

SPARCcenter 2000E Power Supply Installation Manual



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Preface

This manual provides instructions for installing a power supply in a redundant-capable SPARCcenter™ 2000™ or SPARCcenter 2000E™ system.

These instructions are designed for an experienced service provider.

How This Book Is Organized

Chapter 1, “Before You Start,” is an overview of the tasks involved. Read this chapter to become familiar with the overall upgrade process.

Chapter 2, “Power Supply Installation,” explains how to perform the installation.

Appendix A, “Access” details how to remove and replace system covers.

Related Documents

The following documents contain information that may be helpful after the upgrade is installed.

Table P-1 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
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>150MB Tape Drive User's Guide</i>	800-7020
	<i>5.0 GB 8mm Tape Drive User's Guide</i>	800-7022
	<i>10 Gbyte 8mm Tape Drive User's Guide</i>	801-7652
	<i>14 Gbyte 8mm Tape Drive User's Guide</i>	802-1850
	<i>20 Gbyte 4 mm Internal Tape Auto-Loader User's Guide</i>	801-4977
Service	<i>SPARCcenter 2000 ServiceManual</i>	801-2007

What Typographic Changes Mean

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

Table P-2 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. machine_name% You have mail.
AaBbCc123	What you type, contrasted with on-screen computer output	machine_name% su Password:
<i>AaBbCc123</i>	Command-line placeholder: replace with a real name or value	To delete a file, type <code>rm filename</code> .
<i>AaBbCc123</i>	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-3 Shell Prompts

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

Notes, Cautions, and Warnings



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.

Before You Start



This manual provides procedures for installing a power supply in a redundant-capable SPARCcenter 2000 or 2000E system cabinet.

1.1 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 1-1 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.
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 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.

1.2 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.



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.

1.3 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

Power Supply Installation



This chapter provides the complete upgrade procedures.

Perform these tasks in order to install a system power supply.

<i>Safety Precautions</i>	<i>page 1-1</i>
<i>Powering Down the System</i>	<i>page 2-2</i>
<i>Removal Procedures</i>	<i>page A-1</i>
<i>Installing the Bottom Power Supply</i>	<i>page 2-4</i>
<i>Closing the System</i>	<i>page A-6</i>
<i>Restarting the System</i>	<i>page 2-20</i>



Warning – Risk of electric shock. Do not work inside the cabinet while power is applied to the system. Power down using the procedure which follows.

2.1 Operating System

The correct operating system must be installed to support dual power supply operation. The operating system must be:

Solaris 2.4 or higher, or

Solaris 2.3 with the patch: ID# 101318-59 or later revision level (obtain this patch through your normal service channels)

Check to see which operating system is running on your machine. If necessary, load one of the correct Solaris versions listed here before proceeding.


2.2 Open Boot PROM

The system boards require the Open Boot PROM version -10 or higher to support dual power supply operation. If necessary, install new PROMs on all system boards before proceeding.

2.3 Powering Down the System

Halt the operating system before turning off system power. Proceed below.

- 1. Notify users that the system is going down.**
- 2. Be sure that the system files and data have been backed up.**
- 3. Halt the system using the appropriate commands.**

The halt procedure varies for different types of operating systems. Refer to the documentation for your operating system for the correct halt procedure.
- 4. Wait for the system-halted message and the boot monitor prompt.**
- 5. Turn the key switch to the  (standby) position.**

See Figure 2-1.
- 6. Turn AC power off:**

Turn the AC distribution unit power switch to Off. The switch is at the rear of the cabinet. See Figure 2-2.

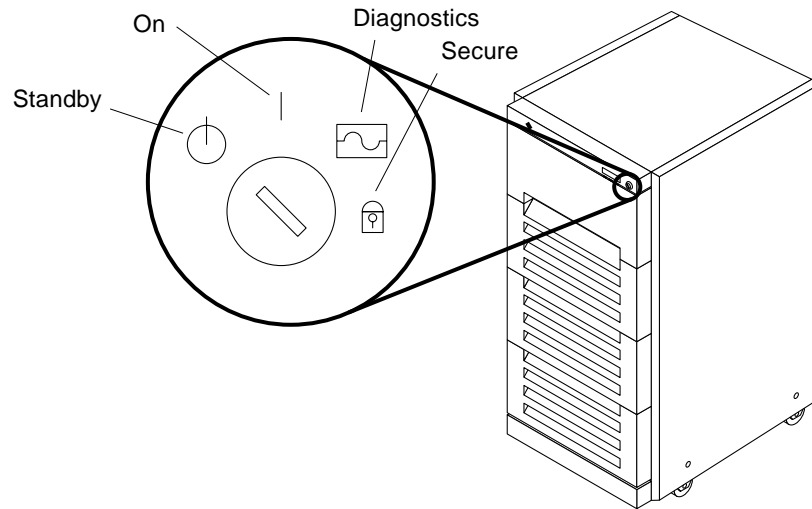


Figure 2-1 Key Switch Positions

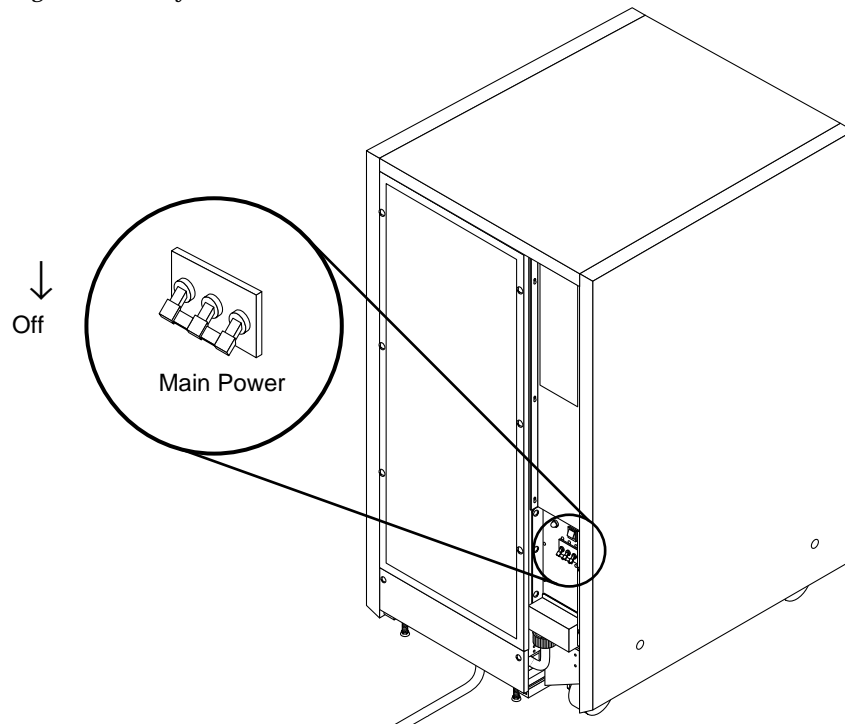


Figure 2-2 AC Distribution Unit Power Switch

2.4 Access

Remove all system cover panels before proceeding with the upgrade. For these procedures, refer to Appendix A, “Access.”

2.5 Installing the Bottom Power Supply

Note – Read and follow all safety and ESD instructions found in Section 1.1, “Safety Precautions.”

2.5.1 Identifying a Redundant-Capable Cabinet

Note – The cabinet in question is a redundant-capable cabinet if:

- The power supply cover panel on this chassis is long as shown in Figure 2-3. 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
 - The cabinet is configured with the power supply adapter board. This board, if present, can be viewed by looking through the EMI screen on the front of the system.
-

2.5.2 Installing the Supply

2.5.2.1 Preparation

- 1. Remove the power supply compartment EMI panel Part No. 340-3134-xx covering both power supplies. See Figure 2-3.**
Remove twelve 10-32 screws securing the panel in place and set aside.

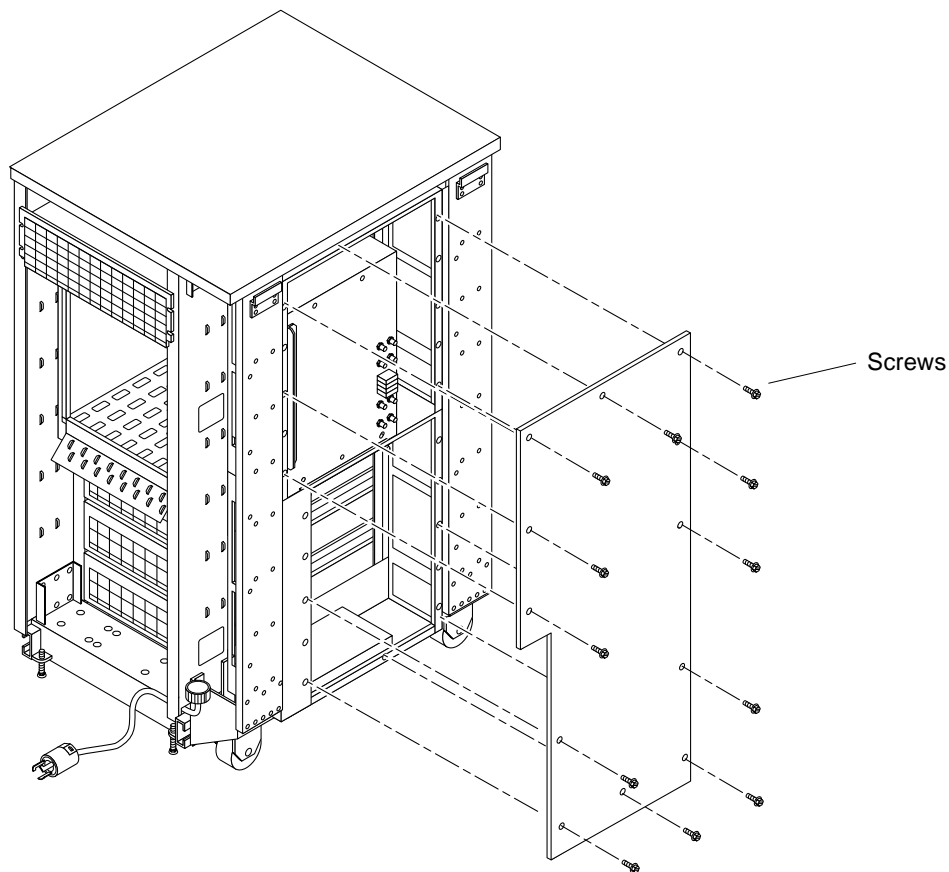


Figure 2-3 Removing the Power Supply Compartment EMI Panel

- 2. Disconnect the top power supply power cord.**
This is in the lower-center of the top supply. See Figure 2-4.

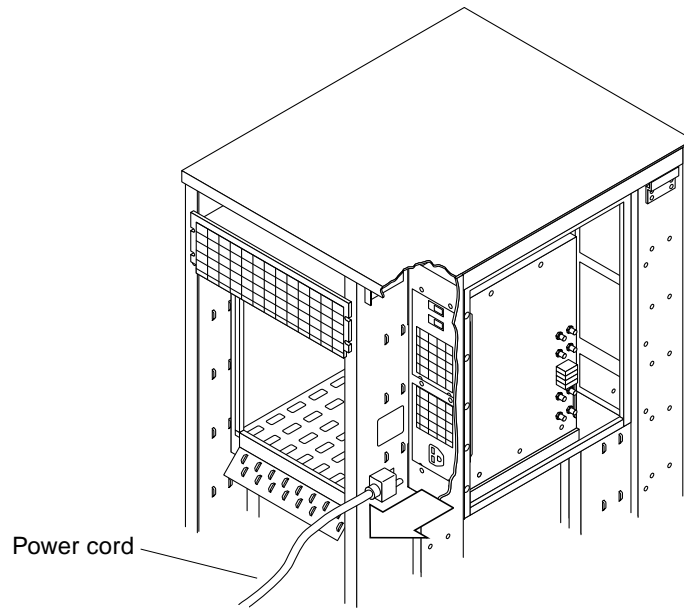


Figure 2-4 Disconnecting the Top Power Supply Power Cord

3. Remove the power supply cage cover panel.

Remove six screws securing the panel, Part No. 340-3157-xx to the power supply cage and remove the panel (it will not be reused). See Figure 2-5.

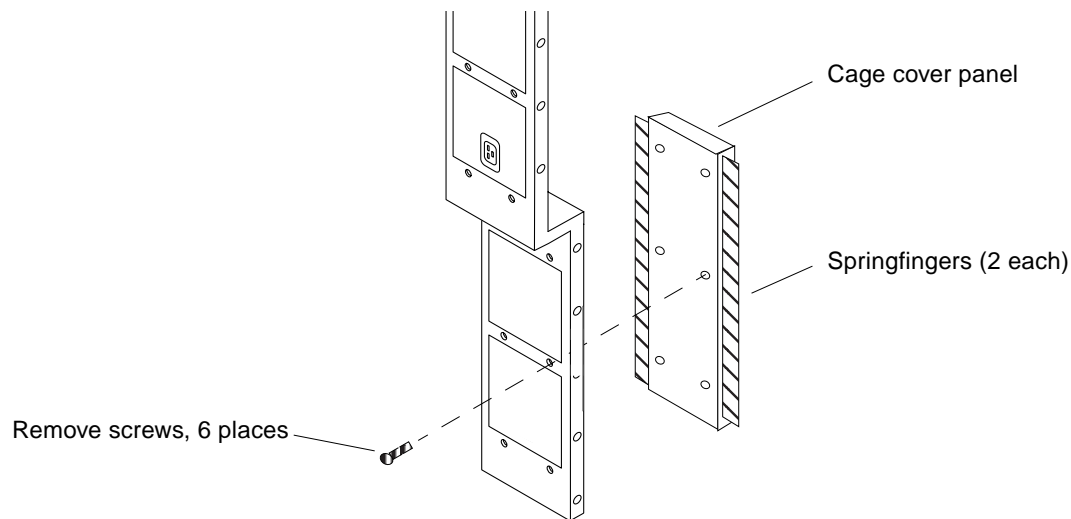


Figure 2-5 Removing the Power Supply Cage Cover Panel

Remove the AC Distribution Unit

1. **Disconnect all AC cables plugged into the unit, and disconnect cables from connectors J2 and J3.**

See Figure 2-6.

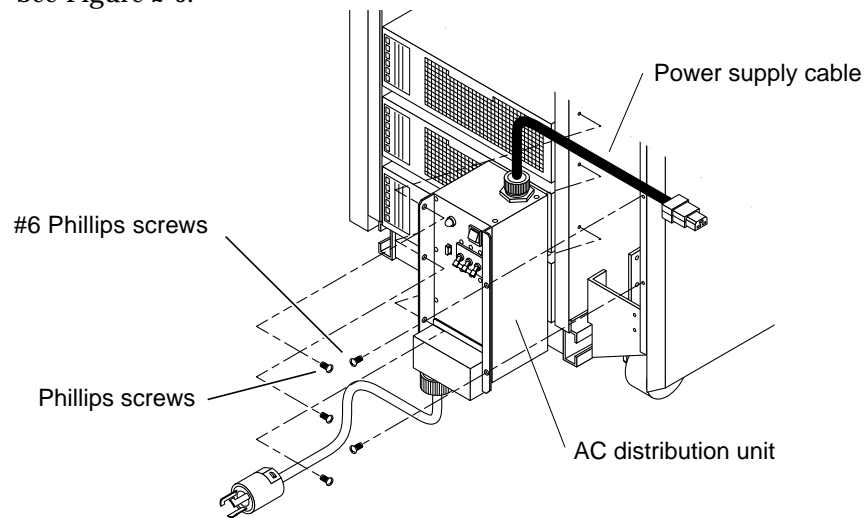


Figure 2-6 AC Distribution Unit Removal and Replacement

Note – J3 is located on the top of the AC distribution unit, J2 is on the backside.

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

Remove the Breaker Box

- 1. Remove the power breaker box. See Figure 2-7.**
 - a. Unplug the power cord from the breaker box going to the top power supply.**
 - b. Remove two screws from holes in the bottom lip of the breaker box which secure it to the bottom power supply. Set the screws aside.**
 - c. Unscrew two captive screws at the top of the breaker box securing it to the top power supply.**
 - d. Remove the box and set aside.**

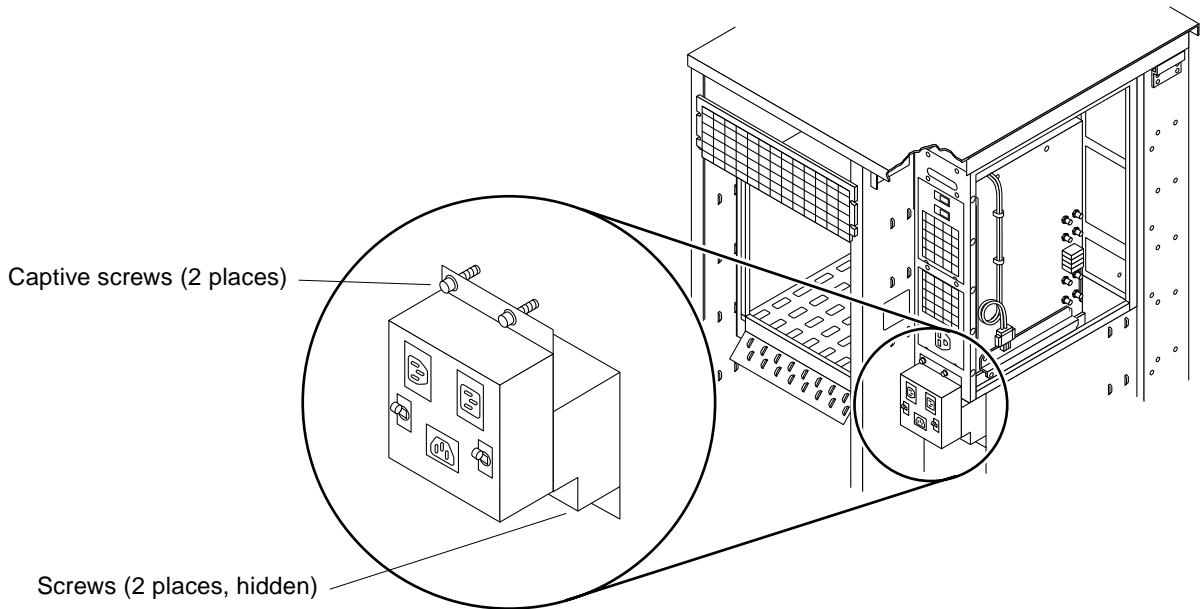


Figure 2-7 Removing the Power Breaker Box

Filter Cable

1. Free the filter cable.

- a. On the inside of the power supply cage, cut the tie wrap and uncoil the cable. See Figure 2-8.**
- b. Pass the cable connector through the rectangular hole in the power supply cage and allow it to hang.**

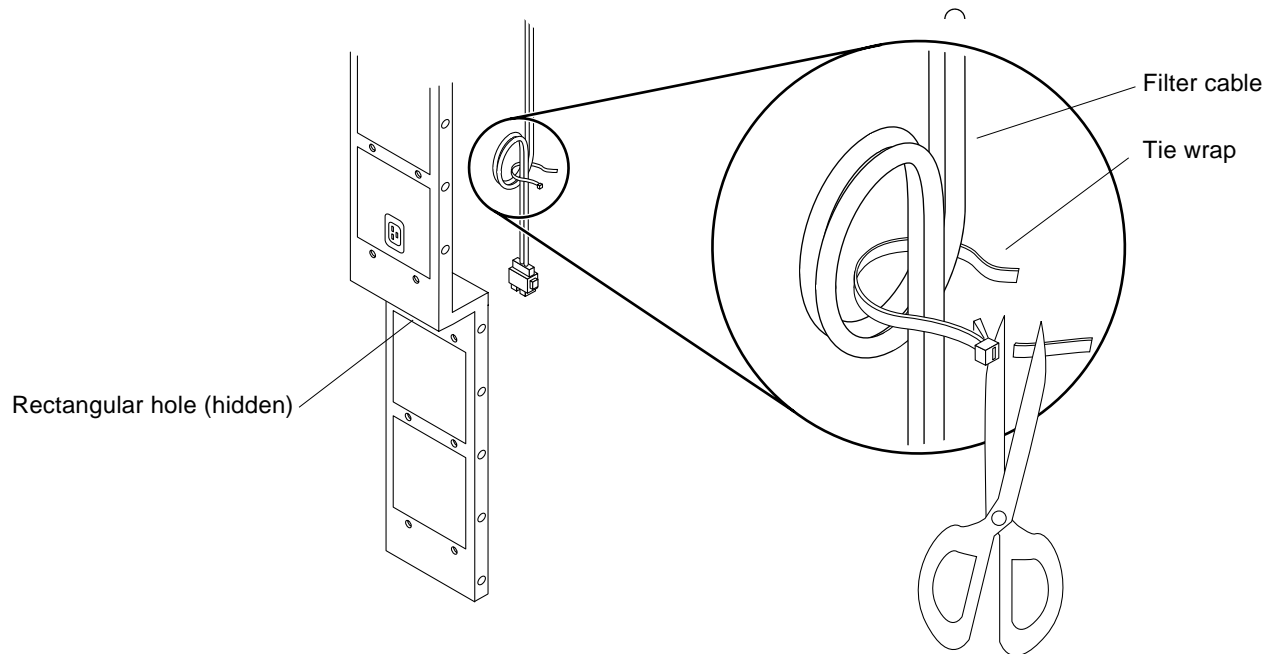


Figure 2-8 Freeing the Filter Cable

2.5.2.2 *Power Supply Physical Installation*

- 1. Install the springfingers, Part No. 340-2415-xx (two each — included with the kit) on the new power supply.**
Install each springfinger (shown in Figure 2-9) using three screws.
- 2. Place the supply on the power supply shelf at a slight angle so the left-edge enters the power supply cavity first.**

- 3. Shove the supply into the cavity — flush against the sheet metal in the left-interior of the power supply cage.**
See Figure 2-9.

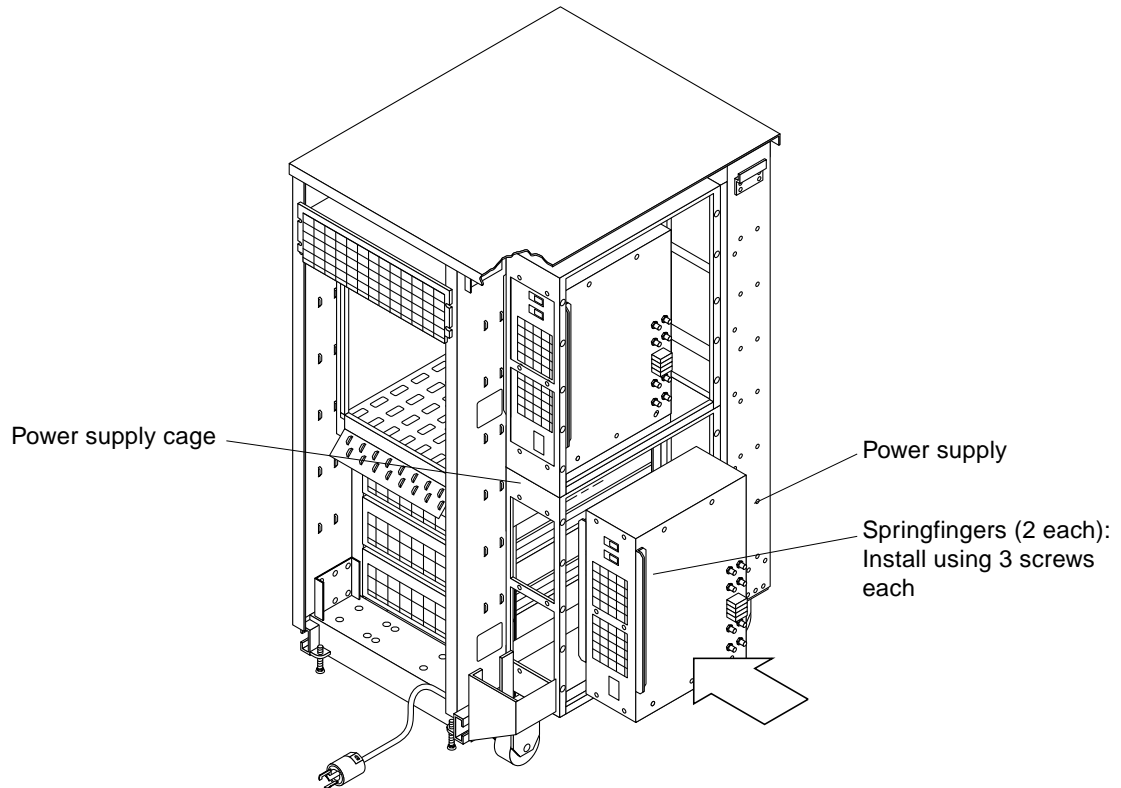


Figure 2-9 Installing the Bottom Power Supply

- 4. Install six screws to secure the power supply to the power supply cage.**
Use screws Part No. 340-1372-xx. See Figure 2-10.

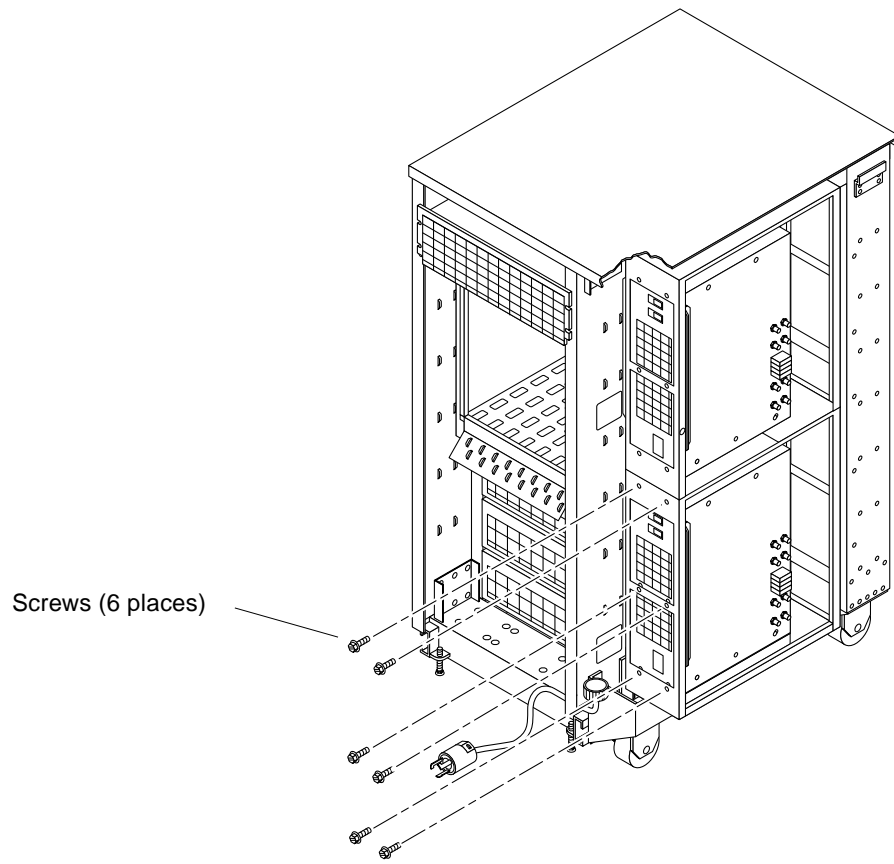


Figure 2-10 Installing the Power Supply Mounting Screws

5. Install the bottom cover panel.

Position the panel Part No. 340-3190-xx and install 12 screws Part No. 240-1372-xx to secure the panel to the cabinet. See Figure 2-11.g

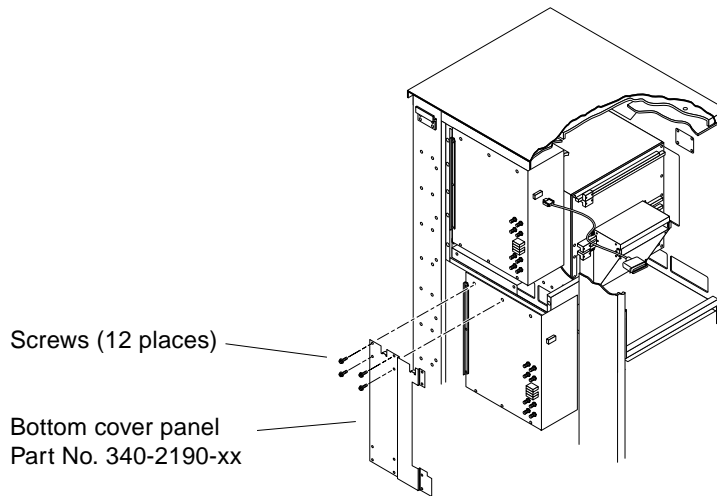


Figure 2-11 Installing the Bottom Cover Panel

2.5.2.3 Main Bus Bar Installation

Install the main bus bar Part No. 340-3136-xx to connect the top and bottom power supply busses.

1. Orient the bus bar as shown in Figure 2-12.
2. Place the bus bar flush against the top and bottom power supplies so holes in the tabs slide over all bolts on the supplies: eight on the top supply and eight on the bottom.
3. Loosely install in the order given the following on each bolt: a flat washer, a lock washer and a nut.
See Figure 2-12.
4. Loosely install four M6 screws through holes in the bus bar to secure the bus bar to the top and bottom cover panels.
The screw Part No. is 240-2083-xx. See Figure 2-12.
5. Tighten all nuts and screws installed in Step 3 and Step 4.

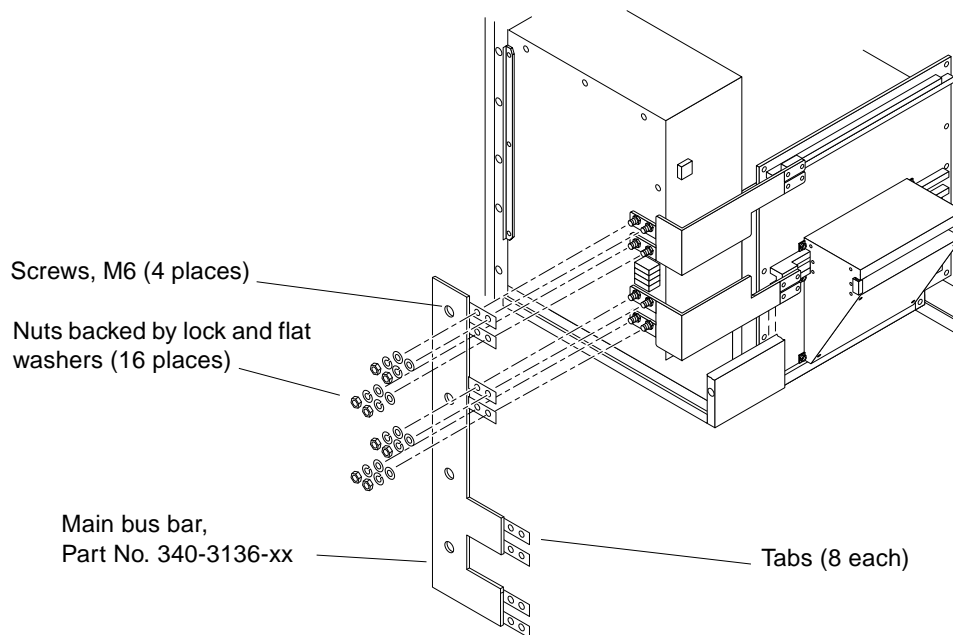


Figure 2-12 Installing the Main Bus Bar

2.5.2.4 Power Harness Installation

Install the power harness, Part No. 530-2164-xx (comprised of four bus wires) to connect the two power supplies.

- 1. Orient the power harness as shown in Figure 2-13.**
- 2. Connect the power harness to the top power supply.**
Push four spade connectors onto the spade lugs. See Figure 2-13.
- 3. Connect the power harness to the bottom power supply.**
Push four spade connectors onto the spade lugs.
- 4. Secure the power harness to the cover panels.**
Clip the power harness into nylon retainers in the top and bottom power supply cover panels. See Figure 2-14.

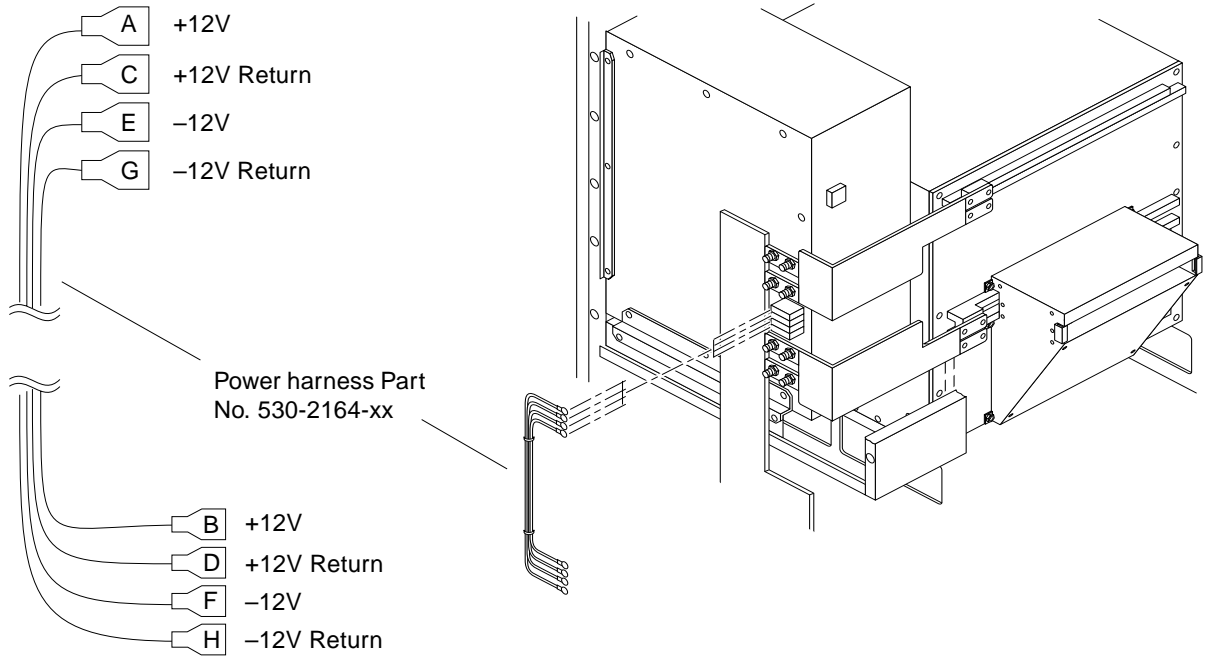


Figure 2-13 Installing Power Harness on the Top and Bottom Power Supply Terminal Blocks

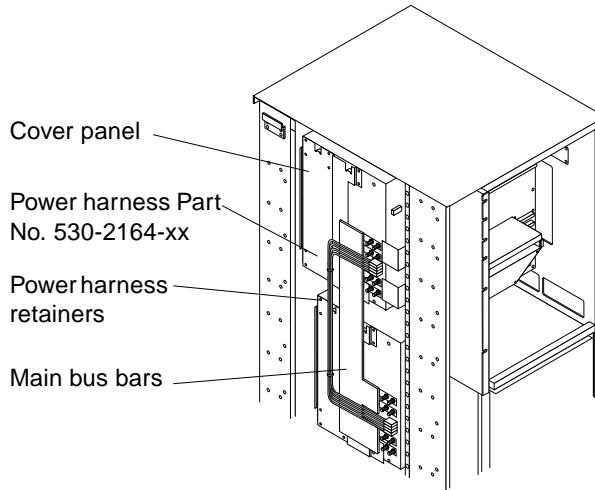


Figure 2-14 Installing the Main Bus Bar and the Power Harness

2.5.2.5 Cabling

Filter Cable, Breaker Box and AC Distribution Unit

1. Plug in the filter cable.

Form a service loop in the cable and plug the connector into J2 (the top connector) on the power supply. See Figure 2-15.

2. Replace the power breaker box. See Figure 2-15.

c. Insert the filter cable service loop into the hole in the back side of the breaker box (Figure 2-15).

Note – Insert filter cable loop into the hole in breaker box that is surrounded by springfingers.

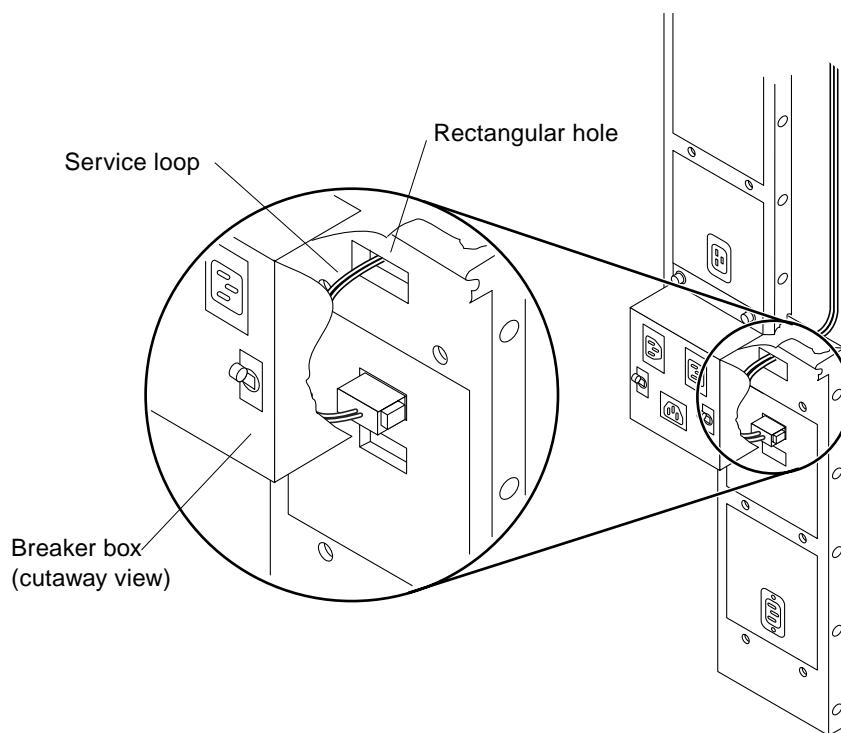


Figure 2-15 Plugging the Filter Cable into the Bottom Power Supply

- d. Place the breaker box against power supply cage.**
Align the captive screws with the bottom two holes in the top power supply. See Figure 2-16.
- e. Loosely thread the two captive screws at the top of the breaker box into holes in the top power supply.**
- f. Loosely thread two screws through holes in the bottom lip of the breaker box into holes in the bottom power supply.**
- g. Tighten all four screws to secure the power breaker box in place.**

Note – Ensure the filter cable does not become crimped between the breaker box and the power supply cage.

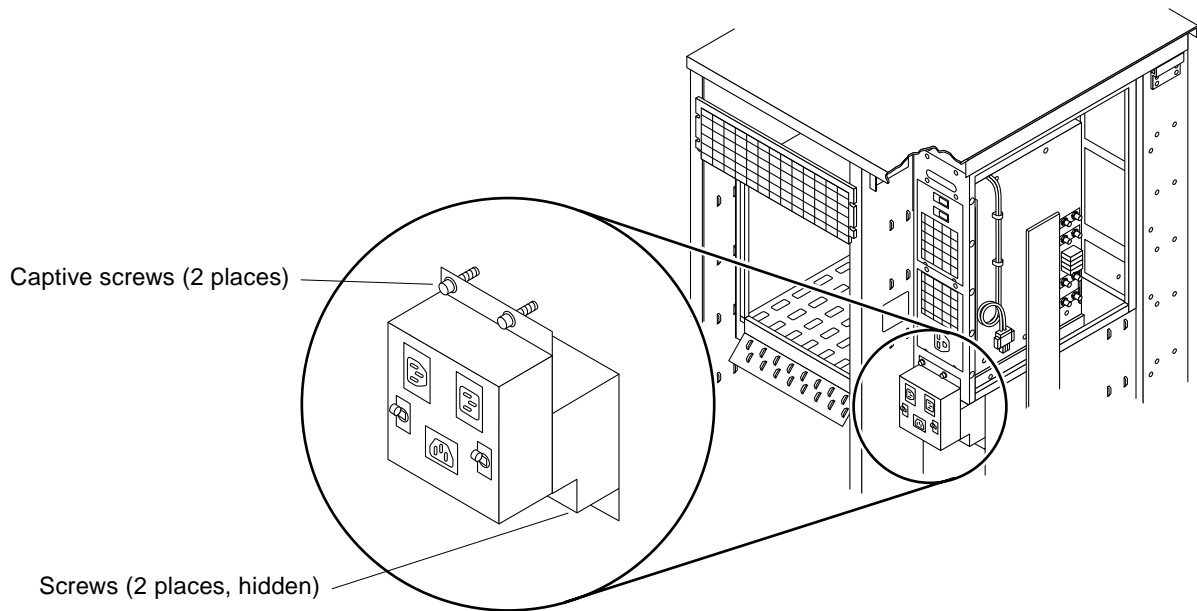


Figure 2-16 Replacing the Power Breaker Box

3. Replace the AC distribution unit.

- a. Place the power distribution unit against the chassis with all four holes aligned with those in the chassis.**

- b. Replace the three Phillips screws and two #6-32 Phillips screws.
 - c. Replace cables in connectors J2 and J3.
1. Plug in the three power cords:
See Figure 2-17.
 - a. Plug the main power cord into the AC distribution box J2 and the other end into breaker box J1 (bottom-right jack).
 - b. Plug power cord Part Number 530-2160-xx into breaker box J2 (top jack) and the other end into the top power supply AC input.
 - c. Plug power cord Part Number 530-2160-xx into breaker box J3 (bottom-left jack) and the other end into the bottom power supply AC input.

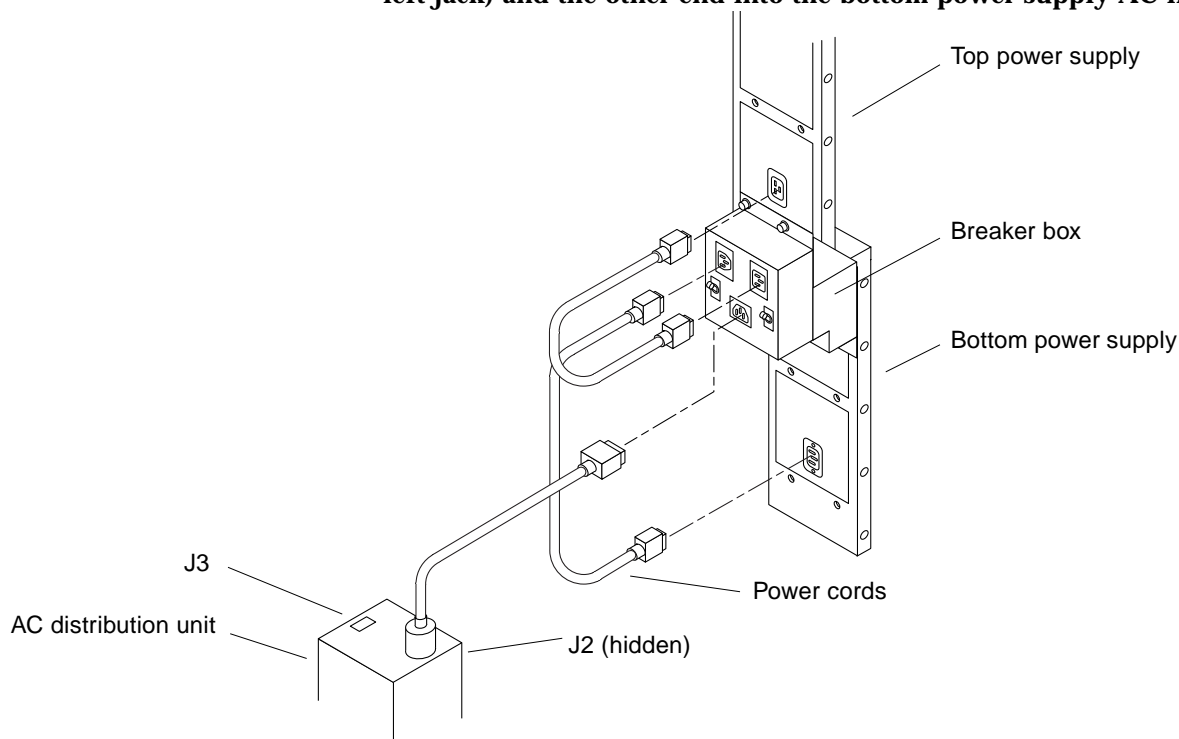


Figure 2-17 Connecting the Power Cords

Note – Examine the breaker box to ensure both circuit breakers are ON. Set them to ON if required.

2.5.2.6 Power Supply Sense Cable

1. **Remove the jumper-connector from the power supply adapter board.**
You will find this device plugged into the connector nearest the outside edge of the cabinet. Remove it. See Figure 2-18.
2. **Plug the sense cable for the bottom power supply into the power supply adapter board.**
Plug it into the near-most connector — from which the jumper-connector was removed in Step 2.
3. **Plug the other end of the sense cable into the sense connector on the bottom power supply.**
Plug it into J1 near the top of the supply.

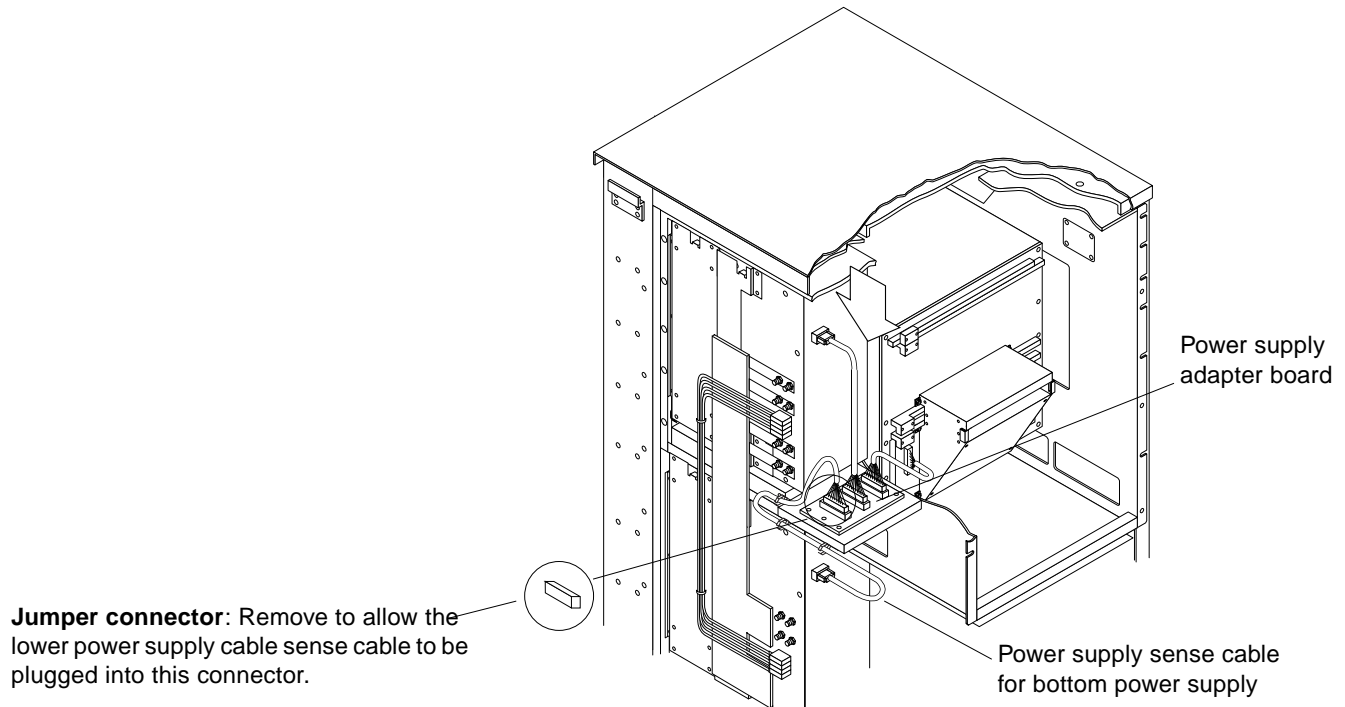


Figure 2-18 Removing the Jumper-Connector and Installing the Sense Cable

2.5.2.7 Restore the System

1. **Replace the power supply compartment EMI panel.** See Figure 2-3. Position the panel against the cabinet and secure using 12 screws.

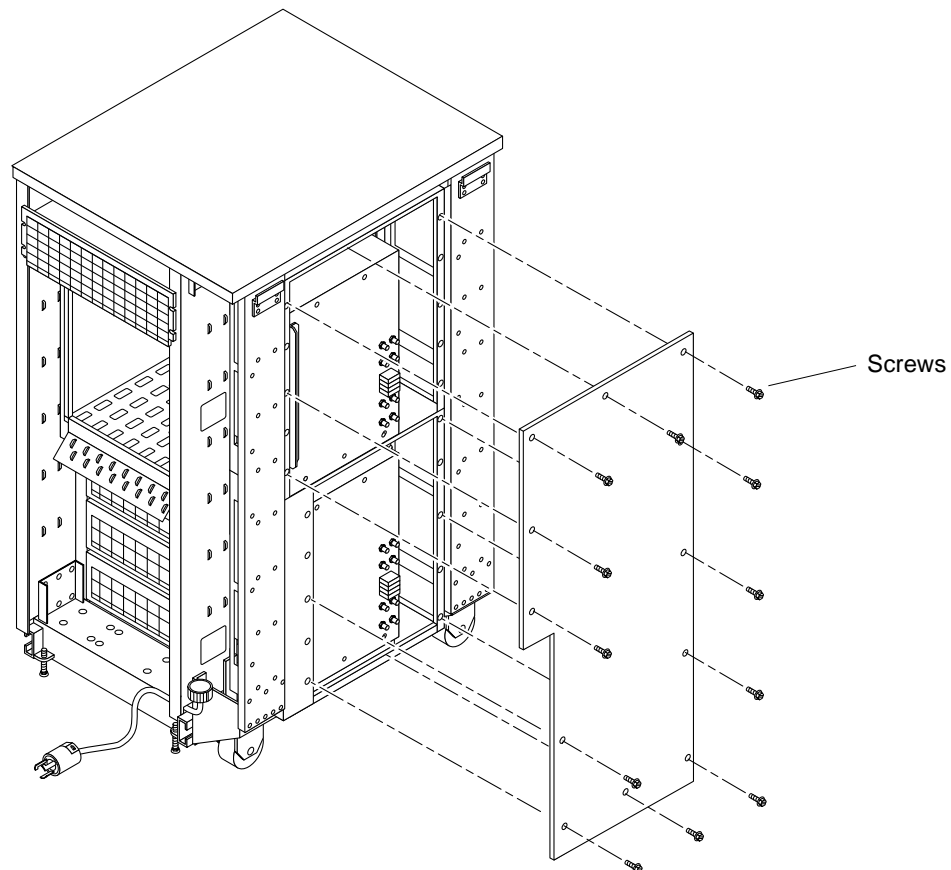


Figure 2-19 Replacing the Power Supply Compartment EMI Panel

2.6 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 ϕ (the standby position).**
See Figure 2-1.



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 2-20.**
- 3. Turn on the power switch on the AC distribution unit.**
See Figure 2-2.
- 4. Turn on power to the terminal.**
A terminal is required for viewing system messages.
- 5. Turn the key switch to | (the power-on position). See Figure 2-1.**
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.

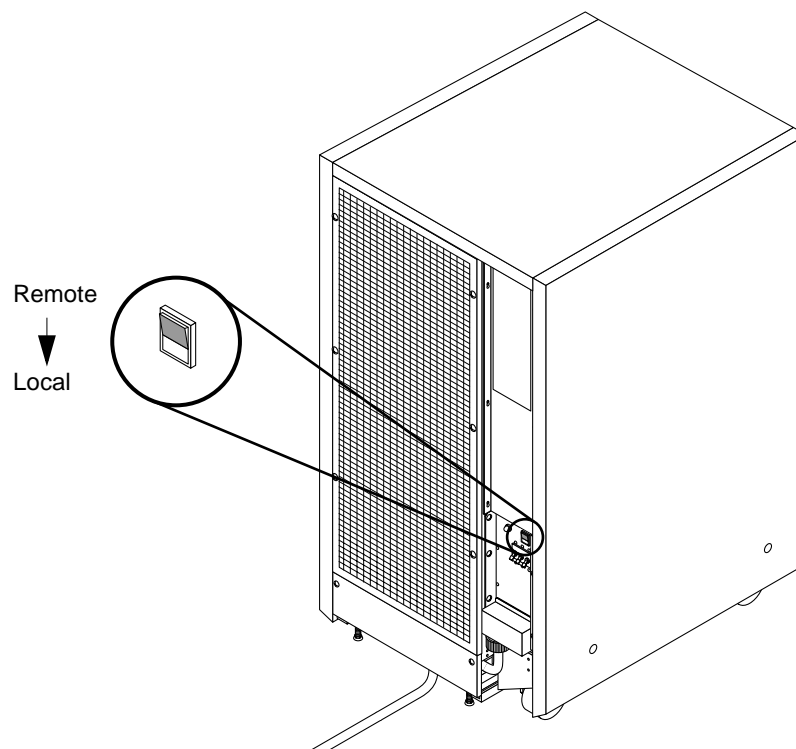


Figure 2-20 Local/Remote Switch Location



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 similar to the one below 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 2-21.

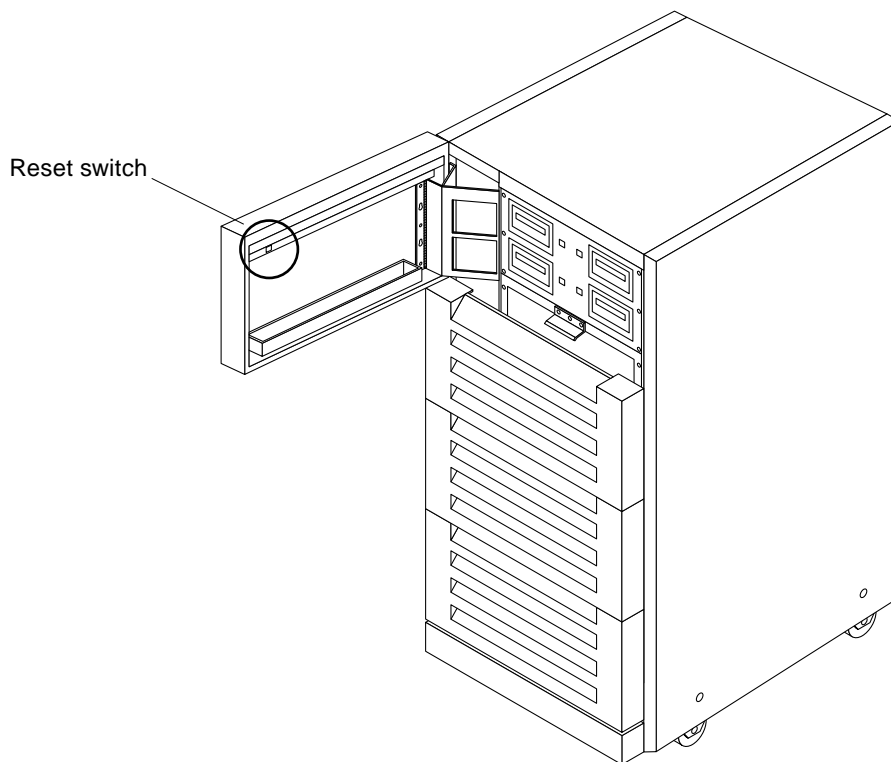


Figure 2-21 System Reset Switch

8. If the system displays “not responding” or “no carrier” messages, the Link Integrity Test may be set incorrectly.

2.7 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 2-22 and Figure 2-23.

Table 2-1 summarizes LED status conditions during and after POST.

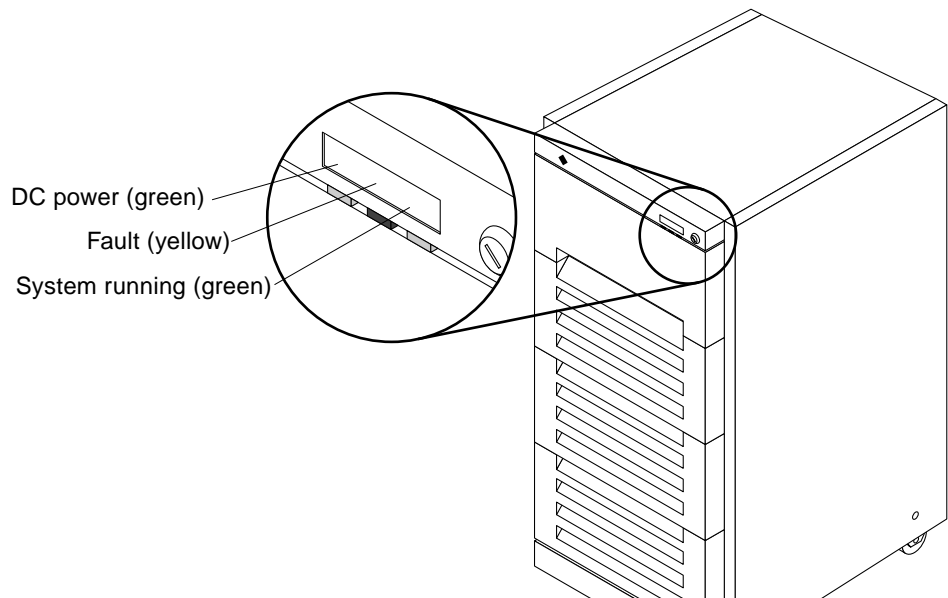


Figure 2-22 Front Panel Status LEDs

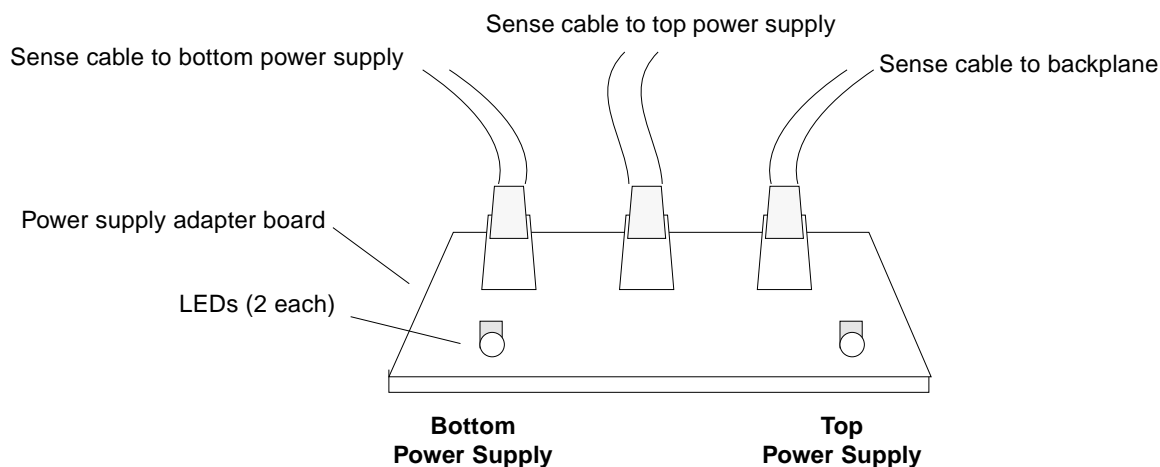


Figure 2-23 Power Supply Adapter Board LEDs

Table 2-1 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.

Access



A.1 Removal Procedures

Remove panels to afford access to the power supplies and related components.

A.1.1 Opening the Hinged Door

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

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.

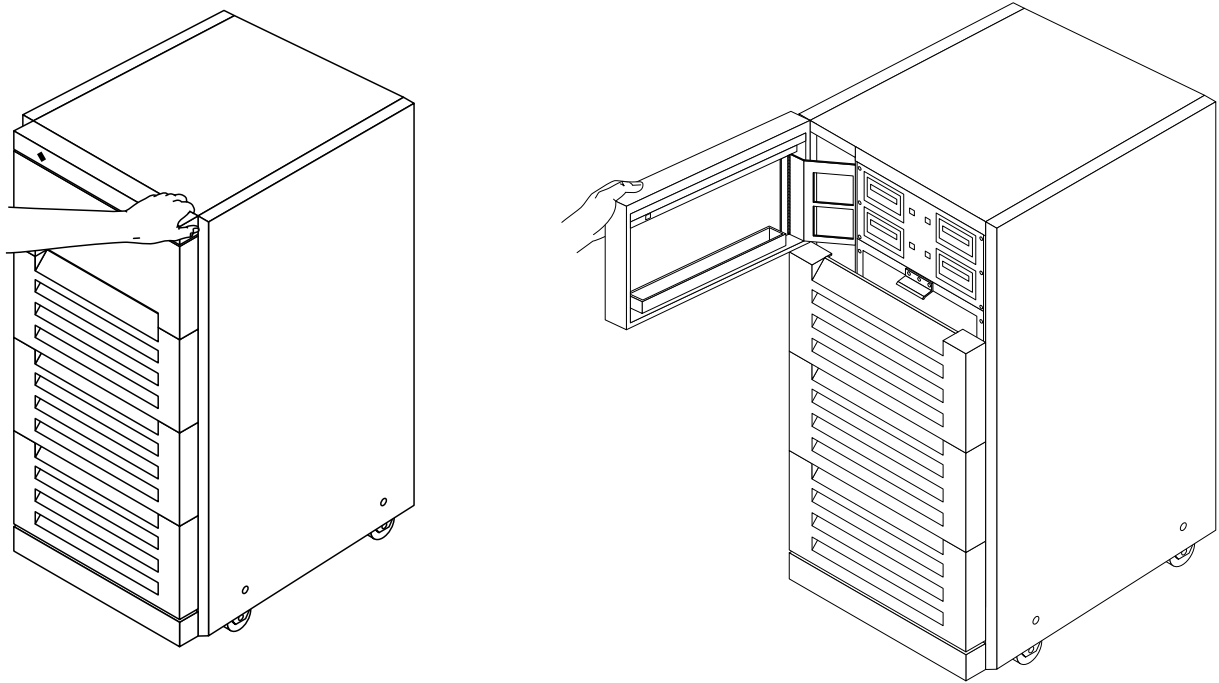


Figure 1-1 Opening the Hinged Door

A.1.2 Removing the Vented Front Panels

1. Grasp the panel under the vent at one end and pull it outward approximately 1 inch (2-3 centimeters) to disengage the ball studs. See Figure 1-2.
2. Repeat this procedure at the opposite side to free the panel.

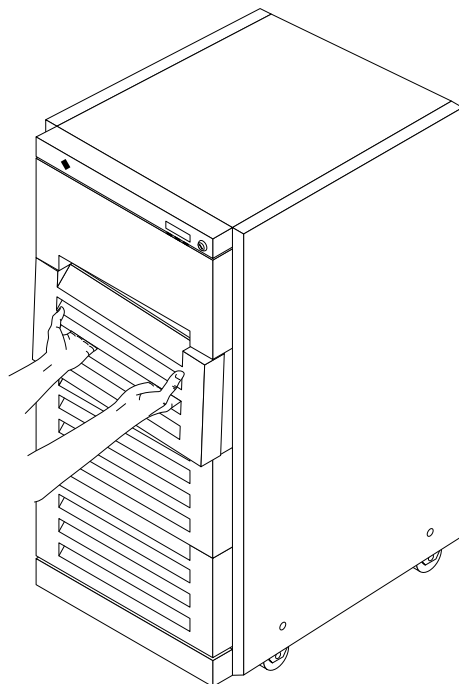


Figure 1-2 Removing the Vented Front Panels

A.1.3 Removing the 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.

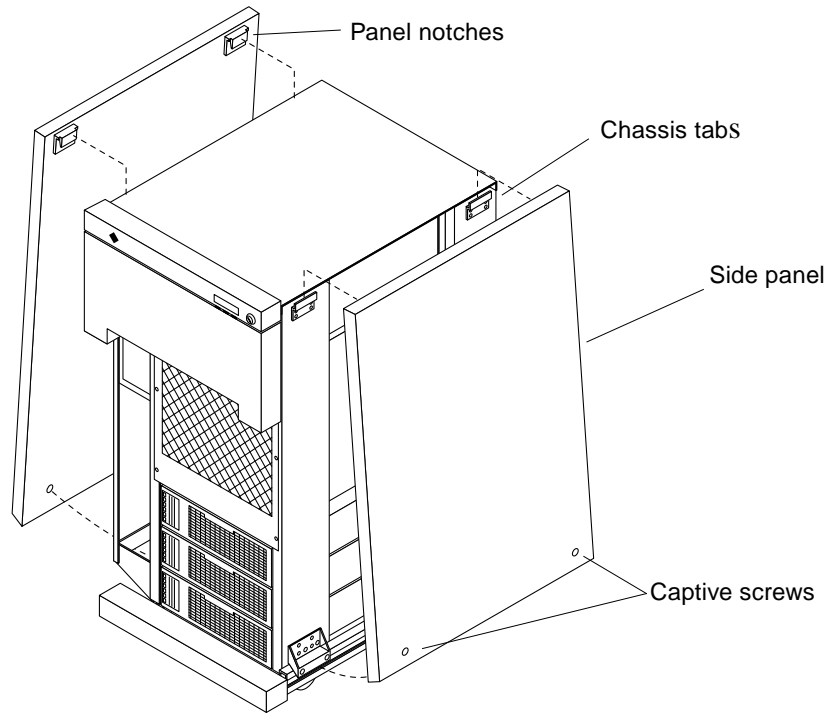


Figure 1-3 Removing the Side Panels

A.1.4 Removing the EMI Shield

The EMI shield is located behind the front panels.

1. **Remove the Phillips screws securing the EMI shield to the chassis.**
See Figure 1-4.
2. **Grab the handle at the panel top to tilt the panel out to remove it.**

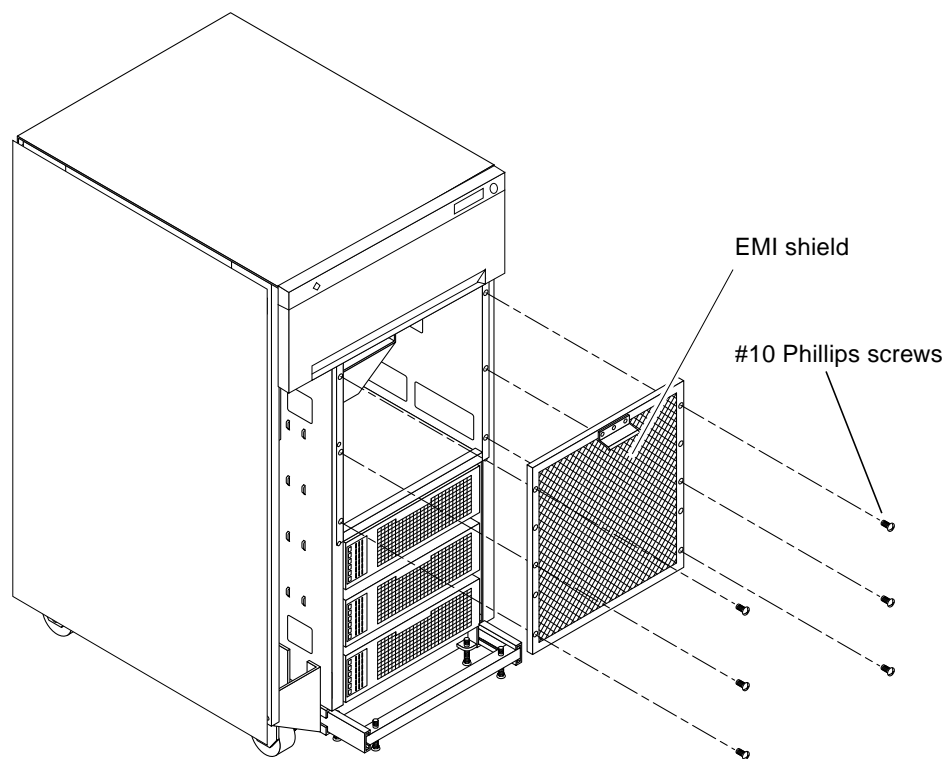


Figure 1-4 Removing the EMI Shield

A.1.5 Rear Screen Panel

1. Remove the two #10 Phillips screws securing the panel to the frame. See Figure 1-5.

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.

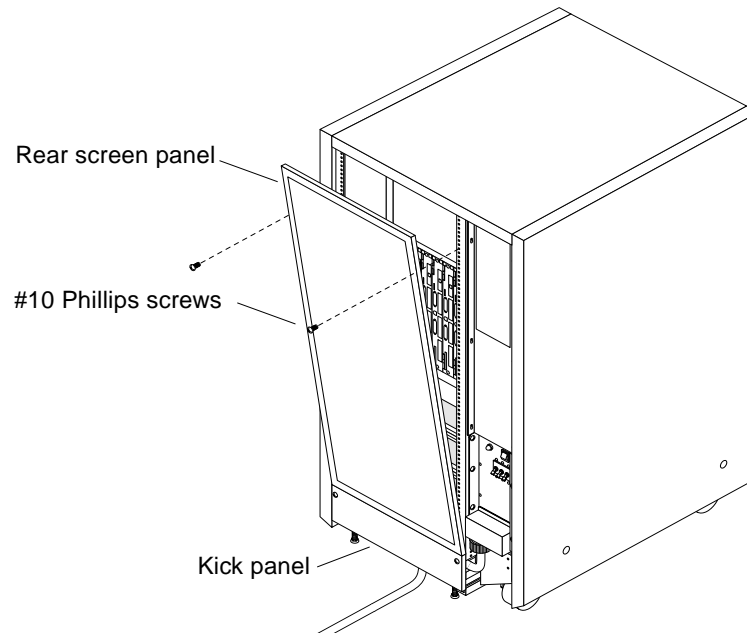


Figure 1-5 Rear Screen Panel Removal

A.2 Closing the System

A.2.1 EMI Panel

1. Hold the panel by the handle at the top. Position the panel in the opening so the bottom flange fits over the lip at the bottom of the opening.
2. Tilt the panel flush against the chassis. Install and tighten all screws.

A.2.2 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 two screws.

A.2.3 Vented Front Panel

- ♦ **Place the panel against the chassis with ball studs aligned with catches on the panel.**

At both ends, tap or press the panel into place.

A.2.4 Side Panels

- 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.**

Revision History

Revision	Dash	Date	Comments
802-2700-10	-A	April 1995	First Customer Ship

Reader Comments

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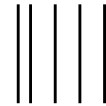
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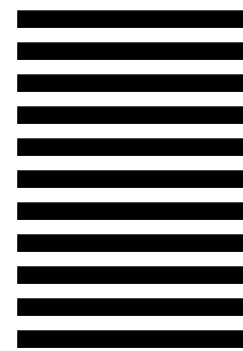
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