

HP 5900 Switch Series

Installation Guide

Abstract

This document guides you through installation of HP products, including installing the device, connecting to the network, hardware management, and troubleshooting.

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Product overview

Table 1 models and power supplies

Product code	HP description	Alias
JC772A	HP 5900AF-48XG-4QSFP+ Switch	HP 5900AF-48XG-4QSFP+
JC680A	A58x0AF 650W AC Power Supply	650W AC power supply
JC681A	A58x0AF 650W DC Power Supply	650W DC power supply



IMPORTANT:

For regulatory identification purposes, the HP 5900AF-48XG-4QSFP+ switch is assigned an RMN BJNGA-AD0016. This regulatory number should not be confused with the marketing name HP 5900AF, or product code JC772A.

Preparing for installation

Safety recommendations

WARNING!

Read all of the safety instructions in *5900 Routing Switch Series Compliance and Safety Guide* supplied with your device before installation and operation.

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, unplug 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 proper ventilation of the equipment room and keep the air inlet and outlet vents of the switch free of obstruction.
- Connect the yellow-green protection grounding cable before power-on.
- Make sure that 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 FRUs, including power supplies and fan trays, wear an ESD-preventive wrist strap to avoid damaging the units.

Examining the installation site

The HP 5900AF-48XG-4QSFP+ switch must be used indoors.

Mount your switch in a rack and make sure:

- Adequate clearance is reserved at the air inlet and exhaust vents for ventilation.
- The rack has a good ventilation system.
- Identify the hot aisle and cold aisle at the installation site, and make sure that 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 bottom device from entering the top device.
- The rack is sturdy enough to support the switch and its accessories.
- The rack is well earthed.

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

Temperature/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 switch.

For the temperature and humidity requirements of different switch models, see "[Support and other resources](#)."

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 2 Dust concentration limit in the equipment room

Substance	Concentration limit (particles/m ³)
Dust	$\leq 3 \times 10^4$ (no visible dust on the tabletop over three days)

NOTE:

Dust 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 3](#).

Table 3 Harmful gas limits in the equipment room

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

EMI

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

- If AC power is used, use a single-phase three-wire power receptacle with 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.

- Route interface cables only indoors to prevent signal ports from getting damaged by overvoltage or overcurrent caused by lightning strikes.

Laser safety

WARNING!

Do not stare into any fiber port when the switch has power. The laser light emitted from the optical fiber may hurt your eyes.

The HP 5900 series switches are Class 1 laser devices.

Installation tools

- Phillips screwdriver
- ESD-preventive wrist strap

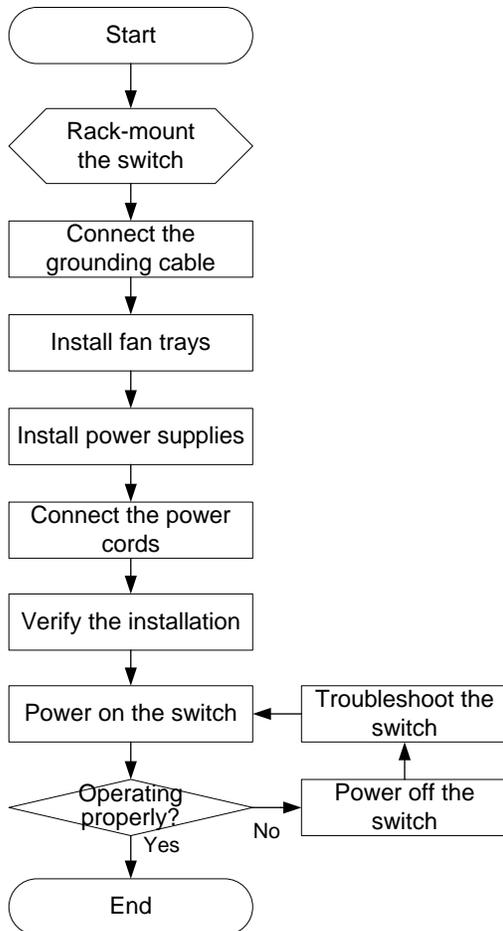
All these installation tools are user supplied.

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 HP for permission. Otherwise, HP shall not be liable for any consequence caused thereby.

Figure 1 Hardware installation flow

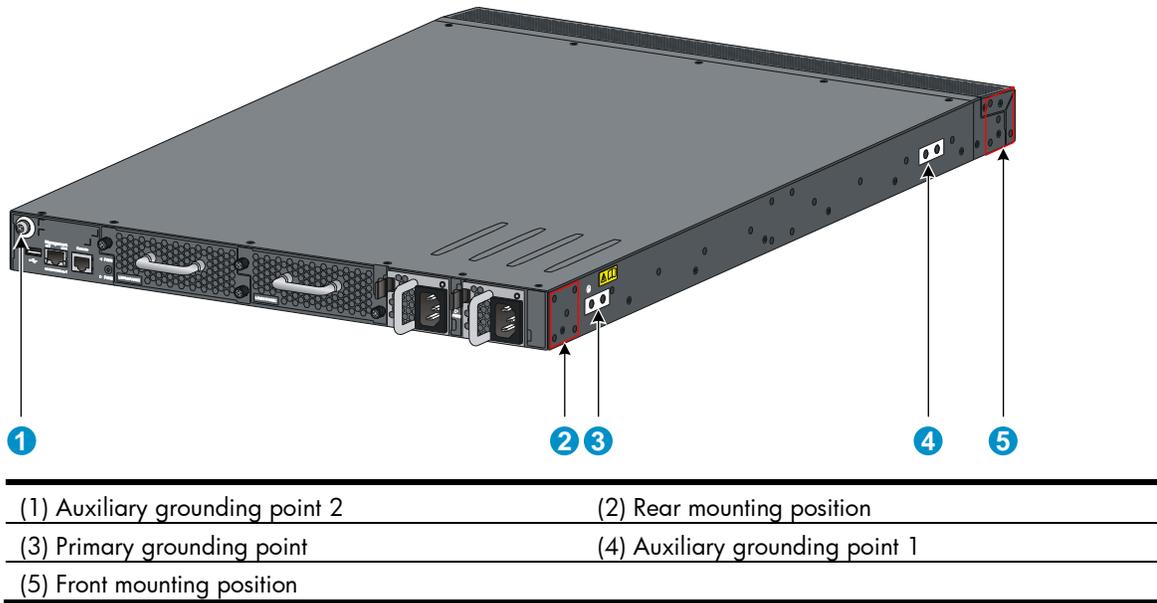


Installing the switch in a 19-inch rack

Installation prerequisites

The rack depth for the HP 5900AF-48XG-4QSFP+ Switches must be 1000 mm (39.37 in).

Figure 5 Identifying the mounting and grounding positions of the HP 5900AF-48XG-4QSFP+



Attaching the mounting brackets and chassis rails to the chassis

To attach the mounting brackets and chassis rails to the switch chassis:

1. Align the mounting brackets with the screw holes in the rear mounting position (see [Figure 6](#)) or front mounting position (see [Figure 7](#)).
2. Use M4 screws (supplied with the switch) to attach the mounting brackets to the chassis.
3. Align the chassis rails with the rail mounting holes in the chassis:
 - If the mounting brackets are in the rear mounting position, align the chassis rails with the screw holes at the front of the side panels (see [Figure 6](#)).
 - If the mounting brackets are in the front mounting position, align the chassis rails with the screw holes at the rear of the side panels (see [Figure 7](#)).
4. Use M4 screws (supplied with the switch) to attach the chassis rails to the chassis.

NOTE:

Attach the mounting brackets and chassis rails to both sides of the chassis in the same way.

Connecting the grounding cable to the chassis

⚠ CAUTION:

The primary grounding point and auxiliary grounding point 1 are located on the left side panel. If you use one of these grounding points, you must connect the grounding cable to the grounding point before you mount the switch in the rack.

To connect the grounding cable to a chassis grounding point, for example, the primary grounding point:

1. Choose a grounding point.
2. Unpack the grounding cable and grounding screws.
You can use the cable and screws shipped with the switch only for connecting to the primary grounding point or auxiliary grounding point 1.

3. Align the two-hole grounding lug at one end of the cable with the grounding holes of the grounding point, insert the grounding screws into the holes, and tighten the screws with a screwdriver to attach the grounding lug to the chassis, as shown in [Figure 6](#).

NOTE:

- HP recommends that you use the primary grounding point or auxiliary grounding point 1 because the grounding cable and grounding screw that come with the switch are suitable only for these two grounding points.
 - To use auxiliary grounding point 2 on the HP 5900AF-48XG-4QSFP+ switch, you must prepare a grounding cable yourself.
-

Figure 6 Attaching the rear mounting brackets/chassis rails/grounding cable to the chassis

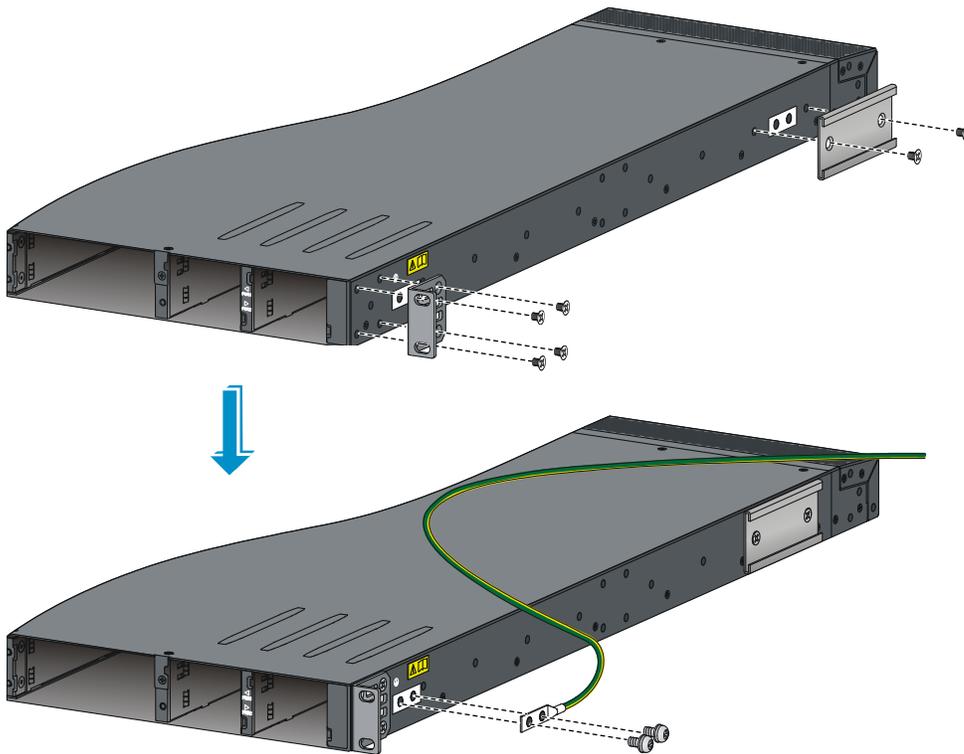
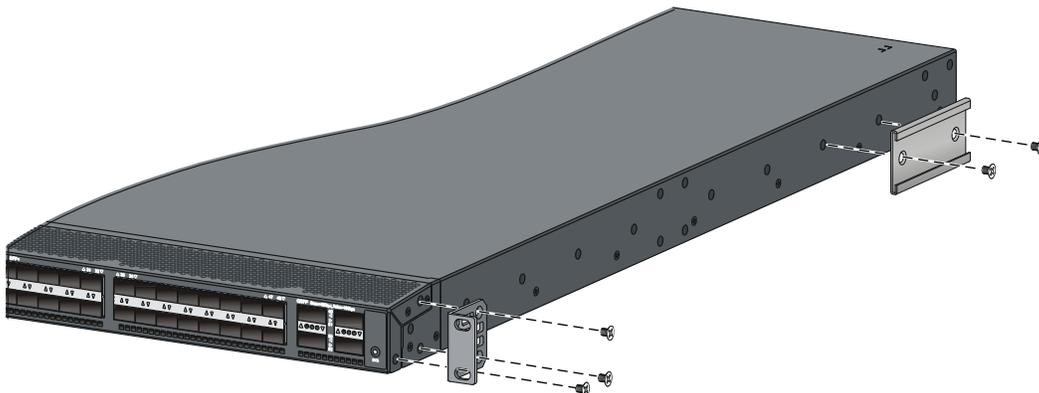


Figure 7 Attaching the front mounting brackets/chassis rails to the chassis

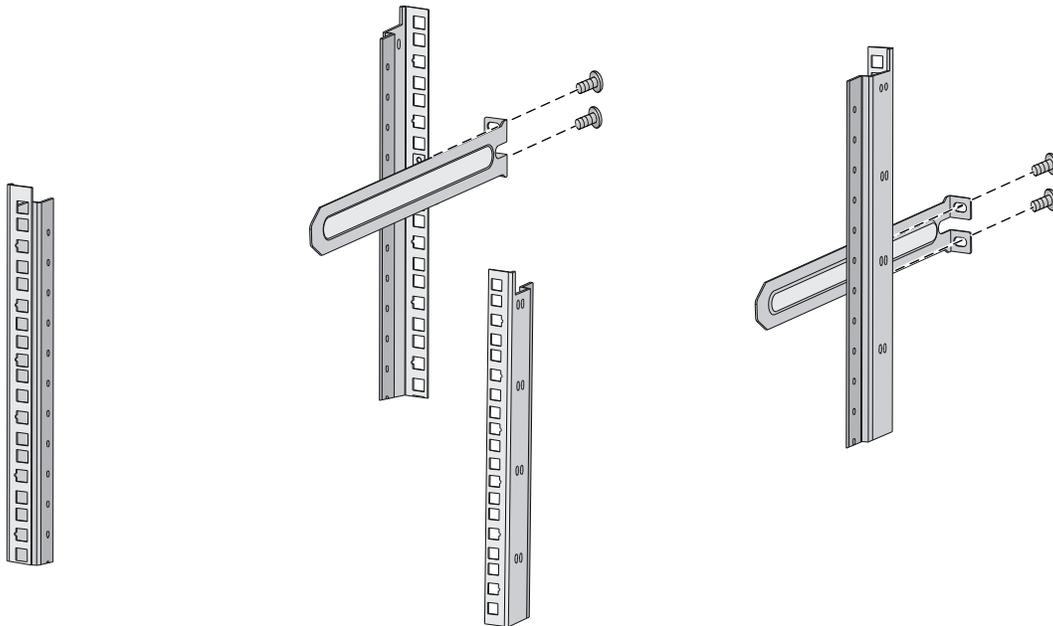


Attaching the slide rails to the rack

To attach the slide rails to the rack:

1. Identify the rack attachment position for the slide rails.
2. Install cage nuts (user-supplied) in the mounting holes in the rack posts.
3. Align the screw holes in one slide rail with the cage nuts in the rack post on one side, and use screws (user supplied) to attach the slide rail to the rack, as shown in [Figure 8](#).
4. Repeat the preceding step to attach the other slide rail to the rack post on the other side.
Keep the two slide rails at the same height so the slide rails can attach into the chassis rails.

Figure 8 Installing the slide rails



Mounting the switch in the rack

This task requires two people. To mount the switch in the rack:

1. Wear an ESD-preventive wrist strap and make sure it makes good skin contact and is well grounded.
2. Check that the mounting brackets and chassis rails have been securely attached to the switch chassis.
3. Check that the slide rails have been correctly attached to the rear rack posts.
4. Install cage nuts (user-supplied) to the front rack posts and make sure they are at the same level as the slide rails.
5. Supporting the bottom of the switch, align the chassis rails with the slide rails on the rack posts, as shown in [Figure 9](#). Work with another person to slide the chassis rails along the slide rails until the mounting brackets are flush with the rack posts.
6. Use screws (user-supplied) to attach the mounting brackets to the rack, as shown in [Figure 10](#).

To secure the switch in the rack, make sure that the front ends of the slide rails reach out of the chassis rails.

Figure 9 Mounting the switch in the rack (I)

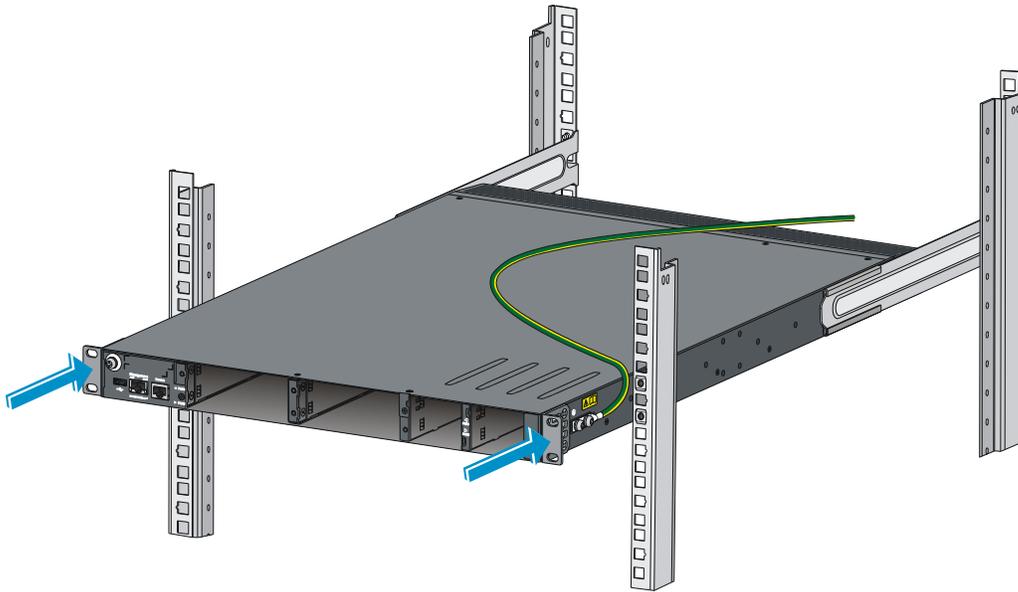
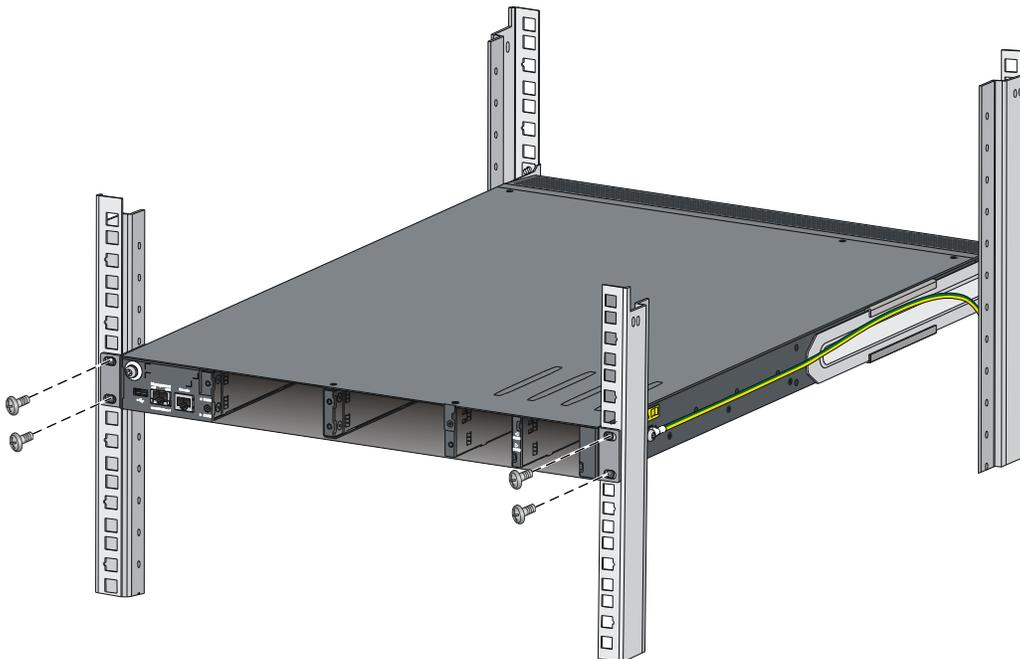


Figure 10 Mounting the switch in the rack (II)



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 a switch by using a grounding strip at the installation site or the AC power cord connected to the switch.

NOTE:

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

Grounding the switch with a grounding strip

⚠ WARNING!

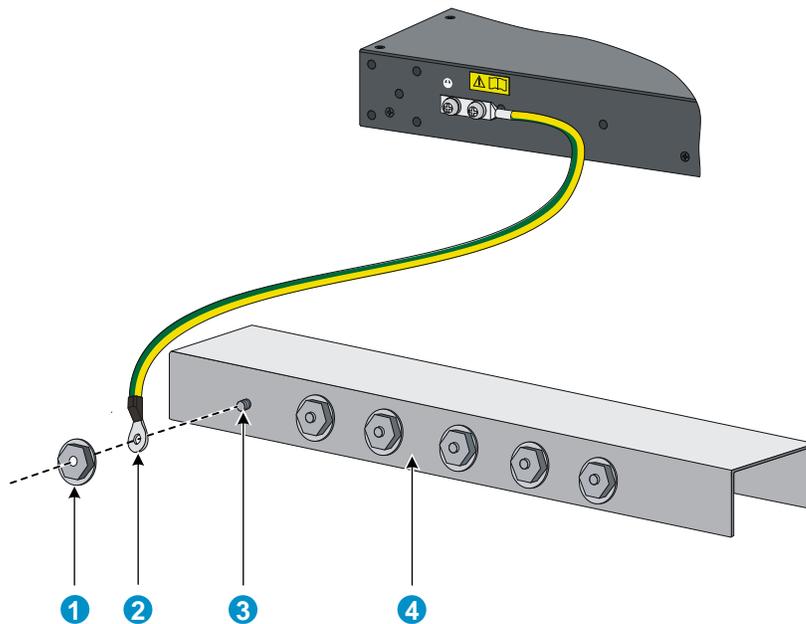
Connect the grounding cable to the grounding system in the equipment room. Do not connect it to a fire main or lightning rod.

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

To connect the grounding cable:

1. Attach the two-hole grounding lug at one end of the grounding cable to a grounding point on the switch chassis (see "[Connecting the grounding cable to the chassis](#)").
2. Remove the hex nut of a grounding post on the grounding strip.
3. Attach the OT terminal at the other end of the grounding cable to the grounding strip through the grounding post, and fasten the OT terminal with the removed hex nut.

Figure 11 Connecting the grounding cable to a grounding strip



(1) Hex nut

(2) OT terminal

(3) Grounding post

(4) Grounding strip

NOTE:

- HP recommends that you use the primary grounding point or auxiliary grounding point 1, because the grounding cable and grounding screw provided with the switch are applicable only to these two grounding points.
 - To use auxiliary grounding point 2 on the HP 5900AF-48XG-4QSFP+ switch, you must prepare a grounding cable yourself. The connection method is the same as connecting to the other two grounding points.
-

Grounding the switch by using the AC power cord

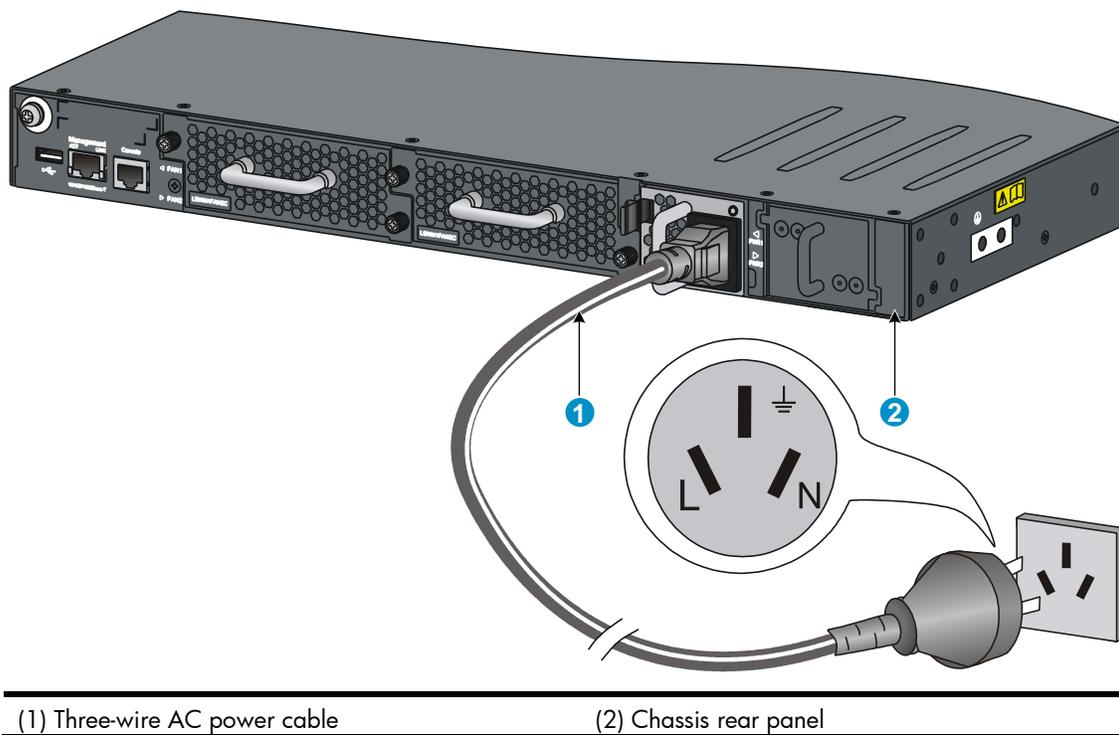
If the installation site has no grounding strips, you can ground an AC-powered switch through the PE wire of the power cord, but must make sure:

- The power cord has a PE terminal.
 - The ground contact in the power outlet is securely connected to the ground in the power distribution room or on the AC transformer side.
 - The power cord is securely connected to the power outlet.
-

NOTE:

- If the ground contact in the power outlet is not connected to the ground, report the problem and reconstruct the grounding system.
 - To guarantee the grounding effect, use the grounding cable provided with the switch to connect to the grounding strip in the equipment room.
-

Figure 12 Grounding through the PE wire of the AC power cord



Installing/removing a fan tray

⚠ CAUTION:

The HP 5900AF-48XG-4QSFP+ switches require two same-direction air flow fan trays to function properly.

- Do not operate the system with one failed fan tray for more than 24 hours.
- Do not remove the failed fan tray until you are ready for replacing it.
- Do not operate the system without any fan tray for more than 2 minutes.
- Do not operate the system outside of the temperature range 0°C to 45°C (32°F to 113°F) degrees.

Failure to comply with these operating requirements may void the warranty.

Installing a fan tray

⚠ CAUTION:

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

To install a fan tray:

1. Wear an ESD-preventive wrist strap and make sure it makes good skin contact and is well grounded.
2. Unpack the fan tray and check that the fan tray model is correct.
3. 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 (see callout 1 in [Figure 13](#) or [Figure 14](#)).
4. Fasten the captive screw on the fan tray with a Philips screwdriver until the fan tray is securely attached in the chassis (see callout 2 in [Figure 13](#) or [Figure 14](#)).

If the captive screw cannot be tightly fastened, check the installation of the fan tray.

Figure 13 Installing an LSWM1FANSC or LSWM1FANSCB fan tray

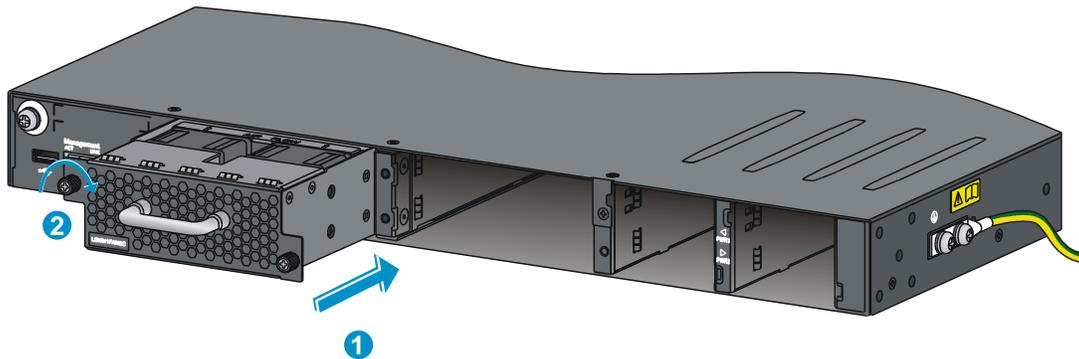
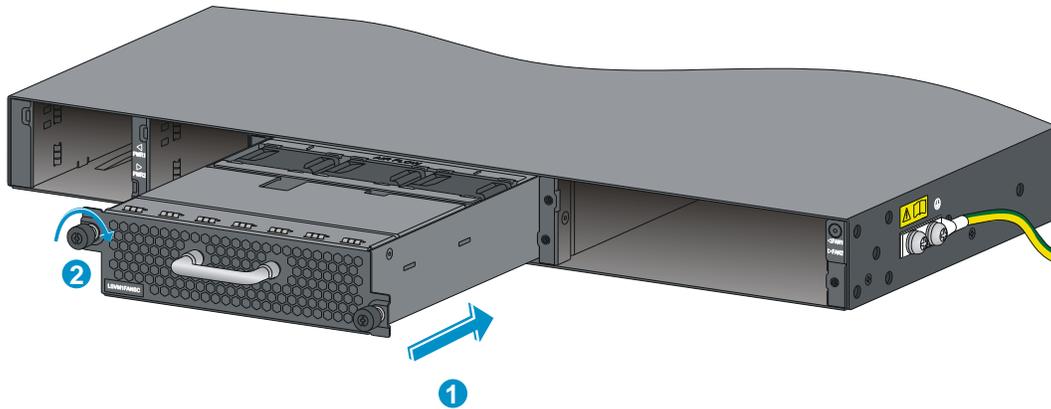


Figure 14 Installing an LSVM1FANSC or LSVM1FANSCB fan tray



Removing a fan tray

⚠ WARNING!

- Take out the fan tray after the fans completely stop rotating.
- To avoid an unbalanced fan causing loud noise, do not touch the fans, even if they are not rotating.

To remove a fan tray:

1. Wear an ESD-preventive wrist strap and make sure it makes good skin contact and is well grounded.
2. Loosen the captive screw of the fan tray with a Philips screwdriver until it is fully disengaged from the switch chassis.
3. 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.
4. Put away the removed fan tray in an antistatic bag for future use.

Installing/removing a power supply

⚠ WARNING!

- In power redundancy mode, you can replace a power supply without powering off the switch but must strictly follow the installation and procedures in [Figure 15](#) and [Figure 16](#) to avoid any bodily injury or damage to the switch.
- The switches do not support intermixing of AC and DC power supplies.

The HP 5900AF-48XG-4QSFP+ switches come with both power supply slots empty and the power filler modules as accessories.

You can install one or two power supplies for these switches as needed. For more information about the power supplies available for the switches, see "[Hot swappable power supplies.](#)"

Figure 15 Installation procedure

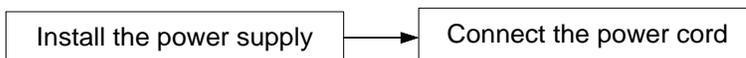


Figure 16 Removal procedure



NOTE:

The HP A58x0AF 650W AC power supply and the HP A58x0AF 650W DC power supply are referred to as the 650W AC power supply and the 650W DC power supply throughout this installation guide.

Installing a power supply

CAUTION:

- Follow the forward inertia of the power supply when inserting it into the chassis, and make sure that the power supply has firm contact with the connectors on the backplane.
- To prevent damage to the connectors inside the switch chassis, insert the power supply gently. If you encounter resistance while inserting the power supply, pull out the power supply and insert it again.
- If only one power supply is installed, install a power filler module in the empty power supply slot for good ventilation of the switch.

To install a 650W AC power supply or 650W DC power supply into the switch:

1. Wear an ESD-preventive wrist strap and make sure it makes good skin contact and is well grounded.
2. Unpack the power supply and check that the power supply model is correct.
3. Correctly orient the power supply with the power supply slot (see [Figure 17](#)), 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.

If you cannot insert the power supply into the slot, re-orient the power supply rather than use excessive force to push it in.

Figure 17 Installing a power supply

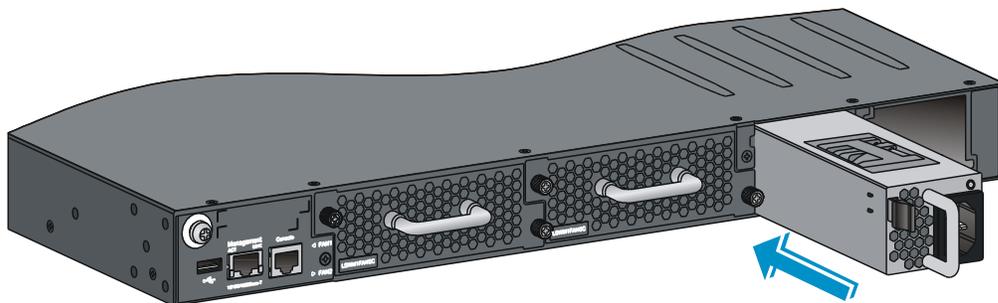
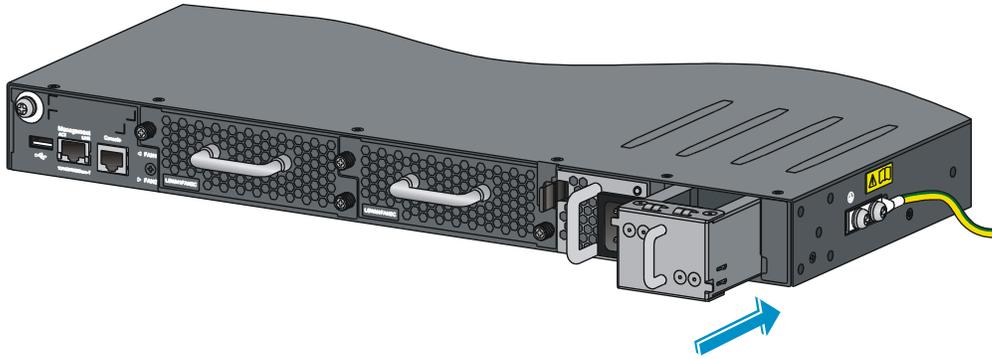


Figure 18 Installing a power filler module



Removing a power supply

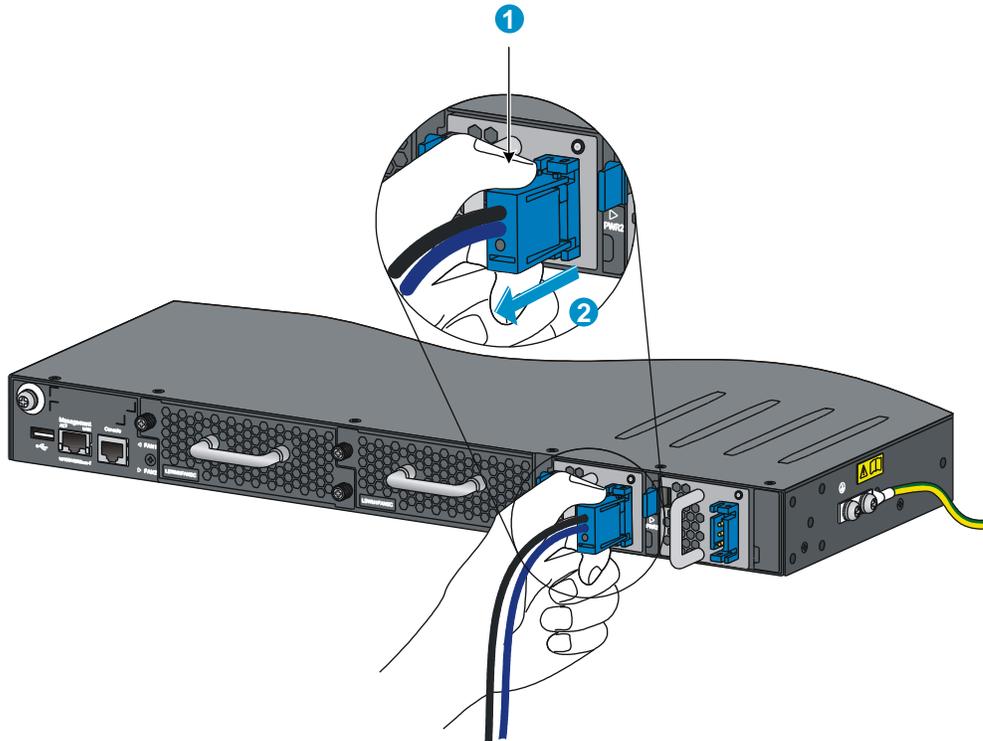
△ CAUTION:

If the switch has two power supplies, removing one power supply does not affect the operation of the switch. If the switch has only one power supply, removing the power supply powers off the switch.

To remove a 650W AC or DC power supply from the switch:

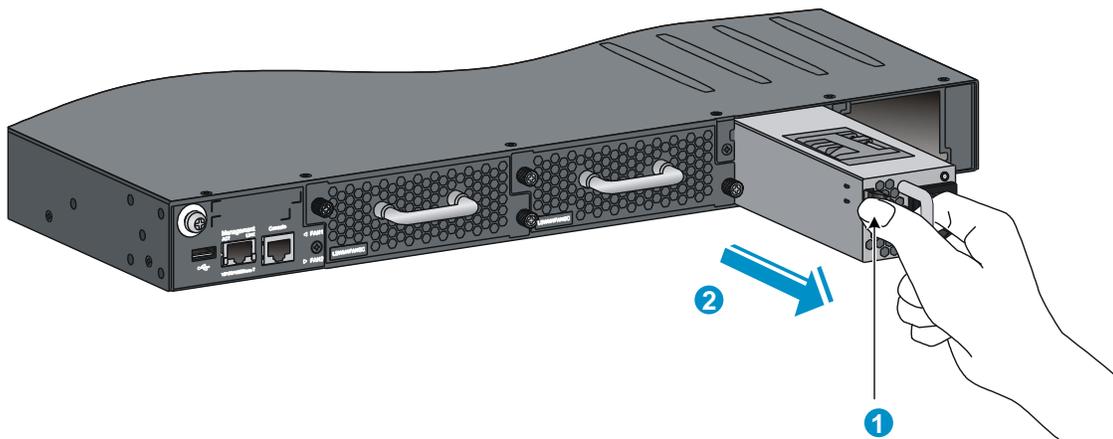
1. Wear an ESD-preventive wrist strap and make sure it makes good skin contact and is well grounded.
2. Squeeze the tabs on the power cord connector with your thumb and forefinger, and pull the connector out to remove the power cord, as shown in [Figure 19](#).
3. Hold the handle on the power supply with one hand, pivot the latch on the power supply to the right with your thumb, and pull the power supply part way out of the slot, as shown in [Figure 20](#).
4. Supporting the power supply bottom with one hand, slowly pull the power supply out with the other hand.
5. Put away the removed power supply in an antistatic bag for future use.

Figure 19 Removing the DC power cord



(1) Press the tabs on the power cord connector with your thumb and forefinger (2) Pull the power cord connector out

Figure 20 Removing the power supply



(1) Pivot the latch to the right with your thumb (2) Pull the power supply out

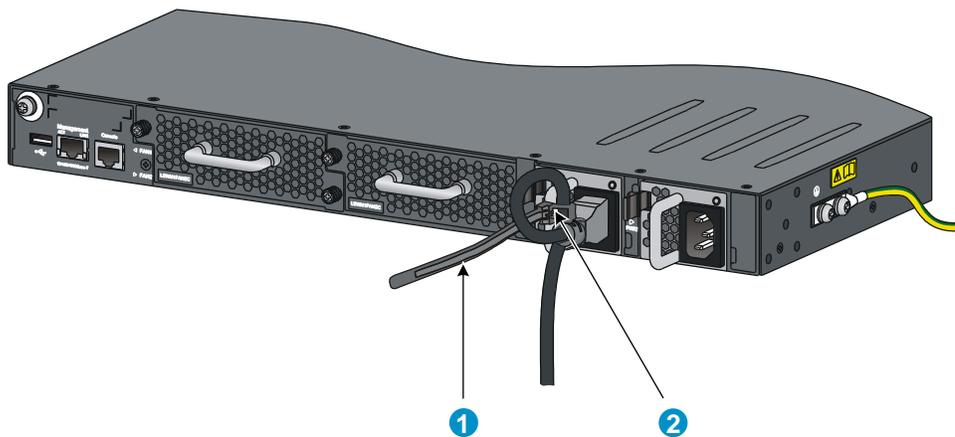
Connecting the power cord

Connecting the 650W AC power supply

To connect the 650W AC power supply:

1. Insert the female connector of the AC power cord supplied with the power supply into the power receptacle on the power supply.
2. Use a cable tie to secure the power cord to the handle of the power supply, as shown in [Figure 21](#).
3. Connect the other end of the power cord to an AC power outlet.

Figure 21 Connecting the 650W AC power supply



(1) Cable tie

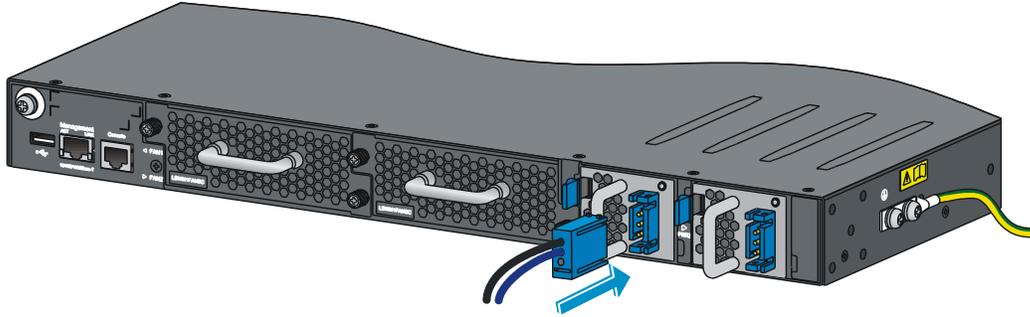
(2) Tighten the cable tie to secure the power cord to the handle of the power supply

Connecting the 650W DC power supply

To connect the 650W DC power supply:

1. Unpack the DC power cord, identify the plug for connecting to the power supply, orient the plug with the power receptacle on the power supply, and insert the plug into the receptacle (see [Figure 22](#)).
If you cannot insert the plug into the receptacle, re-orient the plug rather than use excessive force to push it in.
2. Use a cable tie to secure the power cord to the handle of the power supply, as shown in [Figure 21](#).
3. Connect the other end of the power cord to the DC power source.

Figure 22 Connecting the 650W DC power supply



Verifying the installation

After you complete the installation, verify that:

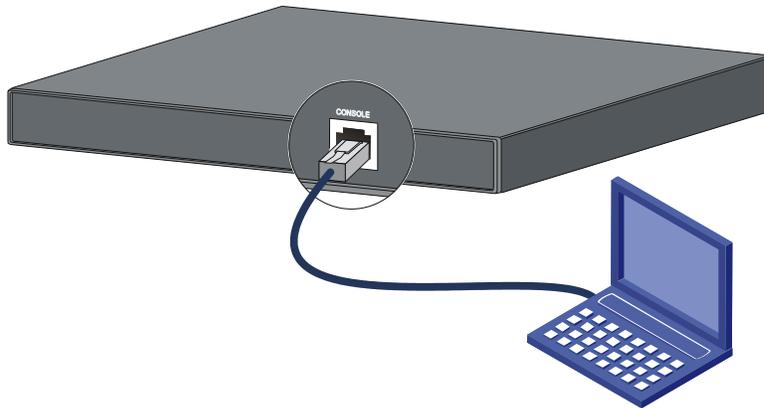
- There is enough space for heat dissipation around the switch.
- The rack is stable.
- The grounding cable is securely connected.
- The correct power source is used.
- The power cords are properly connected.
- All the interface cables are cabled indoors. If any cable is routed outdoors, verify that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

Powering on the switch for the first time

Setting up the configuration environment

The first time you access the switch you must use a console cable to connect a console terminal to the console port on the switch, for example, a PC.

Figure 23 Connecting the console port to a terminal

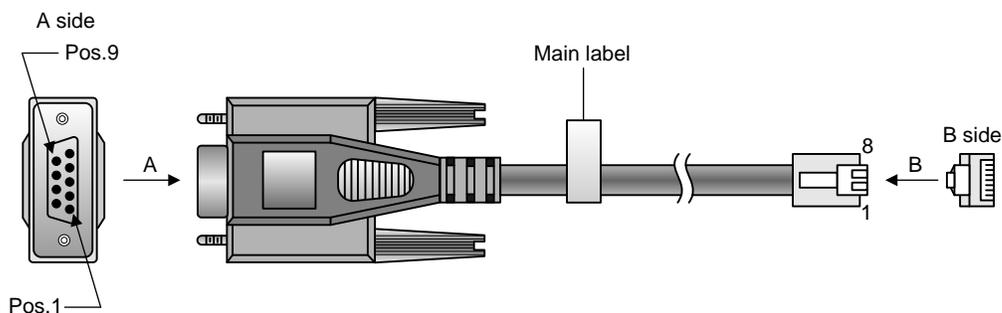


Connecting the console cable

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.

The serial ports on PCs do not support hot swapping. If the switch has been powered on, connect the console cable to the PC before connecting to the switch, and when you disconnect the cable, first disconnect from the switch.

Figure 24 Console cable



To connect a 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 that you are connecting to the correct port.

Setting terminal parameters

To configure and manage the switch, you must run a terminal emulator program on the console terminal.

The following are the required terminal settings:

- **Bits per second**—9,600
- **Data bits**—8
- **Parity**—None
- **Stop bits**—1
- **Flow control**—None
- **Emulation**—VT100

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

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

Figure 25 Connection description



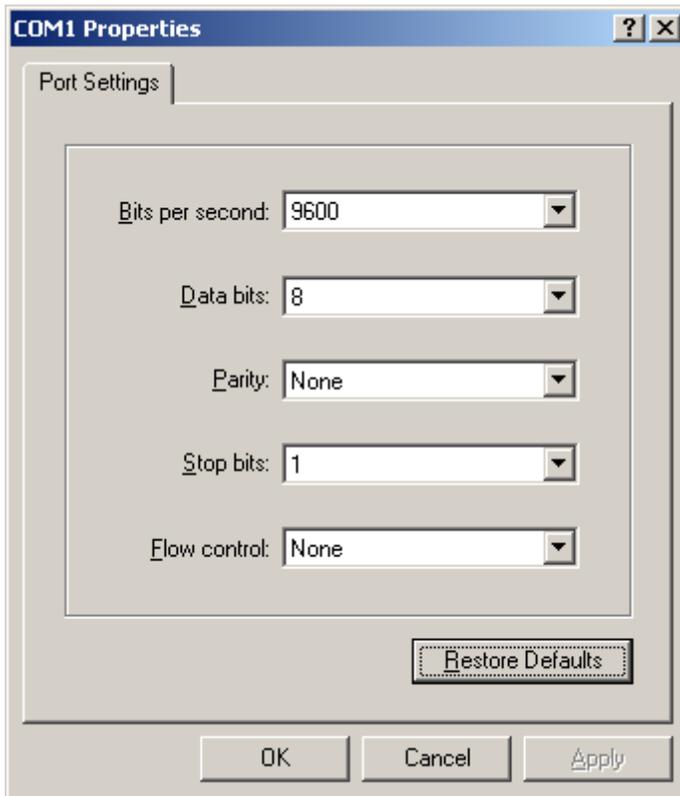
3. Select the serial port to be used from the **Connect using** list, and click **OK**.

Figure 26 Setting the serial port used by the HyperTerminal connection



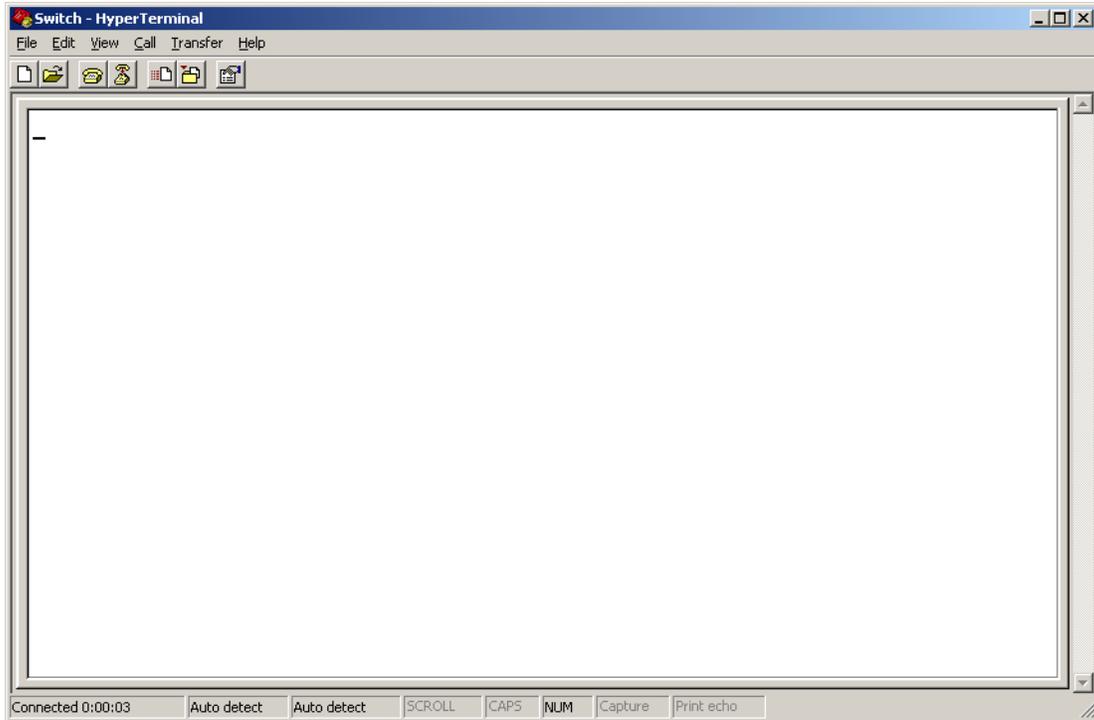
4. Set **Bits per second** to **9600**, **Data bits** to **8**, **Parity** to **None**, **Stop bits** to **1**, and **Flow control** to **None**, and click **OK**.

Figure 27 Setting the serial port parameters



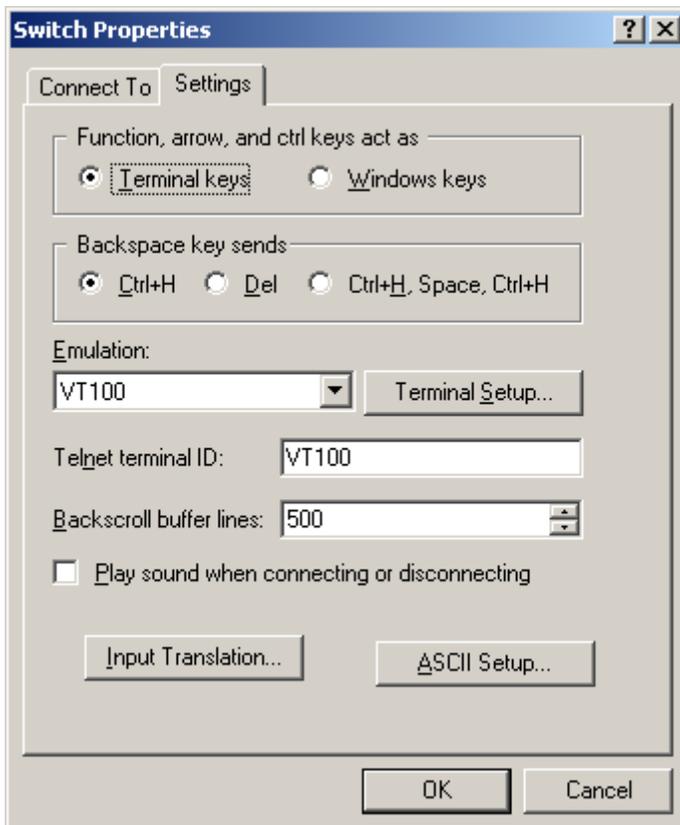
5. Select **File > Properties** in the HyperTerminal window.

Figure 28 HyperTerminal window



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

Figure 29 Setting terminal emulation in Switch Properties dialog box



Powering on the switch

Before powering on the switch, verify that:

- The power cord is properly connected.
- The input power voltage meets the switch requirement.
- The console cable is properly connected, the terminal or PC used for configuration has started, and the configuration parameters have been set.

Power on the switch (for example, an HP 5900AF-48XG-4QSFP+ switch), and you can see the following information:

```
Starting.....
```

```
*****
*
*          HP 5900AF-48XG-4QSFP+ Switch BOOTROM, Version 112
*
*****
```

```
Copyright (c) 2010-2011 Hewlett-Packard Development Company, L.P.
```

```
Creation Date   : Nov 14 2011,16:32:02
CPU Clock Speed : 1000MHz
Memory Size    : 2048MB
Flash Size     : 512MB
CPLD Version   : 002/002
PCB Version    : Ver.A
Mac Address    : 00E0FC005800
```

```
Press Ctrl-B to enter Extended Boot menu...1
```

Press **Ctrl + B** at the prompt within one second to access the Boot menu, or wait for the system to automatically start up.

NOTE:

The system has two startup modes: full startup and fast startup. By default, the system starts up in fast mode and the waiting time is one second. If you set the startup mode to full, the waiting time is five seconds. To change the startup mode, see "[Changing the startup mode.](#)"

- If you press **Ctrl + B** within one second, the following Boot menu appears:

```
BOOT MENU
```

1. Download image to flash
2. Select image to boot
3. Display all files in flash
4. Delete file from flash
5. Modify BootRom password

6. Enter BootRom upgrade menu
7. Skip current system configuration
8. Set BootRom password recovery
9. Set switch startup mode
0. Reboot

Enter your choice(0-9):

Table 4 Boot menu options

Item	Description
1. Download image to flash	Download a software image package to the Flash memory.
2. Select image to boot	Select the main or backup startup software image to boot. Select the main or backup configuration file to boot.
3. Display all files in flash	Display all files in the Flash memory.
4. Delete file from flash	Delete files from the Flash memory.
5. Modify BootRom password	Modify the Boot ROM password.
6. Enter BootRom upgrade menu	Access the Boot ROM update menu.
7. Skip current system configuration	Start the switch with the factory default configuration. This is a one-time operation and does not take effect at the next reboot. You use this option when you forget the console login password.
8. Set BootRom password recovery	Disable or enable the Boot ROM password recovery function. By default, Boot ROM recovery is enabled. You can disable this function to protect system security. ⚠ CAUTION: If Boot ROM recovery is enabled, you can contact HP Technical Support to get a super Boot ROM password to access the Boot menu after your Boot ROM password is lost. If Boot ROM recovery is disabled, you cannot use a super Boot ROM password to access the Boot menu after your Boot ROM password is lost, and you must contact HP Technical Support for help.
9. Set switch startup mode	Set the startup mode of the switch to normal (full) mode or fast mode, as described in " Changing the startup mode. "
0. Reboot	Restart the switch.

- If you perform no operation or press a key other than **Ctrl + B** within one second, the system automatically starts up when the remaining time becomes zero, and displays the following information:

```

Loading the main images...
Starting to get the image flash:/5900_5920-cmw710-system-a2106p01.bin.....
.....
.....Done!
Starting to get the image flash:/5900_5920-cmw710-boot-a2106p01.bin.....
.....Done!
The flash:/5900_5920-cmw710-boot-a2106p01.bin image is
self-decompressing.....
.....

```


6. Enter BootRom upgrade menu
7. Skip current system configuration
8. Set BootRom password recovery
9. Set switch startup mode
0. Reboot

Enter your choice(0-9):

Enter **0** at the prompt. The system reboots in full startup mode and displays the following information:

Starting.....

```
*****
*
*          HP 5900AF-48XG-4QSFP+ Switch BOOTROM, Version 112          *
*
*****
Copyright (c) 2010-2011 Hewlett-Packard Development Company, L.P.
```

```
Creation Date   : Nov 14 2011,16:32:02
CPU Clock Speed : 1000MHz
Memory Size    : 2048MB
Flash Size     : 512MB
CPLD Version   : 002/002
PCB Version    : Ver.A
Mac Address    : 00E0FC005800
```

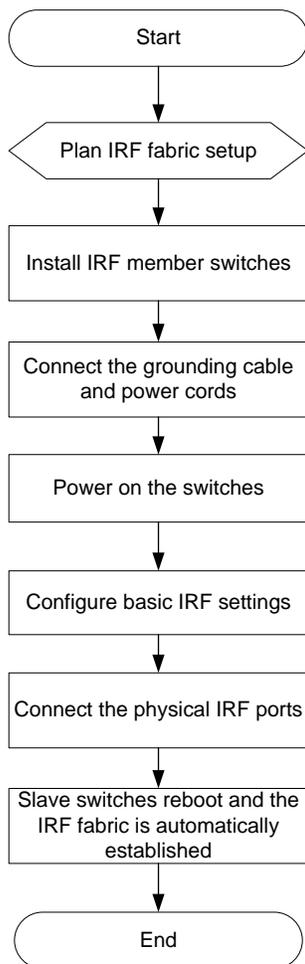

Setting up an IRF fabric

You can use HP IRF technology to connect and virtualize HP 5900 switches into a large virtual switch called an "IRF fabric" for flattened network topology, and high availability, scalability, and manageability.

To set up IRF links between HP 5900 series switches, use SFP+ ports or QSFP+ ports.

IRF fabric setup flowchart

Figure 30 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: <ul style="list-style-type: none">• 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

Step	Description
	<ul style="list-style-type: none"> • Planning the cabling scheme
2. Install IRF member switches.	See " Installing the switch in a 19-inch rack ".
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 <i>HP 5900 Switch Series IRF Configuration Guide</i> .
6. Connect the physical IRF ports.	<p>Connect the physical IRF ports on switches. Use SFP+ or QSFP+ transceiver modules and fibers for long-distance connection. Use SFP+ or QSFP+ cables for short-distance connection.</p> <p>All switches except the master switch automatically reboot, and the IRF fabric is established.</p>

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.

NOTE:

- As your business grows, you can plug an HP 5900 switch into an IRF fabric to increase the switching capacity without any topology change or replacement.
-

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 command line interface of the master switch.

NOTE:

IRF member switches will 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 *HP 5900 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 reliably, ring topology. In ring topology, the failure of one IRF link does not cause the IRF fabric to split as in daisy chain topology. Rather, 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 at least 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.

The HP 5900AF-48XG-4QSFP+ switch can provide 10-GE and 40-GE IRF connections through SFP+ ports and QSFP+ ports, respectively. You can bind several SFP+ or QSFP+ ports to an IRF port for increased bandwidth and availability.

NOTE:

- Figure 31 and Figure 32 show the topologies of an IRF fabric made up of three HP 5900AF-48XG-4QSFP+ switches that use SFP+ ports for IRF connections.
 - The IRF port connections in the two figures are for illustration only, and more connection methods are available.
-

Figure 31 IRF fabric in daisy chain topology

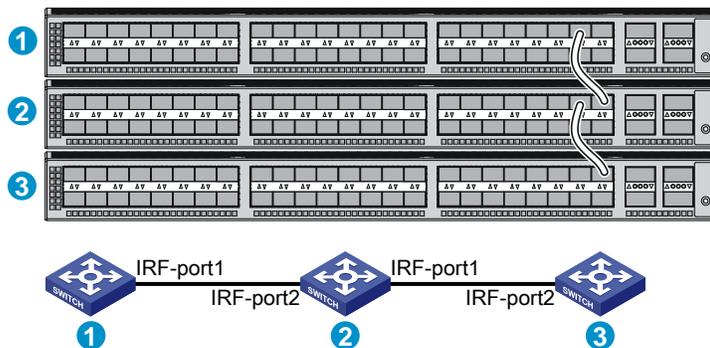
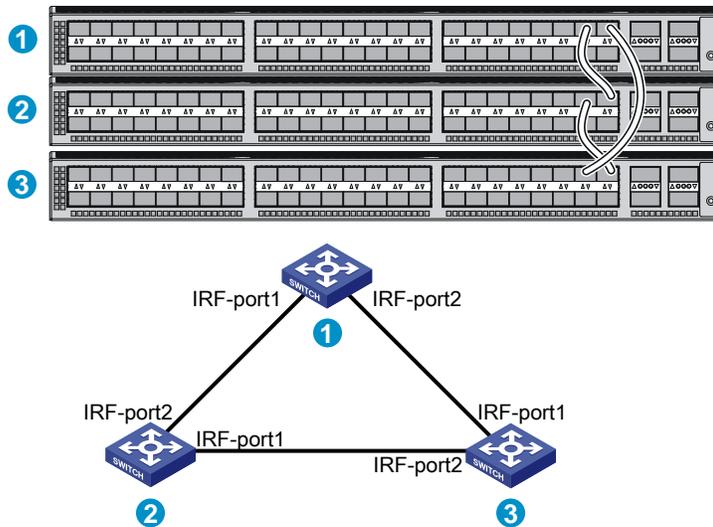


Figure 32 IRF fabric in ring topology



Identifying physical IRF ports on the member switches

Identify the SFP+ or QSFP+ ports to be used for IRF connections on the member switches according to your topology and connection scheme.

All the SFP+ and QSFP+ ports on the HP 5900AF-48XG-4QSFP+ switch can be used for IRF connections.

Follow these guidelines when you identify SFP+ ports to be used for IRF connections:

- The SFP+ ports are grouped by port number in ascending order, starting from one. Every four SFP+ ports form one group.
- An SFP+ port can be bound to an IRF port or operate as a service port. When an SFP+ port is bound to an IRF port, other SFP+ ports in the same port group cannot be used as service ports, and vice versa.

A common practice is to use one SFP+ port group for IRF connections, and bind every two SFP+ ports in the group to an IRF port for increased bandwidth and availability.

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 the 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 available SFP+/QSFP+ cables and transceiver modules, see "SFP+ port" and "QSFP+ port."

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

Connecting the IRF member switches in one rack

Use short-haul and long-haul SFP+ cables to connect the IRF member switches (four switches in this example) in a rack as shown in Figure 33. The switches in the ring topology (see Figure 34) are in the same order as connected in the rack.

Figure 33 Connecting the switches in one rack

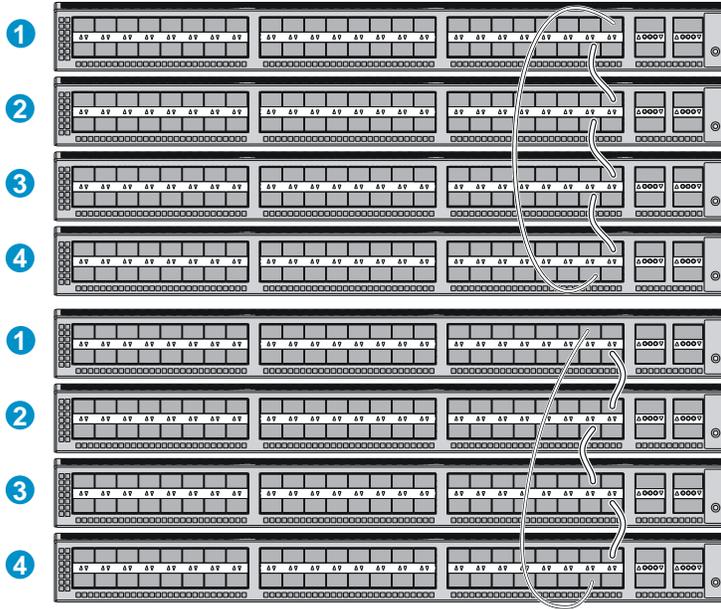
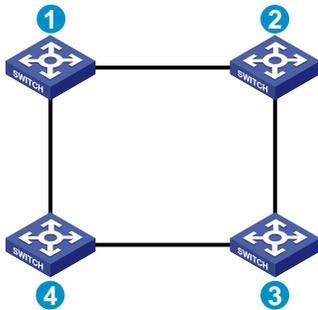


Figure 34 IRF fabric topology

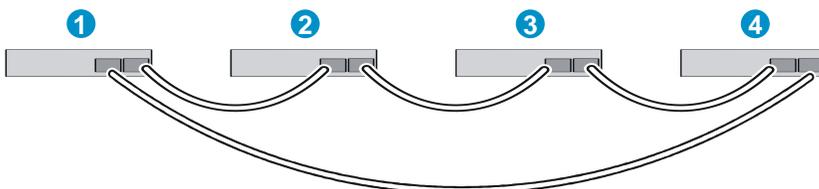


Connecting the IRF member switches in a ToR solution

You can install IRF member switches in different racks side by side to deploy a ToR solution.

Figure 35 shows an example for connecting four top of rack IRF member switches by using SFP+/QSFP+ cables, and SFP+/QSFP+ transceiver modules, and optical fibers. The topology is the same as Figure 34.

Figure 35 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 *HP 5900 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. Perform IRF port binding before or after connecting IRF physical ports depending on the software release.
- Execute the **display irf configuration** command to verify the basic IRF settings.

For more information about configuring basic IRF settings, see *HP 5900 Switch Series IRF Configuration Guide*.

Connecting the physical IRF ports

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

NOTE:

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

Accessing the IRF fabric to verify the configuration

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 that 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 *HP 5900 Switch Series Fundamentals Configuration Guide*.)
4. Check 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 5](#).

Table 5 Display and maintain 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 at least one MAD mechanism to detect the presence of multiple identical IRF fabrics and handle collisions. For more information about MAD detection, see *HP 5900 Switch Series IRF Configuration Guide*.

Maintenance and troubleshooting

Password loss

This section helps you handle several common password loss situations.

Console login password loss

If you forget the console login password, access the Boot menu:

```
BOOT MENU
```

1. Download image to flash
2. Select image to boot
3. Display all files in flash
4. Delete file from flash
5. Modify BootRom password
6. Enter BootRom upgrade menu
7. Skip current system configuration
8. Set BootRom password recovery
9. Set switch startup mode
0. Reboot

```
Enter your choice(0-9):
```

Enter **7** and restart the switch. The switch reboots with empty configuration, and you can log in through the console port without entering the password so you can check the configuration file for the user password.

Boot ROM password loss

Contact HP Technical Support for help.

Power supply failure

You can use the LEDs on the power supply to identify a power supply failure. For more information about the LEDs on a power supply, see *HP A58x0AF 650W AC (JC680A) & 650W DC (JC681A) Power Supplies User Guide*.

The LEDs on the power supply are steady green (active) or blinking green (standby) while the power supply system is correctly working. If the LEDs behave in any other way, verify the following items:

- The switch power cord is properly connected.
- The power source meets the requirement.
- The operating temperature of the switch is in the normal range and the power supply has good ventilation.

NOTE:

If the problem persists, contact HP Technical Support for help.

To replace a hot swappable power supply, see "[Installing/removing a power supply.](#)"

Fan failure

△ CAUTION:

The HP 5900AF-48XG-4QSFP+ switches require two same direction air flow fan trays to function properly.

- Do not operate the system with one failed fan tray for more than 24 hours.
- Do not remove the failed fan tray until you are ready for replacing it.
- Do not operate the system without any fan tray for more than 2 minutes.
- Do not operate the system outside of the temperature range 0°C to 45°C (32°F to 113°F) degrees.

Failure to comply with these operating requirements may void the warranty.

When a fan tray has problems, the system status LED is steady red and the system outputs alarm messages.

To replace a failed fan tray, see "[Installing/removing a fan tray.](#)"

Configuration terminal 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 terminal display

If the configuration terminal displays nothing when the switch is powered on, verify the following items:

- The power supply is supplying power to the switch.
- The console cable is properly connected.
- The console cable has no problem and the terminal settings are correct.

Garbled terminal display

If terminal display is garbled, verify that the following settings are configured for the terminal, for example, HyperTerminal:

- **Baud rate**—9,600
- **Data bits**—8
- **Parity**—none
- **Stop bits**—1
- **Flow control**—none
- **Emulation**—VT100

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 A-Series 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.

Port numbering in examples

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

Appendix A Technical specifications

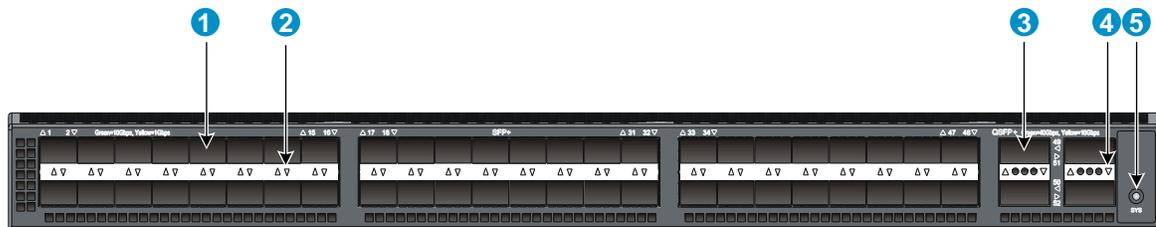
Table 6 HP 5900AF-48XG-4QSFP+ switches technical specifications

Item	HP 5900AF-48XG-4QSFP+
Dimensions (H × W × D)	43.6 × 440 × 660 mm (1.72 × 17.32 × 25.98 in)
Weight	≤ 13 kg (28.66 lb)
Console ports	1
Management Ethernet ports	1
USB ports	1
SFP+ ports	48
QSFP+ ports	4
Fan tray slots	2, hot swappable, on the rear panel
Power module slots	2, hot swappable, on the rear panel
AC-input voltage	Rated voltage: 100 VAC to 240 VAC @ 50 or 60 Hz Max voltage: 90 VAC to 264 VAC @ 47 to 63 Hz
DC-input voltage	Rated voltage: -40 VDC to -60 VDC Max voltage: -40 VDC to -72 VDC
Minimum power consumption	Single AC input: 183 W Dual AC inputs: 200 W Single DC input: 182 W Dual DC inputs: 197 W
Maximum power consumption	AC: 257 W DC: 250 W
Chassis leakage current compliance	UL60950-1, EN60950-1, IEC60950-1, GB4943
Melting current of power supply fuse	10 A @ 250 VAC 30 A @ 250 VDC
Operating temperature	0°C to 45°C (32°F to 113°F)
Operating humidity	10% to 90%, noncondensing

Item	HP 5900AF-48XG-4QSFP+
Fire resistance compliance	UL60950-1, EN60950-1, IEC60950-1, GB4943

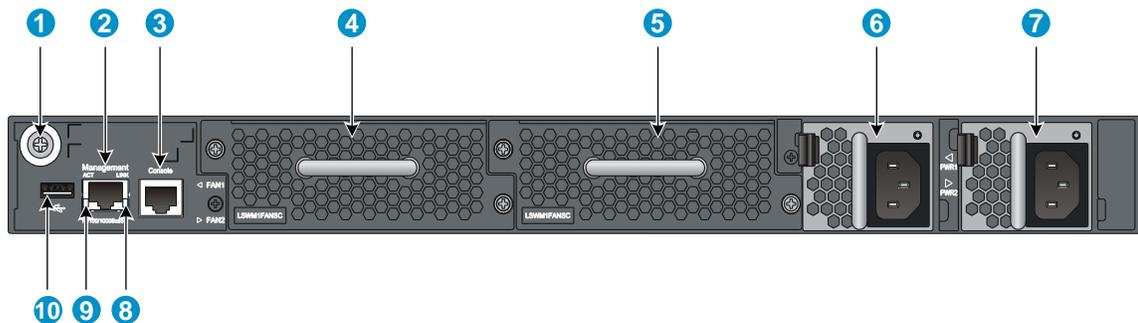
HP 5900AF-48XG-4QSFP+ panel views

Figure 36 HP 5900AF-48XG-4QSFP+ front panel



- | | |
|-----------------------------|--------------------|
| (1) SFP+ port | (2) SFP+ port LED |
| (3) QSFP+ port | (4) QSFP+ port LED |
| (5) System status LED (SYS) | |

Figure 37 HP 5900AF-48XG-4QSFP+ rear panel

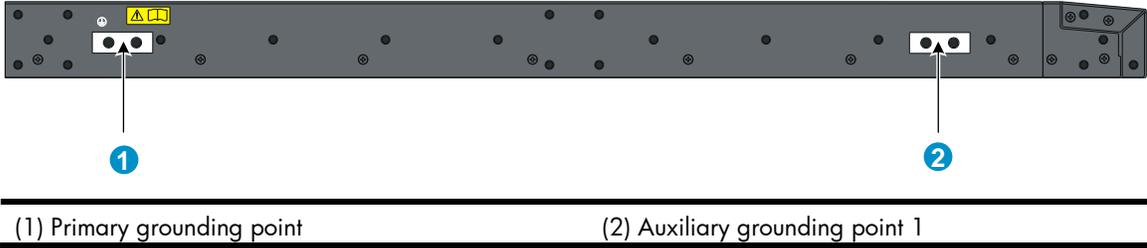


- | | |
|---|---|
| (1) Grounding screw (auxiliary grounding point 2) | (2) Management Ethernet port |
| (3) Console port | (4) Fan tray slot 1 |
| (5) Fan tray slot 2 | (6) Power supply slot 1 |
| (7) Power supply slot 2 | (8) LINK LED for the management Ethernet port |
| (9) ACT LED for the management Ethernet port | (10) USB port |

NOTE:

- The HP 5900AF-48XG-4QSFP+ switch comes with the power supply slots empty and the filler modules for the slots as accessories. You can install one or two power supplies for the switch as needed. In this figure, two 650W AC power supplies are installed.
- The HP 5900AF-48XG-4QSFP+ switch also comes with the fan tray slots empty. You must install two fan trays for the 5900AF-48XG-4QSFP+ for adequate heat dissipation, and their models must be the same. In this figure, two LSWM1FANSC fan trays are installed.

Figure 38 HP 5900AF-48XG-4QSFP+ left side panel



Appendix B FRUs and compatibility matrixes

This appendix describes the FRUs available for the HP 5900 Switch Series and their compatibility. All the FRUs in this appendix are hot swappable.

Hot swappable power supplies

Table 7 lists the power supplies available for the HP 5900AF-48XG-4QSFP+ switches.

Table 7 Power supplies for the HP 5900AF-48XG-4QSFP+ switches

Power supply	Specifications	Reference
650W AC Power Supply	<ul style="list-style-type: none">Rated input voltage: 100 VAC to 240 VAC @ 50 Hz or 60 HzMax input voltage: 90 VAC to 264 VAC @ 47 Hz to 63 HzMax output power: 650 W	<i>HP A58x0AF 650W AC (JC680A) & 650W DC (JC681A) Power Supplies User Guide</i>
650W DC Power Supply	<ul style="list-style-type: none">Rated input voltage: -40 VDC to -60 VDCMax input voltage: -40 VDC to -72 VDCMax output power: 650 W	<i>HP A58x0AF 650W AC (JC680A) & 650W DC (JC681A) Power Supplies User Guide</i>

Hot swappable fan trays

Table 8 lists the fan trays available for the HP 5900AF-48XG-4QSFP+ switches.

Table 8 Fan trays available for the HP 5900AF-48XG-4QSFP+ switches

Item	Specifications
LSWM1FANSC (for the HP 5900AF-48XG-4QSFP+ switch)	
Fans	Two 40 × 40 × 28 mm (1.57 × 1.57 × 1.1 in) fans
Fan speed	18500 R.P.M
Max airflow	45 CFM
Airflow direction	Back to front (fans blow air from the power supply side to the network port side.)
Input voltage	12 V
Maximum power consumption	19.5 W
Documentation reference	<i>HP LSWM1FANSC & LSWM1FANSCB Fan Assemblies Installation</i>

Item	Specifications
LSWM1FANSCB (for the HP 5900AF-48XG-4QSFP+ switch)	
Fans	Two 40 × 40 × 28 mm (1.57 × 1.57 × 1.1 in) fans
Fan speed	18500 R.P.M
Max airflow	45 CFM
Airflow direction	Front to back (fans draw air from the network side to the power supply side.)
Input voltage	12 V
Maximum power consumption	19.5 W
Documentation reference	<i>HP LSWM1FANSC & LSWM1FANSCB Fan Assemblies Installation</i>

Appendix C Ports and LEDs

Ports

Console port

Every HP 5900AF-48XG-4QSFP+ switch has one console port.

Table 9 Console port specifications

Item	Specification
Connector type	RJ-45
Compliant standard	EIA/TIA-232
Transmission baud rate	9600 bps (default) to 115200 bps
Services	<ul style="list-style-type: none">• Provides connection to an ASCII terminal.• Provides connection to the serial port of a local or remote (through a pair of modems) PC running terminal emulation program.

Management Ethernet port

Every HP 5900AF-48XG-4QSFP+ switch has one management Ethernet port. You can connect this port to a PC or management station for loading and debugging software or remote management.

Table 10 Management Ethernet port specifications

Item	Specification
Connector type	RJ-45
Connector quantity	1
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

Every HP 5900AF-48XG-4QSFP+ switch has one OHC-compliant USB2.0 port that can upload and download data at a rate up to 12 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.

SFP+ port

HP 5900AF-48XG-4QSFP+ switches have fixed SFP+ ports. You can plug the SFP transceiver modules in [Table 11](#), the SFP+ transceiver modules in [Table 12](#), and the SFP+ cables in [Table 13](#) into the SFP+ ports as needed. You can use the SFP+ ports as IRF physical ports to connect the switches in an IRF deployment.

Table 11 1000 Mbps SFP transceiver modules available for the SFP+ ports

Product Code	Module description	Central wavelength (nm)	Cable/fiber diameter (μm)	Multimode fiber modal bandwidth (MHz × km)	Max transmission distance
JD089B	HP X120 1G SFP RJ45 T transceiver	N/A	Category-5 twisted pair	N/A	100 m (328.08 ft)
JD118B	HP X120 1G SFP LC SX transceiver	850	50/125	500	550 m (1804.46 ft)
				400	500 m (1640.42 ft)
JD119B	HP X120 1G SFP LC LX transceiver	1310	9/125	N/A	10 km (6.21 miles)
JD061A	HP X125 1G SFP LC LH40 1310nm transceiver	1310	9/125	N/A	40 km (24.86 miles)
JD062A	HP X120 1G SFP LC LH40 1550nm transceiver	1550	9/125	N/A	40 km (24.86 miles)
JD063B	HP X125 1G SFP LC LH70 Transceiver	1550	9/125	N/A	70 km (43.50 miles)

Table 12 10 Gbps SFP+ transceiver modules available for the SFP+ ports

Product Code	Module description	Central wavelength (nm)	Fiber diameter (μm)	Multimode fiber modal bandwidth (MHz × km)	Max transmission distance
JD092B	HP X130 10G SFP+ LC SR transceiver	850	50/125	2000	300 m (984.25 ft)
				500	82 m (269.03 ft)
				400	66 m (216.54 ft)
JD093B	HP X130 10G SFP+ LC LRM transceiver	1310	62.5/125	200 160	220 m (721.78 ft)
JD094B	HP X130 10G SFP+ LC LR transceiver	1310	9/125	N/A	10 km (6.21 miles)
JG234A	HP X130 10G SFP+ LC LH 40km Transceiver	1550	9/125	N/A	40 km (24.86 miles)

Table 13 SFP+ cables available for the SFP+ ports

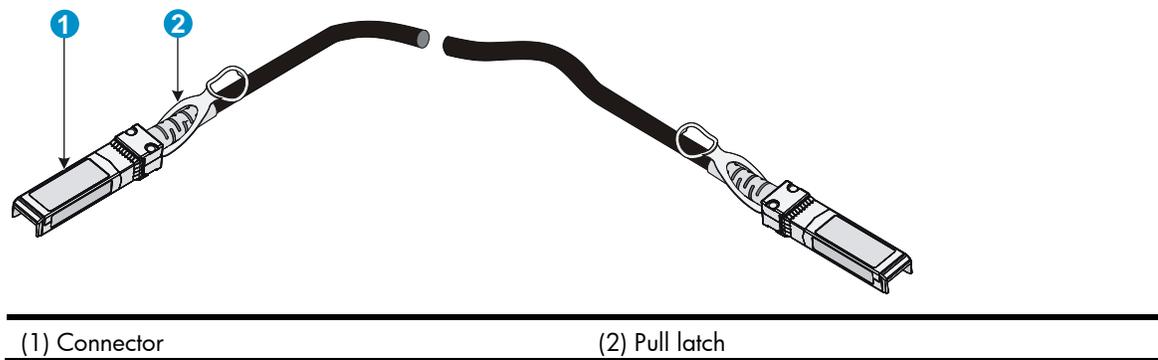
Product code	Cable description	Cable length
JD095B	HP X240 10G SFP+ SFP+ 0.65m DA Cable	0.65 m (2.13 ft)
JD096B	HP X240 10G SFP+ SFP+ 1.2m DA Cable	1.2 m (3.94 ft)
JD097B	HP X240 10G SFP+ SFP+ 3m DA Cable	3 m (9.84 ft)
JG081B	HP X240 10G SFP+ SFP+ 5m DA Cable	5 m (16.40 ft)

NOTE:

- To guarantee the functionality of the SFP+ ports, use only HP SFP or SFP+ transceiver modules.
- The SFP and SFP+ transceiver modules available for this switch series are subject to change over time. For the most up-to-date list of SFP transceiver modules, consult your HP sales representative or technical support engineer.
- For the SFP transceiver module specifications, see *HP A-Series Switches Transceiver Modules User Guide*.

The SFP+ cables available for the HP 5900 Switch Series are 10 Gbps SFP+ Cu cables, as shown in [Figure 39](#).

Figure 39 SFP+ cable



QSFP+ port

HP 5900AF-48XG-4QSFP+ switch provides QSFP+ ports. You can plug the QSFP+ transceiver modules in [Table 14](#) and the QSFP+ cables in [Table 15](#) into the SFP+ ports as needed.

Table 14 QSFP+ transceiver modules available for the HP 5900AF-48XG-4QSFP+ switch

Product Code	Module description	Central wavelength (nm)	Fiber diameter (μm)	Max transmission distance
JG325A	HP X140 40G QSFP+ MPO SR4 Transceiver	850	Multimode, 50/125, OM3	100 m (328.08 ft)

Table 15 40G QSFP+ cables available for the HP 5900AF-48XG-4QSFP+ switch

Product code	Cable description	Cable length
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)
JG329A	HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	1 m (3.28 ft)
JG330A	HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	3 m (9.84 ft)
JG331A	HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	5 m (16.40 ft)

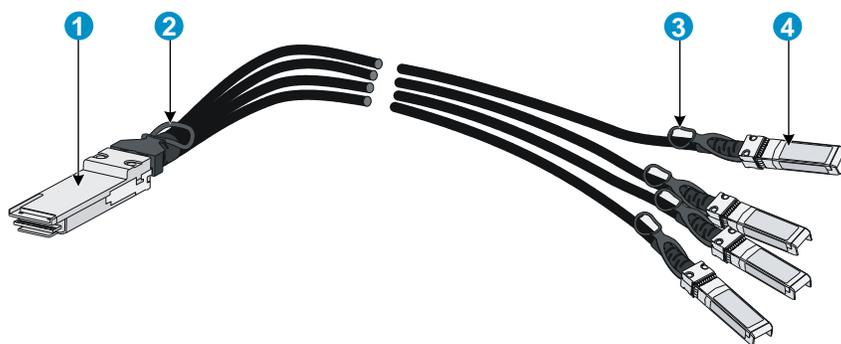
Figure 40 40G QSFP+ cable



(1) Connector

(2) Pull tab

Figure 41 40G QSFP+ to 4x10G SFP+ cable



(1) QSFP+ module

(2) QSFP+ side pull tab

(3) SFP+ side pull tab

(4) SFP+ module

NOTE:

- To guarantee the functionality of the QSFP+ ports, use only HP QSFP+ transceiver modules and cables.
 - The QSFP+ transceiver modules and cables available for this switch series are subject to change over time. For the most up-to-date list of SFP transceiver modules, consult your HP sales representative or technical support engineer.
 - For QSFP+ transceiver module and cable specifications, see *Transceiver Modules User Guide*.
-

LEDs

System status LED

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

Table 16 System status LED description

LED mark	Status	Description
SYS	Steady green	The switch is operating properly.
	Flashing green	The switch is performing power-on self-test (POST).
	Steady red	The system has failed to pass POST or has problems such as fan failure.
	Flashing red	Some ports have failed to pass POST.
	Off	The switch is powered off or has failed to start up.

SFP+ port LED

Each SFP+ port has a status LED to show port operating status and activities.

Table 17 SFP+ port LED description

LED status	Description
Steady green	A transceiver module or cable has been correctly installed. The port has a link and is operating at 10 Gbps.
Flashing green	The port is sending or receiving data at 10 Gbps.
Steady yellow	A transceiver module or cable has been correctly installed. The port has a link and is operating at 1 Gbps.
Flashing yellow	The port is sending or receiving data at 1 Gbps.
Off	No transceiver module or cable has been installed or no link is present on the port.

QSFP+ port LED

Each QSFP+ port has a status LED to show port operating status and activities.

Table 18 QSFP+ port LED description

LED status	Description
Steady green	A transceiver module or cable has been correctly installed. The port has a link and is operating at 40 Gbps.
Flashing green	The port is sending or receiving data at 40 Gbps.
Steady yellow	A transceiver module or cable has been correctly installed. The port has a link and 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.

Management Ethernet port LEDs

A management Ethernet port has one LINK LED and one ACT LED to show its link and data transmission status.

Table 19 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.

Appendix D Cooling system

The cooling system of HP 5900AF-48XG-4QSFP+ switches comprises the ventilation holes in the chassis, fan trays, and built-in fans of hot swappable power supplies. To guarantee that this cooling system can effectively work, you must consider the site ventilation design when you plan the installation site for the switches.

HP 5900AF-48XG-4QSFP+ cooling system

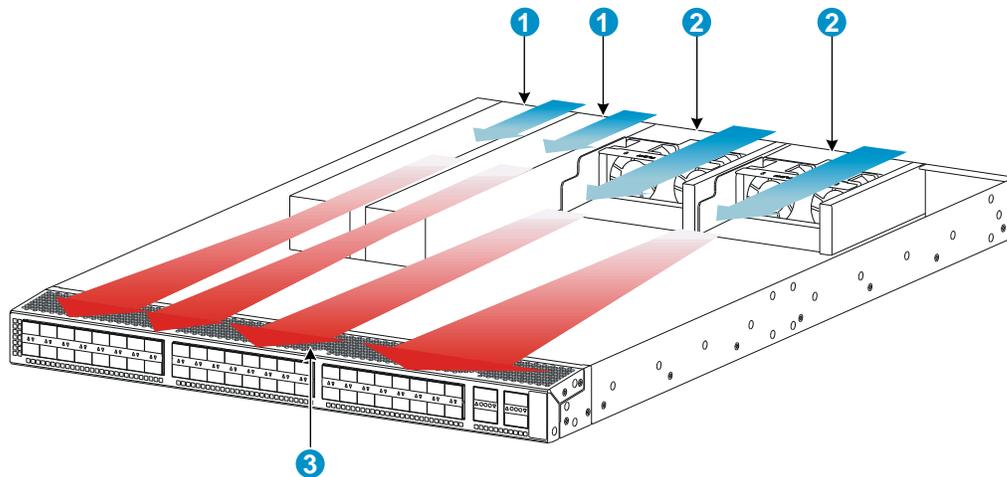
! **IMPORTANT:**

The chassis and the power supplies use separate air aisles. Make sure that both aisles are not blocked.

The fan trays in the HP 5900AF-48XG-4QSFP+ switch must be the same type: LSWM1FANSC or LSWM1FANSCB.

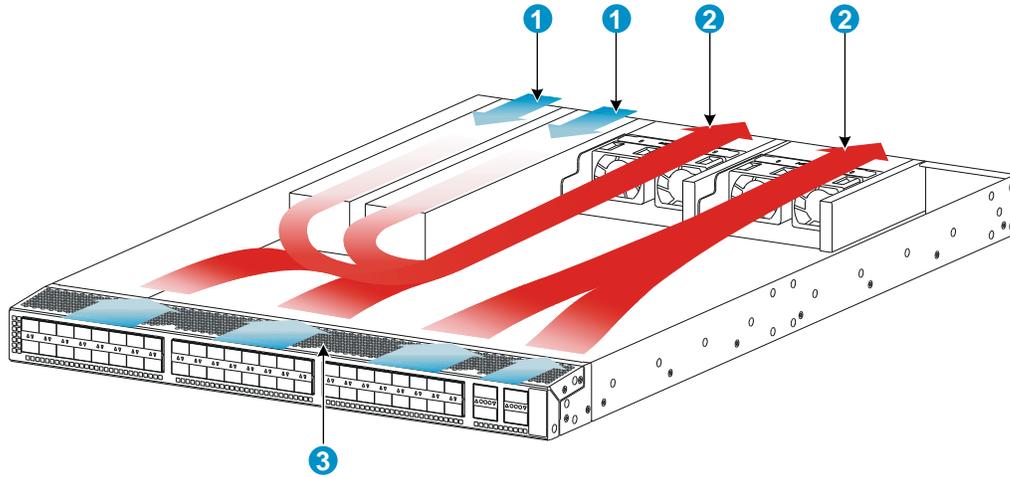
- When LSWM1FANSC fan trays are used, cool air flows in through the air vents in the fan tray panel and the power supply panels, circulates through the chassis and the power supplies, and exhausts at the network port side, as shown in [Figure 42](#).
- When LSWM1FANSCB fan trays are used, cool air flows in through the air vents in the network port-side panel and the power supply panels, circulates through the chassis and the power supplies, and exhausts through the air vents in the fan tray panels, as shown in [Figure 43](#).

Figure 42 Airflow through the chassis (with LSWM1FANSC fan trays)



(1) Power supply air vents	(2) Fan tray air vents
(3) Network port-side air vents	

Figure 43 Airflow through the chassis (with LSWM1FANSCB fan trays)



(1) Power supply air vents

(2) Fan tray air vents

(3) Network port-side air vents

ⓘ **IMPORTANT:**

The chassis and the power supplies use separate air aisles. Make sure that both aisles are not blocked.

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