HP StorageWorks
All-in-One SB600c Storage Blade Solution
user guide

Part number: 452693–001
First edition: September 2007

Legal and notice information

Printed in the US

Contents

About this guide . . . 7
- Intended audience . . . 7
- Related documentation . . . 7
- Document conventions and symbols . . . 8
- Rack stability . . . 8
- HP technical support . . . 9
- Product warranties . . . 9
- Subscription service . . . 9
- HP websites . . . 9
- Documentation feedback . . . 9

1 Setup . . . 11
- Shipping carton contents . . . 11
- Installing an HP BladeSystem c-Class enclosure . . . 11
  - HP BladeSystem c7000 Enclosure . . . 11
  - HP BladeSystem c3000 Enclosure . . . 12
- Installation guidelines . . . 12
  - HP AiO SB600c Server and Storage Blades . . . 13
- Installing the HP AiO SB600c Server and Storage Blades . . . 13
  - Installing interconnect modules . . . 17
  - Interconnect bay numbering and device mapping for the c7000 Blade enclosure . . . 17
  - Interconnect bay numbering and device mapping for the c3000 Blade enclosure . . . 18

2 Operations . . . 19
- Powering up the HP All-in-One SB600c Storage Blade Solution . . . 19
- Powering down the HP All-in-One SB600c Storage Blade Solution . . . 19
  - Virtual Power Button . . . 20
  - Manual Power Button . . . 20
- Removing the HP AiO SB600c Server Blade . . . 20
- Removing the access panel . . . 21
- Installing the access panel . . . 22

3 Hardware Options installation and cabling . . . 23
- Introduction . . . 23
- Processor option . . . 23
- Memory options . . . 31
  - Installing FBDIMMs . . . 31
  - Mezzanine card option . . . 31
- Cabling . . . 33
  - Using the local I/O cable . . . 33
  - Connecting locally to a server blade with video and USB devices . . . 33
    - Accessing a server blade with local KVM . . . 33
    - Accessing a server blade with local media devices . . . 34

4 Configuration utilities . . . 37
- iLO 2 . . . 37
- System Recovery DVD . . . 37
  - iLO 2 virtual DVD-ROM . . . 38

USB DVD-ROM . . . 38
Configuration tools . . . 38
Array Configuration Utility . . . 38
Keeping the system current . . . 39
All-in-One SB600c Storage Blade Solution updates . . . 39
HP Care Pack . . . 39

5 Troubleshooting . . . 41
Troubleshooting resources . . . 41
HP web site . . . 41
Storage system documentation . . . 41
Subscriber's Choice . . . 41
White papers . . . 41
Firmware updates . . . 41

A All-in-One SB600c Storage Blade Solution components . . . 43
HP All-in-One SB600c Server Blade LEDs . . . 43
HP All-in-One SB600c Storage Blade LEDs . . . 45
SAS and SATA components . . . 46
System board components . . . 48
Mezzanine connector definitions . . . 49
System maintenance switches . . . 49

B Regulatory Compliance Notices and Safety . . . 51
Regulatory compliance identification numbers . . . 51
Federal Communications Commission notice . . . 51
FCC rating label . . . 51
Class A Equipment . . . 52
Class B Equipment . . . 52
Declaration of conformity for products marked with the FCC logo, United States only . . . 52
Modifications . . . 52
Cables . . . 52
Canadian notice (Avis Canadien) . . . 53
European Union regulatory notice . . . 53
Disposal of waste equipment by users in private households in the European Union . . . 53
Japanese notice . . . 54
BSMI notice . . . 54
Korean notice . . . 54
Laser compliance . . . 55
Battery replacement notice . . . 55
Taiwan battery recycling notice . . . 55
Preventing electrostatic discharge . . . 56
Grounding methods to prevent electrostatic discharge . . . 56
Environmental specifications . . . 57

Index . . . 59

Figures

1 c7000 Enclosure half-height device bay numbering 12
2 c3000 Enclosure half-height device bay numbering 12
3 c7000 Blade enclosure interconnect bay numbering 17
4 c3000 Blade enclosure interconnect bay numbering 18
5 Installing FBDIMMs 31
6 Removing the mezzanine connector cover 32
7 Installing the mezzanine card. 32
8 Connecting with a local KVM 34
9 Connecting with local media devices 35
10 HP All-in-One SB600c Server Blade LEDs 43
11 HP All-in-One SB600c Storage Blade LEDs 45
12 SAS and SATA device numbers 46
13 SAS and SATA hard drive LEDs 46
14 System board components 48

Tables

1 Document conventions 8
2 Interconnect bay numbering and device mapping c7000 Blade enclosure 18
3 Interconnect bay numbering and device mapping ports c3000 Blade enclosure 18
4 Local KVM connection components 34
5 USB Hub devices 35
6 HP All-in-One SB600c Server Blade LEDs 44
7 HP All-in-One SB600c Storage Blade LEDs 45
8 SAS and SATA hard drive LEDs 46
9 SAS and SATA hard drive LED combinations 47
10 System board components 48
11 FBDIMM slot numbering 49
12 Mezzanine connector definitions 49
13 System maintenance switches 49
14 Disposal of waste equipement 53
15 Battery replacement notice 55
16 Environmental specifications 57

About this guide

This guide provides information about:

- All-in-One SB600c Storage Blade Solution

Intended audience

HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels. This guide is intended for IT administrators with knowledge of:

- installation of servers and storage systems
- administration of servers and storage systems
- troubleshooting servers and storage systems

Related documentation

The following documents provide related information:

- HP BladeSystem Onboard Administrator user guide
- HP Integrated Lights-Out 2 user guide
- HP BladeSystem c3000 enclosure setup and installation guide
- HP BladeSystem c7000 enclosure setup and installation guide
- HP Proliant Blade troubleshooting guide

You can find these documents from the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/manuals

In the Storage section, click **Disk Storage Systems** and then select your product.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Blue text: Table 1	Cross-reference links and e-mail addresses
Blue, underlined text: http://www.hp.com	website addresses
Bold text	• Keys that are pressed • Text typed into a GUI element, such as a box • GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes
Italic text	Text emphasis
`Monospace` text	• File and directory names • System output • Code • Commands, their arguments, and argument values
`Monospace, italic` text	• Code variables • Command variables
`Monospace, bold` text	Emphasized monospace text

⚠ WARNING!

Indicates that failure to follow directions could result in bodily harm or death.

△ CAUTION:

Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT:

Provides clarifying information or specific instructions.

NOTE:

Provides additional information.

TIP:

Provides helpful hints and shortcuts.

Rack stability

Rack stability protects personnel and equipment.

⚠ WARNING!

To reduce the risk of personal injury or damage to equipment:

- Extend leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, fasten racks together securely.
- Extend only one rack component at a time. Racks can become unstable if more than one component is extended.

HP technical support

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Product warranties

For information about HP StorageWorks product warranties, see the warranty information website:

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

Subscription service

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

http://www.hp.com/go/e-updates

After registering, you will receive e-mail notification of product enhancements, new driver versions, firmware updates, and other product resources.

HP websites

For additional information, see the following HP websites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/service_locator
- http://www.hp.com/support/manuals
- http://www.hp.com/support/downloads

Documentation feedback

HP welcomes your feedback.

To make comments and suggestions about product documentation, please send a message to storagedocs.feedback@hp.com. All submissions become the property of HP.

1 Setup

In this section:

- Shipping carton contents
- Installing an HP BladeSystem c-Class enclosure
- Installation guidelines
- Installing the HP AiO SB600c Server and Storage Blades

Shipping carton contents

When unpacking the HP All-in-One SB600c Storage Blade Solution, check for the following items:

- HP Storageworks SB600c server blade
- HP StorageWorks SB600c storage blade
- Local I/O cable
- Documentation Kit, Safety and Disposal Documentation CD
- HP StorageWorks AiO Storage Blade System Recovery DVD
- End User License Agreement

Documentation is also available in the following locations:

- Documentation CD that ships with the enclosure
- HP Business Support Center website http://www.hp.com/support
- HP Technical Documentation websitehttp://docs.hp.com

Installing an HP BladeSystem c-Class enclosure

Before performing any procedures specific to the HP AiO SB600c Storage Blade Solution, install an HP BladeSystem c-Class enclosure.

IMPORTANT:

If your HP AiO SB600c Storage Blade Solution is factory-integrated, the server and storage blades are pre-installed in an HP BladeSystem c-Class enclosure. For instructions on connecting the enclosure to the network and powering it on, see the installation guides that are shipped with the enclosures.

HP BladeSystem c7000 Enclosure

The colors correspond to a partner bay; for example 1 and 2 are in one partner bay.

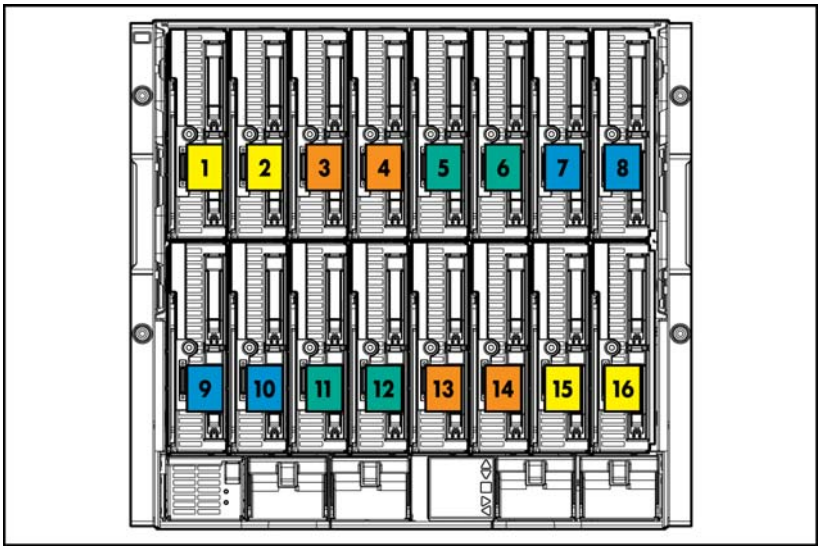


Figure 1 c7000 Enclosure half-height device bay numbering

HP BladeSystem c3000 Enclosure

The colors correspond to a partner bay; for example 1 and 2 are in one partner bay.

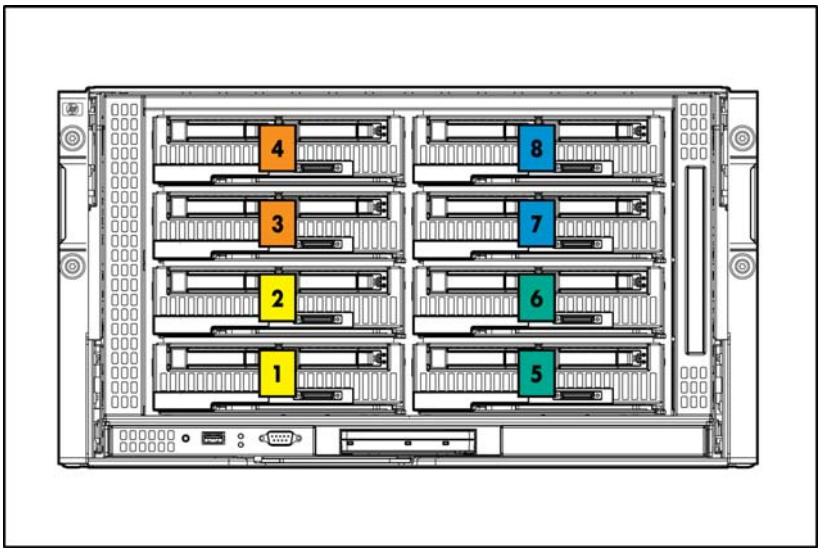


Figure 2 c3000 Enclosure half-height device bay numbering

Installation guidelines

Observe the following guidelines when installing the server and storage blades for the HP AiO SB600c:

- Install the storage blade prior to installing the server blade
- Before installing and initializing the server blade, install any server blade options, such as an additional processor or mezzanine card.

Onboard Administrator is used to configure the enclosure and the HP AiO SB600c. To function with the HP AiO SB600c, Onboard Administrator version 1.30 or later is required.

HP AiO SB600c Server and Storage Blades

SB600c server and storage blades support each other in partner bays. Each partner bay will hold one server blade and one storage blade.

- If the storage blade is installed in an odd-numbered bay, install the partner server blade in the adjacent even-numbered bay to the right.
- If the storage blade is installed in an even-numbered bay, install the partner server blade in the adjacent odd-numbered bay to the left.

Installing the HP AiO SB600c Server and Storage Blades

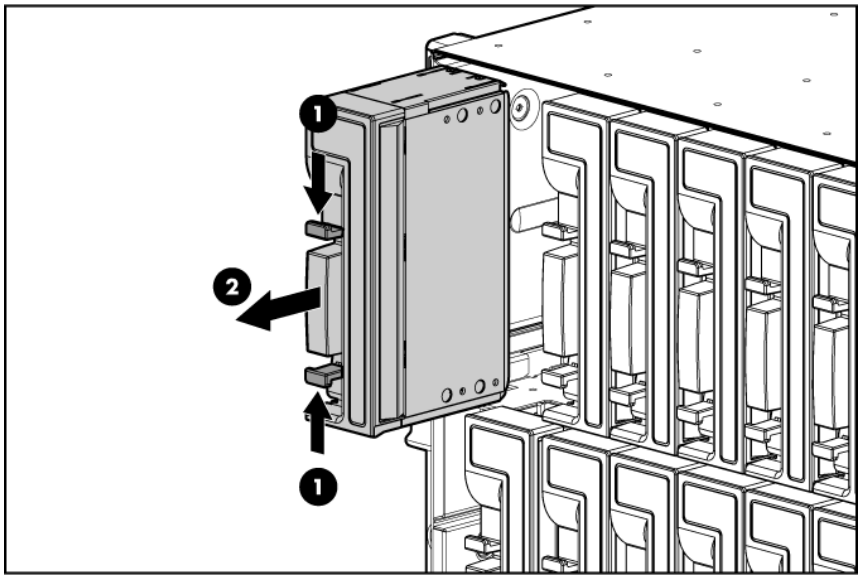
IMPORTANT:

Install the storage blade prior to installing the server blade.

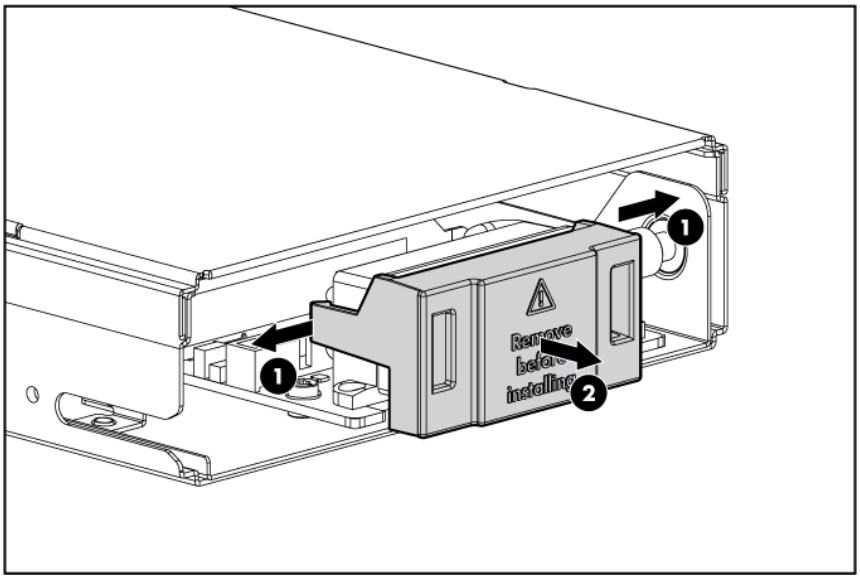
CAUTION:

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.

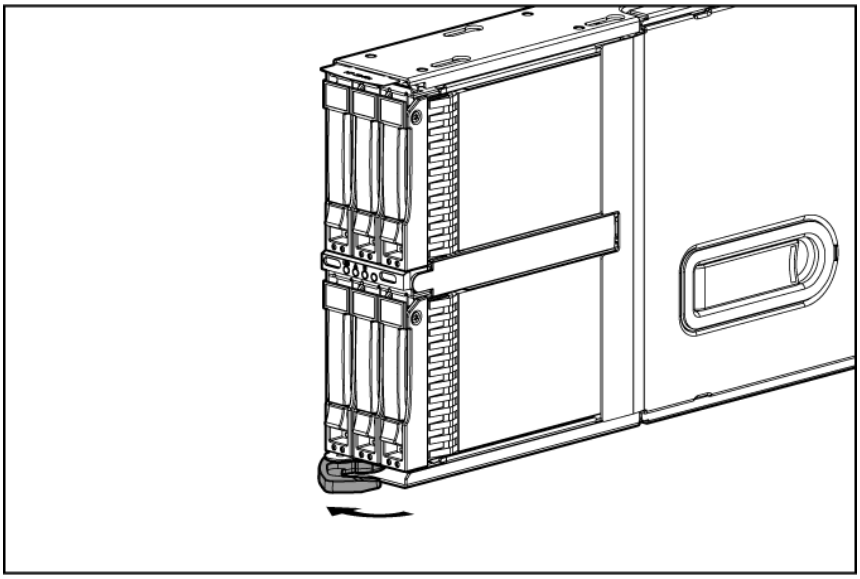
1. Remove the blank.



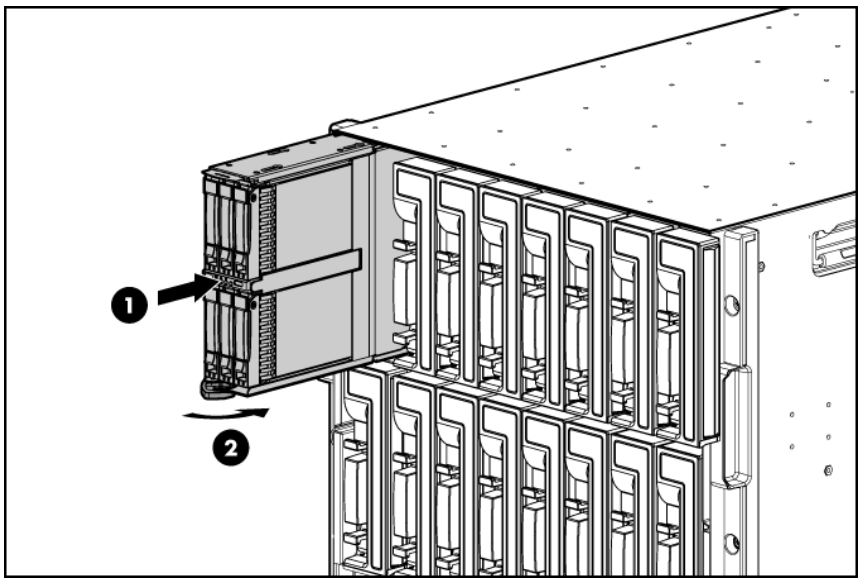
2. Remove the enclosure connector cover.



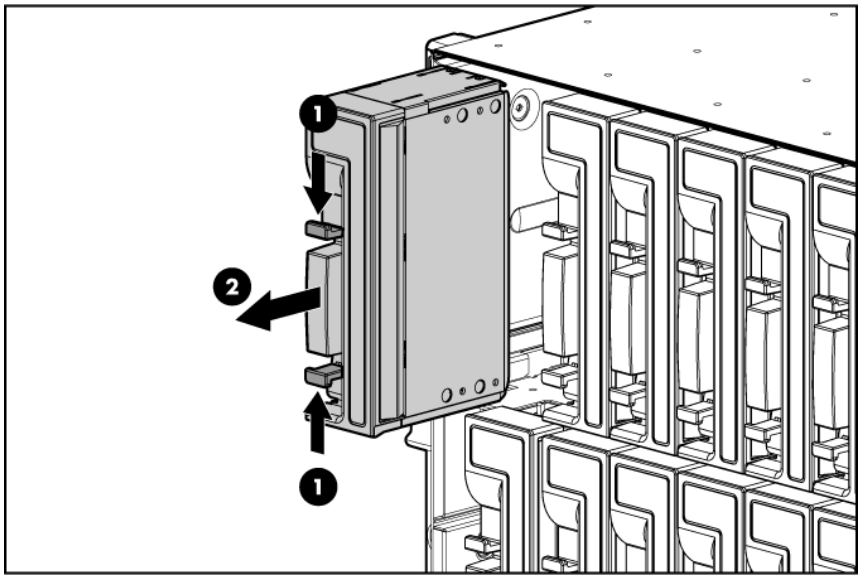
3. Open the locking clip at the bottom of the front panel of the storage blade.



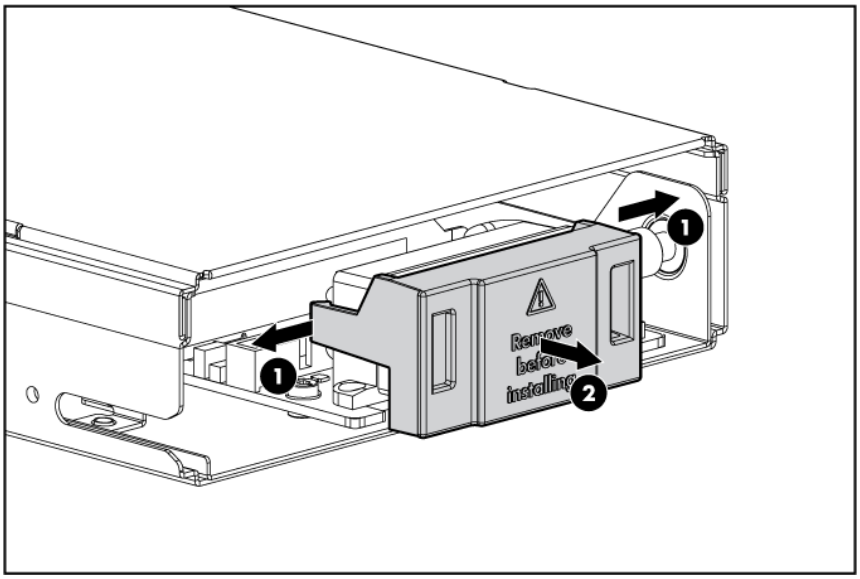
4. Install the storage blade by inserting it fully into one of the two partner bays, and closing the locking clip.



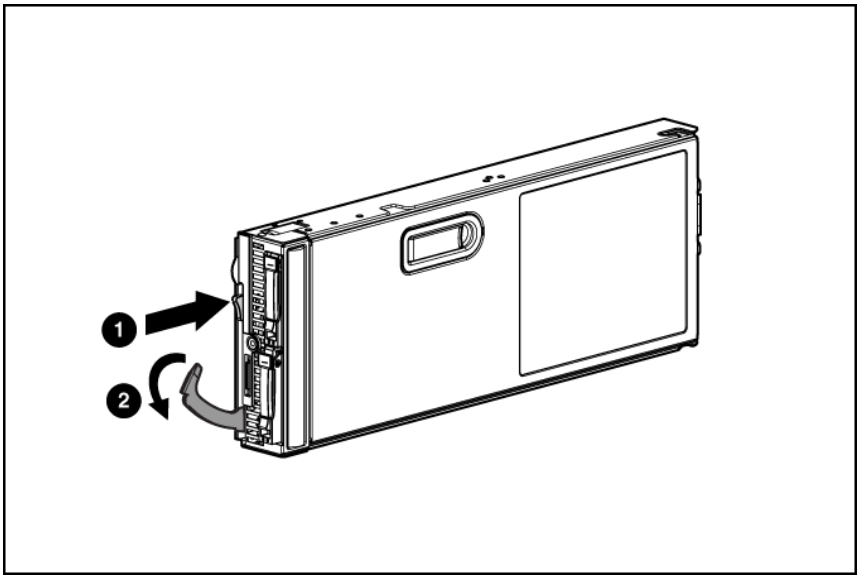
5. Remove a second blank from the adjacent partner bay.



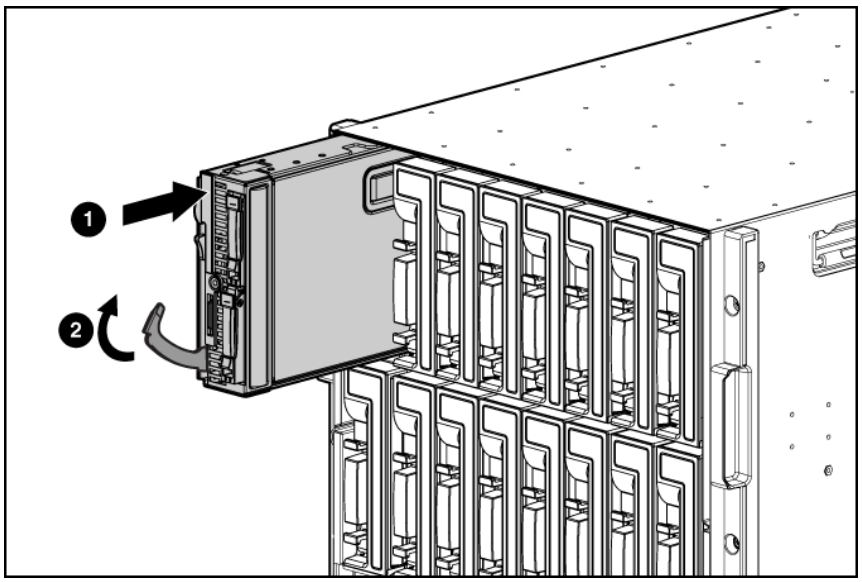
6. Remove the enclosure connector cover from the server blade and the Product Licenses Agreement label.



7. Open the locking clip on the left side of the server blade.



8. Install the server blade by inserting it fully into the device bay and closing the locking clip.



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 for the c7000 Blade enclosure

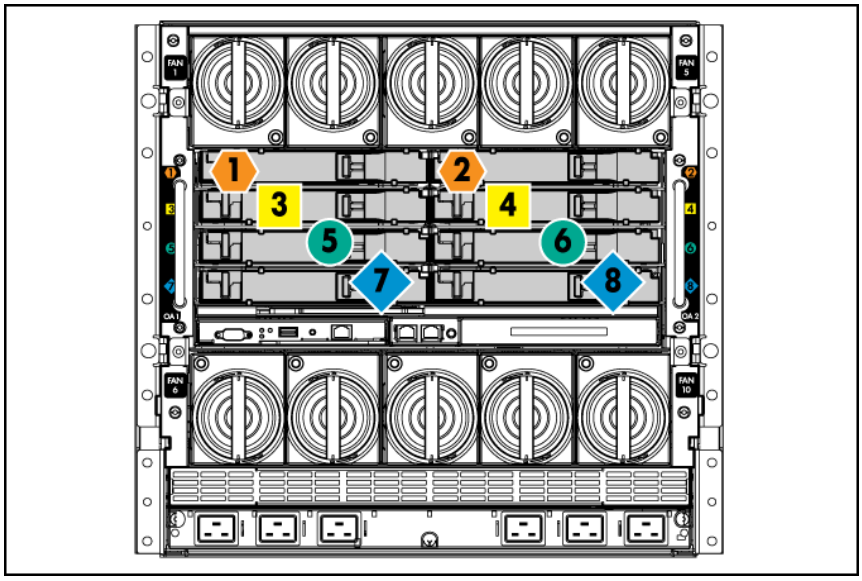


Figure 3 c7000 Blade enclosure interconnect bay numbering

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

Table 2 Interconnect bay numbering and device mapping c7000 Blade enclosure

Server blade signal	Interconnect bay	Interconnect bay labels
NIC 1 (Embedded)	1	
NIC 2 (Embedded)	2	
Mezzanine 1	3 and 4	
Mezzanine 2	5 and 6	
	7 and 8	

Interconnect bay numbering and device mapping for the c3000 Blade enclosure

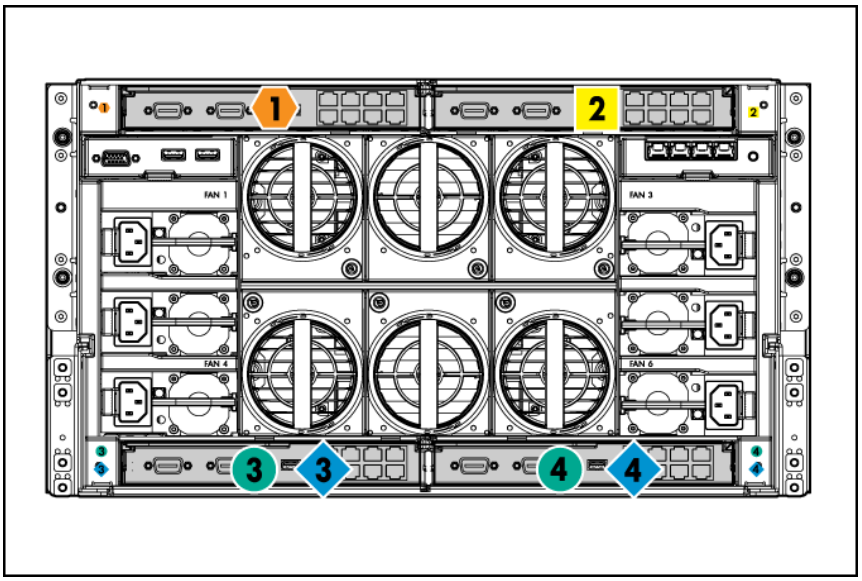


Figure 4 c3000 Blade enclosure interconnect bay numbering

Table 3 Interconnect bay numbering and device mapping ports c3000 Blade enclosure

Server blade signal	Interconnect bay number	Interconnect bay label	Notes
NICs 1, 2 (embedded)	1		—
Mezzanine 1	2		Four port cards connect to bay 2
Mezzanine 2	3,4		Four port cards; Ports 1 and 3 connect to bay 3. 2 and 4 connect to bay 4.

For detailed port mapping information, see the*HP BladeSystem Enclosure installation poster* or the *HP BladeSystem Enclosure setup and installation guide* at http://www.hp.com/go/bladesystem/documentation

2 Operations

In this section:

- Powering up the HP All-in-One SB600c Storage Blade Solution
- Powering down the HP All-in-One SB600c Storage Blade Solution
- Removing the HP AiO SB600c Server Blade
- Removing the access panel
- Installing the access panel

Powering up the HP All-in-One SB600c Storage Blade Solution

1. Ensure the server blade is powered down.
2. Install the HP AiO SB600c storage blade.

   See Installing the HP AiO SB600c Server and Storage Blades on page 13 for installing storage blades.
3. After the storage blade is installed, the system health LED flashes amber.
4. Install the server blade.

   See Installing the HP AiO SB600c Server and Storage Blades on page 13 for installing server blades.
5. The Onboard Administrator initiates an automatic power-up sequence when the server blades are installed. If the default setting is changed, use one of the following methods to power up the server blade:
   - Use a virtual power button selection through iLO 2.
   - Select the virtual power button on the Onboard Administrator interface.
   - Press and release the Power On/Standby button on the server blade.
6. When the server blade goes from the standby mode to the full power mode, the system power LED changes from amber to green.

For more information about the Onboard Administrator, see *HP BladeSystem Onboard Administrator user guide.*

For more information about iLO 2, see iLO 2 on page 37 for more information.

Powering down the HP All-in-One SB600c Storage Blade Solution

Two different methods are available to power down the HP AiO SB600c Storage Blade Solution, a virtual power button and a power button located on the HP AiO SB600c Server Blade.

The preferred method for closing down the HP AiO SB600c is using the virtual power button through OnBoard Administrator.

NOTE:

Before powering down the HP AiO SB600c for any upgrade or maintenance procedures, perform a backup of critical server data and programs.

IMPORTANT:

When the server blade is in standby mode, auxiliary power is still being provided. To remove all power from the server blade, remove the server blade from the enclosure.

To power down the HP AiO SB600c, first power down the HP AiO SB600c Server Blade. Depending on the Onboard Administrator configuration, use one of the following methods to power down the server blade, the virtual power button or the manual power button located on the server blade.

Virtual Power Button

Two ways are available to access the virtual power button, either through the Onboard Administrator interface or through iLO 2.

- Select the virtual power button through the Onboard Administrator interface. (Preferred method)
- Use a virtual power button selection through iLO 2.

  This method initiates a controlled remote shutdown of applications and the OS before the server blade enters standby mode. You must be logged into the server to complete this task.

Manual Power Button

The manual Power On/Standby button is located on the server blade.

- Press and release the Power On/Standby button.

  This method initiates a controlled shutdown of applications and the OS before the server blade enters standby mode. You must be logged into the server to complete this task

- Press and hold the Power On/Standby button for more than 4 seconds to force the server blade to shut down.

△ CAUTION:

This method should only be used when no other shut down methods are available. Applications and files could be permanently corrupted from this method.

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.

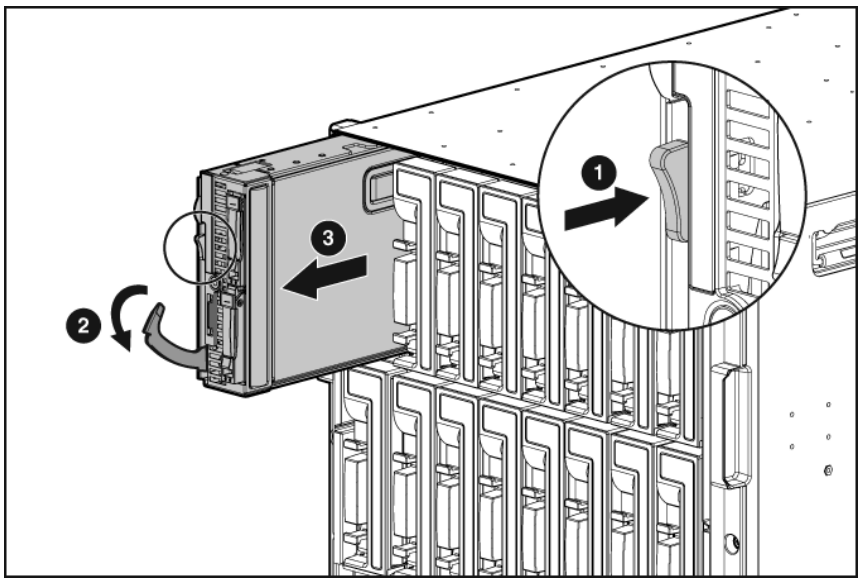
After initiating a virtual power down command, be sure that the server blade goes into standby mode by observing that the system power LED is amber.

Removing the HP AiO SB600c Server Blade

To remove the component:

1. Identify the proper server blade.
2. Power down the server blade.

   See Powering down the HP All-in-One SB600c Storage Blade Solution on page 19 for more information.
3. Ensure the server is completely off before removing the blade from the chassis.
4. Open the locking clip located on the lower left of the server blade.



5. Remove the server blade from the chassis.
6. Place the server blade on a flat, level work 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:

To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause Electrostatic Discharge (ESD).

Removing the access panel

To remove the component:

1. Power down the server blade.

   See Powering down the HP All-in-One SB600c Storage Blade Solution on page 19 for more information.
2. Remove the server blade.

   See Installing the HP AiO SB600c Server and Storage Blades on page 13 for more information.
3. Lift the access panel latch and slide the access panel to the rear.
4. Remove the access panel.

⚠ 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 damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

Installing the access panel

1. Place the access panel on top of the server blade with the hood latch open. Allow the panel to extend past the rear of the server blade approximately 0.8 cm (0.2 in).
2. Engage the anchoring pin with the corresponding hole in the latch.
3. Push down on the hood latch. The access panel slides to a closed position.

3 Hardware Options installation and cabling

In this section

- Introduction
- Processor option
- Memory options
- Cabling

Introduction

The following gives information for installing components and cabling for the HP All-in-One SB600c Storage Solution.

⚠ WARNING!

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

△ CAUTION:

To prevent damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

Processor option

⚠ 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 avoid damage to the system board:

- Do not touch the processor socket contacts.
- Always install the processor socket cover after removing the processor from the socket.
- Do not tilt or slide the processor when lowering the processor into the socket.

△ 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 malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

CAUTION:

To prevent possible server blade overheating, always populate processor socket 2 with a processor and a heatsink or a processor cover and a heatsink blank.

CAUTION:

The heatsink thermal interface media is not reusable and must be replaced if the heatsink is removed from the processor after it has been installed.

IMPORTANT:

When installing the heatsink, align the guide pins on the processor retention bracket with the alignment holes in the heatsink.

IMPORTANT:

Processor socket 1 must always be populated. If processor socket 1 is empty, the server blade does not power up.

NOTE:

Do not discard the processor protective cover. Always install the processor protective cover if the processor is removed from the socket.

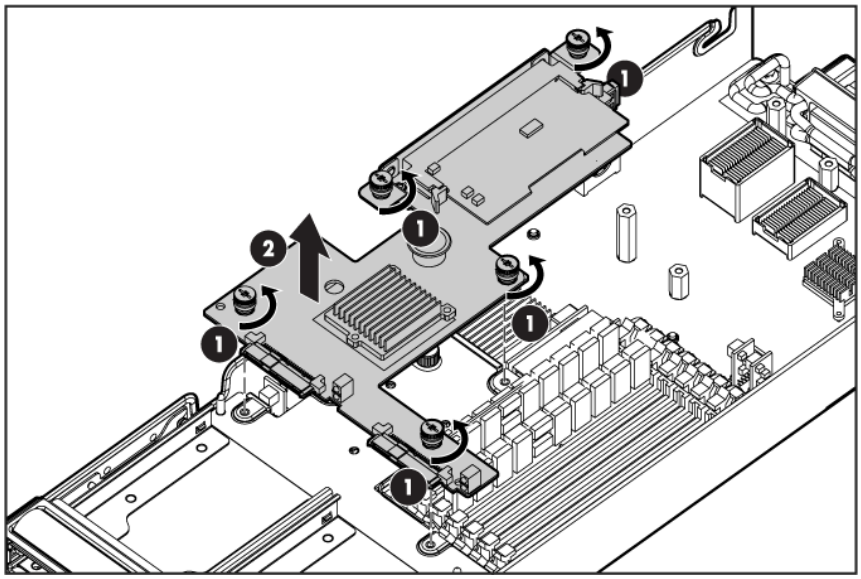
To install the component:

1. Power down the server blade.

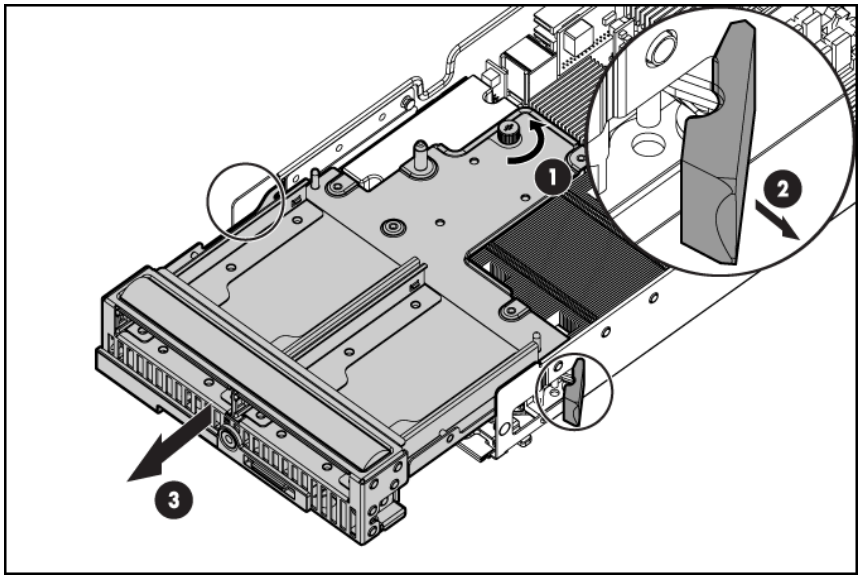
   See Powering down the HP All-in-One SB600c Storage Blade Solution on page 19 for more information.
2. Remove the server blade.

   See Removing the HP AiO SB600c Server Blade on page 20 for more information.
3. Remove the access panel.

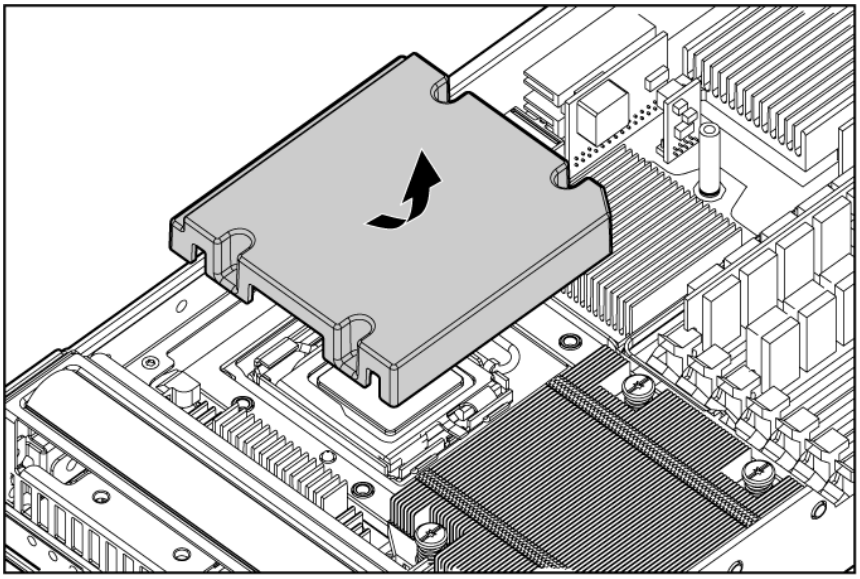
   See Removing the access panel on page 21 for more information.
4. Remove all hard drives.
5. Remove the hard drive backplane.



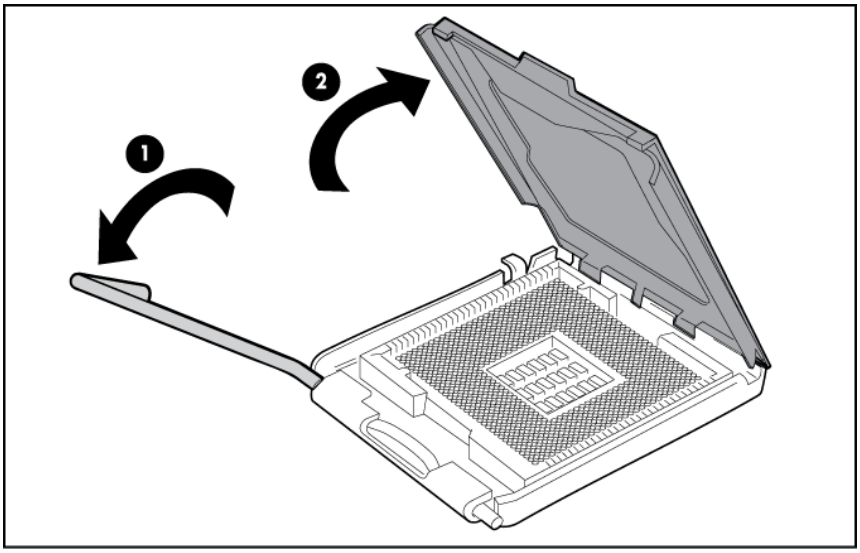
6. Remove the front panel/hard drive cage assembly.



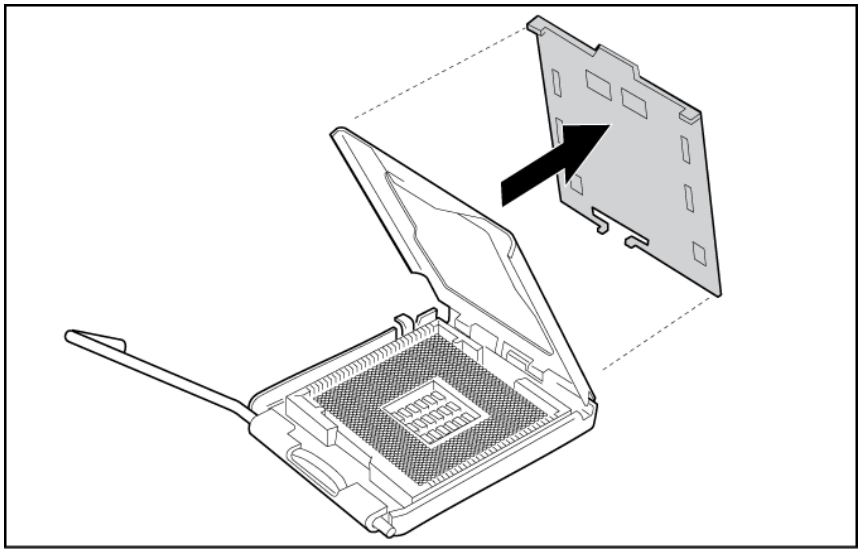
7. Remove the heatsink blank. Retain the heatsink blank for future use.



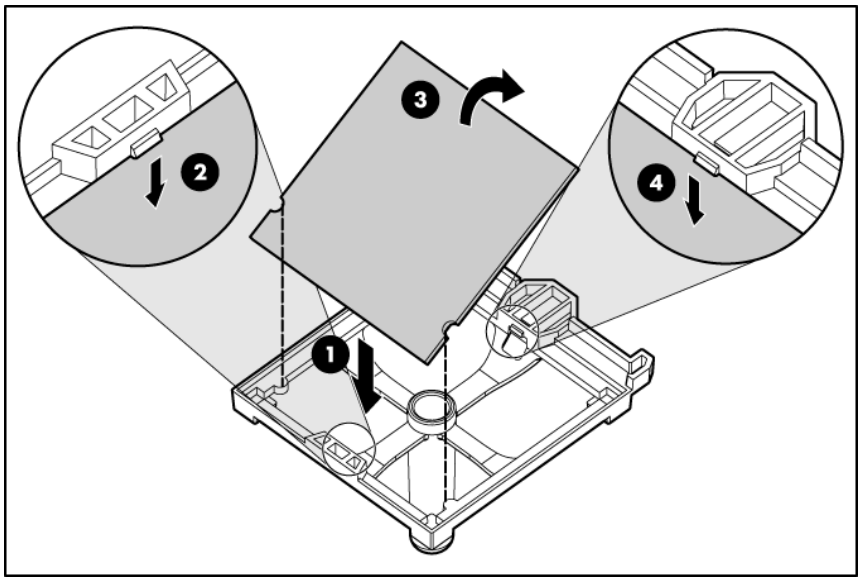
8. Open the processor retaining latch and the processor socket retaining bracket.



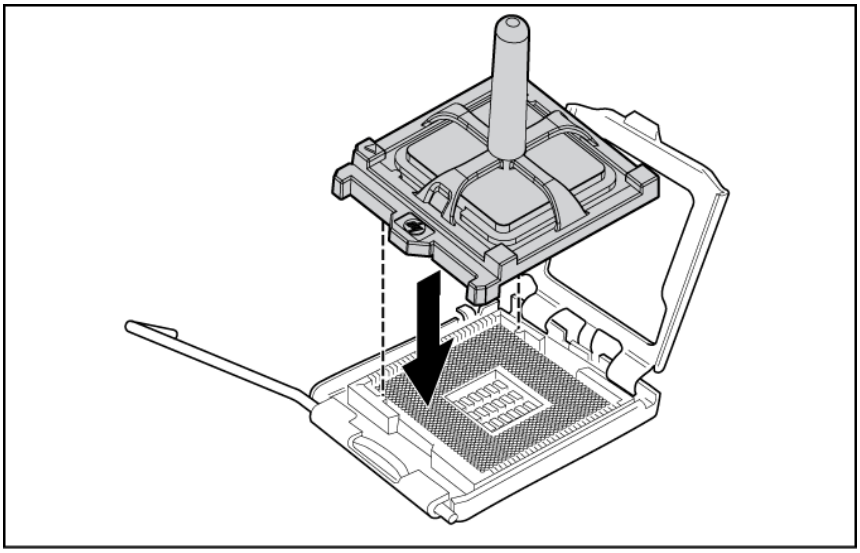
9. Remove the processor socket protective cover.



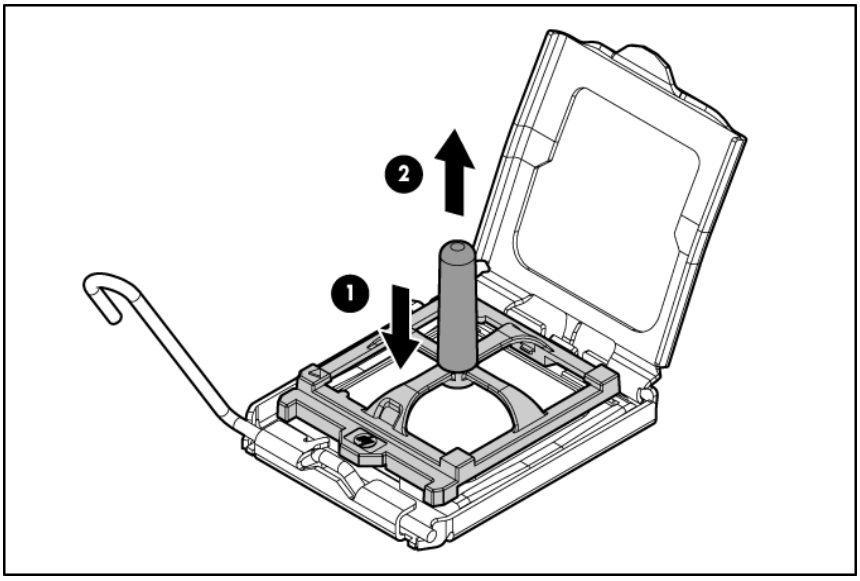
10. If the processor has separated from the installation tool, carefully re-insert the processor in the tool.



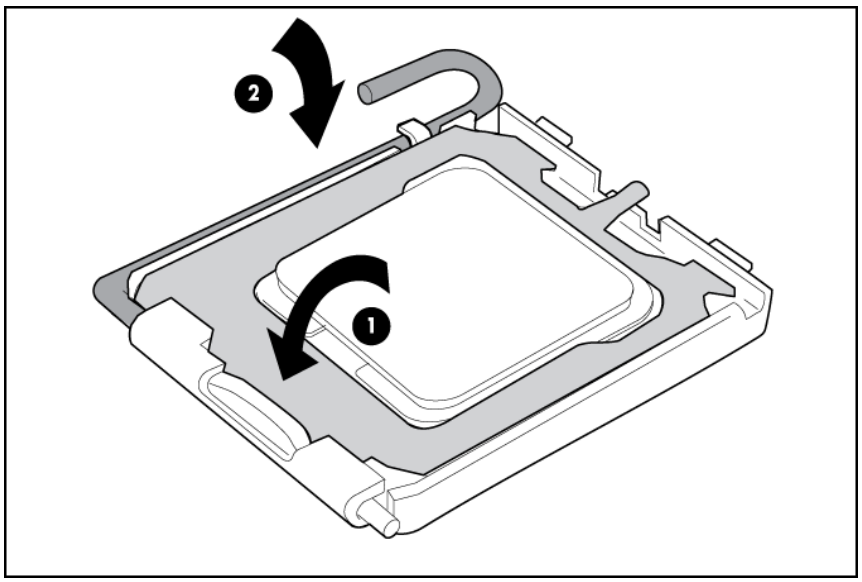
11. Align the processor installation tool with the socket and install the processor.



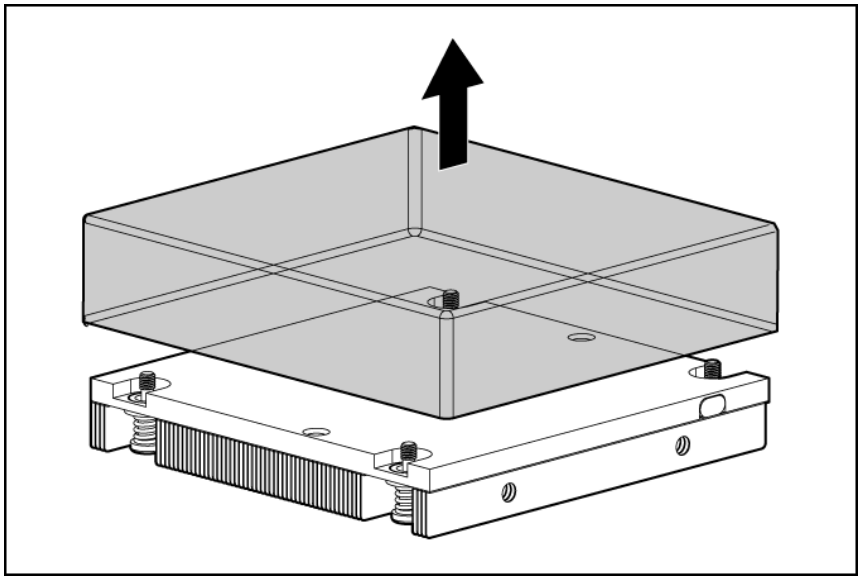
12. Press down firmly until the processor installation tool clicks and separates from the processor, and then remove the processor installation tool.



13. Close the processor socket retaining bracket and the processor retaining latch.



14. Remove the thermal interface protective cover from the heatsink.



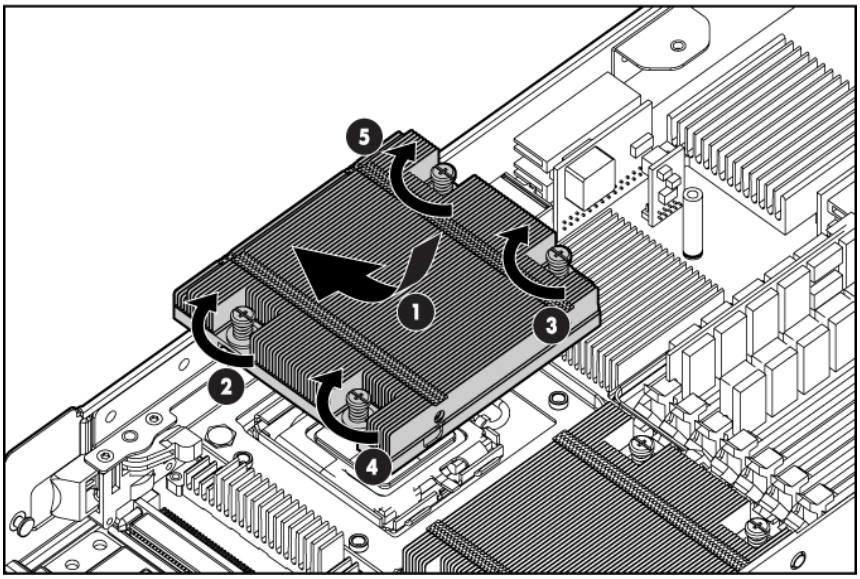
15. Install the heatsink.

IMPORTANT:

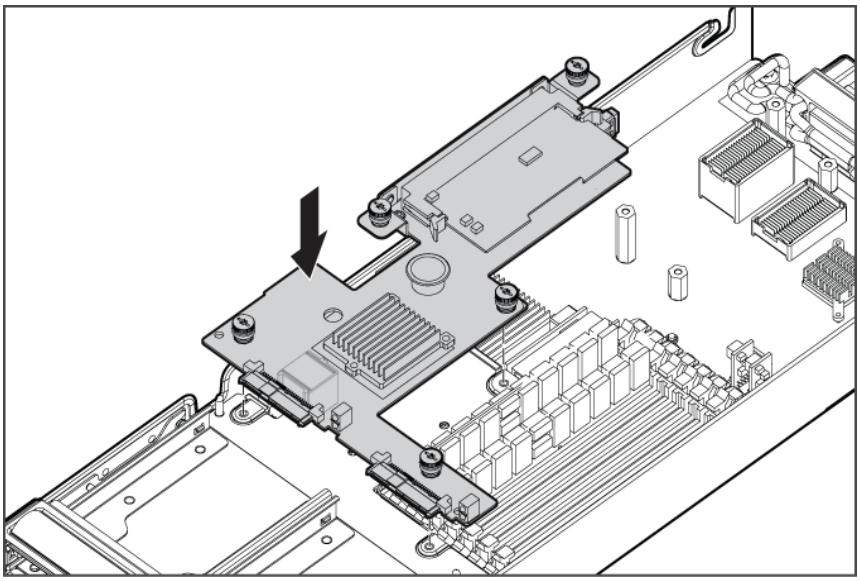
Be sure the processor remains inside the processor installation tool.

△ CAUTION:

Heatsink retaining screws should be tightened in diagonally opposite pairs (in an "X" pattern).



16. Install the front panel/hard drive cage assembly.
17. Install the hard drive backplane. Press down on the connector to seat the board.



18. Install the hard drives.
19. Install the access panel. See Installing the access panel on page 22 for more information.
20. Install the server blade. See Installing the HP AiO SB600c Server and Storage Blades on page 13 for more information.

Memory options

The HP AiO SB600c Server Blade is configured with 2 GB of memory. The server contains eight FBDIMM slots and the Operating System can address up to 4 GB of memory. Using the Advanced Memory Protection options will allow 4 GB more of memory to be used as an online spare or mirrored memory. See http://www.hp.com for more information.

Installing FBDIMMs

To install the component:

1. Power down the server blade.

   See Powering down the HP All-in-One SB600c Storage Blade Solution on page 19 for more information.
2. Remove the server blade. See Removing the HP AiO SB600c Server Blade on page 20 for more information.
3. Remove the access panel. See 21 for more information.
4. Install the FBDIMM.

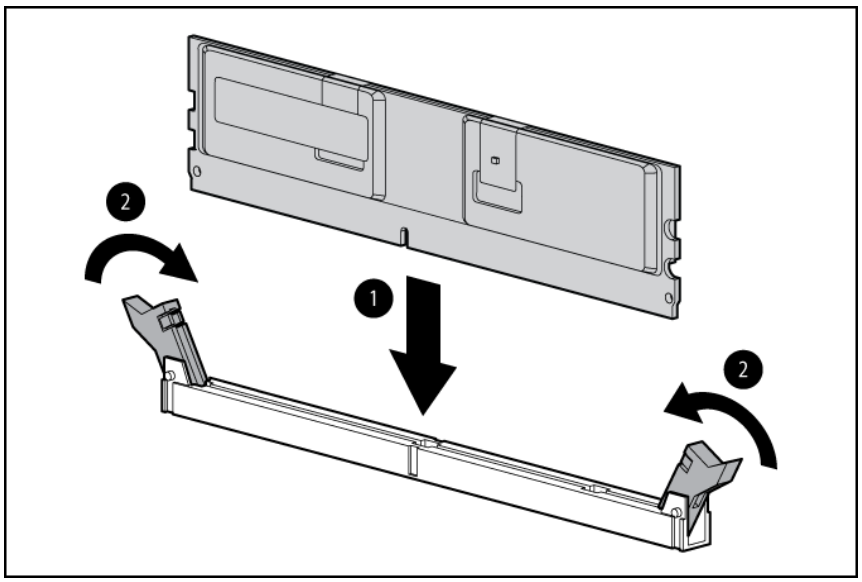


Figure 5 Installing FBDIMMs

5. Install the access panel. See Installing the access panel on page 22 for more information.
6. Install the server blade.

   See Installing the HP AiO SB600c Server and Storage Blades on page 13 for more information.
7. Power up the server blade.

   See Powering up the HP All-in-One SB600c Storage Blade Solution on page 19 for more information.

Mezzanine card option

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. Optional mezzanine cards enable network connectivity and provide Fibre Channel support. For mezzanine card locations, see System board components on page 48 for more information.

- Install Type I mezzanine cards on either mezzanine 1 connector or mezzanine 2 connector.

- Install Type II mezzanine cards only on mezzanine 2 connector.

To install the component:

1. Power down the server blade.

   See 19 for more information.
2. Remove the server blade.

   See Removing the HP AiO SB600c Server Blade on page 20 for more information.
3. Remove the access panel. See Removing the access panel on page 21 for more information.
4. Remove the mezzanine connector cover.

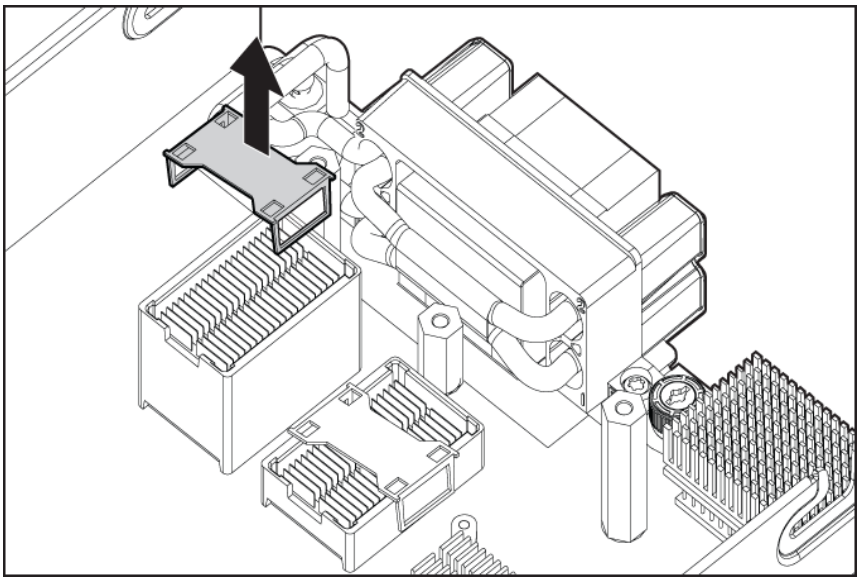


Figure 6 Removing the mezzanine connector cover

5. Install the mezzanine card. Press down on the connector to seat the board.

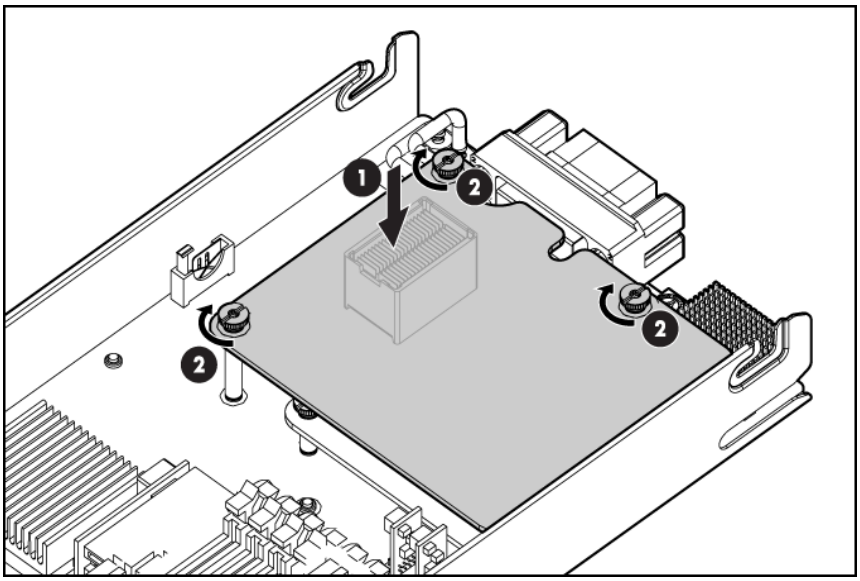


Figure 7 Installing the mezzanine card.

6. Install the access panel. See Installing the access panel on page 22

7. Install the server blade. See Installing the HP AiO SB600c Server and Storage Blades on page 13

Cabling

In this section

- Using the local I/O cable
- Connecting locally to a server blade with video and USB devices

Using the local I/O cable

The local I/O cable enables the user to perform server blade administration, configuration, and diagnostic procedures by connecting video and USB devices directly to the server blade.

Connecting locally to a server blade with video and USB devices

Use the local I/O cable to connect a monitor and any of the following USB devices:

- USB hub
- USB keyboard
- USB mouse
- USB DVD-ROM drive
- USB diskette drive

Multiple configurations are possible. This section offers two possible configurations.

Accessing a server blade with local KVM

CAUTION:

Before disconnecting the local I/O cable from the connector, always squeeze the release buttons on the sides of the connector. Failure to do so can result in damage to the equipment.

NOTE:

For this configuration, a USB hub is not necessary. To connect additional devices, use a USB hub.

1. Connect the local I/O cable to the server blade.
2. Connect the video connector to a monitor.
3. Connect a USB mouse to one USB connector.
4. Connect a USB keyboard to the second USB connector.

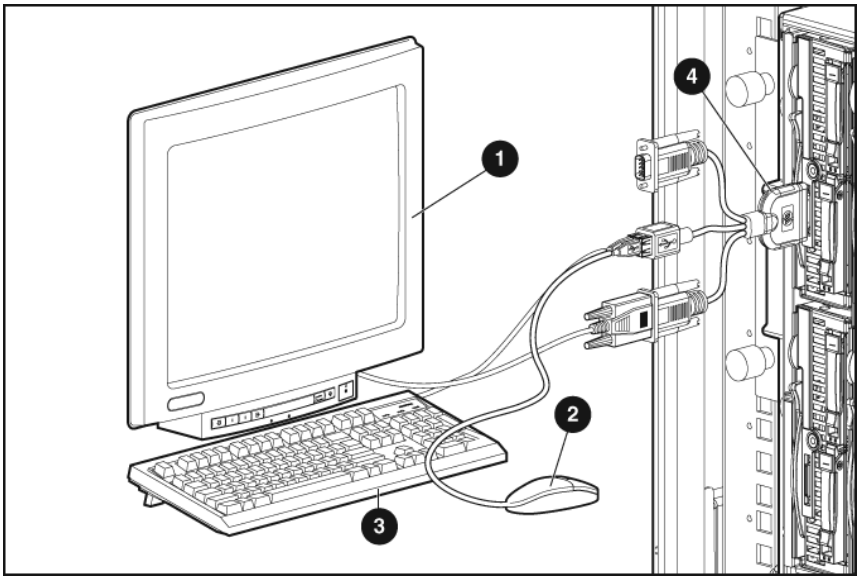


Figure 8 Connecting with a local KVM

Table 4 Local KVM connection components

Item	Description
1	Monitor
2	USB mouse
3	USB keyboard
4	Local I/O cable

Accessing a server blade with local media devices

Use the following configuration when configuring a server blade or loading software updates and patches from a USB DVD-ROM or a USB diskette.

1. Connect the local I/O cable to the server blade.
2. Connect the video connector to a monitor.
3. Connect a USB hub to one USB connector.
4. Connect the following to the USB hub:
   - USB DVD-ROM drive
     - USB keyboard
     - USB mouse
     - USB diskette

NOTE:

Use a USB hub when connecting a USB diskette drive and/or USB DVD-ROM drive to the server blade. The USB hub provides additional connections.

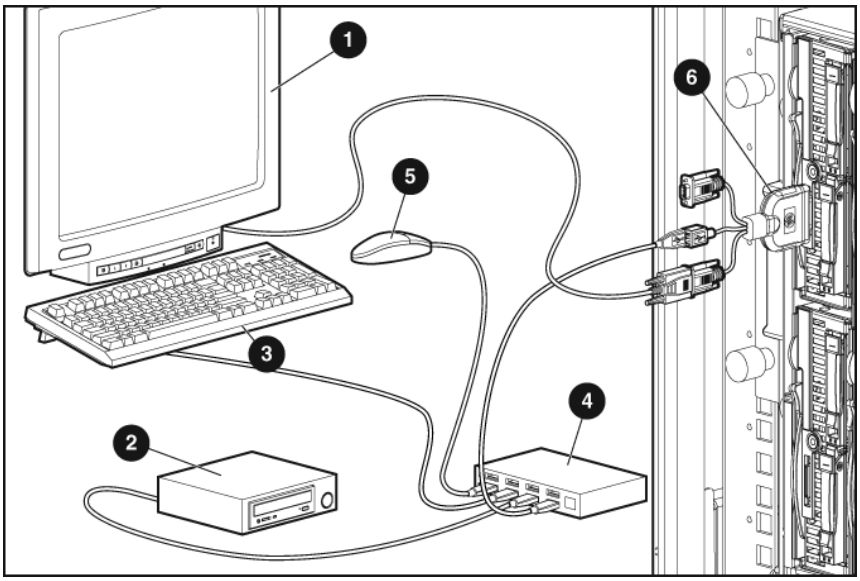


Figure 9 Connecting with local media devices

Table 5 USB Hub devices

Item	Description
1	Monitor
2	USB DVD-ROM drive or diskette drive
3	USB keyboard
4	USB hub
5	USB mouse
6	Local I/O cable

NOTE:

For more information about hardware and cabling configurations, see the documents that ship with the c-Class enclosures.

4 Configuration utilities

In this section

- iLO 2
- System Recovery DVD
- Configuration tools
- Keeping the system current

iLO 2

iLO 2 is a standard component of ProLiant c-Class server blades that provides server health and remote server blade manageability. Its features are accessed from a network client device using a supported web browser. In addition to other features, iLO 2 provides keyboard, mouse, and video (text and graphics) capability for a server blade, regardless of the state of the host OS or host server blade.

iLO 2 includes an intelligent microprocessor, secure memory, and a dedicated network interface. This design makes iLO 2 independent of the host server blade and its OS. iLO 2 provides remote access to any authorized network client, sends alerts, and provides other server blade management functions.

Using a supported web browser, you can:

- Remotely access the console of the host server blade, including all text mode and graphics mode screens with full keyboard and mouse controls.
- Remotely power up, power down, or reboot the host server blade.
- Remotely boot a host server blade to a virtual media image to perform a ROM upgrade or install an OS.
- Send alerts from iLO 2 regardless of the state of the host server blade.
- Access advanced troubleshooting features provided by iLO 2.
- Launch a web browser, use SNMP alerting, and diagnose the server blade with HP SIM.
- Configure static IP bay settings for the dedicated iLO 2 management NICs on each server blade in an enclosure for faster deployment.

To connect to the server blade using iLO 2, install the server blade in an enclosure. Onboard Administrator assigns an IP address to enable iLO 2 connectivity to the server blade.

The c-Class tab enables you to control specific settings for the HP BladeSystem. iLO 2 also provides web-based status for the HP BladeSystem configuration.

For detailed information about iLO 2, refer to the *HP Integrated Lights-Out User Guide* on the HP website http://www.hp.com/servers/lights-out.

System Recovery DVD

The System Recovery DVD is used to restore the system to factory defaults. Keep this DVD in a safe place. You may boot from the DVD and restore the system to the factory condition at any time. This allows you to recover the system if all other means to boot the system fails. While the recovery process makes every attempt to preserve the existing data volumes, you should have a backup of your data if at all possible before recovering the system.

⚠ WARNING!

During a recovery process, this DVD overwrites the original OS logical drives. All data on these drives will be erased.

Two methods are available for system recovery:

- iLO virtual DVD-ROM
- USB DVD-ROM

NOTE:

Using iLO 2 virtual DVD-ROM to restore your system will take longer than the USB DVD-ROM method.

iLO 2 virtual DVD-ROM

This method uses iLO 2 virtual System Recovery DVD to restore your original OS.

To restore with an iLO 2 virtual System Recovery DVD:

1. Insert the System Restore DVD into the client PC that is using the iLO 2 Remote Console.
2. Remotely access the server blade through iLO 2.
3. Click the **Virtual Devices** tab.
4. Select **Virtual Media**.
5. Use the Virtual Media applet to select the local DVD or image file and connect the Virtual DVD to the server blade.
6. Use the iLO 2 Virtual Power Button feature to reboot the server blade.
7. Follow the quick restore instructions

USB DVD-ROM

This method uses System Recovery DVD to restore your original OS.

To restore with the System Recovery DVD:

1. Use the local I/O cable to connect a USB DVD-ROM drive to the server blade.

   See Accessing a server blade with local media devices on page 34
2. Insert the System Recovery DVD into the USB DVD-ROM drive.
3. Reboot the server blade.
4. After the server blade boots, follow the quick restore instructions.

Configuration tools

Array Configuration Utility

NOTE:

ACU does not support mixing SAS and SATA drives in the same logical volume.

ACU is a browser-based utility with the following features:

- Runs as a local application or remote service

- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration
- Suggests the optimum configuration for an unconfigured system
- Provides different operating modes, enabling faster configuration or greater control over the configuration options
- Remains available any time that the server is on
- Displays on-screen tips for individual steps of a configuration procedure

For optimum performance, the minimum display settings are 800 × 600 resolution and 256 colors. Servers running Microsoft® operating systems require Internet Explorer 5.5 (with Service Pack 1) or later.

For more information, refer to the *Configuring Arrays on HP Smart Array Controllers Reference Guide* on the Documentation CD or the HP website http://www.hp.com.

Keeping the system current

All-in-One SB600c Storage Blade Solution updates

Use care when applying operating system updates (service packs, hotfixes, and patches). Before updating the operating system, read the release notes for each update. If you do not require specific fixes from the update, HP recommends that you do not apply the updates.

If you decide to apply an operating system update:

1. Perform a full system backup.
2. Apply the operating system update, using the instructions provided.
3. Install the current drivers.

To obtain downloads for the All-in-One Storage Blade Solution, go to http://www.hp.com/go/AiOstorage.

HP Care Pack

HP Care Pack Services offer upgraded service levels to extend and expand standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your server investments. Refer to the Care Pack website http://www.hp.com/hps/carepack/servers/cp_proliant.html.

5 Troubleshooting

Troubleshooting resources

The *HP ProLiant Servers Troubleshooting Guide* provides simple procedures for resolving common problems as well as a comprehensive course of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance.

To obtain the guide, refer to any of the following sources and then select the *HP ProLiant Servers Troubleshooting Guide:*

- The Business Support Center on the http://www.hp.com/support. Navigate to the server technical support page. Under self-help resources, select **ProLiant Troubleshooting Guide**.
- The Technical Documentation website http://www.docs.hp.com. Select **Enterprise Servers, Workstations and Systems Hardware,** and then the appropriate server.

HP web site

Troubleshooting tools and information, as well as the latest drivers and flash ROM images, are available at http://www.hp.com.

Storage system documentation

Storage system documentation is the set of documents provided with a storage system. Most storage system documents are available as a PDF file or a link on the documentation CD. Storage system documentation can be accessed from http://www.hp.com/support/manuals). Under the storage section, click **Disk Storage Systems** and then select your product.

Subscriber's Choice

HP Subscriber's Choice is a customizable subscription sign-up service that customers use to receive personalized e-mail product tips, feature articles, driver and support alerts, or other notifications.

To create a profile and select notifications, see http://www.hp.com/go/subscriberschoice.

White papers

White papers are electronic documents on complex technical topics. Some white papers contain in-depth details and procedures. Topics include HP products, HP technology, operating systems, networking products, and performance issues. See the HP Business Support Center at http://www.hp.com/go/bizsupport.

Firmware updates

Firmware is software that is stored in Read-Only Memory (ROM). Firmware is responsible for the behavior of the system when it is first switched on and for passing control of the server to the operating system. When referring to the firmware on the system board of the server, it is called the System ROM or the BIOS. When referring to the firmware on another piece of hardware configured in the server, it is called Option ROM. These systems have hard drives and Smart Array Controller options that have firmware that can be updated.

It is important to update the firmware (also called "flashing the ROM") as part of regular server maintenance. In addition, checking for specific firmware updates in between regular updates helps to keep the server performing optimally. HP recommends checking for a firmware update before sending a part back to HP for replacement.

Apply the latest firmware and software updates using the HP All-in-One Service Release DVD. The DVD provides software updates, upgrades, and enhancements for the storage system. The Service Release can be ordered without cost from http://software.hp.com. On the web site, select the "Storage and NAS" category. The latest service release version appears in the list of available software.

A All-in-One SB600c Storage Blade Solution components

HP All-in-One SB600c Server Blade LEDs

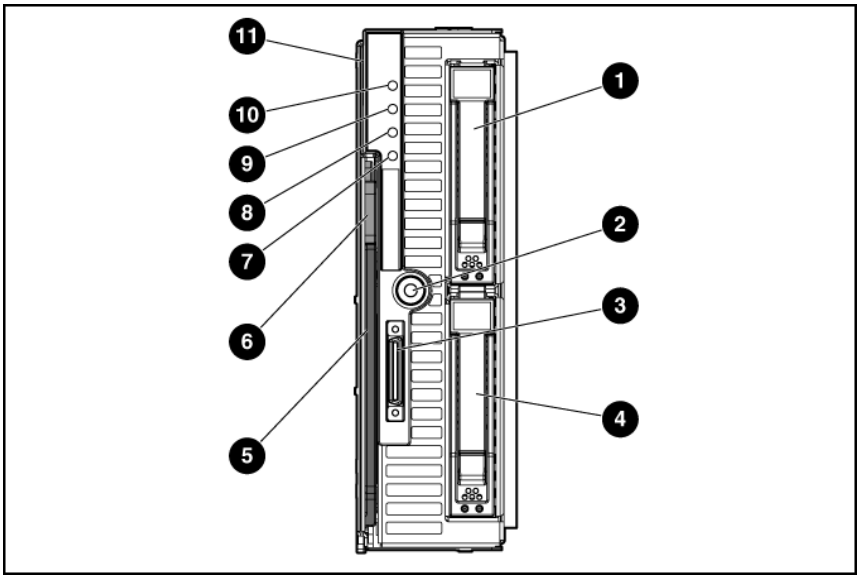


Figure 10 HP All-in-One SB600c Server Blade LEDs

Table 6 HP All-in-One SB600c Server Blade LEDs

Item	Description	Status
1	Hard drive bay 1	N/A
2	Power On/Standby button	N/A
3	Local I/O connector*	N/A
4	Hard drive bay 2	N/A
5	Server blade handle	N/A
6	Release button	N/A
7	NIC 2 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity
8	NIC 1 LED*	Green = Network linked Green flashing = Network activity Off = No link or activity
9	Health LED	Green = Normal Flashing = Booting Amber = Degraded condition Red= Critical condition
10	UID LED	Blue = Identified Blue flashing = Active remote management
11	Serial pull tab	N/A

HP All-in-One SB600c Storage Blade LEDs

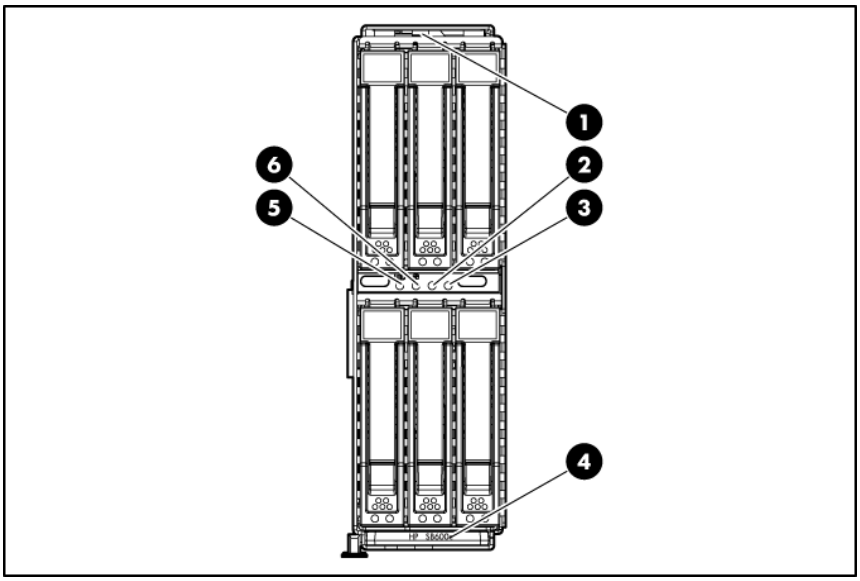


Figure 11 HP All-in-One SB600c Storage Blade LEDs

Table 7 HP All-in-One SB600c Storage Blade LEDs

Item	Description	Status
1	Serial Pull tab	N/A
2	Reserved	N/A
3	Reserved	N/A
4	Storage Blade Handle	N/A
5	UID LED	Blue = Identified Off = Not identified
6	System Health LED	Green = Normal operation Flashing amber = Degraded condition Flashing red = Critical condition

SAS and SATA components

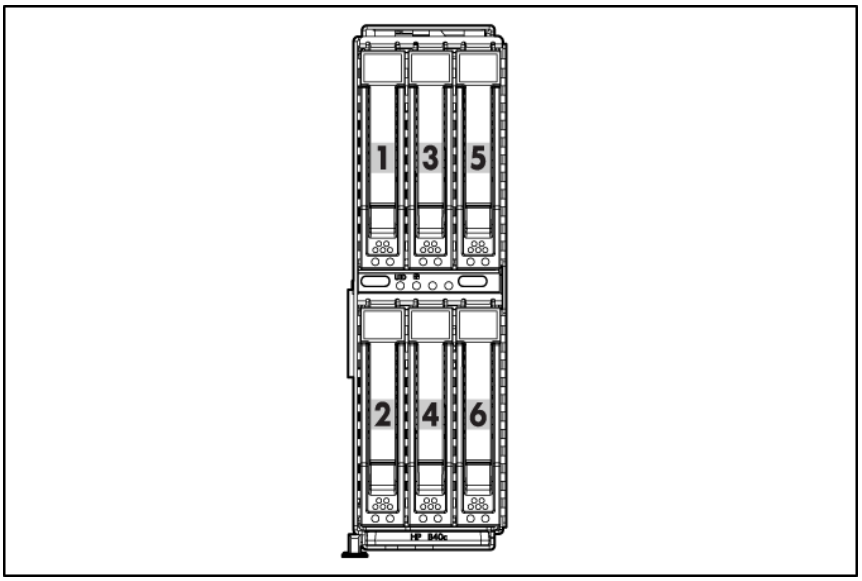


Figure 12 SAS and SATA device numbers

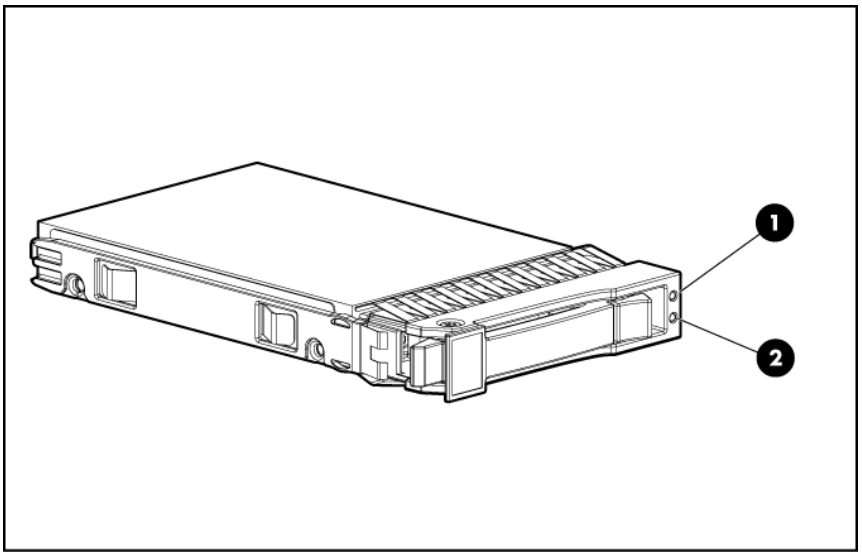


Figure 13 SAS and SATA hard drive LEDs

Table 8 SAS and SATA hard drive LEDs

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

Table 9 SAS and SATA hard drive LED combinations

Online/activity LED (green)	Fault/UID LED (amber/blue)	Interpretation
On, off, or flashing	Alternating amber and blue	The drive has failed, or a predictive failure alert has been received for this drive; it also has been selected by a management application.
On, off, or flashing	Steadily blue	The drive is operating normally, and it has been selected by a management application.
On	Amber, flashing regularly (1 Hz)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On	Off	The drive is online, but it is not active currently.
Flashing regularly (1 Hz)	Amber, flashing regularly (1 Hz)	**Do not remove the drive. Removing a drive may 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 may terminate the current operation and cause data loss.**The drive is rebuilding, 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.

System board components

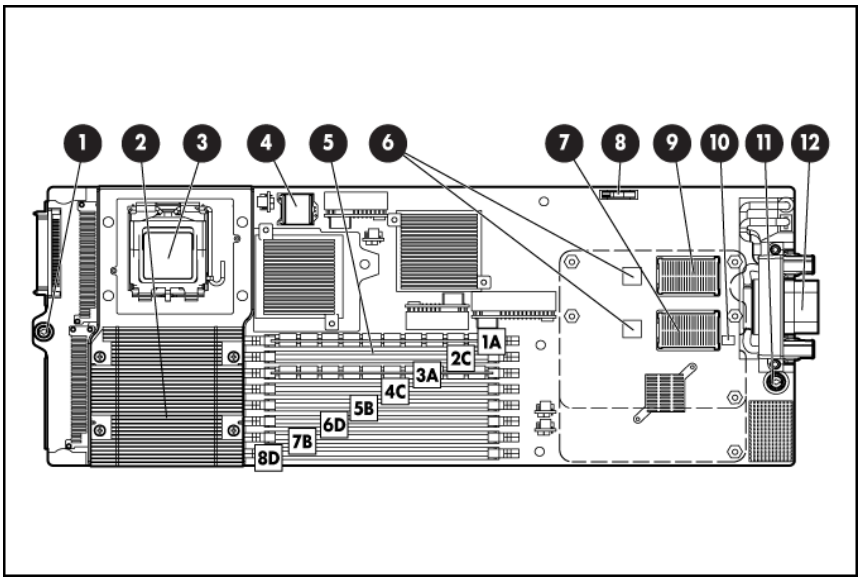


Figure 14 System board components

Table 10 System board components

Item	Description
1	System board thumbscrew
2	Processor socket 2
3	Processor socket 1 (populated)
4	Hard drive backplane connector
5	FBDIMMs (8)
6	Embedded NICs (2)
7	Mezzanine connector 1 [Type I mezzanine only (shown)]
8	Battery
9	Mezzanine connector 2 [Type I (shown) or Type II mezzanine]
10	System maintenance switch (SW2)
11	System board thumbscrew
12	Enclosure connector

The symbols correspond to the symbols located on the interconnect bays.

Table 11 FBDIMM slot numbering

FBDIMM slots	Memory bank	Memory branch
1 and 3	A	0
5 and 7	B	1
2 and 4	C	0
6 and 8	D	1

Mezzanine connector definitions

Table 12 Mezzanine connector definitions

Item	PCIe
Mezzanine connector 1	x4, Type I mezzanine card only
Mezzanine connector 2	x8, Type 1 or II mezzanine card

A PCIe x4 mezzanine connector supports x8 cards at up to x4 speeds. A PCIe x8 mezzanine connector supports x16 cards at up to x8 speeds.

System maintenance switches

Table 13 System maintenance switches

Position	Function	Default
1*	iLO 2 security override	Off
2	Configuration lock	Off
3	Reserved	Off
4	Reserved	Off
5*	Password disabled	Off
6*	Reset configuration	Off
7	Reserved	Off
8	Reserved	Off

*To access redundant ROM, set S1, S5, and S6 to ON.

B Regulatory Compliance Notices and Safety

In this section

- Regulatory compliance identification numbers
- Federal Communications Commission notice
- Declaration of conformity for products marked with the FCC logo, United States only
- Modifications
- Cables
- Canadian notice (Avis Canadien)
- European Union regulatory notice
- Disposal of waste equipment by users in private households in the European Union
- Japanese notice
- BSMI notice
- Korean notice
- Laser compliance
- Battery replacement notice
- Taiwan battery recycling notice
- Preventing electrostatic discharge
- Grounding methods to prevent electrostatic discharge
- Environmental specifications

Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Federal Communications Commission notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

FCC rating label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding this product, contact us by mail or telephone:

- Hewlett-Packard Company P. O. Box 692000, Mail Stop 530113 Houston, Texas 77269-2000
- 1-800-HP-INVENT (1-800-474-6836). (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company P. O. Box 692000, Mail Stop 510101 Houston, Texas 77269-2000
- 1281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian notice (Avis Canadien)

Class A equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union regulatory notice

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:

CE

This marking is valid for non-Telecom products and EU harmonized Telcom products (e.g. Bluetooth). This marking is valid for EU non-harmonized Telecom products.

Disposal of waste equipment by users in private households in the European Union

Table 14 Disposal of waste equipement

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

BSMI notice

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Korean notice

Class A equipment

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Class B equipment

B급 기기 (가정용 정보통신기기)

이 기기는 가정용으로 전자파적합등록을 한 기기로서 주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

Laser compliance

This product may be provided with an optical storage device (that is, CD or DVD drive) and/or fiber optic transceiver. Each of these devices contains a laser that is classified as a Class 1 Laser Product in accordance with US FDA regulations and the IEC 60825-1. The product does not emit hazardous laser radiation.

Each laser product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated May 27, 2001; and with IEC 60825-1:1993/A2:2001.

⚠ WARNING!

Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:

- **Do not try to open the module enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only HP Authorized Service technicians to repair the unit.**

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Battery replacement notice

⚠ 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.**

Table 15 Battery replacement notice

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

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

Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Preventing electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

Grounding methods to prevent electrostatic discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm

  ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Environmental specifications

Table 16 Environmental specifications

Specification	Value
Temperature range*	
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 60°C (-40°F to 140°F)
Storage	-20°C to 60°C (-4 to 140°C)
Maximum wet bulb temperature	30°C (86°F)
Relative humidity (noncondensing)**	
Operating	10% to 90%
Shipping	10% to 90%
Storage	10% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (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.

Index

A
access panel, 21, 22
audience, 7

B
batteries, replacing, 55
battery, 48, 55
battery replacement notice, 55
BSMI notice, 54

C
cables, 52
cabling, 33
Canadian notice, 53
Care Pack, 39
conventions
  document, 8
  text symbols, 8

D
Declaration of Conformity, 52
document
  conventions, 8
  related documentation, 7
documentation
  HP website, 7
  providing feedback, 9

E
electrostatic discharge, 56
environmental specifications, 57
European Union notice, 53

F
FBDIMM slot locations, 48
FBDIMMs, 31, 31, 48
Federal Communications Commission (FCC) notice, 51, 52, 52, 52, 52
firmware updates, 41
front panel/hard drive cage assembly, 23

G
grounding methods, 56

H
hard drive backplane connector, 48
hardware options, 23
heatsink, 23
heatsink blank, 23
help
  obtaining, 9
HP
  technical support, 9

I
identification number, 51
iLO (Integrated Lights-Out), 37
iLO Advanced Functionality, 37
installation instructions, 13
installing hardware, 23

J
Japanese notice, 54

K
Korean notices, 54

L
laser devices, 55
Lights-Out network-based deployment, 37
local I/O cable, 33, 33
local I/O cable connector, 33

M
management tools, 37
memory, 31, 31
mezzanine card, 31
mezzanine connectors, 48, 49

N
NIC (network interface controller), 48

P
powering down, 19
powering up, 19
processors, 23, 48

R

rack stability
  warning, 8
regulatory compliance notices, 53
related documentation, 7
removing the access panel, 21
removing the server blade, 20

S

series number, 51
server
  doocumentation, 41
shipping carton contents, 11
specifications, 57
specifications, environmental, 57
static electricity, 56
Subscriber's Choice, 41
Subscriber's Choice, HP, 9
symbols in text, 8
system board battery, 48, 55
system board thumbscrews, 48
system maintenance switch, 48

T

Taiwan battery recycling notice, 55
technical support
  HP, 9
  service locator website, 9
  web site, 41
text symbols, 8
Type I or Type II mezzanine card, 31

U

USB devices, 33, 38

W

warning
  rack stability, 8
websites
  HP , 9
  HP Subscriber's Choice for Business, 9
  product manuals, 7