# Install and connect the Router

This chapter describes how to install and connect Cisco 8100 Series Secure Routers to LAN and WAN networks.



## Unpack the router

Unpack the router only when you are ready to install it. If the installation site is not ready, to prevent accidental damage, keep the chassis in its shipping container until you are ready to install. The router, accessory kit, publications, and any optional equipment you order may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you have received all the listed items.

## Items shipped with your router

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco 8100 Series Secure Routers.

The following items are shipped with your router:

- Getting Started/Product Document of Compliance
- Grounding Lug Kit
- Power Supply
- AC Power Cord

# Install the router

After unpacking, based on your requirements, you can set up the Cisco 8100 Series Secure Router under-desk, on a desktop, a rack, or the wall.

**Note** You can install external modules before or after mounting a router. However, if you choose to install the external modules after mounting the router on the rack or wall, ensure that you have optimal access to the back/front panel of the router.

**Note** To prevent the system from overheating, do not operate the device in an area that exceeds a local ambient of 40°C. For altitudes above sea-level, de-rate the ambient operating temperature by 1°C per 1000-feet of elevation.

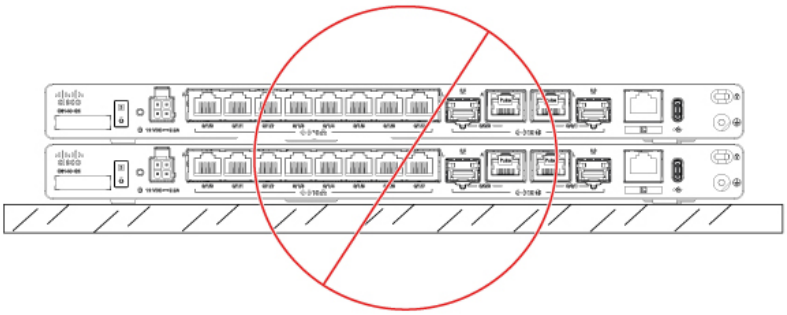
**Note** When mounting a Cisco 8100 Series Secure Router, the local ambient should be measured 2-inches below the fully mounted product when possible. When this is not possible the local ambient should be measured 2-inches from the I/O side of the product.

| Module | Mounting Options |
|---|---|
| C8130-G2 | Desktop, Rack mount, Under Desk/Shelf Mount, Wall mount using Key-hole slots, Wall mount DIN-rail brackets |
| C8140-G2 | |
| C8151-G2 | |
| C8161-G2 | |

## Desktop

If you choose to setup the router on a desktop, you can place the router on a desktop, bench top, or shelf.

**Caution** Do not place anything on top of the device and do not stack devices on a desktop, else, this causes the product to overheat.



# Rack mount

Secure rack mounting brackets on the chassis before you set up the chassis on the rack.

**Caution** Do not stack multiple Cisco 8100 Series Secure Routers when mounting the routers on a tabletop.

Do not put any object on the sides or on top of the routers ensuring that there is ample space for air circulation and heat removal. Your chassis installation must allow unrestricted airflow for chassis cooling.

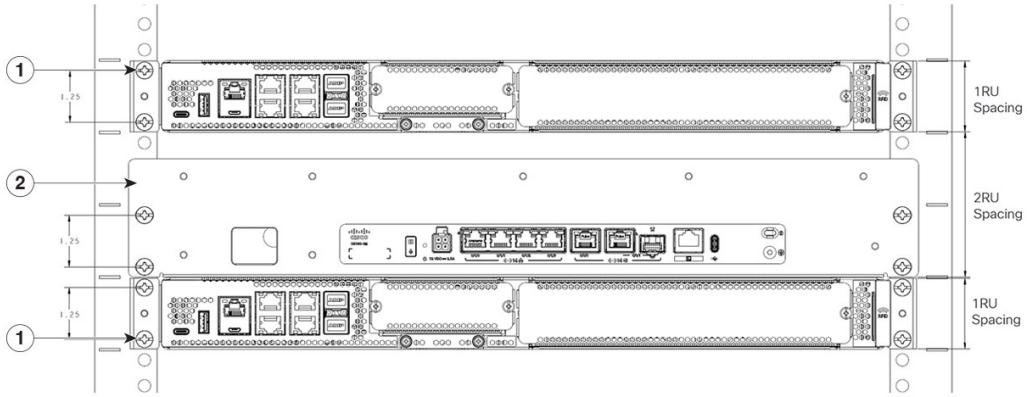
**Important** **Periodic Inspection and Cleaning**:

We recommend that you periodically inspect and clean the external surface of the router. Removing is recommended to minimize the negative impact of environmental dust, debris, and liquid contamination. The frequency of inspection and cleaning is dependent upon the severity of the environmental conditions, but we recommend cleaning the router once every six months.

**Note** Sites with ambient temperatures consistently above 25°C or 77°F and with potentially high levels of dust or debris might require periodic preventative maintenance cleaning.

**Note** When mounting Cisco 8100 Series Secure Routers on a rack, ensure at least one rack unit (1RU) of vertical space between routers. This ensures more heat removal, which in turn helps the surrounding air temperature to stay within the specified operating conditions.

***Figure 1: Rack-tray assembly***




| | |
|---|---|
| 1 | Typical 1RU Product (reference only) |
| 2 | Rack-tray installed |

## Attach the rack mount brackets

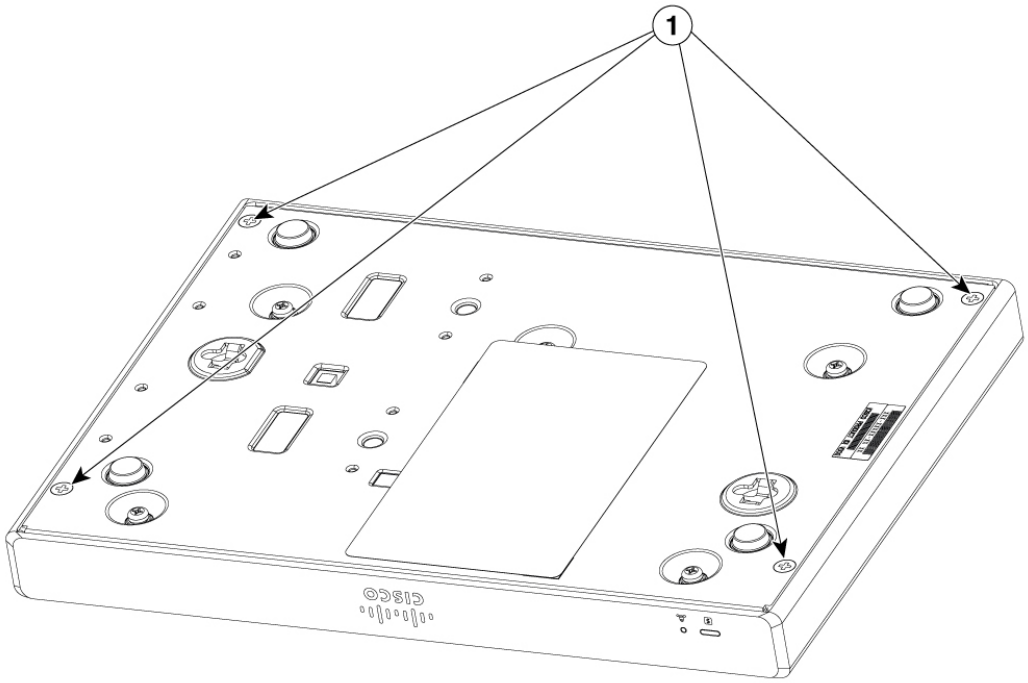
This procedure describes how to attach the brackets on the router chassis for C8130-G2, C8140-G2, C8151-G2 and C8161-G2:

**Procedure**

**Step 1** Remove the screws from the bottom of the chassis as per shown in the following figures.

**Example:**

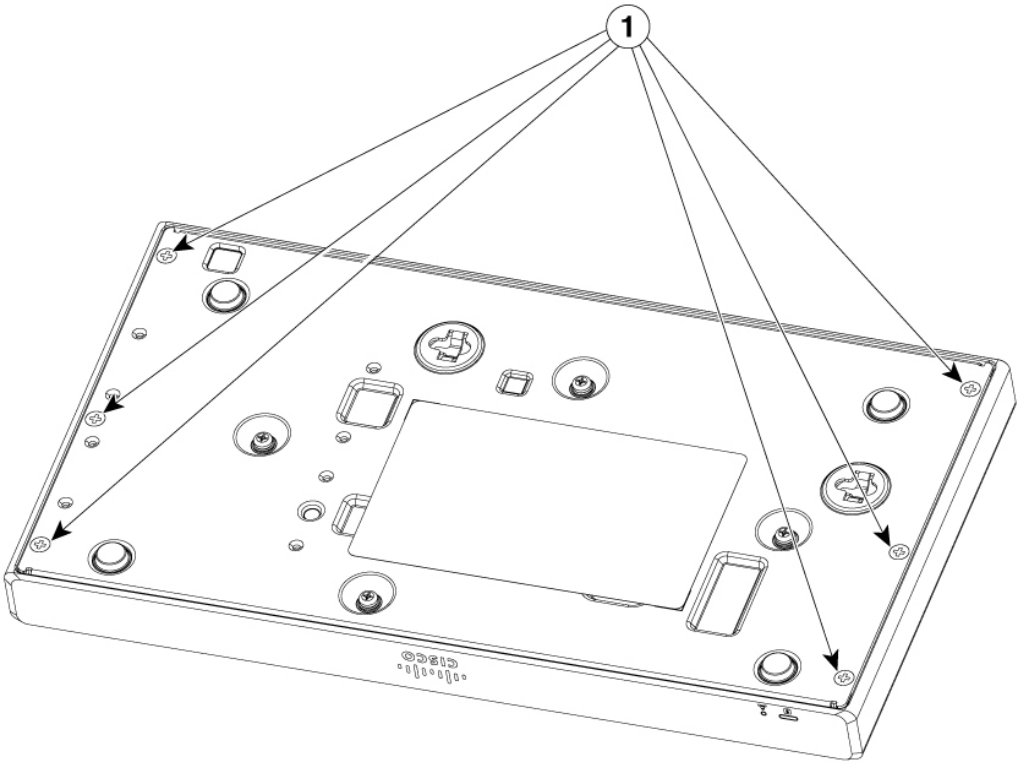
*Figure 2: Removing screws from C8130-G2*




| | |
|---|---|
| 1 | Screws |

**Example:**

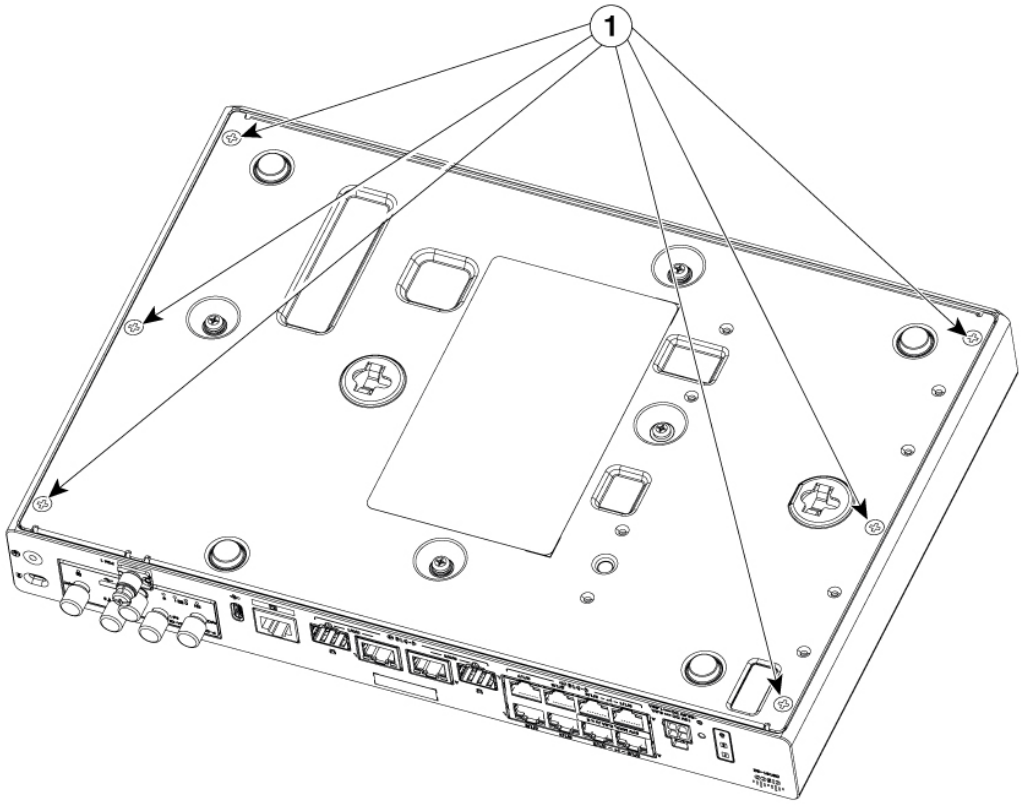
*Figure 3: Removing screws from C8140-G2*




| | |
|---|---|
| 1 | Screws |

**Example:**

*Figure 4: Removing screws from C8151-G2 and C8161-G2*



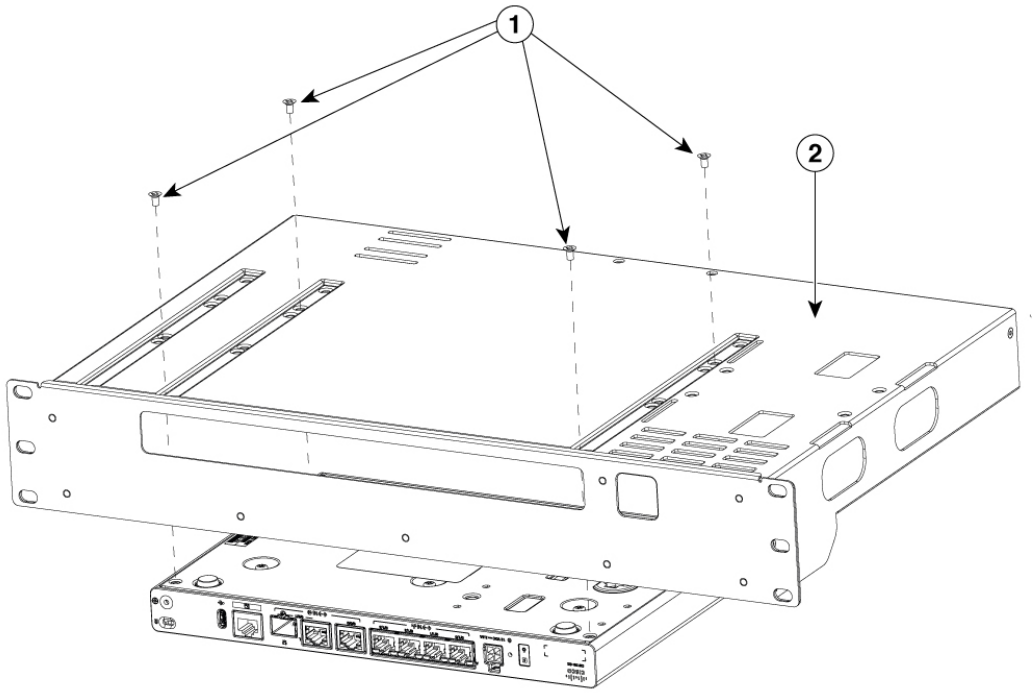

| | |
|---|---|
| 1 | Screws |

**Step 2** Align the bracket to the indicated holes of the chassis.

**Step 3** Secure the bracket to the router using the screws that were removed.

**Example:**

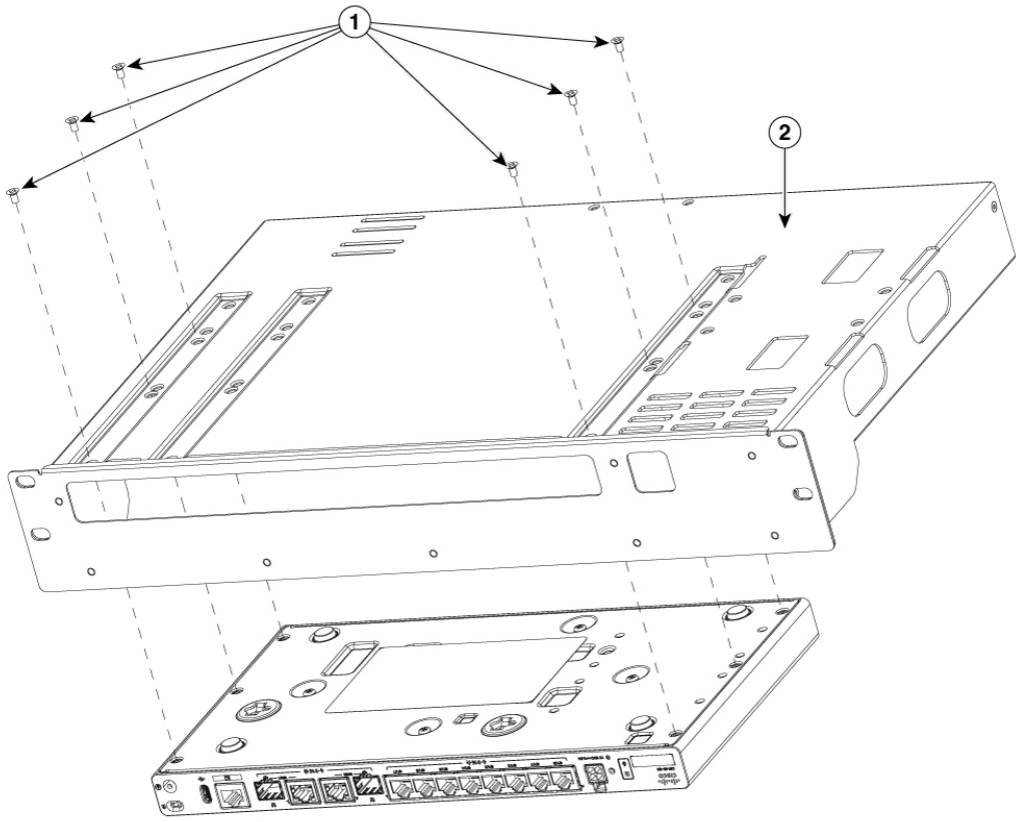
*Figure 5: Rack mounting bracket installation for C8130-G2*




| | |
|---|---|
| 1 | Screws |
| 2 | Brackets |

**Example:**

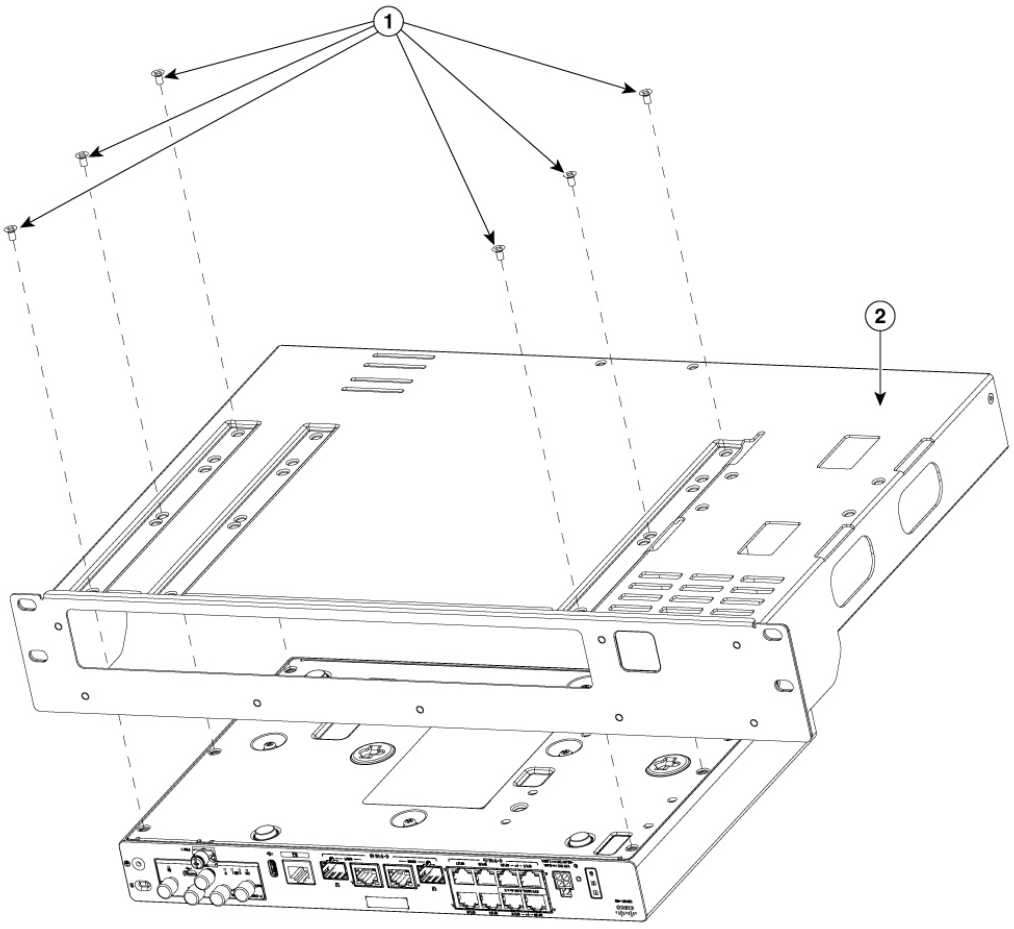
*Figure 6: Rack mounting bracket installation for C8140-G2*




| | |
|---|---|
| 1 | Screws |
| 2 | Brackets |

**Example:**

*Figure 7: Rack mounting bracket installation for C8151-G2 and C8161-G2*




| | |
|---|---|
| 1 | Screws |
| 2 | Brackets |

# Mount the router

### Before you begin

Before mounting the router on to the rack, refer to the following safety warning statements:

**Warning** **Statement 1006—**Chassis Warning for Rack-Mounting and Servicing

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.

**Procedure**

To install the router, use the screws provided with the accessory kit to secure the router when you mount it over the rack.

# Under desk or shelf mount

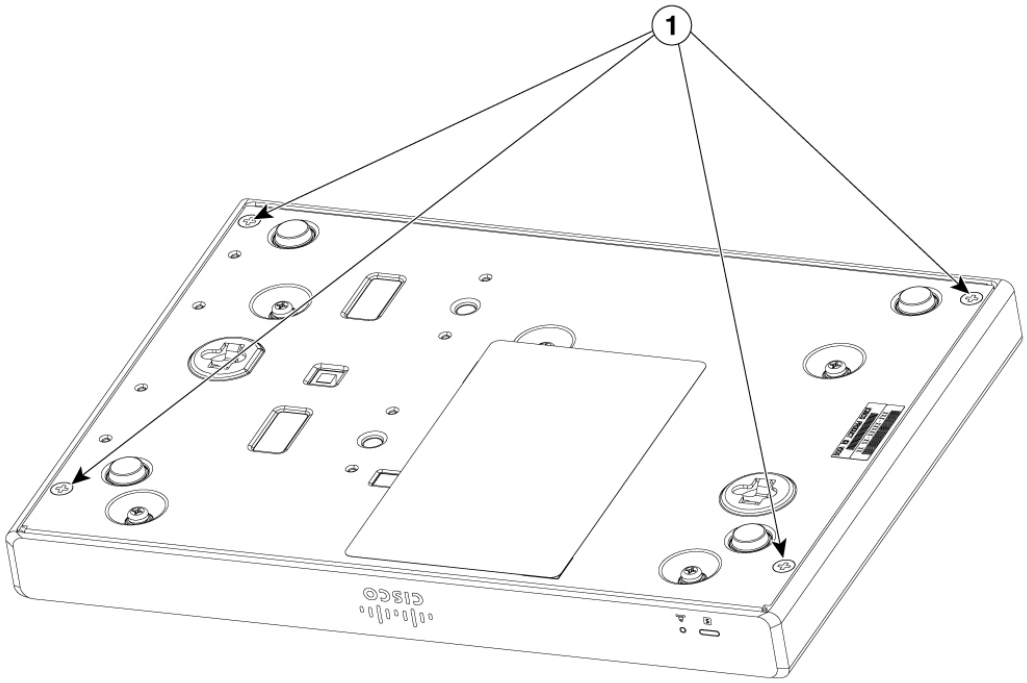
Installing the router under a desk requires an optional bracket kit that is not included with the router. The kit contains the under-desk brackets and screws to secure the brackets to the bottom of the desk. You can order these kits from your Cisco representative. This procedure describes how to mount a router under a desk or a shelf.

**Procedure**

**Step 1** Remove the screws from the bottom of the chassis.

**Example:**

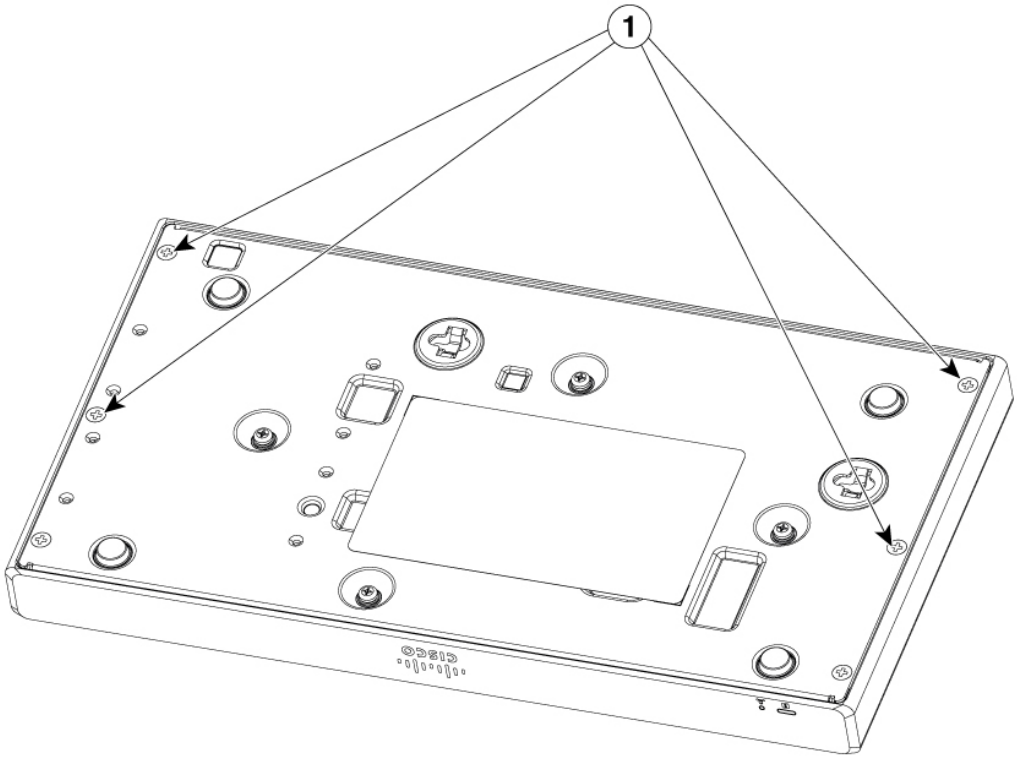
*Figure 8: Removing screws from C8130-G2*




| | |
|---|---|
| 1 | Screws |

**Example:**

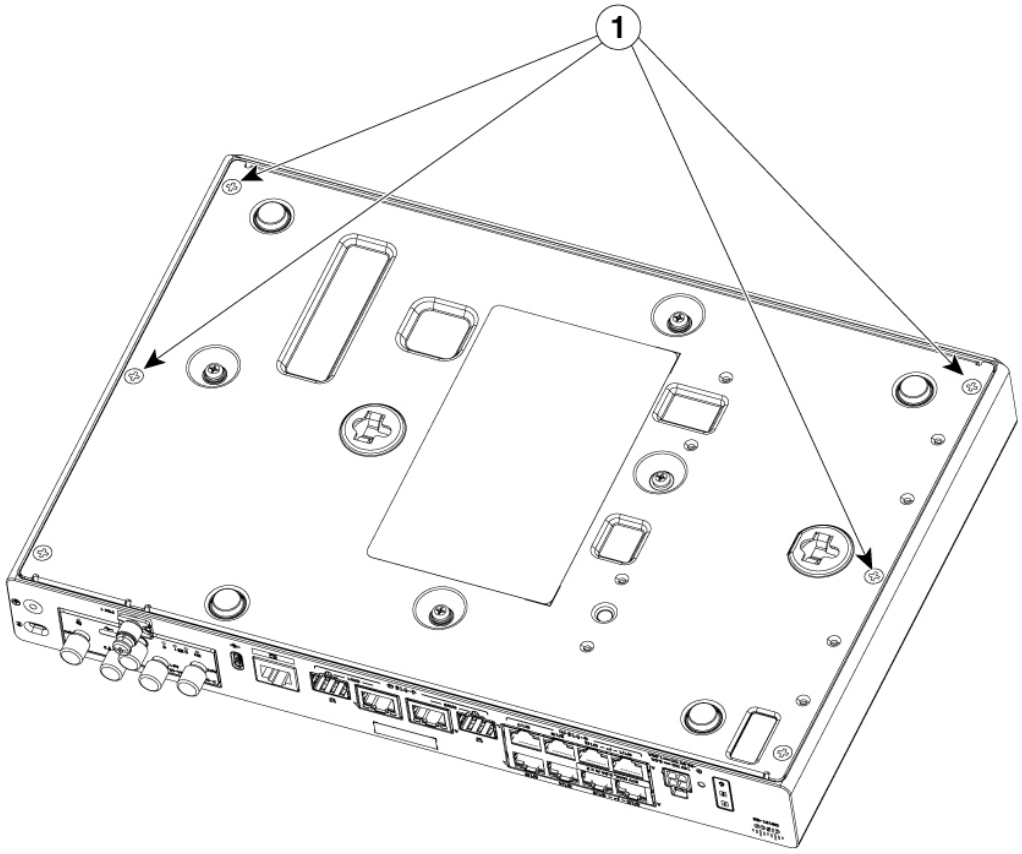
*Figure 9: Removing screws from C8140-G2*




| | |
|---|---|
| 1 | Screws |

**Example:**

*Figure 10: Removing screws from C8151-G2 and C8161-G2*

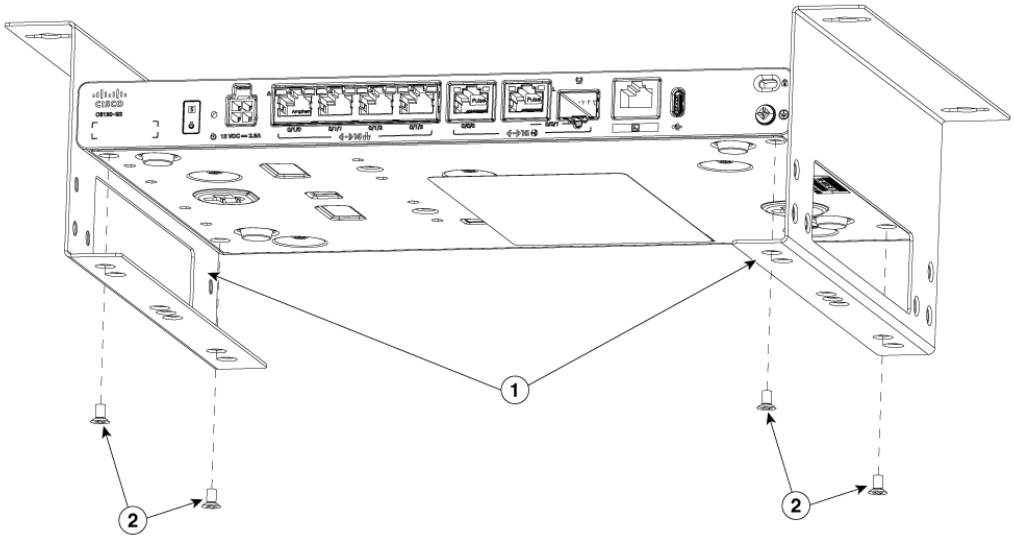



| | |
|---|---|
| 1 | Screws |

**Step 2** Align the brackets to the indicated screw holes of the chassis.

**Example:**

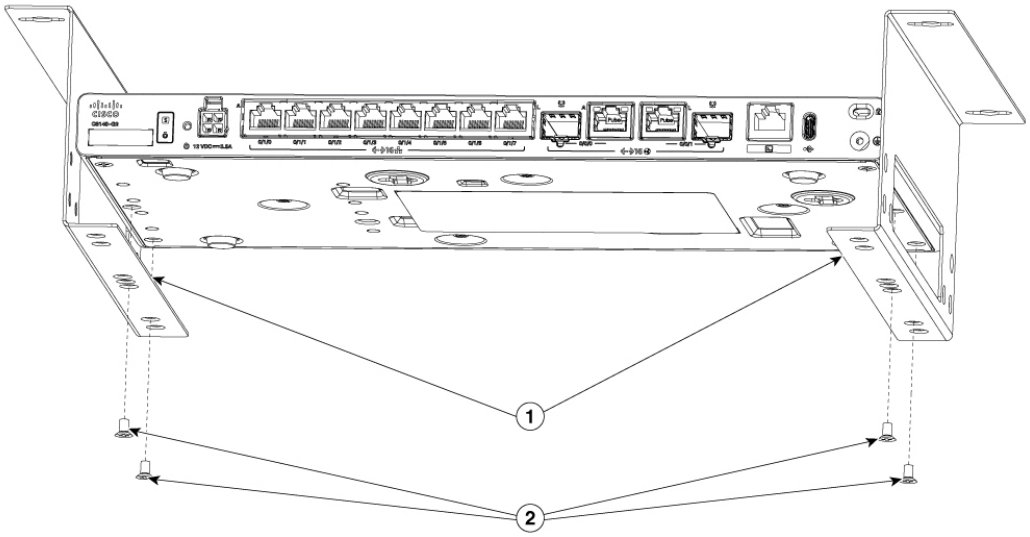
*Figure 11: Under desk mounting brackets installation for C8130-G2*




| | |
|---|---|
| 1 | Under desk mounting brackets |
| 2 | Screws |

**Example:**

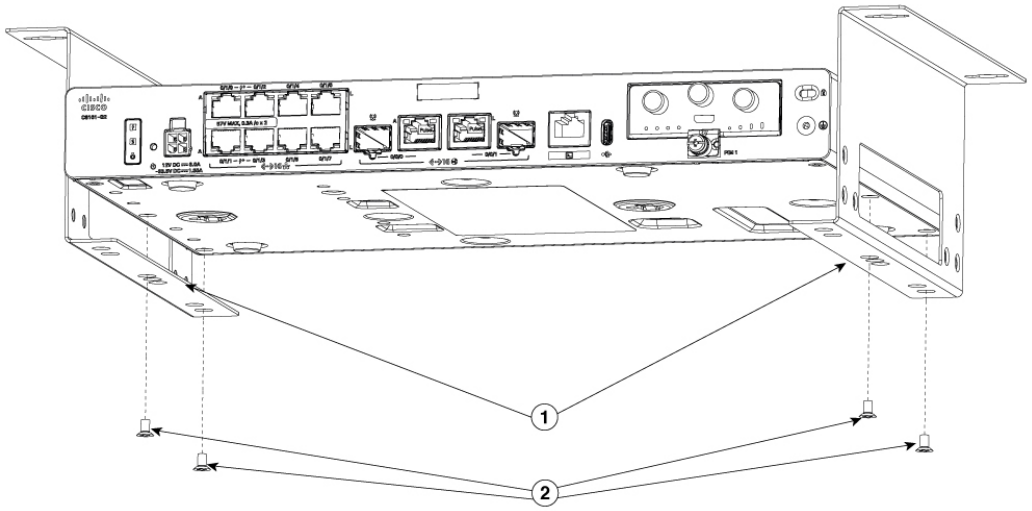
*Figure 12: Under desk mounting brackets installation for C8140-G2*




| | |
|---|---|
| 1 | Under desk mounting brackets |
| 2 | Screws |

**Example:**

*Figure 13: Under desk mounting brackets installation for C8151-G2 and C8161-G2*

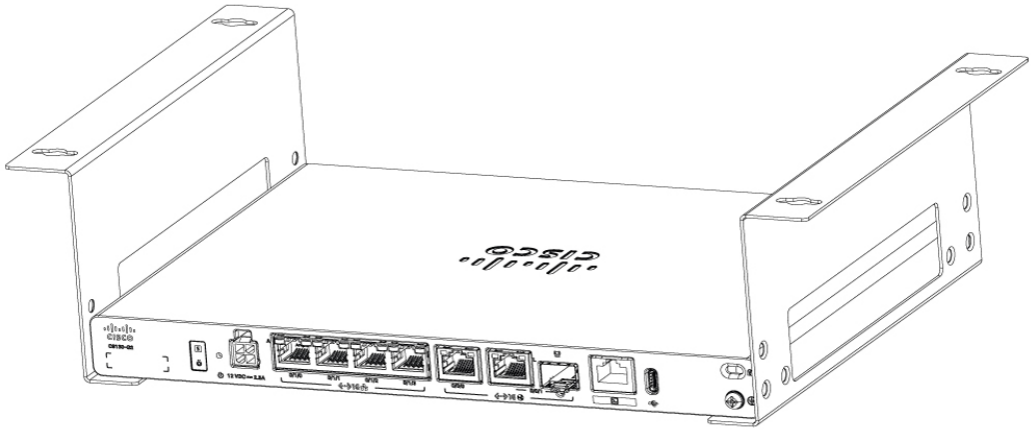



| | |
|---|---|
| 1 | Under desk mounting brackets |
| 2 | Screws |

**Step 3** Secure the under desk mounting brackets to the router using the screws. Ensure that all the screw fasteners on the installed components are securely tightened.

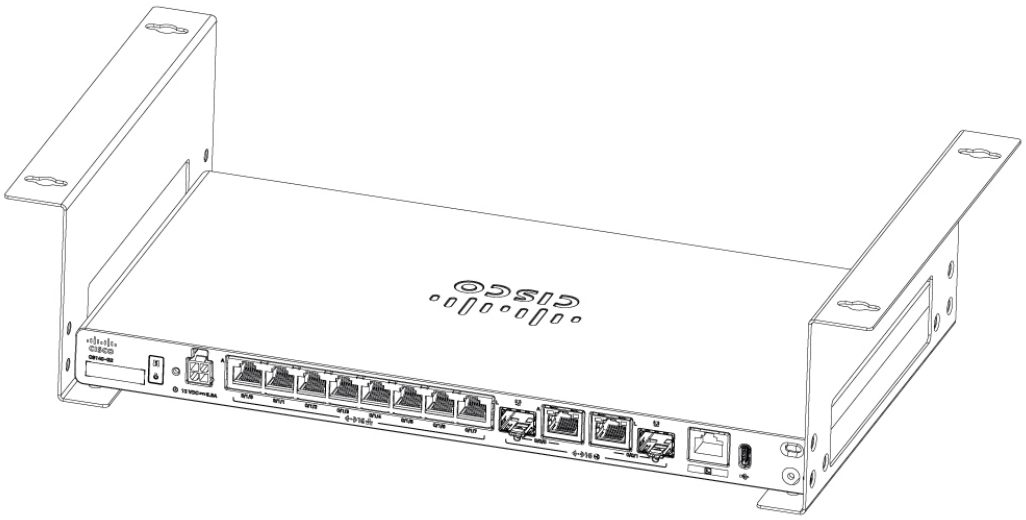
**Example:**

*Figure 14: C8130-G2 with attached under desk mounting brackets*



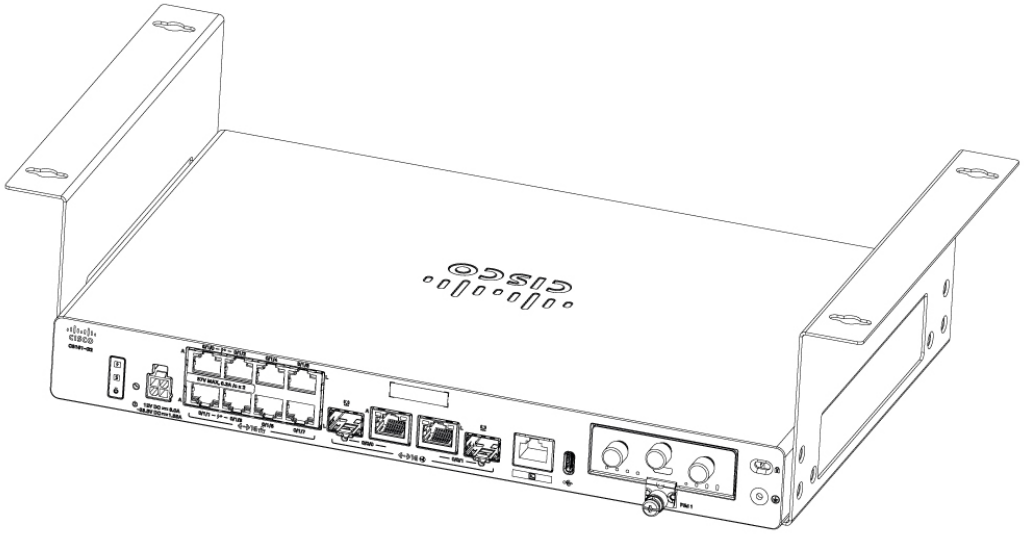
**Example:**

*Figure 15: C8140-G2 with attached under desk mounting brackets*



**Example:**

*Figure 16: C8151-G2 and C8161-G2 with attached under desk mounting brackets*



**Step 4** After the bracket is attached, drill a 2mm hole under the desk and insert the wooden screws. Mount the router under the desk or shelf using the pan-head wood screws.

**Example:**

*Figure 17: Mounting C8130-G2 under a shelf*

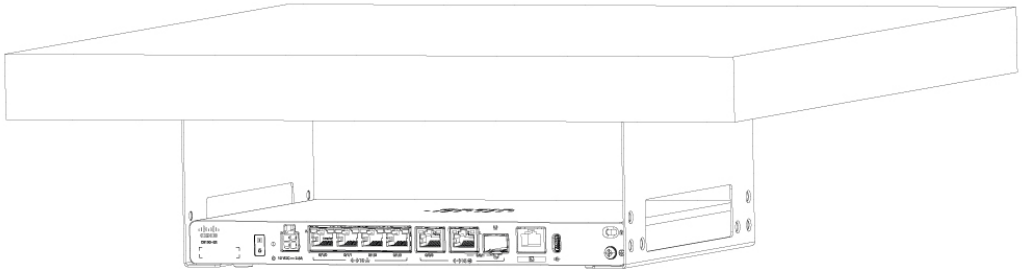


*Figure 18: Mounting C8140-G2 under a shelf*

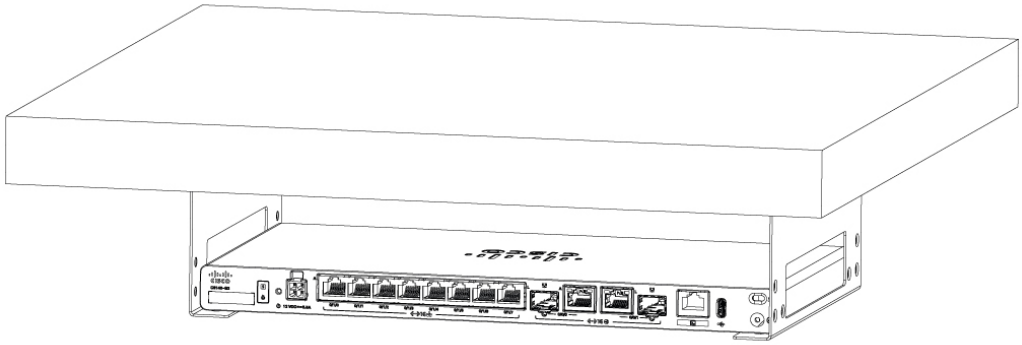


*Figure 19: Mounting C8151-G2 and C8161-G2 under a shelf*

*Figure 20: Pan-head wood screws*

# Wall mount

There are two ways to mount a router on the wall, using **Keyhole slots** and **DIN rail brackets**.

**Warning** **Statement 1094—**Read Wall-Mounting Instructions Before Installation

Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.

**Note** The recommended clearance when a router is horizontally mounted is 1.5 inches on both sides for clearance and 1.75 inches on top. I/O side clearance is needed as it is required to access the cable connections. Clearance is not required on the backside (opposite side from I/O face) unless mounting on a DIN rail. Clearance is required to attach and mount the DIN rail bracket.

## Wall mount using Keyhole Slots

The Cisco 8100 Series Secure Routers have keyhole slots at the bottom of the chassis for mounting on a wall or any vertical surface.

**Note** When choosing a location for wall mounting the router, consider cable limitations and wall structure.

**Note** Route the cables so that they do not put a strain on the connectors or mounting hardware.

**Procedure**

**Step 1** Measure the distance between both the keyhole slots and mark them onto the wall.

**Step 2** Drill holes into the wall as per the markings you took in **Step 1**, and insert the screws in it.

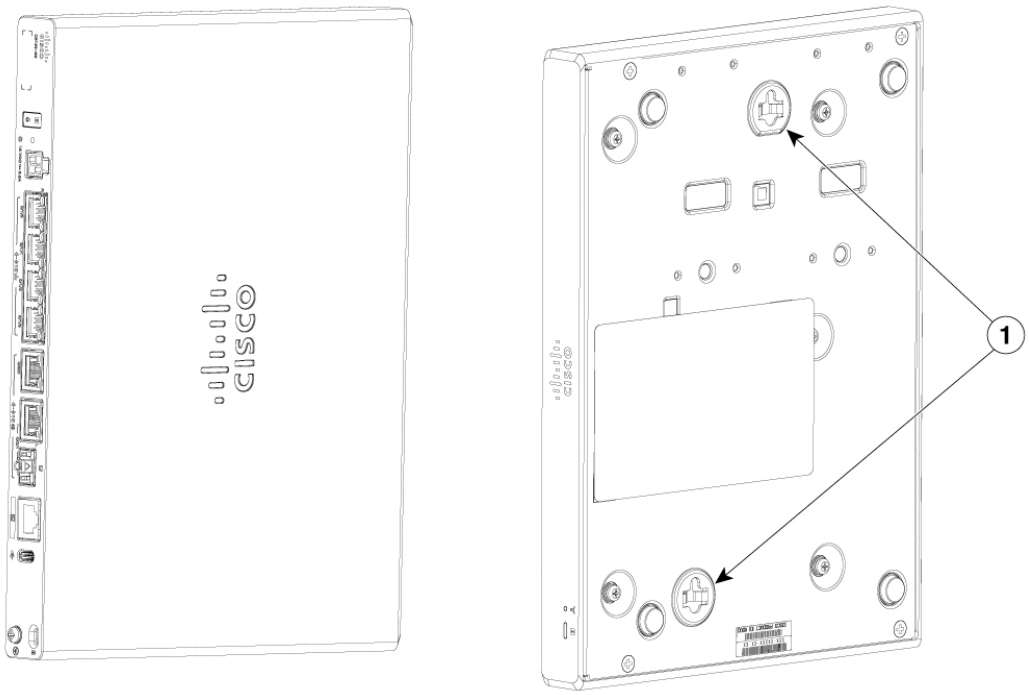
To attach a router to the wall stud, each bracket should have one number 10 wood screw (pan-head) with number 10 washers, or two number 10 washer-head screws. The screws must be long enough to penetrate at least 1.5 inches (38.1 mm) into the supporting wood or metal wall stud.

For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size number 6 (pan-head).

**Step 3** Place the router onto the screws and slide the router to lock it into place.

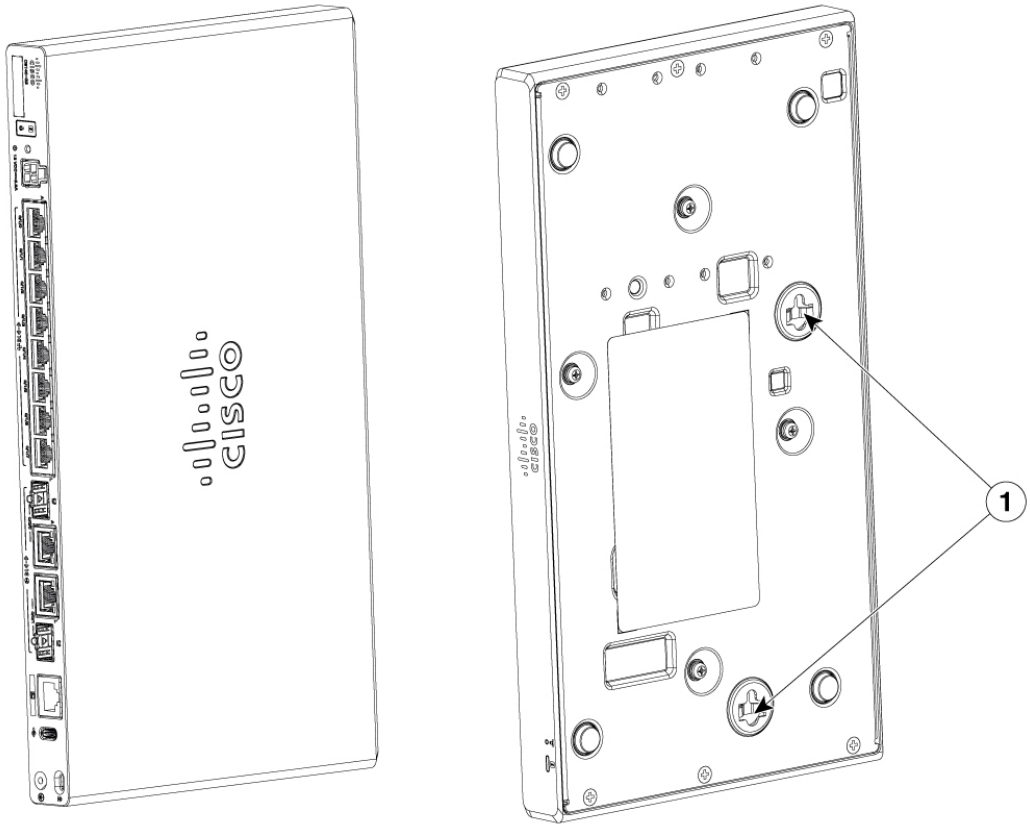
**Example:**

*Figure 21: Wall mount using keyhole slots for C8130-G2*



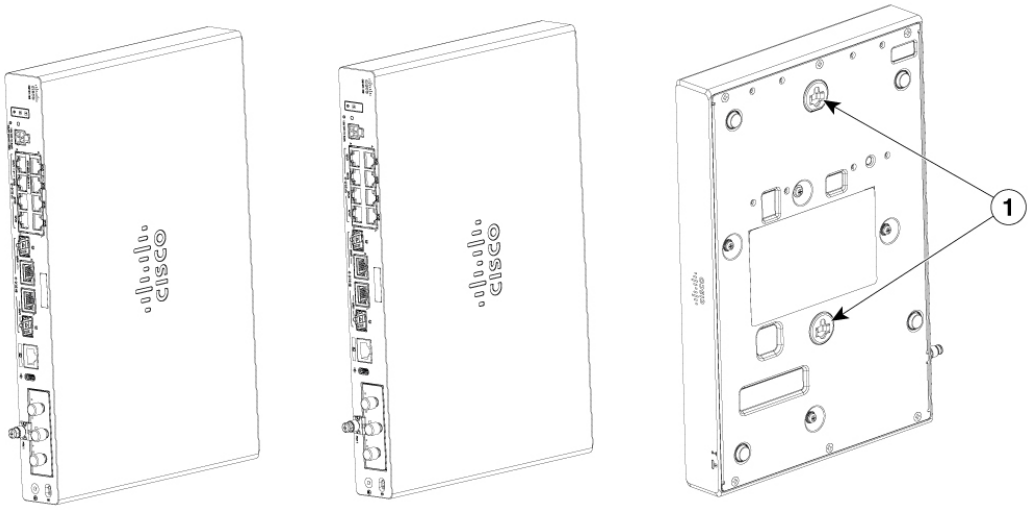

| | |
|---|---|
| 1 | Keyhole slots<br>Horizontal spacing: 1.693 in(43.00 mm)<br>Vertical spacing: 8.113 in(206.07 mm) |

*Figure 22: Wall mount using keyhole slots for C8140-G2*




| | |
|---|---|
| 1 | Keyhole slots<br>Horizontal spacing: 1.330 in(33.78 mm)<br>Vertical spacing: 6.500 in(165.10 mm) |

*Figure 23: Wall mount using keyhole slots for C8151-G2 and C8161-G2*




| | |
|---|---|
| 1 | Keyhole slots<br>Key-hole slots spacing: 7.250 in(184.15 mm) |

## Wall mount using DIN rail brackets

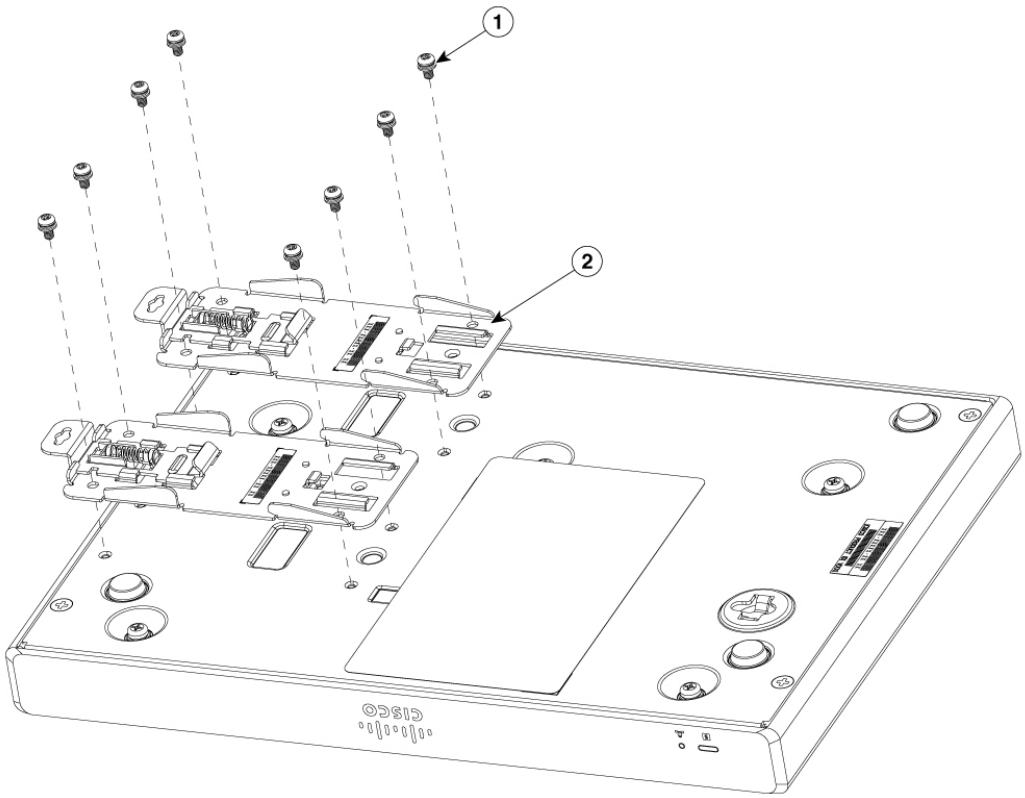
The router is shipped with DIN rail brackets that are to be secured on the bottom side of the chassis. Your chassis installation must allow unrestricted airflow for chassis cooling.

**Procedure**

**Step 1** Align the din rail brackets to the holes indicated in the following figure.To attach the DIN rail brackets to the router chassis, use the PHMS screws and the plastic spacers provided for each bracket.

**Example:**

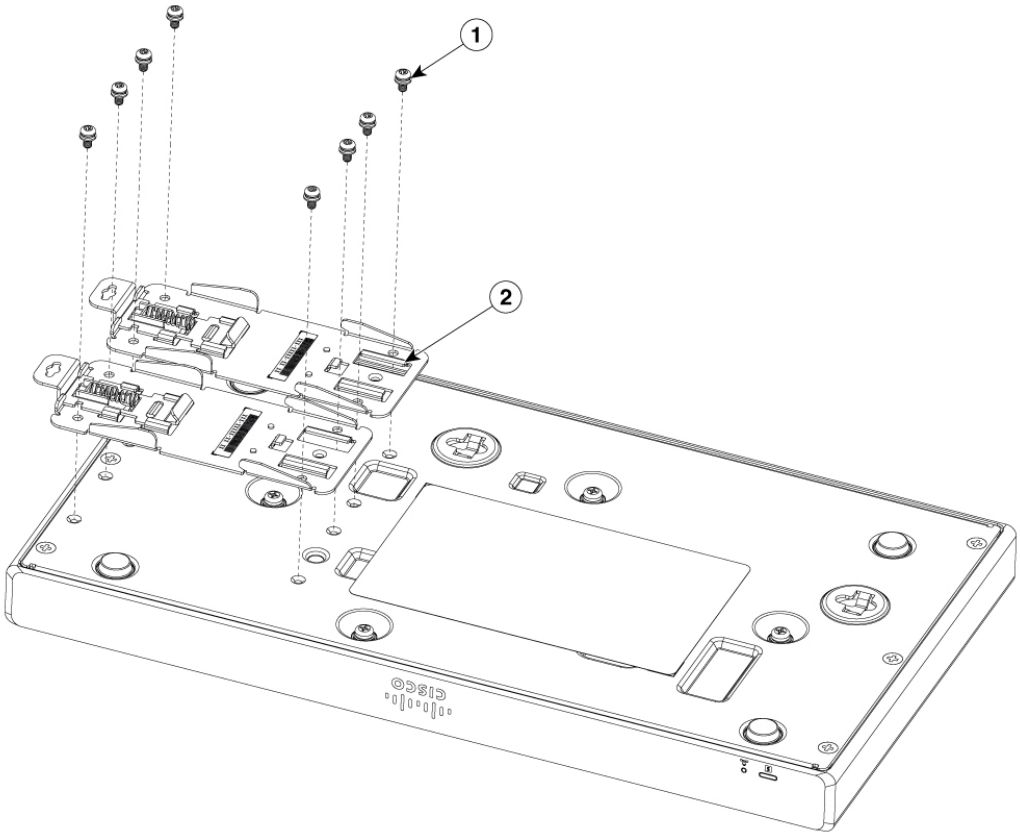
*Figure 24: DIN rail bracket installation for C8130-G2*




| | |
|---|---|
| 1 | PHMS screws |
| 2 | DIN rail brackets |

**Example:**

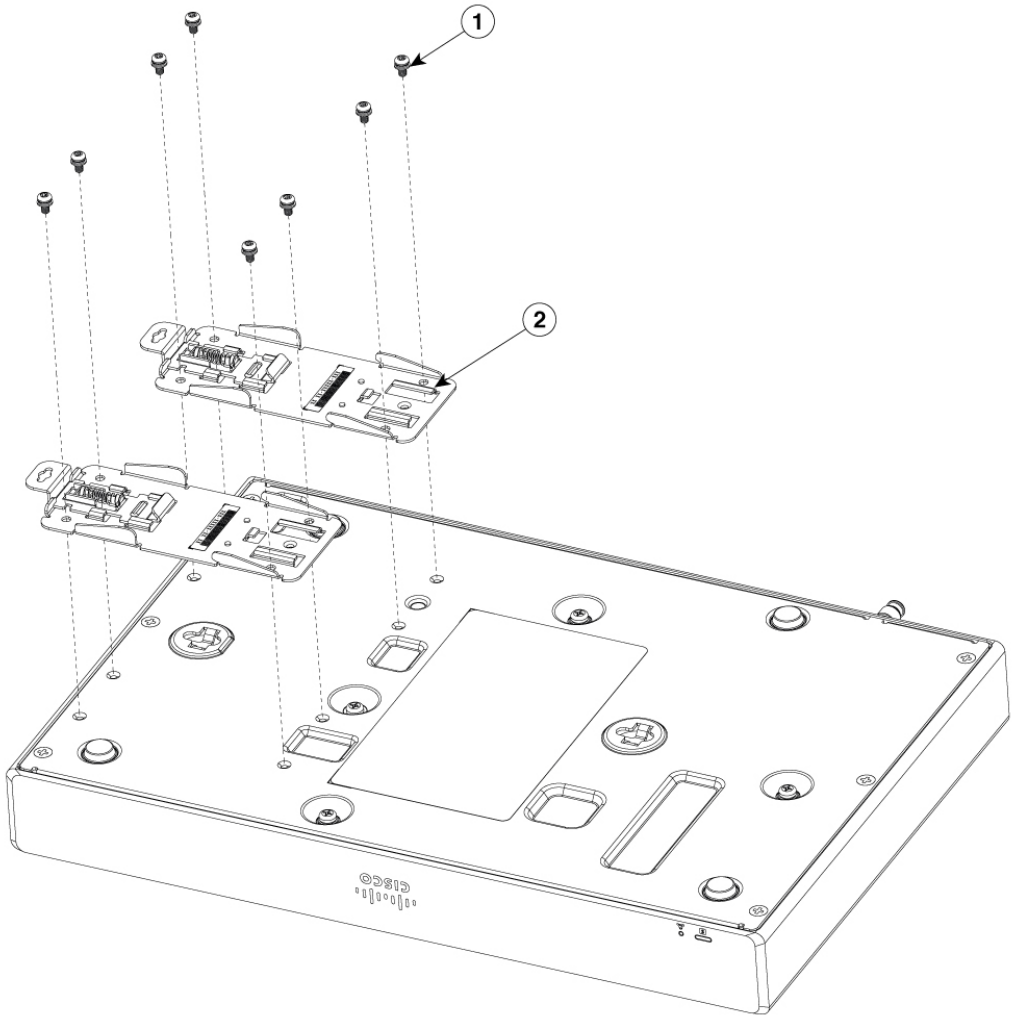
*Figure 25: DIN rail bracket installation for C8140-G2*




| | |
|---|---|
| 1 | PHMS screws |
| 2 | DIN rail brackets |

**Example:**

*Figure 26: DIN rail bracket installation for C8151-G2 and C8161-G2*




| | |
|---|---|
| 1 | PHMS screws |
| 2 | DIN rail brackets |

**Step 2** Secure the din rail brackets to the router using the PHMS screws and the plastic spacers provided for each bracket.

**Example:**

*Figure 27: C8130-G2 with attached DIN rail brackets*

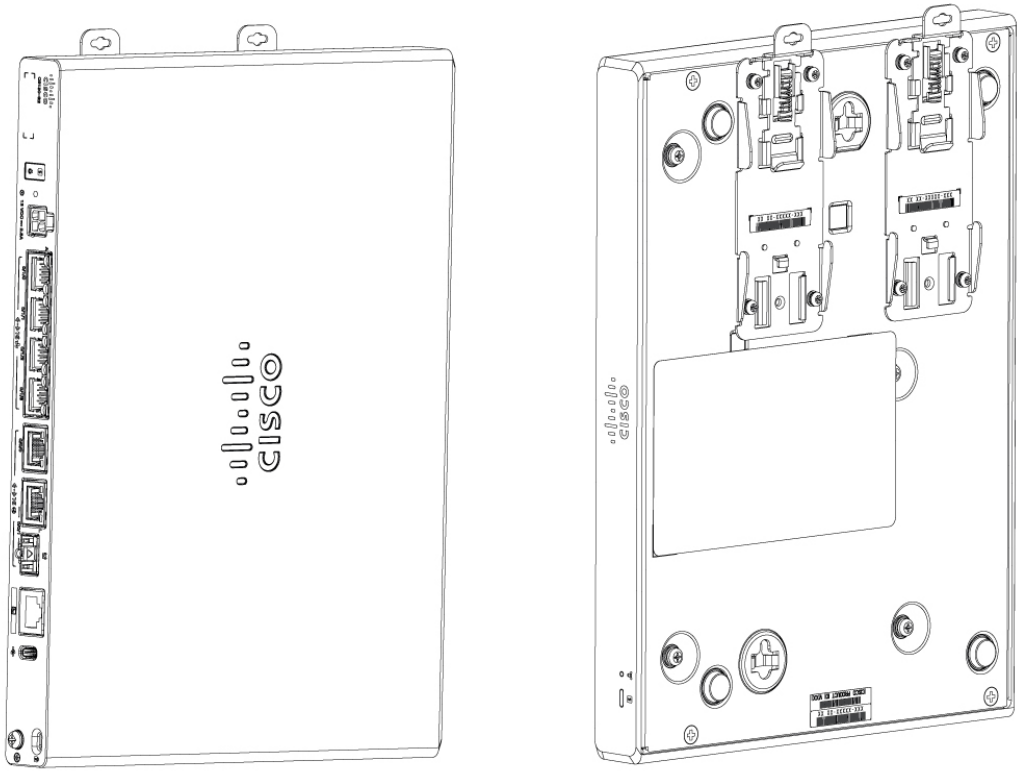


*Figure 28: C8140-G2 with attached DIN rail brackets*

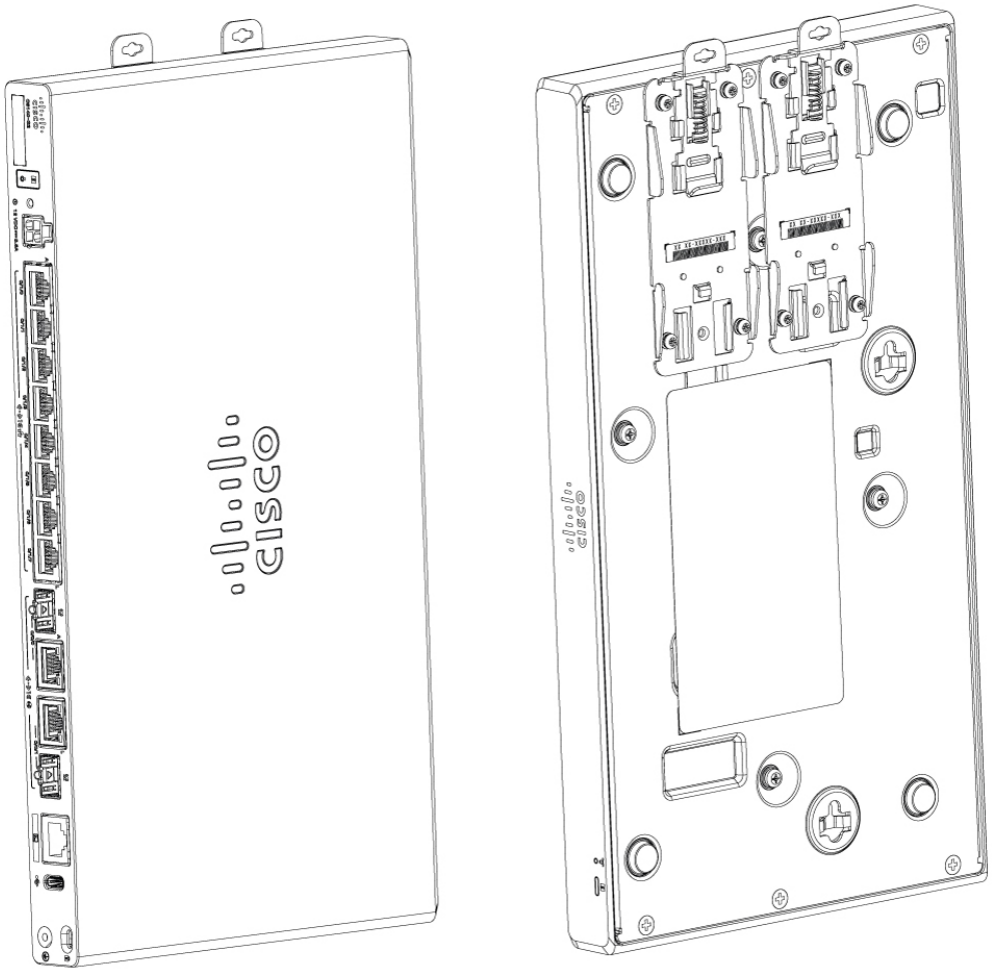
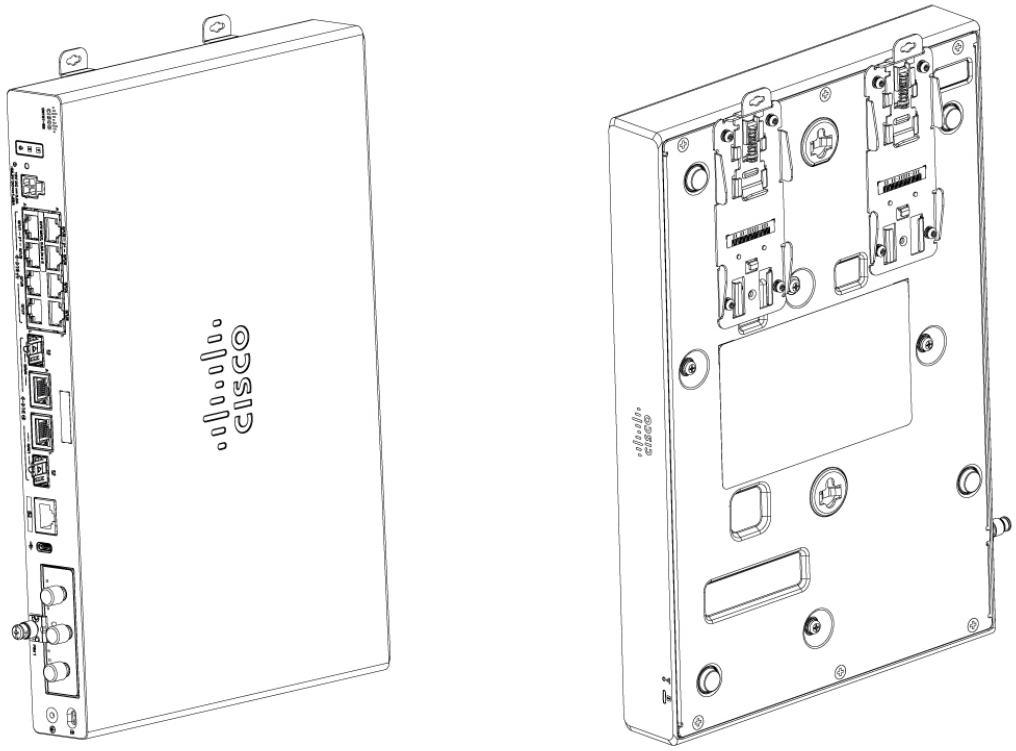


*Figure 29: C8151-G2 and C8161-G2 with attached DIN rail brackets*



**Note**
Do not over-torque the screws. The recommended torque is 8 to 10 inch-lbf (0.9 to 1.1 N-m).

**Step 3** Attach the brackets onto the DIN rail to clamp it together.

**Example:**

*Figure 30: Mounting C8130-G2 using DIN rail brackets*

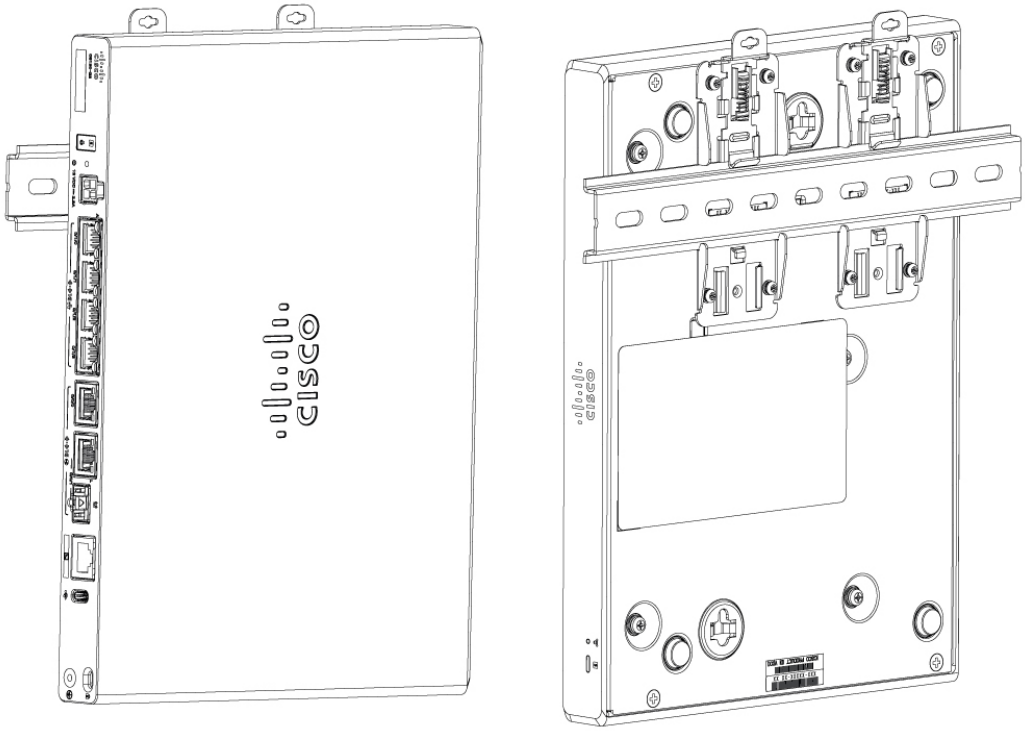


*Figure 31: Mounting C8140-G2 using DIN rail brackets*

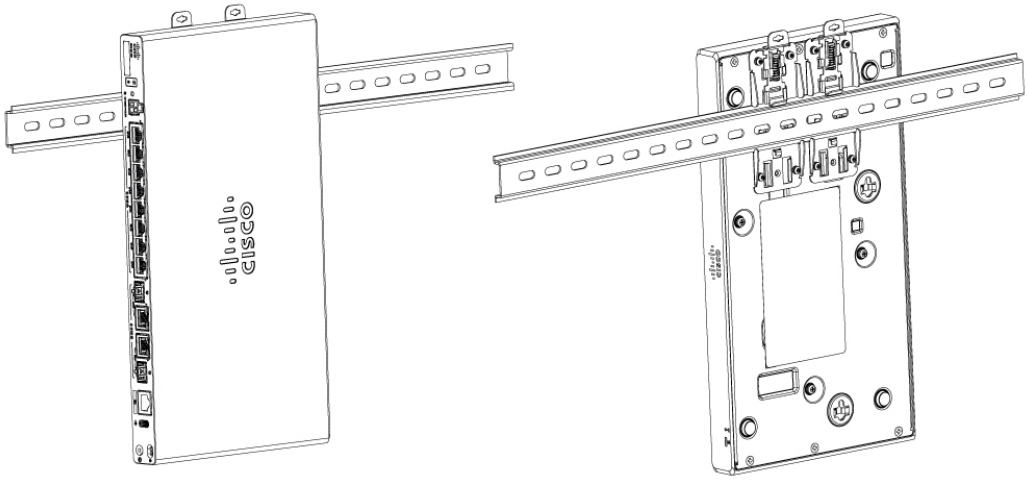
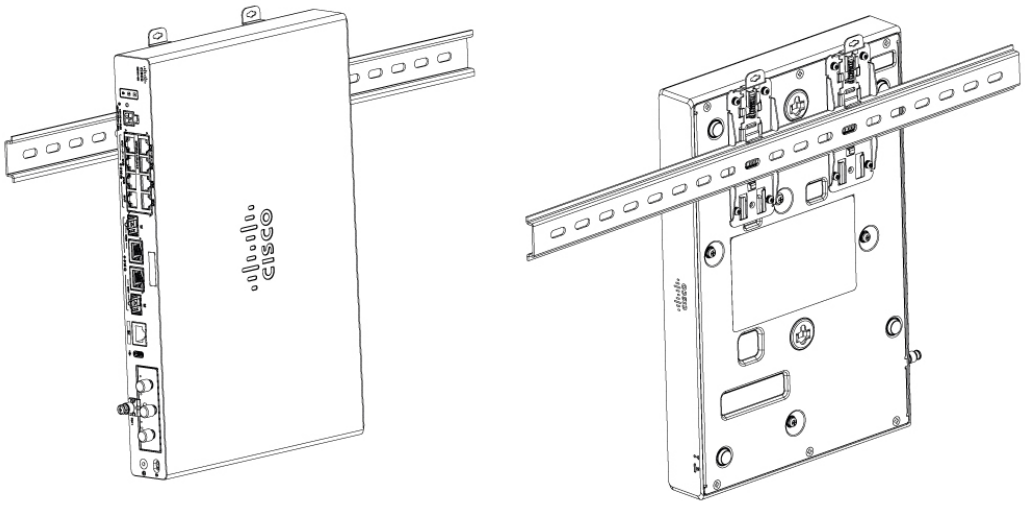


*Figure 32: Mounting C8151-G2 and C8161-G2 using DIN rail brackets*



# Ground connection warnings

Take note of the following ground connection warnings:

**Warning** **Statement 1101—**Connected To Grounded Outlet

In the Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden) the appliance must be connected to a grounded outlet.

# Chassis grounding

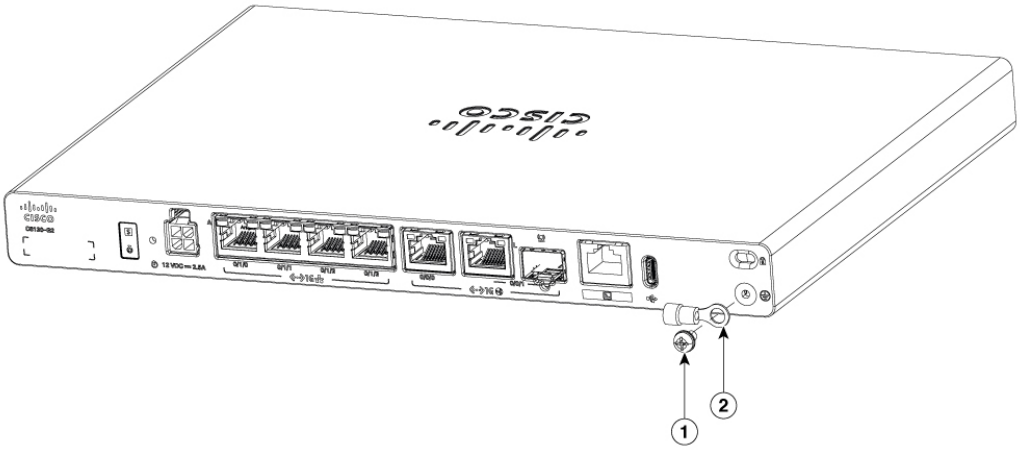
After you set up the router, connect the chassis to a reliable earth ground. The ground wire must be installed in accordance with local electrical safety standards. For grounding the chassis, use a copper wire of size of 14 AWG (2 mm²). Following components are provided along with the router:

1. Ground Lug
2. UNC 5-32 screws which have a length of about 0.25 inches.

To install the ground connection for your router, perform the following steps:

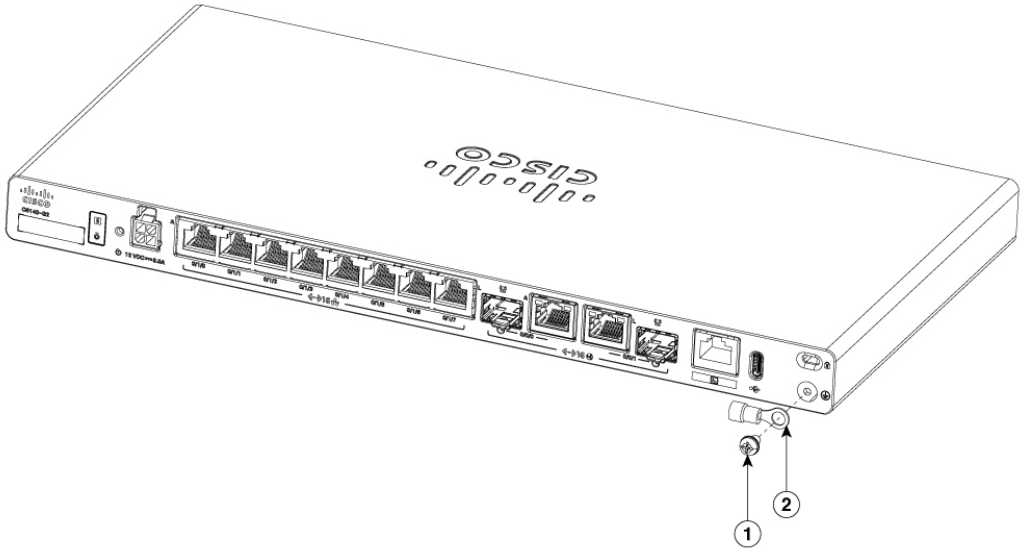
1. Strip one end of the ground wire to the length approximately 0.75 inch (20 mm) for the ground lug.
2. Crimp the ground wire to the ground lug using a crimp tool of the appropriate size.
3. Attach the ground lug to the chassis as shown in the below figures. Tighten the screw; the recommended torque is 8 to 10 inch-lbf (0.9 to 1.1 N-m).

*Figure 33: Chassis ground connection - C8130-G2*



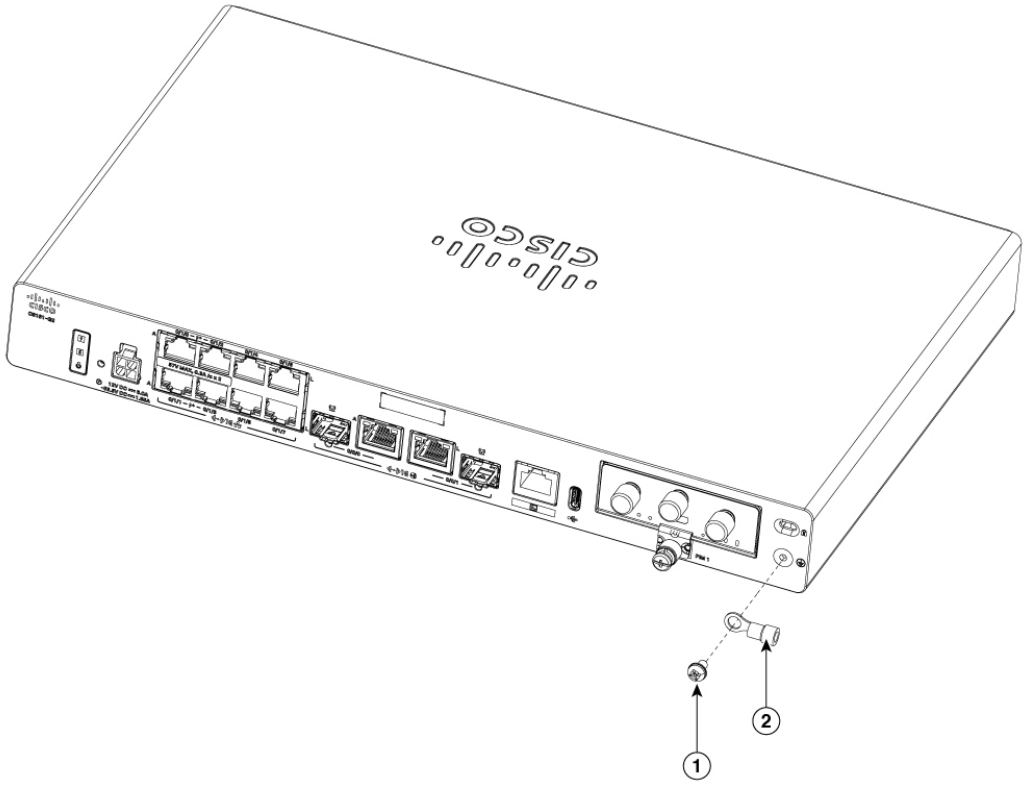

| | |
|---|---|
| 1 | Screw (UNC 6-32) |
| 2 | Ground lug |

*Figure 34: Chassis ground connection - C8140-G2*




| | |
|---|---|
| 1 | Screw (UNC 6-32) |
| 2 | Ground lug |

*Figure 35: Chassis ground connection - C8151-G2 and C8161-G2*




| | |
|---|---|
| 1 | Screw (UNC 6-32) |
| 2 | Ground lug |

# Optical connection SFP warnings

Take note of the following optical connection warnings:

**Warning** **Statement 1051—**Laser Radiation

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

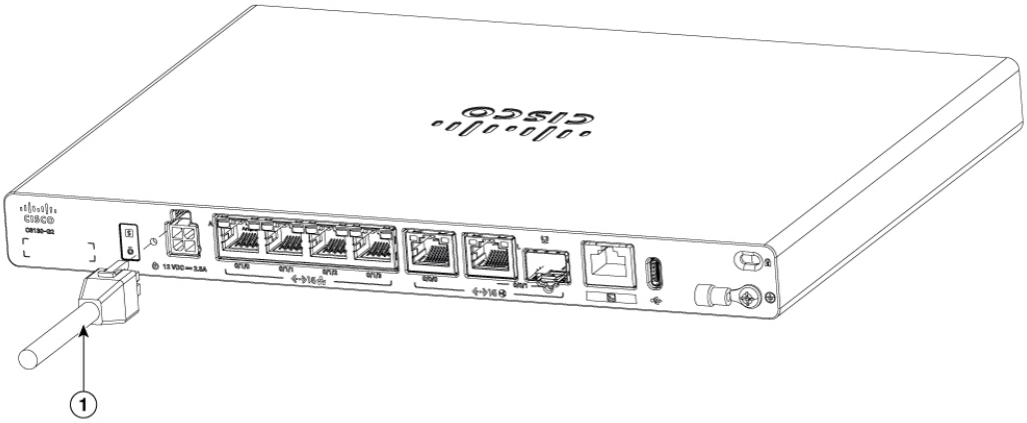
# Connect the power cable

Power supply of the Cisco 8100 Series Secure Routers is an external AC to DC power adapter. The external DC power connector plugs into the router's 4 points power connector.

The router does not have a power button. Refer the following to Power on/off the Router:

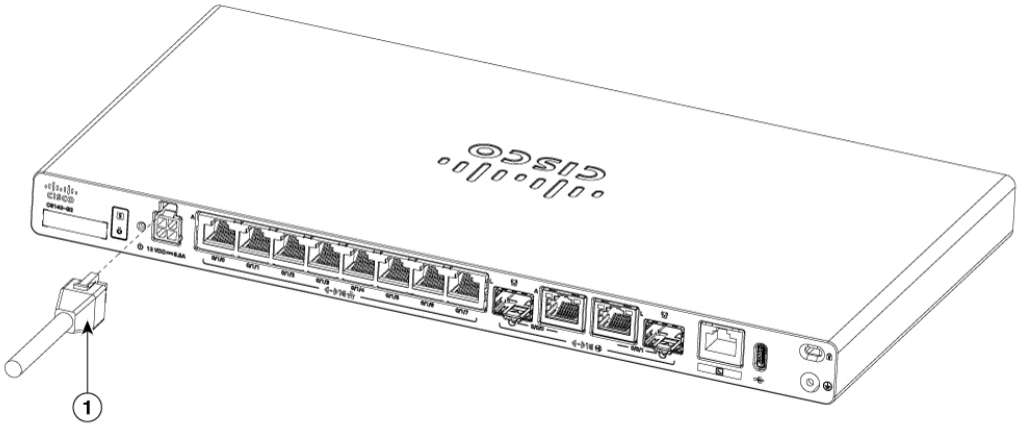
- To power on the router – you can locate the power cable and connect it to a power source.
- To power off the router – unplug the power cord from the back of the router or gently pull the power cable from the router or the wall outlet.

***Figure 36: Power cable - C8130-G2***



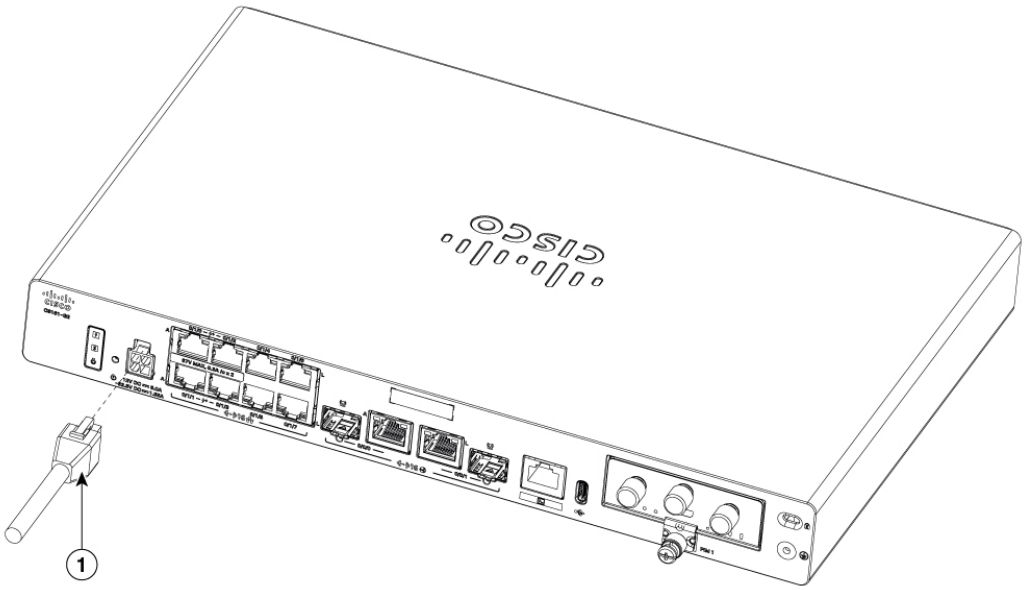

| | |
|---|---|
| 1 | Power cable |

***Figure 37: Power cable - C8140-G2***




| | |
|---|---|
| 1 | Power cable |

*Figure 38: Power cable - C8151-G2 and C8161-G2*




| | |
|---|---|
| 1 | Power cable |

# Connect the router to a console

The Cisco 8100 Series Secure Routers contains a RJ45 console port. This port provides administrative access to the router through a console terminal or a PC.

Use the RJ45 console port on the router to access the Cisco Internetwork Operating System (IOS XE) command line interface (CLI) on the router and perform configuration tasks. A terminal emulation program is required to establish communication between the router and a PC.

To configure the router through the CLI, you must establish a connection between the router console port and either a PC or a terminal.

Use the following cables and adapters to establish a local or remote connection.

***Table 1: Local and remote connections***

| Port type | Cable | Action |
|---|---|---|
| Serial (RJ45) | RJ45 serial console cable | Connecting to the serial port with terminal emulation program. |

# Connect to the Serial Port with Microsoft Windows

This procedure describes how to connect a Microsoft Window USB port to a console port.

### Before you begin

To establish a physical connectivity between the router and a PC, you need to install a Microsoft Windows USB.

### Procedure

**Step 1** Connect the end of the console cable with the RJ45 connector to the light blue console port on the router.

**Step 2** Connect the end of the cable with the DB-9 connector (or USB Type-A) to the terminal or PC. If your terminal or PC has a console port that does not accommodate a DB-9 connector, you must provide an appropriate adapter for that port.

**Step 3** Start a terminal emulator application to communicate with the router. Configure the software with the following parameters:

- 9600 baud
- 8 data bits
- no parity
- 1 stop bit
- no flow control

# Connect to the console port with Mac OS X

This procedure describes how to connect a Mac OS X system USB port to the console using the built in OS X Terminal utility.

### Procedure

**Step 1** Use the Finder to go to Applications > Utilities > Terminal.

**Step 2** Connect the OS X USB port to the router.

**Step 3** Enter the following commands to find the OS X USB port number

**Example:**

```
macbook:user$ cd /dev
macbook:user$ ls -ltr /dev/*usb*
crw-rw-rw-  1 root    wheel       9,  66 Apr  1 16:46 tty.usbmodem1a21 DT-macbook:dev user$
```

**Step 4** Connect to the USB port with the following command followed by the router USB port speed

**Example:**

```
macbook:user$ screen /dev/tty.usbmodem1a21 9600
```

**To disconnect the OS X USB console from the Terminal window**

Enter Ctrl-a followed by Ctrl-\

## Connect to the console port with Linux

This procedure shows how to connect a Linux system USB port to the console using the built in Linux terminal utility.

**Procedure**

**Step 1** Open the Linux terminal window.

**Step 2** Connect the Linux USB port to the router.

**Step 3** Enter the following commands to find the Linux USB port number.

**Example:**

```
root@usb-suse# cd /dev
root@usb-suse /dev# ls -ltr *ACM*
crw-r--r--    1 root     root     188,   0 Jan 14 18:02 ttyACM0
root@usb-suse /dev#
```

**Step 4** Connect to the USB port with the following command followed by the router USB port speed.

**Example:**

```
root@usb-suse /dev# screen /dev/ttyACM0 9600
```

**Note**
**To disconnect the Linux USB console from the terminal window:**

Enter Ctrl-a followed by : then quit.

# Connect WAN and LAN interfaces

This section describes how to connect WAN and LAN interface cables.

## Ports and cabling

This section summarizes typical WAN and LAN connections for Cisco 8100 Series Secure Routers. The connections summarized here are described in detail in the Cisco Modular Access Router Cable Specifications document on cisco.com.

*Table 2: WAN and LAN connections*

| Port | Port Type | Connection | Cable |
|---|---|---|---|
| Ethernet | RJ45 | Ethernet hub or Ethernet switch | Category 5 or higher Ethernet |
| Gigabit Ethernet SFP, optical | LC | 1000BASE-SX, -LX, -LH, -ZX, -CWDM | Optical fiber as specified on applicable data sheet |
| Gigabit Ethernet SFP, copper | RJ45 | 1000BASE-T | Category 5, 5e, 6 UTP |

# Connection procedures and precautions

After you have installed the router chassis, perform these steps to connect the WAN and LAN interfaces:

**Procedure**

**Step 1** Connect each WAN and LAN cable to the appropriate ports on the chassis.

**Step 2** Position the cables carefully so that you do not strain the connectors.

**Step 3** Organize cables in bundles so that cables do not intertwine.

**Step 4** Inspect the cables to make sure that the routing and bend radius is satisfactory. If necessary, reposition the cables.

**Step 5** Install cable ties in accordance with site requirements.