

StorageWorks by Compaq NAS B2000

Maintenance and Service Guide

Part Number 292280-001

(First Edition) May 2002

Product Version: 1.0

This maintenance and service guide provides a parts list and step-by-step instructions for servicing the *StorageWorks*[™] NAS B2000 by Compaq.

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About This Guide

This maintenance and service guide is a troubleshooting guide that can be used for reference when servicing the *StorageWorks™* NAS B2000 by Compaq.



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs can create conditions that are hazardous.

IMPORTANT: The installation of options and servicing of this product shall be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.



WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.



CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Important Safety Information

Before installing this product, read the *Important Safety Information* document provided.

Compaq Technician Notes



WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.



WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures. Because of the complexity of the individual boards and subassemblies, do not attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create conditions that are hazardous.



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Disconnect power from the system by unplugging all power cords from the power supplies.
 - Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
-



CAUTION: To properly ventilate the system, you must provide at least 7.6 cm (3.0 in.) of clearance at the front and back of the server.



CAUTION: The computer is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

NOTE: Any indications of component replacement or printed wiring board modifications may void any warranty.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User documentation
- *Compaq Service Quick Reference Guide*
- Service training guides
- Compaq service advisories and bulletins
- Compaq *QuickFind*™ information services
- Compaq Insight Manager software

For additional copies, visit the Compaq website:

www.compaq.com

Integrated Management Log

The server includes an integrated, nonvolatile management log that contains fault and management information. The contents of the Integrated Management Log (IML) can be viewed with Compaq Insight Manager.

Telephone Numbers

For the name of your nearest Compaq authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.

For Compaq technical support:

- In the United States and Canada, call 1-800-OK COMPAQ.
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website:

www.compaq.com

Text Conventions

This document uses the following conventions:

- *Italic type* is used for complete titles of published guides or variables. Variables include information that varies in system output, in command lines, and in command parameters in text.
- **Bold type** is used for emphasis, for onscreen interface components (window titles, menu names and selections, button and icon names, and so on), and for keyboard keys.
- `Monospace typeface` is used for command lines, code examples, screen displays, error messages, and user input.
- `Sans serif typeface` is used for uniform resource locators (URLs).

Illustrated Parts Catalog

This chapter provides the illustrated parts breakdown and spare parts list for the StorageWorks NAS B2000 by Compaq. See Table 1-1 and Table 1-2 for the names of referenced spare parts.

Mechanical Parts Exploded View

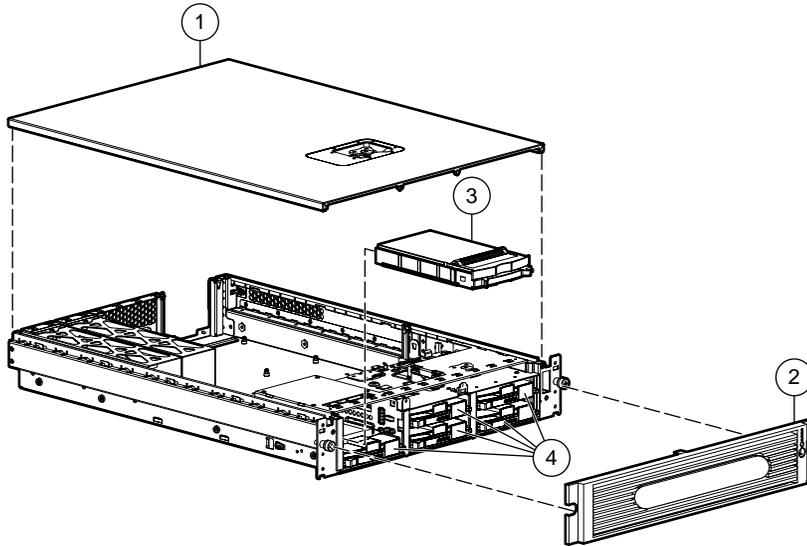


Figure 1-1: Exploded view of the StorageWorks NAS B2000 mechanical parts

Mechanical Spare Parts List

Table 1-1: Mechanical Spare Parts List

Item	Description	Part Number	Spare Part Number
1	Access panel (top cover)	218377-001	228523-001
2	Front bezel assembly (with faceplate)	293482-001	300961-001
3	Hard drive blank	349448-001	122759-001
4	Hot-plug SCSI hard drives		
	a) 18.2 GB	164184-B21	143920-001
	b) 72.8 GB	232458-B21	233349-001

System Components

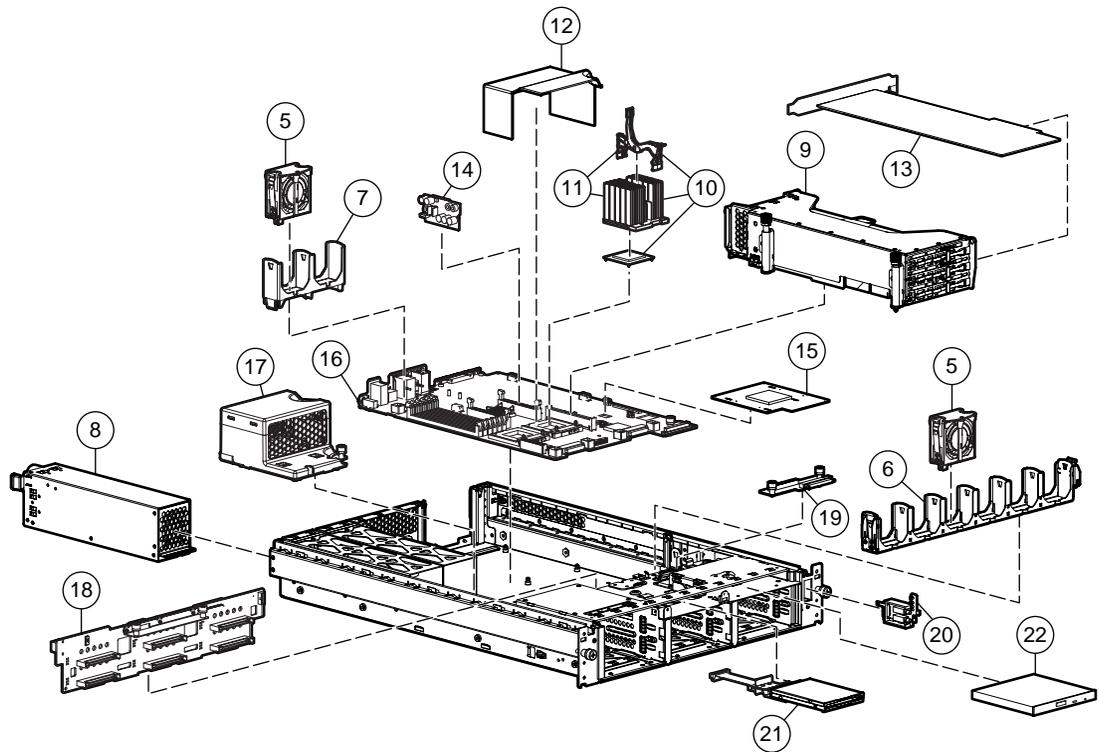


Figure 1-2: System components

NOTE: Items not shown in the illustration are indicated with an asterisk in the spare parts list.

Table 1-2: System Components Spare Parts List

Item	Description	Part Number	Spare Part Number
System Components			
5	Hot-plug fan, 60-mm	218382-001	228513-001
6	Front fan bracket, 6-bay	218383-001	228514-001
7	Rear fan bracket, 2-bay	218667-001	228493-001
8	Hot-plug power supply, 400-W	194989-001	228509-001
9	PCI riser cage, with boards	227238-001	228495-001
10	1.4-GHz Intel Pentium III processor, heatsink, and heatsink clip	201099-B21	—
11	Heatsink and heatsink clip	228075-001	228497-001
12	Air baffle	228073-001	228525-001

continued

Table 1-2: System Components Spare Parts List *continued*

Item	Description	Part Number	Spare Part Number
Boards			
13	Remote Insight Lights-Out Edition board	188591-001	217925-001
14	Processor power module (PPM), 12-V, 28.5-A	217336-001	228506-001
15	Smart Array 5i Controller	011003-003	228510-001
16	System board, with heatsink	010933-001	228494-001
17	Power converter module	207066-001	228505-001
18	SCSI backplane, 6-bay	010936-001	228502-001
19	CD MultiBay adapter board	010984-001	228504-001
20	Power button/LED board	010963-001	228503-001
Mass Storage Devices			
21	Diskette drive, slimline, 1.44-MB	235168-001	228507-001
22	CD-ROM drive, IDE, 24X	222837-001	228508-001
Cables			
23	SCSI cable kit *	—	228517-001
	SCSI cable, short, 68-pin	199606-018	—
	SCSI cable, long, 68-pin	166298-032	—
24	Signal cable kit *	—	228518-001
	Power button/LED cable, 14-pin	219048-001	—
	CD MultiBay cable, 50-pin	314014-006	—
	PCI Hot Plug backplane cable	219049-001	—
25	Miscellaneous cable kit *	—	228519-001
	System cable (LED/CD-ROM drive or diskette drive), 50-pin	219047-001	—
	Remote Insight Lights-Out Edition interface cable, 16- to 30-pin	241793-009	—
Rack-mounting Hardware			
26	Rack-mounting hardware kit *	—	232793-001
	Standard rack rail, slide assembly, left	232041-001	—
	Standard rack rail, slide assembly, right	232040-001	—
	Cable management arm, assembly	227026-001	—
* Not shown			

continued

Table 1-2: System Components Spare Parts List *continued*

Item	Description	Part Number	Spare Part Number
Miscellaneous			
27	Hardware kit *	—	228527-001
	Screws, T-15, flathead	228213-001	—
	Expansion slot cover	228072-001	—
28	Plastics kit *	—	228516-001
	PCI slot release lever	228194-001	—
	PCI shipping bracket	233129-001	—
	PCI lightpipe, rear	218517-001	—
	PCI lightpipe cover	218518-001	—
	PCI riser cage door latch	221047-001	—
	Thumbscrew with molded cap, PCI slot 1	179333-003	—
29	CD ejector assembly *	233905-001	237158-001
30	PCI expansion board ejector/divider *	218976-001	228515-001
31	Battery, 3.3-V, lithium *	334149-001	179322-001
32	Country kit *	195313-001	228526-001
33	Return kit, pack box and cushions *	—	228522-001
34	Maintenance and service guide *	203840-001	228520-001
Memory			
35	DIMM, 128-MB, registered 133-MHz SDRAM *	127007-031	164278-001
36	DIMM, 256-MB, registered 133-MHz SDRAM *	127005-031	159377-001
37	DIMM, 512-MB, registered 133-MHz SDRAM *	127006-041	177628-001
38	DIMM, 1-GB, registered 133-MHz SDRAM *	127008-041	163902-001
Options			
39	Telco rack-mounting kit *	228892-B21	232794-001
40	Third-party rack-mounting kit *	228894-B21	232795-001
* Not shown			

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for the StorageWorks NAS B2000. After completing all necessary removal and replacement procedures, run the Diagnostics program to verify that all components operate properly.

You need the following items for some procedures:

- Torx T-15 screwdriver
- Diagnostics Utility from the Compaq *SmartStart*[™] for Servers CD

Safety Considerations

Before performing service procedures, review the following safety information.

Electrostatic Discharge

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover workstations with approved static-dissipating material. Use a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep the work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Always be properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives PCB assembly-side down.
- Use conductive field service tools.

Symbols on Equipment



25 kg
55 lb

Any product or assembly marked with these symbols 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.



Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or a hot component.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching it.



Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. The enclosed area contains no operator serviceable parts.

WARNING: To reduce the risk of injury from electrical shock hazards, do not open this enclosure.



Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



This label or equivalent is located on the surface of your CD-ROM drive. This label indicates that the product is classified as a Class 1 Laser Product.

Rack Warnings and Cautions



WARNING: To reduce the risk of personal injury or damage to the equipment, adequately stabilize the rack before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended.



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

- Extend the leveling jacks to the floor.
 - Rest the full weight of the rack on the leveling jacks.
 - Attach the stabilizers to the rack if it is a single rack installation.
 - Racks are coupled in multiple rack installations.
-



WARNING: When installing the device in a Telco rack, adequately secure the rack frame to the building structure at the top and bottom.



WARNING: To reduce the risk of personal injury or damage to the equipment, use two or more people to safely unload the rack from the pallet. An empty 42U rack weighs 115 kg (253 lb), is over 2.1 m (7 ft) tall, and may become unstable when moved on its casters. Handle the rack from both sides as it rolls down the ramp from the pallet. Do not stand in front of the rack.



CAUTION: Always begin by mounting the heaviest item on the bottom of the rack. Continue to populate the rack from the bottom to the top.

Device Warnings and Cautions



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



WARNING: To reduce the risk of electrical shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
 - Unplug the power cord from each power supply to disconnect power to the equipment.
-



WARNING: Because the rack allows you to stack computer components in a vertical rather than a horizontal plane, you must take precautions to provide for rack stability and safety to protect both personnel and property. Heed all cautions and warnings throughout the installation instructions that came with the device.



CAUTION: Protect the device from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure



CAUTION: Do not operate the device for extended periods without the access panel. Operating the device without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

Preparation Procedures

To access some components and perform certain service procedures, you must do one or more of the following:

- Extend the device from the rack.

If you are performing service procedures in a Compaq rack or third-party rack cabinet, you can use the locking feature of the rack rails to support the device and gain access to internal components.

- Power down the device.

If you must remove a device from a rack or a non-hot-plug component from a device, power down the device.

- Remove the device from the rack.

If the rack environment, cabling configuration, or the device location in the rack creates awkward conditions, remove the device from the rack. If your device is installed in a Telco rack, you must remove the device from the rack to access internal components.

Extending the Device from the Rack

To extend the device from the rack:

1. Loosen the front panel thumbscrews that secure the device faceplate to the front of the rack.
2. Extend the device until the device rail-release latches engage.

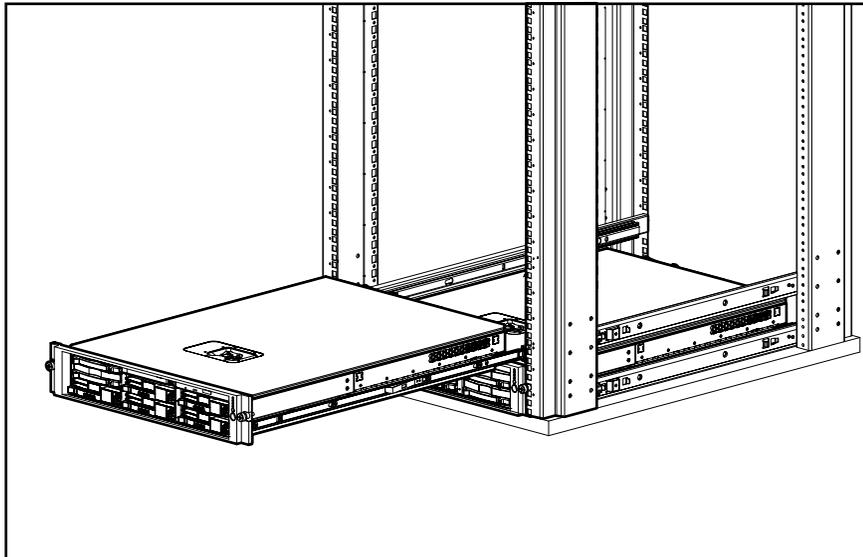


Figure 2-1: Extending the device from the rack

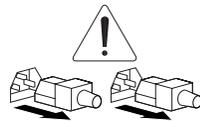


WARNING: To reduce the risk of personal injury, be careful when pressing the device rail-release latches and sliding the component into or out of the rack. The sliding rails could pinch your fingertips.

3. After performing the maintenance procedure, slide the device back into the rack:
 - a. Press the device rail-release latches.
 - b. Slide the device fully into the rack.
 - c. Secure the device by tightening the thumbscrews.

Powering Down the Device

System power in the StorageWorks NAS B2000 does not completely shut off with the front panel Power On/Standby button. The button toggles between on and standby modes, rather than on and off. The standby position removes power from most electronics and the drives, but portions of the power supply and some internal circuitry remain active. To completely remove all power from the system, you must disconnect all power cords from the device.



WARNING: To reduce the risk of injury from electrical shock, remove the power cords to completely disconnect power from the system.



CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. For more information, see the "Electrostatic Discharge" section in this chapter.

To power down the device:

1. Back up your device data.
2. Shut down the operating system as directed in your operating system instructions.
3. Press the front unit identification LED switch on the device front panel to illuminate the LED. The rear unit identification LED switch illuminates on the device rear panel.
4. Press the device Power On/Standby button to place the device in standby mode. The system power LED turns to amber when standby power mode is activated.

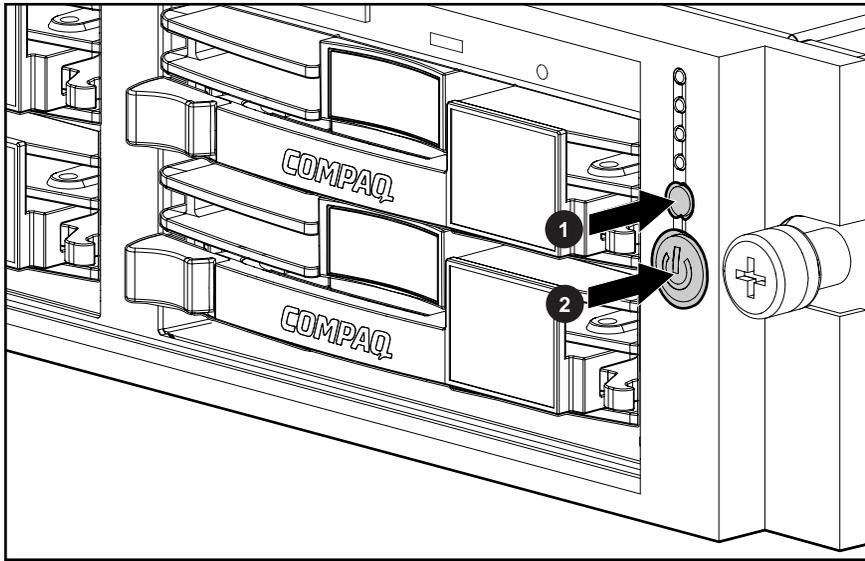


Figure 2-2: Front unit identification LED switch and Power On/Standby button

5. At the rear of the device, locate the illuminated rear unit identification LED switch that identifies the device you are servicing.

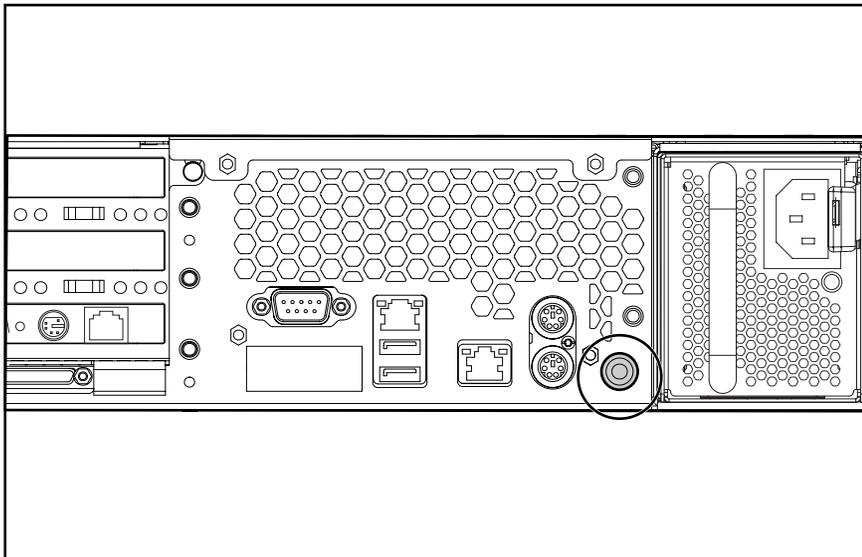


Figure 2-3: Rear unit identification LED switch

6. Disconnect all power cords.
7. Disconnect all remaining cables on the device rear panel.

Removing the Device from the Rack

To remove the device from your Compaq, Telco, or third-party rack:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Loosen the front panel thumbscrews that secure the device faceplate to the front of the rack.
3. Remove the device from the rack. Refer to the documentation that ships with your rack-mounting option.
4. Place the device on a sturdy, level surface.

Hot-Plug Procedures

You can perform some service procedures as hot-plug procedures without powering down the device. Before performing hot-plug procedures, observe the following guidelines:

- For hot-plug fan procedures, make sure that the fan zone is fully populated.
- For hot-plug power supply procedures, make sure that a redundant power supply is installed and connected to a power source.
- For hot-plug drive procedures, determine whether the drive is part of an array. For more information, refer to the “Hot-Plug SCSI Hard Drive Replacement Guidelines” in the *Compaq Servers Troubleshooting Guide*.
- For hot-plug expansion board procedures, make sure that the proper drivers for PCI Hot Plug functionality are installed.

Hot-Plug SCSI Hard Drive



CAUTION: If you are replacing a drive that is part of an array, observe the “Hot-Plug SCSI Hard Drive Replacement Guidelines” from the *Compaq Servers Troubleshooting Guide*.

To remove a hot-plug SCSI hard drive:

1. Press the release button to unlock the lever on the hard drive.
2. Pull the ejector lever to release the SCSI hard drive from the cage.
3. Pull the drive to remove it from the cage.

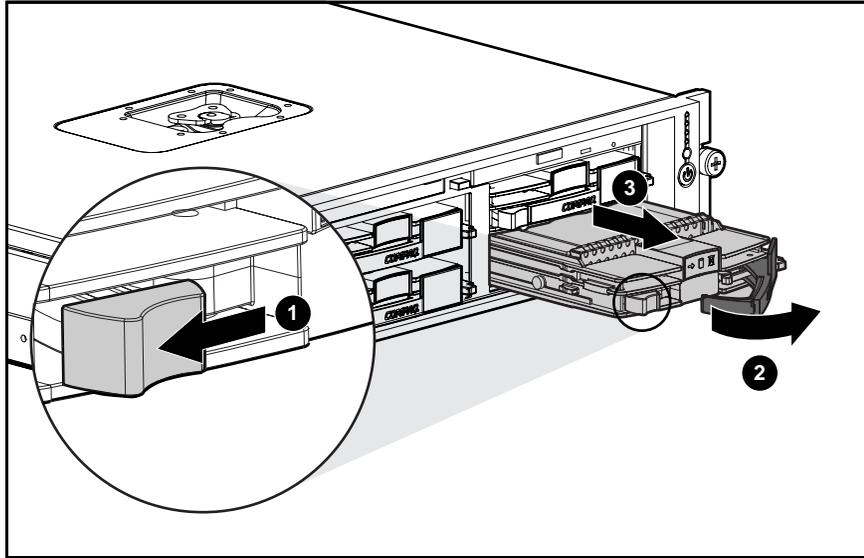


Figure 2-4: Removing a hot-plug SCSI hard drive



CAUTION: Always populate hard drive bays with either a hard drive or blank. Operating the device without a hard drive or blank results in improper airflow and improper cooling that can lead to thermal damage.

IMPORTANT: Always populate hard drive bays starting with the lowest SCSI ID.

To replace the hard drive:

1. Slide the drive into the cage until it clicks, locking the drive into place.
2. Close the lever.

Hard Drive Blank

To remove a hard drive blank:

1. Press the release button.
2. Pull the blank out of the drive bay.

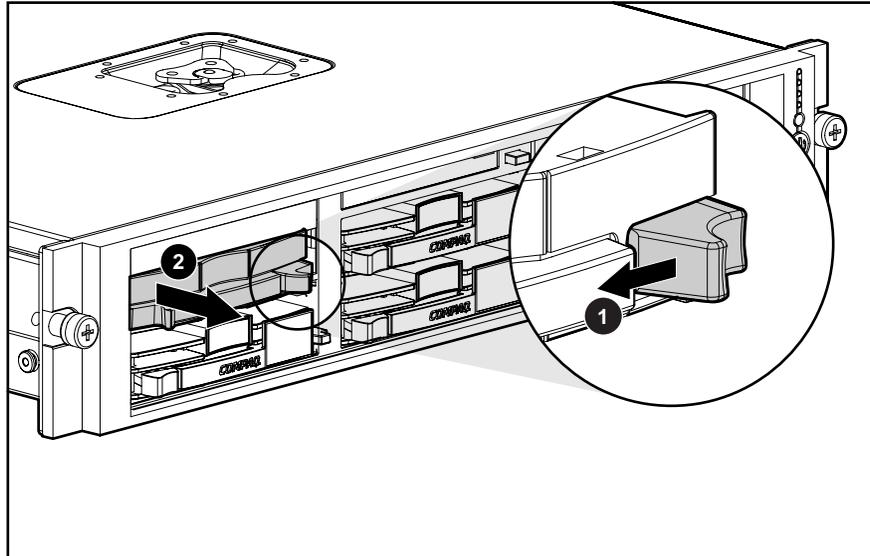


Figure 2-5: Removing a hard drive blank



CAUTION: Always populate hard drive bays with either a hard drive or hard drive blank. Operating the device without installing a hard drive or hard drive blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace the hard drive blank, slide the blank into the bay until it locks into place.

Tape Drive Blank

To remove the tape drive blank:

1. Remove the hot-plug SCSI hard drive or hard drive blank in the bay below the tape drive blank:
 - If a hot-plug SCSI hard drive is installed in the bay, see the “Hot-Plug SCSI Hard Drive” section in this chapter.
 - If a hard drive blank is installed in the bay, see the “Hard Drive Blank” section in this chapter.
2. Squeeze the middle of the tape drive blank.
3. Pull to remove the blank.

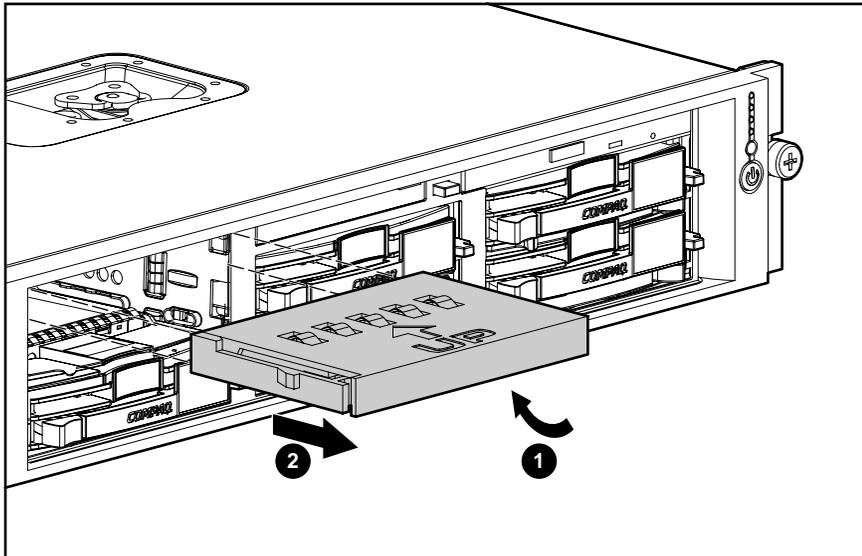


Figure 2-6: Removing the tape drive blank



CAUTION: Always populate the tape drive bay with either a tape drive or hard drive blank and tape drive blank. Operating the device without installing a tape drive or blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace the tape drive blank, slide the blank into the bay until it locks into place.

Universal Hot-Plug Tape Drive (Optional)

To remove a universal hot-plug tape drive:

1. Press the release button on the hot-plug tape drive.
2. Pull the tape drive out of the bay.

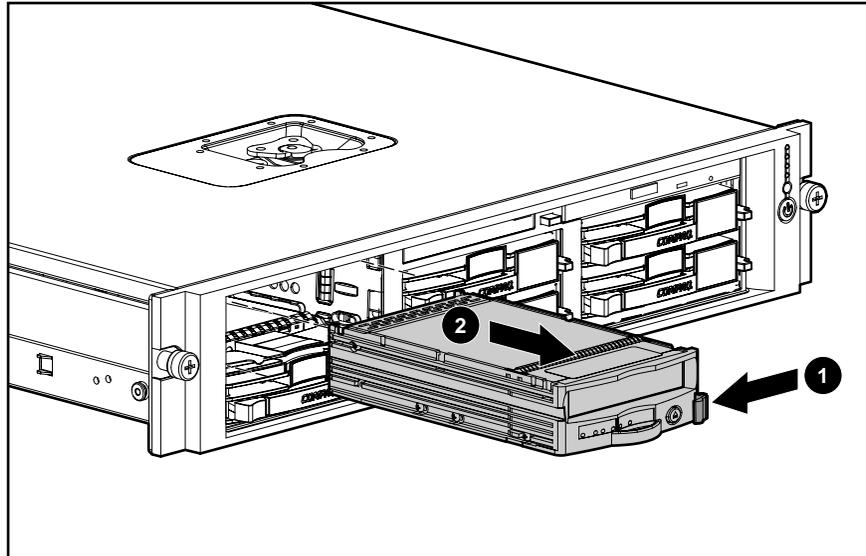


Figure 2-7: Removing a universal hot-plug tape drive



CAUTION: Always populate the tape drive bay with either a tape drive or hard drive blank and tape drive blank. Operating the device without installing a tape drive or blanks results in improper airflow and improper cooling that can lead to thermal damage.

To replace the tape drive, slide the drive into the bay until it locks into place.

Hot-Plug Power Supply

 **CAUTION:** Do not attempt to remove and replace a power supply as a hot-plug procedure unless both bays are populated with power supplies.

To remove a hot-plug power supply:

1. Unlock the hinge on the cable arm and swing the arm away from the power supply area.
2. Press the locking latch.
3. Pull the power supply out of the bay.

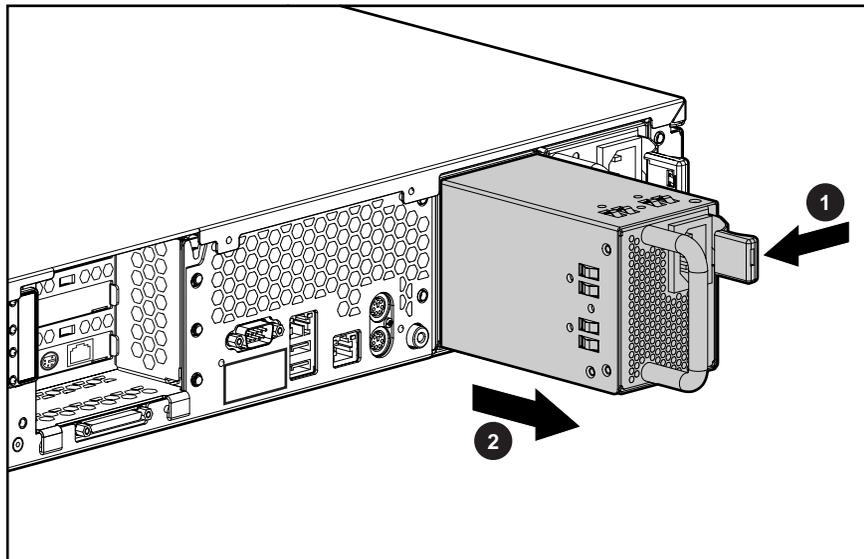


Figure 2-8: Removing a hot-plug power supply

 **CAUTION:** Always populate power supply bays with either a power supply or blank. Operating the device without installing a power supply or blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace a power supply:

1. Remove the protective cover over the connector pins on the new power supply.
2. Slide the power supply into the bay until it locks into place.
3. Connect the power cord.
4. Swing the cable management arm into place and lock it.
5. Route the power cord in the cable arm.

Access Panel



CAUTION: Do not operate the device for extended periods without the access panel. Operating the device without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

To remove the access panel:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Flip up the hood latch handle.
3. Turn the handle one-half turn counter-clockwise. When the latch disengages, it extends upward.

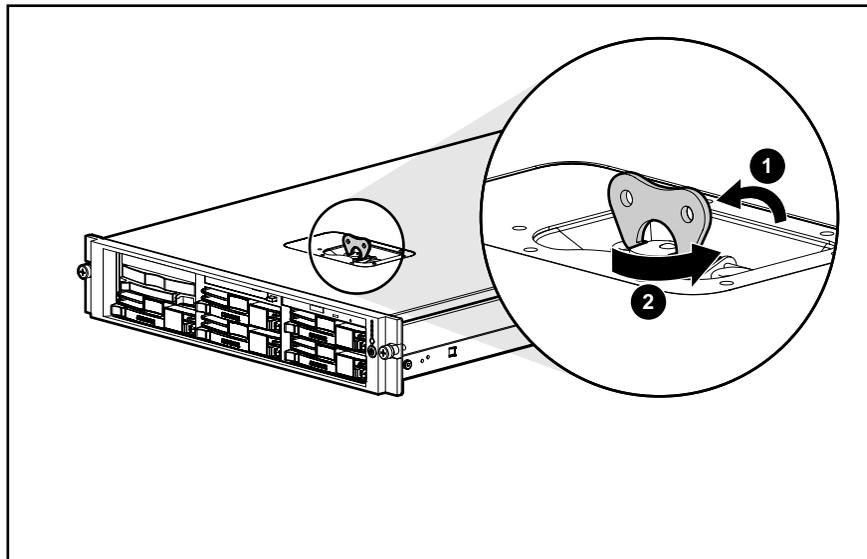


Figure 2-9: Unlocking the hood latch

4. Slide the access panel toward the rear of the unit about 1.25 cm (0.5 inch) and lift to remove the panel.

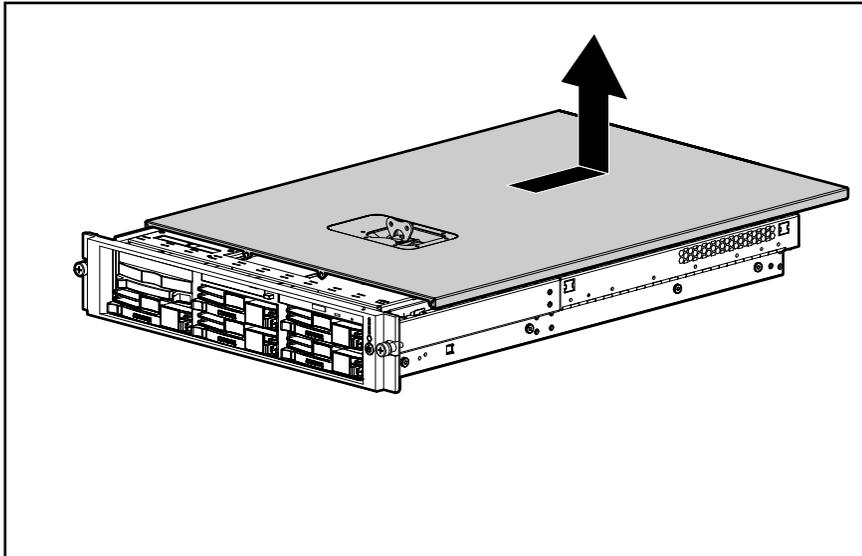


Figure 2-10: Removing the access panel

Reverse steps 1 through 4 to replace the access panel.

Hot-Plug Fan



CAUTION: Do not attempt to remove and replace a fan as a hot-plug procedure unless the fan zone is redundant.

To remove a fan:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Remove the access panel. See the “Access Panel” section in this chapter.
3. Press the release lever on the side of the fan.
4. Lift the fan.

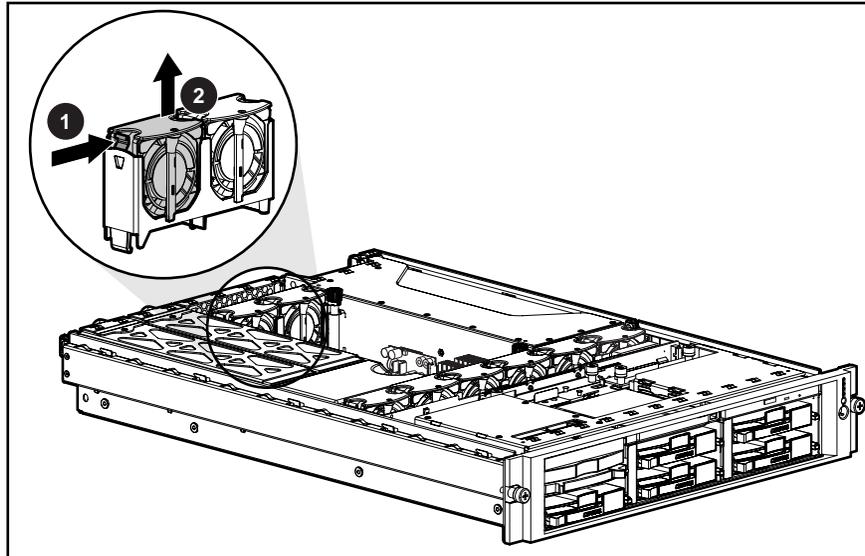


Figure 2-11: Removing a fan

 **CAUTION:** Do not operate the device for extended periods without the access panel. Operating the device without the access panel results in improper airflow that can lead to thermal damage.

IMPORTANT: For proper cooling, install fans in all primary fan locations.

Reverse steps 1 through 4 to replace a fan.

Air Baffle

To remove the air baffle:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Remove the access panel. See the “Access Panel” section in this chapter.
3. Lift the air baffle.

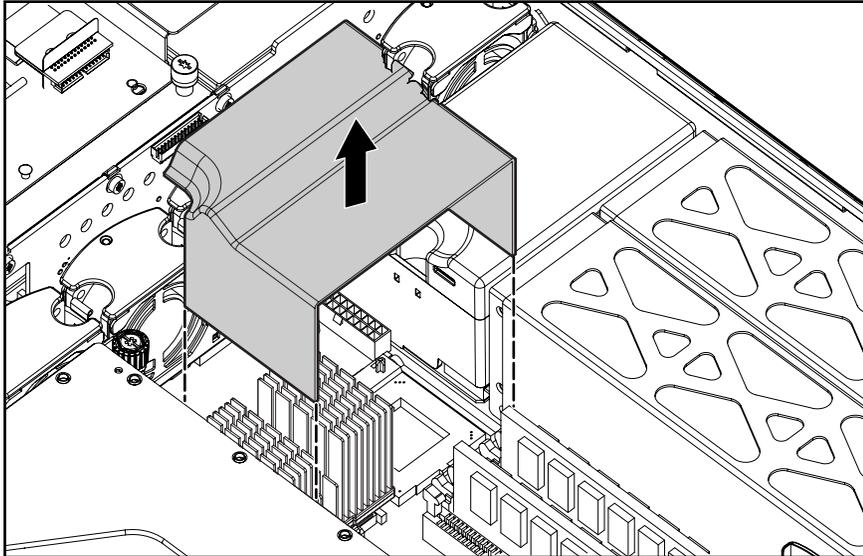


Figure 2-12: Removing the air baffle



CAUTION: Always install the air baffle after completing hardware installation or maintenance procedures. Operating the device without installing the air baffle results in improper airflow and improper cooling that can lead to thermal damage.

Reverse steps 1 through 3 to replace the air baffle.

PCI Shipping Bracket

To remove the PCI shipping bracket:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Remove the access panel. See the “Access Panel” section in this chapter.
3. Open the PCI riser cage door.
4. Lift and remove the PCI shipping bracket.

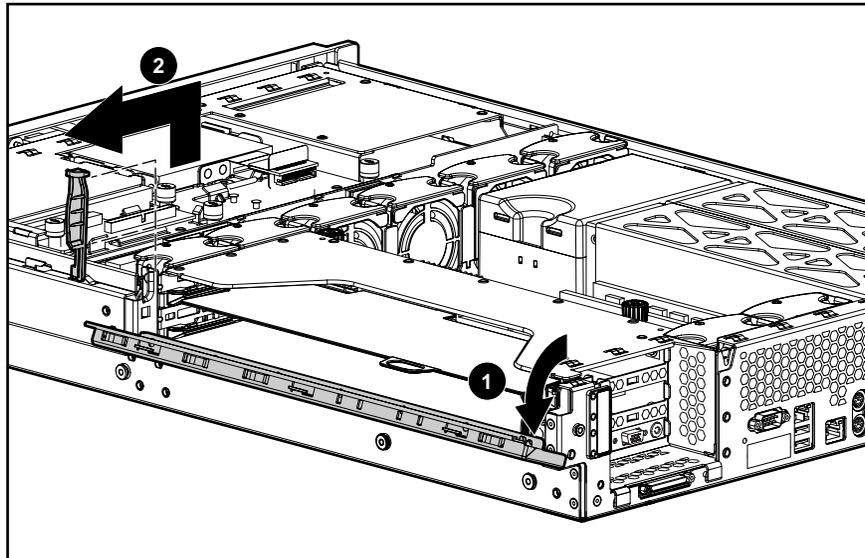


Figure 2-13: Removing the PCI shipping bracket



CAUTION: Always use the PCI shipping bracket when you are shipping the device with PCI expansion boards installed.

Reverse steps 1 through 4 to replace the PCI shipping bracket.

PCI Riser Cage Door Latch

To remove the PCI riser cage door latch:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Remove the access panel. See the “Access Panel” section in this chapter.
3. Open the PCI riser cage door.

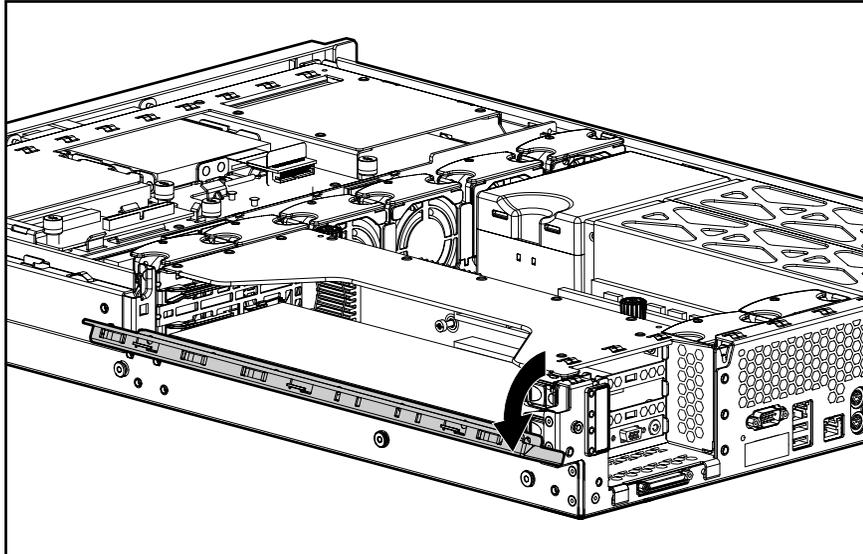


Figure 2-14: Opening the PCI riser cage door

4. Press the door latch locking tab.
5. Push the door latch through the door.

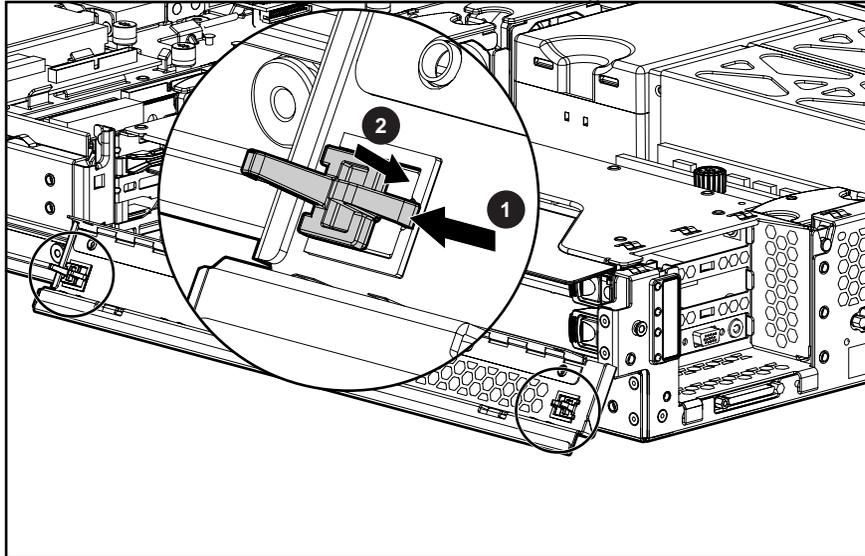


Figure 2-15: Removing the PCI riser cage door latch

Reverse steps 1 through 5 to replace the PCI riser cage door latch.

Expansion Slot Cover (Slots 2 and 3)

To remove an expansion slot cover from slots 2 and 3:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Remove the access panel. See the “Access Panel” section in this chapter.
3. Open the PCI riser cage door.

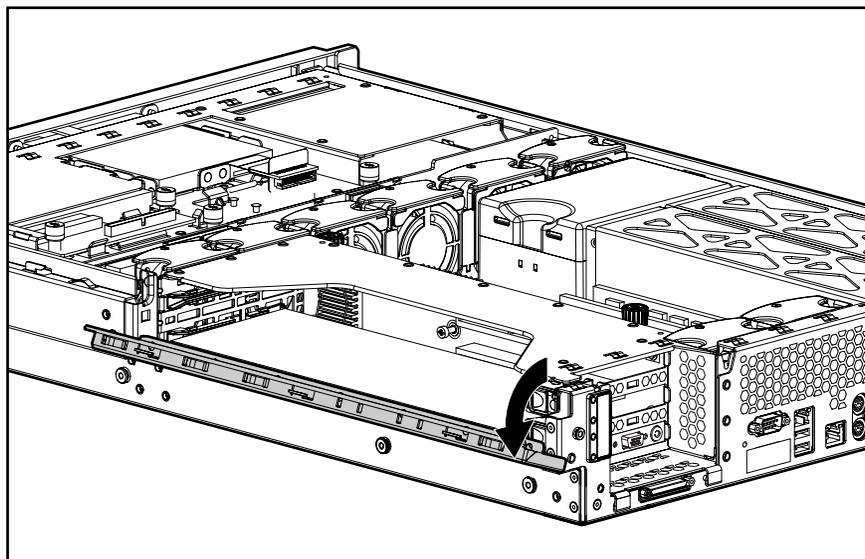


Figure 2-16: Opening the PCI riser cage door

4. Press the PCI slot release lever to unlock it.
5. Open the PCI slot release lever.
6. Slide the expansion slot cover out of the slot.

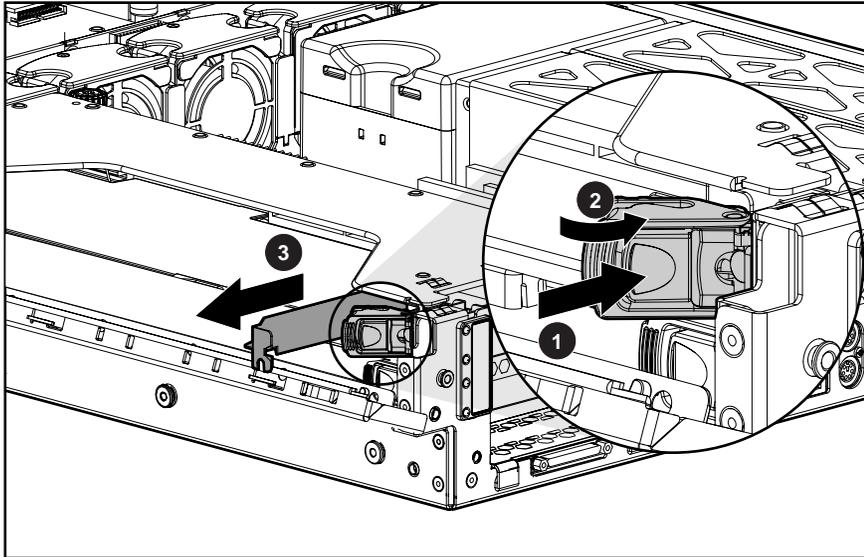


Figure 2-17: Removing the expansion slot cover from slot 3



CAUTION: Always install either an expansion board or an expansion slot cover. Operating the device without an expansion board or slot cover results in improper airflow and cooling that can lead to thermal damage.

Reverse steps 1 through 6 to replace the expansion slot cover.

Expansion Board (Slots 2 and 3)

To remove an expansion board from slots 2 and 3:

1. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
2. Remove the access panel. See the “Access Panel” section in this chapter.
3. Open the PCI riser cage door.

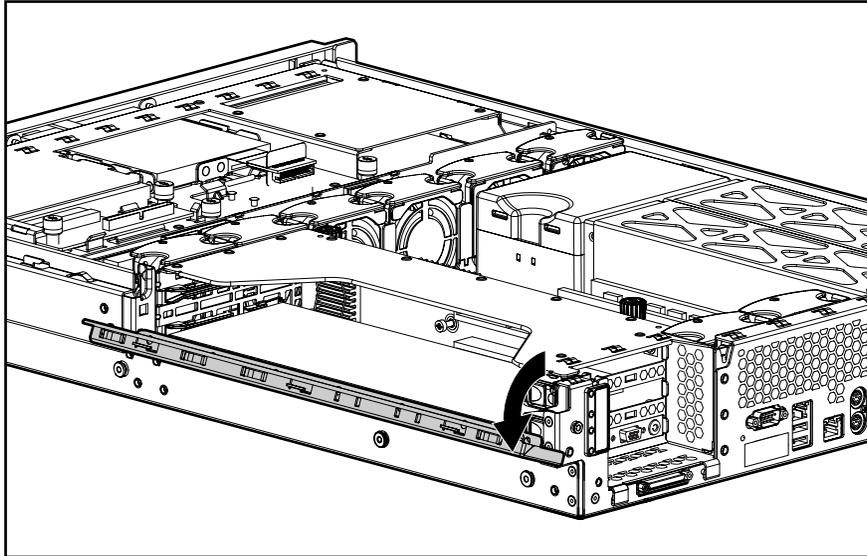


Figure 2-18: Opening the PCI riser cage door

4. Remove the PCI shipping bracket, if installed. See the “PCI Shipping Bracket” section in this chapter.
5. Press the PCI Hot Plug button for five seconds to power down the slot.

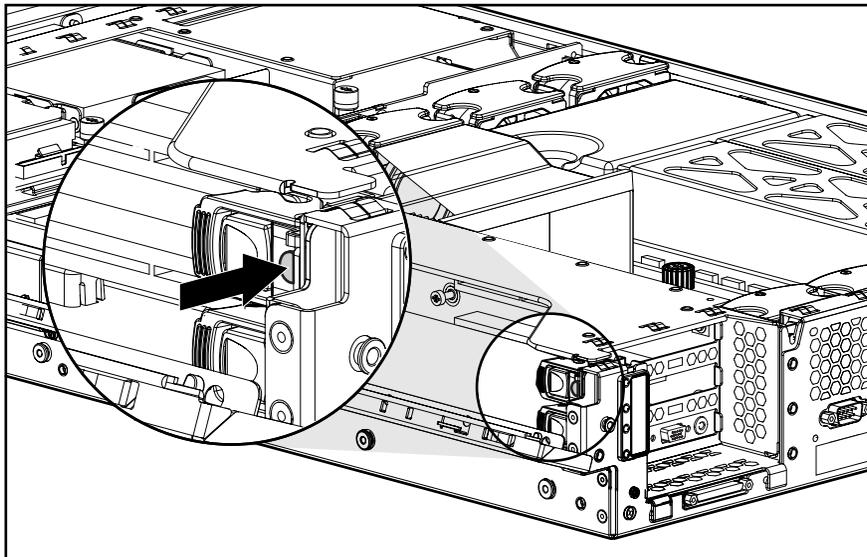


Figure 2-19: Pressing the PCI Hot Plug button

6. Disconnect any cables connected to the expansion board.

7. Press the PCI slot release lever to unlock it.
8. Open the PCI slot release lever.
9. Remove the expansion board from the slot:
 - If the expansion board is installed in slot 2, grasp the PCI expansion board ejector/divider and pull to remove the expansion board.
 - If the expansion board is installed in slot 3, grasp the expansion board and pull to remove it from the slot.

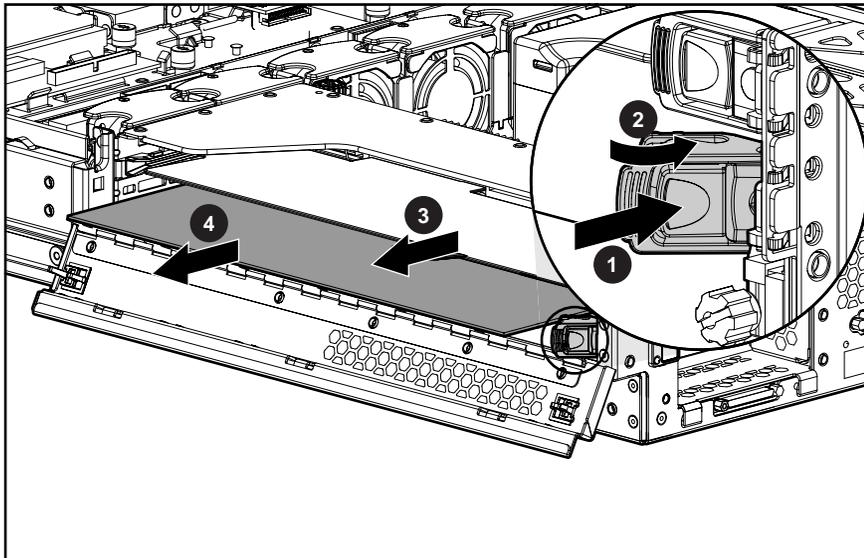


Figure 2-20: Removing an expansion board from slots 2 and 3



CAUTION: Always install either an expansion board or an expansion slot cover. Operating the device without an expansion board or slot cover results in improper airflow and cooling that can lead to thermal damage.

Reverse steps 1 through 9 to replace the expansion board.

Non-Hot-Plug Procedures

You must power down the NAS B2000 to perform non-hot-plug removal and replacement procedures. The components in this section are non-hot-plug service items, regardless of rack type or environment.

Front Bezel and Faceplate

To remove the front bezel and faceplate:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove any hot-plug SCSI hard drives, if installed. See the “Hot-Plug SCSI Hard Drive” section in this chapter.
5. Remove any hard drive blanks, if installed. See the “Hard Drive Blank” section in this chapter.
6. Remove the tape drive, if installed. See the “Universal Hot-Plug Tape Drive” section in this chapter.
7. Use a Torx T-15 screwdriver to remove the four bezel screws.
8. Tilt the top of the bezel downward.
9. Remove the bezel.
10. Remove the faceplate.

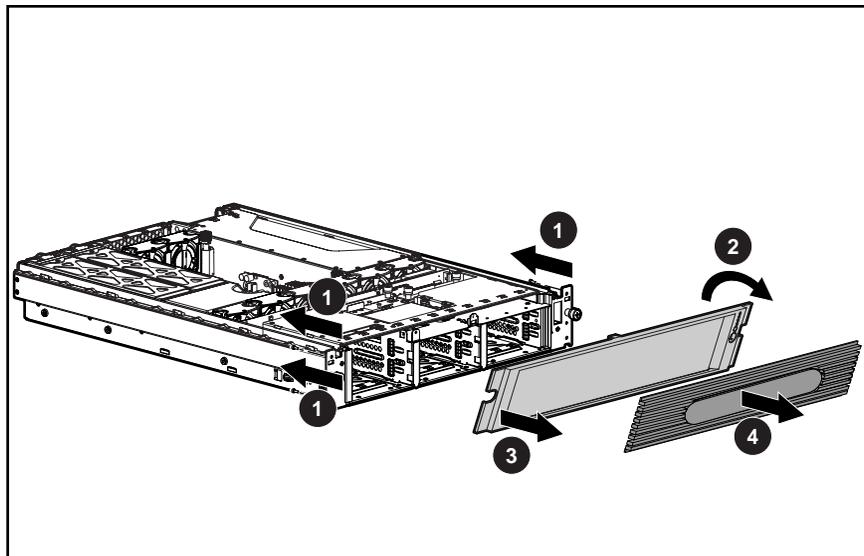


Figure 2-21: Removing the front bezel and faceplate

Reverse steps 1 through 10 to replace the front bezel and faceplate.

CD-ROM Drive

To eject the CD-ROM drive:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Push the ejection button.
3. Pull the CD-ROM drive out the CD MultiBay.

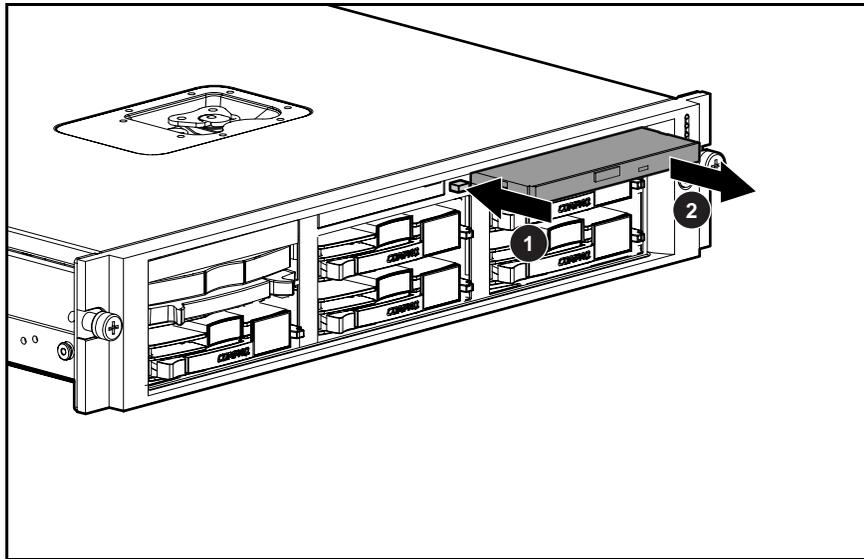


Figure 2-22: Ejecting the CD-ROM drive



CAUTION: Always populate the CD MultiBay with either a CD-ROM drive or a CD blank. Operating the device without installing a CD-ROM drive or CD blank results in improper airflow and improper cooling that can lead to thermal damage.

To replace the CD-ROM drive, slide the CD-ROM drive into the CD MultiBay until it is fully seated.

Diskette Drive

To remove a diskette drive:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Disconnect the diskette interface cable from the SCSI backplane.
5. Loosen the diskette drive thumbscrew.
6. Slide the diskette drive toward the SCSI backplane and lift.

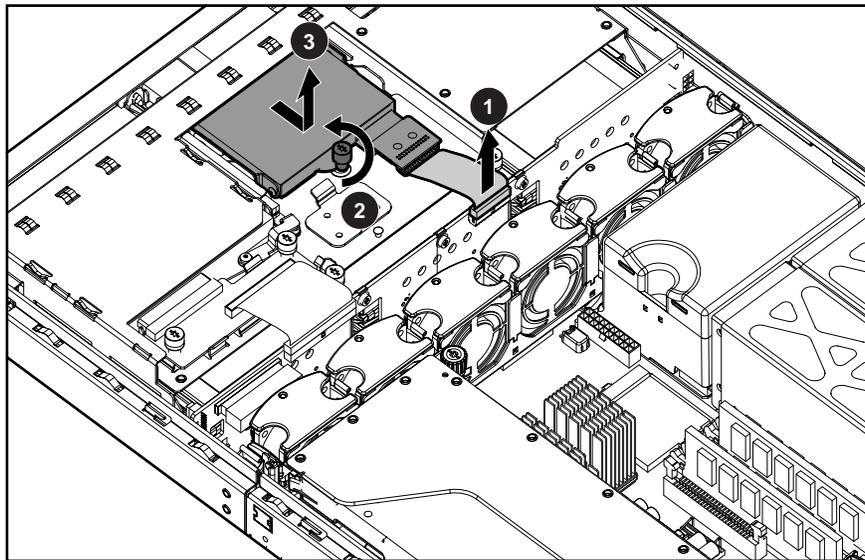


Figure 2-23: Removing the diskette drive

Reverse steps 1 through 6 to replace the diskette drive.

CD MultiBay Adapter Board

To remove the CD MultiBay adapter board:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the CD-ROM drive or CD blank. See the “CD-ROM Drive” section in this chapter.
5. Disconnect the CD MultiBay cable from the adapter board.
6. Loosen the two thumbscrews that secure the adapter board to the chassis.
7. Lift the adapter board.

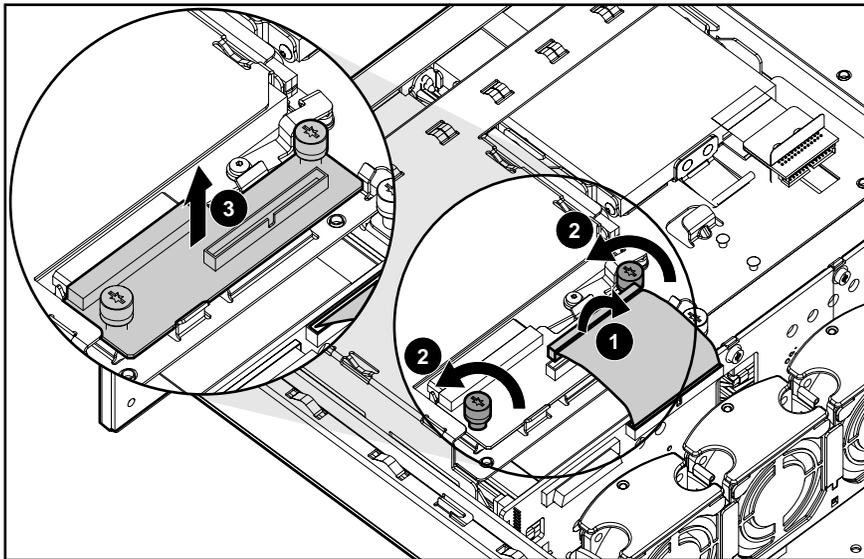


Figure 2-24: Removing the CD MultiBay adapter board

Reverse steps 1 through 7 to replace the CD MultiBay adapter board.

CD Ejector Assembly

To remove the CD ejector assembly:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the CD-ROM drive or CD blank. See the “CD-ROM Drive” section in this chapter.
5. Remove the diskette drive. See the “Diskette Drive” section in this chapter.
6. Remove the CD MultiBay adapter board. See the “CD MultiBay Adapter Board” section in this chapter.
7. Use a Torx T-15 screwdriver to remove the ejector lever screw.
8. Remove the ejector lever.

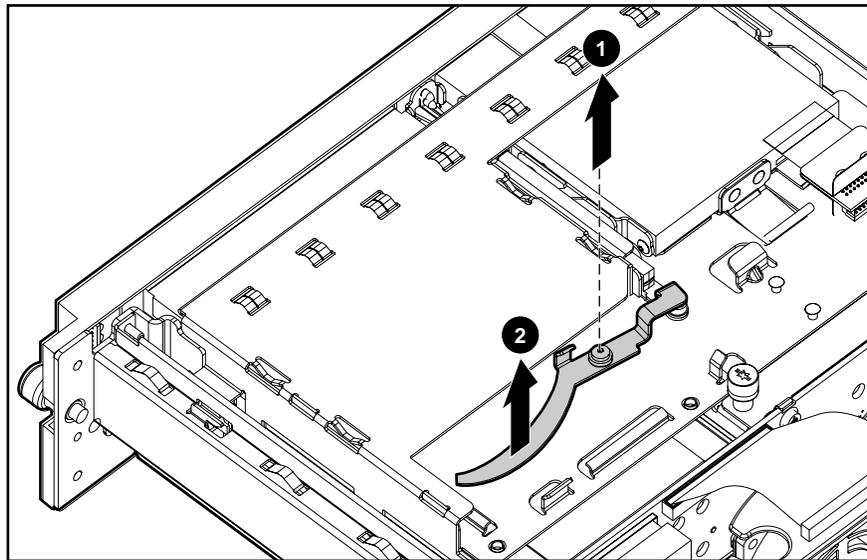


Figure 2-25: Removing the ejector lever

9. Use a Torx T-15 screwdriver to remove the ejector assembly screw.
10. Press and hold the ejection button.
11. Slide the ejector assembly toward the rear of the chassis and lift.

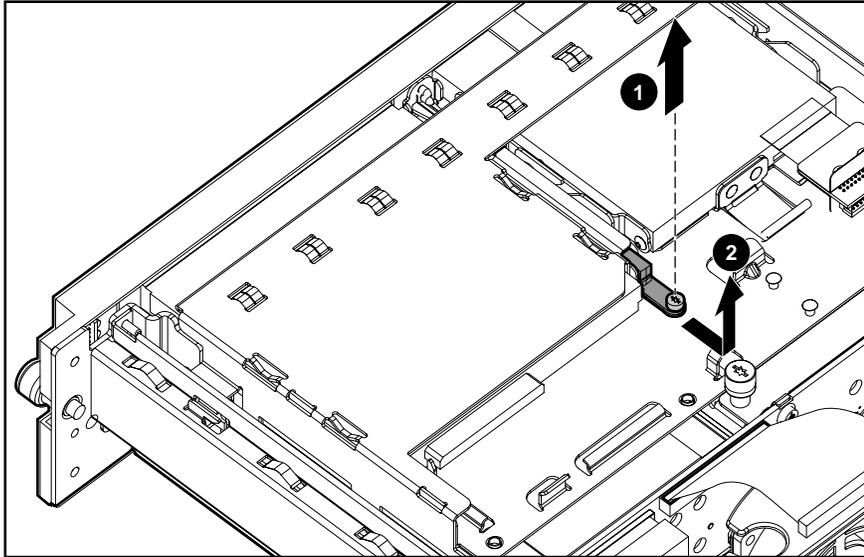


Figure 2-26: Removing the CD ejector assembly

Reverse steps 1 through 11 to replace the CD ejector assembly.

Front Fan Bracket

To remove the front fan bracket:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove all the hot-plug fans in the bracket. See the “Hot-Plug Fan” section in this chapter.
5. Press inward on the release levers.
6. Lift the bracket.

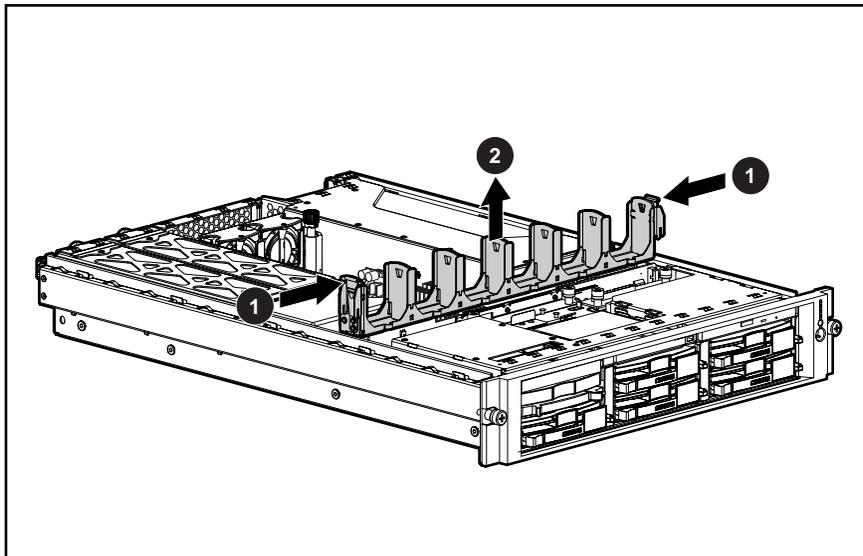


Figure 2-27: Removing the front fan bracket

IMPORTANT: Tighten the system board thumbscrew before installing the front fan bracket. The fan bracket does not seat securely if the thumbscrew is not fully tightened.

Reverse steps 1 through 6 to replace the front fan bracket.

SCSI Backplane

To remove the SCSI backplane:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove any hot-plug SCSI hard drives. See the “Hot-Plug SCSI Hard Drive” section in this chapter.
5. Remove the tape drive, if installed. See the “Universal Hot-Plug Tape Drive” section in this chapter.
6. Remove all hot-plug fans from the front fan bracket. See the “Hot-Plug Fan” section in this chapter.
7. Remove the front fan bracket. See the “Front Fan Bracket” section in this chapter.
8. Disconnect any cables connected to the SCSI backplane.
9. Loosen the two SCSI backplane thumbscrews.
10. Lift the SCSI backplane.

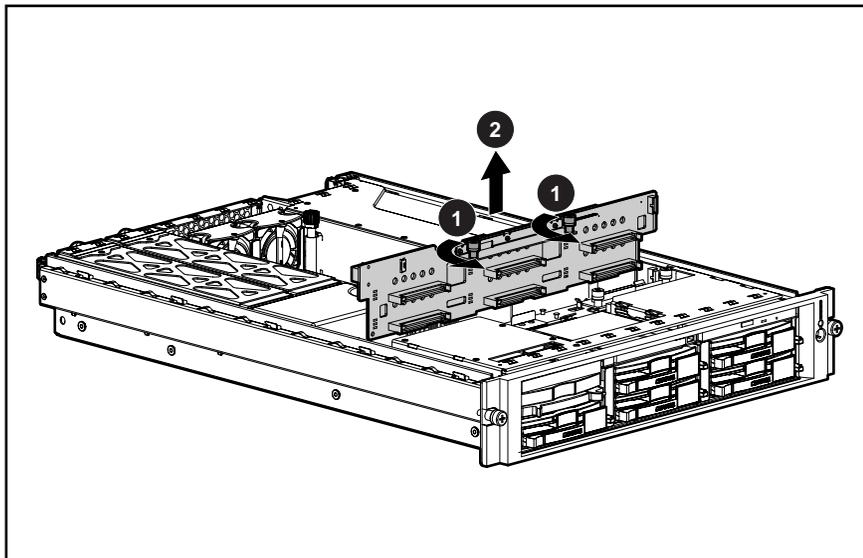


Figure 2-28: Removing the SCSI backplane

Reverse steps 1 through 10 to replace the SCSI backplane.

PCI Riser Cage



CAUTION: To avoid the risk of damage to your system or expansion boards, remove all AC power cords before installing or removing non-hot-plug expansion boards. Moving the Power On/Standby button to the standby position still provides auxiliary power to the PCI expansion slot and may damage the board or other system components.

To remove the PCI riser cage:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Disconnect any external cables connected to expansion boards.
3. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
4. Remove the access panel. See the “Access Panel” section in this chapter.
5. Disconnect the long SCSI cable from any array controller PCI expansion board, if installed.
6. Pull up the thumbscrew knobs.
7. Loosen both thumbscrews by turning them counterclockwise.

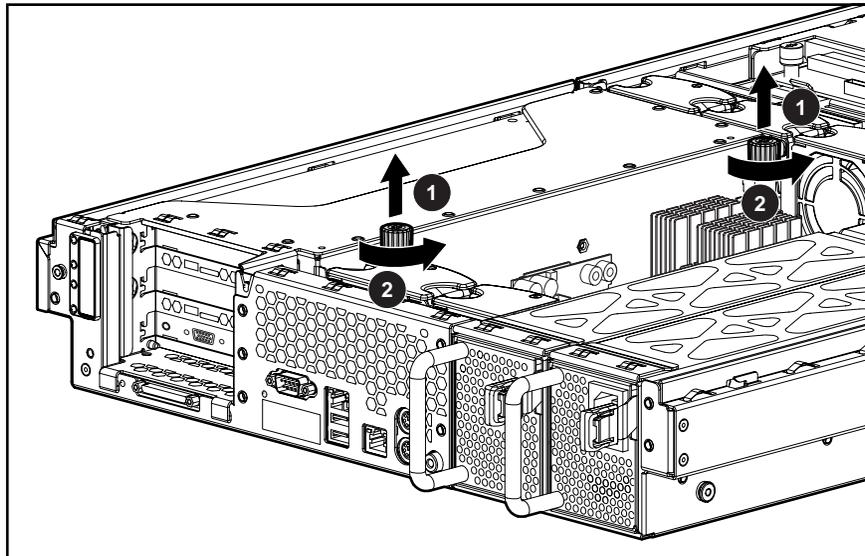


Figure 2-29: Loosening the PCI riser cage thumbscrews

- Lift the PCI riser cage.

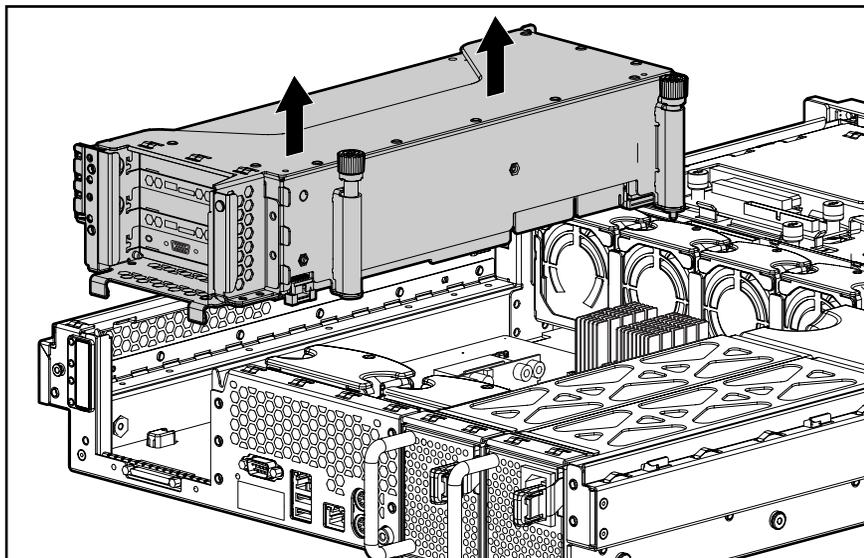


Figure 2-30: Removing the PCI riser cage

Reverse steps 1 through 7 to replace the PCI riser cage.

Remote Insight Lights-Out Edition Board

To remove a Remote Insight Lights-Out Edition board:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
5. Disconnect the Remote Insight Lights-Out Edition interface cable from the PCI riser board.
6. Disconnect the Remote Insight Lights-Out Edition interface cable from the Remote Insight Lights-Out Edition expansion board.

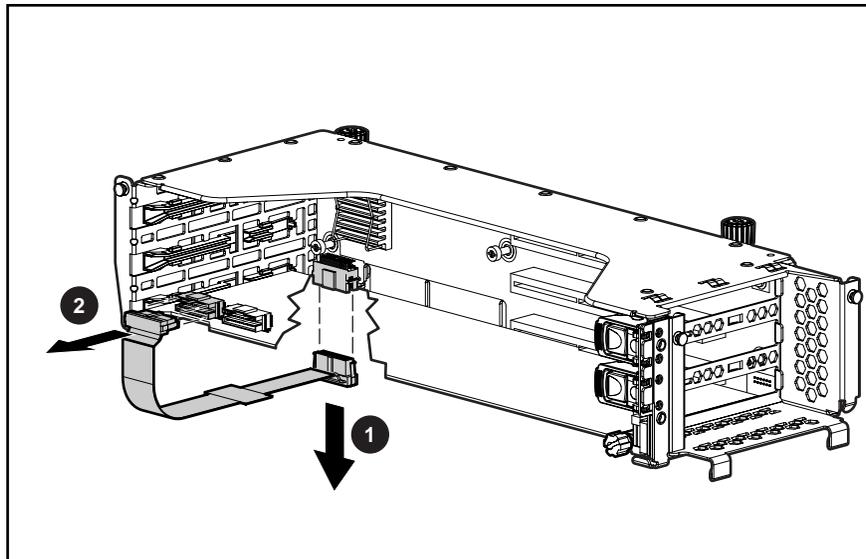


Figure 2-31: Removing the Remote Insight Lights-Out Edition board interface cable (PCI expansion board ejector/divider removed for clarity)

7. Disconnect any cables connecting the expansion board to the PCI riser cage.
8. Remove the PCI shipping bracket, if installed. See the “PCI Shipping Bracket” section in this chapter.

9. Remove the expansion slot thumbscrew.
10. Remove the expansion board from its slot.

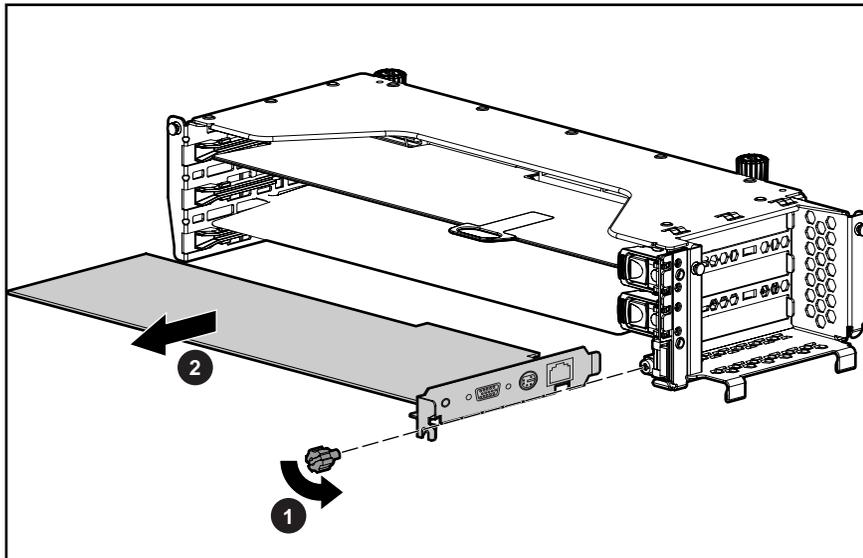


Figure 2-32: Removing a Remote Insight Lights-Out Edition board



CAUTION: Always install either an expansion board or an expansion slot cover. Operating the device without an expansion board or slot cover results in improper airflow and cooling that can lead to thermal damage.

Reverse steps 1 through 10 to replace the Remote Insight Lights-Out Edition board.

Expansion Slot Cover (Slots 2 and 3)

To remove an expansion slot cover:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
5. Press the expansion slot release lever to unlock it.
6. Open the PCI slot release lever.
7. Slide the expansion slot cover out of the slot.

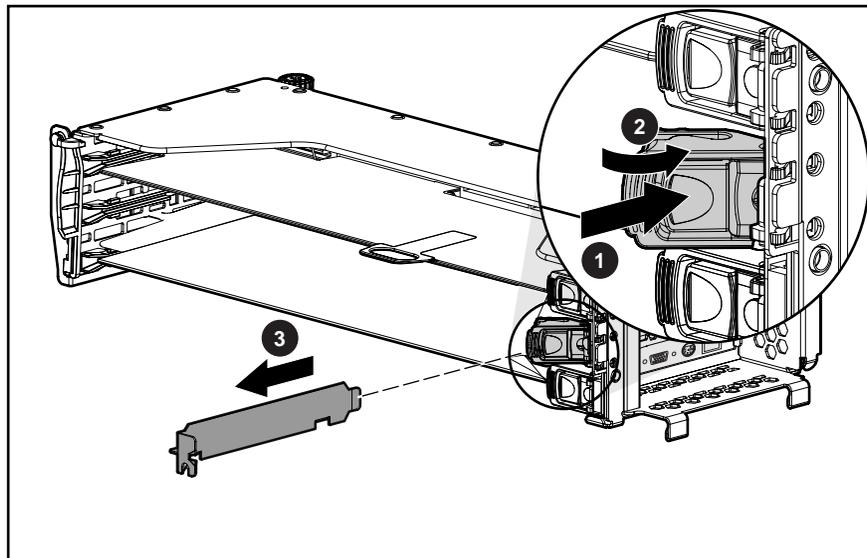


Figure 2-33: Removing the expansion slot cover



CAUTION: Always install either an expansion board or an expansion slot cover. Operating the device without an expansion board or slot cover results in improper airflow and cooling that can lead to thermal damage.

Reverse steps 1 through 7 to replace the expansion slot cover.

PCI Expansion Board Ejector/Divider

To remove the expansion board ejector/divider:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
5. Remove the three Torx T-15 screws that secure the expansion board ejector/divider.
6. Slide the expansion board ejector/divider toward the rear of the cage. This action dislodges the front tabs of the ejector/divider from the front of the cage.
7. Remove the expansion board ejector/divider from the cage.

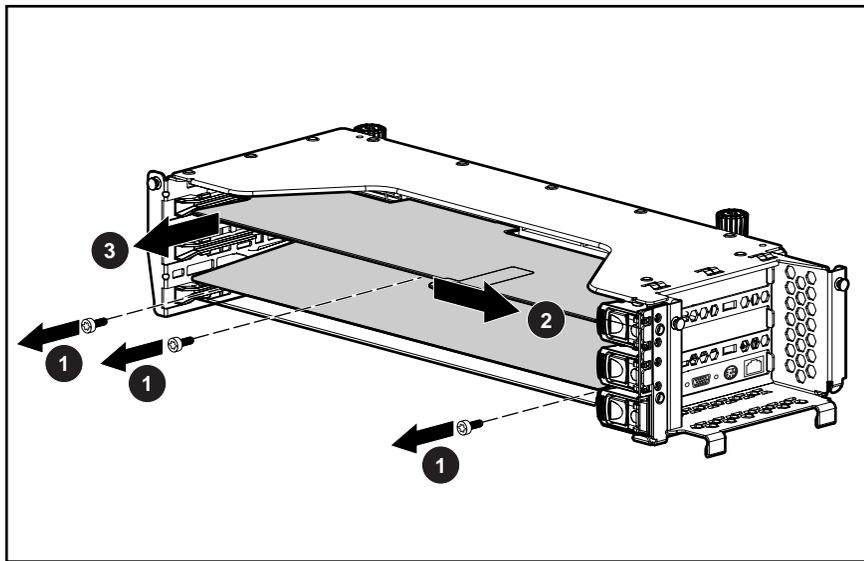


Figure 2-34: Removing the PCI expansion board ejector/divider

Reverse steps 1 through 7 to replace the PCI expansion board ejector/divider.

PCI Slot Release Lever (Slots 2 and 3)

To remove a PCI slot release lever:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the expansion board or slot cover from the slot:
 - If an expansion board is installed in the slot, see the “Expansion Board (Slots 2 and 3)” section in this chapter.
 - If an expansion slot cover is installed in the slot, see the “Expansion Slot Cover (Slots 2 and 3)” section in this chapter.
5. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
6. Press the slot release lever to unlock it.
7. Open the slot release lever.

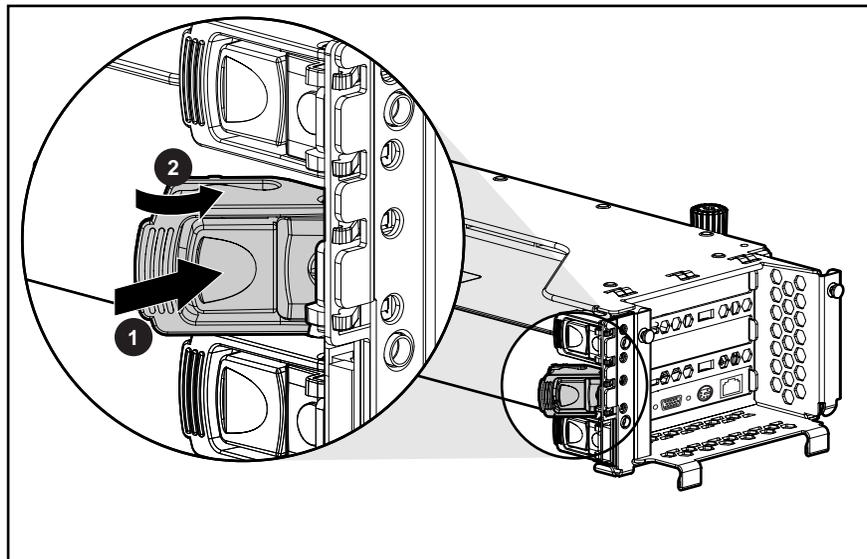


Figure 2-35: Opening the PCI slot release lever

8. From the rear of the PCI riser cage, press the slot release lever to unseat it.
9. Rotate the slot release lever out of the chassis.

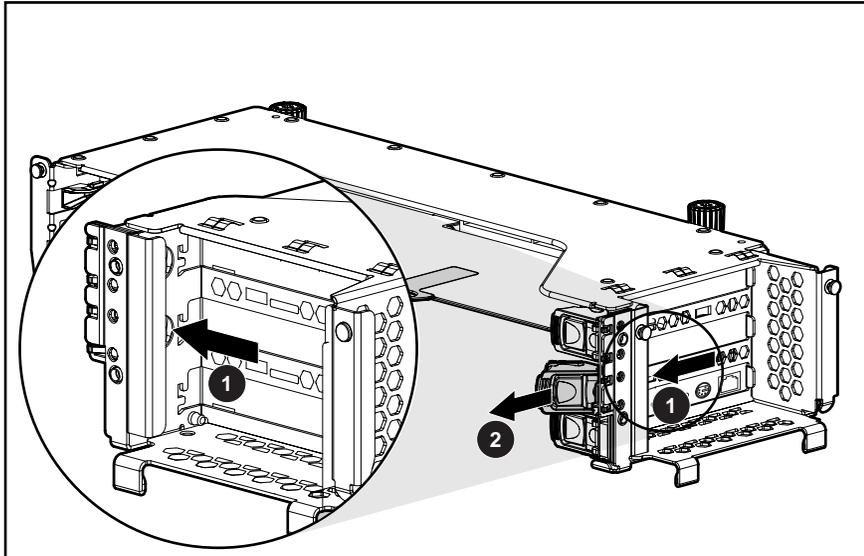


Figure 2-36: Removing the PCI slot release lever

Reverse steps 1 through 9 to replace the PCI slot release lever.

PCI Lightpipe and Cover

To remove the PCI lightpipe and cover:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Press down on the locking tab that secures the lightpipe cover to the chassis.
5. Tilt the top of the lightpipe cover away from the chassis.
6. Remove the lightpipe cover from the chassis.

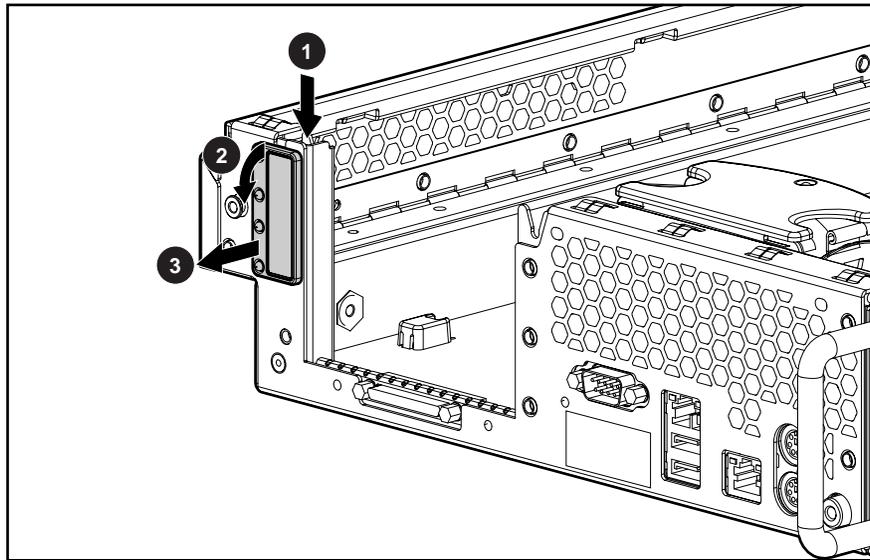


Figure 2-37: Removing the PCI lightpipe cover

7. Slide the lightpipe out of the chassis.

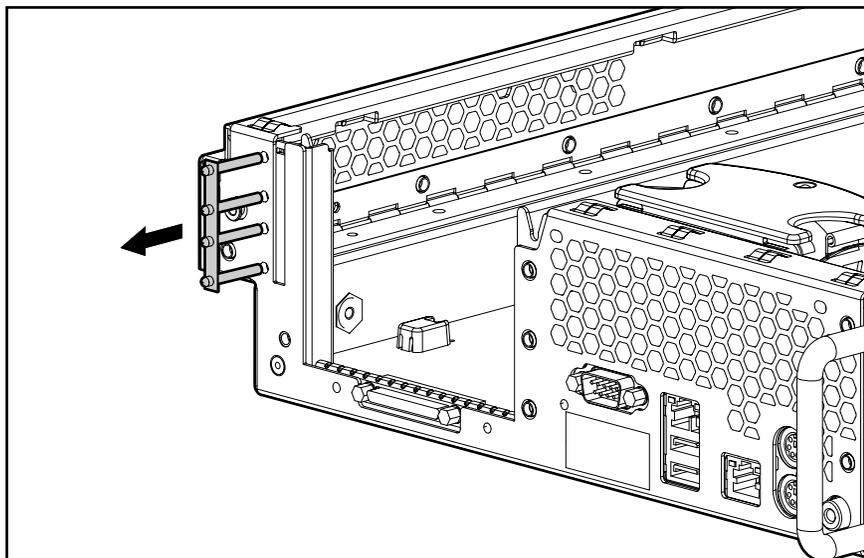


Figure 2-38: Sliding the lightpipe out of the chassis

Reverse steps 1 through 7 to replace the PCI lightpipe and cover.

Power Converter Module

To remove the power converter module:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove all hot-plug fans in the front fan bracket. See the “Hot-Plug Fan” section in this chapter.
5. Remove the front fan bracket. See the “Front Fan Bracket” section in this chapter.
6. Remove all hot-plug power supplies. See the “Hot-Plug Power Supply” section in this chapter.
7. Disconnect all power cables:
 - a. Disconnect the system power cable from the system board.
 - b. Disconnect the power supply signal cable from the system board.
 - c. Disconnect the SCSI power cable from the SCSI backplane.

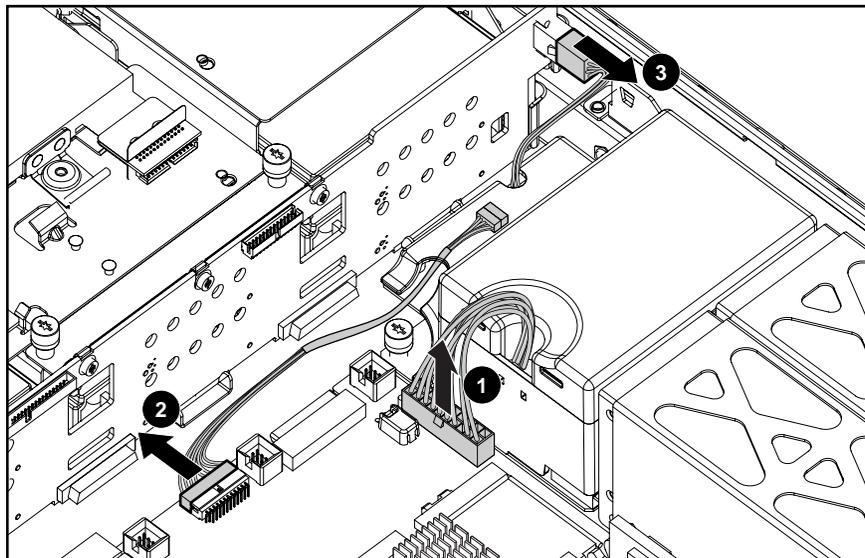


Figure 2-39: Disconnecting the power cables

8. Loosen the thumbscrew that secures the power converter module to the chassis.
9. Slide and lift the power converter module off the chassis.

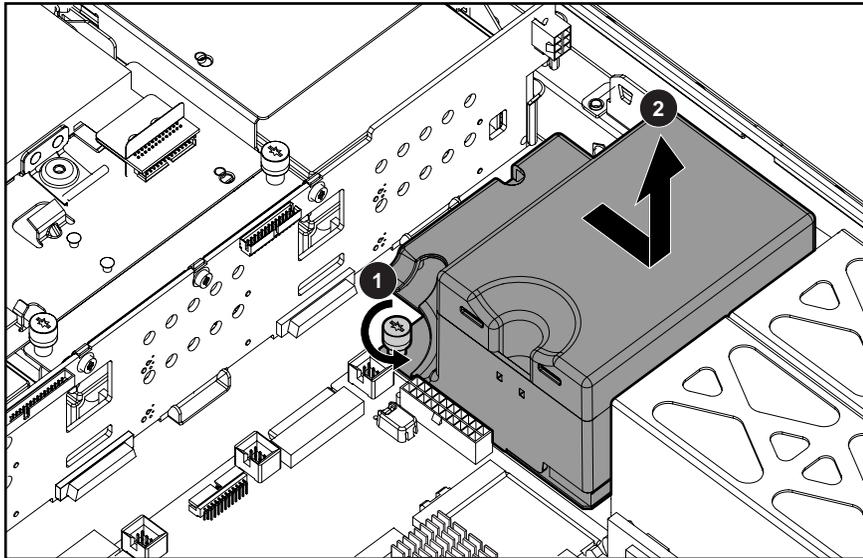


Figure 2-40: Removing the power converter module from the chassis (cables removed for clarity)

Reverse steps 1 through 9 to replace the power converter module.

Power Button/LED Board

To remove the power button/LED board:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Disconnect the power button/LED cable from the power button/LED board.
5. Press the locking tab.
6. Slide the power button/LED board out of the chassis.

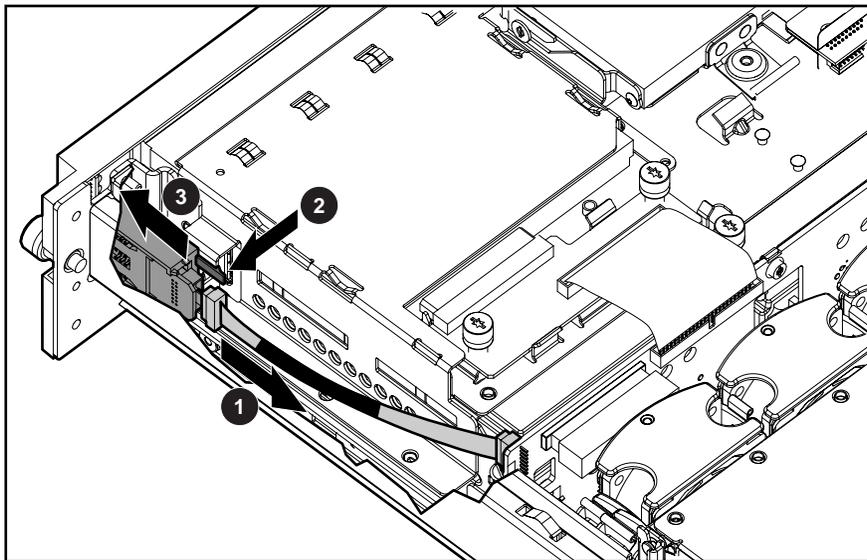


Figure 2-41: Removing the power button/LED board

Reverse steps 1 through 6 to replace the power button/LED board.

DIMMs

To remove DIMMs:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.

NOTE: The device ships with two DIMMs installed in DIMM slots 1A and 4A.

4. Open the DIMM slot latches.
5. Remove the DIMM from the slot.

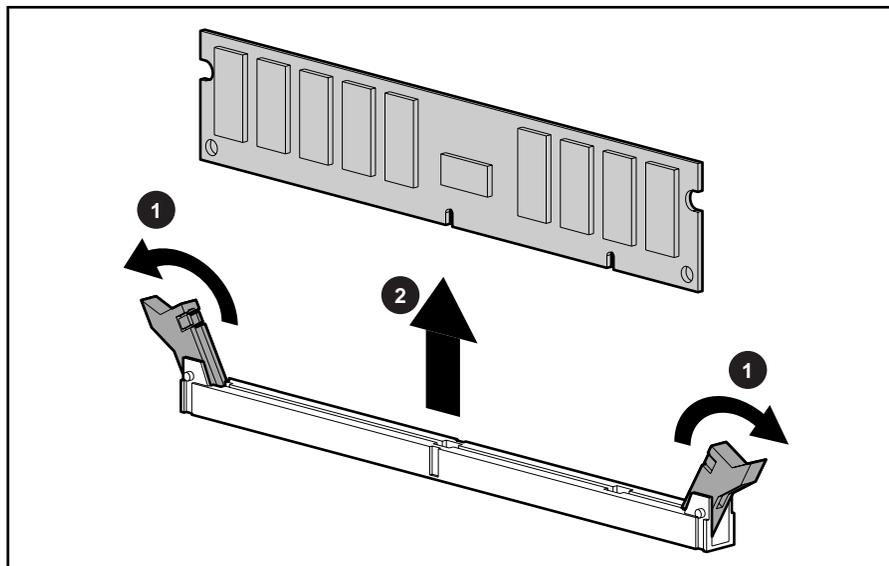


Figure 2-42: Removing a DIMM



CAUTION: Use only Compaq DIMMs. DIMMs from other sources may adversely affect data integrity.

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

To replace a DIMM, align the DIMM with the slot and insert the DIMM firmly. When fully seated, the DIMM slot latches lock into place.

Processors

To remove a processor:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the air baffle. See the “Air Baffle” section in this chapter.
5. Open the locking lever on the heatsink-retaining clip.
6. Press the base of the heatsink-retaining clip and lift the opposite end of the clip to disengage the clip from the processor socket.
7. Remove the heatsink-retaining clip.

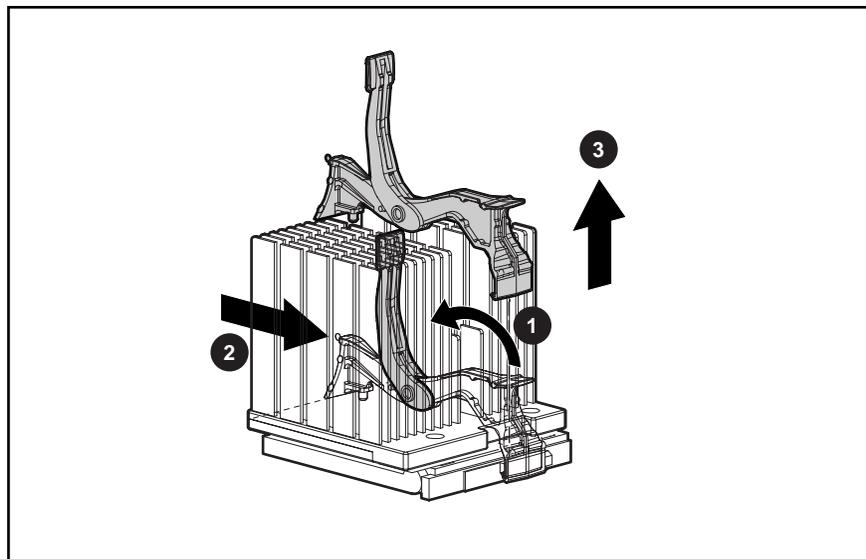


Figure 2-43: Disengaging the heatsink-retaining clip

8. Remove the heatsink.



CAUTION: Discard the heatsink after you remove it from the processor. The heatsink is for one-time use only; after use the thermal interface material is degraded and does not provide proper thermal dissipation.

9. Lift the locking lever.
10. Remove the processor.

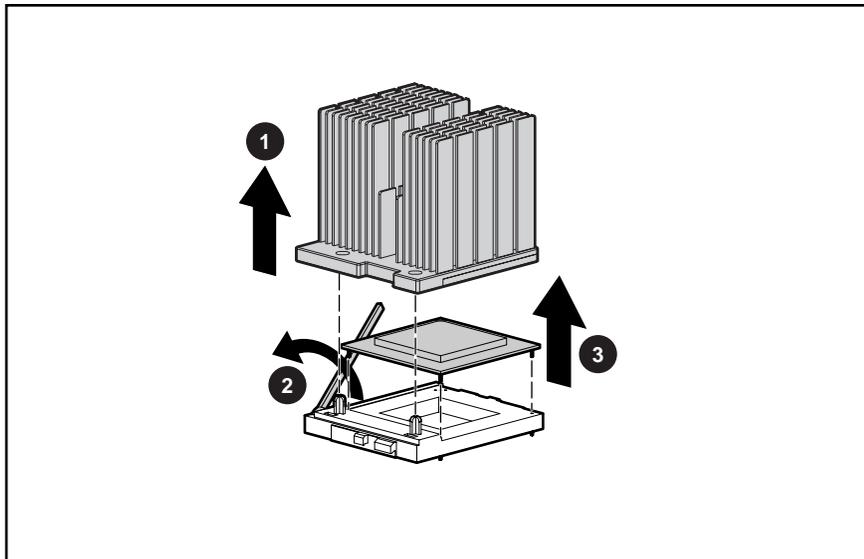


Figure 2-44: Removing the heatsink and processor from the system board

To replace a processor:



CAUTION: Processor socket 1 must be populated with a processor at all times. The system fails to boot if the socket is not populated.



CAUTION: Do not mix processors of different types or speeds.



CAUTION: You must align the processor pins to seat the processor into the socket

IMPORTANT: When installing a new processor, refer to the documentation that ships with the processor.

1. Align the notched corner of the processor with the notched corner of the socket.
2. Insert the processor.
3. Close the locking lever on the processor socket.

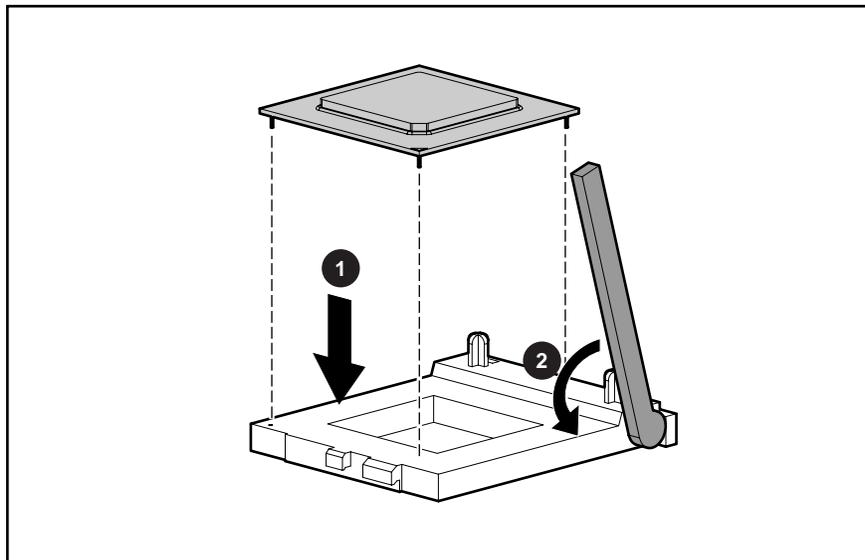


Figure 2-45: Installing the processor



CAUTION: Always use a new heatsink with thermal interface material when replacing processors. Failure to use new components may result in damage to the processor.

4. Remove the plastic cover on a new, unused heatsink to expose the thermal interface material.

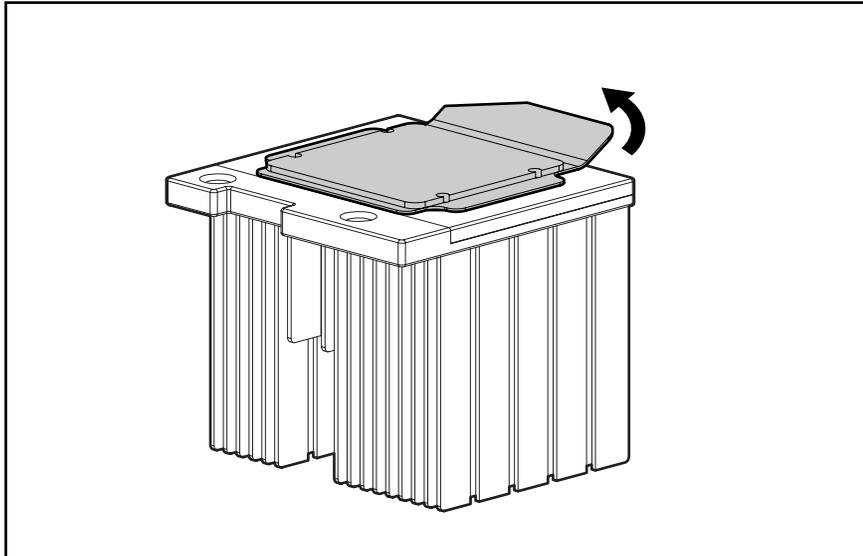


Figure 2-46: Removing the plastic strip on the heatsink

5. Install the heatsink.
6. Carefully install the heatsink-retaining clip.
7. Close the locking lever on the heatsink-retaining clip.

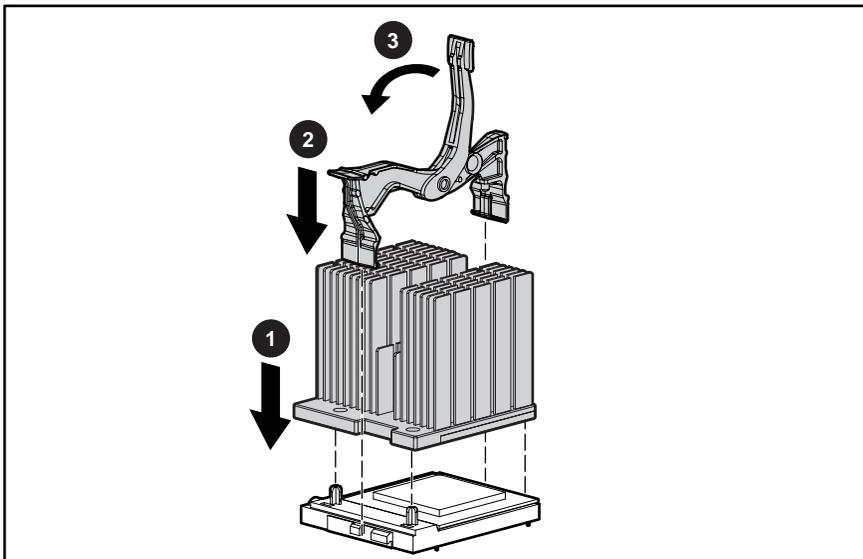


Figure 2-47: Installing the heatsink and heatsink-retaining clip



CAUTION: PPM slots must be populated when processors are installed. If PPM slots are not populated, the system does not boot.

8. Install a PPM in the corresponding slot, if the slot is empty.
9. Install the air baffle.
10. Install the access panel.
11. Slide the device back into the rack. See the “Preparation Procedures” section in this chapter.

PPMs

To remove a PPM:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Open the latches on the sides of the PPM slots.
5. Lift the PPM out of the slot.

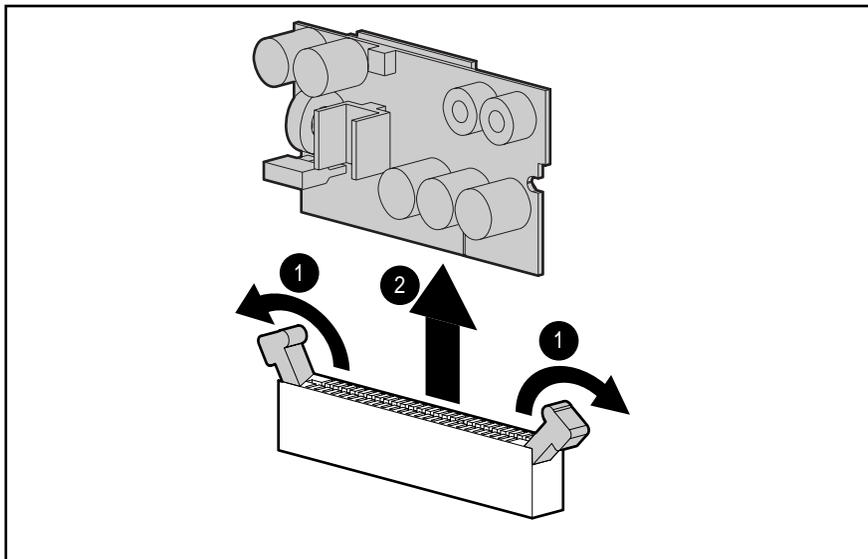


Figure 2-48: Removing a PPM



CAUTION: PPM slots must be populated when processors are installed. If PPM slots are not populated, the system does not boot.

IMPORTANT: PPMs do not seat if turned the wrong way.

Reverse steps 1 through 5 to replace the PPM.

Smart Array 5i Controller

To remove the Smart Array 5i Controller:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
5. Turn each of the four anchor pins counterclockwise one-quarter turn.
6. Lift the controller off the system board.

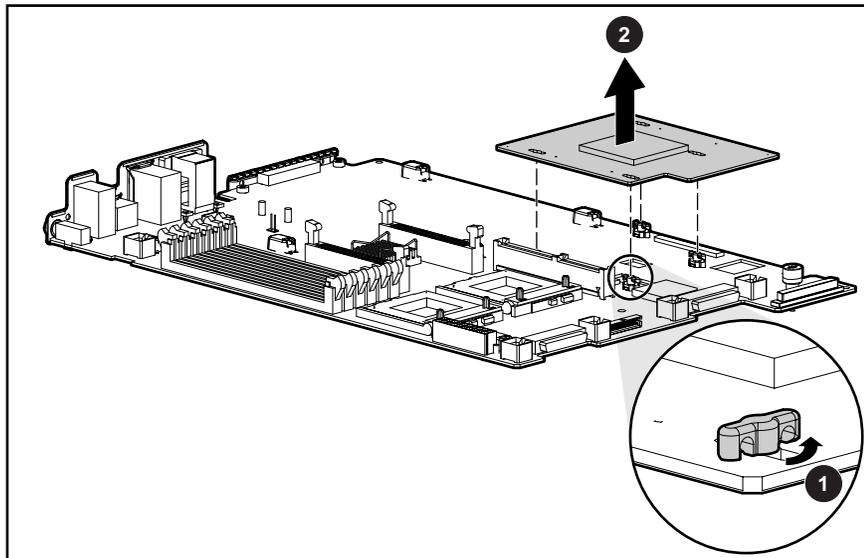


Figure 2-49: Removing the Smart Array 5i Controller

IMPORTANT: In the default position (off), the SCSI interlock disable switch prevents the StorageWorks by Compaq NAS B2000 from booting when the Smart Array 5i Controller is removed. If you operate the device without the Smart Array 5i Controller for troubleshooting purposes, you must set the SCSI interlock disable switch to on. For more information, see Chapter 4, “Connectors, LED Indicators, Switches, and Jumpers.”

Reverse steps 1 through 6 to replace the Smart Array 5i Controller.

Battery

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

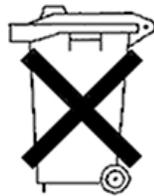


WARNING: This device contains either an internal lithium manganese dioxide or a vanadium pentoxide battery. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

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



CAUTION: Removing the lithium battery causes the system to lose the BIOS settings. Reconfigure the BIOS settings when you replace the battery.



CAUTION: Do not dispose batteries, battery packs, and accumulators with general household waste. Use the public collection system, or return them to your authorized partners or their agents for recycling.

IMPORTANT: Run RBSU to configure the system after replacing the battery. See Chapter 3, “Diagnostic Tools,” for more information.

To remove the battery:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Locate the battery holder on the system board.

5. Remove the battery.

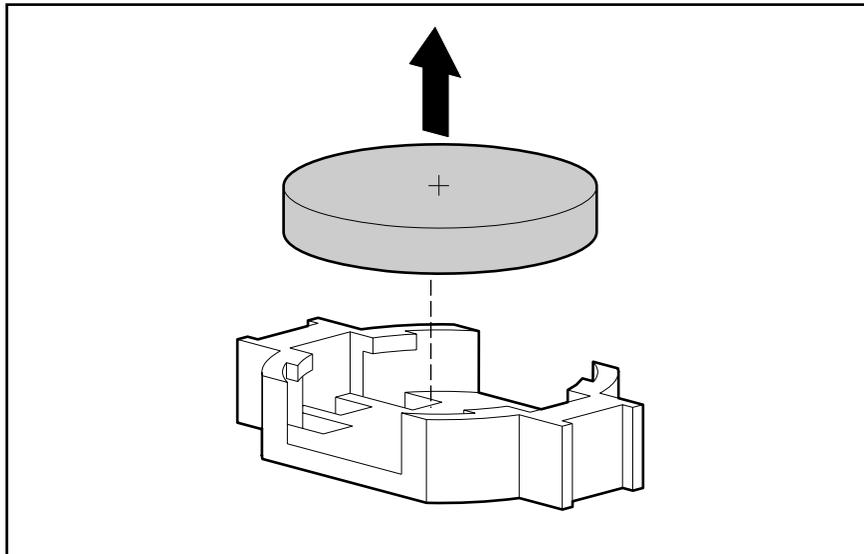


Figure 2-50: Removing the battery

Reverse steps 1 through 5 to replace the battery.

After replacing the battery, you must use the ROM-Based Setup Utility (RBSU) to reconfigure the system.

System Board

To remove the system board:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Device Access Panel” section in this chapter.
4. Remove the air baffle. See the “Air Baffle” section in this chapter.
5. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
6. Remove all hot-plug fans. See the “Hot-Plug Fan” section in this chapter.
7. Remove the front fan bracket. See the “Front Fan Bracket” section in this chapter.
8. Remove any SDRAM DIMMs. See the “DIMMs” section in this chapter.
9. Remove the processors. See the “Processors” section in this chapter.



CAUTION: Discard the heatsink after you remove it from the processor. The heatsink is for one-time use only; after use the thermal interface material is degraded and does not provide proper thermal dissipation.

10. Remove the PPMs. See the “PPMs” section in this chapter.
11. Remove the Smart Array 5i Controller. See the “Smart Array 5i Controller” section in this chapter.
12. Remove the battery. See the “Battery” section in this chapter.
13. Disconnect all cables connected to the system board.

14. Loosen the system board thumbscrew.

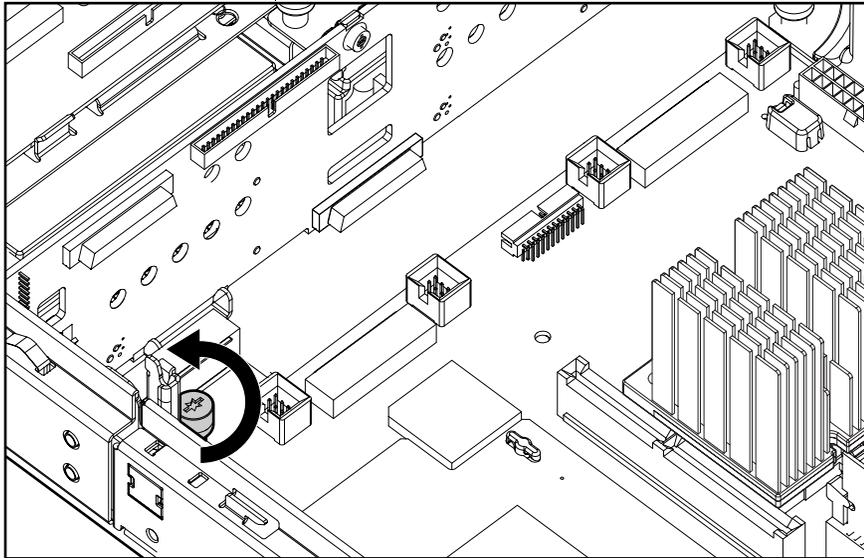


Figure 2-51: Loosening the system board thumbscrew

15. Identify the alignment keys and keyhole locations through on the system board.

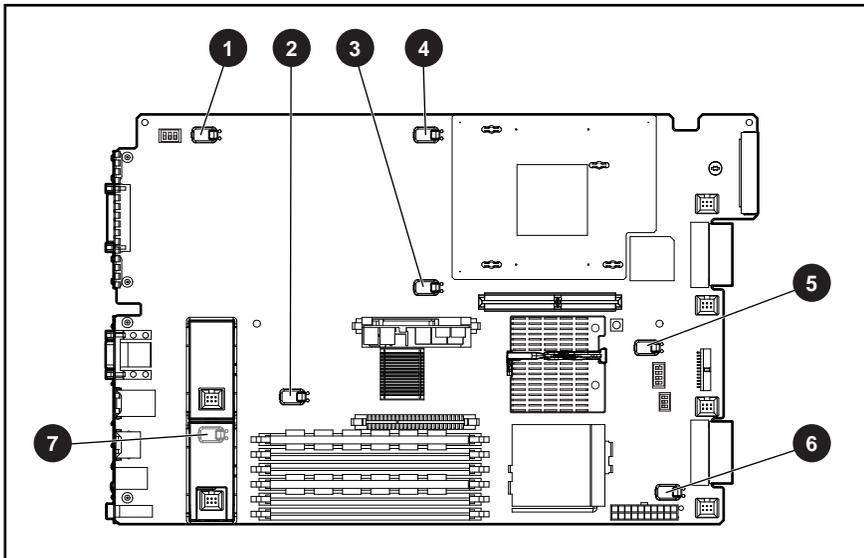


Figure 2-52: Identifying the alignment keys and keyhole locations

- Slide the system board toward the front of the device and lift the system board off the alignment keys.

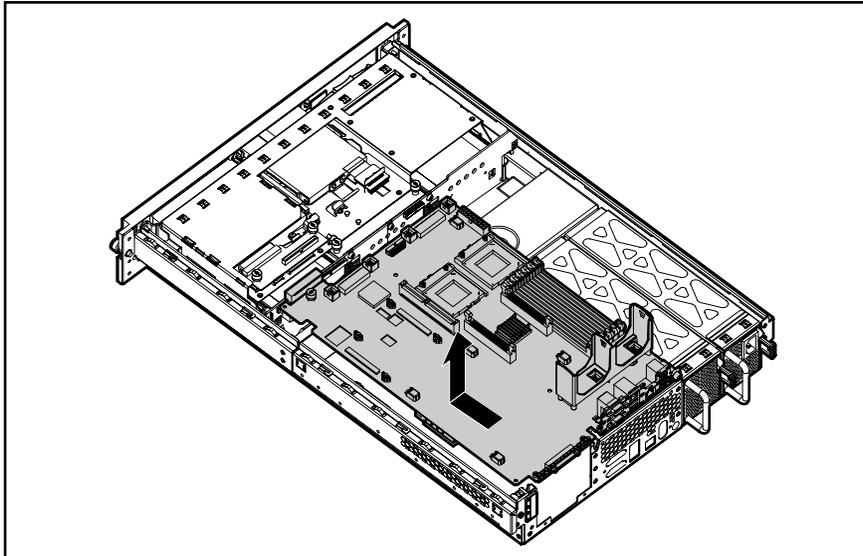


Figure 2-53: Removing the system board from the chassis

- Remove the rear fan bracket. See the “Rear Fan Bracket” section in this chapter.

Reverse steps 1 through 17 to replace the system board.



CAUTION: Always use a new heatsink with thermal interface material when replacing processors on the new system board. Failure to use new components may result in damage to the processor. For more information, see the “Processors” section in this chapter.

IMPORTANT: Tighten the system board thumbscrew before installing the front fan bracket. The fan bracket does not seat securely if the thumbscrew is not fully tightened.

When reinstalling the processor on the new system board, discard the used heatsink. Reinstall the processors with the new heatsink that ships in the system board spare parts kit.

Rear Fan Bracket

To remove the rear fan bracket:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
5. Remove the air baffle. See the “Air Baffle” section in this chapter.
6. Remove all hot-plug fans. See the “Hot-Plug Fan” section in this chapter.
7. Remove the front fan bracket. See the “Front Fan Bracket” section in this chapter.
8. Remove the system board. See the “System Board” section in this chapter.

NOTE: When removing the system board, you may leave the DIMMs, the processors, the PPMs, the Smart Array 5i Controller, and the system battery on the system board, unless you are replacing them as failed items.

9. Use a Torx T-15 screwdriver to remove the screws that secure the rear fan bracket to the system board.
10. Rotate the rear fan bracket toward the edge of the system board and remove the bracket.

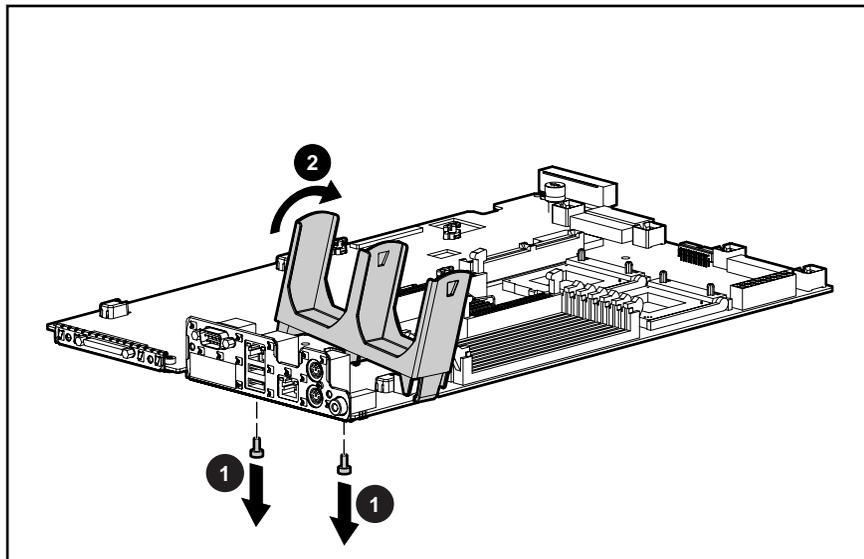


Figure 2-54: Removing the rear fan bracket

Reverse steps 1 through 10 to replace the rear fan bracket.

SCSI Cable (Short)

To remove the short SCSI cable:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Disconnect the SCSI cable from the SCSI backplane.
5. Disconnect the SCSI cable from the system board.

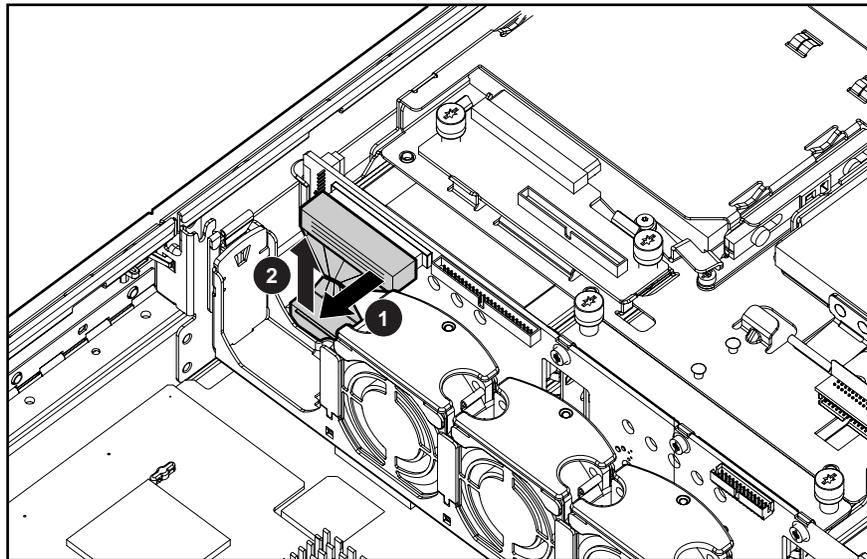


Figure 2-55: Removing the short SCSI cable (PCI riser cage and fan removed for clarity)

Reverse steps 1 through 5 to replace the short SCSI cable.

CD MultiBay Cable

To remove the CD MultiBay cable:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Disconnect the CD MultiBay cable from the SCSI backplane.
5. Disconnect the CD MultiBay cable from the CD MultiBay adapter board.

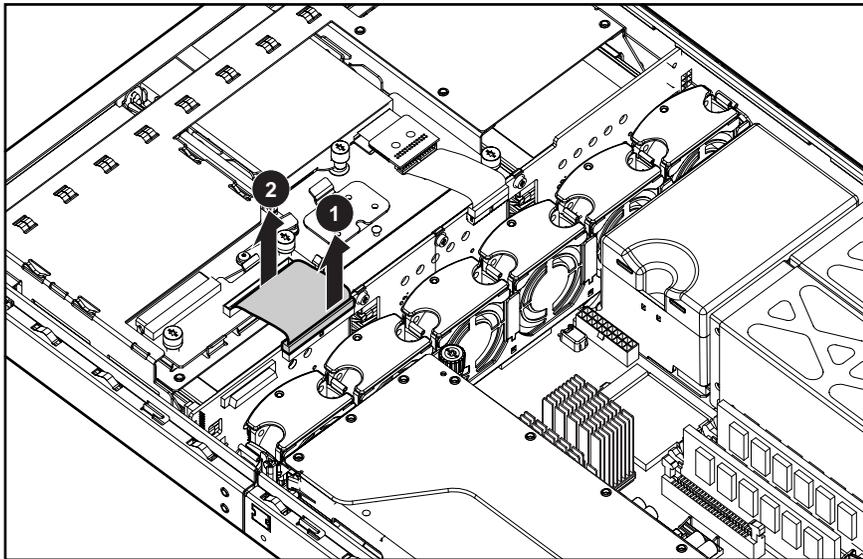


Figure 2-56: Removing the CD MultiBay cable

Reverse steps 1 through 5 to replace the CD MultiBay cable.

Power Button/LED Cable

To remove the power button/LED cable:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Disconnect the power button/LED cable from the SCSI backplane.
5. Disconnect the power button/LED cable from the power button/LED board.

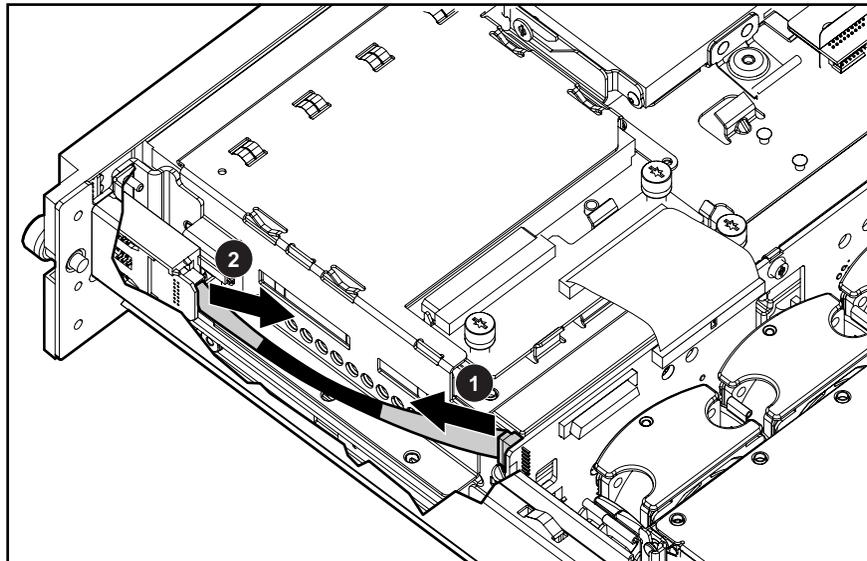


Figure 2-57: Removing the power button/LED cable

Reverse steps 1 through 5 to replace the power button/LED cable.

System Cables

To remove the LED/CD-ROM drive system cable or the diskette drive system cable:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the fans from the front fan bracket. See the “Hot-Plug Fan” section in this chapter.
5. Remove the front fan bracket. See the “Front Fan Bracket” section in this chapter.
6. Disconnect the system cable from the SCSI backplane.
7. Disconnect the system cable from the system board.

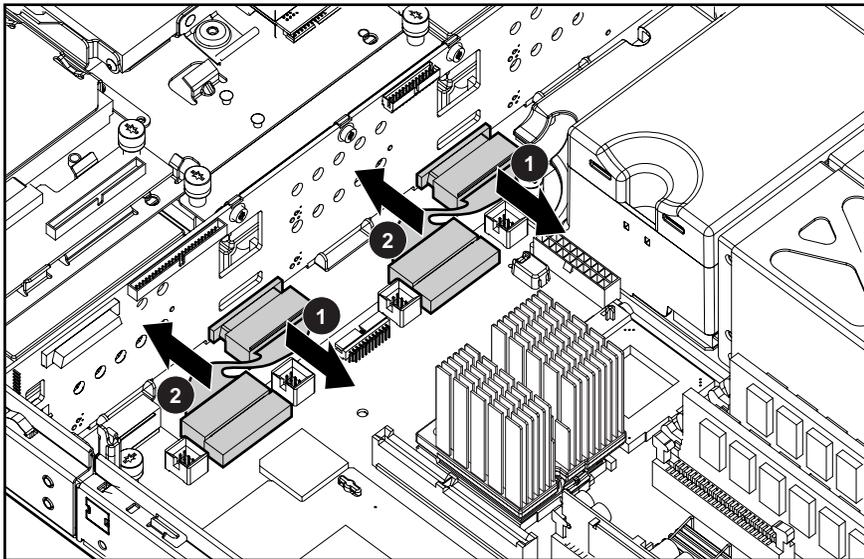


Figure 2-58: Removing the system cables (PCI riser cage removed for clarity)

Reverse steps 1 through 7 to replace the system cable.

PCI Hot Plug Backplane Cable

To remove the PCI Hot Plug backplane cable:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Remove the PCI riser cage. See the “PCI Riser Cage” section in this chapter.
5. Disconnect the PCI Hot Plug backplane cable from the PCI Hot Plug backplane.
6. Disconnect the PCI Hot Plug backplane cable from the PCI riser board.

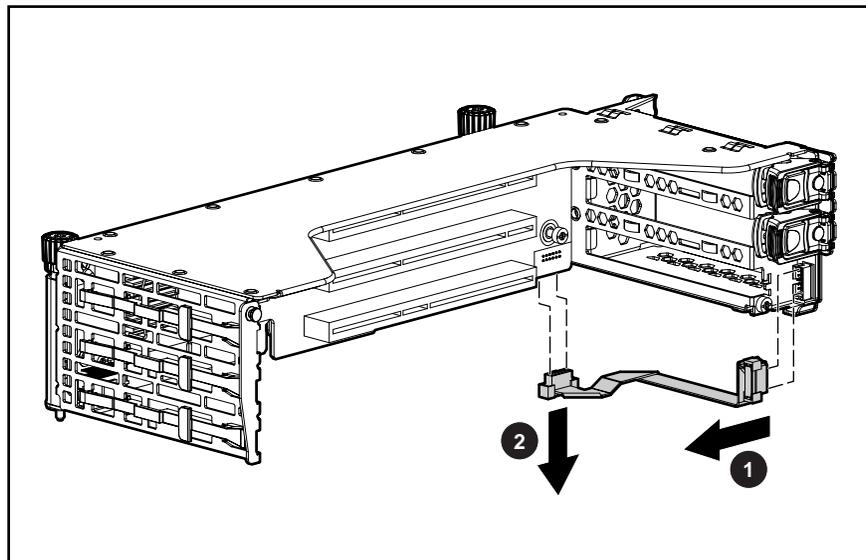


Figure 2-59: Removing the PCI Hot Plug backplane cable (PCI expansion board ejector/divider removed for clarity)

Reverse steps 1 through 6 to replace the PCI Hot Plug backplane cable.

Long SCSI Cable (Optional)

To remove the long SCSI cable:

1. Power down the device. See the “Powering Down the Device” section in this chapter.
2. Extend or remove the device from the rack. See the “Preparation Procedures” section in this chapter.
3. Remove the access panel. See the “Access Panel” section in this chapter.
4. Disconnect the SCSI cable from the SCSI backplane.
5. Disconnect the SCSI cable from the optional PCI array controller expansion board.

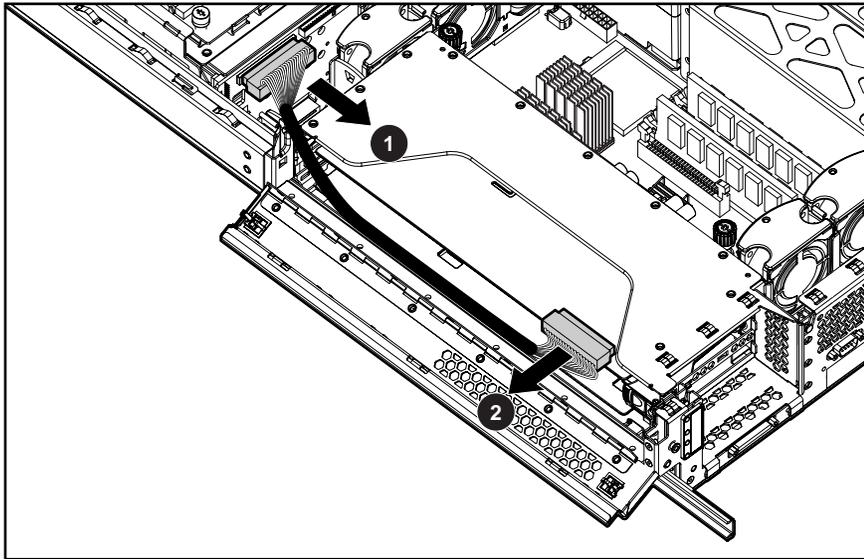


Figure 2-60: Removing the long SCSI cable

Reverse steps 1 through 5 to replace the long SCSI cable.

Diagnostic Tools

This chapter is an overview of software and firmware diagnostic tools that are available for configuring, monitoring, and managing the StorageWorks NAS B2000.

Diagnostic Tools

Use the following tools to diagnose problems, test hardware, and monitor and manage NAS B2000 operations.

Table 3-1: Diagnostic Tools

Tool	Description	How to run the tool
Array Diagnostics Utility (ADU)	ADU is designed to run on all Compaq systems that support Compaq array controllers. ADU collects information about the array controllers in the system and generates a list of detected problems.	For a list of Compaq servers that support ADU, visit the Compaq website: www.compaq.com/support/files For a complete list of ADU error messages, refer to the <i>Compaq Servers Troubleshooting Guide</i> .
Automatic Server Recovery-2 (ASR-2)	ASR-2 automatically restarts the server after a catastrophic operating system failure. With ASR-2, you have multiple recovery options: <ul style="list-style-type: none"> • Available Recovery provides software error recovery and environmental recovery. • Unattended Recovery logs the error information to the IML, resets the server, and tries to restart the operating system. 	Run RBSU and set ASR-2 to enable this tool.
Compaq Diagnostics	Compaq Diagnostics tests and verifies operation of Compaq hardware. If Compaq Diagnostics finds a hardware failure, it isolates the replaceable part, if possible.	Access Compaq Diagnostics when POST detects a system configuration error. For a complete list of POST error messages, refer to the <i>Compaq Servers Troubleshooting Guide</i> . Compaq Diagnostics can be run from the SmartStart CD or downloaded from the Compaq website: www.compaq.com/support/files
<i>Compaq Insight Manager™ XE</i>	Compaq Insight Manager XE is a client/server application used to remotely manage Compaq hardware in a network environment. Compaq Insight Manager reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information on viewing and printing the event list, refer to the Compaq Management CD or the <i>Compaq Insight Manager User Guide</i> .

continued

Table 3-1: Diagnostic Tools *continued*

Tool	Description	How to run the tool
Compaq SmartStart for Servers	Compaq SmartStart software is the intelligent way to set up your Compaq server. The Compaq SmartStart for Servers CD includes the ROMPaq Utility, driver updates, and assistance installing operating systems.	Use the information provided in the Server Setup and Management pack.
Compaq Survey Utility	<p>Compaq Survey Utility gathers critical hardware and software information on servers running Microsoft Windows NT, Novell NetWare, SCO OpenServer, or SCO Unixware operating systems.</p> <p>If a significant change occurs between data-gathering intervals, the survey utility marks the previous information and overwrites the survey text files to reflect the latest changes in the configuration.</p>	Install the Compaq Survey Utility from the SmartStart CD, the Compaq Integration Maintenance Utility, or the Compaq Management CD.
Integrated Management Log (IML)	<p>The IML is a log of system events such as system failures or nonfatal error conditions. View events in the IML from within:</p> <ul style="list-style-type: none"> • Compaq Insight Manager XE • Compaq Survey Utility • Operating system-specific IML utilities 	The IML requires Compaq operating system management drivers. Refer to the SmartStart CD for instructions on installing the appropriate drivers.
ROM-Based Setup Utility (RBSU)	<p>RBSU configures the hardware installed in or connected to the server. Specifically, it can:</p> <ul style="list-style-type: none"> • Store configuration information in nonvolatile memory. • Manage memory installation, processor upgrades, network interface cards and mass storage devices. • Assist in installing an operating system. • Configure ports and IRQs, if required. 	Run RBSU by pressing the F9 key during POST.

continued

Table 3-1: Diagnostic Tools *continued*

Tool	Description	How to run the tool
<i>ROMPaq</i> [™] Utility	The ROMPaq Utility checks the system and provides a choice of available ROM revisions and controller firmware.	Run this utility from the SmartStart CD included with your server.
SmartStart Diskette Builder	The SmartStart Diskette Builder is a utility that uses data stored on the SmartStart CD to create support diskettes. You can create support diskettes for specific configuration needs or for software that cannot be used directly from the SmartStart CD.	Run the diskette builder tool from the SmartStart CD.

Connectors, LED Indicators, Switches, and Jumpers

This chapter explains the location and function of system connectors, internal and external LEDs, system board switches, and jumpers.

Connectors

The figures and tables on the following pages show connector locations on the rear panel and the system board of the NAS B2000.

Rear Panel Connectors

Figure 4-1 and Table 4-1 show the connectors on the rear panel of the NAS B2000.

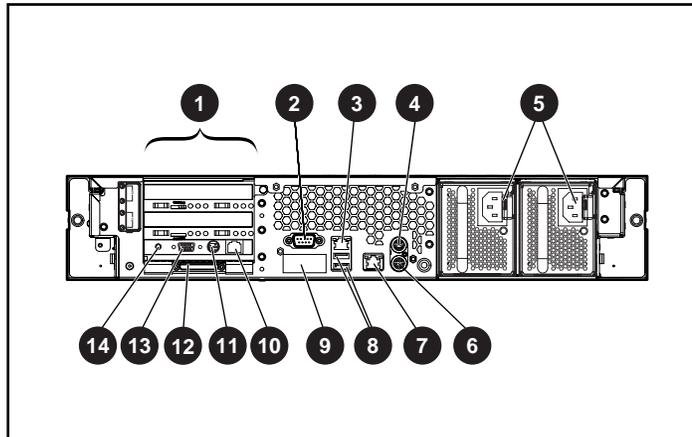


Figure 4-1: Rear panel connectors

Table 4-1: Rear Panel Connectors

Item	Description
1	PCI expansion slots
2	Serial connector (teal)
3	RJ-45 connector for NIC 2 (Eth1)
4	Mouse connector (PS/2) (green)
5	Power connectors
6	Keyboard connector (PS/2) (purple)
7	RJ-45 connector for NIC 1 (Eth0)
8	USB connectors (2) (black)
9	Video connector (blue) (not supported)
10	Remote Insight Lights-Out Edition board Ethernet port
11	Keyboard/mouse connector (Remote Insight Lights-Out Edition board) (not needed, internally connected)
12	VHDCI SCSI connector (SCSI port 1)
13	Video connector (Remote Insight Lights-Out Edition board)
14	Power for external adapter (Remote Insight Lights-Out Edition board)

System Board Connectors

Figure 4-2 and Table 4-2 show the connectors on the system board.

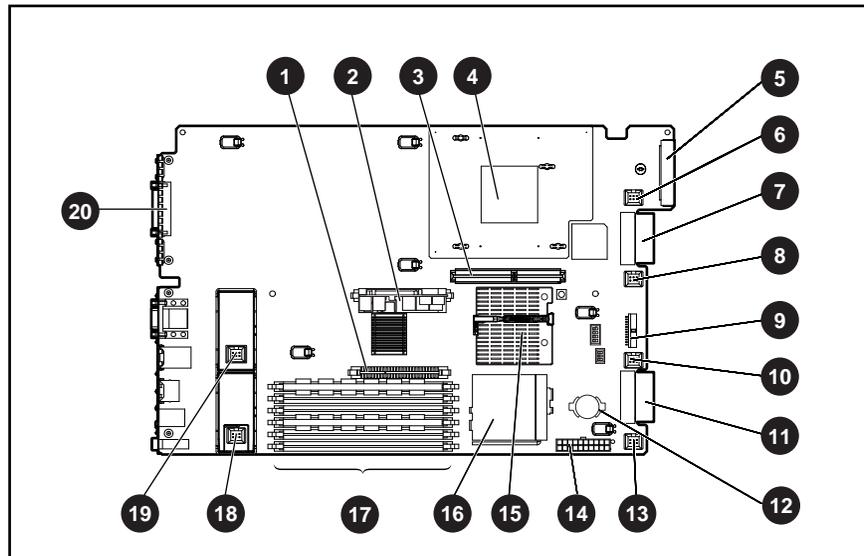


Figure 4-2: System board connectors

Table 4-2: System Board Connectors

Item	Description	Item	Description
1	PPM slot 2	11	Diskette drive system connector
2	PPM slot 1	12	Battery
3	PCI riser cage connector	13	Fan 6 connector
4	Smart Array 5i Controller	14	System power connector
5	SCSI port 2 (internal)	15	Processor socket 1
6	Fan 3 connector	16	Processor socket 2
7	LED/CD-ROM drive system connector	17	DIMM slots (1A-6C)
8	Fan 4 connector	18	Fan 2 connector
9	Power supply signal connector	19	Fan 1 connector
10	Fan 5 connector	20	VHDCI SCSI connector (port 1)

LED Indicators

The NAS B2000 contains several sets of LEDs that indicate the status and settings of hardware components. This section explains the following types of LEDs:

- Front panel
- Hot-plug SCSI hard drive
- PCI riser cage
- PCI Hot Plug
- RJ-45 network connector
- Rear unit identification LED switch
- Hot-plug power supply
- Hot-plug fan
- Power converter module
- System board

Front Panel LEDs

The five LEDs on the front of the device indicate device status. Figure 4-3 and Table 4-3 identify and describe the LED locations and functions.

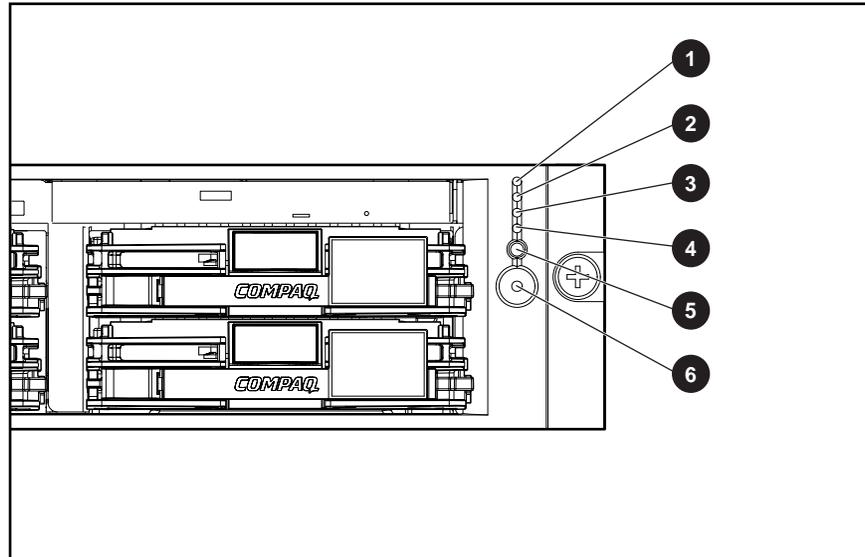


Figure 4-3: Front panel LEDs

Table 4-3: Front Panel LEDs

Item	LED Description	Status
①	Internal health	Red = System critical Amber = System degraded Green = Normal
②	External health (power supply)	Red = Critical power supply failure Amber = Power redundancy failure Green = Normal
③	NIC 1 link/activity	Green = Network link
④	NIC 2 link/activity	Flashing = Network link/activity Off = No link/activity. (If power is off, view the rear panel RJ-45 LEDs.)
⑤	Front unit identification LED switch	Blue = Activated Off = Deactivated
⑥	System power	Amber = System shut down, but power still applied Green = System on Off = Power cord not attached or power supply failure

The internal health LED identifies service events for internal components in a pre-failure or failed condition. Use Table 4-9 to identify LED combinations for the internal health LED and the system LEDs.

Hot-Plug SCSI Hard Drive LEDs

Each hot-plug SCSI hard drive has three LEDs located on the front of the drive. The LEDs provide activity, online, and fault status for each corresponding drive configured as a part of an array and attached to a powered-on Smart Array Controller. The indicators may vary depending on the status of other drives in the array. Use Figure 4-4 and Table 4-4 to analyze the status of each hot-plug SCSI hard drive.

 **WARNING:** To avoid personal injury, read the “Hot-Plug Hard Drive Replacement Guidelines” in the *Compaq Servers Troubleshooting Guide* before removing a hard drive.

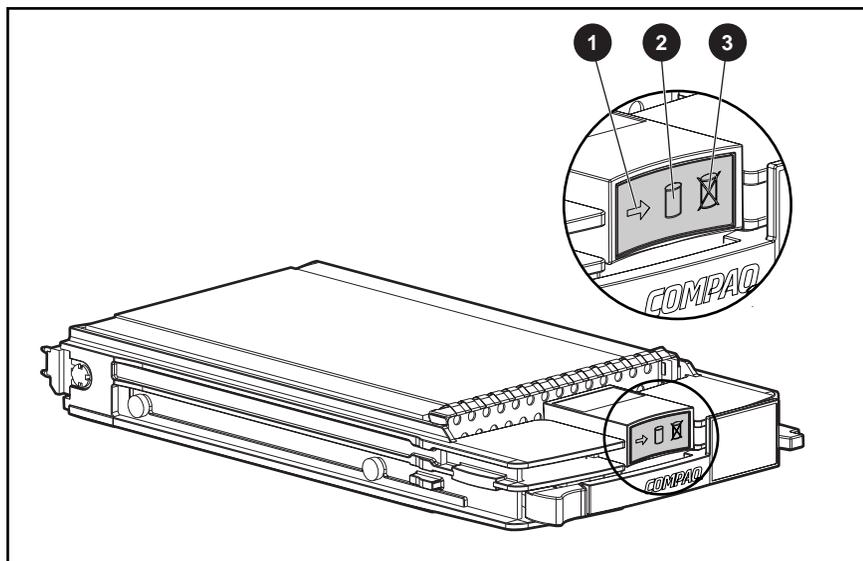


Figure 4-4: Hot-plug SCSI hard drive LEDs

- The LED on the left indicates drive activity status, where ON indicates activity and OFF indicates no activity by the drive.
- The center LED indicates online status, where flashing indicates an active online condition and OFF indicates an inactive online condition.
- The LED on the right indicates fault status, where flashing indicates fault-process activity and OFF indicates a no fault-process activity.

Table 4-4: Hot Plug SCSI Hard Drive LED Status Combinations

① Activity	② Online	③ Fault	Means
On	Off	Off	<p>Do not remove the drive. Removing a drive during this process causes data loss.</p> <p>The drive is being accessed and is not configured as part of an array.</p>
On	Flashing	Off	<p>Do not remove the drive. Removing a drive during this process causes data loss.</p> <p>The drive is rebuilding or undergoing capacity expansion.</p>
Flashing	Flashing	Flashing	<p>Do not remove the drive. Removing a drive during this process causes data loss.</p> <p>The drive is part of an array being selected by the Array Configuration Utility.</p> <p>-Or-</p> <p>The Options ROMPaq is upgrading the drive.</p>
Off	Off	Off	<p>OK to replace the drive online if a predictive failure alert is received (see the following section for details) and the drive is attached to an array controller.</p> <p>The drive is not configured as part of an array.</p> <p>-Or-</p> <p>If this drive is part of an array, then a powered-on controller is not accessing the drive.</p> <p>-Or-</p> <p>The drive is configured as an online spare.</p>
Off	Off	On	<p>OK to replace the drive online.</p> <p>The drive has failed and has been placed off-line.</p>
Off	On	Off	<p>OK to replace the drive online if a predictive failure alert is received (see the following section for details), provided that the array is configured for fault tolerance and all other drives in the array are online.</p> <p>The drive is online and configured as part of an array.</p>
On or flashing	On	Off	<p>OK to replace the drive online if a predictive failure alert is received (see the following section for details), provided that the array is configured for fault tolerance and all other drives in the array are online.</p> <p>The drive is online and being accessed.</p>

PCI Riser Cage LEDs

The PCI riser cage contains two LEDs. The slot speed LED indicates whether slots 2 and 3 are operating at 66 or 33 MHz. The AC power connected LED indicates when the AC power is connected to the device.

Use Figure 4-5 and Table 4-5 to identify the PCI riser cage LEDs.

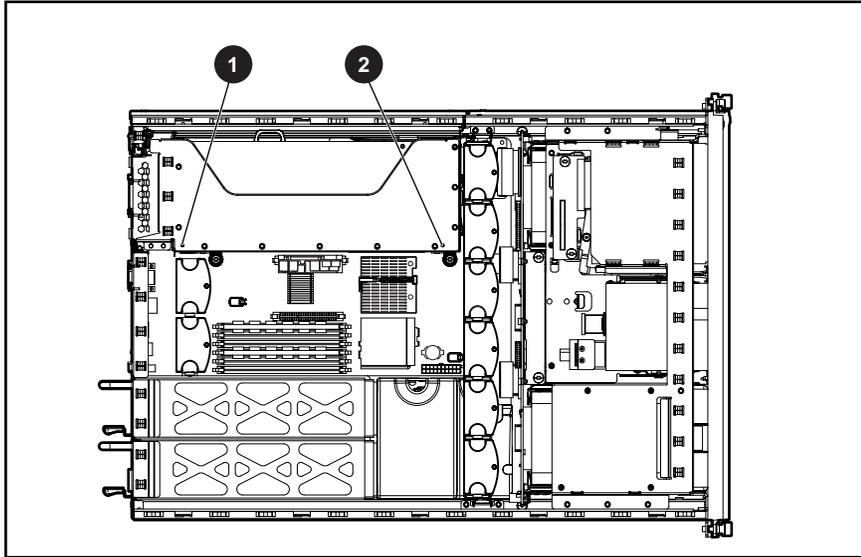


Figure 4-5: PCI riser cage LEDs

Table 4-5: PCI Riser Cage LEDs

Item	LED Description	Status
①	AC power connected (green)	On = AC power connected Off = AC power disconnected
②	Slot speed (green)	On = 66 MHz Off = 33 MHz

PCI Hot Plug LEDs

The PCI Hot Plug LEDs adjacent to each expansion slot provide a visual reference of the status for each slot. These LEDs can also be viewed when the hot-plug door is open. Use Figure 4-6 and Table 4-6 to identify the LEDs.

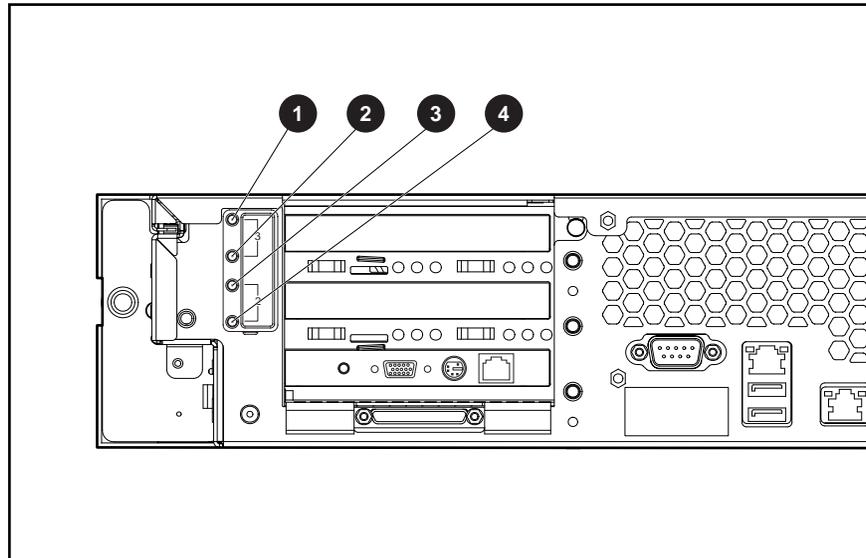


Figure 4-6: PCI Hot Plug button LEDs

Table 4-6: PCI Hot Plug LEDs

Item	LED Description	Status
①	Slot 3 power (green)	On = Power is applied to the slot. Flashing = Power is cycling. Off = Power is not applied to the slot.
②	Slot 3 fault (amber)	On = Board has failed. Off = Board is normal.
③	Slot 2 power (green)	On = Power is applied to the slot. Flashing = Power is cycling. Off = Power is not applied to the slot.
④	Slot 2 fault (amber)	On = Board has failed. Off = Board is normal.

RJ-45 Network Connector LEDs

The RJ-45 network connector on the device rear panel has two LEDs. Use Figure 4-7 and Table 4-7 to identify the location and status of the LEDs.

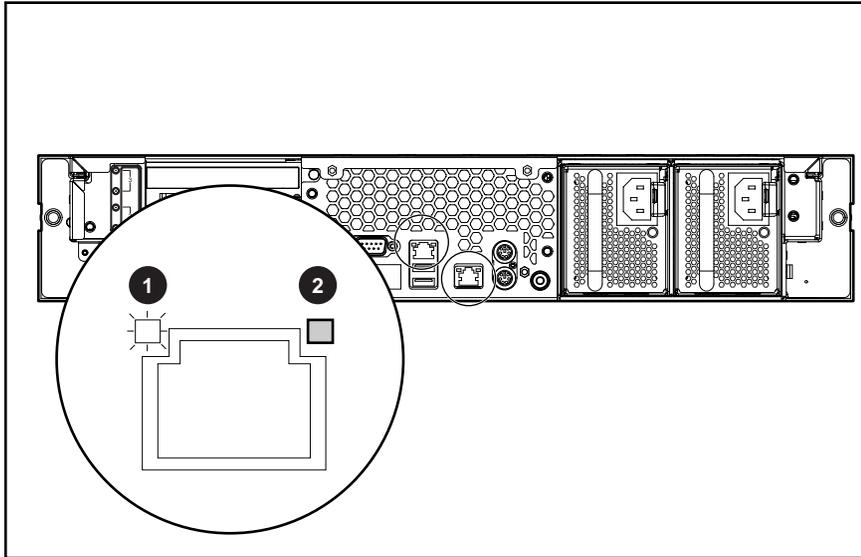


Figure 4-7: RJ-45 network connector LEDs

Table 4-7: RJ-45 Network Connector LEDs

Item	LED Description	Status
❶	Activity (green)	On or flashing = Network activity Off = No network activity
❷	Link (green)	On = Linked to the network Off = Not linked to the network

Rear Unit Identification LED Switch

The rear unit identification LED switch offers a visual reference for service personnel (Figure 4-8).

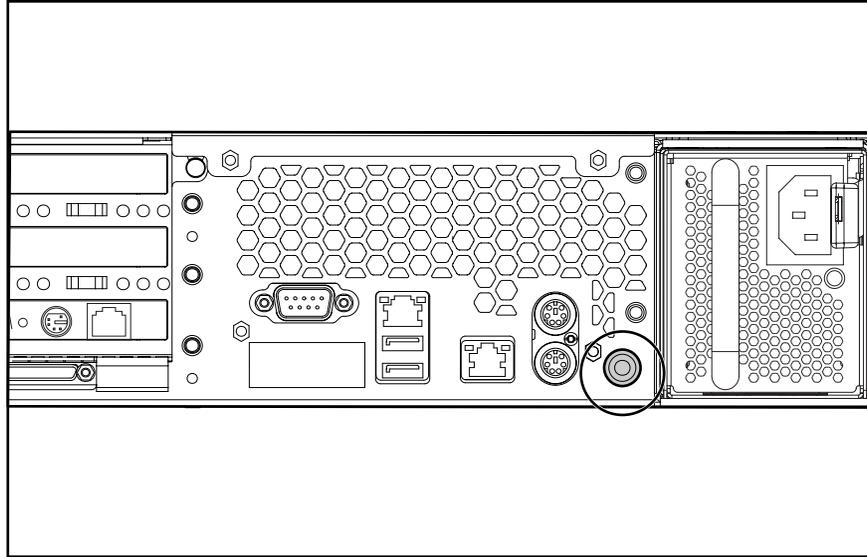


Figure 4-8: Rear unit identification LED switch

The rear unit identification LED switch indicates the following conditions:

- Blue = The switch is activated.
- Off = The switch is deactivated.

Hot-Plug Power Supply LED

Determine the hot-plug power supply status by observing the color of the power supply LED located adjacent to the AC inlet (Figure 4-9).

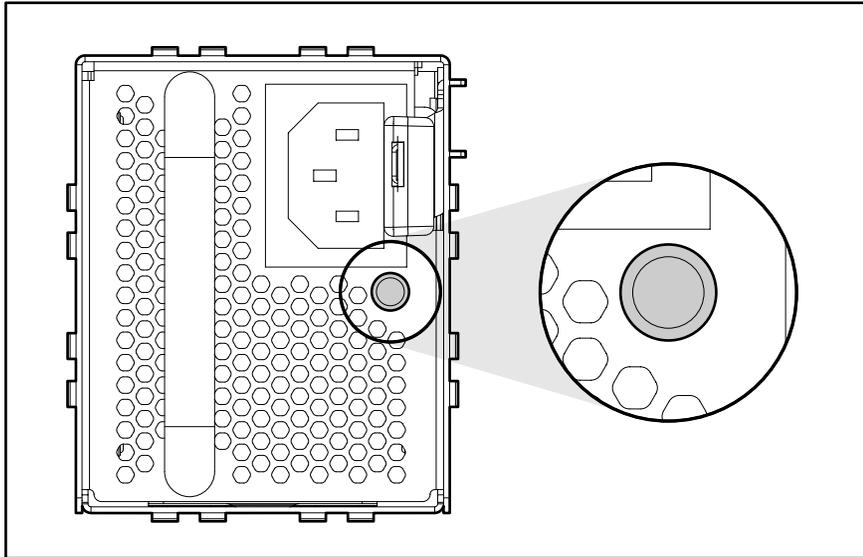


Figure 4-9: Hot-plug power supply LED

When the power supply LED is off, the following conditions may exist:

- The AC power is unavailable.
- The power supply has failed.
- The power supply is in standby mode.
- The power supply has exceeded the maximum current limit.

When the power supply LED is green, the power is turned on and the power supply is functioning properly.

Hot-Plug Fan LED

Each of the hot-plug fans contains a dual-color LED (Figure 4-10).

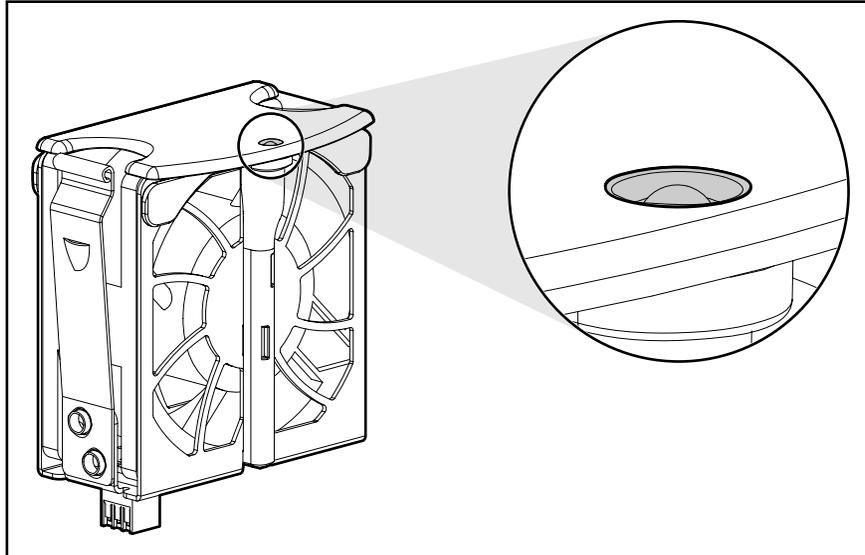


Figure 4-10: Hot-plug fan LED

The hot-plug fan LED indicates the following conditions:

- Green = The fan is operating normally.
- Amber = The fan has failed.
- Off = The fan is not powered.

Power Converter Module LED

The power converter module LED indicates whether the power converter module is functioning properly (Figure 4-11).

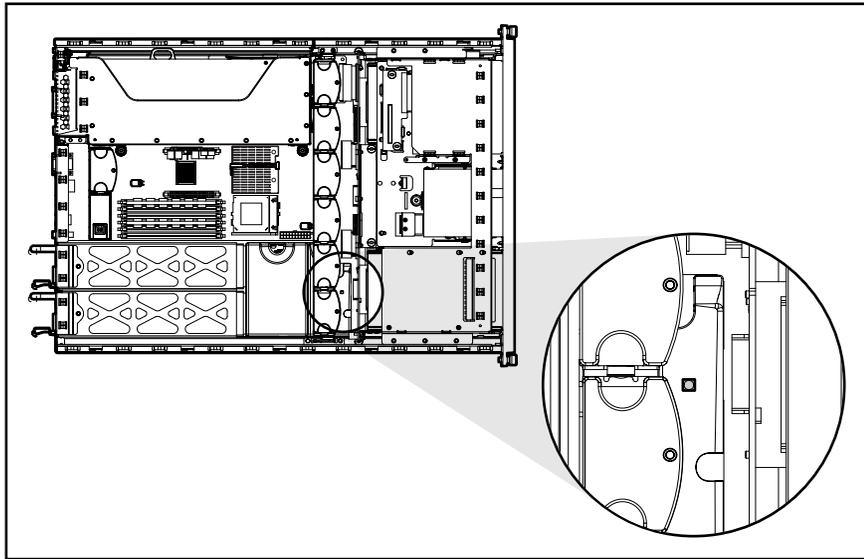


Figure 4-11: Power converter module LED

The power converter module LED indicates the following conditions:

- Amber = The power converter module has failed.
- Off = The power converter module is functioning.

System Board LEDs

The following LEDs are located on the system board:

- Processor failure
- PPM failure
- Memory failure
- Overtemperature
- Riser/SCSI interlock failure

Use Figure 4-12 and Table 4-8 to identify system board LEDs location and status.

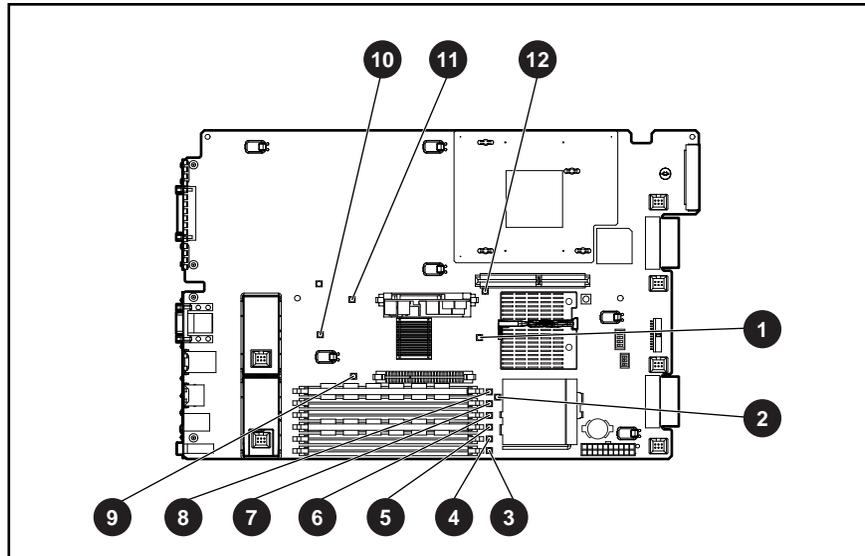


Figure 4-12: System board LEDs

Table 4-8: System Board LEDs

Item	LED Description	Status
❶	Processor 1 failure	Amber = Processor failed Off = Normal
❷	Processor 2 failure	Off = Normal
❸	DIMM failure 6C	
❹	DIMM failure 5B	
❺	DIMM failure 4A	Amber = Memory failed Off = Normal
❻	DIMM failure 3C	
❼	DIMM failure 2B	
❽	DIMM failure 1A	
❾	PPM 2 failure	Amber = PPM failed Off = Normal
❿	Overtemperature	Amber = Temperature has exceeded OS cautionary level or critical hardware level. Off = Temperature is OK.
⓫	PPM 1 failure	Amber = PPM failed Off = Normal
⓬	Riser/SCSI interlock failure	Amber = PCI Riser or Smart Array 5i controller not seated Off = Normal

Note: When the SCSI interlock disable switch is set to default (off), the riser/SCSI interlock failure LED indicates that the PCI riser or the Smart Array 5i Controller is unseated. If the default setting is changed for troubleshooting purposes (on), the LED indicates that only the PCI riser is unseated.

System LEDs and Internal Health LED Status Combinations

When the internal health LED on the front panel illuminates either amber or red, the device is experiencing a health event. Combinations of illuminated system LEDs and the internal health LED indicate system status (Table 4-9).

IMPORTANT: For the internal health LED to provide pre-failure and system conditions, the system management driver must be installed.

The front panel health LEDs indicate only the current hardware status. In some situations, Compaq Insight Manager XE may report device status differently than the health LEDs because the software tracks more system attributes.

Table 4-9: System LEDs and Internal Health LED Status Combinations

System LED and Color	Internal Health LED Color	Status
Processor failure, socket X (Amber)	Red	Processor in socket X has failed. Processor X has failed over to offline spare. Processor X is not installed in the socket. Processor X is unsupported. ROM detects a failed processor during POST.
	Amber	Processor in the socket is in a pre-failure condition.
Processor failure, both sockets (Amber)	Red	Processors are mismatched (speed and/or type).
PPM failure, slot X (Amber)	Red	PPM in slot X has failed. PPM is not installed in slot X. PPM is not installed in slot X, but the corresponding processor is installed.
	Amber	DIMM in slot X has failed. DIMM in slot X is an unsupported type, and no valid memory exists in another bank. DIMM in slot X has experienced a multi-bit error.
DIMM failure, slot X (Amber)	Red	DIMM in slot X has failed. DIMM in slot X is an unsupported type, and no valid memory exists in another bank. DIMM in slot X has experienced a multi-bit error.
	Amber	DIMM in slot X has reached single-bit correctable error threshold. DIMM in slot X is in a pre-failure condition. DIMM in slot X is an unsupported type, but valid memory exists in another bank.

continued

Table 4-9: System LEDs and Internal Health LED Status Combinations *continued*

System LED and Color	Internal Health LED Color	Status
DIMM failure, all slots in one bank (Amber)	Red	Interleaving error: DIMM is missing from the bank, and no valid memory exists in another bank. Interleaving error: DIMMs are mismatched within the bank, and no valid memory exists in another bank.
	Amber	DIMMs have failed over to the online spare bank. Interleaving error: DIMM is missing from the bank, but valid memory exists in another bank. Interleaving error: DIMMs are mismatched within the bank, but valid memory exists in another bank.
DIMM failure, all slots in all banks (Amber)	Red	No valid or usable memory is installed in the system.
Overtemperature (Amber)	Red	System has reached the operating system cautionary level.
		System has exceeded the hardware critical level.
Riser/SCSI interlock failure (Amber)	Red	PCI riser or Smart Array 5i Controller is unseated. *
Power converter module (Amber)	Red	The power converter module has failed.
Fan (Amber)	Red	A primary fan has failed at least one zone.
	Amber	A redundant fan has failed at least one zone.
Note: * When the SCSI interlock disable switch is set to default (off), the riser/SCSI interlock failure LED indicates that the PCI riser or the Smart Array 5i Controller is unseated. If the default setting is changed for troubleshooting purposes (on), the LED indicates that only the PCI riser is unseated.		

System Switches

With system switches, you can enable or disable certain settings or perform advanced diagnostic procedures. The following sections explain the functions of each switch. Figure 4-13 and Table 4-10 identify switch locations on the system board.

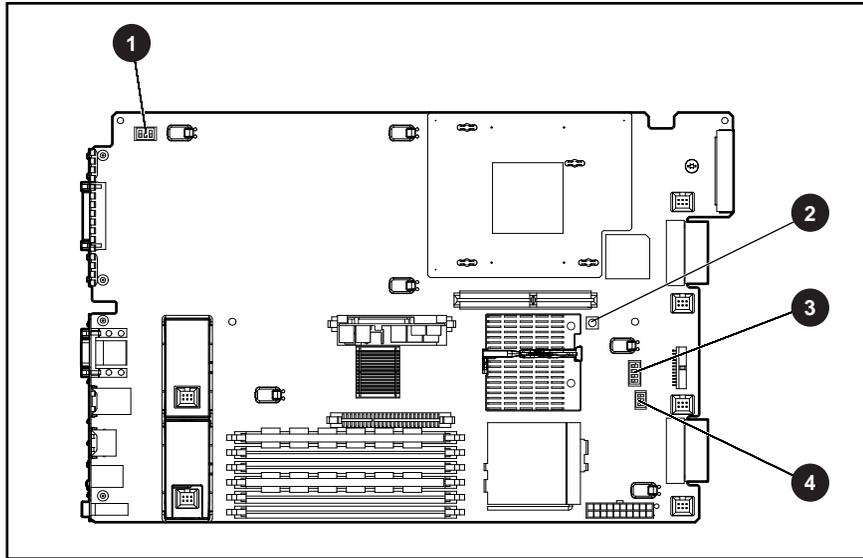


Figure 4-13: System board switches

Table 4-10: System Board Switches

Item	Description
❶	SCSI interlock disable
❷	Non-maskable interrupt (NMI)
❸	System maintenance
❹	Chassis ID

SCSI Interlock Disable Switch

The SCSI interlock disable switch (Figure 4-13) is a two-position switch that enables the system to boot during troubleshooting procedures when the Smart Array 5i Controller is not installed on the system board. The default setting requires the system to halt during boot if the controller is not installed.

Table 4-11 shows the switch settings and positions.

Table 4-11: SCSI Interlock Disable Switch

Position	Description	On/Off Function
①	SCSI interlock disable	Off = Interlock failure applies to both the PCI riser and the Smart Array 5i Controller. On = Interlock failure applies only to the PCI riser.
②	Reserved	—

NMI Switch

Crash dump analysis is an essential part of eliminating reliability problems such as hangs or crashes in operating systems, device drivers, and applications. Crashes can freeze a system, requiring you to do a hard reset. Resetting the system erases any information that supports root cause analysis.

The system can experience a blue screen trap when the operating system crashes. When this happens, Microsoft recommends that system administrators perform a NMI event by pressing a dump switch. The NMI event allows a hung system to become responsive.

The NAS B2000 is equipped with an NMI switch that, when pushed, performs a memory dump before performing a hard reset (Figure 4-13).

System Maintenance Switch

The system maintenance switch is a six-position switch that is used for system configuration (Figure 4-13). The default setting for all six positions is off. For the proper system maintenance switch settings, refer to the labels attached to the inside of the device access panel or see Table 4-12.

Table 4-12: System Maintenance Switch

Position	Description	On/Off Function
①	Reserved	—
②	Configuration lock	Off = System configuration can be modified. On = System configuration is locked and cannot be modified.
③	Rack mount indicator	Off = System is in a tower configuration. On = System is in a rack-mounted configuration.
④	Enable diskette boot	Off = RBSU controls booting from diskette. On = Booting from diskette is enabled and RBSU is overridden.
⑤	Password disable	Off = Power-on password is enabled. On = Power-on password is disabled.
⑥	Invalidate configuration	Off = No function On = ROM treats the system configuration as invalid.

Chassis ID Switch

The Chassis ID switch is a three-position switch that identifies the operational use of the device (Figure 4-13). This switch is set to default to the NAS B2000 rack-mount setting. All three positions of the switch default to the off value.

Jumpers

The NAS B2000 contains one two-pin bootblock flash jumper. It enables the user to configure the system board for a bootblock flash of the system ROM (Figure 4-14).

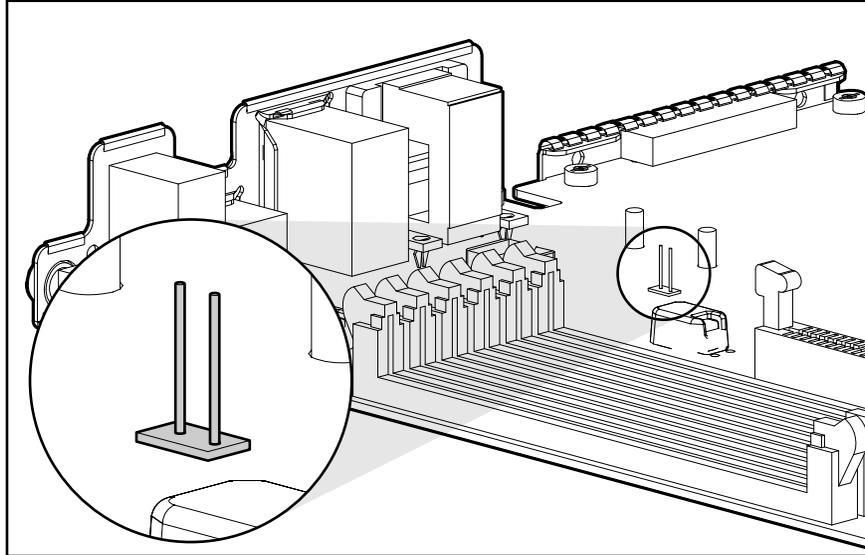


Figure 4-14: Bootblock flash jumper

To perform a bootblock flash of the system ROM, contact your Compaq authorized service provider for the appropriate utility.

Specifications

This chapter provides operating and performance specifications for the StorageWorks NAS B2000 components and hardware, including:

- System unit
- Hot-plug power supply
- Memory
- 1.44-MB diskette drive
- CD-ROM drive
- Wide Ultra3 SCSI hard drives

System Unit

Table 5-1: Operating and Performance Specifications for the NAS B2000

Item	Description	
Dimensions		
Height	8.64 cm	3.38 in
Depth	65.45 cm	25.75 in
Width	44.45 cm	17.50 in
Weight (maximum)	27.22 kg	60 lb
Weight (no drives installed)	20.41 kg	47.18 lb
Input requirements		
Rated input voltage	100 VAC to 240 VAC	—
Rated input frequency	50 Hz to 60 Hz	—
Rated input current	6 A (110 V) – 3 A (220 V)	—
Rated input power	600 W	—
Power supply output		
Rated steady-state power	400 W	—
Maximum peak power	400 W	—
Temperature range		
Operating	10°C to 35°C	50°F to 95°F
Shipping	-40°C to 70°C	-40°F to 158°F
Relative humidity (noncondensing)		
Operating	10% to 90%	—
Non-operating	5% to 95%	—
Maximum wet bulb temperature	28°C	82.4°F
<p>Note: Operating temperature has an altitude derating of 1°C per 1,000 ft. No direct sunlight allowed. Storage maximum humidity of 95% is based on a maximum temperature of 45°C. Altitude minimum for storage is 70 KPa.</p>		

Hot-Plug Power Supply

Table 5-2: Hot-Plug Power Supply Specifications

Item	Description
Input voltage specifications	
Rated input voltage	100 VAC to 240 VAC
Rated input line	180 VAC to 264 VAC (90 VAC to 132 VAC)
Rated input frequency	50 Hz to 60 Hz
Rated input power	600 W
Rated input current	6 A (110 V) to 3 A (220 V)
Output Power	
Steady state power	400 W
Maximum peak power	400 W
Dielectric voltage withstand	
Input to output	2,000 VAC/minute
Input to ground	2,000 VAC/minute

Memory

Table 5-3: SDRAM DIMM Specifications

Item	Description
Size	128 MB, 256 MB, 512 MB, 1 GB
Speed	133 MHz
Width	72 bits
Upgrade requirement	Any combination of like-paired SDRAM DIMMs that provide a minimum of 256 MB
Note: Use only 128-, 256-, 512-MB, or 1-GB, 72-bit wide, 3.3 V, registered ECC SDRAM. SDRAM must be 133 MHz. Use Compaq SDRAM only.	

1.44-MB Diskette Drive

Table 5-4: 1.44-MB Diskette Drive

Item	Description
Size	12.7 mm (0.5 in) high, 96 mm (3.8 in) wide, 130 mm (5.1 in) deep
LEDs (front panel)	Green = On
Read/write capacity per diskette	
High density	1.44 MB
Low density	720 KB
Drives supported	1
Drive height	One-third height
Drive rotation	300 rpm
Transfer rate	
High	500 Kb/s
Low	250 Kb/s
Bytes/sector	512
Sectors per track (high/low)	18/9
Tracks per side (high/low)	80/80
Access times	
Track-to-track (high/low)	3 ms/6 ms
Average (high/low)	169 ms/94 ms
Settling time	15 ms
Latency average	100 ms
Cylinders (high/low)	80/80
Read/write heads	2

CD-ROM Drive

Table 5-5: CD-ROM Drive Specifications

Item	Description
Applicable disk	CD-ROM (modes 1 and 2); mixed mode (audio and data combined); CD-DA; Photo CD (single/multiple-session), CD-XA ready; CDi ready
Capacity	550 MB (mode 1, 12 cm)
	640 MB (mode 2, 12 cm)
Block size	2368, 2352 bytes (mode 0)
	2352, 2340, 2336, 2048 bytes (mode 1)
	2352, 2340, 2336, 2048 bytes (mode 2)
Dimensions	
Height	12.7 mm (0.50 in)
Depth	123.08 mm (5.20 in)
Width	132.08 mm (5.20 in)
Weight	0.34 kg (0.75 lb)
Data transfer rate	
Sustained	150 KB/s (sustained 1X), 1500-4800 KB/s (10X to 32X)
Burst	4.0 MB/s
Access times (typical)	
Full stroke	300 ms
Random	140 ms
Diameter	12 cm, 8 cm (4.70 in, 3.15 in)
Thickness	1.2 mm (0.05 in)
Track pitch	1.6 μm (6.3×10^{-7} in)
Cache/buffer	128 KB
Startup time	< 10 s
Stop time	< 5 s (single); < 30 s (multisession)
Laser parameters	
Type	Semiconductor laser GaAs
Wave length	700 \pm 25 nm
Divergence angle	53.5° \pm 1.5°
Output power	0.14 mW
Operating conditions	
Temperature	5°C to 45°C (41°F to 118°F)
Humidity	5% to 90%

Wide Ultra3 SCSI Hard Drives

Table 5-6: Wide Ultra3 SCSI Hard Drive Specifications

Item	9-GB SCSI Drive	18-GB SCSI Drive	36-GB SCSI Drive	72-GB SCSI Drive
Capacity	9100.0 MB	18,209.8 MB	36,419.6 MB	72,839.2 MB
Height	One-third, 1.0 in	One-third, 1.0 in	One-third, 1.0 in	One-third, 1.0 in
Size	3.5 in	3.5 in	3.5 in	3.5 in
Interface *	Wide Ultra3	Wide Ultra3	Wide Ultra3	Wide Ultra3
Transfer rate	160 MB/sec	160 MB/sec	160 MB/sec	160 MB/sec
Rotational speed	10,000 RPM	10,000 RPM	10,000 RPM	10,000 RPM
Bytes per sector	512	512	512	512
Logical blocks	17,773,524	35,566,080	71,132,000	142,264,000
Operating temperature	10°C to 35°C (50°F to 95°F)			

Note: * The NAS B2000 also supports Ultra2 SCSI hard drives.

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