Install and Connect the Router

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

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

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

- Unpack the Router, on page 1
- Set up Router on Desktop, Rack, or Wall, on page 1
- Connect Power Cable, on page 20
- Connect the Router to a Console, on page 22
- Connect WAN and LAN Interfaces, on page 26
- Configure the Router at Startup, on page 27

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 listed items.

Set up Router on Desktop, Rack, or Wall

After unpacking, based on your requirements, you can set up a Cisco 1100 Series Integrated Services Routers (ISR) on a desktop, a rack, or the wall.
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 1100 ISR are:

<table>
<thead>
<tr>
<th>Model</th>
<th>Mounting Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>C111x and C1111X</td>
<td>Desktop, Rack Mount, Wall Mount using Key-hole Slots, Wall Mount using-Din-Rail</td>
</tr>
<tr>
<td>C1101-4P</td>
<td>Desktop, Wall Mount using Key-hole Slots</td>
</tr>
<tr>
<td>C1101-4PLTEPWx</td>
<td>Desktop, Wall Mount using Key-Hole Slots</td>
</tr>
<tr>
<td>C1109-2PLTExx</td>
<td>Desktop, Wall Mount using Key-Hole Slots,</td>
</tr>
<tr>
<td>C1121-4Px</td>
<td>Desktop, Rack Mounting using Din-Rail Brackets, Under Desk</td>
</tr>
<tr>
<td>C1126(X)-8PLTEP</td>
<td>Desktop, Rack Mounting using Din-Rail Brackets, Under Desk</td>
</tr>
<tr>
<td>C1128(X)-8PLTEP</td>
<td>Desktop, Rack Mounting using Din-Rail Brackets, Under Desk</td>
</tr>
</tbody>
</table>

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 ISRs when mounting the routers on a table top.

**Note**

When mounting Cisco 1000 ISRs on a rack, ensure that there is ample surrounding space. This ensures more heat removal, which in turn will enable the surrounding air temperature to stay within the specified operating conditions.

**Attach the Brackets for C111x**

This procedure describes how to attach the 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 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:
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

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>To install the router, use the screws provided with the accessory kit to secure the router when you mount it on the rack.</td>
</tr>
</tbody>
</table>

### 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 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 3: Attaching Brackets to the Router*

*Figure 4: Flat-head Machine 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.

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.

Mount Router using DIN Rail Brackets
To attach the DIN Rail brackets to the router chassis, use the PHMS 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 8: Attaching Din Rail Brackets for C1121-4Px, C1126-8PLTEP and C1128-8PLTEP*
**Wall Mount the Router**

Depending on the models of the Cisco 1100 Series Integrated Services Routers (ISRs), the tasks for mounting the router chassis on the wall may vary.

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**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.

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

---

**Wall Mount Using Key-hole Slots**

The Cisco 1100 Series Integrated Services Routers (ISRs) have key-hole slots at the bottom of the chassis for mounting on a wall or any vertical surface.

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**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.

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**Note**

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

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**Note**

To attach a router to the wall stud, each bracket should have one number10 wood screw (pan-head) with number10 washers, or two number10 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 9: Wall Mount Using Key-hole Slots
Install and Connect the Router

Wall Mount Using Key-hole Slots

Figure 10: Wall Mount Orientation-C111x

1  Key-hole slots
Figure 11: Wall mount using key-hole slots - C1101-4P

Key-hole slots
Key-hole slots-spacing: 3.024in (76.81mm)
Figure 12: Wall mount using key-hole slots - C1101-4PLTEP

Key-hole slots
Horizontal spacing: 3.100in (78.74mm)
Vertical spacing: 5.758inin (146.25mm)
Install and Connect the Router

Wall Mount Using Key-hole Slots

Figure 13: Wall mount using key-hole slots - C1109-2P

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

Figure 14: Wall mount using key-hole slots - C1109-4PLTEP
Key-hole slots
Horizontal spacing: 3.100in (78.74mm)
Vertical spacing: 5.758in (146.25mm)

Figure 15: 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 16: DIN Rail Bracket Installation - C111x and C111X**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screws</td>
</tr>
<tr>
<td>2</td>
<td>DIN Rail Brackets</td>
</tr>
</tbody>
</table>
Install and Connect the Router

Figure 17: Orientation of DIN Rail Brackets

Figure 18: 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).
### Install and Connect the Router

#### Chassis Grounding

**Figure 19: Chassis Ground Connection-Cisco 111x**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screw (UNC 6-32)</td>
</tr>
<tr>
<td>2</td>
<td>Ground Lug</td>
</tr>
</tbody>
</table>

**Figure 20: Chassis Ground Connection-Cisco 1101-4PLTEP**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screw (UNC 6-32)</td>
</tr>
</tbody>
</table>
**Connect Power Cable**

Power supply of the Cisco 1000 Series ISRs is an external AC to DC power adapter. The external DC power connector plugs into the router's 4 points power connector.
1. Power Cable
Connect the Router to a Console

The C111x Series ISR has an asynchronous serial port. This port provides administrative access to the router through a console terminal or a PC.
Install and Connect the Router

Connect the Router to a Console

Figure 24: Console Adapter for C1101-4PLTEP

Micro USB to RJ45 console adapter

Figure 25: Console Adapter for C1127X-8PLTEP

Micro USB to RJ45 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

<table>
<thead>
<tr>
<th>Port Type</th>
<th>Cable</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial (RJ-45)</td>
<td>C111x, C1111X: RJ-45 Serial console cable</td>
<td>Connecting to the Serial Port with Microsoft Windows</td>
</tr>
<tr>
<td></td>
<td>CAB-CON-USB (Serial USB to RJ-45 serial cable)</td>
<td></td>
</tr>
<tr>
<td>Serial (USB)</td>
<td>C110x: CAB-CON-USBRJ45</td>
<td></td>
</tr>
</tbody>
</table>

### 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 over 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

To disconnect the Linux USB console from the Terminal window
Enter Ctrl-a followed by Ctrl-\.
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 1100 Series ISRs. 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

<table>
<thead>
<tr>
<th>Port or Connection</th>
<th>Port Type, Color</th>
<th>Connection</th>
<th>Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>RJ-45, yellow</td>
<td>Ethernet hub or Ethernet switch</td>
<td>Category 5 or higher Ethernet</td>
</tr>
<tr>
<td>Gigabit Ethernet SFP, optical</td>
<td>LC, color according to optical wavelength</td>
<td>1000BASE-SX, -LX, -LH, -ZX, -CWDM</td>
<td>Optical fiber as specified on applicable data sheet</td>
</tr>
<tr>
<td>Gigabit Ethernet SFP, copper</td>
<td>RJ-45</td>
<td>1000BASE-T</td>
<td>Category 5, 5e, 6 UTP</td>
</tr>
<tr>
<td>xDSL (VDSL2 / ADSL2/2+)</td>
<td>RJ-11</td>
<td>POTS or ISDN line</td>
<td>RJ-11 telephone cable</td>
</tr>
</tbody>
</table>
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.
Configure the Router at Startup