

HP Integrity BL860c i2, BL870c i2 & BL890c i2 Server Blade User Service Guide

Abstract

This document contains specific information that is intended for users of this HP product.

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Warranty

To get a copy of the warranty for this product see the warranty information website:

<http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c01865770/c01865770.pdf>

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Contents

1 Overview	8
Server blade overview	8
Server blade components	9
2 Site preparation	10
Server blade dimensions and weight	10
Enclosure information	10
Enclosure environmental specifications	10
Sample Site Inspection Checklist	11
Power subsystem	13
ESD handling information	13
Unpacking and inspecting the server blade	13
Verifying site preparation	14
Inspect the shipping containers for damage	14
Unpacking the server blade	14
Verifying the inventory	14
Returning damaged equipment	14
3 Installing the server blade into the enclosure	15
Installation sequence and checklist	15
Installing and powering on the server blade	15
Preparing the enclosure	15
Removing a c7000 device bay divider	16
Removing a c3000 device bay mini-divider or device bay divider	17
Installing interconnect modules	18
Interconnect bay numbering and device mapping	19
Installing the server blade into the enclosure	20
Server blade power states	21
Powering on the server blade	22
Powering off the server blade	22
Installing the Blade Link for BL870c i2 or BL890c i2 configurations	22
Conjoin checks	25
Using iLO 3	25
Accessing UEFI or the OS from iLO 3 MP	26
UEFI Front Page	27
Saving UEFI configuration settings	28
Booting and installing the operating system	28
Operating system is loaded onto the server blade	29
Operating system is not loaded onto the server blade	29
OS login prompt	29
Installing the latest firmware using HP Smart Update Manager	29
4 Operating system procedures	30
Operating systems supported on the server blade	30
Installing the operating system onto the server blade	30
Installing the OS from an external USB DVD device or tape device	30
Installing the OS using HP Ignite-UX	31
Installing the OS using vMedia	31
Configuring system boot options	32
Booting and shutting down HP-UX	32
Adding HP-UX to the boot options list	32
HP-UX standard boot	33
Booting HP-UX from the UEFI Boot Manager	33

Booting HP-UX from the UEFI Shell.....	34
Booting HP-UX in single-user mode.....	34
Booting HP-UX in LVM-maintenance mode.....	34
Shutting down HP-UX.....	34
Booting and shutting down HP OpenVMS.....	35
Adding OpenVMS to the Boot Options List.....	35
Booting OpenVMS.....	36
Booting OpenVMS from the UEFI Boot Manager.....	36
Booting HP OpenVMS from the UEFI Shell.....	36
Shutting Down OpenVMS.....	37
Booting and shutting down Microsoft Windows.....	37
Adding Microsoft Windows to the boot options list.....	37
Booting the Microsoft Windows operating system.....	39
Shutting down Microsoft Windows.....	39
Shutting down Windows from the command line.....	40
5 Optional components.....	41
Partner blades.....	41
Hot-plug SAS disk drives.....	42
Installing internal components.....	43
Removing the access panel.....	43
Processor and heatsink module.....	44
DIMMs.....	49
Mezzanine cards.....	52
HP Smart Array P700m/512 Controller.....	53
Battery kit and other components.....	53
Battery mounting bracket parts.....	54
Installing the Controller Board.....	55
Upgrading or replacing controller options.....	56
Replacing the 512MB cache module.....	56
Replacing the battery mounting bracket.....	57
Replacing the BBWC battery.....	58
Removing upgrade components.....	60
Removing the 512MB cache module.....	60
Removing the battery mounting bracket.....	60
Removing the BBWC battery.....	61
HP Smart Array P711m Controller.....	62
Supercap pack mounting kit.....	62
Installing the Supercap mounting bracket.....	63
Installing the P711m controller board.....	64
Installing the Supercap Pack.....	64
Replacing the access panel.....	65
Upgrading a conjoined configuration.....	66
Procedure summary.....	66
Upgrade kit contents.....	66
Before getting started.....	67
Supported operating systems.....	67
Minimum firmware versions.....	68
Determining your current firmware revisions.....	68
Rules for server blade internal components.....	72
Upgrading the existing server blade.....	73
Existing server blade check.....	73
Adding resources.....	73
Final hardware check.....	78
Booting the operating system.....	79

Warranty registration.....	79
Support.....	80
Blade link and system information parameters.....	80
Operating System Licenses.....	81
HP-UX.....	81
HP OpenVMS.....	81
Windows Server 2008.....	81
Upgrade scenarios which do not require a reinstall of the operating system.....	82
Possible changes due to VC profile mapping on the upgraded server blade.....	82
Preserving VC-assigned MAC addresses in HP-UX by enabling Portable Image.....	84
Pre-Upgrade Procedure for PI.....	85
Post-Upgrade Procedure for PI.....	85
6 Troubleshooting.....	87
Methodology.....	87
General troubleshooting methodology.....	87
Executing recommended troubleshooting methodology	88
Basic and advanced troubleshooting tables.....	88
Troubleshooting tools.....	91
Controls and ports.....	92
Front panel view.....	92
Rear panel view.....	93
Server blade LEDs.....	93
Front panel LEDs.....	93
SAS disk drive LEDs.....	95
SAS hard drive LED combinations.....	95
Blade Link LEDs.....	96
Virtual Front Panel LEDs in the iLO 3 TUI.....	96
SUV Cable and Ports.....	99
Connecting to the serial port.....	99
Diagnostics.....	100
Offline Diagnostics Environment.....	100
General diagnostic tools.....	100
Fault management overview.....	101
HP-UX Fault management.....	101
Errors and error logs.....	101
Event log definitions.....	101
Event log usage.....	102
iLO 3 MP event logs.....	102
SEL review.....	104
Troubleshooting processors.....	105
Processor installation order.....	105
Processor module behaviors.....	105
Enclosure information.....	105
Cooling subsystem.....	105
Firmware.....	105
Identifying and troubleshooting firmware issues.....	105
Verify and install the latest firmware.....	106
Troubleshooting the server interface (system console).....	106
Troubleshooting the environment.....	106
7 Removing and replacing components.....	108
Server blade components list.....	108
Preparing the server blade for servicing.....	110
Powering off the server blade.....	110
Blade Link for BL870c i2 or BL890c i2 configurations.....	110

Removing the Blade Link for BL870c i2 or BL890c i2 configurations.....	110
Replacing the Blade Link for BL870c i2 or BL890c i2 configurations.....	111
Blade Link for BL860c i2 configurations.....	112
Server blade.....	113
Access panel.....	113
Disk drive blanks.....	114
Removing a disk drive blank.....	114
Disk drives.....	114
DIMM baffle.....	115
DIMMs.....	116
CPU baffle.....	117
CPU and heatsink module.....	118
SAS backplane.....	121
Server battery.....	122
Mezzanine cards.....	123
ICH mezzanine board.....	124
System board.....	124
Blade Link.....	125
8 Support and other resources.....	127
Contacting HP.....	127
Before you contact HP.....	127
HP contact information.....	127
Subscription service.....	127
Documentation feedback.....	127
HP Insight Remote Support Software.....	128
New and changed information in this edition.....	128
Typographic conventions.....	128
Standard terms, abbreviations, and acronyms.....	130
A Utilities.....	133
Configuring a Smart Array Controller.....	133
Using the saupdate command.....	133
get_mode.....	133
set_mode.....	134
Updating the firmware using saupdate.....	134
Determining the Driver ID and CTRL ID.....	134
Configuring RAID volumes using the ORCA menu-driven interface.....	135
Creating a logical drive.....	136
Deleting a logical drive.....	137
Useful UEFI command checks.....	138
UEFI.....	139
UEFI Shell and HP POSSE commands.....	139
Drive paths in UEFI.....	142
Using the Boot Maintenance Manager.....	142
Boot Options.....	143
Add Boot Option.....	143
Delete Boot Option.....	144
Change Boot Order.....	145
Driver Options.....	146
Add Driver Option.....	146
Delete Driver Option.....	147
Change Driver Order.....	147
Console Options.....	147
Boot From File.....	147

Set Boot Next Value.....	148
Set Time Out Value.....	148
Reset System.....	149
iLO 3 MP.....	149
Index.....	150
Index.....	154

1 Overview

The HP Integrity BL860c i2 Server Blade is a dense, low-cost, Intel® Itanium® processor server blade. Using a Blade Link hardware assembly, multiple BL860c i2 Server Blades can be conjoined to create dual-blade, four socket and quad-blade, eight socket variants.

Name	Number of Conjoined Server Blades	Number of Processor Sockets
BL860c i2	1	2
BL870c i2	2	4
BL890c i2	4	8

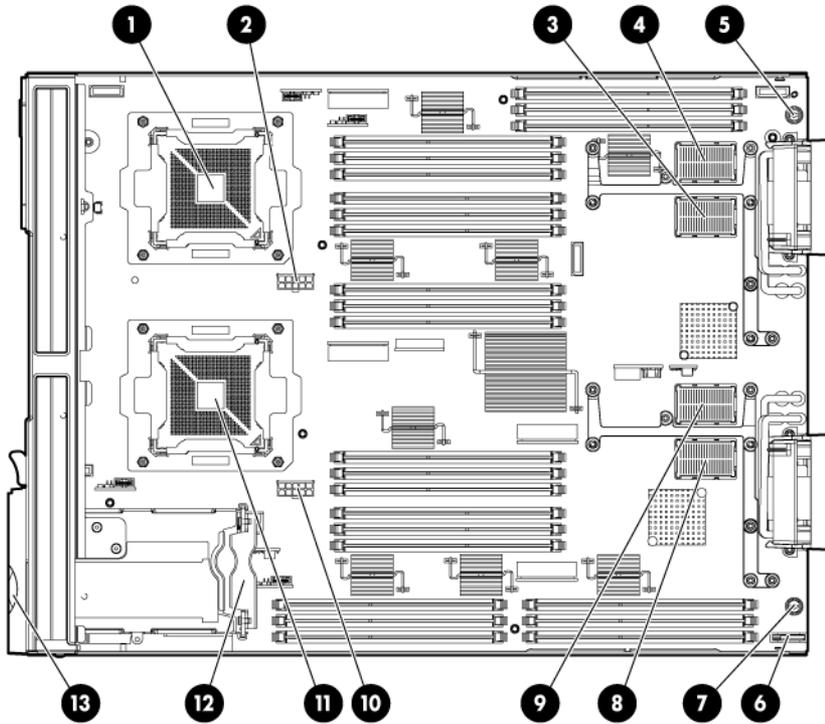
The three blade configurations support the HP-UX, HP OpenVMS, and Windows operating systems and are designed for deployment in c-Class enclosures, specifically the 10U c7000 and the 6U c3000 Enclosures.

NOTE: For purposes of this guide, make sure that the c-Class server blade enclosure is powered on and running properly and that the OA iLO 3 is operational.

Server blade overview

Product	CPU cores (quad)	DIMM slots	max memory	PCIe I/O Mezzanine card capacity	SAS Hard Disk Drives
BL860c i2	8	24	384GB with 16GB DIMMs	3	2
BL870c i2	16	48	768GB with 16GB DIMMs	6	4
BL890c i2	32	96	1.5TB with 16GB DIMMs	12	8

Server blade components



- | | | | |
|----------|-------------------------------------|-----------|-------------------------------------|
| 1 | CPU0 | 8 | ICH mezzanine connector |
| 2 | CPU0 power connector | 9 | Mezzanine connector 3 (type 1 or 2) |
| 3 | Mezzanine connector 1 (type 1) | 10 | CPU1 power connector |
| 4 | Mezzanine connector 2 (type 1 or 2) | 11 | CPU1 |
| 5 | System board thumbscrew | 12 | SAS backplane |
| 6 | Battery (CR2032) | 13 | Pull tab |
| 7 | System board thumbscrew | | |

NOTE: The iLO 3 password is located on the pull tab.

2 Site preparation

The HP Integrity BL860c i2 Server Blade does not have cooling or power systems. Cooling and power is provided by the c-Class enclosure.

- ❗ **IMPORTANT:** To avoid hardware damage, allow the thermal mass of the product to equalize to the temperature and humidity of the installation facility after removing the shipping materials. A minimum of one hour per 10°C (18°F) of temperature difference between the shipping facility and installation facility is required

Server blade dimensions and weight

Table 1 Server blade dimensions and weight for the BL860c i2

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)

Table 2 Blade Link dimensions and weight

Blade Link type	Height	Width	Weight
SBL1 (BL860 i2)	44 mm (1.73 in)	51 mm (2 in)	.5 lb (.22 kg)
SBL2 (BL870 i2)	44 mm (1.73 in)	106 mm (4.17 in)	1 lb (.45 kg)
SBL4 (BL890 i2)	44 mm (1.73 in)	212 mm (8.34 in)	2 lb (.90 kg)

Enclosure information

All three blade configurations are supported in c7000 and c3000 Enclosures.

For more enclosure information see:

<http://h71028.www7.hp.com/enterprise/cache/316735-0-0-0-121.html>.

Enclosure environmental specifications

NOTE: This information is for both c3000 and c7000 Enclosures.

Specification	Value
Temperature range ¹	
Operating	10°C to 35°C (50°F to 95°F)
Non-operating	-30°C to 60°C (-22°F to 140°F)
Wet bulb temperature	
Operating	28°C (82.4°F)
Non-operating	38.7°C (101.7°F)
Relative humidity (noncondensing) ²	

Operating	20% to 80%
Non-operating	5% to 95%

¹ All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048 m (10,000 ft) or 70 KPa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

² Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

For more information on the c-Class enclosures, go to <http://h71028.www7.hp.com/enterprise/cache/316735-0-0-0-121.htmlf>.

For more site preparation information, go to <http://www.hp.com/go/Blades-docs>, select **HP Integrity BL860c i2 Server Blade** in the list of servers, and then select the *Generalized Site Preparation Guidelines*.

Sample Site Inspection Checklist

Table 3 Customer and HP Information

Customer Information	
Name:	Phone number:
Street address:	City or Town:
State or province:	Country
Zip or postal code:	
Primary customer contact:	Phone number:
Secondary customer contact:	Phone number:
Traffic coordinator:	Phone number:
HP information	
Sales representative	Order number:
Representative making survey	Date:
Scheduled delivery date	

Table 4 Site Inspection Checklist

Check either Yes or No. If No, include comment number or date.				Comment or Date
Computer Room				
Number	Area or condition	Yes	No	
1.	Is there a completed floor plan?			
2.	Is adequate space available for maintenance needs? Front 36 inches (91.4 cm) minimum and rear 36 inches (91.4 cm) minimum are recommended clearances.			
3.	Is access to the site or computer room restricted?			
4.	Is the computer room structurally complete? Expected date of completion?			
5.	Is a raised floor installed and in good condition?			
6.	Is the raised floor adequate for equipment loading?			
7.	Are channels or cutouts available for cable routing?			

Table 4 Site Inspection Checklist (continued)

Check either Yes or No. If No, include comment number or date.				Comment or Date
8.	Is a network line available?			
9.	Is a telephone line available?			
10.	Are customer-supplied peripheral cables and LAN cables available and of the proper type?			
11.	Are floor tiles in good condition and properly braced?			
12.	Is floor tile underside shiny or painted? If painted, judge the need for particulate test.			
Power and Lighting				
Number	Area or Condition	Yes	No	
13.	Are lighting levels adequate for maintenance?			
14.	Are AC outlets available for servicing needs (for example, laptop)?			
15.	Does the input voltage correspond to equipment specifications?			
15a.	Is dual source power used? If so, identify types and evaluate grounding.			
16.	Does the input frequency correspond to equipment specifications?			
17.	Are lightning arrestors installed inside the building?			
18.	Is power conditioning equipment installed?			
19.	Is a dedicated branch circuit available for equipment?			
20.	Is the dedicated branch circuit less than 75 feet (22.86 m)?			
21.	Are the input circuit breakers adequate for equipment loads?			
Safety				
Number	Area or Condition	Yes	No	
22.	Is an emergency power shutoff switch available?			
23.	Is a telephone available for emergency purposes?			
24.	Does the computer room have a fire protection system?			
25.	Does the computer room have antistatic flooring installed?			
26.	Do any equipment servicing hazards exist (loose ground wires, poor lighting, and so on)?			
Cooling				
Number	Area or Condition	Yes	No	
27.	Can cooling be maintained between 5°C (41 °F) and 35°C (95 °F) (up to 1,525 m/5,000 ft)? Derate 1°C/305 m (34 °F/1,000 ft) above 1,525 m/5,000 ft and up to 3,048 m/10,000 ft.			
28.	Can temperature changes be held to 5°C (9 °F) per hour with tape media? Can temperature changes be held to 20°C (36 °F) per hour without tape media?			
29.	Can humidity level be maintained at 40% to 55% at 35°C (95 °F) noncondensing?			
30.	Are air-conditioning filters installed and clean?			
Storage				

Table 4 Site Inspection Checklist (continued)

Check either Yes or No. If No, include comment number or date.				Comment or Date
Number	Area or Condition	Yes	No	
31.	Are cabinets available for tape and disc media?			
32.	Is shelving available for documentation?			
Training				
Number	Area or Condition			
33.	Are personnel enrolled in the System Administrator's Course?			
34.	Is on-site training required?			

Power subsystem

The power subsystem is located on the system board. The BL860c i2 Server Blade receives 12 Volts directly from the enclosure. The voltage is immediately passed through an E-fuse circuit, which will immediately cut power to the blade if a short circuit fault or over current condition is detected. The E-fuse can also be intentionally power cycled through the manageability subsystem. The 12V is distributed to various points on the blade and is converted to lower voltages through power converters for use by integrated circuits and loads on the blade.

ESD handling information

- △ CAUTION:** Wear an ESD wrist strap when handling internal server components. Acceptable ESD wrist straps include:
- The wrist strap that is included in the ESD kit with circuit checker (part number 9300-1609).
 - The wrist strap that is included in the ESD kit without circuit checker (part number 9300-1608).
- If the above options are unavailable, the throw away (one use only) strap that ships with some HP memory products can also be used, with increased risk of electrostatic damage.

When removing and replacing server components, use care to prevent injury and equipment damage. Many assemblies are sensitive to damage by electrostatic discharge.

Follow the safety precautions listed to ensure safe handling of components, to prevent injury, and to prevent damage to the server blade:

- When removing or installing a server blade or server blade component, review 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 electrical components on accessory boards.

Unpacking and inspecting the server blade

Be sure that you have adequately prepared your environment for your new server blade, received the components that you ordered, and verified that the server and the containers are in good condition after shipment.

Verifying site preparation

Verifying site preparation is an essential factor of a successful server blade installation, and includes the following tasks:

- Gather LAN information. Determine the two IP addresses for the iLO 3 MP LAN and the server blade LAN.
- Establish a method to connect to the server blade console. For more information on console connection methods, see [“Using iLO 3” \(page 25\)](#) for more information.
- Verify electrical requirements. Be sure that grounding specifications and power requirements are met.
- Confirm environmental requirements.

Inspect the shipping containers for damage

HP shipping containers protect their contents under normal shipping conditions. After the equipment arrives, carefully inspect each carton for signs of shipping damage. Shipping damage constitutes moderate to severe damage such as punctures in the corrugated carton, crushed boxes, or large dents. Normal wear or slight damage to the carton is not considered shipping damage. If you find shipping damage to the carton, contact your HP customer service representative immediately.

Unpacking the server blade

1. Use the instructions printed on the outside top flap of the carton.
 2. Remove inner accessory cartons and the top foam cushions.
-
- ① **IMPORTANT:** Inspect each carton for shipping damage as you unpack the server blade.
-
3. Place the server blade on an antistatic pad.

Verifying the inventory

The sales order packing slip lists the equipment shipped from HP. Use this packing slip to verify that the equipment has arrived.

NOTE: To identify each item by part number, see the sales order packing slip.

Returning damaged equipment

If the equipment is damaged, immediately contact your HP customer service representative. The service representative initiates appropriate action through the transport carrier or the factory and assists you in returning the equipment.

3 Installing the server blade into the enclosure

Installation sequence and checklist

Step	Description	Completed
1	Perform site preparation (see “Site preparation” (page 10) for more information).	
2	Unpack and inspect the server shipping container and then inventory the contents using the packing slip.	
3	Install additional components shipped with the server.	
4	Install and power on the server blade.	
5	Configure iLO 3 MP access.	
6	Access iLO 3 MP.	
7	Access UEFI from iLO 3 MP.	
8	Download latest firmware using HP Smart Update Manager	
9	Install and boot the OS.	

NOTE: For more information regarding HP Integrity Server Blade upgrades, see [“Upgrading a conjoined configuration”](#) (page 66) for more information.

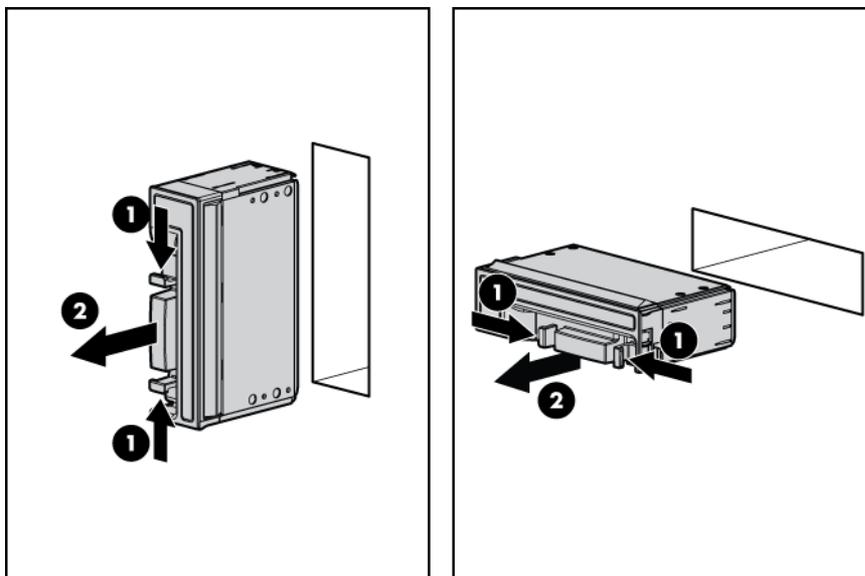
Installing and powering on the server blade

Preparing the enclosure

HP BladeSystem enclosures ship with device bay dividers to support half-height devices. To install a full height device, remove the blanks and the corresponding device bay divider.

CAUTION: To prevent improper cooling and thermal damage, do not operate the server blade or the enclosure unless all hard drive and device bays are populated with either a component or a blank.

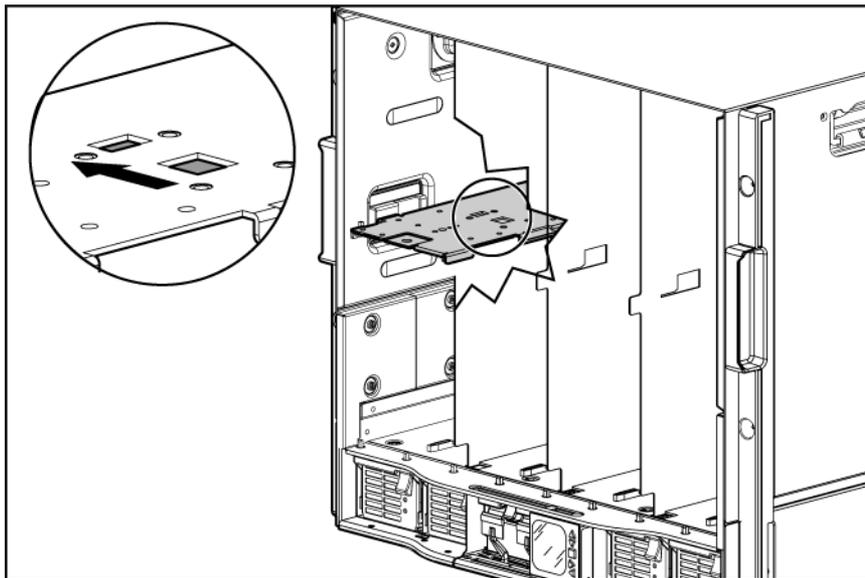
1. Remove the device bay blank.



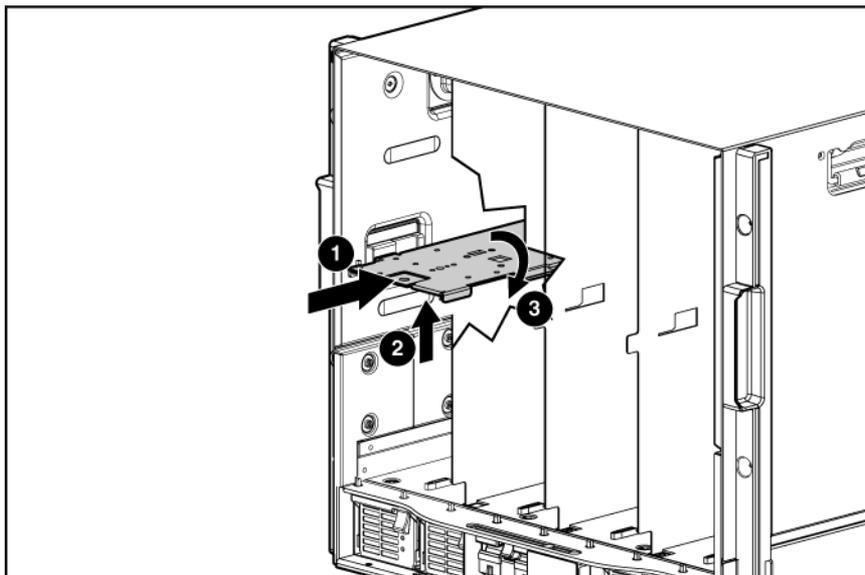
2. Remove the three adjacent blanks.

Removing a c7000 device bay divider

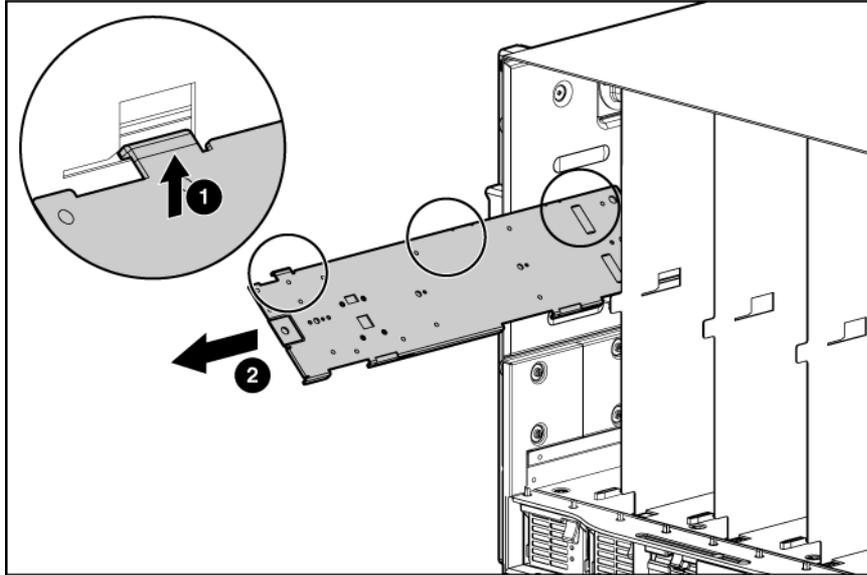
1. Slide the device bay shelf locking tab to the left to open it.



2. Push the device bay shelf back until it stops, lift the right side slightly to disengage the two tabs from the divider wall, and then rotate the right edge downward (clockwise).

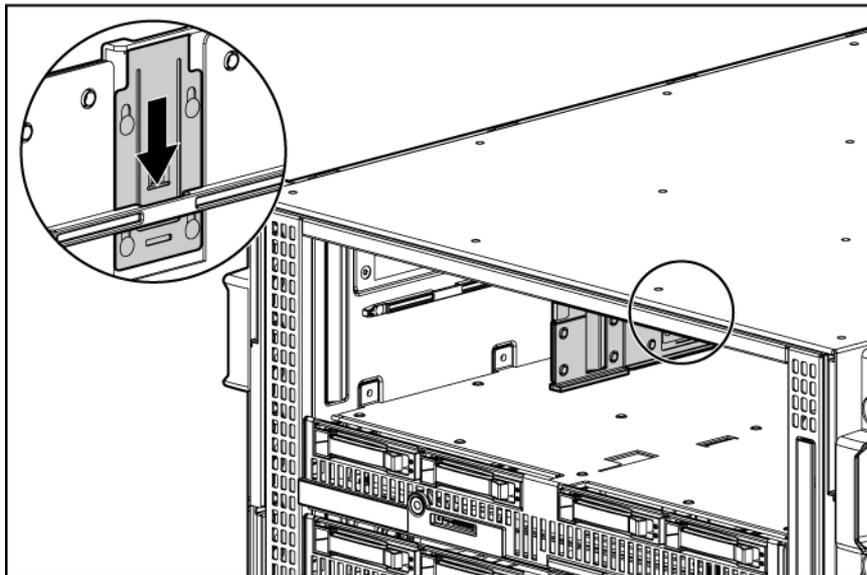


3. Lift the left side of the device bay shelf to disengage the three tabs from the divider wall, and then remove it from the enclosure.



Removing a c3000 device bay mini-divider or device bay divider

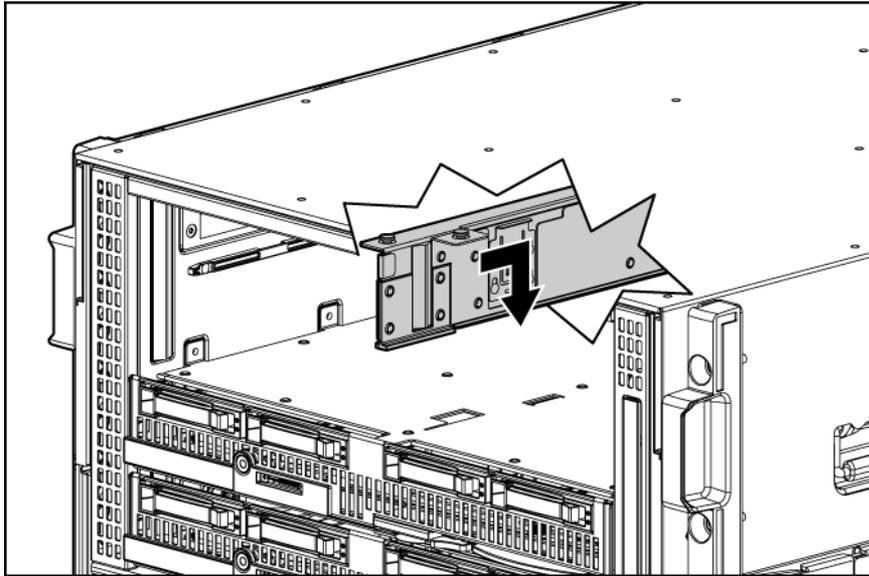
1. Slide the locking tab down.



2. Remove the mini-divider or divider:

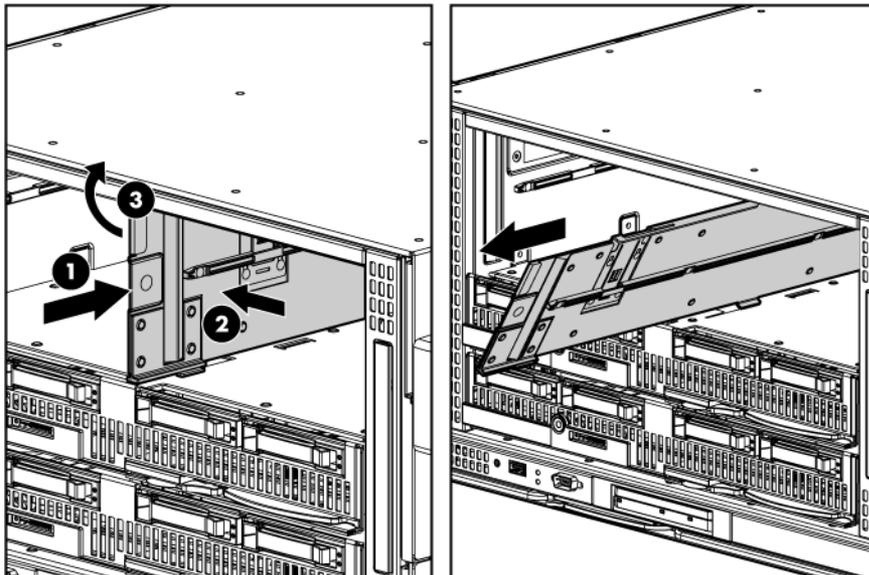
- c3000 mini-divider:

Push the divider toward the back of the enclosure until the divider drops out of the enclosure.



- c3000 divider

- a. Push the divider toward the back of the enclosure until it stops.
- b. Slide the divider to the left to disengage the tabs from the wall.
- c. Rotate the divider clockwise.
- d. Remove the divider from the enclosure.

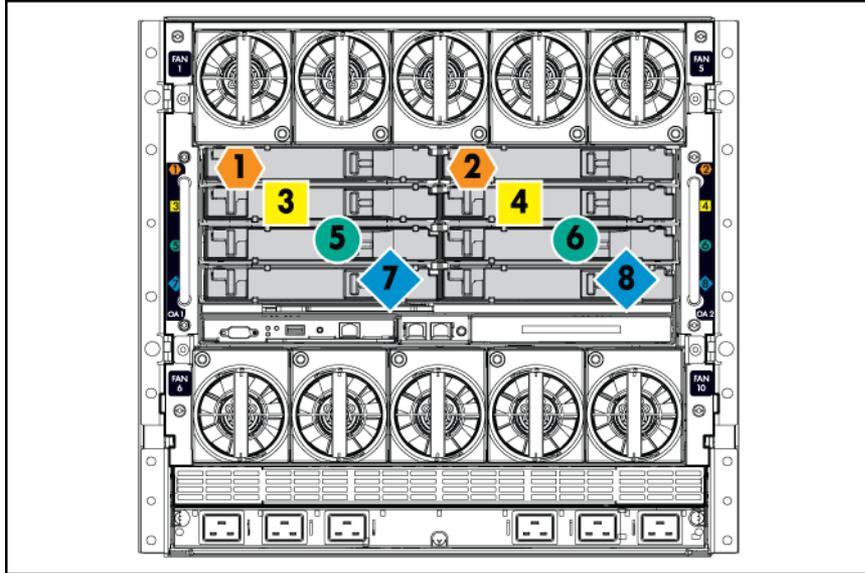


Installing interconnect modules

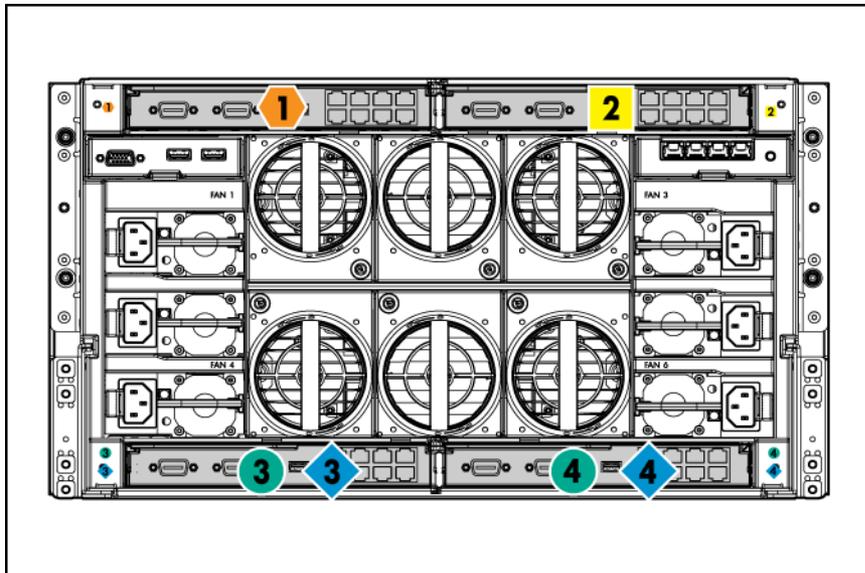
For specific steps to install interconnect modules, see the documentation that ships with the interconnect module.

Interconnect bay numbering and device mapping

- HP BladeSystem c7000 Enclosure



- HP BladeSystem c3000 Enclosure



To support network connections for specific signals, install an interconnect module in the bay corresponding to the embedded NIC or mezzanine signals.

Server blade signal	c7000 interconnect bay	c3000 interconnect bay	Interconnect bay labels
NIC 1 (Embedded)	1	1	
NIC 2 (Embedded)	2	1	
NIC 3 (Embedded)	1	1	
NIC 4 (Embedded)	2	1	
Mezzanine 1	3 and 4	2	

Server blade signal	c7000 interconnect bay	c3000 interconnect bay	Interconnect bay labels
Mezzanine 2	5 and 6	3 and 4	●
	7 and 8	3 and 4	◆
Mezzanine 3	5 and 6	3 and 4	●
	7 and 8	3 and 4	◆

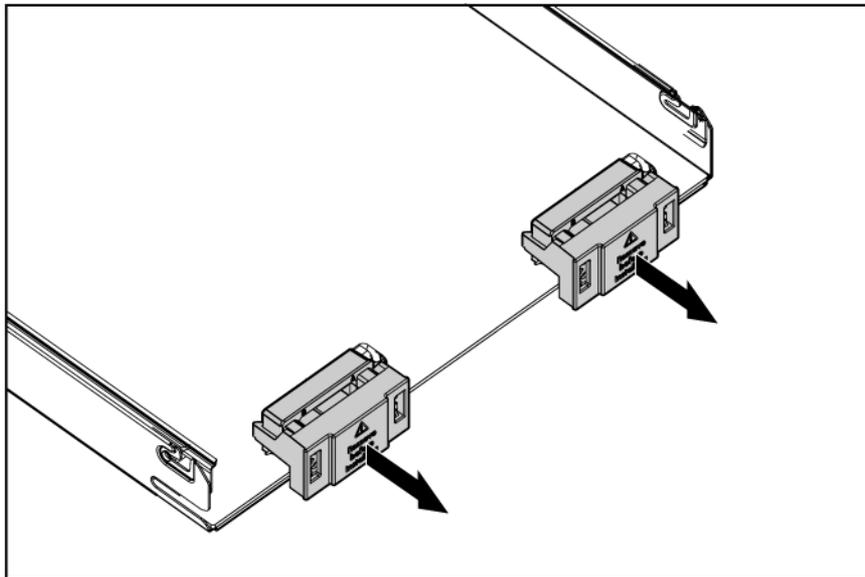
For detailed port mapping information, see the HP BladeSystem enclosure installation poster or the HP BladeSystem enclosure setup and installation guide for your product on the HP website (<http://www.hp.com/go/bladeSystem/documentation>).

Installing the server blade into the enclosure

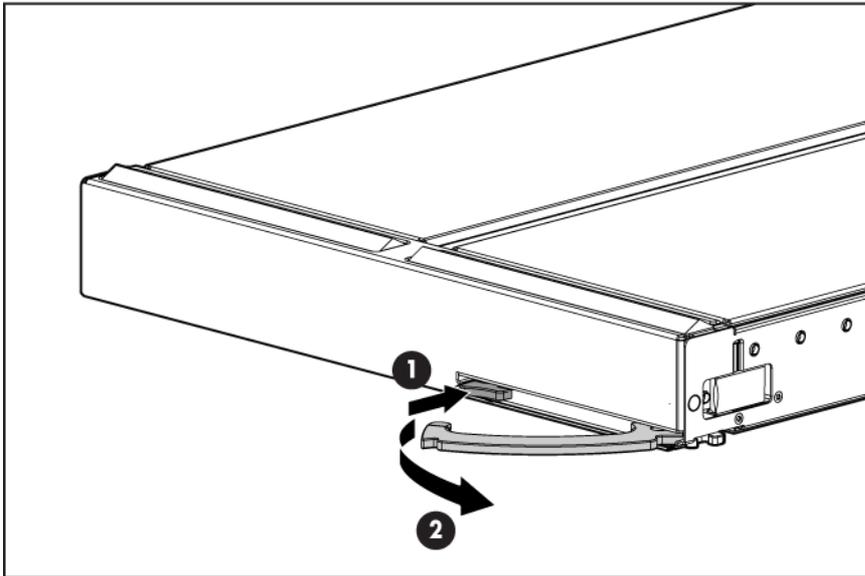
NOTE: When installing additional blades into an enclosure, additional power supplies might also be needed to meet power requirements. For more information, see the HP BladeSystem enclosure setup and installation guide for your product on the HP website (<http://www.hp.com/go/bladeSystem/documentation>).

NOTE: Before installing and initializing the server blade, install any server blade options, such as an additional processor, hard drive, or mezzanine card.

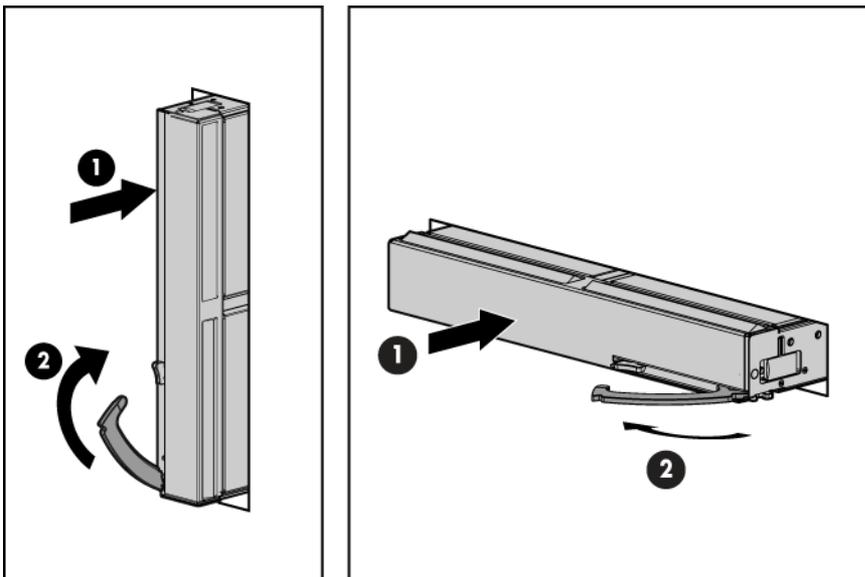
1. Remove the connector covers if they are present.



2. Prepare the server blade for installation.



3. Install the server blade.



The server blade should come up to standby power. The server blade is at standby power if the blade power LED is amber.

Server blade power states

The server blade has three power states: standby power, full power, and off. Install the server blade into the enclosure to achieve the standby power state. Server blades are set to power on to standby power when installed in a server blade enclosure. Verify the power state by viewing the LEDs on the front panel, and using [Table 5](#).

For more front panel LED information, see [“Front panel LEDs” \(page 93\)](#).

Table 5 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

Powering on the server blade

Use one of the following methods to power on the server blade:

NOTE: To power on blades in a conjoined configuration, only power on the Monarch blade.

- Use a virtual power button selection through iLO 3.
- Press and release the Monarch power button.

When the server blade goes from the standby mode to the full power mode, the blade power LED changes from amber to green.

For more information about iLO 3, see “Using iLO 3” (page 25).

Powering off the server blade

Before powering down the server blade for any upgrade or maintenance procedures, perform a backup of critical server data and programs.

Use one of the following methods to power off the server blade:

NOTE: To power off blades in a conjoined configuration, only power off the Monarch blade.

- Use a virtual power button selection through iLO 3 (Power Management, Power & Reset). This method initiates a controlled remote shutdown of applications and the OS before the server blade enter standby mode.
- Press and release the Monarch power button. This method initiates a controlled shutdown of applications and the OS before the server blade enter standby mode.
- Press and hold the Monarch power button for more than 4 seconds to force the server blade to enter standby mode. This method forces the server blade to enter standby mode without properly exiting applications and the OS. It provides an emergency shutdown method in the event of a hung application.

Installing the Blade Link for BL870c i2 or BL890c i2 configurations

ⓘ **IMPORTANT:** Without an attached Blade Link, the server blades will not power on.

NOTE: Before installing the Blade Link for BL870c i2 or BL890c i2, make sure the following statements are true:

- All blades have the same CPU SKUs
- All blades have the same hardware revision (only use BL860c i2, BL870c i2, or BL890c i2 Server Blades)
- All blades have CPU0 installed
- All blades have the same firmware revision set
- All blades follow the memory loading rules for your configuration, see “DIMMs” (page 49)
- The enclosure OA firmware is compatible with the blade firmware
- The Monarch blade has an ICH mezzanine card installed
- The proper Blade Link is being used for your configuration

To check on the blade hardware revisions and CPU SKUs, go to the Command Menu in the iLO 3 TUI and enter the `DF` command. This dumps the FRU content of the blades.

NOTE: If you will be upgrading an initial installation, see “Upgrading a conjoined configuration” (page 66) for more information on server blade upgrades.

Blade Link bay location rules

Class	Blade Link part number	Number of conjoined blades	Supported enclosures	Blade location rules	Partner blade support?	Partner blade half-height bay number / Server blade full-height bay number
BL1	AD399-67002	1 (standard for BL860c i2)	c7000	No specific bay location rules for blades	Yes	Bottom half-height adjacent bay, paired with the server blade in full-height bays 1&2, 3&4, 5&6, or 7&8
			c3000			Half-height bay 8, paired with the server blade in full-height bay 3. CAUTION: The bay mini-divider must be installed in the c3000 enclosure to ensure the partner blade is inserted correctly. Failure to install the bay mini-divider might result in damage to the blade or enclosure when installing the partner blade. ¹
BL2	AD399-67003	2 (BL870c i2)	c7000	Bays 1&2, 3&4, 5&6, or 7&8 with Monarch blade in odd bay	No	N/A
			c3000	Bays 1&2, 3&4 with Monarch blade in odd bay		
BL2E	AD399-67010	2 (BL870c i2)	c7000 only	Bays 2&3, 4&5 or 6&7 with Monarch blade in even bay using full-height numbering	Yes	Bottom half-height bay 9 paired with full-height bays 2&3, bottom half-height bay 11 paired with full-height bays 4&5, bottom half-height bay 13 paired with full-height bays 6&7

Class	Blade Link part number	Number of conjoined blades	Supported enclosures	Blade location rules	Partner blade support?	Partner blade half-height bay number / Server blade full-height bay number
	AD399-67011	2 (BL870c i2)	c3000 only	Bays 2&3 with Monarch blade in even bay using full-height numbering.	No	N/A
BL4	AD399-67006	4 (BL890c i2)	c7000 only	Bays 1&2&3&4 or 5&6&7&8, with Monarch blade defaulting to slot 1 or slot 5, respectively	No	N/A
	AD399-67007	4 (BL890c i2)	c3000 only	Bays 1&2&3&4 with Monarch blade defaulting to slot 1	No	N/A

¹ For information on installing the c3000 bay mini-divider, see the *HP BladeSystem c3000 Enclosure Setup and Installation Guide*.

⚠ CAUTION: Using the incorrect Blade Link can cause damage to the Blade Link and to the connectors on both the Blade Link and the server blades.

ⓘ IMPORTANT: Failure to follow bay location rules can prevent server blade power on.

NOTE: The manufacturing part numbers for the Blade Link is located on a sticker on the PCA.

“Upgrading a conjoined configuration” (page 66)

To install the Blade Link:

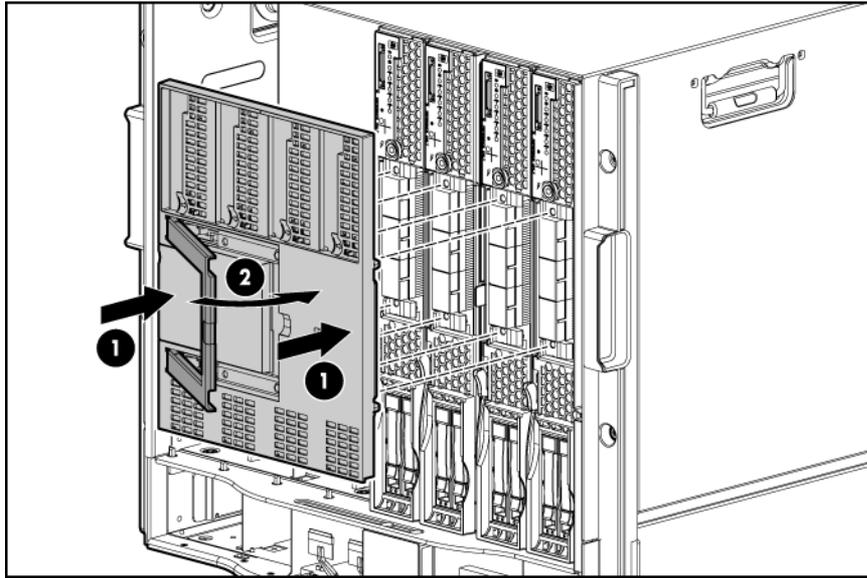
1. Log on to the OA.
2. Install the first blade into the lowest bay number, this blade becomes the Monarch blade (“Installing the server blade into the enclosure”).
3. Wait 10 seconds. The IP address of the installed blade appears in the OA.
4. Insert each adjacent blade, waiting 10 seconds between blades.

NOTE: The blades will go into stand-by

5. Using the OA, verify that the rest of the blades that will be conjoined have an IP address and are powered off.
6. Remove the plastic protectors from the connectors on the back of the Blade Link.
7. Push in the blue release latch on the handle to release the handle.
8. Pull the handle all the way out
9. Align the guide pins on the back of the Blade Link to the holes on the front of the server blades. As you insert the pins into the holes, ensure the face on the Blade Link is evenly aligned parallel to the face of the server blades.
10. Press firmly on the left and right sides of the Blade Link face until the handle naturally starts to close.

⚠ CAUTION: If not properly aligned, you can damage the Blade Link

11. Close the handle when it has engaged.



12. Log into iLO 3 on the Monarch blade. For more information, see the *HP Integrity iLO3 Operations Guide*.
13. In iLO 3, go to the Command Menu and execute `xd -r` to reboot all of the iLO 3s in the conjoined set.
14. Still in the iLO 3 Command Menu, power on the Monarch blade with the `pc -on -nc` command. Powering on the Monarch blade will power the entire conjoined system on.
15. Boot the Monarch blade. Booting the Monarch blade boots the entire conjoined system.

Conjoin checks

Integrity BL870c i2 and BL890c i2 systems go through a process called “conjoining” when the Blade Link is attached. The system cannot boot until that process is completed properly. The following CM commands in the iLO 3 TUI show data from all blades, and can be used to determine if the blades are successfully conjoined:

- `DF`— Lists the FRUs on all of the blades (2 or 4).
- `SR` — Shows a table of each blades firmware revisions.
- `Blade`— Shows information about the OA and the bays used.

The OA will also show a properly conjoined system from its GUI.

-
- ❗ **IMPORTANT:** The secondary UUID and other system variables are stored on the Monarch blade. If you do not put the Monarch blade in the leftmost slot, your system variables will not match. If you ever change your iLO 3 configuration (such as adding users) that data is also stored on the Monarch blade.
-

NOTE: Auxiliary blades are not slot dependent after being installed and configured, however when the conjoined systems ship, they come with A, B, C, D stickers located under the Blade Links. While auxiliary blades are not slot dependent after being installed and configured, HP recommends using the shipped order to ensure proper auxiliary blade function.

Using iLO 3

The iLO 3 subsystem is a standard component of selected server blades that provides blade health and remote server manageability. The iLO 3 subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO 3 independent of the host server and operating system. The iLO 3 subsystem provides remote access to any authorized network client, sends alerts, and provides other server management functions.

Using iLO 3, you can:

- Remotely power on, power off, or reboot the host server.
- Send alerts from iLO 3 regardless of the state of the host server.
- Access advanced troubleshooting features through the iLO 3 interface.

For more information about iLO 3 basic features, see the iLO 3 documentation on the HP website (<http://www.hp.com/servers/lights-out>).

Accessing UEFI or the OS from iLO 3 MP

UEFI is an architecture that provides an interface between the server blade OS and the server blade firmware. UEFI provides a standard environment for booting an OS and running preboot applications.

Use this procedure to access UEFI or the OS from the iLO 3 MP. Your security parameters were set regarding remote access.

1. Retrieve the factory iLO 3 password from the iLO 3 Network pull tab located on the right side of the Monarch blade.
2. From the **MP Main Menu**, enter `co` to access the **Console**.

NOTE: Terminal windows should be set to a window size of 80 columns x 25 rows for optimal viewing of the console at UEFI.

3. After memory test and CPU late self test the following message appears:

Press `Ctrl-C` now to bypass loading option ROM UEFI drivers.

The prompt will timeout if **Ctrl-C** is not pressed within a few seconds. If **Ctrl-C** is pressed, you will be presented with two options:

- Bypass loading from I/O slots.
- Bypass loading from I/O slots and core I/O.

The Bypass loading from I/O slots and core I/O option may be useful if a bad core I/O UEFI driver is preventing system boot. USB drives can still be used at the UEFI shell to update core I/O drivers.

⚠ CAUTION: Hitting **Ctrl-C** before the prompt will not work and may even disable this feature, be sure wait for the prompt before hitting **Ctrl-C**.

NOTE: It can take several minutes for this prompt to appear, and the window of time when **Ctrl-C** can be pressed is very short. For typical boots, HP recommends that you let the prompt time out.

After selecting an option, boot will proceed.

NOTE: If no option is selected, normal boot will proceed after ten seconds.

4. Depending on how the server blade was configured from the factory, and if the OS is installed at the time of purchase, you are taken to:
 - UEFI shell prompt
 - OS login prompt

If the server blade has a factory-installed OS, you can interrupt the boot process to configure your specific UEFI parameters.

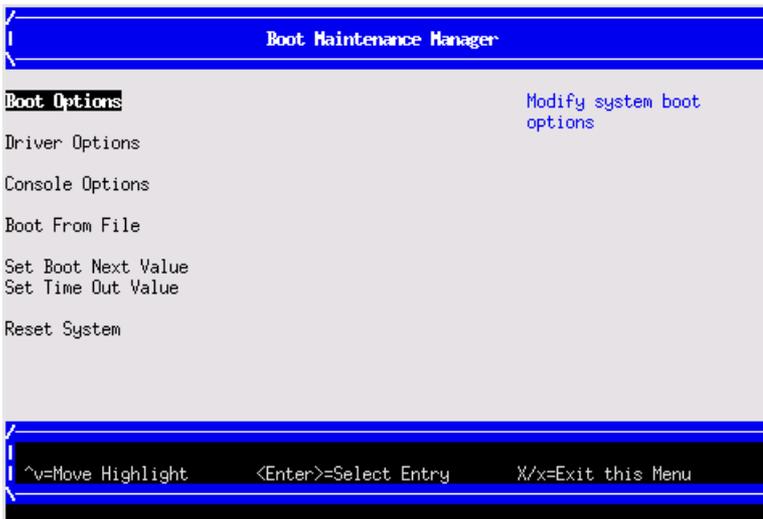
If you are at the UEFI shell prompt, go to “[UEFI Front Page](#)” (page 27).

If you are at the OS login prompt, go to “[OS login prompt](#)” (page 29).

To configure specific devices, press **D** or **d** to launch the Device Manager. This is an advanced feature and should only be performed when directed.



To perform maintenance on the system such as adding, deleting, or reordering boot options, press **M** or **m** to launch the Boot Maintenance Manager.



To perform more advanced operations, press **S** or **s** to launch the UEFI Shell.

To view the iLO 3 LAN configuration, press **I** or **i** to launch the iLO 3 Setup Tool.

Saving UEFI configuration settings

There are other UEFI settings you can configure at this time. For more UEFI configuration options, see [Appendix A \(page 133\)](#).

Booting and installing the operating system

From the **UEFI Front Page** prompt, you can boot and install in either of two manners:

- If your OS is loaded onto your server blade, see “[Operating system is loaded onto the server blade](#)” (page 29).
- If the OS is not installed onto your server blade, see “[Operating system is not loaded onto the server blade](#)” (page 29).

Operating system is loaded onto the server blade

If the OS is loaded on your server blade, normally UEFI will automatically boot to the OS. If the UEFI Front Page is loaded, press **ENTER** to start auto boot, or **B** or **b** to select a specific boot option for your OS.

- Use your standard OS logon procedures, or see your OS documentation to log on to your OS.

Operating system is not loaded onto the server blade

There are two options on how to load the OS if it is not loaded onto your server blade.

- To load the OS from a DVD, see “Installing the OS from an external USB DVD device or tape device” (page 30).
- To load the OS using Ignite-UX, see “Installing the OS using HP Ignite-UX” (page 31).

OS login prompt

If your server blade is at the OS login prompt after you establish a connection to the server blade, use your standard OS log in procedures, or see your OS documentation for the next steps.

Installing the latest firmware using HP Smart Update Manager

The HP Smart Update Manager utility enables you to deploy firmware components from either an easy-to-use interface or a command line. It has an integrated hardware discovery engine that discovers the installed hardware and the current versions of firmware in use on target servers. This prevents extraneous network traffic by only sending the required components to the target. HP Smart Update Manager also has logic to install updates in the correct order and ensure all dependencies are met before deployment of a firmware update. It also contains logic to prevent version-based dependencies from destroying an installation and ensures updates are handled in a manner that reduces any downtime required for the update process. HP Smart Update Manager does not require an agent for remote installations.

Key features of HP Smart Update Manager are:

- GUI and CLI—command line interface
- Dependency checking, which ensures appropriate installation order and dependency checking between components
- Intelligent deployment deploys only required updates
- Improved deployment performance
- Remote command-line deployment
- Windows X86 or Linux X86 support

At this time, firmware updates on Integrity systems through HPSUM are done remotely. For example, HP SUM runs on an x86 Linux or Windows management system and updates targeted Integrity systems through the network. HP Smart Update Manager supports firmware updates on the BL860c i2, BL870c i2, and BL890c i2 servers. Firmware bundles for these servers are available and can be downloaded from the HP website at <http://www.hp.com>.

For more information about HP Smart Update Manager, see the *HP Smart Update Manager User Guide* (<http://www.hp.com/go/hpsum/documentation>).

4 Operating system procedures

Operating systems supported on the server blade

- HP-UX 11i v3 HWE 1003
- HP OpenVMS v8.4
- Microsoft Windows Server 2008 Itanium Edition R2

Installing the operating system onto the server blade

The following procedures describe generalized operating system installation. For more details, see the operating system documentation.

Installing the OS from an external USB DVD device or tape device

NOTE: Tapeboot requires BL8x0c i2 system firmware bundle 26.11 or later and a partner tape blade, or an additional 51378-B21 Integrity Smart Array P711m HBA running 6.22 firmware or later to boot from an Ultrium 6250 tape drive.

1. If using an external USB DVD device:
 - a. Connect the Integrity SUV cable to the front of the Monarch server blade.
 - b. Connect the USB DVD cable to one of the USB ports on the SUV cable.
-
- NOTE:** Some DVD drives might also require a separate power connection.
-
- c. Turn on the external USB DVD device.
2. Insert the OS media into the USB DVD device or tape device.
 3. Power on the server blade and boot to UEFI. If the server blade is already powered on, then reboot to UEFI using the `reset` command at the UEFI prompt.
 4. From the UEFI Front Page, press **S** or **s** to launch the UEFI Shell.
-

NOTE: If the device is already selected or you already know the device name, then skip the following step.

If you are using a tape device, when the UEFI shell comes up, you should see a message similar to the following on the console:

```
HP Smart Array P212 Controller      (version 6.22)
  Tape Drive(s) Detected:
  Port: 1I, box:0, bay: 3 (SAS)
```

The message may also be similar to the following.

```
HP Smart Array P711m Controller    (version 6.22) 0 Logical Drives
  Tape Drive(s) Detected:
  Port: 2E, box:1, bay: 9 (SAS)
```

NOTE: If you do not see a line starting with `Port` and ending with `(SAS)`, the tape is not connected correctly or it is not responding.

5. Locate the device you want to boot from.
 - a. For USB DVD, locate the device:
 - i. Use the `map` command to list all device names from the UEFI Shell prompt. The `map` command displays the following:

```
fs2:\> map
Device mapping table
```

```
fs6      :Removable CDRom - Alias cd66d0a blk6
          PciRoot(0x30304352)/Pci(0x1D,0x7)/USB(0x3,0x0)/CDROM(0x0)
```

From the list generated by the `map` command, locate the device name (in this example, `fs6`)

NOTE: Your DVD drive might not be named `fs6`. Make sure you verify the ID appropriate to your DVD device.

- ii. At the UEFI shell prompt, specify the device name for the DVD-ROM and then enter the UEFI install command, as in the following example:

```
Shell> fs6:
fs6:\> install
```

- b. For tape, locate the device:

- To boot from tape once you are at the UEFI shell:

```
Shell> tapeboot select
01
PciRoot(0x30304352)/Pci(0x8,0x0)/Pci(0x0,0x0)/SAS(0x50060B00007F6FFC,0x0,0x1,NoTopology,0,0,0,0x0)
Select Desired Tape: 01 <<input 01
```

- If the correct media is installed, it will boot from tape when you enter the index number.
- If there is no media in the SAS tape drive and you select 1, the following message appears:

```
tapeboot: Could not load tapeboot image
```

6. The OS now starts loading onto the server blade. Follow the on-screen instructions to install the OS fully.
7. Continue with “Configuring system boot options” (page 32)

Installing the OS using HP Ignite-UX

Ignite-UX is an HP-UX administration toolset that enables:

- Simultaneous installation of HP-UX on multiple clients
- The creation and use of custom installations
- The creation of recovery media
- The remote recovery of clients

To install the OS onto the server blade using Ignite-UX, go to www.hp.com/go/ignite-ux.

Installing the OS using vMedia

NOTE: Installing the OS using vMedia might be significantly slower than installing using other methods.

vMedia enables connections of a DVD physical device or image file from the local client system to the remote server. The virtual device or image file can be used to boot the server with an operating system that supports USB devices.

vMedia depends on a reliable network with good bandwidth. This is especially important when you are performing tasks such as large file transfers or OS installations.

For more information regarding loading the OS with vMedia, see the vMedia Chapter of the *HP Integrity Integrated Lights-Out Management Processor Operations Guide*.

NOTE: After the OS is loaded, make sure to save your nonvolatile memory settings to preserve boot entries in case of blade failure.

Configuring system boot options

- **Boot Manager**

Contains the list of boot options available. Ordinarily the boot options list includes the UEFI Internal Shell and one or more operating system loaders.

To manage the boot options list for each server, use the UEFI Shell, the Boot Maintenance Manager, or operating system utilities.

- **Autoboot setting**

The `autoboot` setting determines whether a server automatically loads the first item in the boot options list or remains at the **UEFI Front Page** menu. With autoboot enabled, UEFI loads the first item in the boot options list after a designated timeout period.

Configure the autoboot setting for an HP Integrity server using either the `autoboot` UEFI Shell command or the Set Time Out Value menu item from the Boot Maintenance Manager.

Examples of autoboot commands for HP-UX:

- Disable autoboot from the UEFI 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`
- Set autoboot from HP-UX using `setboot`
- Enable autoboot from HP-UX using `setboot -b on`
- Disable autoboot from HP-UX using `setboot -b off`

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

Booting and shutting down HP-UX

To boot HP-UX, use one of the following procedures:

- To boot HP-UX normally, see “[HP-UX standard boot](#)” (page 33). HP-UX boots in multi-user mode.
- To boot HP-UX in single-user mode, see “[Booting HP-UX in single-user mode](#)” (page 34).
- To boot HP-UX in LVM-maintenance mode, see “[Booting HP-UX in LVM-maintenance mode](#)” (page 34).

Adding HP-UX to the boot options list

You can add the `\EFI\HPUX\HPUX.EFI` loader to the boot options list from the UEFI Shell or the Boot Maintenance Manager.

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

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

To add HP-UX to the list:

1. Access the UEFI Shell environment.
 - a. Log in to iLO 3 for Integrity and enter `CO` to access the system console.
When accessing the console, confirm that you are at the **UEFI Front Page**.
If you are at another UEFI menu, then choose the **Exit** option or press **X** or **x** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers.
 - b. Press **S** or **s** to launch the UEFI shell.
2. Access the UEFI System Partition (`fsX:` 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 UEFI System Partition for the bootable file system number `2`. The UEFI 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 UEFI 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 server.
 - `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 v3"` adds an HP-UX 11i v3 item as the first.

For more information, see the `help bcfg` command.
4. Exit the console and iLO 3 MP interfaces.
Press **Ctrl-B** to exit the system console and return to the iLO 3 MP Main Menu. To exit the MP, press **X** or **x** at the Main Menu.

HP-UX standard boot

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

- [“Booting HP-UX from the UEFI Boot Manager” \(page 33\)](#)
- [“Booting HP-UX from the UEFI Shell” \(page 34\)](#)

Booting HP-UX from the UEFI Boot Manager

1. From the **UEFI Boot Manager** menu, choose an item from the boot options list to boot HP-UX.
2. Access the **UEFI Boot Manager** menu for the server on which you want to boot HP-UX.
3. Log in to iLO 3 MP and enter `CO` to choose the system console.
4. Confirm you are at the **UEFI Front Page**. If you are at another UEFI menu, then choose the **Exit** option or press **X** or **x** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers. Press **B** or **b** to launch the Boot Manager.
5. At the **UEFI 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.
6. Press **Enter** to initiate booting using your chosen boot option.

7. Exit the console and iLO 3 MP interfaces.
8. Press **Ctrl-B** to exit the system console and return to the **MP Main Menu**. To exit the **MP Main Menu**, press **X** or **x**.

Booting HP-UX from the UEFI Shell

1. Access the UEFI Shell.
2. From the **UEFI Front Page**, press **S** or **s** to launch the UEFI shell.
3. Use the `map` command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.
4. To select 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 `fs0`, enter `fs0:` at the UEFI Shell prompt.
5. Enter `HPUX` at the UEFI Shell command prompt to launch the `HPUX.EFI` loader from the currently selected boot device.

If needed, specify the full path of loader by entering `\EFI\HPUX\HPUX` at the UEFI Shell command prompt.

6. Allow the `HPUX.EFI` loader to proceed with the `boot` command specified in the `AUTO` file, or manually specify the `boot` command.

By default, the `HPUX.EFI` loader boots using the loader commands found in the `\EFI\HPUX\AUTO` file on the UEFI System Partition of the selected boot device. The `AUTO` file typically contains the `boot vmunix` command.

To interact with the `HPUX.EFI` loader, interrupt the boot process (for example, type a **space**) within the time-out period provided by the loader. To exit the loader, use the `exit` command, which returns you to UEFI.

Booting HP-UX in single-user mode

1. Use steps 1–5 from “[Booting HP-UX from the UEFI Shell](#)” (page 34) to access the UEFI shell and launch the `HPUX.EFI` loader.
2. Access 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 step 3
 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 UEFI Shell, enter `exit`.
3. 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.

Booting HP-UX in LVM-maintenance mode

The procedure for booting HP-UX into LVM Maintenance Mode is the same as for booting into single user mode (“[Booting HP-UX in single-user mode](#)” (page 34)), except use the `-lm` boot option instead of the `-is` boot option:

```
HPUX> boot -lm vmunix
```

Shutting down HP-UX

For more information, see the `shutdown(1M)` manpage.

1. Log in to HP-UX running on the server that you want to shut down or log in to iLO 3 MP for the server and use the Console menu to access the system console. Accessing the console through iLO 3 MP enables you to maintain console access to the server after HP-UX has shut down.

2. Issue the `shutdown` command with the appropriate command-line options.
The command-line options you specify determines the way in which HP-UX shuts down and whether the server is rebooted.
Use the following list to choose an HP-UX shutdown option for your server:
 - Shut down HP-UX and halt (power off) the server using the `shutdown -h` command.
Reboot a halted server by powering on the server using the `PC` command at the iLO 3 MP Command menu.
 - Shut down HP-UX and reboot the server by issuing the `shutdown -r` command.

Booting and shutting down HP OpenVMS

Adding OpenVMS to the Boot Options List

NOTE: If OpenVMS is already installed on the server blade, add OpenVMS to the boot options list by using the command procedure `SYS$MANAGER:BOOT_OPTIONS.COM`, then following the on-screen instructions.

1. Access the UEFI Shell environment.
 - a. Log in to iLO 3 for Integrity and enter `CO` to access the system console.
When accessing the console, confirm that you are at the **UEFI Front Page**.
If you are at another UEFI menu, then choose the **Exit** option or press **X** or **x** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers.
 - b. Press **S** or **s** to launch the UEFI shell.
2. Access the UEFI System Partition (fsX: where X is the file system number) for the device from which you want to boot OpenVMS.
For example, enter `fs2:` to access the UEFI System Partition for the bootable file system number 2. The UEFI Shell prompt changes to reflect the file system currently accessed.
The full path for the loader is `\EFI\VMS\VMS_LOADER.EFI` and it should be on the device you are accessing.
3. At the UEFI 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 server.
 - `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\VMS\VMS_LOADER.EFI "OpenVMS V8.4"` adds an OpenVMS item as the first entry in the boot options list.
 For more information, see the `help bcfg` command.
4. Exit the console and iLO 3 MP interfaces.
5. Press **Ctrl-B** to exit the system console and return to the **MP Main Menu**. To exit the **MP Main Menu**, press **X** or **x**.

For more details, see the *HP OpenVMS 8.4 Upgrade and Installation Manual*.

Booting OpenVMS

To boot OpenVMS, use either of the following procedures:

- “Booting OpenVMS from the UEFI Boot Manager” (page 36)
- “Booting HP OpenVMS from the UEFI Shell” (page 36)

Booting OpenVMS from the UEFI Boot Manager

1. From the **UEFI Boot Manager menu**, choose an item from the boot options list to boot OpenVMS using the chosen boot option.
2. Access the UEFI Boot Manager menu for the server on which you want to boot OpenVMS.
3. Log in to the iLO 3 MP and enter `CO` to choose the system console.
4. Confirm you are at the **UEFI Front Page**. If you are at another UEFI menu, then choose the **Exit** option or press **X** or **x** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers. Press **B** or **b** to launch the Boot Manager.
5. 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.
6. Press **Enter** to initiate booting using the chosen boot option.
7. Exit the console and iLO 3 MP interfaces.
8. Press **Ctrl-B** to exit the system console and return to the **MP Main Menu**. To exit the **MP Main Menu**, press **X** or **x**.

Booting HP OpenVMS from the UEFI 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 UEFI Shell.
2. From the **UEFI Front Page**, press **S** or **s** to launch the UEFI shell.
3. Use the `map` command to list the file systems (`fs0`, `fs1`, and so on) that are known and have been mapped.
4. To select 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 `fs0`, enter `fs0:` at the UEFI Shell prompt.
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
fs5:> \efi\vms\vms_loader.efi
HP OpenVMS Industry Standard 64 Operating System, Version V8.4
© Copyright 1976-2010 Hewlett-Packard Development Company, L.P.
```

```
%DECnet-I-LOADED, network base image loaded, version = 05.17.00
```

```
%DECnet-W-NOOPEN, could not open SYS$SYSROOT:[SYSEXE]NET$CONFIG.DAT
```

```
%SMP-I-CPUTRN, CPU #2 has joined the active set.
%SMP-I-CPUTRN, CPU #3 has joined the active set.
%SMP-I-CPUTRN, CPU #8 has joined the active set.
%SMP-I-CPUTRN, CPU #15 has joined the active set.
%SMP-I-CPUTRN, CPU #14 has joined the active set.
%SMP-I-CPUTRN, CPU #12 has joined the active set.
%SMP-I-CPUTRN, CPU #10 has joined the active set.
%SMP-I-CPUTRN, CPU #7 has joined the active set.
%SMP-I-CPUTRN, CPU #4 has joined the active set.
%SMP-I-CPUTRN, CPU #6 has joined the active set.
```

```
%SMP-I-CPUTRN, CPU #5 has joined the active set.
%SMP-I-CPUTRN, CPU #9 has joined the active set.
%SMP-I-CPUTRN, CPU #1 has joined the active set.
%SMP-I-CPUTRN, CPU #11 has joined the active set.
%SMP-I-CPUTRN, CPU #13 has joined the active set.
%STDRV-I-STARTUP, OpenVMS startup begun at 11-AUG-2010 06:15:29.21
```

6. Exit the console and iLO 3 MP interfaces.
7. Press **Ctrl-B** to exit the system console and return to the **MP Main Menu**. To exit the **MP Main Menu**, press **X** or **x**.

Shutting Down OpenVMS

1. Log in to OpenVMS running on the server that you want to shut down.
Log in to the iLO 3 MP for the server and use the Console menu to access the system console. Accessing the console through the iLO 3 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.

NOTE: Use the command in step 2 when you shut down OpenVMS the first time. If you have shut down OpenVMS more than once, use the `$ shutdown` command.

```
$@sys$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
```

Booting and shutting down Microsoft Windows

Adding Microsoft Windows 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 UEFI Shell environment.
 - a. Log on to iLO 3 for Integrity and enter `CO` to access the system console.
When accessing the console, confirm that you are at the **UEFI Front Page**.
If you are at another UEFI menu, then choose the Exit option or press **X** or **x** to exit the menu. Exit until you return to the screen that lists the keys that can be pressed to launch various Managers.
 - b. Press **S** or **s** to launch the UEFI shell.
2. Access the UEFI 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 UEFI System Partition for the bootable file system number 2. The UEFI 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.

3. Use the `ls` command to 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. Use 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: Your output may not exactly match the output shown here.

6. Enter **Q** or **q** to quit the NVRBOOT utility.
7. Exit the console and iLO 3 MP interfaces.
Press **Ctrl-B** to exit the system console and return to the iLO 3 MP Main Menu. To exit the MP, enter **X** at the Main Menu.

Booting the Microsoft Windows operating system

Use **UEFI Boot Manager** menu to choose the appropriate Windows item from the boot options list. See “[Shutting down Microsoft Windows](#)” (page 39) for more information on shutting down the Windows operating system.

1. From the **UEFI Boot Manager** choose an item from the boot options list to boot Windows
2. Access the **UEFI Boot Manager** menu for the server on which you want to boot Windows.
3. Log into the iLO 3 MP and enter **CO** to choose the system console.
4. Confirm that you are at the **UEFI Boot Manager** menu (the main UEFI menu). If you are at another UEFI menu, choose the **Exit** option from the submenus until you return to the screen with the UEFI Boot Manager heading.
5. At the **UEFI 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.

6. Press **Enter** to initiate booting using the chosen boot option.
7. After Windows begins loading, wait for the SAC to become available.

The SAC interface provides a text-based administration tool that is available from the system console. For more information, see 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: Your output may not exactly match the output shown here.

8. Exit the console and iLO 3 MP interfaces when finished using them.
Enter **Ctrl-B** to exit the console and return to the iLO 3 MP Main menu. To exit the iLO 3 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 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.

You can issue this command from a command prompt through the Special Administration Console 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 3 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 more information.

Shutting down Windows 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 Special Administration Console interface to start a command prompt, from which you can issue Windows commands to shut down the server.
2. Verify 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 3 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.

5 Optional components

If your server blade has no additional components to install, go to “Installing and powering on the server blade” (page 15).

Partner blades

The following partner blades are supported:

- Ultrium 448c Tape Blade
- SB920c Tape Blade
- SB1760c Tape Blade
- SB3000c Tape Blade
- SB40c Storage Blade
- D2200sb Storage Blade
-

ⓘ **IMPORTANT:** In c7000 enclosures, partner blades are supported with BL860c i4 servers and BL870c i4 servers with BL2E blade links.

In c3000 enclosures, partner blades are supported with BL860c i4 servers.

Partner blades are not supported with BL890c i4 servers.

Partner blade slotting rules are dependent on the conjoined blade configuration. For more information on partner bay blade locations, see “Installing the Blade Link for BL870c i2 or BL890c i2 configurations” (page 22).

NOTE: SAS tape boot is now supported with tape blades on HP Integrity BL860c i4, BL870 i4, and BL980 i4 server blades.

NOTE: PCIe Gen-1 (driven from the ICH10 on the monarch blade’s ICH mezzanine card) provides the interface to the partner blades. A separate mezzanine pass-thru card is not required.

Hot-plug SAS disk drives

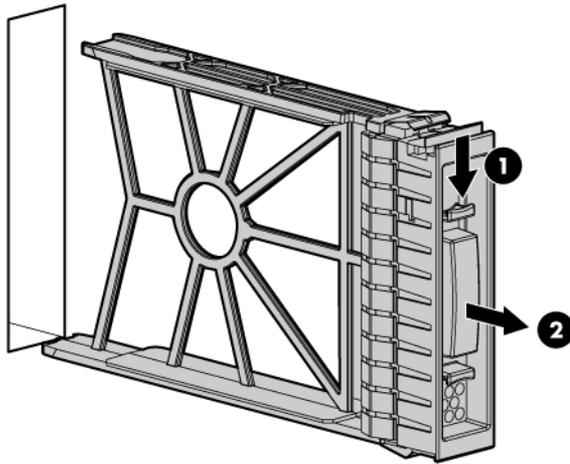
The server blade supports up to two hot-plug SAS drives.

CAUTION: To prevent improper cooling and thermal damage, do not operate the server blade or the enclosure unless all hard drive and device bays are populated with either a component or a blank.

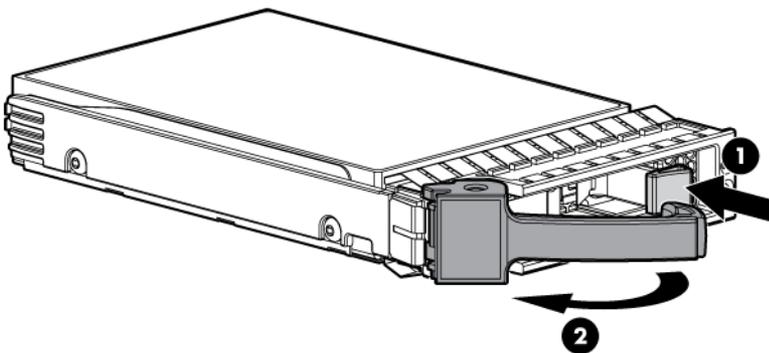
IMPORTANT: The disk drive does not seat properly when 180° out of alignment. Verify the orientation before insertion.

NOTE: For a list of supported disk drives for the server blade, see: [“Server blade components list”](#) (page 108).

1. Remove the hard drive blank.

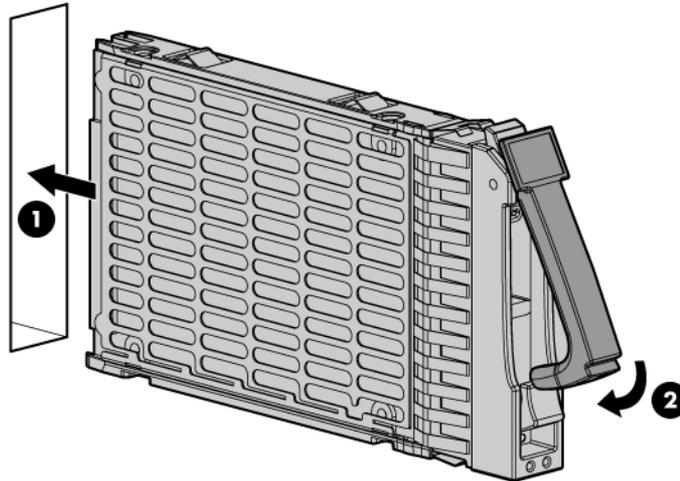


2. Prepare the hard drive.



3. Slide the drive into the cage until it is fully seated.

4. Close the lever to lock the drive into place.



Installing internal components

Removing the access panel

1. Lift the access panel latch.
2. Slide the access panel backwards approximately 2 cm (0.75 in).
3. Remove the access panel by lifting it straight up and off the server blade.

After the access panel is off, you can do the following:

- Add an additional processor (“[Processor and heatsink module](#)”).
- Add additional memory DIMMs (“[DIMMs](#)”).
- Add additional mezzanine cards (“[Mezzanine cards](#)”).

Processor and heatsink module

Processor load order

Observe the following guidelines when installing additional processors:

- In a BL860c i2, CPU0 is installed before CPU1.
- In a BL870c i2 or BL890c i2, each blade must have CPU0 installed.
- When adding additional CPUs in a conjoined configuration:
 - Load both CPU0 and CPU1 in the Monarch blade first
 - Load additional CPUs in sequence, from lowest slot-numbered blade to highest.

⚠ CAUTION: The pins on the processor socket are very fragile. Any damage to them might require replacing the server blade base unit.

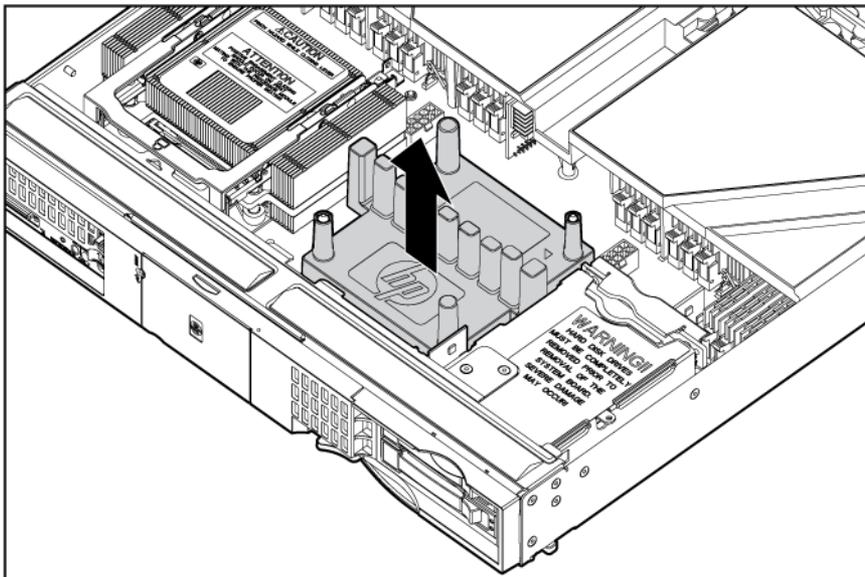
CAUTION: To avoid damage to the processor, verify that the plastic tabs on the processor are pulled fully out before installation.

CAUTION: To avoid damage to the processor, handle the processor only by the edges. Do not touch the bottom of the processor, especially the contact area.

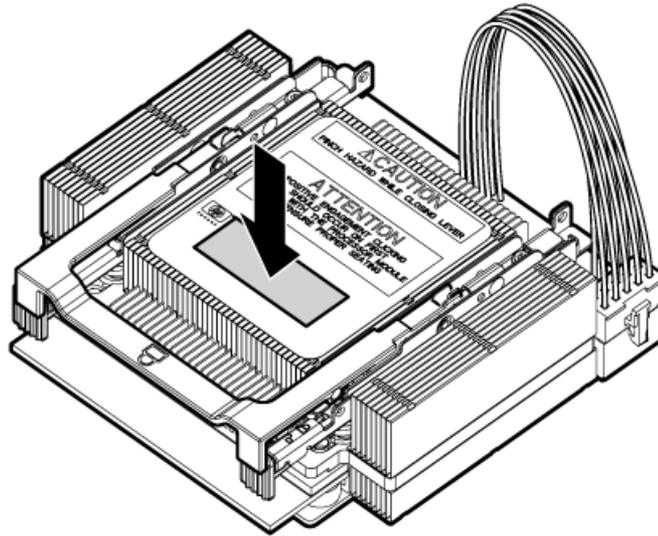
CAUTION: To prevent possible server blade malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

The processor and heatsink ship as two separate units and are coupled together during installation into the server blade.

1. Remove the CPU airflow baffle.



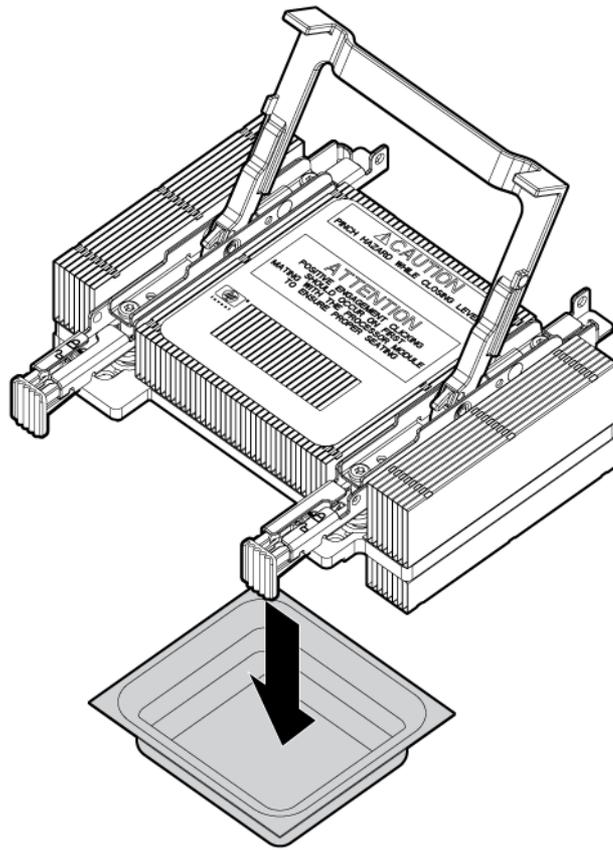
2. Transfer the duplicate part/serial numbers label from the processor module to the processor heatsink.
 - a. Remove the duplicate tear-away label that lists the part and serial numbers from the processor module.
 - b. Place the label on the top of the heatsink.



3. Install the processor over the load posts.

NOTE: Ensure pin 1, indicated on the empty socket with an embossed triangle, matches the pin 1 marker on the processor module, the chamfered corner of its attached voltage regulator heatsink.

4. Remove the heatsink cover.

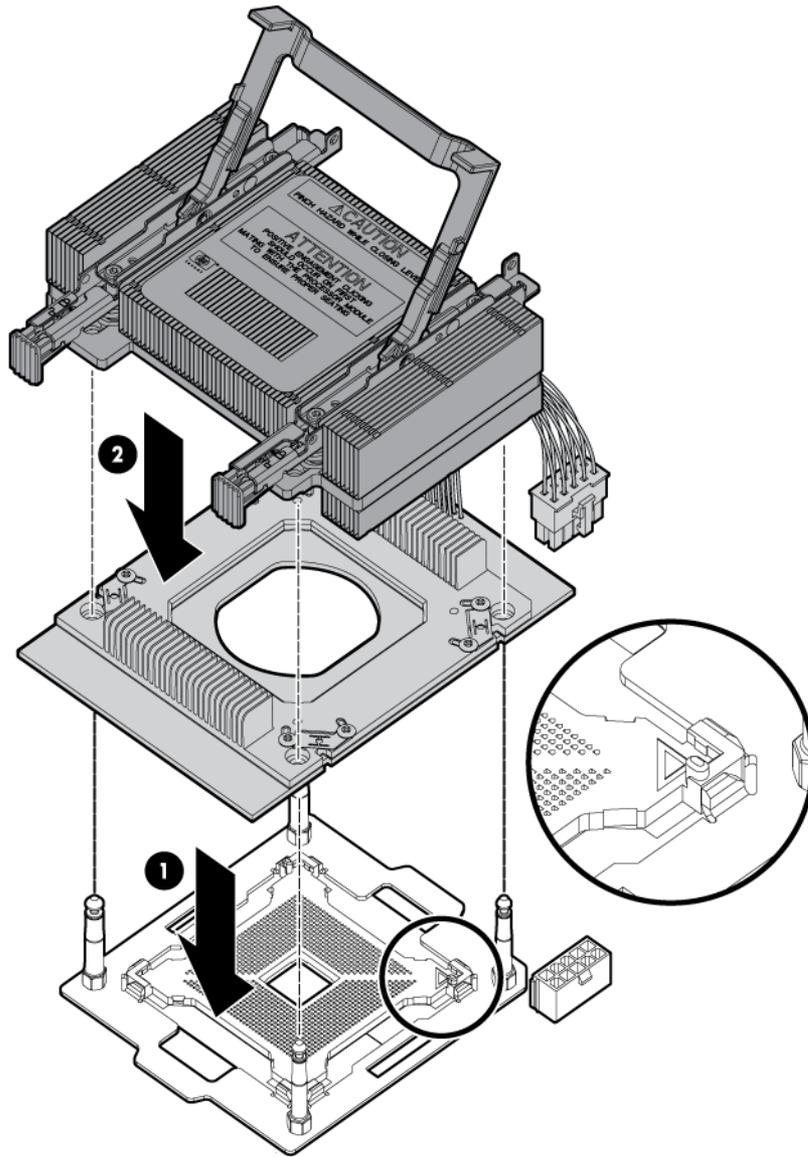


-
- △ **CAUTION:** During installation, after removing the protective cover from the heatsink:
- Do not touch or come into contact with the thermal interface material.
 - Immediately install the heatsink.

CAUTION: To avoid damage to the server blade and processor, ensure the processor heatsink locking handle is fully back against the stops, rotated about 120° back. Also verify that the plastic tabs on the processor heatsink are pulled fully out before installation.

5. Install the heatsink over the load posts.

-
- △ **CAUTION:** Do not lower the heatsink locking handle before pushing the plastic locking tabs into place.
-

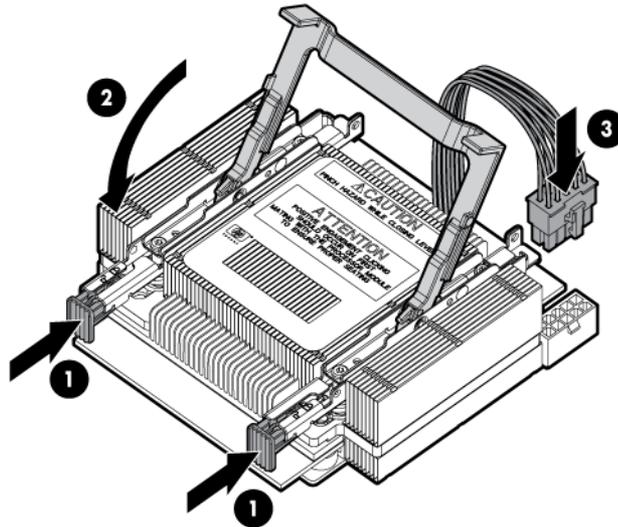


⚠ **CAUTION:** To prevent thermal instability and damage to the server blade, do not separate the processor module from the processor's heatsink after they have been coupled.

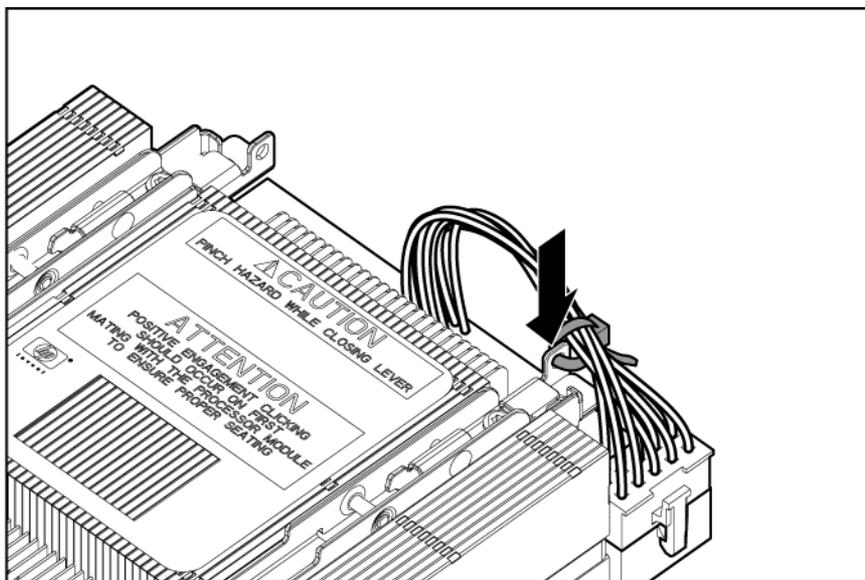
6. Secure the heatsink to the processor
 - a. Slide both plastic locking tabs into place. (See callout 1 in the following figure).
 - b. Grasp and rotate the latch downward. (See callout 2 in the following figure.)

⚠ WARNING! The heatsink locking lever can constitute a pinch hazard, keep your hands on top of the lever during installation to avoid personal injury.

NOTE: Positive engagement clicking should occur during mating of the processor heat sink and processor module onto the socket to ensure proper seating.



7. Connect the power cord. (See callout 3 in the previous figure).
8. Tie wrap the processor cable to the right tie point on the processor assembly.



⚠ CAUTION: When the CPU is installed, dress all slack in the power cable to the connector end of the cable. Failure to do so could result in pinched or damaged CPU power cables.

- ❗ **IMPORTANT:** If you are adding an additional processor to your server blade, the DIMMs in the server blade must be reconfigured to support both CPUs. For more information, see “DIMM pair load order” (page 49).

DIMMs

DIMM installation guidelines

Observe the following guidelines when installing additional memory:

- In a BL860c i2 Server Blade, memory is loaded in pairs.
- In a BL870c i2 or BL890c i2 Server Blade, memory is loaded in quads that alternate between blades.
- Only two DIMM sizes can be mixed in a BL870c i2 or BL890c i2 Server Blade.
 - In a BL870c i2 Server Blade, the two DIMM sizes must alternate between blades. Load all of one DIMM size, then repeat with the second DIMM size.
 - In a BL890c i2 Server Blade, blades 1 and 2 must have one DIMM size and blades 3 and 4 must have the other DIMM size. If only one DIMM size is used on BL980 i2, alternate between all 4 blades.

NOTE: HP Integrity Server Blade upgrades follow the same DIMM loading rules. See “Upgrading a conjoined configuration” (page 66) for more information on server blade upgrades.

DIMM pair load order

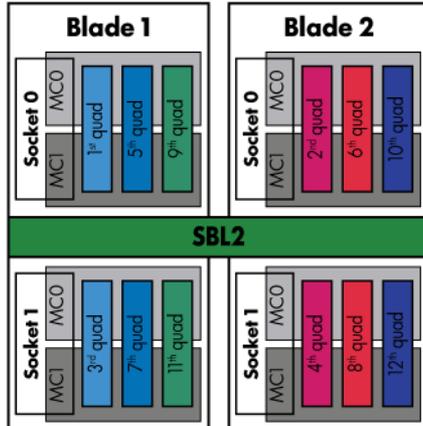


Table 6 DIMM pair load order

		CPU0		CPU1	
CPU0 only	1st	3A	4A	—	—
	2nd	9B	10B	—	—
	3rd	1C	6C	—	—
	4th	7D	12D	—	—
	5th	2E	5E	—	—
	6th	8F	11F	—	—
Both CPUs loaded	1st	3A	4A	—	—

Table 6 DIMM pair load order (continued)

		CPU0				CPU1	
	2nd	—	—	—	—	1A	7A
	3rd	9B	—	10B	—	—	—
	4th	—	—	—	6B	10B	—
	5th	1C	—	6C	—	—	—
	6th	—	—	—	3C	9C	—
	7th	7D	—	12D	—	—	—
	8th	—	—	—	4D	12D	—
	9th	2E	—	5E	—	—	—
	10th	—	—	—	2E	8E	—
	11th	8F	—	11F	—	—	—
	12th	—	—	—	5F	11F	—

DIMM quad load order rules

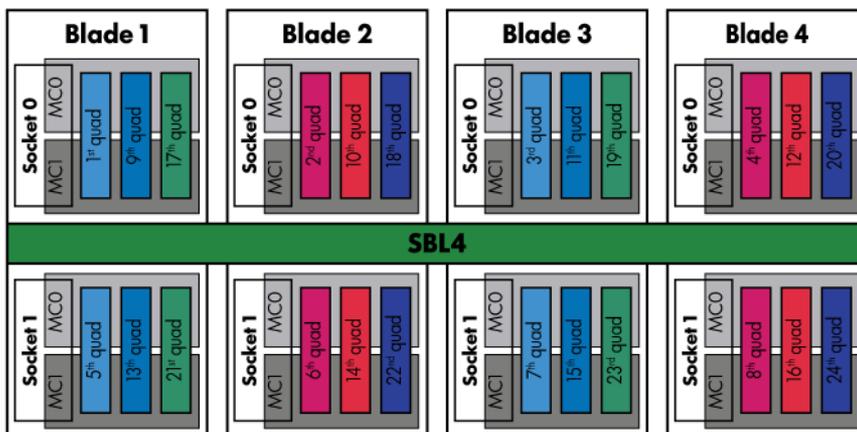
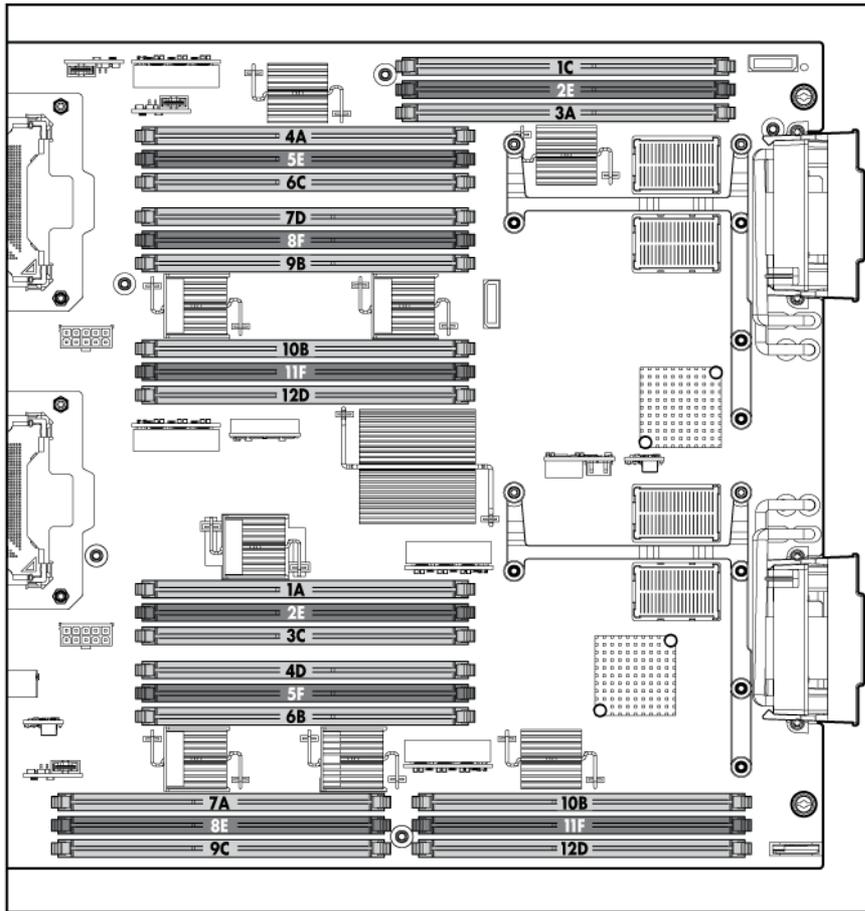


Table 7 DIMM quad load order

		CPU0				CPU1			
Both CPUs loaded	1st	3A	4A	9B	10B	—	—	—	—
	2nd	—	—	—	—	1A	7A	6B	10B
	3rd	1C	6C	7D	12D	—	—	—	—
	4th	—	—	—	—	3C	9C	4D	12D
	5th	2E	5E	8F	11F	—	—	—	—
	6th	—	—	—	—	2E	8E	5F	11F

Installing DIMMS

1. Remove the DIMM baffle (“DIMM baffle” (page 115)).
2. Locate the DIMM slots on the server blade system board.



NOTE: The server blade ships with at least two DIMMs installed in slots 3A and 4A.

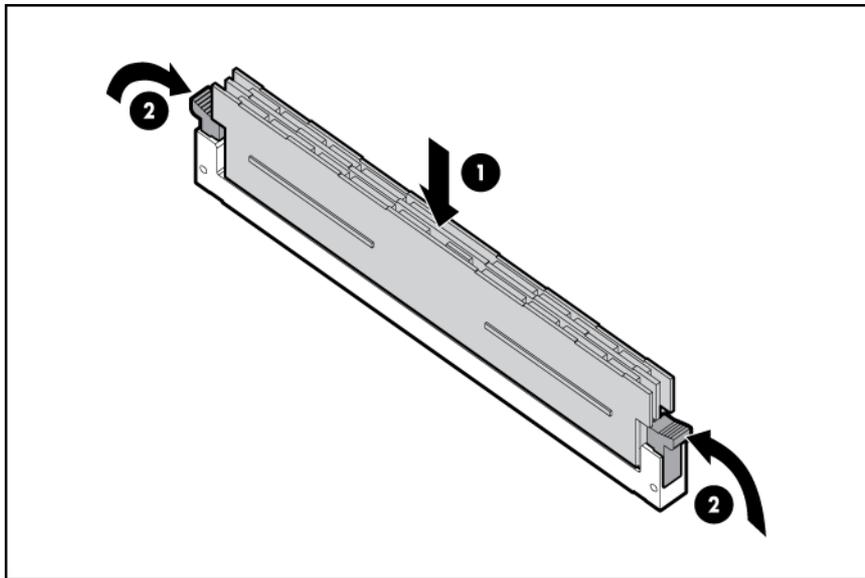
3. Ensure the DIMM slot latches are open.
-

CAUTION: Use only HP low profile DIMMs. DIMMs from other sources might adversely affect data integrity.

DIMMs do not seat fully if turned the wrong way.

DIMMs in a pair or quad must be identical.

4. Insert a DIMM in a slot and push down firmly until the latches click shut.



Mezzanine cards

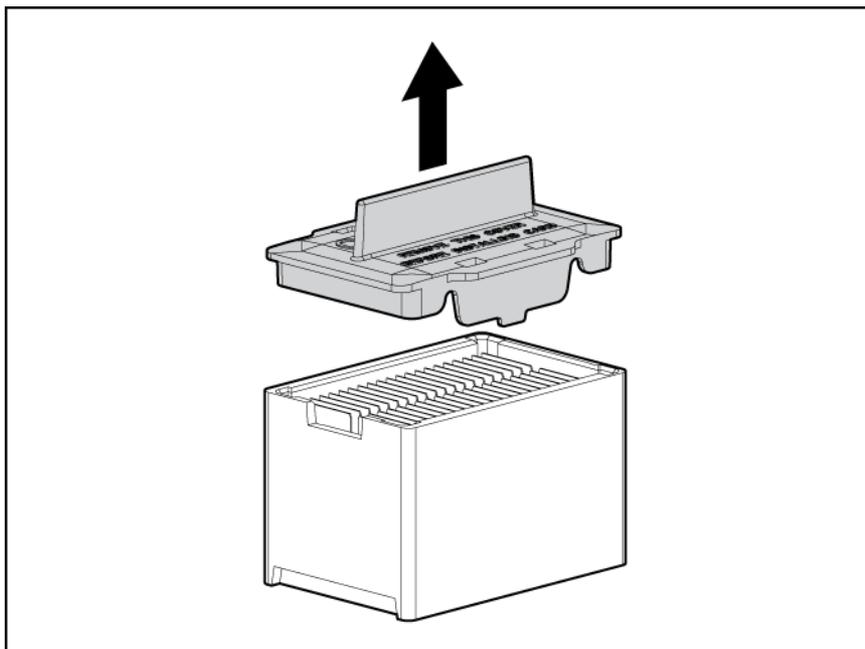
Optional mezzanine cards enable additional network connectivity and provide Fibre Channel support. For mezzanine card locations, see [“Server blade components” \(page 9\)](#).

Optional mezzanine cards are classified as Type I mezzanine cards and Type II mezzanine cards. The card type determines where it can be installed in the server blade:

- Install Type I mezzanine cards on any mezzanine connector.
- Install Type II mezzanine cards only on Mezzanine 2 connector or Mezzanine 3 connector.

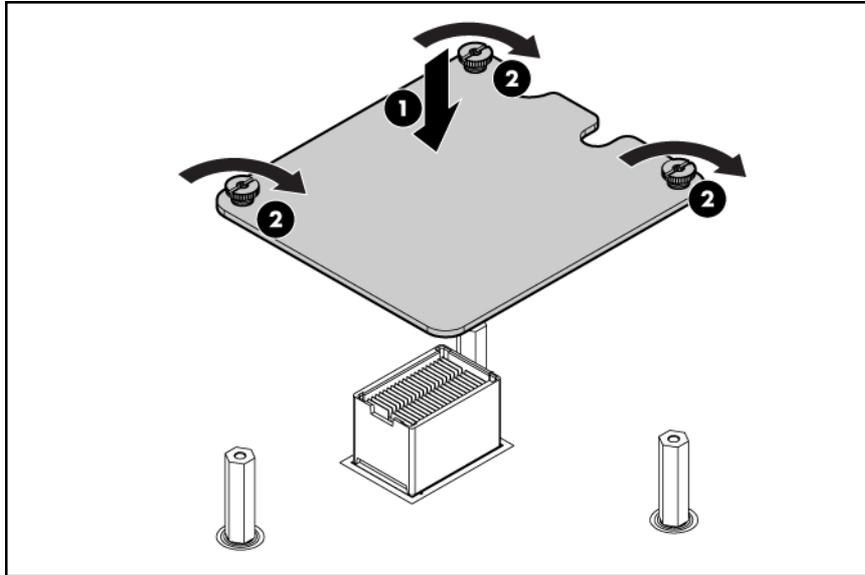
To install a card:

1. Power off the server blade and remove it from the server blade enclosure ([“Preparing the server blade for servicing”](#)).
2. Remove the access panel ([“Access panel” \(page 113\)](#)).
3. Remove the mezzanine connector cover.



4. Align the mezzanine connector on the option card with the mezzanine connector on the system board.
5. Press down on the connector to seat the card.

⚠ CAUTION: To prevent damage to the server blade, apply pressure over the mezzanine connector when installing the mezzanine card. Do not apply pressure to the edges of the card.



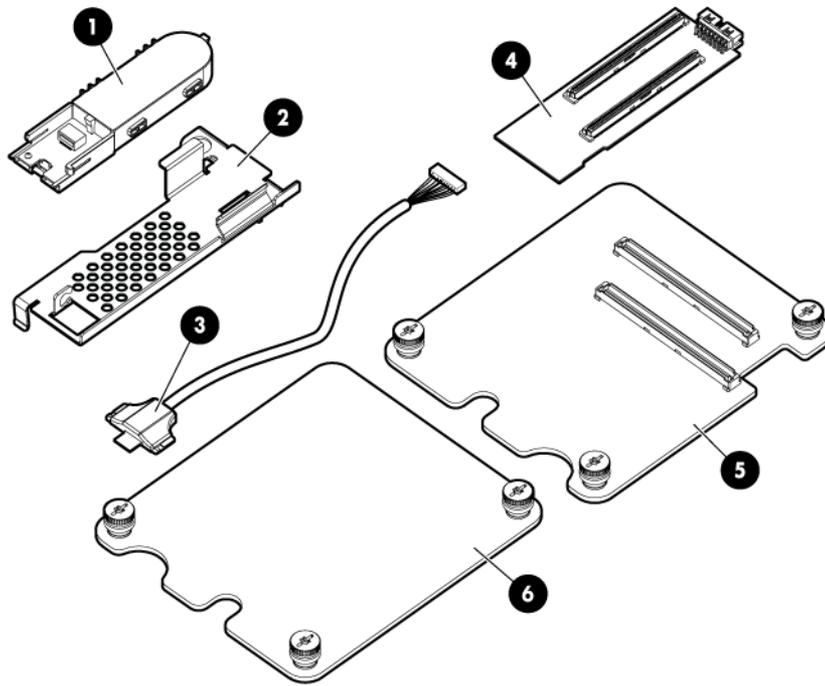
HP Smart Array P700m/512 Controller

- ⓘ **IMPORTANT:** The *HP Smart Array P700m Controller for HP ProLiant Servers User Guide* includes a battery replacement procedure that uses the two driveless HDD trays included in the kit. This procedure is not supported on the BL860c i2, BL870c i2 or BL890c i2.

The HP Smart Array P700m/512 is a PCIe card supporting direct attach and shared SAS Storage. It includes additional components that are covered in this section.

Battery kit and other components

The battery kit includes the following:



- | | | |
|-----------------------------------|--|---------------------------------|
| 1 BBWC battery | 3 11.5 inch (29.2 cm) battery cable | 5 P700m controller board |
| 2 Battery mounting bracket | 4 512 cache module | 6 Mezzanine card blank |

ⓘ **IMPORTANT:** This product uses the 452348-B21 battery kit, also called the HP SA P-Series Low Profile Battery. Do not order or use the 383280-B21 battery kit option.

Battery mounting bracket parts

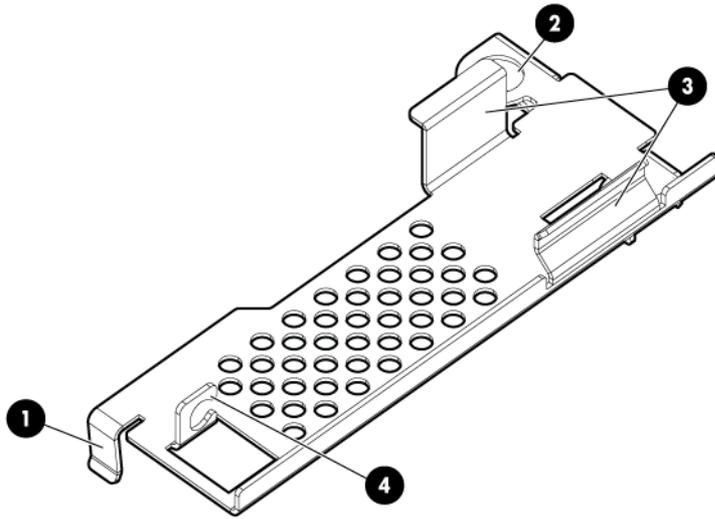
The BBWC battery mounts on a black metal battery mounting bracket installed inside the server blade. The mounting bracket clips onto a mezzanine card in slot 1. If no card is used in slot 1, the mezzanine card blank option must be installed for the bracket to clip on.

For installing the bracket on to the server blade, the mounting bracket has:

- A mezzanine post loop that slides over the abutting mezzanine 2 post
- A thumbscrew clip that clips over the mezzanine 1 card or mezzanine blank thumbscrew located at the rear of the blade
- A mezzanine foot that clips over the edge of the mezzanine 1 card or mezzanine blank that is installed closest to the center of the blade

For installing the BBWC battery onto the bracket, the mounting bracket has:

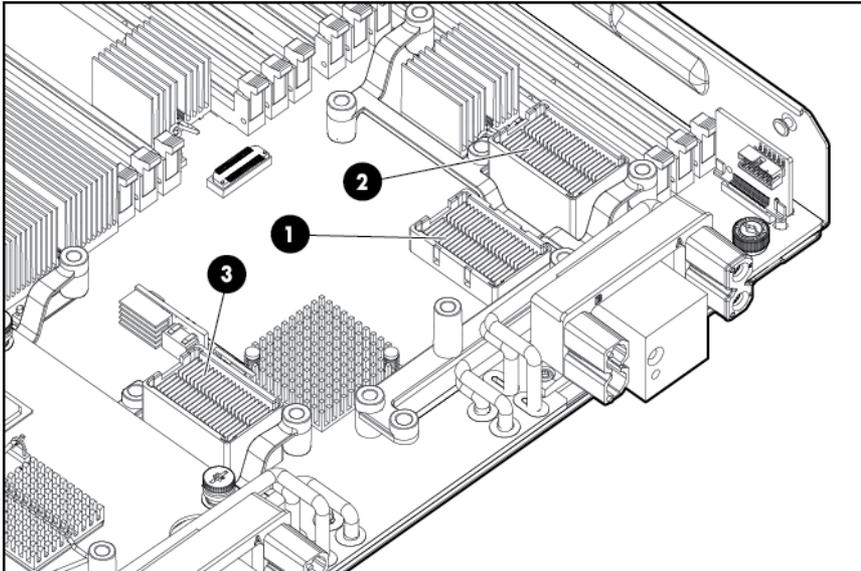
- A C-hook to restrain the battery cable
- Two battery restraining clips to restrain the BBWC battery



- 1** Mezzanine foot
- 3** Battery restraining clips
- 4** C-hook
- 2** Mezzanine post loop

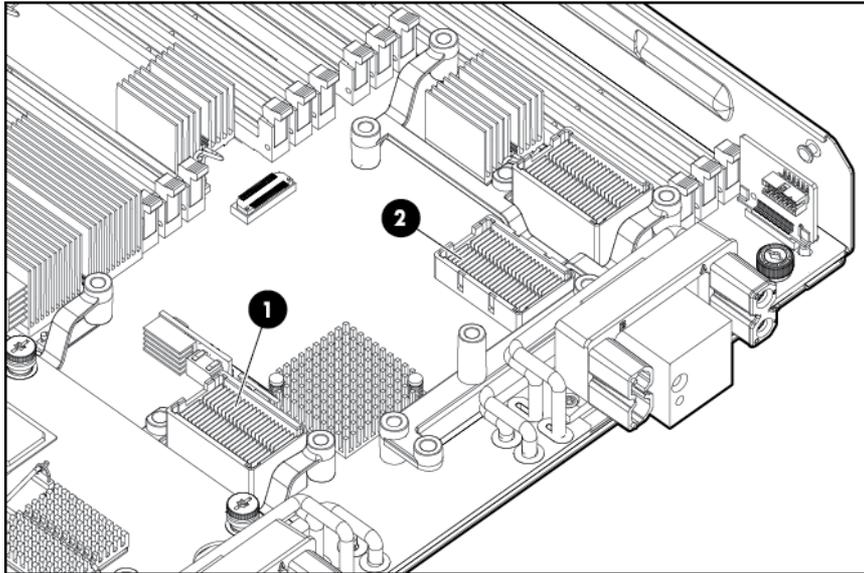
Installing the Controller Board

When used with the MSA2000sa G2 storage array (and therefore without the optional battery kit) this card is supported in slots 1, 2, and 3 on the Integrity BL860c i2, BL870c i2, and BL890c i2 server blades.



- 1** Slot 1
- 2** Slot 2
- 3** Slot 3

When used with the MDS600, the battery kit is required and this card is supported in slots 1 and 3 on the Integrity BL860c i2, BL870c i2, and BL890c i2 server blades. Mezzanine 2 installation of this card is not supported on Integrity BL860c i2, BL870c i2, and BL890c i2 products for MDS600 configurations. If you must remove the cache module to transfer data, the BBWC battery must remain connected so that the data is preserved. HP recommends installation into mezzanine slot 3, with a mezzanine blank or mezzanine card in slot 1 so the cache module and battery can be removed together.



1 Slot 3

2 Slot 1

NOTE: When a mixed configuration of BL860c i2, BL870c i2, and BL890c i2 blade(s) and other c-Class server blades are in the same enclosure, the preferred location for the P700m cards is slot 3.

If you are unable to use mezzanine slot 3, you will have to remove the mezzanine card in slot 2, BBWC battery, and battery mounting bracket to gain access to the cache module.

Use the procedure for installing standard mezzanine cards to install the SAS controller board, see [“Mezzanine cards” \(page 52\)](#) for more information.

Upgrading or replacing controller options

Replacing the 512MB cache module

CAUTION: To avoid damage to the controller board, only install the cache module when the HP Smart Array P700m/512 Controller is installed in the server blade.

IMPORTANT: If you must remove the cache module to transfer data, the BBWC battery must remain connected to it so that the data is preserved.

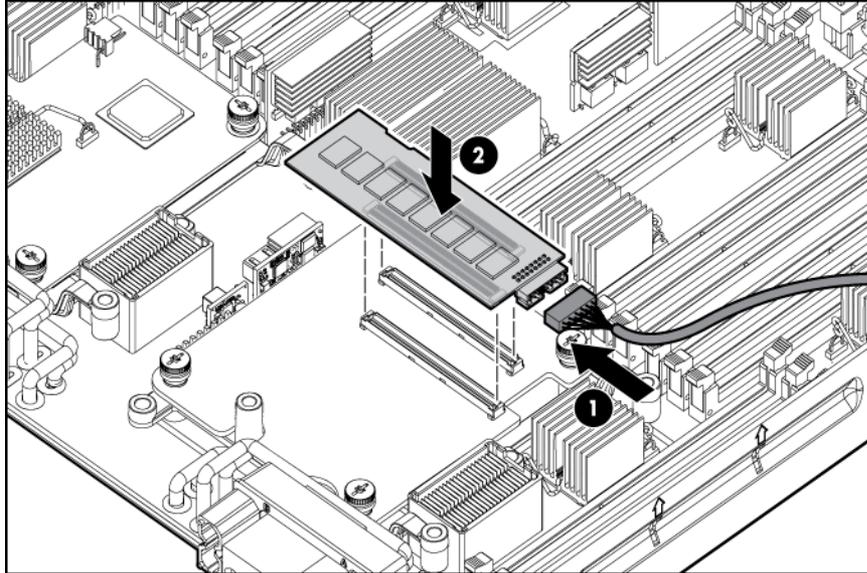
1. power off the server blade and remove it from the server blade enclosure ([“Preparing the server blade for servicing”](#)).
2. Remove the access panel ([“Access panel” \(page 113\)](#)).
3. Remove the DIMM baffle ([“DIMM baffle” \(page 115\)](#))
4. Remove any mezzanine cards blocking access to the HP Smart Array P700m/512 Controller ([“Mezzanine cards” \(page 123\)](#)).
5. Plug the smaller battery cable plug into the cache module battery connector.

IMPORTANT: Only use the 11.5 inch (29.2 cm) battery cable (408658-001).

NOTE: The lip of the battery cable cache module plug has three tiny tabs that should face down.

6. With the cache module battery connector pointing towards the 3A DIMM slot, line up the two cache module connectors with the two corresponding slots on the P700m controller.
7. Press straight down on the cache module until it snaps into place.

NOTE: If the P700m controller is in mezzanine 1, route the battery cable back over the card and under the DIMM latches, doubling back towards slot 3, sliding the cable under the inner mezzanine post for slot 3.



8. Replace the battery mounting bracket.
9. If the battery mounting bracket and BBWC were previously installed:
 - a. Replace the battery mounting bracket (“[Replacing the battery mounting bracket](#)”).
 - b. Position the battery with the print side down and push the end of the battery cable that is plugged into the battery down under the battery mounting bracket's C-hook.
 - c. Route the cable so its battery end is on the side of the hook that is away from slot 3.
 - d. Push the other end of the battery down between the two restraining clips.
10. Replace any mezzanine cards that you had to remove from mezzanine slot 2 (“[Mezzanine cards](#)” (page 123)).

NOTE: If the P700m controller is installed in mezzanine slot 3, tuck the cable between the battery mounting bracket and slot 3.

Replacing the battery mounting bracket

1. power off the server blade and remove it from the server blade enclosure (“[Preparing the server blade for servicing](#)”).
2. Remove the access panel (“[Access panel](#)” (page 113)).
3. Remove the DIMM baffle (“[DIMM baffle](#)” (page 115))
4. Temporarily remove any mezzanine card installed in slot 2 (“[Mezzanine cards](#)” (page 123)).

NOTE: If you will be installing the BBWC battery, be sure that the cache module is installed and the battery cable is plugged into the cache module (“[Replacing the 512MB cache module](#)”).

NOTE: If you are not installing the p700m into slot 1, slot 1 must contain either another mezzanine card or mezzanine card blank.

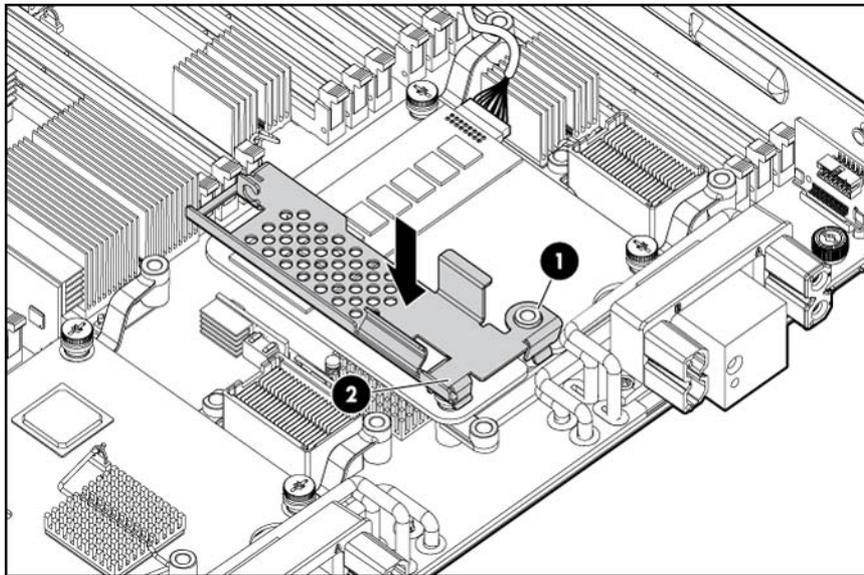
5. Clip the mounting bracket onto the mezzanine card or mezzanine card blank.

NOTE: If you are installing the p700m into slot 1, slide the bracket loop over the mezzanine 2 post that sticks up through the notch in the edge of the mezzanine card or mezzanine card blank.

6. Press the bracket thumbscrew clip over the thumbscrew closest to the mezzanine post.
7. Push the remaining bracket foot over the other edge of the mezzanine card or mezzanine card blank.

△ **CAUTION:** Push only enough to anchor the bracket, keeping the bracket level.

△ **CAUTION:** To avoid damage to the power cable ensure the battery bracket does not pinch the power cable to the power connectors.



8. Replace any mezzanine cards that you had to remove from mezzanine slot 2 (“[Mezzanine cards](#)” (page 123)).

Replacing the BBWC battery

The BBWC battery snaps onto the battery mounting bracket to secure the battery inside the server blade.

NOTE: The battery mounting bracket is installed either on top of a mezzanine card in slot 1, or the mezzanine blank in slot 1, depending upon the customer's configuration. If no card is used in slot 1, the mezzanine card blank must be installed for the bracket to clip onto.

1. power off the server blade and remove it from the server blade enclosure (“[Preparing the server blade for servicing](#)”).
2. Remove the access panel (“[Access panel](#)” (page 113)).
3. Remove the DIMM baffle (“[DIMM baffle](#)” (page 115)).
4. If the P700m controller is in mezzanine 1, and the battery cable is not already plugged into the cache module:
 - a. Remove any mezzanine card installed in slot 2 so you can access the P700m cache module (“[Mezzanine cards](#)” (page 123)).
 - b. Temporarily remove the cache module so you can access the module battery connector (“[Removing the 512MB cache module](#)”).

5. If it is not already connected, plug the battery cable cache module plug into the cache module battery connector. Push the battery cable's plug into the battery connector until it snaps into place.

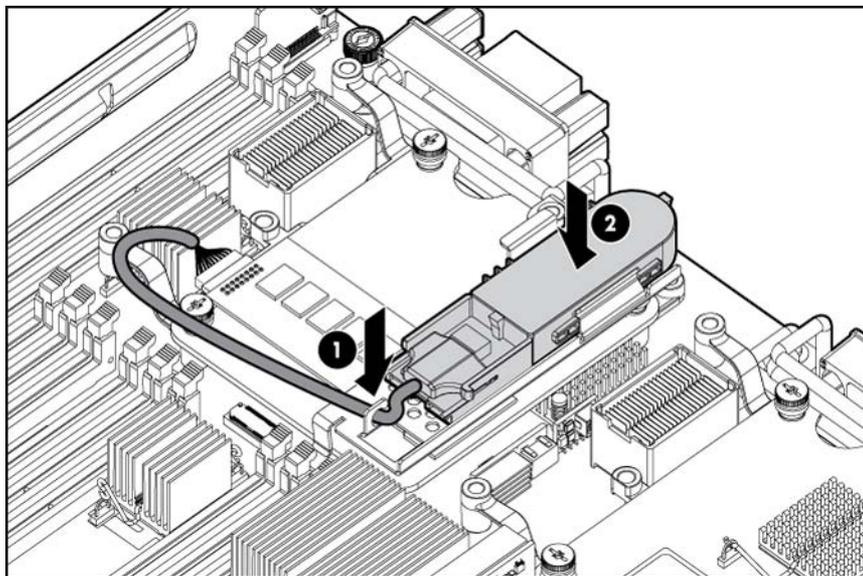
NOTE: The lip of the battery cable's cache module plug has three tiny tabs that should face down.

6. If you had to remove the cache module, reinstall it ("[Replacing the 512MB cache module](#)").
7. With the battery cable plug label (contoured side) up line up the plug's thin edges with the thin slits on the sides of the battery.

NOTE: The BBWC battery should be print side down.

8. Push the battery cable's plug, into the battery connector until it snaps into place.
9. Mount the battery onto the battery mounting bracket:
 - a. Position the battery with the print side down and push the end of the battery cable that is plugged into the battery down under the battery mounting bracket's C-hook, routing the cable so its battery end is on the side of the hook that is away from slot 3.
 - b. Push the other end of the battery down between the two restraining clips.
 - c. If the P700m is located in slot 1, route the battery cable over the P700m, under the DIMM latches, doubling back towards slot 3, sliding it under the inner mezzanine post for slot 3.

If the P700m is located in slot 3, tuck the cable between the battery bracket and slot 3.



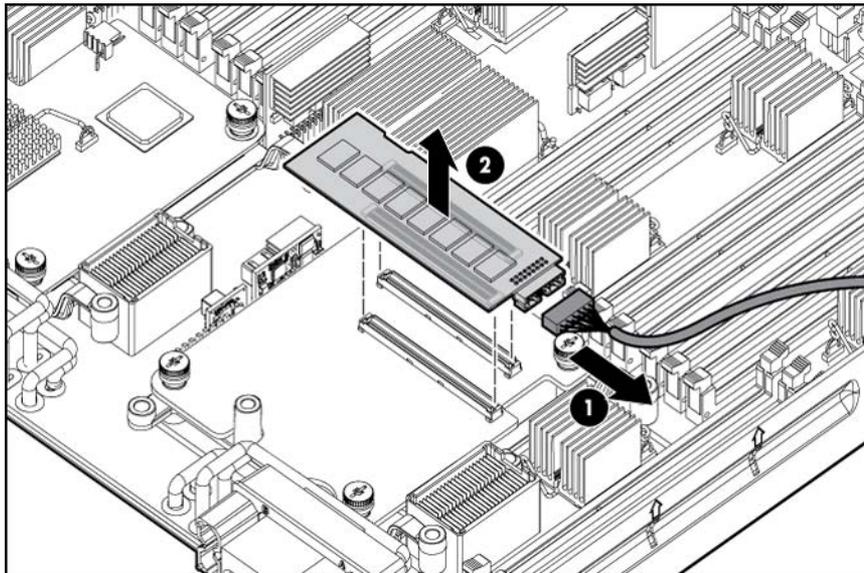
NOTE: After installing a BBWC battery, you might see a POST message during reboot indicating the array accelerator is temporarily disabled. This is normal as the new BBWC battery will have a low charge. The recharge process will begin automatically when the server blade is installed in the enclosure.

The P700m controller will operate properly while the BBWC battery recharges, although the performance advantage of the array accelerator will be absent. After the BBWC battery charges up to a satisfactory level, the array accelerator is automatically enabled.

Removing upgrade components

Removing the 512MB cache module

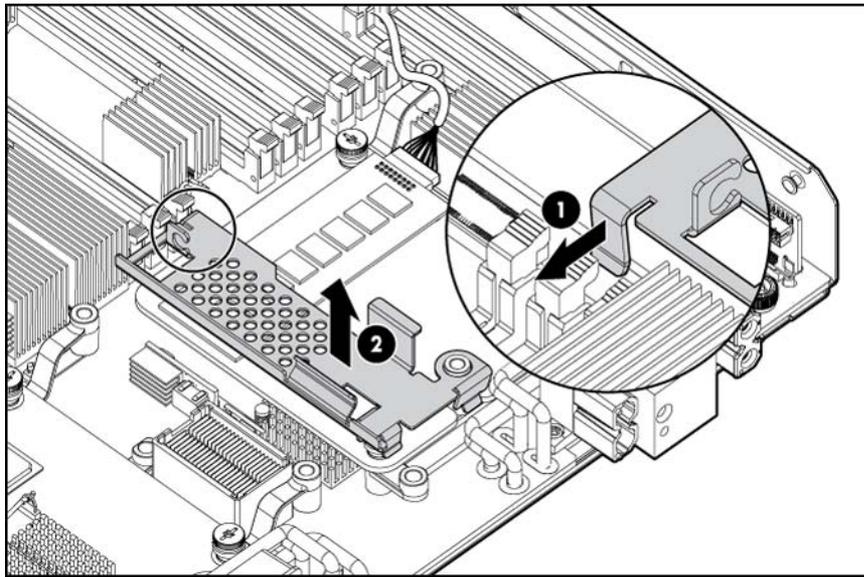
- CAUTION:** Only remove/replace the cache module when it is installed in the blade, so as not to bend the controller board.
1. If you are also going to be removing the BBWC battery:
 - a. Back up all data.
 - b. Close all applications
 2. power off the server blade and remove it from the server blade enclosure (“Preparing the server blade for servicing”).
 3. Remove the access panel (“Access panel” (page 113)).
 4. Remove the DIMM baffle (“DIMM baffle” (page 115)).
 5. Remove any mezzanine card installed in slot 2 (“Mezzanine cards” (page 123)).
 6. Lift the BBWC battery straight up to remove it from the battery mounting bracket.
 7. Pull straight up on the cache module to remove it from the controller.
 8. Push the battery cable down and towards the rear of the server blade to push it out of the battery bracket's C-hook.
 9. If the controller is installed into slot 1, remove the battery mounting bracket from the mezzanine card or mezzanine card blank by pulling straight up on the bracket and lifting it out of the server.
 10. Lift the cache module and the attached battery out of the server blade.
- CAUTION:** If you must remove the cache module to transfer data, the battery must remain connected so that the data is preserved.
11. If you will be replacing the cache module, unplug the battery cable from the cache module battery connector (“Replacing the 512MB cache module”).



Removing the battery mounting bracket

1. power off the server blade and remove it from the server blade enclosure (“Preparing the server blade for servicing”).
2. Remove the access panel (“Access panel” (page 113)).
3. Remove the DIMM baffle (“DIMM baffle” (page 115)).

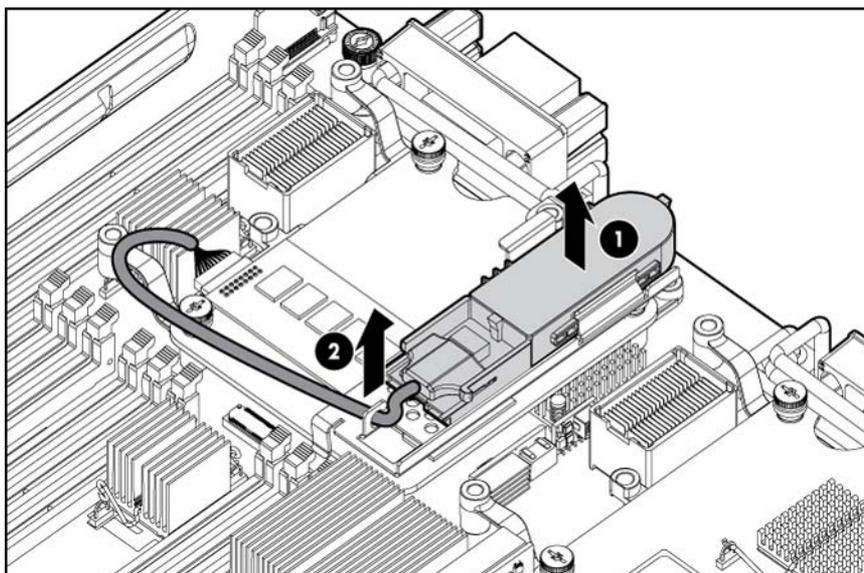
4. Remove any mezzanine card installed in slot 2 (“Mezzanine cards” (page 123)).
5. If installed, remove the BBWC battery (“Removing the BBWC battery”).
6. Remove the battery mounting bracket



Removing the BBWC battery

CAUTION: If you must remove the cache module to transfer data, the battery must remain connected so that the data is preserved. If you must keep the battery connected to the cache module, follow the steps for 512MB cache module removal (“Removing the 512MB cache module”) instead of using this procedure.

1. Back up all data.
2. Close all applications.
3. power off the server blade and remove it from the server blade enclosure (“Preparing the server blade for servicing”).
4. Remove the access panel (“Access panel” (page 113)).
5. Remove the DIMM baffle (“DIMM baffle” (page 115))
6. Lift up on the battery to remove it from the battery bracket.
7. Push the battery cable down and towards the rear of the server blade to push it out of the battery bracket's C-hook.



8. Push the battery plug out of the battery connector.

HP Smart Array P711 m Controller

The HP Smart Array P711 m is a PCIe card supporting direct attach and shared SAS Storage. This card is supported in slots 1, 2, and 3 on the Integrity BL860c i2, BL870c i2, and BL890c i2 server blades.

NOTE: When a mixed configuration of BL860c i2, BL870c i2, and BL890c i2 server blades and other c-Class server blades is in the same enclosure, the preferred location for the P711 m cards is slot 3.

Supercap pack mounting kit

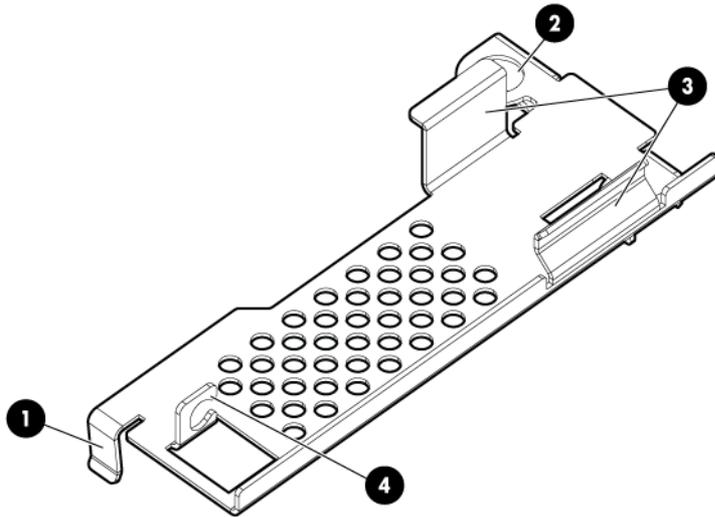
The HP Smart Array P711 m Controller includes a cabled Supercap Pack which mounts inside the server using the orderable AM341A Mounting Kit for Low profile battery (HP part number AD399-2132A KIT, RAID BATTERY HOLDER). This kit contains a black metal mounting bracket and a mezzanine card blank. The mounting bracket clips onto a mezzanine card in slot 1. If no card is used in slot 1, the mezzanine card blank included in the kit must be installed to mount the bracket.

For installing the bracket on to the server blade, the mounting bracket has:

- A mezzanine post loop that slides over the abutting mezzanine 2 post
- A thumbscrew clip that clips over the mezzanine 1 card or mezzanine blank thumbscrew located at the rear of the blade
- A mezzanine foot that clips over the edge of the mezzanine 1 card or mezzanine card blank that is installed closest to the center of the blade

For installing the Supercap Pack onto the bracket, the mounting bracket has:

- A C-hook to restrain the cable
- Two restraining clips to restrain the Supercap Pack



- 1 Mezzanine foot
- 3 Cable restraining clips
- 4 C-hook
- 2 Mezzanine post loop

Installing the Supercap mounting bracket

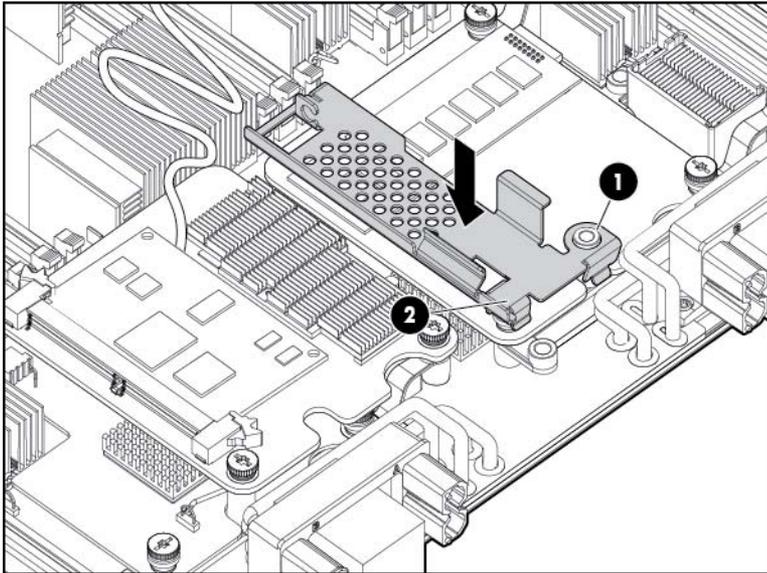
1. Power off the server blade and remove it from the server blade enclosure (“[Preparing the server blade for servicing](#)”).
2. Remove the access panel (“[Access panel](#)” (page 113)).
3. Remove the DIMM baffle (“[DIMM baffle](#)” (page 115)).
4. Temporarily remove any mezzanine card installed in slot 2 (“[Mezzanine cards](#)” (page 123)).

NOTE: Mezzanine slot 1 must contain the P711m Controller, another mezzanine card, or the mezzanine card blank. If you are installing the P711m card in mezzanine slot 1, do so now following the instructions “[Installing the P711m Controller Board](#).” If you are not installing the P711m card in mezzanine slot 1, and no other mezzanine card is present in slot 1, then install the mezzanine card blank at this time.

5. Clip the mounting bracket onto the mezzanine card or mezzanine card blank.
6. Press the bracket thumbscrew clip over the thumbscrew closest to the mezzanine post.
7. Push the remaining bracket foot over the other edge of the mezzanine card or mezzanine card blank.

CAUTION: Push only enough to anchor the bracket, keeping the bracket level.

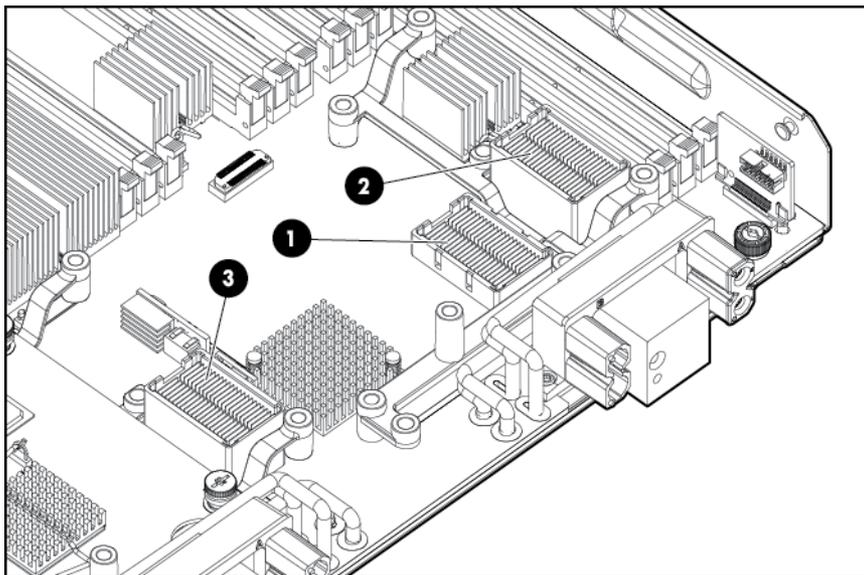
CAUTION: To avoid damage to the power cable ensure the battery bracket does not pinch the power cable to the power connectors.



8. Replace any mezzanine cards that you had to remove from mezzanine slot 2 (“Mezzanine cards” (page 123)).

Installing the P711 m controller board

This card is supported in slots 1, 2, and 3 on the Integrity BL860c i2, BL870c i2, and BL890c i2 server blades.



1 Slot 1

2 Slot 2

3 Slot 3

NOTE: When a mixed configuration of BL860c i2, BL870c i2, and BL890c i2 server blades and other c-Class server blades are in the same enclosure, the preferred location for the P711 m cards is slot 3.

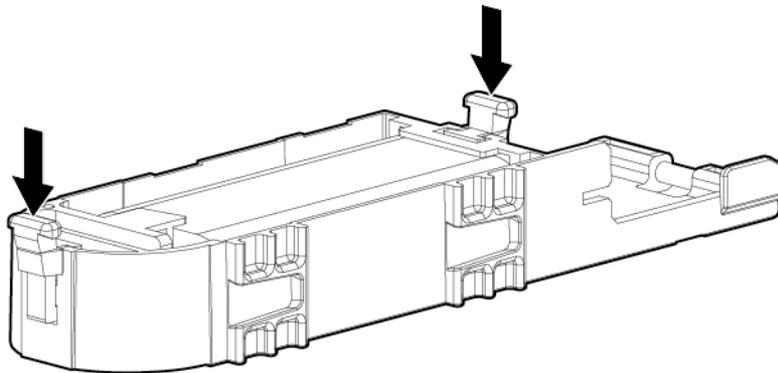
Use the procedure for installing standard mezzanine cards to install the SAS controller board, see “Mezzanine cards” (page 52) for more information.

Installing the Supercap Pack

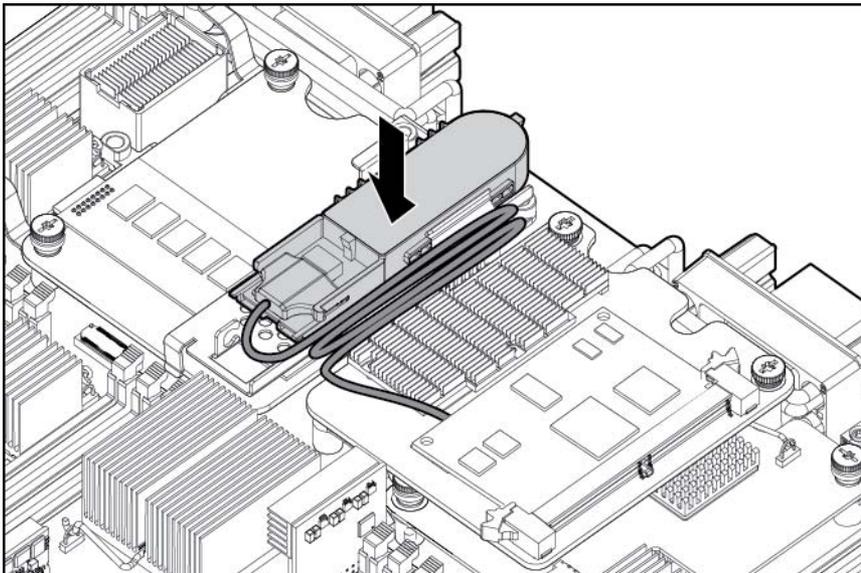
The Supercap Pack snaps onto the mounting bracket to secure the Supercap Pack inside the server blade.

NOTE: The mounting bracket is installed either on top of a mezzanine card in slot 1, or the mezzanine blank in slot 1, depending upon the customer's configuration. If no card is used in slot 1, the mezzanine card blank must be installed for the bracket to clip onto.

NOTE: The Supercap Pack includes two plastic tabs that must be removed for proper fit in the BL860c i2, BL870c i2, and BL890c i2 server blades. One tab is located on the rounded end of the Supercap Pack, the other tab is directly above the cable as it exits the plastic housing of the Supercap Pack. To remove these tabs, squeeze them firmly toward each other (significant force is required). Optionally, these two tabs can be clipped off even with the rest of the Supercap Pack.



1. Position the Supercap Pack with the print side down and push the end of the cable that is connected to the Supercap Pack under the mounting bracket's C-hook, routing the cable so its supercap end is on the side of the hook that is away from slot 3
2. Push the other end of the Supercap Pack down between the two restraining clips.
3. Consolidate and secure remaining cable length using tie wrap or similar retention method.



Replacing the access panel

1. Place the access panel onto the server blade by lining up the keyways on the panel to the posts on the server blade chassis.
2. Slide the access panel toward the front of the server blade until the panel lock button snaps into place.

Upgrading a conjoined configuration

This section contains information required to complete an upgrade of a BL860c i2, BL870c i2, or BL890c i2 server blade. This document expands on the information provided in the Read This First document which is included in the upgrade kit.

Procedure summary

1. **Existing server blade check** — The existing server blades that will be upgraded are checked and their firmware level is updated to the minimum level if necessary. This must be completed before the blades are combined for an upgrade and the upgrade Blade Link is applied.
2. **Adding resources** — The blades for the upgrade are placed together, internal component changes are made if necessary, the Upgrade Blade Link is installed, and system information parameters are exchanged between the server blade and the new Blade Link.
3. **Final check** — A final consistency check for firmware levels across each blade is completed, the upgraded system is checked for normal operation at a low level, the Operating System (OS) may need to be reinstalled, and finally the Operating Environment is booted and the system checked for normal operation.
4. **Warranty registration** — Warranty and support are arranged to be transferred from the server being upgraded to the upgraded server.

Upgrade kit contents

- The *HP Integrity BL860c i2, BL870c i2 & BL890c i2 Server Blade Upgrades Read Me First* — part number 5991-8089
- One of the following:
 - AM358A HP Integrity Upgrade BL2 Blade Link (c3000 or c7000 enclosure)
 - AM364A HP Integrity Upgrade BL2-c 7E Blade Link (c7000 enclosure, Monarch in even numbered bay)
 - AM365A HP Integrity Upgrade BL2-c 3E Blade Link (c3000 enclosure, Monarch in even numbered bay)
 - AM359A HP Integrity Upgrade BL4 Blade Link (c7000 enclosure)
 - AM366A HP Integrity Upgrade BL4-c 3 Blade Link (c3000 enclosure)Each Blade Link will include a new product number label to attach to the system label carrier; the actual part number will depend on the type of upgrade ordered.
- AM360A HP Integrity BL860c i2 Upgrade Blade. One or more upgrade blades may be included depending on the type of upgrade ordered. These should be pre-installed with ordered processors, memory, and other components.



IMPORTANT:

- Do not install or use the upgrade Blade Link until explicitly called for in the upgrade procedure. For more information, see “Blade link and system information parameters” (page 80).
- The server blade firmware may need to be updated on the existing server blades as part of the upgrade process, see “Determining your current firmware revisions” (page 68) for more information.
- If the upgrade kit includes new Upgrade Blades, there are some situations which will require a second firmware update.
- Processor and memory DIMM loading and distribution follows applicable rules across the blades. For more information, see “Installing internal components” (page 43), and “Rules for server blade internal components” (page 72).
- Adding new Upgrade Blades to an enclosure may require additional power supplies in the enclosure to meet the new power requirements. This situation would be reported by the enclosure Onboard Administrator. For more information, see the HP BladeSystem setup and information guide for your enclosure at <http://www.hp.com/go/bladesystem/documentation>.
- If more than one existing server blade will be combined in the upgrade, one of them must be designated as the “Monarch Server”. The Monarch blade from this server will become the Monarch blade in the upgraded server blade.
- The UUID and serial number of the upgraded server blade will come from the Monarch Server.
- If the upgrade requires moving to a new enclosure, the configuration of the new enclosure must match the mezzanine card I/O of the Monarch Server, so that LAN and SAN connections can function correctly.
- A reinstallation of the OS may be required on the final upgrade system for certain upgrade scenarios. You will use the section “Upgrade scenarios which do not require a reinstall of the operating system” (page 82) to determine whether you must reinstall the OS. This will be covered within the upgrade procedure steps.
- When the OS is not reinstalled, the boot disk must be attached to the designated Monarch Server.
- When the OS is not reinstalled and VC is used, some rearrangement of the VC server profile may be necessary. See “Possible changes due to VC profile mapping on the upgraded server blade” (page 82).
- Depending on the type of upgrade and the OS used, a new OS license may be required.
- At the end of the upgrade, the Blade Links removed from the existing server blades cannot be reused.

Supported operating systems

- HP-UX 11i v3 OE Update for March 2010
- HP-UX 11i v3 OE Update for September 2010
- HP-UX 11i v3 OE Update for March 2011
- HP OpenVMS Industry Standard 64 Operating System, Version V8.4 + VMS84I_UPDATE-V0500
- Windows Server 2008 R2 7600 34N

❗ **IMPORTANT:** The Operating System may need to be reinstalled on the upgraded server. This will be explained later.

IMPORTANT: If you will be using HP-UX, review the HP-UX errata documentation that is listed at the following url:

<http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c02111059/c02111059.pdf>

Minimum firmware versions

A minimum set of firmware is required for the blades and blade enclosures involved in the upgrade. Firmware on the server blades, the enclosure HP Onboard Administrator, and the HP Virtual Connect Manager (if Virtual Connect interconnect modules are installed) must be updated to at least the minimum firmware level. Every blade in the upgrade must be at the same firmware level.

❗ **IMPORTANT:** Any required updates must be checked for and completed during the upgrade process.

Product Name(s)	Minimum Firmware Version	Minimum Firmware Location
HP Integrity BL860c i2 Server Blade HP Integrity BL870c i2 Server Blade HP Integrity BL890c i2 Server Blade	21.08	Go to hp.com → Support & Drivers → enter product name → select operating system → "Cross operating system"
HP BladeSystem Onboard Administrator	3.21	Go to hp.com → Support & Drivers → enter product name
HP BladeSystem c-Class Virtual Connect	3.15	Go to hp.com → Support & Drivers → enter Interconnect Module product name

Determining your current firmware revisions

Server blade

1. Log into the system iLO 3 MP.
2. From the Main Menu, enter `cm` to access the Command Menu
3. Enter `sr` to view the system FW revisions.

```
Hewlett-Packard Integrated Lights-Out 3 for Integrity
(C) Copyright 1999-2010 Hewlett-Packard Development Company, L.P.

MP Host Name: ilo002264fee2de

iLO MP Firmware Revision 01.41.01

*****
MP ACCESS IS NOT SECURE
A default MP user Administrator/Admin is currently configured
and remote access is enabled. Modify the default password or
delete the default user (see UC command)
OR
Disable all types of remote access (see SA command)
*****

MP MAIN MENU:

CO: Console
VFP: Virtual Front Panel
CM: Command Menu
CL: Console Log
SL: Show Event Logs
HE: Main Help Menu
```

X: Exit Connection

```
[ilo002264fee2de] hpiLO-> cm
```

(Use Ctrl-B to return to MP main menu.)

```
[ilo002264fee2de] CM:hpiLO-> sr
```

SYSREV

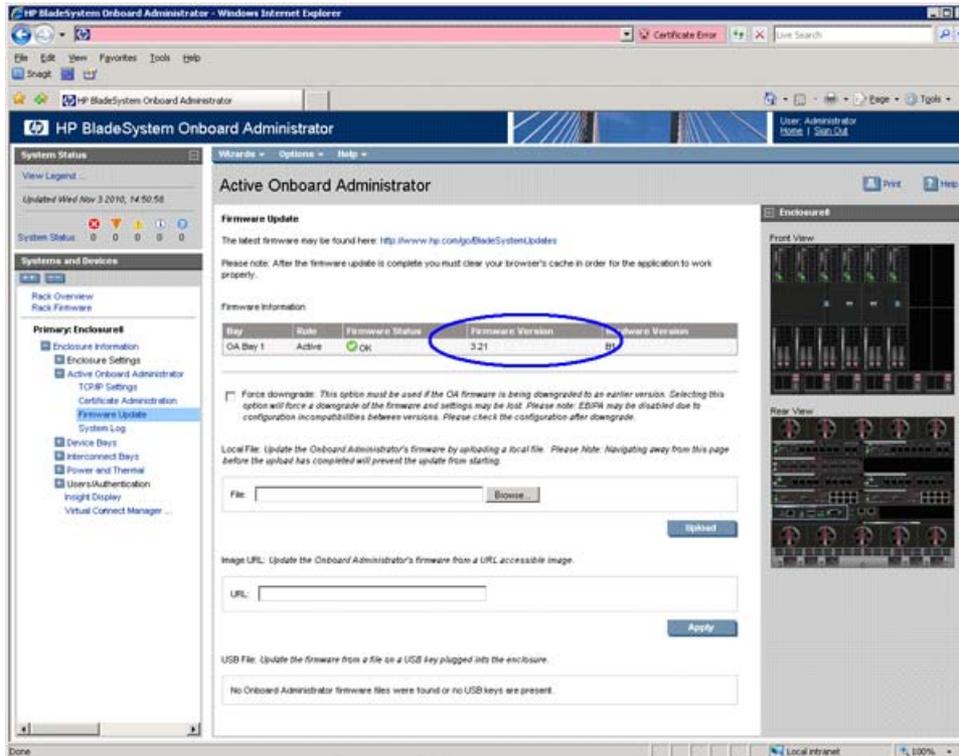
Revisions	Active	Pending	Bay 5	Bay 6
iLO FW	: 01.41.01		01.41.01	01.41.01
System FW	: 01.80		01.80	01.80
MHW FPGA	: 02.00		02.00	02.00
Power Mon FW	: 03.04		03.04	03.04
Front Panel HW	: 04.00		04.00	04.00
PRS HW	: 02.07		02.07	02.07
IOH HW	: 02.02		02.02	02.02

4. Compare the first four Revisions lines with the version information listed in the release notes at www.hp.com for the current server blade, HP Smart Update Firmware bundle. If any of the firmware revisions are less than those in the release notes, then the server firmware must be updated.

OA

Use one of the following methods to determine the current OA firmware version:

- **OA GUI** — Connect to the OA GUI, expand the **Active Onboard Administrator** section of the left sidebar menu, and select **Firmware Update**. The Firmware Version is listed under **Firmware Information**.



- **OA CLI** — Log in to the OA CLI through the serial console port or LAN and enter `show oa info` at the command prompt.

```
OA8> show oa info
```

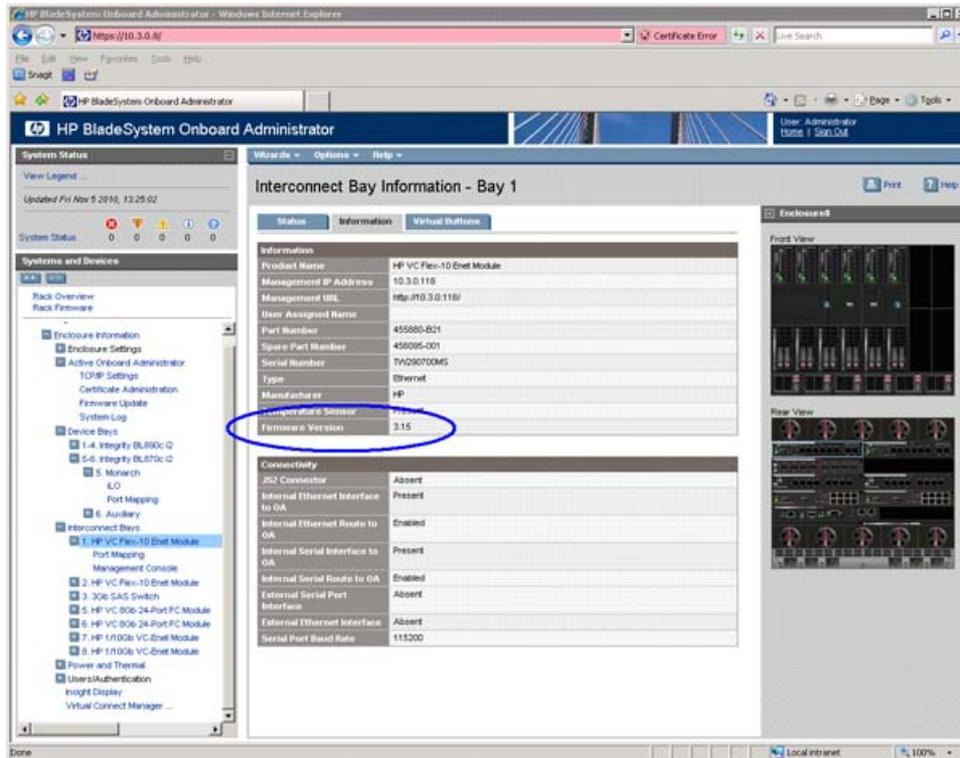
```
Onboard Administrator #1 information:
```

Product Name : BladeSystem c7000 Onboard Administrator
Part Number : 412142-B21
Spare Part No.: 414055-001
Serial Number : 0985MP8457
UUID : 090985MP8457
Manufacturer : HP
Firmware Ver. : 3.15
Hw Board Type : 0
Hw Version : B1

VCM

Use one of the following methods to determine the current VCM firmware version:

- **OA GUI** — Select the **Interconnect Bay 1 device** and then select the **Information tab**. Under **Information** there is a Firmware Version line which indicates the current VC FW version installed on the primary VC interconnect module.



- **VC Support Utility** — Launch VC Support Utility – Interactive and enter version.

```
-----
HP BladeSystem c-Class Virtual Connect Support Utility
Version 1.6.0 (Build 95)
Build Date: Oct 13 2010 07:03:49
Copyright (C) 2007-2010 Hewlett-Packard Development Company, L.P.
All Rights Reserved
-----
```

```
Please enter action ("help" for list): version
Please enter Onboard Administrator IP Address: 10.3.0.8
Please enter Onboard Administrator Username: Administrator
Please enter Onboard Administrator Password: *****
The target configuration is integrated into a Virtual Connect Domain. Please
enter the Virtual Connect Domain administrative user credentials to continue.
User Name: Administrator
Password: *****
```

```
=====
```

Enclosure	Bay	Module	Version
USE827CYVC	1	HP VC Flex-10 Enet Module	3.15 2010-10-09T07:18:16Z
USE827CYVC	2	HP VC Flex-10 Enet Module	3.15 2010-10-09T07:18:16Z
USE827CYVC	3	3Gb SAS Switch	
USE827CYVC	4	Module not present	Not available
USE827CYVC	5	HP VC 8Gb 24-Port FC Module	1.03 v6.1.0_49
USE827CYVC	6	HP VC 8Gb 24-Port FC Module	1.03 v6.1.0_49
USE827CYVC	7	HP 1/10Gb VC-Enet Module	3.15 2010-10-09T07:18:16Z
USE827CYVC	8	HP 1/10Gb VC-Enet Module	3.15 2010-10-09T07:18:16Z

```
-----
```

```
Total execution time: 00:01:31
Press Return/Enter to exit...
```

Rules for server blade internal components

You may need to remove or redistribute internal components across server blades before beginning the upgrade. The following section contains additional information required for upgrades.

Processor loading and matching rules

There are two processor sockets on each blade: socket 0 and socket 1. Socket 0 of each blade in the server must be filled. Any additional processors must be loaded in socket 1 of the blade in the lowest numbered enclosure bay which has an empty socket 1.

Every processor must be of the same type and must have the following:

- The same core count.
- The same core frequency.
- The same cache size.

This can be checked using the following methods:

- Examine the part number marked on each processor and each blade to make sure they are the same on each component.
- Examine the core count, core frequency, and cache size of each processor to ensure that every processor in the upgrade is the same. This can be done by logging into the Monarch iLO 3 MP, choosing the Command Menu, then entering `df` to display FRU information. Each

processor of each blade (by enclosure bay number) can be chosen individually and the information displayed will include the information needed for comparison.

For more information, see “Processor and heatsink module” (page 44), and “CPU and heatsink module” (page 118).

DIMM matching and loading rules

The rules regarding DIMM load order change, especially when upgrading from a BL860c i2 to either a BL870c i2 or BL890c i2. For more information on DIMM loading rules, see “DIMM quad load order rules” (page 50).

There are also minimum system memory and performance guidelines must be followed. See the *Memory subsystem information for HP Integrity Server Blades (BL860c i2, BL870c i2, and BL890c i2) Technical White Paper* (<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA1-1126ENW.pdf>).

ICH mezzanine boards

If you will be combining existing server blades during upgrade, remove the ICH mezzanine board from any server blades which are not the designated Monarch Blade for the upgrade

For more information on removing ICH mezzanine cards, see “ICH mezzanine board” (page 124).

Optional mezzanine cards

The HP NC532m Dual Port 10GbE BL-c Adapter is restricted to two cards per blade on a BL890c i2. There are no additional rules regarding the number of cards installed or the order of their installation across the blades in an upgraded server blade. Ensure all mezzanine cards follow the mezzanine port to interconnect module mapping detailed in “Installing interconnect modules” (page 18).

Upgrading the existing server blade

Existing server blade check

- ❗ **IMPORTANT:** All existing server blades to be combined in the upgrade should be installed in an enclosure and functioning normally. Do not remove Blade Links or other components at this time. Backup any important data on the existing servers before proceeding with the upgrade process.
1. If the Monarch Server is an HPVM host with active guests, then either stop those guests now or migrate them to a temporary host server. Refer to the *HP Integrity Virtual Machines Installation, Configuration, and Administration* document for information regarding guest migration. If your upgrade scenario requires an OS reinstall, then the guests must be migrated to a temporary host server before the upgrade or else they will be lost. See the section “Upgrade scenarios which do not require a reinstall of the operating system” (page 82) to determine whether your particular upgrade scenario requires an OS reinstall.
 2. If the Monarch Server has HP-UX installed and Virtual Connect is used, you may wish to use the Portable Image tool to assist in the upgrade. Refer to “Preserving VC-assigned MAC addresses in HP-UX by enabling Portable Image” (page 84) and if you choose to use PI, then execute the steps under “Pre-Upgrade Procedure for PI” in that section now.
 3. If necessary, upgrade the firmware on the existing server blades, the OA, and VCM (if used). Use the information in “Determining your current firmware revisions” (page 68) and “Minimum firmware versions” (page 68) to determine if you will need to perform any firmware upgrades.
 4. Verify that each existing server blade is able to boot to the UEFI shell without problems.
 5. Verify that the designated Monarch Server is able to boot its OS. For information on launching the OS from the UEFI shell, refer to “UEFI Front Page” (page 27)

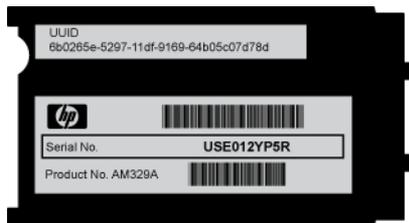
Adding resources

1. Shutdown each existing server blade (“Powering off the server blade” (page 22)).

2. If a VC configuration is used and the upgrade requires moving to a new enclosure, then setup the target VC server profile on the new enclosure now using the VCM domain and the designated Monarch Server VC profile on the current system for guidance. Refer to [“Possible changes due to VC profile mapping on the upgraded server blade” \(page 82\)](#) for important information before starting this.
3. If the enclosure uses Virtual Connect, then unassign any VC server profiles assigned to enclosure bays occupied by original servers and also those which will be occupied by upgrade server blades. This must include profiles assigned to bays which will contain Monarch or auxiliary blades. See the *HP Virtual Connect for c-Class BladeSystem User Guide* for more information on VCM server profiles
4. If the Monarch Server or any other existing system to be added in the upgrade is using a partner blade, remove it from the enclosure now. If the Monarch Server uses a partner blade which will remain in the upgrade, it will be added back in a later step.
5. If necessary, move the Monarch Server. This step will be necessary for cases such as moving from a c7000 to a c3000 enclosure or upgrading from a BL860c i2 or BL870c i2 in an odd numbered enclosure bay to a BL870c i2 in an even numbered enclosure bay. See the table [“Blade Link bay location rules”](#) in section [“Installing the Blade Link for BL870c i2 or BL890c i2 configurations” \(page 22\)](#)
6. Place any other existing systems or upgrade blades to be combined in the upgrade into enclosure bays adjacent to the Monarch Server.

① **IMPORTANT:** Existing systems and new upgrade blades must be placed into enclosure bays with higher numbers than those occupied by the Monarch Server.

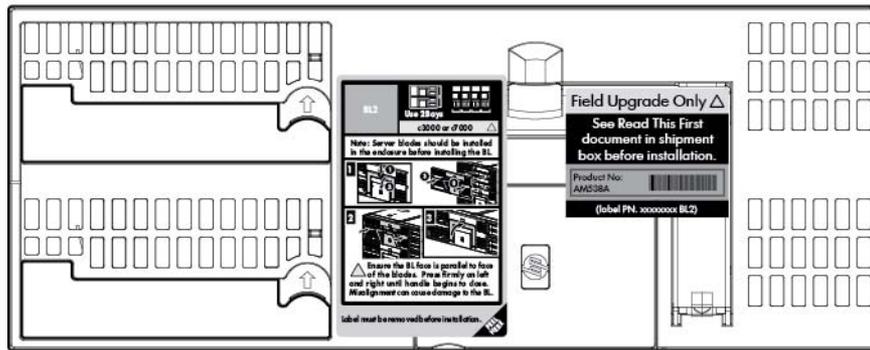
7. Install any partner blades that will be used in the upgraded server blade. For positioning rules, see [“Installing the Blade Link for BL870c i2 or BL890c i2 configurations” \(page 22\)](#)
8. Transfer the Monarch Server label carrier card to the Upgrade Blade Link:
 - a. Remove the label carrier card from behind the trap door of the Monarch Server Blade Link. See [“Blade Link” \(page 125\)](#) for the trap door location. The label carrier card will look like the image below:



- b. Remove the product number portion of the Field Upgrade Only label on the Upgrade Blade Link. This label will look similar to the image below:



Below is an example showing upgrade Blade Link sticker locations for the BL870c i2.



- c. Place the product number portion from the Field Upgrade Only label on top of the old product number and barcode on the label carrier card from the Monarch Server.
-
- ❗ **IMPORTANT:** Do not cover the serial number on the label carrier card.
-
- d. Remove the position information label (the left hand label in the above picture) from the front of the upgrade Blade Link bezel.
Temporarily remove the “Field Upgrade Only” label if it blocks the Blade Link trap door.
 - e. Place the label carrier card behind the trap door of the Upgrade Blade Link, but do not install the Upgrade Blade link at this time.
 - f. Reapply the “Field Upgrade Only” label to the upgrade Blade Link, making sure not to cover the Blade Link handle.
9. Remove the Blade Links from the existing servers that will be included in the upgrade (“[Blade Link for BL870c i2 or BL890c i2 configurations](#)” (page 110)).
-
- ❗ **IMPORTANT:** Mark the Monarch Server Blade Link and keep track of it until the upgrade is successfully completed. Do not reuse the old Blade Links after the upgrade has been completed.
-
10. Make any necessary blade internal component changes. The following hardware components have loading rules that can change after upgrading:
 - processors
 - DIMMs
 - optional mezzanine cards
 - ICH mezzanine boards
 See “[Rules for server blade internal components](#)” (page 72) for more information.
 11. Fully insert any unseated blades into the enclosure. Make sure all server blades that will be included in the upgraded server are now fully seated into the enclosure with no Blade Links installed.
 12. Install the upgrade Blade Link by completing steps 1 through 11 in “[Installing the Blade Link for BL870c i2 or BL890c i2 configurations](#)” (page 22)
 13. Enter the `show server list` command at the Onboard Administrator command line interface. The output should show a status of “OK” for each blade in the upgraded server, or “OTHER” if there’s a current VC domain defined on the enclosure. The Monarch blade should have an iLO 3 IP address assigned that would be the same one assigned to the Monarch Server iLO 3.
 14. Log into the iLO 3 MP interface and enter `cm` at the Main Menu to reach the Command Menu prompt.

- Enter `sr` to view the system revision information. A sample output for a BL890c i2 is shown below. The BL890c i2 will show four blades composing the serve blade, a BL870c i2 will show two. If the output does not show all of the blades expected, then there is a problem which must be resolved before proceeding. Reseating the Blade Link or individual blades may correct server blade conjoining problems.

```
[ilo002264fed1da] CM:hpiLO-> sr
```

```
SYSREV
```

Revisions	Active	Pending	Bay 5	Bay 6	Bay 7	Bay 8
iLO FW	: 01.30.30		01.30.30	01.30.30	01.30.30	01.30.30
System FW	: 01.24		01.24	01.24	01.24	01.24
MHW FPGA	: 01.14		01.14	01.14	01.14	01.14
Power Mon FW	: 03.04		03.04	03.04	03.04	03.04
Front Panel HW	: 03.00		03.00	03.00	03.00	03.00
PRS HW	: 02.07		02.07	02.07	02.07	02.07
IOH HW	: 02.02		02.02	02.02	02.02	02.02

- If the `sr` output indicates that the firmware is not consistent across all of the blades, which should only be due to a new Upgrade Blade with different firmware version being added, then complete a second server firmware update. Update the system to the same firmware version used previously for the existing servers. An example of `sr` output indicating a firmware inconsistency is shown below.

```
[ilo002264fee2de] CM:hpiLO-> sr
```

```
SYSREV
```

Revisions	Active	Pending	Bay 5	Bay 6	Bay 7	Bay 8
iLO FW	: --.--!		01.30.29	01.30.29	01.01.02	01.01.02
System FW	: --.--!		01.24	01.24	01.08	01.08
MHW FPGA	: --.--!		01.14	01.14	01.12	01.12
Power Mon FW	: 03.04		03.04	03.04	03.04	03.04
Front Panel HW	: 03.00		03.00	03.00	03.00	03.00
PRS HW	: 02.07		02.07	02.07	02.07	02.07
IOH HW	: 02.02		02.02	02.02	02.02	02.02

```
Note(s):
```

```
! = FW mismatch, update needed
```

If an update is required, it may need to be completed using the HPSUM Force Install option for both the iLO 3 and system firmware bundles. When finished, log back into the iLO 3 MP of the Monarch blade and enter `sr` from the Command Menu to verify that the firmware levels on all conjoined blades are now consistent and up to date.

- Exchange the System Information Parameters by following the steps below. For more information regarding the information contained in the System Information Parameters, see ["Blade link and system information parameters"](#) (page 80).

- a. Log into the Monarch iLO 3 MP, enter the Command Menu, and execute the command `sysset`. This will list the system information parameters stored in the Upgrade Blade Link (Primary) and those stored on the server blade (Secondary). Below is an example of the output when upgrading from a BL860c i2 to a BL870c i2.

```
[ilo002264fe1be] CM:hpiLO-> sysset
```

```
SYSSET
```

```
Current System Information Parameters:
```

```
Manufacturer           : HP
Product Name (prodname) : Integrity BL870c i2
Secondary Product Name  : Integrity BL860c i2
Product Number (prodnum) : AM358A
Secondary Product Number : AD399A
Serial number (serial)   : Uninitialized
Secondary Serial Number  : USA0003
UUID (uuid)             : FFFFFFFF-FFFF-FFFF-FFFF-FFFFFFFFFFFFFF
Secondary UUID          : 89742B3C-AD78-11DF-BB2A-5ABBD7A51B74
Product ID              : 0x702
```

```
An Upgrade Blade Link has been detected.
```

```
Primary and secondary system parameters values do not match.
```

```
Copy secondary UUID and serial number to primary? (Y/[N]):
```

The product name and product number from the Upgrade Blade Link reflect a BL870c i2, while the Secondary product name and number (from the Monarch Server) reflect the original BL860c i2.

- b. The system detects the Upgrade Blade Link and prompts you to make the required system information exchanges between Upgrade Blade Link and the server. Enter `y` to approve the exchange. You will then be informed that a reset of the iLO 3 MP is necessary for the changes to take effect.

```
Copy secondary UUID and serial number to primary? (Y/[N]): y
```

```
-> Secondary system parameters values have been copied to primary
    system parameters.
```

```
->System Information parameters have been updated.
```

```
iLO MP needs to be reset in order for these changes to take effect
```

- c. Reset the iLO 3 MP by entering `xd -r -nc` at the Command Menu prompt.

```
[ilo002264fe1be] CM:hpiLO-> xd -r -nc
```

```
XD -r -nc
```

```
-> MP reset requested
```

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

```
-> Command successful.
```

- d. After the iLO 3 MP reset (less than one minute), log back into the iLO 3 MP, go to the Command Menu, and enter `sysset` again to verify that the system information parameters have been set for correctly for both Primary and Secondary. The values between Primary and Secondary should now match.

```
[ilo002264feelbe] CM:hpiLO-> sysset
```

```
SYSSET
```

```
Current System Information Parameters:
```

```
Manufacturer           : HP
Product Name (prodname) : Integrity BL870c i2
Secondary Product Name  : Integrity BL870c i2
Product Number (prodnum) : AM358A
Secondary Product Number : AM358A
Serial number (serial)   : USA0003
Secondary serial number  : USA0003
UUID (uuid)             : 89742B3C-AD78-11DF-BB2A-5ABBD7A51B74
Secondary UUID          : 89742B3C-AD78-11DF-BB2A-5ABBD7A51B74
Product ID              : 0x702
```

18. Remove the “Field Upgrade Only” sticker from the bezel of the Upgrade Blade Link. This is no longer a Field Upgrade Blade Link because the serial number and UUID have now been programmed.
19. If the enclosure uses Virtual Connect, then the Monarch Server VCM server profile should now be assigned to the enclosure bays occupied by the upgraded server. The profile may need some modifications after it is assigned to the upgrade so that network assignments and other elements of the VC server profile match what is required. See [“Possible changes due to VC profile mapping on the upgraded server blade” \(page 82\)](#) for more information. If the HP-UX Portable Image tool is used (see [“Preserving VC-assigned MAC addresses in HP-UX by enabling Portable Image” \(page 84\)](#)), then it’s best not to make changes until after the entire upgrade is completed and any changes then should be made very carefully. Once assigned, verify that there are no errors indicated by VCM or by the OA. Any VCM Domain Status or OA System Status alerts or warnings should be resolved before proceeding. Sometimes, VCM problems can be corrected by unassigning then reassigning the VC server profile.

Final hardware check

1. Log into the Monarch iLO 3 MP and power on the server by entering `pc -on` at the Command Menu prompt or pressing the server power button.
2. Boot to the UEFI shell for a basic system check. Do not autoboot any currently installed operating systems.
3. Complete the following checks to be sure that the upgraded server blade is functioning properly. Any problems found in the steps immediately below should be resolved before proceeding.
 - a. Check the iLO 3 MP SEL for any problems. See [“Errors and error logs” \(page 101\)](#) for more information on resolving any errors.

❗ **IMPORTANT:** If any errors are found in the SEL, do not continue until resolving them.

- b. Execute the UEFI shell command `lanaddress` and verify that the expected number of LAN ports are shown and that there is a link indication for every port that is connected to a network or network switch.

NOTE: You should see an M on each applicable line.

NOTE: `lanaddress` and other EFI commands will only list 4 LAN ports for each blade's embedded Flex-10 LOMs, regardless of the active VC profile configuration. If the profile specifies additional Flex-10 LOM ports, those will become available while the operating system runs.

- c. Execute the UEFI shell command `map -r` to make sure that all of the expected disks are mapped.
 - d. Execute the UEFI shell command `cpuconfig` to make sure that all of the expected processors are there and indicate active.
 - e. Execute the UEFI shell command `info mem -dimms` to make sure that all of the expected DIMMs are there and indicate active.
4. If necessary, switch the onboard SmartArray SAS controller on new upgrade blades to RAID mode (“[Configuring a Smart Array Controller](#)” (page 133))

NOTE: All new Upgrade Blades come with the onboard SmartArray SAS controller in HBA mode.

5. If installed on the upgrade, configure the partner blade as necessary. See the specific partner blade documentation for more information on configuration and setup. The documentation can be located on www.hp.com by searching on the partner blade product name.

Booting the operating system

The server blade has now been physically upgraded and it may be ready to boot to the OS. Certain upgrade scenarios require OS reinstallation:

1. See “[Upgrade scenarios which do not require a reinstall of the operating system](#)” (page 82) to determine whether your particular server blade upgrade scenario requires a reinstallation of the OS.
 2. If a reinstallation of the OS is required, or you choose to reinstall the OS though it’s not required, then complete it now. Refer to “[Operating system procedures](#)” (page 30) and the OS specific installation documentation for more information. Any special configuration, such as for an HPVM host server, must be redone after the OS is reinstalled.
 3. Boot the OS. See “[Operating system procedures](#)” (page 30) for more information.
-
- ① **IMPORTANT:** A new Operating System license may be required for the upgraded server. See “[Operating System Licenses](#)” (page 81) for more information.
-
4. If you are using the HP-UX Portable Image tool, execute the steps under “Post-Upgrade Procedure for PI” in the “[Preserving VC-assigned MAC addresses in HP-UX by enabling Portable Image](#)” (page 84) section.
 5. Verify that the system, especially networking and storage, function as expected.

NOTE: The Windows Server 2008 environment may require significant time for assimilating new hardware after an upgrade with no OS reinstall. Check Device Manager carefully for any problems. A restart of the OS will often correct problems with new hardware. It may be necessary in some cases to manually install drivers for new devices.

6. If the Monarch Server is an HPVM host server, then the VM guests can now be migrated back or started if they were stopped. Refer to the *HP Integrity Virtual Machines Installation, Configuration, and Administration* document for information regarding guest migration. Test each VM guest to make sure it’s functioning properly.

Warranty registration

After completing the upgrade, contact HP with the server serial number and new product number. The warranty of the designated Monarch Server will be transferred to the upgraded server blade and the service time will be reset. Proof of purchase must be provided and the HP warranty organization must be notified.

The proof of purchase should be a scanned copy or fax of a sales receipt or invoice from HP or an authorized reseller. It can also be an order confirmation, shipping receipt, or reseller based purchase/shipping confirmation that contains the following:

- The purchase or shipping date.
- The product number or product name/product description.
- The serial number, but it is not required (some invoices do not have serial numbers).
- The vendor's name (the name of the business where the unit was purchased).

❗ **IMPORTANT:** Be sure that all information is clearly readable.

More information regarding server blade warranties can be found at: <http://bizsupport2.austin.hp.com/bc/docs/support/SupportManual/c01865770/c01865770.pdf>.

Support

A support Flex Care Pack with at least the same level of care as the server blade to be upgraded (the Monarch Server) should have been purchased when the Upgrade Kit was ordered. Your HP sales representative will apply the support package to the upgraded server blade and provide credit for the unused portion of the package purchased for the original Monarch Server. The new Flex Care Pack must be registered with the serial number of the original Monarch Server (now attached to the upgraded server) included to ensure support entitlement. For more information, go to www.hp.com/go/cpc. You can also contact your HP sales representative or contact HP sales through the following link:

<http://www.hp.com/large/contact/enterprise/index.html?key=1-57BVO&mcc=DRSR>

Blade link and system information parameters

Every HP BL860c i2, BL870c i2 and BL890c i2 server blade has a set of information called the System Information Parameters which helps to identify the server blade and is used for certain applications and for the server blade warranty. This information includes:

- product name
- product number
- UUID
- serial number

This information is stored in nonvolatile memory onboard the Blade Link and server blades. The system information parameters can be viewed from the iLO 3 MP interface Command Menu prompt by entering `sysset`.

```
[ilo002264fed1da] CM:hpiLO-> sysset
```

```
SYSSET
```

```
Current System Information Parameters:
```

```
Manufacturer           : HP
product name (prodname) : Integrity BL890c i2
Secondary Product Name : Integrity BL890c i2
Product Number (prodnum) : AH384A
Secondary Product Number : AH384A
Serial number (serial)   : USA0000
Secondary Serial Number  : USA0000
UUID (uuid)             : E14F772A-AD78-11DF-85ED-1FC66668C7F5
Secondary UUID          : E14F772A-AD78-11DF-85ED-1FC66668C7F5
Product ID              : 0x704
```

There are two sets of parameters shown:

- Primary values are stored on the Blade Link.
- Secondary values are those stored on the server blades.

When an existing server blade is upgraded, the system must retain the existing UUID and serial number, but the product name and number will need to be changed to reflect the configuration of the upgrade. The Upgrade Blade Link will come already installed with a product name and number which reflects the upgrade configuration. This information will need to be copied to the server blades, and the UUID and serial number of the server blades will need to be copied to the Upgrade Blade Link. This exchange of system information parameters is done by firmware.

The server UUID, serial number, and product number are printed on the label carrier card behind the Blade Link trapdoor which is described in “Blade Link” (page 125). The Upgrade Blade Link does not ship with a label carrier card, but has a trap door for one. It also has a “Field Upgrade Only” label on the front bezel which contains a peel-off sticker with the new product number.

Operating System Licenses

Some operating systems use tiered licensing levels based upon the maximum processor socket count of the server it runs on. If the upgrade results in a higher tier for the system, then a new software license will be required for using those operating systems. The tier level will rise when the upgraded server contains more sockets than the original Monarch Server.

The “tiers” map to the server blades as follows:

- BL860c i2 – 2 Socket Tier
- BL870c i2 – 4 Socket Tier
- BL890c i2 – 8 Socket Tier

Your HP sales representative must be contacted to get this new license. Full credit will be received when the original Monarch Server license is surrendered. The credit will reflect the current purchase price of the original license, not the original purchase price, and the credit cannot exceed the original license purchase price.

For more information contact your HP sales representative. HP sales can also be contacted by following the link below:

<http://www.hp.com/large/contact/enterprise/index.html?key=1-57BVO&mcc=DRSR>.

The sections below provide specific information on licensing.

HP-UX

HP-UX uses tiered licensing and the license is delivered physically or electronically by certificate. For more information regarding HP-UX 11i software licensing go to:

http://h71028.www7.hp.com/enterprise/us/en/os/hpux11i-oe-software-licensing.html?jumpid=reg_R1002_USEN.

HP OpenVMS

OpenVMS uses tiered licensing and the license is delivered physically by certificate. For more information regarding OpenVMS software licensing go to: http://h71000.www7.hp.com/ovmslicensing/openvms_licensing_information.html.

Windows Server 2008

Windows does not use tiered licensing. No licensing changes or other extra steps are required for the upgraded server blade.

Upgrade scenarios which do not require a reinstall of the operating system

Operating system	Virtual Connect		HP Virtual Machines		OS reinstall required?
	VC	no VC	HPVM	no HPVM	
HP-UX	X			X	NO ¹
		X		X	NO
	X		X		NO ¹
		X	X		NO
OpenVMS	X		N/A	N/A	NO ¹
		X			NO
Windows Server 2008	X		N/A	N/A	NO ¹
		X			NO

¹ Note cautions in “Possible changes due to VC profile mapping on the upgraded server blade” (page 82)

Possible changes due to VC profile mapping on the upgraded server blade

Virtual Connect Manager supports assigning a VC server profile to each bladed server. Profiles can include VC-assigned:

- UUID
- serial number
- Ethernet port MAC addresses with network assignments
- FC HBA connection WWNs with FC SAN assignments.

The VC-assigned MAC addresses, FC WWNs, UUID and serial number can come from blocks of values supplied by VCM or from user-defined blocks of values. Alternatively, the factory-assigned UUID, serial number, Ethernet port MAC addresses and FC HBA connection WWNs can be used. The following information pertains to all of these options.

When performing an upgrade it is critical to understand how the server profile connection entries will be mapped to ports on the upgrade server as this may impact the OS. What happens is somewhat different for FC SAN assignments compared to Ethernet network assignments, so each is described separately below.

The FC SAN connection entries in a profile should be thought of as sets of entries. If there are N Virtual Connect FC Interconnect modules in an enclosure (where N is rounded up to an even number) then there are N FC SAN connection entries per set. The first N entries are mapped to the FC HBA ports on the Monarch blade, the second set of N entries are mapped to the FC HBA ports on the first auxiliary blade, the next set of N entries to the next auxiliary blade, until all of the FC connection entries have been mapped to ports or until there are no more FC HBA ports available to map entries to. Below are a few examples of upgrading a BL860c i2 to a BL870c i2 in an enclosure with 4 Virtual Connect FC Interconnect modules where the BL860c i2 becomes the Monarch blade in the upgrade server.

- If the profile assigned to the BL860c i2 server had 4 or fewer FC SAN connection entries then those entries are still mapped to the FC HBA ports on the original BL860c i2 blade (since it is the Monarch in the new server). There will be no FC SAN connection entries mapped to any ports on the auxiliary blade in the upgraded server.
- If the profile assigned to the BL860c i2 server had more than 4 FC SAN connection entries then the first 4 entries are still mapped to the FC HBA ports on the original BL860c i2 blade (since it is the Monarch in the new server). The additional FC SAN connection entries (up to

4), that had not been mapped to any ports prior to the upgrade, will be mapped to FC HBA ports on the auxiliary blade in the upgraded server.

The Ethernet connection entries in a profile are handled differently from SAN entries in order to balance the use of Flex-10 ports (even if no Flex-10 ports are used, the same balanced approach is used). Virtual Connect manager distributes the Ethernet connection entries across all of the blades in a server, and on each blade it distributes connection entries across all of the Ethernet physical ports. This is done so that as few Flex-10 sub-ports are used as needed, which results in maximum band-width available to each Flex-10 sub-port. This distribution of Ethernet connection entries across all Ethernet ports is done for single-blade servers, too. The net result is that the mapping of Ethernet connection entries in a profile assigned to a server will change when that server is upgraded. Consider the following examples.

- If the upgrade is from a BL860c i2 to a BL870c i2 then every other Ethernet connection entry starting with the first entry (i.e., the first, third, fifth, etc. entries) will be mapped to ports on the Monarch blade, and every other entry starting with the second entry (i.e., the second, fourth, sixth, etc. entries) will be mapped to ports on the auxiliary blade.
- If the upgrade is from a BL860c i2 to a BL890c i2 then every fourth Ethernet connection entry starting with the first entry (i.e., the first, fifth, ninth, etc. entries) will be mapped to ports on the Monarch blade; every fourth entry starting with the second entry (i.e., the second, sixth, tenth, etc. entries) will be mapped to the first auxiliary blade; every fourth entry starting with the third entry (i.e., the third, seventh, eleventh, etc. entries) will be mapped to the second auxiliary blade; and finally every fourth entry starting with the fourth entry will be mapped to ports on the 3rd auxiliary blade.

For example, a profile with 8 Ethernet connection entries where each entry defines a connection to a different network (this makes it easy to see what happens when an upgrade is done). Assume that the profile is assigned to a BL860c i2 that is upgraded to a BL870c i2. Assume that VC Flex-10 Interconnection modules exist in bays 1 and 2, thus the Flex-10 LOMs on the blades are utilized. The following table shows how these entries are mapped to ports on the original server and to the blades in the upgraded server.

Profile entry	Assigned network	VCM assigned MAC address	Mapping to BL860c i2 ports	Mapping to BL870c i2 ports
1	LAN-1	00-17-A4-77-90-10	Monarch LOM1-a	Monarch LOM1-a
2	LAN-2	00-17-A4-77-90-12	Monarch LOM2-a	Auxiliary LOM1-a
3	LAN-3	00-17-A4-77-90-14	Monarch LOM3-a	Monarch LOM2-a
4	LAN-4	00-17-A4-77-90-16	Monarch LOM4-a	Auxiliary LOM2-a
5	LAN-5	00-17-A4-77-90-18	Monarch LOM1-b	Monarch LOM3-a
6	LAN-6	00-17-A4-77-90-1A	Monarch LOM2-b	Auxiliary LOM3-a
7	LAN-7	00-17-A4-77-90-1C	Monarch LOM3-b	Monarch LOM4-a
8	LAN-8	00-17-A4-77-90-1E	Monarch LOM4-b	Auxiliary LOM4-a

If it is important that each of the networks be mapped to the same ports on the Monarch blade after the upgrade, then the profile will need to be edited to add 7 Ethernet connection entries, and then the entries must be edited to obtain the desired network connections aligned with the ports

on the Monarch blade. The resulting set of Ethernet connection entries in the profile would be as follows.

Profile entry	Assigned network	VCM assigned MAC address	Mapping to BL870c i2 ports
1	LAN-1	00-17-A4-77-90-10	Monarch LOM1-a
2	unassigned	00-17-A4-77-90-12	Auxiliary LOM1-a
3	LAN-2	00-17-A4-77-90-14	Monarch LOM2-a
4	unassigned	00-17-A4-77-90-16	Auxiliary LOM2-a
5	LAN-3	00-17-A4-77-90-18	Monarch LOM3-a
6	unassigned	00-17-A4-77-90-1A	Auxiliary LOM3-a
7	LAN-4	00-17-A4-77-90-1C	Monarch LOM4-a
8	unassigned	00-17-A4-77-90-1E	Auxiliary LOM4-a
9	LAN-5	00-17-A4-77-90-20	Monarch LOM1-b
10	unassigned	00-17-A4-77-90-22	Auxiliary LOM1-b
11	LAN-6	00-17-A4-77-90-24	Monarch LOM2-b
12	unassigned	00-17-A4-77-90-26	Auxiliary LOM2-b
13	LAN-7	00-17-A4-77-90-28	Monarch LOM3-b
14	unassigned	00-17-A4-77-90-2A	Auxiliary LOM3-b
15	LAN-8	00-17-A4-77-90-2C	Monarch LOM4-b

NOTE: While the network mapping has been adjusted to preserve the original mapping of networks to ports, it is not possible to adjust the MAC address assignment to preserve the same mapping of MAC addresses to ports. If your OS is HP-UX, see the section [“Preserving VC-assigned MAC addresses in HP-UX by enabling Portable Image” \(page 84\)](#) for a method which can be used to preserve VC-assigned MAC addresses.

When moving a bladed server to a new enclosure as part of the upgrade where VC-assigned MAC addresses or WWNs are used, the new enclosure VCM setup must use the same built-in blocks of addresses. Even when this is done, it may be difficult to define a VC server profile where the MAC addresses and WWNs are the same as those used on the original server before the upgrade. If identical MAC addresses and WWNs are required and cannot be obtained using the pre-defined blocks of addresses on the new enclosure, then the new enclosure will have to be set for user-defined addresses with the addresses from the original enclosure profile moved into the new enclosure VC domain. This caution also applies where VC-assigned UUID and serial numbers are used, but it may not be possible to obtain the same VC-assigned UUID in a new enclosure. It's very important that setup for the new enclosure is done carefully so that there are no duplicate MAC addresses or WWNs on a network. The values moved to a new enclosure should not remain in use on the original enclosure.

The VC server profile should always be checked after being applied to the upgrade to make sure that profile connection entries are mapped to ports as expected and to make sure there are no profile errors or warnings which must be resolved. See the *HP Virtual Connect for c-Class BladeSystem User Guide* for more information on VCM server profiles.

Preserving VC-assigned MAC addresses in HP-UX by enabling Portable Image

If your OS is HP-UX where the VC server profile does not use the hardware default MAC addresses and it is important that Ethernet connections configured in the OS retain their VC-assigned MAC addresses, then there is a package called “Portable Image” (PI) which can be used. The HP-UX

Portable Image product is installed and enabled on the blade server before the upgrade. After the upgrade, PI will automatically modify the HP-UX network instance numbers of the new hardware environment so that they match the pre-upgrade environment. This takes advantage of the VCM interconnect stacking links to allow all of the Monarch Server network connections to function correctly with no corrections needed in the original VC server profile.

Portable Image can be used on VC configured systems where the VC domain has selected Virtual Connect assigned MAC addresses instead of the static, factory-default MAC addresses. If you choose to use PI to assist the upgrade, there will be a pre-upgrade step to follow on the designated Monarch Server and then another step to follow after the upgrade. These two steps are detailed below but they must not be executed until they're explicitly called for in the upgrade procedure which is found in the section "Upgrading the existing server blade" which is located in this section.

Pre-Upgrade Procedure for PI

These instructions are to be executed on the designated Monarch Server with the OS booted.

1. You need to obtain the PI package if it's not already installed.
 - a. First, check for it being already installed by executing the following command:

```
swlist|grep HPPortableImage
```
 - b. If nothing is returned, then the package must be installed now. Go to www.software.hp.com and search for "HP Portable Image". Follow the link for HP-UX Portable Image in the product list and follow the instructions there for installing the depot.
2. If your HP-UX 11i v3 release is September 2010 or earlier, then you must install the GIO cumulative patch before proceeding.
 - a. Go to the HP Support Center web page at <http://www.hp.com/go/hpsc>. The site requires a quick registration.
 - b. Search for "PHKL_41525" using the **Search: HP Support Center** box and download the patch.
 - c. Follow the patch link and execute the installation instructions found there.

3. Enable PI by executing the following command:

```
kctune gio_portable_image=1
```

You should see the following:

Tunable	Value	Expression	Changes
gio_portable_image	(before)	0	Default
	(now)	1	1

4. The PI state must be saved before starting the upgrade. This is done by explicitly executing the PI save command:

```
/opt/network/bin/hpuxpitool -s
```
5. Dump the saved PI state to a text file for possible use later. Obtain the dump by executing the following command:

```
/opt/network/bin/hpuxpitool -g
```

This will list out each network instance along with its pre-upgrade MAC address.
6. Shutdown the OS using a shutdown command.

Post-Upgrade Procedure for PI

1. Dump the new PI state to a file for possible use later. Obtain the dump by executing the following command:

```
/opt/network/bin/hpuxpitool -g
```

This will list out each network instance along with its post-upgrade MAC address.
2. Disable PI by executing the following command:

```
kctune gio_portable_image=0
```

You should see the following:

Tunable	Value	Expression	Changes	
gio_portable_image	(before)	1	1	Immed
	(now)	0	0	

3. The networking should be checked to make sure that the original system network instances function correctly. If the HP-UX boot reports a LAN interface configuration failure, then check the `/etc/rc.log` file for the failed instance number which may indicate something like the following example:

```
ERROR:   lan18 interface: ifconfig: no such interface
"/sbin/rc2.d/S340net start" FAILED
```

Get the MAC address for the failed instance number from the pre-upgrade PI dump and look for that MAC address in the post-upgrade PI state dump. From that entry, note the new instance number and edit the HP-UX networking configuration for the failed instance number so that it uses the new instance number.

6 Troubleshooting

This chapter provides strategies, procedures, and tools for troubleshooting server blade error and fault conditions.

Methodology

General troubleshooting methodology

1. Review the following list of symptoms:
 - Front Panel LED blinking
 - System Alert present on system console
 - Server blade will not power-up
 - Server blade will not boot
 - Error/Event Message received
 - MCA occurred
2. Narrow down the observed issue to the specific troubleshooting procedure required. Isolate the failure to a specific part of the server blade to perform more detailed troubleshooting. For example:
 - Issue - Front Panel LED blinking

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

- Look for a system alert on the OA or system console.
 - Analyze the alert by using the SEL, to identify the last error logged by the server blade. Use the iLO 3 MP commands to view the SEL, through the MP menu 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 will not power-up”, the initial troubleshooting procedure might have indicated a issue with the DC power rail not coming up after the power was turned on.
 4. Your goal is to identify the failed FRU and replace it. You must now perform the specific removal and replacement procedure, and verification steps, see [Chapter 7: “Removing and replacing components” \(page 108\)](#) for more details.

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

5. You might have to perform specific recovery procedures to finish the repair.

If a failure occurs the front panel LEDs and the SEL helps you identify the issue or FRU:

- The front panel LEDs and LAN LEDs of the server blade change color and blink to help identify specific issues, and display LAN activity.

For information on LED locations and states, see [“Front panel LEDs” \(page 93\)](#).

- The SEL provides detailed information about the errors identified by the LEDs.

For server alerts of levels 3-5, the attention condition on the server LED can only be cleared by cycling DC power.

If the LEDs and SEL do not give you enough information for you to identify the issue you are experiencing, HP also provides diagnostic tools with each operating system (see [“Troubleshooting tools” \(page 91\)](#) for more details).

NOTE: Always examine the iLO 3 MP SEL in the case of a blinking yellow or red front panel health LED, before replacing any hardware.

Executing 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, and so on, pertaining to a server blade error or fault.
2. View the front panel LEDs (power and health), locally or remotely through the iLO 3 MP `vfnp` command.
3. Read the symptom/condition information in the left column of [Table 9 \(page 88\)](#).
4. Perform the actions specified in the Action column.

For more details, see the appropriate subsection of this chapter, where this information is provided in the Action column. The Action you are directed to perform might be to access and read one or more error logs (the event log and/or the FPL).

You can follow the recommended troubleshooting methodology, and use [Table 9](#) and [Table 10 \(page 91\)](#) or go directly to the subsection of this chapter which corresponds to your own entry point. [Table 8](#) 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 101)).

Table 8 Troubleshooting Entry Points

Entry Point	Subsection or Location
Front panel LEDs	See “Basic and advanced troubleshooting tables” (page 88), “Troubleshooting tools” (page 91), and “Front panel LEDs” (page 93).
Virtual Front Panel LEDs in the iLO 3 TUI	See “Virtual Front Panel LEDs in the iLO 3 TUI” (page 96)
SEL and FPLs	See “Errors and error logs” (page 101).
Offline and Online Diagnostics	See “Troubleshooting tools” (page 91).
System Event Analyzer	See http://www.compaq.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. The state of the front panel LEDs can be viewed locally.

NOTE: Virtual front panel LEDs in the iLO 3 TUI are not the same as the front panel LEDs, see “Virtual Front Panel LEDs in the iLO 3 TUI” (page 96) for more information about Virtual front panel LED troubleshooting

Table 9 Basic Low End Troubleshooting

Step	Condition	Action
1	Server blade appears “dead” – no front panel LEDs are on, and no fans are running. iLO 3 MP is running.	Nothing is logged for this condition. <ol style="list-style-type: none"> 1. For new server installations, review the installation procedures. 2. Be sure that that the enclosure power cords are connected to both the power supplies and to the AC receptacles. 3. Be sure that that AC power, at the proper AC voltage levels, is available to the receptacles.

Table 9 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
		<p>4. If the power button's integrated LED on front panel remains off, then reseal the server blade.</p> <p>5. As a last resort, replace the server blade. This issue is fixed when the front panel LED states are as follows: blade health is steady green.</p>
2	Server blade does not power on after front panel power button is momentarily pressed (less than four seconds).	<p>A fatal fault has been detected and logged, attempting to power on the server.</p> <ol style="list-style-type: none"> 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 might need an additional power supply to supply sufficient power to run the blades in the enclosure. 3. Examine the iLO 3 MP subsystem logs for events related to DC power rails. <p>This issue is fixed when the front panel LEDs are as follows: Health is steady green and power is steady green.</p>
3a	Blade health LED is off and iLO 3 MP is not running.	<p>A fatal fault has been detected and logged while booting or running system firmware.</p> <ol style="list-style-type: none"> 1. Cannot access the iLO 3 MP at this time. 2. Must reseal or replace the server blade. This issue is fixed when the iLO 3 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	Blade health LED is flashing amber or red and iLO 3 MP is running.	<p>A warning or critical failure has been detected and logged while booting or running system firmware. Examine the iLO 3 MP logs for events related to switched DC power or cooling fans or configuration. This issue is fixed when both front panel health LED and server power LED states show: Flashing green or steady green, and steady green, respectively.</p>
4a	Cannot see iLO 3 MP prompt on system console -- blade server power is on. iLO 3 MP is running.	<p>Nothing can be logged for this condition. The blade health LED state indicates that the server blade is either booting or running system FW, or booting or running OS.</p> <ol style="list-style-type: none"> 1. Look for loose, damaged, or disconnected signal cables between the system console device, and serial port connector on the front panel. 2. Be sure that that the RS232C configuration matches between the server blade and the local console (see "Troubleshooting the server interface (system console)" (page 106) for more details). 3. As a last resort, replace the server blade. This issue is fixed when the iLO 3 MP menu appears on the system console.
4b	Cannot see UEFI prompt on system console. iLO 3 MP is running.	<p>Nothing can be logged for this condition.</p> <ol style="list-style-type: none"> 1. Examine the iLO 3 MP logs for entries related to processors, processor power modules, and shared memory, and core I/O devices (see "Errors and error logs" (page 101) for more details). 2. As a last resort, replace the server blade. This issue is fixed when the UEFI menu appears on the system console.
4c	Cannot find a boot disk. The iLO 3 MP is running.	<p>Nothing can be logged for this condition.</p> <ol style="list-style-type: none"> 1. Reinsert the boot disk into the drive bay

Table 9 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
		<ol style="list-style-type: none"> 2. Search for the boot disk path using the UEFI shell (<code>map-r</code>) command. 3. Examine the iLO 3 MP logs for entries related to processors, processor power modules, and shared memory, and core I/O devices (see “Errors and error logs” (page 101) for more details). 4. As a last resort, replace the server blade. This issue is fixed when all boot paths are found.
5	Cannot see OS prompt on system console. iLO 3 MP is running.	<p>Nothing can be logged for this condition.</p> <ol style="list-style-type: none"> 1. Examine the iLO 3 MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (see “Errors and error logs” (page 101) for more details). This issue is fixed when the OS prompt appears on the system console.
<p>NOTE: All events listed below are logged in both FPL and SEL unless otherwise noted. An event of alert level 2 or greater will be logged in both places, alert level 1 or 0 is logged in FPL only.</p>		
6a	“POWER_FAIL_NO_SBL” - Power command failed because no Blade Link is installed	<ol style="list-style-type: none"> 1. Be sure that the Blade Link is properly installed and fully seated. 2. Look for bent connector pins on the Blade Link
6b	“SBL_REMOVED ” - Blade Link was removed	<ol style="list-style-type: none"> 1. If the Blade Link was not removed, be sure that is properly installed and fully seated. 2. Look for bent connector pins on the Blade Link.
6c	“ILO_RST_REASON_SBL” - The iLO 3 was reset because the Blade Link was installed (FPL only)	<ol style="list-style-type: none"> 1. Be sure that the Blade Link is properly installed and fully seated. 2. Look for bent connector pins on the Blade Link.
6d	“SYSVARS_MISMATCH” - The system variable stored on the Blade Link does not match the system variable stored on the blade.	<ol style="list-style-type: none"> 1. Use the <code>sysset</code> command.
6e	“SBL_DOMAIN_IMPROPER_SBL” - The Blade Link currently installed is not appropriate for the blade slot (even/odd) and enclosure (c7000/c3000) being used	<ol style="list-style-type: none"> 1. Be sure that the Blade Link installed in the correct slot and enclosure, see “Installing the Blade Link for BL870c i2 or BL890c i2 configurations” (page 22) 2. Be sure that the Blade Link is properly installed and fully seated. 3. Look for bent connector pins on the Blade Link.
6f	“POWER_FAIL_IMPROPER_SBL” - Power command failed because the Blade Link currently installed is not appropriate for the blade slot (even/odd) and enclosure (c7000/c3000) being used	<ol style="list-style-type: none"> 1. Be sure that the Blade Link installed in the correct slot and enclosure, see “Installing the Blade Link for BL870c i2 or BL890c i2 configurations” (page 22) 2. Be sure that the Blade Link is properly installed and fully seated. 3. Look for bent connector pins on the Blade Link.
6g	Incorrect number of processors displayed for the conjoined blades	<ol style="list-style-type: none"> 1. Be sure that the Blade Link is properly installed and fully seated. 2. Look for bent connector pins on the Blade Link.
6h	“QPL_CPU_LINK_DEGRADED”	<ol style="list-style-type: none"> 1. Be sure that the Blade Link is properly installed and fully seated.

Table 10 Advanced Low End Troubleshooting

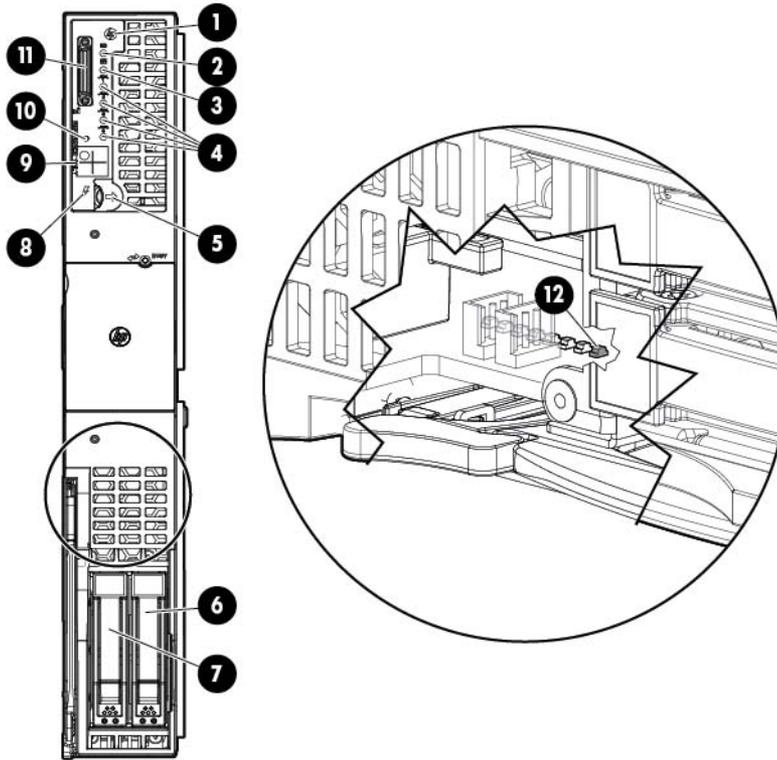
Step	Symptom/Condition	Action
6	Cannot read SEL from the system console.	SEL logging has stopped (health is steady green and power is steady green). 1. Examine console messages for any UEFI errors or warnings about operation or communications. This issue is fixed when the SEL resumes logging.
7	OS is non-responsive (hung)	Front panel LEDs indicate that the server blade 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 can be logged for this condition. 1. Use the iLO 3 MP Command Menu to initial a ToC, using the <code>tc</code> command. 2. Reboot the OS and escalate. 3. Obtain the system hardware status dump for root cause analysis. 4. Examine the iLO 3 MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (see “Errors and error logs” (page 101) for more details). This issue is fixed when the root cause is determined.
8a	MCA occurs during server blade operation. The server blade reboots the OS. Note: The 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 UEFI command, <code>errdump mca</code> . If the server blade can boot the OS, you can capture binary MCA dump files online. 2. Examine the iLO 3 MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (See “Errors and error logs” (page 101) for more details). The issue is fixed when the MCA does not repeat or the source of the MCA has been eliminated.
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. 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. System firmware is running to gather and log all error data for this MCA event. 1. Examine the iLO 3 MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (see “Errors and error logs” (page 101) for more details). This issue is fixed when the MCA does not repeat.

Troubleshooting tools

The HP Integrity BL860c i2 Server Blade uses LEDs and other tools to help troubleshoot problems that occur in the server blade.

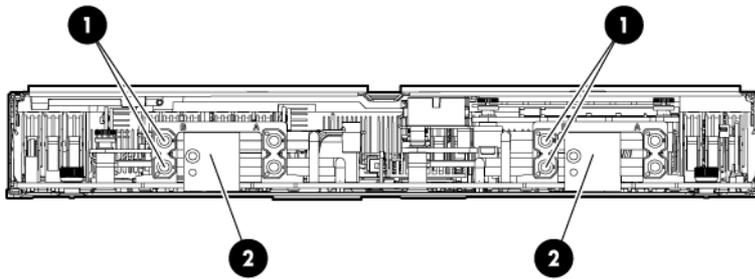
Controls and ports

Front panel view



- | | | |
|----------------------------------|-------------------------------|--|
| 1 Monarch blade indicator | 5 Monarch power button | 9 Partition Identifier |
| 2 UID LED | 6 HDD bay 1 | 10 Physical Presence Button |
| 3 Blade health LED | 7 HDD bay 2 | 11 SUV connector |
| 4 NICs 1, 2, 3, 4 | 8 Blade power LED | 12 iLO heartbeat LED (behind grill) |

Rear panel view

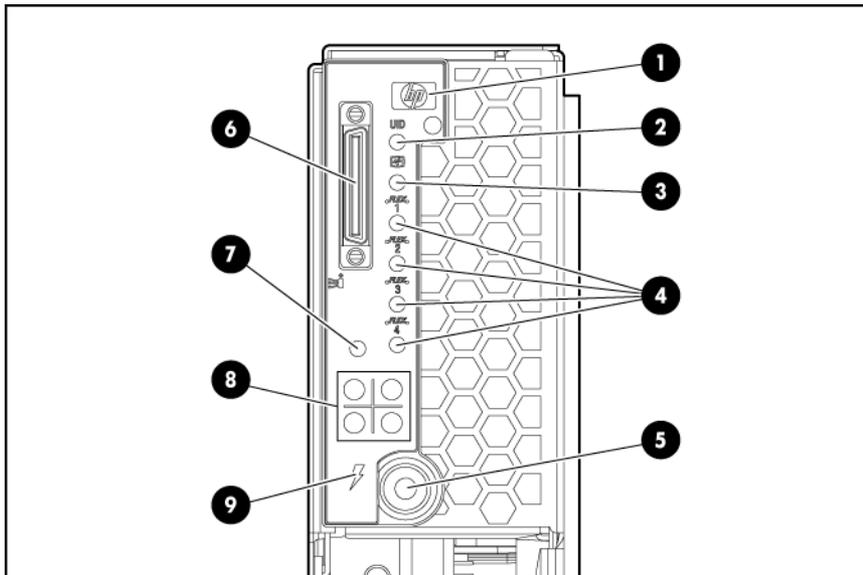


1 Power connectors

2 GBX signal connectors

Server blade LEDs

Front panel LEDs

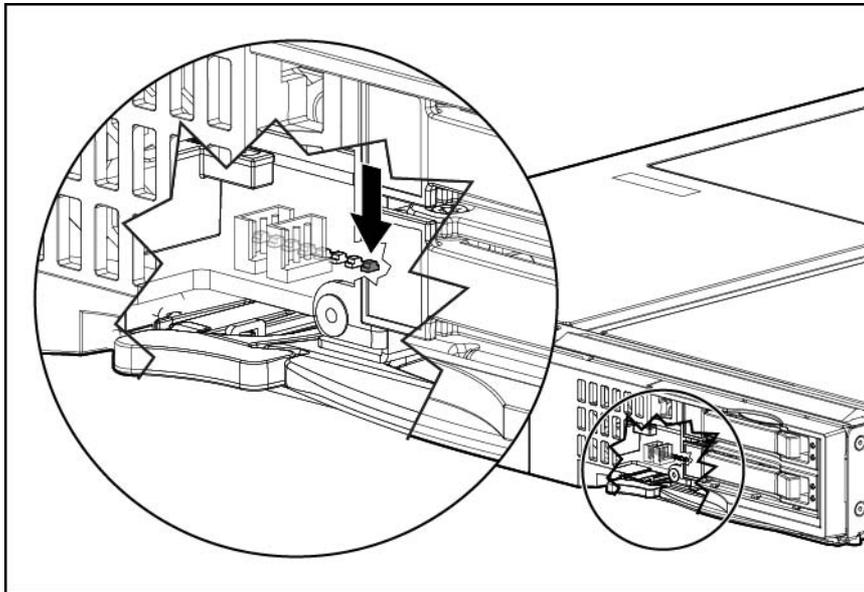


Item	Description	Status
1	Monarch blade indicator	Green = Blade is acting as Monarch blade Off = Blade is not Monarch or is not conjoined
2	UID LED	Blue = Identified Blue flashing = Active remote management Off = No active remote management
3	Blade health LED	Green = Normal operation Amber flashing = Degraded condition Red flashing = Critical condition

Item	Description	Status
4	NICs 1, 2, 3, 4	Green = Network linked Green flashing = Network activity Off = No link or activity
5	Monarch power button / Monarch power LED	Green = Blade is acting as Monarch and is powered on Amber = Blade is acting as Monarch and is in standby Off = Blade is not Monarch
6	SUV connector	N/A
7	Physical Presence Button	N/A
8	Partition Identifier	Green = Blade is in a partition Off = Blade is not in a partition
9	Blade power LED	Green = Server blade is powered on Amber = standby (auxiliary power available) ¹ Off = Off
See Figure 1 (page 94)	iLO 3 Heartbeat (behind grill)	Green flashing = iLO 3 Active Solid green or off = iLO 3 failure or no standby power

¹ If the Onboard Administrator denies power to the server blade, the server blade returns to Standby mode.

Figure 1 iLO Heartbeat LED detail view

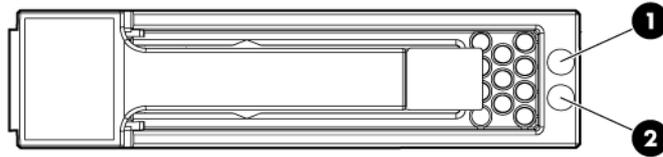


NOTE: The iLO heartbeat LED is visible when looking through the front grill of the Blade Link nearest to the hard drive bays.

- If the blade is installed in a c7000 enclosure, then the LED is visible through the third and fourth holes from the top of the blade in the leftmost row of holes.
- If the blade is installed in a c3000 enclosure, then the LED is visible through the third and fourth holes from the left side of the blade in the bottommost row of holes.

SAS disk drive LEDs

There are two disk drives on the BL860c i2 Server Blade. They have identical LEDs that display the drive status.



Item	Description
1	Fault/UID LED (amber/blue)
2	Online LED (green)

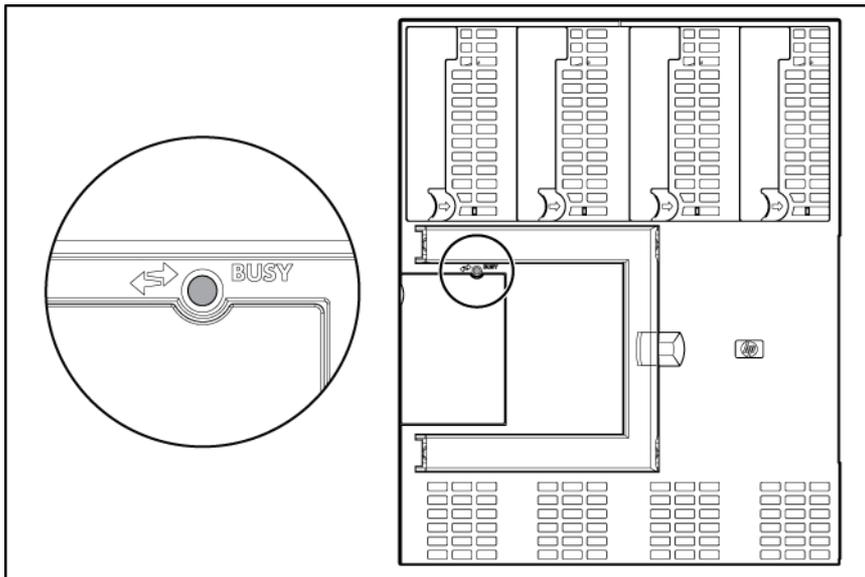
SAS hard drive LED combinations

NOTE: Predictive failure alerts only occur when the hard drive is connected to a Smart Array controller.

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
On, off, or flashing	Alternating amber and blue	The drive has failed, or a predictive failure alert has been received for this drive; it also has been selected by a management application.
On, off, or flashing	Steadily blue	The drive is operating normally, and it has been selected by a management application.
On	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On	Off	The drive is online, but it is not active currently.
Flashing regularly (1 Hz)	Amber, flashing regularly (1 Hz)	Do not remove the drive. Removing a drive might terminate the current operation and cause data loss. The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not replace the drive until the expansion or migration is complete.
Flashing regularly (1 Hz)	Off	Do not remove the drive. Removing a drive might terminate the current operation and cause data loss. The drive is rebuilding, erasing, or it is part of an array that is undergoing capacity expansion or stripe migration.
Flashing irregularly	Amber, flashing regularly (1 Hz)	The drive is active, but a predictive failure alert has been received for this drive. Replace the drive as soon as possible.

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
Flashing irregularly	Off	The drive is active, and it is operating normally.
Off	Steadily amber	A critical fault condition has been identified for this drive, and the controller has placed it offline. Replace the drive as soon as possible.
Off	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or not configured as part of an array.

Blade Link LEDs



Description	Status
Busy LED	Green = Blade Link is currently active. Do not remove. Off = Blade Link is not currently active. Safe to remove.

Virtual Front Panel LEDs in the iLO 3 TUI

iLO 3 has no LED that equates to the Blade Health LED located on the front panel of each individual BL860c i2 Server Blade. The Blade Health LED represents the health of the individual server blade. The virtual LEDs in the iLO 3 GUI and TUI reflect system/partition health. The closest equivalency to the Blade Health LED is a field called **Bay [x] Health** on the System Health page of the iLO 3 GUI.

The **VFP**, located in the iLO 3 TUI directly off the **MP MAIN MENU**, is a textual representation of the system/partition state as well as the system's status with respect to where it is in the boot process (running non-OS code, etc).

The following virtual LEDs are located in the VFP:

- HEALTH
- SYSTEM

- LOCATOR
- POWER

Table 11 Indications for the iLO 3 TUI LEDs

VFP LED	Purpose	Equivalent	Indications	Value
HEALTH	Represents the health of the entire system/partition. Shows the worst health case of any blade that is part of the partition.	System Health LED in the iLO 3 GUI's Virtual Front Panel	Flashing amber	Health of the partition and the health of one or more blades within the partition is DEGRADED, meaning that: <ul style="list-style-type: none"> • A FRU has failed • A fatal event has been logged Level seven alert events cause this indication if there are no FRU failures. <p>NOTE: if the SYSTEM LED lights red, this counts as a FRU failure for the HEALTH LED.</p>
			Flashing red	Health of the partition is FATAL and the health of one or more blades within the partition are FATAL, meaning that: <ul style="list-style-type: none"> • A FRU has failed and A fatal event has been logged (Level seven events cause this indication if there are FRU failures on one of the blades in the partition.) A reset will clear this LED of a fatal event, but not a FRU failure. A power cycle will clear both.
			Steady green	All internal FRUs in the partition are healthy, there are no fatal events, and the system power is on.
			Off	Power to the system/partition is off and there were no AMBER or RED HEALTH indications on the last boot.
SYSTEM	There is only one SYSTEM LED per partition. The state will be the same for every blade in the partition.	<ul style="list-style-type: none"> • System Event Log Health as displayed on the System Health page in the iLO 3 GUI • There is no physical LED on the blade's front panel that represents this state. 	Flashing red	There has been a FATAL event since the last power on or system reset. A reset or power on will clear this LED.
			Steady green	System is beginning to boot the OS
			Off	OS is not booting and there are no fatal events.

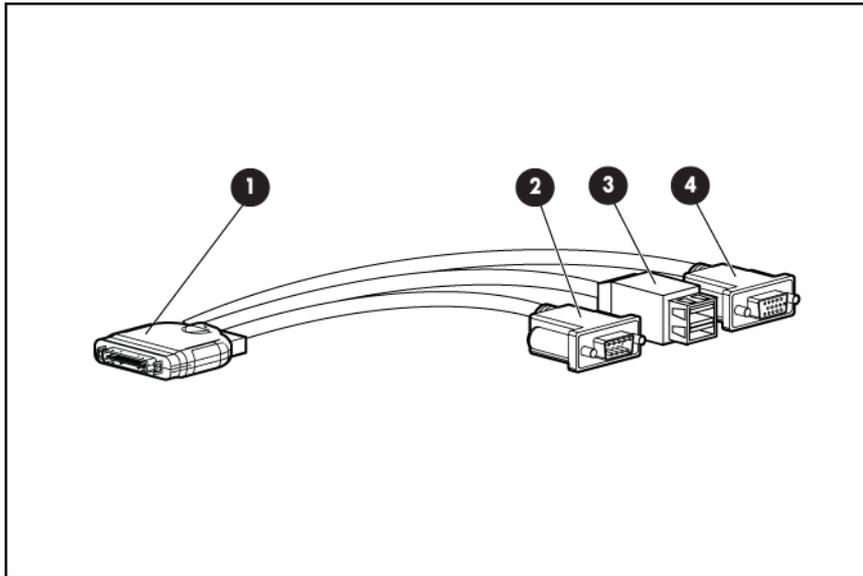
LOCATOR	Identifies the system/partition and will blink while a firmware update is in progress. NOTE: All blades in a partition show the same LOCATOR status at all times. NOTE: You can toggle the UID in software from either the iLO 3 TUI or web GUI. There is no UID hardware button on the server blade itself to turn it on or off.	<ul style="list-style-type: none"> • UID LED on the front panel of the individual blade • Locator UID in iLO 3 • Virtual Indicator in the Onboard Administrator's interface 	On	The system/partition is identified.
			Off	System/partition is not identified and no firmware update is actively writing to any of the system ROMs
			Flashing	Power should not be interrupted; firmware is actively burning a ROM. NOTE: On ProLiant servers this LED blinks to indicate remote management; however this is not currently a supported indication on Integrity servers.
			ON/OFF toggle	Toggles the current LED state to indicate transitional mode states activated by a push and hold of the Physical Presence button. If the Locator is off it will toggle on and then off, but if the Locator is on, it will toggle off and then on. If the Locator is flashing, no action will be taken.
POWER	Identifies the system/partition power state.	<ul style="list-style-type: none"> • Monarch Power button LED on the front panel of the Monarch blade • System Power LED in the iLO 3 GUI 	Steady green	System/partition is fully powered on.
			Steady amber	System/partition is in standby.
			Off	The system/partition is powered off.

SUV Cable and Ports

The SUV port on the front of the server blade is used in conjunction with an SUV cable to connect the server to external devices such as a terminal emulator or monitor. In a conjoined server, only the SUV port on the Monarch Server is active.

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 might cause the port on the server blade to break. This can damage the system board.



1 Server blade
2 Video

3 USB ports (2)

4 Serial

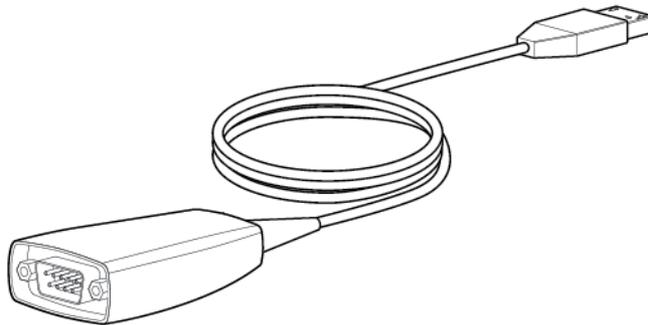
Connecting to the serial port

IMPORTANT: It is not necessary to physically connect to the Integrity iLO 3 via the serial port to perform any management task. The intention is that the iLO LAN port should be used to communicate with any iLO in the enclosure, as well as the Onboard Administrator. The LCD panel and the Onboard Administrator can be used to configure and determine the iLO LAN address.

To physically connect to Integrity iLO 3 using the serial port:

1. Connect the SUV cable to the SUV port (i.e., the diagnostic port).
2. Connect an RS-232 cable to the RS-232 port on the SUV cable. This is the local connection to the Integrity iLO 3 consoles.
3. Connect the other end of the RS-232 cable to your terminal emulator.

NOTE: The terminal emulator is typically software that runs on a PC, such as Putty, Reflections, or Hyper Terminal. This software enables a PC to communicate with the server using one of the PC's comm ports. If the PC has a RS-232 serial port then connect the cable to that port and then configure the terminal emulator software to use that serial port. However, if the PC does NOT have a serial port, then you will need a USB to Serial converter. These devices can be ordered from SmartBuy and typically are in-expensive. The device has a USB connector that plugs into a USB port on the PC, and it has a RS-232 port for connecting to the SUV serial port.



Diagnostics

A suite of offline and online support tools are available to enable troubleshooting server blade issues. In general, if the operating system (HP-UX) is already running, HP does not recommend shutting down the server blade. Use the online support tools.

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

If it is not possible to reach the UEFI 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.

Offline Diagnostics Environment

The Offline Diagnostics Environment provides a support tools platform that enables you to troubleshoot a system that is running without an operating system. With Offline Diagnostics, you can test systems that cannot be tested using the online tools.

The *HP Integrity Servers and Itanium Workstations Offline Diagnostics and Utilities CD-ROM* is shipped with all Integrity systems and Itanium® workstations. This CD is updated quarterly, at which time new functions and features can be added, new hardware diagnostics can be incorporated, and performance can be improved.

For more information, regarding the use of the Offline Diagnostics Environment, see the *Offline Diagnostics Environment Administrator's and User's Guide* (<http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02628971/c02628971.pdf?HPBCMETA::>).

General diagnostic tools

Diagnostic Tool	Description
IPMI Event Decoder	Provides detailed information about the IPMI event (Issue 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 issues automatically, as close as possible to the time of occurrence.
- To diagnose issues automatically, at the time of detection.
- To automatically report (in understandable text) a description of the issue, the likely causes of the issue, the recommended actions to resolve the issue, and detailed information about the issue.
- To be sure 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 SFM and WBEM indications. WBEM is a collection of standards that aid large-scale systems management. WBEM allows management applications to monitor systems in a network.

SFM and WBEM indication providers enable 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.

HP SMH is the applications used to query information about monitored devices and view indications and instances on WBEM. This WBEM-based network management application enables you to create subscriptions and view indications.

SysMgmtPlus functionality displays the property pages of various devices and firmware on HP SMH. SysMgmtPlus enables HP SMH to display improved property pages that contain dynamic content, providing the user to view and hide details of devices and firmware. The Health Tests are associated with components. The healthtest feature provides an option to perform health test on all the device instances of the component.

For complete information on installing, administrating, and troubleshooting SFM software and its components, see the *System Fault Management Administrator's Guide* (<http://h20000.www2.hp.com/bc/docs/support/SupportManual/c02677231/c02677231.pdf?HPBCMETA::>).

Errors and error logs

Event log definitions

Often the underlying root cause of an MCA event is captured by the server blade or firmware in both the SEL and FPL logs. These errors are easily matched with MCA events by timestamps. For example, the loss of a processor VRM might cause a processor fault. Decoding the MCA error logs would only identify the failed processor 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 the OS and are stored in either or both of the SEL and forward progress event logs.
- The iLO 3 MP displays the SEL event logs.

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. To view event logs, enter the `sl` command:

```
[kauai20c] MFG! hpiLO-> sl
```

Event Log Viewer Menu:

Log Name	Entries	% Full	Latest Timestamped Entry
E - System Event	206	40 %	04 Dec 2009 20:30:31
F - Forward Progress	4096	100 %	
I - iLO Event	500	100 %	04 Dec 2009 20:50:57
C - Clear All Logs			
L - Live Events			

Enter menu item or [Ctrl-B] to Quit:

System Event (**E**) and Forward Progress (**F**) logs are useful to determine the context of an error.

iLO 3 MP event logs

The iLO 3 MP provides diagnostic and configuration capabilities. For more information on the iLO 3 MP commands, see the *HP Integrity and HP 9000 Integrated Lights-Out Management Processor Operations Guide* To access the MP:

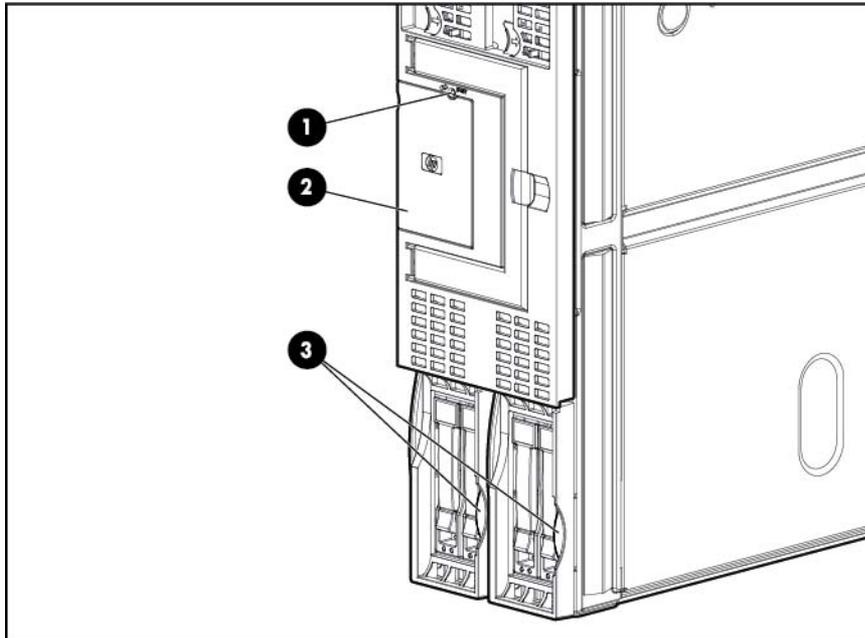
NOTE: The iLO 3 MP must be accessed from a terminal console which has access to the MP.

1. Log in with the proper username and password.

NOTE: the default login and password are:

login = **Administrator**

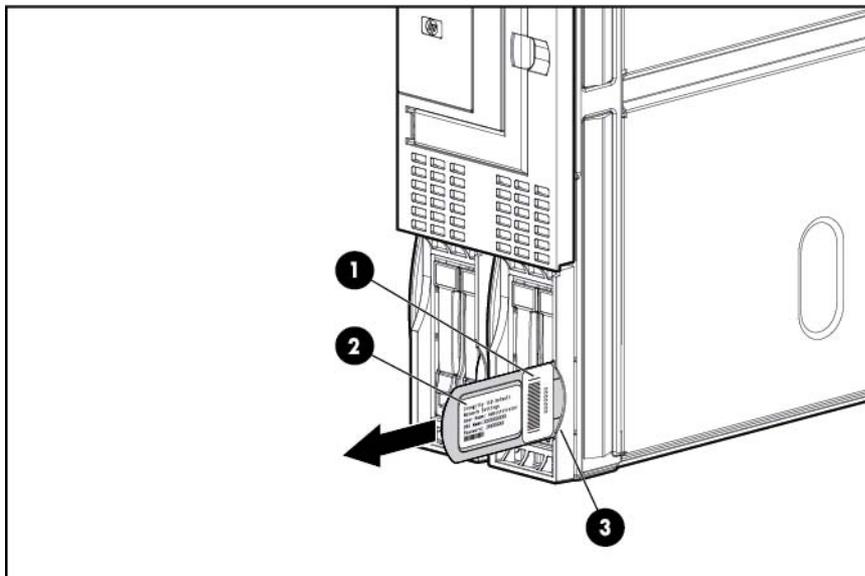
password = Randomly generated password found on the iLO 3 Network pull tab located on the right side of the Monarch blade.



1 Busy LED

2 Label carrier door

3 Pull tab



1 MP iLO 3 label

2 Factory tracking label

3 Blade chassis end

You are now at the **MP Main Menu**.

2. Enter **c1** 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 **s1** to display the status logs. The status logs consist of:
 - System Event
 - Forward Progress
 - Current Boot
 - Previous Boot
 - Live Events
 - Clear SELs
5. Enter **Ctrl-B** to return to the **MP Main Menu**.

SEL review

1. Access the iLO 3 MP command prompt.
2. Run the **s1** command. The Event Log Viewer menu displays:

```
[kauai20c] MFG! hpiLO-> s1
```

Event Log Viewer Menu:

Log Name	Entries	% Full	Latest Timestamped Entry
E - System Event	206	40 %	04 Dec 2009 20:30:31
F - Forward Progress	4096	100 %	
I - iLO Event	500	100 %	04 Dec 2009 20:50:57
C - Clear All Logs			
L - Live Events			

Enter menu item or [Ctrl-B] to Quit:

3. Select **E** to review the system events. The Event Log Navigation menu displays:

```
+      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 Menu
```

SL:hpiLO (+,-,<CR>,D,F,L,J,H,K,T,A,U,?,Q or Ctrl-B to Quit)->

#	Location	Alert	Encoded Field	Data Field	Keyword/Timestamp
10	ILO 1	2	408022E400E10012	0000000000000000	EXIT_MFG_MODE 07 Jan 2010 22:42:00
9	ILO 1	*3	6080253500E10010	0000000000000000	SYSVARS_MISMATCHED 07 Jan 2010 22:41:30
8	ILO 1	*3	608022E600E1000E	0000000000000000	ILO_SPECIAL_MODE 07 Jan 2010 22:41:27
7	ILO 1	2	408022E200E1000C	0000000000000000	ENTER_MFG_MODE 07 Jan 2010 22:41:27
6	ILO 1	2	408022AE00E1000A	0000000000000000	ILO_IS_BOOTING 07 Jan 2010 22:41:19
5	ILO 1	2	4080231200E10008	0000000000000000	FW_UPDATE_SUCCESS 07 Jan 2010 22:40:43
4	ILO 1	2	4080236800E10006	0000000000000000	FW_UPDATE_SIG_OVERRIDE 07 Jan 2010 22:33:05

```

3      ILO 1          2  4080230D00E10004 0000000000000000 FW_UPDATE_START
                                07 Jan 2010 22:31:23
2      ILO 1          2  408022E200E10002 0000000000000000 ENTER_MFG_MODE

```

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. To decode the blinking state of a blade server LED, review the entire SEL and look at events with alert level 2 and above.

Troubleshooting processors

Processor installation order

For a minimally loaded server blade, one processor must be installed in processor slot 0. Install a processor of the same version into processor slot 1 (if purchased). See “[CPU and heatsink module](#)” (page 118) for more information on processor installation.

Processor module behaviors

All physical processors become functional after server power is applied.

Double-bit data cache errors in any physical processor core can cause a local MCA event, which can have one of the following consequences:

- Can cause the entire system to crash.
- The failure is corrected and the processor is restarted.
- The failure is corrected, but the processor is disabled if it has experienced a local MCA before within a certain time span.

Enclosure information

This installation document covers only the BL860c i2 server blade, and does not include any specific server blade enclosure information. For server blade enclosure information, go to:

<http://h71028.www7.hp.com/enterprise/cache/316735-0-0-0-121.html>

Cooling subsystem

The server blade does not contain any fans. Cooling is handled by the enclosure.

Firmware

The server blade has two sets of firmware installed:

- Server blade firmware
- iLO 3 MP firmware

Identifying and troubleshooting firmware issues

Erratic server blade operation, or unsuccessful boot to the **UEFI Boot Manager** or UEFI Shell, are symptoms of possible firmware issues.

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

Probable firmware failure areas are:

- Unsupported firmware installation
- Corrupt firmware installation

To troubleshoot firmware issues:

1. Verify that all server blade firmware components are from the same release (use the MP **sysrev** command).
2. Reinstall server blade firmware.

Verify and install the latest firmware

HP recommends that all firmware on all devices in your c-Class Ecosystem be updated to the latest version anytime a new Integrity Server Blade or other hardware component is added.

To verify that you have the latest version of firmware for each component:

1. Go to <http://www.hp.com>.
2. Locate and click the **Support & Drivers** link on the main page.
3. Click the button next to **Download drivers and software (and firmware)**.
4. Enter your product name (for example, BL860c i2) or number and click >>.
5. Choose the OS or Cross operating system (BIOS, Firmware, Diagnostics, etc.)
6. Refer to the Release Notes or Installation Instructions to verify the firmware version.

Troubleshooting the server interface (system console)

All system console connections (local RS-232 and iLO 3 MP LAN) are made through the port connectors on the front of the server blade, through the SUV 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 10/100 BT LAN connection over a private network, to control one or more server blade operations locally through telnet or SSH, or remotely over a public network through a web GUI.

NOTE: RS-232 connection: If a dummy terminal/PC running terminal emulation software is attached to the iLO 3 MP local port and does not respond to a **Ctrl-B** key sequence then it is possible that the iLO 3 MP is not operational/functional.

Troubleshooting the 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.

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 12 Server blade environmental specifications

Parameter	Operating Range	Recommended Operating Range	Maximum Rate of Change	Non-Operating Range
Temperature	5°C to 35°C (41°F to 95°F) (up to 5000 feet)	20°C to 25°C (68°F to 77°F) (up to 5000 feet)	10°C (50°F) / hr with tape 20°C (68°F) / hr without tape	-40°C to 60°C (-40°F to 140°F)
Relative Humidity	15-80% at 35°C (95°F) noncondensing	40-60% at 35 degrees 35°C (95°F) noncondensing	30% per hour noncondensing	90% at 65°C (149°F) noncondensing

7 Removing and replacing components

Server blade components list

NOTE: Part numbers are found by using the part nomenclature from this list to select the correct part from HP Partsurfer (<http://www.partsurfer.hp.com/search.aspx>).

Table 13 CRU List

Description with Part Number	Spare Part Number
Memory	
2 GB DDR3 PC3-10600R,128Mx8 memory (part number 500202-361)	AM326-69001
4 GB DDR3 PC3-10600R,256Mx4 memory (part number 591750-371)	AM327-69001
8 GB DDR3 PC3-10600R, 512Mx4 memory (part number 500205-371)	AM328-69001
16GB PC3-8500R,512Mx4 memory (part number 500207-371)	AM363-69001
Processors	
Intel Itanium Processor Quad Core 1.86GHz/24MB (DBS) AH388A (Product) (part number AH339-2025A)	AH339-6918A
Intel Itanium Processor Quad Core 1.73GHz/20MB (DBS) AH387A (Product) (part number AH339-2024A)	AH339-6917A
Intel Itanium Processor Quad Core 1.46GHz/16MB (No DBS) AH386A (Product) (part number AH339-2022A)	AH339-6915A
Intel Itanium Processor Dual Core 1.6GHz/12MB (No DBS) AH385A (Product) (part number AH339-2021A)	AH339-6914A
CPU Heatsink ¹ (part number 612269-001)	612269-001
Internal Disks	
HP 146GB 10K SAS 2.5" DP HDD (part number 507125-B21)	507283-001
HP 300GB 10k SAS 2.5 HP DP HDD (part number 507127-B21)	507284-001
HP 146GB 15k SAS 2.5" HP DP HDD (part number 512547-B21)	512744-001
HP 72GB 15k SAS 2.5" HP DP HDD (part number 512545-B21)	512743-001
HP 450GB 10k SAS 2.5" 6Gb HDD (part number 581285-B21)	581310-001
HP 600GB 10k SAS 2.5" 6Gb HDD (part number 581287-B21)	581311-001
HP 900GB 10k SAS 2.5" 6Gb HDD (part number 619291-B21)	653971-001
HP 200GB SAS 2.5" SSD SLC Drive (part number 632492-B21)	632627-001
HP 400GB SAS 2.5" SSD SLC Drive (part number 632494-B21)	632630-001

Table 13 CRU List *(continued)*

Boards and Cards	
HP Dual Port 8Gbps Fibre Channel HBA Mezzanine Card (Emulex) (part number 456972-B21)	456978-001
HP Dual Port 8Gbps Fibre Channel HBA Mezzanine Card (Q-Logic) (part number 451871-B21)	455869-001
HP P700m PCIe Dual Port SAS HBA Mezzanine Card with 512MB Cache Memory (part number 508226-B21)	615316-001
Optional HP SA P-Series Low Profile Battery for SA P700m card (part number 452348-B21)	452348-B21
HP 4x DDR Dual Port IB Mezzanine HCA Option Kit (part number 492303-B21)	519133-001
HP NC364m 4-port mezzanine adapter (part number 447883-B21)	615318-001
HP NC360m PCI Express Dual Port 1Gb (part number 445978-B21)	445978-B21
HP NCxxxm PCI Express Dual Port 10GbE (part number 467799-B21)	615317-001
ICH Mezz Card with TPM (part number AD399-60013)	AD399-60013
ICH Mezz Card without TPM (part number AD399-60014)	AD399-69014
Blade Links	
Blade Link - 1 blade (part number AD399-60002)	AD399-67002
Blade Link - 2 blades (part number AD399-60003)	AD399-67003
Blade Link- 4 blades, c7000 (part number AD399-60006)	AD399-67006
Blade Link- 4 blades, c3000 (part number AD399-60007)	AD399-67007
Blade Link - 2 Blades-E- c7000 (part number AD399-60010)	AD399-67010
Blade Link - 2 Blades-E-c3000 (part number AD399-60011)	AD399-67011
Miscellaneous	
Memory Airflow Baffle (part number AD399-2128B)	AD399-2128B
Blade Top Cover (part number AD399-2101B)	AD399-2101B
BL860c i2 Base Unit (part number AD399-2001D)	AD399-6901D
SAS Disk backplane (part number AD399-60009)	AD399-67009
NVRAM battery (part number 1420-0356)	234556-001
Processor Airflow baffle (part number AD399-2134A)	AD399-2134A

¹ The heatsink must be ordered along with the processor. You cannot replace a processor without also replacing the heatsink.

Preparing the server blade for servicing

To service an internal server blade component, power off the server blade and remove it from the server blade enclosure.

⚠ WARNING! Before proceeding with maintenance or service on a server blade that requires physical contact with electrical or electronic components, be sure that power is removed or safety precautions are followed to prevent electric shock and equipment damage. Observe all warning and caution labels on equipment.

⚠ CAUTION: Electrostatic discharge can damage electronic components. Ensure you are properly grounded before beginning an installation procedure. For more information, see the “ESD handling information” (page 13).

Powering off the server blade

Before powering down the server blade for any upgrade or maintenance procedures, backup critical server data and programs.

Use one of the following methods to power off the server blade:

NOTE: To power off blades in a conjoined configuration, only power off the Monarch blade.

- Use a virtual power button selection through iLO 3 (Power Management, Power & Reset). This method initiates a controlled remote shutdown of applications and the OS before the server blade enter standby mode.
- Press and release the Monarch power button. This method initiates a controlled shutdown of applications and the OS before the server blade enter standby mode.
- Press and hold the Monarch power button for more than 4 seconds to force the server blade to enter standby mode. This method forces the server blade to enter standby mode without properly exiting applications and the OS. It provides an emergency shutdown in the event of a hung application.

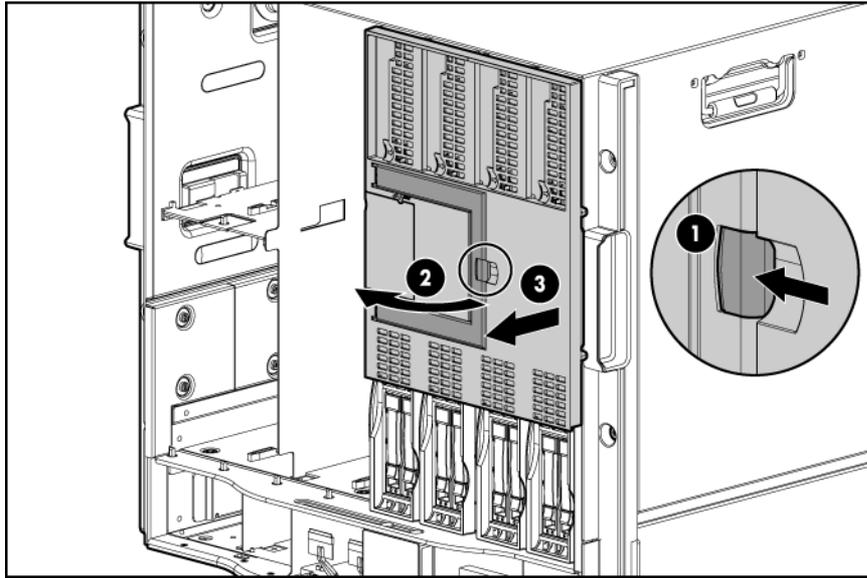
Blade Link for BL870c i2 or BL890c i2 configurations

ⓘ IMPORTANT: If you are replacing a faulty Blade Link, you must transfer the label with the blade serial number from the failed Blade Link to the replacement.

Removing the Blade Link for BL870c i2 or BL890c i2 configurations

⚠ CAUTION: To prevent damage to the Blade Link, make sure that the activity light is off before proceeding.

1. Power off the Monarch blade. (“Preparing the server blade for servicing”).
2. Push in the blue release latch on the handle to release it.
3. Pull the handle out to release the Blade Link.
4. Pull the Blade Link straight out, placing a free hand on the top right side of the bezel as you pull to provide a counterbalance.



5. Place a plastic protector over the connector on the back of the Blade Link and place it in an antistatic bag.

NOTE: Plastic protectors are only provided with replacement Blade Links.

Replacing the Blade Link for BL870c i2 or BL890c i2 configurations

- ⓘ **IMPORTANT:** If you are installing the Blade Link for the first time, see [“Installing the Blade Link for BL870c i2 or BL890c i2 configurations”](#) (page 22) for more information regarding bay location rules and other pre-installation requirements.
-

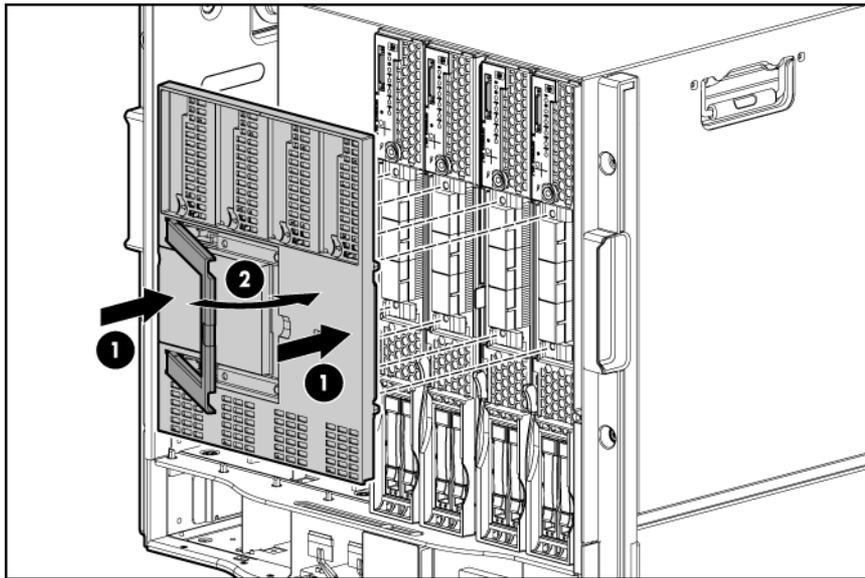
1. Log on to the OA.
 2. Install the first blade into the lowest bay number, this blade becomes the Monarch blade ([“Installing the server blade into the enclosure”](#)).
 3. Wait 10 seconds. The IP address of the installed blade appears in the OA.
 4. Insert each adjacent auxiliary blade, waiting 10 seconds between blades.
-

NOTE: The blades will go into stand-by

5. Using the OA, verify that the rest of the blades that will be conjoined have an IP address and are powered off.
 6. Remove the plastic protectors from the connectors on the back of the Blade Link.
 7. Push in the blue release latch on the handle to release the handle.
 8. Pull the handle all the way out
 9. Align the guide pins on the back of the Blade Link to the holes on the front of the server blades. As you insert the pins into the holes, ensure the face on the Blade Link is evenly aligned parallel to the face of the server blades.
 10. Press firmly on the left and right sides of the Blade Link face until the handle naturally starts to close.
-

- ⚠ **CAUTION:** If not properly aligned, you can damage the Blade Link
-

11. Close the handle when it has engaged.



12. Log into iLO 3 on the Monarch blade. For more information, see the *HP Integrity iLO3 Operations Guide*.
13. In iLO 3, go to the Command Menu and execute `xd -r` to reboot all of the iLO 3s in the conjoined set.
14. Still in the iLO 3 Command Menu, power on the Monarch blade with the `PC -on -nc` command. Powering on the Monarch blade will power the entire conjoined system on.
15. Boot the Monarch blade. Booting the Monarch blade boots the entire conjoined system.

Blade Link for BL860c i2 configurations

ⓘ **IMPORTANT:** Only remove a Blade Link from a BL860c i2 Server Blade in the following circumstances:

- The Blade Link is faulty.
- You will be using the blade in a BL870c / BL890c i2 configuration.

⚠ **CAUTION:** To prevent damage to the Blade Link, make sure that the activity light is off before proceeding.

1. Power off the server blade and remove it from the enclosure (“Preparing the server blade for servicing”).
2. Place the blade on a flat, level, antistatic surface on its side, with the access panel facing up.
3. Squeeze the blue button on the side of the bezel.
4. While holding in the release button, pull the Blade Link off the blade while applying counter pressure down on the blade to keep the blade from moving.
5. Place a plastic protector over the connector on the back of the Blade Link and place it in an antistatic bag.

NOTE: Plastic protectors are only provided with replacement Blade Links.

ⓘ **IMPORTANT:** If you are replacing a faulty Blade Link, take the label carrier card with the system ID values out of the faulty Blade Link and place it inside the label carrier door of the new Blade Link.

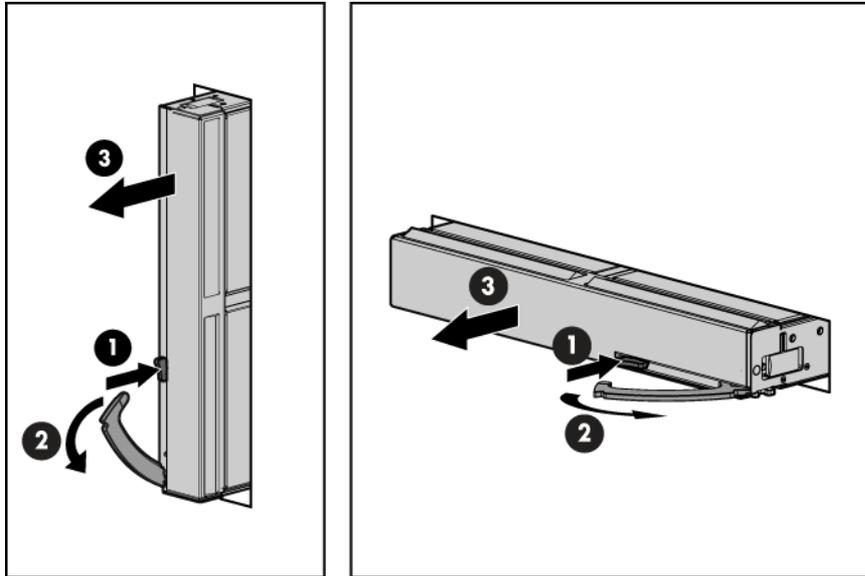
To replace the component, reverse the removal procedure.

Server blade

- ⚠ **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).

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

1. Power off the server blade. (“[Powering off the server blade](#)”)
2. If the blade is conjoined, then remove the Blade Link (“[Removing the Blade Link for BL870c i2 or BL890c i2 configurations](#)”).
3. Remove the server blade.



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

⚠ **WARNING!** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

⚠ **CAUTION:** Populate server blade enclosure bays with a server blade or server blade blank. Operating the enclosure without a server blade or server blade blank causes improper airflow and cooling which can lead to thermal damage.

To replace the component, reverse the removal procedure.

Access panel

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

1. Power off the server blade and remove it from the server blade enclosure. (“[Preparing the server blade for servicing](#)”).
2. Lift the access panel latch.
3. Slide the access panel backwards approximately 2 cm (0.75 in).
4. Remove the access panel by lifting it straight up and off the server blade.

To replace the component, reverse the removal procedure.

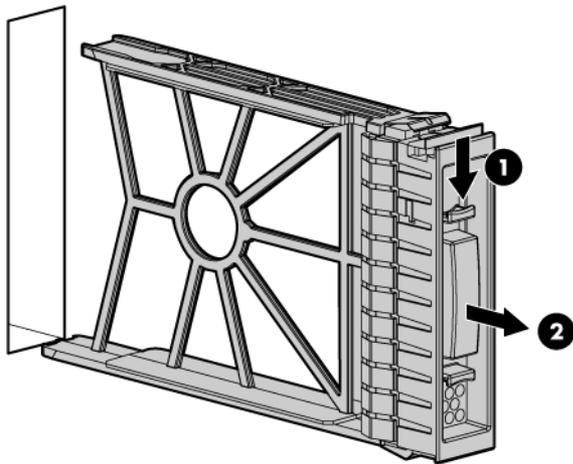
Disk drive blanks

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

- △ **CAUTION:** Populate hard drive bays with a disk drive or a disk drive blank. Operating the server blade without a disk drive or disk drive blank causes improper airflow and cooling, which can lead to thermal damage.

Removing a disk drive blank

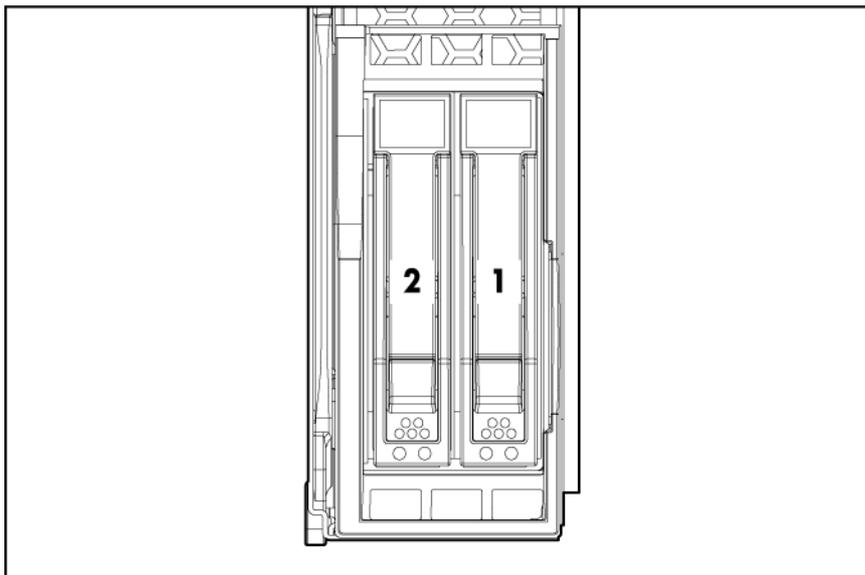
Remove the component as indicated:



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.

Disk drives

The BL860c i2 Server Blade has SAS disk drive slots on the BL860c i2 server blade. The SAS disk drives have identical LEDs that display the drive status.



For the location of the SAS disk LEDs, see [“SAS disk drive LEDs” \(page 95\)](#).

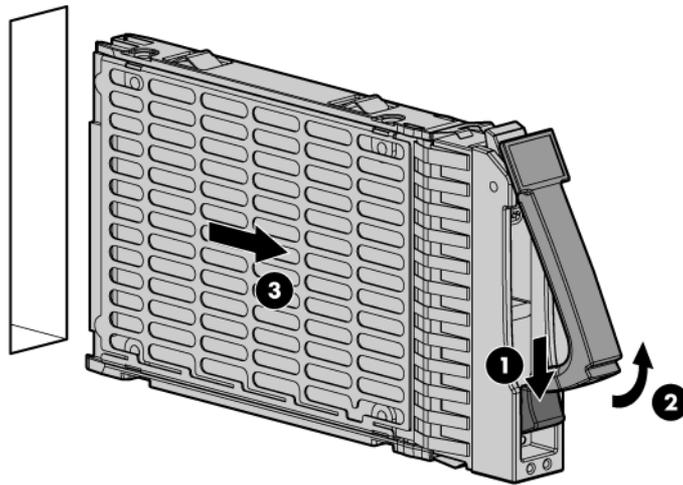
To assess hard drive status, observe the SAS disk drive status LEDs. For an explanation of these LEDs, see [“Front panel LEDs” \(page 93\)](#).

ⓘ **IMPORTANT:** Before removing a SAS disk drive, perform a complete data backup.

If disk drive mirroring is enabled, you do not have to power off the server blade before removing or replacing a SAS disk drive. If mirroring is not enabled, perform an OS shutdown before removing a disk drive to protect data.

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

1. Press the release button.
2. Open the ejector lever.
3. Slide the disk drive out of the drive cage.



⚠ **CAUTION:** Populate hard drive bays with a SAS disk drive or a hard drive blank. Operating the server blade without a SAS disk drive or disk drive blank causes improper airflow and cooling, which can lead to thermal damage.

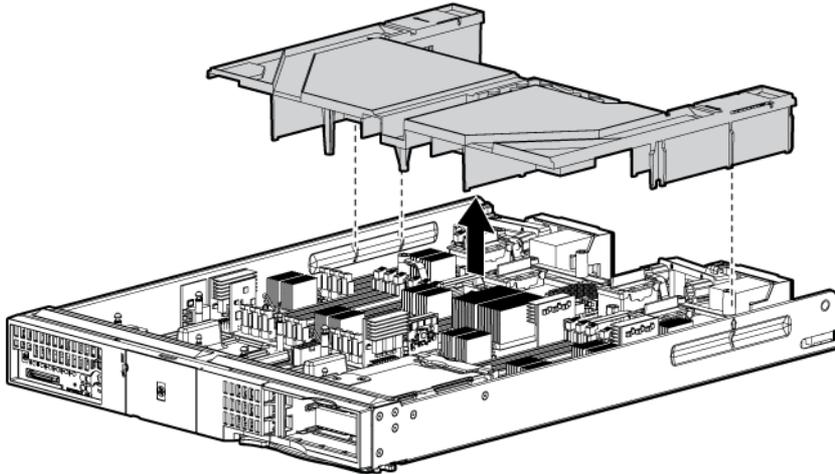
To replace the component, reverse the removal procedure.

DIMM baffle

⚠ **CAUTION:** To avoid damage to the server blade and the enclosure, install the DIMM baffle in the proper location after adding or replacing DIMMs. DIMM baffles that are missing or installed incorrectly can compromise server blade and enclosure cooling.

1. power off the server blade and remove it from the server blade enclosure ([“Preparing the server blade for servicing”](#)).
2. Remove the access panel ([“Access panel” \(page 113\)](#)).

3. Pull the DIMM baffle straight up and out.



To replace the component, reverse the removal procedure.

DIMMs

The memory subsystem supports only DDR3 SDRAM technology using industry-standard 1.2" high DIMMs.

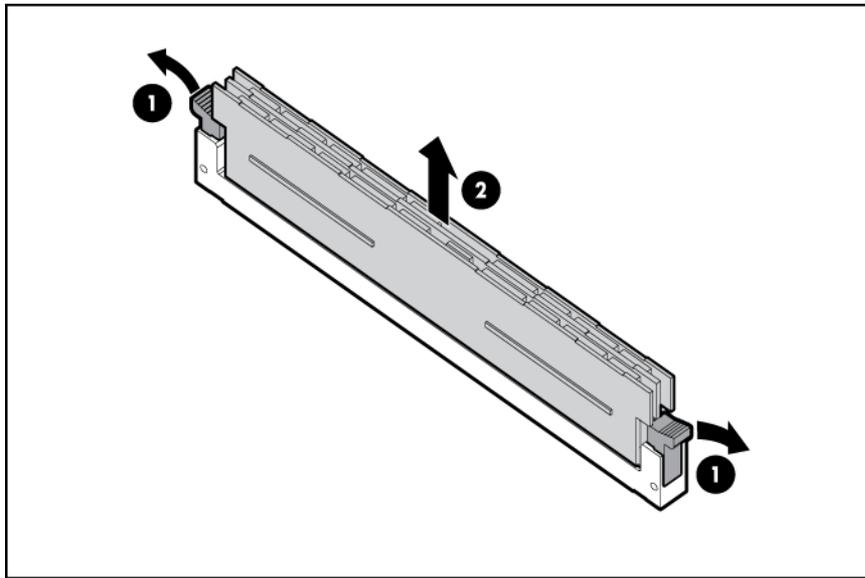
Single DIMM sizes	BL860c i2 Min / Max Memory size	BL870c i2 Min / Max Memory size	BL890c i2 Min / Max Memory size
2 GB	8 GB / 48 GB	Not supported	Not supported
4 GB	8 GB / 96 GB	16 GB / 192 GB	32 GB / 384 GB
8 GB	16 GB / 192 GB	32 GB / 384 GB	32 GB / 768 GB
16 GB	32 GB / 384 GB	64 GB / 768 GB	64 GB / 1.5 TB

CAUTION: When a single DIMM is removed it must either be replaced with a new matching DIMM, or the DIMM load order must be adjusted.

1. Power off the server blade and remove it from the server blade enclosure ("[Preparing the server blade for servicing](#)").
2. Remove the access panel ("[Access panel](#)" (page 113)).
3. Locate the DIMM slots on the server blade system board ([Step 2](#)).
4. Remove the DIMM baffle ("[DIMM baffle](#)" (page 115)).
5. Open the DIMM slot latches.

6. Remove the DIMM from the slot.

❗ **IMPORTANT:** DIMMs do not seat fully if turned the wrong way.

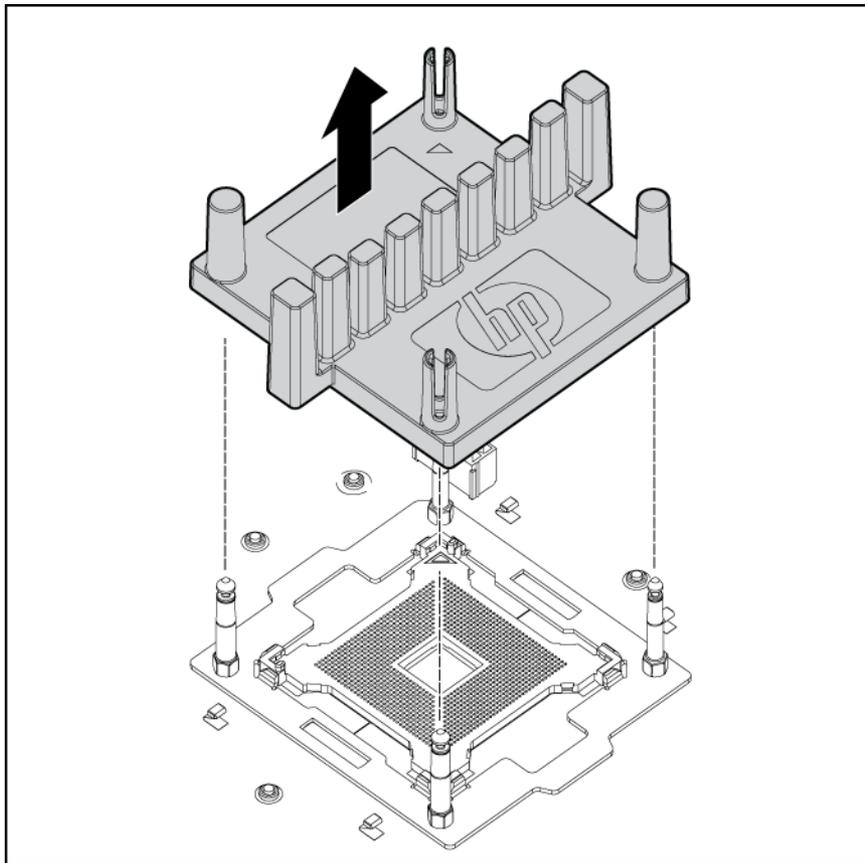


To replace the component, reverse the removal procedure.

CPU baffle

- ⚠ **CAUTION:** To prevent damage to the server blade, never power on a server blade without a CPU baffle or CPU in each CPU socket. The CPU baffle is needed for proper system cooling
- CAUTION:** Immediately install a CPU baffle in an empty CPU socket. To avoid damage to the socket pins, the socket should never be uncovered for more than 5 seconds. If the socket is damaged, the entire base blade must be replaced.
-
1. power off the server blade and remove it from the server blade enclosure (“[Preparing the server blade for servicing](#)”).
 2. Remove the access panel (“[Access panel](#)” (page 113)).

3. Pull the CPU baffle straight up and out.



To replace the component, reverse the removal procedure.

CPU and heatsink module

The BL860c i2 Server Blade contains a processor subsystem accommodating one or two Intel Itanium processor modules.

Each processor module consists of the following:

- CPU chip, including CPU cores, QPI links for CPU-CPU and CPU-IO Hub chip connections, and SMI links for CPU-Memory interface chip connections
- CPU power conversion module
- Heatsink, with mechanical attachment / assembly features

WARNING! To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To prevent possible server malfunction, do not mix CPUs of different speeds or cache sizes.

CAUTION: Removing a CPU will cause the DIMM loading rules to change. See [“DIMMs” \(page 49\)](#) and use the loading rules for two CPUs. If you do not perform these procedures, then any memory associated with the removed CPU will not be seen by the system.

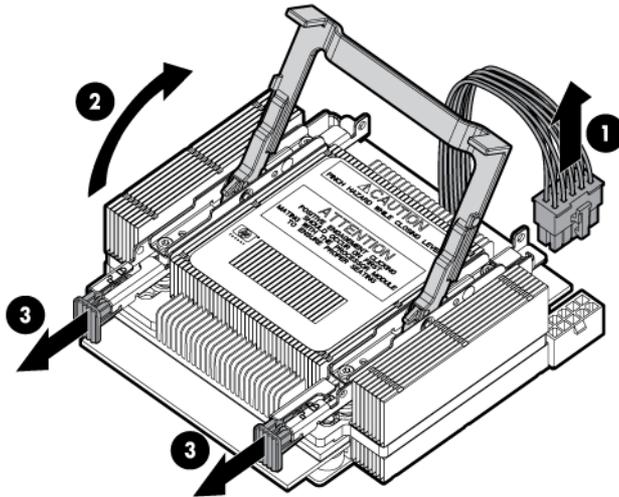
CAUTION: To prevent thermal instability and damage to the server, do not separate the CPU module from the heatsink.

1. Power off the server, and remove it from the enclosure ([“Preparing the server blade for servicing” \(page 110\)](#)).

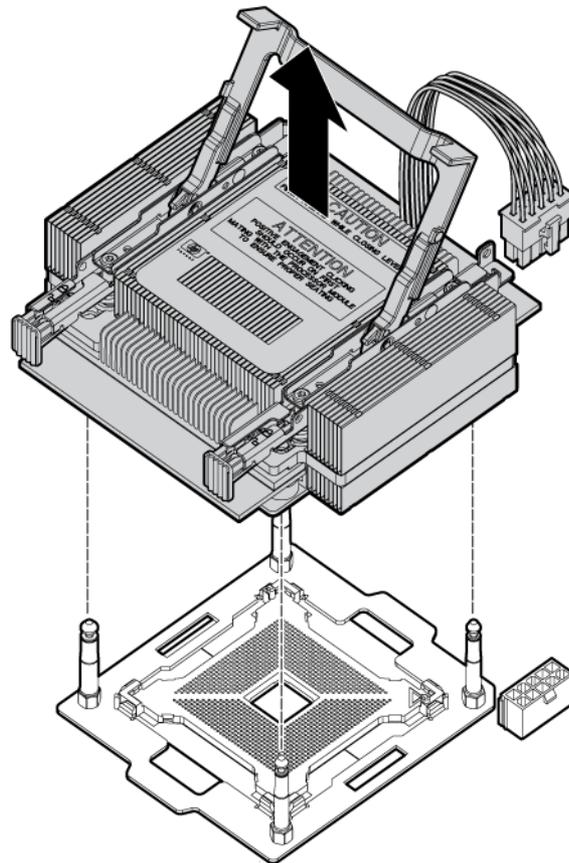
2. Remove the access panel (“Access panel” (page 113)).
3. Disconnect the power cord (see 1 below)
4. Rotate the CPU locking handle up and back until it reaches a hard stop (see 2 below)

⚠ WARNING! The heatsink locking lever can constitute a pinch hazard, keep your hands on top of the lever during installation to avoid personal injury.

5. Pull both plastic tabs out (see 3 below).



6. Lift the CPU and heatsink off of the socket, pulling straight up.



7. If the CPU is not being replaced, install a CPU baffle (“[CPU baffle](#)” ([page 117](#))).

⚠ CAUTION: To avoid damage to CPU socket pins and ensure proper system cooling, install a CPU baffle in an empty CPU socket.

The replacement CPU module is shipped from HP without a heatsink. You will need to order and attach a heatsink to the processor module before installing them for repair. See “[Processor and heatsink module](#)” ([page 44](#)) for more information on the installation procedure.



WARNING!

DO NOT SEPARATE THE HEATSINK FROM THE PROCESSOR MODULE.

Damage to the assembly will occur! Only Factory-Repair is authorized to separate assembly. Return the assembly in the heatsink box using the processor's defective return label.

When the processor/heatsink assembly is removed from the server:

- **Do NOT separate** the heatsink from the processor.
- Place the intact processor/heatsink assembly, **with the handle in the up position**, into the extra ESD bag provided in the heatsink box (if necessary re-use the ESD bag from the processor box).
- To receive credit for **both** the processor and the heatsink:
 - Package the processor/heatsink assembly into the **heatsink box**.
 - Place the paper work originally shipped with the processor in the heatsink box.
 - Apply the processor defective return label to the heatsink box.

Global Customer Services and Support (GCSS) case coding recommendations:

- If the new processor/heatsink assembly is used – (solves the issue or is left in the server for any reason) – return the defective assembly using the normal process; for example a part failure code of 74, 75, etc...

- Once assembled, the parts cannot be returned as “Unused”.

In some scenarios assembled parts will not fix an issue, for example:

- The new assembly is removed and the original is re-installed in the server.
- The wrong speed processor or heatsink combination is assembled.

In these cases:

- Use the defective label (B label) from the processor box and apply to the heatsink box.
- Use a Parts Failure Code of **“AI”** on both parts.

NOTE: After replacing the processor and heatsink module use the `cpuconfig` from UEFI to verify the that the processor socket has been reconfigured.

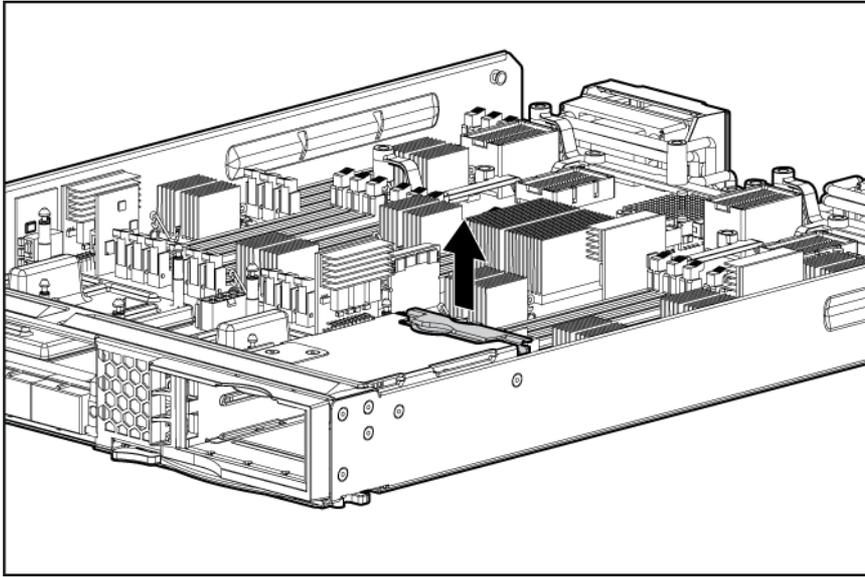
SAS backplane

The SAS disk backplane supports two small form factor hard disk drives. The backplane supports hot-plugging a single SAS drive at a time. The activity LEDs and drive present LEDs are controlled by a preprogrammed system-on-chip. The system board hosts the SAS controller and supplies 12 V, 5 V, and 3.3 V standby power to the backplane.

The SAS backplane is connected to the system board with a right angle connector. This connector is specifically designed for high-speed differential applications, and supports server speeds exceeding 5 Gigabits per second. Power, sense, and I²C signals are routed through this connector as well as the SAS differential pairs and SGPIO signals.

1. Power off the server blade and remove it from the enclosure (“[Preparing the server blade for servicing](#)”).
2. Remove the access panel (“[Access panel](#)” (page 113)).

3. Remove the disk drives or disk drive blanks (“Disk drives” (page 114) or “Disk drive blanks” (page 114)).
4. Lift the SAS back plane straight out of the server by the backplane handle.



To replace the component, reverse the removal procedure.

Server battery

If the server blade no longer automatically displays the correct date and time, you might have to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

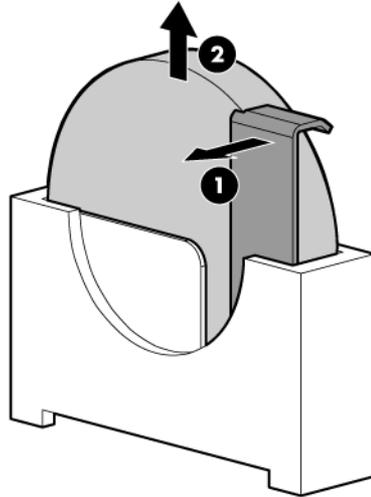


WARNING! The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the spare designated for this product.

1. Power off the server and remove it from the enclosure (“Preparing the server blade for servicing”).
2. Remove the access panel (“Access panel” (page 113)).

3. Remove the battery.



To replace the component, reverse the removal procedure.

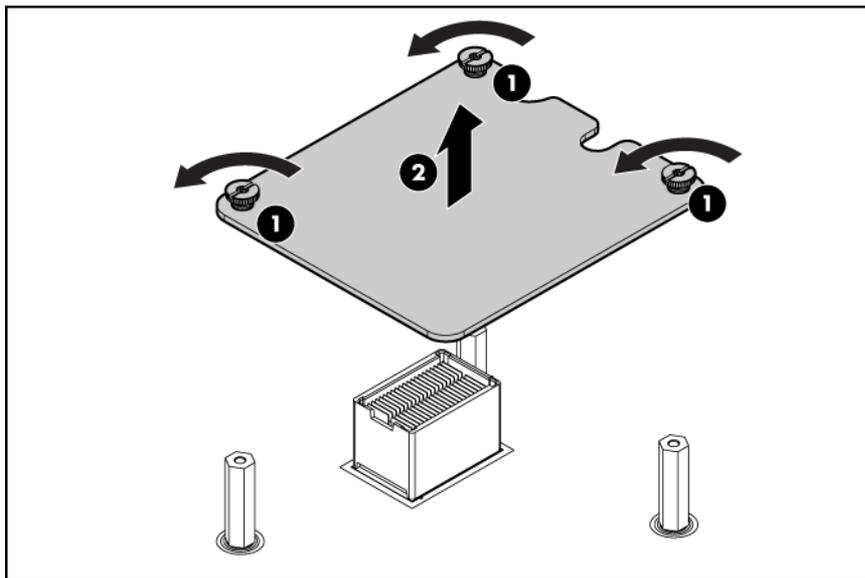
Mezzanine cards

The I/O subsystem is composed of embedded core I/O and up to three mezzanine cards. The server blade supports the following configurations:

- Up to three type I mezzanine cards using up to x8-PCIe Gen-2 links
- One type I and up to two type II mezzanine cards using up to x8-PCIe Gen-2 links

The server blade does not support PCI Hot Plug.

1. Power off the server and remove it from the enclosure ([“Preparing the server blade for servicing”](#)).
2. Remove the access panel ([“Access panel”](#) (page 113)).
3. Remove the mezzanine card.



To replace the component, reverse the removal procedure.

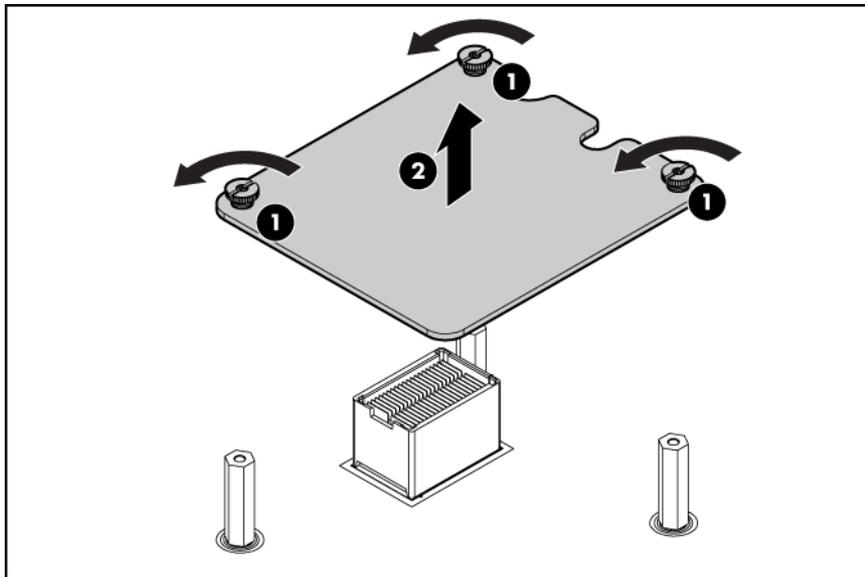
ICH mezzanine board

The ICH mezzanine card houses the following components:

- Intel ICH10 South Bridge
- ATI/AMD RN50/ES1000 Video Controller
- Embedded TPM 1.2
- Internal USB port — **NOT SUPPORTED FOR USE**

One ICH mezzanine board is required per system. The ICH mezzanine board is required in the BL860c i2. In the BL870c i2 and BL890c i2, the ICH mezzanine board is only required in the Monarch blade.

1. Power off the server and remove it from the enclosure (“[Preparing the server blade for servicing](#)”).
2. Remove the access panel (“[Access panel](#)” (page 113)).
3. Remove the ICH mezzanine card:



To replace the component, reverse the removal procedure.

System board

- ⚠ CAUTION:** To prevent damage to the system board, do not remove the system board from the server blade.

In the event of a system board failure, both the system board and the server blade are replaced.

Before sending in the system board and server blade for replacement, remove the following components:

- The processor and heatsink module (“[CPU and heatsink module](#)” (page 118))
- The processor air baffle (“[CPU baffle](#)” (page 117))
- The DIMMs (“[DIMMs](#)” (page 116))
- The DIMM baffle (“[DIMM baffle](#)” (page 115))
- The Smart Array battery (“[Removing the BBWC battery](#)” (page 61))
- The Mezzanine cards (“[Mezzanine cards](#)” (page 123))

- The ICH mezzanine board (“ ICH mezzanine board” (page 124))
- The hard disk drives (“Disk drives” (page 114))

Remove these items from the replacement base unit and place them on the defective base unit for protection during return shipment:

Item	Quantity
Protective processor covers	2
Mezzanine covers	4
Backplane connector covers	2

After replacing the system board and server blades:

- ① **IMPORTANT:** Replacement server blades are shipped with the RAID controller in HBA mode by default. If the server blade RAID controller was in RAID mode before replacement, you must change the mode using the `saupdate` utility before booting the OS. See “[Configuring a Smart Array Controller](#)” (page 133) for instructions on using the `saupdate` utility.
- Be sure that that the firmware on all conjoined blades matches (“[Determining your current firmware revisions](#)” (page 68)).
 - Be sure that the Stable storage info has transferred using the `sysset` command from the MP/iLO 3 TUI (CLI).

Blade Link

Conjoining server blades using the Blade Link enables four (BL870c i2) and eight (BL890c i2) socket server blade variants.

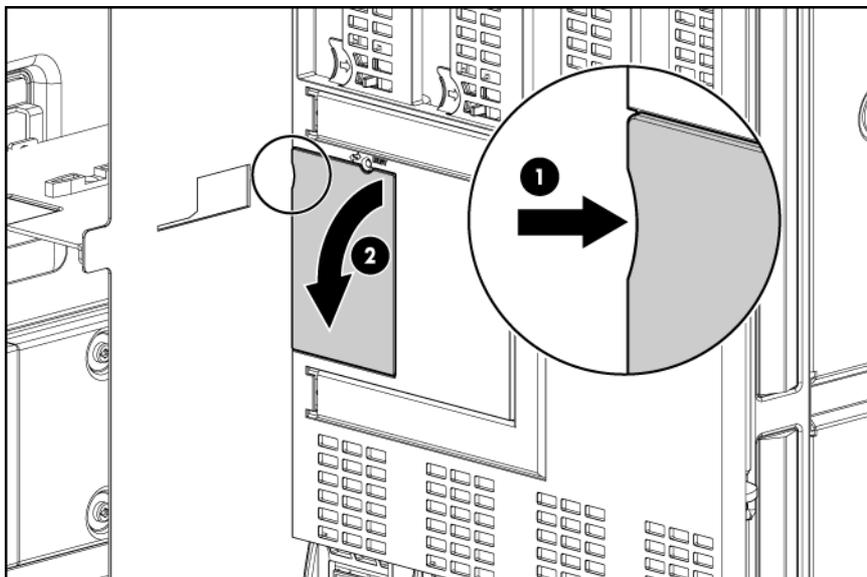
In a conjoined configuration, one of the BL860c i2 Server Blades becomes the master blade, also referred to as the Monarch blade. The Monarch server blade is in the lowest numbered enclosure bay, communication to the conjoined server blade is done through the Monarch blade.

Conjoined configurations can be upgraded after the initial installation, see “[Upgrading a conjoined configuration](#)” (page 66) for more information on server blade upgrades.

Each Blade Link includes a trap door for the label carrier. To access the label carrier:

1. Locate the indentation on the upper-right corner of the access door.

2. Use the indent to pull the door open.



For more information see [“Installing the Blade Link for BL870c i2 or BL890c i2 configurations”](#) (page 22)

8 Support and other resources

Contacting HP

Before you contact HP

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

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error message
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, see the HP US service locator webpage (<http://welcome.hp.com/country/us/en/wwcontact.html>.)
- In other locations, see the Contact HP worldwide (in English) webpage: <http://welcome.hp.com/country/us/en/wwcontact.html>.

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage: (http://welcome.hp.com/country/us/en/contact_us.html)

To contact HP by phone:

- Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website: (<http://www.hp.com/hps>).
- In other locations, see the Contact HP worldwide (in English) webpage (<http://welcome.hp.com/country/us/en/wwcontact.html>)

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/country/us/en/contact_us.html.

Documentation feedback

HP welcomes your feedback. To make comments and suggestions about product documentation, send a message to docsfeedback@hp.com.

Include the document title and manufacturing part number. All submissions become the property of HP

HP Insight Remote Support Software

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable improved delivery of your HP Warranty, HP Care Pack Service or HP contractual support agreement. HP Insight Remote Support supplements your monitoring, 24x7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The software is available in two variants:

- **HP Insight Remote Support Standard:** This software supports server and storage devices and is optimized for environments with 1-50 servers. Ideal for customers who can benefit from proactive notification, but do not need proactive service delivery and integration with a management platform.
- **HP Insight Remote Support Advanced:** This software provides comprehensive remote monitoring and proactive service support for nearly all HP servers, storage, network, and SAN environments, plus selected non-HP servers that have a support obligation with HP. It is integrated with HP Systems Insight Manager. A dedicated server is recommended to host both HP Systems Insight Manager and HP Insight Remote Support Advanced.

Details for both versions are available at:

<http://www.hp.com/go/insightremotesupport>

To download the software, go to Software Depot:

<http://www.software.hp.com>

Select **Insight Remote Support** from the menu on the right.

New and changed information in this edition

The following additions and changes have been made for this edition:

- The following information has been added:
 - Instructions for SAS tape boot in “Installing the OS from an external USB DVD device or tape device” (page 30)
- The following information has been updated:
 - Supported partner blade configurations in “Blade Link bay location rules” (page 23)
 - Supported partner blades and support for SAS tape boot in “Partner blades” (page 41)
 - Revised component descriptions in “Server blade components list” (page 108)

Typographic conventions

This document uses the following typographical conventions:

Command	A command name or qualified command phrase.
Computer output	Text displayed by the computer.
Ctrl-X	A key sequence. A sequence such as Ctrl-X indicates that you must hold down the key labeled Ctrl while you press another key or mouse button.
ENVIRONMENT VARIABLE	The name of an environment variable, for example, PATH.
ERROR NAME	The name of an error, usually returned in the <code>errno</code> variable.
Key	The name of a keyboard key. Return and Enter both refer to the same key.

User input	Commands and other text that you type.
<i>Variable</i>	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
WARNING	A warning calls attention to important information that if not understood or followed will result in personal injury or nonrecoverable system issues.
CAUTION	A caution calls attention to important information that if not understood or followed will result in data loss, data corruption, or damage to hardware or software.
IMPORTANT	This alert provides essential information to explain a concept or to complete a task
NOTE	A note contains additional information to emphasize or supplement important points of the main text.

Standard terms, abbreviations, and acronyms

A

ASIC	Application-specific integrated circuit
Auxiliary	Any blade in a conjoined server other than the lowest-numbered blade

B

BBRAM	Battery-backed RAM
BBWC	Battery Backed Write Cache
BCH	Boot console handler

C

CE	Customer engineer
CEC	Core electronics complex
CMC	Corrected machine check
CPE	Corrected platform errors
CRU	Customer replaceable unit
CSR	Control status registers

D

DDNS	Dynamic domain name system
DHCP	Dynamic host configuration protocol
DLL	Dynamic-link library
DMA	Direct memory access
DMDC	Data multiplexer/demultiplexer controller
DNS	Domain name system

E

EFI	Extensible Firmware Interface <i>See also</i> UEFI.
EMS	Event management service
ESD	Electrostatic discharge

F

FC	Fibre Channel
FPL	Forward progress log
FRU	Field replaceable unit

H

HBA	Host bus adapter
HPSP	HP service partition

I

iLO 3	Integrated Lights-Out
IPF	Itanium processor family

L

LDAP	Lightweight directory access protocol
LVM	Logical volume manager

M

Monarch	Designates a single-blade server, or lowest-numbered blade in a conjoined server
MP	Management processor
MPS	Maximum payload size

N

NIC	Network interface card
NVRAM	Non-Volatile RAM

O

OA	Onboard Administrator
ORCA	Option Rom Configuration for Arrays

P

PA-RISC	Precision Architecture, Reduced Instruction Set Computing
PCA	Printed circuit assembly
PCI	Peripheral component interface
PCI-X	Peripheral component interconnect extended
PCIe	Peripheral component interconnect express
POL	Point-of-load
POSSE	Pre-OS system startup environment
POST	Power-On Self-Test

Q

QPI	Intel QuickPath Interconnect
------------	------------------------------

S

SAL	System abstraction layer
SAS	Serial attached SCSI
SATA	Serial ATA
SBA	System bus adapter
SEL	System event log
SFM	System fault management
SGPIO	Serial general purpose input/output
SMH	System management homepage
SSH	Secure Shell
STM	Support Tool Manager

T

TLB	Translation look-aside buffer
ToC	Transfer of control
TPM	Trusted platform module

TUI	Text user interface
U	
UART	Universal asynchronous receiver-transmitter
UEFI	Unified Extensible Firmware Interface, replaces EFI.
UID	Unit identification
UPS	Uninterruptible power supply
USB	Universal serial bus
V	
VCM	Virtual Connect Manager
vMedia	Virtual media
VRM	Voltage regulator module
W	
WBEM	Web-Based enterprise management

A Utilities

Configuring a Smart Array Controller

Using the saupdate command

The saupdate command is used to query or change the mode of the Smart Array P410i and Smart Array P411 controllers to HBA or RAID. Querying or changing modes is not supported for other controllers.

The following are the newly added commands to saupdate:

- get_mode
- set_mode

get_mode

This command displays the current mode of the controllers.

Syntax

```
saupdate get_mode <controller>
```

<controller> can be any one of the strings listed in [Table 14](#).

Table 14 <controller> strings

<controller>	Meaning
<seg:bus:dev:func>	A controller having the PCI segment id, bus id, device id and function id is addressed
all	Addresses all controllers in the system
<model>	Controllers of a particular type indicated by the <model> string are addressed

```
fs2:\> saupdate get_mode 0:2:0:0
The controller at 0:2:0:0 is in HBA mode
fs2:\> saupdate get_mode p410i
The controller at 0:2:0:0 is in HBA mode
The controller at 0:42:0:0 is in HBA mode
The controller at 0:82:0:0 is in HBA mode
The controller at 0:C2:0:0 is in HBA mode
fs2:\> saupdate get_mode all
The controller at 0:2:0:0 is in HBA mode
The controller at 0:42:0:0 is in HBA mode
The controller at 0:82:0:0 is in HBA mode
The controller at 0:C2:0:0 is in HBA mode
fs2:\> █
```

set_mode

-
- ❗ **IMPORTANT:** If you are using HBA mode, do not install any disk that has previously been a part of a RAID volume into the system.
-

Use `set_mode` to change the mode of the controller. If the controller is already in the required mode the following message appears:

The controller at `<seg:bus:dev:func>` is already in HBA|RAID mode

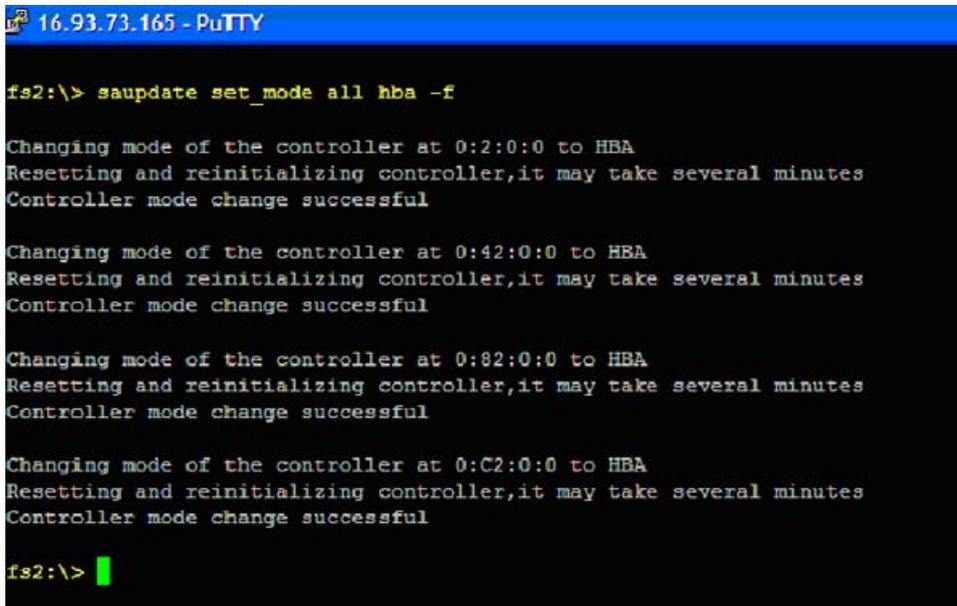
Syntax

```
saupdate set_mode <controller> <hba|raid> [-f]
```

`<controller>` can be any one of the strings listed in [Table 14 \(page 133\)](#).

An alert message about the possible data loss is displayed when a mode change command is issued. A confirmation is required before the actual mode change is made. This ensures unintentional change of mode does not happen.

The `-f` option indicates the user is aware of the changes that are being made and there is not need of a warning message or a confirmation regarding the mode change.



```
16.93.73.165 - PuTTY
fs2:\> saupdate set_mode all hba -f

Changing mode of the controller at 0:2:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

Changing mode of the controller at 0:42:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

Changing mode of the controller at 0:82:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

Changing mode of the controller at 0:C2:0:0 to HBA
Resetting and reinitializing controller,it may take several minutes
Controller mode change successful

fs2:\>
```

-
- ❗ **IMPORTANT:** After changing the mode, perform a `reconnect-r` command at UEFI.
-

NOTE: Commands are not case-sensitive

Updating the firmware using saupdate

1. Download the firmware image file into the system's UEFI partition.
2. Boot the system to the UEFI Shell and change directories to the UEFI partition.
3. Use the `saupdate list` command to display all detected Smart Array controllers along with the active firmware versions, the identification information from this list is used to designate which controller is to be updated.
4. Use `saupdate update <seg:bus:dev:func:index> <firmware image>` to update the firmware.
5. Restart the system.

Determining the Driver ID and CTRL ID

Use the `drvcfg` utility and UEFI shell commands to find the Driver ID corresponding Ctrl ID for the SAS Host Bus Adapter.

1. At the UEFI shell, use the `drivers` command.
2. Find the SAS Host Bus Adapter in the list of drivers, and make a note of the Driver ID from the left column.
3. Use the `drvcfg` command.
4. Find the SAS Host Bus Adapter's Driver ID in the list, and make a note of the corresponding Ctrl ID.

```
Shell> drivers
      T  D
D      Y C I
R      P F A
V  VERSION  E G G #D #C DRIVER NAME                IMAGE NAME
=====
23 0000000A B - - 1 61 PCI Bus Driver                PciBusDxe
92 00000010 D - - 1 - Usb Ehci Driver                EhciDxe
94 0000000A D - - 4 - Simple Network Protocol Driver   SnpDxe
A4 00000312 B X X 1 2 Smart Array SAS Driver v3.12    MemoryMapped<0xB,0x
A7 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x
A9 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x
B2 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x
B4 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x

Shell> drvcfg
Configurable Components
Drv[A7] Ctrl[A6] Lang[en-US;eng]
Drv[A9] Ctrl[A8] Lang[en-US;eng]
Drv[B2] Ctrl[B1] Lang[en-US;eng]
Drv[B4] Ctrl[B3] Lang[en-US;eng]
Drv[A4] Ctrl[A3] Lang[eng]

Shell> drvcfg -s a4 a3_
```

NOTE: If the drivers listing shows X under CFG and DIAG, the drive is in RAID mode and you can run `drvcfg` against it.

If the drivers listing shows - under CFG and DIAG, the drive is in HBA mode.

Configuring RAID volumes using the ORCA menu-driven interface

NOTE: The function keys cannot be used in ORCA if you are using a serial console. Substitute **ESC** followed by the corresponding number key. For example, **F3** would be **Esc-3**

NOTE: ORCA will not launch if there is no hard disk drive in the server blade.

From the UEFI Shell, enter `drvcfg -s <Driver ID> <Ctrl ID>`. To locate this information, see “Determining the Driver ID and CTRL ID” (page 134).

```
Shell> drivers
      T  D
D      Y C I
R      P F A
V  VERSION  E G G #D #C DRIVER NAME                IMAGE NAME
=====
23 0000000A B - - 1 61 PCI Bus Driver                PciBusDxe
92 00000010 D - - 1 - Usb Ehci Driver                EhciDxe
94 0000000A D - - 4 - Simple Network Protocol Driver   SnpDxe
A4 00000312 B X X 1 2 Smart Array SAS Driver v3.12    MemoryMapped<0xB,0x
A7 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x
A9 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x
B2 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x
B4 00050023 B X X 1 1 Broadcom 10 Gigabit Ethernet Driver MemoryMapped<0xB,0x

Shell> drvcfg
Configurable Components
Drv[A7] Ctrl[A6] Lang[en-US;eng]
Drv[A9] Ctrl[A8] Lang[en-US;eng]
Drv[B2] Ctrl[B1] Lang[en-US;eng]
Drv[B4] Ctrl[B3] Lang[en-US;eng]
Drv[A4] Ctrl[A3] Lang[eng]

Shell> drvcfg -s a4 a3_
```

The ORCA main menu will appear.

```
Option Rom Configuration for Arrays, version 3.12
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

+-----Main Menu-----+
| Create Logical Drive   |
| View Logical Drive    |
| Delete Logical Drive  |
+-----+

<Enter> to create a new logical drive
<UP/DOWN ARROW> to select main menu option; <ESC> to exit
```

The ORCA main menu contains the following options:

- Create Logical Drive
- View Logical Drive
- Delete Logical Drive

NOTE: If you are configuring the HP Smart Array P700m/512 Controller or the HP StorageWorks SB40c storage blade (P400 controller), then you can enter ORCA from POST by pressing the **F8** key when prompted.

Creating a logical drive

1. At the ORCA main menu, select Create Logical Drive.

```
Option Rom Configuration for Arrays, version 3.12
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

+-----Available Physical Drives-----+ +---Raid Configurations-----+
| [X] Port 1I, Box 1, Bay 1, 73.4 GB SAS | | [ ] RAID 1+0 |
| [X] Port 1I, Box 1, Bay 2, 73.4 GB SAS | | [X] RAID 0 |
+-----+ +-----+

+-----Spare-----+
| [ ] Use one drive as spare |
+-----+

<Enter> to create a logical drive; <Tab> to navigate
<UP/DOWN ARROW> to scroll; <ESC> to return
```

2. Select the physical disks to be included in the logical drive in the Available Physical Drives section.
3. To select the Raid Configurations section and select the RAID type for the logical drive, press **Tab**.
4. To select the Spare section and assign spare disks, as needed, press Tab.
5. To create the logical drive, press **Enter**. A summary of your choices appears.

```
Option Rom Configuration for Arrays, version 3.12
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

+-----+
| You have selected a logical drive with a total |
| data size of 136.7 GB and RAID 0 fault tolerance. |
| Press <F8> to save the configuration |
| Press <ESC> to cancel |
+-----+

<F8> to save the configuration
<ESC> to cancel
```

6. To save the configuration, press **F8**.
7. To acknowledge that the configuration was saved and return to the ORCA Main Menu, press **Enter**.

Deleting a logical drive

⚠ WARNING! Back up all necessary data before deleting the logical drive. When you delete a logical drive, data on the drive is not preserved.

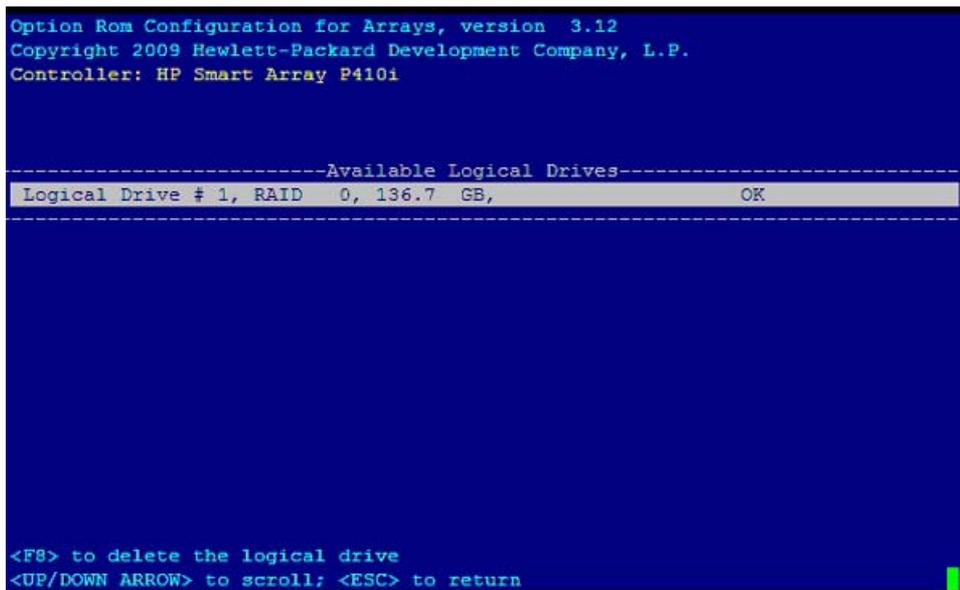
1. At the ORCA main menu, select Delete Logical Drive.

```
Option Rom Configuration for Arrays, version 3.12
Copyright 2009 Hewlett-Packard Development Company, L.P.
Controller: HP Smart Array P410i

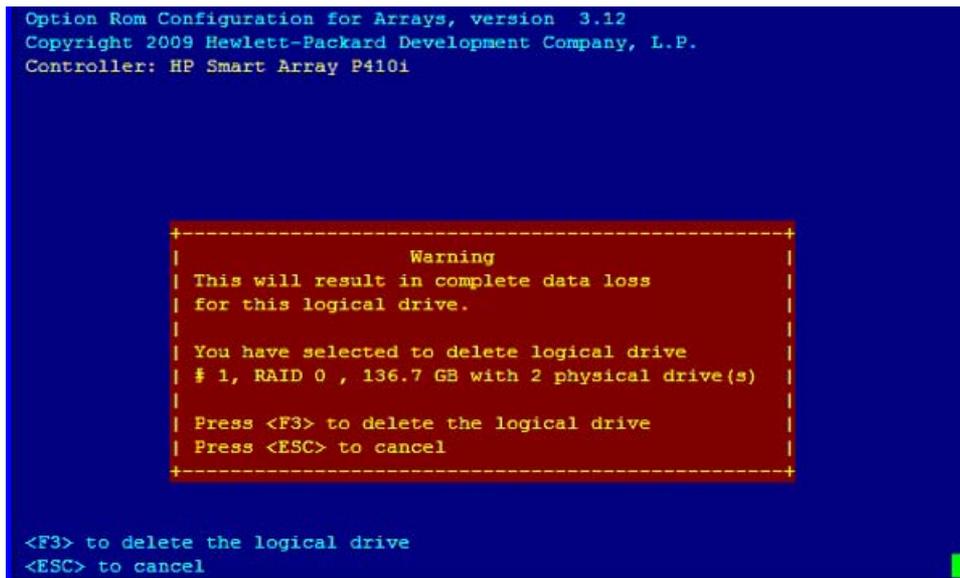
+-----Main Menu-----+
| Create Logical Drive |
| View Logical Drive |
| Delete Logical Drive |
+-----+

<Enter> to delete an existing logical drive
<UP/DOWN ARROW> to select main menu option; <ESC> to exit
```

2. Select a logical drive to be deleted.



3. **F3** to delete the logical drive.



4. To acknowledge that the configuration was saved and return to the ORCA Main Menu, press **Enter**.

Useful UEFI command checks

`saupdate.efi list`

Use `saupdate.efi list` to list controller information such as the controller version.

Seg	Bus	Dev	Func	Description	Version	Build
0	2	0	0	HP Smart Array P410i	3.00	0

`drivers`

Use `drivers` to find the driver version and DRV #.

94	00000000	D	-	4	-	Simple Network Protocol Driver	SnpDxe	
A4	00000312	B	X	X	1	2	Smart Array SAS Driver v3.12	MemoryMapped(0xB,0x
02	00050023	B	X	X	1	1	Broadcom 10 Gigabit Ethernet Driver	MemoryMapped(0xB,0x

`pci-i <path>`

Use `pci-i <path>` to find vendor information.

```
00 02 00 00 ==> Mass Storage Controller - RAID controller
Vendor 103C Device 323A Prog Interface 0
```

UEFI

UEFI is an OS and platform-independent boot and preboot interface. UEFI resides between the OS and platform firmware, allowing the OS to boot without having details about the underlying hardware and firmware. UEFI supports boot devices, uses a flat memory model, and hides platform and firmware details from the OS.

NOTE: Unified EFI Forum, Inc. defines the specification used to implement UEFI. POSSE is an HP extension to UEFI, which provides a common user interface architecture to better serve HP customers, service, and manufacturing.

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

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

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

The UEFI boot manager allows you to control the server 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 server blade. For example, you can boot to the UEFI shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance Manager.

UEFI Shell and HP POSSE commands

For more information on these commands, enter `help command` at the UEFI Shell prompt.

Table 15 UEFI Shell Commands

UEFI Shell Command	Definition
?	Displays the UEFI Shell command list or verbose command help
alias	Displays, creates, or deletes UEFI Shell aliases
attrib	Displays or changes the attributes of files or directories
autoboot	Set/View autoboot timeout and retries
bcfg	Display/Modify the driver/boot configuration
boottest	Turn specific speedyboot bits on or off
cd	Displays or changes the current directory
cls	Clears standard output and optionally changes background color
comp	Compares the contents of two files
conconfig	Configure consoles and set/view primary operating system console
connect	Connects one or more UEFI drivers to a device

Table 15 UEFI Shell Commands *(continued)*

UEFI Shell Command	Definition
cp	Copies one or more files or directories to another location
cpuconfig	Deconfigure/Reconfigure processor sockets and threads
date	Displays or changes the current system date
dblk	Displays one or more blocks from a block device
dbprofile	Manage direct boot profiles
default	Set default values
devices	Displays the list of devices managed by UEFI drivers
devtree	Displays the UEFI Driver Model compliant device tree
dh	Displays UEFI handle information
disconnect	Disconnects one or more UEFI drivers from a device
dmem	Displays the contents of memory
dmpstore	Displays, saves, loads or deletes all UEFI NVRAM variables
drivers	Displays the UEFI driver list
drvcfg	Invokes the Driver Configuration Protocol
drvdiag	Invokes the Driver Diagnostics Protocol
echo	Controls batch file command echoing or displays a message
edit	Full screen editor for ASCII or UNICODE files
eficompress	Compress a file
efidecompress	Decompress a file
errdump	View/Clear logs
exit	Exits the UEFI Shell environment
for	Executes commands for each item in a set of items
ftp	Perform FTP operation
goto	Forces batch file execution to jump to specified location
guid	Displays all registered UEFI GUIDs
help	Displays the UEFI Shell command list or verbose command help
hexedit	Full screen hex editor
if	Executes commands in specified conditions
ifconfig	Modify the default IP address of UEFI network stack
info	Display hardware information
input	Take user input and place in UEFI variable
ioconfig	Deconfigure/Reconfigure IO components or settings
lanaddress	Display LAN devices
lanboot	LAN boot
load	Loads and optionally connects one or more UEFI drivers
loadpcirom	Loads a PCI Option ROM

Table 15 UEFI Shell Commands *(continued)*

UEFI Shell Command	Definition
ls	Displays a list of files and subdirectories in a directory
map	Displays or defines mappings
memconfig	Set/View memory configuration settings
memmap	Displays the memory map
mkdir	Creates one or more directories
mm	Displays or modifies MEM/MMIO/IO/PCI/PCIE address space
mode	Displays or changes the console output device mode
mount	Mounts a file system on a block device
mv	one or more files or directories to another location
openinfo	Displays the protocols and agents associated with a handle
palproc	Make a PAL procedure call
pause	Prints a message and waits for keyboard input
pci	Displays PCI device list or PCI function configuration space
ping	Ping a target machine with UEFI network stack
reconnect	Reconnects one or more UEFI drivers to a device
reset	Resets the system
rm	Deletes one or more files or directories
salproc	Make a SAL procedure call
secconfig	View/configure system security features
sermode	Sets serial port attributes
set	Displays or modifies UEFI Shell environment variables
setsize	Set the size of a file
shift	Shifts batch file input parameter positions
smbiosview	Displays SMBIOS information
stall	Stalls the processor for the specified number of microseconds
tapeboot	Boot from tape
tftp	Perform TFTP operation
time	Displays or changes the current system time
timezone	Displays or sets time zone information
touch	Updates filename timestamp with current system date and time
type	Displays file contents
unload	Unloads a UEFI driver
ver	Displays UEFI Firmware version information
vol	Displays or changes a file system volume label
xchar	Turn on/off extended character features

Drive paths in UEFI

Devices in the server blade are represented by device paths in the UEFI shell. Each internal SAS drive could be configured either as:

- RAID mode
- HBA (raw) mode

NOTE: A SAS drive in RAID mode is identified by "Scsi" in the device path A SAS drive in HBA mode is identified by "SAS" in the device path.

NOTE: Unlike parallel SCSI, you cannot correlate UEFI device paths to internal SAS disk drive bays with SAS regardless of RAID/HBA mode. The UEFI device paths currently do not contain any information that could be used to determine the physical location of the drives.

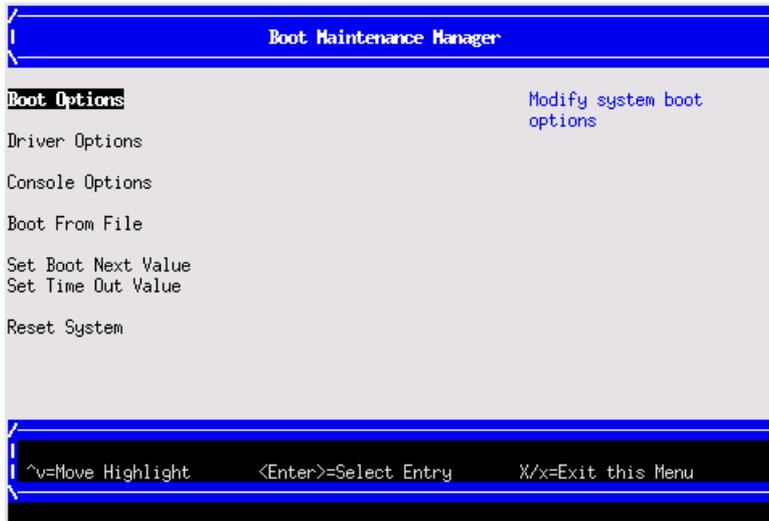
Device	Path format	Path example
PCIe root bridge device path node	UID	PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0) (RAID mode)
		PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/SAS(0x5000C500037688B9,0x0,0x1,NoTopology,0,0,0,0x0) (HBA mode)
Hard drive partition device path	HD (Partition,Type,Signature)	PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/Scsi(0x0,0x0)/HD(1,GPT,27C34F01-9F1E-11DE-A0BB-AA000400FEFF) (RAID mode)
		PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0)/SAS(0x5000C500037688B9,0x0,0x1,NoTopology,0,0,0,0x0)/HD(1,GPT,27C34F01-9F1E-11DE-A0BB-AA000400FEFF) (HBA mode)
CD-ROM / DVD-ROM partition device path	CDROM(Entry)	PcieRoot(0x30304352)/Pci(0x1D,0x7)/USB(0x3,0x0)/CDROM(0x1)

NOTE: Everything after "Scsi" or "SAS" in the output can vary because each SAS drive/partition is unique

Using the Boot Maintenance Manager

This menu allows you to change various boot options. The Boot Maintenance Manager Contains the following submenus:

- Boot Options
- Driver Options
- Console Options
- Boot From File
- Set Boot Next Value
- Set Time Out Value
- Reset System



Boot Options

the Boot Options menu contains the following options:

- Add Boot Option
- Delete Boot Option
- Change Boot Order



Add Boot Option

Use this option to add items to the Boot Options list.

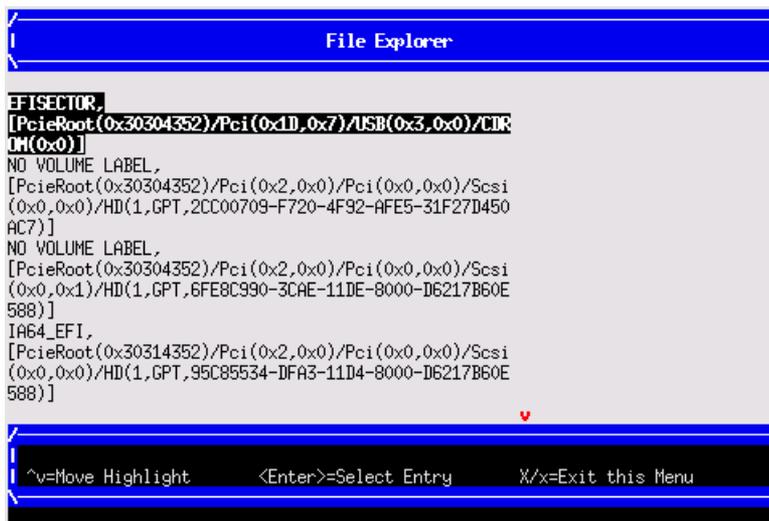
To add a boot option:

1. Select a boot device type.



2. Use the File Explorer menu to locate the correct boot device.

NOTE: File Explorer will load with the appropriate devices for the selected boot device.

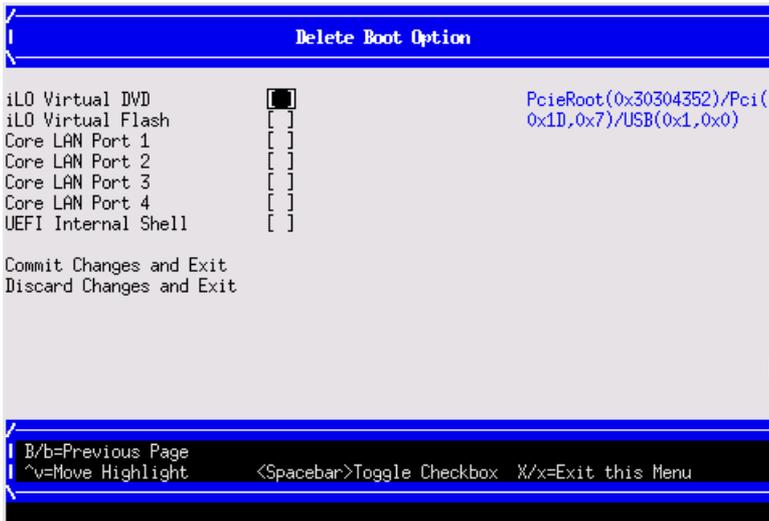


Delete Boot Option

Use this option to remove boot options from the Boot Options list.

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

To remove items from the boot list:



1. Press **spacebar** to toggle the checkbox for each boot options that you want to delete.
2. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

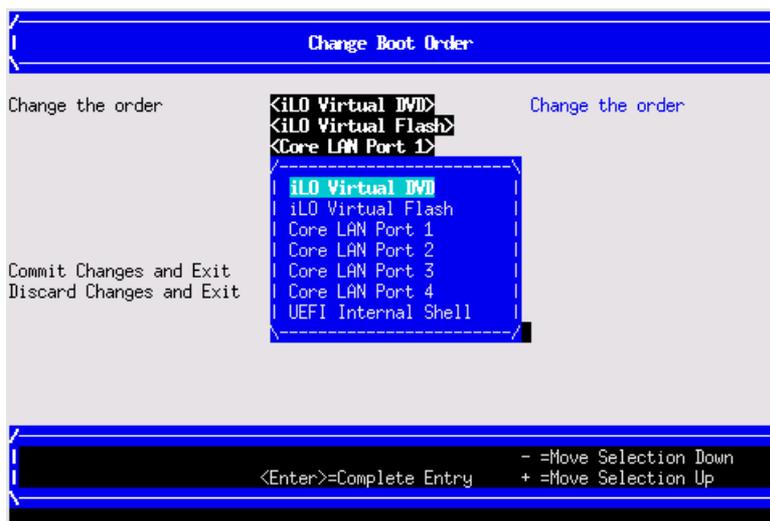
Change Boot Order

Use this option to change the order of boot options. If the first boot option fails, the server 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.

To change the boot order:

1. Select an item on the boot order list.
2. Using the + and - keys, move the selection to the desired position in the boot order list.



3. Press **Enter** when the item is in the desired position.
4. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

Driver Options

The Driver Options menu contains the following options:

- Add Driver Option
- Delete Driver Option
- Change Driver Order

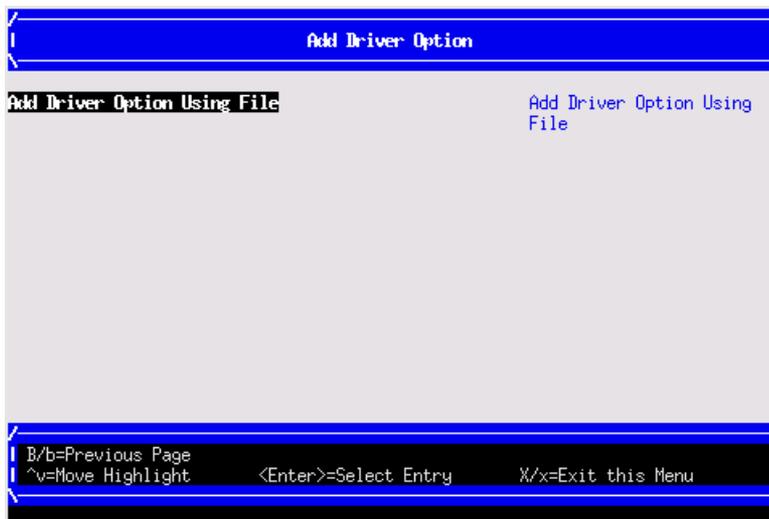


Add Driver Option

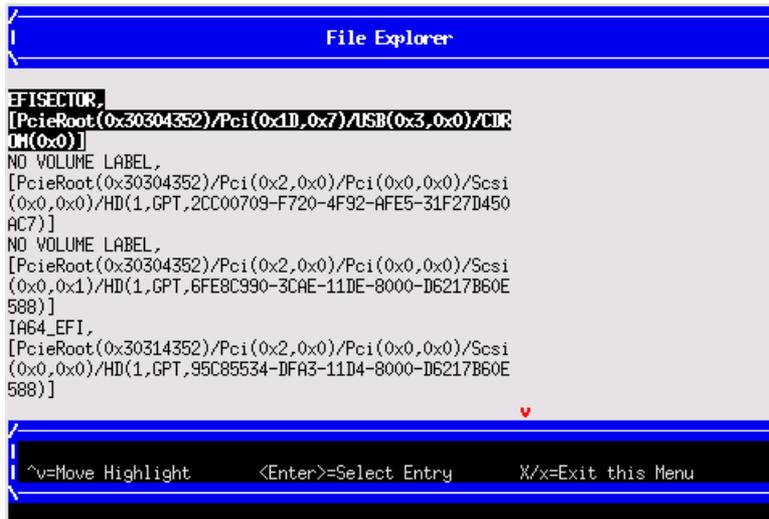
Use this option to add driver options.

To add a driver option:

1. Select **Add Driver Using File**.



2. Use the File Explorer menu to locate the correct driver.



Delete Driver Option

Use this option to remove driver options.

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

To remove driver options:

1. Press **spacebar** to toggle the checkbox for each driver that you want to delete.
2. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

Change Driver Order

Use this option to change the load order of driver options.

To change the driver load order:

1. Select an item on the driver list.
2. Using the **+** and **-** keys, move the selection to the desired position in the boot order list.
3. Press **Enter** when the item is in the desired position.
4. Select **Commit Changes and Exit** to save the new settings and return to the Boot Maintenance Manager.

Console Options

The Console Options menu is not currently supported. Use the `conconfig` command from the UEFI Shell to set console options.

Boot From 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.

1. Select a boot device type.



2. Use the File Explorer menu to locate the correct driver or file.

Set Boot Next Value

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 server boot settings.

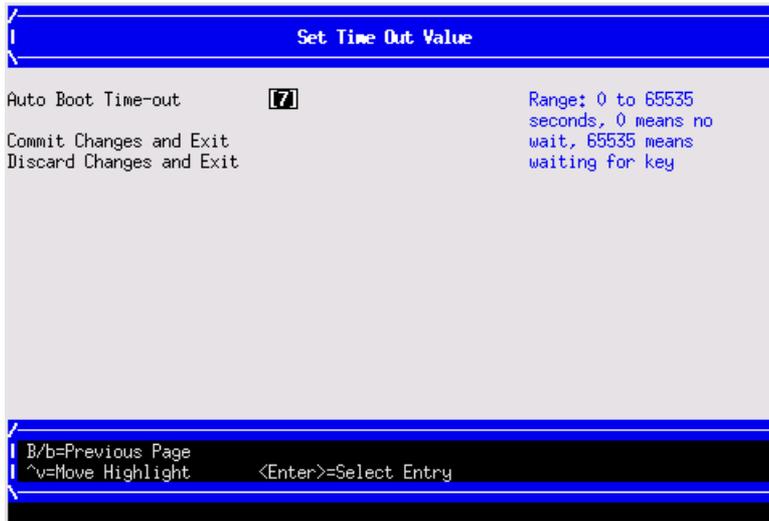


Set Time Out Value

Use this option to set the amount of time the server pauses before attempting to launch the first item in the Boot Options list.

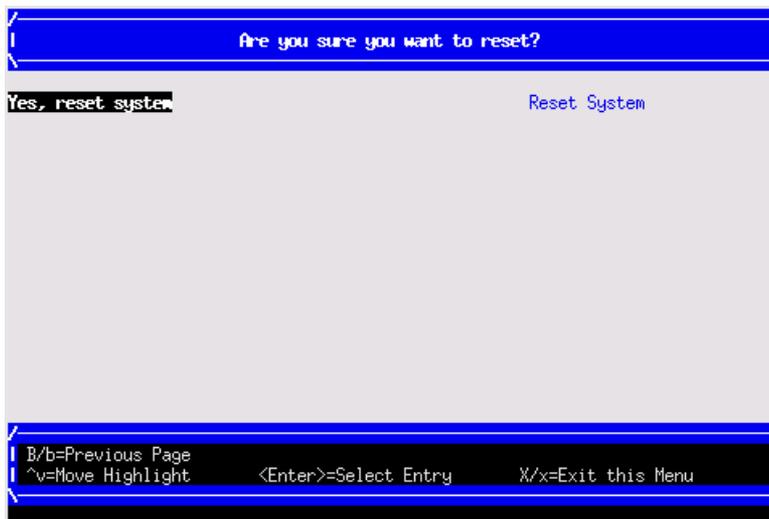
Interrupting the timeout during the countdown stops the Boot Manager from loading any boot options automatically. If there is no countdown, boot options must be selected manually.

To set the auto boot timeout value, in seconds, select Set Timeout Value and enter the desired value.



Reset System

Use this option to perform a system reset.



iLO 3 MP

The iLO 3 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 3 MP controls power, reset, ToC capabilities, provides console access, displays and records system events, and displays detailed information about the various internal subsystems. The iLO 3 MP also provides a virtual front panel used to monitor server status and the state of front panel LEDs. All iLO 3 MP functions are available through the LAN and the local RS-232 port.

The iLO 3 MP is available whenever the server is connected to a power source, even if the server main power switch is off.

Access to the iLO 3 MP can be restricted by user accounts. User accounts are password protected and provide a specific level of access to the server and MP commands.

For more information regarding the iLO 3 MP, see the *HP Integrity iLO 3 Operations Guide*.

Index

A

- access panel
 - removing, 113
 - replacing, 65, 113
- adding Windows to the boot options list, 37
- antistatic wrist strap, 13
- autoboot, 32

B

- battery mounting bracket
 - parts, 54
- Blade Link, 125
 - installing, 22
 - LEDs, 96
 - removing, 110
 - replacing, 111
- boot option
 - add, 143
 - change boot order, 145
 - delete, 144
 - Set Boot Next Value, 148
- boot option maintenance manager menu, 142
- boot options list, 32
 - add HP-UX, 32
 - adding Windows, 37
- booting
 - from file, 147
 - HP-UX (LVM maintenance mode), 34
 - HP-UX (UEFI boot manager), 33
 - HP-UX (UEFI Shell), 34
 - HP-UX in single-server mode, 34
 - OpenVMS, 36
 - OpenVMS (UEFI boot manager), 36
 - UEFI boot manager, 139
 - Windows, 39

C

- c-Class enclosure *see* enclosure
- checking the inventory, 14
- commands
 - saupdate, 133
- component locations, 9
- configure system boot options, 32
- configuring system boot options, 32
- confirming the packing slip, 14
- cooling subsystem, 105
- CPU
 - removing, 118
- customer replaceable unit (CRU), 108

D

- damaged equipment, 14
- diagnostics, 100
 - general diagnostic tools, 100
 - IPMI event decoder, 100

- MCA analyzer, 100
 - offline, 100
- dimensions of server blade, 10
- DIMM baffle
 - removing, 115
 - replacing, 115
- DIMMs
 - installation guidelines, 49
 - load order, 49
 - overview, 116
 - removing, 116
 - slot locations, 51, 116
- disk drive backplane *see* SAS backplane
- disk drive blank
 - removing, 114
 - replacing, 114
- disk drives
 - removing, 115
- drive paths, 142
- driver option
 - add, 146
 - delete, 147
 - driver boot order, 147
- drvcfg
 - CTRL ID, 134
 - Driver ID, 134

E

- EFI *see* UEFI
- enclosure, 10, 11, 105
 - general information, 10
 - interconnect mapping, 19
 - interconnect modules, 18
 - LAN ports, 18
- error logs, 101–105

F

- fault management, 101
- field replaceable unit (FRU), 108
- firmware
 - install, 106
 - MP, 105
 - OA, 69
 - server blade, 68
 - troubleshooting, 105
 - updates, 29
 - upgrades, 68
 - VCM, 71
 - verify, 106
- forward progress log, 101
- front panel
 - LEDs, 93
 - port, 92

H

- hard disk drive *see* SAS disk drive

- HDD *see* SAS disk drive
- HDD backplane *see* SAS backplane
- heatsink module
 - installing, 44
 - removing, 118
- HP Smart Array P700m/512 Controller, 53, 62
 - 512MB cache module
 - removal, 60
 - replacment, 56
 - battery kit, 53
 - battery mounting bracket, 54
 - removal, 60
 - replacment, 57
 - BBWC battery
 - removal, 61
 - replacment, 58
 - controller board
 - installation, 55
- HP Smart Update Manager, 29
- HP-UX
 - booting in LVM maintenance mode, 34
 - booting in single-user mode, 34
 - Fault Management, 101
 - shutting down, 34
 - standard boot, 33
- HP-UX Ignite, 29
- HPSUM *see* HP Smart Update Manager

I

- I/O subsystem, 123
- ICH Mezzanine board
 - removing, 124
 - replacing, 124
- iLO 3 MP, 149
 - accessing UEFI from, 26
 - event log, 102
- inspecting the shipping container, 14
- installation order
 - processors, 105
- installing
 - Blade Link, 22
 - heatsink module, 44
 - operating system with Ignite-UX, 31
 - operating system with vMedia, 31
 - processor, 44
 - SAS backplane, 121
 - SAS disk drives, 42
 - server battery, 122
 - server blade into enclosure, 15, 20
- installing components, 43
- integrated Lights-Out Management Processor *see* iLO 3 MP

L

- LEDs
 - front panel, 93, 95, 96
 - SAS disk drive, 95
- load order
 - processors, 105

- Logical drive
 - creating, 136
 - deleting, 137

M

- MAC addresses
 - Portable Image, 84
- Management Processor *see* iLO 3 MP
- memory *see* DIMMs

N

- NICs
 - locations on enclosure, 19
- NVRAM configuration utility, 28

O

- OpenVMS
 - booting (UEFI boot manager), 36
 - shutting down, 37
- operating system
 - installation, 30
 - installing with Ignite-UX, 31
 - installing with vMedia, 31
 - supported, 30
- ORCA, 135, 136, 137, 138

P

- PI
 - Post-upgrade, 85
 - Pre-upgrade, 85
- point-of-load voltage rails
 - specifications, 13
- ports
 - front panel, 92
 - rear panel, 93
- power button, 22, 110
- power subsystem
 - specifications, 13
- powering off, server blade, 22, 110
- powering on
 - default, automatically, 21, 22
 - server blade, 21, 22
- processor
 - installing, 44
 - load order, 105

R

- RAID, 136, 137
 - configuration, 135
 - using ORCA, 135
- rear panel
 - ports, 93
- removing
 - access panel, 43
 - Blade Link, 110
 - CPU, 118
 - DIMM baffle, 115
 - DIMMs, 116
 - disk drive blank, 114

- ICH Mezzanine board, 124
 - replacing, 111
- SAS backplane, 121
- SAS disk drive, 115
- server battery, 122
- server blade access panel, 113
- server blade from enclosure, 113
- replacing
 - access panel, 65
 - DIMM baffle, 115
 - disk drive blank, 114
 - ICH Mezzanine board, 124
 - removing, 118
 - SAS backplane, 121
 - server battery, 122
 - server blade access panel, 113
- returning a damaged server blade, 14

S

- safety information, 13
- SAS backplane
 - removing, 121
 - replacing, 121
- SAS disk drives
 - LEDs, 95
 - mirroring, 115
 - removing, 115
 - slot locations, 114
- saupdate, 133, 134
 - firmware updates, 134
 - get_mode, 133
 - set_mode, 134
- server battery
 - removing, 122
 - replacing, 122
- server blade
 - , 22
 - access panel, 43, 65
 - components, 9
 - dimensions, 10
 - enclosure interconnect mapping, 19
 - front view, 92
 - LEDs, 95
 - overview, 8
 - powering off, 110
 - powering on, 21, 22
 - rear panel connectors, 93
 - rear view, 93
 - removing access panel, 113
 - removing from enclosure, 113
 - replacing the access panel, 113
 - returning a damaged server blade, 14
 - servicing, 110
 - unpacking, 14
 - weight, 10
- servicing the server blade, 110
- shipping damage, 14
- shutting down
 - HP-UX, 34

- OpenVMS, 37
- Windows, 39
 - Windows from the command line, 40
- site inspection checklist, 11
- site preparation, 14
- slot locations
 - DIMMs, 116
 - SAS disk drives, 114
- Smart Array, 138
 - P700m/512 Controller, 53, 62
- Smart Array Controller
 - firmware updates, 134
 - saupdate, 133
- status log, 104
- support tools
 - offline, 100
- SUV cable, 99
- SUV cable port, 92
- system boot options, 32
- system event log, 87, 101, 104

T

- troubleshooting
 - basic, 88
 - environment, 106
 - methodology, 88
 - MP firmware, 105
 - overview, 87
 - processors, 105
 - system console, 106

U

- UEFI
 - accessing from iLO 3 MP, 26
 - commands, 138, 139
 - drive paths, 142
 - Front Page, 27
 - saving configuration settings, 28
- Unified Extensible Firmware Interface *see* UEFI
- unpacking the server blade, 14
- upgrades, 66, 73
 - adding resources, 73
 - firmware, 68
 - firmware versions, 68
 - kit contents, 66
 - licenses, 81
 - OS reinstall, 82
 - procedure summary, 66
 - support, 80
 - supported operating systems, 67
 - warranty registration, 79

V

- virtual power button, 22, 110
- vMedia, 31

W

- weight of server blade, 10
- Windows

booting, 39
shutting down, 39
shutting down from the command line, 40
Special Administration Console, 39
wrist strap, antistatic, 13

Index

- A**
 - access panel
 - removing, 113
 - replacing, 65, 113
 - adding Windows to the boot options list, 37
 - antistatic wrist strap, 13
 - autoboot, 32
- B**
 - battery mounting bracket
 - parts, 54
 - Blade Link, 125
 - installing, 22
 - LEDs, 96
 - removing, 110
 - replacing, 111
 - boot option
 - add, 143
 - change boot order, 145
 - delete, 144
 - Set Boot Next Value, 148
 - boot option maintenance manager menu, 142
 - boot options list, 32
 - add HP-UX, 32
 - adding Windows, 37
 - booting
 - from file, 147
 - HP-UX (LVM maintenance mode), 34
 - HP-UX (UEFI boot manager), 33
 - HP-UX (UEFI Shell), 34
 - HP-UX in single-server mode, 34
 - OpenVMS, 36
 - OpenVMS (UEFI boot manager), 36
 - UEFI boot manager, 139
 - Windows, 39
- C**
 - c-Class enclosure *see* enclosure
 - checking the inventory, 14
 - commands
 - saupdate, 133
 - component locations, 9
 - configure system boot options, 32
 - configuring system boot options, 32
 - confirming the packing slip, 14
 - cooling subsystem, 105
 - CPU
 - removing, 118
 - customer replaceable unit (CRU), 108
- D**
 - damaged equipment, 14
 - diagnostics, 100
 - general diagnostic tools, 100
 - IPMI event decoder, 100
 - MCA analyzer, 100
 - offline, 100
 - dimensions of server blade, 10
 - DIMM baffle
 - removing, 115
 - replacing, 115
 - DIMMs
 - installation guidelines, 49
 - load order, 49
 - overview, 116
 - removing, 116
 - slot locations, 51, 116
 - disk drive backplane *see* SAS backplane
 - disk drive blank
 - removing, 114
 - replacing, 114
 - disk drives
 - removing, 115
 - drive paths, 142
 - driver option
 - add, 146
 - delete, 147
 - driver boot order, 147
 - drvcfg
 - CTRL ID, 134
 - Driver ID, 134
- E**
 - EFI *see* UEFI
 - enclosure, 10, 11, 105
 - general information, 10
 - interconnect mapping, 19
 - interconnect modules, 18
 - LAN ports, 18
 - error logs, 101–105
- F**
 - fault management, 101
 - field replaceable unit (FRU), 108
 - firmware
 - install, 106
 - MP, 105
 - OA, 69
 - server blade, 68
 - troubleshooting, 105
 - updates, 29
 - upgrades, 68
 - VCM, 71
 - verify, 106
 - forward progress log, 101
 - front panel
 - LEDs, 93
 - port, 92
- H**
 - hard disk drive *see* SAS disk drive

- HDD see SAS disk drive
- HDD backplane see SAS backplane
- heatsink module
 - installing, 44
 - removing, 118
- HP Smart Array P700m/512 Controller, 53, 62
 - 512MB cache module
 - removal, 60
 - replacment, 56
 - battery kit, 53
 - battery mounting bracket, 54
 - removal, 60
 - replacment, 57
 - BBWC battery
 - removal, 61
 - replacment, 58
 - controller board
 - installation, 55
- HP Smart Update Manager, 29
- HP-UX
 - booting in LVM maintenance mode, 34
 - booting in single-user mode, 34
 - Fault Management, 101
 - shutting down, 34
 - standard boot, 33
- HP-UX Ignite, 29
- HPSUM see HP Smart Update Manager

I

- I/O subsystem, 123
- ICH Mezzanine board
 - removing, 124
 - replacing, 124
- iLO 3 MP, 149
 - accessing UEFI from, 26
 - event log, 102
- inspecting the shipping container, 14
- installation order
 - processors, 105
- installing
 - Blade Link, 22
 - heatsink module, 44
 - operating system with Ignite-UX, 31
 - operating system with vMedia, 31
 - processor, 44
 - SAS backplane, 121
 - SAS disk drives, 42
 - server battery, 122
 - server blade into enclosure, 15, 20
- installing components, 43
- integrated Lights-Out Management Processor see iLO 3 MP

L

- LEDs
 - front panel, 93, 95, 96
 - SAS disk drive, 95
- load order
 - processors, 105

- Logical drive
 - creating, 136
 - deleting, 137

M

- MAC addresses
 - Portable Image, 84
- Management Processor see iLO 3 MP
- memory see DIMMs

N

- NICs
 - locations on enclosure, 19
- NVRAM configuration utility, 28

O

- OpenVMS
 - booting (UEFI boot manager), 36
 - shutting down, 37
- operating system
 - installation, 30
 - installing with Ignite-UX, 31
 - installing with vMedia, 31
 - supported, 30
- ORCA, 135, 136, 137, 138

P

- PI
 - Post-upgrade, 85
 - Pre-upgrade, 85
- point-of-load voltage rails
 - specifications, 13
- ports
 - front panel, 92
 - rear panel, 93
- power button, 22, 110
- power subsystem
 - specifications, 13
- powering off, server blade, 22, 110
- powering on
 - default, automatically, 21, 22
 - server blade, 21, 22
- processor
 - installing, 44
 - load order, 105

R

- RAID, 136, 137
 - configuration, 135
 - using ORCA, 135
- rear panel
 - ports, 93
- removing
 - access panel, 43
 - Blade Link, 110
 - CPU, 118
 - DIMM baffle, 115
 - DIMMs, 116
 - disk drive blank, 114

- ICH Mezzanine board, 124
 - replacing, 111
- SAS backplane, 121
- SAS disk drive, 115
- server battery, 122
- server blade access panel, 113
- server blade from enclosure, 113
- replacing
 - access panel, 65
 - DIMM baffle, 115
 - disk drive blank, 114
 - ICH Mezzanine board, 124
 - removing, 118
 - SAS backplane, 121
 - server battery, 122
 - server blade access panel, 113
- returning a damaged server blade, 14

S

- safety information, 13
- SAS backplane
 - removing, 121
 - replacing, 121
- SAS disk drives
 - LEDs, 95
 - mirroring, 115
 - removing, 115
 - slot locations, 114
- saupdate, 133, 134
 - firmware updates, 134
 - get_mode, 133
 - set_mode, 134
- server battery
 - removing, 122
 - replacing, 122
- server blade
 - , 22
 - access panel, 43, 65
 - components, 9
 - dimensions, 10
 - enclosure interconnect mapping, 19
 - front view, 92
 - LEDs, 95
 - overview, 8
 - powering off, 110
 - powering on, 21, 22
 - rear panel connectors, 93
 - rear view, 93
 - removing access panel, 113
 - removing from enclosure, 113
 - replacing the access panel, 113
 - returning a damaged server blade, 14
 - servicing, 110
 - unpacking, 14
 - weight, 10
- servicing the server blade, 110
- shipping damage, 14
- shutting down
 - HP-UX, 34

- OpenVMS, 37
- Windows, 39
 - Windows from the command line, 40
- site inspection checklist, 11
- site preparation, 14
- slot locations
 - DIMMs, 116
 - SAS disk drives, 114
- Smart Array, 138
 - P700m/512 Controller, 53, 62
- Smart Array Controller
 - firmware updates, 134
 - saupdate, 133
- status log, 104
- support tools
 - offline, 100
- SUV cable, 99
- SUV cable port, 92
- system boot options, 32
- system event log, 87, 101, 104

T

- troubleshooting
 - basic, 88
 - environment, 106
 - methodology, 88
 - MP firmware, 105
 - overview, 87
 - processors, 105
 - system console, 106

U

- UEFI
 - accessing from iLO 3 MP, 26
 - commands, 138, 139
 - drive paths, 142
 - Front Page, 27
 - saving configuration settings, 28
- Unified Extensible Firmware Interface *see* UEFI
- unpacking the server blade, 14
- upgrades, 66, 73
 - adding resources, 73
 - firmware, 68
 - firmware versions, 68
 - kit contents, 66
 - licenses, 81
 - OS reinstall, 82
 - procedure summary, 66
 - support, 80
 - supported operating systems, 67
 - warranty registration, 79

V

- virtual power button, 22, 110
- vMedia, 31

W

- weight of server blade, 10
- Windows

- booting, [39](#)
- shutting down, [39](#)
- shutting down from the command line, [40](#)
- Special Administration Console, [39](#)
- wrist strap, antistatic, [13](#)