HP ProLiant ML110 Generation 2 Server Maintenance and Service Guide

Audience Assumptions

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

Contents

1

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and spare parts lists for the HP ProLiant ML110 Generation 2 server. Information for contacting HP is also provided.

Customer Self Repair (CSR)

What is customer self repair?

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

A convenient, easy-to-use program:

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

- Replacement parts are express-shipped. Most in-stock parts are shipped the very same day you contact HP. You may be required to send the defective part back to HP, unless otherwise instructed.

- Available for most HP products currently under warranty or contract. For information on the warranty service, refer to the HP website (http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html).

For more information about HP's customer self-repair program, contact your local service provider. For the North American program, refer to the HP website (http://www.hp.com/go/selfrepair).

Customer replaceable parts under the CSR program are identified in Table 1-1 and Table 1-2.

NOTE: Table items marked with an asterisk (*) are not shown in the figures.

Mechanical Parts Exploded View
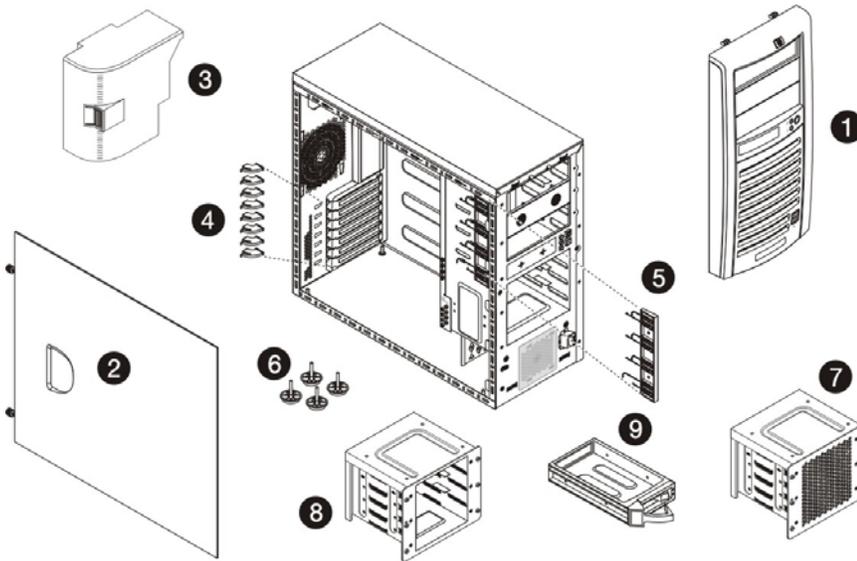
Figure 1-1: Mechanical parts exploded view

Table 1-1: Mechanical Spare Parts List

Item	Description	Assembly Number	Spare Part Number	Customer Self Repair
1	Front bezel	377587-001	382953-001	Yes
2	Access panel	—	—	—
3	Air baffle	385712-001	385758-001	Yes
4	PCI retainer clips	—	—	Yes
5	Release lever (for the full-height drive bay)	—	—	Yes
6	Feet (4)	—	—	Yes
	Hard disk drive (HDD) cage		382992-001	
7	Non-hot-plug HDD cage for SCSI	346079-001	385640-001	Yes
	Non-hot-plug HDD cage for SATA	346078-001	382992-001	
8	Hot-plug HDD cage for SATA	384522-001	384756-001	Yes
9	Hot-plug HDD carrier for SATA	—	—	Yes
10	Plastics kit *	—	382201-001	—

System Components Exploded View

Figure 1-2: System components exploded view

Table 1-2: System Components Spare Parts List

Item	Description	Assembly Number	Spare Part Number	Customer Self Repair
1	System fan	381458-001	382109-001	Yes
2	Processor heatsink-cooling fan (HSF) assembly	379265-001	382110-001	No
3	**Processor**			
	a) Intel Celeron D 2.8 GHz/533 MHz FSB with 256 KB L2 cache	367744-001	382232-001	No
	b) Intel Pentium 4 3.2 GHz/800 MHz FSB with 1 MB L2 cache *	353452-203	366644-005	No
	c) Intel Pentium 4 3.4 GHz/800 MHz FSB with 1 MB L2 cache *	353452-204	367415-005	No
4	256-MB PC3200 unbuffered DDR DIMM	326315-441	382202-001	Yes
	Boards			
5	System board	377581-001	382083-001	Yes
6	Hot-plug SATA HDD backplane board	379271-001	384859-001	Yes
7	SCSI controller card	332541-001	366651-005	Yes
8	SATA RAID controller card	372952-001	382955-001	Yes
9	HP Lights-Out 100 remote management card (IPMI card) *	383065-001	385737-001	Yes

continued

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

Item	Description	Assembly Number	Spare Part Number	Customer Self Repair
	Mass storage devices			
10	IDE CD-ROM drive (48X)	266072-001	288894-005	Yes
11	Non-hot-plug SCSI hard drive, 36 GB	357014-001	372659-005	Yes
12	Non-hot-plug SATA hard drive, 80 GB	332649-003	373311-005	Yes
	Power			
13	350-W power supply unit with cable assembly	377580-001	382097-001	Yes
	Cable assembly			
14	IDE CD-ROM drive cable assembly *	346128-001	382111-001	Yes
15	SCSI drive cable assembly	—	382156-001	
	a) SCSI cable *	346081-001	—	Yes
	b) SCSI LED cable *	346082-001	—	Yes
16	SATA drive cable assembly			
	a) SATA cable *	379267-001	382959-001	Yes
	b) SATA 4-in-1 cable *	379266-001	382960-001	Yes
17	I^{2}C LED cable *	381499-001	382956-001	Yes
18	Front panel board cable assembly *	379269-001	382203-001	Yes
19	Front USB ports cable assembly *	379268-001	382112-001	Yes
20	Return kit *	—	382204-001	Yes
	Miscellaneous processor-related spare items			
21	Alcohol pad *	229566-001	—	—
22	Thermal grease, 24 ml (Shin Etsu G751) *	182759-004	—	—

HP Contact Information

For the name of the nearest HP authorized reseller:

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

- In Canada, call 1-800-263-5868.

- In other locations, refer to the HP website at http://www.hp.com/.

For HP technical support:

- In North America:
  — Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
  — If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website at http://www.hp.com/.

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

Before You Contact HP

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

- Technical support registration number (if applicable)

- Product serial number

- Product model name and number

- Applicable error messages

- Add-on boards or hardware

- Third-party hardware or software

- Operating system type and revision level

2

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the HP ProLiant ML110 Generation 2 server.

Review the specifications of a new component before installing it to make sure it is compatible with the server. When you integrate new components into the system, record its model and serial number, and any other pertinent information for future reference. After completing any removal or replacement procedure, run the diagnostics program to verify that all components operate properly.

Hardware Configuration Tools

In performing any hardware configuration procedure you may need the following tools:

- T-15 Torx screwdriver

- Flat-blade screwdriver

NOTE: The figures used in this chapter to illustrate procedural steps are labeled numerically (i.e., 1, 2…). When these figures are used in substep items, the alphabetically labeled instructions correspond to the numbered labels on the related figure (i.e., Label 1 corresponds to step a, label 2 corresponds to step b, etc.).

Hardware Configuration Information

WARNING: Only authorized technicians trained by HP 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 the "Electrostatic Discharge Information" section for more information.

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

Non-hot-plug Device

If the device is non-hot-plug, the server must be powered down. Non-hot-plug devices in the server include the processor, all boards, memory modules, fans, PCI option cards, and non-hot-plug disk drives.

Electrostatic Discharge Information

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.**

Pre-installation Instructions

Perform the steps below before you open the server or before you remove or replace any component:

	WARNING: Failure to properly turn off the server before you open the server or before your start installing/removing components may cause serious damage as well as bodily harm.

1. Turn off the server and all the peripherals connected to it.

   Refer to the "Powering Down the Server" section in this chapter for detailed instructions on how to completely power down the server.

2. Unplug all cables from the power outlets to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

   If necessary, label each one to expedite reassembly.

3. Disconnect telecommunication cables to avoid exposure to shock hazard from ringing voltages.

4. Open the server according to the instructions described in the "System Covers" section in this chapter.

5. Follow the ESD precautions listed previously in this chapter when handling a server component.

Post-installation Instructions

Observe the following items after installing or removing a server component:

1. Be sure all components are installed according to the described step-by-step instructions.

2. Check to make sure you have not left loose tools or parts inside the server.

3. Reinstall any expansion board(s), peripheral(s), board cover(s), and system cable(s) that have previously been removed.

4. Reinstall the air baffle.

5. Reinstall the system covers.

6. Connect all external cables and the AC power cord to the system.

7. Press the power button ⏻ on the front panel to turn on the server.

> **CAUTION:** Do not operate the server for more than 10 minutes with the access panel and disk drives removed. Otherwise, improper cooling airflow may damage the system components.

Powering Down the Server

The server does not completely power down when the power button ⏻ is pressed. The button toggles between On and Standby. 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, disconnect all power cords from the server.

> **WARNING:** Hazardous voltages are present inside the server. Always disconnect AC power from the server and other associated assemblies while working inside the unit. Serious injury may result if this warning is not observed.

> **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 the system covers on. Proper cooling is not achieved when the system covers are removed.

To power down the server:

1. Shut down server as directed by the OS documentation.

2. Press the power button ⏻ to toggle to Standby.

    This places the server in standby mode changing the power LED indicator to amber. In this mode, the main power supply output is disabled. Standby does not completely disable or remove power from the system.

3. Disconnect the AC power cord from the AC outlet and then from the server.

4. Be sure that the power LED indicator is turned off and that the fan noise has stopped.

5. Disconnect all external peripheral devices from the server.

System Covers

The access panel and the front bezel are both detachable. You need to remove these system covers before you can remove or replace a server component. For better access to the system fan and the system board components you will also need to remove the air baffle.

Access Panel

The access panel must be removed to access the internal components and mass storage devices.

To remove the access panel:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel from the chassis:

    a. Loosen the two captive thumbscrews located on the rear edge of the access panel.

    b. Slide the panel back about 1.5 cm (0.5 in).

c. Pull the panel upward to remove it from the chassis.
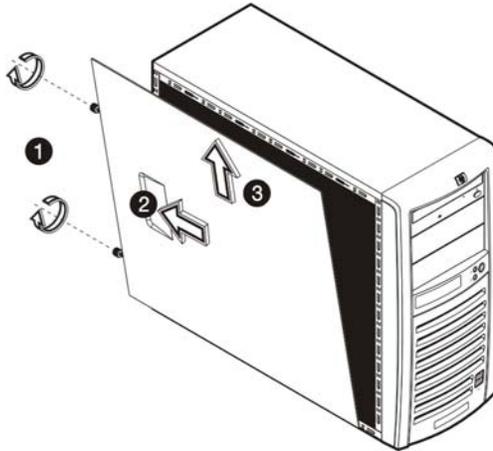
Figure 2-1: Removing the access panel

3. Place the access panel in a safe place for reinstallation later.

After completing any removal or replacement procedure, replace the access panel. Follow the steps below:

1. If you have been installing accessories or servicing the server, return the server to its normal upright position.

2. Perform steps 1 through 4 of the post-installation instructions.

3. Reinstall the access panel:

a. Use two hands to place the lower edge of the access panel at an angle to the hinge tabs along the bottom of the chassis.

NOTE: The hinge tabs are keyed to accept the panel in only one position.

b. With the panel resting on the hinge tabs, tilt it up until it engages the locking mechanism at the top of the chassis.

c. Slide the panel towards the front panel to position it into place.

d. Once the panel is attached to the chassis, secure it by tightening the two captive thumbscrews.
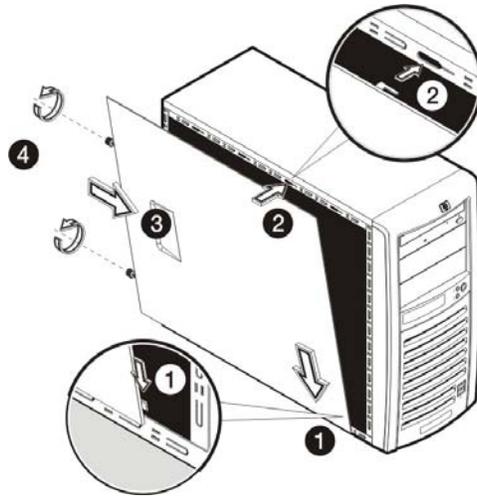
Figure 2-2: Reinstalling the access panel

4.   Perform steps 5 through 7 of the post-installation instructions.

Front Bezel

The front bezel must be removed to access the hard disk drive (HDD) cage.

To remove the front bezel:

1.   Remove the access panel.

2.   Remove the front bezel:

a.   Press the two plastic retention clips on the bottom of the bezel upward to release them from their tabs on the inside of the chassis.

b.   Tilt the bottom edge of the bezel away from the front panel to disengage it from the chassis.

c.   Detach the bottom edge of the bezel from the front panel.

d.   Pull the whole bezel away from the front panel.
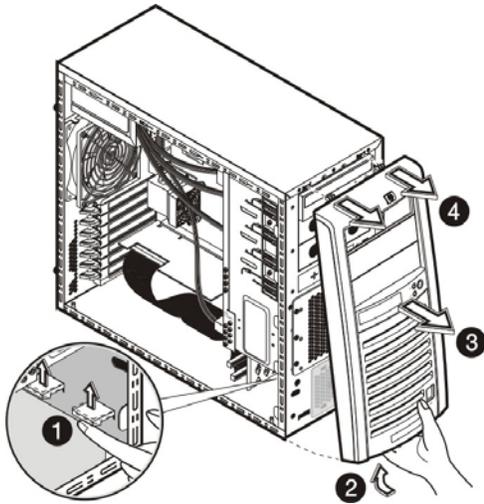
Figure 2-3: Removing the front bezel

3. Place the front bezel in a safe place for reinstallation later.

To replace the front bezel, follow the steps below:

1. Position the bezel so the two mounting tabs are aligned with their notch on the front panel, then insert the tabs into their notch.

2. Align then insert the two plastic retention clips to their notch on the front panel, and then press them firmly until they snap into place.
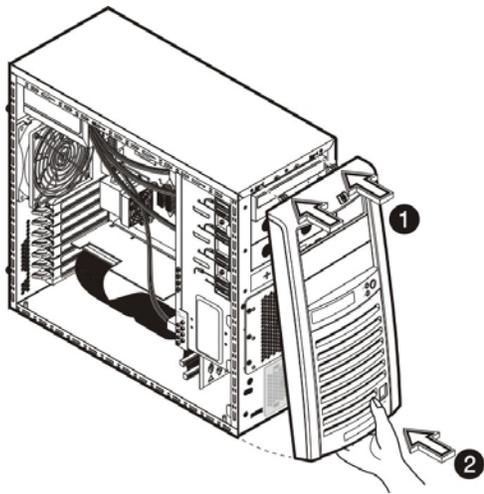
Figure 2-4: Reinstalling the front bezel

Air Baffle

Remove the air baffle to better access the system fan and the system board components.

To remove the air baffle:
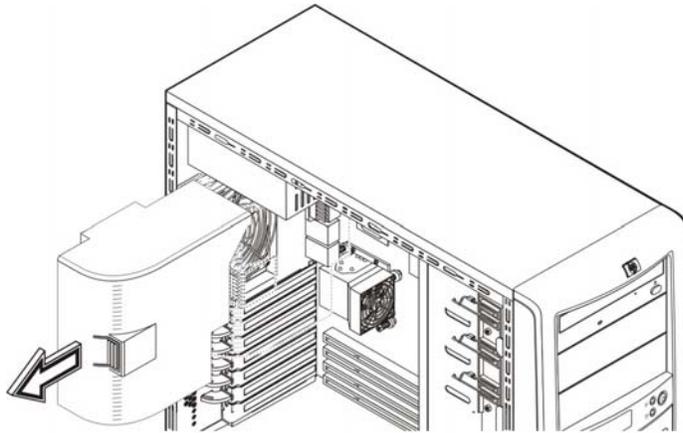
Figure 2-5: Removing the air baffle

To reinstall the air baffle:
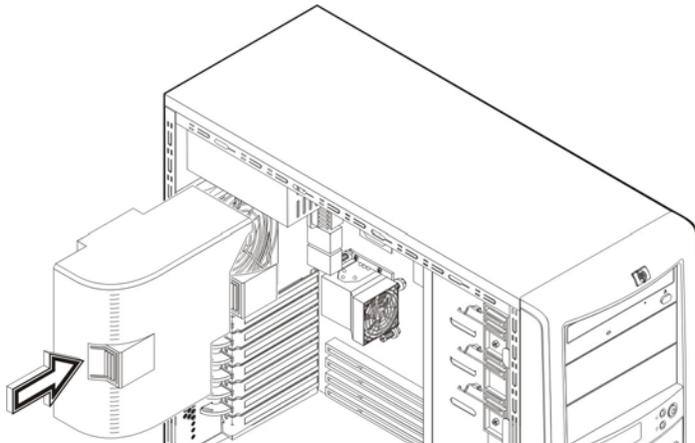
Figure 2-6: Reinstalling the air baffle

Drive Bay Configuration

The server supports a maximum of seven internal drives. The upper drive bay is for removable media devices, while the lower drive bay is for an HDD cage. The upper drive bay contains a one-half height IDE CD-ROM drive and two empty full-height drive bays. The lower drive bay can accommodate a hot-plug or a non-hot-plug HDD cage.
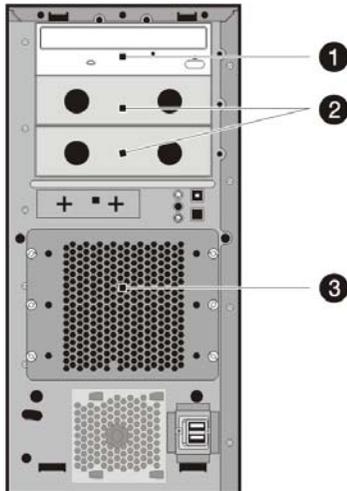
Figure 2-7: Drive bay configuration

Item	Description
1	IDE CD-ROM drive
2	Full-height drive bays (empty)
3	HDD cage

Note: Figure 2-7 shows a non-hot-plug HDD cage.

Cable Routing Diagrams

Figure 2-8 through Figure 2-12 show the cable routing for the server.

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

IDE CD-ROM Drive Cable Routing
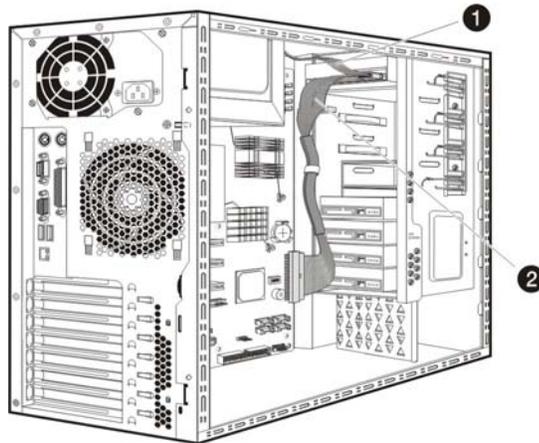
Figure 2-8: IDE CD-ROM drive cable routing

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

Optional Media Drive Cable Routing
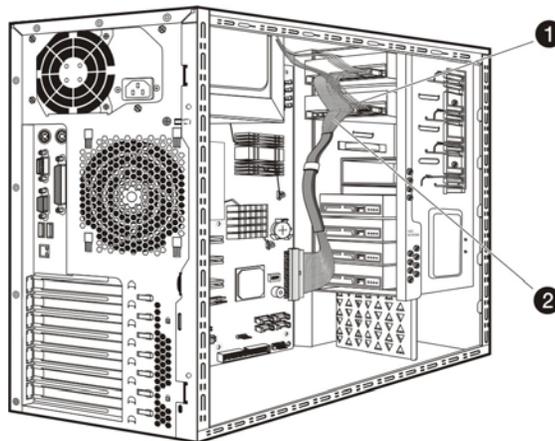
Figure 2-9: Optional media drive cable routing

Item	Description
1	Optional media drive power cable
2	Optional media drive data cable

Non-hot-plug SCSI/SATA HDD Cable Routing
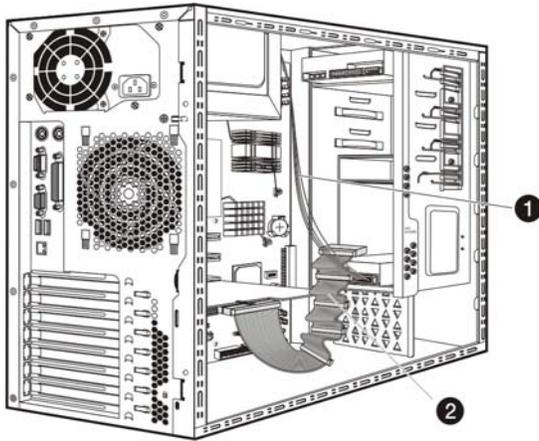
Figure 2-10: Non-hot-plug SCSI HDD cable routing

No.	Description
1	SCSI power cable
2	SCSI data cable
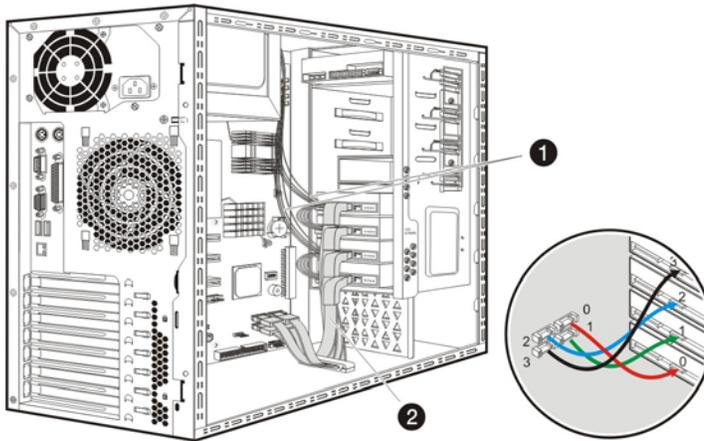
Figure 2-11: Non-hot-plug SATA HDD cable routing

No.	Description
1	SATA power cables
3	SATA data cables

Hot-plug SATA HDD Cable Routing
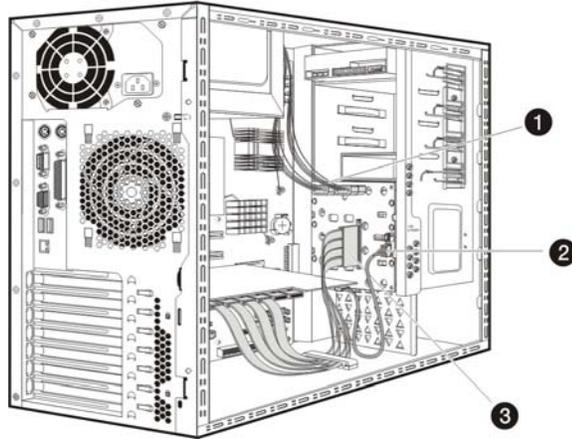
Figure 2-12: Hot-plug SATA HDD cage cable routing

No.	Description
1	SATA power cables
2	4-in-1 SATA data cables
3	SATA LED cable
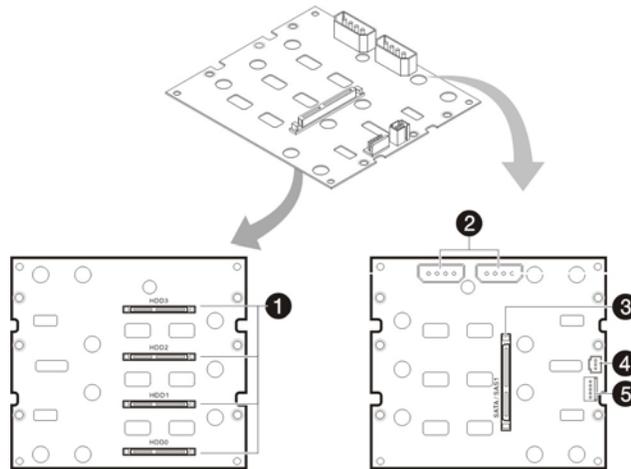
Figure 2-13: Hot-plug SATA HDD backplane board

No.	Connector	Description
1	CN8 – CN11	SATA HD connectors
2	CN1 – CN2	SATA power connectors
3	CN5	SATA 4-in-1 data connector
4	CN3	SATA I^{2}C LED connector
5	CN7	PSOC ISP connector
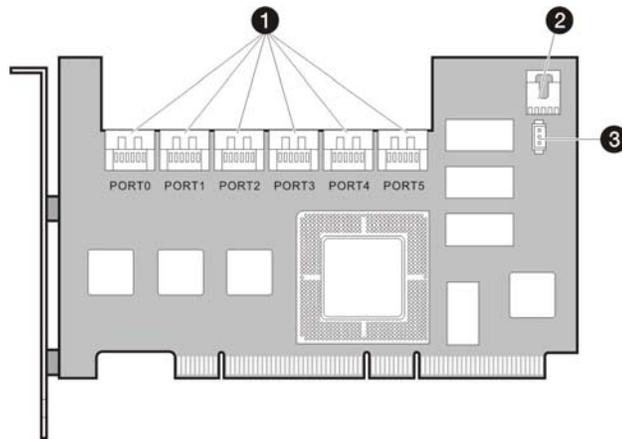
Figure 2-14: Hot-plug SATA HDD RAID card

No.	Connector	Description
1	PORT0 – PORT5	SATA HD connectors (connects to the HD connectors on the backplane board)
2	I2C	SATA I^{2}C LED connector (connects to CN3 on the backplane board)
3	ACT_LED	SATA HD active LED connector

IDE CD-ROM Drive

To replace the IDE CD-ROM drive:

1. Perform steps 1-3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the front bezel.

4. Remove the currently installed CD-ROM drive from the server:

   a. Disconnect the IDE power and data cables from the rear of the CD-ROM drive.

   b. Press the drive-retaining lever.

   c. Move the lever downward to release the bar from its retaining hook.

   d. Gently pull out the CD-ROM drive from the chassis.
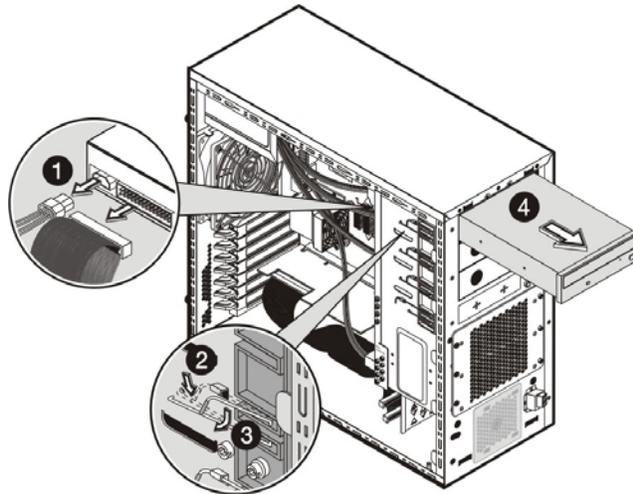
Figure 2-15: Removing the IDE CD-ROM drive

5. Place the old CD-ROM on a static-dissipating work surface or inside an anti-static bag.

6. Remove the new CD-ROM from its protective packaging.

7. Check that the IDE jumper on the rear section of the CD-ROM drive is set to
   Cable-Select mode.

8. Install the new CD-ROM drive:

   a. Guide the new CD-ROM drive into the CD-ROM bay, with the cable connectors
      facing the rear of the chassis, then push the drive all the way into the chassis until the
      mounting holes are aligned.

   b. Press the drive-retaining lever downward.

   c. Move the lever into its retaining hook to secure the new drive in place.

   d. Connect the IDE power and data cables to their connectors on the rear of the drive.
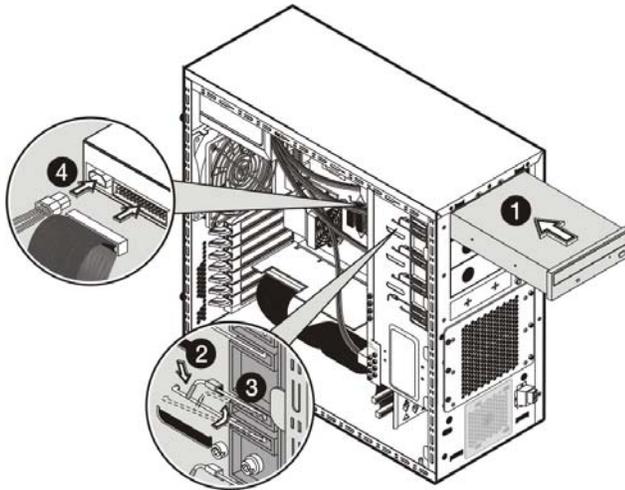
Figure 2-16: Installing the IDE CD-ROM drive

9. Observe the post-installation procedures.

Optional Media Device

The two full-height drive bays may be used for a DVD-ROM drive, tape drive, non-hot-plug hard drive, any SCSI device or a 2-bay SCSI drive cage, including a DLT tape drive. A DLT tape drive or the 2-bay SCSI drive cage requires both empty full-height drive bays.

To install an optional media drive:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the front bezel.

4. Select the drive bay where you plan to install the optional drive.

5. Prepare the selected common bay for drive installation:

    a. Pull out the bay cover. Store it for later use.

    > ⚠ **CAUTION:** Do not discard the bay cover. If the optional media drive is removed in the future, the cover must be reinstalled to maintain proper cooling.

    b. Press the retaining lever of the selected bay.

    c. Move the lever downward to release the bar from its retaining hook.
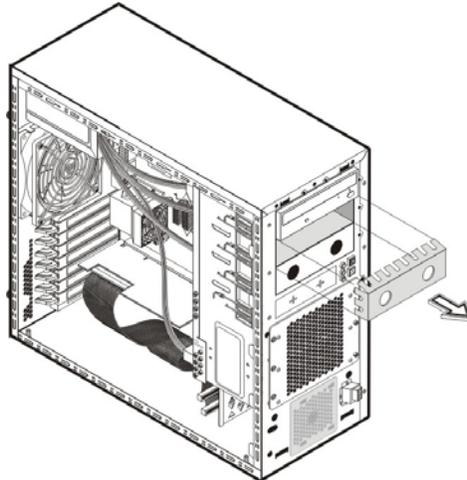
Figure 2-17: Preparing the drive bay for installation

6. Prepare the new drive for installation.

   Refer to the documentation that came with the drive for related installation procedures.

7. Install the new drive:

   a. Guide the new drive into the selected common bay, with the cable connectors of the drive facing the rear of the chassis, then push the drive all the way into the chassis until the mounting holes are aligned.

   b. Press the retaining lever downward.

   c. Move the lever into its retaining hook to secure the new drive in place.

   d. Connect the drive power and data cables to their connectors on the rear of the drive.
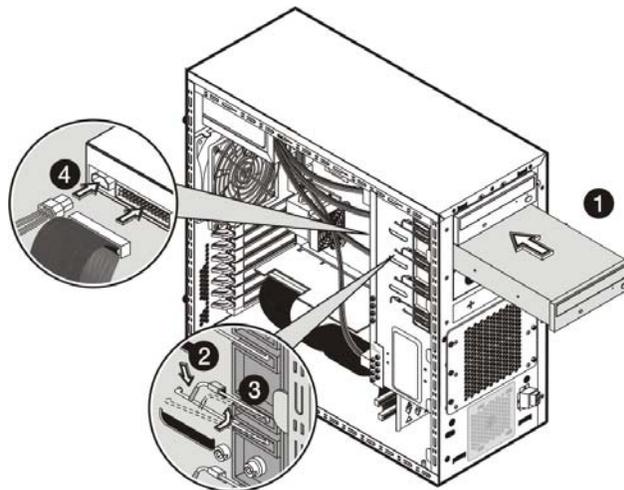
Figure 2-18: Installing an optional media drive

8. Observe the post-installation procedures.

HDD Cage

The lower drive bay on the front panel accommodates an HDD cage for installation of up to four additional hard drives. The hot-plug HDD cage model supports SATA drives, while the non-hot-plug one supports both SATA and SCSI drives.

To install an HDD cage:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the front bezel.

4. Install the HDD cage:

   a. Guide the HDD cage into the chassis opening, and then push the cage all the way into the chassis.

   b. Use the six Torx screws provided to secure the cage to the chassis.

   c. For a non-hot-plug HDD cage for use with SCSI drives, connect the power and data cables to the available drives.

   Make sure that the other end of the power cable is connected to the PSU, and the other end of the data cable is connected to the corresponding connector in the SCSI card.
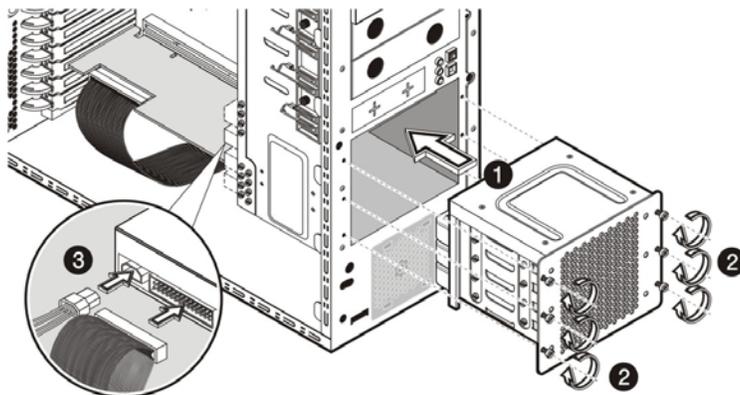
Figure 2-19: Installing a non-hot-plug HDD cage (SCSI)

   For a non-hot-plug HDD cage for use with SATA drives, connect the power and data cables to the available drives.

   Make sure that the other end of the power cable is connected to the PSU, and the other end of the data cables are connected to the onboard SATA connectors (SAT0-SATA3).
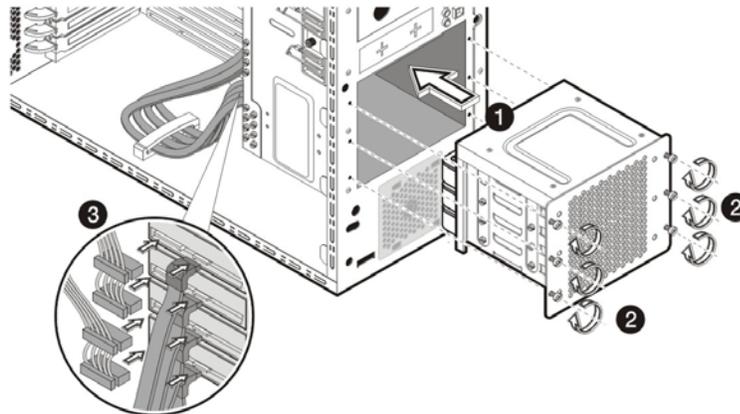
Figure 2-20: Installing a non-hot-plug HDD cage (SATA)

For the hot-plug HDD cage, connect the SATA power, data, and LED cables to their corresponding backplane board connectors. Refer to Figure 2-13 for an illustration of the backplane board.

Make sure that the other end of the power cable is connected to the PSU, and the other end of the data and LED cables are connected to their corresponding connector on the SATA RAID card. Refer to Figure 2-14 for an illustration of the SATA RAID card.
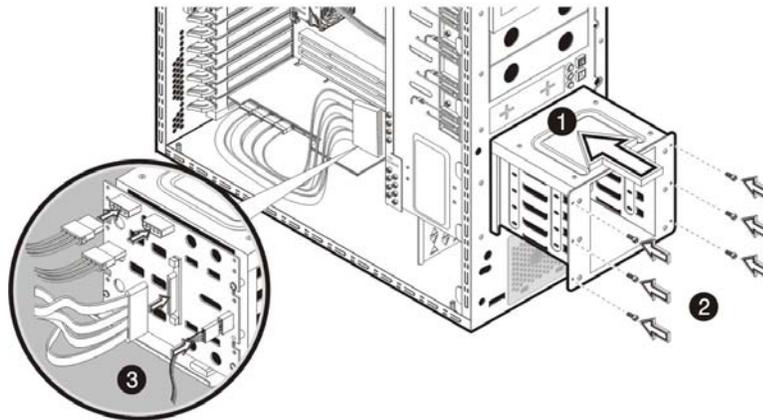
Figure 2-21: Installing a hot-plug HDD cage

Non-hot-plug HDD Cage

To install a SCSI drive in a non-hot-plug HDD cage:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the front bezel.

4. Remove the non-hot-plug HDD cage:

   Step (a) below assumes that a drive is currently installed in the cage. If the cage is empty, go directly to step (b).

   a. Disconnect the power and data cables from the rear of the drive.

      Perform this step for all drives currently installed in the cage.

   b. Remove the six Torx screws that secure the cage to the chassis.

      Keep the screws for reinstalling the cage later.

   c. Gently slide out the cage from the chassis.
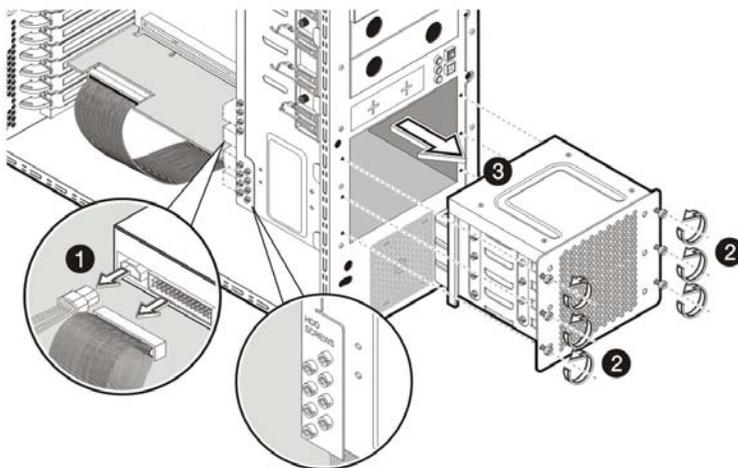
Figure 2-22: Removing the non-hot-plug HDD cage for SCSI drive installation

5. Select a drive bay in the cage where you want to install the new SCSI hard disk.

   If you going to install the new hard disk in a previously occupied drive bay, pull out the installed drive by removing the four screws securing the old drive to the cage, before sliding the drive out of the cage. You will be reusing these screws when you install the new hard disk.

   If you are going to install a new hard disk in an empty drive bay, remove four screws from the side of the chassis labeled 'HDD SCREWS'. See Figure 2-22 for the location of these spare HDD screws.

6. Install the new SCSI hard disk into the cage:

    a. Slide the new hard disk into the selected bay.

    b. If you are installing the new hard disk in a previously occupied drive bay, use the screws you removed from that old drive to secure the new drive.

       If you are installing the new hard disk in an empty drive bay, use the four screws you removed earlier from the side of the chassis to secure the new drive.
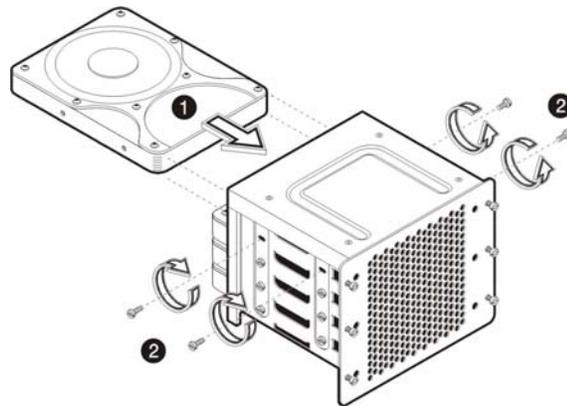
Figure 2-23: Installing a SCSI hard disk in the non-hot-plug HDD cage

7. Reinstall the HDD cage into the chassis following the procedures described in step 4 of the "To install an HDD cage" section.

8. Observe the post-installation procedures.

To install a SATA drive in a non-hot-plug HDD cage:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the front bezel.

4. Remove the non-hot-plug HDD cage:

   Step (a) below assumes that a drive is currently installed in the cage. If the cage is empty, go directly to step (b).

    a. Disconnect the power and SATA cables from the rear of the drive.

       Perform this step for all drives currently installed in the cage.

    b. Remove the six Torx screws that secure the cage to the chassis.

       Keep the screws for reinstalling the cage later.

    c. Gently slide out the cage from the chassis.
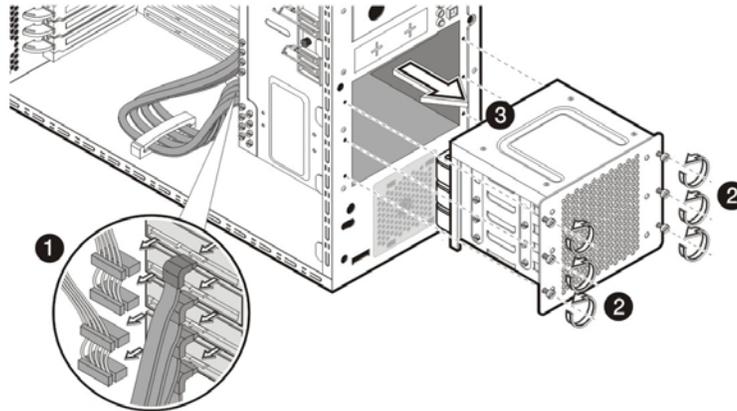
Figure 2-24: Removing the non-hot-plug HDD cage for SATA drive installation

5. Select a drive bay in the cage where you want to install the new SATA hard disk.

   If you going to install the new hard disk in a previously occupied drive bay, pull out the installed drive by removing the four screws securing the old drive to the cage, before sliding the drive out of the cage. You will be reusing these screws when you install the new hard disk.

   If you are going to install a new hard disk in an empty drive bay, remove four screws from the side of the chassis labeled 'HDD SCREWS'. See Figure 2-22 for the location of these spare HDD screws.

6. Install the new SATA hard disk into the cage:

   a. Slide the new hard disk into the selected bay.

   b. If you are installing the new hard disk in a previously occupied drive bay, use the screws you removed from that old drive to secure the new drive.

      If you are installing the new hard disk in an empty drive bay, use the four screws you removed earlier from the side of the chassis to secure the new drive.
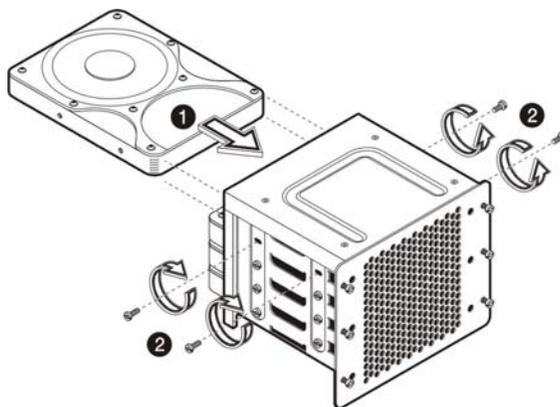
Figure 2-25: Installing a SATA hard disk in the non-hot-plug HDD cage

7. Reinstall the HDD cage into the chassis following the procedures described in step 4 of the "To install an HDD cage" section.

8. Observe the post-installation procedures.

Hot-plug HDD Cage

To install a SATA drive in a hot-plug HDD cage:

1. Remove the front bezel.

2. Select a drive bay in the cage where you want to install the SATA new hard disk.

   If the desired drive bay is occupied, remove the currently installed drive from the cage. Proceed to step 3 for procedures.

   If the desired drive bay is unoccupied, proceed to step 4 for procedures on how to install the new drive.

3. Remove a currently installed drive:

   a. Press the hard disk carrier button to release the carrier latch.

   b. Pull out the carrier latch.

   c. Gently slide out the drive from the cage.
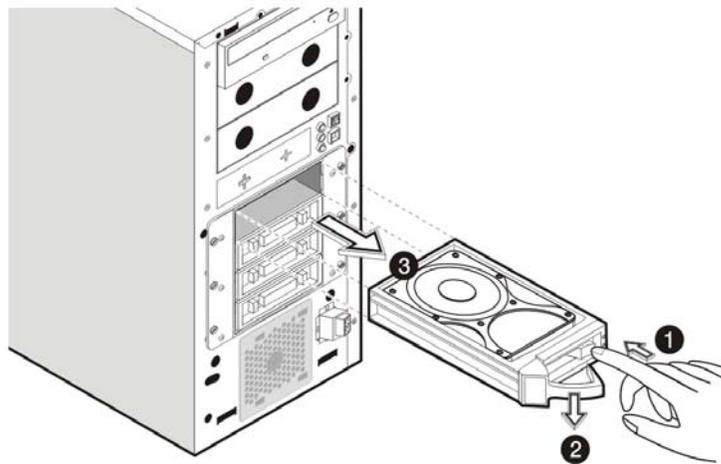
Figure 2-26: Removing a SATA hard disk from the hot-plug HDD cage

4. Install the SATA new hard disk:

   a. Slide the new drive into the selected drive bay.

   b. Close the ejector lever to secure the new drive in the cage.
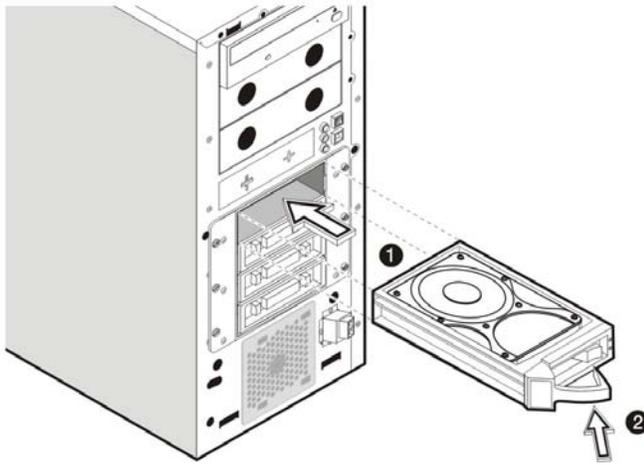
Figure 2-27: Installing a SATA hard disk in the hot-plug HDD cage

5. Reinstall the front bezel.

If you need to remove the hot-plug HDD cage from the chassis, follow the steps below:

> ⚠️ **CAUTION:** Failure to remove hard drives from the hot-plug HDD cage prior to removing the cage from the chassis may cause damage to the drives.

1. Remove all drives currently installed in the HDD cage.

2. Perform steps 1 through 4 of the pre-installation instructions.

3. Remove the hot-plug HDD cage:

   a. Disconnect the power, data, and LED cables from the backplane board.

   b. Remove the six Torx screws that secure the cage to the chassis.

      Keep the screws for reinstalling the cage later.

c.   Gently slide out the cage from the chassis.
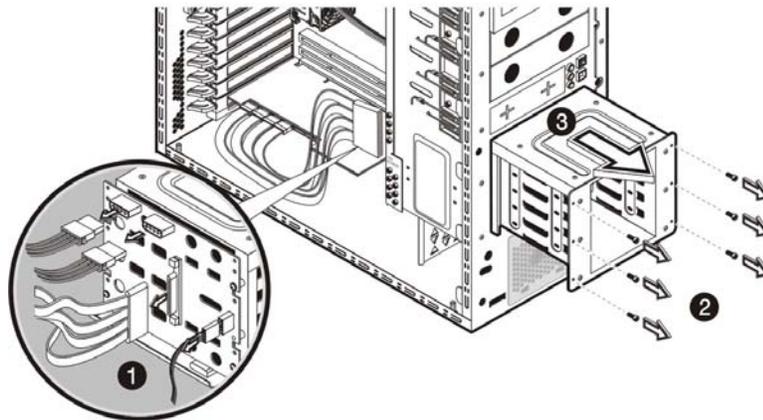
Figure 2-28: Removing the hot-plug HDD cage

System Board Components

Refer to the following sections for instructions on how to remove or replace the processor, the memory modules, the expansion cards, and the system battery.

Processor

The server LGA775 processor socket supports Intel Pentium 4 processors.
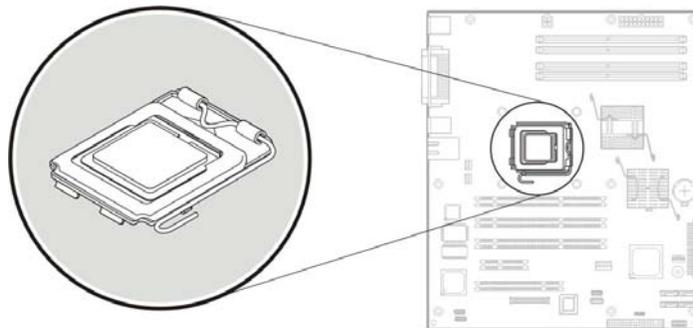
Figure 2-29: LGA775 processor socket

To replace the processor:

1.   Perform steps 1 through 3 of the pre-installation instructions.

2.   Remove the access panel.

3.   Lay the server on its side (components showing).

4. Pull out the air baffle for better access to the processor socket (U10).

5. If necessary, remove any accessory boards or cables that prevent access to the processor socket.

6. Remove the heatsink-cooling fan (HSF) assembly:

   a. Disconnect the processor fan cable from the connector on the system board (CN7).

   b. Twist the mounting pins clockwise to loosen them up.

   c. Once you have loosened all four mounting pins, lift the HSF away from the system board.

   Lay down the HSF down in an upright position—with the thermal patch facing upward. **Do not** let the thermal patch touch the work surface.
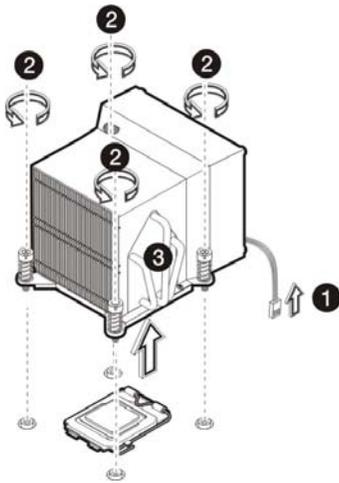
Figure 2-30: Removing the heatsink-cooling fan assembly

7. Remove the previously installed processor:

   a. Disengage the load lever.

   b. Lift up the retention plate to expose the socket body.

   c. Grasp the processor by its edges and lift it out of its socket.
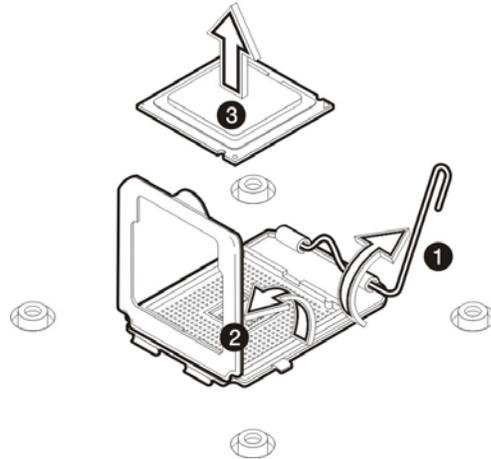
Figure 2-31: Removing the processor

8. Place the old processor on a static-dissipating work surface or inside an anti-static bag.

To allow the heatsink to draw away as much heat as possible from the processor base, it is required there be a tight connection between the contact surfaces—the heatsink base and the top side of the processor. To ensure this, it is required that a thermal grease compound be applied.

NOTE: For this server model, it is recommended that you use the Shin Etsu G751 brand of thermal grease compound.

9. Apply the thermal grease compound:

   a. Use a clean cloth dipped in rubbing alcohol to clean both contact surfaces in the HSF and in the new processor. Wipe the contact surfaces several times to make sure that no particles or dust contaminants are evident.

   > ⚠ **CAUTION:** Never touch the bottom of the processor; any contaminant on this side of the processor could prevent the mounting pads from making contact with the socket.

   b. Apply the thermal grease compound to both contact surfaces.

   c. Use the edge of a razor blade to spread out the grease throughout the entire contact surface and **lightly** scrape out any excess grease. Make sure that only a **very thin layer** is applied so that the contact surface is still visible.

> ⚠ **CAUTION:** Applying too much grease will cause a gap between the contact surfaces. This means that the heatsink is not even in direct contact with the processor, and therefore its capacity to draw out heat is greatly reduced. Applying too much grease could also make the grease squish out from the sides and go all over the processor pins or to the system board base once the heatsink is installed. This may cause electrical shorts that can damage your system.

10. Install the new processor:

   a. With the load lever and the retention plate still disengage, hold the processor by its edges and align it over the empty processor socket.

      Make sure that processor is properly aligned with the orientation notch on the socket.

   b. Insert the processor into the socket.

   c. Close down the retention plate.

   d. Engage the load lever back into place.
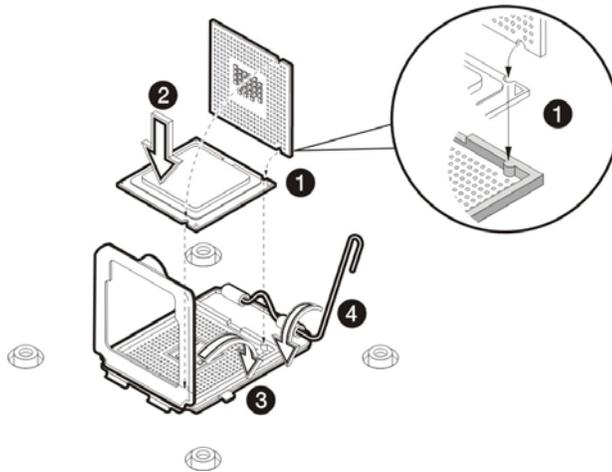
Figure 2-32: Installing a processor

Once the processor is installed, the HSF must be reinstalled on top of the processor socket. The thermal grease you applied on the contact surfaces of the HSF and the processor provides the necessary thermal bonding to allow the heatsink to draw away heat from the processor.

> ⚠ **CAUTION:** To prevent overheating or a possible system crash, use only an HSF assembly specified for the HP ProLiant ML110 Generation 2 server.

11. Replace the heatsink-cooling fan assembly:

    a. Align the HSF mounting pins to the system board holes and press it down until you hear a click.

    b. Twist the mounting pins counter-clockwise to secure the HSF's connection to the system board.

    c. Connect the processor fan cable to its connector on the system board (CN7).

    > ⚠ **CAUTION:** Failure to connect the processor fan cable to its connector may cause the server to shut down with no messages displayed and possibly damage the processor.
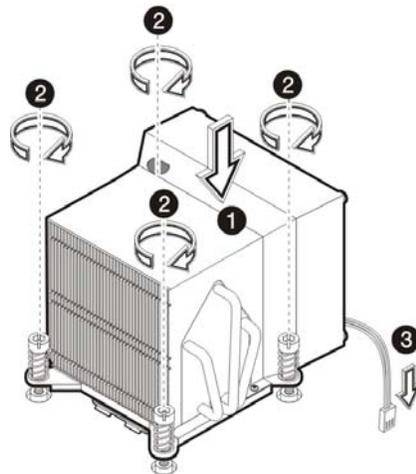
Figure 2-33: Installing the heatsink-cooling fan assembly

12. Observe the post-installation procedures.

Memory

The HP ProLiant ML110 Generation 2 server has four DIMM slots that support up to 4 GB maximum system memory (1 GB in each of the four DIMM slots).
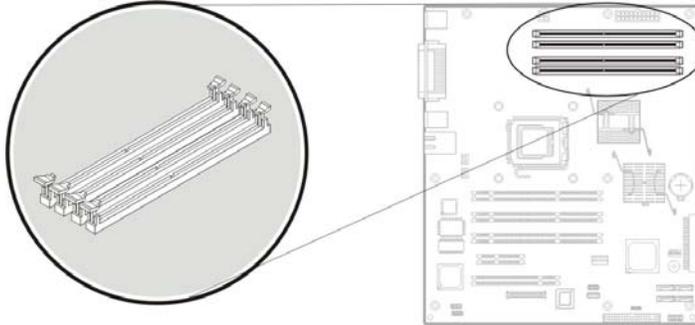
Figure 2-34: DIMM slots

Guidelines for Installing Memory Modules

The following guidelines must be followed when memory modules are being added or replaced:

- Use only DDR1-400 unbuffered ECC and non-ECC DIMMs in 256-MB, 512-MB, or 1-GB configuration.

- Use only PC2100 and PC3200 (266 MHz/400 MHz) DIMMs

- Up to two DIMMs per channel, single-sided and/or double-sided. Channel A corresponds to the DIMM1 and DIMM2 slots, while channel B corresponds to the DIMM3 and DIMM4 slots.

- While the four DIMM slots can accept different size DIMMs in any configuration, HP recommends installing the smallest capacity module in slot 4 and progressively larger capacity modules in slots 3, 2 and 1.

- Memory modules must be populated for dual-channel operation.

To remove a memory module:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Lay the server on its side (components showing).

4. Remove the air baffle for better access to the DIMM slots (DIMM1 to DIMM4).

5. If necessary, remove any accessory boards or cables that prevent access to the DIMM slots.

6. Locate the memory module you want to remove.

7. Remove the selected memory module:

   a. Completely open the holding clips securing the module.

      This forces the module up in the slot and makes it easier to remove.

   b. Gently pull the memory module upward to remove it from its slot.
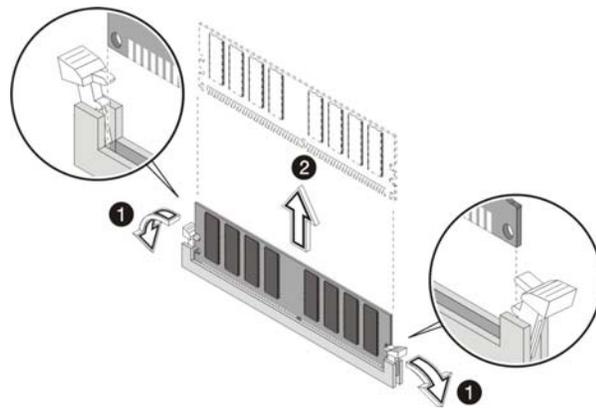
Figure 2-35: Removing a memory module

8. Place the memory module on a static-dissipating work surface or inside an anti-static bag.

To install a memory module:

1. Locate an empty DIMM slot on the system board.

2. Remove the memory module from its protective packaging, handling it by the edges.

3. Install the memory module:

   a. Orient the module so that the notch on its bottom edge aligns with the keyed surface of the DIMM slot, and then press it fully into the slot.

      The DIMM slots are structured to ensure proper installation. If you insert a memory module but it does not fit easily into the slot, you may have inserted it incorrectly. Reverse the orientation of the module and insert it again.

b. Firmly press the holding clips inward to secure the memory module in place.

If the holding clips do not close, the module is not inserted correctly.
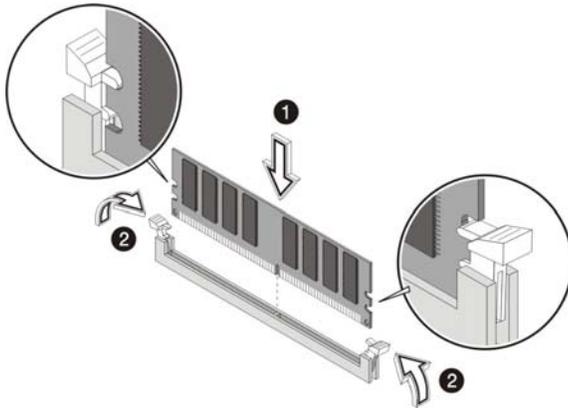
Figure 2-36: Installing a memory module

4. Observe the post-installation procedures.

Expansion Cards

The HP ProLiant server supports five PCI slots with three separate bus channels:

- Three 64-bit/100-MHz, 3.3-V PCI-X bus slots (PCI1 to PCI3)
- One PCI-Express x4 bus slot (PCI4)
- One 32-bit/33-MHz, 5-V PCI bus slot (PCI5)
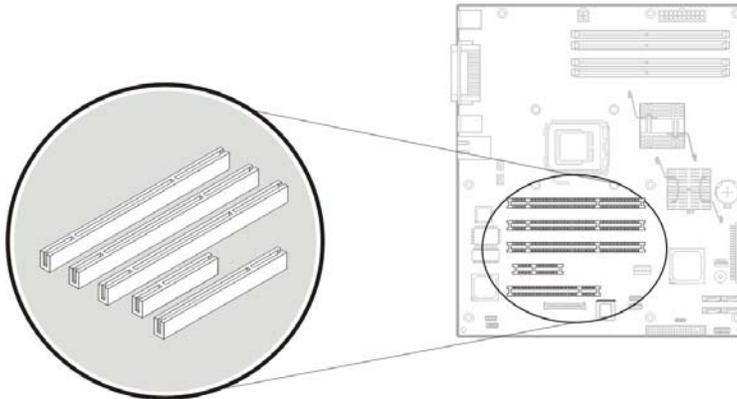
Figure 2-37: PCI slots

To install an expansion card:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the air baffle for better access to the PCI slots (PCI1 to PCI5).

4. If necessary, remove any accessory boards or cables that prevent access to the PCI slots.

5. Locate an empty PCI slot on the system board.

6. Prepare the selected PCI slot for installation:

    a. Press the retention clip of the slot cover opposite the selected PCI slot.

    b. Pull out the slot cover. Store it for reassembly later.

> ⚠ **CAUTION:** Do not discard the slot cover. If the PCI expansion card is removed in the future, the slot cover must be reinstalled to maintain proper cooling.
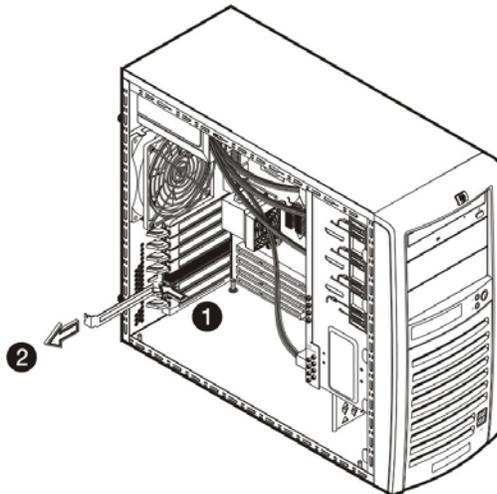
Figure 2-38: Removing the PCI slot cover

7. Remove the expansion card from its protective packaging.

8. Install the expansion card:

   a. Slide the expansion card into the selected slot and press it down to seat it properly.

   b. Firmly press the retention clip until it snaps into place.
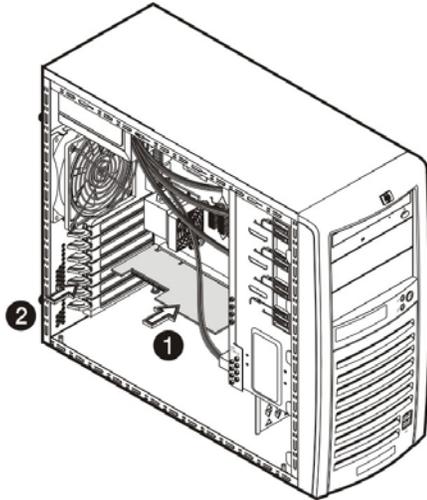
Figure 2-39: Installing an expansion card

9. Connect the necessary cable to the card.

10. Observe the post-installation procedures.

System Battery

The HP ProLiant server uses nonvolatile memory that requires a battery to retain system information when power is removed. The battery, a 3-V 200-mAh internal lithium battery, is located on the system board.
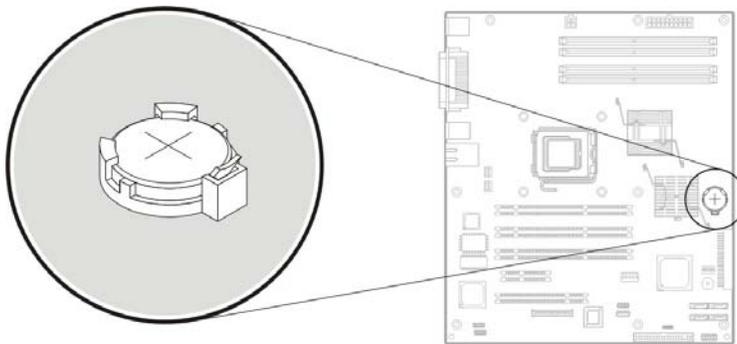
Figure 2-40: System battery

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

⚠ **WARNING: Note the following reminders when replacing the system battery.**

- **Replace the battery with the same type as the battery recommended by HP. Use of another battery may present a risk of fire or explosion.**

- **A risk of fire and chemical burn exists if the battery is not handled properly. Do not disassemble, crush, puncture, or short external contacts, or expose the battery to temperatures higher than 60°C (140°F).**

- **Do not dispose of used battery in water or fire. Dispose of used batteries according to manufacturer's instructions.**

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

To replace the system battery:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Lay the server on its side (components showing) for better access to the battery socket (BT1).

4. If necessary, remove any accessory boards or cables that prevent access to the battery socket.

5. Replace the battery:

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

   a. Insert a small flat-blade screwdriver or a similar tool between the battery and spring latch to dislodge the battery from its socket.

   b. Lift up the old battery to remove it.

   c. Insert a new battery with the positive polarity (+ side) facing up, and ensure that it is seated completely.

   Ensure the spring latch is in place, and that it holds the battery firmly.
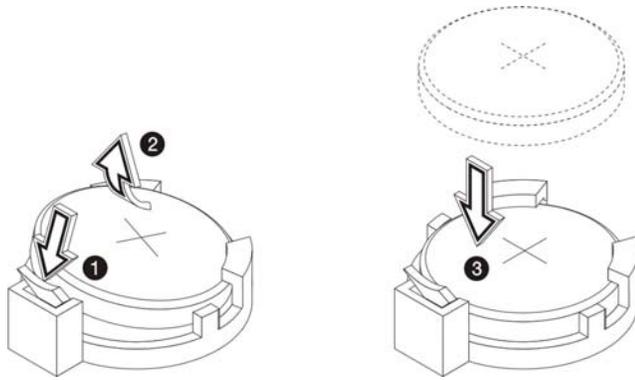
Figure 2-41: Replacing the battery

6. Observe the post-installation procedures.

Power Supply Unit (PSU)

Located on the rear panel of the server is a single standard autoranging 350-watts PSU with PFC (power factor correction) function.

> ⚠ **WARNING: Take note of the following reminders to reduce the risk of personal injury from electric shock hazards and/or damage to the equipment.**
>
> - **Installation of power supply units should be referred to individuals who are qualified to service server systems and are trained to deal with equipment capable of generating hazardous energy levels.**
> - **DO NOT open the power supply unit. There are no serviceable parts inside it.**

To replace the PSU:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the air baffle for better access to the PSU.

4. Remove the default PSU:

> ⚠ **WARNING: Be sure to support the PSU with your hands when removing the screws securing it to the chassis. The PSU is heavy and could hurt you or damage system components.**

   a. Disconnect the processor and system board power cables from their connectors (PWRCON1 and PWRCON2).

   Disconnect the power cables of all installed drives from the PSU.

   b. While supporting the PSU with one hand, remove the four screws securing the PSU to the chassis.

c. Gently slide the PSU out of the chassis.
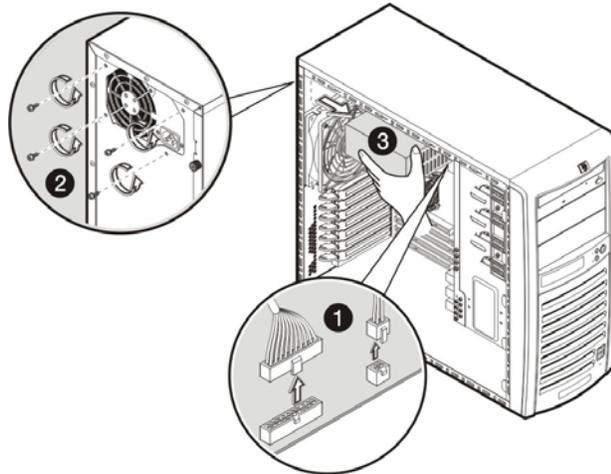
Figure 2-42: Removing the PSU

5. Install a new PSU:

    Perform step (a) and (b) simultaneously.

    a. Align the new PSU to the support ledges inside the chassis.

    b. Secure the PSU in place using the four screws you removed earlier.

    c. Reconnect the processor and system board power cables to their connectors (PWRCON1 and PWRCON2), then connect the power cables of all installed drives to the PSU.
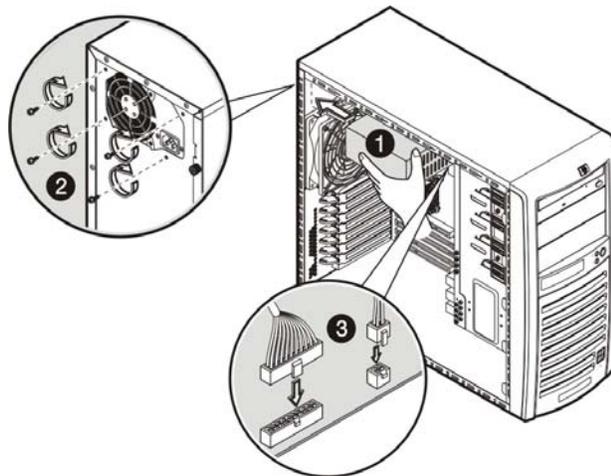
Figure 2-43: Installing a PSU

6. Observe the post-installation procedures.

System Fan

A new system fan can be installed to allow the server to operate properly in case the default system fan becomes defective.

To replace the system fan:

1. Perform steps 1 through 3 of the pre-installation instructions.

2. Remove the access panel.

3. Remove the air baffle.

4. Remove the default system fan:

⚠ **WARNING: Be sure to support the system fan with your hands when removing it from the chassis. The fan could fall onto the system board or an accessory board causing damage if not supported.**

    a.   Disconnect the system fan cable from its connector (CN10) on the system board.

Perform step (b) and (c) simultaneously.

    b.   While supporting the system fan with one hand push a finger through the middle ventilation hole on the rear panel.

    c.   Slide the system fan upward to disengage the frame tabs from the chassis.

    d.   Pull the system fan away from the chassis.
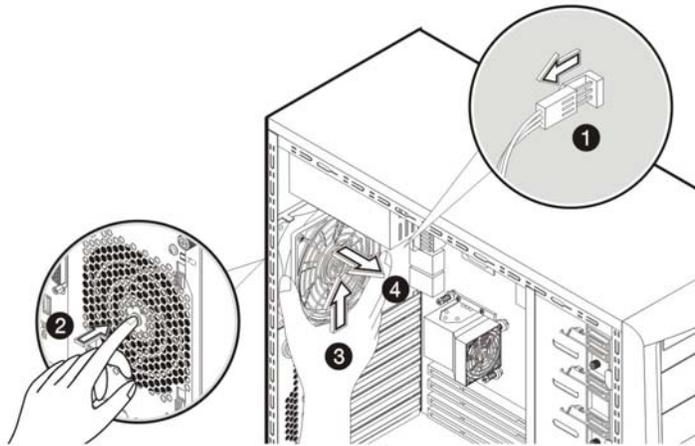
Figure 2-44: Removing the system fan from the chassis

5. Detach the old fan from its frame:

    a. Unclasp the four retention latches on the frame.

    b. Pull the fan away from its frame.
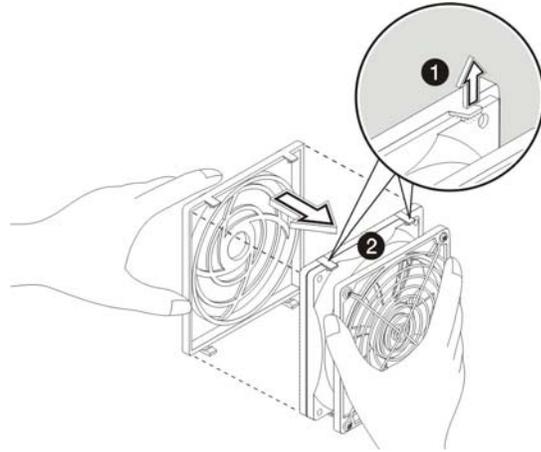
Figure 2-45: Removing a system fan from its frame

6. Install the new fan to its frame by aligning the pegs on the frame to their corresponding notch on the fan, and then firmly press the two together until the retention latches snap into place.
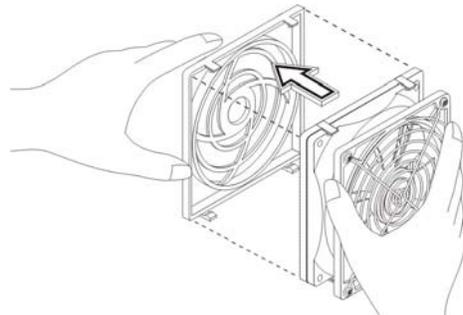
Figure 2-46: Installing a system fan to its frame

7. Install a new system fan:

   a. Insert the tabs on the system fan frame to their chassis notch.

   b. Slide the system fan downward to secure it to the chassis.

   c. Connect the system fan cable to its connector (CN10) on the system board.
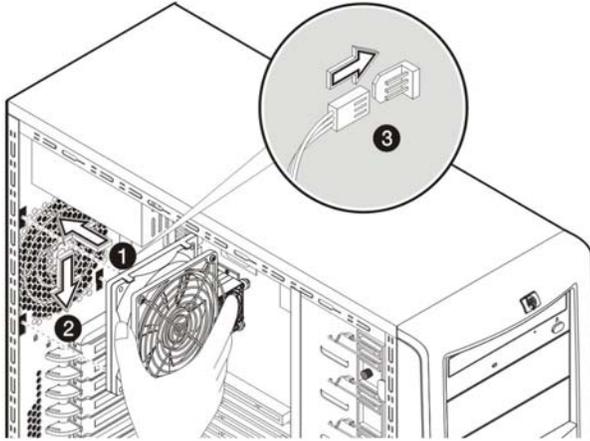
Figure 2-47: Installing a system fan on the chassis

8. Observe the post-installation procedures.

3

Diagnostic Tools

This chapter describes the system diagnostic tools available for the HP ProLiant ML110 Generation 2 server. It also provides a comprehensive list of POST-related messages and their meanings.

*Phoenix*BIOS Software

*Phoenix*BIOS software is a ROM BIOS-based diagnostic tool that monitors system activity and performs constant hardware testing to ensure proper system operation. ROM BIOS is a set of programs permanently stored in an EEPROM chipset (U34) located on the system board. These programs micro-manage the hardware devices installed on your computer.

The *Phoenix*BIOS software serves three functions:

- A configuration program via the *Phoenix*BIOS Setup Utility

  Using the Setup program, you can install, configure, and optimize the hardware devices on your system (clock, memory, disk drives, etc.).

- Initialize hardware at boot via POST routines

  At power-on or reset, the software performs Power-On Self Test (POST) routines to test system resources and run the operating system.

- Perform run-time routines

  Using the software, perform basic hardware routines that can be called from DOS and Windows applications.

*Phoenix*BIOS Setup Utility

NOTE: For ease of reading, *Phoenix*BIOS Setup Utility will be simply referred to as "Setup" or "Setup Utility" in this guide.

NOTE: The screenshots used in this guide display default system values. These values may not be the same those in your server.

*Phoenix*BIOS Setup Utility is a hardware configuration program built into your system's Basic Input/Output System (BIOS). Since most systems are already properly configured and optimized, there is normally no need to run this utility.

You will need to run this utility under the following conditions:

- When changing the system configuration including:
  — Defining the diskette drive
  — Defining the serial or parallel (COM/LPT) ports to prevent any conflicts
  — Setting the system time and date
  — Configuring the hard drives
  — Specifying the boot device sequence
  — Configuring the power management modes
  — Setting up system passwords or making other changes to the security setup
- When a configuration error is detected by the system and you are prompted ("Run Setup" message) to make changes to the BIOS settings.

NOTE: If you repeatedly receive "Run Setup" messages, the battery may be defective. In this case, the system cannot retain configuration values in CMOS. Ask a qualified technician for assistance.

The Setup Utility loads the configuration values in a battery-backed nonvolatile memory called CMOS RAM. This memory area is not part of the system RAM, which allows configuration data to be retained when power is turned off. The values take effect when the system is booted. POST uses these values to configure the hardware. If the values and the actual hardware do not agree, POST generates an error message. You must run this utility to change the BIOS settings from the default or current configuration.

Accessing the Setup Utility

1. Turn on the monitor and the server.

   If the server is already turned on, save your data and exit all open applications, then restart the server.

2. During POST, press **F10**.

   If you fail to press **F10** before POST is completed, you will need to restart the server.

   The first page to be displayed will be the <u>Main</u> menu showing the Setup Utility's menu bar. Use the left (←) and right (→) arrow keys to move between selections on the menu bar.
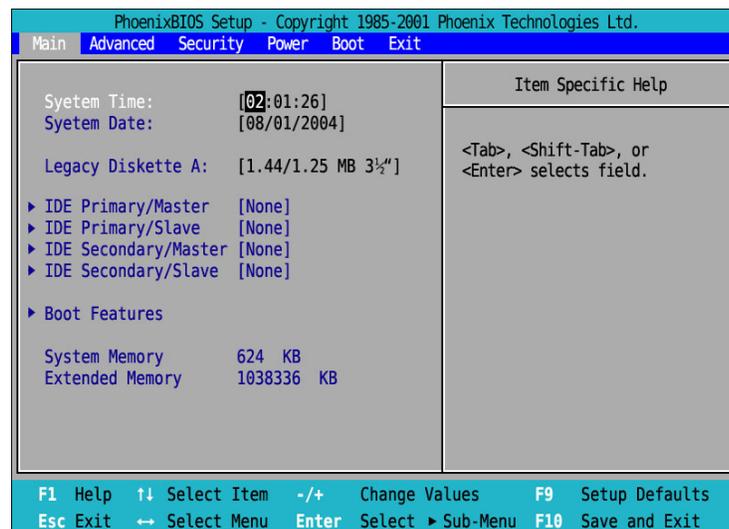
Figure 3-1: Setup Utility's Main menu

Navigating Through the Setup Utility

Use the keys listed in the legend bar on the bottom of the Setup screen to work your way through the various menu and submenu screens of the Setup Utility. Table 3-1 lists these legend keys and their respective functions.

Table 3-1: Setup Utility's Navigation Keys

Key	Function
← and →	To move between selections on the menu bar.
↑ and ↓	To move the cursor to the field you want.
	The currently selected field will be highlighted. The right side of each menu screen displays a field help panel—Item Specific Help panel. This panel displays the help text for the currently selected field. It updates as you move the cursor to each field.
+ and -	To select a value for the currently selected field (only if it is user-configurable).
	Press the (+) or (-) keys repeatedly to display each possible entry, or the **Enter** key to choose from a pop-up menu.
	A parameter that is enclosed in square brackets [ ] is user-configurable.
	Grayed-out parameters are not user-configurable for one of the following reasons:
	• The field value is auto-configured or auto-detected.
	• The field value is informational only.
	• The field is password-protected.
Enter	To select a field value or display a submenu screen.
►	Indicates a submenu field.
	To view a submenu screen, use the ↑ and ↓ keys to move the cursor to the submenu you want, then press **Enter**.
Esc	If you press this key:
	• On one of the primary menu screens, the Exit menu displays.
	• On a submenu screen, the previous screen displays.
	• When you are making selections from a pop-up menu, closes the pop-up without making a selection.
F1 or Alt-H	To bring up the General Help window.
	The General Help window describes other Setup navigation keys that are not displayed on the legend bar.
F9	Press to load default system values.
F10	Press to save changes and close the Setup Utility.

Setup Utility Primary Menus

The Setup Utility's menu bar displays the six primary menu selections. Table 3-2 lists these menus and their corresponding functions.

Table 3-2: Setup Utility's Primary Menus

Menu	Function
Main	Use this menu to:
	• Set the system time and date.
	• Select the type of diskette drive type.
	• Configure drive settings for available IDE and SATA devices.
	• Select which options to run during system boot-up.
	• View the amount of available conventional and extended memory detected during boot-up.
Advanced	Use this menu to:
	• Clear all configuration data in a section of memory for ESCD (Extended System Configuration Data) which stores the configuration settings for non-PnP plug-in devices.
	• Enable or disable support for the legacy USB bus.
	• Configure settings for available PCI devices.
	• Configure settings for the PCI chipset (U16), as well as enable or disable the onboard LAN and VGA controllers (U13 and U22).
	• Enable or disable the processor's Hyper-Threading function, and set its internal frequency multiplier.
	Hyper-Threading (HT) is an Intel technology that enables a processor to execute two threads in parallel—allowing the system to multi-task more effectively thus significantly boosts computing performance.
	• Configure settings for the I/O ports.
	• Configure settings for hardware protection. For detailed procedures on how to this, go to the "Setting Hardware Protection" section in this chapter.
	• Configure console redirection settings to allow the system to be displayed on a remote terminal for online server management.
	• View the pre-failure system threshold levels for hardware monitoring. This function is only applicable if a BMC card is installed in the server.
	• Configure settings for the IPMI function.
	CAUTION: Be cautious in setting field values in this menu as any incorrect value may cause the system to malfunction.

Table 3-2: Setup Utility's Primary Menus *continued*

Menu	Function
Security	Use this menu to safeguard and protect the system from unauthorized use by setting up access passwords. For more information on using this menu, go to the "System Passwords" section in this chapter.
Power	Use this menu to: • Set the mode of operation if an AC power loss occurs. • Enable or disable the PCI PME power-up function. • Set whether to wake up the system when an incoming call is detected on the modem. • Enable or disable the keyboard power-up function.
Boot	Use this menu to set the preferred drive sequence in which the Setup Utility attempts to boot the operating system. By default, the server searches for boot devices in the following order: 1. Removable device 2. IDE CD-ROM drive 3. Hard disk drive 4. PXE (Preboot Execution Environment, remote boot)

Exit	Use this menu to select an exit option to quit from the Setup Utility. Options include:
	
	• Exit Saving Changes - Saves changes made and close the Setup Utility.
	
	  Keyboard shortcut: **F10**
	
	• Exit Discarding Changes - Discards changes made and close the Setup Utility.
	
	• Load Setup Defaults - Loads the factory-default settings for all Setup parameters.
	
	  Keyboard shortcut: **F9**
	
	• Discard Changes - Discards all changes made to the Setup Utility and loads previous configuration settings.
	
	• Save Changes - Saves all changes made to the Setup Utility.

System Summary Screen

The System Summary Screen displays basic and important information about the current server configuration and is necessary for troubleshooting and may be required when asking for technical support. These information include:

- Processor specifications

- System BIOS ROM version

- Embedded LAN MAC address

- System serial number and asset tag

- Size of the system and video memory

- I/O ports available

- Installed mass storage devices

- PCI slots available

It is recommended that you check this screen during the initial system setup and each time you install, remove, or upgrade accessories.

To view the System Summary Screen:

You first need to enable the display of the System Summary Screen during bootup. Follow the steps below.

1. In the Main menu screen, select **Boot Features.**

2. Select the **Summary Screen** field.

3. Press the plus (+) or minus (-) key to set the field to **Enabled**.

4. Press **F10** to save the changes you made and close the Setup Utility.

5. Reboot the server.

The System Summary Screen is displayed briefly at the end of POST.

```
                    PhoenixBIOS Setup Utility

CPU Type        : Genuine Intel (R) CPU 3.80GHz
CPU Speed       : 2.80 GHz
CPU Microcode   : 0F41h          BIOS Version : 1.04 T13

LAN MAC Address : 00.11.85.DA.08.46
                                COM Ports    : 03F8 02F8 02F8
System Memory:  : 1024 MB       LPT Ports    : 0378
Cache Ram       : 1024 KB       PS/2 Mouse   : Installed
Video Memory    : 8 MB
Option ROM      : 56 KB         PCI Slot 1   : None
                                PCI Slot 2   : None
Hard Disk 0     : 256GB SATA1   PCI Slot 3   : None
Hard Disk 1     : None          PCI Slot 4   : None
Hard Disk 2     : CD-ROM        PCI Slot 5   : None
Hard Disk 3     : None
Hard Disk 4     : None
Hard Disk 5    : None
```

Figure 3-2: System Summary Screen

6. Press the **Pause/Break** key to continue displaying the screen until another key is pressed.

7. Press any key to continue with the system bootup.

System Passwords

The <u>Security</u> menu lets you set system passwords that would provide different levels of protection for the server. There are three types of passwords that you can set:

- Supervisor password

  Entering this password will allow the user to access and change all settings in the Setup Utility.

- User password

  Entering this password will restrict a user's access to the Setup menus. A user can only access and modify the following fields:

  — Main menu: System Time and System Date

  — Security menu: Set User password

- Power-on password

  When the **Password on Boot** field is enabled, a password will be required to boot up the server. To enable or disable this field, a supervisor password must first be set.

To set a system password:

NOTE: A Supervisor password should be set first before a User password can be defined.

1. In the Security menu screen, select a set password field—**Set User Password** or **Set Supervisor Password**, then press **Enter**.


```
                    PhoenixBIOS Setup Utility
    Main    Advanced    Security    Power    Boot    Exit

                                             Item Specific Help
    Supervisor Password Is:  Clear
    User Password Is:        Clear
                                          Supervisor Password
    Set Supervisor Password   [Enter]     controls access to the
    Set User Password         [Enter]     setup utility.

    Password on boot
                          Set Supervisor Password

                     Enter New Password    [_      ]
                     Confirm New Password  [       ]




                        Enter  Accepts
                        Esc    Clears
```
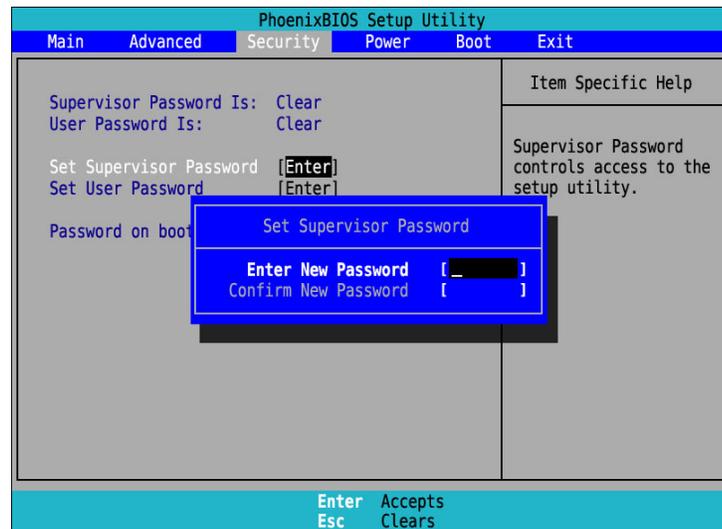
Figure 3-3: Setup window for setting a system password

2. Type a new password in the password box.

   The password may consist of up to eight alphanumeric characters (A-Z, a-z, 0-9).

3. Retype the password to verify the first entry, then press **Enter**.

4. Press **F10** to save the password and close the Setup Utility.

   After setting the password, Setup automatically sets the selected password field to **Enabled**.

To change a system password:

1. In the Security menu screen, select a set password field—**Set User Password** or **Set Supervisor Password**, then press **Enter**.

```
                    PhoenixBIOS Setup Utility
    Main     Advanced    Security    Power     Boot     Exit

                                              Item Specific Help

    Supervisor Password Is:  Set
    User Password Is:        Clear
                                              Supervisor Password
    Set Supervisor Password  [Enter]          controls access to the
    Set User Password        [Enter]          setup utility.

    Password on boot         Set Supervisor Password

                     Enter Current Password    [        ]
                       Enter New Password      [        ]
                       Confirm New Password    [        ]




                         Enter   Accepts
                         Esc     Clears
```
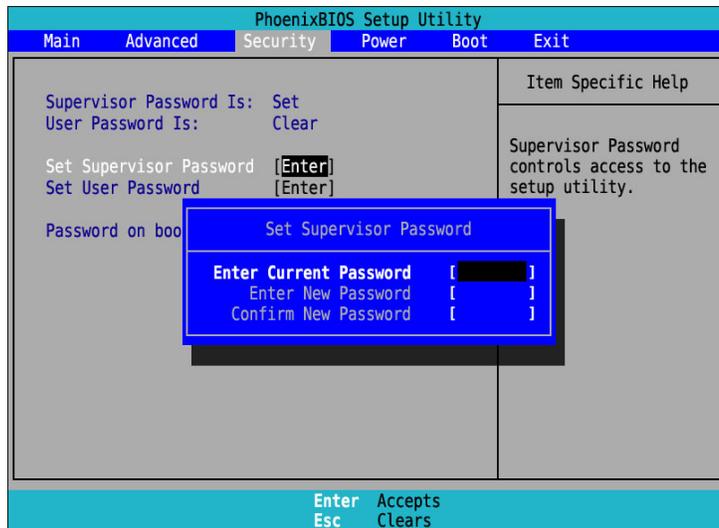
Figure 3-4: Setup window for changing a system password

2. Type the original password in the password box.

3. Type a new password then press **Enter**.

4. Retype the new password to verify the first entry then press **Enter** again.

5. Press **F10** to save the password and close the Setup Utility.

To remove a system password:

1. In the Security menu screen, select a set password field—**Set User Password** or **Set Supervisor Password**, then press **Enter**.

2. Type the original password then press **Enter**.

3. Press **Enter** twice without entering anything in the new and confirm password fields.

4. Press **F10** to save the changes you made and close the Setup Utility.

    Setup automatically sets the selected password field to **Clear**.

To reset a system password:

If you have forgotten the user password or the supervisor password, the server will continue to function normally but you will not be able to access the Setup Utility.

If you have enabled the <u>Password on Boot</u> field and have forgotten both the user password and the supervisor password, you will not be able to reboot the server.

If you have forgotten the user password, you can use the supervisor password to reset it. However, if it is the supervisor password that you have forgotten, you can only reset it via hardware. The clear password switch is switch 2 of the system configuration switch (SW1). Go to Chapter 5 for the location of this switch.

Follow the steps below to reset the system password:

1. Perform the pre-installation instructions listed in Chapter 2.
2. If necessary, remove any accessory boards or cables that prevent access to the system configuration switch.
3. Locate the system configuration switch (SW1) on the system board.
4. Identify SW1-2 of the switch.

   By default, SW1-2 is set to the **Off** position.
5. Set SW1-2 to the **On** position.
6. Reinstall the access panel as described in Chapter 2.
7. Reconnect only the power cord.
8. Turn on the server.

   The system would have already cleared any reference to the lost password. Perform the following steps to reset SW1-2 to its default position.
9. Power down the server and disconnect the power cable.
10. Remove the access panel as described in Chapter 2.
11. Repeat steps 2 through 3.
12. Set SW1-2 to its default **Off** position.
13. Perform the post-installation instructions listed in Chapter 2.

Recording Custom Setup Values

Write down the settings in the Setup Utility and keep them in a safe place. If the custom values ever need restoring (after a CMOS clear, for example), you must run the Setup Utility and enter these custom settings again. A record of these custom settings will make this much easier.

Loading System Defaults

If your system fails after you make changes in the Setup menus, reboot the server, enter Setup and load the system default settings to correct the error. These default settings have been selected to optimize your server's performance.

To load the system defaults:

1. Reboot the server in a normal manner.

2. During POST, press **F10** to access the Setup Utility.

3. Press **F9** to load the default values.

4. Press **F10** to save the changes you made and close the Setup Utility.

Clearing CMOS

You may need to clear the Setup configuration values (CMOS) if the configuration has been corrupted, or if incorrect settings made in the Setup Utility have caused error messages to be unreadable. Clearing the CMOS data does not invalidate previously set system passwords.

The clear CMOS switch is switch 4 of the system configuration switch (SW1). Refer to Chapter 5 for the location of this switch.

To clear CMOS:

1. Perform the pre-installation instructions listed in Chapter 2.

2. If necessary, remove any accessory boards or cables that prevent access to the system configuration switch.

3. Locate the system configuration switch (SW1) on the system board.

4. Identify SW1-4 of the switch.

   By default, SW1-4 is set to the **Off** position.

5. Set SW1-4 to the **On** position.

   This will clear the CMOS memory.

6. Switch SW1-4 back to its default **Off** position.

7. Perform the post-installation instructions listed in Chapter 2.

8. During POST, press **F10** to access the Setup Utility.

9. Press **F9** to load the system default values.

10. Press **F10** to save the changes you made and close the Setup Utility.

Setting Hardware Protection

You have the option to lock and unlock some of the I/O ports available on the server.

1. In the Advanced menu screen, select the **Hardware Protection** field, then press **Enter**.

```
                    PhoenixBIOS Setup Utility
         Advanced

            Hardware Protection                    Item Specific Help

   Embedded COM Port A    [Unlock]             Lock/Unlock Serial
   Embedded COM Port B    [Unlock]             Port A
   Embedded LPT Port      [Unlock]
   USB Port               [Unlock]




   F1  Help   ↑↓ Select Item   -/+   Change Values   F9   Setup Defaults
   Esc Exit   ↔  Select Menu   Enter Select ▶ Sub-Menu F10  Save and Exit
```
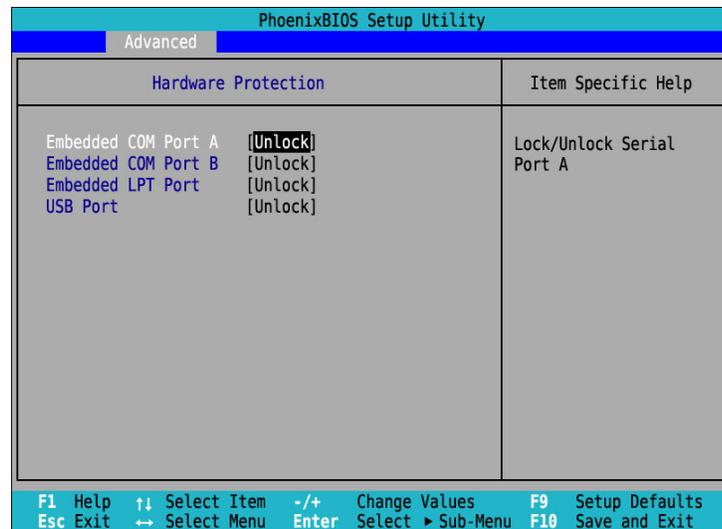
Figure 3-5: Setup Utility's Hardware Protection window

2. Select the hardware item you want to lock. Options include:

   - Serial port

   - Parallel port

   - USB ports

3. Press the (+) or (-) key to set the selected hardware to **Lock**.

4. Press **F10** to save the changes you made and close the Setup Utility.

Power-On Self Test (POST)

When the server boots up, a series of tests are displayed on the screen. This is referred to as Power–On Self–Test or POST. POST is a series of diagnostic tests that checks firmware and assemblies to ensure that the server is properly functioning. This diagnostic function automatically runs each time the server is powered on.

These diagnostics, which reside in the BIOS ROM, isolate server-related logic failures and indicate the board or component that needs to be replaced, as indicated by the error messages. Most server hardware failures will be accurately isolated during POST. The number of tests displayed depends on the configuration of the server.

During POST, you can:

- Press **F8** to display the Boot menu.

- Press **F10** to access the Setup Utility.

- Press **F12** to request a network boot.

POST Error Indicators

When POST detects a system failure, it either:

- Displays a POST error message, or

- Emits a series of beep codes

Recoverable POST Errors

Whenever a non-fatal error occurs during POST, an error message describing the problem appears onscreen. These text messages are displayed in normal video (white text on black background). It shows the details of the error. The following is an example of a POST error message:

```
Error message 1 of 1:  Error code 0103
Keyboard not detected - Keyboard error
```

In some cases an error message may include recommendations for troubleshooting or require that you press the **Enter** key to display recommendations. Follow the instructions on the screen.

Table 3-3 lists down the most common POST error messages with their corresponding troubleshooting recommendation. It is recommended that you correct the error before proceeding, even if the server appears to boot successfully.

If your system displays one of the messages marked below with an asterisk (*), write down the code and message and contact your HP Customer Support provider.

When no POST error message is displayed but the server stops during POST, listen for beep codes.

Table 3-3: POST Error Messages

Error code	Error message	Description/corrective action
0200	Failure Fixed Disk	Fixed disk is not working or not configured properly.
		1. Run Setup and check if the fixed-disk type is correctly identified.
		2. Check to see if fixed disk is attached properly.
0210	Stuck key	Stuck key on keyboard.
		1. Locate the stuck key on your keyboard and release it.
		2. Reboot the server.
	Mouse error	Mouse not working.
		Verify the mouse cable is securely connected to the mouse port (not the keyboard port) on the rear panel of the server.
		If the problem persists, replace the mouse or contact your HP Customer Support provider.
0211	Keyboard error	Keyboard not working.
		Verify that the keyboard cable is securely connected to the keyboard port (not the mouse port) on the rear panel of the server.
		If the problem persists, replace the keyboard or contact your HP Customer Support provider.
0212	Keyboard Controller Failed *	Keyboard controller failed test.
0220	Monitor type does not match CMOS - Run SETUP	The attached monitor cannot be correctly identified in by Setup.
		Run Setup and check if the monitor type is correctly identified.

continued

Table 3-3: POST Error Messages *continued*

Error code	Error message	Description/corrective action
0250	System battery is dead - Replace and run SETUP	The CMOS clock battery indicator shows the system battery is dead. 1. Replace the system battery. Go to the "System Battery" section of Chapter 2. 2. Run Setup to reconfigure the system.
0251	System CMOS checksum bad - Default configuration used	The settings in the Setup Utility have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. You can either: • Load the system default values. Refer to the "Loading System Defaults" section in this chapter for details. • Access Setup and enter your own custom values. If the error persists, check the system battery or contact your HP Customer Support provider.
0260	System timer error *	The timer test failed. Requires repair of the system board.
0270	Real time clock error *	Real-Time Clock (RTC) fails BIOS hardware test. May require board repair.
0271	Check date and time settings	BIOS found date or time out of range and reset the RTC. May require setting legal date (1991-2099). Access Setup and check the values in the System Time and System Date fields of the <u>Main</u> menu.
02B0	Diskette drive A error	Applicable only if an optional diskette drive is installed. The diskette drive is present but fails the POST diskette tests.
02B1	Diskette drive B error	
02B2	Incorrect Drive A type - run SETUP	1. Run Setup and check if the diskette drive type is correctly identified.
02B3	Incorrect Drive B type - run SETUP	2. Open the server and check that the diskette drive is properly installed.

continued

Table 3-3: POST Error Messages *continued*

Error code	Error message	Description/corrective action
02D0	System cache error - Cache disabled *	RAM cache failed and BIOS disabled the cache.
	Invalid System Configuration Data	Problem with the CMOS data. You can do any of the following: • Load the system default values. Refer to the "Loading System Defaults" section in this chapter for details. • Access Setup and enter your own custom values. • Clear the CMOS memory then restart the server. For instructions, refer to the "Clearing CMOS" section in this chapter. If the error persists, check the system battery or contact your HP Customer Support provider.
	Operating system not found	Operating system cannot be located on any of the boot drives. • Verify that the priority boot drive has power and that its IDE or SCSI cable is connected properly. • Verify that the desired boot drive has power and its SCSI cable is connected. • Verify that the IDE or SCSI cable is securely plugged into their respective system board connector. • Verify that the boot device is enabled in the Setup Utility. • Verify that the boot device has an operating system installed. • If you have a diskette drive installed, verify that there is no non-bootable floppy present in it. If the problem persists, contact your HP Customer Support provider.

Terminal POST Errors

There are several POST routines that issue a POST terminal error and shut down the system if they fail. Before shutting down the system, the terminal-error handler issues a beep code signifying the test point error, writes the error to port 80h, attempts to initialize the video, and writes the error in the upper left corner of the screen (using both mono and color adapters).

POST-related Troubleshooting

Perform the following procedures when POST fails to run or display error messages or emit beep codes.

If the POST failure is during a routine bootup, check the following:

- All external cables and power cables should be firmly plugged in.

- The power outlet to which the server is connected is working.

- The server and monitor are both turned on. The bicolor status LED indicator on the front panel must be lit up green.

- The monitor's contrast and brightness settings are correct.

- All internal cables are properly connected and all boards firmly seated.

- The processor is fully seated in its socket on the system board.

- The HSF assembly is properly installed on top of the processor.

- Verify that the all memory modules are properly installed.

If the POST failure occurs after installing an accessory, check the following:

1. Perform steps 1 through 4 of the pre-installation instructions listed in Chapter 2.

2. If necessary, remove any accessory boards or cables that prevent access to the system components.

3. Check the following:

   - If you have installed a PCI accessory board, verify that the board is firmly seated in its slot and any switches or jumpers on the board are properly set.

     Refer to the documentation provided with the accessory board.

   - All internal cabling and connections are in their proper order.

   - If you have changed any switches on the system board, verify that each one is properly set.

4. Observe the post-installation procedures described in Chapter 2.

5. Turn on the monitor.

6. If the server still does not work, repeat steps 1 and 2.

7. Remove all accessories, except the primary boot hard disk drive.

8. Repeat steps 4 and 5.

If the server now works, replace the boards and accessories one at a time to determine which one is causing the problem.

Diagnostics for Windows

Diagnostics for Windows provides an easy-to-use hardware diagnostic for server verification and rapid troubleshooting. This utility is installed from the HP ProLiant ML110 Generation 2 Server Support CD, and run under Microsoft Windows. For instructions on installation and use, refer to the README file located inside the Diagnostics for Windows folder in the Support CD.

HP recommends using *Diagnostics for Windows* to verify all server functions are operating correctly, after completing all the configuration steps. The utility generates a text file containing the hardware detected and the test results. This text file should be saved to a diskette for future reference or use by your support provider.

For More Information

For more information about the diagnostic tools described in this chapter, and other tools available for your server, refer to the Servers Troubleshooting Guide on the HP ProLiant ML110 Generation 2 Server Support CD. For the most recent version of this guide, go to www.hp.com.

4

Connectors, Switches, and LEDs

This chapter contains illustrations and tables identifying and describing the connectors, switches, buttons, and LED indicators located on the front panel, rear panel, system board and hard drives of the HP ProLiant ML110 Generation 2 server.

Connectors and Components

This section contains illustrations and tables identifying connectors and components on the front and rear panels of the server, as well as those located on the system board.

Front Panel Components

Figure 4-1 and Table 4-1 show and describe the components on the front panel of the server. In Figure 4-1, the server is shown with both the front bezel attached (items labeled 1 through 9), and removed (items labeled 10 and 11).
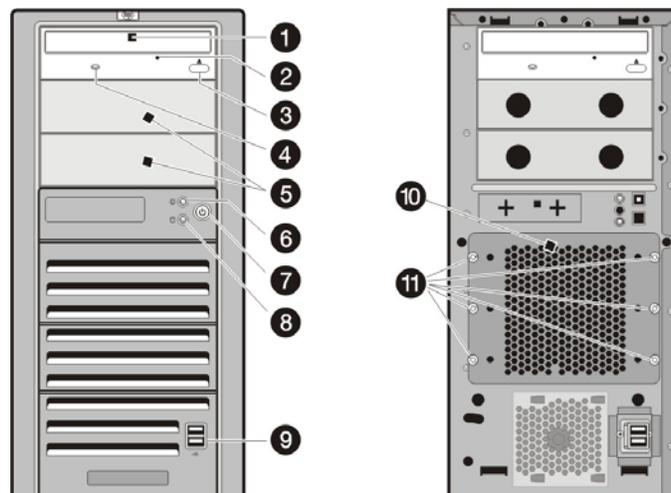
Figure 4-1: Front panel components

Table 4-1: Front Panel Components

Item	Icon	Component
1		IDE CD-ROM drive
2		IDE CD-ROM drive mechanical eject hole
3	⏏	IDE CD-ROM drive eject button
4		IDE CD-ROM drive activity LED indicator (amber)
5		Full-height common bays
6	☼	Power/system health LED indicator (bicolor: green/amber)
7	⏻	Power button • Powers up the server. • Places the server in standby mode. • Powers down the server.
8	🛢	Hard drive activity LED indicator (amber) For IDE, SCSI, and non-hot-plug SATA drives only. A hot-plug SATA drive installed in the server has its own set of LED indicators located on its carrier. For more information, refer to the "Hard Drive Activity LED Indicators" section in this chapter.
9	⟝•	Front USB 2.0 ports (two)
10		HDD cage The server supports both non-hot-plug and hot-plug HDD cage models.
11		Torx screws for the HDD cage

Rear Panel Components

Figure 4-2 and Table 4-2 show and describe the components on the rear panel of the server.
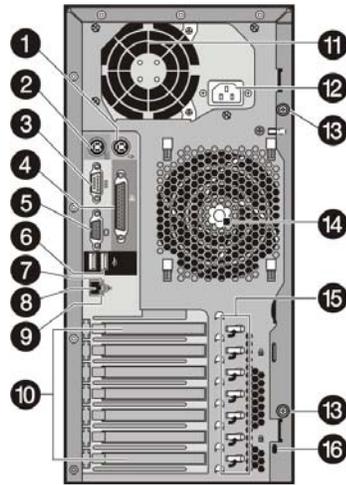
Figure 4-2: Rear panel components

Table 4-2: Rear Panel Components

Item	Icon	Component
1		PS/2 mouse port (green)
2		PS/2 keyboard port (purple)
3		Serial port (teal)
4		Parallel port (burgundy)
5		Video port (blue)
6		Rear USB 2.0 ports (black)
7		LAN activity/link status LED indicator
8		LAN port (RJ-45)
9		LAN network speed LED indicator
10		PCI slot covers
11		PSU fan
12		Power supply cable socket
13		Thumbscrews for the access panel
14		System fan
15		Retention clips for the PCI slot covers
16		Kensington lock notch

I/O Device Connection

The color-coded I/O ports on the rear panel are each marked with icons that indicate the kind of devices that can be connected to them.
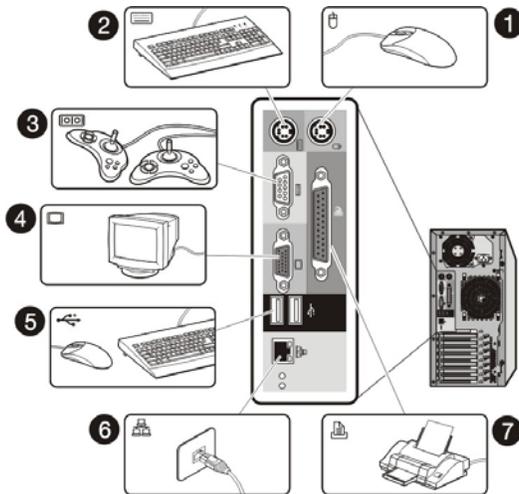
Figure 4-3: Connecting I/O devices

System Board Components

Figure 4-4 and Table 4-3 show and describe the components on the system board.
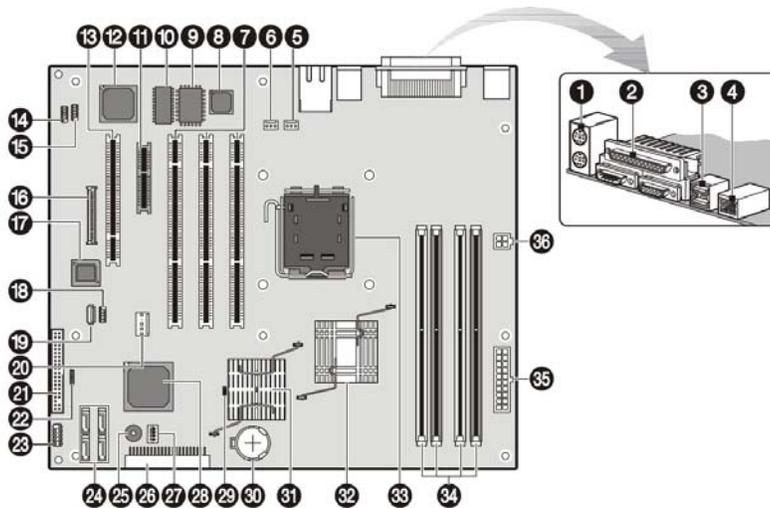
Figure 4-4: System board components

Table 4-3: System Board Components

Item	Component Code	Component
1	CN1	Top: PS/2 mouse port
		Bottom: PS/2 keyboard port
2	CN2	Top: Parallel port
		Left: Video port
		Right: Serial port
3	CN5	Rear USB 2.0 ports (two)
4	CN6	LAN port (RJ-45)
5	CN7	3-pin processor fan connector
6	CN10	3-pin system fan connector (rear)
7	PCI1 – PCI3	64-bit/100-MHz, 3.3-V PCI-X bus slots (three)
8	U13	Intel GD8254IPI GbE controller
9	U17	SMSC LPC47M192 Super I/O chipset
10	U18	VGA frame buffer
11	PCI4	PCI-Express x4 bus slot
12	U22	ATI Rage XL VGA chipset
13	PCI5	32-bit/33-MHz, 5-V PCI bus slot
14	CN22	9-pin BMC COM connector
15	CN24	9-pin extension serial connector (COM2)
16	CN20	IPMI connector
17	U34	BIOS flash EEPROM (Electrically Erasable Programmable Read-Only Memory)
18	CN21	Connector for the front USB 2.0 ports
19	CN27	Internal USB connector
20	CN17	Internal USB connector (for internal USB tape use)
21	CN18	Connector for the diskette drive option
22	CN13	4-pin SCSI LED connector
23	CN16	9-pin front panel board connector
24	SATA0 – SATA3	7-pin 150-MBps SATA connectors (four)
25	BZ1	Internal buzzer

continued

Table 4-3: System Board Components *continued*

Item	Component Code	Component
26	IDE1	IDE connector
27	SW1	System configuration switch (dip switch)
28	U46	Intel 82801FR I/O controller hub 6 R (ICH6R) chipset (south bridge)
29	JP1	PCI-X bus speed jumper Jumper setting: • 1-2 – 133 MHz PCI-X bus (default) • 2-3 – 100 MHz PCI-X bus
30	BT1	Maxell CR2032 H 3 V internal lithium system battery
31	U16	Intel 6702 PXH-V (PCI-X hub) chipset (PCI bridge)
32	U9	Intel E7220 chipset (north bridge)
33	U10	Intel LGA775 processor socket
34	DIMM1 – DIMM4	DIMM slots (four)
35	PWRCON2	20-pin ATX system board power connector
36	PWRCON1	4-pin ATX processor power connector

System Configuration Switch

The system board has a system configuration switch (SW1). Figure 4-5 and Table 4-4 show and describe the use of this switch. In the table, the switch status indicated in **bold text** is the default setting.
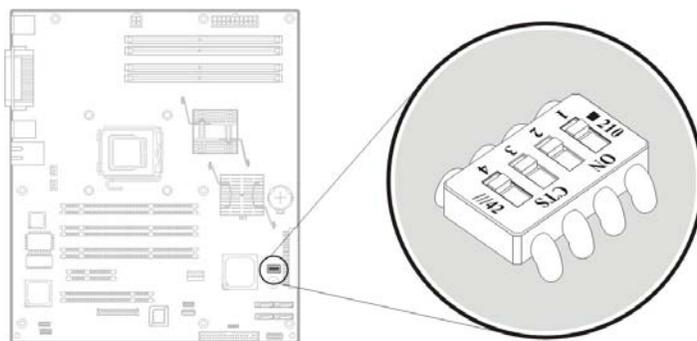
Figure 4-5: System configuration switch

Table 4-4: System Configuration Switch Settings

Switch	Status	Function
SW1-1	On	Enable FWH (firmware hub) protection by software
	Off	No FWH protection
SW1-2	On	Clear password enabled
	Off	Clear password disabled
SW1-3	On	Boot block enabled
	Off	Normal boot
SW1-4	On	Clear CMOS enabled
	Off	Clear CMOS disabled

Status LED Indicators

This section contains illustrations and descriptions of internal and external status LED indicators located on the:

- Front panel
- Rear panel
- System board

These LED indicators aid in problem diagnosis by indicating the status of system components and operations of the server.

Front Panel LED Indicators

The front panel LED indicators allow constant monitoring of basic system functions while the server is operating.

IDE CD-ROM Drive Activity LED Indicator

The IDE CD-ROM drive has an activity indicator that shows when a compact disc (audio, video, or data disc) is being read
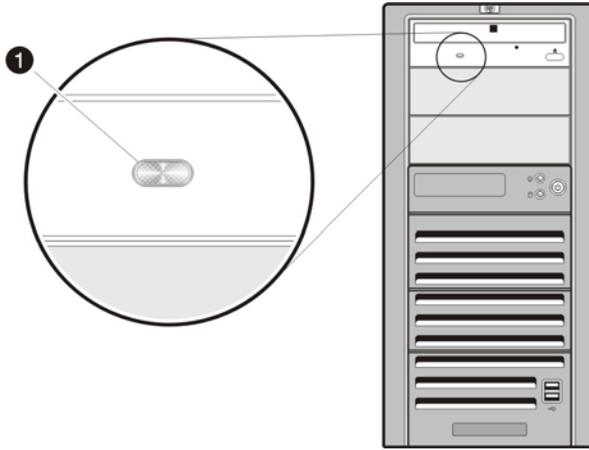
Figure 4-6: IDE CD-ROM drive activity LED indicator

Activity states for the IDE CD-ROM drive are as follows:

- Flashing amber – Ongoing drive activity

- Off – No drive activity

Power/System Health LED Indicator

The power status and health condition of the server is indicated by the bicolor LED indicator 🔆 found on the front panel. Figure 4-7 and Table 4-5 show and describe the function of this LED.
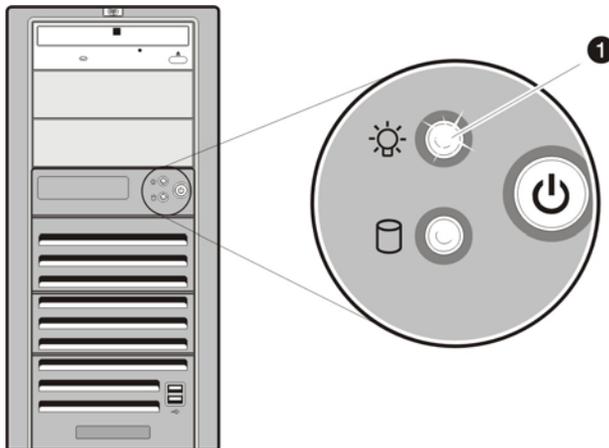
Figure 4-7: Power/system health LED indicator

Table 4-5: Power/System Health LED Indicator Status

Function	Status	Description
Power status indicator	Steady green	The server is operating normally.
	Flashing green	The server is in standby mode (auxiliary power present).
	Off	The server is powered off (AC power disconnected).
System health indicator	Steady amber	A pre-failure system threshold has been breached. This may be any of the following:
		• At least one fan failure
		• At least one processor failure
		• At least one of the temperature sensors reached critical level
		• At least one processor VRM (voltage regulator) failure
		• At least one memory module exceeds the max single bit error rate

Hard Drive Activity LED Indicators

Hard Drive Activity LED Indicator for SCSI/IDE/Non-hot-plug SATA Drives

The status of any SCSI, IDE, or non-hot-plug SATA device installed in the server is indicated by the drive activity LED indicator located on the front panel of the server.
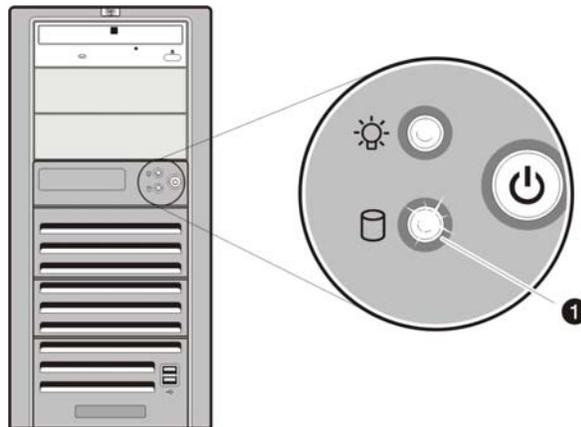
Figure 4-8: Drive activity LED indicator for SCSI/IDE/non-hot-plug SATA drives

Activity states for a SCSI, IDE, and non-hot-plug SATA drive are as follows:

- Flashing amber – Ongoing drive activity
- Off – No drive activity

Hard Drive LED Indicators for Hot-plug SATA Drives

A hot-plug SATA device installed in the server has its own set of LED indicators located on its carrier. Figure 4-9 and Table 4-6 show and describe these LEDs.
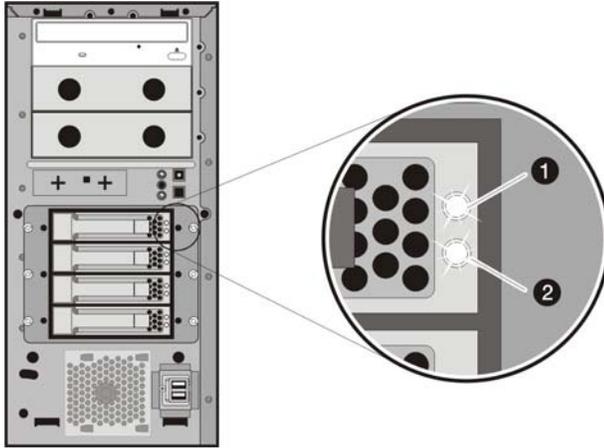
Figure 4-9: LED indicators on a hot-plug SATA drive

Table 4-6: Hot-plug SATA Drive LED Indicators Status

Item	Component	Status	Description
1	Drive activity status LED indicator	⚪	Forced off (override drive activity output)
			Drive is not a member of any RAID volumes; or drive is configured but in a replacement or failed state for at least one volume that it is a member of; or drive is a spare drive that is inactive or has been activated but has not been rebuilt.
			Drive is not rebuilding
			Drive is not a member of a volume undergoing capacity expansion or RAID migration
		🟢	Solid green
			• Drive is a member of a RAID volume
			• Drive is not an inactive spare drive
			• Drive is not in a replacement or failed state for any volumes that it is a member of
			• Drive is not currently performing any I/O activity

continued

Table 4-6: Hot-plug SATA Drive LED Indicators Status *continued*

Item	Component	Status	Description
		🟢	Flashing green during a drive activity (if command is outstanding continually the indicator is forced to flash at 4 Hz 50% duty cycle instead of solid off) • Drive is currently performing an I/O activity • Drive is a member of a RAID volume • Drive is not in a replacement or failed state for any volumes that it is a member of (drive is online) • Drive is not rebuilding • Drive is not a member of a volume undergoing capacity expansion or RAID migration
		🟢	Flashing green @ 1 Hz 50% duty cycle (override drive activity output) • Drive is rebuilding, or is a member of a volume undergoing capacity expansion or RAID migration
2	Fault identification LED indicator	⚪	Off • Drive is not in a failed state • Drive is not selected (unit identification)
		🔵	Solid blue • Drive is not in a failed state • Drive is selected (unit identification)
		🟠	Solid amber • Drive is in a failed state • Drive is not selected
		🟠	Flashing amber @ 1Hz 50% duty cycle • Drive is in a predictive failure state • Drive is not in a failed state • Drive is not selected
		🟠	Flashing amber/blue flashing @ 1Hz 50% duty cycle • Drive is in a failed or predictive failure state • Drive is selected

S.M.A.R.T. Function

Self-Monitoring Analysis and Reporting Technology or S.M.A.R.T. is an interface function between the system BIOS and the SATA hard drive. When enabled BIOS receives information from the SATA drive that allows the former to send a warning message of possible hard drive failure.

To activate the S.M.A.R.T. function:

1. Turn on the monitor and the server.

   If the server is already turned on, save your data and exit all open applications, then restart the server.

2. During POST, press **F10**.

   If you fail to press **F10** before POST is completed, you will need to restart the server.

3. Under the Main menu click **IDE Channel 0 Master**.

4. Set the SMART Monitoring option to **Enabled**.

5. Press **F10** to save the changes you made and close the *Phoenix*BIOS Setup Utility.

Rear Panel LED Indicators

The LAN port on the rear panel has two LED indicators that allow monitoring of network activity. Figure 4-10 and Table 4-7 show and describe the function of these LEDs.
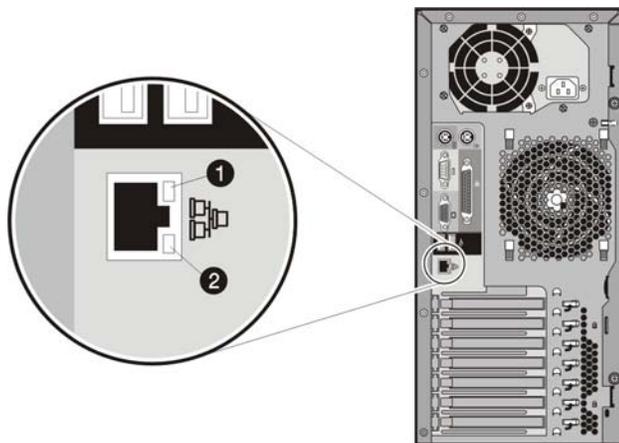
Figure 4-10: LAN LED indicators

Table 4-7: LAN LED Indicators Status

Item	Component	Status	Description
1	LAN activity/link status LED indicator	Steady green	An active network link exists.
		Flashing green	An ongoing network data activity exists.
		Off	The server is off-line
2	LAN network speed LED indicator	Steady green	The LAN connection is using a GbE link.
		Steady amber	The LAN connection is using a 100 Mbps link.
		Off	The LAN connection is using a 10 Mbps link.

System Board LED Indicators

The system board contains two internal power status LED indicators for use during troubleshooting operations. Figure 4-11 and Table 4-8 show and describe the function of these LEDs.
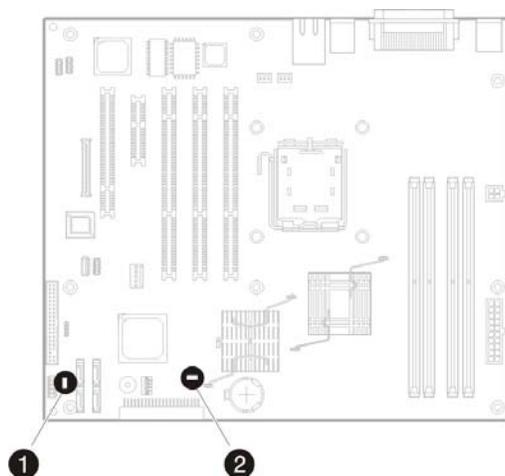
Figure 4-11: System board LED indicators

Table 4-8: System Board Power LED Indicators Status

Item	Component	Status	Description
1	Standby mode LED indicator	Green	The server is in standby mode (auxiliary power present).
		Off	The server is powered off (AC power disconnected).
2	Power-on LED indicator	Green	The system has adequate AC power.
		Off	Either the power cord is not connected or the power supply unit has failed.

5

Physical and Operating Specifications

This chapter provides physical and operating specifications for the HP ProLiant ML110 Generation 2 server. The specifications for the following items are provided:

- System unit
- Memory
- Processor
- IDE CD-ROM drive
- Non-hot-plug SCSI hard drive
- Hot-plug SATA hard drive
- SCSI storage controller
- SATA RAID controller

System Unit

Table 5-1: Hardware Specifications

Item	Component
Processor socket	Intel LGA775 socket platform
Processor support	Intel Celeron D
	Intel Pentium 4
Core logic chipset	Intel E7220 (north bridge)
	Intel ICH6R (south bridge)
	Intel 6702 PXH-V (PCI bridge)
Super I/O chipset	SMSC LPC47M192
Hardware monitoring chipset	Winbond W83792AD
Gigabit Ethernet controller	Intel GD8254IPI
Memory controller	Integrated in the Intel E7220 chipset
Storage controller	Integrated in the Intel ICH6R chipset
VGA controller	ATI Rage XL VGA with 8-MB of video memory
I/O subsystem	• Three 64-bit/100-MHz, 3.3-V PCI-X bus slots
	• One PCI-Express x4 bus slot
	• One 32-bit/33-MHz, 5-V PCI bus slot
Memory	Four DDR1-400 DIMM slots, up to 4-GB
Default media storage	• One-half height IDE CD-ROM drive
	• 80-GB SATA hard drive
Optional media storage	• Two full-height drive bays for DVD-ROM drive, tape drive, non-hot-plug hard drive, any SCSI device or a 2-bay SCSI drive cage, including a DLT tape drive.
	• Four-bay non-hot-plug HDD cage for SCSI and SATA drives
	• Four-bay hot-plug HDD cage for SATA drives
I/O ports	PS/2 keyboard port, PS/2 mouse port, USB 2.0 ports (two front-mounted ports, two rear-mounted ports, and two internal connectors on the system board), video port, serial port, parallel port, and LAN port

continued

Table 5-1: Hardware Specifications *continued*

Item	Component
Status LED indicators	
Front panel	• IDE CD-ROM drive activity
	• Power/system health status
	• Hard drive activity
Rear panel	• LAN activity/link status
	• LAN network speed
System board	• Standby mode
	• Power status
Power supply unit (PSU)	Delta SSI DPS (350 watts)
System management function	IPMI 1.5 compliant
Thermal solution	• One system fan
	• One processor fan
	• One PSU fan

Table 5-2: Software Specifications

Item	Description
Network operating system (NOS) support	• Microsoft Windows Server 2003, Standard Edition
	• Red Hat Enterprise Linux ES 3
	• Red Hat Enterprise Linux ES 3 (64-bit)
	• SUSE Linux Enterprise Server 9
	• SUSE Linux Enterprise Server 9 (64-bit)
	• Novell NetWare 6.5 with Service Pack 2
	• Novell Small Business Suite 6.5 with Service Pack 2
	• SCO OpenServer 5.0.7
System diagnostics	• *Phoenix*BIOS Setup Utility
	• Diagnostics for Windows

Table 5-3: Physical Dimensions

Item	Description
System board platform	ATX (Advanced Technology eXtended)
System board dimensions	
Length	305 mm (12 in)
Width	244 mm (9.6 in)
Server dimensions	
Height	• Without foot stands – 430 mm (16.9 in) • With foot stands – 440 mm (17.3 in)
Width	200 mm (7.9 in)
Length	• Without bezel – 500 mm (19.7 in) • With bezel – 535 mm (21.1 in)
Server weight	• Basic configuration (excludes keyboard and monitor) – approximately 14.1 kg (31 lb) • Fully loaded configuration (includes keyboard and monitor) – approximately 20 kg (44 lb)

Table 5-4: Environmental Specifications

Item	Description
Temperature	
Operating	+5 to +35°C (+41 to +95°F)
Non-operating	-10 to +60°C (+14 to +140°F)
Storage	-20 to +60°C (+14 to +140°F)
Wet-bulb temperature	29°C (84.2°F)
Relative humidity	
Operating	20% to 80% RH, non-condensing
Non-operating	20% to 80% RH, non-condensing (unpacked)
Storage	20% to 90% RH, non-condensing

Table 5-4: Environmental Specifications *continued*

Item	Description
Altitude	
Operating	0 to 3,048 m (0 to 10,000 ft)
Non-operating	0 to 9,144 m (0 to 30,000 ft)
Thermal output (maximum operating)	1907 BTU/hr
Acoustic emissions	
Normal configuration	LpA: <38 dBA, operating at room temperature
Maximum configuration	LpA: <70 dBA

Table 5-5: Power Supply Requirements

Item	Description
Model	Delta SSI DPS
Input type	AC
Operating power	350-W at 25°C; 320-W at 50°C
Input requirements	
Rated input voltage	90 VAC to 135 VAC (180 VAC to 265 VAC, auto range, single phase)
Rated input frequency	47 Hz to 63 Hz.
Normal voltage range	100 VAC – 127 VAC (low range)
	200 VAC – 240 VAC (high range)
Rated input current	8 A max at 115 VAC; 4 A max. at 230 VAC
Efficiency	> 65 %
Input maximum range	265 VAC
Maximum current	8 A

Memory

Table 5-6: Memory Specifications

Item	Description
Size	256-MB, 512-MB, and 1-GB
Speed	266/400-MHz (PC2100/PC3200)
Type	DDR1-400 unbuffered ECC or non-ECC DIMMs
Dimension	42.5 x 42.5 mm (1.67 x 1.67 in)
Packaging	1005-pin FC-BGA

Processor

The server's Intel LGA775 processor socket supports Celeron D and Pentium 4 processors employing the 90 nm process technology.

Table 5-7: Intel Celeron D Processor Specifications

Operating Frequency	FSB Speed	On-die L2 Cache	Voltage Range	Package
3.06 GHz	533 MHz	256 MB	1.25 – 1.4	FC-LGA4
2.93 GHz	533 MHz	256 MB	1.25 – 1.4	FC-LGA4
2.8 GHz	533 MHz	256 MB	1.25 – 1.4	FC-LGA4
2.66 GHz	533 MHz	256 MB	1.25 – 1.4	FC-LGA4
2.53 GHz	533 MHz	256 MB	1.25 – 1.4	FC-LGA4

Note: The server supports Intel Celeron D processors with Execute Disable Bit capability.

Table 5-8: Intel Pentium 4 Processor Specifications

Operating Frequency	FSB Speed	On-die L2 Cache	Voltage Range	Package
3.8 GHz	800 MHz	1 MB	1.25 – 1.4	FC-LGA
3.6 GHz	800 MHz	1 MB	1.25 – 1.4	FC-LGA
3.4 GHz	800 MHz	1 MB	1.25 – 1.4	FC-LGA
3.2 GHz	800 MHz	1 MB	1.25 – 1.4	FC-LGA
3.0 GHz	800 MHz	1 MB	1.25 – 1.4	FC-LGA
2.8 GHz	800 MHz	1 MB	1.25 – 1.4	FC-LGA

Note: The server supports Intel Pentium 4 processors with HT (Hyper-Threading) technology.

IDE CD-ROM Drive

Table 5-9: IDE CD-ROM Drive Specifications

Item	Description
Model	HP GCR-8482B
Form factor	5.25 in, half-height
Dimensions	
Height	41.3 mm (1.6 in)
Width	146 mm (5.8 in)
Depth	184.7 mm (7.3 in)
Weight	.72 kg (1.6 lb)

continued

Table 5-9: IDE CD-ROM Drive Specifications *continued*

Item	Description
Supported disc formats	• Mixed mode (audio and data combined)
	• CD-DA, mode 1(basic format), M ode 2, Form 1 and Form 2
	• Photo-CD (multi-session), CD-XA
	• CD-I, CD-Plus/CD-Extra, CD-RW
Rotational speed	20x to 48x
Data capacity	
Mode1 and Mode 2, Form 1	2,048 bytes/block
Mode 2	2,340/2,336 bytes per block
Mode 2, Form 2	2,332 bytes/block
CD-DA	2,352 bytes/block
Data buffer capacity	128-KB
Data transfer rate	
Sustained	
	• 20X (inner side) – 3,000 KB/s
	• 48X (outer side) – 7,200 KB/s
Burst	
	• PIO mode 4 – 16.67 MB/s
	• Multi-DMA mode – 216.67 MB/s
	• UDMA mode 2 – 33.3 MB/s
Average access time	
Typical	75 ms
Maximum	100 ms
Three-way eject support	• Via software
	• Via drive open/close button
	• Via emergency eject hole
Operating conditions	
Temperature	0°C to 50°C (32°F to 122°F)
Relative humidity	5% to 90%

Non-hot-plug SCSI Hard Drive

Table 5-10: Non-hot plug SCSI Hard Drive Specifications

Item	Description
Model	Fujitsu Allegro 8LX
Capacity	36-GB
Dimensions	
Height	25.4 mm (1.0 in)
Width	101.6 mm (4.0 in)
Depth	146.0 mm (5.8 in)
Weight (max. population)	.68 kg (1.5 lb)
Interface	Universal 80-pin Ultra320
Maximum transfer rate	118 MB/s
Rotational speed	15,000 RPM
Bytes per sector	512
Maximum block count	71,132,000
Operating temperature	5°C to 60°C (41°F to 140°F)

Hot-plug SATA Hard Drive

Table 5-11: Hot-plug SATA Hard Drive Specifications

Item	Description
Model	Maxtor DiamondMax Plus 9
Capacity	80-GB
Dimensions (maximum)	
Height	26.1 mm (1.03 in)
Width	101.6 mm (4.0 in)
Depth	147 mm (5.8 in)
Weight	.63 kg (1.4 lb)
Interface	Ultra ATA/133
Maximum transfer rate	133 MB/s
Rotational speed	7200 RPM
Bytes per sector	512
Sectors per drive	160,086,528
Operating temperature	5°C to 55°C (41°F to 131°F)

SCSI Storage Controller

Table 5-12: SCSI Storage Controller Specifications

Item	Description
Model	LSI Logic Ultra320 SCSI Host Adapter
Processor	LSI LSI53C1020
Form factor	Low-profile PCI-X
Interface type	PCI-X/133 MHz
Controller interface	Ultra320 SCSI
Dimensions	
Height	63.5 mm (2.5 in)
Depth	170.2 mm (6.7 in)
Data transfer rate	320 MB/s
Supported devices	Hard drive, disk array (RAID)
Number of channels	1
Maximum number of supported storage devices	15
Standard compliance	FCC Class B, CE, VCCI, and C-Tick
OS requirement	Microsoft Windows XP
Operating conditions	
Temperature	0°C to 55°C (32°F to 131°F)
Relative humidity	5% to 90%

SATA RAID Controller

Table 5-13: SATA RAID Controller Specifications

Item	Description
Model	Adaptec AAR-2610SA
Form factor	Half-size, full height PCI
Features	• Intel 80302 Intelligent I/O processor
	• Three (3) Silicon Image SI3512 dual SATA 1.0 controllers with command queuing
	• CE (Capacity expansion)
	• OCE (Online Capacity Expansion)
	• RLM (RAID Level Migration)
	• Audible alarm support
	• Interrupt sharing
RAID levels support	• RAID 0 (1 to 6 drives)
	• RAID 1 (2 drives)
	• RAID 5 (3 to 6 drives)
	• RAID 10 (4 to 6 drives)
SATA compliance	SATA 1.0 and SATA II phase 1 specifications
PCI compliance	PCI 2.2 and Universal PCI
PCI slot compatibility	• 32-bit/33 MHz PCI
	• 64-bit/66 MHz PCI
	• 133/100/66 MHz PCI-X
Management software	ASM and Adaptec RAID Configuration Utility
Power management	ACPI 2.0 and PCI Power Management Specifications
Maximum capacity	137-GB
Fixed memory	64-MB
Option ROM size	<64-KB
Programmable controller firmware	2-MB (Flash upgradeable)
Maximum number of logical drives	24
Operating conditions	
Temperature	0°C to 55°C (32 °F to 131°F)
Relative Humidity	8% to 80% (non-condensing)

Note: The card can be plugged in a PCI-X slot but will operate in PCI mode at reduced performance.

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