Install and Connect the Router

This chapter describes how to install and connect Cisco 1000 Series Integrated Services Router to LAN and WAN networks.

⚠️ **Warning**   Read the installation instructions before using, installing or connecting the system to the power source. Statement 1004

Installing the Cisco 1000 Series Integrated Services Router involve these tasks:

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.

Set up Router on Desktop, Rack, or Wall

After unpacking, based on your requirements, you can set up a Cisco 1000 Series Integrated Services Router 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.
>
> For information on modules and Field Replaceable Units (FRUs), see the Install and Upgrade Modules and FRUs section.

Depending on the model, the available options for mounting a Cisco 1000 Series Integrated Services Router are:

Table 1: Models and Mounting Options

Model	Mounting Options
C111x and C1111X	Desktop, Rack Mount, Wall Mount using Key-hole Slots, Wall Mount using-Din-Rail
C1101-4P	Desktop, Wall Mount using Key-hole Slots
C1101-4PLTEPWx	Desktop, Wall Mount using Key-Hole Slots
C1109-2PLTExx	Desktop, Wall Mount using Key-Hole Slots,
C1121-4Px	Desktop, Rack Mounting using Din-Rail Brackets, Under Desk
C1126(X)-8PLTEP	Desktop, Rack Mounting using Din-Rail Brackets, Under Desk
C1128(X)-8PLTEP	Desktop, Rack Mounting using Din-Rail Brackets, Under Desk
C1131(X)-8PLTEPWx	Desktop, Rack Mounting using Din-Rail Brackets, Under Desk
C1131(X)-8PWx	Desktop, Rack Mounting using Din-Rail Brackets, Under Desk
C111x	Attach the C111x Top Plate (C1110-TOP-PLATE=) on Desktop, Attach the C111x Top Plate (C1110-TOP-PLATE=) for Rack Mount
C1121/C1161	Attach the C1121/C1161 Top Plate (C1120-TOP-PLATE=) on Desktop, Attach the C1121/C1161 Top Plate (C1120-TOP-PLATE=) for Rack Mount

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

Rack Mount

Secure the rack mounting brackets on the sides of the chassis. You must first secure rack mounting brackets on the chassis before you set up the chassis on the rack.

⚠️

Caution   Do not stack multiple Cisco 1000 Series Integrated Services Routers when mounting the routers on a table top.

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.

☞

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. Cleaning involves vacuuming router air intake and exhaust vents.

✎

Note   Using the top plate on the chassis significantly helps in preventing any damages that may occur from rodent infestation.

✎

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 1000 Series Integrated Services Routers on a rack, ensure that there is ample surrounding space. This ensures more heat removal, which in turn helps the surrounding air temperature to stay within the specified operating conditions.
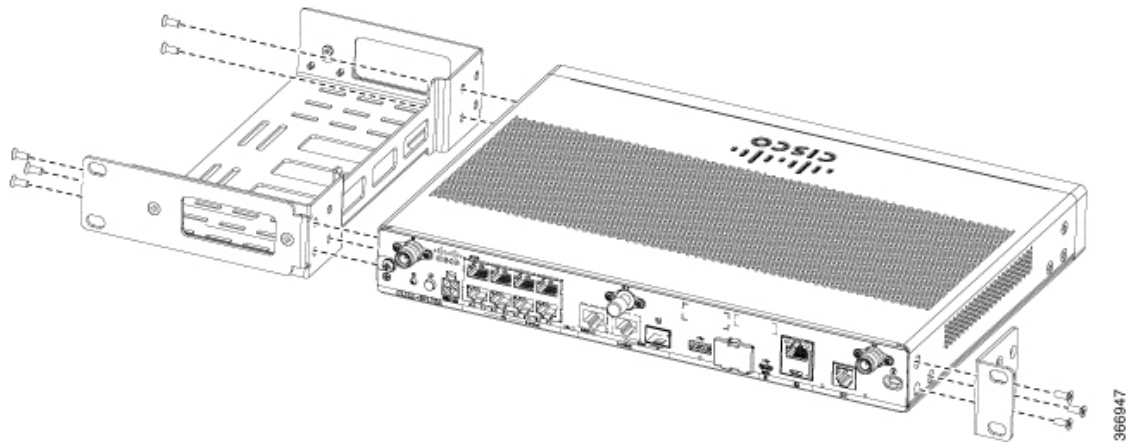
Attach the Rack Mount Brackets for C111x

This procedure describes how to attach the rack mount brackets on the router chassis:

Step 1   Secure the brackets to the router chassis (on the left) as shown in figure below:

Example:

Figure 1: Bracket Installation for Left-Side Mounting - C111x

Step 2 Similarly, secure the brackets on the right-side of the chassis for mounting the router.

## Attach the C111x Top Plate (C1110-TOP-PLATE=) on Desktop

This procedure describes how to attach the top plate on the router chassis:

Step 1 Use Phillips 2 screwdriver to remove two 6-32 screws on the sides of the unit.

Step 2 Orient the top plate with the Bezel Side arrow pointing outwards.

Example:

Figure 2: Removing side screws and orienting the top plate on C111x platforms
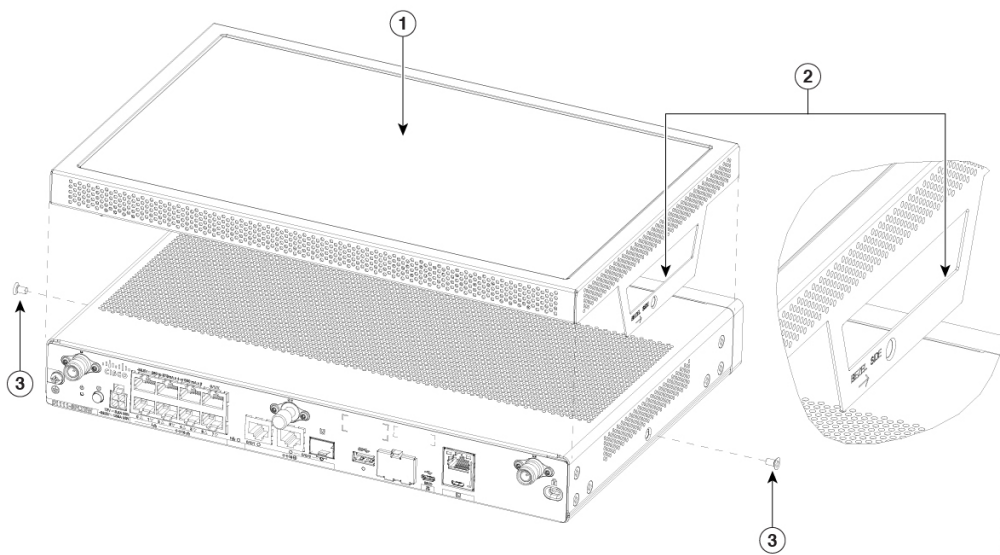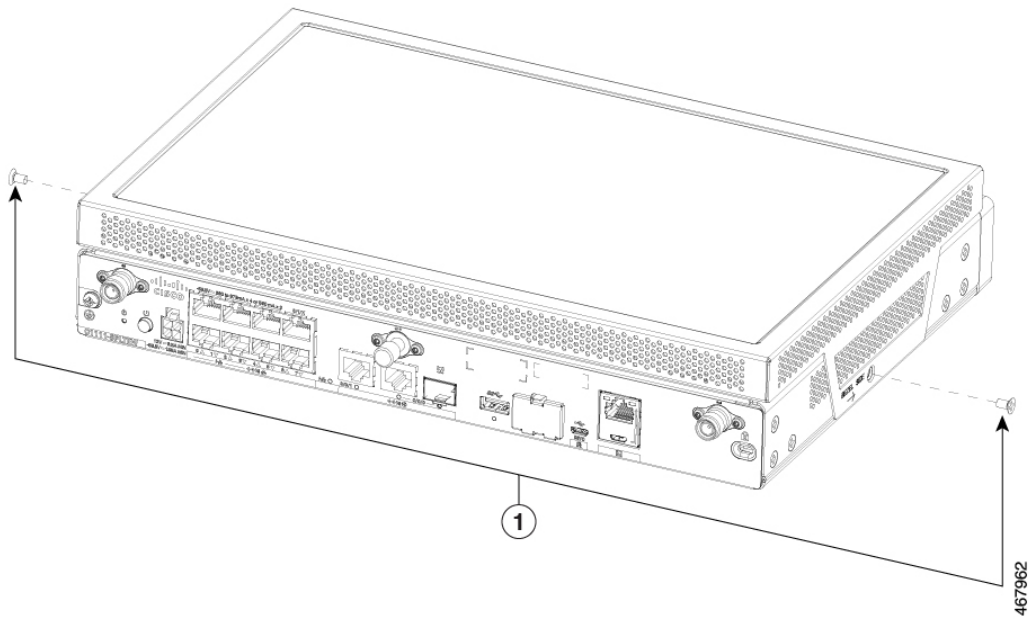
1	Top plate

2	Bezel side view pointing outwards
3	6-32 screws (2x)

Step 3 Lower the top plate and align side holes.

Step 4 Use Phillips 2 screwdriver to secure the screws, torque to 6-8 in-lbs.

Example:

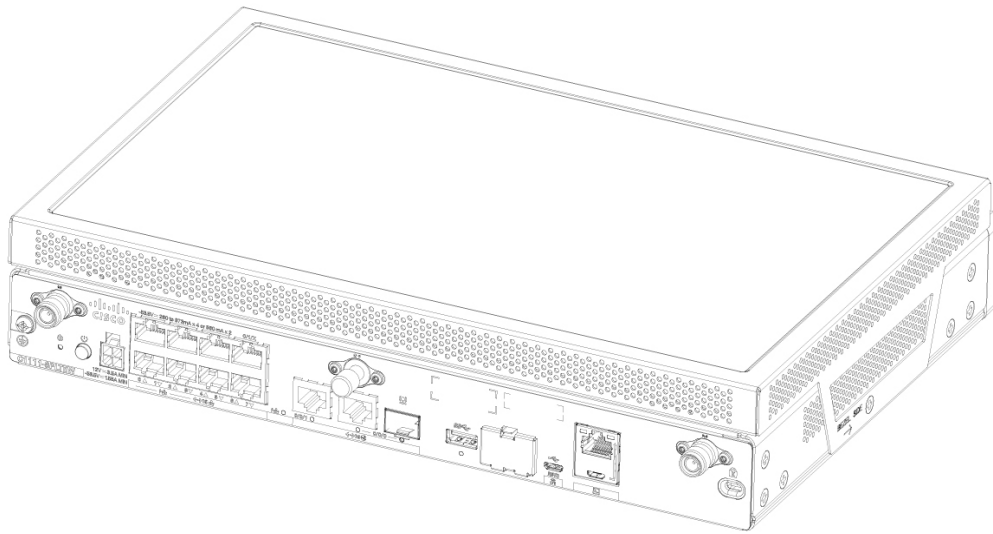*Figure 3: Aligning the side holes and securing the top plate with provided screws*

1	Secure the side screws

Step 5 The following figure displays the top plate fully secured to the unit.

Example:

Figure 4: Fully assembled C111x unit with top plate

Attach the C111x Top Plate (C1110-TOP-PLATE=) for Rack Mount

This procedure describes how to rack mount top plate on the router chassis:

Step 1   Follow the Attach the C111x Top Plate (C1110-TOP-PLATE=) on Desktop to attach C111x Top Plate for Desktop.

Step 2   Assemble the C111x unit with top plate to rack mount brackets according to the Rack Mount procedure.

Step 3   The following figure shows a complete assembled C111x unit with top plate and rack mount brackets.

Example:

Figure 5: Fully assembled C111x unit with top plate on rack mount brackets
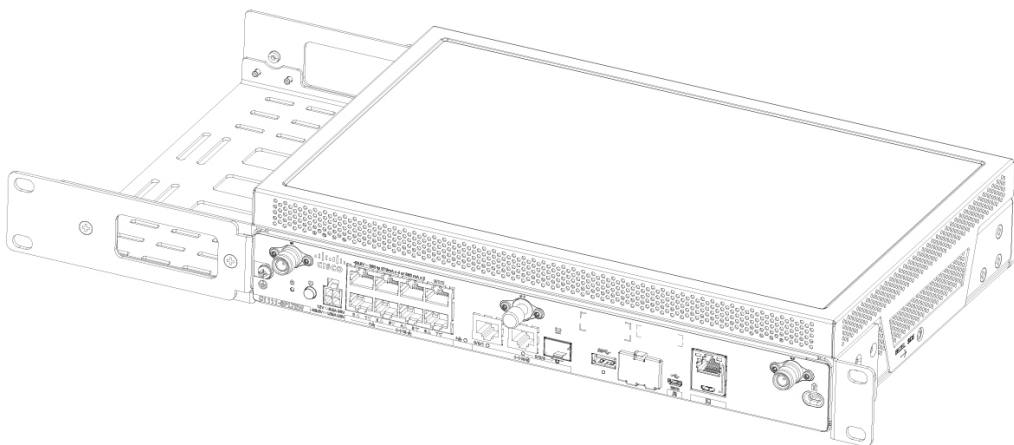
Attach the C1121/C1161 Top Plate (C1120-TOP-PLATE=) on Desktop

This procedure describes how to install the top plate on the router chassis:

Step 1 Verify the following PIDs (10.8in W x 7.85in D) for applicability:

- C1121-4P
- C1121-4PLTEP
- C1121-8PLTEP
- C1121X-8PLTEP
- C1121-8P
- C1121X-8P
- C1161-8P
- C1161X-8P
- C1161-8PLTEP
- C1161X-8PLTEP

Step 2 Use Phillips 2 screwdriver to remove four 6-32 screws from the bottom side of the unit.

Example:
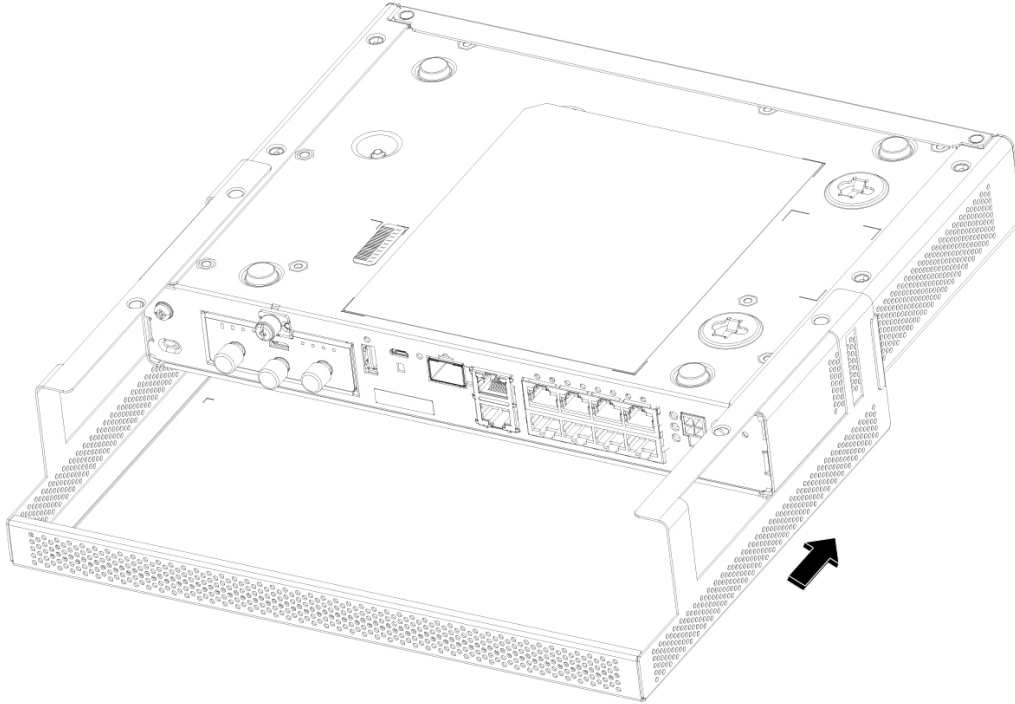
Figure 6: Removing 4 screws from C1121/C1161 unit
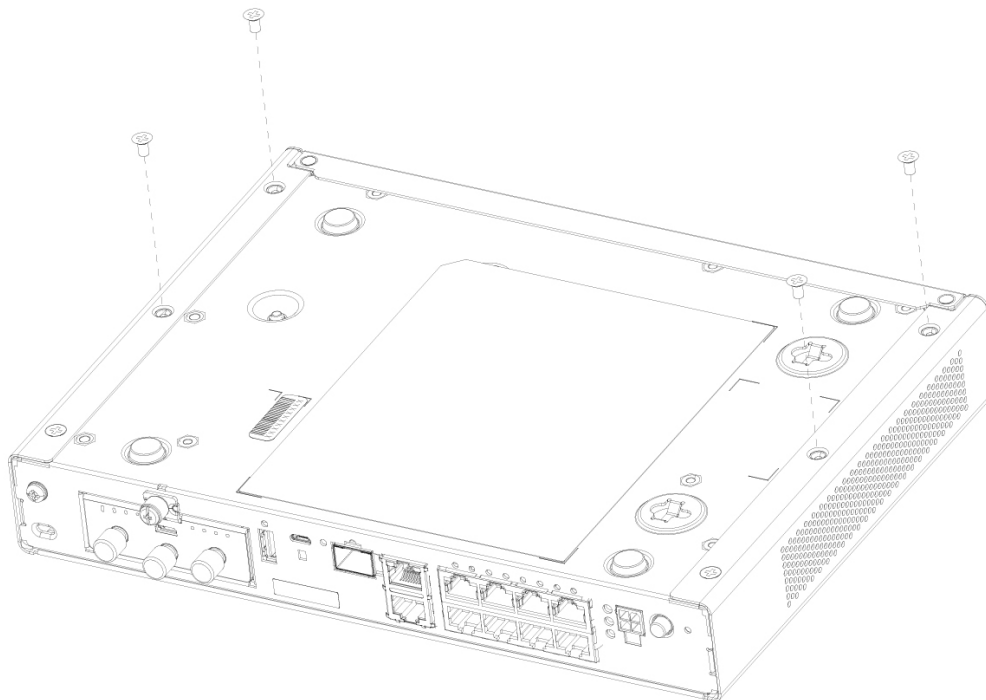
Step 3 Orient the top plate and slide it on to the unit.

Example:

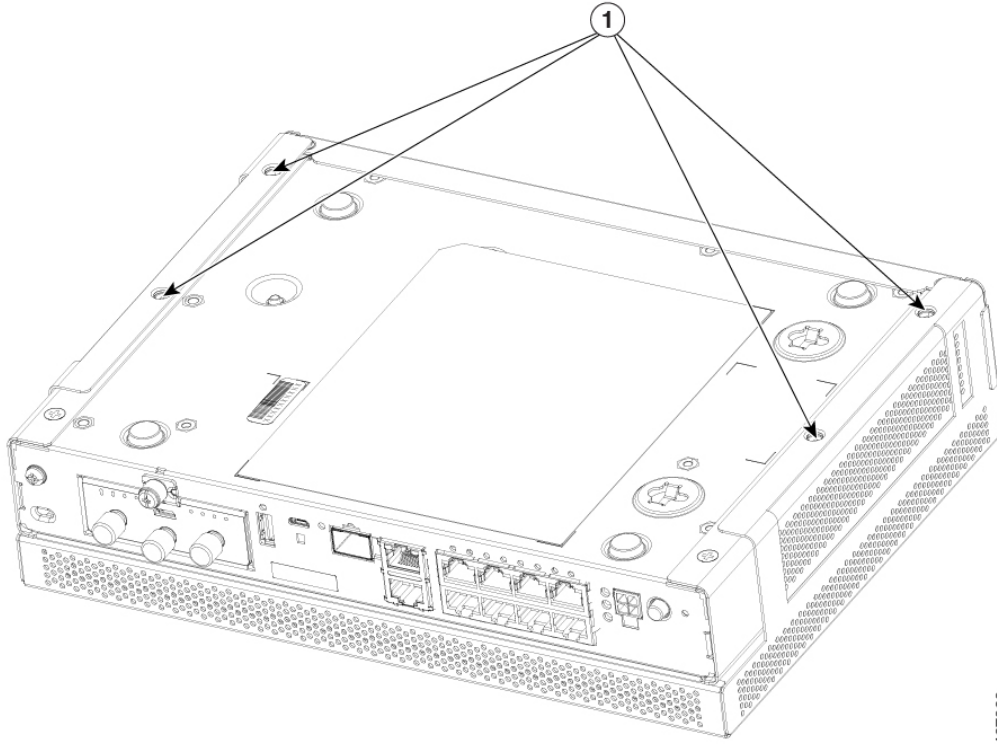*Figure 7: Installing top plate on to C1121/C1161*

467966

Step 4 Aligning the securing holes of top plate to C1121/C1161.

Example:

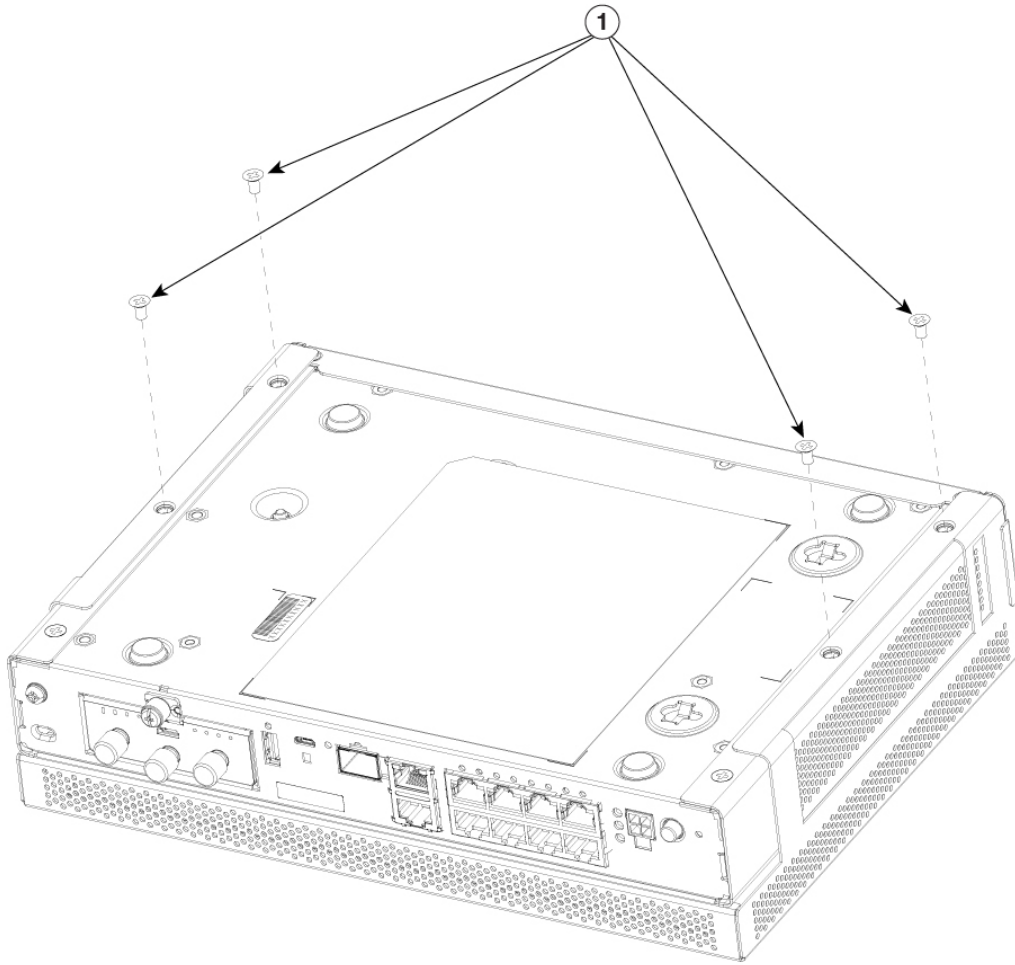*Figure 8: Aligning the securing holes of top plate to C1121/C1161*

467969

1	Align securing holes

Step 5   Use Phillips 2 screwdriver to secure screws to 6-8 in-lbs.

Example:

Figure 9: Securing top plate of C1121/C1161 with screws
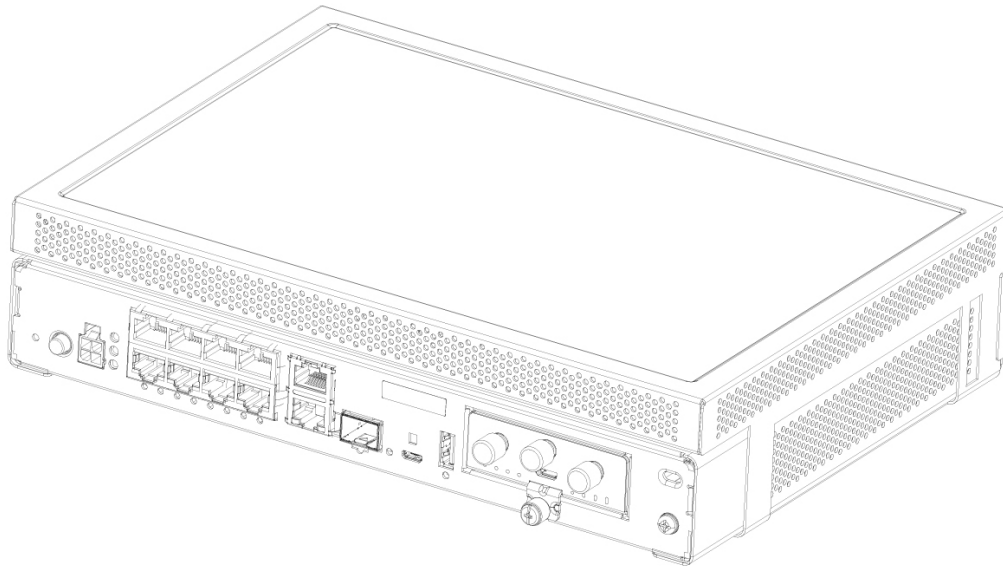

1	Securing the screws

Step 6   Fully assembled C1121/C1161 with secured top plate.

Example:

Figure 10: Fully assembled C1121/C1161 with top plate

Attach the C1121/C1161 Top Plate (C1120-TOP-PLATE=) for Rack Mount

This procedure describes how to attach the top plate and rack mount the brackets on the router chassis:

Step 1 Verify the following PIDs (10.8in W x 7.85in D) for applicability:

- C1121-4P
- C1121-4PLTEP
- C1121-8PLTEP
- C1121X-8PLTEP
- C1121-8P
- C1121X-8P
- C1161-8P
- C1161X-8P
- C1161-8PLTEP
- C1161X-8PLTEP

Step 2 Follow the Attach the C1121/C1161 Top Plate (C1120-TOP-PLATE=) on Desktop to set up the router top plate (C1120-TOP-PLATE=) to the unit.

Step 3 Align and secure the unit with top plate to rack mount the brackets.

Step 4   Use Phillips 2 screwdriver to secure the screws to 6-8 in-lbs.

Example:

Figure 11: Aligning and securing C1121/C1161 with top plate to rack mount brackets
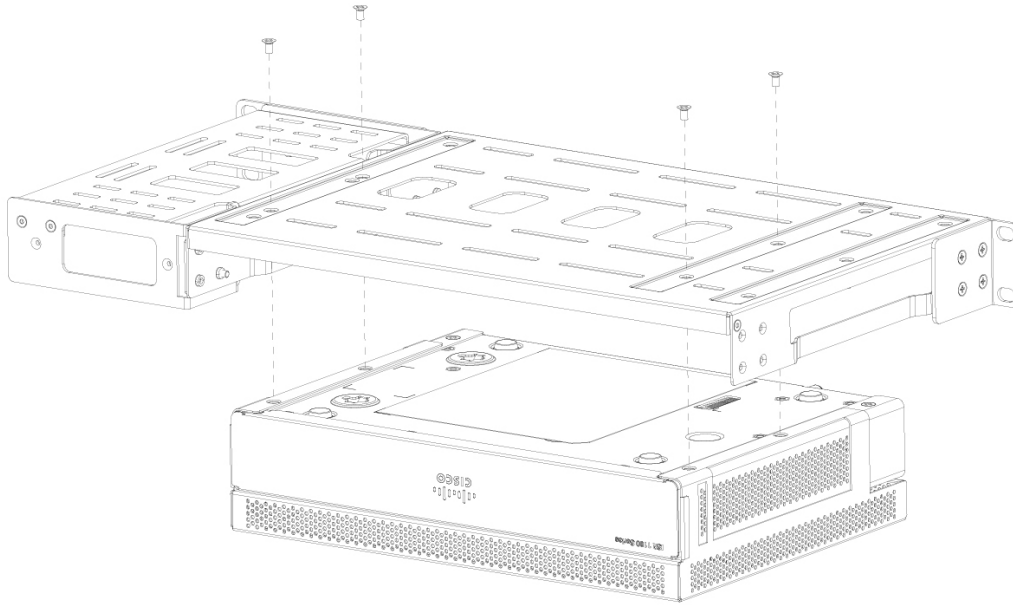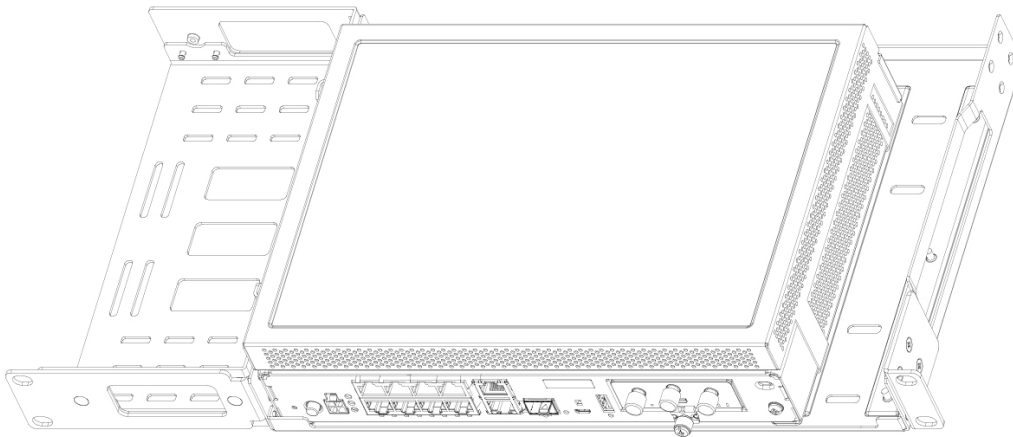

Step 5   Fully assembled C1121/C1161 secured with top plate and rack mount brackets.

Example:

Figure 12: Fully assembled C1121/C1161 with top plate and rack mount brackets


Attach the Rack Mounting Brackets for C112x

This procedure describes how to attach the brackets on the router chassis:

Step 1   Remove the 6 screws from the bottom of the chassis.

Step 2   Place the platform into the bottom tray.

Step 3   Secure the original screws from the bottom side of the tray.

Example:

Figure 13: Bracket Installation for C1121-4Px, C1126-8PLTEP and C1128-8PLTEP
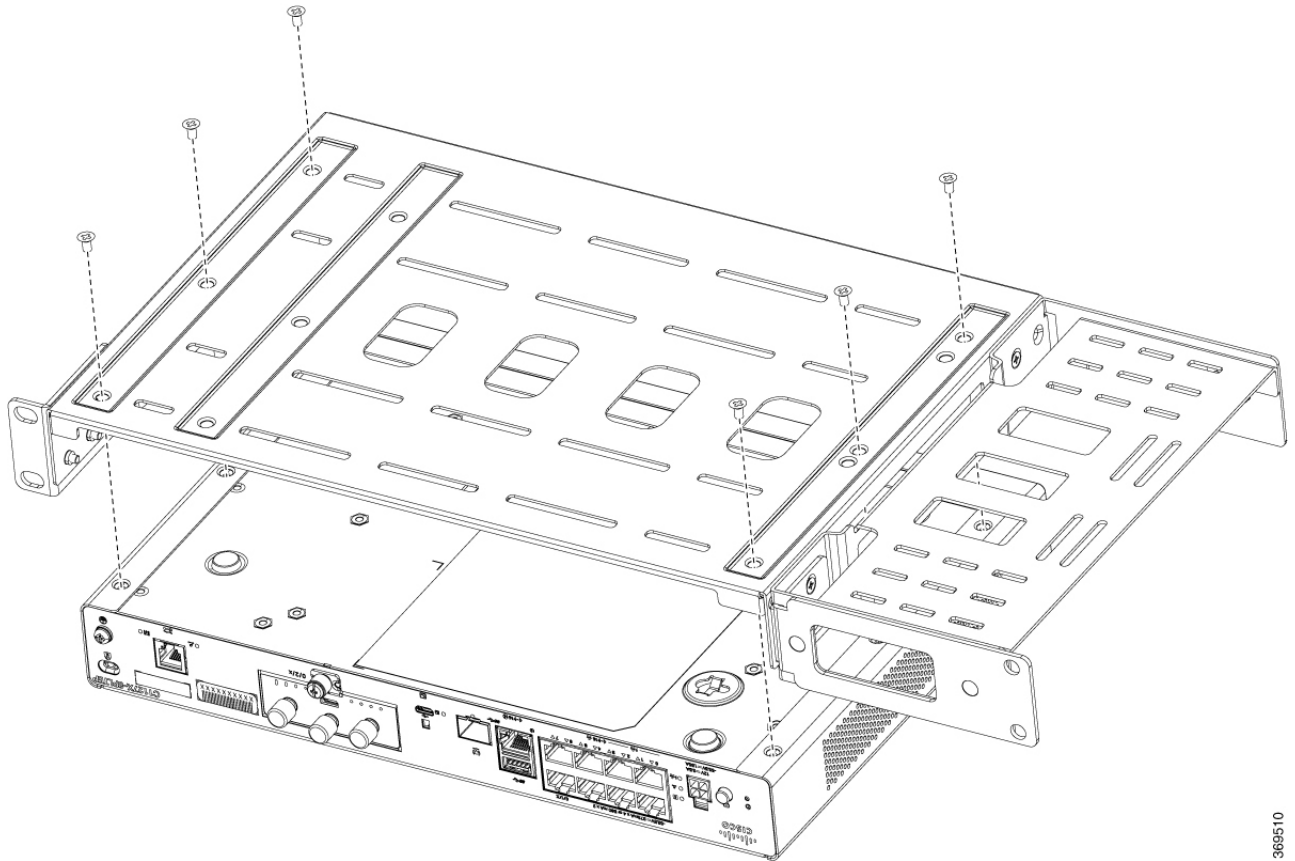
Mount the Router

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

Warning   To prevent airflow restriction, allow clearance around the ventilation openings to be at least: 1.75 in. (4.4 cm). Statement 1076.

> ⚠ **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.

Procedure

	Command or Action	Purpose
Step 1	To install the router, use the screws provided with the accessory kit to secure the router when you mount it on the rack.	

Mount the Router under a Desk or a Shelf

Installing the router under a desk requires an optional bracket kit that is not included with the router. The kit contains the rack-mount brackets and screws to secure the brackets to the router and the underside 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 .

Step 1 Attach a bracket to one side of the router using the flat-head screws. Follow the same steps to attach the second bracket to the opposite side.

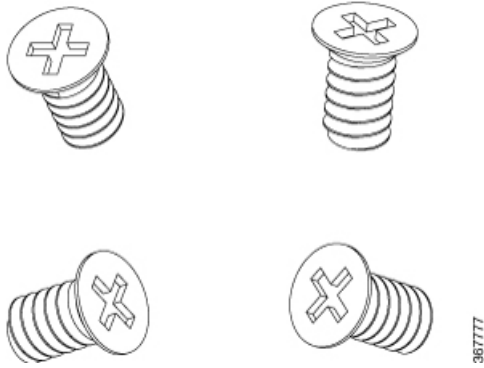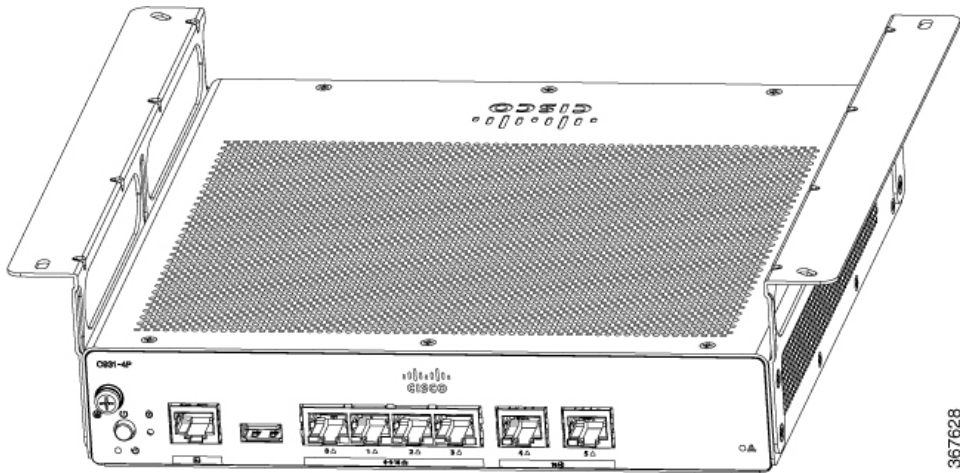Figure 14: Attaching Brackets to the Router
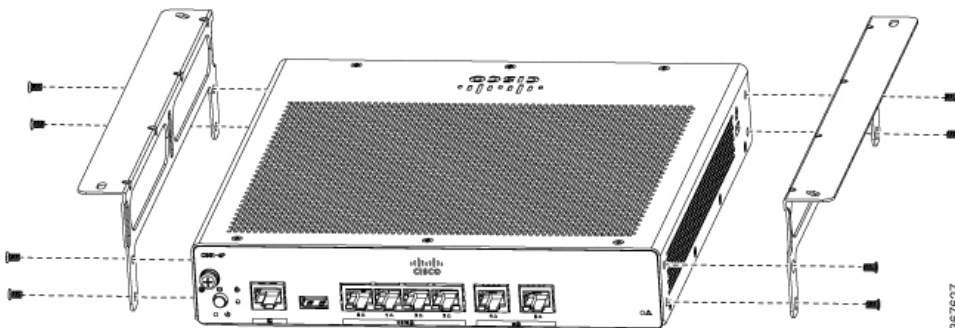
Figure 15: Flat-head Machine Screws

Figure 16: Router with the Brackets Attached

Step 2   After the brackets are attached, drill a 2 mm hole under the desk and insert the wooden screws provided. Mount the router under the desk or shelf using the pan-head wood screws).

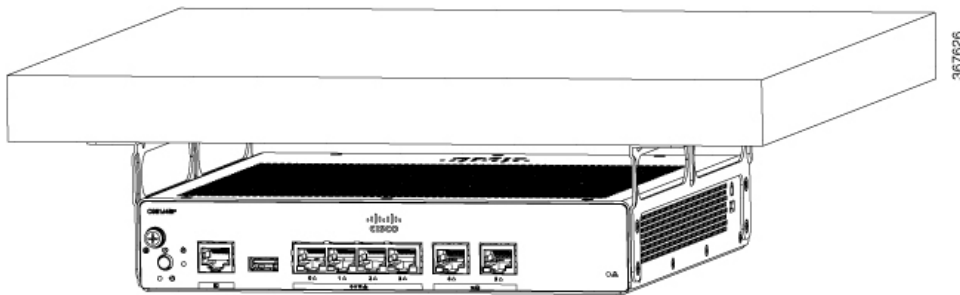Figure 17: Mounting the Router under a Desk or Shelf

Figure 18: Pan-head Wood Screws

Mount Router 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.

To attach the DIN Rail brackets to the router chassis, use the pan head machine screws and the plastic spacers provided for each bracket.

Attach Din-Rail Brackets on C112x

This procedure describes how to attach the brackets on the router chassis:

Step 1   Remove the 3 bottom screws from the chassis.

Step 2   Place the din-rail tray assy on the bottom side of the chassis.

Step 3   Secure the original screw from bottom side of tray, leverage the existing chassis screws to secure the din rail mounting bracket from the bottom of the chassis.

Step 4   Take the other two screws to secure the din-rail trail assy.

Example:

Figure 19: Attaching Din Rail Brackets for C1121-4Px, C1126-8PLTEP and C1128-8PLTEP
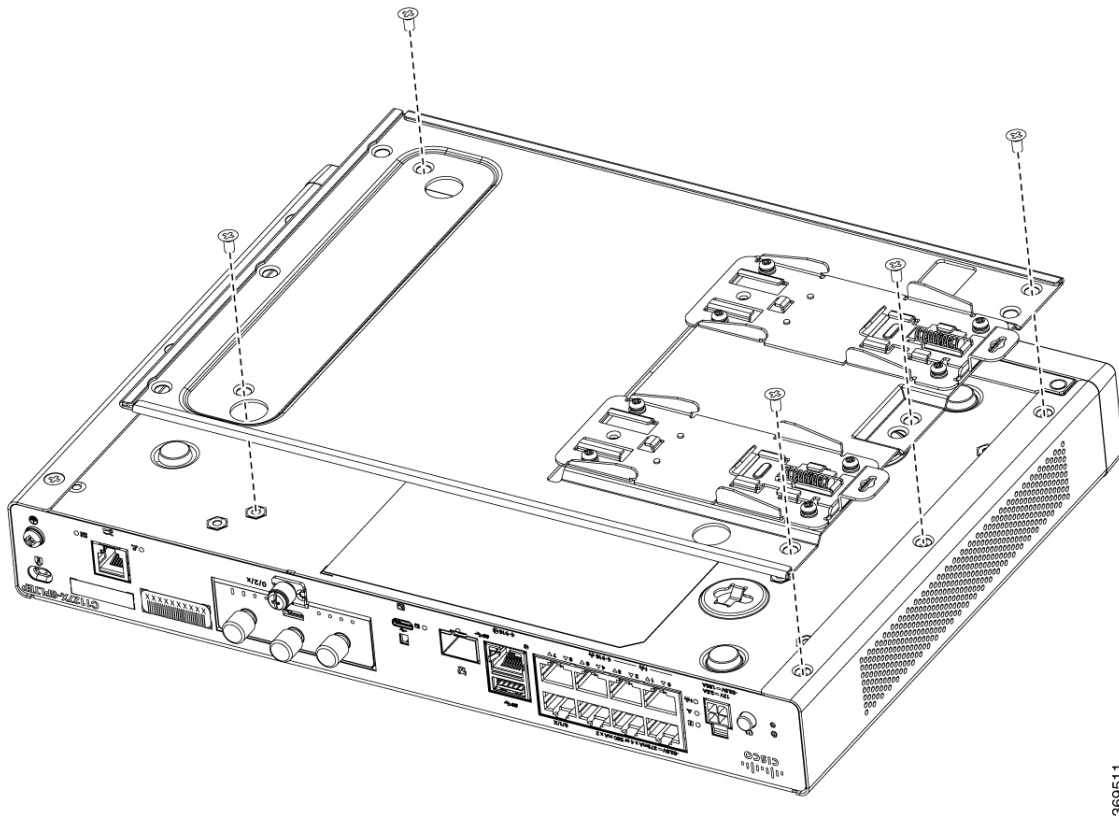
Wall Mount the Router

Depending on the models of the Cisco 1000 Series Integrated Services Router, the tasks for mounting the router chassis on the wall may vary.

There are two ways to mount a router on the wall, using Key-hole slots and DIN Rail Brackets.

⚠️

Warning 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. Statement 378.

✎

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 Key-hole Slots

The Cisco 1000 Series Integrated Services Routers have key-hole slots at the bottom of the chassis for mounting on a wall or any vertical surface.

Note Do not mount the router with the output ports facing downwards. For the C111x series, ensure that the cables are placed on the sides.

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

Note 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.
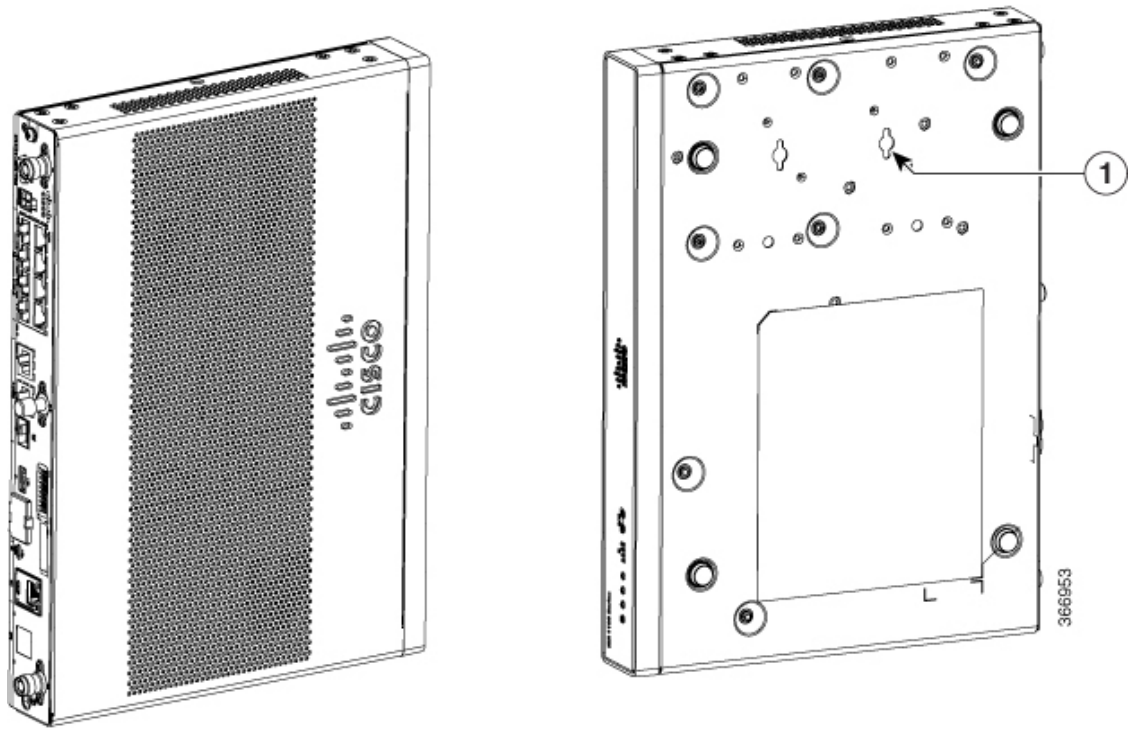
Note For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size number 6 (pan-head). Route the cables so that they do not put a strain on the connectors or mounting hardware.

Figure 20: Wall Mount Using Key-hole Slots - C111x
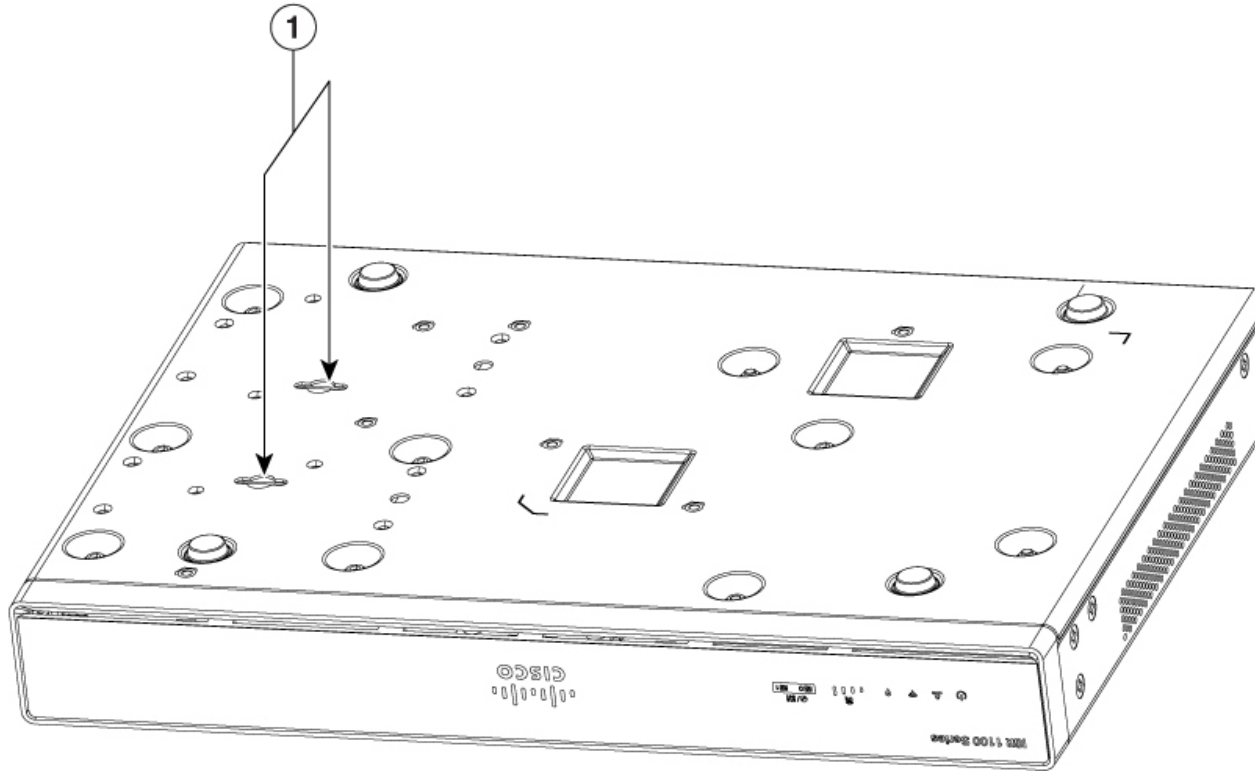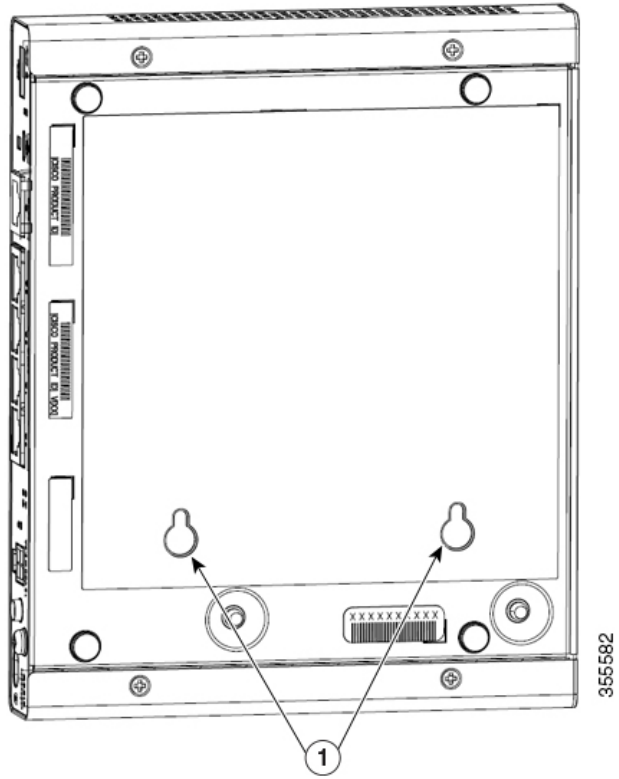

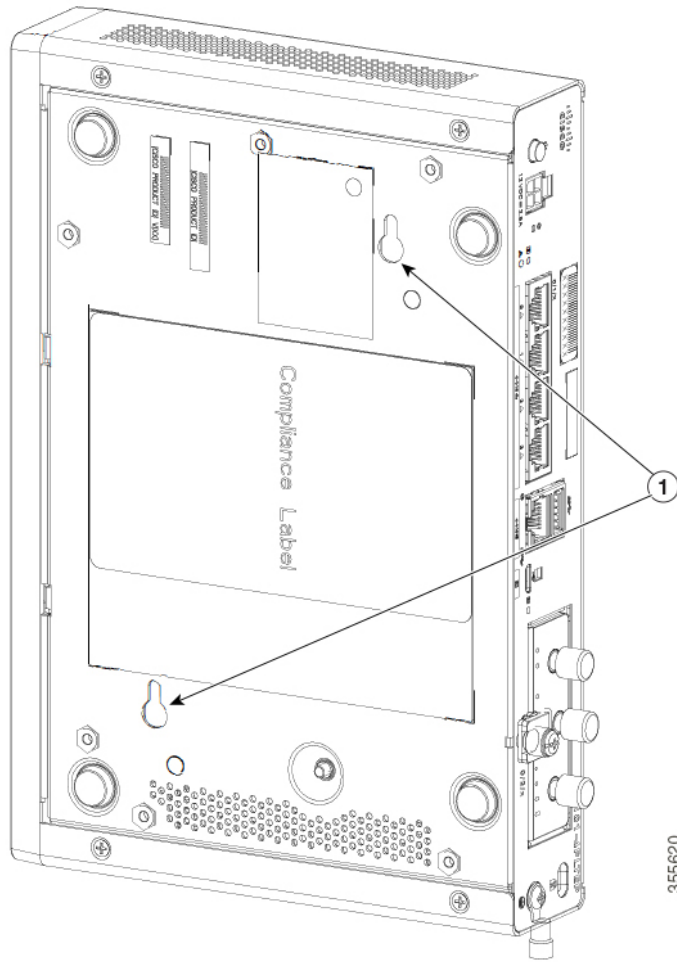| 1	Key-hole slots

Figure 21: Wall Mount Orientation-C111x

1	Key-hole slots

Figure 22: Wall mount using key-hole slots - C1101-4P

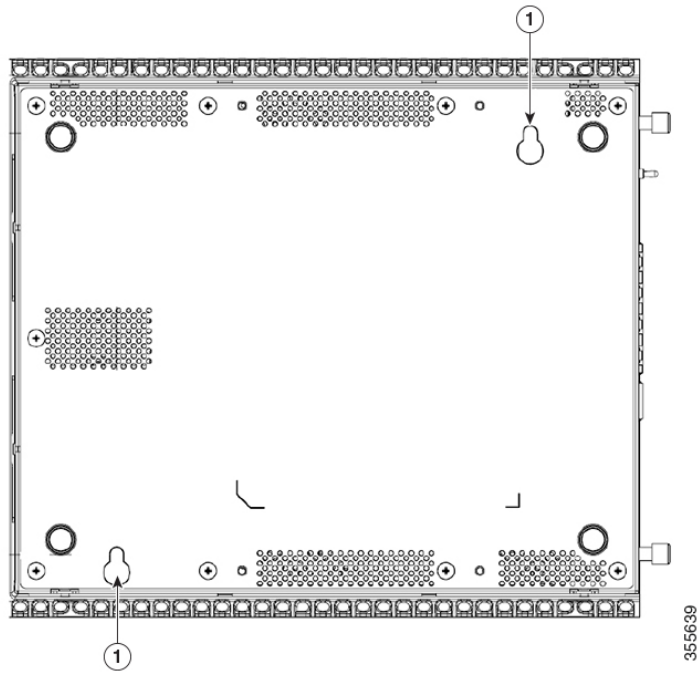| 1	Key-hole slots
	Key-hole slots-spacing: 3.024 in (76.81 mm)

Figure 23: Wall mount using key-hole slots - C1101-4PLTEP

1	Key-hole slots Horizontal spacing: 3.100 in (78.74 mm) Vertical spacing: 5.758 in (146.25 mm)

Figure 24: Wall mount using key-hole slots - C1109-2P

1	Horizontal spacing: 7.302 in (185.47 mm)
Key-hole slots	Vertical spacing: 7.430 in (188.72 mm)

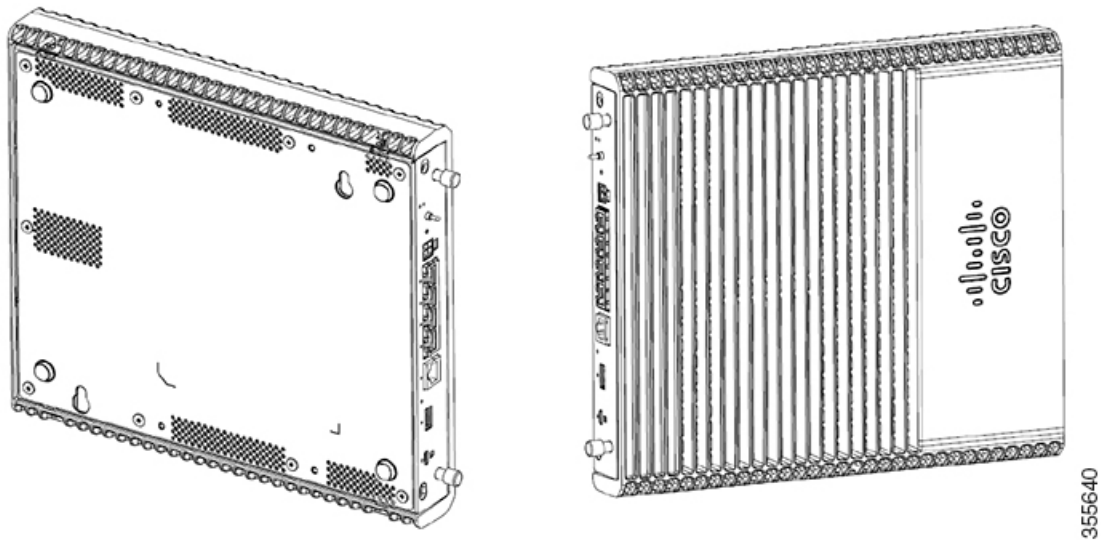Figure 25: Wall mount using key-hole slots - C1109-4PLTEP

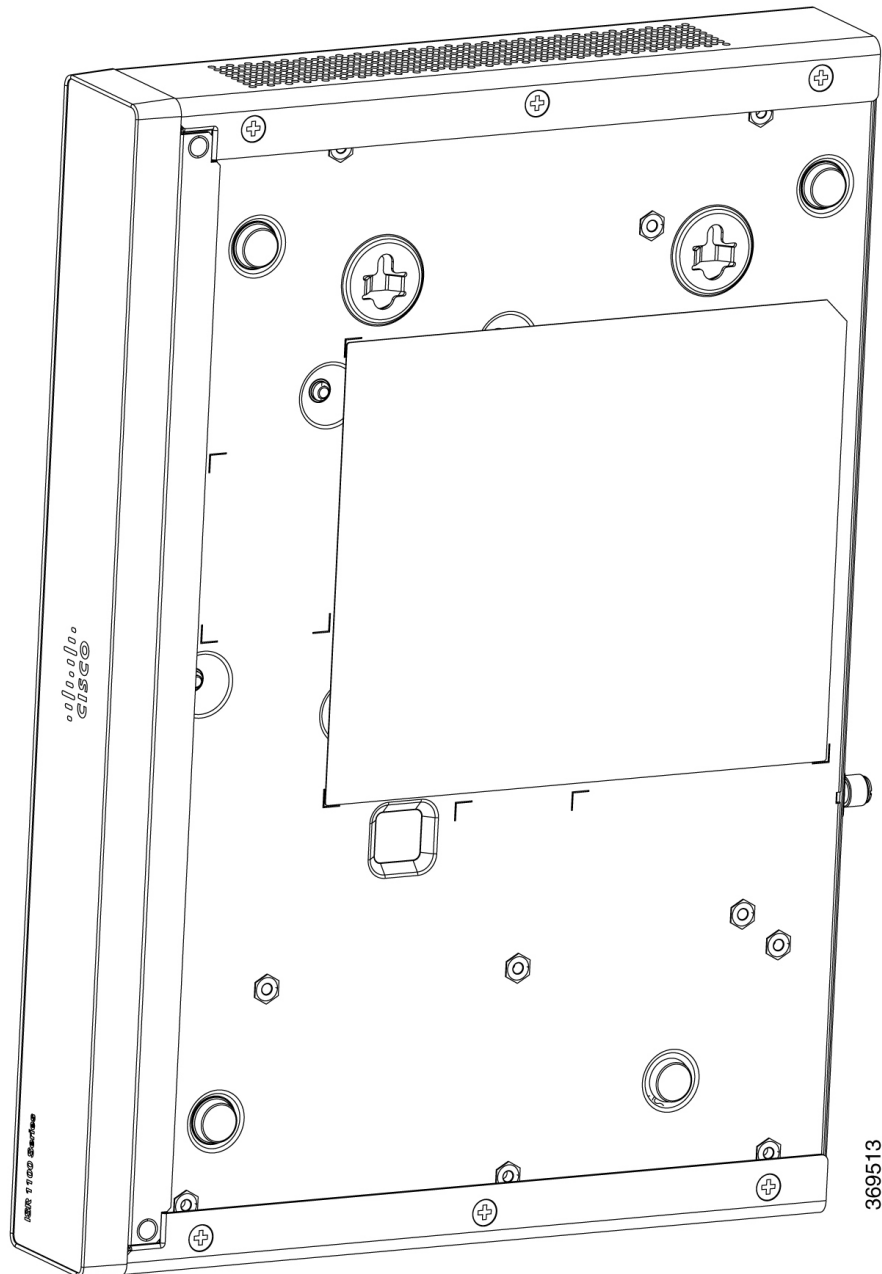| 1 | Key-hole slots |
| | Horizontal spacing: 3.100 in (78.74 mm) |
| | Vertical spacing: 5.758 in (146.25 mm) |

Figure 26: Wall mount using key-hole slots - C1126-8PLTEP

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.

Note   Wall mount using DIN Rail brackets is applicable only for C111x.

To attach the DIN Rail brackets to the router chassis, use the PHMS screws and the plastic spacers provided for each bracket.

Figure 27: DIN Rail Bracket Installation - C111x and C111X
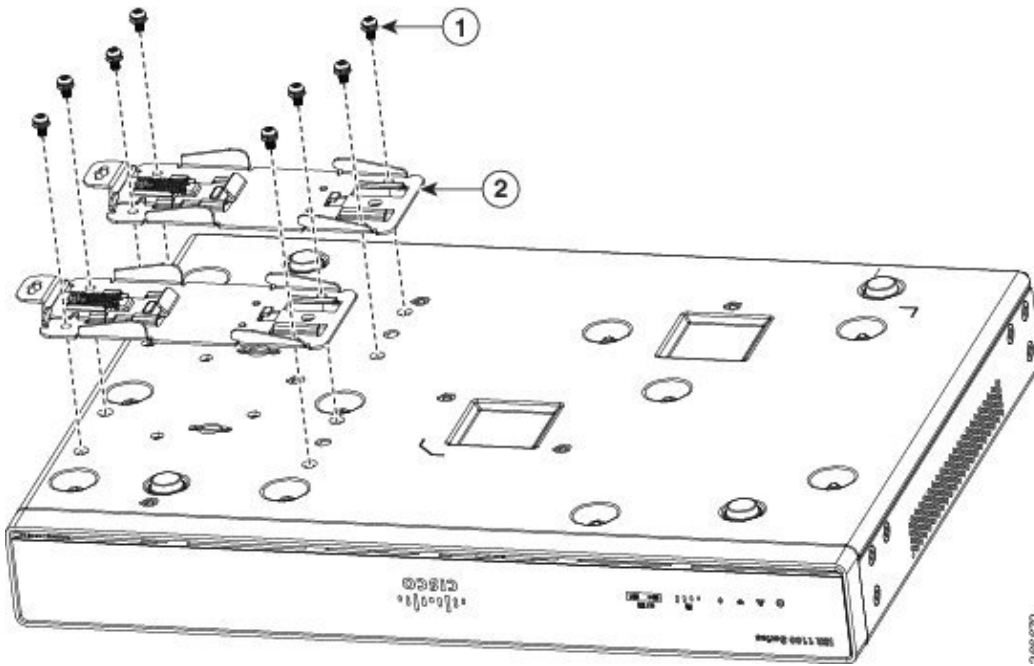
1	Screws
2	DIN Rail Brackets

Figure 28: Orientation of DIN Rail Brackets

Figure 29: DIN Rail Brackets and Mount

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

Chassis Grounding

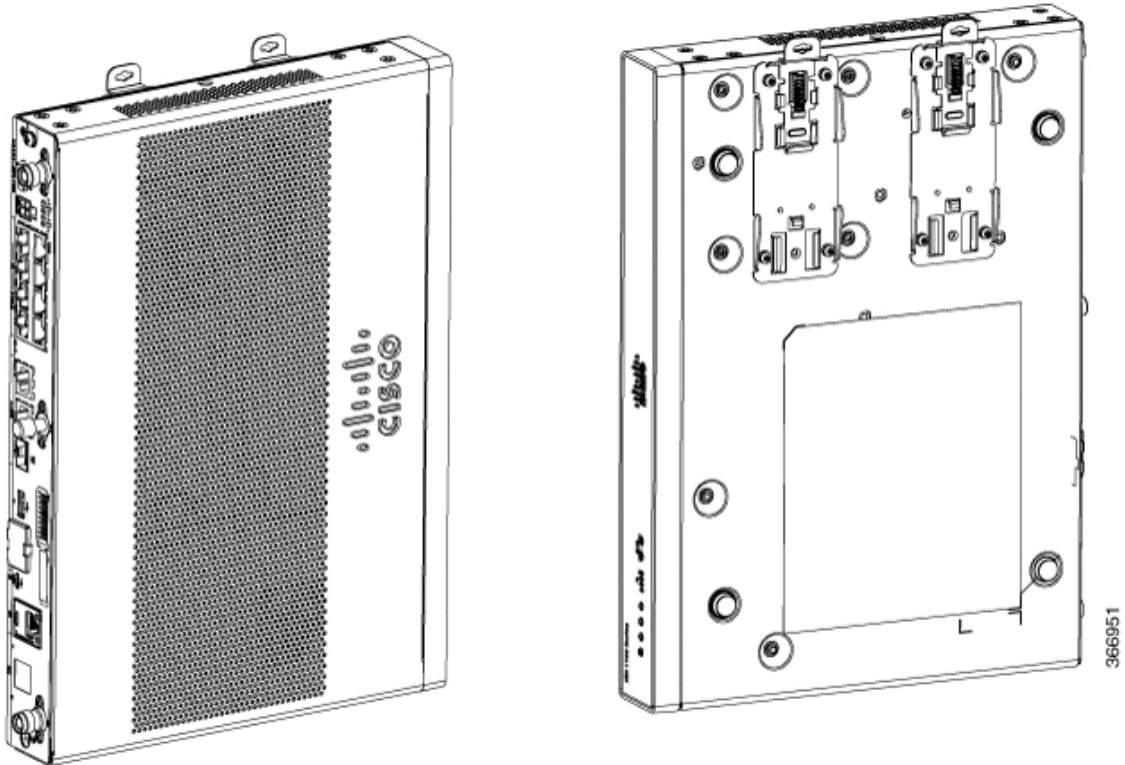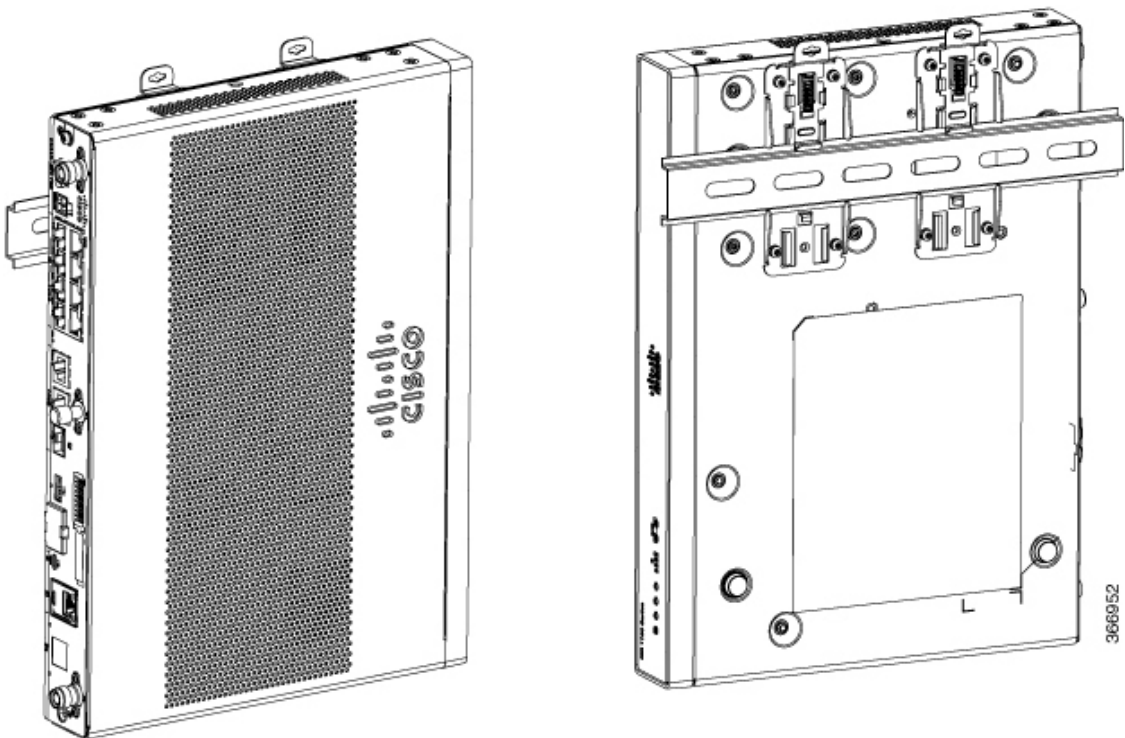**Warning**   Connect the Chassis to Earth Ground—To reduce the risk of electric shock, the chassis of this equipment needs to be connected to permanent earth ground during normal use. Statement 445

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

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 safety information on grounding the chassis, refer to the chassis ground connection procedures.

1. For grounding the chassis, use a copper wire of size of 14 AWG (2 mm²) and the ground lug. These are not a part of the accessory kit.

2. Use the UNC 6-32 screws, which have a length of about 0.25 inches.

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

1. Strip one end of the ground wire to the length required for the ground lug or terminal.

    • For the ground lug—approximately 0.75 inch (20 mm)

    • For user-provided ring terminal—as required

2. Crimp the ground wire to the ground lug or ring terminal, using a crimp tool of the appropriate size.

3. Attach the ground lug or ring terminal to the chassis as shown in the below figures. The screw for the ground lug is provided. Tighten the screw; the recommended torque is 8 to 10 inch-lbf (0.9 to 1.1 N-m).

Figure 30: Chassis Ground Connection-Cisco 111x
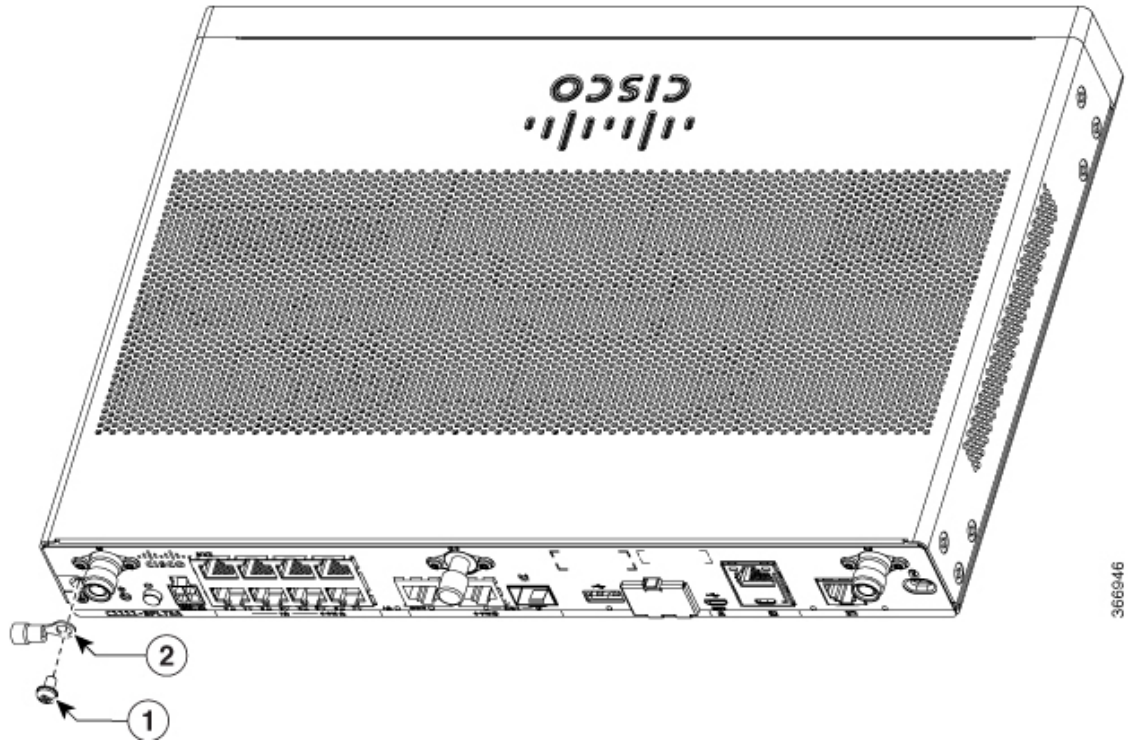
1	Screw (UNC 6-32)
2	Ground Lug

Figure 31: Chassis Ground Connection-Cisco 1101-4PLTEP
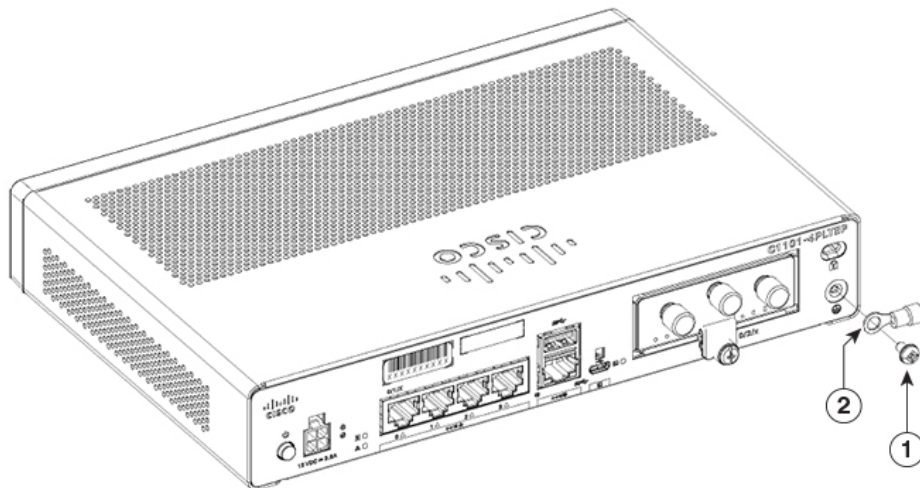
1	Screw (UNC 6-32)

2	Ground Lug

Figure 32: Chassis Ground Connection-Cisco 1121X-8PLTEP
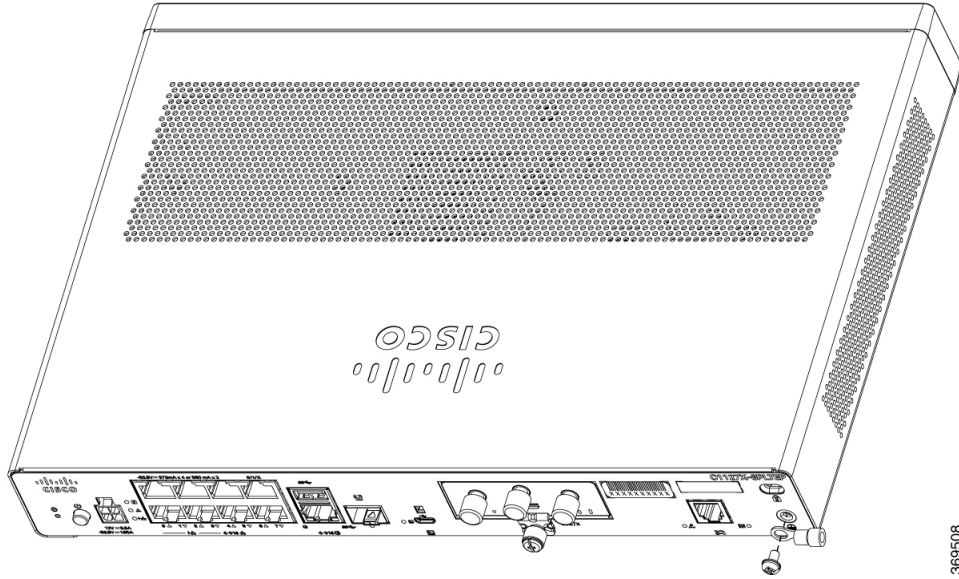
1	Screw (UNC 6-32)
2	Ground Lug

Connect Power Cable

Power supply of the Cisco 1000 Series Intergrated Services Routers is an external AC to DC power adapter. The external DC power connector plugs into the router's 4 points power connector.

Figure 33: Power Cable for C111x
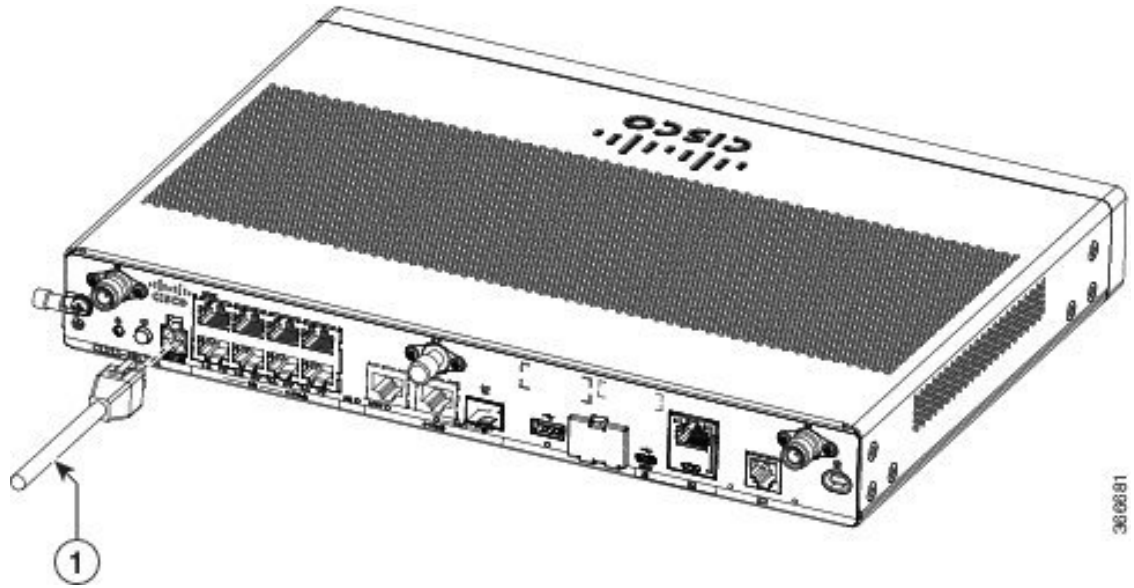
1.	Power Cable

Figure 34: Power Cable for C1127-8PLTEP
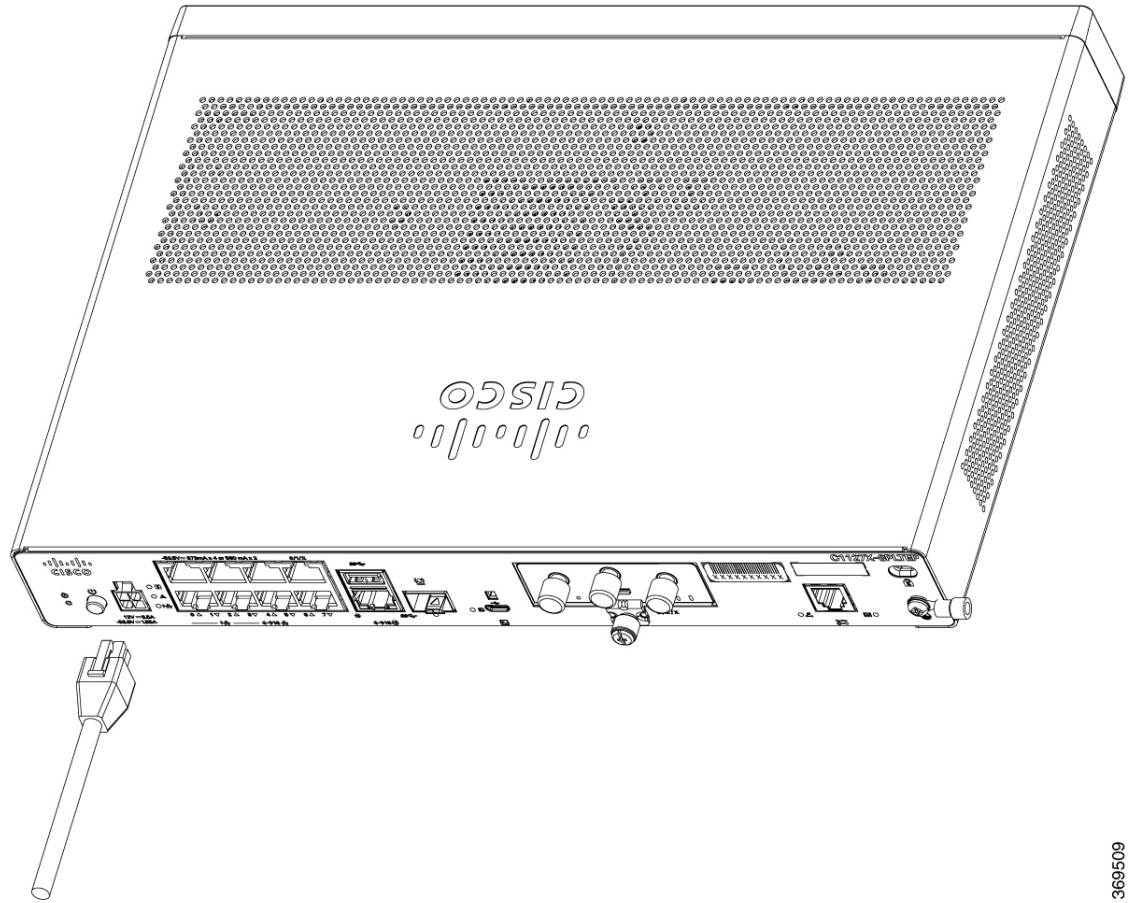
1.	Power Cable

Connect the Router to a Console

The Cisco 1000 Series Integrated Services Router has an asynchronous serial port. This port provides administrative access to the router through a console terminal or a PC.

Figure 35: Console Adapter for C1101-4PLTEP
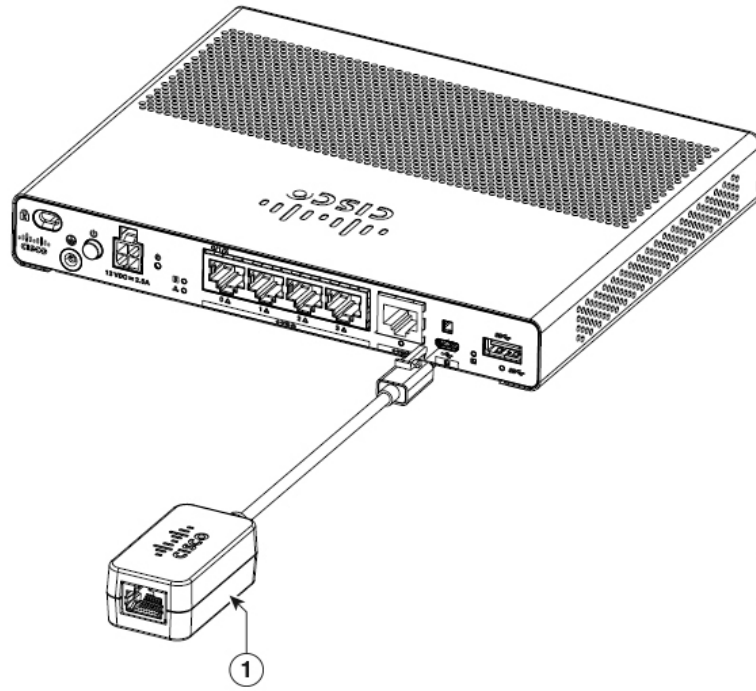
1.	Micro USB to RJ-45 console adapter

Figure 36: Console Adapter for C1127X-8PLTEP
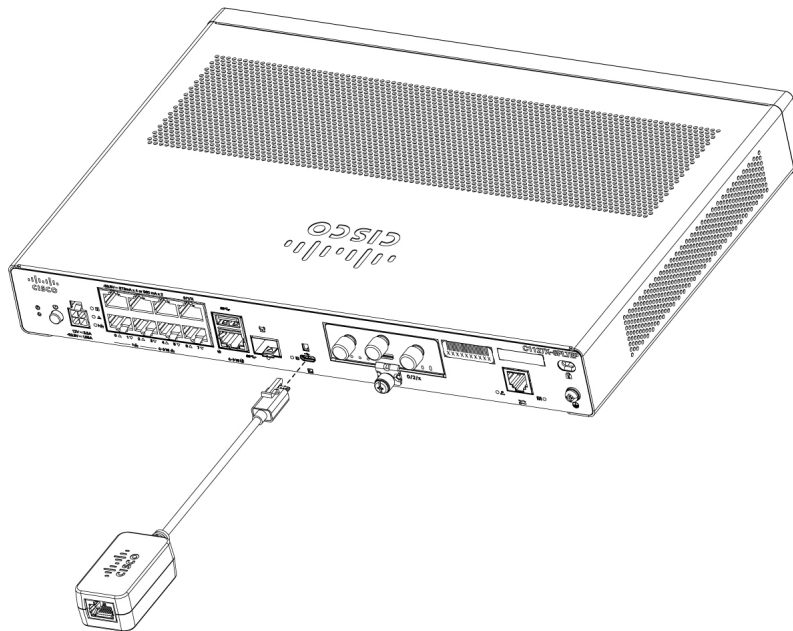
1.	Micro USB to RJ-45 console adapter

Use the USB or RJ-45 console port on the router to access the Cisco Internet 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 Cisco IOS 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 2: Local and Remote Connections*

Port Type	Cable	Action
Serial (RJ-45)	C111x,C1111X: RJ-45 Serial console cable CAB-CON-USB (Serial USB to RJ-45 serial cable)	Connecting to the Serial Port with Microsoft Windows
Serial (USB)	C110x: CAB-CON-USB RJ-45	

Connect to the Serial Port with Microsoft Windows

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

Use the USB Console cable plugged into the USB serial port to establish this connection.

1. Connect the end of the console cable with the RJ-45 connector to the light blue console port on the router.

2. OR

   Connect a USB 5-pin micro USB Type-B to the USB console port. If you are using the USB serial port for the first time on a Windows-based PC, install the USB driver.

   > ✎
   >
   > **Note** You cannot use the USB port and the EIA port concurrently. When the USB port is used it takes priority the RJ-45 EIA port.

3. 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.

4. 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.

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.

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. Before you connect the interface cables, refer to the following warning statements:

Warning Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Statement 1036.

Warning Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface. Statement 1037.

Warning For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection, LAN, PoE. Statement 1044.

Warning Avoid using or servicing any equipment that has outdoor connections during an electrical storm. There may be a risk of electric shock from lightning. Statement 1088.

Ports and Cabling

This section summarizes typical WAN and LAN connections for Cisco 1000 Series Integrated Services Router. The connections summarized here are described in detail in the Cisco Modular Access Router Cable Specifications document on cisco.com.

Table 3: WAN and LAN Connections

Port or Connection	Port Type, Color[1]	Connection	Cable
Ethernet	RJ-45, yellow	Ethernet hub or Ethernet switch	Category 5 or higher Ethernet
Gigabit Ethernet SFP, optical	LC, color according to optical wavelength	1000BASE-SX, -LX, -LH, -ZX, -CWDM	Optical fiber as specified on applicable data sheet
Gigabit Ethernet SFP, copper	RJ-45	1000BASE-T	Category 5, 5e, 6 UTP

Port or Connection	Port Type, Color[1]	Connection	Cable
xDSL (VDSL2 / ADSL2/2+)	RJ-11	POTS or ISDN line	RJ-11 telephone cable

[1] Cable color codes are specific to Cisco cables.

Connection Procedures and Precautions

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

- Connect each WAN and LAN to the appropriate connector on the chassis.

- Position the cables carefully so that you do not strain the connectors.

- Organize cables in bundles so that cables do not intertwine.

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

- Install cable ties in accordance with site requirements.

Configure the Router at Startup

After installing the router and connecting the cables, you can configure the router with basic configurations. For more information on how to configure the router, see the Cisco 1100 Series Software Configuration Guide.