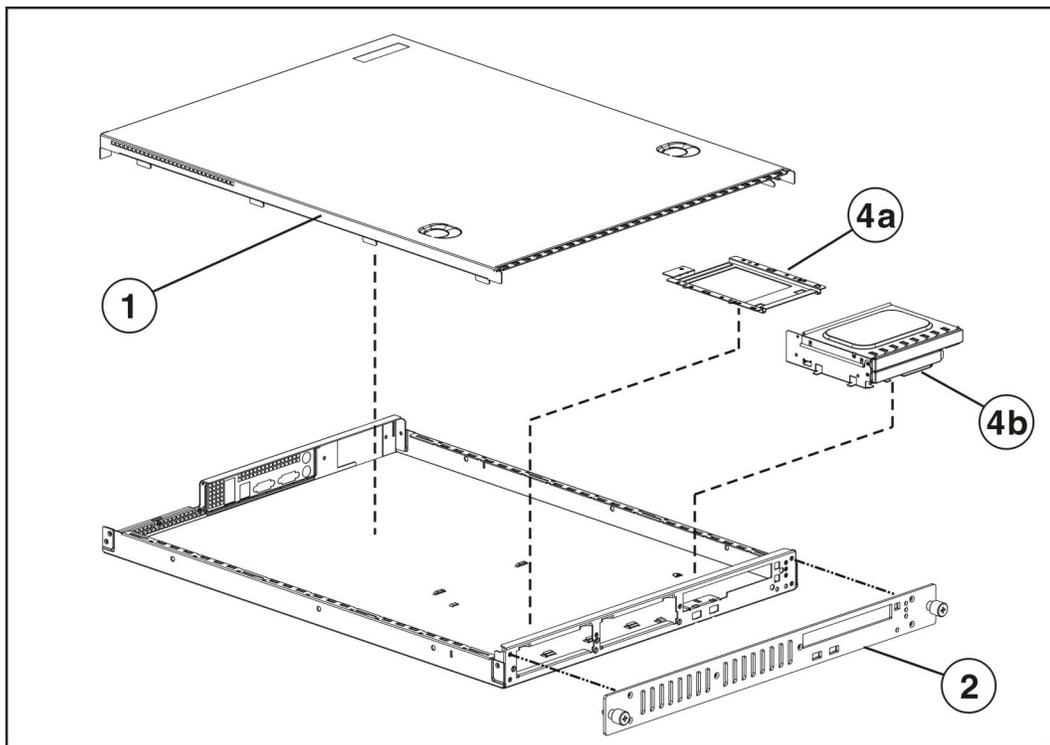


Figure 1-1: Mechanical parts exploded view

System Components Exploded View

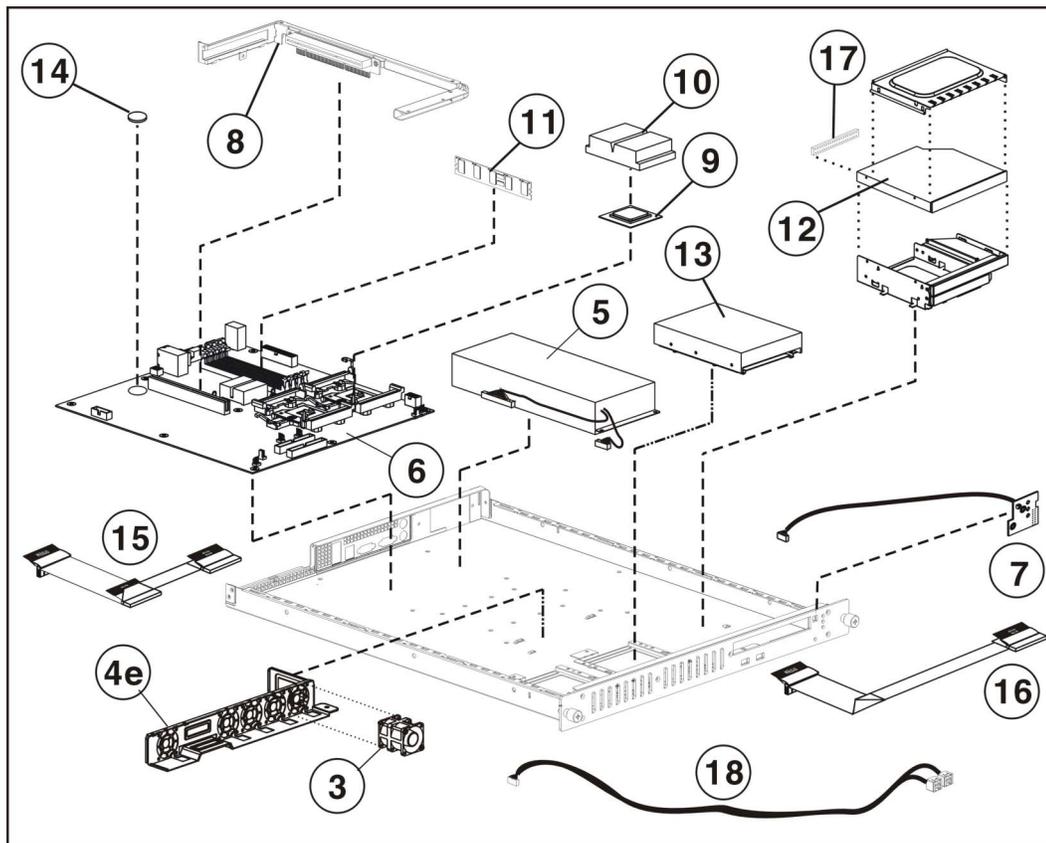


Figure 1-2: System components exploded view

Mechanical Parts and System Components Spares List

Table 1-1: Mechanical and System Spare Parts List

Item	Description	Spare Part Number
Mechanical Components		
1	Access panel (top cover)	348801-001
2	Front Bezel, Mylar and screws	348797-001
3	Single Fan	348795-001
4	Hardware and Plastics Kits	348798-001
	4a) HDD Bracket (Drive not included)	
	4b) CD Bracket (CD-ROM Drive not included)	
	4c) Processor Heatsink Retention Module*	
	4d) Cable Tie Downs*	
	4e) Fan Bracket	
	4f) System Board Screws*	
Power		
5	325-Watt power supply	348796-001
Boards		
6	System Board	348790-001
7	Power Switch Board with cable	348791-001
8	PCI Riser Assembly with bracket	348792-001
Processor		
9	a) 2.4-GHz Intel® Xeon™ processor	288599-204
	b) 3.2-GHz Intel® Xeon™ processor	336417-002
	Note: Processor spares do not come with a heatsink. A new heatsink must be used when replacing a processor.	
10	Heatsink	348789-001
Memory		
11	a) PC2100 DDR ECC Registered DIMM 512-MB*	261584-041
	b) PC2100 DDR ECC Registered DIMM 1-GB*	261585-041
12	CD-ROM drive assembly (CD-ROM Drive only)	228508-001
* Not shown		

continued

Table 1-1: Mechanical and System Spare Parts List *continued*

Item	Description	Spare Part Number
Hardware		
13	ATA hard drive, 80 GB	294934-004
14	Replacement battery, 3-V lithium	166899-001
15	Hard drive cable	348799-001
16	Optical CD-ROM cable	348799-001
17	Optical CD-ROM assembly backplane	348799-001
18	Front USB cable	348800-001
19	Return kit*	349586-001
20	Country kit*	349411-001
	20a) Startup, Documentation and Utilities CD	
	20b) Important Safety Information Guide	
	20c) Limited Warranty and Material Limitations	
	20d) Installation Poster	
Option Kit Spares		
21	Third-party cabinet rack-mounting kit*	177854-001
22	Fixed Rails*	353314-001
23	Telco Rails*	353359-001
* Not shown		

Removal and Replacement Procedures

This chapter provides subassembly and module-level removal and replacement procedures for HP ProLiant DL140 servers. After completing all necessary removal and replacement procedures, run the diagnostics program to verify that all components operate properly.

The following references, diagnostic programs and tools may be used:

- Startup, Documentation and Utilities CD
- BIOS Setup Utility and IPMI Event Log
- Diagnostics software

Electrostatic Discharge Information

An electrostatic discharge (ESD) can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are required to prevent damage. To prevent damage due to ESD, 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 as well as properly grounded tools and equipment.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Ensure proper grounding before 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



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component.

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



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

WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of electric shock hazards. The enclosed area contains no operator-serviceable parts.



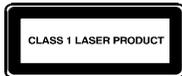
This symbol indicates the presence of electric shock hazards. The enclosed area contains no user or field-serviceable parts. Do not open for any reason.

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



Any RJ-45 receptacle marked with these symbols 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 label or equivalent is located on the surface of the CD-ROM or DVD-ROM drive. This label indicates that the product is classified as a Class 1 Laser Product.

Rack Warnings



WARNING: To reduce the risk of personal injury or damage to equipment, always ensure that the rack is adequately stabilized before extending a component outside the rack. A rack may become unstable if more than one component is extended for any reason. Extend only one component at a time.



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 stabilizers are attached to the rack, if it is a single rack installation.
 - The racks are coupled together in multiple rack installations.
-



WARNING: When installing the server in a telco rack, make certain that the rack frame is adequately secured to the building structure at the top and bottom.



WARNING: To reduce the risk of personal injury or damage to the equipment, at least two people are needed to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 m (7 ft) tall, and may become unstable when being moved on its casters. Do not stand in front of the rack as it rolls down the ramp from the pallet. Handle the rack from both sides.

Server Warnings and Precautions



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



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

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
 - Unplug the power cord from the power supply to disconnect power to the equipment.
-



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 the system top cover closed. Proper cooling is not achieved if the system top cover is removed.

Removal and Replacement Procedures

This chapter discusses preparing the server for servicing and provides step-by-step instructions for the removal or replacement of the:

- Top cover
- Optical device assembly
- Bezel/Mylar/Bezel screws
- ATA Hard drives
- Optical device assembly backplane
- PCI riser board assembly
- Expansion board
- PCI card guide
- Fan bracket with system fans
- Cables
 - ATA cables
 - Optical CD-ROM device assembly cable
 - USB Cables
- Power supply
- Battery
- Memory modules
- Processor
- System board

Powering Down the Server

The server does not completely power down when the front panel power button is pressed. The button toggles server power between On and Standby. In Standby, the server removes power from most electronics and drives, portions of the power supply and some internal circuitry remain active. To completely remove all power from the system, disconnect the power cord from the server.



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



WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.



WARNING: Because the rack allows you to stack computer components in a vertical rather than a horizontal plane, you must take precautions to provide for rack stability and safety to protect both personnel and property. Heed all cautions and warnings throughout the installation instructions that come with the server.



WARNING: To reduce the risk of personal injury or damage to the equipment, place the server on a sturdy table or workbench whenever it is removed from the rack for device accessibility. Refer to the *HP ProLiant DL140 Server Setup and Installation Guide* for further information on working with racks.



CAUTION: Moving the Power On/Off switch to the Off position does not completely remove system power. Some portions of the power supply and some internal circuitry remain active. Disconnect all power cords from the server to remove all power from the system.



CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. For more information, see "Electrostatic Discharge Information" in this chapter.

To power down the server:

1. Press the power button to toggle the server to standby. The power LED on the power button changes from green to off.
2. Listen for the fan noise to stop to indicate that the server is powered down.
3. Disconnect the power cord first from the AC outlet and then from the server.
4. Disconnect all remaining cables on the server rear panel, including cables extending from external connectors on expansion boards.
5. Remove the server from the rack and position it securely on a workbench or other solid surface for stability and safety.

Top Cover

To access the system board, processor, memory modules, expansion slot, and other internal components, remove the top cover. Observe the following warnings and cautions.



WARNING: The front panel Power On/Off switch does not completely shut off all system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.



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



CAUTION: Before removing the server top cover, be sure that the server is powered down and that the power cord is disconnected from the server or the electrical outlet.



CAUTION: To avoid the risk of damage to the system or expansion boards, remove all power cords before installing or removing expansion boards. When the Power On/Off switch is in the Off position, auxiliary power is still connected to the PCI expansion slot and may damage the card.



CAUTION: Electrostatic discharge can damage electronic components. Ensure proper grounding before beginning any installation procedure.

To remove the top cover:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Loosen rear thumbscrew.
3. Slide the top cover approximately 1.25 cm (0.5 in) toward the rear of the unit and lift the panel to remove it (1).

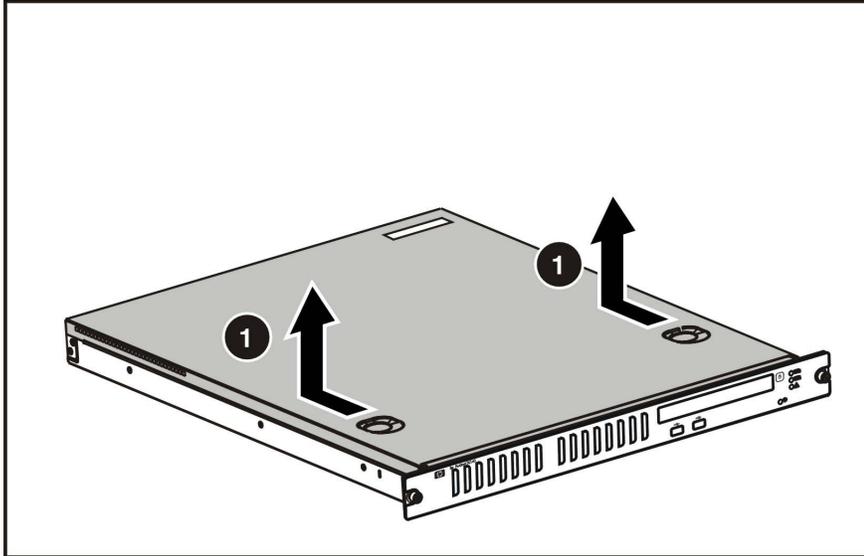


Figure 2-1: Removing the top cover

To replace the top cover, reverse steps 1 through 3.

Optical CD-ROM Drive Assembly

To remove the Optical CD-ROM drive assembly:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the CD-ROM cable and power cable (1).
4. Press in and hold the CD-ROM latch (2)
5. Slide the tray toward the rear of the server until the USB connectors are visible (3).
6. Lift the CD-ROM tray out of the server (4).

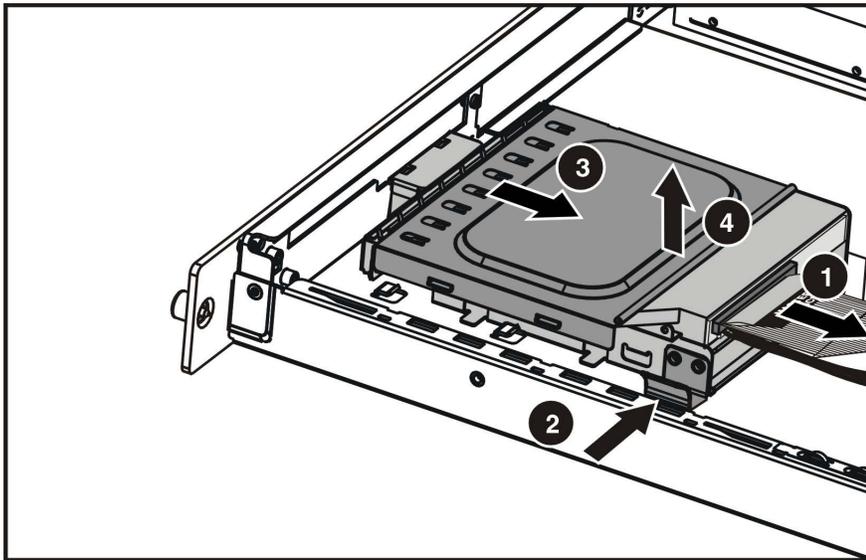


Figure 2-2: Remove the option CD-ROM drive assembly

To replace the assembly, reverse steps 1 through 6.

NOTE: See the HP ProLiant Server Setup and Installation Guide for instructions on installing the optional CD-ROM drive.

NOTE: If the CD-ROM drive must be replaced due to failure, the Optical CD-ROM Drive backplane must be removed from the failed drive and installed on the replacement. See Chapter 1 for illustrations.

Hard Drive Overview

The server contains two drive bays for ATA hard drives. There are two ATA channels. One channel is dedicated to the hard drives and the other to the CDROM. The server ships standard with two 1-inch drive trays for use with two 1-inch ATA hard drives. The following sections provide general guidelines and installation procedures for installing or upgrading hard drives.

Guidelines for Installing ATA Hard Drives

When installing ATA hard drives in the server, observe the following general guidelines:

- Populate hard drive bays starting with the lowest ATA device number. Device 0 serves as the primary boot drive.
- Set the jumpers on both ATA drives to Cable-Select mode.
- Do not add more than two ATA drives in the HP ProLiant DL140 server.

IMPORTANT: ATA hard drives must be configured to the Cable-Select mode.

NOTE: ATA drives are set to Cable-Select mode by default.

NOTE: Refer to the documentation shipped with the hard drive to determine how to set the jumpers on the ATA hard drives to Cable-Select mode, if they are not already set in Cable-Select mode.

Hard Drive Identification Numbers

The servers include two 1-inch hard drive trays. Hard drives installed in the server are labeled as Device 0 and Device 1 in the following illustration for clarification.

IMPORTANT: Always populate hard drive bays starting with the lowest ATA device number.

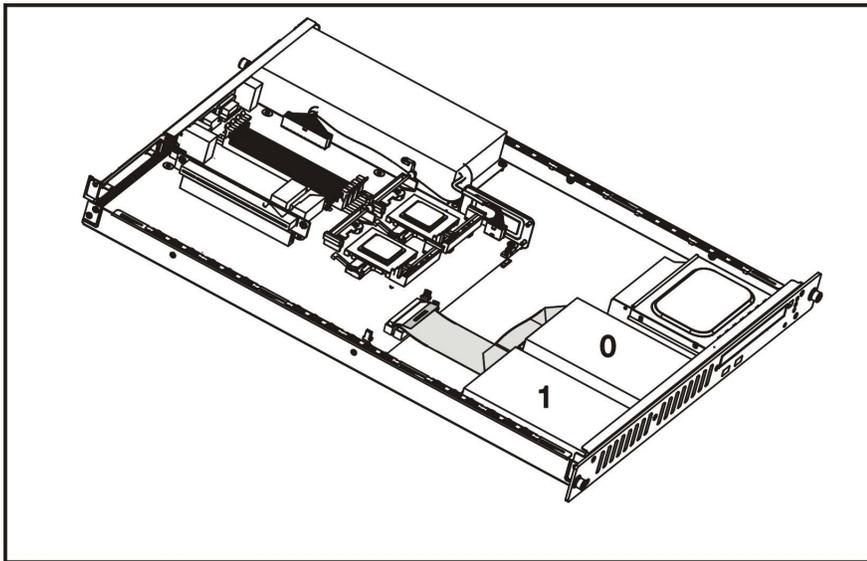


Figure 2-3: ATA device numbers

Hard Drives

To remove a hard drive from the hard drive bay:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Disconnect the ATA cables from hard drives (1,2).

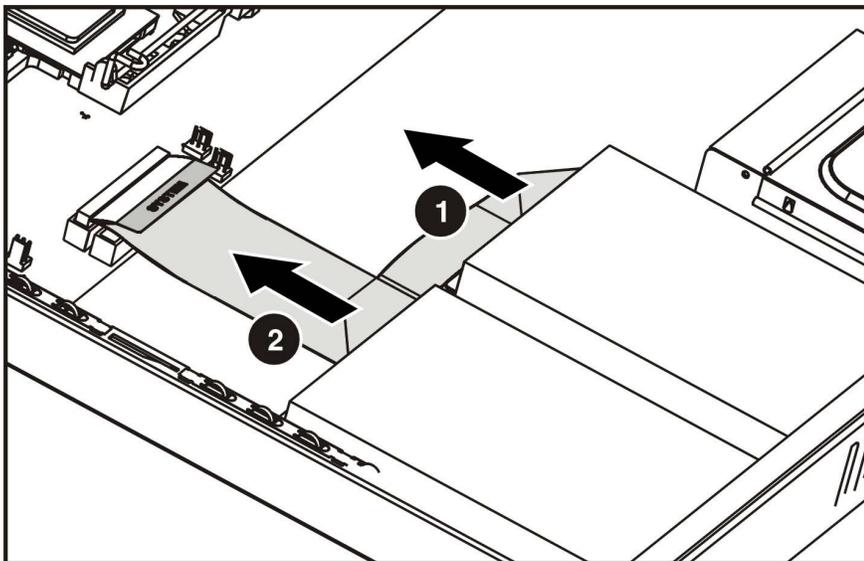


Figure 2-4: Disconnecting the cables from the ATA hard drives

4. Disconnect the power cables from the hard drives.

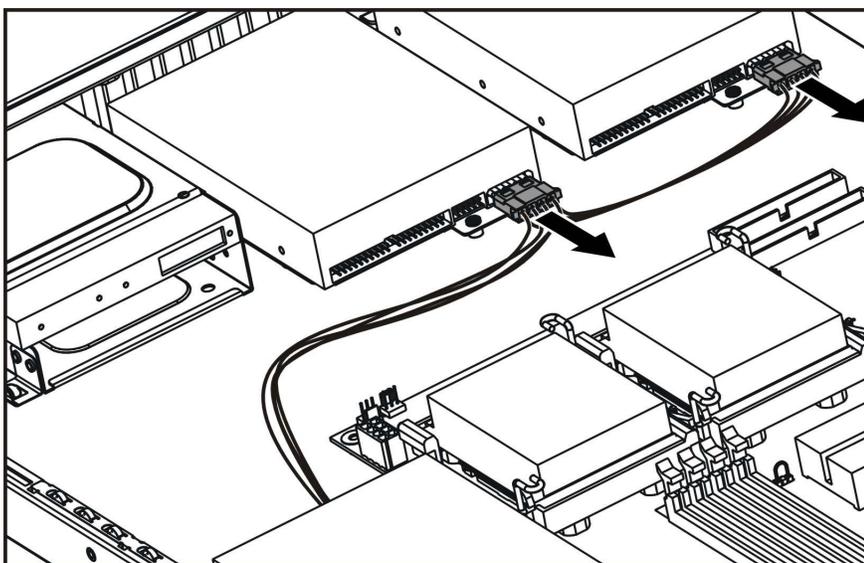


Figure 2-5: Disconnecting the hard drive power cables

5. Remove the hard drive and hard drive tray:
 - a. Remove the screw that secures the hard drive tray to the chassis (1).
 - b. Slide the tray toward the rear of the server and lift the tray out of the chassis (2).

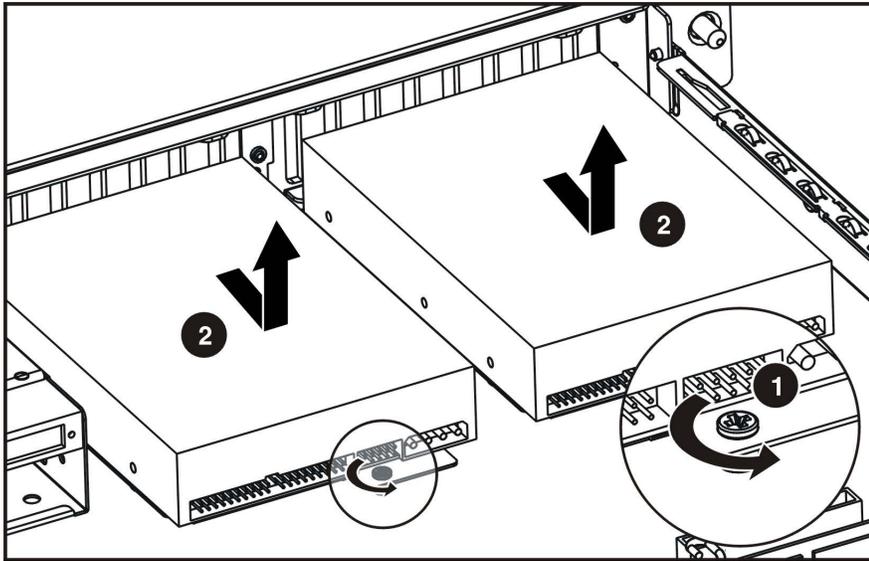


Figure 2-6: Removing the hard drive tray from the chassis

6. Remove the four screws that secure the hard drive to the hard drive tray (1).
7. Remove the hard drive from the hard drive tray (2).

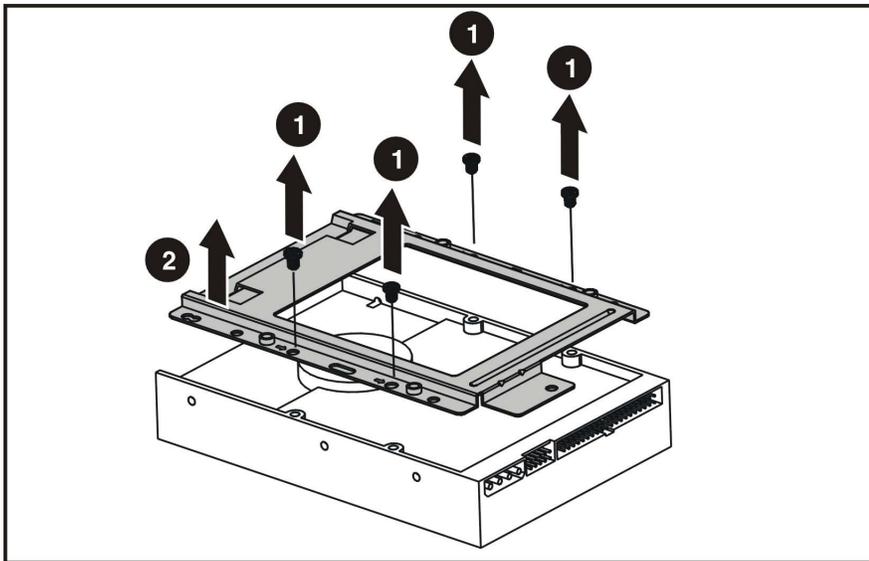


Figure 2-7: Removing the hard drive from a hard drive tray

Reverse steps 1 through 7 to replace the hard drive.

Power Switch Board

To remove the Power Switch Board:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the cable attached to the Power Switch Board.
4. Remove the two screws (1) and slide the Power Switch Board toward the rear of the server (2) and lift to remove the board.

IMPORTANT: Remove the Power Switch Board carefully to avoid damaging the LEDs.

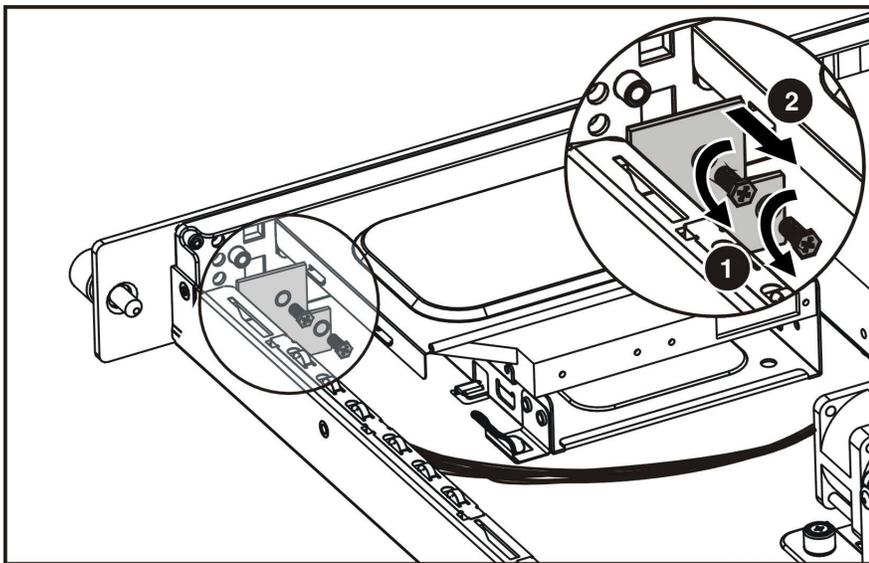


Figure 2-8: Removing the Power Switch Board

Reverse steps 1 through 4 to replace the Power Switch Board.

PCI Riser Board Assembly

To remove the PCI riser board assembly:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Disconnect any cables connecting an existing expansion board to the system board.
4. Lift and remove the assembly from the server chassis (1).

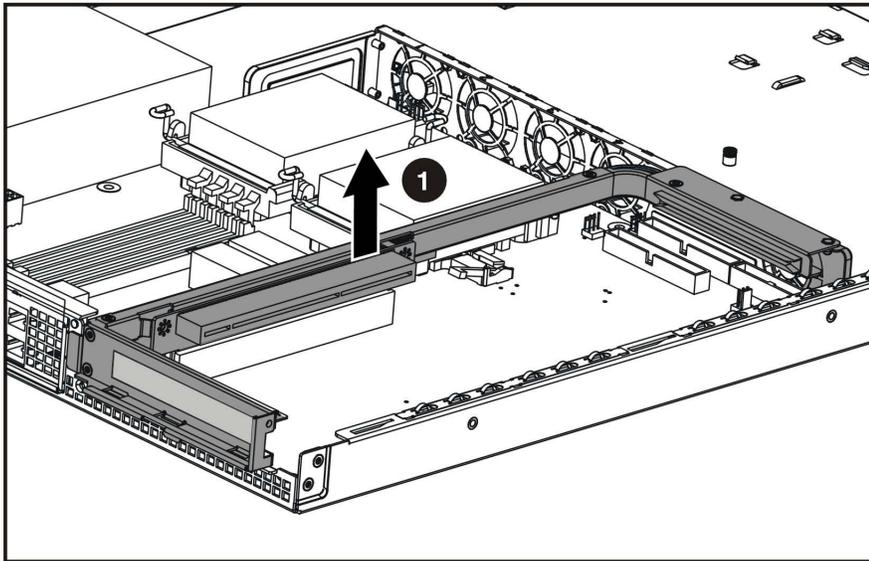


Figure 2-9: Removing the PCI riser board



CAUTION: When removing the PCI riser board assembly, avoid damage to the system cables

When replacing an expansion board, refer to “Expansion Board” following this procedure.

IMPORTANT: Do not replace the PCI riser board assembly in the chassis unless all installation and cabling procedures are complete.

Reverse steps 1 through 5 to replace the PCI riser board assembly, ensuring that the assembly seats properly in the retainers on the rear of the chassis and the guides located on the fan bracket.

Expansion Board

To remove an expansion board:



CAUTION: To avoid the risk of damage to the system or expansion boards, remove all power cords before installing or removing an expansion board. When the front panel power switch is off, auxiliary power is still connected to the PCI expansion slot and may damage the card.

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Disconnect all cables from the expansion board.
4. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.
5. Remove the PCI riser Board assembly screw(1)
6. Apply even pressure to pull the expansion board out of its socket in the PCI riser board assembly (2).

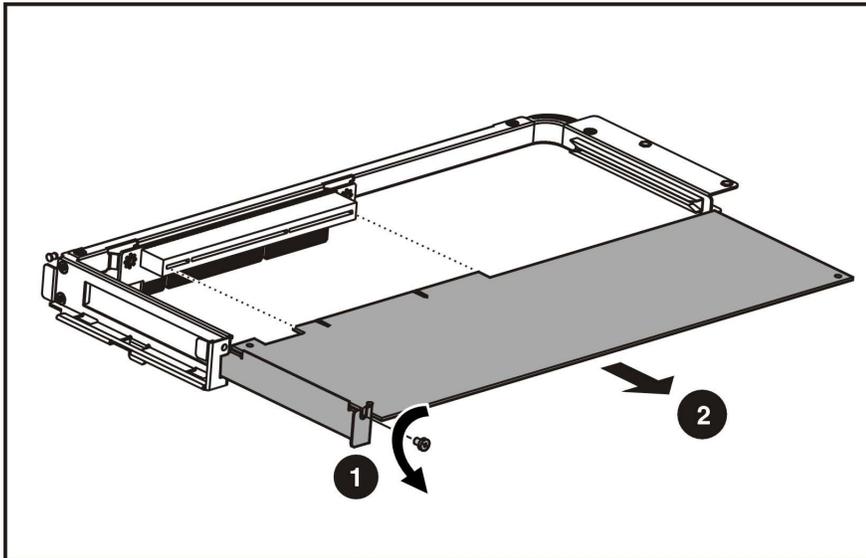


Figure 2-10: Removing an expansion board from the PCI riser board assembly

Reverse steps 1 through 6 to replace an expansion board. Use the PCI card guide on the assembly to position the board in the socket.

IMPORTANT: Ensure that the expansion board is seated securely in the expansion slot before replacing the PCI riser board assembly and access panel.

Fan Bracket

To remove the fan bracket:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.



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

4. Disconnect the fan bracket fan cables (1~5) from the fan connectors on the system board.

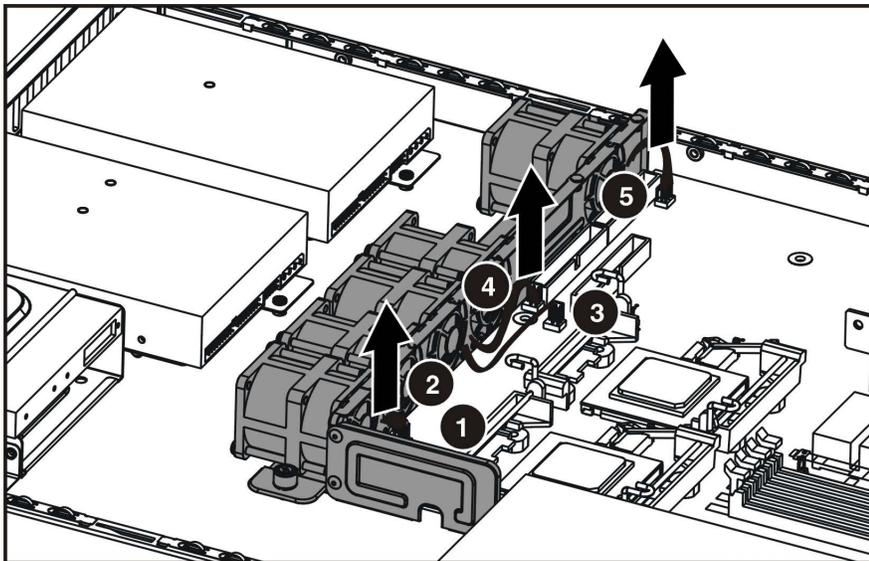


Figure 2-11: Disconnecting the fan bracket power cables (processor heatsinks removed for clarity)

5. Loosen the fan bracket thumbscrew (1).
6. Push the fan bracket toward the power supply side of the chassis to clear the alignment tab and lift fan bracket out (2).

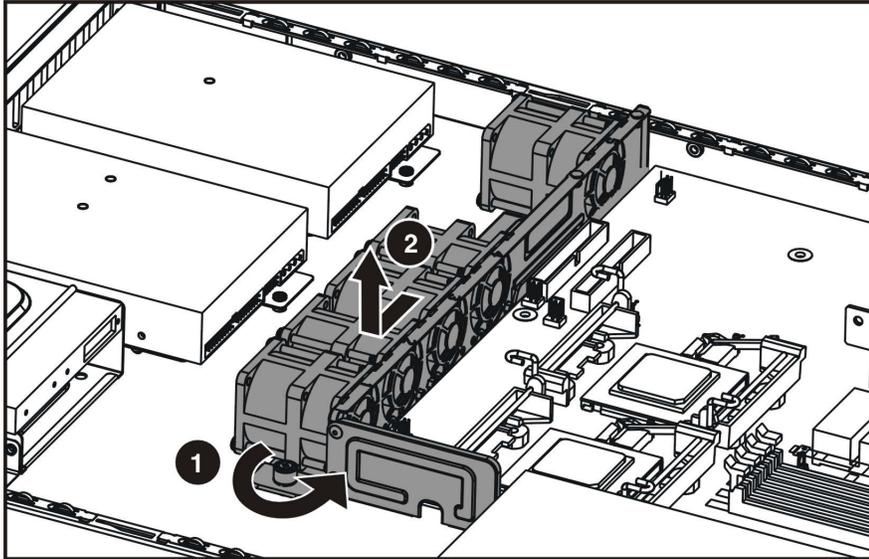


Figure 2-12: Unlocking the fan bracket and clearing the fan bracket alignment tab

Reverse steps 1 through 6 to replace the fan bracket.

IMPORTANT: See Server Access Panel Label or System Board Connector section later in this manual for correct fan cable connections.



CAUTION: When installing fan bracket assembly, avoid damage to the power supply and fan cables

Fans

The server contains five system fans. The fans are located on the fan bracket.

Use the following figure and table to locate the system fans.

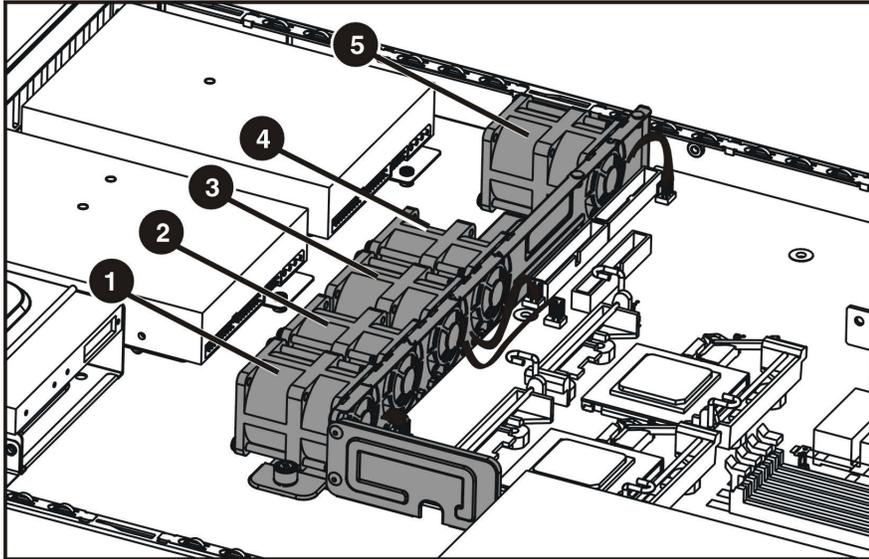


Figure 2-13: Locating the system fans

NOTE: Fans are spared and replaced individually. Each fan listed in table 2-1 is a separate spare.

Table 2-1: System Fans

Item	Component
1	Fan 1
2	Fan 2
3	Fan 3
4	Fan 4
5	Fan 5

Cables

The following sections of this guide contain removal and replacement procedures for the standard cables that ship with the server:

- ATA/100 cables
- Optical CD-Rom Drive Assembly cable.
- Front USB cables.

ATA Hard Drive Cables

To remove the ATA cables:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.
4. Remove the fan bracket. See “Fan Bracket” in this chapter.
5. Disconnect the ATA hard drive cable from the primary ATA controller (1) and hard drive connector (2, 3).

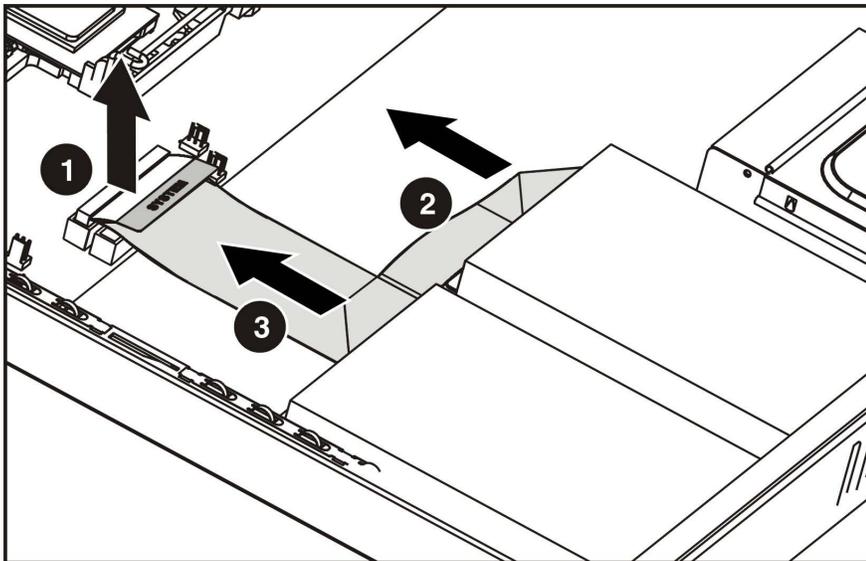


Figure 2-14: Disconnecting the ATA cables

Reverse steps 1 through 5 to replace the ATA cables.

Optical CD-ROM Drive Assembly Cable

To remove the optical CD-ROM drive assembly cable:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.
4. Remove the fan bracket. See “Fan Bracket” in this chapter.
5. Disconnect the optical CD-ROM drive assembly cable from the optical device assembly backplane (1).
6. Disconnect the optical CD-ROM drive assembly cable from the system board (2).

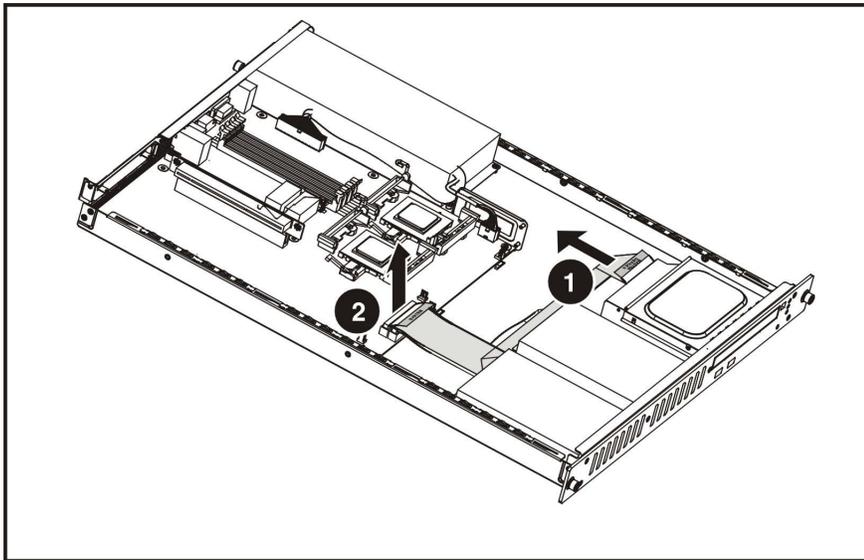


Figure 2-15: Disconnecting the optical device assembly cable

Reverse steps 1 through 6 to replace the optical device assembly cable.

Front USB Cable

To remove the Front USB cable:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.
4. Remove the fan bracket. See “Fan Bracket” in this chapter.
5. Remove the optical CD-ROM drive assembly; see “Optical CD-ROM Drive Assembly” in this chapter.
6. Remove the hard drive tray(s), See “Hard Drive” in this chapter.
7. Disconnect the USB cable from the system board (1).

Remove the USB Cable from the front of the chassis (2) using a flat blade screwdriver to depress plastic tabs (top and bottom of connectors).

NOTE: The top tabs can be accessed once the CD-ROM Drive assembly is removed. The bottom tabs can be accessed from the bottom of the server.

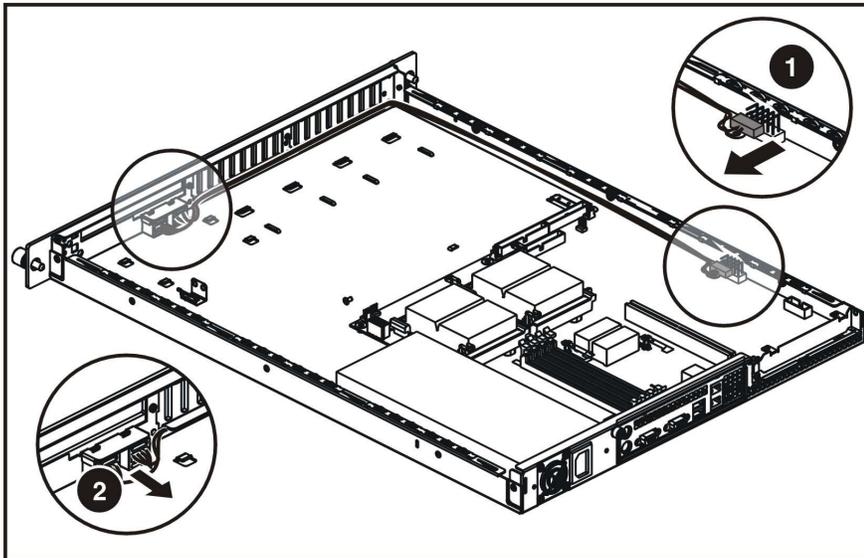


Figure 2-16: Remove the front USB cable.

Reverse steps 1 through 7 to replace the optical device assembly cable.

Power Supply

To remove the power supply:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.
4. Remove the fan bracket. See “Fan Bracket” in this chapter.
5. Disconnect the hard drive power cables from the hard drives (1).
6. Disconnect the optical CD-ROM drive assembly power cable from the optical CD-ROM drive assembly (2).
7. Disconnect the AUX power supply cable (3) and System power supply cable (4) from the power supply connector on the system board by pressing the locking tab on the side of the connector and pulling upwards.
8. Remove the four power supply screws that secure the power supply unit to the chassis (5), (6).
9. Slide the power supply away from the back of the chassis and lift it from the server (7).

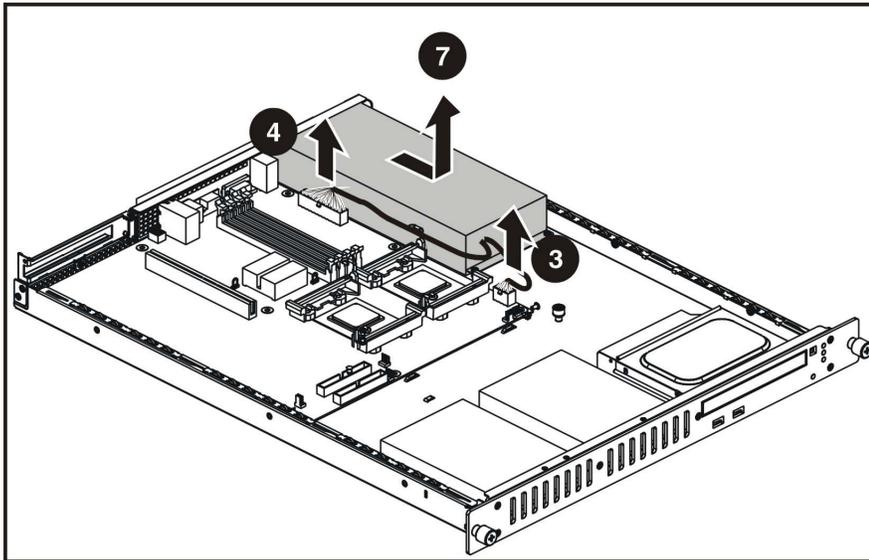
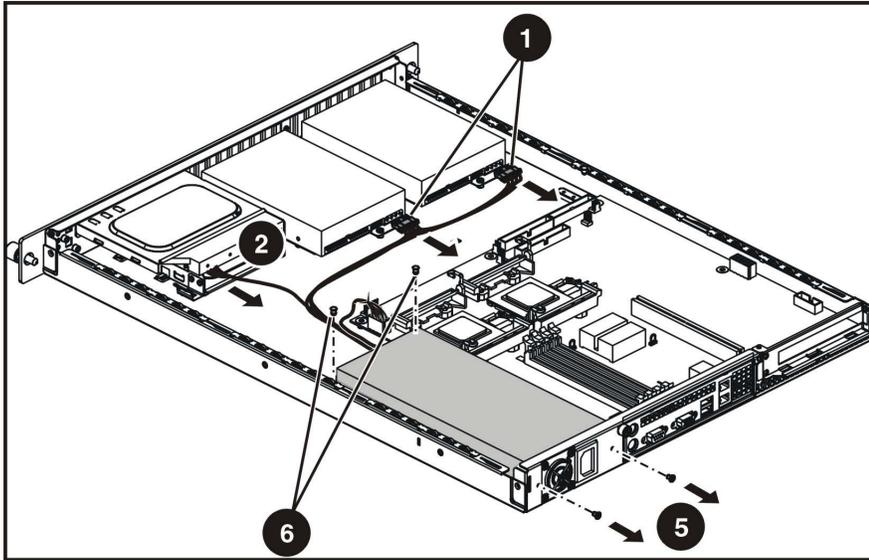


Figure 2-17: Removing the power supply

Reverse steps 1 through 9 to replace the power supply.

Battery

If the server no longer automatically displays the correct date and time, check the battery that provides power to the real-time clock. If necessary, replace a used battery with a CR2032 lithium battery. Under normal use, battery life is at least 5 years.



WARNING: This server contains either an internal lithium manganese dioxide, or a vanadium pent oxide battery. There is a 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.
 - Do not expose to temperatures higher than 60°C (140°F).
 - Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
 - Replace only with the spare designated for this product.
-



CAUTION: Loss of BIOS settings occurs when the battery is removed. BIOS settings must be reconfigured whenever the battery is replaced.



CAUTION: Batteries, battery packs, and accumulators should not be disposed of together with general household waste. Use the public collection system or return used batteries to your authorized partners or their agents for proper recycling and disposal.

To remove the battery:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Locate the battery on the system board (1).

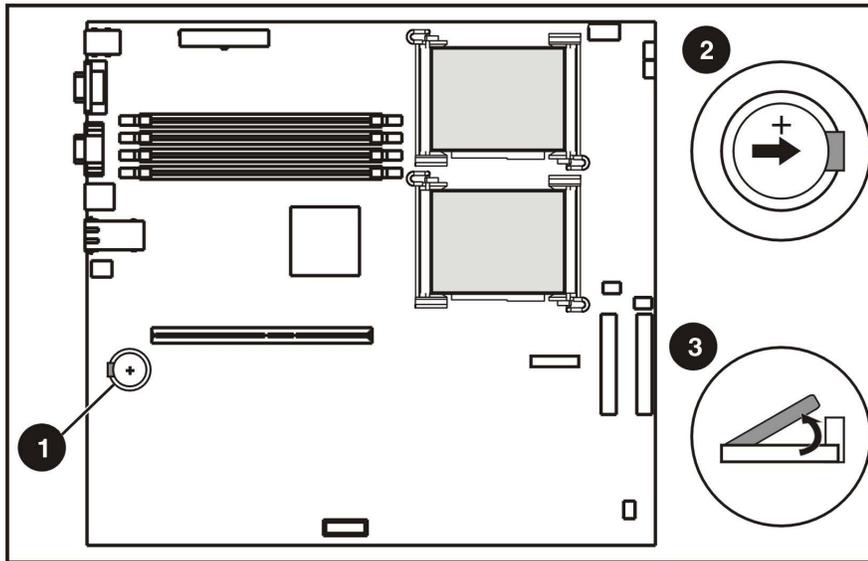


Figure 2-18: Locating and removing the system battery

4. If necessary, remove the PCI riser board assembly to access the battery location. See “PCI Riser Board Assembly” in this chapter.
5. Press the battery release lever away from the battery (2).
6. Lift the battery on the lever side and pull it out of the holder (3).

IMPORTANT: Do not bend the retaining clip during battery replacement. For proper operation, the clip must maintain a position of contact with the battery.

Reverse steps 1 through 6 to replace the battery, ensuring that the new battery is installed with the positive side up.

Memory Modules

The server supports up to four PC2100 DDR ECC registered SDRAM DIMMs installed in four sockets on the system board.

NOTE: Populate the DIMM sockets in descending sequential order, starting with DIMM socket 4.

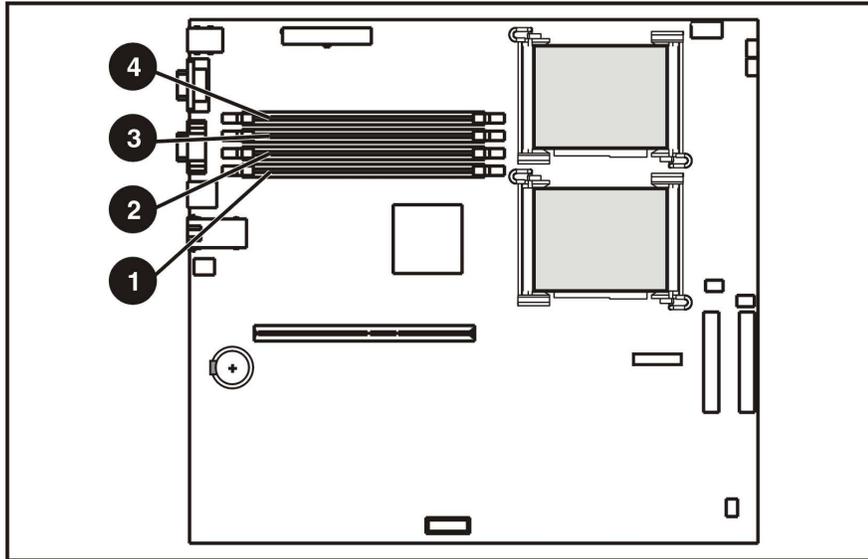


Figure 2-19: Identifying DIMM sockets on the system board

Table 2-2: DIMM Socket Identification

Item	Description
1	DIMM socket 1
2	DIMM socket 2
3	DIMM socket 3
4	DIMM socket 4

Observe the following guidelines when installing additional memory:

- DIMMs must be industry-standard, 512-MB, or 1-GB, 3-cm (1.2-in), 184-pin PC2100, 266-MHz DDR ECC memory DIMMs. The DDR memory DIMMs must support CAS Latency 2, where CL=2 or greater. They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD) information.
- DIMMs installed in the server must be registered DDR, 2.5 volts and 64-bits wide.
- Do not mix ECC and non-ECC DIMMs or DIMMs of different speeds. If different types of DIMMs are mixed, the system will not function properly.

IMPORTANT: A DIMM can be installed only one way. Be sure to match the key slots on the module with the tabs on the memory slot. Push the module down into the slot until it is fully inserted and properly seated. The system will not recognize improperly aligned or seated DIMMs.

To replace a DIMM from the system board:

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



CAUTION: ESD can damage electronic components. Ensure that you are properly grounded before beginning any installation procedure. Refer to “Electrostatic Discharge Information” in this chapter.

2. Remove the top cover. See “Top Cover” in this chapter.
3. Press both memory module socket latches outward (1). This action releases the module and partially lifts it out of the socket.
4. Lift out the memory module (2).

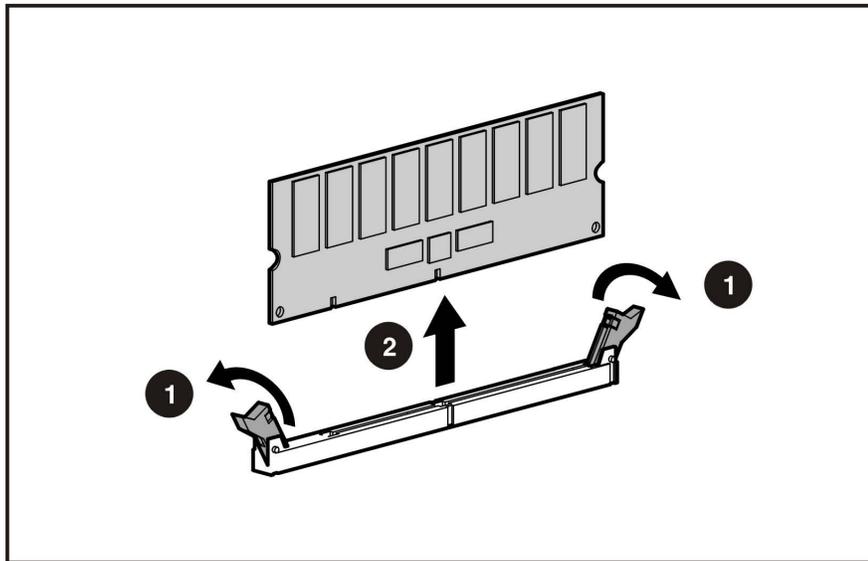


Figure 2-20: Removing a DIMM from a DIMM socket

5. Align the key slot in the bottom edge of the DIMM with the tab in the expansion socket.

-
6. To install a DIMM, gently push the DIMM into the socket on the system board (1). As the DIMM enters the socket and is properly seated, the latches close (2).

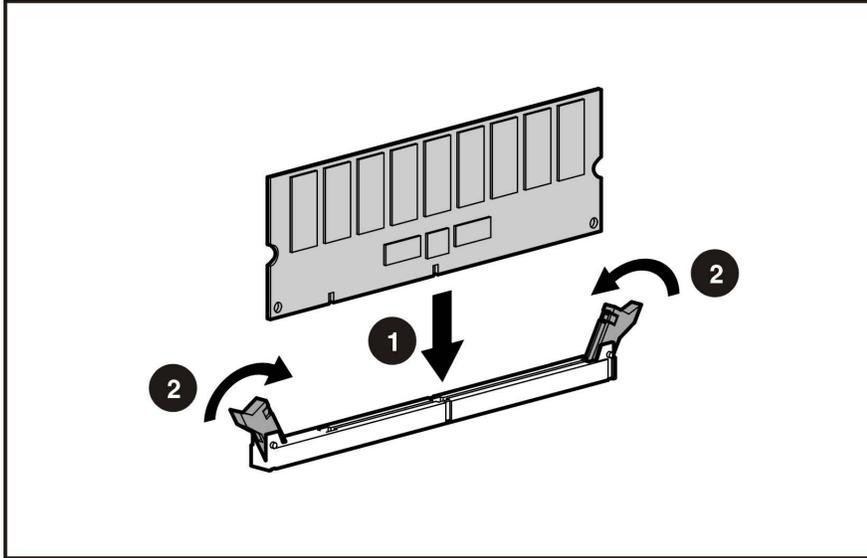


Figure 2-21: Installing a DIMM in a DIMM socket



CAUTION: Use only HP supplied DIMMs. DIMMs from other sources can adversely affect data integrity.

-
7. Press down firmly on the DIMM while pushing the latches inward until the latches snap into place.

Processor



CAUTION: Always use a new heatsink when replacing processors. Failure to use new components can cause damage to the processor.

To remove the processor:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Locate the processor on the system board.

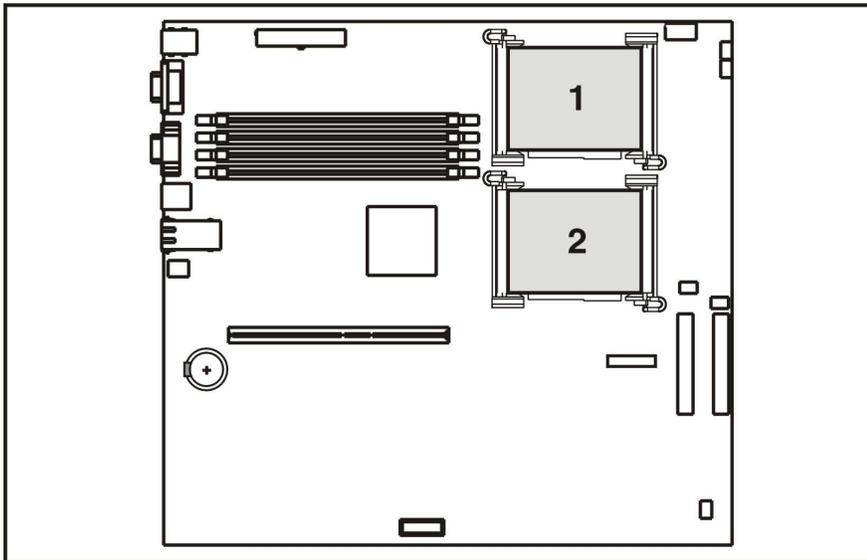


Figure 2-22: Locating the processor on the system board



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



CAUTION: Processor socket 1 must be populated at all times. Failure to replace the processor results in the system failing to boot and halting during POST. This error prevents the system from functioning properly.

4. Disengage the retaining clips on each side of the heatsink (1).
5. Remove the heatsink from the top of the processor (2).

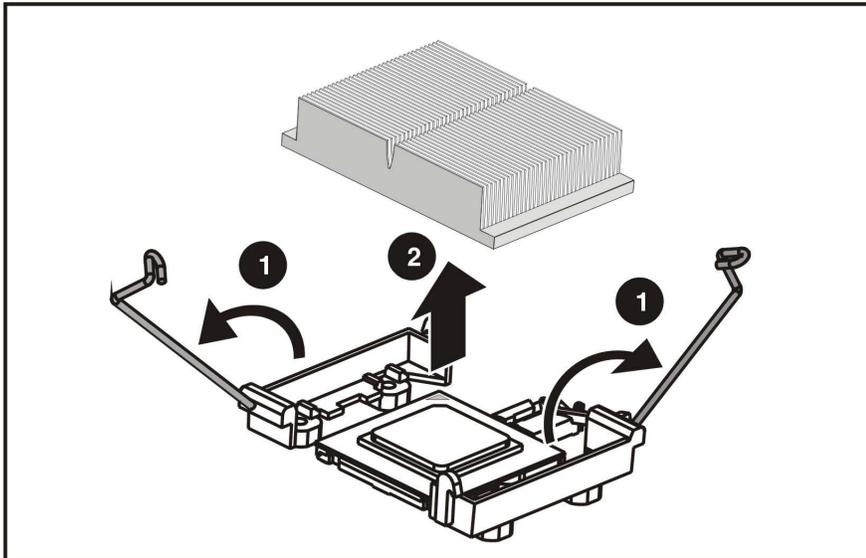


Figure 2-23: Disengaging the heatsink retaining clips (one on each side) and removing the heatsink (both retaining clips disengaged)

6. Lift the processor locking lever (1) and lift the processor from the socket (2).

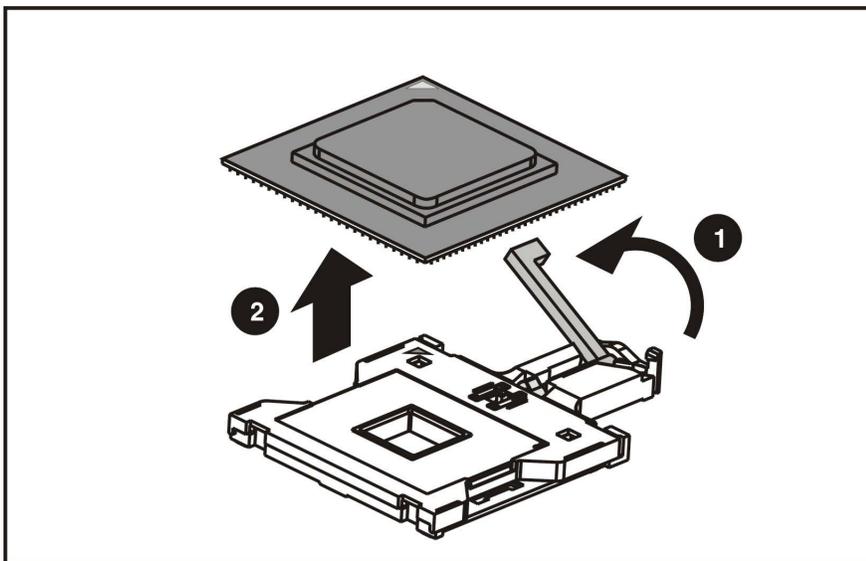


Figure 2-24: Removing the processor from the system board

Reverse steps 1 through 6 to reinstall the processor and heatsink.



CAUTION: Always use a new heatsink when replacing processors. Failure to use new components may result in damage to the processor.

System Board

To remove the system board:

1. Power down the server. See “Powering Down the Server” in this chapter.
2. Remove the top cover. See “Top Cover” in this chapter.
3. Remove the PCI riser board assembly. See “PCI Riser Board Assembly” in this chapter.
4. Disconnect the fan cables 1 through 5. See “Fans” in this chapter.
5. Remove any DIMMs. See “Memory Modules” in this chapter.
6. Remove the fan bracket. See “Fan Bracket” in this chapter.
7. Disconnect the power supply from the system board. See “Power Supply” in this chapter.
8. Disconnect the optical CD-ROM drive assembly cable from the system board. See “Optical CD-ROM Drive Assembly Cable” in this chapter.
9. Disconnect the ATA drive cables from the hard drives. See “Hard Drives” in this chapter.
10. Remove the processor(s). See “Processor” in this chapter.



CAUTION: Always use a new heatsink when replacing processors on the system. Failure to use new components may result in damage to the processor. See “Processor” in this chapter.

11. Remove 8 heatsink retention module screws and heatsink retention module 4 (1).
12. Remove all screws that secure the system board to the chassis (2).
13. Slide the system board toward the front of the chassis, ensuring that the board unseats from all the alignment keys, and lift the board up and away from the keys (3).

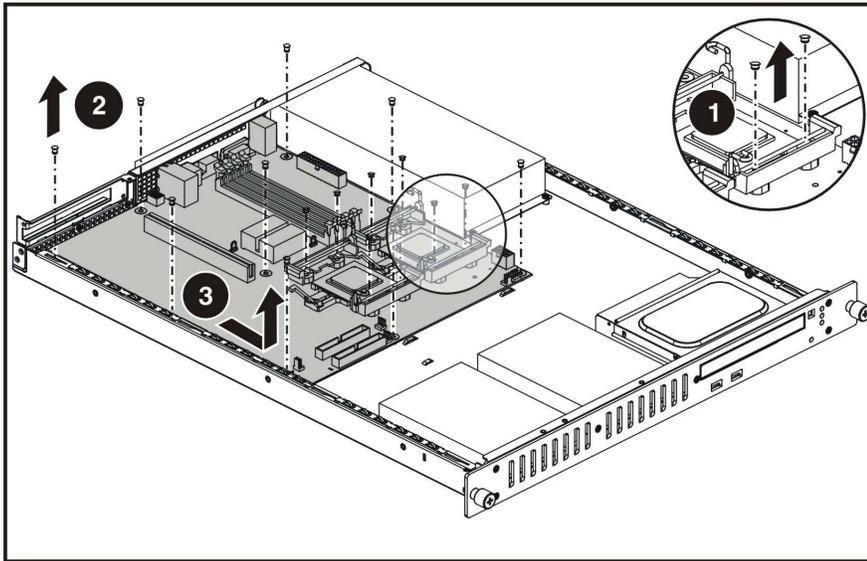


Figure 2-25: Removing the system board

Reverse steps 1 through 13 to replace the system board.

Diagnostic Tools

This chapter provides an overview of the software and firmware diagnostic tools available for HP ProLiant DL140 servers.

Diagnostic Tools Utility Overview

The following utilities assist in diagnosing problems, testing hardware, and monitoring and managing server operations.

Table 3-1: Diagnostic Tools

Tool	What it is	How to run it
User Diagnostics	A tool to assist testing and/or verifying operation of hardware. If problems are found, the diagnostics package isolates failures down to the replaceable part, whenever possible.	Diagnostics and utilities must be accessed when a system configuration error is detected during Power-On Self-Test (POST). Check the www.hp.com website for the most recent version of the HP ProLiant DL140 User Diagnostics.
IPMI Event Log	A log of system events such as system failures or nonfatal error conditions.	View events in the IPMI event log from the BIOS setup.
BIOS Setup	A utility used to report memory, processor, and system settings. Stores settings information in nonvolatile memory.	Run BIOS Setup directly by pressing the DEL key during POST.
ROM Upgrade Utility	A utility that upgrades the current system ROM.	Run this utility from the ROM Upgrade Utility after powering up the system unit. Check the www.hp.com website for the most recent version of the HP ProLiant DL140 ROM.
BMC Management Upgrade Utility	A utility that upgrades the current system management firmware.	Run this utility from the BMC Upgrade Utility after powering up the system unit. Check the www.hp.com website for the most recent version of the HP ProLiant DL140 management firmware.

Connectors, Switches, and LED Indicators

This chapter contains illustrations and tables identifying and describing connectors, switches, and LED indicator locations on the front panel, rear panel, system board, and hard drives for the HP ProLiant DL140 server.

Connectors

This section contains figures and tables showing connector locations on the front panel, rear panel, PCI riser board assembly, and the system board of the server.

Rear Panel Connectors

The following figure and table show the connectors on the rear panel of the server.

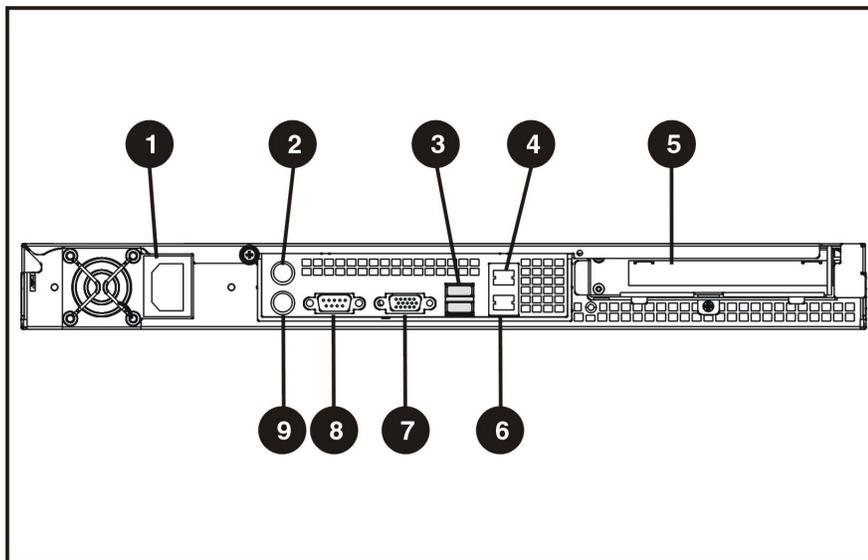


Figure 4-1: Rear panel connectors

Table 4-1: Rear Panel Connectors

Item	Description
1	Power connector
2	Mouse connector
3	Dual USB connector
4	RJ-45 GbE connector for NIC 2 (supports WOL, PXE)
5	Expansion slot
6	RJ-45 GbE connector for NIC 1 (supports WOL, PXE)
7	Video connector
8	Serial connector
9	Keyboard connector

Expansion Slot Connector

The following figure and table shows the PCI expansion board slot connector and expansion board slot cover.

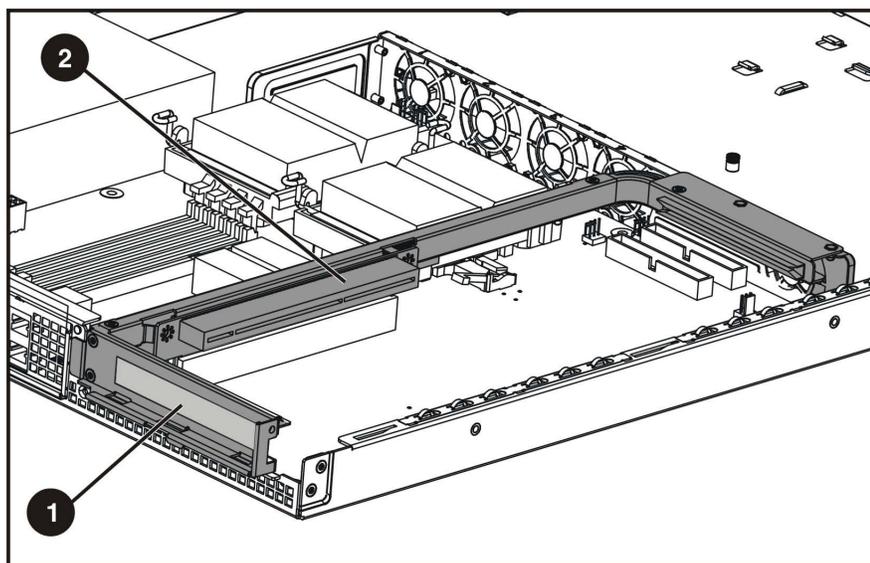


Figure 4-2: Expansion slot connector

Table 4-2: Expansion Slot

Item	Description
1	Expansion board slot cover
2	64-bit 133-MHz PCI-X slot

System Board Connectors

The following figure and table show system board connectors on the system board.

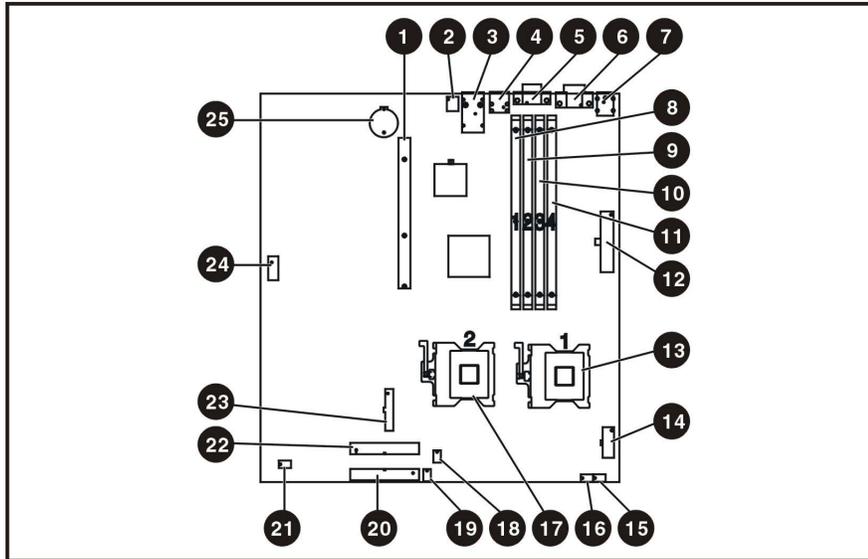


Figure 4-3: System board connectors

Table 4-3: System Board Connectors

Item	Description	Item	Description
1	PCI Riser Card Connector	14	AUX Power Connector
2	System Configuration Switch (SW1)	15	System Fan 1 Connector
3	RJ-45 GbE connectors for NIC 1 (bottom) and NIC 2 (top)	16	System Fan 2 Connector
4	Rear USB Connectors	17	Processor 2 socket
5	VGA Connector	18	System Fan 3 Connector
6	Serial Port	19	System Fan 4 Connector
7	Keyboard (Bottom) and Mouse (Top) connectors	20	CD-ROM IDE Connector
8	DIMM socket 1	21	System Fan 5 Connector
9	DIMM socket 2	22	ATA Hard Drive Connector
10	DIMM socket 3	23	Power Switch Board connector
11	DIMM socket 4	24	Front Panel USB Connector
12	Power Connector	25	System Battery
13	Processor 1 socket		

System Switches

The server has a switch bank (SW1) for system configuration

Refer to the labels on the inside of the server top cover or to the following sections for the proper switch settings. The following figure and table show the location of the system switch.

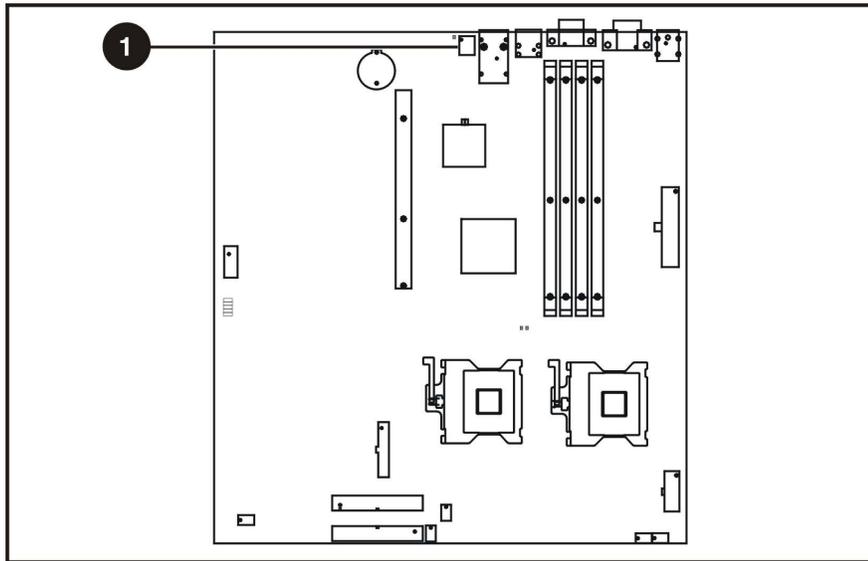


Figure 4-4 : System switches

Table 4-4: System Switches

Item	Description
1	System configuration switch (SW1)

System Configuration Switch (SW1)

The system configuration switch (SW1) is a four-position switch used for system configuration. Refer to the labels attached to the inside of the server top cover for proper system configuration settings. The following table shows the shipping system configuration switch settings of SW1.

Table 4-5: System Configuration Switch (SW1) Settings

Position	Function	Default	Description
S1	PASSWORD CLEAR	OFF	ON = PASSWORD CLEAR OFF = NORMAL
S2	CMOS CLEAR	OFF	ON = CMOS CLEAR OFF = NORMAL
S3	RECOVERY MODE	OFF	ON = RECOVERY MODE OFF = NORMAL
S4	CONFIGURATION LOCK	OFF	ON = CONFIGURATION LOCK OFF = NORMAL

NOTE: "On" activates the function.

LED Indicators

This section contains illustrations and descriptions for the following internal and external server LEDs:

- Front panel
- Rear panel
- System board

Front Panel LED Indicators

Front panel status LEDs allow constant monitoring of basic system functions while the server is operating.

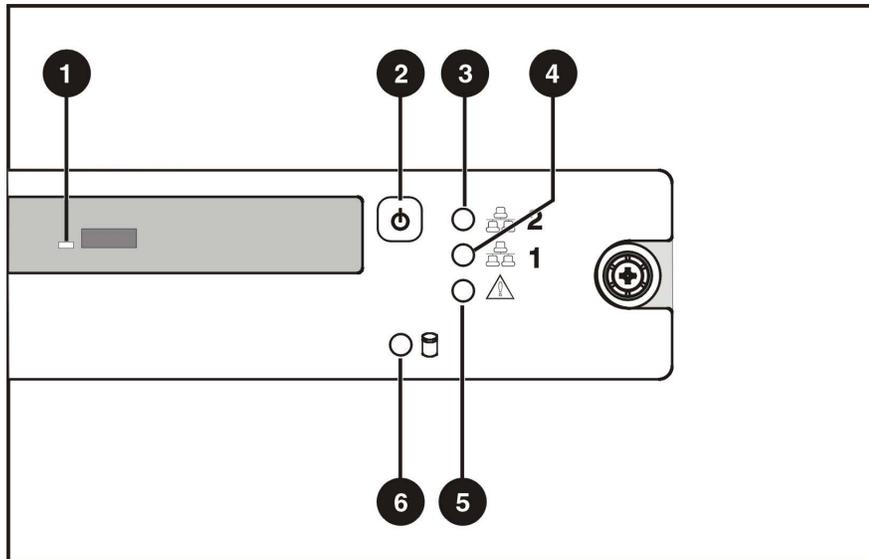


Figure 4-5: Front panel LEDs

Table 4-6: Front Panel LEDs

Item	LED Description	Status
1	Optical CD-ROM drive activity	On = Activity Off = No activity
2	Power On/Off Button	Green = System has AC power and is turned on. Off = Standby mode or System is not powered on. Blinking Green = Hibernate.
3	NIC 2 link/activity	On (Green) = Link Off = No Link Blinking Green = Activity
4	NIC 1 link/activity	On (Green) = Link Off = No Link Blinking Green = Activity
5	Server Status	Off = Good Red = Critical Error as following: <ul style="list-style-type: none"> • At least one fan failure • At least one processor failure • At least one of the temperature sensors reached critical temperature • At least one processor VRM failure • At least one memory module exceeds the max single bit error rate
6	Hard drive activity	Blinking Green = Activity Off = No Activity

Rear Panel LED Indicators

The server rear panel contains two LEDs that allow monitoring of network activity and server identification.

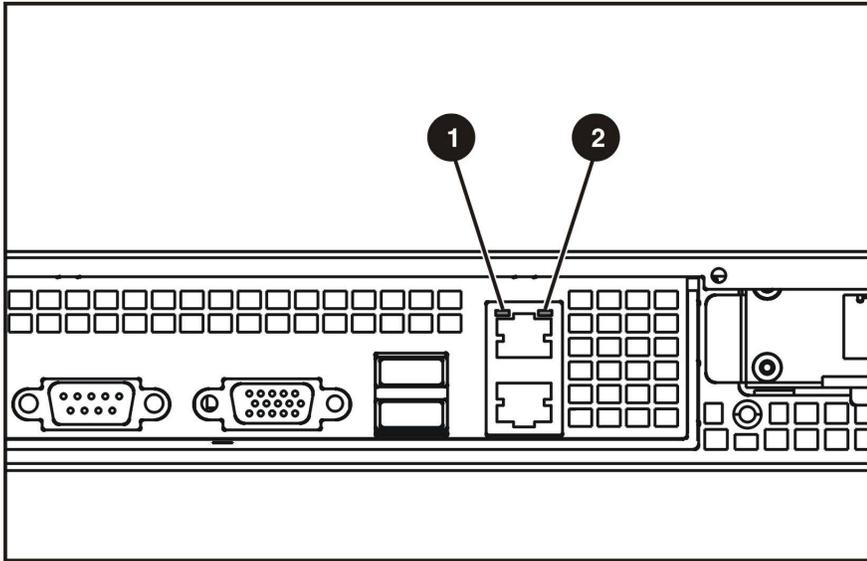


Figure 4-6: Rear panel LEDs

Table 4-7: Rear Panel LEDs

Item	Description	Status
1	NIC 1 link/activity	On (Green) = Link Off = No link Blinking Amber = Activity
2	NIC 2 link/activity	On (Green) = Link Off = No link Blinking Amber = Activity

Internal LED Indicator

The system board contains an internal power status LED for use during troubleshooting operations. When the LED is illuminated, adequate power is available to the system from the power supply. If the LED is not illuminated, either the power cord is not connected or the power supply has failed.

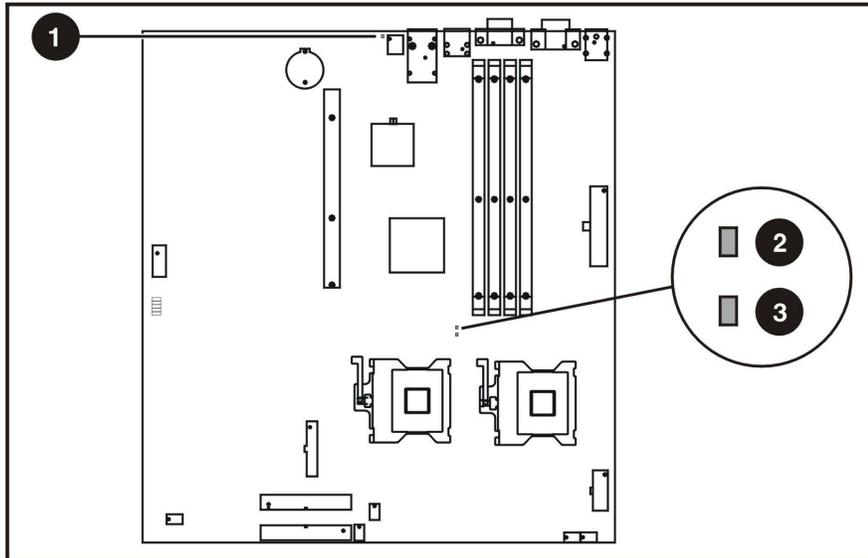


Figure 4-7: Power status LEDs

Table 4-8: Power status LED

Item	Description	Location	
1	AC Power	CR10	On = Activity Off = No activity
2	Multi bit error	CR15	On = Activity Off = No activity
3	Single bit error	CR17	On = Activity Off = No activity

IPMI Event Log Code List

The IPMI Event Log Code List can be used in conjunction with the IPMI Event log found in the BIOS setup to assist in troubleshooting of the unit.

Fan

Discrete Event/Reading class. Sensor numbers are from 01h to 05h.

Error Type*

* See IPMI event log description details.

Memory

Discrete Event /Reading class. Sensor number is 06h.

Error Type	Data1	Data2	Data3
Correctable ECC	00h	FFh	FFh
Uncorrectable ECC	01h	FFh	FFh

Processor

Discrete Event /Reading class. Sensor numbers are from 07h to 08h.

Error Type	Data1	Data2	Data3
IERR	00h	FFh	FFh
Presence detected	07h	FFh	FFh

Voltage

Discrete Event /Reading class. Sensor number is 09h.

Error Type	Data1	Data2	Data3
VRM Failure asserted	01h	FFh	FFh

Threshold Event /Reading class. Sensor numbers are from 0Eh to 12h.

Error Type	Data1	Data2	Data3
Voltage Over Err	59h	(Read Value)	(Threshold Value)
Voltage Over Warn	57h	(Read Value)	(Threshold Value)
Voltage Low Err	52h	(Read Value)	(Threshold Value)
Voltage Low Warn	50h	(Read Value)	(Threshold Value)

Temperature

Discrete Event /Reading class. Sensor number is 0Ch.

Error Type	Data1	Data2	Data3
Thermal Trip State asserted	01h	FFh	FFh

Threshold Event /Reading class. Sensor numbers are 0Ah, 0Bh and 0Dh.

Error Type	Data1	Data2	Data3
Thermal Trip State asserted	01h	FFh	FFh
Upper Critical	59h	(Read Value)	(Threshold Value)
Upper Non-critical	57h	(Read Value)	(Threshold Value)

System Firmware

Error Type	Data1	Data2	Data3
System Firmware Error			
Unspecified			
CMOS_MEMORY_SIZE_ERR	E0h	00h	01h
PASSWORD_CHECK_ERR	E0h	00h	02h
PASSWORD_CHECK_ERR_NON_CRITICAL	E0h	00h	03h
CMOS_BATTERY_ERR	E0h	00h	04h
CMOS_DIAG_STS_ERR	E0h	00h	05h
CMOS_CHECKSUM_ERR	E0h	00h	06h
CMOS_DATE_TIME_ERR	E0h	00h	07h
PMM_MEM_ALLOC_ERR	E0h	00h	08h
SEGMENT_REG_ERR	E0h	00h	09h
ADM_MODULE_ERR	E0h	00h	0Ah
LANGUAGE_MODULE_ERR	E0h	00h	0Bh
No usable system memory	E0h	02h	01h
Unrecoverable hard-disk/ATAPI/IDE device failure			
HDD_0_ERR	E0h	03h	01h
HDD_1_ERR	E0h	03h	02h
HDD_2_ERR	E0h	03h	03h
HDD_3_ERR	E0h	03h	04h
ATAPI_0_ERR	E0h	03h	05h
ATAPI_1_ERR	E0h	03h	06h
ATAPI_2_ERR	E0h	03h	07h
ATAPI_3_ERR	E0h	03h	08h
ATA_SMART_FEATURE_ERR	E0h	03h	09h
Unrecoverable system-board failure			
REFRESH_TIMER_ERR.	E0h	04h	01h

Error Type	Data1	Data2	Data3
DMAC_PAGE_REG_ERR	E0h	04h	02h
DMAC1_CH_REG_ERR	E0h	04h	03h
DMAC2_CH_REG_ERR	E0h	04h	04h
TIMER_COUNT_RW_ERR	E0h	04h	05h
Unrecoverable PS/2 or USB keyboard failure			
KBC_BAT_TEST_ERR	E0h	07h	01h
INSERT_FUNC_KEY_ERR	E0h	07h	02h
KBD_LOCK_ERR	E0h	07h	03h
KBC_INTERFACE_ERR	E0h	07h	04h
NO_KBD_ERR	E0h	07h	05h
No video device detected			
DISPLAY_MEMORY_ERR	E0h	0Ah	01h
CMOS_DISPLAY_ERR	E0h	0Ah	02h
System Firmware Progress			
Option ROM initialization	C0h	08h	FFh
Video initialization	C0h	09h	FFh
Keyboard controller initialization	C0h	0Ch	FFh
Keyboard test	C0h	17h	FFh

Watchdog Timer

Error Type	Data1	Data2	Data3
Hard Reset	C1h	xxh ²	FFh
Power Down	C2h	xxh ²	FFh
Power Cycle	C3h	xxh ²	FFh

Note 1: FFh indicates an unspecified value.

Note 2: 7:4 interrupt type

0h = none

1h = SMI

2h = NMI

3h = Messaging Interrupt

Fh = unspecified

all other = reserved

3:0 timer use at expiration:

0h = reserved

1h = BIOS FRB2

2h = BIOS/POST

3h = OS Load

4h = SMS/OS

5h = OEM

Fh = unspecified

all other = reserved

Specifications

This chapter provides operating and performance specifications for HP ProLiant DL140 server components and optional hardware, including:

- System unit
- Power supply
- Memory
- Optical CD-ROM drive Assembly
- Integrated Ultra ATA/100 controller
- Optional ATA hard drives
- Integrated Dual Broadcom 10/100/1000 NICs (Wake on LAN and PXE capable)

System Unit

Table 5-1: System Unit Specifications

Item	Description
Height	4.37 cm (1.72 in)
Depth	60.22 cm (23.7 in)
Width	43.0 cm (16.9 in)
Weight (maximum)	11.00 kg (24.2 lb)
U.S. and international input voltage requirements	
Rated input voltage	100 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	4.5A (100-120 V) / 2.5A (200-240 V)
Rated input power	440 W
BTUs per hour	1509
Temperature range ¹	
Operating	10°C to 35°C (50°F to 93°F)
Shipping	-40°C to 60°C (-40°F to 140°F)
Relative humidity (non-condensing) ²	
Operating	10% to 90%
Non-operating	10% to 95%
Maximum wet-bulb temperature	28°C (82.4°F)

¹Operating temperature has an altitude derating of 1°C per 308.4 M (1.8°F per 1000 ft). No direct sunlight.

²Storage maximum humidity of 95 percent based on maximum temperature of 45°C (113°F). Altitude minimum for storage is 70 KPa.

Power Supply

Table 5-2: Power Supply Specifications

Item	Description
Input characteristics	
Rated input voltage	100 VAC to 240 VAC
Rated input line	110VAC / 220 VAC
Frequency range	50 to 60 Hz
Rated input power	440 W
Rated input current	4.5 A (100 V) to 2.1 A (240 V)
Output characteristics	
Steady state power	325 W
Maximum peak power	422 W for 15 seconds.
Ambient temperature range	
Operating	10°C to 48°C (50°F to 118°F)
Non-operating	-40°C to 70°C (-40°F to 158°F)
Relative humidity (non-condensing)	
Operating	5% to 85%
Non-operating	5% to 95%
Dielectric voltage withstand	
Input to output	1800 VAC/second
Input to ground	1800 VAC/second
Maximum wet-bulb temperature	28°C (82.4°F)

Memory

Table 5-3: SDRAM DIMM Specifications

Item	Description
Size	512 MB and 1GB
Speed	266 MHz
Width	64 bits
Type	PC2100 ECC registered DDR SDRAM DIMMs

Note: DIMMs must be industry-standard 184-pin PC2100 DDR DIMMs. The DDR DIMMs must support CAS Latency 2, or greater. They must also contain the mandatory Joint Electronic Device Engineering Council (JEDEC) Serial Presence Detect (SPD). Use HP supplied DIMMs only.

Optical CD-ROM Drive

Table 5-4: Optical CD-ROM Drive Specifications

Item	Description
Applicable disk formats	CD-DA, CD-ROM (mode 1 and 2); CD-XA (mode 2, Form 1 and 2), CD-1 Ready; CD-Extra; Video CD, Photo CD (single and multiple session)
Capacity	550 MB (mode 1, 12 cm) 640 MB (mode 2, 12 cm)
Block size	2638, 2352 bytes (mode 0); 2352, 2340, 2336, 2048 bytes (mode 1); 2352, 2340, 2336, 2048, bytes (mode 2)
Dimensions	(Bezel Included)
Height	1.27 cm (0.5 in)
Depth	13.17 cm (5.39 in)
Width	13.26 cm (5.22 in)
Weight	<340 g (<11.98 oz)
Data transfer rate	
Sustained	150 KBps (sustained 1X) 3.6 Mbytes/s (sustained, 24X Outer Diameter)
Burst	16.6 Mbytes/s (burst)
Access times (typical)	
Full stroke	300 ms (average)
Random	140 ms (average)
Disc diameter	12 cm, 8 cm (4.7 in, 3.15 in)
Disc thickness	0.12 cm
Track pitch	1.6 μ m
Cache/buffer	128 KB
Startup time	<10s
Stop time	<4s (single); <30s (multi-session)
Laser parameters	
Type	Semiconductor Laser
Wave length	795nm
Output power	<0.25 mW
Operating conditions	
Temperature	5° to 55°C (41° to 131°F)
Humidity	10% to 80%

Integrated Ultra ATA/100 Controller

Table 5-5: Ultra ATA/100 Controller Specifications

Item	Description
Simultaneous drive transfer channels	2 channels
Transfer rate synchronous (Max)	100 MBps
Data transfer method	32-bit PCI bus master
Drive support	Ultra ATA, EIDE & Fast ATA-2
PCI bus transfer rate (maximum)	266 MBps
Data transfer modes	UDMA Modes 5/4/3/2/1/0, DMA Modes 2/1/0, PIO Modes 4/3/2/1/0
Protocol	ATA/100 compatible
Feature	CRC (Cyclical Redundancy Check)
Buffer size	128 byte

Optional Hard Drives

ATA Hard Drives

Table 5-6: ATA Hard Drive Specifications

	80 GB
Formatted capacity	80,026 MB
Height	Third, 2.54 cm (1.0 in)
Size	8.89 cm (3.5 in)
Interface	ATA/100
Transfer rate synchronous (max)	100 MBps
Single track	0.8 ms
Average	9.0 ms
Full stroke	17.0 ms
Rotational speed	7,200 rpm
Bytes/sector	512
Logical blocks	160,086,528
Operating temperature	
Celsius	5° to 55°
Fahrenheit	41° to 131°

Integrated Broadcom 10/100/1000 Gigabit Server Auto-Switching Network Interface Controller (NIC)

Table 5-7: Integrated Broadcom 10/100/1000 Gigabit Server Auto-Switching Network Interface Controller (NIC) Specifications (WOL and PXE capable)

Item	Description
Network interface	10Base-T/100Base-TX/1000Base-T Ethernet
Compatibility	IEEE 802.3
Data transfer method	64-bit, 133MHz PCI(X)1.0
Network transfer rate	10/100/1000 Mbps
Connector	RJ-45
I/O address and interrupt	Plug and Play PCI
Emissions standards	FCC class B