SPARCstorage™ MultiPack 2 Service Manual

THE NETWORK IS THE COMPUTER™

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Preface

The *SPARCstorage MultiPack 2 Service Manual* describes how to troubleshoot problems and remove and replace parts in the SPARCstorage™ MultiPack 2 disk drive enclosure.

This book is written for a qualified Sun™ field service engineer or system administrator. You must have experience as a system administrator or field service engineer to perform the procedures in this book.

Set-up Commands and Procedures

See these sources for more specific information on commands and procedures:

- The *Solaris Handbook for SMCC Peripherals* that corresponds to your operating system
- *AnswerBook* on-line software, which contains the complete set of documentation supporting the Solaris 1.x or Solaris 2.x environments
- Other software documentation that you received with your system

The *Solaris Handbook for SMCC Peripherals* for your system software release contains information about shutting down and configuring your system.

Related Documentation

TABLE P-1 Related Documentation

Application	Title	Part Number
Installation	*SPARCstorage MultiPack 2 Installation*	805-1664-xx
User's Guide	*SPARCstorage MultiPack 2 User's Guide*	805-1665-xx
Hot-plug Instructions	*SPARCstorage MultiPack 2 Storage Guide*	805-1666-xx

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PART I System Information

Product Description

CHAPTER 1

Product Description

The SPARCstorage MultiPack 2 storage enclosure runs at Fast or UltraSCSI (Fast20) speeds with a small computer system interface (SCSI) host connection. The UltraSCSI label on the front and on the removable door of the MultiPack 2 indicates UltraSCSI capability.

Both the UltraSCSI and Fast SCSI versions of the device use fixed SCSI target addresses. The drive bay in which a drive is installed determines the SCSI target address. The SCSI address for each drive is listed by the drive on the partition between the drive columns inside the unit.

Major parts of the enclosure include:

- Disk drives
- LEDs
- Power supply
- Backplane

The SPARCstorage MultiPack 2 enclosure is shown in FIGURE 1-1. The interior of the enclosure is shown in FIGURE 1-2 The back of the enclosure is shown in FIGURE 1-3.

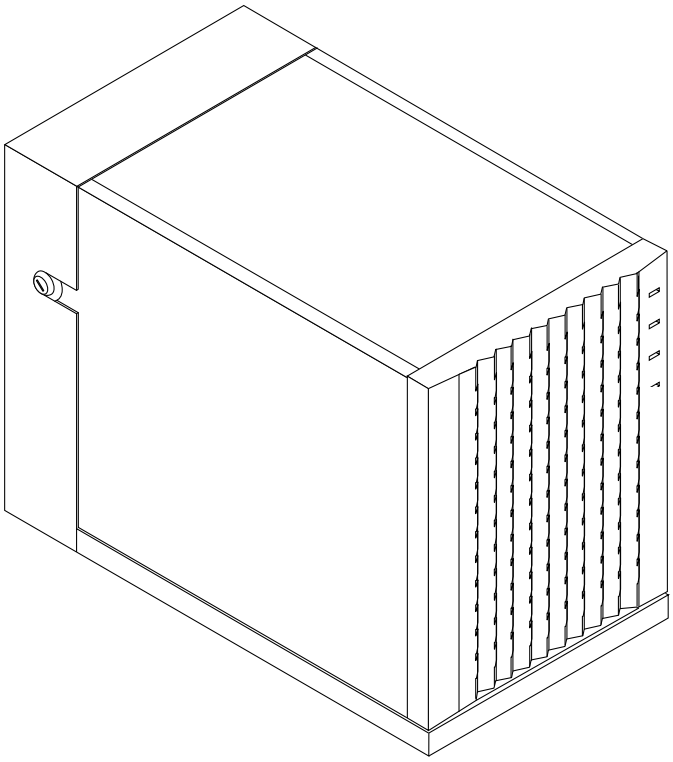

FIGURE 1-1 SPARCstorage MultiPack 2 Enclosure—Front View

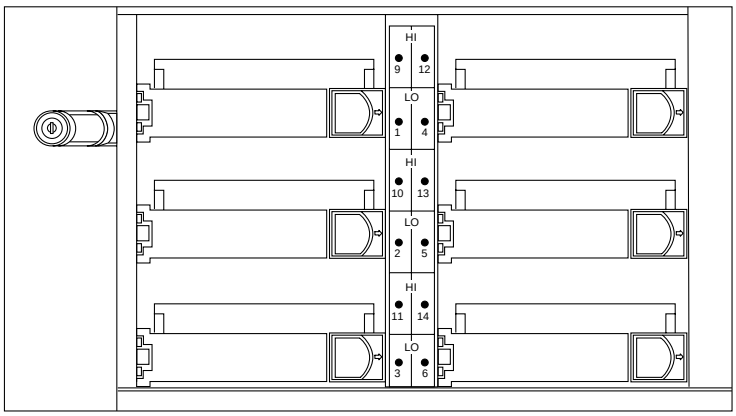

FIGURE 1-2 SPARCstorage MultiPack 2 Enclosure Interior

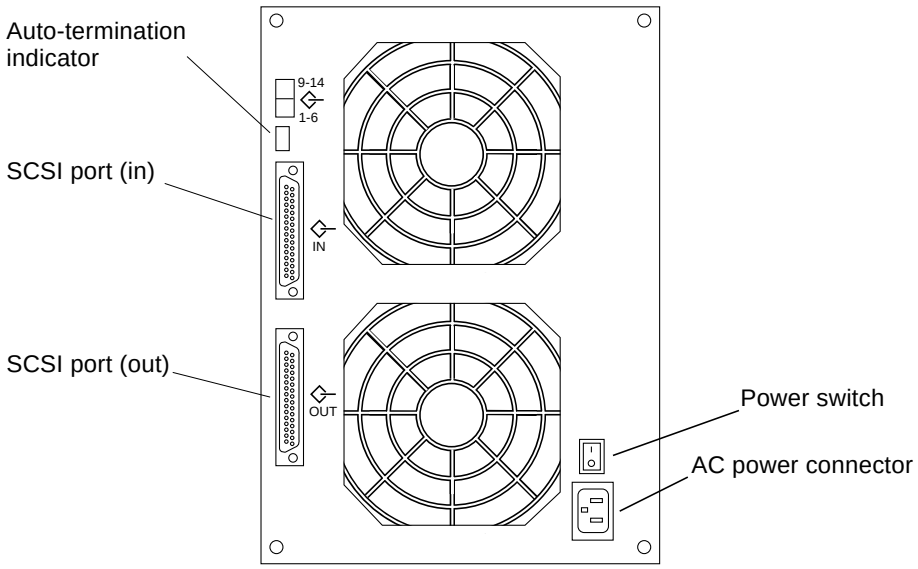

FIGURE 1-3 SPARCstorage SPARCstorage MultiPack 2 Enclosure—Back View

PART I Troubleshooting

Diagnostics for Troubleshooting

CHAPTER 2

Diagnostics for Troubleshooting

This chapter contains the information necessary to troubleshoot a problem in a SPARCstorage MultiPack 2 enclosure.

2.1 Disk Drive LEDs

There are two sets of LEDs that indicate drive activity: the front panel LEDs, shown in FIGURE 2-1 and FIGURE 2-2, and the interior LEDs located on the partition between drive columns, shown in FIGURE 2-2.

- If there is no drive in the drive bay, the LED does not light.
- If a drive is present but not active, the LED displays a solid green light.
- When the drive is active (or selected), the light remains off during activity, and then blinks on when the activity concludes. Under normal operation, the LED appears to blink. During heavier periods of activity, the LED appears to turn off.

When you power on the SPARCstorage MultiPack 2 unit, the drives initialize sequentially by SCSI target address. As each drive spins up, the LED for that drive goes off for about 10 seconds. For a fully loaded SPARCstorage MultiPack 2 enclosure, it can take one to two minutes for all the drives to initialize.

Formatting a disk drive can take up to 15 minutes per Gbyte, during which time the LED will be off. For example, if you have 2.1 Gbyte drive, the LED can go off for up to 30 minutes while the drive is being formatted.

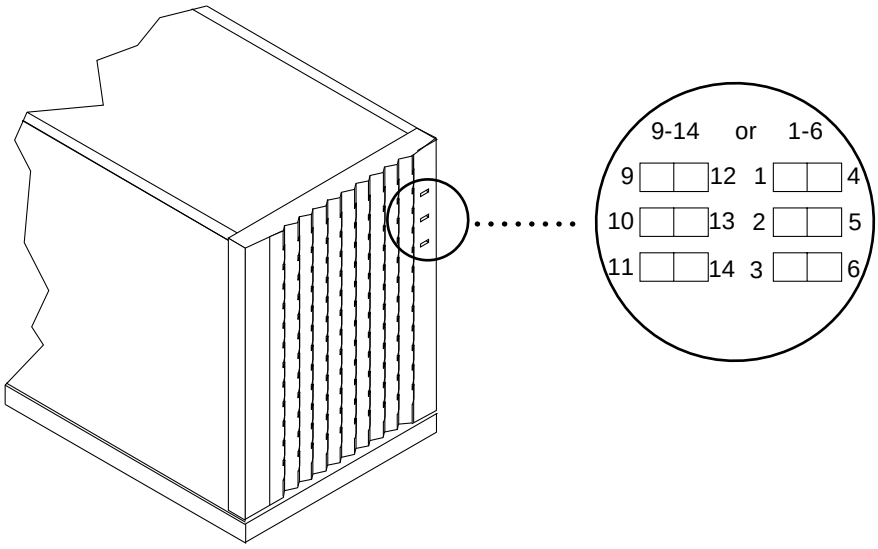

FIGURE 2-1 Front Panel Drive LEDs and SCSI Target Addresses

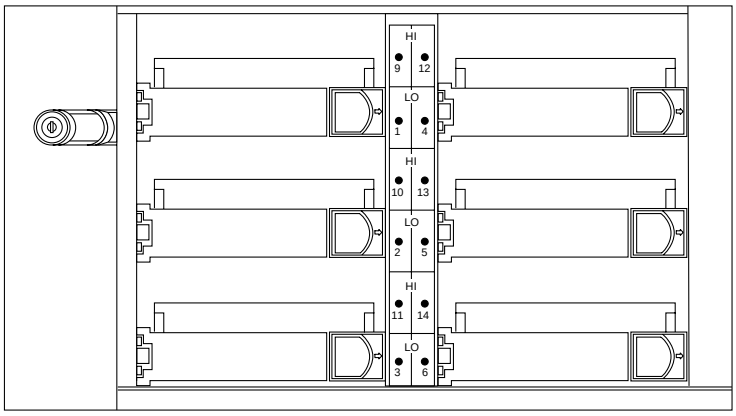

FIGURE 2-2 Interior LEDs and SCSI Target Address

To troubleshoot possible disk drive problems using the LEDs:

1. **Remove the left side cover of the unit.**
   See Section 5.1, “Removing and Replacing the Left Panel,” on page 5-2.

2. **Examine the LEDs on the partition that separates the drive columns.**

   If the LED next to a drive is not lit, and the power to the unit is on, this indicates that the drive may not be fully seated in the connector. See TABLE 2-1 for other possible causes.

Note – You can also diagnose a drive from the LEDs on the front of the enclosure if you know which drive bays contain disk drives.

2.2 Power LED

The green power LED of the SPARCstorage MultiPack 2 enclosure is located on the front panel in the lower right corner.

2.3 Troubleshooting

TABLE 2-1 lists possible problems that can occur, how to determine the cause of the problem, and the action to take to fix it.

TABLE 2-1 Troubleshooting the SPARCstorage MultiPack 2

If:	Then:	Action
A single disk drive is not responding.	Make sure the SCSI cable(s) is firmly connected. Check for bent pins on the connector.	Halt the system and turn off the power. (Refer to the *Solaris Handbook for SMCC peripherals.*) Connect the SCSI cable(s) securely, then turn on the power.
	Determine if another SCSI device is sharing the same SCSI target address as the disk drive in the enclosure.	Do a `probe-scsi-all` command at the `ok` prompt. Change the SCSI target address of the other SCSI device to a number that is not used for the SPARCstorage MultiPack 2 enclosure.
	Check the position of the SCSI address switch on the back of the enclosure .	Set the switch to the correct position for the SCSI target address range (SCSI IDs 1–6, *or* 9–14).

TABLE 2-1 Troubleshooting the SPARCstorage MultiPack 2 *(Continued)*

If:	Then:	Action
	Check the connection between the disk drive connector and the connector on the backplane.	Make sure the drive is seated in the correct drive bay. Make sure the drive is pushed all the way in and that the bracket handle is latched correctly.
	If you have checked all of the above and the drive still does not respond...	Replace the disk drive.
Drive LED does not light.	Determine if you have a bad disk drive in the drive bay.	Replace the disk drive.
	If the disk drive is functional, but the LED still does not display, the LED may need to be replaced.	LEDs are connected to the backplane. Replace the backplane.
Disk drives are not responding or will not boot.	Check the unit to determine if it is receiving power, and that the power switch is in the On position.	If the unit appears to be powered on except for the presence of the LED light, the LED needs to be replaced. To replace the LED, replace the backplane.
	Check the power cord connection to the unit and to the power outlet.	Secure the power cord connections if they are loose.
	Check the position of the SCSI address switch on the back of the unit (six-drive unit only). There may be a SCSI address conflict.	Set the switch to the correct position for the SCSI target address range (SCSI IDs 1–6, *or* 9–14).
	Power cord is secure and power switch is in the On position, but the unit is not receiving power.	Replace the power supply to the enclosure.
Drive LED does not light.	Determine if you have a bad disk drive in the drive bay.	Replace the disk drive.
	If the disk drive is functional, but the LED still does not display, the LED may need to be replaced.	LEDs are connected to the backplane. Replace the backplane.
Disk drives are not responding or will not boot.	Check the unit to determine if it is receiving power, and that the power switch is in the On position.	If the unit appears to be powered on except for the presence of the LED light, the LED needs to be replaced. To replace the LED, replace the backplane.

TABLE 2-1 Troubleshooting the SPARCstorage MultiPack 2 *(Continued)*

If:	Then:	Action
	Check the power cord connection to the unit and to the power outlet.	Secure the power cord connections if they are loose.
	Check the position of the SCSI address switch on the back of the unit (six-drive unit only). There may be a SCSI address conflict.	Set the switch to the correct position for the SCSI target address range (SCSI IDs 1–6, *or* 9–14).
	Power cord is secure and power switch is in the On position, but the unit is not receiving power.	Replace the power supply to the enclosure.

PART II Preparing for Service

Safety and Tools Requirements

Powering Off and On the System

CHAPTER 3

Safety and Tools Requirements

Read this section before beginning any procedure. This section explains how to work safely when installing a Sun product.

3.1 Safety Agency Compliance

For your protection, observe these safety precautions when setting up your equipment:

- Follow all warnings and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source matches the voltage and frequency on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

3.1.1 Symbols

These symbols appear in this manual:

Caution – Risk of personal injury and equipment damage. Follow the instructions.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

3.1.2 Modification to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for regulatory compliance of a modified Sun product.

3.1.3 Placement of a Sun Product

Caution – To ensure reliable operation of your Sun product and to protect it from overheating, openings in the equipment must not be blocked or covered.
A Sun product should never be placed near a radiator or heat register.

3.1.4 Power Cord Connection

Caution – Sun products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electrical shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Caution – Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords.

Caution – Your Sun product is shipped with a grounding type (3-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

Caution – The power switch of this product functions as a standby type device only. The power supply plug is intended for use as the primary disconnect device. The product must be installed near the socket outlet such that the socket outlet is readily accessible.

3.1.5 Cover

You must remove the cover of your Sun SPARCstorage MultiPack 2 drive in order to remove or replace storage devices. Be sure to replace the cover before powering up your enclosure.

Caution – It is not safe to operate Sun products without the cover in place. Failure to take this precaution may result in personal injury and system damage.

3.2 Tools Required

- Antistatic wrist strap
- Electrostatic discharge (ESD) mat for disk drives
- #1 Phillips screwdriver
- 5 mm or 3/16-inch hex-head screwdriver
- Small flat-blade screwdriver
- Flashlight

CHAPTER 4

Powering Off and On the System

This chapter describes how to turn off and on the power to your SPARCstorage MultiPack 2 enclosure when it is attached to a desktop system.

4.1 Powering Off the System

Before you can power off the system, you must shut down the operating system. Refer to the *Solaris Handbook for SMCC Peripherals* for specific software instructions to shut down your operating system.

- **Once you have shut down your operating system, you can turn off the power to your system in the following order:**

  a. Desktop system

  b. Monitor

  c. SPARCstorage MultiPack 2 enclosure and other peripheral devices

  The power switch for the SPARCstorage MultiPack 2 enclosure is located on the back of the unit (FIGURE 4-1).

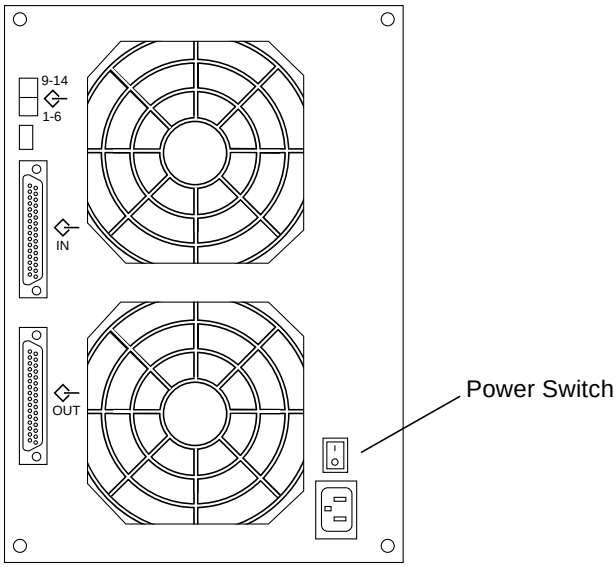

FIGURE 4-1 Power Switch Location on a SPARCstorage MultiPack 2 Enclosure

4.2 Powering On the System

1. **Turn on the power to the SCSI peripherals connected to the system in this order:**

   a. **Last (terminating) device on the daisy chain**

   b. **Other peripheral devices**

2. **Turn on the power to the monitor**

3. **Turn on the power to the desktop system.**

Caution – Always allow 10 seconds between turning off the power and turning it back on again. This prevents possible damage to the power supply components in your system.

PART III Subassembly Removal and Replacement

Internal Access

Major Subassemblies

Storage Devices

CHAPTER 5

Internal Access

This chapter describes how to access the internal components. Before you begin any of the procedures, make sure you read the safety agency compliance information in Chapter 3 and gather the necessary tools.

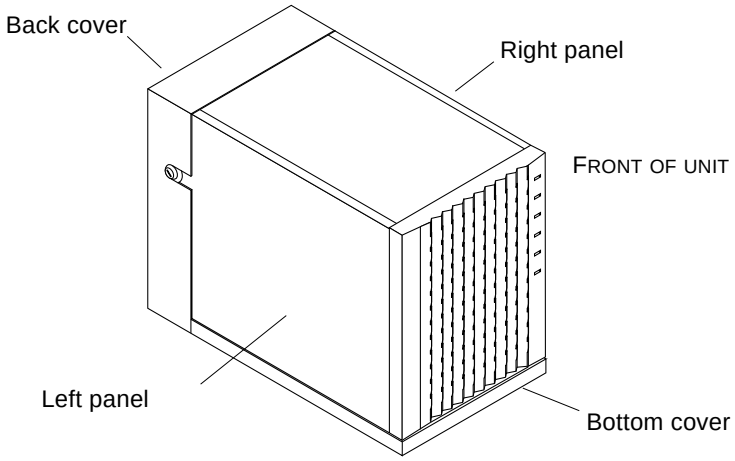

FIGURE 5-1 Removable Covers

5.1 Removing and Replacing the Left Panel

▼ To remove the left panel:

1. **Unlock the panel door latch by turning the key 90 degrees counterclockwise (**FIGURE 5-2**).**

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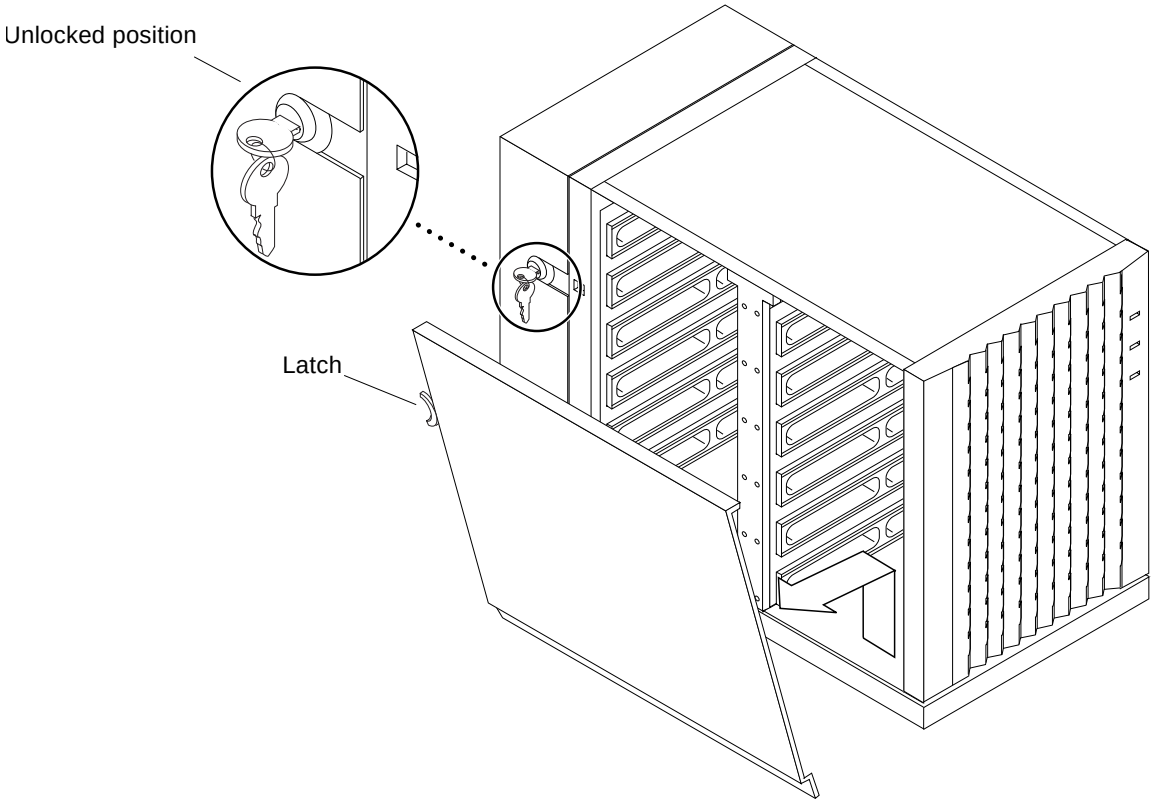

FIGURE 5-2 Removing and Replacing the Left Side Panel

2. **Pull the door latch forward to release the panel (**FIGURE 5-2**).**
3. **Pull the panel out about 30 degrees from the top and lift it off.**

   When pulling the panel off, be careful not to damage the springfingers on the interior edge of the panel.

▼ To replace the left panel:

1. **Place the bottom lip of the panel in the side groove of the enclosure, aligning the two slots on the panel bottom with the two notches in the enclosure.**
2. **Push the panel in the rest of the way.**

   Push the upper right corner of the panel to make sure it is fully latched. You will hear the latch catch when the panel is completely closed.
3. **Lock the panel door by turning the key 90 degrees clockwise.**

5.2 Removing and Replacing the Back Cover

▼ To remove the back cover:

1. **Shut down and power off the desktop system, the SPARCstorage MultiPack 2 enclosure, and all peripherals that are connected to the system.**

   Refer to the *Solaris Handbook for SMCC Peripherals* for specific software procedures to shut down and power off your system.
2. **Remove the SCSI cables and power cord from the enclosure (**FIGURE 5-3**).**

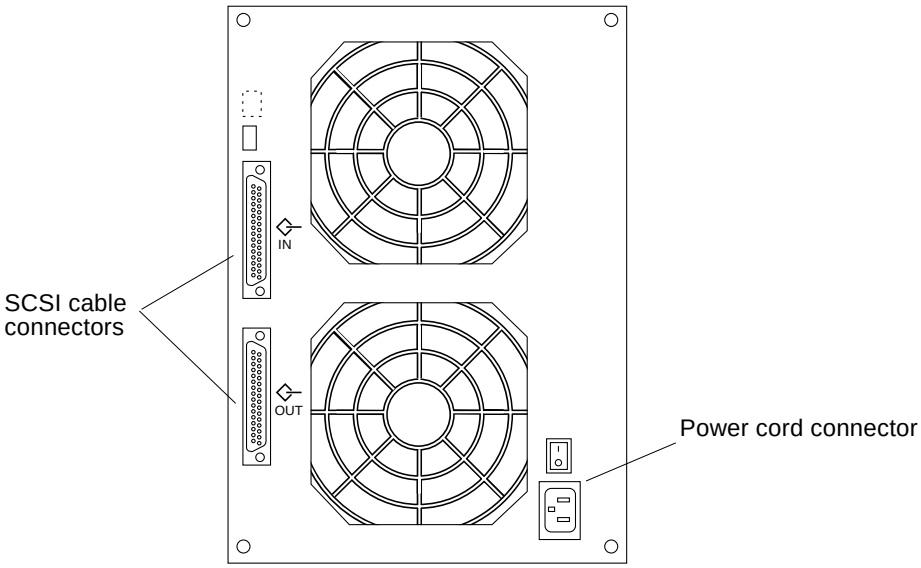

FIGURE 5-3 SPARCstorage MultiPack 2 SCSI Cable and Power Cord Connectors

3. **Remove the left panel.**

   See “To remove the left panel:” on page 26.

4. **Remove the lock block from the back cover (**FIGURE 5-4**).**

5. **Remove the three Phillips screws that secure the back cover to the unit (**FIGURE 5-4**).**

6. **Slide the back cover off and set it aside.**

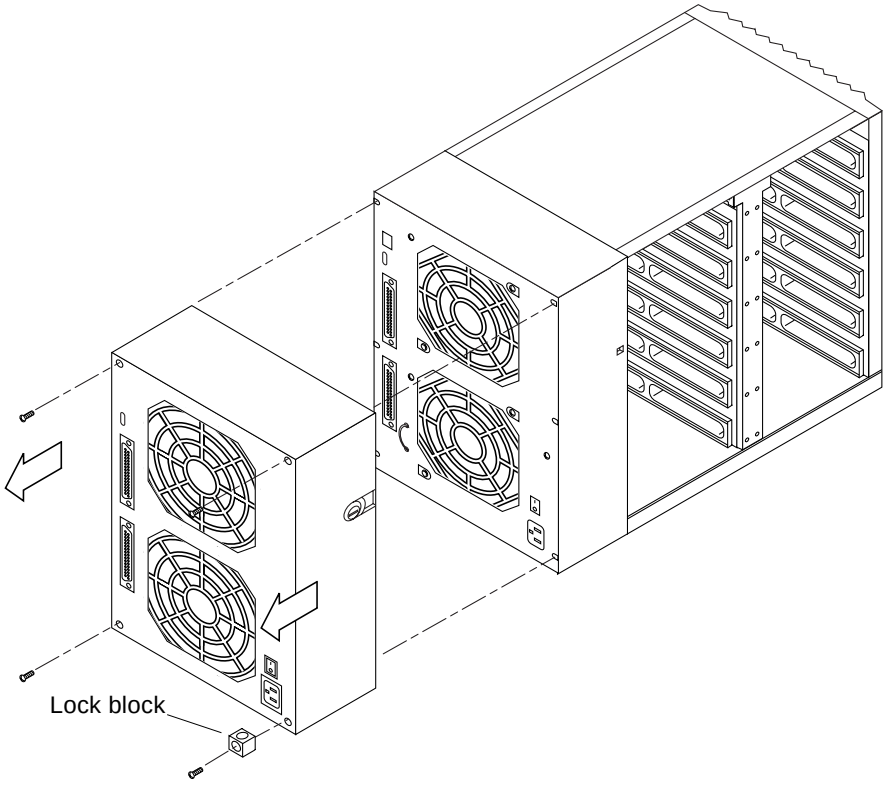

FIGURE 5-4 Removing and Replacing the Back Cover

▼ To replace the back cover:

1. **Position the cover over the power supply, aligning the four screw holes.**
2. **Secure the cover with the three Phillips screws.**
3. **Replace the lock block.**
4. **Replace the left panel.**
   See “To replace the left panel:” on page 27.
5. **Connect the SCSI cables and power cord.**
6. **Turn on the power to your system.**
   See Section 4.2, “Powering On the System,” on page 4-2.

5.3 Removing and Replacing the Right Side Panel

▼ To remove the right panel:

You must remove the left panel, back cover, and the disk drives to remove the right panel.

1. **Shut down and power off the desktop system, the SPARCstorage MultiPack 2 enclosure, and all peripherals that are connected to the system.**

   Refer to the *Solaris Handbook for SMCC Peripherals* for specific software procedures to shut down and power off your system.

2. **Remove the left panel.**

   See “To remove the left panel:” on page 26.

3. **Remove all of the disk drives.**

   See Section 7.1, “Removing a Disk Drive,” on page 7-1.

4. **Remove the back cover.**

   See “To remove the back cover:” on page 27.

Note – The right panel is held onto the chassis by **eight** plastic tabs that hook into holes in the chassis wall. The backplane is attached to the other side of the chassis wall. You must unhook the tabs without removing the backplane by accessing the tabs through slots in the backplane (FIGURE 5-5).

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5. **Facing the left side of the unit, find the rectangular slots on the backplane (**FIGURE 5-5**). You may need to use a flashlight.**

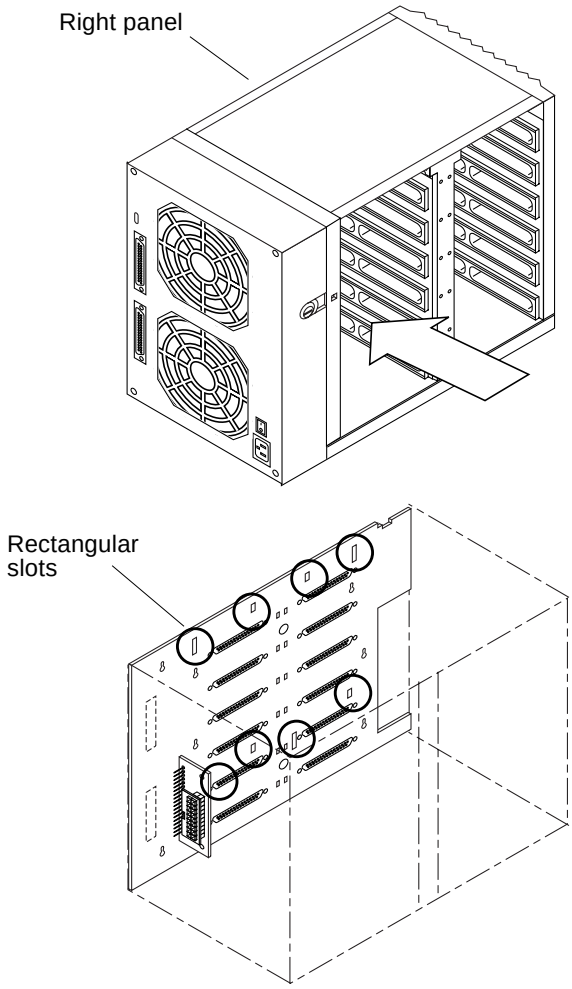

FIGURE 5-5 Rectangular Slots on Backplane

6. **Insert a small flat-blade screwdriver into one of the rectangular slots on the backplane, and carefully angle the screwdriver to unlatch the plastic tab from the chassis.**

   The four hooks on the left side of the backplane face opposite the four hooks on the right side of the backplane.

a. Angle the screwdriver to right to unlatch the tabs from the four hooks on the left side of the unit (FIGURE 5-6**).**

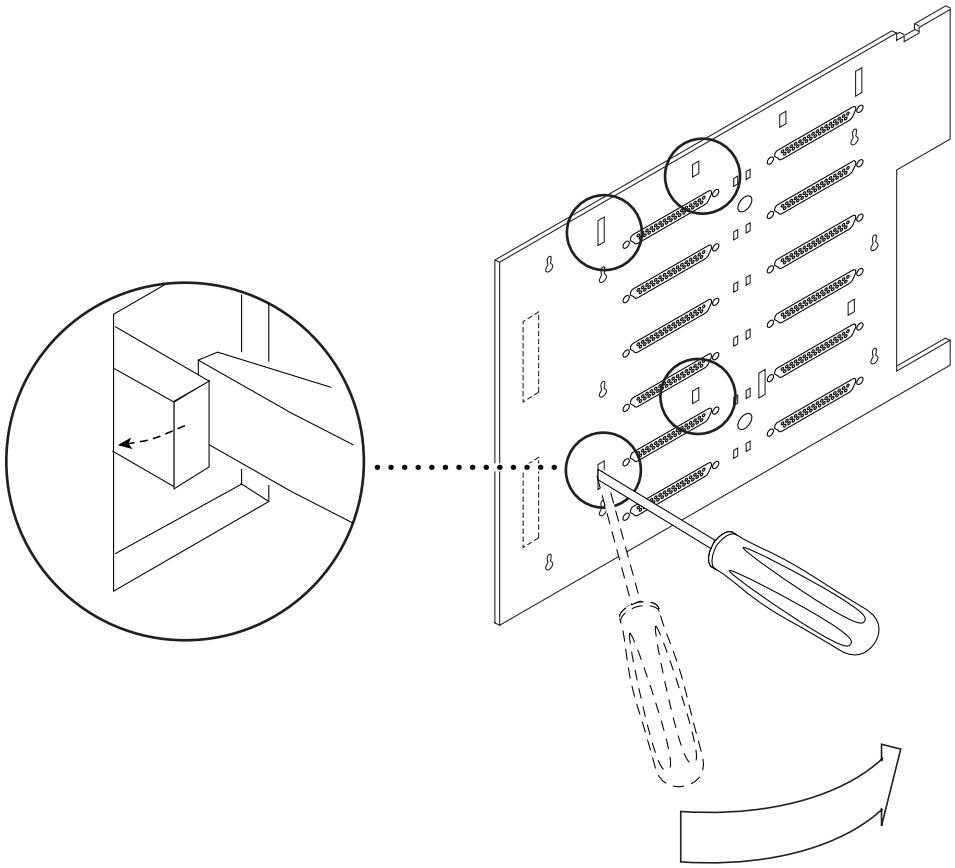

FIGURE 5-6 Unlatching the Tabs on the Left Side

b. Angle the screwdriver to your left to unlatch the four hooks on the right side of the unit (FIGURE 5-7**).**

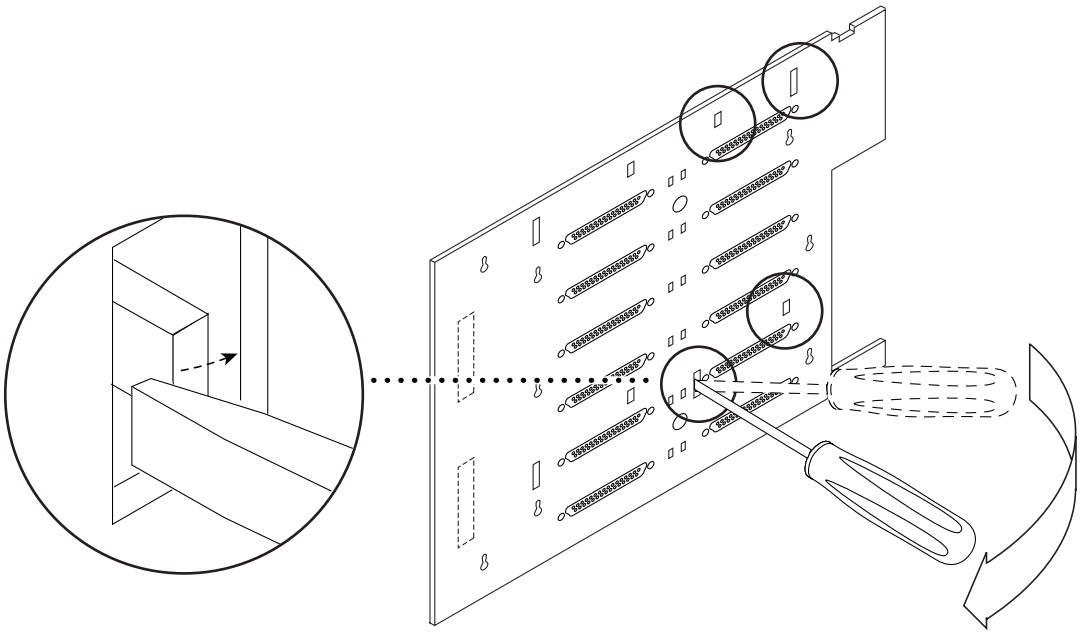

FIGURE 5-7 Unlatching the Tabs on the Right Side

7. Use your other hand to help slip off the right panel as you feel it coming loose from the chassis (FIGURE 5-8**).**

Set the panel aside.

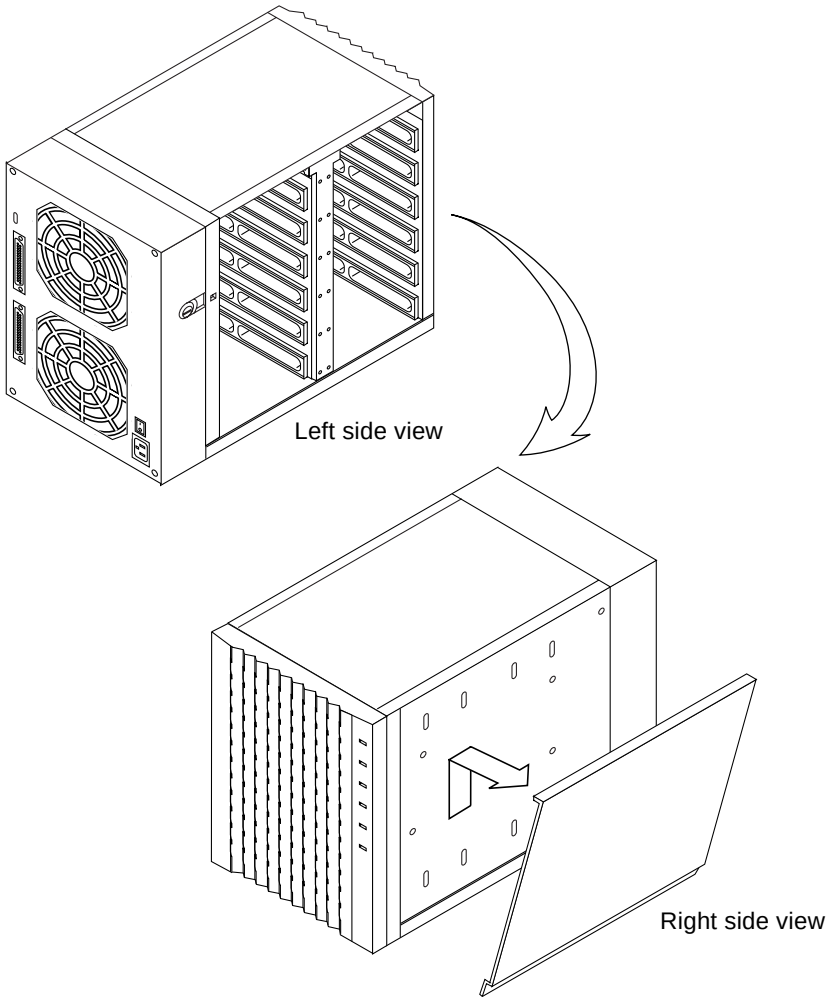

FIGURE 5-8 Removing the Right Panel

▼ To replace the right panel:

1. **Align the hooks of the right side panel with the holes and tabs of the enclosure (**FIGURE 5-8**).**
2. **Push the side panel on the enclosure until it snaps onto the unit.**

3. **Replace the back cover.**

   See “To replace the back cover:” on page 29.

4. **Replace the disk drives.**

   See Section 7.2, “Replacing a Disk Drive,” on page 7-3.

5. **Replace the left side panel.**

   See “To replace the left panel:” on page 27.

5.4 Removing and Replacing the Bottom Cover

▼ To remove the bottom cover:

1. **Remove the left panel.**

   See “To remove the left panel:” on page 26.”

2. **Remove the disk drives from the unit.**

   See Section 7.1, “Removing a Disk Drive,” on page 7-1.

3. **Turn the unit on its right side so that the bottom faces you.**

4. **Unlatch the tabs off the hooks on the floor of the unit that connect the bottom cover.**

5. **Jiggle the bottom cover gently to unseat the tabs the rest of the way and pull the cover off the unit.**

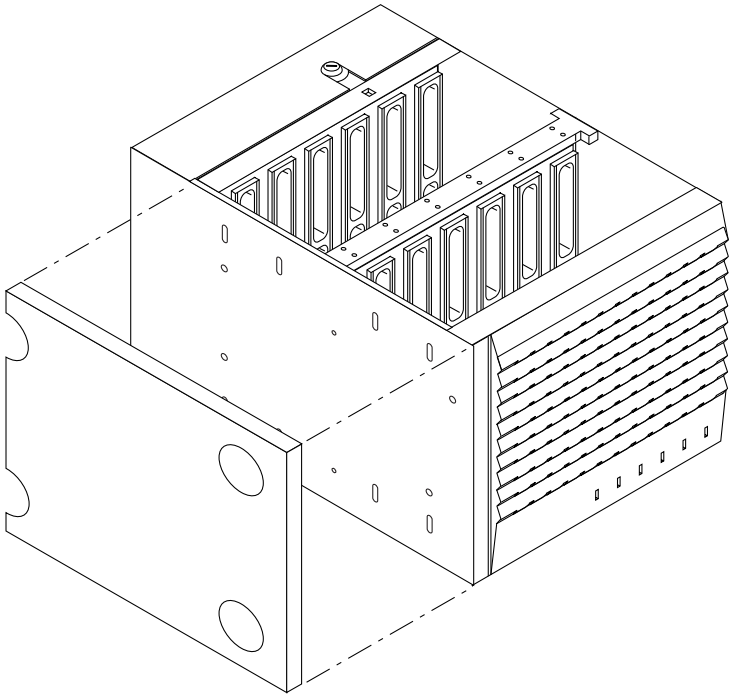

FIGURE 5-9 Removing and Replacing the Bottom Cover

▼ To replace the bottom cover:

1. **Turn the unit on its right side so that the bottom faces you.**
2. **Align the hooks on the bottom cover with the holes and tabs of the chassis (**FIGURE 5-9**).**
3. **Push the bottom cover on until it snaps onto the unit.**
4. **Replace the disk drives.**

   See Section 7.2, “Replacing a Disk Drive,” on page 7-3.
5. **Replace the left panel.**

   See “To replace the left panel:” on page 27.

CHAPTER 6

Installing Major Subassemblies

This chapter describes how to remove and replace the major subassemblies.

Before you begin any of the procedures, make sure you read the safety agency compliance information in Chapter 3 and gather the necessary tools.

6.1 Removing the Power Supply

1. **Shut down and power off the desktop system, the SPARCstorage MultiPack 2 enclosure, and all peripherals that are connected to the system.**

   Refer to the *Solaris Handbook for SMCC Peripherals* for specific software procedures to shut down and power off your system.

2. **Remove the SCSI cable and power cord from the enclosure (**FIGURE 6-1**).**

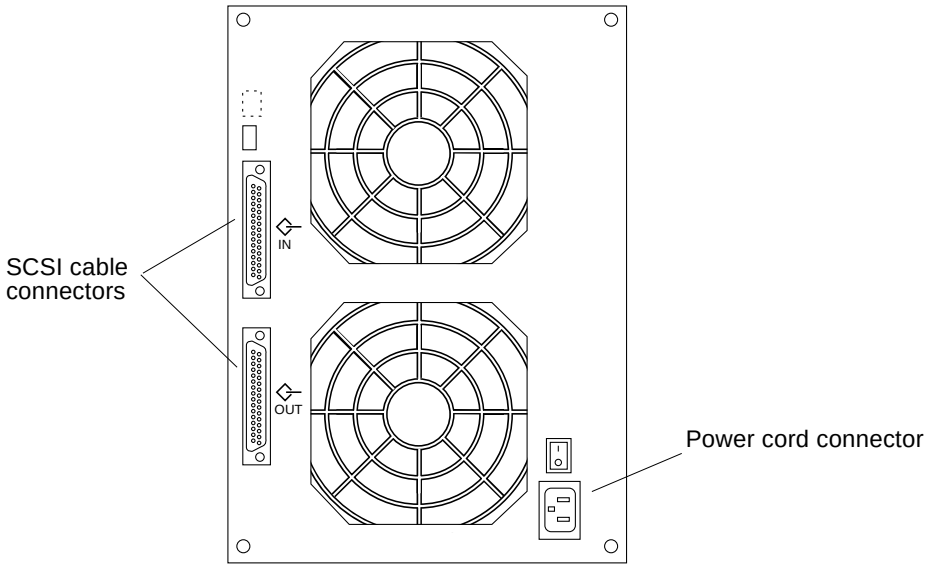

FIGURE 6-1 SPARCstorage MultiPack 2 SCSI Cable and Power Cord Connectors

3. **Remove the back cover.**

   See “To remove the back cover:” on page 3.

4. **Remove the two Phillips screws that secure the power supply to the unit (**FIGURE 6-2**).**

5. **Remove the four hex-head screws at the SCSI connectors (**FIGURE 6-2**).**

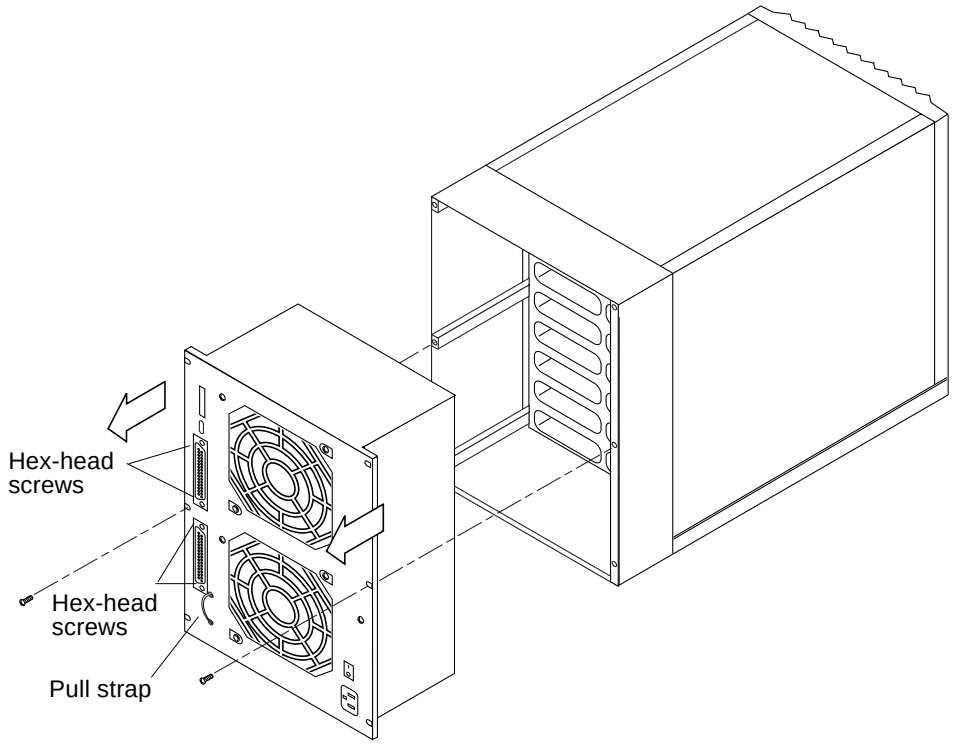

FIGURE 6-2 Removing and Replacing the Power Supply

6. **Carefully pull the power supply out from the unit using the pull strap and set it aside (**FIGURE 6-2**).**

   The connector at the back of the power supply connects it to the backplane (FIGURE 6-3). Because of this connection, the power supply will not slide out of the unit easily. Slowly work the power supply loose from the connector as you remove it from the enclosure.

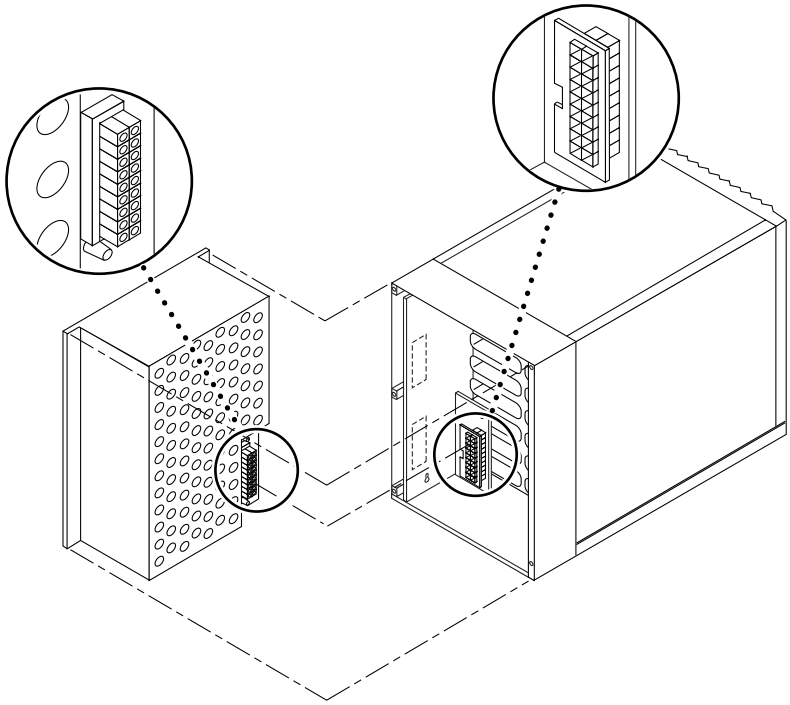

FIGURE 6-3 Power Supply Connection to Backplane

6.2 Replacing the Power Supply

1. **Align the power supply at the back of the unit so that the connector on the power supply lines up with the connector on the backplane (**FIGURE 6-3**).**
2. **Insert the power supply into the unit until the edges of the power supply are flush against the edge of the chassis.**
3. **Replace the two Phillips screws that attach the power supply to the unit (**FIGURE 6-2**).**
4. **Insert and secure the four hex-head screws at the SCSI connectors (**FIGURE 6-2**).**
5. **Push the pull strap back into the power supply casing.**

   The pull strap should be pushed in enough so that it does not affect replacing the back cover.

6. **Replace the back cover.**

   See “To replace the back cover:” on page 5.

7. **Attach the SCSI cable and power cord (**FIGURE 6-1**).**

8. **Turn on the power to your system.**

   See Section 4.2, “Powering On the System,” on page 4-2.

6.3 Removing the Backplane

To remove the backplane, you must completely disassemble the unit for access. You must be a qualified service provider to do this procedure.

1. **Shut down and power off the desktop system, the SPARCstorage MultiPack 2 enclosure, and all peripherals that are connected to the system.**

   Refer to the *Solaris Handbook for SMCC Peripherals* for specific software procedures to shut down and power off your system.

2. **Remove the SCSI cable and power cord from the enclosure (**FIGURE 6-1**).**

3. **Remove the left panel.**

   See “To remove the left panel:” on page 2.

4. **Attach a wrist strap to yourself and then to the unit chassis (**FIGURE 6-4**).**

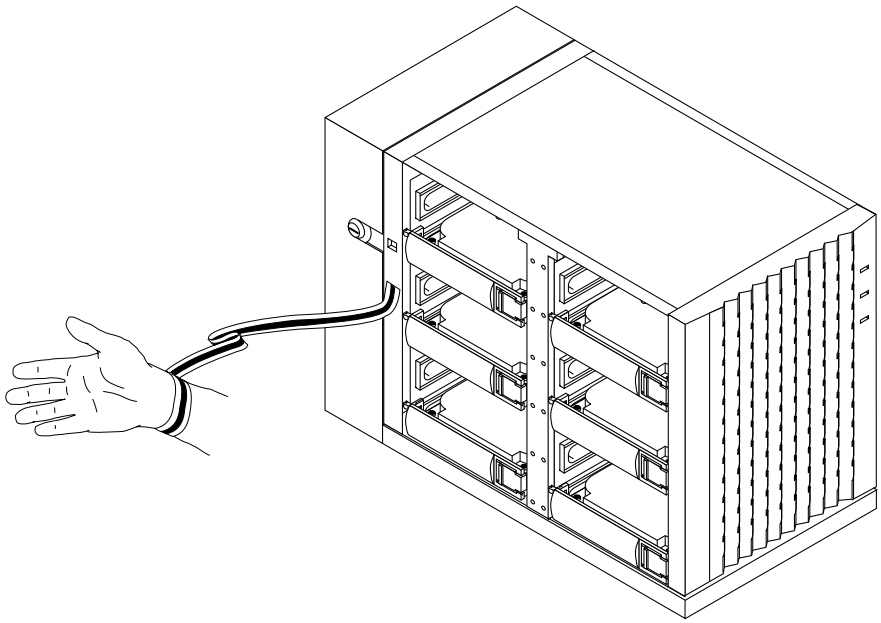

FIGURE 6-4 Attaching the Wrist Strap

5. **Remove the disk drives from the unit.**
   See “Removing a Disk Drive” on page 1.
6. **Remove the back cover.**
   See “To remove the back cover:” on page 3.
7. **Remove the power supply from the unit.**
   See “Removing the Power Supply” on page 1.
8. **Remove the right panel.**
   See “To remove the right panel:” on page 6.
9. **Remove the bottom cover.**
   See “To remove the bottom cover:” on page 11.
10. **Remove the two screws on the right side of the unit that connect the partition between the drives to the backplane and chassis (**FIGURE 6-5**).**

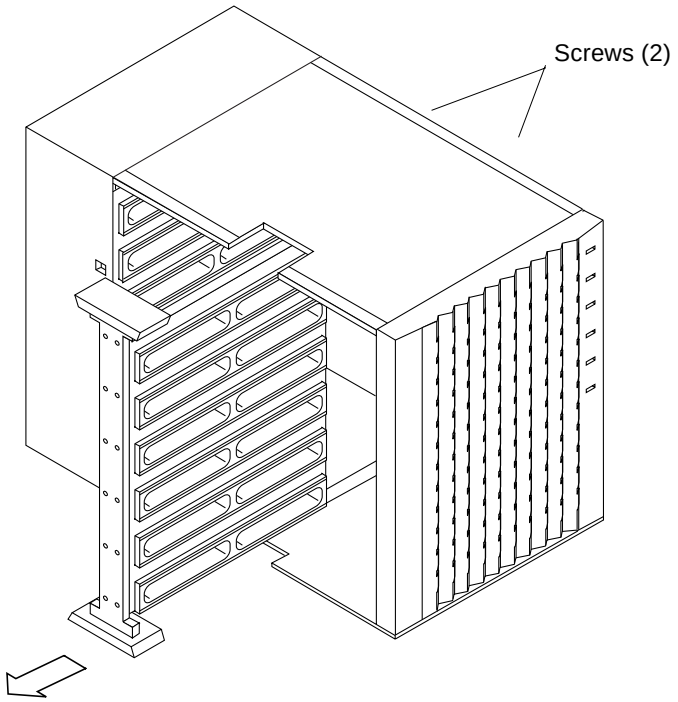

FIGURE 6-5 Removing the Partition

11. **Slide the partition out of the unit (**FIGURE 6-5**).**
12. **Remove the two screws that secure the daughterboard to the chassis (**FIGURE 6-6**).**

Note – The backplane is attached to the right wall of the chassis by resting on eight keyhole posts (FIGURE 6-6).

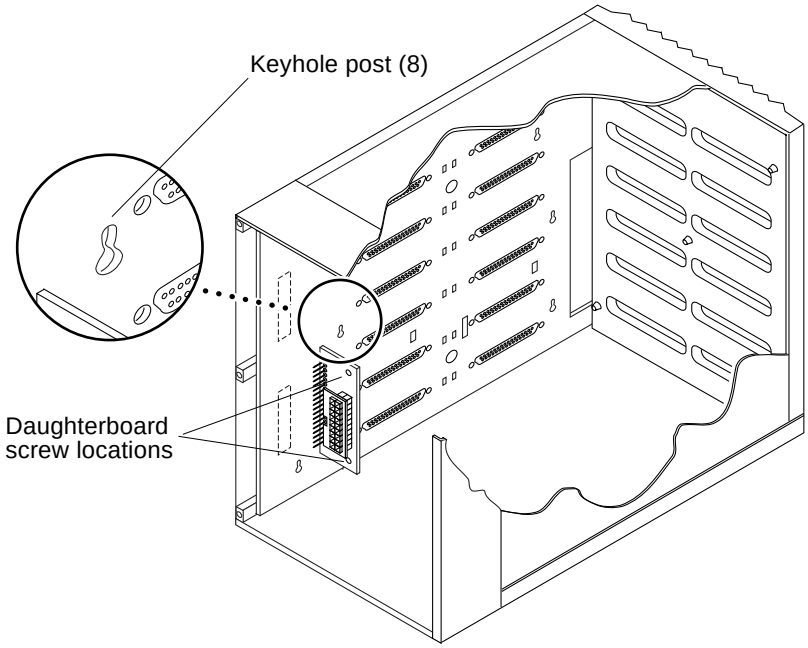

FIGURE 6-6 Detaching the Backplane

13. **Lift up slightly on the backplane to slip it off the keyhole posts (**FIGURE 6-6**).**

14. **Slide the backplane out through the back of the unit once you have cleared it away from the posts (**FIGURE 6-7**).**

Note – LEDs are attached to the backplane at the front end of the board (FIGURE 6-7). Be careful not to break off the LEDs when sliding the board out.

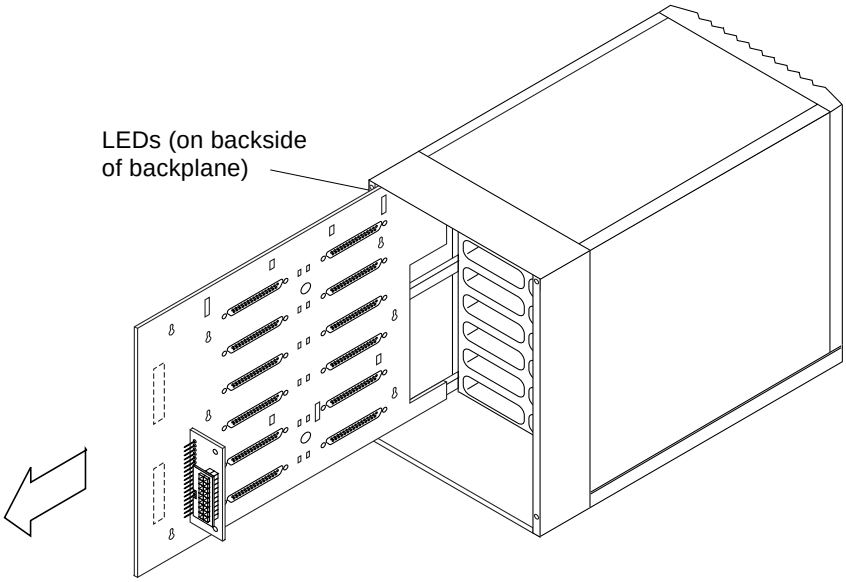

FIGURE 6-7 Removing and Replacing the Backplane

6.4 Replacing the Backplane

1. **Slide the new backplane in through the back of the unit so that it is parallel to the wall of the chassis as you face the back of it (**FIGURE 6-7**).**

   Make sure the backplane is oriented properly so that the connectors on the daughterboard face you as you push the board in, and the drive connectors on the motherboard face into the open drive area.

   Note – LEDs are attached to the backplane at the front end of the board. Be careful not to break off the LEDs when sliding the board in.

   ---

2. **Align the keyholes on the backplane to the keyhole posts on the chassis, and carefully hang the backplane on the posts (**FIGURE 6-6**).**

   Make sure the backplane is installed correctly on the backposts before proceeding.

3. **Slide the partition all the way back into the slot so that it rests against the backplane (**FIGURE 6-5**).**

4. **Insert and secure the two screws on the right side of the unit that secure the partition to the backplane and chassis (**FIGURE 6-5**).**

5. **Insert and secure the two screws that connect the daughterboard to the chassis (**FIGURE 6-6**).**

6. **Replace the bottom cover.**

   See “To replace the bottom cover:” on page 12.

7. **Replace the right side panel.**

   See “To replace the right panel:” on page 10

8. **Replace the power supply.**

   See “Replacing the Power Supply” on page 4.

9. **Replace all the disk drives.**

   See “Replacing a Disk Drive” on page 3.

10. **Remove the wrist strap.**

11. **Replace the back and left covers, if you have not already done so.**

    See “To replace the back cover:” on page 5” and “To replace the left panel:” on page 3.

12. **Replace the SCSI cable and power cord (**FIGURE 6-1**).**

13. **Turn on the power to your system.**

    See “Powering On the System” on page 2.

PART IV Illustrated Parts Breakdown

Illustrated Parts

CHAPTER 7

Illustrated Parts Breakdown

This chapter illustrates the replacement parts and lists them with their part numbers.

7.1 List of Replacement Parts

TABLE 7-1 SPARCstorage MultiPack 2 Replacement Part List

Replacement Part	Part Number
Replacement disk drive (9Gbyte, 7200 rpm)	#540-2951-xx
Power Supply	#300-1330-xx #300-1283-xx
Backplane	#501-4747-xx
Key	#330-1966-xx
68–68 pin cable - 0.8m	#530-2383-xx
68–68 pin cable - 2.0m	#530-2384-xx
50–68 pin cable - 1.2m	#530-2115-xx
50–68 pin cable - 2.0m	#530-2228-xx
Wide external single-ended terminator	#150-2267-xx
Replacement cover kit (6-drive unit) Front cover Left panel assembly Top cover Right panel	#540-3423-xx

7.2 Illustrations of Replacement Parts

Figures 8-1 through 8-8 show the replacement parts. See TABLE 7-1 for part numbers.

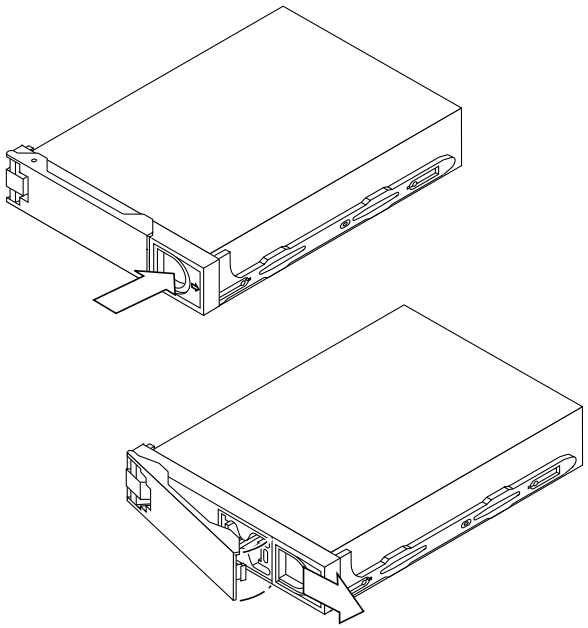

FIGURE 7-1 Single Connector, 1.6-inch High Disk Drive

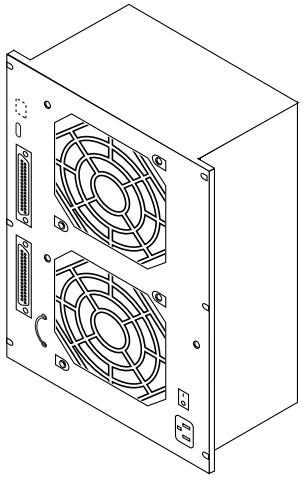

FIGURE 7-2 Power Supply

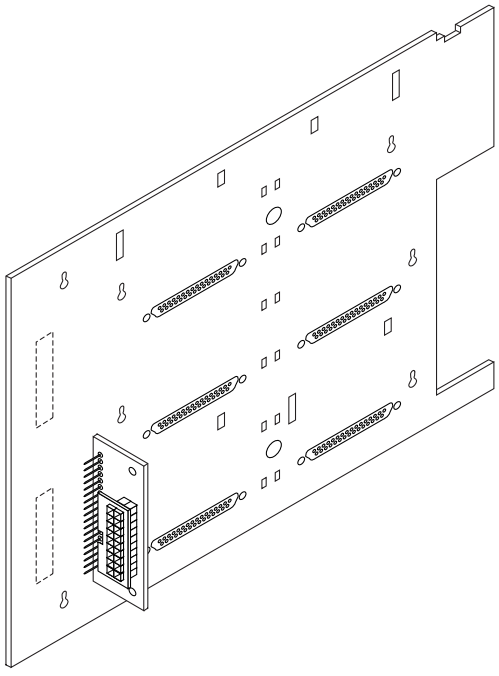

FIGURE 7-3 Backplane

FIGURE 7-4 SCSI Cables

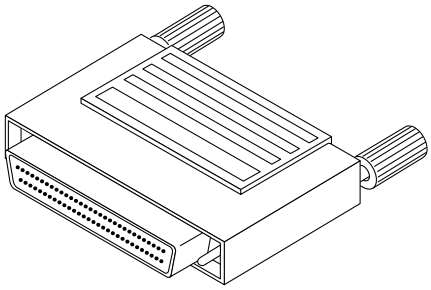

FIGURE 7-5 Wide External Single-Ended Terminator

PART V Appendixes and Index

APPENDIX **A**

Product Specifications

This appendix contains the SPARCstorage MultiPack 2 product specifications.

A.1 Electrical Specifications

TABLE A-1 Electrical Specifications

Input voltage	100-240 VAC
Frequency	47-63 Hz
Maximum input power	265W
Maximum input current	3.0A
Maximum input VA	300 VA
Maximum heat output	900 BTUs

A.2 Physical Specifications

TABLE A-2 Physical Specifications

Height	225 mm (8.86 inches)
Width	190 mm (7.48 inches)
Depth	395 mm (15.55 inches)
Weight	
Empty	approx. 6.12 kg (13.5 lbs)
Full (12 drives)	approx. 12.7 kg (28 lbs)

A.3 Environmental Specifications

TABLE A-3 Environmental Specifications

Temperature	
Operating	5 to 40°C
Nonoperating	-40 to 60°C
Relative Humidity	
Operating	20 to 80%
Nonoperating	93% or less
Vibration	
Operating	.20G, 5 to 500 Hz
Storage	1.0G, 5 to 500 Hz
Altitude	
Operating	70 KPa (3 km)
Nonoperating	19.3 KPa (12 km)

APPENDIX **B**

SCSI Bus Information

The SPARCstorage MultiPack 2 high volume storage enclosure runs optimally with an ultra small computer system interface (UltraSCSI) host connection: a 68-pin connector with a 16-bit data path and a sixteen address ID capacity. You can add an adapter card for UltraSCSI operation to any workstation system with the appropriate slots.

A computer with a narrow (50-pin connector) SCSI bus has only seven SCSI addresses available for internal or external devices. With devices using SCSI addresses 8 through 15, you *must* have a system equipped with a wide SCSI bus (68-pin connector) *or* a wide SCSI adapter Sbus card.

Note – To determine if you have a wide or narrow SCSI bus available, check the pins on the host SCSI connector port. A narrow SCSI bus uses a 50-pin connector and uses side clips to hold the cable in place. A wide SCSI bus uses a 68-pin connector, with jack screws to hold the connector in place. See the documentation that came with your host system or host adapter to determine its UltraSCSI capability.

B.1 SPARCstorage MultiPack 2 SCSI Addressing

The SPARCstorage MultiPack 2 unit is equipped with a fast, wide SCSI bus. The device uses single connector disk drives. The drive bay in which a drive is installed determines the SCSI target address. The SCSI address for each drive is listed by the drive on the partition between the drive columns inside the unit. FIGURE B-1 shows the SCSI target address labels.

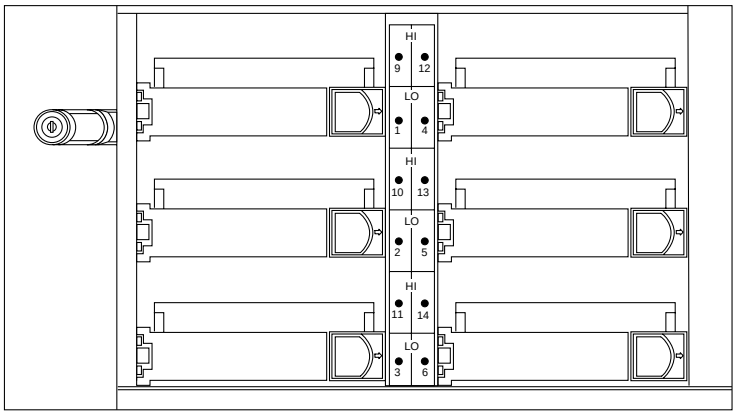

FIGURE B-1 SCSI Address Label on Partition

A SCSI target address conflict can occur between one of the system devices and a drive in the SPARCstorage MultiPack 2 enclosure. Because the target address in the unit is determined by the bay in which a drive is installed, there is less flexibility to assign addresses. To resolve the target address conflict, you have options based upon your configuration:

- If you have a fully loaded unit connected to an UltraSCSI or fast wide SCSI bus, you can install a host adapter card (see Section B.2, “Host Adapter Cards”), or select one of two preset ranges of SCSI target ID numbers to assign to the drives: 1 through 6, *or* 9 through 14. To select the SCSI target address range, set the switch on the back of the unit to the 1–6 or 9–14 position. See FIGURE B-2 for the switch location.

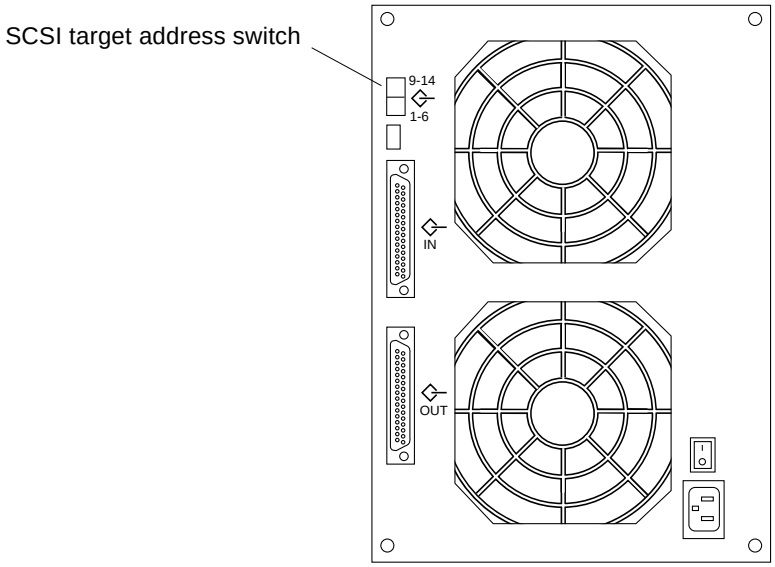

FIGURE B-2 SCSI Target Address Switch Location

When you install the SPARCstorage MultiPack 2, you must choose either the 1–6 or 9–14 SCSI target address range for your drives. To select the range, set the SCSI target address switch on the back of the enclosure to the 1–6 or 9–14 position (FIGURE B-2). The default switch setting is 1–6.

Note – You must first power off the system and then change the SCSI address switch setting for the system to recognize the new SCSI address range.

Note – If you are connected to a host system that has a narrow SCSI bus, you must select the 1–6 SCSI target address switch setting.

B.2 Host Adapter Cards

You can add a host adapter card for UltraSCSI or fast wide SCSI operation to either a workstation with an internal fast wide SCSI bus, or an internal narrow one.

The number of adapters you can install is limited only by the number of slots available on your system. Each adapter you add increases the number of SCSI devices you can attach to your system.

If your host system is equipped with only an internal narrow SCSI bus, adding a wide, 68-pin adapter card enables you to attach a fully loaded SPARCstorage MultiPack 2 unit. UltraSCSI performance depends on the capability of the adapter.

B.3 Termination

Each SPARCstorage MultiPack 2 drive enclosure comes with an external single-ended terminator. For UltraSCSI operation, *do not use* the external terminator. The on-board autoterminator functions in UltraSCSI mode.

For Fast operation, install the terminator on the SCSI OUT port of a SPARCstorage MultiPack 2 unit after you have connected it to the host.

Note – When an external terminator is attached, the auto-termination indicator LEDs do not light.

B.4 Types of Connection

You can connect your SPARCstorage MultiPack 2 enclosure to your desktop system two ways:

- Direct connection—connecting the SCSI cable from the enclosure directly to the SCSI connector of the host system.
- Daisy-chain—Connecting the SCSI cable of the enclosure to the SCSI connector of an additional SCSI device, thus “chaining” together multiple SCSI devices.

Note – If you chain other SCSI devices to your SPARCstorage MultiPack 2, the units will function at reduced speed.

B.4.1 Direct Connection

To connect your SPARCstorage MultiPack 2 unit in a direct connection to your host system:

1. **Connect one end of the SCSI cables to the SCSI port on the back of the storage enclosure (**FIGURE B-3**).**
2. **Connect the other end of the SCSI cable to the SCSI port on the host system, or to the SCSI port of an installed host adapter card.**

Note – The SPARCstorage MultiPack 2 enclosure is self-terminating and does not require installation of an external terminator in the unused SCSI port.

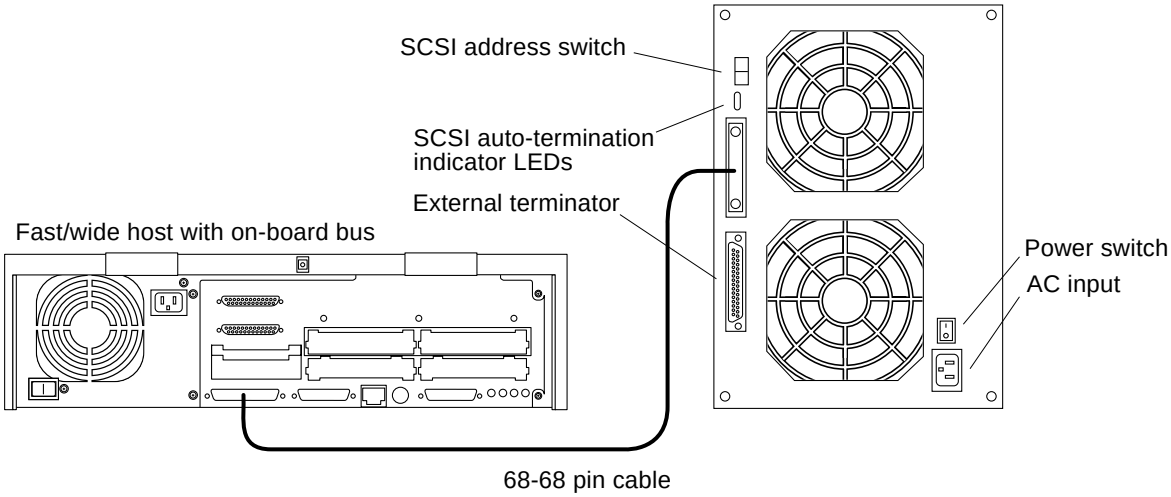

FIGURE B-3 Fast/wide Host in a Direct Connection with a SPARCstorage MultiPack 2

B.4.2 Daisy-Chain

To connect your SPARCstorage MultiPack 2 enclosure to your host system and other peripheral devices:

1. **Connect one end of the SCSI cable to the SCSI port of your host system (**FIGURE B-4**).**

2. **Connect the other end of the SCSI cable to the nearest SCSI device in the chain.**

   See Appendix C, “Rules for System Configuration,” to determine where to connect your enclosure in the daisy-chain.

3. **Connect a second SCSI cable to the other empty port on the first SCSI device in the chain.**

4. **Connect the other end of the second SCSI cable to the next SCSI device.**

   Repeat these steps until you have connected all the SCSI devices. The last device in the chain requires a regulated terminator.

Note – When an external terminator is attached, the auto-termination indicator LEDs do not light.

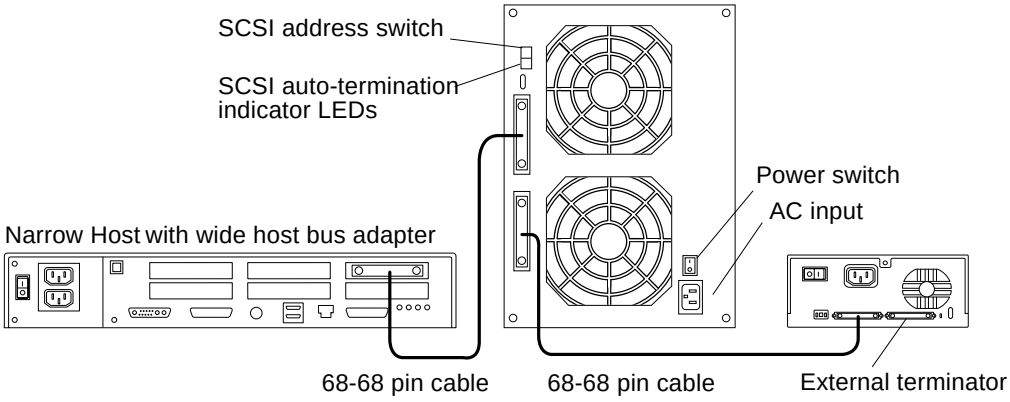

FIGURE B-4 SPARCstorage MultiPack 2 Unit in a Daisy-Chain Connection

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Caution – Devices with the 3-row 50-pin D connector or the 50-pin ribbon connector (old-style connectors) must *not* be used on the same bus with fast SCSI devices.

B.5 SCSI Bus Length

The number of SCSI devices you can add on a SCSI bus depends on the available SCSI addresses *and* the total length of the SCSI chain.

The total length of all external cables and internal bus lengths will affect the SCSI bus speeds.

B.5.1 UltraSCSI Operation

If you connect your SPARCstorage MultiPack 2 enclosure to the on-board host port of your computer, use only a .8 meter cable. You can use a 2-meter cable if you connect it to a host adapter. Do not use an external terminator.

The total length of the SCSI bus is computed by adding:

- External SCSI cable lengths of all SCSI devices on the same bus
- Internal SCSI cable lengths of
  - All SCSI devices on the same SCSI bus
  - Host system

B.5.2 Non UltraSCSI Operation

The maximum length of your SCSI bus should not exceed 6 meters (20 feet) for optimum performance. All SPARCstorage MultiPack 2 disks are single connector disks, which eliminates the need for interior cables and increases SCSI bus reliability.

The total length of the SCSI bus is computed by adding:

- External SCSI cable lengths of all SCSI devices on the same bus
- Internal SCSI cable lengths of
  - All SCSI devices on the same SCSI bus
  - Host system

Note – To ensure proper operation, follow the configuration guidelines, in Section C.3, “Configuration Guidelines,” in Appendix C.

B.5.3 External SCSI Cable Length

To directly connect a SPARCstorage MultiPack 2 enclosure to your desktop system, or to daisy-chain it to another SCSI peripheral, use the SCSI cable that ships with the unit.

TABLE B-1 contains the lengths and types of external cables that can be used with the enclosure.

Caution – Using cables other than the cable supplied with your SPARCstorage MultiPack 2 enclosure or cables recommended by Sun can result in data loss. UltraSCSI capable cables must be used to achieve UltraSCSI speeds.

TABLE B-1 SCSI External Cable Lengths

Cables	Meters	Inches
68–68 pin cable	0.8	31.4
50–68 pin cable	1.2	47.2
68–68 pin cable or 50–68 pin cable	2.0	78.6

B.6 Internal SCSI Cable Length

The SPARCstorage MultiPack 2 enclosure does not use internal cables. TABLE B-2 lists the internal cable lengths of supported systems.

TABLE B-2 Internal Cable Lengths of Supported Systems

Devices and Cables	SCSI Cable Length	
	Meters	Inches
SPARCstorage UniPack (rem. media)	0.4	15.7
SPARCstorage UniPack (disk)	0.3	11.8
SPARCstorage MultiPack	0.9	35.4
Desktop Disk Pack (tape, disk, CD-ROM)	0.3	11.8
Desktop Storage Module (disk unit)	0.3	11.8
Desktop Storage Module (tape unit)	0.4	15.7
Multi-Disk Pack	1.0	39.3
Ultra™ 1 Model 140, Model 170	0.9	35.4
Ultra 1 Creator and Ultra 1 Creator 3D	0.9	35.4
Ultra Enterprise 450	0.9	35.4
Ultra 2 Creator and Ultra 2 Creator 3D	0.9	35.4
Ultra 30	0.9	35.4
SPARCstation™ 5, 20	1.6	62.6
SPARCstation 4	1.2	48.0
SPARCstation 10, LX, SPARCclassic	0.9	35.4
SPARCstation™ Voyager™	0.4	15.7
SPARCserver™ 1000	1.8	70.2
SBus cards (SBE/S, FSBE/S, SBus SCSI host adapter)	0.1	3.9
Sun Swift PCI Adapter	0.1	3.9
PCI Ultra Single-Ended 2 Channel SCSI Adapter	0.2	7.8
SBus Expansion Subsystem	0.9	35.4

APPENDIX **C**

Rules for System Configuration

This appendix includes some general rules to follow when you configure your SPARCstorage MultiPack 2 enclosure.

C.1 Placement

The SPARCstorage MultiPack 2 enclosure weighs up to 30 lbs (13.6 kg) when loaded with disk drives.Choose a location that is relatively permanent. Keep cable lengths in mind. Placing peripherals away from your computer requires longer SCSI bus cables. See Appendix B, “SCSI Bus Information,” for tables of SCSI bus lengths.

Because the drive replacement panel opens at the left side of the unit, place the SPARCstorage MultiPack 2 box at the left side of your system, or anywhere the panel can open freely.

Leave enough space in front of the air vents (about 2 inches), both around the SPARCstorage MultiPack 2 enclosure and your host system.

C.2 Disk Drives

The SPARCstorage MultiPack 2 unit uses 1.6-inch high disk drives. You must set the SCSI target address switch on the back of the enclosure to select the SCSI address range for the drives. For SCSI target address switch settings and other SCSI bus information, see Appendix B.

If you are operating your SPARCstorage MultiPack 2 box with less than the maximum number of drives, the drives should be installed starting at the upper left drive bay, and placed in order of the ascending SCSI addresses. The SCSI addresses are labeled by each drive bay on the partition between the drive columns (FIGURE B-1).

Note – The drive placement order described here is suggested for best air ventilation and cooling. You can also arrange the disk drives based on your own requirements, such as to avoid SCSI address conflicts with other devices.

C.3 Configuration Guidelines

The guidelines for daisy-chaining your host system with storage devices depends on which type of platform host or host bus adapter you are connecting the enclosure. The total length of the SCSI bus in the daisy chain must also be taken into account. (See Section B.5, “SCSI Bus Length,” in Appendix B for more information on SCSI bus length.)

Follow the guidelines in TABLE C-1 for configuring the SPARCstorage MultiPack 2 enclosure with the host system.

Note – When you daisy chain additional storage devices with your SPARCstorage MultiPack 2 unit, the speed will be slower than UltraSCSI speed.

TABLE C-1 SPARCstorage MultiPack 2, SPARCstorage MultiPack, and SPARCstorage UniPack Configuration Guidelines

External Subsystem Daisy Chain Configurations	UltraSCSI Host or Host Bus Adapter	UltraSPARC™ Fast/Wide Onboard Hosts	Fast/Wide Host Bus Adapter (SWIS/S, SunSwift™)	Fast/Narrow Onboard Hosts	Fast/Narrow Host Bus Adapter
UltraSCSI MultiPack 2 2-6 drives	1 MultiPack 2 only*	1 MultiPack 2 + 1 UniPack	2 MultiPack 2 + 1 UniPack	1 MultiPack 2 + 1 UniPack**	1 MultiPack 2 + 1 UniPack**
MultiPack 2-12 drives		1 MultiPack-12 only	1 MultiPack-12 only	None	None
MultiPack 2-6 drives		1 MultiPack-6 + 1 UniPack	2 MultiPack-6 + 1 UniPack	1 MultiPack-6 + 1 UniPack**	1 MultiPack-6 + 1 UniPack**
2.1 Gbyte 7200 rpm UniPack		3	4	4	4
4.2/1/05 Gbyte UniPack		4	5	4	5
Tape/CD UniPack		4***	4***	4***	4***

*This configuration alone permits UltraSCSI performance

** Maximum of seven devices are allowed on a SCSI bus (including the internal devices).

*** When mixing disk and tape devices on a SCSI chain, only two tape devices are allowed.

Only one SPARCstorage MultiPack 2 unit may be attached to the host port of an Ultra 1 system or any non-wide host interface. On a non-wide host interface, the SCSI ID switch for the unit must be set for SCSI IDs 1–6.

Up to two SPARCstorage MultiPack 2 units may be attached to a wide host adapter. The SCSI ID switch for the first unit must be set to 1–6; the second unit must be set for 7–12.

Only one SPARCstorage UniPack unit may be attached on a SCSI bus with a single SPARCstorage MultiPack 2 unit.

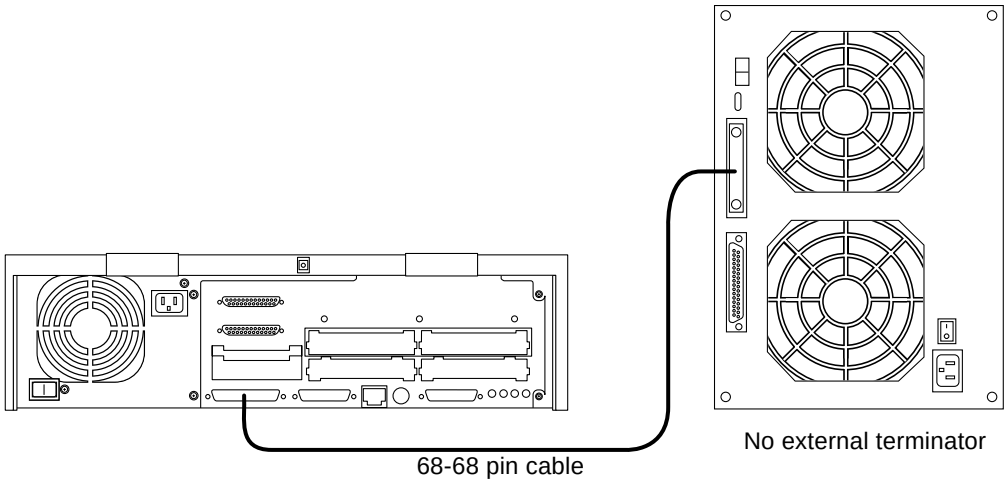

FIGURE C-1 SPARCstorage MultiPack 2 Unit Connected to an UltraSCSI Host System

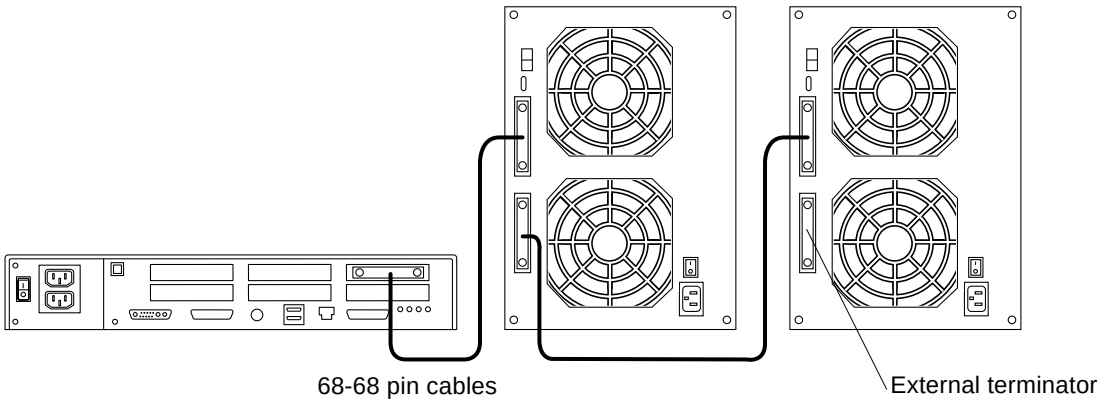

FIGURE C-2 Two SPARCstorage MultiPack 2 Units Attached to a Narrow Host With a Wide Host Bus Adapter

C.3.1 Additional Peripheral Devices

If there are target addresses available in the configuration to add another SCSI device, use a wide SCSI device for optimum performance. An example of a SPARCstorage MultiPack 2 enclosure connected to a desktop system and another SCSI device is shown in FIGURE C-3. Only one additional device is supported

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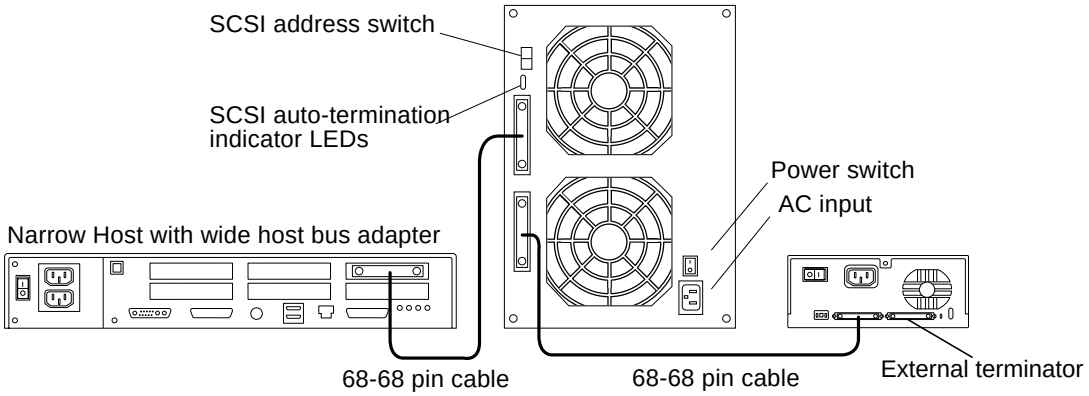

FIGURE C-3 SPARCstorage MultiPack 2 Unit Connected to an Additional SCSI Device

When you add devices:

- Connect the wide SCSI device (68-pin) to the host system as the first device in the chain.
- Connect a narrow SCSI device (50-pin) to the narrow SCSI host system. An example is shown in FIGURE C-4.
- Use an external terminator on the last device in the chain.

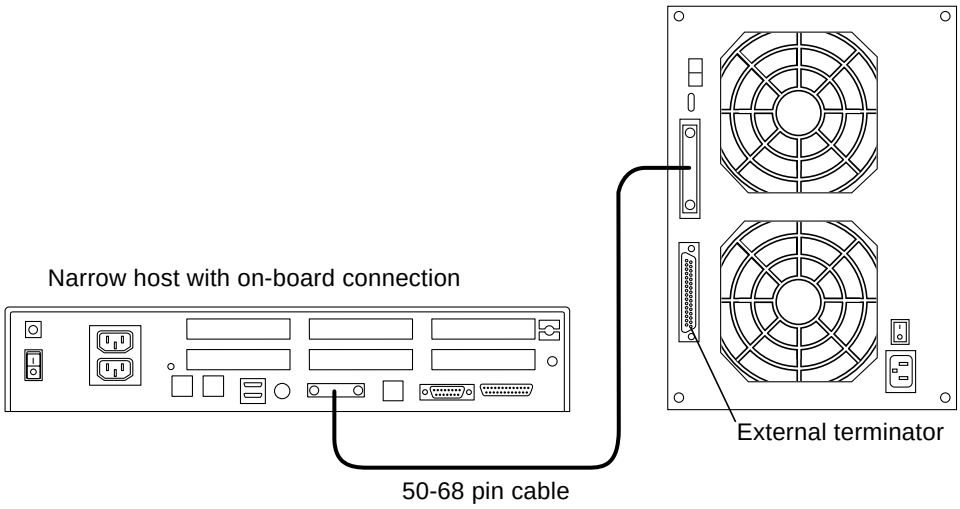

FIGURE C-4 SPARCstorage MultiPack 2 Chained with a Narrow SCSI Device

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