HP ProLiant ML110 Generation 3 Server

Maintenance and Service Guide

Contents

1 Illustrated parts catalog

This chapter provides the illustrated parts breakdown and spare parts lists for the HP ProLiant ML110 Generation 3 server. Information for contacting HP is also provided.

Customer self repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period, HP identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- Mandatory - Parts for which customer self repair is mandatory. If you request HP (including any of it's partners or service providers) to replace these parts, you will be charged for the travel and labor costs of this service.
- Recommended - Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, this may be done at no additional charge under the type of warranty service designated for your product.

Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered where geography permits, for customers with those entitlements. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

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

Mechanical parts exploded view

Figure -1 [Mechanical parts exploded view]
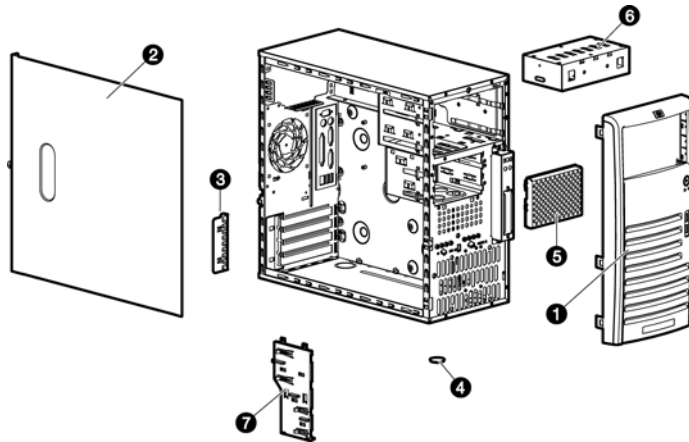
Table -1 Mechanical spare parts list

Item	Description	Assembly number	Spare part number	Customer self repair
1	Front bezel	391980-001	392174-001	Mandatory
2	Access panel	396648-001	397120-001	Mandatory
3	Expansion slot cover lock (included in Misc Hardware Kit)	397084-001	----	Mandatory
4	Foot (included in Misc Hardware Kit)	166939-007	----	Mandatory
5	Hard drive EMI shield	395015-001	395624-001	Mandatory
6	Optical drive shield	395019-001	395625-001	Mandatory
7	Drive release latch	395020-001	397122-001	Mandatory
8	Misc Plastics/Hardware Kit *, including: • Screw, 6-32x.187,TF,HI/TP w/serr (10) • Screw, M3,TT,HI/TP,S15IPX5mm (10) • Feet (4) • Expansion slot cover lock • Thumbscrew, 6-32 X .25, Cbn	----	397119-001	Mandatory

System components exploded view

Figure -2 [System components exploded view]

Table -2 System components spare parts list

Item	Description	Assembly number	Spare part number	Customer self repair
1	System fan	391976-001	392172-001	Mandatory
2	Processor heatsink-cooling fan (HSF) assembly	391818-001	392171-001	Recommended
3	**Processors (include alcohol pad and thermal grease)**			
	a) Intel Celeron D 2.53 GHz/533 MHz FSB with 256 KB L2 cache	367744-005	392167-001	Recommended
	b) Intel Pentium 4 3.0 GHz/800 MHz FSB with 2 MB L2 cache	379289-001	392168-001	Recommended
	c) Intel Pentium 4 3.2 GHz/800 MHz FSB with 2 MB L2 cache	379289-002	392169-001	Recommended
	d) Intel Pentium 4 3.4-GHz/800 MHz FSB, with 2 MB L2 cache	379289-003	398388-001	Recommended
	e) Intel Pentium 4 3.6-GHz/800 MHz FSB, with 2 MB L2 cache	379288-001	398389-001	Recommended
	f) Intel Pentium 4 3.8-GHz/800 MHz FSB, with 2 MB L2 cache	379288-002	398390-001	Recommended
4	**Memory boards (PC2-4200 unbuffered ECC DDR II DIMM)**			
	a) 512 MB	384375-051	392176-001	Mandatory
	b) 1 GB	384376-051	398955-001	Mandatory
	c) 2 GB	384377-061	398956-001	Mandatory
5	System board	389504-001	392170-001	Recommended
6	SCSI controller card	332541-001	339051-001	Recommended
			366651-001	Mandatory
	Mass storage devices			
7	48X CD-ROM drive	266072-001	288894-001	Mandatory
8	SCSI hard drive			
	a) 36GB 15K U320	357014-001	372659-001	Mandatory
	b) 72GB 10K U320		332934-001	Mandatory
	c) 146GB 10K U320		357915-001	Mandatory
9	SATA hard drive	332649-003	373311-001	Mandatory
	Misc parts			
10	350-W power supply unit with cable assembly	391977-001	392173-001	Mandatory

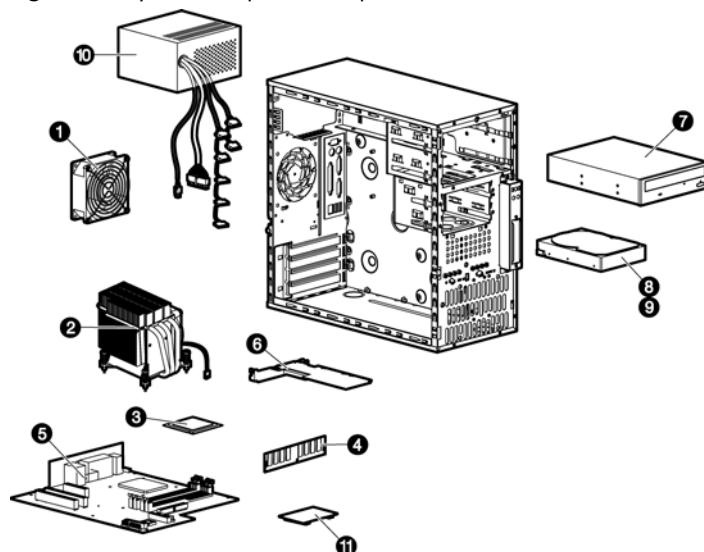**Table -2** System components spare parts list

Item	Description	Assembly number	Spare part number	Customer self repair
11	HP Lights-Out 100 Remote Management Card *	389503-001	392175-001	Mandatory
12	Hard drive conversion bracket *	351795-001	397117-001	Mandatory
13	Return kit *	----	394742-001	Mandatory
14	CD-ROM drive cable assembly, ATA100 *	395016-001	395620-001	Mandatory
15	SCSI hard drive cable *	391982-001	392178-001	Mandatory
16	SATA hard drive cable, 5.25-inch, ODD bay *	326965-002	346142-001	Mandatory
17	SATA hard drive cable *	381868-002	392179-001	Mandatory
18	USB/Power LED cable*	398417-001	398770-001	Mandatory

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 3 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, you must power down the server. Non-hot-plug devices in the server include the processor, all boards, memory modules, fans, PCI option cards, and all hard 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.

Weight in kg
Weight in lbs

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

WARNING! To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

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 it or before you 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 power outlets to avoid exposure to high energy levels that may cause burns if parts are short-circuited by metal objects such as tools or jewelry. If necessary, label each cable for 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. Make sure that you install all components according to the described step-by-step instructions.
2. Make sure not to leave loose tools or parts inside the server.
3. Reinstall any expansion board(s), peripheral(s), and system cable(s) that have previously been removed.
4. Reinstall the system covers.
5. Connect all external cables and the AC power cord to the system.
6. 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 drives removed. Otherwise, improper cooling airflow may damage system components.

Powering down the server

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 operating system documentation.
2. Disconnect the AC power cord from the AC outlet and then from the server.
3. Be sure that the power LED indicator is turned off and that the fan noise has stopped.
4. Disconnect all external peripheral devices from the server.

System covers

The access panel and the front bezel are both detachable. You must remove these system covers before you can remove or replace a server component.
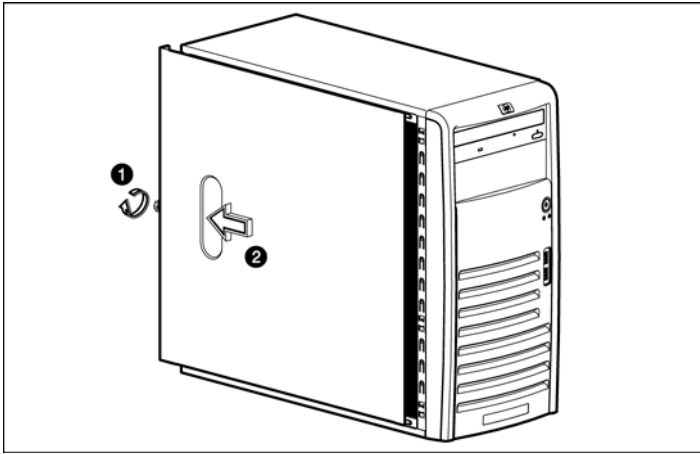
Access panel

You must remove the access panel to access 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 captive thumbscrew located on the rear edge of the access panel.
   b. Slide the panel back about 2.5 cm (1.0 in).
   c. Lift the panel from the chassis.

Figure -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 by following the steps below:

1. Perform steps 1 through 3 of the Post-installation instructions.
2. Reinstall the access panel:
   a. Use two hands to place the access panel flat against the chassis, the back of the access panel extending about 2.5 cm (1.0 in) behind the back of the server. Make sure the hooks on the access panel align with the holes on the edges of the chassis.
   b. Slide the access panel toward the front of the chassis to position it into place.
   c. Tighten the captive thumbscrew to secure the access panel.

Figure -2 [Reinstalling the access panel]
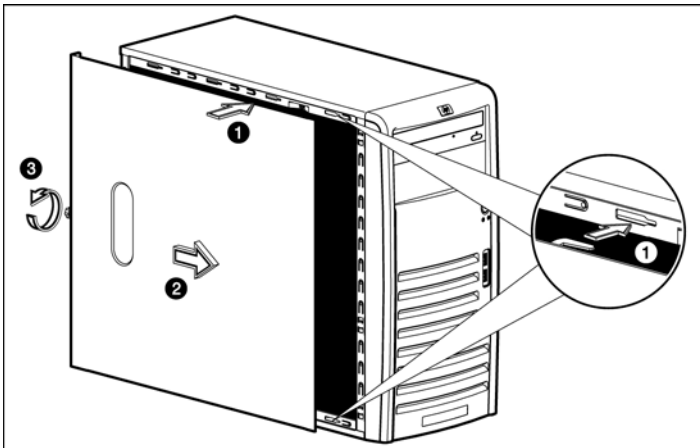
3. Perform steps 5 through 6 of the Post-installation instructions.

Front bezel

You must remove the front bezel to access the hard drives and optical drives.

To remove the front bezel:

1. Remove the access panel.
2. Remove the front bezel:
   a. Press in on the two bottom tabs on the side of the bezel so that they release from the chassis.
   b. Press in on the upper tab on the side of the bezel so that it releases from the chassis. The bezel will rotate out slightly.
   c. Pull the bezel away from the front panel.

Figure -3 [Removing the front bezel]
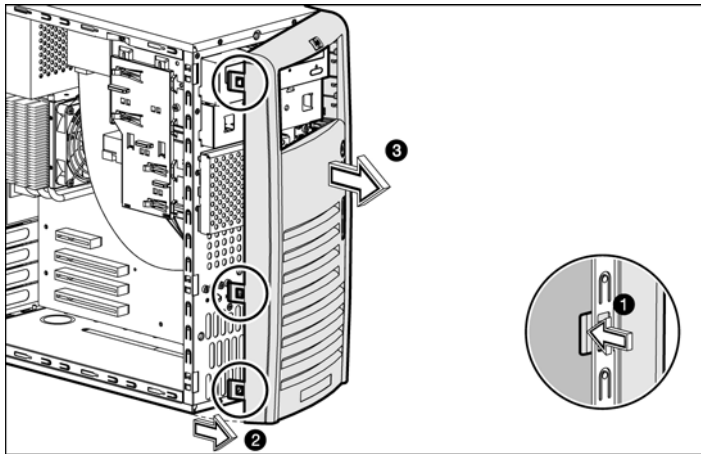
3. Place the front bezel in a safe place for reinstallation later.

To replace the front bezel, follow the steps below:

1. Position the chassis in the upright position.
2. Insert the two hooks on the right side of the bezel into the rectangular holes on the chassis, and then rotate the bezel into place so that the three tabs on the left side of the bezel snap into the slots on the chassis.

Figure -4 [Reinstalling the front bezel]
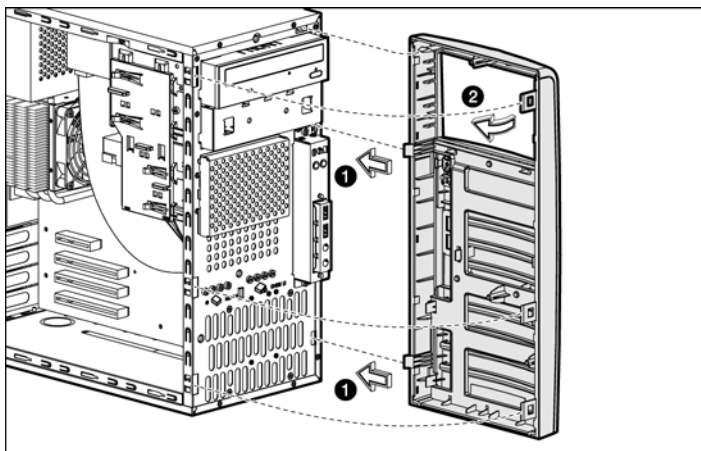
Drives

You can install up to two optical drives or up to three hard drives in the server. The second optical drive bay can support a SATA or SCSI hard drive.

Cable management

Always follow good cable management practices when working inside the computer.

- Keep cables away from major heat sources like the heatsink.
- Do not jam cables on top of expansion cards or memory modules. Printed circuit cards are not designed to withstand excessive pressure.
- Keep cables clear of sliding or moveable parts to prevent cutting or crimping.
- When folding a flat ribbon cable, never fold to a sharp crease. Sharp creases may damage the wires.
- Some flat ribbon cables come prefolded. Never change the folds on these cables.
- Do not sharply bend any cable. A sharp bend can break the internal wires.
- Never bend a SATA data cable tighter than a 30 mm (1.18 in) radius.
- Never crease a SATA data cable.
- Do not rely on components like the drive cage, power supply, or system cover to push cables down into the chassis.

When removing the power supply power cables from the P2 or P3 connectors on the system board, always follow these steps:

1. Squeeze on the top of the retaining latch attached to the cable end of the connector.
2. Grasp the cable end of the connector and pull it straight up.

⚠ **CAUTION:** Always pull the connector - NEVER pull on the cable. Pulling on the cable could damage the cable and result in a failed power supply.

Figure -5 [Unplugging power cables]
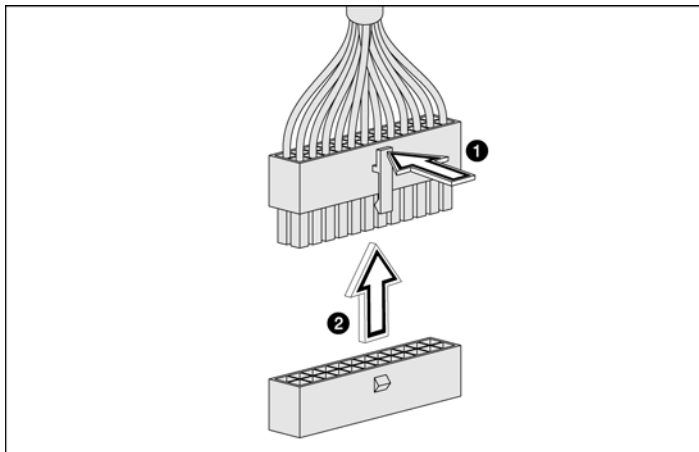
Cable connections

The following table provides information about power supply cable connector labels, as well as system board connector designators. The top half of the table indicates the label on the power supply cable. The bottom half of the table provides the system board designators that various cables plug into. For more detailed information about system board components, see System board components in Chapter 4.

Table -1 Cable connections

Cable	To	Cable Designator
Power supply	System board	P1
Power supply	System board CPU power	P2
Power supply	1st SATA hard drive	P9
Power supply	2nd SATA hard drive	P8
Power supply	3rd SATA hard drive	P7
Power supply	1st SCSI hard drive	P6
Power supply	2nd SCSI hard drive	P5
Power supply	3rd SCSI hard drive	P4
Power supply	1st optical drive	P3
Power supply	2nd optical drive	P4

| Cable	To	System board designator
CPU fan connector	System board	P70
Rear system fan	System board	P8
Serial port B	System board	P52
Front USB connector	System board	P24
Front I/O connector	System board	P5
1st SATA connector	System board	P60
2nd SATA connector	System board	P61
Internal USB tape drive	System board	J4
Internal USB port	System board	J3

Drive bay configuration

The server supports a maximum of four internal drives. The two upper drive bays are primarily for removable media devices, while the two lower drive bays are only for hard drives. The two upper bays are half height IDE optical bays. The two lower drive bays can accommodate non-hot-plug hard drives.

NOTE: You can install a SATA or SCSI hard drive into the second half-height optical bay. This type of installation requires use of a conversion kit.

Figure -6 [Drive bay configuration]
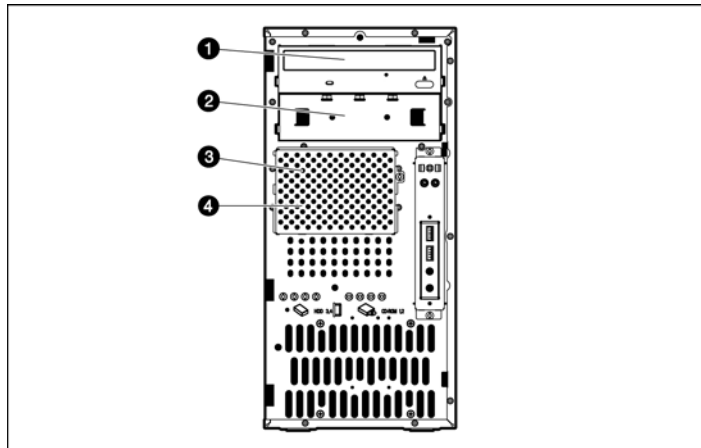
1	Optical drive	3	2nd SATA or SCSI hard drive
2	2nd optical drive or 3rd SATA or SCSI hard drive	4	1st SATA or SCSI hard drive

Releasing drives

A drive latch with release tabs secures the drives in the drive bay. Lift the release tab on the drive latch for the drive you want to remove, and then slide the drive from its drive bay.

Figure -7 [Releasing drives]
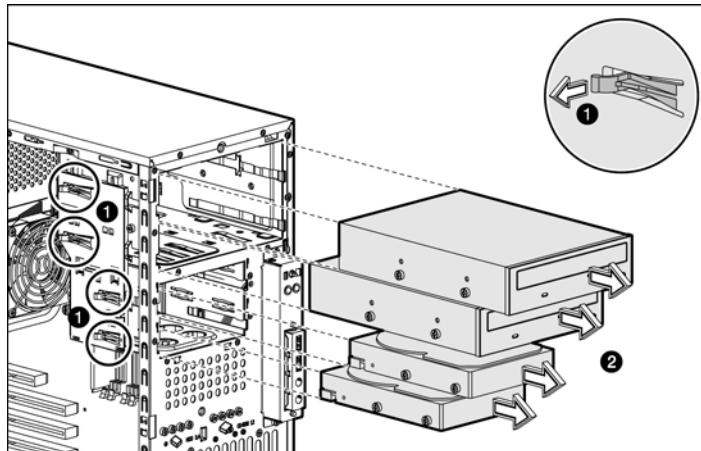
When replacing drives, remove the four guide screws (two on each side) from the old drive. You will need these screws to install a new drive.
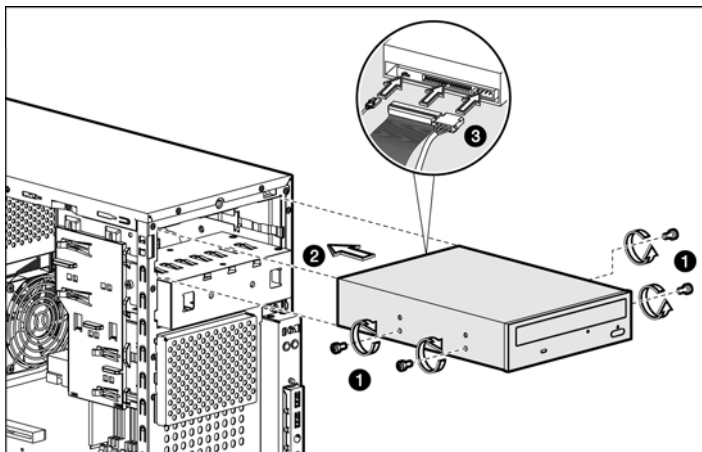
Optical drive

To replace an optical drive:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. Remove the front bezel.
4. Remove the optical drive from the server:
   a. Disconnect the power and data cables from the rear of the optical drive.
   b. A drive latch with release tabs secures the drives in the drive bay. Lift the release tab on the drive latch.
   c. Slide the drive from the drive bay.

Figure -8 [Removing an optical drive]
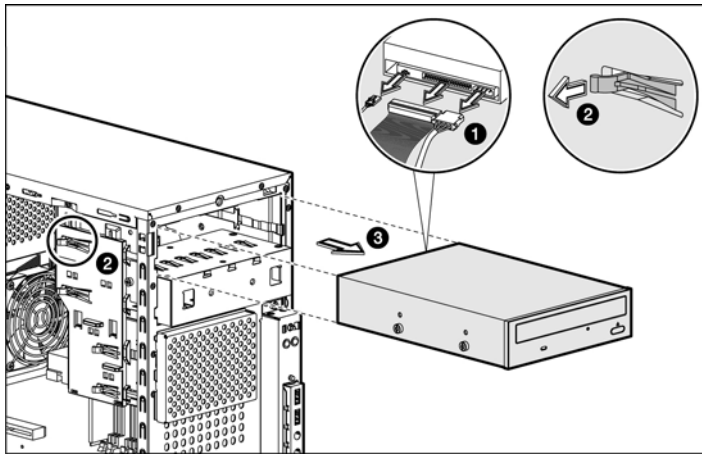
5. Place the old optical drive on a static-dissipating work surface or inside of an anti-static bag.
6. Remove the new optical drive from its protective packaging.
7. Check that the IDE jumper on the rear section of the optical drive is set to Cable-Select mode.
8. Install the new optical drive:
   a. Insert four screws (two on each side) into the new optical drive.
   b. Guide the new optical drive into the optical bay, with the cable connectors facing the rear of the chassis, and then push the drive all the way into the drive bay until the drive clicks into place.
   c. Connect the IDE power and data cables to their connectors on the rear of the drive.

Figure -9 [Installing an optical drive]

9. Observe the post-installation procedures.

Optional media device

The lower half-height drive bay may be used for an optical drive or a non-hot-plug SATA or SCSI hard drive. For more information about installing a hard drive in this bay, see Hard drive bracket later in this chapter.

To install an optional optical drive:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. Remove the front bezel.
4. Remove the drive shield to prepare the bay for drive installation:
    a. Remove the screw that secures the drive shield.
   b. Pull the shield off of the chassis. Store it for later use.

    ⚠ **CAUTION:** Do not discard the shield. If the drive is removed in the future, you must reinstall the shield to maintain proper system function.

Figure -10 [Removing the drive shield]
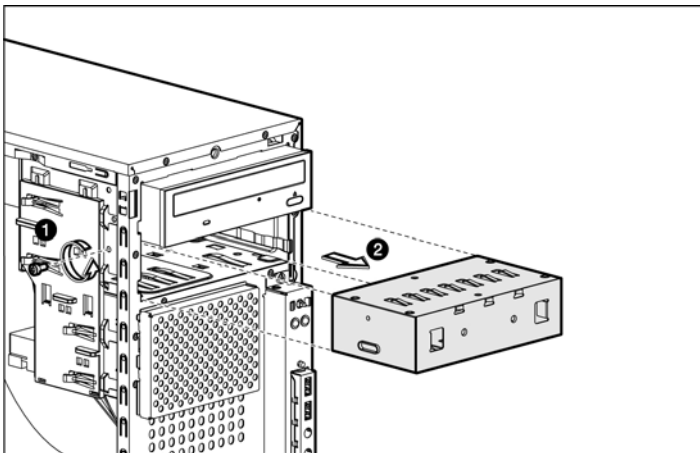
5. Prepare the new drive for installation. Refer to the documentation that came with the drive for related installation procedures.
6. Install the new drive:
    a. Insert four screws (two on each side) into the new optical drive.
    b. Guide the new drive into the bay, with the cable connectors of the drive facing the rear of the chassis, and then push the drive all the way into the chassis until the drive clicks into place.
    c. Connect the power and data cables to the connectors on the rear of the drive.

Figure -11 [Installing an optional media drive]
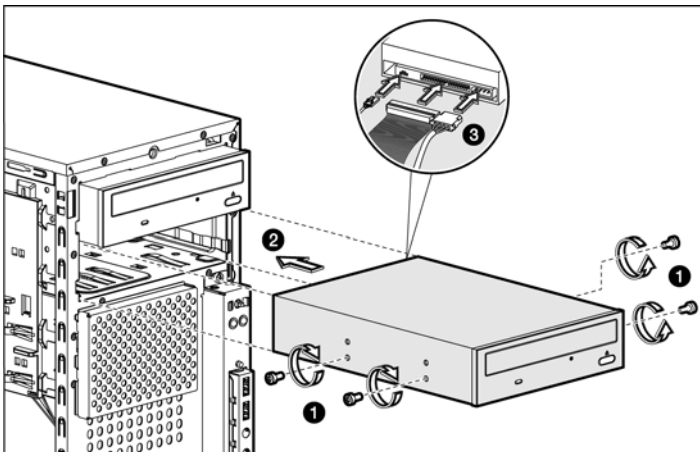
7. Observe the post-installation procedures.

Hard drives

You can install either SATA hard drives or SCSI hard drives in the server. The bottom two bays (bays 3 and 4) are the hard drive bays. You can also install a SATA or SCSI hard drive into the second optical drive bay (bay 2).

SCSI hard drives require that you also install a SCSI PCI expansion card. Connect the hard drive data cable from the hard drive to the SCSI expansion card. Then connect power cable from the power supply to the back of hard drive. For more information about installing PCI expansion cards, see Expansion cards.

To replace or install hard drives:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. Remove the front bezel.
4. If you want to install the new hard drive in an occupied drive bay:
   a. Disconnect the power and data cables from the back of the installed drive.
   b. Remove the installed drive by lifting the drive latch and sliding the drive out of the bay.
   c. Remove the four screws from the sides of the drive. You will reuse these screws when you install the new hard drive.

Figure -12 [Removing a hard drive]
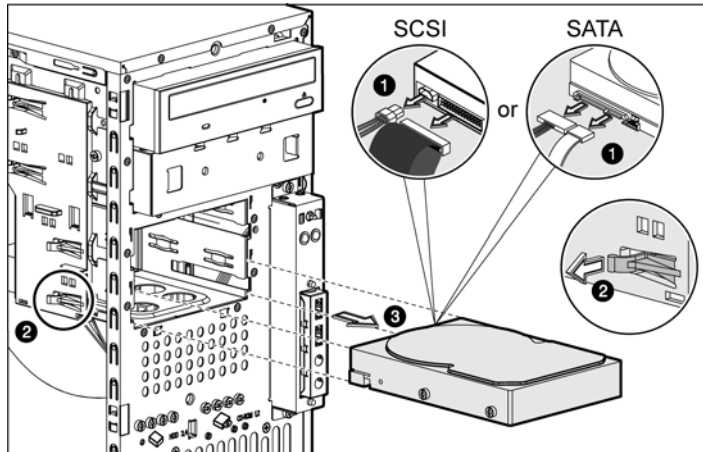
5. If you want to install a new hard drive in an empty drive bay, remove four screws from the front of the chassis labeled 'HDD SCREWS'. See Figure -13 for the location of these spare screws.

Figure -13 [Drive screw location]
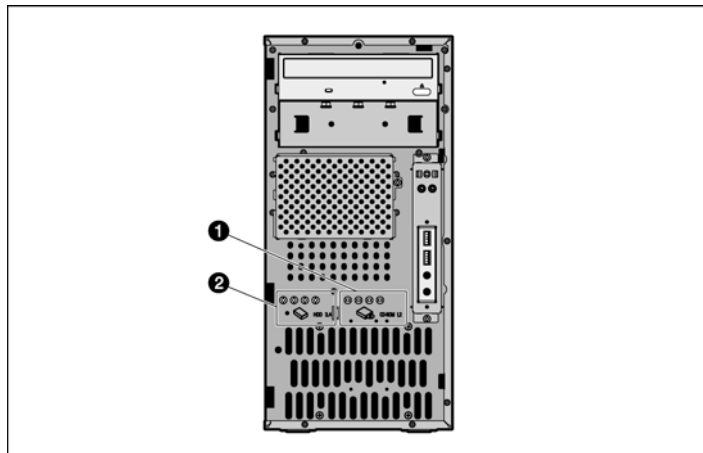
6. Install the new hard drive into the bay:

    a. Insert the four drive screws (two on each side) into the hard drive.

    b. Slide the new hard drive into the selected bay until it clicks into place.

    c. If you are installing a SATA hard drive, connect the data and power cables from the system board to the back of the hard drive and connect the power cable from the power supply to the back of the hard drive.

    d. If you are installing a SCSI hard drive, connect the data cable from the SCSI PCI expansion card to the back of the hard drive, and then connect the power cable from the power supply to the back of the hard drive.

Figure -14 [Installing a hard drive]
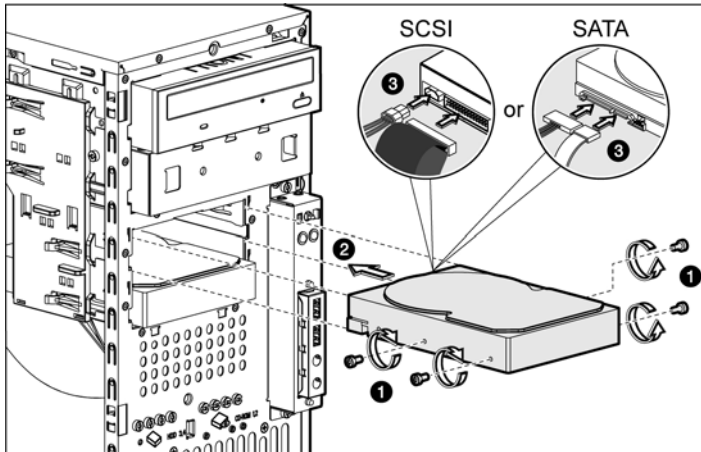
7. Observe the post-installation procedures.

Hard drive bracket - second optical drive bay

You can install a hard drive in the second optical drive bay. To install a hard drive into this bay, you first must insert the hard drive to the hard drive conversion kit. After installing the hard drive into the conversion kit, you can install it into the second optical bay.

To insert a hard drive into the hard drive conversion kit:

1. Insert the hard drive into the conversion kit bracket, making sure the screw holes in the bracket align with the holes in the hard drive.

2. Insert four screws (two on each side) into the hard drive assembly, making sure the screws secure the hard drive to the bracket.

Figure -15 [Installing a hard drive into the half-height bay bracket]
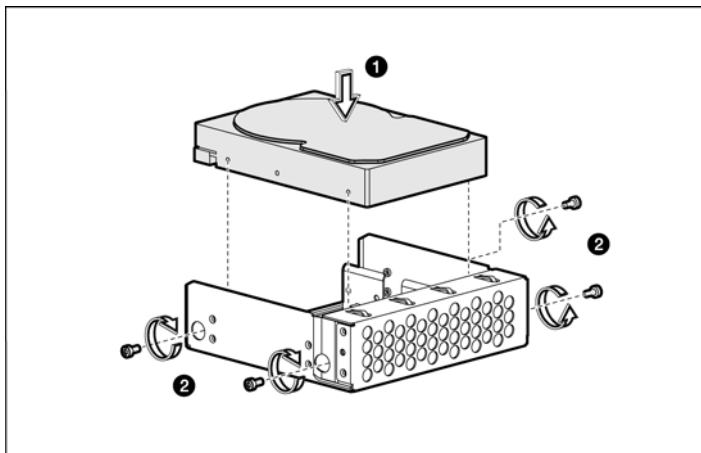
To install the hard drive assembly into the second optical drive bay:

1. Remove the drive shield from the front of the second optical drive bay to prepare the bay for drive installation:
   a. Remove the screw that secures the drive shield.
   b. Pull the shield off of the chassis. Store it for later use.
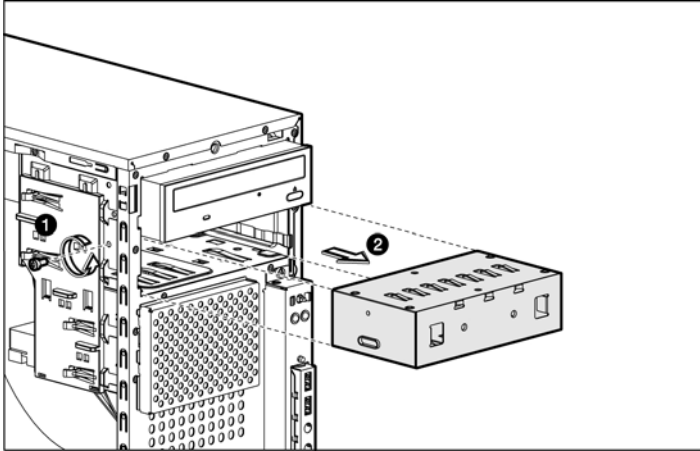
   📝 **NOTE:** Do not discard the shield. If the drive is removed in the future, you must reinstall the shield to maintain proper system function.

Figure -16 [Removing the optical drive shield]

2. Insert four screws (two on each side) into the hard drive bracket. These screws secure the hard drive assembly in the server after you install the drive assembly.
3. Slide the hard drive assembly into the bay until it clicks into place.
4. Connect the data and power cables to the back of the hard drive.

   📝 **NOTE:** If you are installing a SCSI hard drive, use the cable that comes with the server.

Figure -17 [Installing the hard drive assembly into the second optical drive bay]
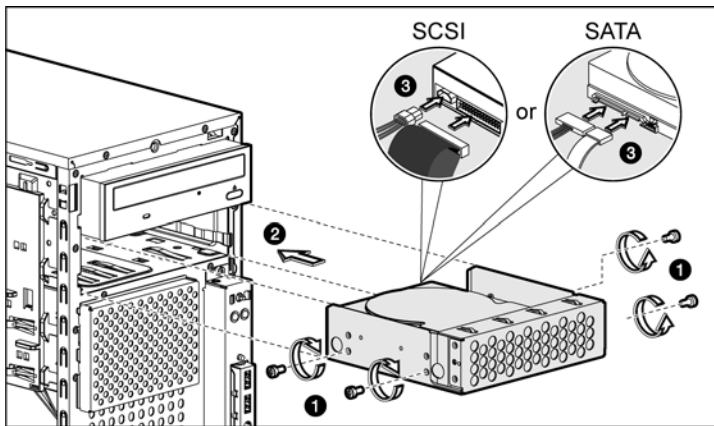
5. Replace the front bezel.
6. Replace the access panel.
7. Observe the post-installation procedures.

Drive latch

You can remove the latch that secures and allows removal of the drives.

To replace the drive latch:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. Remove the front bezel.
4. Remove the drive latch:
    a. Pull the latch to loosen the two tabs that secure the latch to the chassis.
    b. Slide the latch straight down and remove it from the chassis.

    📝 **NOTE:** To loosen the latch, you may also have to pull the tabs that secure inserted drives. Drive latch tabs may break during removal.

Figure -18 [Removing the drive latch]
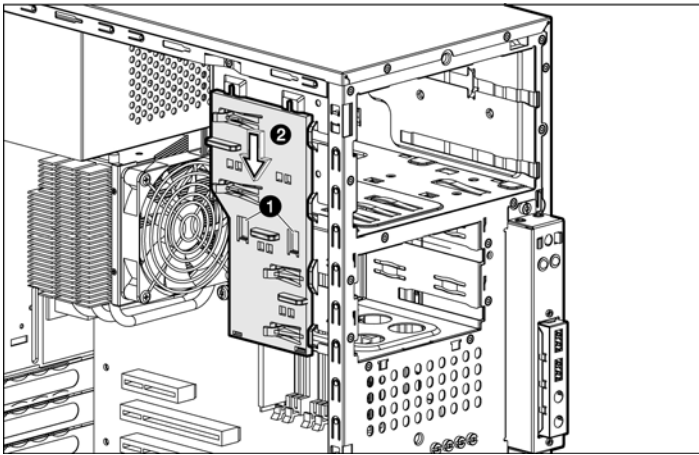
5. Install a new drive latch:
    a. Insert the two tabs on the top of the latch into their holders near the top of the chassis.
    b. Slide the latch upward until the two tabs in the middle of the latch click into place.

Figure -19 [Installing a drive latch]
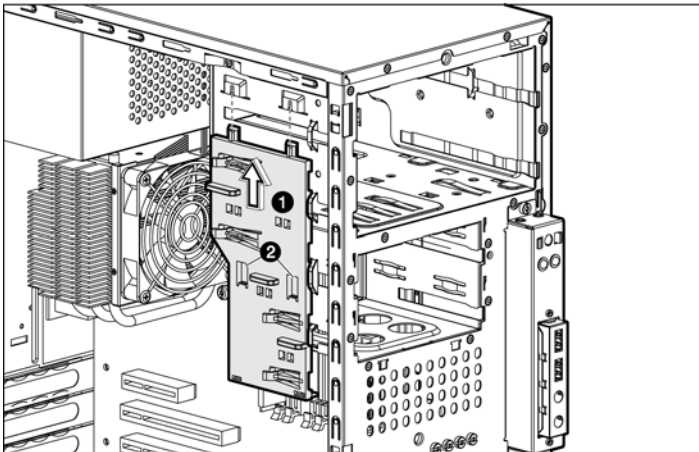
6. Observe the post-installation procedures.

System board components

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

Processor

The LGA775 processor socket supports Intel Pentium 4, Pentium D, and Celeron D processors.

Figure -20 [LGA775 processor socket]
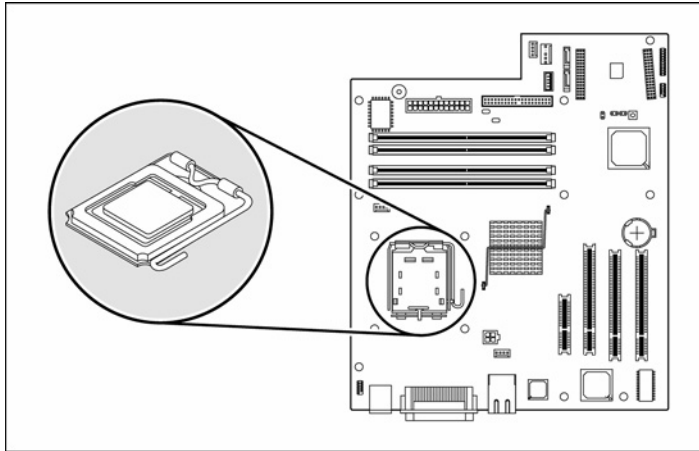
⚠ **WARNING!** To reduce the risk of injury from a hot component, allow the surface to cool before touching.

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 with the open side facing up.
4. If necessary, remove any accessory boards or cables that prevent access to the processor socket.
5. Remove the heatsink-cooling fan (HSF) assembly:
   a. Disconnect the processor fan cable from the connector on the system board (P70).
   b. Twist the mounting pins counterclockwise to loosen them.
   c. After you loosen all four mounting pins, lift the HSF away from the system board.

   Place the HSF down in an upright position with the thermal patch facing upward. Do not let the thermal patch touch the work surface.

Figure -21 [Removing the heatsink-cooling fan assembly]
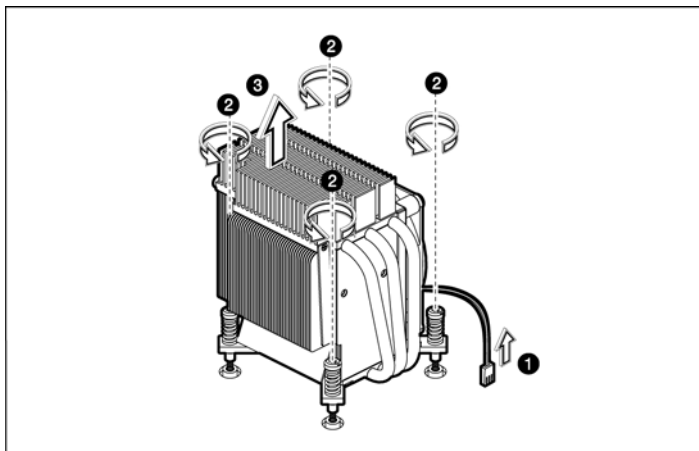
6. Remove the processor:
   a. Disengage the load lever.
   b. Lift the retention plate to expose the socket body.
   c. Grasp the processor by its edges and lift it out of the socket.

Figure -22 [Removing the processor]
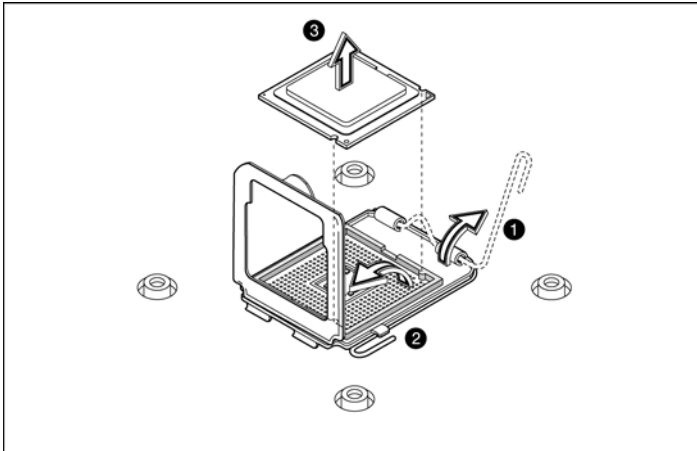
7. Place the processor on a static-dissipating work surface or in an anti-static bag.

   To allow the heatsink to draw as much heat as possible from the processor base, there must be good contact between the heatsink base and the top of the processor. To ensure good contact, you must apply thermal grease compound.

8. Apply the thermal grease compound:
   a. Use a clean cloth dipped in rubbing alcohol to clean the contact surface on the HSF and on the new processor. Wipe the contact surfaces several times to make sure they are free of particles or dust contaminants.

   ⚠ **CAUTION:** Never touch the bottom size of the processor; any contaminant could prevent the processor contact pads from making contact with the socket.

   b. Apply the thermal grease compound to both contact surfaces.
   c. Use a proper tool to spread the grease throughout the entire contact surface and **lightly** scrape off any excess grease.

   ⚠ **CAUTION:** Applying too much grease creates a gap between the contact surfaces, significantly reducing the ability of the heatsink to draw out heat. Installing the heatsink with excessive grease can also cause the grease to spread over the processor pins or the system board base, which can cause electrical shorts that damage the system.

9. Install the new processor:
   a. With the load lever and the retention plate disengaged, hold the processor by its edges and align it over the empty processor socket. Make sure that you properly align the processor with the orientation notch on the socket.
   b. Insert the processor into the socket.
   c. Engage the retention plate and the load lever.

Figure -23 [Installing a processor]
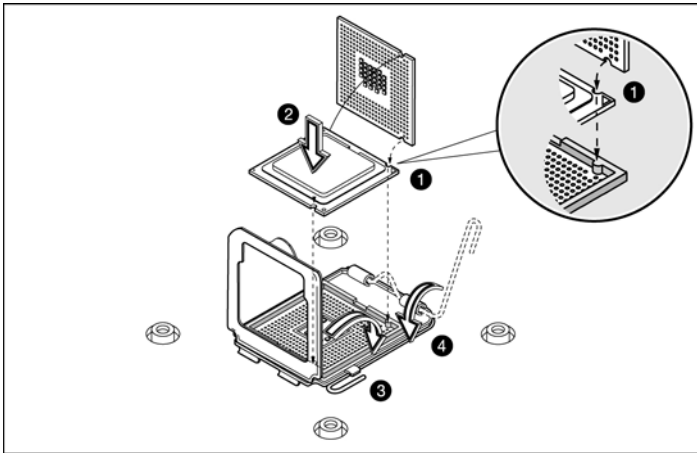
After you install the processor, you must reinstall the HSF on top of the processor socket. The thermal grease you applied on the contact surfaces of the HSF and the processor provides the necessary thermal bonding to allow the heatsink to draw heat from the processor.

⚠ **CAUTION:** To prevent processor overheating or system instability, use only an HSF assembly specified for the HP ProLiant ML110 Generation 3 server.

10. Replace the heatsink-cooling fan assembly:
    a. Properly align the HSF mounting pins to the system board mounting holes and press down until you hear a click.
    b. Twist the mounting pins clockwise to secure the HSF connection to the system board.
    c. Connect the processor fan cable to the connector on the system board (P70).

⚠ **CAUTION:** Failure to connect the processor fan cable to the system board may result in damage to the processor and could cause the server to shut down without displaying messages.

Figure -24 [Installing the heatsink-cooling fan assembly]
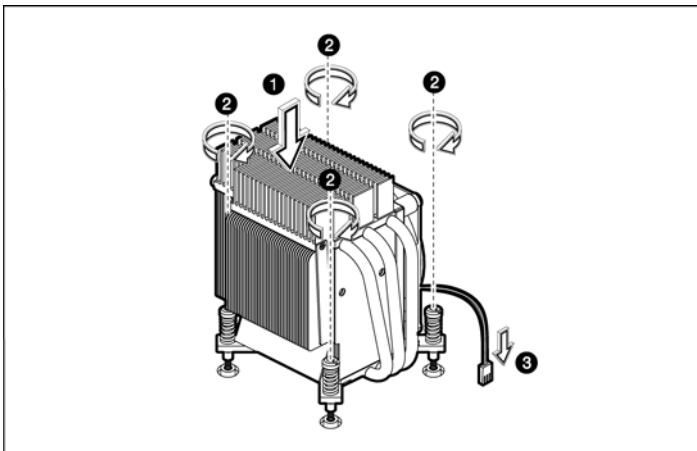
11. Observe the post-installation procedures.

Memory

The HP ProLiant ML110 Generation 3 server has four DIMM slots that support up to 8 GB maximum system memory (2 GB in each of the four DIMM slots).

Figure -25 [DIMM slots]
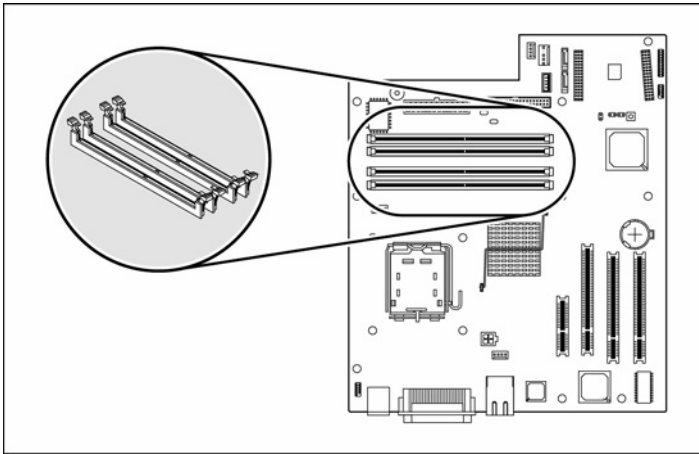
Guidelines for installing memory modules

You must adhere to the following guidelines when adding or replacing memory modules:

- Use PC2-4200 unbuffered ECC DDRII DIMMs.
- DIMM sizes supported are 512 MB, 1 GB, and 2 GB, allowing up to a total of 8 GB maximum system memory capacity.
- Supported DIMM configurations are single DIMM, one pair (two DIMMs), or two pairs (4 DIMMs).
- For optimal two-DIMM configuration, populate slot 1 and slot 3. Identical DIMMs are recommended.

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 with the open side facing up.
4. If necessary, remove any accessory boards or cables that prevent access to the memory slots.
5. Locate and remove the memory module:
   a. Disengage the latch socket at both ends of the DIMM sockets.
   b. Gently pull the memory module upward to remove it from the socket.

Figure -26 [Removing a memory module]
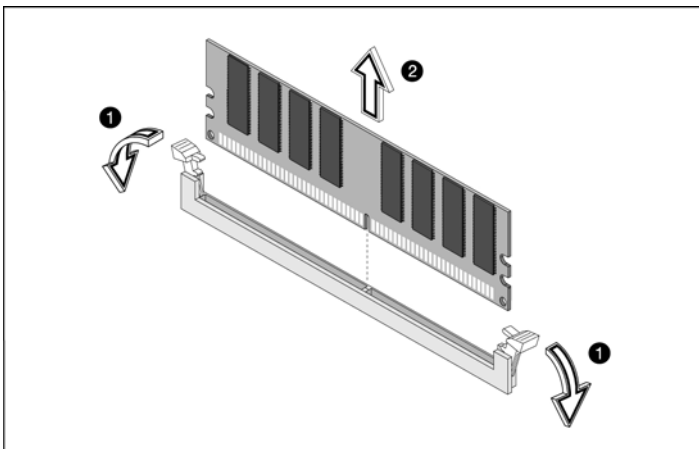
6. Place the memory module on a static-dissipating work surface or inside of an anti-static bag.

To install a memory module:

   a. Locate an empty memory socket on the system board.
   b. Remove the memory module from its protective packaging, handling only the edges of the module.

7. Install the memory module:

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

       The memory sockets are structured to ensure proper installation. If you insert a memory module but it does not fit easily into the socket, you may have inserted it incorrectly. Double-check the orientation of the module and reinsert.

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

       If the latches do not close, the module is not inserted correctly.

Figure -27 [Installing a memory module]
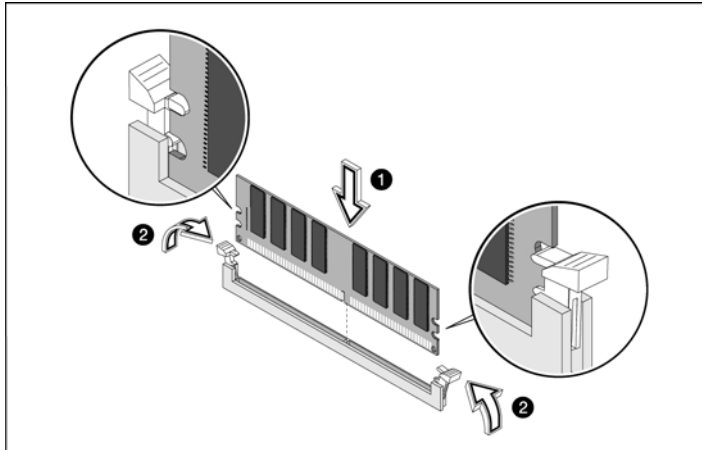
8. Observe the post-installation procedures.

Expansion cards

You must remove the PCI expansion slot cover lock before installing or removing expansion cards.

The server supports the following:

- Two 32-bit/33-MHz 3.3V PCI slots (J20 to J21)
- One PCI-Express x4 link with x4 slot (J33)
- One PCI Express x8 link with x16 slot (J32)

Figure -28 [PCI slot location]
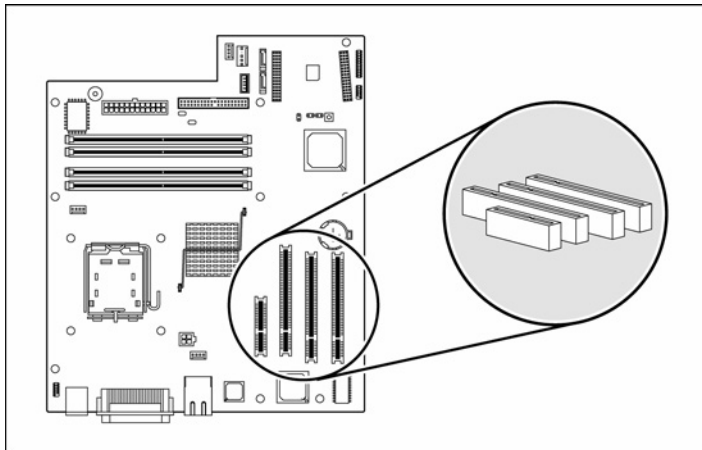
To install an expansion card:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. If necessary, remove any accessory boards or cables that prevent access to the PCI slots.
4. Remove the PCI slot cover lock from the rear of the server to gain access to the expansion slots:

    a. Remove the retaining screw that secures the lock to the chassis.

    b. Remove the slot cover lock from the chassis.

Figure -29 [Removing the PCI slot cover lock]
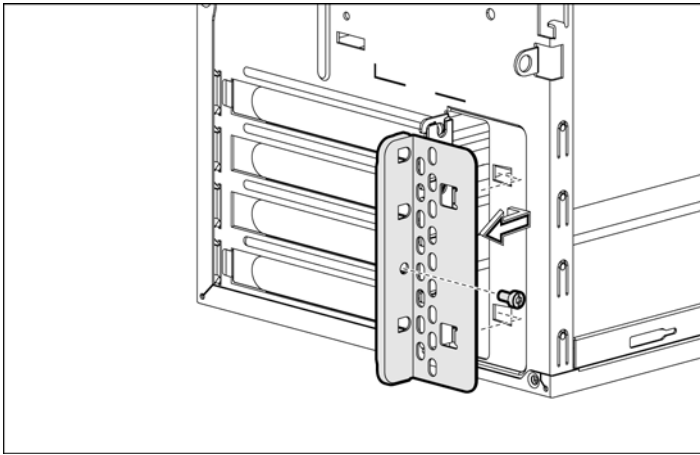
5. Lay the server on its side with the open side facing up.

   If replacing a PCI expansion card go to step 6.

   If installing a PCI expansion card for the first time, skip to step 8.

6. When removing an expansion card from an expansion slot, hold the card at both ends, and then carefully rock the card back and forth until the expansion cards pull free from the slot.

7. Remove the card from the chassis. Store the old card in the anti-static packaging.

8. If a PCI expansion slot has a slot cover, remove it prior to installation the card.

   ⚠ **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.

9. When installing an expansion card, hold the card just above the expansion slot on the system board, and then move the card toward the rear of the chassis so that the bracket on the card is aligned with the open slot on the rear of the chassis.

10. Press the card straight down into the expansion slot on the system board.

Figure -30 [Installing a PCI card]
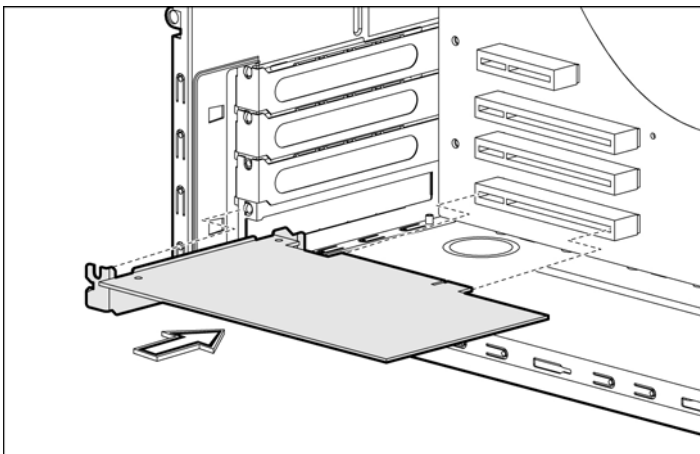
11. Replace the slot cover lock by sliding it onto the rails toward the server.

12. Replace the slot cover lock retaining screw.

Figure -31 [Replacing the PCI slot cover]
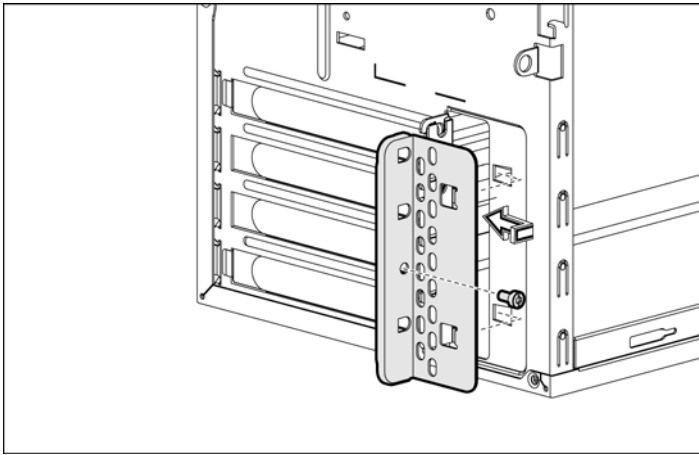
13. Connect any necessary cables to the card.
14. Observe the post-installation procedures.

System battery

The server uses volatile memory that requires a battery to retain system information when power is removed. This 3-volt lithium coin cell battery is located on the system board.

Figure -32 [System battery location]
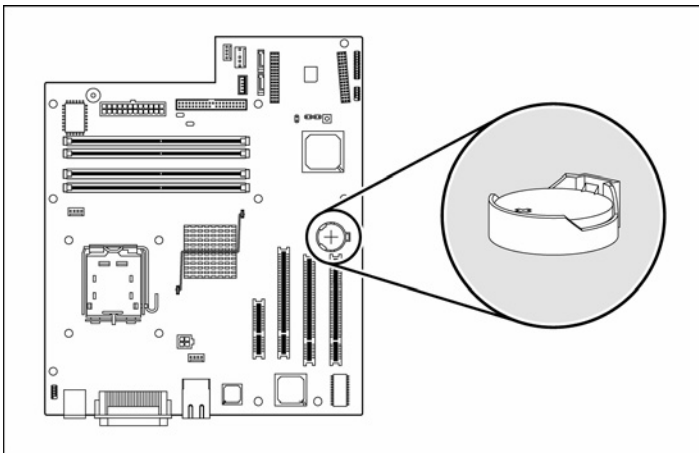
If the server no longer automatically displays the correct date and time, you may need to replace the system battery. Under normal use, battery life is five to ten years.

⚠ **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 the manufacturer's instructions.

⚠ **CAUTION:** Loss of BIOS settings occurs when the battery is removed. You must reconfigure BIOS settings whenever you replace the battery.

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 for better access to the battery holder (XBT2).
4. If necessary, remove any accessory boards or cables that prevent access to the battery holder.

5. Replace the battery:
   a. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out.
   b. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up. Push the other edge down until the clamp snaps over the other edge of the battery.

Figure -33 [Replacing the battery]
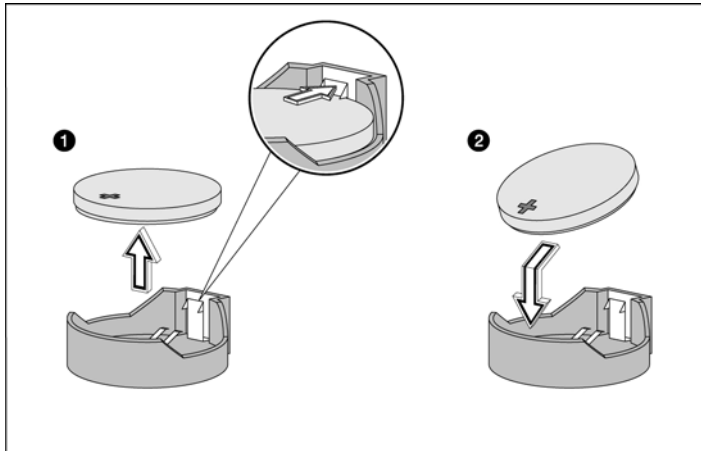
6. Replace the access panel.
7. Observe the post-installation procedures.

Power supply unit (PSU)

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

⚠ **WARNING!** Note the following reminders are 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 power supply:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. Lay the server on its side with the open side facing up.
4. Remove the power supply:
   a. Disconnect the processor and system board power cables from the system board connectors (P1 and P2).
   b. Disconnect the power cables of all installed drives from the PSU.
   c. Remove the four screws that secure the PSU to the chassis.
   d. Lift the power supply out of the chassis.

Figure -34 [Removing the PSU]
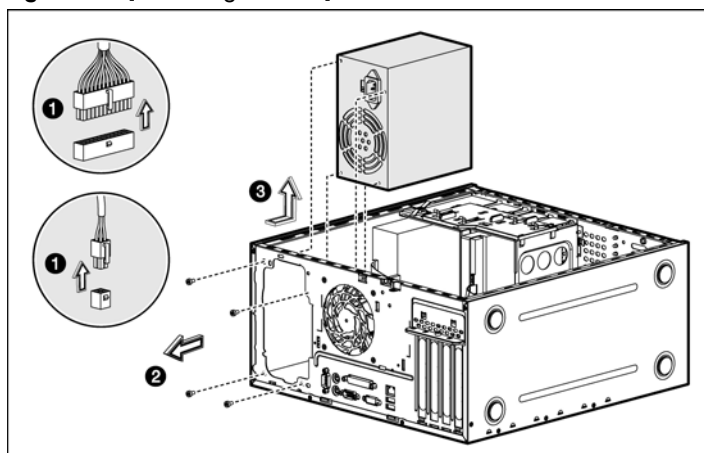
5. Install a new PSU:

   a. Align the new PSU to the support edges inside of the chassis.

   b. Secure the PSU to the chassis using four screws.

   c. Reconnect the processor and system board power cables to the system board connectors (P1 and P2), and then connect the power cables to all installed drives.

Figure -35 [Installing a PSU]
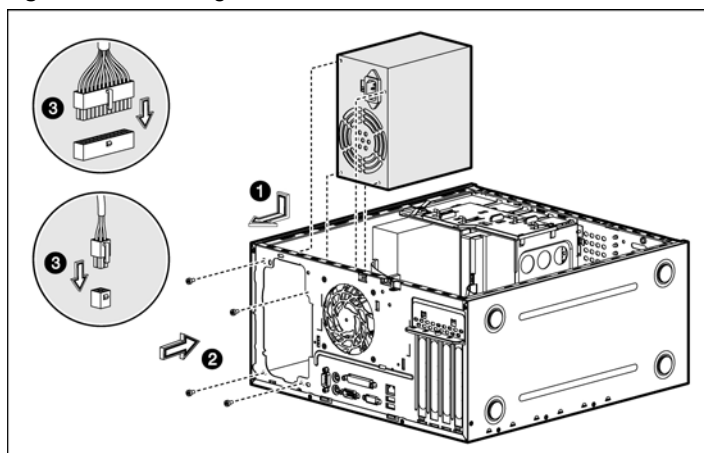
6. Observe the post-installation procedures.

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 system fan:

> ⚠ **WARNING!** Be sure to support the system fan with your hand when removing screws 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 (P8) on the system board.
    b. Remove the four screws from the rear of the chassis that secure the fan.
    c. Remove the fan from the chassis.

Figure -36 [Removing the system fan]
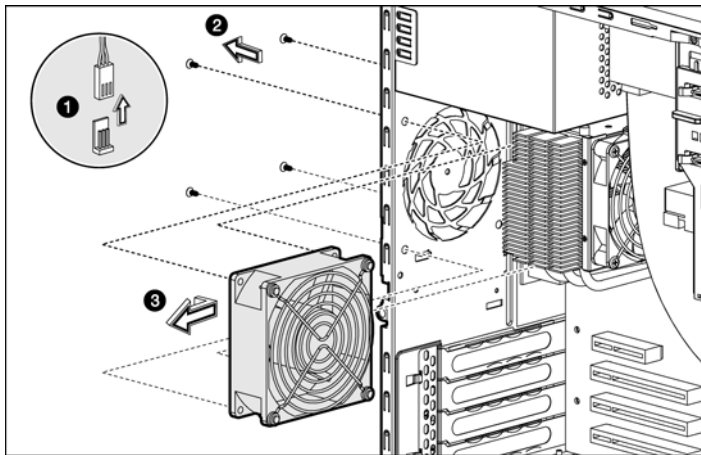
4. Install a new system fan:
    a. Align the new fan to the screw holes inside of the chassis
    b. While holding the new fan against the chassis, secure the fan to the chassis with four screws.
    c. Connect the system fan cable to its connector (P8) on the system board.

Figure -37 [Installing a system fan]
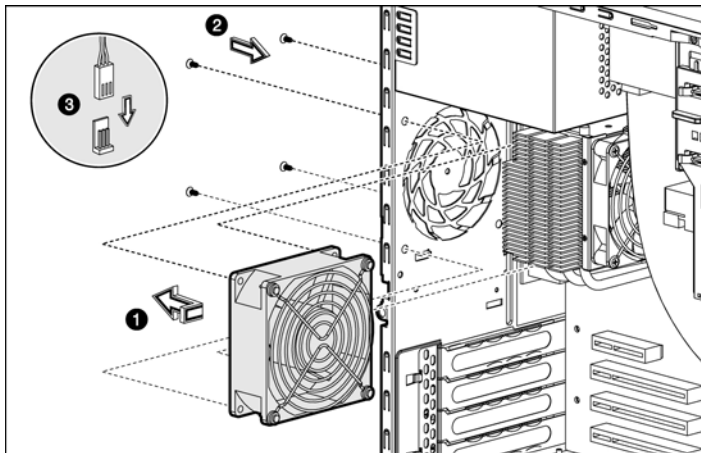
5. Observe the post-installation procedures.

HP Lights-Out 100 Remote Management Card

Lights-Out 100 Remote Management is a suite of products that enable remote management of ProLiant 100 Series servers. HP Lights-Out 100 allows customers or their service providers to remotely manage ProLiant ML110 G3 servers over a LAN or the Internet. With HP Lights-Out 100, users can access a system's text console, control system power, and monitor system environmental conditions from a browser or command line.

To install the remote management card:

1. Perform steps 1 through 3 of the Pre-installation instructions.
2. Remove the access panel.
3. Lay the server on its side with the open side facing up.
4. Locate the remote management card connector on the system board.

Figure -38 [Remote management card connector location]
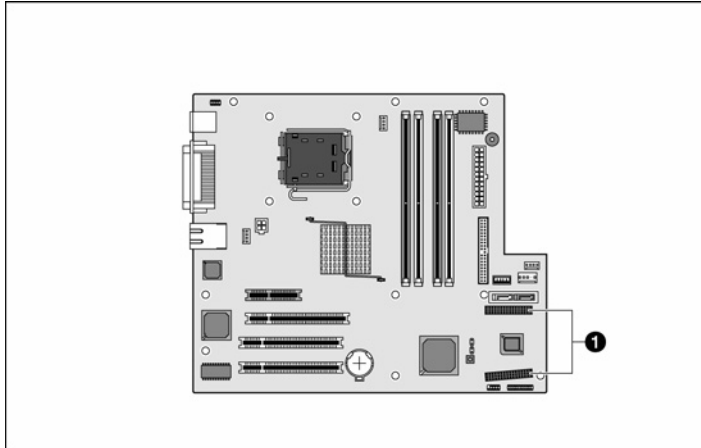
5. Install the remote management card in the connectors located in J110 and J111 on the system board. The connectors are angled so that you can only install the card in one at the correct position.

Figure -39 [Installing the remote management card]
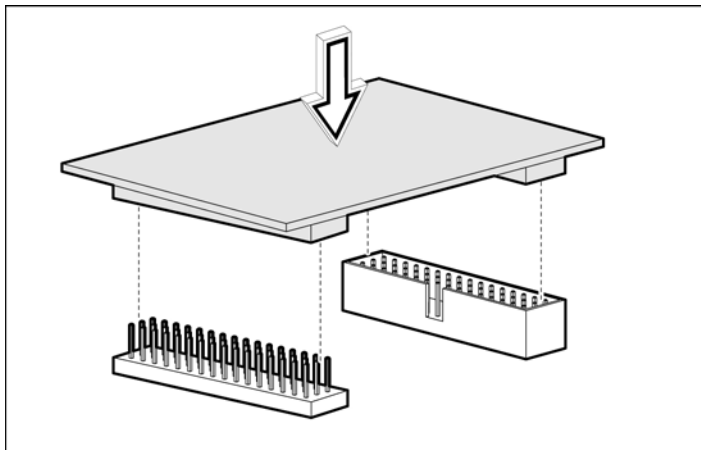
6. Observe the post-installation procedures.

3 Diagnostic tools

This chapter describes the system diagnostic tools available for the HP ProLiant ML110 Generation 3 server. It also provides a comprehensive list of POST-related messages and their meanings.

AMIBIOS software

The G3 server uses AMIBIOS to boot up the system. AMIBIOS software is a ROM BIOS-based firmware that allows reliability, manageability, and connectivity for server platforms. This software contains a set of programs permanently stored in an EEPROM chipset located on the system board. These programs assist in managing, initializing, and testing the hardware devices installed on the computer.

AMIBIOS software allows you to:

- Perform configuration from the AMIBIOS Setup Utility

  Using the Setup Utility, you can install, configure, and optimize the hardware devices on the system board. In addition, you can enable various features such serial console redirection, hyper-threading, PXE boot, IPMI Virtual Floppy support, and much more.

- Initialize hardware at bootup using POST routines

  During power-on or warm reset, the BIOS performs Power-On Self Test (POST) routines to test system components, to allocate resource for various hardware devices, and to the prepare the system to boot to various operating systems.

Accessing the Setup Utility

1. Turn on the monitor and server. If the server is already turned on, save your data and exit all open applications, then restart the server.
2. When the HP logo is displayed during POST, press **F10**. If you fail to press **F10** before POST is completed, you will need to restart the server.

   The first page displayed is the Main menu showing the Setup Utility menu bar. Use the left ($\leftarrow$) and right ($\rightarrow$) arrow keys to move between selections on the menu bar. Use the up ($\uparrow$) and down ($\downarrow$) arrow keys to select items within a menu.

Figure -1 [Setup Utility Main menu]
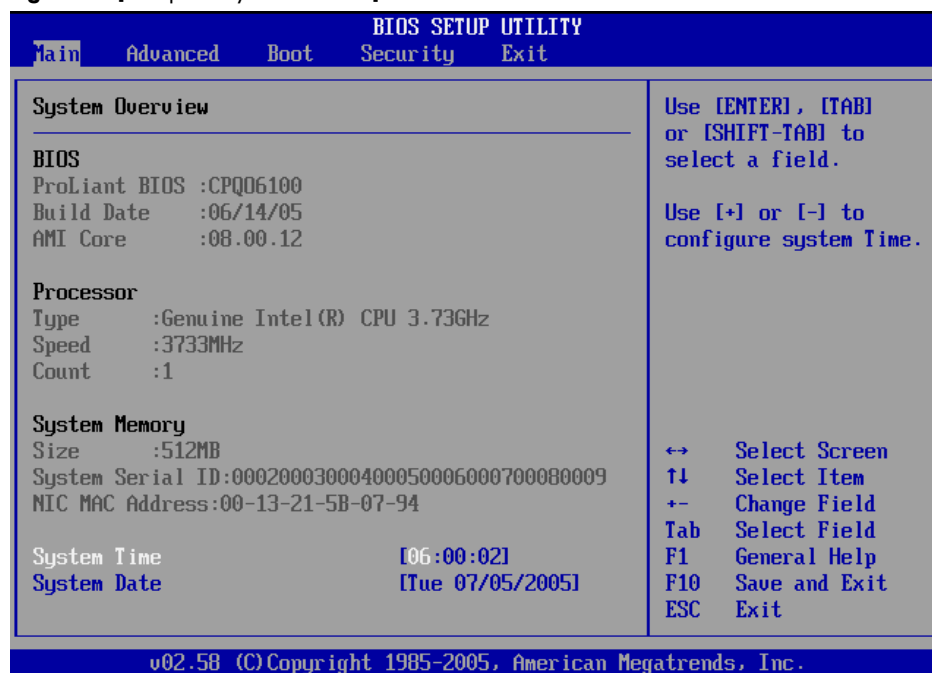
Navigating through the Setup Utility

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

Table -1 Setup Utility 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 is 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, Tab, Shift-Tab	To select a field value or display a submenu screen.
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, the pop-up closes without making a selection.
F1	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	To load default system values.
F10	To save changes and close the Setup Utility.

Figure -2 [Setup Utility General Help screen]
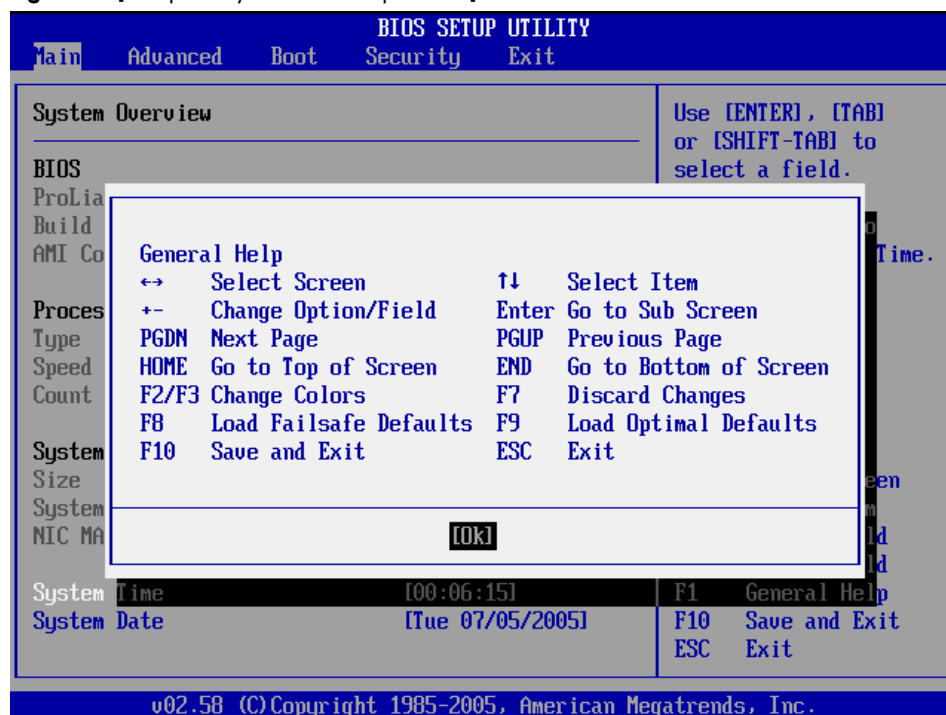
Setup Utility primary menus

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

Table -2 Setup Utility Primary Menus

Menu	Function
Main	Use this menu to: • Set system time and date • View BIOS version • View BIOS build date • View processor type • View processor speed • View system memory size • View system serial number • View MAC address for the embedded NIC
Advanced	Use this menu to: • Enable or disable hardware prefetcher. • Enable or disable Cache Line prefetch. • Enable or disable the support of hyper-threading technology. • Disable SATA/IDE configuration or configure IDE/SATA to Compatible or Enhanced mode. When the system is in Enhanced mode, you can configure the SATA as IDE, RAID, or AHCI. When the system is in compatible mode, you can configure the IDE channels as SATA only, PATA as primary and SATA secondary, SATA as primary and PATA as secondary, or PATA only. NOTE: When the SATA/IDE configuration is set to Compatible mode (4 drive mode), only one SATA drive, which acts as the Primary master, appears in the system. For example, if you set the legacy IDE channels to SATA PRI, PATA Sec in the IDE configuration of the Setup Utility, and install two SATA drives, one IDE hard drive, and one CD ROM drive, you will see the following: • Primary IDE Master: [Hard Disk] • Primary IDE Slave: [Not Detected] • SEC IDE Master: [Hard Disk] • SEC IDE Slave: [ATAPI CDROM] The secondary IDE master has the IDE hard drive. There is no Primary IDE slave. • Configure a superior device such as serial com1, serial com2, or parallel port. • View CPU and ambient temperature. • View CPU and chassis fan speed (RPMs). • Enable or disable temperature display via BMC. • View IPMI system event logging. • Clear IPMI system event logging. • Set IP address and subnet mask for remote access. • Enable or disable COM1 port muxed to the remote management card. • Enable or disable the remote management card virtual floppy, • Enable or disable Serial over LAN (SOL) support. NOTE: When COM1 is selected, the mux to the remote management card, you cannot use COM1 as the BIOS serial console redirection. Use COM2 as the serial console redirection if COM1 is enabled for remote management card muxing. NOTE: When Serial Over LAN (SOL) is enabled, it uses virtual com3 to send data. NOTE: All the functions above are applicable if a remote management card is installed in the server. NOTE: The IPMI configuration menu item is not displayed on the Advanced screen if no remote management card is inserted in the server. Configure console redirection settings to allow the system to be displayed on a remote terminal for online server management. You can configure the baud rate from 9600 to 115200. • Enable/disable USB legacy support. When legacy USB support is enabled, you can select either Hispeed or Fullspeed under USB 2.0 Controller Mode if the USB 2.0 Controller is enabled.

Table -2 Setup Utility Primary Menus

Menu	Function

Boot	Use this menu to:
	• Enable or disable the BIOS summary display.
	• Enable or disable the HP splash display.
	• Turn on or off bootup NumLock.
	• Set restore on AC power loss options, such as last state, power off, and power on.
	• Set boot device priority. By default, the server searches for boot devices in the following order:
	  a. Removable device
	  b. IDE CD-ROM drive
	  c. Hard disk drive
	  d. PXE (Preboot Execution Environment, remote boot)
	• View hard disk drive information.
	• View network drive information.

Security	Use this menu to: • Prevent unauthorized users from accessing the system. • Configure user access levels. • Input asset tag ID. For more information about this menu, please refer to the System Passwords section in this chapter.
Exit	Use this menu to select an exit option from the Setup Utility. Options include: **1** Save changes and exit out of the Setup Utility **2** Discard any changes made and exit out of the Setup Utility **3** Discard any changes made and remain in the Setup Utility **4** Load optimal default CMOS configuration for the system

System Summary Screen

Figure -3 [System Summary screen]

```
            System Configuration, AMIBIOS Version 08.00.12

 Main Processor(s): Genuine Intel(R) CPU 3.73GHz

 Math Processor    : Built-In        Base Memory Size : 640KB
 Extd Memory Size : 511MB           Serial Port(s)   : 3F8,2F8
 Display Type     : VGA/EGA         Parallel Port(s) : 378
 BIOS Build Date  : 07/05/05        PS/2 Mouse       : Present
 ACPI v2.0        : Enabled         BMC Interface    : KCS

 ATA(PI) Device(s)  Type       Size   LBA    Block  SMART 32Bit DMA    PIO
                                      Mode   Mode   Info  Mode  Mode   Mode
 Primary Master   : Hard Disk  80.0GB LBA    16Sec  Good  On    UDMA5  4

 PCI Devices:
 PCIE Onboard PCI Bridge,IRQ11        PCIE Onboard PCI Bridge,IRQ10
 PCI Onboard USB Controller,IRQ15     PCI Onboard USB Controller,IRQ6
 PCI Onboard USB Controller,IRQ5      PCI Onboard USB Controller,IRQ15
 PCI Onboard PCI Bridge               PCI Onboard IDE,IRQ5
 PCI Onboard IDE                      PCIE Bridge Ethernet,IRQ11
 PCI Bridge VGA,IRQ10

Press <ESC> to boot....9
```

To enable display of the System Summary Screen during bootup:

1. From the Main menu screen, select **Boot.**
2. Select **Boot Settings Configuration**.
3. Select the **BIOS Summary Display** field.
4. Press the plus (+) or minus (-) key to set the field to **Enabled**.

5. Press **F10** to save the changes you made and close the Setup Utility.
6. Reboot the server.
7. Press **Pause/Break** to freeze the screen until another key is pressed.
8. Press **ESC** to continue booting the system.

System passwords

The Security menu allows you to set system passwords that provide different levels of protection for the server. There are two types of passwords:

- Supervisor password

  Allows you to access and change all settings in the Setup Utility. The supervisor password allows you to configure access for system users. The following list provides different user access levels:

  - No Access – Prevents access to the Setup Utility.
  - View Only – Allows access to the Setup Utility without change capability.
  - Limited – Allows limited capability to change field values, such as date and time.
  - Full Access – Allows capability to modify any value in the Setup Utility.

  In addition, supervisor password access can protect users from booting to the operating system by setting the **Password check** field to "Always". Figure -4 shows the Security Settings screen, and that supervisor password access allows the ability to clear user passwords and to configure so that users do not have to enter a password to access the operating system.

- User password

  Entering this password will restrict a user's access to the Setup menus. A user can only access and modify fields depending on the user access level set using supervisor password access.

Figure -4 [System passwords screen]

```
                         BIOS SETUP UTILITY
   Main    Advanced    Boot    Security    Exit

   Security Settings                              Install or Change the
   _____   password.
   Supervisor Password :Installed
   User Password        :Installed

   Change Supervisor Password
   User Access Level               [Full Access]
   Change User Password
   Clear User Password
   Password Check                  [Setup]

   Asset Tag                       [                ]

                                                  ↔     Select Screen
                                                  ↑↓    Select Item
                                                  Enter Change
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

         v02.58 (C)Copyright 1985-2005, American Megatrends, Inc.
```

To set a system password:
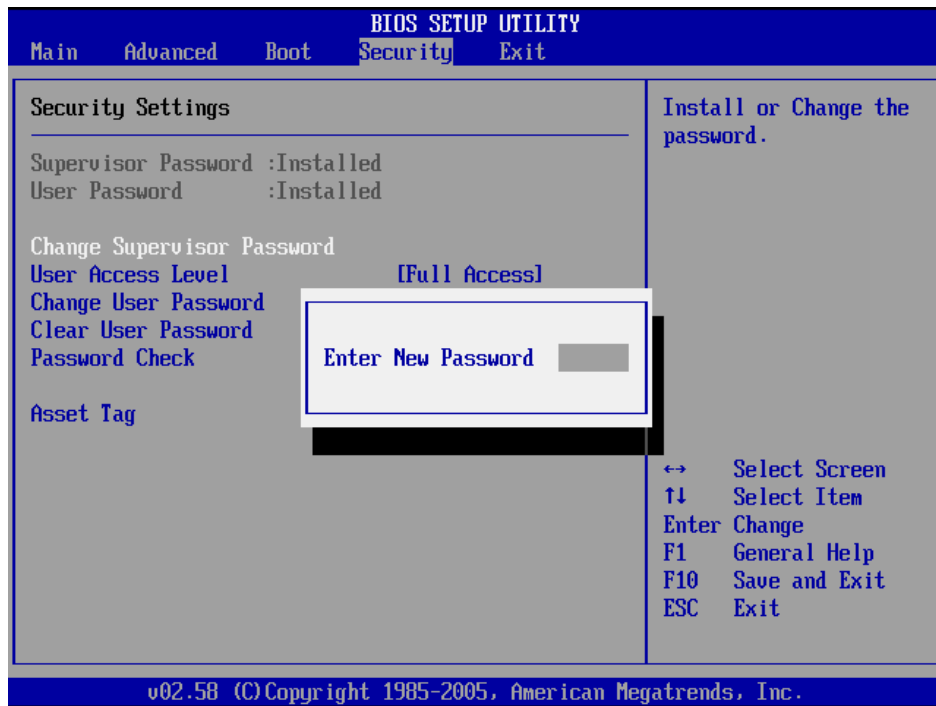
📝 **NOTE:** You must set a Supervisor password before defining a User password.

1. In the Security screen, select a set password field—**Set User Password** or **Set Supervisor Password**, and then press **Enter**.
2. Type a new password in the **Enter New Password** box.

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

Figure -5 [Enter New Password dialog box]

```
                        BIOS SETUP UTILITY
  Main    Advanced    Boot   Security    Exit

  Security Settings                           Install or Change the
                                              password.
  Supervisor Password :Installed
  User Password       :Installed

  Change Supervisor Password
  User Access Level             [Full Access]
  Change User Password
  Clear User Password       ┌──────────────────┐
  Password Check            │                  │
                            │ Enter New Password      ▒▒▒▒▒ │
  Asset Tag                 │                  │
                            └──────────────────┘
                              ↔     Select Screen
                              ↑↓    Select Item
                              Enter  Change
                              F1    General Help
                              F10   Save and Exit
                              ESC   Exit

        v02.58 (C)Copyright 1985-2005, American Megatrends, Inc.
```

3. Retype the password to verify the first entry, and 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**.
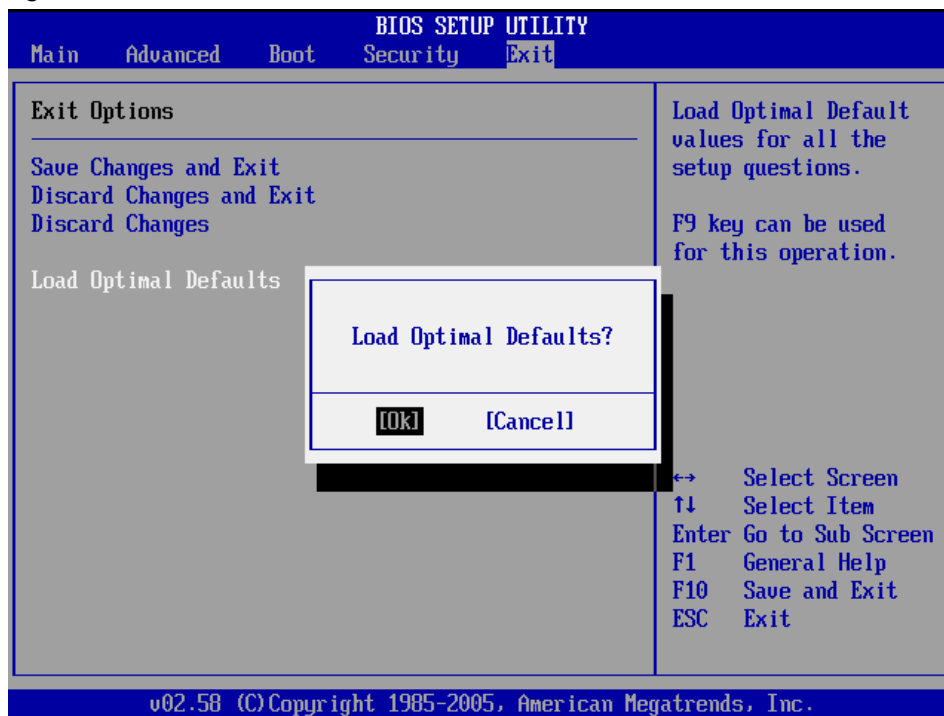
To reset a system password:

- If you forget the user password or the supervisor password, the server functions normally, but you cannot access the Setup Utility.
- If you do not know the user password but do know the supervisor password, you can use the **Clear User Password** menu to clear the user password.
- If "Always" is selected in the **Password check** field and you do not know either the user or the supervisor password, you cannot boot to the operating system or access the Setup Utility.

1. Perform the Pre-installation instructions listed in Chapter 2.
2. If necessary, remove any accessory boards or cables that prevent access to the CMOS button.
3. Locate the Password jumper (P137) on the system board.
4. Remove the jumper from pins 1 and 2 and power on the server.
5. Power down the server.
6. Place the jumper back on pins 1 and 2.
7. Reinstall the access panel as described in Chapter 2.

Loading system defaults

To load system default settings:

1. Reboot the server.
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 and close the Setup Utility.

Figure -6 [Load defaults screen]

```
                        BIOS SETUP UTILITY
  Main    Advanced    Boot    Security    Exit

 ┌─────────────────────────────────────────┬─────────────────────────┐
 │ Exit Options                             │ Load Optimal Default    │
 │ ─────────────────────────────────────── │ values for all the      │
 │                                          │ setup questions.        │
 │ Save Changes and Exit                    │                         │
 │ Discard Changes and Exit                 │                         │
 │ Discard Changes                          │ F9 key can be used      │
 │                                          │ for this operation.     │
 │ Load Optimal Defaults                    │                         │
 │              ┌──────────────────────┐    │                         │
 │              │                      │    │                         │
 │              │ Load Optimal Defaults?│   │                         │
 │              │                      │    │                         │
 │              │                      │    │                         │
 │              │  [Ok]      [Cancel]  │   ←→      Select Screen      │
 │              └──────────────────────┘   ↑↓      Select Item        │
 │                                         Enter  Go to Sub Screen    │
 │                                         F1     General Help        │
 │                                         F10    Save and Exit       │
 │                                         ESC    Exit                │
 └─────────────────────────────────────────┴─────────────────────────┘
        v02.58 (C)Copyright 1985-2005, American Megatrends, Inc.
```

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.

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 (SW50) on the system board.
4. Press the switch. AC power must not be connected.
5. Perform the post-installation instructions listed in Chapter 2.
6. During POST, press **F10** to access the Setup Utility.
7. Set time, date, and other system values.
8. Press **F10** to save the changes you made and close the Setup Utility.

📝 **NOTE:** Clearing CMOS deletes all system configurations and password settings.

Power-On Self Test (POST)

Before you can use a server, all devices must be tested and initialized, and the operating system must be bootstrapped to the memory. This is referred to as Power–On Self–Test or POST. POST is a series of diagnostic tests that checks firmware and hardware components on the system 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 you need to replace, 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 **ESC** to skip the HP logo and go to POST boot progress display system summary screen.
- Press **F8** to display the Boot menu.
- Press **F10** to access the Setup Utility.
- Press **F12** to request a network boot (PXE).

POST error indicators

When POST detects a system failure, it displays a POST error message.

Recoverable POST errors

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

```
018 – CMOS Date/Time not set
```

Table -3 lists the most common POST error messages with corresponding troubleshooting recommendation. HP recommends that you correct the error, even if the server appears to boot successfully.

Table -3 POST Error Messages

Error code	Error Message	Description/Corrective Action
000	Timer Error	Indicates an error while programming the count register of channel 2 of the 8254 timer. This may indicate a problem with system hardware. Requires repair of the system board.
003	CMOS Battery Low	CMOS Battery is low. This message usually indicates that the CMOS battery needs to be replaced. It could also appear when the users intentionally discharge the CMOS battery.
004	CMOS setting Wrong	CMOS settings are invalid. This error can be resolved by using **F9** to load optimal default in the Setup Utility.
005	CMOS Checksum Bad	CMOS contents failed the Checksum check. Indicates that the CMOS data has been changed by a program other than the BIOS or that the CMOS is not retaining its data due to malfunction. This error can be resolved by using **F9** to load optimal default in the Setup Utility.
008	Unlock keyboard	PS2 keyboard is locked. Users need to unlock the keyboard to continue the BIOS POST.
009	PS2 Keyboard not found	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.
018	CMOS Date/Time not Set	The CMOS Date and/or Time are invalid. This error can be resolved by readjusting the system time in the Setup Utility.
019	Ps2 mouse not found	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.
048	Password check failed	Password is incorrect after retried a few times. Users might need to reset the password.
04c	Keyboard/Interface Error	Keyboard controller failed test. This may indicate a problem with system hardware.
04D	Primary Master Hard Disk Error	The IDE/ATAPI device configured as Primary Master could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST
04E	Primary Slave Hard Disk Error	The IDE/ATAPI device configured as Primary Slave could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
4F	Secondary Master Hard Disk Error	The IDE/ATAPI device configured as Secondary Master could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.

Table -3 POST Error Messages

Error code	Error Message	Description/Corrective Action
50	Secondary Slave Hard Disk Error	The IDE/ATAPI device configured as Secondary Slave could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
51	Master Hard Disk Error	The IDE/ATAPI device configured as Master in the 3rd IDE controller could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
52	Master Slave Disk Error	The IDE/ATAPI device configured as Slave in the 3rd IDE controller could not be properly initialized by the BIOS. This message is typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.
0641	BMC card not responding.	System does not see the remote management card. Verify the remote management card is connected to the system board.
	Uncorrectable memory error	System halts after displaying this message. If the problem persists, contact HP Customer Support.
	Microcode Error	BIOS could not find or load the CPU Microcode Update to the CPU. The message is most likely to appear when a new CPU is installed in a system board with an outdated BIOS. In this situation, you must update the BIOS to include the Microcode Update for the new CPU.
	Checking NVRAM..Update Failed	BIOS could not write to the NVRAM block. This message appears when the FLASH part is malfunctioning.
	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 the IDE or SCSI cable is connected properly. • Verify that the desired boot drive has power and the SCSI cable is connected. • Verify that the IDE or SCSI cable is securely plugged into the respective system board connectors. • Verify that the boot device is enabled in the Setup Utility. • Verify that the boot device has an operating system installed. If the problem persists, contact your HP Customer Support provider.

POST-related troubleshooting

Perform the following procedures when POST fails to run, displays error messages, or emits 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 and 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.
- All memory modules are properly installed.
- If you have installed a PCI accessory board, verify that the board is firmly seated 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 is properly set.

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 3 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 -1 and the following table show and describe the components on the front panel of the server.

Figure -1 [Front panel components]
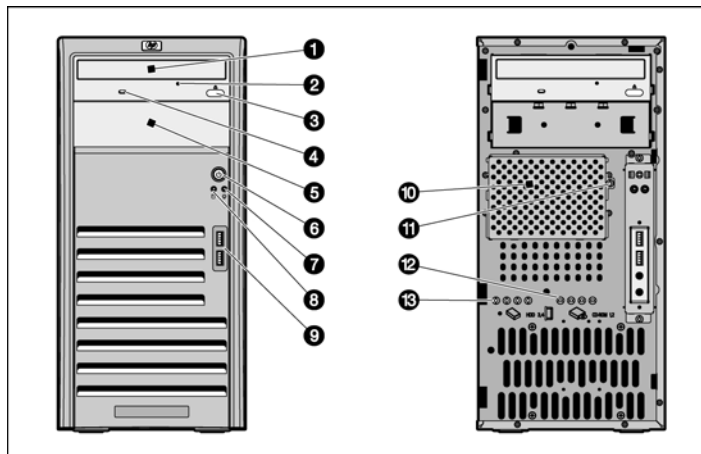
1	Optical drive	**8**	Drive activity indicator
2	Optical drive manual eject hole	**9**	Front USB 2.0 ports
3	Optical drive eject button	**10**	Hard drive EMI shield
4	Optical drive activity indicator	**11**	Hard drive EMI shield screw
5	Half-height common bay	**12**	Optical drive spare screws
6	Power button	**13**	Hard drive spare screws
7	Power LED indicator		

Rear panel components

Figure -2 and the following table show and describe the components on the rear panel of the server.

Figure -2 [Rear panel components]
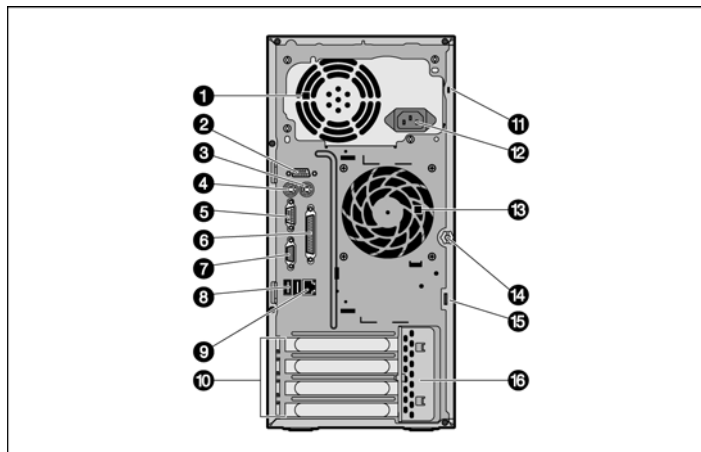
1	PSU fan	**9**	LAN port (RJ-45)
2	Serial port B	**10**	PCI slot covers
3	PS/2 mouse port	**11**	Kensington lock notch
4	PS/2 keyboard port	**12**	Power supply outlet
5	Serial port A	**13**	Rear system fan
6	Parallel port	**14**	Thumbscrew for access panel
7	Monitor port	**15**	Cable lock provision tab
8	Rear USB 2.0 ports	**16**	PCI expansion slot cover lock

System board components

Figure -3 and Table -1 show and describe the components on the system board.

Figure -3 [System board components]
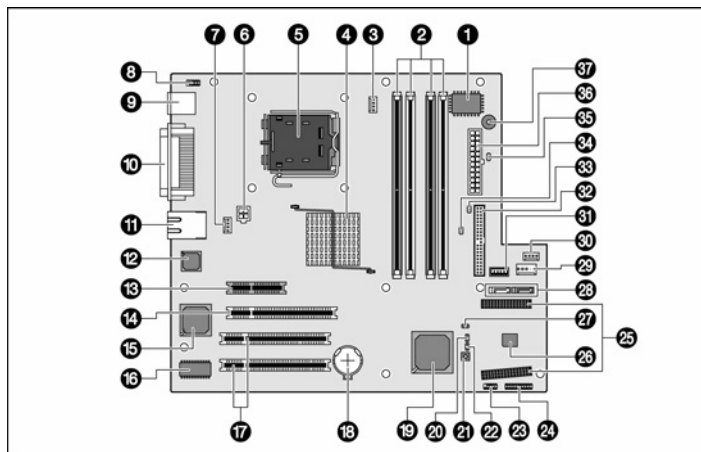
Table -1 System board components

Item	Component Code	Description
1	U19	Super I/O
2	XMM1 - 4	DDRII slots
3	P70	CPU fan connector
4	U3	Intel E7230
5	XU1	Intel LGA775 CPU socket
6	P3	4-pin ATX CPU power connection

Table -1 System board components

Item	Component Code	Description
7	P8	4-pin system fan connection (rear)
8	J112	Serial port B
9	J68	Top: PS/2 mouse port Bottom: PS/2 keyboard port
10	J50 J69 P53	Parallel port Monitor port Serial port A
11	J9	Top: LAN port Bottom: USB 2.0 ports (rear)
12	U1033	Broadcom 5721 GbE LAN controller
13	J33	PCI Express x4 bus slot
14	J32	PCI Express x16 bus slot
15	U11	ATI RN50 graphic chip
16	U1040	VGA frame buffer
17	J20, J21	32-bit/33-MHz 3.3V PCI bus slot
18	XBT2	Battery
19	U38	Intel 6702V
20	P137	Password jumper
21	SW50	CMOS reset button
22	P29	SCSI LED
23	P24	9-pin front USB connector
24	P5	20-pin front panel I/O connector
25	J110, J111	Remote management card connector
26	J2	BIOS
27	P136	Boot block jumper
28	P60, P61	7-pin 150-MBps SATA connectors (2)
29	J4	Internal USB tape drive
30	P9	4-pin system fan connection (front)
31	J3	Internal USB port
32	P23	IDE channel UDMA-100
33	CR2	3.3V auxiliary power indicator
34	CR7	System error indicator
35	CR1	5V auxiliary power indicator
36	P2	24-pin ATX system board power connection
37	SP1	Internal buzzer

Jumpers – Password and Boot Block

The system board password (P137) and boot block (P136) jumpers. Table -2 describes the jumper settings.

Table -2 System configuration switch settings

Jumper	Status	Function
P137	On (default)	Password enabled.
	Off	Password reset/disabled.
P136	On	Boot block unprotected.
	Off (default)	Boot block protected.

Clear CMOS button

The system board has a system configuration (CMOS) button (SW50). To clear system configuration, disconnect AC power and press the CMOS button.

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.

Optical drive activity LED indicator

The optical drive has an activity indicator that indicates when the drive is reading media.

Figure -4 [Optical drive activity LED indicator]
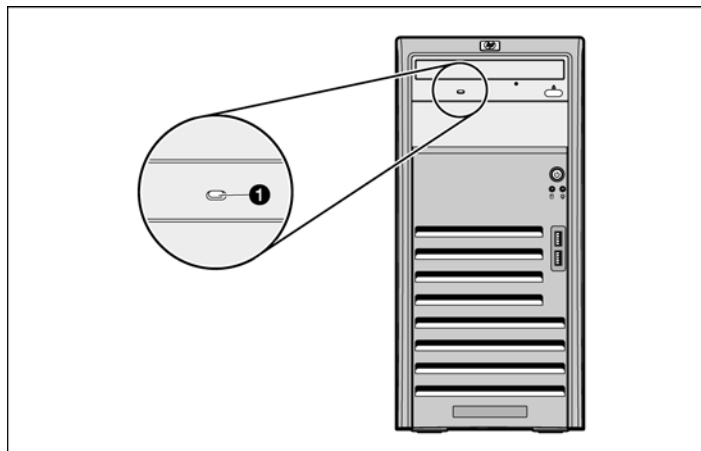
Activity states for the optical drive are as follows:

- Flashing green – 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 -5 and Table -3 show and describe the function of this LED.

Figure -5 [Power/system health LED indicator]
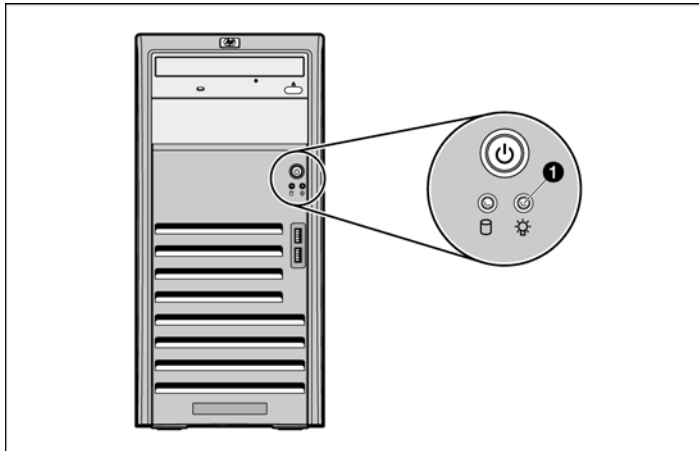
Table -3 Power/system health LED indicator status

Component	Status	Description
Power/system health LED indicator	Steady green	The server is operating normally.
	Flashing red (2 blinks)	Thermal event (THERMTRIP#).
	Flashing red (3 blinks)	No CPU.
	Flashing red (4 blinks)	Crowbar.
	Off	The server is powered off.

Hard drive activity LED indicators

The status of hard drives installed in the server is indicated by the drive activity LED indicator located on the front panel of the server.

Figure -6 [Drive activity LED indicator]
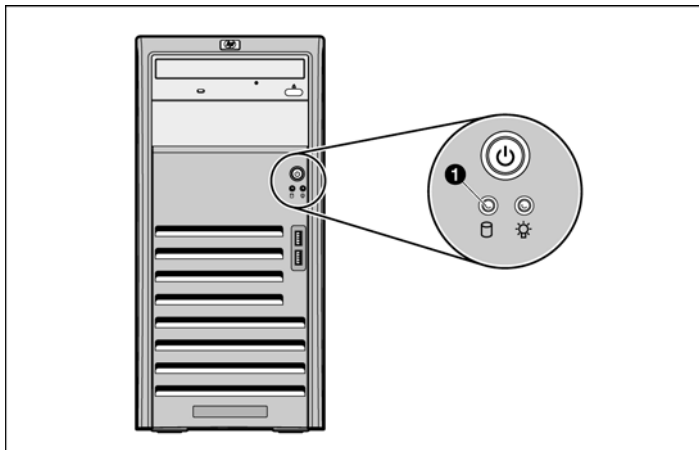
Activity states for hard drives are as follows:

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

Rear panel LED indicators

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

Figure -7 [LAN/LED indicators]
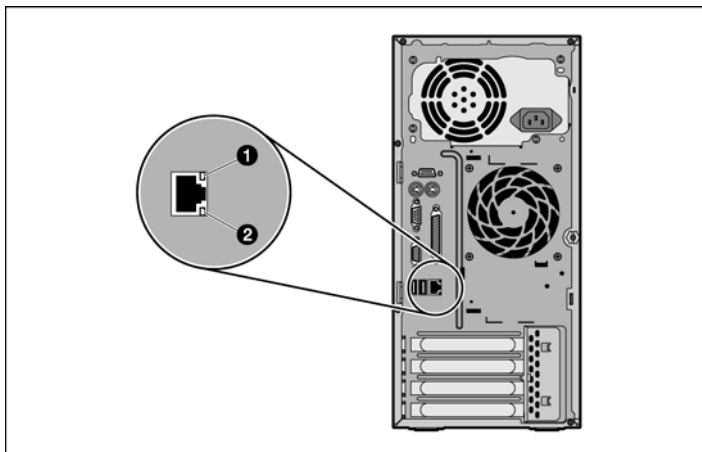
Table -4 LAN/LED indicator states

Item	Component	Status	Description
1	LAN activity status LED indicator	Flashing green	Ongoing network data activity.
		Off	No network data activity or no connection.
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 or no connection.

System board LED indicators

The system board contains two internal power status LED indicators for use during troubleshooting operations. Figure -8 and Table -5 show and describe the function of these LEDs.

Figure -8 [System board LED indicators]
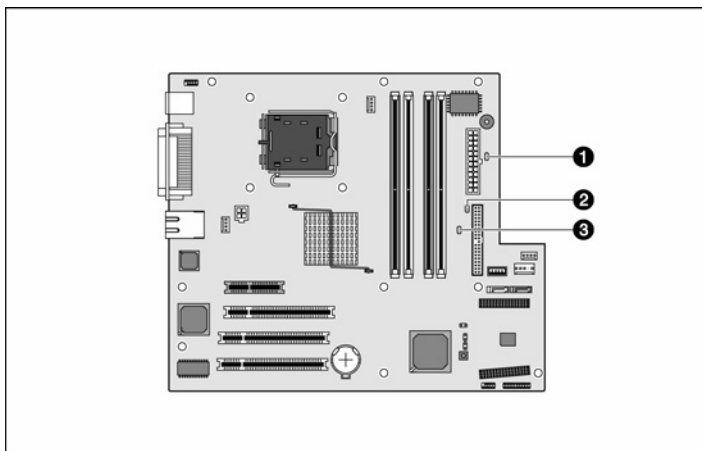
Table -5 System board LED indicators

Item	Component	Status	Description
1	5V aux power indicator (CR1)	Green	Auxiliary power present
2	3.3V aux power indicator (CR2)	Off	The server is powered off (AC power disconnected).
3	System Error Indicator (CR7)	Red	A system error has occurred.
		Off	System is operating under normal condition.

5 Physical and operating specifications

This chapter provides physical and operating specifications for the HP ProLiant ML110 Generation 3 server. Specifications include:

- System unit
- Memory
- Processor
- IDE CD-ROM drive
- SCSI hard drive
- SATA hard drive
- SCSI storage controller

System unit

Table -1 Hardware specifications

Item	Component
Processor socket	Intel LGA775
Processor support	Intel Celeron D Intel Pentium 4 Intel Pentium D
Core logic chipset	Intel E7230 Intel 6702V
Super I/O chipset	SMSC SCH5307
Hardware monitoring device	SMSC EMC1023
Gigabit Ethernet controller	Broadcom BMC5721
Memory controller	Integrated in the Intel E7230
SATA and IDE controllers	Integrated in the Intel 6702V
VGA controller	ATI ES1000/RN50 with 16 MB of video memory
I/O subsystem	• One PCI-E x4 slot • One PCI-E x8 link with x16 slot • Two 3.3V 32-bit/33-MHz PCI bus slot
Memory	Four DDR II DIMM slots
Storage Bay	• Two half-height storage bays for CD-ROM drive, tape drive, non-hot-plug hard drive • Two 3.5-in bay for non-hot-plug SCSI or SATA HDD
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, two serial ports, parallel port, and LAN port.
Status LED indicators Front panel	• IDE CD-ROM drive activity • Power/system health status • Hard drive activity
Rear panel	• LAN activity • LAN link status
System board	• Auxiliary power indicators • Processor IERR indicator
Power supply unit (PSU)	Delta SSI DPS (350 watts)
Thermal solution	• One system fan • One processor heatsink fan • One PSU fan

Table -2 Software specifications

Item	Description
Network operating system (NOS) support	• Microsoft Windows Server 2000 • Microsoft Windows Server 2003, Standard Edition (32-bit) • Microsoft Windows Server 2003, Standard Edition (64-bit) • Microsoft Windows Small Business Server 2003 • Red Hat Enterprise Linux 4 AS (32-bit) • Red Hat Enterprise Linux 4 AS (64-bit) • SuSE SLES9 (32-bit) • SuSE SLES9 (64-bit) • Novell Netware 6.5 SBS
System diagnostics	• AMI BIOS Setup Utility • HP Insight Diagnostics

Table -3 Physical dimensions

Item	Description
System board platform	ATX (Advanced Technology eXtended)
System board dimensions Length Width	 244 mm (9.6 in) 289 mm (11.36 in)
Server dimensions Height	 367 mm (14.5 in)
Width	175 mm (6.9 in)
Length	With bezel – 426 mm (16.8 in) Without bezel – 386 mm (15.2 in)
Server weight	• Basic configuration (excludes keyboard and mouse) – approximately 11.7 kg (25.8 lb) • Fully loaded configuration (includes keyboard, mouse, and kits in the box) – approximately 15.0 kg (33.1 lb)

Table -4 Environmental specifications

Item	Description
Temperature range: Operating Shipping	 10 to 35 C (50 to 95 F) -40 to 60 C (-40 to 140 F)
Relative humidity: Operating Non-operating	 10 to 90% 10 to 90%
Acoustic noise: Idle (Fixed disk drives spinning) L Wad (BELS)	 5.5
Operating (Random seeks to fixed disks) L Wad (BELS)	 6.0

Table -5 Power supply specifications

Item	Description
Dimensions (HxWxD) (with feet)	15.0 cm x 14.0 cm x 8.6 cm (5.9 in x 5.5 in x 3.4 in)
Weight (approximate)	2.0 kg (4.5 lb)
Input requirements: Rated input voltage Normal line voltage	 100 VAC to 127 VAC/200VAC to 265 VAC 115 VAC to 230 VAC
Line frequency	50 to 60 Hz
Rated input current	Load 8A at 115 VAC, 4A at 230 VAC
BTU rating	1907 BTU
Power supply output power: Rated steady state power Maximum peak power	 350W 350W
Temperature range: Operating Shipping	 10 to 35 C (50 to 95 F) -40 to 60 C (-40 to 140 F)
Relative humidity: Operating Non-operating	 10 to 90% 10 to 90%

Memory

Table -6 Memory specifications

Item	Description
Size	512-MB, 1-GB, 2-GB
Speed	PC2-4200
Type	• unbuffered ECC DDRII DIMM

Processor

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

Table -7 Intel Celeron D processor specifications

Operating Frequency	FSB Speed	On-die L2 Cache	Voltage	Package
2.53 GHz	533 MHz	256 MB	1.4	775FC-LGA4
2.66 GHz	533 MHz	256 MB	1.4	775FC-LGA4
2.8 GHz	533 MHz	256 MB	1.4	775FC-LGA4
2.93 GHz	533 MHz	256 MB	1.4	775FC-LGA4
3.06 GHz	533 MHz	256 MB	1.4	775FC-LGA4
3.2 GHz	533 MHz	256 MB	1.4	775FC-LGA4

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

Table -8 Intel Pentium 4 processor specifications

Operating Frequency	FSB Speed	On-die L2 Cache	Voltage	Package
3.0 GHz	800 MHz	2 MB	1.425	775FC-LGA4
3.2 GHz	800 MHz	2 MB	1.425	775FC-LGA4
3.4 GHz	800 MHz	2 MB	1.425	775FC-LGA4
3.6 GHz	800 MHz	2 MB	1.425	775FC-LGA4
3.8 GHz	800 MHz	2 MB	1.425	775FC-LGA4
Note: The server supports Intel Pentium 4 processors with HT (Hyper-Threading) technology.				

Table -9 Intel Pentium D processor specifications

Operating Frequency	FSB Speed	On-die L2 Cache	Voltage	Package
2.8 GHz	800 MHz	2x1 MB	1.40	775FC-LGA4
3.0 GHz	800 MHz	2x1 MB	1.40	775FC-LGA4
3.2 GHz	800 MHz	2x1 MB	1.40	775FC-LGA4
3.4 GHz	800 MHz	2x1 MB	1.40	775FC-LGA4
3.6 GHz	800 MHz	2x1 MB	1.40	775FC-LGA4
Note: The server supports Intel Pentium D processors with dual core technology.				

IDE CD-ROM drive

Table -10 IDE CD-ROM specifications

Item	Description
Form factor	5.25 in, half-height
Dimensions Height Width Depth	 41.3 mm (1.6 in) 146 mm (5.8 in) 184.7 mm (7.3 in)
Weight	.72 kg (1.6 lb)
Supported disc formats	• Mixed Mode (audio and data combined) • CD-DA, Mode 1(basic format), Mode 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 Mode 2 Mode 2, Form 2 CD-DA	 2,048 bytes/block 2,340/2,336 bytes per block 2,332 bytes/block 2,352 bytes/block
Data buffer capacity	128-KB
Data transfer rate Sustained Burst	 • 20X (inner side) – 3,000 KB/s • 48X (outer side) – 7,200 KB/s • PIO Mode 4 – 16.67 MB/s • Multi-DMA Mode – 216.67 MB/s • UDMA Mode 2 – 33.3 MB/s

Table -10 IDE CD-ROM specifications

Item	Description
Average access time	
Typical	75 ms
Maximum	100 ms
Three-way eject support	• Using software
	• Using drive open/close button
	• Using emergency eject hole
Operating conditions	
Temperature	0°C to 50°C (32°F to 122°F)
Relative humidity	5% to 90%

SCSI hard drive

Table -11 SCSI hard drive specifications

Item	Description
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)

SATA hard drive

Table -12 SATA hard drive specifications

Item	Description
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 -13 SCSI storage controller specifications

Item	Description
Processor	LSI 53C1020
Form factor	Low-profile PCI-X
Interface type	PCI-X/133 MHz
Controller interface	Ultra320 SCSI

Dimensions
    Height
    Depth
	
	63.5 mm (2.5 in)
	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

Operating conditions
    Temperature
    Relative humidity
	
	0°C to 55°C (32°F to 131°F)
	5% to 90%

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