

SPARCcenter 2000/2000E Service Manual



Warning – Procedures contained in this manual must be performed by qualified service-trained maintenance providers.

Refer to the section entitled “Notes, Cautions, and Warnings” found in the Preface of the front matter of this service manual Binder.



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Preface

The Sun™ SPARCcenter™ 2000/2000E service manual is for the qualified service-trained maintenance provider. This manual contains sufficient information to remove and replace the replaceable subassemblies after system failure.

This service manual applies to both SPARCcenter 2000 and SPARCcenter 2000E systems. The term *SPARCcenter 2000* is generally used to refer to either system; if information differs for the 2000E system, this will be explicitly noted.

Document Organization

Information in this manual is organized in seven parts:

Part 1, System Information provides a product description.

Part 2, Troubleshooting contains fault isolation information and a flow chart to locate system hardware problems.

Part 3, Preparing for Service explains how to prepare the system for service and how to access the subassemblies.

Part 4, Subassembly Removal and Replacement shows how to remove and replace the major replaceable subassemblies in the system cabinet.

Part 5, System Board shows how to install and service the system board, and how to remove and replace the processor modules, memory modules, and SBus cards.

Part 6, Illustrated Parts Breakdown lists and illustrates replacement parts and includes part numbers.

Part 7, Appendixes, Glossary, Index provides additional reference information of interest to the qualified service-trained maintenance provider.

What Typographic Changes Mean

The following table describes the typographic changes used in this book.

Table P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> You have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	<pre>machine_name% su Password:</pre>
AaBbCc123	Command-line placeholder: replace with a real name or value	To delete a file, type <code>rm filename</code> .
AaBbCc123	Book titles, new words or terms, or words to be emphasized	Read Chapter 6 in <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be root to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

Table P-2 Shell Prompts

Shell	Prompt
C shell prompt	<code>machine_name%</code>

Table P-2 Shell Prompts

Shell	Prompt
C shell superuser prompt	machine_name#
Bourne shell and Korn shell prompt	\$
Bourne shell and Korn shell superuser prompt	#

Related Documents

The following documents contain information that may be helpful after the system has been installed.

Table P-3 Related Documents

Application	Title	Part Number
Safety	<i>SPARCcenter 2000 Regulatory Compliance Manual</i>	801-3051
Installation	<i>SPARCcenter 2000 Installation Manual</i>	800-6975
	<i>56" Expansion Cabinet Install</i>	800-5936
Diagnostics	<i>SPARCcenter 2000 Post User's Guide</i>	800-7481
	<i>OpenBoot Command Reference</i>	800-6076
User's Guides	<i>SPARCcenter 2000 Storage Device User's Guide</i>	800-7009
	<i>16-32 Gbyte 4mm Tape Autoloader Desktop Storage Module Installation and User's Guide</i>	802-5325
	<i>20 Gbyte 4 mm Internal Tape Auto-Loader User's Guide</i>	801-4977
Specifications	<i>8mm Tape Drive Specifications</i>	802-5775
	<i>2.5 Gbyte 1/4-inch Tape Drive Specifications</i>	802-6234
Service	<i>56" Expansion Cabinet Service Manual</i>	800-6371
	<i>SPARCcenter 2000 Board Manual</i>	800-6993
	<i>Multi-Tape Backup Tray Service Manual</i>	800-7340

System Compliance Information

FCC Class A Notice—United States

This device complies with Part 15 of the FCC Rules. Operation is subject to two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

DOC Class A Notice—Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Nippon—Japan

この装置は、第一種情報装置(商工業地域において使用されるべき情報装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会 (VCCI) 基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Translation: This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. Read the instructions for correct handling.



Caution – Do not make mechanical or electrical modifications to the equipment. Sun Microsystems, Inc. is not responsible for regulatory compliance of a modified SPARCcenter 2000 system cabinet.

Cables

All cables provided with the equipment are designed to reduce RFI emissions. For regulatory compliance reasons, these cables must be used and must not be replaced by any other cables.

Springfinger Considerations

Springfingers are metal strips between the edge of the printed circuit board and the outer panel to reduce RFI emissions. Serrated metal *fingers* protrude from either side of the strip.



Caution – Installation of a board WITHOUT springfingers may increase RFI emissions and jeopardize regulatory compliance.

Sun Microsystems, Inc. will not be responsible for regulatory compliance if boards without springfingers are added to a SPARCcenter 2000 system that was originally shipped WITH springfingers and regulatory approval.

Lithium Battery

Pay attention to the following warnings when dealing with the batteries incorporated into Sun boards.



Warning – On the SPARCcenter 2000 system boards there is a lithium battery molded into the MK48T08 SGS-Thomson real-time clock.

On Sun NVSIMM memory modules there is a lithium battery.

Replace the battery only with Matsushita Electric or Panasonic part number BR2330-1F3.

Batteries are NOT customer-replaceable parts. They may explode if mistreated. Do not dispose of the battery in fire. Do not disassemble it or recharge it.

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Country	Telephone	Fax
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France	05-90-61-57	05-90-61-58
Belgium	02-720-09-09	02-725-88-50
Luxembourg	32-2-720-09-09	32-2-725-88-50
Germany	01-30-81-61-91	01-30-81-61-92
The Netherlands	06-022-34-45	06-022-34-46
Sweden	020-79-57-26	020-79-57-27
Switzerland	155-19-26	155-19-27
Japan	0120-33-9096	0120-33-9097

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1-415-786-6443

Notes, Cautions, and Warnings



Warning – The SuperSPARC module has a *hot surface*. Avoid contact. Surfaces are hot and may cause personal injury if touched.



Warning – This equipment contains lethal voltage. Accidental contact can result in serious injury or death.



Caution – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resultant damage to the equipment.

Individuals who remove any outer panels or open covers to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

Procedures contained in this document must be performed by qualified service-trained maintenance providers.

Note – Before you begin, carefully read each of the procedures in this manual. If you have not performed similar operations on comparable equipment, *do not attempt* to perform these procedures.

Part 1— System Information

Product Description	page 1-1
<i>Standard Features</i>	page 1
<i>Internal Options</i>	page 3
<i>External Options</i>	page 3

Product Description

1.1 Standard Features

The SPARCcenter 2000 (or SPARCcenter 2000E) system is packaged in a 56-inch cabinet as shown in Figure 1-1.

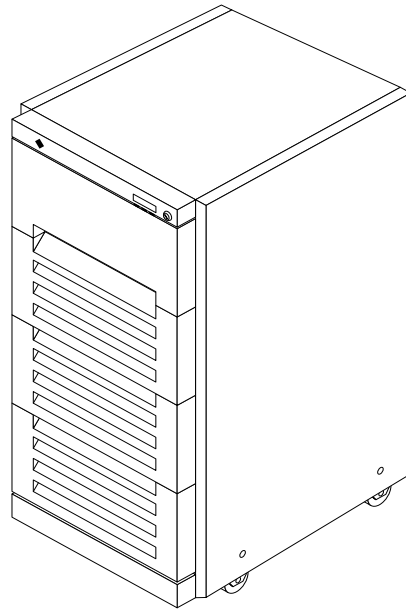


Figure 1-1 SPARCcenter 2000E System Cabinet

The minimum configuration for the standard server cabinet is:

- System card cage
- Blower
- Power supply
- AC distribution unit
- SCSI tray for removable media, including:
- SunCD™ 2Plus drive

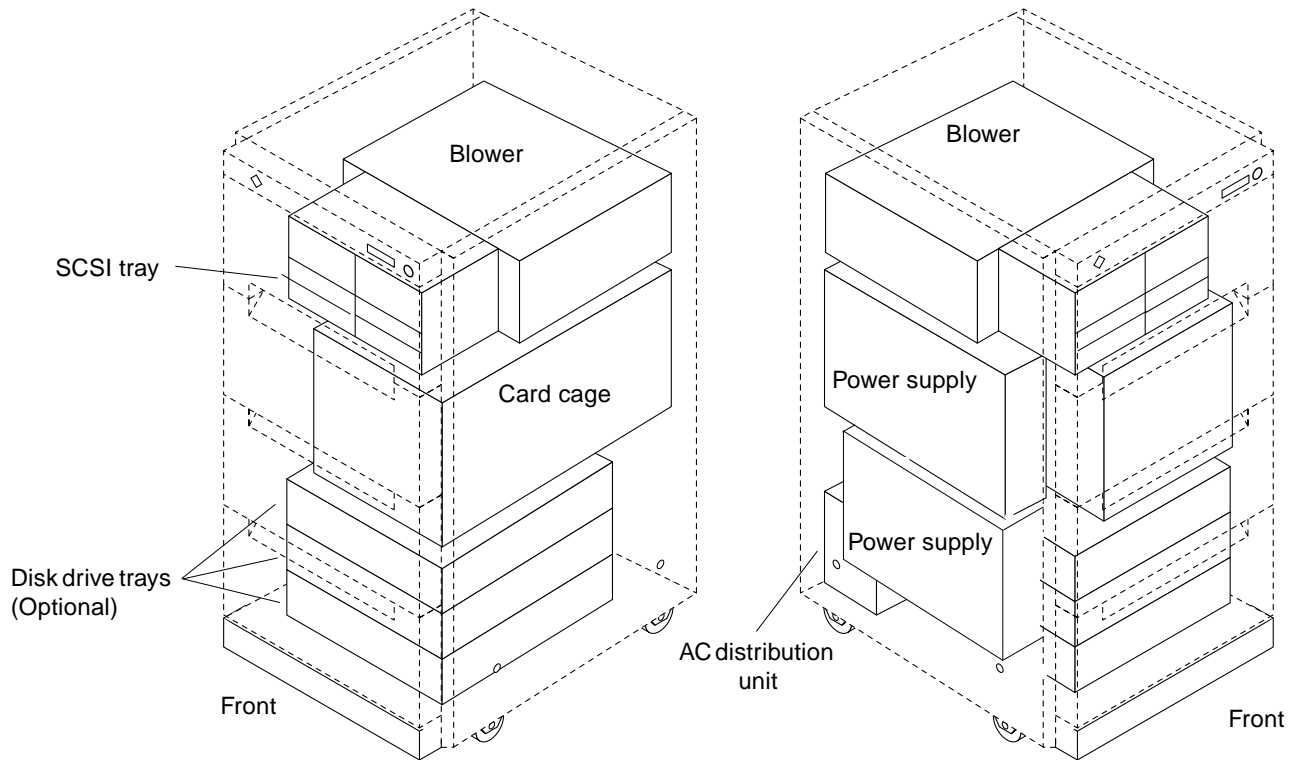


Figure 1-2 Major Subassemblies in the Server Cabinet

1.2 Internal Options

The main cabinet contains the card cage and has space for disk drive trays and various types of individual drives.

Table 1-1 Internal Options for the SPARCcenter 2000E System

Option	Quantity	Comments
System board	1-10 per system	One system board becomes the system master automatically. Jumper changes are not needed.
SuperSPARC module	1-20 per system	0-2 modules on each system board. (A moduleless board can provide additional memory and SBus slots for the system.)
SIMM, NVSIMM	0, 8, or 16 SIMMs per board	Add 8 SIMMs at a time, dividing the SIMMs (as groups of 4) between the two buses, but on the same group number (for example, group 0 on bus 0 and group 0 on bus 1); it is helpful (but not mandatory) to place the SIMMs on the same board. SIMM sizes are 8 or 32 MB DRAM or 1 Mbyte NVSIMM. Do not mix sizes between groups. For optimum performance, add memory to multiples of 2 boards. This allows interleaving of memory between 2 or 4 boards. Interleaving does not occur for an unpaired, odd-numbered board.
SBus card	1-40 per system	0-4 cards per system board.
SCSI tray	Up to 4 full-height drives, or 4 half-height and 2 full-height drives	SCSI tray takes removable-media drives only. One SunCD 2Plus is standard equipment per system. Optional drives must be 1/4-inch or 8 mm tape drive or 4 mm tape auto-loader drive.
Disk drive tray	0-3 trays	Disk tray holds up to six 5 1/4-Inch form factor disk drives.

1.3 External Options

The SPARCcenter 2000E system includes the main cabinet and can include up to two tape expansion cabinets and up to four disk expansion cabinets.

Figure 1-3 shows the differences in front panels that identify the cabinet types.

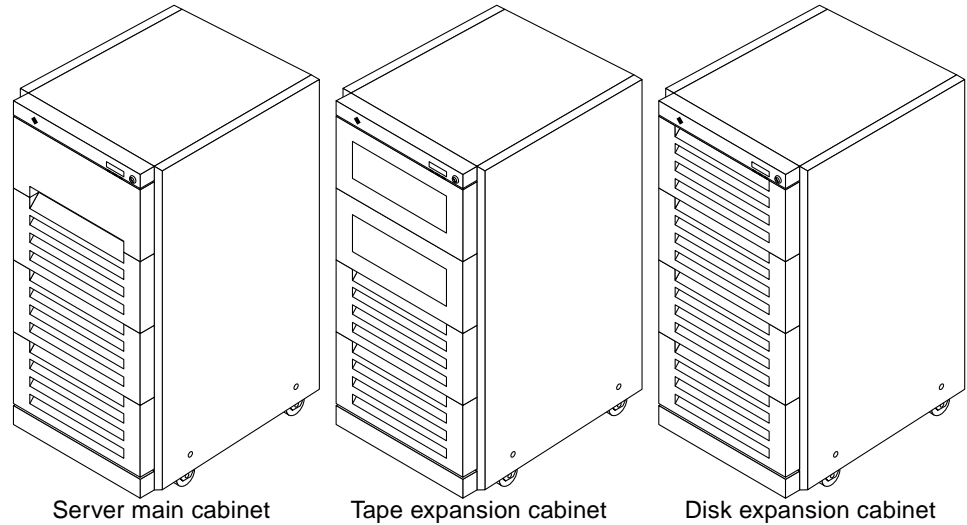


Figure 1-3 SPARCcenter 2000E Main Cabinet and Expansion Cabinets

Most external options interface through SBus cards. Each system board has four SBus slots.

A monitor is not necessary for normal server operation, but a TTY terminal or SPARCstation™ can be attached to the server to display system messages and self-test diagnostic results.

Part 2— Troubleshooting

Troubleshooting Overview	<i>page 2-1</i>
<i>System Control</i>	<i>page 2-1</i>
<i>Status Lights and Indicators</i>	<i>page 2-4</i>
Diagnostics and Commands for Troubleshooting	<i>page 3-1</i>
<i>Diagnosing Problems</i>	<i>page 3-1</i>
<i>Using <code>prtdiag</code></i>	<i>page 3-3</i>
<i>Using <code>probe scsi</code></i>	<i>page 3-4</i>
<i>Precautions when Using POST and OBP</i>	<i>page 3-6</i>
<i>Connecting a Terminal to the System Master</i>	<i>page 3-8</i>
<i>Running OBP and POST</i>	<i>page 3-9</i>
<i>Verifying Connection to Drives</i>	<i>page 3-15</i>
<i>Interpreting System Board LEDs</i>	<i>page 3-17</i>
<i>Enabling and Disabling the Link Integrity Test</i>	<i>page 3-18</i>
<i>SuperSPARC Modules</i>	<i>page 3-19</i>
<i>SIMMs and NVSIMMs</i>	<i>page 3-19</i>
<i>Fuses</i>	<i>page 3-19</i>
Troubleshooting Flow Diagrams	page 4-1
<i>Flow Diagrams</i>	<i>page 4-2</i>

Troubleshooting Overview



This chapter explains how to determine which hardware or software has control of the system at different times during system operation.

2.1 System Control

To troubleshoot a problem, it is helpful to know what part of the system has control of system operations at any moment.

When AC power turns on, control of the system passes in this order:

- AC distribution unit
- Control board
- Power-on self-test (POST) program
- OpenBoot program
- Operating system
- JumpStart automatic configuration program

Table 2-1 shows the actions that occur as system control transfers between the phases.

The third column shows how to verify the system is operating properly.

Table 2-1 Hardware and Software Control of the System

Controlling Area	Actions	Observations and Verification
AC distribution unit	When the key switch is in the Ⓞ (Standby) position and the AC breaker on the AC distribution unit is turned on, the disk drive trays receive AC power.	Listen for the sound of the disk drives and small AC fans in the drive trays.
Key Switch	When the key switch is turned to the (On) position, the DC power supply receives AC current.	Listen for the sound of the large DC blower fan in the top of the system cabinet. The left (green) front panel LED should light immediately, indicating presence of DC power.
Control board	The control board holds the system in reset until all of the DC supplies reach nominal operating voltages. Buffers on the control board pass status signals from the power supply and the main blower fan to the system board(s).	Four yellow LEDs on the left side of the control board must be off. Four green LEDs on the right of the control board must be on.
System board	The system board monitors the AC voltage, the DC voltages, the DC blower fan rotation speed, and the system board temperature sensors. The system board can turn off the AC distribution unit if the monitored conditions cannot reach or stay within nominal ranges.	
POST	<p>POST tests the system boards individually, then POST tests the ability of system boards to work together on the backplane. POST does not test individual SBus cards, drives, or interface cables.</p> <p>POST next configures a system, omitting marginal or failing circuits. The system uses one of two possible schemes to assign the system master. Refer to Section E.2, "System Master Board" for specific information.</p>	<p>POST turns on the middle (yellow) front panel LED while tests are running, and should turn it off after about 60 seconds. The two green LEDs should remain on.</p> <p>Any other LED combination indicates a problem. If all three LEDs are on, the problem is not severe enough to prevent the system from booting and running. If the right side green LED remains off, the problem is major.</p> <p>POST displays error messages on a terminal, while displaying codes on the system board LEDs (note: POST may reset the SuperSPARC modules and the LED codes may be lost).</p>

Table 2-1 Hardware and Software Control of the System (Continued)

Controlling Area	Actions	Observations and Verification
OpenBoot	<p>The program boots the system by loading the operating system from the root disk drive.</p> <p>The root disk is usually drive number 0 in the bottom disk drive tray in the system cabinet, but this location is not mandatory and can differ for your system.</p> <p>To read OBP messages, connect the console (serial ASCII terminal) to the system master. If the console is connected to the wrong system board, messages will NOT appear on the screen.</p>	<p>If set to verbose mode, OpenBoot displays on the terminal a list of the hardware options found in the system.</p> <p>On the system master, the eight lower (yellow) LEDs cycle constantly.</p> <p>The yellow LEDs of all other system boards should stay on, without cycling.</p> <p>On any system board, if the yellow LEDs are off, the board has failed POST.</p>
Operating system (UNIX)	<p>The operating system loads into memory and begins running.</p> <p>If a hardware failure occurs while the system is running, POST can automatically configure around the failure, and reboot.</p>	<p>For all system boards, the top two (green) LEDs indicate that 0, 1, or 2 SuperSPARC modules are present on the board and are functional.</p> <p>All yellow system board LEDs should be flashing in a cyclical pattern, except on boards that have no SuperSPARC modules.</p>
JumpStart automatic installation program	<p>When the system is started for the first time under Solaris 2.X, the JumpStart automatic installation feature will install the system (if the hardware is connected to network or to a CD-ROM drive containing a Solaris release CD-ROM.) If a server-specific configuration file is not also present on the disk drive, JumpStart may configure the server incorrectly (as a stand-alone workstation.)</p>	<p>Determine if the proper configuration information is on the disk by reading the card, <i>JumpStart Installation Instructions</i>, which is provided with the system documentation set.</p> <p>To prevent JumpStart installation at the initial powering up, disconnect the system from the network, and ensure that a Solaris release CD-ROM is <i>not</i> in the CD-ROM drive.</p> <p>If JumpStart automatic installation begins, interrupt it by pressing L1-A (or Stop-A).</p> <p>If JumpStart installs the wrong configuration, reinstall Solaris 2.X manually.</p>

2.2 Status Lights and Indicators

Figure 2-1 shows the locations of indicators on and inside the main cabinet.

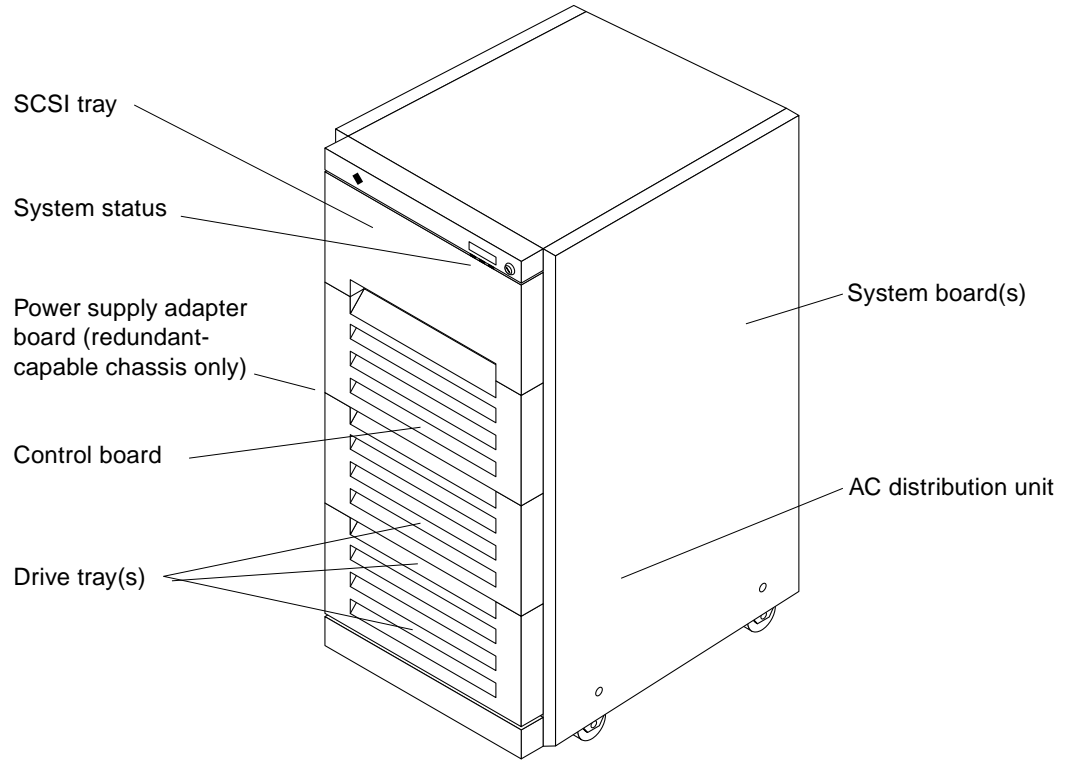


Figure 2-1 Indicator Lights in the SPARCcenter 2000 System Cabinet

To find LEDs and lamps in the system cabinet, refer to Table 2-2.

Table 2-2 Indicator Locations and Meanings

Location	Access	Description
Door	See system cabinet door	Left (green) LED should be ON to show DC power is correct. Middle (yellow) LED will be on while POST is running, and should turn OFF after POST has ended. Right (green) LED should be ON after POST has ended.
System board(s)	Look from rear of system cabinet	On each system board the top 2 LEDs (green), when lighted, indicate the presence of SuperSPARC module A and/or B. During OBP, the system master displays a cycling pattern of LEDs 0-7, and other system boards display a solid pattern of LEDs. After boot, all system boards (including the system master) should display cyclical patterns of status LEDs, with the exception of any system boards that do not have SuperSPARC modules. If none of the status LEDs are cycling at this time, the system is hung.
AC distribution unit	Look from rear of system cabinet	Main power indicator lamp
SCSI tray	Pull open the top front cover	LEDs on individual tape and SunCD drives
Drive tray(s)	Pull off one or more vented front panels	Group of 6 LEDs on front of each tray; system cabinet can have up to 3 trays
Control board	Pull off vented front panel and remove RFI screen	Four status LEDs (yellow) are on the left side of the board. A lighted status LED indicates a system problem. Four DC power indicator LEDs (green) are on the right side of the board. All four must be lighted.
Power supply adapter board	Pull off the top vented front panel and view the LEDs through the RFI screen	Left LED lit designates a failure of the bottom power supply in a redundant power supply-equipped cabinet. Right LED lit designates a failure of the top power supply.

Diagnostics and Commands for Troubleshooting



This chapter describes basic troubleshooting procedures.

2.1 Diagnosing Problems

2.1.1 LEDs

To determine if a system failure has occurred, look at the front panel LEDs. If the center (yellow) LED is lit, the system has one or more hardware failures.

System board LED patterns provide some information about board status. It is best to use a terminal and execute the `prtdiag` command. Alternatively, initiate Power-On Self-Test (POST) and OpenBoot PROM (OBP) programs.

To identify the system master, observe status LEDs (yellow, marked 0 through 7) on the system board rear (valid *only* while OBP is booting.) LEDs on the system board in slot 0 will flash in a repeated cyclical pattern. For other system boards, LEDs should present a solid pattern.

When boot is complete, LED patterns change: the status LEDs on *all* boards present a cyclical pattern, with several exceptions. Boards lacking SuperSPARC modules present a solid LED pattern. On failed boards, LEDs are off.



Caution – The system master is a standard system board. However, the following is recommended: Do **NOT** swap the system master with another board for purpose of troubleshooting. The system master is configured to fulfill minimum requirements, and if swapped with another board of lesser configuration, results may be misleading.

2.1.2 Console Messages

A system console (or tip line) is an alternative means for troubleshooting. The system console is connected to serial port “A” on the system board in slot 0 only; messages will not display if the console is connected any other system board. Refer to Section 2.1.1, “LEDs,” to determine the system master.

To install and setup a terminal, see Section 2.5, “Connecting a Terminal to the System Master.”

The `prtdiag` command displays information which is useful for most field repairs. See Section 2.2, “Using `prtdiag`.”

The `probe scsi` command displays the status of SCSI-2 devices installed in your system. See Section 2.3, “Using `probe scsi`.”

As system boot initializes, POST tests the general functionality of system boards and some supporting system hardware. POST presents several menus to help the user debug failures. For a complete explanation of menus, see the *SPARCcenter 2000 POST User’s Guide*. The menus provide detailed information that may prove more useful in the factory or service depot than in the field.

When POST ends, OBP continues the boot process by establishing communication among separate functional hardware elements in the system configuration. OBP displays messages on a terminal connected to the OBP system board. For information on OBP messages and commands, see the *OpenBoot Command Reference*.



Caution – Pauses may occur during boot which can be easily misinterpreted as a locked-up system. If the terminal remains blank during POST, or appears to lock up during OBP, see Section 2.4, “Precautions when Using POST and OBP.”

2.2 Using prtdiag

The `prtdiag` command is the preferred tool for locating replaceable units in the card cage.

Note – `prtdiag` is a UNIX command. It can only be accessed if the OS is booted and running on the machine in question. `prtdiag` resides in `/usr/kvm`.

Below is an example of the command and its output. Actual output will differ.

Code Example 2-1 The `prtdiag` Command

```
# ./prtdiag
System Configuration: Sun Microsystems sun4d SPARCcenter 2000
System clock frequency: nn MHz
Memory size: 448Mb
Number of XDBuses: 2
===== CPU Units [MHz] ===== Memory Groups [MB] =====
      A      B      grp0      grp1      grp2      grp3
      --      --      ----      ----      ----      ----
Board1: nn      nn          32      32      32      32
Board4: nn      nn          32      32      32      32
Board7: nn      nn          32      32      32      32
Board8:          32      32      32      32
=====SBus Cards=====
Board1:          0: dma/esp(scsi)      `SUNW,500-1902'
                lebuffer/le(network) `SUNW,500-1902'
                1: dma/esp(scsi)      `SUNW,500-1902'
                lebuffer/le(network) `SUNW,500-1902'
                2: cgsix                `SUNW,501-1672'
                3: dma/esp(scsi)      `500-1869-01'
                lebuffer/le(network) `500-1869-01'
Board4:          0: <empty>
                1: dma/esp(scsi)      `500-1902-01'
                lebuffer/le(network) `500-1902-01'
                2: bf                    `SUNW,501-1732'
                3: bf                    `SUNW,501-1732'
Board7:          0: <empty>
                1: <empty>
                2: <empty>
                3: <empty>
Board8:          0: <empty>
                1: <empty>
```

Code Example 2-1 The prtdiag Command (Continued)

```

                2: <empty>
                3: <empty>

Failed Field Replaceable Units (FRU) in System:
=====
SBus Card unavailable on System Board #7
Failed Field Replaceable Unit is SBus card 0

cpu-unit unavailable on System Board #8
Failed Field Replaceable Unit is SuperSPARC Module A

#

```

As shown above, `prtdiag` displays the status of system boards and replaceable system board components:

- System boards, by location
- SuperSPARC modules, by number, location, and type (identified as operating speed)
- SIMMs, by quantity and locations (identified by group)
- SBus cards, by location and type

2.3 Using `probe scsi`

Use this command to verify operation for a new or replacement SCSI-2 device installed in the system.

1. **Become superuser.**
2. **Use the appropriate command to halt the system.**
Once the system is halted, several system messages display. When messages finish, condition a or b below exists; respond as appropriate:
 - a. **The “ok” prompt displays; proceed to step 3.**
 - b. **The screen below displays**

```

Type b (boot), c (continue), or n (new command mode)
>

```

Type the following:


```
> n <return>
```

This yields the “ok” prompt.

3. Enter the appropriate command to probe the system for SCSI-2 devices.

a. To probe all SCSI-2 devices installed in the system:

```
probe-scsi-all <return>
```

4. To limit the probing to SCSI devices that are attached to a specific SBus card on a specific board, substitute for the variables *A* and *B* in the command below, where *A* is the board number (0-9) and *B* is the SBus slot number (0-3):

```
probe-scsi-all /io-unit@f,eA200000/sbi@0,0/dma@B,81000 <return>
```

5. Verify the drive in question is listed.

After entering the command above, a list of drives like the one below displays:

```
Target 0
    Unit 0 Disk < drive brand name>
Target 3
    Unit 0 Disk < drive brand name>
Target 5
    Unit 0 Tape < drive brand name>
Target 6
    Unit 0 Removable Read Only Device
```

The “Target #” lines identify the SCSI-2 addresses of installed devices. If the address is listed for the device in question, installation was successful. If the address is absent, verify the cables are installed correctly.

6. Reboot the system using the command below:

```
reset <return>
```

The screen goes blank for several seconds as the system reboots.

2.4 Precautions when Using POST and OBP

A system may appear to be hung or not communicating if the terminal is not connected to the system master board.

2.4.1 System Boards with PROM Revision 2.13 (or Higher)

PROM revision 2.13 uses auto-master scheme instead of master-nvram scheme to select the system master board, and then nvram information is automatically propagated to all boards.

If there is no system hardware error, OBP will select the POST master board (or the lowest board that has a functional CPU) as the system master board.

The auto-master scheme ignores the status of nvram master or slave.

If any system hardware error occurs after power on, then OBP will use the master-nvram scheme to select a system master.

To identify the system master while the system is booting, look for the one board back panel with flashing diagnostic LEDs. Figure 2-1 shows these LEDs and the CPU LEDs. Diagnostic LEDs on all other system boards will be *OFF*. After boot completes, the LED displays change:

- all system boards with modules display the same cycling LED pattern
- LEDs on system boards without SPARC modules are *ON* in a solid pattern

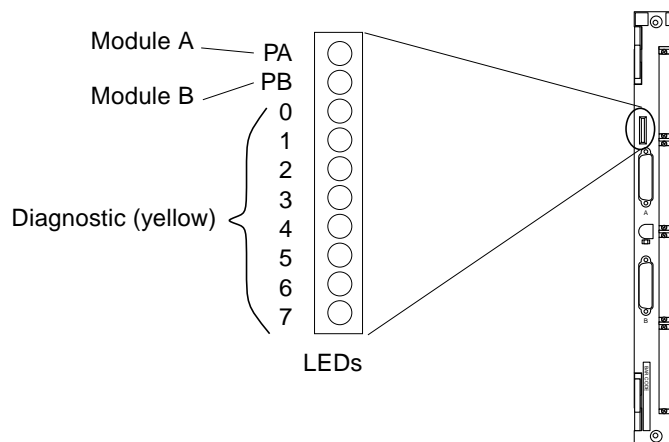


Figure 2-1 LEDs on System Board

In multiple-board configurations, when the system is powered on for the first time, OBP may prompt you to select a system board to become the new master. This prompt will appear *only if*:

- The system does not recognize any board as the system master.
- More than one board is recognized as being qualified to function as the system master.



Caution – To see the OBP message prompt, the system master board must be connected to a terminal. If the terminal is connected to the *wrong* board, the message will not appear. The system may seem to be locked up, but OBP is only pausing, waiting for you to respond to the prompt.

The following example for a three board system shows the prompt and the recommended responses (0 and y).

```
ttya initialized
Need to select system master from the following boards:
Board#0 -- nvram slave, Prom Version 2.11
Board#1 -- nvram slave, Prom Version 2.11
Board#2 -- nvram slave, Prom Version 2.11
```

```
Please enter the desired board#: 0
Are you sure? <y/n>: y
Resetting ...
```

If you enter an illegal board number, or select a board that has no SPARC modules, OBP will prompt you for another selection.

You may also force one particular board to be the master by removing all system boards from the card cage except the one in slot 0. This action forces OBP to select the board in slot 0 board as the new master

Note – The system board in slot 0 must have at least one SPARC module.

The installer (or system administrator or service provider at a later time) can change the selection of the system master, but to maintain consistency between systems, the default selection should not be overridden.

To run POST and OBP, See Section 2.6, “Running OBP and POST.”

2.5 Connecting a Terminal to the System Master

1. Connect a terminal to serial port A on the system master.

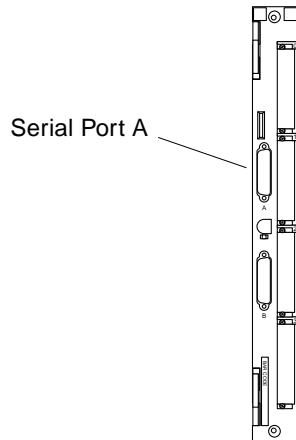


Figure 2-2 TTY Serial Port

2. Set up the terminal.
 - These settings are commonly used:

- 9600 bps
- 8 data bits
- 1 stop bit
- Even parity
- Full duplex



Caution – The setup parameters may differ from the example shown. Refer to the *OpenBoot Command Reference* for `set-defaults` and `printenv` commands.

2.6 Running OBP and POST

1. Turn the front panel key switch to I (the On position).
2. Press the reset switch on the back of the hinged door.
See Figure 2-3.
3. Start the diagnostic menu from the OpenBoot PROM (OBP) mode, as follows. (OBP is identified by an `ok` prompt.)
 - If the system is in OBP, enter the following in sequence:

```
reset at the keyboard
v key
s key
```
 - If the system is in an unknown state, press the following in sequence:

```
system Reset switch (See Figure 2-3)
v key
s key
```

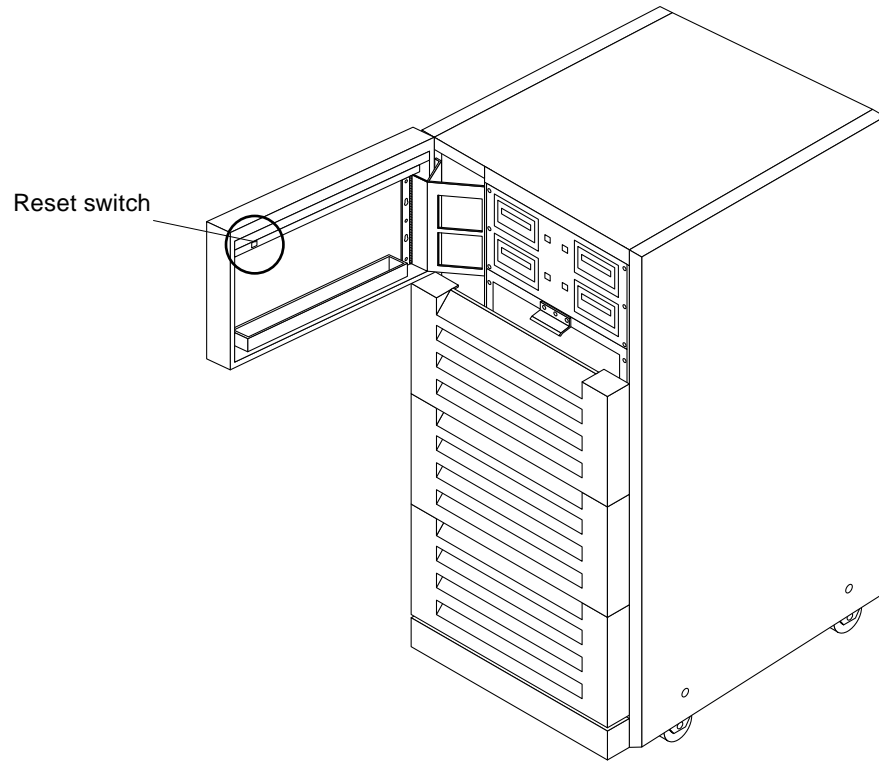


Figure 2-3 System Reset Switch

The terminal display will be approximately as shown below.

```

<#2> ok reset
Resetting...
1A>
  *** Toggle Verbose Flag = 1 ***

1A>
  *** Toggle Stop POST Flag = 1 ***

1A>
DEMON
1A>Select one of the following functions
1A>  '0'      System Parameters
1A>  '1'      Read/Write device
1A>  '2'      Software Reset
  
```

```
1A>  '3'      NVRAM Management
1A>  '4'      Error Reporting
1A>  '5'      Analyze Error Logs
1A>  '6'      Power Off at Main Breaker
1A>  '7'      NVRAM SIMM tests
1A>  'r'      Return to selftest
1A>

Command ==>
```

4. Type 0 to enter the System Parameters submenu.

```
Command ==> 0
1A>
System Parameters
1A>Select one of the following functions
1A>  '0'      Set POST Level
1A>  '1'      Dump Device Table
1A>  '2'      Display System
1A>  '3'      Dump Board Registers
1A>  '4'      Dump Component IDs
1A>  '5'      Clear Error Logs
1A>  '6'      Display Simms
1A>  '7'      Scrub Main Memory
1A>  'r'      Return
```

5. Type 2 to display the system status.

(The following display is only an example. The display will vary depending on the options actually used in the system.)

```

Command ==> 2
1A> WARNING Board 8 has failed POST
1A> Configuration = C2
1A> (0=failed,1=passed,blank=untested/unavailable)
    (sbus 1=card present,0=card not present,x=failed)
1A>-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1A>Slot|cpuA|bw0|bw1|cpuB|bw0|bw1|bb|ioc0|ioc1|sbi|mqh0|mqh1|mem|sbus|xd1|xd0|
1A>-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1A> 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 64|1111| 1 | 1 |
1A> 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 128|1110| 1 | 1 |
1A> 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 128|000x| 1 | 1 |
1A> 8 | 0 |  |  |  |  |  |  | 0 | 1 | 1 | 1 | 1 | 1 | 128|0000| 1 | 1 |
1A>-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1A>
1A>Memory Group Status
    (0=failed,1=passed,m=simm missing,c=simm mismatch,blank=unpopulated/unused)
1A>-----+-----+-----+-----+
1A>Slot|xd0_g0|xd0_g1|xd1_g0|xd1_g1|
1A>-----+-----+-----+-----+
1A> 1 | 1 |  |  | 1 |  |  |
1A> 4 | 1 |  | 1 | 1 |  | 1 |
1A> 7 | 1 |  | 1 | 1 |  | 1 |
1A> 8 | 1 |  | 1 | 1 |  | 1 |
1A>-----+-----+-----+-----+
1A>Hit any key to continue :

```

As noted at the top of the example, a 0 in the sbus section means an SBus slot is empty. A 0 in any other test category indicates that the test failed.

Note – Before replacing a system board, attach the terminal to that board and run POST for more details about the failure. In the example shown above, you should connect the terminal to the board in slot 8 and press the system reset button to run POST.

Table 2-1 describes the fields in the system status display in more detail.

Table 2-1 Terms Used in the System Status Display

Term	Meaning	Comment
Slot	card cage slot number	
cpuA, cpuB	SuperSPARC module slot A or B	0 = module failed 1 = module passed blank = not present
bw0, bw1	SuperSPARC module detected on system bus	0 = SuperSPARC module is not present on bus 1 = SuperSPARC module is present
bb	boot bus communication	if fail, attach terminal to that board and run POST
ioc0, ioc11	SBus to system bus communication	if fail, replace system board
sbi	SBus to system bus communication	if fail, replace system board
mqh0, mqh1	SIMM to system bus interface	if fail, replace system board
mem	total memory on system board	# = size of memory, in megabytes
sbus	SBus card in slot 3, 2, 1, or 0	0 = card not present 1 = card present
xd0, xd1		if fail, replace system board

6. To test for memory failure, return to the main menu by typing `r`, then type `3` to enter the NVRAM Management submenu.

```

Command ==> r
0A>
DEMON
0A>Select one of the following functions
0A> '0' System Parameters
0A> '1' Read/Write device
0A> '2' Software Reset
0A> '3' NVRAM Management
0A> '4' Error Reporting
0A> '5' NVRAM SIMM tests
0A> 'r' Return to selftest

Command ==> 3
0A>
Bootbus NVRAM Management
0A>Select one of the following functions

```

```
0A> '0' Print Bad Group List
0A> '1' Clear Bad Group List
0A> '2' Print Bad Page List
0A> '3' Clear Bad Page List
0A> 'r' Return to Main menu
0A>

Command ==>
```

7. Type 0 to list bad groups of memory.

```
Command ==> 0
0A>Bad Memory Groups on System

0A>No Bad groups found
0A>Hit any key to continue :
0A>
0A>
Bootbus NVRAM Management
0A>Select one of the following functions
0A> '0' Print Bad Group List
0A> '1' Clear Bad Group List
0A> '2' Print Bad Page List
0A> '3' Clear Bad Page List
0A> 'r' Return to Main menu
0A>

Command ==>
```

8. Type 2 to list any bad pages of memory.

```
Command ==> 2
0A>Bad Memory Pages in System

0A>No Bad pages found
0A>Hit any key to continue :
0A>
0A>
Bootbus NVRAM Management
0A>Select one of the following functions
0A> '0' Print Bad Group List
0A> '1' Clear Bad Group List
0A> '2' Print Bad Page List
0A> '3' Clear Bad Page List
```

```
0A> `r' Return to Main menu
0A>

Command ==>
```

- 9. To exit the menu, press `r` to return to the main menu, then press `r` again to return to the self test.**

2.7 Verifying Connection to Drives

Use this procedure to verify that a new or replacement drive is installed correctly.

- 1. Become superuser.**
- 2. Use the appropriate command to halt or shut down the system.**
Once you have halted your system, you will see several system messages.
 - If you see the “ok” prompt at the end of the system messages, go to Step 3.
 - If you see the following screen at the end of the system messages:

```
Type b (boot), c (continue), or n (new command mode)
>
```

type “n” at the “>” prompt and press <return>:

```
> n <return>
```

This will bring you to the “ok” prompt.

- 3. Enter one of the following commands to probe your system for SCSI devices.**
 - To probe all SCSI devices in the entire system:

```
probe-scsi-all <return>
```

- To limit the probing to SCSI devices that are attached to a specific SBus card on a specific board, substitute for the variables *A* and *B* in the command below, where *A* is the board number (0-9) and *B* is the SBus slot number (0-3):

```
probe-scsi-all /io-unit@f,eA200000/sbi@0,0/dma@B,81000 <return>
```

4. Verify that the drive you have installed is listed.

After entering one of the commands shown above, you should see a list of drives similar to the following:

```
Target 0
  Unit 0 Disk <drive brand name>
Target 3
  Unit 0 Disk <drive brand name>
Target 4
  Unit 0 Tape <drive brand name>
Target 6
  Unit 0 Removable Read Only device
```

The “Target #” lines will tell you the SCSI addresses of the devices you have connected to your system.

If you see the SCSI address listed for the drive you just installed, then the installation was successful. If you do not see the SCSI address for the new drive, verify that the cables are installed correctly.

5. Enter the following command to reboot your system:

```
reset <return>
```

Your screen will go blank for several seconds after you enter this command. Then the system will reboot.

2.8 Interpreting System Board LEDs

If there is no terminal, inspect the front panel LEDs to see if POST found a problem.

Note – The middle (yellow) LED on the door should light while POST is running, then turn off when POST ends. In normal operation, both green LEDs should be on, and the middle LED should be off.

If the front panel LEDs indicate a problem, look at the status LEDs on the backs of the system boards to determine which has the problem.

2.8.1 While POST Is Running

When the key switch is in the I (On) position (or in the Secure position), POST should finish in one minute or less. Do not use the diagnostic position; extended diagnostics take much longer and display detail usually not useful to the field engineer.

Note – Severe hardware problems can cause POST to retry a test and the LED codes on a board may be reset. (This situation is called a *watchdog reset*.) The preferred method of using POST is with a terminal.

2.8.2 After POST Ends

After the system has booted, the left and right (green) front panel LEDs should be lit, and the middle (yellow) LED should be off.

On system boards with SuperSPARC modules, one or two green LEDs, (PA and PB) should be lit; all yellow LEDs should cycle in a repeating pattern.

On system boards lacking SuperSPARC modules, both green LEDs should be off, and the yellow LEDs should be lit in a solid pattern.

Note – A system board can be installed without SuperSPARC modules to provide additional SBus slots or serve as a memory expansion board.

On any system board, if the eight yellow LEDs are off, the board is not functioning. However, if *all* system boards show errors, a faulty common unit is indicated. Candidates may be the control board, backplane, or power supply.

2.9 *Enabling and Disabling the Link Integrity Test*

If the network hub does not use the 10BaseT Link Integrity Test, the system may report “no carrier” and be unable to transmit. If this occurs, disable the link integrity test (the default state for Sun equipment). This test can be disabled or enabled on some SBus cards using a jumper. However, for consistency in maintenance, disable the test using software commands below.

For a single network, disable the command. At the ok prompt enter the following:

```
ok false set-tpe-test
```

For a system connected to two or more networks, program the system NVRAM using statements of the type below:

```
ok false “ <Ethernet-node1-pathname>” “ set-tpe-test” execute-device-method drop  
ok false “ <Ethernet-node2-pathname>” “ set-tpe-test” execute-device-method drop  
ok false “ <Ethernet-node3-pathname>” “ set-tpe-test” execute-device-method drop  
(Repeat for additional nodes.)
```

If it becomes necessary to re-enable testing at the server, use the following command.

```
ok true set-tpe-test
```

For more information, refer to the *OpenBoot Command Reference*.

2.10 SuperSPARC Modules

When adding or moving SuperSPARC modules, fill all A slots in the system before filling B slots. See Section 11.3, “SuperSPARC Modules” for module location and replacement procedure.

2.11 SIMMs and NVSIMMs

POST will identify failed SIMMs or NVSIMMs. See Section 11.5, “SIMM and NVSIMM” for location and replacement procedure.

Refer to Section E.3.3, “SIMMs” to determine

- the correct system board on which to install SIMMs
- the correct group and socket locations
- correct SIMM identification

2.12 Fuses

There are fuses in the AC distribution unit and on the card cage backplane. See Figure 2-4.

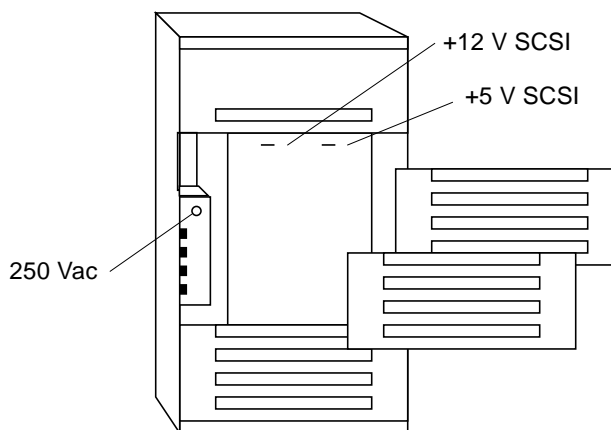


Figure 2-4 Fuses in the SPARCcenter 2000 System Cabinet

Troubleshooting Flow Diagrams



This chapter presents strategies for locating faulty hardware quickly.

Use this table to find a starting point in this chapter.

Problem Area	Flow Diagram	Reference
Physical system	A	Figure 3-2
Faulty SuperSPARC module	A.1	Figure 3-3
Power-On Self-Tests (POST)	B, B.1	Figure 3-4 and Figure 3-4
Faulty CPU motherboard	A.1, B.1	Figure 3-2 and Figure 3-4
Faulty SIMMs	B.2	Figure 3-6
Faulty SBus cards	B.3	Figure 3-7
System does not boot	C, D	Figure 3-8 and Figure 3-9
System configuration	C, D	Figure 3-8 and Figure 3-9
Wrong boot path	D.1	Figure 3-9
Network configuration	E	Figure 3-10
Client boot status	E.1, E.2, E.3	Figure 3-11
Ethernet error messages	E.4	Figure 3-12

3.1 Flow Diagrams

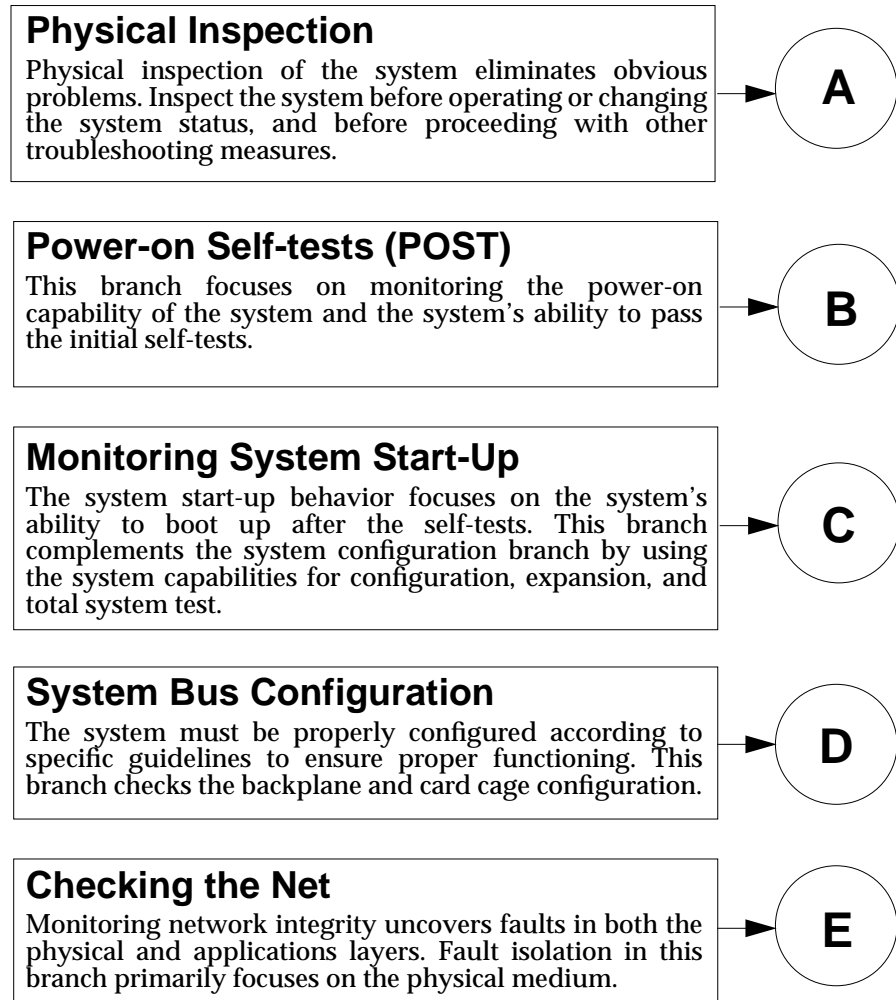


Figure 3-1 Troubleshooting Flow Diagram Overview

Physical Inspection

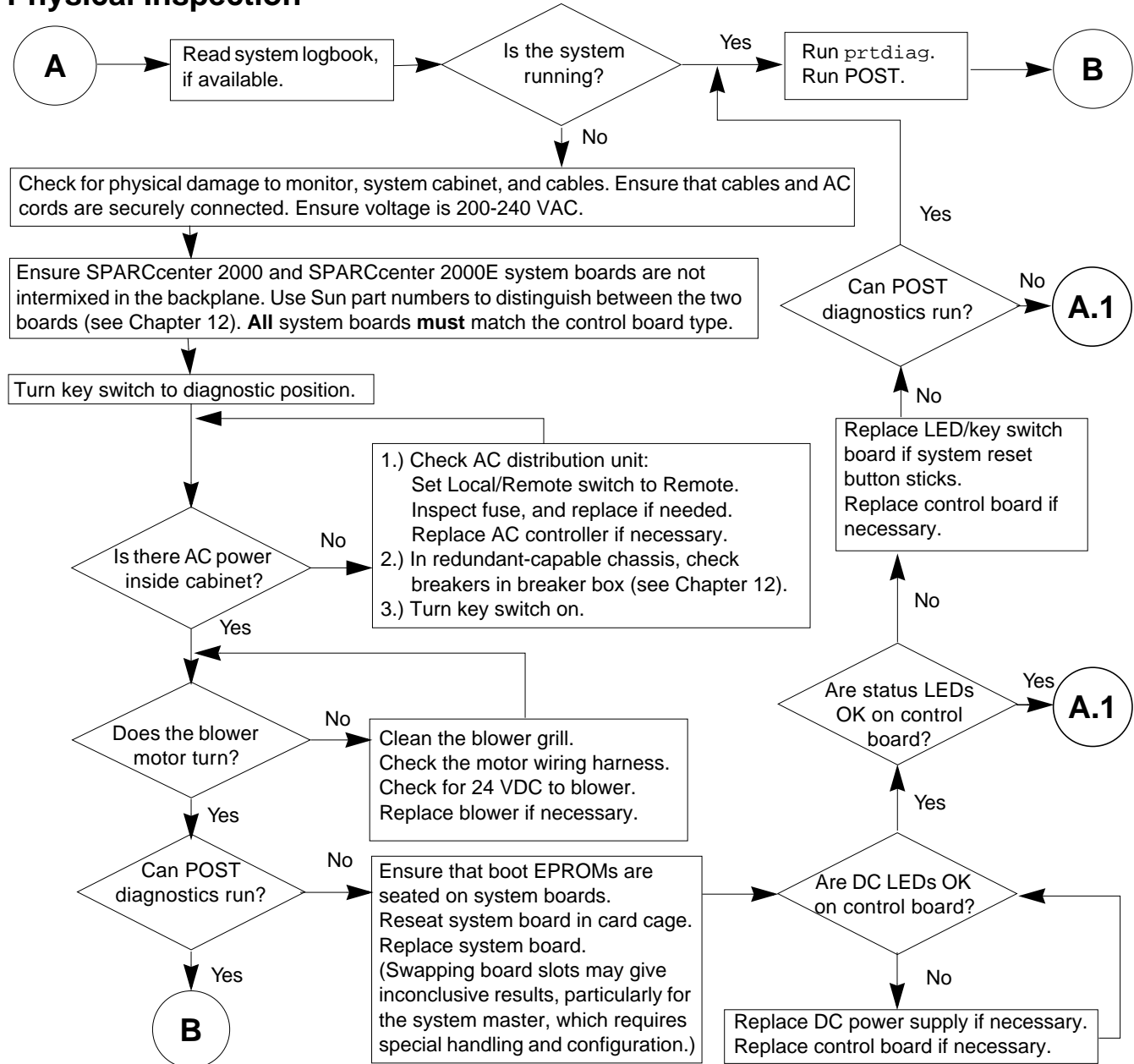


Figure 3-2 Branch A: Physical Inspection

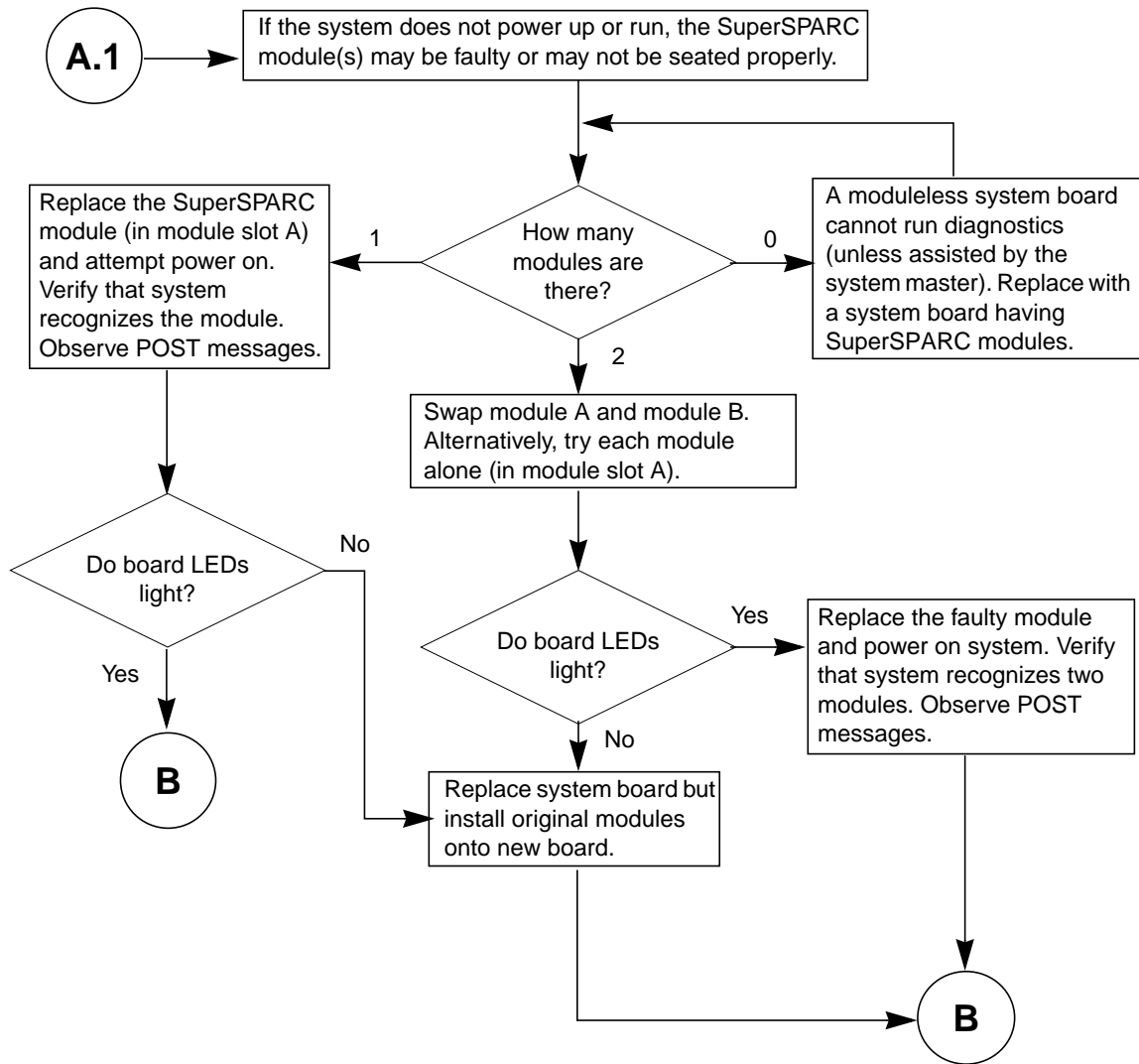


Figure 3-3 Branch A.1: Checking the SuperSPARC Modules

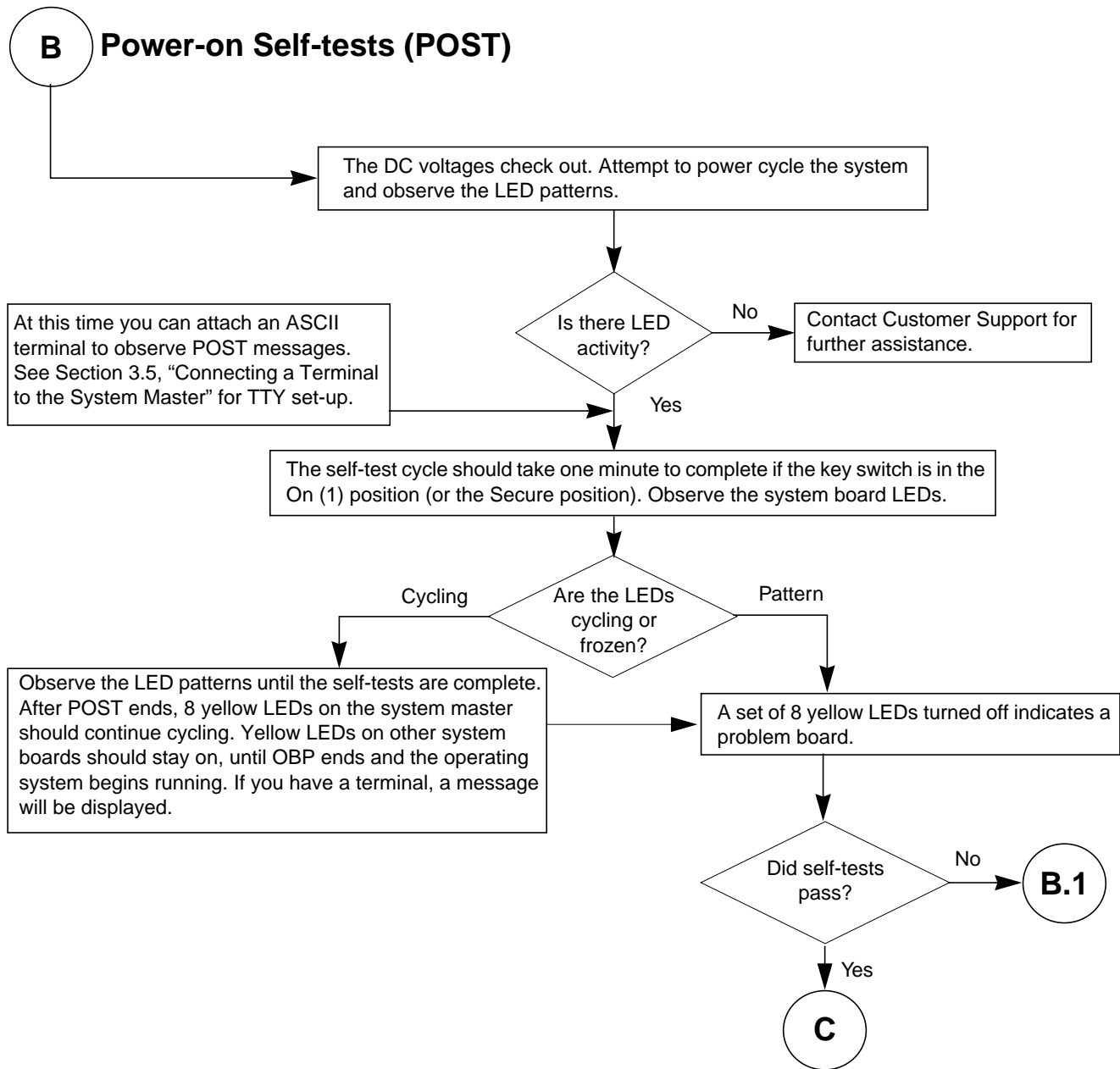


Figure 3-4 Branch B: Power-on Self-test (POST) Functions

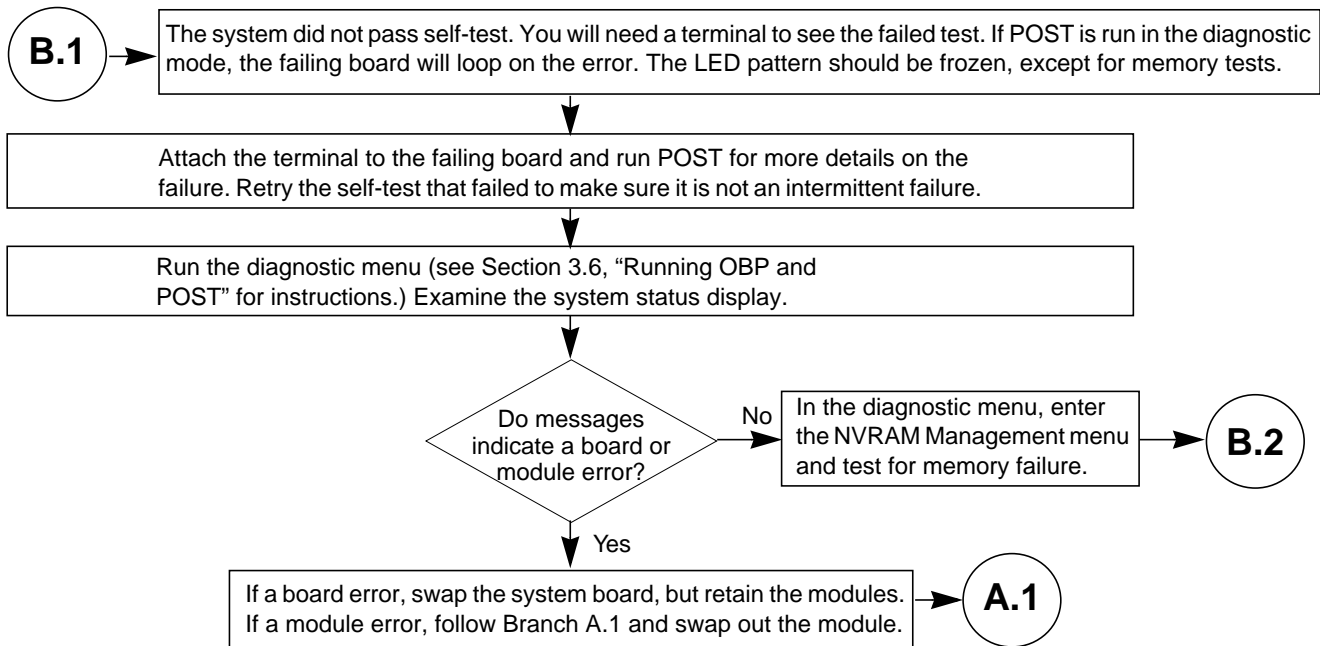


Figure 3-5 Branch B.1: Does Not Pass Self-tests

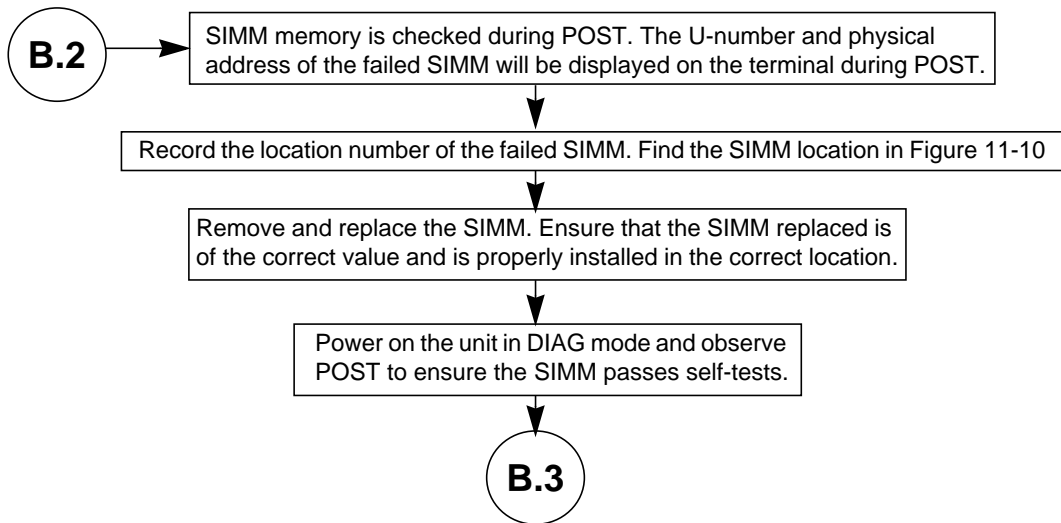


Figure 3-6 Branch B.2: SIMM Memory Faults

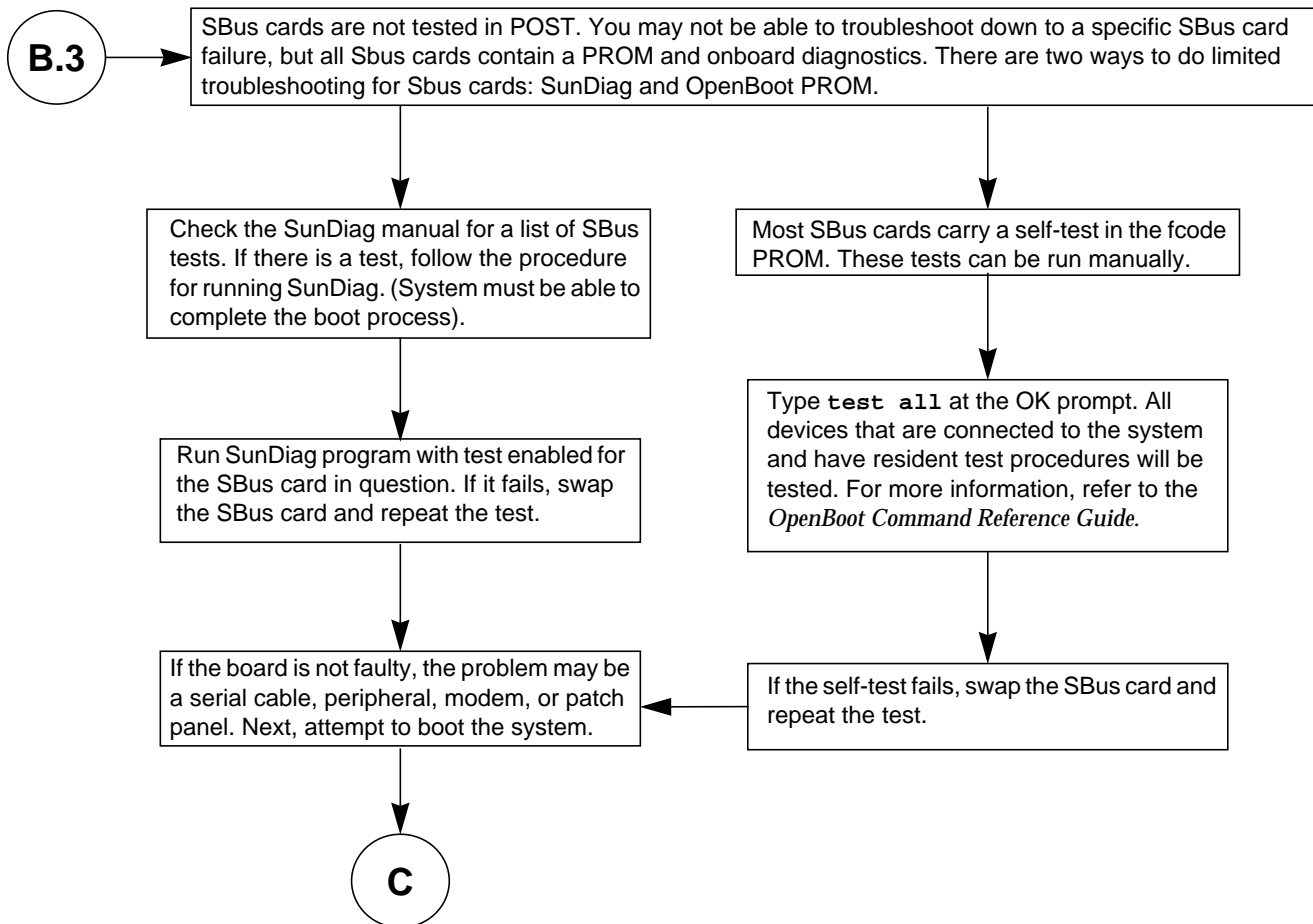


Figure 3-7 Branch B.3: SBus Card Faults

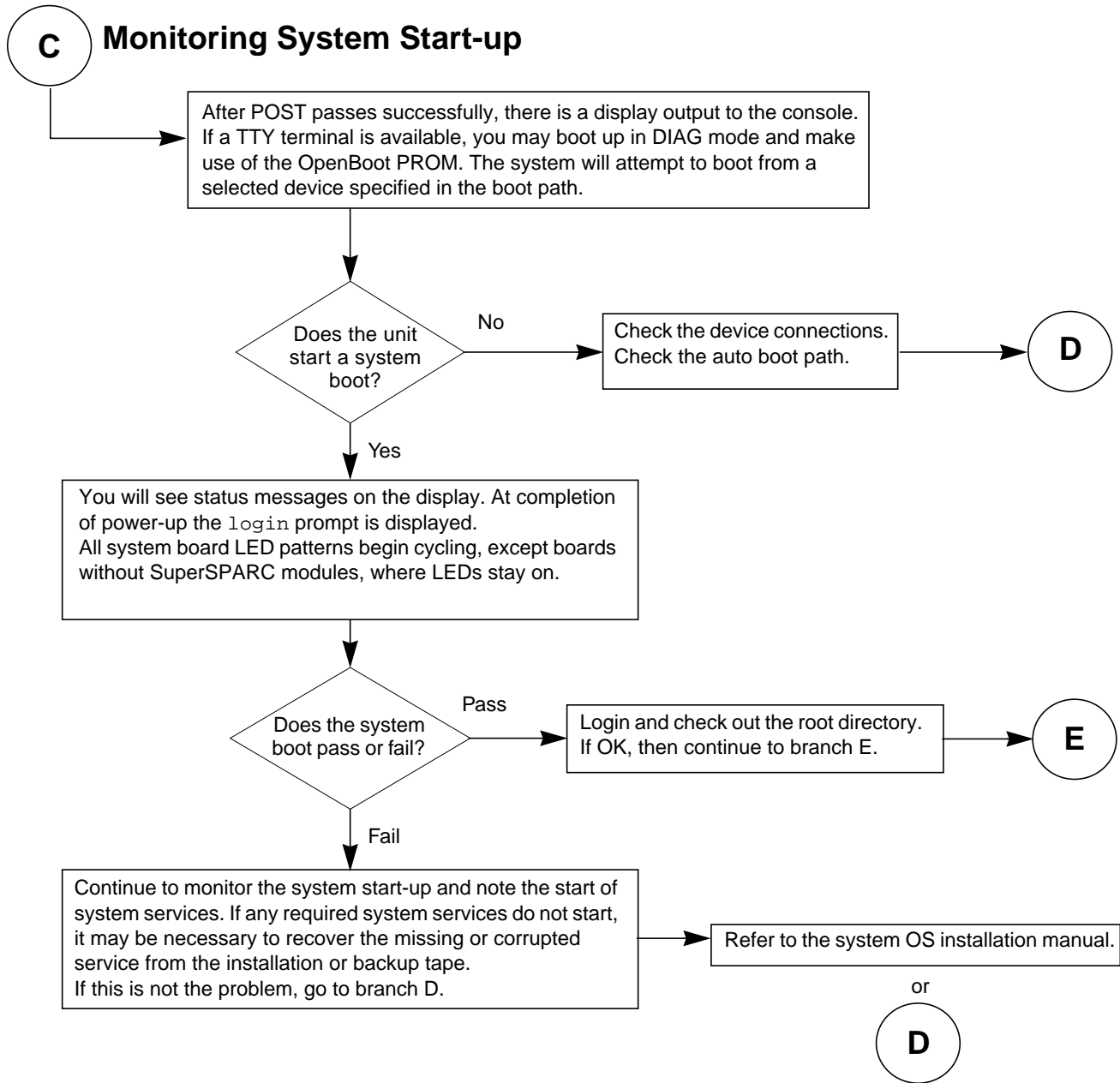


Figure 3-8 Branch C: Monitoring the System Boot-up

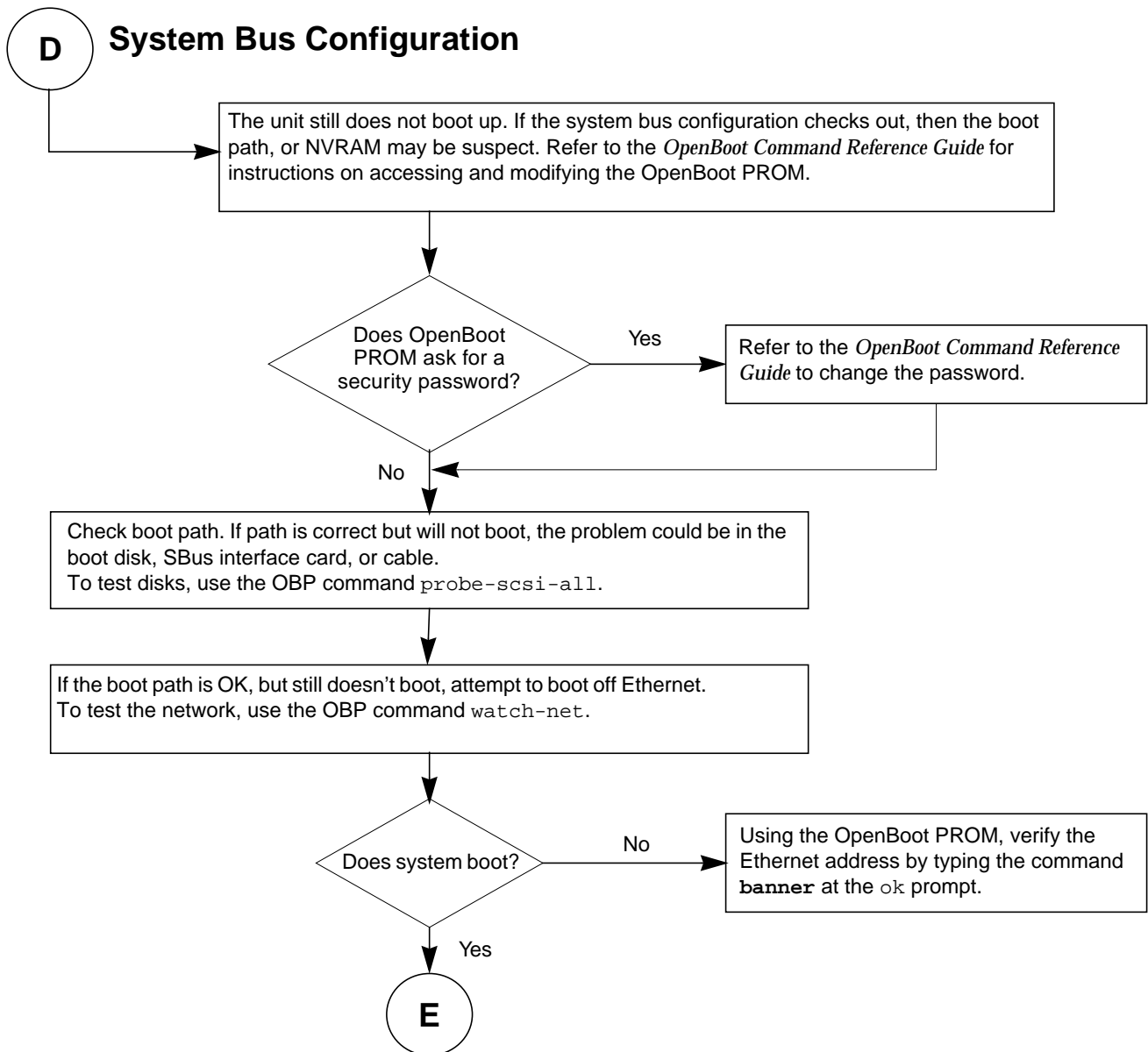


Figure 3-9 Branch D.1: Checking Boot Path and NVRAM

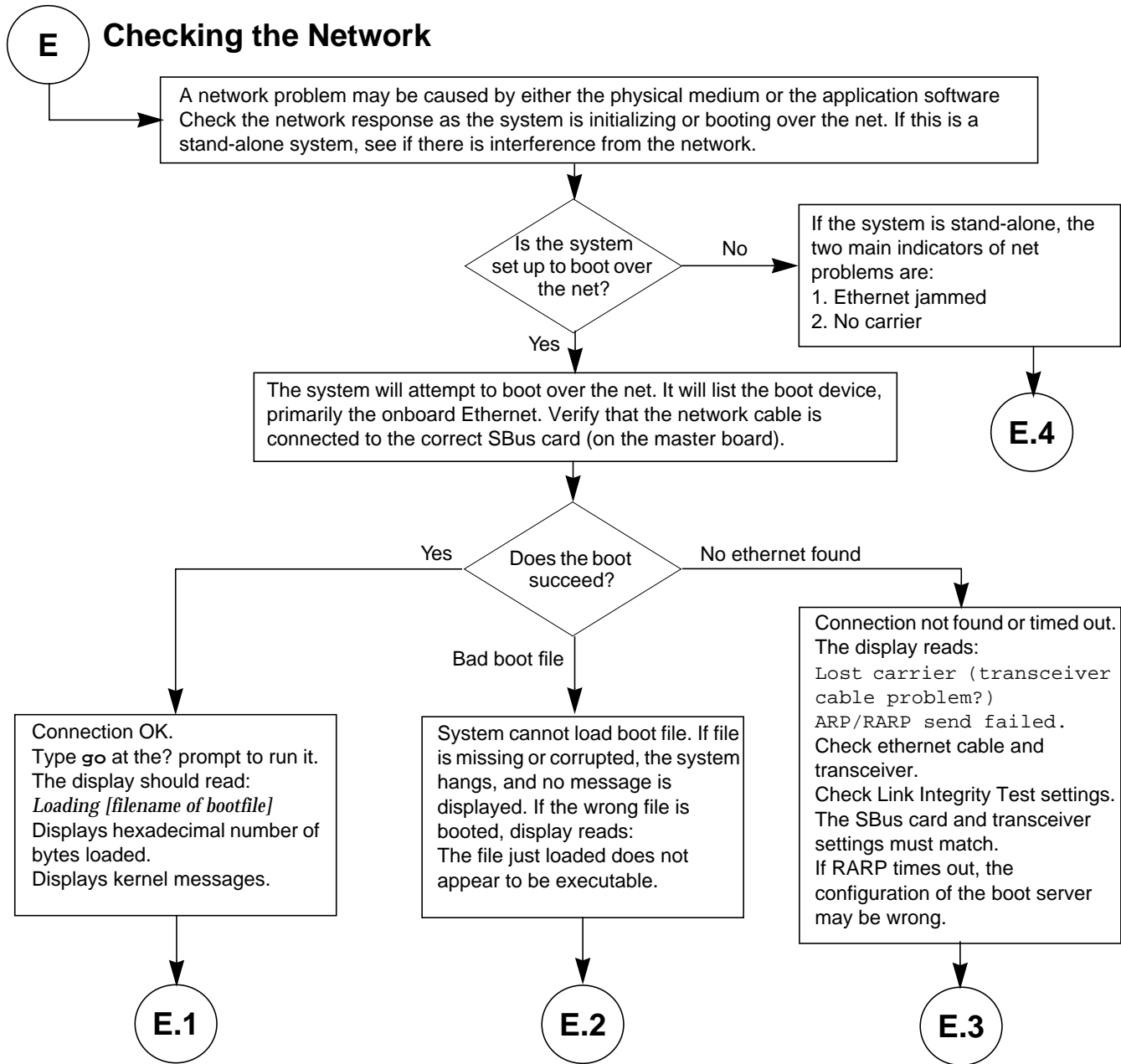


Figure 3-10 Branch E: Checking the Net

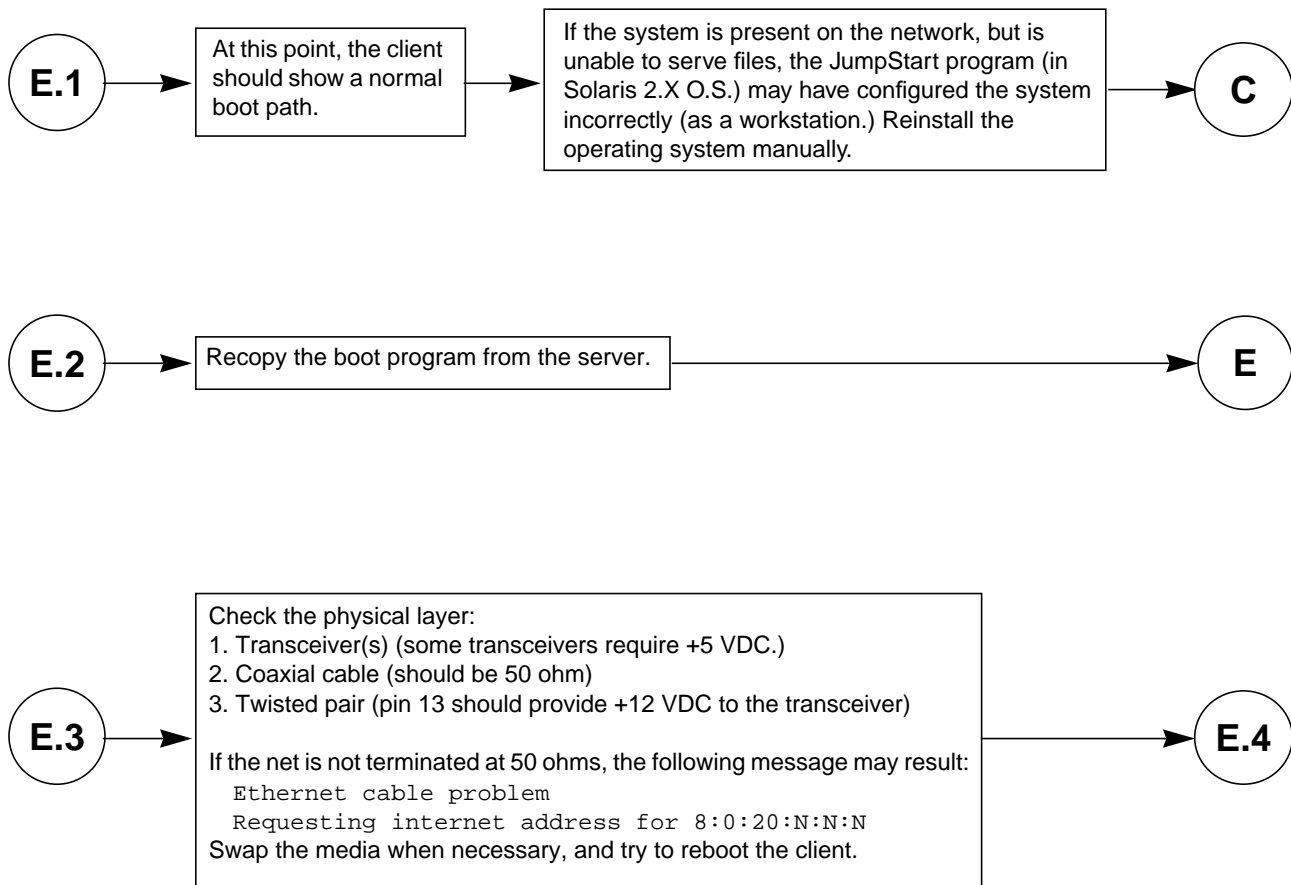


Figure 3-11 Branches E.1, E.2, and E.3: Client Boot Status

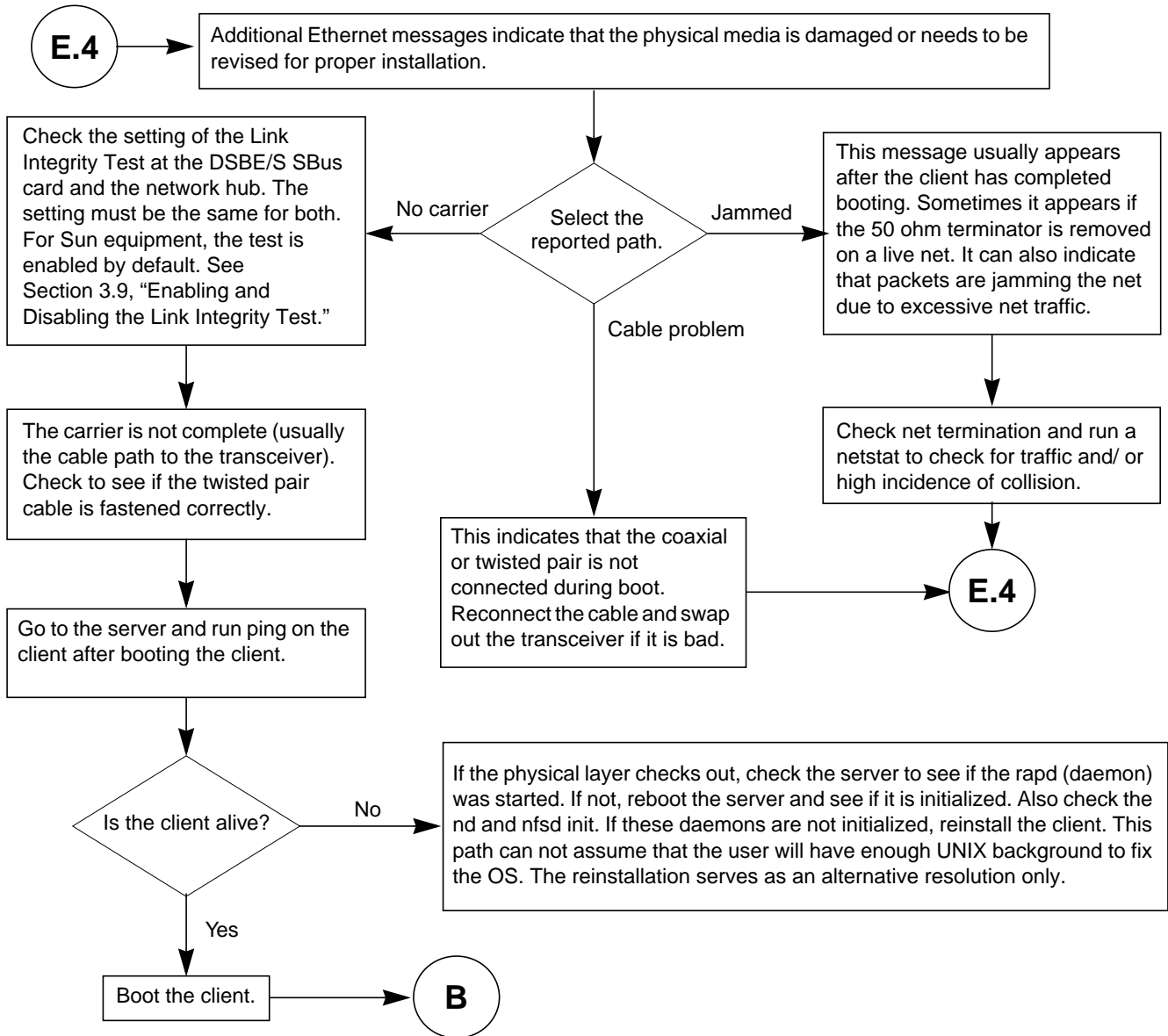


Figure 3-12 Branch E.4: Additional Ethernet Messages

Part 3— Preparing for Service

Safety and Tools Requirements	page 5-1
<i>Safety Precautions</i>	<i>page 5-1</i>
<i>Symbols</i>	<i>page 5-2</i>
<i>System Precautions</i>	<i>page 5-3</i>
<i>Tools Required</i>	<i>page 5-4</i>
Powering Off and On	page 6-1
<i>Powering Off the System</i>	<i>page 6-1</i>
<i>External Cables</i>	<i>page 6-3</i>
<i>Restarting the System</i>	<i>page 6-5</i>
<i>Reading Boot Messages</i>	<i>page 6-8</i>

Safety and Tools Requirements



5.1 Safety Precautions

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

- Follow all cautions, warnings, and instructions marked on the equipment.
- Ensure that the voltage and frequency rating of the power outlet you use matches the electrical rating label on the equipment and video monitor.
- Use properly grounded power outlets only.
- Never push objects of any kind through openings in the equipment as they may touch dangerous voltage points or short out components that could result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

To protect both yourself and the equipment, observe the following precautions:

Table 5-1 Safety Precautions

Item	Problem	Precaution
Springfingers	Personal injury	The springfingers have sharp edges. Use care when handling springfinger-equipped cabinet screens and system boards.
	RFI leakage	Keep springfinger-equipped screens and panels in place when the system is running. These assemblies suppress radio frequency interference (RFI) and are required by law in many localities.
	Damaged springfingers	Look for any broken or twisted springfingers and replace any damaged screen or board with a new assembly.
AC power cord	Electric shock	Unplug the AC cord from the AC wall socket before working inside the system. chassis
Wrist strap or Foot strap	ESD	Wear a conductive wrist strap or foot strap when handling printed circuit boards.
ESD mat	ESD	An approved ESD mat provides protection from static damage when used with a wrist strap or foot strap. The mat also cushions and protects small parts that are attached to printed circuit boards.
Cover panels	System damage and overheating	Attach all cabinet cover panels after performing any service work on the system.
Filler panels	System damage and overheating	Install card cage filler panels in all unused card cage slots. Open slots severely reduce the cooling capability of the system.
SBus slot covers	System damage and overheating	Install SBus slot covers in all unused system board SBus slots. Openings on the backs of system boards reduce the cooling capability of the system.

5.2 Symbols

The following symbols mean:











WARNING

Risk of electrical shock. To reduce the risk, follow the instructions.



WARNING

Risk of personal injury. To reduce the risk, follow the instructions.

	CAUTION	Risk of equipment damage. To reduce the risk, follow the instructions.
	AC	A terminal to which alternating current or voltage may be applied.
	ON	The principal and stand-by switches are in the ON position.
	OFF	The principal switch is in the OFF position.
	STAND-BY	The stand-by switch is in the STAND-BY position.
	PROTECTIVE EARTH	Protective earth conductor.
	CHASSIS	Frame or chassis terminal.
	FUSE REPLACEMENT MARKING	For continued protection against risk of fire and electric shock, replace ONLY with same type and rating of fuse.

5.3 System Precautions

Ensure that the voltage and frequency of the power outlet to be used matches the electrical rating labels on the cabinet.

Wear antistatic wrist straps when handling any magnetic storage devices or system boards.

Only use properly grounded power outlets as described in the *Site Preparation Guide*.



Caution – DO NOT make mechanical or electrical modifications to the cabinet. Sun Microsystems is not responsible for regulatory compliance of modified cabinets.



Caution – Power off the cabinet and all equipment connected to it before performing any of the procedures described in this book. The system chassis power must be turned off, and the AC power cord must remain plugged in to ensure a proper ground.



Warning – This equipment contains lethal voltages. Accidental contact can result in serious injury or death.



Caution – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resulting damage to the equipment.

Persons who remove any of the outer panels to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

All procedures contained in this document must be performed by qualified service-trained maintenance providers.



Caution – Before you begin, carefully read each of the procedures in this manual. If you have not performed similar operations on comparable equipment, *do not attempt* to perform these procedures.

5.4 Tools Required

The following list represents the minimum of tools and test equipment required to service the system cabinet:

- Screwdriver, slotted, 3/16 inch
- Screwdriver, Phillips #2
- Screwdriver, Phillips #1

-
- Hex driver, M-4
 - Hex driver, 3/16 inch
 - Hex driver, 9 mm
 - Wrench, 13 mm
 - DIP/IC extraction tool
 - ESD mat, Sun P/N 250-1088, or equivalent
 - Grounding wrist strap
 - Needlenose pliers


Powering Off and On

This chapter contains information necessary to prepare the system for servicing. Included are system power off and on, and external cable removal procedures.

6.1 Powering Off the System

Before turning off the system power, you must halt the operating system or loss of data may occur.

To shut down the system and give users a shutdown warning:

1. **Notify users that the system is going down.**
2. **Back up the system files and data to tape, if necessary.**
3. **Halt the system using the appropriate commands.**
4. **Wait for the system-halted message and the boot monitor prompt.**
5. **Turn the front panel key switch to  (the standby position).**
See Figure 6-1.
6. **Turn the AC distribution unit power switch to Off.**
The unit is at the rear of the cabinet. See Figure 6-2.



Caution – Turn off the power at the AC distribution unit power switch on the rear of the system before attempting to service the system cabinet.

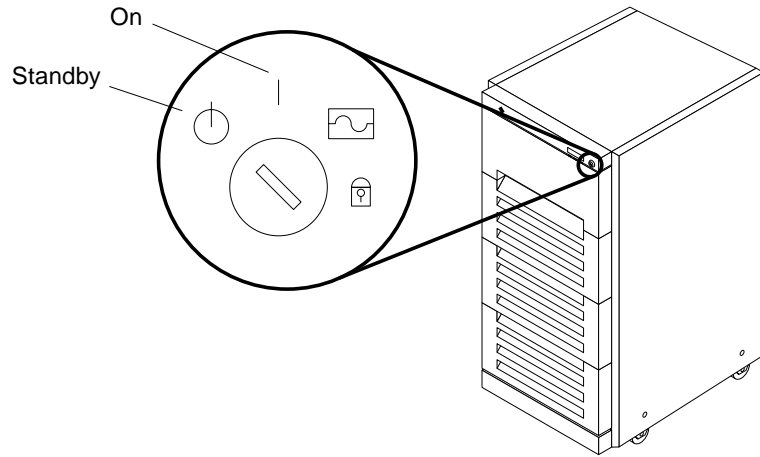


Figure 6-1 Key Switch Positions

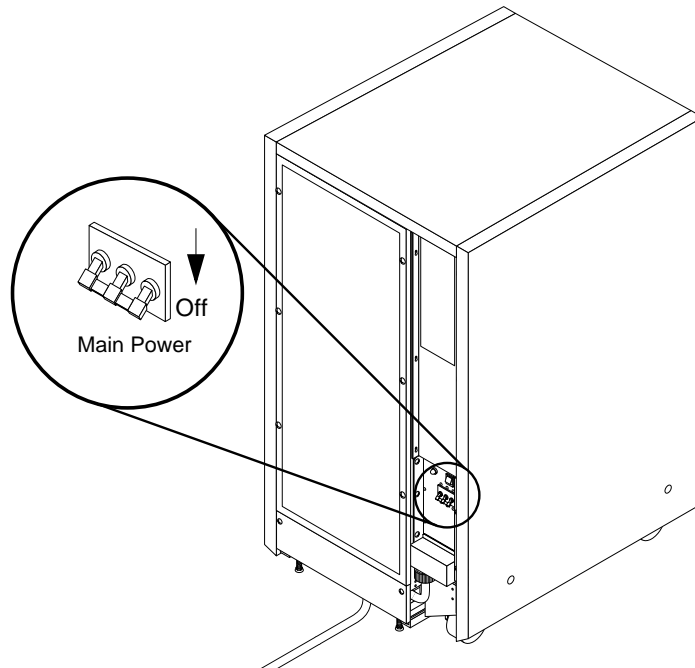


Figure 6-2 AC Distribution Unit Power Switch

6.2 External Cables

See the *SPARCcenter 2000 Installation* manual for system wiring configurations.

To remove the cables:

1. Remove the rear screen panel.

The screen is attached with two #10 Phillips screws. See Figure 6-3.

2. Remove the kick panel by loosening the captive screws. See Figure 6-3.

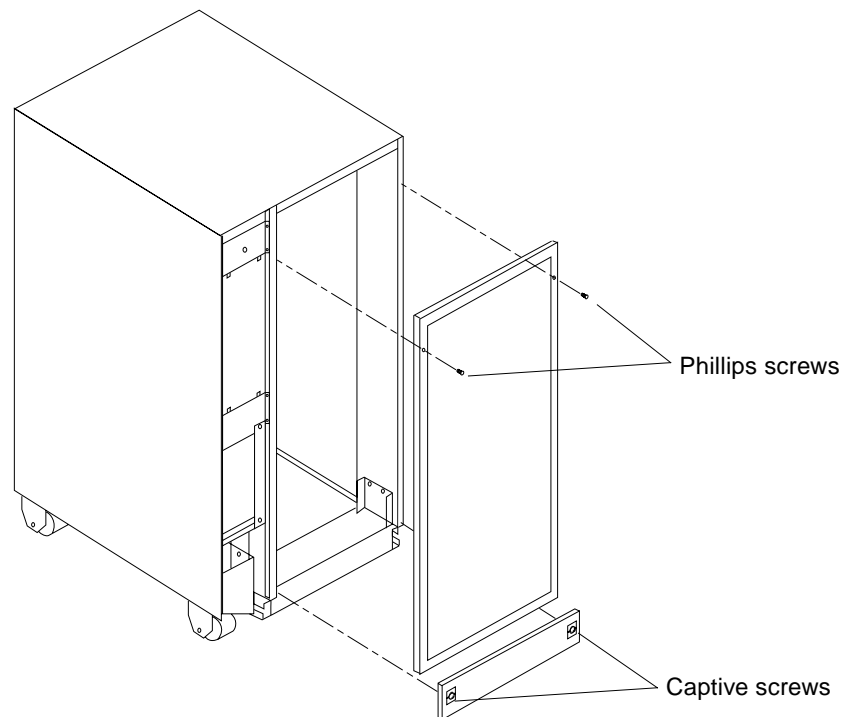


Figure 6-3 Rear Screen and Kick Panel

3. Disconnect each cable from the system boards.

Achieve this by either squeezing the locking tabs on the sides of the connector body, or by loosening any retaining screws (if provided).

- a. **Mark each cable (for identification) as you remove it.**
- b. **Use Figure 6-4 as a worksheet to keep track of the cable locations.**

4. Pull the connectors out carefully.
5. Remove any cable restraints.
6. Clear the cables away from the cabinet.

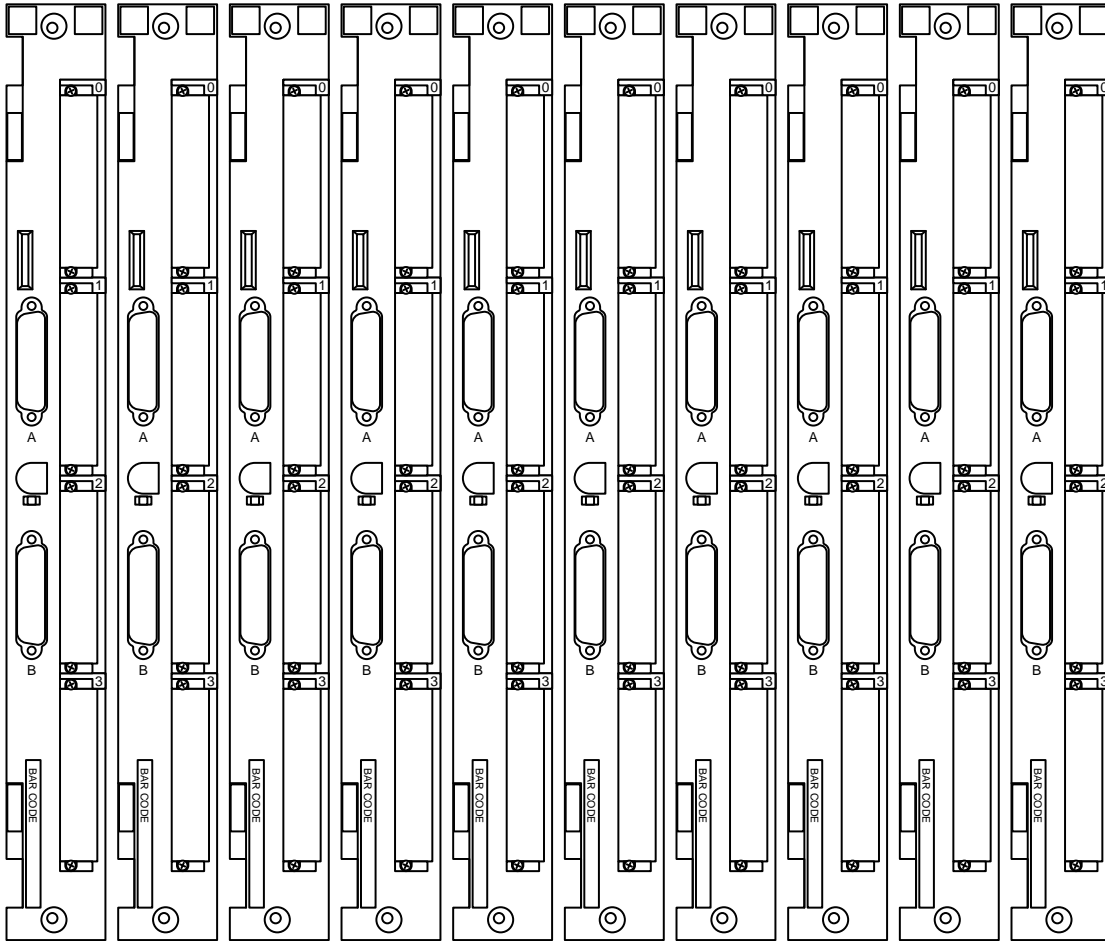



Figure 6-4 Backplane Cable Worksheet


6.3 Restarting the System

Note – As the system starts up, watch for error messages from the POST diagnostic program. If a terminal is not already part of the system, install a TTY terminal before continuing the start up. See the *SPARCcenter 2000 Installation* manual for terminal settings.

1. **The system key switch must be turned to  (the standby position).**
See Figure 6-1.



Caution – The outlet must be a 200-240 Vac 30-ampere circuit, intended solely for use by the server cabinet, as described in the site preparation instructions in the *SPARCcenter 2000 Installation* manual. The electrical receptacle must be grounded, and the grounding conductor serving this receptacle must be connected to the earth ground at the service equipment.

2. **Turn the Local/Remote switch down, to Local.** See Figure 6-5.
3. **Turn on the power switch on the AC distribution unit.**
See Figure 6-2.
4. **Turn on power to the terminal.**
A terminal is required for viewing system messages. For setup instructions, see Section 3.5, “Connecting a Terminal to the System Master.”
5. **Turn the key switch to  (the power-on position).** See Figure 6-1.
Several things will happen:
 - The DC-powered blower fan in the top of the cabinet begins turning.
 - The left front panel LED (green) turns on immediately to indicate the DC power supply is functioning.
 - The middle front panel LED (yellow) lights immediately and should turn off after approximately 60 seconds.
 - The right front panel LED (green) lights after POST has ended to show that booting is successful.
 - The terminal beep indicates that the system is ready.
 - The terminal screen lights up upon completion of the internal self test.

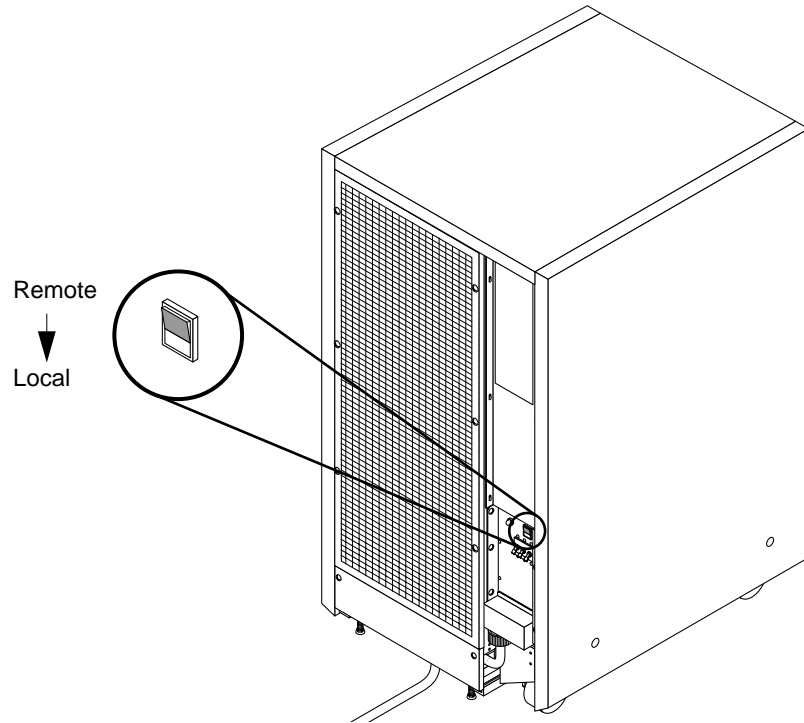


Figure 6-5 Local/Remote Switch Location



Caution – Never move the system cabinet or the expansion cabinets when system power is on. Excessive movement can cause catastrophic disk drive failure. Always power the system OFF before moving cabinets.

6. Watch the terminal screen for any POST error messages.

At the conclusion of testing, POST automatically configures the system, omitting any devices that have failed diagnostics. After POST ends, the system will boot using the new configuration.

If the middle front panel LED remains lit after the system has booted, the system has failed POST.

If your system has two power supplies and one fails, the system will continue to operate. If POST, OBP or the operating system detects the power supply failure, a warning message will be displayed to the console:

```
Power supply maintenance should be scheduled.
```

Note – POST does not test drives or internal parts of SBus cards. To test these devices, run OpenBoot PROM (OBP) diagnostics manually after the system has booted. Refer to the *OpenBoot Command Reference* manual for instructions.

7. To start POST again, or if the system hangs, press the reset switch on the back of the front panel.

See Figure 6-6.

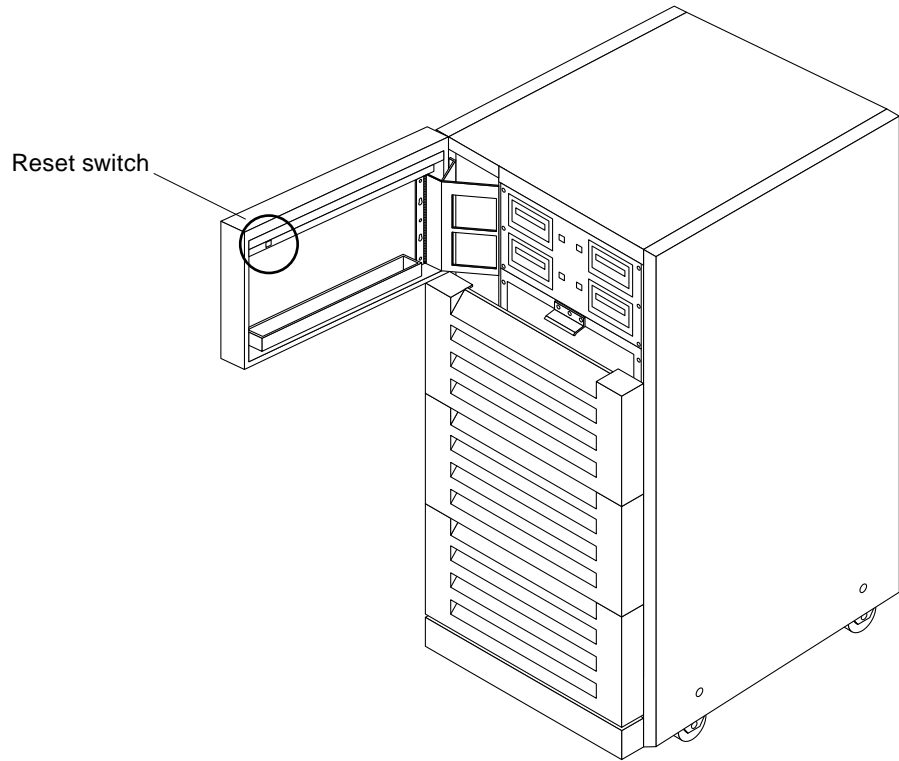


Figure 6-6 System Reset Switch

8. If the system displays “not responding” or “no carrier” messages, the Link Integrity Test may be set incorrectly. See Section 3.9, “Enabling and Disabling the Link Integrity Test.”

6.4 Reading Boot Messages

Use the boot software messages to verify the presence of options in the system. After POST completes the system self-test, a message similar to the following will appear on your screen. The message lists hardware detected in the system.

Note – The following screen display is an example only. The actual message displayed on the screen will vary with the software running on the system.

```
<<<< SPARCsystem 2000XX POST VX.X >>>>
...(various test messages)...
SPARCsystem 2000 Series (2 X XXXXXX), No Keyboard
ROM Rev. --, --- MB Memory installed, Serial #---.
Ethernet address -:-:--:-:--:-:--:-, Host ID: -----.
```

Note – When a system is started for the first time, or if the master board is replaced, OBP will prompt you to select a system board to be the new system master. The system master is normally in slot 0.

If there is no terminal on this system, you must check the system status by inspecting LEDs on the front panel and if present) on the power supply adapter board. See Figure 6-7 and Figure 6-8.

Table 6-1 summarizes LED status conditions during and after POST.

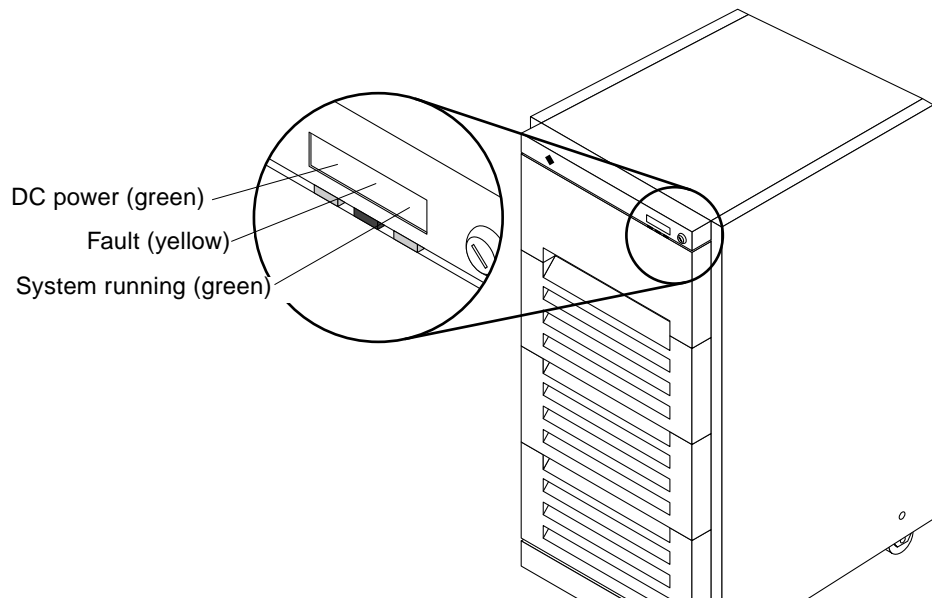


Figure 6-7 Front Panel Status LEDs

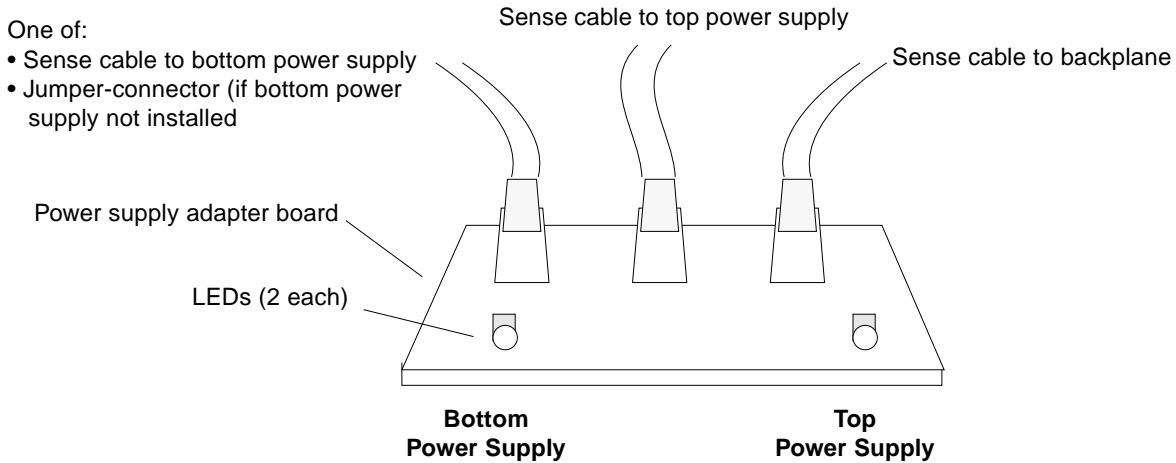


Figure 6-8 Power Supply Adapter Board LEDs

Table 6-1 LED Status Indicators

Location	LED	Condition
Front panel	Left LED (green)	On — DC power supply is receiving AC current. Off — There is no DC power.
	Middle LED (yellow)	On — (first 60 seconds) Self tests are running. Off — (after self tests end) No hardware failures. On — (after self tests end) Hardware failure was detected.
	Right LED (green)	Off — (first 60 seconds) Self tests are running. On — (after self tests end) System is running. Off — (after self tests end) System cannot run; repair is needed.
All system boards	Lower 8 LEDs	During POST, LEDs cycle on and off in irregular pattern.
Master system board only	Lower 8 LEDs	After POST, LEDs display cyclic pattern.
All slave system boards	Lower 8 LEDs	After POST, LEDs display solid pattern until boot is ended, then LEDs display same cycling pattern as master board. After boot ends, for boards without SPARC modules, LEDs continue to display solid pattern. After boot ends, LEDs on failed boards should be OFF.
Power supply adapter board (redundant-capable chassis only)	Left LED	On — bottom power supply failed, or the circuit breaker (breaker box) tripped.
	Right LED	Off — top power supply fail, or the circuit breaker (breaker box) tripped.

Part 4— Subassembly Removal and Replacement

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<i>Vented Front Panels</i>	<i>page 7-3</i>
<i>Rear Screen Panel</i>	<i>page 7-4</i>
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<i>Power Supply Compartment Cover</i>	<i>page 7-8</i>
<i>Kick Panel</i>	<i>page 7-9</i>
<i>Stabilizer Bar</i>	<i>page 7-9</i>
Major Subassemblies	page 8-1
<i>External Cables</i>	<i>page 8-1</i>
<i>EMI Shield</i>	<i>page 8-1</i>
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Internal Access



This chapter provides information necessary to prepare the system for service after the system has been powered off.

The SPARCcenter 2000 system cabinet outer panels, shown in Figure 7-1 through Figure 7-7, consist of the following parts:

- Hinged door
- Three vented front panels
- Rear screen panel
- Two side panels
- Power supply panel
- Power supply compartment cover
- Kick panel
- Stabilizer bar

7.1 Outer Cover Reference Guide

Use Table 7-1 as a guide in determining which panels will need to be removed to access replaceable parts for the SPARCcenter 2000 system cabinet.

Table 7-1 Cover Removal by Assembly

	Hinged Doors	Vented Front Panels	Rear Screen	Left Side Panel	Right Side Panel	Kick Panel	Power Supply Cover
EMI Shield	X	X					
Power Supply	X	X		X			X
Power Supply Breaker Box				X			X
Power Supply Adapter Board				X			
SCSI Tray	X	X					
Control Board	X	X					
Backplane	X	X	X	X			
Blower			X				
Power Distribution Unit				X		X	
External Cables			X			X	
System Board			X				
Differential SCSI Trays		X	X				



Caution – Do not remove the vented front panels by twisting off. Such action can result in breakage of the panels or fasteners. Always support the panels during removal and replacement.

7.2 Opening the Hinged Door

1. Grasp the door at the upper-right corner and pull towards you firmly. See Figure 7-1.

The door is secured closed by clips and ball-studs at the side opposite of the hinge. The door is released and swings open if pulled firmly.

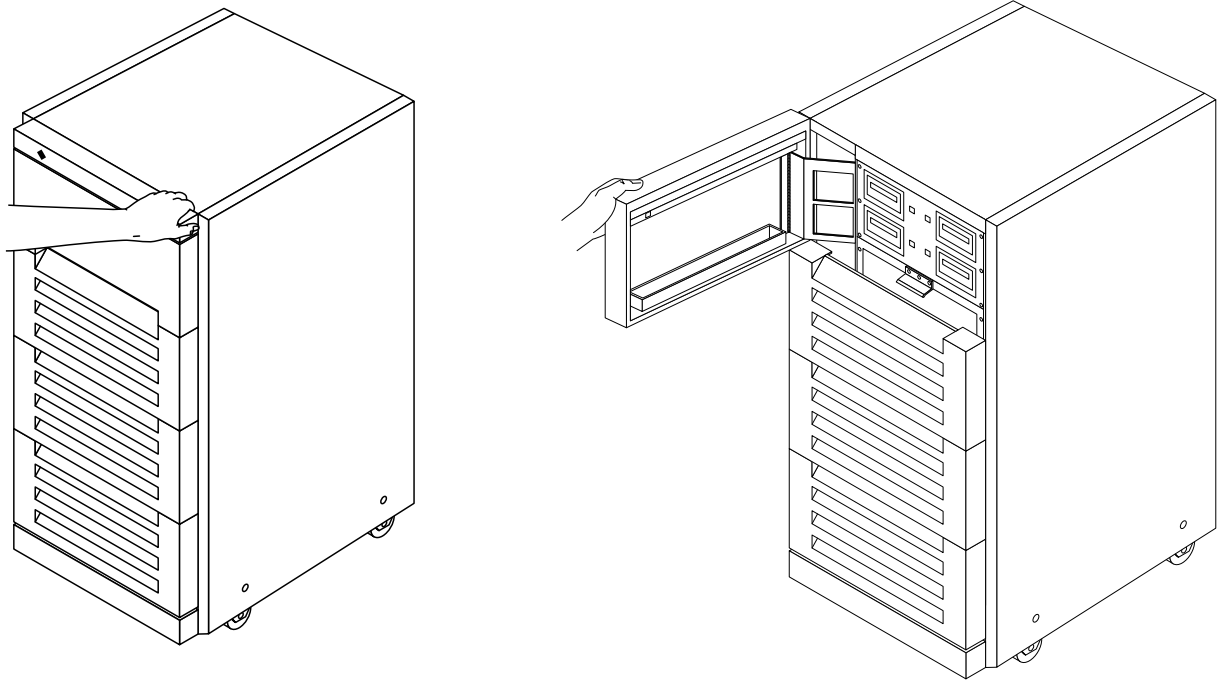


Figure 7-1 Opening the Hinged Door

7.3 Vented Front Panels

The three vented front panels all remove in the same manner. They are retained by chassis-mounted ball studs that mate with catches on the panel backside.

To remove the panels:

- 1. Grasp the panel under the vent on one side and pull out far enough to just disengage the ball studs.**
See Figure 7-2.
- 2. Repeat this procedure on the other side of the vent to disengage and remove the panel. Set the panel aside.**

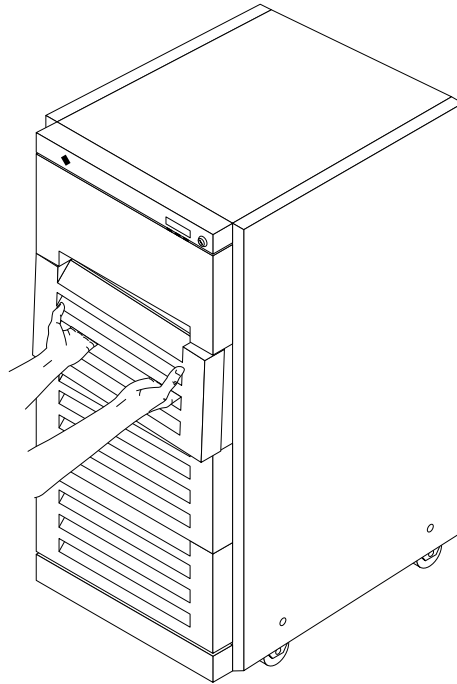


Figure 7-2 Removing the Vented Panels

To replace a panel:

1. **Place the panel against the chassis with ball studs aligned with the catches on the panel.**
Tap or press both sides of the panel into place.

7.4 Rear Screen Panel

To remove the rear screen panel:

1. **Remove the two #10 Phillips screws securing the panel to the frame.**
See Figure 7-3.

2. Tilt the panel top out and lift it free of the chassis. Set the panel aside. There is a flange on the bottom of the rear screen.

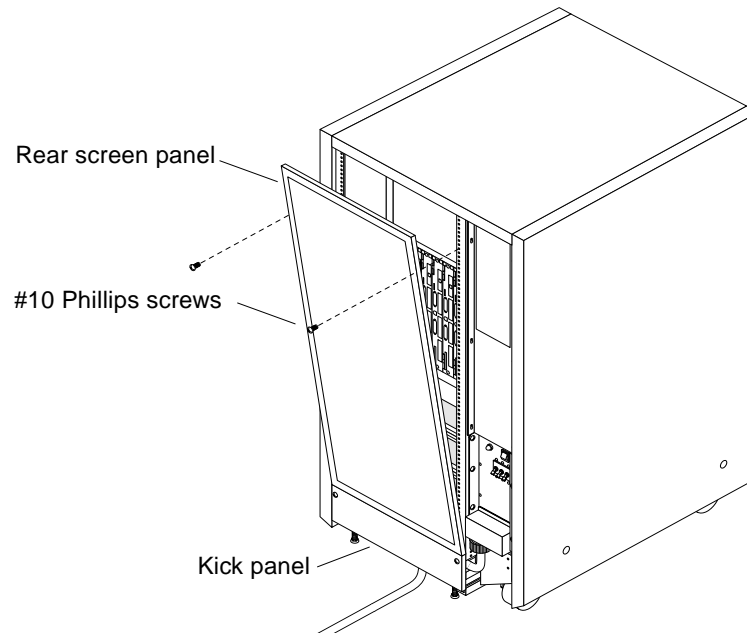


Figure 7-3 Rear Screen Panel Removal

To replace the rear screen panel:

1. Insert the panel so the bottom flange engages behind the top of the kick panel.
2. Tilt the panel flush against the frame and secure using Phillips screws.

7.5 Side Panels

To remove the left and right side panels:

1. Loosen two slot-head captive screws near the panel base.
2. Tilt the panel bottom out.

- 3. Lift the panel up until free of the tabs at the top of the chassis.
Set the panel aside.**

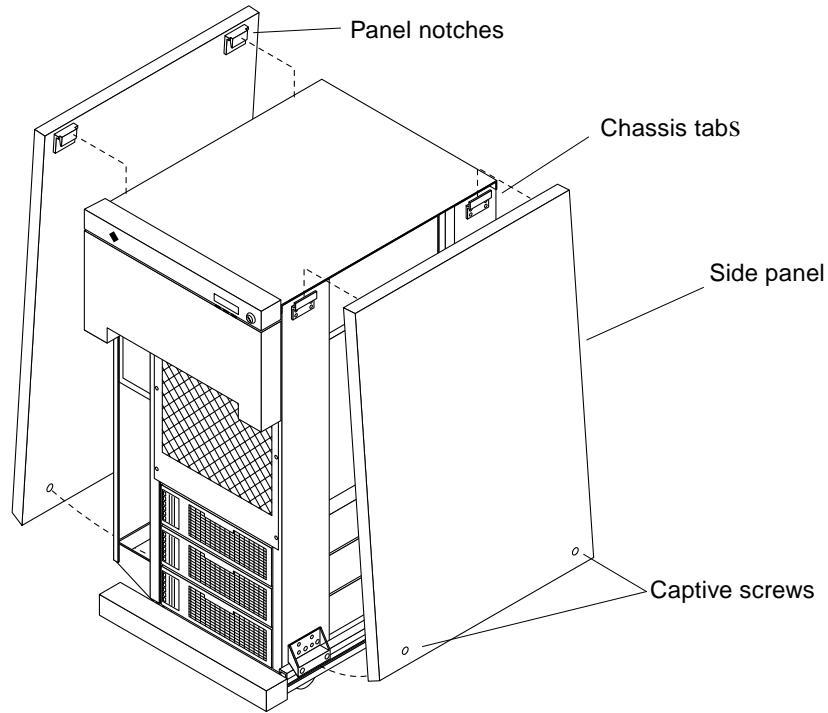


Figure 7-4 Removing the Side Panels

To replace a side panel:

- 1. Place the panel against the cabinet so the notches on the panel inside align with tabs at the chassis top.**
- 2. Lower the panel into place and allow it to hang flush against the chassis.**
- 3. Tighten the two captive screws at the panel base.**

7.6 Power Supply Cover

To remove the power supply cover:

- 1. Loosen the six #6 Phillips screws that secure the cover to the frame.**
Removing the screws is not necessary since the cover has slotted screw holes. Figure 7-5 shows the screws removed for ease of identification.
- 2. Lift the panel up until the slotted screw holes clear the screw heads.**
- 3. Lift out the panel and set it aside.**

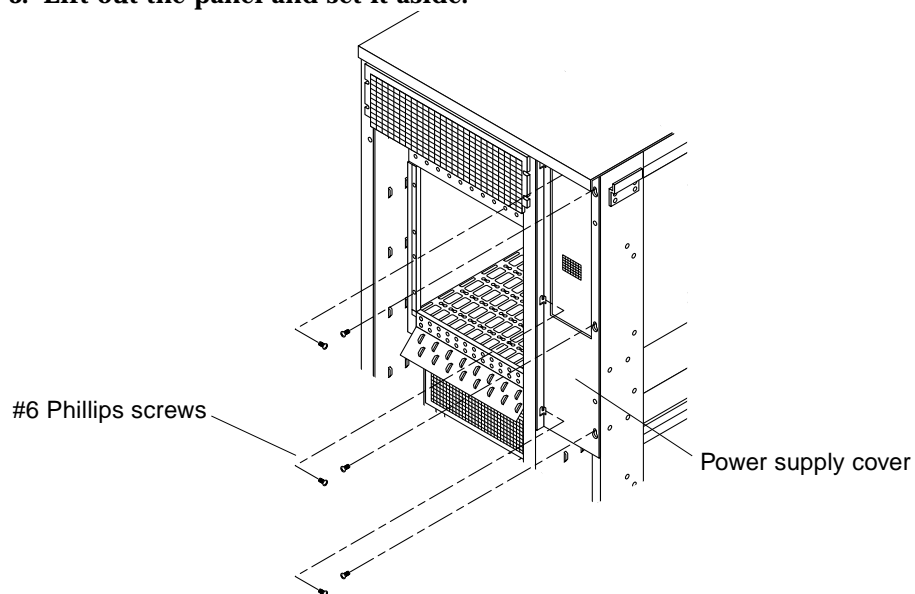


Figure 7-5 Removing the Power Supply Cover

To replace the power supply cover, reverse the above instructions.

7.7 Power Supply Compartment Cover

- ◆ Remove the power supply compartment EMI panel covering both power supplies. See Figure 7-6.

Remove all screws securing the panel in place and set the panel aside.

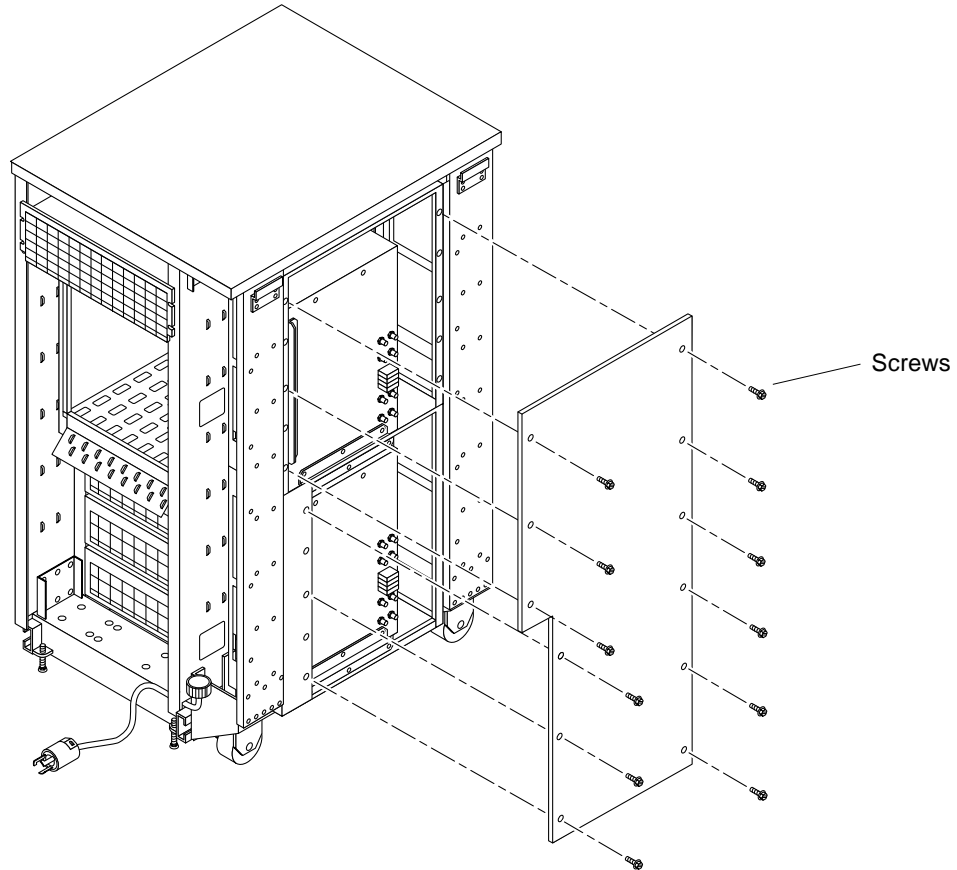


Figure 7-6 Removing the Power Supply Compartment EMI Panel

7.8 Kick Panel

1. Loosen the two captive screws. See Figure 7-7.

To replace the kick panel:

1. Arrange cables (if applicable) neatly behind the kick panel, then fasten the two captive screws to secure the panel in place.

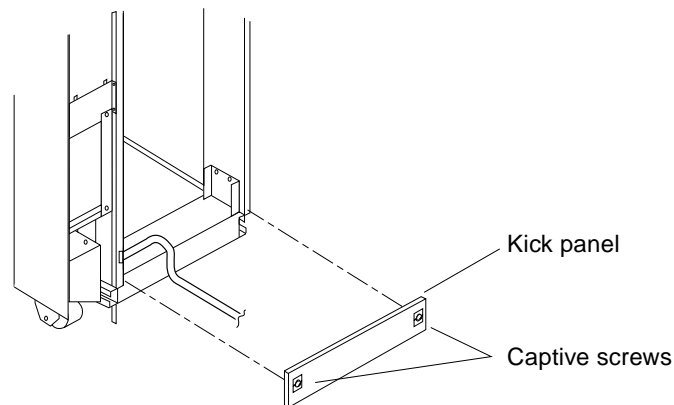


Figure 7-7 Removing the Kick Panel

7.9 Stabilizer Bar



Warning – Always extend the stabilizer bar before pulling the disk drive trays out for servicing.

The cabinet has six levelling pads. Four pads on the cabinet frame are lowered to touch the floor and prevent the cabinet from rocking. Two levelling pads are part of the stabilizer bar and should not touch the floor.

1. **Extend the stabilizer bar fully from the bottom of the cabinet.**
See Figure 7-8.
2. **Screw the two stabilizer bar levelling pads down until they are $\frac{1}{8}$ - to $\frac{1}{4}$ -inch (3 to 6 mm) above the floor.**
Ensure both pads are at equal heights. This clearance allows the stabilizer bar to slide in and out easily, yet catch the cabinet if it should begin to tilt.

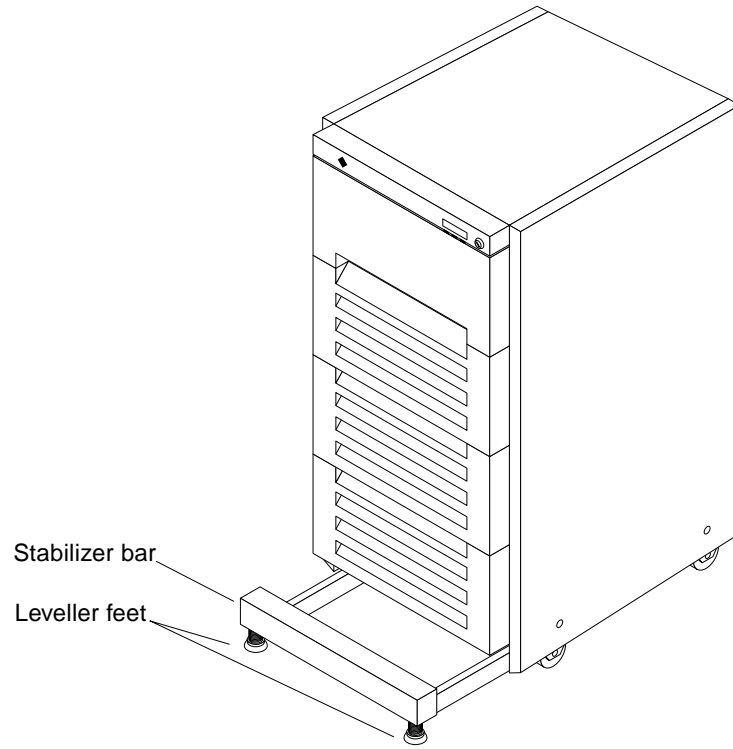


Figure 7-8 Stabilizer Bar

Major Subassemblies



This chapter supplies information necessary to completely remove and replace the field-replaceable parts for the SPARCcenter 2000 system cabinet.

7.1 External Cables

The SPARCcenter 2000 system cabinet is connected to other devices by data cables and a ground cable.

To remove or replace external system cables see Section 6.2, “External Cables.”

7.2 EMI Shield

Perform these tasks in order to replace the EMI shield.	
Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
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The EMI shield covers the control board and backplane. The shield backside features springfingers to prevent leakage of electromagnetic interference. Six screws secure the screen. See Figure 7-1 and remove the shield as follows:

- 1. Remove six Phillips screws securing the shield in place.**

2. Tilt the top of the shield outward and lift the shield free of the chassis. Set the shield aside.

Note – Use care to ensure you do not damage the springfingers.

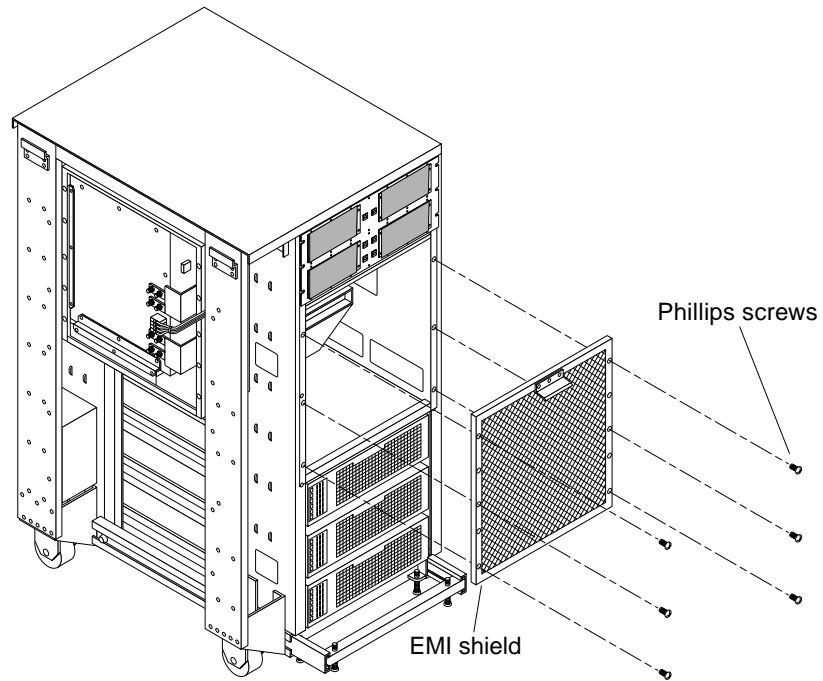


Figure 7-1 EMI Shield Removal and Replacement

To replace the EMI shield:

1. Insert the shield so the bottom flange engages the frame.
2. Tilt the shield flush against the frame so the springfingers snugly contact the frame.
3. Install six Phillips screws to secure the shield in place.

7.3 Power Supply

Perform these tasks in order to replace the system power supply.	
--	--

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Opening the Hinged Door	page 7-2
Vented Front Panels	page 7-3
Side Panels	page 7-5
Power Supply Cover	page 7-7

7.3.1 Single Power Supply Cabinet in a Non Redundant-Capable Chassis

Note – To identify a non redundant-capable chassis:

- The power supply cover panel on this chassis is short as shown in Figure 7-2. This panel reaches about half the way down the frame. In contrast, the cover panel on the redundant-capable chassis reaches to the bottom of the frame.
- This chassis lacks the power supply adapter board. This board, if present, can be viewed by looking through the EMI screen on the front of the system.

To remove the power supply from the system cabinet, see Figure 7-2 through Figure 7-6, and proceed as follows:

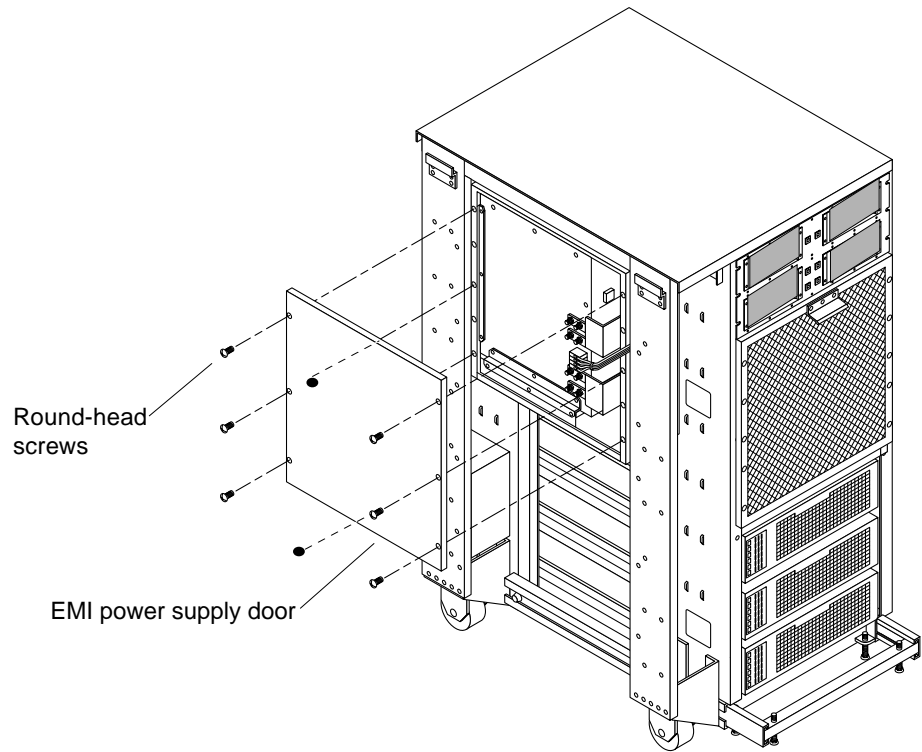


Figure 7-2 Power Supply Cover Panel Removal — Non-Redundant-Capable Chassis

1. **Remove the eight round-head screws that secure the EMI power supply door to the power supply enclosure assembly. Put these aside.** The inner edge of the door has springfingers. Use care when handling to prevent damage to the springfingers.

2. Remove the eight screws that connect the end of the power buss bars to the backplane buss bars.

The power supply can not be removed without disconnecting and removing the power buss bars at both ends.

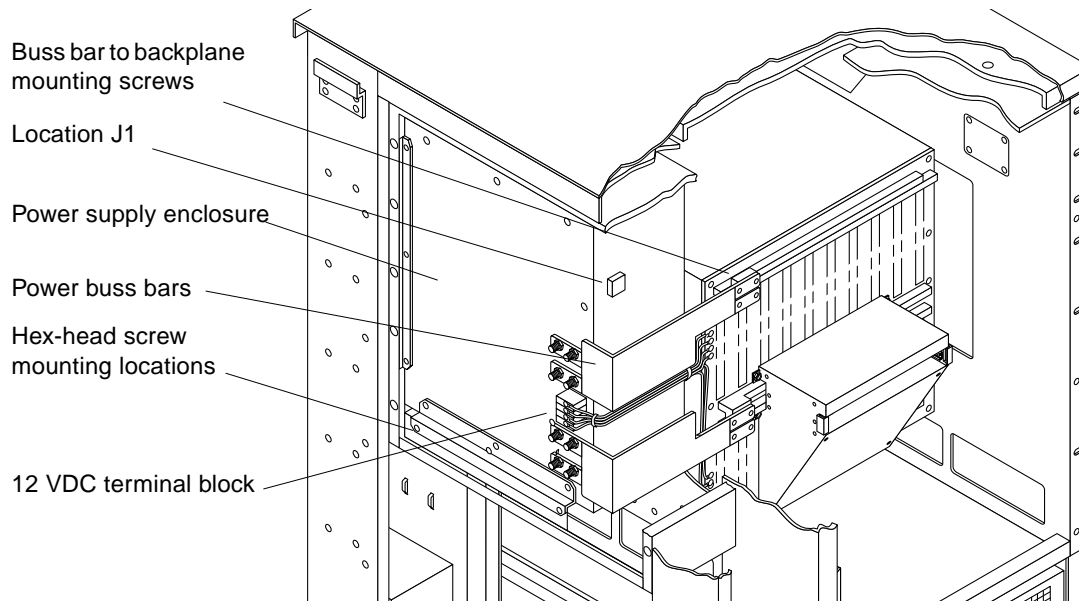


Figure 7-3 Power Buss Bar Connection Detail

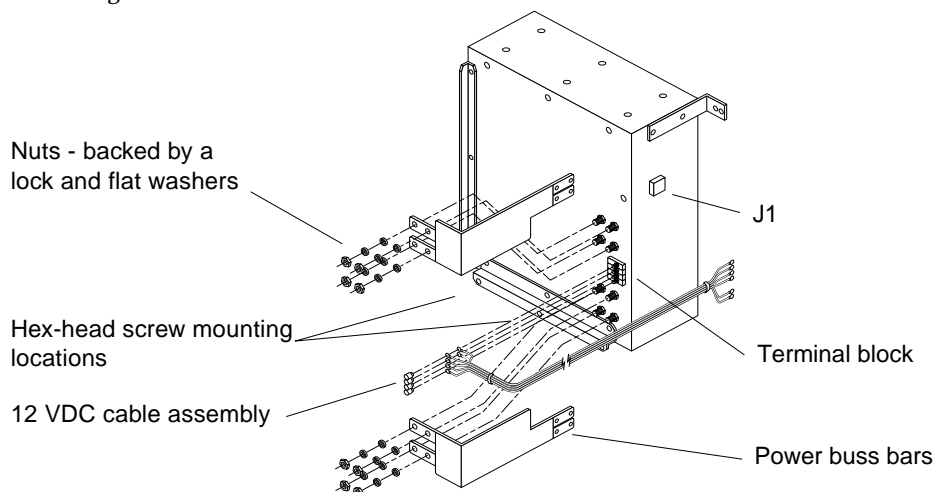


Figure 7-4 Power Buss Bar Removal

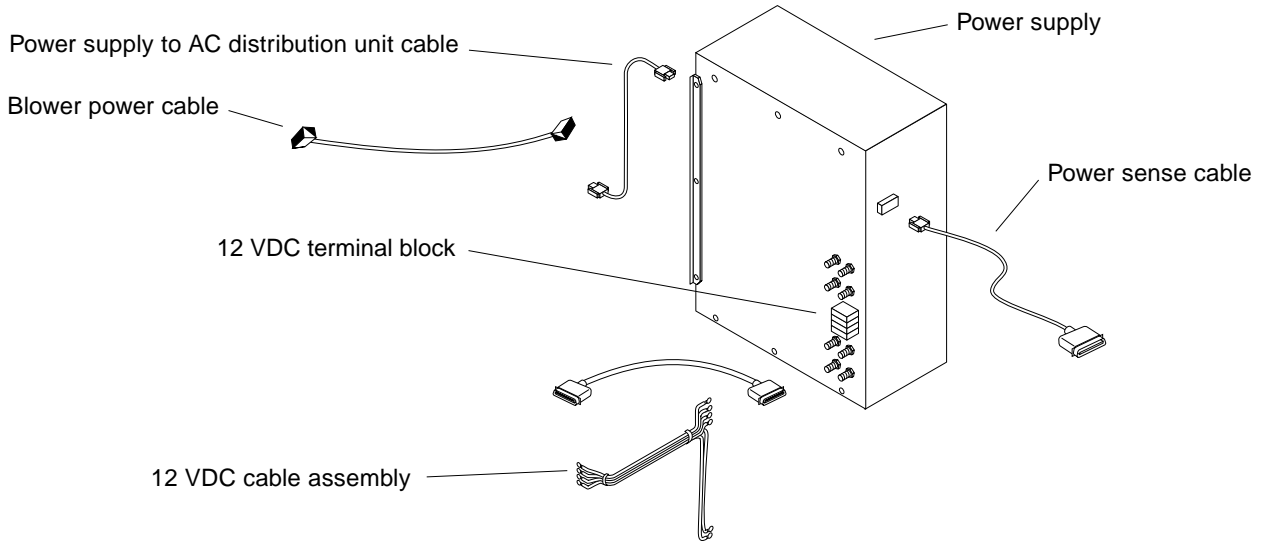


Figure 7-5 Power Supply and Cable Connection Detail

3. Remove the eight 13mm hex nuts that secure the two power buss bar assemblies to the power supply posts. See Figure 7-4.
4. Remove the plastic cover from the terminal block for the 12 VDC cable assembly, and remove screws securing the cable assembly to the terminal block. See Figure 7-5.
5. Unplug the power sense cable connected to J1. See Figure 7-5.
6. Unplug the blower power cable from J3. See Figure 7-6.
7. Unplug the +24 VDC power supply to AC distribution unit cable from J2.
8. Remove the six hex-head screws that secure the power supply to the side of the power supply enclosure. See Figure 7-5.
9. At the chassis rear, disconnect the power plug from the power supply (this cable goes to the AC distribution unit).
10. Remove the six hex-head screws that secure the power supply to the power supply enclosure. See Figure 7-6.

11. Remove the springfingers.

Remove three screws securing each of the two sets of springfingers to the face of the supply. See Figure 7-6. Set these aside for installation on the new power supply.

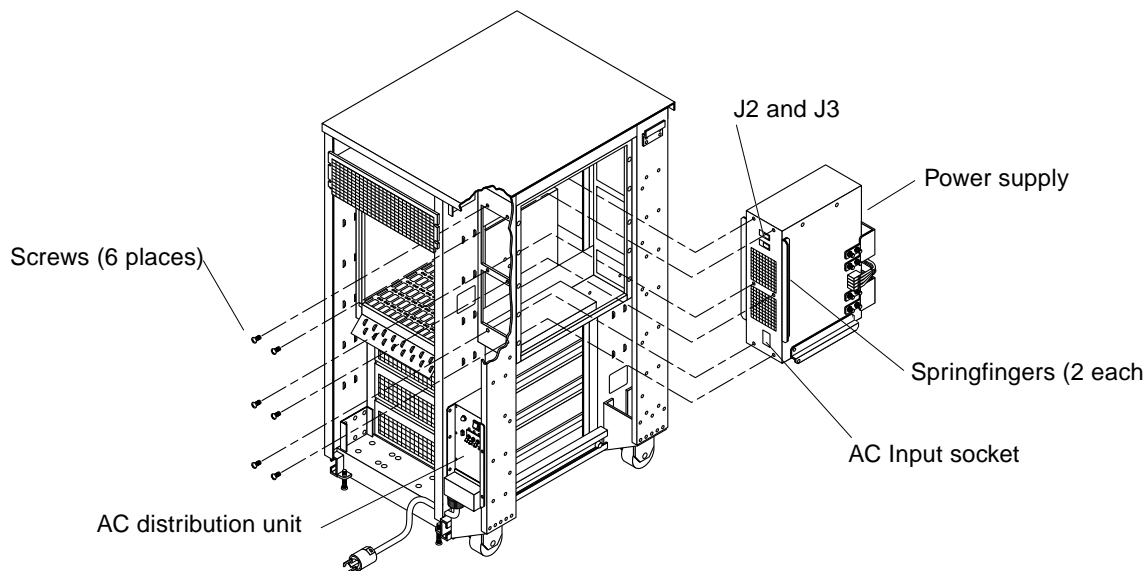


Figure 7-6 Removing the Power Supply

Replace the Power Supply

1. Install the springfingers from the old supply onto the new supply.
2. Install the new supply using Section 7.3.1, “Single Power Supply Cabinet in a Non Redundant-Capable Chassis” in reverse order.

7.3.2 Dual Power Supplies

Note – To identify a redundant-capable chassis:

- The power supply cover panel on this chassis is long as shown in Figure 7-7. This panel reaches to the bottom of the frame. In contrast, the cover panel on the non redundant-capable chassis reaches about half the way down the frame as shown in Figure 7-2.
- This chassis features the power supply adapter board. This board, if present, can be viewed by looking through the EMI screen on the front of the system.

◆ **Remove the power supply compartment EMI panel covering both power supplies. See Figure 7-7.**

Remove all screws securing the panel in place and set the panel aside.

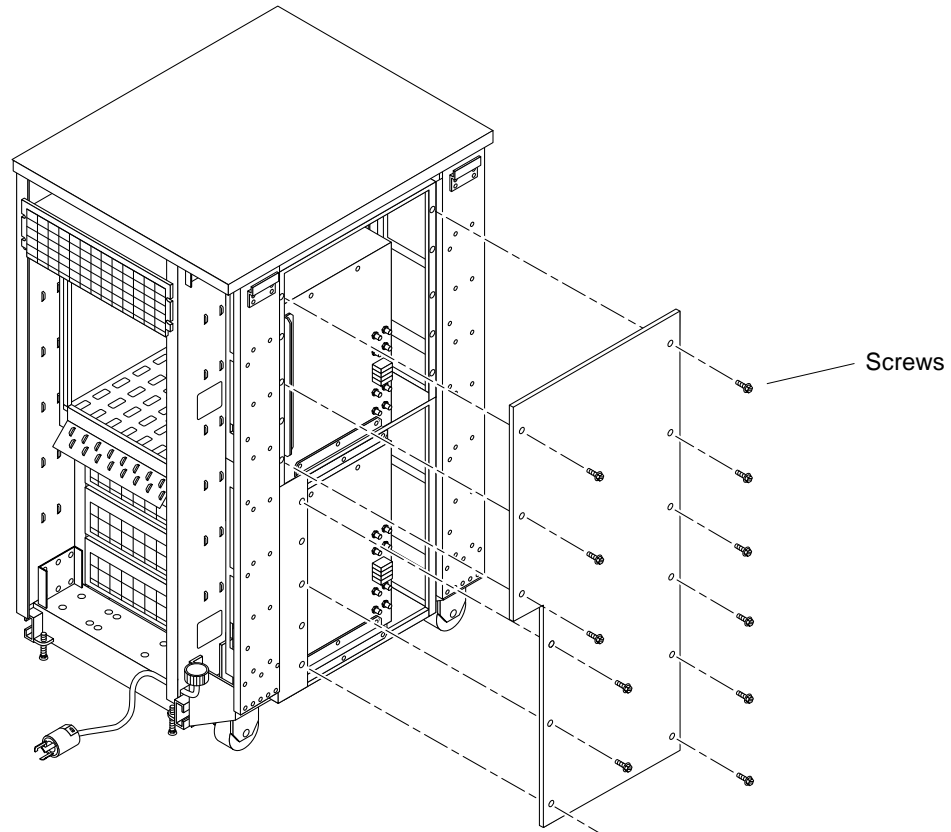


Figure 7-7 Removing the Power Supply Compartment EMI Panel

7.3.2.1 Top Power Supply

Disconnect Bus Wires

- 1. Disconnect four bus wires leading to the lower power supply (if this power supply is present).**

These wires are on the left side of the terminal block. Pull them off the spade lugs and mark them for ease of reconnection later. See Figure 7-8.

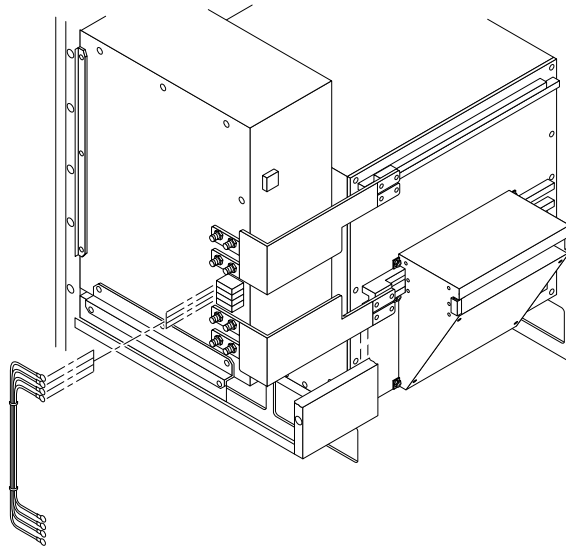


Figure 7-8 Disconnecting Bus Wires from the Terminal Block

- 2. Disconnect six wires leading to the backplane.**

These wires on the right side of the terminal block are secured by screws. See Figure 7-9.

- a. Mark the wires for ease of reconnection later.**
- b. Remove screws securing the lugs and wires to the block.**
- c. Remove the wires from under the lugs.**
- d. Replace the lugs on the terminal block using the four screws.**
The lugs may need to be transferred to the new power supply later.

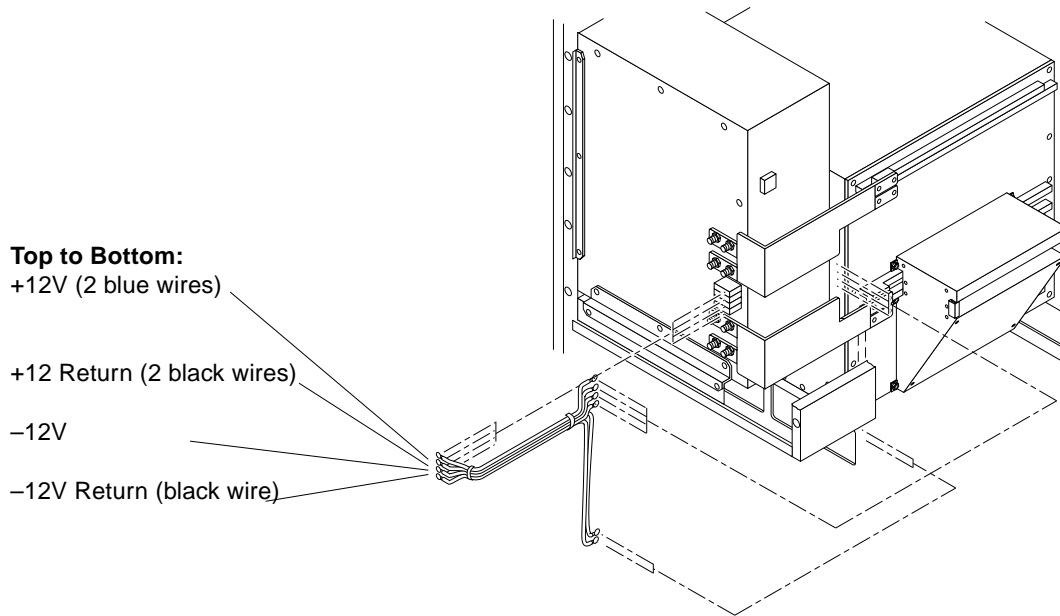


Figure 7-9 Disconnecting Bus Wires to the Backplane

Remove the Outer and Inner Bus Bars

- 1. Remove the outer bus bar connecting the top and bottom power supplies (if the bottom power supply is present).**
Remove sixteen nuts (each backed by a flat and lock washer) securing the bus bar to the two power supplies. See Figure 7-10.
- 2. Remove four screws securing the bus bar to the cover panels (if the bottom power supply is present) (Figure 7-10).**
- 3. Remove the bus bar (if present) and set aside.**

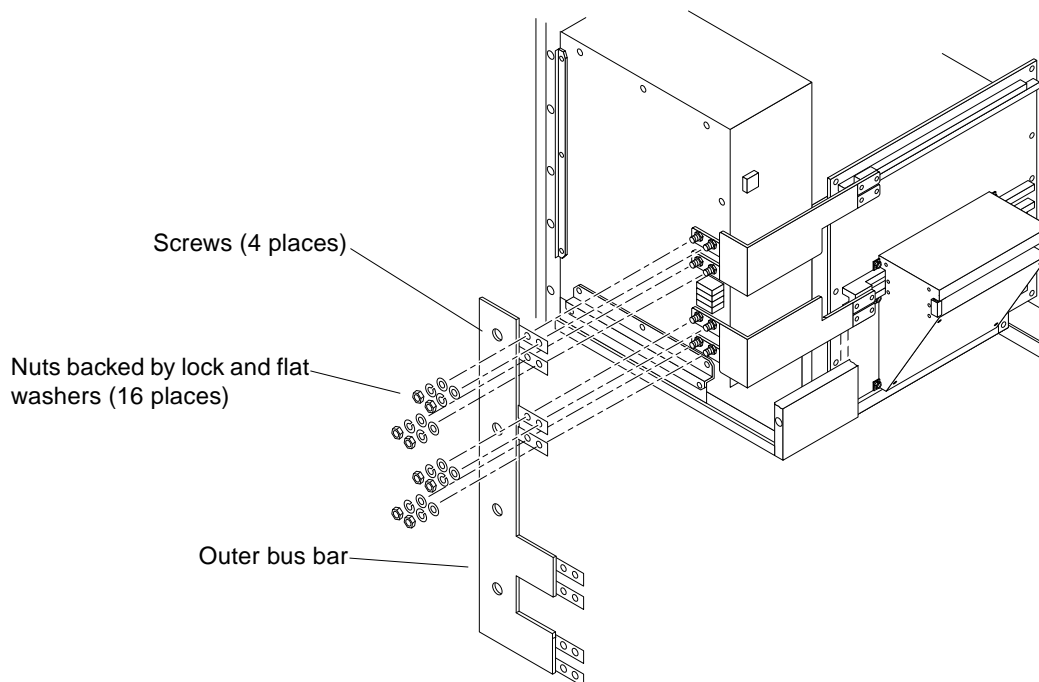


Figure 7-10 Removing the Outer Bus Bar

4. Remove the inner bus bars.

These bus bars connect the top power supply to the backplane.

a. Remove eight screws securing the bus bars to the backplane.

Four screws secure the top bus bar, and four secure the bottom. See Figure 7-11.

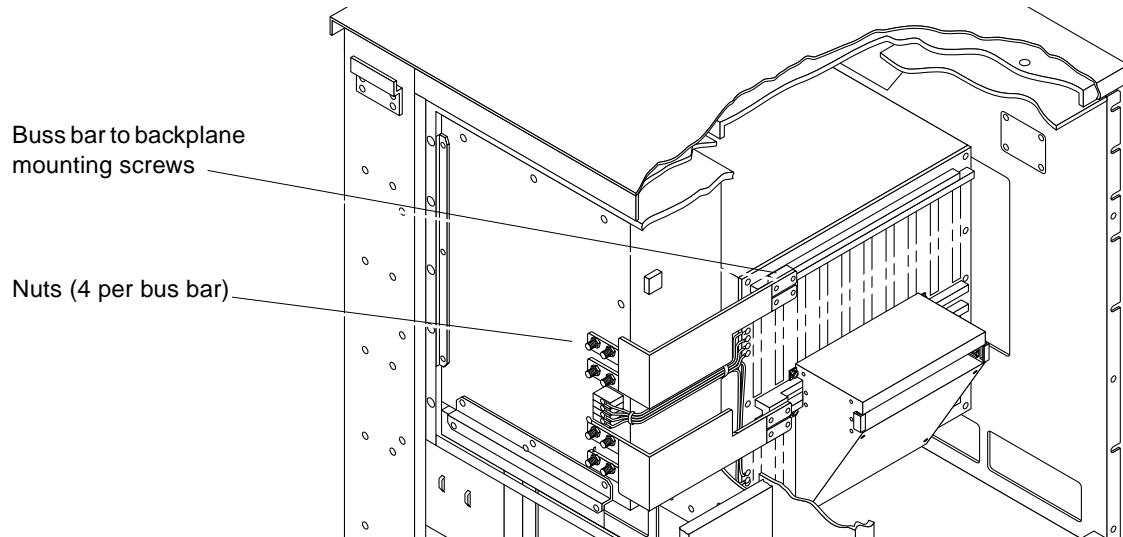


Figure 7-11 Disconnecting the Inner Bus Bars from the Backplane

b. Disconnect the bus bars from the power supply.

Remove eight nuts (each backed by a lock and flat washer) from the bus bars. See Figure 7-11.

c. Remove the bus bars and set aside.

Figure 7-12 identifies the top and bottom bus bar for later replacement.

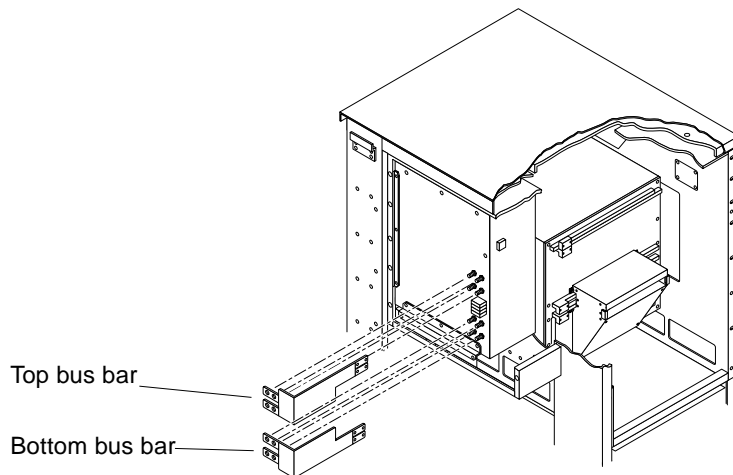


Figure 7-12 Inner Bus Bars

Disconnect Cables

1. Remove the top cover panel.

Remove 13 screws securing the panel to the chassis and remove the panel. See Figure 7-20.

2. Remove the sense cable from the three cable holders.

3. Remove the panel.

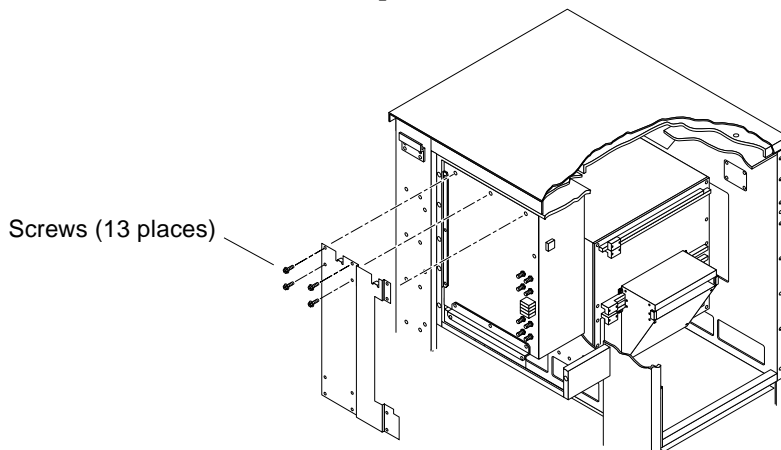


Figure 7-13 Removing the Top Cover Panel

4. Disconnect the power cord.

This is in the lower-center of the supply. See Figure 7-14.

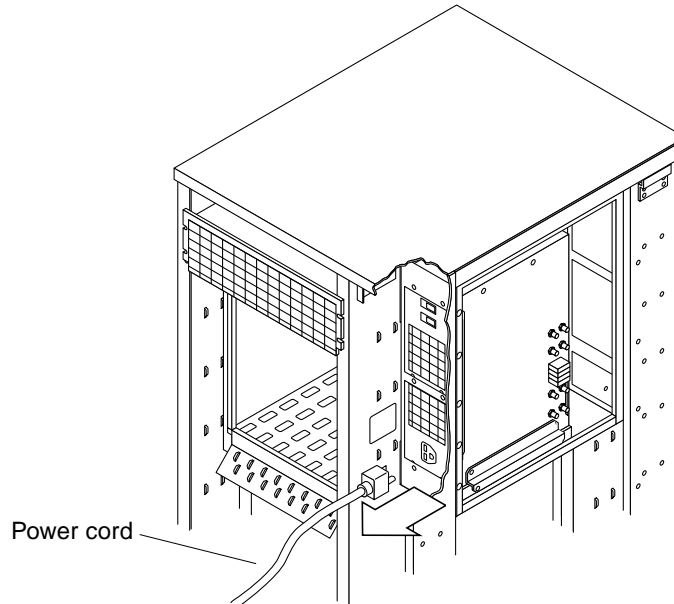


Figure 7-14 Disconnecting the Power Cord

5. Remove the EMI box from the power supply. See Figure 7-15.

- a. Remove two screws from the bottom lip of the box.
- b. Loosen two captive thumbscrews at the top of the box.
- c. Allow the box to drop far enough to expose the cables.

6. Unplug the filter cable from the top connector on the power supply. See Figure 7-15.

7. Remove the power sense cable from J1.

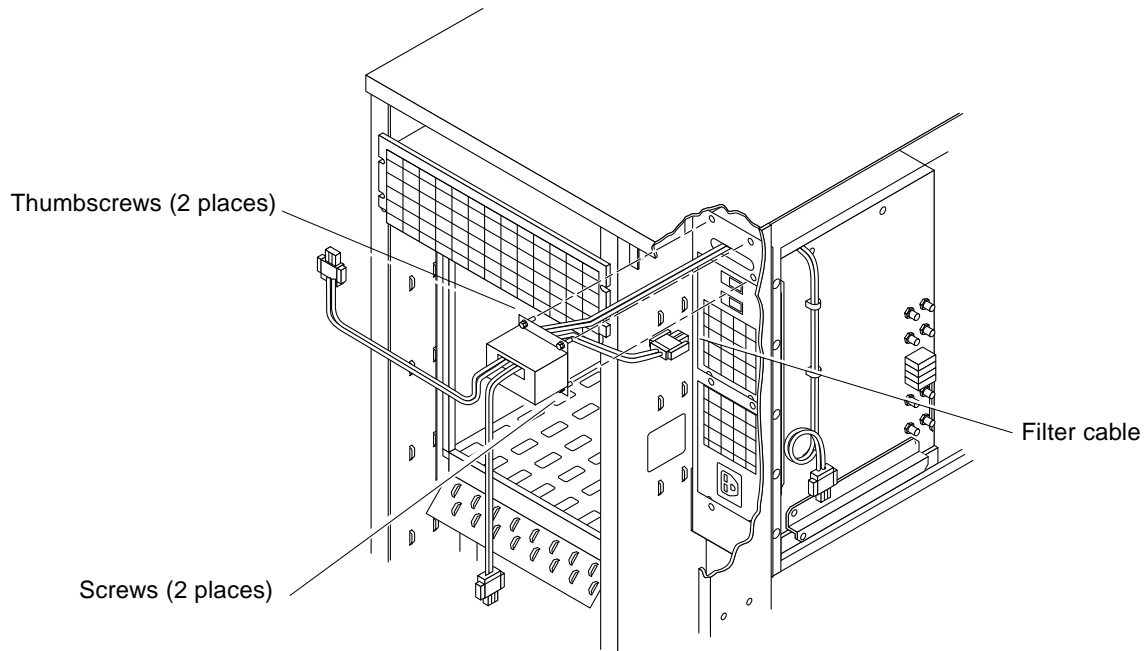


Figure 7-15 Removing the EMI Box

Remove the Power Supply

- 1. Remove the breaker box from the power supply.**
 - a. Remove two screws from the bottom lip of the box.**
 - b. Loosen two captive thumbscrews at the top of the box.**
 - c. Allow the box to drop free of the top power supply.**
- 2. Remove four remaining screws securing the rear face of the power supply.**
See Figure 7-16.

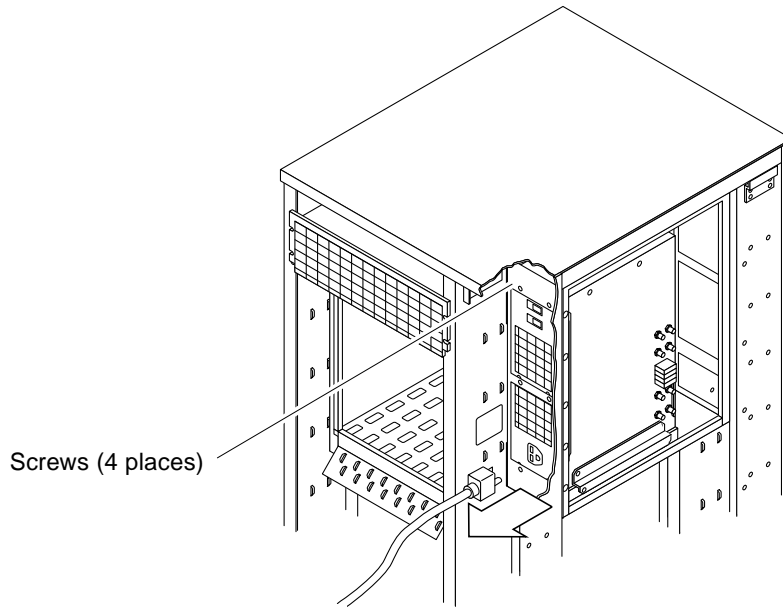


Figure 7-16 Removing the Power Supply Mounting Screws

3. Remove the power supply.

Shift the power supply to the right (clear of obstructing sheet metal) and lift it out. See Figure 7-17.

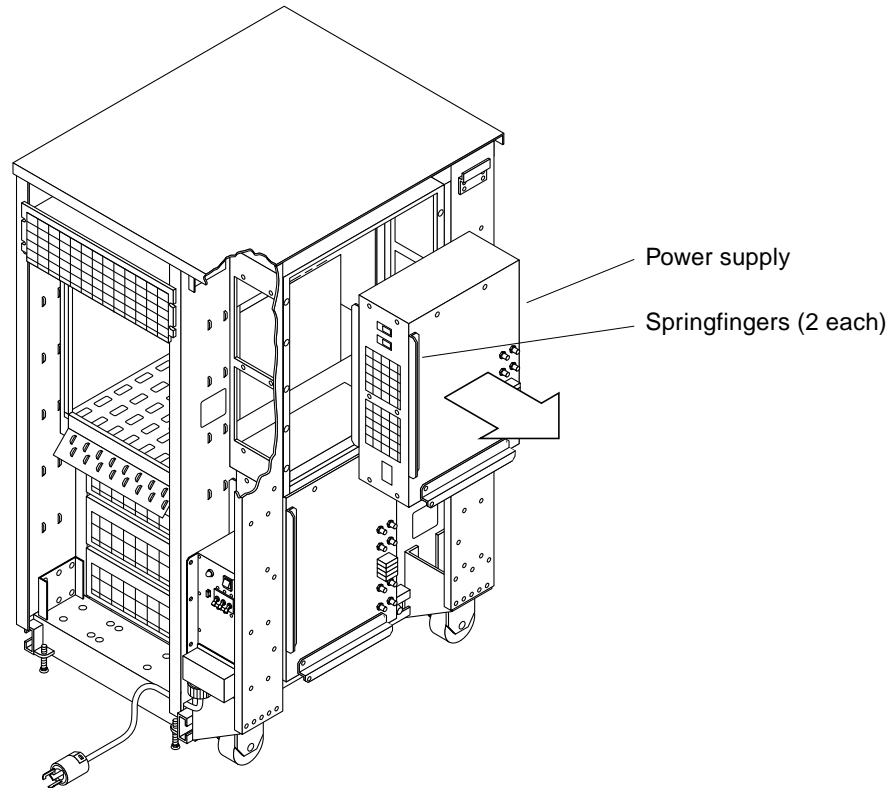


Figure 7-17 Removing the Top Power Supply

4. Remove the springfingers.

Remove three screws securing each of the two sets of springfingers to the face of the supply. See Figure 7-17. Set these aside for installation on the new power supply.

Replace the Power Supply

- 1. Install the springfingers from the old supply onto the new supply.**
- 2. Install the new supply using Section 7.3.2.1, “Top Power Supply” in reverse order.**

7.3.2.2 Bottom Power Supply

Disconnect Bus Wires

- 1. Disconnect four bus wires leading to the upper power supply.**
Pull the connectors off the spade lugs and mark them for ease of reconnection later. See Figure 7-8.

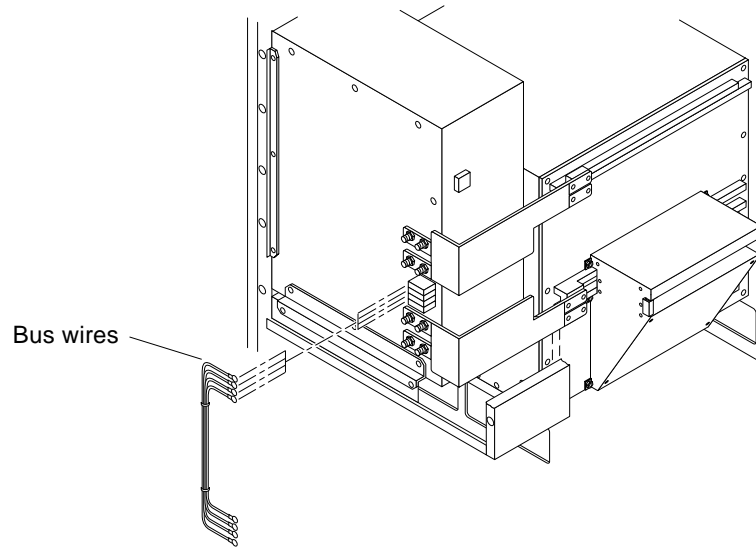


Figure 7-18 Disconnecting Bus Wires from the Terminal Block

Remove the Outer Bus Bars

- 1. Remove the outer bus bar connecting the top and bottom power supplies.**
Remove sixteen nuts (each backed by a flat and lock washer) securing the bus bar to the two power supplies. See Figure 7-10.
- 2. Remove four screws securing the bus bar to the cover panels (Figure 7-10).**
- 3. Remove the bus bar and set aside.**

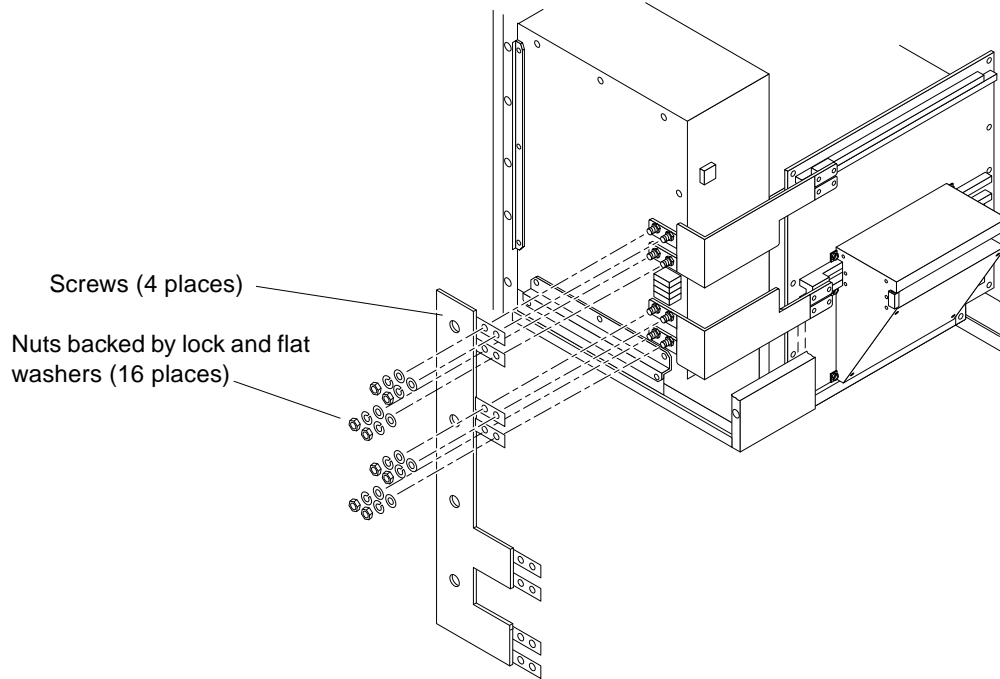


Figure 7-19 Removing the Outer Bus Bar

Disconnect Cables

1. Remove the bottom cover panel.

Remove 12 screws securing the panel to the chassis and remove the panel.
See Figure 7-20.

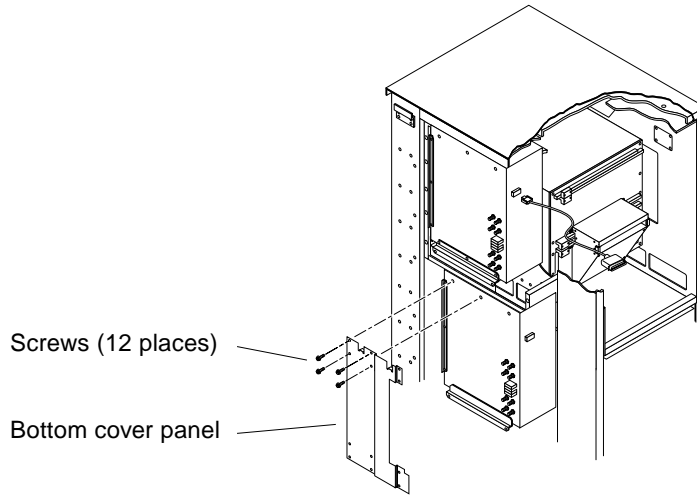


Figure 7-20 Removing the Bottom Cover Panel

2. Disconnect the power cord from the rear of the supply. See Figure 7-14.

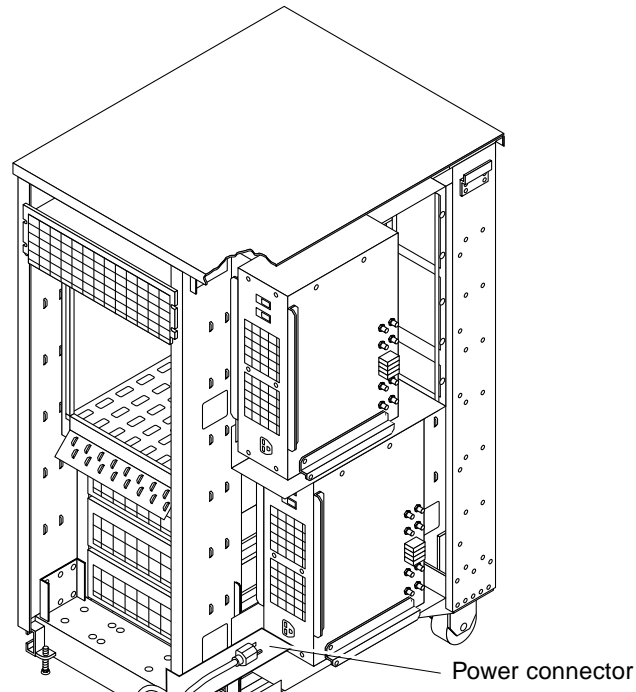


Figure 7-21 Disconnecting the Power Cord

3. **Remove the power breaker box from the power supply. See Figure 7-15.**
 - a. **Remove two screws from the bottom lip of the box.**
 - b. **Remove the AC distribution unit (six screws) to expose two screws at the bottom of the power breaker box. Remove these screws securing the breaker box.**
 - c. **Loosen two screws at the top of the breaker box.**

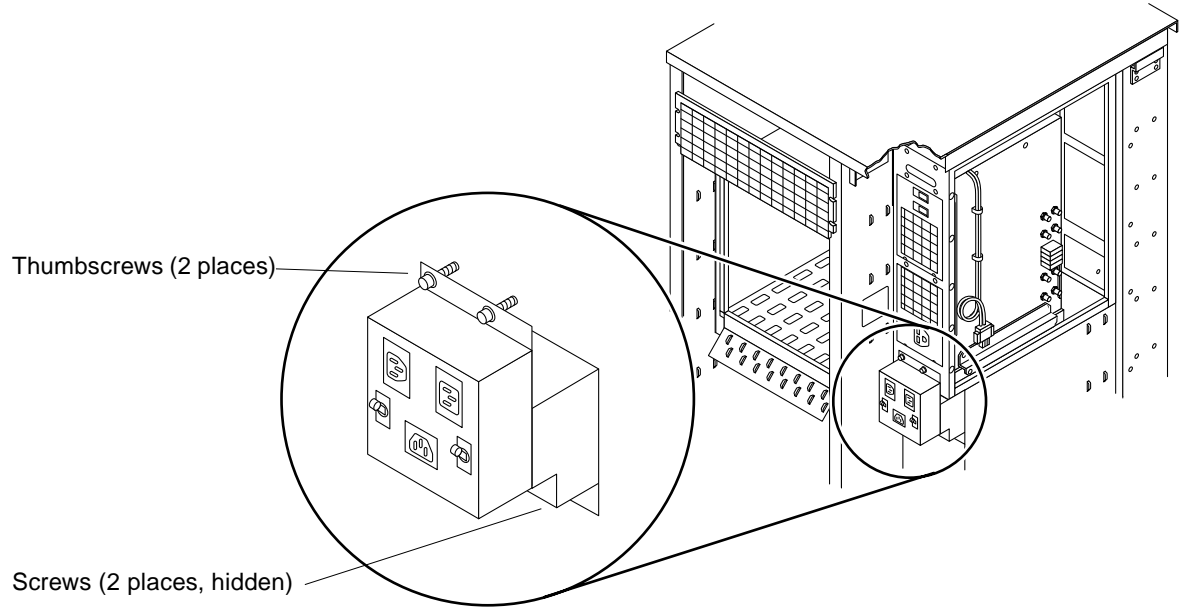


Figure 7-22 Removing the Power Breaker Box

4. **Unplug the filter cable from the top connector on the power supply.**
See Figure 7-23.

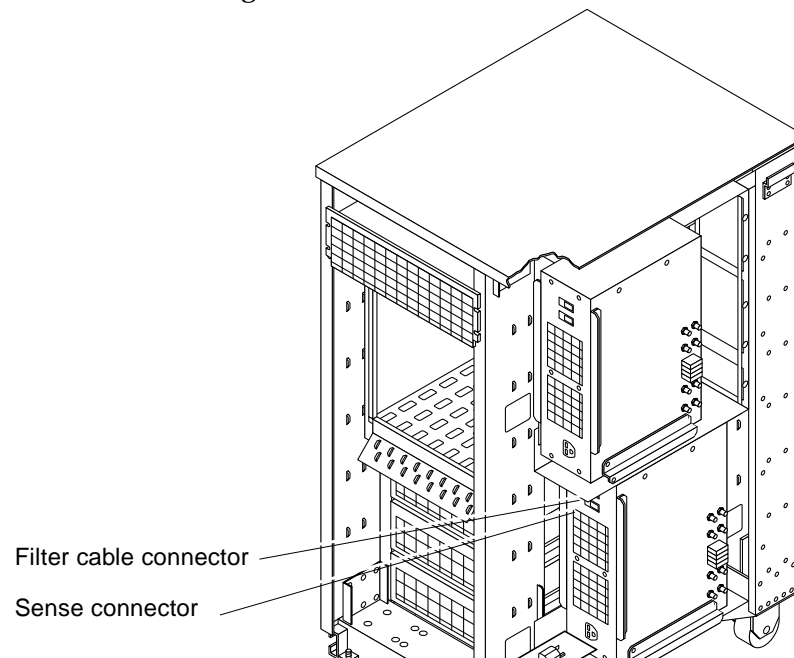


Figure 7-23 Disconnecting the Filter Cable

5. **Remove the power sense cable from J1.**

Remove the Power Supply

1. **Remove six screws securing the rear of the power supply.**
See Figure 7-16.

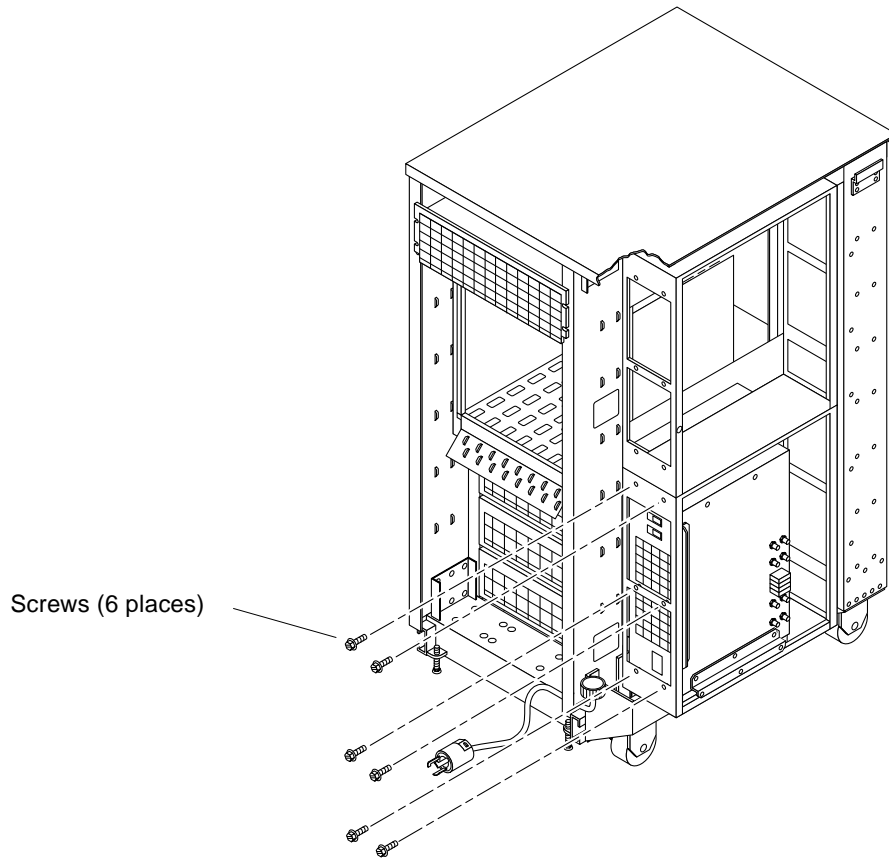


Figure 7-24 Removing Power Supply Mounting Screws

2. **Slide the supply to the right, slightly toward the front of the cabinet and pull the right edge away from the frame. This exposes the unit for grabbing.**
See Figure 7-25.

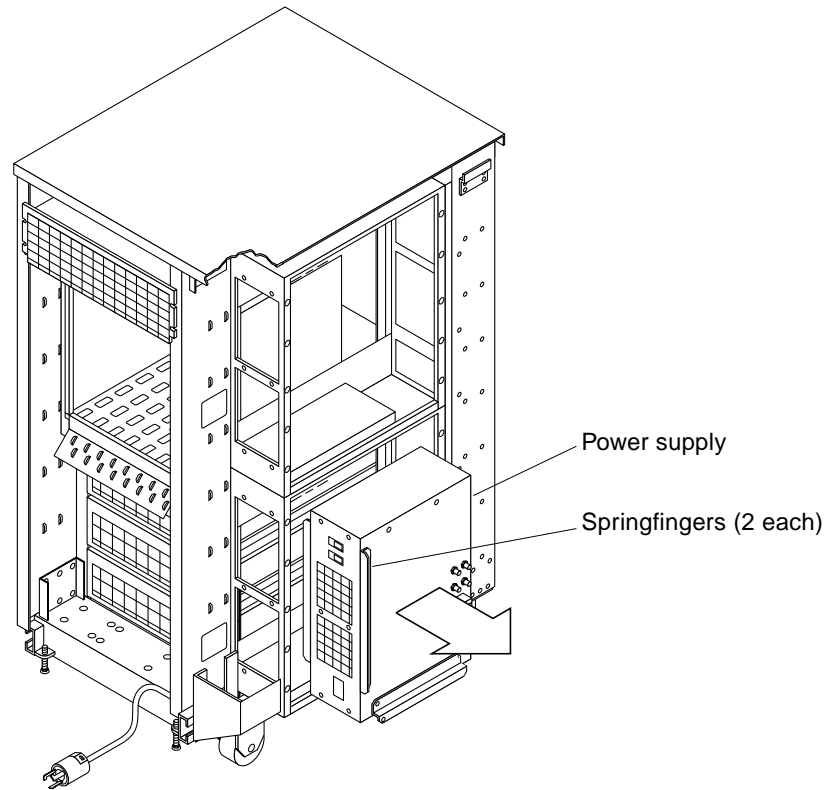


Figure 7-25 Removing the Bottom Power Supply

3. Remove the power supply.

4. Remove the springfingers.

Remove three screws securing each of the two sets of springfingers to the face of the supply. See Figure 7-25. Set these aside for installation on the new power supply.

Replace the Power Supply

1. Install the springfingers from the old supply onto the new supply.

2. Install the new supply using Section 7.3.2.2, “Bottom Power Supply” in reverse order.

7.4 *Power Supply Adapter Board*

The power supply adapter board is present in a redundant-capable chassis only. It monitors power supplies and displays possible failures as follows (see Figure 7-26):

- Both power supplies installed: It monitors both supplies and lights
 - the left LED if the bottom supply fails
 - the right LED if the top power supply fails
- Top power supplies only installed: It monitors the top supply and lights the right LED if the top or bottom supply fails
- Normal condition is with both LEDs off

Note – To view the LEDs, remove the top vented front panel and peer through the EMI screening on the left side of the chassis. Normal condition is both LEDs off.

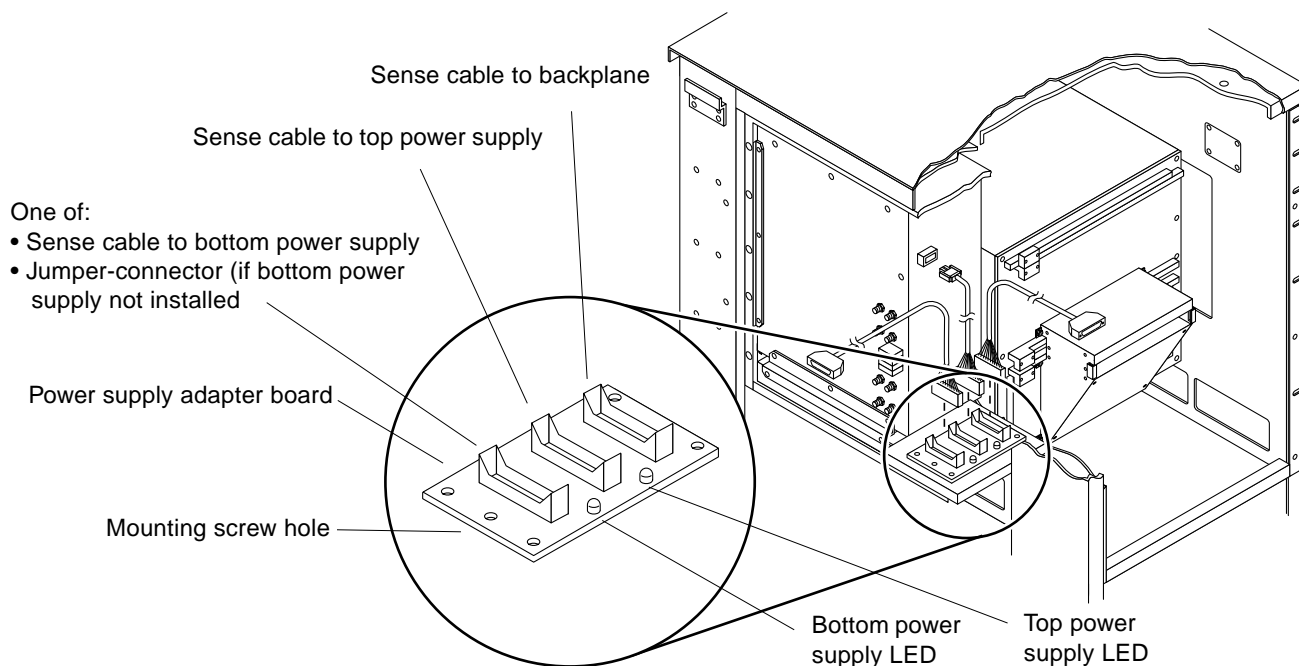


Figure 7-26 Power Supply Adapter Board LEDs

1. Disconnect all cables/connectors from the board (see Figure 7-27):

a. Systems with two power supplies:

Disconnect cables from the bottom power supply (front-most connector), top power supply (middle), backplane (rear).

b. Systems with the top power supply only:

Disconnect cables from the top power supply (middle), backplane (rear). Remove the jumper connector (front) and set aside. It must be installed on the new adapter board.

1. Remove the screw at the near edge of the board securing it in place.

2. Slide the board toward the chassis (away from you) so the open portion of the slotted holes in the board clear the heads on all four standoffs.

3. Lift the board up and free of the chassis.

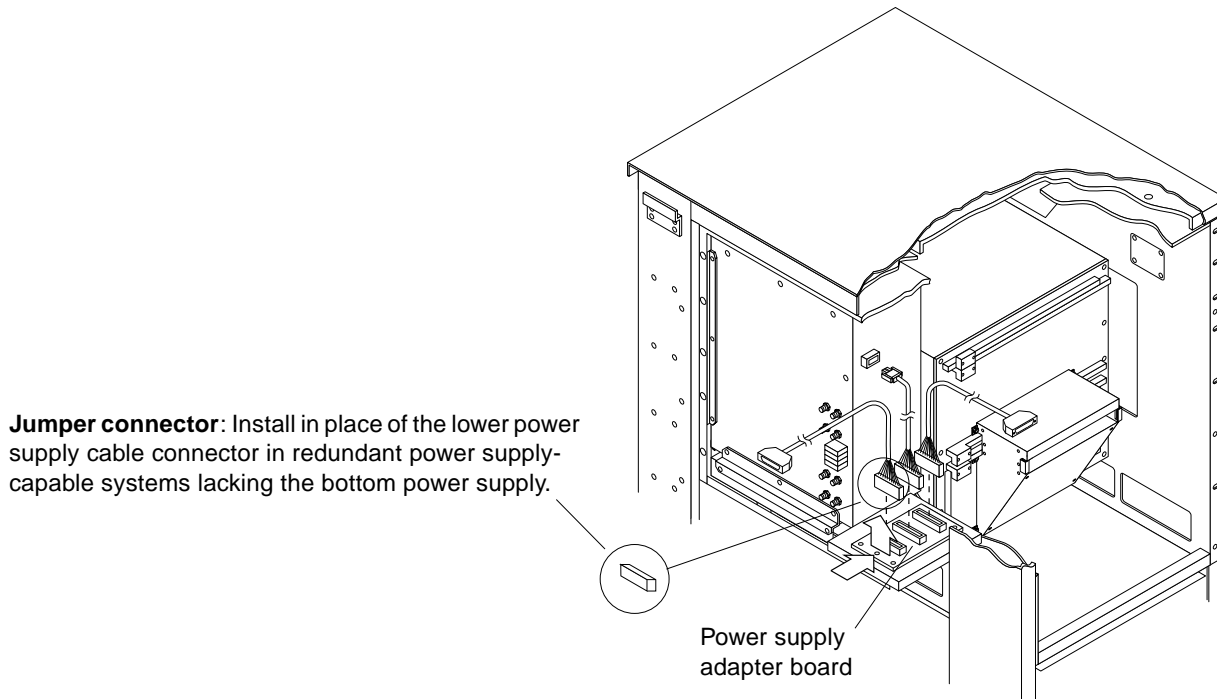


Figure 7-27 Power Supply Adapter Board (Redundant-Capable Systems Only)

To replace the board:

1. **Position the board over the four standoffs with the LEDs to the right.**
2. **Allow the board to drop into place over the four standoffs (the large holes slip over the standoff heads).**
3. **Pull the board toward you to align the screw hole over the threaded standoff underneath. Install the screw to secure the board in place.**
The screw hole is shown in Figure 7-26.
4. **Connect all sense cables/connectors.**
 - Backplane cable (toward the rear)
 - Top power supply cable (middle)
 - Front connector:
 - Bottom power supply cable (if bottom power supply present) or
 - jumper-connector (bottom power supply absent)

7.5 Power Supply Breaker Box

5. Remove the power breaker box from the power supply. See Figure 7-28.
 - a. Remove two screws from the bottom lip of the box.
 - b. Loosen two screws at the top of the box.

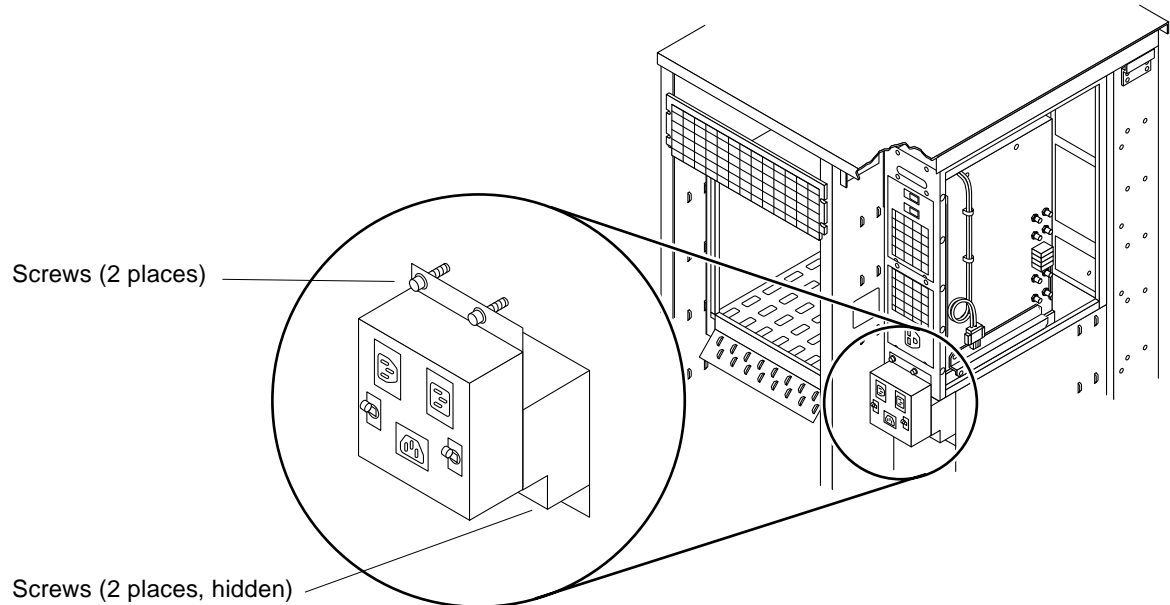


Figure 7-28 Removing the Power Breaker Box

6. Unplug the power sense cable from the top connector on the power supply.
7. Remove the sense cable from the breaker box (pass it through holes in the sheet metal).
8. Remove the box.

To replace the box, use the removal procedure above in reverse.

7.6 System Board

Perform these tasks in order to replace the system board.

Safety and Tools Requirements	page 5-1
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Rear Screen Panel	page 7-4

To remove any cables connected to a system board, see Section 6.2, “External Cables” before starting the following procedure.

When removing the cables from the system board back panel, use Figure 6-4 as a worksheet to keep track of the cable locations.

- Mark each cable (for identification) as it is being removed.
- Use the worksheet (Figure 6-4) to relocate and reconnect the appropriate cables when reinstalling a system board.

To remove the system board, see Figure 7-29, and proceed as follows:

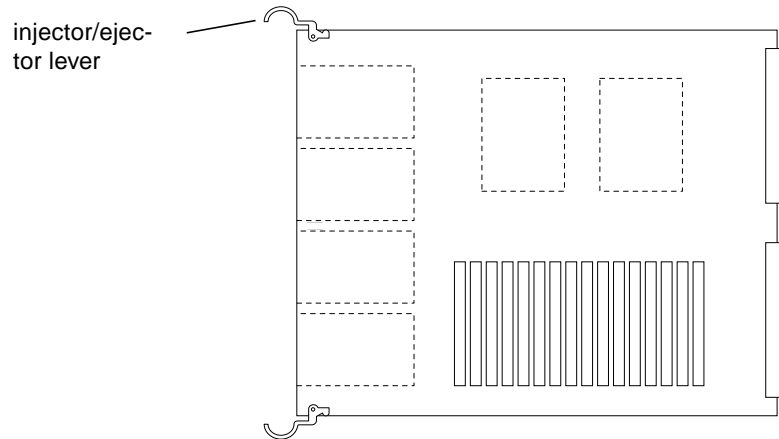


Figure 7-29 System Board with Injector/ejector Levers Extended



Caution – Use the Sun ESD kit P/N 250-1088 for this procedure.

1. **Remove the two screws that secure the board to the card cage.**
Set the screws aside for later use.
2. **Pull the curved ends of injector/ejector levers outward to release the board from the backplane connectors.**
See Figure 7-29.
3. **Gently pull the board out of the card cage.**
4. **Place the board on the ESD mat or in an antistatic bag.**

To reinstall a system board, proceed as follows:

Note – To select a card cage slot for the system board, refer to Appendix E, “General Rules for System Configuration.”

1. **Open the protective packaging and take out the system board.**
2. **Carefully insert the board in the proper slot in the card cage.**
The component side of the board must face to the right.



Caution – Do not allow components on either side of the board to scrape against other boards. **DO NOT FORCE** any board into a slot. If the board binds, remove it and inspect the card cage slot for any obvious obstructions. Also inspect both the board and the backplane for bent pins or other damage.

3. **Ensure that the injector/ejector levers are in the outward position as you slide the board toward the backplane connectors.**
See Figure 7-29. The board will not seat fully unless the levers are in this starting position.
4. **Use the injector/ejector levers to seat the board.**
Swing the injector/ejector levers into the locked position. Do not press on the board to seat it—doing so will damage the connector pins.
5. **Install two 2-56 Allen screws to secure the board to the card cage.**

Connect any applicable interface cables to the system board back panel.

7.7 Control Board

Perform these tasks in order to replace the backplane control board.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Opening the Hinged Door	page 7-2
Vented Front Panels	page 7-3
EMI Shield	page 7-1

To minimize risk of ESD damage:

- Handle board by edges only.
- Store board in antistatic bag provided.

Use Sun ESD kit P/N 250-1088 when working on the control board.

1. Remove the control board assembly from the backplane connector.

Grasp each board ejector and carefully pull the board outward. See Figure 7-30. With the board unseated, gently slide it out and clear of the enclosure.

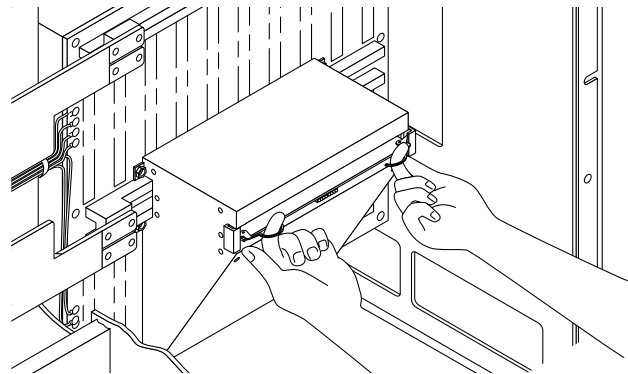


Figure 7-30 Control Board Assembly Removal

To replace the control board assembly proceed as follows:

1. Insert the control board assembly in the enclosure, component side down.

Carefully insert the board in the guide rails and firmly push the board in.

2. Seat the board in the backplane connector.

Bring the board ejectors toward the center of the board.

3. Turn on system power.

The yellow (middle) LED on the front panel should turn on and stay on.

4. At the ok prompt, enter the following command:

```
ok: update-system-idprom
```

Note - The `update-system-idprom` command causes the ID PROM on the control board to be loaded with required data from the NVRAM on the master system board.

5. Press the system reset switch to restart the operating system.

The yellow LED should turn off after approximately 30 seconds.

7.8 Backplane

Perform these tasks in order to replace the card cage backplane.	
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Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Opening the Hinged Door	page 7-2
Vented Front Panels	page 7-3
EMI Shield	page 7-1
Power Supply	page 7-3
Rear Screen Panel	page 7-4
System Board	page 7-30

The backplane is mounted to the card cage by 33 hex-head screws.

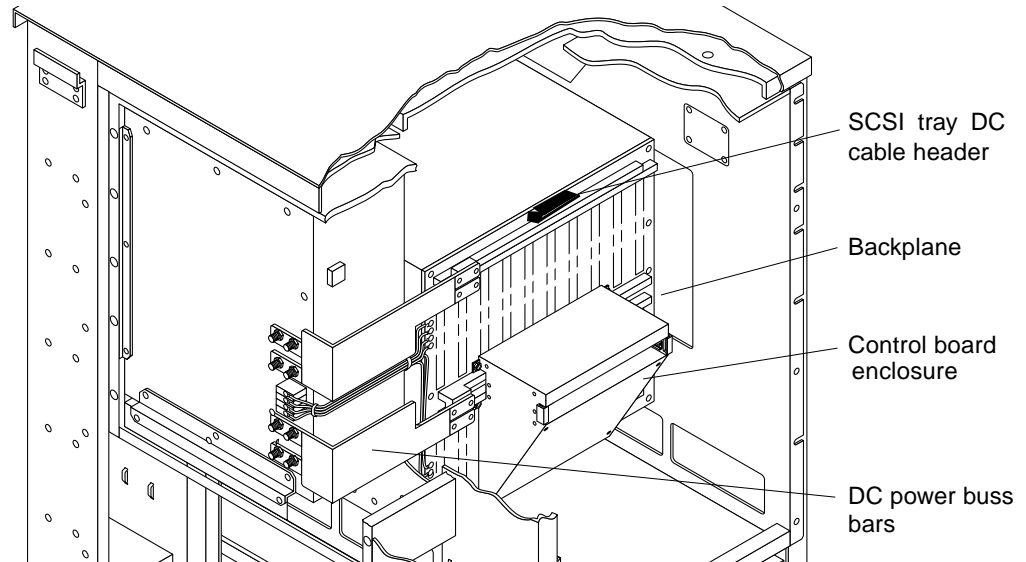


Figure 7-31 Backplane Location in the Card Cage

When removing the backplane from the card cage assembly, you must first remove the DC power buss bars from the power supply.

The control board enclosure must be removed before the backplane can be fully accessed. To remove the control board enclosure, see Figure 7-32 and proceed as follows:

1. **Remove the four hex-head screws shown on the left side of Figure 7-32.**
Access to the screws is through the card cage.
2. **Remove the two hex-head screws shown on the right side of Figure 7-32.**
Access these screws from the front of the system.
3. **Remove and set aside the control board enclosure.**

Note – All cables that are plugged into or are located in front of the backplane must be removed and pulled out of the way.

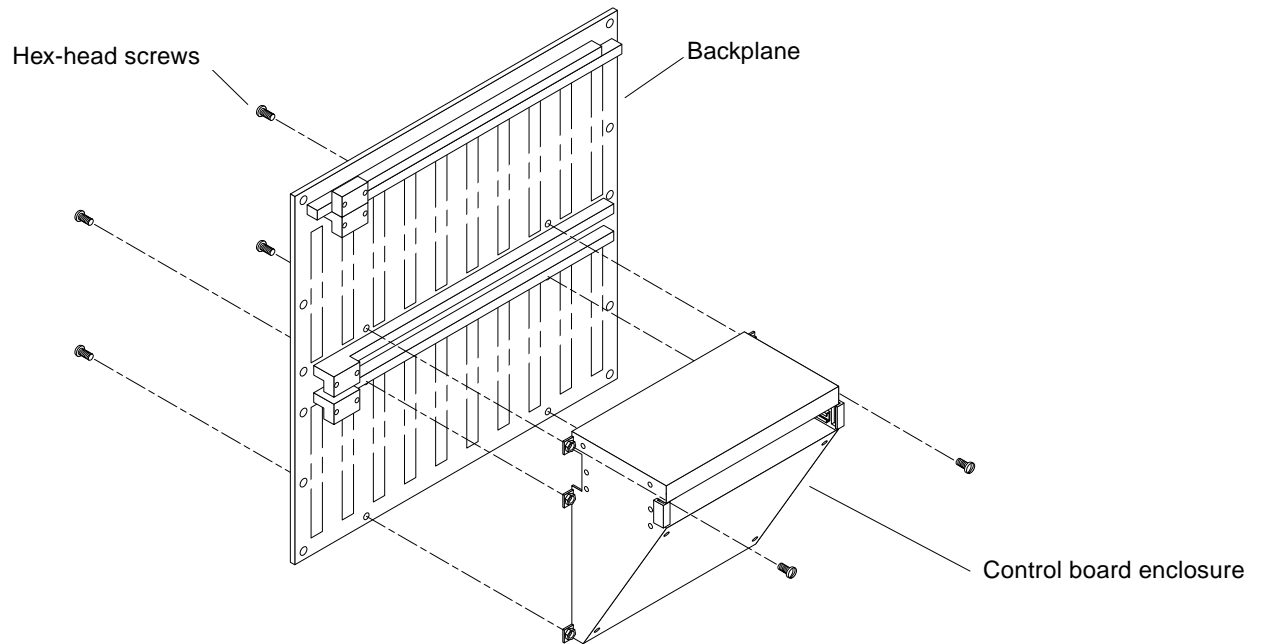


Figure 7-32 Control Board Enclosure Removal.

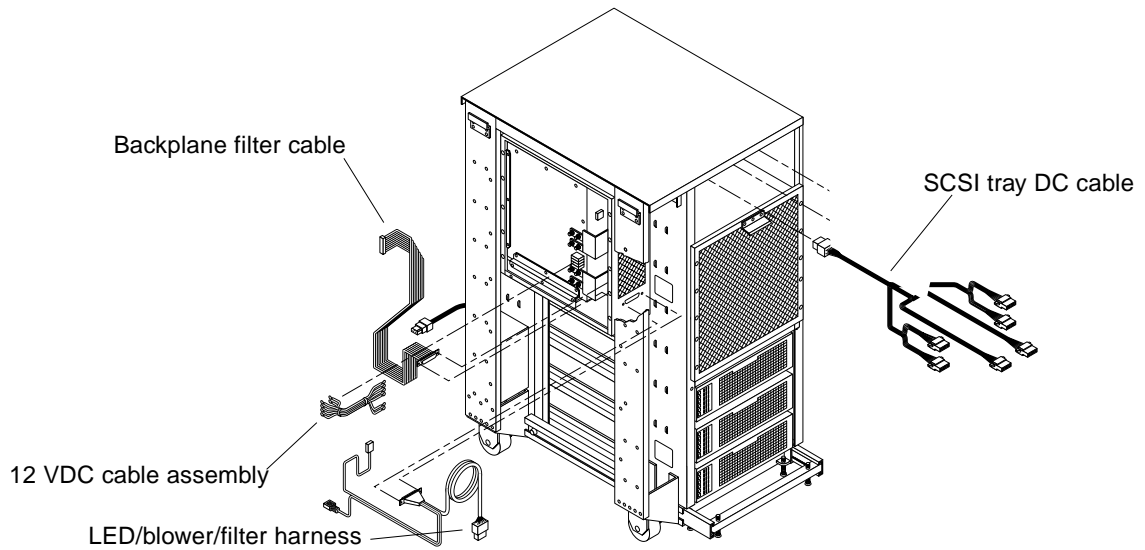


Figure 7-33 Cable Assemblies Removal

The cables include:

- SCSI tray data cable assembly
- SCSI tray DC cable assembly
- Backplane filter cable assembly
- Voltage sense cable
- 12 VDC cable assembly

4. Remove the SCSI tray data cable assembly and the SCSI tray DC cable assembly.

See Section 7.9, “Cable Removal from the Internal SCSI Tray” for removal details.

5. Remove the 12 VDC cable assembly from the backplane terminal blocks.
Do this by removing the six slotted screws.

6. Remove the backplane filter cable assembly by pressing the ejectors until the cable is free of the shrouded header.

Push the cable out of the way.

7. Remove the voltage sense cable assembly by pressing the ejectors until the cable is free of the shrouded header.

Push the cable out of the way.

The backplane is now disconnected from any cable assembly and removal can now take place.

8. Carefully remove the hex-head screws that hold the backplane to the card cage. See Figure 7-34.



Caution – The backplane is heavy. First remove all but the top left and right screws. Then support the board with one hand and remove the two remaining screws.

9. Lift out the backplane and set it on an antistatic mat. Take care not to bend any pins on the board.

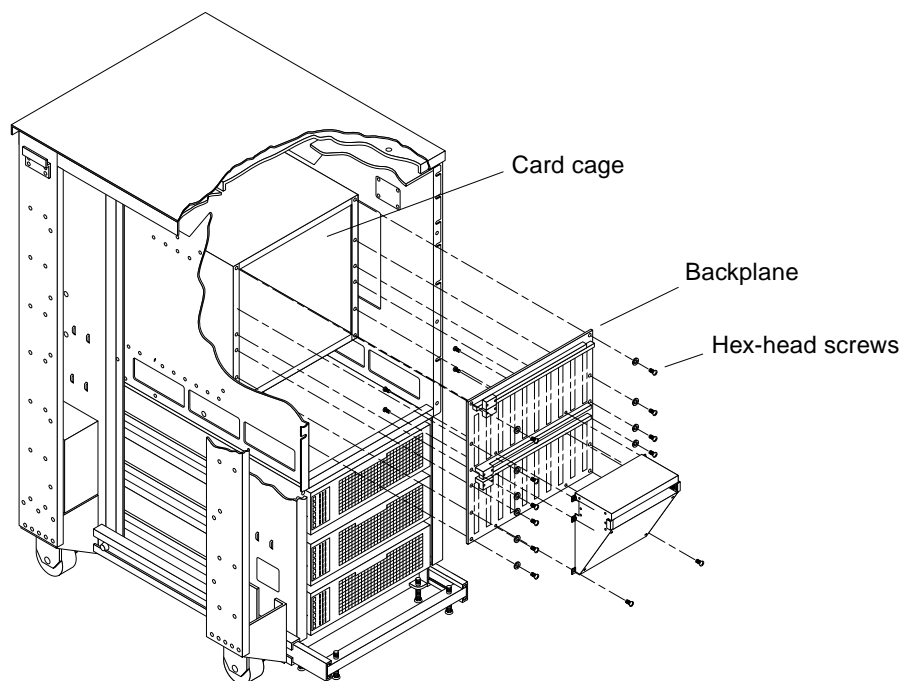


Figure 7-34 Backplane Removal

To replace the backplane:

- 1. Hold the backplane in position against the cardcage**
There are two locating tabs at the base of the card cage. Allow the backplane to rest on these tabs. Then install the four corner 4M hex-head screws loosely to the cardcage.
- 2. Insert all the screws loosely through the backplane to the cardcage.**
- 3. When all the screws have been located, tighten them from the center of the backplane to the outer edges.**

When the backplane has been installed in the card cage, reinstall the power buss bars and the cable assemblies.

Then replace the control board enclosure as follows:

- 1. Hold the control board enclosure against the backplane until the screw holes align.**

2. **Insert the two screws through the top mounting holes of the control board enclosure into the threaded holes in the backplane, and tighten.**
This is accomplished from the front of the system.
3. **Insert the four screws through the backplane into the lower four threaded mounting holes of the control board enclosure, and tighten.**
This is accomplished from inside the card cage enclosure.

The backplane is now fully installed.

7.9 Cable Removal from the Internal SCSI Tray

Perform these tasks in order to replace the SCSI tray cables.	
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Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Opening the Hinged Door	page 7-2
Vented Front Panels	page 7-3
EMI Shield	page 7-1
Drive Assembly Removal (as required—see the note below)	page 9-1

Note – To remove the SCSI data cable and SCSI DC cable from the internal SCSI tray, all the drive assemblies have to be removed. To remove a SCSI address cable assembly, it is only necessary to remove the one affected drive.

Figure 7-35 shows the three types of cable used for the SCSI tray.

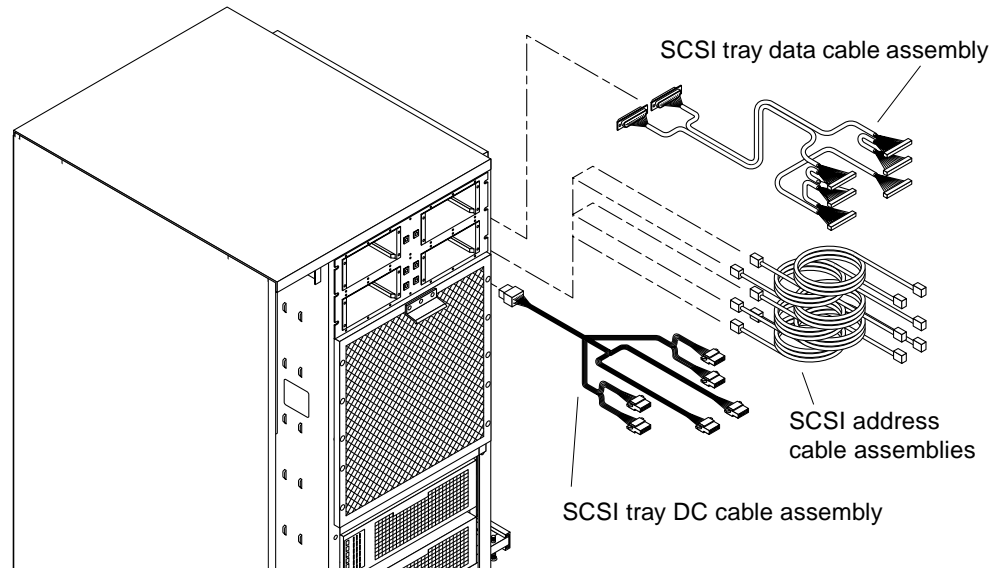


Figure 7-35 SCSI Tray Cable Assemblies (Front View)

7.9.1 SCSI Tray DC Cable

- 1. Disconnect the DC cable assembly from the header at the top center of the backplane and push the cable and connector up into the SCSI tray through the cut-out provided.**
See Figure 7-36 for the header location on the backplane.
- 2. Carefully pull the complete cable assembly out through the front of the internal SCSI tray.**

To replace the DC cable assembly, reverse the preceding instructions.

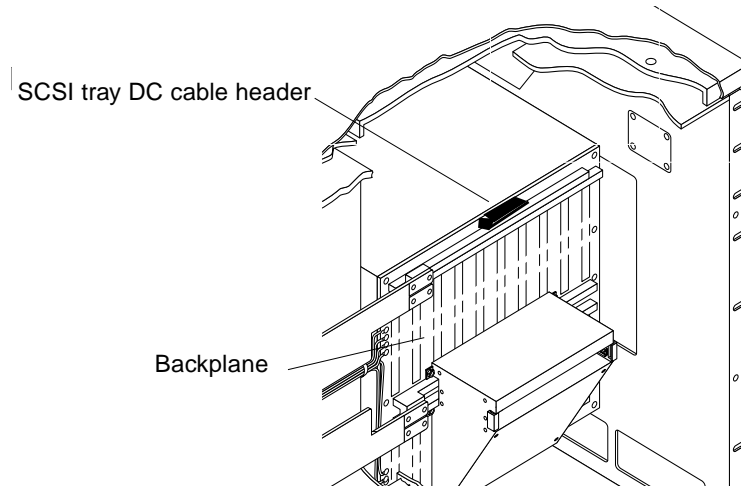


Figure 7-36 SCSI Tray DC Header Location

7.9.2 SCSI Tray Data Cable

1. **At the rear of the card cage under the cable restraint panel, remove the four #2-56 screws that secure the two SCSI connectors for the SCSI tray data cable assembly.**
The access panel can be removed to gain access to the cable assembly. See Figure 7-37.
2. **From the front of the chassis, pull the SCSI tray data cable assembly so that the nylon cable mounts pop out of the chassis.**
Cut the cable ties that hold both cables together.
3. **Push each cable up into the SCSI tray through its own cut-out, making sure the connectors clear the sheet metal.**
4. **Carefully pull the complete cable assembly out through the front of the internal SCSI tray.**

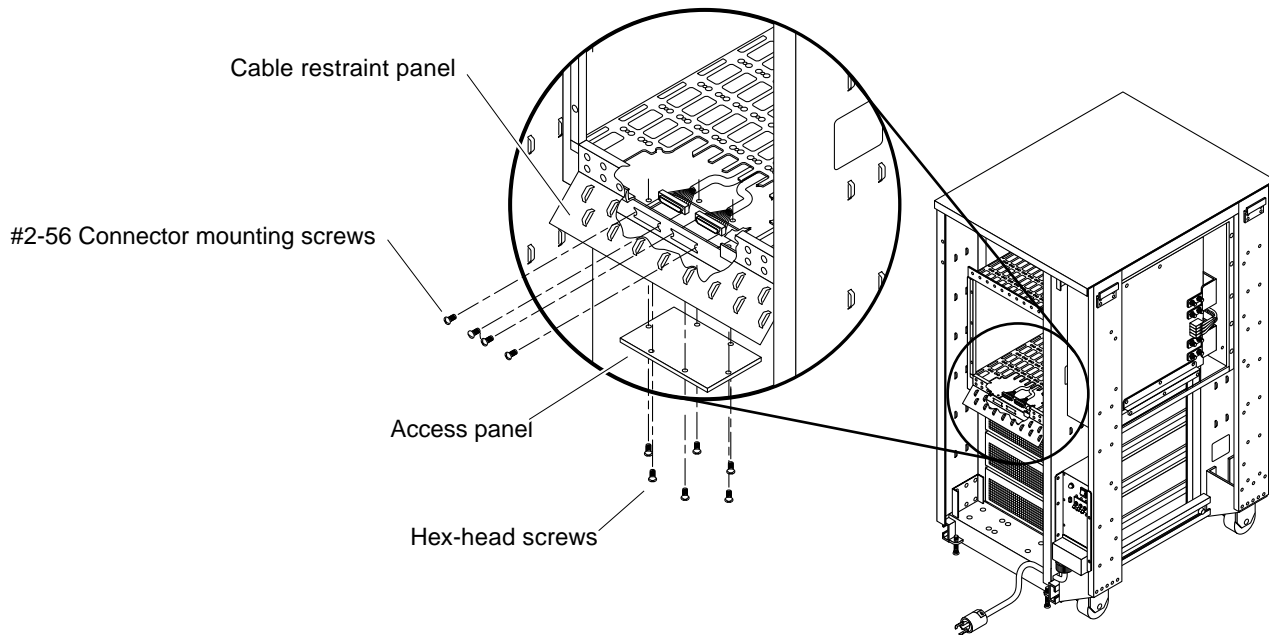


Figure 7-37 SCSI Tray Data Cable Assembly Removal (Rear View)

To replace the cable, reverse the preceding instructions.

7.9.3 SCSI Address Cable

To remove the SCSI address cable, only the affected drive must be removed. See Chapter 9, “Storage Devices” for procedures for removing a drive from the SCSI tray.

7.10 LED/Key Switch Board and Keyswitch

Perform these tasks in order to replace the LED/key switch board.	
Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Opening the Hinged Door	page 7-2

The LED/key switch board is mounted behind the hinged door.

7.10.1 One-Piece Keyswitch Assembly

1. **Unplug the key switch cable from the LED/key switch board.**
See Figure 7-38.

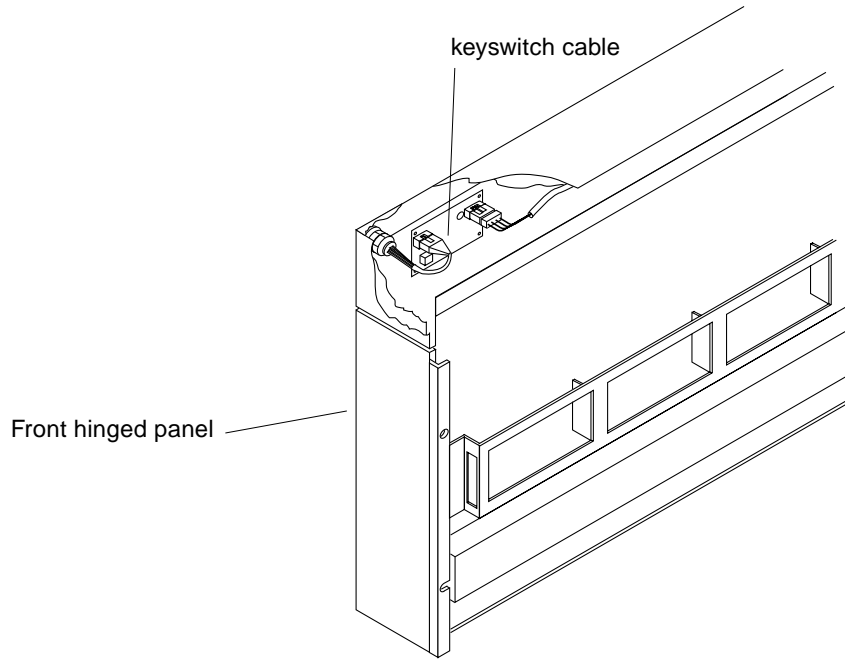


Figure 7-38 One Piece Keyswitch — Disconnecting the cable

2. **Remove the C-shaped retainer clip from the groove in the keyswitch body at the backside of the panel.**
See Figure 7-39.
3. **Pull the keyswitch assembly through the panel hole from the front.**

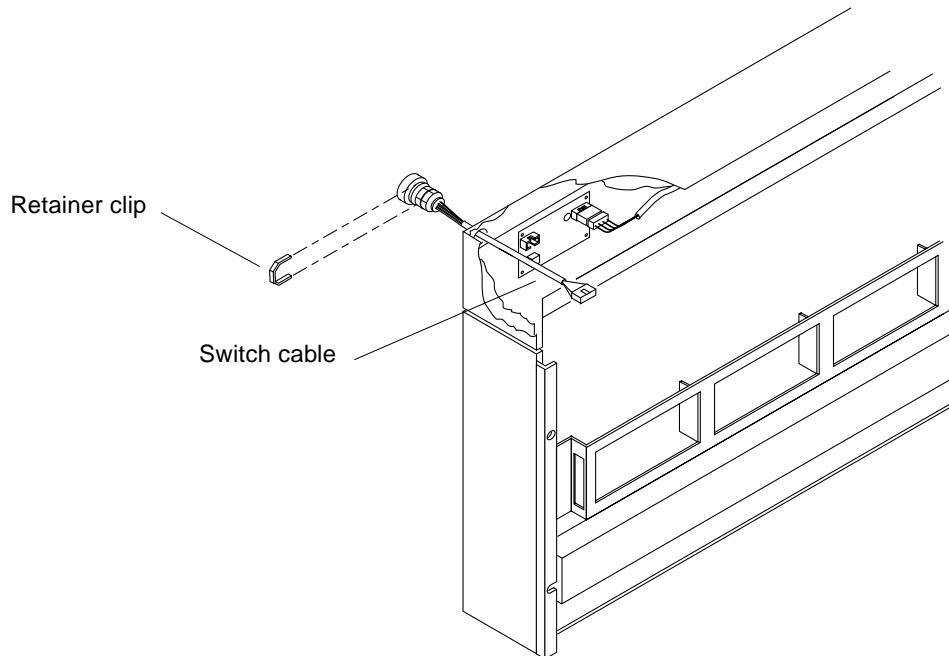


Figure 7-39 One Piece Keyswitch — Disconnecting the cable

To replace the switch, reverse the preceding instructions.

7.10.2 Multiple-Piece Keyswitch Assembly

To replace the LED/key switch board, first disconnect the LED/blower/filter harness cable or key switch cable from the LED/key switch board. See Figure 7-40 and proceed as follows:

1. **Unplug the power sense cable and the key switch cable from the LED/key switch board.**

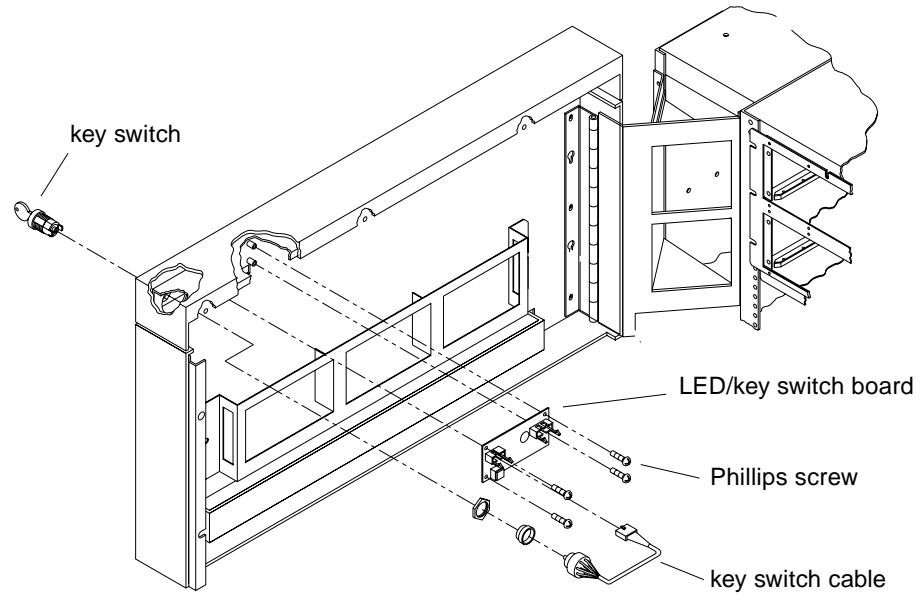


Figure 7-40 LED/Key Switch Board Removal and Replacement

2. Remove the four Phillips screws and remove the board.

To replace the board, reverse the preceding instructions.

7.11 Blower Assembly

Perform these tasks in order to replace the blower assembly.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Rear Screen Panel	page 7-4

This procedure applies to both the single blower assembly and the quad blower assembly (used with dual power supply systems).

1. **Remove the power sense cable and +24 VDC cable from underneath the blower assembly. See Figure 7-41.**

Squeeze the locking tabs on the sides of the connector body and pull the cable assembly away from the cable housing on the blower assembly.

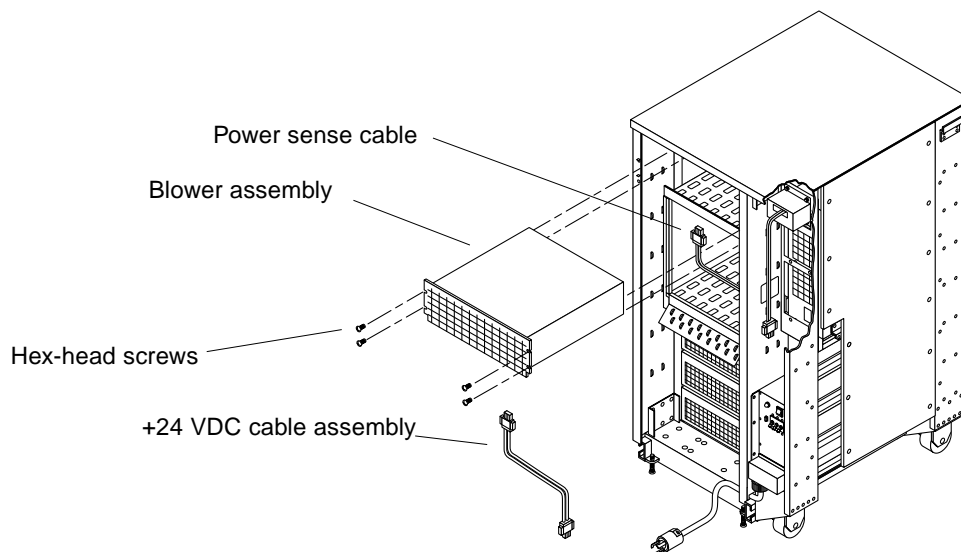


Figure 7-41 Blower Assembly Removal and Replacement

2. **Remove the four hex-head screws as shown.**
3. **Carefully pull the blower assembly forward from the system chassis and lift it out.**



Caution – The blower assembly is heavy. Exercise care when lifting.

4. **Put the blower assembly aside.**

To replace the blower assembly, reverse the preceding instructions.

7.12 AC Distribution Unit

Perform these tasks in order to replace the AC distribution unit.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Side Panels	page 7-5
Kick Panel	page 7-9

Figure 7-42 shows the AC distribution unit.

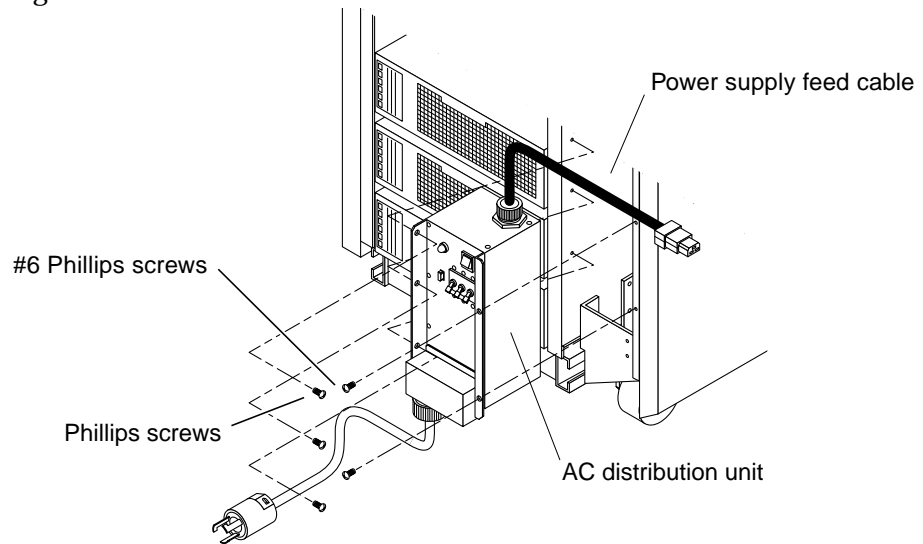


Figure 7-42 AC Distribution Unit Removal and Replacement

To remove the AC distribution unit:

1. **Disconnect all AC cables that may be plugged into the unit, and any cables connected to the connectors marked J2 or J3.**

Note – J2 and J3 may be found in different locations in the AC distribution unit, depending on the specific unit installed in your chassis.

2. **Disconnect the AC distribution unit from the main power source and disconnect the power supply feed cable.**



Warning – Before removing the power distribution unit, disconnect the unit from any AC source, and remove all cables that are plugged into it.

3. Remove the three Phillips screws and two #6-32 Phillips screws.
4. Carefully remove the power distribution unit from the system chassis.

To reinstall the AC distribution unit, reverse the preceding instructions.

7.13 Differential SCSI Disk Tray

Perform these tasks in order to replace the differential SCSI disk tray.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Vented Front Panels	page 7-3
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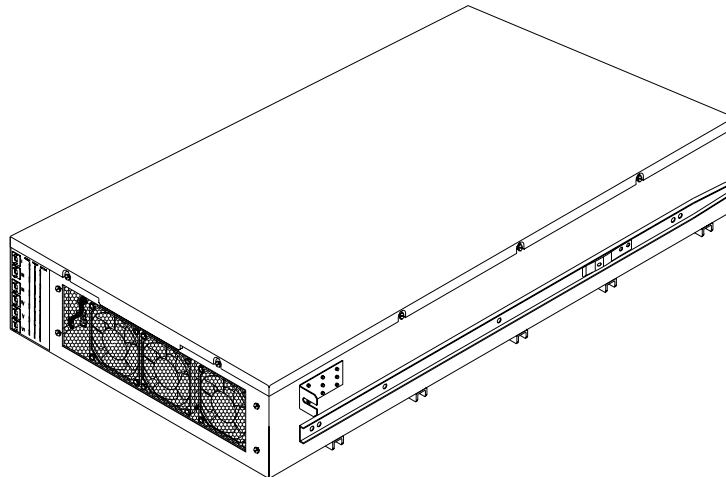


Figure 7-43 Differential SCSI Disk Tray

See Figure 7-44 and Figure 7-45 when preparing the tray for removal or replacement of drives or cables.

1. At the rear of the cabinet, disconnect the power cord from the power receptacle of the differential SCSI disk tray.
2. Disconnect the exterior SCSI data cables from the I/O ports at the rear of the differential SCSI disk tray.
3. Remove the four Phillips screws that lock the tray slide rails in place. See Figure 7-44.

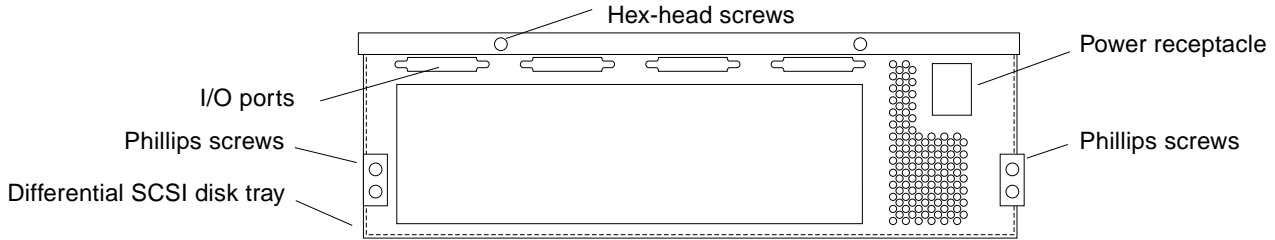


Figure 7-44 Differential SCSI Disk Tray Power Receptacle and I/O Ports

4. Loosen the two hex-head screws at the rear of the tray that secure the top cover to the tray.
5. At the front of the cabinet, unscrew the two Phillips screws that secure the mounting brackets at the sides of the tray to the cabinet. See Figure 7-45.

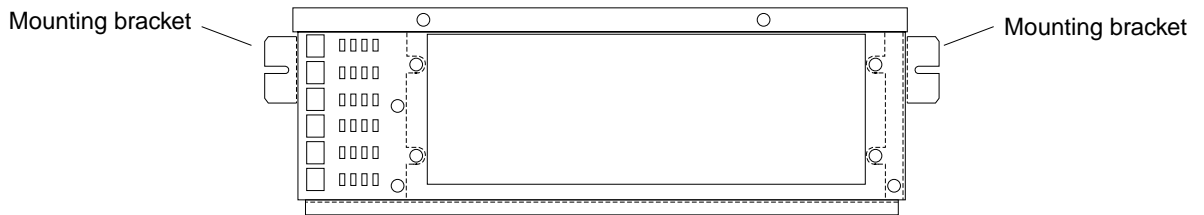


Figure 7-45 Removing Screws at the Front of the Tray



Warning – Before fully extending the tray, extend the stabilizer bar at the base of the system cabinet. See Section 7.9, “Stabilizer Bar.”

6. Fully extend the tray until the slide rail button clicks.
7. Loosen the remaining eight hex-head top cover screws (three at each side and two at the front).

8. Remove the cover from the tray and set aside.

To add or replace disk drives in the tray, see Section 9.7, “5 1/4-Inch Disk Drive,” on page 9-26.

7.13.1 Fan Tray Assembly

Perform these tasks in order to replace the fan tray assembly.	
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Safety and Tools Requirements	page 5-1
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Vented Front Panels	page 7-3
Rear Screen Panel	page 7-4
Differential SCSI Disk Tray	page 7-47

It is not necessary to remove the disk drives from the differential SCSI disk tray. See Figure 7-46 and proceed as follows:

- 1. Remove the DC harness fan connector (P9) from the fan DC receptacle.**
Squeeze the locking tabs on the connector, and gently pull the connector.
- 2. Remove the four hex-head screws that hold the fan tray assembly in place.**
Lift the fan tray assembly out.

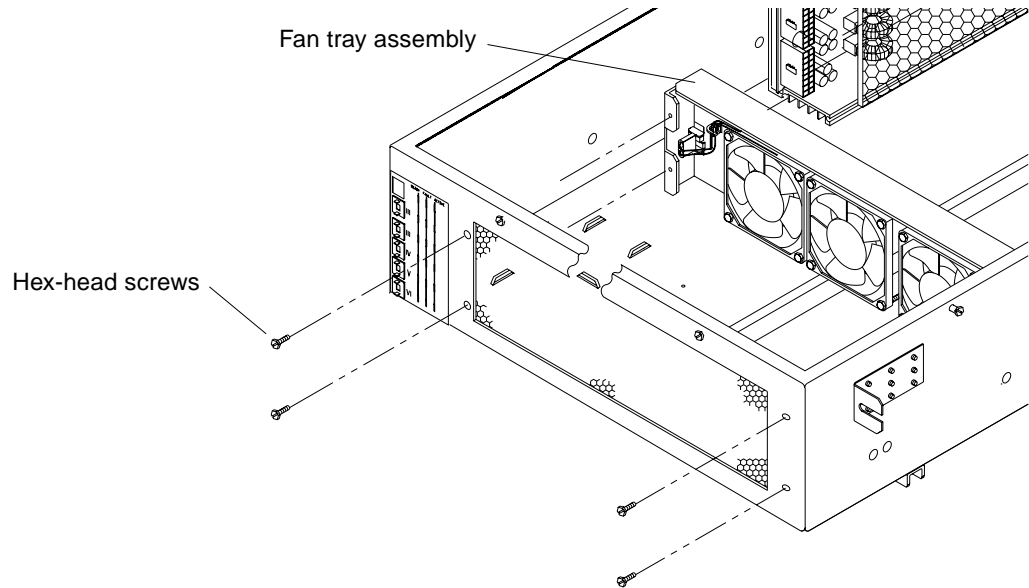


Figure 7-46 Fan Tray Assembly Removal and Replacement

To replace the fan tray assembly, reverse the preceding instructions.

7.13.2 SCSI Data Cable Harness

Perform these tasks in order to replace the SCSI data cable harness.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Vented Front Panels	page 7-3
Rear Screen Panel	page 7-4
Differential SCSI Disk Tray	page 7-47

To remove the SCSI data cable harness from the differential SCSI disk tray, see Figure 7-47 and proceed as follows:

Note – There are two identical data cable harnesses in the differential SCSI disk tray. Each harness services one half of the tray.

- 1. Disconnect the data cable from each of the drives.**
See Section 9.7, “5 1/4-Inch Disk Drive,” on page 9-26.
- 2. Remove any cable restraints that hold the harness to the chassis or other cable assemblies.**
- 3. At the back panel of the tray, remove the jackscrews that secure the I/O connectors to the tray.**
The connectors mount from the interior.
- 4. Remove the cable assembly.**

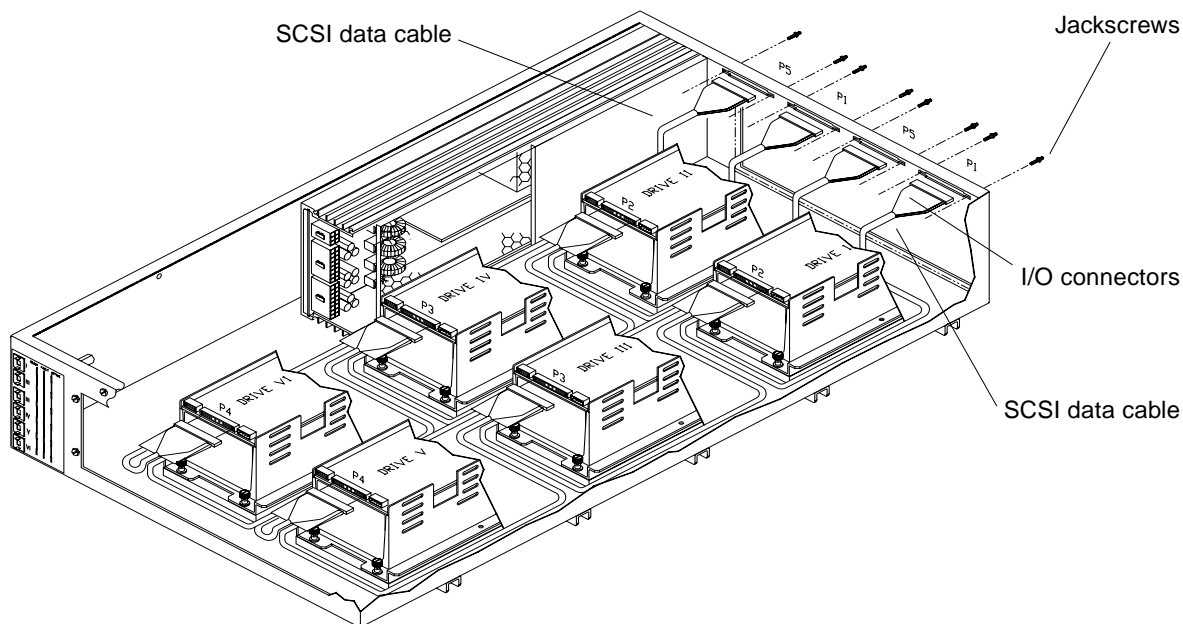


Figure 7-47 SCSI Data Cable Harness Removal and Replacement

To replace the SCSI data cable harnesses, reverse the preceding instructions.

7.13.3 SCSI Address Cable

Perform these tasks in order to replace the SCSI address cable.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Vented Front Panels	page 7-3
Rear Screen Panel	page 7-4
Differential SCSI Disk Tray	page 7-47

To remove the SCSI address cable harness from the differential SCSI disk tray:

- 1. Disconnect the SCSI address cable from each of the drives.**
See Figure 7-48.

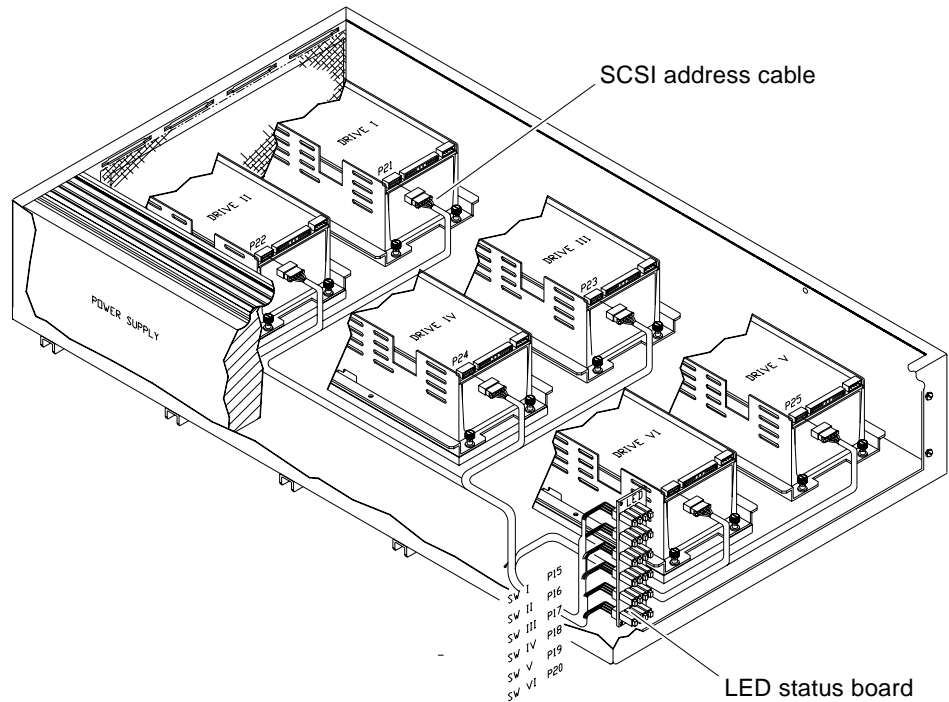


Figure 7-48 SCSI Address Cable Removal and Replacement

2. Remove any cable restraints that hold the harness to the chassis or other cable assemblies.

3. Disconnect each connector from the LED status board at the tray front.
The connectors are a staggered assembly of the SCSI address harness.

Set the harness aside.

To reinstall the SCSI address harness, reverse the preceding instructions.

7.13.4 LED Status Board

Perform these tasks in order to replace the LED status board.	
---	--

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Vented Front Panels	page 7-3
Rear Screen Panel	page 7-4
Differential SCSI Disk Tray	page 7-47

To remove the LED status board, first remove the SCSI address harness and the fan tray assembly, as shown in the preceding sections, then proceed as follows:

1. Remove the three hex-head screws that hold the board to the standoffs.
See Figure 7-49.

2. When the board is disconnected from the standoffs, gently wiggle the board to disengage from the ID selector switch interconnections.

To replace the LED status board, reverse the preceding instructions.

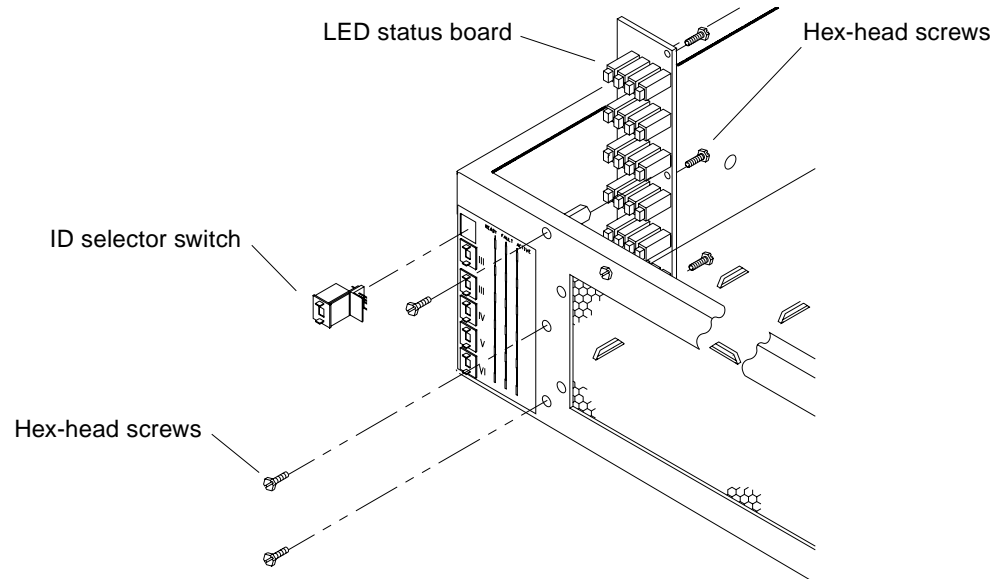


Figure 7-49 LED Status Board Removal and Replacement

7.13.5 SCSI DC Cable

Perform these tasks in the order listed to replace the SCSI DC cable.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Vented Front Panels	page 7-3
Rear Screen Panel	page 7-4
Differential SCSI Disk Tray	page 7-47

Follow these instructions to remove the SCSI DC cable harness from the differential SCSI disk tray:

- 1. Disconnect the SCSI DC cable from each of the drives, fan tray, and LED status board.**
See Figure 7-50 and Section 9.7, “5 1/4-Inch Disk Drive.”

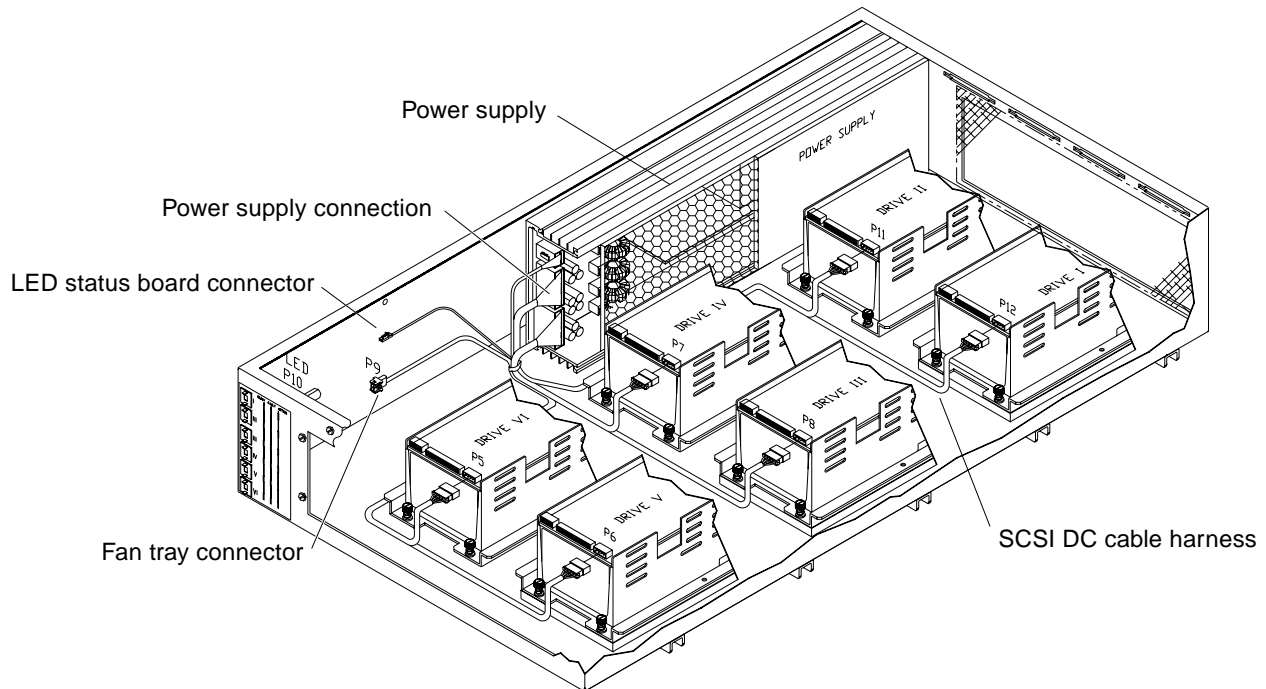


Figure 7-50 SCSI DC Cable Harness Removal and Replacement

- 2. Remove any cable restraints that hold the harness to the chassis or other cable assemblies.**
- 3. Disconnect the DC cable harness from the three connectors at the power supply.**
Each of the connectors is secured with a locking tab. Press the tab to disconnect the connectors from the supply.

7.13.6 Disk Tray Power Supply

Perform these tasks to replace the disk tray power supply.

Review the safety precautions.	page 5-1
Power off the SCSI disk tray.	page 6-1
Remove the vented front panels.	page 7-3
Extend the stabilizer bar.	page 7-9
Remove the differential SCSI disk tray.	page 7-47

To remove the power supply from the differential SCSI disk tray:

- 1. Disconnect the DC cable harness from the three connectors at the power supply as shown in Figure 7-51.**
Each of the connectors is secured with a locking tab. Press the tab to disconnect the connector from the supply.
- 2. Loosen the four captive slotted screws that secure the power supply to the tray as shown in Figure 7-52.**
- 3. Remove the power supply from the tray and set it aside.**

To replace the power supply, reverse the preceding instructions.

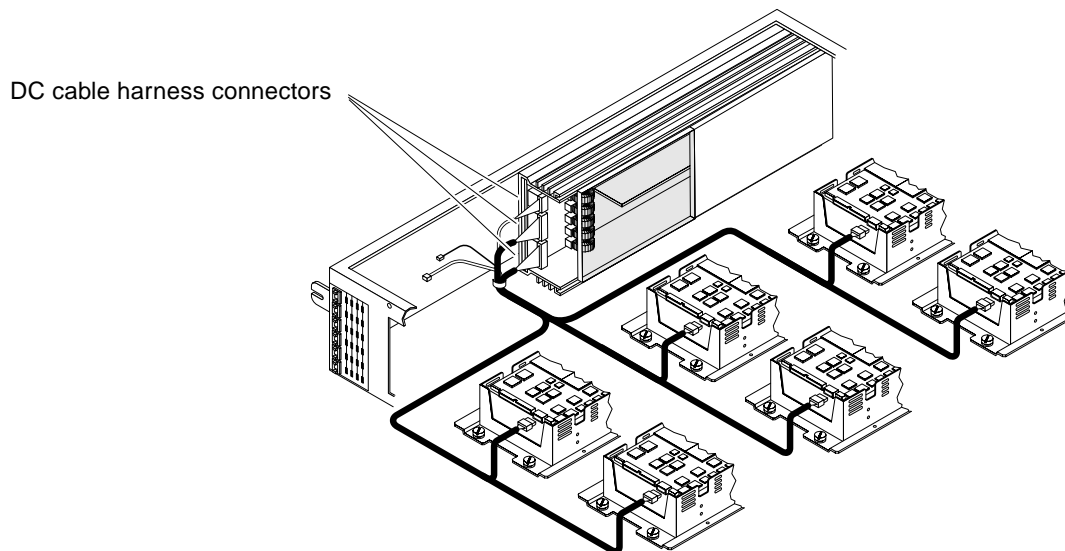


Figure 7-51 Power Supply Cable Harness in the Disk Tray

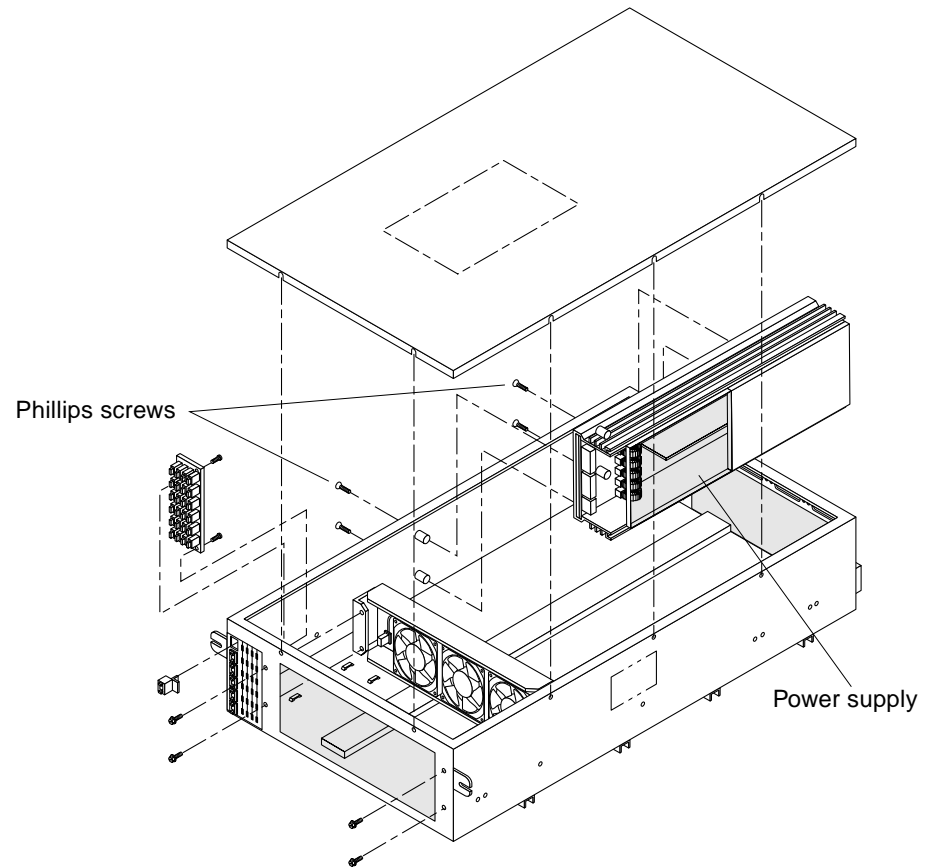


Figure 7-52 Disk Tray Power Supply Removal and Replacement

7.13.7 Connecting the Power Cord

Perform these tasks in order to replace the power cord.

Safety and Tools Requirements	page 5-1
Powering Off the System	page 6-1
Vented Front Panels	page 7-3
Rear Screen Panel	page 7-4
Side Panels	page 7-5

Use instructions below to connect the power cord to the differential SCSI tray:

1. **Locate the power cord for the differential SCSI disk tray.**
2. **Connect the female end of the power cord to the power receptacle at the rear of the differential SCSI disk tray. See Figure 7-53.**

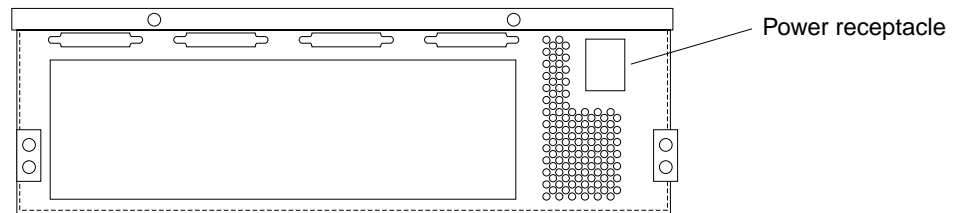


Figure 7-53 Location of the Power Receptacle on the Tray

3. **Route the power cord for the tray you are installing down the right side and along the bottom of the cabinet.**
4. **Route the cord up through the cutout to the AC distribution unit.**
5. **Plug the power cord for the tray into the AC distribution unit. See Figure 7-54.**



Warning – The AC distribution unit serves as the primary disconnect device for the Differential SCSI disk tray. Do not plug the tray into a power source other than the AC distribution unit. Personal injury may result if you work on a tray that is plugged into another power source since that power source may still be active when you work on the tray.

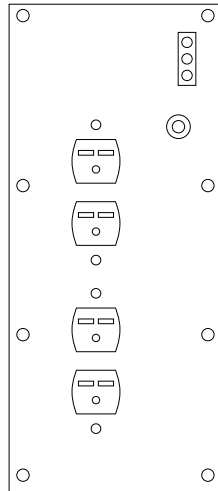


Figure 7-54 AC Distribution Unit for a SPARCcenter 2000 System

- 6. Tuck the extra length of the power cord into the pocket beneath the AC distribution unit.**

This chapter contains information needed to remove and replace storage device units in the SPARCcenter 2000 system cabinet.

9.1 Internal SCSI Tray

Figure 9-1 shows the locations of drives in the internal SCSI tray.

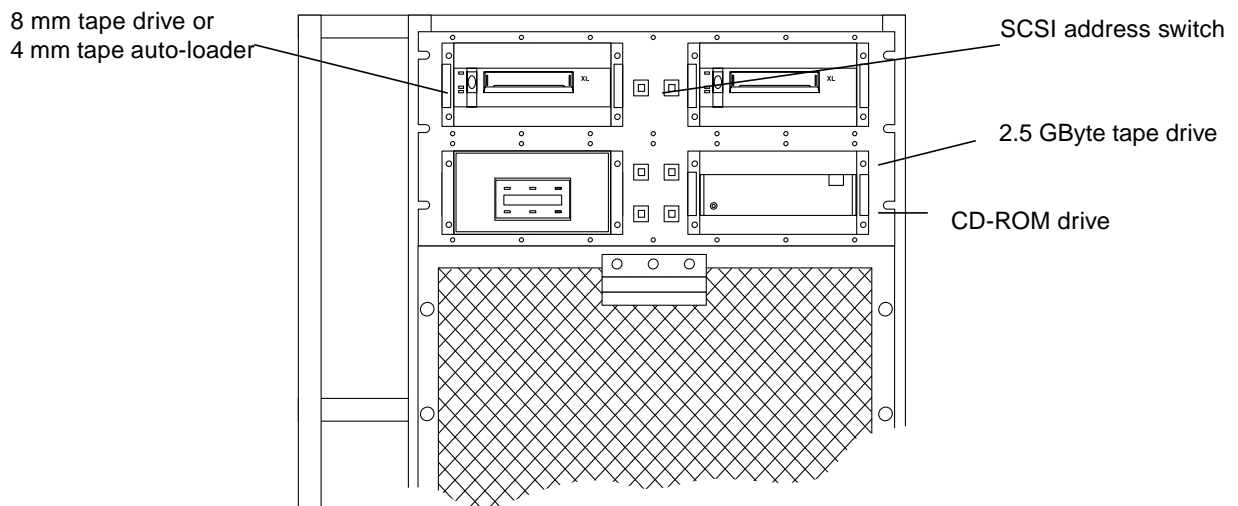


Figure 9-1 Drive Locations in the Internal SCSI Tray

9.2 SunCD Plus or SunCD 2Plus and 1/4-Inch Tape Drive Assembly

1. Remove four hex-head screws securing the CD-ROM drive (SunCD Plus or SunCD 2Plus) and 1/4-inch tape drive assembly in place. See Figure 9-2.

Note – The procedure for removing a CD-ROM drive is the same even if a tape drive is not mounted above the CD-ROM.

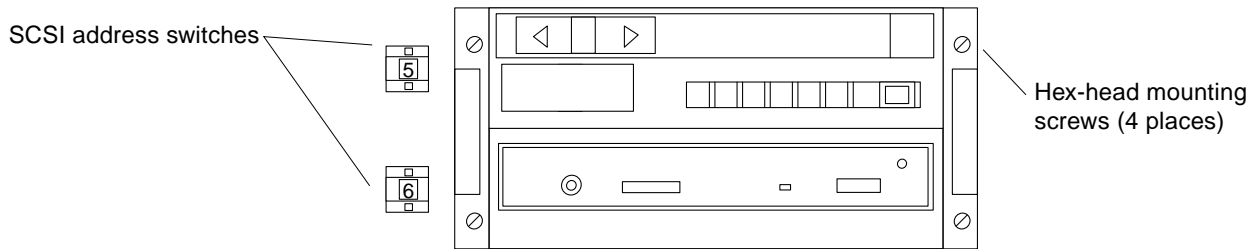


Figure 9-2 CD-ROM and 1/4-Inch Tape Drive Assemblies

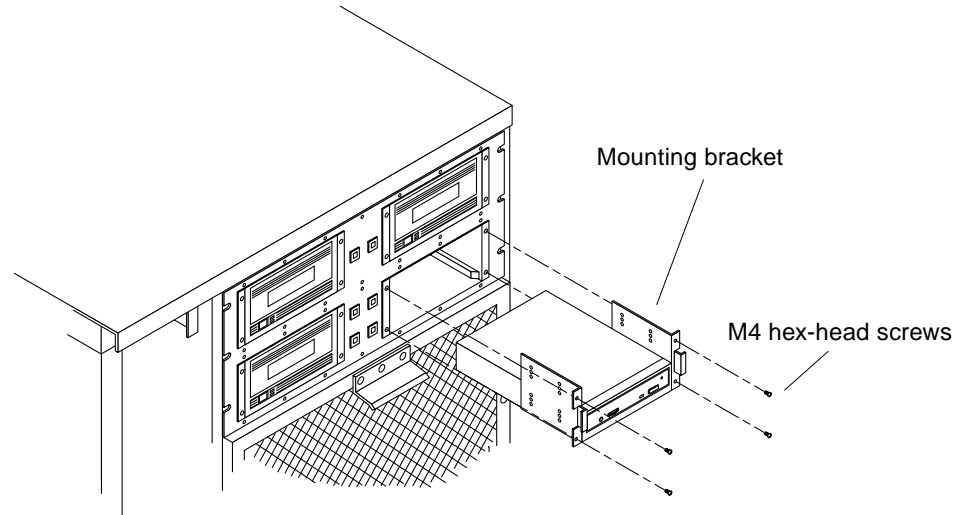


Figure 9-3 Sliding the CD-ROM Drive Assembly Out of the SCSI Tray

2. Slide the assembly out of the cabinet until the cables attached to the drives are exposed. See Figure 9-3.

3. Unplug the four cables from the rear of the CD-ROM drive.

The SCSI data cable is easily damaged by excessive force. To remove this cable safely, grasp the strain relief tab and pull gently. See Figure 9-4.

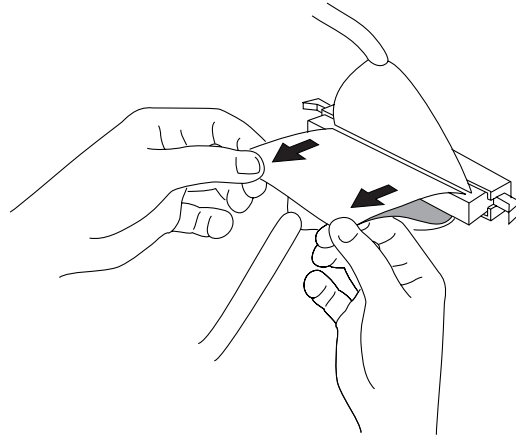


Figure 9-4 Disconnecting the SCSI Data Cable

4. If a 1/4-inch tape drive is part of the assembly, unplug the three cables from the rear of the tape drive.

5. Remove the Phillips screws that secure the two mounting brackets to the CD-ROM drive and the tape drive. See Figure 9-5.

Each mounting bracket is secured to each drive with two screws. The ground strap will then also be disconnected from the mounting bracket.

Note – SunCD and SunCD Plus only: Remove the insulator sheet from between the CD-ROM drive and tape drive.

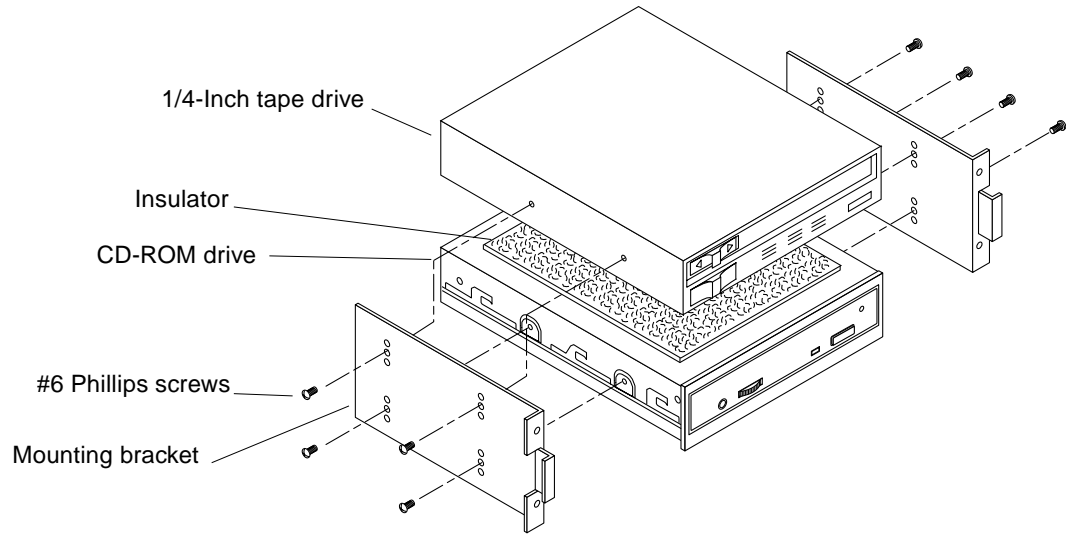


Figure 9-5 SunCD/SunCD Plus and 1/4-Inch Tape Drive Assembly

9.3 SunCD Drives

To install a SunCD, SunCD Plus, SunCD 2Plus, or SunCD Plus4 drive:

1. **On the drive rear panel, locate the PARITY and ID SELECT pins. See Figure 9-6.**
2. **Verify the jumpers are correct for SunCD Plus or SunCD 2Plus as appropriate:**
 - a. **SunCD Plus:**
Ensure jumpers are installed on the PARITY and PREVENT/ALLOW pins only. Refer to Figure 9-6.
 - b. **SunCD 2Plus:**
Ensure a jumper is installed on TERM POWER only. Refer to Figure 9-6.
3. **If there is a 1/4-inch tape drive installed in the upper position of the mounting brackets, place the insulator sheet on the CD-ROM drive. See Figure 9-5.**

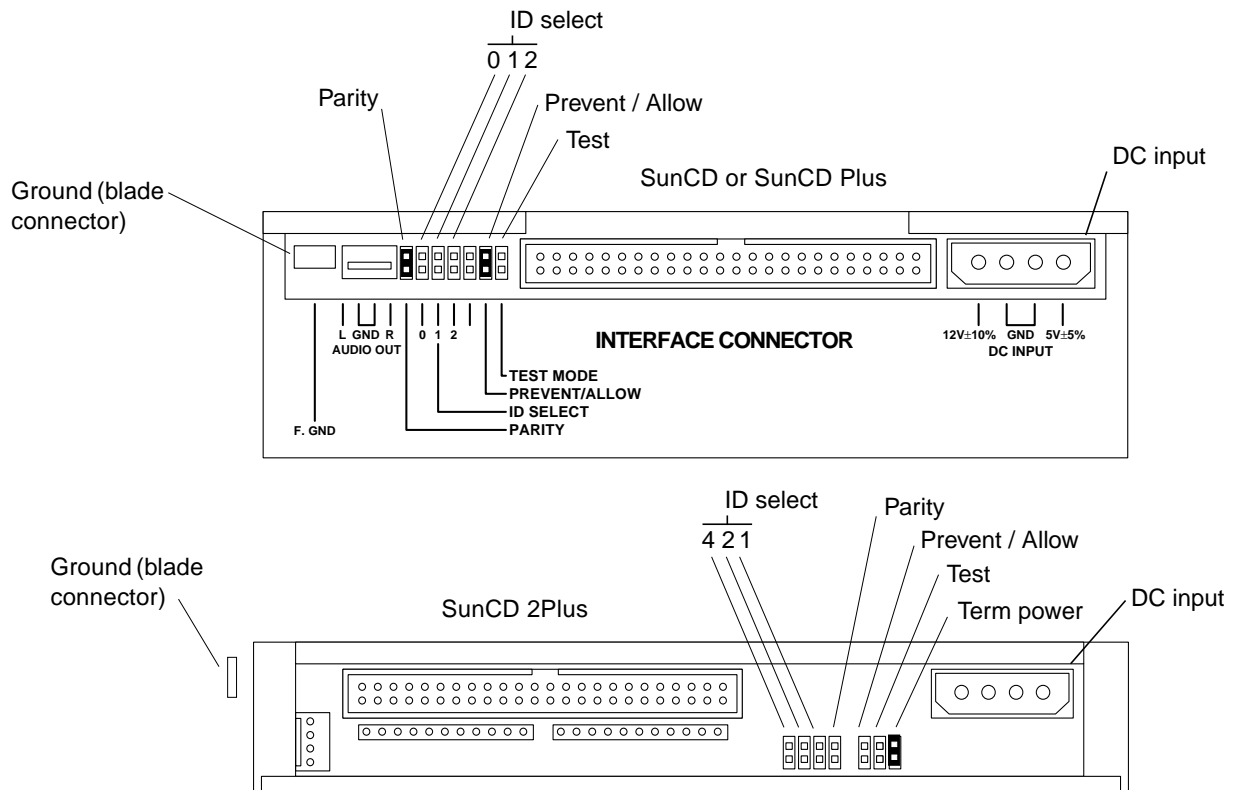


Figure 9-6 Location of ID SELECT Pins

4. Place the CD-ROM drive between the lower halves of the mounting brackets. See Figure 9-7.

The front of the drive should be flush with the short portion of the brackets that face outward and away from the sides of the drive.

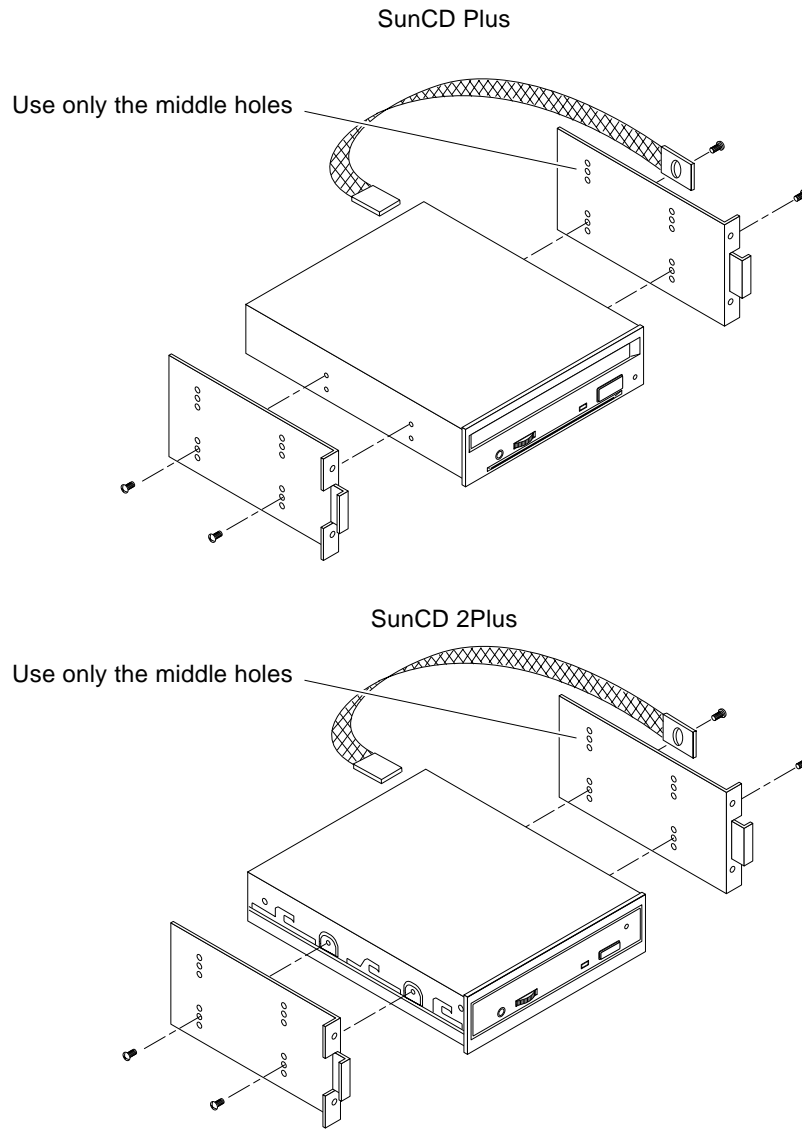


Figure 9-7 Attaching the Mounting Brackets to the CD-ROM Drive

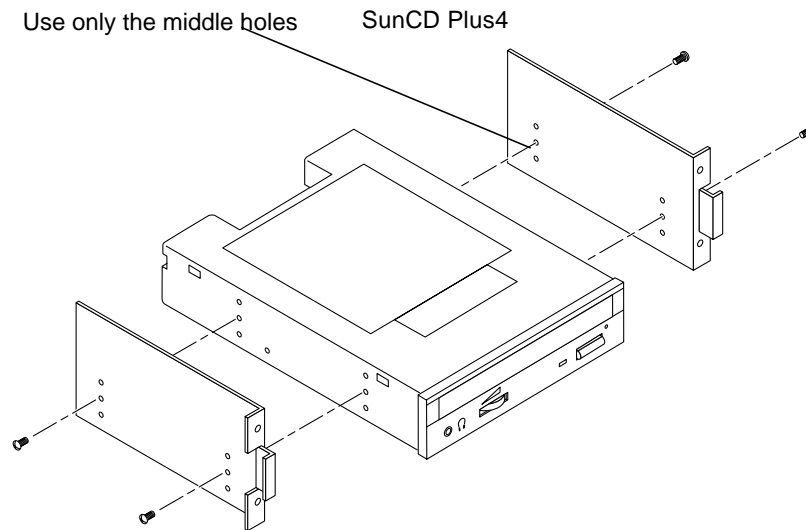


Figure 9-8 Attaching the Mounting Brackets to the CD-ROM Drive

- 5. Position the ground strap against the outer surface of a mounting bracket and align hole in the ground strap with the proper hole on the bracket.**
- 6. Secure the mounting brackets to the sides of the CD-ROM drive.**
Use two Phillips screws for each mounting bracket.
- 7. Position the drive assembly so that it will be installed in the lower right drive bay in the SPARCcenter 2000 system cabinet. See Figure 9-9.**

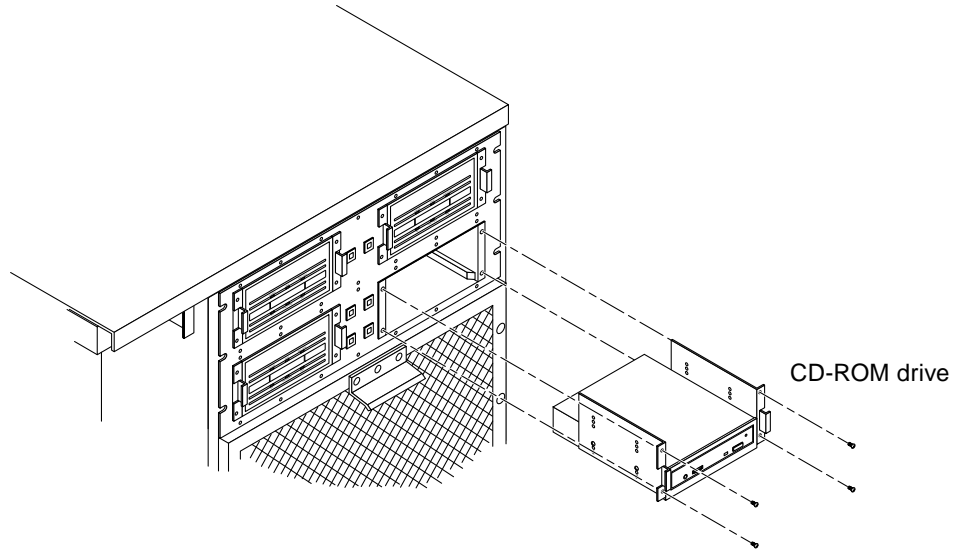


Figure 9-9 Location for the CD-ROM Drive

8. Attach the SCSI address cable for the CD-ROM drive.

The address cable for the CD-ROM drive attaches to the lower SCSI address switch. See Figure 9-10.

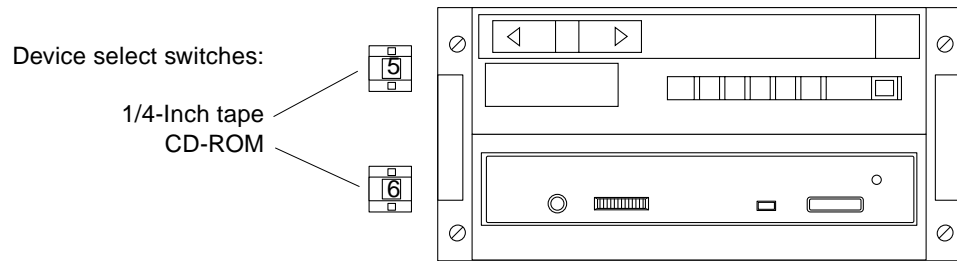


Figure 9-10 Location of the Device Select Switches

9. Plug the address cable for the drive into the SCSI ID connector at the rear of the drive. See Figure 9-11.

The black wire in the address cable goes to the upper pin of location 0 of the SCSI ID connector.

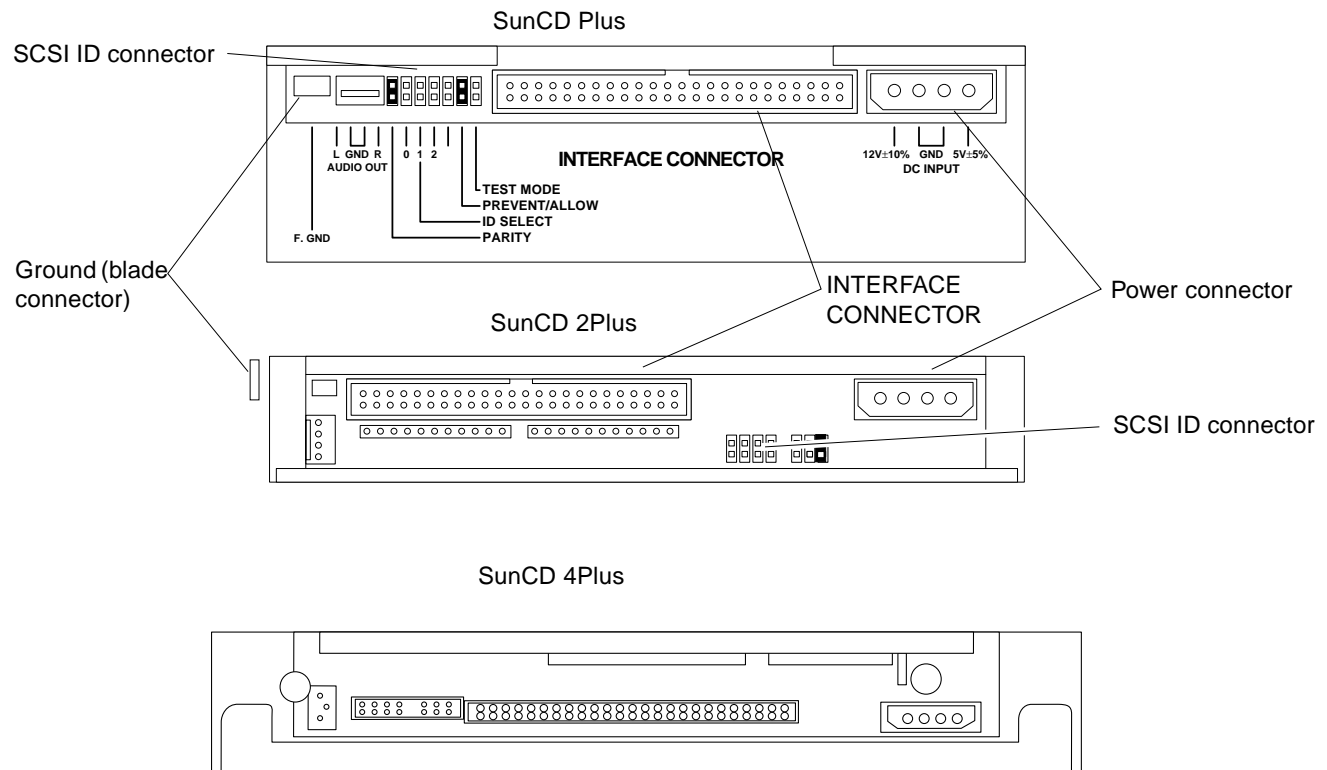


Figure 9-11 Connector Locations on the CD-ROM Drive

10. Attach the remaining drive cables:

- a. Plug the SCSI data cable from the bottom right drive bay in the cabinet into the INTERFACE CONNECTOR at the drive rear. See Figure 9-11
- b. Plug the power harness cable from the bottom right drive bay into the DC INPUT connector at the rear of the drive.
- c. Plug the ground strap into the ground blade type connector at the rear of the drive.

11. If a 1/4-inch tape drive is installed in the mounting brackets above the drive, connect the cables to the tape drive as follows:

- a. **Attach the SCSI address cable for the tape drive to the upper SCSI address switch. See Figure 9-10.**
 - b. **Attach the remaining cables to the tape drive.**
Orient the address cable so that pin 1 of the address cable connector plugs into pin 1 on the SCSI ID connector.
12. **Set the SCSI address for the 1/4-inch tape drive to “5”.**
Press the buttons marked “+” or “-” on the upper device select switch (at the left side of the bottom right drive bay) until you reach “5”.
 13. **Tuck the cables in behind the drive(s) and slide the drive assembly into the drive bay.**
 14. **Secure the device assembly to the cabinet.**
See Figure 9-9. Use the 9 mm hex-head socket to replace the four mounting screws on the front of the drive bay.

Note – If a 1/4-inch tape drive is not installed, replace the half-height cover plate.

15. **Set the SCSI address for the SunCD 2Plus and SunCD Plus4 drives to “6”.**
Press the buttons marked “+” or “-” on the lower device select switch (at the left side of the bottom right drive bay) until you reach “6”.
16. **Close the hinged front panel of the SPARCcenter 2000 system.**
Swing the panel toward the cabinet and press firmly against the upper right side until the panel clicks into place.

9.4 Full Height 8 mm Tape Drive

Three possible locations exist for the full height 8 mm tape drive in the system cabinet. Refer to Appendix F for location and SCSI addressing information.

To remove a full height 8 mm tape drive:

1. **Remove four hex-head screws securing the drive to the tray (Figure 9-12).**
2. **Slide the drive from the cabinet until the attached cables are exposed.**

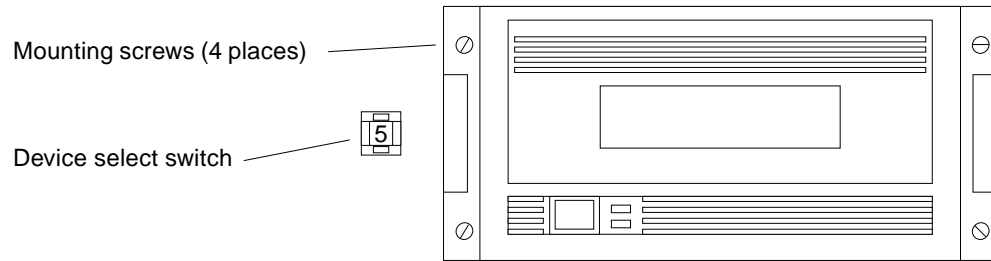


Figure 9-12 Removing a Full Height 8 mm Tape Drive

3. Unplug the three cables from the rear of the full height 8 mm tape drive.

- For the cables connected to the SCSI ID and power connectors, grasp each cable connector on both sides and firmly, but gently, pull the cable away from the connector at the rear of the tape drive.
- For the cable connected to the SCSI connector, press out on the ejectors at the sides of the SCSI connector on the full height 8 mm tape drive to release the SCSI data cable from the tape drive. See Figure 9-13. Then grasp the cable connector by the attached strain relief tab and firmly, but gently, pull the cable away from the SCSI connector on the tape drive.



Figure 9-13 Releasing Ejectors and Disconnecting the SCSI II Cable

4. Remove the four Phillips screws that secure the two mounting brackets to the full height 8 mm tape drive. See Figure 9-14.

Each mounting bracket is secured to the drive with two screws.

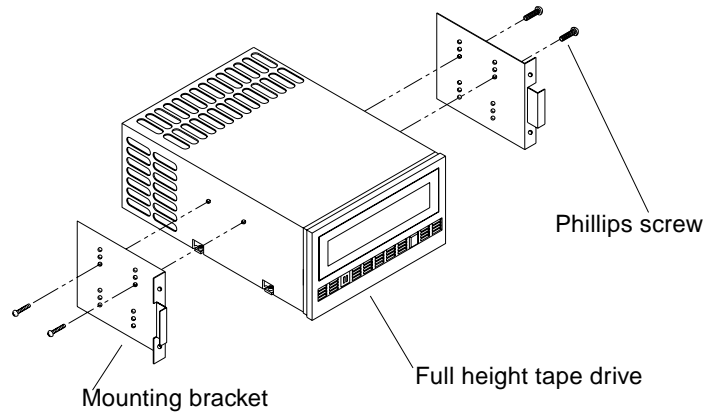


Figure 9-14 Removing Full Height 8mm Tape Drive Mounting Brackets

Note – If not replacing the full height 8 mm tape drive with another drive, install a cover plate over the empty drive bay. Then replace the panels and power on the system using instructions given in Part 3—“Preparing for Service.”

9.5 Half Height 8 mm Tape Drive

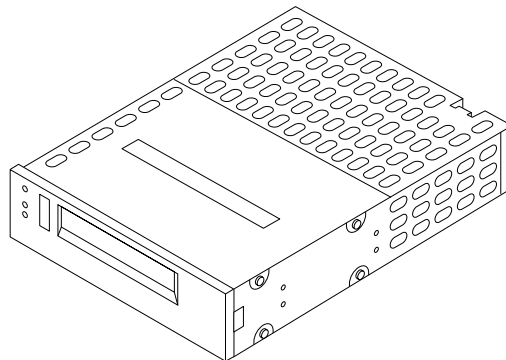


Figure 9-15 Half height 8 mm Tape Drive

There are five possible locations for the half height 8 mm tape drive in the SPARCcenter 2000 system cabinet. See Figure 9-16. Refer to Appendix F for location and SCSI addressing information.

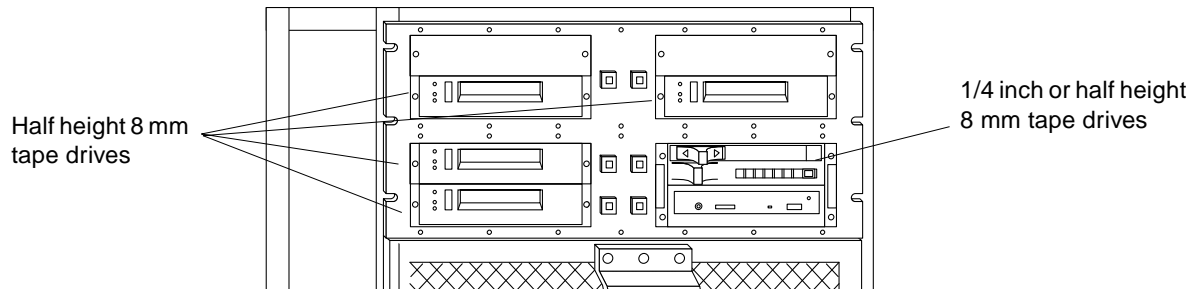


Figure 9-16 Half height 8 mm Tape Drive Locations in the System

Each tape drive has its own ID select switch.

Note – The top left and top right drive bays can hold *only one* half-height drive each. If you are using these bays, install the tape drive in the lower half of the drive bay and install a cover plate on the top half.

Note – The bottom left drive bay can hold two half-height drives.

To remove a 8 mm tape drive:

1. **Remove the cover plate from the top half of the drive bay.**
Use a 9 mm hex-head socket to unscrew two mounting screws. See Figure 9-17.

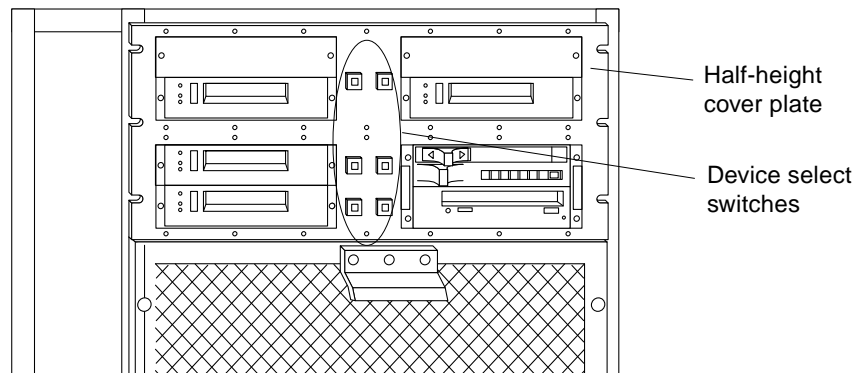


Figure 9-17 Device Select Switches and Cover Plate

2. **Remove two screws securing the mounting bracket/drive to the cabinet.**
See Figure 9-22.
3. **Slide the drive out of the cabinet until the cables are exposed.**

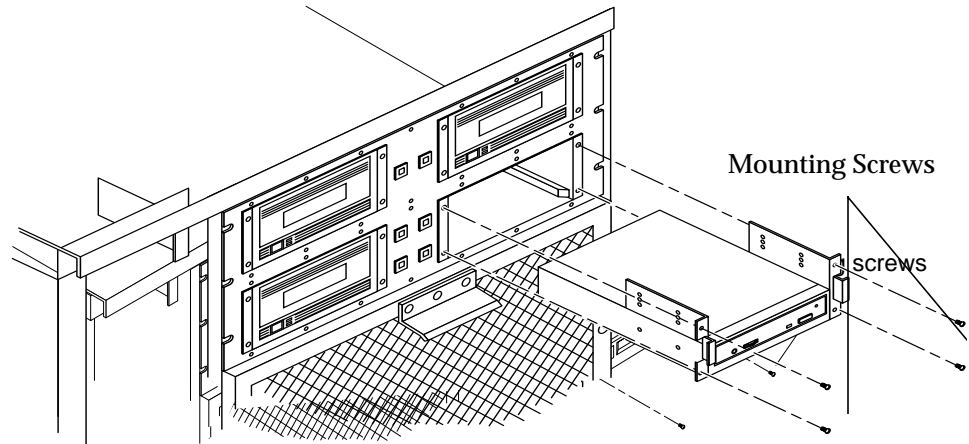


Figure 9-18 Drive Bay Mounting Screws

4. **Unplug the power, SCSI ID, and SCSI data cables from the drive rear.**
 - For the power and SCSI ID cables, grasp each cable connector on both sides and firmly, but gently, pull the cable away from the connector at the rear of the tape drive.
 - The SCSI data cable is easily damaged by excessive force. To remove this cable safely, grasp the strain relief tab and pull gently. See Figure 9-19.

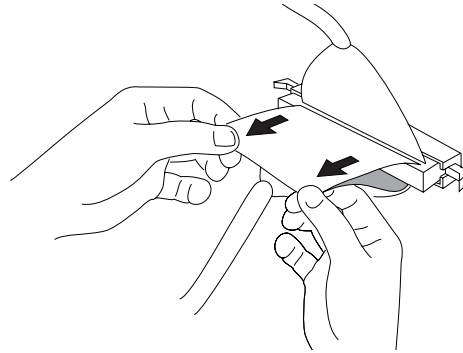


Figure 9-19 Disconnecting the SCSI Data Cable

5. **Remove the tape drive from the cabinet.**
6. **Remove four screws that secure the mounting brackets to the tape drive.**
See Figure 9-20. Save the screws.

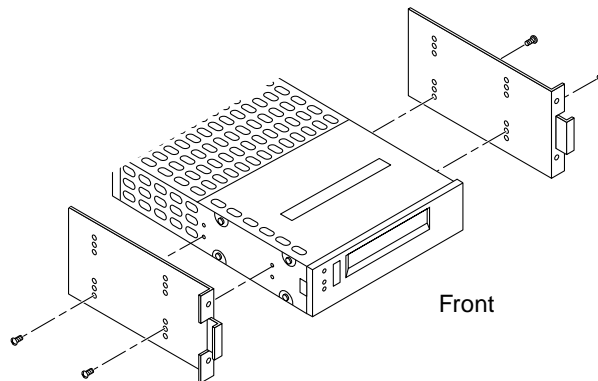


Figure 9-20 Mounting Brackets for the Drive

Note – If you are not replacing the half height 8 mm tape drive with another drive, install a cover plate over the empty drive bay. Then, replace the panels and power on the system using the instructions given in Part 3— “*Preparing for Service.*”

To install a half height 8 mm tape drive:

- 1. Remove the cover plate or tape drive from the drive bay where the half height 8 mm tape drive will be installed.**
Use the 9 mm hex-head socket to remove screws securing the plate.
- 2. Place the half height 8 mm tape drive between the lower halves of the mounting brackets. See Figure 9-20.**
Attach the brackets to the drive.
- 3. Locate the SCSI ID (address) cable for the drive.**
One end of this cable plugs into the device select switch for the drive bay. Figure 9-17 shows a device select switches. Each switch is adjacent to the drive bay which it controls.
- 4. Plug the address cable into the SCSI ID connector at the tape drive rear.**
Pin 1 of the address cable connector must plug into pin 1 of the SCSI ID connector on the drive.
- 5. Plug the power cable from the drive bay into the power connector on the drive.**
- 6. Plug the SCSI data cable from the drive bay into the SCSI data connector on the drive.**
- 7. Tuck the cables in behind the drive and slide the drive into the drive bay.**
- 8. Align the holes in the mounting brackets with the holes in the cabinet and secure the tape drive to the cabinet.**
Use the 9 mm hex-head socket to install two screws at the front of the mounting brackets. See Figure 9-22.

Note – A half-height cover plate must be installed above the half height 8 mm tape drive when the drive bay contains only one half-height drive. The half-height drive must be installed in the lower half of the bay.

- 9. Determine which SCSI address to assign the tape drive you are installing.**
The SCSI address for the tape drive depends on the SPARCcenter 2000 system configuration and/or the location of the drive. Figure 9-17 shows possible locations for the half height 8 mm tape drive. Table 9-1 shows examples of SCSI addresses for the four drive bays.
 - If the tape drive replaces one previously installed in the drive bay, keep the same SCSI address assigned to the drive that was replaced.

- If the tape drive is installed in a previously unused drive bay, assign the next available SCSI address to the tape drive (from 0 to 6, depending on the system configuration). For example:

Your system has both a CD-ROM drive and a 1/4-inch tape drive in the bottom right bay, ID6 and ID 5. If all other drive bays are empty, you can:

- Install the tape drive in any of the other three drive bays.
- Assign the next available SCSI address, ID 4 in this example, to the newly installed tape drive (regardless of which bay is used).

Note – If the SPARCcenter 2000 system has more than one 1/4-inch tape drive, however, the ID numbers for *all* 1/4-inch tape drives *must be higher* than the ID numbers for any 8 mm tape drives or 4 mm tape auto-loaders.

Table 9-1 Half Height 8 mm Tape Drive: Example of SCSI Addresses

Drive Bay	SCSI Address
Bottom right	ID 6 (lower); ID 5 (upper)
Top right	ID 4
Top left	ID 3
Bottom left	ID 2 (upper); ID 1 (lower)

- 10. Use the device select switch to set the SCSI address for the installed drive.**
Press the buttons marked “+” or “-” until you reach the proper address.

9.6 4 mm Internal Tape Auto-Loader

There are three possible locations for the 4 mm tape auto-loader in the SPARCcenter 2000 internal SCSI tray. See Figure 9-21.

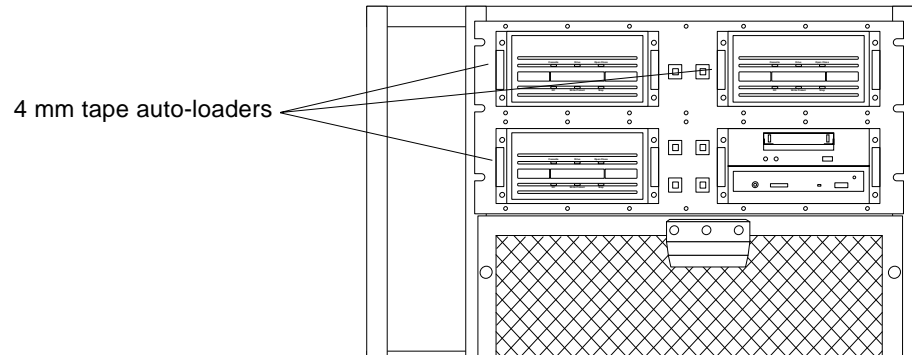


Figure 9-21 Drive Bays for 4 mm Tape Auto-Loaders

9.6.1 Removing the Auto-Loader and Disconnecting Cables

To remove a 4 mm tape auto-loader from a SCSI tray:

1. Use the 7 mm hex-head socket to remove the four mounting screws that secure the drive to the cabinet. See Figure 9-22.

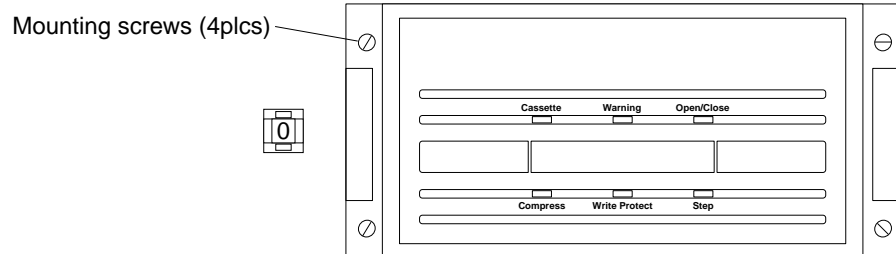


Figure 9-22 Removing a 4 mm Tape Auto-Loader

2. Slide the drive out until the cables attached to the drive are exposed.
3. Unplug the power cable, SCSI ID cable, and SCSI data cable from the connectors at the rear of the auto-loader. See Figure 9-23.

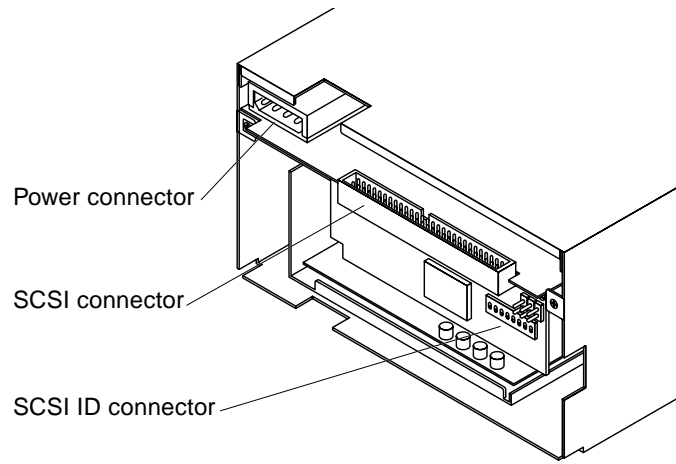


Figure 9-23 Connector Locations on the 4 mm Tape Auto-Loader

Note – The auto-loader power connector has a fan power cable plugged in. This hardwired fan power cable, which extends from the fan, connects the auto-loader and the SCSI tray.

- Power cable — Unplug both ends of the fan power cable (Figure 9-20). Grasp the cable connector on both sides and firmly, but gently, pull the cable away from the autoloader power connector and SCSI tray cable connector.
- SCSI ID cable — Grasp the cable connector on both sides and firmly, but gently, pull the cable away from the SCSI ID connector.
- The SCSI data cable is easily damaged by excessive force. To remove this cable safely, grasp the strain relief tab and pull gently. See Figure 9-19.

4. Use the 5 mm hex-head socket to remove the screws that attach the two mounting brackets to the auto-loader. See Figure 9-20. Save the screws for the new drive.

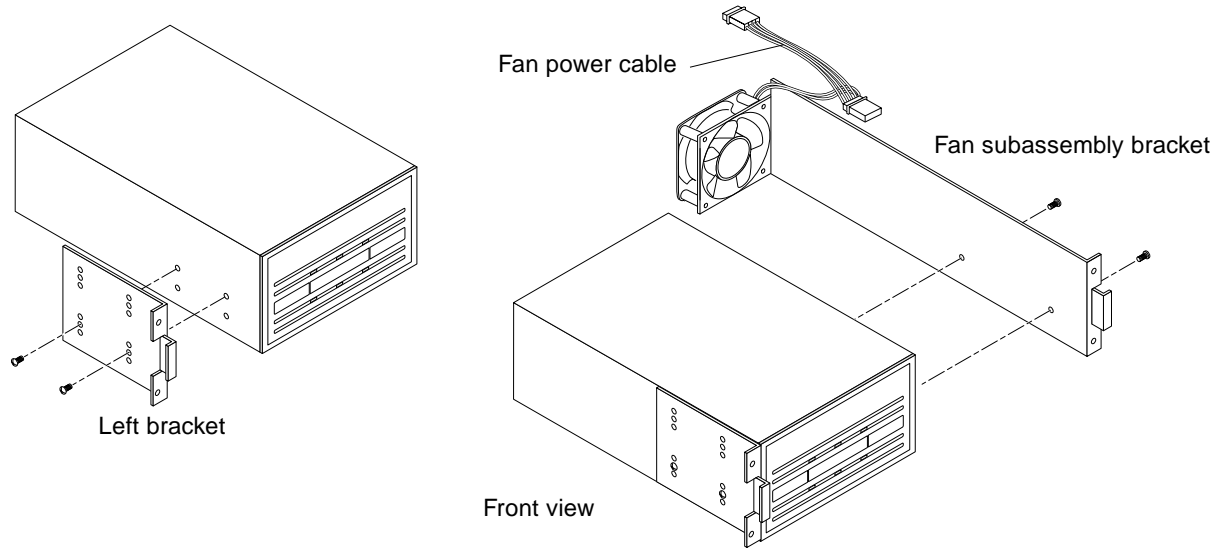


Figure 9-24 4 mm Tape Auto-Loader: Removing the Mounting Brackets

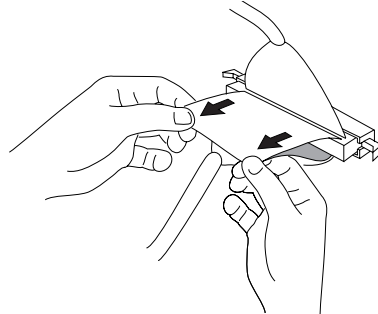


Figure 9-25 Disconnecting the SCSI Data Cable

Note – If you are not replacing the auto-loader with another drive, install a full-high or two half-high cover plates over the empty drive bay. Then, replace the panels and power on the system using the instructions given in Part 3—“Preparing for Service.”

9.6.2 *Removing and Replacing the Fan*

The fan attached to the fan subassembly bracket is a field replaceable unit (FRU) part. To order a replacement, contact your Sun representative and request FRU part number **F540-2606-xx**.

To remove and replace the fan, first detach the fan subassembly bracket from the auto-loader. See Section 9.6.1, “Removing the Auto-Loader and Disconnecting Cables.”

- 1. Remove the two M4 screws holding the fan and finger guard in place.**
Save the screws for use when you install the replacement fan.
- 2. Position the FRU fan so that the cable extends from the top left side.**
The fan is positioned properly when the two airflow arrows on the top right side point to the right and to the rear, away from the auto-loader (the label on the fan will also face the rear).
- 3. Attach the fan and finger guard to the bracket using the two screws removed in step 1.**
- 4. Align the fan subassembly bracket along the right side of the auto-loader.**
The fan is at the rear of the device when the bracket is properly aligned.
- 5. Attach the bracket to the device using the two M3 screws set aside earlier.**
- 6. Connect the fan power cable to the auto-loader.**
 - a. Plug one end of the fan power cable (J1) into the auto-loader power connector.**
The power connector is at the rear. See Figure 9-26.

- b. **Connect the other end of the fan power cable (P1) to the SCSI power cable in the SCSI tray.**

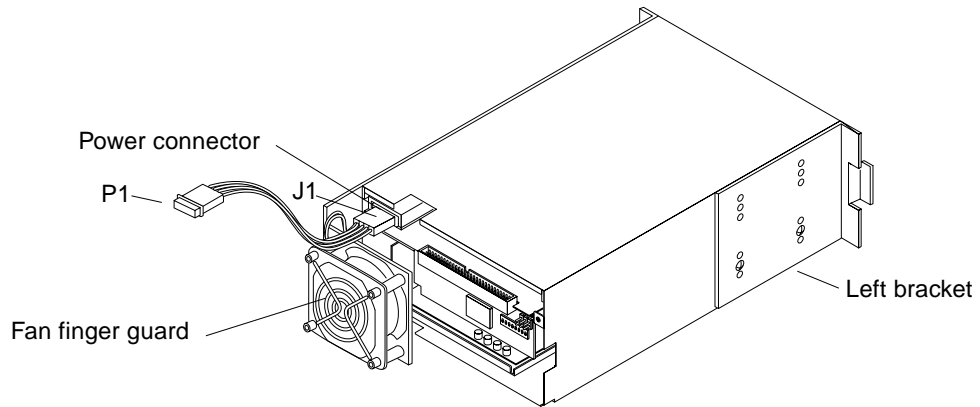


Figure 9-26 Fan Finger Guard, Power Connector and Mounting Brackets

9.6.3 Installing a 4 mm Tape Auto-Loader

Before installing the auto-loader in a system cabinet, you must remove the mylar sheet that is shipped in the unit.

1. **Turn the auto-loader upside down and remove the two screws that secure the mylar sheet to the auto-loader. See Figure 9-27.**

There should be six screws at the bottom of the auto-loader; remove *only* the two screws that protrude slightly from the bottom of the auto-loader.

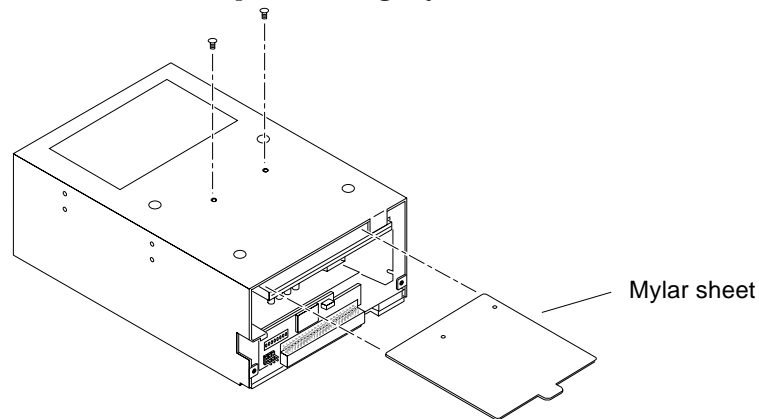


Figure 9-27 Removing the Mylar Sheet from the Auto-Loader

2. Grasp the clear plastic tab at the rear of the auto-loader and pull the mylar sheet out of the unit. See Figure 9-27.

Keep the mylar sheet and the two screws in a safe place. If you ship the unit at a later date, reverse these steps to place the mylar sheet back in the unit.

To install the auto-loader:

1. If jumpers are installed on the SCSI ID connector, remove them using the needle-nosed pliers.

See Figure 9-28 for location of SCSI ID connector.

2. Verify that the DIP switches at the rear of the drive are set to the proper positions. See Figure 9-28.

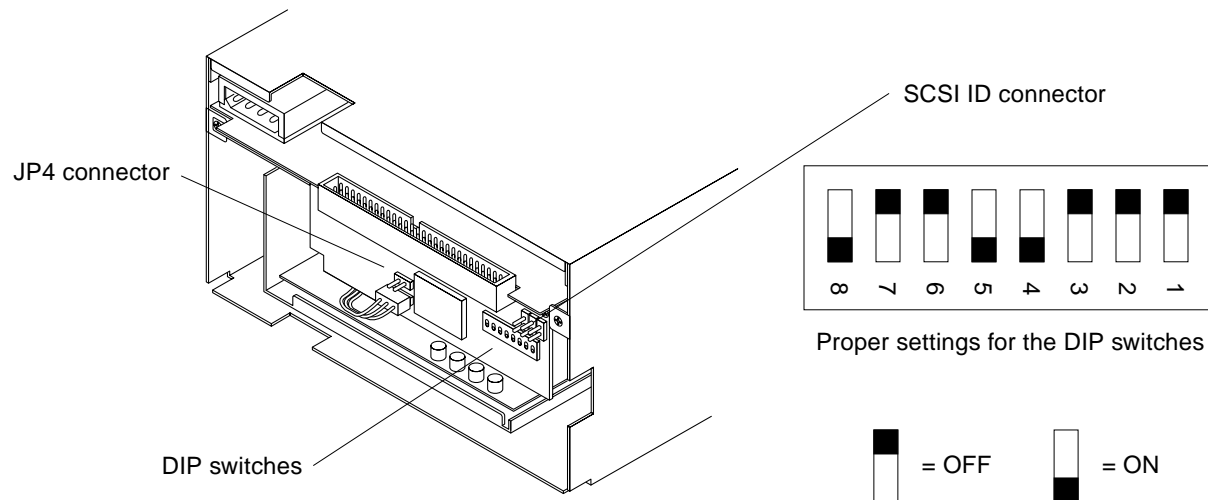


Figure 9-28 Auto-Loader: SCSI ID, JP4 Connector and DIP Switch Locations

3. Verify that the JP4 connector either has a jumper installed vertically or no jumper at all. See Figure 9-28.

The JP4 jumper should *not* have a jumper installed horizontally over both connectors.

4. Attach two mounting brackets to the drive. See Figure 9-26.

- a. Attach the shorter bracket to the left side of the autoloader.

- b. **Attach the fan subassembly bracket to the right side of the autoloader.**
The fan will be at the rear of the unit when the bracket is properly aligned.

Note – The fan subassembly bracket can be attached to the right side of the autoloader *only*. Holes in the bracket will not line up properly on the left side.

5. Locate the SCSI address cable for the auto-loader.

The address cable is plugged into the device select switch for the bay where the autoloader is installed. Figure 9-29 shows the device select switch on the left side of a right drive bay. Drives installed in left drive bays have device select switches on the right side of the drive.

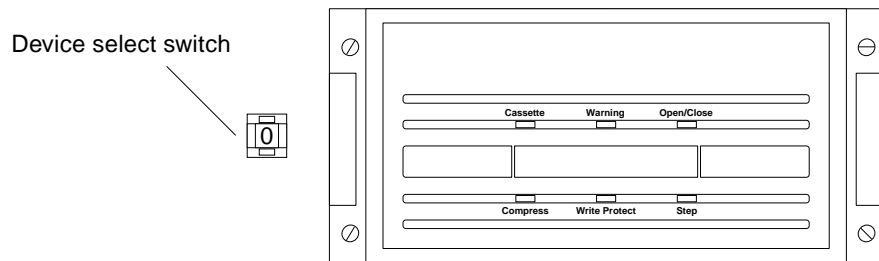


Figure 9-29 Right Drive Bay Device Select Switch

- 6. **Position the auto-loader in front of the drive bay. Plug the address cable into the SCSI ID connector at the rear of the auto-loader (Figure 9-30).**
Position the address cable so that the black wire is located at the lower right corner of the SCSI ID connector.
- 7. **Plug the power harness cable from the drive bay into the power connector (P1) attached to the fan assembly bracket on the drive.**
- 8. **Plug the SCSI data cable from the drive bay into the SCSI connector on the auto-loader.**
- 9. **Tuck the cables in behind the autoloader and slide the drive into the drive bay. See Figure 9-31.**

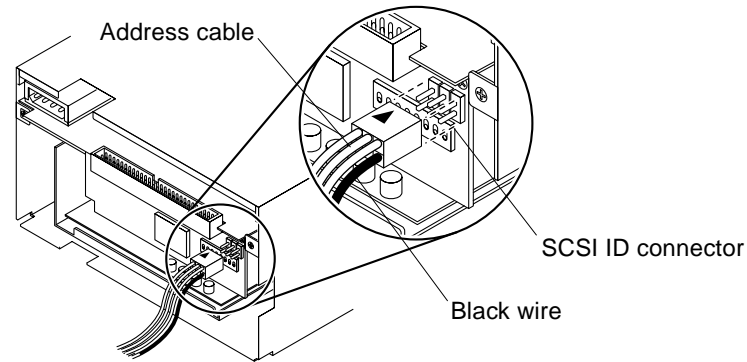


Figure 9-30 Positioning the Address Cable

- 10. Insert and tighten the four screws in the mounting brackets to secure the autoloader to the cabinet. See Figure 9-31.**
Use the 7mm hex-head socket.

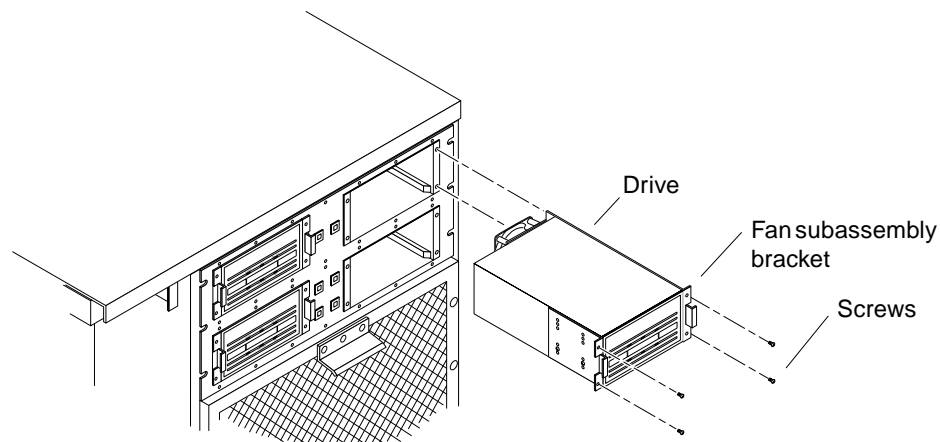


Figure 9-31 Inserting the Auto-Loader into the Drive Bay

- 11. Determine the SCSI address for the installed auto-loader.**
The SCSI address depends on the location of the auto-loader in the SPARCcenter 2000 system. Refer to Appendix F for location and SCSI addressing information.

- If the auto-loader replaces a drive previously installed in the drive bay, keep the same SCSI address assigned to the drive that was replaced.

- If the auto-loader is installed in a previously unused drive bay, assign the next available SCSI address to the auto-loader (from 0 to 6, depending on the system configuration). For example:
Your system has both a CD-ROM drive and a 1/4-inch tape drive in the bottom right bay, ID6 and ID 5. If all other drive bays are empty, you can:
 - Install the tape drive in any of the other three drive bays.
 - Assign the next available SCSI address, ID 4 in this example, to the newly installed auto-loader (regardless of which bay is used).

12. Use the device select switch to set the SCSI address for the installed auto-loader.

Press the buttons marked “+” or “-” until you reach the proper address.

9.7 5 1/4-Inch Disk Drive

The differential SCSI disk tray can contain up to six disk drives. See Figure 9-32. The first drive in the tray should be installed in the Drive I location, the second in the Drive II location, and so on.

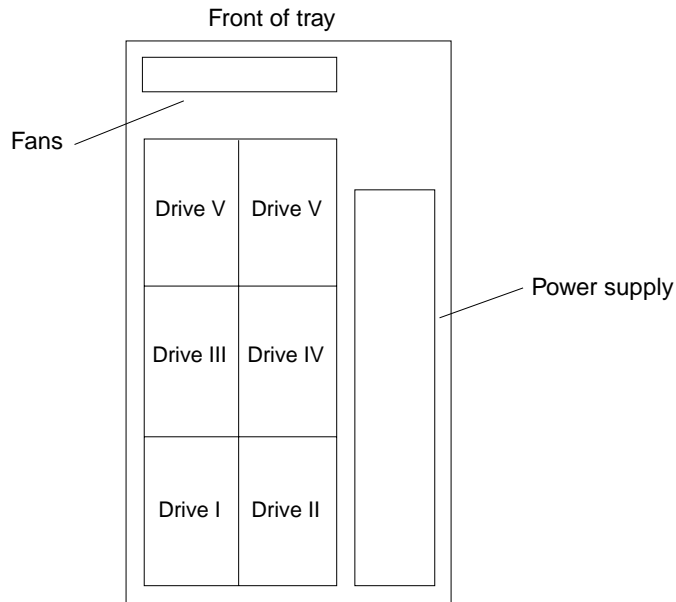


Figure 9-32 Drive Locations in Drive Tray



Caution – Observe the following rules when replacing or installing disk drives.

- Drives of different bus sizes, 8-bit vs. 16-bit “wide”, cannot be combined inside a single tray.
- If you are connecting two different types of tray in a daisy chain, make sure you have the SBus Fast/Wide Intelligent Differential SCSI Host Adapter (DWIS/S) Expansion Card.
- For Fast/Wide Differential disk drives, you must use a tray with address switches that can be set for SCSI addresses 0 through 15.
- If you are connecting two trays, and one tray contains 8-bit bus drives and the second tray contains 16-bit Wide bus drives, the tray with the 8-bit bus drives must have SCSI addresses 0 through 5 and the tray with the 16-bit Wide bus drives must have SCSI addresses 8 through 13.

9.7.1 *Removing the Disk Drive*



Caution – Do not remove a disk drive from the differential SCSI disk tray if doing so will leave only one disk drive in the tray. This will affect the air flow in the tray and damage the remaining disk drive.

To remove a disk drive from the differential SCSI disk tray:

1. Unplug the three cables from the rear of the disk drive.

Figure 9-33 shows the three connectors that should have cables installed.

For the cables connected to the SCSI ID, SCSI data connector and power connectors, grasp each cable connector on both sides and firmly, but gently, pull the cable away from the connector at the rear of the disk drive. See Figure 9-19.

2. Loosen three captive screws securing the drive to the bottom of the tray.

3. Use the plastic strap to remove the drive from the tray.

4. Remove the four Phillips screws that hold the drive and the plastic strap to the mounting bracket. See Figure 9-34.

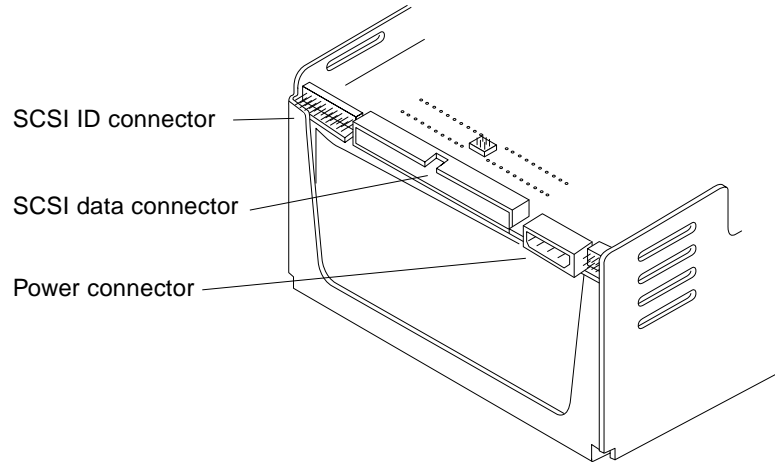


Figure 9-33 Connector Locations on the Disk Drive

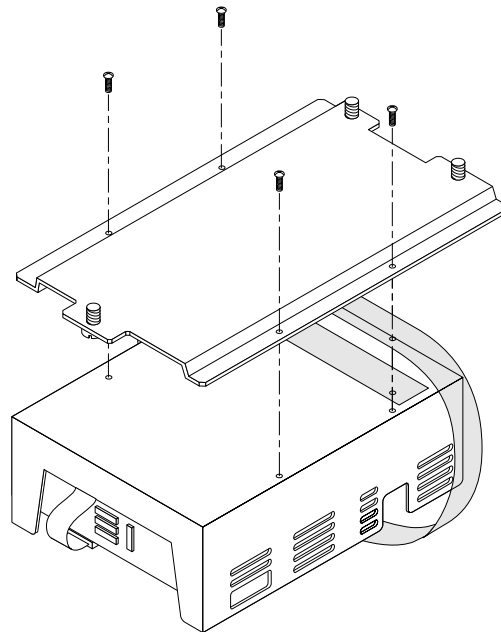


Figure 9-34 Removing the Mounting Bracket from the Drive

9.7.2 Jumpers

1. Verify that the jumpers have been removed from the SCSI ID connector at the rear of the new disk drive. See Figure 9-36 and Figure 9-37. If the jumpers have not been removed, remove them.
2. Verify that the jumpers are *installed* on the Wait Spin Enabled and Sweep Cycle Enabled connectors and are *removed* from the SCSI Bus Parity Disable connector at the drive. See Figure 9-36 and Figure 9-37.

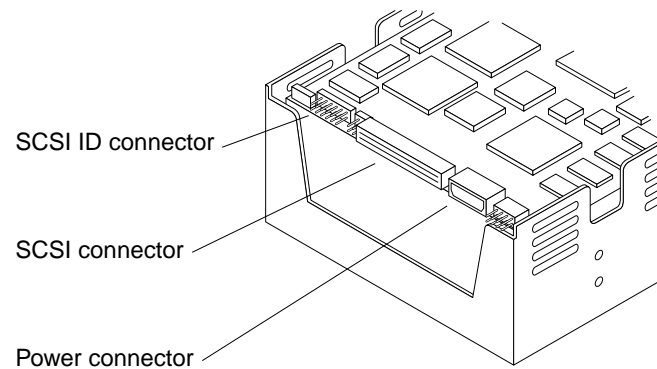


Figure 9-35 Connector Locations on Some 5 1/4-Inch Disk Drives

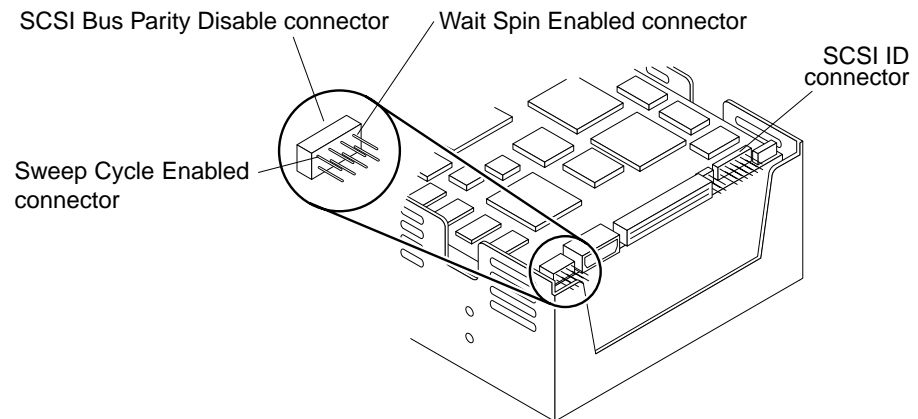


Figure 9-36 Jumper Locations on Other Types of 5 1/4-Inch Disk Drive

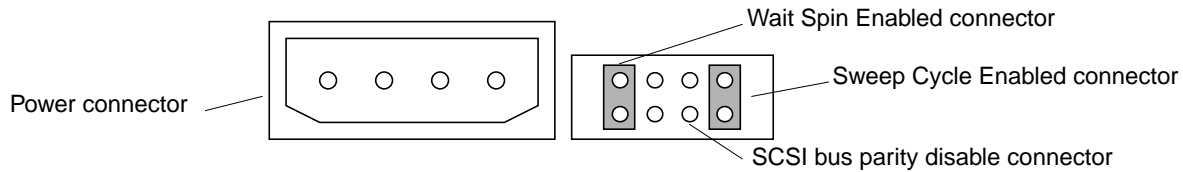


Figure 9-37 Jumper Settings Detail

9.7.3 Replacing the Disk Drive

To install a disk drive in the tray:

1. **Place the disk drive carefully on a flat surface with the electronics facing down.**
2. **Align the holes at the bottom of the disk drive with the holes in the mounting bracket.**
3. **Slide the plastic strap under the disk drive.**
Wrap it around the slot provided. This slot is located about two-thirds of the way towards the front of the disk drive.
4. **Drape the ends of the plastic strap over each other until the holes in the strap are aligned.**
5. **Press the ends of the plastic strap together so that the adhesive on the strap keeps the holes aligned.**
6. **Align holes in the strap with the holes at the bottom of the drive and the holes in the mounting bracket that are closest to the rear of the bracket.**
7. **Use four 6-32 screws to secure the drive and the plastic strap to the mounting bracket. See Figure 9-38.**
8. **Use the plastic strap to slide the disk drive into the appropriate location in the differential SCSI disk tray until the front of the mounting bracket rests flush against the two alignment tabs. See Figure 9-39.**

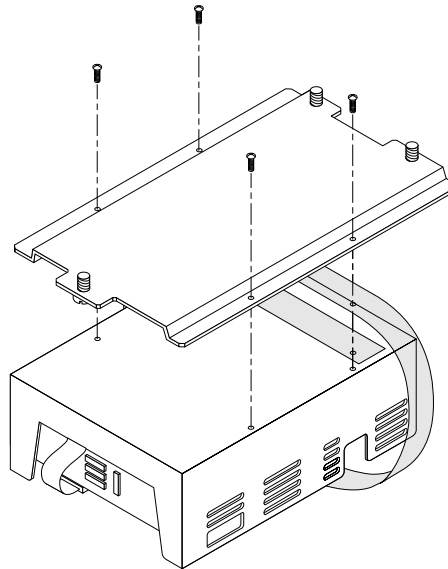


Figure 9-38 Securing the Drive to the Bracket

- 9. Tighten the three captive screws on the mounting bracket to secure the drive to the tray.**

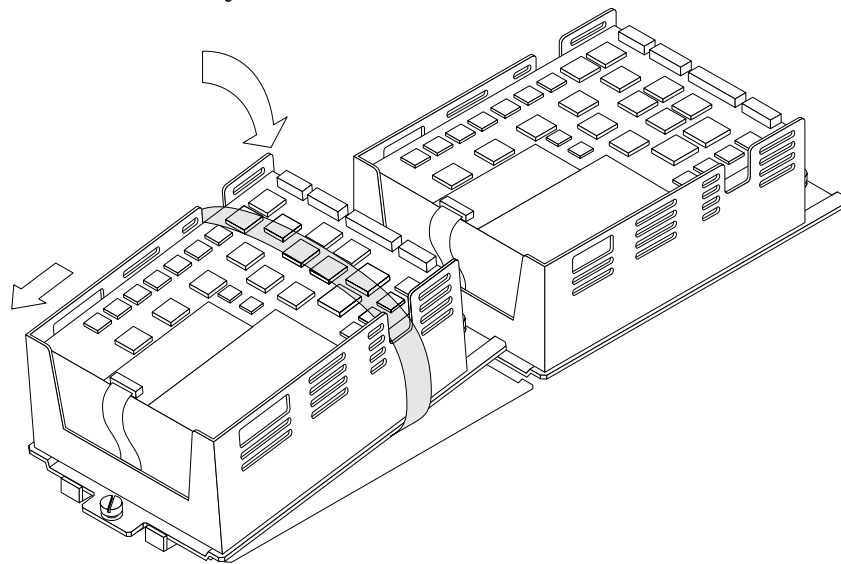


Figure 9-39 Placing the Drive in the Tray

9.7.4 Attaching the Cables to the Disk Drive

See Figure 9-40 for cable connector locations.

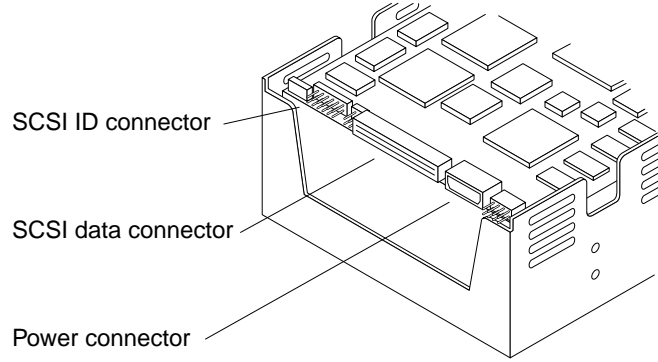


Figure 9-40 Connector Locations: 5 1/4-Inch Disk Drives

1. Plug the SCSI ID cable into the SCSI ID connector on the drive.

Table 9-2 shows correct SCSI ID connections for each disk drive in the differential SCSI disk tray. Figure 9-41 shows SCSI ID cable routing should in the tray.

Table 9-2 Differential SCSI Disk Tray: Connections for the SCSI ID Cable

Disk Drive Location	SCSI ID Connector
I	P21
II	P22
III	P23
IV	P24
V	P25
VI	P26

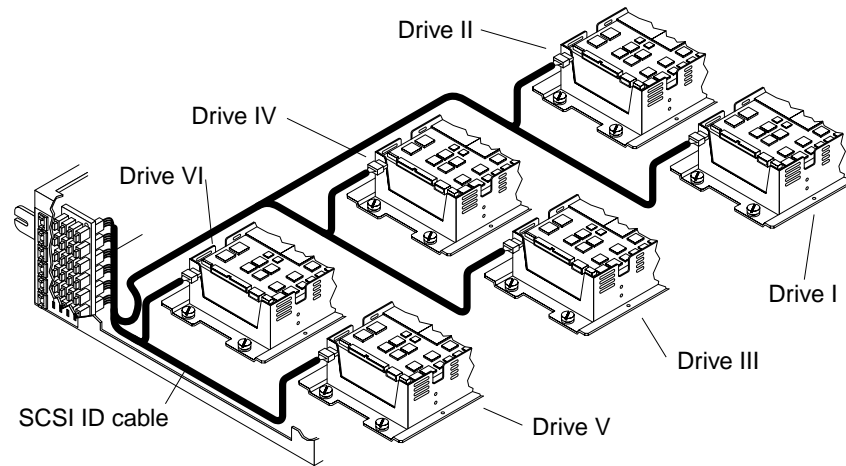


Figure 9-41 ID Address Cabling in the Tray

2. Plug the data cable into the SCSI data connector on the drive.

Table 9-3 shows the correct SCSI connections for each disk drive in the differential SCSI disk tray, and Figure 9-42 shows how the SCSI data cable should be routed in the tray.

Table 9-3 Differential SCSI Disk Tray: SCSI Data Cable Connections

Disk Drive Location	SCSI Data Connector
I	P2
II	P2
III	P3
IV	P3
V	P4
VI	P4

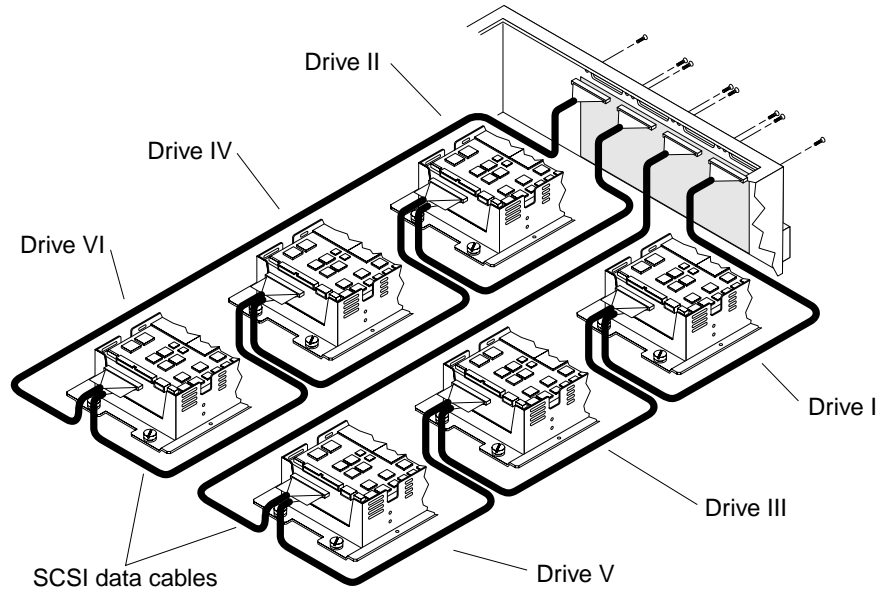


Figure 9-42 Connecting the SCSI Data Cable

3. Plug the DC harness cable into the power connector on the drive.

Table 9-4 shows the correct DC harness connections for each disk drive in the differential SCSI disk tray, and Figure 9-43 shows how the DC harness cable should be routed in the tray.

Table 9-4 Differential SCSI Disk Tray: DC Harness Cable Connections

Disk Drive Location	DC Harness Connector
I	P12
II	P11
III	P8
IV	P7
V	P6
VI	P5

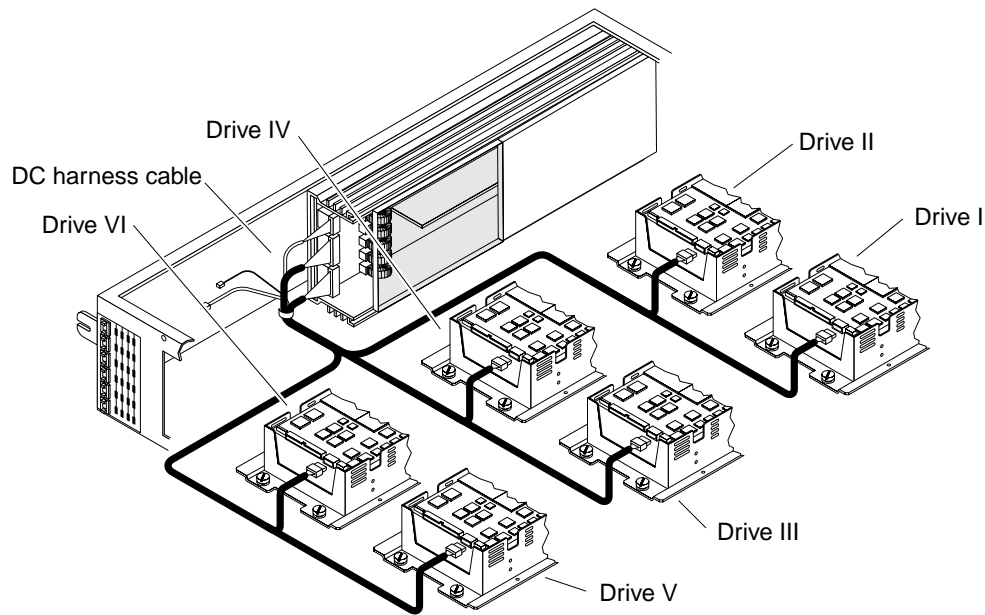


Figure 9-43 Connecting the DC Harness Cable

- Determine what the SCSI addresses will be for the disk drives in the tray.** The SCSI addresses depend on the location of the disk drives in the tray and on the type(s) of drives used. SCSI addresses for a Fast/Wide Differential SCSI tray may be 0 to 15. SCSI addresses for an 8-bit (narrow) drive tray are limited to 0 through 6.

Note – A Fast/Wide Differential SCSI drive tray can be used as the first or second tray in a SCSI daisy-chain. An 8-bit drive tray has a more limited range of addresses and must be used either alone or as the first tray in a two-tray daisy-chain.

Table 9-5 shows the SCSI addresses for the drives in a tray.

Table 9-5 SCSI Addresses for Differential Disk Trays

Tray 1 (for 8-bit (narrow) or 16-bit Fast/Wide drives)		Tray 2 (for 16-bit Fast/Wide drives)	
Drive Location	SCSI Address	Drive Location	SCSI Address
I	0	I	8
II	1	II	9
III	2	III	10
IV	3	IV	11
V	4	V	12
VI	5	VI	13

Note – SCSI address 7 is reserved for the DWIS/S controller card.

5. At the front of the tray, set the SCSI address for the drives.

Press the buttons marked “+” and “-” to change the address shown in the window. See Figure 9-44.

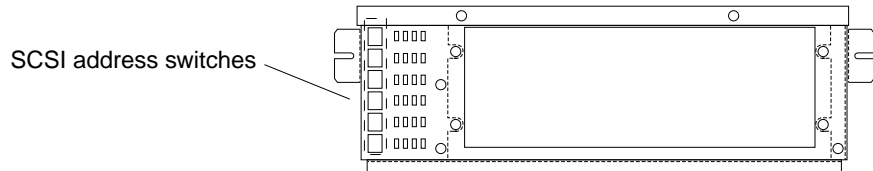


Figure 9-44 Differential SCSI Disk Tray SCSI Address Switches

6. Set the SCSI addresses for all unused drive locations.

- In a 8-bit (narrow) disk tray, set the SCSI address switches to the blank position for all empty drive locations.
- In a 16-bit Fast/Wide disk tray, use SCSI address 15 for all empty drive locations.

Part 5— System Board

System Board Overview	page 10-1
<i>Damage Prevention</i>	<i>page 10-1</i>
<i>Handling System Boards and Assemblies</i>	<i>page 10-1</i>
<i>System Board Description</i>	<i>page 10-2</i>
<i>Replacement Parts</i>	<i>page 10-3</i>
System Boards and Component Replacement	page 11-1
<i>System Board</i>	<i>page 11-1</i>
<i>Using Standoffs</i>	<i>page 11-3</i>
<i>SuperSPARC Modules</i>	<i>page 11-4</i>
<i>SBus Cards</i>	<i>page 11-6</i>
<i>SIMM and NVSIMM</i>	<i>page 11-11</i>
<i>OpenBoot PROM</i>	<i>page 11-15</i>

10.1 Damage Prevention



Caution – When working on the SPARCcenter 2000 (or SPARCcenter 2000E) system board, use an antistatic mat that has at least 0.25 inch (6 mm) of cushioning. This cushioning protects underside components and prevent harmful board flexing.

10.2 Handling System Boards and Assemblies



Caution – The system chassis power must be turned off, and the AC power cord must remain plugged in to ensure a proper ground.



Caution – The system board and related modules and cards have surface-mount components that may break when the board is flexed.

To minimize the amount of board flexing, observe the following precautions:

- Hold the system board only by the edges near the middle of the board where the board stiffener is located. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the Sun ESD mat.

- Do not place the board or cards on a hard surface. Use a cushioned antistatic mat. board connectors and components have very thin pins that bend easily.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in an antistatic bag.

Protect yourself and the equipment by observing the following precautions presented in Chapter 5, Table 5-1.

10.3 System Board Description

Figure 10-1 shows the major components on the system board.

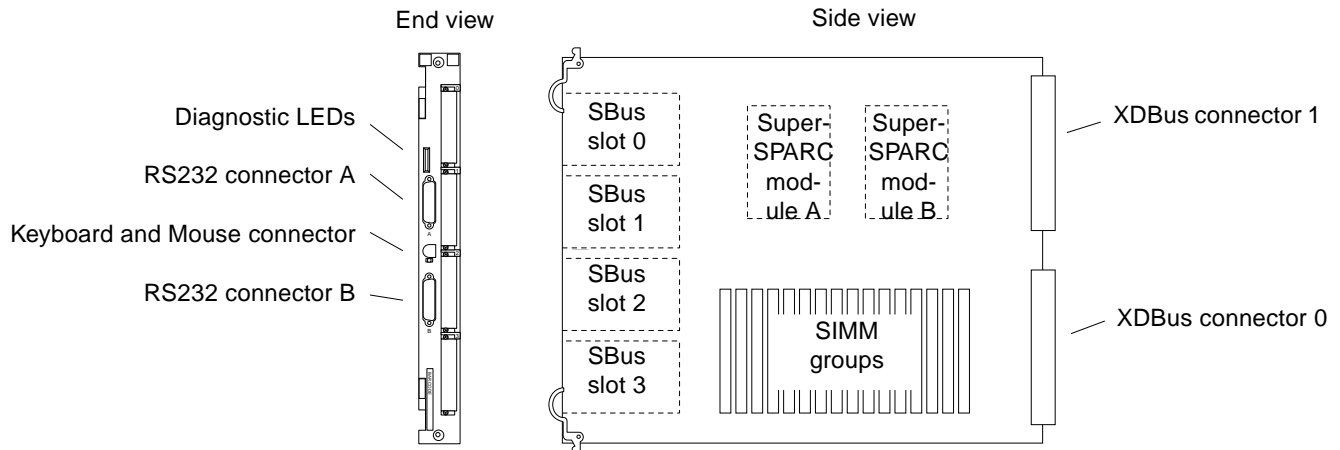


Figure 10-1 System Board

Minimum configuration for the board in slot 0, the system master, is a SuperSPARC module in location A. See the note below.

Note – A system board can be moved to any slot, especially during troubleshooting. However, by convention, the system master is in slot 0. The factory ships systems in this configuration. It is possible POST may assign a new system master in a different slot if the original system master fails. If this occurs, correct it and install a fully functional system board in slot 0.

If a serial-interface console is used, it must be plugged into RS232 connector A on the system master. If a color monitor is used, a color-graphics interface card must be installed in SBus slot 1 on the system master.

Also, by convention, install system boards in the lowest card cage slot numbers first. Fill all SuperSPARC module A slots before installing modules in the B slots. Install all group 0 SIMMs before installing any group 1 SIMMs.

For comprehensive slot assignment rules and configuration priorities, See Appendix E, “General Rules for System Configuration.”

10.3.1 System Master Board

For rules governing which board is the correct candidate to be system master and which board is currently functioning as system master, refer to Appendix E, Section E.2, “System Master Board.”

10.4 Replacement Parts

In the Figure 10-2 logic diagram, parts shown in dark outlines can be replaced. These items include SuperSPARC modules, SIMMs, and SBus cards.

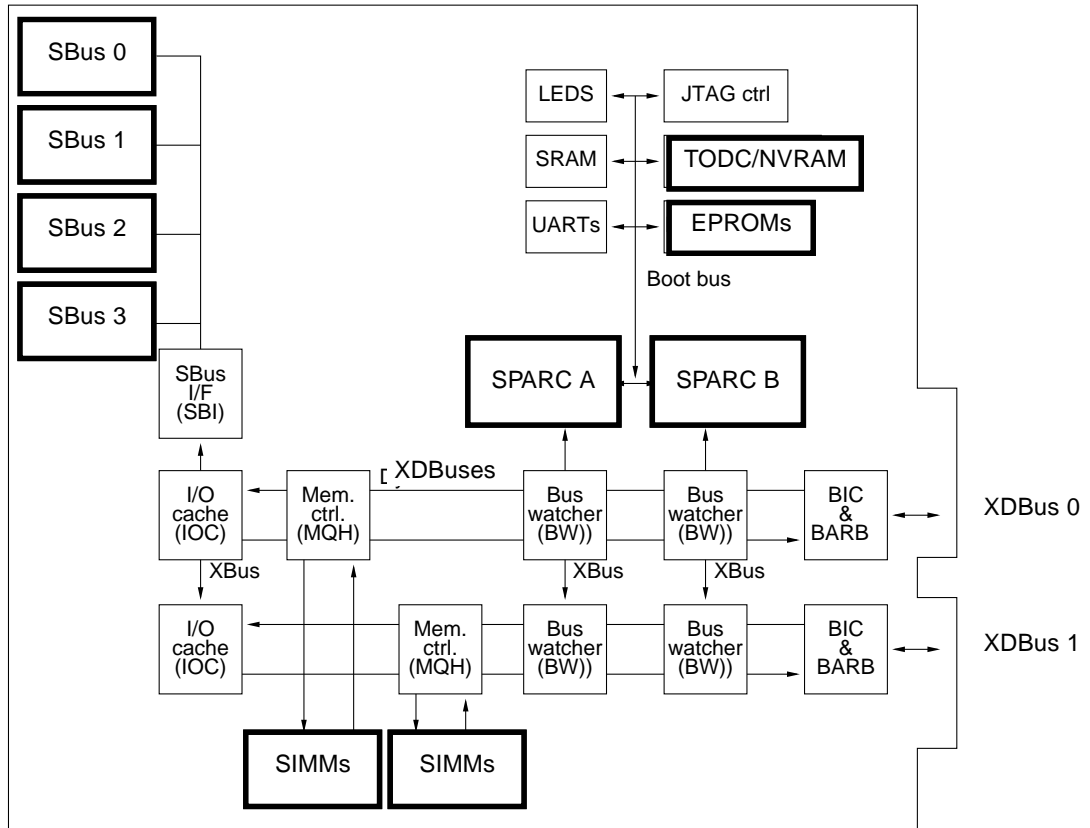


Figure 10-2 Replacement Part Locations

The remaining components may be referred to in system error messages (by part number) but they cannot be replaced in the field. Failure of any of these components requires replacement of the system board.

System Boards and Component Replacement

This chapter provides information about removing or replacing:

- System boards
- SuperSPARC modules
- SBus cards
- SIMMs and NVSIMMs
- OpenBoot PROMs

10.1 System Board

To remove and replace a system board, see Section 7.4, “Rear Screen Panel,” for access to the card cage.

10.1.1 Removal



Caution – Use the Sun ESD kit P/N 250-1088 for this procedure.

1. **Unfasten any cable connectors from the board back panel; set them aside.** First disconnect any keyboard cable, SCSI cable, network cable, or any other cables connected to the back panel. Refer to Section 6.2, “External Cables” for this procedure. Label all cables to avoid confusion later.

2. **Remove the two screws that secure the system board to the card cage.**
See Figure 10-1. Set the screws aside for later reinstallation.
3. **Pull the curved ends of both ejector/injector levers outward simultaneously to release the board from the backplane connectors.**
See Figure 10-1.
4. **Place the board on the ESD mat or in an antistatic bag.**

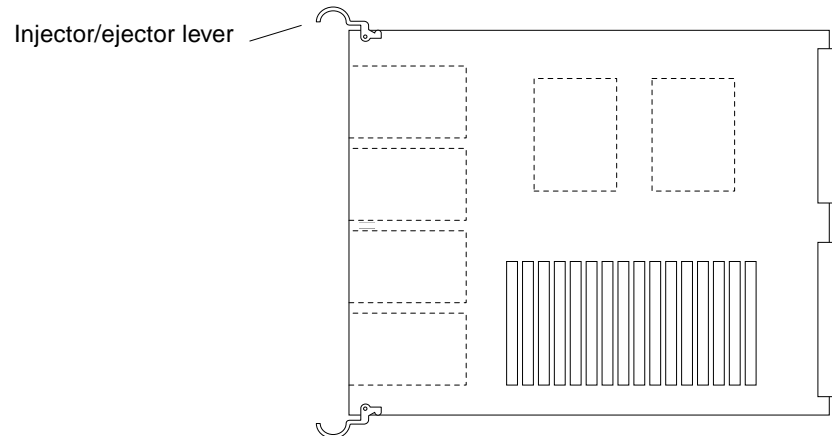


Figure 10-1 System Board Levers in the Unlocked Position

10.1.2 Replacement

Note – To select a card cage slot for the system board, refer to Appendix E, “General Rules for System Configuration.”

1. **Open the protective packaging and take out the system board.**

Note – The board with the highest revision-level Boot PROMs must be installed in the system master position, slot 0. To determine which board to install in slot 0, see Appendix E, “General Rules for System Configuration.”

Note – Your board may already have the current dash-revision Boot PROMs installed. If so, do not replace them. Compare the dash-revision of Boot PROMs installed on your board against those provided in this kit. Replace the Boot PROMs **ONLY** if they are of a lower dash-revision level than those in this kit.

- 2. Carefully insert the board in the proper slot in the card cage, ensuring that the board does not slip out of the upper and lower card guides.**
The component side of the board must face to the right.



Caution – Do not allow components on either side of the board to scrape against other boards. **DO NOT FORCE** any board into a slot. If the board binds, remove the board and inspect the card cage slot for any obvious obstructions. Also inspect both the board and the backplane for bent pins or other damage.

- 3. Ensure that the ejector/injector levers are in the outward position as you slide the board toward the backplane connectors.**
See Figure 10-1. The board will not seat fully unless the levers are in this starting position.
- 4. Use the ejector/injector levers to seat the board.**
Swing the ejector/injector levers into the locked position. Do not press on the board to seat it—doing so will damage the connector pins.



Caution – Do not press on the board rear panel to seat it—doing so will damage the connector pins.

- 5. Install two Allen screws to secure the board to the card cage.**
- 6. Connect any applicable interface cables to the system board back panel.**

10.2 Using Standoffs

Plastic standoffs lock the SuperSPARC modules and SBus cards to the system board. See Figure 10-2.

- To unlock a standoff, pull up the tip. See Figure 10-2.
- To lock a standoff, first ensure that the module or card rests on the standoff flange, then press down the tip.

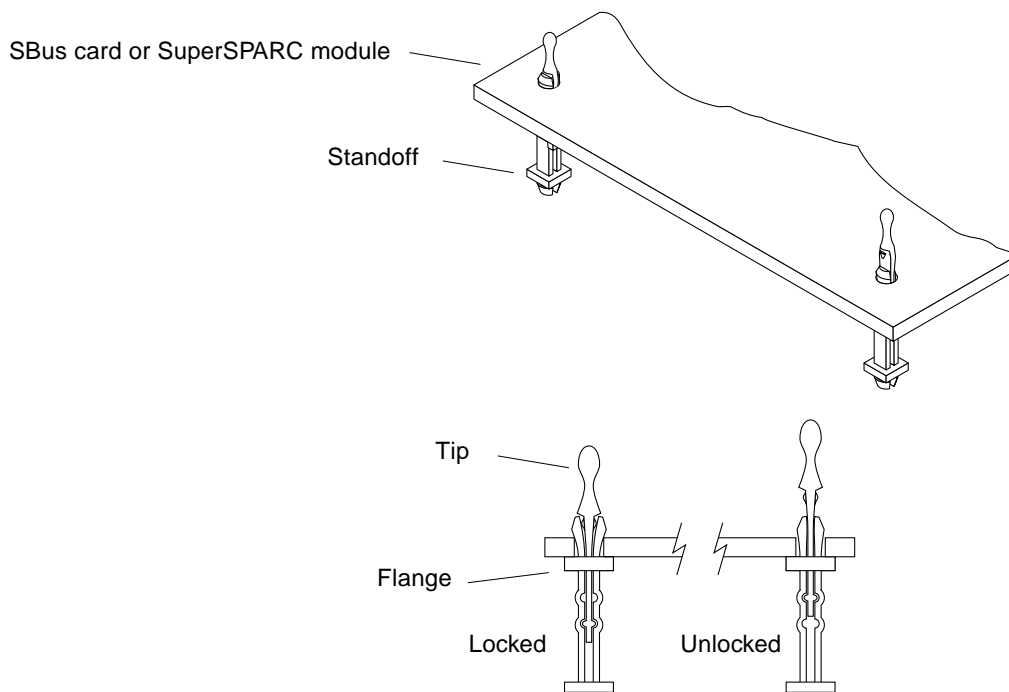


Figure 10-2 Locking and Unlocking Standoffs

10.3 SuperSPARC Modules

The system board can have zero, one, or two SuperSPARC modules. See Figure 10-3. If you are adding a new SuperSPARC module, see Section E.3.1, “SuperSPARC Modules.”



Caution – Use the Sun ESD kit P/N 250-1088 for these procedures.

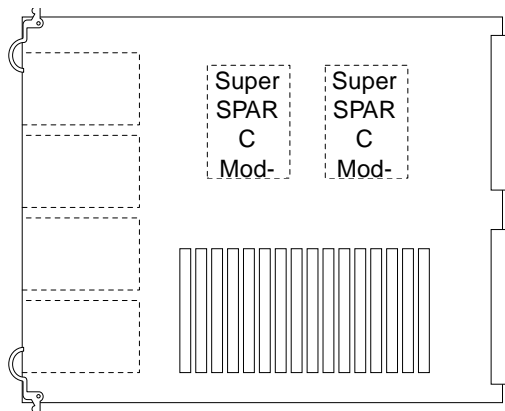


Figure 10-3 SuperSPARC Modules A and B

10.3.1 Removal

- 1. Unlock the four standoffs that secure the module to the system board.**
Pull up the tip of a standoff to unlock it. See Figure 10-2.
- 2. Hold the SuperSPARC module by the edges near the connector and carefully lift the module off the connector.**
Do not “rock” the module off of the connector. Ensure vertical movement of the module during insertion or removal process.



Caution – Risk of equipment damage: the connector housing may break if the module is tilted too far.

- 3. Place the module in an antistatic bag.**

10.3.2 Replacement

- 1. Unlock the four standoffs for the slot if they are not already unlocked.**
Pull up the tip of a standoff to unlock it. See Figure 10-2.
- 2. Remove the SuperSPARC module from the protective packaging and inspect the connector for bent pins.**
- 3. Place the SuperSPARC module on the four standoffs and align the module connector with the system board socket.**

4. **Hold the SuperSPARC module by the edges near the connector and firmly but gently press the module down until the connector is fully seated.** Do not “rock” the module onto the socket; the plastic connector housing may break.
5. **Starting from the side opposite the connector, press each corner of the SuperSPARC module to ensure that it rests on the collar of the standoff.**
6. **Press down on the tip of each standoff to lock the module in place.**

10.4 SBus Cards

The system board has four locations for SBus cards. See Figure 10-4.

If you are adding a new SBus card, see Section E.3.2, “SBus Cards.”



Caution – Use the Sun ESD kit P/N 250-1088 for these procedures.

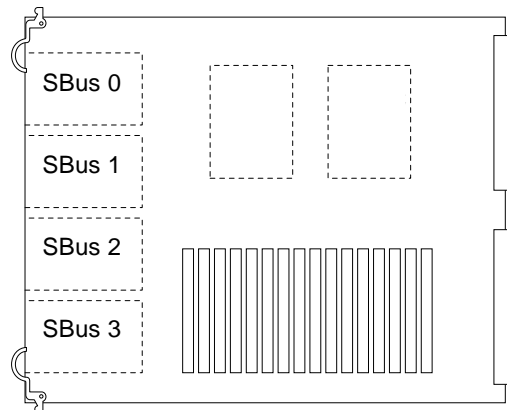


Figure 10-4 SBus Slot Locations

10.4.1 Removal

1. **Remove the two M2.5 screws that secure the SBus card to the backpanel.** Save the screws for installation of a replacement SBus card or a filler panel.
2. **Unlock the SBus card by pulling up the tips of the two standoffs.** Pull up the tip of a standoff to unlock it. See Figure 10-2.

3. Hold the card by the edges near the connector and gently rock the card back and forth to loosen it from the socket.



Caution – The connector housing will break if the SBus card is tilted too far.

4. Lift the SBus card from the socket at an angle while guiding the face plate out from the backpanel opening and under the springfingers. See Figure 10-5.

5. Place the SBus card in an antistatic bag.

6. If the SBus card is not immediately replaced, install a filler panel on the backpanel opening of the system board. To secure the filler panel, use the screws that were removed in step 1.



Caution – Installing the filler panel upside down will create a gap at the top edge of the SBus slot opening and impair system cooling.

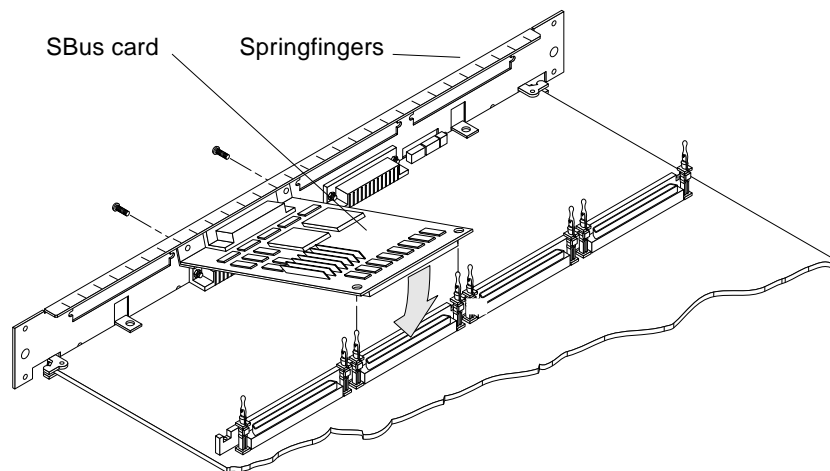


Figure 10-5 Removing or Installing an SBus Card

10.4.2 Preparing a New SBus Card

1. Open the protective packaging and take out the SBus card.

2. If the card has a plastic card retainer, remove it.

Spread the ends of the retainer apart to remove it from the card. The retainer is not needed for this installation. See Figure 10-6.

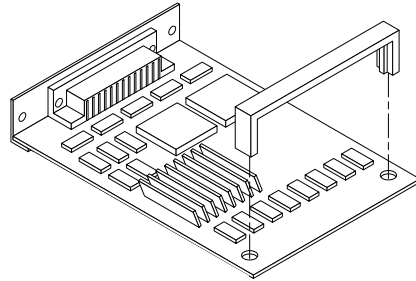


Figure 10-6 SBus Card Retainer

3. If the card has an adapter bracket, remove it.

Using a #0 Phillips screwdriver, remove the two screws securing the adapter to the card rear panel. The adapter bracket and the screws are not needed for this installation. See Figure 10-7.

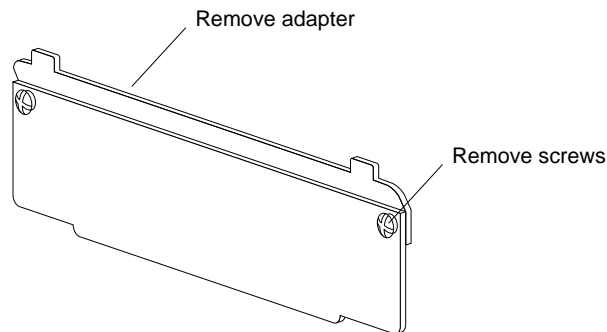


Figure 10-7 SBus Card Rear Panel with Adapter

4. For DSBE/S card only: remove the two outer retaining screws, but do NOT remove the middle screw or the springfinger.

You will need a #1 Phillips screwdriver and a 3/16 nut driver or socket wrench. See Figure 10-8.

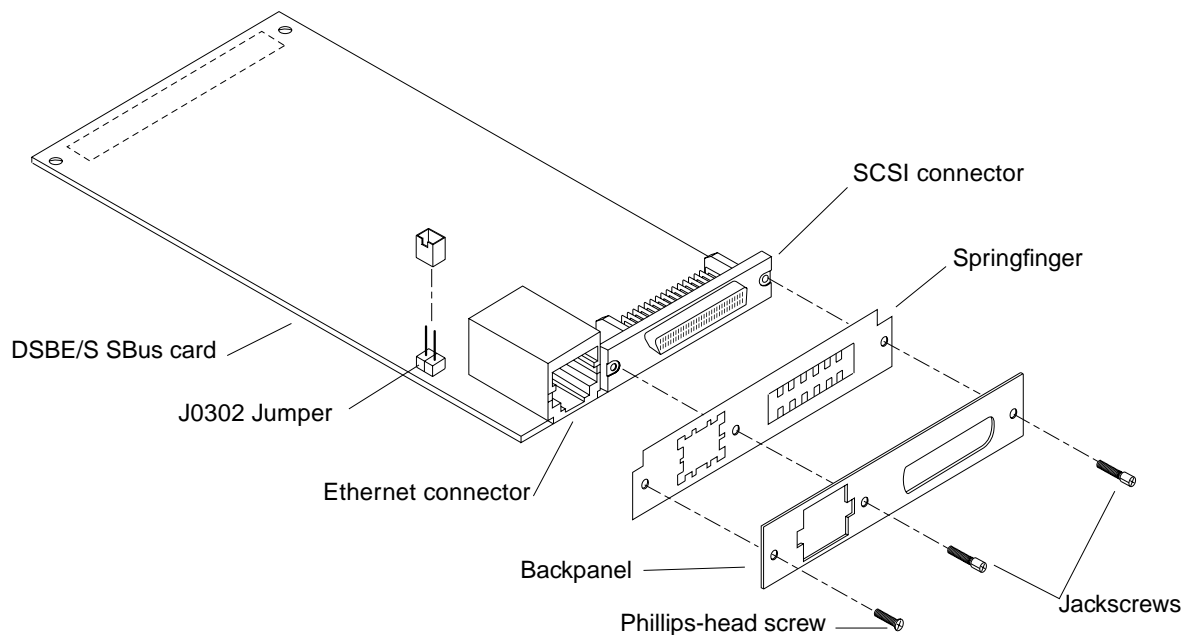


Figure 10-8 DSBE/S SBus Card with Springfinger, Backpanel, and Screws

5. For DSBE/S cards only: configure the J0302 jumper shown in Figure 10-8:

- To enable the Link Integrity Test, put the shunt in one pin as shown in part A of Figure 10-9. This is the default condition for Sun equipment.
- To disable the test, put the shunt over both pins. See part B of Figure 10-9.

Note – The Link Integrity Test can also be changed through software commands. See Section 3.9, “Enabling and Disabling the Link Integrity Test.”



Caution – If the customer chooses to disable the test, it must be disabled both at the hub and at the server. In the event of “loss of carrier” or “not responding” problems, check the status of the link enable at both the server and the hub.

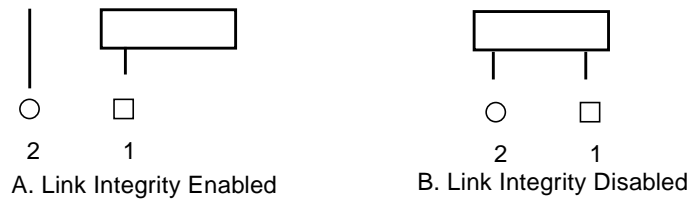


Figure 10-9 Disabling and Enabling the Link Integrity Test Feature

10.4.3 Installing an SBus Card

1. **If a filler panel covers the backpanel SBus slot, use a #0 Phillips screwdriver to remove the two screws and detach the filler panel.** Retain the screws to attach the SBus card to the backpanel unless the card has a wide connector or set of connectors. See the SBus card installation manual to verify the specific connector type.
2. **Unlock the two standoffs for the slot.** Pull up the tip of a standoff to unlock it. See Figure 10-2.
3. **Take the card out of the protective packaging and inspect the pins in the connector to make sure they are not bent.**
4. **Guide the SBus card face plate under the springfingers and against the rear face of the backpanel.**
See Figure 10-5. The I/O connectors of the card should be visible through the opening in the backpanel.
5. **Hold the card by the edges nearest the SBus connector and place the card over the two standoffs.**
6. **Firmly but gently press the card down until the connector is fully seated.** To align the connector and socket, push the card toward the system board backpanel. Do not rock the card onto the socket; the plastic connector housing may break.
7. **Press each corner of the card to ensure it rests on the standoff flange.** See Figure 10-2.
8. **Press down on the tip of each standoff to lock the card in place.**

10.5 SIMM and NVSIMM

All SIMMs and NVSIMMs are removed and installed in the same manner.

If you are adding SIMMs or NVSIMMs to the system, always add these devices in multiples of eight. Also, be aware that your choice of location can affect the efficient operation of these devices. For rules for selecting a location and for optimizing memory use, see Section E.3.3, “SIMMs,” on page 7.



Caution – Do not mix SIMMs of different capacities. A replacement SIMM may or may not resemble the original SIMM. When replacing a SIMM or NVSIMM, verify that the memory capacity and the part number are the same as for the original. Do not rely on the physical appearance. See Section E.3.3, “SIMMs” for drawings and device markings.

10.5.1 Removal

If a SIMM or NVSIMM fails, the power-on selftests (POST) will identify the location number (also known as the U-number or J-number) of the failing device. The socket number (J-number) is printed on the back of the board.

- 1. Locate the faulty SIMM by matching the location number displayed by POST with the U-number shown in Figure 10-10.**
- 2. Orient the system board so that the XDBus connectors face you.**
- 3. To unlock a SIMM, press the locking tabs toward the sides of the socket and tilt the SIMM forward.**
See Figure 10-11.
- 4. Unlock two more SIMMs to make space for the faulty SIMM to tilt forward far enough to be free of the locking pins.**
See Figure 10-12.
- 5. Remove the SIMM from the socket.**

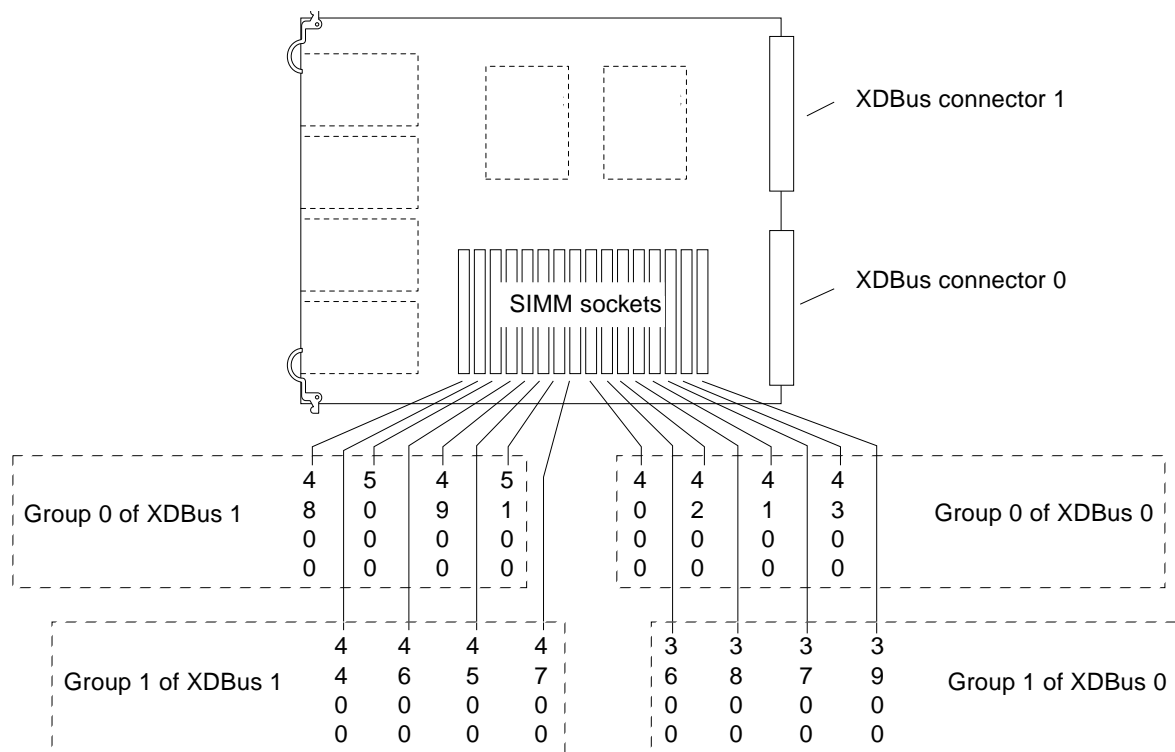


Figure 10-10 SIMM Location Numbers

6. For NVSIMMs: If the NVSIMM contains no useful data, disable the battery circuit by changing the jumper on the card. All data in the NVSIMM will be lost if the jumper is moved. See Figure 10-13 for the location of the jumper.
7. Store the SIMM or NVSIMM in an antistatic bag.

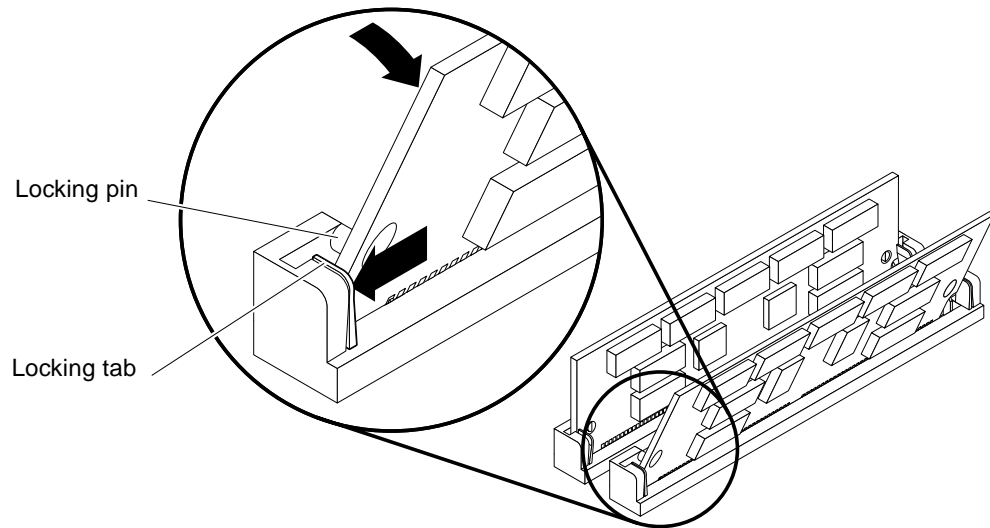


Figure 10-11 Unlocking a SIMM

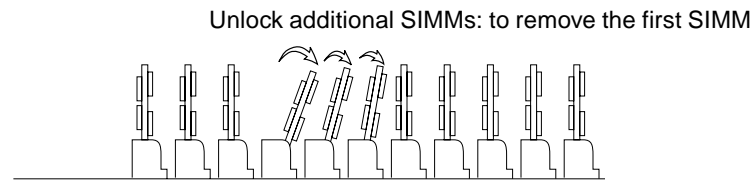


Figure 10-12 Creating Space to Remove a SIMM

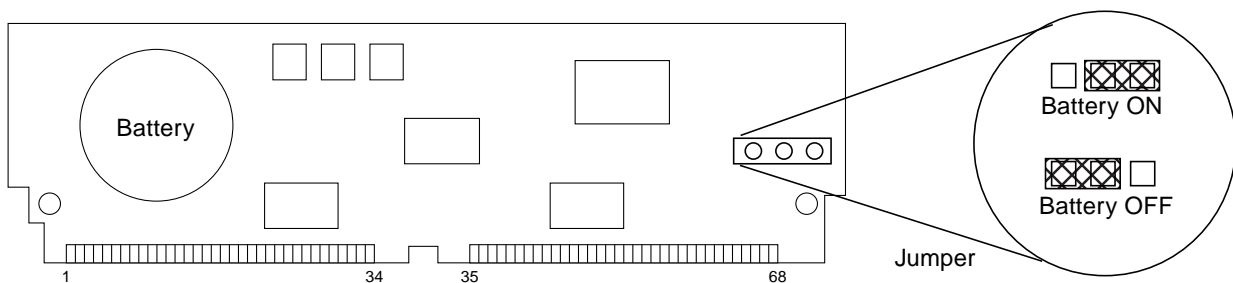


Figure 10-13 NVSIMM Jumper Positions

10.5.2 Installing a SIMM or NVSIMM

Note – Do not mix SIMMs of different capacities.



Caution – If you are adding memory to a system (always in multiples of 8 SIMMs), refer to Section E.3.3, “SIMMs.” Selecting the wrong location(s) can impair system performance.

1. **Orient the system board so that the XDBus connectors face you.**
2. **Remove the SIMM (or NVSIMM) from the antistatic package.**
3. **For NVSIMM only: if the battery is not already activated, move the jumper to the ON position. See Figure 10-13. If the jumper is already in the ON position, do not move it.**



Caution – Once you turn the battery ON, do not move or remove the jumper. Any data contained in the NVSIMM memory will be lost.

Note – It is not necessary to move jumpers on NVSIMMs that have been factory-installed in a new system. The system is delivered with the NVSIMM batteries activated.

4. **Hold the SIMM at the edges with pin 1 to the left.**
The large alignment notch or the double notch is at the left side. See Figure E-3.
5. **Guide the SIMM into the slot so that the SIMM connector pads touch the bottom of the socket.**
The bottom alignment notch on the SIMM must align with the tab in the center of the socket. The locking pins must align with the holes in the sides of the SIMM. See Figure 10-11.
6. **Tilt the SIMM upright to lock it in place.**
The locking tabs should automatically lock around the SIMM.

Note – The SIMM should require very little insertion force. If there are difficulties, or if the SIMM does not resemble the original SIMM, the replacement SIMM may be backward; check again that the alignment holes and the alignment notch align *exactly* with corresponding parts of the SIMM socket.

7. Lock into place any SIMMs that were loosened in the previous procedure.

10.6 OpenBoot PROM

See Figure 10-14 for the PROM socket locations.

10.6.1 Removal

- 1. To uncover the PROMs, remove the SBus card (if any) in SBus slot 0.**
- 2. Use an IC extraction tool to remove the PROMs.**
- 3. Place PROMs on antistatic foam plastic and store in an antistatic package.**

10.6.2 Replacement

- 1. Verify the correct PROM location.**
Each PROM has a different socket location and part number. See Figure 10-14.
- 2. Position the PROM carefully on the socket and partially seat the PROM.**
- 3. Ensure that the PROM pins are not bent; then press firmly to seat the PROM in the socket.**

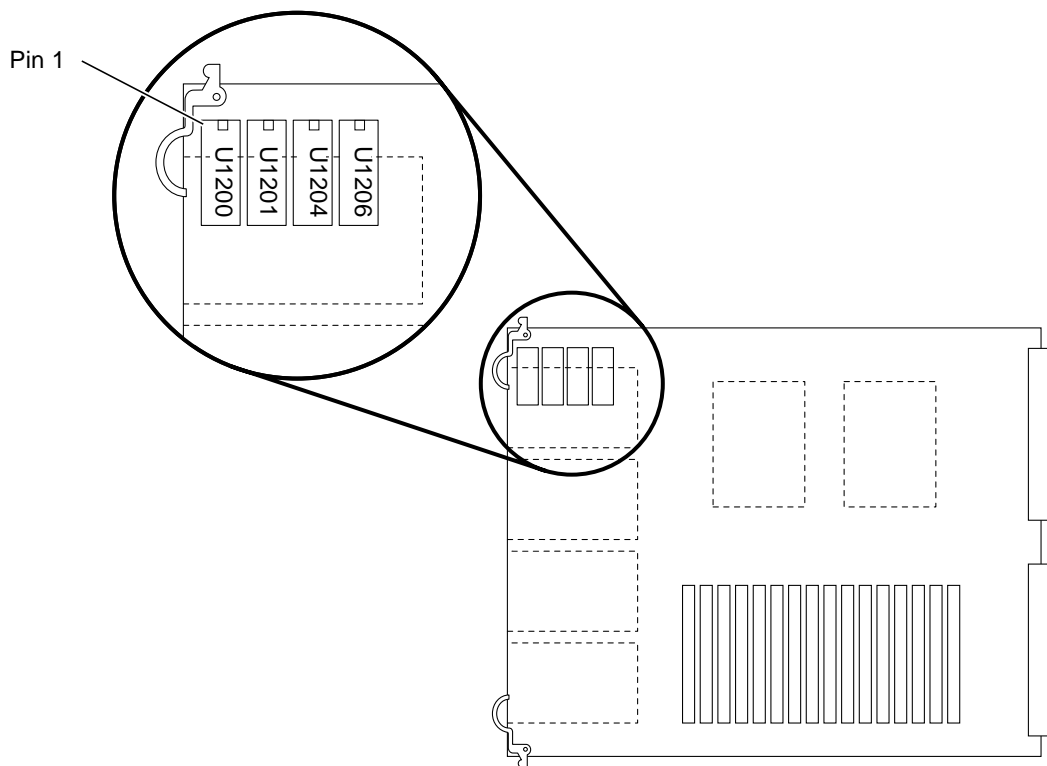


Figure 10-14 Open Boot PROM Locations



Caution – When inserting the PROM, do not flex the board or press it against a hard surface. Use a cushioned ESD mat to protect the board.

4. Repeat steps 2 and 3 for the remaining OpenBoot PROMs.
5. Replace any SBus card that was removed for this procedure.

Part 6— Illustrated Parts Breakdown

Illustrated Parts Breakdown	page 12-1
<i>Replaceable Parts</i>	<i>page 12-2</i>
<i>Assembly Illustrations</i>	<i>page 12-5</i>

Illustrated Parts Breakdown

The parts list and the illustrations on the following pages are intended to supplement the removal and replacement procedures.

The list of replacement parts begins on page 12-2, followed by illustrations of major assemblies in the SPARCcenter 2000 main cabinet.

The following assemblies are illustrated in this chapter.

Cable assemblies	<i>page 12-5</i>
Blower assembly	<i>page 12-6</i>
LED/keyswitch	<i>page 12-7</i>
Power supply	<i>page 12-9</i>
Backplane assembly	<i>page 12-12</i>
AC distribution unit	<i>page 12-13</i>
Differential SCSI disk tray	<i>page 12-14</i>
Differential SCSI disk tray LED/address cable assembly	<i>page 12-15</i>
Differential SCSI disk tray DC cable assembly	<i>page 12-16</i>
Differential SCSI disk tray data cable assembly	<i>page 12-17</i>
Differential SCSI disk drive and mounting bracket	<i>page 12-18</i>
Storage devices in the internal SCSI tray	<i>page 12-19</i>

12.1 Replaceable Parts

The following items for the SPARCcenter 2000 system can be replaced at the customer site by a qualified service engineer.

Table 12-1 Replaceable Parts

General Category	Replacement Part	Part No.	Illustration
Blower fan	Blower assembly, single	370-1379	page 6
	Blower assembly, quad	370-1853	page 6
	Blower assembly cable, blower power	530-1741	page 6
	LED/ blower/filter cable harness	530-1724	page 7
AC distribution unit	AC distribution unit (US)	300-1099	page 13
	AC distribution unit (international)	300-1100	page 13
	Fuse, 250 Vac	140-1152	page 13
DC power supply	Power supply, single power supply application	300-1073	page 9
	Power supply, dual power supply application	300-1281	page 9
	Power supply cable, P/S to AC dist unit	530-1738	page 9
	Power supply harness, +/-12 VDC	530-1743	page 9
	Power supply adapter board	540-2724	page 9
	Power supply breaker box	540-2689	page 9
SCSI cables	SCSI harness, SCSI power	530-1752	page 5
	SCSI cable, SCSI data	530-1835	page 5
	SCSI cable, SCSI address	530-1849	page 5
Main cabinet miscellaneous	LED/keyswitch board	501-1877	page 7
	Keypad assembly, multi-piece	530-1723-01	page 7
	Keypad assembly, one-piece	530-1723-05	page 8
	Control board, SPARCcenter 2000	501-2406	page 12
	Control board, SPARCcenter 2000E	501-2666	page 12
	Backplane assembly	501-1670	page 12

Table 12-1 Replaceable Parts (Continued)

General Category	Replacement Part	Part No.	Illustration
	Cable, backplane filter	530-1725	page 5
	Rear screen assembly	540-2104	page 20
	644 Mbyte SunCD drive	370-1312	page 19
	644 Mbyte SunCD Plus drive	370-1615	page 19
	644 Mbyte SunCD 2Plus drive	370-1681	page 19
	150 Mbyte 1/4 "tape drive	370-1205	page 19
	5.0 Gbyte 8mm tape drive	370-1415	page 19
	10 Gbyte 8mm tape drive	370-1809	page 19
	14 Gbyte 8mm tape drive	370-1856	page 19
	20 Gbyte 4 mm internal tape auto-loader	370-1617	page 19
System board	System board, SPARCcenter 2000, 0 processors, 0 SIMMs	501-2334	Chapter 10 page 2
	System board, SPARCcenter 2000E, 0 processors, 0 SIMMs	501-2718	Chapter 10 page 2
	SuperSPARC module, 40 MHz	501-2258	
	SuperSPARC module, 50 MHz	501-2601	
	SuperSPARC module, 60 Mhz	501-2543	
	OpenBoot PROM	*	Chapter 11 page 16
	TOD/NVRAM	100-3528	
	8Mbyte x 9, 100ns SIMM	501-1817	Chapter E page 8
	32Mbyte x 9, 100ns SIMM	501-2196	Chapter E page 8
	1Mbyte x 9, NVSIMM	501-2197	Chapter E page 8
	Filler panel, SBus slot cutout (Screw size is M2.5 for SBus cards)	340-2305	

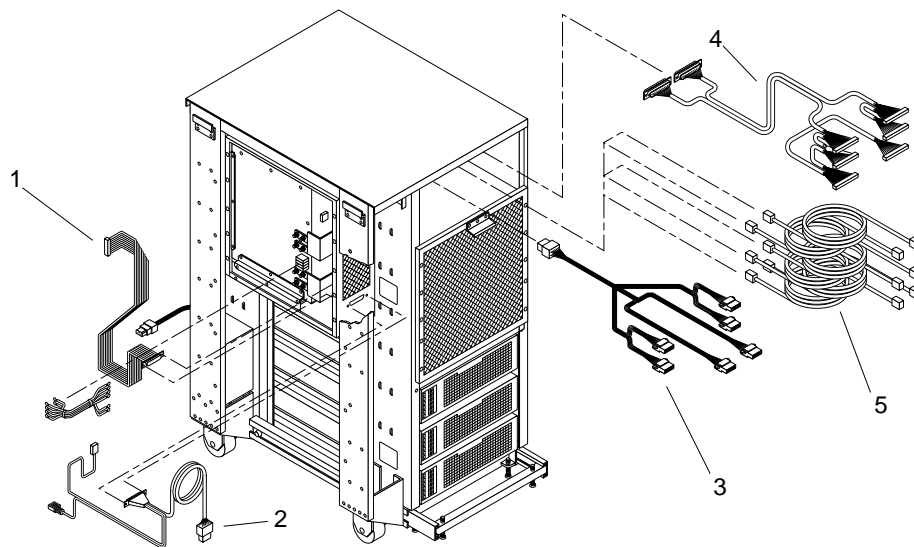
Table 12-1 Replaceable Parts (Continued)

General Category	Replacement Part	Part No.	Illustration
	Filler panel, card cage board slot	540-2114	
	SBus differential fast/wide intelligent SCSI host adapter (DWIS/S) expansion card	370-1704	

* See your Sun representative for the current part number.

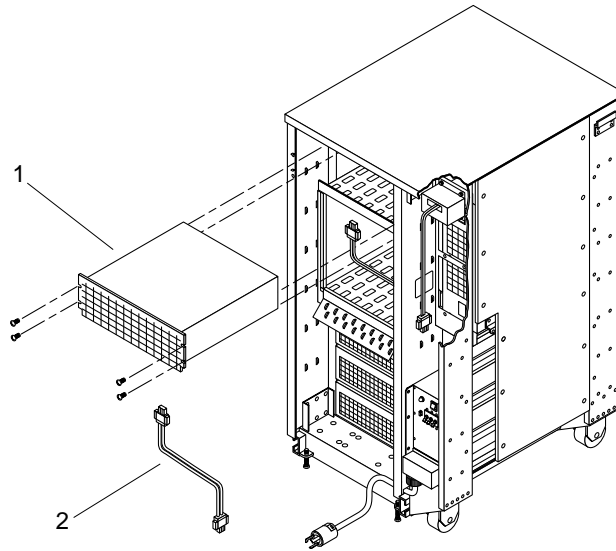
12.2 Assembly Illustrations

Table 12-2 Cable Assemblies



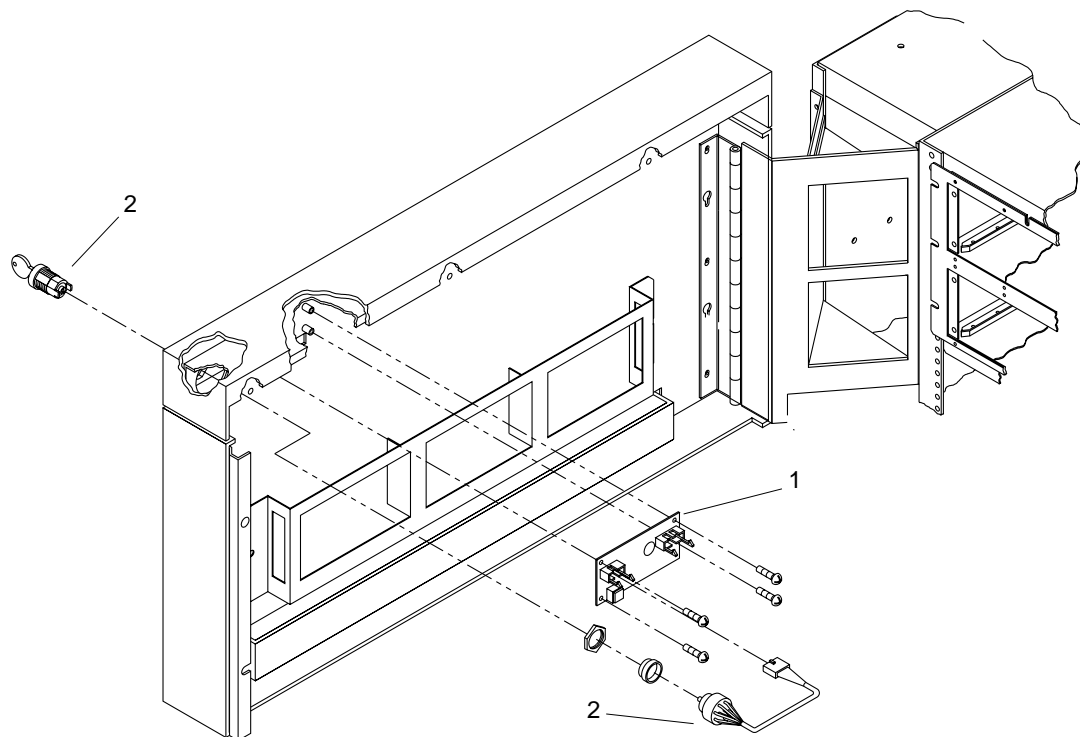
Key	Description	Part Number
1	Backplane filter cable	530-1725
2	LED/blower/filter cable harness	530-1724
3	SCSI power cable	530-1752
4	SCSI data cable	530-1835
5	SCSI address cable	530-1849

Table 12-3 Blower Assembly



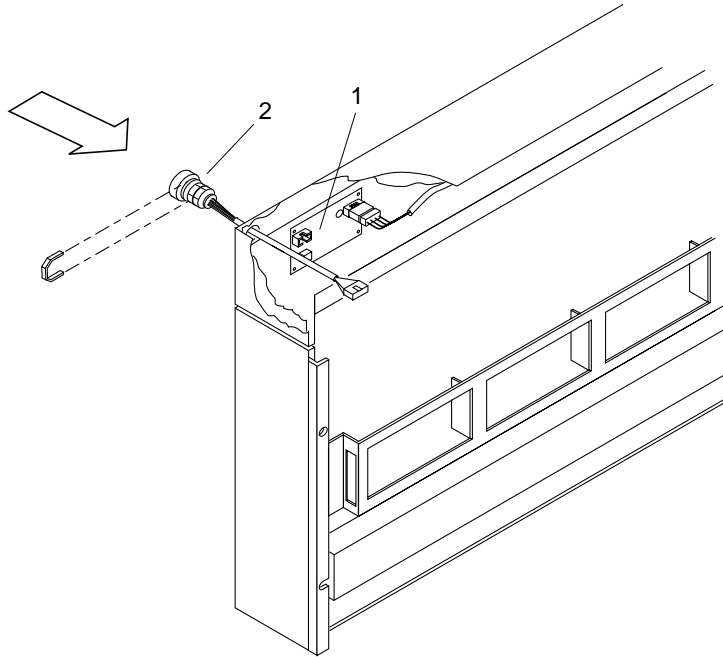
Key	Description	Part Number
1	BlowerAssembly, single	370-1379
1	BlowerAssembly, quad	370-1853
2	Blower Assembly cable, blower power	530-1741

Table 12-4 LED/Keyswitch Board and Multi-Piece Keyswitch



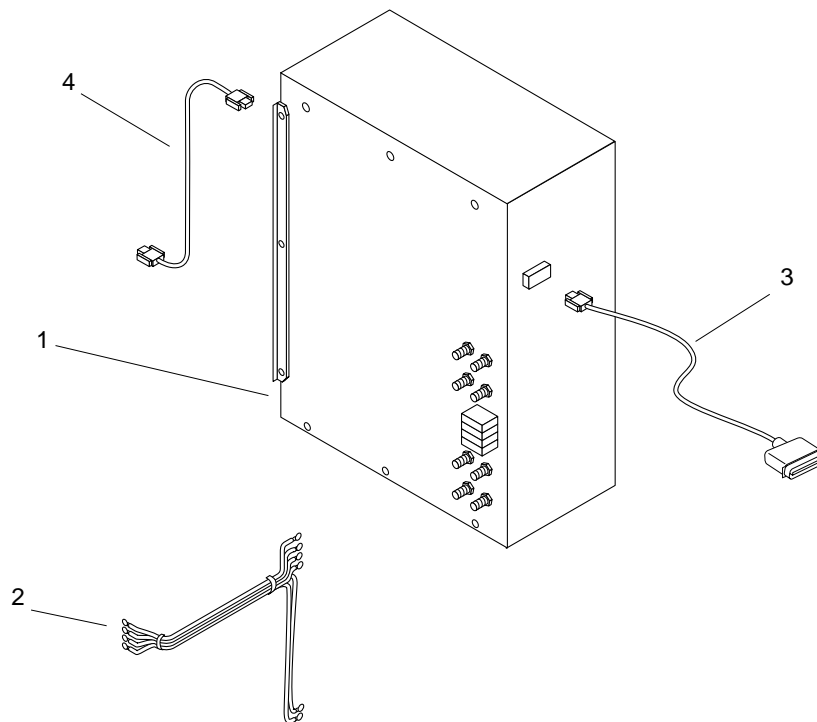
Key	Description	Part Number
1	LED/Keyswitch board	501-1877
2	Keyswitch assembly, multi-piece	530-1723-01
3	Keyswitch assembly, one piece	530-1723-05

Table 12-5 Keyswitch — One Piece



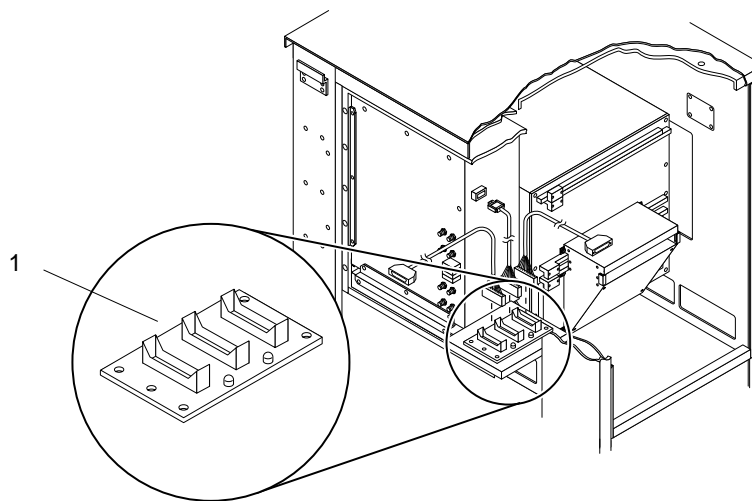
Key	Description	Part Number
1	LED/Keyswitch board	501-1877
3	Keyswitch assembly, one piece	530-1723-05

Table 12-6 Power Supply



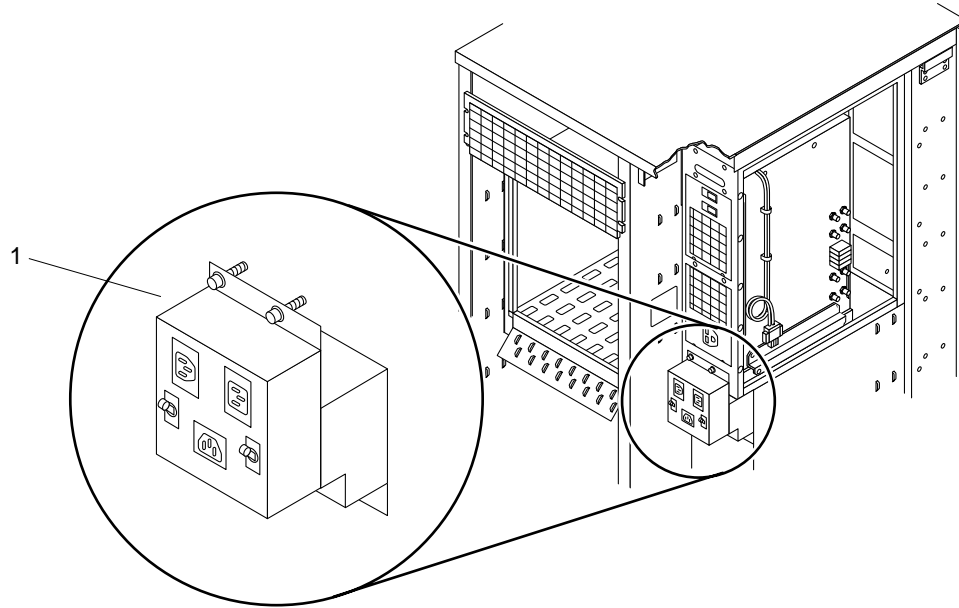
Key	Description	Part Number
1	Power supply, single power supply application	300-1073
1	Power supply, dual power supply application	300-1281
2	Harness, 12 VDC	530-1743
3	Voltage sense cable	530-1728
4	Power supply to AC distribution unit	530-1738

Table 12-7 Power Supply Adapter Board



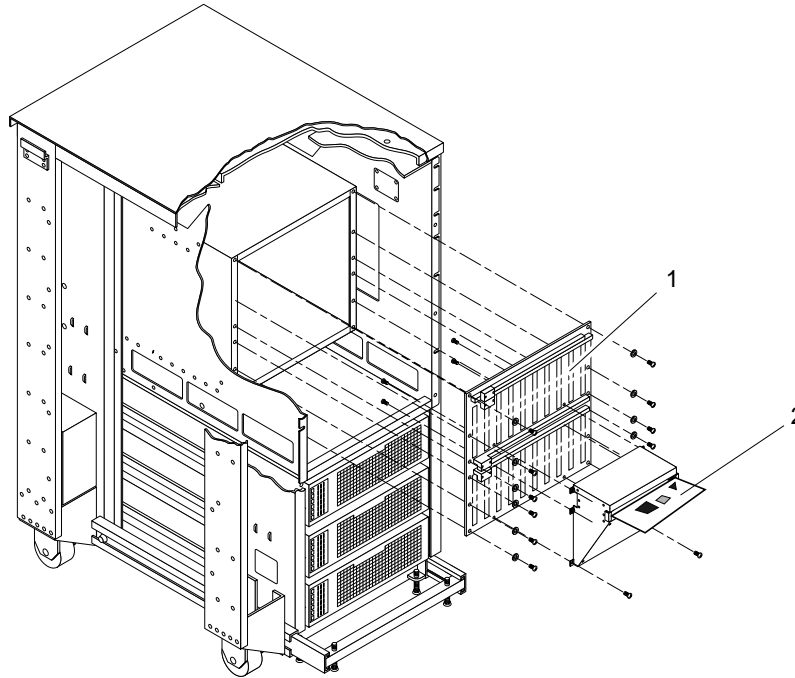
Key	Description	Part Number
1	Power supply adapter board	540-2724

Table 12-8 Power Supply Breaker Box



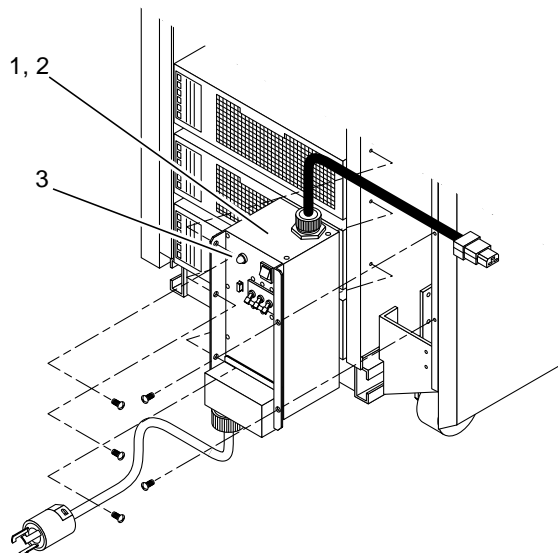
Key	Description	Part Number
1	Power supply breaker box	540-2689

Table 12-9 Backplane Assembly



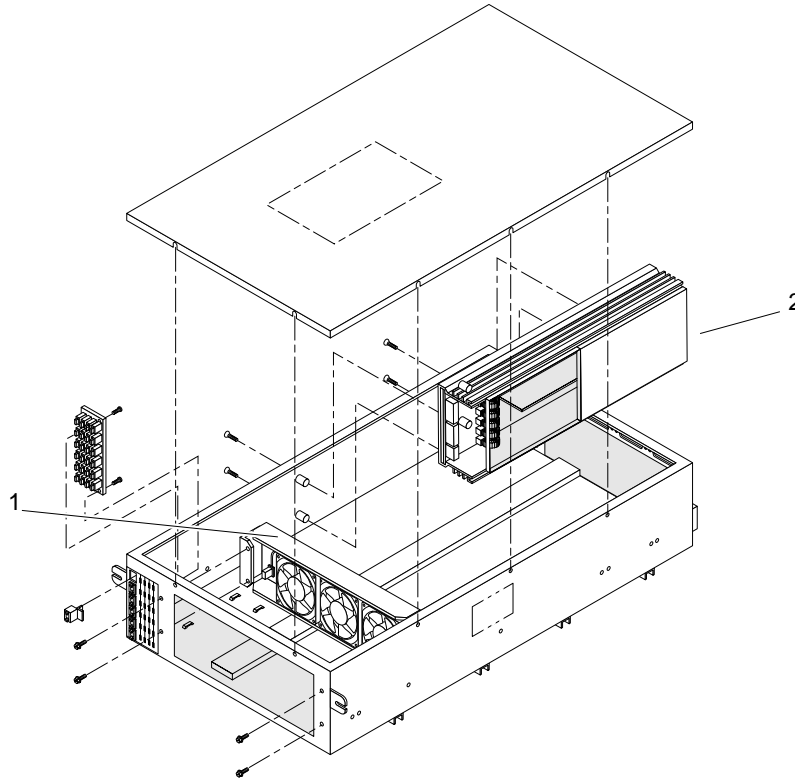
Key	Description	Part Number
1	Backplane assembly	501-1670
2	Control board, SPARCcenter 2000	501-2406
2	Control board, SPARCcenter 2000E	501-2666

Table 12-10 AC Distribution Unit



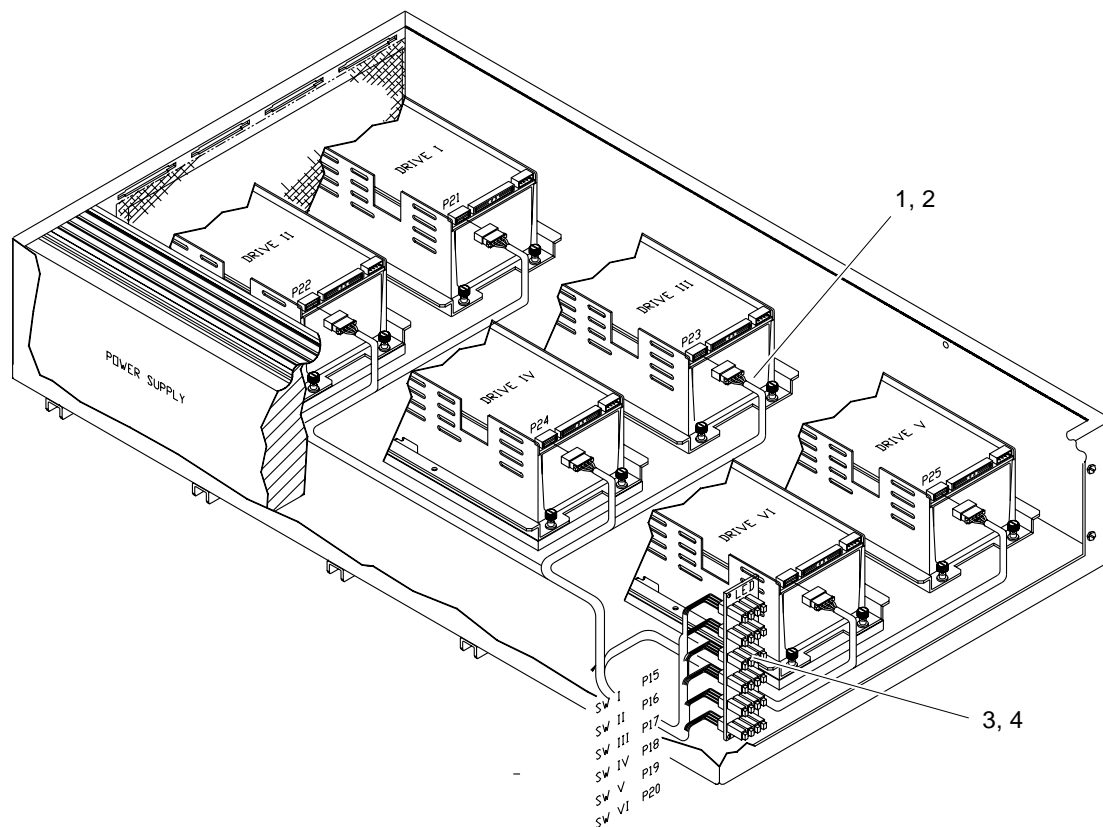
Key	Description	Part Number
1	AC distribution unit (US)	300-1099
2	AC distribution unit (International)	300-1100
3	Fuse, 250 Vac	140-1152

Table 12-11 Differential SCSI Disk Tray Major Assemblies



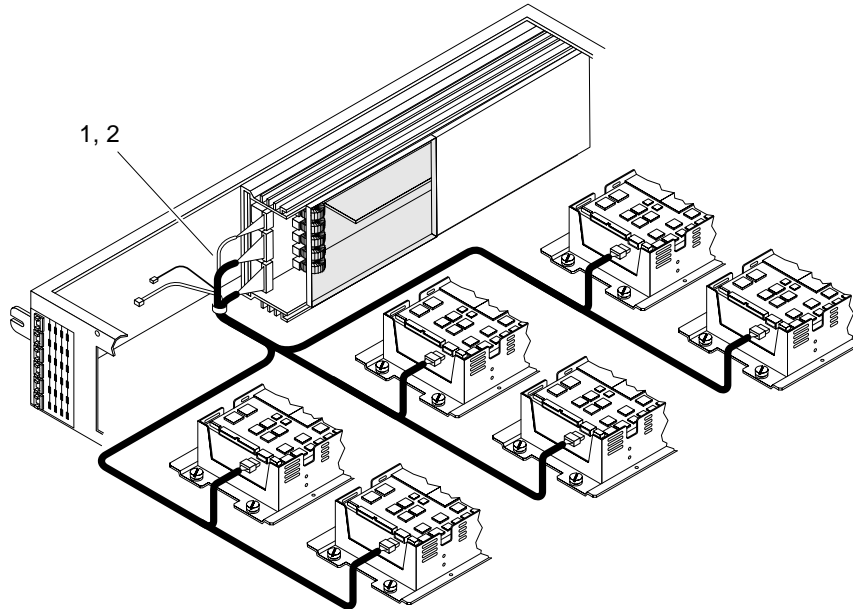
Key	Description	Part Number
1	3 fan tray assembly	540-2213
2	Power supply, 269W	300-1096

Table 12-12 Differential SCSI Disk Tray LED/Address Cable Assembly



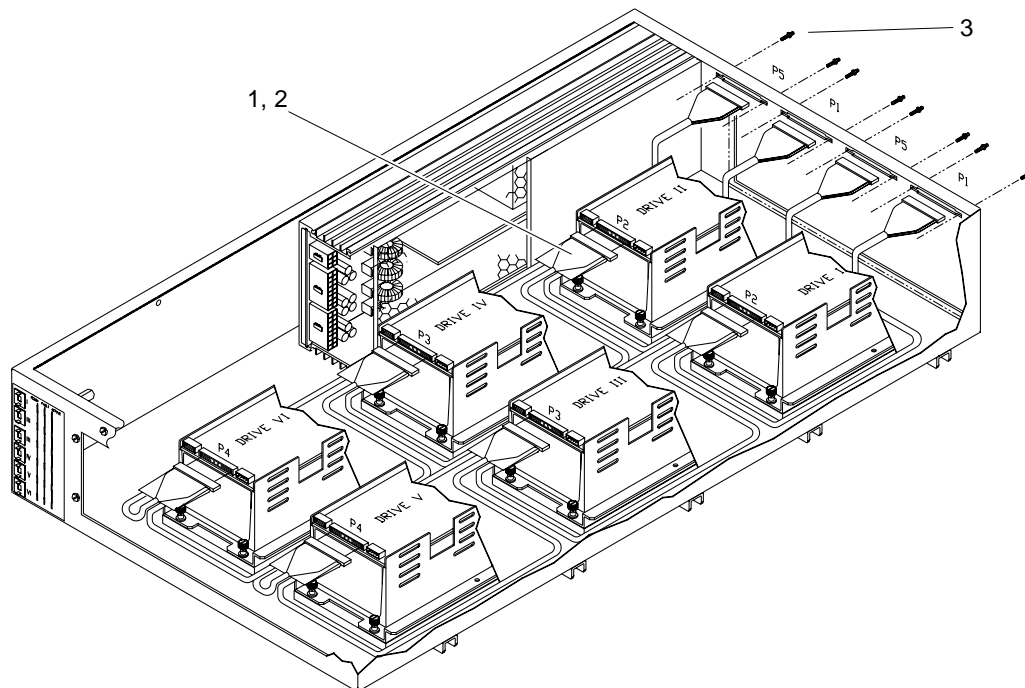
Key	Description	Part Number
1	LED/Address harness for 8-bit (narrow) differential SCSI disk drive	530-1882
2	LED/Address harness for 16-bit Fast/Wide differential SCSI disk drive, includes 16-bit Fast/Wide drive DC cable harness assembly	530-2097
3	LED status board, 8-bit (narrow) differential SCSI disk drive	501-1957
4	LED status board, 16-bit Fast/Wide differential SCSI disk drive	501-2426

Table 12-13 Differential SCSI Disk Tray DC Cable Assembly



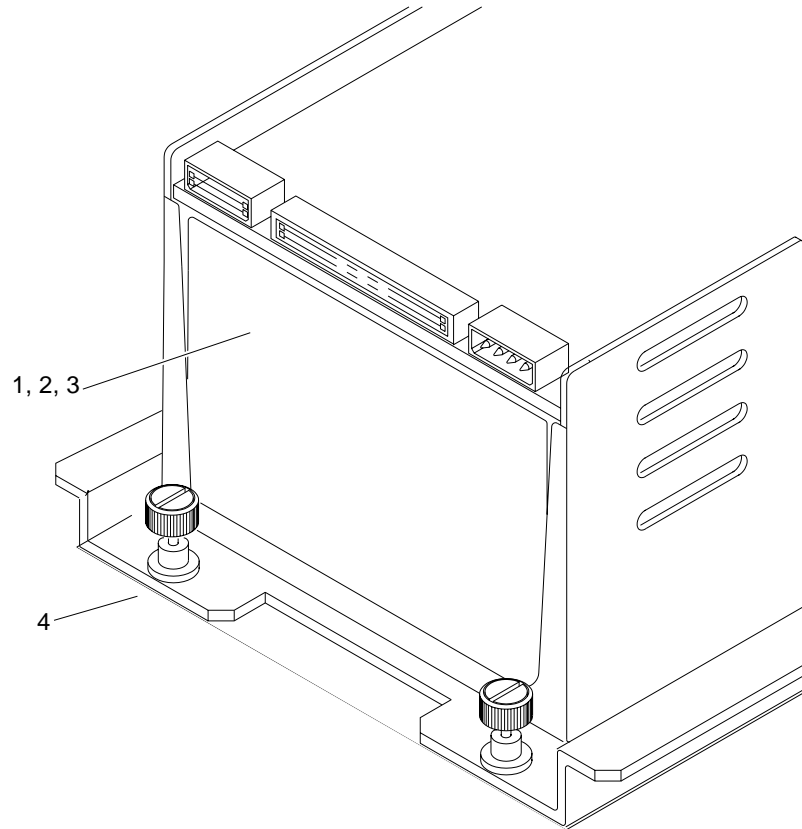
Key	Description	Part Number
1	DC cable harness for 2.1 Gbyte disk drive	530-1881
2	DC cable harness assembly for 16-bit (wide) differential SCSI disk drive, includes 16-bit (wide) drive LED/address harness	530-2097

Table 12-14 Differential SCSI Disk Tray Data Cable Assembly



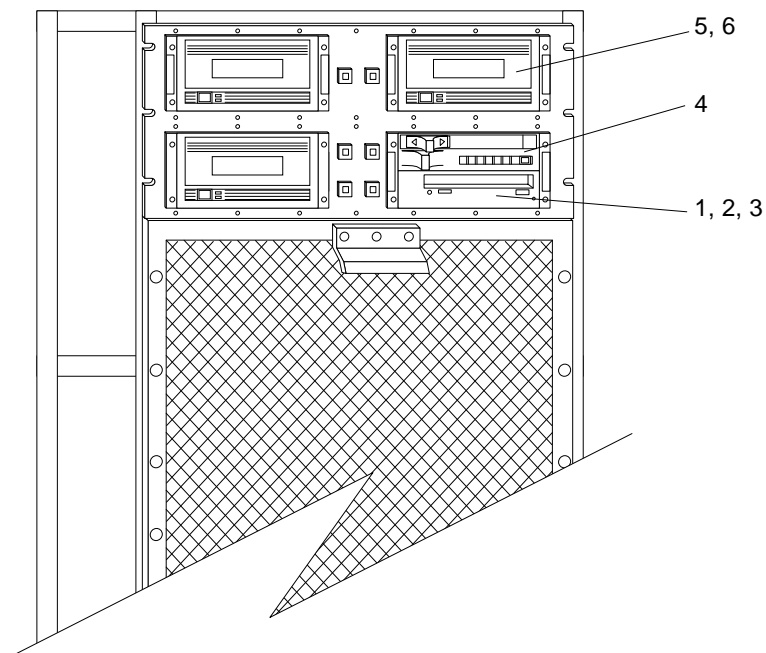
Key	Description	Part Number
1	SCSI data cable assembly, 8-bit (narrow) differential SCSI disk drive	530-1904
2	SCSI data cable assembly, 16-bit (wide) differential SCSI disk drive	530-2096
3	Jackscrew	240-1926

Table 12-15 Differential SCSI Disk Drive and Mounting Bracket



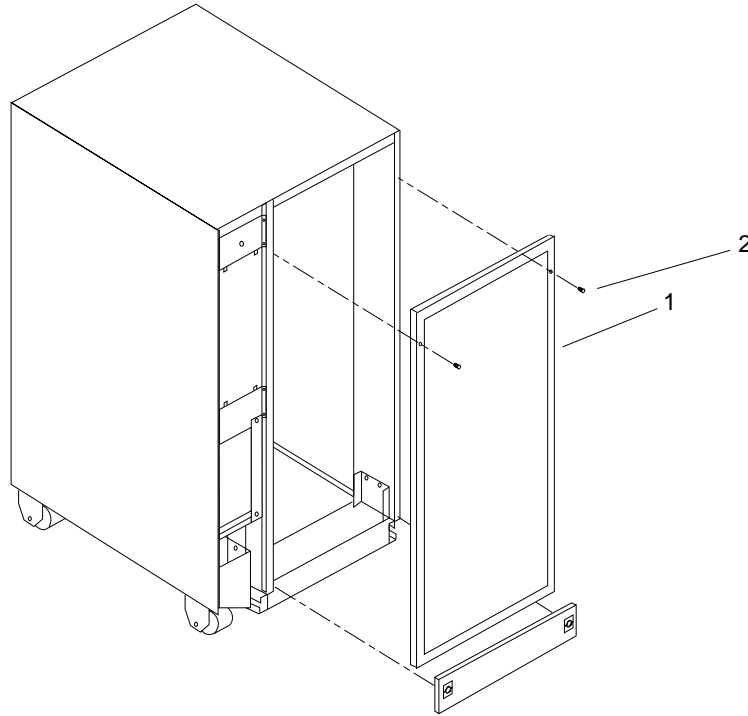
Key	Description	Part Number
1	SCSI differential disk drive, 8-bit (narrow), 2.1 Gbyte	370-1412
2	SCSI differential disk drive, 16-bit (wide), 2.9 Gbyte	370-1695
3	SCSI differential disk drive, 16-bit (wide), 9.0 Gbyte	370-1868
4	Disk drive mounting bracket	340-2612

Table 12-16 Storage Devices in the Internal SCSI Tray



Key	Description	Part Number
1	CD-ROM SunCD drive	370-1312
2	CD-ROM SunCD Plus drive	370-1615
3	CD-ROM SunCD 2Plus drive	370-1681
4	CD-ROM SunCD Plus4	
6	2.5 GByte 1/4" tape drive	
6	7 - 14 Gbyte 8mm tape drive (half-height drive)	370-1856
7	16-32 Gbyte 4 mm internal tape autoloader	

Table 12-17Rear Screen Assembly



Key	Description	Part Number
1	Rear screen assembly	540-2104
2	Screws, #10-32 x 3/4-inch	240-1655

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<i>Processor Module</i>	<i>page B-4</i>
<i>I/O Unit</i>	<i>page B-5</i>
<i>Main Memory Unit</i>	<i>page B-7</i>
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Product Specifications



A.1 Physical Specifications

Table A-1 Cabinet Physical Specifications

	U.S.	Metric
Height	56 in	143 cm
Width	30 in	77 cm
Depth	39 in	99 cm
Weight, system	800 lb, approx	360 kg, approx
Weight, expansion	1000 lb, approx	455 kg, approx
Power cord	15 ft	4.6 m

Table A-2 Clearance and Service Access

	U.S.	Metric
Front	48 in	122 cm
Rear	36 in	92 cm
Left	2 in	5 cm
Right	2 or 48 in (if optional I/O ports are installed in system right side)	5 or 120 cm

Table A-3 Main Cabinet Shipping Specifications

	U.S.	Metric
Height	62.0 in	157 cm
Width	39 in	99 cm
Depth	44.5 in	113 cm
Weight: system cabinet	875 lb, approx	400 kg, approx
Weight: expansion cabinet	1075 lb, approx	490 kg, approx

A.2 Electrical Specifications

The electrical specifications are listed separately for each cabinet type.

Table A-4 Main Cabinet Electrical Specifications

Parameter	Value	
Input current	Voltage range	200-240 Vac
	Current, maximum	24A
	Current frequency range	47-63 Hz
Output current	+5 VDC, maximum	330A
	+1.2 VDC, maximum	176A
	+12 VDC, maximum	14A
	-12 VDC, maximum	2A
	+24 VDC, maximum	9A
Input power rating	Total continuous power	3500W (with 3 drive trays)
Volt-Ampere rating		3600 VA
BTU rating		12,000 BTU
Power factor		0.98 at full load
Plug type	U.S.	NEMA L6-30P for 200-240 Vac
	International	32A, single phase IEC 309, connected for 220-240 Vac

Table A-5 Tape Expansion Cabinet Electrical Specifications

Parameter		Value
Input current	Voltage range	200-240 VAC
	Current frequency range	47-63 Hz
Power rating	Total continuous power	2690W, maximum
Volt-Ampere rating		2890 VA
BTU rating		9178 BTU
Power factor		0.85-0.88
Plug type	U.S.	NEMA L6-30P for 200-240 Vac
	International	32A, single phase IEC 309, connected for 220-240 Vac

Table A-6 Disk Expansion Cabinet Electrical Specifications

Parameter		Value
Input current	Voltage range	200-240 Vac
	Current frequency range	47-63 Hz
Power rating	Total continuous power	3057W, maximum
Volt-Ampere rating		3.3 KVA
BTU rating		10,500 BTU
Power factor		0.95 at full load
Plug type	U.S.	NEMA L6-30P for 200-240 VAC
	International	32A, single phase IEC 309, connected for 220-240 VAC

A.3 Environmental Requirements

Table A-7 Temperature Limits

	Operating¹		Non-operating	
	U.S.	Metric	U.S.	Metric
Recommended range	50°-104°F	10°-40°C	50°-140°F	10°-60°C
Minimum temperature	50°F at 20% RH	10°C at 20% RH	-4°F	-20°C
Maximum temperature	104°F at 20% RH	40°C at 20% RH	140°F	60°C
Maximum gradient	<27°F/hr, <30% RH/hr	<15°C/hr, <30% RH/hr	<27°F/hr, <30% RH/hr	<15°C/hr, <30% RH/hr
Wet bulb	humidity 27C° non-condensing		humidity 27C° non-condensing	
Dwell at extremes	8 hours	8 hours	24 hours	24 hours

1. The 1/2-inch front load tape drive has a maximum temperature limit of 86°F (30°C).

Table A-8 Humidity Limits

	Operating		Non-operating	
	U.S.	Metric	U.S.	Metric
Recommended range	20%-80% RH at 104°F	20%-80% RH at 40°C	95% RH at 104°F	95% RH at 40°C
Minimum humidity	20%	20%	10%	10%
Maximum humidity	80%	80%	95%	95%
Maximum gradient	<30% RH/hr <27°F/hr	<30% RH/hr <15°C/hr	<30% RH/hr <18°F/hr	<30% RH/hr <10°C/hr
Dwell at extremes	8 hours	8 hours	120 hours	120 hours

Table A-9 Altitude Limits

	Operating		Non-operating	
	U.S.	Metric	U.S.	Metric
Maximum altitude	10,000 ft	3 km	40,000 ft	12 km
Temperature range	50°-104°F	10°-40°C	32°F	0°C
Maximum gradient	<1.5kPa/min <18°F/hr	<1.5kPa/min <10°C/hr	<8kPa/min <18°F/hr	<8kPa/min <10°C/hr
Dwell at extremes	4 hours	4 hours	4 hours	4 hours

B.1 System Overview

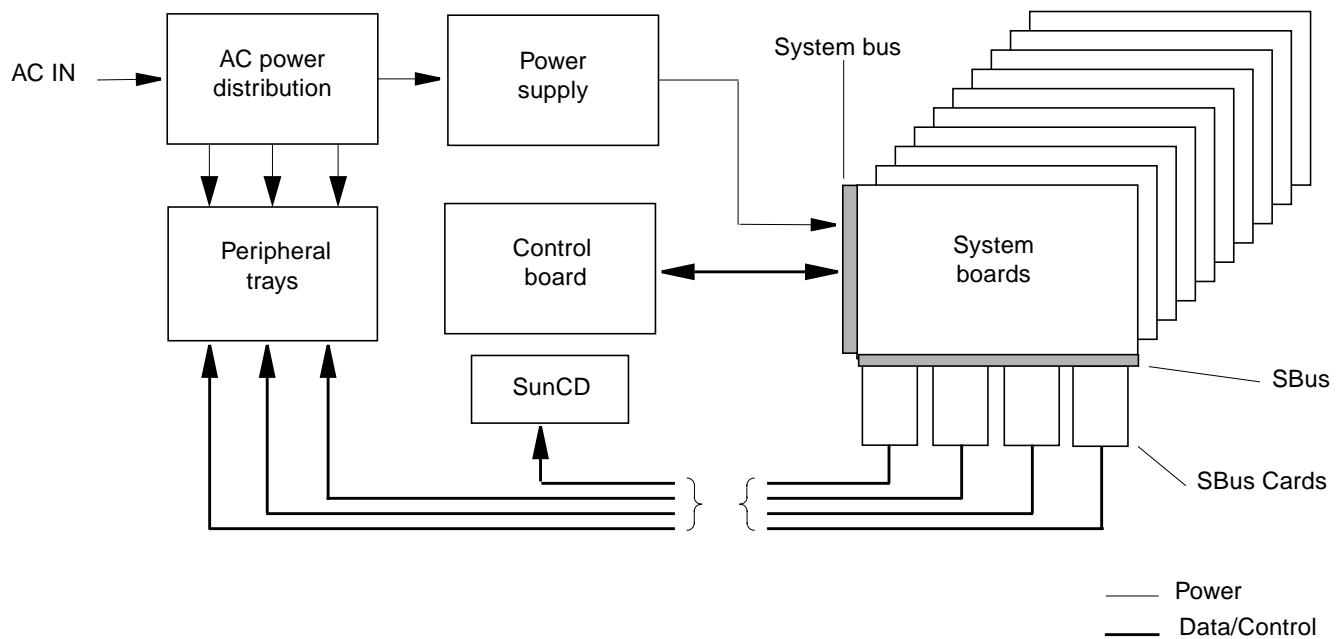


Figure B-1 SPARCcenter 2000 System Simplified Block Diagram

The system consists of one to ten system boards, a control board, a backplane, a power supply, an AC power distribution unit, one to three peripheral trays for disk drives, and an internal peripherals tray. The internal peripherals tray contains a SunCD drive and space for 1/4-inch and 8mm tape drives, and 4 mm tape auto-loaders.

Figure B-2 shows the components on the system board. The system board has two processor modules, SIMM memory banks divided into two interleaved groups, and up to four SBus cards. Any of these devices can access the main system bus. Each system board also has two arbitrators, called board arbiters (BARBs), one for each XDBus and eight bus interface chips (BICs).

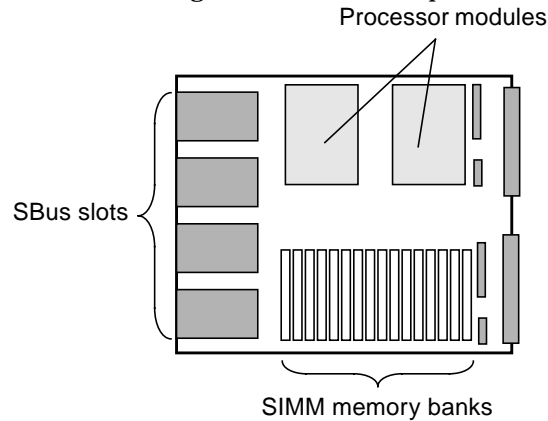


Figure B-2 System Board Components

B.2 System Architecture

Figure B-3 is a detailed block diagram of the SPARCcenter 2000 system architecture. Each SPARCcenter 2000 system supports 1 to 20 processor modules, and 1 to 40 SBus cards. One to four SBus cards can be plugged into the SBus on each system board. Memory capacity is 64 Mbytes to 5 Gbytes.

Functionally, the SPARCcenter 2000 system consists of three main sections:

- Processor module
- I/O unit
- Main memory unit.

The main sections of the system are interconnected by the system bus, which is called an XDBus.

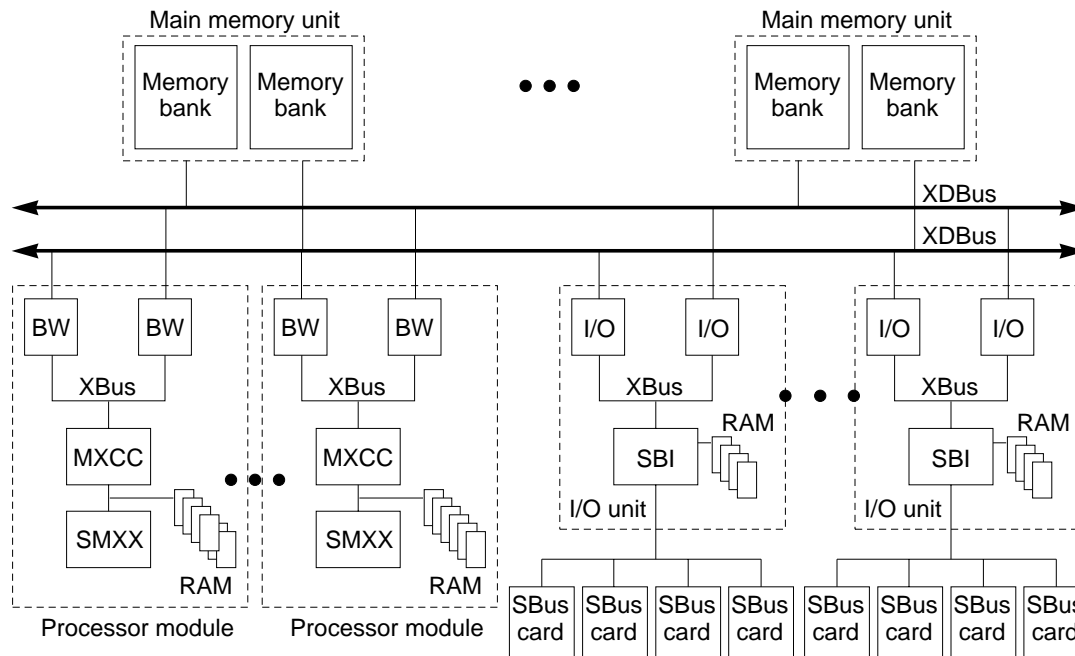


Figure B-3 SPARCcenter 2000 System, Logical Block Diagram

The XDBus is the main system bus. The XDBus is the backplane bus in the main card cage and the system bus on the system board. BICs interconnect the on-board and backplane XDBus. BICs are 18-bit bit-sliced pipeline registers. Each XDBus is supported by four BICs.

For high-speed system operation, the XDBus is divided into two independent halves. Either half of the XDBus can be accessed by SBUS cards via the SBUS interface (SBI) and the XBUS. The SBI transfers data between the SBUS and the XBUS.

B.3 Arbitration System

The SPARCcenter 2000 system supports a large number of devices that demand ownership of system resources, including exclusive access to the system backplane address and data bus. To prevent conflicts over access to resources, the SPARCcenter 2000 system has a two-tier arbitration system; one tier monitors the boards; the other, which is higher, monitors the overall system.

Each system board has two arbitrators, called board arbiters (BARBs), one for each XDBus. The function of the BARBs is to determine which device, bus watcher (BW), memory queue handler (MQH), or I/O cache (IOC) is next in line to access the XDBus.

Because the system boards are identical, an external arbitrator must determine which board can access the system bus at any instant. The external arbitrator is called the central arbiter (CARB). The control board has two CARBs, one for each half of the XDBus.

B.4 Processor Module

Figure B-4 is a block diagram of the processor module. Each system board has up to two processor modules. Each processor module contains one processor integrated circuit (SMXX), cache memory, an MX cache memory controller (MXCC) and (BW) interface. The main memory banks are on the system board.

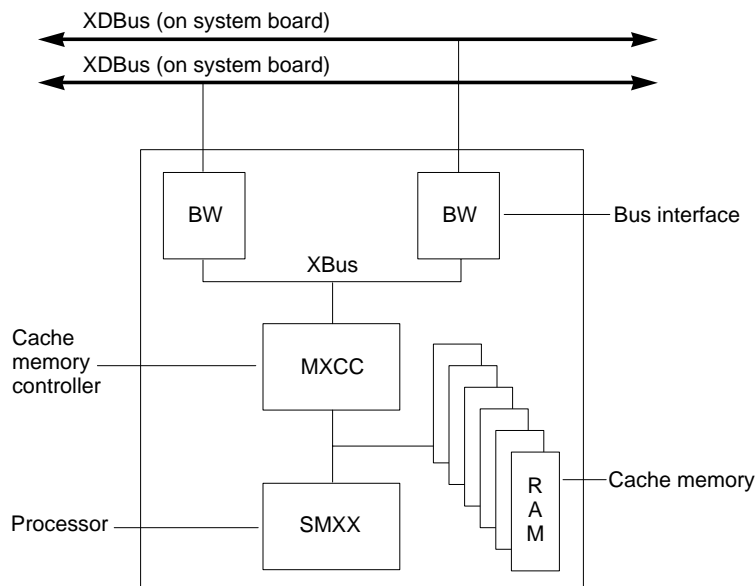


Figure B-4 Processor Module, Block Diagram

B.5 I/O Unit

Figure B-5 shows the I/O section of the system board, which is called the I/O unit. All I/O devices are connected to the SBus. The SBus-to-XDBus interface uses an SBus Interface (SBI) chip and two I/O cache (IOC) chips. A small I/O cache in the IOC chips stays consistent with the processor caches. SBus addresses are translated into memory and I/O addresses by an I/O memory management unit (I/O MMU) that is dedicated to the SBus. The I/O MMU is an external static random access memory (SRAM) array, called the external page table (XPT), that is controlled by the SBI.

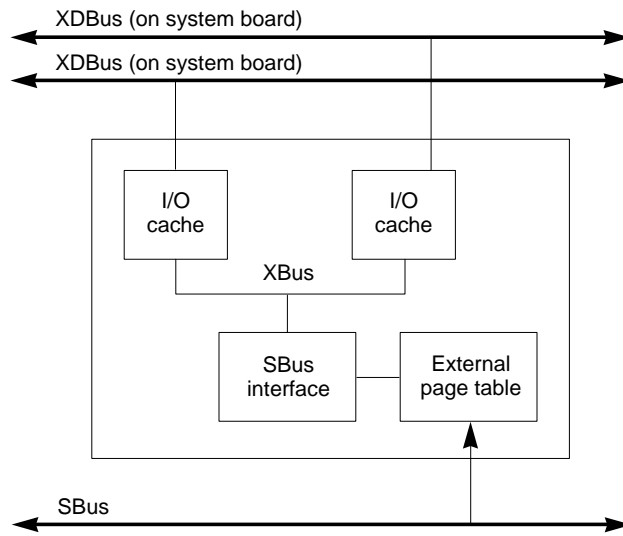


Figure B-5 I/O Unit, Block Diagram

B.6 Main Memory Unit

Figure B-6 shows the main system board memory section — called the main memory unit. Each board contains two memory queue handlers (MQHs). Each MQH controls two memory banks, bank 0 and bank 1, which are interleaved across the XDBus. Each memory bank is a dynamic random access memory (DRAM).

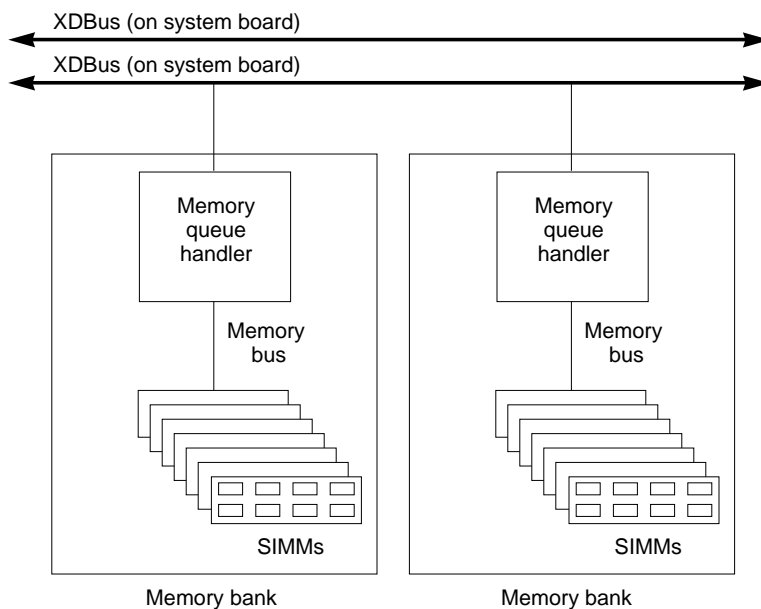


Figure B-6 Main Memory Unit, Block Diagram

B.7 Control Board

Figure B-7 is a detailed block diagram of the control board. One control board serves the entire system regardless of the number of system boards. The control board generates all system-wide clocks. The central arbiters (CARBS) arbitrate disputes between the BARBS on system boards that compete for use of system bus. LEDs on the board edge display the power and signal status.

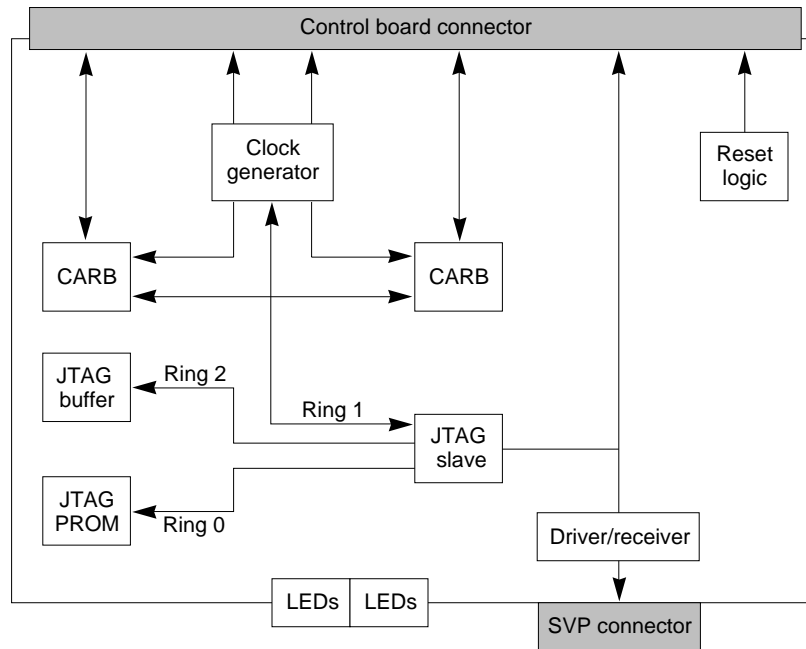


Figure B-7 Control Board, Block Diagram

B.8 SBus Cards

The SBus cards allow the use of a wide variety of I/O options such as graphic displays, Ethernet, FDDI, printers, and so forth. Each system board supports one to four SBus cards.

B.9 Power Distribution

Figure B-8 shows the SPARCcenter 2000 system power distribution. AC input power is routed to the main system power supply and the power supplies in the SCSI differential drive trays via a 30-ampere circuit breaker in the AC power distribution unit.

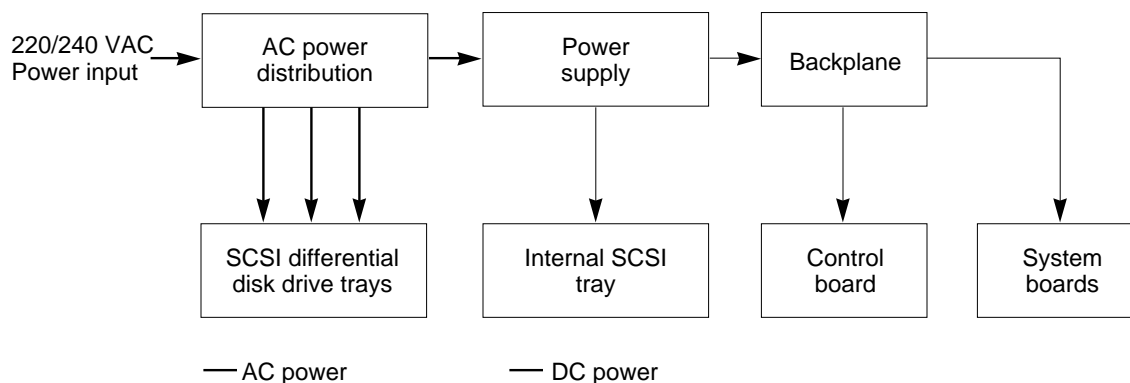


Figure B-8 Power Distribution, Block Diagram

A 2270 watt power supply provides +1.2, +5, +12, and -12 VDC power to the control and system boards through the backplane and +5 and +12 VDC power to the internal SCSI tray. The supply also produces +24 VDC for the system cooling unit located in the system rack.

Jumpers



Use this appendix to set or identify jumpers on:

- The DSBE/S SBus card
- The NVSIMM
- The system board

B.1 DSBE/S SBus Card Jumper

The Link Integrity Test tests communications between the DSBE/S SBus card in the server and the nearest network hub. If the test is set differently at the card and the hub, communication is not possible. (A monitor attached to the server will display “no carrier” or “not responding” or a similar message).

The test is enabled or disabled through hardware or software settings. To change the setting through software commands, see Section 3.9, “Enabling and Disabling the Link Integrity Test,” on page 18. Alternatively, the Link Integrity Test may be set by way of a jumper on the DSBE/S SBus card. The jumper (J0302) is shown in Figure B-1.

- To *enable* the Link Integrity Test, put the shunt in one pin as shown in part A of Figure B-2. This is the default condition for Sun equipment.
- To *disable* the Link Integrity Test, put the shunt over both pins, as shown in part B of Figure B-2.

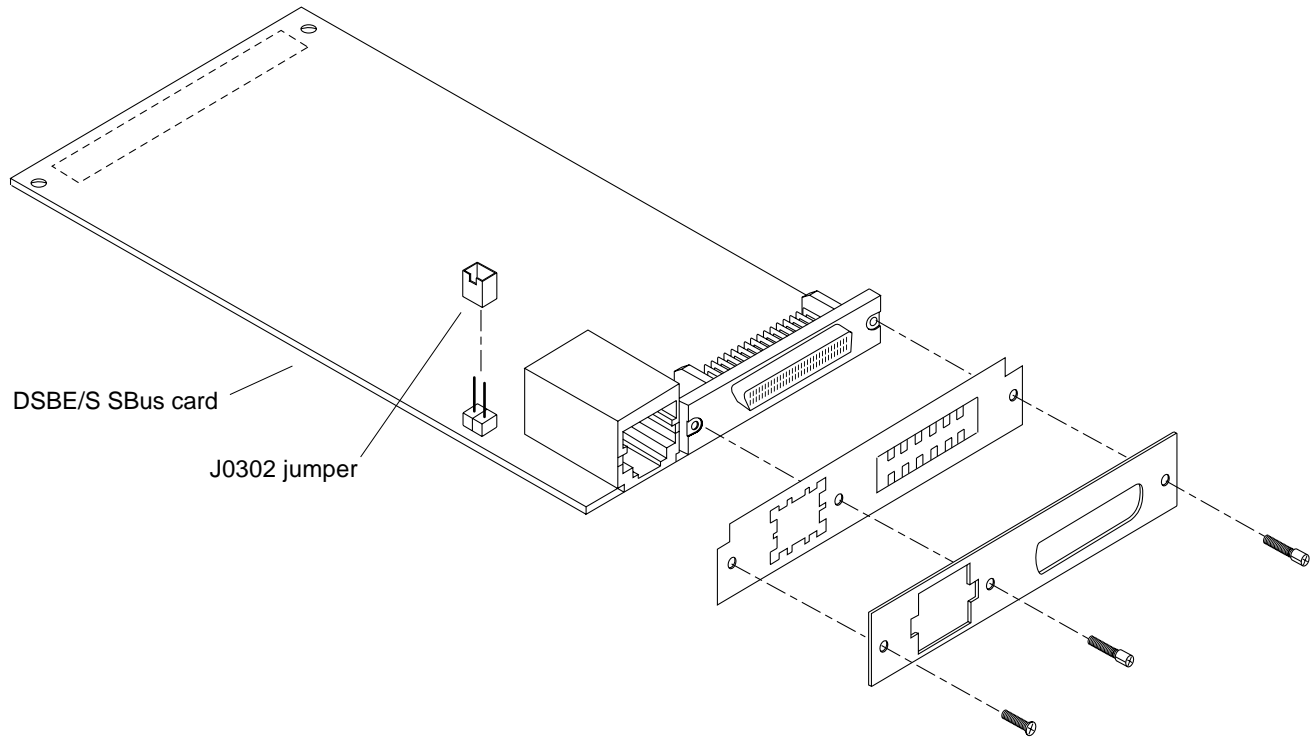


Figure B-1 Link Integrity Test Jumper (J0302) on the DSBE/S SBus Card

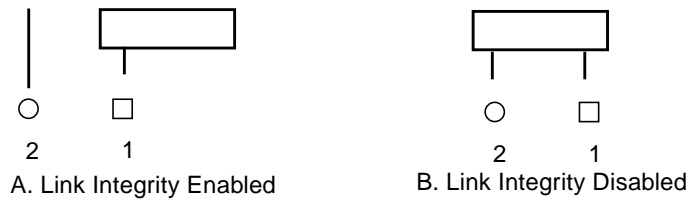


Figure B-2 Disabling and Enabling the J0302 Jumper

B.2 NVSIMM Jumper

Before installing NVSIMMs, move the jumper to the battery ON position. See Figure B-3.

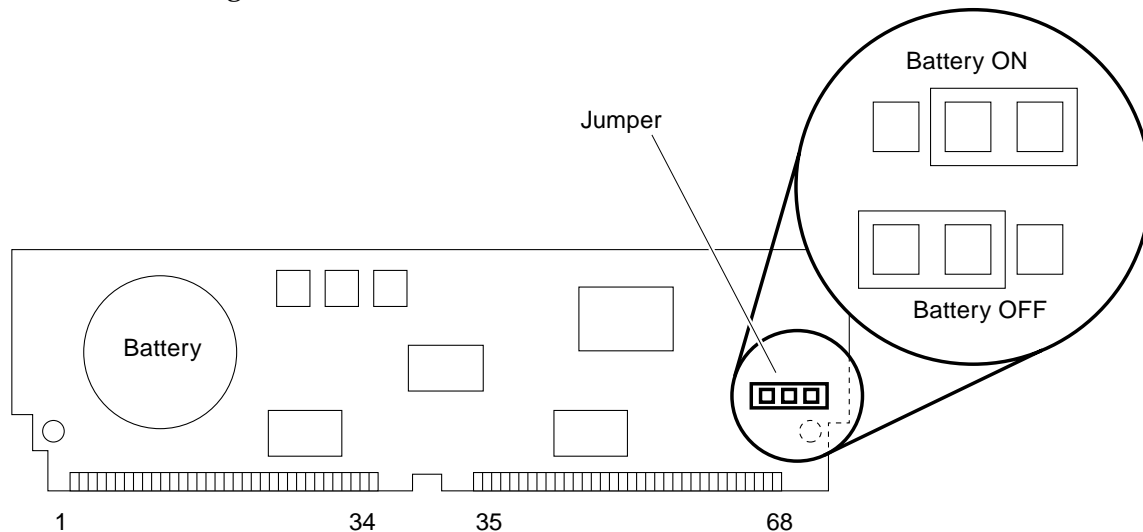


Figure B-3 NVSIMM Jumper Locations



Caution – Do not move or remove the jumper once you turn the battery ON. Any data contained in the NVSIMM memory will be lost if the jumper is moved.

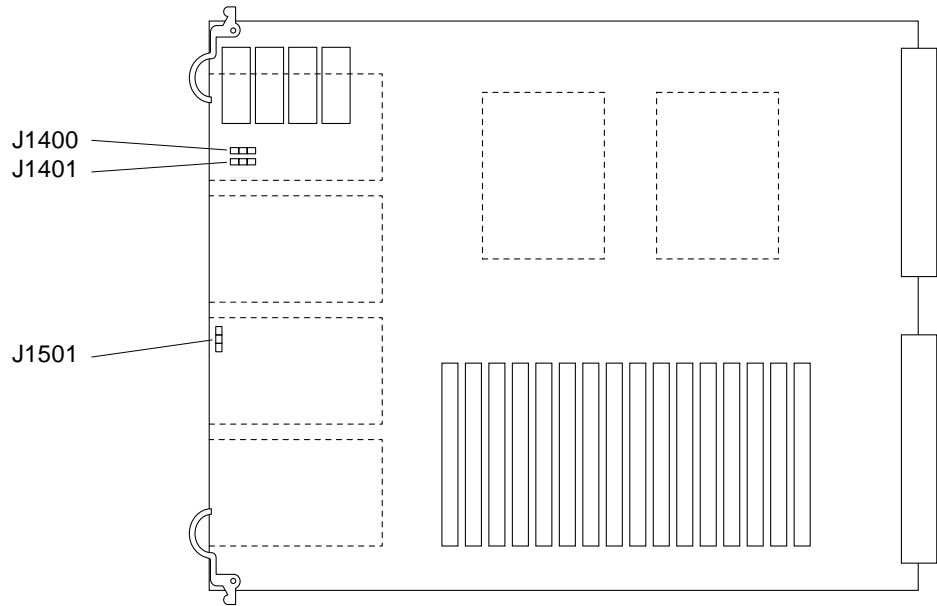
B.3 System Board Jumpers

Board jumpers are set at the factory and should not be changed except for use with factory diagnostic equipment and software.

Use Table B-1 to verify that jumper settings are correct. Pin 1 of each location is identified by a square solder pad.

Table B-1 System Board Jumpers

Label	Jumper	Default Setting	Function
J1400	Pins 2, 3	In	Connects +12V to RS232 line driver. (Pin 1 = ground, pin 2 = line driver input, pin 3 = +12V supply.)
J1401	Pins 2, 3	In	Connects -12V to RS232 line driver. (Pin 1 = ground, pin 2 = line driver input, pin 3 = -12V supply.)
J1501	2, 3	In	Pins 1 and 2 are for factory or service depot use only. Pins 2 and 3 are connected if a service processor does not have a mouse.



Jumper Locations on the System Board

Connector Pinouts



This appendix lists pinouts of connectors on the system board:

- Keyboard and mouse connector
- Serial port connectors A and B
- SBus slots 0, 1, 2, and 3
- XDBus connectors 0 and 1
- SuperSPARC module slots A and B

C.1 Connector Locations

Figure C-1 shows the end view and the side view of the system board.

The end panel has cable connectors for serial ports and a keyboard/mouse cable. The side of the board has connectors for SBus cards, SuperSPARC modules, and the XDBus connectors. These connectors are described in this appendix.

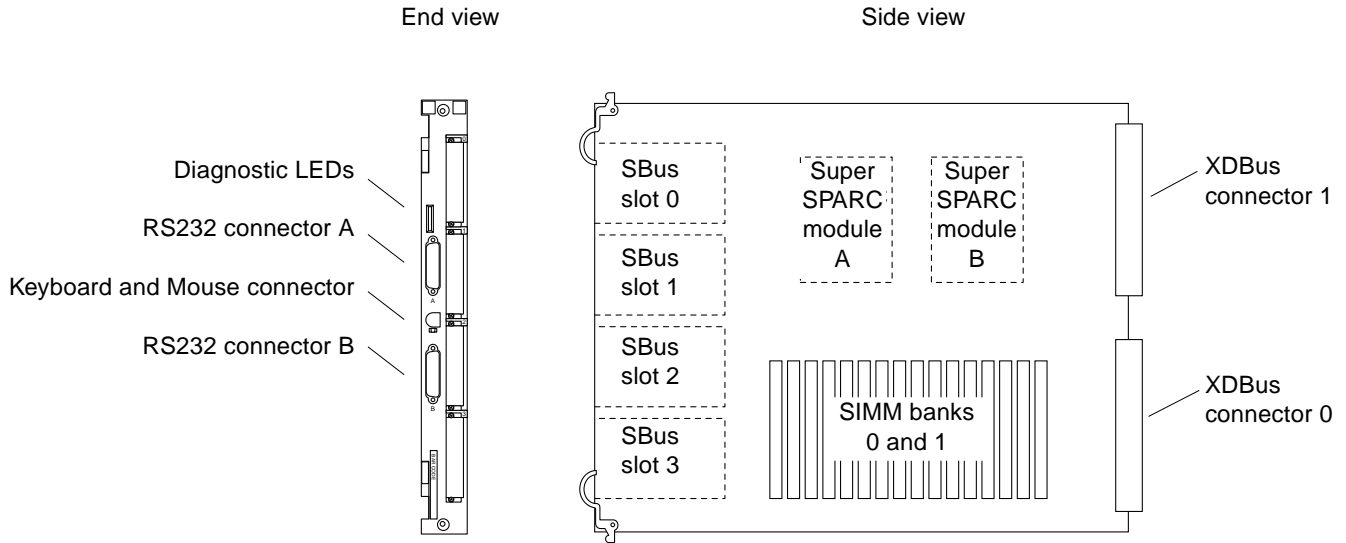


Figure C-1 End and Side Views of the System Board

C.2 Keyboard and Mouse Connector

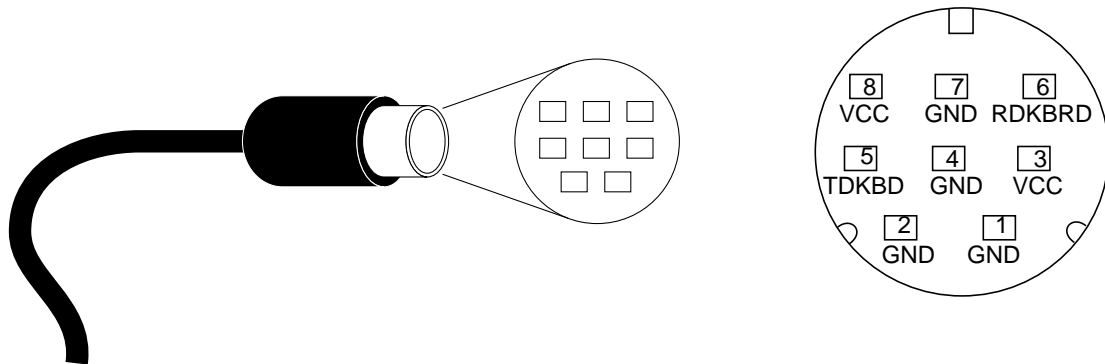


Figure C-2 Keyboard/Mouse Connector (DIN-8) Pinout

C.3 Serial Port Connectors

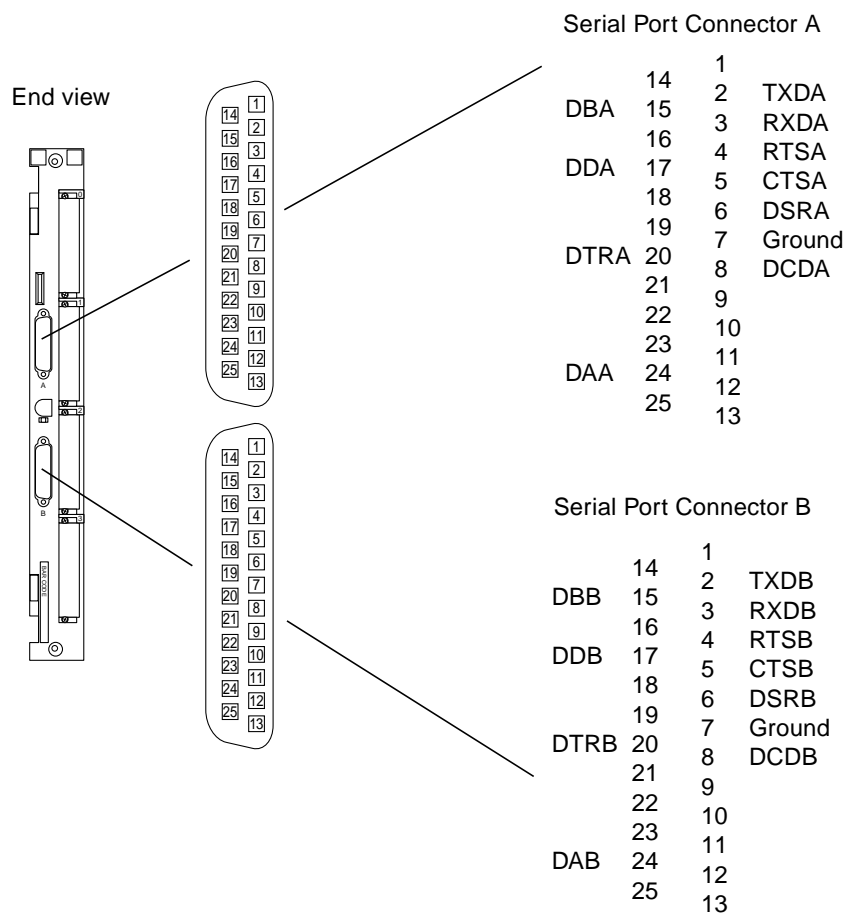
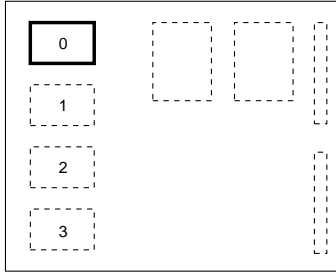


Figure C-3 Serial Port A and B Connector Pinouts

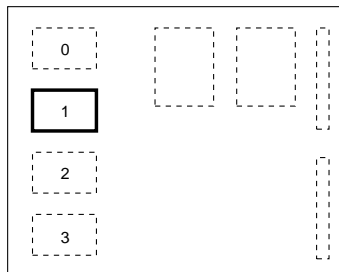
C.4 SBus Connectors

Table C-1 SBus Connector 0 (Connector J5700)



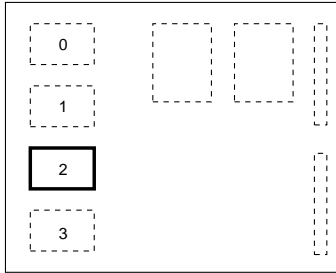
Section 1		Section 2		Section 3	
1	GND	33	SB_PA<6>	65	SB_D<18>
2	SB_BR_L<0>	34	SB_PA<8>	66	SB_D<20>
3	SB_Sel_L<0>	35	SB_PA<10>	67	SB_D<22>
4	SBIntR_L<0>	36	SB_Ack<0>	68	GND
5	SB_D<0>	37	SB_PA<12>	69	SB_D<24>
6	SB_D<2>	38	SB_PA<14>	70	SB_D<26>
7	SB_D<4>	39	SB_PA<16>	71	SB_D<28>
8	SBIntR_L<1>	40	SB_Ack<1>	72	VCC
9	SB_D<6>	41	SB_PA<18>	73	SB_D<30>
10	SB_D<8>	42	SB_PA<20>	74	SB_Siz<1>
11	SB_D<10>	43	SB_PA<22>	75	SB_Rd
12	SBIntR_L<2>	44	SB_Ack<2>	76	GND
13	SB_D<12>	45	SB_PA<24>	77	SB_PA<1>
14	SB_D<13>	46	SB_PA<26>	78	SB_PA<3>
15	SB_D<16>	47	SB_DPar	79	SB_PA<5>
16	SBIntR_L<3>	48	FS_VBB	80	VCC
17	SB_D<19>	49	SB_Clk<0>	81	SB_PA<7>
18	SB_D<21>	50	SB_SBG_L<0>	82	SB_PA<9>
19	SB_D<23>	51	SB_A._L	83	SB_PA<11>
20	SBIntR_L<4>	52	GND	84	GND
21	SB_D<25>	53	SB_D<1>	85	SB_PA<13>
22	SB_D<27>	54	SB_D<3>	86	SB_PA<15>
23	SB_D<29>	55	SB_D<5>	87	SB_PA<17>
24	SBIntR_L<5>	56	VCC	88	VCC
25	SB_D<31>	57	SB_D<7>	89	SB_PA<19>
26	SB_Siz<0>	58	SB_D<9>	90	SB_PA<21>
27	SB_Siz<2>	59	SB_D<11>	91	SB_PA<23>
28	SBIntR_L<6>	60	GND	92	GND
29	SB_PA<0>	61	SB_D<13>	93	SB_PA<25>
30	SB_PA<2>	62	SB_D<15>	94	SB_PA<27>
31	SB_PA<4>	63	SB_D<17>	95	SB_Rst_L<0>
32	SBLErr_L	64	VCC	96	FS_VDD

Table C-2 SBus Connector 1 (Connector J5701)



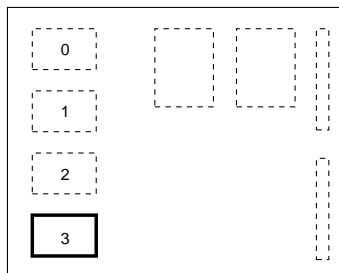
Section 1	Section 2	Section 3
1 GND	33 SB_PA<6>	65 SB_D<18>
2 SB_BR_L<1>	34 SB_PA<8>	66 SB_D<20>
3 SB_Sel_L<1>	35 SB_PA<10>	67 SB_D<22>
4 SBIntR_L<7>	36 SB_Ack<0>	68 GND
5 SB_D<0>	37 SB_PA<12>	69 SB_D<24>
6 SB_D<2>	38 SB_PA<14>	70 SB_D<26>
7 SB_D<4>	39 SB_PA<16>	71 SB_D<28>
8 SBIntR_L<8>	40 SB_Ack<1>	72 VCC
9 SB_D<6>	41 SB_PA<18>	73 SB_D<30>
10 SB_D<8>	42 SB_PA<20>	74 SB_Siz<1>
11 SB_D<10>	43 SB_PA<22>	75 SB_Rd
12 SBIntR_L<9>	44 SB_Ack<2>	76 GND
13 SB_D<12>	45 SB_PA<24>	77 SB_PA<1>
14 SB_D<13>	46 SB_PA<26>	78 SB_PA<3>
15 SB_D<16>	47 SB_DPar	79 SB_PA<5>
16 SBIntR_L<10>	48 FS_VBB	80 VCC
17 SB_D<19>	49 SB_Clk<1>	81 SB_PA<7>
18 SB_D<21>	50 SB_SBG_L<0>	82 SB_PA<9>
19 SB_D<23>	51 SB_A_L	83 SB_PA<11>
20 SBIntR_L<11>	52 GND	84 GND
21 SB_D<25>	53 SB_D<1>	85 SB_PA<13>
22 SB_D<27>	54 SB_D<3>	86 SB_PA<15>
23 SB_D<29>	55 SB_D<5>	87 SB_PA<17>
24 SBIntR_L<12>	56 VCC	88 VCC
25 SB_D<31>	57 SB_D<7>	89 SB_PA<19>
26 SB_Siz<0>	58 SB_D<9>	90 SB_PA<21>
27 SB_Siz<2>	59 SB_D<11>	91 SB_PA<23>
28 SBIntR_L<13>	60 GND	92 GND
29 SB_PA<0>	61 SB_D<13>	93 SB_PA<25>
30 SB_PA<2>	62 SB_D<15>	94 SB_PA<27>
31 SB_PA<4>	63 SB_D<17>	95 SB_Rst_L<1>
32 SBLerr_L	64 VCC	96 FS_VDD

Table C-3 SBus Connector 2 (Connector J5702)



Section 1	Section 2	Section 3
1 GND	33 SB_PA<6>	65 SB_D<18>
2 SB_BR_L<2>	34 SB_PA<8>	66 SB_D<20>
3 SB_Sel_L<2>	35 SB_PA<10>	67 SB_D<22>
4 SBIntR_L<4>	36 SB_Ack<0>	68 GND
5 SB_D<0>	37 SB_PA<12>	69 SB_D<24>
6 SB_D<2>	38 SB_PA<14>	70 SB_D<26>
7 SB_D<4>	39 SB_PA<16>	71 SB_D<28>
8 SBIntR_L<15>	40 SB_Ack<1>	72 VCC
9 SB_D<6>	41 SB_PA<18>	73 SB_D<30>
10 SB_D<8>	42 SB_PA<20>	74 SB_Siz<1>
11 SB_D<10>	43 SB_PA<22>	75 SB_Rd
12 SBIntR_L<16>	44 SB_Ack<2>	76 GND
13 SB_D<12>	45 SB_PA<24>	77 SB_PA<1>
14 SB_D<13>	46 SB_PA<26>	78 SB_PA<3>
15 SB_D<16>	47 SB_DPar	79 SB_PA<5>
16 SBIntR_L<17>	48 FS_VBB	80 VCC
17 SB_D<19>	49 SB_Clk<2>	81 SB_PA<7>
18 SB_D<21>	50 SB_SBG_L<2>	82 SB_PA<9>
19 SB_D<23>	51 SB_A_L	83 SB_PA<11>
20 SBIntR_L<18>	52 GND	84 GND
21 SB_D<25>	53 SB_D<1>	85 SB_PA<13>
22 SB_D<27>	54 SB_D<3>	86 SB_PA<15>
23 SB_D<29>	55 SB_D<5>	87 SB_PA<17>
24 SBIntR_L<19>	56 VCC	88 VCC
25 SB_D<31>	57 SB_D<7>	89 SB_PA<19>
26 SB_Siz<0>	58 SB_D<9>	90 SB_PA<21>
27 SB_Siz<2>	59 SB_D<11>	91 SB_PA<23>
28 SBIntR_L<20>	60 GND	92 GND
29 SB_PA<0>	61 SB_D<13>	93 SB_PA<25>
30 SB_PA<2>	62 SB_D<15>	94 SB_PA<27>
31 SB_PA<4>	63 SB_D<17>	95 SB_Rst_L<2>
32 SBLerr_L	64 VCC	96 FS_VDD

Table C-4 SBus Connector 3 (Connector J5703)



Section 1	Section 2	Section 3
1 GND	33 SB_PA<6>	65 SB_D<18>
2 SB_BR_L<3>	34 SB_PA<8>	66 SB_D<20>
3 SB_Sel_L<3>	35 SB_PA<10>	67 SB_D<22>
4 SBIntR_L<21>	36 SB_Ack<0>	68 GND
5 SB_D<0>	37 SB_PA<12>	69 SB_D<24>
6 SB_D<2>	38 SB_PA<14>	70 SB_D<26>
7 SB_D<4>	39 SB_PA<16>	71 SB_D<28>
8 SBIntR_L<22>	40 SB_Ack<1>	72 VCC
9 SB_D<6>	41 SB_PA<18>	73 SB_D<30>
10 SB_D<8>	42 SB_PA<20>	74 SB_Siz<1>
11 SB_D<10>	43 SB_PA<22>	75 SB_Rd
12 SBIntR_L<23>	44 SB_Ack<2>	76 GND
13 SB_D<12>	45 SB_PA<24>	77 SB_PA<1>
14 SB_D<13>	46 SB_PA<26>	78 SB_PA<3>
15 SB_D<16>	47 SB_DPar	79 SB_PA<5>
16 SBIntR_L<24>	48 FS_VBB	80 VCC
17 SB_D<19>	49 SB_Clk<3>	81 SB_PA<7>
18 SB_D<21>	50 SB_SBG_L<3>	82 SB_PA<9>
19 SB_D<23>	51 SB_A_L	83 SB_PA<11>
20 SBIntR_L<25>	52 GND	84 GND
21 SB_D<25>	53 SB_D<1>	85 SB_PA<13>
22 SB_D<27>	54 SB_D<3>	86 SB_PA<15>
23 SB_D<29>	55 SB_D<5>	87 SB_PA<17>
24 SBIntR_L<26>	56 VCC	88 VCC
25 SB_D<31>	57 SB_D<7>	89 SB_PA<19>
26 SB_Siz<0>	58 SB_D<9>	90 SB_PA<21>
27 SB_Siz<2>	59 SB_D<11>	91 SB_PA<23>
28 SBIntR_L<27>	60 GND	92 GND
29 SB_PA<0>	61 SB_D<13>	93 SB_PA<25>
30 SB_PA<2>	62 SB_D<15>	94 SB_PA<27>
31 SB_PA<4>	63 SB_D<17>	95 SB_Rst_L<3>
32 SBLerr_L	64 VCC	96 FS_VDD

C.5 XDBus Backplane Connectors

There are two XDBus connectors on the system board.

C.5.1 XDBus Connector 0

Figure C-4 shows the location of XDBus connector 0 and Table C-5 lists pins in this connector.

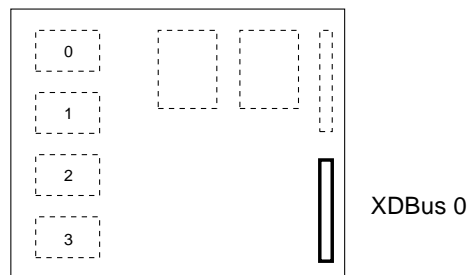


Figure C-4 Location of XDBus Connector 0

Table C-5 XDBus Connector 0 (Connector P0200) (1 of 3)

Section 1		Section 2		Section 3		Section 4	
A1	VTT	B1	GND	C1	GND	D1	SyPwrRst_L
A2	GND	B2	GND	C2	N.C.	D2	VCC
A3	VTT	B3	SYSECR	C3	GND	D3	N.C.
A4	SYRST_L	B4	AC_Fail	C4	SYSRST_L	D4	LEDGN_L
A5	LEDYEL_L	B5	LEDRED_L	C5	DIAGMODE	D5	Fan_Fail
A6	N.C	B6	GND	C6	DC_OK	D6	VCC
A7	VTT	B7	SY0RQ_L<1>	C7	GND	D7	SY0RQ_L<0>
A8	GND	B8	SY0RQS_L	C8	SY0RQ_L<2>	D8	VCC
A9	SyEClk	B9	GND	C9	SY0RQP_L	D9	SY0RQO_L
A10	SyEClk_L	B10	GND	C10	SY0GT_L	D10	VCC
A11	GND	B11	SY0GTT_L<3>	C11	GND	D11	SY0GTT_L<0>
A12	SY0GTS_L<2>	B12	GNDS	C12	SY0GTT_L<2>	D12	VCC
A13	GND	B13	SY0GTP_L	C13	GND	D13	SY0GTO_L

Table C-5 XDBus Connector 0 (Connector P0200) (2 of 3)

Section 1		Section 2		Section 3		Section 4	
A14	SY0D_L<1>	B14	GND	C14	SY0D_L<0>	D14	VCC
A15	VTT	B15	SY0D_L<3>	C15	GND	D15	SY0D_L<2>
A16	SY0D_L<5>	B16	GND	C16	SY0D_L<4>	D16	VCC
A17	GND	B17	SY0D_L<7>	C17	GND	D17	SY0D_L<6>
A18	SY0DP_L<8>	B18	GND	C18	SY0DP_L<0>	D18	VCC
A19	VTT	B19	SY0D_L<10>	C19	GND	D19	SY0D_L<9>
A20	SY0D_L<12>	B20	GND	C20	SY0D_L<11>	D20	VCC
A21	GND	B21	SY0D_L<14>	C21	GND	D21	SY0D_L<13>
A22	SY0DP_L<1>	B22	GND	C22	SY0D_L<15>	D22	VCC
A23	VTT	B23	N.C.	C23	GND	D23	N.C.
A24	N.C.	B24	GND	C24	N.C.	D24	VCC
A25	GND	B25	SY0D_L<17>	C25	GND	D25	SY0D_<16>
A26	SY0D_L<19>	B26	GND	C26	SY0D_L<18>	D26	VCC
A27	VTT	B27	SY0D_L<21>	C27	GND	D27	SY0D_L<20>
A28	SY0D_L<23>	B28	GND	C28	SY0D_L<22>	D28	VCC
A29	GND	B29	SY0D_L<24>	C29	GND	D29	SY0DP_L<2>
A30	SY0D_L<26>	B30	GND	C30	SY0D_L<25>	D30	VCC
A31	VTT	B31	SY0D_L<28>	C31	GND	D31	SY0D_L<27>
A32	SY0D_L<30>	B32	GND	C32	SY0D_L<29>	D32	VCC
A33	GND	B33	SY0DP_L<3>	C33	GND	D33	SY0D_L<31>
A34	N.C.	B34	GND	C34	N.C.	D34	VCC
A35	VTT	B35	N.C.	C35	GND	D35	N.C.
A36	SY0D_L<33>	B36	GND	C36	SY0D_L<32>	D36	VCC
A37	GND	B37	SY0D_L<35>	C37	GND	D37	SY0D_L<34>
A38	SY0D_L<37>	B38	GND	C38	SY0D_L<36>	D38	VCC
A39	VTT	B39	SY0D_L<39>	C39	GND	D39	SY0D_L<38>
A40	SY0DP_L<40>	B40	GND	C40	SY0DP_L<4>	D40	VCC

Table C-5 XDBus Connector 0 (Connector P0200) (3 of 3)

Section 1		Section 2		Section 3		Section 4	
A41	GND	B41	SY0D_L<42>	C41	GND	D41	SY0D_L<41>
A42	SY0D_L<44>	B42	GND	C42	SY0D_L<43>	D42	VCC
A43	VTT	B43	SY0D_L<46>	C43	GND	D43	SY0D_L<45>
A44	SY0DP_L<5>	B44	GND	C44	SY0D_L<47>	D44	VCC
A45	GND	B45	N.C.	C45	GND	D45	N.C.
A46	N.C.	B46	GND	C46	N.C.	D46	VCC
A47	VTT	B47	SY0D_L<49>	C47	GND	D47	SY0D_L<48>
A48	SY0D_L<51>	B48	GND	C48	SY0D_L<50>	D48	VCC
A49	GND	B49	SY0D_L<53>	C49	GND	D49	SY0DP_L<52>
A50	SY0D_L<55>	B50	GND	C50	SY0D_L<54>	D50	VCC
A51	VTT	B51	SY0D_L<56>	C51	GND	D51	SY0DP_L<6>
A52	SY0D_L<58>	B52	GND	C52	SY0D_L<57>	D52	VBB
A53	GND	B53	SY0D_L<60>	C53	GND	D53	SY0D_L<59>
A54	SY0D_L<62>	B54	GND	C54	SY0D_L<61>	D54	VBB
A55	VTT	B55	SY0DP_L<7>	C55	GND	D55	SY0D_L<63>

C.5.2 XDBus Connector 1

Table C-6 shows the location of XDBus connector 1 and lists connector pins.

Table C-6 XDBus Connector 1 (Connector P0300) (1 of 2)

Section 1		Section 2		Section 3		Section 4	
A1		B56		C56		D56	
A1	GND	B1	Sy1D_L<0>	C1	GND	D1	SY1D_L<1>
A2	SY1D_L<2>	B2	GND	C2	SY1D_L<3>	D2	VDD
A3	VTT	B3	Sy1D_L<4>	C3	GND	D3	SY1D_L<5>
A4	SY1D_L<6>	B4	GND	C4	SY1D_L<7>	D4	VDD
A5	GND	B5	Sy1DP_L<0>	C5	GND	D5	SY1D_L<8>
A6	SY1D_L<9>	B6	GND	C6	SY1D_L<10>	D6	VCC
A7	VTT	B7	Sy1D_L<11>	C7	GND	D7	SY1D_L<12>
A8	SY1D_L<13>	B8	GND	C8	SY1D_L<14>	D8	VCC
A9	GND	B9	Sy1D_L<15>	C9	GND	D9	SY1DP_L<1>
A10	N.C.	B10	GND	C10	N.C.	D10	VCC
A11	VTT	B11	N.C.	C11	GND	D11	N.C.
A12	SY1D_L<16>	B12	GND	C12	SY1D_L<17>	D12	VCC
A13	GND	B13	Sy1D_L<13>	C13	GND	D13	SY1D_L<19>
A14	SY1D_L<20>	B14	GND	C14	SY1D_L<21>	D14	VCC
A15	VTT	B15	Sy1D_L<22>	C15	GND	D15	SY1D_L<23>
A16	SY1DP_L<2>	B16	GND	C16	SY1D_L<24>	D16	VCC
A17	GND	B17	Sy1D_L<25>	C17	GND	D17	SY1D_L<26>
A18	SY1D_L<27>	B18	GND	C18	SY1D_L<28>	D18	VCC
A19	VTT	B19	Sy1D_L<29>	C19	GND	D19	SY1D_L<30>
A20	SY1D_L<31>	B20	GND	C20	SY1DP_L<3>	D20	VCC
A21	GND	B21	N.C.	C21	GND	D21	N.C.
A22	N.C.	B22	GND	C22	N.C.	D22	VCC
A23	VTT	B23	Sy1D_L<32>	C23	GND	D23	SY1D_L<33>
A24	SY1D_L<34>	B24	GND	C24	SY1D_L<35>	D24	VCC
A25	GND	B25	Sy1D_L<36>	C25	GND	D25	SY1D_L<37>
A26	SY1D_L<38>	B26	GND	C26	SY1D_L<39>	D26	VCC
A27	VTT	B27	Sy1DP_L<4>	C27	GND	D27	SY1D_L<40>

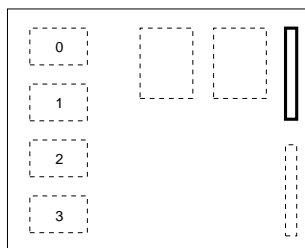


Table C-6 XDBus Connector 1 (Connector P0300) (2 of 2)

Section 1		Section 2		Section 3		Section 4	
A28	SY1D_L<41>	A28	GND	C28	SY1D_L<42>	D28	VCC
A29	GND	B29	Sy1D_L<43>	C29	GND	D29	SY1D_L<44>
A30	SY1D_L<45>	B30	GND	C30	SY1D_L<46>	D30	VCC
A31	VTT	B31	Sy1D_L<47>	C31	GND	D31	SY1DP_L<5>
A32	N.C.	B32	GND	C32	N.C.	D32	VCC
A33	GND	B33	N.C.	C33	GND	D33	N.C.
A34	SY1D_L<48>	B34	GND	C34	SY1D_L<49>	D34	VCC
A35	GND	B35	Sy1D_L<50>	C35	GND	D35	SY1D_L<51>
A36	SY1D_L<33>	B36	GND	C36	SY1D_L<53>	D36	VCC
A37	VTT	B37	Sy1D_L<54>	C37	GND	D37	SY1D_L<55>
A38	SY1DP_L<52>	B38	GND	C38	SY1D_L<56>	D38	VCC
A39	GND	B39	Sy1D_L<57>	C39	GND	D39	SY1D_L<58>
A40	SY1D_L<59>	B40	GND	C40	SY1D_L<60>	D40	VCC
A41	VTT	B41	Sy1D_L<61>	C41	GND	D41	SY1D_L<62>
A42	SY1D_L<63>	B42	GND	C42	SY1DP_L<7>	D42	VCC
A43	GND	B43	SY1RQ_L<1>	C43	GND	D43	SY1RQ_L<0>
A44	SyClk_L	B44	GND	C44	SY1RQ_L<2>	D44	VCC
A45	SyClk	B45	GND	C45	SY1RQO_L	D45	SY1RQS_L
A46	GND	B46	ST1GT_L	C46	SY1RP_L	D46	VCC
A47	N.C.	B47	ST1GTT_L	C47	GND	D47	SY1GTT_L<0>
A48	SY1GTS_L	B48	GND	C48	SY1GTT_L<2>	D48	VCC
A49	VTT	B49	SY1GTP_L	C49	GND	D49	SY1GTO_L
A50	N.C.	B50	GND	C50	N.C.	D50	VCC
A51	SYTDO	B51	MSTRPR_L	C51	N.C.	D51	N.C.
A52	SYTD1	B52	SYTCK	C52	SYTMS	D52	SYTAS
A53	GND	B53	BDID<1>	C53	GND	D53	BDID<0>
A54	VTT	B54	GND	C54	BDID<2>	D54	VCC
A55	GND	B55	VTT	C55	GND	D55	BDID<3>

C.6 SuperSPARC Module Connectors

SuperSPARC module connectors A and B have identical pinouts. Each connector has two rows of 50 pins, separated by blade-shaped power supply pins.

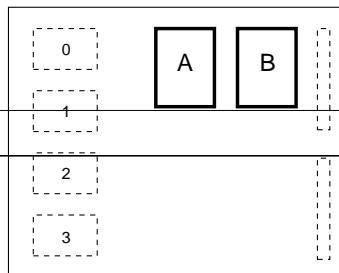


Table C-7 SuperSPARC Module Connectors (Connectors J2800 and J3100) (1 of 2)

Name	Blade	Name
1 BW0Tdo		51 BdTms
2 BW1Tdo	Ground	52 BdPwrRst_L
3 BDTck		53 BootData<7>
4 BootData<6>	Ground	54 BootData<5>
5 BootData<4>		55 BtStrb_L
6 XData<0>	Ground	56 XData<1>
7 XData<2>		57 XData<3>
8 XData<4>	Ground	58 XData<5>
9 XData<6>		59 XData<7>
10 XData<8>		60 XData<9>
11 XData<10>		61 XData<11>
12 XData<12>	+5V	62 XData<13>
13 XData<14>		63 XData<15>
14 XData<16>	+5V	64 XData<17>
15 XData<18>		65 XData<19>
16 XData<20>	+5V	66 XData<21>
17 XData<22>		67 XData<23>
18 XData<24>	+5V	68 XData<25>
19 XData<26>		69 XData<27>
20 XData<28>		70 XData<29>
21 XData<30>		71 XData<31>
22 XGnt0_L	Ground	72 XReq1_L<1>
23 XDPar<3>		73 XReq1_L<0>

Table C-7 SuperSPARC Module Connectors (Connectors J2800 and J3100) (2 of 2)

Name	Blade	Name
24 VikClk	Ground	74 XDPar<2>
25 CcClk		75 XDPar<1>
26 XGtyp_L	Ground	76 XDPar<0>
27 XCCAF_L		77 XReq0_L<1>
28 GND	Ground	78 XReq0_L<0>
29 VREF\G		79 Spare
30 XData<32>		80 XData<33>
31 XData<34>		81 XData<35>
32 XData<36>	+5V	82 XData<37>
33 XData<38>		83 XData<39>
34 XData<40>	+5V	84 XData<41>
35 XData<42>		85 XData<43>
36 XData<44>	+5V	86 XData<45>
37 XData<46>		87 XData<47>
38 XData<48>	+5V	88 XData<49>
39 XData<50>		89 XData<51>
40 XData<52>		90 XData<53>
41 XData<54>		91 XData<55>
42 XData<56>	Ground	92 XData<57>
43 XData<58>		93 XData<59>
44 XData<60>	Ground	94 XData<61>
45 XData<62>		95 XData<63>
46 BootCmd<2>	Ground	96 BootData<3>
47 BootData<2>		97 BootData<1>
48 BootData<0>	Ground	98 CCErr_L
49 BdRst_L		99 BootCmd<1>
50 BootCmd<0>		100 XGnt_L

General Rules for System Configuration



This appendix lists recommended priorities and locations for:

- Selecting the proper system board slot
- Selecting a SuperSPARC® module location
- Selecting an SBus module location
- Selecting SIMM locations
- Selecting a disk drive tray location
- Selecting drive identification numbers (IDs) in the SCSI tray
- Connecting SCSI cables
- Connecting DSBE/S cables
- Connecting Ethernet
- Connecting video cables

E.1 Selecting Installation Locations

Each component described in this appendix has a specific recommended location. The following sections describe the location for each component.

E.2 System Master Board

The system board slot numbers are marked on the card cage. Install system boards from the lowest card cage slot number (0) to the highest (9). Install filler panels in all empty slots.

The system board must be installed in card cage slot 0. If the system has an TTY console, connect it to port A of the system master. A TTY console is not normally required if the system is in auto-boot mode (see the OpenBoot Command Reference for instructions on enabling and disabling auto-boot).

E.2.1 Identifying the System Master

To determine which board is the system master, observe the LEDs on the system board rear panels during boot.

- On the system master the lower eight LEDs (yellow) cycle on and off in a repeated pattern.
- On other system boards the lower eight LEDs are lit in a solid pattern until boot completes.
- After boot ends, all LEDs (on boards with SuperSPARC® modules) will cycle.

The system master in must meet a set of minimum hardware requirements, as described next.

E.2.2 Minimum Requirements for the System Master

The system master must have

- one or two SuperSPARC modules
 - Two green LEDs, marked PA and PB, denote the presence of functional SuperSPARC modules in slots A and B when lit.
- DSBE/S or DWIS/S interface card in SBus slot 0
 - The DSBE/S or DWIS/S card connects to the root disk drive. DSBE/S can also connect to the main network.
- FSBE/S interface card in SBus slot 3

The FSBE/S card connects to the SCSI tray in the top of the cabinet, and possibly to the main network.

E.2.2.1 *Selecting a New System Master*

If the system master is replaced in the field by a new system board, the OpenBoot PROM on the replacement board will not have the specific system information that is necessary for an OBP master.

System Boards with PROM Revision 2.11 (or Lower)

PROM revision 2.11 (or lower) uses master-nvram scheme to select the system master board. In multiple-board configurations, when the system is powered on for the first time, OBP may prompt you to select a system board to become the new master. This prompt will appear *only if*:

- The system does not recognize any board as the system master.
- More than one board is recognized as being qualified to function as the system master.



Caution – The system master board must be connected to a terminal or you will not see the OBP message prompt. If the terminal is connected to the *wrong* board, the message will not appear. The system may seem to be locked up, but OBP is only pausing, waiting for you to respond to the prompt.

The following example for a three board system shows the prompt and the recommended responses (0 and y).

```
ttya initialized
Need to select system master from the following boards:
Board#0 -- nvram slave, Prom Version 2.11
Board#1 -- nvram slave, Prom Version 2.11
Board#2 -- nvram slave, Prom Version 2.11
Please enter the desired board#: 0
Are you sure? <y/n>: y
Resetting ...
```

If you enter an illegal board number, or select a board that has no SPARC modules, OBP will prompt you for another selection.

If there is no terminal on the system, remove all system boards except one from the card cage (slot 0 is recommended) to force OBP to select this board as the new master (the board must have at least one SPARC module).

System Boards with PROM Revision 2.13 (or Higher)

If all PROMs are revision 2.13 or higher, the auto-master scheme will be used instead of master-nvram scheme to select the system master board. In this case, nvram information is automatically propagated to all boards.

If there is no system hardware error, OBP will select the POST master board (or the lowest board that has a functional CPU) as the system master board.

The auto-master scheme ignores the status of nvram master or slave.

If any system hardware error occurs after power on, then OBP will use the master-nvram scheme to select a system master. See “System Boards with PROM Revision 2.11 (or Lower)” on page 3.

E.3 System Slave Boards

The remaining system boards are “slave boards,” because the master board exercises control during portions of boot and other system operations.

For uniformity of configuration and ease of service, install and equip slave system boards according to the guidelines below. (These guidelines are not required by system architecture, but are strongly recommended, to maintain consistency between systems and to simplify service procedures.)

Install slave boards in the lowest card cage slot numbers, following the system master.

Installing SuperSPARC modules strictly according to the guidelines presented in Section E.3.1.

Install SIMM devices strictly according to the guidelines presented in Section E.3.3.

E.3.1 SuperSPARC Modules

When installing or replacing a SuperSPARC module, use the following guidelines to verify that you have selected a valid location.



Warning – The heatsinks on the SuperSPARC module may be hot. Use caution when removing or installing SuperSPARC modules and avoid contact with the heatsinks. Hold SuperSPARC modules only by the edges.

Each system board has two SuperSPARC module connectors, designated A and B. See Figure E-1. Modules mount above the system board on standoffs. Modules should first be installed in the A connectors on consecutive system boards starting with the system board in slot 0. After all of the A connectors are filled, begin filling the B connectors, starting with the system board in slot 0 and working down.

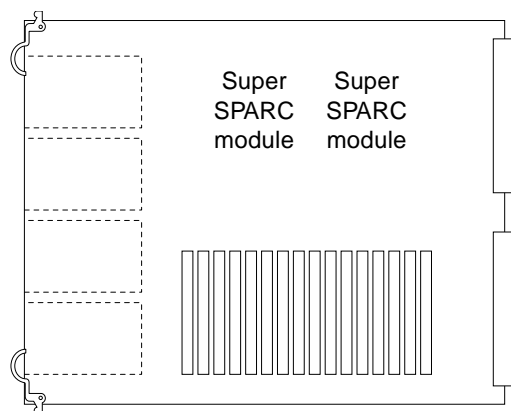


Figure E-1 Locations of SuperSPARC Modules

The example in Table E-1 shows how to distribute seven SuperSPARC modules on five system boards. (Board slots 5–9 are empty in this example.)

Table E-1 Example of Connector and Slot Priorities

Board Slot	9	8	7	6	5	4	3	2	1	0
Board present	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
SuperSPARC Module A	—	—	—	—	—	A	A	A	A	A
SuperSPARC Module B	—	—	—	—	—	—	—	—	B	B

E.3.2 SBus Cards

Each system board has four SBus slots. See Figure E-2.

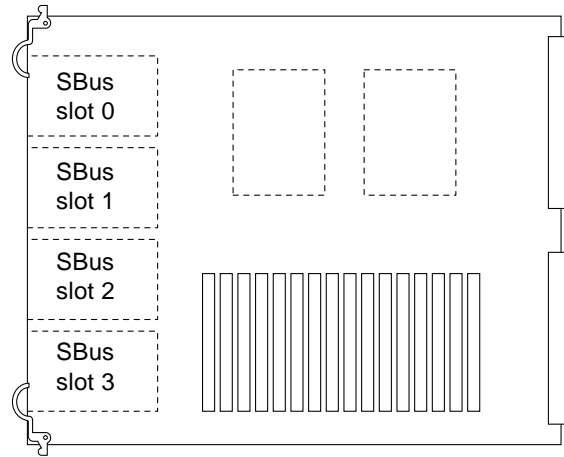


Figure E-2 SBus Card Locations

The system board in slot 0 must have the minimum required configuration (See Table E-2). The on-board SCSI port on the system board in slot 0 must be terminated. All SBus slots are available. Each type of SBus card should be distributed evenly among available system boards.

Table E-2 SBus Slot Requirements for the System Master

Slot	SBus Card	Comments
SBus 0	DSBE/S	Interface to root disk and twisted-pair Ethernet
SBus 1	CGSIX	CGSIX is present if a monitor is part of machine configuration, otherwise the slot is used as general SBus connector
SBus 2	Available	General SBus connector
SBus 3	FSBE/S	To SCSI box

The example in Table E-1 shows how five DSBE/S cards and two FSBE/S cards might be distributed on three system boards. (Board slots 3–9 are empty in this example. D=DSBE/S, F=FSBE/S.)

Table E-3 Example of SBus Card Distribution

	Board Slot Number									
	9	8	7	6	5	4	3	2	1	0
Board present?	No	No	No	No	No	No	No	Yes	Yes	Yes
SBus slot 0	—	—	—	—	—	—	—	D	D	D
SBus slot 1	—	—	—	—	—	—	—	—	D	D
SBus slot 2	—	—	—	—	—	—	—	—	—	—
SBus slot 3	—	—	—	—	—	—	—	—	F	F

E.3.3 SIMMs

The SPARCcenter 2000 system board has three SIMM options. Two types of DRAM, high-density and low-density, are available as well as nonvolatile NVSIMM.

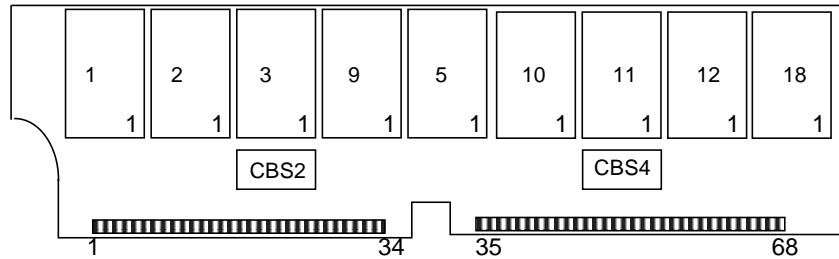
The 8 Mbyte (low-density) SIMMs use 1Mbit by 4bit DRAMs. Two vendors are used, so a slight variation exists in physical appearance between the two products. See Figure E-3.

The 32 Mbyte (high-density) SIMMs use 4 Mbit by 4 bit DRAMs. Each vendor uses the same printed circuit card for both the 8- and 32 Mbyte SIMMs, so no major difference in appearance exist between a given vendor's high- and low-density SIMMs.

The 1 Mbyte NVSIMM uses 128 Kbit by 8 bit SRAM.

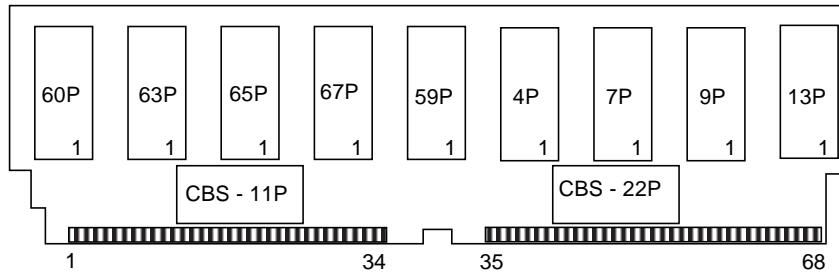
SIMM – Vendor 1

Capacity	Type	P/N
8 Mbyte	DRAM	501-1817
32 Mbyte	DRAM	501-2196



SIMM – Vendor 2

Capacity	Type	P/N
8 Mbyte	DRAM	501-1817
32 Mbyte	DRAM	501-2196



NVSIMM

Capacity	Type	P/N
1Mbyte	NVSIMM	501-2197

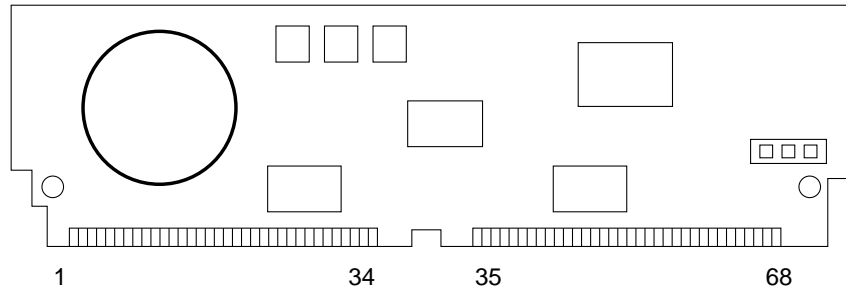


Figure E-3 SIMMs and NVSIMM

The system board has 16 SIMM sockets logically divided into four groups of four. The system board has two buses. Two groups (0 and 1) serve each bus. Figure E-4, shows SIMM locations and identifies groups and buses.

A system board can be installed with zero memory or from one to four groups filled. For example, 0 SIMMs, 4 SIMMs, 8 SIMMs, 12 SIMMs or 16 SIMMs.

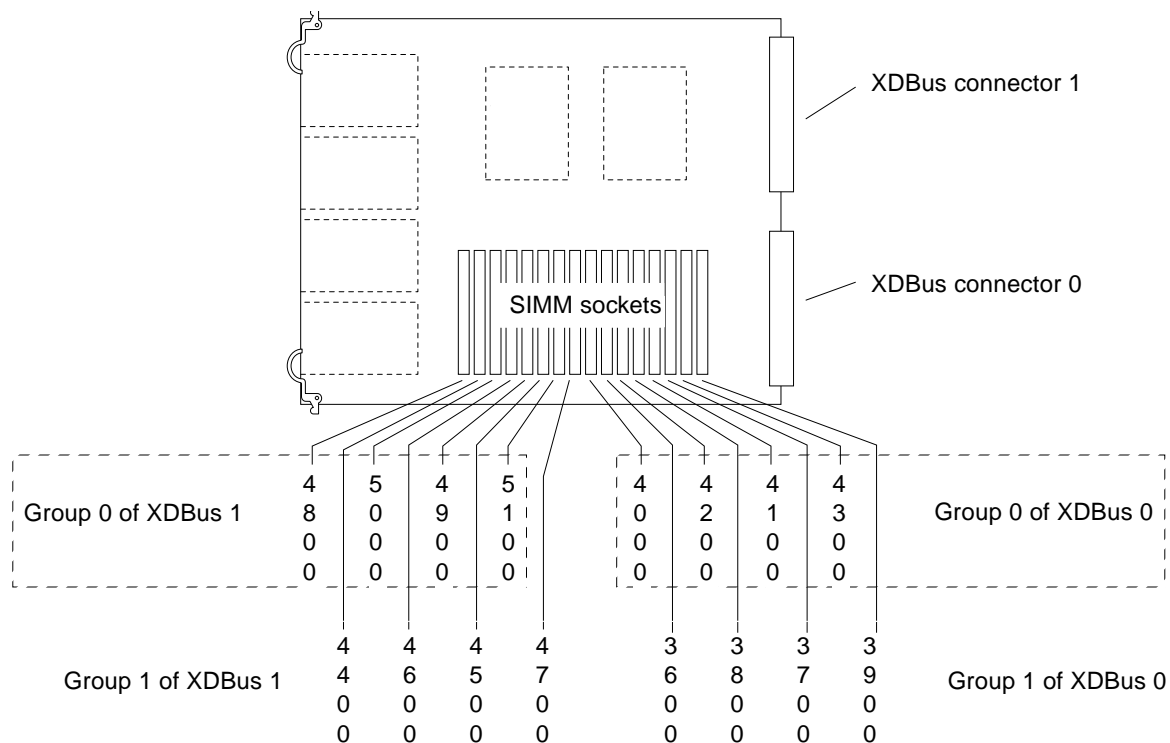


Figure E-4 SIMM Groups on the System Board

The rules for adding memory devices are:

- Always install eight SIMMs at a time.
- First install all group 0 SIMMs on all system boards, from the lowest board slot number to the highest.
- Then, install group 1 SIMMs in the same order for the remaining SIMMs.

A minor exception to the above rule is that to optimize memory performance, keep the numbers of memory groups balanced across multiples of two or four boards. (This allows the system to interleave memory across two or four boards.)

For example, if a system has five boards, and group 0 is filled on all five boards, performance will not be optimal. Memory addresses will be interleaved across the first four boards, but not across the fifth. If this memory is accessed often, performance will suffer.

Ideally (for the case of five boards), populate group 0 across four boards, then populate group 1 across four boards. The next most optimal case would be to populate group 0 across four boards, then populate group 1 across *two* boards. Both cases allow for interleaving across group 0 memory and separate interleaving across group 1 memory.

- Do not mix SIMM sizes within a group.

Note – The 8 Mbyte and 32 Mbyte SIMMs may appear to be almost identical if made by the same manufacturer, so do not rely on physical appearances. To verify the suitability of a replacement module, see Table E-4.

Table E-4 Memory Module Variations

Capacity	Type	Markings	Part Number	Outline in Figure E-3
8 Mbyte	20-pin DRAMs	A SIMM may be variously marked MH1M72A, MH1M72BJ-8, ZA3080 (in etch), or Z124SUN72	501-1817	A or B
32 Mbyte	24-pin DRAMs	A SIMM may be variously marked MH4M72J-8, Za3085 (in etch), or Z496SUN72	501-2196	A or B
1Mbyte	Battery-backed NVSIMM	An NVSIMM may be marked MH12872SN-70H	501-2197	C

E.3.3.1 NVSIMMs

Before installing NVSIMMs, first activate the battery to insure data retention.

To activate the battery:

- 1. Locate the jumper on the right side of the NVSIMM.**
See Figure E-5.
- 2. Move the jumper to the battery on position.**



Caution – Once you turn the battery on do not remove or reposition the jumper. To do so will cause data stored in the NVSIMM memory to be lost.

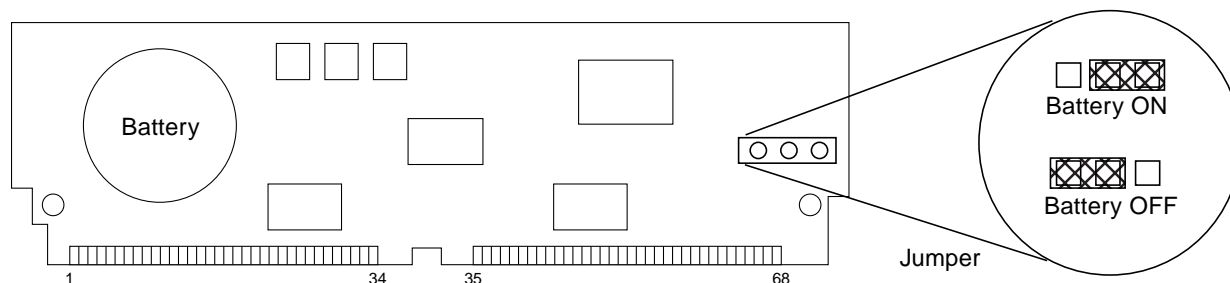


Figure E-5 NVSIMM Jumper Locations

E.4 Locating a Disk Drive Tray

The system cabinet accommodates up to three disk drive trays. Install trays from the bottom up. The trays are numbered 1 (bottom), 2 (middle), and 3 (top). Likewise, tray numbering for expansion cabinets is from the bottom up.

Individual disk drive numbers range from SCSI ID 0 to ID 5 in a 2.1 Gbyte drive tray and 0 - 15 in a 5 1/4-inch Fast/Wide Differential SCSI disk drive tray.

E.5 Selecting Drive ID Numbers in the SCSI Box

The SunCD ID number is 6.

The first 150 Mbyte 1/4-inch tape drive ID is 5. If there are more 1/4-inch tape drives, the ID numbers for the 1/4-inch tape drives must be higher than the ID numbers for any 8 mm tape drives or 4 mm tape auto-loaders.

Example: SunCD (ID 6) has a higher ID number than 1/4-inch tape drives, which have higher ID numbers than 8 mm tape drives and 4 mm tape auto-loaders.

Note – When replacing a tape drive, keep the same SCSI address previously assigned to the drive that was in the drive bay.

In addition, if a ½-inch front load tape drive is used, the drive ID should be the highest in the string (ID 6).

Table E-5 shows one example of how to number five drives in a SPARCcenter 2000 SCSI tray.

Table E-5 Example of ID Numbering in a SCSI Tray

Device	ID
SunCD	6
¼-inch tape drive	5
8 mm tape drive or 4 mm tape auto-loader	4
8 mm tape drive or 4 mm tape auto-loader	1
8 mm tape drive or 4 mm tape auto-loader	0

E.6 Connecting SCSI Cables

The SCSI tray I/O harness terminates at the bottom of the card cage, nearest the rear of the cabinet. One connector on this harness must be connected to the FSBE/S card in SBus slot 3 of the master system board. A SCSI terminator must be installed on the second harness connector.

E.7 Connecting DSBE/S Cables

Disk tray 1 (main cabinet) should be connected to the DSBE/S card in SBus slot 0 on the system master board. Disk tray 1 usually contains the root disk (although not a physical requirement.) Disk trays 2 and 3 should connect to the next two lowest DSBE/S cards. Disk trays in the expansion cabinets should be connected to higher-numbered DSBE/S cards in the system cabinet card cage.

E.8 Connecting Ethernet

The main network cable must be connected to the Ethernet connector of the DSBE/S FSBE/S or QED/S card on the system master board. The SPARCcenter 2000 system supports only 10Base-T twisted-pair Ethernet.

E.9 Connecting Video Cables

A maximum of one CG6 color frame buffer is allowed per system. It must be installed in SBus slot 1 of the system master board. The color monitor keyboard must be plugged into the keyboard connector of the system master.

SCSI Targeting



E.1 Setting SCSI Target ID for the CD-ROM Drive

- 1. Plug the address cable for the SunCD into the SCSI ID connector at the rear of the drive. See Figure E-1.**

Orient the address cable so that the pin 1 portion of the address cable connector plugs into the pin 1 connector on the SCSI ID connector at the rear of the SunCD.

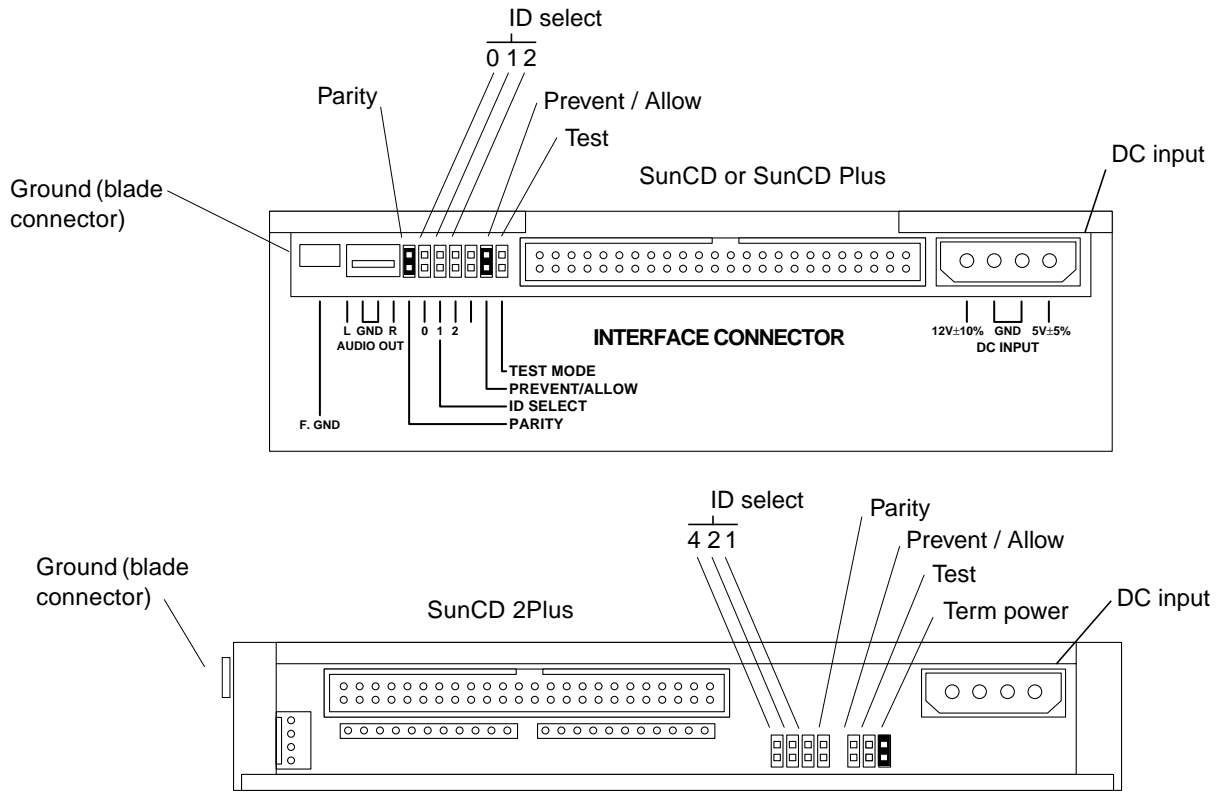


Figure E-1 Connector Locations: SunCD

2. Locate the address cable for the SunCD.

The address cable for the SunCD will be plugged into the lower device select switch on the left side of the bottom right drive bay. See Figure E-2.

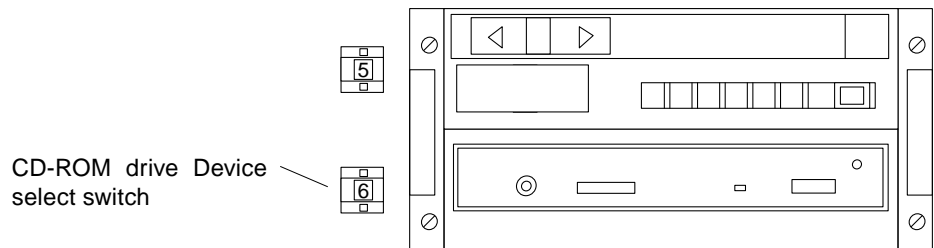


Figure E-2 Device Select Switch for the SunCD

3. Set the SCSI address for the SunCD to “6.”

There are two device select switches at the left side of the bottom right drive bay. See Figure E-2. Locate the lower device select switch and press the button marked “+” to increment the address shown or press the button marked “-” to decrement the address shown until you reach “6.”

E.2 Setting SCSI Target ID for the 150Mbyte Tape Drive

1. Plug the address cable for the 1/4-inch tape drive into the SCSI ID connector at the rear of the tape drive. See Figure E-3.

Orient the address cable so that the pin 1 portion of the address cable connector plugs into the pin 1 connector on the SCSI ID connector at the rear of the 1/4-inch tape drive.

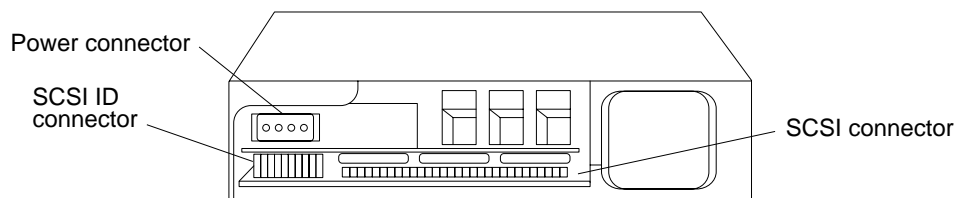


Figure E-3 Connector Locations: 1/4-Inch Tape Drive

2. Locate the address cable for the 1/4-inch tape drive.

The address cable for the 1/4-inch tape drive will be plugged into the upper device select switch on the left side of the bottom right drive bay. See Figure E-4.

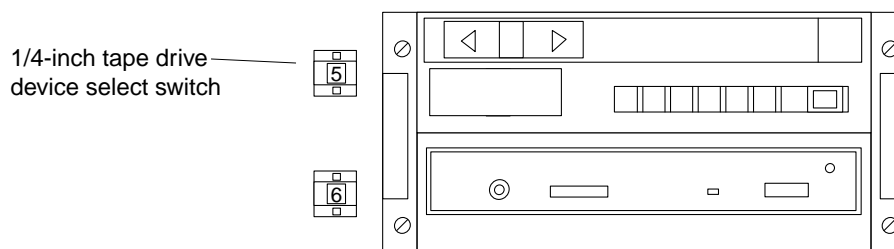


Figure E-4 Device Select Switch for the 1/4-Inch Tape Drive

3. Set the SCSI address for the 1/4-inch tape drive to “5.”

There are two device select switches at the left side of the bottom right drive bay. See Figure E-4. Locate the upper device select switch and press the button marked “+” to increment the address shown or press the button marked “-” to decrement the address shown until you reach “5.”

E.3 Setting SCSI Target ID for the Full Height Tape Drive

1. Plug the address cable for the full height 8 mm tape drive into the SCSI ID connector at the rear of the tape drive. See Figure E-1.

Orient the address cable so that the pin 1 of the address cable connector plugs into pin 1 on the SCSI ID connector at the rear of the drive.

Note – The pin 1 orientation on the 8 mm drive is opposite that of the SunCD and the 1/4-inch tape drive.

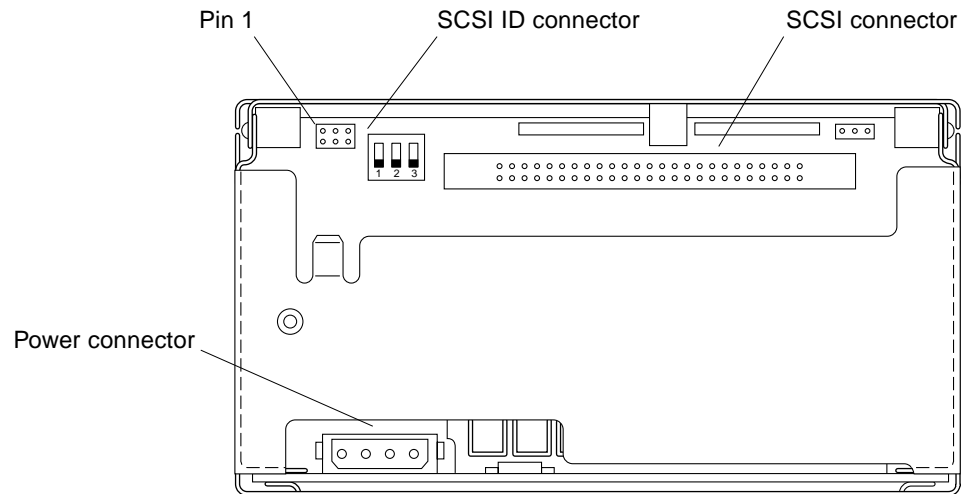


Figure E-5 Connector Locations: Full Height 8 mm Tape Drive

2. Determine what the SCSI address will be for the full height 8 mm tape drive you are installing.

The SCSI address for the tape drive can vary depending on the SPARCcenter 2000 system configuration and/or the location of the drive. Figure E-6 shows possible locations for the full height 8 mm tape drive.

- If the tape drive replaces one previously installed in the drive bay, keep the same SCSI address assigned to the drive that was replaced.
- If the tape drive is installed in a previously unused drive bay, assign the next available SCSI address to the tape drive (from 0 to 6, depending on the system configuration). For example:

Your system has both a CD-ROM drive and a 1/4-inch tape drive in the bottom right bay, ID6 and ID 5. If all other drive bays are empty, you can:

- Install the tape drive in any of the other three drive bays.
- Assign the next available SCSI address, ID 4 in this example, to the newly installed tape drive (regardless of which bay is used).

Note – If the SPARCcenter 2000 system has more than one 1/4-inch tape drive, however, the ID numbers for *all* 1/4-inch tape drives *must be higher* than the ID numbers for any 8 mm tape drives or 4 mm tape auto-loaders.

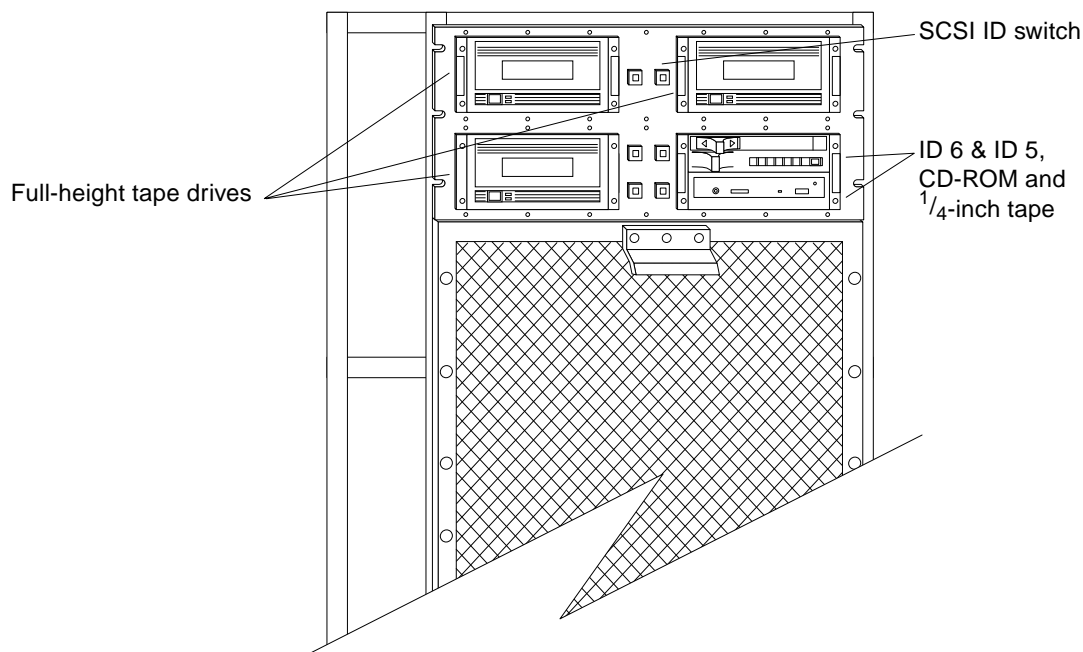


Figure E-6 Three Locations: Full Height 8 mm Tape Drives

3. Use the device select switch to set the SCSI address for the installed drive. Press the buttons marked “+” or “-” until you reach the proper address.

E.4 Setting SCSI Target ID for the Half Height Tape Drive

1. Plug the address cable for the half height 8 mm tape drive into the SCSI ID connector at the rear of the tape drive. See Figure E-1. Orient the address cable so that the pin 1 of the address cable connector plugs into pin 1 on the SCSI ID connector at the rear of the drive.

Note – The pin 1 orientation on the 8 mm drive is opposite that of the SunCD and the 1/4-inch tape drive.

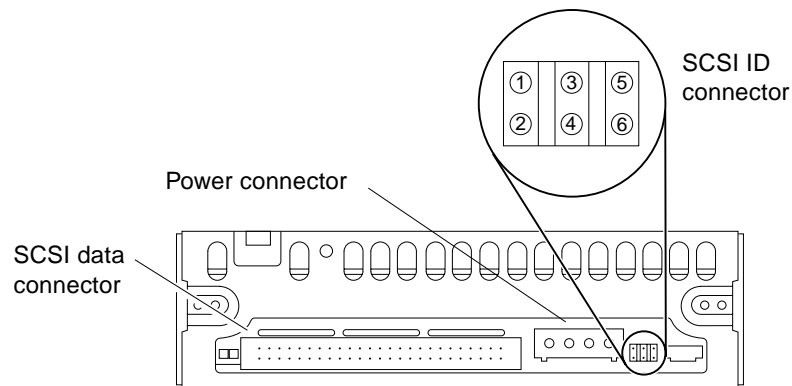


Figure E-7 Connector Location: Half Height 8 mm Tape Drive

2. Determine what the SCSI address will be for the half height 8 mm tape drive you are installing. The SCSI address for the tape drive can vary depending on the SPARCcenter 2000 system configuration and/or the location of the drive. Table E-1 shows examples of SCSI addresses for the four drive bays. Figure E-6 shows possible locations for the half height 8 mm tape drive.
- If the tape drive replaces one previously installed in the drive bay, keep the same SCSI address assigned to the drive that was replaced.

- If the tape drive is installed in a previously unused drive bay, assign the next available SCSI address to the tape drive (from 0 to 6, depending on the system configuration). For example:

Your system has both a CD-ROM drive and a 1/4-inch tape drive in the bottom right bay, ID6 and ID 5. If all other drive bays are empty, you can:

- Install the tape drive in any of the other three drive bays.
- Assign the next available SCSI address, ID 4 in this example, to the newly installed tape drive (regardless of which bay is used).

Note – If the SPARCcenter 2000 system has more than one 1/4-inch tape drive, however, the ID numbers for *all* 1/4-inch tape drives *must be higher* than the ID numbers for any 8 mm tape drives or 4 mm tape auto-loaders.

Table E-1 Example of SCSI Addresses for the 8 mm Tape Drive

Drive Bay	SCSI Address
Bottom right	ID 6 (lower); ID 5 (upper)
Top right	ID 4
Top left	ID 3
Bottom left	ID 2 (upper); ID 1 (lower)

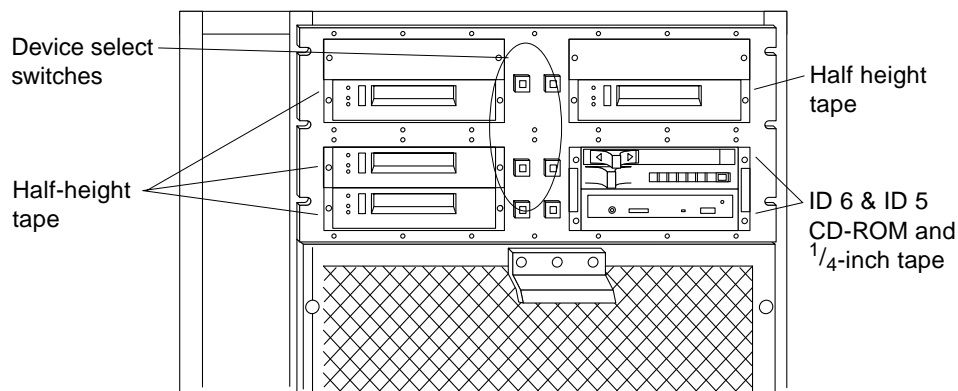


Figure E-8 Four Locations for Half Height 8 mm Tape Drives (Front View)

3. Use the device select switch to set the SCSI address for the installed drive. Press the buttons marked “+” or “-” until you reach the proper address.

E.5 Setting SCSI Target ID for the 4 mm Tape Auto-Loader

1. Plug the address cable for the 4 mm tape auto-loader into the SCSI ID connector at the rear of the auto-loader. See Figure E-9. Position the address cable so that the black wire is located at the lower right corner of the SCSI ID connector.

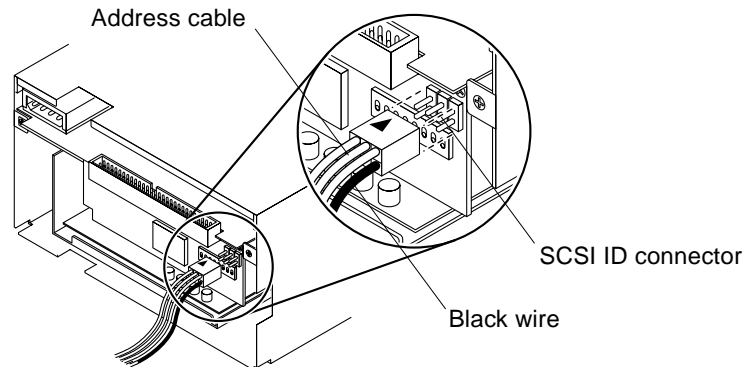


Figure E-9 Positioning the Address Cable

2. Determine what the SCSI address will be for the device you are installing.

The SCSI address for the tape auto-loader can vary depending on the SPARCcenter 2000 system configuration and/or the location of the auto-loader. Figure E-6 shows possible locations for the auto-loader.

- If the auto-loader replaces a drive previously installed in the drive bay, keep the same SCSI address assigned to the drive that was replaced.
- If the auto-loader is installed in a previously unused drive bay, assign the next available SCSI address to the auto-loader (from 0 to 6, depending on the system configuration). For example:

Your system has both a CD-ROM drive and a ¼-inch tape drive in the bottom right bay, ID6 and ID 5. If all other drive bays are empty, you can:

- Install the auto-loader in any of the other three drive bays.

- Assign the next available SCSI address, ID 4 in this example, to the newly installed tape auto-loader (regardless of which bay is used).

Note – If the SPARCcenter 2000 system has more than one $\frac{1}{4}$ -inch tape drive, however, the ID numbers for *all* $\frac{1}{4}$ -inch tape drives *must be higher* than the ID numbers for any 8 mm tape drives or 4 mm tape auto-loaders.

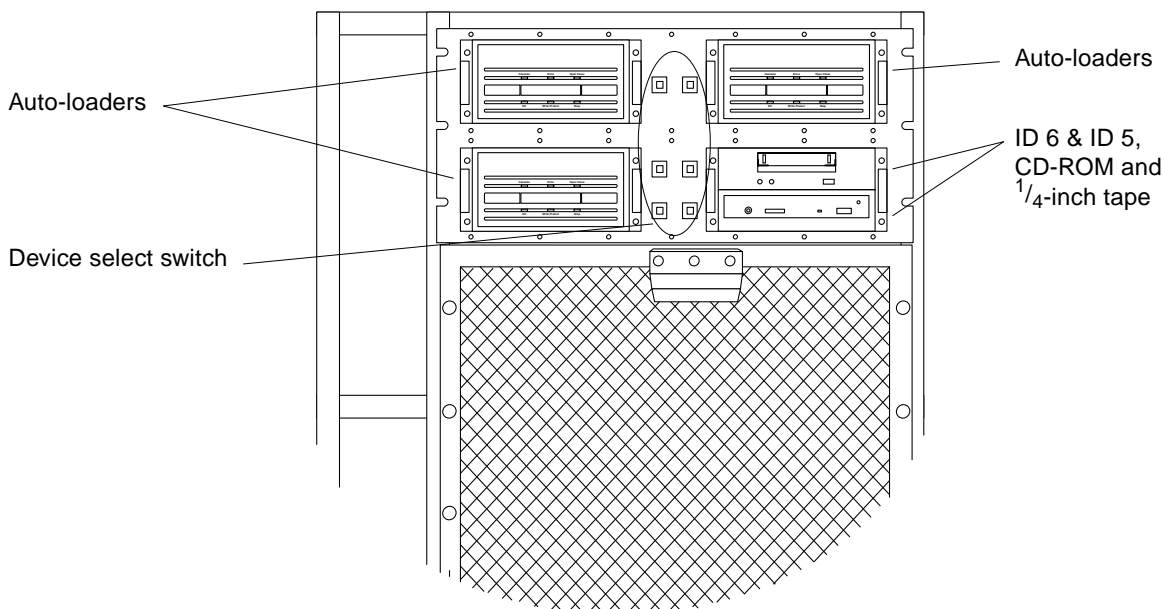


Figure E-10 Three Locations for 4 mm Tape Auto-Loaders

3. Use the device select switch to set the SCSI address for the installed auto-loader.

Press the buttons marked “+” or “-” until you reach the proper address.

E.6 Selecting Drive ID Numbers in the SCSI Internal Tray

The SunCD ID is 6. The first $\frac{1}{4}$ -inch tape drive ID is 5. If there are more $\frac{1}{4}$ -inch tape drives, ID numbers for the $\frac{1}{4}$ -inch tape drives must be higher than the ID numbers for any 8 mm tape drives or 4 mm tape auto-loaders.

For example, the SunCD (ID 6) has a higher ID number than 1/4-inch tape drives, which have higher ID numbers than 8 mm tape drives and 4 mm tape auto-loaders.

Table E-2 gives an example of how to number five drives in a SCSI tray.

Table E-2 Example of ID Numbering in a SCSI Tray

Device	ID
SunCD or SunCD Plus	6
1/4-inch tape drive	5
8 mm tape drive or 4 mm tape auto-loader	4
8 mm tape drive or 4 mm tape auto-loader	1
8 mm tape drive or 4 mm tape auto-loader	0

E.7 Setting SCSI Target for the 5 1/4-Inch Disk Drives

Plug the address cable for the disk drive into the SCSI ID connector at the rear of the drive. See Figure E-11.

Note – Orient the address cable so that the pin 1 of the address cable connector plugs into pin 1 on the SCSI ID connector at the rear of the drive.

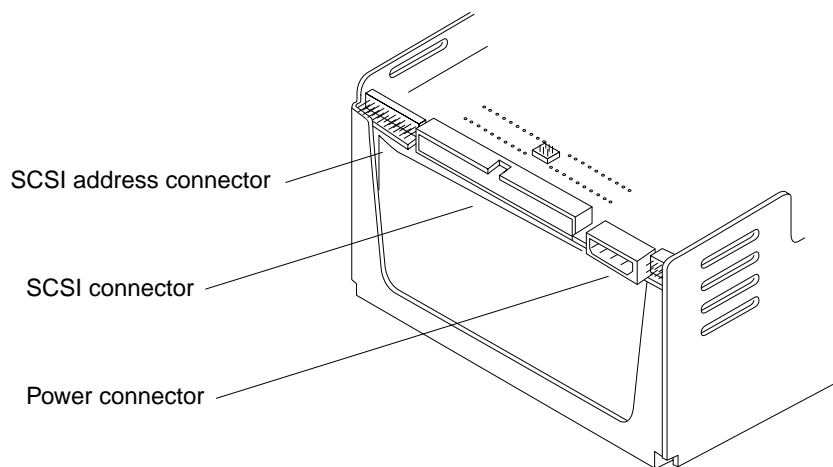


Figure E-11 Connector Locations: Differential SCSI Drive

E.8 Selecting Drive ID Numbers in the Differential SCSI Disk Tray

There are six possible locations for disk drives in each Differential SCSI disk tray. The first drive in the tray should be installed in the drive I location, the second in the drive II location, and so on. See Figure E-12.

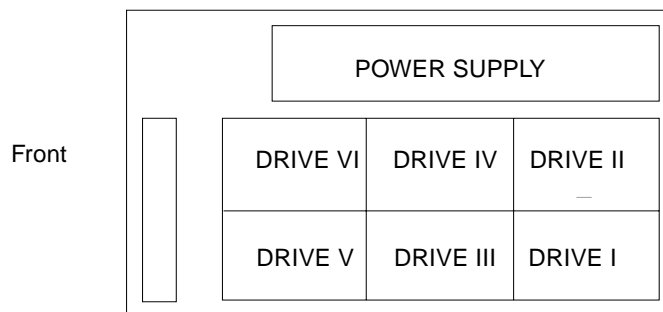


Figure E-12 Drive Locations in the Differential SCSI Disk Tray

- Determine what the SCSI addresses will be for the disk drives in the tray.** The SCSI addresses depend on the location of the disk drives in the tray and on the type(s) of drives used. SCSI addresses for a Fast/Wide Differential SCSI tray may be 0 to 15. SCSI addresses for a 8-bit narrow drive tray are limited to 0 through 5.

Note – A 16-bit fast/wide drive tray can be used as the first or second tray in a SCSI daisy-chain. A 8-bit narrow drive tray has a more limited range of addresses and must be used either alone or as the first tray in a two-tray daisy-chain.

2. **Set the SCSI address for the 8-bit narrow or 16-bit fast/wide disk drive.**
 Press the buttons marked “+” or “-” until you see the proper address. See Table 12-18 and Figure E-13.

Table 12-18 SCSI Addresses for Differential Disk Trays

Tray 1 (for 8-bit (narrow) or 16-bit Fast/Wide drives)		Tray 2 (for 16-bit Fast/Wide drives)	
Drive Location	SCSI Address	Drive Location	SCSI Address
I	0	I	8
II	1	II	9
III	2	III	10
IV	3	IV	11
V	4	V	12
VI	5	VI	13

Note – SCSI address 7 is reserved for the controller card.

Table 12-18 shows the SCSI addresses for drives within the tray. There are six SCSI address switches at the front of the tray (one for each drive within the tray). Figure E-13 shows the SCSI address switches on the tray.

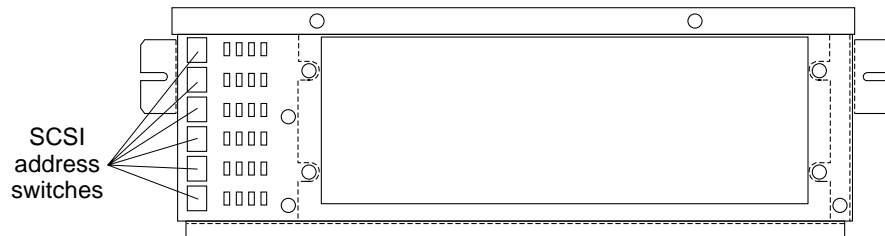


Figure E-13 Differential SCSI Disk Tray SCSI Address Switches

3. Set the SCSI addresses for all unused drive locations.

- In a 8-bit narrow disk tray, set the SCSI address switches to the blank position for all empty drive locations.

In a 16-bit fast/wide disk tray, use SCSI address 15 for all empty drive locations.

Glossary

Air Restrictor Panel

The card cage air restrictor panel (or “filler panel”) is a blank board with a special air deflector fin to simulate the airflow pattern of a system board.

Arbitration System

A bus arbitration system determines which processor can control the system at any instant. The arbitration system consists of circuits on the control board and the system boards.

ASIC

Applications specific integrated circuits (ASICs) are integrated circuits which perform specialized tasks in the system. If an ASIC (BARB, BBC, BIC, BW, BX, IOC, or SBI) fails, the entire system board must be replaced.

Bank

A bank of memory consists of eight SIMMs. Each system board has space for two independent memory banks.

Card Cage

The SPARCcenter 2000 card cage has 10 system board slots (numbered 0 to 9). Slot numbers are marked on the outside of the card cage.

Card Slot

A SPARCcenter 2000 system board has four SBus card slots.

Control Board

The control board generates system clocks and is part of the multiprocessor arbitration system. The control board is located outside the card cage.

Disk Drive Tray

A disk drive tray can hold up to six SCSI disk drives. This option is used in the SPARCcenter 2000 system cabinet, the disk expansion cabinet, and the tape expansion cabinet.

DSBE/S

The Differential SCSI/Buffered Ethernet (DSBE/S) card is a dual-function SBus card. It controls peripheral drives and twisted-pair (10Base-T) Ethernet.

Filler panel

See Air Restrictor Panel

J-number

A J-number is the location of a device socket. In this manual, a J-number corresponds to a U-number, which identifies a replaceable memory module.

Key Switch

The key switch on the hinged door controls the DC supplies and the modes of system operation.

Media Tray

A shelf is provided on the back of the system door. This shelf can hold tape cartridges and SunCDs to be used in the adjacent SCSI tray drives.

NVSIMM

The nonvolatile SIMM (NVSIMM) is a battery-backed SIMM. Battery current is shared in a group of NVSIMMs, in the event that a single battery fails.

Reset Switch

This switch is located on the back of the hinged door.

Root Disk

The root disk is the disk drive where the operating system resides.

SBus Card

SBus cards provide external interfaces and optional features to the system. There are four SBus connectors on a SPARCcenter 2000 system board.

SCSI Tray

The SCSI drive tray is located in the upper part of the main server cabinet, behind the hinged door. This tray holds one SunCD drive, and up to five tape drives.

SIMM

There are several types of single in-line memory modules (SIMMs). SIMMs are socketed on the system board for easy replacement.

Springfingers

Springfingers are metal plates or strips mounted on panel and boards to reduce the leakage of radio frequency interference (RFI) from the system cabinet.

Tape Drive Tray

The tape drive tray is a tape option which is only available in the optional tape expansion cabinet. This tray can hold up to four 5.0 Gbyte 8 mm tape drives.

U-number

In this manual, a U-number (device number) is equivalent to a J-number (socket number). *See J-number.*

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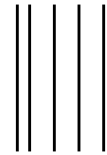
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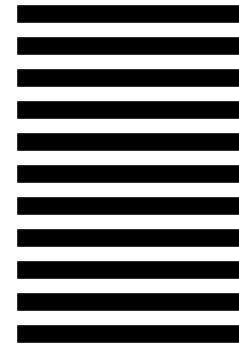
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