Hardware Installation Guide for Cisco ISR 1000 Series Integrated Services Routers (ISR1100-4G, ISR1100-6G, and ISR1100-4GLTE)

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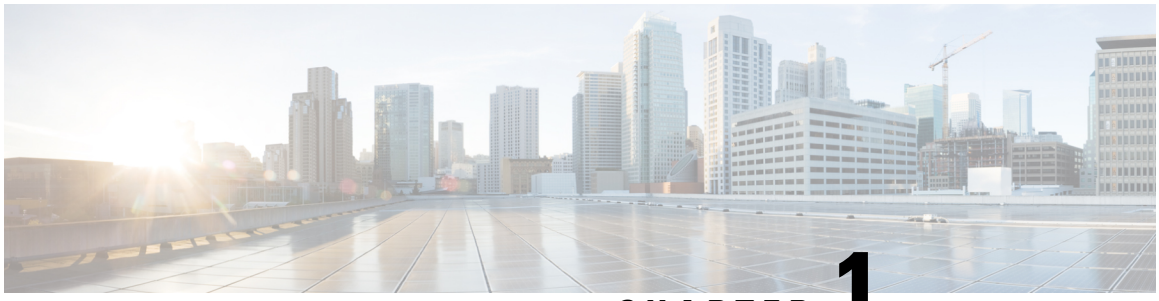


CHAPTER 1

Overview of Cisco ISR1100-4G, ISR1100-6G, and ISR1100-4GLTE

Cisco ISR 1000 Series Integrated Services Routers deliver essential WAN, security, and multi-cloud capability of the Cisco SD-WAN solution. These routers provide highly secure site-to-site data connectivity to small business and home offices, remote offices, and branch offices. These routers are available in fixed form factors.

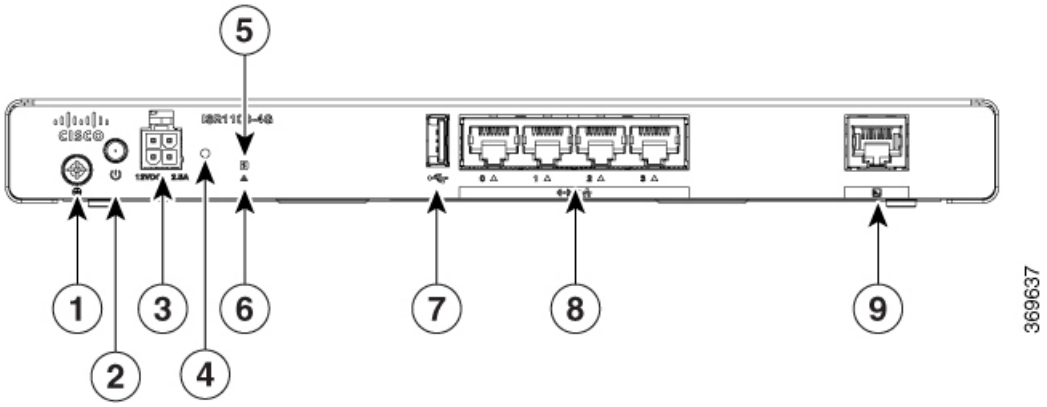
Cisco ISR1100-4G Router

This topic describes the chassis and provides technical specifications of the Cisco ISR1100-4G router.

Chassis Views

Figure 1 and Figure 2 show the front and back panels of the Cisco ISR1100-4G router. The figures indicate the location of the power interfaces, status indicators, and chassis identification labels.

Figure 1: Front Panel



1	Ground Screw	5	System LED
2	Power Button	6	Status LED
3	12 VDC Input	7	Type A USB port
4	Reset Button	8	RJ-45 Ethernet Ports
9	RJ-45 Console Port		

Figure 2: Back Panel

Chassis Specifications

Table 1:

Item	Specification
Services and Slot Density	
CPU	Intel 2.2 GHz 2-core
RJ45 Console	1 **Note** The console port only supports a baud rate of 115,200.
USB Type A	USB 3.0, 4.5 W Maximum
Bulk Flash	8 GB eMMC pSLC **Note** Usable memory is 5.8 GB only.
Serial Flash	Dual 16MB
Memory DDR4 ECC DRAM	4 GB

Item	Specification
GE WAN Ports	4
Physical Specifications	
Form Factor	10.2 in x 7 in x 1.1 in
Operating Condition	
Temperature	Fanless design 0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10,000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15,000 ft)
Reliability	
MTBF	Approximately 1.6 million hours (about 183 years)

Regulatory Compliance: For information on regulatory compliance (EMC, safety, and environment), see ISR1100-4G/6G Data Sheet.

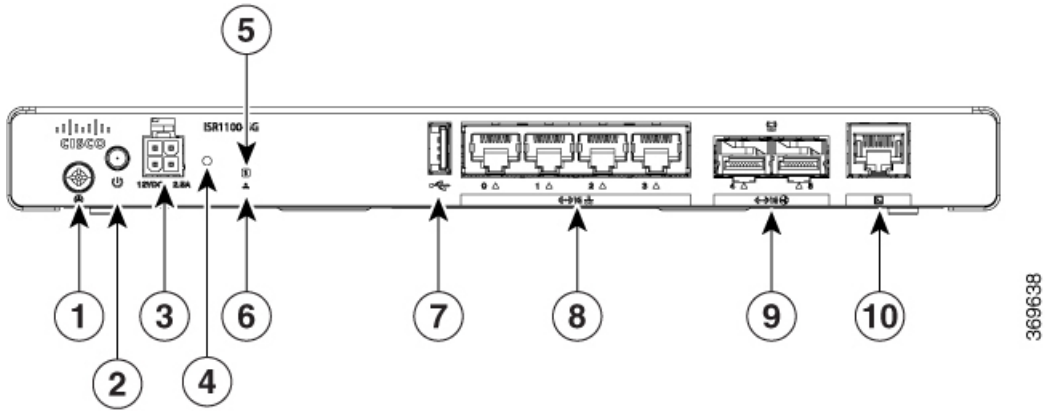
Cisco ISR1100-6G Router

This topic describes the chassis and provides technical specifications of the Cisco ISR1100-6G router.

Chassis Views

Figure 1 and Figure 2 show the front and back panels of the Cisco ISR1100-6G router, indicating the location of the power interfaces, status indicators, and chassis identification labels.

Figure 1: Front Panel



1	Ground Screw	6	Status LED
2	Power Button	7	Type A USB Port
3	12 VDC Input	8	RJ-45 Ethernet Port
4	Reset Button	9	SFP Ethernet port
5	System LED	10	RJ-45 Console Port

Figure 2: Back Panel

Chassis Specifications

Table 2: Features and Specifications

Item	Specification
Services and Slot Density	
CPU	Intel 2.2 GHz 4-core
RJ45 Console	1 **Note** The console port only supports a baud rate of 115,200.
USB Type A	USB 3.0, 4.5 W Maximum.
Bulk Flash	8GB eMMC pSLC **Note** Usable memory is 5.8 GB only.
Serial Flash	Dual 16 MB
Memory DDR4 ECC DRAM	4 GB

Item	Specification
GE WAN Ports	4
GE SFP Ports	2
Physical Specifications	
Form Factor	10.2 in x 7 in x 1.1 in
Operating Condition	
Temperature	Fanless design 0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10,000 feet or 3000 m)
Altitude	Maximum 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15000 ft)
Reliability	
MTBF	Approximately 1.6 million hours (about 183 years)

Regulatory Compliance: For information on regulatory compliance (EMC, safety, and environment), see ISR1100-4G/6G Data Sheet.

Cisco ISR1100-4GLTE Routers

This topic describes the chassis and technical specifications of the Cisco ISR1100-4GLTE routers.

Cisco ISR1100-4GLTE Variants

Cisco ISR1100-4GLTE routers are available in these variants:

- Cisco ISR1100-4GLTENA
- Cisco ISR1100-4GLTEGB

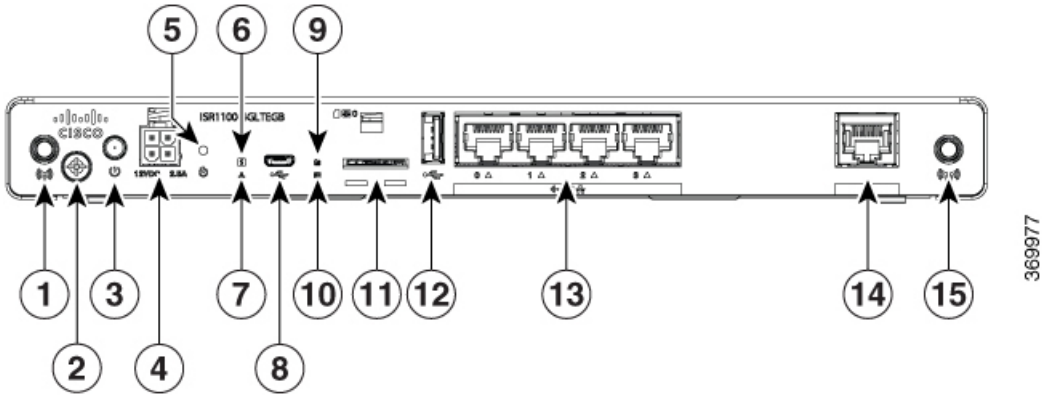
These routers come with built-in, Category-4 modems. There is no difference in the hardware specifications of Cisco ISR1100-4GLTENA and Cisco ISR1100-4GLTEGB . The difference is only in terms of the LTE bands supported. See Cisco ISR1100-4GLTE Wireless Platform Specifications for more details.

Cisco ISR1100-4GLTE Chassis

Figure 1 and Figure 2 show the front and back panels of the Cisco ISR1100-4GLTE routers. The figures indicate the location of the power interfaces, status indicators, and chassis identification labels.

Note For the purpose of illustration, the figure shows the chassis of Cisco ISR1100-4GLTEGB

Figure 1: Front Panel



1	Main Antenna	9	Received signal Strength Indicator (RSSI) LED
2	Ground Screw	10	SIM LED
3	Power Button	11	SIM Slot
4	12 VDC Input	12	USB Port
5	Reset Button	13	RJ-45 Ethernet Ports
6	System LED	14	RJ-45 Console
7	Status LED	15	Antenna (Diversity)
8	Micro USB		

Figure 2: Back Panel

Chassis Specifications

Table 3:

Item	Specification
Services and Slot Density	
RJ45 Console	1 **Note** The console port only supports a baud rate of 115,200.
Ethernet RJ45 Ports	4
USB Type A	USB 3.0, 4.5 W Maximum
Bulk Flash	8 GB eMMC pSLC **Note** Usable memory is 5.8 GB only.
Serial Flash	Dual 16MB
Memory DDR4 ECC DRAM	4 GB
GE WAN Ports	4
Micro-SIM Socket	1
LTE Debug Port	1 (Micro USB Connector)
Physical Specifications	
Form Factor	10.2 in x 7 in x 1.1 in
Operating Condition	
Temperature	Fanless design 0 to 40°C (32 to 104°F) at sea level (temperature de-rating of 1.5 deg C per 1000 feet of altitude applicable up to max of 10,000 feet or 3000 m)
Altitude	Max 3000 m (10000 ft)
Humidity	10 to 85% RH
Transportation/Storage Condition	
Temperature	-40 to 70°C (-40 to 158°F)
Humidity	5 to 95%RH
Altitude	4570 m (15,000 ft)
Reliability	
MTBF	Approximately 1.6 million hours (about 183 years)

Regulatory Compliance: For information on regulatory compliance (EMC, safety, and environment), see ISR1100-4G/6G Data Sheet.

Power Supply

The power specifications for external power supply units are as follows.

Table 4: External Power Supply Unit Specification

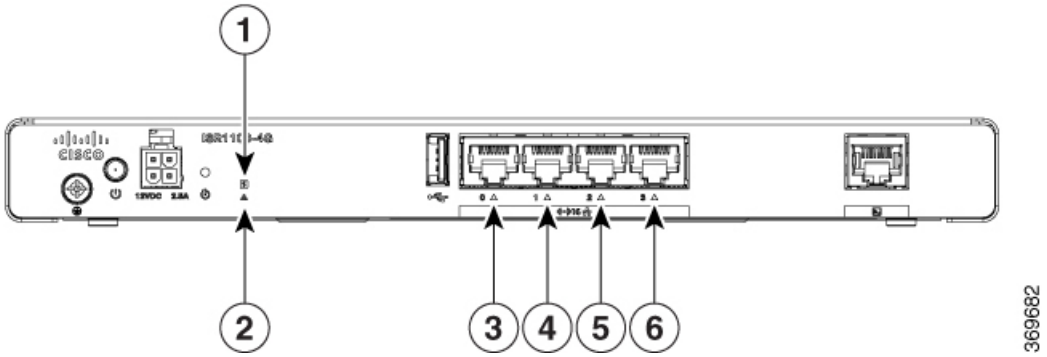
AC input voltage	100-240 VAC nominal
AC input line frequency	50-60 Hz
Maximum Output Power	30 Watts
Output Voltage	12 VDC
P/N	PWR-30W-I-AC

LED Indicators on Cisco ISR1100-4G and Cisco ISR1100-6G

LED Indicators on Cisco ISR1100-4G

The following figure and table summarize the LED indicators that are located on the front panel of Cisco ISR1100-4G chassis.

Figure 2: LED Indicators on Cisco ISR1100-4G



1	Sys LED
2	Status LED
3, 4, 5, 6	RJ-45 Ethernet Port LED

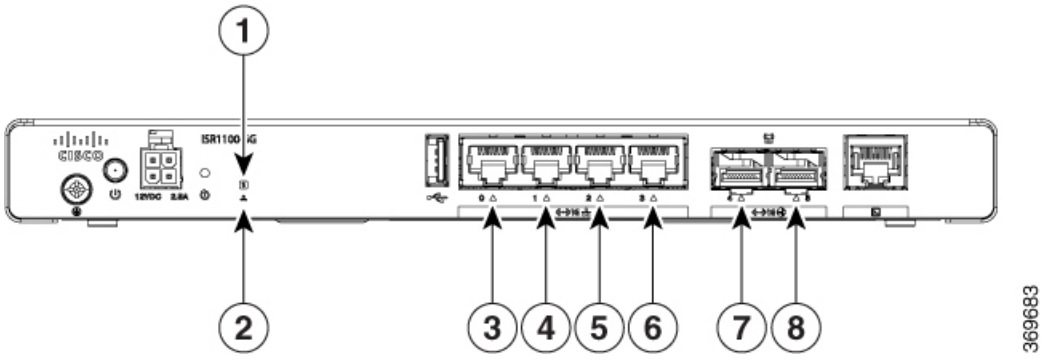
Table 5: LED Indicators for Cisco ISR1100-4G

Port	LED Color	Description
SYS	OFF	System is off
	Amber (blinking)	Boot up phase
	Green steady on	Normal operation
	Amber (steady)	System going down/fault
STATUS	Green	OMP connection is up
	OFF	System is down or OMP connection is down
RJ-45 Ethernet Port LEDs (0-3)	Green solid	Link is established
	Green (blinking)	Data transmission is in progress
	OFF	Link is not connected or is down

LED Indicators on Cisco ISR1100-6G

The following figure and table summarize the LED indicators that are located on the front panel of the Cisco ISR1100-6G chassis.

Figure 3: LED Indicators on Cisco ISR1100-6G



1	Sys LED
2	Status LED
3, 4, 5, 6	RJ-45 Ethernet Port LED
7, 8	SFP Ethernet Port LED

Table 6: LED Indicators for Cisco ISR1100-6G

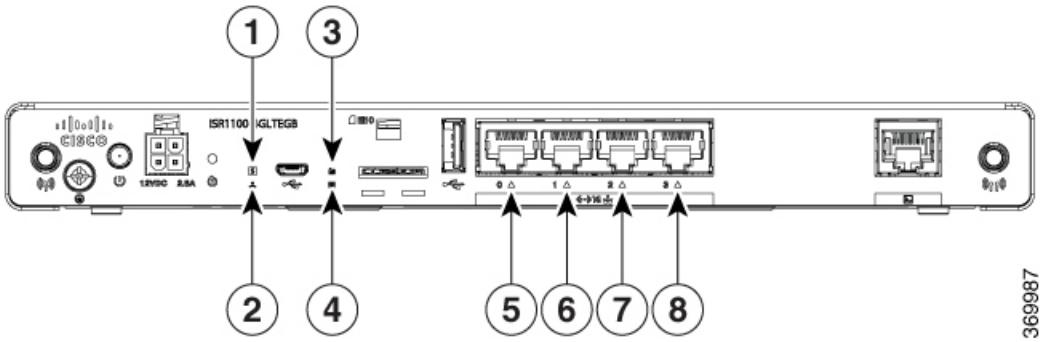
Port	LED Color	Description
SYS	OFF	System is off
	Amber (blinking)	Boot up phase
	Green steady on	Normal operation
	Amber (steady)	System going down/fault
STATUS	Green	OMP connection is up
	OFF	System is down or OMP connection is down
RJ-45 Ethernet Port LEDs (0-3)	Green (solid)	Link is established
	Green (blinking)	Data transmission in progress on the link
	OFF	Link is not connected or is down
SFP Ethernet Port LEDs (4-5)	Green (solid)	Link is established
	Green (blinking)	Data transmission in progress on the link
	OFF	Link is not connected or is down

LED Indicators on Cisco ISR1100-4GLTE Routers

The following figure and table summarize the LED indicators that are located on the front panel of the Cisco ISR1100-4GLTE routers.

Note For the purpose of illustration, we have used the image of the Cisco ISR1100-4GLTEGB router.

Figure 4: LEDs on Cisco ISR1100-4GLTE Routers



1	System LED
2	Status LED
3	RSSI LED
4	SIM LED
5, 6, 7, 8	RJ-45 Ethernet Port LEDs

LED Indicators for Cisco ISR1100-4GLTE Routers

The following table applies to both Cisco ISR1100-4GLTENA and Cisco ISR1100-4GLTEGB routers.

Port	LED Color	Description
SYS	OFF	System is off
	Amber (blinking)	Boot up phase
	Green steady on	Normal operation
	Amber (steady)	System going down/fault
STATUS	Green	OMP connection is up
	OFF	System is down or OMP connection is down
RSSI LED	OFF	LTE interface is shut
	Green (steady)	LTE is enabled, excellent signal
	Green/Orange (blinking)	LTE is enabled, good signal
	Orange (steady)	LTE is enabled, poor signal
	Orange (blinking)	LTE is enabled, but there is some error (no connectivity with BTS or lack of signal)

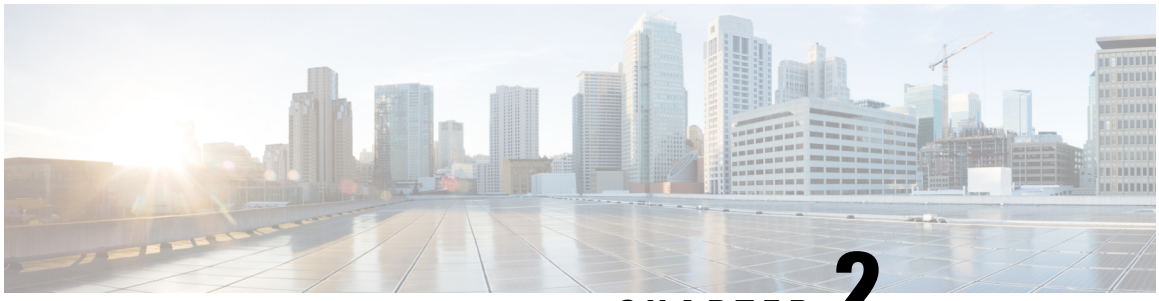
Port	LED Color	Description
SIM LED	OFF	No SIM or SIM is offline
	On 1sec, Off 1sec	Low power mode
	On 200 ms, Off 5 sec	No service
	On (steady)	In service
	On 5 sec, Off 200 ms	Roaming
	On 400 ms, Off 100 ms	Data Active
RJ-45 Ethernet Port LEDs (0-3)	Green (solid)	Link is established
	Green (blinking)	Data transmission in progress on the link
	OFF	Link is not connected or is down

Cisco ISR1100-4GLTE Wireless Platform Specifications

This table lists wireless specifications for Cisco ISR1100-4GLTENA and Cisco ISR1100-4GLTEGB routers.

Table 7: Wireless Specifications for Cisco ISR1100-4GLTE Routers

Features	Cisco ISR1100-4GLTENA	Cisco ISR1100-4GLTEGB
Region	North America	Global
4G LTE Bands	• Band 2 (1900 MHz) • Band 4 (1700 MHz) • Band 5 (850 MHz) • Bands 12, 13, 14, 17 (700 MHz) • Band 66 (1700 MHz)	• Band 1 (2100 (MHz) • Band 3 (1800 MHz) • Band 7 (2600 MHz) • Band 8 (900 MHz) • Band 20 (800 MHz) • Band 28 (700 MHz)



CHAPTER 2

Preinstallation

This chapter provides preinstallation information, such as recommendations and requirements that must be met before installing your router. Before you begin, inspect all items for shipping damage. If anything appears to be damaged or if you encounter problems installing or configuring your router, contact customer service.

General Safety Standards

General Safety Warnings

Warning 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

Safety with Electricity

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

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

Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than 20A. Statement 1005

Caution Before removing or installing router modules and components, ensure that the router chassis is electrically connected to ground. Ensure that you attach an ESD grounding strap to an ESD point and place the other end of the strap around your bare wrist making good skin contact. Failure to use an ESD grounding strap could result in damage to the router.

Caution Some router components are hot-swappable and hot-insertable. You can remove and replace them without powering off or disconnecting power to the router. Do not, however, install the router or any of its component if they appear to be damaged.

- Locate the emergency power-off switch in the room in which you are working. In case of an electrical accident, quickly turn off the power.
- Disconnect power before installing or removing the router.
- If an electrical accident occurs, use caution and immediately turn off power to the router.
- Do not work alone if hazardous conditions exist.
- Always check that power is disconnected from a circuit. Never assume that it is disconnected.
- Carefully inspect your work area for possible hazards, such as moist floors, worn-out power cords, ungrounded power extension cords, and missing safety grounds.
- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the router and the FRUs function safely and correctly, use the specified cables and connectors, and make certain they are in good condition.

Site Preparation Guidelines

Efficient operation of routers requires proper site planning and proper layout of your equipment rack or wiring closet:

- Ensure that the area around the router is kept free of dust and conductive material.
- Follow appropriate airflow guidelines so that the cooling system functions normally.
- Follow ESD prevention procedures to avoid any damage to the router.

Warning Installing or mounting of devices with LTE radio must be done such that a minimum separation distance (distance between a person and the device, or the device's antennas) of 20 cm is always ensured.

Environmental Requirements

Install the routers in a dry, clean, temperature-controlled, and well-ventilated environment:

- Maintain ambient airflow for the router to operate normally. The ambient intake air temperature should be in the range 0°C to 40°C (32°F to 104°F). If the airflow is blocked or if the air intake is too warm, the router can get overheated.
- Avoid temperature extremes. Ensure that the router is operating at an ambient temperature not more that 40°C (104°F) at sea level. For higher altitudes, a derating of 1.50°C per 1,000 feet applies.
- High humidity conditions can cause moisture to penetrate into the chassis. The devices support 10% to 85% humidity levels, non-condensing.

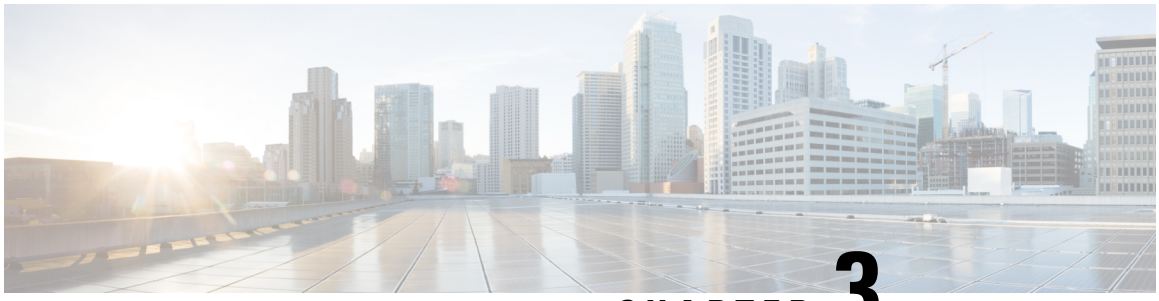
Airflow Requirements

When planning your site for installing Cisco ISR 1100-4G and Cisco ISR 1100-6G routers, allow enough clearance around the installed router.

Tools and Equipment Required for Installation

You need the following tools and equipment to install and upgrade the router and its components:

- ESD-preventive cord and wrist strap
- Number 2 Phillips screwdriver
- Phillips screwdrivers: small, 3/16-in. (4 to 5 mm) and medium, 1/4-in. (6 to 7 mm)
- Wire crimper
- Copper wire for connecting the chassis to an earth ground:
    - AWG 14 (2 mm2) or larger for chassis grounding
- For grounding, an appropriate user-supplied ring terminal sized appropriately for a #6-32 screw.



CHAPTER 3

Install and Connect Cisco ISR1100-4G, Cisco ISR1100-6G, and Cisco ISR1100-4GLTE

This chapter describes how to install and connect the Cisco ISR1100-4G, Cisco ISR1100-6G, and Cisco ISR1100-4GLTE routers.

Unpack Router

Do not unpack the router until you are ready to install it. If the final installation site is not yet ready, keep the chassis in its shipping container to prevent accidental damage. When you are ready to install the router, unpack it.

The router, accessory kit, publications, and any optional equipment that you ordered may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you received all the items on the list.

Install Cisco ISR 1100-4G and Cisco ISR 1100-6G Routers

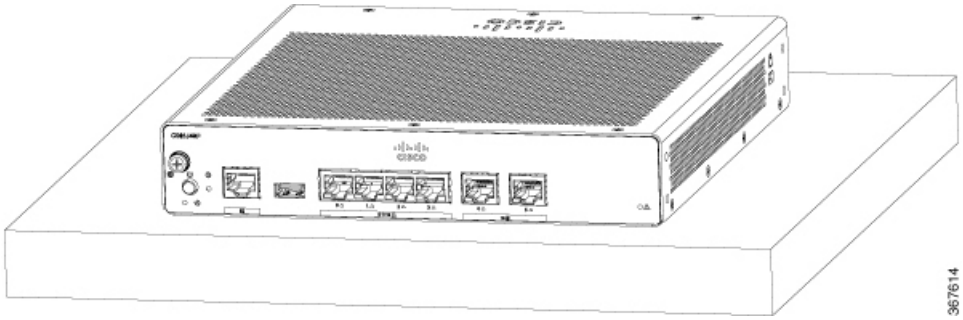
Warning Read the installation instructions before using, installing or connecting the system to the power source. Statement 1004

Warning Installation of the equipment must comply with local and national electrical codes. Statement 1074

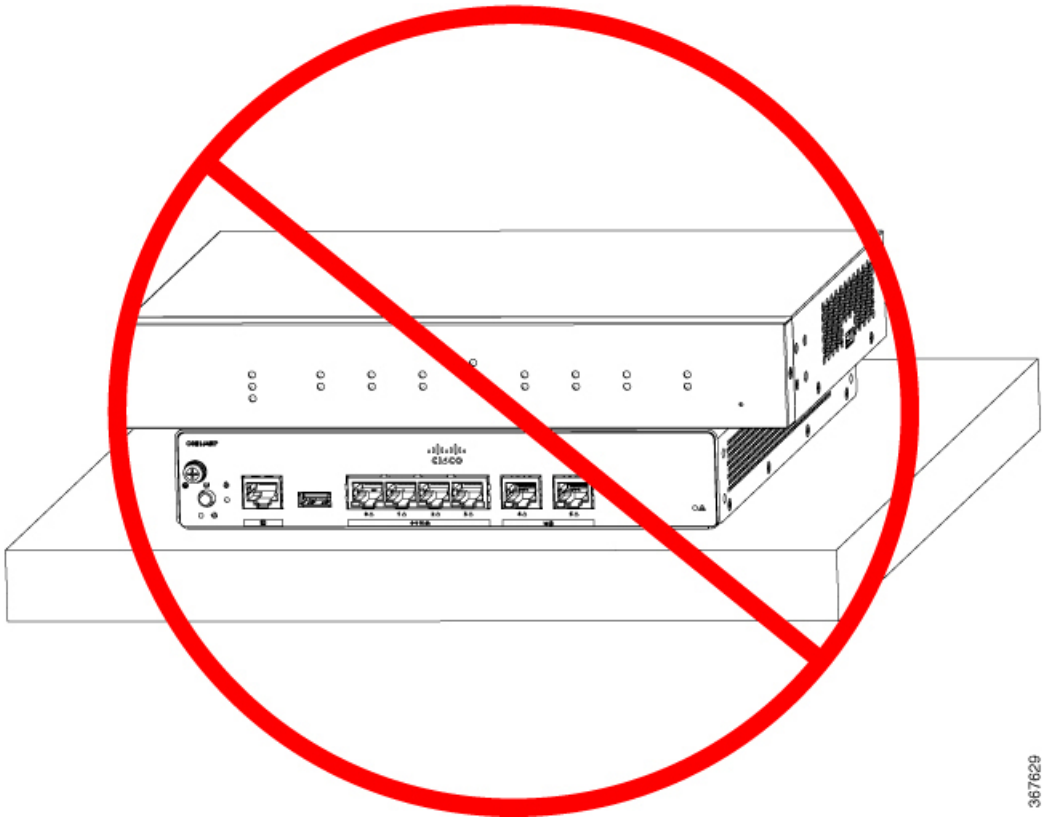
Warning To prevent airflow restriction, allow clearance around the ventilation openings to be at least: 1.75 in. (4.4 cm). Statement 1076

Place the router on a desk or a shelf. At the bottom of the router, there are four rubber feet that protect the router and the surface it is on.

Placing the Router on a Desk or a Shelf



Note Do not stack up routers.



Connect Cisco ISR1100-4G and Cisco ISR1100-6G

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, replace, or service this equipment. Statement 1030

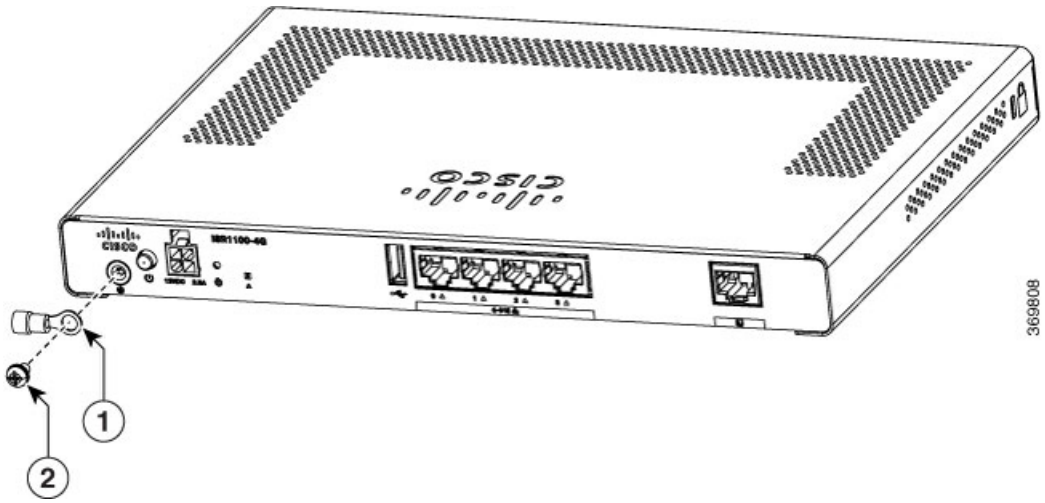
To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation of your Cisco ISR1100-4G and Cisco ISR1100-6G routers, connect the routers to a reliable earth ground before you power it on. To do so, you need a number 2 Phillips (+) screwdriver.

Note You need to use your own 14 AWG copper wire and ring terminal. These are not part of the accessory kit.

1. For grounding the chassis, use a copper wire of size 14 AWG and a ring terminal. These are not part of the accessory kit.
2. Strip one end of the ground wire to the length required for the ground lug or the ring terminal, and attach the ring terminal to the cable.
3. Crimp the ground wire to the ground lug or ring terminal, using a crimp tool of the appropriate size.
4. Make sure that the cable does not touch or block access to other router components.

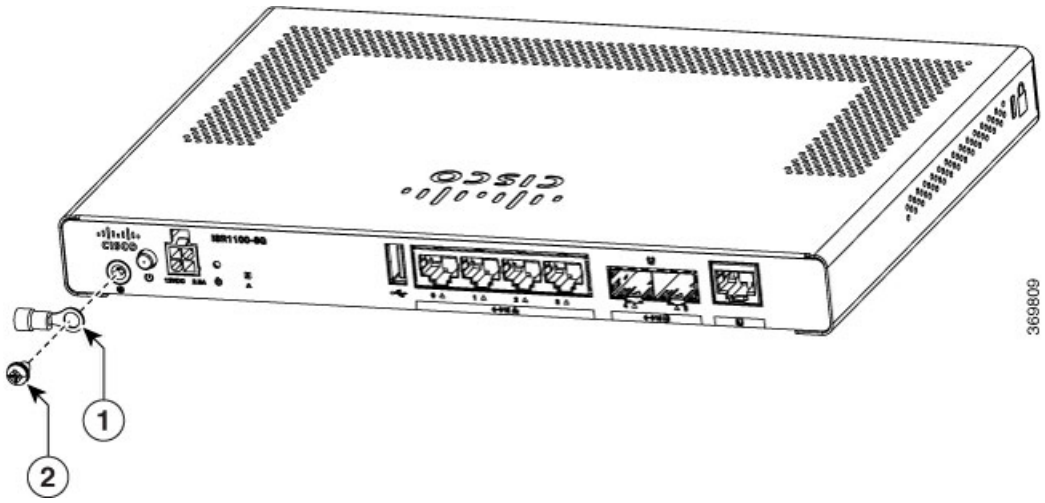
Note For the purpose of illustration, we have used the image of an Cisco ISR1100-4G router to show chassis grounding.

Figure 5: Chassis Grounding for Cisco ISR1100-4G



1	Screw (UNC 6-32)
2	Ground Lug

Figure 6: Chassis Grounding for Cisco ISR1100-6G



Connect the Power Cable

Before you connect power to the router, make sure you have:

- Electrostatic discharge (ESD) grounding strap.
- Power cords appropriate for your geographical location.

Connect Router to AC Power

Before you power the router, first ensure that it is connected to earth ground. Next, plug the power supply output cable to the 4-pin power connector on the font panel. Finally, plug the input power cord to the AC power source.

Warning To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 104°F (40°C). Statement 1047

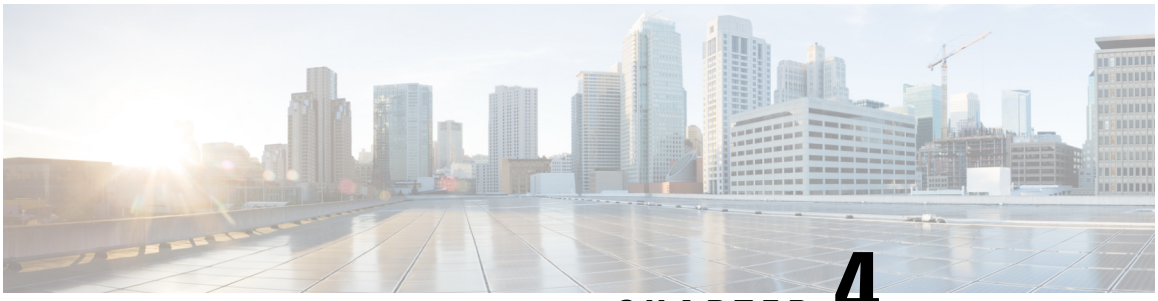
Connect the Router to a Console

You can configure and manage the Cisco ISR1100-4G and Cisco ISR1100-6G routers using a management console. To connect the router to a management console, use the console port which accepts a cable with an RJ-45 connector.

To connect the router to a console:

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

Caution Power over Ethernet (PoE) enabled cables can damage the console port. Do not accidentally connect these cables to the console port.



CHAPTER 4

Default Configuration at Startup

Each Cisco ISR1100-4G and Cisco ISR1100-6G router is shipped from the factory with a default configuration. The default configuration file sets the default CLI prompt to vEdge#, configures OMP, and enables logging of syslog messages to a file.

Cisco ISR1100-4G and Cisco ISR1100-6G Routers

The following is the default configuration at start up on Cisco ISR1100-4G, and ISR1100-6G routers.

```
device# show running-config

system

 host-name               vedge

 admin-tech-on-failure

 no route-consistency-check

 vbond ztp.viptela.com

 aaa

  auth-order local radius tacacs

  usergroup basic

   task system read write

   task interface read write

  !

  usergroup netadmin

  !

  usergroup operator

   task system read

   task interface read
```

```
   task policy read

   task routing read

   task security read

  !

  usergroup tenantadmin

  !

  user admin
   password
$6$tebXK3g64oMdWjSp$kIbJ/qShDI4/eLQ0M8NLyCK7rlmsZAlnwGFqCVZc7rNlIE6f8O1Q6IuP4pHJinc8pSTNGAEYtoCAwDuAiGPF9/

  !
!
logging
  disk
   enable
  !
!
!
omp
no shutdown
graceful-restart
advertise connected
advertise static
!
security
ipsec
  authentication-type ah-sha1-hmac sha1-hmac
!
!
vpn 0
interface ge0/0
  ip dhcp-client
  ipv6 dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
   allow-service https
  !
  no shutdown
!
!
vpn 512
!
```

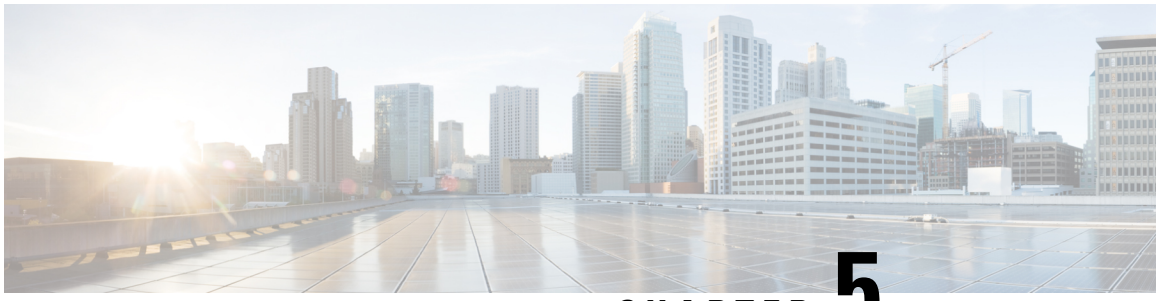
Cisco ISR1100-4GLTE Routers

The following is the default configuration for Cisco ISR1100-4GLTENA and Cisco ISR1100-4GLTEGB routers.

```
Device# show running-config
system
 host-name               vedge
 admin-tech-on-failure
 no route-consistency-check
 vbond ztp.viptela.com
 aaa
  auth-order local radius tacacs
  usergroup basic
   task system read write
   task interface read write
  !
  usergroup netadmin
  !
  usergroup operator
   task system read
   task interface read
   task policy read
   task routing read
   task security read
  !
  usergroup tenantadmin
  !
  user admin
   password
$6$tebXK3g64oMdWjSp$kIbJ/qShDI4/eLQ0M8NLyCK7rlmsZAlnwGFqCVZc7rNlIE6f8OlQ6IuP4pHJinc8pSTNGAEYtoCAwDuAiGPF9/

  !
 !
 logging
  disk
   enable
  !
 !
!
omp
 no shutdown
 graceful-restart
 advertise connected
 advertise static
!
security
 ipsec
  authentication-type ah-sha1-hmac sha1-hmac
 !
!
vpn 0
 interface cellular0
  ip dhcp-client
  tunnel-interface
   encapsulation ipsec
   color lte
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
```

```
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
   allow-service https
  !
  mtu        1428
  profile    0
  technology auto
  no shutdown
 !
 interface ge0/0
  ip dhcp-client
  ipv6 dhcp-client
  tunnel-interface
   encapsulation ipsec
   no allow-service bgp
   allow-service dhcp
   allow-service dns
   allow-service icmp
   no allow-service sshd
   no allow-service netconf
   no allow-service ntp
   no allow-service ospf
   no allow-service stun
   allow-service https
  !
  no shutdown
 !
!
vpn 512
!
```



CHAPTER 5

Install External Modules and FRUs

This chapter describes how to install and remove optional small-form-pluggable (SFP) modules in the router to provide optical Gigabit Ethernet connectivity, It also describes how to install antennae for Cisco ISR1100-4GLTE routers.

Safety Warnings

Warning Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019. Statement 1255

Warning Class 1 laser product. Statement 1008

Install Antennas for Cisco ISR1100-4GLTE Routers

Cisco ISR1100-4GLTE routers have two antenna terminals: Main and Diversity. Cisco ISR1100-4GLTE routers ship with one Omnidirectional Dipole Antenna (LTE-ANTM-SMA-D).

For information on installing the antenna provided with the router, see Installation Instructions for Cisco 4G LTEA, 4GLTE, and 3G Omnidirectional Dipole Antenna.

Note For best performance, you are recommended to install two antennas.

For information on other supported antennas, see Antenna Selection Table.

For information on cables and accessories, see Cisco RF Cables and Accessories

Install and Remove SFP Modules

Install SFPs

Optical SFPs use a small laser to generate the fiber-optic signal. Keep the optical transmit and receive ports covered whenever a cable is not connected to the port.

Warning Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. Statement 1056

Fiber type and Core diameter (µm)	Wavelength (nm)	Max. Power (mW)	Beam divergence (rad)
SM 11	1200 - 1400	39 - 50	0.1 - 0.11
MM 62.5	1200 - 1400	150	0.18 NA
MM 50	1200 - 1400	135	0.17 NA
SM 11	1400 - 1600	112 - 145	0.11 - 0.13

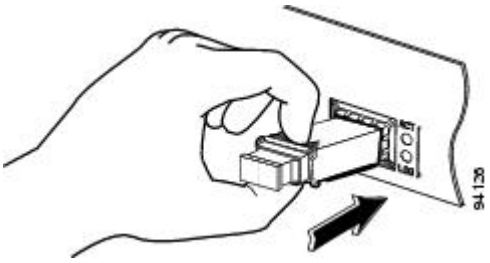
349377

To install an SFP module in your router:

1. Read the “Safety Warnings” section , and disconnect the power supply before you replace any module.
2. Slide the SFP into the router connector until it locks into position.

Note The following image is for reference only.

Figure 7: Install an SFP Module



Caution Do not remove the optical port plugs from the SFP until you are ready to connect cabling.

3. Connect the network cable to the SFP module.

Remove SFP Modules

Read the “Safety Warnings” section in this chapter, and disconnect the power supply before you replace any module.

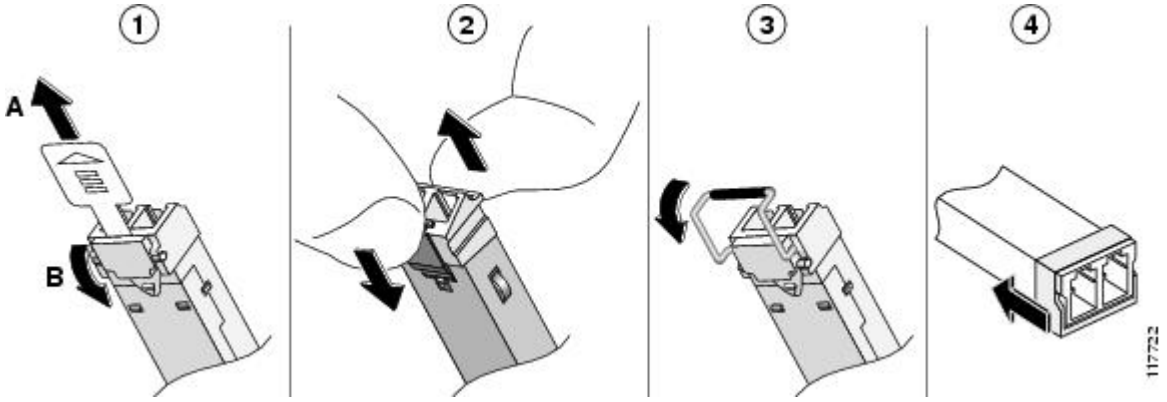
1. Disconnect all cables from the SFP module.

Caution The latching mechanism used on many SFPs locks the SFP into place when cables are connected. Do not pull at the cabling in an attempt to remove the SFP.

2. Disconnect the SFP latch.

Note SFP modules use various latch designs to secure the module in the SFP port. Latch designs are not linked to SFP models or technology type. For information on the SFP technology type and model, see the label on the side of the SFP.

Figure 8: Latch Mechanisms for Disconnecting SFP Modules



- **1:** Sliding latch
- **2:** Swing and slide latch
- **3:** Bale-clasp latch
- **4:** Plastic collar latch

3. Grasp the SFP on both sides and remove it from the router.