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Preparing for installation


Safety recommendations

To avoid any equipment damage or bodily injury, read the following safety recommendations before installation. Note that the recommendations do not cover every possible hazardous condition.

Safety symbols

When reading this document, note the following symbols:

 **WARNING** means an alert that calls attention to important information that if not understood or followed can result in personal injury.

 **CAUTION** means an alert that calls attention to important information that if not understood or followed can result in data loss, data corruption, or damage to hardware or software.

General safety recommendations

- Keep the router and installation tools away from walk areas.
- Place the router in a dry and flat location and make sure anti-slip measures are in place.
- Remove all external interface cables and power cords before moving the router.

Electricity safety

- Locate the external power switch in the room before installation. Shut off the power immediately if an accident occurs.
- Make sure the router is reliably grounded.
- Do not remove and install the chassis cover when the router is operating.
- Connect the interface cables correctly.
- Use an uninterruptible power supply (UPS).
- Do not work alone when the router has power
- Always make sure the power has been disconnected during installation or replacement.

ESD prevention

WARNING!

Check the resistance of the ESD wrist strap for safety. The resistance reading should be in the range of 1 to 10 megohm (Mohm) between a human body and the ground.

To prevent electrostatic discharge (ESD), follow these guidelines:

- Make sure the router and the floor are reliably grounded.

Product Code	Model Number	Product Name	DDR	FLASH	GE WAN	LAN	USB 2.0	3G/4G built-in	WiFi	PCB Board	LED Lamp
JH296A	BJNGA-BB0036	HPE MSR954 1GbE+SFP Router	1GB	256MB	1 GE +1 SFP	4GE	2	x	x	MSR810-W	SYS,VPN,MicoSD(TF)
JH297A	BJNGA-BB0037	HPE MSR954-W 1GbE+SFP (WW) Router	1GB	256MB	1 GE +1 SFP	4GE	2	x	Atheros AR9582	MSR810-W	SYS,VPN,MicoSD(TF),2.4G(wlan)
JH298A	BJNGA-BB0038	HPE MSR954-W 1GbE+SFP LTE (AM) Rtr	1GB	256MB	1 GE +1 SFP	4GE	1	Sierra MC7354	Atheros AR9582	MSR810-W	SYS,VPN,MicoSD(TF),2.4G(wlan),LTE
JH299A	BJNGA-BB0039	HPE MSR954-W 1GbE+SFP LTE (WW) Rtr	1GB	256MB	1 GE +1 SFP	4GE	1	Sierra MC7304	Atheros AR9582	MSR810-W	SYS,VPN,MicoSD(TF),2.4G(wlan),LTE

- Keep the equipment room clean to reduce the negative effects of dusts and particles.
- Maintain the humidity and temperature levels in the acceptable range.
- Always wear an ESD wrist strap. Make sure the wrist strap makes good skin contact and is reliably grounded.

No ESD wrist strap is provided with the router. Prepare it yourself.

To attach an ESD wrist strap:

1. Wear the wrist strap on your wrist.
2. Lock the wrist strap tight around your wrist to maintain good contact with the skin.
3. Secure the wrist strap lock and the alligator clip lock together.
4. Attach the alligator clip to the grounding screw on the router.

Examining the installation site

The router can only be used indoors. To ensure correct operation and a long lifespan for your router, the installation site must meet the requirements in this section.

Temperature and humidity

Maintain the temperature and humidity in the equipment room as described in **Error! Reference source not found.**

- Lasting high relative humidity can cause poor insulation, electricity creepage, mechanical property change of materials, and metal corrosion.
- Lasting low relative humidity can cause washer contraction and ESD and bring problems including loose captive screws and circuit failure.
- High temperature can accelerate the aging of insulation materials and significantly lower the reliability and lifespan of the router.

Table 1 Temperature/humidity requirements in the equipment room

Temperature	Relative humidity
0°C to 45°C (32°F to 113°F)	5% to 95%, noncondensing

Cleanliness

Dust buildup on the chassis might result in electrostatic adsorption, which causes poor contact of metal components and contact points, especially when indoor relative humidity is low. In the worst case, electrostatic adsorption can cause communication failure.

Table 2 Dust concentration limit in the equipment room

Substance	Concentration limit (particles/m ³)
Dust particles	≤ 3 x 10 ⁴ (No visible dust on the tabletop in three days)

NOTE:

Dust diameter ≥ 5 μm

The equipment room must also meet strict limits on salts, acids, and sulfides to eliminate corrosion and premature aging of components, as shown in **Error! Reference source not found.**

Table 3 Harmful gas limits in an equipment room

Gas	Maximum concentration (mg/m ³)
SO ₂	0.2
H ₂ S	0.006
NH ₃	0.05
Cl ₂	0.01

Cooling

- Maintain a minimum clearance of 10 cm (3.94 in) around the air vents.
- Make sure the installation site has a good ventilation system.

EMI

All electromagnetic interference (EMI) sources, from outside or inside of the router and application system, adversely affect the router in the following ways:

- A conduction pattern of capacitance coupling.
- Inductance coupling.
- Electromagnetic wave radiation.
- Common impedance (including the grounding system) coupling.

To prevent EMI, perform the following tasks:

- If AC power is used, use a single-phase three-wire power receptacle with protection earth (PE) to filter interference from the power grid.
- Keep the router far away from radio transmitting stations, radar stations, and high-frequency devices.
- Use electromagnetic shielding, for example, shielded interface cables, when necessary.

Lightning protection

To protect the router from lightning, follow these guidelines:

- Make sure the router is reliably grounded by using a grounding cable.
- Make sure the AC power receptacle is reliably grounded.
- Install a lightning protector at each power input end.

Installation accessories and tools

Figure 1 Installation accessories

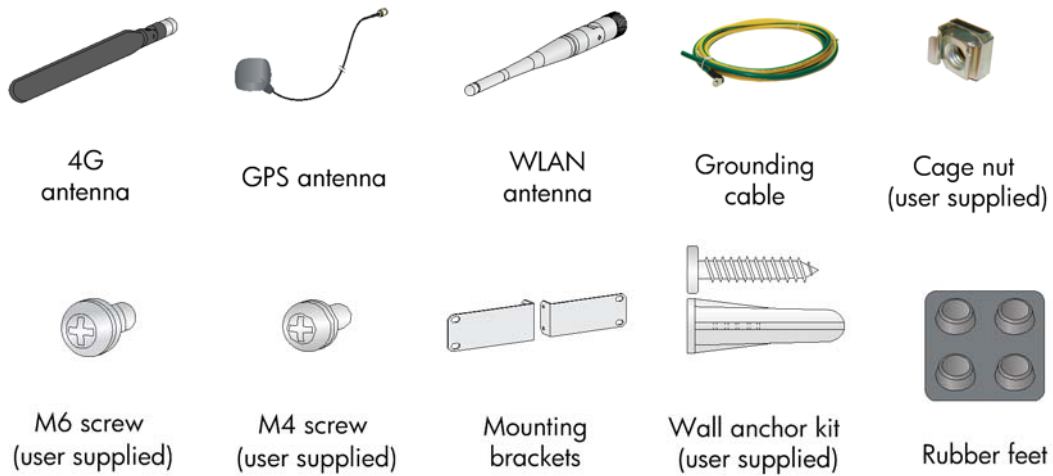


Figure 2 User-supplied tools and equipment



Pre-installation checklist

Item	Requirements
Installation site Ventilation	<ul style="list-style-type: none"> • There is a minimum clearance of 10 cm (3.9 in) around the air inlet and outlet vents. • An adequate ventilation system is available at the installation site.

Item	Requirements
Temperature	0°C to 40°C (32°F to 104°F)
Relative humidity	5% to 90% (noncondensing)
Cleanness	Dust concentration $\leq 3 \times 10^4$ particles/m ³ (no visible dust on the tabletop over three days)
ESD prevention	<ul style="list-style-type: none"> The router and floor are reliably grounded. The equipment room is dust-controlled. Humidity and temperature are maintained at acceptable levels. An ESD wrist strap is available.
EMI prevention	<ul style="list-style-type: none"> A single-phase three-wire power receptacle with protection earth (PE) is available for filtering interference from the power grid. The router is far away from radio transmitting stations, radar stations, and high-frequency devices. Electromagnetic shielding, for example, shielded interface cables, is used as required.
Lightning protection	<ul style="list-style-type: none"> The router is reliably grounded. The AC power receptacle is reliably grounded. (Optional.) Port lightning protectors are available. A signal lightning arrester is required at the input end of an external signal cable. (Optional.) Power lightning protectors are available.
Electricity safety	<ul style="list-style-type: none"> A UPS is available. The external power switch is located so to shut off the power immediately when an accident occurs.
Workbench	<ul style="list-style-type: none"> The workbench is stable. The workbench is reliably grounded.
Safety precautions	<ul style="list-style-type: none"> The router is far away from any sources of heat or moisture. The emergency power switch in the equipment room is identified and accessible.
Tools	<ul style="list-style-type: none"> Installation accessories supplied with the router are ready. User-supplied tools are ready.
Reference	<ul style="list-style-type: none"> Documents shipped with the router are available. Online documents are available.

Installing the router

⚠ WARNING!

To avoid injury, do not touch bare wires, terminals, or parts with high-voltage hazard signs.

ⓘ IMPORTANT:

- The barcode on the router chassis contains product information that must be provided to local sales agent when you return a faulty router for repair.
 - Keep the tamper-proof seal on a mounting screw on the chassis cover intact, and if you want to open the chassis, contact HP for permission. Otherwise, HP shall not be liable for any consequence.
-

Installation prerequisites

- You have read "[Preparing for installation](#)" carefully.
- All requirements in "[Preparing for installation](#)" are met.

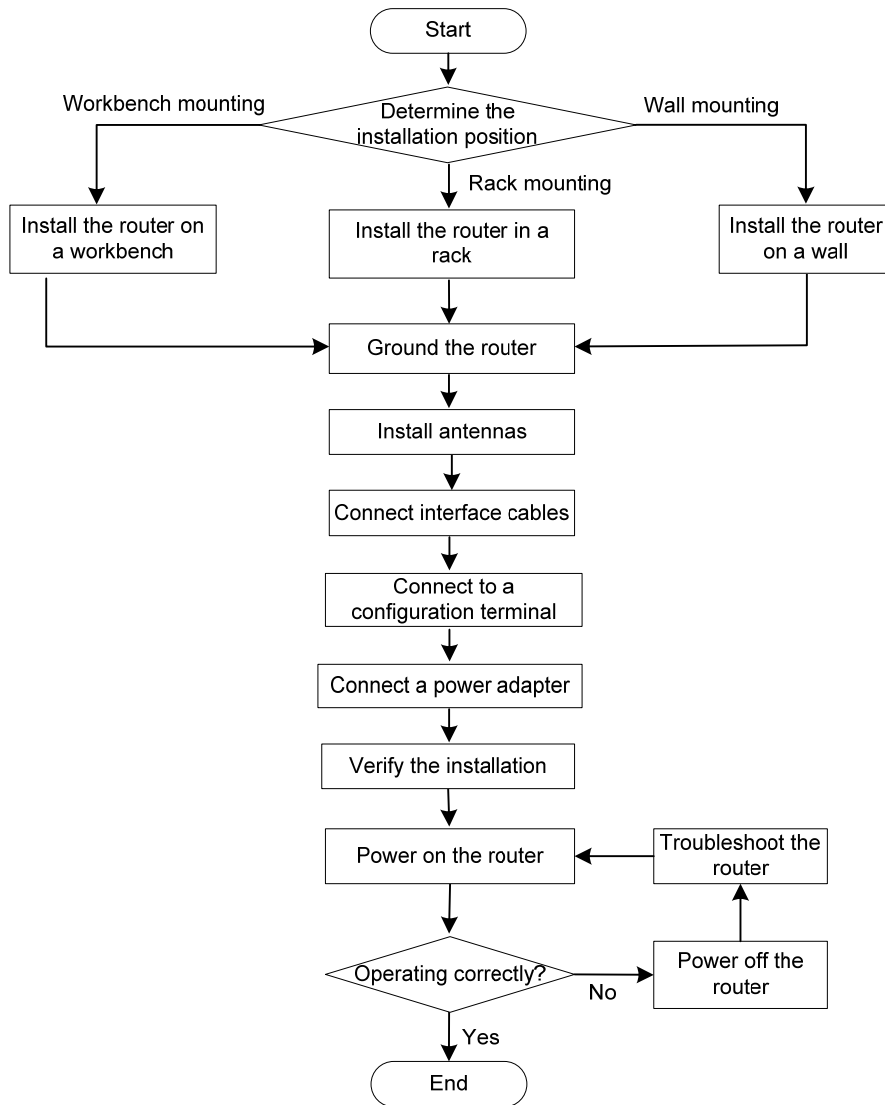
Installation flowchart

The following installation options are available for the router:

- Workbench mounting.
- Wall mounting.
- Rack mounting.

Determine the installation method according to the installation environment. Follow the installation flowchart shown in [Figure 3](#) to install the router.

Figure 3 Installation flowchart



Installing the router

Mounting the router on a workbench

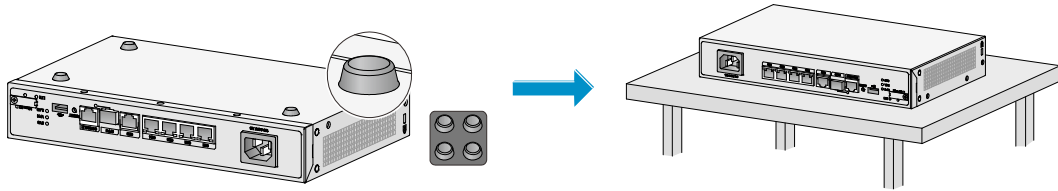
ⓘ **IMPORTANT:**

- Make sure the workbench is clean, stable, and reliably grounded.
 - Maintain a minimum clearance of 10 cm (3.9 in) around the router for heat dissipation.
 - Do not place heavy objects on the router.
-

To mount the router on a workbench:

1. Place the router upside down on the workbench and attach the rubber feet to the four round holes in the chassis bottom.
2. Place the router with the upside up on the workbench.

Figure 4 Mounting the router on a workbench

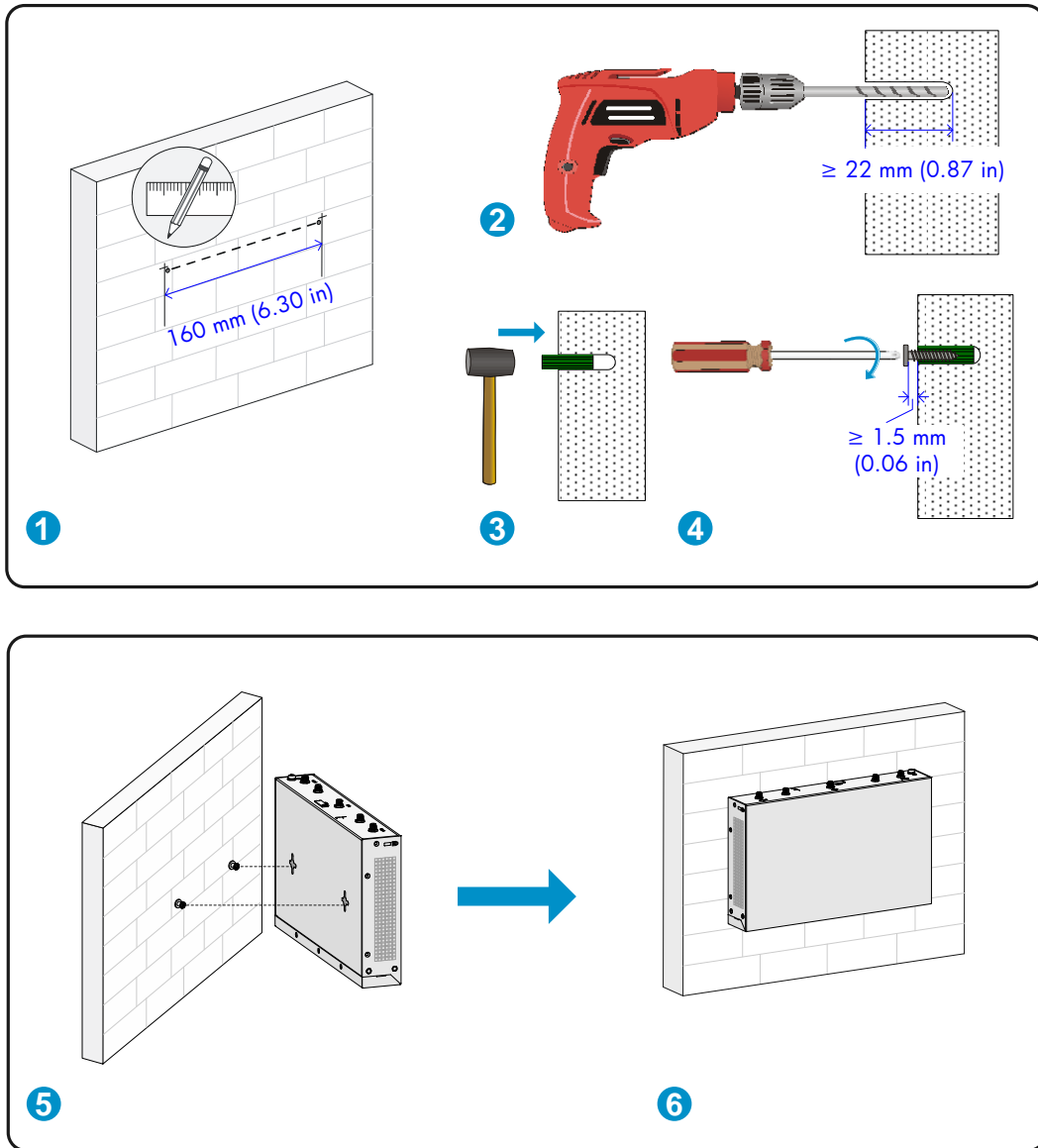


Mounting the router on a wall

1. Mark two screw hole locations on the wall. Make sure the two holes are 160 mm (6.30 in) horizontally apart.
2. Drill holes with a minimum depth of 22 mm (0.87 in) in the marked locations.
3. Use a hammer to tap an anchor into each hole until the anchor end is flush with the wall.
4. Drive a screw into each anchor and make sure the screw protrudes a minimum of 1.5 mm (0.06 in) from the wall.
5. Hang the router on the screws.

Position the router so the network interfaces face downwards, and the sides with ventilation openings are perpendicular to the ground, as shown in [Figure 5](#).

Figure 5 Wall-mounting the router



Installing the router in a rack



CAUTION:

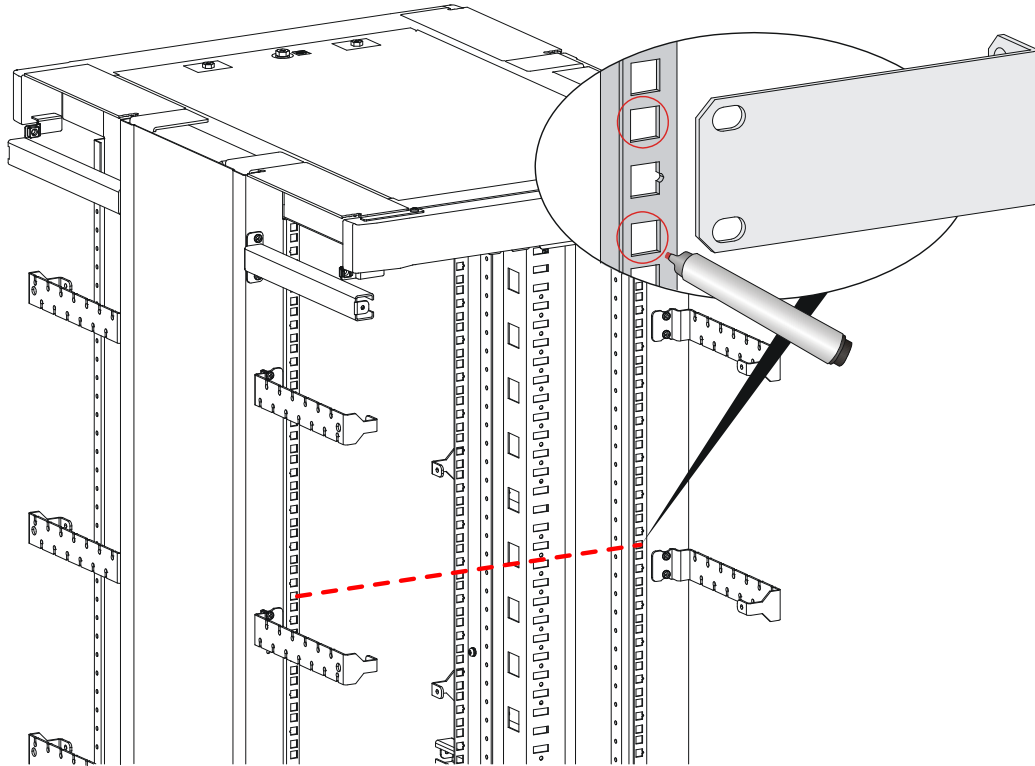
The mounting brackets can support only the weight of the router. Do not place objects on the router.

To install the router in a rack:

1. Use a mounting bracket to mark the cage nut installation holes in the front rack posts, as shown in Figure 6.

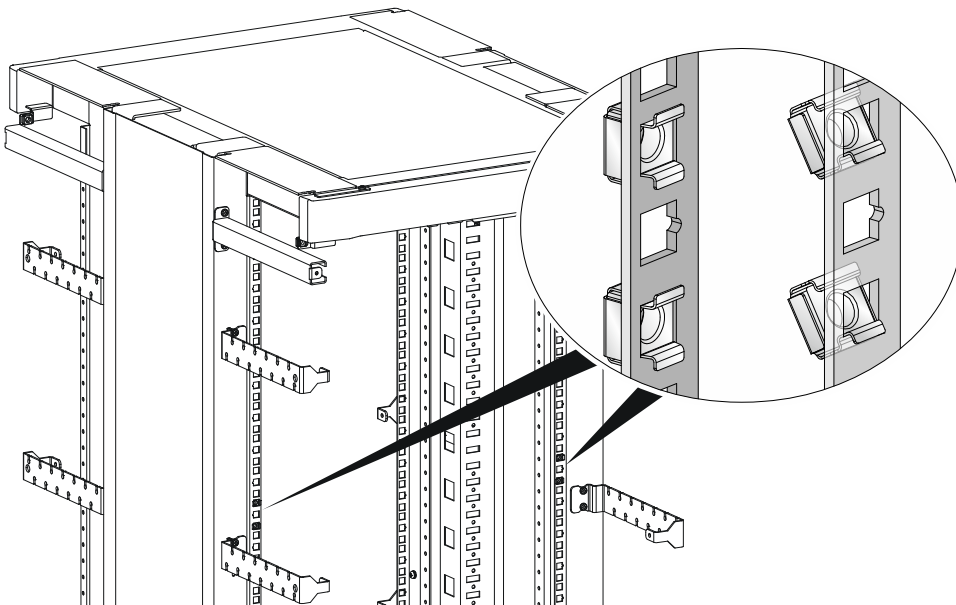
Make sure the cage nut installation holes on the front rack posts are on a horizontal line.

Figure 6 Marking cage nut installation holes



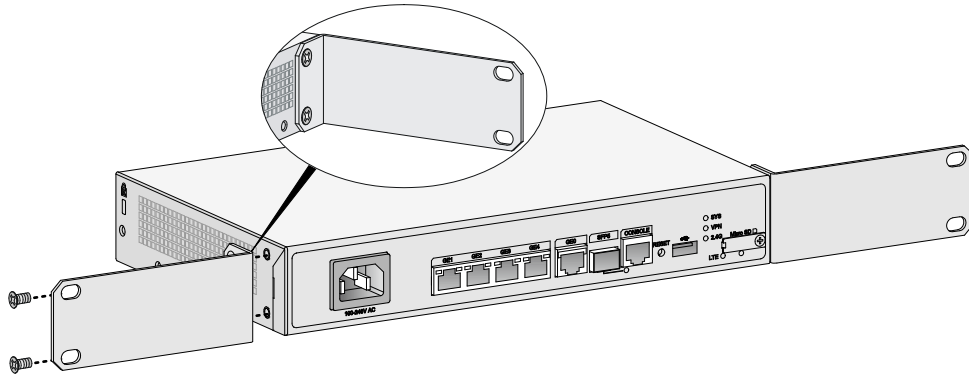
2. Install the cage nuts, as shown in [Figure 7](#).
 - a. Insert one ear of a cage nut into the marked installation hole.
 - b. Use a flathead screwdriver to push another ear into the same hole.

Figure 7 Installing cage nuts



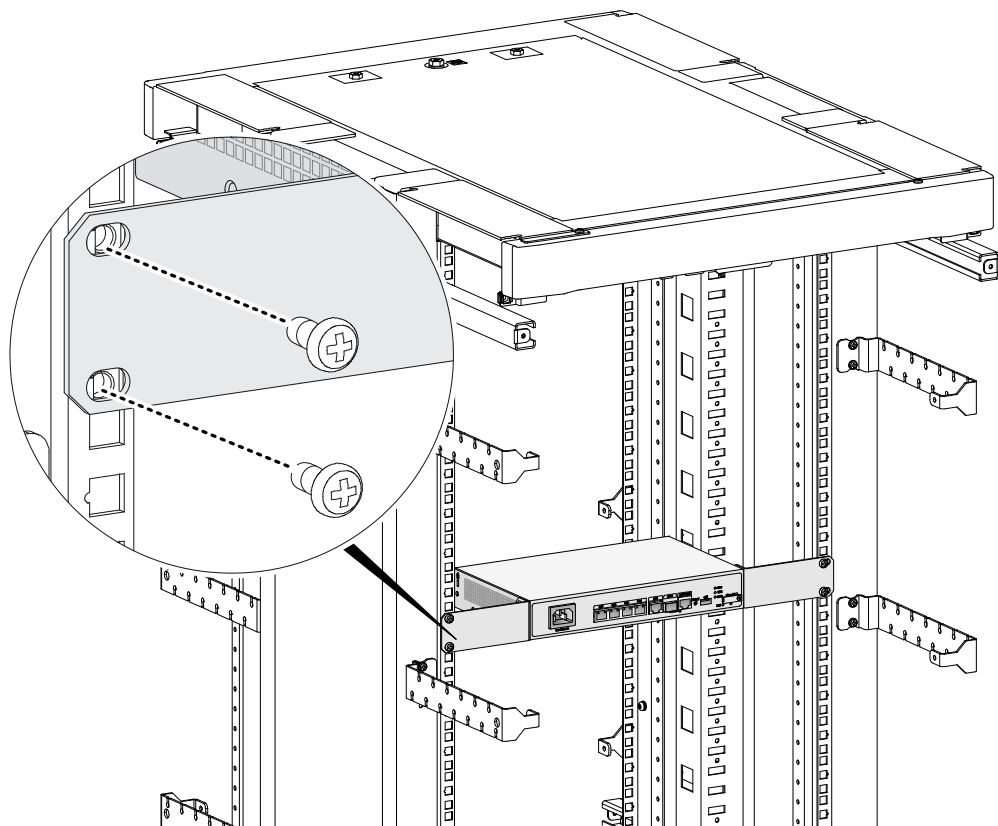
3. Attach mounting brackets to both sides of the router, as shown in [Figure 8](#).

Figure 8 Attaching mounting brackets to the router



4. Use M6 screws to attach the mounting brackets on the router to the front rack posts, as shown in [Figure 9](#).

Figure 9 Securing the router to the rack



Grounding the router

△ CAUTION:

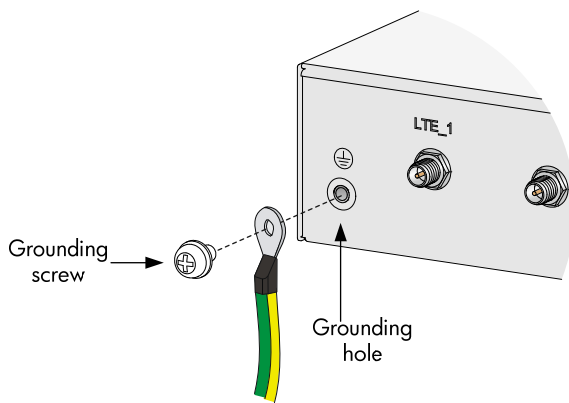
- Correctly connecting the grounding cable is crucial to lightning protection and EMI protection. When you install and use the router, first ground the router reliably.
- Ensure a minimum resistance of 5 ohms between the router and the ground.

The router provides only a ring terminal. No grounding cable is provided with the router. Purchase a grounding cable yourself.

Grounding the router with a grounding strip

1. Remove the grounding screw from the grounding hole in the chassis.
2. Use the grounding screw to attach the ring terminal of the grounding cable to the grounding hole.
3. Use a screwdriver to fasten the grounding screw.
4. Connect the other end of the grounding cable to the grounding strip.

Figure 10 Connecting the grounding cable to the router

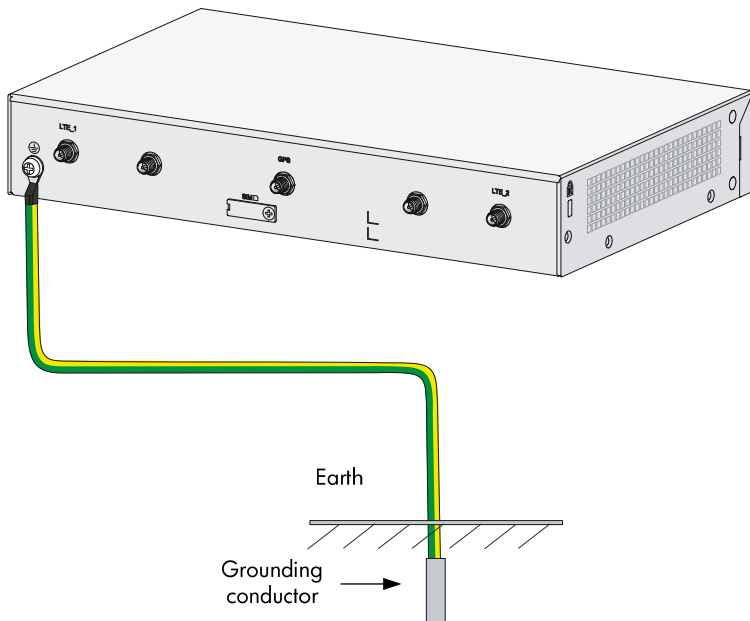


Grounding the router by burying a grounding conductor in the earth ground

If the installation site does not have any grounding strips, but earth ground is available, hammer a 0.5 m (1.64 ft) or longer angle iron or steel tube into the earth ground to act as a grounding conductor.

Weld the yellow-green grounding cable to the angel iron or steel tube and treat the joint for corrosion protection.

Figure 11 Grounding the router by burying a grounding conductor in the earth ground



Installing a 4G SIM card

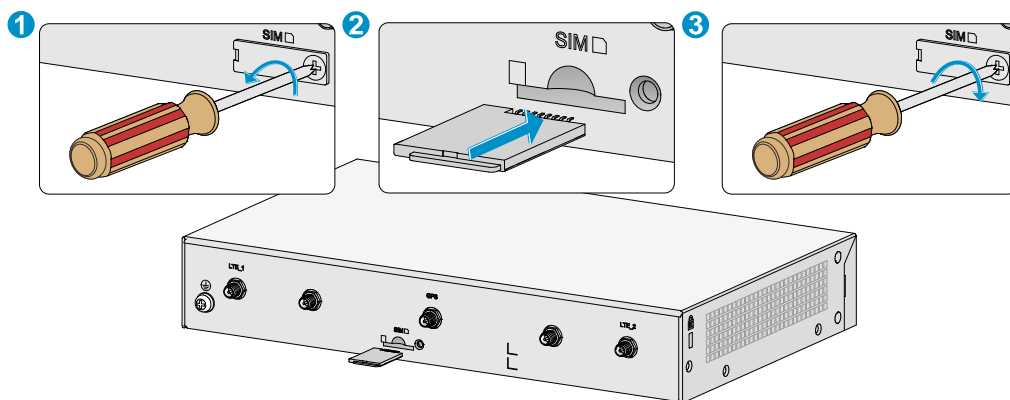
⚠ CAUTION:

- Do not hot-swap a 4G SIM card.
- To avoid damaging the SIM card slot, do not use excessive force when installing a 4G SIM card.

To install a 4G SIM card:

1. Remove the screw on the 4G SIM card slot cover and take off the cover.
2. Insert the 4G SIM card into the SIM card slot along the guide rails.
3. Reinstall the cover and fasten the screw on the cover.

Figure 12 Installing a 4G SIM card



Installing a Micro SD card

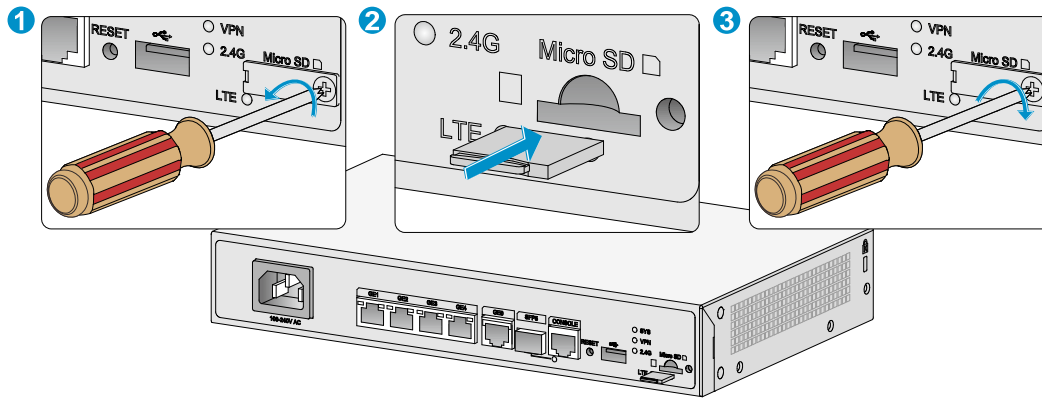
△ CAUTION:

To avoid damaging the Micro SD card slot, do not use excessive force when you install a Micro SD card.

To install a Micro SD card:

1. Remove the screw on the Micro SD card slot cover and take off the cover.
2. Insert the Micro SD card into the Micro SD card slot along the guide rails.
3. Reinstall the cover and fasten the screw on the cover.

Figure 13 Installing a Micro SD card



Installing a 4G antenna

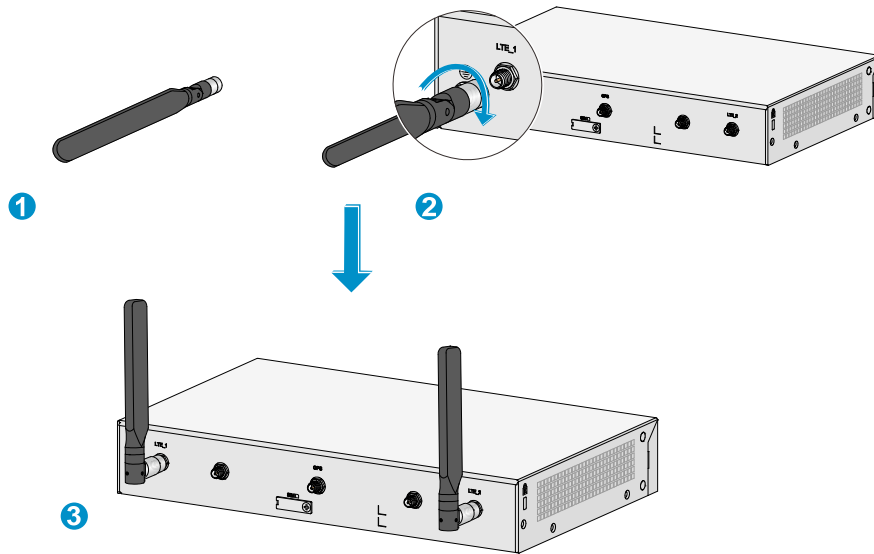
Only the JH298A and JH299A routers support 4G antennas.

To install a 4G antenna:

1. Change the angle of the antenna orientation from vertical to horizontal.
2. Attach the 4G antenna to the 4G antenna port on the router. Do not over-tighten the antenna to avoid damage.

For better signal receiving, change the antenna orientation to vertical.

Figure 14 Installing 4G antennas



Installing a WLAN antenna

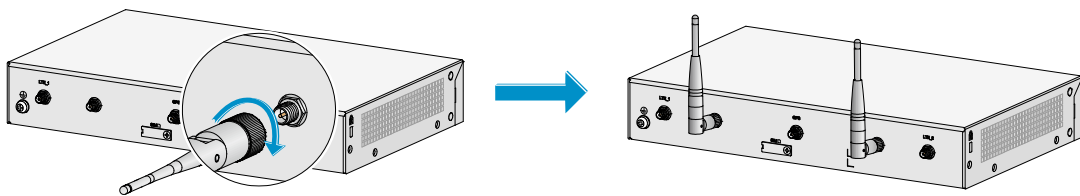
Only the JH297A, JH298A, and JH299A routers support WLAN antennas.

To install a WLAN antenna:

1. Change the angle of the antenna orientation from vertical to horizontal.
2. Attach the antenna to the WLAN antenna port on the router. Do not over-tighten the antenna to avoid damage.

For better signal receiving, change the antenna orientation to vertical.

Figure 15 Installing WLAN antennas



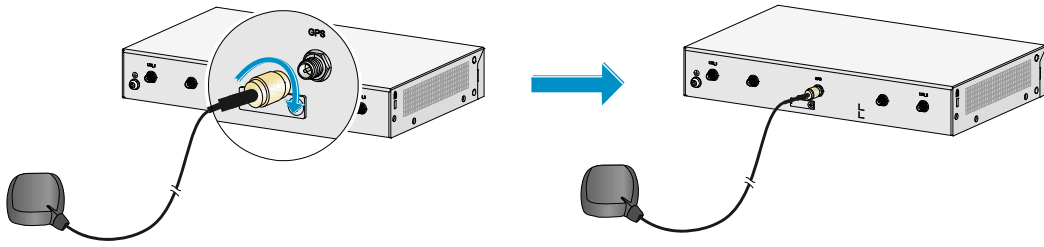
Installing a GPS antenna

Only the JH298A and JH299A routers support a GPS antenna.

To install a GPS antenna:

1. Attach the male connector of the GPS antenna to the GPS antenna port on the router. Do not use excessive force to avoid antenna damage.
2. Attach the magnetic antenna radome to a metal surface.

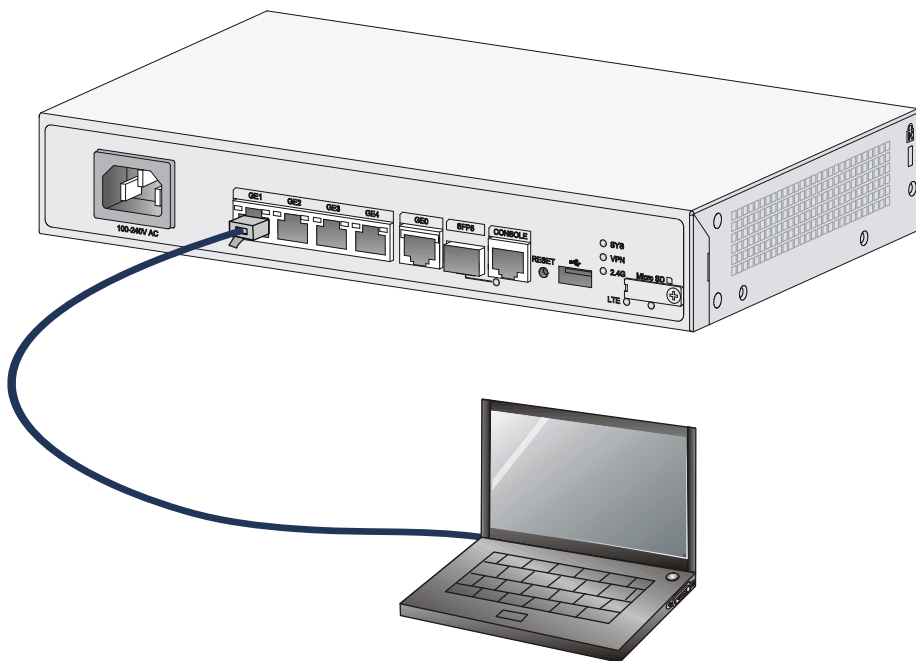
Figure 16 Installing a GPS antenna



Connecting Ethernet interface cables

1. Connect one end of the cable to an Ethernet port on the router.
2. Connect the other end of the cable to the Ethernet port on a host.
3. Examine the port LEDs on the router. For more information about the LEDs, see "LED description."

Figure 17 Connecting an Ethernet cable



Connecting the console cable and setting terminal parameters

Connecting the console cable

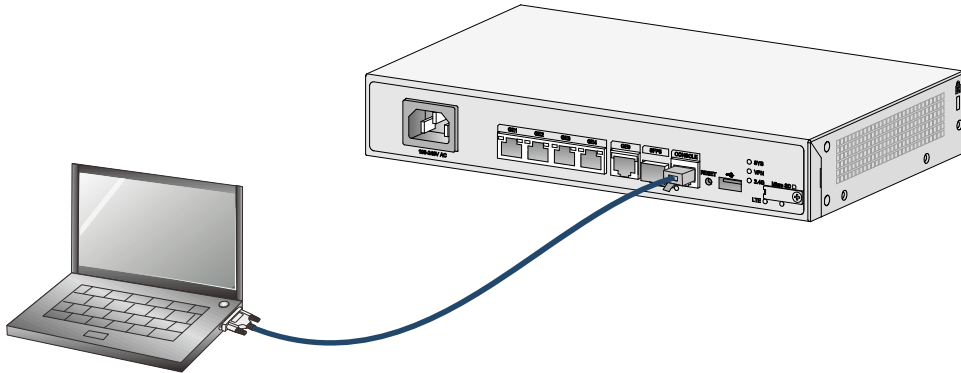
△ CAUTION:

The serial ports on PCs do not support hot swapping. To connect a PC to an operating router, first connect the PC end. To disconnect a PC from an operating router, first disconnect the router end.

To connect the console cable:

1. Select a configuration terminal, which can be an ASCII terminal with an RS232 serial port or a PC. (A PC is more commonly used.)
2. Connect the DB-9 connector (female) of the console cable to the RS-232 serial port on the configuration terminal and the RJ-45 connector to the console port of the router.

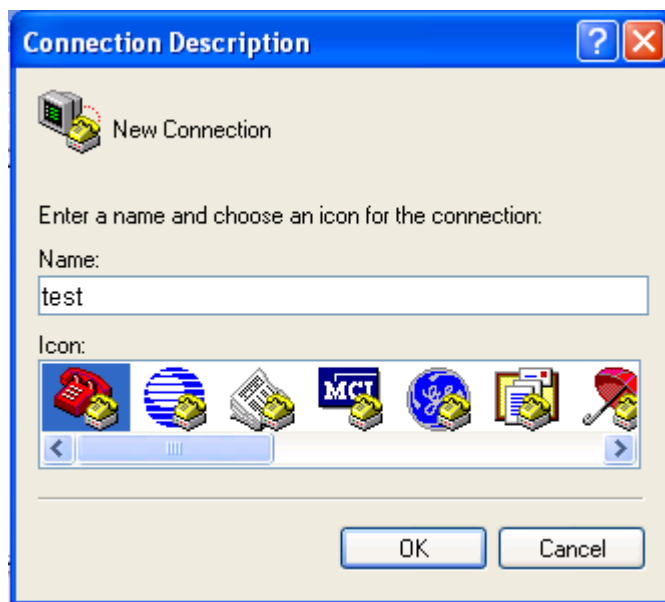
Figure 18 Connecting the console cable



Setting configuration terminal parameters

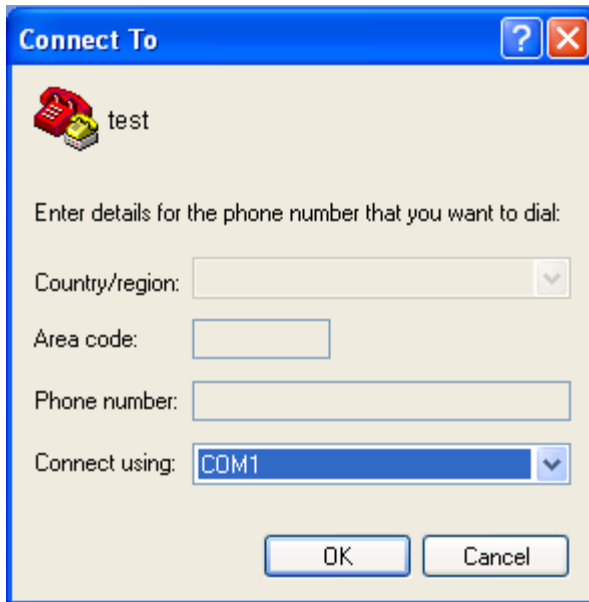
1. Select **Start > All Programs > Accessories > Communications > HyperTerminal**. The **Connection Description** dialog box appears.
2. Enter the name of the new connection in the **Name** field and click **OK**.

Figure 19 Connection description



3. Select the serial port to be used from the **Connect using** list, and click **OK**.

Figure 20 Setting the serial port used by the HyperTerminal connection

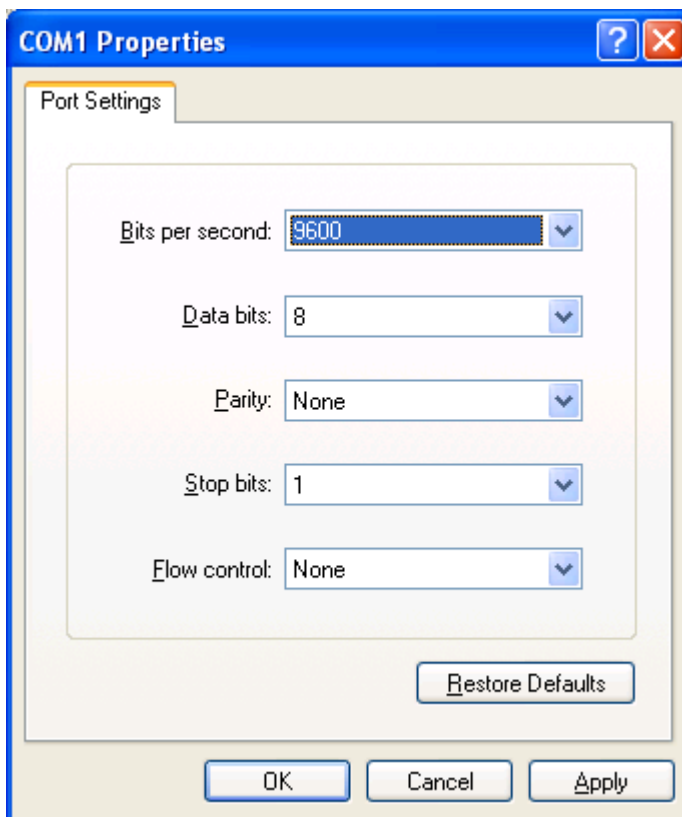


4. Set **Bits per second** to **9600**, **Data bits** to **8**, **Parity** to **None**, **Stop bits** to **1**, and **Flow control** to **None**, and click **OK**.

NOTE:

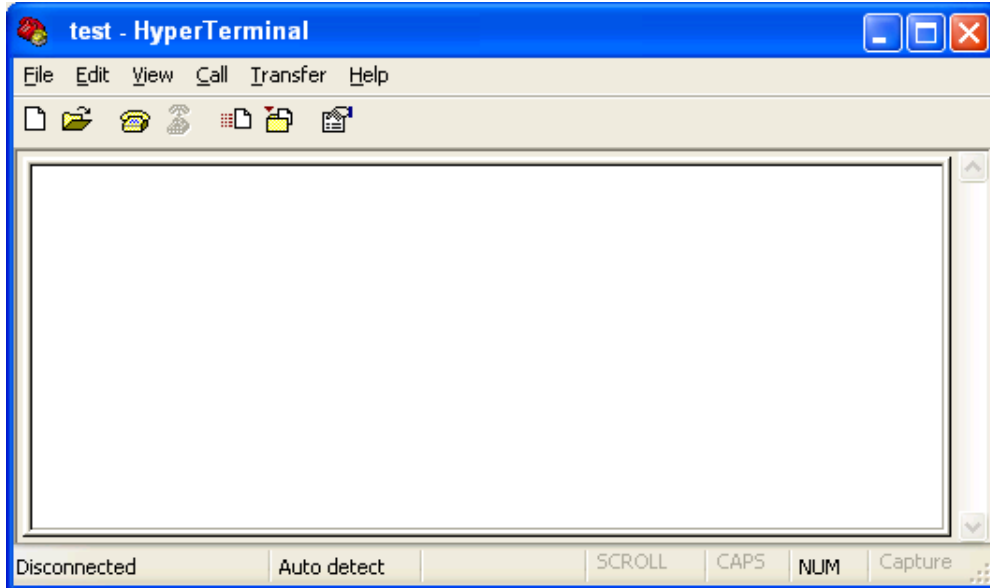
To restore the default settings, click **Restore Defaults**.

Figure 21 Setting the serial port parameters



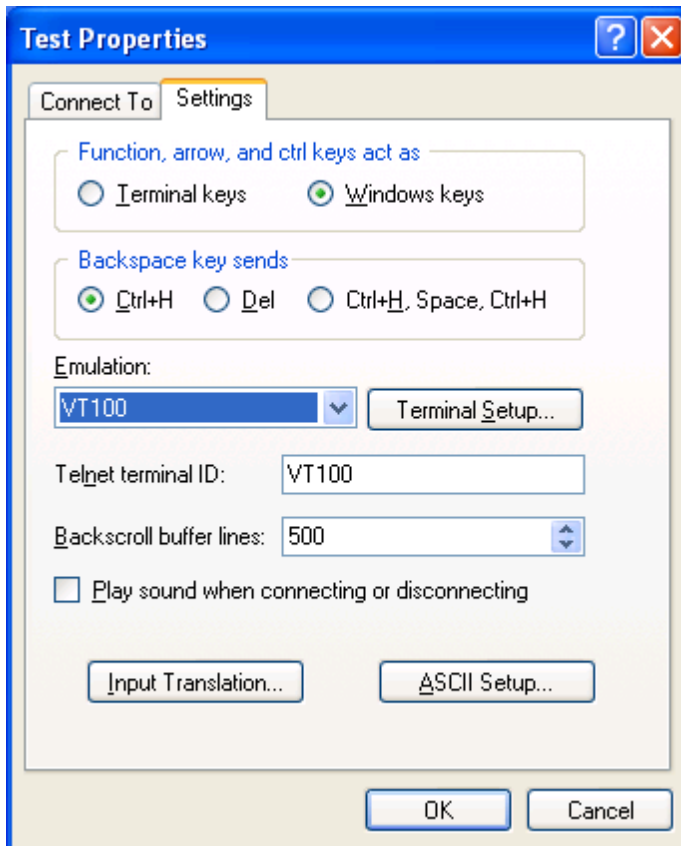
5. Select **File > Properties** in the HyperTerminal window.

Figure 22 HyperTerminal window



6. On the **Settings** tab, set the emulation to **VT100** or **Auto Detect**, and click **OK**.

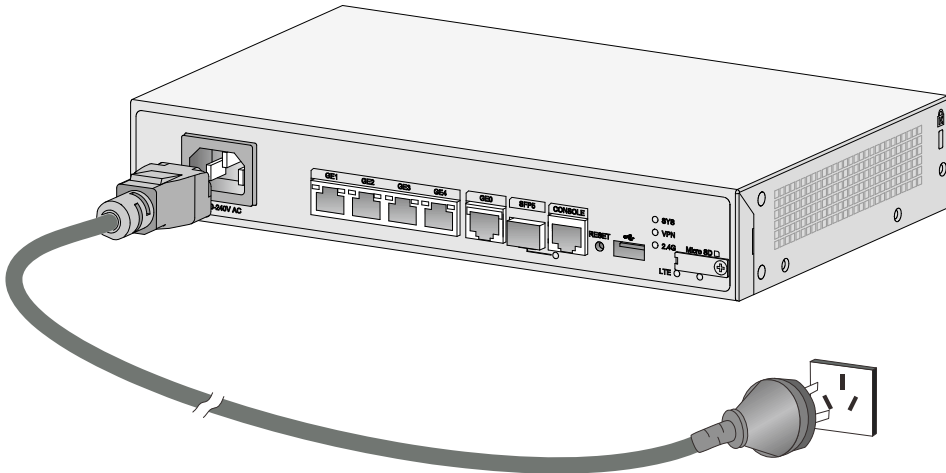
Figure 23 Setting the terminal emulation parameters



Connecting the power cord

1. Make sure the router is reliably grounded
2. Connect one end of the AC power cord to the AC power receptacle on the router, and connect the other end to the AC power source.

Figure 24 Connecting the power cord



Verifying the installation

After you complete the installation, verify the following information:

- There is enough space around the router for heat dissipation.
- The router is securely installed.
- Antennas and USB devices are installed correctly.
- The router and power source are reliably grounded.
- The power source is as required by the router.
- The router is connected correctly to the configuration terminal and other devices. Parameters are configured correctly on the configuration terminal.

Accessing the router for the first time

Powering on the router



WARNING!

Before powering on the router, locate the power source switch so that you can cut off power promptly in case of an emergency.

To power on the router:

1. Turn on the switch for the power source.
2. Turn on the power switch on the router.

Observing the startup process

The router first initializes its memory at startup. Then it runs the extended BootWare. Observe the information displayed on the configuration terminal:

```
System is starting...
Press Ctrl+D to access BASIC-BOOTWARE MENU...
Booting Normal Extended BootWare
The Extended BootWare is self-decompressing...Done.

*****
*
*          HP 95X BootWare, Version 1.43          *
*
*****
Copyright (c) 2010-2015 Hewlett-Packard Development Company, L.P.

Compiled Date       : Jun 17 2014
CPU ID             : 0x1
Memory Type        : DDR3 SDRAM
Memory Size        : 1024MB
Flash Size         : 2MB
Nand Flash size    : 256MB
CPLD Version       : 2.0
PCB Version        : 3.0

BootWare Validating...
Press Ctrl+B to access EXTENDED-BOOTWARE MENU...
Loading the main image files...
Loading file flash:/msr954-cmw710-system-r0106.bin.....
.....Done.
Loading file flash:/msr954-cmw710-security-r0106.bin...Done.
Loading file flash:/msr954-cmw710-voice-r0106.bin....Done.
Loading file flash:/msr954-cmw710-data-r0106.bin....Done.
Loading file flash:/msr954-cmw710-boot-r0106.bin.....Done.

Image file flash:/msr954-cmw710-boot-r0106.bin is self-decompressing.....Done.
System image is starting...
Line aux0 is available.
```

Press ENTER to get started.

Press **Enter** and the system displays the following prompt:

```
<Sysname>
```

This prompt indicates that the router has entered user view and is ready to configure.

Power-on check

After powering on the router, check the following items:

- The LEDs on the front panel are normal, as described in "LED description."
- The configuration terminal displays information correctly. You can see the startup window on the local configuration terminal. For more information, see "Observing the startup process."
- After completing the POST, the system prompts you to press **Enter**. When the command line prompt appears, the router is ready to configure.

Configuring basic settings for the router

After the router is powered on for the first time, configure basic settings for the router. For more information, see *HP MSR Router Series Configuration Guides(V7)* and *HP MSR Router Series Command References(V7)*.

Troubleshooting

ⓘ **IMPORTANT:**

- The barcode on the router chassis contains product information that must be provided to local sales agent when you return a faulty router for repair.
 - Keep the tamper-proof seal on a mounting screw on the chassis cover intact, and if you want to open the chassis, contact HP for permission. Otherwise, HP shall not be liable for any consequence.
-

Power module failure

Symptom

The router cannot be powered on and the LEDs on the front panel are off.

Solution

To resolve the problem:

1. Power off the router
2. Verify that the power cord connects the router to the power source correctly.
3. Verify that the power source is operating correctly.
4. Verify that the power cord is in good condition.
5. If the problem persists, contact HP Support.

No display on the configuration terminal

Symptom

The configuration terminal does not have display when the router is powered on.

Solution

To resolve the problem:

1. Verify that the power system is operating correctly.
2. Verify that the console cable is connected correctly to the specified serial port on the configuration terminal.
3. Verify that the following settings are configured for the terminal:
 - **Baud rate**—9,600.
 - **Data bits**—8.

- **Parity**—none.
 - **Stop bits**—1.
 - **Flow control**—none.
 - **Emulation**—VT100.
4. Verify that the console cable is in good condition.
 5. If the problem persists, contact HP Support.

Garbled display on the configuration terminal

Symptom

The configuration terminal has garbled display when the router is powered on.

Solution

To resolve the problem:

1. Verify that the following settings are configured for the terminal:
 - **Baud rate**—9,600.
 - **Data bits**—8.
 - **Parity**—none.
 - **Stop bits**—1.
 - **Flow control**—none.
2. If the problem persists, contact HP Support.

No response from the serial port

Symptom

The serial port on the router does not respond

Solution

To resolve the problem:

1. Verify that the serial cable is in good condition and the serial port settings are correct.
2. If the problem persists, contact HP Support.

3G/4G SIM card and 4G antenna failures

Symptom

After a 3G/4G SIM card and 4G antennas are installed on the router and the router is powered on, the corresponding LEDs on the front panel indicate operation failure.

Solution

To resolve the problem:

1. Verify that the 3G/4G SIM card has been correctly installed and makes good contact with the card socket.
2. Verify that the 3G/4G SIM card and the card socket use the same wireless standard.
3. Verify that the 4G antenna is correctly installed.
4. Verify that the 3G/4G SIM card, card socket, and 4G antenna are in good condition.
5. Verify that the network provided by NSP is running correctly.
6. If the problem persists, contact HP Support.

Restoring the factory settings

Scenario 1

Symptom

When you replace the router, the router password is lost. As a result, you cannot log in to the router and do not know the router configuration.

Solution

Because the router is replaced, you do not need to save the configuration of the router. In this case, you can press the **Reset** button for more than 4 seconds to reboot the router and restore the factory settings. Then, you can use the username and password shipped with the router to log in to the router.

When the router configuration must be saved and you have a console cable, you can log in to the router from the BootWare menu.

Scenario 2

Symptom

After the configuration is modified, the network connectivity is lost. When you check the configuration, the configuration is very complicated and it is hard to locate the errors. In this case, you must configure the router again.

Solution

If you have not saved any configuration, you can reboot the router by pressing the **Reset** button for a short time or power off the router.

If you have saved the configuration, delete the configuration file at the CLI, and press the **Reset** button to restore the factory settings.

Scenario 3

Symptom

The router crashes.

Solution

Press the **Reset** button for a short time to reboot the router.

Reset button usage guidelines

The router provides the **Reset** button. You can use the button to reboot the system or restore the factory settings.

1. Press the **Reset** button for a short time to reboot the router.
2. Press the **Reset** button for more than 4 seconds to reboot the router and restore the factory settings.

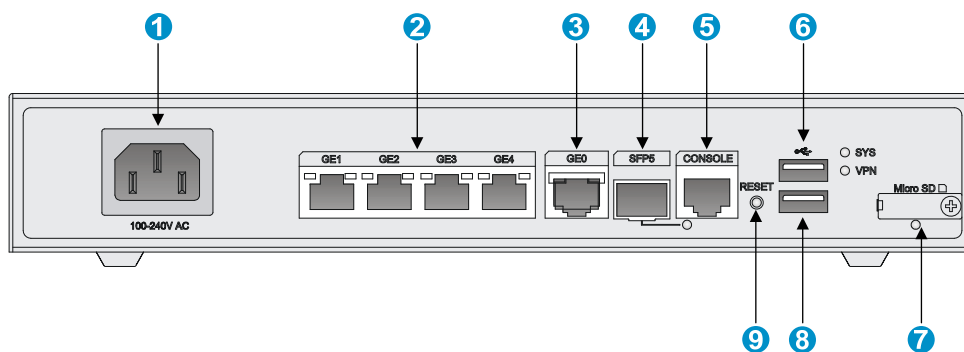
Appendix A Chassis views and technical specifications

Chassis views

The figures in this appendix are for illustration only.

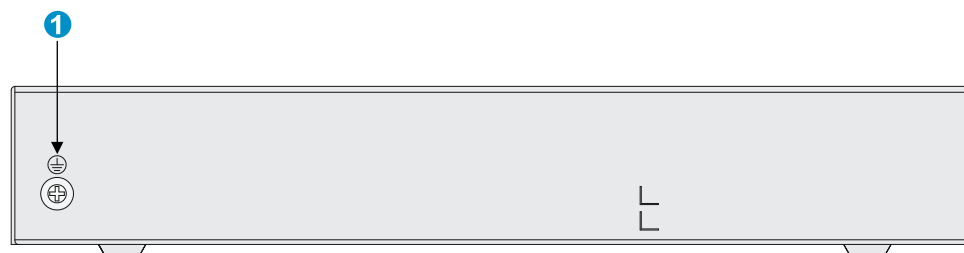
JH296A

Figure 25 Front view



(1) AC power receptacle	(2) Gigabit Ethernet LAN ports (GE1 to GE4)	(3) Gigabit Ethernet WAN port (GE0)
(4) Gigabit fiber port (SFP5)	(5) Console port	(6) USB port
(7) Micro SD card slot	(8) USB port	(9) Reset button (RESET)

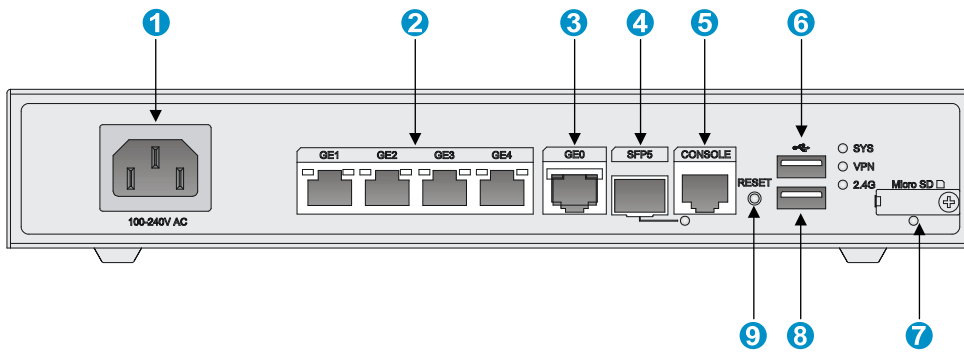
Figure 26 Rear view



(1) Grounding screw

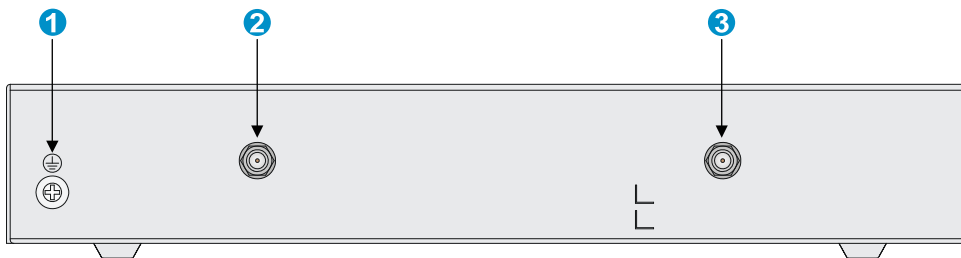
JH297A

Figure 27 Front view



(1) AC power receptacle	(2) Gigabit Ethernet LAN ports (GE1 to GE4)	(3) Gigabit Ethernet WAN port (GE0)
(4) Gigabit fiber port (SFP5)	(5) Console port	(6) USB port
(7) Micro SD card slot	(8) USB port	(9) Reset button (RESET)

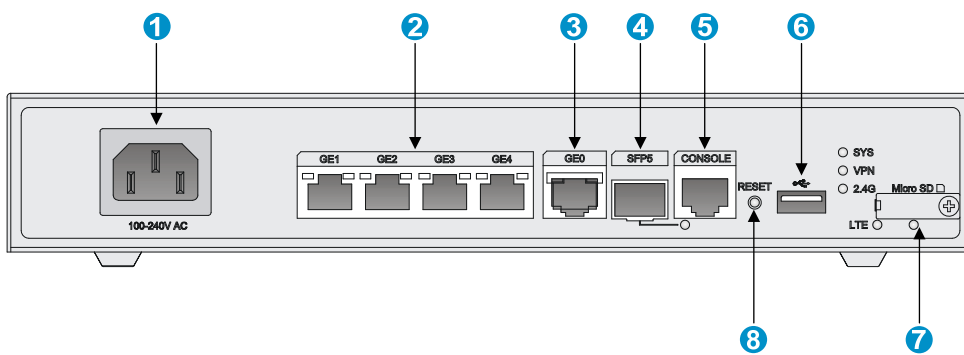
Figure 28 Rear view



(1) Grounding screw	(2) 2.4G WLAN antenna port	(3) 2.4 G WLAN antenna port
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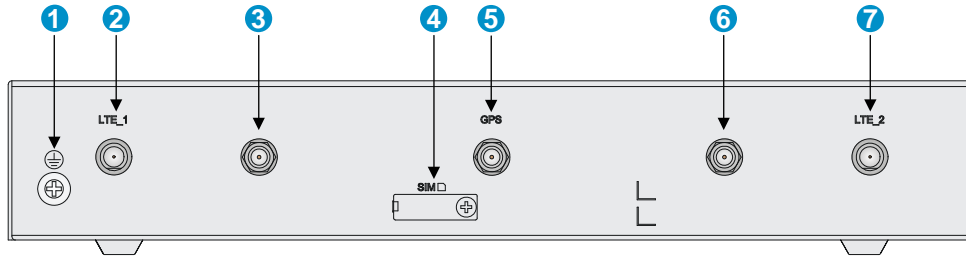
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Figure 29 Front view



(1) AC power receptacle	(2) Gigabit Ethernet LAN ports (GE1 to GE4)	(3) Gigabit Ethernet WAN ports (GE0)
(4) Gigabit fiber port (SFP5)	(5) Console port	(6) USB port
(7) Micro SD card slot	(8) Reset button (RESET)	

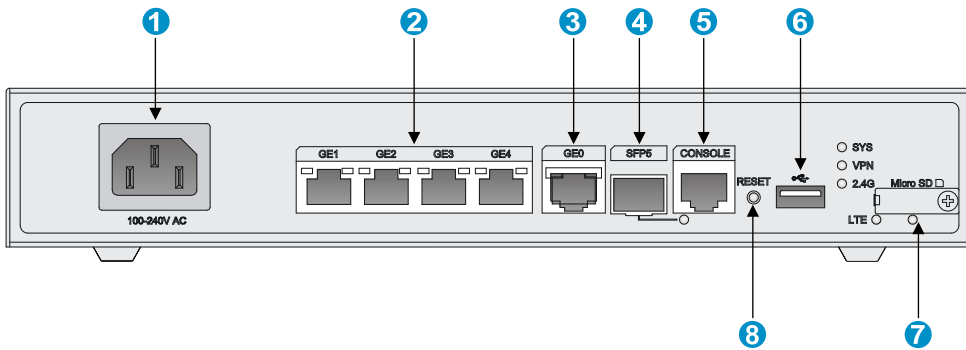
Figure 30 Rear view



- | | | |
|------------------------|------------------------|----------------------------|
| (1) Grounding screw | (2) LTE antenna port 1 | (3) 2.4G WLAN antenna port |
| (4) 4G SIM card slot | (5) GPS antenna port | (6) 2.4G WLAN antenna port |
| (7) LTE antenna port 2 | | |

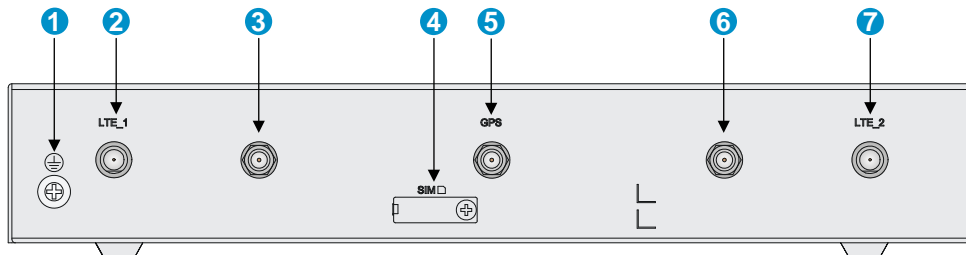
JH299A

Figure 31 Front view



- | | | |
|-------------------------------|---|-------------------------------------|
| (1) AC power receptacle | (2) Gigabit Ethernet LAN ports (GE1 to GE4) | (3) Gigabit Ethernet WAN port (GE0) |
| (4) Gigabit fiber port (SFP5) | (5) Console port | (6) USB port |
| (7) Micro SD card slot | (8) Reset button (RESET) | |

Figure 32 Rear view



- | | | |
|----------------------|------------------------|----------------------|
| (1) Grounding screw | (2) LTE antenna port 1 | (3) 4G SIM card slot |
| (4) GPS antenna port | (5) LTE antenna port 2 | |

Technical specifications

Table 4 Router specifications

Item	JH296A	JH297A	JH298A	JH299A
Console port	1	1	1	1
USB port	2	2	1	1
GE WAN port	1	1	1	1
GE SFP port	1	1	1	1
GE LAN port	4	4	4	4
Memory	1 GB DDR III	1 GB DDR III	1 GB DDR III	1 GB DDR III
Flash	256 MB	256 MB	256 MB	256 MB
Dimensions (H × W × D) (excluding rubber feet and mounting brackets)	43.6 × 266 × 161 mm (1.72 × 10.47 × 6.34 in)	43.6 × 266 × 161 mm (1.72 × 10.47 × 6.34 in)	43.6 × 266 × 161 mm (1.72 × 10.47 × 6.34 in)	43.6 × 266 × 161 mm (1.72 × 10.47 × 6.34 in)
AC input voltage	100 VAC to 240 VAC @ 50 Hz/60 Hz	100 VAC to 240 VAC @ 50 Hz/60 Hz	100 VAC to 240 VAC @ 50 Hz/60 Hz	100 VAC to 240 VAC @ 50 Hz/60 Hz
Max. AC power	15 W	15 W	15 W	15 W
Operating temperature	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)	0°C to 45°C (32°F to 113°F)
Relative humidity (non-condensing)	5% to 90%	5% to 90%	5% to 90%	5% to 90%

Table 5 4G antenna specifications

Item	Specification
Frequency range	698-960 MHz / 1.71-2.70 GHz
Voltage Standing Wave Ratio (VSWR)	≤ 2.5:1
Input impedance	50 ohms
Gain	2 dBi
Max power	5 W
Input port	TNC male
Length	21.4 cm (8.43 in)
Color	Black
Weight	50 g (1.76 oz)
Operating temperature	-40°C to +85°C (-40°F to +185°F)

Table 6 WLAN antenna specifications

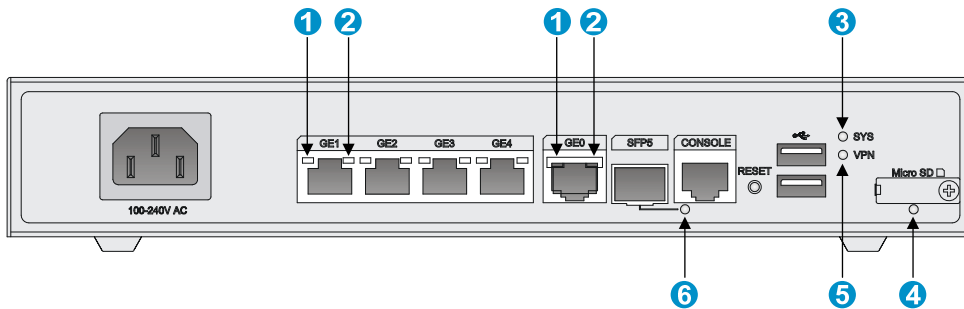
Item	Specification
Frequency range	2.4 to 2.5 GHz
Voltage standing wave ratio (VSWR)	1.92:1
Input impedance	50 ohms
Gain	2 dBi
Max power	1 W
Input port	RSMA
Length	115 mm (4.53 in)
Color	Black
Weight	25 g (0.88 oz)
Operating temperature	-10°C to +60°C (14°F to 140°F)

Appendix B LEDs

LEDs

JH296A

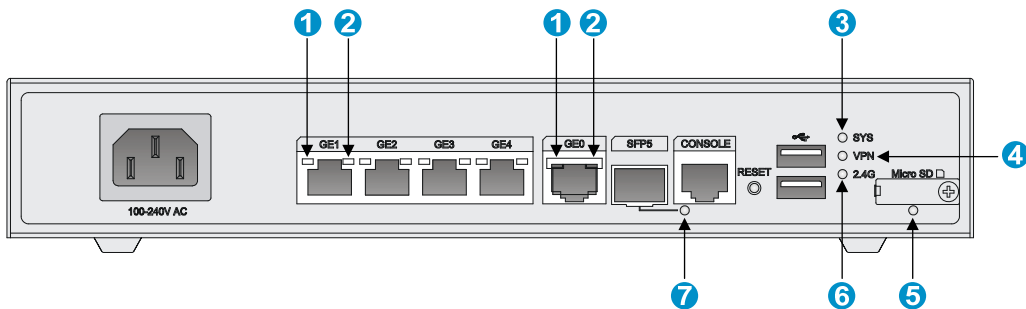
Figure 33 Front panel LEDs



- | | | |
|------------------------|-----------------------|-----------------------------|
| (1) GE port yellow LED | (2) GE port green LED | (3) System status LED (SYS) |
| (4) Micro SD card LED | (5) VPN status LED | (6) SFP port LED |

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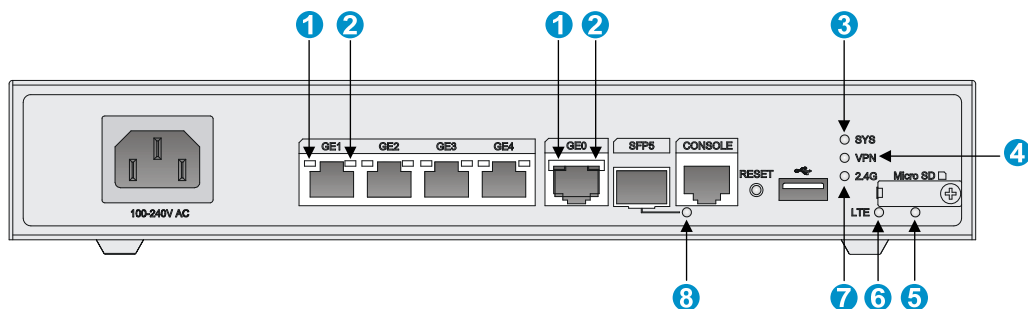
Figure 34 Front panel LEDs



- | | | |
|------------------------|-----------------------|-----------------------------|
| (1) GE port yellow LED | (2) GE port green LED | (3) System status LED (SYS) |
| (4) VPN status LED | (5) Micro SD card LED | (6) 2.4G WLAN LED |
| (7) SFP port LED | | |

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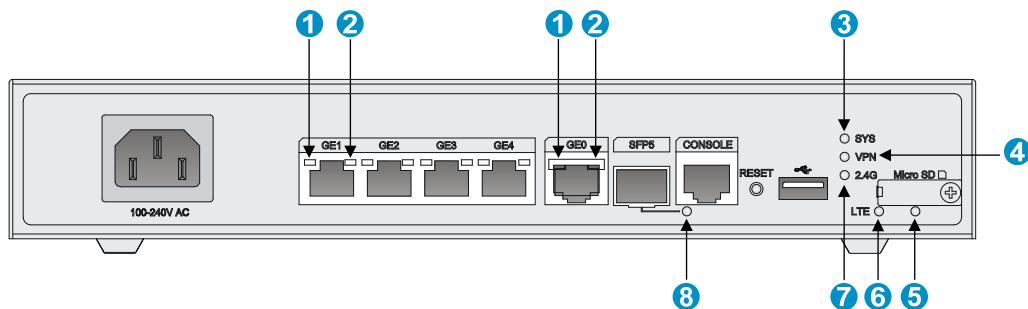
Figure 35 Front panel LEDs



(1) GE port yellow LED	(2) GE port green LED	(3) System status LED (SYS)
(4) VPN status LED	(5) Micro SD card LED	(6) LTE LED
(7) 2.4G WLAN LED	(8) SFP port LED	

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Figure 36 Front panel LEDs



(1) GE port yellow LED	(2) GE port green LED	(3) System status LED (SYS)
(4) VPN LED	(5) Micro SD card LED	(6) LTE LED
(7) 2.4G WLAN LED	(8) SFP port LED	

LED description

LED	Status	Description
GE port LEDs	Green LED	
	Steady green	A 1000 Mbps link is present.
	Flashing green	Data is being received or transmitted at 1000 Mbps.
	Off	No 1000 Mbps link is present.

LED	Status	Description
Yellow LED	Steady yellow	A 10/100 Mbps link is present.
	Flashing yellow	Data is being received or transmitted at 10/100 Mbps
	Off	No 10/100 Mbps link is present.
System status LED (SYS)	Steady green	The SDRAM is performing self-test.
	Flashing green (8 Hz)	The system software image is being copied and decompressed.
	Flashing green (1 Hz)	Comware has started with the configuration file and the router has booted up.
	Flashing yellow (1 Hz)	The SDRAM has failed the self-test.
	Flashing yellow (8 Hz)	The extended segment does not exist.
	Steady yellow	The system software image does not exist.
	Off	No power input, or exceptions have occurred.
VPN status LED (VPN)	Steady on	A minimum of one IPSec VPN tunnel is present.
	Off	No IPSec VPN tunnel is present.
Micro SD card LED	Steady green	The Micro SD card is present and has passed the test.
	Flashing green (8 Hz)	The system is accessing the Micro SD card. Do not remove the card.
	Off	No Micro SD card is inserted or the Micro SD card is installed incorrectly.
LTE LED	Steady green	A 4G link is present.
	Flashing green (8 Hz)	Data is being received or transmitted on a 4G link.
	Steady yellow	A 3G link is present
	Flashing yellow (8 Hz)	Data is being received or transmitted on a 3G link.
	Off	No 3G/4G link is present or no 4G modem is installed.
2.4G WLAN status LED	Steady green	A 2.4G WLAN link is present.
	Flashing green	Data is being received or transmitted on a 2.4G WLAN link.
	Off	No 2.4G WLAN link is present.
SFP port LED	Steady green	A 1000 Mbps link is present.
	Flashing green	Data is being received or transmitted at 1000 Mbps.

LED	Status	Description
	Steady yellow	A 10/100 Mbps link is present.
	Flashing yellow	Data is being received or transmitted at 10/100 Mbps.
	Off	No link is present.

Federal Communications Commission (FCC) Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

IC Radiation Exposure Statement for Canada

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

IMPORTANT NOTE:

Radiation Exposure Statement:

This equipment complies with "Industry Canada RSS-102 for radiation exposure limits set forth for an uncontrolled environment".

This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.