Hewlett Packard Enterprise

HPE FlexFabric 5901 Switch Series

Installation Guide

Document version: 6W101-20230407

Acknowledgments

Contents

Preparing for installation

Table 1 HPE FlexFabric 5901 switch series, power supplies, and fan modules

Product code	HPE description	Alias
HPE FlexFabric 5901 switch series		
JL864A	HPE FlexFabric 5901AF 48-Port 1GBASET 4XG 2QSFP+ Switch	HPE 5901AF 48G 4XG 2QSFP+ Switch
Power supplies		
JD362B	HPE X361 150W 100-240VAC to 12VDC Power Supply	PSR150-A1
JD366B	HPE X361 150W DC Power Supply	PSR150-D1
Fan modules		
JL838A	HPE FlexFabric 5944 Power to Port Airflow (Back to Front) Fan Module	HPE 5944 FAN Module with Power to Port Airflow
JL837A	HPE FlexFabric 5944 Port to Power Airflow (Front to Back) Fan Module	HPE 5944 FAN Module with Port to Power Airflow

For regulatory identification purposes, the HPE 5901AF 48G 4XG 2QSFP+ Switch is assigned a regulatory model number (RMN), which is listed in the following table. This regulatory number should not be confused with the marketing name HPE FlexFabric 5901 or the product code.

Product code	RMN	HPE description
JL864A	BJNGA-AD0098	HPE FlexFabric 5901AF 48-Port 1GBASET 4XG 2QSFP+ Switch

Safety recommendations

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

- Before cleaning the switch, remove all power cords from the switch. Do not clean the switch with wet cloth or liquid.
- Do not place the switch near water or in a damp environment. Prevent water or moisture from entering the switch chassis.
- Do not place the switch on an unstable case or desk. The switch might be severely damaged in case of a fall.
- Ensure good ventilation of the equipment room and keep the air inlet and outlet vents of the switch free of obstruction.
- Make sure the operating voltage is in the required range.

- To avoid electrical shocks, do not open the chassis while the switch is operating or when the switch is just powered off.
- When replacing field replaceable units (FRUs), including power supplies and fan modules, wear an ESD wrist strap to avoid damaging the units.

Examining the installation site

The switch must be used indoors. You can mount your switch in a rack or on a workbench, but make sure:

- Adequate clearance is reserved at the air inlet and outlet vents for ventilation.
- The rack or workbench has a good ventilation system.
- Identify the hot aisle and cold aisle at the installation site, and make sure ambient air flows into the switch from the cold aisle and exhausts to the hot aisle.
- Identify the airflow designs of neighboring devices, and prevent hot air flowing out of the neighboring device from entering the device.
- The rack is sturdy enough to support the switch and its accessories.
- The rack or workbench is reliably grounded.

To ensure correct operation and long service life of your switch, install it in an environment that meets the requirements described in the following subsections.

Temperature/humidity

For correct operation and long service life of your switch, maintain the temperature and humidity in the equipment room at acceptable ranges.

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

For the temperature and humidity requirements of the switch, see "Appendix A Chassis views and technical specifications".

Cleanliness

Dust buildup on the chassis might cause electrostatic adsorption and dust corrosion, resulting in poor contact of metal connectors and contact points. This might shorten the device's lifetime and

even cause device failure in the worst case. Table 2 describes the dust concentration limits in the equipment room.

Table 2 Dust concentration limits in the equipment room

Substance	Particle diameter	Concentration limit
Dust particles	≥ 0.5 μm	≤ 3.5×10^6 particles/m^3
Dust particles	≥ 5 μm	≤ 3×10^4 particles/m^3
Dust (suspension)	≤ 75 μm	≤ 0.2 mg/m^3
Dust (sedimentation)	75 μm to 150 μm	≤ 1.5 mg/(m^2h)

To maintain cleanliness in the equipment room, follow these guidelines:

- Keep the equipment room away from pollution sources. Do not smoke, eat, or drink in the equipment room.
- Use double-layer glass in windows and seal doors and windows with dust-proof rubber strips. Use screen doors and window screens for doors and windows open to the outside and make sure the external windows are air tight.
- Use dustproof materials for floors, walls, and ceilings and use wallpaper or matt paint that does not produce powders.
- Clean the equipment room regularly and clean the air filters of the rack each month.
- Wear ESD clothing and shoe covers before entering the equipment room, keep the ESD clothing and shoe covers clean, and change them frequently.

Corrosive gas limit

Corrosive gases can accelerate corrosion and aging of metal components. Make sure the corrosive gases in the equipment room do not exceed the concentration limits as shown in Table 3.

Table 3 Corrosive gas concentration limits in the equipment room

Gas	Average concentration (mg/m^3)	Maximum concentration (mg/m^3)
SO_2	0.3	1.0
H_2S	0.1	0.5
Cl_2	0.1	0.3
HCl	0.1	0.5
HF	0.01	0.03
NH_3	1.0	3.0
O_3	0.05	0.1
NO_X	0.5	1.0

CAUTION:

As a best practice, control the corrosive gas concentrations in the equipment room at their average values. Make sure the corrosive gas concentrations do not exceed 30 minutes per day at their maximum values.

To control corrosive gases, use the following guidelines:

- As a best practice, do not build the equipment room in a place with a high concentration of corrosive gases.
- Make sure the equipment room is not connected to sewer, vertical shaft, or septic tank pipelines and keep it far away from these pipelines. The air inlet of the equipment room must be away from such pollution sources.
- Use environmentally friendly materials to decorate the equipment room. Avoid using organic materials that contains harmful gases, such as sulfur or chlorine-containing insulation cottons, rubber mats, sound-proof cottons, and avoid using plasterboards with high sulfur concentration.
- Place fuel (diesel or gasoline) engines separately. Do not place them in the same equipment room with the device. Make sure the exhausted air of the engines will not flow into the equipment room or towards the air inlet of the air conditioners.
- Place batteries separately. Do not place them in the same room with the device.
- Employ a professional company to monitor and control corrosive gases in the equipment room regularly.

EMI

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

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

To prevent EMI, use the following guidelines:

- If AC power is used, use a single-phase three-wire power receptacle with protection earth (PE) to filter interference from the power grid.
- Keep the switch far away from radio transmitting stations, radar stations, and high-frequency devices.
- Use electromagnetic shielding, for example, shielded interface cables, when necessary.
- To prevent signal ports from getting damaged by overvoltage or overcurrent caused by lightning strikes, route interface cables only indoors.

Laser safety

⚠ WARNING!

Disconnected optical fibers or transceiver modules might emit invisible laser light. Do not stare into beams or view directly with optical instruments when the switch is operating.

The switch is a Class 1M laser device.

Installation tools

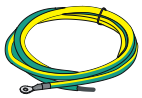
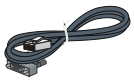
No installation tools are provided with the switch. Prepare the following tools yourself as required:

- Flat-head screwdriver
- Phillips screwdriver
- Needle-nose pliers
- Diagonal pliers
- ESD wrist strap
- Marker

Installation accessories

Table 4 Installation accessories

Product code	Description	Quantity	Applicable models
5066-0850	1 U four-hole mounting bracket kit (including one pair of mounting brackets and eight M4 countersunk screws) 	1 kit	HPE 5901AF 48G 4XG 2QSFP+ Switch
5185-8503	Power supply filler panel 	1	HPE 5901AF 48G 4XG 2QSFP+ Switch
N/A	M6 screw and cage nut (user supplied) 	As required	HPE 5901AF 48G 4XG 2QSFP+ Switch
5184-7298	Rubber feet 	4	HPE 5901AF 48G 4XG 2QSFP+ Switch

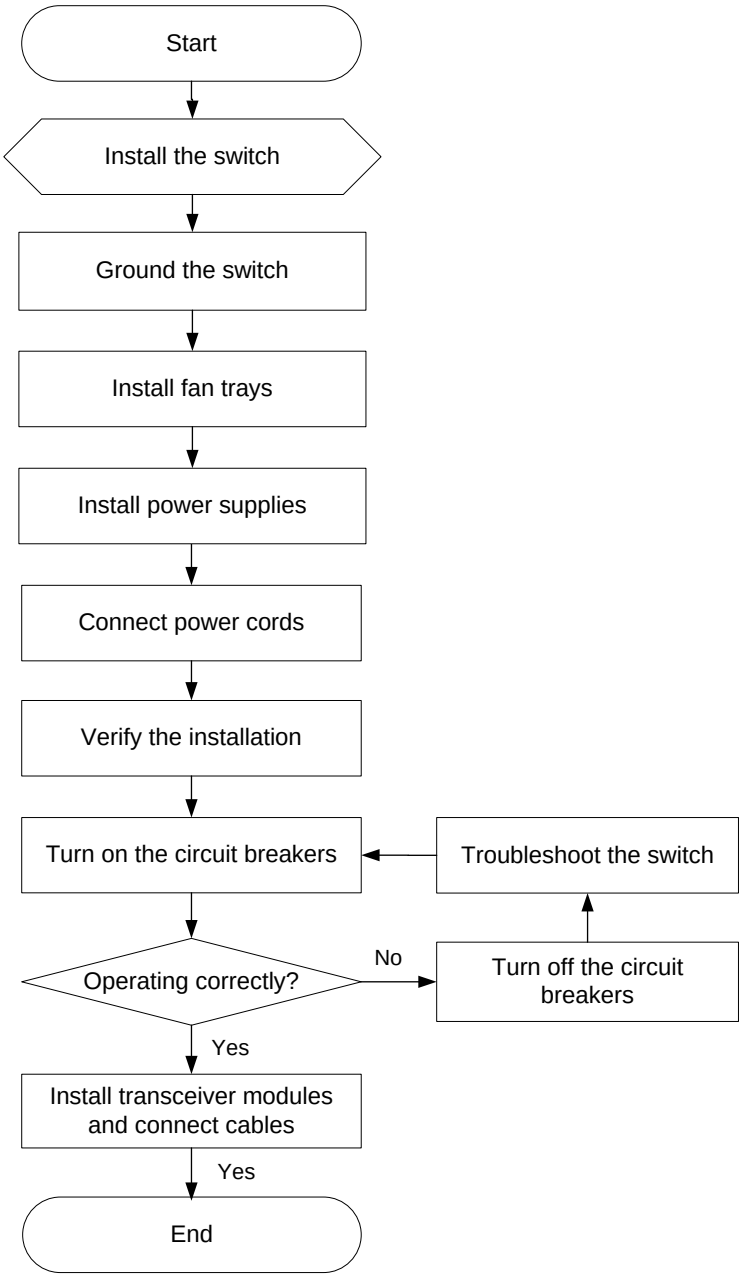
Product code	Description	Quantity	Applicable models
N/A	AC power cord, supplied with the PSR150-A1 (JD362B) AC power supply  **NOTE:** • The AC power cord part number will differ depending on the country or region. • The AC power cord in this figure is for illustration only. The AC power cord for your country or region might differ from this one.	1	PSR150-A1 (JD362B)
5185-9443 5080-0120	DC power cord, supplied with the PSR150-D1 (JD366B) DC power supply  The power cord color code scheme is for illustration only. The cable delivered for your country or region might use a different color scheme.	1	PSR150-D1 (JD366B)
5185-9292	Grounding cable (tin-plated at one end and with a ring terminal at the other end) 	1	HPE 5901AF 48G 4XG 2QSFP+ Switch
5185-8627	Console cable (optional) 	1	HPE 5901AF 48G 4XG 2QSFP+ Switch

Installing the switch

CAUTION:

Keep the tamper-proof seal on a mounting screw on the chassis cover intact, and if you want to open the chassis, contact HPE for permission. Otherwise, HPE shall not be liable for any consequence.

Figure 1 Hardware installation flow



Installing the switch in a 19-inch rack

IMPORTANT:

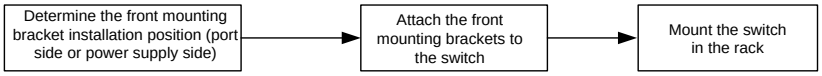
As a best practice, use a torque of 1.18 Nm, 2.94 Nm, and 1.18 Nm to fasten M4, M6, and shoulder screws, respectively.

Installation methods

Table 5 Installation methods

Installation methods	Installation requirements	Installation procedure
Using front mounting brackets	Install the front mounting brackets at the port side or power supply side.	See "Rack-mounting by using front mounting brackets."

Figure 2 Rack-mounting procedure by using the front mounting brackets



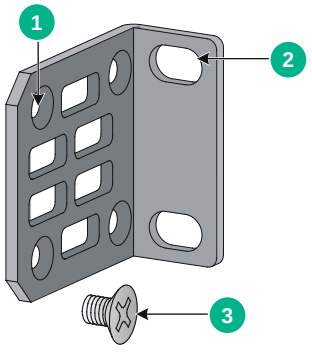
NOTE:

If HPE FlexFabric 5901AF 48G 4XG 2QSFP+ switches require a rack mounting kit to be shipped in a rack, it must be ordered with the #0D1 SKU option.

If a rack shelf is available, you can put the switch on the rack shelf, slide the switch to an appropriate location, and attach the switch to the rack by using the mounting brackets.

Rack mounting accessories

Figure 3 Front mounting bracket



(1) Hole for attaching the bracket to a rack	(2) Hole for attaching the bracket to the switch chassis
(3) M4 screw	

Rack-mounting by using front mounting brackets

This task requires two people.

To install the switch in a 19-inch rack by using the front and rear mounting brackets:

1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Determine the mounting position on the switch for the front mounting brackets.

   You can install the front mounting brackets at one of the following positions: port side or power supply side.
3. Attach the front mounting brackets to the chassis:
   a. Unpack the front mounting brackets and the M4 screws (supplied with the switch) for attaching the brackets to the switch chassis.
   b. Align the round holes in the wide flange of one front mounting bracket with the screw holes in the chassis.
   c. Use M4 screws to attach the mounting bracket to the chassis.
4. Repeat the proceeding two steps to attach the other mounting bracket to the chassis.

Figure 4 Attaching the front mounting bracket to the port side

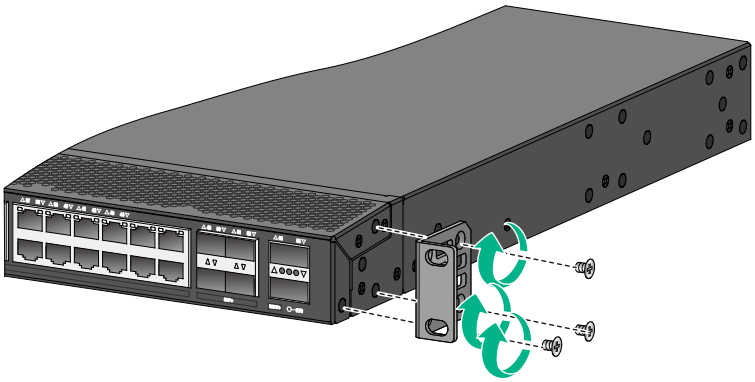
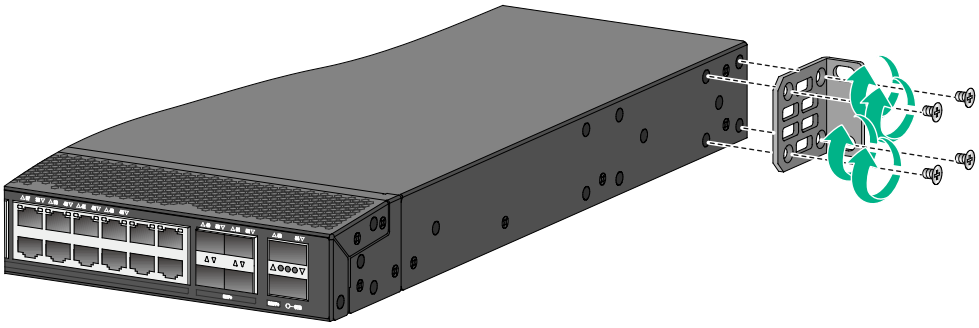
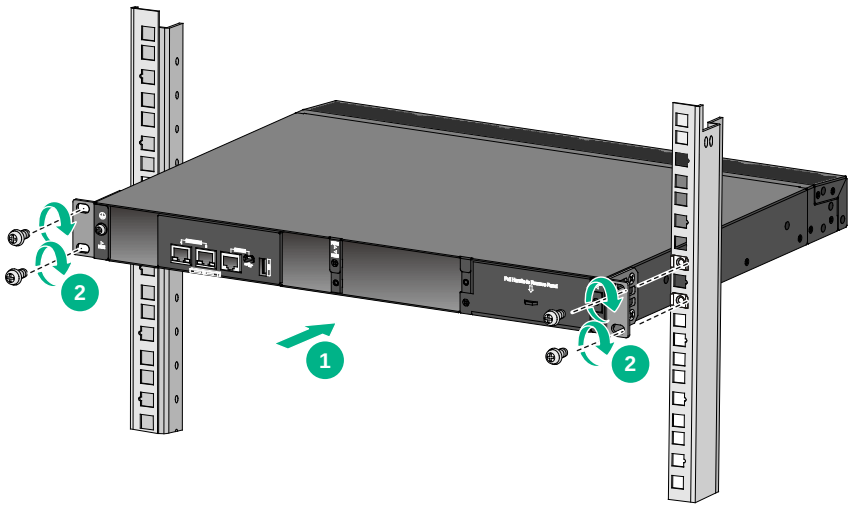


Figure 5 Attaching the front mounting bracket to the power supply side



5. Mount the switch chassis in the rack:
   a. One person supports the chassis bottom with one hand, holds the front part of the chassis with the other hand, and pushes the chassis into the rack gently.
   b. The other person attaches the front mounting brackets with M6 screws (user-supplied) and cage nuts to the front rack posts.

Figure 6 Mounting the switch in the rack (front mounting brackets at the power supply side)



Mounting the switch on a workbench

IMPORTANT:

- Ensure good ventilation and 10 cm (3.9 in) of clearance around the chassis for heat dissipation.
- Avoid placing heavy objects on the switch.

To mount the switch on a workbench:

1. Verify that the workbench is sturdy and reliably grounded.
2. Place the switch with bottom up, and clean the round holes in the chassis bottom with dry cloth.
3. Attach the rubber feet to the four round holes in the chassis bottom.
4. Place the switch with upside up on the workbench.

Grounding the switch

WARNING!

Correctly connecting the switch grounding cable is crucial to lightning protection and EMI protection.

The power input end of the switch has a noise filter, whose central ground is directly connected to the chassis to form the chassis ground (commonly known as PGND). You must securely connect this chassis ground to the earth so the faradism and leakage electricity can be safely released to the earth to minimize EMI susceptibility of the switch.

You can ground the switch in one of the following ways, depending on the grounding conditions available at the installation site:

- Grounding the switch with a grounding strip
- Grounding the switch with a grounding conductor buried in the earth ground

NOTE:
The power and grounding terminals in this section are for illustration only.

Grounding the switch with a grounding strip

⚠ **WARNING!**
Connect the grounding cable to the grounding system in the equipment room. Do not connect it to a fire main or lightning rod.

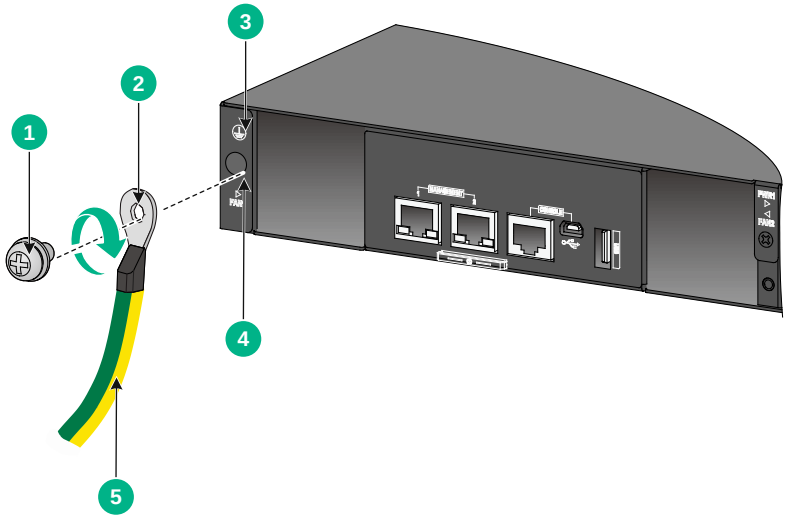
If a grounding strip is available at the installation site, connect the grounding cable to the grounding strip.

Connecting the grounding cable to the chassis

1. Remove the grounding screw from the rear panel of the switch chassis.
2. Use the grounding screw to attach the ring terminal of the grounding cable to the grounding screw hole. Fasten the screw. The recommended torque is 12 kgf-cm (1.18 Nm).

IMPORTANT:
Orient the grounding cable as shown in Figure 7 so you can easily install or remove the fan module.

Figure 7 Connecting the grounding cable to the chassis



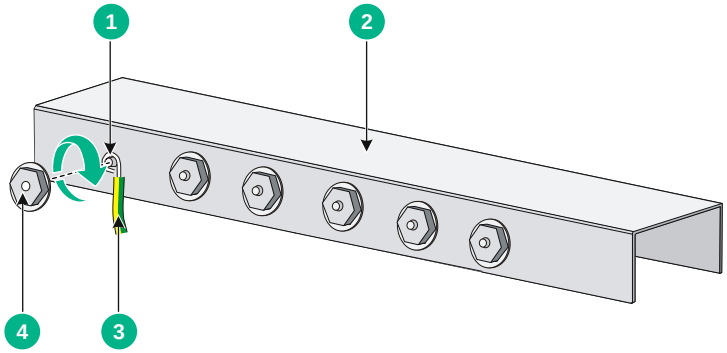
(1) Grounding screw	(2) Ring terminal
(3) Grounding sign	(4) Grounding hole
(5) Grounding cable	

3. Verify that the grounding cable has been securely connected to the rear grounding point.

Connecting the grounding cable to a grounding strip

1. Use needle-nose pliers to bend the bare metal part to the shape as shown in Figure 8. Make sure the bended part can securely attached to the grounding post on the grounding strip.
2. Attach the bended part of the grounding cable to the grounding post and use the hex nut to fasten the bended part to the post.

Figure 8 Connecting the grounding cable to the grounding strip



(1) Grounding post	(2) Grounding strip
(3) Grounding cable	(4) Hex nut

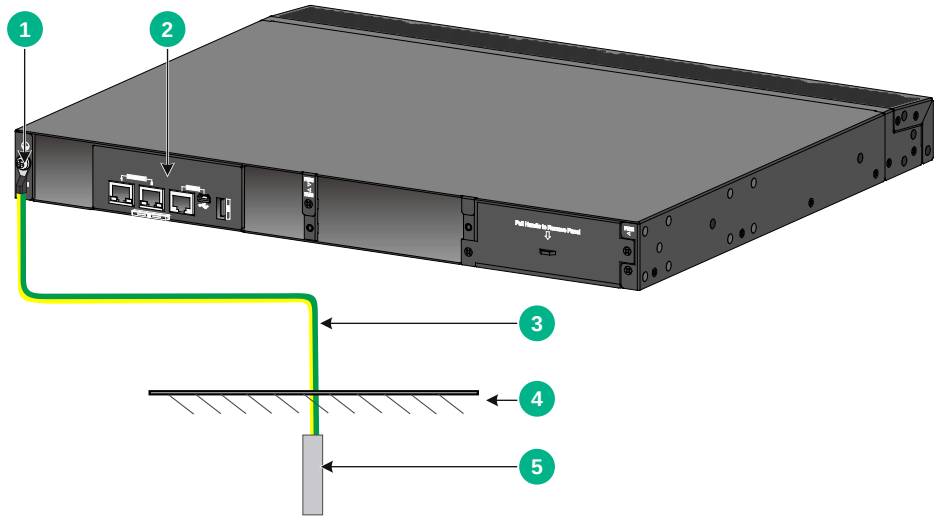
Grounding the switch with a grounding conductor buried in the earth ground

If the installation site has no grounding strips, but earth ground is available, hammer a 0.5 m (1.64 ft) or longer angle iron or steel tube into the earth ground to serve as a grounding conductor.

The dimensions of the angle iron must be a minimum of 50 × 50 × 5 mm (1.97 × 1.97 × 0.20 in). The steel tube must be zinc-coated and its wall thickness must be a minimum of 3.5 mm (0.14 in).

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

Figure 9 Grounding the switch by burying the grounding conductor into the earth ground



(1) Grounding screw	(2) Chassis rear panel	(3) Grounding cable
(4) Earth	(5) Grounding conductor	

Installing/removing a fan module

CAUTION:

- Install two fan modules of the same model on the switch. Do not power on the switch when it does not have a fan module or has only one fan module installed.
- Make sure slots are installed with fan modules or blank filler panels for the device to operate.
- If both fan modules fail during operation, replace them within 2 minutes while the switch is operating.
- If one fan module fails, perform either of the following tasks:
  - If the ambient temperature is not higher than 27°C (80.6°F), replace the fan module within 24 hours and make sure the failed fan module is in position before the replacement.
  - If the ambient temperature is higher than 27°C (80.6°F), replace the fan module immediately.

The switch comes with empty fan module slots. Choose the fan module models based on the ventilation requirement of the site. The air flow direction varies by fan module model.

- The HPE 5944 FAN Module with Port to Power Airflow (JL837A) has a red handle and provides port-to-power air flow.
- The HPE 5944 FAN Module with Power to Port Airflow (JL838A) has a blue handle and provides power-to-port air flow.

Installing a fan module

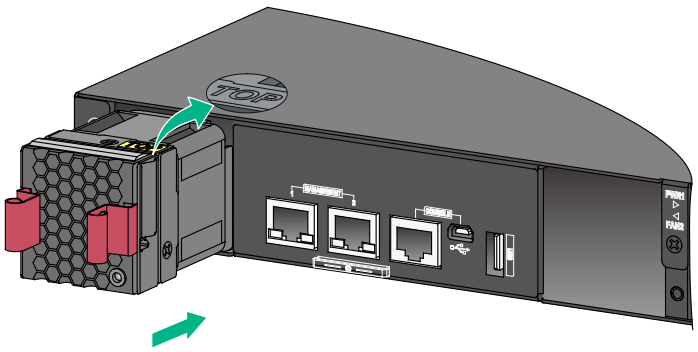
CAUTION:

To prevent damage to the fan module or the connectors on the backplane, insert the fan module gently. If you encounter a hard resistance while inserting the fan module, pull out the fan module and insert it again.

To install a fan module:

1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Unpack the fan module and verify that the fan module model is correct.
3. Grasp the two handles of the fan module with the side marked **TOP** facing up, and slide the fan module along the guide rails into the slot until the fan module seats in the slot and has a firm contact with the backplane.

Figure 10 Installing a fan module



IMPORTANT:

- At the first login to the switch, use the **`fan prefer-direction`** command to set the airflow direction of the switch to be the same as the airflow direction of the fan module. If the fan module has a different airflow direction than the switch, the system outputs traps and logs to notify you to replace the fan module.
- By default, the switch uses the same airflow direction (power-to-port) as the HPE 5944 FAN Module with Port to Power Airflow (JL837A).

Removing a fan module

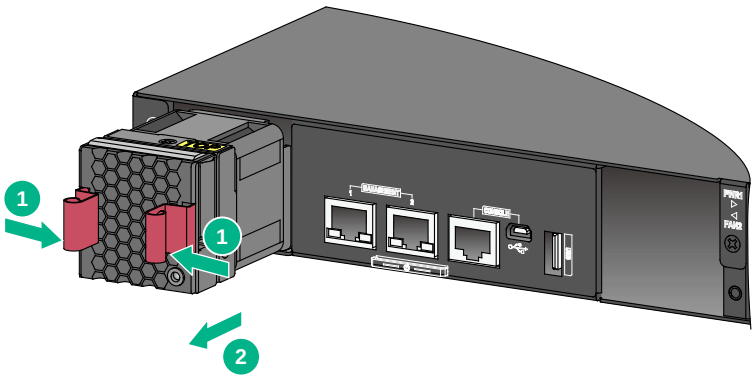
WARNING!

- Do not touch conductors or terminals on the fan modules.
- Do not place the fan module in a moist place. Prevent liquid from entering the fan module.
- Fan modules with faulty internal wiring and conductors require maintenance from maintenance engineers. Do not disassemble the faulty fan modules.

To remove a fan module:

1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Grasp the two handles of the fan module, as shown by callout 1 in Figure 11, and pull out the fan module slowly along the guide rails.
3. Put the removed fan module in an antistatic bag.

Figure 11 Removing a fan module



Installing/removing a power supply

WARNING!

In power redundancy mode, you can replace a power supply without powering off the switch but you must strictly follow the installation and removal procedures in Figure 12 and Figure 13 to avoid any bodily injury or damage to the switch.

CAUTION:

Provide a circuit breaker for each power supply.

Figure 12 Installation procedure

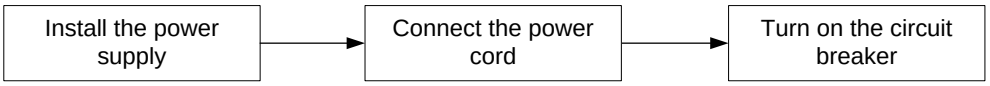
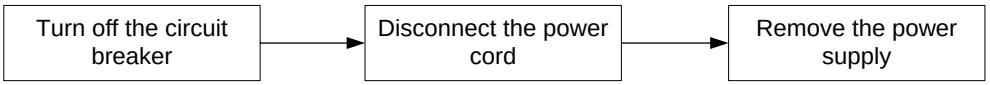


Figure 13 Removal procedure



The PSR150-A1 (JD362B) and PSR150-D1 (JD366B) power supplies are available for the switch. The installation and removal procedures are the same for the PSR150-A1 (JD362B) and PSR150-D1 (JD366B) power supplies. The following procedures install and remove a PSR150-A1 (JD362B) power supply.

Installing a power supply

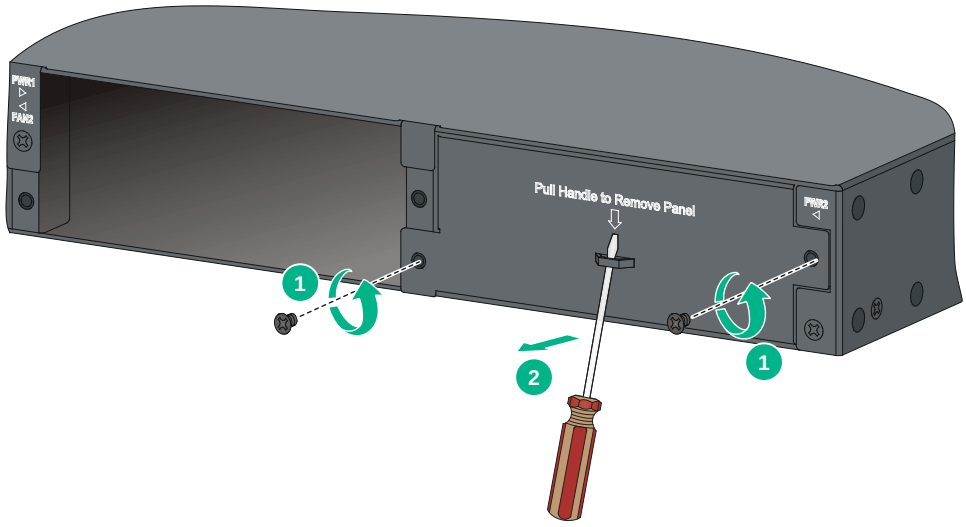
CAUTION:

To prevent damage to the power supply or the connectors on the backplane, insert the power supply gently. If you encounter a hard resistance when inserting the power supply, pull out the power supply and insert it again.

To install a power supply:

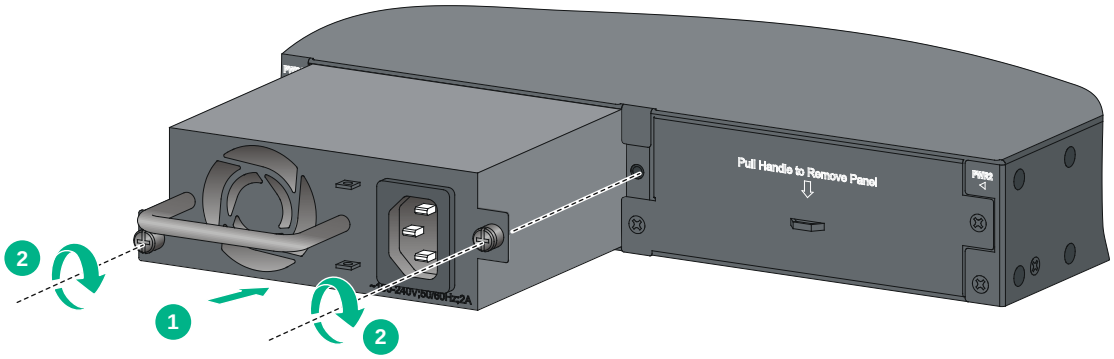
1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Remove the filler panel from the target power supply slot as follows:
   a. Remove the screws on the filler panel.
   b. Use a flathead screwdriver to remove the filler panel.

Figure 14 Removing the filler panel



3. Unpack the power supply and verify that the power supply model is correct.
4. Correctly orient the power supply with the power supply slot (use the letters on the power supply faceplate for orientation), grasp the handle of the power supply with one hand and support its bottom with the other, and slide the power supply slowly along the guide rails into the slot (see callout 1 in Figure 15).
5. Fasten the captive screws on the power supply with a Phillips screwdriver to secure the power supply in the chassis (see callout 2 in Figure 15). If the captive screw cannot be tightly fastened, verify the installation of the power supply.
6. Install the filler panel over the empty power supply slot to prevent dust and ensure good ventilation if you install only one power supply.

Figure 15 Installing a PSR150-A1 (JD362B) power supply



Removing a power supply

1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Disconnect the power cord.
3. Loosen the captive screws of the power supply with a Phillips screwdriver until they are completely disengaged.
4. Grasp the handle of the power supply with one hand and pull it out a little, support the bottom with the other hand, and pull the power supply slowly along the guide rails out of the slot.

   Put away the removed power supply in an antistatic bag or the power supply package bag for future use.
5. Install the filler panel to prevent dust and ensure good ventilation if no power supply is installed in the slot.

Connecting the power cord

CAUTION:
Provide a circuit breaker for each power supply and make sure the circuit breaker is off before installation.

Table 6 Power cord connection procedures at a glance

Power supply	Available power source	Connection procedure reference
PSR150-A1 (JD362B)	AC power source	Connecting the power cord for a PSR150-A1 (JD362B)
PSR150-D1 (JD366B)	–48 VDC power source in the equipment room	Connecting the power cord for a PSR150-D1 (JD366B)
	RPS (RPS800-A or RPS1600-A)	

Connecting the power cord for a PSR150-A1 (JD362B) power supply

To connect the power cord for a PSR150-A1 (JD362B) power supply:

1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Connect one end of the AC power cord supplied with the power supply to the power receptacle .
3. Connect the other end of the power cord to an AC power source.

Connecting the power cord for a PSR150-D1 (JD366B) power supply

WARNING!

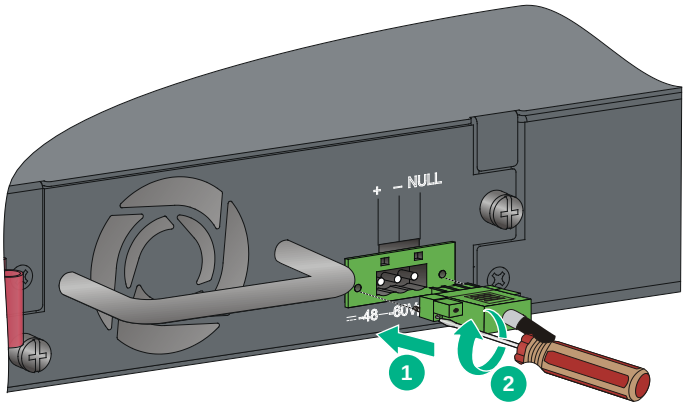
- To use a –48 VDC power source for power supply, use the power cord shipped with the power supply.
- To use an RPS for power supply, purchase a power cord compatible with the RPS yourself.
- To connect a DC power cord to a –48 VDC power source, identify the positive (+) and negative (-) marks on the two wires of the power cord to avoid connection mistakes.

To connect the power cord for a PSR150-D1 (JD366B) power supply:

1. Wear an ESD wrist strap and make sure it makes good skin contact and is reliably grounded.
2. Unpack the DC power cord, correctly orient the connector at one end of the cable with the power receptacle on the power supply, and insert the connector into the DC-input power receptacle (see callout 1 in Figure 16).

   The power receptacle is foolproof. If you cannot insert the connector into the receptacle, re-orient the connector rather than use excessive force to push it in.
3. Tighten the screws on the connector with a flat-blade screwdriver to secure the connector in the DC-input power receptacle (see callout 2 in Figure 16).
4. Connect the two wires at the other end of the power cord to a –48 VDC power source or an RPS.

Figure 16 Connecting the PSR150-D1 (JD366B)



Verifying the installation

After you complete the installation, verify the following information:

- There is enough space for heat dissipation around the switch, and the rack or workbench is stable.
- The grounding cable is securely connected.
- The correct power source is used.
- The power cords are correctly connected.
- All the interface cables are cabled indoors. If any cable is routed outdoors, verify that the socket strip with lightning protection and lightning arresters for network ports have been correctly connected.

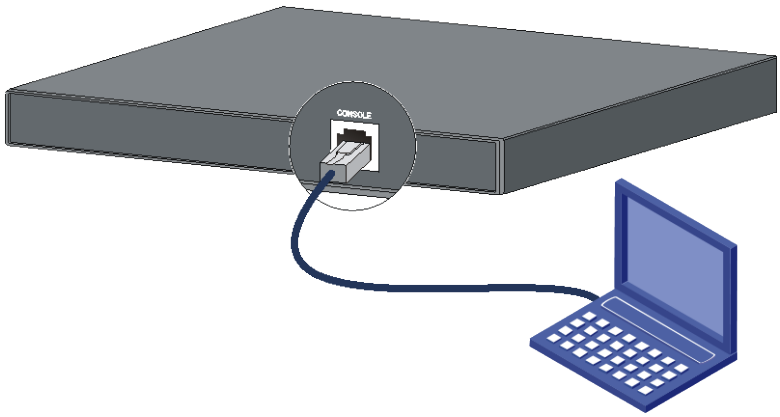
Accessing the switch for the first time

Setting up the configuration environment

You can access the switch through the serial console port or the mini USB console port. The switch is not provided with a serial console cable or Mini USB console cable. Prepare these cables yourself or purchase them from Hewlett Packard Enterprise.

Only the mini USB console port takes effect if you connect both the serial console port and mini USB console port.

Figure 17 Connecting the console port to a PC



Connecting the console cable

A console cable is an 8-core shielded cable, with a crimped RJ-45 connector at one end for connecting to the console port of the switch, and a DB-9 female connector at the other end for connecting to the serial port on the console terminal.

Figure 18 Console cable

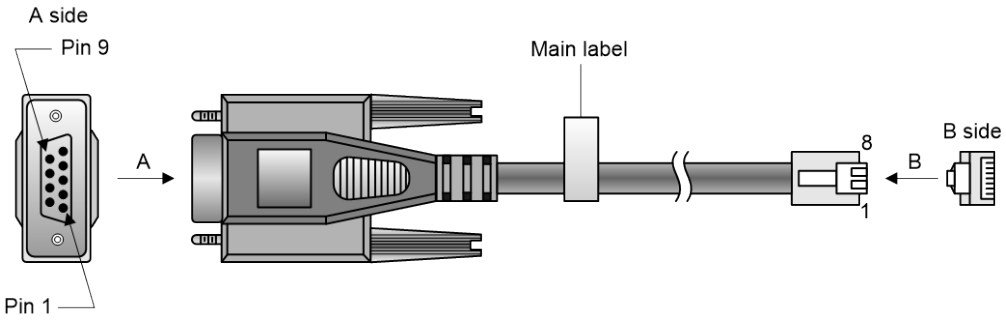


Table 7 Console port signaling and pinout

RJ-45	Signal	DB-9	Signal
1	RTS	8	CTS
2	DTR	6	DSR
3	TXD	2	RXD
4	SG	5	SG
5	SG	5	SG
6	RXD	3	TXD
7	DSR	4	DTR
8	CTS	7	RTS

To connect a configuration terminal (for example, a PC) to the switch:

1. Plug the DB-9 female connector of the console cable to the serial port of the PC.
2. Connect the RJ-45 connector to the console port of the switch.

NOTE:

- Identify the mark on the console port and make sure you are connecting to the correct port.
- The serial ports on PCs do not support hot swapping. To connect a PC to an operating switch, first connect the PC end. To disconnect a PC from an operating switch, first disconnect the switch end.

Connecting the Mini USB console cable

A Mini USB console cable has a Mini USB Type B connector at one end to connect to the Mini USB console port of the switch, and a standard USB Type A connector at the other end to connect to the USB port on the PC.

To connect to the PC through the Mini USB console cable:

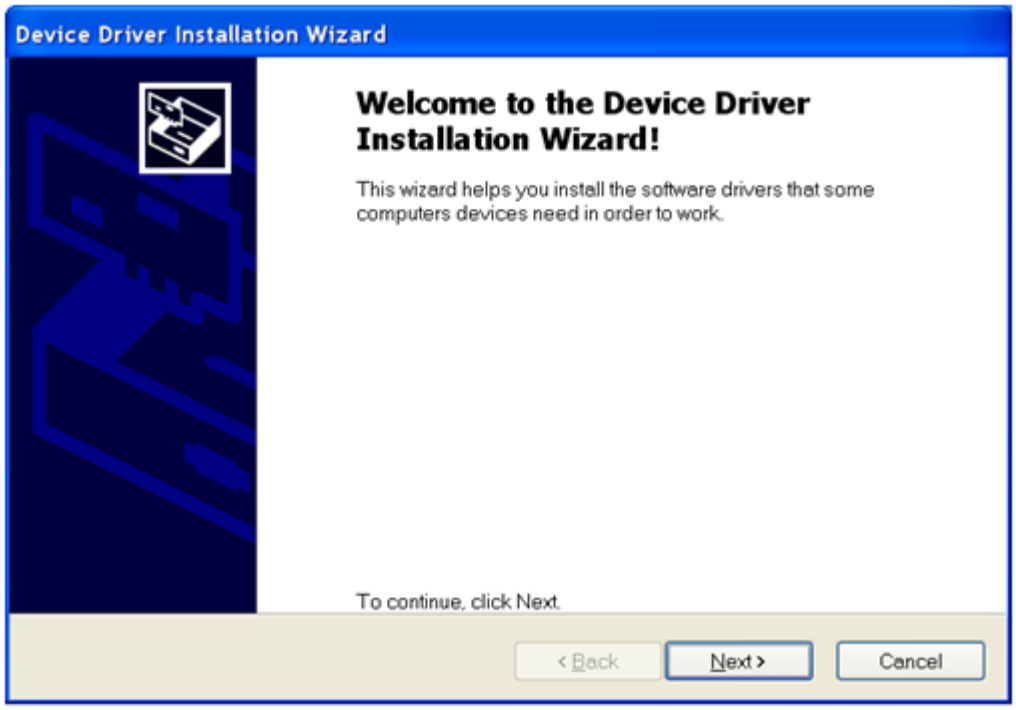
1. Connect the standard USB Type A connector to the USB port of the PC.
2. Connect the Mini USB Type B connector to the Mini USB console port of the switch.
3. Click the following link, or copy it to the address bar on the browser to log in to download page of the USB console driver, and download the driver.

   http://www.exar.com/connectivity/uart-and-bridging-solutions/usb-uarts/xr21v1410
4. Select a driver program according to the operating system you use:

   - **XR21V1410_XR21B1411_Windows_Ver1840_x86_Installer.EXE**—32-bit operating system.
   - **XR21V1410_XR21B1411_Windows_Ver1840_x64_Installer.EXE**—64-bit operating system.

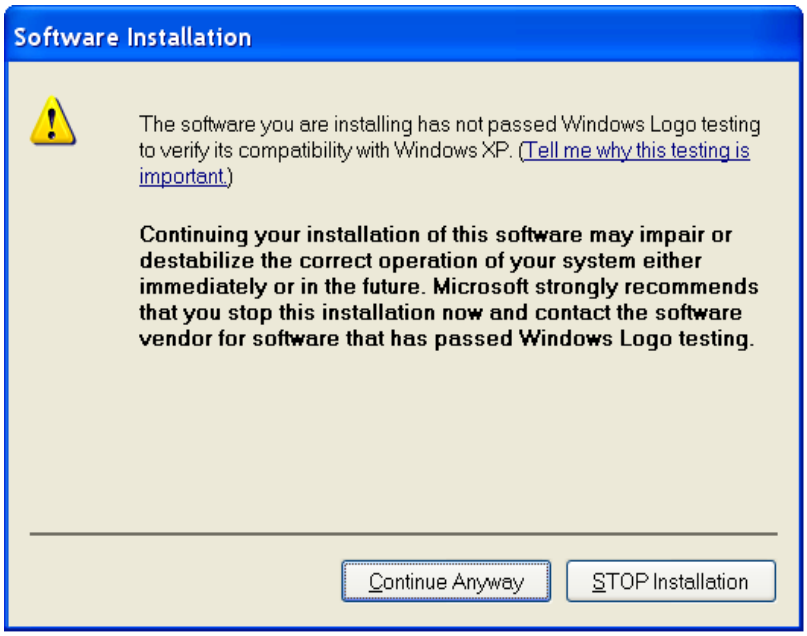
5. Click **Next** on the installation wizard.

Figure 19 Device Driver Installation Wizard



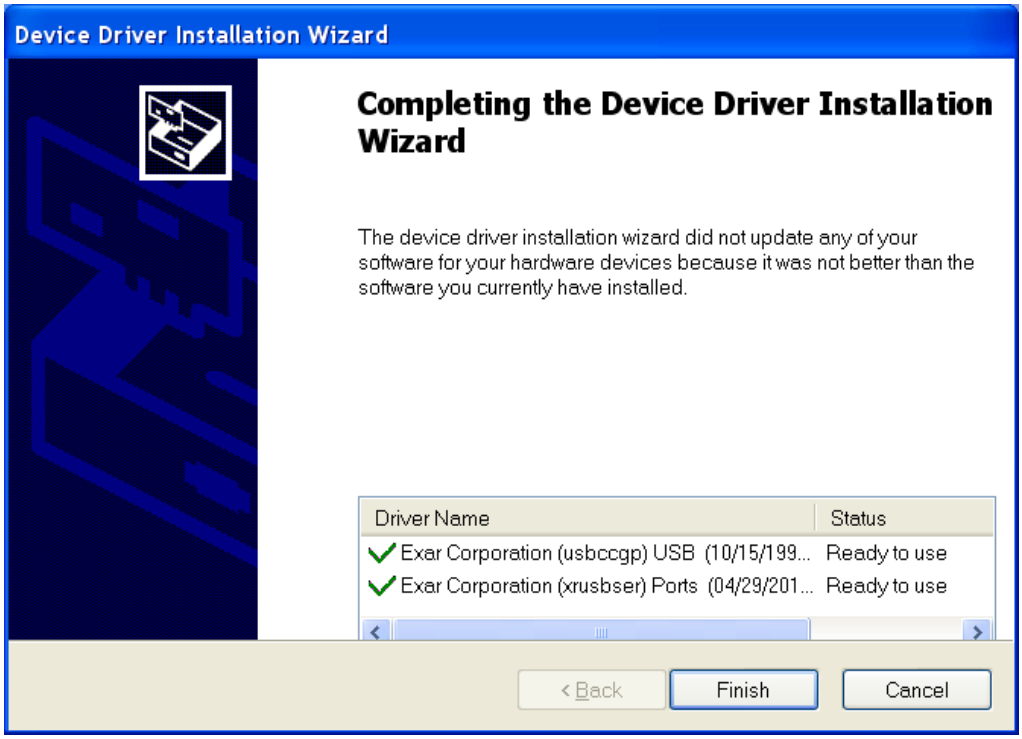
6. Click **Continue Anyway** if the following dialog box appears.

Figure 20 Software Installation



7. Click **Finish**.

Figure 21 Completing the device driver installation wizard



Setting terminal parameters

To configure and manage the switch through the console port, you must run a terminal emulator program, TeraTermPro or PuTTY, on your PC. You can use the emulator program to connect a network device, a Telnet site, or an SSH site. For more information about the terminal emulator programs, see the user guides for these programs.

The following are the required terminal settings:

- **Bits per second**—9,600.
- **Data bits**—8.
- **Parity**—None.
- **Stop bits**—1.
- **Flow control**—None.

Powering on the switch

Before powering on the switch, verify that the following conditions are met:

- The power cord is correctly connected.
- The input power voltage meets the requirement of the switch.

- The console cable is correctly connected.
- The PC has started, and its serial port settings are consistent with the console port settings on the switch.

Power on the switch. During the startup process, you can access Boot ROM menus to perform tasks such as software upgrade and file management. The Boot ROM interface and menu options differ with software versions. For more information about Boot ROM menu options, see the software-matching release notes for the device.

After the startup completes, you can access the CLI to configure the switch.

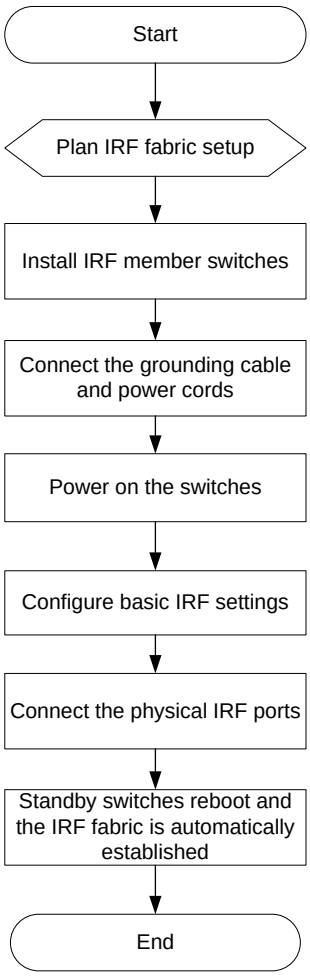
For more information about the configuration commands and CLI, see *HPE FlexFabric 5901 Switch Series Configuration Guides* and *HPE FlexFabric 5901 Switch Series Command References*.

Setting up an IRF fabric

You can use HPE IRF technology to connect and virtualize HPE 5901AF 48G 4XG 2QSFP+ switches into a large virtual switch called an "IRF fabric" for flattened network topology, and high availability, scalability, and manageability.

IRF fabric setup flowchart

Figure 22 IRF fabric setup flowchart



To set up an IRF fabric:

Step	Description
1. Plan IRF fabric setup	Plan the installation site and IRF fabric setup parameters: • Planning IRF fabric size and the installation site • Identifying the master switch and planning IRF member IDs • Planning IRF topology and connections • Identifying physical IRF ports on the member switches • Planning the cabling scheme
2. Install IRF member switches	See "Installing the switch in a 19-inch rack" or "Mounting the switch on a workbench."
3. Connect ground wires and power cords	See "Grounding the switch" and "Connecting the power cord."
4. Power on the switches	N/A
5. Configure basic IRF settings	See *HPE FlexFabric 5901 Switch Series IRF Configuration Guide*.
6. Connect the physical IRF ports	Connect physical IRF ports on switches. Use SFP+/QSFP+ transceiver modules and fibers over a long distance, or use SFP+/QSFP+ cables over a short distance. All switches except the master switch automatically reboot, and the IRF fabric is established.

Planning IRF fabric setup

This section describes issues that an IRF fabric setup plan must cover.

Planning IRF fabric size and the installation site

Choose switch models and identify the number of required IRF member switches, depending on the user density and upstream bandwidth requirements. The switching capacity of an IRF fabric equals the total switching capacities of all member switches.

Plan the installation site depending on your network solution, as follows:

- Place all IRF member switches in one rack for centralized high-density access.
- Distribute the IRF member switches in different racks to implement the ToR access solution for a data center.

Identifying the master switch and planning IRF member IDs

Determine which switch you want to use as the master for managing all member switches in the IRF fabric.

An IRF fabric has only one master switch. You configure and manage all member switches in the IRF fabric at the CLI of the master switch. IRF member switches automatically elect a master.

You can affect the election result by assigning a high member priority to the intended master switch. For more information about master election, see *HPE FlexFabric 5901 Switch Series IRF Configuration Guide*.

Prepare an IRF member ID assignment scheme. An IRF fabric uses member IDs to uniquely identify and manage its members, and you must assign each IRF member switch a unique member ID.

Planning IRF topology and connections

You can create an IRF fabric in daisy chain topology or more reliable ring topology. In ring topology, the failure of one IRF link does not cause the IRF fabric to split as in daisy chain topology. Instead, the IRF fabric changes to a daisy chain topology without interrupting network services.

You connect the IRF member switches through IRF ports, the logical interfaces for the connections between IRF member switches. Each IRF member switch has two IRF ports: IRF-port 1 and IRF-port 2. To use an IRF port, you must bind a minimum of one physical port to it.

When connecting two neighboring IRF member switches, you must connect the physical ports of IRF-port 1 on one switch to the physical ports of IRF-port 2 on the other switch.

As a best practice to avoid loop topology, first complete IRF configuration and then connect the IRF member switches.

The HPE 5901AF 48G 4XG 2QSFP+ switches can provide 10-GE/40-GE IRF connections through SFP+ ports/QSFP+ ports, and you can bind several SFP+ ports/QSFP+ ports to an IRF port for increased bandwidth and availability.

Figure 23 and Figure 24 show the topologies of an IRF fabric made up of three switches. The IRF port connections in the two figures are for illustration only, and more connection methods are available.

Figure 23 IRF fabric in daisy chain topology

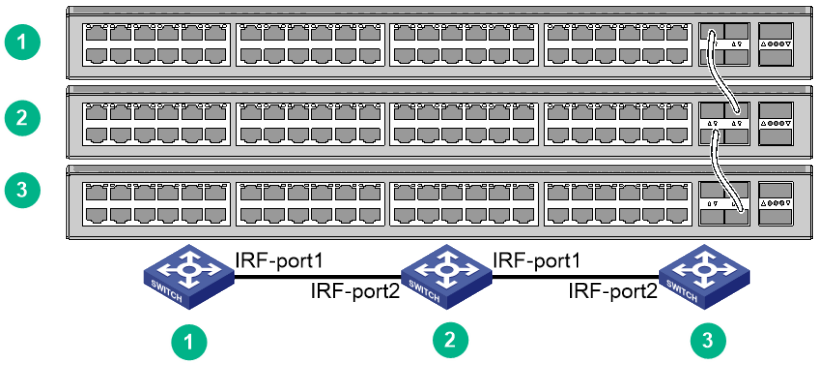
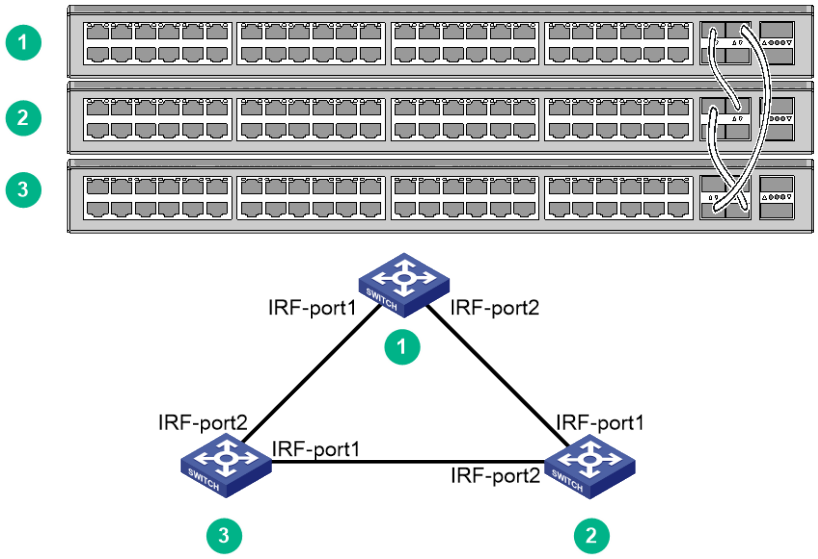


Figure 24 IRF fabric in ring topology



Identifying physical IRF ports on the member switches

Identify the physical IRF ports on the member switches according to your topology and connection scheme.

Only the SFP+ ports and QSFP+ ports on the switch can be used for IRF connections. The 10G ports split from a QSFP+ port can also be used for IRF connections.

Planning the cabling scheme

Use SFP+/QSFP+ cables, or SFP+/QSFP+ transceiver modules and fibers to connect the IRF member switches. If the IRF member switches are far away from one another, choose SFP+/QSFP+ transceiver modules with optical fibers. If the IRF member switches are all in one equipment room, choose SFP+/QSFP+ cables. For more information about SFP+/QSFP+ cables and SFP+/QSFP+ transceiver modules, see ports in *Hardware Information and Specifications*.

The following subsections describe several HPE recommended IRF connection schemes, and all these schemes use a ring topology.

IMPORTANT:

In these schemes, all physical IRF ports are located on the same side. If physical IRF ports are on different sides, you must measure the distance between them to select an appropriate cable.

Connecting the IRF member switches in one rack

Use SFP+ cables to connect the IRF member switches (9 switches in this example) in a rack as shown in Figure 25. The switches in the ring topology (see Figure 26) are in the same order as connected in the rack.

Figure 25 Connecting the switches in one rack

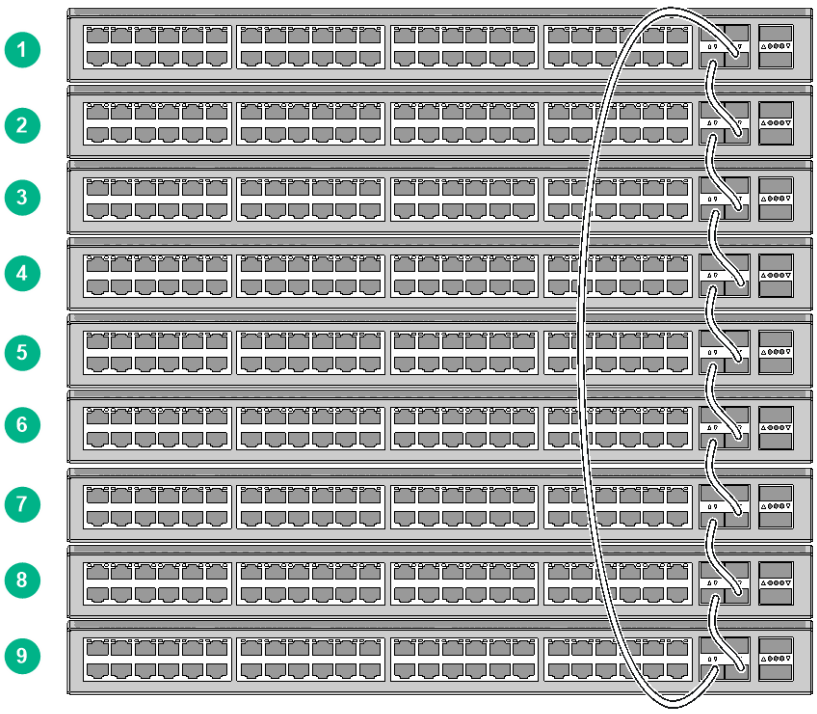
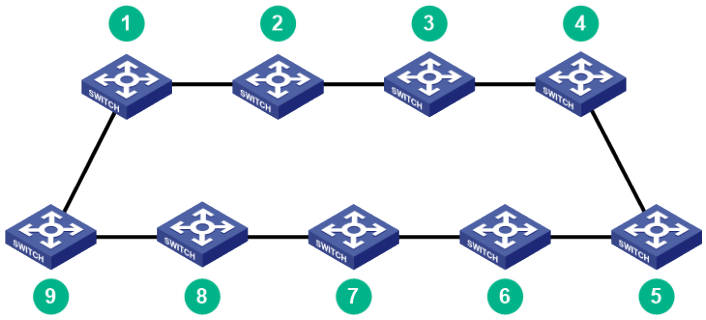


Figure 26 IRF fabric topology

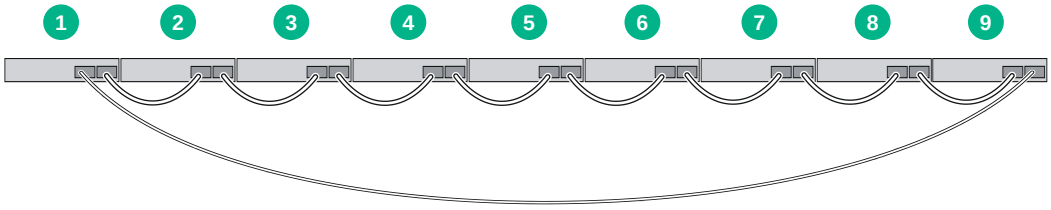


Connecting the IRF member switches in a ToR solution

You can install IRF member switches in different racks side by side to deploy a top of rack (ToR) solution.

Figure 27 shows an example for connecting 9 top of rack IRF member switches by using SFP+/QSFP+ transceiver modules and optical fibers. The topology is the same as Figure 26.

Figure 27 ToR cabling



Configuring basic IRF settings

After you install the IRF member switches, power on the switches, and log in to each IRF member switch (see *HPE FlexFabric 5901 Switch Series Fundamentals Configuration Guide*) to configure their member IDs, member priorities, and IRF port bindings.

Follow these guidelines when you configure the switches:

- Assign the master switch higher member priority than any other switch.
- Bind physical ports to IRF port 1 on one switch and to IRF port 2 on the other switch. You perform IRF port binding before or after connecting IRF physical ports depending on the software release.
- To bind the ports on an interface card to an IRF port, you must install the interface card first. For how to install an interface card, see *HPE FlexFabric 5901 Switch Series Interface Modules User Guide*.
- Execute the **`display irf configuration`** command to verify the basic IRF settings.

For more information about configuring basic IRF settings, see *HPE FlexFabric 5901 Switch Series IRF Configuration Guide*.

Connecting the physical IRF ports

As a best practice to avoid loop topology, first complete IRF configuration and then connect the IRF member switches.

Use SFP+/QSFP+ cables, or SFP+/QSFP+ transceiver modules and fibers to connect the IRF member switches as planned.

Wear an ESD wrist strap when you connect SFP+/QSFP+ cables or SFP+/QSFP+ transceiver modules and fibers. For how to connect them, see *HPE Transceiver Modules and Network Cables Installation Guide*.

Verifying the IRF fabric setup

To verify the basic functionality of the IRF fabric after you finish configuring basic IRF settings and connecting IRF ports:

1. Log in to the IRF fabric through the console port of any member switch.
2. Create a Layer 3 interface, assign it an IP address, and make sure the IRF fabric and the remote network management station can reach each other.
3. Use Telnet, web, or SNMP to access the IRF fabric from the network management station. (See *HPE FlexFabric 5901 Switch Series Fundamentals Configuration Guide*.)
4. Verify that you can manage all member switches as if they were one node.
5. Display the running status of the IRF fabric by using the commands in Table 8.

Table 8 Displaying and maintaining IRF configuration and running status

Task	Command
Display information about the IRF fabric.	**`display irf`**
Display all members' IRF configurations that take effect at a reboot.	**`display irf configuration`**
Display IRF fabric topology information.	**`display irf topology`**

NOTE:

To avoid IP address collision and network problems, configure a minimum of one multi-active detection (MAD) mechanism to detect the presence of multiple identical IRF fabrics and handle collisions. For more information about MAD detection, see *HPE FlexFabric 5901 Switch Series IRF Configuration Guide*.

Maintenance and troubleshooting

Power supply failure

The switch uses removable power supplies. Examine the system status LED of the switch to identify power supply failure.

Symptom

The system status LED is not steady green.

Solution

To resolve the issue:

1. Verify that the switch power cord is correctly connected.
2. Verify that the power source meets the requirement.
3. Verify that the operating temperature of the switch is in an acceptable range and the power supply has good ventilation.
4. If the issue persists, contact Hewlett Packard Enterprise Support.

To replace a failed power supply, see "Installing/removing a ."

Fan module failure

WARNING!

- Do not power on the switch when the switch does not have any fan modules or has only one fan module installed.
- If both fan modules fail during operation, replace them within 2 minutes while the switch is operating.
- If one fan module fails, perform either of the following tasks:
  - If the ambient temperature is not higher than 27°C (80.6°F), replace the fan module within 24 hours and make sure the failed fan module remains in position before the replacement.
  - If the ambient temperature is higher than 27°C (80.6°F), replace the fan module immediately.

The switch uses removable fan modules. Examine the system status LED of the switch and the fan module status LED to identify fan module failure.

Symptom

The status LED on an HPE 5944 FAN Module with Port to Power Airflow (JL837A) or HPE 5944 FAN Module with Power to Port Airflow (JL838A) is flashing yellow or off.

Solution

See "Installing/removing a " to replace a failed fan module. If the issue persists, contact Hewlett Packard Enterprise Support.

Configuration terminal display problems

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

No display

Symptom

The PC displays nothing when the switch is powered on.

Solution

To resolve the issue:

1. Verify that the power supply is supplying power to the switch.
2. Verify that the console cable is correctly connected.
3. Verify that the console cable does not have any problems and the PC settings are correct.
4. If the issue persists, contact Hewlett Packard Enterprise Support.

Garbled display

Symptom

The display on the PC is garbled.

Solution

To resolve the issue:

1. Verify that the following settings are configured for the terminal:
   - **Baud rate**—9,600.
   - **Data bits**—8.

- **Parity**—None.
- **Stop bits**—1.
- **Flow control**—None.

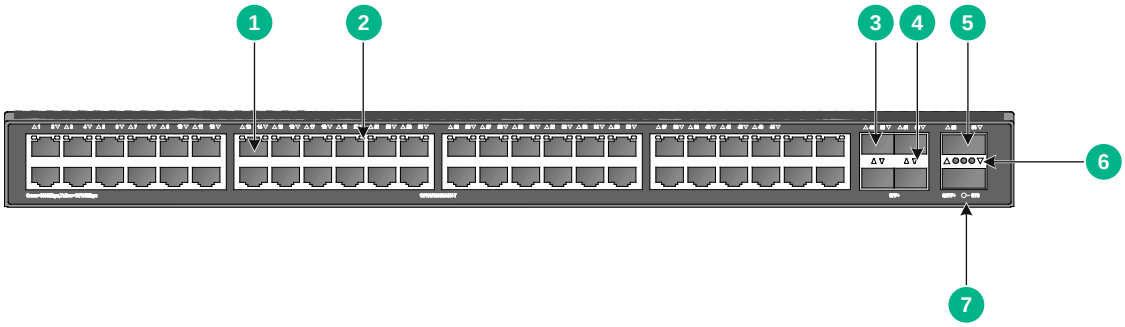
2. If the issue persists, contact Hewlett Packard Enterprise Support.

Appendix A Chassis views and technical specifications

Chassis views

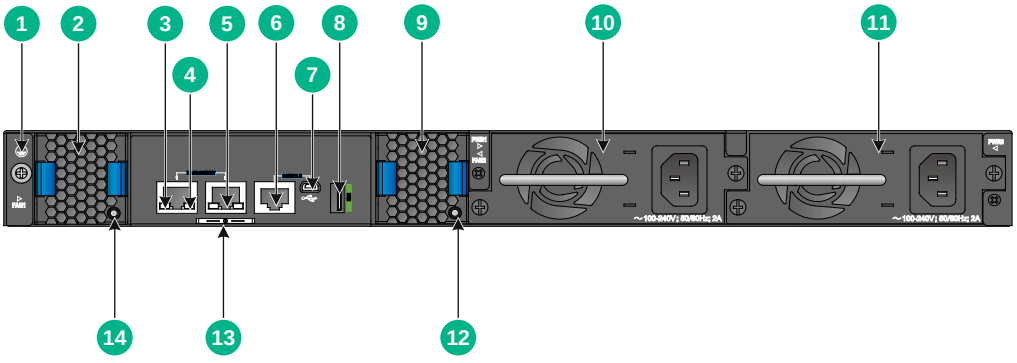
HPE 5901AF 48G 4XG 2QSFP+ Switch

Figure 28 Front panel



(1) 10/100/1000BASE-T autosensing Ethernet port	
(2) 10/100/1000BASE-T autosensing Ethernet port LED	
(3) SFP+ port	(4) SFP+ port LED
(5) QSFP+ port	(6) QSFP+ port LED
(7) System status LED (SYS)	

Figure 29 Rear panel



(1) Grounding screw	(2) Fan module 1
(3) LINK LED for the management Ethernet port	(4) ACT LED for the management Ethernet port
(5) Management Ethernet port	(6) Console port (CONSOLE)
(7) Mini USB console port	(8) USB port
(9) Fan module 2	(10) Power supply 1
(11) Power supply 2	(12) Fan module 2 status LED

(13) Serial label pull tab	(14) Fan module 1 status LED

The SN serial number and MAC address of the HPE 5901AF 48G 4XG 2QSFP+ Switch can be found on the serial label pull tab.

HPE 5901AF 48G 4XG 2QSFP+ Switch comes with power supply slot 1 empty and power supply slot 2 installed with a filler panel. You can install one or two power supplies for the switch as required. In Figure 29, two PSR150-A1 (JD362B) AC power supplies are installed in the power supply slots.

HPE 5901AF 48G 4XG 2QSFP+ Switch comes with the two fan module slots empty. You must install two fan modules of the same model for the switch. In Figure 29, two JL838A fan modules are installed in the fan module slots.

Technical specifications

Table 9 Technical specifications

Item	Specification
Dimensions (H × W × D)	43.6 × 440 × 360 mm (1.72 × 17.32 × 14.17 in)
Weight	≤ 7.5 kg (16.53 lb)
Console ports	• 1 × Mini USB console port • 1 × serial console port Only the Mini USB console port is available when you connect both ports.
USB ports	1
Management Ethernet ports	2
QSFP+ ports	2
SFP+ ports	4
10/100/1000BASE-T autosensing Ethernet ports	48
Power supply slots	2, on the rear panel
Fan module slots	2, on the rear panel

Input voltage	• PSR150-A1 (JD362B) AC power supply:
	  ○ Rated voltage range: 100 VAC to 240 VAC @ 50 Hz or 60 Hz
	  ○ Max voltage range: 90 VAC to 264 VAC @ 47 Hz to 63 Hz
	• PSR150-D1 (JD366B) DC power supply:
	  ○ Rated voltage range: –48 VDC to –60 VDC
	  ○ Max voltage range: –36 VDC to –72 VDC
	NOTE:
	You can use the –48 VDC power source or an A-RPS800 or A-RPS1600 RPS as the DC power source:
	• Rated voltage range: –48 VDC to –60 VDC
	• Max voltage range: –36 VDC to –72 VDC

Item	Specification
Minimum power consumption	• Single AC input: 66 W • Single DC input: 53 W • Dual AC inputs: 70 W • Dual DC inputs: 58 W
Maximum power consumption	• Single AC input: 77 W • Single DC input: 78 W • Dual AC inputs: 96 W • Dual DC inputs: 84 W
Chassis leakage current compliance	GB4943.1
Melting current of power supply fuse	• AC input: 6.3 A, 250 V • DC input: 8 A, 250 V
Operating temperature	–5 to +45°C (23°F to 113°F)
Relative humidity	5% to 95%, noncondensing
Fire resistance compliance	GB4943.1

Appendix B Removable components

Removable power supplies

You can install one power supply, or two power supplies for redundancy on the switch. The switch supports a mixture of an AC power supply and a DC power supply.

The PSR150-A1(JD362B) and PSR150-D1(JD366B) power supplies are available for the switch.

Table 10 Removable power supplies

Power supply	Specifications	Reference
PSR150-A1 (JD362B)	• Rated input voltage range: 100 VAC to 240 VAC @ 50 Hz or 60 Hz • Max input voltage range: 90 VAC to 264 VAC @ 47 Hz to 63 Hz • Max output power: 150 W	*HPE PSR150-A & PSR150-D Series Power Supplies User Guide*
PSR150-D1 (JD366B)	• Rated input voltage range: –48 VDC to –60 VDC • Max input voltage range: –36 VDC to –72 VDC • Max output power: 150 W	

Removable fan modules

CAUTION:
You can power on the switch only when the switch has two fan modules of the same model installed.

The switch supports removable fan modules. The HPE 5944 FAN Module with Port to Power Airflow (JL837A) and HPE 5944 FAN Module with Power to Port Airflow (JL838A) are available for the switch.

Table 11 Removable fan modules

Item	Specifications
HPE 5944 FAN Module with Port to Power Airflow (JL837A)	
Dimensions	40 × 40.6 × 105 mm (1.57 × 1.60 × 4.13 in)
Fan speed	20000 R.P.M
Max airflow	20 CFM
Airflow direction	Front to back (from the network port side to the power supply side)
Input voltage	12 V
Maximum power consumption	9.8 W
Reference	*HPE 5944 Fan Modules (JL837A & JL838A) User Guide*

Item	Specifications
HPE 5944 FAN Module with Power to Port Airflow (JL838A)	
Dimensions	40 × 40.6 × 105 mm (1.57 × 1.60 × 4.13 in)
Fan speed	20000 R.P.M
Max airflow	20 CFM
Airflow direction	Back to front (from the power supply side to the network port side)
Input voltage	12 V
Maximum power consumption	9.8 W
Reference	*HPE 5944 Fan Modules (JL837A & JL838A) User Guide*

Appendix C Ports and LEDs

Ports

Console port

The switch has two console ports: a serial console port and a Mini USB console port.

Table 12 Console port specifications

Item	Console port	Mini USB console port
Connector type	RJ-45	Mini USB Type B
Compliant standard	EIA/TIA-232	USB 2.0
Transmission baud rate	9600 bps (default) to 115200 bps	
Services	• Provides connection to an ASCII terminal. • Provides connection to the serial port of a local PC running terminal emulation program.	Provides connection to the USB port of a local PC running terminal emulation program.

Management Ethernet port

The switch provides two management Ethernet ports on the rear panel. You can connect this port to a PC or management station for loading and debugging software or remote management.

Table 13 Management Ethernet port specifications

Item	Specification
Connector type	RJ-45
Port transmission rate	10/100/1000 Mbps, half/full duplex
Transmission medium and max transmission distance	100 m (328.08 ft) over category-5 twisted pair cable
Functions and services	Switch software and Boot ROM upgrade, network management

USB port

The switch has one OHC-compliant USB2.0 port that can upload and download data at a rate up to 480 Mbps. You can use this USB port to access the file system on the flash of the switch, for example, to upload or download application and configuration files.

NOTE:

USB devices from different vendors vary in compatibilities and drivers. HPE does not guarantee the correct operation of USB devices from all vendors on the switch. If a USB device fails to operate on the switch, replace it with one from another vendor.

SFP+ port

The switch provides four fixed SFP+ ports on the front panel. To connect the peer SFP+ ports over a long distance, use SFP/SFP+ transceiver modules and fibers. To connect the peer SFP+ ports over a short distance, use SFP/SFP+ cables. You can select the GE SFP transceiver modules and cables in Table 14, 10-GE SFP+ transceiver modules in Table 15, and 10-GE SFP+ cables in Table 16 for the SFP+ ports.

Table 14 GE SFP transceiver modules and cables available for the SFP+ ports

Product code	HPE description	Central wavelength (nm)	Connector	Cable/fiber diameter (μm)	Modal bandwidth (MHz × km)	Max transmission distance
JD118B	HPE X120 1G SFP LC SX Transceiver	850	LC	Multi-mode, 50/125	500	550 m (1804.46 ft)
					400	500 m (1640.42 ft)
				Multi-mode, 62.5/125	200	275 m (902.23 ft)
					160	220 m (721.78 ft)
JD119B	HPE X120 1G SFP LC LX Transceiver	1310	LC	Single-mode, 9/125	N/A	10 km (6.21 miles)
				Multi-mode, 50/125	500 or 400	550 m (1804.46 ft)
				Multi-mode, 62.5/125	500	550 m (1804.46 ft)
JD098B	HPE X120 1G SFP LC BX 10-U Transceiver	TX: 1310 RX: 1490	LC	Single-mode, 9/125	N/A	10 km (6.21 miles)
JD099B	HPE X120 1G SFP LC BX 10-D Transceiver	TX: 1490 RX: 1310				
JD103A	HPE X120 1G SFP LC LH100 Transceiver	1550	LC	Single-mode, 9/125	N/A	100 km (62.14 miles)
JD089B	HPE X120 1G SFP RJ45 T Transceiver	N/A	RJ-45	Category-5 twisted pair	N/A	100 m (328.08 ft)

Table 15 10 Gbps SFP+ transceiver modules available for the SFP+ ports

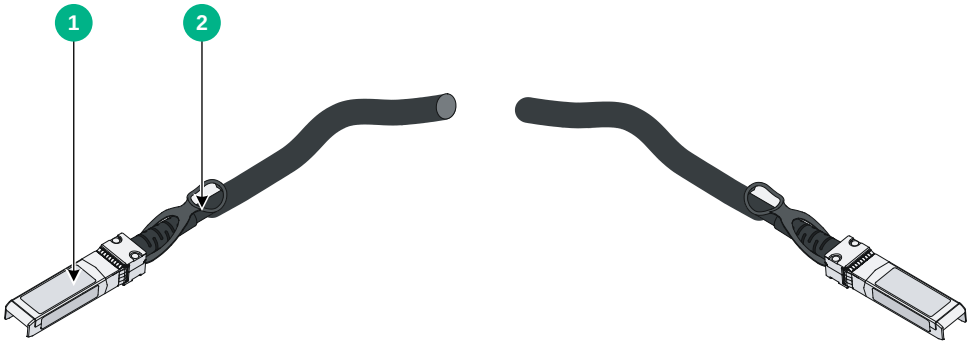
Product Code	HPE description	Central wavelength (nm)	Connector	Fiber diameter (µm)	Modal bandwidth (MHz × km)	Max transmission distance
JD092B	HPE X130 10G SFP+ LC SR Transceiver	850	LC	Multi-mode, 50/125	2000	300 m (984.25 ft)
					500	82 m (269.03 ft)
					400	66 m (216.54 ft)
				Multi-mode, 62.5/125	200	33 m (108.27 ft)
					160	26 m (85.30 ft)
JD094B	HPE X130 10G SFP+ LC LR Transceiver	1310	LC	Single-mode, 9/125	N/A	10 km (6.21 miles)
JL740A	HPE X130 10G SFP+ LC BiDi 40km-Downlink Transceiver	TX: 1330 RX: 1270	LC	Single-mode, 9/125	N/A	40 km (24.86 miles)
JG234A	HPE X130 10G SFP+ LC ER 40km Transceiver	1550	LC	Single-mode, 9/125	N/A	40 km (24.86 miles)
JL739A	HPE X130 10G SFP+ LC BiDi 40km-Uplink Transceiver	TX: 1270 RX: 1330	LC	Single-mode, 9/125	N/A	40 km (24.86 miles)
JG915A	HPE X130 10G SFP+ LC LH 80km Transceiver	1550	LC	Single-mode, 9/125	N/A	80 km (49.71 miles)
JL737A	HPE X130 10G SFP+ LC BiDi 10km-Uplink Transceiver	TX: 1270 RX: 1330	LC	Single-mode, 9/125	N/A	10 km (6.21 miles)
JL738A	HPE X130 10G SFP+ LC BiDi 10km-Downlink Transceiver	TX: 1330 RX: 1270	LC	Single-mode, 9/125	N/A	10 km (6.21 miles)

Table 16 SFP+ DAC cables available for the SFP+ ports

Product code	HPE description	Max transmission distance
JD095C	HPE X240 10G SFP+ SFP+ 0.65m DA Cable	0.65 m (2.13 ft)
JD096C	HPE X240 10G SFP+ SFP+ 1.2m DA Cable	1.2 m (3.94 ft)
JD097C	HPE X240 10G SFP+ SFP+ 3m DA Cable	3 m (9.84 ft)

Product code	HPE description	Max transmission distance
JG081C	HPE X240 10G SFP+ SFP+ 5m DA Cable	5 m (16.40 ft)

Figure 30 SFP+ cable



(1) Connector	(2) Pull latch

NOTE:

- As a best practice, use HPE transceiver modules and cables for the switch.
- The HPE transceiver modules and cables are subject to change over time. For the most recent list of HPE transceiver modules and cables, contact your Hewlett Packard Enterprise Support or marketing staff.
- For more information about HPE transceiver modules and cables, see *HPE Comware-Based Devices Transceiver Modules User Guide*.

QSFP+ port

The switch provides QSFP+ ports. You can select the QSFP+ transceiver modules in Table 17, the QSFP+ cables in Table 18, and the QSFP+ to SFP+ cables in Table 19 for the QSFP+ ports.

Table 17 QSFP+ transceiver modules available for the QSFP+ ports

Product code	HPE description	Central wavelength (nm)	Connector	Fiber diameter (μm)	Modal bandwidth (MHz × km)	Max transmission distance
JG325B	HP X140 40G QSFP+ MPO SR4 Transceiver	850	MPO	Multi-mode, 50/125	2000	100 m (328.08 ft)
					4700	150 m (492.12 ft)
JG709A	HP X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver	850	MPO	Multi-mode, 50/125	2000	300 m (984.25 ft)
					4700	400 m (1312.33 ft)

Product code	HPE description	Central wavelength (nm)	Connector	Fiber diameter (µm)	Modal bandwidth (MHz × km)	Max transmission distance
JG661A	HP X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	Four lanes: • 1271. • 1291. • 1311. • 1331.	LC	Single-mode, 9/125	N/A	10 km (6.21 miles)

Table 18 QSFP+ cables available for the QSFP+ ports

Product code	HPE description	Max transmission distance
JG326A	HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	1 m (3.28 ft)
JG327A	HP X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	3 m (9.84 ft)
JG328A	HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	5 m (16.40 ft)

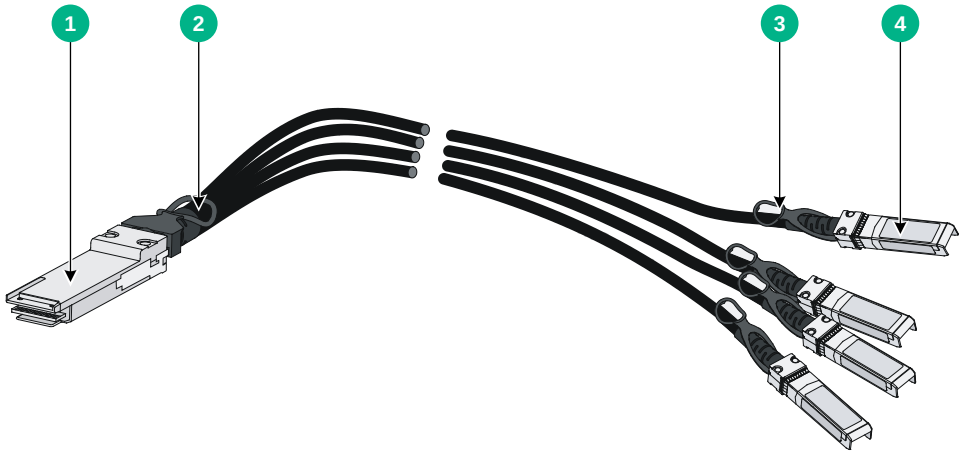
Table 19 QSFP+ to SFP+ cables available for the QSFP+ ports

Product code	HPE description	Max transmission distance
JG329A	HP X240 40G QSFP+ to 4×10G SFP+ 1m Direct Attach Copper Splitter Cable	1 m (3.28 ft)
JG330A	HP X240 40G QSFP+ to 4×10G SFP+ 3m Direct Attach Copper Splitter Cable	3 m (9.84 ft)
JG331A	HP X240 40G QSFP+ to 4×10G SFP+ 5m Direct Attach Copper Splitter Cable	5 m (16.40 ft)

Figure 31 40G QSFP+ cable

(1) Connector (2) Pull tab

Figure 32 40G QSFP+ to SFP+ cable



(1) QSFP+ module	(2) QSFP+ side pull tab
(3) SFP+ side pull tab	(4) SFP+ module

NOTE:

- As a best practice, use HPE transceiver modules and cables for the switch.
- You can use a JG325B or JG709A transceiver module to connect a QSFP+ port to four SFP+ ports. The QSFP+ transceiver module and SFP+ transceiver modules to be connected must be the same in specifications, including central wavelength and fiber type.
- The HPE transceiver modules and cables are subject to change over time. For the most recent list of HPE transceiver modules and cables, contact your Hewlett Packard Enterprise Support or marketing staff.
- For more information about HPE transceiver modules and cables, see *HPE Comware-Based Devices Transceiver Modules User Guide*.

For more information about HPE QSFP+ transceiver modules, QSFP+ cables, and QSFP+ to SFP+ cables, see *HPE Comware-Based Devices Transceiver Modules User Guide.*

10/100/1000BASE-T autosensing Ethernet port

Table 20 10/100/1000BASE-T autosensing Ethernet port specifications

Item	Specification
Connector type	RJ-45
Interface attributes	• 10 Mbps, half/full duplex • 100 Mbps, half/full duplex • 1000 Mbps, full duplex • Auto MDI/MDI-X
Max transmission distance	100 m (328.08 ft)
Transmission medium	Category-5 or above twisted pair cable
Standards	IEEE 802.3i, 802.3u, 802.3ab

LEDs

System status LED

The system status LED shows the operating state of the switch.

Table 21 System status LED description

LED mark	Status	Description
SYS	Steady green	The switch is operating correctly.
	Flashing green (1 Hz)	The switch is performing power-on self test (POST).
	Steady red	The switch has failed the POST or is faulty.
	Flashing yellow (1 Hz)	Some ports have failed to pass POST or are faulty.
	Off	The switch is powered off.

Management Ethernet port LEDs

The switch provides one LINK LED and one ACT LED for each management Ethernet port.

Table 22 Management Ethernet port LEDs description

LED mark	Status	Description
LINK	Off	The management Ethernet port is not connected.
	Steady green	The management Ethernet port is operating at 10/100/1000 Mbps.
ACT	Off	The management Ethernet port is not receiving or sending data.
	Flashing yellow	The management Ethernet port is sending or receiving data.

10/100/1000BASE-T autosensing Ethernet port LED

Table 23 10/100/1000BASE-T autosensing Ethernet port LED description

10/100/1000BASE-T autosensing Ethernet port LED status	Description
Steady green	A link is present on the port and the port is operating at 1000 Mbps.
Flashing green	The port is sending or receiving data at 1000 Mbps
Steady yellow	A link is present on the port and the port is operating at 10/100 Mbps.
Flashing yellow	The port is sending or receiving data at 10/100 Mbps
Off	No link is present on the port.

SFP+ port LED

Table 24 SFP+ port LED description

SFP+ port LED status	Description
Steady green	A link is present on the port and the port is operating at 10 Gbps.
Flashing green	The port is sending or receiving data at 10 Gbps.
Steady yellow	A link is present on the port and the port is operating at 1 Gbps.
Flashing yellow	The port is sending or receiving data at 1 Gbps.
Flashing yellow (3 Hz)	The port has failed POST.
Off	No link is present on the port.

QSFP+ port LED

Table 25 QSFP+ port LED description

LED status	Description
Steady green	A link is present on the port and the port is operating at 40 Gbps.
Flashing green	The port is sending or receiving data at 40 Gbps.
Steady yellow	A link is present on the port and the port is operating at 10 Gbps.
Flashing yellow	The port is sending or receiving data at 10 Gbps.
Off	No transceiver module or cable has been installed or no link is present on the port.

Fan module status LED on the fan module

The HPE 5944 FAN Module with Port to Power Airflow (JL837A) and HPE 5944 FAN Module with Power to Port Airflow (JL838A) each have a fan module status LED to indicate their operating status.

Table 26 Fan module status LED description

LED mark	Status	Description
FAN	Steady yellow	The fan module is operating correctly.
	Flashing yellow (1Hz)	The fan module is faulty.
	Off	The fan module has not been installed or has no power input.

Appendix D Cooling system

To dissipate heat timely and ensure system stability, the switch uses high-performance cooling system. Consider the site ventilation design when you plan the installation site for the switch.

The switch uses hot-swappable fan modules. You can provide airflow from the power supply side to the port side or from the port side to the power supply side for the switch by using different fan modules. For heat dissipation, install two fan modules of the same model for the switch.

Table 27 Cooling system

Switch model	Available fan module	Airflow direction
HPE 5901AF 48G 4XG 2QSFP+ Switch	HPE 5944 FAN Module with Port to Power Airflow (JL837A)	From the port side to the power supply side
	HPE 5944 FAN Module with Power to Port Airflow (JL838A)	From the power supply side to the port side

Figure 33 Airflow from the port side to the power supply side (with HPE 5944 FAN Module with Port to Power Airflow)

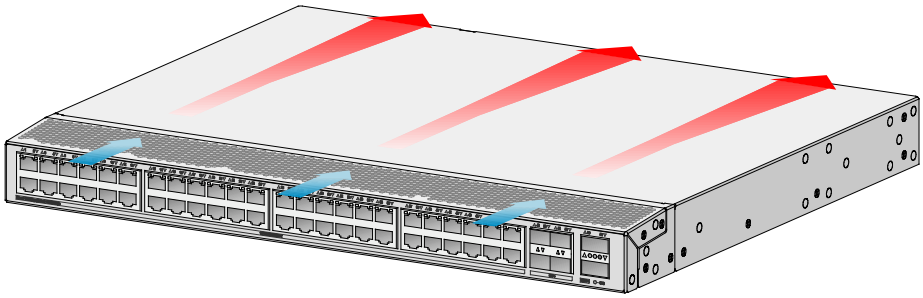
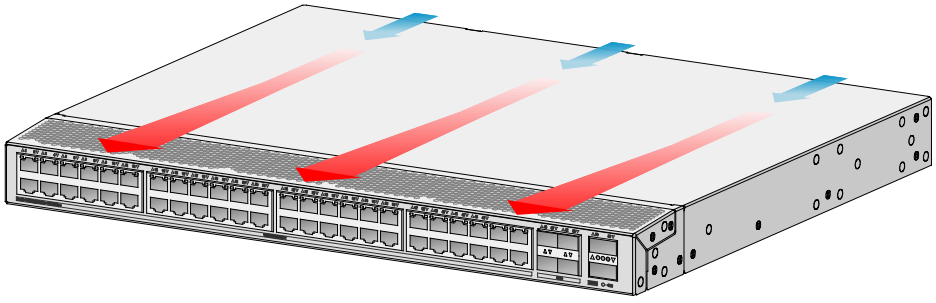


Figure 34 Airflow from the power supply side to the port side (with HPE 5944 FAN Module with Power to Port Airflow)



Document conventions and icons

Conventions

This section describes the conventions used in the documentation.

Command conventions

Convention	Description
Boldface	**Bold** text represents commands and keywords that you enter literally as shown.
Italic	*Italic* 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 Boldface. For example, the **New User** window opens; 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

Convention	Description
	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 access controller engine on a unified wired-WLAN switch.
	Represents an access point.
	Represents a wireless terminator unit.
	Represents a wireless terminator.
	Represents a mesh access point.
	Represents omnidirectional signals.
	Represents directional signals.
	Represents a security product, such as a firewall, UTM, multiservice security gateway, or load balancing device.
	Represents a security module, such as a firewall, load balancing, NetStream, SSL VPN, IPS, or ACG module.

Examples provided in this document

Examples in this document might use devices that differ from your device in hardware model, configuration, or software version. It is normal that the port numbers, sample output, screenshots, and other information in the examples differ from what you have on your device.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  www.hpe.com/assistance
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates, go to either of the following:
  - Hewlett Packard Enterprise Support Center **Get connected with updates** page:

    www.hpe.com/support/e-updates
  - Software Depot website:

    www.hpe.com/support/softwaredepot
- To view and update your entitlements, and to link your contracts, Care Packs, and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

  www.hpe.com/support/AccessToSupportMaterials

IMPORTANT:

Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HP Passport set up with relevant entitlements.

Websites

Website	Link
Networking websites	
Hewlett Packard Enterprise Information Library for Networking	www.hpe.com/networking/resourcefinder
Hewlett Packard Enterprise Networking website	www.hpe.com/info/networking
Hewlett Packard Enterprise My Networking website	www.hpe.com/networking/support
Hewlett Packard Enterprise My Networking Portal	www.hpe.com/networking/mynetworking
Hewlett Packard Enterprise Networking Warranty	www.hpe.com/networking/warranty
General websites	
Hewlett Packard Enterprise Information Library	www.hpe.com/info/enterprise/docs
Hewlett Packard Enterprise Support Center	www.hpe.com/support/hpesc
Hewlett Packard Enterprise Support Services Central	ssc.hpe.com/portal/site/ssc/
Contact Hewlett Packard Enterprise Worldwide	www.hpe.com/assistance
Subscription Service/Support Alerts	www.hpe.com/support/e-updates
Software Depot	www.hpe.com/support/softwaredepot
Customer Self Repair (not applicable to all devices)	www.hpe.com/support/selfrepair
Insight Remote Support (not applicable to all devices)	www.hpe.com/info/insightremotesupport/docs

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty, Care Pack Service, or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure

submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

For more information and device support details, go to the following website:

www.hpe.com/info/insightremotesupport/docs

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