CHAPTER 4

Removing and Replacing FRUs

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

This chapter tells you how to remove and replace Catalyst 4500 series field-replaceable units (FRUs). The information is presented in these sections:

For instructions on installing and replacing supervisor engine and switching modules, refer to the *Catalyst 4500 Series Module Installation Guide*.

Removing and Replacing the Power Supply

This section describes how to remove and install the AC-input power supply and DC-input power supply for the Catalyst 4500 series switches. This information is presented in the following sections:

Warning **Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.** Statement 1034

Figure 4-1 and Figure 4-2 show the AC-input power supplies. Figure 4-3 and Figure 4-4 show a the DC-input power supplies. Locate your power supply and notice the location of the captive installation screws.

Note The power supplies are hot-swappable, so in redundant mode you will not need to power down the switch to replace or upgrade most power supplies. In combined mode some slots may lose power during an upgrade or power supply replacement.

Figure 4-1 AC-Input Power Supply

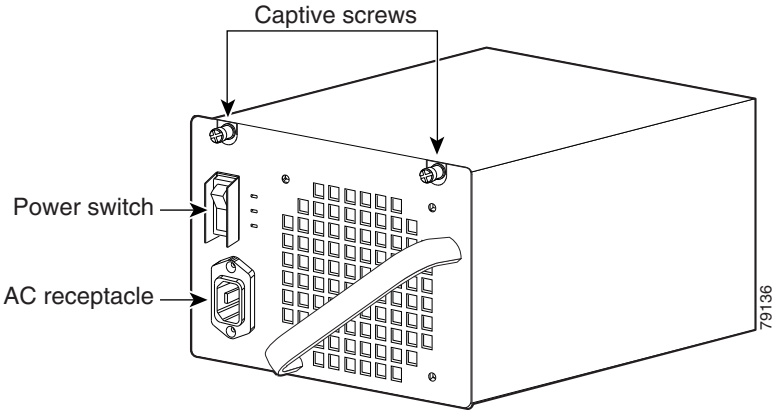


Figure 4-2 4200 W Dual-Input AC Power Supply

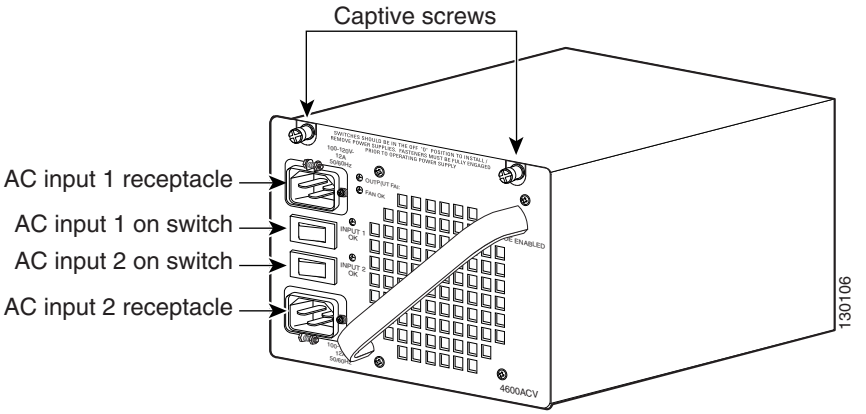


Figure 4-3 DC-Input Power Supply

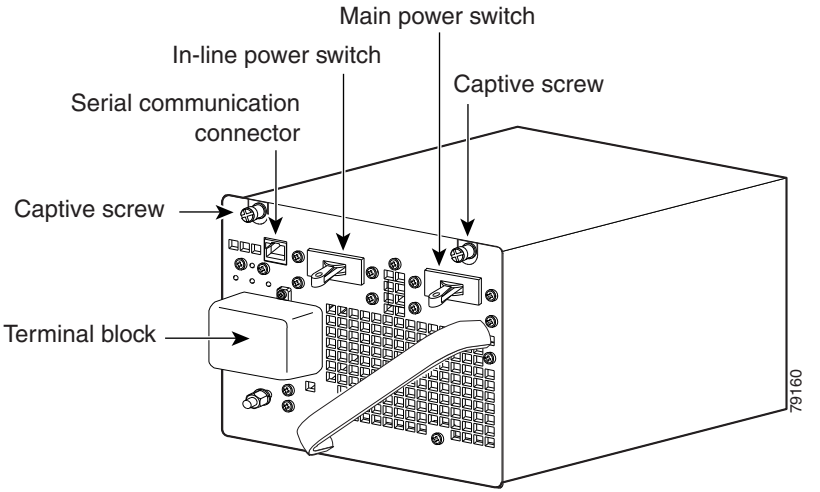
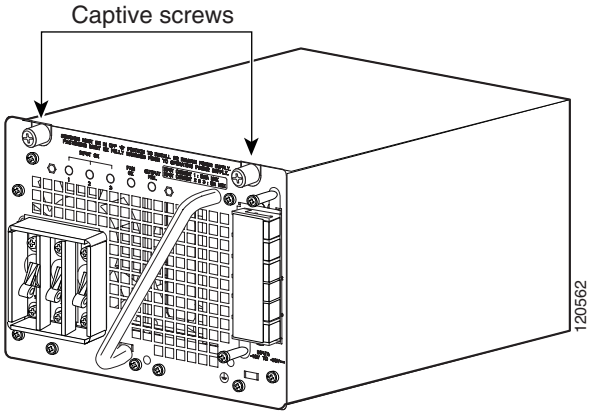


Figure 4-4 1400 W DC Triple-input Power Supply



Required Tools

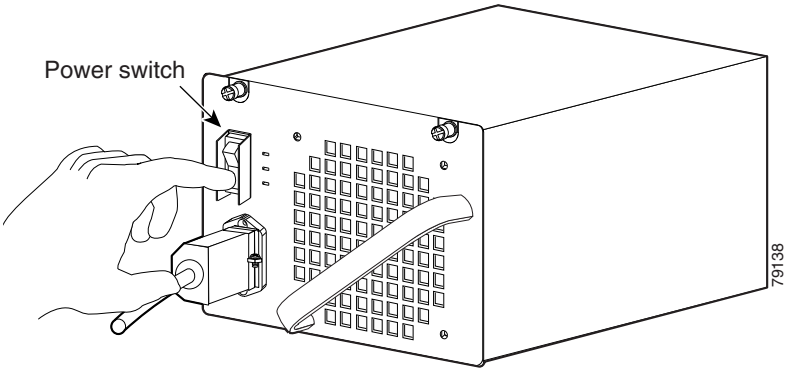
You will need a flathead or Phillips screwdriver to perform these procedures.

Removing an AC-Input Power Supply

Follow these steps to remove the AC-input power supply:

Step 1 Press the power switch on the AC-input power supply down to the off (O) position (see Figure 4-5).

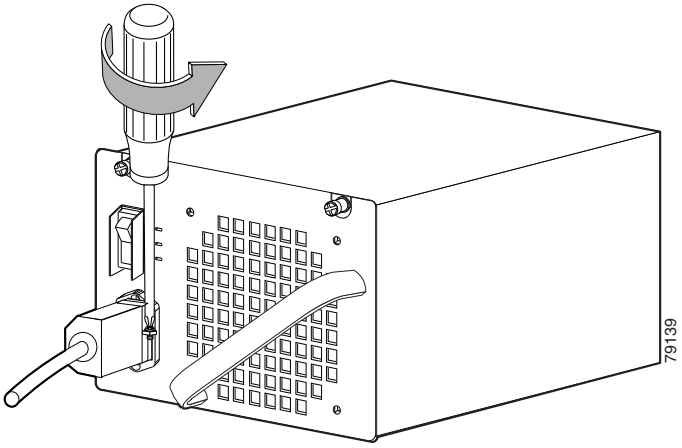
Figure 4-5 Powering Off the Power Switch



Note There are two on/off switches on a 4200 W AC power supply, one for each input.

Step 2 Loosen the side-clamp screw on the right side of the power cord plug (see Figure 4-6).

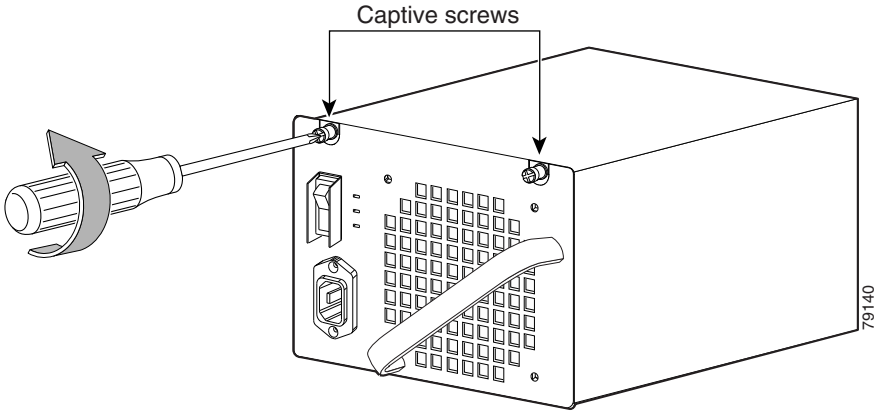
Figure 4-6 Loosening the Side-Clamp Screw



Step 3 Disconnect the power cord from the power supply being removed.

Step 4 Loosen the two captive screws (see Figure 4-7).

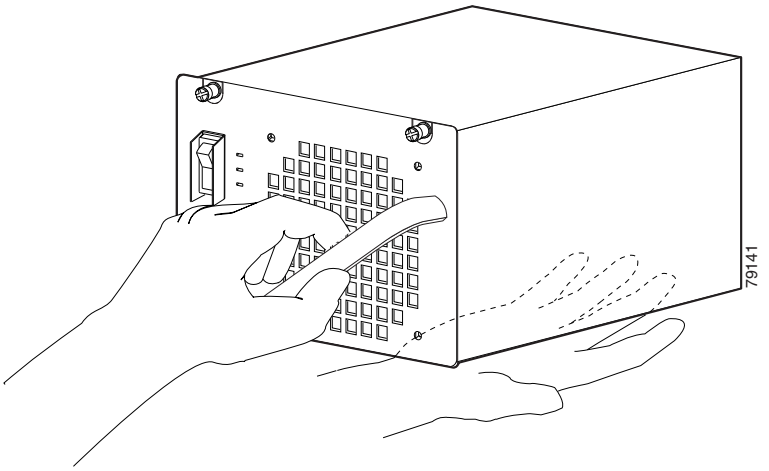
Figure 4-7 Loosening the Captive Screws



Caution Use both hands to grasp a power supply.

Step 5 Grasp the power supply handle with one hand. Place your other hand underneath to support the bottom of the power supply, as shown in Figure 4-8.

Figure 4-8 Handling an AC-Input Power Supply



Step 6 Pull the power supply out of the bay and set it aside.

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Step 7 If the power supply bay is to remain empty, install a blank power supply filler plate over the opening. Secure the filler plate with the two mounting screws and tighten them with a screwdriver.

Installing an AC-Input Power Supply

Warning **The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.** Statement 1019

Follow these steps to install an AC-input power supply:

Step 1 Make sure that the power supply you are installing is not plugged in to a power outlet and that the power cord is not connected to the power supply.

Step 2 Remove the two Phillips-head screws from the power supply filler plate (if a filler plate is present).

Step 3 Remove the power supply filler plate (if one is present) and set it aside.

Caution Use both hands to grasp a power supply.

Step 4 Grasp the power supply handle with one hand. Place your other hand underneath to support the bottom of the power supply, as shown earlier in Figure 4-8.

Step 5 Slide the power supply all the way into the power supply bay.

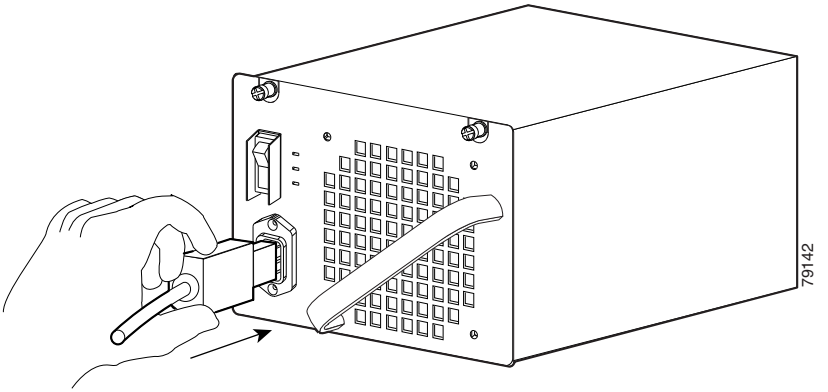
Step 6 Using a screwdriver, tighten the two captive installation screws (see Figure 4-1) on the front panel of the AC-input power supply.

Step 7 Make sure the power supply power switch is in the off position (O).

Step 8 Before you connect the power supply to a power source, ensure that all site power and grounding requirements described in the *Site Preparation and Safety Guide* have been met.

Step 9 Plug the power cord into the power supply (see Figure 4-9).

Figure 4-9 Plugging the Power Cord into the Power Supply

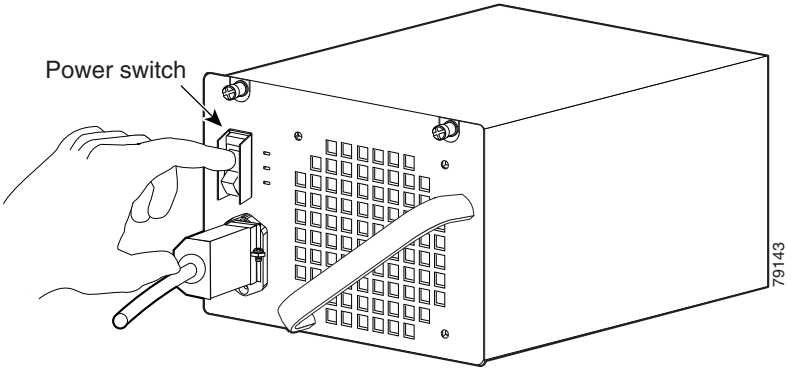


Step 10 Connect the other end of the power cord to an AC-power input source.

Caution In a system with multiple power supplies, connect each power supply to a separate AC power source. In the event of a power source failure, if the second source is still available, it can maintain maximum overcurrent protection for each power connection.

Step 11 Press the power switch down to the on (|) position (see Figure 4-10).

Figure 4-10 Powering On the Power Supply



Step 12 Verify power supply operation by checking the power supply's front-panel LEDs. You should see the following:

- The LED labeled GOOD is green.
- The LED labeled FAIL is not lit.
- The LED labeled FAN OK is green.

Step 13 Check the power supply and system status from the system console by entering the **show system** command (Catalyst Operating System) or the **show power** command (Cisco IOS). For more information on this command, refer to the command reference publication for your switch.

Step 14 If the LEDs or the **show system** command (Catalyst Operating System) or the **show power** command (Cisco IOS) output indicate a power problem or other system problem, see Chapter 5, "Troubleshooting," for more information.

Removing a DC-Input Power Supply

This section describes how to remove a DC-input power supply.

Required Tools

You will need the following tools to perform this procedure:

- A Phillips screwdriver
- A 10-mm wrench/socket

Removal Procedure

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Follow these steps to remove a DC-input power supply:

Step 1 Turn off the in-line power switch. (Single input only. The triple-input power supply does not have this switch.)

Step 2 Turn off the main power switch.

Step 3 Verify that power is off to the DC circuit on the power supply you are removing.

Step 4 Loosen the screw on the terminal block cover and remove it from the terminal block (see Figure 4-11 or Figure 4-12). The triple-input power supply has two screws on the cover.

Figure 4-11 DC-Input Power Supply

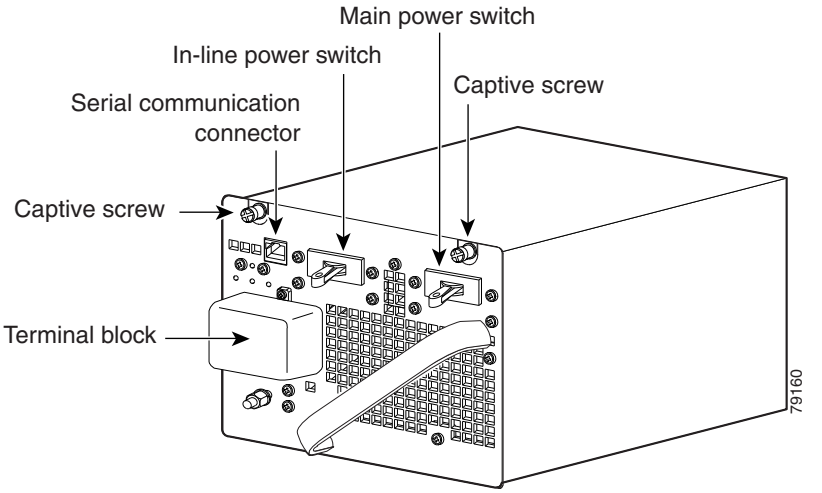
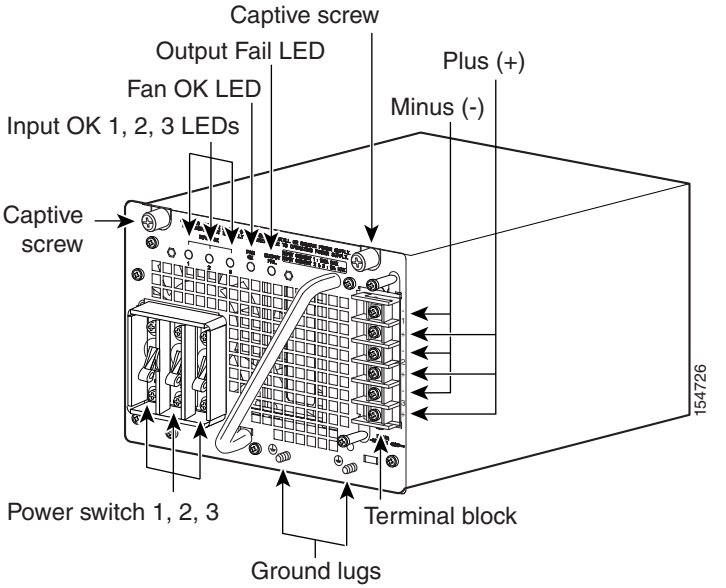


Figure 4-12 DC Triple-input Power Supply



Step 5 Disconnect the DC-input wires from the terminal block. Disconnect the ground wire last (see Figure 4-13 or Figure 4-14).

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Figure 4-13 Connecting the DC-Input Wires

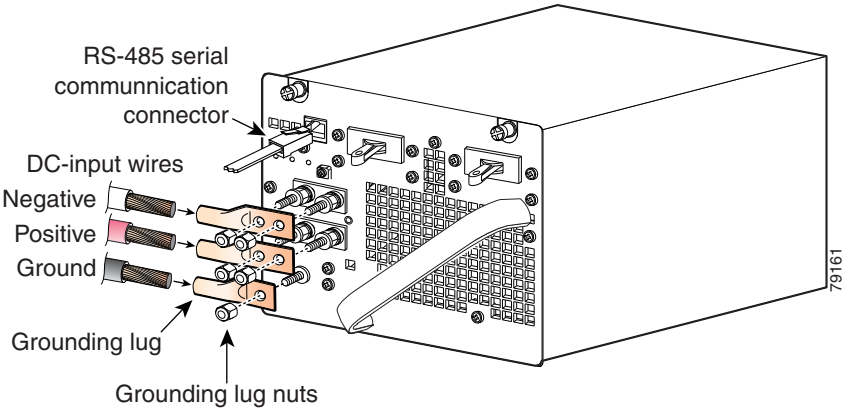
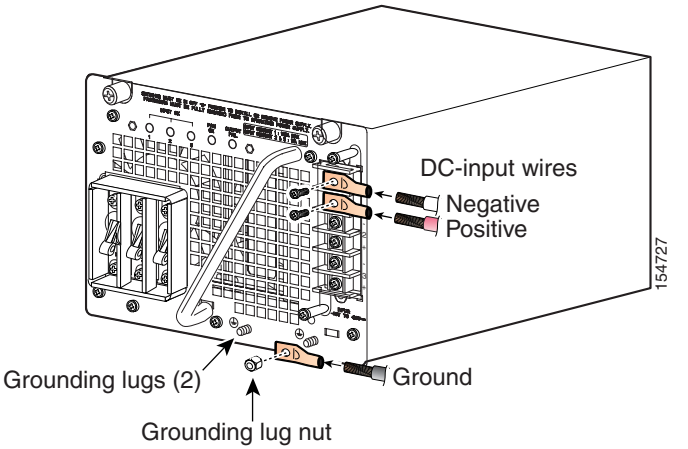
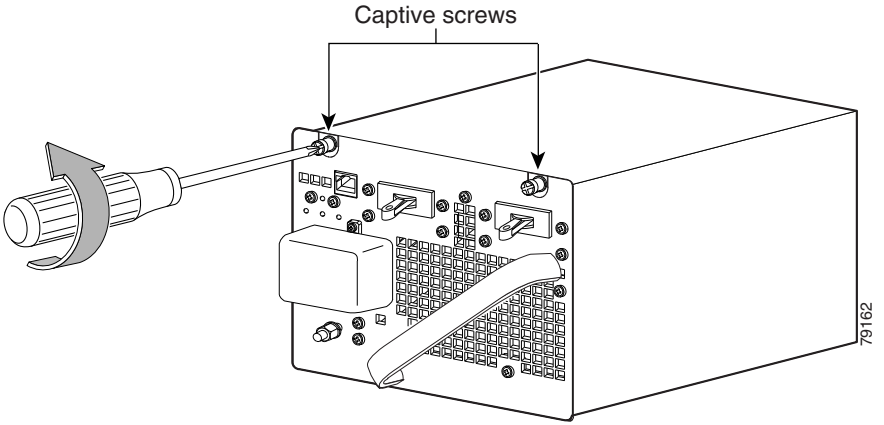


Figure 4-14 Connecting the DC-Input Wires (Triple-input Power Supply)



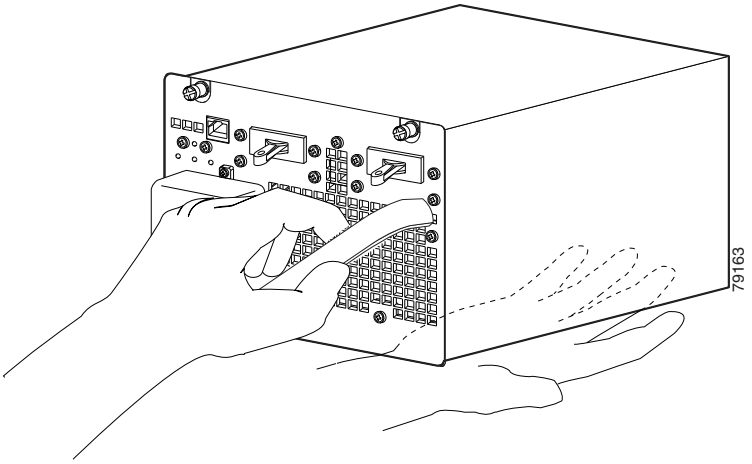
Step 6 Using a screwdriver, loosen and remove the captive screws on the power supply. (See Figure 4-15, which shows the single input power supply. The triple-input power supply has captive screws in the same location.)

Figure 4-15 Loosening the Captive Screws



Step 7 Grasp the power supply handle with one hand. Place your other hand underneath as you slowly pull the power supply out of the bay (see Figure 4-16).

Figure 4-16 Handling a DC-Input Power Supply



Step 8 If the bay is to remain empty, install a blank power supply filler plate over the opening and secure it with the mounting screws. This protects the inner chassis from dust and prevents accidental contact with live voltage at the rear of the bay.

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Installing a DC-Input Power Supply

This section describes how to install a DC-input power supply.

Required Tools

You will need the following tools to perform this procedure:

- A Phillips screwdriver
- A 10-mm wrench/socket
- Connectors and wire for the DC circuit or circuits

Installation Procedure

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.** Statement 1022

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.** Statement 1045

Warning **Use copper conductors only.** Statement 1025

Warning **When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.** Statement 1002

Follow these steps to install a DC-input power supply, connect it to a power source, and verify its operation:

Step 1 Verify that power is off to the DC circuit or circuits on the power supply you are installing.

Step 2 Grasp the power supply handle with one hand. Place your other hand underneath it as you slowly insert the power supply into the bay (as shown earlier in Figure 4-16).

Step 3 Using a screwdriver, tighten the captive screws on the power supply (see Figure 4-15).

Step 4 Before you connect the power supply to a power source, ensure that all site power and grounding requirements have been met.

Step 5 Connect the DC-input wires to the power supply terminal block. The proper wiring sequence is ground to ground, positive to positive, and negative to negative (see Figure 4-13 or Figure 4-14 depending on your installation).

The 1400W triple-input power supply has two grounding posts; use the one that is most convenient for your installation.

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Step 6 Replace the terminal cover.

Step 7 Connect the other end of the power cords to a DC-power input source.

Caution In a system with multiple power supplies or a single triple-input power supply, connect each power supply to a separate DC power source. In the event of a power source failure, if the second source is still available, it can maintain maximum overcurrent protection for each power connection.

Step 8 Verify power supply operation by checking the power supply's front-panel LEDs. You should see the following:

- The LED labeled INPUT OK is green.
- The LED labeled OUTPUT FAIL is not lit.

Step 9 Check the power supply and system status from the system console by entering the **show system** command (Catalyst Operating System) or the **show power** command (Cisco IOS). For more information on these commands, refer to the command reference publication for your switch and software.

Step 10 If the LEDs or the **show system** command (Catalyst Operating System) or the **show power** command (Cisco IOS) output indicate a power problem or other system problem, see Chapter 5, "Troubleshooting," for more information.

Removing and Replacing the Chassis Fan Assembly

This section describes how to remove and install the chassis fan assembly for the Catalyst 4500 series switches. See Figure 4-17 for the Catalyst 4503 system fan assembly, Figure 4-18 for the Catalyst 4506 system fan assembly, Figure 4-19 for the Catalyst 4507R system fan assemblies, and Figure 4-20 for the Catalyst 4510R system fan assemblies.

Figure 4-17 Catalyst 4503 System Fan Assembly

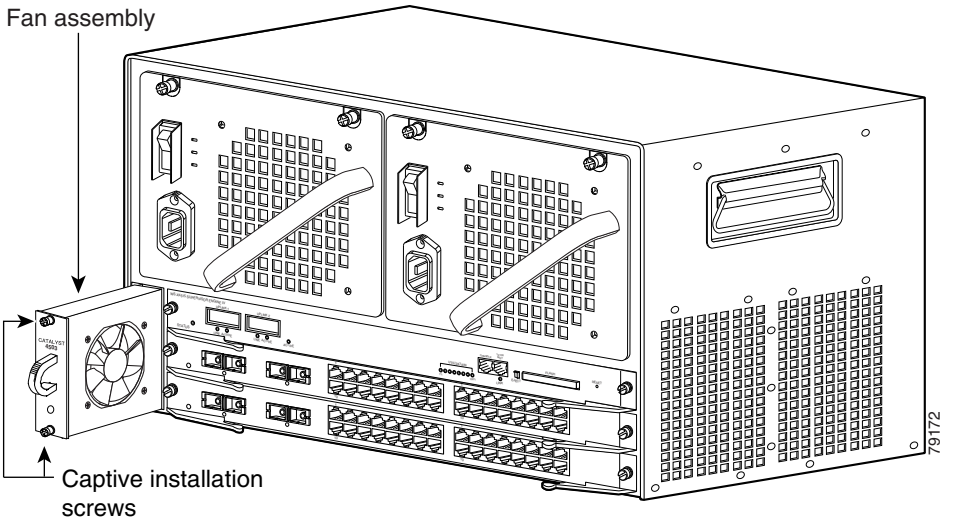


Figure 4-18 Catalyst 4506 System Fan Assembly

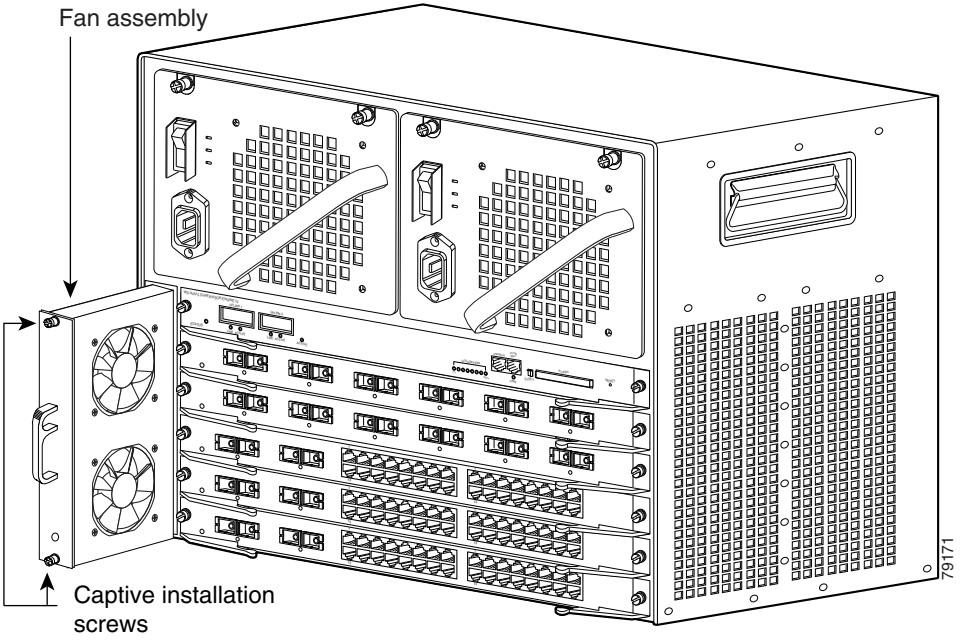


Figure 4-19 Catalyst 4507R System Fan Assembly

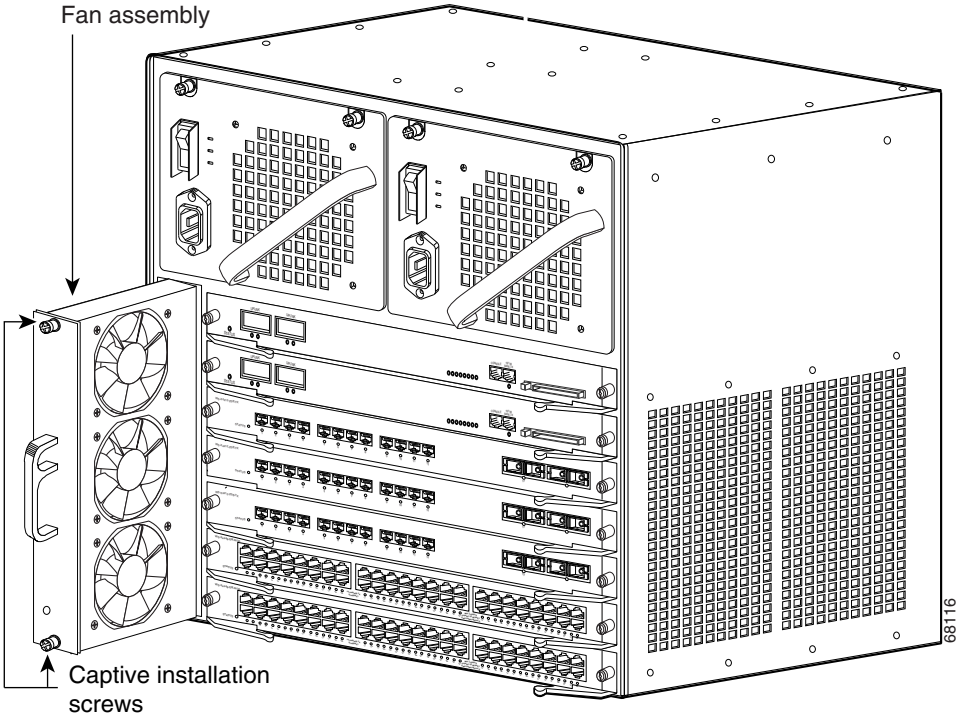
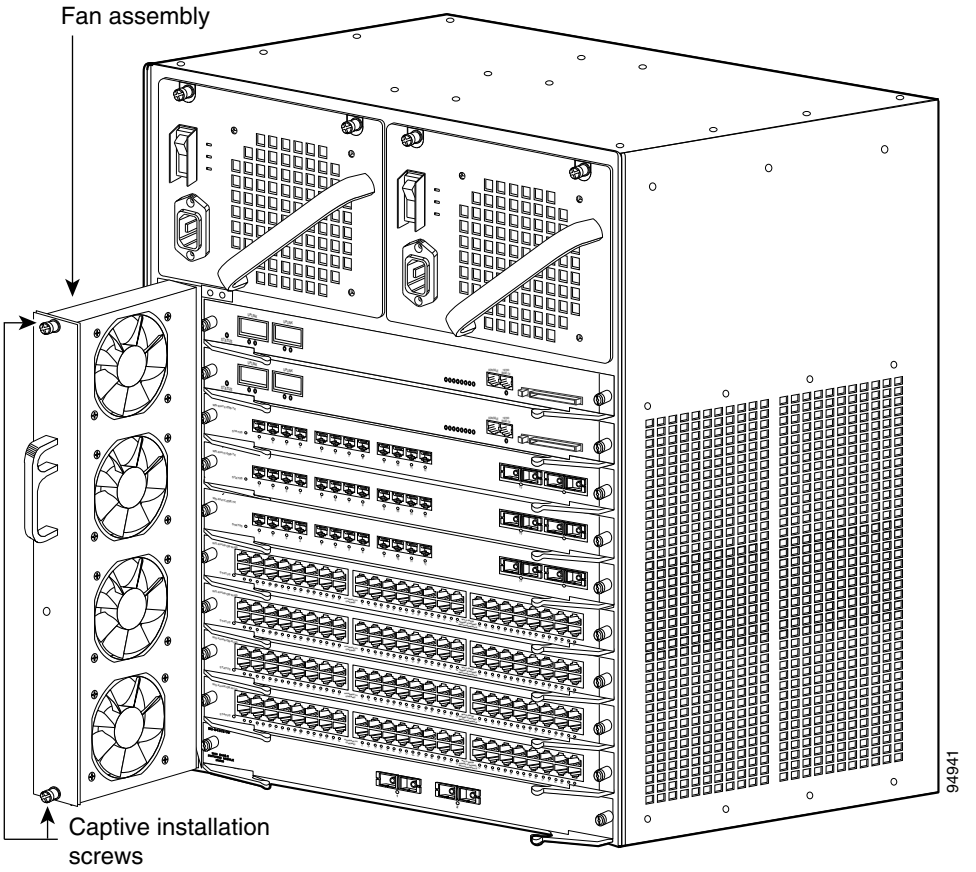


Figure 4-20 Catalyst 4510R System Fan Assembly



Required Tools

You will need a Phillips screwdriver for the following two procedures.

Removing the Fan Assembly

Warning **When removing the fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan tray.** Statement 258

Caution Never operate the system for an extended period if the fan assembly is removed or if it is not functioning properly. An over-temperature condition can cause severe equipment damage.

Follow these steps to remove the existing chassis fan assembly:

Step 1 Loosen the two captive installation screws on the fan assembly by turning them counterclockwise.

Step 2 Grasp the fan assembly with both hands and pull it outward; gently move it side to side if necessary to unseat it from the backplane. Slide it out of the chassis and place it in a safe place.

Installing the Fan Assembly

Follow these steps to install the new fan assembly:

Step 1 Hold the fan assembly with the fans facing to the right.

Step 2 Place the fan assembly into the fan assembly bay so it rests on the chassis, and then lift the fan assembly up slightly, aligning the top and bottom guides.

Step 3 Slide the fan assembly into the chassis until the two captive installation screws make contact with the chassis.

Step 4 Using a screwdriver, tighten the two captive installation screws by turning them clockwise.

Verifying the Installation

Note To check the operation of the fans, you need to power up the chassis.

Follow these steps to verify that the new fan assembly was installed correctly:

Step 1 Listen for the fans; you should immediately hear them operating. If you do not hear them, ensure that the fan assembly is inserted completely in the chassis and that the faceplate is flush with the switch back panel.

Step 2 The fan tray LED should light and be green.

Step 3 If after several attempts the fans do not operate, or if you experience trouble with the installation (for instance, if the captive installation screws do not align with the chassis holes), contact the Cisco TAC for assistance.

Replacing Backplane Modules on a Catalyst 4507R or 4510R Switch

There are 5 redundancy modules (also called mux buffers) and 1 clock module on a Catalyst 4507R chassis backplane. A Catalyst 4510 has 8 redundancy modules on its backplane. They are accessible from the front if the switching modules and supervisor engines are removed. There are two types of redundancy modules, and they are interchangeable.

The clock module replacement procedure is identical to the redundancy module replacement procedure, the connectors are the same. These modules are not hot-swappable, the switch must be taken out of service to replace them.

To replace the backplane modules:

Step 1 Make sure you are grounded with an ESD strap.

Step 2 Turn off the power to the chassis.

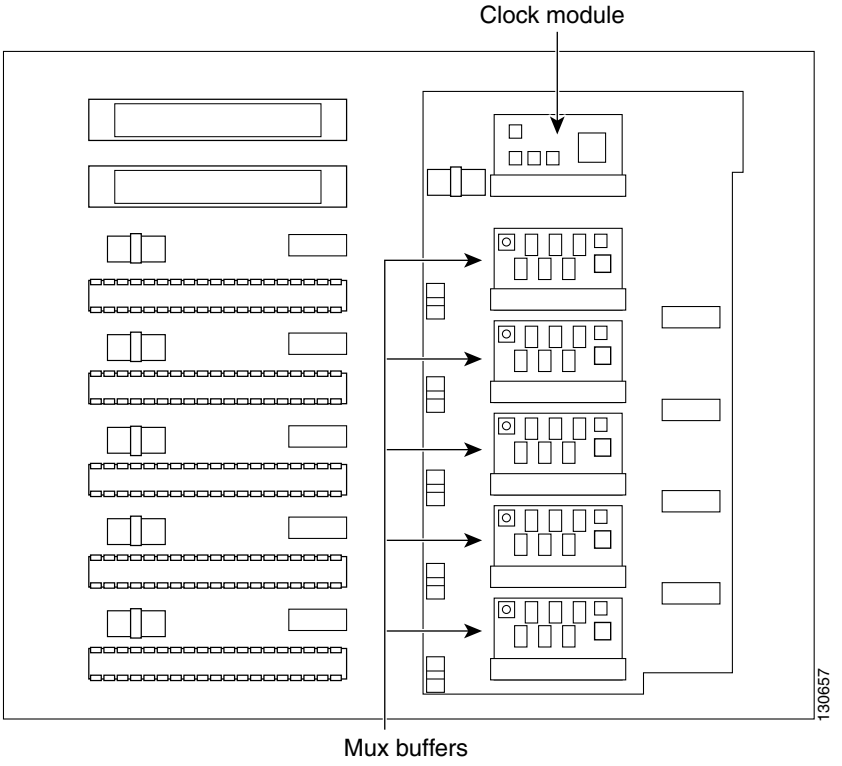
Step 3 Remove all supervisor engines and switching modules from the chassis, and find the backplane modules you need to replace.

Note Keep a record of switching moduleand their slots, so that you can put them back correctly.

Note Generic switching module replacement procedures are documented at: http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/hw_doc/gmdcf_nt.htm#wp21932

Figure 4-21 shows the front view of the backplane with supervisors and switching modules removed.

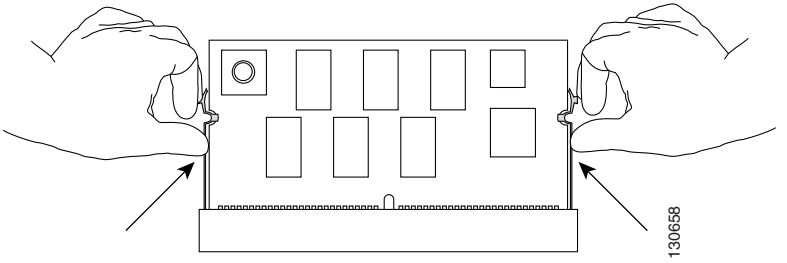
Figure 4-21 Catalyst 4507R Backplane



Step 4 If you are removing a clock module, remove the two screws that attach the module to the backplane.

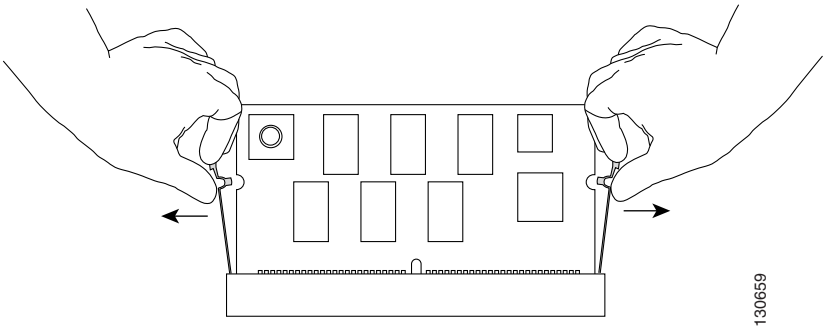
Step 5 Find the seating levers on both sides of the connector for the module you wish to replace. (See Figure 4-22.)

Figure 4-22 Finding the Seating Levers



Step 6 To release the module from its connector, pull the levers outward with your fingernails. The module will pop out slightly. (See Figure 4-23.)

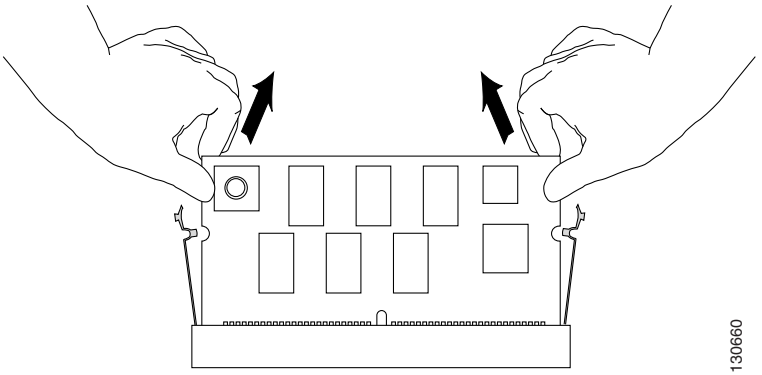
Figure 4-23 Releasing the Module



Step 7 Pull out the module while holding the top left and top right corners. (See Figure 4-24.)

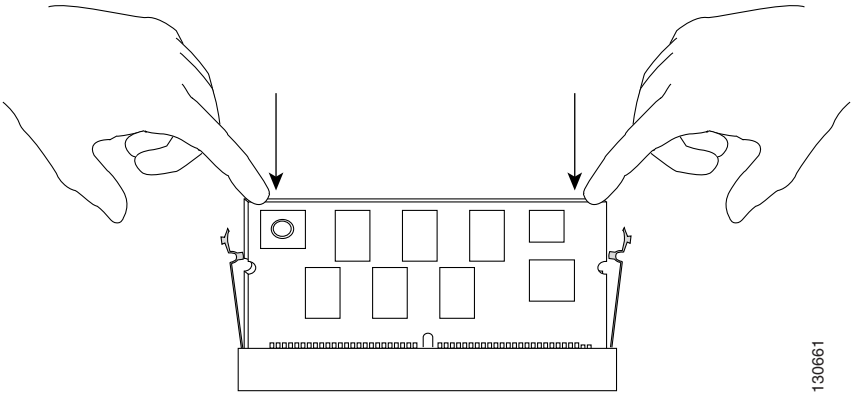
Note When handling the modules, do not touch the chips or the gold edge contacts on the module.

Figure 4-24 Removing the Module



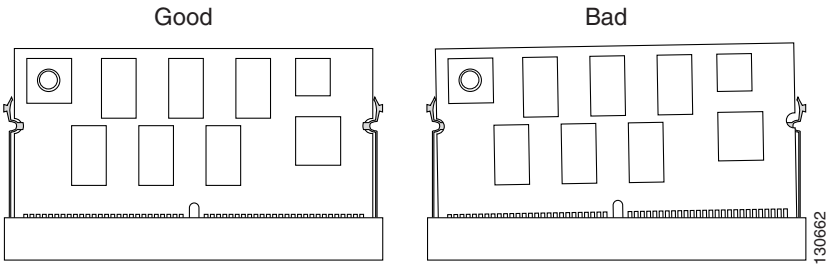
Step 8 Put the replacement module in at roughly a 30 degree angle, and gently push the module down. Make sure you apply force evenly on the left and right. (See Figure 4-25.)

Figure 4-25 Seating the Replacement Module



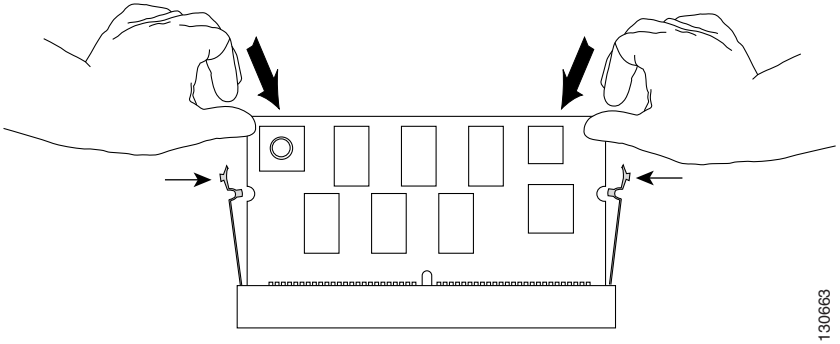
Step 9 Make sure the module is fully seated. (See Figure 4-26.)

Figure 4-26 Correct Module Seating



Step 10 Push the module toward the back of the chassis and make sure it is clipped in by the levers on both sides. (See Figure 4-27.)

Figure 4-27 Securing the Module



Step 11 Repeat Step 4 to Step 10 for the other modules you need to replace.

Step 12 If you are installing a clock module, secure the module to the backplane using the screws from the earlier removal.

Step 13 Replace the supervisor engines and switching modules to their previous slots.

Step 14 Restore power to the switch.

Verify the New Modules

After the switch is reassembled and power is restored, connect a terminal to the supervisor engine and monitor the boot process. Look for the following messages (or any others), which may indicate a problem with the replaced modules:

```
00:00:20: %C4K_SUPERVISOR-2-MUXBUFFERNOTPRESENT: Mux buffer
(WS-X4K-MUX) 3 is not present
00:00:20: %C4K_SUPERVISOR-2-MUXBUFFERNOTPRESENT: Mux buffer
(WS-X4K-MUX) 4 is not present
00:00:20: %C4K_SUPERVISOR-2-MUXBUFFERNOTPRESENT: Mux buffer
(WS-X4K-MUX) 7 is not present
```

The above messages (either at startup or output from a **show logging** command) indicate that the mux-buffer is not present in slots 3, 4 and 7. You need to reinsert and reseat the modules in those slots.

If the switch has already started up, you may also verify the correct function of the new modules with the **show logging** command.