Installing the Switch

- Installation Tasks, on page 1
- Unpacking the Switch, on page 3
- Install the Switch as Shipped, on page 4
- Install the Switch with Shelf Brackets, on page 7
- Installing the Cable Guide, on page 19
- Install the Switch in a NEBS-Compliant Mode, on page 24
- Establishing System Ground, on page 34
- Attaching an ESD Strap, on page 36
- Verifying the Switch Chassis Installation, on page 39

Installation Tasks

These warnings apply to the overall switch installation process:

⚠️ Warning

**IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

⚠️ Warning

Class 1 laser product. Statement 1008

⚠️ 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
Installing the Switch

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
This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

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

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

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

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

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
Installation of the equipment must comply with local and national electrical codes. Statement 1074
The process of installing the switch can be broken down into a series of tasks as shown in the following figure:

**Figure 1: Installation Tasks**

- Unpack the switch (Remove the switch from the packaging materials)
- Install the switch (as shipped)
- Rack Mount the Chassis
- Install Cable Guide (Optional)
- Connect the chassis to System
- Install Power Supplies
- Power up the chassis

**Note**
This section illustrates the installation of a Catalyst 9407R Switch switch. All Cisco Catalyst 9400 Series Switches are installed in the equipment rack, the same way.

Further, the equipment racks shown below are for instructional purposes only. For proper operation, ensure that the racks you use comply with site requirements and air flow requirements as stated in the *Preparing for Installation* section of this document.

**Unpacking the Switch**

Check the contents of the shipping container:
Procedure

Step 1
Check the contents of the accessory kit. Verify that you have received all the listed equipment, including any optional equipment you may have ordered, such as, network interface cables, transceivers, or special connectors.

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

Step 3
Store the shipping carton.

Tip
Do not discard the shipping container when you unpack the switch. Flatten the shipping cartons and store them with the pallet. You will require these containers if you have to move or ship the switch in the future.

Install the Switch as Shipped

Rack-Mounting the Chassis as Shipped

This procedure shows how to rack mount the chassis as shipped.

Before you begin

⚠️ 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

Cable guide installation options have been described in a separate topic. If you are installing the cable guide, read this procedure and the cable guide installation procedure, before you start.

Procedure

Step 1
Insert the rear of the chassis between the mounting posts of the rack.

Step 2
Align the mounting holes in the L bracket on the switch with the mounting holes in the equipment rack.
Figure 2: Securing the Chassis to the Rack Posts

**Step 3**  
Secure the chassis to the rack with either 10-32 or 12-24 pan head screws from the chassis standard accessory kit.
Step 4

4. Use a tape measure and level to ensure that the chassis is installed straight and level.

What to do next

After installing the chassis in its location, complete the installation process by:

1. Connecting the chassis to system ground.
2. Installing and connecting the power supplies to the power source.
3. Connecting the network interface cables to the supervisor module and line card modules. This may involve installing transceivers before you attach the network interface cables.
4. Powering up the chassis and verifying the installation.
Install the Switch with Shelf Brackets

Shelf Kit Contents

Note

The shelf kit is not part of the standard accessory kit. You must order it separately by using the chassis-specific part number.

<table>
<thead>
<tr>
<th>Switch Model</th>
<th>Shelf Kit Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalyst 9404R Switch</td>
<td>C9404-SHELF-KIT=</td>
</tr>
<tr>
<td>Catalyst 9407R Switch</td>
<td>C9407-SHELF-KIT=</td>
</tr>
<tr>
<td>Catalyst 9410R Switch</td>
<td>C9410-SHELF-KIT=</td>
</tr>
</tbody>
</table>

The following table lists the contents of the shelf kit:

Table 1: Shelf Kit Contents

<table>
<thead>
<tr>
<th>Item and Description</th>
<th>Quantity (C9404-SHELF-KIT=)</th>
<th>Quantity (C9407-SHELF-KIT=)</th>
<th>Quantity (C9410-SHELF-KIT=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left L bracket.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fabricated metal chassis L bracket, to secure the chassis to the rack enclosure.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right L bracket.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fabricated metal chassis L bracket, to secure the chassis to the rack enclosure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shelf brackets</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Fabricated metal, rack shelf brackets, to support the weight of the chassis.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-24 x 0.75-inch Phillips screws</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>10-32 x 0.75-inch Phillips screws</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>M4 x 8 mm Phillips flat head screws</td>
<td>4</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Documentation, pointer card</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Provides references to related documentation on cisco.com</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Installing the Switch
Installing the Shelf Kit L Brackets

The switch chassis is shipped with two L brackets installed on the front sides of the chassis. If you are rack-mounting the switch using the Shelf accessory, these L brackets must be removed and replaced with L brackets that are part of the shelf kit.

Before you begin

You have ordered and received the shelf kit.

Procedure

Step 1

Remove and discard the L brackets and the ten mounting screws that the chassis is shipped with. Do not re-use them during any part of the installation process.

Figure 4: L Brackets the Chassis is Shipped With
Figure 5: Removing L Brackets the Chassis is Shipped With
Step 2  Remove the L brackets from the shelf kit packaging.

Step 3  Using the M4 x 8 mm Phillips flat head screws in the shelf kit, secure the L brackets to the front-left and front-right sides of the chassis (four on each side).
What to do next
Mount the shelf brackets on the rack.

Installing the Shelf Brackets
Install the shelf brackets before you install the chassis in the rack. The shelf brackets attach directly to the rack and help support the weight of the chassis while you secure the L brackets to the rack enclosure.
You have to front-mount the shelf brackets.
**Before you begin**

Determine the clearance between the insides of the left and right rails of your rack system and install the shelf brackets accordingly. Keep these tools handy:

- Number 1 and Number 2 Phillips screwdrivers
- 3/16-inch flat-blade screwdriver
- Tape measure and level

**Procedure**

**Step 1** Position the support flange of the left shelf bracket on the front of the left rail. Align and secure the bracket to the rack by using three screws. Use either 10-32 or 12-24 pan head screws from the shelf kit.

**Step 2** Position the support flange of the right shelf bracket on the front of the right rail — make sure that it is level with the left shelf bracket. Align and secure the bracket to the rack by using three screws.

Use the same type of screws for the left and right shelf bracket.

*Figure 8: Installing the Shelf Brackets*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shelf brackets</td>
</tr>
<tr>
<td>2</td>
<td>Pan head screws from the shelf kit that secure the shelf brackets to the rack posts</td>
</tr>
</tbody>
</table>

The shelf brackets are now securely mounted to the rack posts
What to do next

Rack-mount the chassis. Two people will be required for this task.

Rack-Mounting the Chassis

This procedure shows how to rack mount the chassis with shelf brackets.

⚠️ Warning

Two people are required to lift the chassis. To prevent injury, keep your back straight and lift with your legs, not your back. Statement 164

🔍 Tip

We recommend that you have a third person to assist in this procedure.

To install the switch chassis in the equipment rack, perform these steps:

Before you begin

⚠️ 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

• Install the shelf kit L brackets on the chassis and the shelf brackets on the rack posts.

• Cable guide installation options have been described in a separate topic. If you are installing the cable guide, read this procedure and the cable guide installation procedure, before you start.
Procedure

**Step 1**  Pull out all four of the handholds

*Figure 9: Chassis handholds*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All four of the chassis handholds pulled out and the back end of the chassis resting on the edges of the shelf bracket rails.</td>
</tr>
</tbody>
</table>

**Step 2**  With a person standing at each side of the chassis, insert one hand into each handheld. Slowly lift the chassis. Avoid sudden twists or moves to prevent injury.
Step 3  Rest the back end of the chassis on the edges of the shelf bracket rails and slide it in until the first pair of handles on both sides of the chassis are near the rack posts.

Step 4  Push in the handholds that are closest to the rack posts

*Figure 10: Sliding the Chassis in - Part 1*
| Step 5 | Continue sliding the chassis in until the second pair of handholds are near the rack posts |

*Figure 11: Sliding the Chassis in - Part 2*

| 1 | Handholds closest to the rack posts, pushed in. | - | - |

| Step 6 | Push in the the second pair of handholds and continue sliding the chassis in until the L brackets make contact with the rack posts. |

| 1 | Chassis is slid in until the second pair of handholds are near the rack posts. | - | - |

| Step 7 | Secure the chassis to the rack with either the 10-32 or 12-24 pan head screws from the chassis standard accessory kit. |
Figure 12: Securing the Chassis to the Rack Posts
What to do next

After installing the chassis in its location, complete the installation process by:

1. Connecting the chassis to system ground.

2. Installing and connecting the power supplies to the power source.
3. Connecting the network interface cables to the supervisor module and line card modules. This may involve installing transceivers before you attach the network interface cables.

4. Powering up the chassis and verifying the installation.

**Installing the Cable Guide**

You can install cable guides with or without the shelf brackets. Follow the corresponding procedure:

---

**Note**

Cable guides are part of the standard accessory kit.

---

**Note**

You can install cable guides in a NEBS-Compliant setup as well.

---

### Installing the Cable Guide With Shelf Brackets

**Procedure**

**Step 1**

Mount the shelf brackets with only two screws on each side.
**Step 2**  
Using only one screw on each side, secure the L bracket to the rack rails.

**Step 3**  
Position the cable guides and align with the L brackets and shelf brackets.

Using one screw on each side, align the cable guide mounting holes with the shelf bracket holes and the rack rail holes.

Using two screws on each side, align the cable guide mounting holes with the L bracket holes and the rack rail holes.
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screws that are mounted before the cable guide is—two on each side for the shelf bracket and one on each side for the L bracket.</td>
</tr>
<tr>
<td>2</td>
<td>Remaining screws that are mounted when installing the cable guide—one on each side for the shelf bracket and two on each side for the L bracket.</td>
</tr>
</tbody>
</table>

Cable guide installation with shelf brackets is complete.
Installing the Cable Guide Without Shelf Brackets

Procedure

Step 1  Secure the chassis to the rack rails with only two screws on each side.
Step 2  Position the cable guides and align with the L brackets.
1. Screws that are mounted before the cable guide is—two on each side, securing the L bracket to the rack rails.

2. Remaining screws that are mounted when installing the cable guide—two on each side, aligning and securing the cable guide and L bracket to the rack rails.

Cable guide installation without shelf brackets is complete.
Install the Switch in a NEBS-Compliant Mode

NEBS-Compliant Air Filter

A Network Equipment-Building System (NEBS) compliant installation allows filtered, front-to-rear airflow. To mount the chassis in a NEBS-compliant mode with the air filter, use a 23-inch rack mount. Filter brackets that are mounted on the side of the chassis hold the air filter. For more details on the air filter, refer step 6 of Rack-Mounting the Chassis in a NEBS-Compliant Mode, on page 25 section.

Note

In order to meet GR-63-CORE requirements, the switch must be installed in a NEBS-Compliant Mode.
A 23-inch rack mount is used for mounting the switch in a standard 23 inch (58.4 cm) equipment rack with two unobstructed outer posts. 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.

**Table 2: 23 Inch Rack Mount Kit Part Numbers**

<table>
<thead>
<tr>
<th>Switch Model</th>
<th>23-Inch Rack Mount Kit Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalyst 9404R Switch</td>
<td>C9404-FB-23-KIT=</td>
</tr>
<tr>
<td>Catalyst 9407R Switch</td>
<td>C9407-FB-23-KIT=</td>
</tr>
<tr>
<td>Catalyst 9410R Switch</td>
<td>C9410-FB-23-KIT=</td>
</tr>
</tbody>
</table>

**Table 3: 23 Inch Rack Mount Kit Contents**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Parts Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Rack Mounts</td>
</tr>
<tr>
<td>6</td>
<td>M4 Phillips pan-head screws</td>
</tr>
<tr>
<td>6</td>
<td>12-24 x 3/4-inch Phillips binder-head screws</td>
</tr>
</tbody>
</table>

---

**Rack-Mounting the Chassis in a NEBS-Compliant Mode**

⚠️ **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**

⚠️ **Warning**

Take care when connecting units to the supply circuit so that wiring is not overloaded. **Statement 1018**

⚠️ **Warning**

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:

40°C. **Statement 1047**
Before you begin

Prepare for the installation as follows:

- Place the chassis on the floor or on a sturdy table as close as possible to the rack. Leave enough clearance to allow you to move around the chassis.

- Open the rack-mount kit and verify that all parts are included.

Note

Some equipment racks provide a power strip along the length of one of the rear posts. If your rack has this feature, consider the position of the strip when planning fastener points. Before installing the brackets on the chassis, determine whether to install the chassis from the front or the rear of the rack.

Procedure

Step 1

Remove and discard the mounting ears and the ten mounting screws of the chassis. Do not reuse them during any part of the installation process.
Figure 14: Remove the Mounting Ears

Step 2  Install the rack ear brackets on the left and right sides of the chassis. These brackets connect the chassis to the rack.
**Step 3**  
Install the filter brackets.
Step 4  Install the Right and Left Wall covers.

*Figure 17: Install the Wall Covers*
Step 5  Secure the chassis to the rack with either 10-32 or 12-24 pan head screws from the chassis standard accessory kit.

*Figure 18: Secure the Chassis to Rack*

Step 6  Slide the air filter into the air filter slot.
**Note**  The arrows on the top edge of the air filter note the direction of airflow. (Airflow direction is from right to left, when you stand facing the chassis). Insert the air filter into its housing with the arrows pointing toward the chassis.
Figure 19: NEBS-Compliant Air Filter

Note: We recommend that you change the air filter every 3 months. However, examine the air filter once a month (or more often in dusty environments) and replace it if it appears to be excessively dirty or damaged. To comply with Telecordia GR-63-Core standard air filter requirements for NEBS deployments, the air filter must be replaced, not cleaned.

Step 7: Install the top and base covers as shown in illustrations:
What to do next

After installing the chassis in a NEBS-Compliant mode, complete the installation process by:

1. Connecting the chassis to system ground.
2. Installing and connecting the power supplies to the power source.
3. Connecting the network interface cables to the supervisor module and line card modules. This may involve installing transceivers before you attach the network interface cables.
4. Powering up the chassis and verifying the installation.
5. Turning on the NEBS mode for the fan tray. See Useful Cisco IOS Commands - Fan Tray Assembly
Establishing System Ground

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

Before you begin

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

⚠️ 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**

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

To connect the system ground, you require the following tools and materials:

- Grounding lug—A two-hole grounding lug, which supports a 6 AWG size wire. Supplied as part of the standard accessory kit.
- Grounding screws—Two M4 x 8 mm (metric) pan-head screws. Supplied as part of the standard accessory kit.
- Grounding wire—The grounding wire should be sized according to local and national installation requirements. A 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 screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

Procedure

**Step 1**  
Use a wire-stripping tool to remove approximately 0.75 inches (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.

Step 4  Secure the grounding lug to the system ground connector with two M4 screws. Ensure that the grounding lug and the grounding wire do not interfere with other switch hardware or rack equipment.

*Figure 21: Locating and Connecting System Ground*

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stripped end of the grounding wire inserted into the open end of the grounding lug</td>
</tr>
<tr>
<td>2</td>
<td>Grounding lug</td>
</tr>
<tr>
<td>3</td>
<td>M4 screws to secure the lug to the connector</td>
</tr>
<tr>
<td>4</td>
<td>System ground location</td>
</tr>
</tbody>
</table>
Step 5 Prepare the other end of the grounding wire, and connect it to an appropriate grounding point in your site to ensure adequate earth ground for the switch.

Attaching an ESD Strap

After you install the system ground lug, follow these steps to correctly attach the electrostatic discharge (ESD) wrist strap that is provided with the standard accessory kit and all FRUs:

Before you begin

- Do not use the wrist strap if it is wet.
- Do not use the wrist strap on equipment with operating voltage exceeding 250V.
- Ensure that you are not grounded by any other means than through the wrist strap while servicing.

Procedure

Step 1 Open the wrist strap package, unwrap and locate the two ends of the ESD strap.

One end of the strap terminates with the black metal strap exposed; this is wrist end; the other end terminates with a patch of copper foil; this is the equipment end.
Step 2
On the wrist end of the strip, locate the length of conductive film. Wrap the adhesive side around your wrist such that it touches bare skin well.

Step 3
Peel off the adhesive from the equipment end and attach it to an unpainted metal surface of the equipment you are servicing.
When handling modules, follow these guidelines:

- Handle carriers using the available handles or edges only; avoid touching the printed circuit boards or connectors.

- Place a removed component boardside up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.

- Never attempt to remove the printed circuit board from the metal carrier.

**Caution**  For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohm (Mohm).
# Verifying the Switch Chassis Installation

To verify the switch chassis installation, perform these steps:

## Procedure

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Verify that the ejector levers of each module are fully closed (parallel to the faceplate) to ensure that the supervisor engine and all the switching modules are fully seated in the backplane connectors.</td>
</tr>
<tr>
<td>Step 2</td>
<td>Check the captive installation screws of each module, and tighten any loose captive installation screws.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Verify that all empty module slots and power supply bays have blanks installed properly. The blanks optimize the air flow through the chassis and contain EMI. <strong>Warning</strong> Blank faceplates and cover panels serve three important functions—They prevent exposure to hazardous voltages and currents inside the chassis; they contain EMI that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system until all cards, face plates, front covers, and rear covers are in place. <em>Statement 1029</em></td>
</tr>
<tr>
<td>Step 4</td>
<td>Turn on the power supply switches to power up the system. During the power-up sequence, the system performs a series of bootup diagnostic tests.</td>
</tr>
</tbody>
</table>

## What to do next

In case of a problem with any of the hardware components, refer to the Troubleshooting section.

Additional system diagnostic tests are also available. These tests allow you to perform a complete sanity check on the system prior to inserting the system into your network and to monitor the health of the system while the system is running.

## Tip

When prestaging systems in a nonproduction environment, we recommend that you run all the diagnostic tests, including the disruptive tests, to prescreen the systems for failures, if any.
Verifying the Switch Chassis Installation