operations and maintenance guide

hp server rx2600 and hp workstation zx6000

Document Part Number: 5969-3155

April 2003

This manual contains an overview of system specifications, instructions for removing and replacing system components, information on configuring your system using the included tools and interfaces, and detailed troubleshooting information.

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

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

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Important Safety Warnings

WARNING: *Avoid electrical shocks.* To avoid electrical shock, do not open the power supplies. There are no user-serviceable parts inside.

To avoid electrical shock and harm to your eyes by laser light, do not open the DVD laser module. The laser module should be serviced by service personnel only. Do not attempt to make any adjustment to the laser unit. Refer to the label on the DVD for power requirements and wavelength. This product is a class I laser product.

WARNING: *Removing and Replacing the Cover.* For your safety, never remove the system side cover without first disconnecting the power cord from the power outlet and removing any connection to a telecommunications network. If a Power Protection Device is fitted to your system, you must shut down your computer using its on/off switch, then remove the power cord before removing the system's side cover. Remove the Power Protection Device cables before any servicing operation. Always replace the side cover before switching the system on again.

WARNING: *Battery Safety Information.* There is a danger of explosion if the battery is incorrectly installed. For your safety, never attempt to recharge, disassemble, or burn an old battery. Replace the battery with the same or equivalent type, as recommended by the manufacturer.

The battery in this system is a lithium battery that does not contain any heavy metals. However, to protect the environment, do not dispose of batteries in household waste. Return used batteries either to the shop from which you bought them, to the dealer from whom you purchased your system, or to HP so that they can either be recycled or disposed of in the correct way. Returned batteries will be accepted free of charge.

WARNING: *Avoid Burn Injuries.* Some parts inside the computer will be hot. Wait approximately three to five minutes for them to cool down before touching them.

CAUTION: *Avoid Static Electricity.* Static electricity can damage electronic components. Turn OFF all equipment before installing an accessory card. Don't let your clothes touch any accessory card. To equalize the static electricity when replacing an accessory card, rest the accessory card bag on top of the system unit while you are removing the card from the bag. Handle the card as little as possible and with care.

CAUTION: *Information on Ergonomic Issues.* It is strongly recommended that you read the ergonomics information, available in the "Working In Comfort" section of this manual, before using your system. You can access more extensive ergonomics information at: **www.hp.com/ergo**

NOTE: *Recycling your system.* HP has a strong commitment toward the environment. Your HP system has been designed to respect the environment as much as possible. HP can also take back your old system for recycling when it reaches the end of its useful life. HP has a product take-back program in several countries. The collected equipment is sent to an HP recycling facilities in Europe or the U.S.A. As many parts as possible are reused. The remainder is recycled. Special care is taken for batteries and other potential toxic substances, these are reduced into non-harmful components through special chemical processes. If you require more details about the HP product take-back program, contact your local dealer or your nearest HP Sales Office.

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product overview

This chapter provides an overview of your system:

- System configurations
- System features
- Physical characteristics
- Power specifications
- Environmental specifications
- Front panel connectors
- Rear panel connectors

system configurations

The zx6000 workstation and the rx2600 server are available in *tower* and *rack-mount* configurations

Configuration	Accessory Sockets	Fan Type/ Speed	Management Processor	Redundant Hot-swap Power Supply
zx6000 Workstation Tower	3 PCI 1 AGP	Quiet/ Low	No	No
zx6000 Workstation Rack-mount	3 PCI 1 AGP	Hi Capacity/ High	Optional	Optional
rx2600 Server Tower	4 PCI	Hi Capacity/ High	Yes	Yes
rx2600 Server Rack-mount	4 PCI	Hi Capacity/ High	Yes	Yes

system features

Feature	Description
Processor(s)	Intel® Itanium® 2: • Single or dual-processor • 900 MHz with 1.5 MB cache on chip • 1 GHz with 3 MB cache on chip
Firmware	8 MB flash EEPROM Configured using Extensible Firmware Interface (EFI)
Operating system	HP-UX Linux® Microsoft® Windows®: • XP 64-Bit Edition Version 2003 (workstations) • Server 2003, Enterprise Edition (servers)
Main memory	Capacity: • zx6000 workstation: 512 MB min. (2 x 256 MB) • rx2600 server: 1 GB min. (4 x 256 MB) • 24 GB max. Type: PC2100 ECC registered DDR266 SDRAM Sockets: Twelve DIMM sockets Bus Bandwidth: 8.5 GB/s For memory loading order and detailed memory installation, see page 2-22.
Hard drives	Internal bays: three hot-plug SCSI disk bays Hard disk drives supported: • 36 GB (10k or 15k rpm) • 73 GB (15k rpm) • 146 GB (10k rpm) Maximum internal storage: 438 GB
Optical drives	1 open bay for 8x slimline DVD-ROM or CD-RW/DVD-ROM

Feature	Description
SCSI controller	Two channel Ultra 320 SCSI bus. One external SCSI port (rear panel): • 68-pin standard, high density SCSI connector • Must use cables designated as U320-capable with U320 devices • 12 m maximum bus length • SCSI ID: • **may not** use SCSI ID 2 when a drive is installed in internal bay 2 • **may** use SCSI ID 2 for the external port if there is no drive in bay 2 • Termination: • **must** be terminated if there are devices attached • **must not** be terminated if no devices are attached (automatically terminates if no devices are attached) • Device support: • LVD devices • Legacy SE devices • SE, narrow devices
IDE controller	Ultra ATA-100 capable controller Supports one IDE optical drive (CD/DVD)
Graphics controllers	zx6000 workstation supports one of the following options: • AGP graphics card (see Appendix A) • Management Processor (MP) card VGA port rx2600 server: • Management Processor (MP) card VGA port
Accessory card sockets	zx6000 workstation: • One AGP Pro 4× 32-bit socket supporting 1.5V AGP cards (≤50W) • Three 64-bit 133 MHz Peripheral Component Interconnect (PCI-X) sockets, supporting all bridges and multifunction PCI-X devices; all three PCI-X sockets comply with PCI-X specification rx2600 server: • Four 64-bit 133 MHz Peripheral Component Interconnect (PCI-X) sockets

Feature	Description
Management Processor Card (optional)	25-pin serial connector (with console/remote/USP extensions; requires breakout cable) 10/100 Management LAN 15-pin VGA connector • The graphics display port functionality on the HP Management Processor Card is not supported on zx6000 workstations with an AGP graphics card installed; all other HP Management Processor Card functionality is supported
Rear Connectors (labeled)	Four USB connectors: • High speed 480 Mb/sec. capable. • Full speed 12 Mb/sec. and low speed 1.5 Mb/sec. • HP-UX supports HP USB keyboard and mouse, Linux supports all 1.1 USB devices, Windows supports USB keyboard and mouse. Two 9-pin serial ports: • UART 16550 buffered • RS-232-C 10/100 Management LAN 10/100/1000 LAN External 68-pin LVDS/SE SCSI connector (see SCSI controller above)

physical characteristics

Standard configuration as shipped, excluding keyboard and monitor.

Weight:	
• Tower system	Min: 22.4 kg (49.4 lb.) Max: 25.5 kg (56.3 lb.)
• Rack-mount system	Min: 17.5 kg (38.6 lb.) Max: 22.2 kg (49.0 lb.)
Dimensions (DxWxH):	
• Tower system	67.5 cm (26.6 in.) x 29.5 cm (11.6 in.) x 49.4 cm (19.5 in.)
• Rack-mount system	67.9 cm (26.8 in.) maximum x 48.3 cm (19.0 in.) x 8.6 cm (3.4 in.)
Footprint (tower)	0.2 m^2 (2.1 sq. ft.)
Rack units (rack-mount)	2U

power specifications

Available power (output) is the maximum DC power that the power supply can supply to the system.

Maximum input power is what the power supply requires from the AC line to deliver that maximum DC output (given worst case efficiency and max loading).

Maximum input current is the worst case/highest current given the lowest input voltage and the maximum input power.

Parameter	Total Rating		Peak (15 sec.)	Max. per PCI-X Sockets 64-bit, 133MHz	Maximum for AGP Socket Standard Connector
Input voltage	100-127 VAC	200-250 VAC	Off	Off	Off
Input current (max)	7.2A	3.6A	Off	Off	Off
Input frequency	50 to 60 Hz		Off	Off	Off
Measured input power	560W		Off	Off	Off
Available power (output)	600W		Off	85W total for PCI sockets and AGP socket	
Max current at +12V	49A		Off	0.5A	4.8A
Max current at -12V	0.35A		Off	0.1A	N/A
Max current at +3.3V	34A		Off	4.6A	12.1A
Max current at +5V	18A		31A	3A	2A
Max current at +3.3V stdby	3.5A		Off	Off	Off

If an overload triggers the power supply overload protection, the system is immediately powered off. To reset the power supply unit:

1. Disconnect the power cord.
2. Determine what caused the overload by contacting an HP support representative.
3. Reconnect the power cord, then reboot the system.

If an overload occurs twice, there is an undetected short circuit somewhere.

When you use the front panel's power button to turn off the workstation, power consumption falls below the low power consumption, but doesn't reach zero. To reach zero power consumption in “off” mode, either unplug the workstation or use a power block with a switch.

power consumption and cooling

The power consumptions listed in the following table are valid for a standard configuration as shipped (one 1 GHz processor, 6 GB of memory, 600W power supply, three hard disk drives, one graphics card, one LVD SCSI card).

All information in this section is based on primary power consumptions.

Additional Component	Power Consumption	
• Processor	130W	443.6 Btu/h
• SCSI hard disk drive (with I/O access)	23W	78.4 Btu/h
• SCSI hard disk (idle)	16W	54.5 Btu/h
• PCI card	10W to 25W	34.12 Btu/h to 85.30 Btu/h
• AGP card	7W	238.4 Btu/h

environmental specifications

Operating temperature and humidity ranges may vary depending on the installed mass storage devices. High humidity levels can cause improper disk operation. Low humidity levels can aggravate static electricity problems and cause excessive wear of the disk surface.

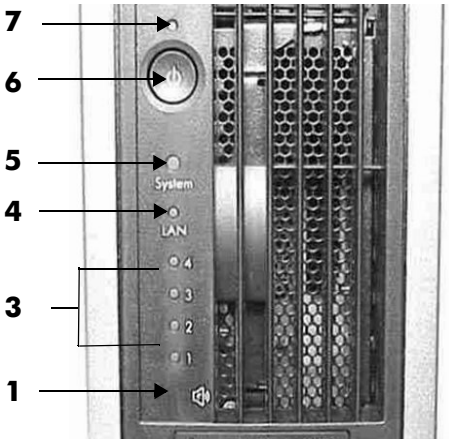
Environmental specifications (system processing unit with hard disk)	
Operating temperature	+10° C to +35° C (+50° F to +95° F)
Storage temperature	-40° C to +70° C (-40° F to +158° F)
Over-temperature shutdown	+40° C (+104° F)
Operating humidity	15% to 80% relative (noncondensing)
Storage humidity	8% to 85% relative (noncondensing)
Acoustic noise emission (ISO 7779)	Sound power level[3]
Tower System:	
• Typical configuration[1] (disk idle)	LwA =5.1 BA
• Maximum configuration[2] (disk idle)	LwA =5.4 BA
• Maximum configuration[2] (disk active)	LwA =6.2 BA
Rack System:	
• Typical configuration[1] (disk idle)	LwA =6.4 BA
• Maximum configuration[2] (disk idle)	LwA =6.4 BA
• Maximum configuration[2] (disk active)	LwA =7.2 BA
Operating altitude	3048 m (10,000 ft.) max
Storage altitude	4600 m (15,000 ft.) max

1. Single processor, one to two SCSI hard disk drives and less than 8 GB of memory.
2. Dual processor, one to two SCSI hard disk drives and less than 8 GB of memory.
3. Typical configuration at room temperature (25°C).

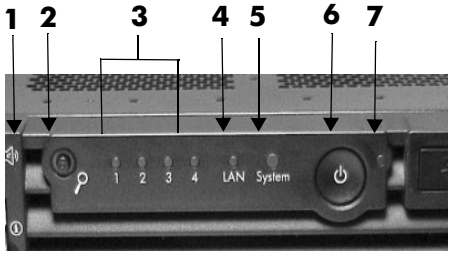
front panel connectors

The front panels of the rx2600 and zx6000 have the following features.

- **Power LED** is green when the power is on or when the power button is pushed in. If the power is on and the button is pushed in, the light stays on even after the system is powered down. When the button is released, the green light turns off.
- **Power Button** turns the system power on and off.
- LAN LED indicates whether the system is communicating over the network.
- **System** and **Diagnostic LEDs** identify system errors on systems with no MP card installed.
- **Locator LED and Button** (rack-mount configuration only) identifies the rack position of the system.
- **Disk Activity LEDs** on each hard drive turn green when the disk is accessed.
- e-buzzer icon indicates the position of the internal speaker.



Front Panel, Tower Configuration



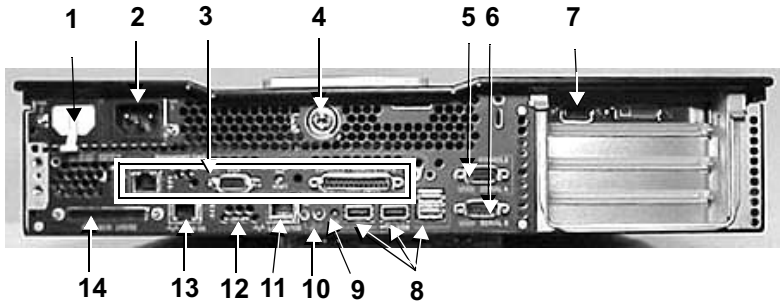
Front Panel, Rack-mounted Configuration

1 e-buzzer icon	**5** System LED
2 Locator LED and button *(rack-mounted system only)*	**6** Power button
3 Diagnostic LEDs 1-4	**7** Power LED
4 LAN LED	

rear panel connectors

The rear panel has the following features.

- **Ports** are shaped to prevent improper cable attachment.
- **Ports** are labeled for easy identification.
- **Management Processor (MP)** ports are positioned above (rack-mount) or to the right of (tower) standard connectors (optional on zx6000).
- **LAN LEDs** provide additional network traffic information.
- **Monitor connector** (on graphics card); zx6000 workstations may include graphics cards with single or multiple monitor support.
- **Locator LED** (rack-mount configuration only) identifies the rack position of the system.



Rear Panel Connectors

1 Power (PWR2)	**8** USB ports (mouse and keyboard ports labelled)
2 Power (PWR1)	**9** TOC button
3 MP VGA, serial, LAN, reset (optional on zx6000)	**10** Locator LED and button
4 System lock	**11** 10/100 Management LAN with integrated LEDs
5 Serial port A (console)	**12** 1Gb LAN LEDs
6 Serial port B	**13** 10/100/1000 LAN
7 Monitor connector(s) (zx6000 only)	**14** LVD/SE SCSI

CAUTION: Do not connect a SCSI terminator to the SCSI connector on the back of the system; the connector is automatically terminated. If an external SCSI device is the last device connected externally to the system, you must connect a SCSI terminator to that device.

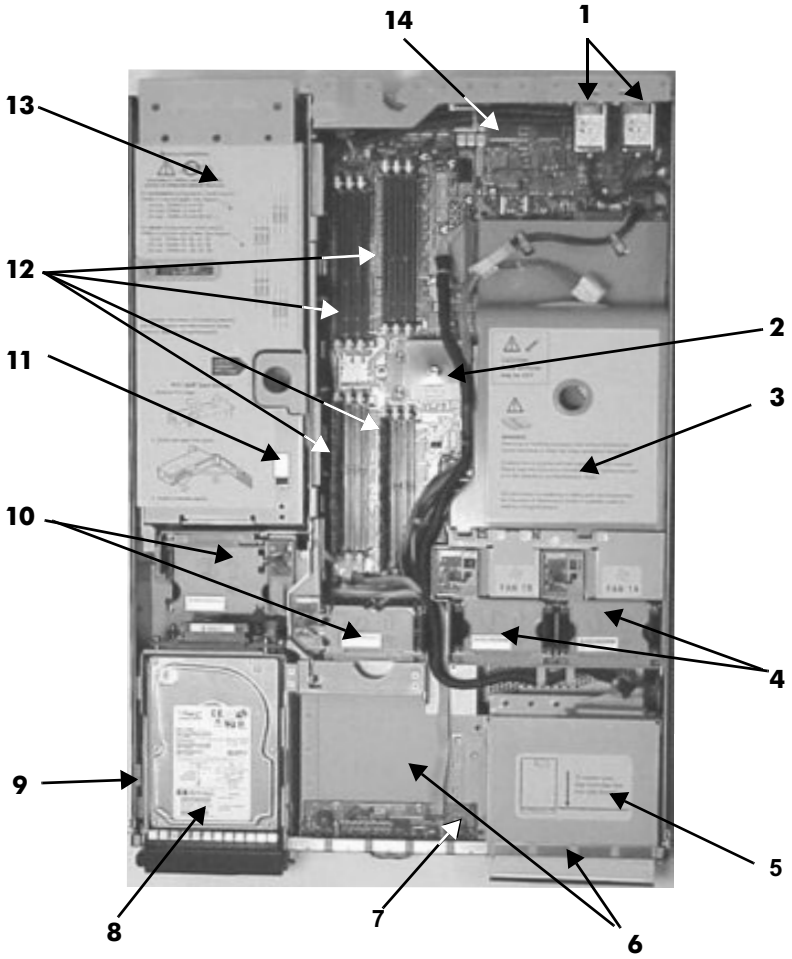
2

installing or replacing parts and accessories

This chapter provides information on:

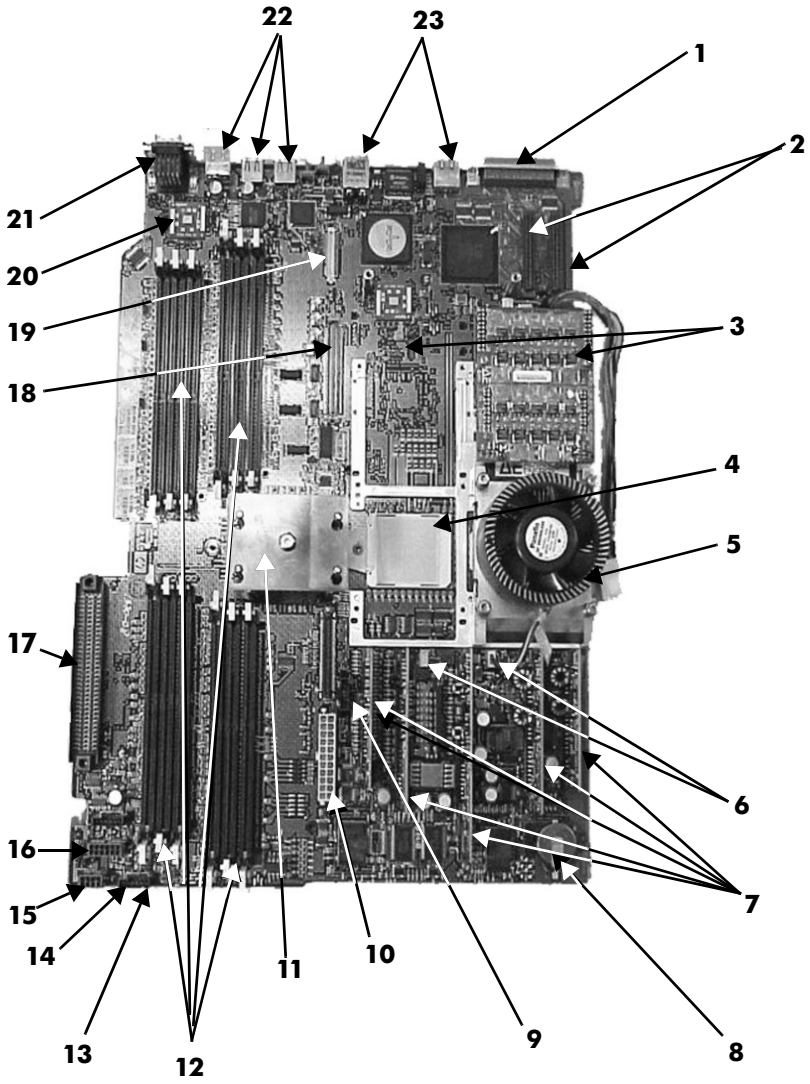
- Location of internal components and connectors
- Remove/replace prerequisites
- System covers and bezel
- Removing/replacing hot-swap and hot-plug devices
- Removing/replacing internal components

location of internal components and connectors



Internal Physical Layout (front of system at bottom of photo)

1 Power receptacles (PWR1 left, PWR2 right)	**8** Hot-swappable hard drives (up to 3)
2 HP ZX1 memory and I/O controller	**9** Hard disk lock
3 Airflow guide	**10** System fans (2 lower right, 3 upper left)
4 System fans (1A right, 1B left)	**11** Intrusion switch
5 Slimline optical drive	**12** Memory sockets
6 Power supplies (PSU1 center, PSU2 under optical drive)	**13** PCI/AGP cage
7 Status panel board	**14** Management card (optional)



System Board Connectors and Sockets (front of system at bottom of photo)

1 External SCSI Connector	**9** Memory and Power Supply Fan Connectors	**17** PCI/AGP Backplane Connector
2 SCSI Connectors A & B	**10** Power Module Power Connector	**18** Optical Drive Connector
3 Voltage Regulator Module(s)	**11** HP ZX1Memory and I/O Controller (under heatsink)	**19** MP Card connector
4 CPU1 (empty socket)	**12** Memory Sockets	**20** HP ZX1 I/O Adapter
5 CPU0 (processor under Turbo Fan)	**13** Status Panel Connector	**21** Serial Ports (2)
6 Turbo Fan Power Connectors	**14** Power Module Auxiliary Connector	**22** USB Connectors (4)
7 Five VRM Cards	**15** SCSI Backplane Power Connector	**23** LAN Connectors (2)
8 Battery	**16** PCI/Memory Fan Cable Connector	

remove/replace prerequisites

Before you remove or replace parts, you must:

- Read the power and EMI warning and note below. (Your safety is important!)
- Gather your tools.
- Follow electrostatic discharge (ESD) precautions.

read the power and EMI warning and note

WARNING: For most of the installation and removal procedures in this chapter, you must:

1. Power off the workstation.
2. Unplug the workstation power cord from the AC power outlet.

CAUTION: To maintain FCC Electromagnetic Interference (EMI) compliance, verify that all covers are replaced and that all screws are properly seated.

gather your tools

You need:

- Flat blade screwdriver
- T-15 Torx driver
- Special processor tool (provided with replacement CPU)
- Static-free mat
- Static strap

Follow electrostatic discharge (ESD) precautions

To prevent damage to this system, observe all of the following ESD precautions while performing the system parts removal/replacement procedures:

- Work on a static-free mat.
- Wear a static strap to ensure that any accumulated electrostatic charge is discharged from your body to ground.
- Create a common ground for the equipment you are working on by connecting the static-free mat, static strap and peripheral units to that piece of equipment.
- Keep uninstalled printed circuit boards in their protective antistatic bags.
- Handle printed circuit boards by their edges, once you have removed them from their protective antistatic bags.

system covers and bezel

To upgrade, remove, or replace most system components, you must first remove the covers from the system chassis. This section explains how to remove and replace the covers for both tower and rackmount configurations.

WARNING: Do not remove the system cover(s) without first turning the system off and unplugging the power cord from the outlet or Power Protection Device unless you are *only* replacing a hot-swappable fan. Always replace the cover(s) before turning the system on.

tower system

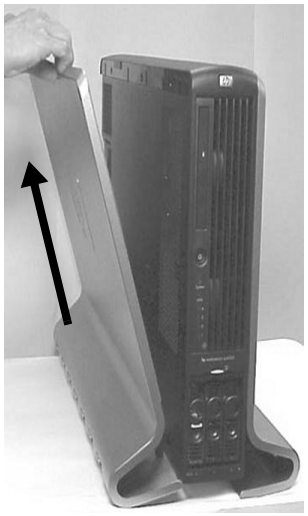
To access the internal components on a tower system, you must remove the plastic and metal left-side covers.

removing the side covers

1. Turn off the system and disconnect the power cable and all other cables from the back of the system.

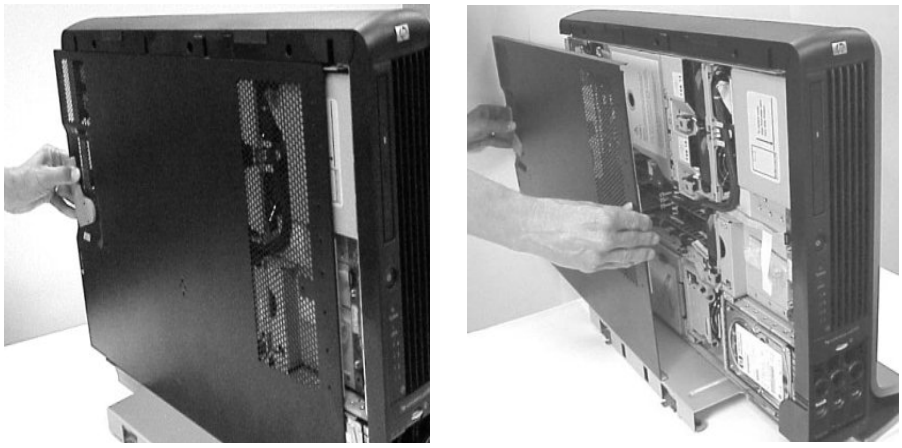
NOTE: If you are removing *only* a hot-swappable system fan, you can leave the system on and the power cables connected.

2. Remove the plastic cover.
   a. Grasp both indentations at the top of the side panel and pull outward.
   b. Lift the plastic cover off of the system chassis.



Removing the Left-side Panel

3. Remove the metal cover:
   a. Rotate the blue release handle to release the latch.
   b. Slide the cover toward the back of the chassis, then lift it off.



Removing the Metal Side Cover

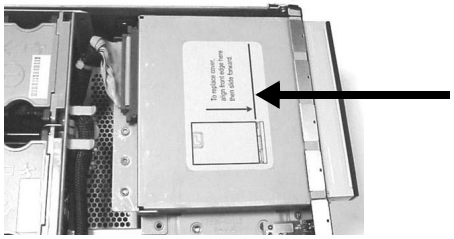
CAUTION: The zx6000 and rx2600 systems depend on the access panels for proper cooling of internal components. Operating the system with the side cover removed can cause the system to quickly overheat.

replacing the covers

1. Replace the metal cover:

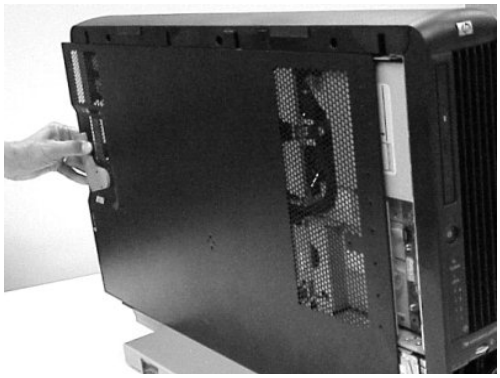
CAUTION: Secure any wires or cables in your system so they do not get cut or interfere with the replacement of the cover.

a. Align the front edge of the metal cover with the alignment mark on the optical drive bay.



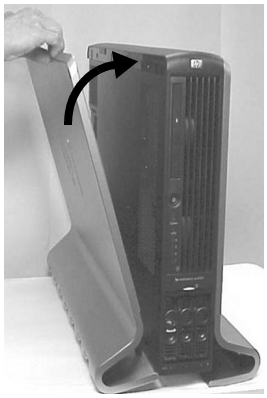
Metal Cover Alignment Mark

b. Place the metal cover on the chassis and slide it toward the front of the system until the blue release lever snaps in place.



Replacing the Metal Cover

2. Replace the plastic cover:
   a. Align the cover's mounting holes with the matching tabs on the system chassis.
   b. Close the cover until it snaps onto the system chassis.



Replacing the Plastic Cover

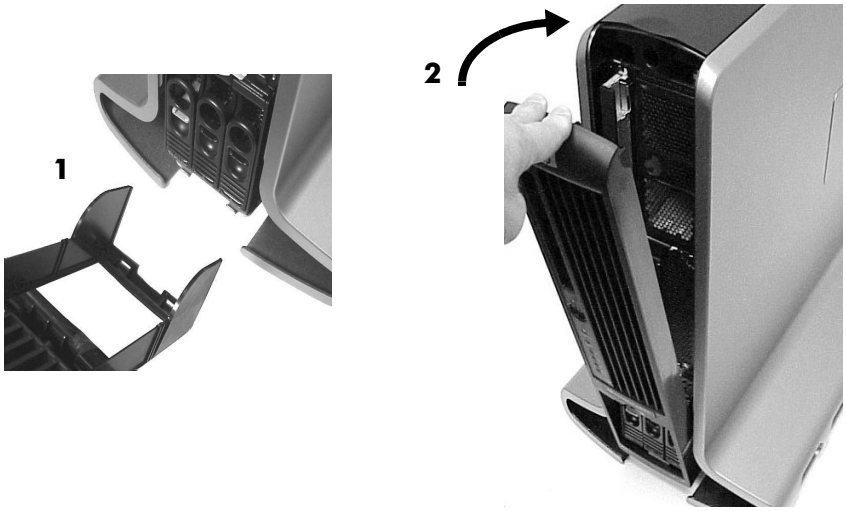
removing the front bezel

You must remove the front bezel from the chassis to upgrade, remove or replace the power supplies or the optical drive.

1. Firmly grasp the finger grip at the top of the bezel and pull forward until the bezel snaps open.
2. Lift the bezel off of the chassis.

replacing the front bezel

1. Insert the bezel's latches into the matching slots on the system chassis.
2. Close the bezel and push toward the front of the system until it snaps into place.



Aligning the Front Bezel

rack-mount system

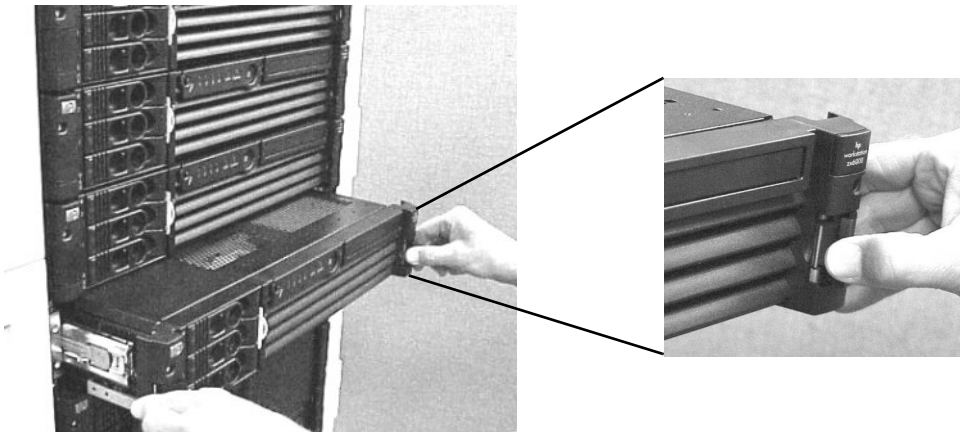
To access the internal components on a rack-mounted system, pull the system out on the rail guides and remove the metal cover.

removing the metal cover

1. Turn off the system and disconnect the power cable and all other cables from the back of the system.

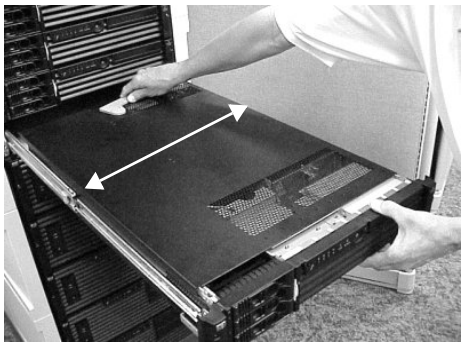
NOTE: If you are removing *only* a hot-swappable system fan, you can leave the system on and the power cables connected.

2. Release the rack latches by rotating them outward.



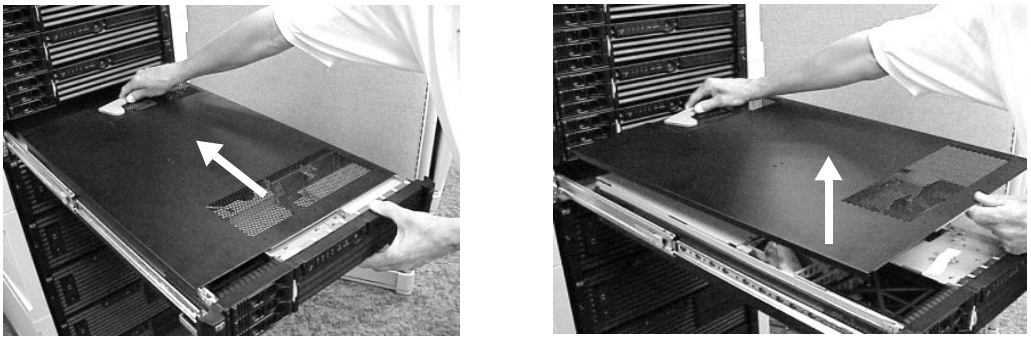
Releasing the Rack Latches

3. Slide the system out of the rack until the guide-rail release clips are visible.



Guide-rail Release Clips

4. Rotate the blue release lever toward the back of the system and slide the panel toward the back of the system.
5. Lift the panel off the system chassis.

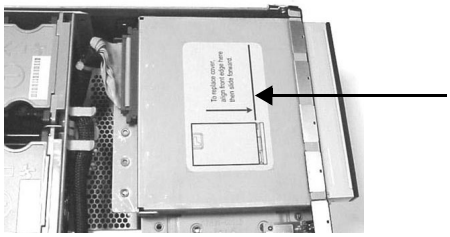


Removing the Metal Cover

replacing the cover

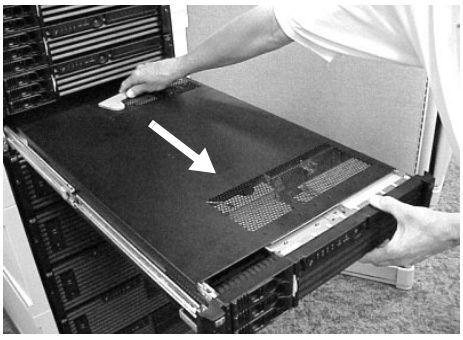
CAUTION: Secure any wires or cables in your system so they will not get cut or interfere with the replacement of the cover.

1. Align the front edge of the cover with the alignment mark on the optical drive bay.



Metal Cover Alignment Mark

2. Grasp the blue release lever and slide the cover toward the front of the system until the lever snaps into place.



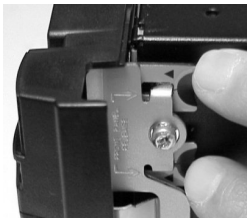
Replacing the Metal Cover

3. Slide the system into the rack enclosure and reconnect the power cables.

removing the front bezel

You must remove the front bezel from the chassis to upgrade, remove or replace the power supplies or the optical drive.

1. Press in on the retaining clips located on the right-side of the front panel.

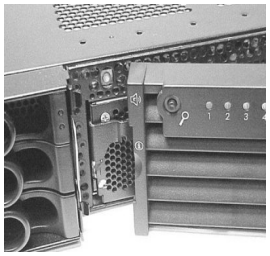


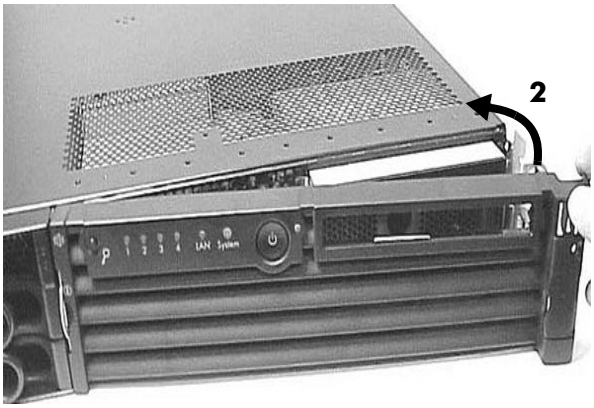
Retaining Clip

2. Rotate the front panel outward and lift if off the system chassis.

replacing the front bezel

1. Insert the bezel's latches into the matching slots on the system chassis.
2. Close the bezel and push toward the front of the system until it snaps into place.





Align the Front Bezel

removing/replacing hot-swap and hot-plug devices

The zx6000 and rx2600 have hard disk drives that are hot-pluggable and power supplies and fans that are hot-swappable. This section explains how to swap the following devices while the system is running:

- System fans
- Power supplies
- Hard drives

system fans

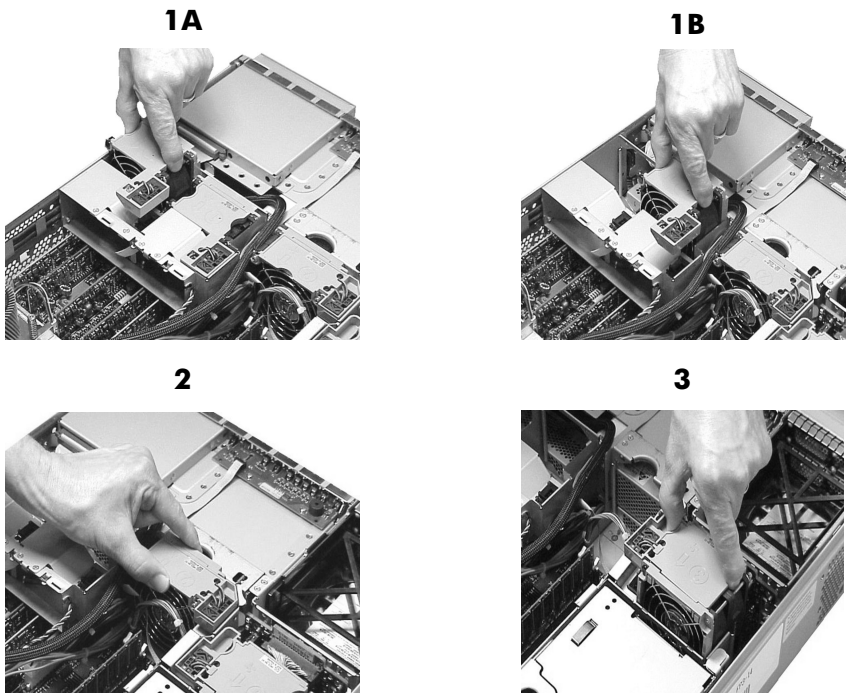
There are four system fans to keep the system cool when it is running. The system fans are hot-swappable, allowing you to replace a fan while the system is running.

CAUTION: When the system is running, the metal cover must be replaced within four minutes to prevent components from overheating.

removing a system fan

1. Remove the system cover(s).
2. Remove the fan.
   a. To remove:
      - fan 1A, 1B, 2 or 3 from a rack-mounted system, or
      - fan 3 from a tower system,

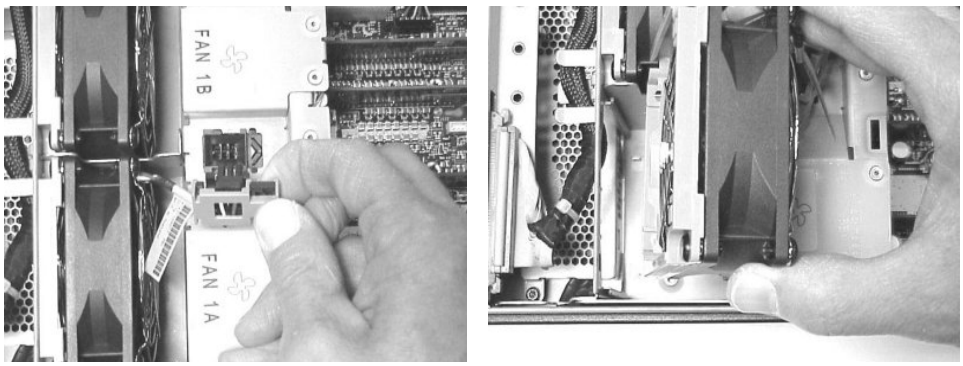
      grasp the appropriate fan and lift it out of the fan socket.



Removing System Fans

b. To remove *fan 1A, 1B, or 2* from a zx6000 tower system:

- Unplug the fan power connector, then
- Remove the fan from the system.



Removing Fans 1A, 1B or 2 from a Tower System

replacing a system fan

1. Grasp the replacement fan module and insert it into its fan socket.

CAUTION: Replace the metal cover within four minutes to prevent damage to the system components.

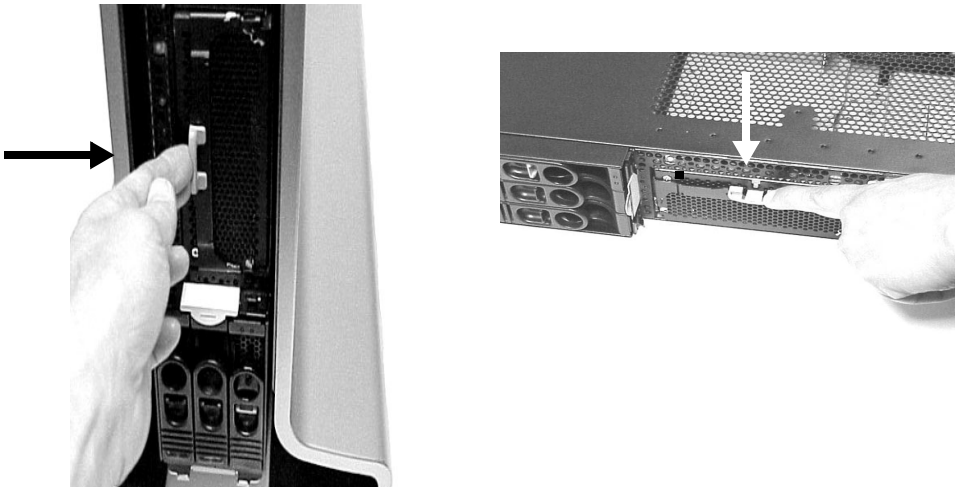
2. Verify that the fan has been properly installed by observing the LED signals on the front of the system for the appropriate fan information (see Chapter 3).

power supplies

The power supplies in the zx2600 and zx6000 systems are hot-swappable, that is if one power supply stops working or exhibits voltage problems, the remaining supply can support the system until the failed unit is replaced. A power supply can be removed and replaced without turning off the system on systems with two power supplies.

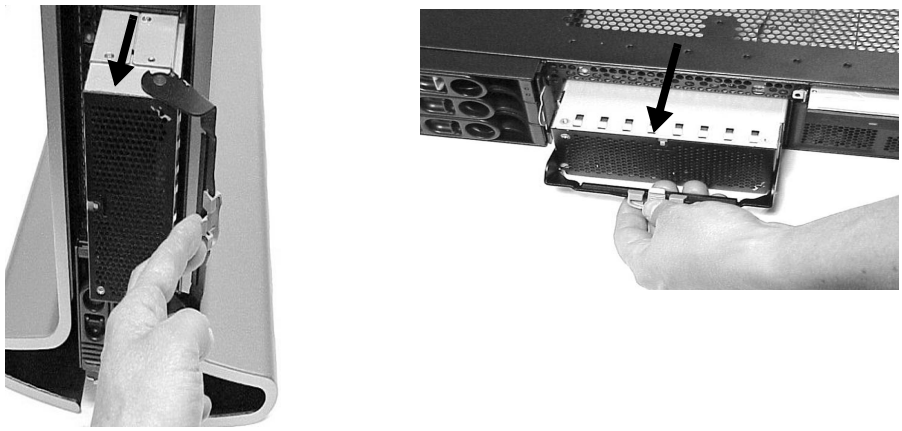
removing a power supply

1. Remove the front bezel from the system.
2. Press the power supply retaining clip to unlatch the power supply release lever.



Releasing the Power Supply Retaining Clip

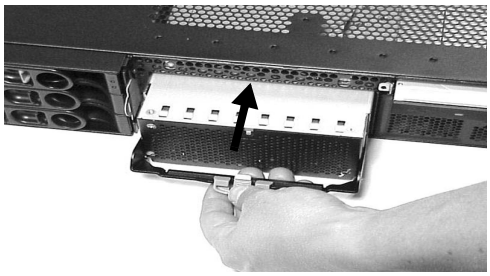
3. Depress the power supply release lever and slide the power supply out of the system.



Removing the Power Supply from the System

replacing a power supply

1. Remove the front bezel from the system and remove the defective power supply if you have not already done so.
2. Open the power supply release lever and slide the power supply into place.



3. Push in on the power supply release lever to lock the retaining clip in place.
4. Replace the front bezel.

hard drives

The zx6000 and rx2600 systems can support up to three hot-pluggable, Low-Voltage Differential (LVD) hard disk drives. These hard disk drives are 3.5-inch form factor, 10K and 15K RPM devices that connect to Ultra 320 Wide LVD (Low Voltage Differential) SCSI interfaces on the disk bay backplane.

There is a significant difference between the terms *hot-pluggable* and *hot-swappable*:

- Hot swapping happens at the device level; that is, a hot-swappable device manages insertion/removal on its own without assistance from operating system commands.
- The hot-plug process allows you to replace a defective disk drive in a high-availability system while it is running.

CAUTION: The disk drives in the zx6000 and rx2600 are not hot-swappable; they are merely hot-pluggable. A manual software procedure must be done in order to safely remove or insert disk drives while the system is running. To avoid damage to the hard drives:

- See the documentation provided with the drive for additional details on inserting/removing a disk drive.
- See your OS documentation for instructions on preparing the OS for inserting/removing a hard drive.

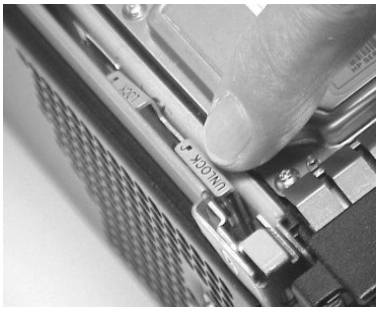
---

removing a hard drive

CAUTION: See your OS documentation for instructions on replacing hot-swap hard drives in your OS before beginning this procedure.

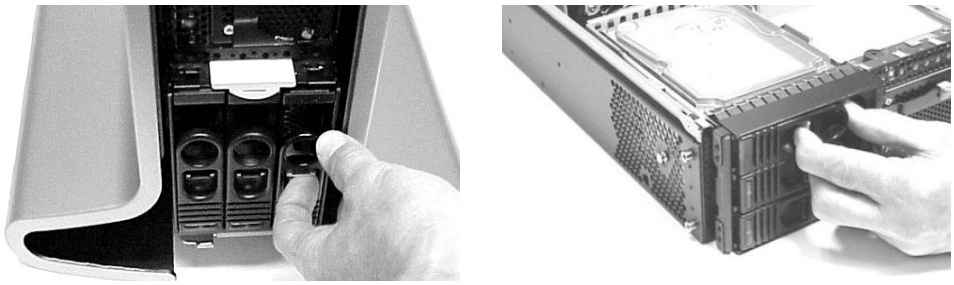
1. Shut down the OS.
2. Unlock the hard disk drives if you have locked them.
   a. Remove the cover(s).
   b. Press down on the **Unlock** lever.

CAUTION: If you try to remove a hard disk drive without unlocking it from the system, you will damage the hard drive bay.



Unlocking the Hard Drives

3. Squeeze inward on the colored release clip on the hard drive release lever.



Squeezing Inward on the Hard Drive Release Clip

4. Pull outward on the release lever to remove the drive from the system.

Removing the Hard Disk Drive from the System

replacing a hard drive

CAUTION: See your OS documentation for instructions on replacing hot-swap hard drives in your OS before beginning this procedure.

1. Shut down the OS.
2. Insert the hard disk drive into the drive bay from which you removed the drive and push inward on the release lever until the drive no long slides forward. You must leave the release lever in the open position, as shown, when you push the drive into the system.
3. Push in on the release lever to secure the drive in the bay and to ensure that the drive connector is seated properly.
4. Reset the system to the EFI Boot Maintenance Menu to rescan the hard drives.

   Use the EFI shell **map** command to verify that the new drive has successfully been installed.

removing/replacing internal components

To upgrade, remove, or replace most system components, you must first remove the covers from the system chassis.

WARNING: Do not remove the system cover(s) without first turning the system off and unplugging the power cord unless you are *only* replacing a hot-swappable system fan. Always replace the cover(s) before turning the workstation on.

airflow guides

The system has the following airflow guides:

- The **processor airflow guide** ensures that the proper volume of air for cooling the voltage regulator modules (VRMs), processor(s), and voltage regulator module(s) flows over these components.

  You must remove the processor airflow guide:

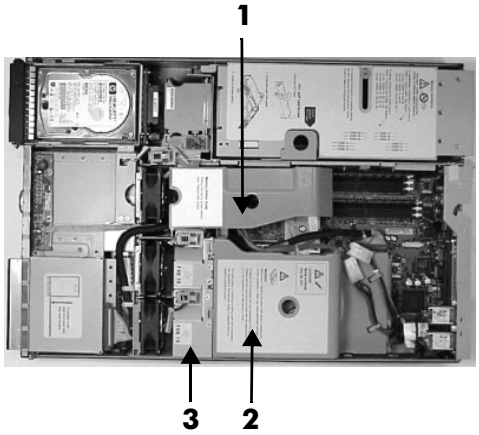
  - ❏ if it is damaged to the point that airflow across the processor(s) is restricted
  - ❏ to access to components under the airflow guide

- The **memory airflow guide** ensures that the proper volume of air flows over the memory cards to cool them.

  You must remove the memory airflow guide:

  - ❏ if it is damaged to the point that airflow across the memory cards is restricted
  - ❏ to access memory modules and sockets

NOTE: Air flows through the system from front to back.

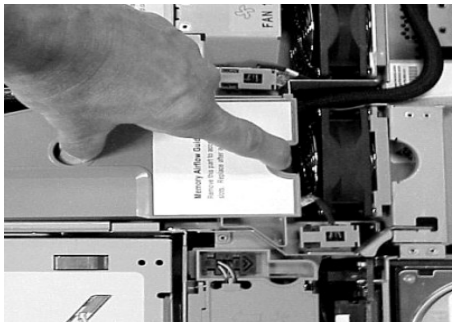


System Airflow Guides

1	Memory Airflow Guide
2	Processor Airflow Guide
3	Processor Airflow Guide Front Half

removing the memory airflow guide

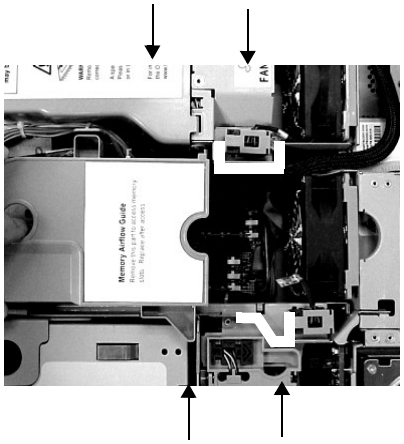
1. Turn off the system, disconnect all power cables and remove the cover(s).
2. Grasp the memory airflow guide and lift it out of the system.



Removing the Memory Airflow Guide

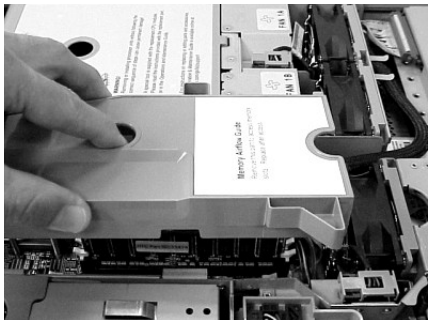
replacing the memory airflow guide

1. Align the guides on both sides of the airflow guide with the slots on the chassis.



Aligning the Memory Airflow Guide

2. Insert the memory airflow guide in the slots.



Replacing the Memory Airflow Guide

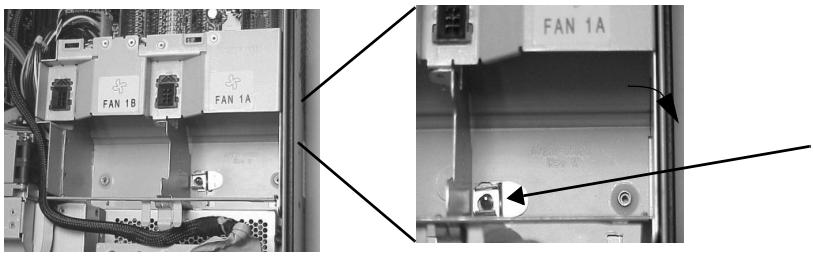
3. Replace the cover(s) and reconnect all of the power cables.

removing processor airflow guide

1. Turn off the system, disconnect all power and external cables and remove the system cover(s).
2. Remove the IDE cable and power module cables from the processor airflow guide cable clips.
3. Remove the main portion of the airflow guide:
   a. Hold the guide using the opening on top of the guide.
   b. At the same time, grasp the back end of the airflow guide and lift the guide out of the system.

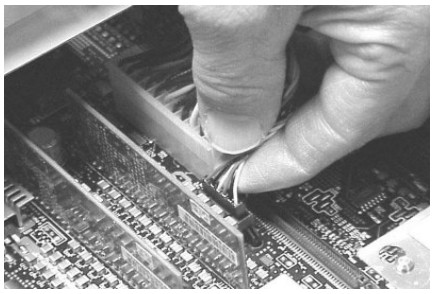
Removing the Main Portion of the Processor Airflow Guide

4. Remove the front portion of the airflow guide:
   a. Remove system fans 1A and 1B (page 2-12).
   b. Rotate the clip clockwise to release the latch.



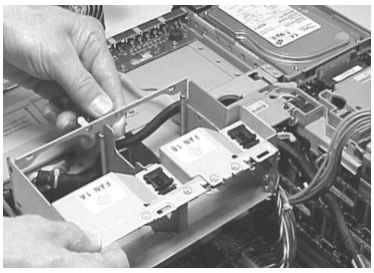
Airflow Guide Release Latch and Post

5. Disconnect the power cable connected to the guide from the system board.



Power Connector for Front Portion of Airflow Guide

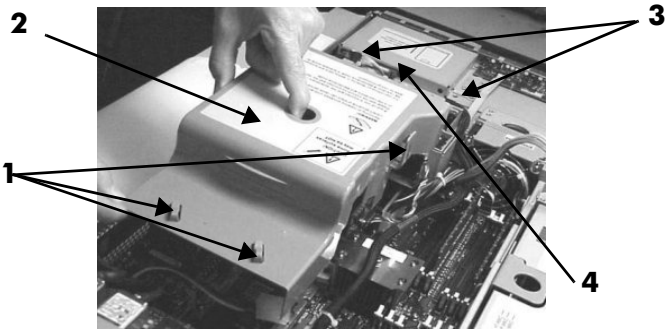
6. Lift the front portion of the airflow guide out of the system.



Removing the Front Portion of the Airflow Guide

replacing the processor airflow guide

1. Replace the front portion of the airflow guide:
   a. Align the release latch of the front half of the airflow guide over the release latch post and snap it in place.
   b. Connect power connector on the front portion of the guide to the connector on the system board.
   c. Replace system fans 1A and 1B (page 2-13).
2. Replace the main portion of the airflow guide:
   a. Hold the opening on top of the processor airflow guide.
   b. At the same time, grasp the back end of the airflow guide and insert the airflow guide into the system.
   c. Connect the power module cable and place the power and IDE cables in the cable clips.
   d. Insert the two airflow guide retaining tabs into the two slots on the front half of the airflow guide.



Replacing the Processor Airflow Guide

1	Cable clips
2	Main portion of airflow guide
3	Retainer clips
4	Front portion of airflow guide

3. Replace the system cover(s). Reconnect cables.

memory

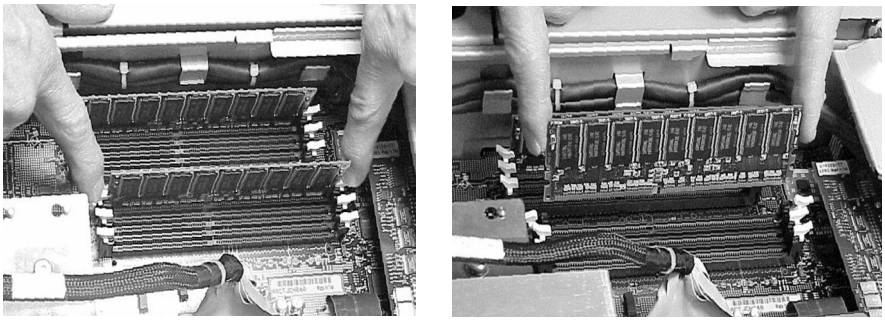
Your system has 12 memory sockets for installing DDR SDRAM memory modules. These memory modules can either be 256 MB, 512 MB, 1 GB or 2 GB. The system supports combinations from 512 MB (zx6000) or 1 GB (rx2600) up to 24 GB. For HP approved memory modules, see Appendix C.

removing memory modules

1. Turn off the system, disconnect power, LAN and telecommunications cables, and remove the cover(s).

CAUTION: To ensure that memory modules are not damaged during removal or installation, turn off the workstation and unplug the power cord from the AC power outlet. Wait until the LED on the back of the power supply turns off before removing memory.

2. Press down on the memory module retainer clips and lift the module out of its memory socket.



Memory Module Retainer Clips

3. If the removed memory is functional, store it in a static-free container for future use.

replacing memory modules

Memory modules must be loaded in the correct order:

- In the zx6000 workstation, DIMMs must be installed as ordered pairs of equal size. For example, the DIMM in socket 0A must match 0B, 1A must match 1B, and so forth.
- In the rx2600 server, DIMMs must be installed in matched quads. Two matched memory card pairs of equal size (that is, four identical DIMMs) must be installed, one pair per memory cell, as listed below:
  - 0A, 0B and 1A, 1B must be matched pairs of equal size
  - 2A, 2B and 3A, 3B must be matched pairs of equal size
  - 4A, 4B and 5A, 5B must be matched pairs of equal size

  This loading order must be used to enable chip spare functionality, available only on rx2600 systems. For more information, see Appendix B.

NOTE: DIMMs match if they have the same HP part number.

- Module sizes can be mixed, as long as DIMMs in each pair (zx6000) or quad (rx2600) match. For example:
  - On zx6000 workstations, it is acceptable to load a pair of 256 MB DIMMs in sockets 0A and 0B, and a pair of 1 GB DIMMs in sockets 1A and 1B.
  - On rx26000 servers, it is acceptable to load a quad of 256 MB DIMMs in sockets 0A, 0B, 1A and 1B, and a quad of 1 GB DIMMs in sockets 2A, 2B, 3A and 3B.

Location of PCI/AGP card cage (reference point)			
Loading Order	**Memory Cell 0**	**Memory Cell 1**	**Loading Order**
1st	DIMM 0B	DIMM 1B	2nd
5th	DIMM 4B	DIMM 5B	6th
3rd	DIMM 2B	DIMM 3B	4th
1st	DIMM 0A	DIMM 1A	2nd
5th	DIMM 4A	DIMM 5A	6th
3rd	DIMM 2A	DIMM 3A	4th

Memory Loading Order

To install or replace a memory module:

1. Turn off the system, disconnect all cables, and remove the system cover(s).

CAUTION: To ensure that memory modules are not damaged during removal or installation, power off the workstation and unplug the power cord from the AC power outlet. Wait until the LED on the back of the power supply turns off before removing or installing memory.

2. Holding the memory module by its left and right edges, insert the module into the socket.

   The memory modules are keyed and can only be inserted in one direction. When the module is correctly seated, the retainer clips will return to their fully upright position. Snap the clips firmly into place to ensure that the DIMMs are seated properly.

3. Replace the system cover(s), reconnect all cables and turn on the system.
4. Execute **info mem** at the EFI shell prompt to verify correct memory configuration.

accessory and graphics cards

The zx6000 has the following accessory card sockets:

- Three 64-bit, 133 MHz PCI-X card sockets
- One AGP Pro 4×, 1.5V socket

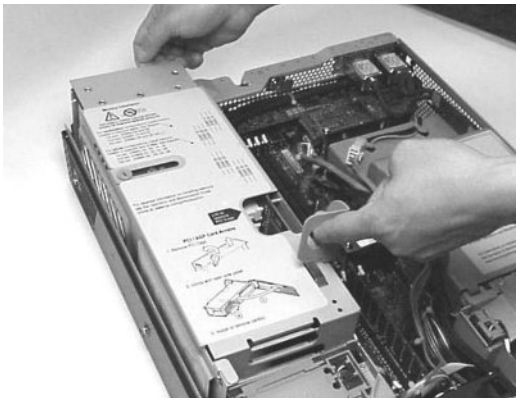
The rx2600 has the following accessory card sockets:

- Four 64-bit, 133 MHz PCI-X card sockets

Accessory cards are installed in a removable PCI/AGP cage. This section explains how to access the PCI/AGP cage, as well as how to remove and install accessory cards.

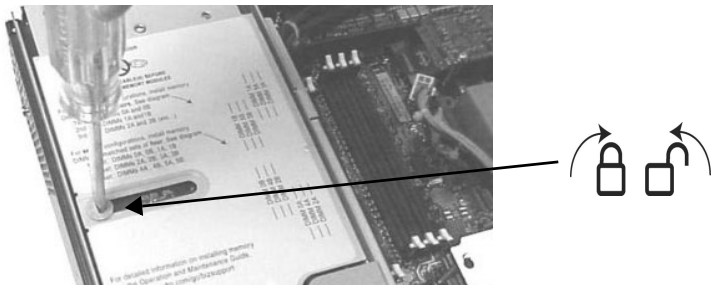
removing an accessory or graphics card

1. Turn off system, disconnect all power and external cables, and remove the system cover(s).
2. Lift up on the PCI/AGP cage release lever and the back edge of the PCI/AGP cage and lift the PCI/AGP cage out of the system.



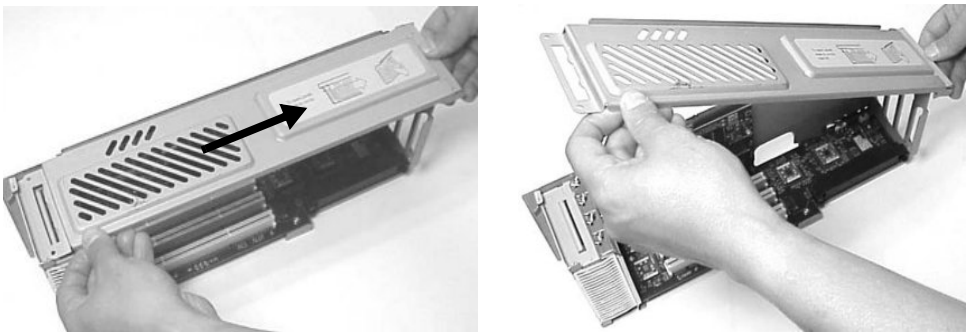
Removing the PCI/AGP Cage

NOTE: If you are removing an AGP card, you may also need to remove the AGP shipment retainer. Turn the shipment retainer counterclockwise and lift it out of the system.



Plastic AGP Card Shipment Retainer

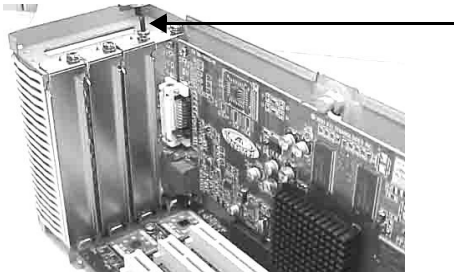
3. Grasp the PCI/AGP cage cover and slide it away from the bulkhead end of the cage, then lift the cover off.



Removing the PCI/AGP Cage Cover

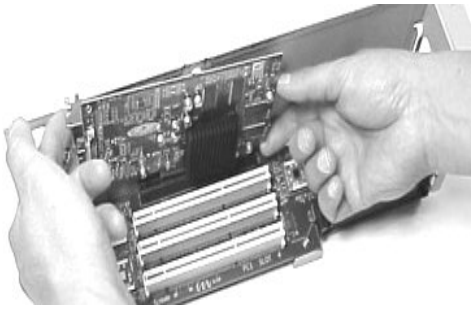
4. Unscrew the bulkhead screw that holds the accessory card in place.

NOTE: If you are removing an audio card, unplug the audio cable from the card.



Removing the Bulkhead Screw

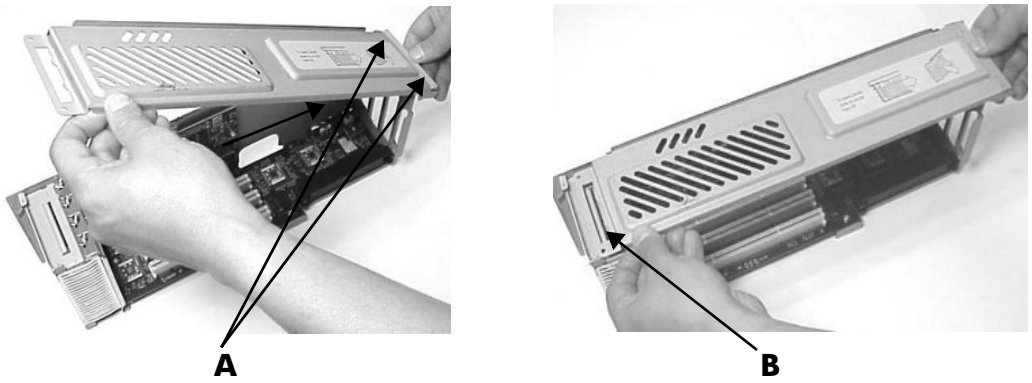
5. Grasp the bulkhead end of the card and the opposite edge and lift the card out of the socket. If you are not installing a new card in the same socket, install a blank in the socket.



Removing the Accessory Card

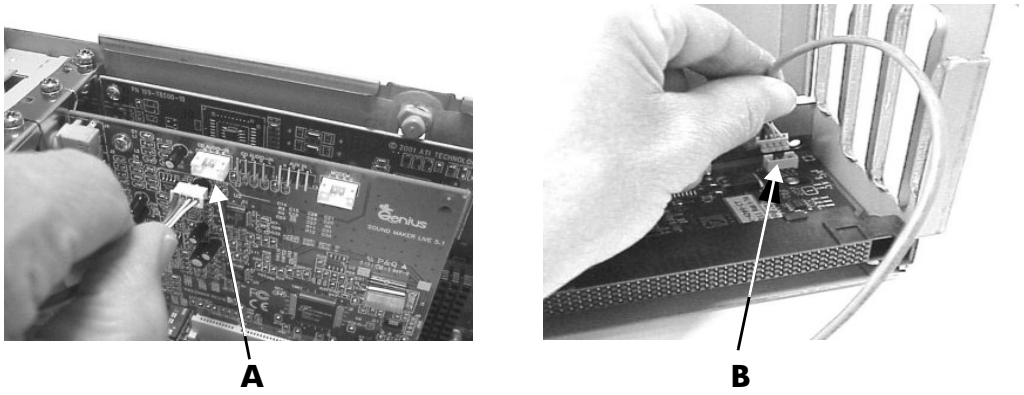
replacing an accessory or graphics card

1. Remove the PCI/AGP cage (page 2-24).
2. Remove any bulkhead blank (if present) from the socket to be used.
3. Insert the card:
   a. Grasp the bulkhead end of the card and its opposite edge and insert the card into the socket. If you are replacing a card, put the new card into the same socket from which you removed the old card.
   b. Secure the card by attaching the screw that was used to hold the blank in place.
4. Attach the cover to the cage:
   a. Slide the retaining tabs on the fan end of the cover into the retaining slots and press the cover down on the accessory board(s).
   b. Slide the tab at the bulkhead end of cage (A) into the socket on the cover (B).



Replacing the PCI/AGP Cage Board Cover

5. If you are replacing an audio card, attach the audio cable to the card (A) and to the connector on the PCI/AGP backplane (B).



Connecting the Audio Cable

6. Place the PCI/AGP cage back in the system and secure it:
   a. Align the PCI/AGP cage in the system, then depress the release lever to lock the cage in place.
   b. If you have an AGP card installed, secure the plastic shipment retainer.
7. Replace the cover(s), reconnect all of the power and external cables and turn on the system.
8. Run **info io** at the EFI shell prompt to verify that new cards have been correctly installed.

NOTE: Ensure that the audio cable is properly installed by connecting headphones to the audio OUT jack on the audio card and playing audio media in the optical device.

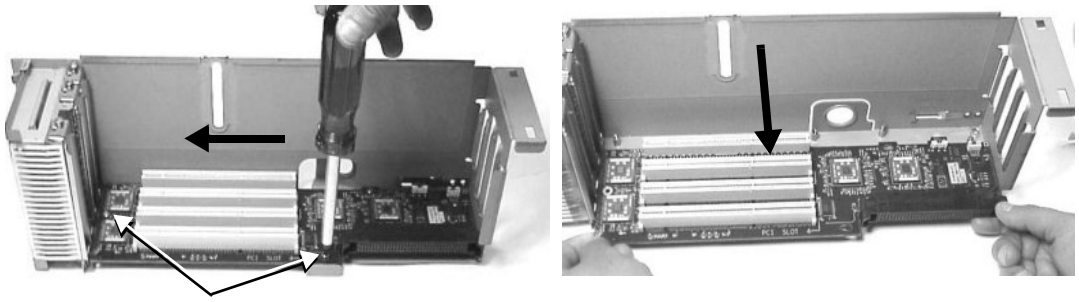
PCI/AGP backplane

removing the PCI/AGP backplane

The backplane for the zx6000 includes one AGP card socket and three PCI card sockets. The rx2600 system backplane is called the PCI/AGP backplane. The removal process is the same for both.

1. Remove all accessory and graphics cards.
2. Unscrew the backplane mounting screws and slide the backplane board toward the bulkhead end of the PCI/AGP cage. This unlocks the backplane from its standoffs.
3. Lift the backplane over the top of the standoffs and slide it out of the cage.

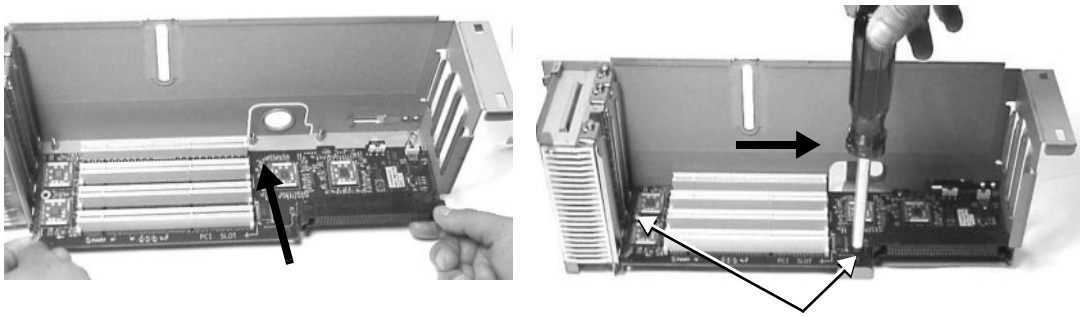
CAUTION: Be careful not to damage the intrusion switch.



Removing the PCI/AGP backplane (rx2600 shown)

replacing the PCI/AGP backplane

1. Place the backplane in the cage by aligning the cage standoffs with the holes on the backplane and slide it into place.
2. Secure the PCI/AGP backplane by screwing in its mounting screws.



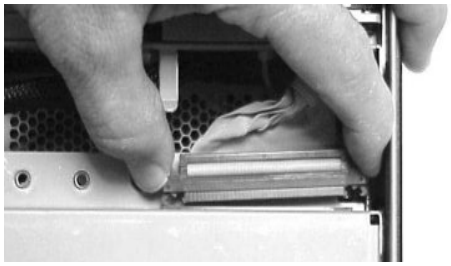
Replacing the PCI/AGP backplane (rx2600 shown)

3. Replace any accessory and graphics cards.

optical drives

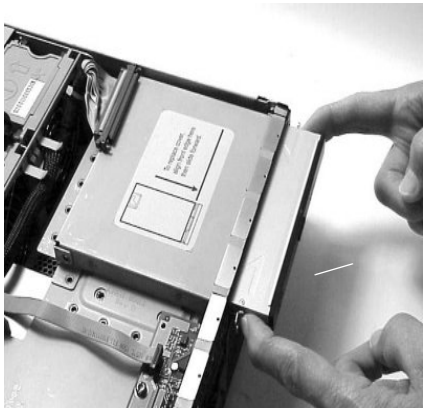
removing an optical drive

1. Turn off the system, disconnect all power and external cables, and remove the system cover(s).
2. Disconnect the IDE cable from the back of the optical drive. Pull back on the retaining clips on the connector cable to release the cable.



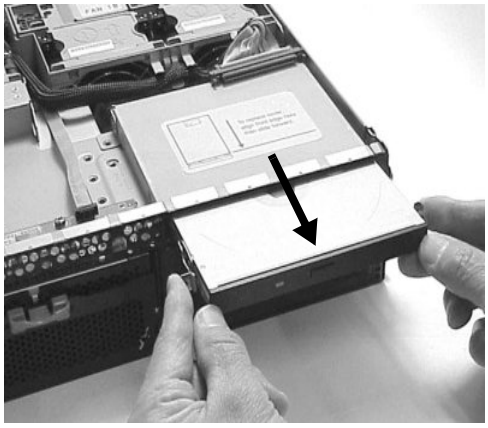
Disconnecting the Optical Drive IDE Cable

3. Press the small retaining clips on both sides of the optical drive inward to release them.



Releasing the Optical Drive Retaining Clips

4. Slide the optical drive out of the optical drive bay.

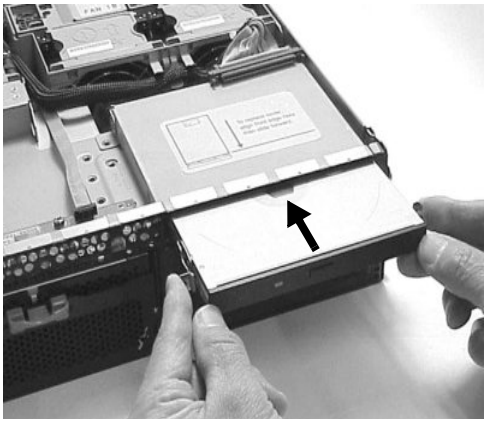


Removing the Optical Drive

replacing an optical drive

1. Slide the optical drive into the drive bay until it stops sliding and the retaining clips on both sides of the optical drive snap into place.

   Grasp both sides of the drive without pressing in on the retaining clips and pull outward. If you can pull outward on the optical drive without it sliding out of its bay, the optical drive is securely in place.



Replacing the Optical Drive

2. Connect the IDE cable on the back of the optical drive.
3. Replace the system cover(s), reconnect all of the power and external cables and turn on the system.
4. Run **info io** at the EFI shell to verify that the optical drive has been properly installed.

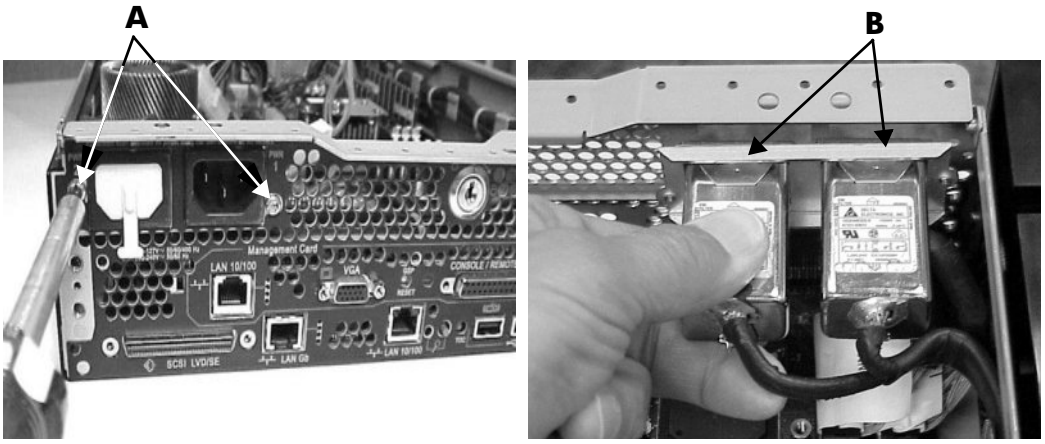
management processor card

The optional Management Processor (MP) card includes these ports:

- 10/100 Management LAN port
- 15-pin VGA port
- 25-pin serial port

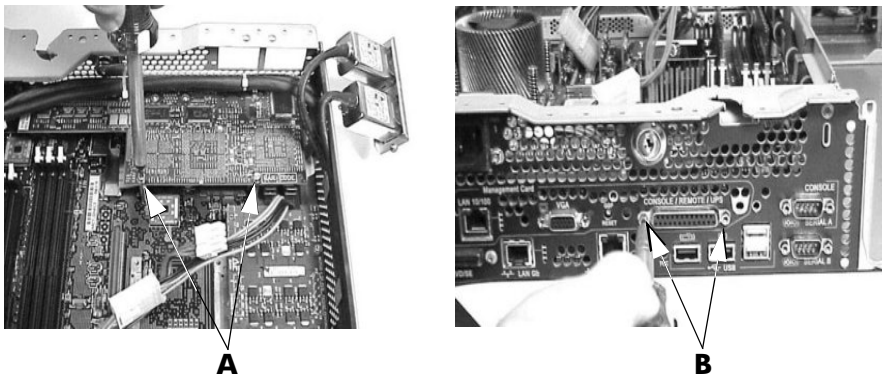
removing the MP card

1. Record the network settings from your MP card before beginning this task. See "Management Processor (MP)" on page 3-22.
2. Turn off the system, disconnect all power and external cables and remove the cover(s).
3. Unscrew the two power connector mounting screws (A) and remove the power connector plate (B) from the back of the system.



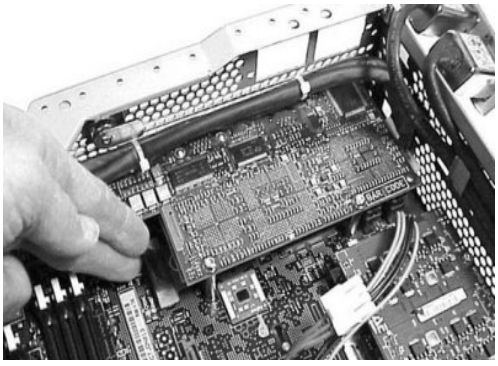
Removing the Power Connectors

4. Unscrew the two mounting screws that connect the Management Card to the internal chassis post (A) and the two external mounting screws that are located on both sides of the 25-pin serial connector (B).



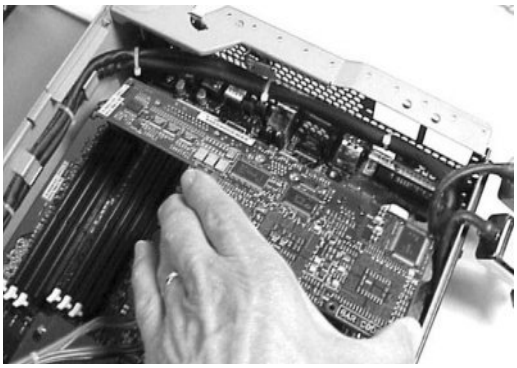
Unscrew the MP Card Mounting Screws

5. Disconnect the MP card connector.



Disconnecting the MP Card Connector

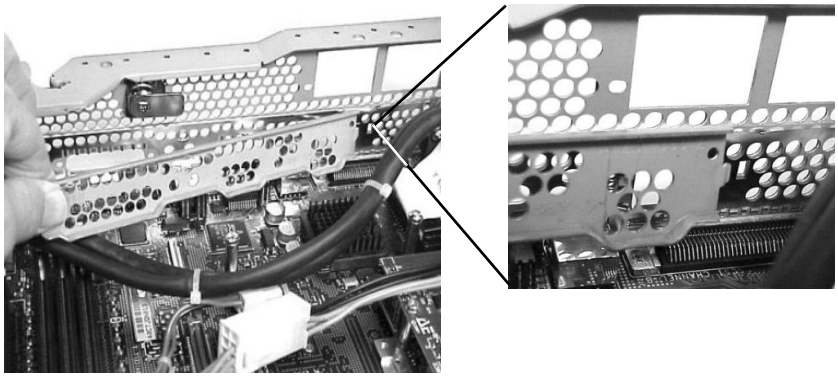
6. Remove the MP card from the system by grasping it by its edges.



Removing the Card

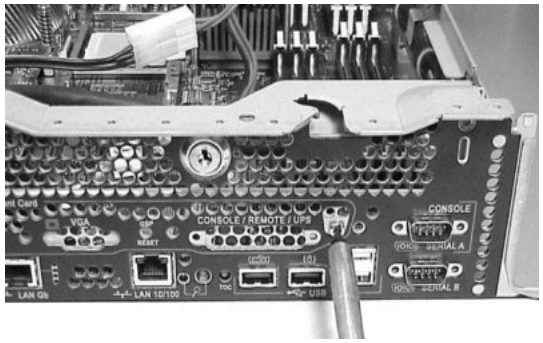
7. Replace the MP card blank, if available, on the chassis. This blank is used to fill the holes left by the 10/100 Management LAN, 15-pin VGA and 25-pin serial connectors.

a. Insert the blank retaining tab into the socket on the chassis.



Aligning the MP Card Blank

b. Push the MP card blank against the inside of the chassis and screw in the blank's mounting screw on the external connector side of the system's chassis.



Securing the MP Card Blank

8. Replace the cover (s) and reconnect the power and external cables.

replacing/installing the MP card

1. Turn off the system, disconnect all power and external cables and remove the system cover(s).
2. If you are installing a new card, remove the MP card blank:
   c. Unscrew the mounting screw for the MP card blank, located on the external connector side of the system chassis.
   d. Remove the blank retaining tab out of its socket on the system chassis and remove the blank from the system.
3. Insert the MP card in the system:
   a. Grasp its edges and place it on the two MP card posts.
   b. Push the 10/100 Management LAN, 15-pin VGA and 25-pin serial connectors through their openings on the back of the system.

4. Connect the MP card:
   a. Connect the MP card cable to its connector on the system board.
   b. Screw in the two mounting screws that connect the MP card to the internal chassis post.
   c. Screw in the two external mounting screws that are located on both sides of the 25-pin serial connector.
   d. Replace the two power connectors.
5. Replace the system cover(s) and reconnect the power and external cables.

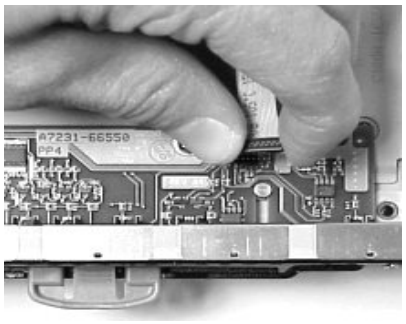
LED status panel

The LED status panel card contains the system LEDs and the e-buzzer.

CAUTION: Some system settings are saved to the LED status panel. If you are replacing **both** the LED status panel and the system board, they must be replaced one at a time to avoid loss of system settings. First replace one component, then turn on the system and boot to the EFI prompt. After confirming that the first component has been replaced successfully, shut down the system and replace the second component.

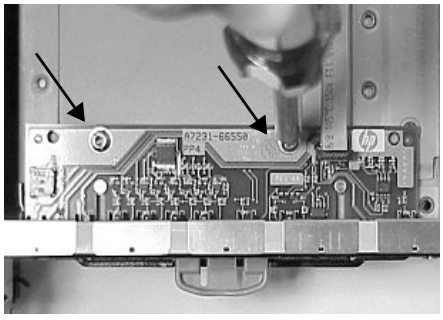
removing the LED status panel

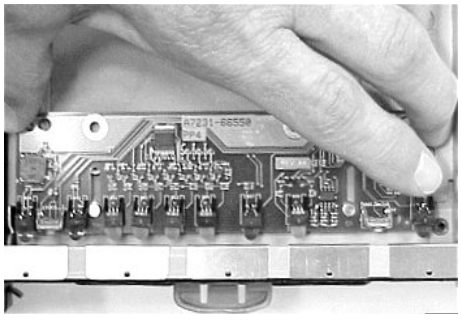
1. Turn off the system, disconnect all power cables, and remove the system cover(s).
2. Disconnect the LED status panel's controller cable.



Disconnect the LED Status Card Controller Cable

3. Unscrew the two LED status panel mounting screws and remove the panel.





Remove the LED Status Card

replacing the LED status panel

1. Replace the LED status panel in the system and screw in the two LED status panel mounting screws.
2. Connect the LED status panel controller cable.
3. Replace the system cover(s) and reconnect all power cables. Turn on the system and verify that the system and power LEDs light up.
4. Copy a valid UUID to the new status panel. To do this, press Y at this prompt during start up:

```
EFI version 1.10 [14.57]
Build flags: EFI64 Running on Intel(R) Itanium Processor
EFI 1.10 IA-64 FOUNDATION XPEAK 1.22 [Tue May 14 16:37:12 2002] - HP
Secondary UUID is undefined
Do you want to copy the valid UUID to the new board?
(y/[n])
```

   A message similar to this appears:

```
EFI version 1.10 [14.57]
Build flags: EFI64 Running on Intel(R) Itanium Processor
EFI 1.10 IA-64 FOUNDATION XPEAK 1.22 [Tue May 14 16:37:12 2002] - HP
Secondary UUID is undefined
Do you want to copy the valid UUID to the new board?
(y/[n]) 2 0 0x0002F2 0x0000000000000000 UUID was set to valid value
```

   This indicates that you have successfully assigned the system board UUID to the status panel.

NOTE: If resetting the UUID does not work successfully, contact your HP support representative.

---

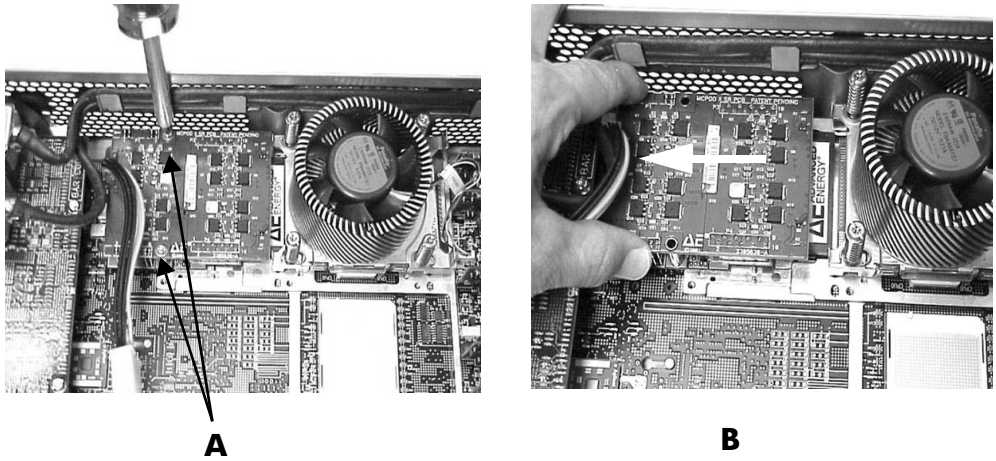
processor

If there are two processors on your system board, the procedure for removing them is the same.

CAUTION: You must **disconnect all power** and follow the correct sequence of steps provided in this section to avoid serious damage to the system.

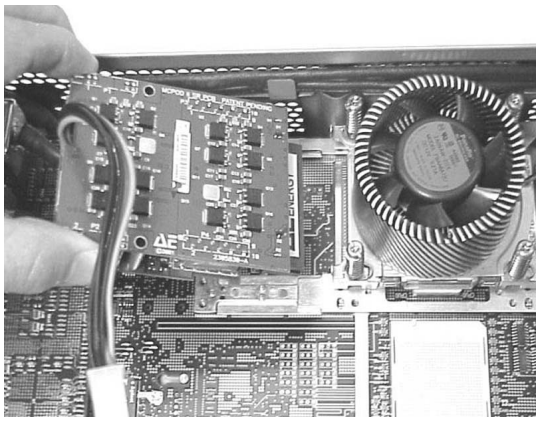
removing a processor

1. Turn off the system, **disconnect all power** and external cables and remove the system cover(s).
2. Remove the processor airflow guide and cables.
3. Unscrew the power module mounting screws (A) and disconnect the module from its processor by sliding it toward the back of the system chassis (B).



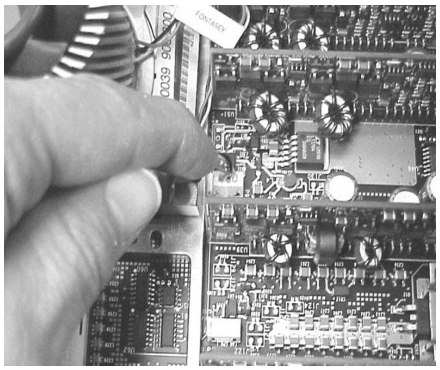
Disconnect the Power Module from its Processor

4. Remove the power module from the system.



Remove the Power Module from the System

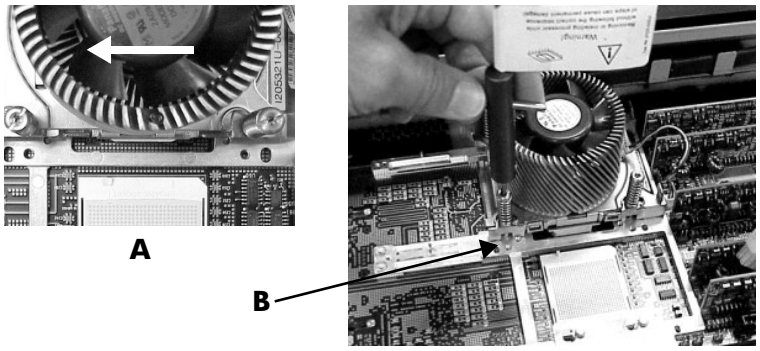
5. Disconnect the power cable for the processor turbo fan.



Disconnect the Power Cable for the Processor Turbo Fan

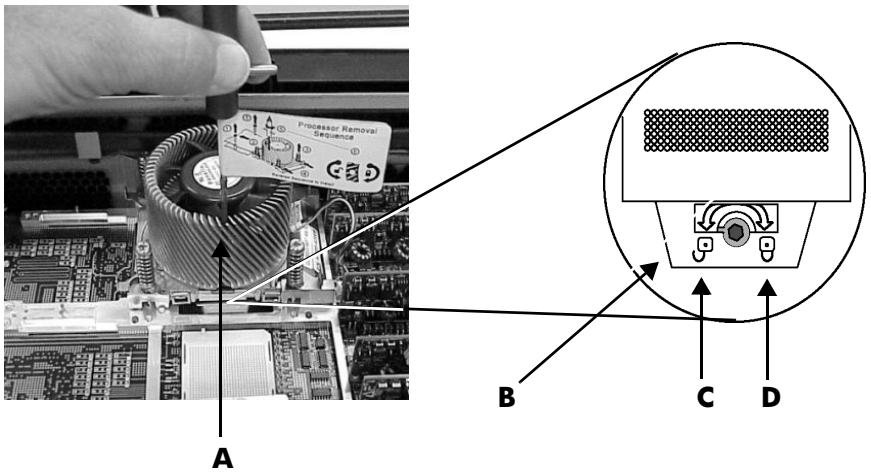
6. Unscrew the four heatsink captive screws using the special processor tool that was shipped with your replacement processor.

   ❏ Slide the sequencing retainer plate toward the back of the system (A) to open the hole in the edge of the turbo fan heatsink for insertion of the special processor tool (B) into the processor locking mechanism.



Unscrew the Turbo Fan Heatsink Captive Screws

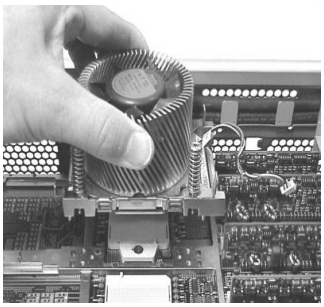
7. Unlock the processor locking mechanism using the special processor tool shipped with your replacement processor assembly.
   - ❏ Insert the tool into the hole that runs down through the edge of the turbo fan heatsink and rotate the special processor tool 180 degrees counterclockwise.



Unlocking the Processor Locking Mechanism with the Special Processor Tool

A	Insert special processor tool here
B	Special processor tool rotates this lock underneath the heat sink
C	**Unlocked**
D	Locked

8. Remove the turbo fan heatsink and processor from the system.

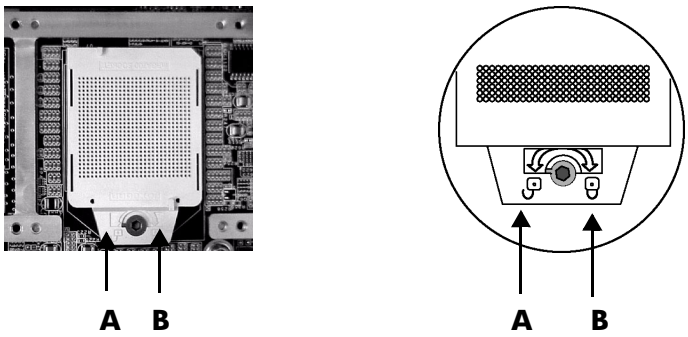


Removing the Turbo Fan Heatsink and the Processor

replacing or installing a processor

You **must** have a processor in socket CPU0 before installing one in socket CPU1.

1. If you are installing a second processor, turn off the system, disconnect all power and external cables and remove the system cover(s).
2. If you are replacing a processor, remove the old processor.
3. Ensure that the processor locking mechanism is rotated into the unlocked position.

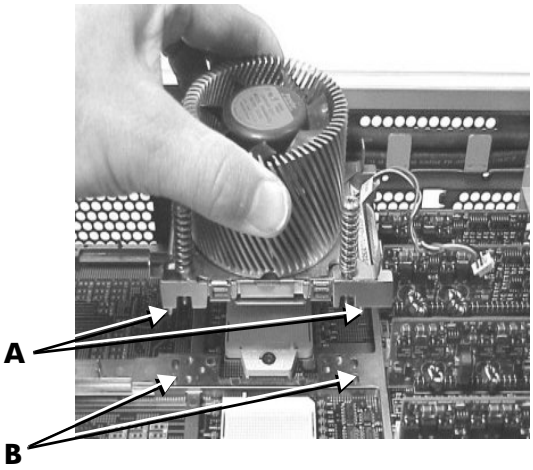


Processor Locking Mechanism

A	**Unlocked**
B	Locked

4. Check to ensure that no processor pin is bent.

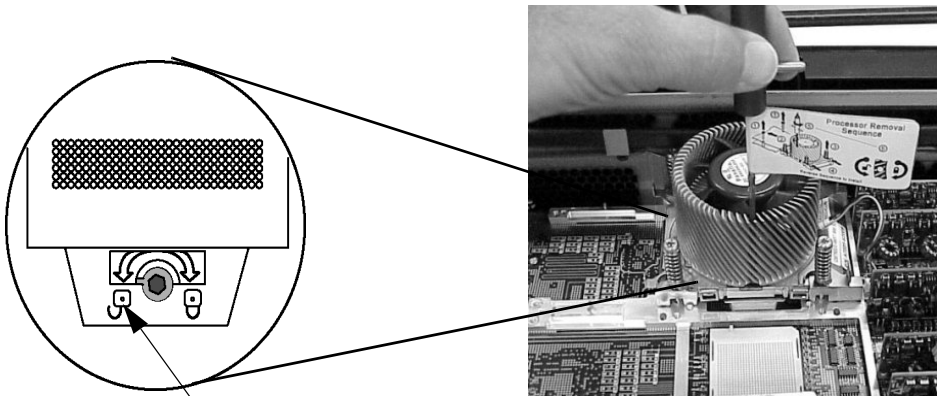
5. Use the four locator posts on the heatsink and the turbo fan power cable to properly align the fan and processor assembly on the system board. The four locator posts will fit in locator holes on the system board processor mount. The turbo fan power cable must be positioned so that it is located on the side of the heatsink that faces the front of the system.



Aligning the Turbo Fan and Processor Assembly

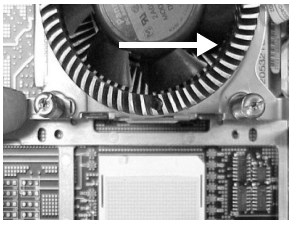
A	Locator posts
B	Locator holes

6. Use the special processor tool shipped with your replacement processor assembly to lock the processor in place on the system board. To do this, insert the special processor tool into the hole that runs down the side of the heatsink and rotate it clockwise 180 degrees.



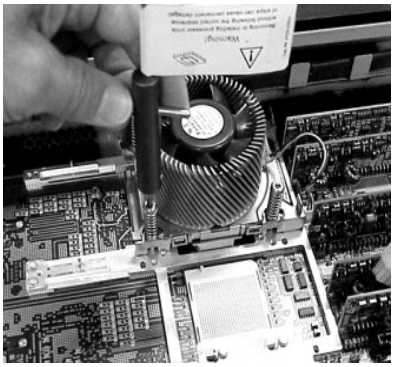
Locking the Processor in Place

7. Slide the sequencing retainer plate toward the front of the system.



Sliding Sequencer Retainer

8. Screw in the four heatsink captive screws.



Screw in the Heatsink and Processor Screws

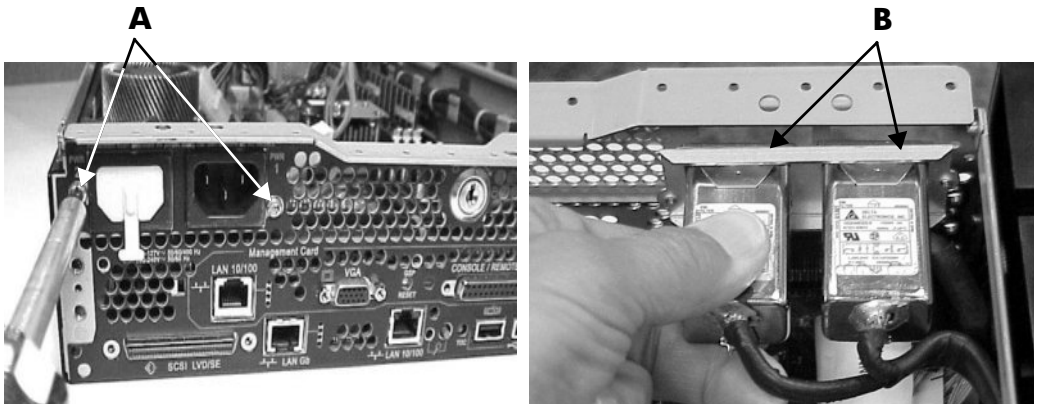
9. Connect the power cable for the processor turbo fan to its connector on the system board.
10. Slide the power module on the system board metal mounting bracket so that the power module connector connects with its connector on the processor. Align the two mounting screw holes on the power module with their screw holes on the system board's metal mounting bracket. Screw in the power module mounting screws.
11. Replace the processor airflow guide and connect the power module power cable and turn on the system.
12. Run **info cpu** at the EFI shell prompt to verify that the processor works.

system board

CAUTION: Some system settings are saved to the LED status panel. If you are replacing **both** the LED status panel and the system board, they must be replaced one at a time to avoid loss of system settings. First replace one component, then turn on the system and boot to the EFI prompt. After confirming that the first component has been replaced successfully, shut down the system and replace the second component.

removing the system board

1. Turn off the system, disconnect all power and external cables and remove the system cover(s).
2. Remove these components from the system board:
   - ❏ Memory
   - ❏ System fans
   - ❏ PCI/AGP card cage
   - ❏ Processor airflow guide and processor(s)
   - ❏ Management card (if installed)
3. If the system does **not** have a Management card installed, remove the power connector plate.
   a. Unscrew the two power connector mounting screws on the back of the system.
   b. Reach inside the system to remove the power connectors from the socket. The power connectors will still be connected to their cables.



Removing the Power Connector Plate

4. Unscrew the six backplane system board mounting screws that connect the system board to the rear of the system chassis.

Six System Board Mounting Screws

5. Disconnect all cables that are connected to the system board. To help with re-assembly, make note of which cables were connected to which connector.

NOTE: To access the three power cables near the PCI/AGP cage, you must lift up the connector bridge for the PCI/AGP cage fan.

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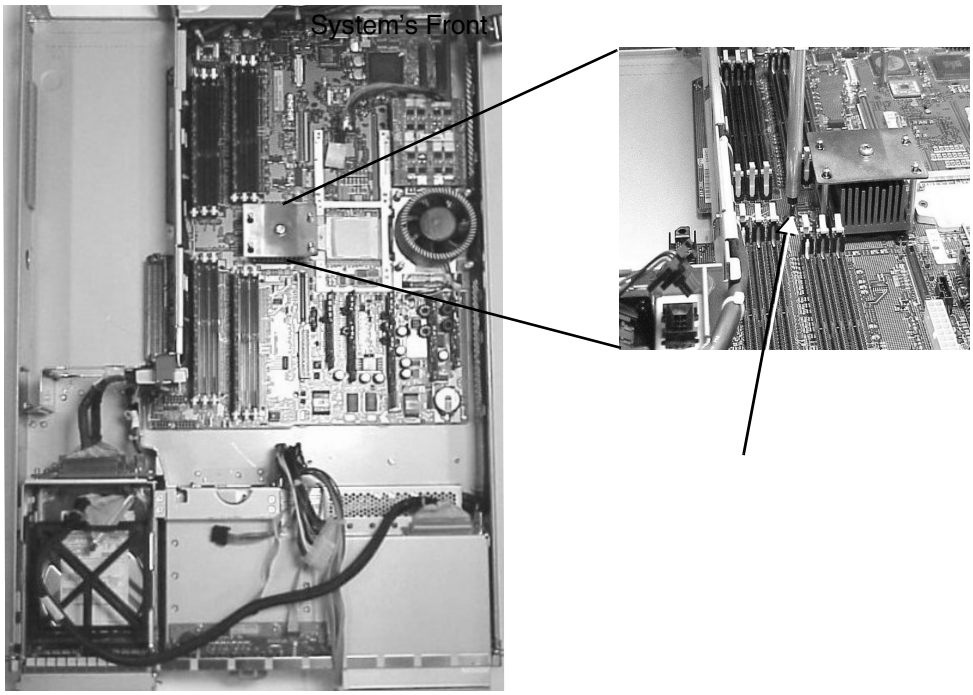
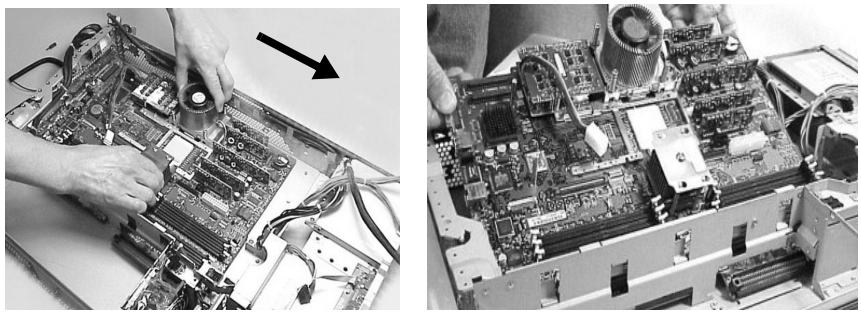
6. Unscrew the system board mounting screw. A screw symbol is adjacent to the mounting screw.



Unscrew the System Board Mounting Screw

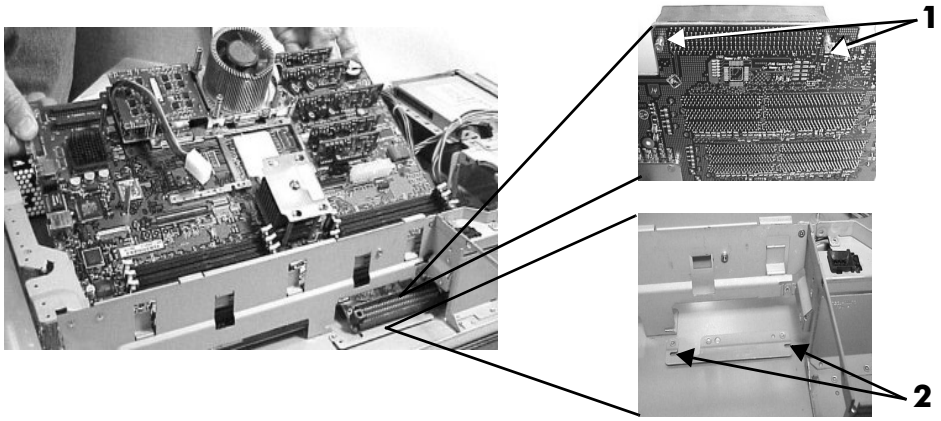
7. Remove the system board:
   a. Grasp the memory controller chip heatsink and the processor heatsink and slide the system board toward the front of the system. This releases the system board from its chassis standoffs.
   b. Lift up the processor side of the system board and slide it free of the PCI/AGP cage bay.



Remove the System Board from the System

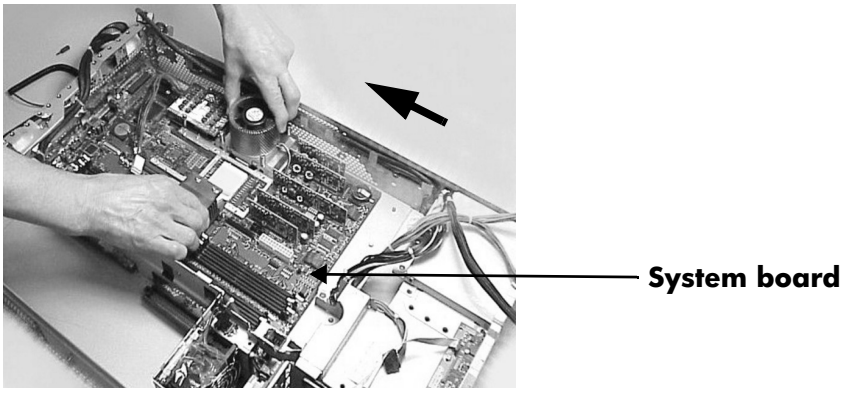
replacing the system board

1. Remove the old system board.
2. Grasp the new system board by its edges and carefully align it in the system:
   - ❏ Angle the board to allow the PCI connector to slide into the PCI/AGP cage bay area.
   - ❏ Align the system board keyholes with their corresponding standoffs on the chassis.
   - ❏ Slide the PCI connector posts 1 on the system board into their slots 2 on the system chassis.



Align the System Board in the System

3. Slide the system board back toward the rear of the system to secure the system board on its standoffs.



Secure the System Board on its Standoffs

4. Screw in the system board mounting screw.
5. Connect all cables to their appropriate connectors on the system board.
6. Screw in the six rear backplane system board mounting screws.
7. If you system does not have a Management Card, replace the power connectors in their slots on the back of the system and screw in the power connector mounting screws.

8. Replace the following system components:
   - ❏ Management card
   - ❏ Processor airflow guide
   - ❏ System fans
   - ❏ PCI/AGP card cage
   - ❏ Memory
9. Replace the system cover(s), reconnect all of the power and external cables and turn on the system.
10. Run **info cpu** at the EFI shell prompt to verify that the processor works.
11. Review the system configuration in the EFI shell and reconfigure settings as necessary.

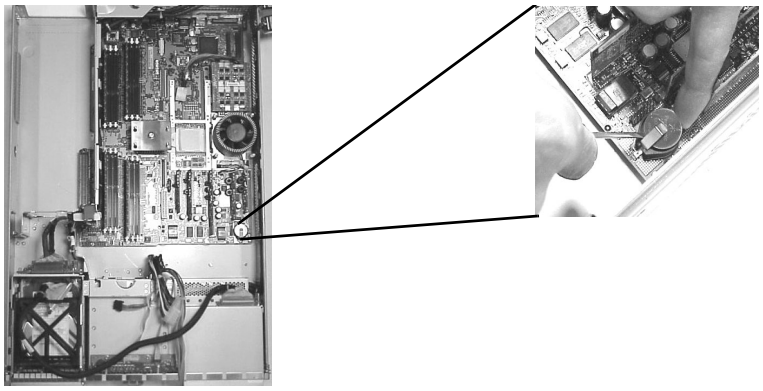
system batteries

Systems with a MP card have two batteries. Systems with no MP Card have only one battery.

removing the system battery

1. Turn off the system, disconnect all power and external cables and remove the system cover(s).
2. Remove the processor airflow guide.
3. Lift up on the battery and push on the back of it with a flat-head screwdriver to remove the battery from its holder.

CAUTION: Lift the battery just high enough to clear its holder. Too much stress on the battery holder retaining clip may break it.



Remove the System Board Battery

replacing the system battery

1. Lift up on the battery holder retaining clip with a flat-head screwdriver and slide the battery into its holder. The positive **(+)** side of the battery should face up.

CAUTION: Lift the battery just high enough to clear its holder. Too much stress on the battery holder retaining clip may break it.

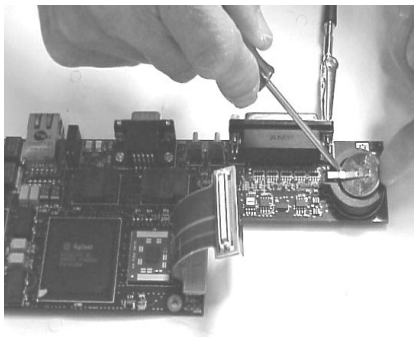
2. Replace the processor airflow guide.
3. Replace the system cover(s), reconnect all of the power and external cables and turn on the system.
4. Execute `time` at the EFI prompt to verify that the battery has been installed correctly.

   You may need to reset the system time and date using the EFI `time` and `date` commands. Once you have set the time, turn the system off, unplug the power cord, and wait for a minute before turning it back on. Execute the `time` and `date` commands again. If the time and date are now correct, you have installed the battery correctly.

removing the management card battery

1. Remove the Management Card from the system.
2. Lift up on the battery and push on the back of it with a small flat-head screwdriver. This will remove the battery from its holder.

CAUTION: Lift the battery just high enough to clear its holder. Too much stress on the battery holder retaining clip may break it.



Remove the Management Card's Battery

replacing the management card battery

1. Lift up on the battery holder retaining clip with a small flat-head screwdriver and slide the battery into its holder. The positive **(+)** side of the battery should face up.

CAUTION: Lift the battery just high enough to clear its holder. Too much stress on the battery holder retaining clip may break it.

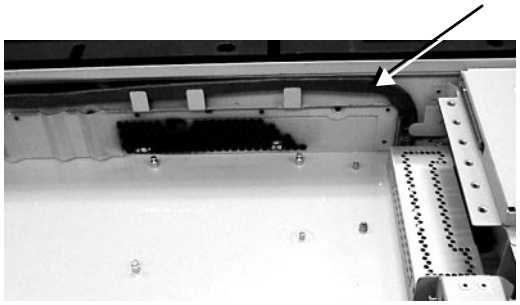
2. Re-install the Management Card in the system.
3. Replace the system cover(s), and reconnect all of the power and external cables.

power supply interface module

The power supply interface (PSI) module supports up to two redundant power supplies.

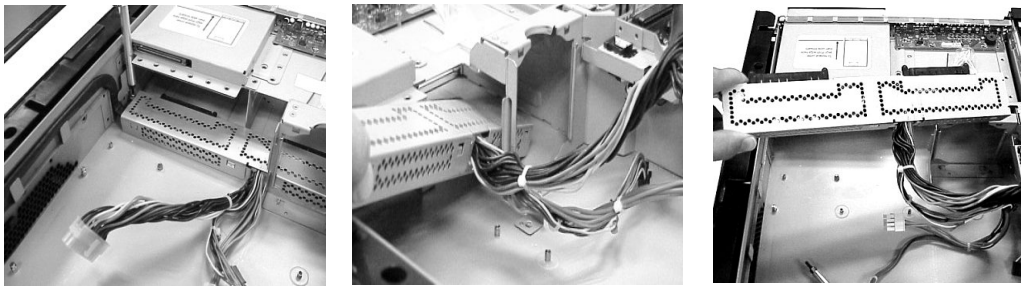
removing the power supply interface

1. Turn off the system, disconnect all power and external cables, and remove the system cover(s).
2. Remove the system board.
3. Lift the power cables out of their metal holding clips.



Power Cables and Holding Clips

4. Unscrew the PSI mounting screw and remove the PSI module from the system.



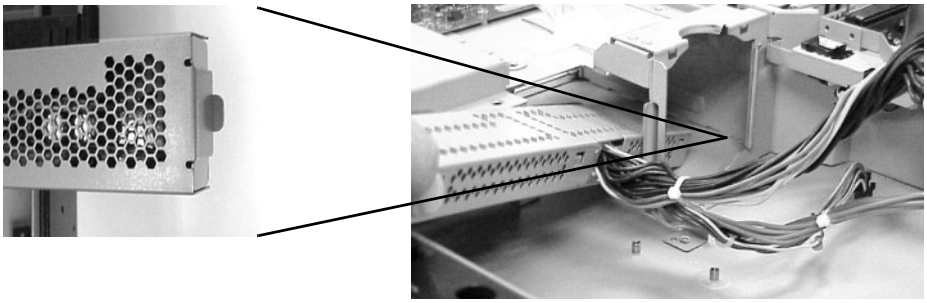
A **B** **C**

Removing the Power Supply Interface Module

A	Remove mounting screw
B	Slide PSI out of chassis
C	PSI removed from system

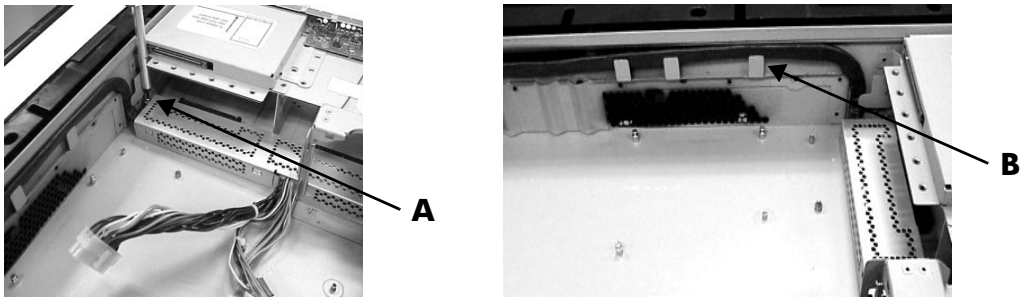
replacing the power supply interface module

1. Place the PSI module into the chassis by sliding the module retaining tab into the socket on the hard disk drive bay wall.



Replacing the Power Supply Interface Module

2. Screw in the PSI module mounting screw (A) and secure the power cables behind the holding clips (B).



Securing the Power Supply Interface Module and Cables

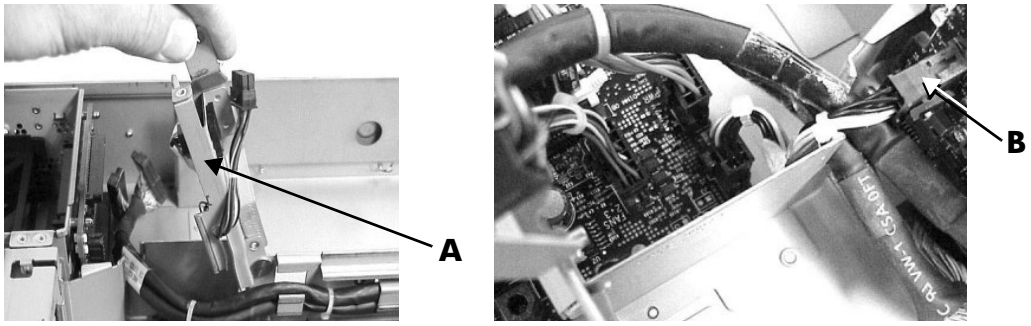
3. Replace the system board.
4. Replace the system cover(s), and reconnect all of the power and external cables.

hard drive backplane

The hard drive backplane provides connectors for three hard disk drives.

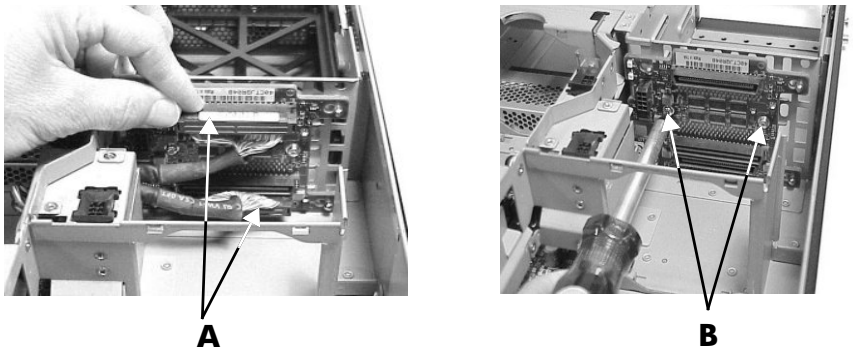
removing the hard drive backplane

1. Turn off the system, disconnect all power and external cables, and remove the system cover(s).
2. Lift up on the PCI/AGP cage release lever and the back edge of the PCI/AGP cage and lift the PCI/AGP cage out of the system.
3. Lift up on the fan power bridge (A) and disconnect the backplane power cable (B).



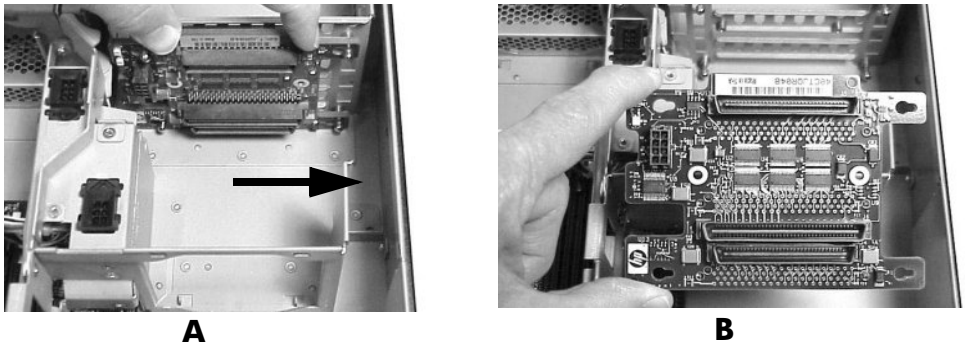
Disconnect the Fan and Backplane Power Cables

4. Disconnect the SCSI cables (A) and unscrew the backplane mounting screws (B) .



Unscrewing the Backplane Mounting Screws

5. Remove the hard drive backplane by sliding it in the direction of the arrow (A) and pulling it outward from its standoff posts (B).



Remove the Hard Drive Backplane

replacing the hard drive backplane

1. Insert the hard drive backplane onto its four chassis standoffs and slide it to the left as you face it. This locks the hard drive backplane in place.
2. Screw in the two backplane mounting screws and connect the two SCSI cables.
3. Connect the backplane power cable and lower the fan power bridge until it snaps in place.
4. Replace the PCI/AGP cage in the system and secure it.
5. Replace the system cover(s), and reconnect all of the power and external cables.

3

system configuration

This chapter covers the tools available for configuring rx2600 and zx6000 systems:

- Extensible Firmware Interface (EFI)
- Management Processor (MP)
- Baseboard Management Controller (BMC)
- Firmware upgrades

extensible firmware interface (EFI)

The Extensible Firmware Interface (EFI) is an interface between the operating systems and the system firmware.

The following topics introduce you to the EFI and explain how to use it to configure your system:

accessing and navigating the EFI shell

When your system starts up, it pauses at the **boot option** screen. This screen gives you three boot options:

- **EFI Shell [Built-in]** is a command line interface that allows you to operate the EFI commands or create and run automated scripts.
- **Boot Option Maintenance Menu** allows you to select the order of the devices from which you want the firmware to attempt to boot the OS. You can also configure the system to boot from a configuration file.
- **Security/Password Menu** lets you add, change and delete system administrator and user passwords.

You have 7 seconds to change the boot option before the system boots to the default OS.

Use the up or down arrow keys to highlight an option, then press **Enter**.

remote access

You also can access the EFI remotely.

1. With the system turned off, connect a 9-pin to 9-pin serial cable to *Serial Port A* on the rear panel of the system, and to your remote device.
2. Configure the terminal emulation software with these settings:
   - ❏ Baud rate: 9600
   - ❏ Bits: 8
   - ❏ Parity: None
   - ❏ Stop Bits: 1 (one)
   - ❏ Flow Control: XON/XOFF
3. Using the terminal emulation software, connect to the system with a *direct connection*.

NOTE: The default terminal emulation type is VT100+. The default baud rate is 9600. These settings can be changed from the EFI **Boot Options Maintenance Menu**.

---

4. Turn on the system and follow the steps in the next section to access the EFI.

using the EFI shell

To access the EFI shell:

1. When the EFI boot option screen displays, use the arrow keys to highlight **EFI Shell**, then press **Enter**.

NOTE: You have 7 seconds to change the boot option before the system boots to the first option in the list. To change the order of boot options, see "Using the Boot Option Maintenance Menu" on page 3-11.

---

2. A list of *file systems* (drives and partitions), and *block devices* on hard drives is displayed. For example:

```
Device mapping table
fs0: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part1,Sig00112233)
blk0: Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)
blk1: Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
```

3. The EFI shell first searches for an optional script file named `startup.nsh`.
   - ❏ If this file is found, it is executed automatically.
   - ❏ After the script runs, the shell waits for commands to be entered at the command prompt.

NOTE: If `startup.nsh` runs an OS or application, you must exit that application to access the EFI shell prompt.

---

4. You can now enter commands.

   To run an individual command:

   a. Type the command at the shell prompt. For example, to clear the display on the monitor:

   ```
   Shell:\> cls
   ```

   b. Press **Enter** to execute the command.

   - ◆ Some commands require additional arguments to further define their action. For example, to display information about the system memory, you must type the command name, plus the desired category of information to display:

     ```
     fs0:\> info mem
     ```

   - ◆ When you enter individual commands at the command prompt, the shell performs variable substitution, then expands wild cards before the command is executed.
   - ◆ To switch to a different file system, execute the following, where `fsx` is the selected file system as listed on the screen (see step 2). For example:

     ```
     Shell> fsx:

     where x is a numeric value representing a file system, for
     example, if you enter:

     Shell> fs0:

     You see this prompt:
     fs0:\> _
     ```

- You also can run EFI applications (files ending with **.efi**). To list applications in the current file system, run the **ls** command. For example:

  ```
  fs0:> ls
  ```

  You will see a list of applications on the `fs0` file system.

command syntax

The EFI shell uses a programming language to control the execution of individual commands. Some characters have special meanings in the EFI shell. This section includes instructions for running EFI shell commands and a list of the available commands.

arguments

Some commands require additional *arguments* to further define their action. For example, to display information about the system memory, you must type the command name, plus the desired category of information to display:

```
fs0:\> info mem
```

rules

Follow these rules or the commands will not run correctly.

# Denotes a *comment*. All text after this symbol is ignored by the EFI.

> Denotes an *output redirect*. Output of EFI shell commands can be saved to files instead of being displayed on the monitor or in the terminal emulation program. The shell redirects standard output to a single file and standard error to a single file. Redirecting both standard output and standard error to the same file is allowed. Redirecting to more than one file on the same command is not supported.

The output redirect options, include:

> redirect output to a unicode file

>a redirect output to an ASCII file

>> append output to a unicode file

>>a append output to an ASCII file

The syntax for redirecting script output is:

Command > **output_file_pathname**

% Denotes an *environment variable*. Environment variables can be set and viewed through the use of the **set** command (see **set** command in this chapter). To access the value of an environment variable as an argument to a shell command, delimit the name of the variable with the **%** character before and after the variable name; for example, **%myvariable%**.

***** Denotes a *wildcard* character. Matches zero or more characters in a file name.

? Denotes a *wildcard* character. Matches exactly one character of a file name.

[Denotes a *wildcard* character. Defines a set of characters; the pattern matches any single character in the set. Characters in the set are not separated. Ranges of characters can be specified by specifying the first character in a range, then the **-** character, then the last character in the range. For example: **[a-zA-Z]**

^	Denotes a *literal argument*. When a command contains a defined alias the shell replaces the alias with its definition (see **alias** command in this chapter). If the argument is prefixed with the **^** character, however, the argument is treated as a literal argument and alias processing is not performed.
" "	Quotation marks in the EFI shell are used for argument grouping. A quoted string is treated as a single argument to a command, and any whitespace characters included in the quoted string are just part of that single argument. Quoting an environment variable does not have any effect on the de-referencing of that variable. Double quotation marks (**" "**) denote strings. Single quotation marks are not treated specially by the shell in any way. Empty strings are treated as valid command line arguments.
space	Used to format batch scripts to separate command names, parameters and so forth.
newline	Used to format batch scripts. Each line represents a new command.

command descriptions

The following sections provide brief descriptions of the EFI commands. For more information, use the EFI shell help system. To access a:

- List of EFI command classes, execute `help` at the EFI shell prompt.
- Detailed description of a command, execute `help` and the command name or other options at the EFI shell prompt. For example:
  - `fs0:\> help date` displays help for the `date` command
  - `fs0:\> help -a` displays all commands in alphabetical order
  - `fs0:\> help -a-b` displays all commands in alphabetical order with page breaks
  - `fs0:\> help class` displays all commands in the specified command class (see below)

command classes

EFI commands are organized into different classes based on their functions. The classes include:

`boot`	Boot options and disk-related commands
`configuration`	Change and retrieve system information
`device`	Get device, driver and handle information
`memory`	Memory related commands
`shell`	Basic shell navigation and customization
`scripts`	EFI shell script commands

boot commands

These let you set boot and disk options.

`autoboot`	View or set autoboot timeout variable
`bcfg`	Display/modify the driver/boot configuration
`dblk`	Display the contents of blocks from a block device
`boottest`	Set/view BootTest bits
`mount`	Mount a file system on a block device
`reset`	Reset the system
`vol`	Display volume information of the file system

configuration commands

These let you change and retrieve system information.

`cpuconfig`	Deconfigure or reconfigure CPUs
`date`	Display the current date or sets the date in the system; format is **mm/dd/yyyy**
`err`	Display or change the error level
`errdump`	View/clear logs
`info`	Display hardware information

`monarch`	View or set the monarch processor
`palproc`	Make a PAL procedure call
`salproc`	Make a SAL procedure call
`time`	Display the current time or sets the system time; format is **hh:mm:ss**
`ver`	Display the version information

device commands

These provide device, driver and handle information.

`baud`	Set serial port settings
`connect`	Bind an EFI driver to a device and start the driver
`devices`	Display the list of devices being managed by EFI drivers
`devtree`	Display the tree of devices that follow the EFI Driver Model
`disconnect`	Disconnect one or more drivers from a device
`dh`	Display the handles in the EFI environment
`driver`	List and install ROM-based drivers
`drivers`	Display the list of drivers that follow the EFI Driver Model
`drvcfg`	Invoke the Driver Configuration Protocol
`drvdiag`	Invoke the Driver Diagnostics Protocol
`guid`	Display all the GUIDs in the EFI environment
`lanaddress`	Display core I/O MAC address
`load`	Load and optionally connect EFI drivers
`loadpcirom`	Load a PCI Option ROM
`map`	Display or define mappings
`openinfo`	Display the protocols on a handle and the agents
`pci`	Display PCI devices or PCI function configuration space
`reconnect`	Reconnect one or more drivers from a device
`unload`	Unload a protocol image

memory commands

These let you manage your memory.

`default`	Reset all NVM values to system defaults
`dmpstore`	Display all NVRAM variables
`dmem`	Display the contents of memory
`memmap`	Display the memory map
`mm`	Display or modify memory, memory-mapped IO and PCI settings
`pdt`	View or clear the Page Deallocation Table (PDT)

shell commands

These let you navigate and customize your shell.

`alias`	Display, create, or deletes aliases in the EFI shell
`attrib`	Display or change the attributes of files or directories
`cd`	Display or change the current directory
`cls`	Clear the standard output with an optional background color
`comp`	Compare the contents of two files
`cp`	Copy one or more files/directories to another location
`edit`	Edit an ASCII or UNICODE file in full screen
`eficompress`	Compress a file
`efidecompress`	Uncompress a file
`exit`	Exit the EFI shell
`help`	Display help menus, command list, or verbose help of a command
`hexedit`	Edit with hex mode in full screen
`ls`	Display a list of files and subdirectories in a directory
`mkdir`	Create one or more directories
`mode`	Display or change the mode of the console output device
`mv`	Move one or more files/directories to destination
`rm`	Delete one or more files or directories
`set`	Display, create, change or delete EFI environment variables
`setsize`	Set the size of the file
`touch`	Update time with current time
`type`	Display the contents of a file
`xchar`	Turn on/off extended character features

scripts commands

These let you use shell scripts.

`echo`	Display messages or turn command echoing on or off
`for/endfor`	Execute commands for each item in a set of items
`goto`	Make batch file execution jump to another location
`if/endif`	Execute commands in specified conditions
`pause`	Print a message and suspends for keyboard input
`stall`	Stalls the processor for the specified time in microseconds

EFI scripts

The EFI scripting language allows you to create executable shell scripts. You can place a set of EFI commands in the shell script, then execute the script as often as needed. You also can modify the script to make it perform different tasks. Script files can be either unicode or ASCII format.

NOTE: Commands executed from a batch script are not saved by the shell for DOSkey history (up-arrow command recall).

The optional script `startup.nsh` is automatically executed when you enter the EFI shell environment. All EFI shell scripts have the "`.nsh`" suffix.

This section provides a brief explanation of how to create, edit and run an EFI shell script.

To create or edit a shell script:

1. At the EFI shell prompt, run the shell's editor. Execute:

   ```
   fs0:\> edit file.nsh
   ```

   where *file.nsh* represents the name of the new shell script you are creating or the existing script you want to edit.

2. Type or edit the commands to be executed when the script is run. For example:

   ```
   echo This is a test file.
   ```

3. When you are finished writing the script: press **F2** to save the file, then press **F3** to exit.

The EFI editor is controlled by function key commands. A menu of available commands is shown at the bottom of the screen. If you are accessing the editor through a terminal emulator and the function keys do not work, use the escape sequences listed here.

Command	Function key	Escape sequence
Open file	F1	Esc 0
Save file	F2	Esc S
Exit	F3	Esc Q
Cut	F4	Esc D
Paste	F5	Esc P
Goto	F6	Esc G
Search	F7	Esc F
Replace	F8	Esc R
File type	F9	Esc T

To run a shell script:

1. Type the name of the command at the EFI shell prompt. For example:

   ```
   fs0:\> mytest.nsh
   ```

2. Press **Enter**.

positional arguments

Up to nine positional arguments are supported for batch scripts. Positional argument substitution is performed before the execution of each line in the script file. Positional arguments are denoted by **%n**, where n is a digit between 0 and 9. By convention, **%0** is the name of the script file currently being executed.

In batch scripts, argument substitution is performed first, then variable substitution. Thus, for a variable containing **%2**, the variable will be replaced with the literal string **%2**, not the second argument on the command line. If no real argument is found to substitute for a positional argument, then the positional argument is ignored.

For example, this script replaces the two literal arguments **arg1** and **arg2** with the positional arguments **%1** and **%2**:

```
#
# Example: EFI Shell Script
#
#//////////////////////////////////////

echo -off
set arg1 %1
set arg2 %2
echo "I found a %arg1%"
echo "I also found a %arg2%"
```

To run the command, type the command name followed by the arguments at the shell prompt:

```
fs0:\efi\tools> example cat dog

example> echo -off
I found a cat
I also found a dog
```

nesting

Script file execution can be nested; that is, script files may be executed from within other script files. Recursion is allowed.

output redirection

Output redirection is fully supported. Output redirection on a command in a script file causes the output for that command to be redirected. Output redirection on the invocation of a batch script causes the output for all commands in the batch script to be redirected to the file, with the output of each command appended to the end of the file.

By default, both the input and output for all commands executed from a batch script are echoed to the console. Display of commands read from a batch file can be suppressed via the echo -off command (see echo). If output for a command is redirected to a file, then that output is not displayed on the console.

error handling in scripts

By default, if an error is encountered during the execution of a command in a batch script, the script will continue to execute. The `lasterror` shell variable allows batch scripts to test the results of the most recently executed command using the if command. This variable is not an environment variable, but is a special variable maintained by the shell for the lifetime of that instance of the shell.

comments in script files

Comments can be embedded in batch scripts. The # character on a line denotes that all characters on the same line and to the right of the **#** are to be ignored by the shell. Comments are not echoed to the console.

using the boot option maintenance menu

This menu allows you to select console output and input devices as well as various boot options. It contains the following items:

- **Boot from a File**
- **Add a Boot Option**
- **Delete Boot Option(s)**
- **Change Boot Order**
- **Manage BootNext setting**
- **Set Auto Boot TimeOut**
- **Select Active Console Output Devices**
- **Select Active Console Input Devices**
- **Select Active Standard Error Devices**
- **Cold Reset**
- **Exit**

These items are described in the following sections.

In all menus, select:

- **Help** to display the help available for the command
- **Exit** to return to the main Boot Options Maintenance menu
- **Enter** to select an item after using the arrow keys to highlight the item
- **Save Settings to NVRAM** to save your changes

NOTE: The options shown here are examples. Your system may have different options available based on the system configuration and installed hardware components.

---

paths

All devices in the zx6000 and zx2600 are represented by *paths* in the EFI shell. To identify the correct socket or disk drive, use the following tables.

rx2600 workstation sockets

Socket	Path
1 AGP	Acpi(HWP0003,400)/pci(0|0)
2 PCI	Acpi(HWP0002,300)/pci(1|0)
3 PCI	Acpi(HWP0002,200)/pci(1|0)
4 PCI	Acpi(HWP0002,600)/pci(1|0)

zx6000 server sockets

Socket	Path
1 PCI	Acpi(HWP0002,400)/pci(1|0)
2 PCI	Acpi(HWP0002,300)/pci(1|0)
3 PCI	Acpi(HWP0002,200)/pci(1|0)
4 PCI	Acpi(HWP0002,600)/pci(1|0)

zx6000 and rx2600 drives

Drive	Path
SCSI Disk	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
SCSI Disk	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)
SCSI Disk	Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun2,Lun0)
Removable Media Boot	Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)

boot from a file

Use this option to manually run a specific application or driver.

NOTE: This option boots the selected application or driver one time only. When you exit the application, you will return to this menu.

This option displays the file systems that are on your server or workstation and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi` extension. You can also select remote boot (LAN) options that have been configured on your network.

For example:

```
Boot From a File. Select a Volume
    NO VOLUME LABEL [Acpi(HWP0002,500)/Pci(2|0)/Ata(Primary,Master)/
    CD_FORMAT [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,Master)/CDRO
    Removable Media Boot [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,M
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,500)/Pci(3|0)/Mac(00306E385AFB)]
    Exit
```

In this example:

- **NO VOLUME LABEL** is a hard drive. When you format a hard drive, the EFI tools provide an option to LABEL the disk. In this example, the volume was not labelled.
- **CD_FORMAT** is the label created for the disk currently inside the DVD-ROM drive.
- **Removable Media Boot** allows you to boot from a removable media drive (CD/DVD drive). This option does not support booting from a specific file on a specific removable media disc.
- The two **Load Files** are the EFI Shell and the LAN.

add a boot option

Use this option to add items to the EFI boot menu.

This option displays the file systems that are on your system and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi` extension. You can also select remote boot (LAN) options that have been configured on your network. The option you have selected will be added to the EFI boot menu.

If you add a new drive to your system, you must manually add its boot options list if you want to make it a bootable device.

When adding a boot option that already exists in the Boot Manager list of boot options, you can choose whether to create a new option or modify the existing one. If you:

- Choose to modify an existing option, you may change the boot option name and/or add boot option arguments to the existing option.
- Create a new boot option for an already existing option, multiple instances of the same boot option exist.

For example:

```
Add a Boot Option. Select a Volume
   NO VOLUME LABEL [Acpi(HWP0002,500)/Pci(2|0)/Ata(Primary,Master)/
   Removable Media Boot [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,M
   Load File [EFI Shell [Built-in]]
   Load File [Acpi(HWP0002,500)/Pci(3|0)/Mac(00306E385AFB)]
   Exit
```

In this example:

- Most of the items are the same options in **Boot From a File**.
- **NO VOLUME LABEL** is a hard drive. You can search through the disk for bootable applications to add to the Boot Manager list of Boot options.
- **Removable Media Boot** will treat the Removable Media (generally a CD) as a bootable device.
- **Load File EFI Shell** adds a new instance to the EFI Shell. Load File with the MAC address adds a network boot option.

delete boot option(s)

Use this option to remove boot options from the EFI boot menu.

NOTE: This does *not* delete any files, applications or drivers from your system.

This option displays a list of boot options that are configured on your system. The names will match the options on the main Boot Manager menu (above).

If you remove a drive from your system, you must manually delete it from the boot options list.

- To delete an item from the list, use the arrow keys to highlight the item and press **Enter**.
- To remove all of the entries from the EFI boot menu, select **Delete All Boot Options**. This setting may be used as a security device on systems that are accessed remotely.

change boot order

Use this option to change the order of boot options. The order in which options are listed in the EFI boot menu also reflects the order in which the system attempts to boot. If the first boot option fails, the system will try booting the second, then the third, and so forth, until a boot option succeeds or until all options have failed.

For example, if you normally boot using a configuration on your LAN but would like to boot from a local hard drive if the LAN is unavailable, move the LAN boot option to the top of the list, followed by the hard drive boot option.

The Menu lists boot options that currently exist in the main Boot Manager menu. You can change the priority of the items by moving them up or down in the list:

- Press **U** to move an option up.
- Press **D** to move an option down.
- Select **Save Settings to NVRAM** to modify the order in the Boot Manager menu, which modifies the order that the Boot Manager will attempt to boot the options.
- The items at the bottom of the screen (shown in bold in these examples) are descriptions of the selected option.

For example:

```
Change boot order. Select an Operation
    EFI Shell [Built-in]
    Current OS
    Save Settings to NVRAM
    Help
    Exit

    VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
    Boot0000
```

manage bootnext setting

Use this option to run the selected boot option immediately upon entering the main Boot Manager menu. This option is useful for booting an option that only needs to be booted once, without changing any other setting in the main Boot Manager menu. This is a one-time operation and does not change the permanent system boot settings.

This option displays the file systems that are on your system and lets you browse these file systems for applications or drivers that are executable. Executable files end with the `.efi` extension. You can also select remote boot (LAN) options that have been configured on your network.

To restore the default boot next setting, select **Reset BootNext Setting**.

For example:

```
Manage BootNext setting. Select an Operation
    EFI Shell [Built-in]
    Current OS
    Reset BootNext Setting
    Save Settings to NVRAM
    Help
    Exit

    VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
    Boot0000
```

set auto boot timeout

Use this option to set the amount of time the system will pause before attempting to launch the first item in the Boot Options list.

For example:

```
Set Auto Boot Timeout. Select an Option
    Set Timeout Value
    Delete/Disable Timeout
    Help
    Exit
```

Interrupting the timeout during the countdown stops the Boot Manager from loading any boot options automatically. If there is no countdown, then boot options must be selected manually.

- To set the auto boot timeout value, in seconds, select **Set Timeout Value** and enter the desired value.
- To disable the timeout function, select **Delete/Disable Timeout**.

NOTE: When this option is selected, the system will not automatically boot. The system will stop at the EFI boot menu and wait for user input.

---

select active console output devices

Use this option to define the devices that will display output from the system console. This list normally includes the VGA monitor and a serial port for directing output to a terminal emulation package.

NOTE: If you install a modem in your system, make sure you disable the modem serial port in both the *Active Console Input* **and** *Active Console Output* device lists.

NOTE: Some Operating Systems support multiple consoles, such as a simultaneous serial and VGA output. **See your OS documentation to determine how many consoles are supported with your system.** Multiple consoles are not supported for HP-UX or Windows (use the *Smart Setup CD* to switch between COM A and the MP on Windows systems).

For example:

```
Select the Console Output Device(s)
   Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
   Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
 * Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
   Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
   Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
   Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
 * Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
   Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
   Acpi(HWP0002,700)/Pci(2|0)
 * Acpi(HWP0003,0)/Pci(0|0)
   Save Settings to NVRAM
   Exit
```

* indicates a currently selected device.

This menu is identical to **Console Error Devices**. The zx6000/rx2600 does not support different configurations for Output and Error console. For correct operation:

- When changes are made to either Output or Error console menus, the identical change must be made in both menus.
- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

To select:	Choose:
Serial A/Serial 1	Acpi(PNP0501,0)/*Uart(9600 N81)/VenMsg(Vt100+)*
MP Serial Console	Acpi(HWP0002,700)/Pci(1|1)/*Uart(9600 N81)/VenMsg(Vt100+)*
MP VGA Port	Acpi(HWP0002,700)/Pci(2|0)
AGP Graphics Port	Acpi(HWP0003,0)/Pci(0|0)

- Each option is identified with an EFI Device path. Not all options will be available, depending on the configuration of the system and the options purchased. Device paths may differ slightly on different product models.
- On both serial device examples, UART 9600 indicates the current baud rate of the serial device (can be changed with the EFI shell `baud` command), VenMsg Vt100+ is the current emulation type (several different terminal emulation protocols are supported, see list above).
- Only one terminal emulation type (PcAnsi, Vt100, etc.) can be selected for each serial console, but multiple serial consoles can be selected at a time.
- Only one VGA (graphics) device can be selected at a time. You cannot select *both* the MP VGA port *and* an AGP graphics card.

select active console input devices

Use this option to define the devices that will be used to provide input to the system console.

This option displays the console devices on your system. This normally includes a standard keyboard and mouse, and a serial port for receiving output from a terminal emulation package on a laptop. Several different terminal emulation protocols are supported.

- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

NOTE: If you install a modem in your system, make sure you disable the modem serial port in both the *Active Console Input* **and** *Active Console Output* device lists.

NOTE: Some Operating Systems support multiple input devices, such as a simultaneous serial and keyboard input. **See your OS documentation to determine how many consoles are supported with your system.**

For example:

```
Select the Console Input Device(s)
   Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
   Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
 * Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
   Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
   Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
   Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
 * Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
   Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
 * Acpi(HWP0002,0)/Pci(1|0)
 Save Settings to NVRAM
 Exit
```

* indicates a currently selected device.

- Each option is identified with an EFI Device path. Not all options will be available, depending on the configuration of the system and the options purchased. Device paths may differ slightly on different product models.
- On both serial device examples, UART 9600 indicates the current baud rate of the serial device, VenMsg Vt100+ is the current emulation type. Several different terminal emulation protocols are supported (see list above).
- Only one terminal emulation type (PcAnsi, Vt100, etc.) can be selected for each serial console, but multiple serial consoles can be selected at a time.

To select:	Choose:
Serial A/Serial 1	Acpi(PNP0501,0)/*Uart(9600 N81)/VenMsg(Vt100+)*

To select:	Choose:
MP Serial Console	Acpi(HWP0002,700)/Pci(1|1)*/Uart(9600 N81)/VenMsg(Vt100+)*
USB Keyboard	Acpi(HWP0002,0)/Pci(1|0)

select active standard error devices

Use this option to define the devices that will display error messages from the system console.

This menu is identical to **Console Output Devices**. The zx6000/rx2600 does not support different configurations for Output and Error console. For correct operation:

- When changes are made to either Output or Error console menus, the identical change must be made in both menus.
- When changing serial devices, changes must be made to Output, Input, and Error menus for proper operation.

using the security/password menu

To change the administrator and user passwords:

1. Select **Security/Password Menu**.
2. Select either:
   - ❑ **Set Administrator Password**
   - ❑ **Set User Password**
3. Select:
   - ❑ **Set Administrator Password** or **Set User Password** to set a new password
   - ❑ **Enable/disable Password** to specify whether a password is required
   - ❑ **Help** for assistance
4. When you are finished, select **Exit**.

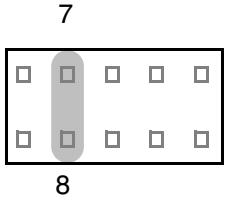
If you forget your passwords, they can be reset using an MP command. To reset the system passwords:

If your system has an MP card:

» Run the MP card `bp` command to reset the administrator and user passwords (see “MP Commands," page 3-28).

If your system does **not** have an MP card, you must reset the passwords using a jumper on the system board:

1. Power down the system and unplug the AC power cord.
2. Place a jumper between pins 7 and 8 on J96 on the system board behind the battery.



Password Reset Jumper

3. Plug in the AC power cord and wait for the BMC heartbeat LED on the system board to start blinking green. This should take about 5 seconds from the time you plug in the power cord.
4. Unplug the AC power cord again and remove the jumper.

5. Plug in the power cord and boot the system.

   The passwords have been cleared. Follow the instructions above to set new system passwords.

6. Store the system in a secure location and keep the system case locked at all times to protect against unauthorized access.

management processor (MP)

The Management Processor (MP) card contains *processor and I/O hardware* that act as an autonomous embedded device for controlling the system console, reset and power management functions. The card connectors located on the back of the system provide:

- Serial (Remote, Console and UPS) connectors
- VGA connector
- LAN connector

NOTE: This section assumes that you have the MP card installed in your system. To determine if the card is installed, look at the back panel of your system and you will see a 25-pin Serial Port if the MP card is installed.

Two major functions of the MP card are *remote* and *local* manageability. The Management card contains the management processor (MP), which monitors system status and can control various aspects of the system operation, such as power, resets, software/firmware upgrades and cooling. The MP card manageability hardware operates on standby power, independently of the on-off state of the rest of the system.

The MP uses the following external memory: 8 MB DRAM, 8 MB Flash and 512 KB of NVRAM. A power monitor and watchdog timer reset the processor if standby power is out of specification or the processor is inactive for a set amount of time. The processor also uses a 25 MHz clock.

The I/O and Memory Controller chip is connected to the Management card's I/O bus interface by rope number seven of the system bus. The Management card consists of the following components:

- I/O Bus Interface
- VGA Controller with 16 MB of DDR SDRAM for a video buffer
- Management Processor with:
  - Three RS-232 Serial Ports
  - Four I^2C Ports
  - 10/100BT LAN
  - 16-bit GPIO Interface
- Management Processor DRAM, Flash Memory and Battery backed NVSRAM
- I^2C battery backed Real Time Clock
- I^2C Field Replaceable Unit EEPROM
- I^2C 8K Serial EEPROM
- System Reset Logic

MP card I/O functionality

The MP card includes these I/O components:

- **System serial ports**
  - Three RS-232 ports can be accessed through one three-connector cable (A6144-63001; Dongle) when this cable is connected to the DB25 connector located on the backplane of the system. This cable provides for three DB9 connectors for console, modem and UPS.
  - The Management card serial ports can be configured to redirect system console and session communications to the RS-232 lines (local port) and a modem (remote port).
- **VGA controller.** The 2D VGA graphics controller console port is provided on a DB15F connector. Also, Serial Flash memory with VGA BIOS and a 16 MB video buffer (DDR SDRAM) is included with the VGA controller.
- **PCI interface.** The PCI interface connects the PCI bus with the MP. This interface emulates three 16550-style UARTs and part of the MP card.
- **I^2C bus.** The I^2C bus of the MP provides communication with the BMC.
- **Service LAN.** Network access is provided by a 10/100BT LAN connection on a RJ-45 connector and its associated LEDs, which are located on the Management card. An I^2C 8K serial EEPROM supports MAC address storage.

NOTE: The MP card can be installed on systems with or without an AGP graphics card. If an AGP graphics card *is not* installed, the MP card VGA port serves as the EFI console and the OS monitor. If an AGP graphics card *is* installed, the AGP graphics card serves as the EFI console and the OS monitor.

---

using the MP

You can access the MP card and enter MP commands by:

- Serial console port
- LAN connection
- Modem connected to RS232 port

using MP via the serial console port

To enter MP command mode using the Serial Console Port:

1. Connect the system to a remove device:
   a. Connect the 25-pin end of a serial cable to the *MP card 25-pin Serial Port*, on the rear panel of the system.
   b. Connect the console connector on the serial cable to your remote device.
2. Configure the terminal emulation software with these settings:
   - ❏ Terminal emulation: VT100+
   - ❏ Baud rate: 9600

NOTE: The EFI `baud` command does not change the MP card serial port speed.

   - ❏ Bits: 8
   - ❏ Parity: None
   - ❏ Stop Bits: 1 (one)
   - ❏ Flow Control: None
3. Using the terminal emulation software, connect to the system with a *direct connection*.
4. Plug in the system. Do not turn it on.

   The MP card boots to the MP command mode login:

```
HP Management Processor
Firmware Revision E.02.10 Oct 1 2002,10:28:32
(c) Copyright Hewlett-Packard Company 1999-2002. All Rights Reserved.

Type Ctrl-B to activate the MP Command Interface
```

5. Press **Ctrl-B**. At the login and password prompts, press **Enter**.

   The MP command mode prompt will display:

```
HP Management Processor
Firmware Revision E.02.10 Oct 1 2002,10:28:32
(c) Copyright Hewlett-Packard Company 1999-2002. All Rights Reserved.

             System Name: fstl3a

 ****************************************************************

             MP ACCESS IS NOT SECURE
 No MP users are currently configured and remote access is enabled.
      Set up a user with a password (see SO command)
                    OR
    Disable all types of remote access (see EL and ER commands)
****************************************************************

MP Host Name: fstl3a
MP>
```

6. You can now enter commands. To run an individual command:
   a. Type the command at the MP command prompt.
   b. Press **Enter** to execute the command.

using MP via the mp LAN port

If you have not already configured your MP LAN port, do so now (page 3-26).

1. Using a telnet client, log on to the system with the Host Name provided by your Network Administrator.

NOTE: All IP addresses and Hostnames should be provided by your Network Administrator.

For example:

```
C:\> telnet MP_Host_Name
```

The MP command mode login will display in the terminal window:

```
HP Management Processor
Firmware Revision E.02.10 Oct 1 2002,10:28:32
(c) Copyright Hewlett-Packard Company 1999-2002. All Rights Reserved.

Type Ctrl-B to activate the MP Command Interface
```

2. Press **Ctrl**-**B**. At the login and password prompts, press **Enter**.
3. The MP command mode prompt displays:

```
HP Management Processor
Firmware Revision E.02.10 Oct 1 2002,10:28:32
(c) Copyright Hewlett-Packard Company 1999-2002. All Rights
Reserved.

              System Name: fstl3a

 ************************************************************

              MP ACCESS IS NOT SECURE
 No MP users are currently configured and remote access is enabled.
      Set up a user with a password (see SO command)
                     OR
    Disable all types of remote access (see EL and ER commands)
**************************************************************

MP Host Name: fstl3a
MP>
```

4. You can now enter commands. To run an individual command:
   a. Type the command at the MP command prompt.
   b. Press **Enter** to execute the command.

configuring the MP LAN port

Before you can execute MP commands via LAN connection, you must configure the LAN settings on the MP card using a Serial Console Port connection:

1. Enter MP command mode using a Serial Console Port, as described above.
2. Execute the LAN configuration (**lc**) command**.**

   Information similar to the following is displayed:

```
LC

This command allows you to modify the LAN configuration.

Current configuration:
   IP Address              : 127.0.0.0
   MP Host Name            : myhost
   Subnet Mask             : 200.0.0.0
   Gateway                 : 127.0.1.0
   Web Console Port Number : 2023

Do you want to modify the LAN configuration? (Y/[N])
```

3. Press **Y**, then **Enter** to modify the LAN settings:
   - ❑ IP Address
   - ❑ MP Host name
   - ❑ Subnet, Gateway
   - ❑ Web Console Port Number
   - ❑ LAN hardware configuration (optional)
     - ◆ The *Link State* controls the speed at which the MP card communicates with the network.
     - ◆ Select *auto-negotiate* to allow the 10/100BaseT LAN connection to make the fastest possible connection. The MP card will also negotiate to half or full duplex.
     - ◆ Select *10BaseT* to force the MP card to operate at the slower 10BaseT speed if necessary for your network configuration. For example, if your network contains both 10BaseT and 100BaseT connections, and you want the system to communicate with the other 10BaseT connections, you must force it to operate at the slower speed.

NOTE: If you force the MP card to operate at 10BaseT speed, it will also operate at half duplex. Make sure that your switch or hub is also in half duplex mode.

Follow the prompts on the screen to enter the correct settings for each option. In all options:

- ❑ to change the setting, type the appropriate information, then press **Enter**.
- ❑ to confirm your selections, type **Y** then press **Enter** at the confirmation prompt.

4. Execute the **xd** command to reset the MP card.

   The following information is displayed:

```
xd
   Non destructive tests:
   1. Parameters checksum
   2. I2C access (get Power Monitor status)
   3. LAN access (PING)
   4. Modem selftests
   5. Secondary I2C access (get System status)

Type R to reset the MP or [Q] to quit the diagnostic menu.

   -> Choice:
```

5. Type **3** and press **Enter** to ping the LAN and verify the LAN settings are correctly configured.
6. Type **R** and press **Enter** to reset the MP card. Wait for the status message to clear:

```
 The MP is now being reset...
```

   The following information will be displayed when the MP is reset:

```
HP Management Processor
Firmware Revision E.02.10 Oct 1 2002,10:28:32
(c) Copyright Hewlett-Packard Company 1999-2002. All Rights Reserved.

Type Ctrl-B to activate the MP Command Interface.
```

7. Close your terminal emulation program. You can now telnet to this system from another remote system.

MP commands

There are five categories of MP commands:

- Status commands
- Server control commands
- General MP configuration commands
- MP port configuration commands
- Connections commands

The following sections provide a brief overview of the available commands. For detailed information, execute the MP Help command (**he**).

The MP Help menu displays:

```
==== MP Help ========================================================
                        MP Help System

Enter a command at the help prompt:
      OVerview  : Launch the help overview
      LIst      : Show the list of MP commands
      <COMMAND> : Enter the command name for help on individual
                  command
      TOPics    : Show all MP Help topics and commands
      HElp      : Display this screen
      Q         : Quit help

====
MP HELP: <selection>
```

Enter a command name for syntax and options for that command.

status commands

Status commands provide status on the system and on the MP card.

Command	Description
CL	Console history
DF	Display Field Replaceable Unit ID
LS	LAN status
MS	Status of the modem
PS	Power management module status
SL	Status Logs
SR	Display all firmware revisions
SS	System's processor status
VFP	Virtual front panel display

server control commands

These commands can be used to alter the state of the server.

Command	Description
MR	Modem reset
PC	Remote power control
RS	System reset from RST signal
TC	Transfer of control; system reset through INIT signal

general MP configuration commands

These commands allow you to perform general configuration tasks such as configuring automatic system restart and setting the default configuration.

Command	Description
AC	Alert display configuration
BP	Reset BMC password
CE	Log a chassis code in the MP chassis code history buffer
CG	Generate RSA key pair of Self Signed Certificate
CT	Configure tracing into MP firmware
DC	Default configuration
EX	Exit from the MP command mode
HE	Print a Help menu
IT	Modify MP inactivity timeout
LOC	Locator LED
OT	Disable over temperature control
PR	Power Restore Policy Configuration
RB	BMC reset
SDM	Set display mode (hex or text)
SO	Security options and access control
VT	View trace buffer
XD	MP diagnostics and reset
XU	Upgrade the MP firmware
ZCTGNAYOR	Clear MP NVM at your own risk
ZDTPMT	Dump the MP internal postmortem trace

MP port configuration commands

Port configuration commands allow you to configure LAN/WEB, remote/modem, and local ports.

NOTE: If you are not connecting anything to a port, hardware flow control should be off.

Command	Description
CA	Configure serial port parameters
EL	Enable LAN access options: telnet and web permissions
ER	Enable remote; modem access configurations
LC	Configure the LAN
PG	Configure paging

connections commands

Connections commands provide a means for examining and making connections or changing modes.

Command	Description
CO	Return to the redirected console mode
CSP	Connect to another service processor
DI	Disconnect remote or LAN connection
SE	Activate a system session on locator remote port
TE	Send message to other user
WHO	Display a list of connected users

baseboard management controller (BMC)

This section explains the BMC command-line interface. Topics include:

- Using the BMC CLI
- BMC Commands

using the BMC command line interface (CLI)

To log in to the BMC command line interface, use a serial connection and terminal emulation software:

NOTE: The default terminal emulation type is VT100+. Terminal emulation for the BMC cannot be changed. The default baud rate is 9600. This setting can be changed from the EFI Boot Options Maintenance Menu.

---

1. With the system turned off, connect a null-modem cable to *Serial Port 1* on the rear panel of the system, and to your remote device.
2. Configure the terminal emulation software with these settings:
   - ❏ Baud rate: 9600
   - ❏ Bits: 8
   - ❏ Parity: None
   - ❏ Stop Bits: 1 (one)
   - ❏ Flow Control: XON/XOFF
3. Using the terminal emulation, connect to the system with a *direct connection*.
4. Turn on the system. The EFI menu displays in the terminal window.
5. To access the BMC command line interface, press **Esc (**

   For example, on a U.S. QWERTY keyboard, press **Esc**, then press **Shift** and **9** at the same time.

NOTE: If AC power is connected to the system, this command activates the BMC command line interface even if the system power is off.

---

6. If prompted, enter the user or admin password at the login prompt:

   ```
   login>
   ```

   If no password is defined, you are not prompted for one.
7. The BMC prompt displays. If you entered the admin password, you have full access. If you entered the user password, you have restricted access.

   ```
   Admin Session Initiated
      cli>
   ```

   or

   ```
   User Session Initiated
      cli>
   ```

logging out of the BMC command line interface

When you are finished using the BMC CLI:

1. If you have a system password set, to log out of the BMC without returning to the system console, execute:

   Q

   The BMC login prompt displays:

   ```
   login>
   ```

2. To log out of the BMC and return to the system console, press **Esc Q** (press **Esc**, then press **Shift** and **Q** at the same time).

bmc command overview

The Baseboard Management Controller supports the industry-standard Intelligent Platform Management Interface specification (IPMI 1.0 with Extensions). This specification describes the management features that have been built into the system board. These features include: diagnostics (local and remote), console support, configuration management, hardware management, and troubleshooting.

There are two categories of BMC commands:

- Simple commands
- Intelligent Platform Management Interface (IPMI) commands

This section provides a brief overview of the available commands. For detailed information, see the Intel web site:

http://www.intel.com/design/servers/ipmi

executing BMC commands

To execute BMC commands at the command prompt:

- Type the command and any required parameters after the `cli>` prompt.
- Use the **Backspace** key to correct mistakes.
- Press **Enter** to execute the command.

simple commands

Simple IPMI commands allow you to control the BMC interface, view logs, get help, and change your password.

To execute simple BMC commands:

1. Type the first letter or letters of the command, as indicated in the table below, followed by any required options. For example, to execute the Change Password command, type **C**.
2. Press **Enter** to execute the command.
3. If prompted, enter the additional information, such as a new password, and press **Enter**. For example:

```
cli> c
Type the new password> ****
Retype the new password> ****
New password confirmed.
cli>
```

Command syntax	Options	Mode	Description
C	Prompts user for new password	User	Allows user to change the password.
FPL	N/A	User	Reads the forward progress log. This log is encoded and can be used by HP support representatives. For additional information see "SEL and FPL Log Entries" on page D-4.
H	N/A	User	Displays list of BMC commands.
INFO	N/A	User	Displays the BMC firmware revision.
LOC [0, 1]	0=off 1=on	User	Turns the system locator LED on or off.
P [0, 1]	0=off 1=on	User	Forces system power on or off; does not shut down using OS procedures. If you do not enter a parameter, displays the current power state.
Q	N/A	User	Logs out user; does not close BMC session.
RS	N/A	User	Resets the system.
SD	N/A	User	Displays the SDR repository. This data is encoded according to the IPMI spec and can be used by HP support representatives.
SE	N/A	User	Displays system event log (SEL). This log is encoded and can be used by HP support representatives. For additional information see "SEL and FPL Log Entries" on page D-4.

IPMI commands

IPMI commands allow you to communicate with and configure various components of the system. IPMI commands are available only to users with Admin level access.

CAUTION: Only run BMC IPMI commands if you are experienced with the IPMI specification. If you make mistakes running these commands, you an accidentally delete or modify data that will cause your system to operate unpredictably or fail to operate.

All IPMI commands require a sequence of hex codes used as parameters. Each command may include some or all of the following parameters:

- *Network Function and Lun (NetFnLun).* The NetFn parameter identifies the message category. The LUN value is always 0.
- *Command.* The messages specified in this document contain a one-byte command field. Commands within each category are unique. Command values can range from 00h through FDh. FEh is reserved for future extension of the specification, and FFh is reserved for message interface level error reporting on potential future interfaces.
- *Data.* The Data field carries the additional parameters for a request or a response, if any.

The IPMI commands can be entered in long or short forms. The associated response from the BMC matches the form of the command.

For example:

- Short format, or `ipmi`, command:
  - Syntax:

    ```
    ipmi NetFnLun Cmd Data1 Data2 ... DataN
    ```

  - Sample command and system response:

    ```
    cli> ipmi 18 04
    00 55 00
    cli>
    ```

- Long format, or `i`, command:
  - Syntax:

    ```
    i 0 NetFnLun 0 0 0 Cmd Data1 Data2 ... DataN 0
    ```

  - Sample command and system response:

    ```
    cli> i 20 18 C8 f0 04 04 08
    F0 1C F4 20 04 04 00 55 00 83
    cli>
    ```

Long format IPMI commands ("I") use an ASCII transcription of the IPMI data format. The following examples illustrate how IPMI commands and responses are structured.

NOTE: All non-command bytes can be replaced with 0.

Long Format IPMI Command Data Structure Example

Bits		Byte
7-2	**1-0**	
rsSa = 0x20		0x20
NetFn = 0x07	rsLUN = 0x00	0x18
Checksum = 0xC8		0xC8
rqSWID = 0xF0		0xF0
rqSeq = 0x01	rqLUN = 0x00	0x04
Cmd = 0x04		0x04
Checksum = 0x08		0x08

Long Format IPMI Response Data Structure Example

Bits		Byte
7-2	**1-0**	
rqSWID = 0xF0		0xF0
NetFn = 0x07	rsLUN = 0x00	0x1C
Checksum = 0xF4		0xF4
rsSA = 0x20		0x20
rqSeq = 0x01	rsLUN = 0x00	0x04
Cmd = 0x04		0x04
Data byte 1 = 0x00 (completion code)		0x00
Data byte 2 = 0x55 (result = no error)		0x55
Data byte 3 = 0x00 (details)		0x00
Checksum = 0x83		0x83

The BMC supports the version 1.0 IPMI categories and commands listed in the following tables. For detailed information on the IPMI specification and commands, see the Intel web site:

http://www.intel.com/design/servers/ipmi

Command Categories

NetFn	NetFn << 2	Description
00, 01	00, 04	Chassis
04, 05	10, 14	Sensor/Event (S/E)
06, 07	18, 1C	Application
0A, 0B	28, 2C	Storage
32, 33	C8, CC	HP Custom (proprietary)

Chassis Commands

Command	Description
01h	Get chassis status
02h	Chassis control
0Fh	Get Power-on Hours (POH) counter
06h	Set Power Restore Policy

Sensor/Event Commands

Command	Description
01h	Get event receiver
02h	Platform event (a.k.a. “Event Message”)
28h	Set sensor event enable
29h	Get sensor event enable
2Ah	Re-arm sensor events
2Dh	Get sensor reading

Application Commands

Command	Description
IPM Device "Global" Commands	
01h	Get device ID
02h	Cold reset
03h	Warm reset
04h	Get self test results
Broadcast Commands	
01h	Broadcast 'Get Device ID'
System Interface Commands	
2Eh	Set BMC global enables
2Fh	Get BMC global enables
30h	Clear message flags
31h	Get message flags
32h	Enable message channel receive
33h	Get message
34h	Send message
35h	Read event message buffer
36h	Get BT interface capabilities
BMC Watchdog Timer Commands	
22h	Reset watchdog timer
24h	Set watchdog timer
25h	Get watchdog timer

Storage Commands

Command	Description
SEL Commands	
40h	Get SEL info
41h	Get SEL allocation info
42h	Reserve SEL
43h	Get SEL entry
44h	Add SEL entry
47h	Clear SEL
48h	Get SEL time
49h	Set SEL time
SDR Repository Commands	
20h	Get SDR repository info
21h	Get SDR repository allocation info
22h	Reserve SDR repository
23h	Get SDR
28h	Get SDR repository time
29h	Set SDR repository time
FRU Inventory Device Commands	
10h	Get FRU inventory area info
11h	Read FRU inventory data
12h	Write FRU inventory data

firmware upgrades

To update the system and BMC firmware or the MP card firmware:

1. Download the firmware update from **http://www.hp.com/go/bizsupport**

   Follow the menu prompts to navigate to the support page:

   - Select **download drivers/ software**.
   - Enter the product name in the search field (**hp workstation zx2000**).
   - Select the search result .
   - Choose the firmware release you need to download (system and BMC or MP card).
   - Click the **i** information icon for instructions on how to download, unpack, and install the firmware upgrade:

2. Download, unpack and install the firmware upgrade.
3. Execute the **info fw** EFI command to confirm that the upgrade was successful.

4

troubleshooting

This chapter contains the following sections, which describe how to identify and solve common problems you may encounter when using your hp server rx2600 or workstation zx6000:

identifying and diagnosing hardware problems

Should a hardware failure occur, the system LEDs and e-buzzer will help you identify the problem:

- **System beeps and e-buzzer.** The rx2600/zx6000 has an e-buzzer that beeps in specific patterns to identify errors when the system boots. The e-buzzer can also send encoded data over the phone to help support representatives identify more complex problems.
- **LEDs.** The lights on the front bezel of the workstation change color and blink in different patterns to help identify specific hardware problems. LEDs on the rear panel of the system display LAN status.
- The **System Event Log (SEL)** provides detailed information about the errors identified by the e-buzzer and LEDs. See see page 4-5 and page D-4.

If the LEDs and e-buzzer do not give you enough information for you to identify the problem you are experiencing, HP also provides diagnostic tools with each operating system.

the system e-buzzer

If a problem is detected at any time when the system is booting or running, the e-buzzer emits audible beeps and an encoded error message.

- The audible beeps consist of a modem-like sound repeated 3 times, followed by 0-7 beeps of a single frequency at 1-second durations, each separated by 1 second. The e-buzzer emits a different number of beeps for each type of error. More detailed information is provided by the LEDs.
- The electronic signal can be sent through a telephone line to an authorized help desk or HP Support. This signal can be decoded by help desk equipment to extract the workstation model, serial number and details about any faults. To send this signal to HP Support, hold your telephone next to the LED 1 on the system front bezel when the system is booting.
- The e-buzzer does **not** report all problems, only the problems listed below. If the e-buzzer indicates an error, check the SEL (see page 4-5 and page D-4) for a more detailed explanations of the failure.

Number of Beeps	Component	Description
1	Processor	Processor absent or not correctly connected. Reseat or replace processor.
2	Power Supply	Power supply failure. Replace power supply.
3	Memory	No memory, bad memory modules or incompatible memory module. Check memory module loading order. Reseat or replace memory modules.
4	Graphics Card	Graphics card problem. Reseat or replace the graphics card.
5	PCI Card	PCI card problem. Reseat or replace the PCI card.
6	Critical System Failure	Two minutes has elapsed after the BMC starts system power and no BOOT_START event is logged in the SEL. Possible problems include: • Clock is bad • MotherBoard problem • CPU connection to the board bad • CPU power pod failure • CPU failure • Corrupt Firmware (bad code, or improper update) Contact support.
7	System Board	Defective system board. Contact support.

NOTE: For detailed instructions on removing and replacing system components, see Chapter 2, "Installing or Replacing Parts and Accessories."

The e-Buzzer may also be activated by several other events:

- If the system firmware detects an error during system operation, the BMC will trigger the e-Buzzer to sound.
- If you miss the beep code count during the initial transmission sequence, trigger the sequence again by pressing and holding the system power button for 3-5 seconds and *release it as soon as the sound begins.*

The power button on the front panel operates differently depending on how long the button is pressed and whether or not the system was on or off when the button was pressed.

- When the system power is off:
  - 1-3 seconds. System power turns on. The e-buzzer will beep if an error is encountered.
  - 3-5 seconds. The e-buzzer will repeat the last stored error.
- When the system power is on and the system is at the EFI:
  - 1-3 seconds. System power turns off immediately.
  - 3-5 seconds. The e-buzzer will repeat the last stored error.
  - 5 seconds or longer. System power turns off immediately.
- When the system power is on and the OS is running:
  - 1-3 seconds. System power turns off via ACPI signal to OS (Soft power-down).
  - 3-5 seconds. The e-buzzer will repeat the last stored error.
  - 5 seconds or longer. System power turns off immediately (Hard power-down).

the diagnostic LEDs

Diagnostic LEDs are on the front panel of the system. The following sections describe their functions. (For the function of other LEDs, see the *hp server rx2600/hp workstation zx6000 Getting Started Guide*.) Additional diagnostic LEDs are on the system board.

If the system has **no** MP card installed, the four diagnostic LEDs on the front panel warn of impending failures and allow you to take preventive action. For example, you may want to back up your data or replace a component before it fails.

- If **no** MP card is installed, the boot progress is monitored by Diagnostic LEDs 1-4. During the boot-up the LEDs will turn on in sequence until the EFI prompt is reached.
- If an MP card is installed, the boot process will be monitored by the MP card. The LEDs will be off.

power and system LEDs

The **Power and System LEDs** indicate the state of the system. When the System LED is blinking orange or red, a problem exists.

systems with MP card

The following system LED states exist for systems with an MP card. See the SL logs for additional information.

System LED	State
Off	Off
Solid green	Running OS
Blinking green	Booting or running EFI
Blinking orange (1/sec.)	Attention: • Alerts of levels 3-5 detected in the MP logs. • The LED will turn off once the event log has been read.
Blinking red (2/sec.)	Fault: • System Alert 7 Detected, LED will blink until the problem is resolved and the system boots successfully or until it is manually turned off with the MP **dc** command • Fatal hardware error detected by BMC, LED will blink until problem is corrected

For system alerts of levels 3-5, the attention condition on the LED can be cleared by accessing the logs using the **sl** or **dc** command available in the MP command mode.

The fault condition for system alerts of level 7 can only be cleared with the **dc** command unless hardware replacement is necessary. Refer to the SL error logs for additional error information.

NOTE: Always check the MP Status Logs in the case of a blinking orange or red System LED before replacing any hardware.

system logs (SL) logs

To view the SL logs for detailed diagnostic information, use the **sl** MP command:

1. Access the MP command prompt (page 3-23).
2. Run the **sl** command. The Event Log Viewer menu will display:

```
SL
Event Log Viewer:

Log Name            Entries    % Full         Latest Entry
-----------------------------------------------------------------
E - System Event           9         1 %      29 Oct 2002 19:15:05
F - Forward Progress      129          3 %
B - Current Boot           82
P - Previous Boot           0
L - Live Events
C - Clear All Logs

Enter your choice or [Q] to Quit:
```

3. Select **e** to review the events. The Event Log Navigation menu will display:

```
Set up alert filter options on this buffer? (Y/[N])

       Log Name            Entries    % Full         Latest Entry
-----------------------------------------------------------------
---
E - System Event         410        47 %      18 Feb 2003 09:38:10

Event Log Navigation Help:

   +       View next block     (forward in time,  e.g. from 3 to 4)
   -       View previous block (backward in time, e.g. from 3 to
2)
   <CR>    Continue to the next or previous block
   D       Dump the entire log for capture and analysis
   F       First entry
   L       Last entry
   J       Jump to entry number
   V       View mode configuration (text, keyword, hex)
   ?       Display this Help menu
   Ctrl-B  Quit and return to the Main Menu
```

4. Select **v**, then **t** to change the display to text mode:

```
Display Mode Configuration:
              H - Hex mode
   Current -> K - Keyword mode
              T - Text mode
Enter new value, or [Q] to Quit:
```

5. To decode the blinking state of System LED, review the entire SEL and look at events with alert level 3 and above.

   For example:

```
Log Entry 24: 14 Feb 2003 15:27:02
Alert Level 3: Warning
Keyword: Type-02 1b0800 1771520
Hot Swap Cage: SCSI cable removed
Logged by: BMC;  Sensor: Cable / Interconnect - SCSI ChExt Cable
Data1: Device Removed/Device Absent
0x203E4D0AC6020220 FFFF0008F61B0300

Log Entry 73: 00:00:12
Alert Level 3: Warning
Keyword: Type-02 050301 328449
The server's built-in sensors have detected an open chassis door.
Logged by: BMC;  Sensor: Physical Security - Chassis Open
Data1: State Asserted
0x200000000C020570 FFFF010302050300
```

systems with no MP card

The following system LED states exist for systems **without MP card**. See the Diagnostic LEDs for additional information.

System LED	State
Off	Off
Solid green	Running
Blinking green	Booting
Blinking orange (1/sec.)	Attention
Blinking red (2/sec.)	Fault

diagnostic LEDs

The four diagnostic LEDs on the front bezel of the system are used for diagnosing the health of the system. Refer to the SEL and FPL logs for specific information about the warning or failure indicated by the diagnostics LEDs.

These LEDs warn of impending hardware failures and allow you to take preventive action, such as making a system backup or replacing a component before it fails. These diagnostic LEDs are labeled 1, 2, 3 and 4.

The location of red LEDs can be used to identify the category of the fault or warning. For example, if LED one is red, there is a problem with memory. However, if LEDs one and two are both red, there is a problem with the system processor.

If the diagnostic LEDs indicate an error, check the SEL (see page 4-5 and page D-4) for a more detailed explanations of the failure.

The following symbols are used in the LED tables.

- The System LED indicates the severity of the error. Check this LED before proceeding to analyze the sequence of diagnostic LEDs:

Blinking orange indicates a WARNING.

Blinking red indicates a FAULT.

- The Diagnostic LEDs provide details about the specific error:

Solid red indicates the failing part or sub-system.

Off or solid green diagnostic LEDs provide additional details about the failure.

The faults and warnings fall into several general categories.

LED1	LED2	LED3	LED4	Category	e-buzzer Beeps
RED				Memory	3
	RED			Firmware	6
		RED		System Board	7
			RED	Fan	None
RED	RED			Processor	1
RED		RED		BMC	7
RED			RED	Temperature	None
	RED		RED	Power Supply	2
RED	RED	RED	RED	Unknown	None

Warnings

The following tables provide additional information about each specific warning associated with the various possible LED lighting sequences **when the system LED is orange**.

System LED	LED1	LED2	LED3	LED4	Problem	Solution
Unknown Warnings						
					Unknown warning.	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.
Memory Warnings						
					Mismatched memory pairs.	Use the memory sequence diagram on page 2-23.
					Memory thermal load order.	Use the memory sequence diagram on page 2-23.
					Bad SPD information (can't detect type).	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.
System Board Warnings						
					Battery voltage low	Replace the system board battery.

System LED	LED1	LED2	LED3	LED4	Problem	Solution
Fan Warnings						
					Fan 1A is not functioning properly	Replace the fan that is not functioning. If a processor fan has failed, you must replace the CPU.
					Fan 1B is not functioning properly	
					CPU fan 0 is not functioning properly	
					CPU fan 1 is not functioning properly	
					Fan module 2 (memory) is not functioning properly	
					Fan module 3 (Disks/PCI) is not functioning properly	

System LED	LED1	LED2	LED3	LED4	Problem	Solution
Processor Warnings						
					Processor 0 temperature exceeds limit	If a processor fan has failed, you must replace the CPU.
					Processor 1 temperature exceeds limit	
Temperature Warnings						
					External air temperature too high	Make sure nothing is blocking the system's airflow and locate your system in an air-conditioned room.
Video Warnings						
					No video adapter present	Install a video adapter. See the installation instructions shipped with the video adapter.
Power Supply Warnings						
					Power supply 1 fault	Replace the power supply.
					Power supply 2 fault	

Faults

The following tables provide additional information about each specific fault associated with the various possible LED lighting sequences **when the system LED is red**.

System LED	LED1	LED2	LED3	LED4	Problem	Solution
Unknown Faults						
					Unknown fault.	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.
Memory Faults						
					Mismatched memory pairs.	Use the memory sequence diagram on page 2-23.
					Uncorrectable memory error.	Replace memory.
					No memory installed.	Install memory.
					Bad Memory. One or more DIMMs are bad or not seated properly.	Reseat the DIMMs. If the error persists, replace them.
Firmware Errors						
					System firmware hang.	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.

System LED	LED1	LED2	LED3	LED4	Problem	Solution
System Board Faults						
					VRM overvoltage	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.
					VRM undervoltage	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.
Fan Faults						
					rs2600: Cooling unit 1 fault (power/CPU) zx6000: Cooling unit 1 fault	Replace the fan that is not functioning. If a processor fan has failed, you must replace the CPU.
					rs2600: Cooling unit 2 fault (memory) zx6000: Cooling unit 2fault (Disks/PCI)	
					rs2600: Cooling unit 3 fault (Disks/PCI) zx6000: N/A	
Processor Faults						
					Processor 0 temperature exceeds limit	If a processor fan has failed, you must replace the CPU.
					Processor 1 temperature exceeds limit	
					No processor detected	

System LED	LED1	LED2	LED3	LED4	Problem	Solution
BMC Faults						
					BMC firmware is damaged	Turn off and unplug the system. Wait 20 seconds, then plug in and restart the system. If the error repeats, replace the system board.
					System board FRU inventory device inaccessible	Replace the system board.
Temperature Faults						
					External air temperature too high	Make sure nothing is blocking the system's airflow and locate your system in an air-conditioned room.
Power Supply Errors						
					VRM or power pod fault	View the SEL for additional information (page D-4). For further assistance, contact your HP Support Engineer.
					Power Supply 1 fault	
					Power Supply 2 fault	Replace the power supply.
					12V out of range (power supply interface fault)	

LAN LEDs

The front panel **LAN LED** indicates the system is communicating over the Gigabit or System Management LAN:

- **blinking green**, the system is communicating over the LAN
- **solid green**, LAN link is established, no current LAN activity
- **not green**, the system is off

Four **Gigabit LAN LEDs** are on the rear panel:

LAN LED	Location	Color	State
1. Gbit	*Tower:* Right	Off	No 1000 Mbps link
	Rack-mounted: Top	Green	Port linked at 1000 Mbps
2. 100mb	*Tower:* 2nd from right	Off	No 100 Mbps link
	Rack-mounted: 2nd from top	Green	Port linked at 100 Mbps
3. Link	*Tower:* 2nd from left	Off	No 10 Mbps link
	Rack-mounted: 2nd from bottom	Green	Port linked at 10 Mbps
4. Activity	*Tower:* Left	Off	No LAN activity
	Rack-mounted: Bottom	Green	Flashing or solid green LED indicates activity on LAN port

Two **System Management 10/100 LAN LEDs** are on the rear panel:

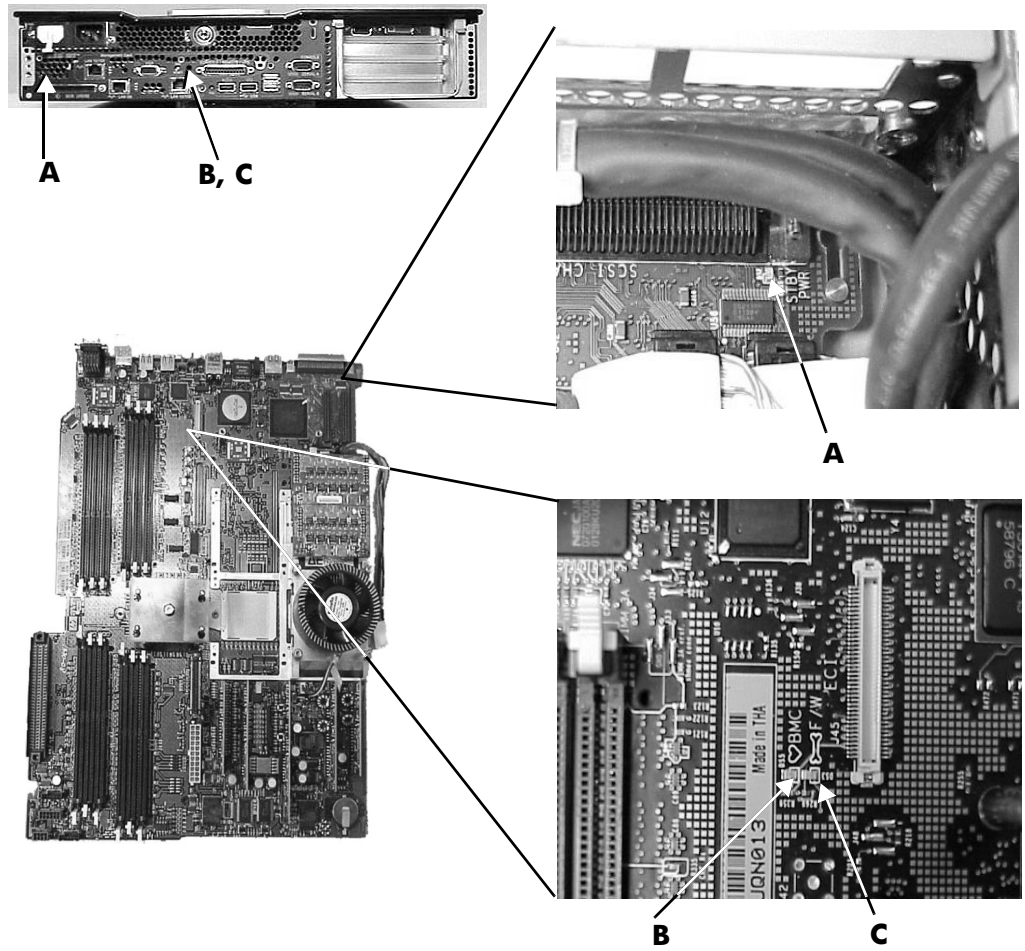
LAN LED	Location	Color	State
1. Speed	*Tower:* Right	On	Port linked at 100 Mb/s
	Rack-mounted: Top	Off	Port linked at 10 Mb/s
2. Activity	*Tower:* Left	On	Port linked
	Rack-mounted: Bottom	Off	No link established

Four **MP LAN LEDs** are also on the rear panel if the system has a MP card installed:

LAN LED	Location	Color	State
1. Self-test	*Tower:* Right	Yellow	MP running self test or error
	Rack-mounted: Top	Off	MP has booted
2. 10BT	*Tower:* 2nd from right	Green	10BT link established
	Rack-mounted: 2nd from top	Blinking Green	10BT activity
		Off	No link or 100BT link
3. 100BT	*Tower:* 2nd from left	Green	100BT link established
	Rack-mounted: 2nd from bottom	Blinking Green	100BT activity
		Off	No link or 10BT link
4. Standby Power	*Tower:* Left	Green	Standby Power on
	Rack-mounted: Bottom	Off	Standby Power off

system board diagnostic LEDs

There are three additional LEDs that can help when troubleshooting the system. These LEDs are located on the system board close to the back of the system and can be viewed through the small cooling holes in the system case.



Location of the STBY LED, F/W LED and BMC LED

	LED	Description
A	STBY	This standby LED comes on as soon as the system's power cord is plugged in. If this light is off when you plug it in, reseat the power supply, and if this does not work, replace the power supply. See Chapter 2 for instructions.
B	BMC	A few seconds after the system is plugged in this LED starts blinking, which means that the Baseboard Management Controller is alive. If this LED is not blinking and the STBY (standby) LED is on, you may have to replace the system board.
C	F/W	A few seconds after the system button is pressed in the system firmware code fetch LED comes on indicating that the firmware has started the boot process. If this LED does not come on, you may have to replace the system board.

running diagnostic software tools

This section includes information on the following diagnostic tools:

- HP e-DiagTools Hardware Diagnostics

Before you run the HP diagnostic software, take note of any e-buzzer and LED error messages. To find out more about the error, note any event messages and use the tool appropriate for your system to determine what failed.

NOTE: Event messages are listed in Appendix D.

hp e-DiagTools hardware diagnostics

Your system came with an *HP IPF Offline Diagnostics and Utilities* CD with HP e-DiagTools Hardware Diagnostics. These tools may be used to diagnose hardware-related problems on your HP system.

Run e-DiagTools before contacting HP for Warranty service. This is to obtain information that will be requested by a Support Agent.

With this utility you can:

- Check the hardware configuration and verify that it is functioning correctly.
- Test individual hardware components.
- Diagnose hardware-related problems.
- Obtain a complete hardware configuration.
- Provide precise information to an HP support agent so they can solve problems quickly and effectively.

HP e-DiagTools provides a user-friendly interface to the *Offline Diagnostics Environment (ODE)*, that enables you to troubleshoot a system that is running without an OS or cannot be tested using the online tools. ODE can also be run separately using a command line interface, which allows the user to select specific tests and/or utilities to execute on a specific hardware module.

starting hp e-DiagTools

1. Insert the *HP IPF Offline Diagnostics and Utilities* CD in the CD or DVD drive.
2. Restart the system.
3. Select the CD/DVD boot option from the EFI startup menu.

NOTE: If you are unable to boot from your CD/DVD drive, restart your system and check the boot options from the **Boot Options Maintenance Menu** to ensure that your system is configured to boot from the CD/DVD drive.

---

4. If you are not familiar with e-DiagTools, review the documentation. From the main menu:
   a. Select **View Release Notes and Documentation Menu** to view a list of available documentation.
   b. Select **View e-DiagTools Info** to open the overview document.
5. If you are already familiar with e-DiagTools, select **Run e-DiagTools for IPF** from the main menu.

producing a support ticket

To produce a complete record of your system's configuration and test results, you will need to create a Support Ticket. This is a simple text file that contains essential information and is designed to assist your local or HP Support Agent.

To produce a Support Ticket, from the **Welcome to e-DiagTools** Menu:

1. Start e-DiagTools and select **Run e-DiagTools for IPF** from the main menu.
2. Select **2 - Run e-DiagTools Basic System Test (BST)** to run the basic diagnostics on your system if you have not already done so.

   e-DiagTools scans your system. The Configuration Description will display on the screen when the configuration detection phase is complete
3. Select **2 - Continue Test** to run the rest of the basic diagnostics test.
4. After the test is complete:
   - ❏ To view the Support Ticket, press **4**. (Use the arrow keys to scroll.) Have the support ticket the screen when you contact customer support.
   - ❏ To exit the Support Ticket tool, press **3**.

offline diagnostics environment (ODE)

The Offline Diagnostics Environment is an offline support tools platform that enables users to troubleshoot a system that cannot be tested using online tools. These may be accessed through the HP e-DiagTools Hardware Diagnostics menus or as separate applications. The offline environment is also useful for some types of testing in which it is not desirable to have to boot the system first.

tools provided

The ODE includes a variety of diagnostics tools. Depending on your system and configuration, these may include some or all of the following tools, plus additional system-specific tools:

- MAPPER is an offline system configuration mapping utility. It identifies and displays a list of system components including hardware modules and peripheral devices.
- CPUDIAG is a CPU diagnostics tool.
- MEMDIAG is a memory diagnostics tool.
- PERFVER is a utility for testing peripherals attached to the boot path.

To access a detailed list of tools provided on your system, from the ODE Main Menu:

1. Select **View Release Notes and Documentation Menu**
2. Browse the documentation and release notes.

running ode from the offline diagnostics and utilities cd

ODE uses a command line interface, which allows the user to select specific tests and/or utilities to execute on a specific hardware module.

To run ODE from the *HP IPF Offline Diagnostics and Utilities* CD:

1. Insert the CD into the CD/DVD drive and reset system power, the system should come up to the boot manager.
2. If the boot manager is already configured, and the CD/DVD drive is configured as one of the boot devices, you move the cursor to the line which shows the CD/DVD drive, and press **Enter**. The CD then will boot to the Launch Menu.
3. Select **Run the Off-line Diagnostic Environment (ODE)** from the launch menu.

NOTE: If you are unable to boot from your CD/DVD drive, restart your system and check the boot options from the **Boot Options Maintenance Menu** to ensure that your system is configured to boot from the CD/DVD drive.

For further information, see **http://docs.hp.com/hpux/diag** under the section titled "Offline Diagnostics." This site includes links to a FAQ, conceptual overview, and a quick reference guide to ODE. Also see the section titled "Diagnostics (Support Tools) General," especially the *SupportPlus: Diagnostic User's Guide*, Chapter 3. "Using the SupportPlus Media to Run Offline Diagnostics" is a useful chapter for more information on what ODE is, and how to run it.

NOTE: Ignore references to the SupportPlus Media in the SupportPlus User's Guide, Chapter 3: they do not apply to zx6000 or rx2600 systems. However, the conceptual and procedural information still applies to IPF systems. Any discrepancies have been noted and explained in the *SupportPlus User's Guide*, and elsewhere, as appropriate.

A

system accessories

This appendix contains information about the graphics cards and mass storage devices supported on the hp sever rx2600 and the hp workstation zx6000:

- For photographs of internal system components, see Chapter 2.
- For a list of system components and part numbers, see Appendix C.
- For additional information on supported accessories and components, visit **http://www.hp.com/go/bizsupport**.

graphics cards

hp server rx2600 and hp workstation zx6000 systems with Management Processor (MP) cards support a VGA monitor connected to the VGA port on the MP card.

zx6000 workstations with **no** MP cards are available with a range of AGP graphics cards.

- Graphics cards may include an 15-pin connector, an 18-pin connector, or both. Only one connecting cable is needed for each monitor.
- Some video cards are pre-installed in the system, while others are packaged separately and shipped with the system. If your workstation did not ship with a pre-installed graphics card, you must install the card and load the drivers. Refer to the documentation included with your graphics card for instructions.

NOTE: If you are running HP-UX or Linux with a graphics card but choose not to run X Server, there are several ways to prevent X Server from starting automatically. Refer to "Management Processor Card" in Chapter 3.

---

supported graphics cards for systems with no MP card

Depending on the OS on your system, you may have one of the following graphics cards. For a complete and current list of supported cards, see **http://www.hp.com/go/bizsupport**.

Type of Card	HP-UX	Linux	Windows
High End 3D	ATI FireGL 4	nVIDIA Quadro4 900XGL nVIDIA Quadro4 980XGL	nVIDIA Quadro4 900XGL nVIDIA Quadro4 980XGL ATI FireGL X1
Entry 3D		nVIDIA Quadro2 EX	
Professional 2D	ATI Radeon 7000	ATI Radeon 7000	ATI Radeon 7000

- For more detailed information about your graphics card, see the manufacturer's web site:
  - ATI: **www.ati.com**
  - NVIDIA: **www.NVIDIA.com**

selecting a monitor

Use the supported resolutions and frequencies to select the appropriate monitor for your graphics card. Frequencies of 75-85Hz and higher (depending on monitor size) provide ergonomic flicker-free viewing on analog CRT monitors. Displays using DVI never flicker; the refresh rate changes the speed at which the image is updated. Anything over 48 frames/sec. is considered "smooth motion."

If the monitor you select is DDC-2B or DDC-2B+ compliant, the graphics card automatically limits itself to the resolutions and frequencies supported by that monitor. In this case, you do not need to use the tables in this section to select your monitor. If the display mode you desire is supported by your video card and monitor, but not part of VESA or is not programmed into the monitor's DDC-ROM, you may override the defaults.

On the tables that follow:

- Only common resolutions are listed. Other intermediate resolutions are possible.
- High frequencies may not be available at all color depths.

CAUTION: To prevent possible damage to your monitor, make sure you select a monitor that supports the resolutions and frequencies you want to use.

supported resolutions and frequencies

ATI FireGL 4

Analog Monitor with DB-15 Connector

Display Resolution	Vertical Frequency (Hz)
1024×768	60, 75, 85, 100
1280×1024	60, 75, 85, 100
1600×1200	60, 75, 85, 100
1920×1200	60, 75, 85, 100

Digital Monitor with DVI Connector

Display Resolution	Vertical Frequency (Hz)
1024×768	60, 75
1280×1024	60, 75
1600×1200	60

ATI FireGL X1

NOTE: Support for two analog or digital monitors. You can set resolutions and refresh rates independently for two connected displays.

Analog or Digital Monitor with DB-15 Connector

Display Resolution	Vertical Frequency (Hz)
800×600	60, 75, 85, 100
1024×768	60, 75, 85, 100
1280×1024	60, 75, 85, 100
1600×1200	60, 75, 85
1920×1200	60, 75

Digital Monitor with DVI Connector

Display Resolution	Vertical Frequency (Hz)
800×600	60, 75
1024×768	60, 75
1280×1024	60, 75
1600×1200	60

ATI RADEON 7000

Analog Monitor with DB-15 Connector

NOTE: Can operate with two analog monitors using included converter dongle

Display Resolution	Vertical Frequency (Hz)
640×480	60, 72, 75, 85, 90, 100, 120, 160, 200
800×600	60, 70, 72, 75, 85, 90, 100, 120, 160, 200
1024×768	60, 70, 72, 75, 85, 90, 100, 120, 140, 150, 160, 200
1280×1024	60, 70, 75, 85, 90, 100, 125, 130, 140
1600×1200	60, 66, 70, 72, 75, 76, 85, 90, 100
1920×1200	60, 72, 75, 76, 80, 85
2048×1536	60, 66

Digital Monitor with DVI Connector

Display Resolution	Vertical Frequency (Hz)
640×480	60, 75
800×600	60, 75
1024×768	60, 75
1280×1024	60, 75
1600×1200	60

NVIDIA Quadro4 900XGL

Analog Monitor with DB-15 Connector

NOTE: Includes two built-in digital video ports with analog converter cables

Display Resolution	Vertical Frequency (Hz)
640×480	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
800×600	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
1024×768	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
1280×1024	60, 70, 72, 75, 85, 100, 120, 140, 144, 150
1600×1200	60, 70, 72, 75, 85, 100, 120
1920×1200	60, 70, 72, 75, 85, 100
2048×1536	60, 70, 72, 75

Digital Monitor with DVI Connector

Display Resolution	Vertical Frequency (Hz)
640×480	60
800×600	60
1024×768	60
1280×1024	60
1600×1200	60

NVIDIA Quadro4 980XGL

Analog Monitor with DB-15 Connector

Display Resolution	Vertical Frequency (Hz)
640×480	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
800×600	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
1024×768	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
1280×1024	60, 70, 72, 75, 85, 100, 120, 140, 144, 150
1600×1200	60, 70, 72, 75, 85, 100, 120
1920×1200	60, 70, 72, 75, 85, 100
2048×1536	60, 70, 72, 75

Digital Monitor with DVI Connector

Display Resolution	Vertical Frequency (Hz)
640×480	60
800×600	60
1024×768	60
1280×1024	60
1600×1200	60

NVIDIA Quadro2 EX

Analog Monitor with DB-15 Connector

Display Resolution	Vertical Frequency (Hz)
640×480	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
800×600	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
1024×768	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170, 200, 240
1280×1024	60, 70, 72, 75, 85, 100, 120, 140, 144, 150, 170
1600×1200	60, 70, 72, 75, 85, 100, 120
1920×1200	60, 70, 72, 75, 85, 100
2048×1536	60, 70, 72, 75

mass storage

supported hard drives

The system supports up to three 3.5-inch (1-inch high) hard disk that may be supplied with the workstation (type and quantity depends on model) on internal shelves, connected to the SCSI controller.

	SCSI (10 krpm)	SCSI (15 krpm)
Capacity	36.4 GB, 73.4 GB, 146 GB	36.4 GB, 73.4 GB
Interface	Ultra 320 SCSI	Ultra 320 SCSI
Average seek time (read)	4.9ms	3.8ms
Track-to-Track Seek Time (read)	0.55ms	0.4ms
Full Stroke Seek Time (read)	9.2ms	6.7ms
Buffer size	8 MB data buffer	8 MB data buffer

supported optical drives

cd-rw drive

The CD-RW features include:

- CD-ROM data disk (Mode 1 and Mode 2)
- Photo-CD Multisession
- Video CD
- CD-DA
- CD-I FMW
- CD-ROM XA Mode 2 (Form 1 & 2)
- Enhanced CD (CD-Plus, CD-Extra, Pre-gap, Mixed)
- MPC III compliant
- Interface type: E-IDE/ATAPI, supports Ultra DMA 33
- DVD-ROM

Readable disks:

- CD/CD-ROM (12cm, 8cm)
- CD-R
- CD-RW
- DVD-ROM
- DVD-R
- DVD-RW
- DVD+R
- DVD+RW

Writable disks:

- CD-R
- CD-RW

Write/Read Speed	Write (CD-R) 2× to 8× Write (CD-R/W) 2× CD-ROM Read 24× (maximum) DVD Read 8× (read only) DVD-RAM 4× (read only) DVD+R 8× (read only) DVD+RW 4× (read only)
Data capacity	650 MB or up to 74 minutes of audio per disc 700 MB or up to 80 minutes of audio per extended disk 547 MB in CD-UDF data format
Data transfer rate (max.)	600 KB/sec, 3600 KB/sec (CD), 10,800 KB (DVD)
Access Time	< 100ms
Loading Type	Manual tray
Mounting Type	Horizontal or vertical
Data Buffer Capacity	2 MB
Rotation Method	• Constant Angular Velocity (CAV) • Constant Linear Velocity
Reliability	MTBF 60,000 POH

dvd-rom drive

The DVD-ROM drive features include:

- Supported CD-ROM formats:
- CD-ROM mode 1 and 2 data disc
- Photo-CD multisession
- CD audio disc
- Mixed mode CD-ROM disc (data and audio)
- CD-ROM XA, CD-I, CD-Extra, CD-R, CD-RW

Supported DVD-ROM formats:

- DVD-ROM
- DVD-R (4.7 GB/3.9 GB)
- DVD-RAM (4.7 GB/2.6 GB)
- DVD-RW
- DVD+RW

Interface: E-IDE/ATAPI, Support Ultra DMA 33.

Data Capacity:	
DVD-ROM	Up to 8.5 GB/side
DVD-RAM	4.7 GB/side
DVD-R	4.7 GB/side
DVD+R	4.7 GB/side
DVD+RW	4.7 GB/side
CD	650 MB
Data Transfer Rate	8× (maximum) DVD/DVD+R 24× (maximum) CD-ROM 4× (maximum) DVD-RAM 4× (maximum) DVD+RW
Loading Type	Manual tray
Access Time	120 ms (DVD) 90 ms (CD-ROM) 210 ms (DVD-RAM)
Data Buffer Capacity	256 KB
Acoustic Noise	45 dB
Reliability	MTBF 60,000 POH

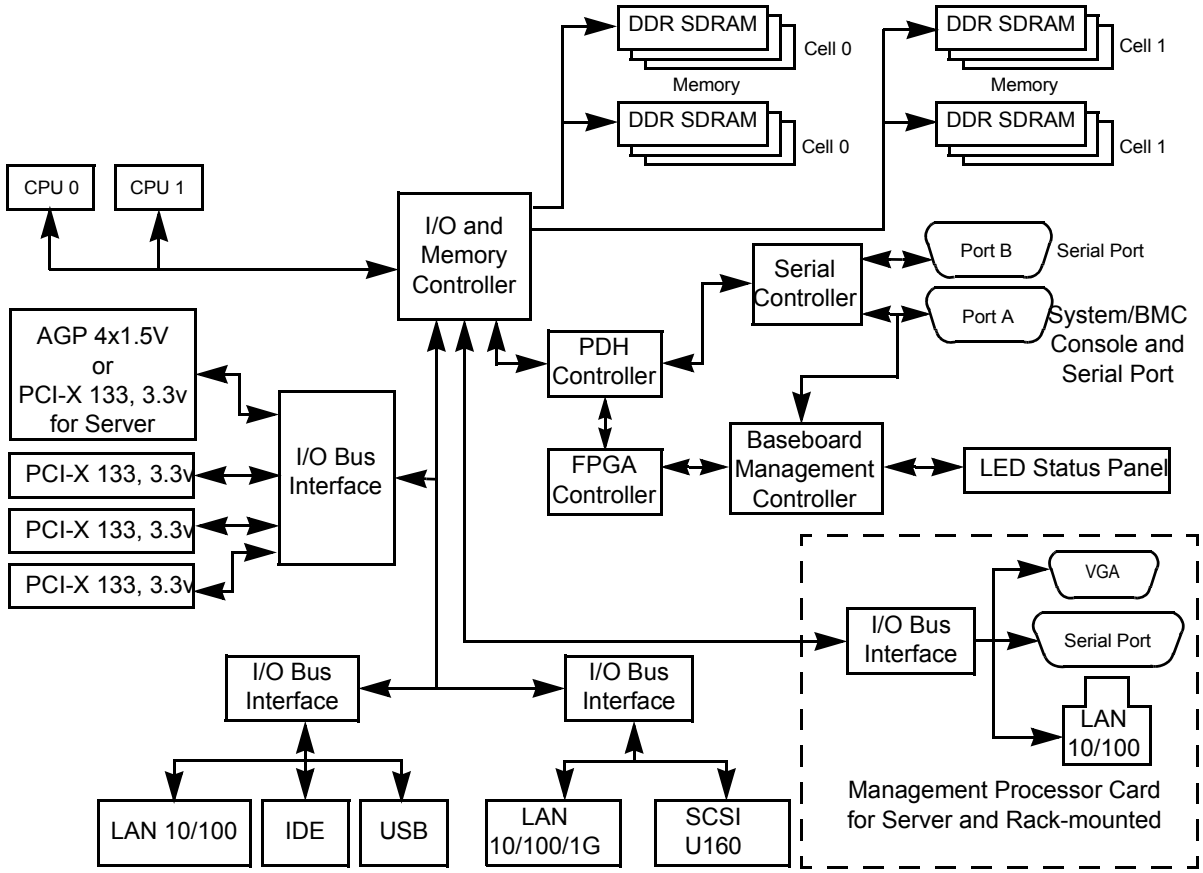
B

system board

This appendix provides an overview of the system board and descriptions of key components (chips) on the board.

system board overview

This section provides a block diagram of the system board and photos of the main components and connectors on the board. For a photograph of the system board connectors, see "Location of internal components and connectors" on page 2-2.



Block Diagram of the System Board

system board components

The following sections describes the main components of the system board:

- Intel® Itanium® 2 Processor (one or two processors supported)
- ZX1 I/O and memory controller
- ZX1 AGP/PCI bus controller
- Processor dependent hardware controller
- Dual serial controller
- Field processor gate array controller
- Baseboard Management Controller
- SCSI controller
- IDE controller
- USB controller
- 10/100BT standard/management LAN
- 10/100/1000 LAN

Intel® Itanium® 2 processor

The Intel® Itanium® 2 processor provides the following features:

- Eight-stage pipeline, six general-purpose ALUs, two integer units, one shift unit, four floating-point units
- Split L1 cache :
  - 16 KB, 4-way set associative data cache
  - 16 KB, 4-way set associative instruction cache
  - 64 byte line size
- Unified L2 cache:
  - 256 KB, 8-way set associative
  - 128 byte line size
- Unified L3 cache:
  - 3 MB, 12-way set associative (1 GHz)
  - 1.5 MB, 6-way set associative (900 MHz)
  - 128 byte line size

processor bus

The Intel® Itanium® 2 processor bus (Front Side Bus, FSB) in this product runs at 200 MHz. Data on the FSB are transferred at a double data rate, which allows a peak FSB bandwidth of 6.4 GB/sec.

ZX1 I/O and memory controller

The rx2600 and zx6000 support the following features of the ZX1 I/O and memory controller chip:

- 3.3 GB/s peak I/O bandwidth
- provides seven communication paths
- Peak memory bandwidth of 8.5 GB/s
- two memory cells, 144 data bits each

I/O bus interface

The I/O bus interface provides these features:

- Provides industry standard AGP 1× and 2× support for legacy graphics, and AGP 4× for current high performance graphics.
- Provides industry standard PCI 33MHz & 66MHz, PCI-X 66MHz to 133MHz, 32 or 64 data bit support.
- Uses 3.3V PCI only, and it does not support 5V PCI.
- Optimizes for DMA performance.
- Supports AGP fast writes (only to addresses less than 4 GB).
- Supports 3.3V or Universal keyed PCI cards. 5V keyed PCI cards are not supported.
- Uses peer-to-peer (P2P) subset that is required by the AGP specification (write-only, PCI cycles).
- Supports up to four PCI sockets.

processor dependent hardware controller

The processor dependent hardware controller (PDH) provides these features:

- 16-bit PDH bus with reserved address space for:
  - Flash memory
  - Non-volatile memory
  - Scratch RAM
  - Real Time Clock
  - UARTs
  - External Registers
  - Firmware read/writable registers
  - Two general purpose 32-bit registers
  - Semaphore registers
  - Monarch selection registers
  - Test and Reset register
- Reset and INIT generation

dual serial controller

The dual serial controller is a dual universal asynchronous receiver and transmitter (DUART). This chip provides enhanced UART functions with 16-byte FIFOs, a modem control interface. Registers on this chip provide onboard error indications and operation status. An internal loopback capability provides onboard diagnostics.

Features include:

- Data rates up to 115.2kbps
- 16550A fully compatible controller
- A 16-byte transmit FIFO to reduce the bandwidth requirement of the external CPU
- A 16-byte receive FIFO with four selectable interrupt trigger levels and error flags to reduce the bandwidth requirement of the external CPU
- UART control that provides independent transmit and receive
- Modem control signals (-CTS, -RTS, -DSR, -DTR, -RI, -CD, and software controllable line break)
- Programmable character lengths (5, 6, 7, 8) with Even, Odd or No Parity
- A status report register

field programmable gate array

The field programmable gate array (FPGA) provides ACPI and LPC support for HP Intel® Itanium® 2 platforms based on HP chipsets. This controller is connected to the PDH bus and provides these features:

- ACPI 2.0 interface
- LPC bus interface to support BMC
- Decoding logic for PDH devices

baseboard management controller

The baseboard management controller supports the industry-standard Intelligent Platform Management Interface (IPMI) specification. This specification describes the management features that have been built into the system board. These features include: diagnostics (both local and remote) console support, configuration management, hardware management and troubleshooting.

The baseboard management controller provides the following:

- Compliance with Intelligent Platform Management Interface 1.0
- Tachometer inputs for fan speed monitoring
- Pulse width modulator outputs for fan speed control
- Push-button inputs for front panel buttons and switches
- One serial port, multiplexed with the system console port
- Remote access and intelligent chassis management bus (IC MB) support
- Three I^2C master/slave ports (one the ports is used for IP MB)
- Low pin count (LPC) bus provides access to three keyboard controller style (KCS) and one-block transfer (BT) interface
- 32-bit ARM7 RISC processor
- 160-pin low profile flat pack (LQFP) package
- Firmware is provided for the following interfaces:
  - Intelligent platform management interface (IPMI)
  - Intelligent platform management bus (IP MB)

SCSI controller

The SCSI controller is an LSI Logic 53C1030 chip. This chip is fully compliant with the SCSI Peripheral Interface-4 Specification (SPI-4). It has two independent SCSI channels supporting devices at speeds up to 320 MB/sec each. The 53C1030 adheres to the PCI-X addendum to the PCI Local Specification and is hard-wired to PCI ID 1 which corresponds to bit 17 of the PCI AD bus.

IDE interface

The IDE interface provides support for an internal CD-RW or a DVD reader through an internal IDE connector and cable. This interface supports the master capability.

The IDE controller (PCI649) supports the ATAPI zero (0) to five (5) modes (from 16 to 100 MB/s). The usable speed on this system is limited to 16MHz (ATA-33 mode, 33 MB/s) because the slimline CD/DVD devices do not support the ATA-66 and 100 modes.

The primary IDE channel is the only channel that is implemented. The IDE cable provides only one drive connector, of the Master type, for the optical storage peripheral.

10/100bt standard/management LAN

The 10/100 LAN port provides: some It mainly provides The 10/100 LAN port also provides:

- Basic remote manageability features on the core system.
- A management LAN interface for operating system level manageability applications such as Toptools.
- The LAN controller is an Intel® 82550 chip.
- Power-On-LAN is an additional feature that the LAN controller provides. Power-On-LAN allows you the ability to power up a system remotely through the LAN by sending special LAN packets to the system to be powered on.

chip spare functionality (rx2600 systems only)

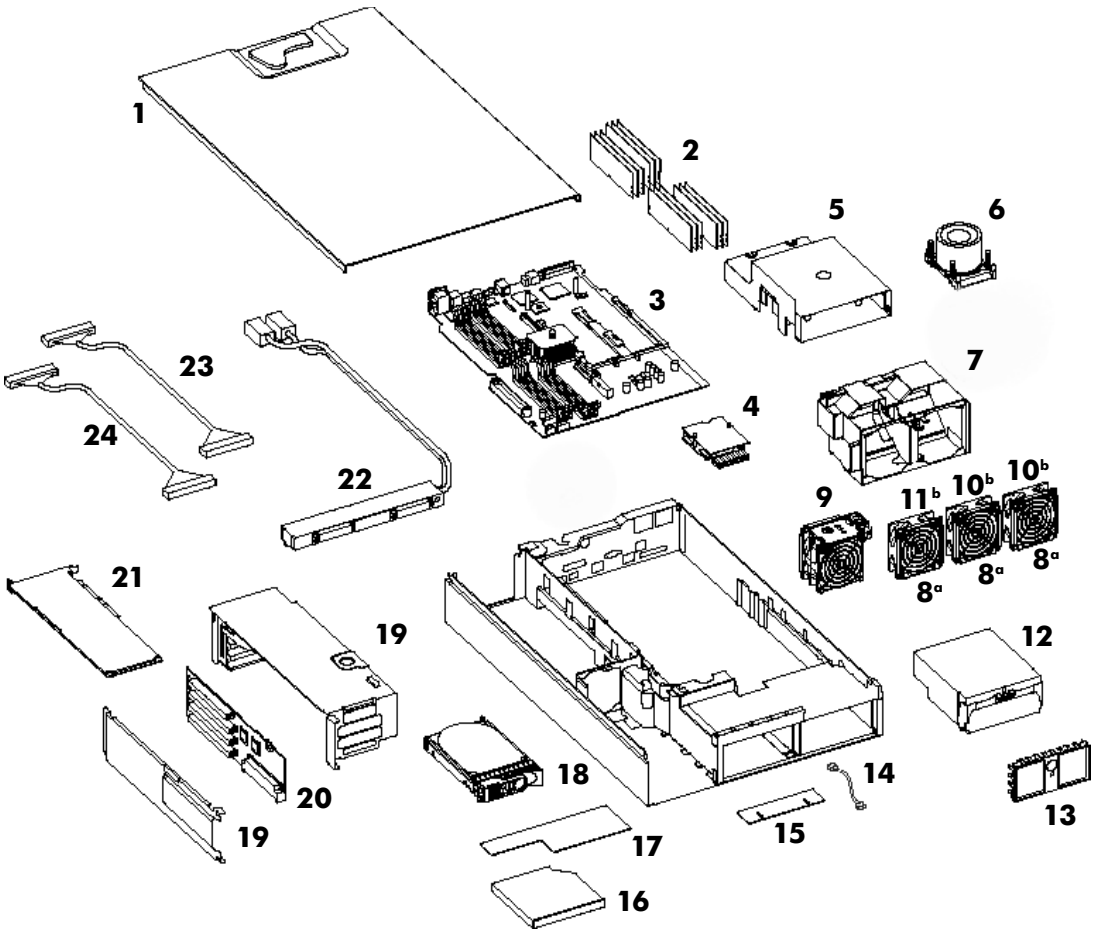
Chip spare enables an entire DDR SDRAM chip on a DIMM to be bypassed in the event that a multi-bit error is detected on the DDR SDRAM. In order to use the chip spare functionality on your system, only DIMMs built with ×4 DDR SDRAM parts can be used, and these DIMMs must be loaded in quads (see page 2-22).

C

part numbers

This appendix contains an overview of system accessories, an exploded view of hp zx6000 workstation and hp rx2600 server components, and a components parts list. For more recent information on supported accessories and components, visit **http://www.hp.com/go/bizsupport**.

zx6000 parts



Exploded View of zx6000 Parts

a. Tower system fan

b. Rack-mount system fan

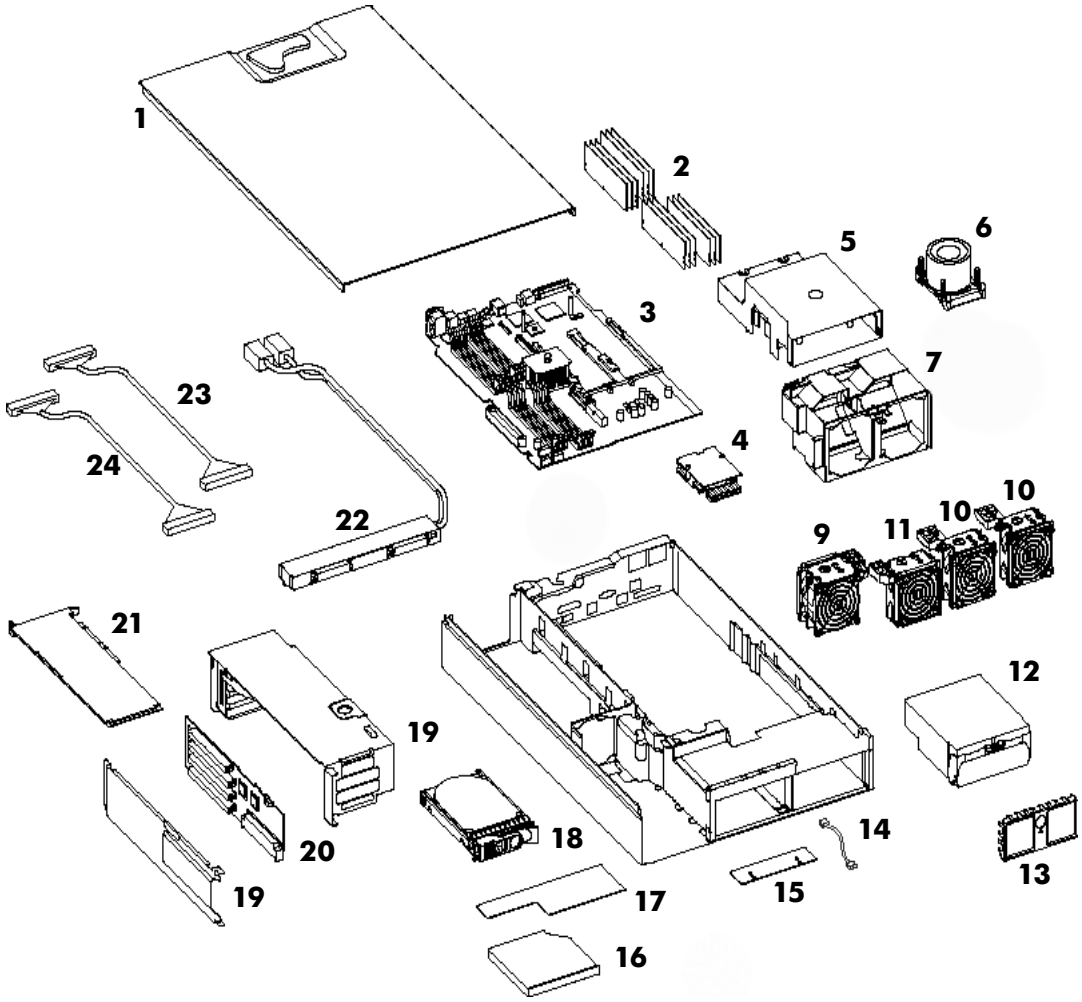
Item	Description	Replacement	Exchange
System Components			
3	zx6000 Workstation System Board	A7231-67510	A7231-69510
20	zx6000 Workstation AGP Board	A7231-66540	N/A
22	Power Supply Interface Module	A7231-04018	N/A
N/A	SCSI Backplane	A7231-66520	A7231-69520
15	Status Panel	A7231-66550	N/A
Processor			
6	Intel® Itanium® 2, 900 MHz	A7231-62039	A7231-69039
6	Intel® Itanium® 2, 1.0 GHz	A7231-62030	A7231-69030
N/A	Processor Tool Kit	A7231-67046	N/A
Hard Drives			
18	36 GB 10 krpm, Ultra 160 SCSI, Carbon	A7835-64001	A7835-69001
18	36 GB 10 krpm, Ultra 320 SCSI, Carbon	A7835-64002	A7835-69002
18	36 GB,15 krpm, Ultra320 SCSI, HotPlug, Carbon	A7836-64001	A7836-69001
18	73 GB 10 krpm, Ultra 160 SCSI, Carbon	A7837-64001	A7837-69001
18	73 GB 15 krpm, Ultra 320 SCSI, Hotplug, Carbon	A7838-64001	A7838-69001
18	146 GB 10 krpm, Ultra320 SCSI, Hotplug	A7839-64001	A7839-69001
Memory			
2	256 MB PC2100 Registered DDR-SDRAM	A6833-60001	A6833-69001
2	512 MB PC2100 Registered DDR-SDRAM	A6746-60001	A6746-69001
2	1.0 GB PC2100 Registered DDR-SDRAM	A6834-60001	A6834-69001
2	2.0 GB PC2100 Registered DDR-SDRAM	A7843-67001	A7843-69001
Power Supply			
12	650W Power Supply-AC	A6874-63000	A6874-69000
4	Voltage Regulator Module	0950-4294	N/A

Item	Description	Replacement	Exchange
Graphics Cards			
21	ATI FireGL 4	A7226-60520	A7226-69520
21	ATI, Fire GLX1, AGP	313287-001	312523-001
21	ATI Radeon 7000	A8049-60520	A8049-69520
21	nVIDIA Quatro2 EX	A7806-60510	A7806-69510
21	nVIDIA Quatro4 900XGL	A8064-60520	A8064-69520
21	nVIDIA Quadro4 980XGL	308961-001	313285-001
21	DVI-I to DB15 cable	A6046-63001	N/A
I/O Cards			
21	10/100BT Ethernet	P3492-63000	N/A
21	100BT Ethernet	B5509-66001	N/A
21	Single channel ultra 160 SCSI adapter	A6829-60001	N/A
21	SCSI adapter, dual port HVD/FW, PCI Bus	A5159-60001	N/A
21	LAN adapter, 1000 SX Gigabit	A6847-67101	N/A
21	LAN adapter, 1000 SX Gigabit	A6825-67001	N/A
21	Fibre channel card, 2 Gb, single port	A6795-62001	A6795-69001
21	100BTX four port	A5506-60102	A5506-69102
21	100BaseT PCI LAN Adapter and L	B5509-66001	N/A
21	FireWire	5185-8203	N/A
21	Audio card	A7784-60501	N/A
17	Management card	A7231-66580	A7231-69580
Fans			
10	Super 80 mm fan (zx6000 rack)	A7231-04014	N/A
11	Thin 80 mm fan (zx6000 rack)	A7231-04015	N/A
9	Dual fan (zx6000 tower and rack)	A7231-04033	N/A
8	Standard 80mm fan (zx6000 tower)	A7231-04017	N/A

Item	Description	Replacement	Exchange
Cables			
N/A	IDE cable	A7231-63002	N/A
23	SCSI cable A	A7231-63017	N/A
24	SCSI cable B	A7231-63018	N/A
14	Status panel cable	A7231-63003	N/A
N/A	Audio cable	8121-0808	N/A
N/A	Disk power cable	A7231-63004	N/A
N/A	80 mm fan cable	A7231-63006	N/A
N/A	Super 80 mm fan cable	A7231-63005	N/A
N/A	DVI-I to DB15, converter dongle	A6064-63001	N/A
Plastic Covers/Metal Latches and Chassis			
N/A	Right-side rack latch	A7231-04023	N/A
N/A	Right-side rack bezel (carbon)	A7231-04038	N/A
N/A	Left-side rack bezel (carbon) and Latch	A7231-04039	N/A
N/A	Optical drive blank (carbon)	A7231-40027	N/A
N/A	Hard disk drive blank (carbon)	A6198-60003	N/A
1	System cover	A7231-04003	N/A
N/A	Rack nameplate (zx6000 rack)	A7231-40032	N/A
5	Main airflow guide (plastic)	A7231-04034	N/A
7	Front half of the airflow guide (metal)	A7231-04004	N/A
19	PCI/AGP cage	A7231-04006	N/A

Item	Description	Replacement	Exchange
Tower and Rack Kit			
N/A	Tower pedestal	A7231-04028	N/A
N/A	Tower pedestal covers	A7231-04041	N/A
N/A	Tower front panel	A7231-40040	N/A
N/A	Tower top cover	A7231-40036	N/A
N/A	Tower nameplate	A7231-40039	N/A
N/A	Rack standard slide, middle weight	5064-9670	N/A
N/A	Rack cable management arm	5065-5963	N/A
Optical Devices			
16	DVD-ROM Drive, Slimline, carbon	A7231-67012	A7231-69012
16	CD-RW/DVD-ROM Drive, Slimline, carbon	A7231-62014	A7231-69014
Keyboards and Mice			
N/A	KBD, USB, Trad. Chinese, PC-104, Quartz	A7861-65323	N/A
N/A	KBD, USB, Korean, PC-106, Quartz	A7861-65321	N/A
N/A	KBD, USB, US English, PC-104, Quartz	A7861-65301	N/A
N/A	KBD, USB, German, PC-105, Quartz	A7861-65303	N/A
N/A	KBD, USB, Spanish, PC-105, Quartz	A7861-65304	N/A
N/A	KBD, USB, French, PC-105, Quartz	A7861-65305	N/A
N/A	KBD, USB, Swiss, PC-105, Quartz	A7861-65311	N/A
N/A	KBD, USB, UK English, PC-105, Quartz	A7861-65313	N/A
N/A	KBD, USB, Japan, JIS-109, Quartz	A7861-65324	N/A
N/A	KBD, USB, Italian, PC-105, Quartz	A7861-65317	N/A
N/A	KBD, USB, Simple Chinese, PC-104, Quartz	A7861-65322	N/A
N/A	KBD, USB, Intl. English, PC-104, Quartz	A7861-65342	N/A
N/A	3-Button scroll mouse, USB	A4983-60101	N/A
N/A	3-Button mouse, USB	A4983-60111	N/A

rx2600 parts



Exploded View of the rx2600 Parts

Item	Description	Replacement	Exchange
System Components			
3	rx2600 system board	A7231-66010	A7231-69010
20	PCI board	A7231-66530	N/A
22	Power supply interface module	A7231-04018	N/A
N/A	SCSI backplane	A7231-66520	A7231-69520
15	Status panel	A7231-66550	N/A
Processor			
6	Intel® Itanium® 2, 900 MHz	A7231-62034	A7231-69034
6	Intel® Itanium® 2, 1.0 GHz	A7231-62030	A7231-69030
N/A	Processor Tool	A7231-67046	N/A
Hard Drives			
18	36 GB 10 krpm, Ultra 160 SCSI, Flint	A6724-64001	A6538-69001
18	36 GB 10 krpm, Ultra 160 SCSI, Flint	N/A	A6571-69001
18	36 GB 15 krpm, Ultra320 SCSI, HotPlug, Flint	A6981-64001	A7329-69001
18	73 GB 10 krpm, Ultra 160 SCSI, Flint	A6725-64001	A6539-69001
18	73 GB 10 krpm, Ultra 160 SCSI, Flint	N/A	A7285-69001
18	73 GB 15K Ultra 320 SCSI, Hotplug, Flint	A6983-64001	A7286-69001
18	146 GB 10K Ultra 320 SCSI, Hotplug, Flint	A6984-64001	A7287-69001
Memory			
2	256 MB PC2100 Registered DDR-SDRAM	A6833-60001	A6833-69001
2	512 MB PC2100 Registered DDR-SDRAM	A6746-60001	A6746-69001
2	1.0 GB PC2100 Registered DDR-SDRAM	A6834-60001	A6834-69001
2	2.0 GB PC2100 Registered DDR-SDRAM	A7843-67001	A7843-69001
Power Supply			
12	600W power supply-AC	A6874-63000	A6874-69000
4	Voltage regulator module	0950-4294	N/A

Item	Description	Replacement	Exchange
I/O Cards - Windows			
21	Emulex FC HBA LP982	A7298-67001	A7298-69001
21	Netraid-2M	P7749-67001	P7749-69001
21	10/100BT Ethernet (P3492A)	P3492-63000	N/A
21	Single channel ultra 160 SCSI adapter	A6829-60001	N/A
21	LSI SCSI - DP	A6829-60001	N/A
21	Gigbit copper NIC	A6825-67101	N/A
21	Gigbit fiber NIC	A6847-67101	N/A
17	Management Card	A7231-66580	A7231-69580
I/O Cards - LINUX and HP-UX			
21	10/100BT Ethernet (P3492A)	P3492-63000	N/A
21	10/100BT Ethernet (A5230A)	B5509-66001	N/A
21	Single channel ultra 160 SCSI adapter	A6829-60001	N/A
21	SCSI adapter, dual port HVD/FW, PCI Bus	A5159-60001	N/A
21	Gigabit Ethernet TX (Copper)	A6825-67001	N/A
21	Gigabit Ethernet SX (Fibre)	A6847-60001	N/A
21	100BTX four port	A5506-60102	A5506-69101
21	HVD SCSi dual port	A5159-60001	N/A
17	Management Card	A7231-66580	A7231-69580

Item	Description	Replacement	Exchange
Fans			
10	Super 80 mm fan (rx2600 tower and rack)	A7231-04014	N/A
11	Thin 80 mm fan (rx2600 tower and rack)	A7231-04015	N/A
9	Dual fan (rx2600 tower and rack)	A7231-04033	N/A
Cables			
N/A	IDE cable	A7231-63002	N/A
23	SCSI cable A	A7231-63017	N/A
24	SCSI cable B	A7231-63018	N/A
14	Status panel cable	A7231-63003	N/A
N/A	Audio cable	8121-4373	N/A
N/A	Disk power cable	A7231-63004	N/A
N/A	80 mm fan cable	A7231-63006	N/A
N/A	Super 80 mm fan cable	A7231-63005	N/A
N/A	DVI-I to DB15, converter dongle	A6064-63001	N/A

Item	Description	Replacement	Exchange
Plastic Covers/Metal Latches and Chassis			
N/A	Right-side rack latch	A7231-04023	N/A
N/A	Right-side rack bezel (grey)	A7231-04025	N/A
N/A	Left-side rack bezel (grey) and latch	A7231-04030	N/A
N/A	Optical drive blank (grey)	A7231-40026	N/A
N/A	Hard disk drive blank (grey)	A6198-60002	N/A
1	System cover	A7231-04003	N/A
N/A	Management cover plate	A7231-00072	N/A
5	Main airflow guide (plastic)	A7231-04034	N/A
7	Front half of the airflow guide (metal)	A7231-04004	N/A
19	PCI/AGP cage	A7231-04006	N/A
N/A	Rack nameplate	A7231-40003	N/A
N/A	Tower nameplate	A7231-40025	N/A
Tower and Rack Kit for the rx2600			
N/A	Tower pedestal	A7231-04028	N/A
N/A	Tower covers	A7231-04036	N/A
N/A	Tower front panel	A7231-40026	N/A
N/A	Tower top cover	A7231-40021	N/A
N/A	Rack standard slide, middle weight	5064-9670	N/A
N/A	Rack cable management arm	5065-5963	N/A
Optical Devices			
16	DVD-ROM drive, Slimline (grey)	A7231-62011	A7231-69011
16	CD-RW/DVD-ROM drive, Slimline (grey)	A7851-62015	A7851-69015
Keyboards and Mice			
N/A	KBD, USB, Trad. Chinese, PC-104, Quartz	A7861-65323	N/A
N/A	KBD, USB, Korean, PC-106, Quartz	A7861-65321	N/A
N/A	KBD, USB, US English, PC-104, Quartz	A7861-65301	N/A
N/A	KBD, USB, German, PC-105, Quartz	A7861-65303	N/A

Item	Description	Replacement	Exchange
N/A	KBD, USB, Spanish, PC-105, Quartz	A7861-65304	N/A
N/A	KBD, USB, French, PC-105, Quartz	A7861-65305	N/A
N/A	KBD, USB, Swiss, PC-105, Quartz	A7861-65311	N/A
N/A	KBD, USB, UK English, PC-105, Quartz	A7861-65313	N/A
N/A	KBD, USB, Japan, JIS-109, Quartz	A7861-65324	N/A
N/A	KBD, USB, Italian, PC-105, Quartz	A7861-65317	N/A
N/A	KBD, USB, Simple Chinese, PC-104, Quartz	A7861-65322	N/A
N/A	KBD, USB, Intl. English, PC-104, Quartz	A7861-65342	N/A
N/A	3-button scroll mouse, USB	A4983-60101	N/A
N/A	3-button mouse, USB	A4983-60111	N/A

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event, error and warning messages

This appendix contains event, error and warning information for the zx6000 and rx2600 systems:

EFI error and warning messages

EFI error and warning messages are displayed on the console as part of the boot process. They can also be retrieved via the **info warnings** EFI command.

Error Number	Error/Warning Message	Solution
2	Insufficient resources to assign to one or more I/O devices	—
3	Failed I/O socket(s) deconfiguration	—
4	Unexpected hardware I/O configuration	—
7	No BMC installed in platform	Ensure the BMC ROM is installed; update BMC firmware
8	BMC cannot be accessed	Check BMC logs for errors
9	One or more BMC ports failed	—
10	BMC system event log is full	Clear SEL
11	Platform SCR is bad	Call support center
12	Set time to BMC SEL failed	—
13	SEL get info failed	—
14	Initial BMC SEL event failed	—
15	Update of BMC buffered data failed	—
16	All ACPI BMC ports bad	—
17	Read error on BMC token	—
18	BMC token transmit checksum error	—
19	Error writing BMC token on download	—
20	NVM token access error	—

Error Number	Error/Warning Message	Solution
21	BMC token write error during NVM write through	—
22	Error reading BMC token on upload to NVM	—
23	Error reading BMC first boot token	—
24	Primary FIT failed	Reflash firmware
25	Secondary FIT failed	Reflash firmware
26	PAL_A warning. One copy of PAL is bad	Reflash firmware
27	PAL_B warning. Not compatible with at least one CPU	Update firmware
28	Memory errors detected and PDT is disabled	Reseat DIMMs, if error persists replace bad DIMMs
30	Memory required reinterleave to get a good page 0	—
31	One or more ranks have chipspare disabled	—
33	One or more memory ranks are mismatched and deallocated	Fix memory loading order (page 2-23)
34	Memory deallocated because of a loading error	—
35	Memory is not loaded recommended loading order	—
36	The PDT is full	Clear with `pdt clear` command in EFI shell
37	At least one (1) CPU has bad fixed core ratio	—
38	All CPUs were slated for compatibility deconfig	—
39	Incompatible CPUs detected	Call support center
40	CPUs installed with mixed cache sizes	This will always cause a stopboot
41	CPUs installed with mixed steppings	—
42	All CPUs are over clocked	—
43	At least one (1) CPU is over clocked	—

Error Number	Error/Warning Message	Solution
44	Monarch changed to lowest stepping CPU	Only seen once after monarch is set to lowest stepping
46	CPUs loaded in wrong order	—
48	SAL NVM cleared	Information only, no action required
49	EFI NVM cleared	Information only, no action required
50	EFI NVM failed	—
51	CPU deconfigured by SAL_B	—
52	A ROM revision is inconsistent with FIT or REVBLOCK	One or more firmware components (fw, bmc, mp) is out of date
53	Error building S MBIOS	Call Support Center
54	Failure constructing the EFI Memory Data Table (MDT)	Call Support Center
55	UUID error	Update with `sysset` command
56	Error reading CPU S MBUS information ROM	—
57	Error accessing FRU information	—
58	Checksum error accessing FRU information	—
59	FRU information version error	—

SEL and FPL log entries

This section is a quick reference for the IPMI events recorded in the SEL and FPL files. These logs are available via the MP card interface or the BMC CLI.

- All entries from the SEL are forwarded to the FPL. The FPL is a circular log so the newest entries replace the oldest. The FPL contains forward progress messages from the BMC, System firmware, EFI, and the OS.
- The SEL will not accept new entries once it is full and contains only those events considered of major importance to system operation.
- Both contain type 02 and E0 messages.
- A triplet is formed from the **SensorType**, **EventType**, and the lower nibble of the **Data1** fields of Type 02 events. MP firmware displays the triplet in the *Keyword* field.

accessing the logs with BMC CLI commands

The **fpl** command displays the *forward progress log*. For example:

```
1       2  3        4     5     6     7
0000000E - Pwr Spply 1 Ctrl Enabled 44-08:09:01 2003-02-28 16:41:46
0000000F 2 CPU0 Boot start 00063 DT 06 0000000000000000
00000010 2 CPU0 Boot start 00063 Time 2003-02-28 16:41:46
00000011 0 CPU0 00020 DT 00 0000000000000000
00000012 0 CPU0 0000E DT 06 0000000000010000
00000013 1 CPU0 CPU monarch 0000C DT 06 0000000000000000
00000014 1 CPU0 CPU present 00261 DT 06 0000000000000000
00000015 0 CPU0 00008 DT 00 0000000000000000
00000016 0 CPU0 0024B DT 00 0000000000000000
00000017 0 CPU0 00006 DT 03 0000000000000000
00000018 0 CPU0 00044 DT 06 02000000002C0400
00000019-  BMC LPC reset 00-12:70:02 2003-02-28 16:41:47
```

The **sel** command displays the *system event log*. For example:

```
1     2 3 4 5 6 7
00E0 - Pwr Spply 1 Ctrl Enabled 44-08:09:01 2003-02-28 16:41:46
00F0 2 CPU0 Boot start 00063 DT 06 0000000000000000
0100 2 CPU0 Boot start 00063 Time 2003-02-28 16:41:46
0110 - BMC LPC reset 00-12:70:02 2003-02-28 16:41:47
```

Each column in the log contains a different data field:

1. Record ID.
2. Severity for E0 messages.
3. Generator id or sensor reporting the event.
4. Text description of events.
5. Sensor number-Sensor Type:Event Type:Data1 fields for type 02 msgs (triplet) event id for E0 msgs.
6. Data2 and Data3 for type 02 msgs (if applicable) or Data type for E0 messages.
7. Timestamp or extended data specific to the event.

accessing the logs with MP commands

The SEL and FPL data can also be accessed from the MP logs using the MP card **SL** command.

The **SDM** (set display mode) command determines the format of the display:

- raw hex mode
- text mode
- keyword mode

Hex Mode Example:

```
13   0x203E5F914A0200E0 FFFF010944080300
14   0x5680006300E000F0 010000003E5F914A
14   0x5680006300E000F0 0000000000000000
15   0x203E5F914B020110 FFFF027000120300
```

Text Mode Example:

```
Log Entry 13: 28 Feb 2003 16:41:46
Alert Level 2: Informational
Keyword: Type-02 080901 526593
Power supply turned on
Logged by: BMC;  Sensor: Power Supply - Pwr Spply 1 Ctrl
Data1: Device Enabled
0x203E5F914A0200E0 FFFF010944080300

Log Entry 14: 28 Feb 2003 16:41:46
Alert Level 2: Informational
Keyword: BOOT_START
CPU starting boot
Logged by: System Firmware  0
Data: Implementation dependent data field
0x5680006300E000F0 0000000000000000

Log Entry 15: 28 Feb 2003 16:41:47
Alert Level 2: Informational
Keyword: Type-02 127002 1208322
Soft Reset
Logged by: BMC;  Sensor: System Event
0x203E5F914B020110 FFFF027000120300
```

Keyword mode example:

```
13   BMC  2  0x203E5F914A0200E0 FFFF010944080300 Type-02 080901 526593
                                                    28 Feb 2003 16:41:46
14   SFW  0   2  0x5680006300E000F0 0000000000000000 BOOT_START
                                                    28 Feb 2003 16:41:46
15   BMC  2  0x203E5F914B020110 FFFF027000120300 Type-02 127002 1208322
                                                    28 Feb 2003 16:41:47
```

system specific events

OEM sensortype 12, eventtype 71

Missing Components are determined at the time of a power-on request, cause a failure in the request, and cause the event to be logged.

Data2	Data3	Missing Component
0x0C-0F		Power pod 0-3
0x20-23		CPU 0-3
0x1E	0x01	Cooling unit 1
0x1E	0x01	Cooling unit 3
0x1E	0x03	Cooling unit 3

chassis control event codes

For BMC rev 1.41+, an SEL event will be logged for each ChassisControl event, whether it's generated by an IPMI request, or a sensor event.

Later revisions of MP firmware recognize the triplet (12:70:A3) as *Chassis Control*.

The EventData fields are:

- Data1: 0xA3 (indicating OEM data in Data2 and Data3, and OEM offset 3)
- Data2:
  - [7] 0 = Request generated by a Sensor Event
  - 1 = IPMI request
  - [6-4] Reserved
  - [3-0] ChassisControl command
- Data3: Sensor Number or IPMI Request Origin

Chassis Control Commands

Command	Description
0x00	Hard power down
0x01	Power up
0x03	Hard reset
0x04	NMI/TOC/INIT
0x0D	Soft shutdown and restart
0x0E	Soft shutdown

Sensor Numbers

Sensor Number	Description
0x04	Power button
0x0E	Wake on LAN
0x11-13	Cooling units
0x40-41	Power supplies
0xCD-D3, 0xD5-D6	Voltage sensors
0xD8	Ambient temp
0xD9-DA	CPU Temps
0xFA	ACPI

IPMI Origins

Number	Source
0x01	BT
0x03	CLI
0x07	IP MB
0x08	I2C1
0x09	I2C2
0x0F	KCS0
0x10	KCS1
0x11	KCS2
0x1F	System power thread (Used by power restore policy)

For example:

```
Data2  Data3
80     03     ipmi req from the CLI thd for CHASSIS_CONTROL_POWER_DOWN ("p 0")
81     03     ipmi req from the CLI thd for CHASSIS_CONTROL_POWER_UP ("p 1")
80     01     ipmi req from via BT for CHASSIS_CONTROL_POWER_DOWN
83     03     ipmi/RS req from the CLI thd for CHASSIS_CONTROL_HARD_RESET
00     FA     CHASSIS_CONTROL_POWER_DOWN req from the ACPI sensor (S5)
00     D9     CHASSIS_CONTROL_POWER_DOWN req from CPU0 temp sensor
01     0E     CHASSIS_CONTROL_POWER_UP req from WakeOnLan sensor
```

events without sensors

The BMC logs these events with a "sensor number" of 0; there is no matching SDR entry.

Triplet	Event	data2	data3	Notes
10:70:64	SEL almost full	1F	%full	The BMC logs this when the SEL is 75% full
12:70:80	BMC entering special mode	Mode	–	Mode is a bit-map: Bit 0: Shmoo Bit 1: MfgTest Bit 2: Shutdown override Bit 3: Fixed fan speed Bit 4: Mfg Bits 7-5: unused, set to 0
12:70:A1	BMC firmware initializing	Major FW rev	Minor FW rev	
1D:70:00	BMC cold reset			
1D:70:01	BMC warm reset			
1D:70:02	BMC cold reset after SDRR update			

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