CHAPTER 3

Installing the Switch

Revised: October 2011

This chapter describes how to install Catalyst 4500 E-series switches in an equipment rack. The chapter contains the following sections:

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

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

Warning **To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.** Statement 1032

Note Before starting the installation procedures in this chapter, complete the site-planning checklist in Table 2-2 of Chapter 2, "Preparing for Installation."

Note For information on installing the supervisor engine and switching modules and verifying switch operation, see the *Catalyst 4500 Series Module Installation Guide*. For information on configuring the switching modules, see the software configuration guide for your switch and software release.

Installation Process

The process of installing the switch can be broken down into a series of tasks. These tasks are listed in Table 3-1.

Table 3-1 Catalyst 4500 E-Series Switch Installation Process

Task	Description
Unpacking the switch	Remove the switch from the packaging materials. **Note** We recommend that you save the packaging material for use later if you need to move the chassis from one site to another.
Installing the switch	All Catalyst 4500 E-series chassis are designed to be rack-mounted.
Connecting the chassis to system ground	Construct and attach a system ground wire from the building (earth) ground to the system ground point on the chassis.
Installing and cabling the power supply or supplies	Normally, one power supply is shipped installed in the chassis. The second power supply, if part of the switch configuration, is shipped separately. Install the second power supply and connect the power supplies to site source power, either AC or DC.
Cabling the supervisor engine and modules to the network	The various ports on the supervisor engine and on the modules that are installed in the chassis must be connected to the network. This process can involve only attaching a network interface cable to the module port, or it can include the installation of a transceiver of some type in the supervisor engine or module port, and then attaching the network interface cable to the transceiver.
Powering up the chassis	After completing the network cabling and making sure that system ground is connected, the power supplies can be turned on. The system powers up and runs through a set of built-in diagnostics.

Tip For additional information about the Cisco Catalyst 4500 E-series switches (including configuration examples and troubleshooting information), see the documents listed on this page:

http://www.cisco.com/en/US/products/hw/switches/ps4324/index.html

Rack-Mounting Guidelines

The Catalyst 4500 E-series switches are designed to be installed in both open and enclosed racks that meet ANSI/EIA-310-D and ETS 300 119-3 specifications. Before rack-mounting the switch, ensure that the equipment rack complies with the following guidelines:

- The width of the rack, measured between the two front-mounting strips or rails, must be 17.75 inches (45.09 cm).
- The depth of the rack, measured between the front- and rear-mounting strips, must be at least 19.25 inches (48.9 cm).

Note All of the Catalyst 4500 E-series switch chassis are designed to install in standard 19-inch racks.

- The rack must have sufficient vertical clearance to insert the chassis. The chassis heights are as follows:
  - Catalyst 4503-E switch—12.25 inches (31.12 cm) (7 RU)
  - Catalyst 4506-E switch—17.38 inches (44.13 cm) (10 RU)
  - Catalyst 4507R-E switch—19.15 inches (49 cm) (10 RU)
  - Catalyst 4510R-E switch—24.35 inches (61.84 cm) (14 RU)
  - Catalyst 4507R+E switch—19.15 inches (49 cm) (10 RU)
  - Catalyst 4510R+E switch—24.35 inches (61.84 cm) (14 RU)

Note Chassis height is sometimes measured in rack units (RU or just U) where 1 RU or 1 U equals 1.75 in (44.45 mm). A typical server rack is 42 RU or 42 U in height.

Caution If the equipment rack is on wheels, ensure that the brakes are engaged and that the rack is stabilized.

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Note To maintain proper air circulation through the Catalyst switch chassis, we recommend that you maintain a minimum 6-inch (15 cm) separation between a wall and the chassis air intake or a wall and the chassis air exhaust. You should also allow a minimum separation of 12 inches (30.5 cm) between the hot air exhaust on one chassis and the air intake on another chassis. Failure to maintain adequate air space can cause the chassis to overheat and the system to fail.

Unpacking the Switch

To check the contents of the shipping cartons, follow these steps:

Step 1 Check the contents of the accessories box against the accessories box components checklist and the packing slip that were included with your switch. Verify that you received all listed equipment, including the following:

- Rack-mount kit, cable guide kit, and system ground kit
- Optional equipment that you ordered, such as network interface cables, transceivers, or special connectors

Step 2 Check the switching modules in each slot. Verify that the configuration matches the packing list and that all the specified interfaces are included.

Step 3 Verify that the L brackets are securely attached to the ides of the chassis.

Note Do not discard the shipping cartons and poly bag when you unpack the switch. Flatten and store them. You will need the containers if you need to move or ship the switch in the future. Repacking instructions are provided in Appendix B, "Repacking a Switch."

Installing the Switch in a Rack

A rack-mount kit is included for mounting the switch in a standard 19-inch (48.3 cm) equipment rack with two unobstructed outer posts, with a nominal depth (between the front and rear mounting posts) of 19.25 inches (48.9 cm) and a maximum depth of 32 inches (81.3 cm). This kit is not suitable for racks with obstructions (such as a power strip) that could impair access to the field-replaceable units (FRUs) of the switch.

Determine if the rack post holes are prethreaded or unthreaded. If the rack post holes are unthreaded, you need to install 12-24 clip-nuts or cage-nuts over the rack post holes to accept the installation screws.

Note Clip-nuts or cage-nuts are not included as part of the accessory kit that comes with the chassis. You must obtain them yourself.

Required Installation Tools

You will need the following tools and equipment to install the chassis in a rack:

- Number 1 and number 2 Phillips-head screwdrivers to tighten the captive installation screws on most systems
- 3/16-inch flat-blade screwdriver for the captive installation screws on the supervisor engine and switching modules on some systems
- Antistatic mat or antistatic foam in case you need to remove switching modules to troubleshoot the installation
- Rack-mount kit

- Tape measure
- Level
- Your own electrostatic discharge (ESD) grounding strap or the disposable ESD strap included with the system

Installing the Catalyst 4500 E-Series Switches in a Rack

To install a Catalyst 4500 E-series switch in an equipment rack, follow these steps:

Step 1 Place the chassis on the floor or on a sturdy table near the rack.

Step 2 Use a tape measure to verify the interior dimensions of the rack:

- Measure the depth of the rack from the outside of the front mounting posts to the outside of the rear mounting strip. The depth must be at least 19.25 inches (48.9 cm) but not greater than 32 inches (81.3 cm).
- Measure the space between the inner edges of the left front and right front mounting posts to ensure that it is 17.75 inches (45.09 cm) wide. (The chassis is 17.25 inches [43.8 cm] wide and must fit between the mounting posts.)

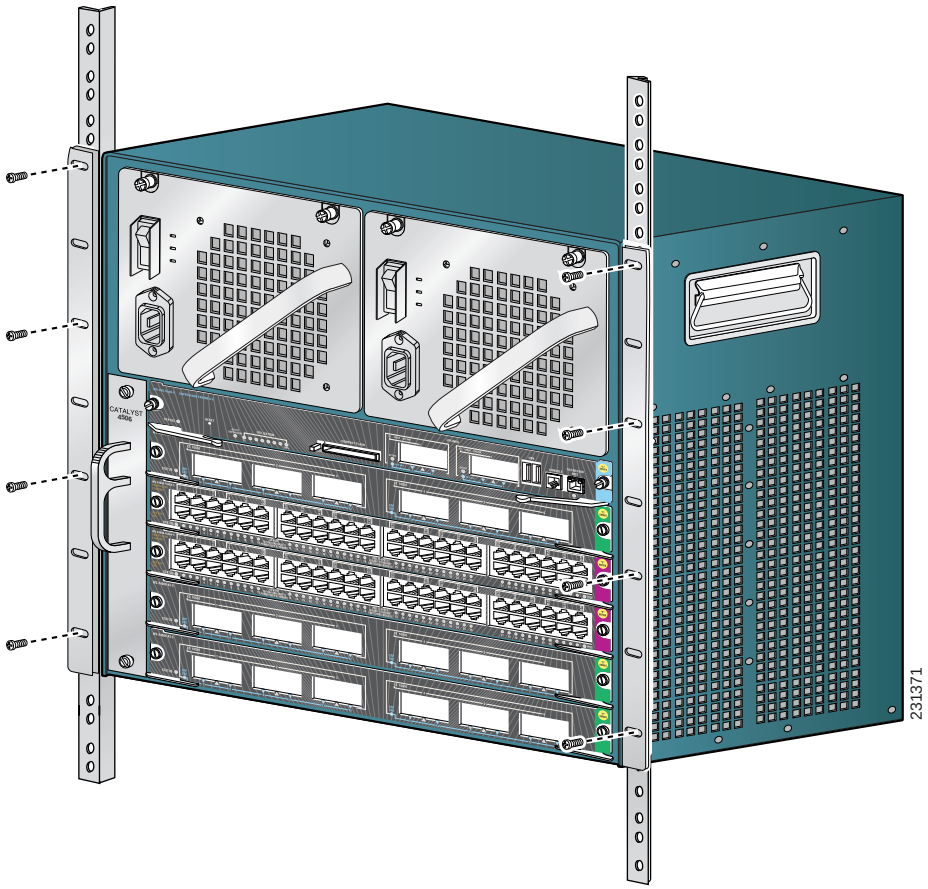
Step 3 Carefully lift the chassis and position the rear of the chassis between the equipment rack mounting posts and slide the chassis into the rack until the L brackets on the sides of the chassis are flush with the equipment rack front posts. (See Figure 3-1.)

Note Figure 3-1 illustrate the installation of a Catalyst 4506-E switch. The other Catalyst 4500 E-series switches are installed in the equipment rack the same way.

Step 4 Align the mounting holes in the L bracket with the mounting holes in the equipment rack posts. Use a tape measure and level to ensure that the chassis is positioned in the rack straight and level. If necessary, install at least six clip-nuts or cage-nuts (three per side) on the rack post to receive the installation screws.

Step 5 Secure the chassis using at least six (three per side) 12-24 x 3/4-inch screws through the elongated holes in the L bracket and into the threaded holes in the mounting post (or the clip-nuts or cage-nuts).

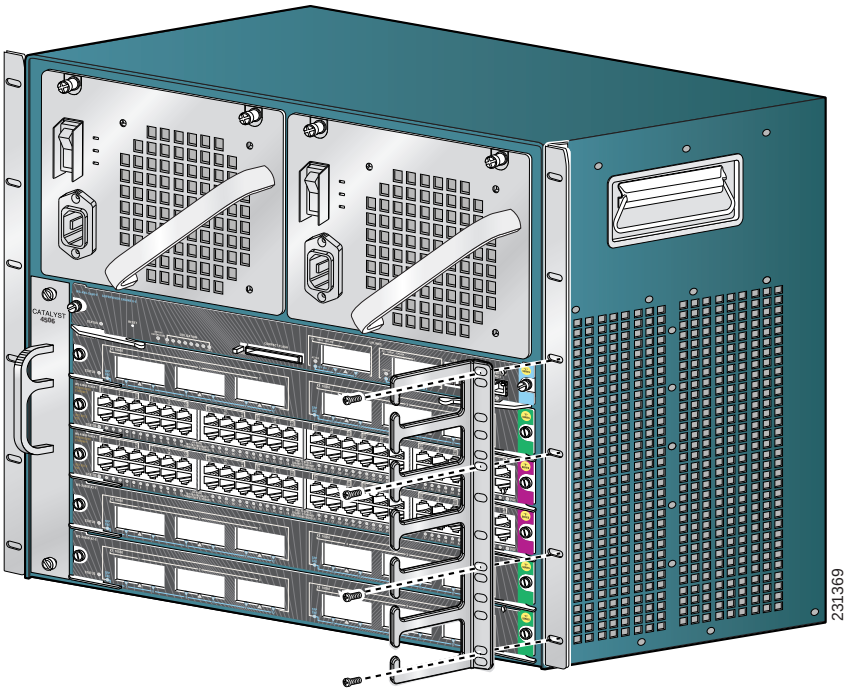
Figure 3-1 Installing the Switch in the Rack (Catalyst 4506-E Switch Shown)



a. Attach the cable guide, if needed, using the M3 screws provided in the cable management kit. The cable guide attaches to prethreaded holes in either L bracket. (See Figure 3-2.)

Note We recommend that you attach the cable guide to the right side of the switch chassis to prevent the network interface cables from obscuring switching module front panel LEDs.

Figure 3-2 Attaching the Cable Guide to the Chassis (Catalyst 4506-E Switch Shown)



Step 6 Verify that on all installed supervisor engines and switching modules, the ejector levers are completely closed and that the captive installation screws are tight.

Establishing the System Ground Connection

The system (NEBS) ground provides additional grounding for EMI shielding requirements and grounding for the low voltage supplies (DC-DC converters) on the modules and is intended to satisfy the Telcordia Technologies NEBS requirements for supplemental bonding and grounding connections.

Proper grounding practices ensure that the buildings and the installed equipment within them have low-impedance connections and low-voltage differentials between chassis. When you include NEBS-compliant system grounds, you reduce or prevent shock hazards, greatly reduce the chances of equipment damage due to transients, and substantially reduce the potential for data corruption.

Without proper and complete system grounding, you run the risk of increased component damage due to ESD. Additionally, you have a greatly increased chance of data corruption, system lockup, and frequent system reboot situations by not using a system (NEBS compliant) ground.

Required Tools and Parts

To connect the system ground, you need the following tools and parts:

- Grounding lug—A two-hole standard barrel lug that supports up to 6 AWG wire. The grounding lug is upplied as part of accessory kit.
- Grounding screws—Two M4 x 8 mm (metric) pan-head screws that are supplied as part of the accessory kit.
- Grounding wire—Not supplied as part of the accessory kit. The grounding wire should be sized according to local and national installation requirements. Depending on the power supply and system, a 12 AWG to 6 AWG copper conductor is required for U.S. installations. Commercially available 6 AWG wire is recommended. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- No. 1 Phillips-head screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

Connecting System Ground

Caution Installations that rely solely on system grounding using only an AC third-prong ground run a substantially greater risk of equipment problems and data corruption than those installations that use both the AC third-prong ground and a properly installed system (NEBS compliant) ground.

To attach the grounding lug and cable to the grounding pad, follow these steps:

Step 1 Use a wire-stripping tool to remove approximately 0.75 inch (19 mm) of the covering from the end of the grounding wire.

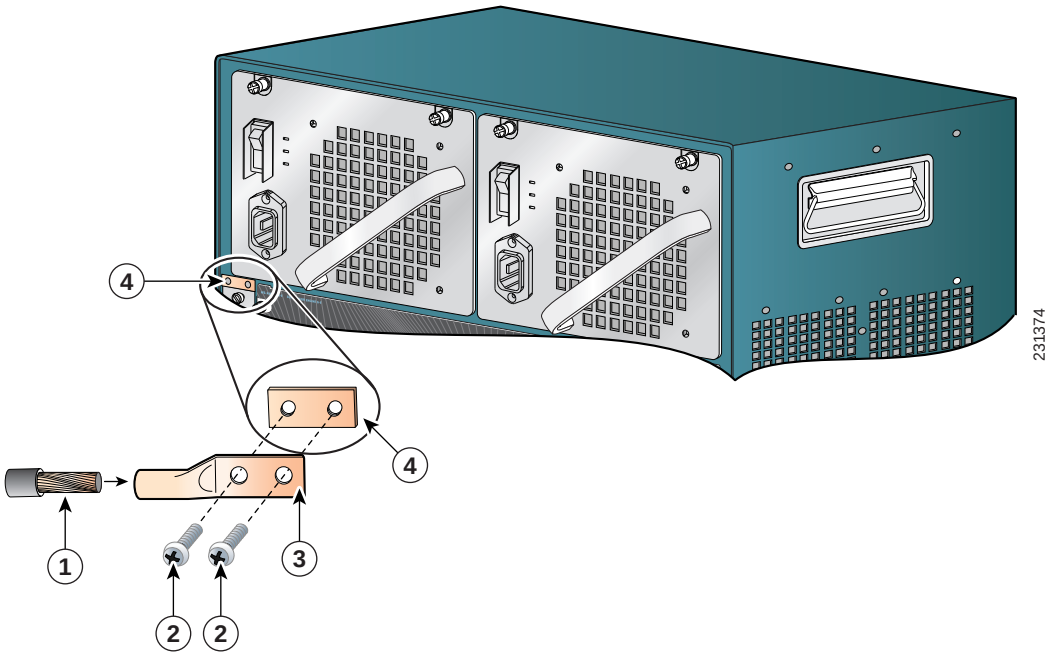
Step 2 Insert the stripped end of the grounding wire into the open end of the grounding lug.

Step 3 Crimp the grounding wire in the barrel of the grounding lug. Verify that the ground wire is securely attached to the ground lug by holding the ground lug and gently pulling on the ground wire.

Step 4 Locate and remove the adhesive label covering the system grounding pad on the switch chassis. (See Figure 3-3.)

Note All Catalyst 4500 E-series chassis have the system ground pad in the same location.

Figure 3-3 Connecting System Ground on the Switch



1	System grounding wire	**3**	Grounding lug
2	Screws (M4)	**4**	Chassis grounding pad

Step 5 Place the grounding lug against the grounding pad making sure there is good metal-to-metal contact between the lug and the bare metal of the chassis and that the grounding lug and the attached wire will not interfere with other switch hardware or rack equipment.

Step 6 Secure the system ground lug to the chassis with the two M4 screws.

Step 7 Prepare the other end of the grounding wire and connect it to an appropriate grounding point at your site to ensure adequate earth ground for the switch. Consult with your local electrician to determine the appropriate place to attach the gound wire.

Completing the Installation Process

Perform the following procedures to complete the installation process.

Attaching the Power Cords

Verify that you have the correct power supply (AC-input or DC-input and the correct wattage) for your configuration. Connect the chassis power supplies to the site power by referring to the "Removing and Installing the AC-Input Power Supplies" section on page 4-2 or the "Removing and Installing the DC-Input Power Supplies" section on page 4-8.

Connecting the Supervisor Engine Console Port

This section describes how to connect a terminal or modem to the supervisor engine console port. The console port on the supervisor engine allows you to perform the following functions:

- Configure the switch from the CLI.
- Monitor network statistics and errors.
- Configure SNMP agent parameters.
- Download software updates to the switch, or distribute software images residing in flash memory to attached devices.

The console port is located on the front panel of the supervisor engine.

Note The accessory kit that shipped with your Catalyst 4500 E-series switch contains the RJ-45-to-DB-25 DTE adapter, but does not contain the console cable. The console cable is available as an option.

To connect a terminal to the console port, follow these steps:

Step 1 Place the console port mode switch in the *in* position (factory default).

Step 2 Connect to the port using an RJ-45-to-RJ-45 cable and RJ-45-to-DB-25 DTE adapter or RJ-45-to-DB-9 DTE adapter (labeled “Terminal”).

Step 3 Position the cable in the cable guide (if installed). Make sure there are no sharp bends in the cable.

Step 4 Check the terminal documentation to determine the baud rate. The baud rate of the terminal must match the default baud rate (9600 baud) of the console port. Set up the terminal as follows:

- 9600 baud
- 8 data bits
- No parity
- 2 stop bits

With this console connection, you can configure the switch as described in Appendix C, “Initial Configuration for the Switch,” and then as discussed in the software configuration guide appropriate for your switch’s software release, and monitor the software as the switch goes through its startup routine.

Note If you move a supervisor engine from a Catalyst 4500 series chassis to a Catalyst 4503-E chassis or Catalyst 4506-E chassis, the supervisor engine must use Cisco IOS Release 12.2(37)SG or later releases. See your release notes for software upgrade procedures if needed:

http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/release/note/OL_5184.html#wp305142

Connecting the Supervisor Engine Uplink Ports

This section describes how to connect to the supervisor engine uplink ports. Some supervisor engine uplink ports may require the installation of transceivers into the supervisor engine port sockets. Refer to the applicable transceiver installation notes for instructions on how to correctly install the transceiver into your supervisor engine uplink port.

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Warning **Class 1 laser product.** Statement 1008

Note In a redundant configuration with two supervisor engines, the uplink ports on the redundant (standby) supervisor engine are active and can be used for normal traffic like any other ports in the chassis.