



Sun™ Rack Service Manual

Sun Rack 900-38

Sun Rack 900-36N

Sun Rack 1000-38

Sun Rack 1000-42

Sun Microsystems, Inc.
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Contents

Preface v

1. Servicing the Sun Rack 1

Installing and Removing Equipment 1

 Deploying the Antitilt Bar 2

Preparing the Rack for Service 2

 Removing the Grounding Straps 2

 Removing a Side Panel 4

 Removing an Extension Panel 5

Power Distribution 5

 Removing and Replacing a Power Sequencer 5

 Removing and Replacing a Power Sequencer in a Sun Rack 1000-42 6

Removing and Replacing a Power Strip 6

Removing and Replacing a Cable Assembly 8

 Removing a Cable Assembly 8

 Replacing a Cable Assembly 9

 Replacing an AC Input Panel 10

 Type 1 AC Input Panel 11

 Type 2 AC Input Panel 12

Removing and Replacing the Top Panel 13

2. Removing and Replacing Modular Power Supplies	15
Overview of Modular Power Supplies	15
Preparing the Rack for Service	16
Replacing a Modular Power Supply	16
Deploying the Antitilt Bar	16
Powering Off the Rack and Components	17
Installing the Power Strips and Brackets	17
Dressing the Power Strip Cables	20
Installing the Modular Power Supply Chassis	23
Connecting the Power Distribution Module to the Cables	25
Removing a Modular Power Supply	27
Deploying the Anti-Tilt Bar	27
Powering Off the Rack and Components	27
Disconnecting the Power Distribution Module from the Cables	28
Removing the Modular Power Supply Carrier	30
Removing the Power Strips and Brackets	31
3. Troubleshooting	37
Power Sequencer	37
Power Strips in Racks with Power Sequencers	40
Power Distribution Modules	41
Power Strips in Racks with Power Distribution Modules	41

Preface

The *Sun Rack Service Manual* provides procedures that describe the removal and replacement of replaceable parts in the following Sun™ Racks.

- Sun Rack 900-38
- Sun Rack 900-36N
- Sun Rack 1000-38
- Sun Rack 1000-42

This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

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Sun Rack Service Manual, part number 816-6387-15

Servicing the Sun Rack

All service procedures must be performed by qualified service personnel.

Read the *Sun Rack Safety and Compliance* document before attempting any service procedures.

There are five types of field-replaceable units in the Sun™ Rack:

- Power sequencers
- Power distribution modules
- Power strips
- Cable harnesses
- Top panel

Installing and Removing Equipment

Refer to the documentation that came with your equipment for bracket and rail installation information.



Caution – To prevent the rack from tipping during equipment installation or removal, the antitilt bar must be deployed.



Caution – For safety, equipment should always be loaded from the bottom up. That is, install equipment in the lowest part of the rack first, then install a unit above that, and so on. When removing all equipment from the rack, remove the top unit first then the one below that, and so on.

Deploying the Antitilt Bar

1. Pull the end of the antitilt bar out to its fully extended position.
2. Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.

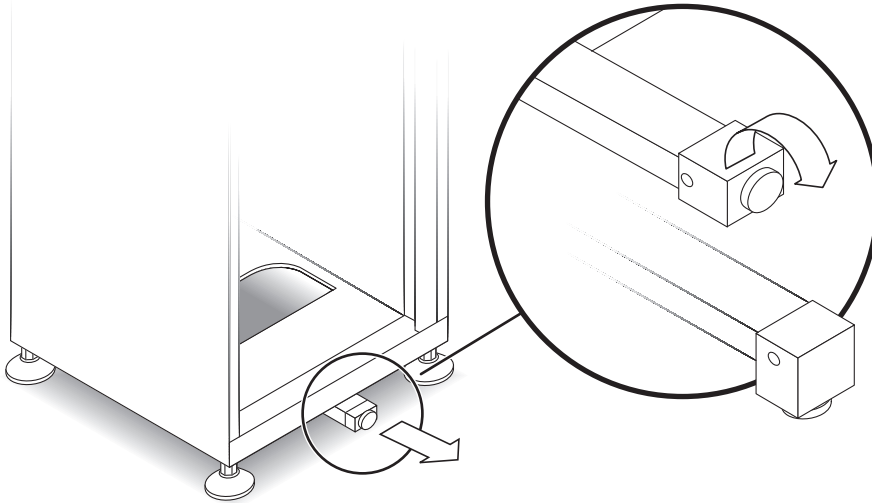


FIGURE 1-1 Deploying the Antitilt Bar

Preparing the Rack for Service

Some maintenance tasks require that the panels be removed from the Sun Rack.

Removing the Grounding Straps

Three grounding straps are mounted to each corner of the top of the rack frame. [FIGURE 1-2](#) and [TABLE 1-1](#) identify which straps are connected to which panels. Before removing any panel, you must disconnect the grounding strap from the panel.

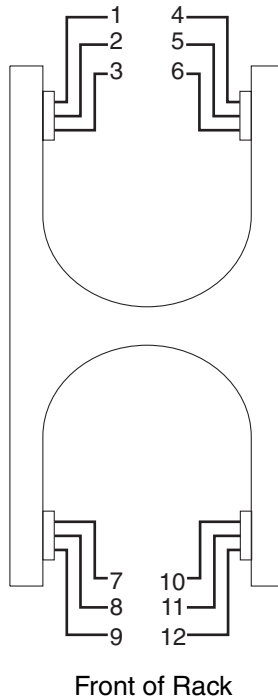


FIGURE 1-2 Rack Frame Showing Grounding Strap Terminals—Top View

TABLE 1-1 Grounding Strap Connections

Rack Terminal	Grounding Strap Number	Connected To:
Rear Left	1	Left extension panel
	2	Left side panel
	3	Rear door if hinged on left
Rear Right	4	Right extension panel
	5	Top panel
	6	Rear door if hinged on right
Front Left	7	Front door if hinged on left
	8	Not used
	9	Not used

TABLE 1-1 Grounding Strap Connections (*Continued*)

Rack Terminal	Grounding Strap Number	Connected To:
Front Right	10	Right side panel
	11	Front door if hinged on right
	12	Not used

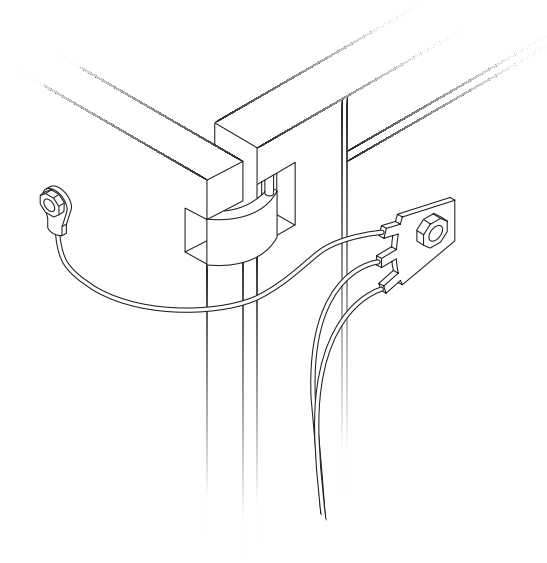


FIGURE 1-3 Typical Grounding Strap Connection

Removing a Side Panel

1. Disconnect the grounding strap from the stud on the top inside of the panel.
2. Release two latches on the bottom inside of the panel.
3. Pull the bottom of the panel slightly away from the rack and lift up the panel.

Removing an Extension Panel

1. Disconnect the grounding strap from the stud on the top inside of the panel.
2. Lift the panel up slightly and slide it toward the front of the rack.

To hold the panel in place, a tab attached to the panel slides into a bracket on the rack side. There are two of these tabs and brackets, one at the top of the panel and one at the bottom.

Power Distribution

Your rack may have one of two types of power distribution. In one type there are power sequencers (PDS) mounted on the side of the rack, inside the side cover. In the other type, there are power distribution modules mounted in the bottom of the rack (MPS).

Note – For procedures on removing and replacing modular power supplies (also called a modular power supply, MPS) and related components, see [“Removing and Replacing Modular Power Supplies”](#) on page 15.

Removing and Replacing a Power Sequencer

1. Loosen captive screws on the front of the power sequencer (PDS).
2. Pull the power sequencer part way out of the rack.
3. Disconnect three cables from the rear panel of the power sequencer.
4. Pull the power sequencer free from the cables and out of the rack.

Note – Do not remove the side panel. The illustration shows the side panel removed for reference purposes only.

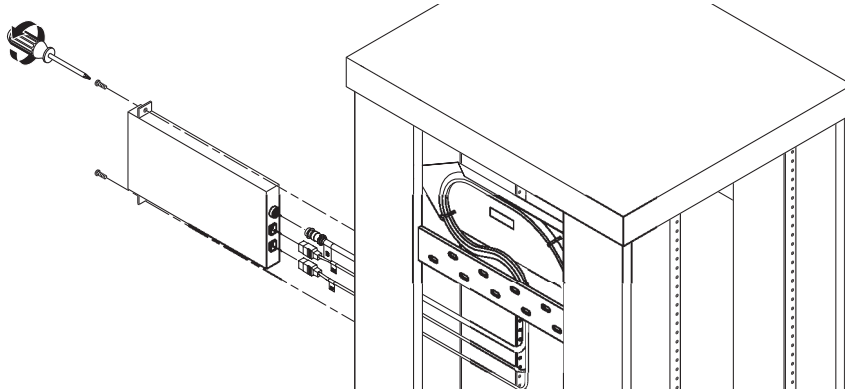


FIGURE 1-4 Removing a Power Sequencer

To replace a power sequencer, reverse the steps of the power sequencer removal procedure.

Removing and Replacing a Power Sequencer in a Sun Rack 1000-42

1. Remove the rack side panel. See Section, “Removing a Side Panel” on page 4.
2. Disconnect the cable connectors from the bottom of the power sequencer (PDS).
3. Remove the four screws on the sides of the power sequencer housing.
4. Pull the top of the power sequencer housing out away from the rack frame.
5. Loosen captive screws on the top of the power sequencer.
6. Pull the power sequencer up and out of the power sequencer housing.

To replace a power sequencer, reverse the steps of the power sequencer removal procedure.

Removing and Replacing a Power Strip

This procedure is for removing power strips in Sun Racks that have a PDS. For procedures on removing and replacing power strips with modular power supplies (MPS), see [“Removing and Replacing Modular Power Supplies”](#) on page 15.

In order to remove the power strip closest to the power strip bracket edge, you must first remove the other power strip. The removal procedure for both power strips is the same.

Note – If your rack has power distribution modules, you must first remove the cable bracket that covers the input cable.

1. **Disconnect the cable from the bottom of the power strip.**
2. **Loosen the retaining screw at the top of the power strip and rotate the top of the power strip toward the open side of the bracket that holds the power strips.**

There are two types of power strip brackets. In one, the power strips are removed toward the front of the rack. In the other, the power strips are removed toward the back of the rack. It will be obvious from looking at the power strip bracket which type your rack has.

3. **Pull the power strip up and out so that the tab at the bottom of the power strip clears the bracket.**

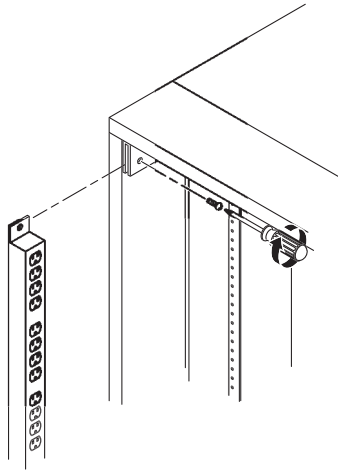


FIGURE 1-5 Power Strip

To replace a power strip, reverse the steps of the power strip removal procedure.

Removing and Replacing a Cable Assembly

Note – Cable harnesses and AC input panels are not field replaceable units in the Sun Rack 900-36N.

Removing a Cable Assembly

1. Disconnect the cable harness to be removed from its power strip.
2. On the power sequencer side of the rack, remove the side panel, the power strip bracket cover, the power strip bracket, and both power strips.

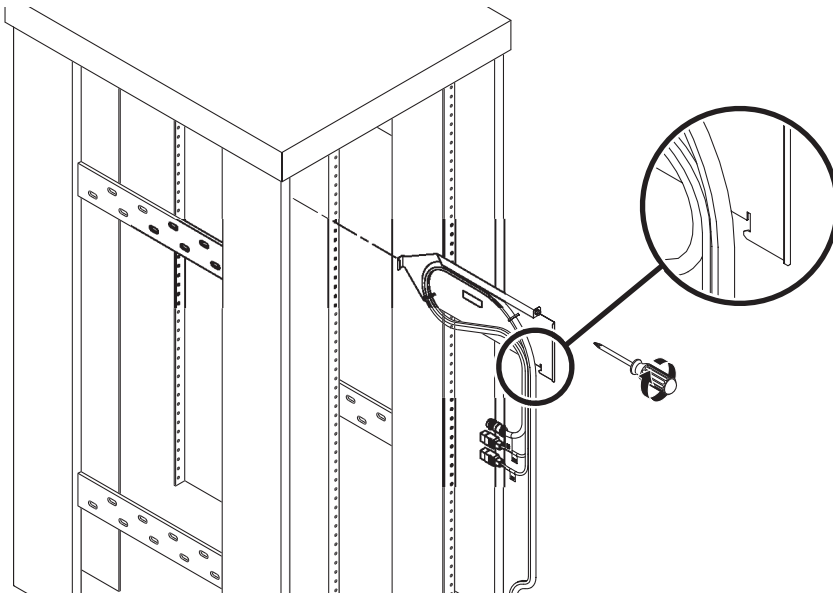


FIGURE 1-6 Cable Harness

3. Disconnect the cable harness from the power input panel.
 - a. Remove two screws holding the power input panel to the rack.

2. **Holding the carrier plate, pass the cable bundle through the space between the outer frame and the rackmounting rail.**

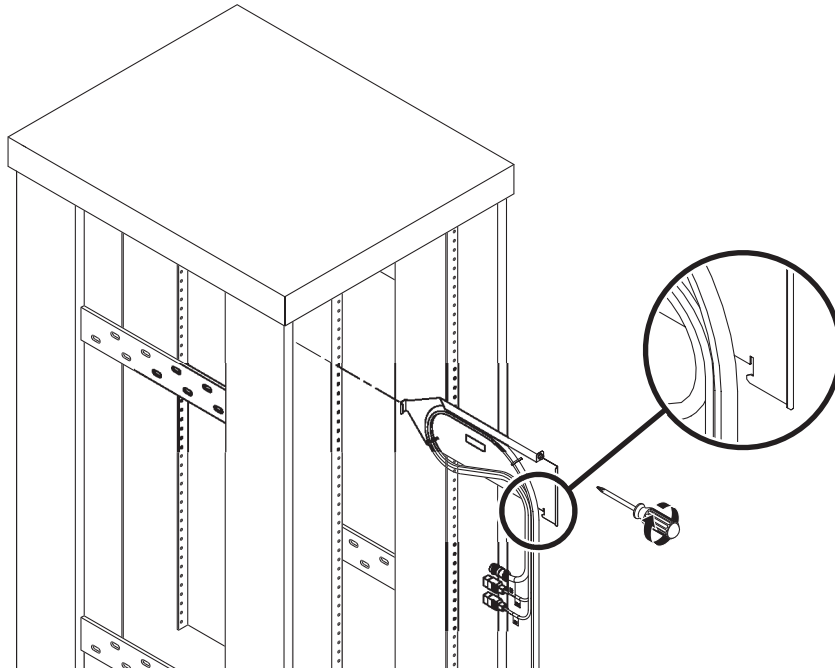


FIGURE 1-7 Cable Harness and Carrier Plate

3. **Insert the cable ends and then the carrier plate and push it forward toward the front of the rack.**

As you slide the carrier plate in, the front end is guided by a vertical channel on the front cover plate.

As the carrier is close to being fully inserted, a small tab on its bottom edge aligns with a slot in the channel to position the carrier to the right. As this tab fully engages a small vertical slot in the carrier plate engages and allows the carrier to drop into its final position.

4. **At this point tighten the captive screw.**

Replacing an AC Input Panel

There are two types of AC Input panels. Use the appropriate procedure for your configuration.

Type 1 AC Input Panel

1. Attach the two connector clusters to the power input panel.

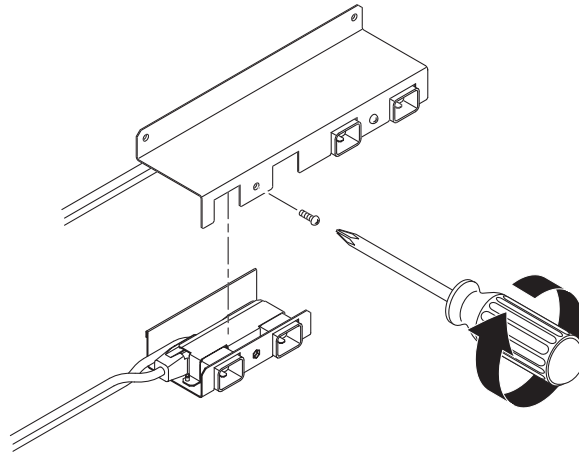


FIGURE 1-8 Attaching Connector Clusters to the Power Input Panel

Mount the lower cable harness cluster (B) on the right side of the input panel.

Position each cluster under the power input panel with the open side up. The cables are positioned on the left side of the power input panel. The connectors engage with the slots in the front surface. Secure each cluster with a single screw between the two connectors. While attaching the left-hand cluster (A) to the power input panel, ensure that the cluster supports the two cables from the right-hand cluster (B).

2. Attach the input power panel to the rack with two 8 mm screws, split washers, and flat washers.

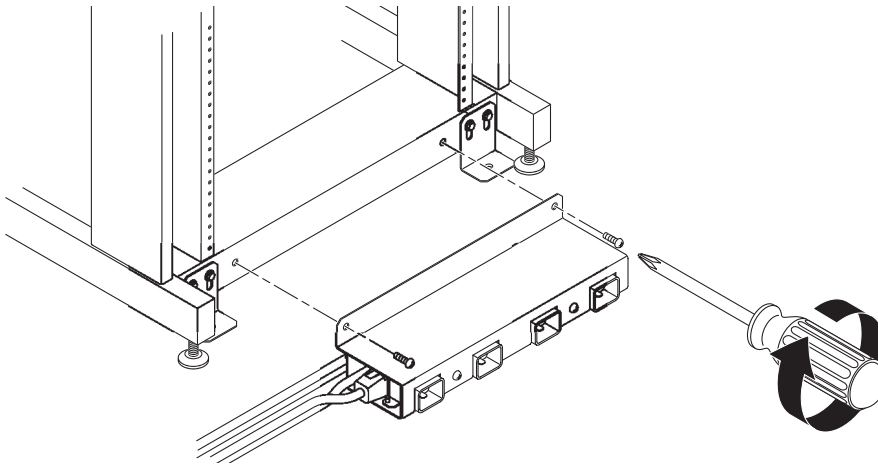


FIGURE 1-9 Attaching the Power Input Panel to the Rack

Type 2 AC Input Panel

1. Attach the input power panel to the rack with two 8 mm screws, split washers, and flat washers.

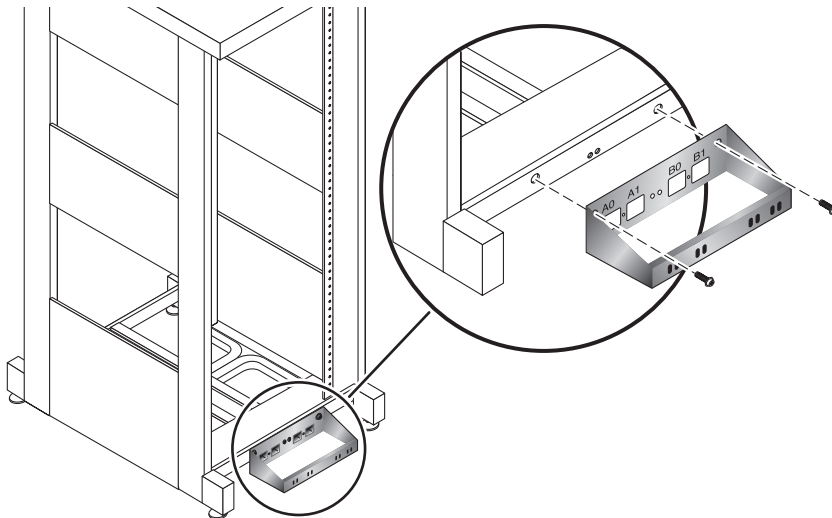


FIGURE 1-10 Attaching the Power Input Panel to the Rack

2. Attach the two connector clusters to the power input panel.

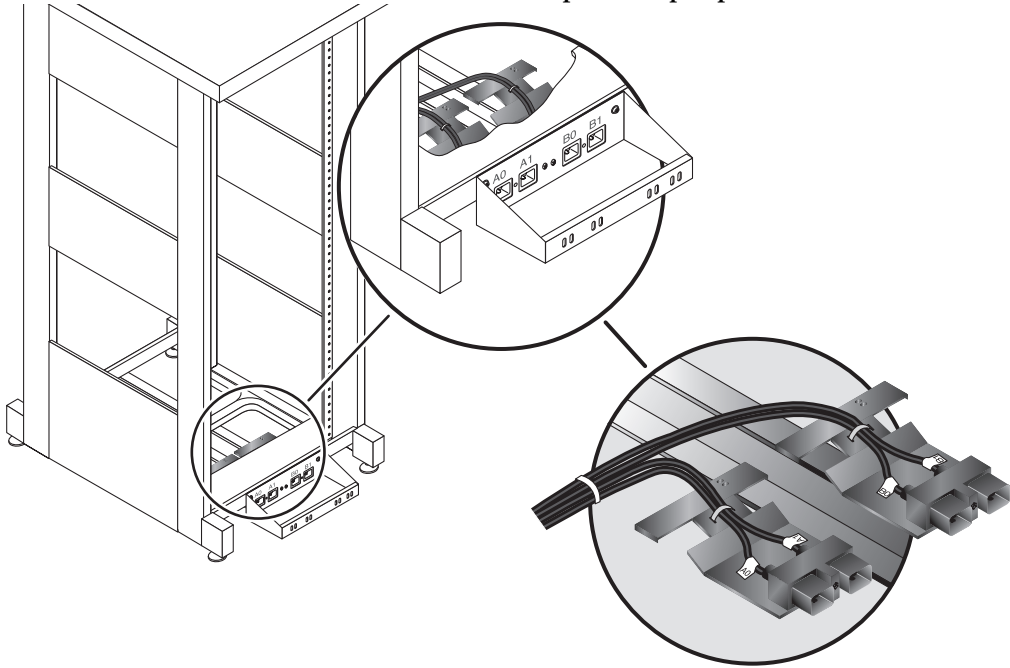


FIGURE 1-11 Attaching Connector Clusters to the Power Input Panel

Removing and Replacing the Top Panel

1. Disconnect the grounding strap from the stud on the inside of the panel.
2. Disconnect the top panel power supply power cord from power strip.
3. Remove the logo panel from the top front of the rack, or if your Sun Rack has a front door, open the door.
4. Loosen the four screws that secure the top panel to the rack.
5. Slide the top panel toward the front of the rack and lift it up to remove it from the rack.

To replace the top panel, reverse the order of the removal procedure.

Removing and Replacing Modular Power Supplies

This procedure describes how to install modular power supplies and related components into the Sun Rack. This chapter contains the following sections:

- “Overview of Modular Power Supplies” on page 15
 - “Preparing the Rack for Service” on page 16
 - “Replacing a Modular Power Supply” on page 16
 - “Removing a Modular Power Supply” on page 27
-

Overview of Modular Power Supplies

An MPS can be installed in the Sun Racks shown in [TABLE 2-1](#).

TABLE 2-1 Modular Power Supply Compatibility

Sun Rack Model	Supported MPS
Sun Rack 900-38	1
Sun Rack 1000-38	1
Sun Rack 1000-42	2

There are four modular power supply (MPS) options:

- MPS 30 amp, 1-phase
- MPS 30 amp, 3-phase
- MPS 32 amp, 3-phase
- MPS 60 amp, 3-phase

Each modular power supply is two rack units tall.

Each power distribution module supports 36 power plugs in six power strips (or a total of 12 power strips, each with 72 outlets per MPS). In the Sun Rack 1000-42, you can install the power strips on either side of the rack. On all other Sun Racks, the power strips can only be mounted on the left side.

Preparing the Rack for Service

Before working on the rack you should extend the antitilt bar. Power off any equipment plugged into the modular power supplies. You might also need to remove some equipment from the rack.

Replacing a Modular Power Supply

Two people are required to safely lift the modular power supply and the power distribution modules. Most procedures can be completed by one person.

You will require the following tools and parts to replace the MPS:

- No. 2 Phillips screwdriver
- 3mm hex wrench
- 5mm hex wrench
- Container for screws

Deploying the Antitilt Bar

1. **Pull the end of the antitilt bar out to its fully extended position.**
2. **Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.**

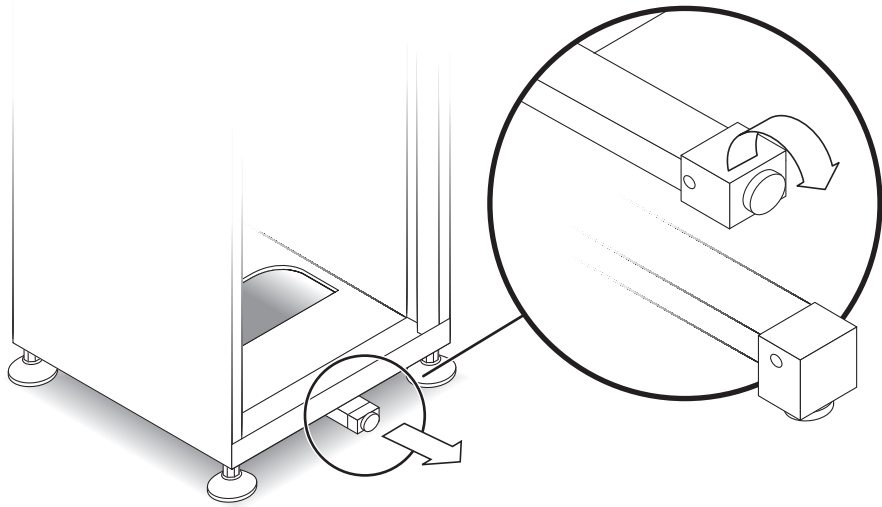


FIGURE 2-1 Deploying the Antitilt Bar

Powering Off the Rack and Components

Before removing or replacing an MPS, you must power off all the units connected to the MPS. Consult the documentation for each system in the rack for correct shutdown procedures.

1. Shut down each piece of equipment connected to the MPS.
2. Switch off all the circuit breakers in each power distribution module.
3. Disconnect the MPS main power cord from the power source.

Installing the Power Strips and Brackets

The illustrations in this chapter show the Sun Rack 1000-42, other racks may appear different.

1. Using a 5 mm hex wrench, install the top power strip bracket at the top of the rack ([FIGURE 2-2](#)).

Note – In some Sun Racks the top bracket is welded in place.

2. Loosely attach the lower power strip bracket.
Do not tighten the screws yet.

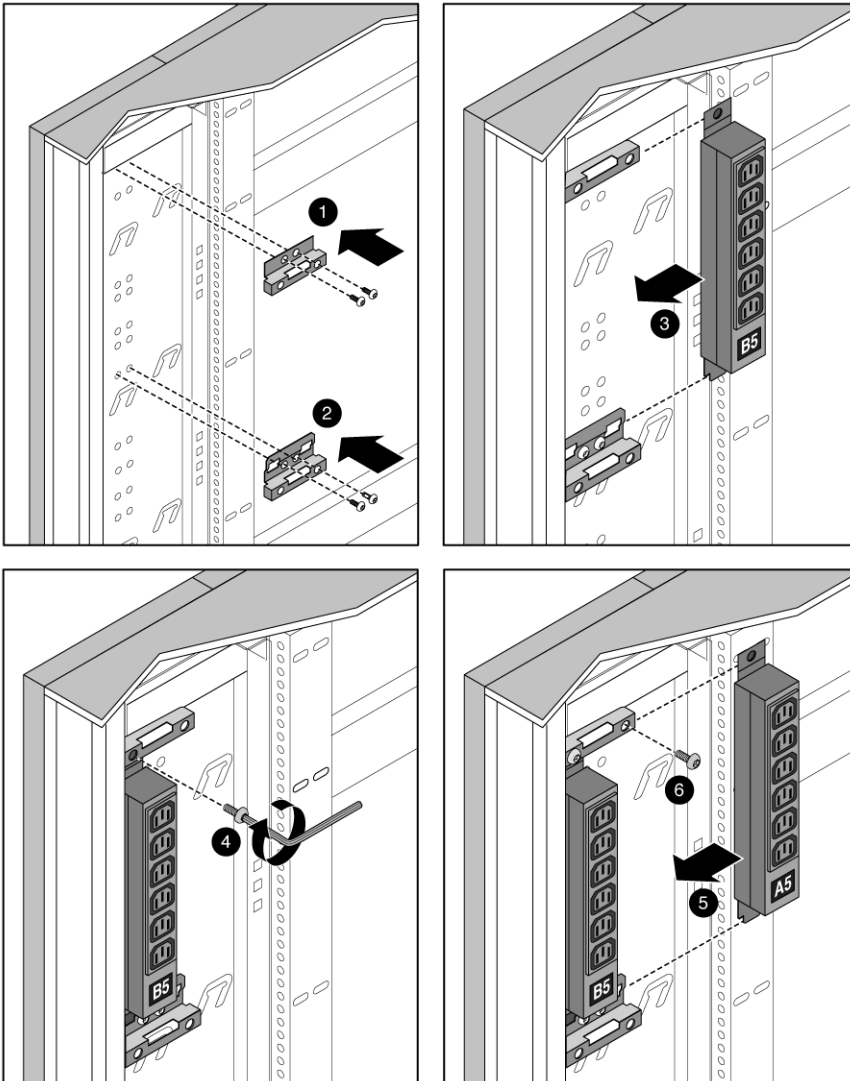


FIGURE 2-2 Installing the Power Strips, Brackets, Cables, and Covers

3. Slide power strip B5 into the top bracket (FIGURE 2-2).

Note – Be sure to keep all the power strips labeled “A” toward the front of the rack, and all of the power strips labelled “B” toward the back of the rack.

4. Slide power strip A5 into the top bracket.
5. Align the bottom tabs of the power strips into the slots of the lower bracket.
6. Secure both power strips to the top bracket with the hex screws.
7. Tighten the middle two screws the bottom bracket.
Do not tighten the two outer screws until you install the next set of power strips.
8. Repeat [Step 1](#) through [Step 7](#) until you have installed all six power strips.
9. Press the power cables into the power strips ([FIGURE 2-3](#)).

Note – The power cables are labelled. Ensure that you plug the power cables into the power strips with the same labels.

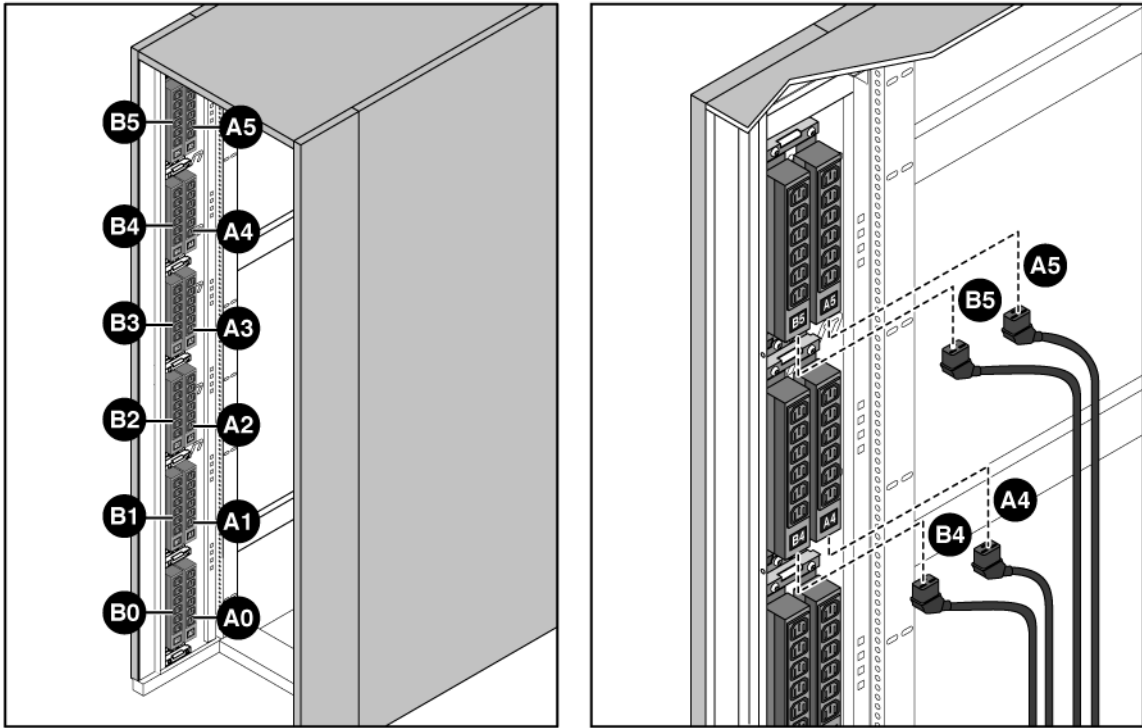


FIGURE 2-3 Connecting the Power Cables to the Power Strips

Dressing the Power Strip Cables

1. Assemble the power cable covers.

a. Slide the two velcro strips through the slots on the power cable cover.

The velcro strips are not used for the MPS or power strip cables. Use the velcro strips to bundle the power cables from your servers and other equipment.

b. Using a 3 mm hex screw, secure the power cable cover to the power strip bracket (FIGURE 2-4).

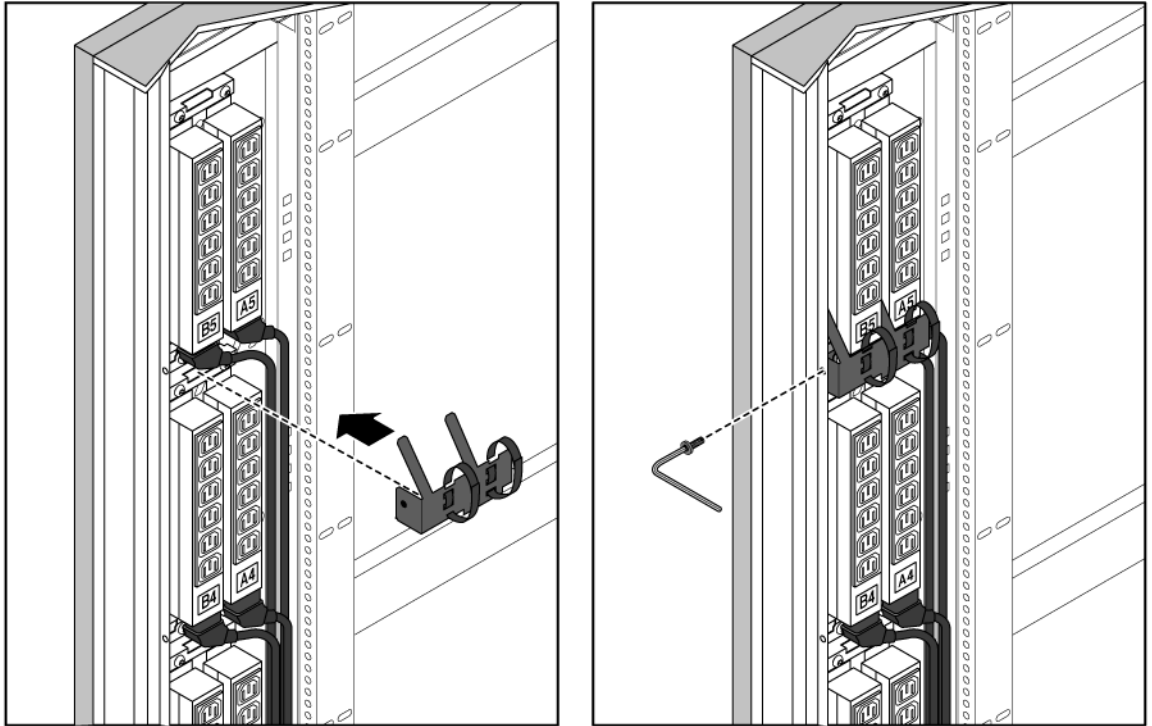


FIGURE 2-4 Installing the Power Cable Covers

2. Route the cables along the sides of the power strips (FIGURE 2-5).
3. Near the bottom of each power strip, secure the cables:
 - a. Insert a tie wrap into the slots in the Sun Rack chassis (FIGURE 2-5).
 - b. Close the tie wrap over the cables.

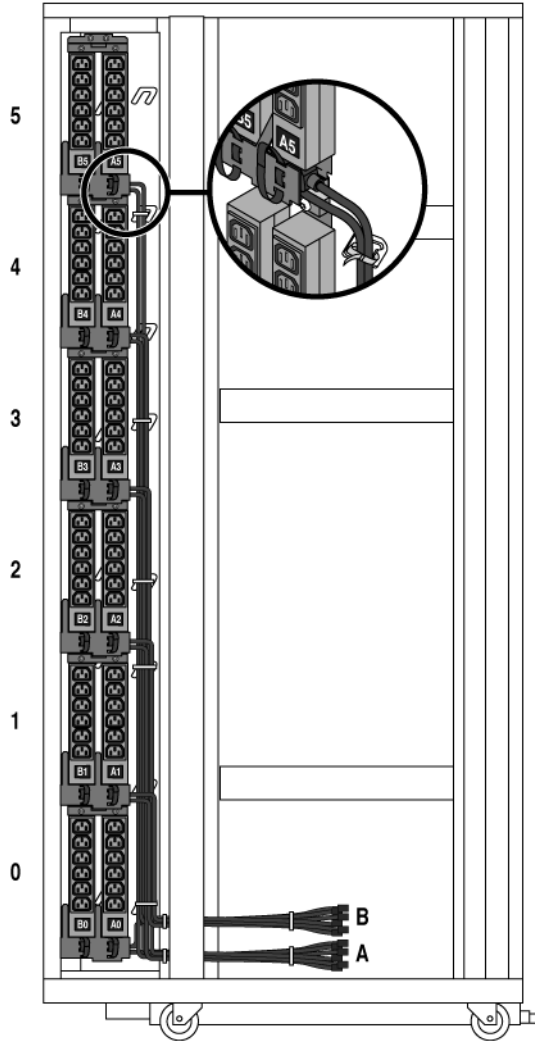


FIGURE 2-5 Tie-wrapping the Power Strip Cables

4. At the bottom of the Sun Rack, bundle all of the cables into two sets ([FIGURE 2-6](#)):
 - a. Bundle the A cables together with a tie wrap.
 - b. Bundle the B cables together with a tie wrap.

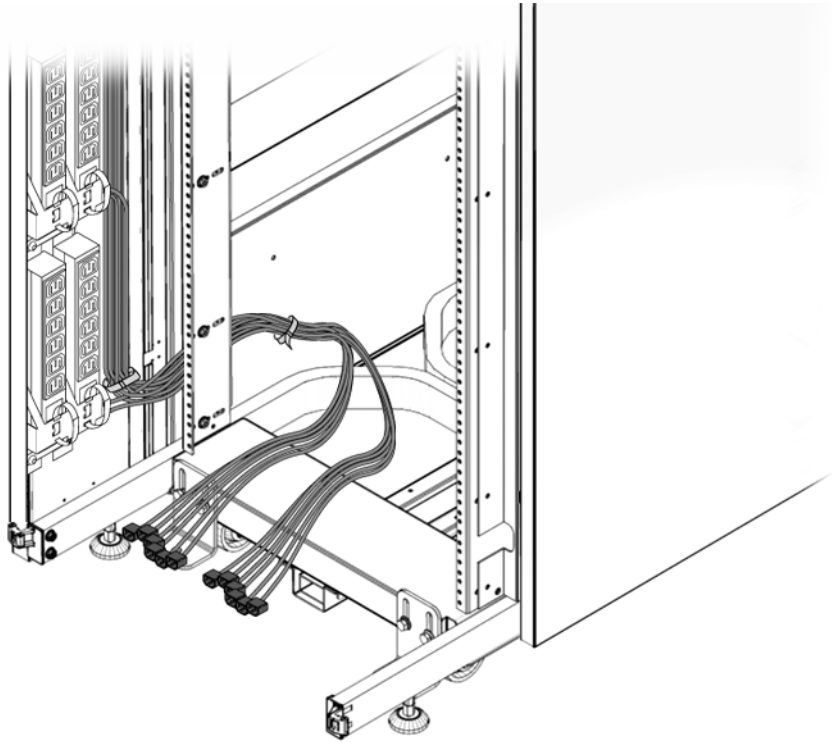


FIGURE 2-6 Bundling the Power Strip Cables

Installing the Modular Power Supply Chassis

You can install up to two modular power supplies in each Sun Rack. The MPS must always be installed into the bottom of the rack.



Caution – The carrier with power distribution modules is heavy. Do not attempt to install the MPS carrier with the power distribution units installed.

1. Tilt the modular power supply carrier to fit it into the rack.
2. Using four screws, secure the modular power supply carrier to the front of the rack ([FIGURE 2-7](#)).
3. Secure the rear of the MPS carrier with four screws at the back of the rack.

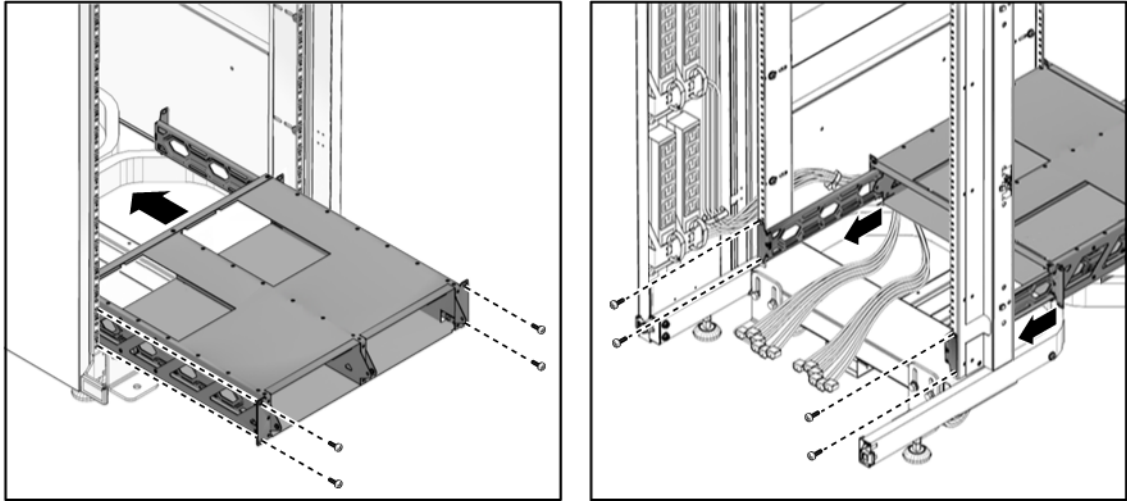


FIGURE 2-7 Installing the Modular Power Supply Carrier

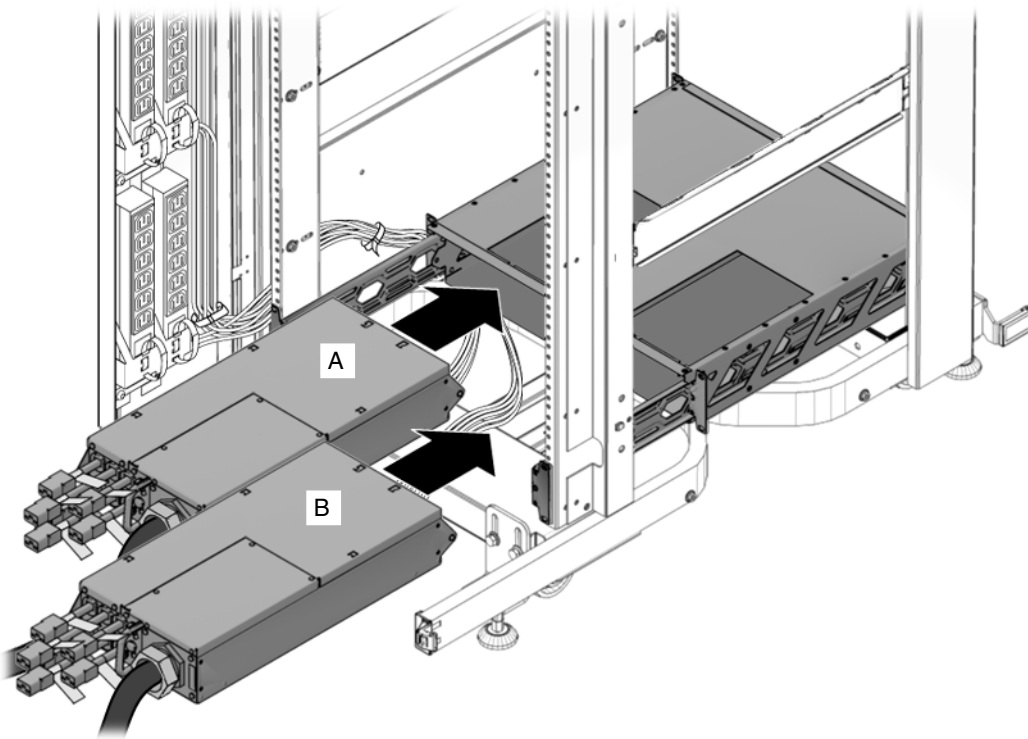


FIGURE 2-8 Power Distribution Module Installation

4. Install the power distribution modules from the back of the MPS (FIGURE 2-8).
 - a. Slide the B module into the left front side of the MPS.
 - b. Slide the A module into the right front side of the MPS.
 - c. Tighten the thumb screws to secure the PDMs to the MPS.

Note – The PDMs are labeled “A” and “B” at the Sun factory. If the labels have been removed, you should apply new labels to ensure that all connections are properly routed and identified (FIGURE 2-9).

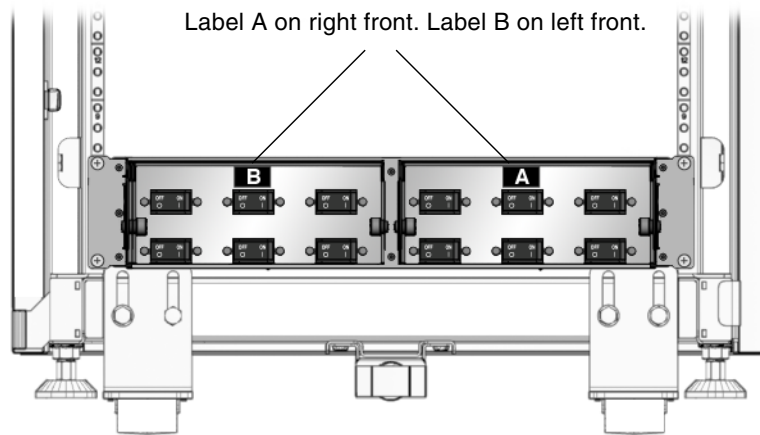


FIGURE 2-9 Labeling the Power Distribution Modules

Connecting the Power Distribution Module to the Cables

1. Route the cable bundles between the side panel and the rack columns, and under the modular power supply carrier (FIGURE 2-8).
2. Connect the power strip cables to the PDM cable connectors.
3. Attach the retaining clips to all the cable connections (FIGURE 2-10).

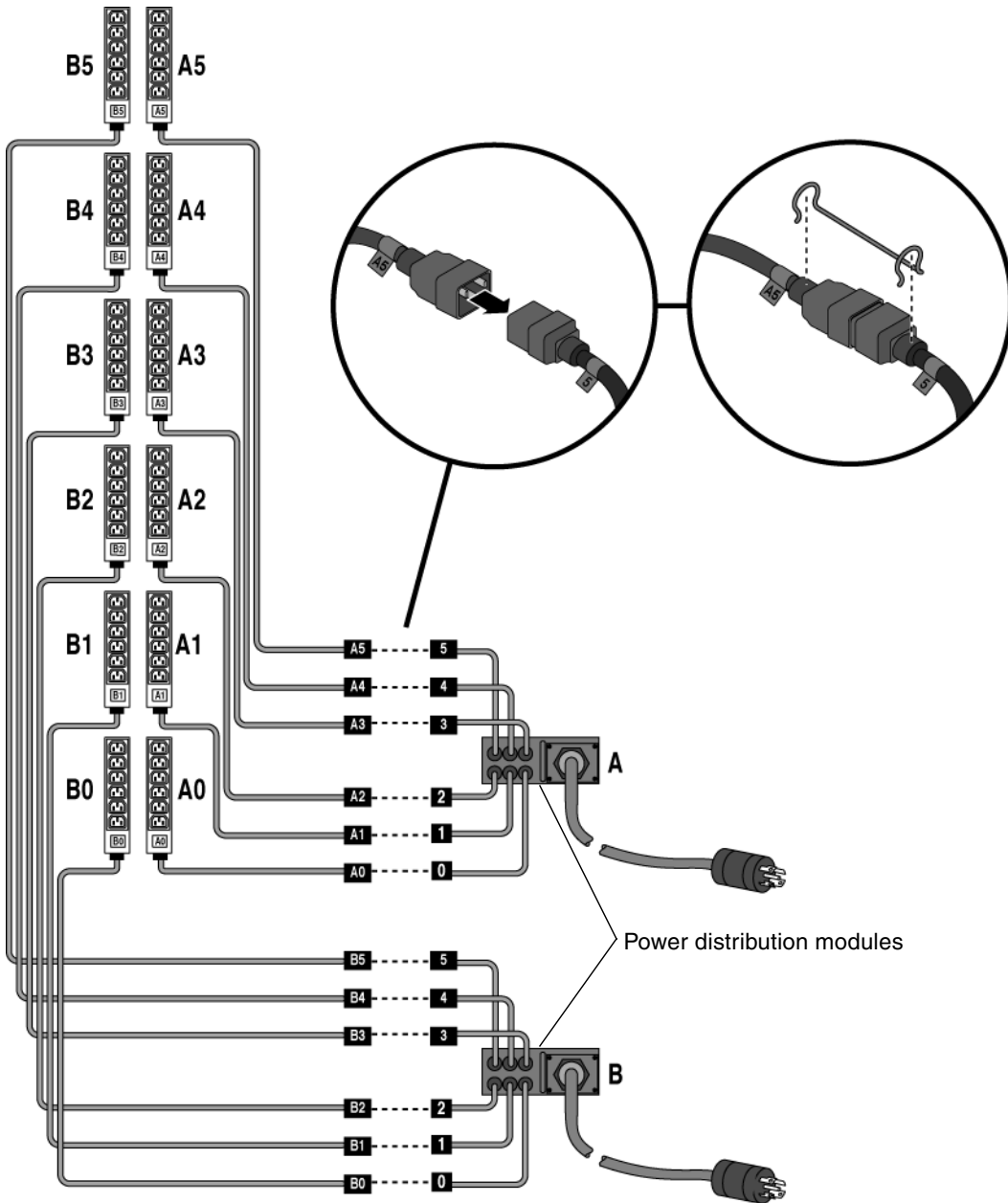


FIGURE 2-10 Connecting the Cable to the MPS Pig-Tail Cables

Removing a Modular Power Supply

This procedure describes how to remove modular power supplies and related components from the Sun Rack.

Deploying the Anti-Tilt Bar

1. Pull the end of the anti-tilt bar out to its fully extended position.
2. Rotate the foot 90 degrees and adjust the height of the foot so that it rests on the floor.

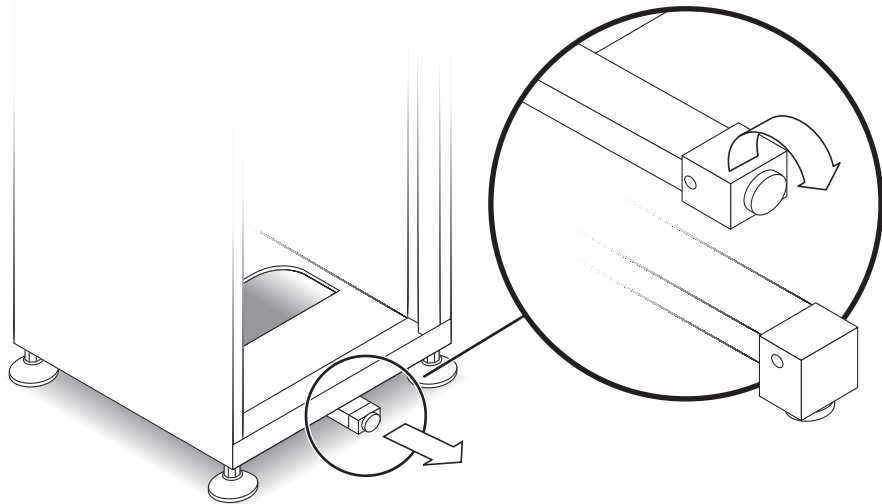


FIGURE 2-11 Deploying the Anti-Tilt Bar

Powering Off the Rack and Components

Before removing an MPS, you must power off all the units connected to the MPS. Consult the documentation for each system in the rack for correct shutdown procedures.

1. Shut down each piece of equipment connected to the MPS.
2. Switch off all the circuit breakers in each power distribution module.

3. Disconnect the MPS main power cord from the power source.

Disconnecting the Power Distribution Module from the Cables

1. Remove the individual server cables if they are secured in the velcro strips.
1. Remove the retaining clips from all the cable connections (FIGURE 2-12).
2. Disconnect the power strip cables from the PDM cable connectors (FIGURE 2-12).
1. Carefully pull the cable bundles from under the modular power supply carrier and around the side of the rack vertical columns (FIGURE 2-13).

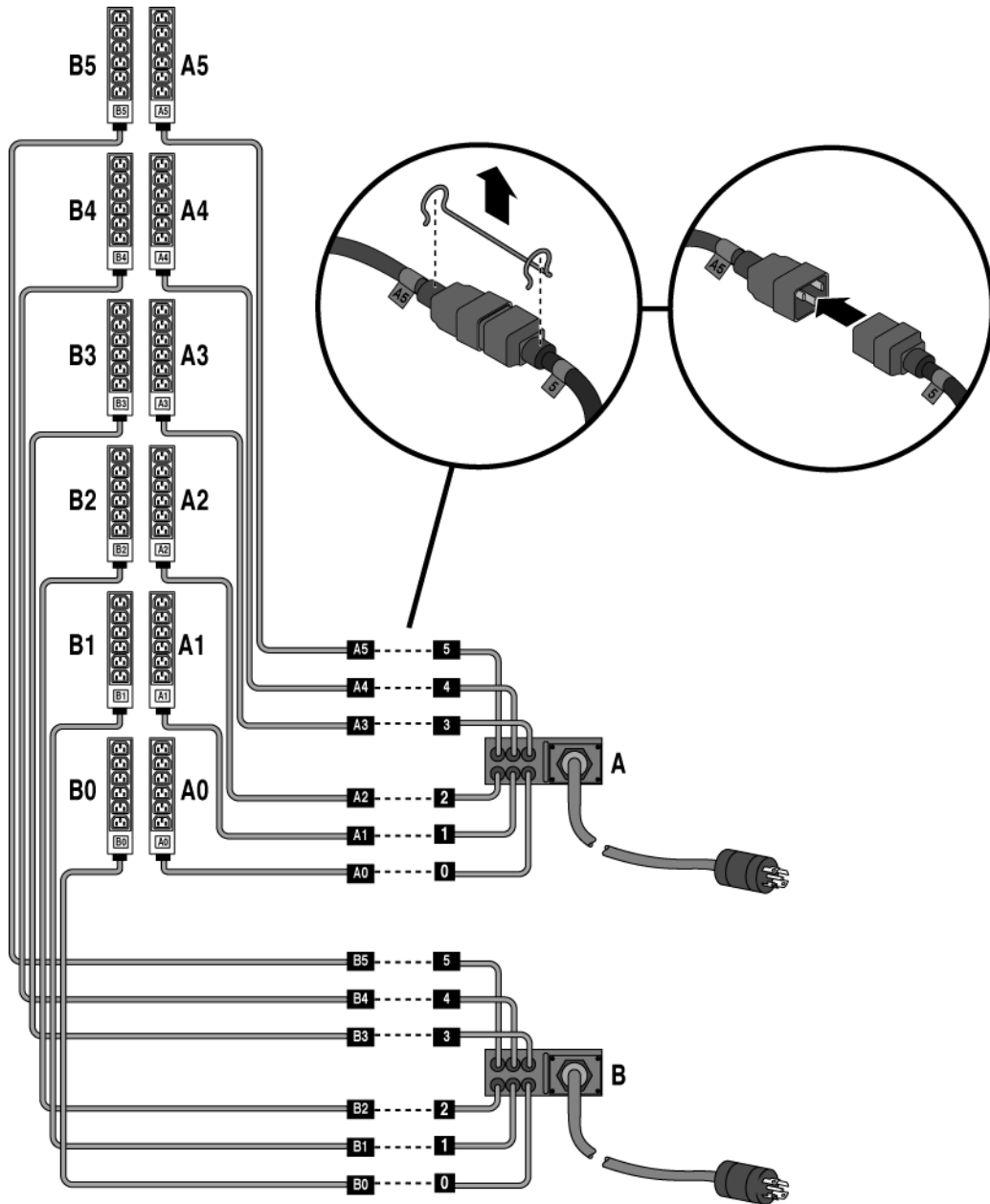


FIGURE 2-12 Disconnecting the Cables from the MPS Pig Tail Cables

Removing the Modular Power Supply Carrier



Caution – The carrier with power distribution modules is heavy. Remove the PDMs from the MPS before you lift the MPS from the rack.

1. Remove the power distribution modules from the back of the MPS:
 - a. Loosen the thumb screws at the front of the PDM (FIGURE 2-14).
 - b. Slide the PDMs out of the MPS.

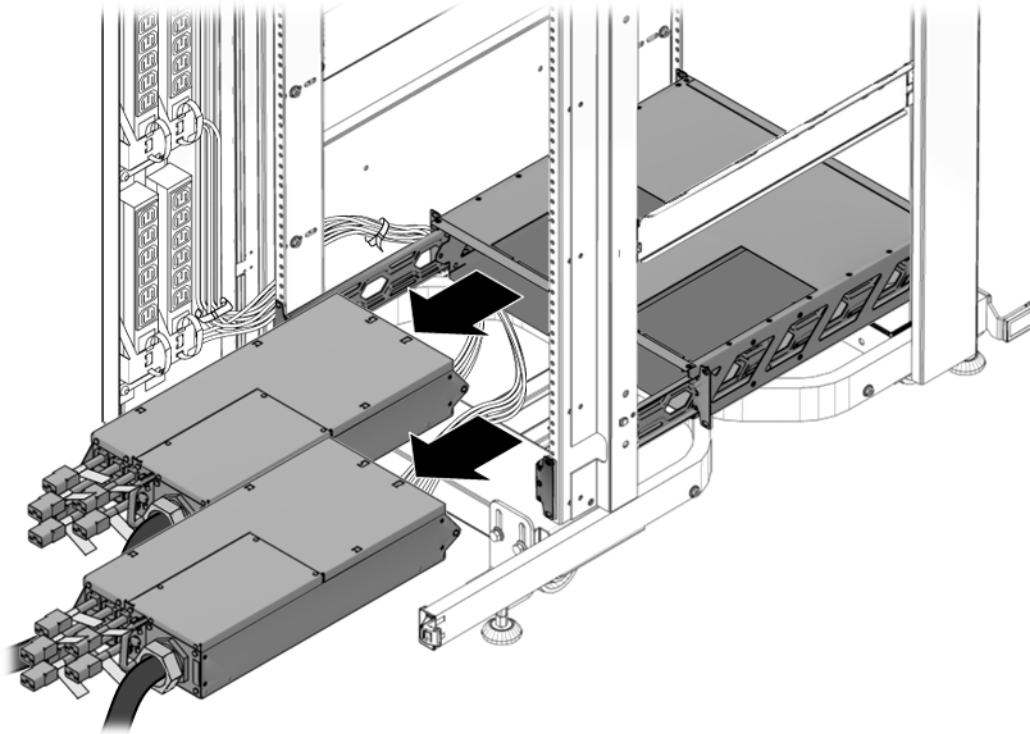


FIGURE 2-13 Power Distribution Module Removal

2. Remove the four screws at the back of the MPS (FIGURE 2-14).
3. Remove the four screws that secure the MPS to the front of the rack.
4. Tilt the modular power supply carrier and lift it out of the rack.

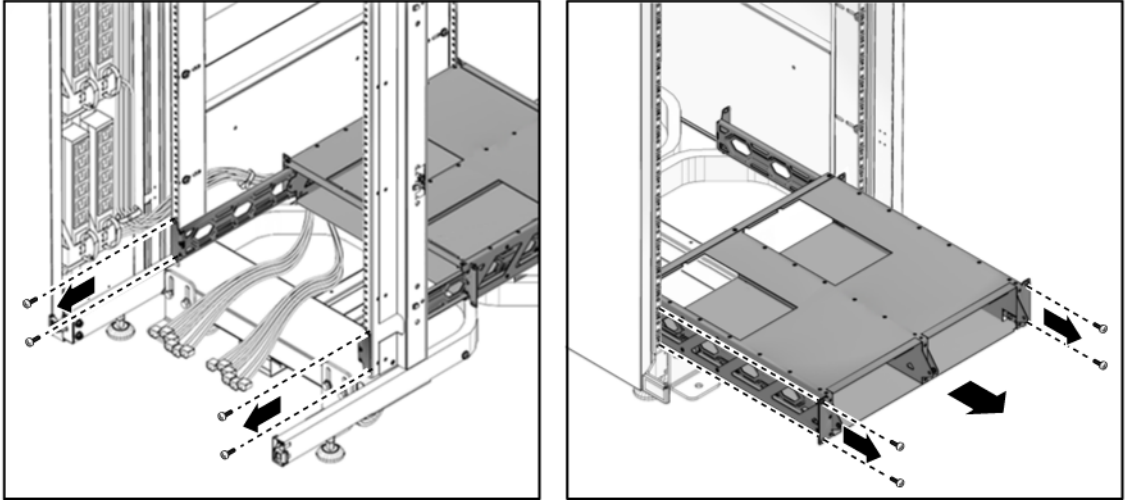


FIGURE 2-14 Removing the Modular Power Supply Carrier

Removing the Power Strips and Brackets

Tip – You can keep all the power strip cables bundled into A and B sets for storage and to simplify installation later.

1. Cut the tie wraps securing the power strip cables to the side of the rack ([FIGURE 2-15](#)).

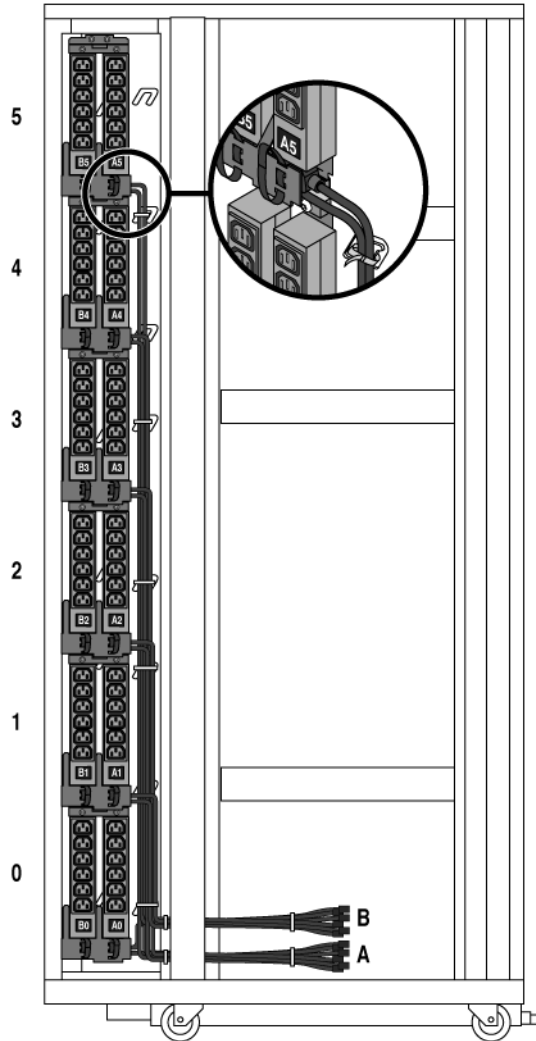


FIGURE 2-15 Cutting the Tie Wraps from the Power Strip Cables

2. Using a 3 mm hex wrench, remove the power cable covers ([FIGURE 2-16](#)).

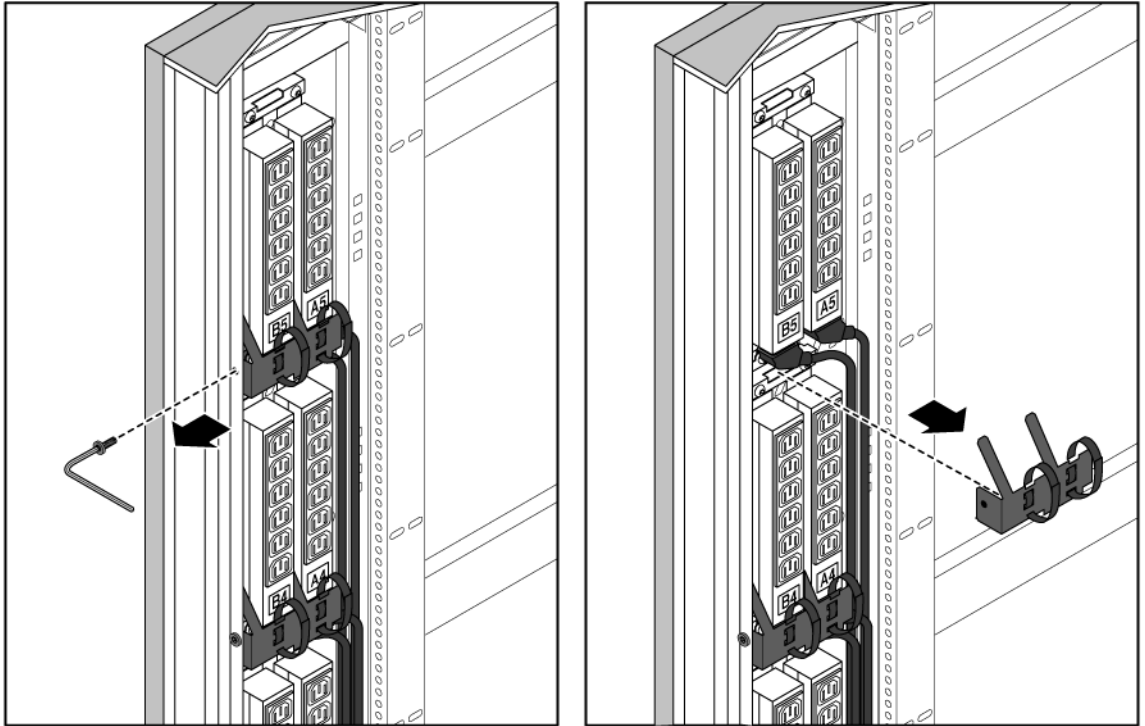


FIGURE 2-16 Removing the Power Cable Covers

3. Remove the power cables from the power strips (FIGURE 2-17).
4. Unscrew the 5 mm hex screws that are holding the bottom power strips A0 and B0.
5. Using a 5 mm hex wrench, unscrew the top power strip bracket from power strip A0 and B0 (FIGURE 2-18).
6. Slide power strip A0 and B0 out of the bracket (FIGURE 2-18).
7. Repeat Step 4 through Step 6 until you have removed all of the power strips.

Note – In some Sun Racks the top bracket is welded in place.

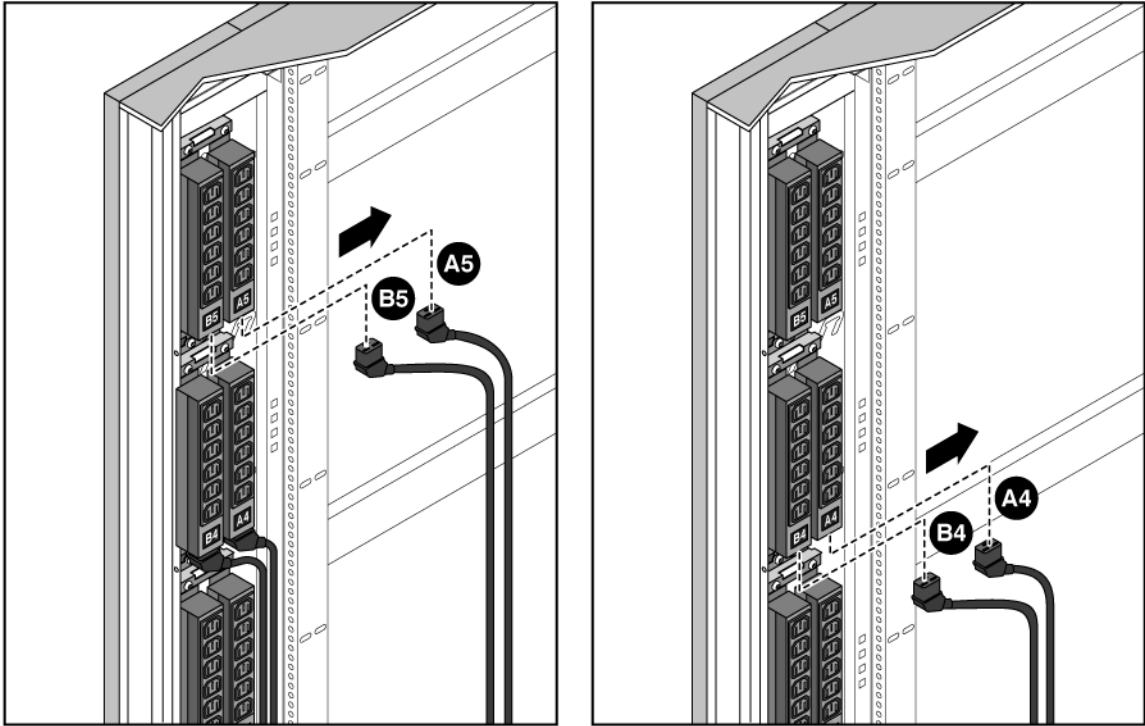


FIGURE 2-17 Disconnecting the Power Cables from the Power Strips

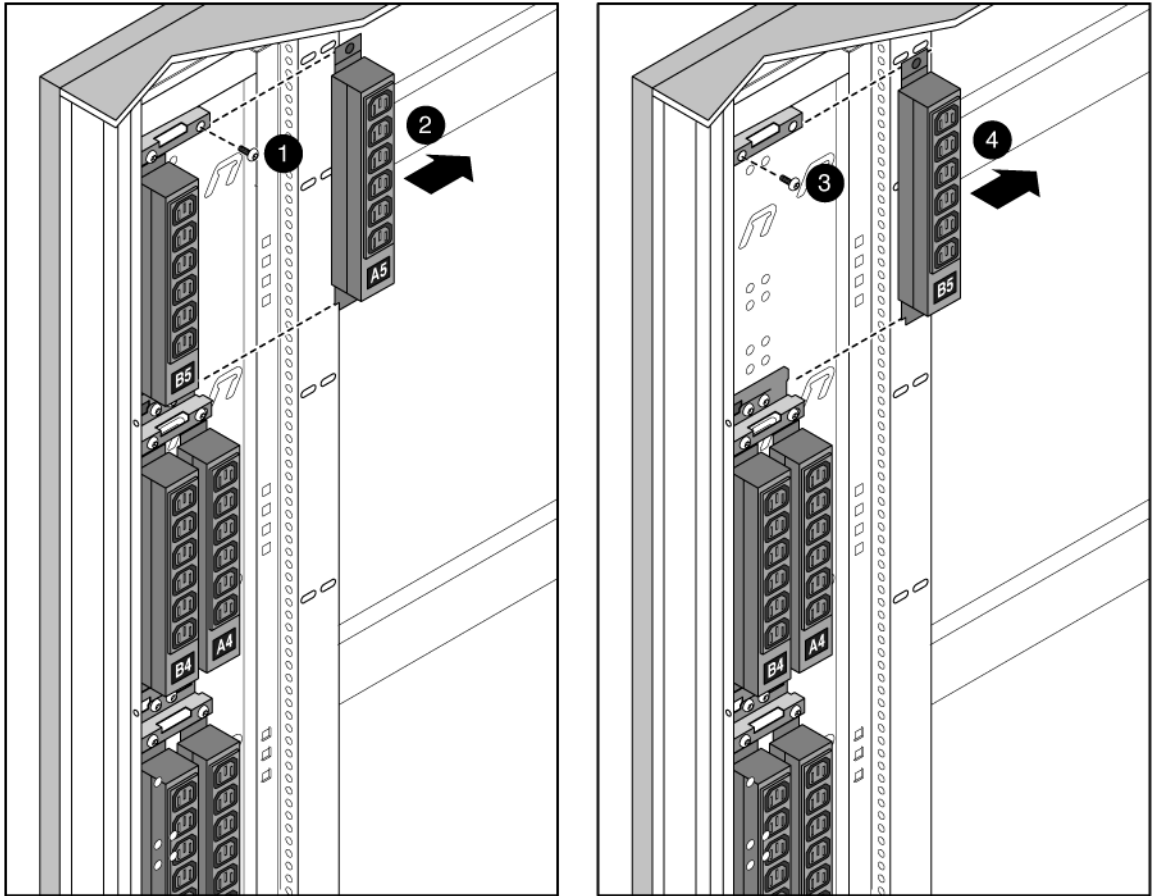


FIGURE 2-18 Removing the Power Strips and Brackets

Troubleshooting

Power Sequencer

FIGURE 3-1 shows only one AC circuit in a power sequencer. There are four of these circuits for the odd (1-7) outlet groups and five more for the even (0-8) outlet groups. Outlet Group 9 is unswitched.

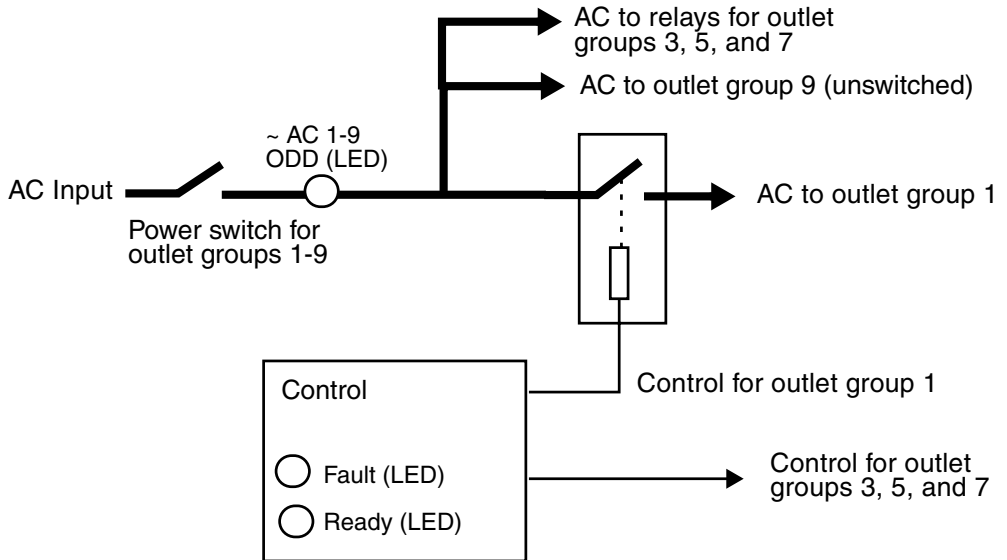


FIGURE 3-1 Simplified Block Diagram of a Single Circuit in a Power Sequencer

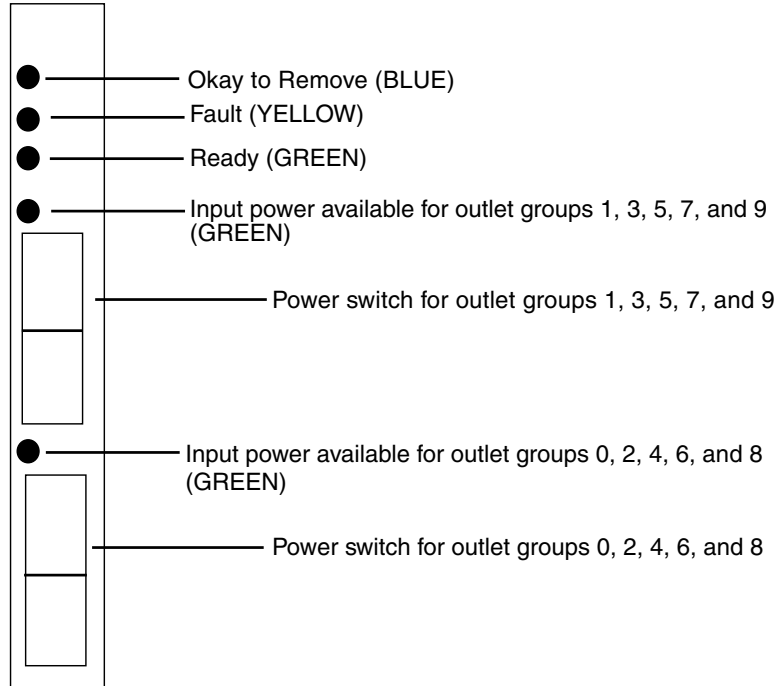


FIGURE 3-2 Power Sequencer LEDs

TABLE 3-1 Sequencer LEDs

LED	ON indicates
Okay to Remove	The sequencer output AC is turned off; there is no power to the power strip outlet groups.
Fault	A problem in the sequencer; either with the sequencer controller or one of the power supplies, or one or more of the outlet groups is not energized. Note: An open (OFF) power switch is not a Fault condition.
Ready	The sequencer is operational and has passed the power-on-self-test (POST).
~ AC 1-9 ODD (Input power available)	AC power is available to the input side of the odd-numbered outlet group relays. Note: this LED only indicates that power is available to the outlet group relays; it does not indicate that AC power is output from the sequencer.
~ AC 0-8 EVEN (Input power available)	AC power is available to the input side of the even-numbered outlet group relays. Note: this LED only indicates that power is available to the outlet group relays; it does not indicate that AC power is output from the sequencer.

TABLE 3-2 LED Indicators on the Power Sequencer

Condition	LED	LED Status	Troubleshooting Action
Normal operation	Okay to Remove	OFF	No action required.
	Fault	OFF	
	Ready	ON	
	~ AC 1-9 ODD	ON	
	~ AC 0-8 EVEN	ON	
Sequencer fault	Okay to Remove	OFF	1. Turn off both power switches. The blue “Okay to Remove” LED lights. 2. Remove and replace the power sequencer.
	Fault	ON	
	Ready	(ON or OFF)	
	~ AC 1-9 ODD	ON	
	~ AC 0-8 EVEN	ON	
Turned off	Okay to Remove	ON	You can safely remove the sequencer.
	Fault	(ON or OFF)	
	Ready	(ON or OFF)	
	~ AC 1-9 ODD	OFF	
	~ AC 0-8 EVEN	OFF	
Missing AC input	Okay to Remove	OFF	Assuming both power switches are on, start troubleshooting the input to the sequencer: 1. Input power panel connectors 2. Branch (wall) circuit breaker
	Fault	OFF	
	Ready	ON	
	~ AC 1-9 ODD	OFF	
	~ AC 0-8 EVEN	ON	

Power Strips in Racks with Power Sequencers

Each power strip is divided into outlet groups. Each outlet group has four outlets (sockets). The outlet groups are divided into two sets: odd and even. The odd outlet groups are 1, 3, 5, 7, and 9. The even outlet groups are 0, 2, 4, 6, and 8. The odd outlet groups receive their power from one AC input and the even outlet groups receive their power from the other AC input.

The power strips have a power indicator LED for each outlet group.

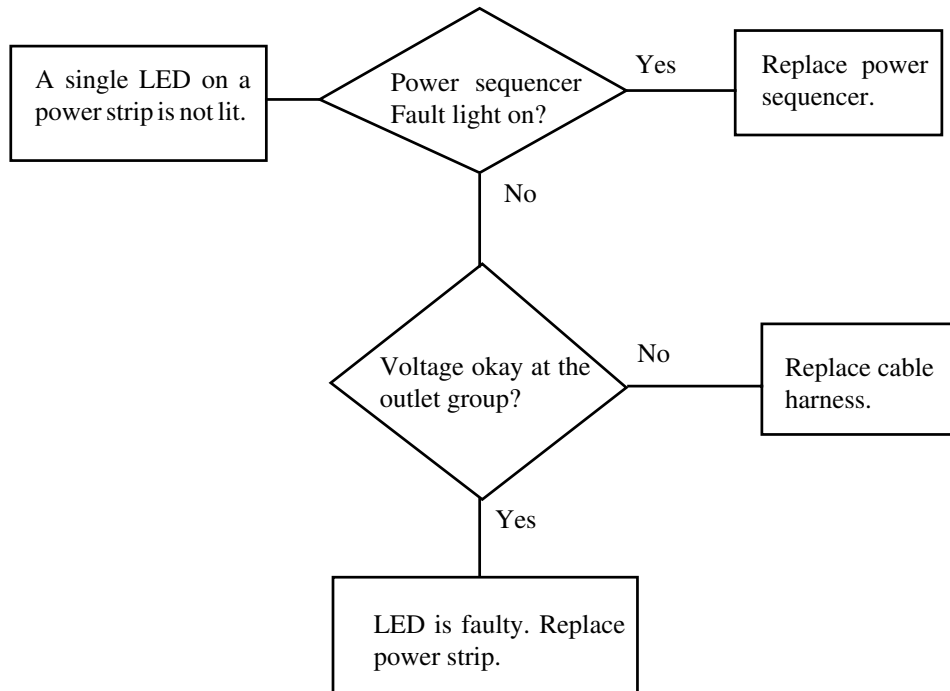


FIGURE 3-3 Troubleshooting a Power Strip

Power Distribution Modules

1. Check that the circuit breaker on the power distribution module is in the ON position.
2. With a voltmeter, check power at the input and output of the module.

Note – To check the input voltage it will be necessary to unplug the input to the power distribution module. The plug may be located under a raised floor.

If power is present at the input to the module and the circuit breaker is ON and there is no power at the output side of the module, replace the module.

Power Strips in Racks with Power Distribution Modules

1. Check the power distribution module.
2. Check the power strip input connection.
3. With a voltmeter, check power at an outlet of the power strip.

If power is not present, check power on the input cable to the power strip with a voltmeter.

If power is present on the input cable, replace the power strip.

If power is not present on the input cable, replace the input cable.

