

# HP StorageWorks

## HP StorageWorks SB40c Storage Blade

### Maintenance and Service Guide



D O C - N U M B E R

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Printed in the US

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# About this guide

## Intended audience

This guide is for an experienced service technician. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels and are familiar with weight and stability precautions for rack installations.

## Document conventions and symbols

**Table 1 Document conventions**

Convention	Element
Blue text: <a href="#">Table 1</a>	Cross-reference links and e-mail addresses
Blue, underlined text: <a href="http://www.hp.com">http://www.hp.com</a>	Website addresses
<b>Bold</b> text	<ul style="list-style-type: none"><li>• Keys that are pressed</li><li>• Text typed into a GUI element, such as a box</li><li>• GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes</li></ul>
<i>Italic</i> text	Text emphasis
Monospace text	<ul style="list-style-type: none"><li>• File and directory names</li><li>• System output</li><li>• Code</li><li>• Commands, their arguments, and argument values</li></ul>
<i>Monospace, italic</i> text	<ul style="list-style-type: none"><li>• Code variables</li><li>• Command variables</li></ul>
Monospace, bold text	Emphasized monospace text

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**⚠ WARNING!**

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

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**⚠ CAUTION:**

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

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❗ **IMPORTANT:**

Provides clarifying information or specific instructions.

---

📝 **NOTE:**

Provides additional information.

---

💡 **TIP:**

Provides helpful hints and shortcuts.

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## Rack stability

## 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

## Customer self repair

HP customer self repair (CSR) programs allow you to repair your StorageWorks product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider, or see the CSR website:

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

## 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/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 [storagedocsFeedback@hp.com](mailto:storagedocsFeedback@hp.com). All submissions become the property of HP.



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# 1 Customer self repair

HP products are designed with many Customer Self Repair (CSR) parts to minimize repair time and allow for greater flexibility in performing defective parts replacement. If during the diagnosis period HP (or HP service providers or service partners) identifies that the repair can be accomplished by the use of a CSR part, HP will ship that part directly to you for replacement. There are two categories of CSR parts:

- **Mandatory**—Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.
- **Optional**—Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product.

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 **NOTE:**

Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.

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Based on availability and where geography permits, CSR parts will be shipped for next business day delivery. Same day or four-hour delivery may be offered at an additional charge where geography permits. If assistance is required, you can call the HP Technical Support Center and a technician will help you over the telephone. HP specifies in the materials shipped with a replacement CSR part whether a defective part must be returned to HP. In cases where it is required to return the defective part to HP, you must ship the defective part back to HP within a defined period of time, normally five (5) business days. The defective part must be returned with the associated documentation in the provided shipping material. Failure to return the defective part may result in HP billing you for the replacement. With a customer self repair, HP will pay all shipping and part return costs and determine the courier/carrier to be used.

For more information about HP's Customer Self Repair program, contact your local service provider. For the North American program, refer to the HP website <http://www.hp.com/go/selfrepair>.

## Parts only warranty service

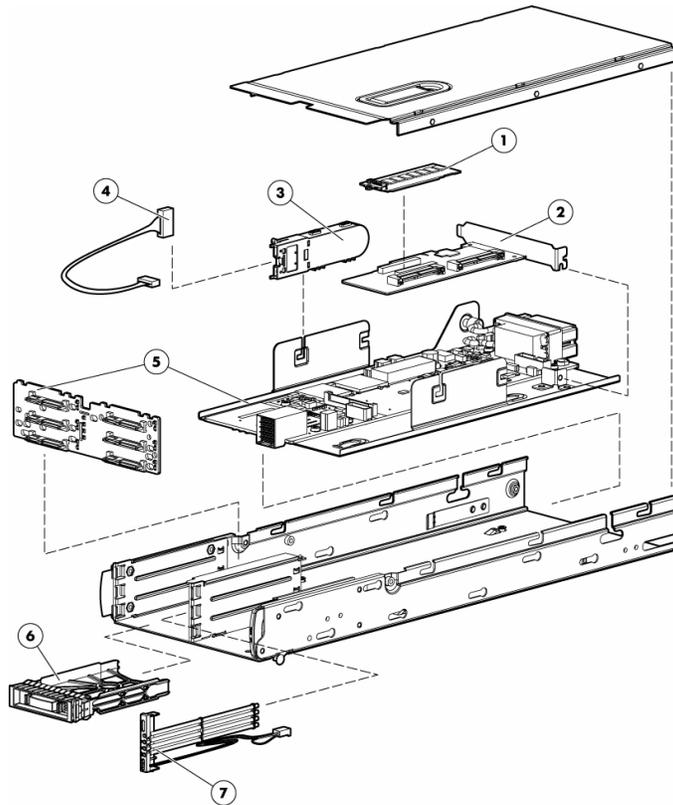
Your HP Limited Warranty may include a parts only warranty service. Under the terms of parts only warranty service, HP will provide replacement parts free of charge.

For parts only warranty service, CSR part replacement is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.



# 2 Illustrated parts catalog

## System components



Item	Description	Spare part number	Customer self repair
1	HP Smart Array P400 Controller 256-MB cache module	405836-001	Mandatory
2	HP Smart Array P400 Controller	405832-001	Optional
3	Cache module battery	398648-001	Mandatory
4	Cache module battery cable	409124-001	Mandatory
5	Mainboard (with subchassis) and midplane	430798-001	Optional
6	Hard drive blank	392613-001	Mandatory

Item	Description	Spare part number	Customer self repair
7	Light pipe bezel	438755-001	Optional
8	Controller cable*	432166-001	Mandatory
9	Hard drives	—	—
	a) 36-GB, 3G, SAS SFF, 10,000-rpm*	376596-001	Mandatory
	b) 72-GB, 3G, SAS SFF, 10,000-rpm*	376597-001	Mandatory
	c) 146-GB, SAS SFF, 10,000-rpm*	432320-001	Mandatory
	d) 36-GB, SAS SFF, 15,000-rpm*	432322-001	Mandatory
	e) 72-GB, SAS, SFF, 15,000-rpm*	432321-001	Mandatory
	f) 60-GB, SATA SFF, 5,400-rpm*	405419-001	Mandatory
	g) 80-GB, SATA SFF, 5,400-rpm*	431907-001	Mandatory
	h) 160-GB, SATA SFF, 5,400-rpm*	431909-001	Mandatory
10	Chassis Spare Part Kit	572028-001	Optional
*: Not Known			
Mandatory: Parts for which customer self repair is mandatory. If you request HP to replace these parts, you will be charged for the travel and labor costs of this service.			
Optional: Parts for which customer self repair is optional. These parts are also designed for customer self repair. If, however, you require that HP replace them for you, there may or may not be additional charges, depending on the type of warranty service designated for your product. 3No—Some HP parts are not designed for customer self repair. In order to satisfy the customer warranty, HP requires that an authorized service provider replace the part. These parts are identified as "No" in the Illustrated Parts Catalog.			

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# 3 Removal and replacement procedures

## Required tools

You need the following items for some procedures:

- T-15 Torx screwdriver
- Diagnostics Utility

## Safety considerations

Before performing service procedures, review all the safety information.

## 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.

## Storage blade warnings and cautions

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### **WARNING!**

To reduce the risk of shock or injury from high-current electrical energy, do not remove the SB40c access panel and then install the SB40c into the enclosure.

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### **WARNING!**

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

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△ CAUTION:

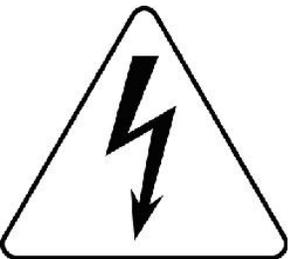
Do not operate the SB40c with the access panel removed. Operating the SB40c in this manner results in improper airflow and improper cooling that can lead to thermal damage.

△ CAUTION:

When performing non-hot-plug operations, you must power down the SB40c and/or the system. However, it may be necessary to leave the SB40c powered up when performing other operations, such as hot-plug installations or troubleshooting.

## Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.

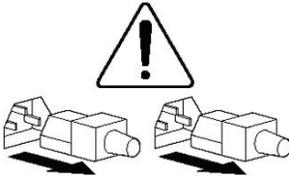
	<p>This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.</p> <p><b>WARNING!</b></p> <p>To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.</p>
	<p>This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.</p> <p><b>WARNING!</b></p> <p>To reduce the risk of injury from electric shock hazards, do not open this enclosure.</p>
	<p>This symbol on an RJ-45 receptacle indicates a network interface connection.</p> <p><b>WARNING!</b></p> <p>To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.</p>
	<p>This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.</p> <p><b>WARNING!</b></p> <p>To reduce the risk of injury from a hot component, allow the surface to cool before touching.</p>



This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

**WARNING!**

To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.



These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

**WARNING!**

To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.



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# 4 Storage blade preparation

To service any internal SB40c component, power down the SB40c and remove it from the enclosure.

## Power down

In systems that use the SB40c as external data storage, be sure that the partner server blade is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system and the OS are shut down in an orderly manner.

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### ⓘ IMPORTANT:

If installing a hot-plug device, it is not necessary to power down the SB40c.

---

To power down the SB40c, power down the partner server blade. See the server blade documentation.

## Remove the SB40c

1. Identify the proper SB40c.
2. Power down the partner server blade.
3. If the SB40c partner server blade is a full-height server blade, remove the blank or the half-height server blade installed above the SB40c.
4. Remove the SB40c:

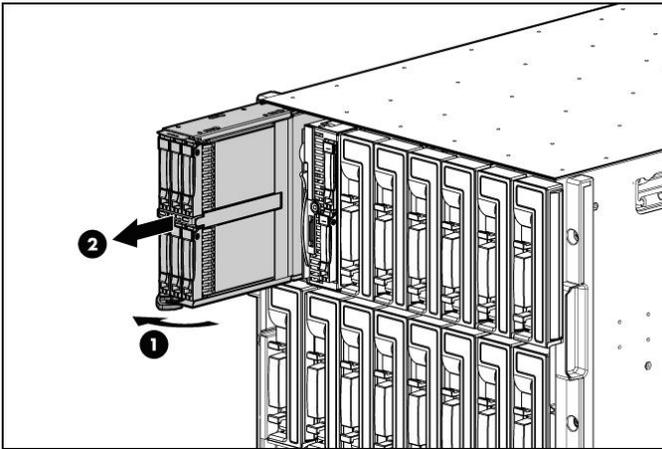


Figure 1 Partnered with a half-height server blade

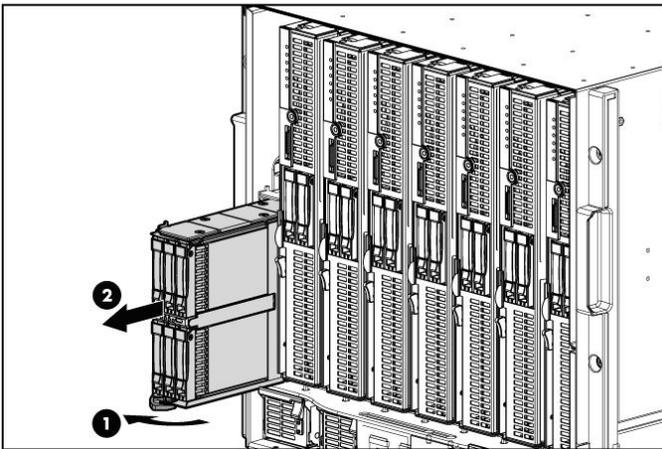


Figure 2 Partnered with a full-height server blade

5. Place the SB40c 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 SB40c before beginning any installation procedure. Improper grounding can cause ESD.

---

## Remove the access panel

To remove the component:

1. Power down the partner server blade.
2. Remove the SB40c.

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:**

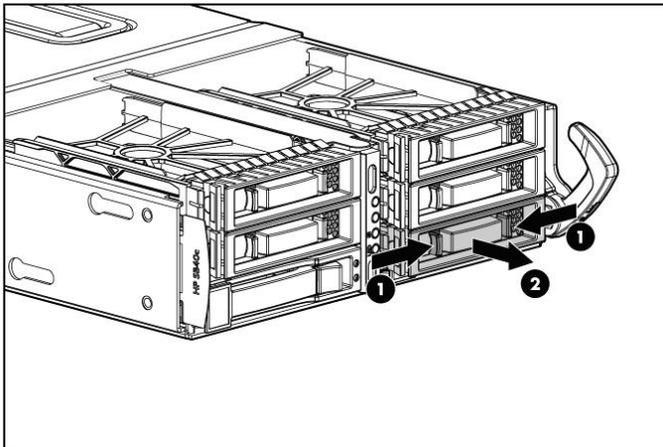
To prevent damage to electrical components, properly ground the server blade before beginning any installation procedure. Improper grounding can cause ESD.

To install the component:

1. Place the access panel on top of the SB40c with the hood latch open. Allow the panel to extend past the rear of the SB40c 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.

## Hard drive blank

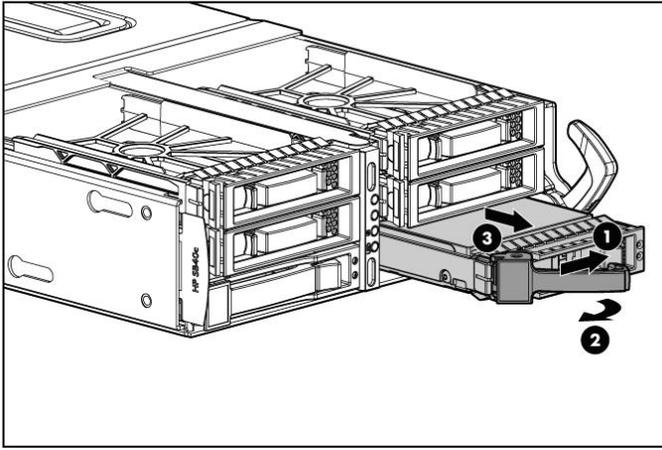
1. Remove the hard drive blank.



2. Replace the component by reversing the removal procedure.

## Hard drive

1. Determine the status of the hard drive from the hot-plug SAS hard drive LED combinations.
2. Back up all server data.
3. Remove the hard drive.



4. Replace the component by reversing the removal procedure.

## Cache module battery pack

This component uses a nickel metal hydride (NiMH) battery pack.

---

### **⚠ WARNING!**

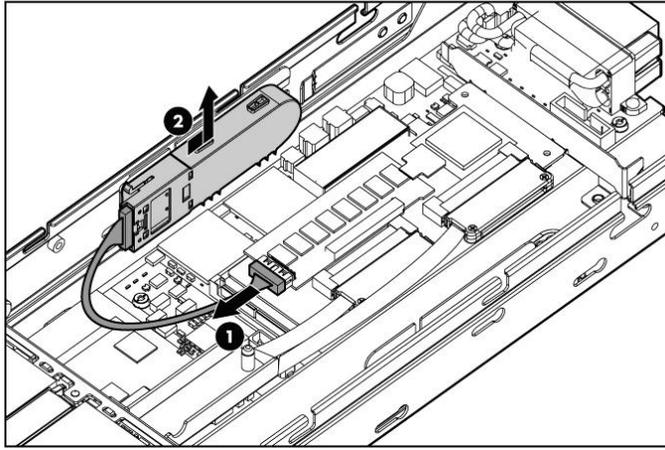
There is a risk of explosion, fire, or personal injury if a battery pack is mishandled. To reduce this risk:

- Do not attempt to recharge the batteries if they are disconnected from the controller.
- Do not expose the battery pack to water, or to temperatures higher than 60°C (140°F).
- Do not abuse, disassemble, crush, or puncture the battery pack.
- Do not short the external contacts.
- Replace the battery pack only with the designated HP spare.
- Battery disposal should comply with local regulations.

---

To remove the component:

1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove the access panel.
4. Remove the battery pack.



5. Replace the component by reversing the removal procedure.

## HP Smart Array P400 Controller 256-MB cache module

To remove the component:

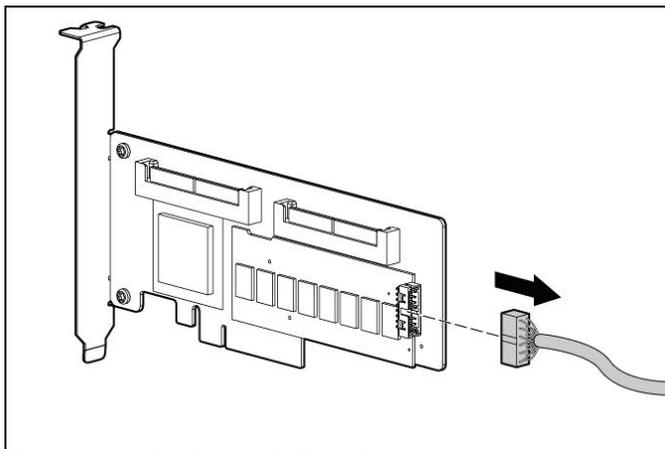
1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove the access panel.
4. Disconnect the battery cable from the cache.

---

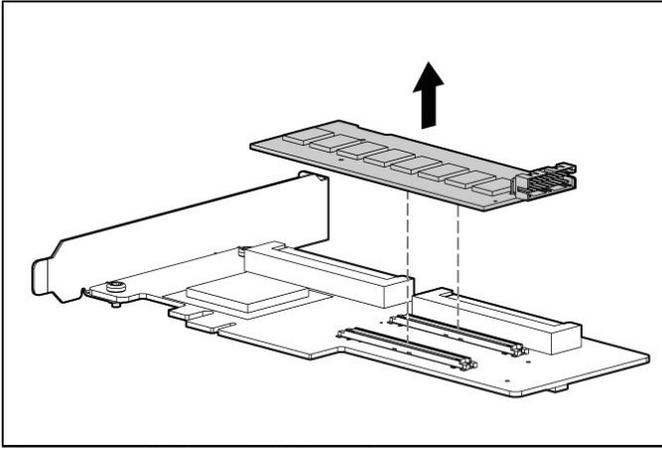
△ **CAUTION:**

Disconnect the cable from the cache module only if the battery pack is not being used to recover data from the server or transfer data to another server.

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5. Remove the cache module from the controller.

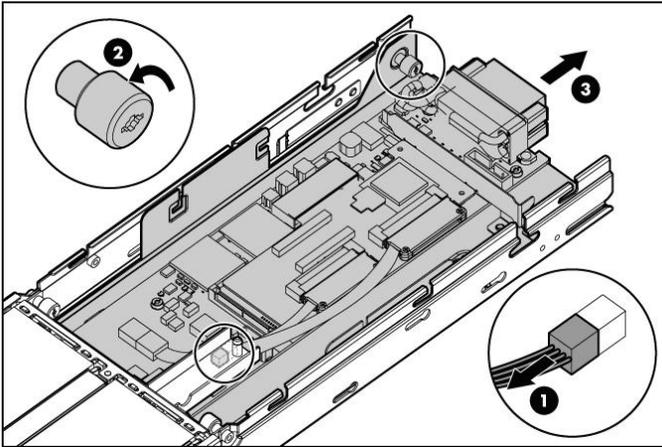


6. Replace the component by reversing the removal procedure.

## Mainboard subchassis and midplane

To remove the component:

1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove all hard drive blanks.
4. Remove all hard drives.
5. Remove the access panel.
6. Remove the mainboard subchassis.

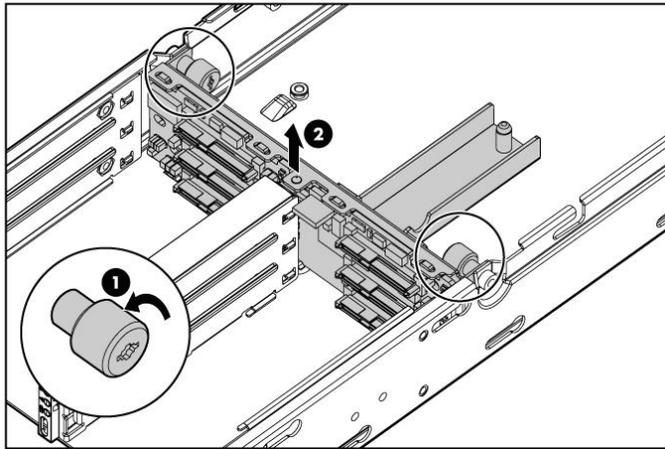


7. Remove the midplane and midplane bracket.

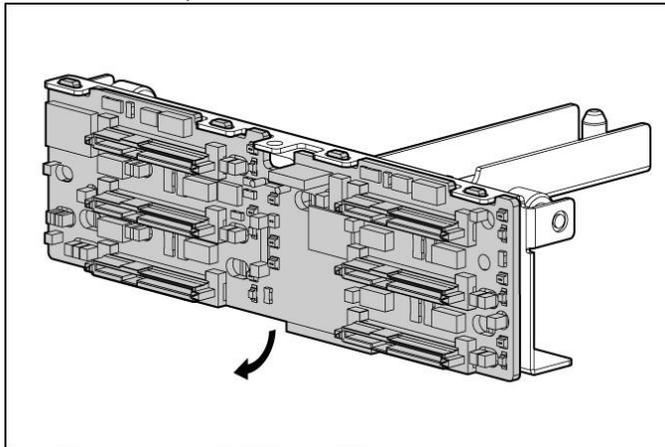


### NOTE:

Be careful not to damage wire for light pipe LEDs by sharp edge.



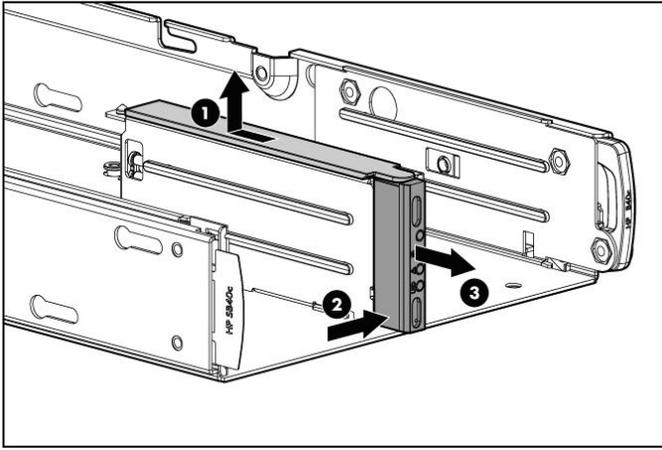
8. Remove the midplane.



9. Replace the component by reversing the removal procedure.

## Light pipe bezel

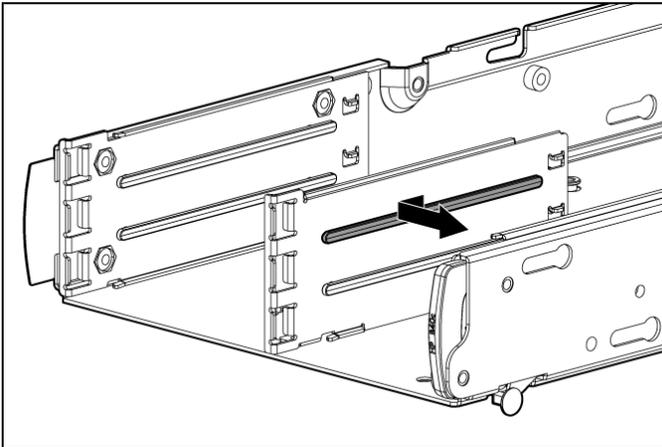
1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove all hard drive blanks.
4. Remove all hard drives.
5. Remove the access panel.
6. Remove the mainboard subchassis and midplane
7. Remove the center cage cover (1) and the light pipe bezel (2) by pulling in the direction of the arrow (3).



8. Replace the component by reversing the removal procedure.

## HDD rails

1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove all hard drive blanks.
4. Remove all hard drives.
5. Remove the access panel.
6. Remove the mainboard subchassis and midplane.
7. Remove the light pipe bezel.
8. Remove the center cage cover and the light pipe bezel.
9. Remove HDD rails.



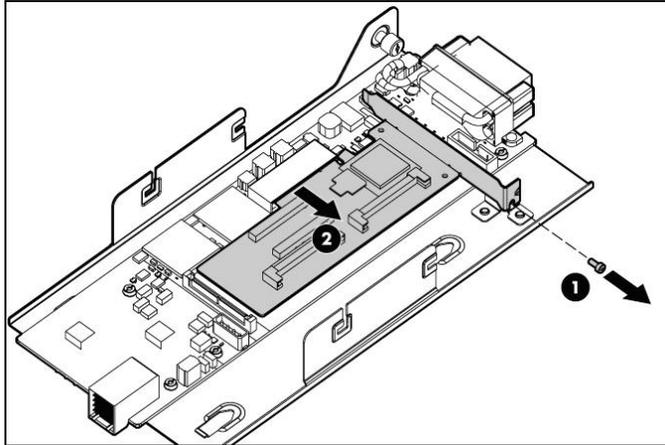
10. Replace the component by reversing the removal procedure.

## HP Smart Array P400 Controller

To remove the component:

1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove all hard drive blanks.

4. Remove all hard drives.
5. Remove the access panel.
6. Remove the cache module.
7. Remove the HP Smart Array P400 Controller cables.
8. Remove the mainboard subchassis.
9. Remove the HP Smart Array P400 Controller.



10. Replace the component by reversing the removal procedure.

## Replacing the chassis

To replace the chassis all of electronic pieces must be transferred over to the new chassis.

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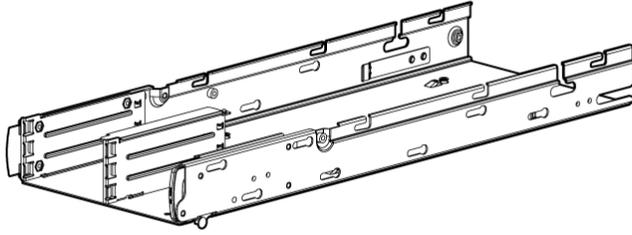
### ! IMPORTANT:

Write down the product number and serial number of the old chassis on the new chassis for warranty or contract validation.

---

## Chassis

1. Power down the partner server blade.
2. Remove the SB40c.
3. Remove all hard drive blanks.
4. Remove all hard drives.
5. Remove the access panel.
6. Remove the mainboard subchassis and midplane.
7. Remove the light pipe bezel.
8. Remove the center cage cover.
9. Remove HDD rails.
10. Chassis is now disassembled and prepared for user serviceable chassis swap.



11. Replace the component by reversing the removal procedure.

---

# 5 Diagnostic tools

## Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HP SIM
- From within Survey Utility
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows®: IML Viewer
  - For Linux: IML Viewer Application
- From within the iLO2 user interface
- From within HP Insight Diagnostics

For more information, refer to the Management CD in the HP ProLiant Essentials Foundation Pack.

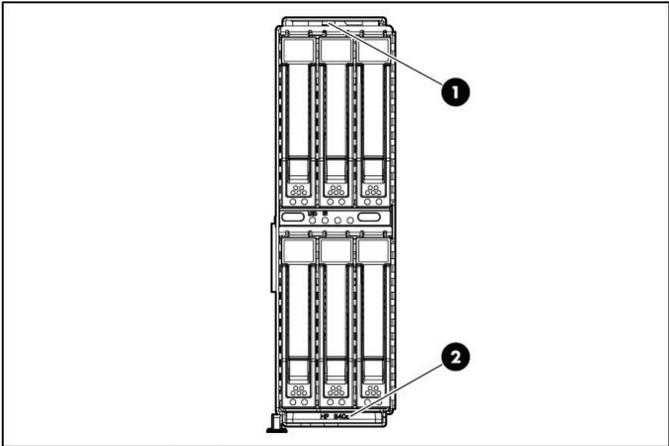
## Array Diagnostic Utility

ADU is a tool that collects information about array controllers and generates a list of detected problems. ADU can be accessed from the SmartStart CD or downloaded from the HP website <http://www.hp.com>.



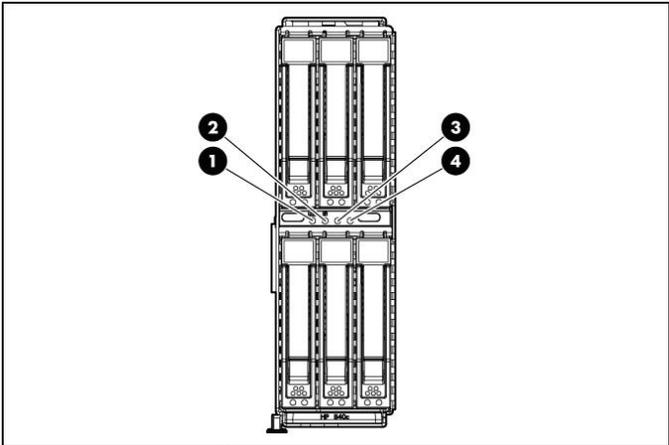
# 6 Component identification

## Front panel components



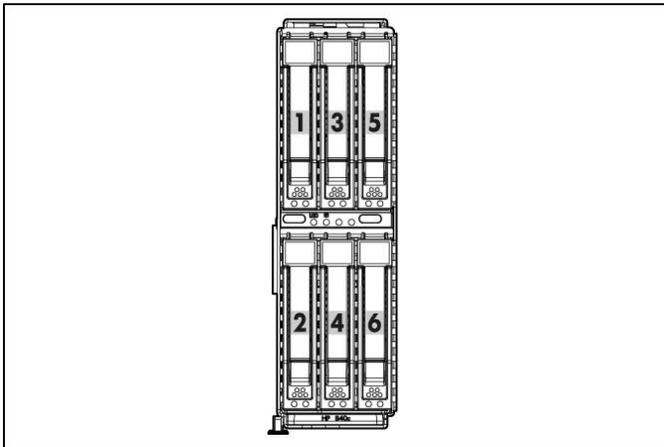
Item	Description
1	Serial pull tab
2	Storage blade handle

## Front panel LEDs

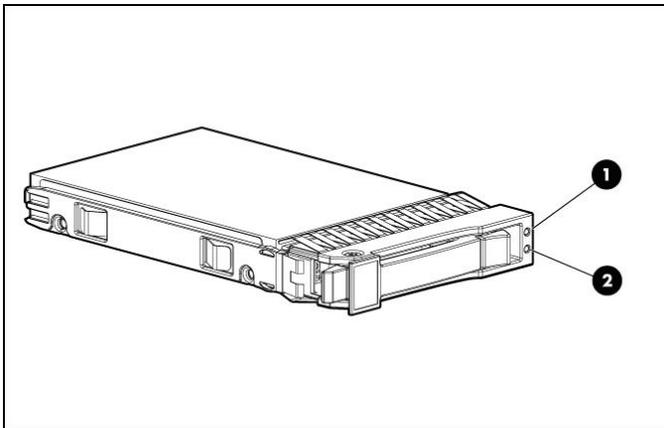


Item	Description
1	Blue = Identified Off = Not identified
2	Green = Normal operation Flashing amber = Degraded condition Flashing red = Critical condition
3	—
4	—

## SAS and SATA device numbers



## SAS and SATA hard drive LEDs



Item	Description
1	Fault/UID LED (amber/blue)

Item	Description
2	Online LED (green)

## 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)	<b>Do not remove the drive. Removing a drive may terminate the current operation and cause data loss.</b> 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 Amber, flashing regularly (1 Hz)	
Flashing irregularly		
Flashing irregularly	Off	
Off	Steadily amber	
Off	Amber, flashing regularly (1 Hz)	
Off	Off	



# 7 Specifications

## Environmental specifications

Specification	Value
<b>Temperature range</b>	
Operating	10° C to 35° C (50° F to 95° F) Maximum rate of change is 10° C/hr (50° F/hr)
Storage	-30° C to 60° C (-22° F to 140° F) Maximum rate of change is 20° C/hr (68° F/hr)
<b>Relative humidity</b>	
Operating	10% to 90% relative humidity (Rh), 28° C (82.4° F) maximum wet bulb temperature, non-condensing
Storage	5% to 95% relative humidity (Rh), 38.7° C (101.66° F) maximum wet bulb temperature, non-condensing.
<b>Altitude ‡</b>	
Operating	3048 m (10,000 ft) This value may be limited by the type and number of options installed.
Non-operating	9144 m (30, 000 ft)
Temperature ratings shown are for sea level. An altitude derating of 1° C per 300 m (1.8° F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. The upper limit may be limited by the type and number of options installed.	
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.	
‡ Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	

## Storage blade specifications

Specification	Value
Height	5.56 cm (2.19 in)

Specification	Value
Depth	50.95 cm (20.06 in)
Width	18.16 cm (7.15 in)
Weight (maximum)	5.0 kg (11.0 lb)
Weight (no drives installed)	3.6 kg (8.0 lb)