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HP Integrity rx2600 Server and HP zx6000 Workstation

Operations and Maintenance Guide

Document Part Number: 5991-5988

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About this Document

This document provides information on the HP Integrity rx2600 Server and the HP zx6000 Workstation. It also describes how to troubleshoot and diagnose server problems, and how to remove and replace server components.

The document printing date and part number indicate the document's current edition. The printing date changes when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The document part number changes when extensive changes are made.

Document updates may be issued between editions to correct errors or document product changes. To ensure you receive the updated or new editions, you should subscribe to the appropriate product support service. See your HP sales representative for details.

The latest version of this document can be found on line at:

http://www.docs.hp.com

Intended Audience

This document is intended to provide technical product and support information for authorized service providers, system administrators, and HP support personnel.

This document is not a tutorial.

New and Changed Information in This Edition

This service guide has been updated to conform with the latest HP standards.

Publishing History

The following table lists the publishing history details for this document.

Document Manufacturing Part Number	Operating Systems Supported	Supported Product Versions	Publication Date
5969-3163	Red Hat® Linux® Advanced Workstation 2.1 for the Itanium® Processor HP-UX 11i v2 Microsoft® Windows® ■ XP 64-Bit Edition Version 2003 (zx6000 workstation) ■ Server 2003, Enterprise Edition (Integrity rx2600 server)	HP Integrity rx2600 HP Workstation zx6000	September 2003
5991-5988	Red Hat Linux Advanced Workstation 2.1 for the Itanium Processor HP-UX 11i v2 Microsoft Windows ■ XP 64-Bit Edition Version 2003 (zx6000 workstation) ■ Server 2003, Enterprise Edition (Integrity rx2600 server)	HP Integrity rx2600 HP Workstation zx6000	August 2007

Document Organization

This guide is divided into several chapters. The appendixes contain supplemental information.

■ Chapter 1: *Overview* Brief introduction to the HP Integrity rx2600 server and the HP Workstation zx6000.

■ Chapter 2: *System Configuration* Provides information on the utilities on the server such as Extensible Firmware Interface (EFI) Boot Manager.

■ Chapter 3: *Removing and Replacing Components* Provides instructions and procedures on how to remove and replace server components.

■ Chapter 4: *Troubleshooting* Provides diagnostics and basic troubleshooting methodology.

■ Appendix A: *Replacement Parts* Provides a list of customer self-repair parts.

■ Appendix B: *Server Accessories* Provides information about the supported graphics cards and mass storage devices.

■ Appendix C: *System Board* Provides an overview of the system board and describes the key components.

Typographic Conventions

This document uses the following conventions:

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.

NOTE: A note highlights useful information such as restrictions, recommendations, or important details about HP product features.

HP-UX Release Name and Release Identifier

Each HP-UX 11i release has an associated release name and release identifier. The **uname(1)** command with the **-r** option returns the release identifier. This table shows the releases available for HP-UX 11i.

Release Identifier	Release Name	Supported Processor Architecture
B.11.23	HP-UX 11i v2.0	Intel® Itanium®

Related Documents

You can find other information on HP server hardware management and diagnostic support tools on the following web sites.

HP Technical Documentation

http://www.docs.hp.com

HP Server Hardware Information

http://www.docs.hp.com/hpux/hw/

Diagnostics and Event Monitoring: Hardware Support Tools

You can find complete information about HP hardware support tools, including online and offline diagnostics and event monitoring tools, at:

http://docs.hp.com/hpux/diag/

HP Technical Support

http://www.us-support2.external.hp.com/

Update System Firmware

http://www.docs.hp.com/en/hw.html#System%20Firmware

HP-UX Books Published by Prentice Hall

The HP Books web site lists the HP books that Prentice Hall currently publishes, such as:

- HP-UX 11i System Administration Handbook
  http://www.hp.com/hpbooks/prentice/ptr_0130600814.html

- HP-UX Virtual Partitions
  http://www.hp.com/hpbooks/prentice/ptr_0130352128.html

HP Books are available worldwide through bookstores, online booksellers, and office and computer stores.

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Include title, manufacturing part number, and any comments, errors found, or suggestions for improvement you have concerning this document. Also, please include what we did right so we can incorporate it into other documents.

1

Overview

This manual provides information for the HP Integrity rx2600 server and the HP workstation zx6000. It contains an overview of system specifications, instructions for removing and replacing system components, information on configuring the server using the included tools and interfaces, and basic troubleshooting information.

The HP Integrity rx2600 is a 2U, 2P/2C server, that supports Intel Itanium 2 processors (low voltage), ranging from 1.0 GHz w/ 1.5 MB cache to 1.5 GHz w/ 6 MB cache depending on your requirements. Up to 24 GB memory is offered. This server has four PCI slots.

The HP zx6000 64bit workstation features one or two Intel Itanium 2 processors at up to 1.5 GHz and up to 24 GB of memory.

This chapter addresses the following topics:

- "System Configurations" (page 13)

- "Server Features" (page 14)

- "Physical Characteristics" (page 16)

- "Power Specifications" (page 17)

- "Environmental Specifications" (page 18)

- "Front Panel" (page 19)

- "Rear Panel" (page 20)

System Configurations

The HP Integrity rx2600 server and HP workstation zx6000 are available in pedestal- and rack-mount configurations.

Configuration	Accessory Slots	Fan Type/Speed	iLO MP	Redundant Hot-Swappable Power Supply
zx6000 Workstation Pedestal	3 PCI 1 AGP	Quiet/Low	No	No
zx6000 Workstation Rack-mount	3 PCI 1 AGP	Hi Capacity/High	Optional	Optional
Integrity rx2600 Server Pedestal	4 PCI	Hi Capacity/High	Yes	Yes
Integrity rx2600 Server Rack-mount	4 PCI	Hi Capacity/High	Yes	Yes

Server Features

The rx2600 and zx6000 are available in many configurations. The table below provides an overview of the server features.

■ For a complete and current list of supported parts, components, and accessories, see:

> **http://partsurfer.hp.com**

■ For information on the specific server features and components on servers with the following:

❑ Firmware revision 1.9 or lower, use the EFI **info** command.

❑ Firmware revision 2.0 or higher, see "Advanced System Configuration Menu" (page 38).

Feature	Description

Processor	Single or dual-processor
	• Intel Itanium 2 processor:
	  • 900 MHz with 1.5 MB cache on chip
	  • 1 GHz with 3 MB cache on chip
	  • 1.3 GHz with 3 MB cache on chip
	  • 1.5 GHz with 6 MB cache on chip

Firmware	8 MB flash EEPROM Configured using Extensible Firmware Interface (EFI)
Operating system	Red Hat Linux Advanced Workstation 2.1 for the Itanium® Processor HP-UX 11i v2 Microsoft Windows: • XP 64-Bit Edition Version 2003 (zx6000 workstation) • Server 2003, Enterprise Edition (Integrity rx2600 server)
Main memory	Capacity: • zx6000 workstation: 512 MB minimum (2 x 256 MB) • rx2600 server: 1 GB minimum (4 x 256 MB) • 24 GB max. Type: PC2100 ECC registered DDR266 SDRAM Slots: Twelve DIMM slots Modules supported: 256 MB, 512 MB, 1 GB, 2 GB Bus Bandwidth: up to 8.5 GB/s
Hard drives	Internal bays: 3 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

Feature	Description
Optical drives	One open bay for 8x slimline DVD or CD-RW/DVD
SCSI controller	Two Ultra 320 SCSI channels 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 • iLO MP card VGA port rx2600 server: • iLO MP card VGA port
Accessory card slots	zx6000 workstation: • One AGP Pro 4× 32-bit slot supporting 1.5V AGP cards • Three 64-bit 133 MHz Peripheral Component Interconnect (PCI-X 1.0) slots, supporting all bridges and multifunction PCI-X devices; all three PCI-X slots comply with PCI-X 1.0 specification rx2600 server: • Four 64-bit 133 MHz Peripheral Component Interconnect (PCI-X 1.0) slots

Feature	Description
iLO Management Processor (iLO MP) card (standard on the rx2600 server; optional on the zx6000 workstation)	25-pin serial connector (with console/remote/USP extensions; requires breakout cable) 10/100 BT Management LAN 15-pin VGA connector • The graphics display port functionality on the iLO MP Card is not supported on zx6000 workstations with an AGP graphics card installed; all other HP iLO MP 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, as well as other USB devices with driver support Two 9-pin serial ports: • UART 16550 buffered • RS-232-C External 68-pin LVDS/SE SCSI connector (see SCSI controller above)
LAN connectors	• 10/100 BT Management LAN • 10/100/1000 BT Gigabit LAN • 10/100 BT iLO MP Card LAN (on servers with iLO MP card)

Physical Characteristics

This table lists the standard configuration as shipped, excluding the keyboard and monitor.

Weight:	
• Pedestal server	Minimum: 22.4 kg (49.4 lb.) Maximum: 25.5 kg (56.3 lb.)
• Rack-mount server	Minimum: 17.5 kg (38.6 lb.) Maximum: 22.2 kg (49.0 lb.)
Dimensions (DxWxH):	
• Pedestal server	67.5 cm (26.6 in.) x 29.5 cm (11.6 in.) x 49.4 cm (19.5 in.)
• Rack-mount server	67.9 cm (26.8 in.) max. x 48.3 cm (19.0 in.) x 8.6 cm (3.4 in.)
Footprint (pedestal) Rack units (rack-mount)	0.2 m^2 (2.1 sq. ft.) 2U

Power Specifications

Power specifications are based on servers with one or two power supplies installed.

Parameter	Total Rating		Peak (15 sec.)	Max. per PCI-X Slots 64-bit, 133MHz	Max. for AGP Slot Standard Connector
Input voltage	100-127 VAC	200-250 VAC	N/A	N/A	N/A
Input frequency	50 to 60 Hz		N/A	N/A	N/A
Maximum input current[1]	7.2A	3.6A	N/A	N/A	N/A
Maximum output power[2]	600W		N/A	85W total for PCI slots and AGP slot	
Max current at +12V	49A		N/A	0.5A	4.8A
Max current at -12V	0.35A		N/A	0.1A	N/A
Max current at +3.3V	34A		N/A	4.6A	12.1A
Max current at +5V	18A		31A	3A	2A
Max current at +3.3V stdby	3.5A		N/A	N/A	N/A

1. Corresponds to the maximum dc power the power supply can provide to the server.
2. The worst case or highest current given the lowest input voltage and the maximum input power.

If an overload triggers the power supply overload protection, the server immediately powers off. To reset the power supply unit, follow these steps:

1. Disconnect the power cord.

2. Contact an HP support representative to determine what caused the overload.

3. Reconnect the power cord.

4. Reboot the server.

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

When you use the front panel power button to power off the server, power consumption falls below the low power consumption but does not reach zero. To reach zero power consumption in OFF mode, unplug the server 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 with one power supply installed.

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	70W	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 (CPU with hard disk)	
Operating temperature	+5° C to +35° C (+41° 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) Pedestal Server:	Sound power level[3]
• Typical configuration[1] (disk idle)	LwA[4] =5.1 BA
• Maximum configuration[2] (disk idle)	LwA =5.4 BA
• Maximum configuration[2] (disk active)	LwA =6.2 BA
Rack Server:	
• 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)
4. LwA = A-weighted sound power level in dB(A)

Front Panel

The front panel on the rx2600 and zx6000 has the following features:

■ Power LED is green when the power is on, or the power button is pushed in. If the power is on and the button is pushed in, the light stays on even after the server is powered off. When the button is released, the green light turns off.

■ Power Butter turns the server power on and off.

■ LAN LED indicates communication over the Gigabit or Management LAN.

■ System and Diagnostic LEDs identify errors on zx6000 workstations with no iLO MP card.

■ Locator LED and Button (rack-mount configuration only) identify the rack position of the server.

■ Disk Activity LEDs on each hard drive turn green when the disk is accessed.

■ e-buzzer icon indicates the position of the internal speaker.
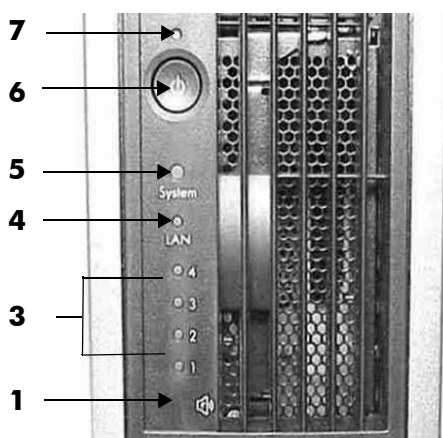
Front Panel, Pedestal Configuration
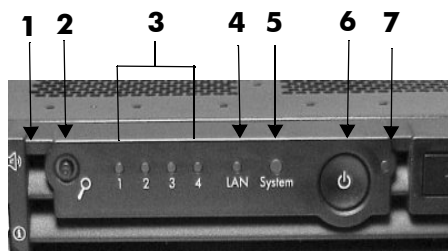
Front Panel, Rack-mounted Configuration

1 e-buzzer Icon	**5** System LED
2 Locator LED and Button *(rack-mounted server only)*	**6** Power Button
3 Diagnostic LEDs 1-4 (active only on zx6000 workstations with no iLO MP card installed)	**7** Power LED
4 LAN LED	

Rear Panel

The rear panel on the rx2600 and zx6000 has the following features:

■ Connectors are shaped to go in only one way to prevent improper cable attachment.

■ Ports are labeled for easy identification.

■ iLO MP ports are positioned above (rack-mount) or to the right of (pedestal) standard connectors (optional on zx6000 workstation).

■ LAN LEDs provide additional information:

❏ Four Gigabit LAN LEDs

❏ Two System Management 10/100 LAN LEDs

❏ Four iLO MP LAN LEDs (optional on zx6000 workstation)

■ 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 server.
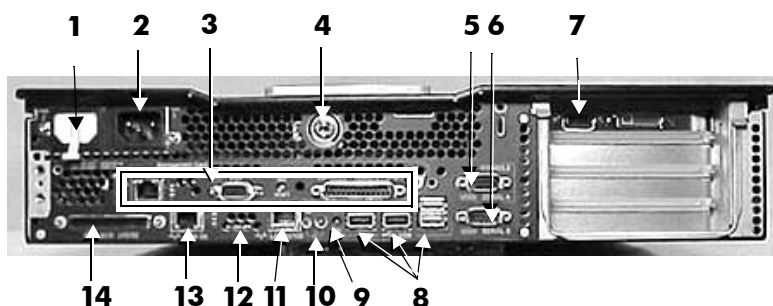
Rear Panel Connectors

1 Power (PWR2)	**8** USB Ports (mouse and keyboard ports labelled)
2 Power (PWR1)	**9** TOC Button
3 iLO MP Card: VGA, Serial, LAN, Reset (optional on zx6000 workstation)	**10** Locator LED and Button
4 System Lock	**11** 10/100 BT Management LAN with Integrated LEDs
5 Serial Console Port A	**12** 10/100/1000 BT Gigabit LAN LEDs
6 Serial Port B	**13** 10/100/1000 BT Gigabit LAN
7 Monitor Connector(s) (zx6000 workstation only)	**14** LVD/SE SCSI

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

2

System Configuration

This chapter describes the utilities that are part of the server.

This chapter addresses the following topics:

- "Extensible Firmware Interface" (page 21)
- "iLO Management Processor" (page 41)
- "Baseboard Management Controller" (page 53)
- "Firmware Upgrades" (page 60)

Extensible Firmware Interface

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

EFI enables you to configure the Itanium Processor Family (IPF) firmware. The EFI menu includes the following options:

- The **EFI Shell [Built-in]** is a command line interface that enables you to operate the EFI commands or create and run automated scripts.
- **Boot Option Maintenance Menu** enables 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.
- **System Configuration Menu** on systems with EFI firmware version 2.0 or higher enables you view the system configuration and change or delete administrator and user passwords.
- **Security/Password Menu** on systems with EFI firmware version 2.9 or lower enables you add, change, and delete system administrator and user passwords.

Accessing the EFI

You can access the EFI directly when you boot the server, or by remote access.

NOTE: To switch between the iLO MP card and EFI console with iLO MP firmware E.02.20 or higher, do the following:

- If you are at the EFI console, press **Ctrl-B** to access the iLO MP login screen.
- If you are at the iLO MP command prompt, run the **CO** command to enter EFI console mode.

Direct Access

When you power on the server and it begins to boot up, it pauses at the **boot option** screen:

```
EFI Boot Manager ver x.xx [xx.xx]
```

```
    Please select a boot option

        [your OS]
        EFI Shell [Built-in]
        Boot option maintenance menu
        Security/Password Menu

Use up and down arrows to change option(s).
Use Enter to select an option.
```

NOTE: The server pauses for seven seconds to enable you to change the boot option before booting to the default OS. To change the pause duration, select **Set Auto Boot TimeOut** from the **Boot Options Maintenance Menu**.

Use the up or down arrow keys to highlight an option and press **Enter** to activate a selection.

Remote Access

To access the EFI remotely, follow these steps:

1. With the server turned off, connect the serial cable provided with your server (HP part number 5182-4794) or a compatible cable to the serial console port (port A) on the rear panel of the server, 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 server with a direct connection.

NOTE: The default terminal emulation type is VT100+. You can change this setting from the EFI **Boot Options Maintenance Menu**.

4. Power on the server and follow the steps in the next section to access the EFI.

Using the EFI Shell

To access the EFI shell, follow these steps:

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

NOTE: You have seven seconds to change the boot option before the server boots to the first option in the list. To change the order of boot options, see "Using the Boot Option Maintenance Menu" (page 30).

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 run 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. Enter the command at the shell prompt. For example, to clear the display on the monitor:

   ```
   Shell:\> cls
   ```

   b. To run the command, press **Enter**.

   ◆ Some commands require additional arguments to further define their action. For example, to display information about the system memory, you must enter 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 run.

   ❏ To switch to a different file system, run 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 enter the command name, plus the desired category of information to display:

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

Rules

Follow these rules to ensure the commands run correctly.

Denotes a comment. All text from the **#** symbol to the end of the line is ignored.

>   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 white space 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 the following:

■ List of EFI command classes, run `help` at the EFI shell prompt.

■ Detailed description of a command, run `help` and the command name or other options at the EFI shell prompt. For example:

❏ `fs0:\> help` displays a list of command classes

❏ `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 the following:

`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

Boot commands enable you to 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

Configuration commands enable you to 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

Device commands 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

Memory commands enable you to manage 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

Shell commands enable you to 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

Scrips commands enable you to use shell scripts.

echo	Display messages or turn command echoing on or off

`for/endfor`	Run commands for each item in a set of items
`goto`	Make batch file execution jump to another location
`if/endif`	Run 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 enables you to create executable shell scripts. You can place a set of EFI commands in the shell script and run the script as often as needed. You can also modify the script to make it perform different tasks. Script files can be either unicode or ASCII format.

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

The optional script `startup.nsh` is automatically run 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, follow these steps:

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

   ```
   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. Enter or edit the commands to be run 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 and 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. Enter 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 run.

In batch scripts, argument substitution is performed first, then variable substitution. For example, for a variable containing **%2**, the variable is 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, 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, enter 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 run 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 run from a batch script are echoed to the console. Display of commands read from a batch file can be suppressed using 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 run. The **lasterror** shell variable enables batch scripts to test the results of the most recently run 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 enables 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 the following:

- **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 server may have different options available based on the system configuration and installed hardware components.

Paths

All devices in the rx2600 server and zx6000 workstation are represented by paths in the EFI shell. To identify the correct slot or disk drive, use the following tables.

Integrity rx2600 server slots

Slot	Path	Description
1 PCI	Acpi(HWP0002,400)/pci(1|0)	Slot 1:0/4
2 PCI	Acpi(HWP0002,300)/pci(1|0)	Slot 2:0/3
3 PCI	Acpi(HWP0002,200)/pci(1|0)	Slot 3:0/2
4 PCI	Acpi(HWP0002,600)/pci(1|0)	Slot 4:0/5

zx6000 workstation slots

Slot	Path	Description
1 AGP	Acpi(HWP0003,400)/pci(0|0)	Slot 1:0/4 (upper rack slot)
2 PCI	Acpi(HWP0002,300)/pci(1|0)	Slot 2:0/3
3 PCI	Acpi(HWP0002,200)/pci(1|0)	Slot 3:0/2
4 PCI	Acpi(HWP0002,600)/pci(1|0)	Slot 4:0/5 (lower rack slot)

rx2600 and zx6000 drives

Drive	Path	Description
SCSI disk	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)	0/1/1/0.0.0 (lower disk)
SCSI disk	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun1,Lun0)	0/1/1/0.1.0 (middle disk)
SCSI disk	Acpi(HWP0002,100)/Pci(1 | 1)/Scsi(Pun2,Lun0)	0/1/1/1.2.0 (upper disk)
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 return to this menu.

This option displays the file systems that are on the server 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 drive.

- **Removable Media Boot** enables 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 the server 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 is added to the EFI boot menu.

If you add a new drive to the server, 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 the server.

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

If you remove a drive from the server, 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 can 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 tries 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 attempts 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 the server 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 pauses 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, 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 does not automatically boot. The system stops at the EFI boot menu and waits for user input.

Select Active Console Output Devices

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

NOTE: If you install a modem in the server, make sure you disable the modem serial console 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 the server. Multiple consoles are not supported for HP-UX or Windows (use the *Smart Setup CD* to switch between COM A and the iLO 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, do the following:

■ 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 the following:	Choose the following:
Serial Console Port A/Serial 1	Acpi(PNP0501,0)/*Uart(9600 N81)/VenMsg(Vt100+)*
iLO MP Serial Console	Acpi(HWP0002,700)/Pci(1|1)/*Uart(9600 N81)/VenMsg(Vt100+)*
iLO 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 are 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, and so on) 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 iLO MP VGA port *and* an AGP graphics card.

Select Active Console Input Devices

Use this option to define the devices that are used to provide input to the server console.

This option displays the console devices on the server. This normally includes a standard keyboard and mouse, and a serial console 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 the server, make sure you disable the modem serial console port in both the Active Console Input and the 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 the server.

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(HWP002,500)/PCI(1|1)/Usb(1,0)


      Save Settings to NVRAM
      Exit
```

```
Active Input Device. Hotplug USB keyboard.
(Deselection feature disabled).
```

* indicates a currently selected device.

■ On server with firmware version 2.0 or higher, the USB keyboard option is always active and cannot be deselected or disabled.

■ Each option is identified with an EFI device path. Not all options are 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 (such as PcAnsi or Vt100) 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+)*
iLO 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 display error messages from the server 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, do the following:

■ 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 System Configuration Menu

The **System Configuration Menu** (on servers with EFI firmware version 2.0 or higher) includes the following options:

■ The **Security/Password Menu** lets you change the administrator and user passwords.

■ The **Advanced System Information Menu** displays information about system and component configuration.

■ **Set System Date** lets you modify the system date.

■ **Set System Time** lets you modify the system time.

■ **Reset Configuration to Default** lets you restore system settings to their original configuration.

■ **Help** displays additional information about the available options.

■ **Exit** returns to the EFI startup menu.

Security/Password Menu

You can set administrator and user passwords to provide different levels of access to the system firmware:

■ The Administrator can access and change all settings in the EFI Boot Manager program and can run the EFI shell.

■ The User can access basic functions in the EFI Boot Manager.

NOTE: These are **not** OS passwords. These passwords limit access to the firmware interface only. For information on setting OS passwords, see your OS user guide.

To add, change, or delete passwords, follow these steps:

1. Select **Security/Password Menu**.

2. Select either:

   ❏ **Set Administrator Options**
   ❏ **Set User Options**

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**.

Advanced System Configuration Menu

The **Advanced System Configuration Menu** displays a variety of information about the server configuration. The following examples show typical configurations, the exact information on each server is different.

■ **All x Information**

This options lists all of the information from the selections below in one screen.

■ **System Information**

```
Date/Time: May 14, 2003 13:00:43 (20:03:05:14:13:00:43)
Manufacturer: hp
Product Name: workstation zx6000
Product Number: A8081A
Serial Number: TS21600014
UUID: 31619E41-2DD2-11D7-BC2F-0735A1DF6599
System Bus Frequency: 200 MHz
```

■ **Processor Information**

```
       # of L3     L4    Family/
CPU  Logical Cache Cache Model Processor
Slot  CPUs  Speed  Size  Size  (hex.)   Rev State
----  ------- -------- ------ ------ ------- --- ------------
0   1   900 MHz 1.5 MB None 1F/00     B3 Active
```

■ **Cache Information**

See processor information, above.

■ **Memory Information**

```
---- DIMM A ----- ---- DIMM B -----
DIMM Current DIMM Current
--- ------ ---------- ------ ----------
0 256MB Active 256MB Active
1 256MB Active 256MB Active
Active Memory : 1024 MB
Installed Memory : 1024 MB
```

■ **Bootable Devices Information**

```
Order Media Type Path
----- ---------- -----------------------------------------
1 HARDDRIVE Acpi(HWP0002,500)/Pci(2|0)/Ata(Primary...
2 CDROM Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary...

Seg Bus Dev Fnc Vendor Device Slot
# # # # ID ID # Path
--- --- --- --- ------ ------ --- -----------
00 A0 01 00 0x1033 0x0035 XX Acpi(HWP0002,500)/Pci(1|0)
00 A0 01 01 0x1033 0x0035 XX Acpi(HWP0002,500)/Pci(1|1)
00 A0 01 02 0x1033 0x00E0 XX Acpi(HWP0002,500)/Pci(1|2)
00 A0 02 00 0x1095 0x0649 XX Acpi(HWP0002,500)/Pci(2|0)
00 A0 03 00 0x8086 0x100E XX Acpi(HWP0002,500)/Pci(3|0)
00 A0 04 00 0x1319 0x0801 XX Acpi(HWP0002,500)/Pci(4|0)
00 A0 04 01 0x1319 0x0802 XX Acpi(HWP0002,500)/Pci(4|1)
```

■ **Boot Information**

```
Monarch CPU:
Current Preferred
Monarch Monarch Possible Warnings
------- --------- ----------------
0 0
AutoBoot: ON - Timeout is : 7 sec
Boottest:
BOOTTEST Settings Default Variable
OS is not speedy boot aware.
Selftest Setting
--------- --------------
early_cpu Run this test
late_cpu Run this test
platform Run this test
chipset Run this test
io_hw Run this test
mem_init Run this test
mem_test Run this test
LAN Address Information:
LAN Address Path
---------------- -----------------------------------------
*Mac(00306E385AFB) Acpi(HWP0002,500)/Pci(3|0)/Mac(00306E385AFB))
```

■ **Firmware Information**

```
Firmware Revision: 2.00 [4320]
PAL_A Revision: 7.31/7.31
PAL_B Revision: 7.40
SAL Spec Revision: 3.01
SAL_A Revision: 2.00
SAL_B Revision: 2.00
EFI Spec Revision: 1.10
```

```
EFI Intel Drop Revision: 14.61
EFI Build Revision: 1.22
POSSE Revision: 0.10
ACPI Revision: 7.00
BMC Revision 1.50
IPMI Revision: 1.00
SMBIOS Revision: 2.3.2a
Management Processor Revision:
```

- **Warning and Stop Boot Information**

    Blank unless system faults have been identified. See Chapter 4, "Troubleshooting."

- **Chip Revision Information**

```
Chip                Logical Device Chip
Type                ID      ID     Revision
------------------- ------- ------ --------
Memory Controller 0 122b 0023
Root Bridge 0 1229 0023
Host Bridge 0000 122e 0032
Host Bridge 0004 122e 0032
Host Bridge 0005 122e 0032
Host Bridge 0006 122e 0032
Other Bridge 0 0 0002
Other Bridge 0 0 0007

Baseboard MC 0 0 0150
```

Using the Security/Password Menu

The **Security/Password Menu** (on servers with EFI firmware version 1.9 or lower) is identical to the security/password submenu of the **System Configuration Menu**.

Resetting Passwords

If you forget a password, you can reset it with an iLO MP command.

To reset a password, follow these steps:

- If the server has an iLO MP card:

    To reset the administrator and user passwords, run the iLO MP card **bp** command.

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

    a. Power off the server and unplug the ac power cord.

    b. Place a jumper between pins 7 and 8 on J96 on the system board behind the battery.
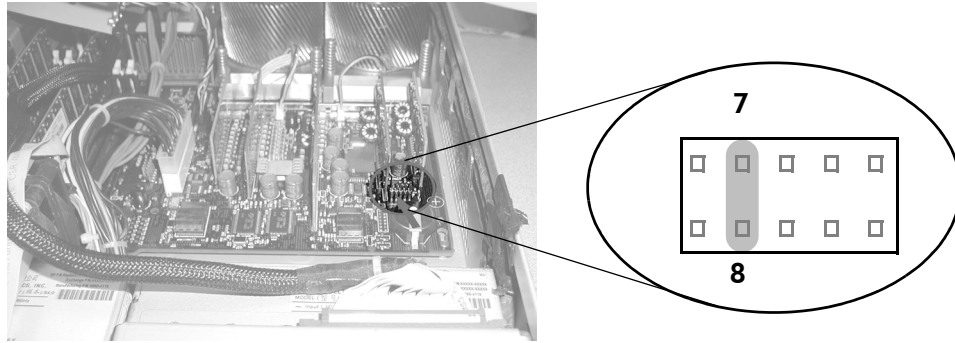
Password Reset Jumper

    c.   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 five seconds from the time you plug in the power cord.

    d.   Unplug the ac power cord again.

    e.   Remove the jumper.

    f.   Plug in the power cord.

    g.   Boot the server. The passwords have been cleared. Follow the instructions above to set new server passwords.

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

iLO Management Processor

The Integrated Lights-Out Management Processor (iLO MP) for entry-level Integrity servers is an autonomous management subsystem embedded directly on the server. It is the foundation of the server's High Availability (HA), embedded server, and fault management. It also provides system administrators secure remote management capabilities regardless of server status or location. The iLO MP is available whenever the system is connected to a power source, even if the server main power switch is in the off position.

HP has used several different names over the years to describe the management functionality embedded in their servers, including "the management processor." In addition, HP uses the term "management processor" to refer to any embedded microprocessor that manages a system. Management processor is a descriptive term (such as "server"), and iLO, is a brand name, or label (such as "Integrity").

Remote access is the key to maximizing efficiency of administration and troubleshooting for enterprise servers. Integrity servers have been designed so all administrative functions that can be performed locally on the machine, can also be performed remotely. iLO enables remote access to the operating system console, control over the server's power and hardware reset functionality, and works with the server to enable remote network booting through a variety of methods. For complete information on the iLO MP, see the HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide.

For more information on the iLO MP, see the *HP Integrity and HP 9000 iLO MP Operations Guide* on the web at:

http://www.docs.hp.com

iLO MP Card I/O

The iLO MP card contains a processor and I/O hardware that act as an autonomous embedded device for controlling the server console, reset, and power management functions.

NOTE: This section assumes that the iLO MP card is installed in the server. To determine if the card is installed, look at the back panel of the server. You will see a 25-pin serial console port if the iLO MP card is installed.

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

The iLO 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 iLO MP card's I/O bus interface by rope number seven of the system bus. The iLO MP card consists of the following components:

- I/O bus interface
- VGA controller with 16 MB of DDR SDRAM for a video buffer
- MP with:
  - ❏ Three RS-232 serial console ports
  - ❏ Four I²C ports
  - ❏ 10/100 BT LAN
  - ❏ 16-bit GPIO interface
- Management Processor DRAM, flash memory and battery backed NVSRAM
- I²C battery backed real time clock
- I²C field replaceable unit EEPROM
- I²C 8K serial EEPROM
- System reset logic

The iLO MP card includes these I/O components:

- System serial console ports:
  - ❏ Three RS-232 serial console 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 server. This cable provides for three DB9 connectors for console, modem and UPS.
  - ❏ The iLO MP card serial ports can be configured to redirect server 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 iLO MP. This interface emulates three 16550-style UARTs and part of the iLO MP card.

■ I²C bus. The I²C bus of the iLO MP provides communication with the BMC.

■ Service LAN. Network access is provided by a 10/100 BT LAN connection on a RJ-45 connector and its associated LEDs, which are located on the iLO MP card. An I²C 8K serial EEPROM supports MAC address storage.

NOTE: The iLO MP card can be installed on servers with or without an AGP graphics card. If an AGP graphics card is not installed, the iLO 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.

Accessing the iLO MP

You can access the iLO MP card and enter iLO MP commands using any of the following:

■ Serial console port

■ LAN connection

■ Modem connected to RS-232 port

NOTE: The iLO MP screens and commands vary depending on the iLO MP firmware version installed on the server. The iLO MP firmware revision number is listed on the iLO MP login screen. **Make note of the version number before proceeding.**

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

Accessing the iLO MP Using the Serial Console Port

To enter iLO MP command mode using the serial console port, follow these steps:

1. Connect the server to a remove device:

   a. Connect the 25-pin end of a serial cable to the iLO MP card 25-pin serial console port, on the rear panel of the server.

   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 iLO MP card serial console port speed.

   ❏ Bits: 8

   ❏ Parity: None

   ❏ Stop Bits: 1 (one)

   ❏ Flow Control: None

3. Using the terminal emulation software, connect to the server with a direct connection.

4. Plug in the server. Do not power on the server. Wait for the iLO MP login to display on the terminal screen.

Accessing the iLO MP Using the iLO MP LAN Port

If you have not already configured your iLO MP LAN port, do so now:

1. Using a telnet client, log on to the system with the hostname provided by your network administrator.

NOTE: All IP addresses and hostnames should be provided by your network administrator.

For example:

```
C:\> telnet MP_Hostname
```

2. Wait for the iLO MP login to display on the telnet screen.

Configuring the iLO MP LAN Port

Before you can run iLO MP commands through a LAN connection, you must configure the LAN settings on the iLO MP card using a console serial console port connection:

1. Enter iLO MP command mode using a serial console port.

   Run the LAN configuration (**LC**) command. The LAN Configuration screen for the server iLO MP firmware revision displays.

   ❏ *iLO MP firmware E.02.10:* the screen includes a summary of your current LAN settings and a prompt:

   ```
   LC
   This command enables 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])
   ```

   ❏ *iLO MP firmware E.02.20 or higher:* the screen contains a menu including your current LAN configuration settings:

   ```
   LC
   At each prompt you may type DEFAULT to set default configuration
   or Q to Quit
   Current LAN Configuration:
   --  MAC Address             : 0x00306e1ee0dd
   I - IP Address              : 127.0.0.0
   H - MP  Host Name           : uninitialized
   M - Subnet Mask             : 255.255.255.0
   G - Gateway Address         :
   L - Link State              : Auto Negotiate
   W - Web Console Port Number : 2023
   Enter Parameter(s) to change, A to modify All, or [Q] to Quit:
   ```

2. To modify the LAN settings, follow the prompts on the screen:

   ❏ IP Address

   ❏ MP Host name

❏   Subnet, Gateway

❏   Web Console Port Number

❏   LAN hardware configuration (optional)

The *Link State* controls the speed at which the iLO MP card communicates with the network.

◆   Select *auto-negotiate* to enable the server to make the fastest possible connection. The iLO MP card also negotiates to half or full duplex. This is the default, recommended in most cases.

◆   Select *10BaseT* to force the iLO 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 server to communicate with the other 10BaseT connections, you must force it to operate at the slower speed.

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

You can do the following in all options:

❏   To change the setting, enter the appropriate information and press **Enter**.

❏   To confirm your selections, enter **Y** and press **Enter** at the confirmation prompt.

3. To reset the iLO MP card, run the **xd** command. The following displays, depending on the server iLO MP firmware revision.

❏   *iLO MP firmware E.02.10*:

```
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:
```

❏   *iLO MP firmware E.02.20 or higher*:

```
XD
Diagnostics Menu:
Non destructive tests:
P - Parameter checksum
I - I2C access (get Power Monitor Status)
L - LAN access (PING)
M - Modem selftests
Destructive tests:
R - Restart the MP
Enter menu item or [Q] to Quit:
```

4. Select option **3** or **L** to ping the LAN and verify the LAN settings are correctly configured.

5. To reset the iLO MP card, enter **R** and press **Enter**. (If prompted, enter **Y** and press **Enter** to confirm the reset.)

Wait for the status message to clear:

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

---

6. Close your terminal emulation program. You can now telnet to this server from another remote server.

Accessing the iLO MP Using a Modem

NOTE: To enable or disable the modem port, or give switch modem control between the iLO MP and the OS, do the following:

■ *iLO MP firmware E.02.10:* use the **ER** command

■ *iLO MP firmware E.02.20 or higher:* use the **SA** command

To enter iLO MP command mode using a modem, follow these steps:

1. Log into the iLO MP using a serial or LAN connection and configure the modem using the **CA** command:

   ❏ Baud rates: Input and output data rates are the same.

   ❏ Flow control: Hardware uses RTS/CTS; Software uses Xon/Xoff.

   ❏ Terminal type: HPterm

   ❏ Transmit configuration strings: Disable this setting whenever the modem being used is not compatible with the supported modem.

   ❏ Modem presence: When the modem may not always be connected, set this parameter to **not always connected**. For example: A modem attached through a switch. In this mode, no dial-out functions are allowed and paging is not possible.

   ❏ Modem protocol: CCITT is a European standard; RTS/CTS signaling is used, as well as the Ring signal. Bell is a U.S. or simple mode.

2. Configure the modem and dial-up software on your remote computer to match the settings on the iLO MP card.

3. Dial-in using the procedures required by your dial-up software.

4. Wait for the iLO MP login to display on the screen.

Logging In to the iLO MP Card Interface

To log in to the iLO MP card interface, follow these steps:

1. Access the iLO MP login screen and **take note of the firmware version number listed**:

   ❏ *iLO MP firmware E.02.10:* press **Ctrl-B** to access the iLO MP login screen.

   ```
   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
   ```

   ❏ *iLO MP firmware E.02.20 or higher:* the iLO MP card boots directly to the iLO MP command mode login screen.

   ```
   HP Management Processor
   Firmware Revision E.02.20 May 12 2003,12:26:25
   (c) Copyright Hewlett-Packard Company 1999-2003. All Rights Reserved.
   ```

```
MP login:
```

NOTE: To switch between the iLO MP card and EFI console with iLO MP firmware E.02.20 or higher, do the following:

■ If you are at the EFI console, press **Ctrl-B** to access the iLO MP login screen.

■ If you are at the iLO MP command prompt, run the **CO** command to enter EFI console mode.

2. Log in. The login options depend on your iLO MP firmware revision:

❏ *iLO MP firmware E.02.10:* there are no default iLO MP users. If you have not yet created iLO MP users, press **Enter** at the login and password prompts for initial access.

❏ *iLO MP firmware E.02.20 or higher:* two default users exist:

◆ Administrator: login **Admin**, password **Admin**

◆ Operator: login **Oper**, password **Oper**

3. If you have not yet created iLO MP users, enter a default ID and password at the login and password prompts and press **Enter** for initial access.

```
HP Management Processor
Firmware Revision E.02.11 Feb 14 2003,9:38:32
(c) Copyright Hewlett-Packard Company 1999-2001. All Rights Reserved

MP login:
MP password:
```

To ensure server security, HP recommends that the system administrator do one of the following:

■ Disable all remote access to the iLO MP including telnet, web, and remote modem access using the **SA** command, or use the **UC** command to configure iLO MP users:

❏ *iLO MP firmware E.02.10:* Add a user with a unique password on servers

❏ *iLO MP firmware E.02.20 or higher:* Add a user with a unique password on servers and delete the default users

Depending on your iLO MP firmware revision, either the command prompt or the menu displays.

❏ iLO MP firmware E.02.10: the iLO 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

 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>
```

❏ *iLO MP firmware E.02.20 or higher*, the main menu displays:

```
Hewlett-Packard Management Processor
```

```
             (c) Copyright Hewlett-Packard Company 1999-2002.
             All Rights Reserved.

             MP Host Name: iaslhpfc
             Revision E.02.11

             **************************************************************
             MP ACCESS IS NOT SECURE
             Default MP users are currently configured and
             remote access is enabled.
             Modify default users passwords or delete
             default users (see UC command)
             OR
             Disable all types of remote access (see SA command)
             **************************************************************
             MP MAIN MENU:
             CO: Consoles
             VFP: Virtual Front Panel
             CM: Command Menu
             CL: Console Logs
             SL: Show Event Logs
             CSP: Connect to Service Processor
             SE: Create Local Session
             HE: Main Help Menu
             X: Exit Connection
             MP Host Name: iaslhpfc
             MP>
```

4. You can now enter individual commands.

   ❏ To run an individual command on servers with *iLO MP firmware E.02.10*, follow these steps:

      a. Enter the command at the iLO MP command prompt.

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

   ❏ To run an individual command on servers with *iLO MP firmware E.02.20 or higher*, follow these steps:

      a. To access the command menu prompt, run the **CM** command.

      b. Enter the command at the prompt.

      c. To run the command, press **Enter**.

Using the iLO MP Commands

The following sections provide a brief overview of the available commands. For detailed information, run the **he** command.

The iLO 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.

Running Commands from Menus

To run commands from the iLO MP menus, follow these steps:

1. Enter the letter designating the command on the menu and press **Enter**.

2. To complete the command, follow the prompts on the screen.

For example, here is the menu for the LAN Configuration (**lc**) command:

```
LC
At each prompt you may type DEFAULT to set default configuration or
Q to Quit
Current LAN Configuration:
--  MAC Address            : 0x00306e1ee0dd
I - IP Address             : 127.0.0.0
H - MP  Host Name          : uninitialized
M - Subnet Mask            : 255.255.255.0
G - Gateway Address         :
L - Link State             : Auto Negotiate
W - Web Console Port Number : 2023

Enter Parameter(s) to change, A to modify All, or [Q] to Quit:
```

Executing Commands from the Command Line

To run a command from the command line, follow these steps:

1. Enter the command and any parameters at the prompt. For example:

       MP> *MPcommand -parameter1 value1 -parameter2 value2 ... [-nc]*

2. To run the command, press **Enter**.

Command Syntax

The iLO MP command syntax is UNIX style; that is, each parameter starts with **-**. For example:

■ **-nc** (no confirmation) is optional. If **-nc** is included at the end of the command line, the command is run without asking for confirmation. If **-nc** is not included, a confirmation prompt is displayed.

■ **-?** (MP command-specific help) is optional. If you type **-?** by itself with the command, help on the command displays. If you use the command incorrectly, the help displays in addition to an error message.

To set the default value of a parameter, a predefined value is used. This is the word **DEFAULT**.

■ To set all parameters to their default value, a special parameter **-all** is used. For example:

       MPcommand -all DEFAULT

■ For multi-level commands with sub-menus, you can set a specific level to the default values. You must be familiar with the operation of the commands and know the level you want to skip to. For example:

       MPcommand *-level* DEFAULT

   where *-level* is the number of the level you wish to reset.

   To determine if a given command is multilevel, you can either:

❏ run it from a command-menu interface, or

❏ review the command line help for that command

One example of a multilevel command is the **CA** serial-port configuration command:

```
MP:CM> ca
This command allows you to modify the local and remote modem serial
port configurations. Note that terminal type is set simultaneously
for all ports. At each prompt you may type DEFAULT to set default
configuration or Q to Quit

Local and Remote Serial Port Configuration Menu:
D - Display Local/Remote Serial Port Configuration
L - Modify Local Serial Port Configuration
R - Modify Remote/Modem Serial Port Configuration
T - Modify Terminal type
Enter menu item or [Q] to Quit: q

MP Host Name: gstlhpd6
MP:CM> ca -r default

New Remote/Modem Serial Port Configuration (* modified values):
* Bit Rate in bits/sec          : 19200
* Flow Control                  : Software
* Modem Presence                : Always connected
* Modem Protocol                : CCITT
* Transmit Configuration Strings : Enabled

Confirm? (Y/[N]):
```

In this example, the **CA** command sets the following:

◆ All parameters to the default settings, run: `CA -all default`

◆ Specific level such as remote or local port configuration to the default, run `CA -remote default` or `CA -local default`

■ You also can set some parameters to defaults, and others to specified values. For example:

```
MPcommand -parameter1 value -parameter2 DEFAULT
```

Command Descriptions

Main Menu Commands

Main Menu commands are run from the following:

❏ iLO MP command prompt with iLO MP firmware E.02.10

❏ Main Menu prompt of the iLO MP interface with iLO MP firmware E.02.20 or higher

Command	Description
CO	Consoles
VFP	Virtual Front Panel
CM	Command Menu
CL	Console Logs
CSP	Connect to Service Processor (local/remote ports only)

Command	Description
SE	OS Session (local/remote ports only)
SL	Show Event Logs
HE	MP Help Menu
X	Exit MP Interface

Command Categories

There are six categories of iLO MP commands:

- **ST** — Status commands
- **SC** — Server control commands
- **C** — General iLO MP configuration commands
- **P** — iLO MP port configuration commands
- **Cx** — Connections commands

The commands in these categories are described in the following sections.

Status Commands

Status commands provide status on the server and on the iLO MP card.

Command	Description
DATE	Display date
DF	Display field replaceable unit information
LS	LAN status
MS	Status of the modem
PS	Power management module status
SR or SYSREV	Display all firmware revisions
SS	Server processor status

Server Control Commands

Server control commands alter the state of the server.

Command	Description
BP	Reset BMP passwords
LOC	Locator LED status
MR	Modem reset
PC	Remote power control
PR	Power restore policy configuration
RB	Reset BMC

Command	Description
RS	System reset from RST signal
TC	Transfer of control; system reset through INIT signal

General iLO MP Configuration Commands

General configuration commands enable you to perform general configuration tasks, such as configuring automatic system restart and setting the default configuration.

Command	Description
CG	Generate RSA key pair of self-signed certificate
DC	Default configuration
FW	Upgrade the iLO MP firmware
ID	System identification
IT	Inactivity timeout settings
SO	Configure security options
UC	User configuration
XD	Diagnostics or reset of iLO MP

iLO MP Port Configuration Commands

Port configuration commands enable 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
Serial Port Configuration	
CA	Configure serial ports
SA	Enable/disable remote and modem access
PG	Paging parameter setup
LAN Configuration	
SA	Enable/disable LAN and web access
LC	LAN configuration menu

Connections Commands

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

Command	Description
DI	Disconnect remote or LAN connection
TE	Send message to other user
WHO	Display a list of connected users43

Baseboard Management Controller

This section explains the Base Management Controller (BMC) command-line interface.

Accessing the BMC

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

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 server powered off, connect a null-modem cable to the serial console port 1 on the rear panel of the server, and to your remote device.

2. Configure the terminal emulation software with the following settings:

   ❏ Baud rate: 9600

   ❏ Bits: 8

   ❏ Parity: None

   ❏ Stop Bits: 1 (one)

   ❏ Flow Control: XON/XOFF

3. Using the terminal emulation, connect to the server with a direct connection.

4. Power on the server. 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 server, this command activates the BMC command line interface even if the server power is off.

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

   ```
   login>
   ```

   (You are not prompted for a password if none has been defined.)

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>
```

Using the BMC Command Line Interface (CLI)

The BMC supports the industry-standard Intelligent Platform Management Interface specification (IPMI 1.0 with Extensions). This specification describes the management features that are built into the system board. These features include:

■ Diagnostics (local and remote)

■ Console support

■ Configuration management

■ Hardware management

■ Troubleshooting

There are two categories of BMC commands:

■ Simple commands

■ IPMI commands

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

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

Executing BMC Commands

To run BMC commands at the command prompt, follow these steps:

1. Enter the command and any required parameters after the `cli>` prompt.

   Use the **Backspace** key to correct mistakes.

2. To run the command, press **Enter**.

Logging Out of the BMC Command Line Interface

When you are finished using the BMC CLI, follow these steps:

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

   Q

   The BMC login prompt displays:

   ```
   login>
   ```

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

Simple Commands

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

To run simple BMC commands, follow these steps:

1. Enter the command followed by any required options. (The table below describes the simple commands.)

2. Press **Enter**.

3. If prompted for additional information, enter the information 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	Enables a 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.
H	N/A	User	Displays a 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 server power on or off; does not shut down using OS procedures. If you do not enter a parameter, it displays the current power state.
Q	N/A	User	Logs out a user; does not close the 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.

IPMI Commands

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

CAUTION: DO NOT run BMC IPMI commands unless you are experienced with the IPMI specification. If you make mistakes running these commands, you can accidentally delete or modify data and cause the server 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

Bits		Byte
7-2	**1-0**	
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 at: **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

Command	Description
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

Command	Description
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 ensure you have the latest version of the firmware running on the server, download the latest version of the firmware from the Web, and create a CD to install the firmware on the server.

You can update firmware by using the HP Firmware Manager (HP FM). HP FM is a set of tools for updating firmware on an HP Integrity system. HP FM is packaged with the firmware and distributed through the web. HP FM provides two methods of updating firmware. The method to use depends on whether or not the operating system is running on the system:

HP OS-Initiated Firmware Manager (HP OSIFM) – Use HP OSIFM if the HP-UX or Linux operating system is running. HP OSIFM provides a firmware package in a patch or product file for HP-UX and a Smart Component for Linux. You download the patch, product, or Smart Component to a system and then use the operating system to update the firmware.

HP Offline Firmware Manager (HP OFM) – Use HP OFM if the operating system is not running or to update the firmware for a device in the boot path. HP OFM provides a firmware package as an .ISO image that you download to a system to create a CD. You then use the CD to boot the system and update the firmware.

For more information about downloading and updating firmware using FM, see the HP Firmware Manager User's Guide under the System Firmware section of the HP Technical Documentation Web site at:

http://www.docs.hp.com/en/hw.html#System%20Firmware

4. Download, unpack, and install the firmware upgrade.

5. Run the **info fw** EFI command to confirm that the upgrade was successful.

Downloading the Latest Version of the Firmware

to download the latest version of the firmware from the web, follow these steps:

1. Go to **http://www.hp.com/go/bizsupport**.

2. Select **download drivers and software**.

3. Select **Itanium-based servers** from the **Server** category.

4. Select your product from the servers listed.

5. Select your operating system.

6. Select the firmware category you want to download.

7. Download the firmware to a CD.

Installing the Latest Version of the Firmware On the Server

to install the latest version the firmware on the server, follow these steps:

1. Start a server console session.

2. Insert the CD with the copy of the latest version of the firmware.

3. Using the **EFI Boot Manager** menu, boot to the drive that contains the CD with the updated firmware.

4. Follow the instructions to update the firmware.

3

Removing and Replacing Components

This chapter addresses the following topics:

- "Location of Internal Components and Connectors" (page 61)
- "Remove or Replace Prerequisites" (page 64)
- "Server Covers and Bezel" (page 65)
- "Removing and Replacing Hot-Swappable and Hot-Pluggable Devices" (page 71)
- "Removing and Replacing Internal Components" (page 76)

Location of Internal Components and Connectors
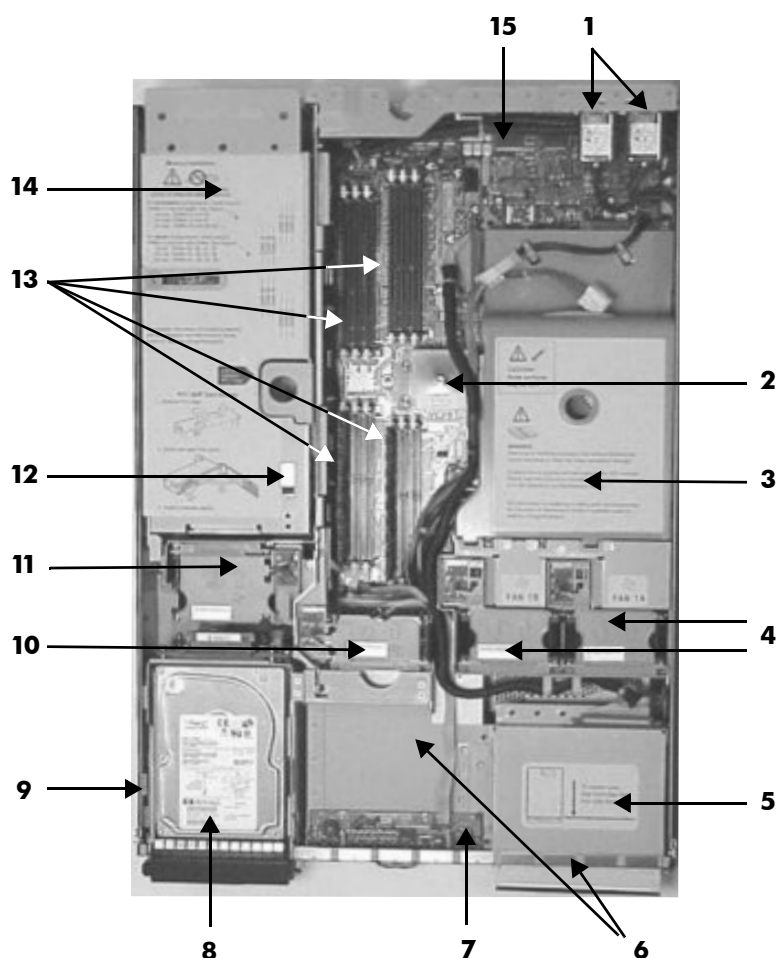
Internal Physical Layout (front of server at bottom of photo)

1 Power receptacles (PWR1 left, PWR2 right)	**9** Hard disk lock
2 HP zx1 memory and I/O controller	**10** Memory fan(s)
3 Airflow guide	**11** PCI fan
4 System fans (1A right, 1B left)	**12** Intrusion switch
5 Slimline optical drive	**13** Memory slots
6 Power supplies (PSU1 center, PSU2 under optical drive)	**14** PCI/AGP cage
7 Status panel board	**15** iLO MP card (optional)
8 Hot-swappable hard drives (up to 3)	
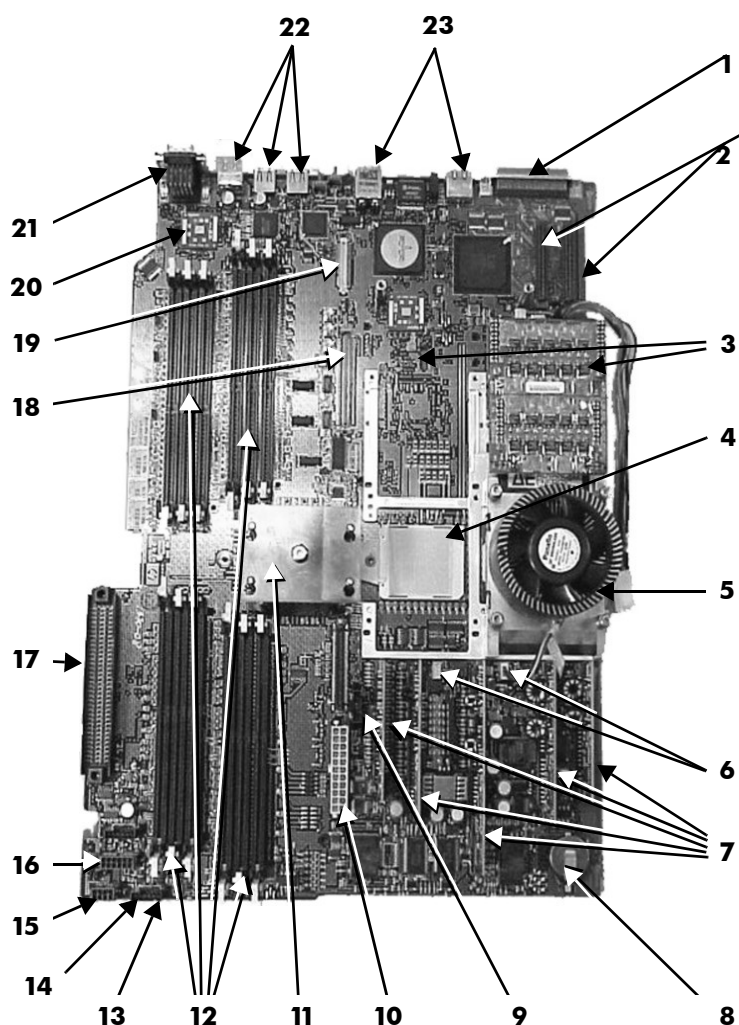
System Board Connectors and Slots (front of server at bottom of photo)

1 External SCSI connector	**13** Status panel connector
2 SCSI connectors A & B	**14** Control and standby power connector
3 Processor power Pod(s)	**15** SCSI backplane power connector
4 CPU1 (empty socket)	**16** PCI/Memory fan cable connector
5 CPU0 (processor under Turbo Fan)	**17** PCI/AGP backplane connector
6 Turbo fan power connectors	**18** Optical drive connector
7 Five VRM cards	**19** iLO MP card connector
8 Battery	**20** HP zx1 I/O adapter
9 System fan connector	**21** Serial ports (2)
10 Main power connector	**22** USB connectors (4)

11 HP zx1Memory and I/O Controller (under heatsink)	**23** LAN Connectors (2)
12 Memory Slots	

Remove or Replace Prerequisites

Before you remove or replace parts, you must do the following:

■ Read the power and EMI warning and note below.

■ 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 server.

2. Unplug the server power cord from the ac power outlet.

WARNING: Some parts inside the server are hot. Wait approximately three to five minutes for them to cool down before touching them.

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

NOTE: HP has a strong commitment toward the environment. Your HP server is designed to respect the environment as much as possible. HP can also return your old server 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 potentially 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.

Gather Your Tools

You need the following:

■ Flat blade screwdriver

■ T-15 Torx driver

■ Special processor tool (HP part number A7231-67046)

■ Static-free mat

■ Static strap

Follow Electrostatic Discharge (ESD) Precautions

To prevent damage to the server, observe all of the following ESD precautions while performing the server parts removal or 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 the 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.

Server Covers and Bezel

To upgrade, remove, or replace most server components, you must first remove the covers from the server chassis. This section explains how to remove and replace the covers for both pedestal and rack-mount configurations.

WARNING: Do not remove the server covers without first powering the server 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 covers before powering the server on.

Pedestal-Mount Server

To access the internal components on a pedestal-mount server, you must remove the left-side cover and the top cover.

Removing the Side and Top Covers on a Pedestal-Mount Server

WARNING: Never remove the server 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 server, you must power off the server using the power button and remove the power cord before removing the server side cover. Remove the Power Protection Device cables before any servicing operation. Always replace the side cover before powering the server on again.

To remove the side cover, follow these steps:

1. Power off the server and disconnect the power cable and all other cables from the back of the server.

NOTE: If you are removing *only* a hot-swappable fan or a hot-plug hard drive, you can leave the server on and the power cables connected.

2. Remove the side cover.

    d.   Grasp both indentations at the top of the side cover and pull outward.

    e.   Lift the side cover off of the server chassis.
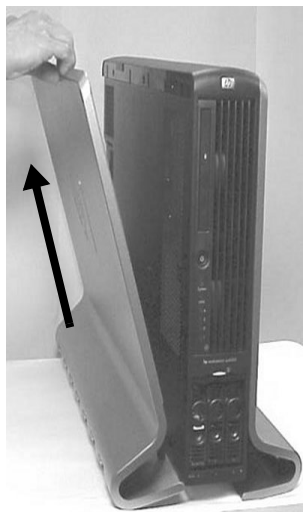
Removing the Left-side Cover

3. Remove the top cover:

    a.   Turn the top cover lock keyswitch is in the unlocked position.

    b.   Rotate the blue release handle to release the latch.

    c.   Slide the cover toward the back of the chassis and lift the cover off.
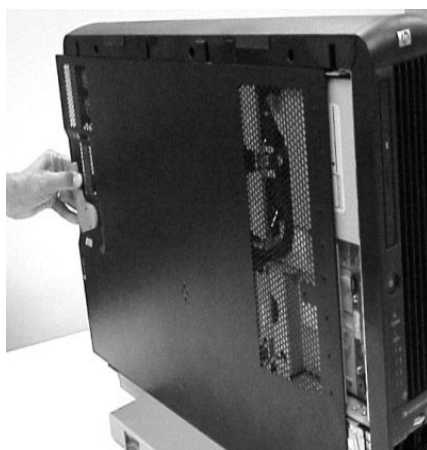
Removing the Top Cover

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

Replacing the Top and Side Covers on a Pedestal-Mount Server

This section shows how to replace the top and side covers.

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

To replace the top cover, follow these steps:

1. Replace the top cover:

    a. Align the front edge of the top cover with the alignment mark on the optical drive bay.
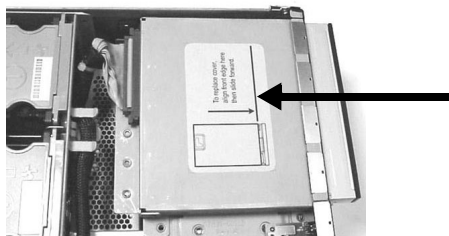
Top Cover Alignment Mark

    b. Place the top cover on the chassis and slide it toward the front of the server until the blue release lever snaps in place.
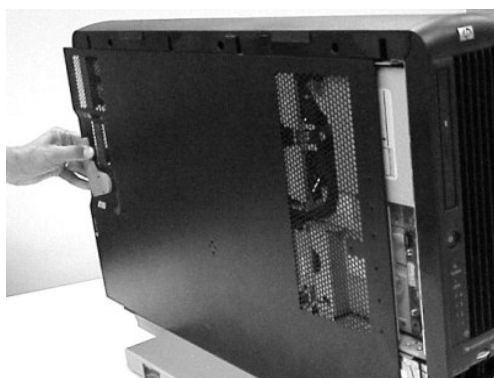
Replacing the Top Cover

To replace the side cover, follow these steps:

2. Replace the side cover:

    a. Align the side cover mounting holes with the matching tabs on the server chassis.

    b. Close the cover until it snaps onto the server chassis.
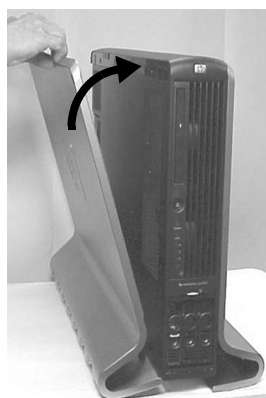
Replacing the Side Cover

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.

To remove the front bezel, follow these steps:

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

To replace the front bezel, follow these steps:

1. Insert the bezel's latches into the matching slots on the server chassis.

2. Close the bezel and push toward the front of the server until it snaps into place.
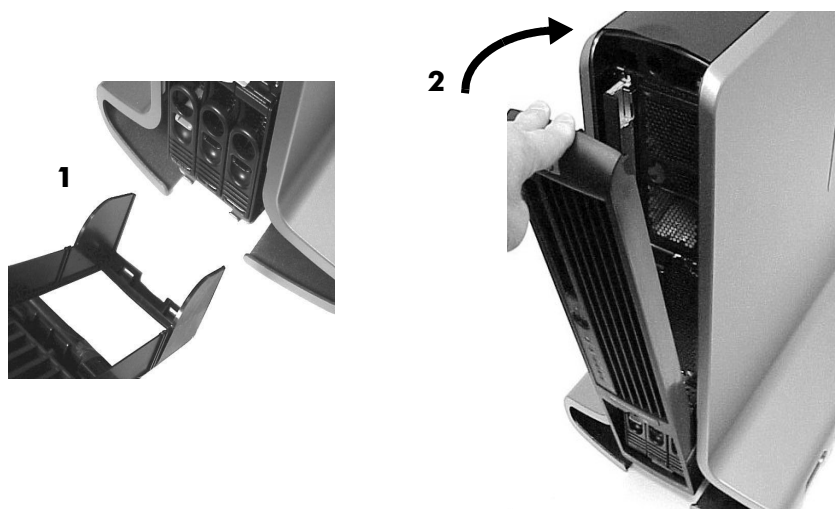
Aligning the Front Bezel

Rack-Mount Server

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

Removing the Top Cover on a Rack-Mount Server

To remove the top cover, follow these steps:

1. Power off the server and disconnect the power cable and all other cables from the back of the server.

NOTE: If you are removing only a hot-swappable system fan or a hot-plug hard drive, you can leave the server on and the power cables connected.

2. Release the rack latches by rotating them outward.
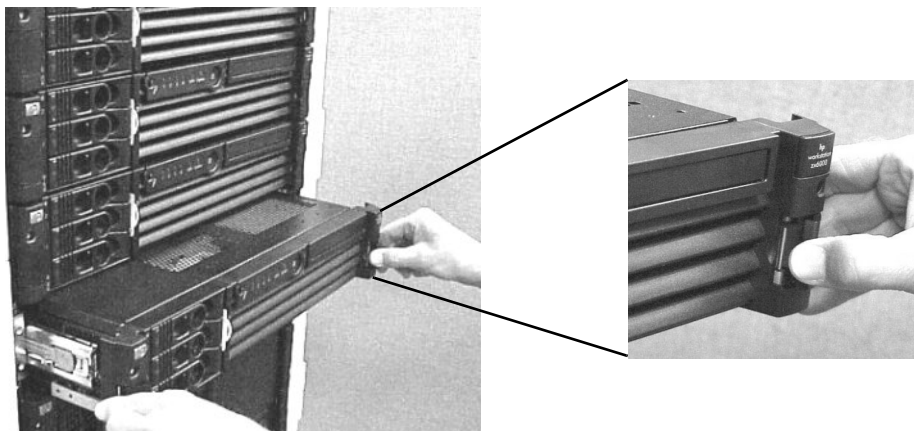
Releasing the Rack Latches

3. Slide the server out of the rack until the guide-rail release clips are visible.
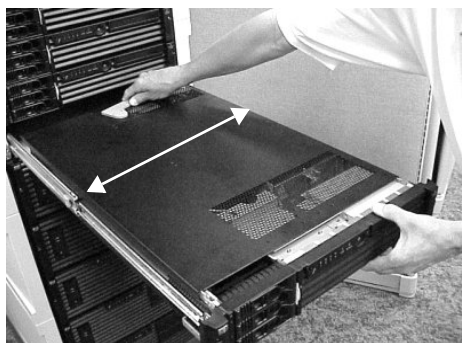
Guide-rail Release Clips

4. Ensure the top cover lock keyswitch is in the unlocked position.

5. Rotate the blue release lever toward the back of the server and slide the top cover toward the back of the server.

6. Lift the top cover off the server chassis.
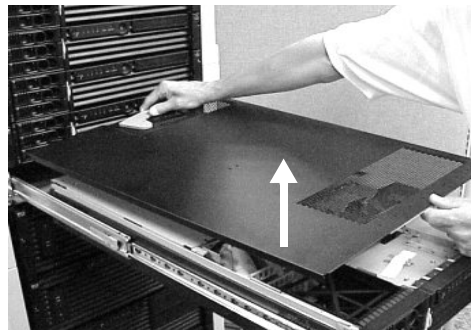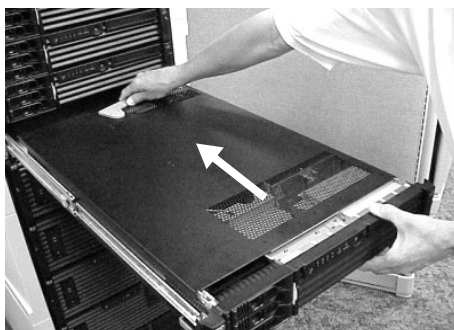
Removing the Top Cover

Replacing the Top Cover on a Rack-Mount Server

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

To replace the top cover, follow these steps:

1. Align the front edge of the top cover with the alignment mark on the optical drive bay.
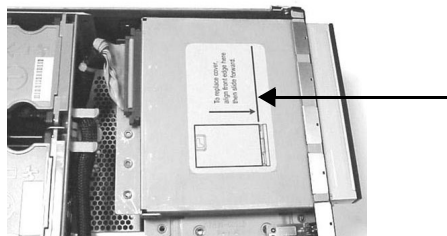
Top Cover Alignment Mark

2. Grasp the blue release lever and slide the top cover toward the front of the server until the lever snaps into place.
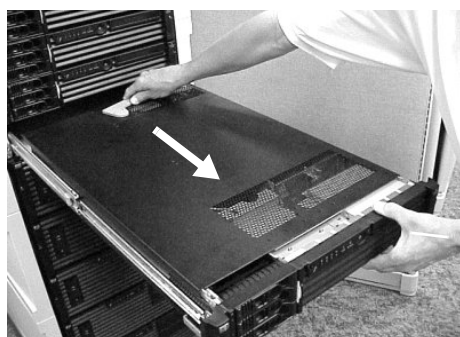
Replacing the Top Cover

3. Slide the server 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.

To remove the front bezel, follow these steps

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 it off the server chassis.

Replacing the Front Bezel

To replace the front bezel, follow these steps

1. Insert the bezel latches into the matching slots on the server chassis.
2. Close the bezel and push toward the front of the server until it snaps into place.
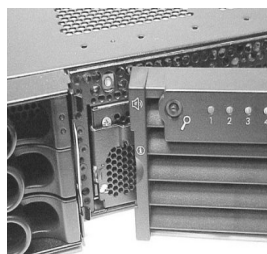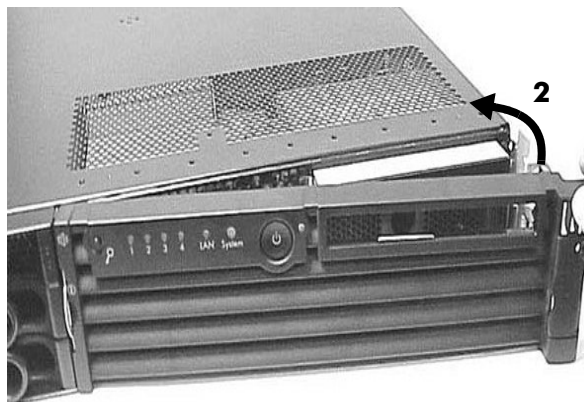
Align the Front Bezel

Removing and Replacing Hot-Swappable and Hot-Pluggable Devices

The rx2600 and zx6000 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 server is running:

■ System fans

■ Power supplies

■ Hard drives

System Fans

There are four system fans that keep the server cool when it is running. The system fans are hot-swappable. This enables you to replace a fan while the server is running.

CAUTION: When the server is running, you must replace the top cover within four minutes to prevent components from overheating.

Removing a System Fan

To remove a system fan, follow these steps

1. Remove the server covers.

2. Remove the fan.

   a. Grasp the appropriate fan and lift it out of the fan socket to remove it:

     ◆ fan 1A, 1B, 2, or 3 from a rack-mounted server, or

     ◆ fan 3 from a pedestal-mount server

1A
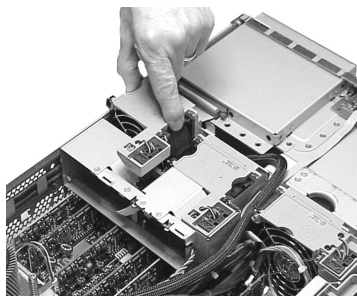
1B
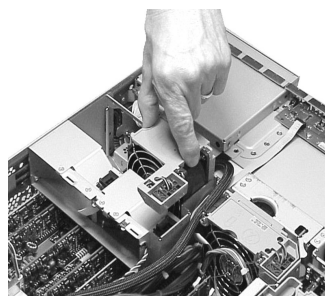
2
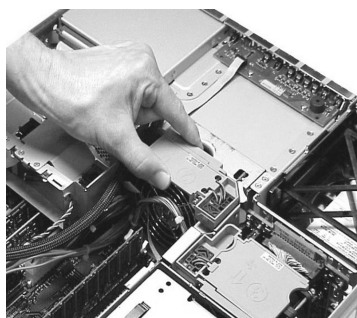
3
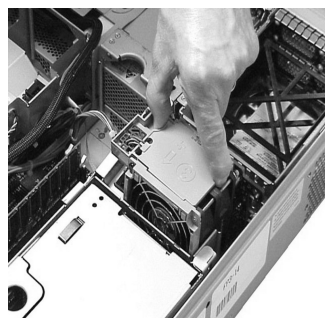
Removing System Fans

b. To remove *fan 1A, 1B, or 2* from a zx6000 pedestal-mount server:

◆ Unplug the fan power connector.

◆ Remove the fan from the server.
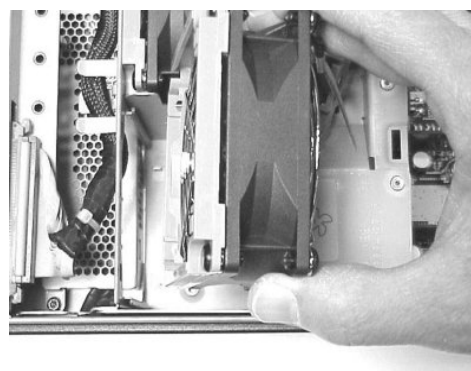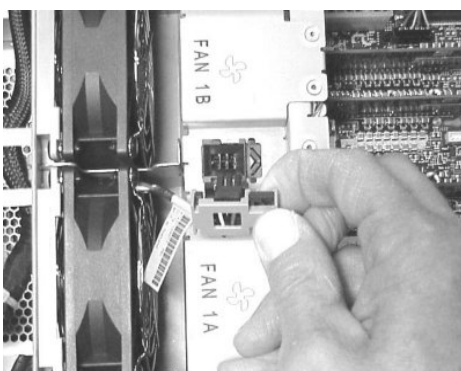
Removing Fans 1A, 1B, or 2 from a Pedestal-Mount Server

Replacing a System Fan

CAUTION: Replace the top cover within four minutes to prevent damage to the server components.

To replace a system fan, follow these steps:

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

2. Verify that the fan has been properly installed by observing the LED signals on the front of the server for the appropriate fan information.

Removing and Replacing Power Supplies

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.

CAUTION: Before removing a power supply, make sure the second power supply is functioning properly. The two green LEDs inside the supply must both be lit on the second supply before you can safely remove the failed power supply.

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

Removing a Power Supply

To remove a power supply, follow these steps:

1. Remove the front bezel from the server.

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 server.
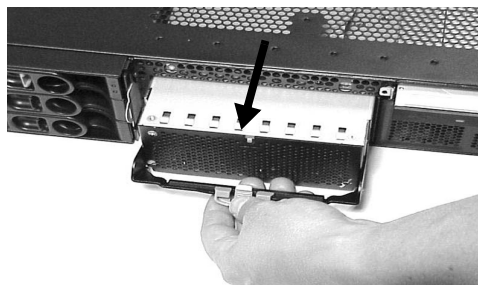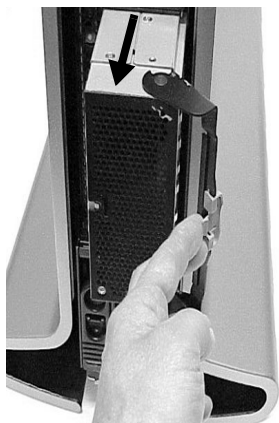
Removing the Power Supply from the Server

Replacing a Power Supply

To replace a power supply, follow these steps

1. Remove the front bezel from the server 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.
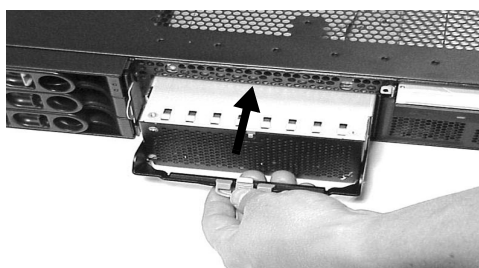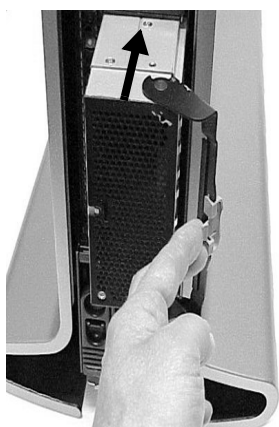
Sliding the Power Supply into Place

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 servers 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 or removal on its own without assistance from operating system commands.

■ The hot-plug process enables you to replace a defective disk drive in a high-availability server 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 server is running. To avoid damage to the hard drives:

■ See the documentation provided with the drive for additional details on inserting or removing a disk drive.

■ See your OS documentation for instructions on preparing the OS for inserting or removing a hard drive.

Removing a Hard Drive

To remove a hard drive, follow these steps

1. If the server is powered on and the OS is running, prepare the OS to have the disk drive removed. See your OS documentation for instructions on preparing the OS for removing and inserting hard drives.

2. If you have locked your hard drives, you must unlock them before removing or replacing a drive:

   a. Remove the covers.

   b. Press down on the **Unlock** lever to unlock the drive.

CAUTION: If you try to remove a hard disk drive without unlocking it from the server, 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.

Releasing the Hard Drive Release Clip
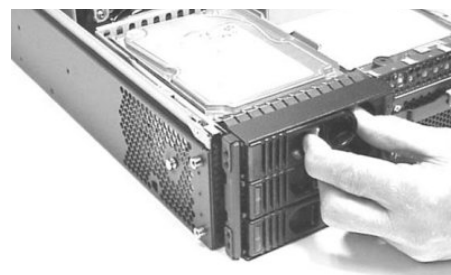
4. Pull outward on the release lever to remove the drive from the server.

Removing the Hard Disk Drive

Replacing a Hard Drive

To replace a hard drive, follow these steps

1. If the server is powered on and the OS is running, prepare the OS to have the disk drive removed. See your OS documentation for instructions on preparing the OS for removing and inserting hard drives.

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 longer slides forward. You must leave the release lever in the open position, as shown, when you push the drive into the server.

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 server to the EFI Boot Maintenance Menu to rescan the hard drives.

5. If desired, lock the hard drive in place. Replace the server covers if they were removed to unlock drives.

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

Removing and Replacing Internal Components

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

WARNING: Do not remove the server covers without first powering off the server and unplugging the power cord unless you are only replacing a hot-swappable system fan. Always replace the covers before powering the server on.

Airflow Guides

The server has the following airflow guides:

■ The processor airflow guide provides the proper volume of air-flow for cooling the processors and voltage regulator modules (VRMs).

   You must remove the processor airflow guide for the following reasons:

   ❑ if it is damaged to the point that airflow across the processors 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 for the following reasons:

❏ if it is damaged to the point that airflow across the memory cards is restricted

❏ to access memory modules and slots

NOTE: Air flows through the server from front to back.
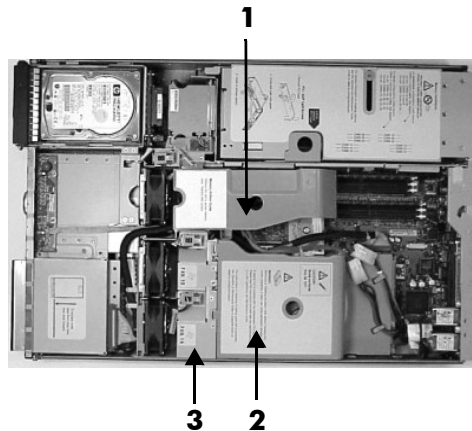
Server Airflow Guides

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

Removing the Memory Airflow Guide

To remove the memory airflow guide, follow these steps

1. Power off the server, disconnect all power cables, and remove the covers.

2. Grasp the memory airflow guide and lift it out of the server.

Removing the Memory Airflow Guide

Replacing the Memory Airflow Guide

To replace the memory airflow guide, follow these steps

1. Align the guides on both sides of the airflow guide with the slots on the chassis.
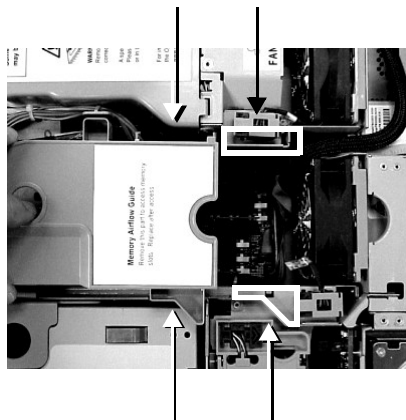
Aligning the Memory Airflow Guide

2. Insert the memory airflow guide in the slots.
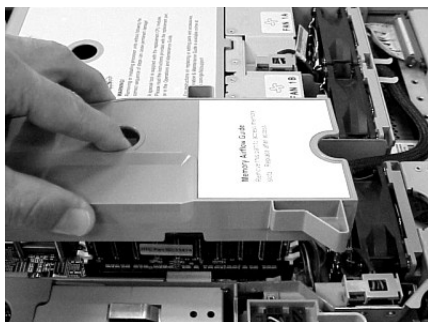
Replacing the Memory Airflow Guide

3. Replace the covers and reconnect all of the power cables.

Removing Processor Airflow Guide

To remove a processor airflow guide, follow these steps

1. Power off the server, disconnect all power and external cables, and remove the server covers.

2. Remove the IDE and power 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 server.

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.

   b. Rotate the clip clockwise to release the latch.
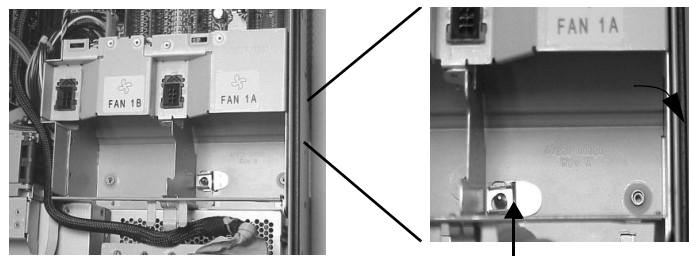
Airflow Guide Release Latch and Post

5. Disconnect the power cable connected to the guide from the system board.
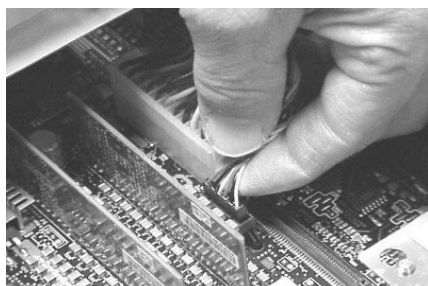
Power Connector for Front Portion of Airflow Guide

6. Lift the front portion of the airflow guide out of the server.
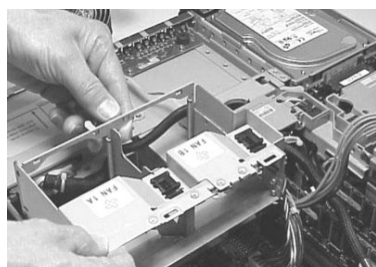
Removing the Front Portion of the Airflow Guide

Replacing the Processor Airflow Guide

To replace the processor airflow guide, follow these steps

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.

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 server.

   c. Connect the power 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.
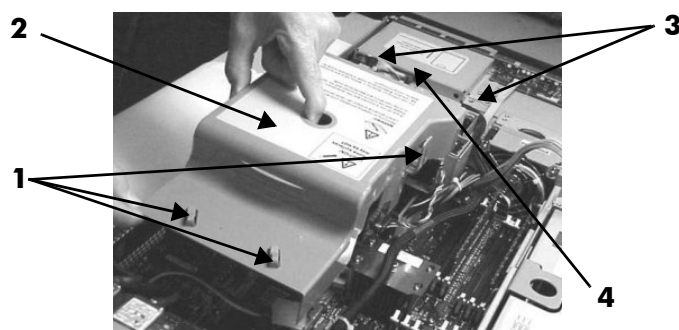
Replacing the Processor Airflow Guide

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

3. Replace the server covers.

4. Reconnect cables.

Removing and Replacing Memory

The server has 12 memory slots for installing DDR SDRAM memory modules. Modules can be 256 MB, 512 MB, 1 GB or 2 GB. The server supports combinations from 512 MB (zx6000) or 1 GB (rx2600) up to 24 GB. For HP approved memory modules.

NOTE: zx6000 workstations running Windows XP® 64-Bit Edition Version 2003 only support up to 16 GB of RAM.

Removing Memory Modules

To remove the memory modules, follow these steps:

1. Power off the server, disconnect power, LAN and telecommunications cables, and remove the covers.

CAUTION: To ensure that memory modules are not damaged during removal or installation, power off the server 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 slot.
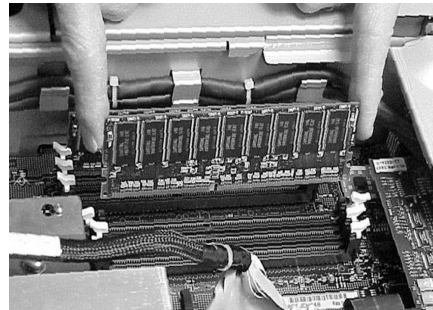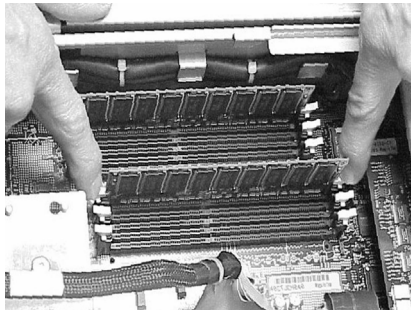
Memory Module Retainer Clips

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 slot 0A must match 0B, 1A must match 1B, and so forth.

■ In the Integrity rx2600 server, DIMMs must be installed in matched quads. Four identical DIMMs must be installed, one pair per memory cell, as listed below:

❑ 0A, 0B and 1A, 1B must match

❑ 2A, 2B and 3A, 3B must match

❑ 4A, 4B and 5A, 5B must match

This loading order must be used to enable chip spare functionality, available only on rx2600 servers.

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 slots 0A and 0B, and a pair of 1 GB DIMMs in slots 1A and 1B.

❏ On Integrity rx2600 servers, it is acceptable to load a quad of 256 MB DIMMs in slots 0A, 0B, 1A and 1B, and a quad of 1 GB DIMMs in slots 2A, 2B, 3A and 3B.

	Loading Order	Memory Cell 0	Memory Cell 1	Loading Order	
	1st	DIMM 0B	DIMM 1B	2nd	
	5th	DIMM 4B	DIMM 5B	6th	
Front	3rd	DIMM 2B	DIMM 3B	4th	*Back*
	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. Power off the server, disconnect all cables, and remove the server covers.

CAUTION: To ensure that memory modules are not damaged during removal or installation, power off the server and unplug the power cord from the ac power outlet. Wait until the STBY PWR LED on the System Board turns off before removing or installing memory.

---

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

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

3. Replace the server covers, reconnect all cables and power on the server.

4. Verify correct memory configuration. Either:

   ❏ Run the **info mem** command at the EFI shell prompt.

   ❏ On servers with firmware version 2.0 or higher, check the configuration using the EFI **System Configuration menu**.

Removing and Replacing Accessory and Graphics Cards

The zx6000 has the following accessory card slots:

■ Three 64-bit, 133 MHz PCI-X card slots

■ One AGP Pro 4×, 1.5V slot

The rx2600 has the following accessory card slots:

■ Four 64-bit, 133 MHz PCI-X card slots

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

CAUTION: *Avoid Static Electricity.* Static electricity can damage electronic components. Power off all equipment before installing an accessory card. Do not let your clothes touch an accessory card. To equalize the static electricity when replacing an accessory card, rest the accessory card bag on top of the server while you are removing the card from the bag. Handle the card as little as possible and with care.

To remove an accessory or graphics card, follow these steps:

1. Power off server, disconnect all power and external cables, and remove the server covers.

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 server.
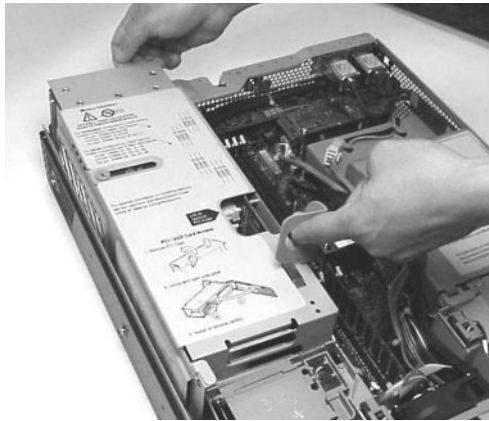
Removing the PCI/AGP Cage

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 server.
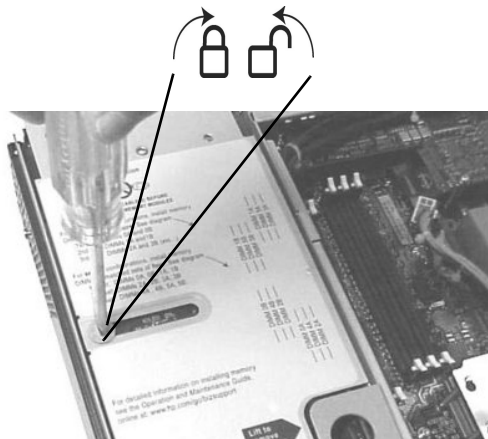
Plastic AGP Card Shipment Retainer

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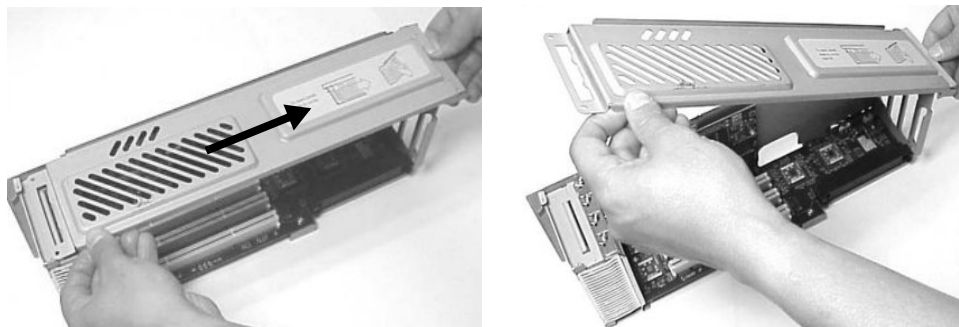
Removing the PCI/AGP Cage Cover

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.
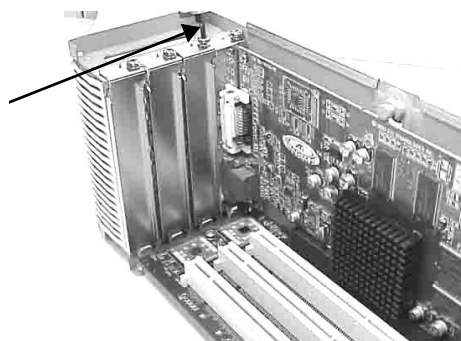
Removing the Bulkhead Screw

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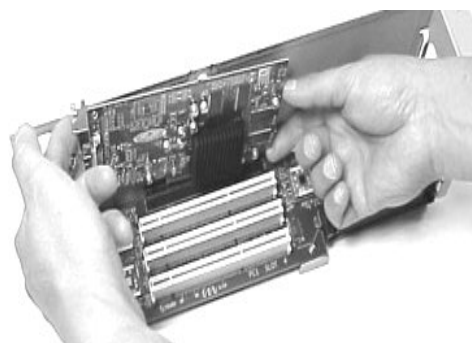
Removing the Accessory Card

Replacing an Accessory or Graphics Card

To replace an accessory or graphics card, follow these steps:

1. Remove the PCI/AGP cage.

2. Remove any bulkhead blank from the slot 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 slot. If you are replacing a card, put the new card into the same slot 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 boards.

b. Slide the tab at the bulkhead end of cage (1) into the slot on the cover (2).
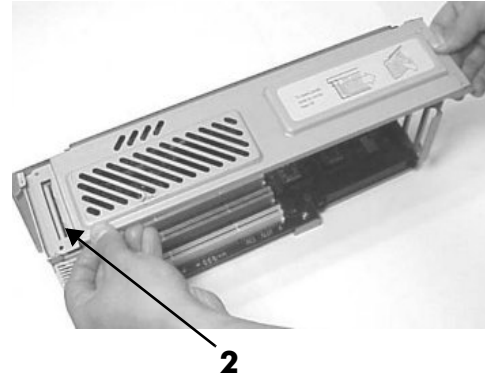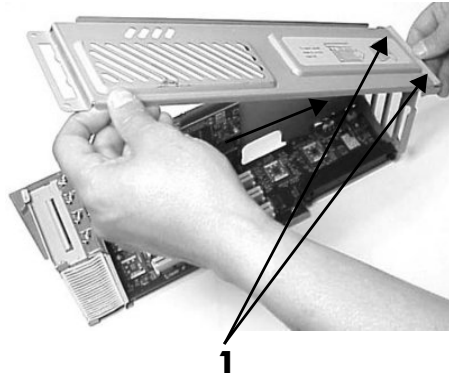
Replacing the PCI/AGP Cage Board Cover

5. If you are replacing an audio card, attach the audio cable to the card (1) and to the connector on the PCI/AGP backplane (2).
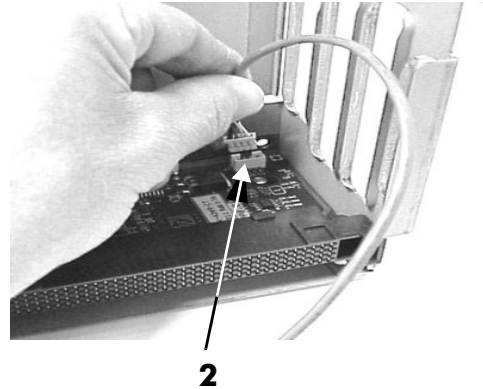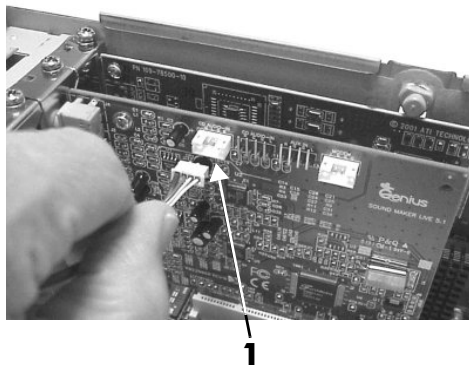
Connecting the Audio Cable

6. Place the PCI/AGP cage back in the server and secure it:

a. Align the PCI/AGP cage in the server.

b. Depress the release lever to lock the cage in place.

c. If you have an AGP card installed, secure the plastic shipment retainer.

7. Replace the covers, reconnect all of the power and external cables and power on the server.

8. Verify that new cards have been correctly installed:

❏ Run the **info io** command at the EFI shell prompt or,

❏ On servers with firmware version 2.0 or higher, check the configuration using the EFI **System Configuration menu**.

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.

Removing and Replacing the PCI/AGP Backplane

The backplane for the zx6000 includes one AGP card slot and three PCI card slots. The rx2600 server backplane is called the PCI/AGP backplane. The removal process is the same for both.

Removing the PCI/AGP Backplane

To remove the PCI/AGP backplane, follow these steps:

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.
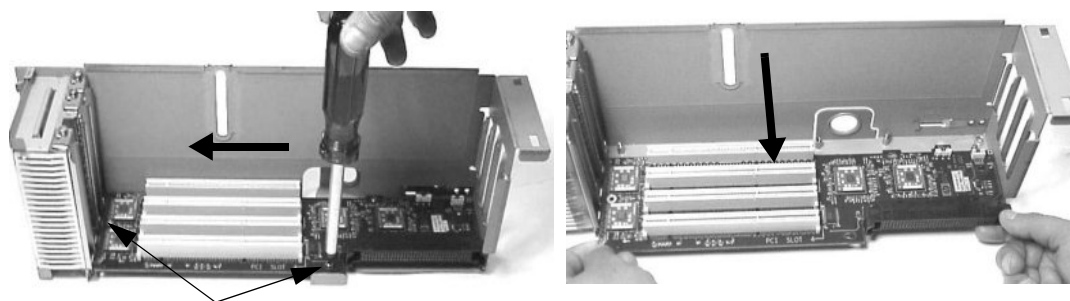
Removing the PCI/AGP backplane (rx2600 shown)

Replacing the PCI/AGP Backplane

To replace the PCI/AGP backplane, follow these steps:

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.
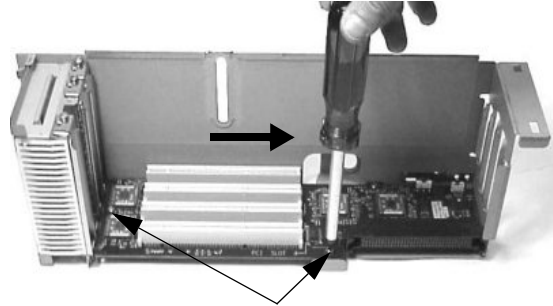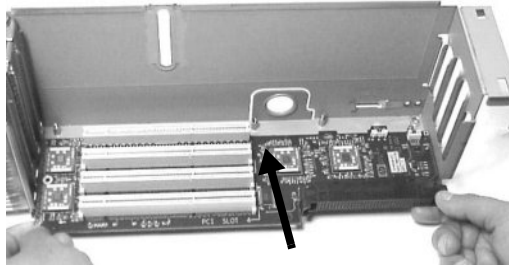
Replacing the PCI/AGP backplane (rx2600 shown)

   3. Replace any accessory and graphics cards.

Removing and Replacing an Optical Drive

The server has one open bay for 8x slimline DVD or CD-RW/DVD.

Removing an Optical Drive

To remove an optical drive, follow these steps:

   1. Power off the server, disconnect all power and external cables, and remove the server covers.

   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.
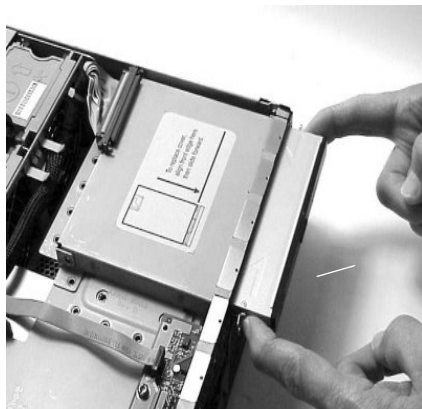
Releasing the Optical Drive Retaining Clips

   4. Slide the optical drive out of the optical drive bay.
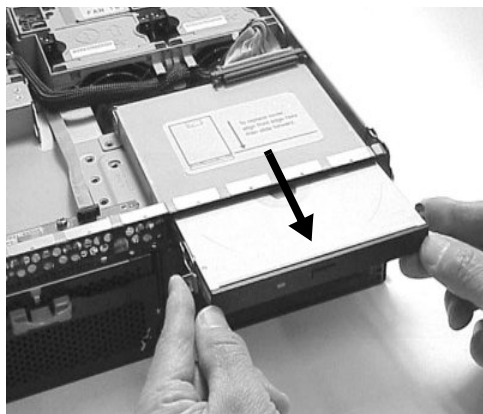
Removing the Optical Drive

Replacing an Optical Drive

To replace an optical drive, follow these steps:

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.
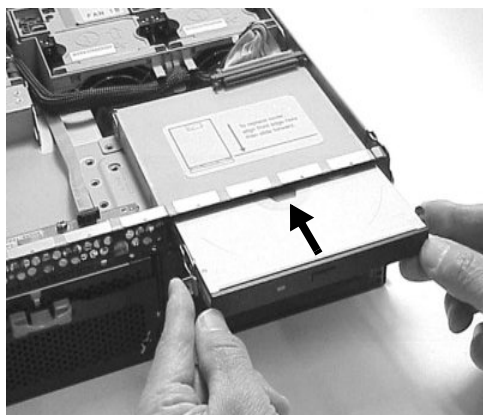
Replacing the Optical Drive

2. Connect the IDE cable on the back of the optical drive.

3. Replace the server covers, reconnect all of the power and external cables and power on the server.

4. Verify that the optical drive has been properly installed:

   ❏ Run the **info io** command at the EFI shell prompt or,

   ❏ On servers with firmware version 2.0 or higher, check the configuration using the EFI **System Configuration menu**.

Removing and Replacing the iLO MP Card

The optional iLO MP card includes these ports:

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

Removing the iLO MP Card

To remove the iLO MP card, follow these steps:

1. Record the network settings from your iLO MP card before beginning this task.

2. Power off the server, disconnect all power and external cables and remove the covers.

3. Unscrew the two power connector mounting screws (1) and remove the power connector plate (2) from the back of the server.
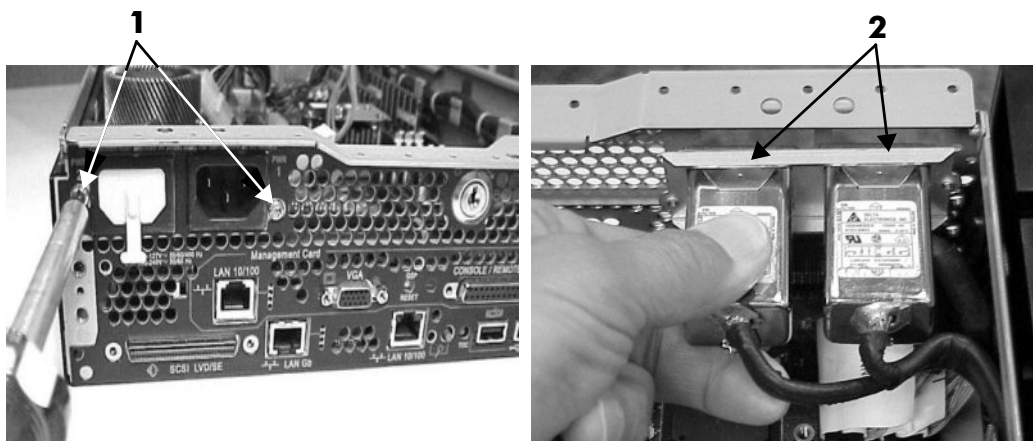
Removing the Power Connectors

4. Unscrew the two mounting screws that connect the iLO MP card to the internal chassis post (1) and the two external mounting screws that are located on both sides of the 25-pin serial connector (2).
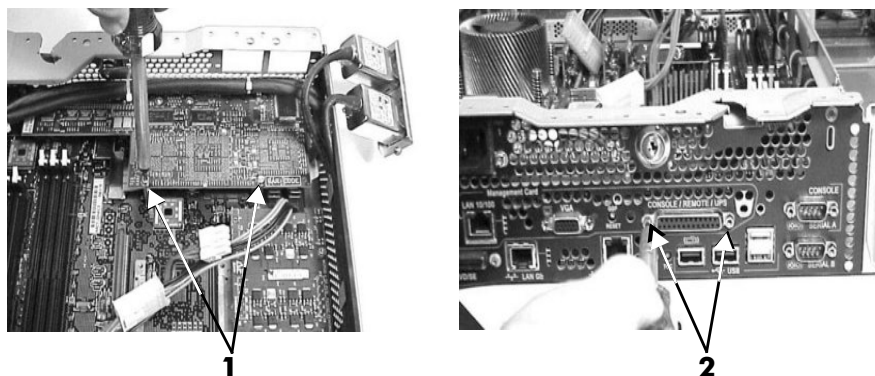
Unscrew the iLO MP Card Mounting Screws

5. Disconnect the iLO MP card connector.
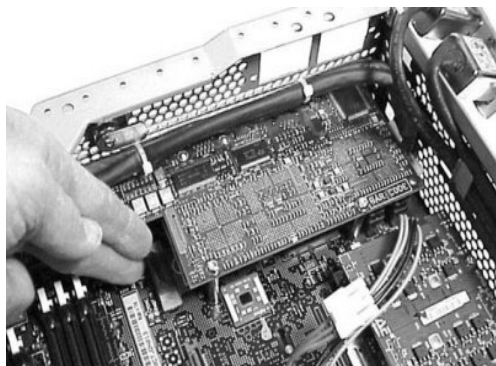
Disconnecting the iLO MP Card Connector

6. Remove the iLO MP card from the server by grasping it by its edges.
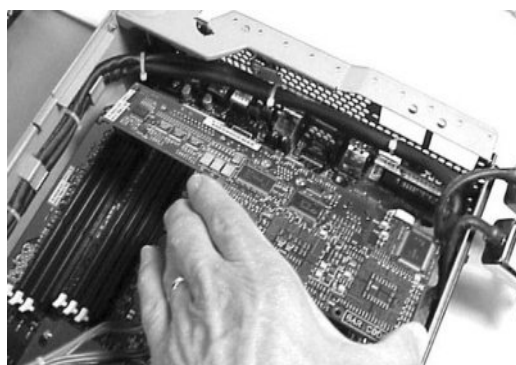
Removing the Card

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

a. Insert the blank retaining tab into the slot on the chassis.
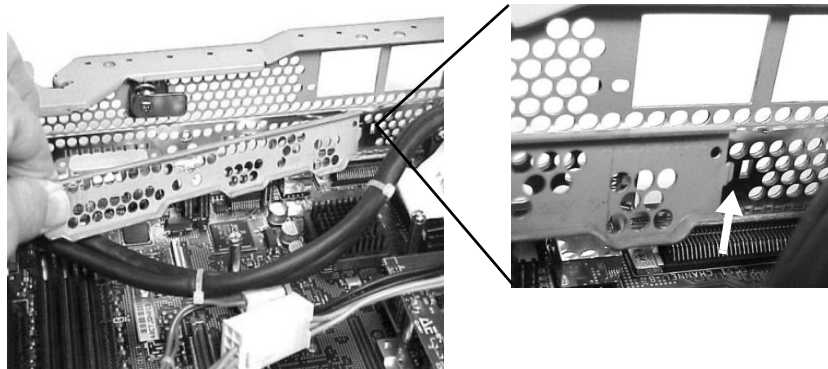
Aligning the iLO MP Card Blank

b. Push the iLO MP card blank against the inside of the chassis and screw in the blank's mounting screw on the external connector side of the server chassis.
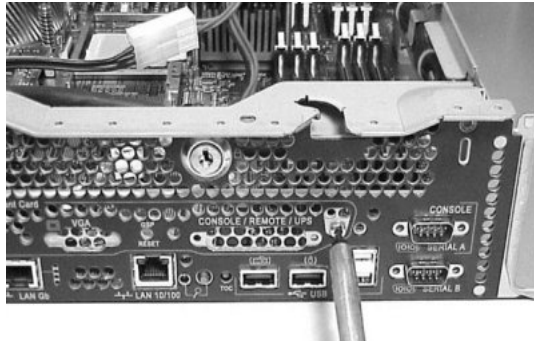
Securing the iLO MP Card Blank

8. Replace the covers and reconnect the power and external cables.

Replacing the iLO MP Card

To replace the iLO MP card, follow these steps:

1. Power off the server, disconnect all power and external cables and remove the server covers.

2. If you are installing a new card, remove the iLO MP card blank:

   a. Unscrew the mounting screw for the iLO MP card blank, located on the external connector side of the server chassis.

   b. Remove the blank retaining tab out of its slot on the server chassis and remove the blank from the server.

3. Insert the iLO MP card in the server:

   a. Grasp its edges and place it on the two iLO MP card posts.

   b. Push the LAN, 15-pin VGA and 25-pin serial connectors through their openings on the back of the server.

4. Connect the iLO MP card:

   a. Connect the iLO MP card cable to its connector on the system board.

   b. Screw in the two mounting screws that connect the iLO 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 server covers and reconnect the power and external cables.

Removing and Replacing the LED Status Panel

The LED status panel card contains the server 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 power on the server and boot to the EFI prompt. After confirming that the first component has been replaced successfully, power off the server and replace the second component.

Removing the LED Status Panel

To remove the LED status panel, follow these steps:

1. Power off the server, disconnect all power cables, and remove the server covers.

2. Disconnect the LED status panel controller cable.
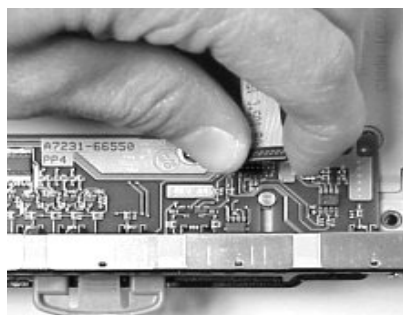
Disconnect the LED Status Card Controller Cable

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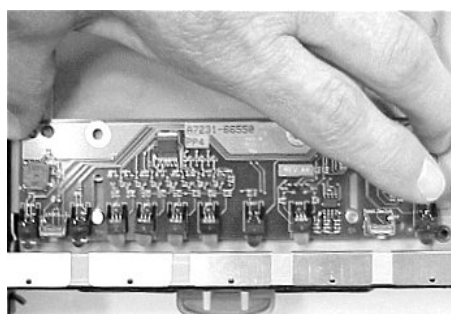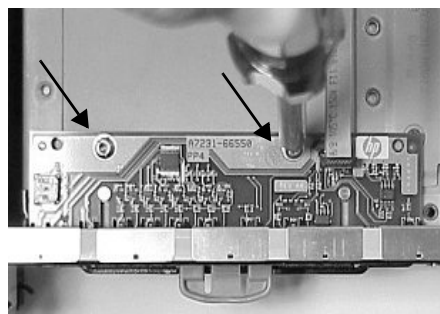
Remove the LED Status Card

Replacing the LED Status Panel

To replace the LED status panel, follow these steps:

1. Replace the LED status panel in the server and screw in the two LED status panel mounting screws.

2. Connect the LED status panel controller cable.

3. Replace the server covers and reconnect all power cables. Power on the server and verify that the system and power LEDs light up.

4. Copy a valid UUID to the new status panel. To do this, during boot up press **Y** at this prompt:

```
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 2003] - 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 2003] - 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 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.

Removing and Replacing a Processor

If there are two processors on the 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 server.

Removing a Processor

To remove a processor, follow these steps:

1. Power off the server, **disconnect all power** and external cables and remove the server covers.

2. Remove the processor airflow guide and cables.

3. Unscrew the processor power pod mounting screws (1) and disconnect the module from its processor by sliding it toward the back of the server chassis (2).

1   **2**
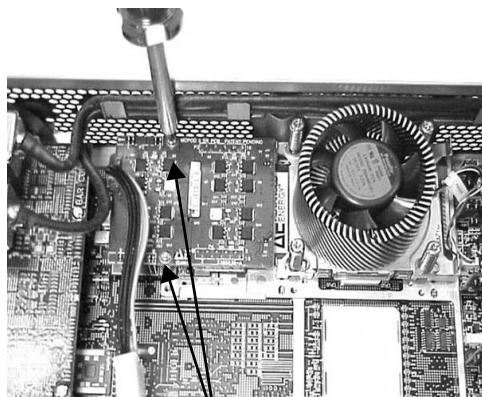
Disconnect the Processor Power Pod
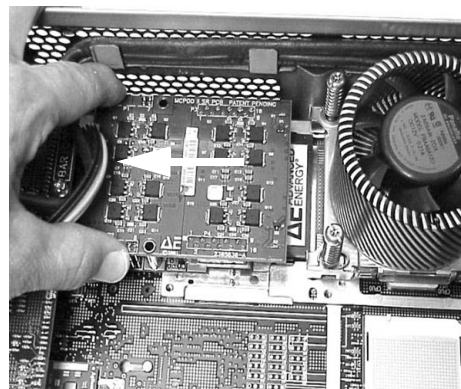
4. Remove the processor power pod from the server.
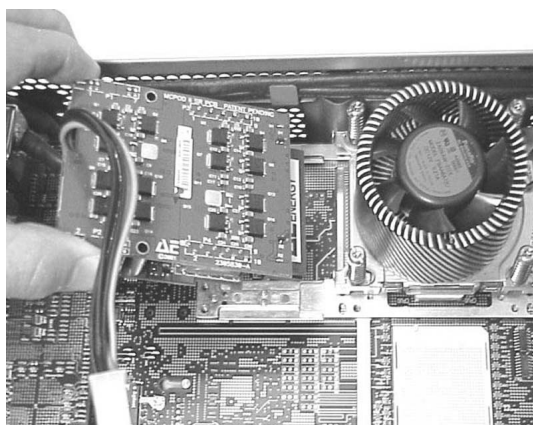
Remove the Processor Power Pod

5. Disconnect the power cable for the processor turbo fan.
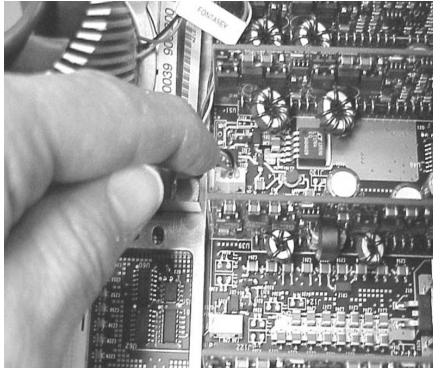
Disconnect the Power Cable for the Processor Turbo Fan

6. Unscrew the four heatsink captive screws using the special processor tool (HP Part Number A7231-67046).

   ❏ Slide the sequencing retainer plate toward the back of the server to open the hole in the edge of the turbo fan heatsink for insertion of the special processor tool into the processor locking mechanism.
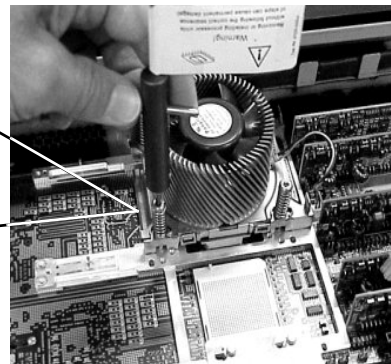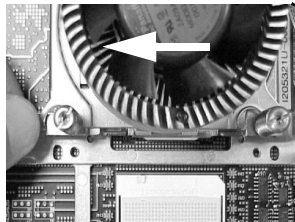
Unscrew the Turbo Fan Heatsink Captive Screws

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.
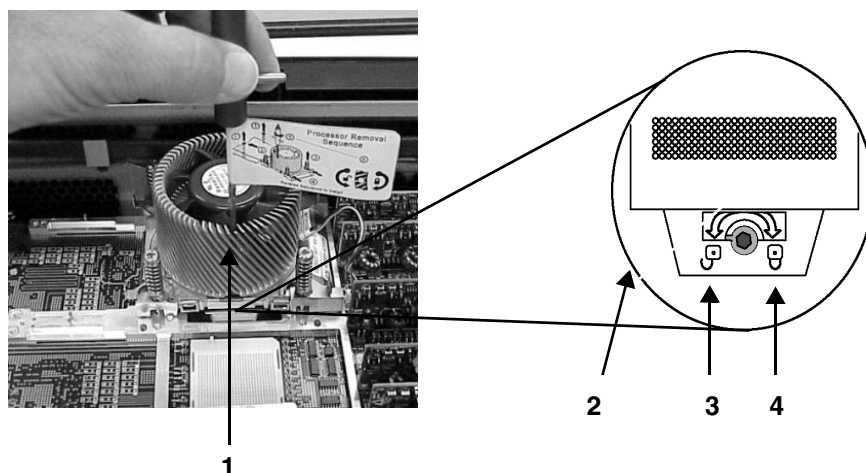
Unlocking the Processor Locking Mechanism with the Special Processor Tool

1	Insert special processor tool here
2	The special processor tool rotates this lock underneath the heat sink
3	**Unlocked**
4	Locked

8. Remove the turbo fan heatsink and processor from the server.
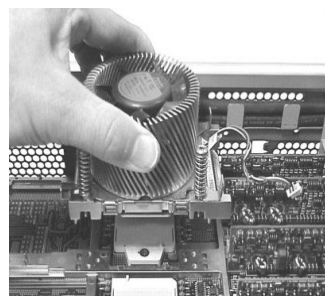
Removing the Turbo Fan Heatsink and the Processor

Replacing a Processor

To replace a processor, follow these steps:

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

1. If you are installing a second processor, power off the server, disconnect all power and external cables and remove the server covers.

2. If you are replacing a processor, remove the old processor.

3. Ensure that the processor locking mechanism is rotated into the unlocked position.
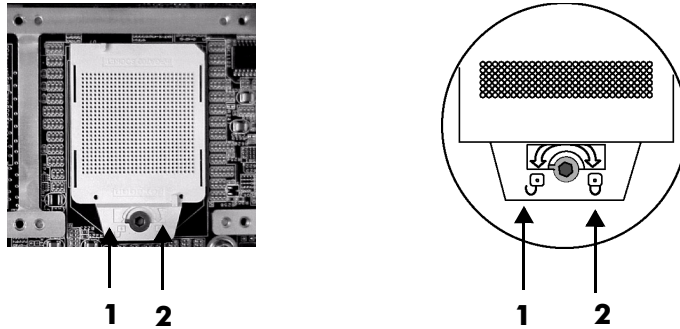
Processor Locking Mechanism

1	**Unlocked**
2	Locked

4. Check to ensure that the processor pins are not 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 server.
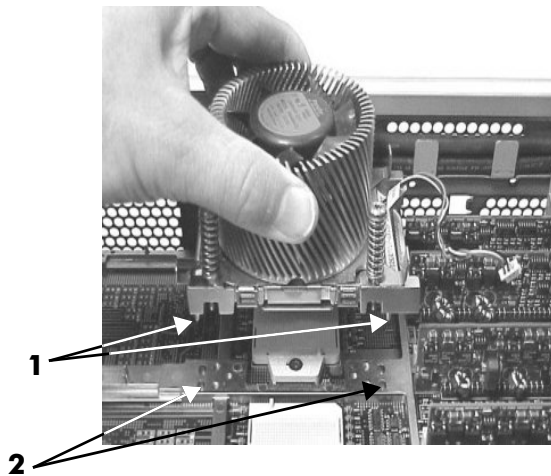
Aligning the Turbo Fan and Processor Assembly

1	Locator Posts
2	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.
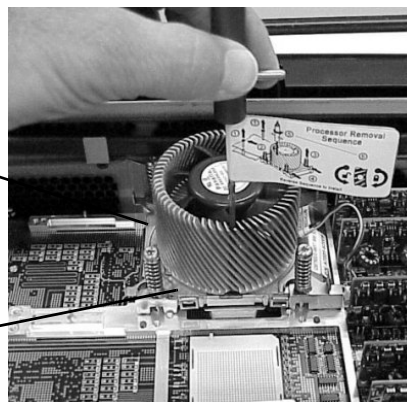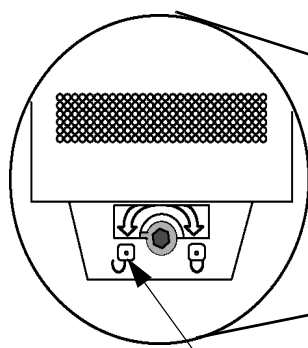
Locking the Processor in Place

7. Slide the sequencing retainer plate toward the front of the server.
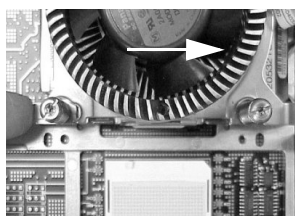
Sliding Sequencer Retainer

8. Screw in the four heatsink captive screws.
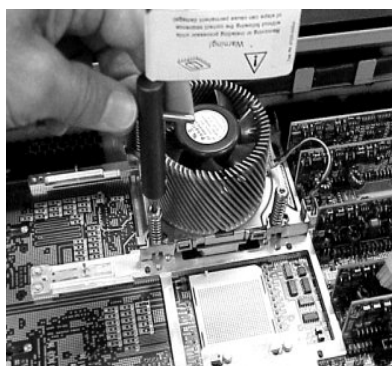
Screw in the Heatsink and Processor Screws

9. Connect the power cable for the processor turbo fan to its connector on the system board.

10. Slide the processor power pod on the system board metal mounting bracket so that the processor power pod connects to the processor. Align the two mounting screw holes on the processor power pod with the holes on the system board metal mounting bracket. Screw in the processor power pod mounting screws.

11. Replace the processor airflow guide, connect the power cable and power on the server.

12. Verify that the processor works:

   ❏ Run the **info cpu** command at the EFI shell prompt or,

   ❏ On servers with firmware version 2.0 or higher, check the configuration using the EFI **System Configuration menu**.

Removing and Replacing the 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 power on the server and boot to the EFI prompt. After confirming that the first component has been replaced successfully, power off the server and replace the second component.

Removing the System Board

To remove the system board, follow these steps:

1. Power off the server, disconnect all power and external cables and remove the server covers.

2. Remove these components from the system board:

   ❏ Memory

   ❏ System fans

   ❏ PCI/AGP card cage

   ❏ Processor airflow guide and processors

   ❏ iLO MP card (if installed)

3. If the server does not have an iLO MP card installed, remove the power connector plate.

   a. Unscrew the two power connector mounting screws on the back of the server (1), and reach inside the server to remove the power connectors from the socket (2). The power connectors will still be connected to their cables.
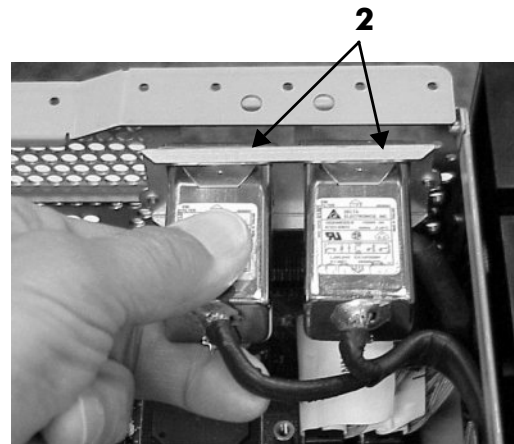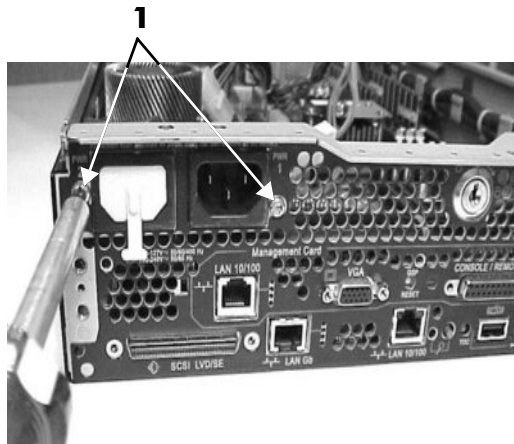
Removing the Power Connector Plate

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

6. Unscrew the system board mounting screw. A screw symbol is adjacent to the mounting screw.
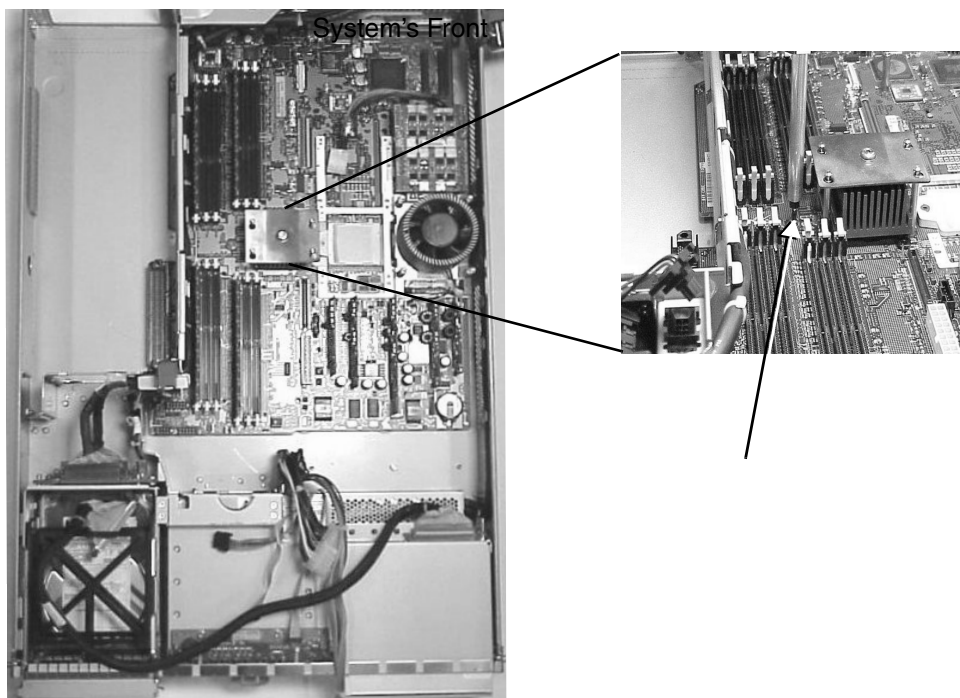
Unscrew the System Board Mounting Screw

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 server. 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.
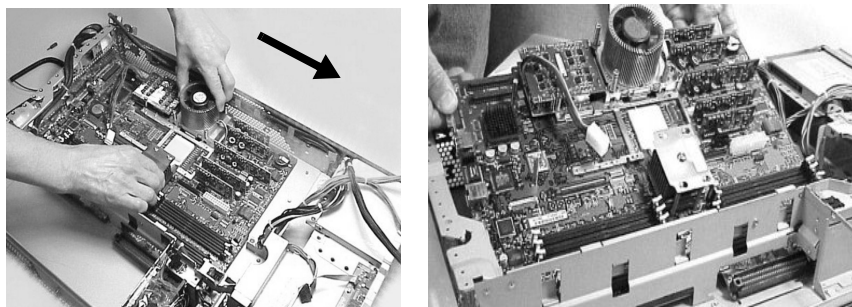
Remove the System Board from the Server

Replacing the System Board

To replace the system board, follow these steps:

1. Remove the old system board.

2. Grasp the new system board by its edges and carefully align it in the server:

   ❏ Angle the board to enable 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 server chassis.
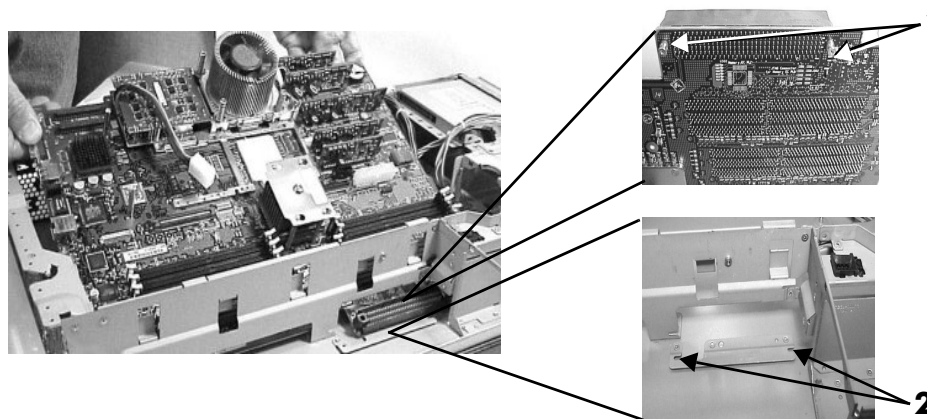
Align the System Board in the Server

3. Slide the system board back toward the rear of the server to secure the system board on its standoffs.
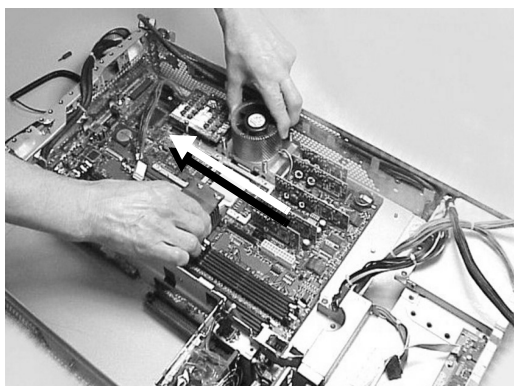
Secure the System Board on its Standoffs

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 the server does not have an iLO MP card, replace the power connectors in their slots on the back of the server and screw in the power connector mounting screws.

8. Replace the following server components:

   ❏ iLO MP card

   ❏ Processor airflow guide

   ❏ System fans

   ❏ PCI/AGP card cage

   ❏ Memory

9. Replace the server covers, reconnect all of the power and external cables and power on the server.

10. Verify that the processor works:

    ❏ Run the **info cpu** command at the EFI shell prompt or,

    ❏ On servers with firmware version 2.0 or higher, check the configuration using the EFI **System Configuration menu**.

11. Review the system configuration in the EFI shell and reconfigure settings as necessary.

Removing and Replacing System Batteries

Servers with an iLO MP card have two batteries. Servers that do not have an iLO MP card only have one battery.

> **WARNING:** 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 server 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 where you bought them, to the dealer from whom you purchased the server, or to HP so that they can be recycled or disposed of in the correct way. Returned batteries are accepted free of charge.

Removing the System Battery

To remove the system battery, follow these steps:

1. Power off the server, disconnect all power and external cables and remove the server covers.

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.
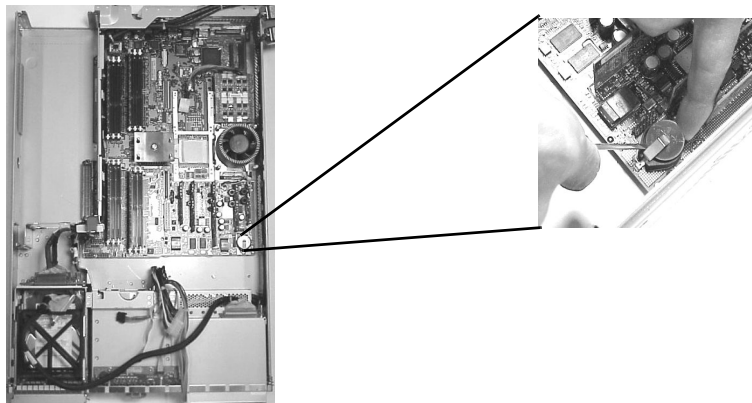
Remove the System Board Battery

Replacing the System Battery

To replace the system battery, follow these steps:

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 server covers, reconnect all of the power and external cables and power on the server.

Verify that the battery has been installed correctly:

❑ Run the **time** and **date** commands at the EFI shell prompt or,

❑ On servers with firmware version 2.0 or higher, adjust the time and date settings using the EFI **System Configuration menu**.

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

Removing the iLO MP Card Battery

To remove the iLO MP card battery, follow these steps:

1. Remove the iLO MP card from the server.

2. Lift up on the battery and push on the back of it with a small flat-head screwdriver. This removes 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.
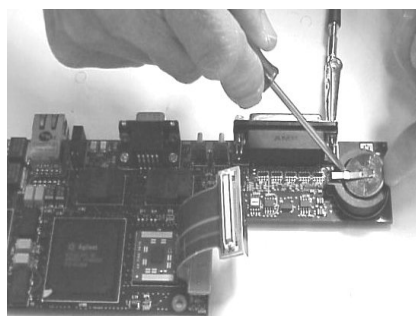
Remove the iLO MP Card Battery

Replacing the iLO MP Card Battery

To replace the iLO MP card battery, follow these steps:

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 iLO MP card in the server.

3. Replace the server covers.

4. 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

To remove the power supply interface module, follow these steps:

1. Power off the server, disconnect all power and external cables, and remove the server covers.

2. Remove the system board.

3. Lift the power cables out of their metal holding clips.
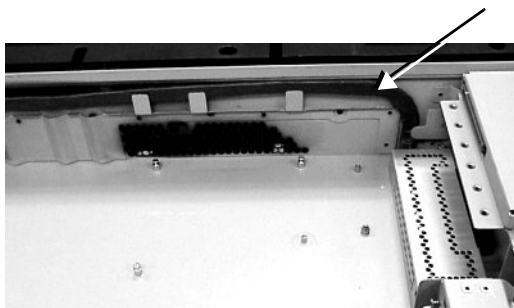
Power Cables and Holding Clips

4. Unscrew the PSI mounting screw and remove the PSI module from the server.
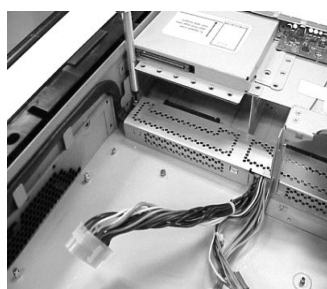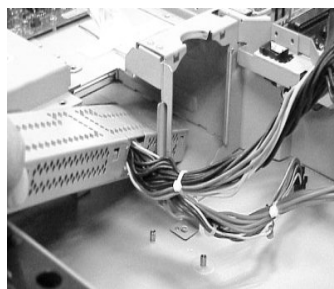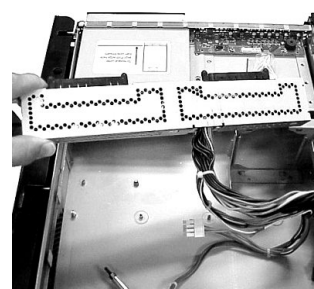
1   **2**   **3**

Removing the Power Supply Interface Module

1	Remove Mounting Screw
2	Slide PSI out of Chassis
3	PSI Removed from Server

Replacing the Power Supply Interface Module

To replace the power supply interface module, follow these steps:

1. Place the PSI module into the chassis by sliding the module retaining tab into the slot on the hard disk drive bay wall.
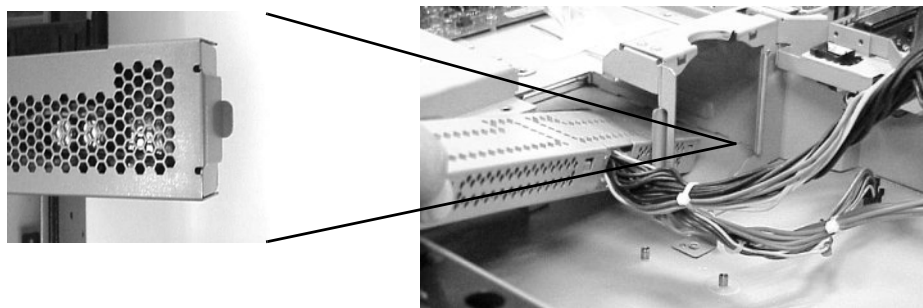
Replacing the Power Supply Interface Module

2. Screw in the PSI module mounting screw (1) and secure the power cables behind the holding clips (2).

1 **2**
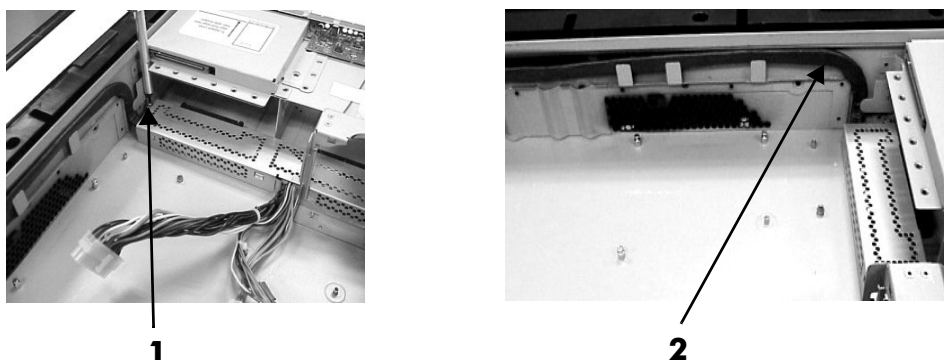
Securing the Power Supply Interface Module and Cables

3. Replace the system board.

4. Replace the server covers.

5. 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

To remove the hard drive backplane, follow these steps:

1. Power off the server, disconnect all power and external cables, and remove the server covers.

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 server.

3. Lift up on the fan power bridge (1) and disconnect the backplane power cable (2).
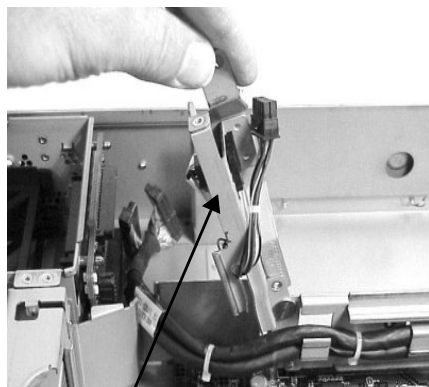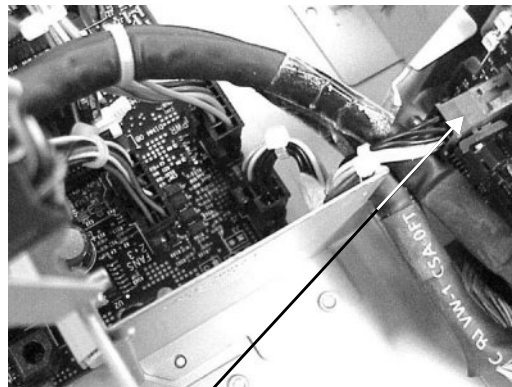
Disconnect the Fan and Backplane Power Cables

4. Disconnect the SCSI cables (1) and unscrew the backplane mounting screws (2).
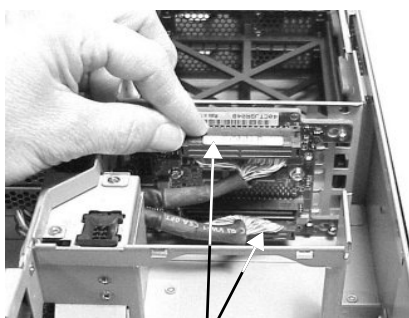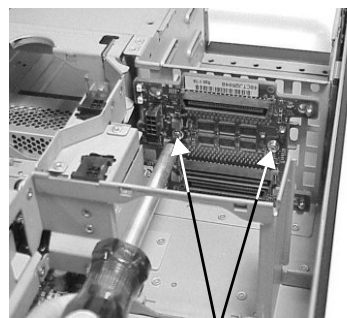
Unscrewing the Backplane Mounting Screws

5. Remove the hard drive backplane by sliding it in the direction of the arrow (1) and pulling it outward from its standoff posts (2).
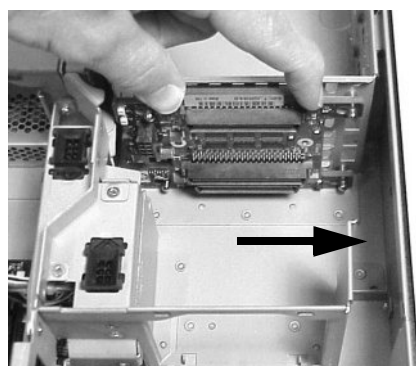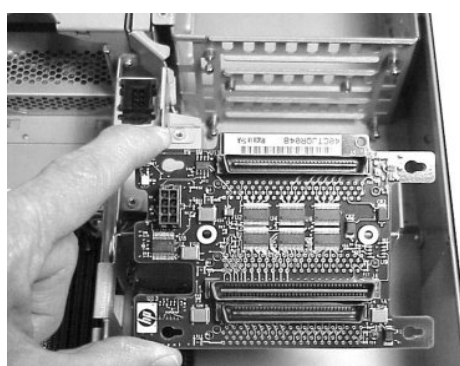
Remove the Hard Drive Backplane

Replacing the Hard Drive Backplane

To replace the hard drive backplane, follow these steps:

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.

3. Connect the two SCSI cables.

4. Connect the backplane power cable.

5. Lower the fan power bridge until it snaps in place.

6. Replace the PCI/AGP cage in the server and secure it.

7. Replace the server covers, and reconnect all of the power and external cables.

4

Troubleshooting

This chapter provides a preferred methodology (strategies and procedures) and tools for troubleshooting server error and fault conditions.

This chapter addresses the following topics:

Identifying and Diagnosing Hardware Problems

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

- Server beeps and e-buzzer. The rx2600/zx6000 has an e-buzzer that beeps in specific patterns to identify errors when the server 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 server change color and blink in different patterns to help identify specific hardware problems. LEDs on the rear panel of the server display LAN status.

- The System Event Log (SEL) provides detailed information about the errors identified by the e-buzzer and LEDs.

If the LEDs and e-buzzer do not give you enough information 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 server 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 three times, followed by zero-seven beeps of a single frequency at one-second durations, each separated by one 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 server 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 server front bezel when the server 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.

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	Contact support.
		• System Fault caused by hardware failure or software fault.
		• 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
		  • System board problem
		  • CPU connection to the board bad
		  • CPU power pod failure
		  • CPU failure
		  • Corrupt Firmware (bad code, or improper update)

7	System board	Defective system board. Contact support.

NOTE: For detailed instructions on removing and replacing server components, see Chapter 3, "Removing and Replacing Components."

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

■ If the system firmware detects an error during system operation, the BMC triggers 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 server power button for three-five seconds and release it as soon as the sound starts.

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

■ When the server power is off:

❏ One-three seconds. Server power turns on. The e-buzzer beeps if an error is encountered.

❏ Three-five seconds. The e-buzzer repeats the last stored error.

■ When the server power is on and the server is at the EFI:

❏ One-three seconds. Server power turns off immediately.

❏ Three-five seconds. The e-buzzer repeats the last stored error.

❏ Five seconds or longer. Server power turns off immediately.

■ When the server power is on and the OS is running:

❏ One-three seconds. Server power turns off through the ACPI signal to OS (Soft power-off).

❏ Three-five seconds. The e-buzzer repeats the last stored error.

❏ Five seconds or longer. Server power turns off immediately (Hard power-off).

The Diagnostic LEDs

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

If the server does not have an iLO MP card installed, the four diagnostic LEDs on the front panel warn of impending failures and enable you to take preventive action. For example, you may want to back up your data or replace a component before it fails.

■ If no iLO MP card is installed, the boot progress is monitored by diagnostic LEDs 1-4. During the boot-up the LEDs turn on in sequence until the EFI prompt is reached.

■ If an iLO MP card is installed, the boot process is monitored by the iLO MP card. The LEDs are off.

Power and System LEDs

The power and system LEDs indicate the state of the server. A problem exists when the system LED is blinking orange or red.

Servers with iLO MP card

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

System LED	State
Off	Off
Solid green	Running OS
Blinking green	Booting or running EFI

System LED	State
Blinking orange (1/sec.)	Attention: • Alerts of levels 3-5 detected in the iLO MP logs. • The LED turns off once the event log is read.
Blinking red (2/sec.)	Fault: • System Alert 7 Detected. LED blinks until the problem is resolved and the server boots successfully or until it is manually turned off with the iLO MP **dc** command. • Fatal hardware error detected by BMC. LED blinks 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 iLO MP command mode.

System alerts of level 7 indicate that the server cannot complete the power-on self test (POST). See the SL error logs for additional error information. Once corrective action is completed, the fault LED turns off.

NOTE: Always check the iLO 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 iLO MP **sl** command:

1. Access the iLO MP command prompt.

2. Run the **sl** command. The Event Log Viewer menu displays:

```
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 appears:

```
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
```

Servers with no iLO MP card

The following system LED states exist for servers that do not have an iLO MP card. See the diagnostic LEDs for additional information.

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

Diagnostic LEDs

The four diagnostic LEDs on the front bezel of the server are used for diagnosing the health of the server. See 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 enable 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 processor.

If the diagnostic LEDs indicate an error, check the SEL.

The following symbols are used in the LED tables.

■ The *s*ystem 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

LED1	LED2	LED3	LED4	Category	e-buzzer Beeps
			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						
ORANGE ❖	RED ●	RED ●	RED ●	RED ●	Unknown warning	View the SEL for additional information. For further assistance, contact your HP Support Engineer.
Memory Warnings						
ORANGE ❖	RED ●	GREEN ■			Mismatched memory pairs	Use the "Memory Loading Order" (page 82)
ORANGE ❖	RED ●		GREEN ■	GREEN ■	Memory thermal load order	Use the "Memory Loading Order" (page 82)

System LED	LED1	LED2	LED3	LED4	Problem	Solution
ORANGE ❖	RED ●	GREEN ■	GREEN ■	GREEN ■	Bad SPD information (can't detect type)	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

System Board Warnings

ORANGE ❖	GREEN ■	GREEN ■	RED ●		Battery voltage low	Replace the system board battery.

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

System LED	LED1	LED2	LED3	LED4	Problem	Solution
Processor Warnings						
ORANGE ❖	RED ●	RED ●	GREEN ■		Processor 0 temperature exceeds limit	If a processor fan has failed, you must replace the CPU.
ORANGE ❖	RED ●	RED ●		GREEN ■	Processor 1 temperature exceeds limit	
Temperature Warnings						
ORANGE ❖	RED ●	GREEN ■	GREEN ■	RED ●	External air temperature too high	Make sure nothing is blocking the airflow. Place the server in an air-conditioned room.
Video Warnings						
ORANGE ❖		RED ●	RED ●		No video adapter present	Install a video adapter. See the installation instructions shipped with the video adapter.
Power Supply Warnings						
ORANGE ❖	GREEN ■	RED ●		RED ●	Power supply 1 fault	Replace the power supply.
ORANGE ❖		RED ●	GREEN ■	RED ●	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						
RED ✖	RED ●	RED ●	RED ●	RED ●	Unknown fault	View the SEL for additional information. For further assistance, contact your HP Support Engineer.
Memory Faults						
RED ✖	RED ●	GREEN ■			Mismatched memory pairs	Use the "Memory Loading Order" (page 82).
RED ✖				GREEN ■	Uncorrectable memory error	Replace memory.
RED ✖	RED ●	GREEN ■	GREEN ■		No memory installed	Install memory.
RED ✖	RED ●	GREEN ■	GREEN ■	GREEN ■	Bad memory; one or more DIMMs are bad or not seated properly	Reseat the DIMMs. If the error persists, replace them.
Firmware Errors						
RED ✖		RED ●			System firmware hang or system fault	View the SEL for additional information. For further assistance, contact your HP Support Engineer.

System LED	LED1	LED2	LED3	LED4	Problem	Solution
System Board Faults						
RED ⊗		GREEN ■	RED ●		VRM overvoltage	View the SEL for additional information. For further assistance, contact your HP Support Engineer.
RED ⊗	GREEN ■		RED ●		VRM undervoltage	View the SEL for additional information. For further assistance, contact your HP Support Engineer.
Fan Faults						
RED ⊗	GREEN ■			RED ●	rs2600: Cooling unit 1 fault (power/CPU) zx6000: Cooling unit 1 fault	
RED ⊗		GREEN ■		RED ●	rs2600: Cooling unit 2 fault (memory) zx6000: Cooling unit 2 fault (disks/PCI)	Replace the failed fan. If a processor fan has failed, you must replace the CPU.
RED ⊗			GREEN ■	RED ●	rs2600: Cooling unit 3 fault (Disks/PCI) zx6000: N/A	
Processor Faults						
RED ⊗	RED ●	RED ●	GREEN ■		Processor 0 temperature exceeds limit	
RED ⊗	RED ●	RED ●		GREEN ■	Processor 1 temperature exceeds limit	If a processor fan has failed, you must replace the CPU.
RED ⊗	RED ●	RED ●	GREEN ■	GREEN ■	No processor detected	

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

LAN LEDs

The front panel **LAN LED** indicates the server is communicating over the gigabit or system management LAN:

■ **Blinking green**, the server is communicating over the LAN

■ **Solid green**, LAN link is established, no current LAN activity

■ **Not green**, the server is off

Four **Gigabit LAN LEDs** are on the rear panel:
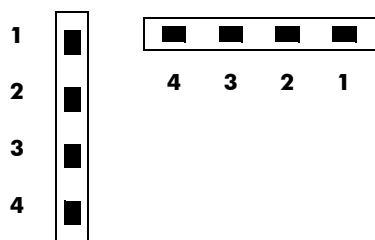
LAN LED	Location	Color	State
1. Gbit	*Pedestal:* Right	Off	No 1000 Mbps link
	Rack-mounted: Top	Green	Port linked at 1000 Mbps
2. 100mb	*Pedestal:* 2nd from right	Off	No 100 Mbps link
	Rack-mounted: 2nd from top	Green	Port linked at 100 Mbps
3. Link	*Pedestal:* 2nd from left	Off	No 10 Mbps link
	Rack-mounted: 2nd from bottom	Green	Port linked at 10 Mbps
4. Activity	*Pedestal:* 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:
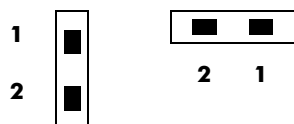
LAN LED	Location	Color	State
1. Speed	*Pedestal:* Right	On	Port linked at 100 Mbps
	Rack-mounted: Top	Off	Port linked at 10 Mbps
2. Activity	*Pedestal:* Left	On	Port linked
	Rack-mounted: Bottom	Off	No link established

Four iLO MP LAN LEDs are also on the rear panel if the server has a iLO MP card installed:
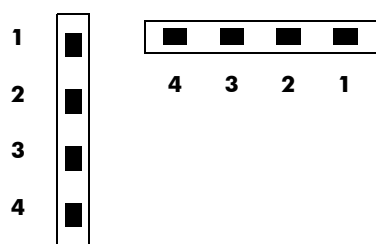
LAN LED	Location	Color	State
1. Self-test	*Pedestal:* Right	Yellow	iLO MP running self test or error
	Rack-mounted: Top	Off	iLO MP has booted
2. 10BT	*Pedestal:* 2nd from right	Green	10 Mb link established
	Rack-mounted: 2nd from top	Blinking Green	10 Mb activity
		Off	No link or 100 Mb link
3. 100BT	*Pedestal:* 2nd from left	Green	100 Mb link established
	Rack-mounted: 2nd from bottom	Blinking Green	100 Mb activity
		Off	No link or 10 Mb link
4. Standby Power	*Pedestal:* 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 server. These LEDs are located on the system board close to the back of the server and can be viewed through the small cooling holes in the server case.
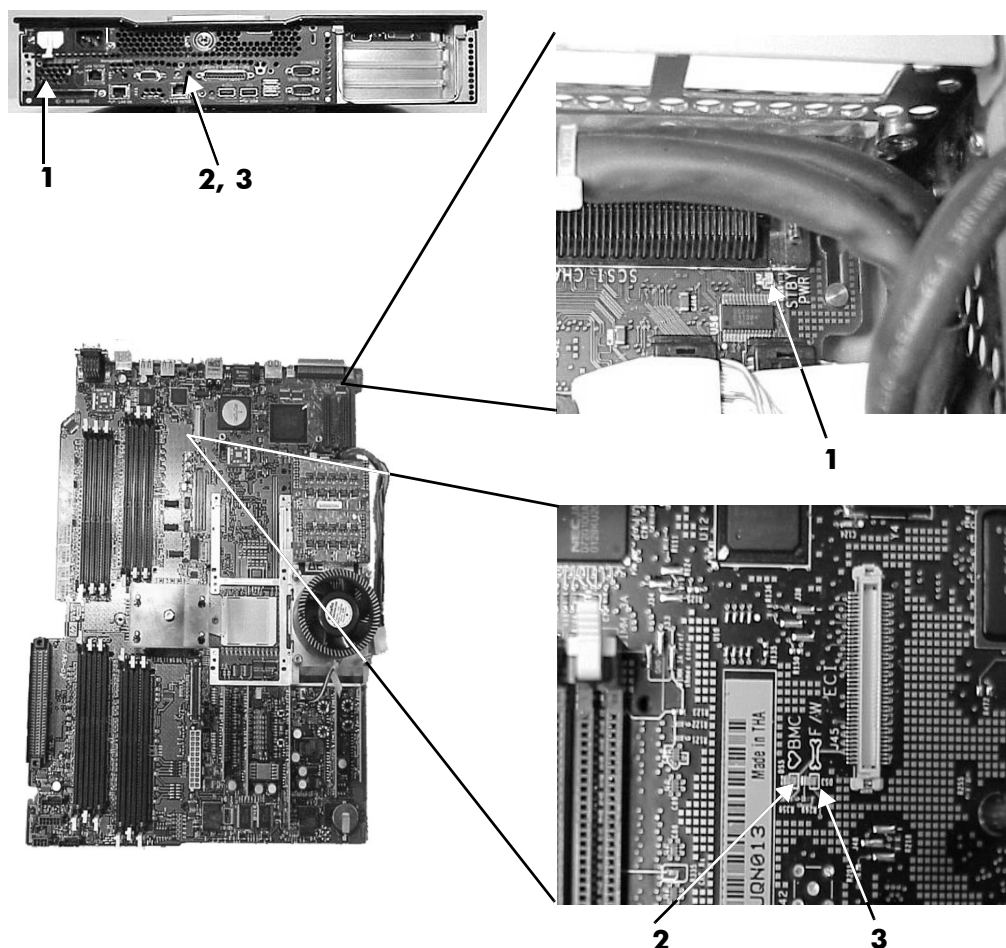
Location of the STBY LED, F/W LED and BMC LED

LED	Description
1 STBY	This standby LED comes on as soon as the server power cord is plugged in. If this light is off when you plug it in, reseat the power supply. If this does not work, replace the power supply.
2 BMC	A few seconds after the server 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.
3 F/W	A few seconds after the power 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 appropriate tool for the server to determine what failed.

HP e-DiagTools Hardware Diagnostics

The server 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 server.

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 do the following:

- 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 server 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 enables the user to select specific tests or utilities to run 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, or download and install the files from **www.hp.com/go/bizsupport**.

2. From the EFI shell (page 6-21), select the CD/DVD drive:

    a. Use the **map** command to list the drives on the server. For example:

    ```
    Shell> map
    Device mapping table
    fs0:Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM...
    fs1:Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)/HD(Part...
    blk0:Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)...
    blk1:Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM...
    ```

NOTE: Lines are truncated to fit.

    b. Change to the CD/DVD drive:

    ```
    Shell> fs0:
    fs0:>
    ```

3. Navigate to the EFI\BOOT directory on the CD:

    a. Change to the EFI directory on the diagnostics CD.

    ```
    fs0:> cd EFI
    fs0\EFI:>
    ```

b. To list the contents of the directory, run the **ls** command.

```
fs0:\EFI> ls

Directory of: fs1:\EFI

11/07/02 04:41p <DIR> 1,024 .
11/07/02 04:41p <DIR> 0 ..
11/07/02 04:41p <DIR> 1,024 HP
11/07/02 04:45p <DIR> 1,024 BOOT

0 File(s) 0 bytes
4 Dir(s)
```

c. Change to the BOOT subdirectory

```
fs0\EFI:> cd BOOT

fs0\EFI\BOOT:>
```

d. Run the **ls** command to list the contents of the directory.

```
fs0:\EFI\BOOT> ls

Directory of: fs1:\EFI\BOOT

11/07/02  04:45p <DIR>          1,024 .
11/07/02  04:45p <DIR>          1,024 ..
11/07/02  01:54p              731,136 LaunchMenu.efi
11/07/02  01:54p                2,763 IO.ini
11/07/02  01:54p              731,136 BOOTIA64.EFI
11/07/02  01:54p                2,995 LaunchMenu.ini
11/07/02  01:54p                3,977 View_Doc.ini

5 File(s)   1,472,007 bytes

2 Dir(s)
```

4. Run the **LaunchMenu** command to reboot from the CD and launch eDiagTools:

```
fs0:\BOOT> launchmenu
```

5. 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.

6. 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 the server configuration and test results, you must 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, follow these steps:

1. Start e-DiagTools and select **Run eDiagTools for IPF** from the main menu.

2. To run the basic diagnostics on the server if you have not already done so, select **2 - Run e-DiagTools Basic System Test (BST)**.

   e-DiagTools scans the server. The Configuration Description displays on the screen when the configuration detection phase is complete.

3. To run the rest of the basic diagnostics test, select **2 - Continue Test**. The results appear on the screen. For example:

```
************************************************

e-Diagtools for IPF rev. A.01.39 (c) Hewlett-Packard Company, 2002


Test Results

Tests passed. No errors found.

If you still experience problems with your system, try the
following:

1. Power off and restart your system.
2. Update the system's firmware.
3. Back up your data and contact your HP Support Agent for more
   advice.


1-Help 2-Advanced 3-Exit 4-Support Ticket
```

4. After the test is complete, press **4**. The support ticket appears on the screen. For example:

```
------------------------------------------

HEWLETT-PACKARD e-Diagtools Support Ticket

------------------------------------------

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Your system: HP - zx6000

Diagnostic: System Test Passed

Date/Time: 05/01/2003 14:37:41

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

❏ The support ticket is a screen that displays a complete record of the test results and the system's configuration. It is the most effective way of communicating this essential information to your support provider.

❏ The current support ticket is the one produced by the last execution of e-Diagtools. When running e-Diagtools, you can create a support ticket on demand in the Configuration Description Screen. When you run the basic system tests or advanced system tests, a support ticket is created automatically. Use the Support Ticket Screen to browse it for information that can help you troubleshoot the server.

❏ Have the support ticket on the screen when you contact customer support. (Use the arrow keys to scroll if necessary.) The support representative may ask you to read the information over the phone.

5. Press **3** to exit the Support Ticket tool.

Offline Diagnostics Environment (ODE)

The Offline Diagnostics Environment is an offline support tools platform that enables you to troubleshoot a server that cannot be tested using online tools. You can access these tools 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 server first.

Tools Provided

The ODE includes a variety of diagnostics tools. Depending on the server 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 server 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 the server, from the ODE Main Menu, follow these steps:

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 enables the user to select specific tests and/or utilities to run 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 the server and check the boot options from the **Boot Options Maintenance Menu** to ensure that the server 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 servers. However, the conceptual and procedural information still applies to IPF servers. Any discrepancies have been noted and explained in the *SupportPlus User's Guide*, and elsewhere, as appropriate.

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 using 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	—
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

Error Number	Error/Warning Message	Solution
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.
34	Memory deallocated because of a loading error	Fix memory loading order.
35	Memory is not loaded recommended loading order	Fix memory 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	—
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. Update Firmware.
53	Error building SMBIOS	Call Support Center

Error Number	Error/Warning Message	Solution
54	Failure constructing the EFI Memory Data Table (MDT)	Call Support Center
55	UUID error	Call Support Center
56	Error reading CPU SMBUS 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 using the iLO 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 does 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. iLO MP firmware displays the triplet in the *Keyword* field.

NOTE: Servers with firmware version 2.0 or higher also have a **clearlogs** command that clears out the log files should they become full.

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 iLO MP Commands

The SEL and FPL data can also be accessed from the iLO MP logs using the iLO MP card **SL** command. Logs can be displayed in three modes: *raw hex*, *text* or *keyword*.

■ *iLO MP firmware E.02.10*: The **SDM** command determines the format of the display.

■ *iLO MP firmware E.02.20 or higher*: Output mode is selected from a menu when the log is displayed.

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. They 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 is logged for each ChassisControl event, whether it's generated by an IPMI request, or a sensor event.

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

The EventData fields are as follows:

■ 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 Off
0x01	Power On
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
12:70:04	BMC entering firmware update mode			
12:70:05	SFW flash lnlock			System firmware update in progress
12:70:06	Front panel lock			Disables all power and reset requests from ipmi or sensors
12:F0:06	Front panel unlock			
12:70:07	Firmware update app: starting component update			
12:F0:07	Firmware update app: ending component update			
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			

A

Replacement Parts

This appendix provides replacement parts information for the rx2600 server and the zx6000 workstation.

This appendix addresses the following topics:

■ "HP zx6000 Workstation Replacement Parts" (page 138)

■ "HP Integrity rx2600 Server Replacement Parts" (page 143)

You can find complete and current information on supported accessories and components on the web at:

http://partsurfer.hp.com

HP zx6000 Workstation Replacement Parts

This section provides information on the zx6000 workstation replacement parts. An exploded view of the parts and a parts list is included.

zx6000 Workstation Parts Illustrations

This view provides parts identification illustrations. See the replacement parts list to identify part numbers.
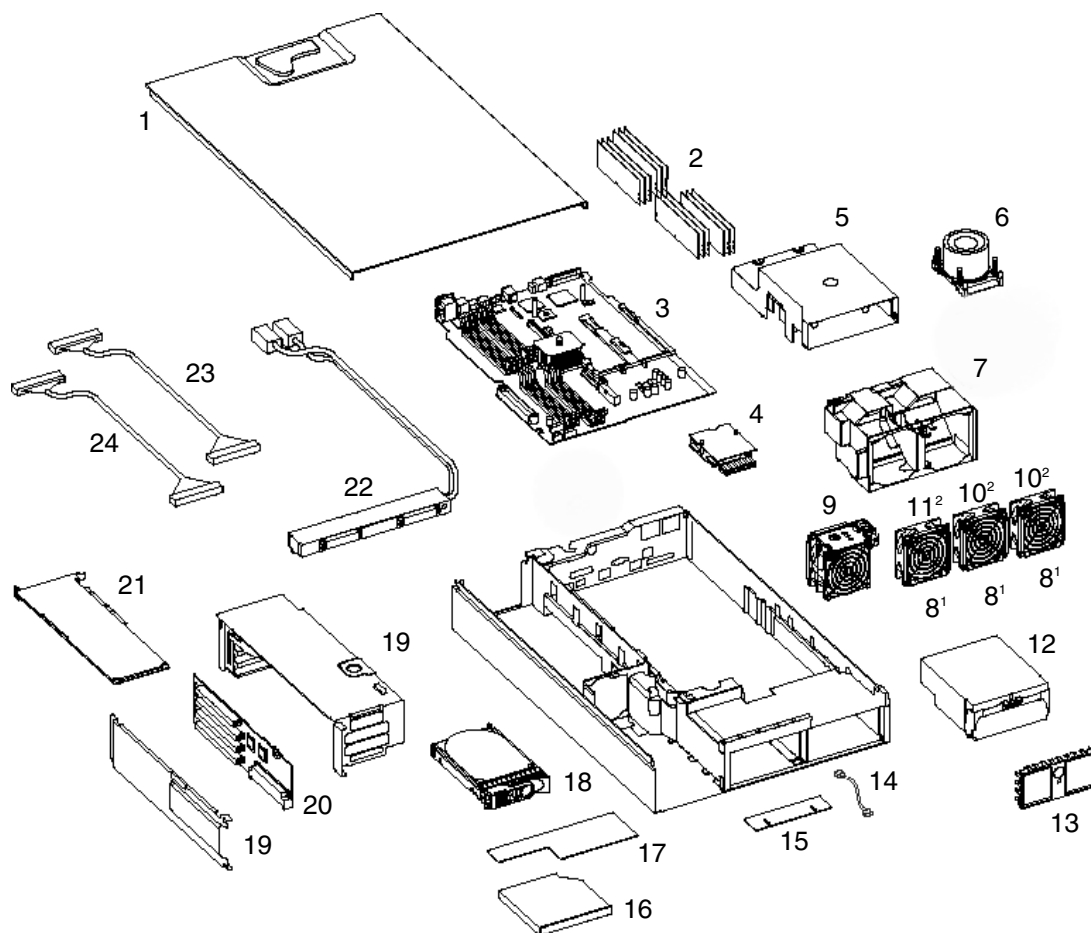
Exploded View of zx6000 Parts

NOTE: Use the correct fans for the server, as shown by footnotes in the diagram above:

1. Pedestal-mount server
2. Rack-mount server

rx6000 Workstation Replacement Parts List

Use this parts list whenever ordering parts for the zx6000 workstation.

This list is for reference only and is subject to change. You can find the latest parts information on the web at:

http://partsurfer.hp.com

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
6	Intel Itanium 2, 1.3 GHz	A9666-67010	A9666-69010
6	Intel Itanium 2, 1.5 GHz	A9667-67010	A9667-69010
N/A	Processor Tool	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, 10 krpm, Ultra 320 SCSI, Carbon/Port	A7835-64003	A7835-69003
18	36 GB,15 krpm, Ultra320 SCSI, Carbon	A7836-64001	A7836-69001
18	36 GB, 15 krpm, Ultra 320 SCSI, Carbon/Port	A9896-64001	A9896-69001
18	73 GB 10 krpm, Ultra 160 SCSI, Carbon	A7837-64001	A7837-69001
18	73 GB 15 krpm, Ultra 320 SCSI, Carbon	A7838-64001	A7838-69001
18	73 GB, 15 krpm, Ultra 320 SCSI, Carbon/Port	A9897-64001	A9897-69001
18	146 GB 10 krpm, Ultra320 SCSI, Carbon	A7839-64001	A7839-69001
18	146 GB, 10 krpm, Ultra320 SCSI, Carbon/Port	A9898-64001	A9898-69001
Memory			
2	256 MB PC2100 ECC registered DDR-SDRAM	A6833-60001	A6833-69001
2	512 MB PC2100 ECC registered DDR-SDRAM	A6746-60001	A6746-69001

Item	Description	Replacement	Exchange
2	1.0 GB PC2100 ECC registered DDR-SDRAM	A6834-60001	A6834-69001
2	2.0 GB PC2100 ECC registered DDR-SDRAM	A7843-67001	A7843-69001
Power Supply			
12	600W power supply-ac	A6874-63000	A6874-69000
4	Processor power pod	0950-4294	N/A
Graphics Cards			
21	ATI FireGL 4	A7226-60520	A7226-69520
21	ATI, Fire GLX1, AGP	313287-001	312523-001
21	ATI, Fire GLZ1, AGP	313286-001	N/A
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, 2Gb, 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	iLO MP card	A7231-66580	A7231-69580

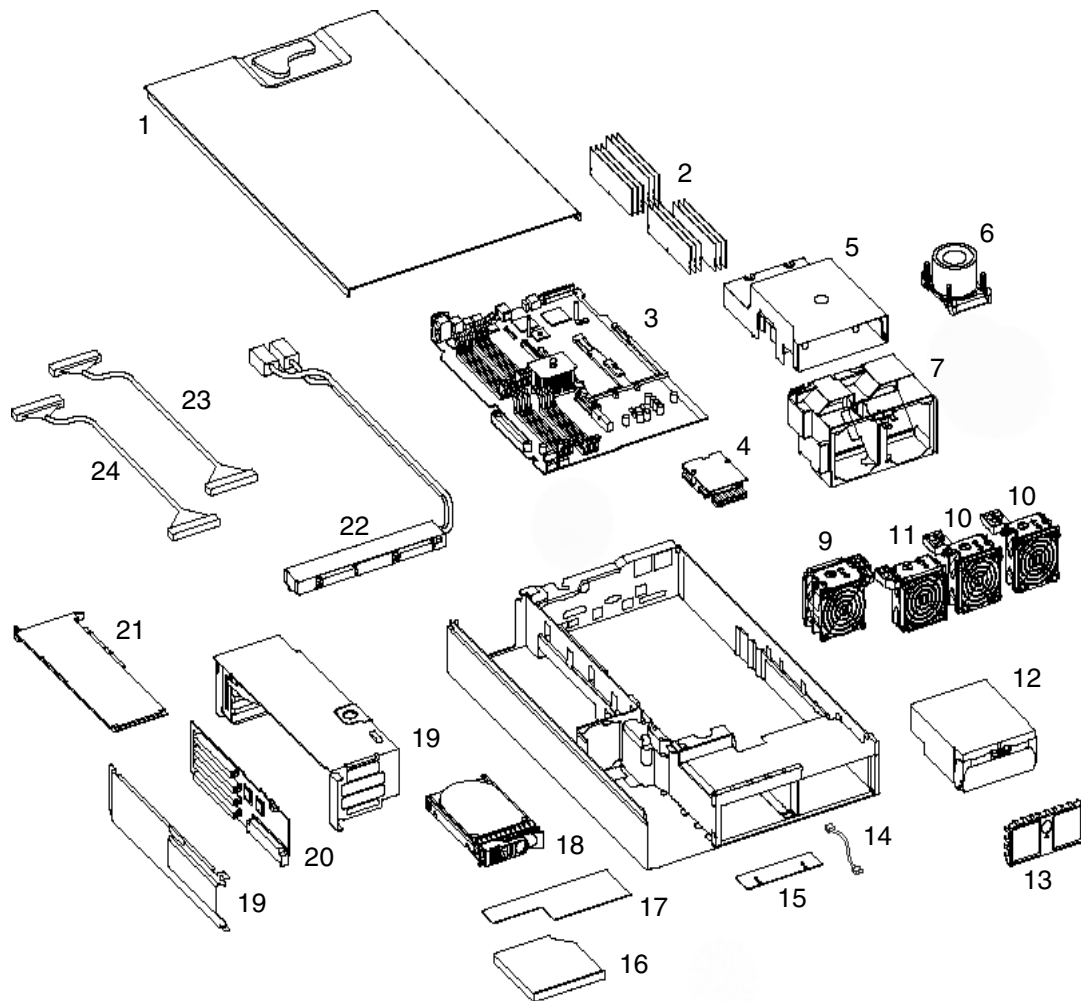| Item	Description	Replacement	Exchange
Fans			
10	Super 80mm fan (zx6000 rack)	A7231-04014	N/A
11	Thin 80mm fan (zx6000 rack)	A7231-04015	N/A
9	Dual fan (zx6000 pedestal and rack)	A7231-04033	N/A
8	Standard 80mm fan (zx6000 pedestal)	A7231-04017	N/A
Cables			
N/A	IDE cable	A7231-63002	N/A
23	SCSI cable 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	8121-0808	N/A
N/A	Disk power cable	A7231-63004	N/A
N/A	80mm fan cable	A7231-63006	N/A
N/A	Super 80mm 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	Server 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
Pedestal and Rack Kit			
N/A	Pedestal pedestal	A7231-04028	N/A
N/A	Pedestal pedestal covers	A7231-04041	N/A
N/A	Pedestal front panel	A7231-40040	N/A
N/A	Pedestal top cover	A7231-40036	N/A
N/A	Pedestal 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 drive, Slimline, Carbon	A7231-67012	A7231-69012
16	CD-RW/DVD 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

HP Integrity rx2600 Server Replacement Parts

This section provides information on the rx2600 server replacement parts. An exploded view of the parts and a parts list is included.

rx2600 Server Parts Illustrations

This view provides parts identification illustrations. See the replacement parts list to identify part numbers.

Exploded View of the rx2600 Parts

rx2600 Replacement Parts List

This list is for reference only and is subject to change. You can see the latest parts information on the web at:

http://partsurfer.hp.com.

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
6	Intel Itanium 2, 1.3 GHz	A9666-67010	A9666-69010
6	Intel Itanium 2, 1.5 GHz	A9667-67010	A9667-69010
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,15krpm, Ultra320 SCSI, Flint	A6981-64001	A7329-69001
18	36 GB, 15 krpm, Ultra 320 SCSI, Carbon/Port	A9896-64001	A9896-69001
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, Flint	A6983-64001	A7286-69001
18	73 GB, 15 krpm, Ultra 320 SCSI, Carbon/Port	A9897-64001	A9897-69001
18	146 GB 10K Ultra 320 SCSI, Flint	A6984-64001	A7287-69001
18	146 GB, 10 krpm, Ultra320 SCSI, Carbon/Port	A9898-64001	A9898-69001
Memory			
2	256 MB PC2100 ECC registered DDR-SDRAM	A6833-60001	A6833-69001
2	512 MB PC2100 ECC registered DDR-SDRAM	A6746-60001	A6746-69001
2	1.0 GB PC2100 ECC registered DDR-SDRAM	A6834-60001	A6834-69001

Item	Description	Replacement	Exchange
2	2.0 GB PC2100 ECC registered DDR-SDRAM	A7843-67001	A7843-69001
Power Supply			
12	600W power supply-ac	A6874-63000	A6874-69000
4	Processor power pod	0950-4294	N/A
I/O Cards			
21	For supported I/O cards, visit: **http://partsurfer.hp.com**		
17	iLO MP card	A7231-66580	A7231-69580
Fans			
10	Super 80mm fan (rx2600 pedestal and rack)	A7231-04014	N/A
11	Thin 80mm fan (rx2600 pedestal and rack)	A7231-04015	N/A
9	Dual fan (rx2600 pedestal 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	80mm fan cable	A7231-63006	N/A
N/A	Super 80mm 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	Right-side rack bezel (graphite)	A7231-04053	N/A
N/A	Left-side rack bezel (grey) and Latch	A7231-04030	N/A
N/A	Left-side rack bezel (graphite) and Latch	A7231-04055	N/A
N/A	Optical drive blank (graphite)	A7231-40027	N/A
N/A	Hard drive blank (graphite)	A6198-60003	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	Pedestal nameplate	A7231-40025	N/A
Pedestal and Rack Kit for the rx2600			
N/A	Pedestal	A7231-04028	N/A
N/A	Pedestal covers	A7231-04036	N/A
N/A	Pedestal front panel	A7231-40026	N/A
N/A	Pedestal 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 drive, Slimline, Gray	A7231-62011	A7231-69011
16	DVD drive, Slimline, Carbon	A7231-67012	A7231-69012
16	CD-RW/DVD drive, Slimline, Gray	A7851-62015	A7851-69015
16	CD-RW/DVD drive, Slimline, Carbon	A7231-62024	A7231-69024

Item	Description	Replacement	Exchange
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

B

Server Accessories

This appendix provides information about the graphics cards and mass storage devices supported on the HP Integrity rx2600 server and HP workstation zx6000.

This appendix addresses the following topics:

■ "Graphics Cards" (page 149)

■ "Mass Storage" (page 153)

For a list of server components and part numbers, see Appendix A.

You can find more information on supported accessories and components on the web at:

http://www.hp.com/go/bizsupport

Graphics Cards

HP Integrity rx2600 server and HP workstation zx6000 servers with iLO MP cards support a VGA monitor connected to the VGA port on the iLO MP card.

zx6000 workstations that do not have an iLO MP card 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 server, while others are packaged separately and shipped with the server. If your server did not ship with a pre-installed graphics card, you must install the card and load the drivers. See 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.

Supported Graphics Cards for Servers With no iLO MP Card

Depending on the OS on your server, you may have one of the following graphics cards.

You can find a complete and current list of supported cards on the web at:

http://www.hp.com/go/bizsupport

Type of Card	HP-UX	Linux	Windows
High End 3D	ATI FIRE GL 4 ATI FIRE GL X1/Z1	nVIDIA Quadro4 900XGL nVIDIA Quadro4 980XGL	nVIDIA Quadro4 900XGL nVIDIA Quadro4 980XGL ATI FIRE GL X1/Z1

Type of Card	HP-UX	Linux	Windows
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 at:

❏ **www.ati.com** (ATI)

❏ **www.NVIDIA.com** (NVIDIA)

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. On displays using DVI never flicker, the refresh rate changes the speed at which the image is updated. Anything over 48 frames per second 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 want is supported by your video card and monitor, but not part of VESA or is not programmed into the monitor's DDC, you may override the defaults.

In the tables below, the following applies:

■ 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 FIRE GL 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 FIRE GL X1/Z1

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

This 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

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 server supports up to three 3.5-inch (1-inch high) hard disks that may be supplied with the server (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 drive includes the following features:

■ CD data disk (Mode 1 and Mode 2)
■ Photo-CD Multisession
■ Video CD
■ CD-DA
■ CD-I FMW
■ CD 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

Readable disks:

- CD/CD (12cm, 8cm)
- CD-R
- CD-RW
- DVD
- 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 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, 3600KB/sec (CD), 10,800KB (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 drive

The DVD drive includes the following features:

Supported CD formats:

- CD Mode 1 and 2 data disk

- Photo-CD Multisession

- CD Audio disk

- Mixed mode CD disk (data and audio)

- CD XA, CD-I, CD-Extra, CD-R, CD-RW

Supported DVD formats:

- DVD

■ 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	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 4× (maximum) DVD-RAM 4× (maximum) DVD+RW
Loading Type	Manual tray
Access Time	120ms (DVD) 90ms (CD) 210ms (DVD-RAM)
Data Buffer Capacity	256 KB
Acoustic Noise	45 dB
Reliability	MTBF 60,000 POH

C

System Board

This appendix provides an overview of the system board and describes the key components. This appendix addresses the following topics:

- "System Board Overview" (page 158)
- "Intel Itanium 2 Processor" (page 159)
- "zx1 I/O and Memory Controller" (page 159)
- "zx1 AGP/PCI Bus Interface" (page 159)
- "Dual Serial Controller" (page 160)
- "Field Programmable Gate Array" (page 160)
- "Baseboard Management Controller" (page 160)
- "SCSI Controller" (page 161)
- "IDE Interface" (page 161)
- "10/100 BT Management LAN" (page 161)
- "1 GB System LAN" (page 161)
- "USB Connectors" (page 162)
- "Chip Spare Functionality" (page 162)

System Board Overview

This section provides a block diagram of the system board.

Block Diagram of the System Board

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:

❏ 1.5 MB, 6-way set associative (900 MHz)

❏ 3 MB, 12-way set associative (1 GHz)

❏ 3 MB, 12-way set associative (1.3 GHz)

❏ 6 MB, 24-way set associative (1.5 MHz)

❏ 128 byte line size

Processor Bus

The Intel Itanium 2 processor bus (Front Side Bus, FSB) 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 through seven concurrent I/O links.

■ Peak memory bandwidth of 8.5 GB/s.

■ Two memory cells, 144 data bits each.

zx1 AGP/PCI Bus Interface

The zx1 AGP/PCI 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.

■ 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).

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 the following:

■ 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 provides the following features:

■ ACPI 2.0 interface

■ LPC bus interface to support BMC

■ Decoding logic for PDH devices

Baseboard Management Controller

The BMC supports the industry-standard IPMI specification. This specification describes the management features that are built into the system board. These features include: both local and remote diagnostics console support, configuration management, hardware management, and troubleshooting.

The BMC provides the following:

■ Compliance with IPMI 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 server console port

■ Remote access and intelligent chassis management bus (IC MB) support

- Three I²C master/slave ports (one of the ports is used for Intelligent platform management bus (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:

  ❏ IPMI

  ❏ 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.

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.

10/100 BT Management LAN

The 10/100 BT LAN port provides the following:

- 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.

1 GB System LAN

The 1 GB system LAN provides the following:

- Main system LAN

- 10/100/1000 Mb capable

USB Connectors

The USB connectors provide the following:

■ High speed 480 Mb/sec. capable

■ Full speed 12 Mb/sec. and low speed 1.5 Mb/sec.

■ Support for USB keyboard and mouse:

  ❏ HP-UX supports HP USB keyboard and mouse

  ❏ Linux supports all 1.1 USB devices

  ❏ Windows supports USB keyboard and mouse

Chip Spare Functionality

This functionality is only for rx2600 servers.

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 the server, you can only use DIMMs built with ×4 DDR SDRAM parts. These DIMMs must be loaded in quads.

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