

HP HSR6600 Routers

Installation Guide



5998-3100

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Preparing for installation

The HP HSR6600 Router Series is a line of high-performance centralized product, which includes the models in [Table 1](#).

Table 1 Models for the HP HSR6600 Routers

Product code	Full name	RMN	Abbreviation
JG353A	HP HSR6602-G Router	BJNGA-BB0001	HSR6602-G
JG354A	HP HSR6602-XG Router	BJNGA-BB0001	HSR6602-XG
JG776A	HP HSR6602-G TAA Router	BJNGA-BB0001	HSR6602-G TAA
JG777A	HP HSR6602-XG TAA Router	BJNGA-BB0001	HSR6602-XG TAA
JG357A	RT-FIP-10	FIP-10	FIP-10
JG358A	RT-FIP-20	FIP-20	FIP-20

! IMPORTANT:

For regulatory identification purposes, every HSR6600 Router is assigned a regulatory model number(RMN). These regulatory numbers should not be confused with the marketing name HP HSR6600, or product codes.

Safety recommendations

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

- Make sure that the ground is dry and flat and anti-slip measures are in place.
- Keep the chassis and installation tools away from walk areas.
- Make sure the installation site is well grounded, and lightning protection and ESD-prevention are provided.
- Only trained and qualified personnel are allowed to install or service the router.
- Keep accessories, installation tools, and documentation safe.
- Avoid bodily injury. Do not touch any power plug when it is connected.
- Clean up the packaging materials after installation to avoid fire hazard.

Electricity

- Locate the emergency power-off switch in the room before installation. Shut the power off at once in case accident occurs.
- Make sure that the router has been correctly grounded.
- Use an uninterruptible power supply (UPS).
- If there are two power inputs, disconnect the two power inputs to power off the router.
- Do not work alone when the router has power.
- Always check that the power has been disconnected.

Laser safety

The HP HSR6600 routers are Class 1 laser devices.

WARNING!

- Do not stare into any fiber port when the router has power. The laser light emitted from the optical fiber may hurt your eyes.
 - Use a fiber test equipment, rather than a microscope or magnifier to observe an operating fiber or port when you test link connectivity or system parameters.
-

Router moving

When you move an HSR6600 router, follow these guidelines:

- Move and unpack the router carefully to avoid router damage.
- Use a safety hand truck when you move a heavy device or multiple devices.
- Before you move the router, remove all the cables, USB devices, mounting brackets, and cable management brackets.
- If the router needs to be moved over a long distance, remove all the field-replaceable units (FRUs), such as power modules, fan trays, and interface modules, and package them separately, and install the filler panels supplied with router.
- If the router needs to be moved over a short distance, make sure all the FRUs are securely seated in slot and the screws are fastened.
- When you move or lift the router chassis, support the bottom of the chassis, rather than holding any FRU. Make sure the accessories of the router are not lost or damaged during router moving.

Examining the installation site

Weight support

Evaluate the floor loading as compared to the actual weight of the router and its accessories (such as rack and power modules), and make sure that the floor can support the weight of the rack and the router chassis. For more information, see [“Appendix A Chassis views and Technical specifications.”](#)

Temperature and humidity

Maintain appropriate temperature and humidity in the equipment room.

- 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.

For the temperature and humidity requirements of the router, see [Table 2](#).

Table 2 Temperature requirements

Item	Temperature
Operating temperature	0°C to 45°C (32°F to 113°F)
Storage temperature	-40°C to 70°C (-40°F to +158°F)

Table 3 Humidity requirements

Item	Relative humidity
Operating humidity	5% to 95%
Storage humidity	5% to 95%

Altitude

Table 4 Altitude requirements

Item	Altitude
Operating altitude	-60 m (-196.85 ft) to 4 km (2.49 miles)
Storage altitude	-60 m (-196.85 ft) to 4.5 km(2.8 miles)

Cleanness

Dust buildup on the chassis may 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 5 Dust concentration limit in the equipment room

Substance	Concentration limit (particles/cu m)
Dust particles	$\leq 3 \times 10^4$ (No visible dust on desk in three days)

NOTE:

Dust particle diameter $\geq 5 \mu\text{m}$

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 6](#).

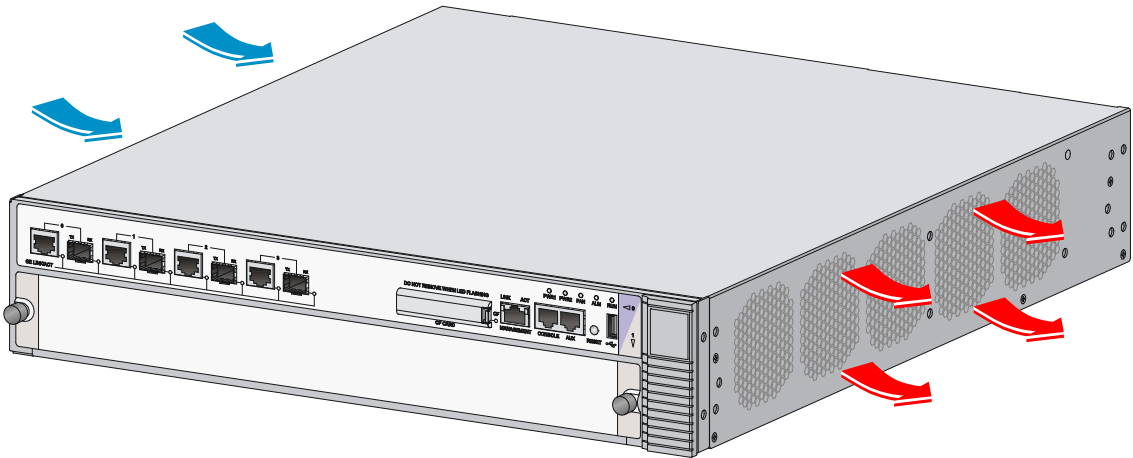
Table 6 Harmful gas limits in an equipment room

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

Cooling system

The HSR6600 routers adopt left to right airflow for heat dissipation.

Figure 1 Airflow



- Make sure there is enough space (greater than 10 cm (3.94 in)) around the air intake and outlet vents on the router for good ventilation.
- Make sure the installation site has a good cooling system.

ESD prevention

To prevent electrostatic discharge (ESD), note the following guidelines:

- Make sure that the router and rack are well grounded.
- An anti-static floor is installed and well grounded.
- Maintain the humidity and temperature at a proper level in the equipment room. For more information, see "[Temperature and humidity](#)."
- Always wear an ESD-preventive wrist strap and ESD-preventive cloth when touching a circuit board, interface module, or transceiver module.
- Place the removed memory module, CF card, FIP, HIM, or MIM on an antistatic workbench, with the face upward, or put it into an antistatic bag.

- Touch only the edges, instead of electronic components when observing or moving a removed memory module, CF card, HIM, or MIM.

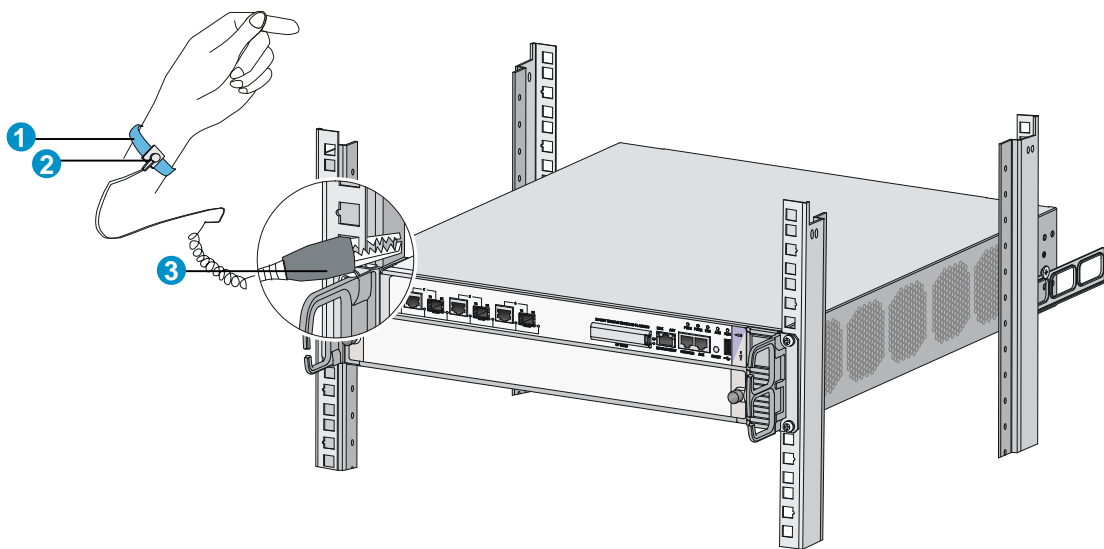
To use the ESD-preventive wrist strap, perform the following steps:

1. Wear the wrist strap on your wrist.
2. Lock the wrist strap tight around your wrist to keep good contact with the skin.
3. Attach the ESD-preventive wrist strap to the alligator clips.
4. Attach the alligator clips to the rack post.
5. Make sure that the rack is well grounded.

△ CAUTION:

- Check the resistance of the ESD-preventive wrist strap for safety. The resistance reading should be in the range of 1 to 10 megohm (Mohm) between human body and the ground.
- The HSR6600 does not provide any ESD-preventive wrist strap. Prepare it yourself.

Figure 2 Use an ESD-preventive wrist strap



(1) ESD-preventive wrist strap

(2) Lock

(3) Alligator clip

EMI

All electromagnetic interference (EMI) sources, from outside or inside of the router and application system, adversely affect the router in a conduction pattern of capacitance coupling, inductance coupling, electromagnetic wave radiation, or common impedance (including grounding system) coupling. To prevent EMI, perform the following tasks:

- Take measures against interference from the power grid.
- Do not use the router together with the grounding equipment or light-prevention equipment of power equipment, and keep the router far away from them.
- Keep the router far away from high-power radio launchers, radars, and equipment with high frequency or high current.

NOTE:

Use electromagnetic shielding when necessary.

Lightning protection

To protect the router from lightning better, do as follows:

- Make sure the chassis is well grounded.
- Make sure the grounding terminal of the AC power receptacle is well grounded.
- Install a lightning protector at the input end of the power supply to enhance lightning protection capability.
- Install a surge lightning protector at the input end of outdoor signal lines (for example, E1/T1 line) to which interface modules of the router are connected to enhance the lightning protection capability.

Space

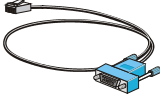
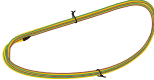
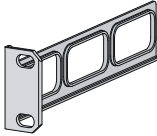
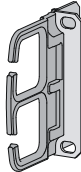
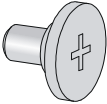
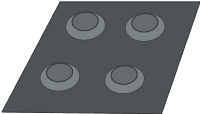

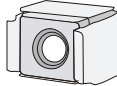


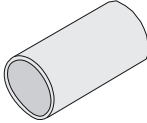

- For ease of installation and maintenance, make sure that the front and rear clearances are at least 1 m (3.28 ft).
- For heat dissipation, make sure the headroom in the equipment room is no less than 3 m (9.84 ft), and an appropriately sized air conditioner is provided.

Power supply

Perform the following steps to satisfy the power supply requirements of the HSR6600 routers:

1. Calculate the system power consumption.
The system power consumption of the HSR6600 routers depends on the number and type of interface modules, and fan tray power consumption. For the power consumption of the router, see [“Appendix A Chassis views and Technical specifications.”](#)
2. Select power modules according to the system power consumption.
To ensure normal operation of the router, make sure the maximum output power of the power modules is greater than the system power consumption of the router. After determining the system power consumption, you can select power modules as needed. For power module specifications, see [“Appendix A Chassis views and Technical specifications.”](#)
3. Check that the power source on the installation site satisfies the power input of the power modules.
Make sure the power source of the installation site is steady and can satisfy the input requirements of the power modules and parameters such as rated voltage.

Accessories

				
Console cable (supplied with router)	3 m (9.84 ft) grounding cable (supplied with router)	Rear mounting bracket (supplied with router)	Front mounting bracket and cable management bracket (supplied with router)	Load-bearing screw (supplied with router)
				
Rubber feet (supplied with router)	M6 screw (user-supplied)	Cage nuts (user-supplied)	ESD-preventive wrist strap (user-supplied)	Cable tie (user-supplied)
				
Insulation sheath (user-supplied)	Ring terminal (user-supplied)			

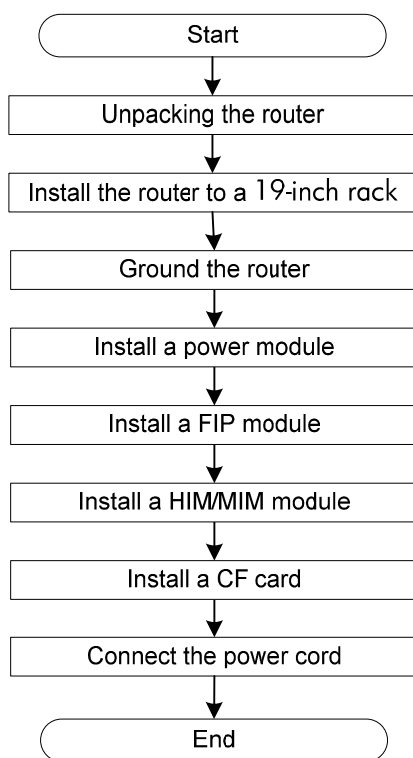
Installing the router

NOTE:

The fan tray, power modules, FIPs, and interface modules are hot swappable.

Installation flow

Figure 3 HSR6600 installation flow



Check before installation

Follow these guidelines to prepare for installing an HSR6600 router:

- Make sure that you have read "[Preparing for installation](#)" carefully and the installation site meets all the requirements.
- Prepare a 19-inch rack.
- Make sure that the rack is sturdy and securely grounded.
- Make sure that there is sufficient clearance around the rack for heat dissipation and installation.
- Make sure that there is no debris inside or around the rack.
- Move the router to a place near the rack.

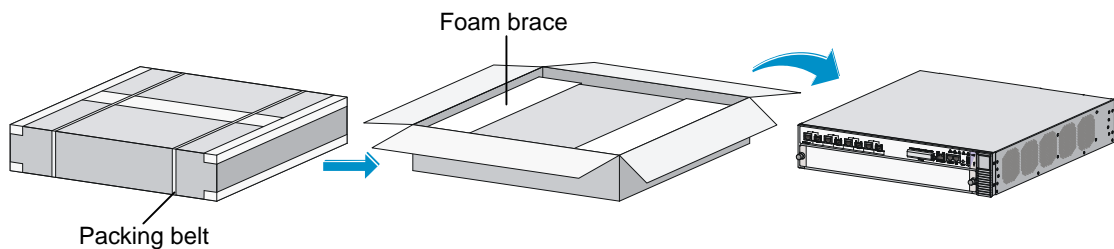
! IMPORTANT:

To mount multiple devices in the rack, place the heaviest one at the bottom of the rack.

Unpacking the router

Unpack the router as shown in Figure 4.

Figure 4 Unpacking the router



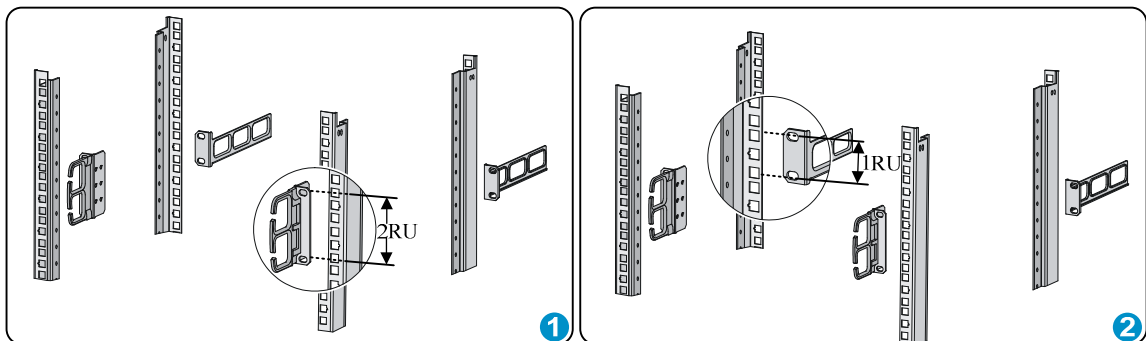
Installing the router in a 19-inch rack

Before you install the router to a rack, wear an ESD-preventive wrist strap. For how to wear an ESD-preventive wrist strap, see “[ESD prevention](#).” The HSR6600 Routers are installed in the same way. The HSR6602-G is used as an example in this section.

To install the router in a rack:

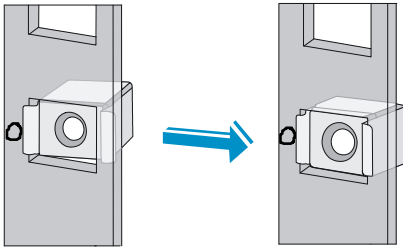
1. Mark the positions of cage nuts on the front rack posts by using a front mounting bracket and mark the positions of cage nuts on the rear rack posts by using a rear mounting bracket. See [Figure 5](#).

Figure 5 Marking the positions of the cage nuts



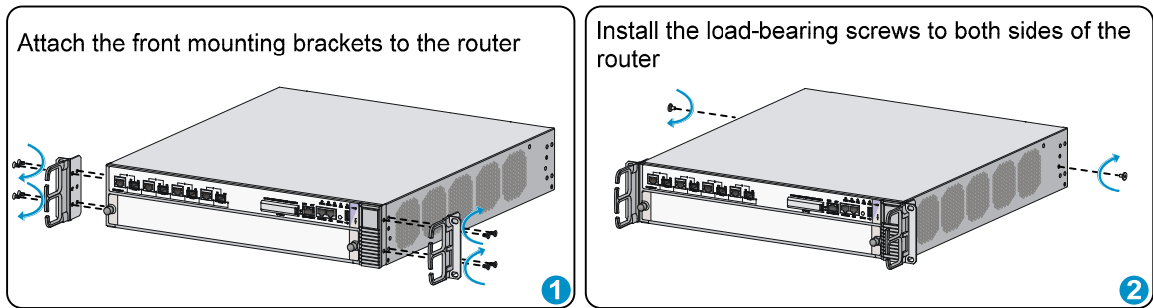
2. Insert one edge of a cage nut into the hole, and use a flat-blade screwdriver to compress the other edge of the cage nut to push the cage nut fully into the hole.

Figure 6 Installing cage nuts



3. Install the cable management brackets. See [Figure 7](#).

Figure 7 Installing the front mounting brackets and load-bearing screws

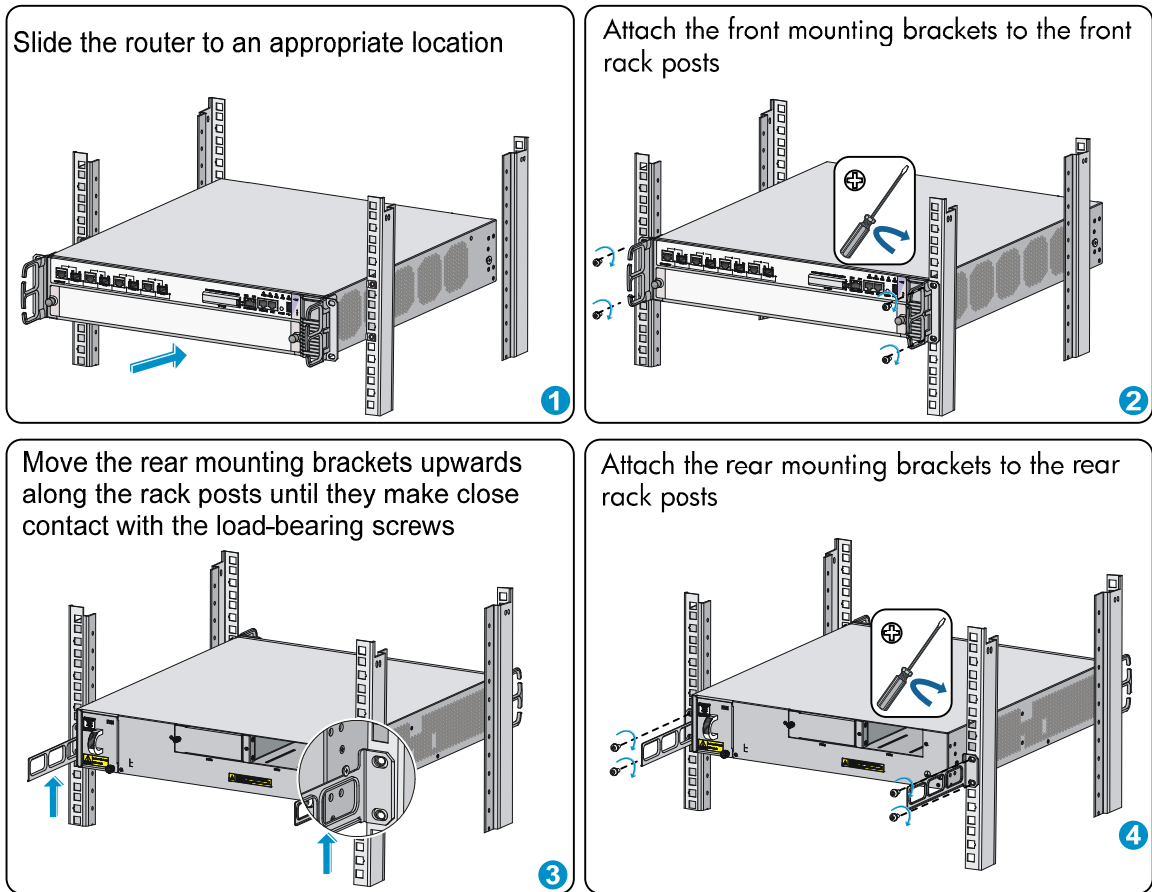


4. Install the router to the rack.

△ CAUTION:

This task requires at least two people.

Figure 8 Installing the router to the rack



Grounding the router

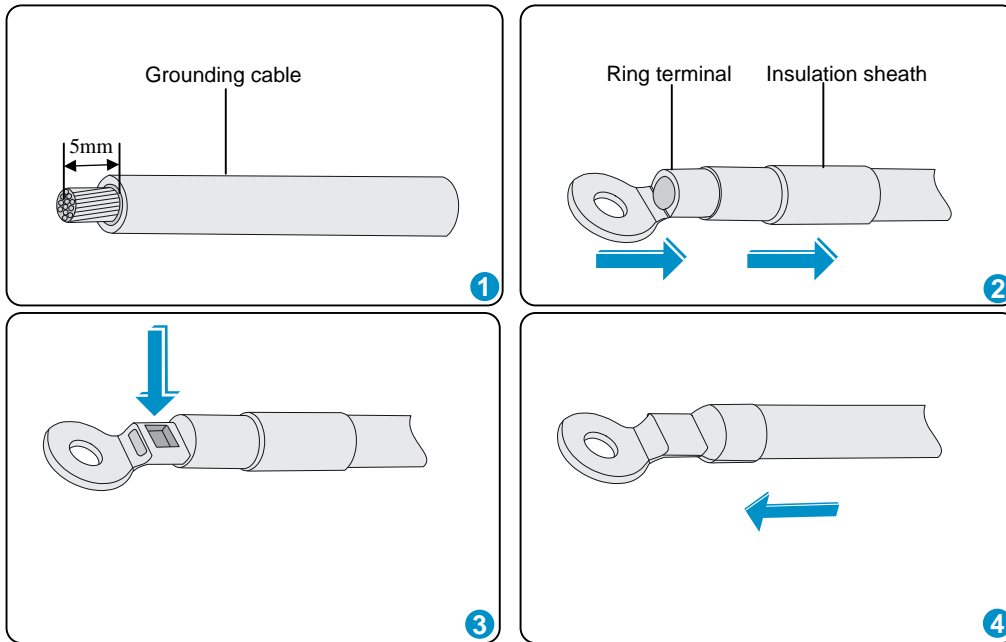
Installing the ring terminal

No ring terminal is supplied with the grounding cable. You must install one yourself.

To install the ring terminal:

1. Cut the grounding cable as appropriate for connecting to the grounding strip, and strip 5 mm (0.20 in) of insulation sheath by using a wire stripper.
2. Insert the bare metal part through the black insulation covering into the end of the ring terminal.
3. Crimp the metal part of the cable to the ring terminal with a crimper.
4. Cover the joint with the insulation covering, and heat the insulation covering with a blow dryer to completely cover the metal part.

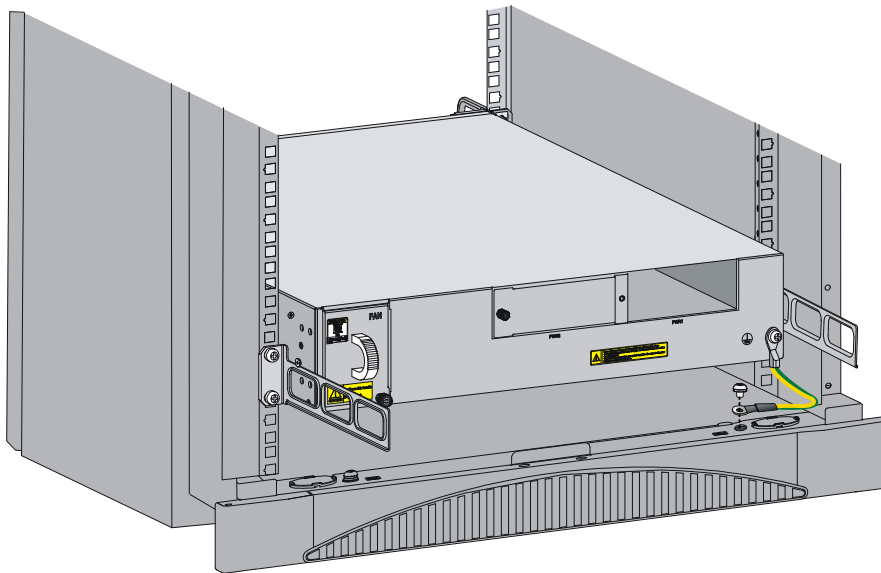
Figure 9 Installing the ring terminal



Connecting the grounding cable

1. Remove the grounding screw from the rear panel of the router chassis.
2. Attach the grounding screw to the ring terminal of the grounding cable.
3. Use a screwdriver to fasten the grounding screw into the grounding screw hole.
4. Attach the ring terminal on the other end of the grounding cable to the grounding strip.

Figure 10 Connecting the grounding cable

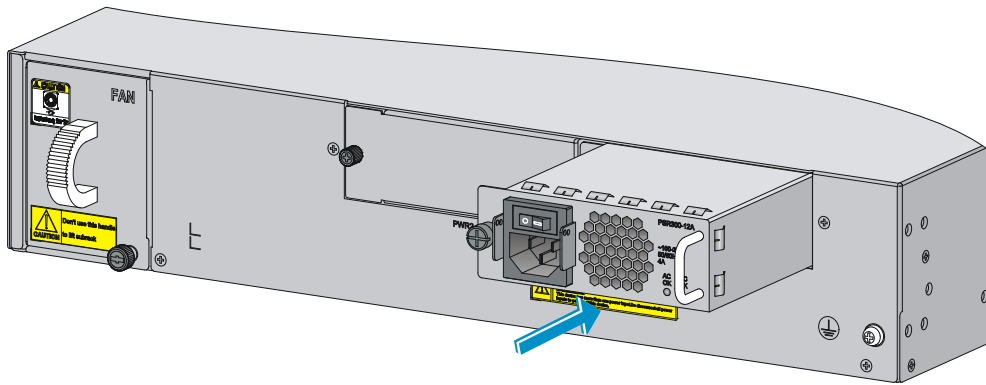


Installing a power module

Before you install a power module, make sure the power switch is off and the router is well grounded. The procedures for installing an AC power module and a DC power module are the same. The following uses an AC power module as an example.

1. Locate the slot to install the power module.
 - To install the power module to slot PWR1, go to step 2.
 - To install the power module to slot PWR2, use a Phillips screwdriver to remove the filler panel from the slot first. Keep the filler panel safe for future use.
2. Correctly orient the power module with the power module slot (see [Figure 11](#)), grasp the handle of the power module with one hand and support its bottom with the other, and slide the power module slowly along the guide rails into the slot.
3. Fasten the captive screws on the power module with a Phillips screwdriver.

Figure 11 Installing the power module



NOTE:

- For the power module LED description, see “[Appendix B LEDs.](#)”
 - An AC power module and a DC power module cannot be installed on the same router.
-

Installing a FIP module

NOTE:

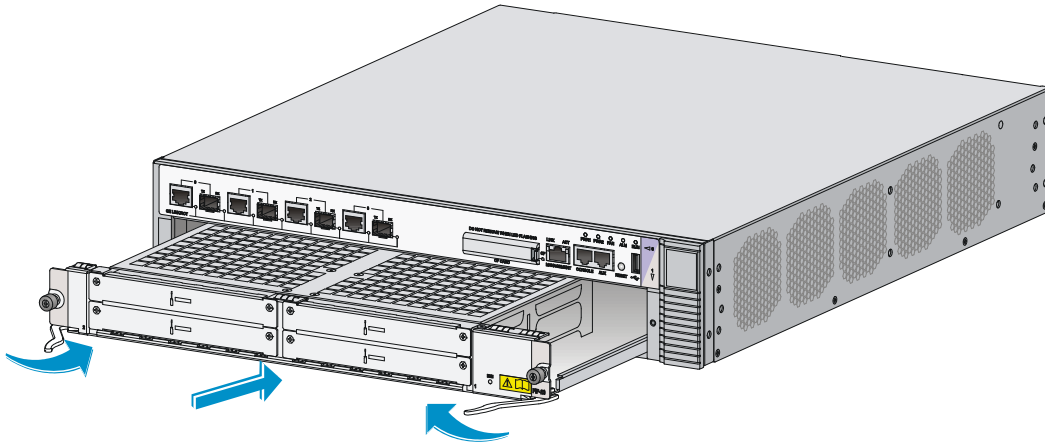
Before you install a FIP module, make sure that the ejector levers are in the open position away from the FIP module panel.

The following uses a FIP-20 as an example.

1. Locate the slot to install the FIP module, and remove the filler panel.
2. Use a Phillips screwdriver to loosen the captive screws on the filler panel, and remove the filler panel. Keep the filler panel safe for future use.
3. Use even pressure to gently push the FIP module into the slot along the slide rails until positioning pins on the backplane are seated in the positioning holes, and then push the ejector levers inward to lock the FIP module in position.

4. Fasten the captive screws on the FIP module with a Philips screwdriver.

Figure 12 Installing a FIP module



NOTE:

For more information about the FIP LEDs, see “[Appendix B LEDs.](#)”

Installing a HIM/MIM

NOTE:

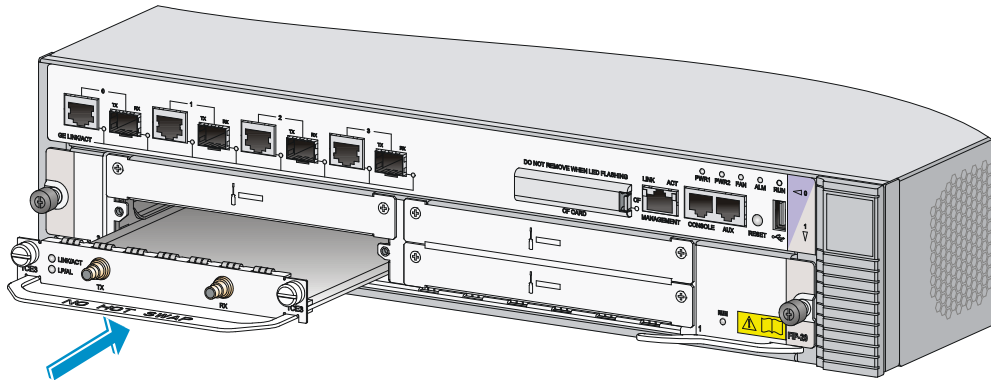
- Install the MIM in the lower slot on the FIP module.
 - Only the FIP-20 supports HIMs.
 - Before you install a HIM, make sure that the ejector levers are in the open position away from the HIM module panel.
-

The procedures for installing HIMs and MIMs are similar. This example installs a MIM to a FIP-20.

To install a MIM:

1. Locate the slot to install the MIM on the FIP module.
2. Loosen the captive screws on a filler panel with a Phillips screwdriver, and then use a flat-blade screwdriver to prize the filler panel to remove it from the router. Keep the filler panel safe for future use.
3. Use even pressure to push the MIM slowly along the slide rails into the slot, and then pull the levers inward.
4. Use a flat-blade screwdriver to fasten the captive screws on the MIM.

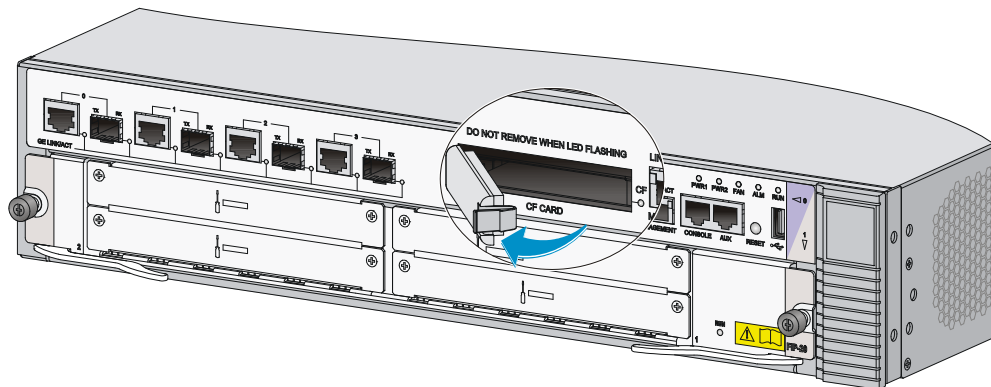
Figure 13 Installing the MIM



Installing a CF card

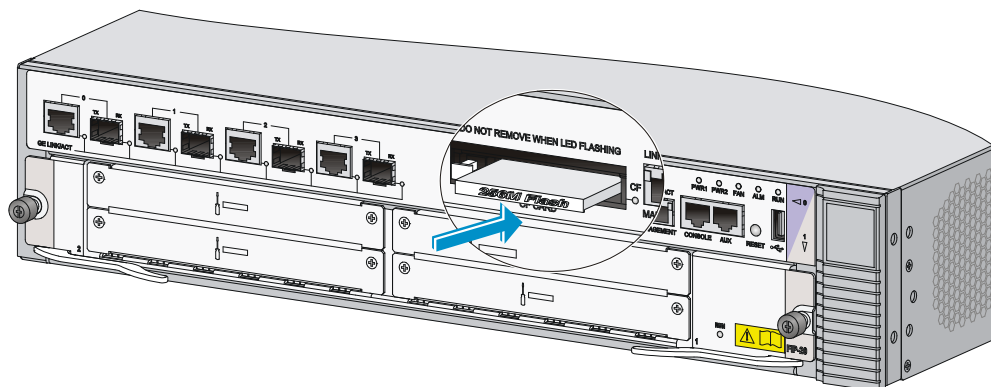
1. Press the spring clip at the right of the CF card cover to open it.

Figure 14 Open the CF card cover



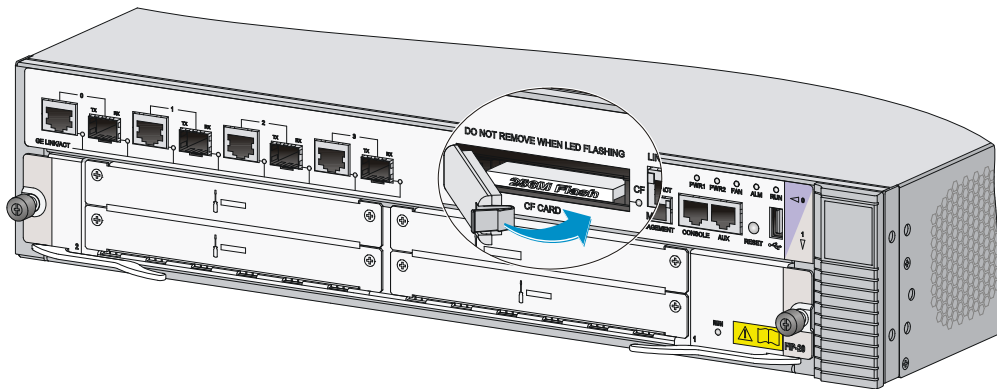
2. Press the ejector button next to the CF card slot. Insert the CF card into the slot and make sure it does not project from the slot.

Figure 15 Insert the CF card



3. Close the CF card cover.

Figure 16 Close the CF card cover



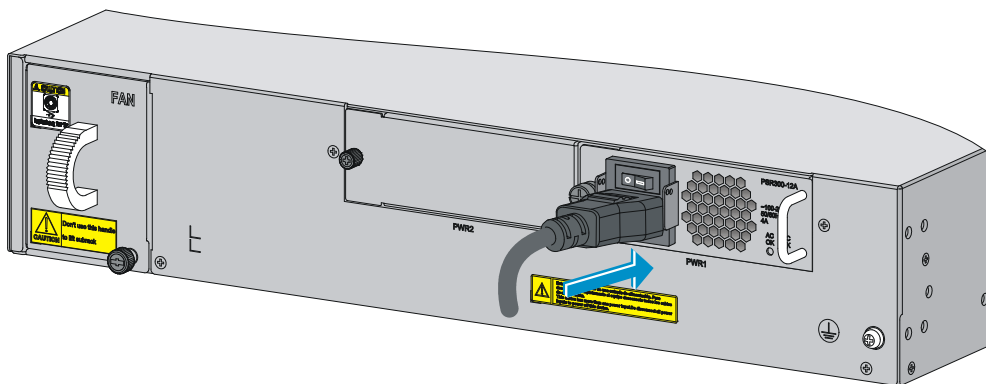
Connecting the power cord

Connecting an AC power cord

To connect an AC power cord:

1. Make sure the router is well grounded, and the power switch on the router is in the OFF position.
2. Pull the bail latch upwards.
3. Connect one end of the AC power cord to the AC-input power receptacle on the router.
4. Pull the bail latch down to secure the plug to the power receptacle.
5. Connect the other end of the power cord to the AC power outlet.

Figure 17 Connecting an AC power cord to the router



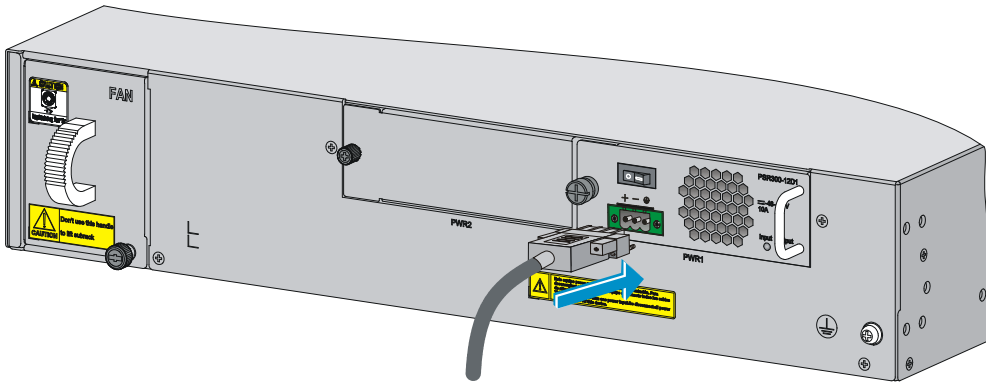
Connecting a DC power cord

To connect a DC power cord:

1. Correctly orient the plug at one end of the cable with the power receptacle on the power module, and insert the plug into the power receptacle.

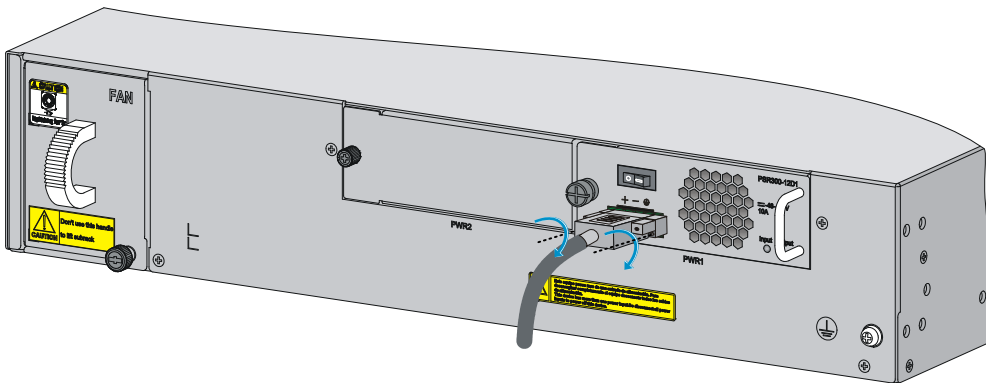
The power receptacle is foolproof. If you cannot insert the plug into the receptacle, re-orient the plug rather than use excessive force to push it in.

Figure 18 Insert the plug



2. Tighten the screws on the plug with a flat-blade screwdriver to secure the plug in the power receptacle.

Figure 19 Tighten the screws



3. Connect the two wires at the other end of the power cord to a DC power source.

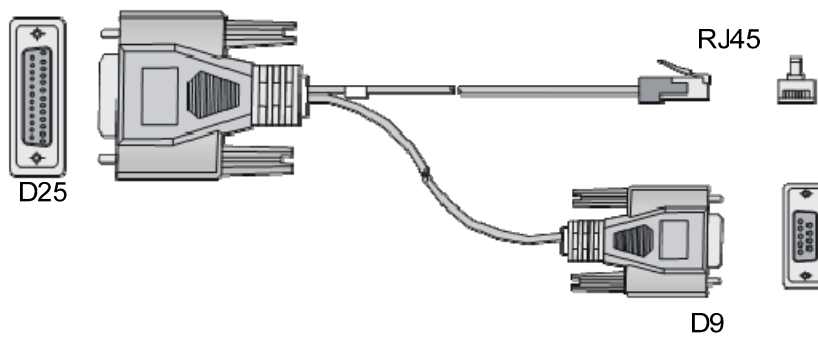
Connecting the router to the network

Connecting the AUX cable

Overview

An AUX console cable is an 8-core shielded cable, with a crimped RJ-45 connector at one end for connecting to the AUX port of the router, and DB-25 and DB-9 male connectors at the other end for connecting to the serial port of the modem.

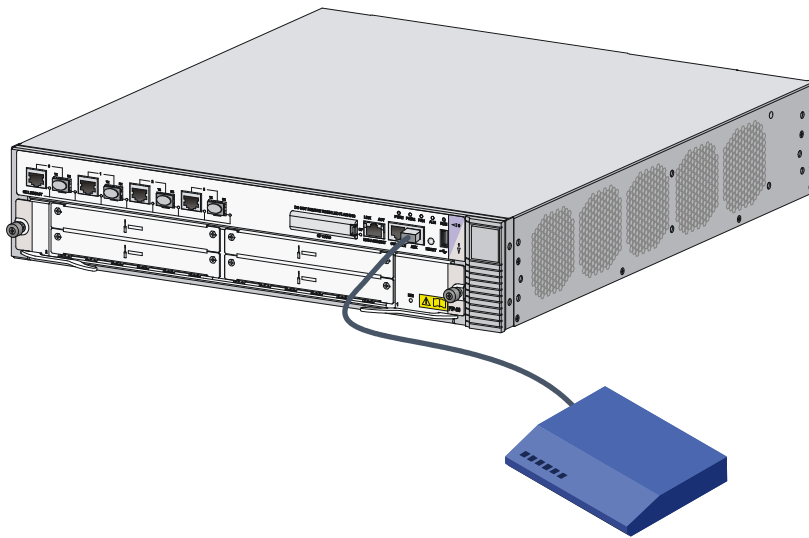
Figure 20 AUX cable



Connecting the AUX cable

1. Plug the DB-9 or DB-25 male connector at one end of the AUX cable into the serial port of the modem.
2. Plug the RJ-45 connector of the AUX cable into the AUX port of the router.

Figure 21 Connecting the AUX port to a modem



Connecting an Ethernet cable

Overview

10/100 Mbps Ethernet uses category-5 twisted pair cables, while 1000 Mbps Ethernet uses category-5 enhanced or category-6 twisted pair cables. Twisted pair cables include straight-through cables and crossover cables.

Category-5 cables provide a transmission frequency of 100 MHz for voice and data transmission; they are mainly used in 100Base-T and 10Base-T networks. Category-5 cables are common Ethernet cables, which can also be used to transmit 1000 Mbps Ethernet data.

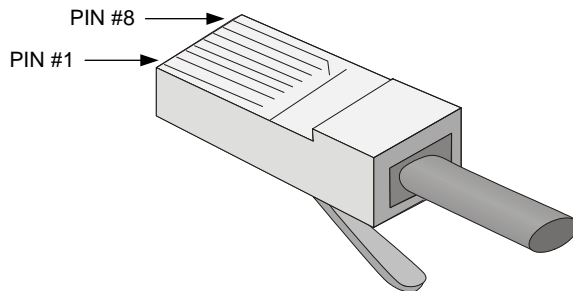
Category-5 enhanced cables feature low attenuation and crosstalk, providing higher attenuation to crosstalk ratio (ACR), less delay error and higher performance than category-5 cables. Category-5 enhanced cables are mainly used in 1000 Mbps Ethernet networks.

Category-6 cables provide a transmission frequency of 1 MHz to 250 MHz, and improve the performance on crosstalk and return loss. A fine better return loss performance is extremely important for new-generation full-duplex high-speed networks. Category-6 cables have sufficient power sum ACR (PS-ACR) when working at 200 MHz. They provide a bandwidth two times than that of category-5 enhanced cables, thus featuring a higher transmission performance. Therefore, category-6 cables are suitable for applications requiring a transmission speed of more than 1 Gbps.

The 10/100 Mbps Ethernet uses two pairs of cables, orange/white, orange, green/white and green cables, to transmit and receive data, while the 1000 Mbps Ethernet uses four pairs of cables to transmit and receive data.

An Ethernet twisted pair cable connects network devices through the RJ-45 connectors at the two ends. [Figure 22](#) shows the pinouts of an RJ-45 connector.

Figure 22 RJ-45 connector pinout



EIA/TIA cabling specifications define two standards, 568A and 568B, for cable pinouts.

- **Standard 568A**—Pin 1: white/green stripe, pin 2: green solid, pin 3: white/orange stripe, pin 4: blue solid, pin 5: white/blue stripe, pin 6: orange solid, pin 7: white/brown stripe, pin 8: brown solid.
- **Standard 568B**—Pin 1: white/orange stripe, pin 2: orange solid, pin 3: white/green stripe, pin 4: blue solid, pin 5: white/blue stripe, pin 6: green solid, pin 7: white/brown stripe, pin 8: brown solid.

Ethernet twisted pair cables can be classified into straight-through and crossover cables based on their pinouts

For the pinouts of the twisted pair cables, see the following tables. (A and B represent the two ends of a cable, respectively.)

Table 7 Straight-through cable pinouts

Pinout No.	A	B
1	Orange/white	Orange/white
2	Orange	Orange
3	Green/white	Green/white
4	Blue	Blue
5	Blue/white	Blue/white
6	Green	Green
7	Brown/white	Brown/white
8	Brown	Brown

Table 8 Crossover cable pinouts

Pinout No.	A	B
1	Orange/white	Green/white
2	Orange	Green
3	Green/white	Orange/white
4	Blue	Blue
5	Blue/white	Blue/white
6	Green	Orange

Pinout No.	A	B
7	Brown/white	Brown/white
8	Brown	Brown

NOTE:

Strictly follow the pinouts in the above tables when identifying or making the two types of Ethernet cables; otherwise, the communication quality may be affected.

Making an Ethernet cable

To make an Ethernet twisted pair cable:

1. Cut the cable to a proper length with the crimping pliers.
2. Strip off an appropriate length of the cable sheath. The length is typically that of the RJ-45 connector.
3. Untwist the pairs so that they can lay flat, and arrange the colored wires based on the wiring specifications.
4. Cut the top of the wires even with one another. Insert the wires into the RJ-45 end and make sure the wires extend to the front of the RJ-45 end and make good contact with the metal contacts in the RJ-45 end and in the correct order.
5. Crimp the RJ-45 connector with the crimping pliers until you hear a click.
6. Use a cable tester to verify the proper connectivity of the cable.

Connecting an Ethernet cable

1. Plug one end of an Ethernet twisted pair cable into the copper Ethernet port (RJ-45 port) to be connected on the router and the other end of the cable into the Ethernet port of the peer device. The 10/100/1000Base-T copper ports of the router support MDI/MDI-X auto-sensing. They are connected to the network through category-5 or above twisted pairs that are equipped with RJ-45 connectors.
2. Check the status LED of the Ethernet ports. For more information about the LED status, see [“Appendix B LEDs.”](#)

Connecting a fiber cable

Transceiver module overview

When you use a fiber port, you need an SFP, XFP, or SFP+ transceiver module and a fiber cable with an LC connector.

- **SFP transceiver module**—Applicable to 100/1000 Mbps Ethernet fiber ports and SFP ports on some HIMs.
- **XFP transceiver module**—Applicable to XFP ports on the HIM-1 EXP.
- **SFP+ transceiver module**—Applicable to GE SFP+ ports on the HSR6602-XG/HSR6602-XG TAA.

Figure 23 SFP transceiver module

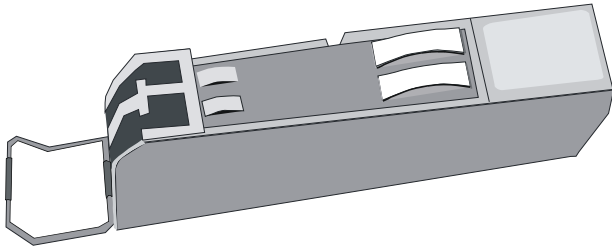


Figure 24 XFP transceiver module

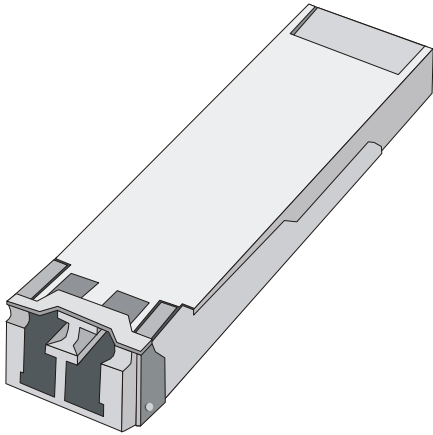
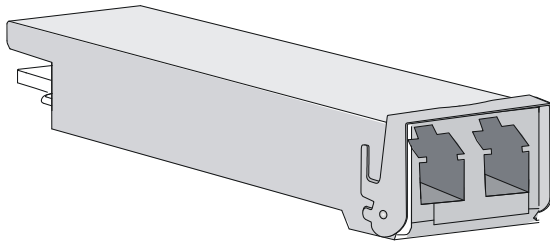


Figure 25 SFP+ transceiver module



Fiber cable overview

You can use an optical fiber to connect a fiber Ethernet port or 10 Gbps Ethernet port. In addition, an optical fiber can connect these types of interface modules: HIM-4GBP/HIM-8GBP, HIM-CL1P/HIM-CL2P, HIM-CLS1P/HIM-CLS2P, HIM-MSP2P/HIM-MSP4P, HIM-PS1P, HIM-AL1P/HIM-AL2P, HIM-RS2P, or HIM-1EXP.

Optical fibers feature low loss and long transmission distance.

Optical fibers can be classified into single mode fibers and multi-mode fibers. A single mode fiber carries only a single ray of light; a multi-mode fiber carries multiple modes of lights.

Table 9 Characteristics of single mode and multi-mode optical fibers

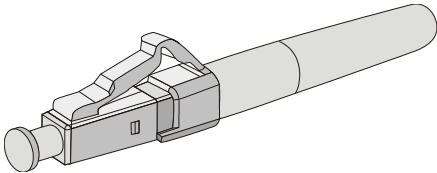
	Single mode fiber	Multi-mode fiber
Core	Small core (10 micrometers or less)	Larger core than single mode fiber (50 micrometers, 62.5 micrometers or greater)
Dispersion	Less dispersion	Allows greater dispersion and therefore, signal loss exists.
Light source and transmission distance	Users lasers as the light source often within campus backbones for distance of several thousand meters	Uses LEDs as the light source often within LANs or distances of a couple hundred meters within a campus network

Table 10 Allowed maximum tensile force and crush load

Period of force	Tensile load (N)	Crush load (N/mm)
Short period	150	500
Long term	80	100

Fiber connectors are indispensable passive components in an optical fiber communication system. They allow the removable connection between optical channels, which makes the optical system debugging and maintenance more convenient. There are multiple types of fiber connectors. [Figure 26](#) shows an LC connector.

Figure 26 Appearance of an LC connector



NOTE:

- The HSR6600 supports LC fiber cables only.
 - Some cards of the HP HSR6600 router provide shielded covers for the fiber ports (such as SFP ports). Before using such fiber ports, remove the shielded covers. Keep the shielded covers properly. When the fiber ports are not in use, install the shielded covers.
 - Fiber connectors are fitted with dust caps. Keep the dust caps properly when the fiber connectors are in use. Install dust caps when the fiber connectors are not in use to avoid damage to their end face. Replace the dust cap if it is loose or polluted.
 - Before connecting an optical fiber, use dust free paper and absolute alcohol to clean the end face of the two fiber connectors. You can brush the end faces only in one direction.
 - After a fiber is installed well, the bend radius must be not less than 10 cm (3.94 in).
 - If the fiber has to pass through a metallic board hole, the hole must have a sleek and fully filleted surface (the filleting radius must be not less than 2 mm, or 0.08 in). When passing through a metallic board hole or bending along the acute side of mechanical parts, the fiber must wear jackets or cushions.
 - Insert and remove a plug with care. Never exert a fierce force to the fiber or plug; otherwise the plug may be damaged or the fiber may be broken. Never pull, press or extrude the fiber fiercely. For the allowed maximum tensile load and crush load, see [Table 10](#).
-

Connecting a fiber cable

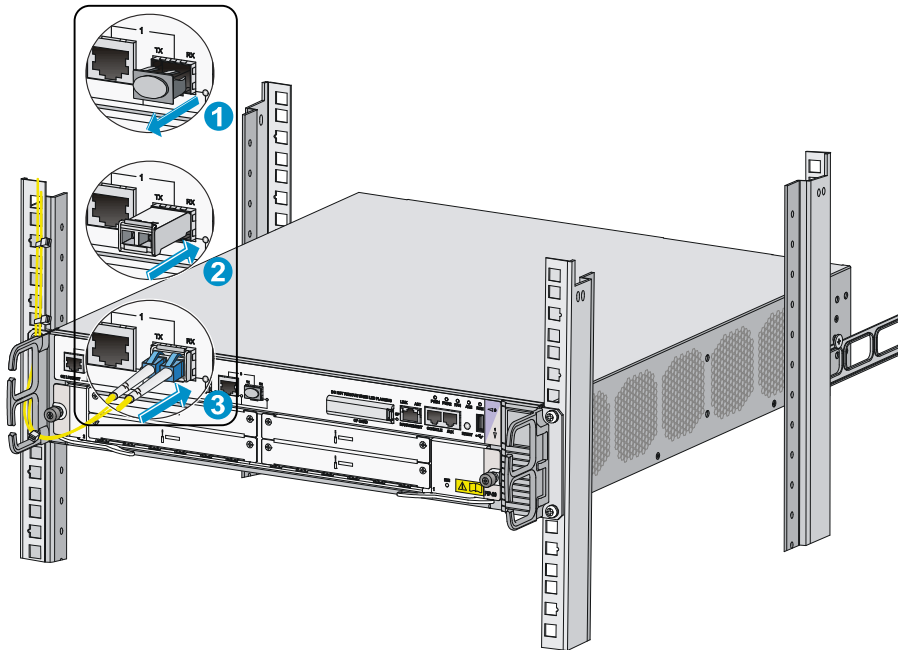
⚠ WARNING!

Do not stare into any fiber port when you connect an optical fiber. The laser light emitted from the optical fiber may hurt your eyes.

To connect a fiber cable:

1. Remove the dust plug from a fiber port of the router.
2. Install the transceiver module
3. Identify the Rx and Tx ports. Plug the LC connector at one end of one fiber cable into the Rx port of the router and the LC connector at the other end into the Tx port of the peer device. Plug the LC connector at one end of another fiber cable into the Tx port of the router and the LC connector at the other end to the Rx port of the peer device.
4. View the LINK LED after connection.
 - If the LED is on, the optical fiber link is present.
 - If the LED is off, no link is present. This may be because the TX and Rx port of the optical fiber are not connected correctly. In this case, connect the optical fiber again.

Figure 27 Connecting a fiber cable



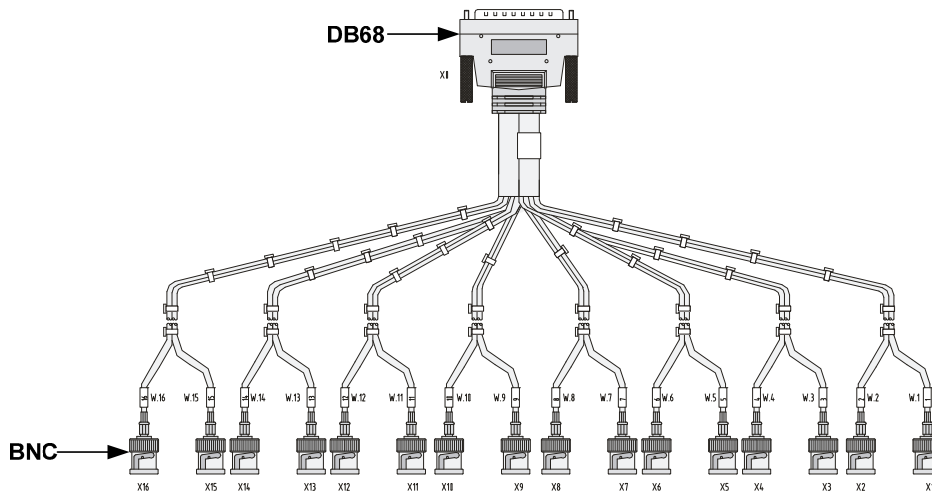
Connecting an E1/T1 cable

E1/T1 cable overview

E1 cable

You can use an 8E1 interface cable to connect to MIM-8E1(75)/MIM-8E1(75)-F modules.

Figure 28 8E1 splitter cable



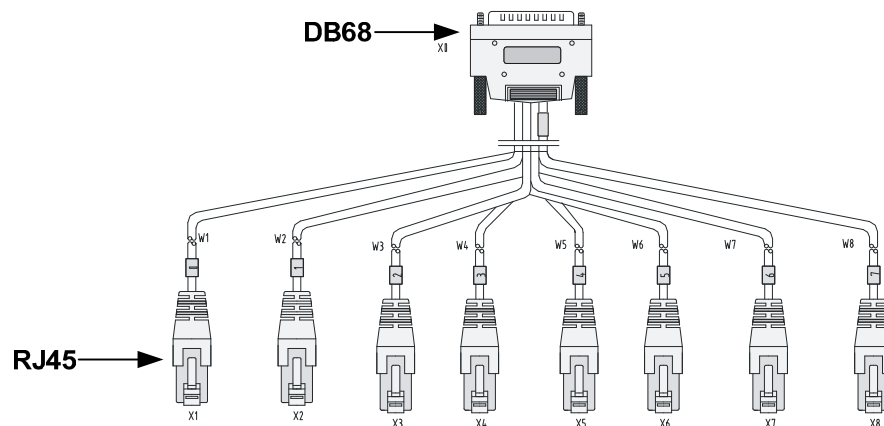
NOTE:

The coaxial connector and 75-ohm E1 adapter cable are optional accessories, and must be purchased separately if needed.

T1 cable

You can use an 8T1 interface cable to connect to MIM-8T1/MIM-8T1-F modules.

Figure 29 8T1 splitter cable



⚠ CAUTION:

- When connecting the interface cable, pay attention to the mark on the interface to avoid wrong insertion, which may damage the interface module or even the router.
- HP recommends that you install a lightning protector at the input end of the 8T1 cables to protect them against lightning strikes more efficiently when they are led outdoors.

Connecting an E1/T1 cable

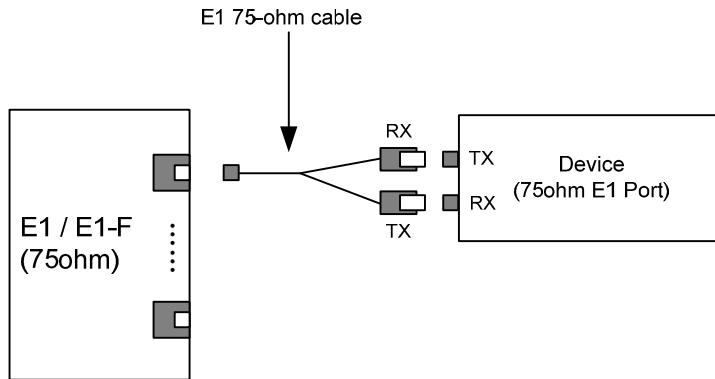
Connecting an E1 cable (D15/D68 <----> BNC)

⚠ CAUTION:

When connecting the interface cable, pay attention to the mark on the interface to avoid wrong insertion, which may damage the interface module or even the router.

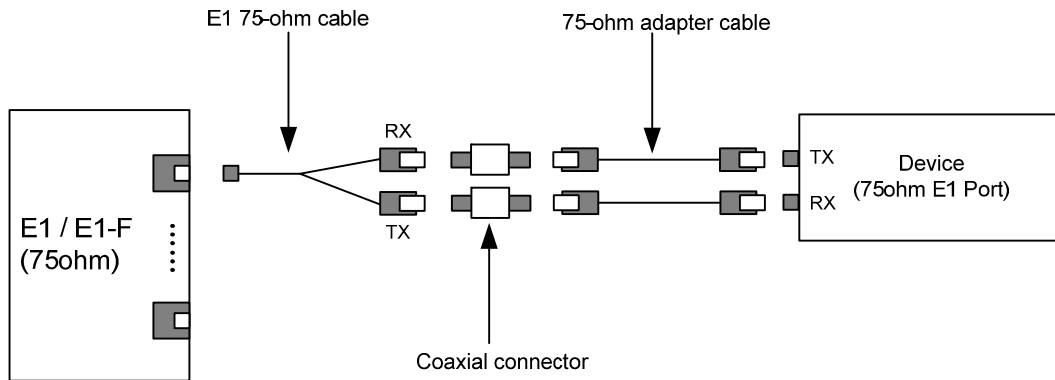
- If you do not need to extend the cable, you can directly connect the BNC connectors of the E1 75-ohm cable to the remote network device as follows.
 - a. Connect the D15/D68 connector of the E1 75-ohm cable to the D15/D68 interface of the interface module and fasten the bolts to fix the cable.
 - b. The other end of the cable provides one pair or multiple pairs of 75-ohm BNC connectors. Connect the TX connectors and the RX connectors on this end to the RX connectors and the TX connectors on the remote device respectively.

Figure 30 Connect an E1 75-ohm cable



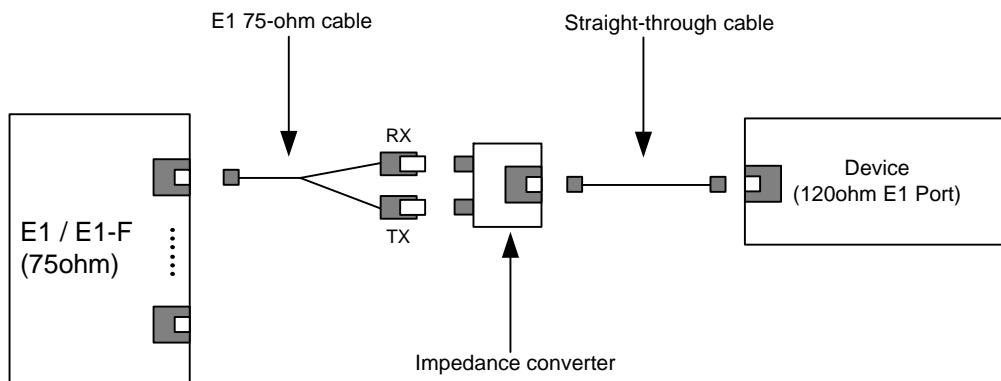
- If you want to extend the cable, connect each BNC connector of the E1 75-ohm cable to one end of a coaxial connector, and connect the remote device to the other end of the coaxial connector through an E1 75-ohm adapter cable.

Figure 31 Connect an E1 75-ohm cable



- If the impedance of the E1 interface on the remote device is 120 ohms, you must use an impedance converter to adapt the impedance.

Figure 32 Connecting an impedance converter

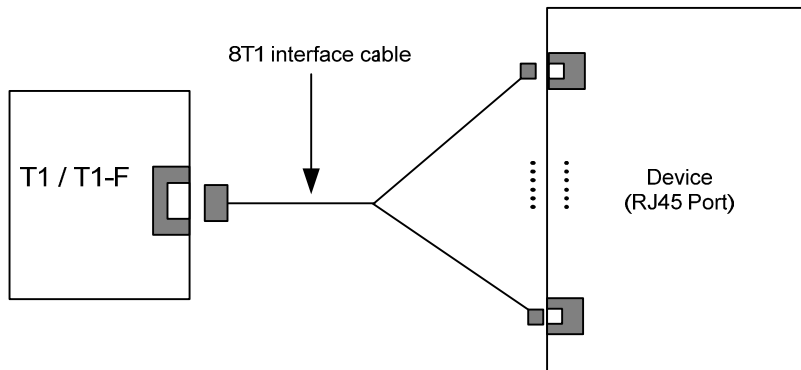


Connecting a T1 cable

1. Connect the D68 connector of the 8-port T1 cable to the D68 interface on the interface module and fasten the bolts to fix the cable.

2. The other end of the cable provides eight RJ-45 connectors. Connect them to the RJ-45 interface on the remote device as needed.

Figure 33 Connecting an 8T1 cable

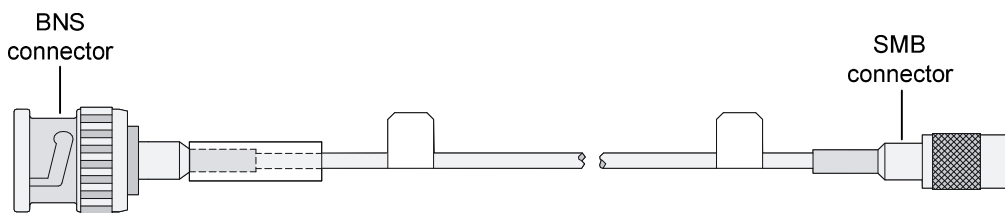


Connecting a CE3/CT3 cable

CE3/CT3 cable overview

You can use a CE3/CT3 interface cable to connect the MIM-1CE3 and MIM-1CT3 modules.

Figure 34 E3/T3 cable



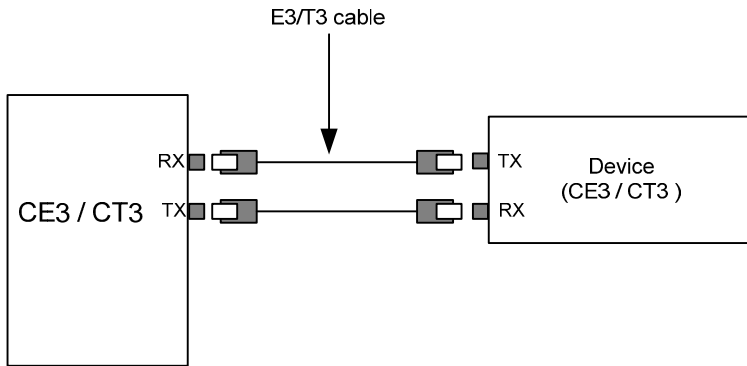
⚠ CAUTION:

HP recommends that you install a special lightning protector at the input end of the E3/T3 cables to protect them against lightning strikes more efficiently when they are routed outdoors.

Connecting a CE3/CT3 cable

1. Connect the SMB connector of an E3/T3 cable to the Tx port on the interface module and the other end to the Rx port on the device to be connected.
2. Connect the SMB connector of another E3/T3 cable to the Rx port of interface module and the other end to the Tx port on the device to be connected

Figure 35 Connecting a CE3/CT3 cable



Connecting a serial port cable

Overview

You can use a serial port cable to connect to the MIM-2SAE/MIM-4SAE/MIM-8SAE module. Select a serial port cable according to the link type.

Figure 36 V.24 DTE cable

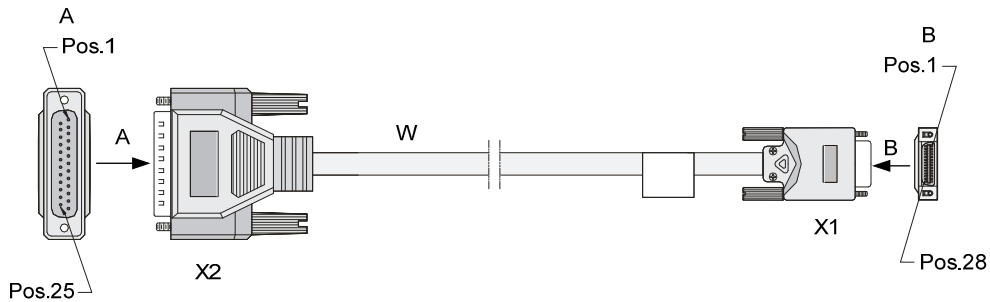


Figure 37 V.24 DCE cable

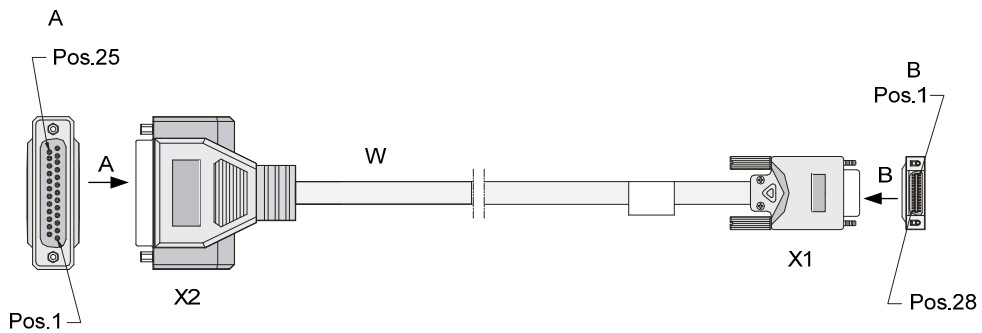


Figure 38 V.35 DTE cable

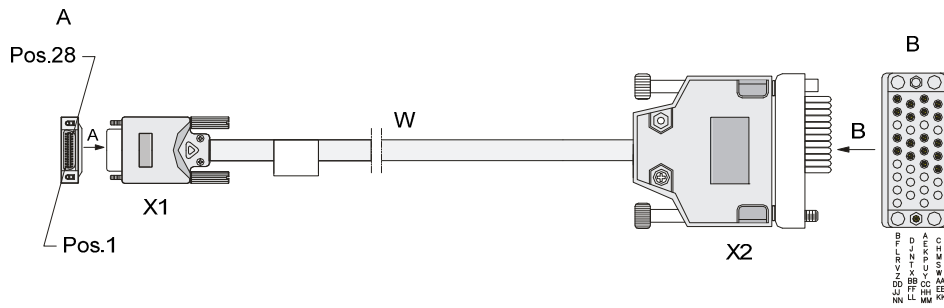


Figure 39 V.35 DCE cable

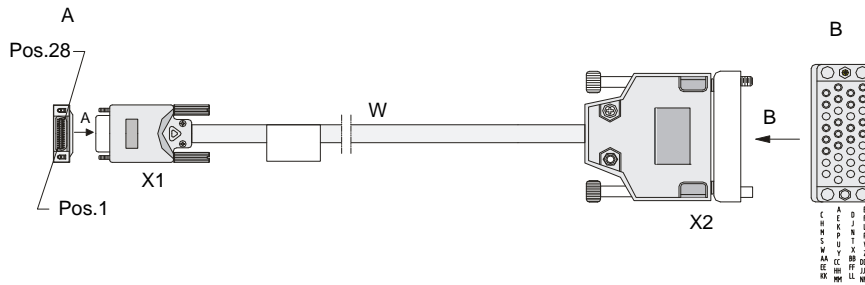


Figure 40 X.21 DTE cable

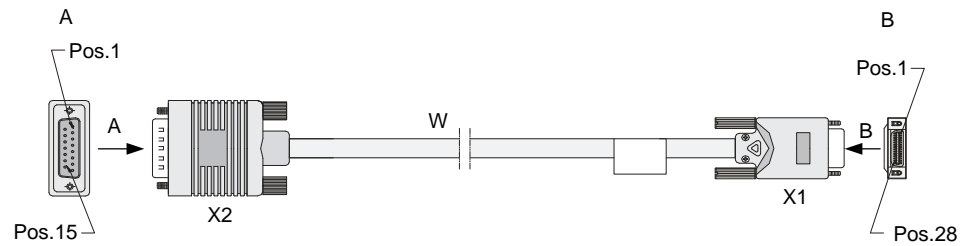


Figure 41 X.21 DCE cable

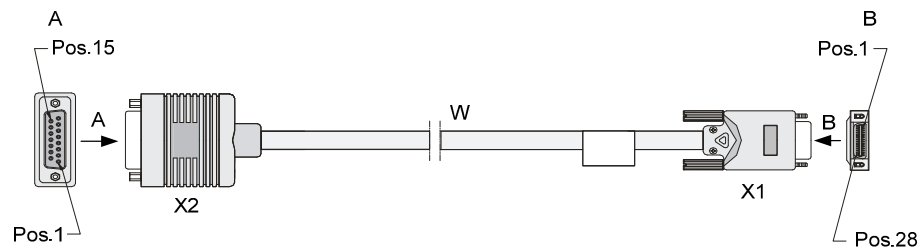


Figure 42 RS449 DTE cable

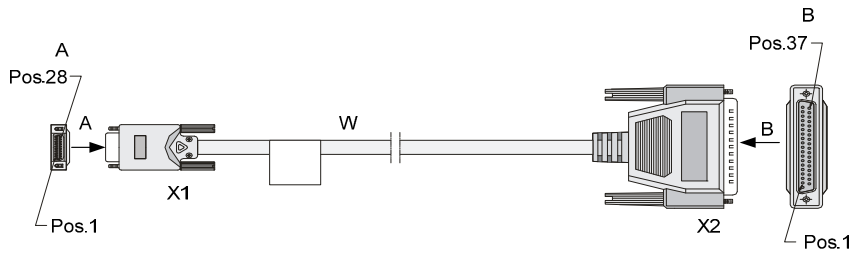


Figure 43 RS449 DCE cable

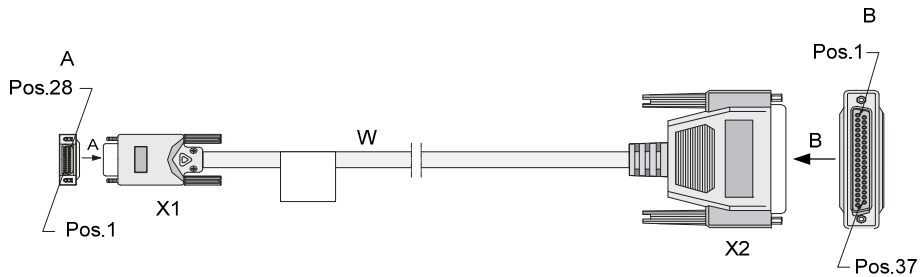


Figure 44 RS530 DTE cable

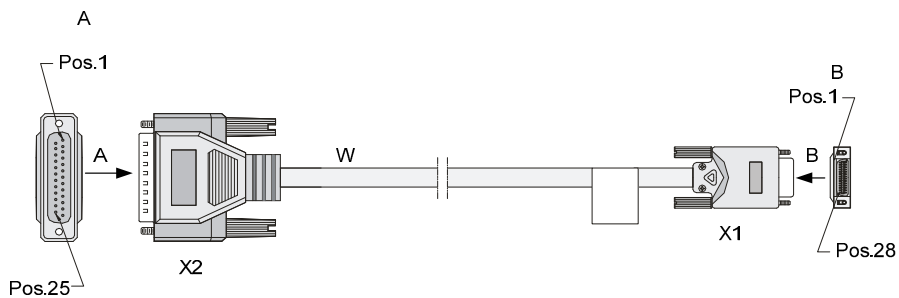
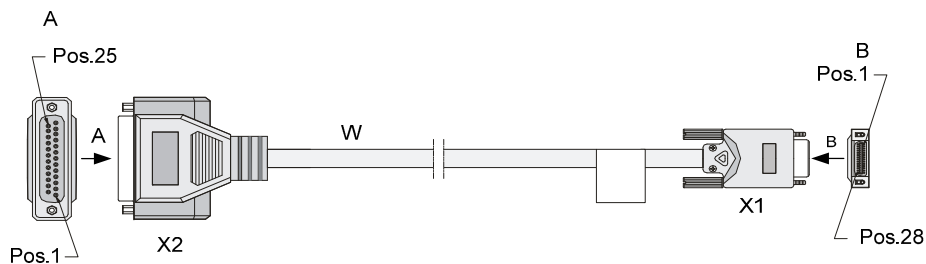


Figure 45 RS530 DCE cable



Connecting a serial port cable

1. Check port type of the peer device and choose the synchronous serial interface cable of correct type.
2. Plug the D28 end of the synchronous serial interface cable into the D28 interface of the SAE interface module.
3. If the WAN uses DDN line, connect the cable to the port of the CSU/DSU.

4. Check the LINK LED on the SAE panel.
 - If the LED is on, a link is present.
 - If the LED is off, a fault has occurred on the link and signal is out of synchronization. In this case, check the link.

Logging in to the router and configuring basic settings

Login methods

The following login methods are available for you to log in to the router:

- Logging in through the console port, which is the most common way to log in to a router and also the prerequisite for configuring other login methods.
- Logging in through Telnet or SSH.
- Logging in through the AUX port.

Logging in through the console port

Preparation

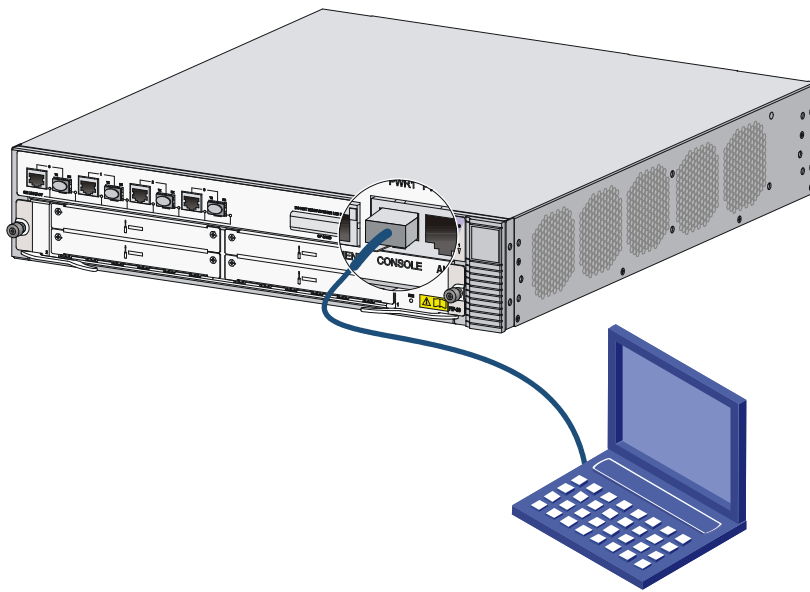
Before you log in to your router, prepare an 8-core shielded cable, with a crimped RJ-45 connector at one end and a DB-9 male connector at the other end, and a PC with the operating system Windows 95/98/NT/2000/XP/7.

Setting up a configuration environment

To connect a configuration terminal to the router by using the console cable:

1. Select a configuration terminal.
2. Plug the DB-9 female connector to the serial port of the configuration terminal and connect the RJ-45 connector to the console port of the router.

Figure 46 Connecting the console cable



△ CAUTION:

To disconnect a PC from the router, disconnect the RJ-45 connector first.

Setting terminal parameters

To set terminal parameters, for example, on a Windows XP HyperTerminal:

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 47 Connection description for the HyperTerminal



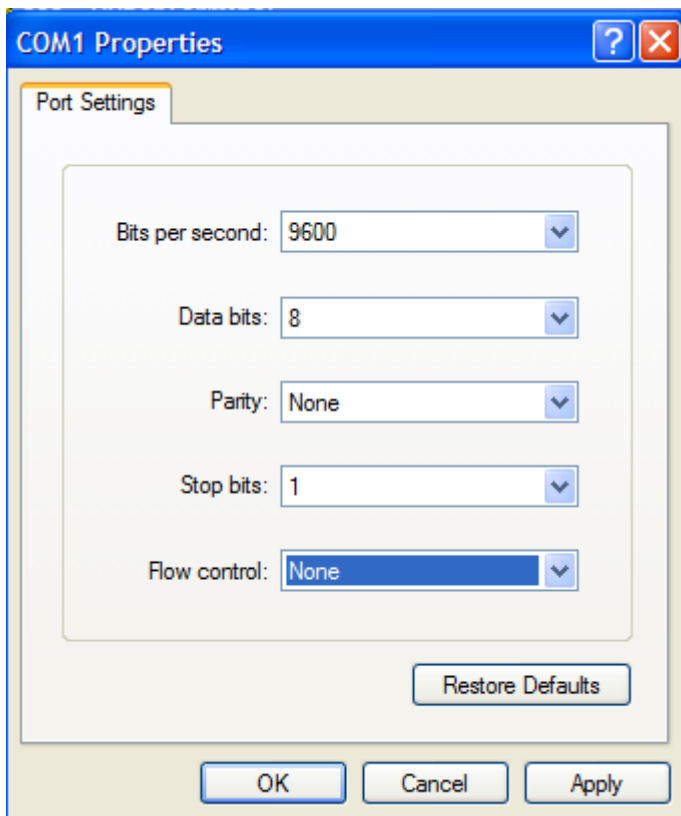
3. Select the serial port to be used from the **Connect using** list, and click **OK**.

Figure 48 Setting the serial port used by the HyperTerminal connection



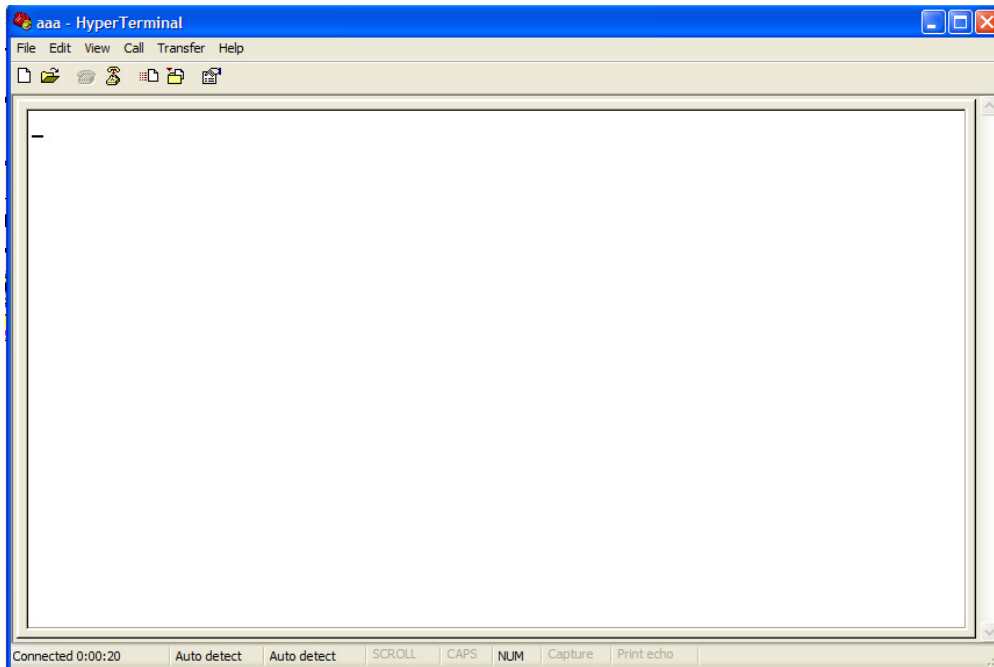
4. Set **Bits per second** to **9600**, **Data bits** to **8**, **Parity** to **None**, **Stop bits** to **1**, and **Flow control** to **None**, and click **OK**.

Figure 49 Setting the serial port parameters



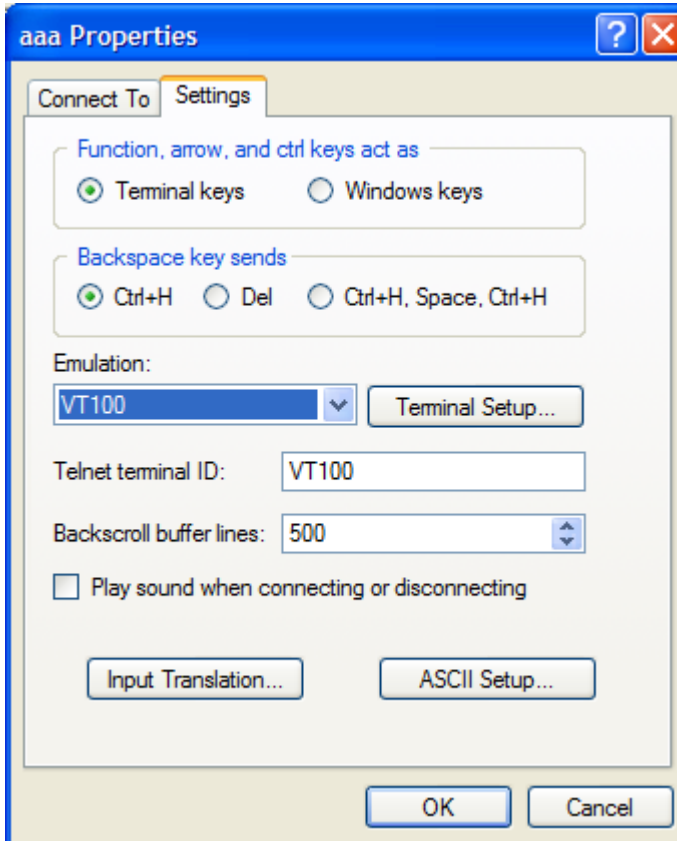
5. Select **File > Properties** in the HyperTerminal window.

Figure 50 HyperTerminal window



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

Figure 51 Setting terminal emulation in aaa Properties dialog box



Verification before power-on

Before powering on the router, verify that:

- Make sure the power modules and fan tray are correctly installed.
- The power cord is properly connected.
- The input power voltage meets the requirement of the switch.
- The console cable is properly connected, the terminal or PC used for configuration has started, and the configuration parameters have been set.
- If you use a CF card, make sure the CF card is firmly seated in slot.
- Make sure the interface modules, if any, are correctly installed.

Powering on the router

Power on the router, and you can see the following information:

```
System is starting...
```

```
Booting Normal Extend BootWare.....
```

```
*****
*
*          HP HSR6600 Router BootWare, Version 1.01          *
*
*****
Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P.
```

```
Compiled Date       : Nov 14 2011
CPU Type            : P4080
CPU L1 Cache       : 32KB
CPU Clock Speed    : 1500MHz
Memory Type        : DDR3 SDRAM
Memory Size        : 4096MB
Memory Speed       : 650MHz
BootWare Size      : 1024KB
Flash Size         : 8MB
Nand Flash size    : 512MB
NVRAM Size         : 128KB
BASIC CPLD Version : 1.0
EXTEND CPLD Version : 1.0
PCB Version        : Ver.A
```

```
BootWare Validating...
```

```
Press Ctrl+B to enter extended boot menu...
```

```
Starting to get the main application file--flash:/HSR6600.bin!
```

```
The main application file is self-decompressing.....
.....
```

```
.....  
.....Done!  
System application is starting...  
User interface con0 is available.
```

Press ENTER to get started.

Press **Enter** at the prompt and the prompt <HP> appears. You can now configure the router.

Logging in to the router through Telnet/SSH

To log in to the router through Telnet/SSH:

1. Log in to the router through the console port. Enable the Telnet or SSH function by using the **telnet server enable** or **ssh server enable** command and set user privileges by using the **user privilege level** command.
2. Connect the PC to the interface on the router.
3. Specify an IP address for an interface on the router.

NOTE:

For more information about how to log in to the router through Telnet, see *HP A6600 Routers Configuration Guides*.

Logging in to the router through the AUX port

To log in to the router through the AUX port:

1. After powering on the router, connect the console cable to the console port, and follow these steps to configure the AUX port.

Step	Command
1. Enter system view	system-view
2. Enter AUX user interface view	user-interface aux 0
3. Set the authentication mode	authentication-mode none
4. Set the user privilege level	user privilege level 3

2. Connect the AUX port to the configuration terminal by using the console cable. Then you can log in to the router through the AUX port.

NOTE:

For more information about how to log in to the router through the AUX port, see *HP A6600 Routers Configuration Guides*.

Displaying the initial configuration

After you log in to the router for the first time, use the **display current-configuration** command to display the initial configuration of the router.

```
<HP>display current-configuration
#
 version 5.20, A2605
#
 sysname HP
#
 domain default enable system
#
domain system
 access-limit disable
 state active
 idle-cut disable
 self-service-url disable
#
user-group system
 group-attribute allow-guest
#
interface NULL0
#
interface GigabitEthernet0/0/0
#
interface GigabitEthernet0/0/1
#
interface GigabitEthernet0/0/2
#
interface GigabitEthernet0/0/3
#
interface M-GigabitEthernet0/0/0
#
load xml-configuration
#
user-interface con 0
user-interface aux 0
user-interface vty 0 4
#
```

Configuring basic settings

To configure basic settings for the router:

Step	Command	Remarks
1.	Set the current time and date clock datetime <i>time date</i>	Optional Available in user view

Step	Command	Remarks
2. Enter system view	system-view	Available in user view
3. Enter Ethernet interface view	interface <i>interface-type</i> <i>interface-number</i>	N/A
4. Specify an IP address for the interface	ip address <i>ip-address</i> { <i>mask-length</i> <i>mask</i> } [sub]	By default, no IP address is assigned to any interface.
5. Return to system view	quit	Available in any view
6. Specify a static route	ip route-static <i>dest-address</i> { <i>mask</i> <i>mask-length</i> } { <i>next-hop-address</i> <i>interface-type interface-number</i> [<i>next-hop-address</i>] vpn-instance <i>d-vpn-instance-name</i> <i>next-hop-address</i> } track <i>track-entry-number</i> [preference <i>preference-value</i>] [tag <i>tag-value</i>] [description <i>description-text</i>]	By default, the preference of a static route is 60, tag is 0, and no description is configured. Do not specify the permanent keyword together with the bfd or track keyword.
7. Save the current configuration to the startup configuration file in the root directory of the storage media	save [safely] [backup main] [force]	Available in any view
8. Verify the running configuration	display current-configuration	Available in any view

Replacement procedures

Safety recommendations

1. Always wear an ESD-preventive wrist strap or ESD-preventive gloves when replacing the modules.
2. When operating a pluggable module, such as a FIP module, memory module, CF card, or HIM/MIM, follow these guidelines:
 - Ensure good alignment with the slot to avoid damage to the module during installation or removal.
 - Before removing a module, make sure that the captive screws are completely loosened. Otherwise, the panel of the module may be deformed.
 - Avoid touching any components on the PCB during observing or moving the module.
 - Put the removed module on an antistatic workbench with the PCB side facing upward or place them in antistatic bags.

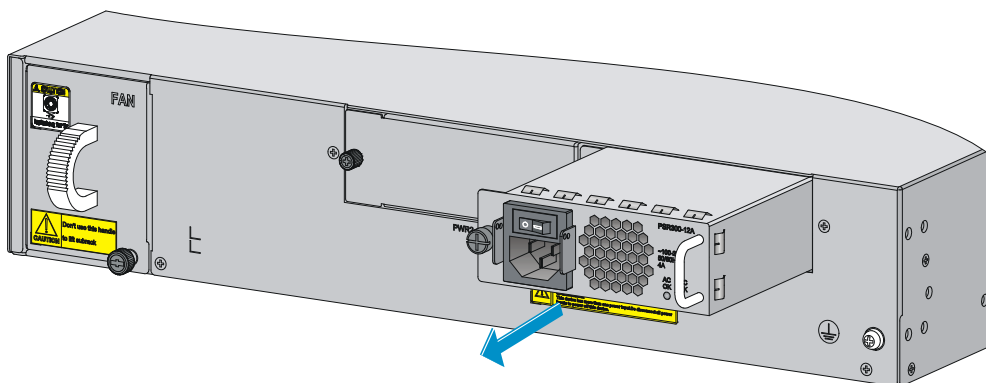
Replacing a power module

The replacement procedure of an AC power module is the same as a DC power module. This section takes an AC power module as an example.

To replace a power module:

1. Use a Philips screwdriver to loosen the captive screws of the power module to be removed until all spring pressure is released.
2. Gently pull the power module out of the slot along the slide rails.

Figure 52 Pulling out the power module



3. Put the removed power module on an antistatic workbench or into an antistatic bag.
4. If you do not install a new power module in the slot, install a blank panel. To install a power module, see “Installing a power module.”

Replacing a FIP module

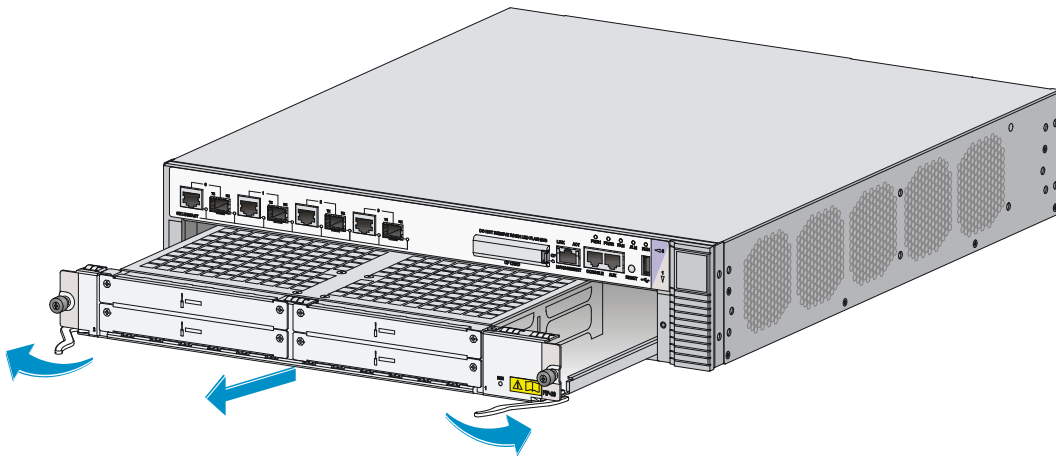
⚠ CAUTION:

When the RUN LED of the FIP module is fast flashing, do not unplug the FIP module.

To replace a FIP module, for example, FIP-20:

1. Determine the FIP module to be removed. This section takes the FIP module in slot 3 as an example.
2. Use a Philips screwdriver to loosen the captive screws of the FIP module to be removed until all spring pressure is released.
3. Holding the ejector levers of the FIP module with both hands, pull the ejector levers outward, and gently pull the FIP module out of the slot along the slide rails.

Figure 53 Pulling the FIP module out of the slot



4. If you do not install a new FIP module in the slot, install a blank panel. To install a new FIP module, see “Installing a FIP module.”

NOTE:

To replace a FIP module when the router is running, perform the **remove slot slot-number** command and then unplug the module.

Replacing a HIM/MIM

NOTE:

To replace a HIM/MIM module when the router is running, perform the **remove slot slot-number** command and then unplug the module.

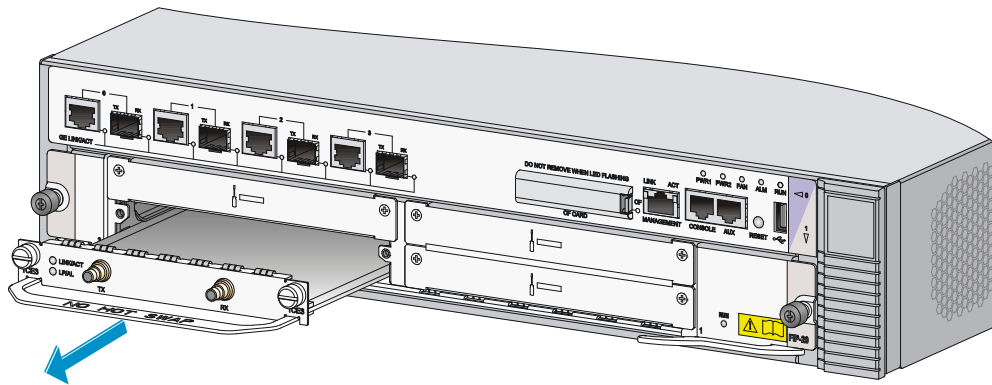
The procedures for replacing HIMs and MIMs are similar. This example replaces a MIM to a FIP-20.

To replace a MIM:

1. Determine the MIM to be removed. Use a flat-blade screwdriver to completely loosen the captive screws of the MIM to be removed.

2. Holding the handle of the MIM, gently pull the MIM out of slot along the slide rails.

Figure 54 Pulling the MIM out of the slot



3. If you do not install a new MIM in the slot, install a blank panel. To install a new MIM, see “Installing a HIM/MIM.”

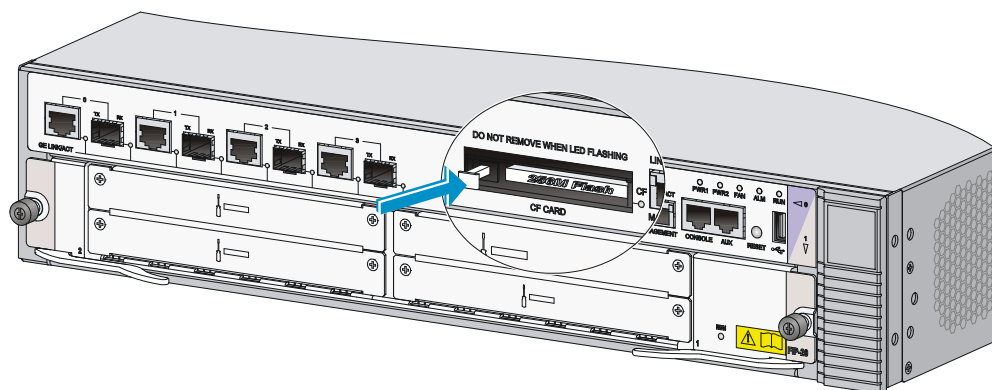
Replacing a CF card

⚠ CAUTION:

- To avoid hardware damage, do not remove the CF card when the router is booting or the CF LED is flashing.
- Before you replace a CF card, open the CF card cover first. For more information, see “Installing a CF card.”

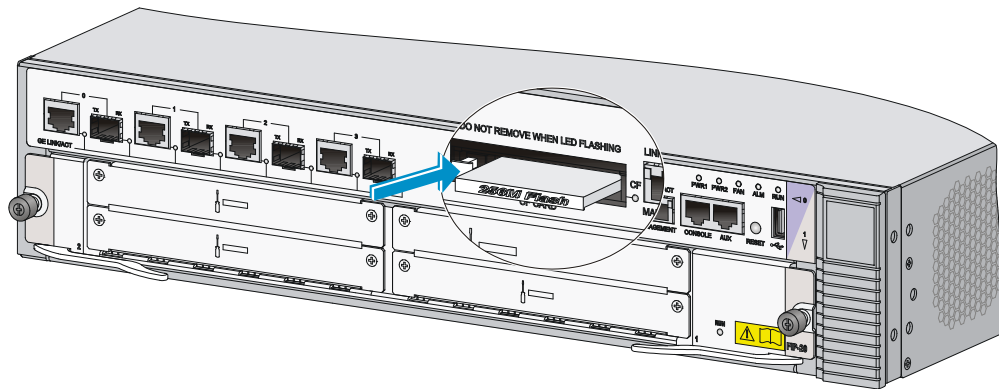
1. Press the ejector button next to the CF card. The ejector button moves outward so that it projects from the panel.

Figure 55 Press the ejector button



2. Press the ejector button again. This ejects the CF card partially out of its slot. Pull the CF card out of its slot.

Figure 56 Pull the CF card



3. To install a new MIM, see “Installing a CF card.”

NOTE:

To protect the CF card, place it into an antistatic bag.

Replacing a transceiver module

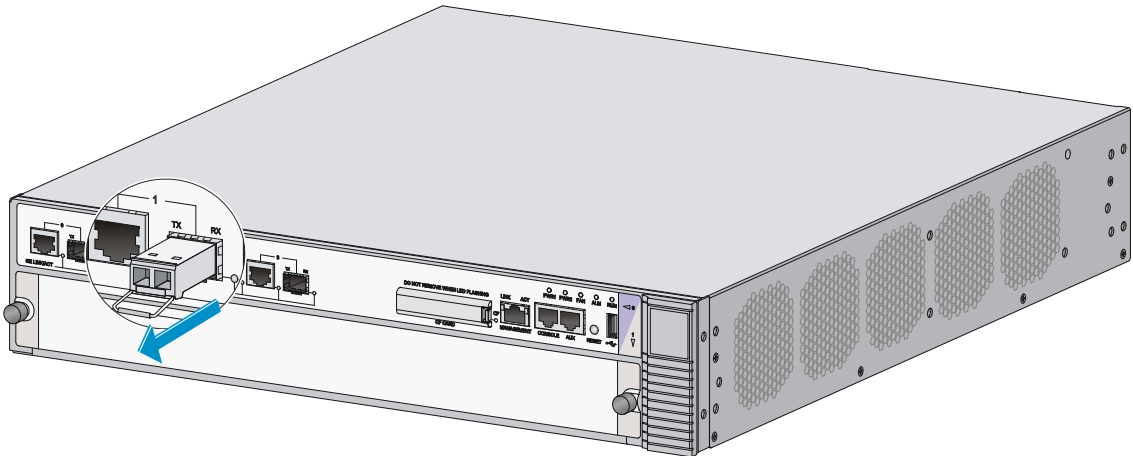
NOTE:

When replacing a transceiver module, make sure that the two transceiver modules connected by the same optical fiber have the same wavelength.

To replace a transceiver module:

1. Remove the optical fibers from the transceiver module.
2. Pivot the clasp down to the horizontal position.
3. Holding the handle of the transceiver module, gently pull the transceiver module out. See [Figure 57](#).
4. Insert the plastic plug to the removed transceiver module, and put the transceiver module into its original shipping materials.
5. If you do not install a new transceiver module in the interface, install a dust-proof plug in the interface. To install a transceiver module, see “[Connecting a fiber cable.](#)”

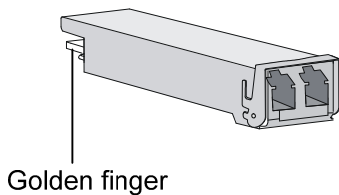
Figure 57 Removing a transceiver module



⚠ WARNING!

- Do not stare into the optical fibers.
- When removing a transceiver module, do not touch the golden finger of the transceiver module.

Figure 58 Transceiver module golden finger



Replacing a fan tray

⚠ WARNING!

Rotating fan blades can cause serious injury or cut. Make sure that all fans have stopped rotating before you take out the entire fan tray.

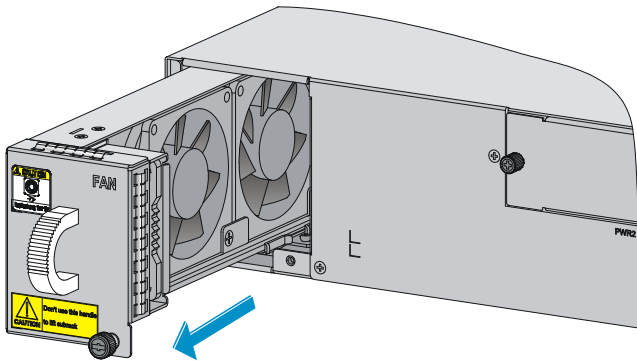
⚠ CAUTION:

Do not operate the system without a fan tray for more than 2 minutes.

To replace a fan tray:

1. Use a Phillips screwdriver to loosen the captive screw on the fan tray.
2. Grasp the handle of the fan tray with one hand and pull the fan tray part way out the slot. Support the fan tray bottom with the other hand, and pull the fan tray slowly along the guide rails out of the slot.

Figure 59 Pulling out the fan tray



3. To install a new fan tray, grasp the handle of the fan tray with one hand and support the fan tray bottom with the other, and slide the fan tray along the guide rails into the slot until the fan tray seats in the slot and has a firm contact with the backplane.
4. Use a Phillips screwdriver to fasten the captive screw on the fan tray.

NOTE:

- Automatic fan speed adjustment and hot-swapping fan trays are supported.
 - Put the removed fan tray in an anti-static bag.
-

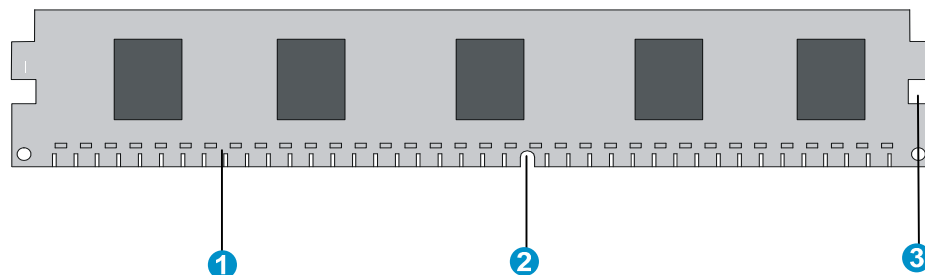
Replacing a memory module

CAUTION:

- Keep the tamper-proof seal on a mounting screw on the chassis cover intact, and if you want to open the chassis, contact the local agent of HP for permission. Otherwise, HP shall not be liable for any consequence caused thereby.
 - Use the memory modules provided by HP only. Otherwise, the router may be unable to operate properly.
 - For the specifications of memory modules supported, see "[Appendix A Chassis views and Technical specifications.](#)"
-

Memory module structure

Figure 60 Memory module structure

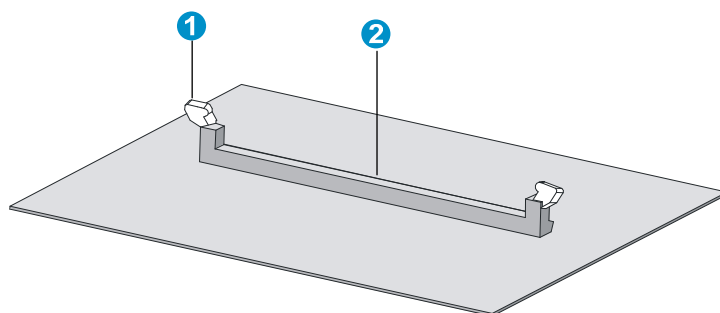


(1) Connector edge

(2) Polarization notch

(3) Latch notch

Figure 61 Memory module slot



(1) Release latch

(2) Memory module slot

When to replace a memory module

Memory modules are removable components of the router.

You need to replace a memory module in the following situations:

- More memory is needed to upgrade the application program.
- The router needs to maintain a large routing table or support other highly memory consuming operations.
- An existing memory module is damaged.

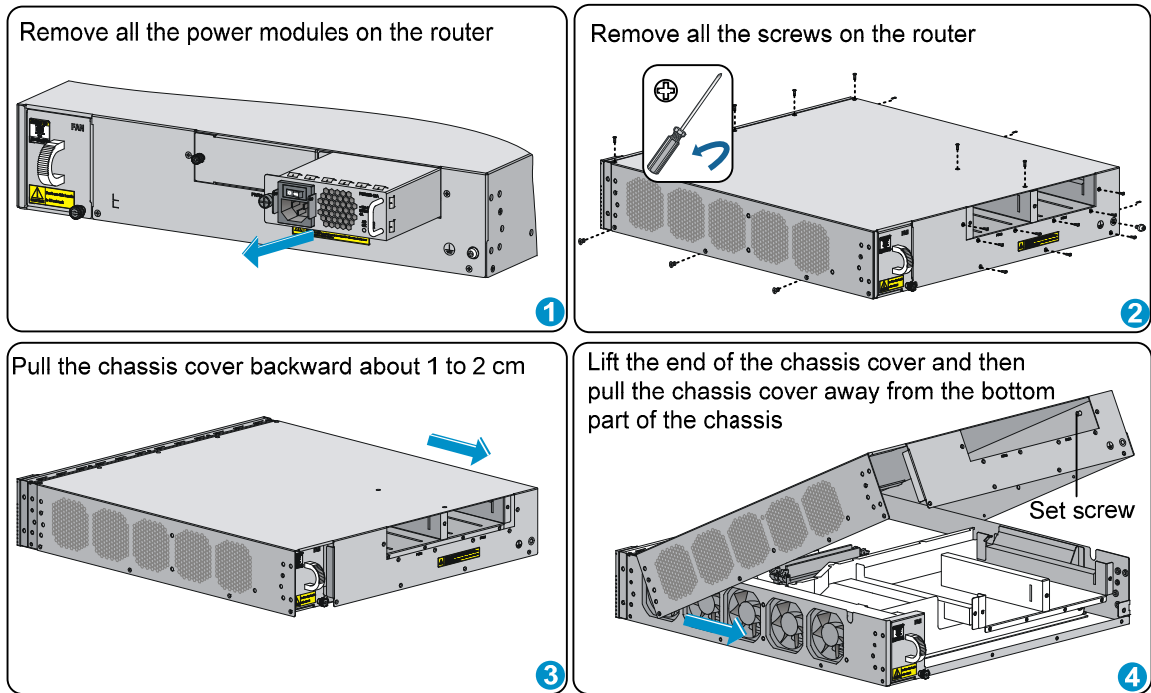
Replacing a memory module

Opening the chassis cover

⚠ CAUTION:

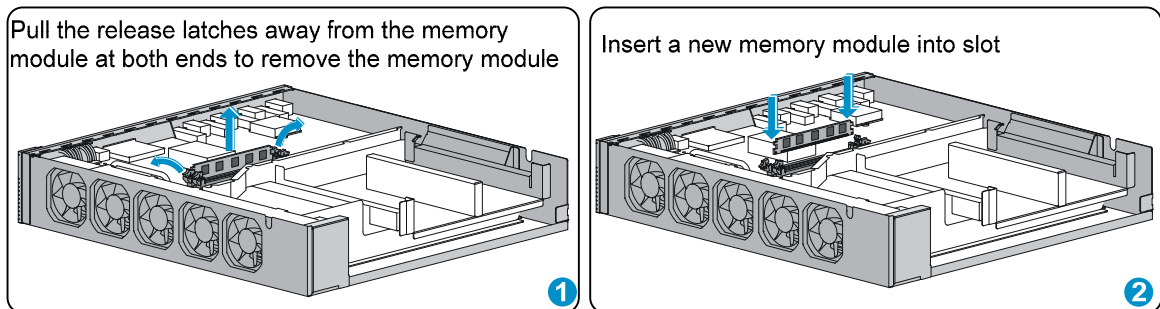
- Screws are available at both sides inside the chassis cover. To avoid damaging the router, do not use excessive force when you pull the chassis cover backward.
- Unplug all cables from the ports and interface modules and remove all the screws (including the grounding screw).

Figure 62 Opening the chassis cover



Replacing a memory module

Figure 63 Replacing a memory module



⚠ CAUTION:

Align the polarization notch of the memory module with the key in the connector when you insert a memory module.

Hardware management and maintenance

NOTE:

The output depends on your router model. For more information about the commands used in this chapter, see the corresponding command references.

Displaying hardware information of the router

Displaying the software and hardware version information of the router

Use the **display version** command to display software and hardware version information of the router. The output includes the following information: the current software version and hardware version, router operating time, type and operating time of each interface module.

```
<Sysname> display version
HP Comware Platform Software
Comware Software, Version 5.20.106, A2701
Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P.
HP HSR6602 uptime is 0 week, 0 day, 0 hour, 1 minute

Slot 0: HSR6602-XG uptime is 0 week, 0 day, 0 hour, 1 minute
CPU type: FREESCALE P4080 1500MHz
4096M bytes DDR3 SDRAM Memory
8M bytes Flash Memory
128K bytes NVRAM
PCB                Version: Ver.A
Basic      Logic Version: 1.0
Extend     Logic Version: 1.0
Basic     BootWare Version: 1.00
Extend    BootWare Version: 1.00
[FIXED  PORT] CON                (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] AUX                (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] MGE 0/0/0          (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] GE 0/0/0           (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] GE 0/0/1           (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] GE 0/0/2           (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] GE 0/0/3           (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] XGE 0/0/0          (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
[FIXED  PORT] XGE 0/0/1          (Hardware)Ver.A,  (Driver)1.0,  (Cpld)145.0
```

Displaying the operational statistics of the router

When you perform routine maintenance or the system fails, you may need to view the operational information of each functional module for locating failures. Generally, you need to run **display** commands one by one. To collect more information one time, you can execute the **display diagnostic-information** command in any view to display or save the operational statistics of multiple functional modules of the router. This command displays the output of the **display clock**, **display version**, **display device**, and **display current-configuration** commands.

- To save the operational statistics of each functional module of the router, type **y** when the system prompts you to save or display the diagnostic information.

```
<Sysname> display diagnostic-information
Save or display diagnostic information (Y=save, N=display)? [Y/N]:y
Please input the file name(*.diag)[flash:/default.diag]:aa.diag
Diagnostic information is outputting to flash:/aa.diag.
Please wait...
Save succeeded.
```

Execute the **more aa.diag** command in user view, and then press the **Page Up** and **Page Down** keys to view the contents of the file **aa.diag**.

- To display the operational statistics of each functional module of the router, type **n** when the system prompts you to save or display the diagnostic information. The output is too much and omitted here.

```
<Sysname> display diagnostic-information
Save or display diagnostic information (Y=save, N=display)? [Y/N]:n
=====
=====running CPU usage information=====
=====
===== Current CPU usage info =====
CPU Usage Stat. Cycle: 23 (Second)
CPU Usage           : 3%
CPU Usage Stat. Time : 2011-12-09 10:36:20
CPU Usage Stat. Tick : 0x2(CPU Tick High) 0x7b652c7(CPU Tick Low)
Actual Stat. Cycle   : 0x0(CPU Tick High) 0x4774e2b8(CPU Tick Low)
...Omitted...
```

Displaying the detailed information about a module

Use the **display device verbose** command to display detailed information of modules in each slot.

```
<Sysname> display device verbose
Slot No.  Board type  Status      Primary  SubSlots
-----
0         HSR6602-XG      Normal     Master   0
1         N/A             Absent     N/A      N/A
```

Use the **display device slot slot-number** command to display detailed information about the module in the specified slot.

```
<Sysname> display device slot 0
Slot 0 :  HSR6602-XG
SubSlot No.  Card Type          Status      Max Ports
-----
```


Table 11 Output description

Field	Description
Slot 0	Interface module model
SubSlot No.	Slot number of the interface module
Card Type	Module model. The value NONE indicates that no module is present in the slot.
Status	Running status of the module: <ul style="list-style-type: none"> • Absent—No module is present in the slot. • Fault—The module in the slot is booting, or the module fails and cannot boot properly. • Normal—The module in the slot is a service module and is operating properly.
Max Ports	Maximum number of interfaces that the module supports.

Displaying the electrical label information of a module

Use the **display device manuinfo** command to display the electrical label information of the module in each slot.

Electrical label information is also called permanent configuration data or archive information, which includes the module name, serial number, MAC address, and vendor name.

```
<Sysname> display device manuinfo
```

```
Slot 0:
```

```
DEVICE_NAME:HSR6602-XG JG354A
DEVICE_SERIAL_NUMBER:CN12FRX123
MAC_ADDRESS:000F-E123-4567
MANUFACTURING_DATE:2012-02-02
VENDOR_NAME:HP
```

```
Slot 1:
```

```
DEVICE_NAME:HP HSR6602-XG FIP-20 Flex Intf Pltfm Rtr Mod JG358A
DEVICE_SERIAL_NUMBER:CN12FS1123
MAC_ADDRESS:NONE
MANUFACTURING_DATE:2012-02-02
VENDOR_NAME:HP
```

Use the **display device manuinfo slot** *slot-number* command to display the electrical label information of the module in the specified slot.

```
<Sysname> display device manuinfo slot 0
```

```
Slot 0:
```

```
DEVICE_NAME:HSR6602-XG JG354A
DEVICE_SERIAL_NUMBER:CN12FRX123
MAC_ADDRESS:000F-E123-4567
MANUFACTURING_DATE:2012-02-02
VENDOR_NAME:HP
```

Table 12 Output description

Field	Description
Slot 0	Router or interface module slot
DEVICE_NAME	Router or module type
DEVICE_SERIAL_NUMBER	Router or module serial number
MAC_ADDRESS	MAC address of the router or interface module: <ul style="list-style-type: none">• An device has a MAC address.• A service module does not have a MAC address, and the field is displayed as NONE.
MANUFACTURING_DATE	Manufacturing data of the router or interface module
VENDOR_NAME	Vendor name
The operation is not supported on the specified board or subslot	Displaying electronic label information by using the display device manuinfo command is not supported.

Displaying the CPU usage of a module

Use the **display cpu-usage** command to display the CPU usage of the module in each slot.

```
<Sysname> display cpu-usage
Slot 0 CPU usage:
    1% in last 5 seconds
    1% in last 1 minute
    1% in last 5 minutes
```

Table 13 Output description

Field	Description
Slot 0 CPU usage	CPU usage of the module in slot 0.
1% in last 5 seconds	Average CPU usage in the last five seconds (after the router boots, the router calculates and records the average usage at the interval of five seconds).
1% in last 1 minute	Average CPU usage in the last minute (after the router boots, the router calculates and records the average usage at the interval of one minute).
1% in last 5 minutes	Average CPU usage in the last five minutes (after the router boots, the router calculates and records the average usage at the interval of five minutes).

Displaying the memory usage of a module

Use the **display memory** command to display the memory information of the device.

```
<Sysname> display memory
System Total Memory(bytes): 3639590560
Total Used Memory(bytes): 369429132
Used Rate: 10%
```

Table 14 Output description

Field	Description
System Total Memory(bytes)	Physical memory size (in bytes) of the module
Total Used Memory(bytes)	Used memory size (in bytes) of the module
Used Rate	Memory usage of the module

Displaying the CF card information

Use the **display device cf-card** command to display the CF card information.

```
<Sysname> display device cf-card
Slot No.      Dev No.      Status      Size(M)
-----
0             0            Normal      495
0             1            Absent      N/A
```

Table 15 Output description

Field	Description
Slot No	Slot number of the CF card
Dev No.	Device number of the CF card: <ul style="list-style-type: none">• 0 for a built-in CF card• 1 for an external CF card
Status:	Operational status of the CF card: <ul style="list-style-type: none">• Absent—No CF card is present in the slot.• Fault—The CF card fails.• Normal—The CF card is operating properly.
Size (M)	Storage capacity of the CF card

Displaying the operational status of the built-in fan

Use the **display fan** command to display the operational status of the built-in fan.

```
<Sysname> display fan
Fan      1 State: Normal
```

Table 16 Output description

Field	Description
Fan 1	Number of the fan
State	The fan state: <ul style="list-style-type: none">• Normal—The fan is operating properly.• Absent—The fan is not in position.• Fault—The fan fails.

Displaying the operational status of power modules

Use the **display power** command to display the operational status of power modules.

```
<Sysname> display power
Power 1 State: Absent
Power 2 State: Normal
```

Table 17 Output description

Field	Description
Power	Number of the power supply
State	The power supply state: <ul style="list-style-type: none">• Normal—The power supply is operating properly.• Absent—The power supply is not in position.• Fault—The power supply fails.

Displaying the alarming thresholds of a module

When the router is operating, too high a temperature and too low a temperature of a module affect the normal operation of the router. When the temperature of a module exceeds 53°C (127.4°F) or drops below -10°C (14°F), the system sends traps to prompt you to solve the problem.

To display the alarming thresholds of a module:

Step	Command	Remarks
1. Enter system view	system-view	N/A
2. (Optional) Display the temperature information of your router	display environment	Available in any view

Configuring a combo interface

Combo interface overview

A combo interface is a logical interface comprising an SFP port of a transceiver module and an RJ-45 Ethernet port. The two ports share one forwarding interface, so they cannot work simultaneously. When you enable either port, the other port is automatically disabled. You can select to activate a port as needed.

Configuration prerequisites

Use the **display interface** *interface-type interface-number* command to find out which port is an SFP port and which port is an RJ-45 Ethernet port.

- If the output includes “Media type is not sure, Port hardware type is No connector”, it means that the port is an SFP port. For example, the following output shows that GigabitEthernet 0/0/2 is an SFP port.

```
[Sysname] display interface GigabitEthernet 0/0/2
```

```

GigabitEthernet0/0/2 current state: DOWN
Line protocol current state: DOWN
Description: GigabitEthernet0/0/2 Interface
The Maximum Transmit Unit is 1500
Internet Address is 51.1.1.1/24 Primary
IP Packet Frame Type: PKTFMT_ETHNT_2, Hardware Address: 000f-e200-0005
IPv6 Packet Frame Type: PKTFMT_ETHNT_2, Hardware Address: 000f-e200-0005
Media type is optical fiber, loopback not set, promiscuous mode not set
1000Mb/s, Full-duplex, link type is autonegotiation
Output flow-control is disabled, input flow-control is disabled
Output queue : (Urgent queuing : Size/Length/Discards) 0/100/0
Output queue : (Protocol queuing : Size/Length/Discards) 0/500/0
Output queue : (FIFO queuing : Size/Length/Discards) 0/1024/0
Last clearing of counters: Never
  Last 5 seconds input rate 0.00 bytes/sec, 0 bits/sec, 0.00 packets/sec
  Last 5 seconds output rate 0.00 bytes/sec, 0 bits/sec, 0.00 packets/sec
  Input: 0 packets, 0 bytes, 0 no buffers
        0 broadcasts, 0 multicasts, 0 pauses
        0 errors, 0 runts, 0 giants
        0 crc, 0 align errors, 0 overruns
        0 dribbles, 0 drops
  Output: 0 packets, 0 bytes
        0 broadcasts, 0 multicasts, 0 pauses
        0 errors, 0 underruns, 0 collisions
        0 deferred, 0 lost carriers

```

- If the output includes “Media type is twisted pair, loopback not set, promiscuous mode not set”, it means that the interface is an RJ-45 Ethernet port. For example, the following output shows that GigabitEthernet 0/0/1 is an RJ-45 Ethernet port.

```

[Sysname] display interface GigabitEthernet 0/0/1
GigabitEthernet0/0/1 current state: DOWN
Line protocol current state: DOWN
Description: GigabitEthernet0/0/1 Interface
The Maximum Transmit Unit is 1500
Internet Address is 66.1.1.1/24 Primary
IP Packet Frame Type: PKTFMT_ETHNT_2, Hardware Address: 000f-e200-0004
IPv6 Packet Frame Type: PKTFMT_ETHNT_2, Hardware Address: 000f-e200-0004
Media type is twisted pair, loopback not set, promiscuous mode not set
1000Mb/s, Full-duplex, link type is autonegotiation
Output flow-control is disabled, input flow-control is disabled
Output queue : (Urgent queuing : Size/Length/Discards) 0/100/0
Output queue : (Protocol queuing : Size/Length/Discards) 0/500/0
Output queue : (FIFO queuing : Size/Length/Discards) 0/1024/0
Last clearing of counters: Never
  Last 5 seconds input rate 0.00 bytes/sec, 0 bits/sec, 0.00 packets/sec
  Last 5 seconds output rate 0.00 bytes/sec, 0 bits/sec, 0.00 packets/sec
  Input: 0 packets, 0 bytes, 0 no buffers
        0 broadcasts, 0 multicasts, 0 pauses
        0 errors, 0 runts, 0 giants

```

```

0 crc, 0 align errors, 0 overruns
0 dribbles, 0 drops
Output: 0 packets, 0 bytes
0 broadcasts, 0 multicasts, 0 pauses
0 errors, 0 underruns, 0 collisions
0 deferred, 0 lost carriers

```

Configuring a combo interface

To configure a combo interface:

Step	Command	Remarks
1. Enter system view	system-view	N/A
2. Enter view of the SFP port or RJ-45 port of the combo interface	interface <i>interface-type</i> <i>interface-number</i>	N/A
3. Activate the RJ-45 Ethernet port or SFP port	combo enable { copper fiber }	Required By default, the Ethernet port is active.

Displaying transceiver module information and alarming information

Introduction to transceiver modules

Table 18 Commonly used transceiver modules

Transceiver module type	Application scenarios	Whether can be an optical transceiver	Whether can be an electrical transceiver
SFP (Small Form-factor Pluggable)	Generally used for 100/1000 Mbps Ethernet ports or POS 155M/622M/2.5G ports	Yes	Yes
XFP (10 Gigabit Small Form Factor Pluggable)	Generally used for 10 Gbps Ethernet ports	Yes	No
SFP+	Generally used for 10 Gbps Ethernet ports	Yes	No

Displaying transceiver module information

To identify transceiver modules, you can use the following command to view the key parameters of the transceiver modules, including transceiver module type, connector type, central wavelength of the laser sent, transmission distance, and vendor name or name of the vendor who customizes the transceiver modules.

To display transceiver module information:

Purpose	Command	Remarks
Display key parameters of the transceiver module in a specified interface	display transceiver interface [<i>interface-type interface-number</i>]	Available for all transceiver modules

Displaying the alarming information or fault detection parameters for a transceiver module

The system outputs alarm information for you to locate and troubleshoot faults of transceiver modules. For the HP-customized transceiver modules, the system can also monitor the key parameters, such as temperature, voltage, laser bias current, TX power, and RX power. When these parameters are abnormal, you can take corresponding measures to prevent transceiver module faults.

To display the alarming information or fault detection parameters of a transceiver module:

Purpose	Command	Remarks
Display the current alarm information of the transceiver module in a specified interface	display transceiver alarm interface [<i>interface-type interface-number</i>]	Available for all transceiver modules

NOTE:

For more information about the transceiver module displaying commands, see *HP A6600 Routers Command References*.

Solving system faults

Solving system faults

When the system detects faults (such as system instruction faults, invalid addresses, data overflow, null pointers, and division by zero operations) during the operation of the active device or standby device, you can solve the problem in one of the following methods:

- **Reboot**—Rebooting the failed device so that the device restores to normal operational status.
- **Maintain**—Maintaining the current status of the failed device so that the system does not take any restoration measures. Some software faults are hard to reproduce, and the printed information will be lost after the router reboots. In this case, you can maintain the current status of the router, facilitating fault location.

To solve system faults:

Step	Command	Remarks
1. Enter system view	system-view	N/A
2. (Optional)Specify the system fault solving method for the active device and standby device	system-failure { maintain reboot }	The default method is reboot .

Viewing the system fault solving method

Use the **display system-failure** command to display the system fault solving method.

```
<Sysname> display system-failure  
System failure handling method: reboot
```

Saving the current configuration of the router

You can save the current configuration of the router in one of the following methods:

- **Fast saving**—Executing the **save** command without the **safely** keyword. This mode saves the file more quickly but is likely to lose the existing configuration file if the router reboots or the power fails during the process. The fast saving mode is suitable for environments where the power supply is stable.
- **Safe saving**—Executing the **save** command with the **safely** keyword. The mode saves the file more slowly but can retain the configuration file in the router even if the router reboots or the power fails during the process. The safe saving mode is preferred in environments where a stable power supply is unavailable or remote maintenance is involved.

Table 19 To save the current configuration of the router:

Purpose	Command	Remarks
Save the current configuration to the specified file, but the configuration file will not be set as the file for the next startup	save <i>file-url</i>	Use either command
Save the current configuration to the root directory of the storage medium of the active or standby device and specify the file as the startup configuration file that will be used at the next system startup	save [safely]	Available in any view

NOTE:

- The configuration file must be with extension `.cfg`.
- During the execution of the save command, the startup configuration file to be used at the next system startup may be lost if the router reboots or the power supply fails. In this case, the router will boot with the factory defaults, and after the router reboots, you need to re-specify a startup configuration file for the next system startup.

Rebooting the router

When upgrading and maintaining the startup configuration file or configuration file for the router, you need to reboot the router. To reboot a router, use one of the following methods:

- Use the **reboot** command to reboot a router.
- Enable the scheduled reboot function at the CLI. You can set a time at which the router can automatically reboot, or set a delay so that the router can automatically reboot within the delay.
- Power on the router after powering it off, which is also called hard reboot or cold start. Powering off a running router causes data loss and hardware damages, and therefore is not recommended.
- Use the RESET button.

To reboot the router immediately:

Purpose	Command	Remarks
Reboot the router immediately	reboot	Required Available in user view

To enable the scheduled reboot function:

Purpose	Command	Remarks
Enable the scheduled reboot function and specify a specific reboot time and date	schedule reboot at <i>hh:mm</i> [<i>date</i>]	Use either command The scheduled reboot function is disabled by default.
Enable the scheduled reboot function and specify a reboot waiting time	schedule reboot delay { <i>hh:mm</i> <i>mm</i> }	Available in user view

 **CAUTION:**

- If the main system software image file does not exist, do not use the **reboot** command to reboot the router. Specify the main system software image file first, and then reboot the router.
- The precision of the rebooting timer is 1 minute. One minute before the rebooting time, the router prompts "REBOOT IN ONE MINUTE" and reboots in one minute.
- If you are performing file operations when the router is to be rebooted, the system does not execute the reboot command for security.
- The router does not save the current configuration when you press the RESET button to reboot the router.
- To avoid system damage, do not press the RESET button repeatedly when the RUN LED is fast flashing.

Troubleshooting

NOTE:

The barcode stuck on the router chassis contains production and servicing information. Before you return a faulty router for servicing, provide the barcode information of the router to your local sales agent.

Router failures

Power status LEDs are off

When the PWR1 and PWR2 LEDs are off, the power module of the router is faulty. For more information about the PWR1 and PWR2 LEDs, see [“Appendix B LEDs.”](#)

To troubleshoot the problem:

1. Check whether a power module is plugged in a right slot.
2. Check whether the power module is powered on normally. A green PWR LED indicates that the router is powered on properly.
3. If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

RUN LED is off

When the RUN LED of the router is off, it indicates that the router is faulty. For more information about the RUN LED, see [“Appendix B LEDs.”](#)

To troubleshoot the problem, contact your local sales agent.

RUN LED fast flashes

Five minutes after the router is powered on, if the RUN LED still fast flashes at 8 Hz, it indicates that the system software image fails to start or the router is faulty.

To troubleshoot the problem:

1. Check whether the terminal display is correct.
2. Check whether the system software image file properties are correct in the BootWare menu.
3. If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

ALM LED is steady on or flashes

If the ALM LED is steady on or flashes, it indicates that the router is faulty. The ALM LED may be on in the following cases.

- When the system is over-temperature. In this case, the system displays the following output:

```
%Dec 7 11:17:01:436 2011 HP DRVMSG/3/TEMP_ALARM:
```

```
CPU temperature is greater than alarm upper limit in slot 0, index is 0.
```

To solve the problem, check the output (such as the system temperature, insufficient available power, and PCB voltage alarms) on the serial terminal and the software management tool.

If the cause cannot be located in the steps above and the problem persists, record the above information, and contact your local sales agent.

Table 20 Router status LED description

LED	Status	Remarks
PWR1 (red/green)	Off	The power module is not in position.
	Steady green	The power module is supplying power properly.
	Steady red	No power is input or the power module is faulty when PWR2 is operating properly.
PWR2 (red/green)	Off	The power module is not in position.
	Steady green	The power module is supplying power properly.
	Steady red	No power is input or the power module is faulty when PWR1 is operating properly.
FAN (red/green)	Off	No power is input or the fan tray is not is position.
	Steady green	The fan tray is operating properly.
	Steady red	The fan tray is faulty.
ALM (red)	Steady on	No alarm exists.
	Off	The router is faulty. You need to view the system logs immediately.
RUN (green)	Off	No power is input or the router is faulty.
	Flashes at 1 Hz	The router is operating properly.
	Flashes at 8 Hz	The router is loading software or has not started.

FIP module failure

If the RUN LED of the FIP module is off, it indicates that the FIP module is powered off or faulty.

To troubleshoot the FIP module failure:

1. Check whether the router is powered on.
2. If the router is powered on, check whether the FIP module is plugged in a right slot.
3. If the FIP module is plugged in a right slot, it indicates that the FIP module is faulty. Contact your local sales agent.

Power module failures

If the router cannot be powered on and the power LED on the front panel is off, it indicates that the power module is faulty.

To troubleshoot the power module failure:

1. Check whether the power switch is turned on.
2. Check whether the power cables of the router are firmly connected.
3. Check whether the switch of the power source is turned on.
4. Check whether the power cord is damaged.
5. If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

Table 21 AC power module LED description

LED	Status	Description
AC OK	Off	No power is input, or the power supply is faulty.
	Steady green	The power supply is working properly.
DC OK	Off	No power is input.
	Steady green	The power supply is working properly.

Table 22 DC power module LED description

LED	Status	Description
Input	Off	No power is input, or the power supply is faulty.
	Steady green	The power supply is working properly.
Output	Off	No power is input.
	Steady green	The power supply is working properly.

Fan failures

Fan tray is absent

After the router is booted, the following information may appear on the configuration terminal:

```
#Dec 9 09:57:12:560 2011 HP DEVM/1/FAN STATE CHANGES TO FAILURE:  
Trap 1.3.6.1.4.1.25506.8.35.12.1.6: fan ID is 1
```

```
%Dec 9 09:57:12:560 2011 HP DEVM/3/FAN_ABSENT: Fan 1 is absent.
```

The output indicates that the fan tray is not in position.

To troubleshoot the fan tray failure:

1. Check whether the fan tray is in position.
2. Check whether the fan tray is in firm contact with the backplane of the router chassis.
3. If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

ALM LED is red

When the router is running, the ALM LED on the fan tray panel may turn red, and the following information may appear on the configuration terminal:

```
%Dec 6 17:13:56:447 2011 HP DEVM/5/FAN_RECOVERED: Fan 1 recovered.  
%Dec 6 17:13:58:158 2011 HP DRVMSG/3/FanErr: Fan 1 Error.  
#Dec 6 17:13:58:847 2011 HP DEVM/1/FAN STATE CHANGES TO FAILURE:  
Trap 1.3.6.1.4.1.25506.8.35.12.1.6: fan ID is 1
```

```
%Dec 6 17:13:58:847 2011 HP DEVM/2/FAN_FAILED: Fan 1 failed.
```

The output shows that fan 1 is faulty.

To solve the problem, check whether any foreign object has entered the fan tray.

If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

HIM/MIM failures

When a HIM/MIM is plugged while the router is running, the following information may appear on the configuration terminal:

```
%Dec 30 09:54:10:264 2011 66mcp DRVICOUT/1/DrvIcOutStr:  
Card in Slot 4 Sublot 2 can not be recognized !
```

The output indicates that the HIM/MIM is faulty or the router cannot recognize the HIM/MIM.

To troubleshoot the HIM/MIM failure:

1. Check whether the HIM/MIM is firmly seated.
2. Check whether the HIM is correctly plugged into an FIP-20 module. An FIP-10 module does not support HIMs.
3. Check whether the interface module connector pins of the FIP module are bent.
4. If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

Configuration system problems

If the configuration environment setup is correct, the configuration terminal displays boot information when the router is powered on. If the setup is incorrect, the configuration terminal displays nothing or garbled text.

No terminal display

If the configuration terminal displays nothing when the router is powered on, To troubleshoot the failure:

1. Check the following items.
 - The power supply system works properly.
 - The console cable is properly connected.

2. If no problem is found, check the following reasons that may apply:
 - The console cable is connected to an incorrect serial port (the serial port in use is not the one set on the terminal).
 - The properties of the terminal are incorrect. You must configure the console terminal as follows: set **Bits per second** to **9600**, **Data bits** to **8**, **Parity** to **None**, **Stop bits** to **1**, **Flow control** to **None**, and **Terminal Emulation** to **VT100**.
 - The console cable fails.
3. If the cause cannot be located in the steps above and the problem persists, contact your local sales agent.

Garbled terminal display

If terminal display is garbled, To solve this problem:

1. Make sure that the **Data bits** field is set to 8 for the console terminal. If the **Data bits** field is set to 5 or 6, the console terminal will display garbled characters.
2. Make sure that the **Bits per second** field is set to 9600 kbps. An incorrect bits per second may also cause the configuration terminal to display garbled characters.

No response from the serial port

If the serial port gives no response, check that the serial port settings are correct.

NOTE:

For more information about the serial port settings, see "[Setting terminal parameters.](#)"

Dealing with password loss

△ CAUTION:

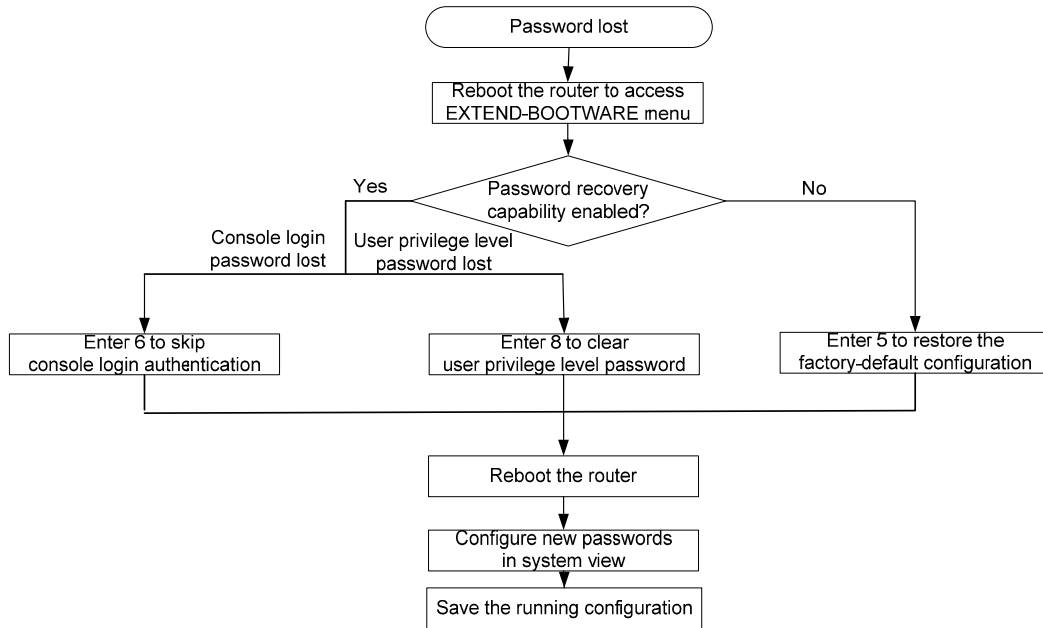
Dealing with console login password loss and user privilege level password loss from BootWare menus is disruptive.

How to deal with console login password loss and user privilege level password loss depends on the state of password recovery capability (see [Figure 64](#)). Password recovery capability controls console user access to the device configuration and SDRAM from BootWare menus.

- If password recovery capability is enabled, a console user can access the device configuration without authentication and configure new passwords.
- If password recovery capability is disabled, a console user must restore the factory-default configuration before configuring new passwords. Restoring the factory-default configuration deletes the main and backup next-startup configuration files.

To enhance system security, disable password recovery capability.

Figure 64 Dealing with password loss



Examining the state of password recovery capability

1. Reboot the router.

System is starting...

Press Ctrl+D to access BASIC-BOOTWARE MENU

Press Ctrl+T to start memory test

Booting Normal Extend BootWare.....

The Extend BootWare is self-decompressing.....Done!

```

*****
*
*           HP Router BootWare, Version 1.04           *
*
*****
  
```

Copyright (c) 2010-2012 Hewlett-Packard Development Company, L.P.

```

Compiled Date       : Dec 26 2012
CPU Type           : P2020
CPU L1 Cache       : 32KB
CPU Clock Speed    : 1000MHz
Memory Type        : DDR3 SDRAM
Memory Size        : 4096MB
Memory Speed       : 667MHz
Flash Size         : 8MB
cfa0 Size          : 999MB
NVRAM Size         : 128KB
BASIC CPLD Version : 1.0
EXTEND CPLD Version : 1.0
  
```

PCB Version : Ver.B

BootWare Validating...

Backup Extend BootWare is newer than Normal Extend BootWare,Update? [Y/N]

Press Ctrl+B to enter extended boot menu...

2. Press **Ctrl + B** within three seconds after the "Press Ctrl+B to enter extended boot menu..." prompt message appears.

BootWare password: Not required. Please press Enter to continue.

3. Press **Enter** and read the password recovery capability state message displayed before the EXTEND-BOOTWARE menu.

Password recovery capability is enabled.

Note: The current operating device is cfa0

Enter < Storage Device Operation > to select device.

=====**<EXTEND-BOOTWARE MENU>**=====

```
|<1> Boot System |
|<2> Enter Serial SubMenu |
|<3> Enter Ethernet SubMenu |
|<4> File Control |
|<5> Restore to Factory Default Configuration |
|<6> Skip Current System Configuration |
|<7> BootWare Operation Menu |
|<8> Clear Super Password |
|<9> Storage Device Operation |
|<0> Reboot |
```

=====**<EXTEND-BOOTWARE MENU>**=====

Ctrl+Z: Access EXTEND-ASSISTANT MENU

Ctrl+F: Format File System

Enter your choice(0-9):

Dealing with console login password loss when password recovery capability is enabled

1. Reboot the router to access the EXTEND-BOOTWARE menu, and then enter **6**.

The current mode is password recovery.

Note: The current operating device is cfa0

Enter < Storage Device Operation > to select device.

=====**<EXTEND-BOOTWARE MENU>**=====

```
|<1> Boot System |
|<2> Enter Serial SubMenu |
|<3> Enter Ethernet SubMenu |
|<4> File Control |
|<5> Restore to Factory Default Configuration |
|<6> Skip Current System Configuration |
|<7> BootWare Operation Menu |
```



```

|<8> Clear Super Password
|<9> Storage Device Operation
|<0> Reboot
=====
Ctrl+Z: Access EXTEND-ASSISTANT MENU
Ctrl+F: Format File System
Enter your choice(0-9): 6

```

After the configuration skipping flag is set successfully, the following message appears:
Flag Set Success.

2. When the EXTEND-BOOTWARE menu appears again, enter **0** to reboot the router.

The router starts up with empty configuration.

3. To use the configuration in the next-startup configuration file, load the file in system view.

```

<HP> system-view
[HP] configuration replace file startup.cfg
Current configuration will be lost, save current configuration? [Y/N]:n
Info: Now replacing the current configuration. Please wait...
Info: Succeeded in replacing current configuration with the file startup.cfg.

```

4. Configure a new console login password.

In the following example, the console login authentication mode is password and the authentication password is 123456. For security, the password is always saved in ciphertext to the configuration file, regardless of whether you specify the **simple** keyword or **cipher** keyword for the **set authentication password** command.

```

<HP> system-view
[HP] user-interface console 0
[HP-ui-console0] authentication-mode password
[HP-ui-console0] set authentication password cipher 123456

```

5. To make the settings take effect after a reboot, save the running configuration to the next-startup configuration file.

```
[HP] save
```

Dealing with user privilege level password loss when password recovery capability is enabled

1. Reboot the router to access the EXTEND-BOOTWARE menu, and then enter **8**.

The current mode is password recovery.

Note: The current operating device is cfa0

Enter < Storage Device Operation > to select device.

```

=====<EXTEND-BOOTWARE MENU>=====
|<1> Boot System
|<2> Enter Serial SubMenu
|<3> Enter Ethernet SubMenu
|<4> File Control
|<5> Restore to Factory Default Configuration
|<6> Skip Current System Configuration
|<7> BootWare Operation Menu

```

```

|<8> Clear Super Password
|<9> Storage Device Operation
|<0> Reboot
=====
Ctrl+Z: Access EXTEND-ASSISTANT MENU
Ctrl+F: Format File System
Enter your choice(0-9): 8

```

The router deletes the user privilege level password configuration commands from the main next-startup configuration file. After the operation is completed, the following message appears:

```
Clear Super Password Success!
```

2. When the EXTEND-BOOTWARE menu appears again, enter **0** to reboot the router.

The router starts up with the main next-startup configuration file.

3. Configure new passwords for user privilege levels.

In the following example, the password 123456 is configured for user privilege level 3. For security, the password is always saved in ciphertext to the configuration file, regardless of whether you specify the **simple** keyword or **cipher** keyword for the **super password** command.

```

<HP> system-view
[HP] super password cipher 123456

```

4. To make the setting take effect after a reboot, save the running configuration to the next-startup configuration file.

```
[HP] save
```

Dealing with password loss when password recovery capability is disabled

1. Reboot the router to access the EXTEND-BOOTWARE menu, and enter **5**.

The current mode is no password recovery.

Note: The current operating device is cfa0

Enter < Storage Device Operation > to select device.

```

=====
|<1> Boot System
|<2> Enter Serial SubMenu
|<3> Enter Ethernet SubMenu
|<4> File Control
|<5> Restore to Factory Default Configuration
|<6> Skip Current System Configuration
|<7> BootWare Operation Menu
|<8> Clear Super Password
|<9> Storage Device Operation
|<0> Reboot
=====
Ctrl+Z: Access EXTEND-ASSISTANT MENU
Ctrl+F: Format File System
Enter your choice(0-9): 5

```

2. At the prompt for confirmation, enter **Y**.

The router deletes its main and backup next-startup configuration files and restores the factory-default configuration.

```
The current mode is no password recovery. The configuration files will be
deleted, and the system will start up with factory defaults, Are you sure to
continue?[Y/N]Y
Setting...Done.
```

3. When the EXTEND-BOOTWARE menu appears again, enter **0** to reboot the router.

The router starts up with the factory-default configuration.

4. Configure a new console login password (see "[Configure a new console login password.](#)") or new user privilege level passwords (see "[Configure new passwords for user privilege levels.](#)").
5. To make the settings take effect after a reboot, save the running configuration to the next-startup configuration file.

```
[HP] save
```

Cooling system failure

When the environmental temperature of a module reaches or exceeds the high temperature threshold, the fans rotate at full speed, and the following information appears on the configuration terminal:

```
%Dec 7 11:49:16:436 2011 HP DRVMSG/3/TEMP_WARNING:
```

```
Environment temperature is greater than warning upper limit in slot 0, index is 1.
```

```
#Dec 7 11:49:20:444 2011 HP DEVM/1/BOARD TEMPERATURE UPPER:
```

```
Trap 1.3.6.1.4.1.25506.8.35.12.1.16: chassisIndex is 0, slotIndex 0.0
```

```
%Dec 7 11:49:20:444 2011 HP DEVM/4/BOARD_TEMP_TOOHIGH: Board temperature is too high on
Chassis 0 Slot 0, type is HSR6602-XG.
```

After the router runs for a period of time, the environmental temperature of the router will drop below the high temperature threshold, and the following information appears on the configuration terminal:

```
%Dec 7 11:50:11:436 2011 HP DRVMSG/3/TEMP_NOWARNING:
```

```
Environment temperature recovered from TEMP_WARNING in Slot 0, index is 1.
```

```
%Dec 7 11:50:11:436 2011 HP DRVMSG/3/TEMP_SYSNOWARNING:
```

```
System temperature recovered from TEMP_WARNING.
```

```
#Dec 7 11:50:13:244 2011 HP DEVM/1/BOARD TEMPERATURE NORMAL:
```

```
Trap 1.3.6.1.4.1.25506.8.35.12.1.17: chassisIndex is 0, slotIndex 0.0
```

```
%Dec 7 11:50:13:244 2011 HP DEVM/5/BOARD_TEMP_NORMAL: Board temperature changes to normal
on Chassis 0 Slot 0, type is HSR6602-XG.
```

When the environmental or CPU temperature of a module exceeds the critical temperature threshold, the ALM LED of the router is red.

```
%Dec 7 11:17:01:436 2011 HP DRVMSG/3/TEMP_ALARM:
```

```
CPU temperature is greater than alarm upper limit in slot 0, index is 0.
```

To view the high temperature threshold and critical temperature threshold of each module, use the **display environment** command.

To troubleshoot the cooling system failure:

1. Check whether the fans are running properly.
2. Check whether the working environment of the module is well ventilated.
3. Use the **display environment** command to check whether the temperature in the module keeps rising.
4. If the temperature inside the module still reaches the critical temperature threshold, power off the router immediately and contact your local sales agent.

NOTE:

For more information about the **display environment** command, see *HP A6600 Routers Command References*.

Interface module, cable, and connection failure

After an HIM/MIM is installed and the router is powered on, the LEDs on the HIM/MIM panel may indicate abnormal operation.

To solve this problem:

1. Check whether the HIM/MIM cable is correctly selected.
2. Check whether the HIM/MIM cable is correctly connected.
3. Use the **display** command to check whether the interface of the interface module has been correctly configured and is working properly.

Software upgrade failures

No response from the serial port

The serial port gives no response.

To solve the problem, check whether the serial port settings are correct (whether the **Bits per second** field is set to 9600 kbps).

NOTE:

For more information about the serial port settings, see "[Setting terminal parameters.](#)"

TFTP upgrade failure

Start the router, and upgrade the software through TFTP. The following problems may occur:

1. The CF card has no enough space.

```
File will be transferred in binary mode
```

```
Downloading file from remote TFTP server, please wait...\
```

```
Failed to write data into storage device, maybe no enough space on device
```

To solve this problem, delete some files in the CF card or use a new CF card so that enough space is available for the application program.

2. The file to be downloaded is not found.

```
File will be transferred in binary mode
```

```
Downloading file from remote TFTP server, please wait...
File not found.
```

To solve this problem, type the correct file name.

3. The configuration of the network port is incorrect.

```
Can't connect to the remote host
```

To solve this problem, configure the network port correctly, and make sure that the network port is up and you can successfully ping the TFTP server from the network port.

NOTE:

The barcode stuck on the router chassis contains production and servicing information. Before you return a faulty router for servicing, provide the barcode information of the router to your local sales agent.

FTP upgrade failure

Start the router, and upgrade the software through FTP. The following problems may occur:

1. The CF card has no enough space.

```
227 Entering Passive Mode (192,168,1,10,10,204)
150 "xxx" file ready to send (xxx bytes) in ASCII mode
FTP: Error Writing Local File(Screen).
```

To solve this problem, delete some files in the CF card or use a new CF card so that enough space is available for the application program.

2. The file to be downloaded is not found.

```
227 Entering Passive Mode (192,168,1,10,10,203)
550 Error: File xxx does not exist
FTP: Error Writing Local File(Screen).
```

To solve this problem, type the correct file name.

3. The configuration of the network port is incorrect.

```
FTP: Unrecognized host or wrong IP address!
```

To solve this problem, configure the network port correctly, and make sure that the network port is up and you can successfully ping the FTP server from the network port.

Application file missing errors

When none of the main, backup, and secure application files exists, the system displays the following information at startup:

```
BootWare Validating...
Application program does not exist.
Please input BootWare password:
```

If you select **1** on the main BootWare menu, the system displays the following information:

```
Starting to get the main application file--cfa0:/main.bin!
The main application file does not exist--cfa0:/main.bin!
Starting to get the backup application file--cfa0:/backup.bin!
The backup application file does not exist--cfa0:/backup.bin!
Starting to get the secure application file--cfa0:/secure.bin!
The secure application file does not exist--cfa0:/secure.bin!
```

Booting App fails!

The name of the main, backup, and secure application files vary by user settings.

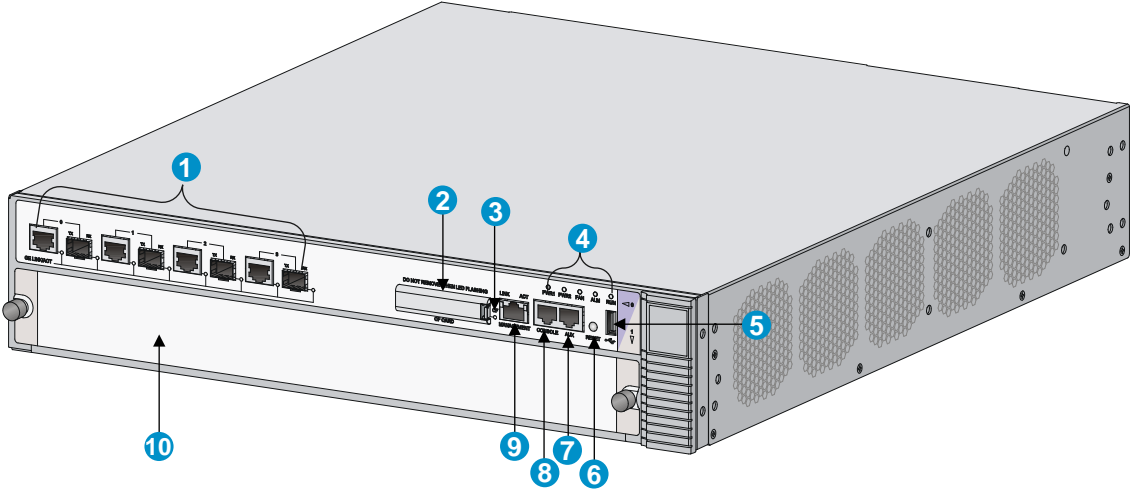
A possible reason for the errors is that the main, backup, and secure application files have been deleted or damaged.

To solve this problem, download the application package again or set the file properties in the BootWare file list.

Appendix A Chassis views and Technical specifications

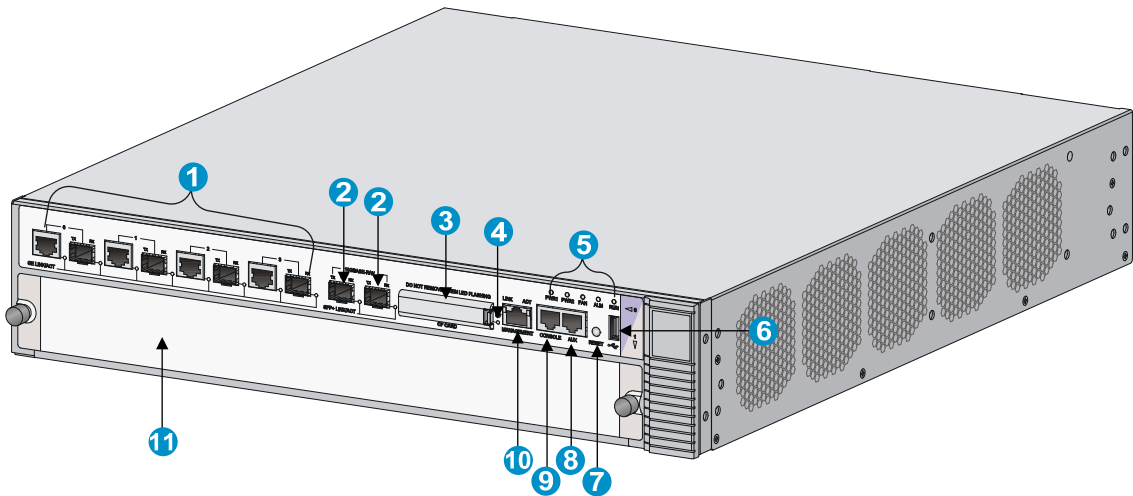
Chassis views

Figure 65 HSR6602-G/HSR6602-G TAA front view



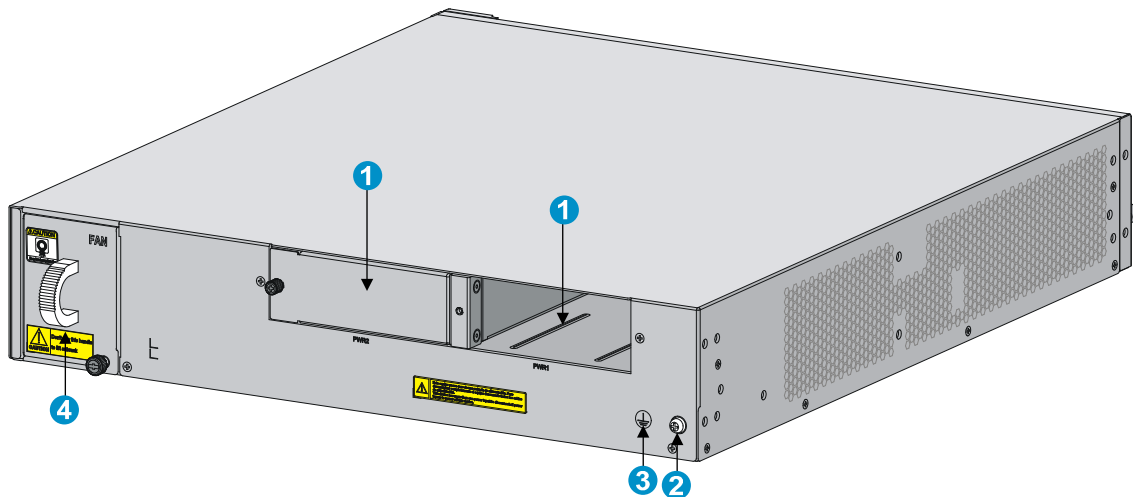
(1) 1000 Mbps Ethernet port	(2) CF card slot (CF CARD)	(3) CF card LED	(4) Status LED
(5) USB port	(6) Reset button (RESET)	(7) Auxiliary port (AUX)	
(8) Console port (CONSOLE)	(9) Management Ethernet port (MANAGEMENT)	(10) FIP slot (slot 1)	

Figure 66 HSR6602-XG/HSR6602-XG TAA front view



(1) 1000 Mbps Ethernet port	(2) 10 Gbps Ethernet port	(3) CF card slot (CF CARD)
(4) CF card LED	(5) Status LED	(6) USB port
(7) Reset button (RESET)	(8) Auxiliary port (AUX)	(9) Console port (CONSOLE)
(10) Management Ethernet port (MANAGEMENT)	(11) FIP slot (slot 1)	

Figure 67 HSR6600 rear view



(1) Power module slots (PWR1, PWR2)	(2) Grounding screw
(3) Grounding sign	(4) Fan tray

Dimensions and weights

Table 23 Dimensions and weight

Item	Dimensions (H x W x D)	Weight
Chassis	88 x 440 x 480 mm (3.46 x 17.32 x 18.90 in)	12.1 kg (26.68 lb)
FIP module	45 x 399 x 412 mm (1.77 x 15.71 x 16.22 in)	3 kg (6.61 lb)

Item	Dimensions (H × W × D)	Weight
Power module	40 × 114 × 235 mm (1.57 × 4.49 × 9.25 in)	1.15 kg (2.54 lb)
Fan tray	84 × 61 × 459 mm (3.31 × 2.40 × 18.07 in)	0.85 kg (1.87 lb)

Storage media

Table 24 Storage media specifications

Item	Specification
Flash	8 MB
FIP module	DDR3 SDRAM <ul style="list-style-type: none"> • HSR6602-G/HSR6602-G TAA—2 GB (default), 4 GB (maximum) • HSR6602-XG/HSR6602-XG TAA—4 GB (default), 4 GB (maximum)
CF card	<ul style="list-style-type: none"> • Built-in—512 MB (default) • External—1 GB (maximum)

Power consumption

Table 25 Power consumption

Item	Specification
System power consumption	<ul style="list-style-type: none"> • HSR6602-G/HSR6602-G TAA—160 W • HSR6602-XG/HSR6602-XG TAA—160 W
Card power consumption	<ul style="list-style-type: none"> • FIP-10—33 W • FIP-20—65 W
Fan tray power consumption	30 W
Interface module power consumption	See <i>HP 6600/HSR6600/HSR6800 Router Series Interface Module Guide</i> .

Power module

Each HP HSR6600 router provides two power module slots, PWR1 and PWR2 on its rear panel, and is shipped with a filler panel on PWR2. You can install one or two power modules for the router as needed.

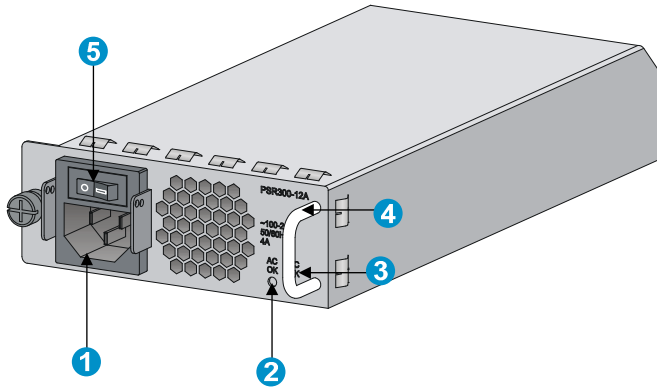
NOTE:

- No power modules are supplied with the router. Purchase them yourself.
- The router does not support intermixing of AC and DC power modules.

AC power module

The supported AC power module is PSR300-12A, which provides a maximum output power of 300 W.

Figure 68 AC power module appearance



(1) AC-input power receptacle	(2) Power input status LED
(3) Power output status LED	(4) Handle
(5) Power switch	

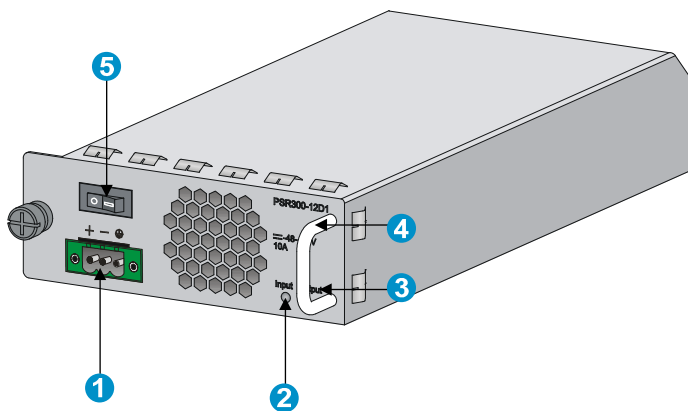
Table 26 AC power module specifications

Item	Specification
Model	PSR300-12A
Rated voltage range	100 VAC to 240 VAC; 50 Hz or 60 Hz
Maximum input current	4 A
Maximum power	300 W

DC power module

The supported DC power module is PSR300-12D1, which provides a maximum output power of 300 W.

Figure 69 DC power module appearance



(1) DC-input terminal block	(2) Power input status LED
(3) Power output status LED	(4) Handle
(5) Power switch	

Table 27 DC power module specifications

Item	Specification
Model	PSR300-12D1
Rated voltage range	-60 VDC to -48 VDC
Maximum input current	10 A
Maximum power	300 W

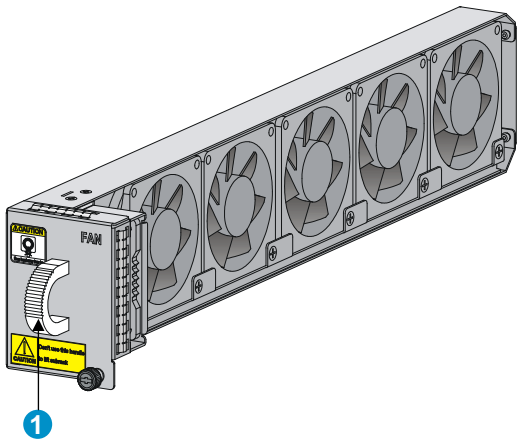
Fan tray

Each HP HSR6600 router provides a fan tray slot on its rear panel. You can install a fan tray for heat dissipation.

NOTE:

The fan tray is supplied with the router.

Figure 70 Fan tray



(1) Handle

Table 28 Fan tray specifications

Item	Specification
Model	RT-FANF
Automatic speed adjustment	Supported
Fool-proof design	Supported
Hot swapping	Supported
Noise level	55dBA to 65dBA
Heat dissipation	102 BTU

Port specifications

Ports and slots

Table 29 Port and slot specifications

Item	Description
Console port	1
AUX port	1
USB port	1
Ethernet port	<ul style="list-style-type: none">• HSR6602-G/HSR6602-G TAA—Four GE combo interfaces• HSR6602-XG/HSR6602-XG TAA—Four combo interfaces and two 10 GE ports
CF card slot	1
Interface module slot	1, supports FIP-10/20

Console port

Table 30 Console port specifications

Item	Specification
Connector	RJ-45
Standard compliant	Asynchronous EIA/TIA-232
Baud rate	9600 bps (default) to 115200 bps
Transmission distance	≤ 15 m (49.21 ft)
Services	Provides connection to the serial port of a local PC to run the terminal emulation program

AUX port

Table 31 AUX port specifications

Item	Specification
Connector	RJ-45
Standard compliant	Asynchronous EIA/TIA-232
Baud rate	9600 bps (default) to 115200 bps
Services	Connects the serial port of a remote PC through a pair of modems to establish a dial-up connection with the PC

Management Ethernet port

The management Ethernet port is a 10Base-T/100Base-TX/1000Base-T RJ-45 port. It allows you to upgrade software and manage the router through a network management server without using any service interface of the router. The management Ethernet port is used only for managing the router and it has no service processing capabilities such as data forwarding.

Table 32 Management Ethernet port specifications

Item	Specification
Connector	RJ-45
Interface type	Automatic MDI/MDI-X
Frame format	Ethernet_II Ethernet_SNAP
Interface speed and duplex mode	10 Mbps, half/full-duplex 100 Mbps, half/full-duplex 1000 Mbps, full-duplex

Combo interface

Copper Ethernet port

Table 33 Copper Ethernet port specifications

Item	Specification
Connector	RJ-45
Interface type	Automatic MDI/MDI-X
Frame format	Ethernet_II Ethernet_SNAP
Interface speed and duplex mode	10 Mbps, half/full-duplex 100 Mbps, half/full-duplex 1000 Mbps, full-duplex

NOTE:

- The media dependent interface (MDI) standard is typically used on the Ethernet port of network adapters. The media dependent interface crossover (MDI-X) standard is typically used on hubs or LAN switches.
- For a combo interface, you can use either the copper port or the fiber port. To switch between the copper and fiber ports, use the **combo enable { copper | fiber }** command in interface view.

Fiber Ethernet port

Table 34 Fiber Ethernet port specifications

Item		Specification				
Connector type		LC				
Transceiver module type		SFP				
Interface standards		802.3, 802.3u, and 802.3ab				
Transmission power	Type	Short-haul multi-mode (850 nm)	Mid-haul single mode (1310 nm)	Long haul (1310 nm)	Long haul (1550 nm)	Super long haul (1550 nm)
	Minimum	-9.5 dBm	-9 dBm	-2 dBm	-4 dBm	-4 dBm
	Maximum	0 dBm	-3 dBm	5 dBm	1 dBm	2 dBm
Receive sensitivity		-17 dBm	-20 dBm	-23 dBm	-21 dBm	-22 dBm
Central wavelength		850 nm	1310 nm	1310 nm	1550 nm	1550 nm
Fiber type		62.5/125 μ m multi-mode	9/125 μ m single mode	9/125 μ m single mode	9/125 μ m single mode	9/125 μ m single mode
Max. transmission distance		0.55 km (0.34 miles)	10 km (6.21 miles)	40 km (24.86 miles)	40 km (24.86 miles)	70 km (43.50 miles)
Operating mode		100/1000 Mbps, full duplex				

10 Gbps Ethernet port

The HSR6602-XG/HSR6602-XG TAA provides two 10 Gbps Ethernet ports. 10 Gbps SFP+ ports do not support 1000 Mbps transceiver modules.

Table 35 10 Gbps Ethernet port specifications

Item	Specification
Protocol	802.3ae
Connector type	LC
Transceiver module type	SFP+
Physical layer	10GBASE-R/W
Transmission rate	<ul style="list-style-type: none"> LAN PHY—10.3125 Gbps WAN PHY—9.95328 Gbps

Table 36 10 Gbps SFP+ transceiver module specifications

Model	Central wavelength	Connector type	Fiber type	Max. transmission distance
SFP-XG-SX-MM850-A	850 nm	LC	50/125 μ m multi-mode	300 m (984.25 ft)
SFP-XG-LX-SM1310	1310 nm	LC	9/125 μ m single mode	10 km (6.21 miles)

Model	Central wavelength	Connector type	Fiber type	Max. transmission distance
SFP-XG-LH40-SM1550	1550 nm	LC	9/125 μ m single mode	40 km (24.86 miles)

Flexible interface platform modules

The HSR6600 Router Series supports flexible interface platform (FIP) modules FIP-10 and FIP-20. You can install High-speed Interface Modules (HIMs) and Multifunctional Interface Modules (MIMs) on a FIP to support different network services as needed. A FIP module is located on the lower part of the front panel.

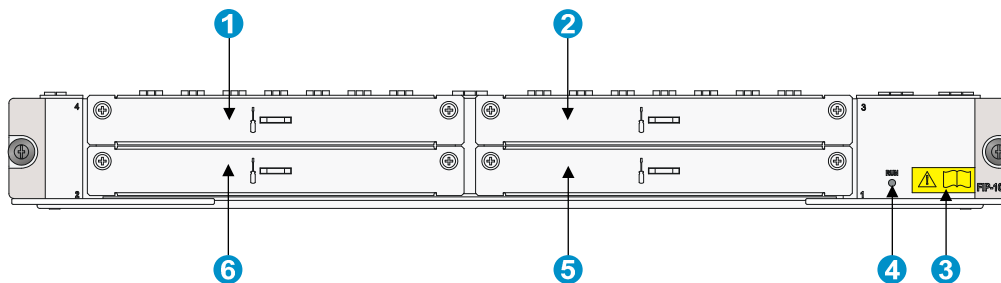
NOTE:

No FIP modules are supplied with the router. Purchase them yourself.

FIP-10

The FIP-10 supports only MIMs, and you can plug at most four MIMs into a FIP.

Figure 71 FIP-10 front panel



(1) Slot 4

(2) Slot 3

(3) OPEN BOOK mark

(4) Status LED (RUN)

(5) Slot 1

(6) Slot 2

The OPEN BOOK mark indicates that the operator must read the following sections before working with the FIP:

Table 37 References for FIP operations

Operation	Reference
Install and remove the FIP	See "Installing a FIP module" and "Replacing a FIP module."
Install and remove MIMs	See "Installing a HIM/MIM" and "Replacing a HIM/MIM."
Connect network cables	See "Connecting an Ethernet cable."
Connect optical fibers	See "Connecting a fiber cable."

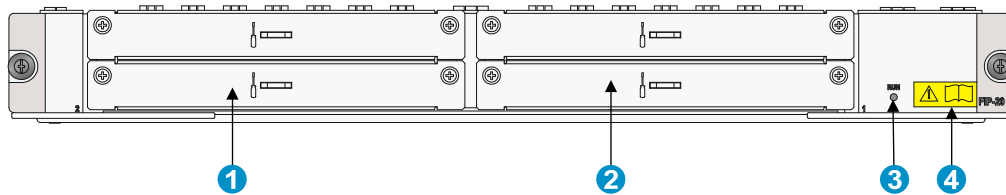
Table 38 FIP-10 specifications

Item	Specification
HIM	Not supported
MIM	4 MIMs supported at the same time
Hot-swapping	Supported
Slot	Four

FIP-20

You can plug up to two HIMs or two MIMs into the FIP-20. The FIP-20 also supports intermix of a HIM and a MIM.

Figure 72 FIP-20 front panel



(1) Slot 2

(2) Slot 1

(3) Status LED

(4) OPEN BOOK mark

The OPEN BOOK mark indicates that the operator must read the following sections before working with the FIP:

Table 39 References for FIP operations

Operation	Reference
Install and remove the FIP	See “Installing a FIP module” and “Replacing a FIP module.”
Install and remove interface modules	See “错误! 未找到引用源。” , “Installing a HIM/MIM” , 错误! 未找到引用源。 , and “Replacing a HIM/MIM.”
Connect network cables	See “Connecting an Ethernet cable.”
Connect optical fibers	See “Connecting a fiber cable.”

Table 40 FIP-20 specifications

Item	Specification
HIM	2 HIMs supported
MIM	2 MIMs supported
Hot swapping	Supported
Interface module slot	2

Interface modules

You can install HIMs to provide 10-Gbps service processing capability and install MIMs to provide high-density narrowband aggregation. The HIMs and MIMs can offer a variety of interfaces, including serial, Ethernet, POS, and E1.

NOTE:

- No interface modules are supplied with the router. Purchase them yourself.
 - An interface module must be installed on a FIP.
 - For information about interface module specifications, see *HP 6600/HSR6600/HSR6800 Router Series Interface Module Guide*.
-

Appendix B LEDs

Panel LEDs

HSR6602-G/HSR6602-G TAA panel LEDs

Figure 73 HSR6602-G/HSR6602-G TAA front view

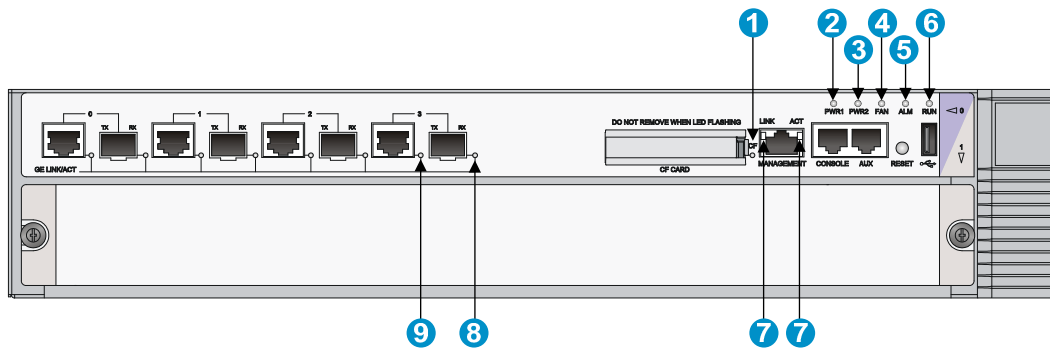












Table 41 HSR6602-G/HSR6602-G TAA panel LED description

LED	Status	Description
1  (yellow/green)	Off	No CF card is in position or the CF card cannot be recognized.
	Steady green	A CF card is in position and has been detected.
	Flashing green	The system is accessing the CF card. In this state, do not remove the CF card.
	Steady yellow	It is a non HP CF card.
2  (red/green)	Off	The power module is not in position.
	Steady green	The power module is supplying power properly.
3  (red/green)	Off	The power module is not in position.
	Steady green	The power module is supplying power properly.
4  (red/green)	Off	No power is input or the fan tray is not in position.
	Steady green	The fan tray is working properly.
	Steady red	The fan tray is faulty.

LED	Status	Description
 5 ALM (red)	ALM	Off The system is operating properly and there is no alarm.
		Steady red A fault has occurred. In this state, check the system log immediately.
 6 RUN (green)	RUN	Off The system is powered off or the router is faulty.
		Flashing at 1 Hz The router operates properly as configured.
 7 (yellow/green)	LINK	Off The corresponding interface is not connected.
		Steady green A 1000 Mbps link is present.
	ACT	Steady yellow A 10/100 Mbps link is present.
		Off No data is being received or transmitted.
 8 (yellow/green)	SFP0 through SFP3	Flashing yellow Data is being received or transmitted.
		Off No link is present.
		Steady green A 1000 Mbps link is present.
		Flashing green Data is being received or transmitted at 1000 Mbps.
 9 (yellow/green)	GEO through GE3	Steady yellow A 100 Mbps link is present.
		Flashing yellow Data is being received or transmitted at 100 Mbps.
		Off No link is present.
		Steady green A 1000 Mbps link is present.
 9 (yellow/green)	GEO through GE3	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.

HSR6602-XG/HSR6602-XG TAA panel LEDs

Figure 74 HSR6602-XG/HSR6602-XG TAA front view

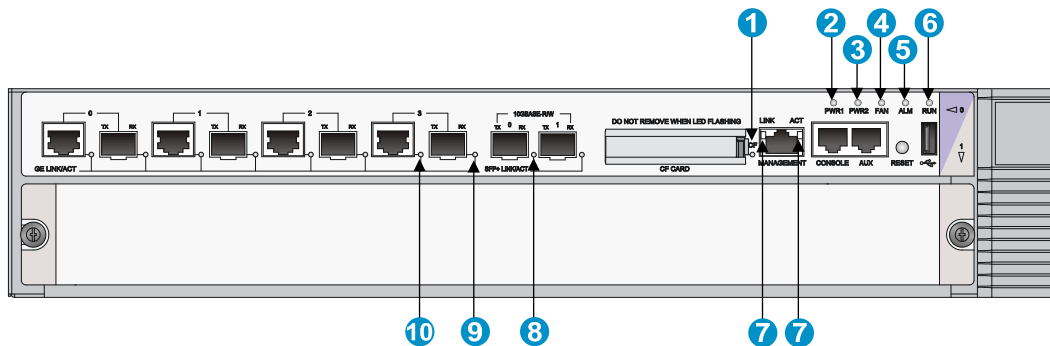












Table 42 HSR6602-XG/HSR6602-XG TAA panel LED description

LED	Status	Description
 1 CF (yellow/green)	Off	No CF card is in position or the CF card cannot be recognized.
	Steady green	A CF card is in position and has been detected.
	Flashing green	The system is accessing the CF card. In this state, do not remove the CF card.
	Steady yellow	It is a non HP CF card.
 2 PWR1 (red/green)	Off	The power module is not in position.
	Steady green	The power module is supplying power properly.
	Steady red	No power is input or the power module is faulty when PWR2 is operating properly.
 3 PWR2 (red/green)	Off	The power module is not in position.
	Steady green	The power module is supplying power properly.
 4 FAN (red/green)	Off	No power is input or the fan tray is not in position.
	Steady green	The fan tray is working properly.
	Steady red	The fan tray is faulty.
 5 ALM (red)	Off	The system is operating properly and there is no alarm.
	Steady red	A fault has occurred. In this state, check the system log immediately.
 6 RUN (green)	Off	The system is powered off or the router is faulty.
	Flashing at 1 Hz	The router operates properly as configured.
	Flashing at 8 Hz	Software is being loaded or the router does not start working yet.
 7 MANAGEMENT (yellow/green)	Off	No link is present.
	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.
 8 SFP+LINK/ACT (yellow/green)	Off	No link is present.
	Steady green	A 10 Gbps link is present.
	Flashing green	Data is being received or transmitted at 10 Gbps.
	Steady yellow	The transceiver module check is not passed.

LED	Status	Description
 9 (yellow/green)	Off	No link is present.
	Steady green	A 1000 Mbps link is present.
	Flashing green	Data is being received or transmitted at 1000 Mbps.
	Steady yellow	A 100 Mbps link is present.
	Flashing yellow	Data is being received or transmitted at 100 Mbps.
 10 (yellow/green)	Off	No link is present.
	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.

FIP LEDs

Figure 75 FIP-10 LED

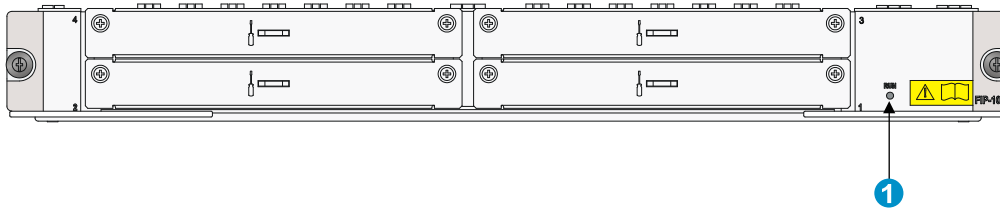


Figure 76 FIP-20 LED

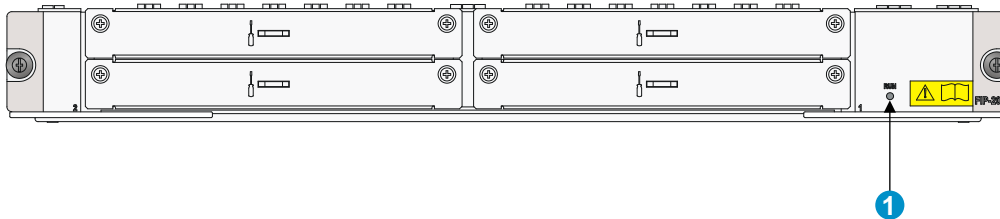



Table 43 FIP LED description

LED	Status	Description
 1 (green)	Off	No power input is available or the FIP has failed.
	Flashing at 1 Hz	The FIP is working properly.
	Flashing at 8 Hz	Application software is being loaded (in this case, never power off the router or hot-swap the FIP; otherwise, the FIP may be damaged).

HIM/MIM LEDs

For description of HIM/MIM LEDs, see *HP A6600 Router Series Interface Module Guide*.

Power module LEDs

Figure 77 AC power module LED

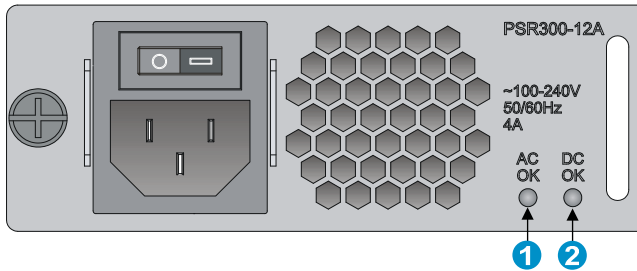


Table 44 AC power module LED description



LED	Status	Description
1 AC OK  (green)	Off	No power is input or the power module has an input problem.
	Steady green	The power input is normal.
2 DC OK  (green)	Off	No power is output or the power module has an output problem.
	Steady green	The power output is normal.

Figure 78 DC power module LED

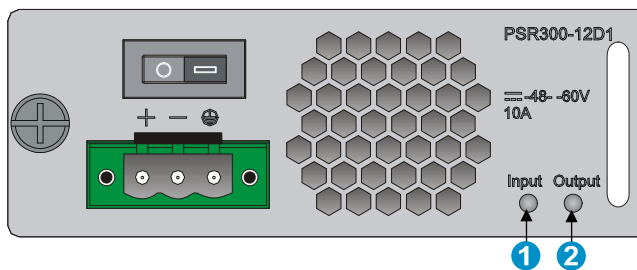




Table 45 DC power module LED description

LED	Status	Description
1 Input  (green)	Off	No power is input or the power module has an input problem.
	Steady green	The power input is normal.
2 Output  (green)	Off	No power is output or the power module has an output problem.
	Steady green	The power output is normal.

Appendix C Cable management

When an HSR6600 router is mounted in a 19-inch standard rack, the interface cables are routed through the cable management brackets, bound at cabling racks on chassis sides, and then routed up or down, depending on the available equipment room condition. The power cables run along the two sides of the chassis and out of the chassis either from the chassis top or the raised floor depending on the equipment room conditions (power distribution cabinet, lightning protection box, and connector strip, etc.) of the exchange office.

General cabling requirements

Minimum curvature radius of cables

- The curvature radius of a fixed power cable, communication cable, or ribbon cable should be at least five times the cable's outer diameter. If the cable is frequently bent, plugged, and unplugged, the curvature radius should be at least seven times the cable's outer diameter.
- The curvature radius of an ordinary fixed coaxial cable should be at least seven times of the cable's outer diameter. If the coaxial cable is frequently bent, plugged, and unplugged, the curvature radius should be at least 10 times the cable's outer diameter.
- The curvature radius of a high-speed cable (for example, SFP+ cable) should be at least five times of the cable's outer diameter. If the coaxial cable is frequently bent, plugged and unplugged, the curvature radius should be at least 10 times the cable's outer diameter.

Minimum curvature radius of fibers

- When the fiber is wrapped up around the cabling plate, the diameter of the cabling plate should be at least 25 times the fiber's diameter.
- When the fiber is being moved, the curvature radius of the fiber should be at least 20 times the fiber's diameter.
- When the fiber is fixed, the curvature radius of the fiber should be at least 10 times the fiber's diameter.

NOTE:

The fiber's diameter refers to the outer diameter of the fiber jacket. Typically, the diameter of a single-core fiber is 0.9 mm (0.04 in), 2.0 mm (0.08 in), or 3.0 mm (0.12 in).

Labeling cables

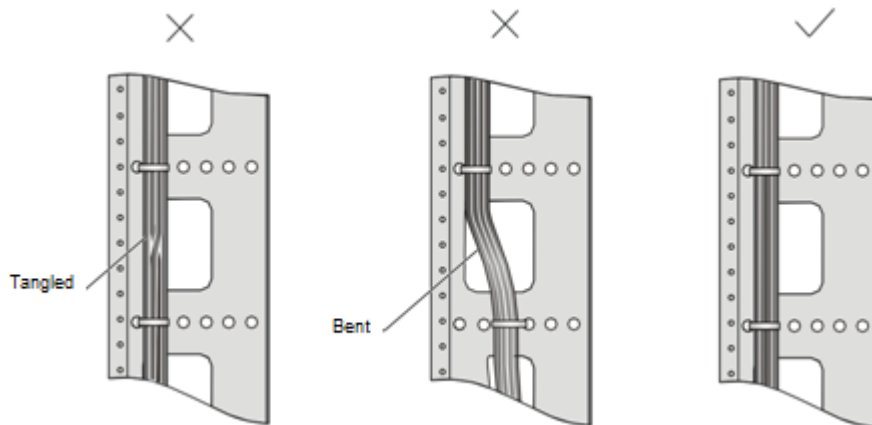
Label cables before you route or bundle them. Labels are typically affixed 20 mm (0.79 in) to cable plugs.

Cable management guidelines

When you route and bundle up cables, follow these guidelines:

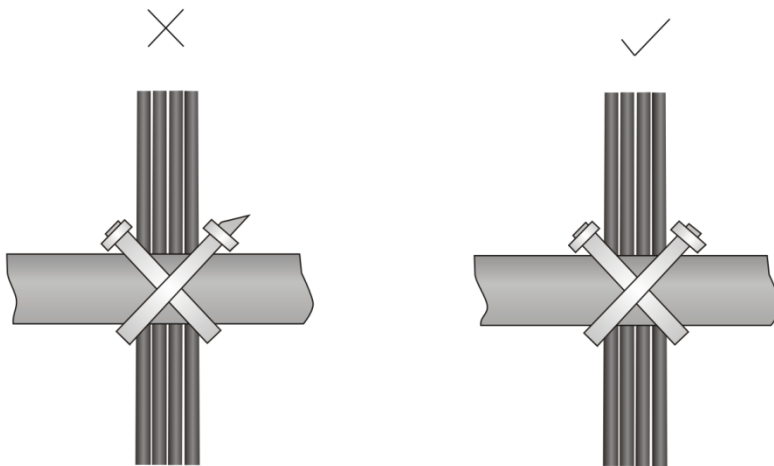
- Bind and route the cables neatly inside the rack, and make sure that the cables are not kinked or bent.

Figure 79 Correct and incorrect cable binding



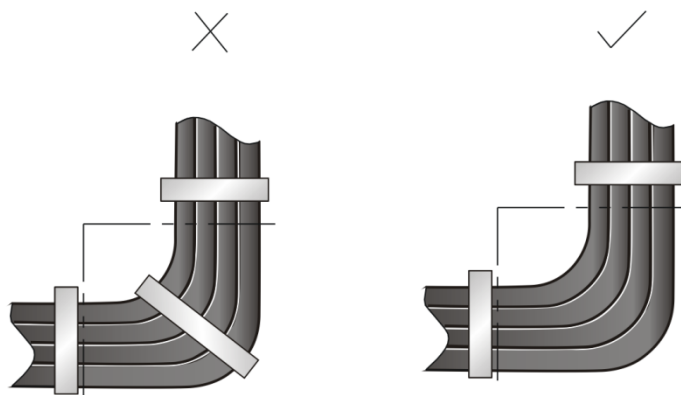
- The cable bend radius at connectors must be at least 5 times the cable diameter, and must be at least twice the cable diameter away from the connectors.
- Route different types of cables (for example, power cables, and signal cables) separately. If they are close to one another, cross them over one another. If you route them in parallel, make sure that the space between a power cable bundle and a signal cable bundle is at least 30 mm (1.18 in).
- The cable management brackets and cable routing slots, inside or outside the rack, are smooth and have no sharp edges or tips.
- When you route cables through sharp sheet metal penetration points or along sharp edges of mechanical parts, use bushings or take any other action to protect the cables from being cut or abraded. The sheet metal penetration points must be smooth and fully rounded.
- Use the correct ties to bind the cables. Do not bind cables with joined ties. The following types of ties are available: 100 × 2.5 mm (3.94 × 0.10 in), 150 × 3.6 mm (5.91 × 0.14 in), 300 × 3.6 mm (11.81 × 0.14 in), 530 × 9 mm (20.87 × 0.35 in), and 580 × 13 mm (22.83 × 0.51 in).
- After binding the cables, cut the excess from the ties, leaving no sharp or angular tips. See [Figure 80](#).

Figure 80 Cutting the cable ties



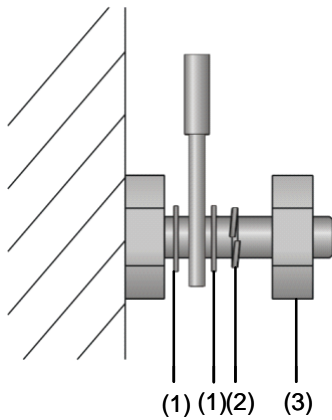
- When you bend cables, bind cables as shown in [Figure 81](#). To avoid cable core break due to excessive stress, do not tie up the cables in the bending area.

Figure 81 Binding the cables



- Route, bind, and attach excess cables for easy, safe maintenance activities and proper operations.
- Do not tie the power cables to the slide rails.
- When you connect a cable to an articulated part, for example, when you connect a grounding cable to a cabinet door, leave enough slack in cables and make sure they are not stressed from any movement of the part.
- Cables must be protected at points where they might rub or come in contact with sharp edges or heated areas. Use high temperature cables near heat sources.
- Securely fasten cables and take adequate measures to prevent loose connections.

Figure 82 Securely fasten cables



(1) Flat washer

(2) Spring washer

(3) Nut

- Fasten heavy or rigid power cables at the connectors to relief stress.
- Do not use tapping screws to fasten the connecting terminals.
- Bind together cables that are the same type and routed in the same direction.

Table 46 lists the cable bundling specifications.

Table 46 Cable bundling specifications

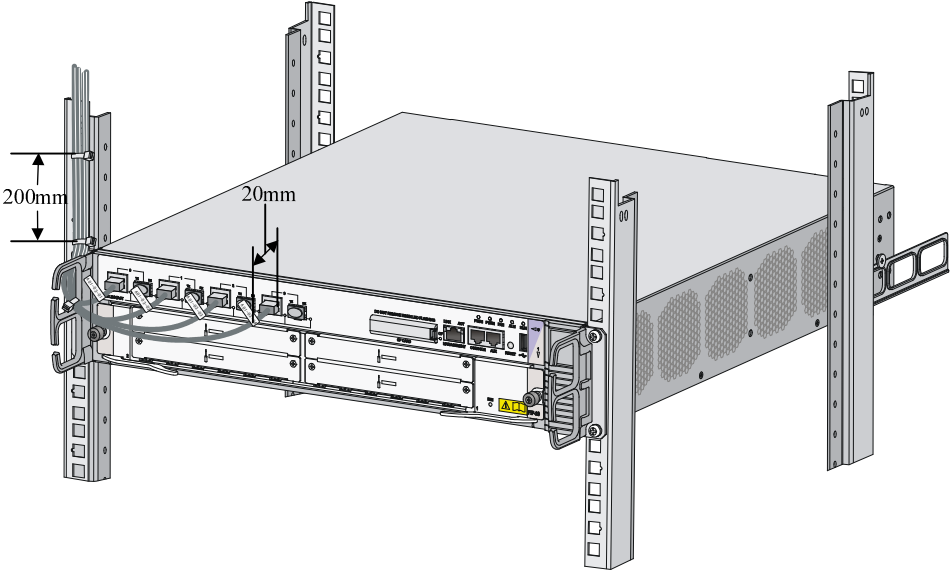
Cable bundle diameter (mm)	Space between bundles (mm)
10	80 to 150
10 to 30	150 to 200
30	200 to 300

- Do not tie cables or bundles in a knot.
- The metal parts of the crimped cold-pressed terminal blocks (such as circuit breaker) cannot protrude beyond the blocks.

Cable routing example

Cables on an HSR6600 router can be routed as shown in Figure 83.

Figure 83 Routing cables



Appendix D Arranging slots and numbering interfaces

Slot arrangement

The router provides many types of interfaces, such as console, AUX, GigabitEthernet, serial (synchronous) and E1 ports. This chapter describes how these interfaces are numbered.

Figure 84 Slot arrangement on the SR6602-X1

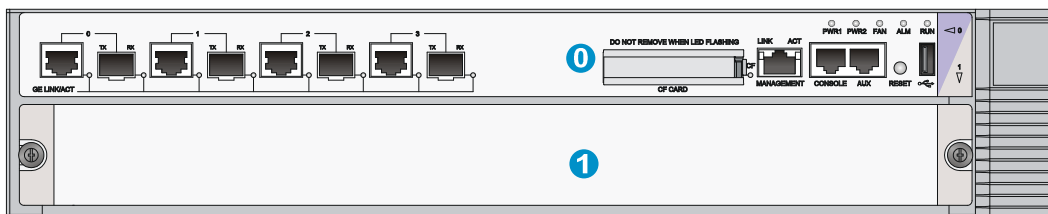
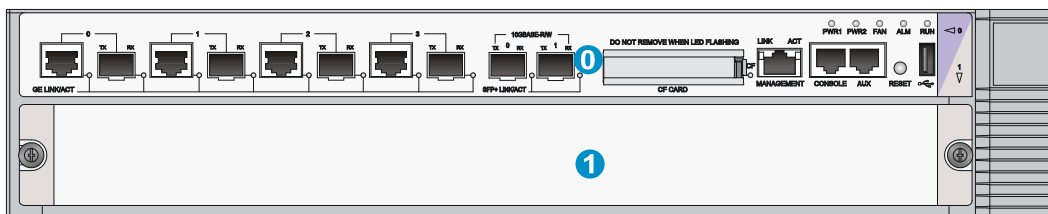


Figure 85 Slot arrangement on the SR6602-X2



NOTE:

The numbers in [Figure 84](#) and [Figure 85](#) represent corresponding slot numbers.

Slot arrangement for FIPs

Table 47 Slot arrangement for FIPs

FIPs	Slot arrangement
FIP-10	Slot 1
FIP-20	

Numbering interfaces

Before installing a HIM/MIM, you must install a FIP. A FIP20 supports both HIMs and MIMs, while a FIP10 supports only MIMs.

The interfaces of the router are numbered in the form of *interface-type X/Y/Z*,

Where,

- *interface-type*: Type of the interface such as GE port and serial port.
- X: Number of the slot where the FIP resides.
- Y: Sub-slot number—The number of the slot where the HIM/MIM resides on the FIP.
- Z: Sequence number of the interface on the HIM/MIM.

NOTE:

- Different interface modules on the same FIP have the same slot number X.
 - Different interfaces on the same HIM/MIM have the same sub-slot number Y.
 - For each type of interface, the sequence number Z starts from 0 on the interface module.
-

Examples

Example 1

A FIP10 is installed in slot 1 and a MIM-2GBE module is installed on the FIP10.

1. If the MIM-2GBE is installed in slot 1 of the FIP10, the GigabitEthernet interfaces are:
 - GigabitEthernet 1/1/0
 - GigabitEthernet 1/1/1
2. If the MIM-2GBE is installed in slot 2 of the FIP10/FIP100/FIP110, the GigabitEthernet interfaces are:
 - GigabitEthernet 1/2/0
 - GigabitEthernet 1/2/1

Example 2

A FIP20 is installed in slot 1 and a HIM-4GBE module is installed on the FIP20.

1. If the HIM-4GBE is installed in slot 1 of the FIP20, the GigabitEthernet interfaces are:
 - GigabitEthernet 1/1/0
 - GigabitEthernet 1/1/1
 - GigabitEthernet 1/1/2
 - GigabitEthernet 1/1/3
2. If the HIM-4GBE is installed in slot 2 of the FIP20, the GigabitEthernet interfaces are:
 - GigabitEthernet 1/2/0
 - GigabitEthernet 1/2/1

- GigabitEthernet 1/2/2
- GigabitEthernet 1/2/3

Support and other resources

Contacting HP

For worldwide technical support information, see the HP support website:

<http://www.hp.com/support>

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

<http://www.hp.com/go/wwalerts>

After registering, you will receive email notification of product enhancements, new driver versions, firmware updates, and other product resources.

Related information

Documents

To find related documents, browse to the Manuals page of the HP Business Support Center website:

<http://www.hp.com/support/manuals>

- For related documentation, navigate to the Networking section, and select a networking category.
- For a complete list of acronyms and their definitions, see *HP FlexNetwork Technology Acronyms*.

Websites

- HP.com <http://www.hp.com>
- HP Networking <http://www.hp.com/go/networking>
- HP manuals <http://www.hp.com/support/manuals>
- HP download drivers and software <http://www.hp.com/support/downloads>
- HP software depot <http://www.software.hp.com>
- HP Education <http://www.hp.com/learn>

Conventions

This section describes the conventions used in this documentation set.





Command conventions

Convention	Description
Boldface	Bold text represents commands and keywords that you enter literally as shown.
<i>Italic</i>	<i>Italic</i> text represents arguments that you replace with actual values.
[]	Square brackets enclose syntax choices (keywords or arguments) that are optional.
{ x y ... }	Braces enclose a set of required syntax choices separated by vertical bars, from which you select one.
[x y ...]	Square brackets enclose a set of optional syntax choices separated by vertical bars, from which you select one or none.
{ x y ... } *	Asterisk-marked braces enclose a set of required syntax choices separated by vertical bars, from which you select at least one.
[x y ...] *	Asterisk-marked square brackets enclose optional syntax choices separated by vertical bars, from which you select one choice, multiple choices, or none.
&<1-n>	The argument or keyword and argument combination before the ampersand (&) sign can be entered 1 to n times.
#	A line that starts with a pound (#) sign is comments.








GUI conventions

Convention	Description
Boldface	Window names, button names, field names, and menu items are in bold text. For example, the New User window appears; click OK .
>	Multi-level menus are separated by angle brackets. For example, File > Create > Folder .

Symbols

Convention	Description
 WARNING	An alert that calls attention to important information that if not understood or followed can result in personal injury.
 CAUTION	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.
 IMPORTANT	An alert that calls attention to essential information.
NOTE	An alert that contains additional or supplementary information.
 TIP	An alert that provides helpful information.

Network topology icons

	Represents a generic network device, such as a router, switch, or firewall.
	Represents a routing-capable device, such as a router or Layer 3 switch.
	Represents a generic switch, such as a Layer 2 or Layer 3 switch, or a router that supports Layer 2 forwarding and other Layer 2 features.
	Represents an access controller, a unified wired-WLAN module, or the switching engine on a unified wired-WLAN switch.
	Represents an access point.
	Represents a security product, such as a firewall, a UTM, or a load-balancing or security card that is installed in a device.
	Represents a security card, such as a firewall card, a load-balancing card, or a NetStream card.

Port numbering in examples

The port numbers in this document are for illustration only and might be unavailable on your device.

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