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QFX5240 Switch Hardware Guide

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QFX5240 Switch Hardware Guide
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About this Guide

Use this guide to plan, install, perform initial software configuration, perform routine maintenance, and to troubleshoot QFX5240 switches.

After completing the installation and basic configuration procedures covered in this guide, refer to the Junos OS documentation for further software configuration.

1

Fast Track: Initial Installation

IN THIS CHAPTER

Fast Track to Rack Installation and Power

SUMMARY

This procedure walks you through the most basic steps for installing your QFX5240 switch in a rack and connecting it to power.

IN THIS SECTION

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You can install the QFX5240-64OD and QFX5240-64QD switches on a four-post rack by using the QFX5240-2U-4PRMK rack mount kit (RMK). We'll walk you through the steps to install the QFX5240 switch using the QFX5240-2U-4PRMK RMK.

Before you install the switch, review:

- "QFX5240 Site Guidelines and Requirements" on page 40.

- General Safety Guidelines and Warnings.

- "Unpack a QFX5240 Switch " on page 71.

Install the QFX5240 Switch in a Rack

SUMMARY

To mount the QFX5240 switch on a four-post rack using the QFX5240-2U-4PRMK RMK.

IN THIS SECTION

-
-
-

1. Unpack the switch and place it on a flat stable surface.

2. Verify the parts received.

3. Ensure that you have the following tools and parts available:

- An ESD grounding strap—not provided

- QFX5240-2U-4PRMK—provided

   a. Two slide rail assemblies

   b. One packet of screws that contains four M4 x 4L screws and two M5 x 13.0L screws.

Prepare the Slide Rail Assembly to Install in the Rack

The slide rail assembly consists of three parts:

1. Outer rail

2. Slider rail

3. Inner rail bracket

Remove the Inner Rail Bracket from the Slide Rail Assembly

1. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end to a site ESD point.

2. Hold the slide rail assembly and pull the inner rail bracket and the slider rail out to their full extended position until you hear a click sound.

3. Push the white tab on the inner rail bracket forward. Pull the inner rail bracket out of the slide rail assembly and place it aside.
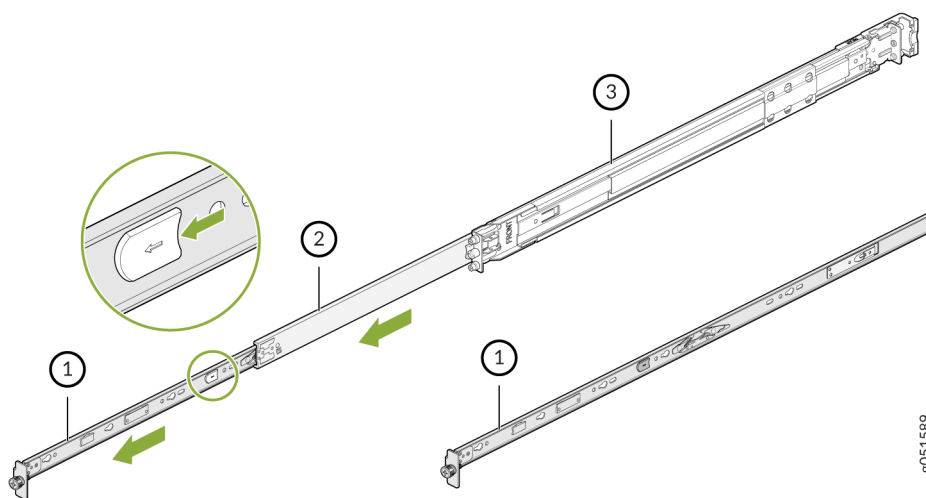
| 1– Inner rail bracket | 3– Outer rail |

2– Slider rail	

4. Press the latch on the slider rail down and retract the slider rail into the slide rail assembly.
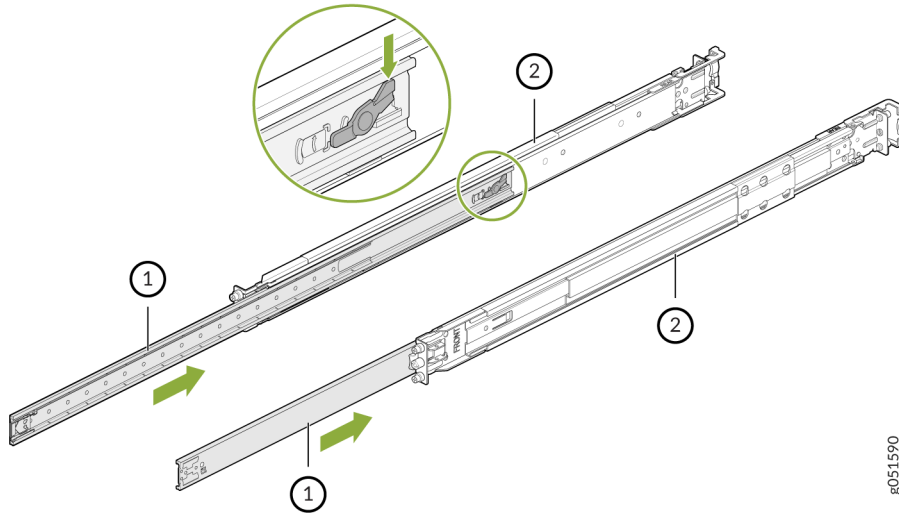
1– Slider rail	2– Outer rail

Install the Slide Rail Assembly in the Rack

1. Move the latch on the rear-end of the slide rail assembly to the open position.

2. Align the rear end of slide rail assembly with the rear rack-post holes that you want to use.

   The mounting pegs on the outer rail enter the rear rack-post holes from the inside of the rack post.

3. Push the outer rail rear mounting pegs into the rear rack-post holes. You will hear a click sound.

4. Move the latch to the close position.

   The outer rail rear-end wraps around the outside of the rear rack post.
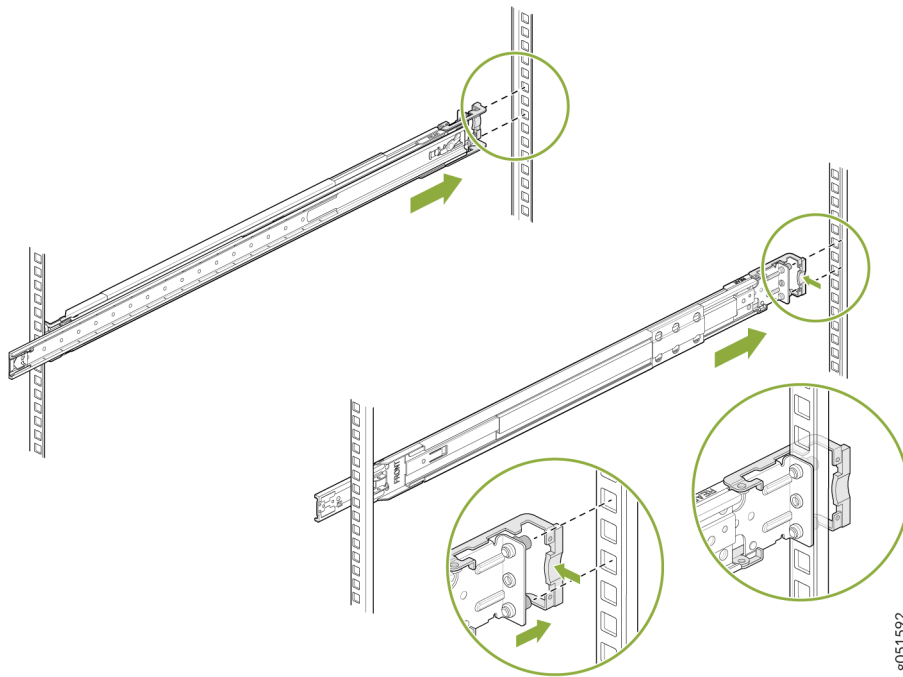
g051592

5. Adjust the slider rail length and push the front mounting pegs on it into the front rack-post holes. You will hear a click sound.

g051593
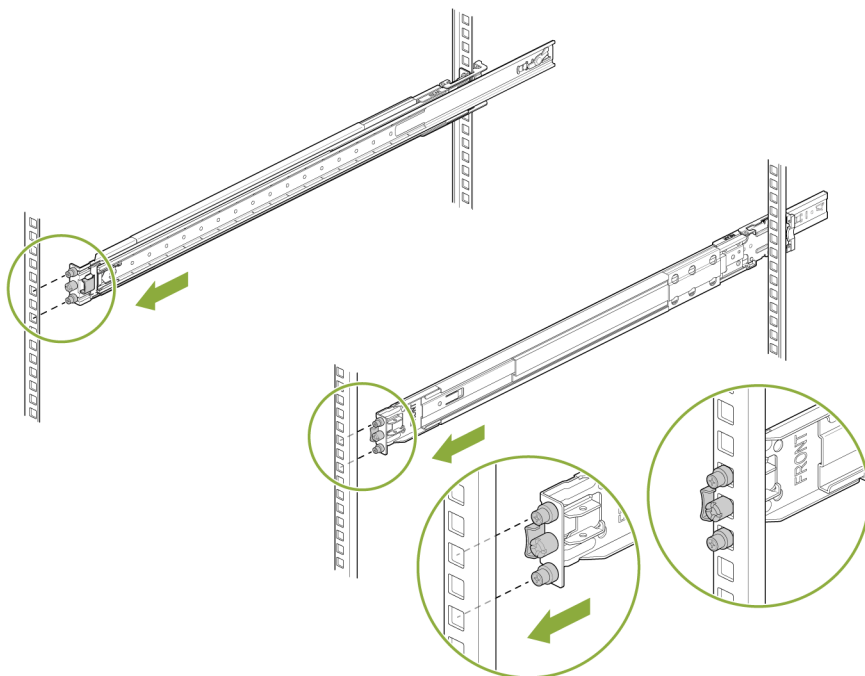
6. The slide rail assembly is fully installed. Check if both the slide rail assemblies are at the same height with each other and are level front-to-back.
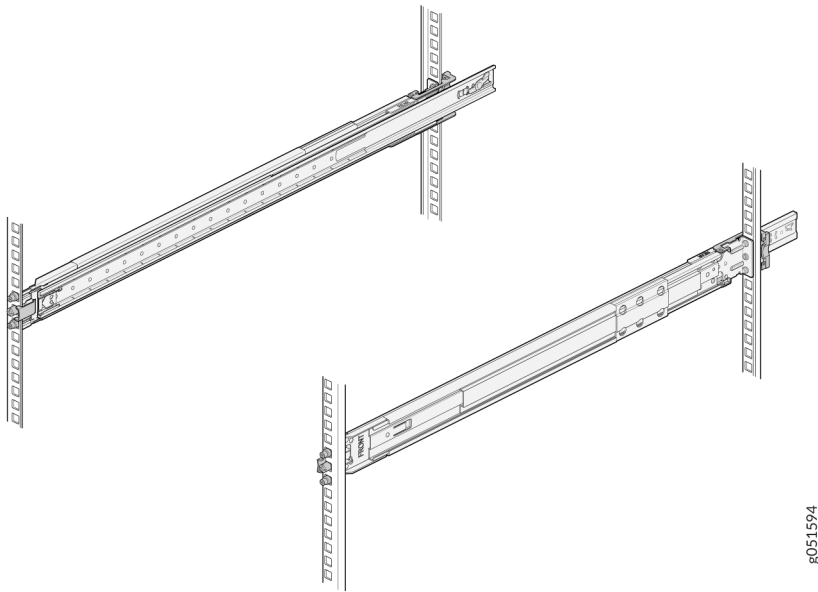
g051594

Mount the Switch in the Rack

1. Pull the slider rails out to their full extended lock position. Ensure that the ball bearing retainer is located at the front of the slider rail.

2. Lift the switch and align the rear of the inner rail brackets with the front ends of the slider rails on the rack.

g051595
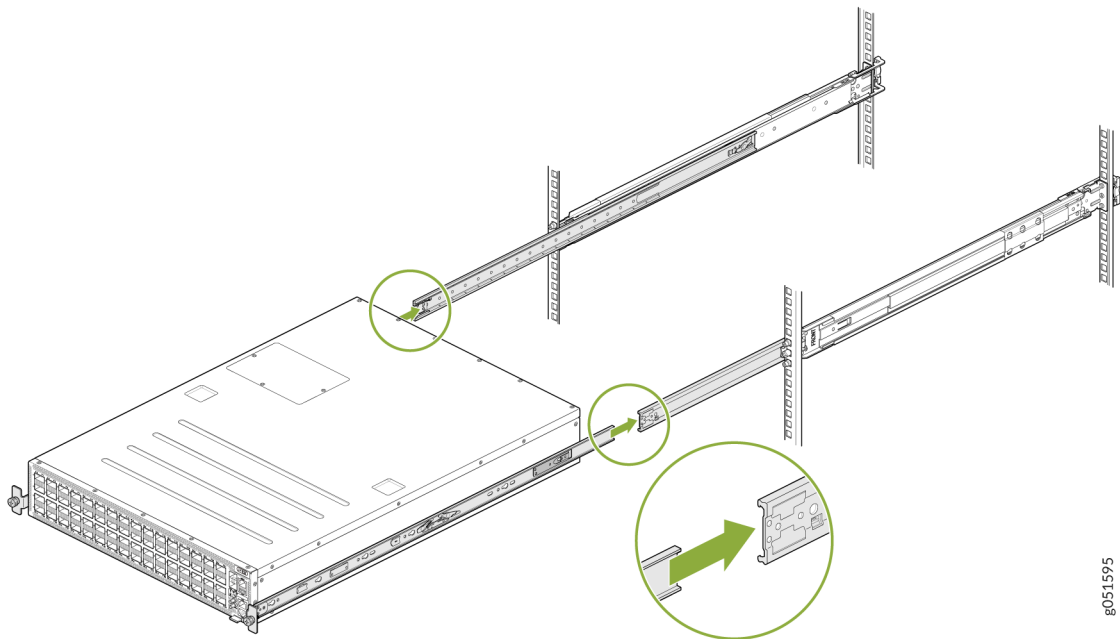
3. Push the inner rail brackets into the slider rails until you hit a stop. After you hit a stop, pull/push the blue release tab on the inner rail brackets.
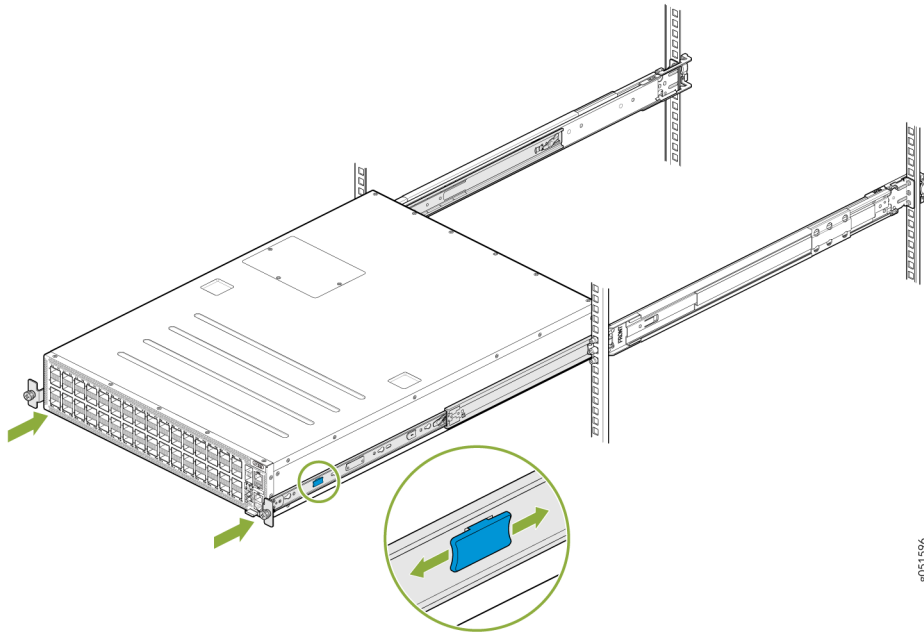
4. Tighten the two thumbscrews to secure the switch.

Connect to Power

This topic describes the steps to connect an AC-powered QFX5240 to power. To connect QFX5240 to power, complete the following procedures:

Ground the QFX5240 Switch

To ground the QFX5240 switch, do the following:

1. Connect one end of the grounding cable to an appropriate earth ground site, such as the mounting rack.

2. Remove the two M6 screws (along with star washers that are already attached to it) from the earthing terminal on the side of the chassis.

3. Place the Panduit LCDXN2-14AF-E or equivalent grounding lug attached to the grounding cable over the protective earthing terminal.

4. Secure the grounding lug to the protective earthing terminal with the M6 screws and star washers.

Figure 1: Attach the Grounding Cable to the QFX5240
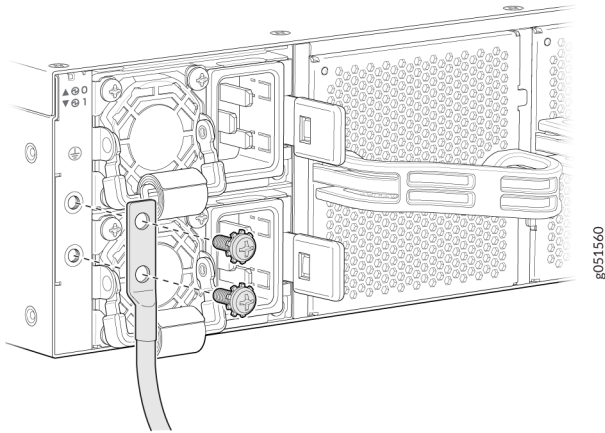
5. Dress the grounding cable and ensure that it does not touch or block access to other device components. Also make sure the cable does not drape where people could trip over it.

Connect the Power Cord and Power On the Switch

For information about the supported AC power cord specifications, see "QFX5240 Power System" on page 28.

To connect the power cord, do the following:

1. Ensure that the power supply is fully inserted in the rear panel of the switch and the latches are secured.
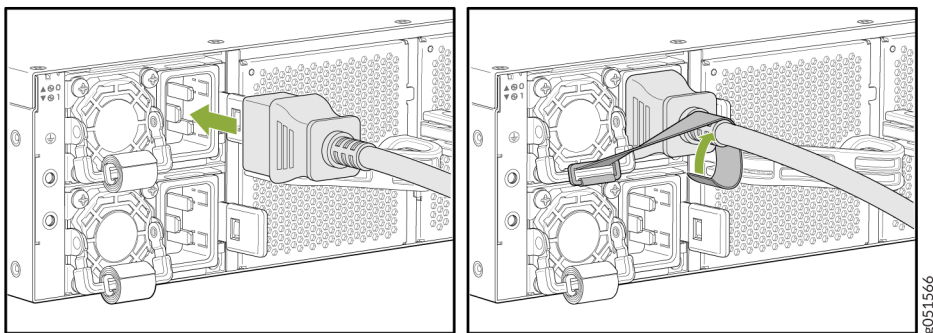
2. If the AC power source outlet has a power switch, turn it off.

3. Plug-in the power cord to the AC power source outlet.

4. Insert the power cord coupler in the power socket of the switch.

5. If the AC power source outlet has a power switch, turn it on. The QFX5240 doesn't have a power switch. The switch powers on as soon as you plug it in.

6. Check to see that the LED on the power supply is lit steadily green. If the LED stays off, disconnect the power supply from the power source. You'll need to replace the power supply.

Onboard, Configure, and Monitor QFX5240

SUMMARY

This topic provides you with pointers to onboard, configure, and monitor QFX5240 switches using Juniper Apstra or CLI (configure only).

You can use Juniper Apstra to onboard, configure, and monitor the QFX5240 switch. See Table 1 on page 10 for more information.

Table 1: Onboard, Configure, and Monitor QFX5240 Using Juniper Apstra

If You Want To	Then
Install and configure Juniper Apstra	See Juniper Apstra Quick Start Guide
Use Juniper Apstra	See Juniper Apstra User Guide
See all documentation available for Juniper Apstra	See Juniper Apstra Documentation

You can configure the QFX5240 switch using the CLI. See Table 2 on page 11 for more information.

Table 2: Configure QFX5240 Using the CLI

If You Want To	Then
Customize the basic configuration	See "Perform Initial Software Configuration for QFX5240 Switches" on page 87
Configure supported software features on QFX5240	See Software Documentation
Stay up-to-date about new and changed features, and known and resolved issues	See Junos OS Evolved Release Notes

2
CHAPTER

Overview

IN THIS CHAPTER

QFX5240 System Overview

SUMMARY

Learn about the key features and benefits, models and specifications, and FRUs of the QFX5240 Switch.

QFX5240 Switch Description

The Juniper Networks® QFX5240 Switches are high-density devices that you can use as end-of-row, leaf or spine devices in an IP fabric architecture. These 2-U fixed-configuration switches offer up to 64 800-Gigabit Ethernet (GbE) ports through two models—the QFX5240-64OD and the QFX5240-64QD.

The QFX5240-64OD offers 64 800-Gbps octal small form factor pluggable (OSFP) ports and 2 10-Gbps SFP+ ports. The QFX5240-64QD switch has 64 800-Gbps quad small form-factor pluggable - double density (QSFP-DD) ports and 2 10-Gbps SFP+ ports. With a bandwidth of 51.2 terabits per second (Tbps), the QFX5240 is an optimal choice for shallow buffer platforms for the spine role in the data center fabric. The QFX5240 switches use the high-radix class TH5 - BCM78900 chip, which is a dedicated ASIC for high-bandwidth network switching devices.

An Intel 4-core 2.2-GHz Ice Lake processor drives the QFX5240 control plane, which runs the Junos OS Evolved software. The Junos OS Evolved software image is stored on two internal 480-GB Non-Volatile Memory Express (NVMe) solid-state drives (SSDs).

Figure 2: Front View of the QFX5240-64OD Switch
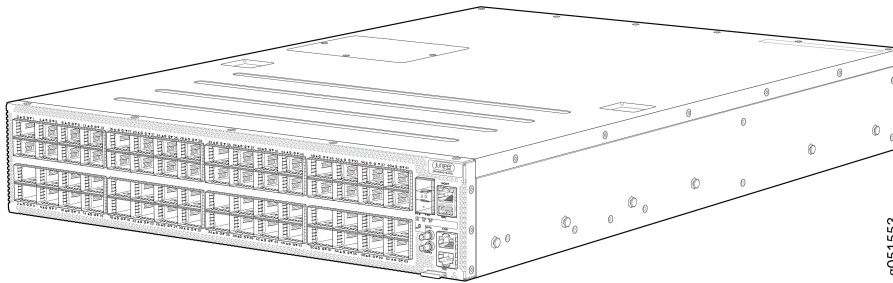
Figure 3: Rear View of the QFX5240-64OD Switch
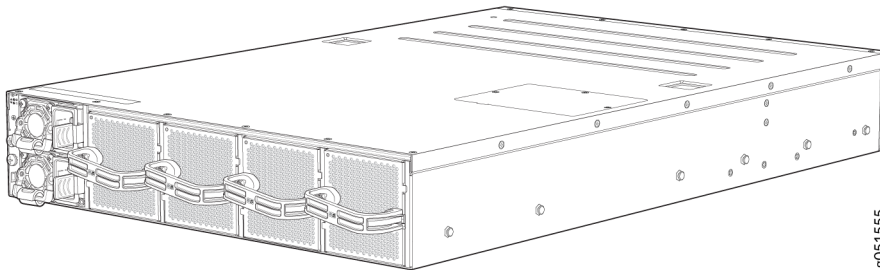
Figure 4: Front View of the QFX5240-64QD Switch
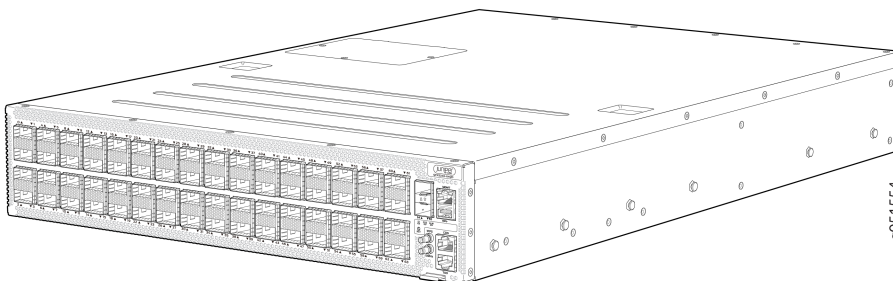
Figure 5: Rear View of the QFX5240-64QD Switch
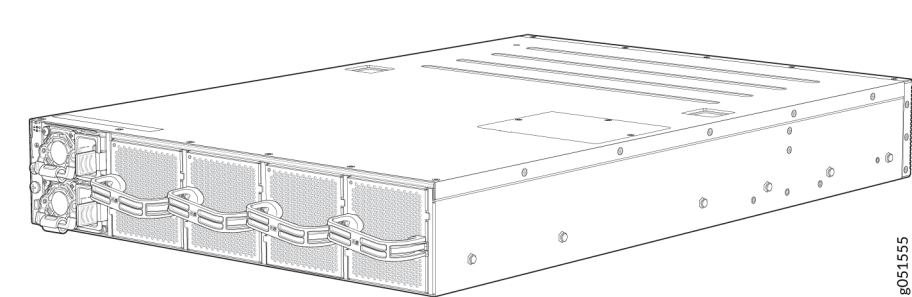
QFX5240 Hardware Models

The QFX5240 has two models: QFX5240-64OD-AO and QFX5240-64QD-AO. provides an overview of the QFX5240 hardware models.

Table 3: QFX5240 Hardware Models

Model	Description	Airflow	PSU FRUs
QFX5240-64OD-AO	64x800GbE OSFP ports and 2x10GbE SFP+ ports	4 airflow out (AFO) fans	2 AC, airflow out (AFO)
QFX5240-64OD-CHAS	Spare chassis without PSU and fans	NA	NA
QFX5240-64QD-AO	64x800GbE QSFP-DD ports and 2x10GbE SFP+ ports	4 airflow out (AFO) fans	2 AC, airflow out (AFO)
QFX5240-64QD-CHAS	Spare chassis without PSU and fans	NA	NA

System Software

The QFX5240 runs the Junos OS Evolved operating system. Junos OS Evolved provides several capabilities that include Layer 2 and Layer 3 switching, routing, and security services. The Junos OS Evolved software is installed on the solid-state drives (SSD) in the switch.

You can manage the switch using the Junos OS Evolved CLI, accessible through the console and out-of-band management ports on the device.

QFX5240 Component Redundancy

The following hardware components provide redundancy on QFX5240 switches:

- QFX5240 power supply units (PSUs)—The QFX5240 PSUs are hot-removable and hot-insertable field-replaceable units (FRUs). The PSUs provide 1+1 redundancy. When installing or replacing the PSUs, you don't need to shut down the device or interfere with the switching process. See .

  Table 4: QFX5240 Power Supply Specifications

PSU	Item	Specification
QFX5240-PWR-AC-AO, 3000 W	Maximum output power	3000 W
	AC input current rating	16 A maximum
	AC input voltage	200 V–240 V AC
	AC input line frequency	50/60 Hz

- QFX5240 cooling system—The cooling system consists of four front-to-back (airflow out or AFO) fan modules with each fan module containing 2 rotors. The cooling system offers N+1 redundancy at rotor level. The fan modules are hot-insertable and hot-removable FRUs.

Table 5: Cooling System Specifications

Fan Module	Description	Airflow
QFX5240-2U-FANAO	AIR OUT, port-to-FRU airflow	Front-to-back

QFX5240 Field-Replaceable Units

Field-replaceable units (FRUs) are switch components that you can replace at your site. The QFX5240 switches uses these types of FRUs:

- Hot-insertable and hot-removable—You can remove and replace these components without powering off the switch or disrupting the switching function.

- Hot-pluggable—You can remove and replace these components without powering off the switch, but the switching function is interrupted until you replace the component.

The power supplies and fan modules in the QFX5240 are hot-insertable and hot-removable FRUs, which means you can replace them out without turning the switch off or interfering with its functionality. See Table 6 on page 17.

Table 6: QFX5240 Field-Replaceable Units

FRUs	Description
QFX5240-2U-FANAO	Fan module, with ports-to-FRUs airflow (front-to-back or AFO)
QFX5240-PWR-AC-AO	AC power supply, 3000 W, ports-to-FRUs airflow (front-to-back or AFO)
QFX5240-2U-4PRMK	Four-post tool-less rack mount kit (RMK)

QFX5240 Chassis Physical Specifications

The QFX5240 chassis is a rigid sheet-metal structure that houses the hardware components (see "QFX5240 Chassis Physical Specifications" on page 17).

Table 7: Physical Specifications of QFX5240 Chassis

Product Model	Height	Width	Depth	Weight
QFX5240-64OD-AO QFX5240-64QD-AO	3.46 in. (8.78 cm)	19.03 in (48.33 cm)	25.51 in. (65 cm)	22 kgs (48.50lbs) fully loaded without optics

> **NOTE**: If you have a Juniper Care service contract, register any addition, change, or upgrade of hardware components at https://www.juniper.net/customers/support/tools/updateinstallbase/. Failure to do so can result in significant delays if you need replacement parts. This note does not apply if you replace existing components with the same type of component.

QFX5240 Port Panel

IN THIS SECTION

- QFX5240 Network Port LEDs | **20**

The ports panel of the QFX5240-64OD has 64 high-speed ports that support transmission at OSFP 800-Gbps speed. The ports panel of the QFX5240-64QD has 64 high-speed ports that support transmission at 800-Gbps speed. See Figure 6 on page 19 and Figure 7 on page 19.

Figure 6: QFX5240-64OD Port Panel
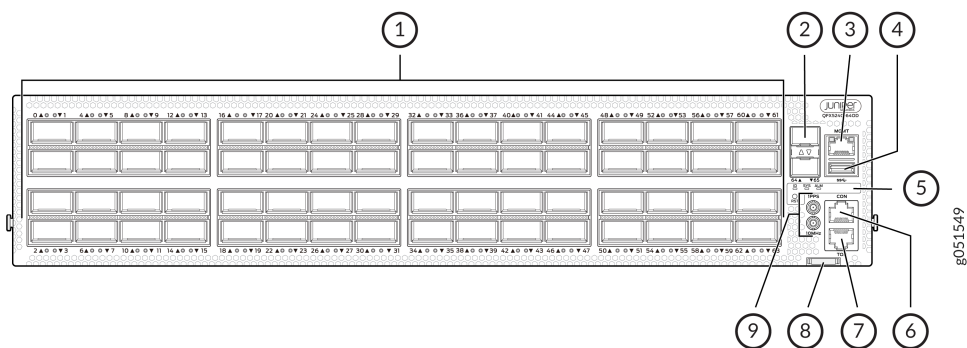
1– Network ports panel	6– RJ-45 console port (CON)
2– SFP28 ports	7– RJ-45 TOD (Time of Day) port
3– RJ-45 management port (MGMT)	8– Chassis serial number pull-out
4– USB port	9– Clock input and output connectors (10 MHz and 1 PPS)
5– Status LEDs	

NOTE: When you use the Reset button, only the device gets rebooted and there is no change to the existing configuration of the switch. The device does not return to the factory-default configuration.

Figure 7: QFX5240-64QD Port Panel
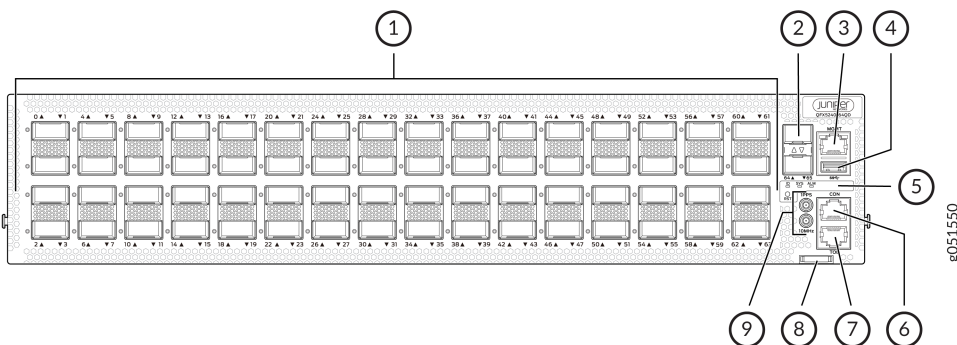
1– Network Ports	6– RJ-45 console port (CON)
2– SFP28 ports	7– RJ-45 TOD (Time of Day) port
3– RJ-45 management port (MGMT)	8– Chassis serial number pull-out

4— USB Port	9— Clock input and output connectors (10 MHz and 1 PPS)
5— Status LEDs	

QFX5240 Network Port LEDs

The high-speed OSFP network ports on QFX5240-64OD and the high-speed QSFP-DD network ports on the QFX5240-64QD use a single RGB LED to indicate link status, activity on the link, or a fault condition.

Figure 8: Network Port LEDs on a QFX5240-64OD Switch
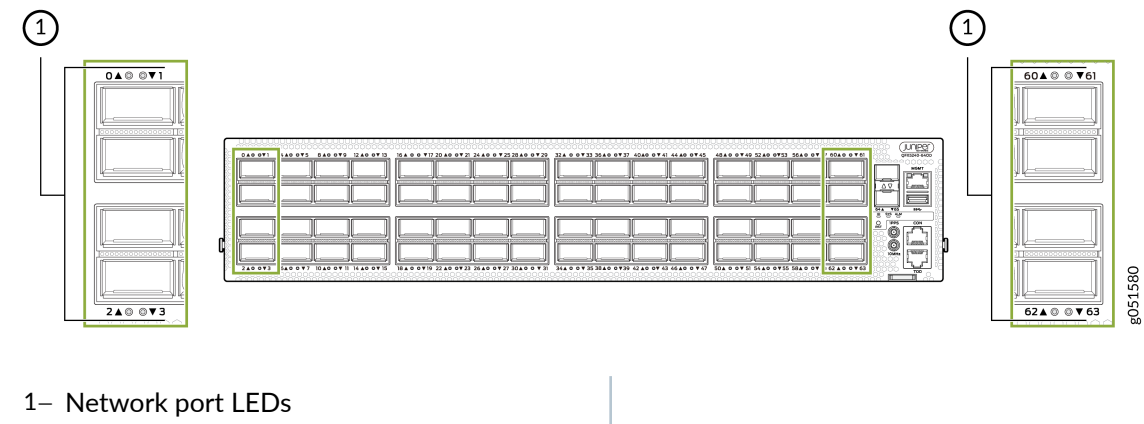
1— Network port LEDs

Figure 9: Network Port LEDs on a QFX5240-64QD Switch
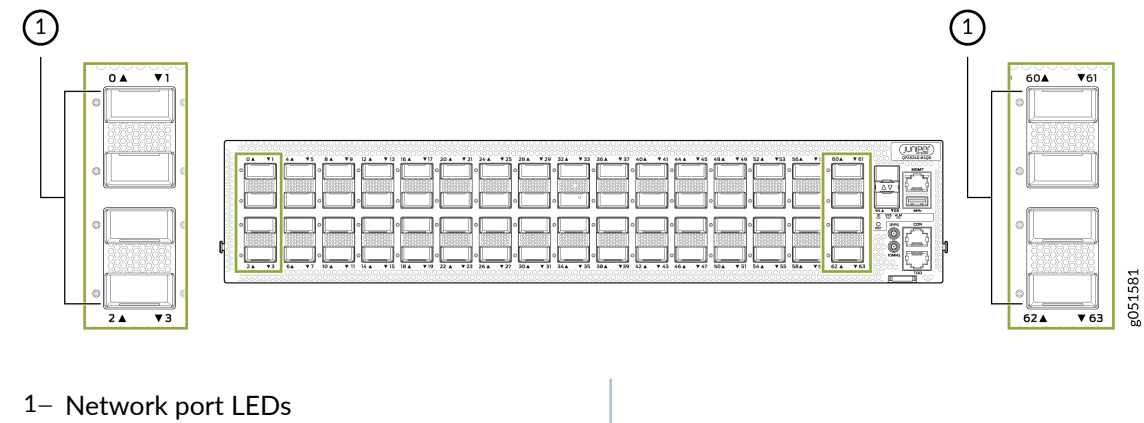
1— Network port LEDs

explains the behaviour of the network ports (non-channelized) LEDs of the QFX5240-64OD and QFX5240-64QD switches.

Table 8: QFX5240-64OD and QFX5240-64QD Network Port LEDs

Color	State	Description
Unlit	Off	Off is the default mode. The LED can be unlit even when power is present and a transceiver is present in the port.
		The link is down.
		Transceiver not present.
Green	On steadily	A 400/800-Gbps link is established, and there is no link activity.
	On steadily	A 400/800-Gbps link is established, and there is link activity.
Yellow	On steadily	Link down; other fault except loss of signal and Transceiver hardware failure
		The link is down because of a remote error or because the port was disabled through the CLI.
Red	On steadily	The link is down because the port/transceiver has a hardware failure.

QFX5240 Management Panel

QFX5240 Management Panel Overview

The management panel of the QFX5240 is located to the right of the port panel. See Figure 10 on page 22 and Figure 11 on page 23.

Figure 10: QFX5240-64OD Management Panel
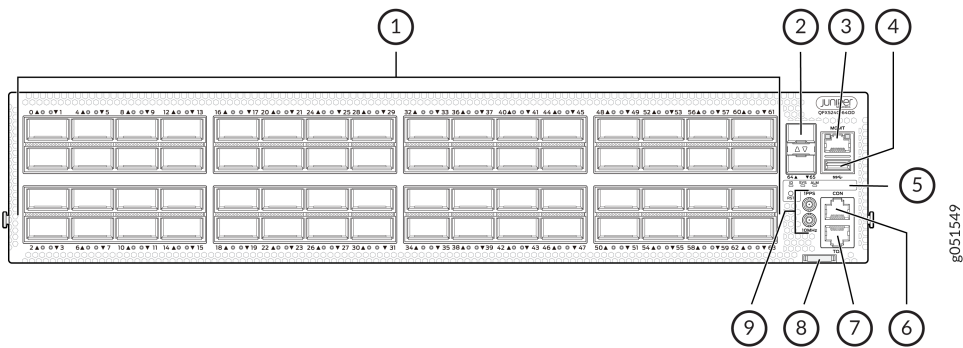
1– Port Panel	6– RJ-45 Console port
2– SFP28 Ports	7– RJ-45 TOD (Time of Day) port
3– RJ-45 Management Port	8– Chassis serial number pull-out
4– USB Port	9– Clock input and output connectors (10 MHz and 1 PPS)
5– Status LEDs	

Figure 11: QFX5240-64QD Management Panel
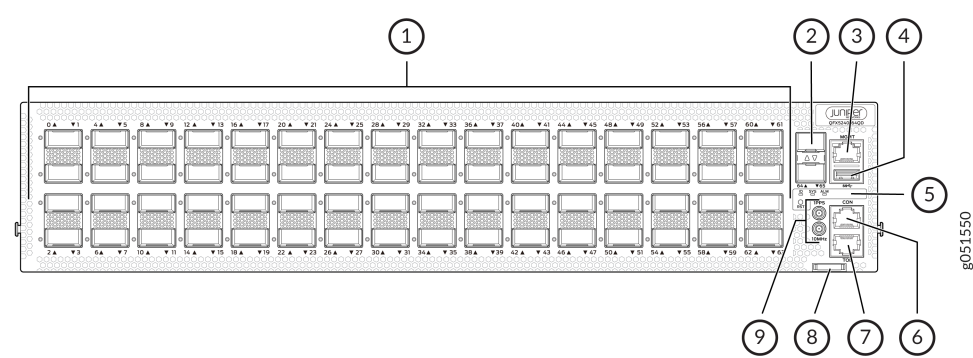
1–	Port Panel	6–	RJ-45 Console port
2–	SFP28 Ports	7–	RJ-45 TOD (Time of Day) port
3–	RJ-45 Management Port	8–	Chassis serial number pull-out
4–	USB Port	9–	Clock input and output connectors (10 MHz and 1 PPS)
5–	Status LEDs		

QFX5240 Management Panel LEDs

IN THIS SECTION

- QFX5240 Chassis Status LEDs | **24**
- Management Port LEDs | **27**

You can find LEDs on these management panel ports:

- Chassis status LEDs

- RJ-45 management port LEDs

The following sections explain how to interpret these LEDs.

QFX5240 Chassis Status LEDs

The QFX5240 has three LEDs that indicate system status. You can find these LEDs to the left of the network ports (see Figure 12 on page 24 and Figure 13 on page 24).

Figure 12: QFX5240-64OD Chassis Status LEDs

1– SYS—System status	3– RST—Reset button
2– ALM—Chassis alarm or fault	4– ID-LED
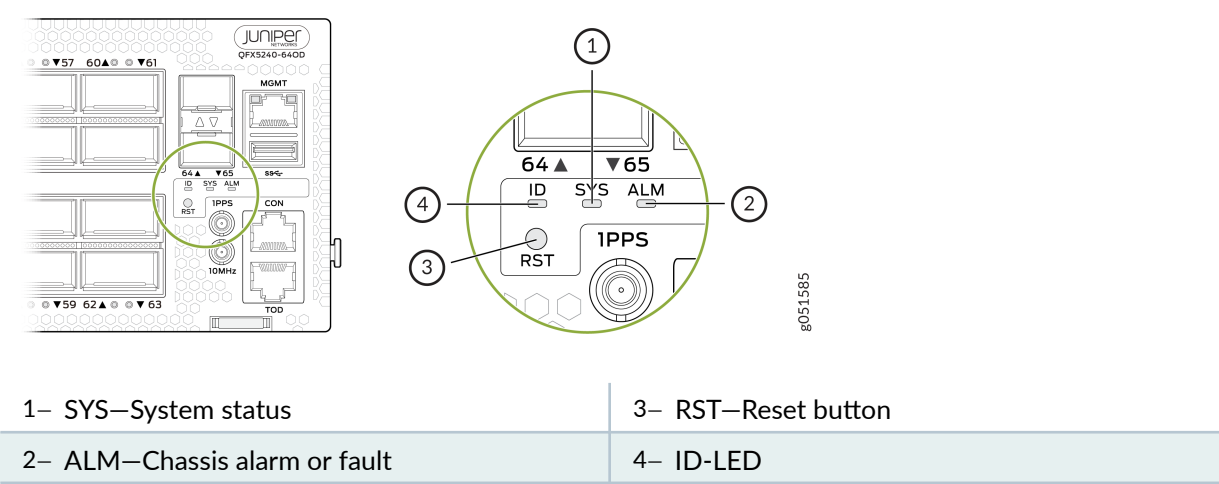
Figure 13: QFX5240-64QD Chassis Status LEDs

1– SYS—System status	3– RST—Rest button
2– ALM—Chassis alarm or fault	4– ID-LED
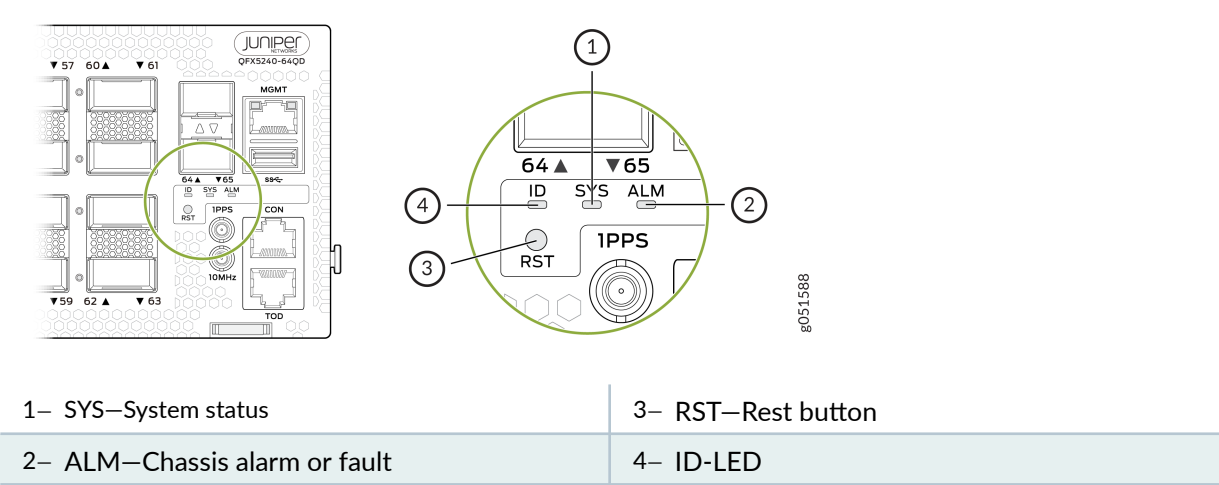
You can view the colors of the three LEDs remotely through the CLI by issuing the operational mode command `show chassis led`.

```
user@host> show chassis led
  ----------------------------------
```

```
LEDs status:
    Alarm LED : Red
    Beacon LED: Off
    System LED: Green

Interface          STATUS LED    LINK/ACTIVITY LED
---------------------------------------------------------
et-0/0/0           N/A           Off
et-0/0/1           N/A           Off
et-0/0/2           N/A           Off
et-0/0/3           N/A           Off
et-0/0/4           N/A           Off
et-0/0/5           N/A           Off
et-0/0/6           N/A           Off
et-0/0/7           N/A           Off
et-0/0/8           N/A           Off
et-0/0/9           N/A           Off
et-0/0/10          N/A           Green
et-0/0/11          N/A           Off
et-0/0/12          N/A           Off
et-0/0/13          N/A           Off
et-0/0/14          N/A           Off
et-0/0/15          N/A           Off
et-0/0/16          N/A           Green
et-0/0/17          N/A           Off
et-0/0/18          N/A           Green
et-0/0/19          N/A           Off
et-0/0/20          N/A           Off
et-0/0/21          N/A           Off
et-0/0/22          N/A           Off
et-0/0/23          N/A           Off
et-0/0/24          N/A           Off
et-0/0/25          N/A           Off
et-0/0/26          N/A           Green
et-0/0/27          N/A           Green
et-0/0/28          N/A           Green
et-0/0/29          N/A           Off
et-0/0/30          N/A           Green
et-0/0/31          N/A           Off
et-0/0/32          N/A           Off
et-0/0/33          N/A           Off
```

Table 9: Chassis Status LEDs on QFX5240 Switches

Name	Color	State	Description
ALM–Alarm	Unlit	Off	The switch is halted, or there is no alarm. **NOTE**: The ALM LED glows green during BIOS booting.
	Red	On steadily	A major hardware fault has occurred, such as a temperature alarm, power failure, or media failure. The device has halted. Power off the device by setting the AC power source outlet to the off (O) position or by unplugging the AC power cords. Correct any voltage or site temperature issues, and allow the switch to cool down. Power on the QFX5240. Monitor the power supply and fan LEDs to help determine where the error is occurring.
	Amber	On steadily	A minor system level alarm has occurred, such as a software error or a missing rescue configuration. Power off the device by setting the AC power source outlet to the off (O) position or by unplugging the AC power cords. Power on the QFX5240, and monitor the status LEDs to ensure that Junos OS Evolved boots properly.
SYS–System	Unlit	Off	The device is powered off or halted. **NOTE**: The SYS LED glows green during BIOS booting.
	Green	On steadily	Junos OS Evolved is loaded on the device.

Table 9: Chassis Status LEDs on QFX5240 Switches *(Continued)*

Name	Color	State	Description
ID–Identification	Unlit	Off	The beacon feature is not enabled on the switch. Enable this feature by using the `request chassis beacon fpc 0` on operational mode command. **NOTE**: The ID LED glows green during BIOS booting.
	Blue	Blinking	The beacon feature is enabled on the switch. Disable this feature by using the `request chassis beacon fpc 0 off` operational mode command.

TIP: To find the status of the beacon, use the `show chassis beacon` operational mode command.

```
user@host> show chassis beacon
    OFF
```

Management Port LEDs

The RJ-45 management port on a QFX5240 has two LEDs that indicate link status and link activity. The management port is labeled **MGMT**. See .

Figure 14: Management port LEDs on a QFX5240 switch
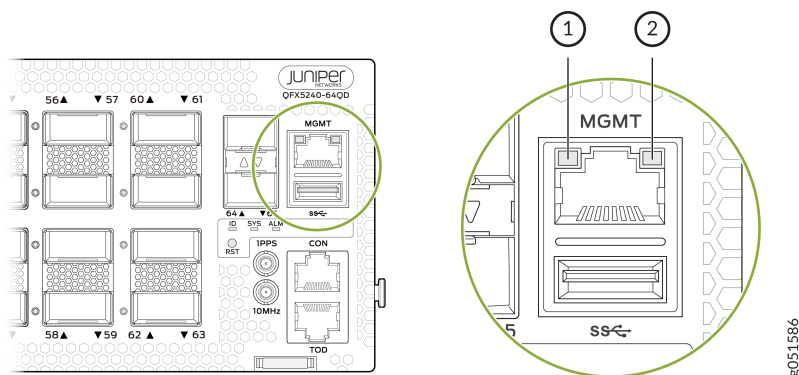
1– Status LED	2– Link activity LED

shows the management port LEDs on a QFX5240 switch.

Table 10: Management Port LEDs on a QFX5240 Switch

LED	Color	State	Description
Link activity	Unlit	Off	No link is established, there is a fault, or the link is down.
	Green	On steadily	A link is established, but there is no link activity.
		Blinking or flickering	A link is established, and there is link activity.
Status	Unlit	Off	Either the port speed is 10 Mbps or the link is down.
	Green	On steadily	The port speed is I Gbps.
	Green	On steadily	The port speed is 100 Mbps.

QFX5240 Power System

IN THIS SECTION

The QFX5240 switch is powered by two 3000-W redundant AC (QFX5240-PWR-AC-AO) power supply modules (PSMs). The power supply modules support front-to-back airflow (airflow out or AFO). The PSMs are fully redundant, load-sharing, and hot-removable and hot-insertable FRUs when the second PSM is installed and running. You can remove and replace the PSMs without powering off the switch or disrupting switch functions.

The two PSMs together can supply double the power needed to power all the components in the switch. When the switch has both the PSMs installed, the switch has full power redundancy. If a PSM fails or is removed, the second PSM balances the electrical load without interruption.

The PSMs for the QFX5240 are located on the FRU panel.

Figure 15: QFX5240 FRU Panel

1– Power Supply Modules (PSM)	2– Fan Modules
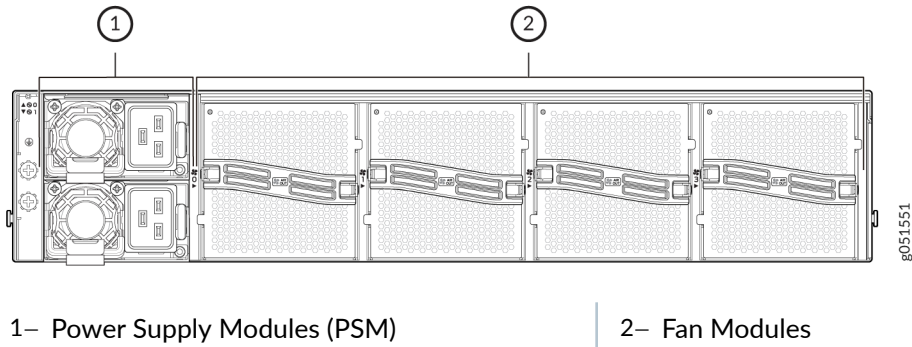
QFX5240 AC Power Supply Module Description

Each 3000-W AC power supply module (PSM) has a single AC input and provides 12-V power to the system. The PSM's output power is 2.7 KW for the input voltage range of 200 VAC through 240 VAC. See Figure 16 on page 29.

Figure 16: AC Power Supply Module

1– Power connector	4– Handle
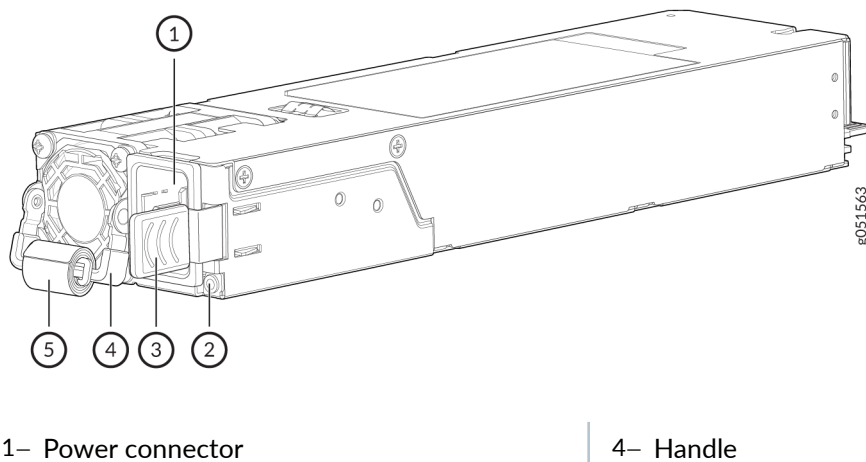
2– PSM LED		5– Velcro strap for cable management	
3– Ejection lever			

AC Power Cord Specifications

Detachable AC power cords are shipped with the chassis if you include them as part of your order.

> ⓘ **NOTE**: In North America, AC power cords must not exceed 14.75 feet (approximately 4.5 meters) in length, to comply with National Electrical Code (NEC) Sections 400-8 (NFPA 75, 5-2.2) and 210-52, and Canadian Electrical Code (CEC) Section 4-010(3). The cords that can be ordered for the QFX Series switches are in compliance.

Table 11 on page 30 lists AC power cord specifications provided for each country or region.

Table 11: AC Power Cord Specifications

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
Argentina	250 VAC, 16 A, 50 Hz	C19 IRAM to C19	CBL-EX-PWR-C19-AR
Brazil	250 VAC, 16 A, 50 Hz	KC-059-A Plug (NBR14136) to KC-003A Connector (EN 60320 C19)-	CBL-PWR-C19-BR-2M
China	250 VAC, 16 A, 50 Hz	Straight plug to Straight C19	CBL-EX-PWR-C19-CH
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 16 A, 50Hz	RA Plug (IEC 60884-1) to Straight C19 Connector (EN 60320)	CBL-PWR-C19-EU-2M
Great Britain	250 VAC, 16 A, 50 Hz	RA Plug (IEC 60884-1) to Straight C19 Connector (EN 60320)	BL-EX-PWR-C19-INT

Table 11: AC Power Cord Specifications *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
India	250 VAC, 16 A, 50 Hz	RA KC-016 Plug (IS1293) to Straight KC-003A Connector (EN 60320 C19)	CBL-PWR-C19-IN-2M
Israel	250 VAC, 16 A, 50 Hz	RA KC-057 Plug (SI 473) to Straight KC-003A Connector (EN 60320 C19)	CBL-PWR-C19-IL-2M
Italy	250 VAC, 16 A, 50 Hz	Straight, KC-050N Plug (CEI.23-16-VII)) to KC-003A Connector (EN 60320 C19)-	CBL-PWR-C19-IT-2M
Japan	250 VAC, 20 A, 50/60 Hz	Straight,Plug (JIS C8303) to C19 Connector (EN 60320)	CBL-PWR-C19-JP-2M
South Africa	250 VAC, 16 A, 50 Hz	RA KC-016 Plug (SABS 164-1) to KC-003A Connector (EN 60320 C19)	CBL-PWR-C19-SA-2M
South Korea	250 VAC, 16 A, 50 Hz	Straight, KC-024 Plug (KSC8305) to KC-003A Connector (EN 60320 C19)-	CBL-PWR-C19-KR-2M
Switzerland	250 VAC, 16 A, 50 Hz	Straight, KC-051N Plug (SEV 1011) to KC-003A Connector (EN 60320 C19)-	CBL-PWR-C19-SZ-2M
Universal	250 VAC, 16 A, 50 Hz	Straight,C20 Plug (EN 60320) to C19 Connector (EN 60320)-	CBL-PWR-C19-C20-2M
USA	250 VAC, 20 A, 50 Hz	RA Plug (NEMA 6-20P) to Straight C19 Connector (EN 60320)-	BL-PWR-C19-US-2M

QFX5240 AC Power Supply Module LED

Each QFX5240 power supply module (PSM) has a single LED on the module faceplate to indicate the power status.

shows the AC power supply LED.

Figure 17: QFX5240 AC Power Supply LED
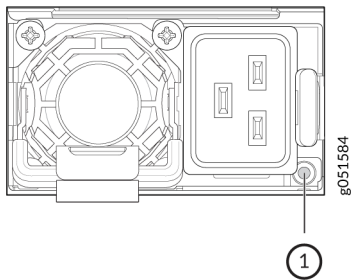
1. **PSM LED**

The PSM uses an amber and green bicolored LED to indicate the operating state. See .

Table 12: QFX5240 AC PSM LED Color and State

LED Color	PSM State
Off	The PSM does not have AC power.
Solid green	The PSM is on and functioning properly.
Blinking green (1 sec./on, 1 sec./off, 0.5Hz)	The PSM is in standby state or the other PSM in the chassis is on with 12 VSB (vestigial sideband).
Blinking green (0.25 sec./on, 0.25 sec./off, 2Hz)	The PSM is in redundant/offline mode.
Solid amber	Standby mode with OTP The PSM shuts down because of a critical event such as high temperature, high power, high current, or fan failure.
	12V Fault (OVP, UVP, OCP, SCP and OTP)
	Fan stopped working for 15 seconds and standby mode.

QFX5240 Cooling System

QFX5240 Cooling System Description

The cooling system components work together to keep all switch components within the acceptable temperature range.

When the switch operates normally, the fans operate at lower than full speed. If a fan fails or the ambient temperature rises above a threshold, the switch's cooling system automatically adjusts the speed of the remaining fans to keep the temperature within the acceptable range. If the maximum temperature specification is exceeded and the system cannot be adequately cooled, the switch shuts down some or all of the hardware components.

The cooling system consists of the following components :

1. "Fan Modules" on page 34

2. "Airflow" on page 36

3. "Power Supply Cooling System" on page 37

Fan Modules

The QFX5240 has four hot-insertable and hot-removable field-replaceable fan modules (QFX5240-2U-FANAO) installed at the rear of the switch. Each fan module houses two 80 mm x 80 mm counter-rotating rotors.

The fan modules in a QFX5240 are FRUs designed for port-to-FRU airflow, which is also known as airflow out (AFO) or front-to-back airflow. The fan modules are numbered from **0** through **3**. Each fan module is 2-U high and has an associated LED to indicate its status. See Figure 18 on page 34.

Figure 18: Fan Module for QFX5240
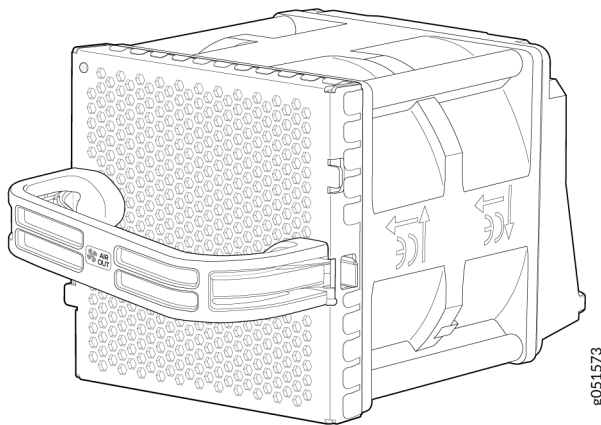
> **ⓘ** **NOTE**: The fan speed varies based on the temperature of internal components, optics modules, and the ambient temperature. The maximum speed at which fans operate depends on the configured ambient temperature. As the fan speed increases, the power consumed by the fans increases. As a result, the device consumes more power when the temperature is high because the fans run faster to maintain the operating temperature of the chassis within the configured limits.

The QFX5240 switch must operate with all the four fan modules installed. If you need to replace a faulty fan module, see "Remove a Fan Module from QFX5240 Switches" on page 92.

QFX5240 Fan Module Status LED

Each fan module has one bicolored status LED. See Figure 19 on page 35.

Figure 19: Fan Module Description for QFX5240
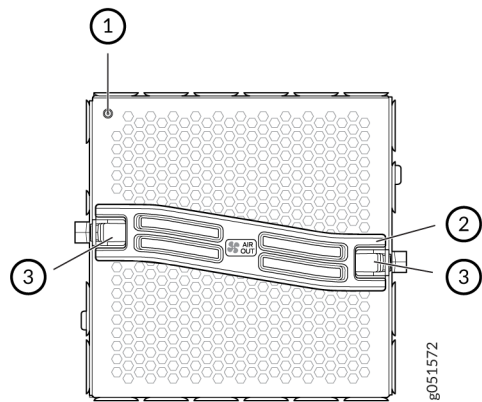
1– Fan module LED	3– Lock release handle
2– Handle	

describes the behavior of the fan module status LED. shows the fan module LED for QFX5240-64OD.

Figure 20: Fan Module LED for QFX5240-64OD
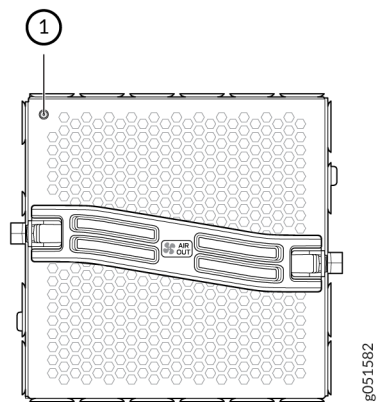
1– Fan module status LED	

Table 13: Fan Module Status LEDs

Color	State	Description
Green	On steadily	Fan is functioning normally.

Table 13: Fan Module Status LEDs *(Continued)*

Color	State	Description
Red	On steadily	Equipment is faulty and malfunctioning.
Unlit	Off	Fan module input power failed.

Under normal operating conditions, the fan modules operate at a moderate speed. Temperature sensors in the chassis monitor the temperature within the chassis.

The system raises an alarm if a fan module fails or if the ambient temperature inside the chassis rises above the acceptable range. If the temperature inside the chassis rises above the threshold temperature, the system shuts down automatically.

Airflow

The switch has a front-to-back (airflow out or AFO) cooling system. The switch pulls air through the front of the chassis toward the fan modules, which exhaust the air out of the switch. See .

Figure 21: AFO Airflow Through the QFX5240 Chassis
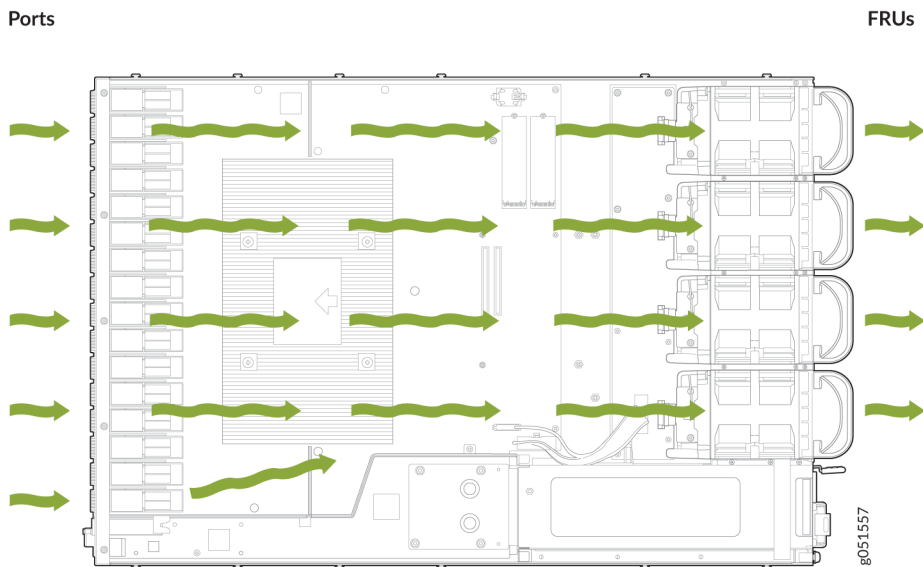
Power Supply Cooling System

The QFX5420 power supply modules (PSMs) are installed at the rear of the chassis. The PSMs are self-cooling. Each PSM has its own fan and is cooled by its own internal cooling system.

> **NOTE**: In the QFX5240 system, the PSU fan speed is controlled by the internal microcontroller firmware and adjusts dynamically based on load conditions and temperature. The operational range is **4,000 RPM to 28,000 RPM**.
>
> - Under normal operating conditions, fan speeds vary within this full range.
>
> - During high-temperature conditions, fan speeds typically operate between **18,000 RPM and 28,000 RPM** to ensure optimal thermal management.
>
> These speed variations are expected behavior and do not impact system functionality or PSU fan longevity.

The PSMs in an QFX5420 switch support front-to-back airflow (airflow out or AFO).

3
CHAPTER

Site Planning, Preparation, and Specifications

QFX5240 Site Preparation Checklist

The checklist summarizes the tasks you need to perform when preparing a site for installing a QFX5240 switch.

Table 14: Site Preparation Checklist

Item or Task	For More Information	Performed by	Date
Environment			
Verify that environmental factors such as temperature and humidity do not exceed switch tolerances.			
Power			
Measure the distance between external power sources and the switch installation site.			
Calculate the power consumption and requirements.			
Rack or Cabinet			
Verify that your rack or cabinet meets the minimum requirements for the installation of the switch.			
Plan rack or cabinet location, including required space clearances.			
Secure the rack or cabinet to the floor and building structure.			
Cables			

Table 14: Site Preparation Checklist *(Continued)*

Item or Task	For More Information	Performed by	Date
Acquire cables and connectors: • Determine the number of cables needed based on your planned configuration. • Review the maximum distance allowed for each cable. Choose the length of cable based on the distance between the hardware components being connected.			
Plan the cable routing and management.			

QFX5240 Site Guidelines and Requirements

SUMMARY

The proper function of the QFX5240 switch depends on you meeting certain environmental requirements, following site and wiring guidelines, and ensuring that your installation meets the grounding specifications and airflow clearance requirements that support QFX5240 switches.

IN THIS SECTION

- QFX5240 Environmental Requirements and Specifications | **41**
- General Site Guidelines | **42**
- QFX5240 Grounding Cable and Lug Specifications | **42**
- QFX5240 Clearance Requirements for Airflow and Hardware Maintenance | **43**
- Site Electrical Wiring Guidelines | **44**
- QFX5240 Rack Requirements | **45**

QFX5240 Environmental Requirements and Specifications

You must install the switch in a rack and house it in a dry, clean, well-ventilated, and temperature-controlled environment.

Follow these environmental guidelines:

- The site must be as dust-free as possible, because dust can clog air intake vents and filters, reducing the efficiency of the switch cooling system.

- Maintain ambient airflow for normal switch operation. If the airflow is blocked or restricted, or if the intake air is too warm, the switch might overheat. As a result, the switch temperature monitor might shut down the device to protect the hardware components.

Table 15: QFX5240 Switch Environmental Tolerances

Description	Tolerance
Altitude	With DAC Cables: At 32° F through 104° F (0° C through 40° C), there is no performance degradation up to 6000 feet (1828.8 meters)
	With Optics: At 32° F through 104° F (0° C through 40° C), Sea level
Relative humidity, operating	Normal operation ensured in relative humidity range of 5% through 90%, non-condensing
Temperature	- Normal operation ensured in the temperature range of 32° F through 104° F (0° C through 40° C) - Nonoperating storage temperature in shipping container: –40° F through 158° F (–40° C through 70° C)
Seismic	Designed to comply with Zone 4 earthquake requirements in accordance with NEBS GR-63-CORE, Issue 3.

General Site Guidelines

Efficient device operation requires proper site planning. For the device to operate properly, you must ensure maintenance and proper layout of the equipment, rack or cabinet, and wiring closet.

To plan and create an acceptable operating environment for your device and prevent environmentally caused equipment failures:

- Keep the area around the chassis free from dust and conductive material, such as metal flakes.

- Follow the prescribed airflow guidelines to ensure that the cooling system functions properly. Ensure that the exhaust from other equipment does not blow into the intake vents of the device.

- Follow the prescribed electrostatic discharge (ESD) prevention procedures to prevent damaging the equipment. Static discharge can cause components to fail completely or intermittently over time.

- Install the device in a secure area, so that only authorized personnel can access the device.

QFX5240 Grounding Cable and Lug Specifications

For installations that require a separate grounding conductor to the chassis, the switch must be adequately grounded before power is connected to ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements.

To ensure proper operation and to meet safety and EMI requirements, you must connect a QFX5240 switch to earth ground before you connect power to the device.

Figure 22: Grounding a QFX5240 Switch
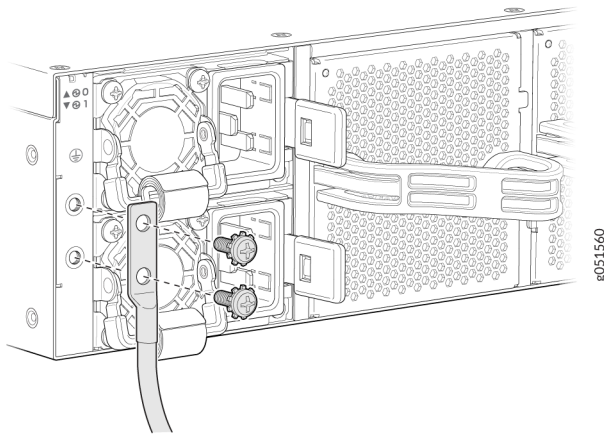
> ⚡ **WARNING**: The switch is pluggable type A equipment that is installed in a restricted-access location. The switch has a separate protective earthing terminal provided on the chassis in addition to the grounding pin of the power supply cord. You must permanently connect this separate protective earthing terminal to earth ground for installations that require a separate grounding conductor to the chassis.

> ⚡ **WARNING**: To comply with GR-1089 requirements, ensure that all intrabuilding copper cabling used for SFP+ and QSFP+ ports are shielded and grounded at both ends.

> ⚠ **CAUTION**: Before you install the switch, a licensed electrician must attach a cable lug to the grounding cables that you supply. See . A cable with an incorrectly attached lug can damage the switch.

Before connecting the switch to earth ground, review the following information:

QFX5240 Clearance Requirements for Airflow and Hardware Maintenance

When planning the site for installing a QFX5240, you must allow sufficient clearance around the installed chassis (see).

Figure 23: Clearance Requirements for Airflow and Hardware Maintenance for a QFX5240 Switch
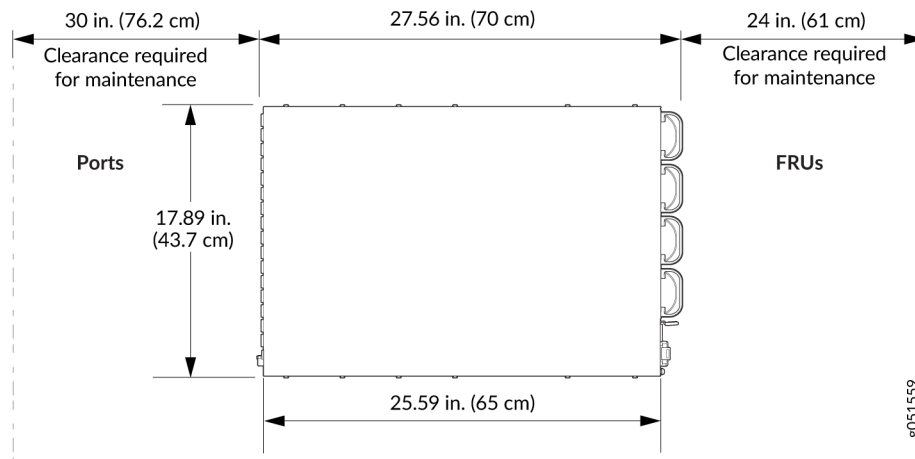
- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See "QFX5240 Cooling System" on page 33 for more information about the airflow through the chassis.

- If you are mounting a QFX5240 in a rack with other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.

- Leave at least 24 in. (61 cm) both in front of and behind the QFX5240. For service personnel to remove and install hardware components, you must leave adequate space at the front and back of the switch. NEBS GR-63 recommends that you allow at least 30 in. (76.2 cm) in front of the rack and 24 in. (61 cm) behind the rack.

Site Electrical Wiring Guidelines

Table 16 on page 45 describes the factors you must consider while planning the electrical wiring at your site.

> **WARNING**: You must provide a properly grounded and shielded environment and use electrical surge-suppression devices.
>
> **Avertissement** Vous devez établir un environnement protégé et convenablement mis à la terre et utiliser des dispositifs de parasurtension.

Table 16: Site Electrical Wiring Guidelines

Site Wiring Factor	Guidelines
Signaling limitations	If your site experiences any of the following problems, consult experts in electrical surge suppression and shielding: • Radio frequency interference (RFI) because of improperly installed wires. • Damage from lightning strikes occurring when wires exceed recommended distances or pass between buildings. • Damage to unshielded conductors and electronic devices as a result of electromagnetic pulses (EMPs) caused by lightning.
Radio frequency interference	To reduce or eliminate RFI from your site wiring, do the following: • Use a twisted-pair cable with a good distribution of grounding conductors. • If you need to exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal, when applicable.
Electromagnetic compatibility	If your site is susceptible to problems with electromagnetic compatibility (EMC), particularly from lightning or radio transmitters, seek expert advice. Strong sources of electromagnetic interference (EMI) can cause: • Destruction of the signal drivers and receivers in the device. • Electrical hazards as a result of power surges conducted over the lines into the equipment.

QFX5240 Rack Requirements

QFX5240 switches are designed to be installed on four-post racks.

Rack requirements consist of:

• Rack type

• Mounting bracket hole spacing

• Rack size and strength

provides the rack requirements and specifications for the QFX5240.

Table 17: Rack Requirements for the QFX5240

Rack Requirement	Guidelines
Rack type	Use a four-post rack that provides bracket holes or hole patterns spaced at 1-U (1.75 in. or 4.45 cm) increments and that meets the size and strength requirements to support the weight. A U is the standard rack unit defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D) published by the Electronics Industry Association.
Mounting bracket hole spacing	The holes in the mounting brackets are spaced at 1-U (1.75 in. or 4.45 cm) increments, so that the switch can be mounted in any four-post rack that provides holes spaced at that distance.
Rack size and strength	- Ensure that the rack complies with the standards for a 19-in. rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D) published by the Electronics Industry Association. - A 900-mm rack as defined in the four-part *Equipment Engineering (EE); European telecommunications standard for equipment practice* (document numbers ETS 300 119-1 through 119-4) published by the European Telecommunications Standards Institute. The horizontal spacing between the rails in a rack that complies with this standard is usually wider than the device's mounting brackets, which measure 19 in. (48.26 cm) from outer edge to outer edge. Use approved wing devices to narrow the opening between the rails as required. - Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the switch chassis. The outer edges of the front-mounting brackets extend the width to 19 in. (48.26 cm). - For four-post installations, the front and rear rack rails must be spaced between 25.6 in. (65 cm) and 31.5 in. (80 cm) front to back. - The rack must be strong enough to support the weight of the switch. - Ensure that the spacing of rails and adjacent racks allows for proper clearance around the switch and rack.

Table 17: Rack Requirements for the QFX5240 *(Continued)*

Rack Requirement	Guidelines
Rack connection to building structure	- Secure the rack to the building structure. - If earthquakes are a possibility in your geographical area, secure the rack to the floor. - Secure the rack to the ceiling brackets as well as wall or floor brackets for maximum stability.

QFX5240 Network Cable and Transceiver Planning

IN THIS SECTION

Determining QFX5240 Optical Interface Support

You can find information about the optical transceivers supported on your Juniper device by using the Hardware Compatibility Tool. In addition to transceiver and connection type, the optical and cable characteristics–where applicable–are documented for each transceiver. The Hardware Compatibility Tool enables you to search by product, displaying all the transceivers supported on that device, or category, by interface speed or type. The list of supported transceivers for the QFX5240 is located at https://apps.juniper.net/hct/product/#prd=QFX5240.

⚠️ **CAUTION**: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not

provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.

Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

NOTE: For interoperability with other QFX Series switches, ensure autonegotiation on the QFX5240 is disabled.

Cable Specifications for QSFP+, QSFP28, and QSFP-DD Transceivers

The 40-GbE QSFP+, 100-GbE QSFP28, 400GbE (QDD-400G-DR4 and QDD-400G-SR4P2), and 800GbE transceivers that are used in QFX Series switches use 12-ribbon multimode fiber crossover cables with socket MPO-12 (UPC/APC) connectors. The fiber can be either OM3 or OM4. These cables are not sold by Juniper Networks.

CAUTION: To maintain agency approvals, use only a properly constructed, shielded cable.

TIP: Ensure that you order cables with the correct polarity. Vendors refer to these crossover cables as *key up to key up*, *latch up to latch up*, *Type B*, or *Method B*. If you are using patch panels between two QSFP+ or QSFP28 transceivers, ensure that the proper polarity is maintained through the cable plant.

Table 18 on page 49 describes the signals on each fiber. Table 19 on page 49 shows the pin-to-pin connections for proper polarity.

Table 18: QSFP+ and QSFP28 Optical Module Receptacle Pinouts

Fiber	Signal
1	Tx0 (Transmit)
2	Tx1 (Transmit)
3	Tx2 (Transmit)
4	Tx3 (Transmit)
5	Unused
6	Unused
7	Unused
8	Unused
9	Rx3 (Receive)
10	Rx2 (Receive)
11	Rx1 (Receive)
12	Rx0 (Receive)

Table 19: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts

Pin	Pin
1	12
2	11

Table 19: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts *(Continued)*

Pin	Pin
3	10
4	9
5	8
6	7
7	6
8	5
9	4
10	3
11	2
12	1

Understand QFX Series Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion

IN THIS SECTION

To determine the power budget and power margin needed for fiber-optic connections, you need to understand how signal loss, attenuation, and dispersion affect transmission. The QFX Series uses various types of network cables, including multimode and single-mode fiber-optic cables.

Signal Loss in Multimode and Single-Mode Fiber-Optic Cables

Multimode fiber is large enough in diameter to allow rays of light to reflect internally (bounce off the walls of the fiber). Interfaces with multimode optics typically use LEDs as light sources. However, LEDs are not coherent light sources. They spray varying wavelengths of light into the multimode fiber, which reflect the light at different angles. Light rays travel in jagged lines through a multimode fiber, causing signal dispersion. When light traveling in the fiber core radiates into the fiber cladding (layers of lower refractive index material in close contact with a core material of higher refractive index), higher-order mode loss occurs. Together, these factors reduce the transmission distance of multimode fiber compared to that of single-mode fiber.

Single-mode fiber is so small in diameter that rays of light reflect internally through one layer only. Interfaces with single-mode optics use lasers as light sources. Lasers generate a single wavelength of light, which travels in a straight line through the single-mode fiber. Compared to multimode fiber, single-mode fiber has a higher bandwidth and can carry signals for longer distances. It is consequently more expensive.

For information about the maximum transmission distance and supported wavelength range for the types of single-mode and multimode fiber-optic cables that are connected to the QFX Series, see the Hardware Compatibility Tool. Exceeding the maximum transmission distances can result in significant signal loss, which causes unreliable transmission.

Attenuation and Dispersion in Fiber-Optic Cable

An optical data link functions correctly provided that modulated light reaching the receiver has enough power to be demodulated correctly. *Attenuation* is the reduction in strength of the light signal during transmission. Passive media components such as cables, cable splices, and connectors cause attenuation. Although attenuation is significantly lower for optical fiber than for other media, it still occurs in both multimode and single-mode transmission. An efficient optical data link must transmit enough light to overcome attenuation.

Dispersion is the spreading of the signal over time. The following two types of dispersion can affect signal transmission through an optical data link:

- Chromatic dispersion, which is the spreading of the signal over time caused by the different speeds of light rays.

- Modal dispersion, which is the spreading of the signal over time caused by the different propagation modes in the fiber.

For multimode transmission, modal dispersion, rather than chromatic dispersion or attenuation, usually limits the maximum bit rate and link length. For single-mode transmission, modal dispersion is not a factor. However, at higher bit rates and over longer distances, chromatic dispersion limits the maximum link length.

An efficient optical data link must have enough light to exceed the minimum power that the receiver requires to operate within its specifications. In addition, the total dispersion must be within the limits specified for the type of link in the Telcordia Technologies document GR-253-CORE (Section 4.3) and International Telecommunications Union (ITU) document G.957.

When chromatic dispersion is at the maximum allowed, its effect can be considered as a power penalty in the power budget. The optical power budget must allow for the sum of component attenuation, power penalties (including those from dispersion), and a safety margin for unexpected losses.

Calculate Power Budget and Power Margin for Fiber-Optic Cables

IN THIS SECTION

Use the information in this topic and the specifications for your optical interface to calculate the power budget and power margin for fiber-optic cables.

> 💡 **TIP:** You can use the Hardware Compatibility Tool to find information about the pluggable transceivers supported on your Juniper Networks device.

To calculate the power budget and power margin, perform the following tasks:

Calculate Power Budget for Fiber-Optic Cables

To ensure that fiber-optic connections have sufficient power for correct operation, you need to calculate the link's power budget (P_B), which is the maximum amount of power it can transmit. When you calculate the power budget, you use a worst-case analysis to provide a margin of error, even though all the parts of an actual system do not operate at the worst-case levels. To calculate the worst-case estimate of P_B, you assume minimum transmitter power (P_T) and minimum receiver sensitivity (P_R):

$P_B = P_T - P_R$

The following hypothetical power budget equation uses values measured in decibels (dB) and decibels referred to one milliwatt (dBm):

$P_B = P_T - P_R$

$P_B = -15$ dBm $- (-28$ dBm$)$

$P_B = 13$ dB

How to Calculate Power Margin for Fiber-Optic Cables

After calculating a link's P_B, you can calculate the power margin (P_M), which represents the amount of power available after subtracting attenuation or link loss (LL) from the P_B. A worst-case estimate of P_M assumes maximum LL:

$P_M = P_B - LL$

P_M greater than zero indicates that the power budget is sufficient to operate the receiver.

Factors that can cause link loss include higher-order mode losses, modal and chromatic dispersion, connectors, splices, and fiber attenuation. Table 20 on page 53 lists an estimated amount of loss for the factors used in the following sample calculations. For information about the actual amount of signal loss caused by equipment and other factors, refer to vendor documentation.

Table 20: Estimated Values for Factors Causing Link Loss

Link-Loss Factor	Estimated Link-Loss Value
Higher-order mode losses	Single mode—None Multimode—0.5 dB
Modal and chromatic dispersion	Single mode—None Multimode—None, if product of bandwidth and distance is less than 500 MHz-km
Faulty connector	0.5 dB
Splice	0.5 dB

Table 20: Estimated Values for Factors Causing Link Loss *(Continued)*

Link-Loss Factor	Estimated Link-Loss Value
Fiber attenuation	Single mode—0.5 dB/km Multimode—1 dB/km

The following sample calculation for a 2-km-long multimode link with a P_B of 13 dB uses the estimated values from . This example calculates LL as the sum of fiber attenuation (2 km @ 1 dB/km, or 2 dB) and loss for five connectors (0.5 dB per connector, or 2.5 dB) and two splices (0.5 dB per splice, or 1 dB) as well as higher-order mode losses (0.5 dB). The P_M is calculated as follows:

$P_M = P_B - LL$

P_M = 13 dB – 2 km (1 dB/km) – 5 (0.5 dB) – 2 (0.5 dB) – 0.5 dB

P_M = 13 dB – 2 dB – 2.5 dB – 1 dB – 0.5 dB

P_M = 7 dB

The following sample calculation for an 8-km-long single-mode link with a P_B of 13 dB uses the estimated values from . This example calculates LL as the sum of fiber attenuation (8 km @ 0.5 dB/km, or 4 dB) and loss for seven connectors (0.5 dB per connector, or 3.5 dB). The P_M is calculated as follows:

$P_M = P_B - LL$

P_M = 13 dB – 8 km (0.5 dB/km) – 7(0.5 dB)

P_M = 13 dB – 4 dB – 3.5 dB

P_M = 5.5 dB

In both the examples, the calculated P_M is greater than zero, indicating that the link has sufficient power for transmission and does not exceed the maximum receiver input power.

QFX5240 Management Cable Specifications and Pinouts

IN THIS SECTION

Cable Specifications for Console and Management Connections for the QFX Series

lists the specifications for the cables that connect the QFX Series switch to a management device.

> ⓘ **NOTE**: The QFX Series switches have small form-factor pluggable (SFP) management ports that support 1000BASE-SX transceivers. QFX switches come with a RJ-45 management port, and support 10-Gbps speed. See the Hardware Compatibility Tool for more information about the fiber-optic cables required for use with these transceivers.

Table 21: Cable Specifications for Console and Management Connections for the QFX Series

Port on QFX Series Device	Cable Specification	Maximum Length	Device Receptacle
Console port	RS-232 (EIA-232) serial cable	7 ft (2.13 m)	RJ-45

Table 21: Cable Specifications for Console and Management Connections for the QFX Series
(Continued)

Port on QFX Series Device	Cable Specification	Maximum Length	Device Receptacle
Management port	Category 5 cable or equivalent suitable for 1000BASE-T operation	328 ft (100 m)	RJ-45

> (i) **NOTE**: We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:
>
> - RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
>
> - RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
>
> - RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)
>
> If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See, https://ftdichip.com/drivers/vcp-drivers/ to download the driver.

RJ-45 Management Port Connector Pinout Information

Table 22 on page 56 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 22: RJ-45 Management Port Connector Pinout Information

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2

Table 22: RJ-45 Management Port Connector Pinout Information *(Continued)*

Pin	Signal	Description
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Console Port Connector Pinouts for the QFX Series

The console port (labeled **CON** or **CONSOLE**) is an RS-232 serial interface that uses an RJ-45 connector to connect to a console management device. The default baud rate for the console port is 9600 baud. You can also use a RJ45 to USB 2.0 Type-A cable and a RJ45 to USB 2.0 Type-C cable.

provides the pinout information for the RJ-45 console connector.

> *i* **NOTE**: If your laptop or PC does not have a DB-9 plug connector pin and you want to connect your laptop or PC directly to a QFX Series device, use a combination of an RJ-45 to DB-9 adapter and a USB to DB-9 plug adapter. You must provide the USB to DB-9 plug adapter.

> *i* **NOTE**: We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:
> - RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)

- RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)

- RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)

If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See, https://ftdichip.com/drivers/vcp-drivers/ to download the driver.

Table 23: Console Port Connector Pinouts for the QFX Series

Pin	Signal	Description
3	TxD Output	Transmit data
4	Signal Ground	Signal ground
5	Signal Ground	Signal ground
6	RxD Input	Receive data
7	DCD Input	Data carrier detect

QSFP-DD Port Connector Pinout Information

Table 24 on page 58 provides the pinout mapping for quad SFP double-density (QSFP-DD) port connectors.

Table 24: QSFP-DD Network Port Pinout Mapping

Pin	Symbol	Description
1	GND	Ground
2	TX2n	Transmitter inverted data input

Table 24: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
3	TX2p	Transmitter non-inverted data input
4	GND	Ground
5	TX4n	Transmitter inverted data input
6	TX4p	Transmitter non-inverted data input
7	GND	Ground
8	ModSelL	Module select
9	ResetL	Module reset
10	VCC RX	+3.3 V power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	RX3p	Receiver non-inverted data output
15	RX3n	Receiver inverted data output
16	GND	Ground
17	RX1p	Receiver non-inverted data output

Table 24: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
18	RX1n	Receiver inverted data output
19	GND	Ground
20	GND	Ground
21	RX2n	Receiver inverted data output
22	RX2p	Receiver non-inverted data output
23	GND	Ground
24	RX4n	Receiver inverted data output
25	RX4p	Receiver non-inverted data output
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt
29	VCC TX	+3.3 V power supply transmitter
30	VCC1	+3.3 V power supply
31	LPMode	Low power mode
32	GND	Ground

Table 24: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
33	TX3p	Transmitter non-inverted data input
34	TX3n	Transmitter inverted data input
35	GND	Ground
36	TX1p	Transmitter non-inverted data input
37	TX1n	Transmitter inverted data input
38	GND	Ground
39	GND	Ground
40	TX6n	Transmitter inverted data input
41	TX6p	Transmitter non-inverted data input
42	GND	Ground
43	TX8n	Transmitter inverted data input
44	TX8p	Transmitter non-inverted data input
45	GND	Ground
46	TBD	Not used
47	TBD	Not used

Table 24: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
48	VCC	+3.3 V power supply
49	TBD	Reserved
50	TBD	Reserved
51	GND	Ground
52	RX7p	Receiver non-inverted data output
53	RX7n	Receiver inverted data output
54	GND	Ground
55	RX5p	Receiver non-inverted data output
56	RX5n	Receiver inverted data output
57	GND	Ground
58	GND	Ground
59	RX6n	Receiver inverted data output
60	RX6p	Receiver non-inverted data output
61	GND	Ground
62	RX8n	Receiver inverted data output

Table 24: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
63	RX8p	Receiver non-inverted data output
64	GND	Ground
65	NC	No connect
66	TBD	Reserved
67	VCC	+3.3 V power supply
68	VCC	+3.3 V power supply
69	TBD	Reserved
70	GND	Ground
71	TX7p	Transmitter non-inverted data input
72	TX7n	Transmitter inverted data input
73	GND	Ground
74	TX5p	Transmitter non-inverted data input
75	TX5n	Transmitter inverted data input
76	GND	Ground

QSFP+, QSFP28, and QSFP56 Port Connector Pinout Information

provides the pinout mapping for the quad small-form factor pluggable (QSFP) connectors QSFP+, QSFP28, and QSFP56.

Table 25: QSFP+, QSFP28, and QSFP56 Port Connector Pinout Mappng

Pin	Symbol	Description
1	GND	Ground
2	TX2n	Transmitter inverted data input
3	TX2p	Transmitter non-inverted data input
4	GND	Ground
5	TX4n	Transmitter inverted data input
6	TX4p	Transmitter non-inverted data input
7	GND	Ground
8	ModSelL	Module select
9	LPMode_Reset	Low power mode reset
10	VccRx	+3.3 V power supply receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground

Table 25: QSFP+, QSFP28, and QSFP56 Port Connector Pinout Mappng *(Continued)*

Pin	Symbol	Description
14	RX3p	Receiver non-inverted data output
15	RX3n	Receiver inverted data output
16	GND	Ground
17	RX1p	Receiver non-inverted data output
18	RX1n	Receiver inverted data output
19	GND	Ground
20	GND	Ground
21	RX2n	Receiver inverted data output
22	RX2p	Receiver non-inverted data output
23	GND	Ground
24	RX4n	Receiver inverted data output
25	RX4p	Receiver non-inverted data output
26	GND	Ground
27	ModPrsL	Module Present
28	IntL	Interrupt

Table 25: QSFP+, QSFP28, and QSFP56 Port Connector Pinout Mappng *(Continued)*

Pin	Symbol	Description
29	VccTx	+3.3 V power supply transmitter
30	Vcc1	+3.3 V power supply
31	TBD	Reserved
32	GND	Ground
33	TX3p	Transmitter non-inverted data input
34	TX3n	Transmitter inverted data input
35	GND	Ground
36	TX1p	Transmitter non-inverted data input
37	TX1n	Transmitter inverted data input
38	GND	Ground

SFP, SFP+, and SFP28 Port Connector Pinout Information

provides the pinout mapping for small-form factor pluggable (SFP) connectors, SFP+ connectors, and SFP28 connectors.

Table 26: SFP, SFP+, and SFP28 Port Connector Pinout Mapping

Pin	Symbol	Description
1	VeeT	Transmitter ground
2	TX_Fault	Transmitter fault indication
3	TX_Disable	Optical output disabled when high
4	SDA	2-wire serial interface data (MOD-DEF2)
5	SCA	2-wire serial interface data (MOD-DEF1)
6	MOD_ABS	Module absent
7	RS0	Receiver rate select
8	RX_LOS	Receiver loss of signal indication
9	RS1	Transmitter rate select
10	VeeR	Receiver ground
11	VeeR	Receiver ground
12	RD-	Receiver inverted DATA out
13	RD+	Receiver non-inverted DATA out
14	VeeR	Receiver ground
15	VccR	Receiver power supply

Table 26: SFP, SFP+, and SFP28 Port Connector Pinout Mapping *(Continued)*

Pin	Symbol	Description
16	VccT	Transmitter power supply
17	VeeT	Transmitter ground
18	TD+	Transmitter non-inverted DATA in
19	TD-	Transmitter inverted DATA in
20	VeeT	Transmitter ground

USB Port Specifications for the QFX Series

The following Juniper Networks USB flash drives have been tested and are officially supported for the USB port in QFX Series devices:

- RE-USB-1G-S—1-gigabyte (GB) USB flash drive (except QFX3100 Director device)

- RE-USB-2G-S—2-GB USB flash drive (except QFX3100 Director device)

- RE-USB-4G-S—4-GB USB flash drive

⚠ **CAUTION**: Any USB memory product not listed as supported for the QFX Series has not been tested by Juniper Networks. The use of any unsupported USB memory product could expose your device to unpredictable behavior. Juniper Networks Technical Assistance Center (JTAC) can provide only limited support for issues related to unsupported hardware. We strongly recommend that you use only supported USB flash drives.

⚠ **CAUTION**: Remove the USB flash drive before upgrading Junos OS or rebooting a QFX Series device. Failure to do so could expose your device to unpredictable behavior.

NOTE: Executing the `request system snapshot` CLI command on a QFX3500 device requires an external USB flash drive with at least 4 GB of free space. We recommend using the RE-USB-4G-S flash drive.

NOTE: USB flash drives used with the QFX Series device must support USB 2.0 or later.

RELATED DOCUMENTATION

No Link Title

4

CHAPTER

Initial Installation and Configuration

IN THIS CHAPTER

Unpack and Mount the QFX5240 Switch

Unpack a QFX5240 Switch

The QFX5240 chassis is a rigid sheet-metal structure that houses the hardware components. A QFX5240 switch is shipped in a cardboard carton, secured with foam packing material.

> ⚠ **CAUTION**: The QFX5240 switch is maximally protected inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack a QFX5240 switch:

1. Move the shipping carton to a staging area as close to the installation site as possible, but where you have enough room to remove the system components.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Remove the switch out of the packing material from the pellet
5. Verify the contents of the carton against the inventory included in the carton. Table 27 on page 71 lists the inventory of components supplied with a QFX5240.
6. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Table 27: Inventory of Components Supplied with a QFX5240

Component	Quantity
Chassis	1

Table 27: Inventory of Components Supplied with a QFX5240 *(Continued)*

Component	Quantity
Fan modules	4, factory installed
Power supplies • QFX5240-PWR-AC-AO	2, factory installed
Rack mount kit for QFX5240-2U-4PRMK • Inner rail bracket • Rear-mounting blades • Extension brackets Flathead screws (Phillips, M4 x 6 mm) The order number for a spare rack mount kit is QFX5240-2U-4PRMK.	1 1 1 3
Rack mount assembly drawing, which is part of the RMK	1
Power cords with plugs appropriate to your geographical location	2
Documentation roadmap card	1
Warranty	1

NOTE: We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:

• RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)

- RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)

- RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)

If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See, https://ftdichip.com/drivers/vcp-drivers/ to download the driver.

Update Base Installation Data

⚠️ **CAUTION**: Update the installation base data if any addition or change to the installation base occurs or if the installation base is moved. Juniper Networks is not responsible for not meeting the hardware replacement SLA for products that do not have accurate installation base data.

Update your installation base at https://supportportal.juniper.net/s/CreateCase .

Mount the QFX5240 Switch in a Four-Post Rack

IN THIS SECTION

You can mount QFX5240 switches only on a four-post 19-in. rack using the QFX5240-2U-4PRMK rack mount kit provided with the switch. The rack mount kit can be adapted for a four-post rack-only installation. A four-post installation evenly supports the chassis by all four corners.

The rack mount kit contains two front-mounting rail assemblies and two rear-mounting blades that match the front-mounting rails. This configuration allows either end of the switch chassis to be mounted flush with the rack and still be adjustable for racks with different depths.

The front and rear rack rails must be spaced between 28 in. (71.1 cm) and 32 in. (81.2 cm) front to back.

Before You Begin Rack Mounting

Before you begin mounting a QFX5240 switch in the rack:

1. Ensure that you understand how to prevent electrostatic discharge (ESD) damage..

2. Verify that the site meets the requirements described in "QFX5240 Site Preparation Checklist" on page 39.

3. Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.

4. Read *Chassis and Component Lifting Guidelines*.

5. Remove the switch from the shipping carton.

6. In addition to the items in Table 27 on page 71, ensure that you have the following parts and tools available that are not normally provided with the device to mount the switch in a rack:

   - ESD grounding strap

   - Appropriate screwdriver for the mounting screws

   - Management host, such as a PC laptop, with a serial port

   - Grounding lug, grounding wire, screws, and washers

   - Dust covers for unused ports

> ⚠ **CAUTION**: A QFX5240 requires two people for installation, one person to lift the device into place and another person to attach the device to the rack. If you are installing the QFX5240 above 60 in. (152.4 cm) from the floor, we recommend that you remove the power supplies and fan modules to minimize the weight before attempting to install the device.

> ⚠ **CAUTION**: If you are mounting multiple devices on a rack, mount the heaviest device in the lowest position of the rack first. Proceed to mount the rest of the devices from the bottom to the top of the rack to minimize the risk of the rack toppling.

Mount the QFX5240 in a Four-Post Rack

IN THIS SECTION

1. Unpack the switch and place it on a flat stable surface.

2. Verify the parts received.

3. Ensure that you have the following tools and parts available:

   - An ESD grounding strap—not provided

   - QFX5240-2U-4PRMK rack mount kit (RMK)—provided

     a. Two slide rail assemblies

     b. One packet of screws

Prepare the Slide Rail Assembly to Install in the Rack

The slide rail assembly consists of three parts:

1. Outer rail

2. Slider rail

3. Inner rail bracket

Remove the Inner Rail Bracket from the Slide Rail Assembly

1. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end to a site ESD point.

2. Hold the slide rail assembly and pull the inner rail bracket and the slider rail out to their full extended position until you hear a click sound.

3. Push the white tab on the inner rail bracket forward and pull the bracket out of the slide rail assembly and place it aside.
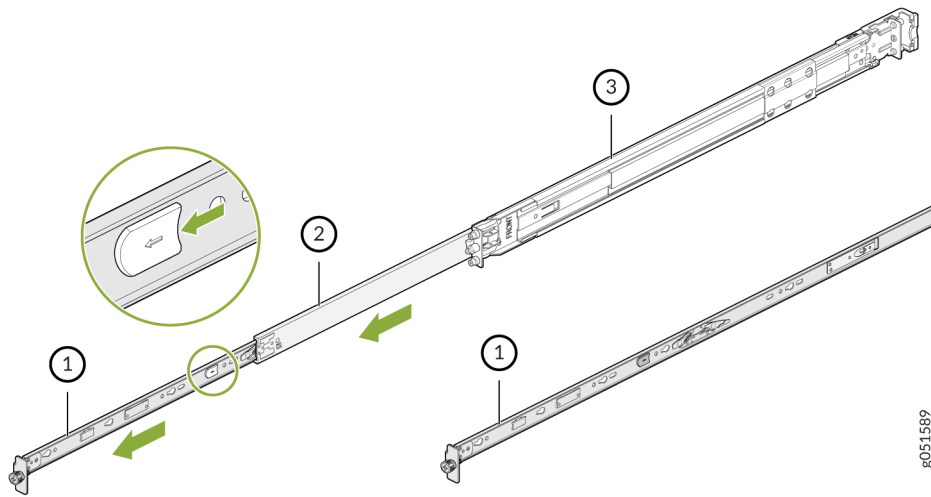
a. Inner rail bracket

b. Slider rail

c. Outer rail

4. Press the latch on the slider rail down and retract the slider rail into the slide rail assembly.
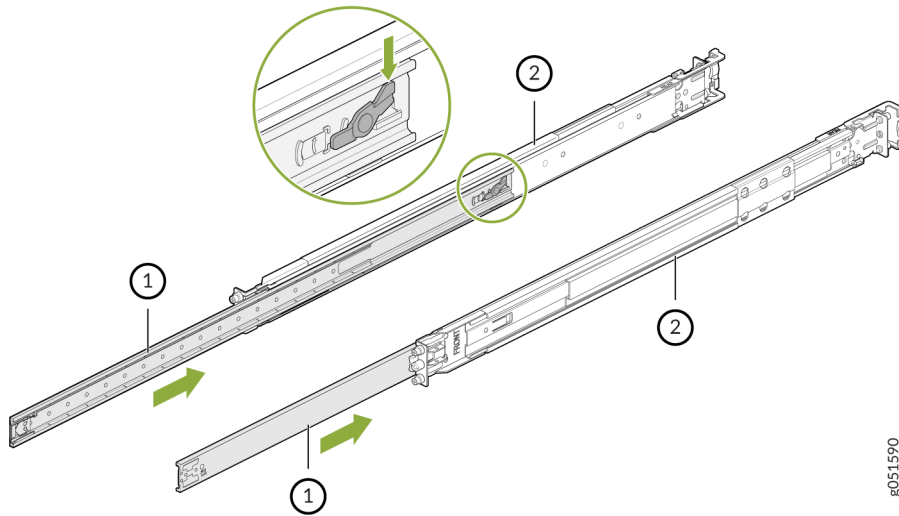
a. Slider rail

b. Outer rail

Install the Slide Rail Assembly in the Rack

1. Move the latch on the rear end of the slide rail assembly to the open position.

2. Align the rear end of slide rail assembly with the rear rack-post holes that you want to use.

   The mounting pegs on the outer rail enter the rear rack-post holes from the inside of the rack post.

3. Push the outer rail rear mounting pegs into the rear rack-post holes. You will hear a click sound.

4. Move the latch to the close position.

   The rear end of the outer rail wraps around the outside of the rear rack post.
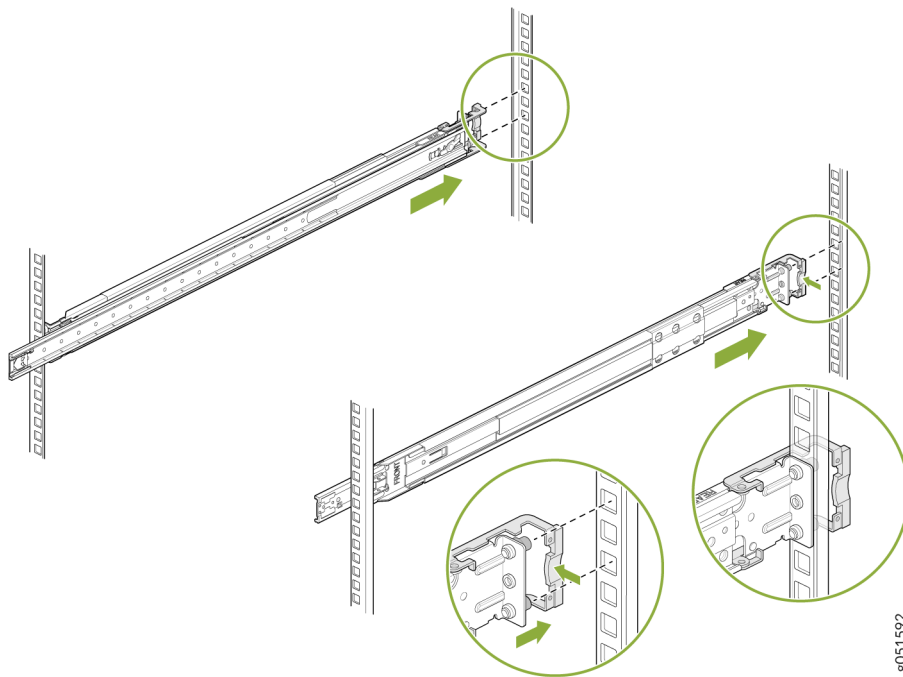
5. Adjust the slider rail length and push the front-mounting pegs on it into the front rack-post holes. You will hear a click sound.
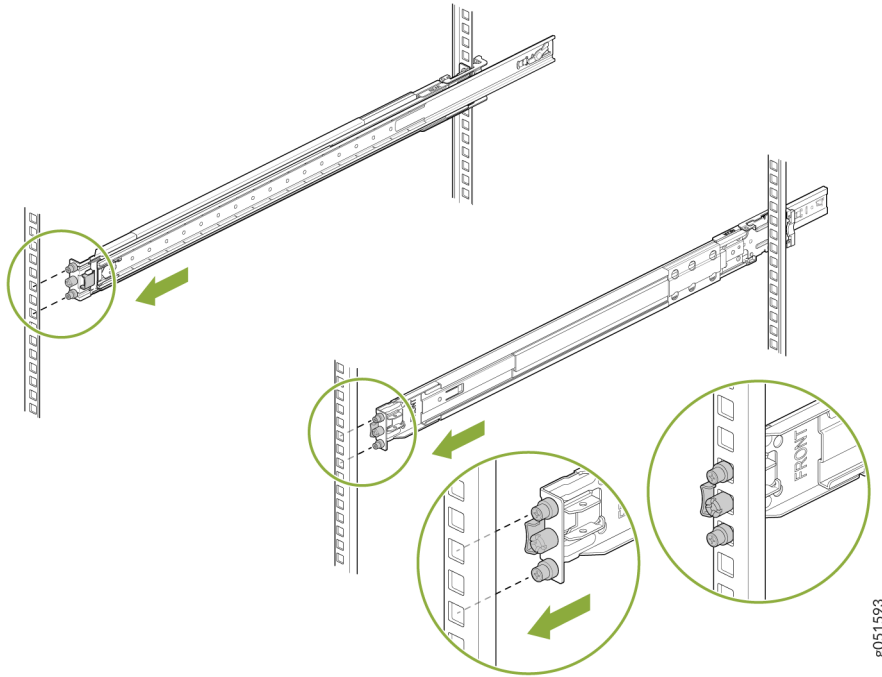
6. The slide rail assembly is fully installed. Verify that both the slide rail assemblies are at the same height each other and are level front-to-back.
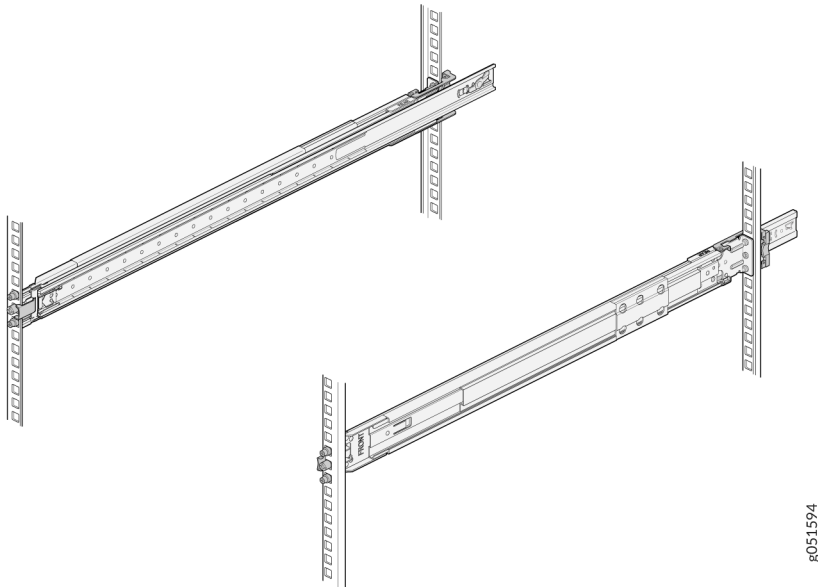
Mount the Switch in the Rack

1. Pull the slider rails out to their full extended lock position, and ensure that the ball bearing retainer is located at the front of the slider rail.

2. Lift the switch and align the rear of the inner rail brackets with the front ends of the slider rails on the rack.
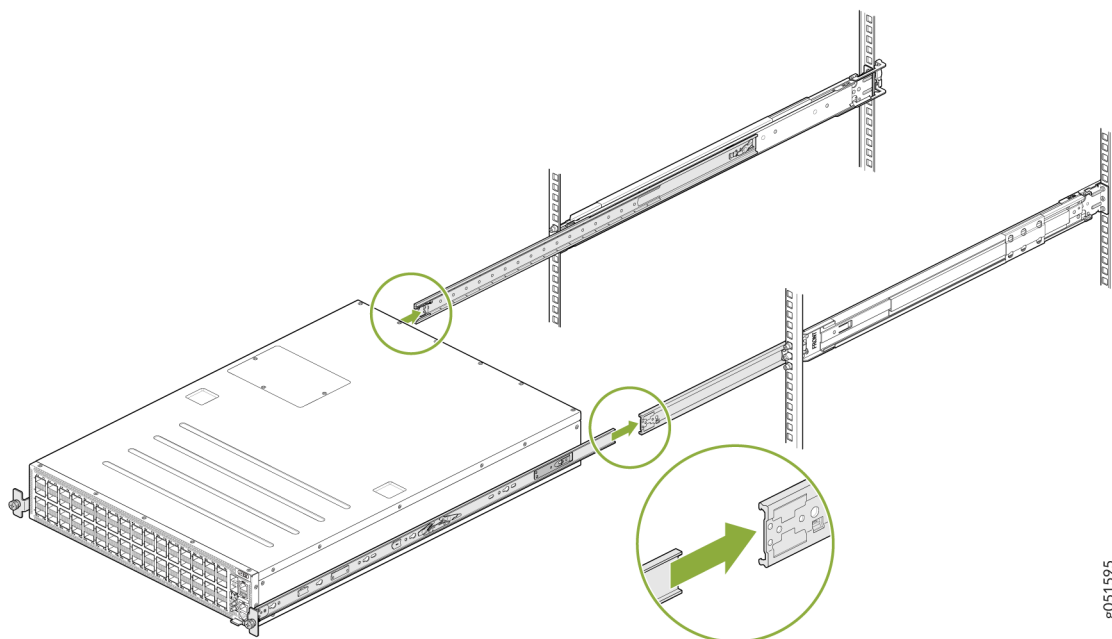
3. Push the inner rail brackets into the slider rails until you can no longer proceed.
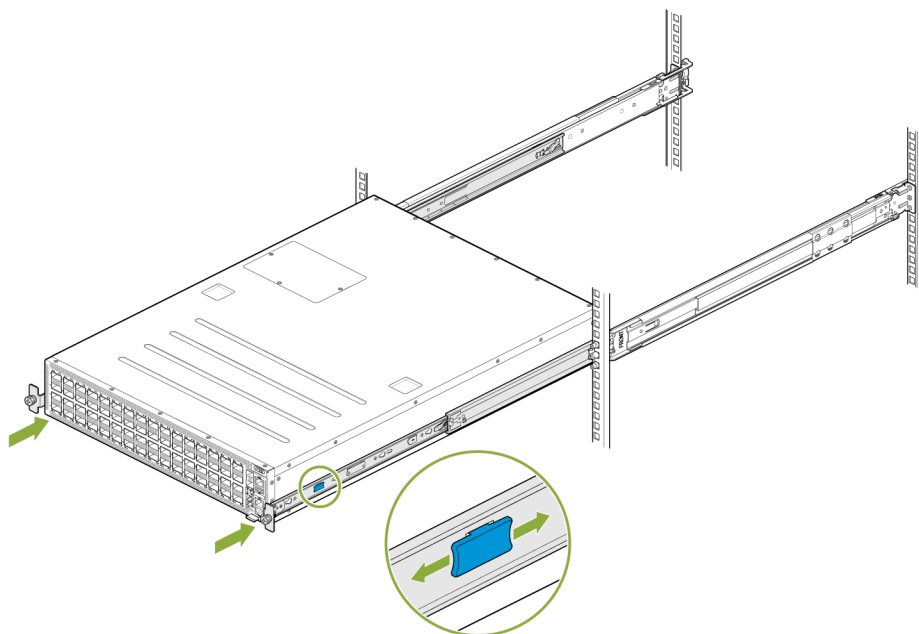
4. Tighten the two thumbscrews to secure the switch.
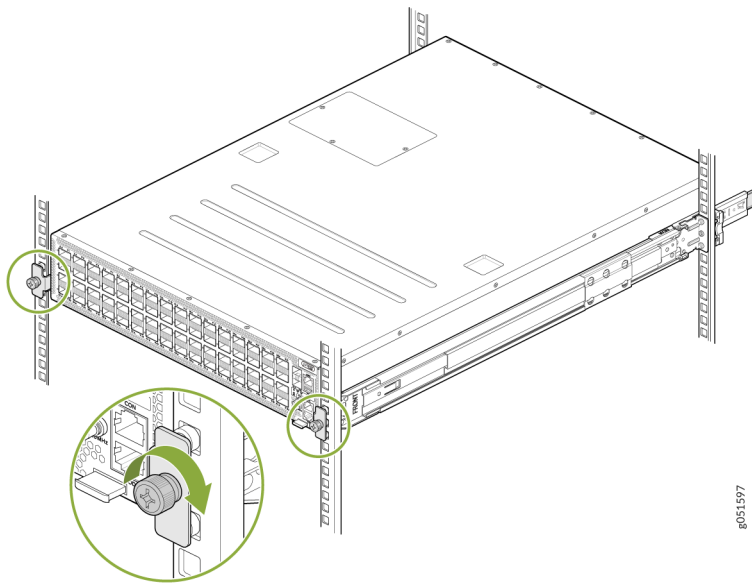
Connect the QFX5240 Switch to Power

Ground the QFX5240 Switch

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect QFX5240 switches to earth ground before you connect it to power.

You must install QFX5240 switches in a restricted-access location and ensure that the chassis is always properly grounded. QFX5240 switches come with a two-hole protective grounding terminal provided on the chassis. See Figure 24 on page 81. Under all circumstances, use this grounding connection to ground the chassis. For AC-powered systems, you must also use the grounding wire in the AC power cord along with the two-hole grounding lug connection. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.

> ⚠️ **CAUTION**: Ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable that you supply. Using a grounding cable with an incorrectly attached lug can damage the device.

> ℹ️ **NOTE**: Mount your switch in the rack before attaching the grounding lug to the switch.

Ensure that you have the following parts and tools available:

- A grounding cable must be 2 AWG , minimum 90° C wire, or as permitted by the local code.

- Panduit LCDXN2-14AF-E or equivalent grounding lug

- Two M6 screws with start washers

- Number 2 Phillips (+) screwdriver—not provided

- ESD grounding strap—not provided

- Grounding lug:

  - QFX5240: The grounding lug required is a Panduit LCDXN2-14AF-E or equivalent. The grounding lug attaches to the device chassis through the left-front mounting bracket, providing a protective earthing terminal for the device.

The QFX5240 switches chassis gain additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using an AC power cord appropriate for your geographical location.

To ground the QFX5240:

1. Connect one end of the grounding cable to an appropriate earth ground site, such as the mounting rack.
2. Remove the two M6 screws and star washers from the earthing terminal on the side of the chassis.
3. Place the Panduit LCDXN2-14AF-E or equivalent grounding lug attached to the grounding cable over the protective earthing terminal.
4. Secure the grounding lug to the protective earthing terminal with the M6 screws and star washers.

Figure 24: Connect a Grounding Cable to a QFX5240 Switch
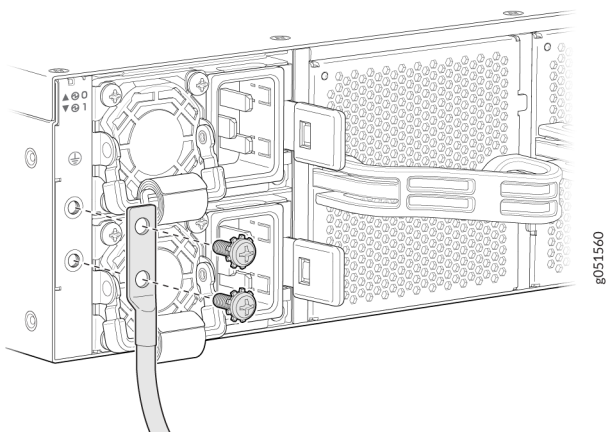
5. Dress the grounding cable and ensure that it does not touch or block access to other device components. Also make sure the cable does not drape where people could trip over it.

How to Connect AC Power to a QFX5240 Switch

Ensure that you have a power cord appropriate for your geographical location available to connect AC power to the switch.

Before you begin connecting AC power to the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

- Ensure that you have connected the switch chassis to earth ground.

> ⚠ **CAUTION**: Before you connect power to the switch, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit).
>
> To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. For instructions on connecting earth ground, see "Ground the QFX5240 Switch" on page 80. The switch gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location.

- Install the power supplies in the chassis. For instructions on installing a power supply in a QFX5240, see "Install an AC Power Supply Unit in QFX5240 Switches" on page 96.

The QFX5240 ships from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU). You can install a replacement power supply in the slots next to the fan modules without powering off the switch or disrupting the switching function.

> **ⓘ** **NOTE**: Each power supply must be connected to a dedicated power source outlet.

To connect AC power to the QFX5240:

1. Attach the grounding strap to your bare wrist and to a site ESD point.
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure.
3. Locate the power cords shipped with the switch; the cords have plugs appropriate for your geographical location. See " AC Power Cord Specifications" on page 30 .

   For each power supply:

   a. Connect the AC power cord. Insert the power cord coupler firmly into the AC inlet on the power supply faceplate. See Figure 25 on page 83.

   Figure 25: Connect the AC Power Cord
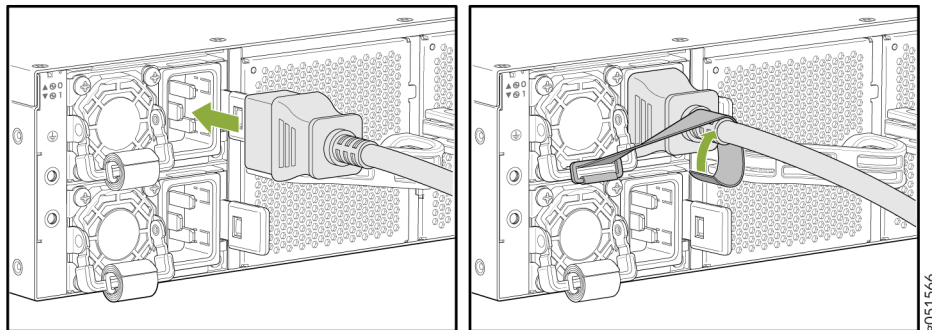
   b. Connect a dedicated customer site 2-pole circuit breaker for each power supply. We recommend that you use a dedicated customer-site circuit breaker rated for 20A (250V), or as required by local code.

4. If the AC power source outlet has a power switch, set it to the off (O) position.

> **ⓘ** **NOTE**: The switch powers on as soon as you provide power to the PSU. There is no power switch on the device.

5. Insert the power cord plug into an AC power source outlet.

6. If the AC power source outlet has a power switch, set it to the on (|) position.

7. Verify that the AC and DC LEDs on each power supply are lit green.

   If the status LED is lit amber, remove power from the power supply, and replace the power supply ("Maintain the QFX5240 Power System" on page 95). Do not remove the power supply until you have a replacement power supply ready: the power supplies must be installed in the switch to ensure proper airflow.

Connect the QFX5240 Switch to External Devices

IN THIS SECTION

Connect a Device to a Network for Out-of-Band Management

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end.

Figure 26: RJ-45 Connector on an Ethernet Cable
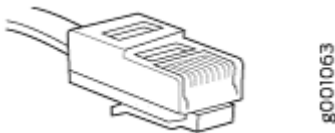
You can monitor and manage a network device, such as a router or a switch, by using a dedicated management channel. Each device has a management port to which you can connect an Ethernet cable with an RJ-45 connector. Use the management port to connect the device to the management device.

To connect a device to a network for out-of-band management:

1. Connect one end of the Ethernet cable to the management port on the device.

2. Connect the other end of the Ethernet cable to the management device.
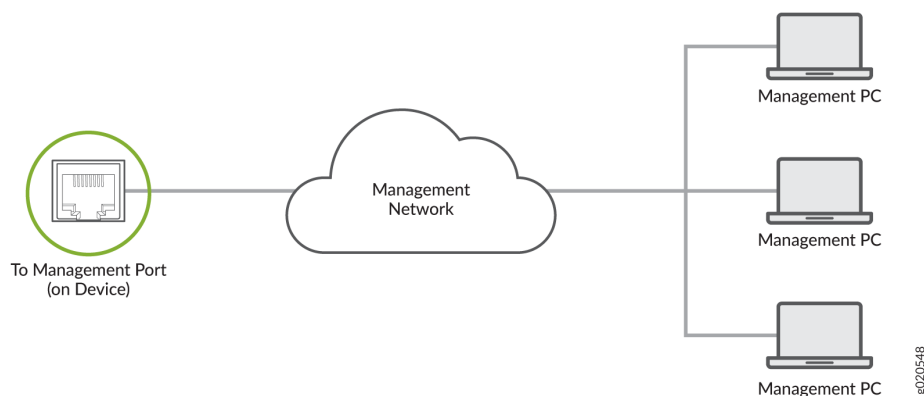
Connect a Device to a Management Console Using an RJ-45 Connector

Ensure that you have an Ethernet cable that has an RJ-45 connector at either end and an RJ-45-to-DB-9 serial port adapter.

Figure 27: RJ-45 Connector on an Ethernet Cable
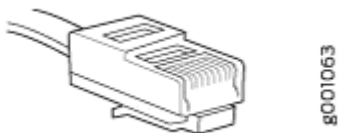
> *i* **NOTE**: We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:
>
> - RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
>
> - RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
>
> - RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)
>
> If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter, you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See https://ftdichip.com/drivers/vcp-drivers/ to download the driver.

> **NOTE**: If your laptop or desktop PC does not have a DB-9 plug connector pin and you want to connect your laptop or desktop PC directly to the device, use a combination of the RJ-45-to-DB-9 socket adapter and a USB-to-DB-9 plug adapter. You must provide the USB-to-DB-9 plug adapter.

You can configure and manage your network devices using a dedicated management channel. Each device has a console port that you can connect to using an Ethernet cable with an RJ-45 connector. Use the console port to connect the device to the console server or management console. The console port accepts a cable that has an RJ-45 connector.

To connect the device to a management console:

1. Connect one end of the Ethernet cable to the console port (labeled **CON**, **CONSOLE**, or **CON1**) on the device.
2. Connect the other end of the Ethernet cable to the console server (see Figure 28 on page 86) or management console (see Figure 29 on page 86).

Figure 28: Connect a Device to a Management Console Through a Console Server

To Console Port   Console Server   PC

g020547
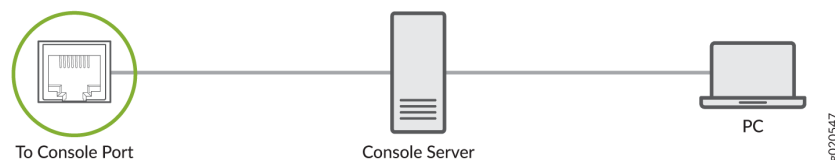
Figure 29: Connect a Device Directly to a Management Console

To Console port   PC

g020570
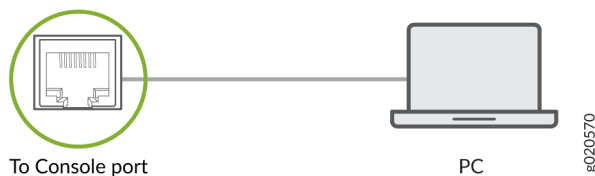
Register Products—Mandatory to Validate SLAs

Juniper Networks auto registers newly purchased products based on the end customer information provided at the point of sale. Registering products and changes to products activates your hardware replacement service-level agreements (SLAs).

> ⚠️ **CAUTION**: Update the installation base data if any installation base data is added or changed or if the installation base is moved. Juniper Networks is not responsible for customers not meeting the hardware replacement service-level agreement (SLA) for products that do not have registered serial numbers or accurate installation base data.
>
> To know more about how to register your product and update your installation base, see Juniper Networks Product Registration and Install Base Management.

Perform Initial Software Configuration for QFX5240 Switches

Before you begin connecting and configuring a QFX5240 switch, set the following parameter values on the console server or PC:

- Baud Rate—9600

- Flow Control—None

- Data—8

- Parity—None

- Stop Bits—1

- DCD State—Disregard

You must perform the initial configuration of the QFX5240 switch through the console port using the CLI or through zero-touch provisioning (ZTP). In order to use ZTP to provision the device, you must have access to a Dynamic Host Control Protocol (DHCP) server and a File Transfer Protocol (anonymous FTP), Hypertext Transfer Protocol (HTTP), or Trivial File Transfer Protocol (TFTP) server on which the software image and configuration files are stored. For more information about using ZTP for provisioning the device, see Understanding Zero Touch Provisioning in the *Installation and Upgrade Guide*.

> **ⓘ** **NOTE**: We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. If the console cable and adapter are not included in your device package, or if you need a different type of adapter, you can order the following separately:
>
> - RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
>
> - RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
>
> - RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)
>
> If you want to use RJ-45 to USB-A or RJ-45 to USB-C adapter you must have X64 (64-Bit) Virtual COM port (VCP) driver installed on your PC. See, https://ftdichip.com/drivers/vcp-drivers/ to download the driver.

To connect and configure the switch from the console:

1. Connect the console port to a laptop or PC using an RJ-45 cable and RJ-45-to-DB-9 adapter. The console (**CON**) port is located on the top right corner of the port panel.

2. Log in as **root**. You don't need to enter a password. If the software booted before you connected to the console port, you might need to press the Enter key for the prompt to appear.

```
login: root
```

3. Start the CLI.

```
root@% cli
```

4. Enter configuration mode.

```
root> configure
```

5. Add a password to the root administration user account.

```
[edit]
root@# set system root-authentication plain-text-password
New password: password
Retype new password: password
```

6. (Optional) Configure the name of the switch. If the name includes spaces, enclose the name in quotation marks (" ").

```
[edit]
root@# set system host-name host-name
```

7. Configure the IP address and prefix length for the switch management interface.

```
[edit]
root@# set interfaces re0:mgmt-0 unit 0 family inet address address/prefix-length
```

> ⚠️ **CAUTION**: Although the CLI allows you to configure two management Ethernet interfaces within the same subnet, only one interface is usable and supported.

> ⓘ **NOTE**: On the QFX5240 switch, the management port `re0:mgmt-0` is the bottom RJ-45 port on the right side of the port panel and is labeled **MGMT**.

8. Create the mgmt_junos routing instance, and configure the static routes to remote prefixes with access to the management port.

```
[edit]
root@# set routing-instances mgmt_junos routing-options static route 0/0 next-hop destination-ip
```

9. Enable the management instance.

```
[edit]
root@# set system management-instance
```

10. Enable Telnet service.

```
[edit]
root@# set system services telnet
```

> **(i)** **NOTE**: When Telnet is enabled, you cannot log in to a QFX5240 switch through Telnet using root credentials. Root login is allowed only for SSH access.

11. Enable SSH service for root login.

```
[edit]
root@# set system services ssh root-login allow
```

12. Commit the configuration to activate it on the switch.

```
[edit]
root@# commit
```

5

CHAPTER

Maintaining Components

Maintain the QFX5240 Cooling System

The fan modules in a QFX5240 switch are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace one of them without powering off the switch or disrupting switching function.

Remove a Fan Module from QFX5240 Switches

> ⚠ **CAUTION**: To ensure proper airflow, keep a failed fan module in place until you have a replacement fan module at hand. Do not run the device with an open fan tray slot for an extended amount of time.

Make sure you calculate the time required to replace the fan module in the chassis. See Table 28 on page 92.

Table 28: Time Allowed to Replace a Fan Module

Ambient Temperature (°C)	Duration
25	2 minutes
35 to 40	30 seconds

Before you remove a fan module from a QFX5240 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

Ensure that you have the following parts and tools available to remove a fan module from a QFX5240 switch :

- ESD grounding strap

- Antistatic bag or an antistatic mat

- Replacement fan module

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.

2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the rack.

3. Grasp the handle on the fan module and squeeze the outside of the handle to release the module.

Figure 30: Remove a Fan Module from a QFX5240 Switch
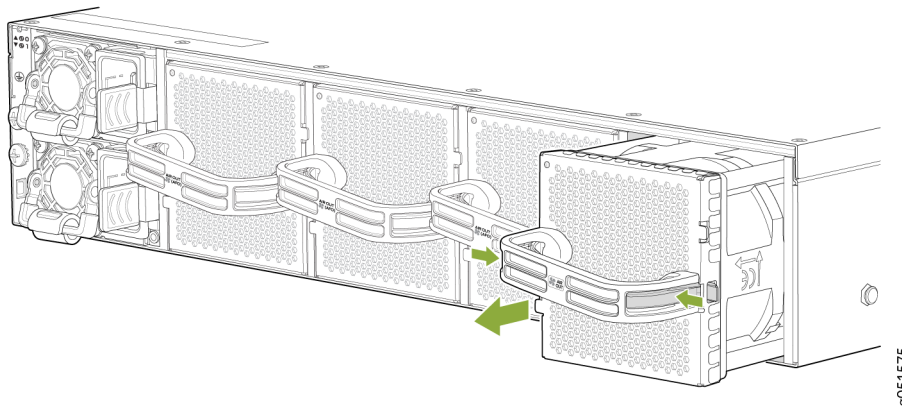
> ⚠️ **WARNING**: To avoid injury, do not touch the fan with your hands or any tools as you slide the fan module out of the chassis—the fan might still be running.

4. Pull firmly to slide the fan module halfway out of the chassis.

5. When the fan stop spinning, use your other hand to support the fan and slide the fan module completely out of the chassis.

6. Place the fan module in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

> ⓘ **NOTE**: When you remove a fan module, the CLI message **Fan/Blower is Absent** is logged in the system log, and the system raises a minor alarm.

Install a Fan Module in QFX5240 Switches

Before you install a fan module in a QFX5240 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

The fan modules in a QFX5240 switch are hot-removable and hot-insertable field-replaceable units (FRUs); you can remove and replace them without powering off the switch or disrupting switch functions.

> ⚠️ **CAUTION**: To ensure proper airflow, keep a failed fan module in place until you have a replacement fan module at hand. Do not run the device with an open fan tray slot for an extended amount of time.

> ⓘ **NOTE**: The fan module provides FRU-to-port or port-to-FRU airflow depending on the switch product variant you purchase.

To install a fan module in a QFX5240 (see Figure 31 on page 94):

1. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the rack.
2. Take care not to touch the connectors as you remove the fan module from its bag.
3. Align the module with the open slot and slide it in until it is fully seated. Figure 31 on page 94 shows how to install a fan module in a QFX5240 switch.

Figure 31: Install a Fan Module in a QFX5240 Switch
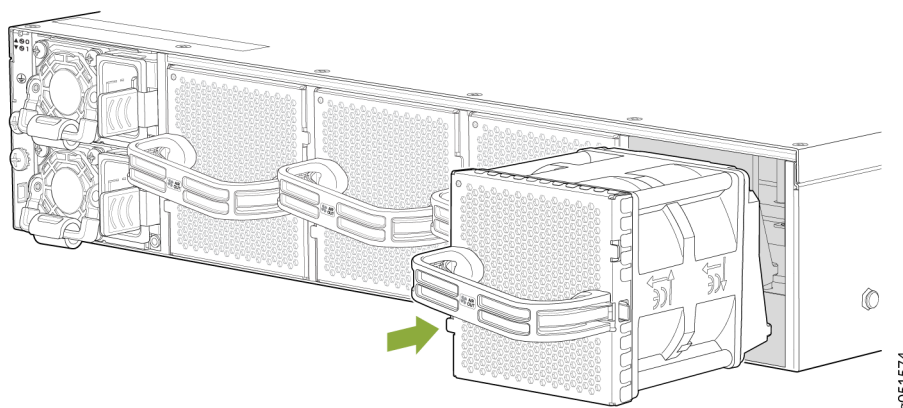
> ⚠️ **CAUTION**: Damage can occur if you attempt to install a fan module into a chassis with a different airflow direction. Compare the switch product variant with the airflow marking on the handle to ensure that you are installing a fan module with the same airflow direction as the chassis. The fan modules are designed so that they can only be inserted into the QFX5240 product variant that supports the same airflow type. See "QFX5240 Power System" on page 28 for more information.

Maintain the QFX5240 Power System

IN THIS SECTION

A QFX5240 power supply unit (PSU) is a hot-removable and hot-insertable field-replaceable unit (FRU). You can replace power supplies without powering off the switch or disrupting the switching function.

Remove a Power Supply Unit from QFX5240 Switches

We ship the QFX5240 switches from the factory with two power supplies.

Before you remove a PSU from QFX5240 switches, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

Ensure that you have the following parts and tools available to remove a PSU from a QFX5240 switch:

- ESD grounding strap

- Antistatic bag or an antistatic mat

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the rack.

> **ⓘ NOTE**: If only one power supply is installed in your QFX5240 switch, you need to power off the switch before removing the power supply. See "Power Off a QFX5240 Switch" on page 110.

3. Disconnect power to the switch:

   - AC power supply—If the AC power source outlet has a power switch, set it to the OFF (O) position. If the AC power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.

4. Remove the power source cable from the power supply faceplate:

   - AC power supply—Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.

5. Press the power supply handle from the side.

6. Grasp the power supply handle and pull firmly to slide the power supply halfway out of the chassis. Figure 32 on page 96 shows how to remove an AC power supply unit from a QFX5240 switch.

Figure 32: Remove an AC PSU from a QFX5240 Switch
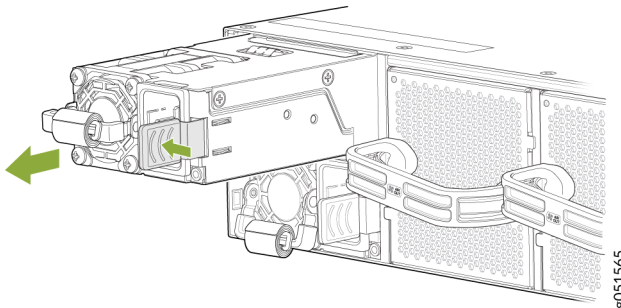
7. Place one hand under the power supply to support it and slide it completely out of the chassis. Take care not to touch power supply components, pins, leads, or solder connections.

8. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

9. Replace with another power supply module.

Install an AC Power Supply Unit in QFX5240 Switches

- Before you install a power supply in QFX5240 switches, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

- Ensure that the airflow direction of the power supply is the same as the chassis. Labels on the power supply handle indicate the direction of airflow. See "QFX5240 Cooling System" on page 33 for more information.

To install a power supply in a QFX5240 Switch:

1. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the rack.

2. Take care not to touch power supply components, pins, leads, or solder connections as you remove the power supply from its bag.

> ⚠️ **CAUTION**: Verify that the direction of the arrow on the power supply handle matches the direction of airflow in the chassis. Ensure that each power supply you install in the chassis has the same airflow direction. If you install power supplies with two different airflow directions, Junos OS raises an alarm, and the status (**ALM**) LED blinks amber.

3. If the power supply has a protective plastic wrap, peel and remove the plastic wrap from all four sides of the power supply.

4. Using both hands, place the power supply in the power supply slot on the FRU panel of the switch and slide it in until it is fully seated.

Figure 33: Install an AC PSU in a QFX5240 Switch
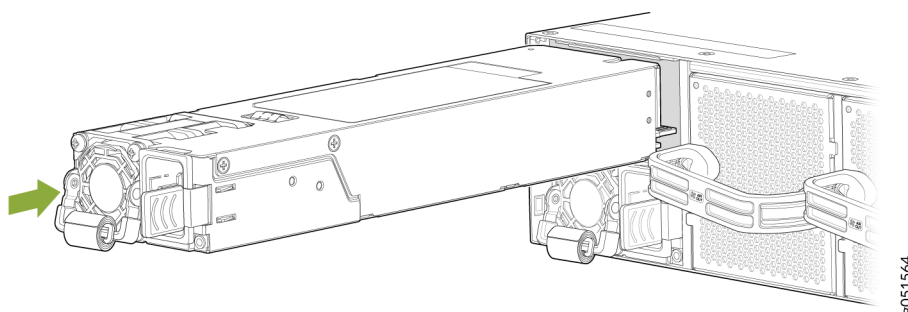
> ⓘ **NOTE**: Each power supply must be connected to a dedicated power source outlet.

> ⓘ **NOTE**: If you have a Juniper Care service contract, register any addition, change, or upgrade of hardware components at https://www.juniper.net/customers/support/tools/updateinstallbase/ . Failure to do so can result in significant delays if you need

replacement parts. This note does not apply if you replace existing components with the same type of component.

Maintain the Solid-State Drive in a QFX5240 Switch

IN THIS SECTION

Remove a Solid-State Drive from a QFX5240 Switch

Before you remove a solid-state drive (SSD) from the device, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

Ensure that you have the following parts and tools available to remove a SSD from a QFX5240 switch:

- ESD grounding strap

- Antistatic bag or an antistatic mat

- Phillips (+) screwdriver, number 1

The QFX5240 supports two 480-GB NVMe SSDs. You cannot install or remove the SSDs when the system is up. You must shut down the system before replacing the SSD. The SSDs are preinstalled in the QFX5240.

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to the ESD point on the rack.
3. Turn the switch chassis upside down and locate the SSD cover plate.
4. Remove the three screws securing the SSD cover plate by using the Phillips (+) screwdriver. See Figure 34 on page 99.

Figure 34: Remove the SSD Cover Plate

5. Remove the single screw holding the SSD in place and slide the drive out of the plug (see Figure 35 on page 99.

Figure 35: Remove the SSDs

6. Place the SSD in an electrostatic bag or on an antistatic mat.

7. Place the SSD cover plate back on the chassis and tighten the three screws securing the SSD cover plate.

Install a Solid-State Drive in a QFX5240 Switch

Before you install an SSD in the device, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see).
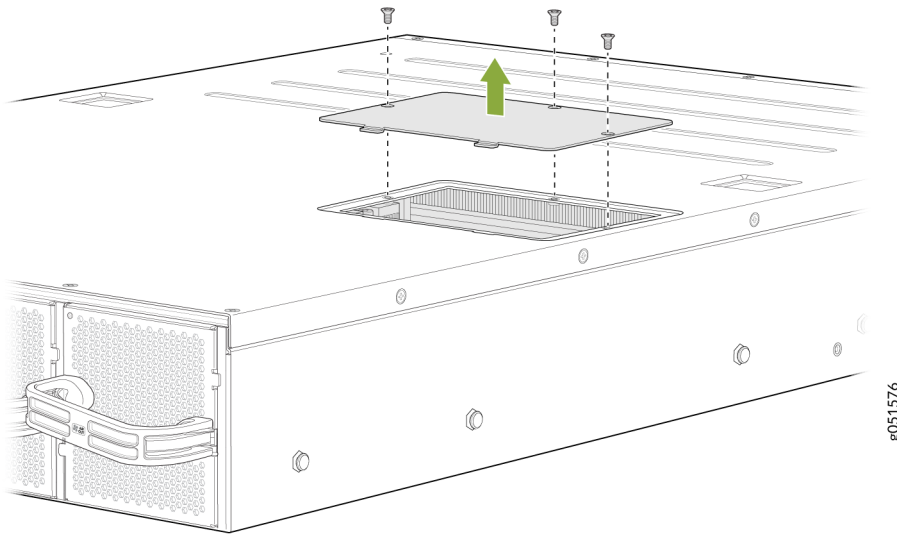
Ensure that you have the following parts and tools available to install an SSD in the QFX5240 switch:

- ESD grounding strap

- Antistatic bag containing the SSD or an antistatic mat

- Phillips (+) screwdriver, number 1

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to the ESD point on the rack.
3. Turn the switch upside down and locate the SSD cover plate.
4. If not already removed, remove the three screws securing the SSD cover plate by using the Phillips (+) screwdriver. See Figure 36 on page 100.

Figure 36: Remove the SSD Cover Plate
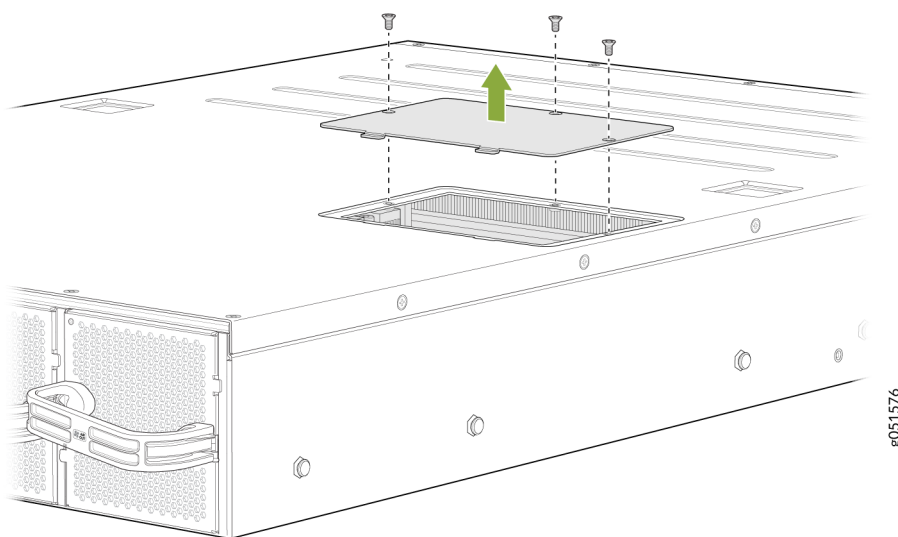
5. Slide the drive into the SSD plug and tighten the single screw holding the SSD (see Figure 37 on page 101).

Figure 37: Install the SSD
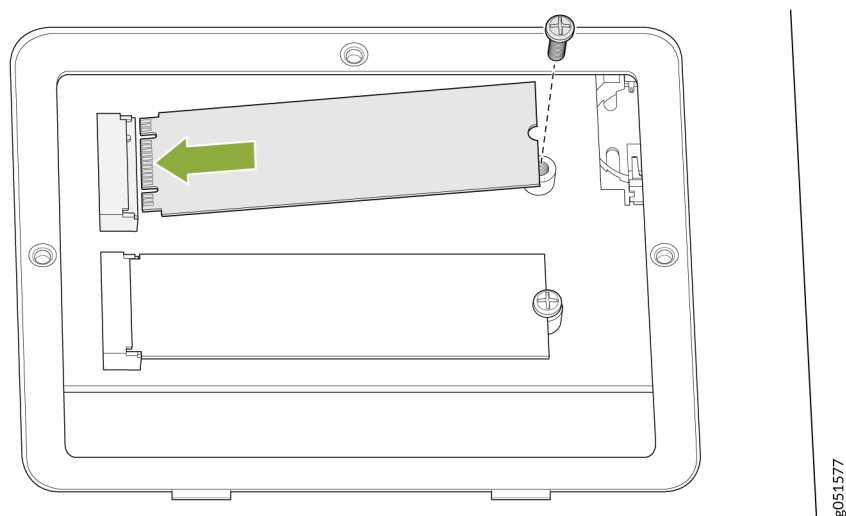
6. Place the SSD cover plate back on the chassis and tighten the three screws securing the SSD cover plate. See .

Figure 38: Replace the SSD Cover Plate
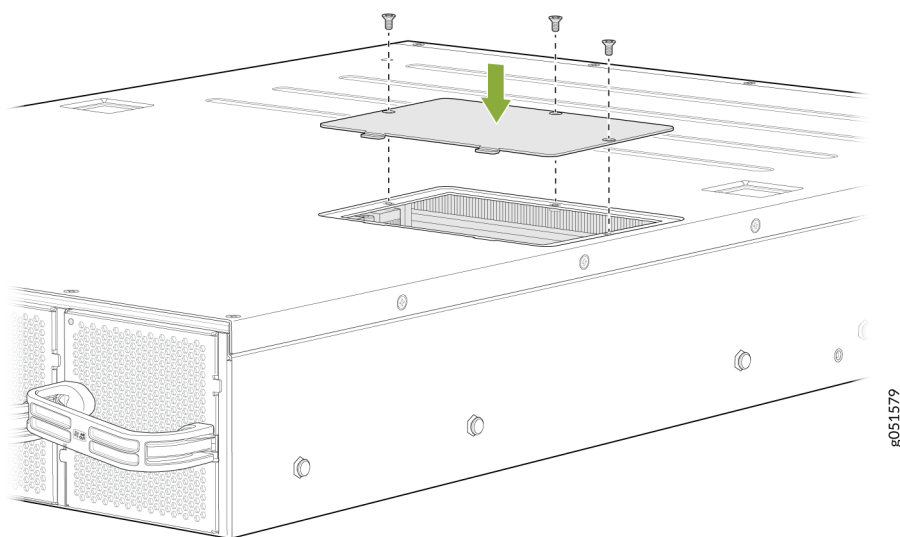
Maintain Transceivers and Fiber Optic Cables on a QFX5240 Switch

Remove a Transceiver

Before you remove a transceiver from a device, ensure that you have taken the necessary precautions for the safe handling of lasers (see Laser and LED Safety Guidelines and Warnings).

Ensure that you have the following parts and tools available:

- An antistatic bag or an antistatic mat

- Rubber safety caps to cover the transceiver and fiber-optic cable connector

- A dust cover to cover the port or a replacement transceiver

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace the transceivers without powering off the device or disrupting device functions.

> (i) **NOTE**: After you remove a transceiver, or when you change the media-type configuration, wait for 6 seconds for the interface to display the operational commands.

Figure 39 on page 104 shows how to remove a quad small form-factor pluggable plus (QSFP+) transceiver. The procedure is the same for all types of transceivers except the QSFP28 and C form-factor pluggable (CFP) transceivers.

To remove a transceiver from a device:
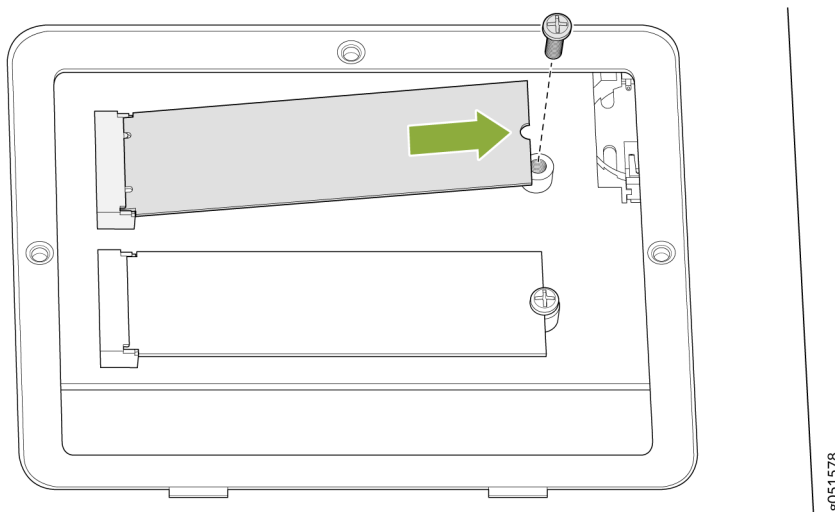
1. Place the antistatic bag or antistatic mat on a flat, stable surface.

2. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the rack.

3. Label the cable connected to the transceiver so that you can reconnect it correctly.

> ⚠ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

> ⚠ **LASER WARNING**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

> ⚠ **CAUTION**: Do not bend fiber-optic cables beyond their minimum bend radius. An arc smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.

4. Remove the cable connected to the transceiver (see Disconnect a Fiber-Optic Cable). Cover the transceiver and the end of each fiber-optic cable connector with a rubber safety cap immediately after disconnecting the fiber-optic cables.

5. If there is a cable management system, arrange the cable in the cable management system to prevent it from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

6. To remove an SFP56-DD, SFP, SFP+, XFP, a QSFP+, or QSFP56-DD transceiver:

    a. Using your fingers, pull open the ejector lever on the transceiver to unlock the transceiver.

    Note that QSFP-DD and SFP-DD transceivers don't have ejector levers, instead they have a pull tab which can be used to unlock and remove the transceiver.

    > ⚠ **CAUTION**: Before removing the transceiver, make sure that you open the ejector lever completely until you hear it click. This precaution prevents damage to the transceiver.

    b. Grasp the transceiver ejector lever and gently slide the transceiver approximately 0.5 in. (1.3 cm) straight out of the port.

> ⚠️ **CAUTION**: To prevent ESD damage to the transceiver, do not touch the connector pins at the end of the transceiver.

Figure 39: Remove a QSFP+ Transceiver
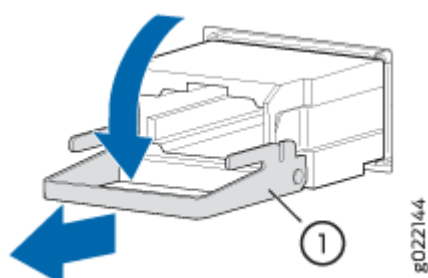
1– Ejector lever

To remove a CFP transceiver:

a. Using your fingers, loosen the screws on the transceiver.

b. Grasp the screws on the transceiver and gently slide the transceiver approximately 0.5 in. (1.3 cm) straight out of the port.

> ⚠️ **CAUTION**: To prevent ESD damage to the transceiver, do not touch the connector pins at the end of the transceiver.

7. Using your fingers, grasp the body of the transceiver and pull it straight out of the port.

8. Place the transceiver in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

9. Place the dust cover over the empty port, or install the replacement transceiver.

Install a Transceiver

Before you install a transceiver in a device, ensure that you have taken the necessary precautions for safe handling of lasers (see Laser and LED Safety Guidelines and Warnings).

Ensure that you have a rubber safety cap available to cover the transceiver.

The transceivers for Juniper Networks devices are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace the transceivers without powering off the device or disrupting the device functions.

> **NOTE**: After you insert a transceiver or after you change the media-type configuration, wait for 6 seconds for the interface to display operational commands.

> **NOTE**: We recommend that you use only optical transceivers and optical connectors purchased from Juniper Networks with your Juniper Networks device.

> **CAUTION**: The Juniper Networks Technical Assistance Center (JTAC) provides complete support for Juniper-supplied optical modules and cables. However, JTAC does not provide support for third-party optical modules and cables that are not qualified or supplied by Juniper Networks. If you face a problem running a Juniper device that uses third-party optical modules or cables, JTAC may help you diagnose host-related issues if the observed issue is not, in the opinion of JTAC, related to the use of the third-party optical modules or cables. Your JTAC engineer will likely request that you check the third-party optical module or cable and, if required, replace it with an equivalent Juniper-qualified component.
>
> Use of third-party optical modules with high-power consumption (for example, coherent ZR or ZR+) can potentially cause thermal damage to or reduce the lifespan of the host equipment. Any damage to the host equipment due to the use of third-party optical modules or cables is the users' responsibility. Juniper Networks will accept no liability for any damage caused due to such use.

Figure 40 on page 107 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers.

To install a transceiver:

> **CAUTION**: To prevent electrostatic discharge (ESD) damage to the transceiver, do not touch the connector pins at the end of the transceiver.

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to a site ESD point or to the ESD point on the device.
2. Remove the transceiver from its bag.
3. Check to see whether the transceiver is covered with a rubber safety cap. If it is not, cover the transceiver with a rubber safety cap.

> ⚠ **LASER WARNING**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

4. If the port in which you want to install the transceiver is covered with a dust cover, remove the dust cover and save it in case you need to cover the port later. If you are hot-swapping a transceiver, wait for at least 10 seconds after removing the transceiver from the port before installing a new transceiver.

5. Using both hands, carefully place the transceiver in the empty port. The connectors must face the chassis.

> ⚠ **CAUTION**: Before you slide the transceiver into the port, ensure that the transceiver is aligned correctly. Misalignment might cause the pins to bend, making the transceiver unusable.

6. Slide the transceiver in gently until it is fully seated. If you are installing a CFP transceiver, use your fingers to tighten the captive screws on the transceiver.

7. Remove the rubber safety cap from the transceiver and the end of the cable, and insert the cable into the transceiver.

> ⚠ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can damage your eyes.

> ⚠ **CAUTION**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

8. If there is a cable management system, arrange the cable in the cable management system to prevent the cable from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs toward the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.

> ⚠ **CAUTION**: Do not let fiber-optic cable hang free from the connector. Do not allow fastened loops of cable to dangle, which stresses the cable at the fastening point.

> ⚠️ **CAUTION**: Avoid bending the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

> ⓘ **NOTE**: When you install SFP-DD transceivers, push it hard until you hear a click sound. Use a long nose plier to pull the SFP-DD transceiver connected on the top and bottom rows of the chassis where the pull tabs face each other.

> ⓘ **NOTE**: Make sure to use a dust cap to cover ports that are unused.

> ⓘ **NOTE**: While using Finisar AOC SFP+ optical module with the QFX5130-48C switch, you may need to pull the module upwards to pull out the module smoothly from the cage.

Figure 40: Install a Transceiver
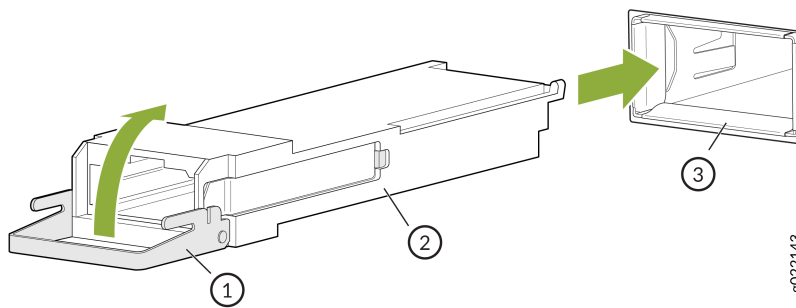
1– Ejector lever	3– Port
2– Transceiver	

Disconnect a Fiber-Optic Cable

Before you disconnect a fiber-optic cable from an optical transceiver, ensure that you have taken the necessary precautions for safe handling of lasers. See Laser and LED Safety Guidelines and Warnings.

Ensure that you have the following parts and tools available:

- A rubber safety cap to cover the transceiver

- A rubber safety cap to cover the fiber-optic cable connector

Juniper Networks devices have optical transceivers to which you can connect fiber-optic cables.

To disconnect a fiber-optic cable from an optical transceiver installed in the device:

1. Disable the port in which the transceiver is installed by issuing the following command:

```
[edit interfaces]
user@device# set interface-name disable
```

> ⚠ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

2. Carefully unplug the fiber-optic cable connector from the transceiver.
3. Cover the transceiver with a rubber safety cap.

> ⚠ **LASER WARNING**: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

4. Cover the fiber-optic cable connector with the rubber safety cap.

Connect a Fiber-Optic Cable

Before you connect a fiber-optic cable to an optical transceiver installed in a device, take the necessary precautions for safe handling of lasers (see Laser and LED Safety Guidelines and Warnings).

To connect a fiber-optic cable to an optical transceiver installed in a device:

> ⚠ **LASER WARNING**: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

1. If the fiber-optic cable connector is covered with a rubber safety cap, remove the cap. Save the cap.

2. Remove the rubber safety cap from the optical transceiver. Save the cap.

3. Insert the cable connector into the optical transceiver.

Fiber-optic cable   Transceiver
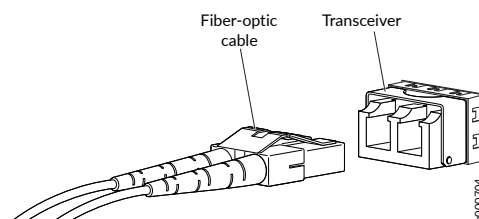
4. Secure the cables so that they do not support their own weight. Place excess cable out of the way in a neatly coiled loop. Placing fasteners on a loop helps cables maintain their shape.

> ⚠ **CAUTION**: Do not bend fiber-optic cables beyond their minimum bend radius. An arc smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.
>
> Do not let fiber-optic cables hang free from the connector. Do not allow fastened loops of cables to dangle, which stresses the cables at the fastening point.

How to Handle Fiber-Optic Cables

Fiber-optic cables connect to optical transceivers that are installed in Juniper Networks devices.

Follow these guidelines when handling fiber-optic cables:

- When you unplug a fiber-optic cable from a transceiver, place rubber safety caps over the transceiver and on the end of the cable.

- Anchor fiber-optic cables to prevent stress on the connectors. When attaching a fiber-optic cable to a transceiver, be sure to secure the fiber-optic cable so that it does not support its own weight as it hangs to the floor. Never let a fiber-optic cable hang free from the connector.

- Avoid bending the fiber-optic cables beyond their minimum bend radius. Bending fiber-optic cables into arcs smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.

- Frequent plugging and unplugging of fiber-optic cables in and out of optical instruments can damage the instruments, which are expensive to repair. To prevent damage from overuse, attach a short fiber extension to the optical equipment. The short fiber extension absorbs wear and tear due to frequent plugging and unplugging. Replacing the short fiber extension is easier and cost efficient compared with replacing the instruments.

- Keep fiber-optic cable connections clean. Microdeposits of oil and dust in the canal of the transceiver or cable connector can cause loss of light, reduction in signal power, and possibly intermittent problems with the optical connection.

  - To clean the transceiver canal, use an appropriate fiber-cleaning device such as RIFOCS Fiber Optic Adaptor Cleaning Wands (part number 946). Follow the instructions in the cleaning kit you use.

  - After cleaning the transceiver, make sure that the connector tip of the fiber-optic cable is clean. Use only an approved alcohol-free fiber-optic cable cleaning kit such as the Opptex Cletop-S® Fiber Cleaner. Follow the instructions in the cleaning kit you use.

Power Off a QFX5240 Switch

Before you remove the power cord to power off a QFX5240 switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See No Link Title.

- Ensure that you do not need to forward traffic through the switch.

Ensure that you have the following parts and tools available to power off the switch:

- An ESD grounding strap

- An external management device such as a PC

- An RJ-45-to-DB-9 rollover cable to connect the external management device to the console port

To power off a QFX5240 switch:

1. Connect to the switch using one of the following methods:

   - Connect a management device to the console (**CON**) port on a QFX5240 switch. For instructions about connecting a management device to the console (**CON**) port, see No Link Title.

   - Shut down the QFX5240 from a management device on your out-of-band management network. For instructions about connecting a management device to the management (**MGMT**) port, see No Link Title.

2. Shut down Junos OS from the external management device.
   For QFX5240 systems:

a. Issue the `request system shutdown power-off` operational mode CLI command. This command shuts down the switch gracefully and preserves system state information. A message appears on the console, confirming that the operating system has halted.

On Junos OS Evolved systems, you see the following output:

```
user@host>request system shutdown power-off
Power off the system ? [yes,no] (n) yes


poweroff the system at Tue Sep 18 11:15:27 2018
```

> ⚠️ **CAUTION**: Wait at least 60 seconds after first seeing the final message before following the instructions in Step 4 and Step 5 to power off the switch.

3. Attach the grounding strap to your bare wrist and to a site ESD point.

4. Disconnect power to the switch by performing one of the following tasks:

- AC power supply—If the AC power source outlet has a power switch, set it to the off (O) position. If the AC power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.

5. Remove the power source cable from the power supply faceplate:

- AC power supply—Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.

6. Uncable the switch before removing it from the rack.

6
CHAPTER

Troubleshooting Hardware

IN THIS CHAPTER

Troubleshoot the QFX5240 Switch

QFX5240 Troubleshooting Resources Overview

To troubleshoot a QFX5240 problem, you can use:

- Junos Evolved OS CLI

  The CLI is the primary tool for controlling and troubleshooting hardware, Junos OS Evolved, routing protocols, and network connectivity. CLI commands display information from routing tables, information specific to routing protocols, and information about network connectivity derived from the ping and traceroute utilities. For information about using the CLI to troubleshoot Junos OS Evolved, see the appropriate Junos OS Evolved configuration guide.

- Alarms and LEDs on the network ports, management panel, and components

  When the Routing Engine detects an alarm condition, it lights the red or yellow alarm LED on the management panel as appropriate. In addition, you can also use component LEDs and network port LEDs to troubleshoot the QFX5240 switch. For more information, see "QFX5240 Management Panel" on page 22.

- JTAC

  If you need assistance during troubleshooting, you can contact the Juniper Networks Technical Assistance Center (JTAC) by using the Web or by telephone. If you encounter software problems, or problems with hardware components not discussed here, contact JTAC.

- Knowledge Base articles–Knowledge Base.

QFX5240 Alarm Messages Overview

When a QFX5240 switch detects an alarm condition, it lights the red or yellow alarm LED on the management panel as appropriate. To view a more detailed description of the alarm cause, issue the `show system alarms` operational CLI command.

```
user@host> show system alarms
2 alarms currently active
Alarm time                Class  Description
2019-01-22 16:32:54 PST   Major  PEM 1 Absent
2019-01-22 16:31:04 PST   Minor  Host 0 Disk 2 Labelled incorrectly
```

For thermal problems, the `show chassis temperature-thresholds` CLI command shows the cutoff temperatures for each level of alarm:

```
user@host> show chassis temperature-thresholds
```

| | Fan speed | | Yellow alarm | | Red alarm | | Fire Shutdown |
| | (degrees C) | | (degrees C) | | (degrees C) | | (degrees C) |
Item	Normal	High	Normal	Bad fan	Normal	Bad fan	Normal
Routing Engine 0 CPU Temperature	65	70	95	92	97	94	100
Routing Engine 0 Ch-0 DIMM-0 Temp	55	62	80	77	82	79	85
Routing Engine 0 Ch-1 DIMM-0 Temp	55	62	80	77	82	79	85
FPC 0 Sensor TH5 Max Reading	75	80	100	97	105	102	110
FPC 0 et-0/0/0	53	60	73	73	76	76	77
FPC 0 et-0/0/4	53	60	73	73	76	76	77
FPC 0 MB Middle Right Rear	45	50	80	77	85	82	90
FPC 0 MB Middle Left Rear	45	50	80	77	85	82	90
FPC 0 MB Left Rear	45	50	80	77	85	82	90
FPC 0 MB Left Front	45	50	80	77	85	82	90
FPC 0 MB Right Rear	45	50	80	77	85	82	90
FPC 0 MB Right Front	45	50	80	77	85	82	90
FPC 0 MB OSFP_GRP1_3V3	75	80	115	112	120	117	125
FPC 0 MB OSFP_GRP2_3V3	75	80	115	112	120	117	125
FPC 0 MB OSFP_GRP3_3V3	75	80	115	112	120	117	125
FPC 0 MB VDD_0P75	75	80	115	112	120	117	125
FPC 0 MB TRVDD1_0V9_0V75	75	80	115	112	120	117	125
FPC 0 MB TRVDD0_0V9_0V75	75	80	115	112	120	117	125

```
FPC 0 FB Exhaust Left          40    45    65    62    70    67    75
FPC 0 FB Exhaust Right         40    45    65    62    70    67    75
```

You can also calculate the percentage of fan RPM, or *duty cycle*. Use the following command as `root`:

```
root@re0.~#i2cget -y -f 13 0x66 0x11
0x07
```

In this example, the system returned the hexadecimal value `0x07`. If you convert that value to decimal, you get 7. Then use this formula to calculate the duty cycle:

```
Duty cycle = (value returned + 1)*6.25%
```

In this example, duty cycle = (7 +1)*6.25 = 50%

Chassis Alarm Messages

Chassis alarms indicate a failure on the device or one of its components. Chassis alarms are preset and cannot be modified.

Chassis alarms on QFX5240 switches have two severity levels:

- Major (red)—Indicates a critical situation on the device that has resulted from one of the conditions described in Table 29 on page 116. A red alarm condition requires immediate action.

- Minor (yellow)—Indicates a noncritical condition on the device that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow alarm condition requires monitoring or maintenance.

Table 29 on page 116 describes the chassis alarm messages on a QFX5240.

Junos OS Evolved systems, such as QFX5240, are based on a new alarm infrastructure, which does not support all power supplies and fan alarms. Table 29 on page 116 shows these alarms.

Table 29: Chassis Alarm Messages for QFX5240

Component	Alarm Type	CLI Message	Recommended Action
Fans	Red (major)	Fan Tray *fan-tray-number* Absent	Install fan modules in the slots where they are absent.
		Fan Tray *fan-tray-number* Failure	Remove and check the fan module for obstructions. Reinsert the fan module. If the problem persists, replace the fan module.
		sensor-location Temp Sensor Too Hot	Check the environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor. If the condition persists, the device might shut down.
	Yellow (minor)	FAN *fan-number* Fan Sensor Fail	Remove and check the fan module for obstructions. Reinsert the fan module. If the problem persists, check the system log for the message related to the sensor and report the message to customer service.
		sensor-location Temp Sensor Too Warm	Check the environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor.
Power Supplies	Red (major)	PEM *pem-number* Not Powered	Install a power supply into the empty slot and ensure the power supply is powered.

Table 29: Chassis Alarm Messages for QFX5240 *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
Temperature sensors	Major (red)	`FPC 0 Temperature Hot`	Check environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor. If the condition persists, the device might shut down.
	Minor (yellow)	`FPC 0 Temperature Warm`	Check environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor.
		`FPC 0 Temp Sensor Fail`	Check the system log for the following error message and report the message to customer support:
Routing Engine	Major (red)	`RE `*`RE number`*` /var partition is full`	File storage is at capacity. Reduce unnecessary files to free space.
	Minor (yellow)	`RE `*`RE number`*` /var partition is high`	File storage is reaching capacity. Reduce unnecessary files to free space.
Management Ethernet interface	Major (red)	`Management interface `*`management-interface-name`*` down on `*`node`*	Check whether a cable is connected to the management Ethernet interface, or whether the cable is defective. Replace the cable, if required.

7

CHAPTER

Contacting Customer Support and Returning the Chassis or Components

IN THIS CHAPTER

Contact Customer Support to Obtain Return Material Authorization

If you need to return a device or hardware component to Juniper Networks for repair or replacement, obtain a Return Material Authorization (RMA) number from Juniper Networks Technical Assistance Center (JTAC). You must obtain an RMA number before you attempt to return the component.

After locating the serial number of the device or hardware component you want to return, open a service request with the Juniper Networks Technical Assistance Center (JTAC) on the Web or by telephone.

Before you request an RMA number from JTAC, be prepared to provide the following information:

- Your existing service request number, if you have one

- Serial number of the component

- Your name, organization name, telephone number, fax number, and shipping address

- Details of the failure or problem

- Type of activity being performed on the device when the problem occurred

- Configuration data displayed by one or more show commands

You can contact JTAC 24 hours a day, seven days a week on the Web or by telephone:

- Service Request Manager: https://support.juniper.net/support

- Telephone: +1-888-314-JTAC (+1-888-314-5822), toll free in U.S., Canada, and Mexico

> **NOTE**: For international or direct-dial options in countries without toll free numbers, see https://support.juniper.net/support.

If you are contacting JTAC by telephone, enter your 12-digit service request number followed by the pound (#) key for an existing case, or press the star (*) key to be routed to the next available support engineer.

The support representative validates your request and issues an RMA number for return of the component.

Return a QFX5240 Chassis or Components

IN THIS SECTION

Locate the Serial Number on a QFX5240 Device or Component

IN THIS SECTION

If you are need to return a switch or component to Juniper Networks for repair or replacement, you must locate the serial number of the switch or component. You must provide this serial number to the Juniper Networks Technical Assistance Center (JTAC) when you contact them to obtain a Return Materials Authorization (RMA).

If the switch is operational and you can access the CLI, you can list serial numbers for the switch and for some components with a CLI command. If you do not have access to the CLI or if the serial number for the component does not appear in the command output, you can locate the serial number ID label on the switch or component.

> **NOTE**: If you want to find the serial number ID label on a component, you need to remove the component from the switch chassis, for which you must have the required parts and tools available.

List the Chassis and Component Details Using the CLI

To list the switch and components and their serial numbers, use the `show chassis hardware` CLI operational mode command. The following output lists the switch components and serial numbers for a QFX5240 switch. The output is similar for other QFX5240 switches:

```
user@device> show chassis hardware
Hardware inventory:
Item                Version  Part number  Serial number    Description
Chassis                                   JN0000000        QFX5240-64OD
PSM 0                                     6U6LX010234424H  AC AFO 3000W PSU
PSM 1                                     6U6LX01023442EZ  AC AFO 3000W PSU
Routing Engine 0 REV 01   611-176059     AN45037787       RE-QFX5240
CB 0             REV 01    650-175147     AN45056963       QFX5240-64OD
FPC 0                      BUILTIN        BUILTIN          QFX5240-64OD
  PIC 0                    BUILTIN        BUILTIN          64X800G-OSFP
    Xcvr 1       REV 01    740-174935     1G1CVXA84800C    OSFP-2x400G-FR4
    Xcvr 3       REV 01    740-174935     1G1CVXA84800P    OSFP-2x400G-FR4
    Xcvr 4       REV 01    740-174935     1W1CVXA84600E    OSFP-2x400G-FR4
    Xcvr 6       XXXX      NON-JNPR       UP6T020006       OSFP-2x400G-FR4
    Xcvr 10      REV 01    740-174933     X9RB9W8          OSFP-800G-DR8
    Xcvr 12      XXXX      NON-JNPR       INNBD6580004     UNKNOWN
    Xcvr 13      REV 01    740-174935     1W1CVXA84600B    OSFP-2x400G-FR4
    Xcvr 15      REV 01    740-174935     1G1CVXA849008    OSFP-2x400G-FR4
    Xcvr 16      REV 01    740-174935     1W1CVXA84600C    OSFP-2x400G-FR4
    Xcvr 17      XXXX      NON-JNPR       UP6T020008       OSFP-2x400G-FR4
    Xcvr 18      REV 01    740-174935     1W1CVXA84600D    OSFP-2x400G-FR4
    Xcvr 19      REV 01    740-174935     1G1CVXA84800Y    OSFP-2x400G-FR4
    Xcvr 20      XXXX      NON-JNPR       UP6T020015       OSFP-2x400G-FR4
    Xcvr 21      REV 01    740-174933     X9SBK7B          OSFP-800G-DR8
    Xcvr 22      XXXX      NON-JNPR       UP5Q150001       OSFP-2x400G-FR4
    Xcvr 26      XXXX      NON-JNPR       INNBD6580007     UNKNOWN
    Xcvr 27      XXXX      NON-JNPR       INNBD6580021     UNKNOWN
    Xcvr 28      XXXX      NON-JNPR       INNBD6580025     UNKNOWN
    Xcvr 30      XXXX      NON-JNPR       N6WT000083       UNKNOWN
    Xcvr 42      XXXX      NON-JNPR       N6WT000067       UNKNOWN
```

```
    Xcvr 53      XXXX      NON-JNPR    INNBD6580026      UNKNOWN
    Xcvr 56      XXXX      NON-JNPR    N6WT000065        UNKNOWN
    Xcvr 58      XXXX      NON-JNPR    N6WT000068        UNKNOWN
    Xcvr 60      REV 01    740-174933  XA1CRMD           OSFP-800G-DR8
Fan Tray 0                                              QFX5240-64OD/QFX5240-64QD Fan Tray,
Front to Back Airflow - AFO
Fan Tray 1                                              QFX5240-64OD/QFX5240-64QD Fan Tray,
Front to Back Airflow - AFO
Fan Tray 2                                              QFX5240-64OD/QFX5240-64QD Fan Tray,
Front to Back Airflow - AFO
Fan Tray 3                                              QFX5240-64OD/QFX5240-64QD Fan Tray,
Front to Back Airflow - AFO
```

NOTE: You must remove the fan module to read the fan serial number from the serial number ID label. The fan module serial number cannot be viewed through the CLI. **Fan Tray 2** refers to the third module from the left, counting from 0.

Locate the Chassis Serial Number ID Label on a QFX5240 Switch

You can find the chassis serial number in either the `show chassis hardware` command output or physically on a pull-out tab located on the right side of the QFX5240 port panel. See Figure 41 on page 122 for the QFX5240-64OD Switch and Figure 42 on page 123.

Figure 41: Location of the Serial Number ID Label on a QFX5240-64OD Switch
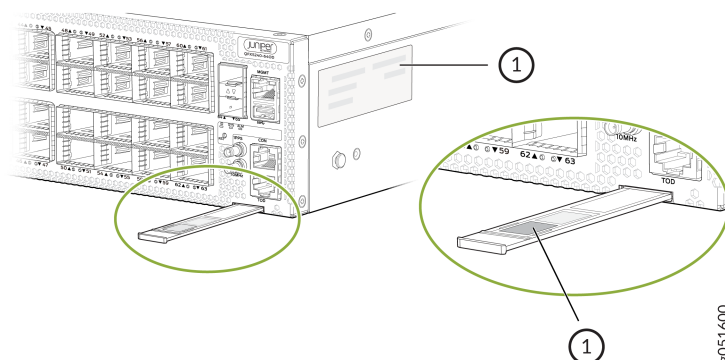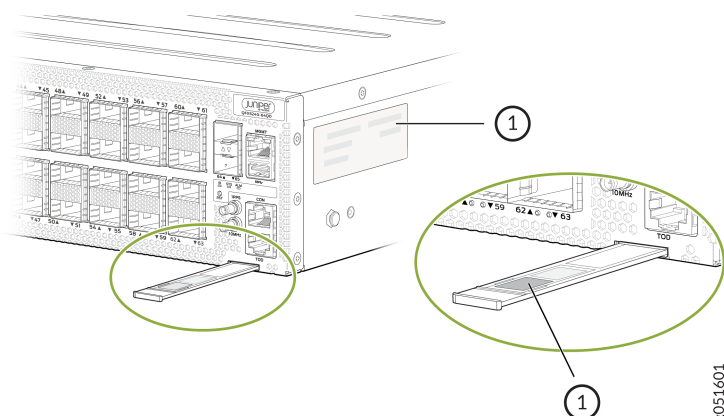

g051600

Figure 42: Location of the Serial Number ID Label on a QFX5240-64QD Switch


Locate the Serial Number ID Labels on FRUs in a QFX5240 Switch

The power supplies and fan modules installed in a QFX5240 switch are field-replaceable units (FRUs). For each FRU, you must remove the FRU from the switch chassis to see the FRU serial number ID label.

- AC power supply—The serial number ID label is on the top of the AC power supply. Figure 43 on page 123 shows the location of the serial number ID label on the AC power supply for QFX5240 switches.

Figure 43: Serial Number ID Label on a QFX5240 AC Power Supply
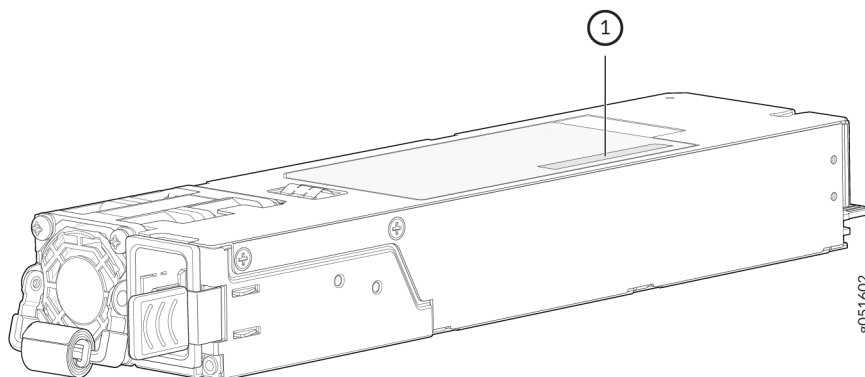
1— Serial number ID label

- Fan module—The serial number ID label is on the bottom of the fan module for QFX5240 switches. Figure 44 on page 124 shows the location of serial number on QFX5240 switches. The serial number ID label is on the side of the fan module for QFX5240-48C switches.

Figure 44: Serial Number ID Label on a QFX5240 Fan Module
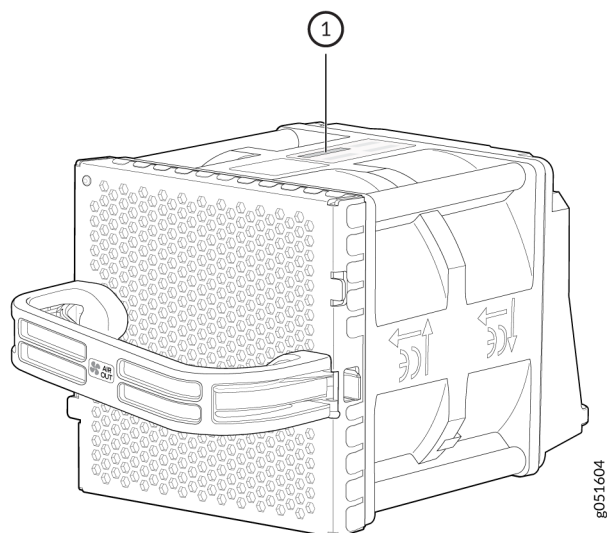
1— Serial number ID label

## Remove the Solid-State Drives for RMA on QFX5240 Switches

The QFX5240 switches have two solid-state drives (SSDs) that store the software images, system logs, and the configuration files. Before returning a chassis to Juniper Networks as part of a Return Material Authorization (RMA), you have the option of removing the SSDs and disposing them according to your own company's security procedures. Before you begin this procedure, ensure you have the following tools:

- ESD grounding strip (not provided)

- Phillips screwdriver, number 2

Use this optional procedure to remove the drives from the QFX5240 switches after the device has shut down and you've removed it from the rack or cabinet. The SSD doors are located on the top of the QFX5240 switch.

1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.

2. Place the device on a firm surface such as a workbench or a table with the SSD doors facing up.

3. Use the Phillips screwdriver to remove the three flat-head screws from each door on the top of the device. See .

**Figure 45: Remove Screws on SSD Doors for a QFX5240 Switch**
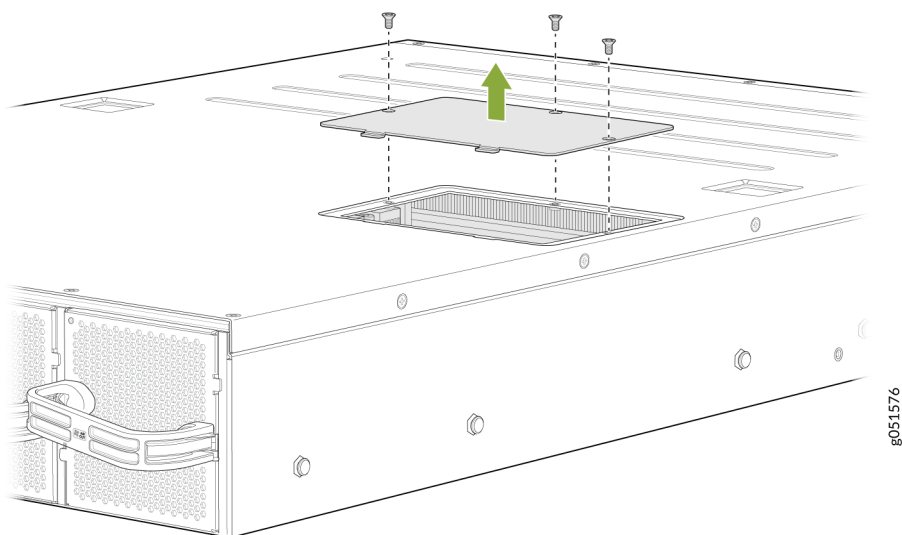
4. Remove the doors and set aside the screws.

5. Use the Phillips screwdriver to remove the screw on one of the SSDs and set it aside. See Figure 46 on page 125.

Figure 46: Removing the Screw and Lifting the SDD Out
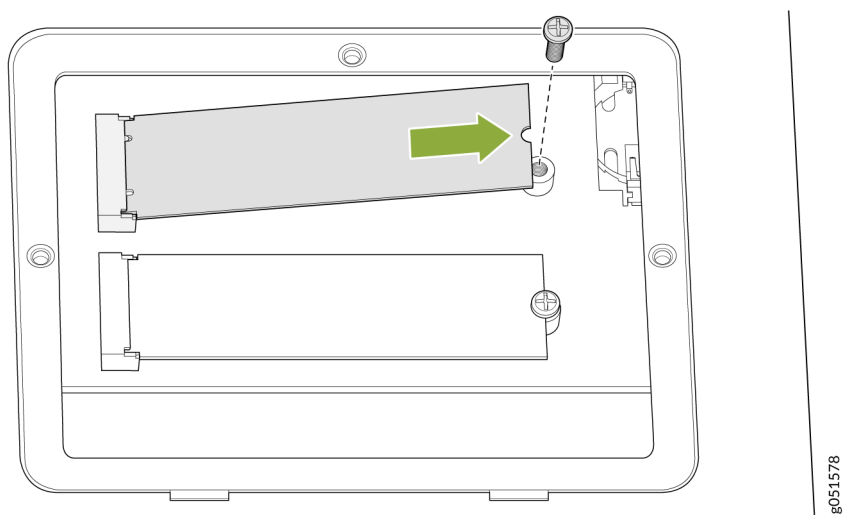
6. Lift the end furthest from the connector and remove from the cavity. Repeat Step 5 and Step 6.

7. Replace the screws and hand-tighten the screws using the Phillips screwdriver.

8. Replace the SSD doors and the six flat-head screws. See Figure 47 on page 126.

Figure 47: Replace the SSD Doors
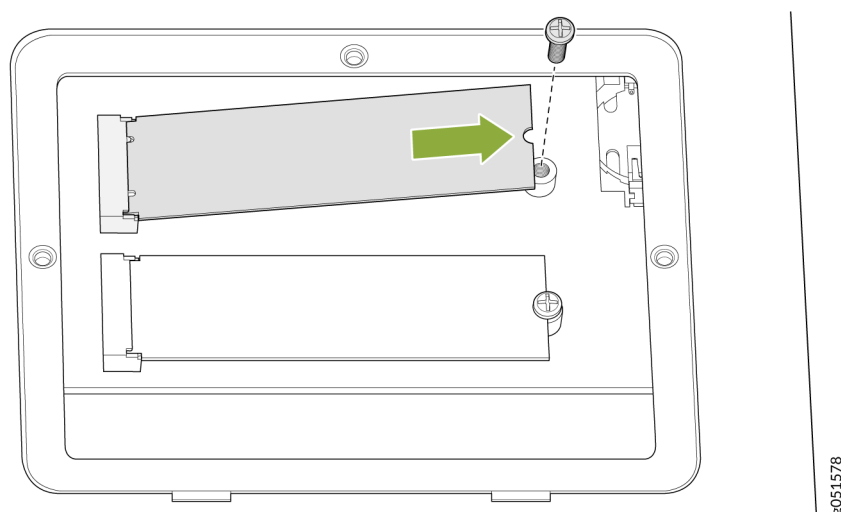
9. Hand-tighten the screws using the Phillips screwdriver.

10. Dispose of the SSDs according to your site security procedures.

How to Return a Hardware Component to Juniper Networks, Inc.

If a hardware component fails, you need to contact Juniper Networks, Inc. to obtain a Return Material Authorization (RMA) number. This number is used to track the returned material at the factory and to return repaired or new components to the customer as needed.

> **NOTE**: Do not return any component to Juniper Networks, Inc. unless you have first obtained an RMA number. Juniper Networks, Inc. reserves the right to refuse shipments that do not have an RMA. Refused shipments are returned to the customer by collect freight.

For more information about return and repair policies, see the customer support webpage at https://support.juniper.net/support/.

For product problems or technical support issues, contact the Juniper Networks Technical Assistance Center (JTAC) by using the Service Request Manager link at https://support.juniper.net/support/ or at 1-888-314-JTAC (within the United States) or 1-408-745-9500 (from outside the United States).

To return a defective hardware component:

1. Determine the part number and serial number of the defective component.

2. Obtain an RMA number from the Juniper Networks Technical Assistance Center (JTAC). You can send e-mail or telephone as described above.

3. Provide the following information in your e-mail message or during the telephone call:

   - Part number and serial number of component

   - Your name, organization name, telephone number, and fax number

   - Description of the failure

4. The support representative validates your request and issues an RMA number for return of the component.

5. Pack the component for shipment.

Guidelines for Packing Hardware Components for Shipment

To pack and ship individual components:

- When you return components, make sure that they are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.

- Use the original shipping materials if they are available.

- Place individual components in antistatic bags.

- Write the RMA number on the exterior of the box to ensure proper tracking.

> ⚠️ **CAUTION**: Do not stack any of the hardware components.

Pack a QFX5240 Switch or Component for Shipping

IN THIS SECTION

If you are returning a QFX5240 or one of its components to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you pack a QFX5240 switch or component:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

- Retrieve the original shipping carton and packing materials. Contact your JTAC representative if you do not have these materials, to learn about approved packing materials. See "Contact Customer Support to Obtain Return Material Authorization" on page 119.

Ensure that you have the following parts and tools available:

- ESD grounding strap.

- Antistatic bag, one for each component.

- If you are returning the chassis, an appropriate screwdriver for the mounting screws used on your rack or cabinet.

Pack a QFX5240 Switch for Shipping

To pack a QFX5240 switch for shipping:

1. Power off the switch and remove the power cables. See "Power Off a QFX5240 Switch" on page 110.
2. Remove the cables that connect the QFX5240 switch to all external devices.
3. Remove all field-replaceable units (FRUs) from the switch.
4. Have one person support the weight of the switch while another person unscrews and removes the mounting screws.
5. Remove the switch from the rack or cabinet and place the switch in a large antistatic bag.
6. Place the switch in the shipping carton.
7. Place the packing foam on top of and around the switch.
8. If you are returning accessories or FRUs with the switch, pack them as instructed in "Pack QFX5240 Components for Shipping" on page 129.
9. Replace the accessory box on top of the packing foam.
10. Close the top of the cardboard shipping box and seal it with packing tape.
11. Write the RMA number on the exterior of the box to ensure proper tracking.

Pack QFX5240 Components for Shipping

> ⚠️ **CAUTION**: Do not stack switch components. Return individual components in separate boxes if they do not fit together on one level in the shipping box.

To pack and ship QFX5240 components:

- Place individual FRUs in antistatic bags.

- Ensure that the components are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.

- Close the top of the cardboard shipping box and seal it with packing tape.

- Write the RMA number on the exterior of the box to ensure proper tracking.

8
CHAPTER

Safety and Compliance Information

IN THIS CHAPTER

Safety Information

The Juniper Networks Safety Guide provides general safety information and guidelines for all Juniper Networks products. Follow the guidelines provided in the guide to reduce the likelihood of personal injury, equipment damage, and damage to surrounding areas.

Along with the information provided in the Juniper Networks Safety Guide, you must read and understand the QFX5240 specific safety information provided in this hardware guide.

Compliance Statements for EMC Requirements

IN THIS SECTION

- Canada | **131**
- European Community | **131**
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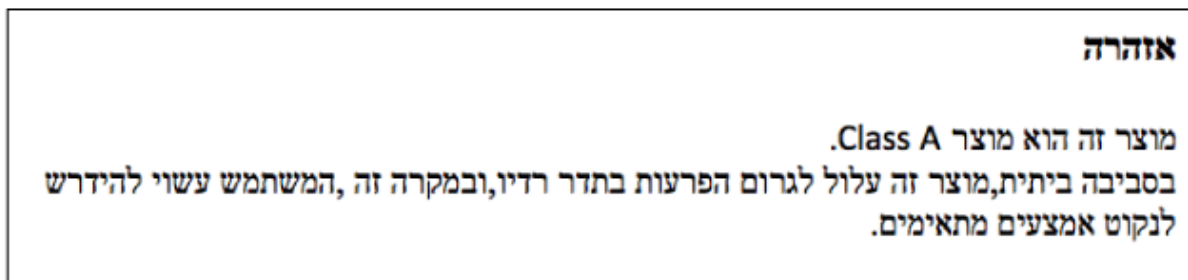- Japan | **132**
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Canada
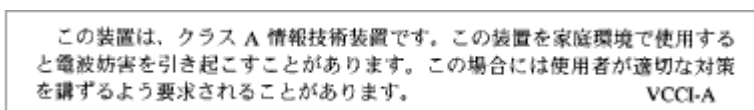
CAN ICES-3 (A)/NMB-3(A)

European Community

This is a Class A product. In a domestic environment, this product might cause radio interference in which case the user might be required to take adequate measures.

Israel

אזהרה

‏מוצר זה הוא מוצר Class A.
‏בסביבה ביתית,מוצר זה עלול לגרום הפרעות בתדר רדיו,ובמקרה זה ,המשתמש עשוי להידרש
‏לנקוט אמצעים מתאימים.

Translation from Hebrew—Warning: This product is Class A. In residential environments, the product might cause radio interference, and in such a situation, the user might be required to take adequate measures.

Japan

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。　VCCI-A

The preceding translates as follows:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this product is used near a radio or television receiver in a domestic environment, it might cause radio interference. Install and use the equipment according to the instruction manual. VCCI-A.

United States

The hardware equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Compliance Standards for QFX5240 Switches

The QFX5240 switches comply with the following standards:

- Safety

  - UL 60950-1:2007 R10.14 Information Technology Equipment

  - CAN/CSA-C22.2 No. 60950-1-07, Amd 1:2011, Amd 2:2014 Information Technology Equipment

  - IEC 62368-1:2014 (2nd Edition) Audio/Video, Information and Communication Technology Equipment (Include all country deviation)

  - IEC 62368-1:2018 (3rd Edition) Audio/Video, Information and Communication Technology Equipment (Include all country deviation)

  - EN 62368-1:2014+A11:2017 Audio/Video, Information and Communication Technology Equipment

  - UL/CSA 62368-1:2019 (3rd edition) Audio/Video, Information and Communication Technology Equipment

  - IEC/EN 60825-1 Safety of Laser Products – Part 1: Equipment classification and requirements

- EMC

  - FCC 47 CFR Part 15

  - ICES-003 / ICES-GEN

  - BS EN 55032

  - BS EN 55035

  - EN 300 386 V1.6.1

  - EN 300 386 V2.2.1

  - BS EN 300 386

- EN 55032

- CISPR 32

- EN 55035

- CISPR 35

- IEC/EN 61000 Series

- IEC/EN 61000-3-2

- IEC/EN 61000-3-3

- AS/NZS CISPR 32

- VCCI-CISPR 32

- BSMI CNS 15936

- KS C 9835 (Old KN 35)

- KS C 9832 (Old KN 32)

- KS C 9610

- BS EN 61000 Series
- DC-NEBS
  - DC NEBS GR 3160 standard

Compliance Statement for Argentina

EQUIPO DE USO IDÓNEO.