Hewlett Packard Enterprise

# HPE FlexNetwork MSR958 Routers

## Installation Guide

Part number: 5200-1204
Document version: 6W100-20160531

**Acknowledgments**

# Contents

# Preparing for installation

The HPE MSR958 Router Series includes the models in Table 1.

**Table 1** HPE MSR958 Router Series models

| Product code | HPE description | RMN |
|---|---|---|
| JH300A | HPE MSR958 1GbE and Combo Router | BJNGA-BB0040 |
| JH301A | H PE MSR958 1GbE and Combo PoE Router | BJNGA-BB0041 |

**IMPORTANT:**

For regulatory identification purposes, every MSR958 router is assigned a regulatory model number (RMN). These regulatory model numbers should not be confused with the marketing name HPE MSR958 or the product codes.

# 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 uninterrupted 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.
- 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. Supply 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 Table 2.

- 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 2 Temperature/humidity requirements in the equipment room**

| Temperature | Relative humidity |
|---|---|
| 0°C to 45°C (32°F to 113°F) | 5% to 90%, 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 3 Dust concentration limit in the equipment room**

| Substance | Concentration limit (particles/$m^3$) |
|---|---|
| Dust particles | ≤ 3 x $10^4$<br>(No visible dust on the tabletop in three days) |
| **NOTE:**<br>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 Table 4.

**Table 4 Harmful gas limits in an equipment room**

| Gas | Maximum concentration (mg/$m^3$) |
|---|---|
| $SO_2$ | 0.2 |
| $H_2S$ | 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

**Table 5 Installation accessories**

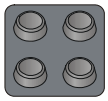
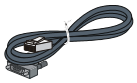
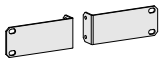
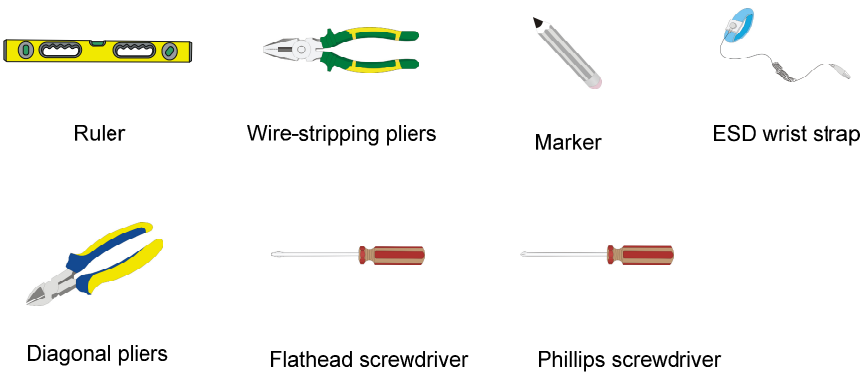
| Product code | Description | Quantity | Applicable models |
|---|---|---|---|
| 5400-0125 | Grounding cable  | 1 | • JH300A<br>• JH301A |
| N/A | Cage nut  | User-supplied | • JH300A<br>• JH301A |
| 5400-0123 | M6 screw  | 4 | • JH300A<br>• JH301A |
| 5400-0124 | M4 screw  | 4 | • JH300A<br>• JH301A |
| 5400-0122 | Rubber feet  | 1 kit | • JH300A<br>• JH301A |
| 5184-6719 | Console cable  | 1 | • JH300A<br>• JH301A |
| JH317A | Mounting brackets  | 1 kit | • JH300A<br>• JH301A |

**Figure 1 User-supplied tools and equipment**



# Pre-installation checklist

| Item | | Requirements |
|---|---|---|
| Installation site | Ventilation | • There is a minimum clearance of 10 cm (3.9 in) around the air inlet and outlet vents.<br>• An adequate ventilation system is available at the installation site. |
| | Temperature | 0°C to 45°C (32°F to 113°F) |
| | Relative humidity | 5% to 90% (noncondensing) |
| | Cleanness | Dust concentration ≤ $3 \times 10^4$ particles/$m^3$ (no visible dust on the tabletop over three days) |
| | ESD prevention | • The router and floor are reliably grounded.<br>• The equipment room is dust-controlled.<br>• Humidity and temperature are maintained at acceptable levels.<br>• An ESD wrist strap is available. |
| | EMI prevention | • A single-phase three-wire power receptacle with protection earth (PE) is available for filtering interference from the power grid.<br>• The router is far away from radio transmitting stations, radar stations, and high-frequency devices.<br>• Electromagnetic shielding, for example, shielded interface cables, is used as required. |
| | Lightning protection | • The router is reliably grounded.<br>• The AC power receptacle is reliably grounded.<br>• (Optional.) Port lightning protectors are available. A signal lightning arrester is required at the input end of an external signal cable.<br>• (Optional.) Power lightning protectors are available. |
| | Electricity safety | • A UPS is available.<br>• The external power switch is located so to shut off the power immediately when an accident occurs.. |
| | Workbench | • The workbench is stable.<br>• The workbench is reliably grounded. |
| Safety precautions | • The router is far away from any sources of heat or moisture.<br>• The emergency power switch in the equipment room is identified and accessible. | |
| Tools | • Installation accessories supplied with the router are ready.<br>• User-supplied tools are ready. | |
| Reference | • Documents shipped with the router are available.<br>• 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 Hewlett Packard Enterprise for permission. Otherwise, Hewlett Packard Enterprise shall not be liable for any consequence.

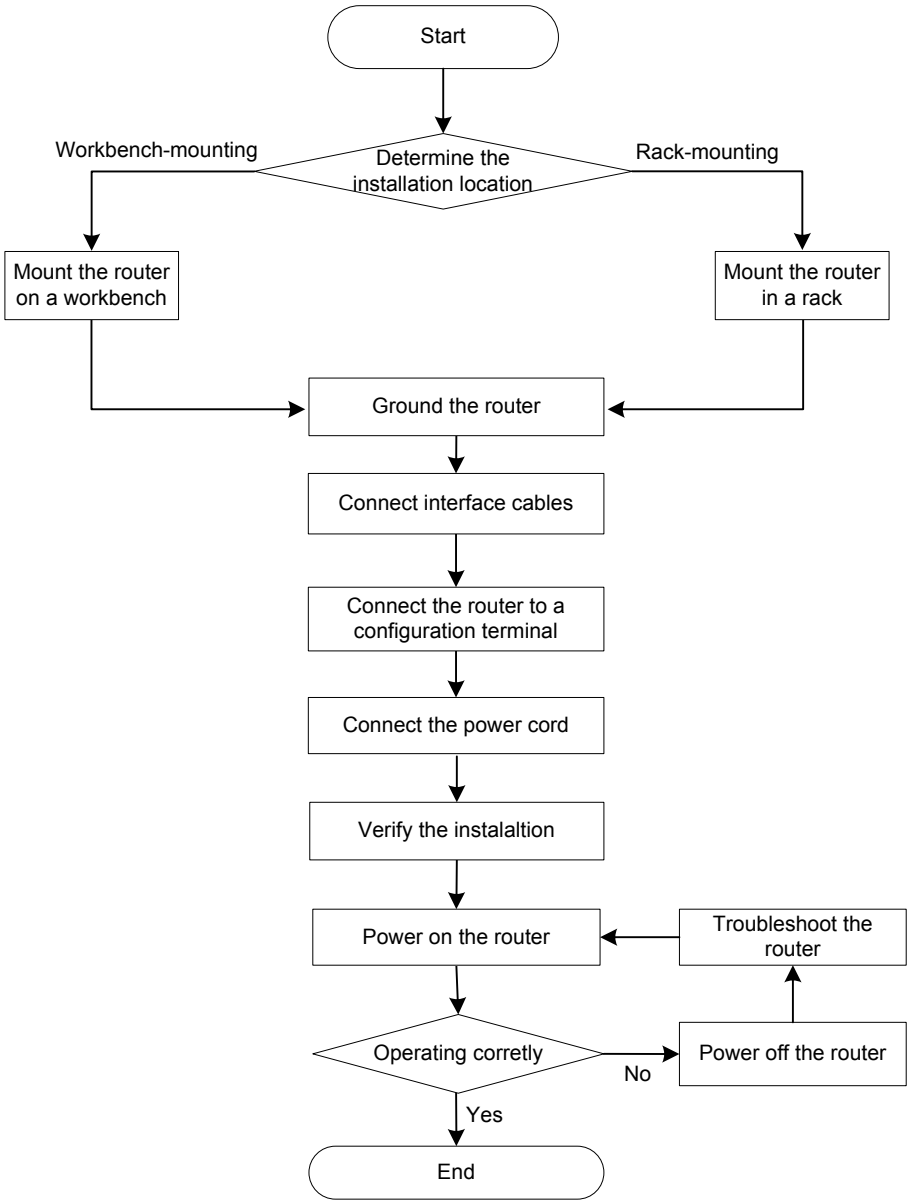
## Installation prerequisites

- You have read "Preparing for installation" carefully.
- All requirements in "Preparing for installation" are met.

## Installation flowchart

You can install the router on a workbench or in a rack. Determine the installation location as required. Follow the installation flowchart shown in Figure 2 to install the router.

**Figure 2 Installation flowchart**




# Installing the router

## Mounting the router on a workbench

**IMPORTANT:**

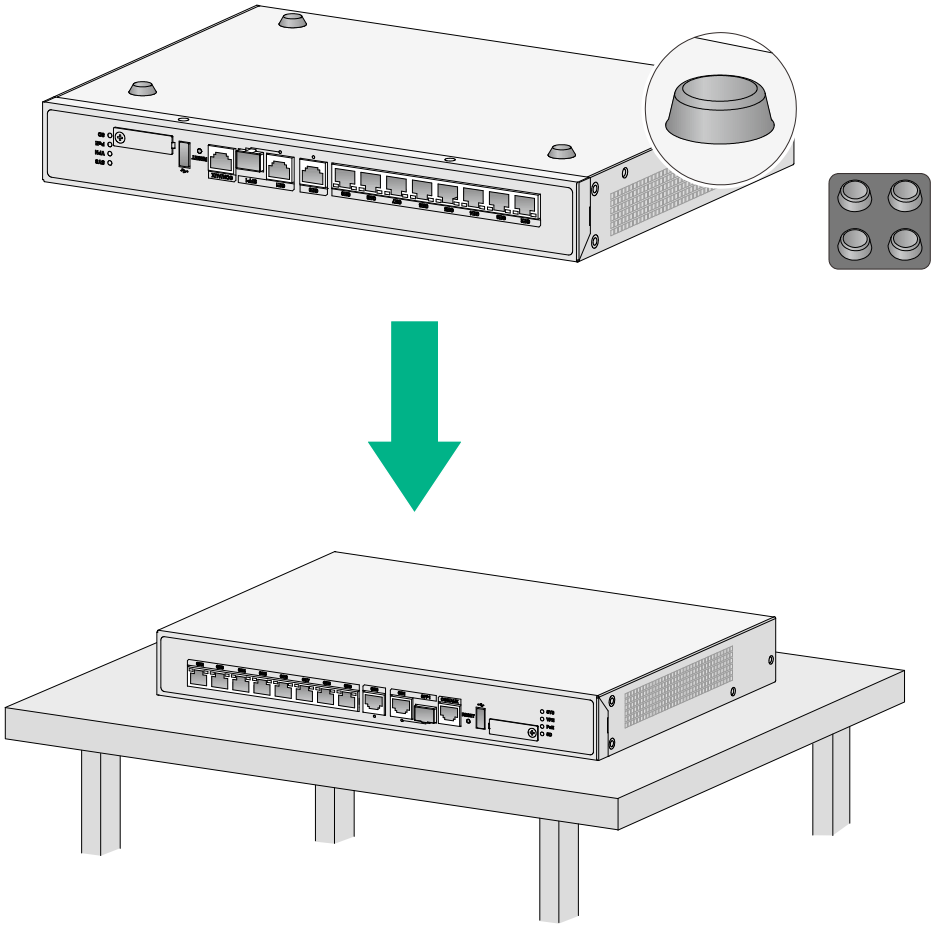
- Make sure the workbench is clean, stable, and reliably grounded.
- Maintain a minimum clearance of 10 cm (3.9 in) around the router for heat dissipation.
- Do not place heavy objects on the router.

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 upside up on the workbench.

**Figure 3 Mounting the router on a workbench**



# Installing the router in a rack

**CAUTION:**

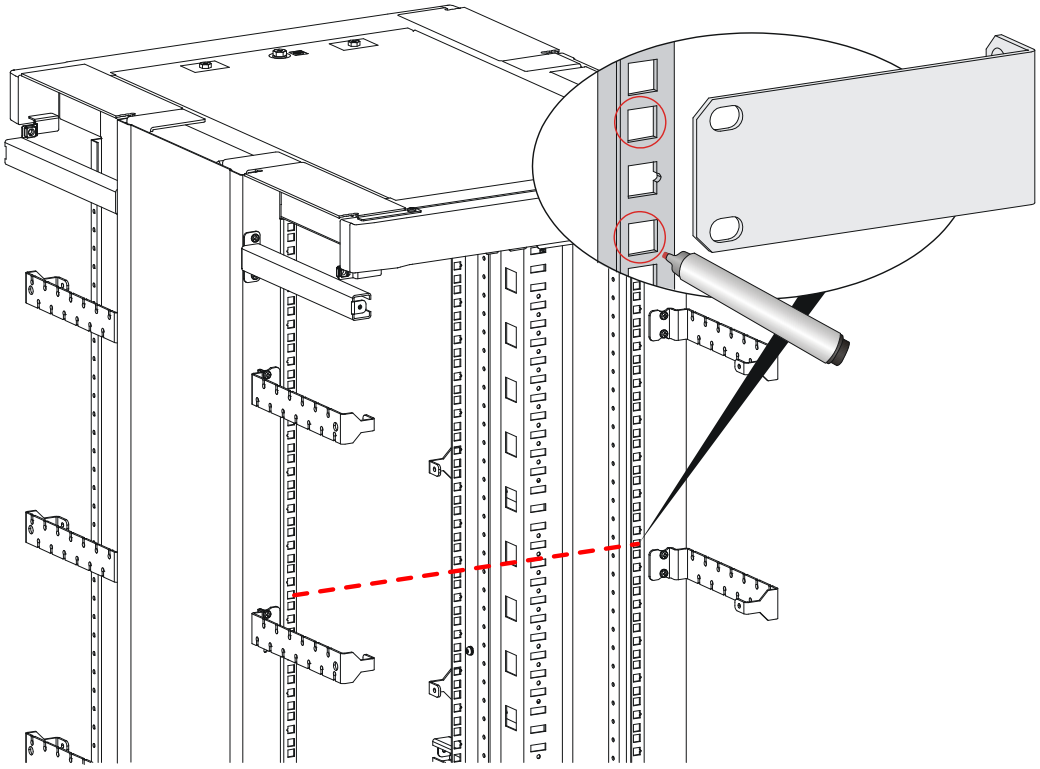
The mounting brackets can support only the weight of the router. Do not place objects on the router.

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 4.

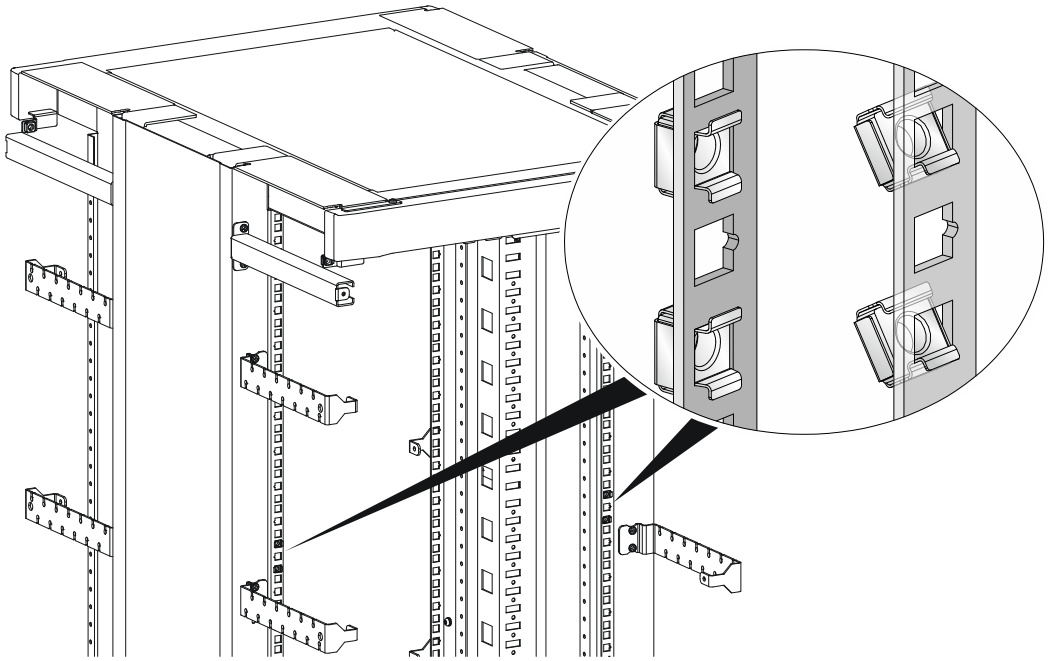
   Make sure the cage nut installation holes on the front rack posts are on a horizontal line.

**Figure 4 Marking cage nut installation holes**



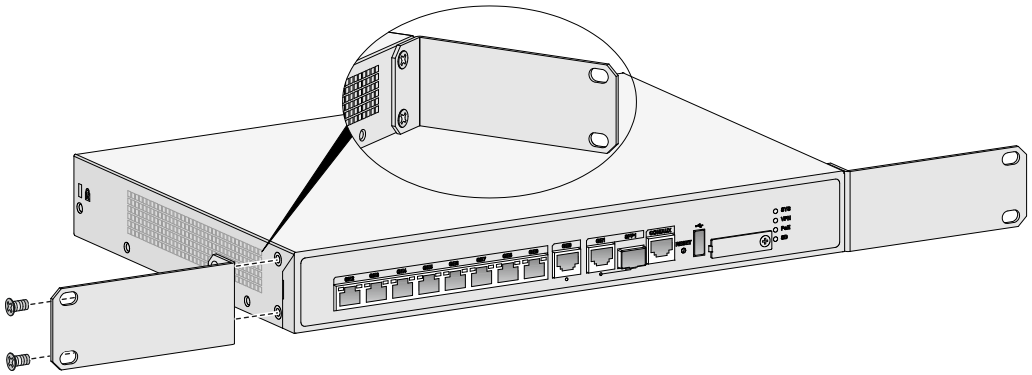
2. Install the cage nuts, as shown in Figure 5.
   a. Insert one ear of a cage nut into the marked installation hole.
   b. Use a flathead screwdriver to push another ear into the same hole.

**Figure 5 Installing cage nuts**



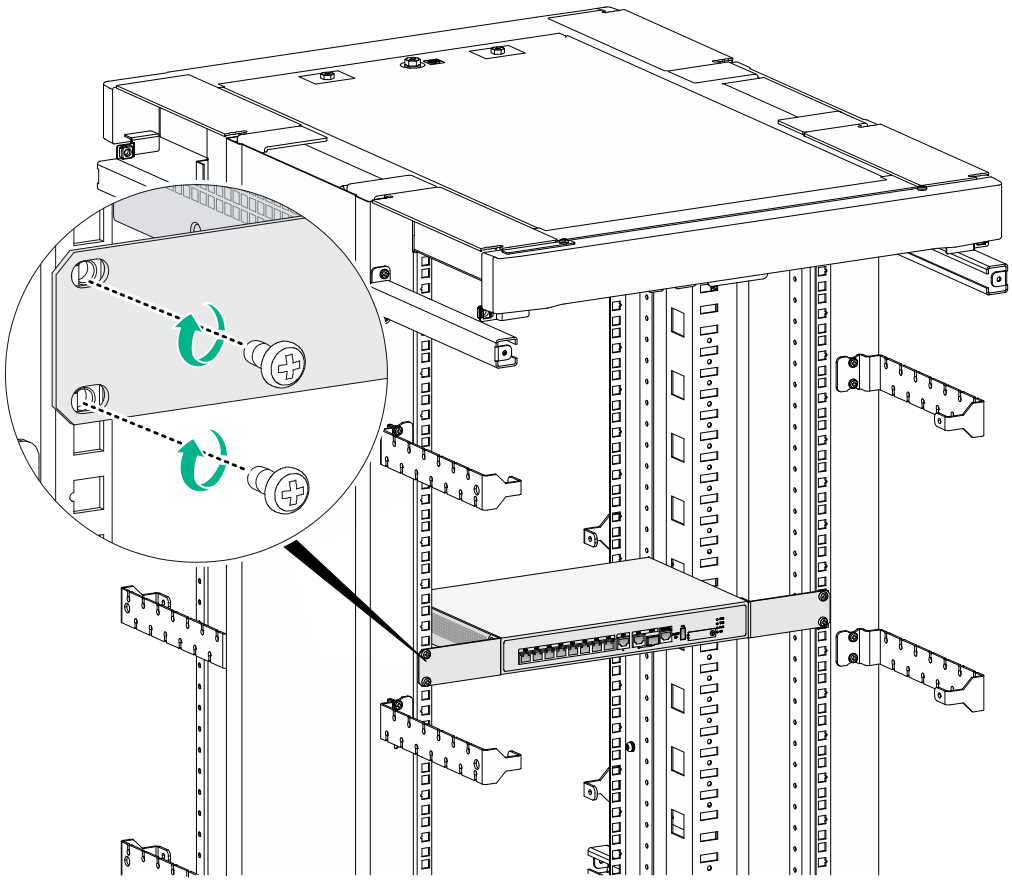
3. Attach mounting brackets to both sides of the router, as shown in Figure 6.

**Figure 6 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 7.

**Figure 7 Securing the router to the rack**



# Grounding the router

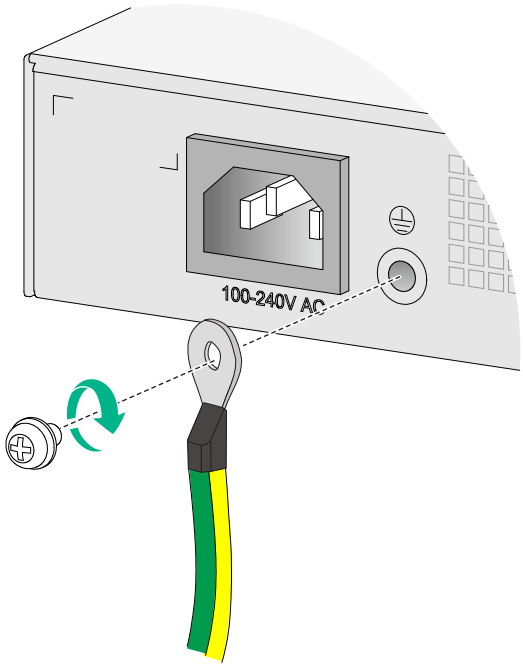
**CAUTION:**

- 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.

## 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 8 Connecting the grounding cable to the router**

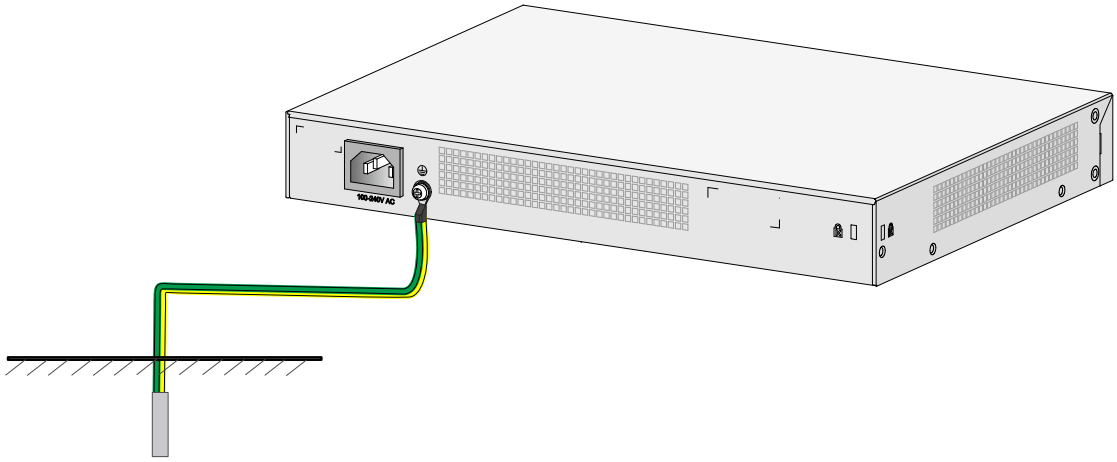



## Grounding the router by burying a grounding conductor in the earth ground

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 serve 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 9 Grounding the router by burying a grounding conductor in the earth ground**



# Installing an SD card

**CAUTION:**

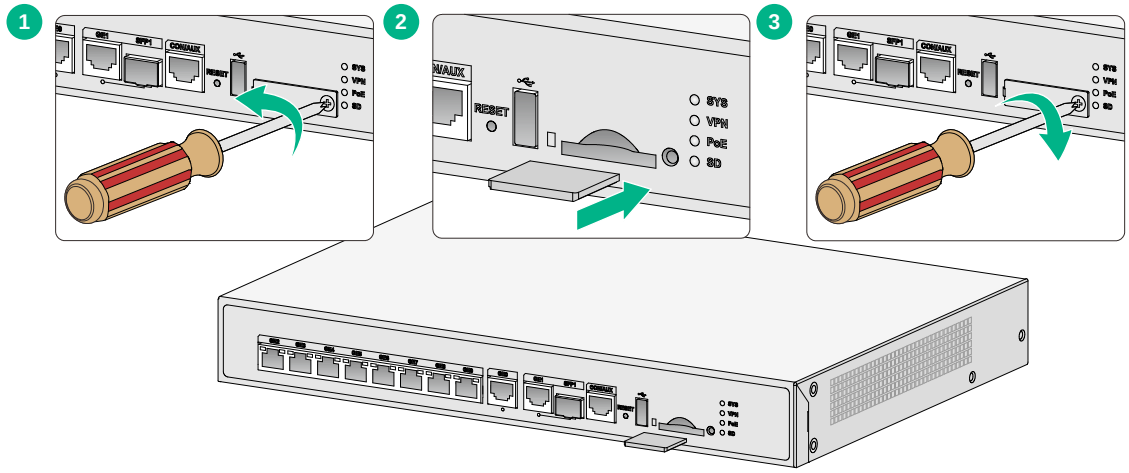
To avoid damaging the SD card slot, do not use excessive force when you install an SD card.

The device supports only JH318A SD cards. No JH318A SD cards are provided with the device. Purchase a JH318A SD card as needed.

To install an SD card:

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

**Figure 10 Installing an SD card**




# Connecting optical fibers to an SFP port

**WARNING!**

Never stare into a bare SFP port, because invisible rays might be emitted from the SFP port.

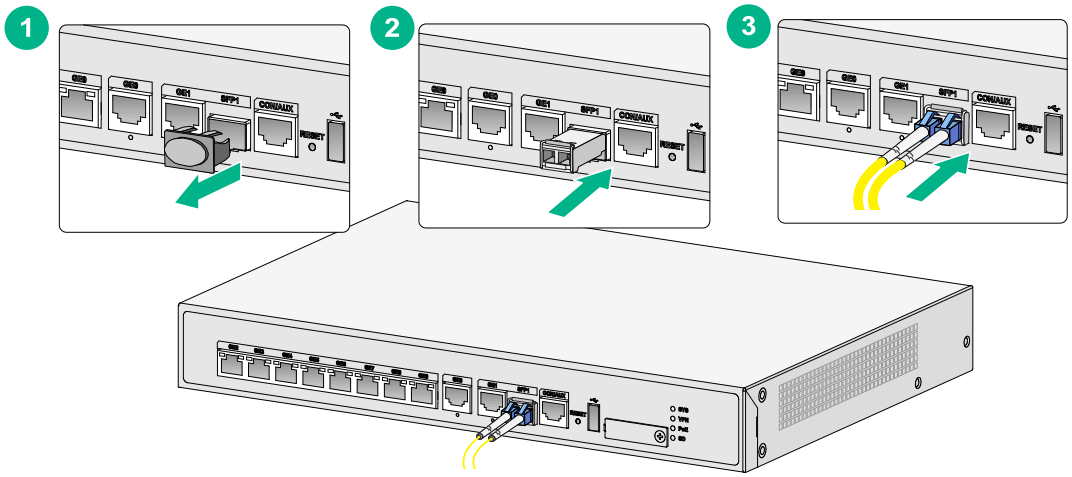
**CAUTION:**

- Never bend a fiber excessively. The bend radius should not be less than 10 cm (3.94 in).
- Make sure the Tx and Rx ports on the SFP port are correctly connected.
- Make sure the fiber end is clean.
- If you are not to connect optical fibers to an SFP port, install a dust plug in the port.

To connect optical fibers to an SFP port:

1. Remove the dust plug from the SFP port.
2. Align the transceiver module end without a bail latch with the SFP port and insert the module into the SFP port.
3. Identify the Rx and Tx ports on the transceiver module. Use optical fibers with LC connectors to connect the Rx port and Tx port on the transceiver module to the Tx port and Rx port on the peer end, respectively.
4. Observe the SFP port LED to verify that the optical fibers are connected correctly.

**Figure 11 Connecting optical fibers to an SFP port**



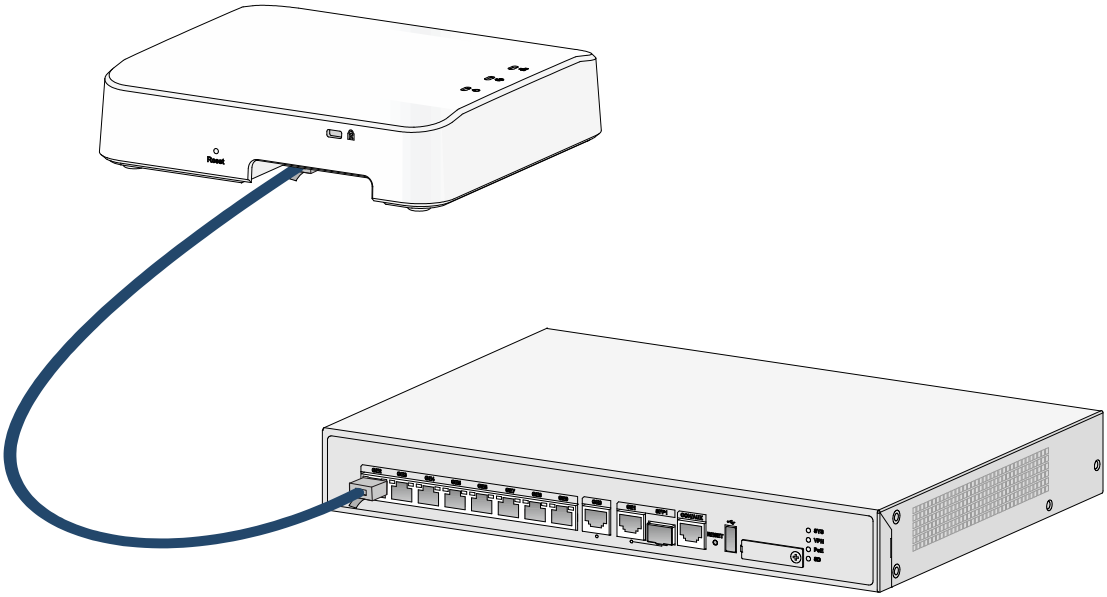

# Supplying power to a terminal through PoE

Only the JH301A router supports PoE. To supply power to a terminal, the terminal must support PoE.

To supply power to a terminal through PoE:

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 terminal.
3. Examine the port LEDs on the router. For more information about the LEDs, see "LED description."

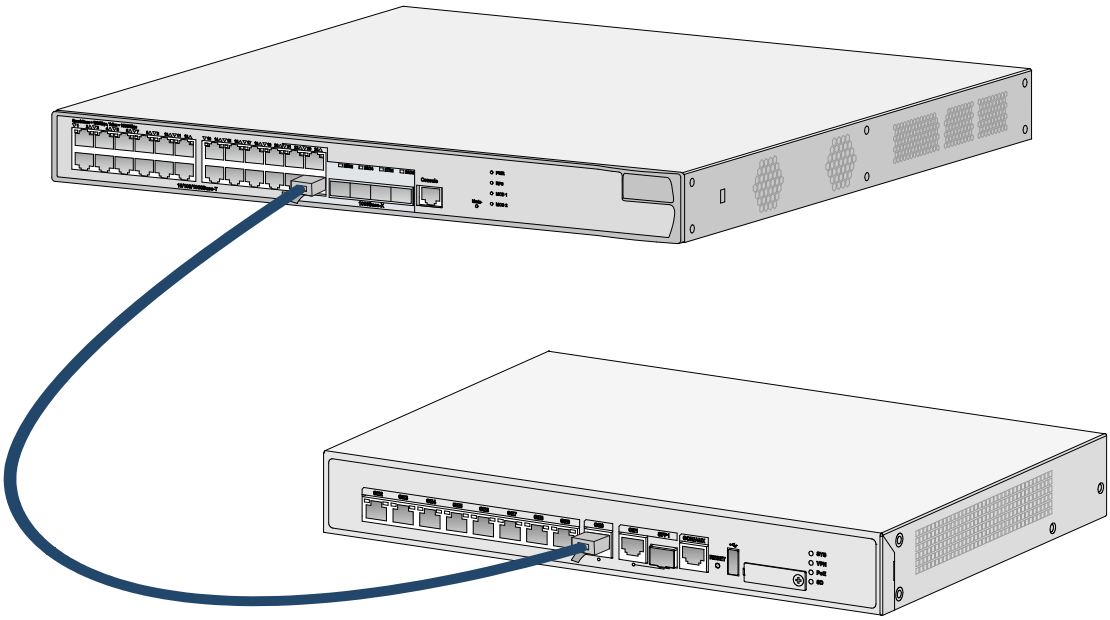
**Figure 12 Supplying power to a terminal**



# 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 13 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.

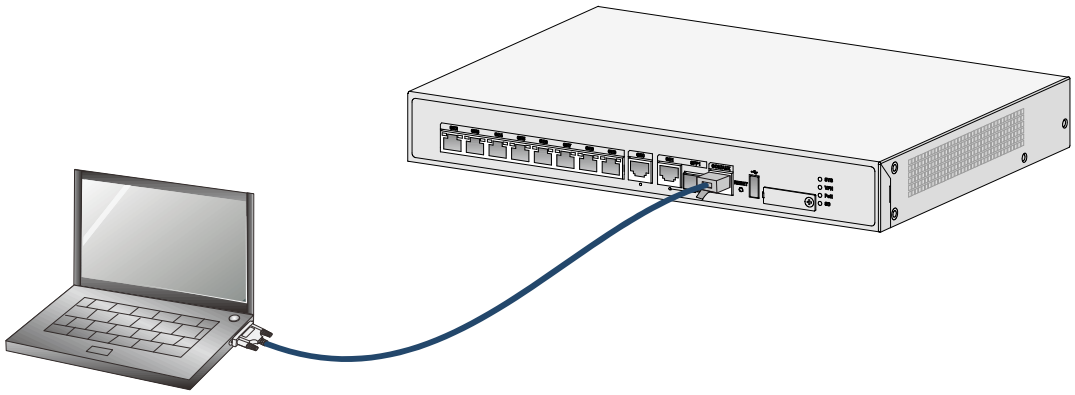
To connect the console cable:

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.

**NOTE:**

If the configuration terminal does not have an RS-232 serial port, a serial adapter is required to connect the console cable to a USB port on the terminal.

**Figure 14 Connecting the console cable**



## Setting configuration terminal parameters

To access the device through the console port, you must run a terminal emulator program (HyperTerminal, PuTTY, or Tera Term) on the configuration terminal. For information about using a terminal emulator program, see the program's user guide.

The following are the required terminal settings:

- **Baud rate**—9600.
- **Data bits**—8.
- **Stop bits**—1.
- **Parity**—none.
- **Flow control**—none.

# Connecting the power cord

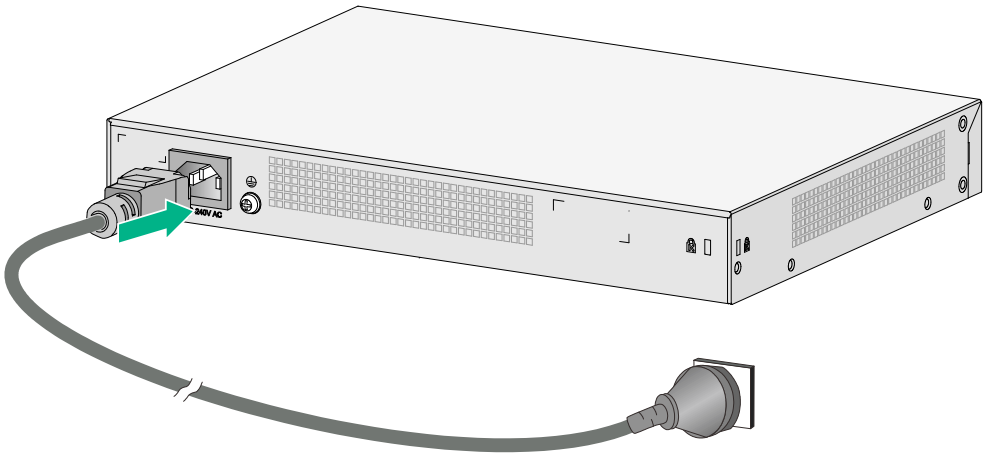
**CAUTION:**

Before you connect the power cord, make sure the power supply system in the building is reliably grounded.

To connect the power cord:

1. Make sure the router is reliably grounded.
2. Connect the power cord to the source AC outlet.
3. Insert the power cord plug into the AC power receptacle on the router.

**Figure 15 Connecting the power cord**




# Verifying the installation

After you complete the installation, verify that:

- There is enough space around the router for heat dissipation.
- The router is securely installed.
- 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 Extend BootWare
Do you want to check SDRAM? [Y/N]
********************************************************************************
*                                                                              *
*                   HPE MSR958 BootWare, Version 1.10                          *
*                                                                              *
********************************************************************************
Copyright (c) 2010-2016 Hewlett Packard Enterprise Development LP
Compiled Date       : Jan 11 2016
CPU ID              : 0xe
CPU L1 Cache        : 32KB
CPU L2 Cache        : 1024KB
Memory Type         : DDR3 SDRAM
Memory Size         : 1024MB
Memory Speed        : 800MHz
Flash Size          : 256MB
PCB Version         : 2.0
BootWare Validating...
Press Ctrl+B to access EXTENDED-BOOTWARE MENU...
Loading the main image files...
Loading file flash:/msr958-cmw710-system-e0403p01.bin.......................
.......................Done.
Loading file flash:/msr958-cmw710-security-e0403p01.bin...Done.
Loading file flash:/msr958-cmw710-voice-e0403p01.bin...Done.
Loading file flash:/msr958-cmw710-data-e0403p01.bin......Done.
Loading file flash:/msr958-cmw710-wifidog-e0403p01.bin...Done.
Loading file flash:/msr958-cmw710-boot-e0403p01.bin.........Done.
Image file flash:/msr958-cmw710-boot-e0403p01.bin is self-decompressing......
................................................................................
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................................................................................
.............................................Done.
System image is starting...
Cryptographic Algorithms Known-Answer Tests are running ...
CPU 0 of slot 0 in chassis 0:
Starting Known-Answer tests in the user space.
```

```
.....
Cryptographic Algorithms Known-Answer Tests passed.
Startup configuration file does not exist.
Performing automatic configuration... Press CTRL_D to break.
Line con0 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 *HPE FlexNetwork MSR Router Series Configuration Guides* and *HPE FlexNetwork MSR Router Series Command References*.

# 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 Hewlett Packard Enterprise for permission. Otherwise, Hewlett Packard Enterprise shall not be liable for any consequence.

## Power supply failure

### Symptom

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

### Solution

To resolve the problem:

1. Verify that the power cord connects the router to the power source correctly.
2. Verify that the power source is operating correctly.
3. Verify that the power cord is in good condition.
4. If the problem persists, contact Hewlett Packard Enterprise Support.

## No display on the configuration terminal

### Symptom

The configuration terminal does not display any information 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 Hewlett Packard Enterprise 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 Hewlett Packard Enterprise 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 Hewlett Packard Enterprise 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.

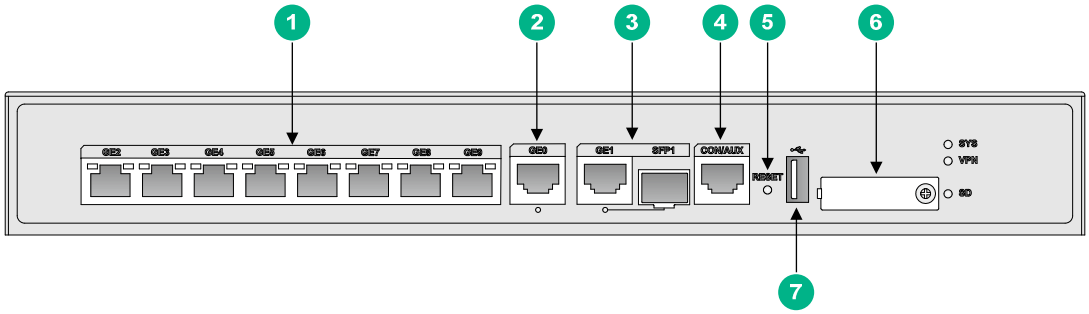
# Appendix A Chassis views and technical specifications

## Chassis views

The figures in this appendix are for illustration only.

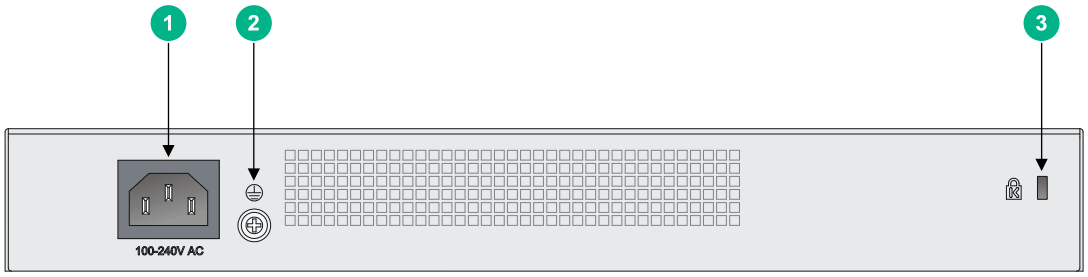
## JH300A

**Figure 16 Front view**




| | |
|---|---|
| (1) Gigabit Ethernet LAN ports (GE2 to GE9) | (2) Gigabit Ethernet WAN port (GE0) |
| (3) Gigabit combo interface (GE1/SFP1) | (4) Console port (CON/AUX) |
| (5) Reset button (RESET) | (6) SD card slot |
| (7) USB port | |

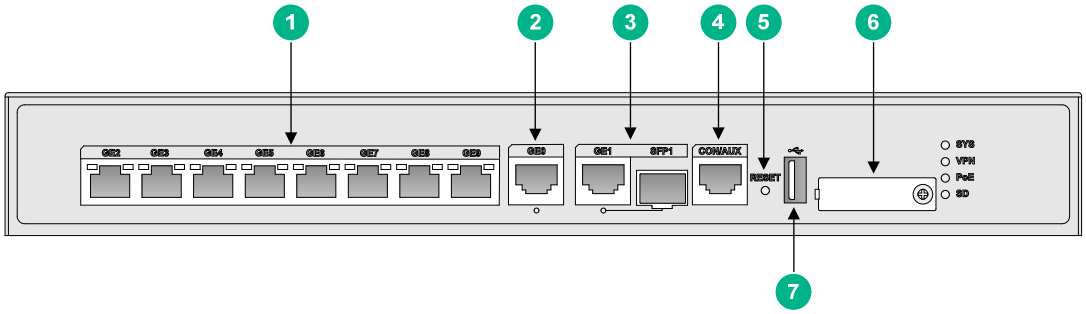
**Figure 17 Rear view**




| | |
|---|---|
| (1) AC power receptacle | (2) Grounding screw |
| (3) Security slot | |

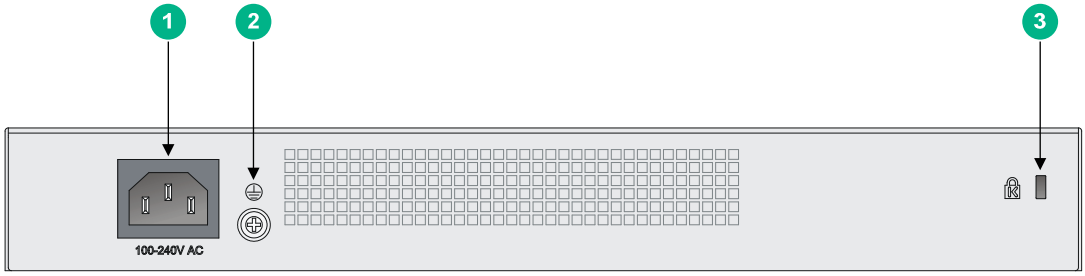
# JH301A

**Figure 18 Front view**




| | |
|---|---|
| (1) Gigabit Ethernet LAN ports (GE2 to GE9) | (2) Gigabit Ethernet WAN port (GE0) |
| (3) Gigabit combo interface (GE1/SFP1) | (4) Console port (CON/AUX) |
| (5) Reset button (RESET) | (6) SD card slot |
| (7) USB port | |

**Figure 19 Rear view**




| | |
|---|---|
| (1) AC power receptacle | (2) Grounding screw |
| (3) Security slot | |

# Technical specifications

**Table 6 Technical specifications**

| Item | JH300A | JH301A |
|---|---|---|
| Console port | 1 | 1 |
| USB port | 1 | 1 |
| GE WAN port | 1 | 1 |
| Combo interface | 1 (GE1 port + SFP1 port) | 1 (GE1 port + SFP1 port ) |
| GE LAN port | 8 | 8 |
| Memory | 1 GB DDR3 | 1 GB DDR3 |
| Flash | 256 MB | 256 MB |
| Dimensions (H × W × D) (excluding rubber feet and mounting brackets) | 44.2 × 330 × 230 mm (1.74 × 12.99 × 9.06 in) | 44.2 × 330 × 230 mm (1.74 × 12.99 × 9.06 in) |

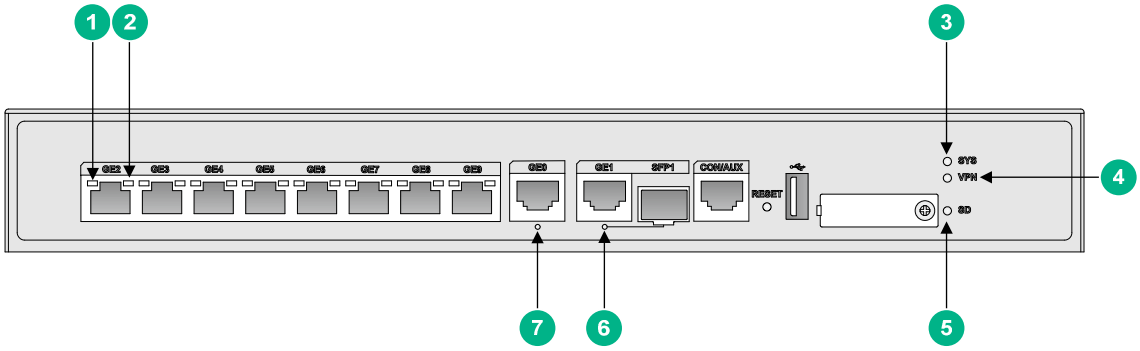
| Item | JH300A | JH301A |
| --- | --- | --- |
| AC input voltage | 100 VAC to 240 VAC@50 to 60Hz | 100 VAC to 240 VAC@50 to 60Hz |
| Max. AC power | 20 W | 20 W for the system and 65 W for PoE |
| Operating temperature | 0°C to 45°C (32°F to 113°F) | 0°C to 45°C (32°F to 113°F) |
| Relative humidity (non-condensing) | 5% to 90% | 5% to 90% |

# Appendix B LEDs

## LEDs

### JH300A

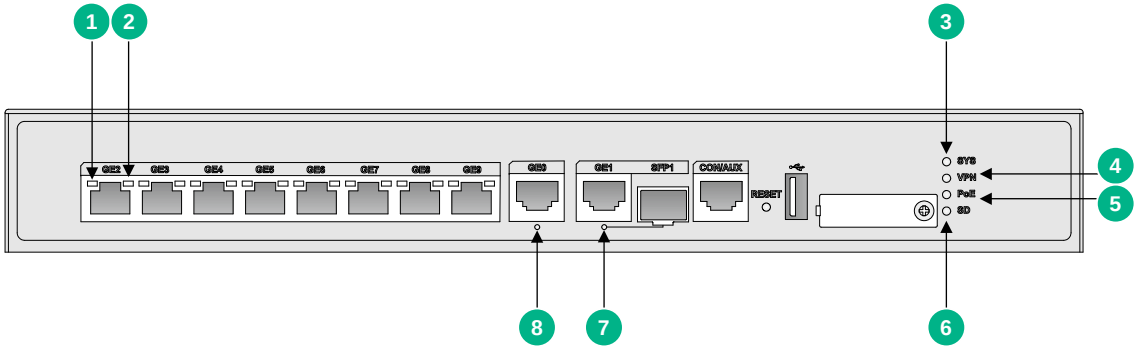
**Figure 20 Front panel LEDs**




| | | |
|---|---|---|
| (1) GE port yellow LED | (2) GE port green LED | (3) System status LED (SYS) |
| (4) VPN status LED | (5) SD card LED | (6) Combo interface LED |
| (7) GE0 port LED | | |

### JH301A

**Figure 21 Front panel LEDs**




| | | |
|---|---|---|
| (1) GE port yellow LED | (2) GE port green LED | (3) System status LED (SYS) |
| (4) VPN status LED | (5) PoE status LED | (6) SD card LED |
| (7) Combo interface LED | (8) GE0 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. |
| | 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. |
| Combo interface LED | | Steady green | A 1000 Mbps link is present. |
| | | Flashing green | Data is being received or transmitted at 1000 Mbps. |
| | | 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. |
| PoE LED | | Steady green | PoE is operating correctly. |
| | | Flashing green at 8 Hz | PoE has failed. |
| | | Off | PoE is disabled. |
| SD card LED | | Steady green | An SD card is present and has passed the test. |
| | | Flashing green | A write operation is being performed. |
| | | Off | No SD card is present or SD card installation has failed. |

# Index