HP Integrity BL860c Server Blade User Service Guide

HP Part Number: AD217–9011A
Published: June 2007

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About This Document

This document provides information and instructions on servicing the HP Integrity BL860c server blade.

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 that 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 is a new document as part of the HP Integrity BL860c Server Blade release.

Publishing History

The publishing history below identifies the edition dates of this manual. Updates are made to this publication on an unscheduled, *as needed*, basis. The updates will consist of a complete replacement manual and pertinent online or CD documentation.

Table 1 Publishing History Details

Document Manufacturing Part Number	Operating Systems Supported	Supported Product Versions	Publication Date
AD217-9005A	HP-UX	BL860c	February 2007
AD217-9011A	HP-UX, HP OpenVMS, Linux®, and Windows®	BL860c	June 2007

Document Organization

This guide is divided into the following chapters.

Chapter 1 *Introduction* Use this chapter to learn about the features and specifications of the HP Integrity BL860c server blade.

Chapter 2 *Controls, Ports, and LEDs* Use this chapter to learn about the locations of the external controls, ports, and LEDs on the server blade.

Chapter 3 *Powering Off and Powering On the Server* Use this chapter to learn about powering the server off and on.

Chapter 4 *Removing and Replacing Components* Use this chapter to learn how to remove and replace the field replaceable components (FRUs) on the server blade.

Chapter 5 *Troubleshooting* Use this chapter to learn about troubleshooting problems you may encounter with the server blade.

Appendix A *Parts Information* Use this appendix to learn the location and part numbers of the server blade components.

Appendix B	*Operating System Boot and Shutdown* Use this appendix to learn about booting and shutting down the operating system on the server blade.
Appendix C	*Utilities* Use this appendix for information regarding the utilities available for the server blade.
Appendix D	*Console Setup and Connection* Use this appendix to learn about the the process for setting up a console session and connecting to the server blade.

Typographic Conventions

This document uses the following conventions.

WARNING! A warning lists requirements that you must meet to avoid personal injury.

CAUTION: A caution provides information required to avoid losing data or avoid losing system functionality.

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

Book Title	The title of a book. On the Web and on the Instant Information CD, it may be a hot link to the book itself.
KeyCap	The name of a keyboard key or graphical interface item (such as buttons, tabs, and menu items). Note that **Return** and **Enter** both refer to the same key.
Emphasis	Text that is emphasized.
Bold	Text that is strongly emphasized.
Bold	The defined use of an important word or phrase.
`ComputerOut`	Text displayed by the computer.
`UserInput`	Commands and other text that you type.
`Command`	A command name or qualified command phrase.
`Option`	An available option.
`Screen Output`	Example of computer screen output.
[ ]	The contents are optional in formats and command descriptions. If the contents are a list separated by |, you must select one of the items.
{ }	The contents are required in formats and command descriptions. If the contents are a list separated by |, you must select one of the items.
...	The preceding element may be repeated an arbitrary number of times.
|	Separates items in a list of choices.

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 the BL860c server blade.

Table 2 HP-UX 11i Releases

Release Identifier	Release Name	Supported Processor Architecture
B.11.23	HP-UX 11i v 2.0	Intel Itanium

Related Documents

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

Web Site for HP Technical Documentation: http://docs.hp.com

Server Hardware Information: http://docs.hp.com/hpux/hw/

Windows Operating System Information You can find information about administration of the Microsoft Windows operating system at the following Web sites, among others:

- http://docs.hp.com/windows_nt/
- http://www.microsoft.com/technet/

Diagnostics and Event Monitoring: Hardware Support Tools Complete information about HP's hardware support tools, including online and offline diagnostics and event monitoring tools, is at the http://docs.hp.com/hpux/diag/ Web site. This site has manuals, tutorials, FAQs, and other reference material.

Web Site for HP Technical Support: http://us-support2.external.hp.com/

Books about HP-UX Published by Prentice Hall The http://www.hp.com/hpbooks/ Web site lists the HP books that Prentice Hall currently publishes, such as HP-UX books including:

- *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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Please send comments to: netinfo_feedback@cup.hp.com.

Please include title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document. Also, please include what we did right so we can incorporate it into other documents.

1 Introduction

The HP Integrity BL860c server blade is a dense, low-cost, c-Class Intel® Itanium ® Dual-Core server blade. The BL860c server blade supports the HP-UX, OpenVMS, Windows, and Linux operating systems. The BL860c server blade is designed for commercial server blade customers deploying c-Class blade enclosures. The BL860c server blade is consistent with other full-slot, single-width c-Class blades.

NOTE: This documentation is based on the assumption that the c-Class server blade enclosure is powered on and running properly, and that the Onboard Administrator Integrated Lights Out (OA iLO) is operational.

This chapter addresses the following topics:

Server Blade Overview

The server blade supports up to two Intel Itanium (200 MHz front side bus [FSB]) dual-core processors. The server blade supports up to 48 GB of memory (using twelve 4 GB, PC2–4200 DIMMs), two hot-pluggable serial-attached SCSI (SAS) disk drives, and up to three mezzanine I/O cards.

Server Blade Dimensions

Table 1-1 shows the dimensions and weight of the server blade.

Table 1-1 Server Dimensions

Dimensions	Value
Height	36.63 cm (14.42 in.)
Width	5.14 cm (2.025 in.)
Depth	48.51 cm (19.1 in.)
Weight	Unloaded: 8.6 kg (19 lb.) Fully loaded: 11.3 kg (25 lb.)

Server Blade Components

The following sections detail the components of the server blade. The components are shown in a front view and a top view. See Figure 1-1for the front view, and see Figure 1-3 (page 22)for the top view

Front View

The server blade features include the following components:

- Front bezel: The front bezel assembly provides air vents and electromagnetic interference (EMI) containment features. The front bezel provides the HP logo, matching family product

color scheme, and branding name. The display panel LEDs indicate unit ID, power status, LAN status, and overall server blade health.

- Two hot-plug SAS disk drives: These SAS disk drives each have their own carrier. These SAS disk drives can be removed and replaced without removing the bezel.
- Serial, USB, video (SUV) cable port
- Power button
- Blade extraction lever (to remove and replace blade)

Figure 1-1 Front View of the BL860c Server Blade

1 SAS disk drives
2 Front panel LEDs
3 Power button
4 Blade extraction handle
5 SUV cable port

SAS Disk Drives

There are two SAS disk drive slots on the BL860c server blade. The SAS disk drives have identical LEDs that show the status of the SAS hard disk drives.

See Figure 1-2 for the slot numbers of the SAS hard disk drives.

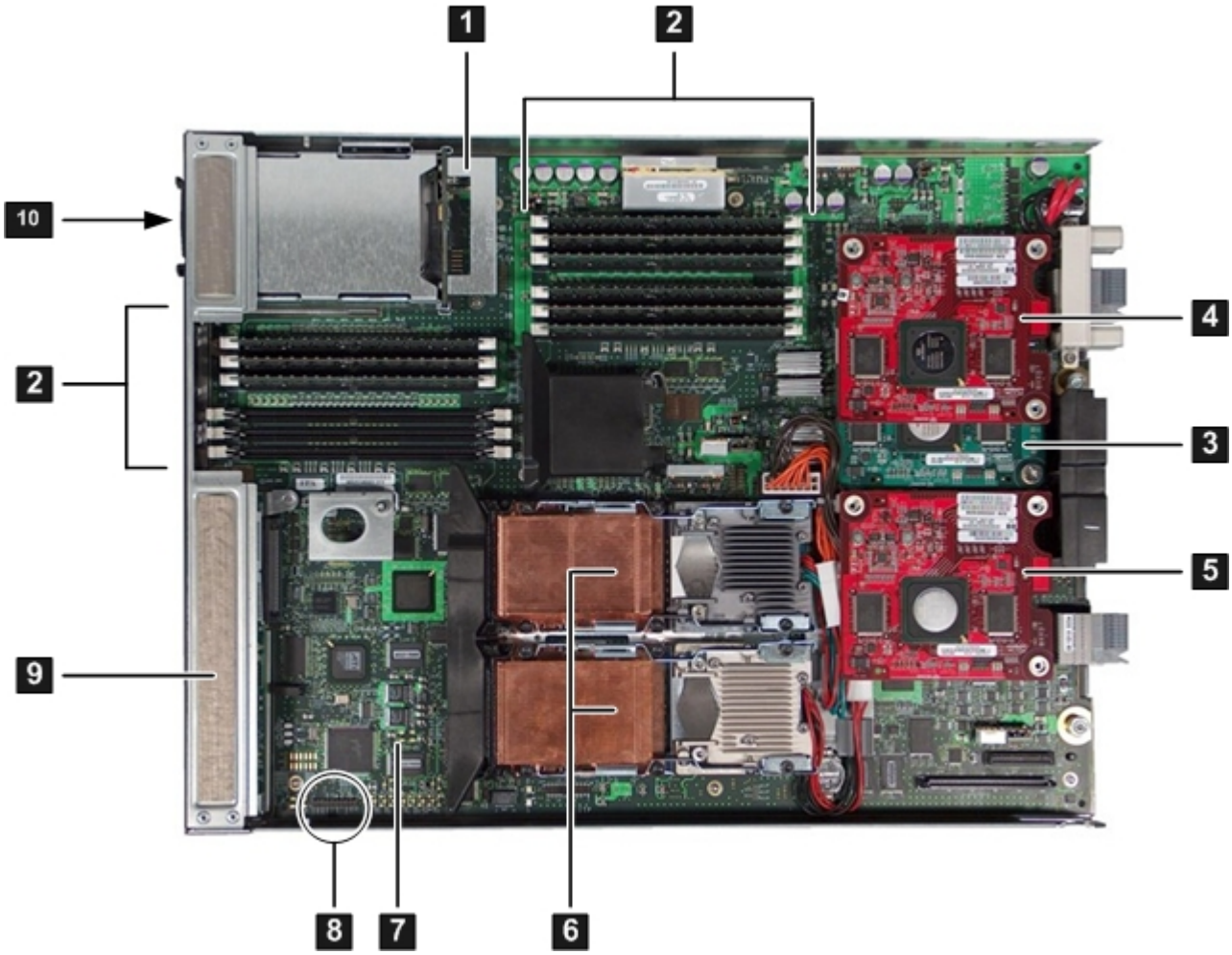
Figure 1-2 SAS Disk Drive Slots

See Figure 2-3 for locations of the SAS disk drive LEDs.

Top View (with access cover removed)

There is one removable access cover located on the right side of the server blade. This cover gives access to the internal components of the server blade. See Figure 1-3 for their location:

Figure 1-3 Top View of the BL860c Server Blade (access cover removed)



1	Memory DIMMs	6	Processors
2	System board	7	System board
3	Mezzanine card 1	8	Trusted Platform module
4	Mezzanine card 2	9	Front display panel
5	Mezzanine card 3	10	SAS disk drives

The following field replaceable components (FRUs) are also accessible when the access cover is removed:

- Processors
- Memory DIMMs
- Mezzanine cards
- SAS backplane
- Front display panel
- System board

None of these items are hot-swappable. They are only accessible when the server blade is removed from the enclosure.

SAS Backplane

The SAS disk backplane supports two small form factor (SFF) hard disk drives. The backplane supports hot-plugging a single SAS drive at a time. The activity LEDs and drive present LEDs shall be controlled by a pre-programmed system-on-chip (PSOC). The system board supplies 12

V, 5 V, and 3.3 V standby power to the backplane and hosts the SAS controller. The backplane is designed as a field replaceable unit.

The connection mechanism between the system board and the SAS backplane is through a right angle connector. This connector is specifically designed for high-speed differential applications, and supports system speeds up to 5 Gigabits per second and beyond. Power, Sense, and I2C signals are routed through this connector along with the SAS differential pairs and SGPIO signals.

I/O Subsystem

The I/O subsystem is composed of built in I/O and up to three mezzanine cards. The server blade does not support PCI Hot Plug (PHP). Two type II and one type I mezzanine cards are supported with PCI express links, which serves as a bridge between the ZX2 ropes links and PCI-e.

For the system board fast and slow core I/O, memory controllers are used as the ropes to PCI bridge. Two memory controllers are used to interface to the Core LAN and SAS. The memory controllers run at 33 MHz and are used to interface with the manageability, USB, and graphics through the SUV cable. The serial, USB, and video are provided through the PCI devices attached to logical rope 0.

Memory Subsystem

The server blade physical memory layout includes the PC2-4200 Double Data Rate Synchronous Dynamic Random Access Memory (DDR2 SDRAM) DIMMs, along with the memory bus traces and required termination. The memory subsystem supports only DDR 2 SDRAM technology utilizing industry-standard PC2-4200 type DIMMs. The DIMMs use a 184-pin JEDEC standard connector. The server blade memory subsystem provides two memory cells; each cell is 144 bits wide each (128 bits of data, 16 bits of ECC). Each cell has six DIMM slots; and there are 12 DIMM slots (six DIMMs per cell). All 12 DIMM slots are shared by both processors.

The minimum amount of memory supported in the server blade is 1 GB (two 512 MB DIMMs).

The maximum amount of memory supported in the server blade is 48 GB (twelve 4 GB DIMMs).

The DIMMs used in the server blade are low-profile (1.2" tall) DIMMs. The DIMMs are standard PC2-4200 registered DIMMs. Only DIMMs qualified by HP are supported.

DIMMs

The memory subsystem supports only DDR2 SDRAM technology utilizing industry-standard 1.2" high PC2-4200 DIMMs. The DIMMs use a 184-pin JEDEC standard connector. You must load the DIMMs in pairs. To enable chip sparing, load the DIMM in pairs (both DIMMs must be the same capacity). Table 1-2 summarizes the BL860c server blade memory solutions

Table 1-2 Server Blade Memory Array Capacities

Min / Max Memory Size	Single DIMM Sizes
1 GB / 6 GB	512 MB DIMM
2 GB / 12 GB	1 GB DIMM
4 GB / 24 GB	2 GB DIMM
8 GB / 48 GB	4 GB DIMM

NOTE: Loading DIMMs as a pair (two identical DIMMs) enables lock-step mode and chip sparing.

Load DIMMs from highest capacity to lowest capacity (for example, load 4 GB DIMMs first, then 2 GB DIMMs, then 1 GB DIMMs). Load memory DIMMs into slots 0A and 0B first.

Power Subsystem (on System Board)

Each server blade receives bulk DC voltage from the enclosure. Bulk DC voltage is then converted to the required DC voltages needed by the server blade's power block.

The BL860c server blade receives 12 V directly from the enclosure. This passes through E-Fuse circuitry that resides in the blade. The 12 V supply is always on as long as a power supply is installed in the enclosure. A control line from the enclosure administrator (OA) can turn on or off the E-Fuse to supply or cut power to the blade. The 12 V then gets distributed to various point-of-load (POL) converters. The switched POL voltage rails are 0.9 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5.0 V, 3.3 V standby, and 5.0 V standby.

CPU / Core Electronics Complex

The BL860c processor subsystem accommodates 1 or 2 Itanium processor modules. It consists of the ZX2 CEC front side bus, memory and I/O controller; system clock generation and distribution; multiple POL converters, I2C circuitry for manageability and fault detection; JTAG Boundary Scan for manufacturing test; and the Intel In-Target Probe interface for system development and debug.

The speed of the front side bus is 267 MHz. The ZX2 CEC and the processor modules are located on the system board. Each processor connects to the board through a Zero Insertion Force (ZIF) socket. Heatsinks, CPU metal frames and bolster plates are part of the mechanical attach requirements for the CPUs and ZX2.

Enclosure Information

This installation document only covers the BL860c server blade itself, and does not include any specific server blade enclosure information. For server blade enclosure information, go to:

http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00698286/c00698286.pdf.

2 Controls, Ports, and LEDs

This chapter describes the controls, ports, and LEDs found on the front panel and rear panel of your HP Integrity server blade.

This chapter addresses the following topics:

- “Front Panel” (page 25)
- “Rear Panel” (page 29)
- “SUV Cable” (page 29)

For more information on LED functions and descriptions, see Chapter 5: “Troubleshooting” (page 53).

Front Panel

The server blade has seven system LEDs, one power button, two reset buttons, and SAS disk drive LEDs and one front panel port that accepts the serial, USB, video (SUV) cable, for configuration and troubleshooting purposes. Figure 2-1 shows the LEDs, ports, and controls on the front panel of the server blade..

Figure 2-1 Server Blade FRont View

1 SAS disk drives
2 Front panel LEDs
3 Power button
4 Blade extraction handle
5 SUV cable port

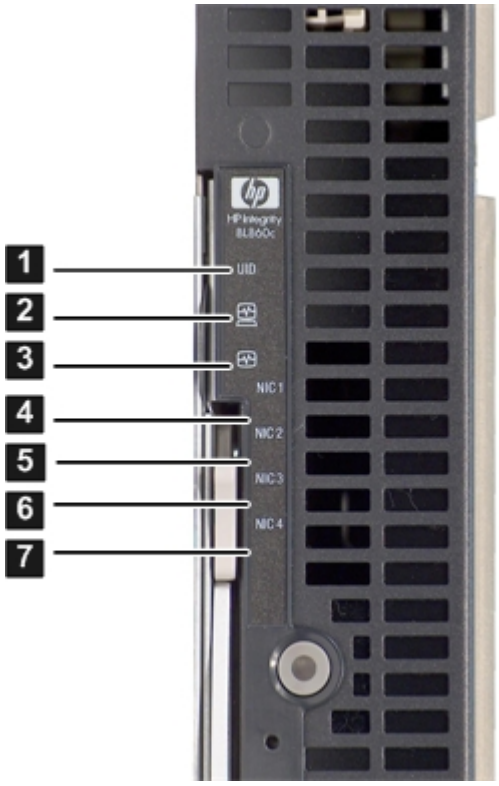
CAUTION: Disconnect the local I/O cable from the I/O port when not in use. The connector is not designed to provide a permanent connection.

Front Panel LEDs

The server blade contains seven LEDs on the front panel that indicate the server status.

Use Figure 2-2 to locate the front panel LEDs.

Figure 2-2 Front Panel View of the BL860c Server Blade



1 UID LED
2 System health LED
3 Internal health LED
4 NIC 1 LED
5 NIC 2 LED
6 NIC 3 LED
7 NIC 4 LED

Table 2-1 details the functions of the front panel LEDs.

Table 2-1 Integrity BL860c Server Blade Front Panel

Item	LED Description
1	Unit identification (UID)
2	System health
3	Internal health
4	NIC 1
5	NIC 2
6	NIC 3
7	NIC 4

SAS Disk Drive LEDs

There are two SAS disk drives on the BL860c server blade. They have identical LEDs that show the status of the SAS hard disk drives.

See Figure 2-3 for locations of the SAS disk drive LEDs.

Figure 2-3 SAS Disk Drive LEDs

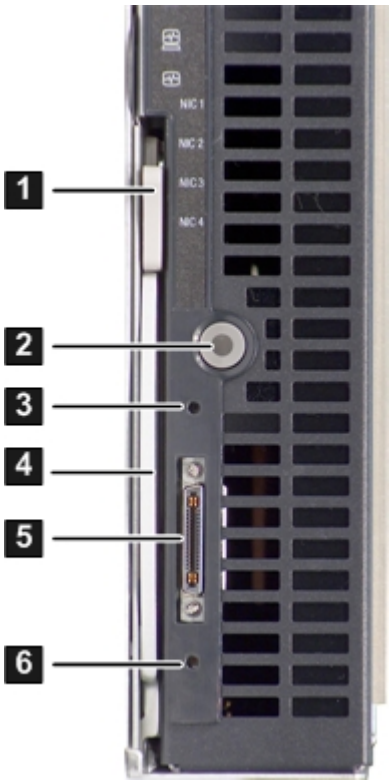
1 Activity LED
2 Status LED

Controls and Ports

The following section identifies the locations and functions of the front panel controls and ports.

The power button, and server blade extraction lever, and the SUV cable port are located on the front of the server. . For more information about the power button and server blade power states, see Chapter 3: “Power Off and Power On the Server” (page 31).

Figure 2-4 Front Panel Controls and Ports



1 Extraction lever release button
2 Power button
3 iLO MP reset pinhole button
4 Extraction lever
5 SUV port
6 Init (ToC) pinhole button

SUV Cable

The HP Integrity BL860c server blade has a serial, USB, and video (SUV) cable included with the server blade. Use the SUV cable to connect the server to external devices, such as: a terminal emulator, an external DVD drive, or a monitor. The SUV cable attaches to the front of the server blade in the SUV cable port. Figure 2-5 shows the SUV cable attached to the server blade.

CAUTION: The SUV cable is not designed to be used as a permanent connection.

Use caution when walking near the server blade when the SUV cable is installed. Hitting or bumping the cable can cause the port on the server blade to break. This can damage the system board, and it will need to be replaced.

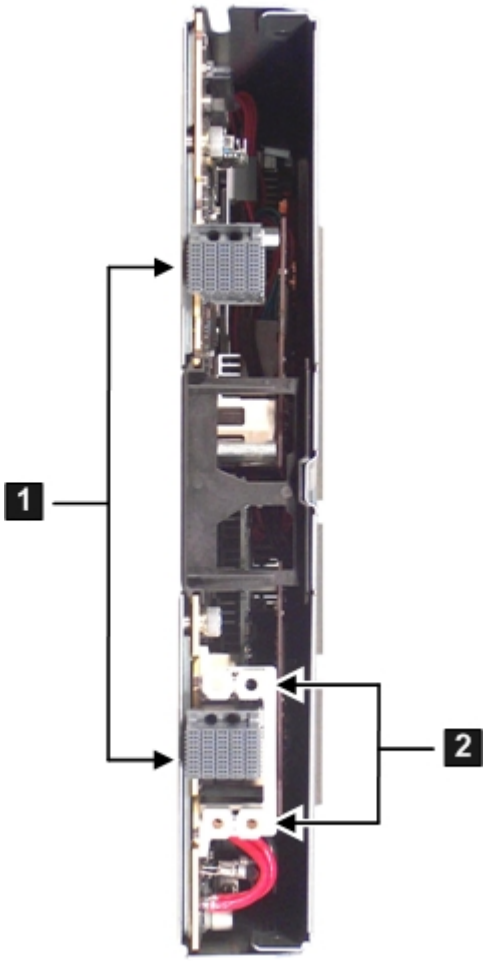
Figure 2-5 SUV Cable Ports

1 Serial port
2 USB ports (2)
3 Video port

Rear Panel

See Figure 2-6 to identify the server blade rear panel connectors.

Figure 2-6 BL860c Server Blade Rear Panel Connectors



1 GBX signal connector

2 Power connector

3 Power Off and Power On the Server

This chapter provides information on how to power off and power on the server blade.

The following sections are included in this chapter:

Power States

The HP Integrity BL860c server blade has three power states: standby power, full power, and off. You must install the server blade into the enclosure to achieve the standby and full power states. Depending on your server blade settings, the server blade may go to standby power mode (internal health LED is amber); or straight to full power (internal health LED is green) when it is installed into the enclosure. The enclosure should always have power applied to it, so the only way to remove all power from the server blade is to remove it from the enclosure. Table 3-1 describes the server power states:

Table 3-1 Power States

Power States	Server Blade Installed in Enclosure?	Front Panel Power Button Activated?	Standby Power Applied?	DC Power Applied?
Standby power	Yes	No	Yes	No
Full power	Yes	Yes	Yes	Yes
Off	No	No	No	No

Power Off the Server

The following procedure describes how to power off your BL860c server blade.

1. Gracefully shut down your OS by pressing the power button (for less than five seconds).

IMPORTANT: Momentarily pressing the power button initiates an ACPI graceful shutdown of the server blade. This process can take as long as 30 seconds, during which time the only observable feedback is the blinking disk activity light. The system power goes to standby mode. When the system goes into standby mode, the power LED turns from green to amber.

Holding the power button for five seconds forces a sudden power-off. This should only be used if the system has hung, and does not respond to a graceful power-off. Data loss may occur depending on the current state and activity of the system.

2. The server blade is now in standby power mode. To remove all power to the server blade, remove the server blade from the enclosure. See "Removing and Replacing the Server Blade from the Enclosure" (page 37).

Power On the Server

The following procedure describes how to power on your server blade.

1. Install your server blade into the server blade enclosure. See "Replacing the Server Blade into the Enclosure" (page 38).

   Depending on your server blade settings, installing the server blade may either go to standby power mode, or go to full power and start the boot process.
2. If the server blade is in standby mode, press the power button to get your server to full power.
3. Start your operating system (if not already autobooting). See Appendix B (page 79), or your operating system documentation for more information.

4 Removing and Replacing Components

This chapter provides information on removing and replacing components in your HP Integrity BL860c server blade.

The following sections are included in this chapter:

Safety Information

Use care to prevent injury and equipment damage when performing removal and replacement procedures. Many assemblies are sensitive to damage by electrostatic discharge.

Follow the procedures listed below to ensure safe handling of components, to prevent injury, and to prevent damage to the HP Integrity server blade:

- When removing or installing any server component, follow the instructions provided in this guide
- Do not wear loose clothing that might snag or catch on the server or on other items
- Do not wear clothing subject to static charge build-up, such as wool or synthetic materials
- If installing an internal assembly, wear an antistatic wrist strap and use a grounding mat, such as those included in the Electrically Conductive Field Service Grounding Kit
- Handle components by the edges only. Do not touch any metal-edge connectors or any electrical components on accessory boards

Service Tools Required

Service of this product may require one or more of the following tools:

- IPF CPU Install Tool Kit, consisting of:
  - Disposable ESD Kit
  - Labelless CPU install tool (2.5mm hex and Torx 15)
- 1/4-inch flat blade screwdriver
- Phillips No. 1 screwdriver
- ACX-10 Torx screwdriver
- ACX-15 Torx screwdriver

NOTE: None of the internal components are hot-swappable because they are not accessible unless the server blade is removed from the server blade enclosure.

Removing and Replacing a Hot–Plug SAS Disk Drive

The only hot–plug devices in the server blade are the SAS disk drives. The following procedures show how to remove and replace the SAS disk drives. You do not need to remove the server blade from the enclosure to replace a SAS disk drive. To assess hard drive status, observe the SAS disk drive status LEDs. For an explanation of these LEDs, see "SAS Disk Drive LEDs" (page 71).

IMPORTANT: Ensure a complete data backup has been performed prior to removing a SAS disk drive.

If disk drive mirroring is enabled, then it is not necessary to power down the server blade before removing or replacing a SAS disk drive. If mirroring is not enabled, perform a graceful OS shutdown before removing a hard drive to protect data.

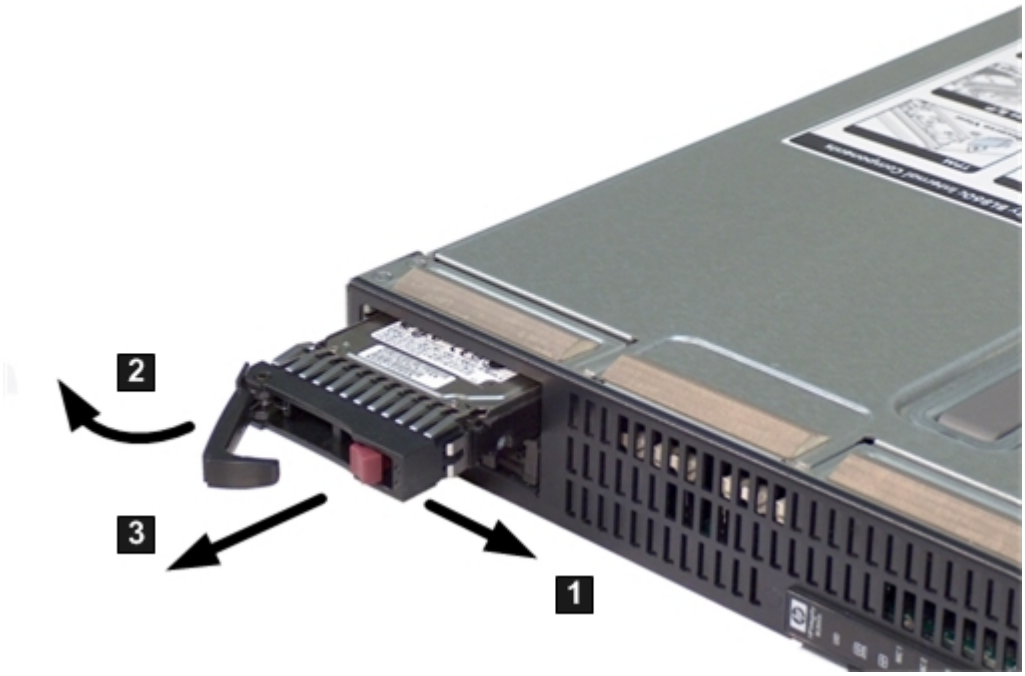
You do not need to remove the server blade from the enclosure to remove and replace a SAS disk drive.

Removing a SAS Disk Drive

To remove a SAS disk drive, perform the following steps:

1. Press the release button (1). See Figure 4-1.
2. Open the ejector lever (2).
3. Slide the SAS disk drive out of the drive cage (3).

Figure 4-1 Removing a SAS Disk Drive



CAUTION: Always populate hard drive bays with either a SAS disk drive or a hard drive blank. Operating the server blade without a SAS disk drive or disk drive blank results in improper airflow and improper cooling, which leads to thermal damage.

Replacing a SAS Disk Drive

To replace a SAS disk drive, perform the following steps:

1. Slide the drive into the cage until it is fully seated.
2. Close the lever to lock the drive into place.

Removing and Replacing Disk Drive Blanks

The server blade has two disk drive bays. If you only purchased one hard drive, your server blade has a hard drive blank installed. Hard drive blanks are used to maintain proper airflow throughout the server blade.

CAUTION: Always populate hard drive bays with either a SAS disk drive or a disk drive blank. Operating the server blade without a SAS disk drive or disk drive blank results in improper airflow, which leads to thermal damage.

Removing a Disk Drive Blank

To remove a disk drive blank, perform the following steps:

1. Press the release buttons simultaneously (1). See Figure 4-2.
2. Pull the blank out of the disk drive bay.

Figure 4-2 Removing a Disk Drive Blank

Replacing a Disk Drive Blank

To replace the hard drive blank, slide the blank into the bay until it locks into place. The hard drive blank is keyed to fit only one way.

Preparing the Server Blade for Servicing

To service any internal server blade component, power down the server blade and remove it from the server blade enclosure.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. For more information, see the "Safety Information" (page 33).

Power Off the Server Blade

System power in the server blade does not completely shut off with the front panel power switch, or the Virtual Power Button feature. The function toggles between on and standby modes, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active.

WARNING! Before proceeding with any maintenance or service on a server that requires physical contact with electrical or electronic components, be sure that either power is removed or safety precautions are followed to protect against electric shock and equipment damage. Observe all WARNING and CAUTION labels on equipment.

To service internal server blade components:

1. Identify the proper server blade in the server blade enclosure. The enclosure slots are numbered Bay 1 one through Bay 16 from left to right.
2. Remove power from the server blade in one of the following ways:
   - Use the iLO Virtual Power Button feature in the Remote Console to power off the server blade from a remote location. It may take up to 30 seconds for the server blade reach standby mode. Wait for the power LED to go from green to amber.
   - Press the power button on the front of the server blade. It may take up to 30 seconds for the server blade to reach standby. Wait for the power LED to go from green to amber.

Removing and Replacing the Server Blade from the Enclosure

Use the following procedures to remove and replace the server blade from the enclosure.

Removing the Server Blade from the Enclosure

Perform the following steps to remove the server blade from the enclosure:

1. Press the release button (1). See Figure 4-3.

CAUTION: After you press the release button, the server blade is unlocked from the enclosure. Use both hands to support the server blade when you remove it from the rack. The server blade weighs approximately 9 kg (20 lb.).

NOTE: The enclosure fans may still be running when the server blade is in standby mode. Opening the lever removes all power from the server blade.

2. Open the lever (2).
3. Grasp the lever and slide the server blade from the enclosure (3). Place a hand under the server blade to support it as you remove it from the enclosure.

Figure 4-3 Removing the Server Blade from the Enclosure

4. Place the server blade on a flat, level, antistatic surface.

CAUTION: Always populate server blade enclosure bays with either a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank results in improper airflow and improper cooling, which can lead to thermal damage.

Replacing the Server Blade into the Enclosure

Use the following procedure to replace the server blade into the enclosure:

1. Slide the server blade back into the enclosure.
2. Close the lever.

NOTE: Once you install the server blade back into the enclosure, the server blade may go to standby power (Internal health LED is amber), or full power (internal health LED is green, and the fans may get louder).

3. If the server blade, has not come up to full power, push the power button to get the server to full power.

   The fans may get much louder as the server powers up to full power.

Removing and Replacing the Server Blade Access Panel

The access panel is located on the right side of the server blade (when mounted in an enclosure).

Removing the Server Blade Access Panel

To remove the access panel, perform the following steps:

1. Power off the server blade and remove it from the server blade enclosure. See “Preparing the Server Blade for Servicing” (page 36).
2. Unlock the cam on the access panel latch (if necessary) by turning the lock on the latch counter-clockwise with a 2.5 mm allen wrench.
3. Pull up on the access panel latch (1). This causes the access panel to slide back about 1.75 cm (0.75 in.).Figure 4-4.
4. Lift the access panel straight up off the server blade to remove it (2).

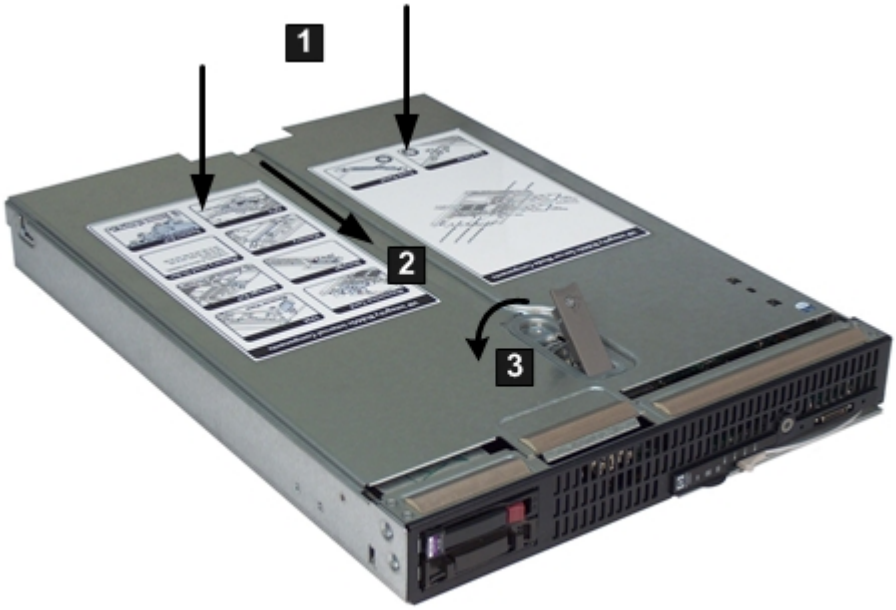
Figure 4-4 Removing the Server Blade Access Panel

Replacing the Server Blade Access Panel

To replace the access panel, perform the following steps:

1. Place the access panel on the blade with the panel hanging over the back of the enclosure about 1.25 cm (0.5 in), and slide the access panel toward the front of the server until the thumb indentations click into place (1). See Figure 4-5
2. Tighten the thumbscrew (2).
3. Place the server blade back into the enclosure and power it on. See “Preparing the Server Blade for Servicing” (page 36).

Figure 4-5 Replacing the Server Blade Access Panel



Removing and Replacing Internal Components

These procedures detail how to remove and replace the internal components in the server blade. The server blade contains the following field replaceable components (FRUs):

- DIMMs
- Processors
- SAS backplane
- Front display board
- Mezzanine cards
- System board

NOTE: The server blade must be removed from the enclosure to access the internal components, therefore, no internal devices are hot-swappable or hot-pluggable in the server blade.

Removing and Replacing DIMMs

There are 12 DIMM slots located on the system board. The following procedures show how to remove and replace memory DIMMs in the server blade.

Removing a DIMM

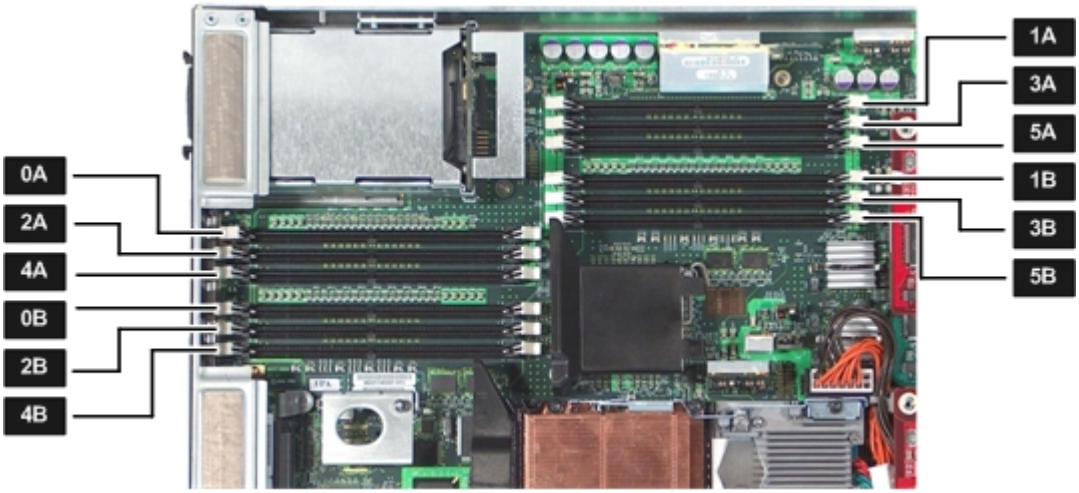
Use the following procedure to remove a failed DIMM from the server blade.

1. Power down the server blade and remove it from the server blade enclosure. See "Preparing the Server Blade for Servicing" (page 36).
2. Remove the access panel. See "Removing the Server Blade Access Panel" (page 38).

NOTE: The server blade ships with at least two DIMMs installed in slots 0A and 0B.

3. Locate the DIMM slots on the server blade system board. See Figure 4-6.

Figure 4-6 DIMM Slot Locations



4. Open the DIMM slot latches for the DIMM you are removing.
5. Remove the DIMM from the slot.

IMPORTANT: Always install DIMMs in identical pairs. DIMM sizes within each pair must match.

DIMMs do not seat fully if turned the wrong way.

DIMM Load Order

The DIMM load order is as follows:

- Load slots DIMM 0A and DIMM 0B first
- Load slots DIMM 1A and DIMM 1B second
- Load slots DIMM 2A and DIMM 2B third
- Load slots DIMM 3A and DIMM 3B forth
- Load slots DIMM 4A and DIMM 4B fifth
- Load slots DIMM 5A and DIMM 5B sixth

The server blade uses a minimum of 1 GB of memory (two 512 MB DIMMs), and a maximum of 48 GB of memory (twelve 4 GB DIMMs). If you have purchased additional memory, use these procedures to install more memory into your server blade.

NOTE: Load DIMMs from highest capacity to lowest capacity (for example, load 4 GB DIMMs first, then 2 GB DIMMs, then 1 GB DIMMs).

The memory subsystem supports chip spare functionality. The DIMMs in a pair must be identical to enable chip sparing. Chip sparing enables an entire SDRAM chip on a DIMM to be bypassed (logically replaced) in the event that a multi-bit error is detected on that SDRAM.

In order to use the chip spare functionality, use only DIMMs built with the same HP part numbers. These DIMMs must be loaded in pairs.

DIMM Configuration

The memory subsystem supports only Double Data Rate Synchronous Dynamic Random Access Memory (DDR SDRAM) technology utilizing industry-standard PC2–4200 type DDR SDRAM DIMMs, 1.2 inches tall, using a 184-pin JEDEC standard connector. In the server blade, you must load the DIMMs in pairs. To enable chip sparing, you must four DIMMs of the same capacity and configuration. Table 4-1 summarizes the server blade memory solutions.

Table 4-1 BL860c Server Blade Memory Array Capacities

Min / Max Memory Size	Single DIMM Sizes
1 GB / 2 GB	512 MB DIMM
2 GB / 4 GB	1 GB DIMM
4 GB / 8 GB	2 GB DIMM
	4 GB DIMM

NOTE: Loading DIMMs as pairs (two identical DIMMs) enables lock-step mode and chip sparing.

Replacing a DIMM

Use the following procedure to replace a DIMM.

1. Ensure the DIMM slot latches are open.

CAUTION: Use only HP low-profile (1.2 in.) DIMMs. DIMMs from other sources may adversely affect data integrity.

2. Insert the DIMM into the slot and push down until the latches click shut.
3. Replace the access panel. See the "Replacing the Server Blade Access Panel" (page 39).
4. Place the server blade into the enclosure. See "Replacing the Server Blade into the Enclosure" (page 38).

Removing and Replacing a Processor

Use the following procedures to remove and replace a processor in the server blade.

NOTE: The processor load order is processor slot 0, then processor slot 1. The processor slot 0 is the slot closest to the edge of the chassis. See Figure 4-7 for CPU slot locations.

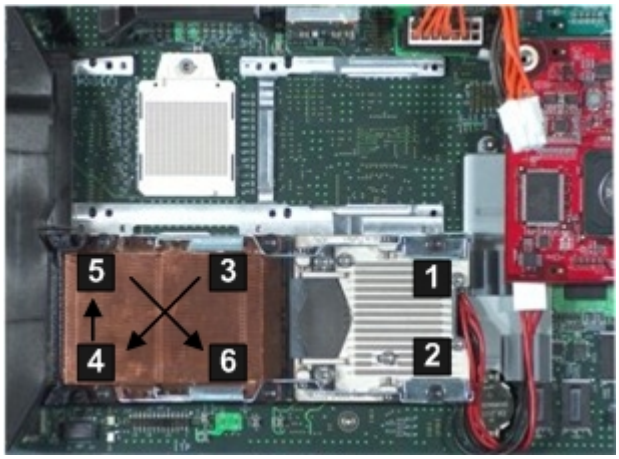
Removing a Processor

To remove a processor, perform the following steps (removing processor 0 is shown in this procedure):

NOTE: If you are only adding a processor, remove the dust cover from the processor socket, and proceed to "Replacing a Processor" (page 43).

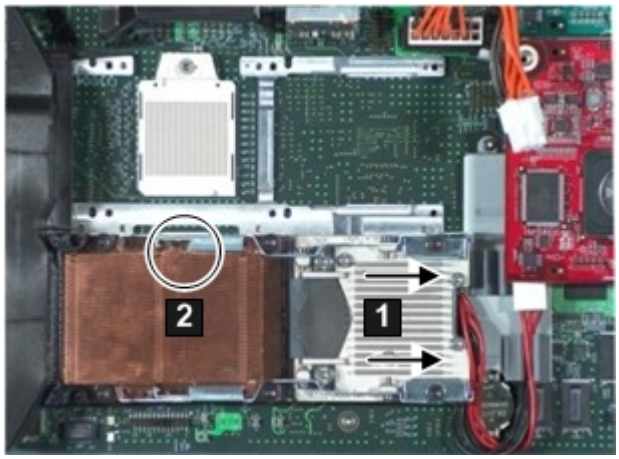
1. Power off the server, and remove it from the enclosure. See "Preparing the Server Blade for Servicing" (page 36).
2. Remove the access panel. See "Removing the Server Blade Access Panel" (page 38).
3. Disconnect the power cable from the processor and power pod module you are removing.
4. Loosen the captive screws (1 - 2) on the power pod with the (ACX-15) Torx screwdriver.

Figure 4-7 Removing the Processor Module on the Server Blade Board



5. Loosen the captive shoulder screws (3 - 6) on the processor heat sink in the order shown in Figure 4-7 with the (ACX-15) Torx screwdriver.
6. Slide the processor sequencer to the right, and hold it in place to uncover the ZIF socket (1).
7. Unlock the ZIF socket by turning the socket 180º counter clockwise (2). See Figure 4-8.

Figure 4-8 ZIF Socket on the Processor



8. Carefully remove the processor module by lifting it straight up from the system board. Place the processor module in an antistatic bag.

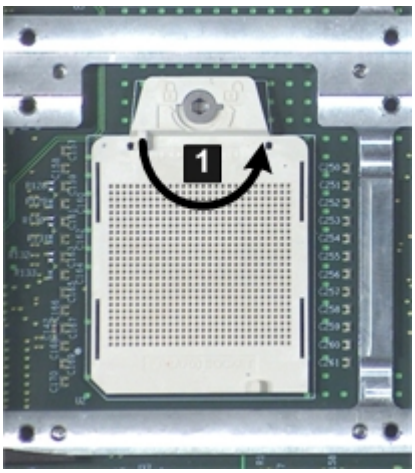
Replacing a Processor

To install the processor, perform the following steps:

1. Ensure the ZIF socket for the processor you are installing is in the open position. Insert the 2.5 mm hex end of the ACX-15 Torx screwdriver into the ZIF socket and gently try to rotate the socket 180º counter clockwise. If it doesn't turn, the socket is open.

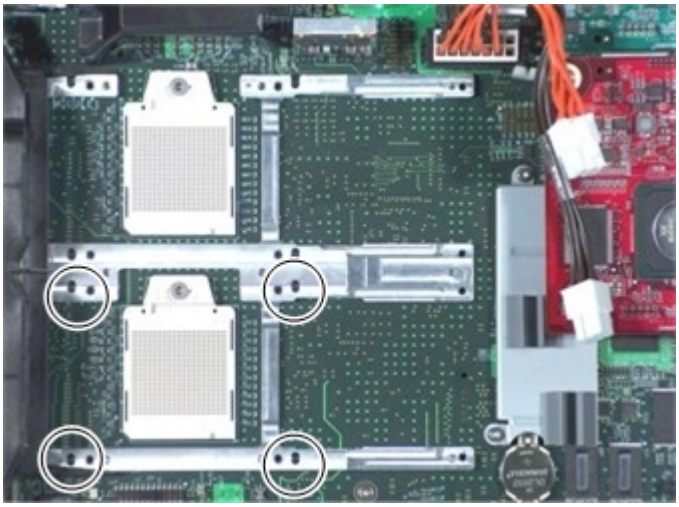
NOTE: If you have just removed a processor, then the ZIF socket is unlocked.

Figure 4-9 Processor Module



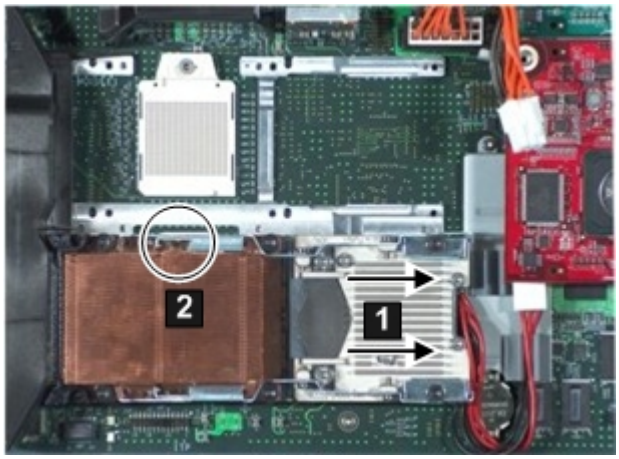
2. Carefully insert the processor module into the empty CPU slot (CPU 0 is shown) on the server blade system board. Line up the guide pins on the processor to the alignment holes in the processor slot to seat the processor correctly. See Figure 4-10.

Figure 4-10 Alignment Holes in Processor Slot 0



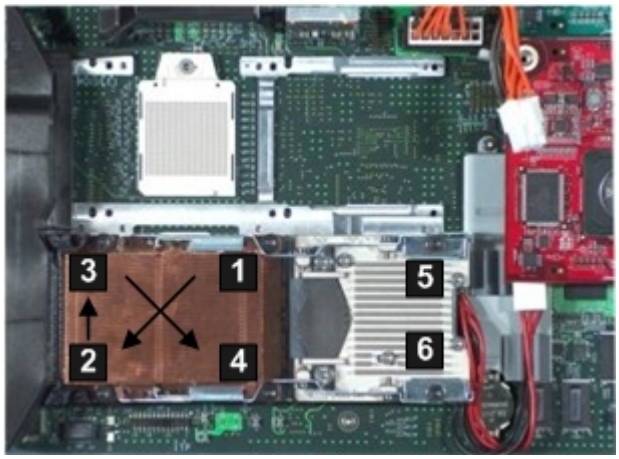
3. Slide the sequencer to the right and hold it there to uncover the ZIF socket. Tighten the ZIF socket with the 2.5 mm hex end of the processor installation tool. Turn the socket 180º clockwise. See Figure 4-11.

Figure 4-11 ZIF Socket on Processor Slot 0



4. Tighten the captive shoulder screws (1 - 4) on the processor heat sink in the order shown in Figure 4-11 with the (ACX-15) Torx screwdriver. See Figure 4-12 (page 45).
5. Tighten the captive screws (5 - 6) on the power pod with the (ACX-15) Torx screwdriver.

Figure 4-12 Installing a Processor in Slot 0



6. Connect the power cable to the pod power connector on the processor power pod module.
7. Install the access panel. See "Replacing the Server Blade Access Panel" (page 39).
8. Place the server blade back into the enclosure and power it up. See "Replacing the Server Blade into the Enclosure" (page 38).

Removing and Replacing the SAS Backplane

The following procedures details how to remove and replace a failed SAS backplane. The BL860c backplane supports two serial-attached SCSI (SAS) disk drives on the SAS backplane.

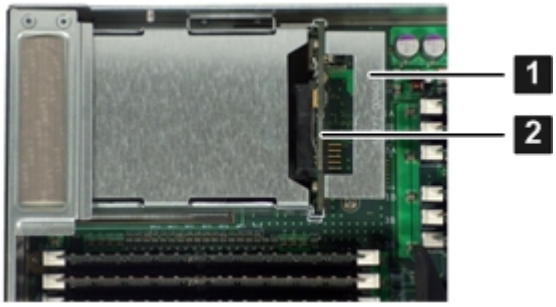
Removing the SAS Backplane

Use the following procedure to remove the failed SAS backplane from the server blade.

1. Power off the server and remove it from the enclosure. See "Preparing the Server Blade for Servicing" (page 36).
2. Remove the access panel. See "Removing the Server Blade Access Panel" (page 38).
3. Remove the SAS disk drives or disk drive blanks. See "Removing a SAS Disk Drive" (page 34), or "Removing a Disk Drive Blank" (page 35).

4. Remove the access panel. See “Removing the Server Blade Access Panel” (page 38).
5. Remove the SAS backplane by lifting it straight out of the server by the backplane handle. See Figure 4-13.

Figure 4-13 Removing the SAS Backplane



1 SAS backplane handle

2 SAS backplane

Replacing the SAS Backplane

Use the following procedure to replace new the SAS backplane into the server blade after a SAS backplane failure..

1. Slide the SAS backplane into the slot on the system board. See Figure 4-13 (page 46).
2. Install the SAS disk drives, or disk drive blanks into the server blade. See “Replacing a SAS Disk Drive” (page 35), or “Replacing a Disk Drive Blank” (page 36).
3. Install the access panel. See “Replacing the Server Blade Access Panel” (page 39).
4. Place the server blade back into the enclosure and power it up. See “Replacing the Server Blade into the Enclosure” (page 38).

Removing and Replacing the Front Display Assembly

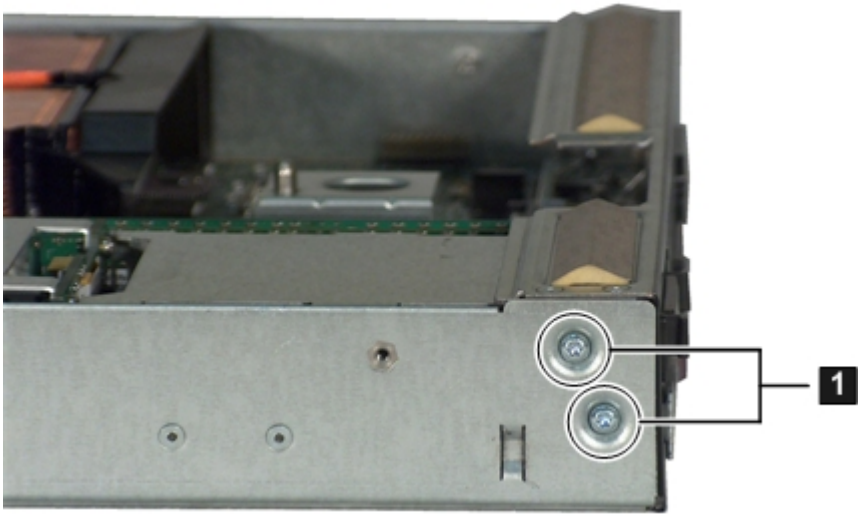
The following procedures detail how to remove and replace the front display assembly on the BL860c server blade. The front display assembly is attached to the front of the server blade.

Removing the Front Display Assembly

Use the following procedure to remove the failed front display assembly on the server blade.

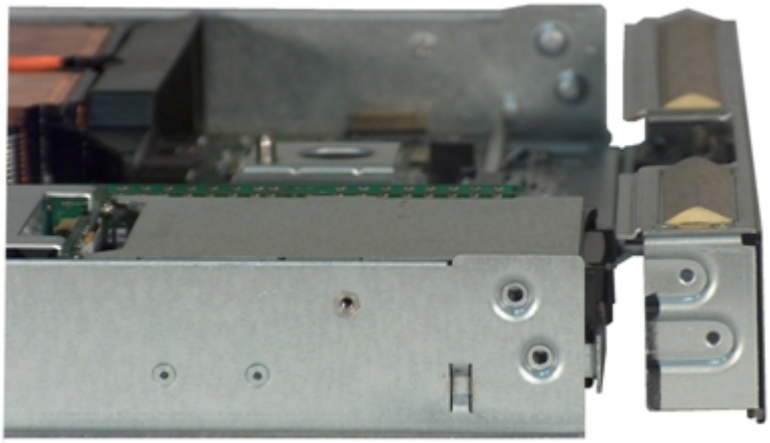
1. Power off the server and remove it from the enclosure. See “Preparing the Server Blade for Servicing” (page 36).
2. Remove the access panel. See “Removing the Server Blade Access Panel” (page 38).
3. Remove the four screws that hold the front display assembly to the front of the server blade. There are two screws on each side (1). See Figure 4-14.

Figure 4-14 Removing the Front Display Assembly Housing Screws



4. Remove the front display assembly from the front of the server blade by pulling it straight off of the front of the server. See Figure 4-15 (page 47).

Figure 4-15 Removing the Front Display Assembly from the Front of the Server Blade



Replacing the Front Display Assembly

Use this procedure to install the new front display assembly into the server blade after a front display board failure.

1. Attach the front display assembly to the front of the server blade with the Torx T-15 screwdriver. Make sure the port on the front display assembly is lined up with the plug on the system board.
2. Install the access panel. See "Replacing the Server Blade Access Panel" (page 39).
3. Place the server blade back into the enclosure and power it on. See "Replacing the Server Blade into the Enclosure" (page 38).

Removing and Replacing the System Battery

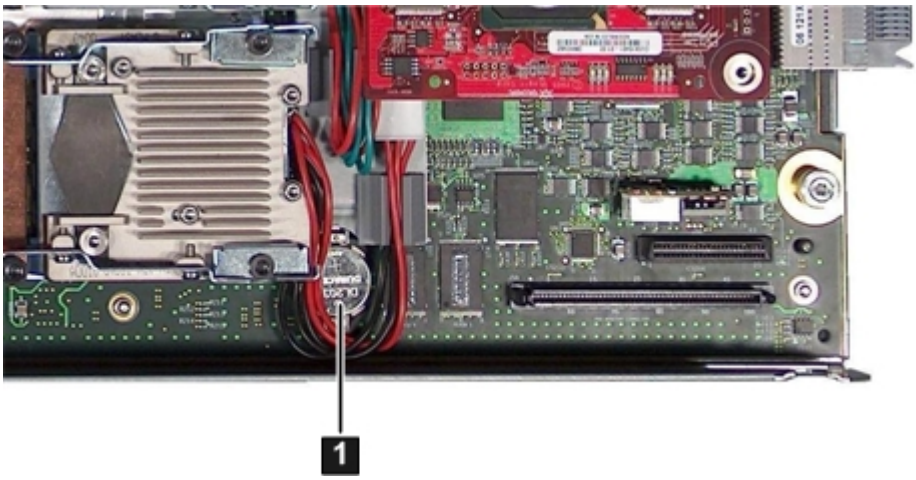
The following procedures detail how to remove and replace the system battery on the system board of the HP Integrity BL860c server blade.

Removing the System Battery

Use the following procedure to remove the system battery from the system board.

1. Power off the server and remove it from the enclosure. See “Preparing the Server Blade for Servicing” (page 36).
2. Remove the access panel. See “Removing the Server Blade Access Panel” (page 38).
3. Note the position of the battery in the socket for the installation of the replacement battery.
4. Gently pry the system battery out of its socket with your fingers. Move the processor 0 power cable out of the way if necessary. See Figure 4-16 (page 48).

Figure 4-16 System Battery Location



1 System battery on the system board

5. Dispose of the system battery per your local requirements.

Replacing the System Battery

Use the following procedure to remove the system battery from the system board.

1. Install the new system battery by gently pushing the battery into the socket. Move the processor 0 power cable if necessary.
2. Install the access panel. See “Replacing the Server Blade Access Panel” (page 39).
3. Place the server blade back into the enclosure and power it on. See “Replacing the Server Blade into the Enclosure” (page 38).

Removing and Replacing the Mezzanine Cards

The following procedures detail how to remove and replace the three mezzanine cards available on the BL860c server blade. The server blade holds up to three PCI-e mezzanine cards. Slot one is a PCI-e x4 slot, and slots two and three are PCI-e x8 slots.

Removing a Mezzanine Card

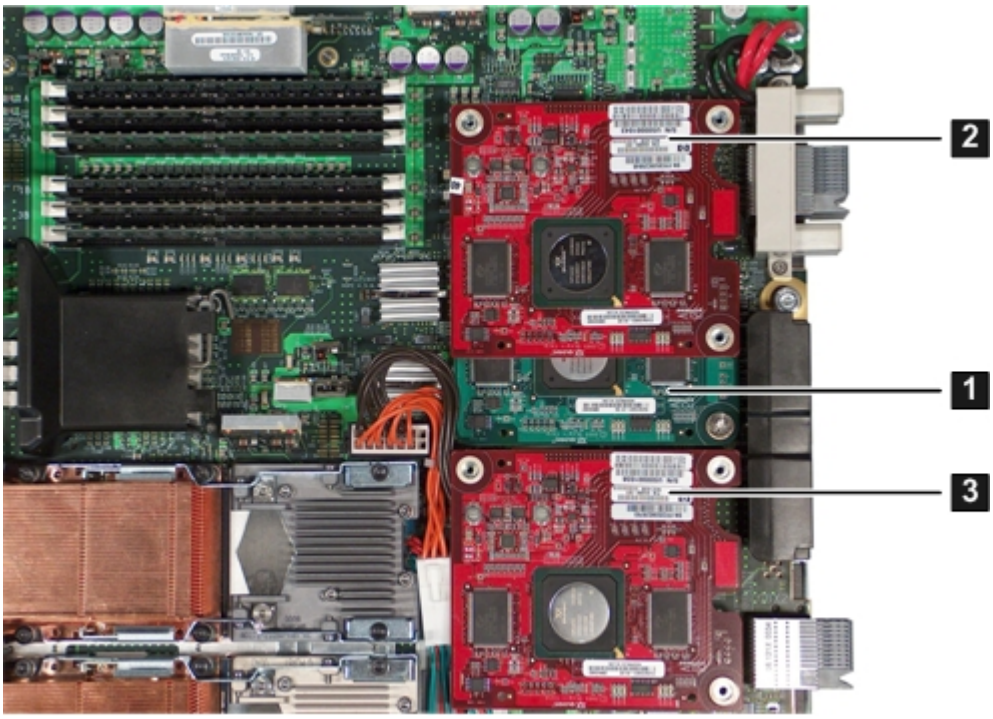
Use the following procedure to remove a mezzanine card from the server blade. See Figure 4-17 (page 49) to determine which card you are replacing.

NOTE: For more information regarding the different cards supported by the BL860c server blade, see http://h71028.www7.hp.com/enterprise/cache/316682-0-0-0-121.html?jumpid=reg_R1002_USEN.

1. Power off the server and remove it from the enclosure. See "Preparing the Server Blade for Servicing" (page 36).
2. Remove the access panel. See "Removing the Server Blade Access Panel" (page 38).
3. Unscrew the thumbscrews holding the card you are replacing.
4. Grasp the mezzanine card by the edges and lift it off of the port.

NOTE: If you are removing mezzanine card one, you need to remove mezzanine card two to access it (if necessary). Mezzanine card two is installed above mezzanine card one on the system board.

Figure 4-17 Server Blade with All Three Mezzanine Cards Installed



1. Mezzanine card one, PCI-e x4
2. Mezzanine card two, PCI-e x8
3. Mezzanine card three, PCI-e x8

Replacing a Mezzanine Card

Use this procedure to a mezzanine card on the system board.

NOTE: If you are installing mezzanine card one, you need to remove mezzanine card two to access it (if necessary). Mezzanine card two is installed above mezzanine card one on the system board.

For a matrix of supported mezzanine cards, see http://h71028.www7.hp.com/enterprise/cache/316682-0-0-0-121.html?jumpid=reg_R1002_USEN.

1. Grasp the mezzanine card by its edges, and line the card up with the post on the system board. See Figure 4-17 (page 49) for mezzanine card locations on the system board.
2. Push down on the card right above the port to seat it into the port.
3. Tighten the three thumbscrews to secure the card to the system board.
4. Install the access panel. See "Replacing the Server Blade Access Panel" (page 39).
5. Place the server blade back into the enclosure and power it up. See "Replacing the Server Blade into the Enclosure" (page 38).

Removing and Replacing the System Board

The following procedures detail how to remove and replace the system board from the BL860c server blade. When a system board fails, you need to remove the following components from the failed system board (unless they caused the failure), and install them on the new system board:

- SAS disk drives
- Memory DIMMs
- Processors
- SAS backplane
- Mezzanine cards
- TPM

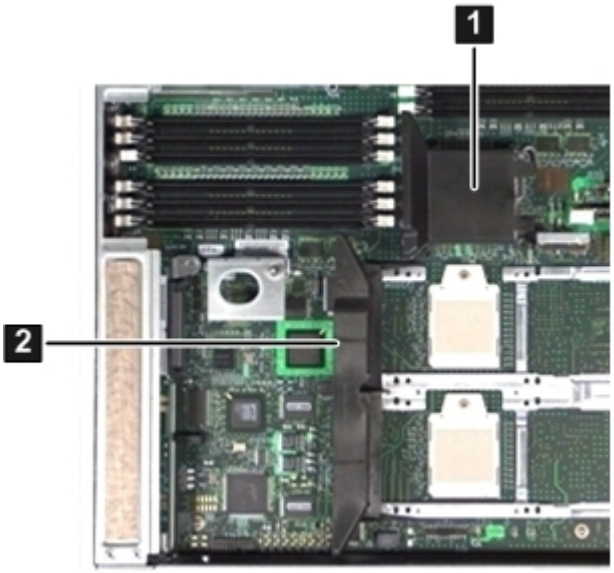
CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any removal or installation procedure. See the "Safety Information" (page 33) for more information.

Removing the System Board

Use this procedure to remove a failed system board in the BL860c server blade.

1. Power off the server and remove it from the enclosure. See "Preparing the Server Blade for Servicing" (page 36).
2. Remove the access panel. See "Removing the Server Blade Access Panel" (page 38).
3. Remove the hard disk drives. See "Removing a SAS Disk Drive" (page 34).
4. Remove the memory DIMMs. See "Removing a DIMM" (page 40).
5. Remove the processors. See "Removing a Processor" (page 42).
6. Remove the SAS backplane. See "Removing the SAS Backplane" (page 45).
7. Remove the system battery. See "Removing the System Battery" (page 47).
8. Remove the mezzanine cards. See "Removing a Mezzanine Card" (page 49).
9. Remove the controller air baffle from the system board by undoing the tabs and lifting the air baffle out of the server. See Figure 4-18 (page 51) for the location of the air baffles.
10. Remove the processor air baffle by unsnapping it from the processor frame and lifting the air baffle out of the server.

Figure 4-18 Air Baffle Locations



1 Controller air baffle 2 Processor air baffle

11. Remove the TPM by pulling it straight up and out of the system board. See Figure 4-19 (page 51) for the location of the TPM.

Figure 4-19 Trusted Platform Module Location

NOTE: The system board is attached to the front display panel.

12. Loosen the two captive thumbscrews toward the back of the system board. See Figure 4-20 (page 51) for the thumbscrew locations.

Figure 4-20 System Board

13. Shuttle the system board to the left to disengage the system board from the connectors on the front display board and the keyways under the system board.
14. Lift the system board out of the server blade.

Replacing the System Board

Use this procedure to install a new system board in the BL860c server blade after a system board failure.

1. Install the system board into the server by lining up the keyways on the bottom of the system board with the pins on the server blade chassis.
2. Shuttle the system board to the right, and make sure the system board connects to the front display board.

3. Tighten the two thumbscrews on the system board.
4. Install the TPM. See Figure 4-19 (page 51) for the location of the TPM on the system board.
5. Install the system battery. See "Replacing the System Battery" (page 48).
6. Install the air baffles. See Figure 4-18 (page 51).
7. Install the mezzanine card or cards. See "Replacing a Mezzanine Card" (page 49).
8. Install the SAS backplane. See "Replacing the SAS Backplane" (page 46).
9. Install the memory DIMMs. See "Replacing a DIMM" (page 42).
10. Install the processors. See "Replacing a Processor" (page 43).
11. Install the hard disk drives. See "Replacing a SAS Disk Drive" (page 35).
12. Install the access panel. See "Replacing the Server Blade Access Panel" (page 39).
13. Install the server blade into the enclosure. See "Replacing the Server Blade into the Enclosure" (page 38).

5 Troubleshooting

The purpose of this chapter is to provide a preferred methodology (strategies and procedures) and tools for troubleshooting server blade error and fault conditions.

The following sections are included in this chapter:

Methodology

General Troubleshooting Methodology

There are multiple entry points to the troubleshooting process, dependent upon your level of troubleshooting expertise; the tools, processes, and procedures which you have at your disposal; and the nature of the system fault or failure.

1. Typically, you select from a set of symptoms, ranging from very simple, system LED is blinking; to the most difficult, Machine Check Abort (MCA) has occurred. The following is a list of symptom examples:
   - Front Panel LED blinking
   - System Alert present on system console
   - Server blade won't power-up
   - Server blade won't boot
   - Error/Event Message received
   - MCA occurred
2. Narrow down the observed problem to the specific troubleshooting procedure required. Isolate the failure to a specific part of the server blade to perform more detailed troubleshooting. For example:
   - Problem- Front Panel LED blinking

NOTE: The front panel health LED flashes amber with a warning indication, or flashes red with a fault indication.

— System Alert on system console?

— Analyze the alert by using the system event log (SEL), to identify the last error logged by the server blade. Use the iLO MP commands to view the SEL, through the MP's text interface.

3. You should have a good idea about which area of the server blade requires further analysis. For example, if the symptom was "server blade won't power-up", the initial troubleshooting procedure may have indicated a problem with the DC power rail not coming up after the power was turned on.
4. You have now reached the point where the failed Field Replaceable Unit (FRU or FRUs) has been identified and needs to be replaced. You must now perform the specific removal and replacement procedure, and verification steps (see Chapter 4: "Removing and Replacing Components" (page 33) for more details).

NOTE: If multiple FRUs are identified as part of the solution, fix all identified failed FRUs to guarantee success.

5. There may be specific recovery procedures you need to perform to finish the repair.

Should a failure occur, the front panel LEDs and the SEL helps you identify the problem or FRU:

- LEDs. The front panel LEDs and LAN LEDs of the server blade change color and blink to help identify specific problems, and display LAN activity.
- The SEL provides detailed information about the errors identified by the LEDs.

For system alerts of levels 3-5, the attention condition on the system LED can be cleared by accessing the logs using the `sl`command, available in the iLO MP command mode. To access the iLO MP from the console serial port, enter**Ctrl–B** or **ESC-(**.

If the LEDs and SEL do not give you enough information for you to identify the problem you are experiencing, HP also provides diagnostic tools with each operating system (see "Troubleshooting Tools" (page 58) for more details).

NOTE: Always check the iLO MP SEL in the case of a blinking yellow or red front panel health LED, before replacing any hardware.

Recommended Troubleshooting Methodology

The recommended methodology for troubleshooting a server blade error or fault is as follows:

1. Consult the system console for any messages, emails, etc., pertaining to a server blade error or fault.
2. View the front panel LEDs (power and health), locally; or remotely through the iLO MP `vfp` command.
3. Compare the state of the server blade's LEDs (off; flashing or steady; red, green, or amber) with the LED states listed in Table 5-2 (page 55).
4. Go to the step number of Table 5-3 (page 56), as specified in the rightmost column of Table 5-2 (page 55), located in the row which corresponds to your front panel LED display state.
5. Read the symptom/condition information in the leftmost column of Table 5-3 (page 56).
6. Perform the action(s) specified in the "Action" column.
7. If more details are required or desired, see the appropriate subsection of this chapter, where this information is provided in the "Action" column. The "Action" you are directed to perform may be to access and read one or more error logs (the event log and/or the forward progress log).

You can follow the recommended troubleshooting methodology, and use Table 5-3 and Table 5-4 (page 57), or go directly to the subsection of this chapter which corresponds to your own entry point of choice. Table 5-1 provides the corresponding subsection or location title for these different entry points (for example, to start by examining the logs, go directly to "Errors and Error Logs" (page 64)).

Table 5-1 Troubleshooting Entry Points

Entry Point	Subsection or Location
Front panel LEDs	See "Basic and Advanced Troubleshooting Tables" (page 55) and "Troubleshooting Tools" (page 58).
System Event Log and Forward Progress Logs	See "Errors and Error Logs" (page 64).
Offline and Online Diagnostics	See "Troubleshooting Tools" (page 58).
System Event Analyzer (SEA)	See **http://h18023.www1.hp.com/support/svctools/webes** for more information about this tool).

Basic and Advanced Troubleshooting Tables

Use the following troubleshooting tables to determine the symptoms or condition of a suspect server blade. Be aware that the state of the front panel LEDs can be viewed locally; or remotely using the `vfp` command from the MP.

The tables are designed to cover troubleshooting symptoms from AC power-on up to booting the OS, specifically in Steps 1-5. In most cases, Table 5-2: "Basic Front Panel LED Troubleshooting States", identifies the step number where troubleshooting should begin. Alternatively, you can skip Table 5-2, and start with Step 1 in Table 5-3: "Basic Low End Troubleshooting", sequencing through the table steps to locate the symptom/condition most descriptive of your current server blade status. This becomes the first step in your troubleshooting procedure. Where appropriate, an action or actions prescribed in the "Action" column of Table 5-3: "Basic Low End Troubleshooting", is followed by a reference to the corresponding subsection of this chapter for further information.

NOTE: In Table 5-2, the Unit Identifier (UID)/Locator LED has not been included, because it is not used directly for troubleshooting server blades. However, indirectly, it can provide useful system information (for example when it is blue, this indicates the BMC is working). It also indicates the server blade which has an error or fault condition by illuminating steady blue on the front of the server blade in question.

Table 5-2 Basic Front Panel LED Troubleshooting States

System Health	Internal Health	Basic Low End Troubleshooting Table Step Number
Off	Off	Step 1 in Table 5-3 and Step 6 in Table 5-4
Off	Steady amber	Step 2 in Table 5-3
Off	Steady green	Step 3a in Table 5-3
Flashing amber	Steady green	Step 3b in Table 5-3
Steady green	Steady green	Steps 4a, 4b, 4c, and 5 in Table 5-3, and Steps 6 and 7 in Table 5-4
Flashing red	Steady green	Steps 8a and 8b in Table 5-4

Table 5-3 Basic Low End Troubleshooting

Step	Condition	Action
1	Server blade appears “dead” -- no front panel LEDs are on, and no fans are running. BMC and iLO MP are running.	Nothing is logged for this condition. 1. For new server installations, review the installation procedures. 2. Verify that the enclosure’s power cord(s) are connected to both the power supplies and to the AC receptacle(s). 3. Verify that AC power, at the proper AC voltage levels, is available to the receptacle(s). 4. If the power button’s integrated LED on front panel remains off, then reseat the server blade. 5. As a last resort, replace the server blade. The preceding problem is fixed when the front panel LED states are as follows: System health is off and Internal health is steady amber.
2	Server blade does not power on after front panel power button is momentarily pressed (less than four seconds). BMC is running, if locator LED (UID) can be turned on or off through the system console.	A fatal fault has been detected and logged, attempting to power on the server. 1. Examine enclosure power supply LEDs. If they are not steady green, then replace power supply. 2. If the enclosure power supply LED is green, then you may need an additional power supply to supply sufficient power to run the blades in the enclosure. 3. Examine the iLO MP subsystem logs for events related to DC power rails. Preceding problem is fixed when the front panel LEDs are as follows: Health is off and power is steady green.
3a	System health LED is off and Internal health LED is steady green, iLO MP is not running.	A fatal fault has been detected and logged while booting or running System F/W.1. Cannot access the iLO MP at this time (see “Management Subsystem (iLO MP and BMC)” (page 70) for more details). 2. Must reseat or replace the server blade. Preceding problem is fixed when iLO MP logs can be read and both front panel health LED and server power LED states show: Flashing green or steady green, and steady green, respectively.
3b	System health LED is flashing amber and Internal health LED is steady green. The BMC and iLO MP are running.	A warning or critical failure has been detected and logged while booting or running system firmware. Examine the iLO MP logs for events related to switched DC power or cooling fans or configuration. Preceding problem is fixed when both front panel health LED and server power LED states show: Flashing green or steady green, and steady green, respectively.
4a	Cannot see iLO MP prompt on system console -- blade server power is on. BMC and iLO MP are running.	Nothing may be logged for this condition. Since the BMC controls the different states of the system health LED, the system health LED state indicates that the server blade is either booting or running system F/W, or booting or running OS.1. Look for loose, damaged, or disconnected signal cables between the system console device, and serial port connector on the front panel.2. Verify proper ‘Terminal type is set: supported settings are hpterm and VT100+ (default) and VTUTF8.3. Verify that the RS232C configuration matches between the server blade and the local console (see “Server Interface (System Console)” (page 73) for more details). 4. As a last resort, replace the server blade. Preceding problem is fixed when the iLO MP menu appears on the system console.

Table 5-3 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
4b	Cannot see EFI prompt on system console. BMC and iLO MP are running.	Nothing may be logged for this condition. 1. Examine the iLO MP logs for entries related to processors, processor power modules (PPM)s, and shared memory, and core I/O devices (see "Errors and Error Logs" (page 64) for more details). 2. As a last resort, replace the server blade. Preceding problem is fixed when the EFI menu appears on the system console.
4c	Cannot find a boot disk. BMC and iLO MP are running.	Nothing may be logged for this condition. 1. Reinsert the boot disk into the drive bay (see "Supported Configurations" (page 67) for more details). 2. Search for the boot disk's ACPI path using the EFI shell (map –r) command (see "I/O Subsystem (SCSI, LAN, FibreChannel, HDD, and Core I/O)" (page 71) for more details). 3. Examine the iLO MP logs for entries related to processors, processor power modules (PPM)s, and shared memory, and core I/O devices (see "Errors and Error Logs" (page 64) for more details). 4. As a last resort, replace the server blade. Preceding problem is fixed when all boot paths are found.
5	Cannot see OS prompt on system console. BMC and iLO MP are running.	Nothing may be logged for this condition. 1. Examine the iLO MP logs for entries related to processors, processor power modules (PPM)s, and shared memory, and core I/O devices (see "Errors and Error Logs" (page 64) for more details). Preceding problem is fixed when the OS prompt appears on the system console.

Table 5-4 Advanced Low End Troubleshooting

Step	Symptom/Condition	Action
6	Cannot read System Event Log from the system console.	System event logging has stopped and a BMC malfunction is assumed (health is steady green and power is steady green). 1. Examine console messages for any EFI errors or warnings about BMC operation or communications. 2. Test the operation of the BMC by toggling the UID locator LED on the front panel -- the blue LED is turned On/Off by the BMC through the system console. Preceding problem is fixed when the System Event Log resumes logging.
7	OS is non-responsive (hung)...	Front panel LEDs indicate that the server blade's power is turned on, and it is either booting or running the OS (for example, health is steady green and power is steady green). Nothing may be logged for this condition. 1. Use the system console to start a system initialization, or push the Init (ToC) pinhole button on the front of the server blade. 2. Reboot the OS and escalate. 3. Obtain the system hardware status dump for root cause analysis. 4. Examine the iLO MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see "Errors and Error Logs" (page 64) for more details). The preceding problem is fixed when the root cause is determined.

Table 5-4 Advanced Low End Troubleshooting *(continued)*

Step	Symptom/Condition	Action
8a	MCA occurs during server blade operation; the server blade reboots the OS. (Note: Server blade reboots OS if enabled.)	Front panel LEDs indicate that the server blade detected a fatal error that it cannot recover from through OS recovery routines (for example, health is flashing red and power is steady green). 1. Capture the MCA dump with the EFI command,`errdumpmca`. If the server blade can boot the OS, you can capture binary MCA dump files online. 1. Examine the iLO MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (See "Errors and Error Logs" (page 64) for more details). Preceding problem is fixed when the MCA does not repeat, or the source of the MCA has been determined and dealt with.
8b	MCA occurs during server blade operation; server blade reboot of OS is prevented... (Note: The troubleshooting actions for this step are identical to those in Step 8a, except that the server blade in this step must be hard reset to begin the booting process) (Note: You must hard reset the server blade to clear the fatal condition and boot the OS.)	Front panel LEDs indicate that the server blade detected a fatal, front side bus error, caused by MBEs reading cache or DIMM; or by any parity in the I/O path between SBA, LBA, or HBA (for example, health is Off Power is Steady Green). System firmware is running to gather and log all error data for this MCA event. 1. Examine the iLO MP logs for entries related to processors, processor power modules (PPMs), shared memory, and core I/O devices (see "Errors and Error Logs" (page 64) for more details). Preceding problem is fixed when the MCA does not repeat.

Troubleshooting Tools

Front Panel LEDs

The front panel of the server blade contains the unit identifier (UID) LED, System Health LED, Internal Health LED, and the network interface controller (NIC) LEDs. Figure 5-1 shows the front panel LED locations.

Server blades use flashing states (amber or red) on these LEDs to indicate a warning or an error.

There are a total of seven buttons, arranged vertically (when the server blade is installed in the enclosure). In addition to the two integrated button/LEDs, there is one health LED.

The health LED is arranged sequentially in line with the Power button/LED, and as the server blade starts up, there will be more "green" the further the system proceeds in the startup process:

1. The power LED turns green soon as the system starts to power up.
2. The health LED turns green when firmware leaves "exit boot services" and starts the OS boot.

The health LED is driven by the BMC; the Power LED is driven solely by hardware. Both BMC and iLO MP code determine the state of the health LED.

Figure 5-1 Server Blade Front Panel LEDs

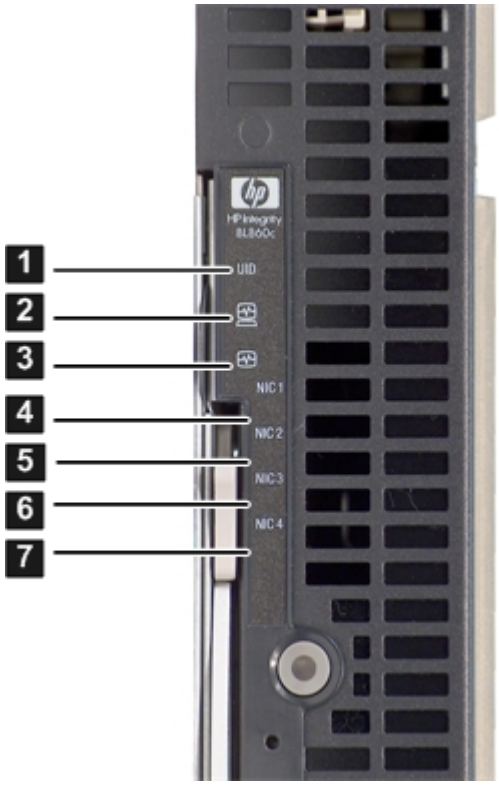


Table 5-5 details the functions of the front panel LEDs.

Table 5-5 Server Blade Front Panel LEDs

Item	LED Description	Status
1	Unit Identification (UID)	Steady Blue = Flagged Off = Not flagged
2	System health	Off = Power is off Steady Green = Power is on Flashing Amber = System is degraded (power is on or off) Flashing Red = System critical (power is on or off)
3	Internal health	Green = On Amber = Standby power (main power off, iLO MP power on) Flashing Red = Critical internal error Off = Unit off (no power coming from enclosure)
4 – 7	NIC 1 NIC 2 NIC 3 NIC 4	Steady Green = Linked to network Flashing Green = Network activity Off = No activity

Locator LED

The locator LED, or unit identifier (UID) allows a specific server blade to be identified in a rack or data center environment. One Locator LED is located in the front panel.

Table 5-6 Locator LED Status

LED Description	Status
Steady Blue	Identification
Off	Not flagged

NOTE: When the UID is lit, this also indicates that the BMC is working properly.

System Health LED

Server blades added the system health LED for the following reasons:

- To carry forward the Attention functionality of legacy Integrity front panel designs.
- To indicate whether the system is up or down.
- To cover the wide range of faults for which software/firmware is not sure that a FRU must be reseated/replaced.

This LED indicates the overall health state of the server blade, including the state of system firmware and the OS. If the LED is amber or red, the server blade needs attention. Examine the event logs (on iLO MP) for details of the problem. Table 5-7 details the functions of the health LED.

Table 5-7 System Health LED States

Definition	Flash Rate	LED Color
Server blade is off.	LED Off	
Server blade has left the firmware boot, and an OS is booting or running with no failures, since SEL logs last examined.	Steady	Green
A warning or critical failure has been detected and logged.	Flash 1 Hz	Amber
A fatal fault has been detected and logged.	Flash 2 Hz	Red

Internal Health LED

The Internal Health LED indicates the internal health of the server blade. If the LED is red, the server blade needs attention. Examine the event logs (on iLO) for details of the problem. Table 5-8 details the states of the Internal Health LEDs.

Table 5-8 Internal Health LED States

LED	Status
Green	Server is on and health is good
Amber	Server degraded, check System Event Log
Flashing red	Critical internal error, check System Event Log
Off	Server is off, and health last known state is good

NIC LEDs

Table 5-9 shows the status of the NIC LEDs on the server blade.

Table 5-9 NIC LEDs

LEDs 4 – 7	Status
Steady green	NIC is connected to the network
Flashing green	Network activity
Off	No activity

Diagnostics

A suite of offline and online support tools are available to enable manufacturing, field support personnel, and you to troubleshoot server blade problems. In general, if the operating system (HP-UX) is already running, it is best not to shut it down. Use the online support tools.

If the OS cannot be booted, use the offline support tools to resolve the problem. The offline support tools are available from the EFI partition. Once you resolve the problem preventing booting, boot HP-UX, and use the online support tools for any further testing.

If it is not possible to reach the EFI from either the main disk or from LAN, you must troubleshoot, using the visual fault indicators, console messages, and system error logs that are available.

Online Diagnostics/Exercisers

Online support tools are provided on the server blade. Centralized error archiving and hardware inventory tools are available as long as the agents/providers that support them are installed on the managed server blade.

On HP-UX systems, the legacy tools within OnlineDiag continue to be supported. The online support tools, on HP-UX 11.23 and greater, include the Support Tool Manager (STM) tools, and the additional Web-Based Enterprise Management (WBEM) features added by SysFaultMgmt.

The STM suite of tools includes verifiers, diagnostics, exercisers, information modules, and expert tools.

Verifiers quickly determine whether or not a specific device is operational by performing tasks similar in nature to the way applications use the device. No license is required to run the verifiers.

Diagnostics are tools designed to identify faulty or failed FRUs.

Exercisers stress devices in order to facilitate the reproduction of intermittent problems.

Information modules create a log of information specific to one device, including:

- The product identifier
- A description of the device
- The hardware path to the device
- The vendor
- Onboard log information (if applicable)
- Miscellaneous information associated with the device
- The firmware revision code, if firmware is present in the device, is also displayed

Expert tools are device-specific troubleshooting utilities for use by sophisticated users. Their functionality varies from tool to tool, but they are intended to be interactive, and rely on users to provide information necessary to perform a particular task. These tools require users to have the appropriate license, if they wish to run them.

Online Support Tool Availability

Online diagnostics are included in the HP-UX OE media, and are installed by default.

Online Support Tools List

The following online support tools are available on HP-UX 11.23 hosted server blades. In some cases, a tool, such as a disk exerciser, is generic to many types of hardware; in other cases, a tool, such as a tape diagnostic, is specific to a particular technology or type of tape drive. Table 5-10 details the online support tools available for the server blade.

Table 5-10 Online Support Tools List

Functional Area	Information	Verify	Exercise	Diagnose	Expert
System	Yes	No	No	No	No
CPU/FPU	No	No	Yes	No	Yes
Memory	Yes	No	Yes	No	No
Graphics	Yes	Yes	Yes	No	No
Core I/O LAN	Yes	Yes	Yes	Yes	No
Disk/Arrays	Yes	Yes	Yes	No	No
Tape	Yes	Yes	Yes	Yes	Yes
M/O	Yes	No	No	No	Yes
Add-On Network I/O Cards	Yes	Yes	Yes	No	Yes
Add-On Mass Storage I/O Cards	Yes	No	No	No	No

Offline Support Tool Availability

Updates to the EFI HP service partition (HPSP) are available through the CD Installer option on the IPF Offline Diagnostics and Utilities CD. At a minimum, an ISO image of the IPF Offline Diagnostics and Utilities CD is available from the HP web.

Offline Support Tools List

Table 5-11 details the offline support tools available for the server blade.

Table 5-11 Offline Support Tools List

Offline Tool	Functional Area
CPUDIAG	Processor Diagnostic
MEMDIAG	Memory Diagnostic
MAPPER	System Mapping Utility
PLUTODIAG	SBA/LBA Chipset
PERFVER	Peripheral Verifier
DFDUTIL	SCSI Disk Firmware Update Utility
DISKUTIL	Disk Test Utility (Non-Destructive)
COPYUTIL	Data Copy Utility
DISKEXPT	Disk Expert Utility
IODIAG	I/O Diagnostics Launch Facility (Executes third party diagnostics and runs BIST, if available)
CIODIAG2	Core I/O Diagnostic
Specific Card I/O Diagnostics	Card-Specific I/O Diagnostics/BIST

General Diagnostic Tools

Table 5-12 details the general diagnostic tools available for most HP Integrity server platforms. The distribution method is through the Web.

Table 5-12 General Diagnostic Tools List

Diagnostic Tool	Description
IPMI Event Decoder	Provides detailed information about the IPMI event (Problem description, cause, action)

Fault Management Overview

The goal of fault management and monitoring is to increase server blade availability, by moving from a reactive fault detection, diagnosis, and repair strategy to a proactive fault detection, diagnosis, and repair strategy. The objectives are:

- To detect problems automatically, as close as possible to the time of occurrence.
- To diagnose problems automatically, at the time of detection.
- To automatically report (in understandable text) a description of the problem, the likely cause(s) of the problem, the recommended action(s) to resolve the problem, and detailed information about the problem.
- To ensure that tools are available to repair or recover from the fault.

HP-UX Fault Management

Proactive fault prediction and notification is provided on HP-UX by SysFaultMgmt WBEM indication providers, as well as by the Event Management Service (EMS). The Event Management Service and WBEM provide frameworks for monitoring and reporting events.

SysFaultMgmt WBEM indication providers and the EMS Hardware Monitors allow users to monitor the operation of a wide variety of hardware products, and alert them immediately if any failure or other unusual event occurs. By using hardware event monitoring, users can virtually eliminate undetected hardware failures that could interrupt server blade operation or cause data loss.

Complete information on installing and using EMS hardware event monitors, as well as a list of supported hardware, can be found in the *EMS Hardware Monitors Users Guide*. An electronic copy of this book is provided on the web site **http://docs.hp.com/hpux/diag**.

WBEM indication providers and EMS Hardware Monitors

Hardware monitors are available to monitor the following components (these monitors are distributed free on the OE media):

- Chassis/Fans/Environment
- CPU monitor
- UPS monitor
- FC Hub monitor
- FC Switch monitor
- Memory monitor
- Core Electronics Components
- Disk drives
- Ha_disk_array

Errors and Error Logs

Event Log Definitions

Often the underlying root cause of an MCA event is captured by server blade or BMC firmware in both the System Event Log (SEL) and Forward Progress Event Logs (FP). These errors are easily matched with MCA events by their timestamps. For example, the loss of a CPU's VRM might cause a CPU fault. Decoding the MCA error logs would only identify the failed CPU as the most likely faulty FRU. Following are some important points to remember about events and event logs:

- Event logs are the equivalent of the old chassis logs for status or error information output.
- Symbolic names are used in the source code; for example, `MC_CACHE_CHECK`.
- The hex code for each event log is 128 bits long with an architected format:
  - Some enumerated fields can be mapped to defined text strings.
  - All can be displayed in hex, keyword, or text mode.
- Events are created by firmware or OS code, and are sent over the PDH bus to the BMC for storage in either or both of the SEL and FP logs (HP-UX shows an I/O path for the BMC).
- The iLO MP displays event logs: SEL events are sent over the IPMB, between the BMC and the MP.
- Event logs are read back over the PDH bus by software (i.e., the IPMI driver or agent) for storage on disk.

Event Log Usage

To consult the event logs:

1. Connect to the system console.
2. Enter **Ctrl–B** to access the **MP Main Menu**.
3. Enter the `sl` command to view event logs: System Event (`E`) and Forward Progress (`F`) logs are useful to determine the context of an error.

NOTE: The SEL `E` shows only event logs with alert level 2 or higher. The SEL defaults to alert level 2 on the BL860c because there are some level 2 events related to rack infrastructure change. the alert level can be changed. The SEL is never overwritten unless first manually cleared. It does get full.

The Forward Progress Log (`F`) shows all event log outputs. The FPL log is circular. It wraps, automatically replacing the oldest events with the newest. It never get full. Oldest logs get overwritten first.

iLO MP Event Logs

The iLO MP provides diagnostic and configuration capabilities. See the *HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide* for details on the iLO MP commands. To access the MP, perform the following:

NOTE: The iLO MP must be accessed from a terminal console which has access to the MP.

1. Log in with the proper username and password.

   NOTE: Default operator login and password: login = **`Oper`**, password = **`Oper`**.

   You are now at the **MP Main Menu**.
2. Enter **`cl`** to display the console history log. This log displays console history from oldest to newest.
3. Enter **Ctrl–B** to return to the **MP Main Menu**.
4. Enter `sl` to display the status logs. The status logs consist of:
   - System Event
   - Forward Progress
   - Current Boot
   - Previous Boot
   - Live Events
   - Clear SEL/FPL Logs
5. Enter **Ctrl–B** to return to the **MP Main Menu**.

System Event Log (SEL) Review

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 system events. The Event Log Navigation menu displays:

```
Enter menu item or [Ctrl-B] to Quit: e
    Log Name            Entries    % Full      Latest Timestamped Entry
-------------------------------------------------------------------------
E - System Event           12         1 %      31 Oct 2003 23:37:45
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
   F       First entry
   L       Last entry
   J       Jump to entry number
   H       View mode configuration - Hex
   K       View mode configuration - Keyword
   T       View mode configuration - Text
   A       Alert Level Filter options
   U       Alert Level Unfiltered
   ?       Display this Help menu
   Q       Quit and return to the Event Log Viewer Menu

   Ctrl-B  Exit command, and return to the MP Main MenuMP:SL (+,-,<CR>,D, F, L, J, H, K, T, A, U, ? for
Help, Q or Ctrl-B to Quit) >a

Alert Level Threshold Filter:
   1  : Major Forward Progress
   2  : Informational
   3  : Warning
   5  : Critical
   7  : Fatal

Enter alert level threshold or [Q] to quit filter setup: 3

   -> Alert threshold level 3 filter will be applied.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 **a**, then a threshold filter number to filter events to desired level.

```
MP:SL (+,-,<CR>,D, F, L, J, H, K, T, A, U, ? for Help, Q or Ctrl-B to Quit) >a
Alert Level Threshold Filter:
   1  : Major Forward Progress
   2  : Informational
   3  : Warning
   5  : Critical
   7  : Fatal
Enter alert level threshold or [Q] to quit filter setup: 3
   -> Alert threshold level 3 filter will be applied.
```

5. 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:
```

6. To decode the blinking state of system LED, review the entire SEL and look at events with alert level 2 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
```

Supported Configurations

This subsection provides examples of how to use the iLO MP to acquire configuration information for troubleshooting purposes. It also provides a system build-up procedure.

For a list of all FRUs in the server blade, with their corresponding part numbers, see Appendix A (page 77).

System Build-Up Troubleshooting Procedure

Use this procedure only when the system powers on and remains powered on but does not enter into or pass POST, or does not boot to EFI menu.

1. Remove the access panel to gain access to internal FRUs. See "Removing the Server Blade Access Panel" (page 38).
2. Remove all of the HDDs from the front of the chassis. See "Removing a SAS Disk Drive" (page 34).
3. Remove the memory DIMMs. See "Removing a DIMM" (page 40).
4. Remove the processors. See "Removing a Processor" (page 42).
5. Replace the server blade in the enclosure. The server blade (and MP) powers on.
6. Enter the `DF` command from the **MP Console Menu**. The following displays:

```
CM> DF

Display FRU Information Menu:
     S - Specific FRU
     A - All available FRUs
     V - Display Mode: Text
```

7. Enter `S`to show the FRU IDs. The following displays:

```
FRU IDs:
--------
0001-Comm Module        0002-Disk Backplane
0003-Mezzanine Board    0000-Motherboard
```

If you do not see all of the above FRU IDs, then concentrate on the missing FRU ID(s). The following alert (IPMI) event displays for this action, as read from the SEL:

```
Log Entry 4: Dec 2005 00:00:09
Alert Level 7: Fatal
Keyword: Type-02 257100 2453760
Missing FRU device - DIMM0A
Logged by: Baseboard Management Controller,
Sensor: Entity Presence
0x2000000009020050 FF01807115250300
```

If you do not get the above Alert Level 7 (IPMI) event, but get another high level alert, replace the server blade.

8. Add at least one rank of memory DIMMs.
9. Enter the `DF`command. The following displays:

   The following displays:

```
Display FRU Information Menu:
     S - Specific FRU
     A - All available FRUs
     V - Display Mode: Text
```

10. Enter `S` to show the FRU IDs. The following displays (one rank of DIMMs installed):

```
FRU IDs:
--------
0001-Comm Module    0002-Disk Backplane   0003- Mezzanine Board
0128-DIMM0A         0129-DIMM0B           0000-Motherboard
```

If you do not see all of the above FRU IDs then concentrate on the missing FRU ID(s). The following alert (IPMI) event displays for this action, as read from the SEL:

```
Log Entry 3: Dec 2005 21:50:43
Alert Level 7: Fatal
Keyword: Type-02 257100 2453760
Missing FRU device - Processor 0
Logged by: Baseboard Management Controller,
Sensor: Entity Presence
0x2041CB3DB3020040 FF2080711525030
```

If you do show the Alert level 7 “Missing FRU device - Processor 0”, continue to the next step.

11. Insert a processor into CPU slot 0. When you add the processor and turn on system power, the cooling fans should turn on and stay on, and the`DF`and`S`command output should look something like this:

```
FRU IDs:
--------
0032-Processor 0      0036-Processor 0 RAM     0001-Comm Module
0002-Disk Backplane   0003- Mezzanine Board    0128-DIMM0A
0129-DIMM0B           0000-Motherboard
```

If the installed FRUs are all functional, the system should initiate POST on all processors. Observe the system console output through “Live Events” to ensure that POST initiates and completes without error.

If POST does not start after a few seconds, suspect some sort of system board or processor problem. Typical problems show up in the SEL or FWP. If the IPMI event logs do not point to a root cause, escalate to bring in expert assistance.

CPU/Memory/SBA

All of the CPU, Memory controller, DIMMs, and SBA (I/O rope controller) functions reside on the server blade FRU. This section discusses the roles of physical CPUs and physical memory ranks.

Troubleshooting Server Blade CPU

Each server blade supports 1 or 2 IPF processor modules. This results in two physical CPUs, when two IPF processor modules are installed in server blades.

Each physical IPF CPU core contains logic to support one physical thread. (Note that the operating system kernel attaches one or more software processes to each available thread, so in multiple processor server blades, having more threads means all software processes are launched and executed more rapidly.)

IPF Processor Load Order

For a minimally loaded server blade, one IPF processor module must be installed in CPU slot 0. Slot 0 is the slot closer to the server blade chassis. Install a processor of the same version into CPU slot 1 if purchased.

Processor Module Behaviors

All physical CPUs become functional after system power is applied. Each CPU is in a race to fetch their instructions from their CPU’s instruction and data caches to complete early self test and rendezvous.

It is the processor's cache controller logic that issues cache line fetches from PDH/physical shared memory, when a requested cache line is not within its instruction or data cache. Cache line fetches are transferred over the McKinley bus, between processors and PDH/physical shared memory.

Local machine check abort (MCA) events cause one IPF processor module to fail, while the other IPF processor module continues operating. Double-bit data cache errors in any physical CPU core causes a Global MCA event, that causes all IPF processor modules to fail and reboot the operating system.

Customer Messaging Policy

No diagnostic messages are reported for single-bit errors, that are corrected in both instruction and data caches, during corrected machine check (CMC) events to any physical processor core. Diagnostic messages are reported for CMC events, when thresholds are exceeded for single-bit errors; fatal processor errors cause global/local MCA events.

Troubleshooting Blade Memory

The memory controller logic in the Zx1 chip supports two physical ranks, that hold 2 memory DIMMs each.

Memory DIMMs installed in groups of four are known as a quad, and must be the same size and configuration.

Memory DIMM Load Order

For a minimally loaded server, two equal-size memory DIMMs must be installed into rank 0's slots 0A and 0B. The next two DIMMs are loaded into rank 1's slots 1A and 1B.

Memory Subsystem Behaviors

All server blades with Zx1 chips provide error detection and correction of all memory DIMM single-bit errors, and error detection of most multi-bit errors within a 128 byte cache line.

The Zx1 chip provides memory DIMM error correction for up to 4 bytes of a 128 byte cache line, during cache line misses initiated by processor cache controllers, and by Direct Memory Access (DMA) operations, initiated by I/O devices. This feature is called chip sparing, as 1 of 72 total DRAMs in any memory quad can fail without any loss of server blade performance.

Customer Messaging Policy

PDT logs for all double bit errors are permanent; single bit errors are initially logged as transient errors. If the server logs 2 single bit errors within 24 hours, then it upgrades them to permanent status in the PDT.

Troubleshooting Blade SBA

Each server blade's system bus adapter (SBA) supports core I/O, SCSI, LAN, and FibreChannel functions. The System Bus Adapter (SBA) logic within the Zx1 chip of a server blade uses 6 of 8 ropes to support 4 Lower Bus Adapter (LBA) chips. Each LBA chip interfaces with the SBA in the Zx1 chip, through one or multiple rope connections, as follows:

- One LBA chip uses a single rope connection (used by core I/O) to support a single 32-bit PCI bus running @ 33 MHz;
- One LBA chip use a single-rope connection (used by SCSI controller) to support one 64-bit PCI-X bus running @ 66 MHz;
- Two LBA chips use a dual rope connection (used by LAN and FibreChannel controllers) to support individual 64-bit PCI-X buses running @ 133 MHz;

Enclosure Information

This installation document only covers the BL860c server blade itself, and does not include any specific server blade enclosure information. For server blade enclosure information, go to:

http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00172260/c00172260.pdf

Cooling Subsystem

Each server blade contains 4 dual-rotor cooling fans. Three of the four cooling fans cool both processors and the communications module. One of the four cooling fans cools the PDH module, the Zx1 chip, and the memory DIMMs.

Communications Module (LBAs, Ropes, and PDH/PCI-X Buses)

This subsection provides information on troubleshooting issues with the internal PCI-X buses.

I/O Subsystem Behaviors

The main role of the I/O subsystem is to transfer blocks of data and instruction words between physical shared memory and virtual memory (system disks/disk array). The system boot is the first time blocks of data and instructions words are transferred into physical shared memory from a local disk/DVD, or from a remote disk on another server through multiple LAN transfers. This process is referred to as Direct Memory Access (DMA), and is initiated by I/O devices located in core I/O or on I/O device controllers, and does not involve any processors.

A secondary role of the I/O subsystem is to transfer four bytes of data between the internal registers within each CPU core, and the internal control/store registers within the Zx1/PDH /Local Bus Adapters (LBA) and device controller chips. This process is referred to as programmed I/O, and is initiated by any CPU executing external LOAD/STORE instructions. (Note that both system firmware and the HP-UX kernel use this method to initiate DMA transfers.)

Customer Messaging Policy

- Always point the customer to the SEL for any action from low level I/O subsystem faults. IPMI events in SEL/FPL provide the logical Acpi path of the suspect I/O subsystem FRU. Use Table 5-13 to determine the physical device controller.
- Some diagnostic messages are reported for high level I/O subsystem errors; all fatal I/O subsystem errors cause global MCAs. (Note that HP-UX provides its own path with the physical rope number of the suspect I/O subsystem FRU. Use Table 5-13 to determine the physical device controller.)

Table 5-13 Rope-to-ACPI Paths

PCI Bus	Physical Rope #	Logical ACPI Path
Slow core iLO MP @ 33MHz	0	Acpi(HWP0002,PNP0A00,0)/Pci(1 | 0) Acpi(HWP0002,PNP0A03,0)/Pci(1 | 1) Acpi(HWP0002,PNP0A03,0)/Pci(1 | 2)
Fast core SCSI @ 66 MHz	1	Acpi(HWP0002,PNP0A00,400)/Pci(1 | 0)
Dual FibreChannel @ 133 MHz	2, 3	Acpi(HWP0002,PNP0A03,400)/Pci(2 | 0) Acpi(HWP0002,PNP0A03,400)/Pci(2 | 1)
Pair of dual LAN @ 133 MHz	4, 5	Acpi(HWP0002,PNP0A03,500)/Pci(0 | 0)

Management Subsystem (iLO MP and BMC)

Both the iLO MP and the BMC are integrated components (not FRUs) on the server blade. There are no external or internal LEDs to view or monitor their operational states.

The server blade front panel LEDs are turned on or off by the BMC, then the system console; subsequent access to iLO MP commands and menus is controlled by the MP.

I/O Subsystem (SCSI, LAN, FibreChannel, HDD, and Core I/O)

SAS Disk Drive LEDs

The two SAS disk drives on the BL860c server blade have identical LEDs that show the status of the hard disk drives. Figure 5-2 shows the locations of the hard disk drive LEDs.

Figure 5-2 SAS Disk Drive LEDs

1 Activity LED 2 Status LED

Table 5-14 details the functions of the hard disk drive LEDs.

Table 5-14 SAS Disk Drive LEDs

Activity LED	Status LED	SAS Disk Drive State
Off	Off	Offline or not configured
Solid green	Off	Normal operation; no activity
Flickering green	Off	Normal operation; disk read or write activity
Off	Flashing amber at 1 Hz	Offline, no activity; predictive failure
Solid green	Flashing amber at 1 Hz	Online, no activity; predictive failure
Flickering green	Flashing amber at 1 Hz	Disk activity; predictive failure
Off	Solid amber	Offline; no activity; critical fault
Off	Solid blue	Offline; drive selected by locator function
Flashing green at 1 Hz	Off	Drive rebuilding

LAN LEDs

There are four LAN LEDs on the front panel of the server blade. They are NIC 1 through NIC 4. Table 5-15 details the functions of the LAN LEDs.

Table 5-15 1GB LAN States

LED Color	State
Off	No link
Steady Green	Link found
Flashing Green	LAN activity on network link

Boot Process LEDs

Table 5-16 shows the normal boot process, as reflected in changes to front panel LED states:

Table 5-16 Normal Boot Process LED States

Step	Health	Power	Normal Power-Up Through HP-UX Boot
1	Off	Off	No AC power to the server blade.
2	Off	Amber	Server blade is shut down (server is off), AC power and standby power is active, last health status was healthy.
3	Off	Steady Green	Server blade power rails are on when Power switch is toggled. Hardware drives power LED.
4	Steady green	Steady green	Server blade has powered up and is either at EFI, booting, or at OS.

The following list itemizes the steps that characterize basic platform boot flow:

1. Server blade power switch requests power from the Management Module (the microcontroller that manages the enclosure power and cooling). Once the power is request is granted, server blade power turns on. After the power sequence has completed successfully, BMC releases system reset.
2. Initial CPU firmware code fetch is Platform Abstraction Layer (PAL) code from FEPROM in processor-dependent hardware (PDH), retrieved 4 bytes at a time by the data multiplexer/demultiplexer controller (DMDC) in Zx1. No shared memory or I/O devices are available at this time. They are not initially configured.
3. Firmware code stack is initially in battery-backed RAM (BBRAM) in PDH, retrieved 4 byes at a time, through the PDH and DMD buses.
4. PAL code configures all CPUs.
5. System Abstraction layer (SAL) code configures all platform central electronic complex (CEC) chips, including shared memory and all responding I/O devices.
6. Firmware code and stack are relocated to shared memory, after all x4 DIMM ranks in shared memory are configured and tested.
7. EFI shell is launched from shared memory, and cache lines are retrieved 128 bytes at a time by the memory controller in Zx1.
8. HP-UX loader is launched using the EFI device driver.
9. HP-UX boots and starts its own device drivers.
10. HP-UX may use runtime PAL and SAL calls, and APCI features (these abstraction layers allow platform independence).

Firmware

The server blade has two sets of firmware installed:

- Server blade and BMC firmware
- iLO MP firmware

When upgrading server blade and BMC firmware, you must upgrade both components on the server blade from the same release. Details about a specific release are available in the associated Release Notes.

Firmware updates are available from **http://www.hp.com** under "Support and Drivers".

Identifying and Troubleshooting Firmware Problems

Erratic server blade operation, or the fact that the server blade may not boot successfully to the EFI Boot Manager or to the EFI Shell, are symptoms of possible firmware problems.

NOTE: Firmware problems are relatively rare. Look for other problem causes first.

Probable firmware failure areas are:

- Unsupported firmware installation
- Corrupt firmware installation

To troubleshoot firmware problems:

1. Verify that all server blade and BMC firmware components are from the same release (use the MP`sr` command).
2. Reinstall server blade and BMC firmware.

Updates

Your server blade has an EFI utility for updating the server blade and BMC firmware, and the iLO MP firmware. This utility's name is `fweupdate.efi`

To update your firmware, follow these steps:

1. Start up the server blade and get to the EFI command prompt.
2. Execute the following EFI command at the EFI shell prompt, to determine the current firmware version: `Shell>` **`info fw`**
3. Look for the latest firmware updates at **http://www.hp.com/bizsupport**. If a new version of the firmware is available, then download it and save it to CD, or copy it over the network to the server blade you are going to update.
4. On the server blade you are updating, execute the `fweupdate.efi`command from the EFI command prompt by entering: **`fweupdate.BL860c.sxxxx.byyyy.mzzzz.efi`**

   where:

   `s`means system firmware; **`xxxx`**is the system firmware version number

   `b`means BMC firmware; **`yyyy`**is the BMC firmware version number

   `m`means iLO MP firmware; **`zzzz`**is the iLO MP firmware version number

   This command updates the system firmware, BMC firmware, and iLO MP firmware.

Server Interface (System Console)

All system console connections (local RS-232 and iLO MP LAN) are made through the I/O port connector on the front of the server blade, through the local I/O cable.

HP-UX uses the RS-232 serial text connection to a dumb terminal, or to terminal emulator software running on a PC, to control server blade operations locally. All other connections are unsupported.

HP-UX alternatively uses the MP's 10/100 BT LAN connection over a private network, to control one or more server blade operations -- locally through telnet or Secure Shell (SSH), or remotely over a public network through a web GUI.

Troubleshooting Tips

RS-232 connection: If a dumb terminal/PC running terminal emulation software is attached to the iLO MP "local" port and does not respond to a **Ctrl–B** key sequence (and the terminal is running 9600 baud, 8 data bits, is ONLINE, etc.) then it is possible that the iLO MP is not operational/functional.

Environment

Ambient intake air temperature is often different from ambient room temperature; measure the operating temperature and humidity directly in front of the cabinet cooling air intakes, rather than measure only ambient room conditions.

Within the server blade enclosure, temperature sensors report chassis temperature to the BMC. The BMC controls fan speed, based on this information.

Temperature sensors are found on:

- I/O baseboard, where the processors provide an integrated temperature sensor
- Status panel, where a thermal sensor detects the ambient room temperature. This sensor's reading is the main parameter used to regulate fan speed, under normal conditions.

Table 5-17 provides environmental specifications for server blades:

Table 5-17 Blade Server Environmental Specifications

Parameter	Operating Range	Recommended Operating Range	Maximum Rate of Change	Non-Operating Range
Temperature	5-35 degrees C (up to 5000 feet)	20-25 degrees C (up to 5000 feet)	10 degrees C/hr with tape; 20 degrees C/hr without tape	-40 degrees to +60 degrees C
Relative Humidity	15-80% at 35 degrees C noncondensing	40-60% at 35 degrees C noncondensing	30% per hour noncondensing	90% at 65 degrees C noncondensing

Reporting Your Problems to HP

HP customer care will help you solve server blade problems and, if necessary, initiate appropriate service procedures. Support is available on the web and by phone.

For information on contacting the HP IT Resource Center (ITRC) near you, go to: **http://www.itrc.hp.com**.

Online Support

To contact HP Customer Support online, see the Worldwide Limited Warranty and Technical SupportGuide or visit us at **http://www.hp.com/bizsupport**. On our web page, enter the server blade model number(for example, "BL860c") and search the field.

The following information is available on this web site:

- Software and firmware updates
- The latest drivers and utilities
- Additional documentation

Phone Support

To contact HP customer support by phone, go to the HP IT Resource Center (ITRC) near you, at: **http://www.itrc.hp.com**. Local phone numbers are listed in your native language for help.

Information to Collect Before you Contact Support

NOTE: It is highly recommended that you keep detailed records of any changes to your server blade(s), and of how server blade behavior has changed over time, or as a result of changes made to your server blade(s).

Before you contact HP support, you should:

1. Use this chapter (Chapter 5: "Troubleshooting",) to solve the problem.
   - Note failure symptoms and error indications (LEDs and messages).
   - Capture and permanently log the current SEL and FPL contents.
   - Try to determine precisely what did or did not happen.
2. Collect the following information:
   - The model number of your server blade (for example, "BL860c").
   - The product number of your server blade. This can be found on the identification label, which is found at the front of the unit. (Typically, of the form "AD000A")
   - The serial number of your server blade. This can be found on the identification label.
3. Be familiar with your server blade configuration.
   - Are you using the LAN, RS232, or web interface to monitor the server blade(s)?
   - How many processors and DIMMs have been installed?
   - What versions of processor and memory are used and where are they installed?
   - What accessories are installed?
4. Determine the following
   - Which firmware versions are in use?
   - When did the problem start?
   - Have recent changes been made to the server blade(s)?
   - Which version of HP-UX is in use?

A Parts Information

This chapter provides parts information for the HP Integrity BL860c server blade components (field replaceable units [FRUs]).

The following sections are included in this appendix:

- "Server Blade Components List"

Server Blade Components List

Table A-1 details the part numbers of the components (or FRUs) in the server blade.

NOTE: Part numbers are found by using the part nomenclature from this list to select the correct part from the HP Partsurfer. If a part that is not listed in the FRU list needs to be replaced, the Base Unit Repair Kit is required. Remove processors, DIMMs and HDDs, and transfer these to the new base unit.

Table A-1 FRU List

Description	Manufacturing Part Number	Part Number Replacement	Part Number Exchange
Memory			
512 MB DDR2 memory	AB563–6001A	AD342A	AB563–69001
1 GB DDR2 memory	AB564–6001A	AD343A	AB564–69001
2 GB DDR2 memory	AB565–6001A	AD344A	AB565–69001
4 GB DDR2 memory	AB566–6001A	AD345A	AB566–69001
Processors			
Itanium 2 CPU 1.6 GHz 3 MB	AD272–2107B		AD272–69001
Itanium 2 CPU 1.4 GHz 12 MB	AD271–2101B		AD271–69001
Itanium 2 CPU 1.6 GHz 18 MB	AD270–2101B		AD270–69001
Internal Disks			
36 GB, 10k RPM SAS hot-plug disk	375860–B21	37696–001	
36 GB, 15k RPM SAS hot-plug disk	431934–B21	432322–001	
72 GB, 10k RPM SAS hot-plug disk	375862–B21	376597–001	
72 GB, 15k RPM SAS hot-plug disk	431936–B21	432321–001	
146 GB, 10k RPM SAS hot-plug disk	431959–B21	432320–001	
Boards and Cards			
BL860c system board	AD217–60001	AD217–67001	AD217–69001
2 disk drive SAS backplane	AD217–60003	AD217–67003	
Front panel display assembly	AD217–2002B	AD217–67002	
Dual port 4 Gbps FC mezzanine card	411419–B21	405920–001N	405920–001
Direct adaptor mezzanine card for connecting to the direct attach storage blade	431644–B21	436010–001N	463010–001
Dual port 4x Infiniband mezzanine card	410533–B21	410500–001N	410500–001
HPC 4x DDR IB mezzanine HCA	409779–001	409377–001	

Table A-1 FRU List *(continued)*

Description	Manufacturing Part Number	Part Number Replacement	Part Number Exchange
Cables			
Local I/O cable (SUV)	409496–001	416003–001	
CPU MVR cable	AD217–2004A	AD217–2004A	
Miscellaneous			
Air baffle, CPU	AD217–3404B	AD217–3404B	
Air baffle, ZX2 controller	AD217–3410A	AD217–3410A	
Chassis plug, rear	AD217–3411B	AD217–3411B	
Top cover, chassis	AD217–2105B	AD217–2105B	
TPM module	314581–003	406059–001N	
System battery. 3 V .22 A HR LI manganese dioxide part number	1420-0356		
SPS-DRV DVD+R/RW 2x/2x MBII PA		375557–001	375557–0012

B Operating System Boot and Shutdown

This appendix covers procedures for booting and shutting down operating systems that run on the server blade. The operating systems that run on the server blade are HP-UX 11i Version 2 (B.11.23), HP OpenVMS v 8.3, Microsoft Windows Enterprise Server 2003, Red Hat Enterprise Linux 4 update 4, and Novell SuSE Linux Enterprise Server 10.

The following sections are included in this appendix:

Operating Systems Supported on the Server Blade

HP supports the following operating systems on the server blade.

- **HP-UX 11i Version 2 (B.11.23)**
- **HP OpenVMS v8.3**
- **Microsoft Windows Server 2003**
- **Red Hat Enterprise Linux 4**
- **SuSE Linux Enterprise Server 10**

Configure System Boot Options

This section discusses the configurable system boot options on the HP Integrity BL860c server blade, including the boot options list and the autoboot setting for the server.

- **Boot Options List** The boot options list is a list of loadable items available for you to choose from the EFI Boot Manager menu. Ordinarily the boot options list includes the EFI Shell and one or more operating system loaders.

  The following example includes boot options for HP-UX, Linux, and the EFI Shell. The final item in the EFI Boot Manager menu, the Boot Option Maintenance Menu, is not a boot option. The Boot Option Maintenance Menu allows system configuration through a maintenance menu.

```
EFI Boot Manager ver 1.10 [14.61]  Please select a boot option

    EFI Shell [Built-in]
    HP-UX Primary Boot: 4/0/1/1/0.2.0
    Boot Option Maintenance Menu

    Use ^ and v to change option(s). Use Enter to select an option
```

NOTE: In some versions of EFI, the **Boot Option Maintenance Menu** menu is listed as the Boot Configuration Menu.

To manage the boot options list for each system, use the EFI Shell, the EFI Boot Option Maintenance Menu, or operating system utilities.

At the EFI Shell, use the `bcfg` command to support list and manage the boot options list for HP-UX.

The EFI Boot Option Maintenance Menu provides the **Add a Boot Option**, **Delete Boot Option(s)**, and **Change Boot Order** menu items (use this method if you must add an EFI Shell entry to the boot options list).

Operating system utilities for managing the boot options list include the HP-UX `setboot` command.

See the following section for details:

— Setting HP-UX boot options (see "Adding HP-UX to the Boot Options List" (page 80))

- **Autoboot Setting** The `autoboot` setting determines, at startup, whether a system automatically loads the first item in the boot options list, or remains at the EFI Boot Manager menu. With autoboot enabled, EFI loads the first item in the boot options list after a designated timeout period.

  Configure the autoboot setting for an HP Integrity system using either the `autoboot` EFI Shell command, or the Set Auto Boot Time Out menu item from the EFI Boot Configuration menu.

  Examples of autoboot commands for HP-UX:

  — disable autoboot from the EFI Shell by issuing **`autoboot off`**
  — Enable autoboot with the default timeout value by issuing **`autoboot on`**
  — Enable autoboot with a timeout of 60 seconds by issuing the **`autoboot time 60`**
  — Set autoboot from HP-UX using **`setboot`**
  — Enable autoboot from HP-UX using **`setboot -b on`**
  — Disable autoboot using **`setboot -b off`**

Examples of autoboot commands for Linux:

- Disable autoboot from the EFI Shell by issuing **`autoboot off`**
- Enable autoboot with the default timeout value by issuing **`autoboot on`**
- Enable autoboot with a timeout of 60 seconds by issuing the **`autoboot 60`**
- Disable the automatic retries during autoboot by issuing **`autoboot -nr 0`**

For more information on the `autoboot` command, enter `help autoboot`.

Booting and Shutting Down HP-UX

This section covers booting and shutting down HP-UX on the HP Integrity BL860c server blade.

- To add an HP-UX entry to the boot options list, see "Adding HP-UX to the Boot Options List" (page 80).
- To boot HP-UX, use the following procedures:
  — "HP-UX Standard Boot" (page 81) describes the standard ways to boot HP-UX. Typically this results in booting HP-UX in multi-user mode.
  — "Booting HP-UX in Single-User Mode"Booting and Shutting Down Microsoft Windows" (page)" (page 83) describes how to boot HP-UX in single-user mode.
  — "Booting HP-UX in LVM-Maintenance Mode" (page 84) describes how to boot HP-UX in LVM-maintenance mode.
- To shut down the HP-UX operating system, see "Shutting Down HP-UX" (page 84).

Adding HP-UX to the Boot Options List

This section describes how to add an HP-UX entry to the system boot options list.

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Options Maintenance Menu).

NOTE: On HP Integrity servers, the operating system installer automatically adds an entry to the boot options list.

Adding the HP-UX Boot Option

This procedure adds an HP-UX item to the boot options list from the EFI Shell.

To add an HP-UX boot option when logged in to HP-UX, use the `setboot` command. For details, see the *setboot*(1M) manpage.

1. Access the EFI Shell environment.

   Log in to iLO for Integrity and enter `CO` to access the system console.

When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

From the EFI Boot Manager menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the HP-UX loader is `\EFI\HPUX\HPUX.EFI` and it should be on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Display all items in the boot options list for the system.
   - `bcfg boot rm #` — Remove the item number specified by `#` from the boot options list.
   - `bcfg boot mv #a #b` — Move the item number specified by *#a* to the position specified by *#b* in the boot options list.
   - `bcfg boot add #` *file.efi* `"`*Description*`"` — Add a new boot option to the position in the boot options list specified by `#`. The new boot option references *file.efi* and is listed with the title specified by *Description*.

     For example, `bcfg boot add 1 \EFI\HPUX\HPUX.EFI "HP-UX 11i"`adds an HP-UX 11i item as the first entry in the boot options list.

   See the `help bcfg` command for details.

4. Exit the console and iLO for Integrity interfaces if you are finished using them.

   Press **Ctrl–B** to exit the system console and return to the iLO MP Main Menu. To exit the MP, type `X` at the Main Menu.

HP-UX Standard Boot

Use either of the following procedures to boot HP-UX:

- "Booting HP-UX (EFI Boot Manager)"; or
- "Booting HP-UX (EFI Shell)"

Booting HP-UX (EFI Boot Manager)

From the EFI Boot Manager menu, choose an item from the boot options list to boot HP-UX.

1. Access the EFI Boot Manager menu for the system on which you want to boot HP-UX.

   Log in to iLO for Integrity and enter `CO` to choose the system console.

   Confirm that you are at the EFI Boot Manager menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

2. At the EFI Boot Manager menu, choose an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments you use when booting the device.

3. Press **Enter** to initiate booting using the chosen boot option.
4. Exit the console and iLO MP interfaces when finished using them.

   Press **Ctrl–B** to exit the system console and return to the **MP Main Menu**. To exit the **MP Main Menu**, type `X` at the **MP Main Menu**.

Booting HP-UX (EFI Shell)

From the EFI Shell environment, boot HP-UX on a device by first accessing the EFI System Partition (for example `fs0:`) for the root device, then entering **`HPUX`** to initiate the loader.

1. Access the EFI Shell environment for the system on which you want to boot HP-UX.

   Log in to the iLO for Integrity and enter `CO` to choose the system console.

   Confirm that you are at the EFI Boot Manager menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the EFI Boot Manager menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

   The EFI shell displays all the files systems and block devices available.

2. At the EFI Shell environment, issue the **`map`** command to list all currently mapped bootable devices.

   The bootable file systems of interest typically are listed as `fs0:`, `fs1:`, and so on.

3. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

NOTE: The file system number might change each time it is mapped (for example, when the system boots, or when you issue the **`map -r`** command).

4. When accessing the EFI System Partition for the desired boot device, issue the **`HPUX`** command to initiate the `HPUX.EFI` loader on the device you are accessing.

   The full path for the loader is `\EFI\HPUX\HPUX.EFI`. When initiated, the loader references the `\EFI\HPUX\AUTO` file and proceeds to boot HP-UX using the default boot behavior specified in the `AUTO` file.

   You have 10 seconds to interrupt the automatic booting of the default boot behavior. Pressing any key during this 10 second period stops the HP-UX boot process and enables you to interact with the `HPUX.EFI` loader. To exit the loader (the `HPUX>` prompt) enter `exit` (this returns you to the EFI Shell).

   To boot the HP-UX operating system, do not type anything during the 10 second period given for stopping at the `HPUX.EFI` loader.

```
Shell> map
Device mapping table
  fs0  : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk0 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk1 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part1,Sig72550000)
  blk2 : Acpi(000222F0,269)/Pci(0|0)/Scsi(Pun8,Lun0)/HD(Part2,Sig72550000)
  blk3 : Acpi(000222F0,2A8)/Pci(0|0)/Scsi(Pun8,Lun0)
  blk4 : Acpi(000222F0,2A8)/Pci(0|1)/Scsi(Pun2,Lun0)

Shell> fs0:

fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
```

```
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

5. Exit the console and iLO for Integrity interfaces when finished using them.

   Press **Ctrl–B** to exit the system console and return to the **MP Main Menu**. To exit the **MP Main Menu**, type `X` at the **MP Main Menu**.

Booting HP-UX in Single-User Mode"Booting and Shutting Down Microsoft Windows" (page 88)

Use the following procedure to boot HP-UX in single-user mode.

Booting HP-UX in Single-User Mode (EFI Shell)

From the EFI Shell environment, boot in single-user mode by stopping the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`) and entering the `boot -is vmunix`command.

1. Access the EFI Shell environment for the system on which you want to boot HP-UX in single-user mode.

   Log in to the iLO for Integrity (MP) and enter `CO` to choose the system console.

   Confirm that you are at the EFI Boot Manager menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the `EFI Boot Manager`heading.

   From the EFI Boot Manager menu, choose the **EFI Shell**menu option to access the EFI Shell environment.

2. Access the EFI System Partition by entering `fs`*X*.

   where *X*is the file system number for the device used to boot HP-UX.

3. When accessing the EFI System Partition for the desired boot device, issue the **`HPUX`**command to initiate the `\EFI\HPUX\HPUX.EFI`loader on the device you are accessing.
4. Boot to the HP-UX Boot Loader prompt (`HPUX>`) by pressing any key within the 10 seconds given for interrupting the HP-UX boot process. Use the `HPUX.EFI`loader to boot HP-UX in single-user mode in the next step.

   After you press a key, the `HPUX.EFI`interface (the HP-UX Boot Loader prompt, `HPUX>`) launches. For help using the `HPUX.EFI`loader, enter the `help` command. To return to the EFI Shell, enter **`exit`**.

```
fs0:\> hpux

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HP-UX Boot Loader for IA64  Revision 1.723

Press Any Key to interrupt Autoboot
\efi\hpux\AUTO ==> boot vmunix
Seconds left till autoboot -   9
```

[User Types A Key to Stop the HP-UX Boot Process and Access the HPUX.EFI Loader]

```
   Type 'help' for help

HPUX>
```

5. At the `HPUX.EFI`interface (the HP-UX Boot Loader prompt, `HPUX>`) enter the `boot -is vmunix` command to boot HP-UX (the `/stand/vmunix`kernel) in single-user (`-is`) mode.

```
HPUX> boot -is vmunix
> System Memory = 4063 MB
loading section 0
.................................................. (complete)
loading section 1
........ (complete)
loading symbol table
```

```
loading System Directory(boot.sys) to MFS
....
loading MFSFILES Directory(bootfs) to MFS
......
Launching /stand/vmunix
SIZE: Text:25953K + Data:3715K + BSS:3637K = Total:33306K

Console is on a Serial Device
Booting kernel...
```

6. Exit the console and iLO for Integrity interfaces when finished using them.

   Press **Ctrl–B** to exit the system console and return to the **MP Main Menu**. To exit the MP, type `X` at the **MP Main Menu**.

Booting HP-UX in LVM-Maintenance Mode

Use the following procedure to boot HP-UX in LVM-maintenance mode.

Booting HP-UX in LVM-Maintenance Mode (EFI Shell)

From the EFI Shell environment, boot in LVM-maintenance mode by stopping the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`) and entering the `boot -lm vmunix` command.

1. Access the EFI Shell environment for the system on which you want to boot HP-UX in LVM-maintenance mode.

   Log in to the iLO for Integrity and enter `CO` to choose the system console.

   Confirm that you are at the EFI Boot Manager menu (the main EFI menu) when accessing the console. If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the EFI Boot Manager menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.
3. When accessing the EFI System Partition for the desired boot device, issue the **`HPUX`**command to initiate the `\EFI\HPUX\HPUX.EFI` loader on the device you are accessing.
4. Type any key within the 10 seconds given for interrupting the HP-UX boot process. This stops the boot process at the `HPUX.EFI` interface (the HP-UX Boot Loader prompt, `HPUX>`).
5. At the `HPUX.EFI` interface, enter the **`boot -lm vmunix`**command to boot HP-UX (the `/stand/vmunix` kernel) in LVM-maintenance (`-lm`) mode.
6. Exit the console and iLO for Integrity interfaces when finished using them.

   Press **Ctrl–B** to exit the system console and return to the **MP Main Menu**. To exit the MP, type `X` at the **MP Main Menu**.

Shutting Down HP-UX

To shut down HP-UX running on a system, use the `shutdown` command. You have the following options when shutting down HP-UX:

- Shut down and reboot an HP-UX system using **`shutdown -r`**
- Shut down and halt (power off) an HP-UX system using **`shutdown -h`**

For details, see the *shutdown*(1M) manpage and the following procedure:

Shutting Down HP-UX (`/sbin/shutdown` Command)

From the HP-UX command line, issue the **`shutdown`**command to shut down the HP-UX operating system.

1. Log in to HP-UX running on the system that you want to shut down.

   Log in to iLO for Integrity (MP) for the server and use the Console menu to access the system console. Accessing the console through iLO for Integrity (MP) enables you to maintain console access to the system after HP-UX has shut down.

2. Issue the **shutdown**command with the appropriate command-line options.

   The command-line options you specify dictate the way in which HP-UX shuts down, and whether the system is rebooted.

   Use the following list to choose an HP-UX shutdown option for your system:

   - Shut down HP-UX and halt (power off) the system using **shutdown -h**

     Reboot a halted system by powering on the system using the PC command at the iLO MP Command menu.

   - Shut down HP-UX and reboot the system by issuing **shutdown -r**

Booting and Shutting Down HP OpenVMS

NOTE: Before booting or installing the OpenVMS operating system on the rx2660 server, see the following Web site for the Server Errata Sheet for OpenVMS on the HP Integrity rx2660 Server: **http://www.docs.hp.com/en/hw.html**.

Once you have reached the Enterprise Servers, Workstations and Systems Hardware site, click the HP Integrity rx2660 Server link and refer to documentation specific to OpenVMS.

This section has procedures for booting and shutting down HP OpenVMS on the HP Integrity rx2660 server, and procedures for adding OpenVMS to the boot options list.

- To add an OpenVMS entry to the boot options list, refer to "Adding OpenVMS to the Boot Options List" (page 85).
- To boot HP OpenVMS on an entry-class HP Integrity server, refer to "Booting OpenVMS" (page 86).
- To shut down HP OpenVMS, refer to "Shutting Down OpenVMS" (page 87).

Adding OpenVMS to the Boot Options List

On the rx2660 you can manage boot options using the command procedure SYS$MANAGER:BOOT_OPTIONS.COM. This procedure offers you several options:

```
$ @sys$manager:boot_options.com

    OpenVMS I64 Boot Manager Boot Options List Management Utility

    (1) ADD an entry to the Boot Options list
    (2) DISPLAY the Boot Options list
    (3) REMOVE an entry from the Boot Options list
    (4) MOVE the position of an entry in the Boot Options list
    (5) VALIDATE boot options and fix them as necessary
    (6) Modify Boot Options TIMEOUT setting

    (B)  Set to operate on the Boot Device Options list
    (D)  Set to operate on the Dump Device Options list
    (G)  Set to operate on the Debug Device Options list

    (E) EXIT from Boot Manager utility

    You can also enter Ctrl-Y at any time to abort this utility.

Enter your choice:
```

To ADD an entry to the Boot Options list, select option (1):

```
Enter your choice: 1
Enter the device name (Enter "?" for a list of devices): ?
```

```
Device                  Device          Error    Volume         Free  Trans Mnt
 Name                   Status          Count     Label        Blocks Count Cnt
$1$DGA700:     (NODE1)  Mounted             0  (remote mount)                 1
$1$DGA1510:    (NODE1)  Mounted             0  (remote mount)                 1
$1$DGA4000:    (NODE1)  Mounted             0  WORK         130695025     1   9
$26$DKB5:      (NODE1)  Mounted             0  DISK_V83     540949440   333   1

Device                  Device          Error
 Name                   Status          Count
EWA0:                   Online              1
EWB0:                   Online              0

EFI     Built-in EFI Shell

Enter the device name (Enter "?" for a list of devices): $26$DKB5

Enter the desired position number (1,2,3,,,) of the entry.
To display the Boot Options list, enter "?" and press Return.
Position [1]: 10

Enter the value for VMS_FLAGS in the form n,n.
VMS_FLAGS [NONE]:

Enter a short description (do not include quotation marks).
Description ["$26$DKB5"]: V83 System Disk

efi$bcfg: $26$dkb5 (Boot0008) Option successfully added


Enter your choice:
```

For more details, see the *HP OpenVMS Version 8.3 for Integrity Servers Upgrade and Installation Manual*. Here is a link to the manual:
http://h71000.www7.hp.com/doc/83final/ba322_90045/index.html.

Booting OpenVMS

To boot OpenVMS on an rx2660 server, use either of the following procedures:

- "Booting OpenVMS (EFI Boot Manager)" on page 89
- "Booting OpenVMS (EFI Shell)" on page 89

Booting OpenVMS (EFI Boot Manager)

To boot OpenVMS from the **EFI Boot Manager** menu, perform the following steps:

1. From the **EFI Boot Manager** menu, choose an item from the boot options list to boot OpenVMS using the chosen boot option.
2. Access the **EFI Boot Manager** menu for the server on which you want to boot OpenVMS.

   Log in to the iLO MP and enter**CO**to choose the system console.

NOTE: When accessing the console, confirm that you are at the **EFI Boot Manager**menu (the main EFI menu). If you are at another EFI menu, choose the Exit option from the submenus until you return to the screen with the **EFI Boot Manager** heading.

3. At the **EFI Boot Manager** menu, choose an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to use when booting the device.
4. Press **Enter** to initiate booting using the chosen boot option.
5. Exit the console and iLO MP interfaces when finished using them.
6. Enter**Ctrl-B**to exit the system console and return to the **iLO MP Main Menu**.
7. Exit iLO MP by typing**X**at the **iLO MP Main Menu**.

Booting HP OpenVMS (EFI Shell)

From the **EFI Shell** environment, to boot OpenVMS on a device, first access the bootable partition (for example `fs0:`) for the root device and enter **`\efi\vms\vms_loader`** to initiate the OpenVMS loader.

1. Access the EFI Shell environment for the server on which you want to boot OpenVMS.

   Log in to the iLO MP and enter **`CO`** to choose the system console.

NOTE: When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose the Exit option from the submenus until you return to the screen with the EFI Boot Manager heading.

2. From the **EFI Boot Manager** menu, choose the EFI Shell menu option to access the EFI Shell environment.
3. At the EFI Shell environment, issue the **`map -fs`** command to list all currently mapped bootable devices.

   The bootable file systems are listed as `fs0:, fs1:`, and so on.

4. Access the bootable partition (`fsX`: where *X* is the file system number) for the device you want to boot OpenVMS.

   For example, type **`fs2:`** to access the bootable partition for the bootable file system number 2.

   The EFI Shell prompt changes to reflect the file system currently accessed.

NOTE: The file system number might change each time it is mapped (for example, when the server boots, or when the `map -r` command is issued).

5. When accessing the bootable partition for the desired boot device, issue the **`\efi\vms\vms_loader`** command to initiate the `vms_loader.efi` loader on the device you are accessing.

```
fs5:> \efi\vms\vms_loader.efi
    HP OpenVMS Industry Standard 64 Operating System, Version V8.3
    © Copyright 1976-2006 Hewlett-Packard Development Company, L.P.

%DECnet-I-LOADED, network base image loaded, version = 05.13.00

%SMP-I-CPUTRN, CPU #02 has joined the active set.
%SMP-I-CPUTRN, CPU #03 has joined the active set.
%SMP-I-CPUTRN, CPU #01 has joined the active set.
%SYSINIT-I- waiting to form or join an OpenVMS Cluster
%VMScluster-I-LOADSECDB, loading the cluster security database
%EWA0, Auto-negotiation mode assumed set by console
%EWA0, Merl5704 located in 64-bit, 66-mhz PCI-X slot
%EWA0, Device type is BCM5704C (UTP) Rev B0 (21000000)
%EWB0, Auto-negotiation mode assumed set by console
%EWB0, Merl5704 located in 64-bit, 66-mhz PCI-X slot
%EWB0, Device type is BCM5704C (UTP) Rev B0 (21000000)
%PKA0, Copyright (c) 2001 LSI Logic, PKM V1.1.01  Chip LSISAS1068
%EWA0, Link up: 1000 mbit, full duplex, flow control disabled
```

6. Exit the console and iLO MP interfaces when finished using them.
7. Enter **Ctrl-B** to exit the system console and return to the **iLO MP Main Menu**. To exit the iLO MP, type **`X`** at the **iLO MP Main Menu**.

Shutting Down OpenVMS

This section describes how to shut down the HP OpenVMS operating system on an rx2660 server. From the `OpenVMS DCL` prompt, issue the **`@SYS$SYSTEM:SHUTDOWN`** command to shut down the OpenVMS operating system. Use the following steps:

1. Log in to OpenVMS running on the server that you want to shut down.

   Log in to the iLO MP for the server and use the Console menu to access the system console. Accessing the console through the iLO MP enables you to maintain console access to the server after HP OpenVMS has shut down.

2. At the `OpenVMS DCL` prompt issue the **`@SYS$SYSTEM:SHUTDOWN`** command and specify the shutdown options in response to the prompts given.

```
$@sys$system:shutdown

        SHUTDOWN -- Perform an Orderly System Shutdown
                    on node NODE1

How many minutes until final shutdown [0]:
Reason for shutdown [Standalone]:
Do you want to spin down the disk volumes [NO]?
Do you want to invoke the site-specific shutdown procedure [YES]?
Should an automatic system reboot be performed [NO]?
When will the system be rebooted [later]:
Shutdown options (enter as a comma-separated list):
 REMOVE_NODE         Remaining nodes in the cluster should adjust quorum
 CLUSTER_SHUTDOWN    Entire cluster is shutting down
 REBOOT_CHECK        Check existence of basic system files
 SAVE_FEEDBACK       Save AUTOGEN feedback information from this boot
 DISABLE_AUTOSTART   Disable autostart queues
 POWER_OFF           Request console to power-off the system
 BIB_STATE           Request console to reboot all CPUs to the Itanium BIB state

Shutdown options [NONE]: REBOOT_CHECK

%SHUTDOWN-I-BOOTCHECK, performing reboot consistency check...
%SHUTDOWN-I-CHECKOK, basic reboot consistency check completed

%SHUTDOWN-I-OPERATOR, this terminal is now an operator's console
%SHUTDOWN-I-DISLOGINS, interactive logins will now be disabled
%SET-I-INTSET, login interactive limit = 0, current interactive value = 1
%SHUTDOWN-I-SHUTNET, the DECnet network will now be shut down
```

NOTE: HP OpenVMS I64 currently does not support the **`POWER_OFF`** shutdown option.

Booting and Shutting Down Microsoft Windows

This section describes how to boot and shut down Microsoft Windows on the server blade, and how to add Windows entries to the system boot options list.

- "Adding Microsoft Windows to the Boot Options List" (page 88)
- "Booting the Microsoft Windows Operating System" (page 90)
- "Shutting Down Microsoft Windows" (page 91)

Adding Microsoft Windows to the Boot Options List

To add a Microsoft Windows entry to the system boot options list you must do so from EFI by using the `\MSUtil\nvrboot.efi` utility to import boot options from the `EFI\Microsoft\WINNT50\Boot00...` file on the device from which Windows is loaded.

This procedure adds the Microsoft Windows item to the boot options list.

NOTE: On HP Integrity servers, the operating system installer automatically adds an entry to the boot options list.

1. Access the EFI Shell environment.

   Log in to the iLO MP and enter `CO` to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the **EFI Boot Manager** heading.

From the EFI Boot Manager menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fsX:` where *X* is the file system number) for the device from which you want to boot Windows.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Microsoft Windows loader is `\efi\microsoft\winnt50\ia64ldr.efi` and it should be on the device you are accessing. However, you must only initiate this loader from the EFI Boot Menu and not from the EFI Shell.

3. List the contents of the `\EFI\Microsoft\WINNT50`directory to identify the name of the Windows boot option file (`Boot00nn`) that you want to import into the system boot options list.

```
fs0:\> ls EFI\Microsoft\WINNT50
Directory of: fs0:\EFI\Microsoft\WINNT50

  09/18/03  11:58a <DIR>          1,024  .
  09/18/03  11:58a <DIR>          1,024  ..
  12/18/03  08:16a                  354  Boot0001
          1 File(s)         354 bytes
          2 Dir(s)


fs0:\>
```

4. At the EFI Shell environment, issue the `\MSUtil\nvrboot.efi` command to launch the Microsoft Windows boot options utility.

```
fs0:\> msutil\nvrboot

NVRBOOT: OS Boot Options Maintenance Tool [Version 5.2.3683]

   1. SUSE SLES 10
   2. HP-UX Primary Boot: 0/0/1/0/0.2.0
 * 3. Windows Server 2003, Datacenter
   4. EFI Shell [Built-in]

  * = Windows OS boot option

  (D)isplay (M)odify (C)opy E(x)port (I)mport (E)rase (P)ush (H)elp (Q)uit

Select>
```

5. Use the `Import` command to import the Window boot option file.

```
Select> i
Enter IMPORT file path: \EFI\Microsoft\WINNT50\Boot0001
Imported Boot Options from file: \EFI\Microsoft\WINNT50\Boot0001

Press enter to continue
```

NOTE: Due to the type of server you purchased, your output may not exactly match the output shown here.

6. Enter `Q` to quit the NVRBOOT utility, and exit the console and iLO MP interfaces if you are finished using them.

   Enter **Ctrl-B** to exit the system console and return to the iLO MP Main Menu. To exit the iLO MP, enter `x` at the Main Menu.

Booting the Microsoft Windows Operating System

Boot the Windows Server 2003 operating system on an HP Integrity server by using the EFI Boot Manager to choose the appropriate Windows item from the boot options list. Refer to "Shutting Down Microsoft Windows" (page 91) for details on shutting down the Windows operating system.

1. From the EFI Boot Manager menu, choose an item from the boot options list to boot Windows using the chosen boot option.
2. Access the EFI Boot Manager menu for the server on which you want to boot Windows.

   Log in to the iLO MP and enter `CO` to choose the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the **EFI Boot Manager** heading.
3. At the EFI Boot Manager menu, choose an item from the boot options list.

   Each item in the boot options list references a specific boot device and provides a specific set of boot options or arguments to be used when booting the device.
4. Press **Enter** to initiate booting using the chosen boot option.
5. Once Windows begins loading, wait for the Special Administration Console (SAC) to become available.

   The SAC interface provides a text-based administration tool that is available from the system console. For details refer to the SAC online help (enter `?` at the `SAC>` prompt).

```
Loading.: Windows Server 2003, Datacenter
Starting: Windows Server 2003, Datacenter

                              Starting Windows...
********************************************************************************

Computer is booting, SAC started and initialized.

Use the "ch -?" command for information about using channels.
Use the "?" command for general help.

SAC>
```

NOTE: Due to the type of server you purchased, your output may not exactly match the output shown here.

6. Exit the console and iLO MP interfaces when finished using them.

   Enter **Ctrl-B** to exit the console and return to the iLO MP Main menu. To exit the iLO MP, enter `x` at the Main menu.

Shutting Down Microsoft Windows

Shut down the Windows operating system on HP Integrity servers by using the **Start** menu or the `shutdown` command.

CAUTION: Do not shut down Windows using Special Administration Console (SAC) `restart` or `shutdown` commands under normal circumstances.

Issuing `restart` or `shutdown` at the `SAC>` prompt causes the server to restart or shutdown immediately and can result in the loss of data.

Instead use the Windows **Start** menu or the `shutdown` command to shut down gracefully.

To shut down Windows use either of the following methods.

- Choose **Shut Down** from the **Start** menu and choose either **Restart** or **Shut down** from the pull-down menu.

  The **Restart** menu item shuts down and restarts the server. The **Shut down** menu item shuts down the server.

  You can use this method when using a graphical interface to the server.

- Issue the `shutdown` command from the Windows command line.

  Refer to "" (page 91) for details.

  You can issue this command from a command prompt through the Special Administration Console (SAC) or from any other command line.

  The Windows `shutdown` command includes the following options:

  `/s` Shuts down and halts (power off) the server. This is the equivalent of **Start—>Shut Down, Shut down**. To power on the server, use the iLO MP `PC` command.

  `/r` Shuts down and restarts the server. This is the equivalent of **Start—>Shut Down, Restart**.

  `/a` Aborts a server shutdown.

  `/t` *xxx* Sets the timeout period before shutdown to *xxx* seconds. The timeout period ranges from 0–600, with a default of 30.

  Refer to the `help shutdown` Windows command for details.

Windows Shutdown from the Command Line

From the Windows command line, issue the `shutdown` command to shut down the operating system.

1. Log in to Windows running on the server that you want to shut down.

   For example, access the system console and use the Windows SAC interface to start a command prompt, from which you can issue Windows commands to shut down the server.

2. Check to see whether any users are logged in.

   Use the `query user` or `query session` command.

3. Issue the `shutdown`command and the appropriate options to shut down the Windows Server 2003 on the server.

   You have the following options when shutting down Windows:

   - To shut down Windows and reboot: `shutdown /r` or choose the **Start —> Shut Down** action and choose **Restart** from the pull-down menu.
   - To shut down Windows and halt (power off server hardware): **`shutdown /s`** or choose the **Start —> Shut Down** action and choose **Shut down** from the pull-down menu.

     To reboot a halted server you must power on the server using the `PC` command at the iLO MP Command menu.

   - To abort a shutdown (stop a shutdown that has been initiated): `shutdown /a`

For example:

```
shutdown /r /t 60 /c "Shut down in one minute."
```

This command initiates a Windows system shutdown and reboot after a timeout period of 60 seconds. The `/c` option specifies a message that is broadcast to any other users of the server.

Booting and Shutting Down Linux

This section covers booting and shutting down Linux on the server blade. Procedures for Red Hat Enterprise Linux and SuSE Linux Enterprise Server are given in this section.

- To add a Linux entry to the boot options list, refer to "Adding Linux to the Boot Options List" (page 92).
- To boot Linux, use the following procedures.
  - Refer to "Booting the Red Hat Enterprise Linux Operating System" (page 93) for details on Red Hat Enterprise Linux.
  - Refer to "Booting the SuSE Linux Enterprise Server Operating System" (page 94) for details on SuSE Linux Enterprise Server.
- To shut down either Red Hat Enterprise Linux or SuSE Linux Enterprise Server, refer to "Shutting Down Linux" (page 95).

Adding Linux to the Boot Options List

This section describes how to add a Linux entry to the system boot options list. The processes for adding both Red Hat Enterprise Linux and SuSE Linux Enterprise Servers are given here.

You can add the `\EFI\redhat\elilo.efi` loader or the `\efi\SuSE\elilo.efi` loader to the boot options list from the EFI Shell or EFI Boot Configuration menu (or in some versions of EFI, the Boot Option Maintenance Menu).

NOTE: On HP Integrity servers, the operating system installer automatically adds an entry to the boot options list.

1. Access the EFI Shell environment.

   Log in to the iLO MP and enter `CO` to access the system console.

   When accessing the console, confirm that you are at the EFI Boot Manager menu (the main EFI menu). If you are at another EFI menu, choose the **Exit** option from the submenus until you return to the screen with the `EFI Boot Manager` heading.

   From the EFI Boot Manager menu, choose the **EFI Shell** menu option to access the EFI Shell environment.

2. Access the EFI System Partition (`fs`*X*`:` where *X*is the file system number) for the device from which you want to boot Linux.

   For example, enter `fs2:` to access the EFI System Partition for the bootable file system number `2`. The EFI Shell prompt changes to reflect the file system currently accessed.

   The full path for the Red Hat Enterprise Linux loader is `\EFI\redhat\elilo.efi` and it should be on the device you are accessing.

   The full path for the SuSE Linux Enterprise Server loader is `\efi\SuSE\elilo.efi` and it should be on the device you are accessing.

3. At the EFI Shell environment, use the `bcfg` command to manage the boot options list.

   The `bcfg` command includes the following options for managing the boot options list:

   - `bcfg boot dump` — Displays all items in the boot options list for the server.
   - `bcfg boot rm #` — Removes the item number specified by #from the boot options list.

- `bcfg boot mv #a #b` — Moves the item number specified by *#a* to the position specified by *#b* in the boot options list.
- `bcfg boot add #` *file.efi* `"`*Description*`"` — Adds a new boot option to the position in the boot options list specified by *#*. The new boot option references *file.efi* and is listed with the title specified by *Description*.

  For example, `bcfg boot add 1 \EFI\redhat\elilo.efi "Red Hat Enterprise Linux"` adds a Red Hat Enterprise Linux item as the first entry in the boot options list.

  Likewise, `bcfg boot add 1 \efi\SuSE\elilo.efi "SLES 10"` adds a SuSE Linux item as the first entry in the boot options list.

Refer to the `help bcfg` command for details.

4. Exit the console and iLO MP interfaces if you are finished using them.

   Enter **Ctrl-B** to exit the system console and return to the iLO MP Main Menu. To exit the iLO MP, enter `x` at the Main Menu.

Booting the Red Hat Enterprise Linux Operating System

You can boot the Red Hat Enterprise Linux operating system on HP Integrity servers using either of these methods:

- Choose a Red Hat Enterprise Linux entry from the EFI Boot Manager menu.

  To load the Red Hat Enterprise Linux operating system at the EFI Boot Manager menu, choose its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the operating system using `ELILO.EFI` loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell.

  Refer to "" (page 93) for details.

  On a Red Hat Enterprise Linux boot device EFI System Partition, the full paths to the loader and configuration files are: `\EFI\redhat\elilo.efi` and `\EFI\redhat\elilo.conf`

  After choosing the file system for the boot device (for example, `fs0:`) initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

By default the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI` loader, use the `exit` command.

Booting Red Hat Enterprise Linux from the EFI Shell

Use this procedure to boot Red Hat Enterprise Linux from the EFI Shell.

1. Access the EFI Shell.

   From the system console, choose the **EFI Shell** entry from the EFI Boot Manager menu to access the shell.

2. Access the EFI System Partition for the Red Hat Enterprise Linux boot device.

   Use the `map` EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and mapped.

   To choose a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter `fs3:` at the EFI Shell prompt.

3. Enter `ELILO` at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader path by entering `\EFI\redhat\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the Red Hat Enterprise Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the loader use the `exit` command.

Booting the SuSE Linux Enterprise Server Operating System

You can boot the SuSE Linux Enterprise Server 10 operating system on HP Integrity servers using either of these methods:

- Choose a SuSE Linux Enterprise Server entry from the EFI Boot Manager menu.

  To load the SuSE Linux Enterprise Server operating system at the EFI Boot Manager menu, choose its entry from the list of boot options.

  Choosing a Linux entry from the boot options list boots the operating system using `ELILO.EFI`loader and the `elilo.conf` file.

- Initiate the `ELILO.EFI` Linux loader from the EFI Shell. Refer to "Booting SuSE Linux Enterprise Server from the EFI Shell" (page 94) for details.

  On a SuSE Linux Enterprise Server boot device EFI System Partition, the full paths to the loader and configuration files are: `\efi\SuSE\elilo.efi` and `\efi\SuSE\elilo.conf`.

  After choosing the file system for the boot device (for example, `fs0:`) you can initiate the Linux loader from the EFI Shell prompt by entering the full path for the `ELILO.EFI` loader.

By default, the `ELILO.EFI` loader boots Linux using the kernel image and parameters specified by the default entry in the `elilo.conf` file on the EFI System Partition for the boot device.

To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the `ELILO.EFI`loader, use the `exit` command.

Booting SuSE Linux Enterprise Server from the EFI Shell

Use this procedure to boot SuSE Linux Enterprise Server 10 from the EFI Shell.

1. Access the EFI Shell.

   From the system console, choose the **EFI Shell** entry from the **EFI Boot Manager** menu to access the shell.

2. Access the EFI System Partition for the SuSE Linux Enterprise Server boot device.

   Use the `map` EFI Shell command to list the file systems (`fs0`, `fs1`, and so on) that are known and mapped.

   To choose a file system to use, enter its mapped name followed by a colon (`:`). For example, to operate with the boot device that is mapped as `fs3`, enter `fs3:` at the EFI Shell prompt.

3. Enter **`ELILO`** at the EFI Shell command prompt to launch the `ELILO.EFI` loader.

   If needed, you can specify the loader path by entering `\efi\SuSE\elilo` at the EFI Shell command prompt.

4. Allow the `ELILO.EFI` loader to proceed with booting the SuSE Linux kernel.

   By default, the `ELILO.EFI` loader boots the kernel image and options specified by the default item in the `elilo.conf` file.

   To interact with the `ELILO.EFI` loader, interrupt the boot process (for example, type a space) at the `ELILO boot` prompt. To exit the loader, use the `exit` command.

Shutting Down Linux

Use the `shutdown` command to shut down Red Hat Enterprise Linux or SuSE Linux Enterprise Server.

The Red Hat Enterprise Linux and SuSE Linux Enterprise Server `shutdown`command has the following options:

`-h` Halts (power off) after shutdown.

Use the `PC` command at the iLO MP Command menu to manually power on or power off server hardware, as needed.

`-r` Reboots after shutdown.

`-c` Cancels an already running shutdown.

time When to shut down. (Required.) You can specify *time* in any of the following ways:

- Absolute time in the format *hh*:*mm*,; *hh* is the hour (one or two digits) and *mm* is the minute of the hour (two digits).
- Number of minutes to wait in the format *+m*, in which *m* is the number of minutes.
- `now` to immediately shut down; this is equivalent to using `+0` to wait zero minutes.

Refer to the *shutdown*(8) Linux manpage for details. Also refer to the Linux manpage for the `poweroff` command.

1. From the command line for Red Hat Enterprise Linux or SuSE Linux Enterprise Server, issue the `shutdown` command to shut down the operating system.
2. Log in to Linux running on the server you want to shut down.
3. Issue the `shutdown` command with the desired command-line options, and include the required *time* argument to specify when the operating system shutdown is to occur.

   For example, `shutdown -r +20` shuts down and reboots the server in twenty minutes.

C Utilities

This appendix describes the utilities that are part of the server blade. These include the EFI boot manager, and EFI-POSSE.

This appendix addresses the following topics:

NVRAM Backup Utility

The HP Integrity Non-Volatile RAM (NVRAM) configuration backup utility provides the capability to store and restore critical system settings and EFI Boot Manager options on the HP Integrity BL860c server blade. This utility is available as an offline EFI application.

Downloading and Installing the NVRAM Backup Utility

Use the following procedures to download and install the NVRAM backup utility onto your server.

1. Connect to the HP Support & Drivers home pages at:

   http://welcome.hp.com/country/us/en/support.html.
2. Select **Download drivers and software**.
3. Enter the server model number (**BL860c**) and click >> to begin the search.
4. Select the configuration of your server.
5. Select the operating system (**HP-UX 11.x**).
6. Select **Utility** from the Quick jump list.
7. Select the following utility in the list:

   hp Integrity Non-Volatile RAM Configuration Backup Utility.
8. Select the **Release Notes** tab to view the release notes with the installation instructions.
9. Click **Download**, then **Save**, and select a directory to save the utility package to. The utility package downloads to the directory you selected.

Using the NVRAM Backup Utility

The following shows the options you can enter when using the NVRAM backup utility.

Syntax

```
nvrambkp [-h|-b|-r <archivedb>|-a <archivedb>|-o|-n|-v|-i|-l <log>]
```

Parameters

-h	Displays help text
-b	Enables paging text (only allowed with `-h`)
-r <*archivedb*>	Restores all non-volatile settings from the archived database
-a <*archivedb*>	Archives all non-volatile settings to the archive database
-o	Restores EFI Boot Manager options only (use only with `-r`)
-n	Non-interactive mode, no user prompt
-v	Validates the database that used on the server

-i	Database information
-l <log>	Creates a log file

Example C-1 nvrambkp -h

```
Hewlett-Packard (R) IPF Non-Volatile Configuration Back-up Utility
Version 01.00.00

Copyright (C) Hewlett-Packard. All rights reserved.

Usage:

Purpose:
   The application provides the capability to archive & restore
   critical system settings.

Options:
   -h - Display the help text
   -b - Enable paging text [Only works with -h]
   -r - Restore all the Non-Volatile settings from the <restore database>
        The -r option is not allowed with -a option
   -a - Archive all the Non-Volatile settings to the <archive database>
        The -a option is not allowed with -r option
   -o - Restore the EFI Boot Manager options only
        The -o option is only allowed with -r option
   -n - Non-interactive mode; User will not be prompted
   -v - Validate that the database can be used on the system
   -i - Information about the database
   -l - Log file


Help:
   nvrambkp -h

Archive:
   nvrambkp [-n] [-a <archive database>] [-l <log file>]

Restore All:
   nvrambkp [-n] [-r <restore database>] [-l <log file>]

Restore Boot-Options Only:
   nvrambkp -o [-n] [-r <restore database>] [-l <log file>]

Restore Database Validate:
   nvrambkp -v [-r <restore database>] [-l <log file>]

Restore Database Information:
   nvrambkp -i [-r <restore database>] [-l <log file>]
```

Extensible Firmware Interface

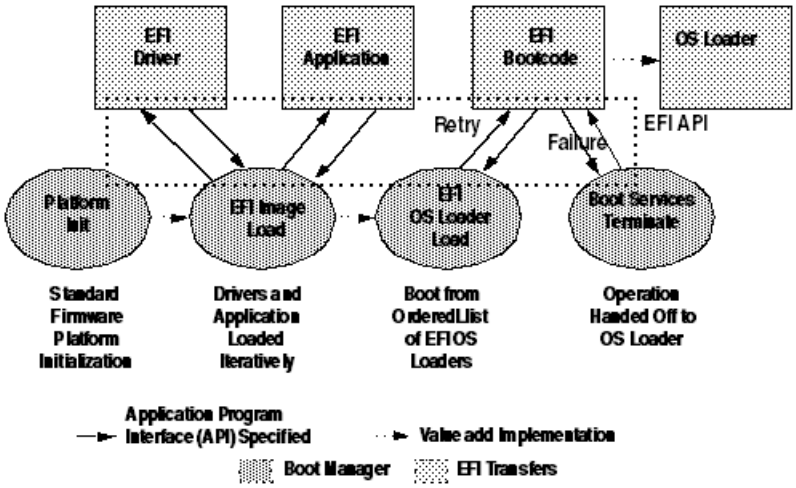
The Extensible Firmware Interface (EFI) is an OS and platform-independent boot and pre-boot interface. EFI resides between the OS and platform firmware, allowing the OS to boot without having details about the underlying hardware and firmware. EFI supports boot devices, uses a flat memory model, and hides platform and firmware details from the OS.

NOTE: EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel® specification, whereas POSSE is the HP implementation that aids HP support.

EFI consolidates boot utilities similar to those found in PA-RISC based systems, such as the Boot Console Handler (BCH), and platform firmware into a single platform firmware. EFI allows the selection of any EFI OS loader from any boot medium that is supported by EFI boot services. An EFI OS loader supports multiple options on the user interface.

EFI supports booting from media that contain an EFI OS loader or an EFI-defined system partition. An EFI-defined system partition is required by EFI to boot from a block device.

Figure C-1 EFI Boot Sequence



The EFI boot manager loads EFI applications (including the OS first stage loader) and EFI drivers from an EFI-defined file system or image loading service. Non-volatile RAM (NVRAM) variables point to the file to be loaded. These variables contain application-specific data that is passed directly to the EFI application. EFI variables provides system firmware a boot menu that points to all the operating systems, even multiple versions of the same operating systems.

The EFI boot manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the boot manager presents you with different ways to bring up the system. For example, you can boot to the EFI shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance menu. See "Using the Boot Option Maintenance Menu" (page 119) for more information.

- *Boot from a File*— Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the system searches for an EFI directory. If the EFI directory is found, then it looks in each of the subdirectories below EFI. In each of those subdirectories, it looks for the first file that is an executable EFI application. Each of the EFI applications that meet this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. You can also launch a specific application without adding it as a boot option. In this case the EFI boot manager searches the root directories and the \EFI\TOOLS directories of all of the EFI system partitions present in the system for the specified EFI application.
- *Add a Boot Option*— Adds a boot option to the EFI boot manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI boot manager searches for the executable file in the same directories as described in "Boot from a File" option. When the file is found, it is executed.
- *Delete Boot Options*— Deletes a specific boot option or all boot options.
- *Change Boot Order*— Controls the relative order in which the EFI boot manager attempts boot options. For help on the control key sequences you need for this option, see the help menu.
- *Manage BootNext Setting*— Selects a boot option to use one time (the next boot operation).
- *Set Automatic Boot Timeout*— Defines the value in seconds that pass before the system automatically boots without user intervention. Setting this value to zero disables the timeout feature.
- *Exit*— Returns control to the EFI boot manager main menu. This displays the active boot devices, including a possible integrated shell (if the implementation is so constructed).

EFI Commands

Table C-1 lists EFI commands for the server blade, and the equivalent BCH commands for reference.

Table C-1 EFI Commands

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
These commands are found in all other menus			
info boot	Boot	[PRI|HAA|ALT|<path>]	Boot from specified path
help <command>	HElp	[<menu>|<command>]	Display help for specified command or menu
reset	RESET		Reset the system (to allow reconfiguration of complex)
exit (at EFI shell)	MAin		Return to the main menu
MAin			
EFI boot manager "change boot order"	PAth	[PRI|HAA|ALT|CON|KEY|<path>]	Display or modify a path
bcfg	SEArch	[ALL]	Search for boot devices
bcfg	SEArch	[DIsplay|IPL] [<path>]	Search for boot devices
many commands offer a [-b] parameter to cause 25 line breaks	ScRoll	[ON|OFF]	Display or change scrolling capability
COnfiguration			
autoboot	AUto	[BOot|SEarch|STart] [ON|OFF]	Display or set the auto start flag
info boot	BootID	[<processor #>[<bootid #>]]	Display or set processor boot identifier
EFI boot manager	Boot info		Display boot-related information
autoboot	BootTimer	[0-200]	Seconds allowed for boot attempt
cpuconfig	CPUconfig	[<proc>][ON|OFF]]	Config/deconfig processor
conconfig	Console config	[index][ON|OFF|primary]	Config primary console
boottest	FastBoot	[ON|OFF] or [test] [RUN|SKIP]	Display or set boot tests execution
date	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the date
time	Time	[cn:yr:mo:dy:hr:mn[:ss]]	Read or set the real time clock
INformation			
info all	ALL		Display all system information
info boot	BootINfo		Display boot-related information
info cpu	CAche		Display cache information
info chiprev	ChipRevisions		Display revision number of major VLSI
iLO MP command <df>	FRU		Display FRU information

Table C-1 EFI Commands *(continued)*

EFI Shell Command	BCH Command Equivalent (PA-RISC)	BCH Command Parameters (PA-RISC)	Definition
info fw	FwrVersion		Display firmware version for PDC, ICM, and complex
info io	IO		Display firmware version for PDC, ICM, and complex
lanaddress	LanAddress		Display core LAN station address
info mem	Memory		Display memory information
info cpu	PRocessor		Display processor information
SERvice			
errdump clear	CLEARPIM		Clear (zero) the contents of PIM
mm	MemRead	<addr> [<len>] [<type>]	Read memory locations scope of page deallocation
pdt	page deallocation table (pdt)		Display or clear the page deallocation table
errdump mca errdump cmc errdump init errdump cpe	processor internal memory (PIM)	[<proc>] [HPMC|LPMC|TOC|ASIC]]	Display PIM information

EFI/POSSE Commands

This section describes the EFI/POSSE commands developed for the server.

NOTE: EFI and Pre-OS System Environment (POSSE) are similar. EFI is an Intel specification, whereas POSSE is the HP implementation that aids HP support.

help

Provides information on the EFI shell commands. It also has an additional feature to aid those familiar with the BCH menus to adjust to their equivalent functions in EFI.

Syntax

```
help [-b] <category>
help [-b] <cmd>
help [-b] bch <bchmenu> <bchcmd>
```

Parameters

```
-b              Enable page breaking
category        Category of commands to view help on commands
cmd             Shell command name on which to provide verbose information
bch             Display the list of BCH commands and their corresponding EFI
bchmenu         BCH menu name taken from the top level of the BCH menu
bchcmd          BCH command on which to display information
```

Operation

If help is invoked with no parameters, a list of shell command categories displays. To list all of the commands within a category, type **`help <category>`** (see examples). If invoked with the **`-b`** switch, any output longer than one page pauses after each page displays. If a shell command name is used as a parameter, verbose help displays for that command.

If help is invoked with the **bch** option, it displays a list of BCH commands and their corresponding EFI/POSSE commands. It instructs the user to repeat the command line followed by a menu name for more information on that menu. If help is invoked followed by **bch** and a menu name, it displays a list of commands that appear under that BCH menu. The user may then invoke help followed by **bch**, the menu name, and a BCH command name to display information on that command. This points the user to the command that has taken the place of that BCH functionality, or will inform the user that the functionality no longer exists. As a shortcut, enter `help` followed by `bch` and a BCH command name to go straight to that command.

Example C-2 `help` Command

```
Shell> help
List of classes of commands:

boot          -- Booting options and disk-related commands
configuration -- Changing and retrieving system information
devices       -- Getting device, driver and handle information
memory        -- Memory related commands
shell         -- Basic shell navigation and customization
scripts      -- EFI shell-script commandsType "help" followed by a class name for a list of commands in that class
Type "help" followed by command name for full documentation
```

Example C-3 help bch Command

```
    COnfiguration          help bch co
    INformation            help bch in
    PAth                   help bch pa
    ScRool                 help bch sr
    SEArch                 help bch sea
    SERvice                help bch ser
    BOot                   help bch bo
    HElp                   help bch he
    RESET                  help bch reset
    MAin                   help bch ma

    For more help on one of the commands above, at the prompt type:
        help bch COMMAND
```

Example C-4 `help configuration` Command

```
Shell> help configuration
Configuration commands:

cpuconfig  -- Deconfigure or reconfigure cpus
date       -- Display or set date
err        -- Display or set error level
esiproc    -- Make an ESI call
errdump    -- View/Clear logs
info       -- Display hardware information
monarch    -- View or set the monarch processor
palproc    -- Make a PAL call
salproc    -- Make a SAL call
time       -- Display or set time
ver        -- Displays version info

Type "help" followed by command name for full documentationon that command.
Type "help -a" to display a list of all commands.
```

Example C-5 `help cpuconfig` **Command**

```
Shell> help cpuconfig

CPUCONFIG [cpu] [on|off]

   cpu    Specifies which cpu to configure
   on|off Specifies to configure or deconfigure a cpu

   Notes:
        1. Cpu status will not change until next boot

   Examples:
       * To deconfigure CPU 0
       fs0:\> cpuconfig 0 off
       CPU will be deconfigured on the next boot

       * To display configuration status of cpus
       fs0:\> cpuconfig
       <CPU configuration data displayed>
```

baud

Sets the baud rate and communication settings for a universal asynchronous receiver-transmitter (UART).

Syntax

```
baud <index> <baudrate>
```

Parameters

```
<index> 0 through the total number of UARTS minus one
<baudrate>      baud rate.
```

Operation

Use this command to change the speed for a UART in the system. This command works for all UARTs visible to EFI/POSSE. If the UART is part of processor dependent hardware (PDH) space and is initialized by the core firmware, this command communicates the settings to core firmware so the UART can be initialized with the new settings on the next boot. System default is 9600 baud.

Other Communication parameters are listed in Table C-2.

Table C-2 Communications Parameters

Parameter	Value
RECEIVE_FIFO_DEPTH	1
TIMEOUT	1000000
PARITY	No parity
DATA_BITS	8
STOP_BITS	1
CONTROL_MASK	0

boottest

Interacts with the speedy boot variable allowing it to be set appropriately.

Syntax

```
bootest                          Displays status of all speedy boot bits
bootest on                       Run all tests (for a normal boot time)
bootest off                      Skip all tests (for a faster boot time)
bootest [test]                   Displays status of specific Speedy Boot bit
bootest [test] [on|off]          Sets or clears a specific Speedy Boot bit
```

Parameters

```
[test]  Each test can be set or cleared:
        booting_valid   Enable/disable system firmware response to BOOTING
                        bit. If OS Speedy Boot aware set to on.
        early_cpu       Enable/disable early CPU selftests.
        late_cpu        Enable/disable late CPU selftests.
        platform        Enable/disable system board hardware tests.
        chipset         Enable/disable CEC tests.
        io_hw           Enable/disable EFI driver Core I/O tests.
        mem_init        Enable/disable memory initialization.
        mem_test        Enable/disable full destructive memory tests.
```

Example C-6 `boottest` **Command**

```
Shell> boottest
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    -------------------------
   booting_valid    On (OS speedy boot aware)
   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
```

Example C-7 `boottest early_cpu off` **Command**

```
Shell> boottest early_cpu off
   BOOTTEST Settings Default Variable
   Selftest         Setting
   -------------    -------------------------
   booting_valid    On (OS speedy boot aware)
   early_cpu        Skip 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
```

cpuconfig

Use this command to display the config/deconfig state of processors in the system and allow the user to configure or reconfigure processors.

Syntax

```
cpuconfig <cpu> <on|off>
```

Parameters

```
<cpu>           specify a processor
<on|off>        state to set the processor to
```

Operation

Issuing cpuconfig with no parameters displays the config/deconfig status of all processors. A user can reconfigure CPUs by specifying a CPU number and a state (on or off). If a valid state is entered and is different from the current state of a CPU, its status changes on the next boot. The last remaining configured CPU in a system cannot be deconfigured.

Example C-8 `cpuconfig` **Command**

```
Shell>  cpuconfig
PROCESSOR INFORMATION
       # of                  L3      L4      Family/
CPU    Logical               Cache   Cache   Model             Processor
Slot   CPUs       Speed      Size    Size    (hex.)  Rev         State
---   -------    ---------  ----    -----   ------   ----    ----------
 0      1        1 GHz      1.5 MB   None    1F/01    B1       Active
 1      1        1 GHz      1.5 MB   None    1F/01    B1       Active
```

Example C-9 `cpuconfig 2` **Command**

```
Shell> cpuconfig 2 off
CPU will be deconfigured on next boot.

Shell> cpuconfig
PROCESSOR INFORMATION
       # of                  L3     L4      Family/
CPU     Logical              Cache  Cache   Model             Processor
Slot    CPUs       Speed     Size   Size    (hex.)   Rev       State
---   -------    ---------   ----   -----   ------   ----    ----------
 0       1          1 GHz    3 MB   None    1F/00    B2       Active
 1       1          1 GHz    3 MB   None    1F/00    B2       Sched Deconf
```

conconfig

Use this command to configure the primary console, and turn other consoles on for mirroring from the firmware.

Syntax

```
conconfig [index][on|off|primary]
```

Parameters

```
Index        Specifies index of console to set as primary
on           Enables the specified console as a secondary console
off          Puts console into "Not Configured" (NC) state
primary      Sets the specified console as primary
```

Notes

1. Primary console setting will take effect after reboot
2. P in status column indicates console is primary
3. S in status column indicates console is secondary
4. NC in status column indicates console is not configured
5. If a disabled console is set to primary it will be enabled

Example C-10 `conconfig` **Command**

To display current primary operating system console

```
Shell> conconfig
CONSOLE CONFIGURATION
```

```
 Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC   Serial    Acpi(PNP0501,0)
 2      S    Serial    Acpi(HWP0002,0)/Pci(1|1)
 3      P    VGA       Acpi(HWP0002,0)/Pci(4|0)
```

Example C-11 `conconfig 2 primary`**Command**

To change primary operating system console

```
Shell> conconfig 2 primary
CONSOLE CONFIGURATION
 Index Status Type     Device Path
 ----- ------ ----     -----------
 1       NC  Serial    Acpi(PNP0501,0)
 2       P   Serial    Acpi(HWP0002,0)/Pci(1|1)
 3       S   VGA       Acpi(HWP0002,0)/Pci(4|0)
```

Example C-12 `conconfig 3 off`**Command**

To disable a console

```
Shell> conconfig 3 off
CONSOLE CONFIGURATION
Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC    Serial   Acpi(PNP0501,0)
 2      P     Serial   Acpi(HWP0002,0)/Pci(1|1
 3      NC    VGA      Acpi(HWP0002,0)/Pci(4|0)
```

Example C-13 `conconfig 3 on`**Command**

To enable a console

```
Shell> conconfig 3 on
CONSOLE CONFIGURATION
Index Status Type     Device Path
 ----- ------ ----     -----------
 1      NC    Serial   Acpi(PNP0501,0)
 2      P     Serial   Acpi(HWP0002,0)/Pci(1|1)
 3      S     VGA      Acpi(HWP0002,0)/Pci(4|0)
```

default

Allows the user to restore non-volatile memory (NVM) to default values and clear NVM storage values.

Syntax

```
default     [efi|sal]
default     clear [bmc|efi|sal]
```

Parameters

```
clear      clears NVM storage values
```

Operation

Default sets NVM and stable store values to predefined default values. To the normal user only a subset of values are available for default. Executing “default clear” resets the system.

errdump

Displays the contents of processor internal memory logged on the first MCA for all processors present in the system.

Syntax

```
errdump [mca | cpe | cmc | init | la | clear]
```

Parameters

```
mca                dumps the Machine Check Abort error log
cpe                dumps the Corrected Platform Error log
cmc                dumps the Corrected Machine Check log
init               dumps the Initialization log
la                 dumps the Logic Analyzer log
clear              erases all of the logs (mca, cpe, cmc, init, la)
```

Operation

If a user enters no parameters, the usage is displayed. Otherwise, the specified error log displays. Adding `-n` to the clear parameter disables the confirmation prompt (Access the `errdump`command from the System Configuration menu).

info

Displays most system information.

Syntax

```
info [ -b] [target]
```

Parameters

```
target:          valid targets are:
        all         display everything
        cpu         display information on cpus
        cache       display information on cache
        mem         display information on memory
        io          display information on io
        boot        display boot-related information
        chiprev       display information on chip revisions
        fw          display firmware version information
        sys         display system information
        warning     display warning and stop boot information
```

Example C-14 `info all` **Command**

```
Shell> info all

SYSTEM INFORMATION

Date/Time:  Oct 31, 2003  22:03:39  (20:03:10:31:22:03:39)
Manufacturer:  hp
Product Name:  server BL860c
Product Number:  A9901A
Serial Number:  MYJ3350026
UUID:  48B4F371-E34C-11D6-A8D6-07A8C14CB68B
System Bus Frequency:  200 MHz

PROCESSOR MODULE INFORMATION

        # of                L3      L4      Family/
   CPU  Logical             Cache   Cache   Model          Processor
   Slot CPUs     Speed      Size    Size    (hex.)   Rev   State

   ---- -------  --------   ------  ------  -------  ---   ------------
     0      1        1 GHz  1.5 MB    None   1F/01    B1         Active
     1      1        1 GHz  1.5 MB    None   1F/01    B1         Active

MEMORY INFORMATION

     ---- DIMM A -----  ---- DIMM B -----
      DIMM   Current     DIMM   Current
---  ------ ----------  ------ ----------
 0   1024MB     Active  1024MB     Active
 1    ----               ----
 2    ----               ----
 3    ----               ----
   Active Memory    : 2048 MB
   Installed Memory : 2048 MB

I/O INFORMATION

BOOTABLE DEVICES

   Order  Media Type  Path
   -----  ----------  ------------------------------------
   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)

BOOT INFORMATION

   Monarch CPU:
   Current  Preferred
   Monarch   Monarch   Possible Warnings
   -------  ---------  -----------------
         0          0
   AutoBoot: OFF - Timeout is disabled
   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(00306E4C4F1A)  Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A))
  *Mac(00306E4C0FF2)  Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E4C0FF2))

FIRMWARE INFORMATION

   Firmware Revision: 1.10 [4341]
   PAL_A Revision: 7.31/5.37
   PAL_B Revision: 5.37
   SAL Spec Revision: 3.01
   SAL_A Revision: 2.00
   SAL_B Revision: 1.10
   EFI Spec Revision: 1.10
   EFI Intel Drop Revision: 14.61
   EFI Build Revision: 1.10
   POSSE Revision: 0.10
   ACPI Revision: 7.00
   BMC Revision: 2.24
   IPMI Revision: 1.00
   SMBIOS Revision: 2.3.2a
   Management Processor Revision: E.02.25

WARNING AND STOP BOOT INFORMATION

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          0001       122e         0032
     Host Bridge          0002       122e         0032
     Host Bridge          0004       122e         0032
     Other Bridge            0          0         0002
     Other Bridge            0          0         0007
     Baseboard MC            0          0         0224
```

Example C-15 `info cpu` Command

```
Shell> info cpu

PROCESSOR MODULE INFORMATION

        # of                 L3      L4      Family/
   CPU  Logical              Cache   Cache   Model          Processor
   Slot CPUs     Speed       Size    Size    (hex.)   Rev   State
   ---- -------  --------    ------  ------  -------  ---   ------------
     0      1        1 GHz  1.5 MB    None   1F/01    B1         Active
     1      1        1 GHz  1.5 MB    None   1F/01    B1         Active
```

Example C-16 `info mem` Command

```
Shell> info mem

MEMORY INFORMATION

     ---- DIMM A -----  ---- DIMM B -----
      DIMM   Current     DIMM   Current
---  ------ ----------  ------ ----------
 0   1024MB     Active  1024MB     Active
 1    ----                ----
 2    ----                ----
 3    ----                ----
   Active Memory    : 2048 MB
   Installed Memory : 2048 MB
```

Example C-17 `info io` Command

```
I/O INFORMATION

BOOTABLE DEVICES


   Order  Media Type  Path
   -----  ----------  ----------------------------------------
     1    CDROM       Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM(Entry0)

   Seg  Bus  Dev  Fnc  Vendor  Device Slot
    #    #    #    #     ID      ID     #   Path
   ---  ---  ---  ---  ------  ------  ---  -----------
    00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
    00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
    00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
    00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
    00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
    00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
    00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
    00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)
    00   40   01   00  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|0)
    00   40   01   01  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|1)
    00   80   01   00  0x14E4  0x1645   01  Acpi(HWP0002,400)/Pci(1|0)
    00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
    00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
    00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
```

Example C-18 `info boot` **Command**

```
Shell> info boot

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      Skip 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
```

lanaddress

Allows the user to display the core I/O MAC address.

Syntax:

```
lanaddress
```

Parameters

none

Example C-19 `lanaddress` **Command**

```
LAN Address Information:

   LAN Address        Path
   -----------------  ----------------------------------------
   Mac(00306E4C4F1A)  Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A))
  *Mac(00306E4C0FF2)  Acpi(HWP0002,100)/Pci(2|0)/Mac(00306E4C0FF2))
```

monarch

Displays or modifies the ID of the bootstrap processor. The preferred monarch number is stored in NVM.

Syntax

```
monarch <cpu>
```

Parameters

```
<cpu>      specifies a cpu
```

Operation

If specified with no parameters, **`monarch`** displays the Monarch processor for the system. Specifying a processor number alters the preferred Monarch processor. None of these changes takes affect until after a reboot.

Example C-20 `monarch` **Command**

```
Shell> monarch
 Current   Preferred
 Monarch    Monarch     Possible Warnings
 -------   ---------    -----------------
       0           0
       0           0

To view monarch: fs0 :\ monarch

                  | Processor
------------------+-----------
current status    |    0
next boot status  |    0

To set the monarch processor to 1: fs0 :\ monarch 1

                  | Processor
------------------+-----------
current status    |    0
next boot status  |    1
```

pdt

Displays or clears the contents of the Page Deallocation Table.

Syntax

```
pdt (clear)
```

Parameters

```
<clear>      clears the pdt
```

Operation

With no options specified, the command displays the PDT information for the system. The PDT is cleared and a reboot is required for memory reallocation and safe booting.

Example C-21 `pdt` **Command**

```
Shell> pdt
PDT Information

                Last Clear time: PDT has not been cleared
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error:  x0000000000000000
```

Example C-22 `pdt clear` **Command**

```
Shell> pdt clear
Are you sure you want to clear the PDT? [y/N] y
Shell>

Shell> pdt
PDT Information

                Last Clear time: 10/21/01  5:00p
       Number of total entries in PDT:                 50
        Number of used entries in PDT:                  0
        Number of free entries in PDT:                 50
  Number of single-bit entries in PDT:                  0
   Number of multi-bit entries in PDT:                  0
     Address of first multi-bit error: 0x0000000000000000
```

sysmode

Display or modify the system mode.

Syntax

```
sysmode <normal | admin| service>
```

Parameters

```
<normal>     sets system mode to normal

<admin>      sets system mode to admin

<service>    sets system mode to service
```

Operation

If specified alone, sysmode displays the system mode. If a mode is specified as a parameter, then the system mode is changed. This new mode takes effect immediately. The system mode is retained on successive boots. Interaction with sysmode in a variety of scenarios is outlined below.

Example C-23 `sysmode` Command

```
Shell> sysmode
System Mode: NORMAL

Shell> sysmode admin
You are now in admin mode.

Shell> sysmode service
You are now in service mode.

Shell> sysmode normal
You are now in normal mode
```

Specifying SCSI Parameters

The following SCSI parameters may be configured for the SCSI board:

- SCSI ID (SCSI initiator ID)
- Maximum data transfer rate (SCSI rate)
- Bus width
- Whether the HBA is bootable (driver support)
- Avoid bus resets (secondary cluster server)

Using the SCSI Setup Utility

1. At the EFI shell prompt, type this command to map the parameters for all PCI cards installed in the system:

   `info io`

   A list of all the devices that are installed in the server blade and managed by EFI drivers displays. The output looks like this:

```
Seg  Bus  Dev  Fnc  Vendor  Device Slot
 #    #    #    #    ID      ID     #    Path
---  ---  ---  ---  ------  ------  ---  -----------
 00   00   01   00  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|0)
 00   00   01   01  0x1033  0x0035   XX  Acpi(HWP0002,0)/Pci(1|1)
 00   00   01   02  0x1033  0x00E0   XX  Acpi(HWP0002,0)/Pci(1|2)
 00   00   02   00  0x1095  0x0649   XX  Acpi(HWP0002,0)/Pci(2|0)
 00   00   03   00  0x8086  0x1229   XX  Acpi(HWP0002,0)/Pci(3|0)
 00   20   01   00  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|0)
 00   20   01   01  0x1000  0x0030   XX  Acpi(HWP0002,100)/Pci(1|1)
 00   20   02   00  0x14E4  0x1645   XX  Acpi(HWP0002,100)/Pci(2|0)
 00   40   01   00  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|0)
 00   40   01   01  0x1000  0x0021   02  Acpi(HWP0002,200)/Pci(1|1)
 00   80   01   00  0x14E4  0x1645   01  Acpi(HWP0002,400)/Pci(1|0)
 00   E0   01   00  0x103C  0x1290   XX  Acpi(HWP0002,700)/Pci(1|0)
 00   E0   01   01  0x103C  0x1048   XX  Acpi(HWP0002,700)/Pci(1|1)
 00   E0   02   00  0x1002  0x5159   XX  Acpi(HWP0002,700)/Pci(2|0)
```

   In the example above, a single SCSI interface is shown in the listing. The information for both channels of the SCSI interface is shown in **bold**, for highlighting purposes.

   For each channel of the SCSI board, you need to note certain information. As an example, look at the information for the SCSI interface (the first two bold lines). For each channel of *this* SCSI interface, note the following information:

   - `Bus #`—identifies the bus the device is on; for the SCSI interface, this is the same for both channels. In this example, the bus number is `20`.
   - `Dev #`—the ID the device is assigned on the bus; for the SCSI interface, this is the same for both channels. In this example, the SCSI interface is device `01`.
   - `Fnc #`—identifies the channel of the device (`00` for channel A, `01` for channel B, and so on). In this example, because the SCSI interface has two channels, one channel is `00` and the other is `01`.

- `Vendor ID`—shows the device's vendor ID; for the SCSI interface, this is the same for both channels. For all the SCSI interface the ID is `0x1000`.
- `Device ID`—shows the device ID; for the SCSI interface, this is the same for both channels. For the SCSI interface the ID is `0x0030`.
- `Slot #`—identifies the physical card slot in the system where the SCSI interface is installed; for the SCSI interface, this is the same for both channels. In this example, the SCSI interface is on the system board therefore the slot number is `xx`.
- `Path`—identifies the device's path; for the SCSI interface, this is the same for both channels. In this example, the SCSI interface path is `Acpi(HWP0002,200)/Pci(1|0)` for channel A and `Acpi(HWP0002,200)/Pci(1|1)` for channel B.

Using the SCSI interface information from the example above, the pieces of information that, combined, tell you this is a SCSI interface are the following (shown in **bold**, for highlighting purposes):

```
00   20   01   00  0x1000  0x0030   xx  Acpi(HWP0002,200)/Pci(1|0)
00   20   01   01  0x1000  0x0030   xx  Acpi(HWP0002,200)/Pci(1|1)
```

The vendor (**0x1000**) and device (**0x0030**) are the IDs for a SCSI interface. Of the devices with those IDs, this device has two channels (Fnc # of **00** immediately followed by Fnc # of **01**). Also, this SCSI interface has a non-numeric (XX) slot # indicating that it is on the system board.

2. From the EFI shell prompt, type the following command to obtain the controller's handle for the SCSI interface:

   `devtree`

   A tree of all EFI-capable devices installed in the system displays. The output looks like this:

```
Shell> devtree

Device Tree

Ctrl[04]
Ctrl[0A] Acpi(HWP0002,0)
Ctrl[12] Usb Open Host Controller
Ctrl[13] Usb Open Host Controller
Ctrl[14] Acpi(HWP0002,0)/Pci(1|2)
Ctrl[15] PCI IDE/ATAPI Controller
Ctrl[48] DW-28E
Ctrl[83] FAT File System [FAT32] 118 MB
Ctrl[16] Acpi(HWP0002,0)/Pci(3|0)
Ctrl[49] Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)
Ctrl[0B] Acpi(HWP0002,100)
Ctrl[17] LSI Logic Ultra320 SCSI Controller
Ctrl[18] LSI Logic Ultra320 SCSI Controller
Ctrl[19] Acpi(HWP0002,100)/Pci(2|0)
Ctrl[4B] Broadcom NetXtreme Gigabit Ethernet (BCM5701)
Ctrl[0C] Acpi(HWP0002,200)
Ctrl[0D] Acpi(HWP0002,400)
Ctrl[0E] Acpi(HWP0002,700)
Ctrl[1A] Acpi(HWP0002,700)/Pci(1|0)
Ctrl[1B] Acpi(HWP0002,700)/Pci(1|1)
Ctrl[36] 16550 Serial UART Driver
Ctrl[37] VT-100+ Serial Console
Ctrl[31] Primary Console Input Device
Ctrl[32] Primary Console Output Device
Ctrl[30] Primary Standard Error Device
Ctrl[1C] Acpi(HWP0002,700)/Pci(2|0)
Ctrl[32] Primary Console Output Device
Ctrl[30] Primary Standard Error Device
Ctrl[33] Acpi(PNP0501,0)
Ctrl[34] 16550 Serial UART Driver
Ctrl[35] VT-100+ Serial Console
Ctrl[31] Primary Console Input Device
```

```
Ctrl[32] Primary Console Output Device
Ctrl[30] Primary Standard Error Device
Ctrl[44] VenHw(904EFCF0-F0A8-11D4-B4CA-303031303833)
Ctrl[46] VenHw(D65A6B8C-71E5-4DF0-A909-F0D2992B5AA9)
```

In the above example, the SCSI interface information is shown **highlighted bold**. You can tell the information is for the SCSI interface because the path on the first line—`Acpi(HWP0002,100)` — is the path from the information displayed by the `info io` command. The next two lines are for the SCSI interface two channels, one line for each channel (they contain the SCSI interface description [`LSI Logic Ultra160 SCSI Controller`]). Note the value shown for `Ctrl`—`17` and `18`—at the beginning of each of those lines; this is the **controller's handle** for each channel. You need to know it for the next step.

NOTE: The controller's handle values will change on every boot.

3. Still at the EFI shell prompt, type this command to obtain the EFI driver's handle for the SCSI interface:

   `drvcfg`

   A list of all EFI-capable configurable components in the system is displayed. The output may look like this:

```
Shell> drvcfg

Configurable Components
Drv[3D] Ctrl[15] Lang[eng]
Drv[3F] Ctrl[19] Lang[eng]
Drv[45] Ctrl[17] Lang[eng]
Drv[45] Ctrl[18] Lang[eng]
```

   This listing shows which driver controls which device (controller). In the above example, the SCSI interface information is shown highlighted **bold**. You can tell the information is for this SCSI interface because the values shown for `Ctrl`—`17` and `18`—are the controller's handles for the SCSI interface two channels (from the information displayed by the `devtree` command).

NOTE: The EFI driver's handle values change on every boot.

TIP: From this command (`drvcfg`), record these two pieces of information for *each* channel of *each* SCSI interface for parameters to be changed:

- `Drv`(the EFI driver's handle)
- `Ctrl`(the controller's handle)

4. Using the information (the driver's handle [`Drv`] and the controller's handle [`Ctrl`]) from the `drvcfg`command, start the EFI SCSI Setup Utility for *one* channel of *this* SCSI interface.

   At the EFI shell prompt, enter:

   `drvcfg -s drvr_handle cntrl_handle`

   where

   - *`drvr_handle`*is the handle of the driver that controls the channel whose SCSI ID you want to display or change
   - *`cntrl_handle`*is the handle of the controller for the channel whose SCSI ID you want to display or change

   Continuing the example for *channel A* of *this* SCSI interface, enter:

   `drvcfg -s 45 18`

5. The EFI SCSI Setup Utility starts and its main menu displays, showing a list of all the EFI capable SCSI interfaces in the system.

TIP: To move the cursor in the EFI SCSI Setup Utility, you can use these keys:

- Arrow keys: ↑ ↓ ← →
- Alternate keys:

  H = left

  J = down

  K = up

  L = right

  I = home

  O = end

Move the cursor to highlight the channel of the SCSI interface; and press **Enter** (to determine which channel of the interface to highlight, match the `PCI Bus`, `PCI Dev`, and `PCI Func` values on this screen to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command).

CAUTION: Do **not** select the `<Global Properties>` option on the main menu.

6. The "Adapter Properties" screen for this channel of the SCSI interface displays. Make sure the utility is running for the channel of the SCSI interface by comparing the values shown for `PCI Bus`, `PCI Device`, and `PCI Function` to the `Bus #`, `Dev #`, and `Fnc #` values from the `info io` command.

CAUTION: Do **not** change the value for **any** of these fields on the "Adapter Properties" screen:

- `Auto Termination`
- `SCSI Parity`
- `SCSI Bus Scan Order`
- `Spinup Delay (Secs)`

Changing any of these fields can cause unpredictable results.

CAUTION: Do **not** change the value for **any** of these fields on the "Device Properties" screen:

- `Scan Id`
- `Scan LUNs > 0`
- `Disconnect`
- `SCSI Timeout`
- `Queue Tags`
- `Format`
- `Verify`

Changing any of these fields can cause unpredictable results.

7. Display (and optionally change) any SCSI parameters listed below for the channel of the SCSI interface, or restore its SCSI parameters to their default values.
   - SCSI ID
   - Maximum data transfer rate
   - Bus width
   - Whether the SCSI interface is bootable (driver support)
   - Avoid bus resets (secondary cluster server)
   - Restore Defaults
8. Use the arrow keys to navigate to the appropriate SCSI parameter.
9. Use the plus (**+**) and minus (**-**) keys to scroll through the values until the value you want displays.

10. Press **Esc** to exit the "Adapter Properties" screen. You are given these choices:
    - Cancel the exit from the screen (to stay in the "Adapter Properties" screen for the channel of the SCSI interface)
    - Save the changes you made and then exit the screen
    - Discard the changes you made and then exit the screen
11. Move the cursor to the action (`cancel`, `save`, or `discard`) you want to take; press **Enter**.

    If you selected `cancel`, you remain in the "Adapter Properties" screen for the channel of the SCSI interface. You can still change the channel's parameters listed above.

    If you selected `save` or `discard`, you go to the EFI SCSI Setup Utility's main menu.

CAUTION: Do *not* select the `<Global Properties>` option on the main menu.

12. Press **Esc** to exit the main menu and the EFI SCSI Setup Utility.
13. Select the option for exiting the utility.
14. When prompted, press **Enter** to stop the SCSI interface; you are at the EFI shell prompt.
15. At the EFI shell prompt, enter this command:

    ```
    reset
    ```

    The system starts to reboot. This is **required** to cause the new SCSI setting.

Using the Boot Option Maintenance Menu

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

- "Boot from a File"
- "Add a Boot Option"
- "Delete Boot Option(s)"
- "Change Boot Order"
- "Manage BootNext Setting"
- "Set Auto Boot TimeOut"
- "Select Active Console Output Devices"
- "Select Active Console Input Devices"
- "Select Active Standard Error Devices"
- "Security/Password Menu"
- "Resetting Passwords"

These items are described in the following sections.

In all menus, select:

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

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

EFI Shell Paths

All devices in the server blade are represented by paths in the EFI shell. To identify the correct socket or disk drive, use the following tables.

Table C-3 Server Blade Sockets

Socket	Path
1 PCI	Acpi(HWP0002,400)/pci(0|0)
2 PCI	Acpi(HWP0003,400)/pci(0|0)

Table C-4 Server Blade Drives

Drive	Path
SCSI Disk	Acpi(HWP0002,100)/Pci(1|0)/Scsi(Pun0,Lun0)
SCSI Disk	Acpi(HWP0002,100)/Pci(1|1)/Scsi(Pun0,Lun1)
Removable Media Boot	Acpi(HWP0002,0)/Pci(1|0)/Usb(0,0)/HD

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

For example:

```
Boot From a File. Select a Volume

    NO VOLUME LABEL [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM
    CD_FORMAT [Acpi(HWP0002,0)/Pci(2|0)/Ata(Secondary,Master)/CDROM
    Removable Media Boot [Acpi(HWP0002,500)/Pci(2|0)/Ata(Secondary,Master)
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)]
    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 allows you to boot from a removable media drive (CD/DVD drive). This option does not support booting from a specific file on a specific removable media disc.
- The two Load Files are the EFI Shell and the LAN.

Add a Boot Option

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

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

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

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

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

For example:

```
Add a Boot Option. Select a Volume

NO VOLUME LABEL [Acpi(HWP0002,0)/Pci(2|0)/Ata(Primary,Master)/CDROM

    Removable Media Boot [Acpi(HWP0002,0)/Pci(2|0)/Ata(Secondary,Master)
    Load File [EFI Shell [Built-in]]
    Load File [Acpi(HWP0002,0)/Pci(3|0)/Mac(00306E4C4F1A)]
    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 treats the Removable Media (generally a CD) as a bootable device.
- Load File EFI Shell adds a new instance to the EFI Shell. Load File with the MAC address adds a network boot option.

Delete Boot Option(s)

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

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

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

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

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

Change Boot Order

Use this option to change the order of boot options. The order in which options are listed in the EFI boot menu also reflects the order in which the system attempts to boot. If the first boot option fails, the system 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. 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 are descriptions of the selected option.

For example:

```
Change boot order. Select an Operation

    EFI Shell [Built-in]
```

```
    Current OS
    Save Settings to NVRAM
    Help
    Exit

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

Manage BootNext Setting

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

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

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

For example:

```
Manage BootNext setting. Select an Operation

    EFI Shell [Built-in]
    Current OS
    Reset BootNext Setting
    Save Settings to NVRAM
    Help
    Exit

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

Set Auto Boot TimeOut

Use this option to set the amount of time the system 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 system console. This list normally includes the VGA monitor and a serial port for directing output to a terminal emulation package.

NOTE: Multiple consoles are not supported for HP-UX.

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)
```

* indicates a currently selected device.

This menu is identical to Console Error Devices. The server blade does not support different configurations for Output and Error console. For correct operation:

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

Table C-5 Console Output Devices

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

- 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 might 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.

Select Active Console Input Devices

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

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

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

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

For example:

```
Select the Console Input Device(s)

  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(PcAnsi)
  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100)
* Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(Vt100+)
  Acpi(PNP0501,0)/Uart(9600 N81)/VenMsg(VtUtf8)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(PcAnsi)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100)
```

```
* Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(Vt100+)
  Acpi(HWP0002,700)/Pci(1|1)/Uart(9600 N81)/VenMsg(VtUtf8)
```

* indicates a currently selected device.

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

Table C-6 Console Input Devices

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

Select Active Standard Error Devices

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

This menu is identical to Console Output Devices. The server blade does not support different configurations for Output and Error console. For correct operation:

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

Using the System Configuration Menu

The System Configuration Menu (on systems 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:

Resetting Passwords

If you forget your passwords, they can be reset using an iLO MP command.

- Run the `MP BP`command to reset the iLO MP and reset the password (see "Reset BMC Passwords" (page 128)" for more information).

NOTE: You can only run this command when directly connected to the server blade.

Integrated Lights Out Management Processor

The integrated Lights Out Management Processor (iLO MP) is an independent support system for the server. It provides a way for you to connect to a server and perform administration or monitoring tasks for the server hardware.

The iLO MP controls power, reset, Transfer of Control (ToC) capabilities, provides console access, displays and records system events, and displays detailed information about the various internal subsystems. The iLO MP also provides a virtual front panel used to monitor system status and the state of front panel LEDs. All iLO MP functions are available through the LAN and the local RS-232 port.

The iLO MP is available whenever the system is connected to a power source, even if the server main power switch is off.

Access to the iLO MP can be restricted by user accounts. User accounts are password protected and provide a specific level of access to the server and iLO MP commands.

Multiple users can interact with the iLO MP. From the **MP Main Menu**, users can select any of the following options: enter iLO MP command mode, enter console, view event logs, view console history, display virtual front panel, enter console session, or connect to another iLO MP. Multiple users can select different options from the **MP Main Menu** at the same time. However, iLO MP command mode and console mode are mirrored, The iLO MP allows only one user at a time to have write access to the shared console. For more information regarding the iLO MP, see the *HP Integrity and HP 9000 Integrated Lights Out Management Processor Operations Guide*.

Accessing the iLO MP

You can connect to the iLO MP using the following methods:

- The **local RS-232 port** using a local terminal
- The **iLO MP LAN port** using Web GUI, telnet, or SSH if login access through the iLO MP LAN is enabled

Interacting with the iLO MP

To interact with the iLO MP, perform the following steps:

1. Log in using your iLO MP user account name and password.

NOTE: If the iLO MP is not displaying the **MP Main Menu**, use **Ctrl–B** to access the **MP Main Menu** and the iLO MP prompt.

2. Use the iLO MP menus and commands as needed. A list of available commands can be displayed by using the iLO MP help function (in the **MP Main Menu**, enter **HE** followed by **LI** at the `MP HELP:` prompt). Log out using the **`x`** command (in the **MP Main Menu**, enter **`x`** at the MP> prompt) when done.

iLO MP Command Interface

Use the iLO MP menus and commands as needed. The login screen, which includes the Main Menu, is shown below. Main Menu commands (`CO`, `VFP`, `CM`, `CL`, `SL`, `HE`, and `X`) can be entered after the `MP` prompt. Commands not displayed in the **MP Main Menu** can be accessed in command mode by first using the `CM` command at the `MP` prompt (display a list of available commands using the iLO MP help function. Display the list of commands as follows: in the **MP Main Menu**, enter **`HE`** after the `MP>` prompt, then enter **`LI`** after the `MP HELP:` prompt). Return to the **MP Main Menu** by typing **Ctrl–B**.

NOTE: At publication, the current version of the iLO MP Revision is H.03.15. Check the HP web site for the latest revision.

iLO MP Welcome Screen

iLO MP Welcome screen commands:

```
MP Login: Admin
MP password: *****
Hewlett-Packard Integrated Lights-Out HP Integrity and HP 9000
(C) Copyright Hewlett-Packard Company 1999-2005. All rights reserved
System Name: xxxxxxxxx
Revision H.03.19


MP MAIN MENU:
CO:   Console
VFP:  Virtual Front Panel
CM:   Command Menu
CL:   Console Log
SL:   Show Event Logs
HE:   Main Menu Help
X:    Exit Connection
```

iLO MP Help System

The iLO MP has a robust help system. To invoke iLO MP HELP, enter**he**after the MP> prompt. The following displays:

```
HE

==== MP Help: Main Menu ==============================================

Hardware Revision H0  Firmware Revision H.03.19 Dec 15 2005,13:02:01
Integrated Lights-Out for HP Integrity and HP 9000 - Management Processor (MP)

                     MP Help System

    Use Ctrl-B to exit MP command interface and return to the main MP menu.
    Enter a command at the help prompt:

           OVerview  : Launch the help overview
           LIst      : Show the list of MP Command Menu 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
```

Enter one of the commands described above: **OV, LI, <command>, TOP, HE, Q**

iLO MP Commands

iLO MP commands are listed in Table C-7 and described in the following paragraphs. These commands should be entered from the Command Menu. Type**CM**from the **MP Main Menu** to access the **Command Menu**,

Table C-7 iLO MP Commands and Descriptions

Command	Description
BLADE	Set server blade infrastructure parameters
BP	Reset BMC passwords
CA	Configure asynch/serial ports
CL	View console log

Table C-7 iLO MP Commands and Descriptions *(continued)*

Command	Description
CM	Select command mode
<Ctrl–B>	Return to MP Main Menu from any iLO MP submenu
<Ctrl–N>rs	Reset iLO MP and allow password reset, user accounts are defaulted
CO	Select console mode
DATE	Date display
DC	Default configuration
DF	Display FRU information
DI	Disconnect remote or LAN console
DNS	Configure DHCP and DNS
FW	Upgrade iLO MP firmware
HE	Display help for menu or command
ID	System information
IT	Inactivity timeout settings
LDAP	Configure LDAP parameters and group administrators
LC	LAN configuration
LM	License management
LOC	Locator LED display and configuration for server blade and enclosure
LS	LAN Status
MA	Return to Main Menu
PC	Remote power control
PR	Power restore
PS	Power management module status
RB	Reset BMC
RS	Reset system through RST signal
SA	Set access
SL	Show event logs
SNMP	Enable/disable the SNMP feature, set community string
SO	Security options
SS	System processor status
SYSREV	Current system firmware revisions
TC	Reset via transfer of control (TOC)
TE	Tell- send a message to other users
UC	User configuration
VFP	Displays LED status as shown on the server blade
WHO	Display connected iLO MP users

Table C-7 iLO MP Commands and Descriptions *(continued)*

Command	Description
X	Exit iLO MP and disconnect
XD	Diagnostics and/or reset of iLO MP

Blade Parameters

`BLADE`: Blade parameters configuration

This command allows you to configure the server blade infrastructure parameters.

Command line usage:

```
BLADE [ -rack <Rack name> ] [ -enclosure <Enclosure name> ] [ -bay <Bay name> ] [ -nc ]
```

- Rack Name: The Rack Name is used to logically group together enclosures in a rack. The Rack Name is shared with the other enclosures in the rack.
- Enclosure Name: The Enclosure Name is used to logically group together the blade servers installed in the same enclosure. The Enclosure Name is shared with the other servers in the enclosure.
- Bay Name: The Bay Name is used to assist in identifying a blade.
- Bay Number: The blade enclosure can support as many as 8 servers. The bays are numbered (when viewed from the rack front) from left to right from 1 to 8. The Bay number is used to locate and identify a blade.
- Rack Serial Number: The Rack Serial Number identifies the components in the rack as a logical grouping.
- Enclosure Serial Number: The Enclosure Serial Number identifies a particular BLADE enclosure.
- Blade Serial Number: The Blade Serial Number identifies the serial number for the server.

NOTE: The configurable blade parameters can be modified only with "M". privilege, regardless of the connection (serial, web, telnet). Other users have read-only permission for these parameters. The maximum length of configurable blade parameters is 32 characters and alphanumeric only.

Reset BMC Passwords

`BP`: Reset BMC Passwords

This command resets BMC passwords (both USER and ADMIN passwords).

Configure Serial Port Parameters

`CA`: Configure local and remote serial port parameters

Set up the local serial port parameters as follows:

- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec.
- FLOW CONTROL: Hardware uses RTS/CTS; Software uses Xon/Xoff.

IMPORTANT: Do not mix HP and vt100 terminal types at the same time.

Set up the remote serial port parameters as follows:

- BAUD RATES: Input and output data rates are the same; 300, 1200, 2400, 4800, 9600, 38400, 115200 bit/sec.
- FLOW CONTROL: Hardware uses RTS/CTS; Software uses Xon/Xoff.

The iLO MP mirrors the system console to the iLO MP local and LAN ports. One console output stream is reflected to all of the connected console users. If several different terminal types are used simultaneously by the users, some users may see strange results.

Example HP-UX

Applications that care about the terminal type (install, SAM, vi, etc.) running on HP-UX use two methods to determine the terminal type:

1. The $TERM shell environment variable.
2. The application directly queries the terminal (in this case, the write enabled terminal establishes the terminal type).

Make sure that settings #1 and #2 agree with your terminal type.

Console Log

`CL`: Console Log—view the history of the Console output

This command displays up to 60 Kilobytes of logged console data (about 60 pages of display in text mode) sent from the system to the Console path.

Command Mode

`CM:` Command Mode—enter command mode

This command switches the console terminal from the **MP Main Menu** to mirrored command interface mode. If the current mux authority is `administrator` and the new login is as `operator`, the command mux is denied (remains in **MP Main Menu** mode). If a command is in progress, a message displays warning the new user of system status.

Console

`CO`: COnsole—leave command mode and enter console mode

This command switches the console terminal from the **MP Main Menu** to mirrored/redirected console mode. All mirrored data displays. Type **Ctrl–B** to return to the **MP Main Menu**.

For VT100 and HPterm, verify that the iLO MP setting in the CA command is correct and all mirrored consoles are of the same terminal type for proper operation.

<Ctrl–B>

`<Ctrl-B>:`Return to the **MP Main Menu** from any submenu in the iLO MP environment.

This command returns you to the **MP Main Menu** from anywhere in the iLO MP environment.

<Ctrl–N>rs

`<Ctrl-N>rs:` Reset iLO MP and allow password reset

This command resets the iLO MP if it is hung. Use this in the place of the iLO MP reset button (not part of the BL860c server blade). It also allows you to reset the iLO MP password.

IMPORTANT: You can only run this command when directly connected to the server blade.

NOTE: To execute this command, press the **Ctrl** key and the **N** key. Release these keys, and press **rs**.

Date

`DATE`: Date display

This command displays the current date, as generated by the OS or system firmware.

Default Configuration

`DC`: Default Configuration—reset all iLO MP parameters to the default configuration

This command sets all iLO MP parameters back to their default values. You may reset all, or a subset of the following parameters:

- IP configurations
- Command Interface configuration
- Disable remote access, security configuration
- Reset LDAP and SNMP configuration parameters
- Reset User and Blade configuration parameters
- Session configuration (for example; setting the security configuration to default erases all users and passwords)

There are three ways to reset passwords in the MP:

1. In the `SO` command, change individual users.
2. In the `DC` command, choose "Reset Security Configuration".
3. Forgotten passwords can be reset by using the **Ctrl–Nrs** command.

NOTE: All user information (logins, passwords, and so on) is erased in methods 2 and 3.

Display FRUID

`DF`: Display FRUID information

This command displays FRUID information from the BMC for FRU devices. Information provided includes serial number; part number; model designation; name and version number; and manufacturer.

Disconnect LAN Console

`DI`: DIsconnect LAN/WEB console

This command disconnects LAN/WEB users from MP. It does not disable the ports. The remote console is no longer mirrored. The DI command also shows the number and type of current LAN based connections. Choose any or all types:

```
     DI

     Current user access state:
          T - Telnet        : Disconnected
          W - Web SSL       : Disconnected
          H - SSH           : Disconnected

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

Domain Name Server Settings

`DNS`: Domain name server settings

This command configures the DNS server settings. DHCP must be enabled for this command to work. DNS lets you configure DNS Domain Name and DNS servers (up to 3) either manually or automatically though DHCP. It further allows a DDNS update through the primary DNS server as long as it is authoritative for the zone.

iLO MP Firmware Update

`FW`: Activates iLO MP firmware upgrade mode

This command is available from either the LAN or local serial port. This command activates firmware upgrade mode, which loads new firmware through the iLO MP LAN by FTP (which must be operational). An iLO MP Reset is generated after the upgrade is complete.

Help

`HE`: Display help for menu or command

This command displays the iLO MP hardware and firmware version identity, and the date and time of firmware generation. If executed from the **MP Main Menu**, general information about the iLO MP, and those commands displayed in the **MP Main Menu**, will be displayed. If executed in command mode, this command displays a list of command interface commands available to the user. It also displays detailed help information in response to a topic or command at the help prompt.

Display System ID

`ID`: Display/modify system information

This command allows the user to display and modify the following:

- SNMP contact information
- SNMP server information
- SPU hostname

Inactivity Timeout

`IT`: Inactivity Timeout settings

The session inactivity timeout is up to 1,440 minutes—default is 60 minutes. This timeout prevents sessions to the system from being inadvertently left open. A session can be started by the `SE` command. An open session can prevent users from logging onto the iLO MP through a port and can also prevent system applications from initiating an outbound connection.

iLO MP inactivity timeout is up to 1,440 minutes—default is 5 minutes. This timeout prevents a user from inadvertently keeping the iLO MP locked in a iLO MP Command Interface mode preventing other users from looking at the console output. The iLO MP Command Interface inactivity. timeout may not be deactivated.

Flow control timeout is 0 to 60 minutes. If set to 0, no timeout is applied. This timeout prevents mirrored flow control from blocking other ports when inactive.

Configure LAN Console

`LC`: LAN configuration (IP address, and so on)

This command displays and allows modification of the LAN configuration. Configurable parameters include:

- iLO MP IP Address
- iLO MP Host Name
- DHCP status (also able to set the Web and SSH access ports)
- SSH Access Port number
- Subnet Mask
- Gateway Address
- Web Console port number
- Link State

The iLO MP Host Name set in this command displays at the iLO MP command interface prompt. This field can be programmed to any useful name or phrase. For clarity, it is useful to enter **`MP-host-name-on-system`**as the iLO MP Host name, so both names show up in the prompt (limit 19 characters, no spaces allowed).

Configure LDAP Parameters

`LDAP`: Configure LDAP parameters and group administrators.

LDAP directory support is an iLO MP Advanced feature that allows you to centralize user account administration using directory services. Configure directory settings with the LDAP command.

- LDAP Directory Authentication: activates or deactivates directory support on this MP. If directory authentication is enabled and configured properly, users may log into iLO MP

using directory credentials. If it is disabled, user credentials are not validated using the directory.

- Local User Accounts: Includes or excludes access to local iLO MP user accounts. If local user accounts are enabled, a user may log into iLO MP using locally-stored user credentials (created through the `UC` command). If they are disabled, user access is limited to valid directory credentials only.

NOTE: Locally-stored user accounts can be active while directory support is enabled. This allows both local- and directory-based user access. If both directory authentication and local user accounts are enabled, login is attempted against the directory first, then local accounts.

Locator LED Status

`LOC`: Locator LED Status

This command displays the current status of the server blade locator LED, and the enclosure LED.

LAN Status

`LS`: LAN Status

This command displays all parameters and the current status of the iLO MP LAN connections. The LAN parameters are not modified by the execution of this command.

Return to Main Menu

`MA`: Return to **MP Main Menu**

This command makes the iLO MP return to the non mirrored **MP Main Menu**. This is the same as executing **Ctrl–B**.

Power Control

`PC`: Power Control—turn system power on and off

This command allows you to switch the system power on or off. You can set the action to take place immediately, or after a specified delay. For proper system shutdown, shut down the OS before issuing this command or use the graceful shutdown option. This command also allows control of the power management module. It allows you to switch the system ON politely (requesting the enclosure management module [EMM] for required power), FORCE ON (without requesting EMM for required power [**not** recommended]), or OFF. Use the command to power cycle the server blade (restart after a fixed delay).

Power Status

`PS`: Power status—display the status of the server blade power, temperature and fans.

This command displays the server blade power, temperature, and fan status.

Reset BMC

`RB`: Reset BMC

This command resets the BMC.

Reset System

`RS`: Reset system (except iLO MP and BMC) through RST signal

IMPORTANT: Under normal operation, shut down the OS before issuing this command.

This command causes the system (except the MP) to be reset through the RST signal.

Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system. The effect of this command is very similar to cycling the system power. The OS is not notified, no dump is taken on the way down, and so on.

Set Access

SA: Set access options—enable/disable LAN access methods

This command disconnects LAN and web users if access is disabled.

Display Logs

SL: Display contents of the system status logs

This command displays the contents of the event logs that have been stored in nonvolatile memory.

- System Event Log (SEL)—Events (filtered by alert level) and errors
- Forward progress Log (FPL)—All events
- Live events—View events as they occur
- Clear logs—Clears the SEL and FPL before they get full
- Current boot log—All events between “start of boot” and “boot complete”
- Previous boot log—The events from the previous boot

Reading the system event log turns off the health LED. Accessing this log is the only way to turn off the health LED when it is flashing and alerts have not been acknowledged at the alert display level.

Events are encoded data that provide system information to the user. Some well-known names for similar data would be Chassis Codes or Post Codes. Events are produced by intelligent hardware modules, the OS, and system firmware. Use SLto view the event log.

Navigate within the logs as follows:

- + — View the next block (forward in time)
- - — View the previous block (backward in time)
- Enter (<CR>) — View the next block in the previously selected direction (forward or backward in time)
- D — Dump the entire log for capture or analysis
- F — First entry
- L — Last entry
- J — Jump to entry number __
- V — View mode configuration (text, keyword, hex)
- ? — Display this help menu
- Q — Quit

Table C-8 defines alert (or severity) levels.

Table C-8 Alert Levels

Severity	Definition
0	Minor forward progress
1	Major forward progress
2	Informational
3	Warning
5	Critical
7	Fatal

Security Options

SO: Configure security options and access control

Use this command to modify the security options of MP. These are:

- Login time-outs
- Allowed password faults
- Allow firmware upgrade over PCI
- Allow iLO MP reset from ipmi
- SSL certificate generation
- SSH key pair generation

Login timeout: is effective on all ports, including the local port, and timeout value is the same for all ports. However, the local port cannot be disconnected like other ports on login timeout. So if a local port user sits at the 'iLO MP login:' prompt, nothing happens even if a timeout occurs. But if a local port user enters a login name, and then sits at the 'iLO MP password:' prompt, if timeout occurs at this stage, this login is cancelled and you go back to the 'iLO MP login:' prompt.

System Status

SS: Displays the status of the system processors

The SS command displays the status of the system processors and which processor is the monarch.

Firmware Revision Status

SYSREV: Displays the revision status of firmware in the system.

This command displays the revision status of firmware in the system.

NOTE: At the time of production of this guide, the firmware revisions were:

```
FIRMWARE INFORMATION

   MP FW: H.03.15
   BMC FW: 04.05
   EFI FW: 05.16
   System FW: 62.14
```

Transfer Of Control

TC: System reset through INIT or TOC (Transfer of Control) signal

Under normal operation, shut down the OS before issuing this command.

This command causes the system to be reset through the INIT (or TOC) signal. Execution of this command irrecoverably halts all system processing and I/O activity and restarts the computer system. It is different from the RS command in that the processors are signaled to dump state on the way down.

Tell

TE: TEll—sends a message to other terminals

Up to 80 characters can be typed in. The message is broadcast to the other mirrored clients. The message displays to all users currently in the iLO MP Command Mode.

User Configuration

UC: User Configuration—controls user access

Use this command to modify the user configuration of the MP. These include user accounts, passwords, etc. There are two default users - Admin and Oper. The Admin user has all 4 rights

(C,P,M and U), and the Oper user has the Console access right by default. The configuration of these default users can also be changed using this command. Most of the parameters are familiar, the following require some extra explanation:

MODE: Single/Multiple If the mode is Single, the state changes to disabled after the first login

USER'S STATE: Enabled/Disabled A disabled user's login is not accepted

SYSREV or SR command (at time of release):

```
 MP FW     : H.03.19      BMC FW    : 04.08
FI FW     : 05.16
 System FW : 01.60
```

Virtual Front Panel

VFP: Display Virtual Front Panel

The VFP command presents a summary of the system by using direct console addressing. If the terminal is not recognized by the MP, VFP mode will be rejected. Each individual user will get this summary in order to avoid issues related to terminal type and screen display mode.

Who

WHO: Displays a list of iLO MP connected users

This command displays the login name and operating mode (Main Menu, command, and so on) of the connected console client users, and the port on which they are connected. For the LAN and WEB console clients the remote IP address is also displayed.

If the local console client user did not originate the iLO MP command interface session, there is always one default user listed for the local serial port: local user i. If the local console operator types **CTRL–B**, then the login name that the local operator used is displayed instead.

Exit from MP

X: Exit from iLO MP command interface and disconnect from the system

This command disconnects the executing user from the system. This command is available from the local port.

Diagnostics

XD: Diagnostics and/or Reset of MP

This command allows the user to perform some simple checks to confirm the MP's health and its connectivity status. The following tests are available:

- iLO MP Parameter Checksum
- Verify I2C connection (get BMC Device ID)
- LAN connectivity test using ping

Also, you can reset the iLO MP with this command. You can safely reset the iLO MP without affecting the operation of the server.

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