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

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Warranty

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

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1 Overview

The HP Integrity BL860c i2 Server Blade is a dense, low-cost, Intel® Itanium® processor server blade. Using a Scaleable 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 CPU Sockets
BL860c i2	1	2
BL870c i2	2	4
BL890c i2	4	8

The three blade configurations support the HP-UX operating system 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 is operational.

Server blade overview

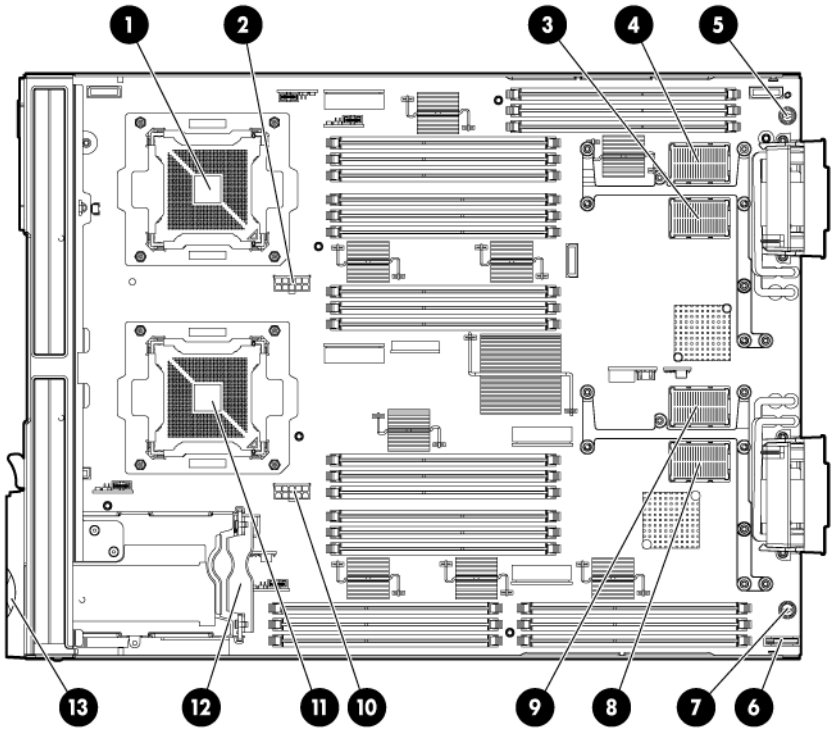
Product	CPU cores (quad)	DIMM slots	max memory	PCIe I/O Mezzanine card capacity	SAS Hard Disk Drives
BL860c i2	8	24	192GB with 8GB DIMMs	3	2
BL870c i2	16	48	384GB with 8GB DIMMS	6	4
BL890c i2	32	96	768GB with 8GB DIMMS	12	8

Server blade dimensions and weight

NOTE: These specifications are for the BL860c i2 Server Blade.

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

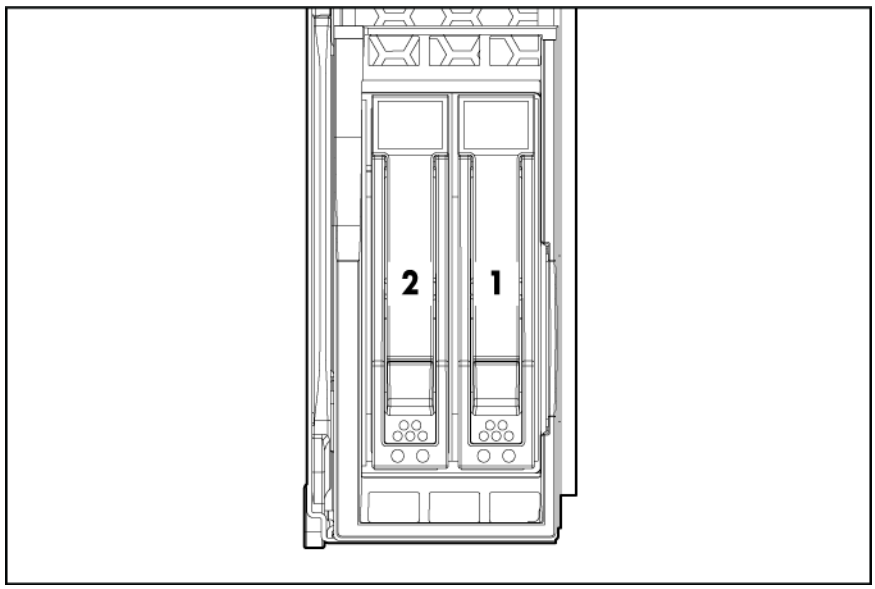
Server blade components



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

SAS 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 16).

SAS disk 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 I^2C signals are routed through this connector as well as the SAS differential pairs and SGPIO signals.

I/O subsystem

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
- 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.

Partner blade support

Partner blade slotting rules are dependent on the conjoined blade configuration. For more information on partner bay blade locations, see "Installing the Scaleable BladeLink" (page 45).

Memory subsystem

The BL860c i2 physical memory subsystem connects two Itanium® processors to two groups of 12 DDR3 DIMMs. Each processor has two memory controllers.

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

For more DIMM information, see "Installing DIMMs" (page 32).

Power subsystem

The power subsystem is located on the system board. Each server blade receives bulk DC voltage from the enclosure. The server blade power block converts the DC voltage from the enclosure to the voltage required by the server blade. The BL860c i2 Server Blade receives 12 V directly from the enclosure. The voltage passes through E-Fuse circuitry that resides in the blade. The 12 V supply is on as long as a power supply is installed in the enclosure. A control line from the enclosure OA can turn the E-Fuse on or off to supply or cut power to the blade. The 12 V gets distributed to various POL converters. The switched POL voltage rails are: 0.9 V, 1.2 V, 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5.0 V, 3.3 V standby, and 5.0 V standby.

Processor and supporting chipset

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

ICH mezzanine card

The ICH mezzanine card houses the following components:

- Intel ICH10 South Bridge
- ATI/AMD RN50/ES1000 Video Controller
- Embedded TPM 1.2
- The internal USB port

One ICH mezzanine card is required per system.

Scaleable BladeLink

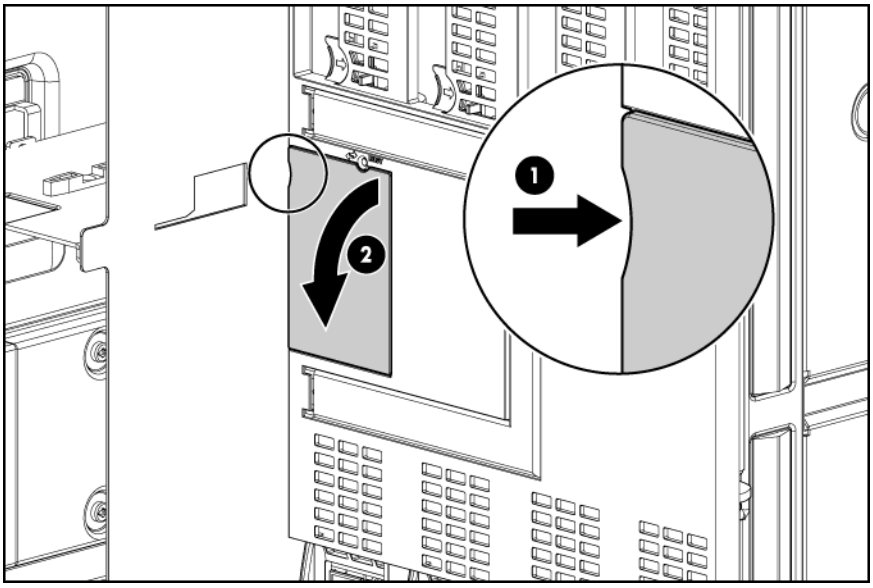
Conjoining server blades using the Scaleable BladeLink enables four (BL870c i2) and eight (BL890c i2) socket server blade variants.

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.

Each Scaleable BladeLink 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 Scaleable BladeLink” (page 45).

Enclosure information

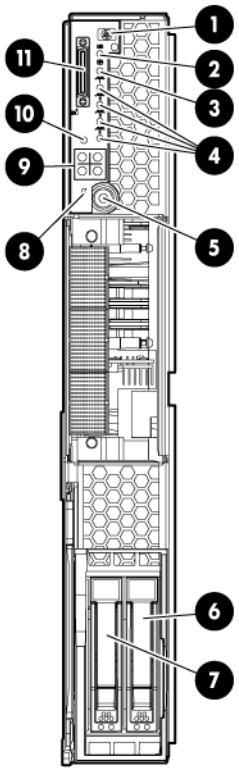
All three blade configurations are supported in c7000 and c3000 Enclosures.

For more enclosure information see:

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

Controls, ports, and LEDs

Front panel view

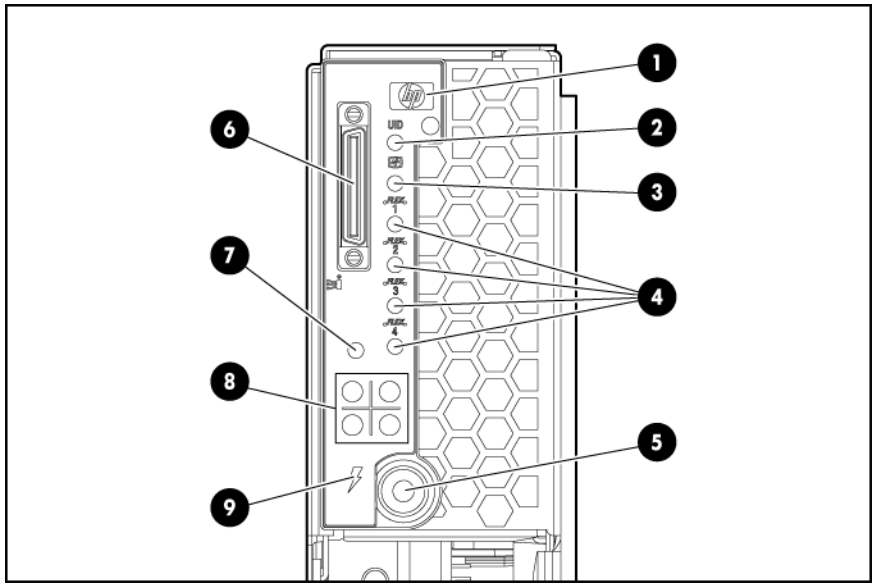


1	Monarch blade indicator	5	Monarch power button	9	Partition Identifier
2	UID LED	6	HDD bay 1	10	Physical Presence Button
3	Blade health LED	7	HDD bay 2	11	SUV connector
4	NICs 1, 2, 3, 4	8	Blade power LED		

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.

Front panel LEDs



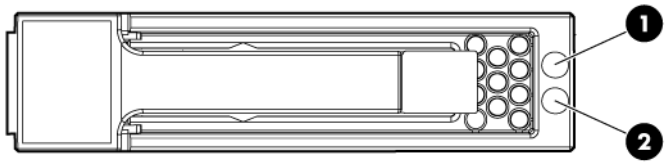
Item	Description	Status
1	Monarch blade indicator	Green = Blade is acting as monarch blade Off = Blade is not monarch or is not conjoined
2	UID LED	Blue = Identified Blue flashing = Active remote management Off = No active remote management
3	Blade health LED	Green = Normal operation Amber flashing =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

Item	Description	Status
9	Blade power LED	Green = Server blade is powered on Amber = standby (auxiliary power available)* Off = Off
	iLO Heartbeat (behind grill)	Green flashing = iLO Active Amber flashing = iLO failure Off = no standby voltage

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

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)

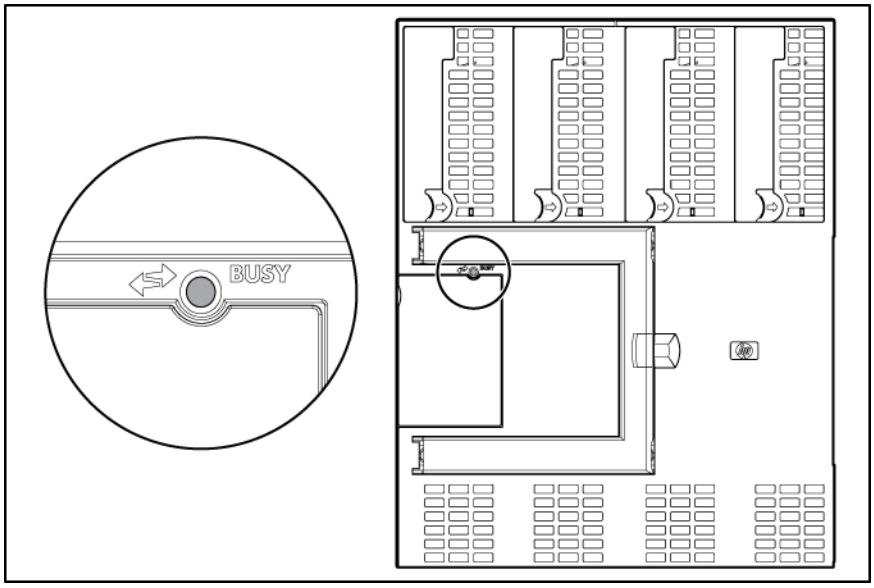
SAS hard drive LED combinations

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.

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
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.
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.

Scaleable BladeLink LEDs



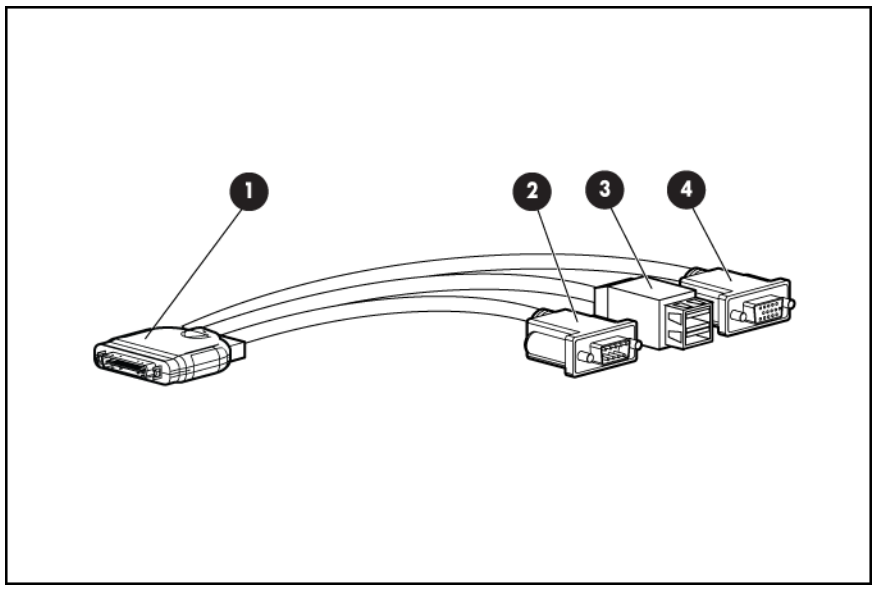
Description	Status
Busy LED	Green = Scaleable BladeLink is currently active. Do not remove. Off = Scaleable BladeLink is not currently active. Safe to remove.

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.

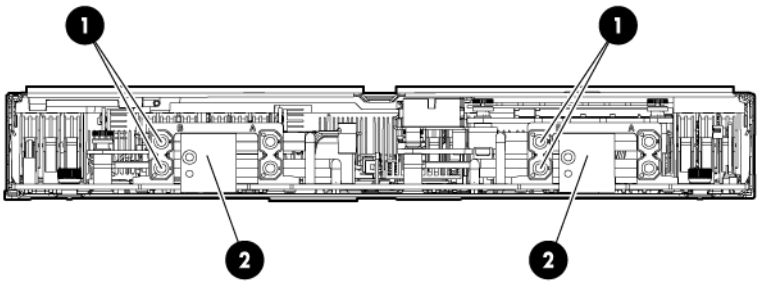
CAUTION: The SUV cable is not designed to be used as a permanent connection.

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

Rear panel view



1 Power connectors
2 GBX signal connectors

2 General site preparation guidelines

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

Enclosure environmental specifications

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

Specification	Value
Temperature range*	
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	28ºC (82.4ºF)
Non-operating	38.7ºC (101.7ºF)
Relative humidity (noncondensing)**	
Operating	20% to 80%
Non-operating	5% to 95%

* 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.

** 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*.

3 Installing the server blade into the enclosure

Safety information

WARNING! 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).
- The throw away strap that ships with HP memory products.

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.

Installation sequence and checklist

Step	Description	Completed
1	Unpack and inspect the server shipping container and then inventory the contents using the packing slip.	
2	Install additional components shipped with the server.	
3	Install and power on the server blade.	
4	Configure iLO MP access.	
5	Access iLO MP.	
6	Access UEFI from iLO MP.	
7	Download latest firmware using HP Smart Update Manager	
8	Install and boot the OS.	

Unpacking and inspecting the server blade

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

Verify 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 Section : "Using iLO" (page 47) for more information.
- Verify electrical requirements. Ensure 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.

Unpack 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.

IMPORTANT: Inspect each carton for shipping damage as you unpack the server blade.

3. Place the server blade on an antistatic pad.

Check 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.

Damaged equipment returns

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.

Installing additional components

If your server blade has no additional components to install, go to "Installing and powering on the server blade" (page 38).

Installing a hot-plug SAS disk drive

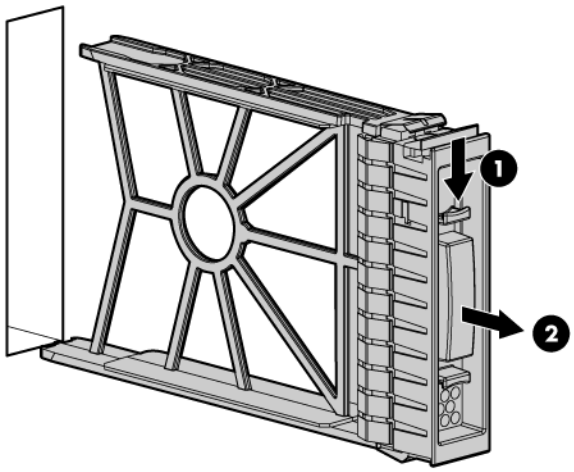
The server blade supports up to two hot-plug SAS drives.

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.

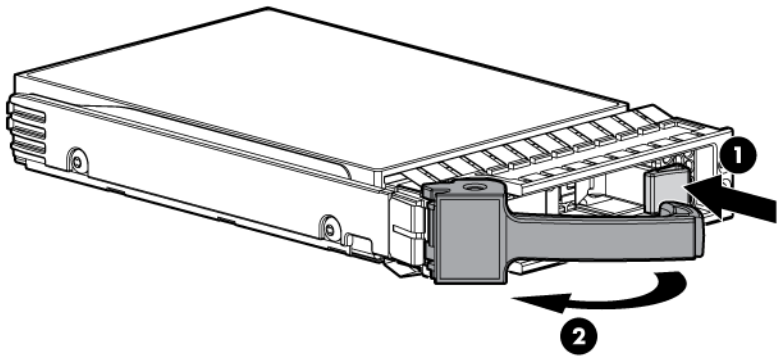
IMPORTANT: The disk drive will not seat properly when 180 degrees out of alignment. Check the orientation before insertion.

NOTE: For a list of supported disk drives for the server blade, see: http://h18004.www1.hp.com/products/blades/components/c-class-storage.html

1. Remove the hard drive blank.

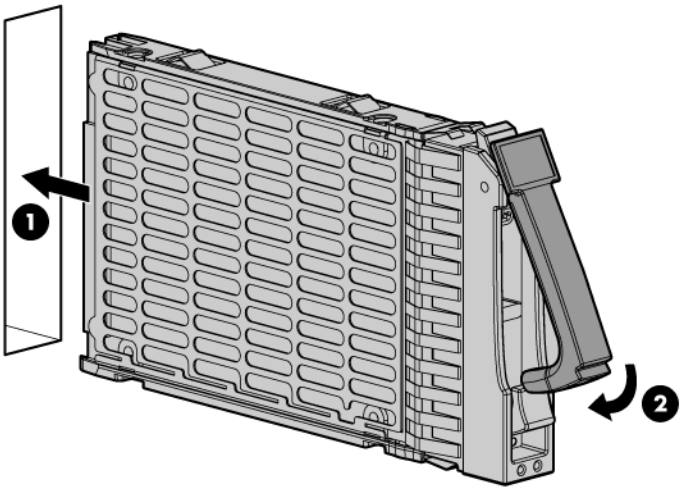


2. Prepare the hard drive.



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. Power down the server blade (“Powering off the server blade”)
2. Remove the server blade. (“Removing the server blade”).
3. Unlock the cam on the access panel latch (if necessary) by turning the lock on the access panel latch counter-clockwise with a Torx T-15 or flathead screwdriver.
4. Pull up on the access panel latch. This causes the access panel to slide back about 2 cm (0.75 in).
5. 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 (“Installing a processor and heatsink module”).
- Add additional memory DIMMs (“Installing DIMMs”).
- Add additional mezzanine cards (“Installing mezzanine cards”).

Installing a 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 BL870 i2 or BL890 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 may 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.

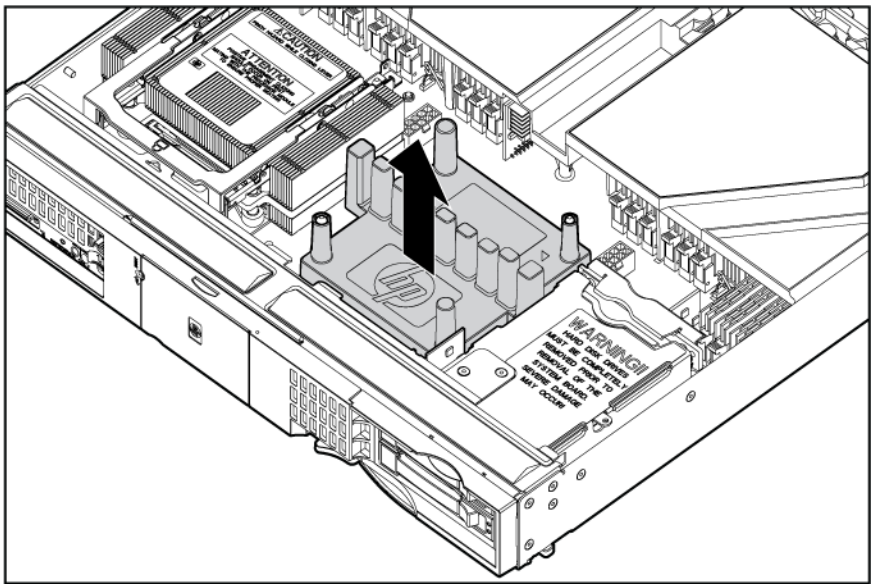
CAUTION: To avoid damage to the processor, handle the processor only by the edges. Do not touch the bottom of the processor, especially the contact area.

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

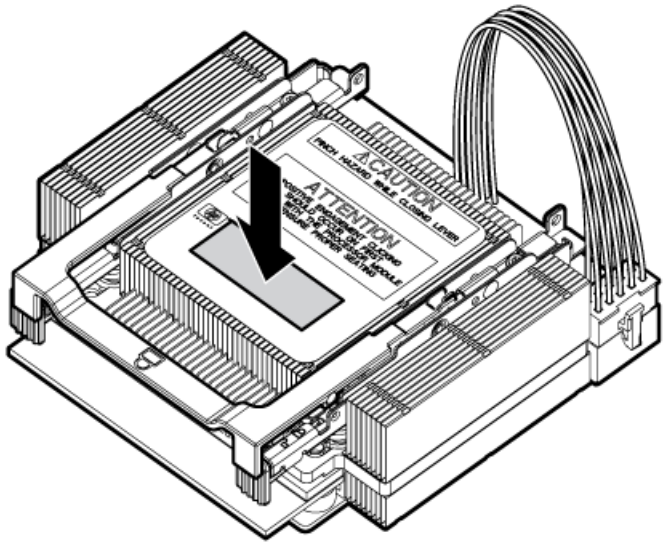
CAUTION: To prevent thermal instability and damage to the server, do not separate the processor from the heatsink after assembling.

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's heatsink.
   a. Remove the duplicate yellow tear-away label that lists the part and serial numbers from the processor module.
   b. Place the label on the top of the heatsink.



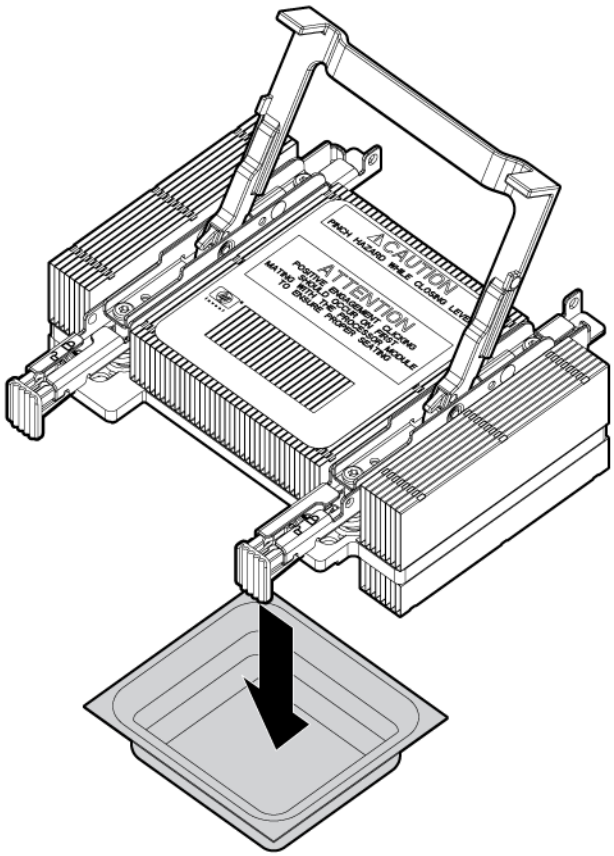
3. Install the processor over the load posts.

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:

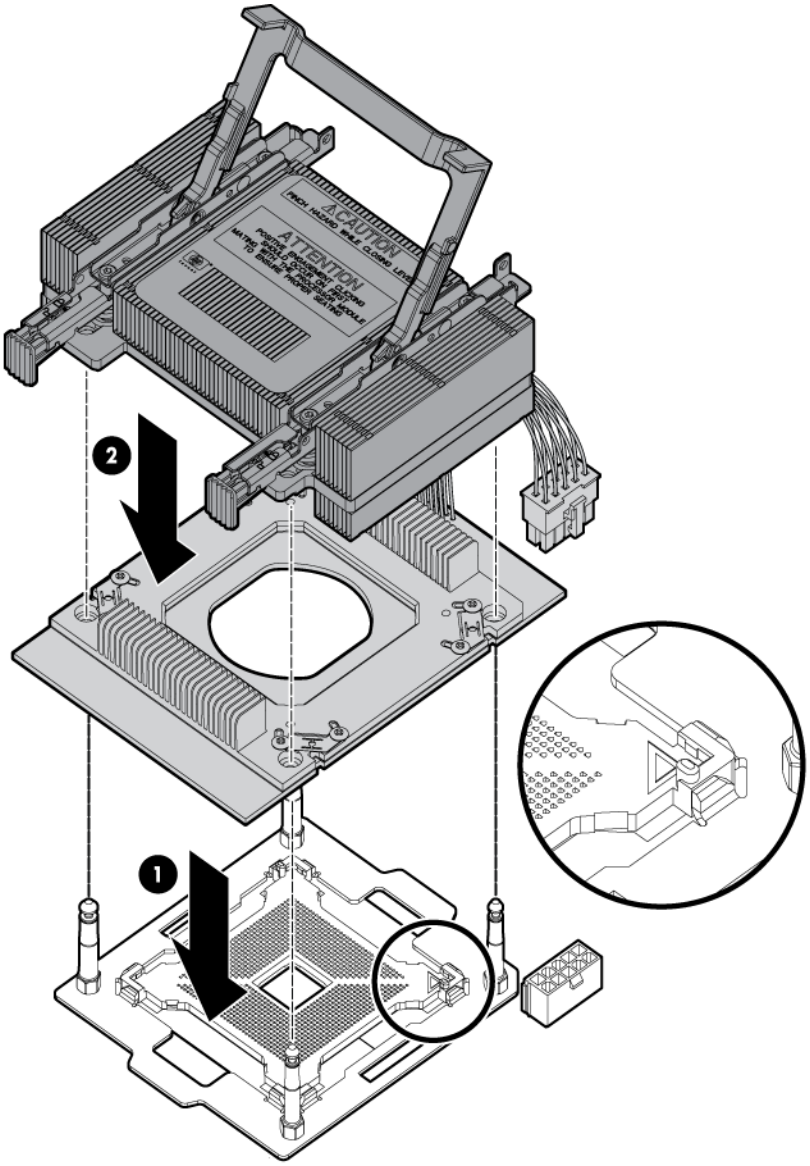
- Do not touch or come into contact with the thermal interface material.
- Immediately install the heatsink.



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



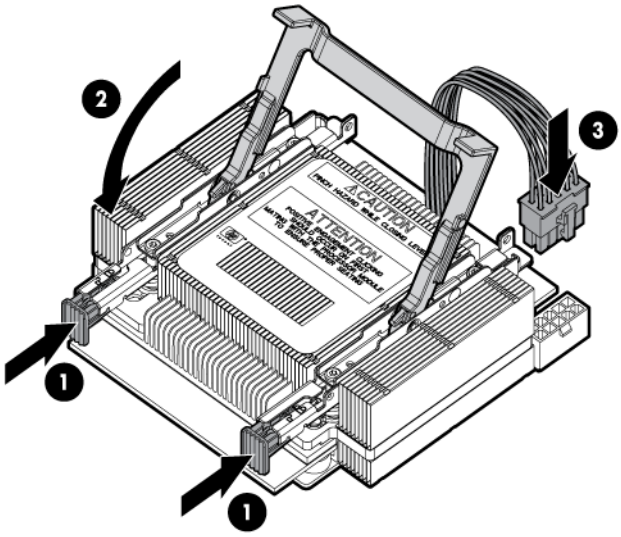
CAUTION: To prevent thermal instability and damage to the server blade, do not separate the processor module from the processor's heatsink after they have been coupled.

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

6. Secure the heatsink to the processor
   a. Slide both plastic locking tabs into place (see callout 1 in the image below).
   b. Flip the latch down (see callout 2 in the image below).

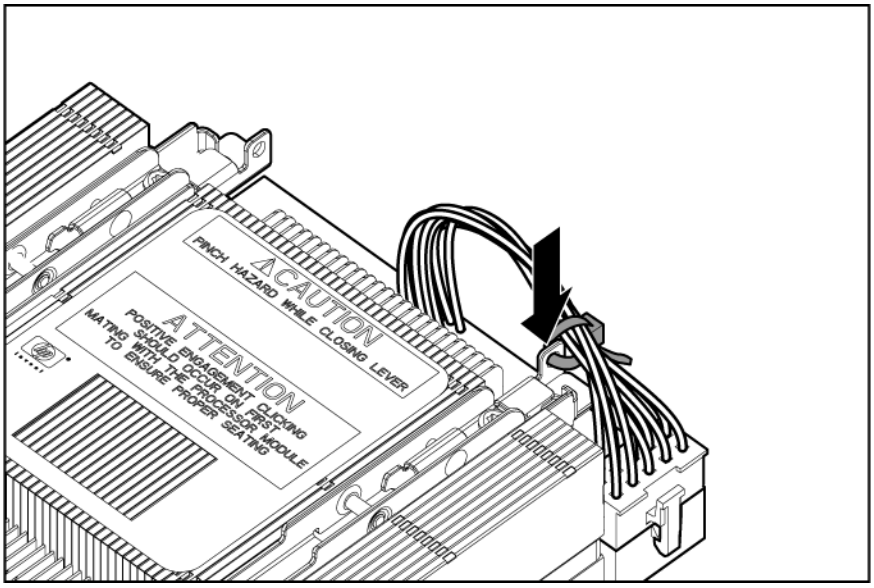
WARNING! The heatsink locking lever can constitute a pinch hazard, keep your hands on top of the lever during installation to avoid personal injury.

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



7. Connect the power cord (see callout 3 in the image above).

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.

NOTE: If you are adding an additional processor to your server blade, the DIMMs in the server blade must be reconfigured to support both CPUs. See "DIMM pair load order" (page 33) for more information.

Installing DIMMs

DIMM installation guidelines

Observe the following guidelines when installing additional memory:

- In a BL860c i2, memory is loaded in pairs.
- In a BL870 i2 or BL890 i2, memory is loaded in quads that alternate between blades.
- Only 2 DIMM sizes can be mixed in a BL870 i2 or BL890 i2.
  - In a BL870c i2, 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, blade configuration, blades 1 and 2 must have one DIMM size and blades 3 and 4 must have the other DIMM size.

DIMM pair load order

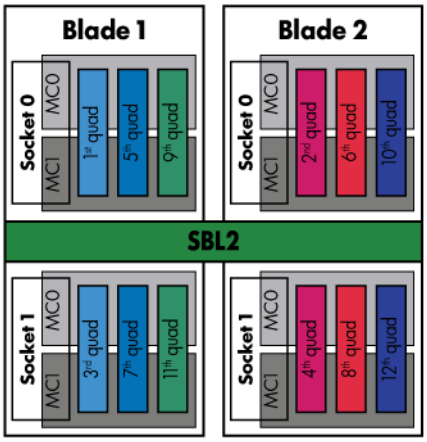


Table 3-1 DIMM pair load order

		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	—	—
	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

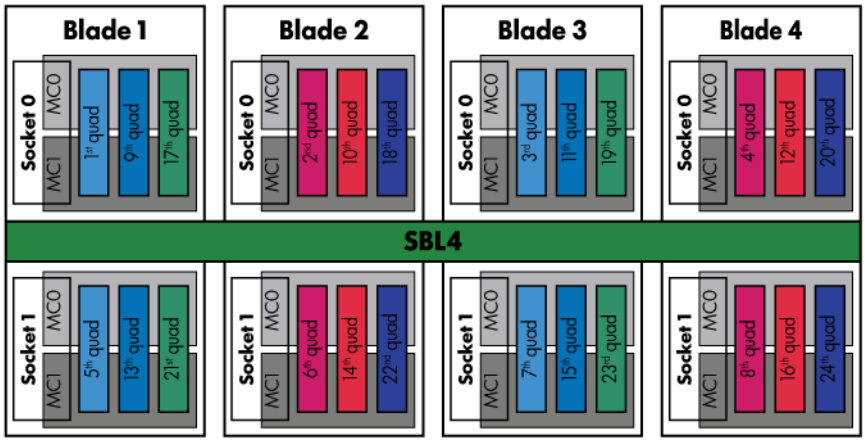
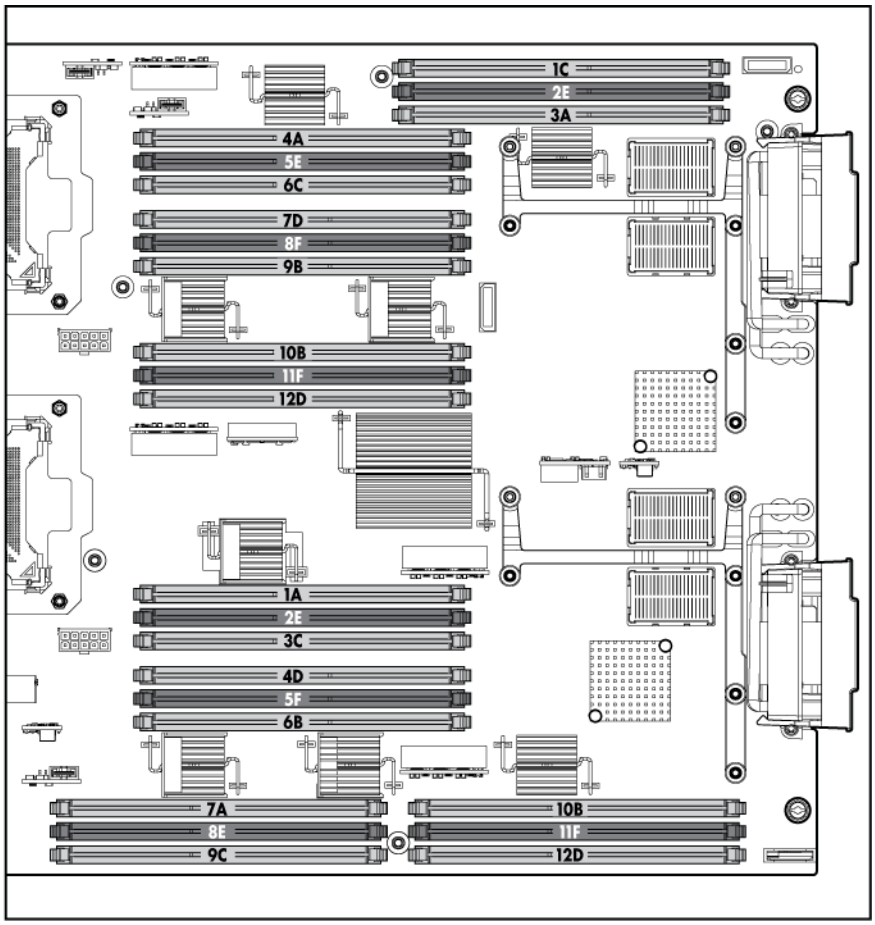


Table 3-2 DIMM quad load order

		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

DIMM locations



To install the DIMMs:

1. Remove the DIMM baffle (“Removing the DIMM baffle”).
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.

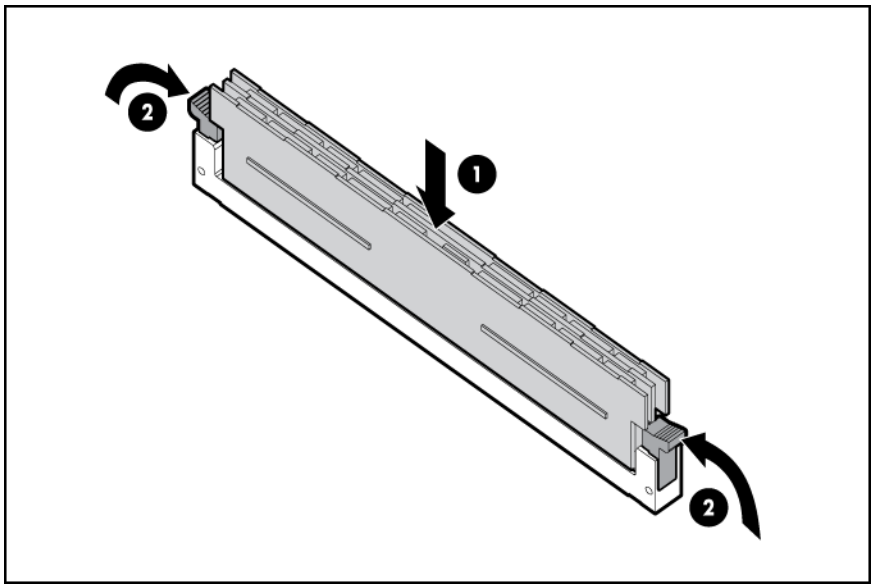
3. Ensure the DIMM slot latches are open.

CAUTION: Use only HP low profile (1.2 in.) 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.



Installing mezzanine cards

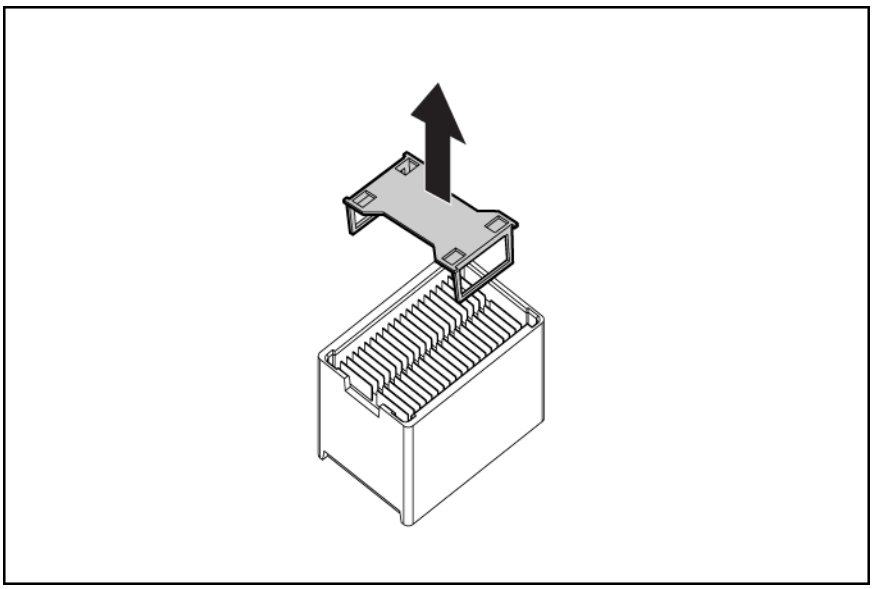
Optional mezzanine cards enable additional network connectivity and provide Fibre Channel support. For mezzanine card locations, see "Server blade components" (page 10).

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.

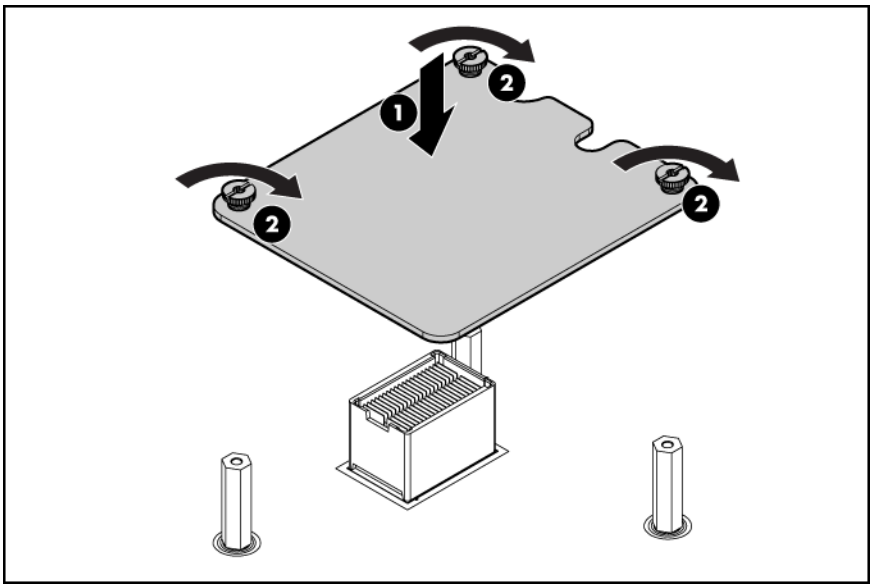
To install a card:

1. Power down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Remove the mezzanine connector cover.



4. Align the mezzanine connector on the option card with the mezzanine connector on the system board.
5. Install the mezzanine card. 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.



6. Install the access panel (“Replacing the access panel”).
7. Install the server blade (“Installing the server blade into the enclosure”).
8. If necessary, install the SBL (“Installing the Scaleable BladeLink”).
9. Power up the server blade (“Powering on the server blade”).

Replacing the access panel

1. Make sure the access panel latch is in the open position (pointing up).
2. Place the access panel onto the server blade by lining up the posts on each side of the access panel with the keyways on the server blade chassis.

3. Slide the access panel toward the front of the server blade, and push down on the access panel latch until it is flush with the access panel.
4. Lock the access panel cam (if necessary) by turning the cam clockwise with the Torx T–15 or flathead screwdriver.

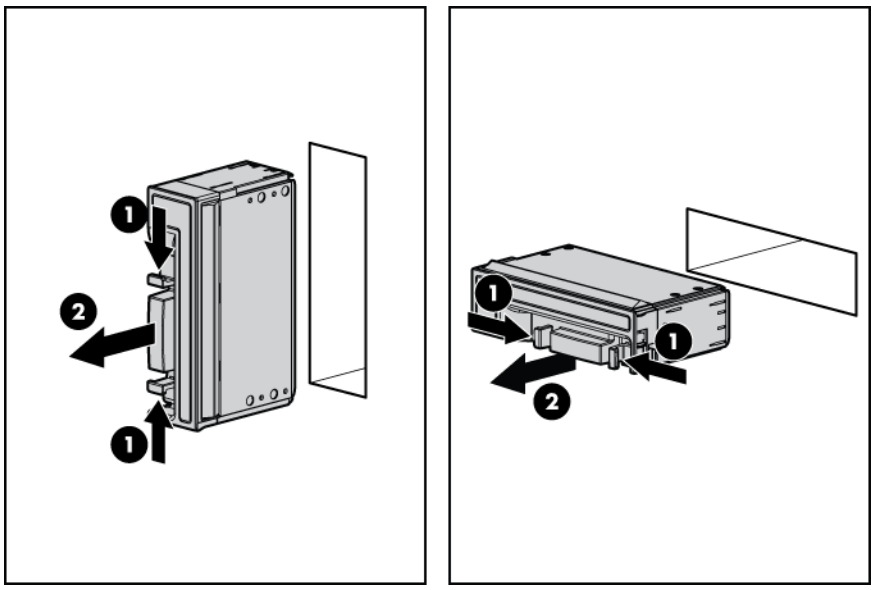
Installing and powering on the server blade

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.

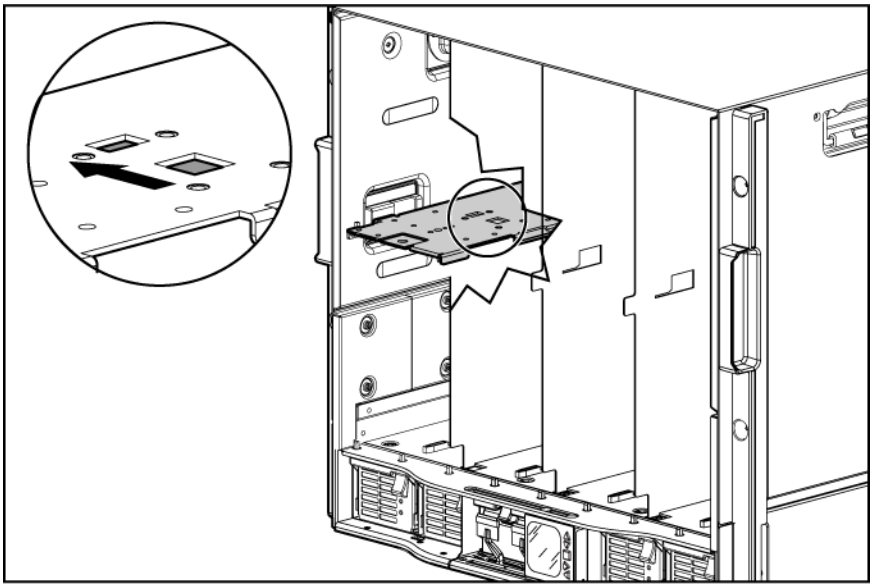
1. Remove the device bay blank.



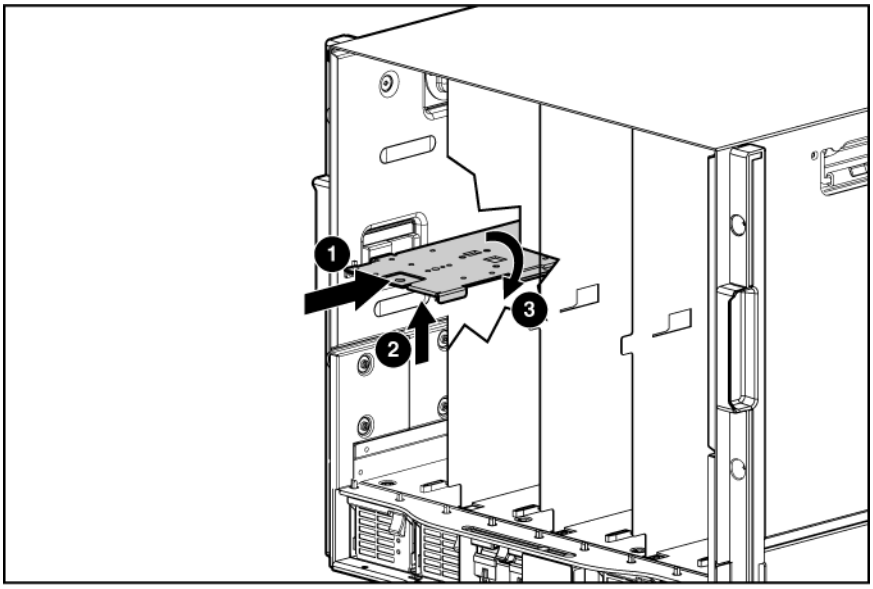
2. Remove the three adjacent blanks.

Removing a c7000 device bay divider

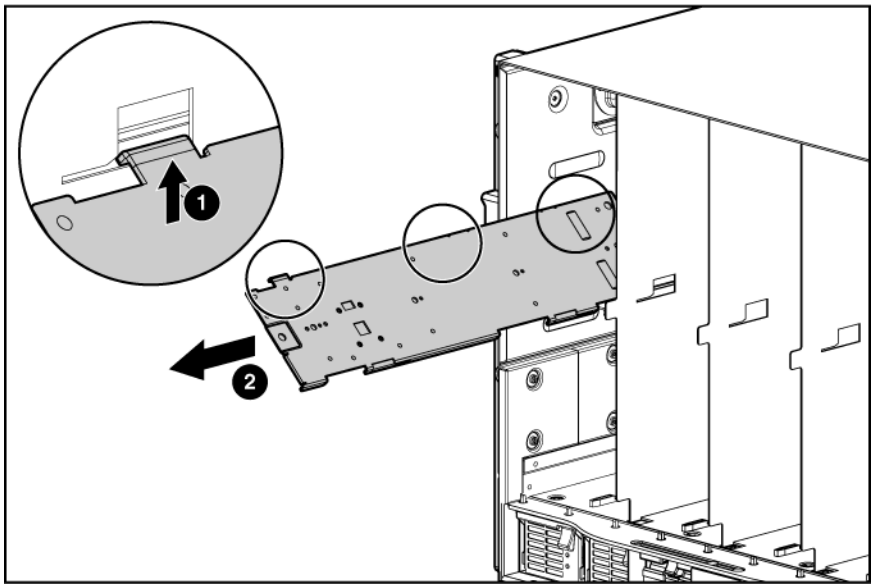
1. Slide the device bay shelf locking tab to the left to open it.



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).

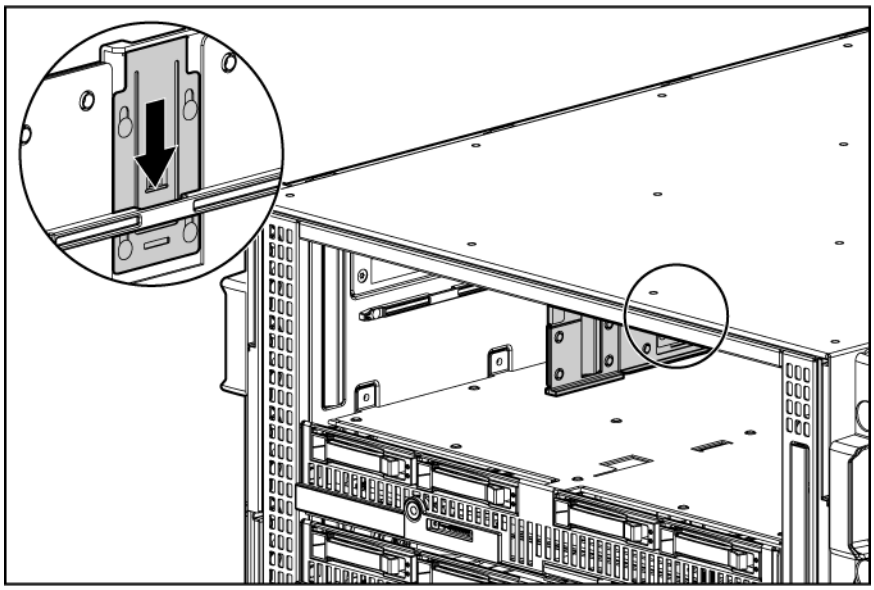


3. Lift the left side of the device bay shelf to disengage the three tabs from the divider wall, and then remove it from the enclosure.



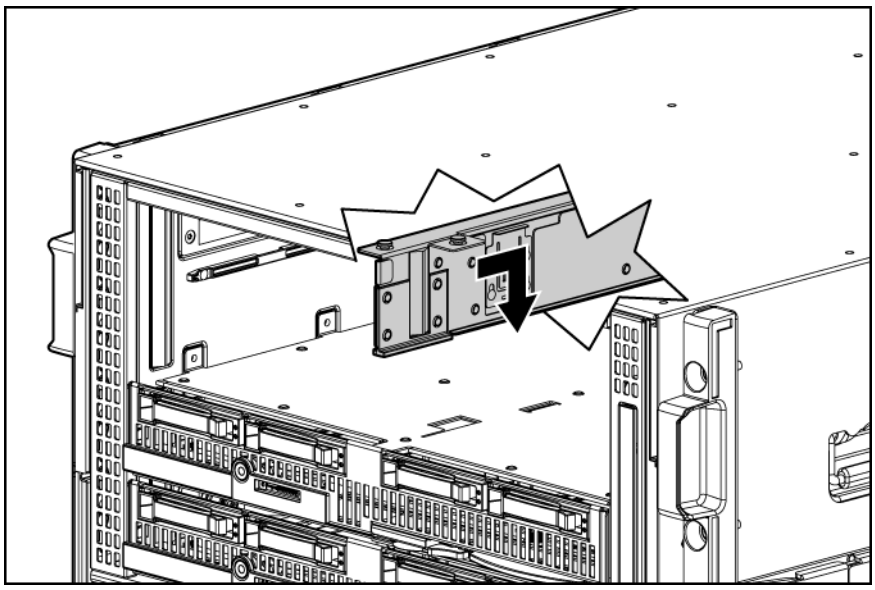
Removing a c3000 device bay mini-divider or device bay divider

1. Slide the locking tab down.



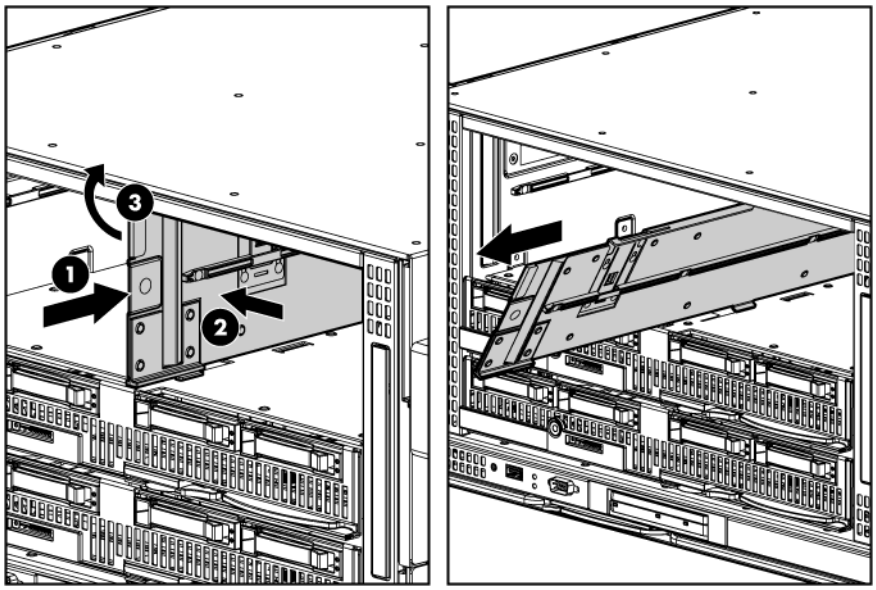
2. Remove the mini-divider or divider:
   - c3000 mini-divider:

     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.

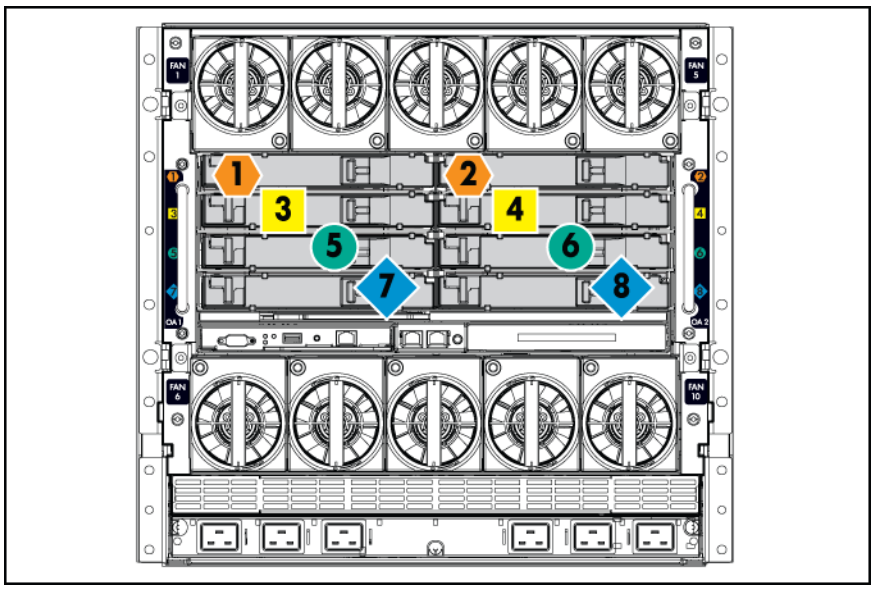


Installing interconnect modules

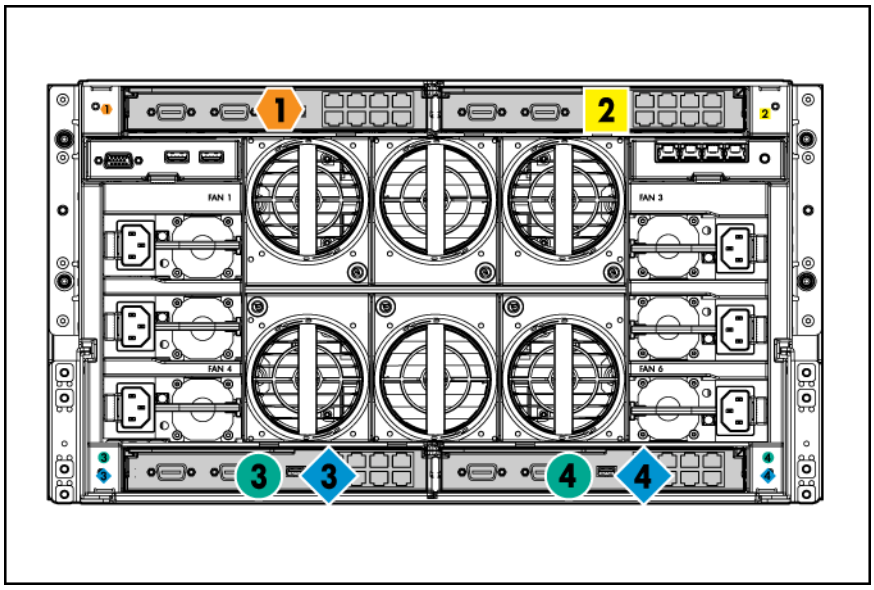
For specific steps to install interconnect modules, see the documentation that ships with the interconnect module.

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	

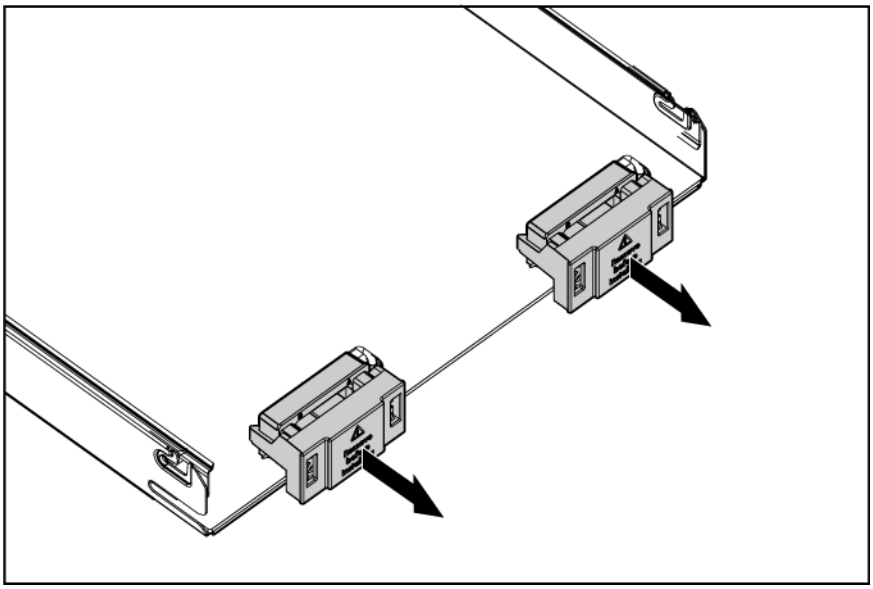
For detailed port mapping information, see the HP BladeSystem enclosure installation poster or the HP BladeSystem enclosure setup and installation guide for your product on the HP website (http://www.hp.com/go/bladesystem/documentation).

Installing the server blade into the enclosure

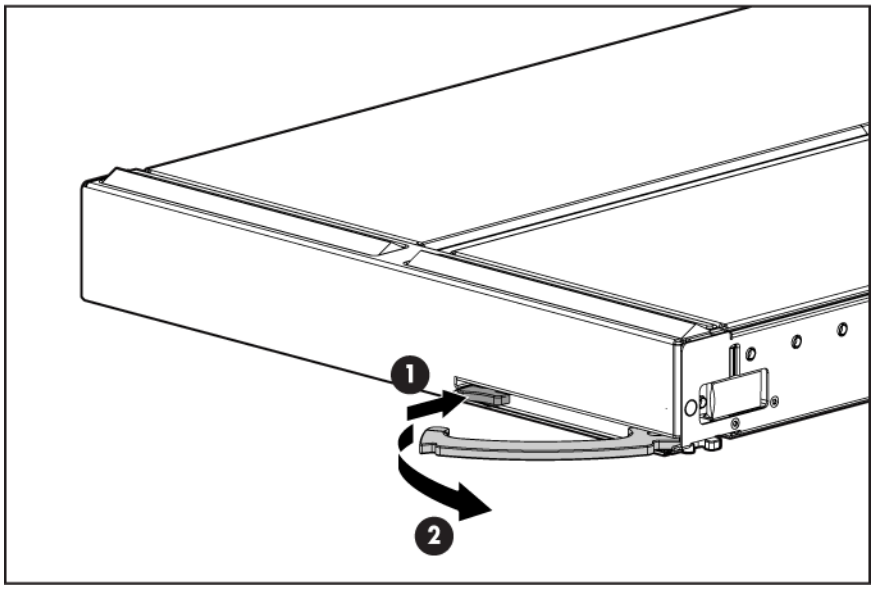
NOTE: When installing additional blades into an enclosure, additional power supplies might also be needed to meet power requirements. For more information, see the HP BladeSystem enclosure setup and installation guide for your product on the HP website (http://www.hp.com/go/bladesystem/documentation).

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

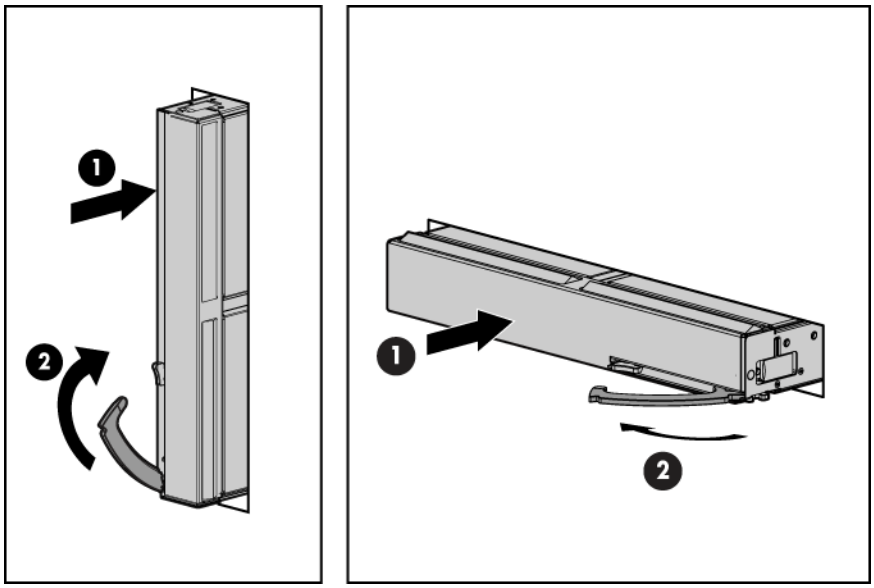
1. Remove the connector covers if they are present.



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.

Installing the Scaleable BladeLink

NOTE: Before installing the Scaleable BladeLink for BL870c or BL890c, make sure the following statements are true:

- All blades have the same CPU SKUs.
- All blades have the same hardware revision
- All blades have CPU0 installed.
- All blades follow the memory loading rules for your configuration, see "Installing DIMMs" (page 32).
- The enclosure OA firmware is compatible with the blade firmware.
- The monarch blade has an ICH mezzanine card installed.

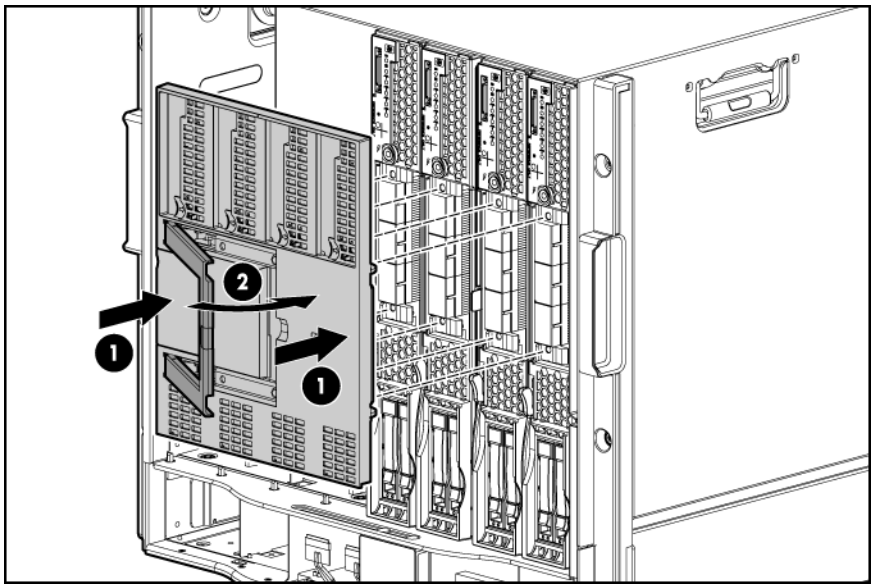
Scaleable BladeLink bay location rules

Class	Scaleable BladeLink part number	Number of conjoined blades	Supported enclosures	Blade location rules	Partner blade support?	Partner blade bay location rules in half-height blade device bays
SBL1	AD399-60002	1 (standard for BL860c i2)	c7000	No specific bay location rules for blades	Yes	Right bottom or left bottom half-height adjacent bay paired with the server blade in full-height bays 1&2, 3&4, 5&6, or 7&8.
			c3000			Top right or bottom right half-height adjacent bay paired with the server blade in full-height bays 1&2 or 3&4.
SBL2	AD399-60003	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		
SBL2E	AD399-60010	2 (BL870c i2)	c7000 only	Bays 2&3, 4&5 or 6&7 with monarch blade in even bay	Yes	Odd bottom half-height bay adjacent to monarch blade.
	AD399-60011	2 (BL870c i2)	c3000 only	Bays 2&3 with monarch blade in even bay	Yes	Top right or bottom right half-height adjacent bay.

Class	Scaleable BladeLink part number	Number of conjoined blades	Supported enclosures	Blade location rules	Partner blade support?	Partner blade bay location rules in half-height blade device bays
SBL4	AD399-60006	4 (BL890c i2)	c7000 only	Bays 1, 2, 3, 4 or 5, 6, 7, 8	No	N/A
	AD399-60007	4 (BL890c i2)	c3000 only	Bays 1, 2, 3, 4	No	N/A

To install the Scaleable BladeLink:

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 will appear in the OA.
4. Insert each adjacent blade, waiting 10 seconds between blades.
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 Scaleable BladeLink.
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 Scaleable BladeLink to the holes on the front of the server blades.
10. Fully insert the Scaleable BladeLink into the blades, and then close the handle.



11. Log into iLO on the monarch blade. For more information, see the *HP Integrity iLO3 Operations Guide*.
12. In iLO, go to the Command Menu and execute `xd -r` to reboot iLOs in the conjoined set.
13. Still in the iLO 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.
14. Boot the monarch blade. Booting the monarch blade boots the entire conjoined system.

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 3-3.

For more front panel LED information, see "Front panel LEDs" (page 15).

Table 3-3 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 up 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.
- 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, see "Using iLO" (page 47).

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 down 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 (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.

Using iLO

The iLO subsystem is a standard component of selected server blades that provides blade health and remote server manageability. The iLO subsystem includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO independent of the

host server and operating system. The iLO subsystem provides remote access to any authorized network client, sends alerts, and provides other server management functions.

Using iLO, you can:

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

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

Accessing UEFI or the OS from iLO MP

The Unified Extensible Firmware Interface 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 MP. Your security parameters were set regarding remote access.

- 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.

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

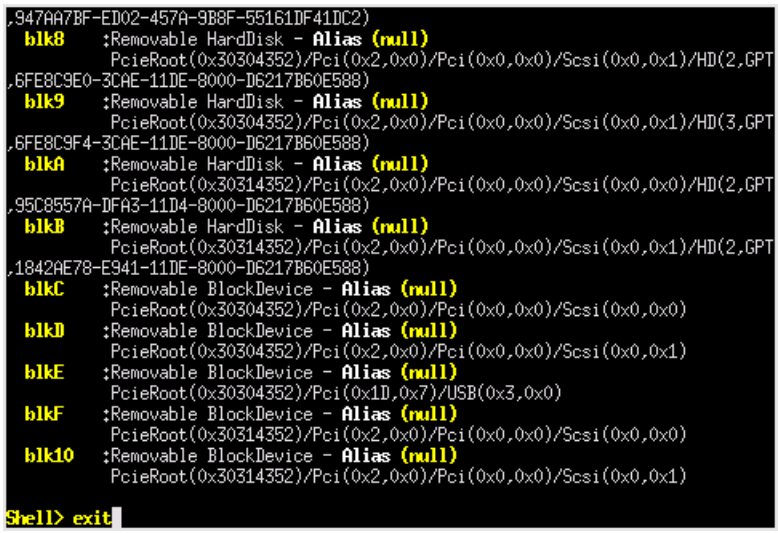
If the server blade has a factory-installed OS, you can interrupt the boot process to configure your specific UEFI parameters.

If you are at the UEFI shell prompt, go to "UEFI Front Page" (page 48).

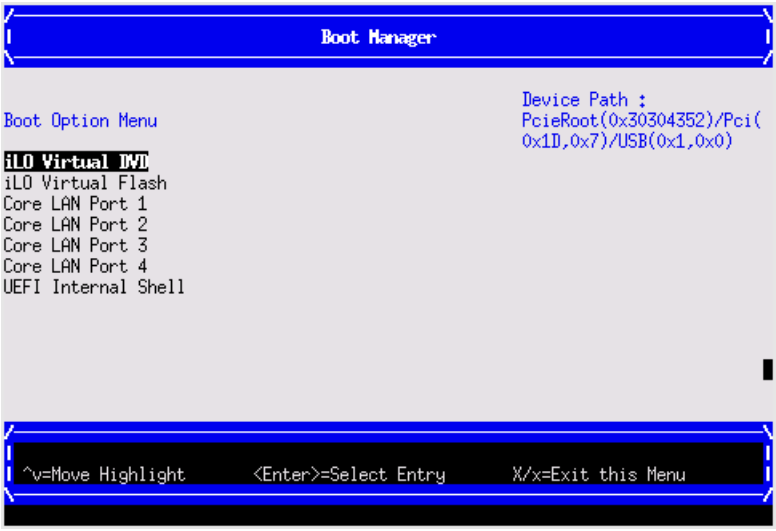
If you are at the OS login prompt, go to "OS login prompt" (page 50).

UEFI Front Page

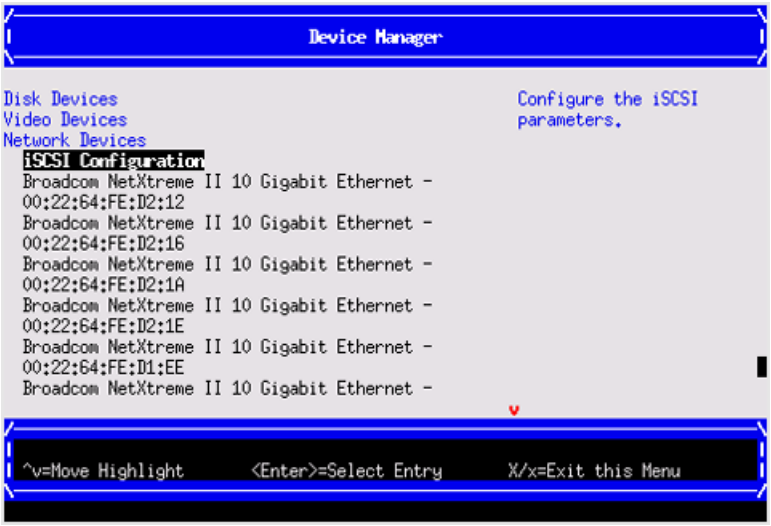
If you are at the UEFI shell prompt, enter **`exit`** to get to the **UEFI Front Page**.



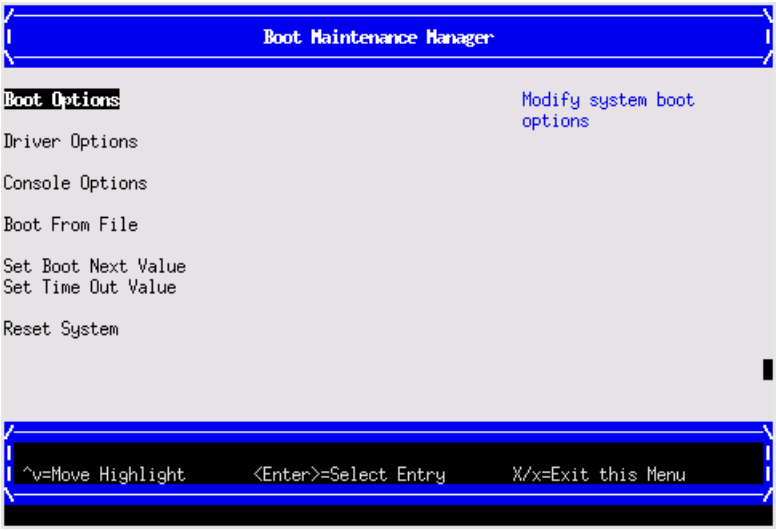
To view boot options, or launch a specific boot option, press **B** or **b** to launch the Boot Manager.



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

Saving UEFI configuration settings

There are other UEFI settings you can configure at this time. For more UEFI configuration options, see Appendix B (page 93).

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 50).
- If the OS is not installed onto your server blade, see "Operating system is not loaded onto the server blade" (page 50).

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 the external USB DVD device" (page 53).
- To load the OS using Ignite-UX, see "Installing the OS using HP Ignite–UX" (page 53).

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. After the installation is complete, HP Smart Update Manager also cleans up after itself.

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.

HP Smart Update Manager is included in the firmware bundles download from hp.com, and is supported on the BL860c i2, BL870c i2, and BL890c i2.

For more information about HP Smart Update Manager, see the *HP Smart Update Manager User Guide* (www.hp.com/support/HP_Smart_Update_Manager_UG_en).

4 Installing, booting and shutting down the operating system

Operating systems supported on the server blade

HP-UX 11i v3 HWE 1003

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 the external USB DVD device

1. Connect the Integrity SUV cable to the front of the server blade.
2. 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.

3. Turn on the external USB DVD device.
4. Insert the HP-UX 11i v3 DVD (Disk 1) into the external USB DVD drive.
5. 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.
6. 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.

7. 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
        PcieRoot(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.

8. 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> fs0:
fs6:\> install
```

9. The OS now starts loading onto the server blade. Follow the on-screen instructions to install the OS fully.
10. Continue with "Configuring system boot options" (page 54)

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.

Virtual Media (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`.

Adding HP-UX to the boot options list

You can add the `\UEFI\HPUX\HPUX.UEFI` 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 details, see the *setboot*(1M) manpage.

To add HP-UX to the list:

1. Access the UEFI Shell environment.
   a. Log in to iLO 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 (`fs`*X*`:` where *X* is the file system number) for the device from which you want to boot HP-UX.

   For example, enter **`fs2:`** to access the 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 details, see the `help bcfg` command.
4. Exit the console and iLO 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 and shutting down HP-UX

- To add an HP-UX entry to the boot options list, see "Adding HP-UX to the boot options list" (page 54).
- To boot HP-UX, use one of the following procedures:
  - To boot HP-UX normally, see "HP-UX standard boot" (page 55). HP-UX boots in multi-user mode.
  - To boot HP-UX in single-user mode, see "Booting HP-UX in single-user mode" (page 56).
  - To boot HP-UX in LVM-maintenance mode, see"Booting HP-UX in LVM-maintenance mode" (page 57).
- To shut down the HP-UX operating system, see "Shutting down HP-UX" (page 57).

HP-UX standard boot

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

- "Booting HP-UX from the UEFI Boot Manager" (page 56)
- "Booting HP-UX from the UEFI Shell" (page 56)

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

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" 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"), 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.

To shut down HP-UX running on a server:

1. Log in to HP-UX running on the server that you want to shut down or log in to iLO MP for the server and use the Console menu to access the system console. Accessing the console through iLO 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 MP Command menu.
   - Shut down HP-UX and reboot the server by issuing the **`shutdown -r`** command.

5 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 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 CRU and replace it. You must now perform the specific removal and replacement procedure, and verification steps, see Chapter 6: "Removing and replacing components" (page 71) for more details.

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

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 CRU:

- LEDs. 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 15)
- 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 be cleared by accessing the logs using the **`sl`** command, available in the iLO MP command mode. To access the iLO MP from the console serial port, enter **Ctrl–B** or **ESC-**.

If the LEDs and SEL do not give you enough information for you to identify the issue you are experiencing, HP also provides diagnostic tools with each operating system (see "Troubleshooting tools" (page 64) for more details).

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

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 MP **`vfp`** command.
3. Read the symptom/condition information in the left column of Table 5-2 (page 61).
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 5-2 and Table 5-3 (page 63) or go directly to the subsection of this chapter which corresponds to your own entry point. Table 5-1 provides the corresponding subsection or location title for these different entry points (for example, to start by examining the logs, go directly to "Errors and error logs" (page 65)).

Table 5-1 Troubleshooting Entry Points

Entry Point	Subsection or Location
Front panel LEDs	See "Basic and advanced troubleshooting tables" (page 60) , "Troubleshooting tools" (page 64), and "Front panel LEDs" (page 15).
SEL and FPLs	See "Errors and error logs" (page 65).
Offline and Online Diagnostics	See "Troubleshooting tools" (page 64).
System Event Analyzer	See **`http://h18023.www1.hp.com/support/svctools/webes`** for more information about this tool).

Basic and advanced troubleshooting tables

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

Table 5-2 Basic Low End Troubleshooting

Step	Condition	Action
1	Server blade appears “dead” -- no front panel LEDs are on, and no fans are running. iLO MP is running.	Nothing is logged for this condition. 1. For new server installations, review the installation procedures. 2. Verify that the enclosure power cords are connected to both the power supplies and to the AC receptacles. 3. Verify that AC power, at the proper AC voltage levels, is available to the receptacles. 4. If the power button’s integrated LED on front panel remains off, then reseat the server blade. 5. As a last resort, replace the server blade. This issue is fixed when the front panel LED states are as follows: blade health is off and Internal health is steady amber.
2	Server blade does not power on after front panel power button is momentarily pressed (less than four seconds).	A fatal fault has been detected and logged, attempting to power on the server. 1. Examine enclosure power supply LEDs. If they are not steady green, then replace power supply. 2. If the enclosure power supply LED is green, then you might need an additional power supply to supply sufficient power to run the blades in the enclosure. 3. Examine the iLO MP subsystem logs for events related to DC power rails. This issue is fixed when the front panel LEDs are as follows: Health is off and power is steady green.
3a	Blade health LED is off and iLO MP is not running.	A fatal fault has been detected and logged while booting or running system firmware. 1. Cannot access the iLO MP at this time (see “Troubleshooting the management subsystem ” (page 68) for more details). 2. Must reseat or replace the server blade. This issue is fixed when the iLO MP logs can be read and both front panel health LED and server power LED states show: Flashing green or steady green, and steady green, respectively.
3b	Blade health LED is flashing amber and iLO MP is running.	A warning or critical failure has been detected and logged while booting or running system firmware. Examine the iLO MP logs for events related to switched DC power or cooling fans or configuration. 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.
4a	Cannot see iLO MP prompt on system console -- blade server power is on. iLO MP is running.	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. 1. Look for loose, damaged, or disconnected signal cables between the system console device, and serial port connector on the front panel. 2. Verify that the RS232C configuration matches between the server blade and the local console (see “Troubleshooting the server interface (system console)” (page 69) for more details). 3. As a last resort, replace the server blade. This issue is fixed when the iLO MP menu appears on the system console.

Table 5-2 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
4b	Cannot see UEFI prompt on system console. iLO MP is running.	Nothing can be logged for this condition. 1. Examine the iLO MP logs for entries related to processors, processor power modules, and shared memory, and core I/O devices (see "Errors and error logs" (page 65) 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 MP is running.	Nothing can be logged for this condition. 1. Reinsert the boot disk into the drive bay 2. Search for the boot disk path using the UEFI shell (`map -r`) command. 3. Examine the iLO MP logs for entries related to processors, processor power modules, and shared memory, and core I/O devices (see "Errors and error logs" (page 65) 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 MP is running.	Nothing can be logged for this condition. 1. Examine the iLO MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (see "Errors and error logs" (page 65) for more details). This issue is fixed when the OS prompt appears on the system console.
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.		
6a	"POWER_FAIL_NO_SBL" - Power command failed because no Scalable BladeLink is installed	1. Ensure that the Scalable BladeLink is properly installed and fully seated. 2. Check for bent connector pins on the Scalable BladeLink
6b	"SBL_REMOVED " - Scalable BladeLink was removed	1. If the Scalable BladeLink was not removed, ensure that is properly installed and fully seated. 2. Check for bent connector pins on the Scalable BladeLink.
6c	"ILO_RST_REASON_SBL" - The iLO was reset because the Scalable BladeLink was installed (FPL only)	1. Ensure that the Scalable BladeLink is properly installed and fully seated. 2. Check for bent connector pins on the Scalable BladeLink.
6d	"SYSVARS_MISMATCH" - The system variable stored on the Scalable BladeLink does not match the system variable stored on the blade.	1. Use the `sysset` command.
6e	"SBL_DOMAIN_IMPROPER_SBL" - The Scalable BladeLink currently installed is not appropriate for the blade slot (even/odd) and enclosure (c7000/c3000) being used	1. Ensure that the Scalable BladeLink installed in the correct slot and enclosure, see "Installing the Scaleable BladeLink" (page 45) 2. Ensure that the Scalable BladeLink is properly installed and fully seated. 3. Check for bent connector pins on the Scalable BladeLink.

Table 5-2 Basic Low End Troubleshooting *(continued)*

Step	Condition	Action
6f	"POWER_FAIL_IMPROPER_SBL" - Power command failed because the SBL currently installed is not appropriate for the blade slot (even/odd) and enclosure (c7000/c3000) being used	1. Ensure that the Scalable BladeLink installed in the correct slot and enclosure, see "Installing the Scaleable BladeLink" (page 45) 2. Ensure that the Scalable BladeLink is properly installed and fully seated. 3. Check for bent connector pins on the Scalable BladeLink.
6g	Incorrect number of processors displayed for the conjoined blades	1. Ensure that the Scalable BladeLink is properly installed and fully seated. 2. Check for bent connector pins on the Scalable BladeLink.
6h	"QPI_CPU_LINK_DEGRADED"	1. Ensure that the Scalable BladeLink is properly installed and fully seated.

Table 5-3 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 MP Command Menu to initial a ToC, using the `tc` command. 2. Reboot the OS and escalate. 3. Obtain the system hardware status dump for root cause analysis. 4. Examine the iLO MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (see "Errors and error logs" (page 65) for more details). This issue is fixed when the root cause is determined.

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

Step	Symptom/Condition	Action
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, `errdump mca`. If the server blade can boot the OS, you can capture binary MCA dump files online. 2. Examine the iLO MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (See "Errors and error logs" (page 65) 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 MP logs for entries related to processors, processor power modules, shared memory, and core I/O devices (see "Errors and error logs" (page 65)for more details).

Troubleshooting tools

The HP Integrity BL860c i2 Server Blade uses LEDs and other tools to help troubleshoot problems that occur in the server blade, see "Front panel LEDs" (page 15) for more information on LED locations and states.

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. Once 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 enhanced.

For more information, regarding the use of the Offline Diagnostics Environment, see the *Offline Diagnostics Environment Administrator's and User's Guide* (http://docs.hp.com/en/5992-6605/5992-6605.pdf).

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 ensure that tools are available to repair or recover from the fault.

HP-UX Fault management

Proactive fault prediction and notification is provided on HP-UX by 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 enhanced 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://docs.hp.com/hpux/diag).

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 CRU. 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 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 MP event logs

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

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

1. Log in with the proper username and password.

NOTE: Default operator login and password:

login = **Oper**

password = **Oper**.

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

2. Enter **cl** to display the console history log. This log displays console history from oldest to newest.
3. Enter **Ctrl–B** to return to the **MP Main Menu**.
4. Enter **sl** to display the status logs. The status logs consist of:
   - System Event
   - Forward Progress
   - Current Boot
   - Previous Boot

- Live Events
- Clear SELs

5. Enter **Ctrl–B** to return to the **MP Main Menu**.

SEL review

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

```
[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:
```

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 "Removing and replacing a processor and heatsink module" (page 80) 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.

Troubleshooting the management subsystem

The iLO MP is an integrated component on the server blade. There are no external or internal LEDs to view or monitor their operational states.

Firmware

The server blade has two sets of firmware installed:

- Server blade firmware
- iLO 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. HP also encourages you to check back often for any updates that may have been posted.

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

1. Go to http://www.hp.com.
2. Select the "Support & Drivers" tab, then "Download drivers and software".
3. Enter your product name or number and hit **Go**.
4. If necessary, select your specific product from the search results.
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 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 MP local port and does not respond to a **Ctrl+B** key sequence then it is possible that the iLO 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 5-4 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

6 Removing and replacing components

Preparing the server blade for servicing

To service an internal server blade component, power down 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, ensure 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 "Safety information" (page 23).

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 down 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 (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.

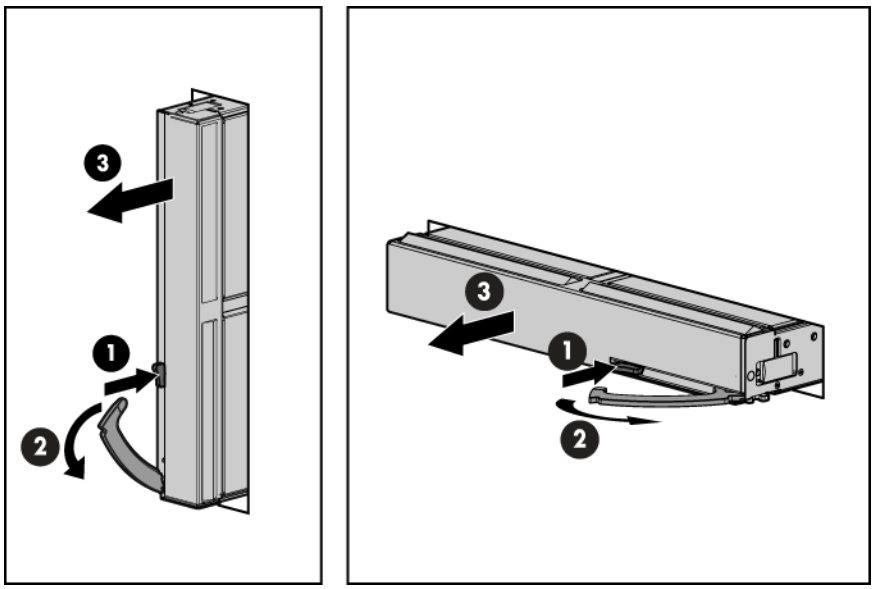
Removing and replacing the server blade from the enclosure

Removing the 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 Scaleable BladeLink ("Removing the Scaleable BladeLink").
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.

Replacing the server blade

See "Installing the server blade into the enclosure" (page 43).

Removing and replacing the server blade access panel

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

Removing the server blade access panel

1. Power off the server blade and remove it from the server blade enclosure. ("Preparing the server blade for servicing").

2. Unlock the cam on the access panel latch by turning the lock on the latch counterclockwise with a 2.5 mm Allen wrench.
3. Pull up on the access panel latch.

   This causes the access panel to slide back about 1.75 cm (0.75 in).
4. Remove the access panel by lifting it straight up and off the server blade.

Replacing the server blade access panel

1. Ensure the access panel latch is in the open position (pointing up) before replacing the access cover.
2. Place the access panel on the blade with the panel hanging over the back of the enclosure about 1.25 cm (0.5 in).
3. Slide the access panel toward the front of the server until the access panel clicks into place.
4. Close the access panel latch.
5. Lock the cam on the access panel latch (if necessary) by turning the lock on the latch clockwise with a 2.5 mm Allen wrench.
6. Place the server blade back into the enclosure and power it on ("Preparing the server blade for servicing").

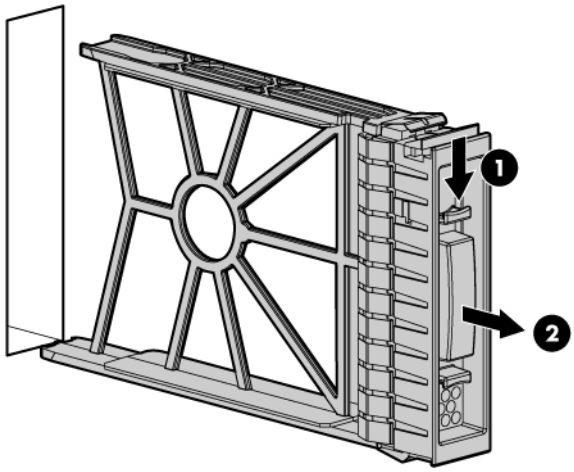
Removing and replacing a disk drive blank

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:



Replacing a disk drive blank

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

Removing and replacing a disk drive

To assess hard drive status, observe the SAS disk drive status LEDs. For an explanation of these LEDs, see "Front panel LEDs" (page 15).

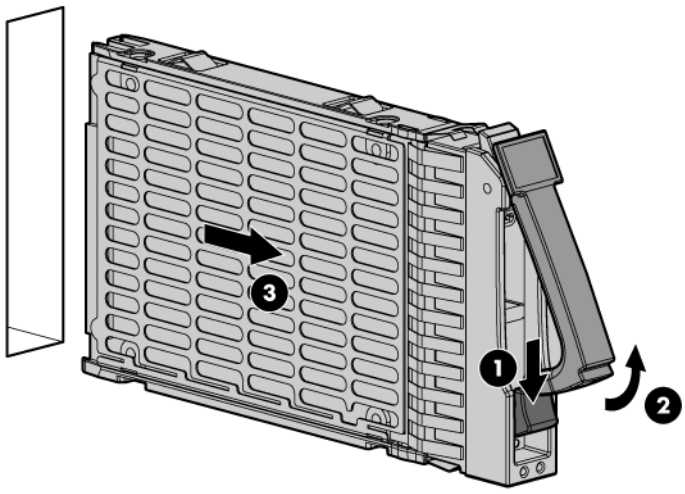
IMPORTANT: Before removing a SAS disk drive, perform a complete data backup.

If disk drive mirroring is enabled, you do not have to power down 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.

Removing a 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.

Replacing a disk drive

See "Installing a hot-plug SAS disk drive" (page 25).

Removing and replacing the Scaleable BladeLink

NOTE: If you are replacing a faulty Scalable BladeLink, you must transfer the label with the blade serial number from the failed Scalable BladeLink to the replacement.

Removing the Scaleable BladeLink

Removing the Scaleable BladeLink from the BL860c i2

CAUTION: To prevent damage to the Scaleable BladeLink, make sure that the activity light is off before proceeding.

NOTE: Only remove a Scaleable BladeLink from a BL860c i2 Server Blade in the following circumstances:

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

NOTE: If you are replacing a faulty Scaleable BladeLink, remove the label

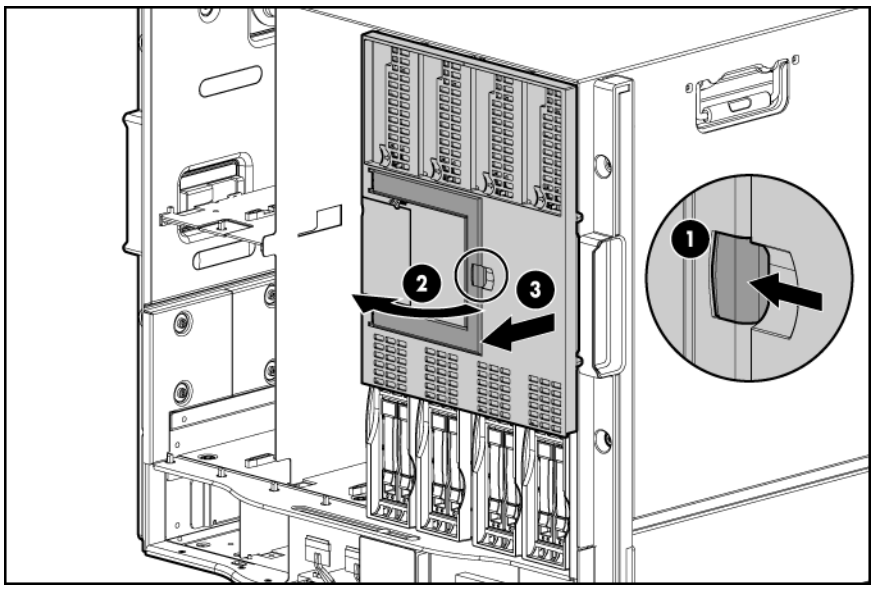
1. Power off the server blade and remove it from the enclosure ("Preparing the server blade for servicing").
2. Place the blade on a flat, level, antistatic surface on its side, with the access panel facing up.
3. Squeeze the blue button on the side of the bezel.
4. Holding in the release button, pull the Scaleable BladeLink 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 Scaleable BladeLink and place it in an antistatic bag.

NOTE: Plastic protectors are only provided with replacement Scaleable BladeLinks.

Removing the Scaleable BladeLink from the BL870c i2 or BL890c i2 configuration

CAUTION: To prevent damage to the Scaleable BladeLink, 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 Scaleable BladeLink.
4. Pull the Scaleable BladeLink 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 Scaleable BladeLink and place it in an antistatic bag.

NOTE: Plastic protectors are only provided with replacement Scaleable BladeLinks.

Replacing the Scaleable BladeLink

Replacing the Scaleable BladeLink on a BL860c i2 Server Blade

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. Remove the plastic protector from the connector on the back of the Scaleable BladeLink.
4. With your hand on side of the Scaleable BladeLink, push in on the blue release button.
5. While holding in the release button:
   a. Line up the long pins on the back of the Scaleable BladeLink with the holes on the front of the server blade.
   b. Push the Scaleable BladeLink onto the blade while applying counter pressure on the rear of the server blade to keep it from moving. The inside bezel edge should mate flush with the front of the server blade.

NOTE: Try to pull on the Scaleable BladeLink without the release button depressed to ensure that it is fully connected to the server blade.

Replacing the Scaleable BladeLink on the BL870c i2 or BL890c i2 Server Blades

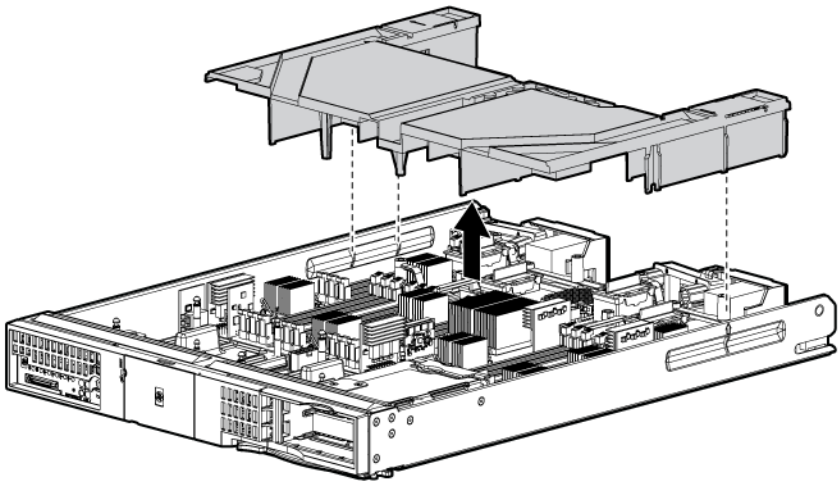
See "Installing the Scaleable BladeLink" (page 45).

Removing and replacing the 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.

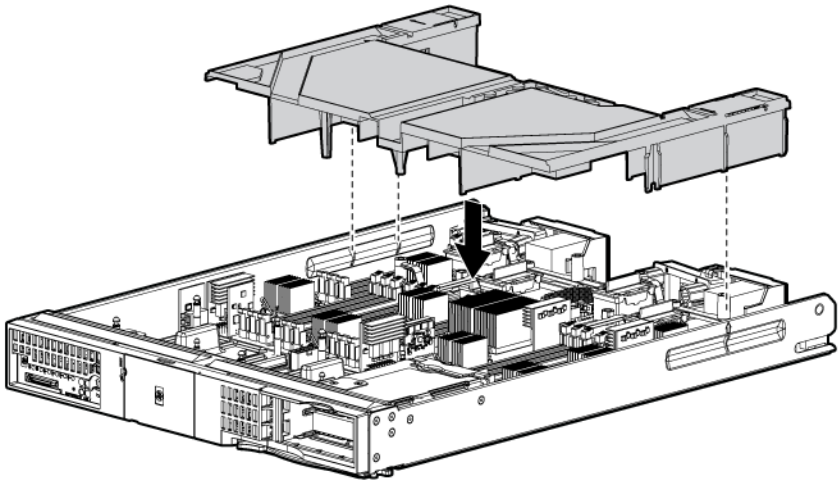
Removing the DIMM baffle

1. Power down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Pull the DIMM baffle straight up and out.



Replacing the DIMM baffle

1. Line the DIMM baffle up with the notches on both sides of the server blade.
2. Guide the DIMM baffle straight down into place.



3. Install the access panel ("Replacing the server blade access panel").
4. Place the server blade back into the enclosure and power it up ("Replacing the server blade").

Removing and replacing DIMMs

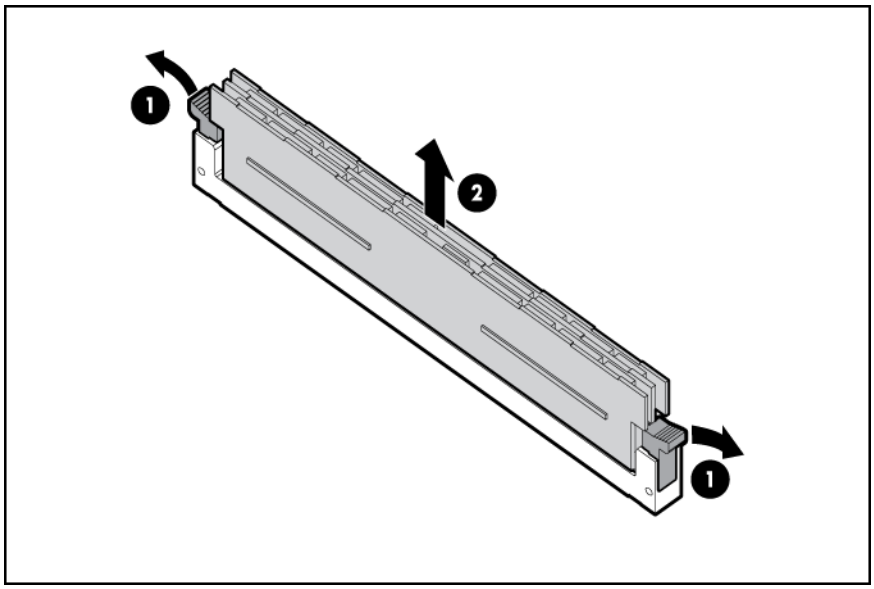
CAUTION: When a single DIMM is removed it must either be replaced with a new matching DIMM, or the DIMM load order must be adjusted.

For the proper load order for DIMMs, see "Installing DIMMs" (page 32) .

Removing DIMMs

1. Power down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Locate the DIMM slots on the server blade system board ("DIMMs").
4. Remove the DIMM baffle ("Removing the DIMM baffle").
5. Open the DIMM slot latches.
6. Remove the DIMM from the slot.

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



Replacing DIMMs

See "Installing DIMMs" (page 32).

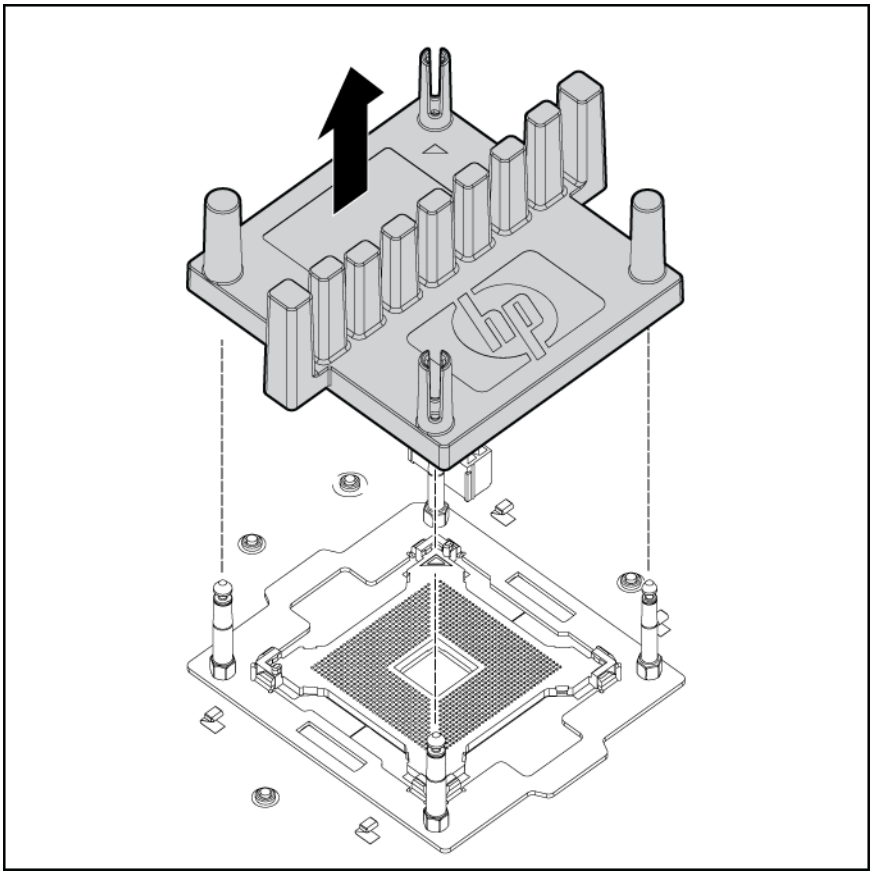
Removing and replacing the CPU baffle

Removing the CPU baffle

CAUTION: To prevent damage to the server blade, never power on a server blade without a CPU baffle or processor in each processor 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 down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Pull the CPU baffle straight up and out.



Replacing the CPU baffle

1. Line the CPU baffle up with 4 load posts on each corner of the socket.
2. Guide the CPU baffle straight down into place.

Removing and replacing a processor and heatsink module

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 processors of different speeds or cache sizes.

CAUTION:

Removing a processor will cause the DIMM loading rules to change. See "Installing DIMMs" (page 32) 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.

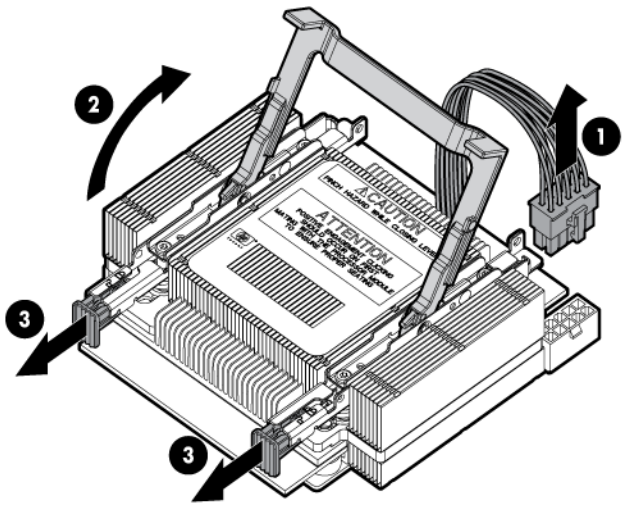
Removing a processor and heatsink module

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

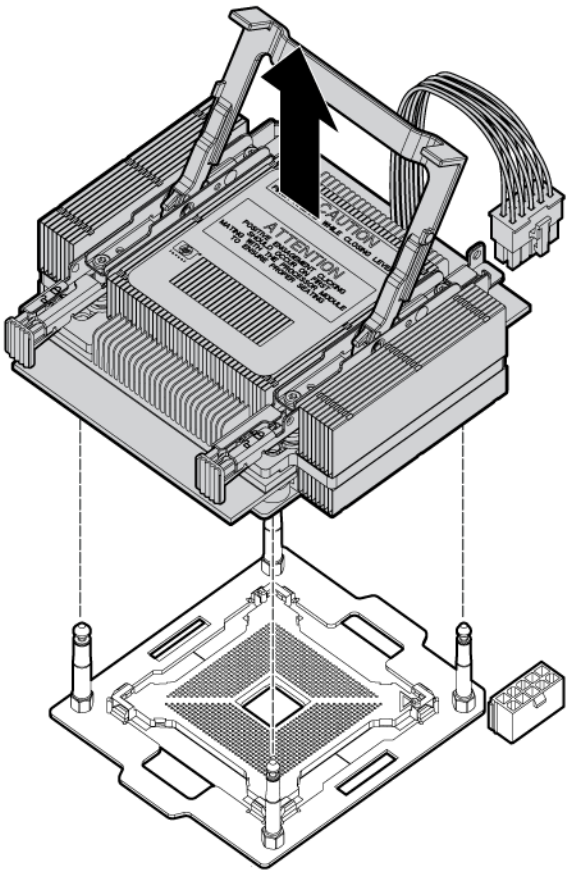
1. Power off the server, and remove it from the enclosure ("Preparing the server blade for servicing" (page 71)).
2. Remove the access panel ("Removing the server blade access panel" (page 72)).
3. Disconnect the power cord (see 1 below)
4. Rotate the processor locking handle up and back until it reaches 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 processor and heatsink off of the socket, pulling straight up.



7. If the processor is not being replaced, install a CPU baffle (“Replacing the CPU baffle”).

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

Replacing a processor

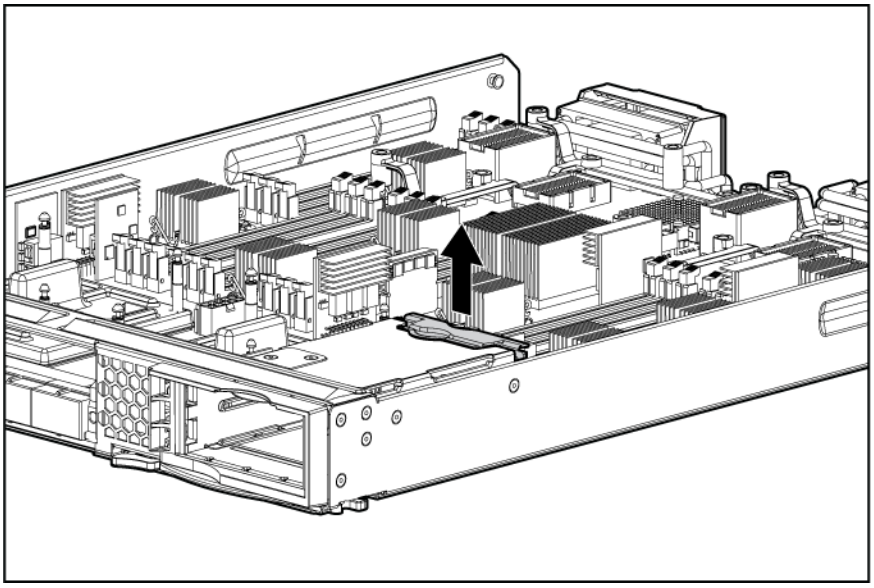
See “Installing a processor and heatsink module” (page 27).

Removing and replacing the SAS backplane

Removing the SAS backplane

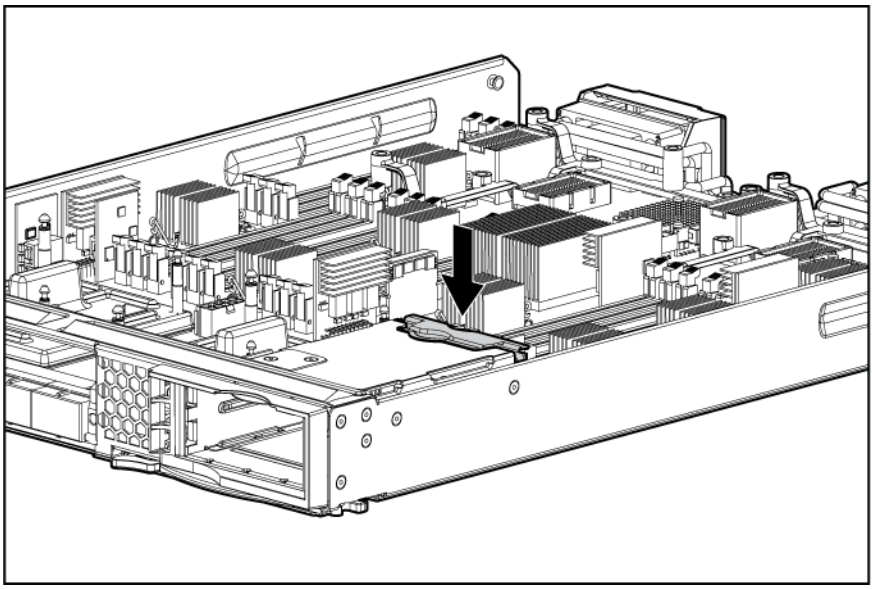
1. Power off the server blade and remove it from the enclosure (“Preparing the server blade for servicing”).
2. Remove the access panel (“Removing the server blade access panel”).
3. Remove the disk drives or disk drive blanks (“Removing a disk drive” or “Removing a disk drive blank”).

4. Lift the SAS back plane straight out of the server by the backplane handle.



Replacing the SAS backplane

1. Slide the SAS backplane into the slot on the system board.



2. Install the disk drives or disk drive blanks (“Replacing a disk drive” or “Replacing a disk drive blank”).

Removing and replacing the server battery

Removing the server battery

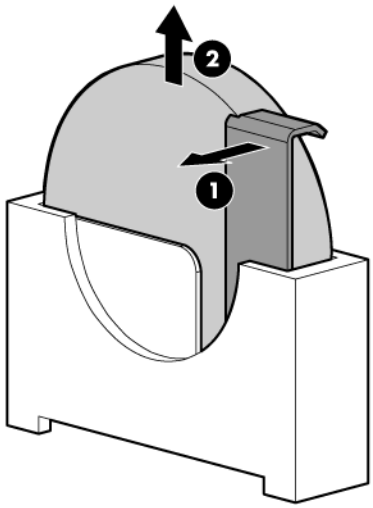
If the server blade no longer automatically displays the correct date and time, you might have to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

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.

To remove:

1. Power off the server and remove it from the enclosure (“Preparing the server blade for servicing”).
2. Remove the access panel (“Removing the server blade access panel”).
3. Remove the battery.



For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

Replacing the server battery

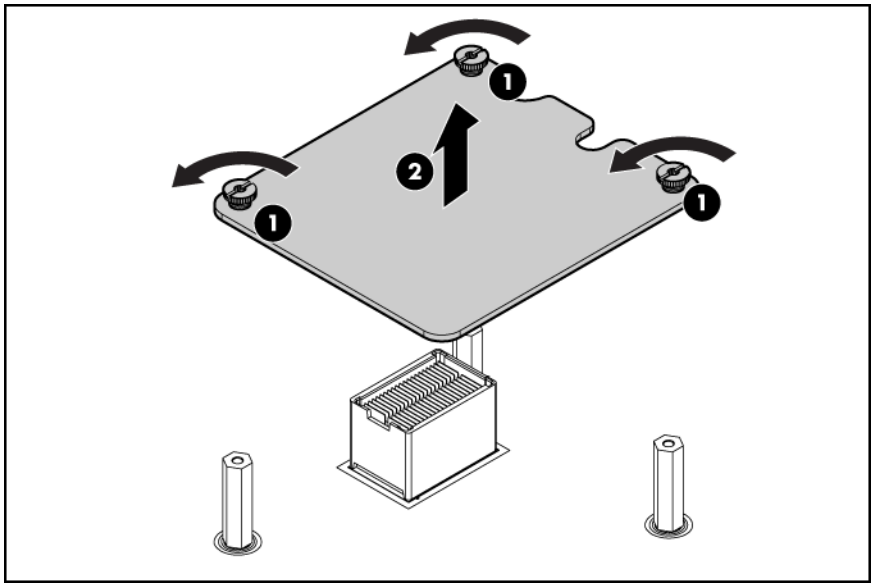
1. Gently pull the metal tab on the side of the battery slot back.
2. Slide the battery into place.

Removing and replacing the mezzanine cards

Removing a mezzanine card

1. Power off the server and remove it from the enclosure (“Preparing the server blade for servicing”).
2. Remove the access panel (“Removing the server blade access panel” (page 72)).

3. Remove the mezzanine card.



Replacing a mezzanine card

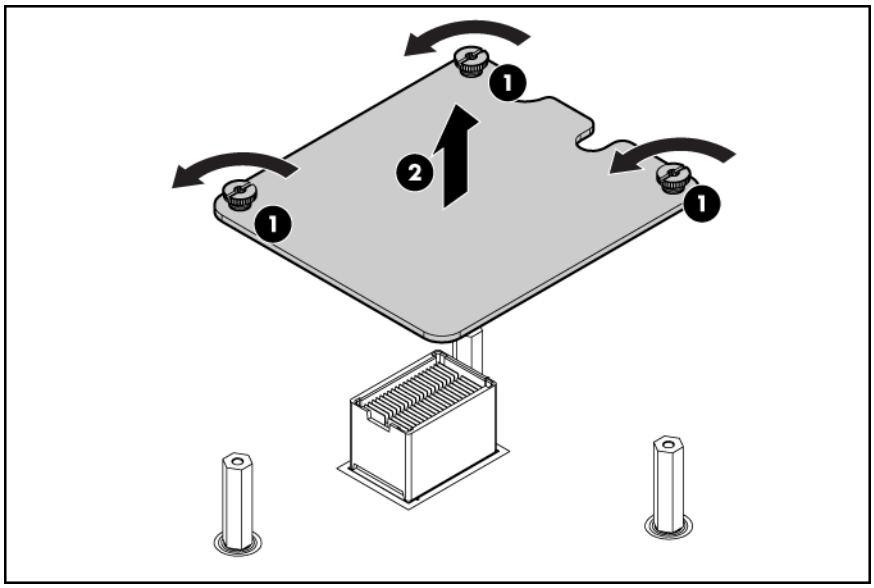
See "Installing mezzanine cards" (page 36).

Removing and replacing the ICH mezzanine board

One ICH mezzanine board is required per system. The ICH is required in the BL860c i2. In the BL870 i2 and BL890 i2, the ICH mezzanine board is only required in the monarch blade.

Removing the ICH mezzanine board

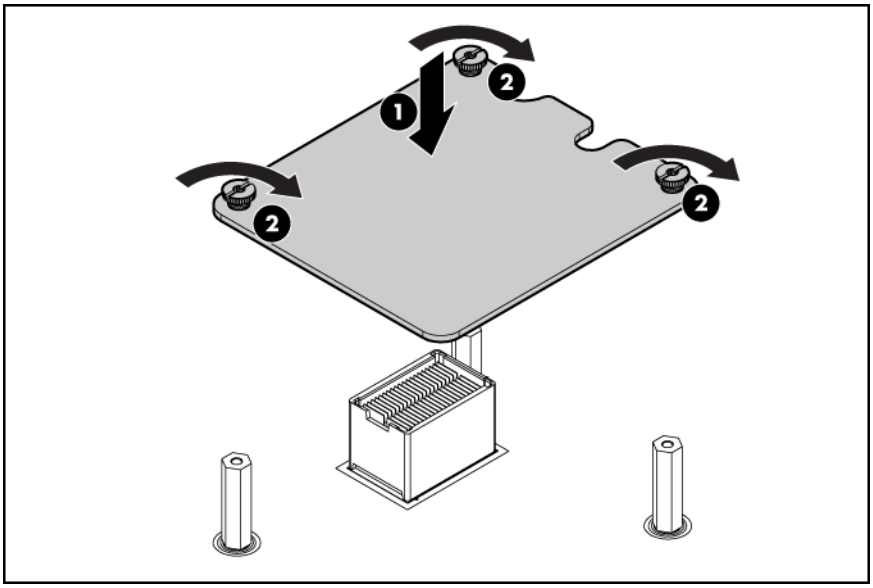
1. Power off the server and remove it from the enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Remove the ICH mezzanine card:



Replacing the ICH mezzanine board

1. Align the mezzanine connector on the option card with the mezzanine connector on the system board.
2. Install the ICH mezzanine card. 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.



Removing and replacing the 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 ("Removing a processor and heatsink module" (page 80))
- The CPU air baffle ("Removing the CPU baffle" (page 79))
- The DIMMs ("Removing DIMMs" (page 78))
- The DIMM baffle ("Removing the DIMM baffle" (page 77))
- The Smart Array battery ()
- The Mezzanine cards ("Removing a mezzanine card" (page 83))
- The ICH mezzanine board ("Removing the ICH mezzanine board" (page 84))
- The hard disk drives ("Removing a disk drive" (page 74))

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

Item	Quantity
Protective CPU covers	2

Mezzanine covers	4
Backplane connector covers	2

7 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

Typographic conventions

This document uses the following typographical conventions:

`%`, `$`, or `#`	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells. A number sign represents the superuser prompt.
audit(5)	A manpage. The manpage name is *audit*, and it is located in Section 5.
`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 `errno` variable.
Key	The name of a keyboard key. **Return** and **Enter** both refer to the same key.
Term	The defined use of an important word or phrase.
`User input`	Commands and other text that you type.
`Variable`	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
[]	The contents are optional in syntax. If the contents are a list separated by `|`, you must choose one of the items.
{}	The contents are required in syntax. If the contents are a list separated by `|`, you must choose one of the items.
...	The preceding element can be repeated an arbitrary number of times.
⌾	Indicates the continuation of a code example.
|	Separates items in a list of choices.
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

B

BBWC Battery Backed Write Cache

C

CE Customer engineer

CRU Customer replaceable unit

E

EFI Extensible Firmware Interface
See also UEFI.

EMS Event management service

ESD Electrostatic discharge

F

FC Fibre Channel

FPL Forward progress log

H

HBA Host bus adapter

HPSP HP service partition

I

iLO Integrated Lights-Out

IPF Itanium processor family

L

LDAP Lightweight directory access protocol

LVM Logical volume manager

M

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

ToC	Transfer of control
TPM	Trusted platform module

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

vMedia	Virtual media
VRM	Voltage regulator module

W

WBEM	Web-Based enterprise management

A Parts information

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 A-1 CRU List

Description
Memory
2 GB DDR3 memory
4 GB DDR3 memory
8 GB DDR3 memory
Processors
Intel Itanium Processor Quad Core 1.86GHz/24MB (DBS)
Intel Itanium Processor Quad Core 1.73GHz/20MB (DBS)
Intel Itanium Processor Quad Core 1.46GHz/16MB (No DBS)
Intel Itanium Processor Dual Core 1.6GHz/12MB (No DBS)
Internal Disks
HP 146GB 10K SAS 2.5" DP HDD
HP 300GB 10k SAS 2.5 HP DP HDD
HP 146GB 15k SAS 2.5" HP DP HDD
HP 72GB 15k SAS 2.5" HP DP HDD
Hard disk blank
Boards and Cards
HP Dual Port 8Gbps Fibre Channel HBA Mezzanine Card (Emulex).
HP Dual Port 8Gbps Fibre Channel HBA Mezzanine Card (Q-Logic).
HP P700m PCIe Dual Port SAS HBA Mezzanine Card with 512MB Cache Memory.
HP SA P-Series Low Profile Battery for SA P700m card.
HP 4x DDR Dual Port IB Mezzanine HCA Option Kit
HP NC532m Dual Port 10GbE Mezzanine Virtual BladeSystem c-Class Adapter
HP NC634m 4-port mezzanine adapter
HP NC360m PCI Express Dual Port 1Gb
SAS disk backplane
Scaleable BladeLinks
CoP1 (1 blade per CoP)
CoP2 (2 blades/CoP)
CoP4-M (4 blades/CoP)
CoP4-S (4 blades/CoP)

Table A-1 CRU List *(continued)*

Description
CoP2E-M
CoP2E-S
Miscellaneous
Memory Airflow Baffle
ICH Mezz Card w/ TPM
ICH Mezz Card w/o TPM
CPU Heatsink
Blade Top Cover
System Chassis
BL8x0c i2 Base Unit
CPU Socket Dust Cover (& airflow baffle)

B Utilities

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. 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. See "Using the Boot Maintenance Manager" (page 96) for more information.

UEFI Shell and HP POSSE commands

For details on these commands, enter `help` *`command`* at the UEFI Shell prompt.

Table B-1 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
cp	Copies one or more files or directories to another location

Table B-1 UEFI Shell Commands *(continued)*

UEFI Shell Command	Definition
cpuconfig	Deconfigure/Reconfigure CPU 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 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
ls	Displays a list of files and subdirectories in a directory

Table B-1 UEFI Shell Commands *(continued)*

UEFI Shell Command	Definition
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.

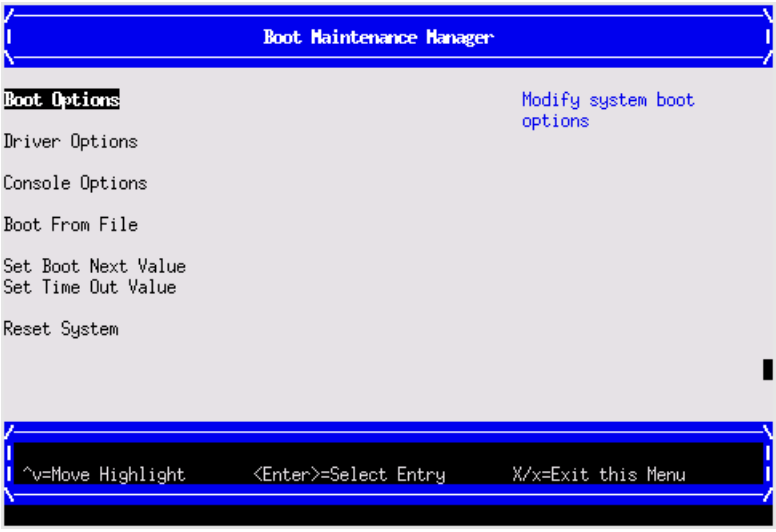
Device	Path format	Path example
PCIe root bridge device path node	UID	`PcieRoot(0x30304352)/Pci(0x2,0x0)/ Pci(0x0,0x0)/Scsi(0x0,0x0)` (RAID mode)
		`PcieRoot(0x30304352)/Pci(0x2,0x0)/Pci(0x0,0x0) /SAS(0x5000C500037688B9,0x0,0x1,NoTopology, 0,0,0,0x0)` (HBA mode)
Hard drive partition device path	HD (Partition,Type,Signature)	`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:

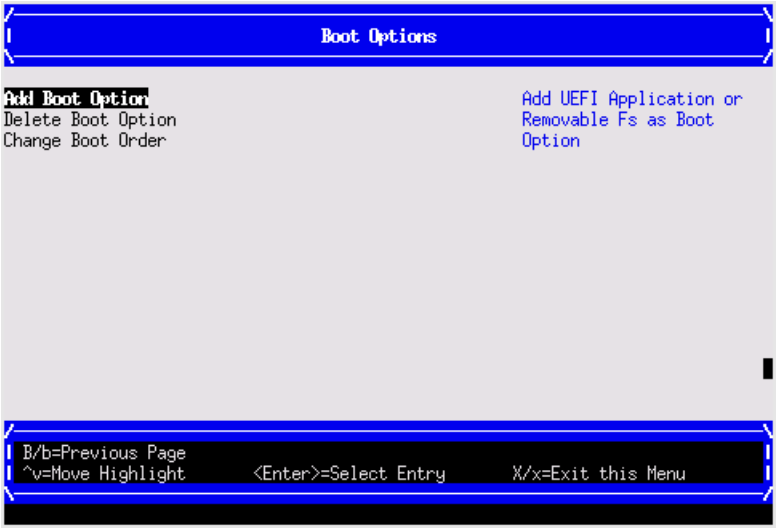
- Boot Options
- Driver Options
- Console Options
- Boot From File
- Set Boot Next Value
- Set Time Out Value
- Reset System



Boot Options

the Boot Options menu contains the following options:

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

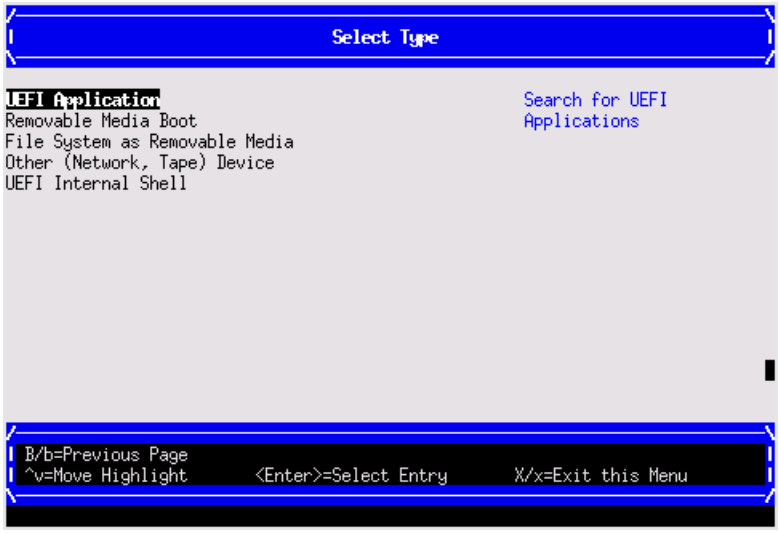


Add Boot Option

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

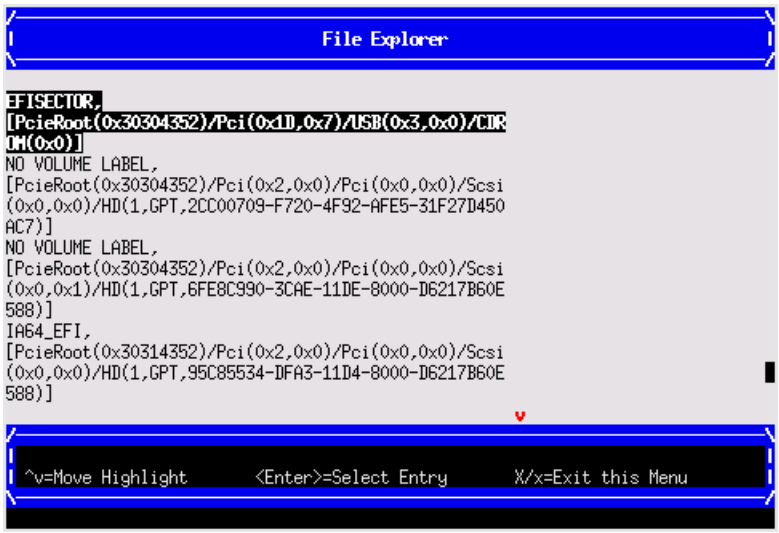
To add a boot option:

1. Select a boot device type.



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

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

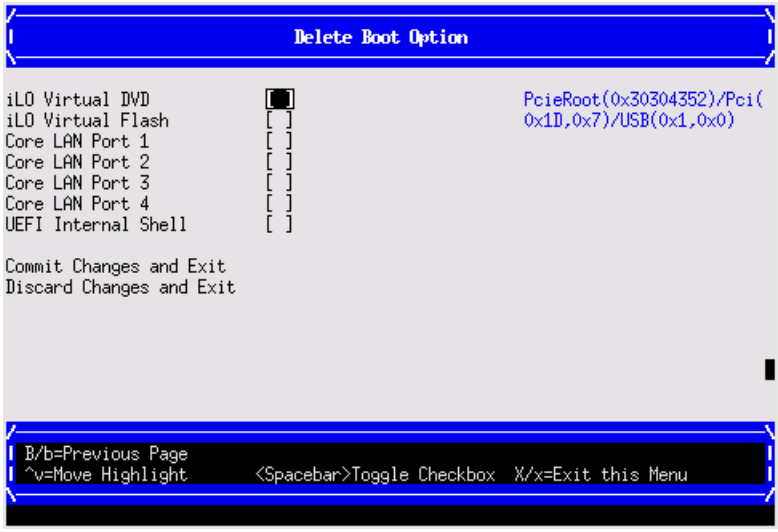


Delete Boot Option

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.

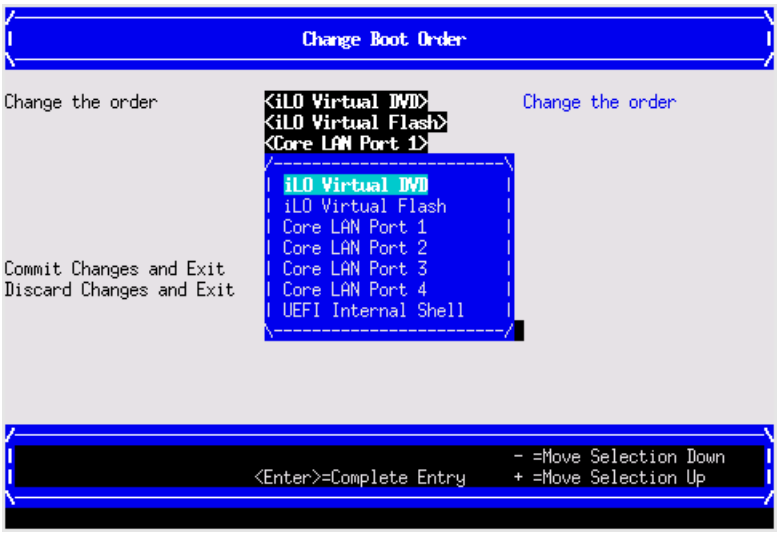
Change Boot Order

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 book 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

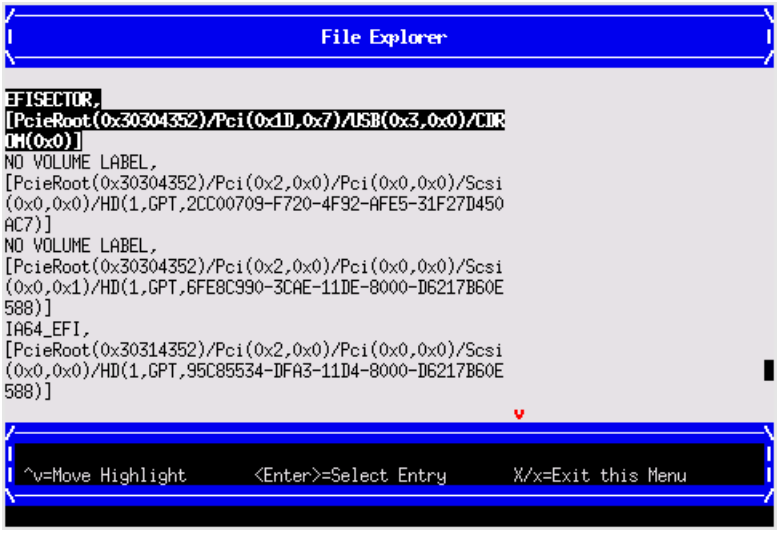
Add Driver Option

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 book 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.

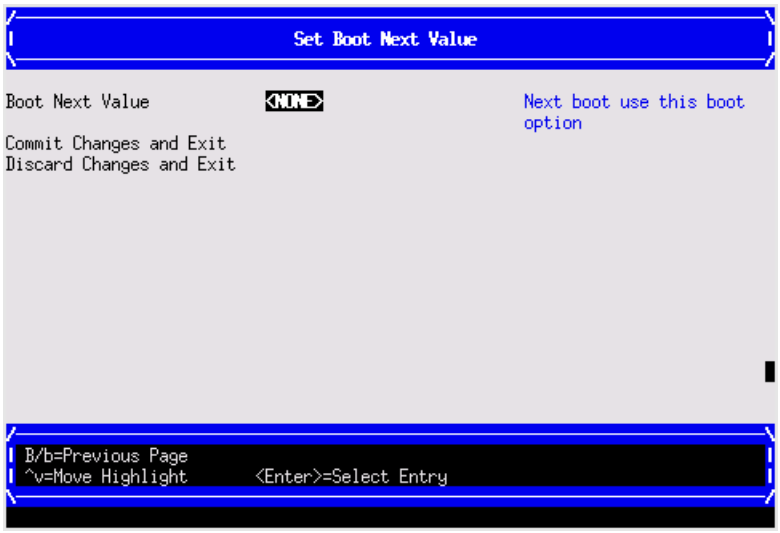
NOTE: This option boots the selected application or driver one time only. When you exit the application, you return to this menu.

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

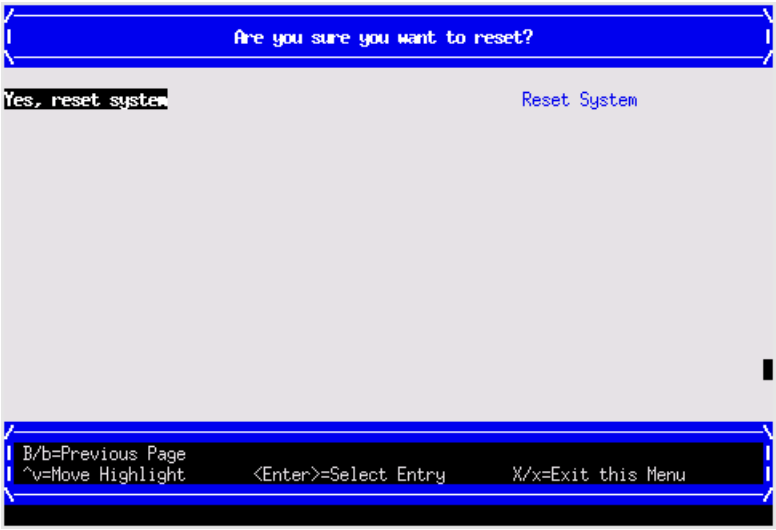
Use this option to set the amount of time the server pauses before attempting to launch the first item in the Boot Options list.

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 MP

The iLO MP is an independent support system for the server. It provides a way for you to connect to a server and perform administration or monitoring tasks for the server hardware.

The iLO MP controls power, reset, ToC capabilities, provides console access, displays and records system events, and displays detailed information about the various internal subsystems. The iLO MP also provides a virtual front panel used to monitor server status and the state of front panel LEDs. All iLO MP functions are available through the LAN and the local RS-232 port.

The iLO MP is available whenever the server is connected to a power source, even if the server main power switch is off.

Access to the iLO MP can be restricted by user accounts. User accounts are password protected and provide a specific level of access to the server and MP commands.

For more information regarding the iLO MP, see the *HP Integrity iLO 3 Operations Guide.*

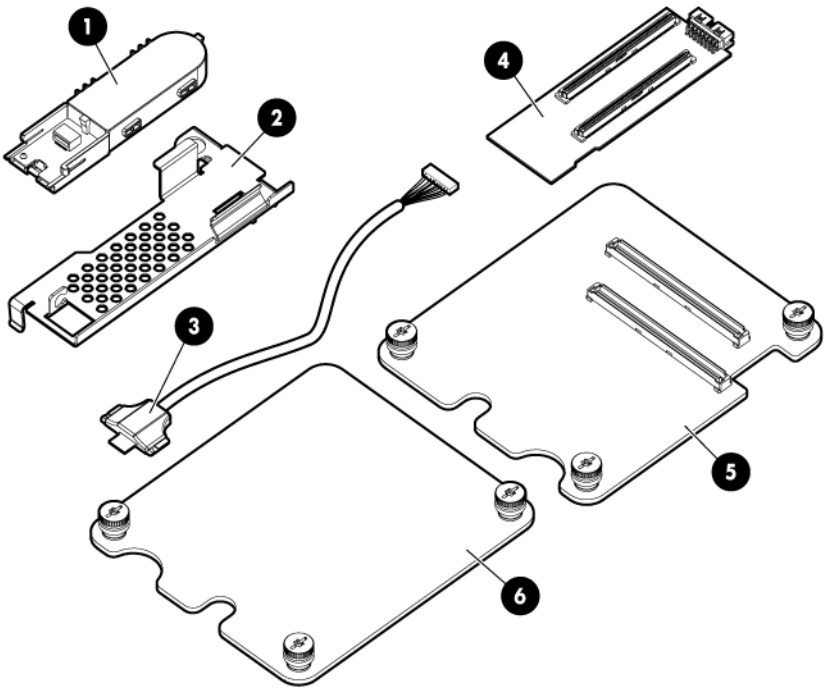
C HP Smart Array P700m/512 Controller

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 Integrity i2 server blades.

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 section.

Battery kit and other components

The battery kit includes the following:



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

IMPORTANT: Integrity BL8X0c i2 products use 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 for Integrity i2 server blades.

Battery mounting bracket parts

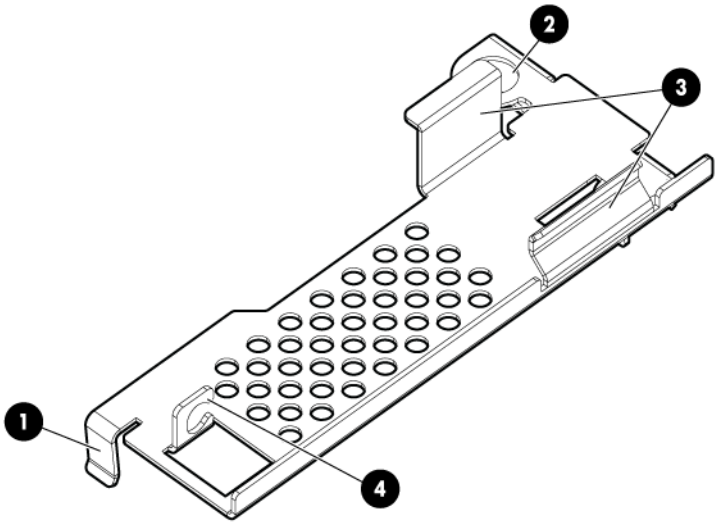
The BBWC battery mounts on a black metal battery mounting bracket installed inside the server blade. The mounting bracket clips onto a mezzanine card in slot 1. If no card is used in slot 1, the mezzanine card blank option must be installed for the bracket to clip on to.

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

Installing the Controller Board

Mezzanine slot support and preference:

The HP Smart Array P700m/512 Controller is only supported in slots 1 or 3 in Integrity i2 server blades, it is not supported in mezzanine slot 2. If you need to 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.

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 "Installing mezzanine cards" (page 36) 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 need to remove the cache module to transfer data, the BBWC battery must remain connected to it so that the data is preserved. If possible, HP recommends that you install the P700m into slot 3 so that the cache and battery can be removed together.

1. Power down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Remove the DIMM baffle ("Removing the DIMM baffle")

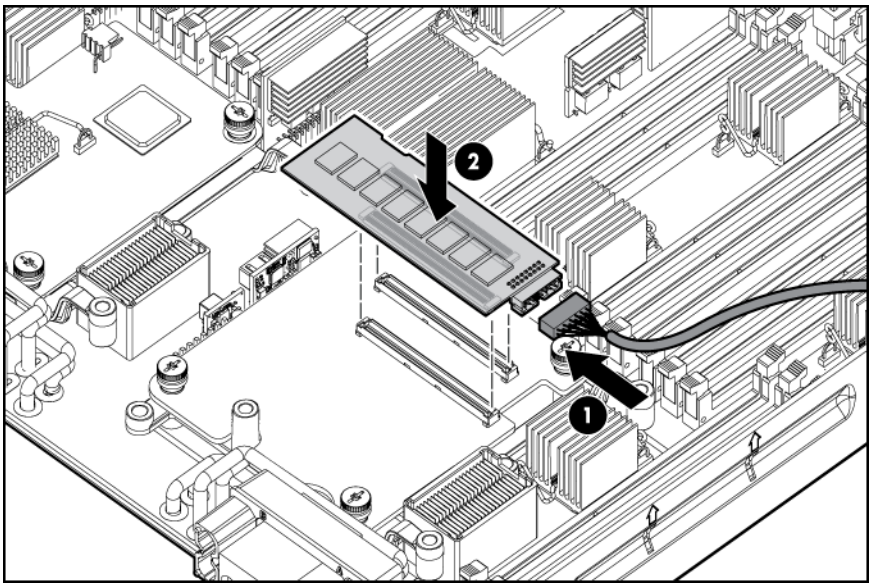
4. Remove any mezzanine cards blocking access to the HP Smart Array P700m/512 Controller ("Removing a mezzanine card").
5. Plug the smaller battery cable plug into the cache module battery connector.

IMPORTANT: Only use the 11.5 inch 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 cache module's two 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, routing the cable so its battery end is on the side of the hook that is away from slot 3.
   c. 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 ("Replacing a mezzanine card").

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 down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Remove the DIMM baffle ("Removing the DIMM baffle")

4. Temporarily remove any mezzanine card installed in slot 2 (“Removing a mezzanine card”).

NOTE: If you will be installing the BBWC battery, ensure 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.

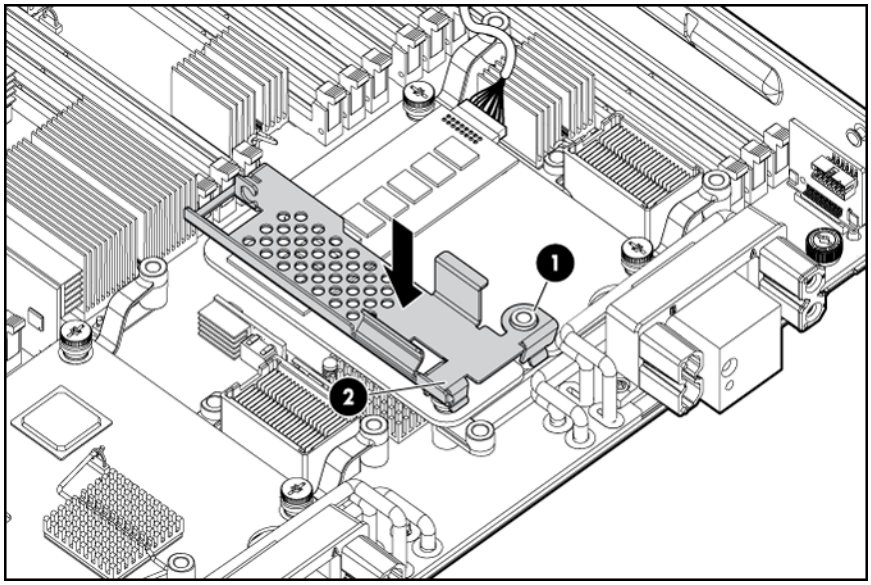
5. Clip the mounting bracket onto the mezzanine card or mezzanine card blank.

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.

WARNING! To avoid damage to the power cable ensure the battery bracket does not pinch the power cable to the power connectors.

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



8. Replace any mezzanine cards that you had to remove from mezzanine slot 2 (“Replacing a mezzanine card”).

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 down the server blade and remove it from the server blade enclosure (“Preparing the server blade for servicing”).
2. Remove the access panel (“Removing the server blade access panel”).

3. Remove the DIMM baffle (“Removing the DIMM baffle”).
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's cache module (“Removing a mezzanine card”).
   b. Temporarily remove the cache module so you can access the module's battery connector (“Removing the 512MB cache module”).

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

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.

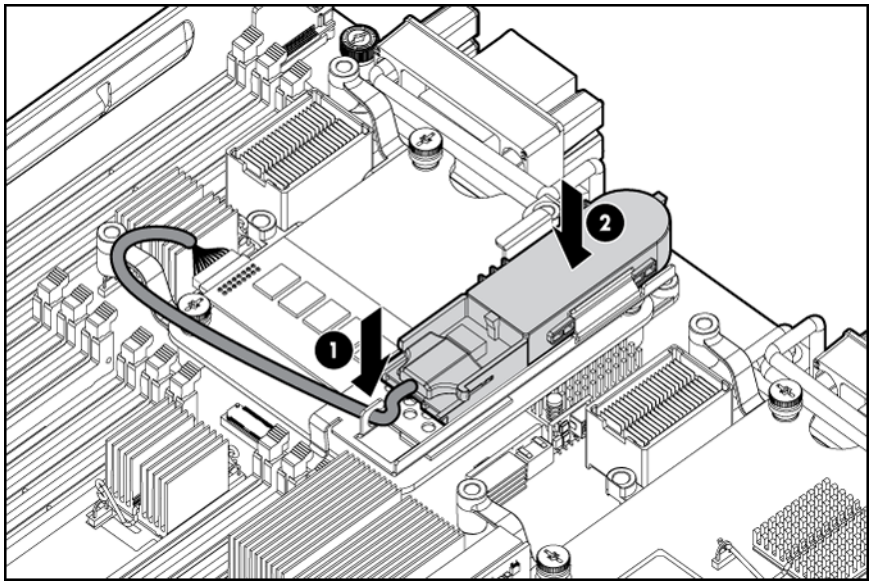
6. If you had to remove the cache module, reinstall it (“Replacing the 512MB cache module”).
7. With the battery cable plug label (contoured side) up line up the plug's thin edges with the thin slits on the sides of the battery.

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. Once 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 down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
3. Remove the access panel ("Removing the server blade access panel").
4. Remove the DIMM baffle ("Removing the DIMM baffle")
5. Proceeding steps will differ depending on which slot the P700m is installed in:
   - Slot 1
     1. Remove any mezzanine card installed in slot 2 ("Removing a mezzanine card").

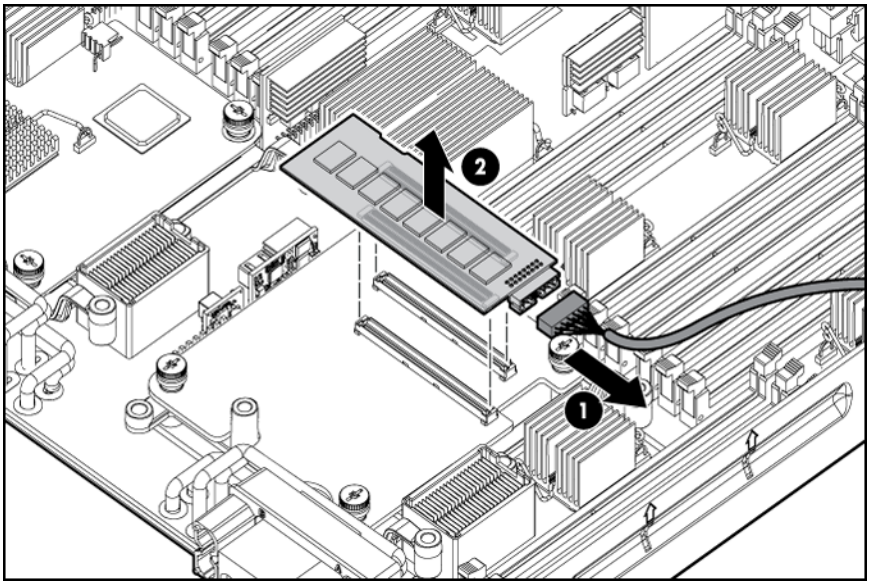
2. Lift the battery straight up to remove it from the battery mounting bracket.
3. Push the battery cable down and towards the rear of the server blade to push it out of the battery bracket's C-hook.
4. Remove the battery mounting bracket from the mezzanine card or mezzanine card blank by pulling straight up on the bracket and lifting the bracket out of the server.

- Slot 3
  1. Lift the BBWC battery straight up to remove it from the battery mounting bracket.
  2. Push the battery cable down and towards the rear of the server blade to push it out from under the battery bracket's C-hook.

6. Pull straight up on the cache module to remove it from the controller.
7. Lift the cache module and the attached battery out of the server blade.

CAUTION: If you need to remove the cache module to transfer data the battery must remain connected so that the data is preserved.

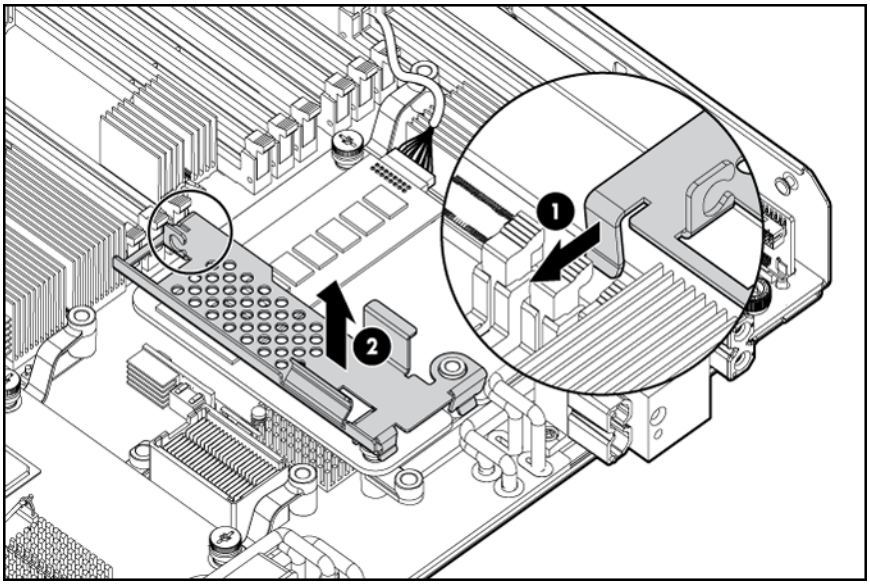
8. If you will be replacing the cache module, unplug the battery cable from the cache module's battery connector ("Replacing the 512MB cache module").



Removing the battery mounting bracket

1. Power down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
2. Remove the access panel ("Removing the server blade access panel").
3. Remove the DIMM baffle ("Removing the DIMM baffle" (page 77))
4. Remove any mezzanine card installed in slot 2 ("Removing a mezzanine card").
5. If installed, remove the BBWC battery ("Removing the BBWC battery").

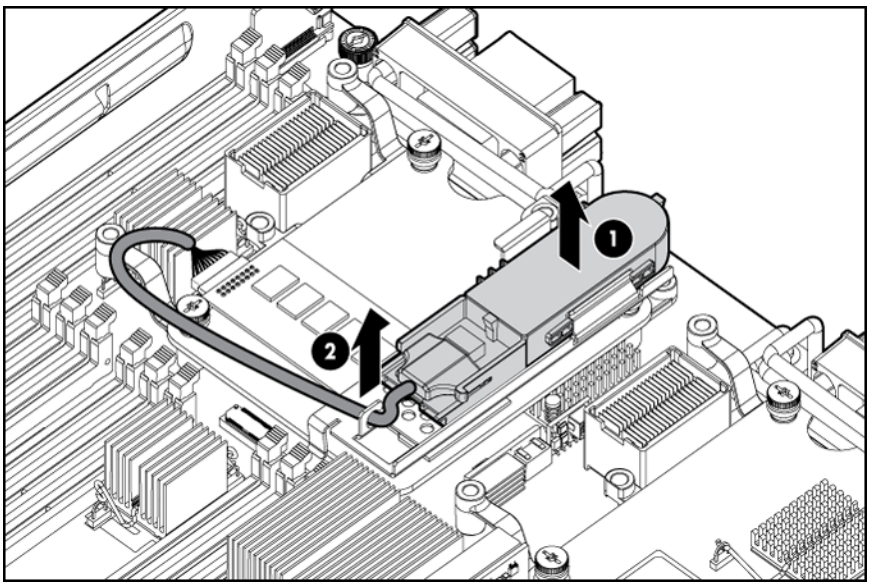
6. Remove the battery mounting bracket



Removing the BBWC battery

CAUTION: If you need to remove the cache module to transfer data, the battery must remain connected so that the data is preserved. If you need to 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 down the server blade and remove it from the server blade enclosure ("Preparing the server blade for servicing").
4. Remove the access panel ("Removing the server blade access panel").
5. Remove the DIMM baffle ("Removing the DIMM baffle")
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.

D 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.

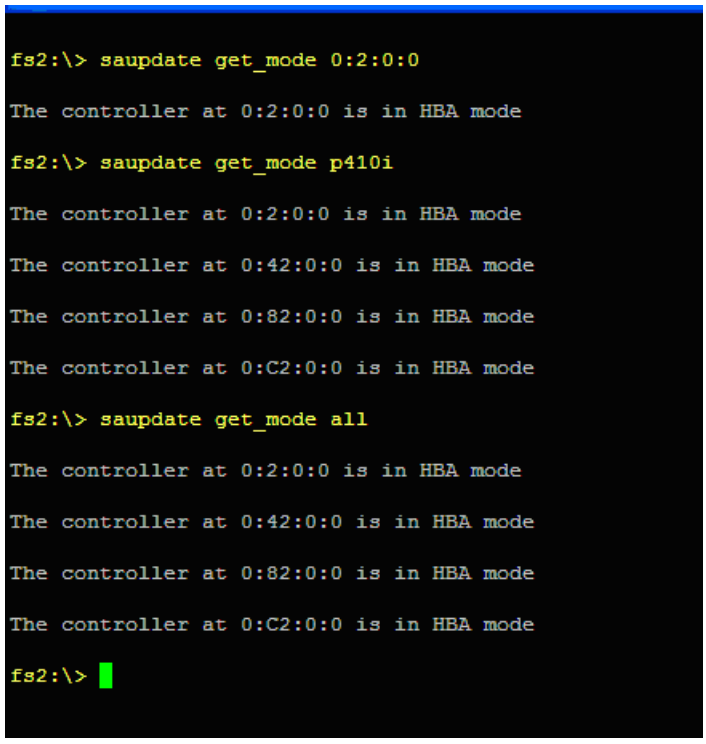
Syntax

```
saupdate get_mode <controller>
```

<controller> can be any one of the strings listed in Table D-1.

Table D-1 <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



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.

Set mode is used 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
```

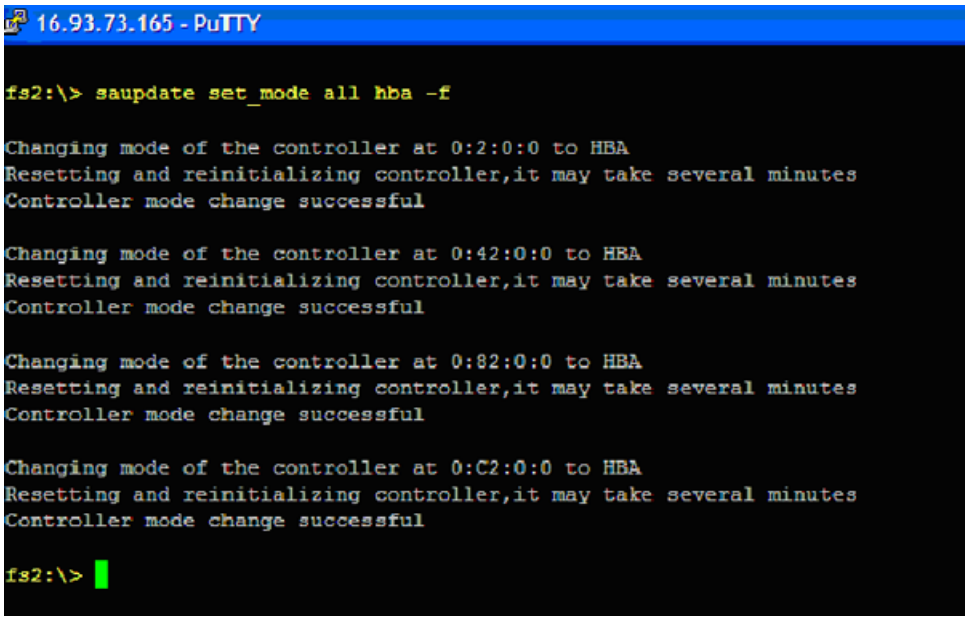
Syntax

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

`<controller>` can be any one of the strings listed in Table D-1 (page 115).

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.



NOTE: All commands are case-insensitive. A system reset is not required after a mode change.

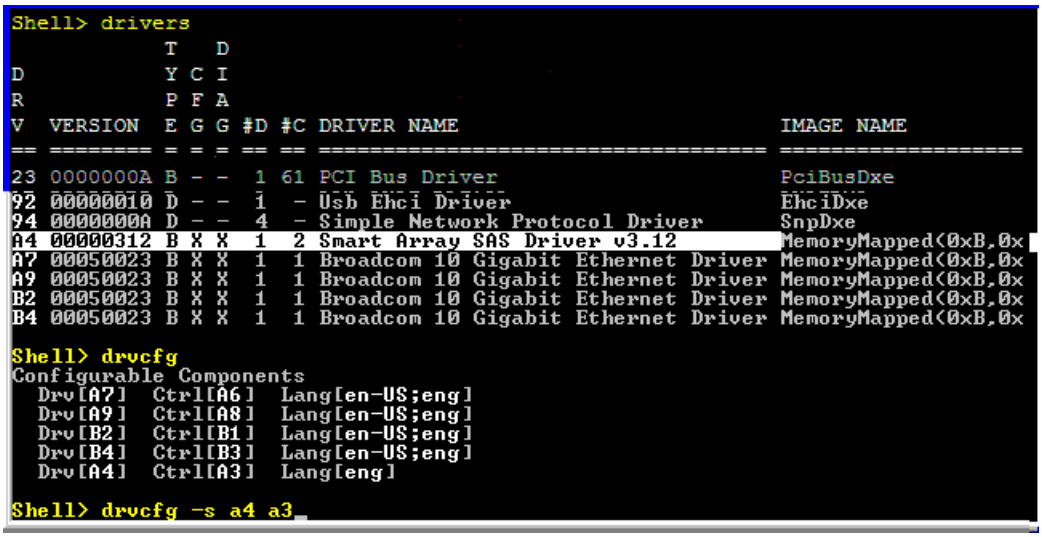
Updating the firmware using `saupdate`

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.

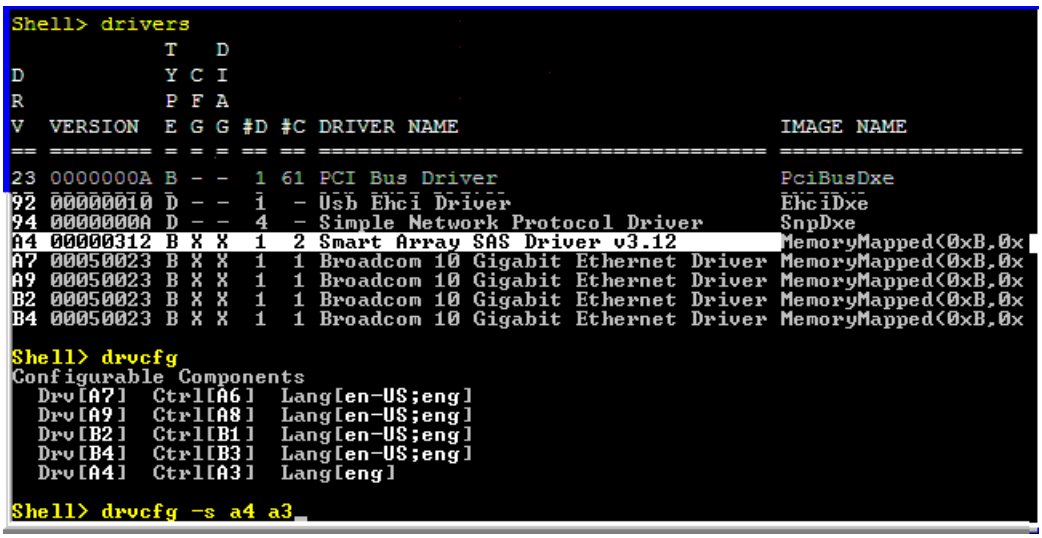


Configuring RAID volumes using the ORCA menu-driven interface

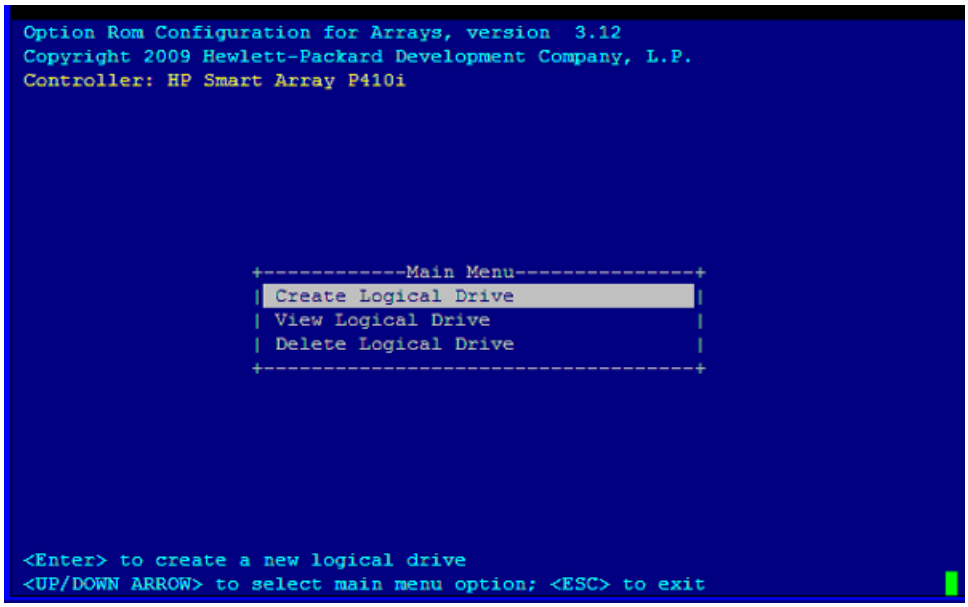
NOTE: HP-UX software mirroring, RAID support for external storage and RAID support for the SB40c storage blade are currently available. Internal RAID (RAID 0, RAID 1, RAID 1+0) logical drive support is not currently supported.

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**

From the UEFI Shell, enter `drvcfg -s <Driver ID> <Ctril ID>`. To locate this information, see "Determining the Driver ID and CTRL ID" (page 116).



The ORCA main menu will appear.



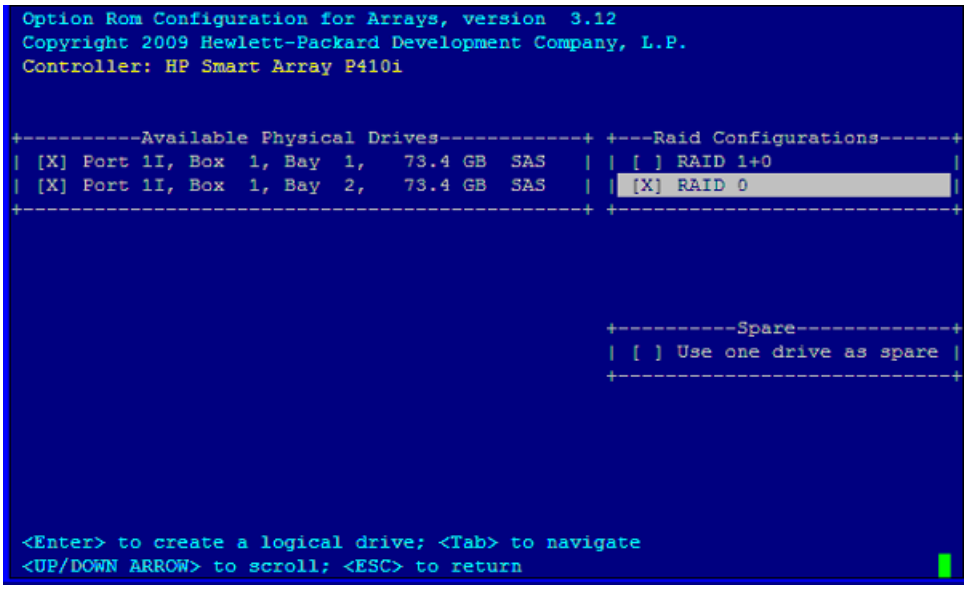
The ORCA main menu contains the following options:

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

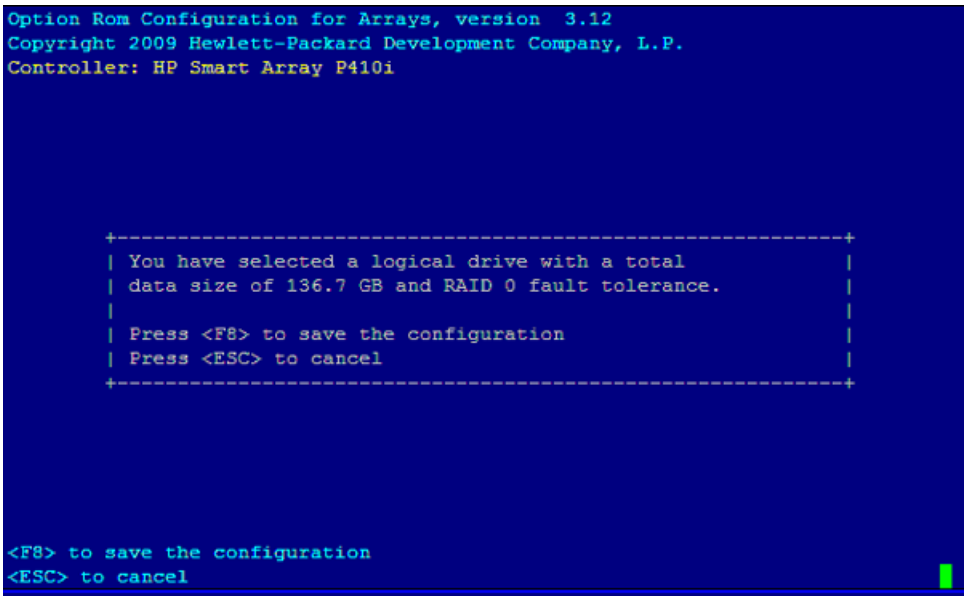
NOTE: If you are configuring the HP Smart Array P700m/512 Controller or the HP StorageWorks SB40c storage blade (P400 controller), then you can enter ORCA from POST by pressing the **F8** key when prompted.

Creating a logical drive

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



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.

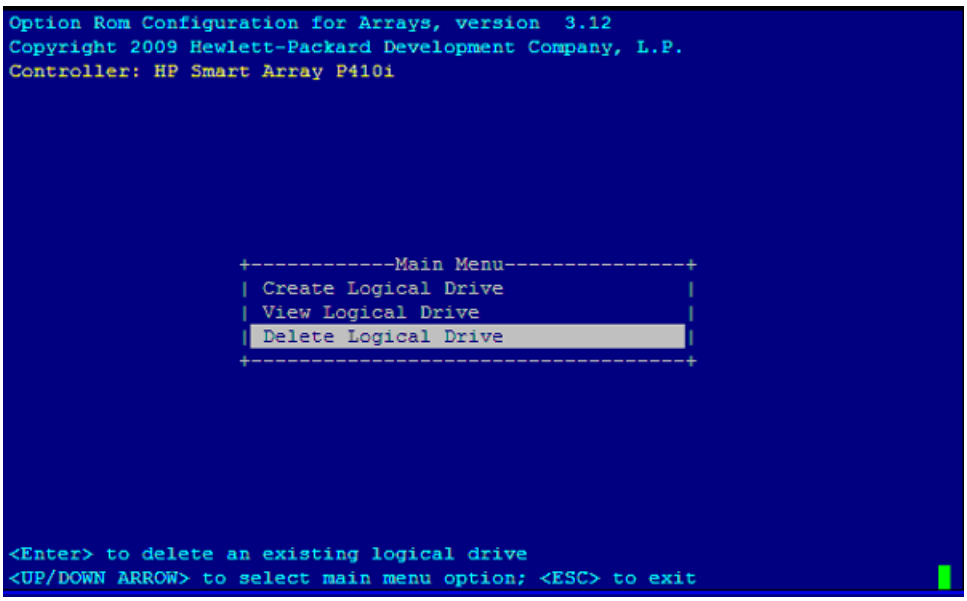


6. To save the configuration, press F8.
7. To acknowledge that the configuration was saved and return to the ORCA Main Menu, press **Enter**.

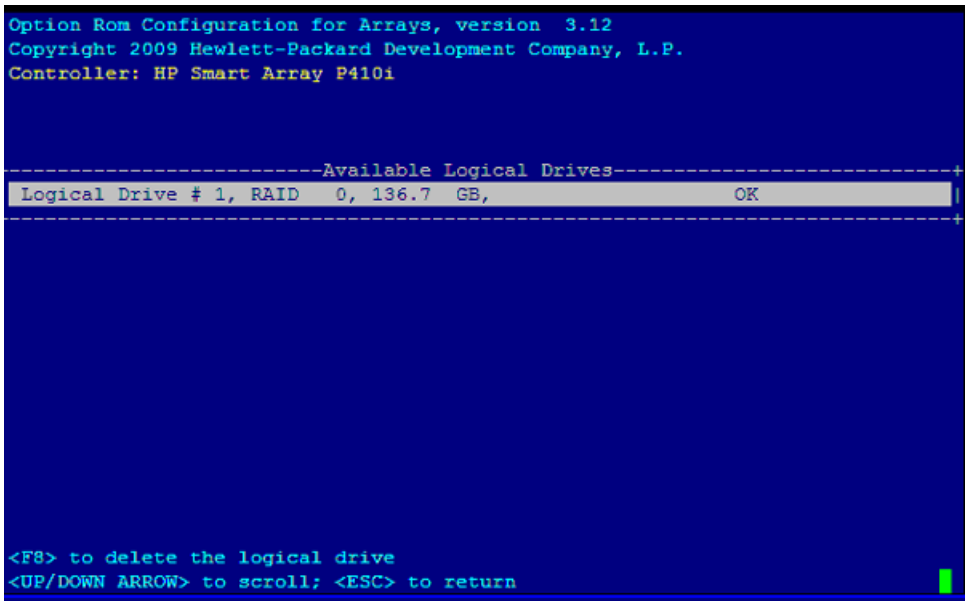
Deleting a logical drive

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

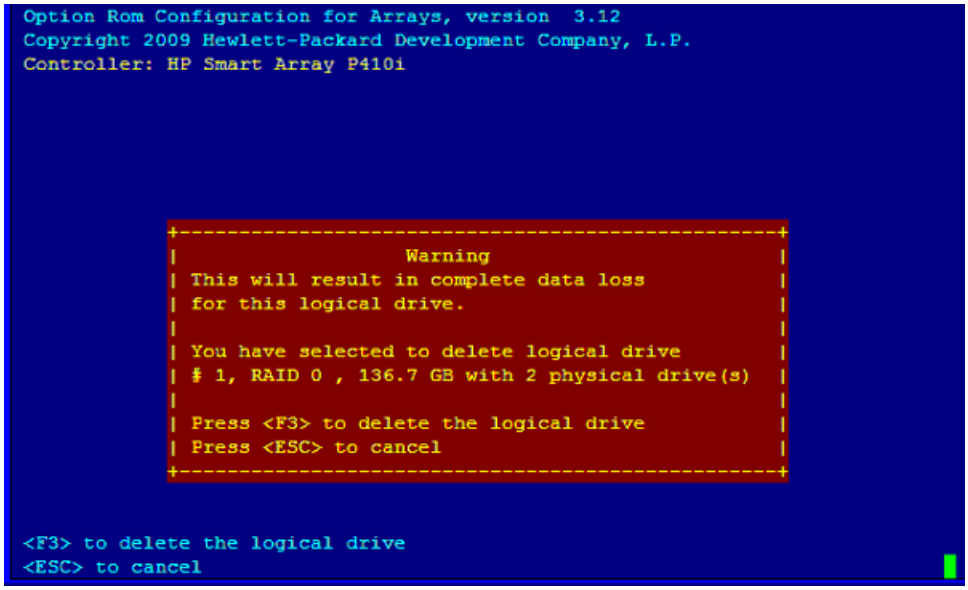
1. At the ORCA main menu, select Delete Logical Drive.



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

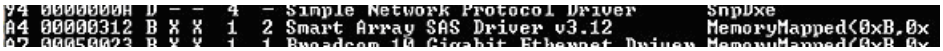
`saupdate.efi list`

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

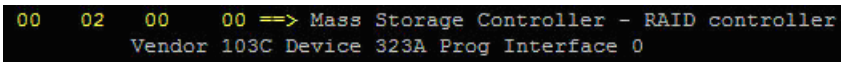
`drivers`

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



`pci-i <path>`

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



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