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QFX5241-64OD and QFX5241-64QD Switches Hardware Guide

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Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, California 94089
USA
408-745-2000
www.juniper.net

QFX5241-64OD and QFX5241-64QD Switches Hardware Guide

The information in this document is current as of the date on the title page.

YEAR 2000 NOTICE

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About this Guide

Use this guide to plan, install, perform initial software configuration, perform routine maintenance, and troubleshoot QFX5241-64OD and QFX5241-64QD switches.

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

Documentation Conventions

For information about the notice icons and text and syntax conventions used in the documentation, see Documentation Conventions.

CHAPTER 1

Fast Track: Initial Installation

IN THIS CHAPTER

Fast Track to Rack Installation and Powering Connection

SUMMARY

This procedure walks you through the basic steps for installing your QFX5241-64OD and QFX5241-64QD switches in a rack and connecting the switches to power. For more complex installation needs, see "Unpack and Install the QFX5241-64OD and QFX5241-64QD Switches" on page 94.

IN THIS SECTION

You can install the AC variant of the Juniper Networks® QFX5241-64OD Switch and Juniper Networks® QFX5241-64QD Switch on a four-post rack using the toolless QFX5240-2U-4PRMK rack mount kit (RMK). This RMK is the default rack mount kit available with these Juniper Networks® QFX Series Switches.

You can install the QFX5241-64OD and QFX5241-64QD DC PSU switches as follows:

- Use the toolless QFX5240-2U-4PRMK rack mount kit (RMK) to install the switch on a four-post rack. This RMK is the default rack mount kit.

Let's walk you through the steps to install the QFX5241 switch using the QFX5240-2U-4PRMK kit.

Before you install the switch, review:

- "QFX5241-64OD and QFX5241-64QD Site Guidelines and Requirements" on page 59.
- "Safety Information" on page 164.
- "Unpack and Install the QFX5241-64OD and QFX5241-64QD Switches" on page 94.

Install the Switch in a Four-Post Rack Using QFX5240-2U-4PRMK

SUMMARY

Here, we'll walk you through the steps to install the QFX5241-64OD and QFX5241-64QD switches in a four-post rack using the default 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 electrostatic discharge (ESD) grounding strap—not provided
   - QFX5240-2U-4PRMK rack mount kit (RMK)—provided
   - Two slide rail assemblies
   - One packet of screws that contains four M4 x 4 mm screws and two M5 x 13.0 mm screws.

Prepare the Slide Rail Assembly to Install in the Rack

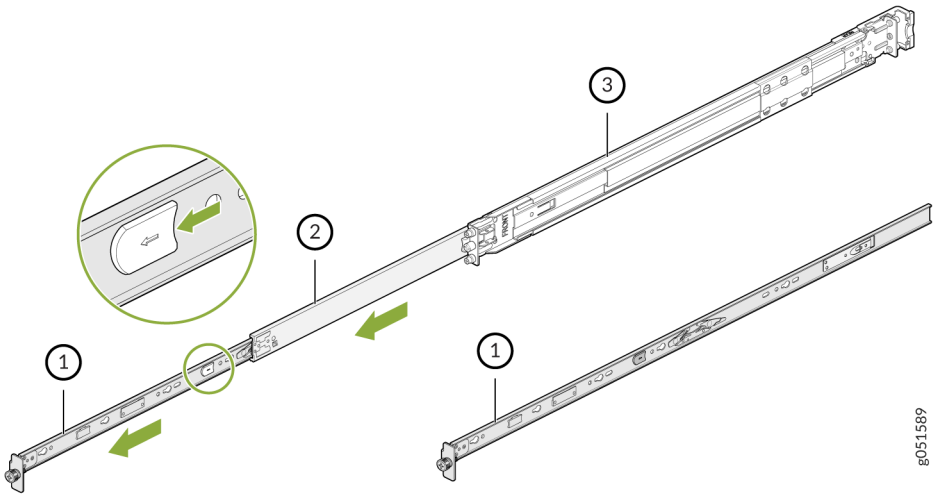
The slide rail assembly consists of three parts:

- Outer rail
- Slider rail
- 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 fully extended position until you hear a click.

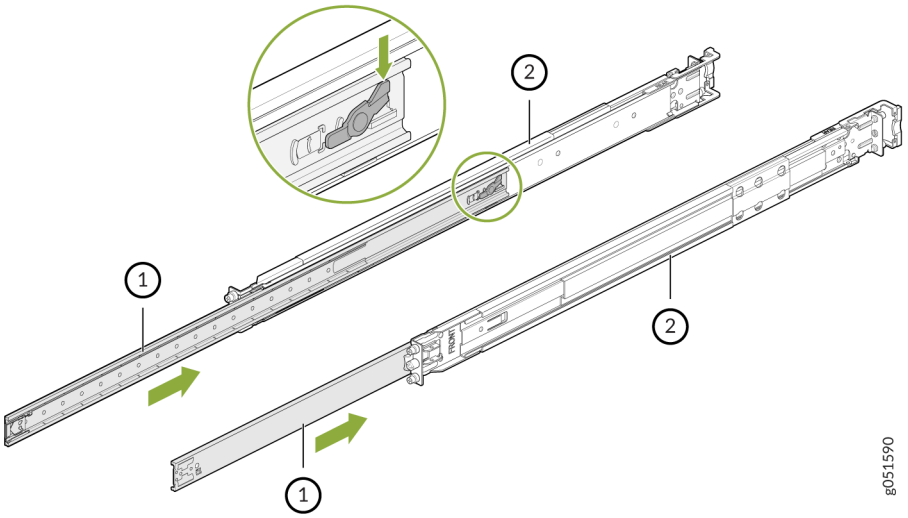
3. Push the white tab on the inner rail bracket forward. Pull the inner rail bracket out of the slide rail assembly and keep it aside.



- 1—Inner rail bracket
- 2—Slider rail
- 3—Outer rail

4. Install the inner rail that you removed from the rail assembly on to the switch chassis using the M4 screws.

5. Press the latch on the slider rail down and retract the slider rail into the slide rail assembly.

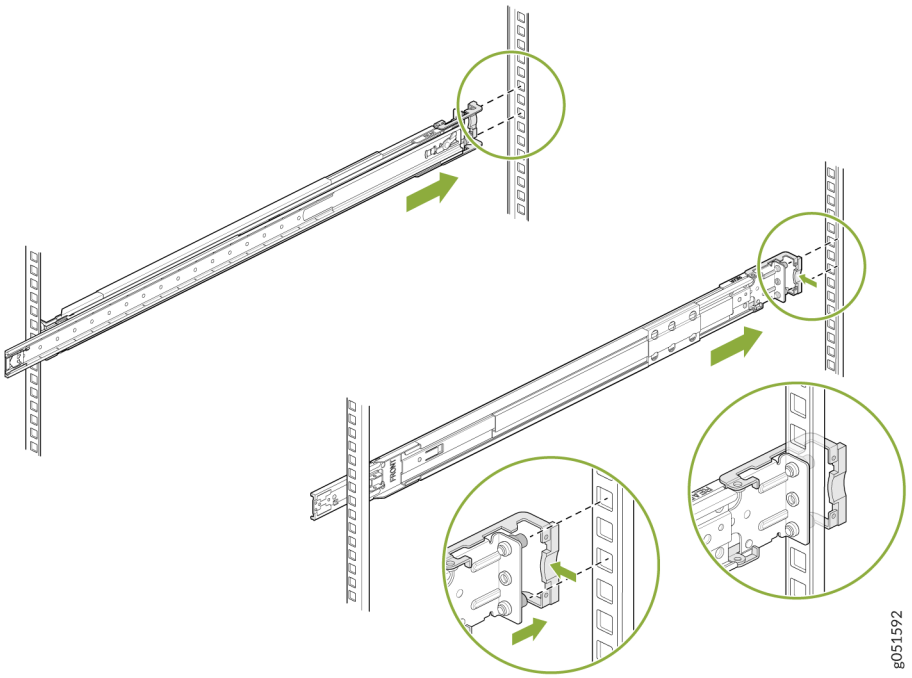


- 1—Slider rail
- 2—Outer rail

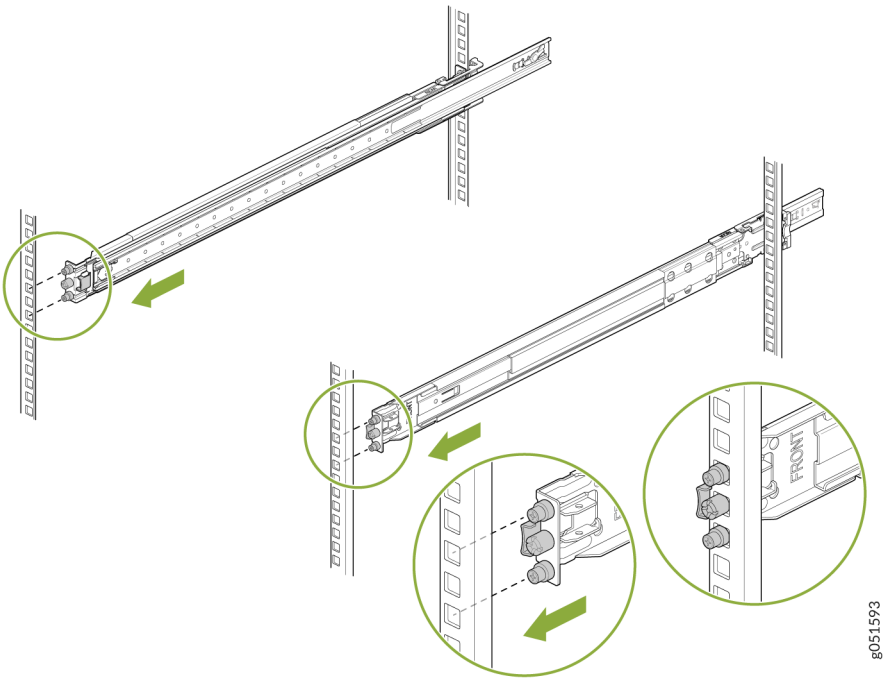
Install the Slider Rail and Outer Rail Assembly in the Rack

1. Move the latch on the rear end of the rail assembly to the open position.
2. Align the rear end of the outer rail with the rear rack-post holes that you want to use. The installation pegs on the outer rail enter the rack-post holes from the inside of the rack post.
3. Push the outer rail rear installation pegs into the rear rack-post holes. You will hear a click.
4. Move the latch to the close position. The rear bracket of the outer rail wraps around the outside of the rear rack post.

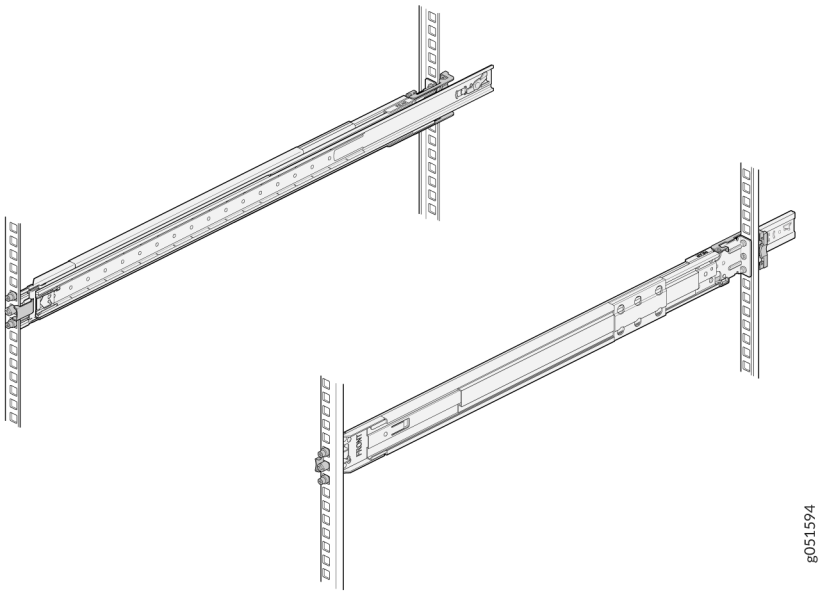
> **NOTE**: The rear end of the outer rail assembly is fastened to the rear rack-post using M5x13.0L screws.



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.



6. The slide rail assembly is fully installed. Verify that both the slide rail assemblies are at the same height on the rack posts and are level front-to-back.

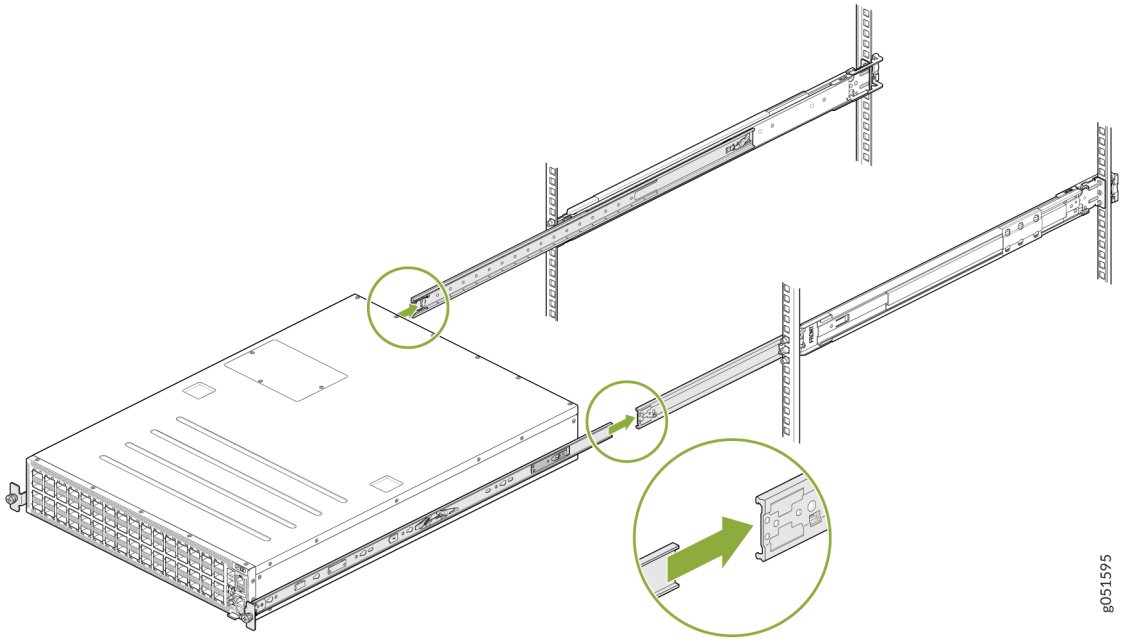


Mount the Switch in the Rack

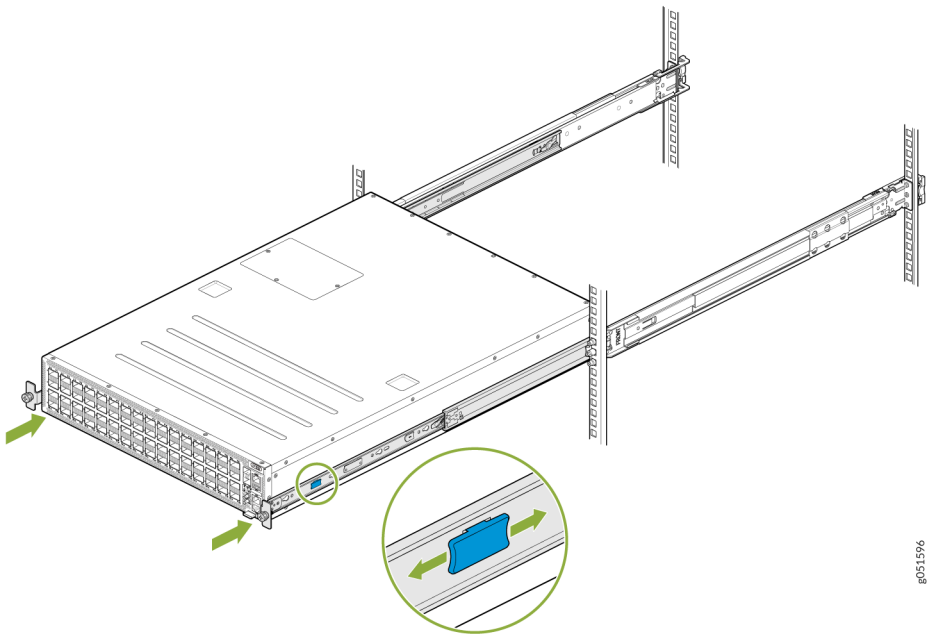
1. Pull the slider rails out to their full extended lock position. Ensure that the ball bearing retainer is located at the front of the slider rail.

2. Attach the inner rail brackets to the chassis. Align the keyholes of the brackets over the shoulder screws of the chassis and slide the brackets toward the rear of the chassis.

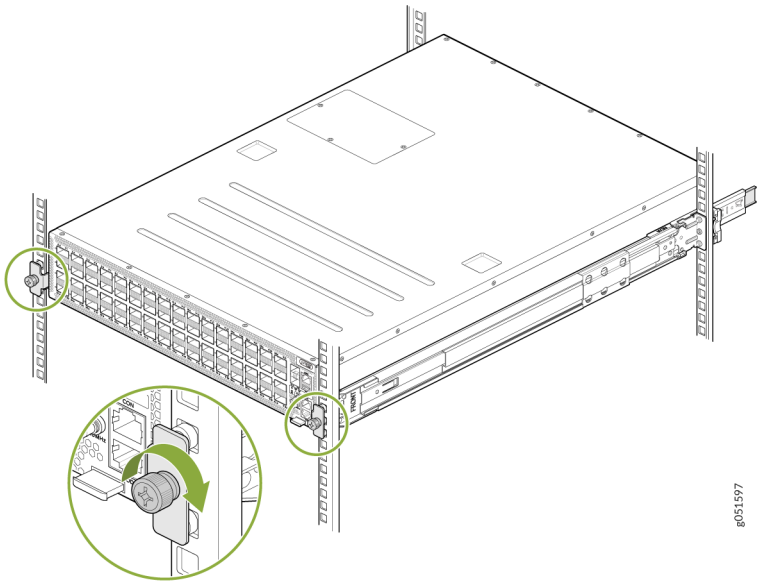
3. Lift the switch and align the rear of the inner rail brackets with the front ends of the slider rails on the rack.



4. Press the blue release tab on the inner rail brackets. Slide the inner rail brackets holding the switch into the slider rail until you hit a stop.



5. Tighten the two thumbscrews to secure the switch.



The switch is now mounted in the rack.

Connect the QFX5241-64OD and QFX5241-64QD Switches to Power

IN THIS SECTION

Ground the QFX5241-64OD and QFX5241-64QD Switches

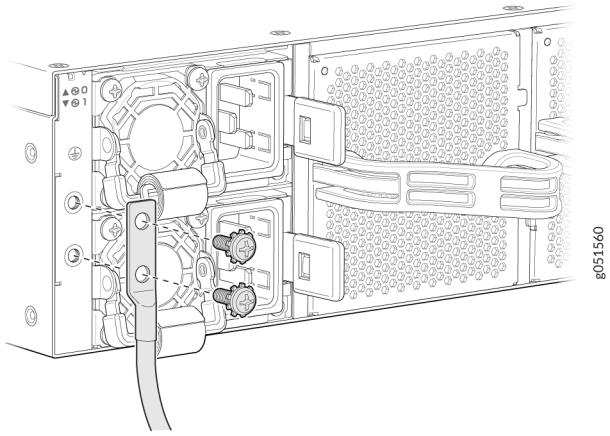
You must connect QFX5241-64OD and QFX5241-64QD switches to earth ground before you connect it to power. Grounding the switches helps to:

- Ensure proper operation
- Meet safety and EMI requirements

To ground the QFX5241-64OD and QFX5241-64QD switches:

1. Wrap and fasten one end of the electrostatic discharge (ESD) grounding strap around your bare wrist, and connect the other end to a site ESD point or to the ESD point on your device.
2. Connect one end of the grounding cable to an appropriate earth ground site, such as the mounting rack.
3. Remove the two M6 screws and star washers from the earthing terminal on the left side of the PSU slots.
4. Place the Panduit LCDXN2-14AF-E or equivalent grounding lug attached to the grounding cable over the protective earthing terminal.
5. Secure the grounding lug to the protective earthing terminal with the M6 screws and star washers.

Figure 1: Connect a Grounding Cable to the QFX5241-64OD and QFX5241-64QD Switches



6. Dress the grounding cable to ensure safety.

NOTE:

- The grounding cable must not touch other device components or obstruct access to the devices.
- Arrange the cable such that it does not drape in areas where people could trip over it.

To gain additional grounding for the chassis of your QFX5241-64OD and QFX5241-64QD switches, connect the PSU in the switch into a grounded power outlet. Use a power cord appropriate for your geographical location.

Connect AC Power to QFX5241-64OD and QFX5241-64QD Switches

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. See "Ground the QFX5241-64OD and QFX5241-64QD Switches" on page 8.
- Install the PSUs in the chassis. For instructions on installing the PSU in the QFX5241-64OD and QFX5241-64QD switches, see "Install an AC Power Supply Unit in QFX5241 Switches" on page 122.

For detailed instructions, see "Connect the QFX5241-64OD and QFX5241-64QD Switches to Power" on page 104.

To connect AC power to the QFX5241-64OD and QFX5241-64QD switches:

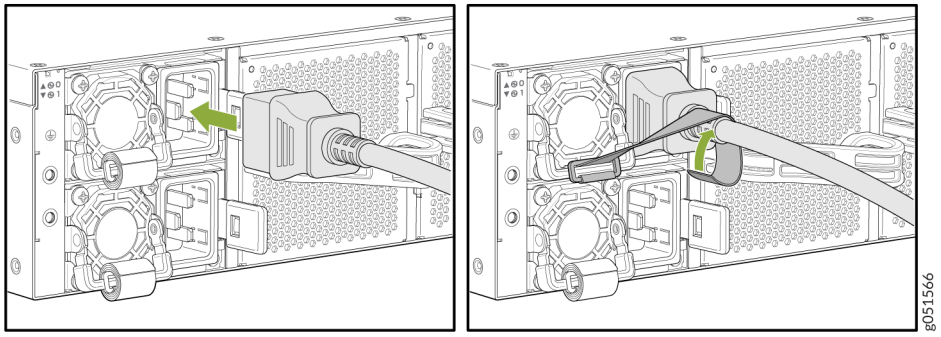
1. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end to a site ESD point.
2. Ensure that the PSUs are fully inserted in the chassis and the latches are secure.
3. Locate the power cords shipped with the switch; the cords have plugs appropriate for your geographical location. See "AC Power Cord Specifications" on page 45.

   For each PSU:

   a. Connect the AC power cord. Insert the power cord coupler firmly into the AC inlet on the PSU faceplate.

   b. Fasten the power cord using the strap provided on the PSU. See Figure 2 on page 10.

Figure 2: Connect the AC Power Cord



c. Connect a dedicated customer site two-pole circuit breaker for each PSU. We recommend that you use a dedicated customer-site circuit breaker rated for 16 A (200 V to 240 V), 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. The device does not have a power switch.

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 status LEDs on each PSU are lit green.

   If the status LED is lit amber, disconnect the power cord from the PSU and replace the PSU. See "Maintain the QFX5241-64OD and QFX5241-64QD Power System" on page 122.

   Do not remove the PSU until you have a replacement PSU ready. The PSUs must be installed in the switch to ensure proper airflow.

Connect DC Power to QFX5241-64OD and QFX5241-64QD Switches

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

Before you begin connecting DC 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. See "Ground the QFX5241-64OD and QFX5241-64QD Switches" on page 8.
- Install the PSUs in the chassis. For instructions on installing a DC PSU in the QFX5241-64OD and QFX5241-64QD switches, see "Install a Power Supply Unit in QFX5241-64OD and QFX5241-64QD Switches" on page 125.

For detailed instructions, see "Connect DC Power to QFX5241-64OD and QFX5241-64QD Switches" on page 108.

> **NOTE**: You must connect the switch only to an isolated DC power source with an output voltage range from –40 V DC to –72 V DC. Wiring from an isolated DC power source that connects to the switch must remain inside the building.

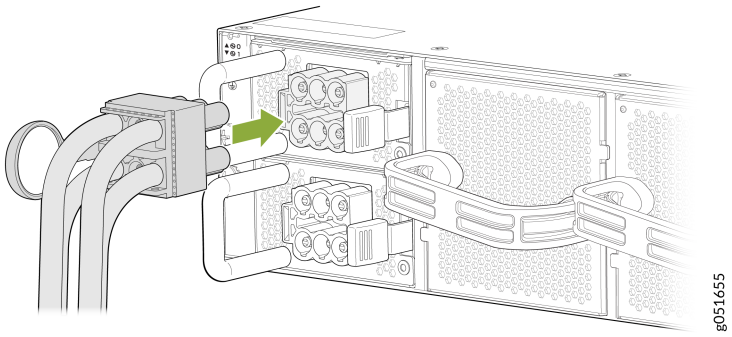
To connect DC power to the QFX5241-64OD and QFX5241-64QD switches:

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. Ensure that the PSUs 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 "DC Power Cord Specifications" on page 49.

   To connect each PSU to a power source:

   a. Insert the power cord connector firmly into the DC inlet on the PSU faceplate. See Figure 3 on page 12.

   Figure 3: Connect the DC Power Cord

   The latch on the power cord connector locks into the corresponding slot on the PSU faceplate.

   b. Connect a dedicated customer-site two-pole circuit breaker for each PSU. We recommend that you use a dedicated customer-site circuit breaker rated for 80 A (–48 V to –60 V) or as required by local code.
4. If the DC 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. The device does not have a power switch.
5. Insert the power cord plug into a DC power source outlet.
6. If the DC power source outlet has a power switch, set it to the on (|) position.
7. Verify that the status LEDs on each PSU are lit green.

   If the status LED is amber, remove power from the PSU and replace the PSU. See "Maintain the QFX5241-64OD and QFX5241-64QD Power System" on page 122.

   Do not remove the PSU until you have a replacement PSU ready. The PSUs must be installed in the switch to ensure proper airflow.

Onboard, Configure, and Monitor QFX5241-64OD and QFX5241-64QD Switches

SUMMARY

This topic provides you with pointers to onboard, configure, and monitor QFX5241-64OD and QFX5241-64QD switches using Juniper Apstra or the Junos OS Evolved CLI (configure only).

You can use Juniper Apstra™ to onboard, configure, and monitor the QFX5241-64OD and QFX5241-64QD switches.

Table 1: Onboard, Configure, and Monitor QFX5241-64OD and QFX5241-64QD Switches 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 QFX5241-64OD and QFX5241-64QD switches using the Junos OS Evolved CLI.

Table 2: Configure QFX5241-64OD and QFX5241-64QD Switches Using the Junos OS Evolved CLI

If You Want To	Then
Customize the basic configuration	See "Perform Initial Software Configuration for QFX5241-64OD and QFX5241-64QD Switches" on page 114
Configure supported software features on QFX5241-64OD and QFX5241-64QD	See Software Documentation

Table 2: Configure QFX5241-64OD and QFX5241-64QD Switches Using the Junos OS Evolved CLI *(Continued)*

If You Want To	Then
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

QFX5241-64OD and QFX5241-64QD System Overview

IN THIS SECTION

QFX5241-64OD and QFX5241-64QD Description

IN THIS SECTION

The Juniper Networks® QFX5241 Switches are devices with high port density. You can use these switches as end-of-row, leaf or spine devices in an IP fabric architecture. It is an optimal choice as shallow buffer platforms for the spine role in the data center fabric. The 64-port QFX5241 switches are available in the following models:

- QFX5241-64OD
- QFX5241-64QD

The QFX5241-64OD and QFX5241-64QD switches have AC and DC power supply units (PSUs) and an airflow out (AFO) cooling system.

For information about the different variants of the QFX5241-64OD and QFX5241-64QD switches, see "Variants of QFX5241-64OD and QFX5241-64QD Switches" on page 21.

Table 3: 64-Port QFX5241 Switch: Key Specifications

Characteristics	QFX5241-64OD	QFX5241-64QD	Notes
Data transmission capability	800 Gbps	800 Gbps	The switches offer up to 800 Gbps of data transmission speed through the 800-Gigabit Ethernet (GbE) ports.
Rack units (U)	2 U 2 OU	2 U 2 OU	The switches have chassis that occupy two rack units (2 U).
Form factor	• Octal small form-factor pluggable (OSFP)—64 OSFP ports with speeds of up to 800 Gbps. • 2 SFP28 ports with speeds of 10 Gbps.	• Quad small form-factor pluggable double-density (QSFP-DD)—64 QSFP-DD ports with speeds of up to 800 Gbps. • 2 SFP28 ports with speeds of 10 Gbps.	
Ports	• 64 OSFP ports (800 Gbps) • 2 SFP28 ports (10 Gbps) • 1 USB 3.0 port • 1 RJ-45 console port • 1 management port	• 64 QSFP-DD ports (800 Gbps) • 2 SFP28 ports (10 Gbps) • 1 USB 3.0 port • 1 RJ-45 console port • 1 management port	
Throughput	51.2 terabits per second (Tbps)	51.2 terabits per second (Tbps)	
Core	64 Peregrine SerDes cores	64 Peregrine SerDes cores	

Table 3: 64-Port QFX5241 Switch: Key Specifications *(Continued)*

Characteristics	QFX5241-64OD	QFX5241-64QD	Notes
Chipset	High-radix class TH5 BCM78900 chipsets	High-radix class TH5 BCM78900 chipsets	It is a dedicated ASIC for high-bandwidth network switching devices.
Processor	Intel 4-core 2.2-GHz Ice Lake D processor	Intel 4-core 2.2-GHz Ice Lake D processor with 32 GB DRAM	The processor drives the control plane of the switch.
Operating system (OS)	Junos OS Evolved software	Junos OS Evolved software	Two internal 480-GB Non-Volatile Memory Express (NVMe) solid-state drives (SSDs) store the Junos OS Evolved software image.

Figure 4: Front View of the QFX5241-64OD Switch

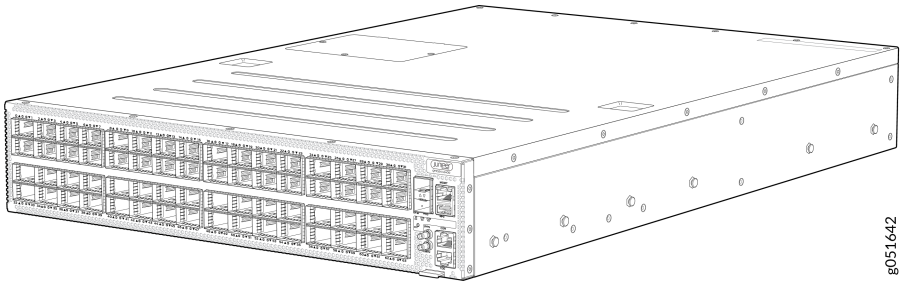


Figure 5: Rear View of the QFX5241-64OD AC Switch

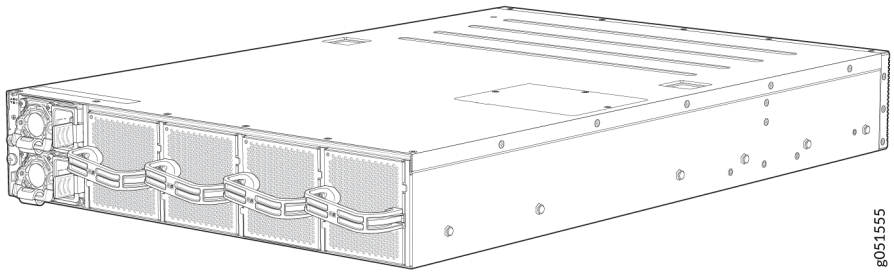


Figure 6: Rear View of the QFX5241-64OD DC Switch

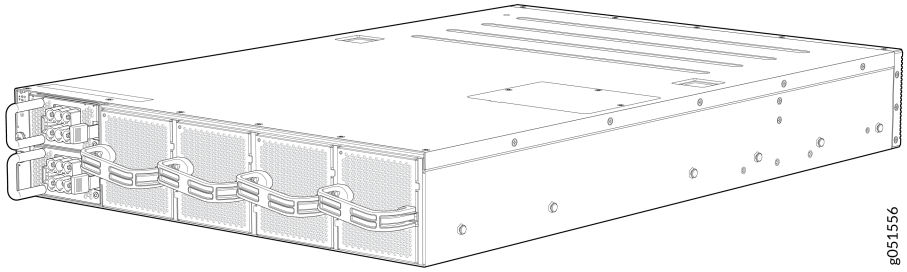


Figure 7: View of the QFX5241-64OD ORv3 Switch-Tray Assembly

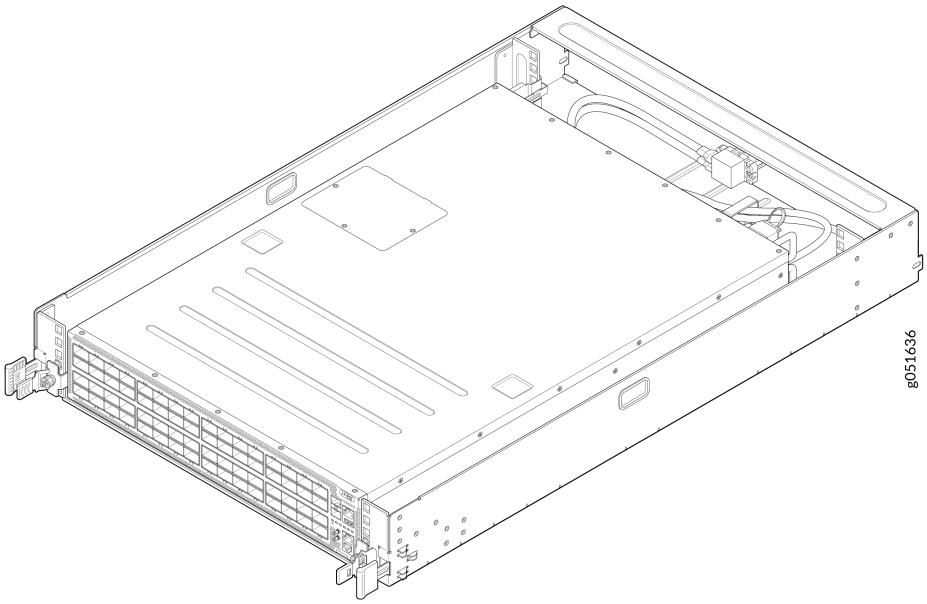


Figure 8: Front View of the QFX5241-64QD Switch

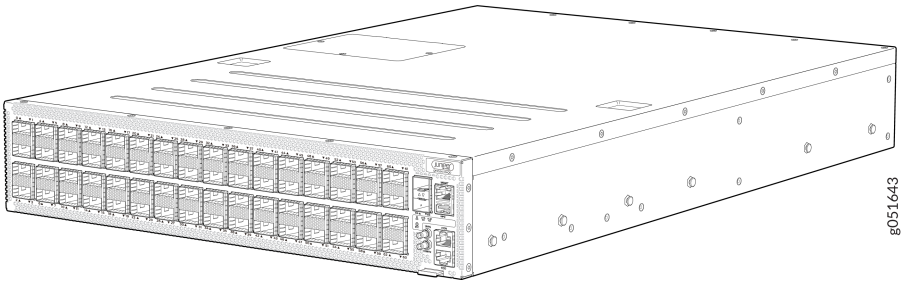


Figure 9: Rear View of the QFX5241-64QD AC Switch

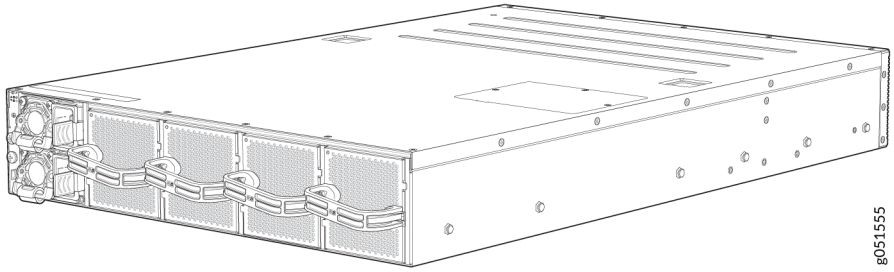


Figure 10: Rear View of the QFX5241-64QD DC Switch

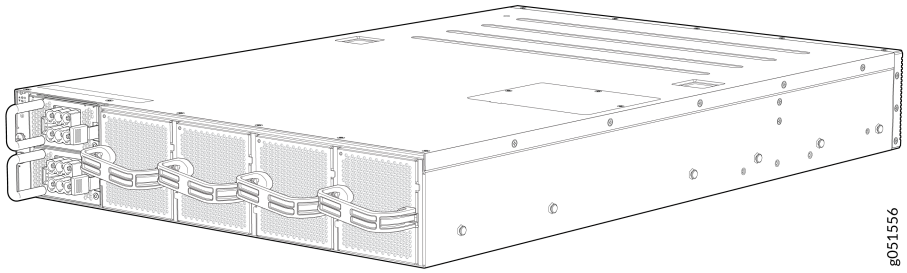
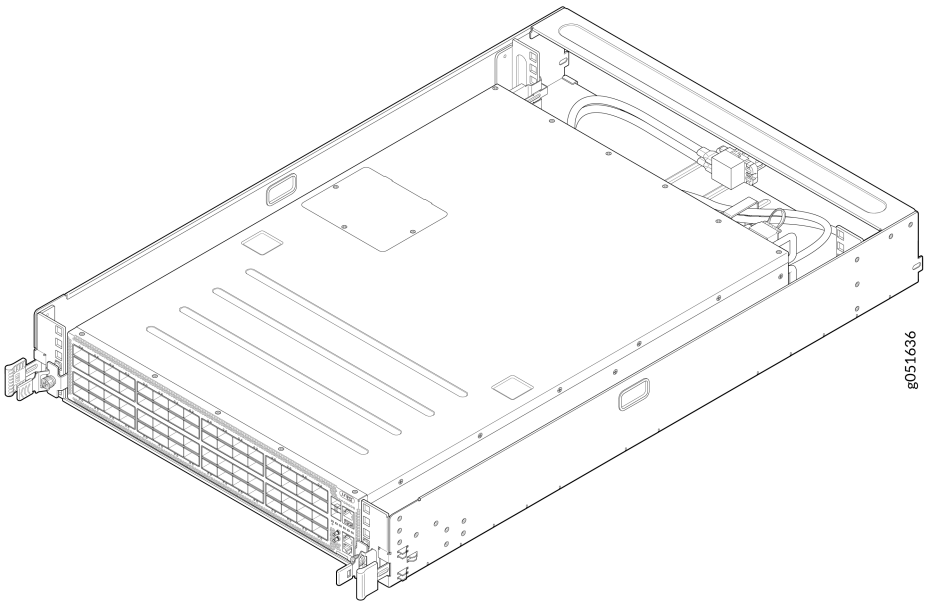


Figure 11: View of the QFX5241-64QD ORv3 Switch-Tray Assembly



Benefits

- Cost reduction—64 ports of 800GbE on a 2-U switch to reduce costs on both space and total power utilization.
- Increased leaf-spine connectivity options—Choice of connectivity with both OSFP and QSFP-DD variants of 800G for leaf-spine connectivity.
- Advanced telemetry capabilities—Advanced telemetry capabilities to support ECN/PFC counters.
- Automation support—Load-balancing capability to handle complex flows.
- Handling of complex flows—Automation of rail-optimized design through Apstra.

Variants of QFX5241-64OD and QFX5241-64QD Switches

The QFX5241-64OD and QFX5241-64QD switches have the following variants:

- QFX5241-64OD-AO—64-port switches with 800-Gbps data transmission capability, octal small form-factor pluggable (OSFP) form factor, AC PSU, airflow out (AFO) cooling design, and installation using the QFX5240-2U-4PRMK rack mount kit.

- QFX5241-64OD-DO—64-port switches with 800-Gbps data transmission capability, OSFP form factor, DC PSU, AFO cooling, and installation using QFX5240-2U-4PRMK rack mount kit.
- QFX5241-64QD-AO—64-port switches with 800-Gbps data transmission capability, quad small form-factor pluggable double density (QSFP-DD) form factor, AC PSU, AFO cooling, and installation using QFX5240-2U-4PRMK rack mount kit.
- QFX5241-64QD-DO—64-port switches with 800-Gbps data transmission capability, QSFP-DD form factor, DC PSU, AFO cooling, and installation using QFX5240-2U-4PRMK rack mount kit.

Table 4 on page 22 provides an overview of the QFX5241-64OD and QFX5241-64QD variants. The table also provides details about the power supply units (PSUs), field-replaceable units (FRUs), and AFO cooling system for the switch.

Table 4: Details of QFX5241-64OD and QFX5241-64QD Switch Variants

Variant	Description	Airflow	Power System
QFX5241-64OD-AO	• 64 OSFP ports (ports 0–63) with port speed of up to 800 Gbps • 2 SFP28 ports (ports 64 and 65) with port speed of up to 10 Gbps • 1 USB 3.0 port • 1 RJ-45 console port • 1 management (**MGMT**) port Install using the rack mount kit QFX5240-2U-4PRMK.	Four hot-insertable and hot-removable fan modules with front-to-back or airflow out (AFO) airflow, indicated by the label **AIR OUT**.	Two 12.2-V, 3000-W AC PSUs with AFO cooling system. The PSUs are hot-insertable and hot-removable FRUs that provide 1 + 1 redundancy and load sharing.

Table 4: Details of QFX5241-64OD and QFX5241-64QD Switch Variants *(Continued)*

Variant	Description	Airflow	Power System
QFX5241-64OD-DO	• 64 OSFP ports (ports 0–63) with port speed of up to 800 Gbps • 2 SFP28 ports (ports 64 and 65) with port speed of up to 10 Gbps • 1 USB 3.0 port • 1 RJ-45 console port • 1 management (**MGMT**) port Install using the rack mount kit QFX5240-2U-4PRMK.	Four hot-insertable and hot-removable fan modules with front-to-back or airflow out (AFO) airflow, indicated by the label **AIR OUT**.	Two 12.2-V, 3000-W DC PSUs with front-to-back airflow. The PSUs are hot-insertable and hot-removable FRUs that provide 1 + 1 redundancy and load sharing.
QFX5241-64QD-AO	• 64 QSFP-DD ports (ports 0–63) with port speed of up to 800 Gbps • 2 SFP28 ports (ports 64 and 65) with port speed of up to 10 Gbps • 1 USB 3.0 port • 1 RJ-45 console port • 1 management (**MGMT**) port Install using the rack mount kit QFX5240-2U-4PRMK.	Four hot-insertable and hot-removable fan modules with front-to-back or airflow out (AFO) airflow, indicated by the label **AIR OUT**.	Two 12.2-V, 3000-W AC PSUs with front-to-back airflow. The PSUs are hot-insertable and hot-removable FRUs that provide 1 + 1 redundancy and load sharing.

Table 4: Details of QFX5241-64OD and QFX5241-64QD Switch Variants *(Continued)*

Variant	Description	Airflow	Power System
QFX5241-64QD-DO	• 64 QSFP-DD ports (ports 0–63) with port speed of up to 800 Gbps • 2 SFP28 ports (ports 64 and 65) with port speed of up to 10 Gbps • 1 USB 3.0 port • 1 RJ-45 console port • 1 management (**MGMT**) port Install using the rack mount kit QFX5240-2U-4PRMK.	Four hot-insertable and hot-removable fan modules with front-to-back or airflow out (AFO) airflow, indicated by the label **AIR OUT**.	Two 12.2-V, 3000-W DC PSUs with front-to-back airflow. The PSUs are hot-insertable and hot-removable FRUs that provide 1 + 1 redundancy and load sharing.

NOTE: While operational, you cannot remove or replace the fans and PSUs in ORv3-compliant QFX5241-64OD and QFX5241-64QD switches.

The QFX5241-64OD and QFX5241-64QD switches have the following spare chassis:

Table 5: QFX5241-64OD and QFX5241-64QD Spare Chassis Details

Chassis	Description
QFX5241-64OD-CHAS	Spare chassis without PSUs and fans for the QFX5241-64OD model
QFX5241-64QD-CHAS	Spare chassis without PSUs and fans for the QFX5241-64QD model

System Software

The QFX5241-64OD and QFX5241-64QD switches use 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.

QFX5241 Component Redundancy

The following hardware components provide redundancy on QFX5241 switches:

- QFX5241-64OD and QFX5241-64QD PSUs—The QFX5241-64OD and QFX5241-64QD PSUs are hot-removable and hot-insertable 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.

  Table 6: QFX5241-64OD and QFX5241-64QD PSU Specifications

PSU	Item	Specification
QFX5240-PWR-AC-AO (for AC PSU, AFO, 2-U variant)	Maximum output power	3000 W (for input voltage of 215 to 240 VAC) 2800 W (for input voltage of 200 to 214 VAC) **NOTE**: When the system power is over 2800 W, the AC input voltage must be over 215 VAC.
	AC input current rating	16 A maximum
	AC input voltage	200 V–240 VAC
	AC input line frequency	50-60 Hz
QFX5241-PWR-DC-AO (for DC PSU, AFO, 2-U variant)	Maximum output power	3000 W

Table 6: QFX5241-64OD and QFX5241-64QD PSU Specifications *(Continued)*

PSU	Item	Specification
	DC output voltage	12.2 V maximum
	DC input voltage range	–48 V to –60 V
	Input current (for the maximum power output of 3 kW)	80 A (maximum per PSU)

- QFX5241-64OD and QFX5241-64QD cooling system—The cooling system consists of four front-to-back (airflow out or AFO) fan modules with each fan module containing two rotors. The cooling system offers *N*+1 redundancy for the fan modules. The fan modules are hot-insertable and hot-removable field-replaceable units (FRUs).

  Table 7: Cooling System Specifications

Fan Module	Description	Airflow	Fan Replacement Duration
QFX5240-2U-FANAO	Four 12.2 V fan modules. The fan modules of 80 mm x 80 mm x 80 mm dimension are hot-insertable and hot-removable FRUs.	Airflow out (AFO), also known as front-to-back or port-to-FRU airflow	2 minutes for ambient temperature of 77 °F (25 °C) . 30 seconds for ambient temperature of 95 °F (35 °C) to 104 °F (40 °C).

QFX5241-64OD and QFX5241-64QD FRUs

Field-replaceable units (FRUs) are switch components that you can replace at your site. The QFX5241-64OD and QFX5241-64QD FRUs are:

- 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 PSUs and fan modules in the QFX5241-64OD and QFX5241-64QD switches are hot-insertable and hot-removable FRUs. That is, you can replace them without turning the switch off or interfering with its functionality. The FRUs such as fan modules and PSUs are installed on the FRU panel at the rear of the QFX5241-64OD and QFX5241-64QD chassis.

Table 8: QFX5241 Field-Replaceable Units

FRUs	Description
QFX5240-2U-FANAO	Fan module, with ports-to-FRUs airflow (front-to-back or AFO airflow)
QFX5240-PWR-AC-AO	AC PSU, 3000 W, ports-to-FRUs airflow (front-to-back or AFO airflow)
QFX5241-PWR-DC-AO	DC PSU, 3000 W, ports-to-FRUs airflow (front-to-back or AFO)
QFX5240-2U-4PRMK	Four-post toolless rack mount kit (RMK)

QFX5241-64OD and QFX5241-64QD Chassis Physical Specifications

The QFX5241-64OD and QFX5241-64QD chassis are rigid sheet-metal structures that house the hardware components.

Table 9: Physical Specifications of QFX5241-64OD and QFX5241-64QD Chassis

Variant	Height	Width	Depth	Weight
QFX5241-64OD-AO	3.46 in. (8.78 cm)	19.03 in. (48.33 cm)	25.51 in. (65 cm)	48.50 lb (22 kg) fully loaded without optics
QFX5241-64QD-AO	3.46 in. (8.78 cm)	19.03 in. (48.33 cm)	25.51 in. (65 cm)	48.50 lb (22 kg) fully loaded without optics
QFX5241-64OD-DO	3.46 in. (8.78 cm)	19.03 in. (48.33 cm)	25.51 in. (65 cm)	48.50 lb (22 kg) fully loaded without optics

Table 9: Physical Specifications of QFX5241-64OD and QFX5241-64QD Chassis *(Continued)*

Variant	Height	Width	Depth	Weight
QFX5241-64QD-DO	3.46 in. (8.78 cm)	19.03 in. (48.33 cm)	25.51 in. (65 cm)	48.50 lb (22 kg) fully loaded without optics
QFX5241-64OD-DO-T2	3.65 in. (9.27 cm)	21.14 in. (53.69 cm)	31.71 in. (80.54 cm)	68.81 lb (31.2 kg) fully loaded without optics
QFX5241-64QD-DO-T2	3.65 in. (9.27 cm)	21.14 in. (53.69 cm)	31.71 in. (80.54 cm)	69 lb (31.29 kg) fully loaded without optics

QFX5241-64OD and QFX5241-64QD Ports Panel

IN THIS SECTION

The ports panel of the QFX5241-64OD and QFX5241-64QD switches have 64 high-speed network ports each. These ports support data transmission speeds of up to 800 Gbps. The 64 ports (numbered 0 to 63) in the QFX5241-64OD support octal small form-factor pluggable (OSFP) transceivers. The 64 ports in the QFX5241-64QD (numbered 0 to 63) support quad SFP double-density (QSFP-DD) transceivers.

For information about the optical transceivers and cables that support 800 Gbps transmission in QFX5241-64OD and QFX5241-64QD, see Hardware Compatibility Tool (HCT).

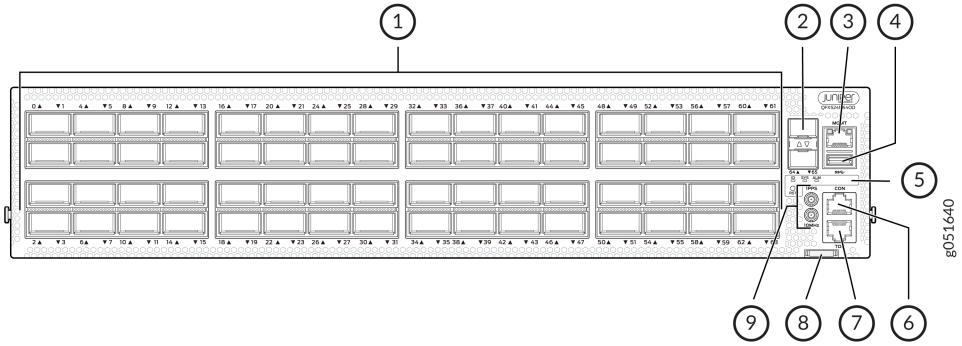
For information about the port configuration and channelization in QFX5241-64OD and QFX5241-64QD, see Port Checker Tool.

Apart from the 64 network ports in the ports panel, both the QFX5241-64OD and QFX5241-64QD switches offer the following ports in the management panel:

- Two SFP28 ports

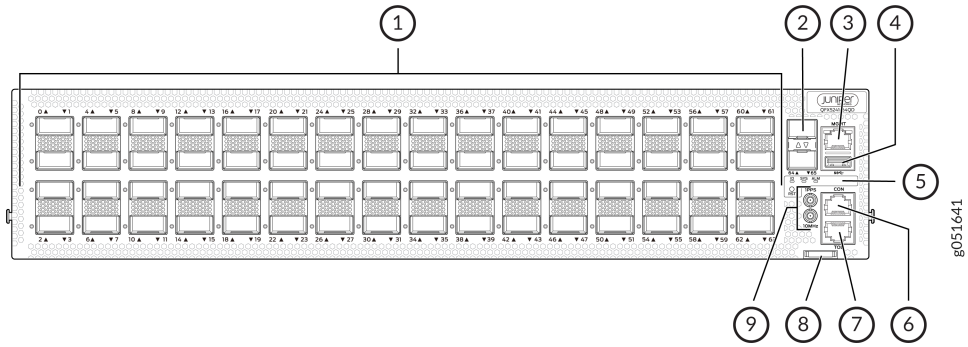
- One USB 3.0 port
- One RJ-45 console (**CON**) port
- One management (**MGMT**) port
- **NOTE**: For information about the ports in management panel, see "QFX5241-64OD and QFX5241-64QD Management Panel" on page 32.

Figure 12: QFX5241-64OD Ports Panel



1– Network ports panel (with 64 800GbE OSFP ports)	6– RJ-45 console port (**CON**)
2– SFP28 ports	7– Time of Delay (**TOD**) port
3– RJ-45 Management port (**MGMT**)	8– Chassis serial number pull-out
4– USB 3.0 port	9– Clock input and output connectors (10 MHz and 1 PPS)
5– Status LEDs (**ID**, **SYS**, **ALM**) and reset (**RST**) button	

Figure 13: QFX5241-64QD Ports Panel

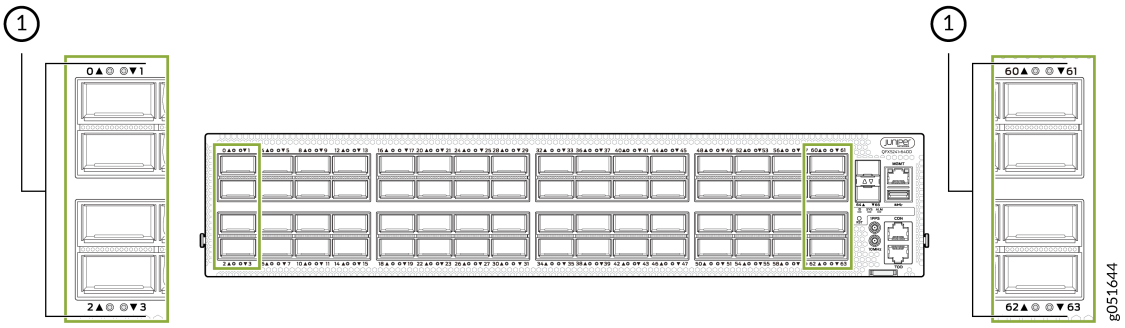


1– Network ports panel (with 64 800GbE OSFP ports)	6– RJ-45 console port (**CON**)
2– SFP28 ports	7– Time of Delay (**TOD**) port
3– RJ-45 Management port (**MGMT**)	8– Chassis serial number pull-out
4– USB 3.0 port	9– Clock input and output connectors (10 MHz and 1 PPS)
5– Status LEDs (**ID**, **SYS**, **ALM**) and reset (**RST**) button	

QFX5241-64OD and QFX5241-64QD Network Port LEDs

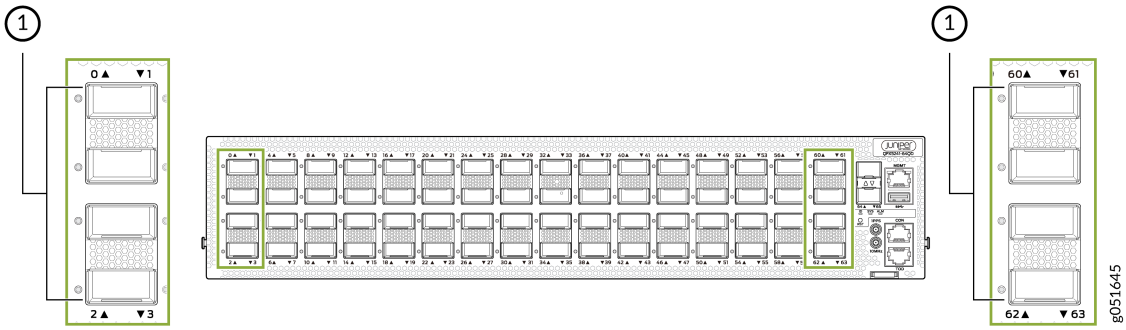
The high-speed OSFP network ports on QFX5241-64OD and the high-speed QSFP-DD network ports on the QFX5241-64QD use a single RGB LED to indicate link status, activity on the link, or a fault condition.

Figure 14: Network Port LEDs on a QFX5241-64OD Switch



1– Network port LEDs	

Figure 15: Network Port LEDs on a QFX5241-64QD Switch



1– Network port LEDs

Table 10 on page 31 explains the behavior of the nonchannelized network ports LEDs of the QFX5241-64OD and QFX5241-64QD switches.

Table 10: QFX5241-64OD and QFX5241-64QD Network Port LEDs

Color	State	Description
Unlit	Off	By default, the LED is unlit, so it is in the Off state. The LED can be unlit even when power is present and a transceiver is present in the port.
		The link is down.
		Transceiver is not installed.
Green	On steadily	A 400/800-Gbps link is established, and there is link activity.
Yellow	On steadily	The link is down or the port experiences a fault other than loss of signal or transceiver hardware failure.

Table 10: QFX5241-64OD and QFX5241-64QD Network Port LEDs *(Continued)*

Color	State	Description
		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 or transceiver has a hardware failure.

QFX5241-64OD and QFX5241-64QD Management Panel

IN THIS SECTION

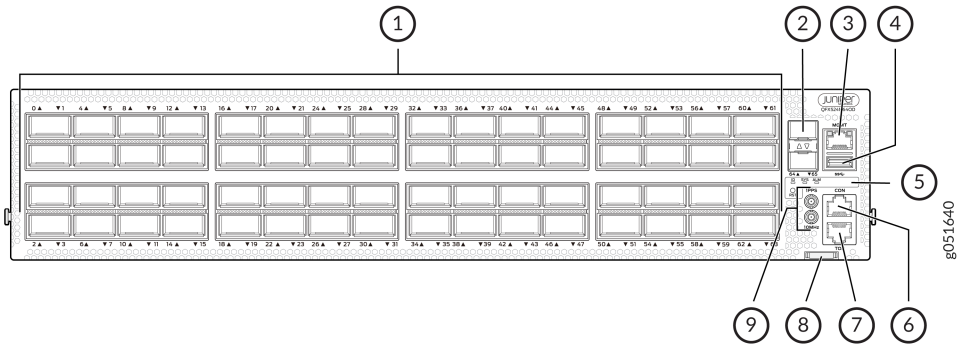
QFX5241-64OD and QFX5241-64QD Management Panel

The management panel is located in the front panel of a QFX5241-64OD or QFX5241-64QD switch. You can find the management panel to the right of the port panel. Apart from the 64 network ports in the ports panel, both the QFX5241-64OD and QFX5241-64QD switches offer the following ports in the management panel:

- Two SFP28 Ports—Supports data transmission speeds of up to 10 Gbps using SFP28 transceivers. The SFP28 ports are numbered 64 and 65.
- One USB 3.0 port—Primarily used for storage and file transfers. For example, use this port to connect a USB drive to perform upgrades, export configuration files, or save log files.

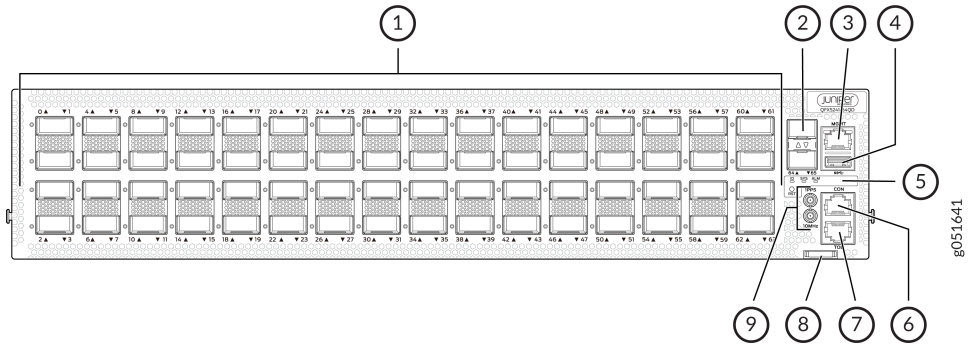
- One RJ-45 console (**CON**) port—Provides direct serial communication with the switch to support tasks such as initial configuration, troubleshooting, and recovery.
- One RJ-45 management (**MGMT**) port—Supports out-of-band management of the switch. The typical use cases include secure management, remote management, monitoring, and logging.

Figure 16: QFX5241-64OD Management Panel



1– Network ports panel (with 64 800GbE OSFP ports)	6– RJ-45 console port (**CON**)
2– SFP28 ports	7– Time of Delay (**TOD**) port
3– RJ-45 Management port (**MGMT**)	8– Chassis serial number pull-out
4– USB 3.0 port	9– Clock input and output connectors (10 MHz and 1 PPS)
5– Status LEDs (**ID**, **SYS**, **ALM**) and reset (**RST**) button	

Figure 17: QFX5241-64QD Management Panel



1– Network ports panel (with 64 800GbE OSFP ports)	6– RJ-45 console port (**CON**)

2– SFP28 ports	7– Time of Delay (**TOD**) port
3– RJ-45 Management port (**MGMT**)	8– Chassis serial number pull-out
4– USB 3.0 port	9– Clock input and output connectors (10 MHz and 1 PPS)
5– Status LEDs (**ID**, **SYS**, **ALM**) and reset (**RST**) button	

QFX5241-64OD and QFX5241-64QD Management Panel LEDs

IN THIS SECTION

The management panel in the QFX5241-64OD and QFX5241-64QD switches has the following LEDs:

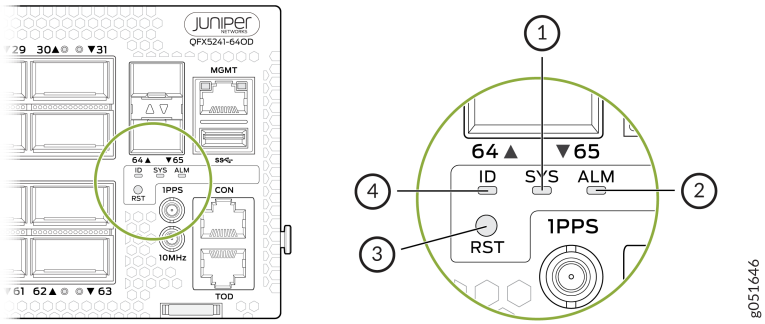
- Chassis Status LEDs
- Management port LEDs
- SFP28 port LEDs

The following sections explain how to interpret these LEDs.

QFX5241-64OD and QFX5241-64QD Chassis Status LEDs

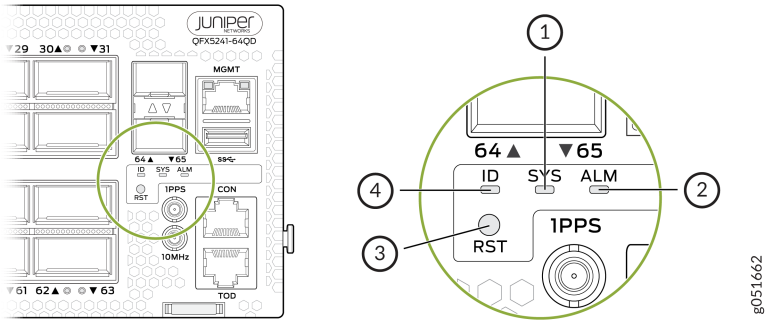
The QFX5241-64OD and QFX5241-64QD switches have three LED types that indicate system status. You can find these LEDs to the right of the network ports (see Figure 18 on page 35 and Figure 19 on page 35).

Figure 18: QFX5241-64OD Chassis Status LEDs



1– **SYS**—System status	3– **RST**—Reset button. You can find the reset button beneath the **ID** LED. The reset button is ***not*** a status LED, although it is located in this panel. **NOTE**: When you use the reset button, the device reboots. However, the existing configuration of the switch does not change. That is, the device does not return to the factory-default configuration.
2– **ALM**—Chassis alarm or fault	4– **ID**—Serves as a locator or identification indicator for the switch

Figure 19: QFX5241-64QD Chassis Status LEDs



1– **SYS**—System status	3– **RST**—Reset button. You can find the reset button beneath the **ID** LED. The reset button is ***not*** a status LED, although it is located in this panel. **NOTE**: When you use the reset button, the device reboots. However, the existing configuration of the switch does not change. That is, the device does not return to the factory-default configuration.
2– **ALM**—Chassis alarm or fault	4– **ID**—Serves as a locator or identification indicator for the switch

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 11: Chassis Status LEDs on QFX5241-64OD and QFX5241-64QD 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.

Table 11: Chassis Status LEDs on QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

Name	Color	State	Description
	Red	On steadily	A major hardware fault has occurred, such as a temperature alarm, power failure, or media failure. The device has halted. Use the CLI commands `show chassis alarms`, `show system alarms`, and `show system errors active detail` to gather information about the error that triggered the alarm. This information helps to decide the recovery steps to perform. To troubleshoot, perform the following: 1. Power off the device by setting the AC power source outlet to the off (**O**) position or by unplugging the AC power cords. 2. Correct any voltage or site temperature issues, and allow the switch to cool down. 3. Power on the device. 4. Monitor the PSU LEDs and fan module LEDs to determine where the error is occurring.

Table 11: Chassis Status LEDs on QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

Name	Color	State	Description
	Yellow	On steadily	A minor system level alarm has occurred, such as a software error or a missing rescue configuration. Use the CLI commands `show chassis alarms`, `show system alarms`, and `show system errors active detail` to gather information about the error that triggered the alarm. This information helps to decide the recovery steps to perform. To troubleshoot, perform the following: 1. Power off the device by setting the AC power source outlet to the off (O) position or by unplugging the AC power cords. 2. Power on the QFX5241-64OD and QFX5241-64QD switches. 3. 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 11: Chassis Status LEDs on QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

Name	Color	State	Description
ID (Identification)	Unlit	Off	The beacon feature is not enabled on the device. 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 device. Disable this feature by using the `request chassis beacon fpc 0 off` operational mode command.

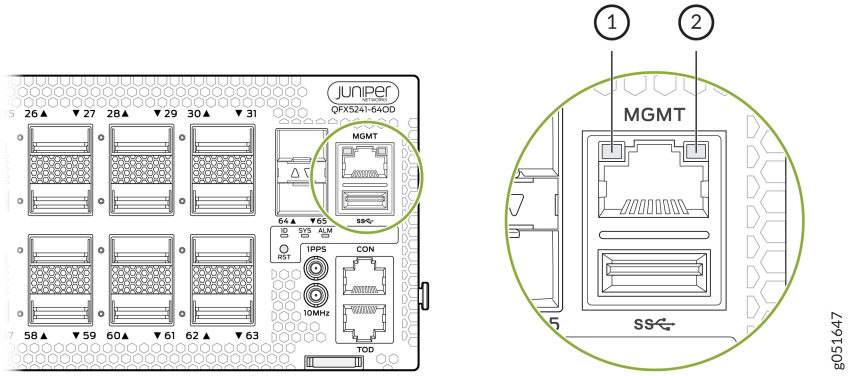
TIP: To know the status of the beacon, use the `show chassis beacon` operational mode command:

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

Management Port LEDs

The RJ-45 management port on the QFX5241-64OD and QFX5241-64QD switches has two LEDs that indicate link status and link activity. The management port is labeled **MGMT**.

Figure 20: Management Port LEDs on QFX5241-64OD and QFX5241-64QD Switches



1– Status LED	2– Link activity LED

Table 12: Management Port LEDs on QFX5241-64OD and QFX5241-64QD Switches

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. However, 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 either 1 Gbps or 100 Mbps.

The management panel also has two SFP28 ports with one LED each.

Table 13: SFP28 Port LEDs on QFX5241-64OD and QFX5241-64QD Switches

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. However, there is no link activity.

Table 13: SFP28 Port LEDs on QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

LED	Color	State	Description
		Blinking or flickering	A link is established, and there is link activity.

QFX5241-64OD and QFX5241-64QD Power System

IN THIS SECTION

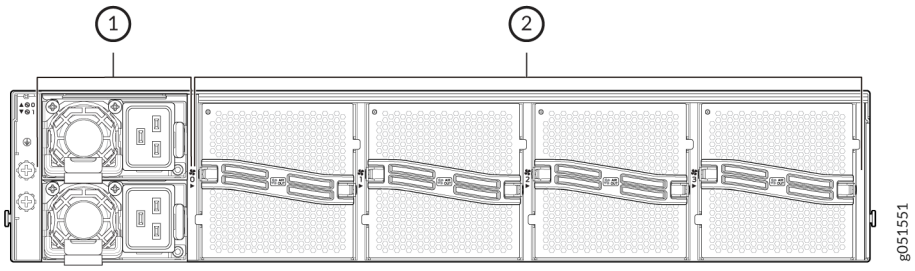
QFX5240-PWR-AC-AO—Two redundant AC power supply units (PSUs) power the AC variant of QFX5241-64OD and QFX5241-64QD switches (with 1 + 1 redundancy). Each QFX5240-PWR-AC-AO PSU provides a maximum output of 3000 W. The PSU modules support airflow out (AFO) cooling, also known as front-to-back or ports-to FRUs airflow. The PSUs are fully redundant and perform load sharing after you install and power on the second PSU. The AC PSUs are hot-removable and hot-insertable field-replaceable units (FRUs). That is, you can remove and replace the PSUs without powering off the switch or disrupting the functioning of the switch.

QFX5241-PWR-DC-AO—Two redundant DC PSUs power the DC variant of QFX5241-64OD and QFX5241-64QD switches (with 1 + 1 redundancy). Each QFX5241-PWR-DC-AO PSU provides a maximum output power of 3000 W. The PSU modules support airflow out (AFO) cooling, also known as front-to-back or ports-to FRUs airflow. The PSUs are fully redundant and perform load sharing after you install and power on the second PSU. The DC PSUs are hot-removable and hot-insertable field-replaceable units (FRUs). That is, you can remove and replace the PSUs without powering off the switch or disrupting the functioning of the switch.

The typical power consumption of the QFX5241-64OD switch is 613 W and the maximum power consumption is 2198 W. The typical power consumption of the QFX5241-64QD switch is 616 W and the maximum power consumption is 2258 W.

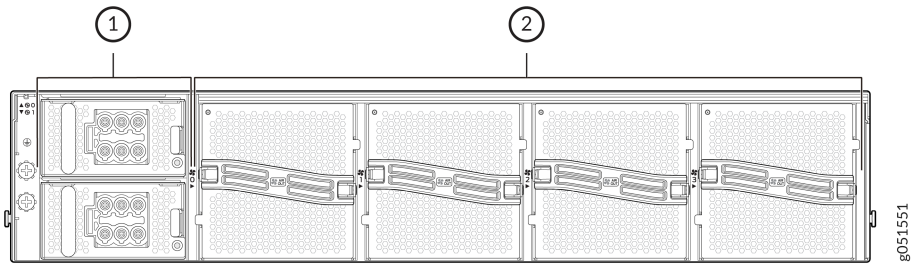
The PSUs for the QFX5241-64OD and QFX5241-64QD switches are located in the FRU panel at the rear of the chassis.

Figure 21: QFX5241-64OD and QFX5241-64QD AC FRU Panel



1– Power supply units (PSUs)	2– Fan modules

Figure 22: QFX5241-64OD and QFX5241-64QD DC FRU Panel



System Electrical Ratings for QFX5241-64OD and QFX5241-64QD Switches

Apart from the individual AC PSU and DC PSU electrical ratings, the QFX5241-64OD and QFX5241-64QD switch models are validated for a specific set of electrical ratings. The models of the QFX5250 switch are rated as follows:

QFX5241-64OD-AO and QFX5241-64QD-AO—The QFX5241-64OD and QFX5241-64QD AC model is rated for an input current of 16 A within an input voltage range of 200 through 240 volts AC (VAC) for each power supply operating within an AC input line frequency of 50 Hz through 60 Hz.

QFX5241-64OD-DO and QFX5241-64QD-DO—The QFX5241-32OD DC model is rated for an input current of 80 A within an input voltage range of -48 volts through -60 volts DC (VDC) for each power supply.

QFX5241-64OD and QFX5241-64QD AC Power Supply Unit Description

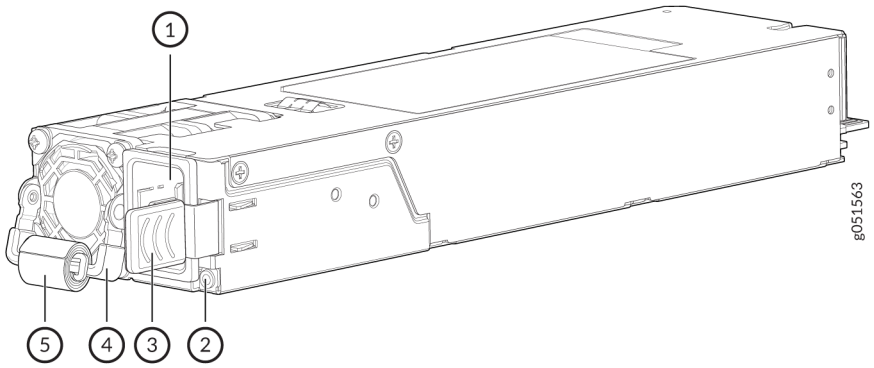
Each 3000-W AC power supply unit (PSU) has a single AC input and provides 12.2 V of output voltage for an AC input current rating of 16 A. The maximum output power of the PSU is 2.8 kilowatt (kW) for the input voltage range of 200 VAC through 215 VAC and 3 kW for the input voltage range of 215 VAC through 240 VAC.

NOTE: At the output power and input voltages provided, you can maintain the input current of the switch within the rated limits.

Table 14: AC Power Specifications for QFX5241-64OD and QFX5241-64QD Switches

Item	Specifications
AC input voltage	Input voltage range: 200 V through 240 V.
AC input current rating	16 A
Output voltage (DC)	12.2 V
Maximum power output	3000 W (for input voltage of 215 VAC through 240 VAC) 2800 W (for input voltage of 200 VAC through 214 VAC)
Maximum power consumption	QFX5241-64OD—2198 W QFX5241-64QD—2258 W
Typical power consumption	QFX5241-64OD—613 W QFX5241-64QD—616 W

Figure 23: AC Power Supply Unit



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

To replace a PSU, see "Maintain the QFX5241-64OD and QFX5241-64QD Power System" on page 122.

AC Power Cord Specifications

We ship detachable AC power cords with the chassis.

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 15 on page 45 lists AC power cord specifications provided.

Table 15: AC Power Cord Specifications

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
US/Europe	250 VAC, 16 A	Straight, C20 (EN 60320) to C19 (EN 60320)-, jumper cord	CG_CBL-C19-C20-2M

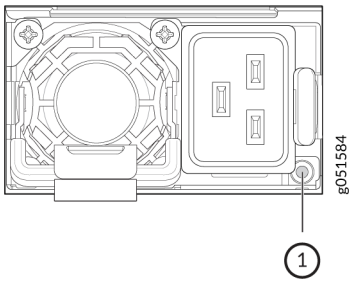
Table 15: AC Power Cord Specifications *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number
India	250 VAC, 16 A	Straight, C20 to C19, jumper cord	CG_CBL-C19-C20-2M
Other Countries (except US, Europe, and India)	250 VAC, 16 A	Straight, C20 to C19, jumper cord	CG_CBL-C19-C20-2M

QFX5241-64OD and QFX5241-64QD AC Power Supply Unit LED

Each QFX5241-64OD and QFX5241-64QD switch PSU has a single LED on the module faceplate to indicate the power status.

Figure 24: QFX5241-64OD and QFX5241-64QD AC PSU LED Location



1. AC PSU LED

The AC PSU uses an amber and green bicolor LED to indicate the operating state.

Table 16: QFX5241-64OD and QFX5241-64QD AC PSU LED Color and State

LED Color and State	Description
Off	The PSU is not receiving AC power.

Table 16: QFX5241-64OD and QFX5241-64QD AC PSU LED Color and State *(Continued)*

LED Color and State	Description
Solid green	The PSU is on and functioning properly.
Blinking green (1 second on, 1 second off, 0.5 Hz)	The PSU is in standby state.
Blinking green (0.25 second on, 0.25 second off, 2 Hz)	The PSU is in redundant or offline mode.
Solid amber	Standby mode with overtemperature protection (OTP) The PSU shuts down because of a critical event such as high temperature, high power, high current, or fan failure.
	Any of the following faults detected at 12.2 V: • Overvoltage Protection (OVP) • Undervoltage Protection (UVP) • Overcurrent Protection (OCP) • Shortcircuit Protection (SCP) • Overtemperature Protection (OTP)
	The PSU fan stops working for more than 15 seconds.

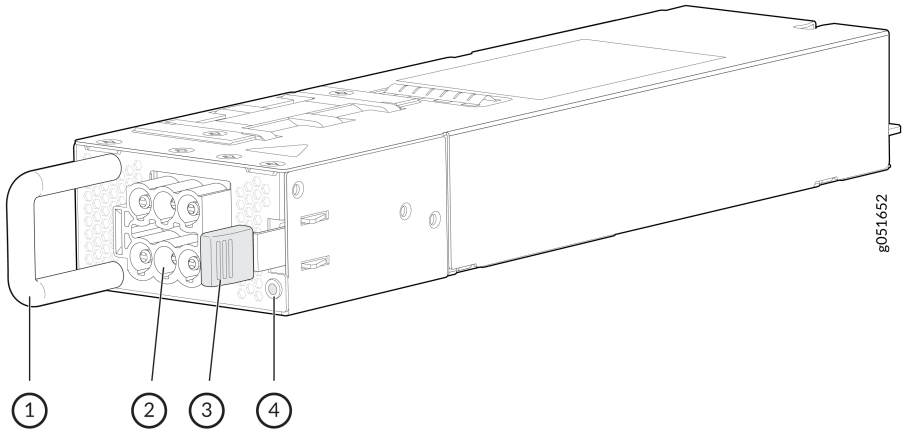
QFX5241-64OD and QFX5241-64QD DC Power Supply Unit Description

The QFX5241-64OD and QFX5241-64QD DC power supply units (PSUs) are hot-removable and hot-insertable FRUs with redundancy (1 + 1). Each PSU has a single DC input and provides 12.2 V of output voltage to the system. The output power of the QFX5241-64OD and QFX5241-64QD DC PSU is 3 KW for the input voltage range of –48 V to –60 V.

Table 17: DC Power Specifications for QFX5241-64OD and QFX5241-64QD Switches

Item	Specifications
DC input voltage	Input voltage range: –48 V through –60 V.
Output voltage (DC to DC)	12.2 V
Input current (for the maximum power output of 3 kW)	80 A (maximum per PSU)
Maximum power output	3000 W

Figure 25: QFX5241-64OD and QFX5241-64QD DC Power Supply Unit



1. Handle
2. Power connector
3. Ejection lever
4. PSU LED

DC Power Cord Specifications

We ship two detachable DC power cords (*DC Power Cable*) with the chassis. The DC power cords have 600 V rating, with 80 A per cord (40 A per pin), and 1.5 m of length. The DC power cords ship with the switch by default.

The DC power cord uses a six-wire DC power connector. This connector employs a six-pin female configuration that interfaces with DC power supply units (PSUs).

The connector pins are arranged in a 2×3 configuration (two rows of three pins). The six wires are organized into two bundles of three conductors each. One bundle (P1, P2, S1) carries negative polarity and negative sensing wire. The other bundle (S2, P3, P4) carries positive polarity and positive sensing wire. The P1, P2, and S1 wires are connected to the negative terminal of the DC source. The P3, P4, and S2 wires are connected to the positive terminal of the DC source. Depending on the installation method and power source configuration, the opposite end of the power cord terminates at the DC power source through ring terminal lugs, a mating connector, or another DC source as appropriate.

Table 18: DC Power Cord Configuration

2x3-Pin Female Connector	Color	Wire	Description
P1	8 AWG (Blue)	W2	Negative (-) bundle
P2	8 AWG (Brown)	W1	Negative (-) bundle
S1	12 AWG (Black)	W3	Negative (-) bundle (Sense Pin)
S2	12 AWG (Red)	W4	Positive (+) bundle (Sense Pin)
P3	8 AWG (Green)	W6	Positive (+) bundle
P4	8AWG (White)	W5	Positive (+) bundle

CAUTION: You must ensure that power connections maintain the proper polarity.

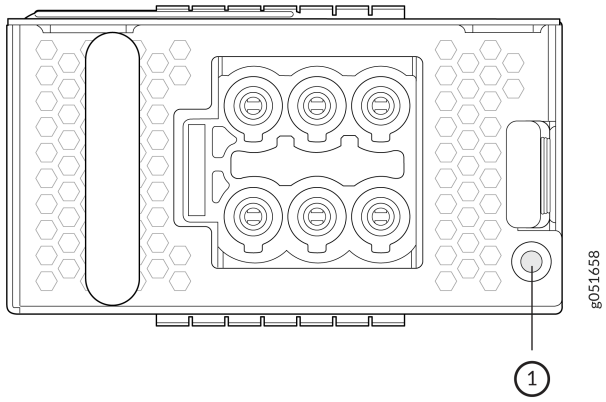
WARNING: For field-wiring connections, use copper conductors only.

Make sure that DC power cables do not block access to the switch components or lie on the ground where people can trip on them.

QFX5241-64OD and QFX5241-64QD DC Power Supply Unit LED

Each QFX5241-64OD and QFX5241-64QD DC power supply unit (PSU) has a bicolor status LED on the PSU faceplate.

Figure 26: QFX5241-64OD and QFX5241-64QD DC PSU LED Status



1. DC PSU LED

The DC PSU uses an amber and green bicolor LED to indicate the operating state.

Table 19: QFX5241-64OD and QFX5241-64QD DC PSU LED Color and State

LED Color and State	Description
Off	The PSU is not receiving DC power.
Solid green	The PSU is on and functioning properly.
Blinking green (1 second on, 1 second off, 0.5 Hz)	The PSU is in standby state.

Table 19: QFX5241-64OD and QFX5241-64QD DC PSU LED Color and State *(Continued)*

LED Color and State	Description
Blinking green (0.25 second on, 0.25 second off, 2 Hz)	The PSU is in redundant or offline mode.
Yellow	Standby mode with overtemperature protection (OTP) The PSU shuts down because of a critical event such as high temperature, high power, high current, or fan failure.
	Any of the following faults detected at 12.2 V: • Overvoltage protection (OVP) • Undervoltage protection (UVP) • Overcurrent protection (OCP) • Shortcircuit protection (SCP) • Overtemperature protection (OTP)
	The PSU fan stops working for more than 15 seconds.

QFX5241-64OD and QFX5241-64QD Cooling System

IN THIS SECTION

QFX5241-64OD and QFX5241-64QD Cooling System Description

IN THIS SECTION

The components of the cooling system work together to keep the switch within the acceptable temperature range. The cooling system consists of the following components:

- "Fan Modules" on page 52
- "Airflow" on page 55
- "Power Supply Cooling System" on page 55

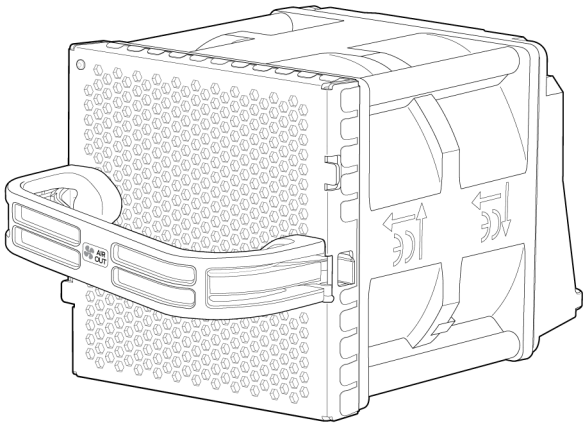
During normal operation, the fans in the fan module operate at moderate or less than full speed. The cooling system offers *N*+1 redundancy for the fan module. If a fan fails or the ambient temperature rises above a threshold, the cooling system of the switch automatically adjusts the speed of the remaining fans. This speed adjustment helps 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.

Fan Modules

The QFX5241-64OD and QFX5241-64QD have 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 the QFX5241-64OD and QFX5241-64QD 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.

Figure 27: Fan Module for QFX5241-64OD and QFX5241-64QD Switches



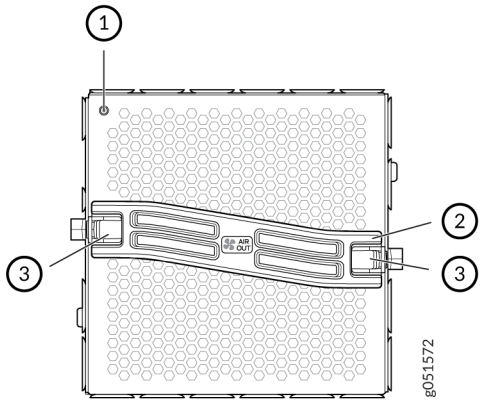
NOTE: The fan speed varies based on the temperature of internal components, optics modules, and the ambient temperature. The maximum speed at which fans operate depends on the ambient temperature that you have set. As the fan speed increases, the power consumed by the fans increases. As a result, the 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 QFX5241-64OD and QFX5241-64QD switches must operate with all the four fan modules installed. If you need to replace a faulty fan module, see "QFX5241-64OD and QFX5241-64QD Fan Module Status LED" on page 53.

QFX5241-64OD and QFX5241-64QD Fan Module Status LED

Each fan module has one bicolor status LED.

Figure 28: Fan Module Components for QFX5241-64OD and QFX5241-64QD Switches



1– Fan module LED	3– Lock release handle
2– Handle	

Table 20 on page 54 describes the behavior of the fan module status LED.

Table 20: Fan Module Status LEDs

Color	State	Description
Green	On steadily	Fan module is functioning normally.
Red	On steadily	Fan module is faulty and malfunctioning.
Unlit	Off	Fan module experiences input power failure.

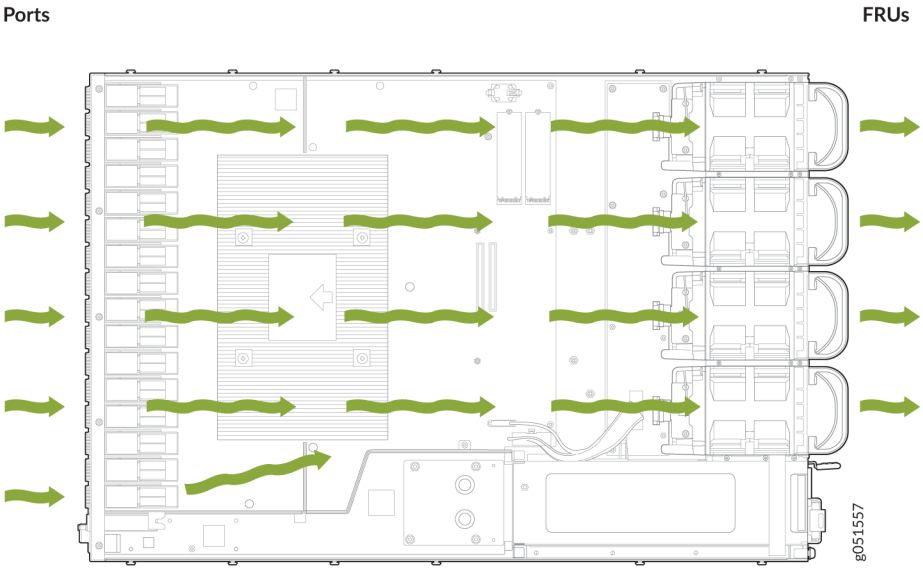
Under normal operating conditions, the fan modules operate at a moderate speed. Temperature sensors in the chassis monitor the temperature within the chassis.

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) airflow design cooling system. The switch pulls air through the front of the chassis toward the fan modules, and exhausts the air from the rear of the switch.

Figure 29: AFO Airflow Through the QFX5241-64OD and QFX5241-64QD Chassis



Power Supply Cooling System

The QFX5241-64OD and QFX5241-64QD PSUs are installed at the rear of the chassis. The PSUs are self-cooling. Each PSU has its own fan and is cooled by its own internal cooling system. The PSUs in QFX5241-64OD and QFX5241-64QD switches support front-to-back airflow (airflow out or AFO).

NOTE: In the QFX5241-64OD and QFX5241-64QD switches, the AC 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 AC PSU fan longevity.

3

CHAPTER

Site Planning, Preparation, and Specifications

IN THIS CHAPTER

QFX5241-64OD and QFX5241-64QD Site Preparation Checklist

The checklist summarizes the tasks you need to perform when preparing a site for installing the QFX5241-64OD and QFX5241-64QD switches.

Table 21: 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 21: 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.			

QFX5241-64OD and QFX5241-64QD Site Guidelines and Requirements

SUMMARY

Your QFX5241-64OD and QFX5241-64QD switches must meet the specified environmental requirements. The switches will function properly if you follow site and wiring guidelines. Ensure that your installation meets the grounding specifications and airflow clearance requirements.

IN THIS SECTION

QFX5241-64OD and QFX5241-64QD Rack Requirements | 65

QFX5241-64OD and QFX5241-64QD Environmental Requirements and Specifications

You must install the switch in a rack. 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. Dust can clog air intake vents and filters, thereby reducing the efficiency of the switch cooling system.
- Maintain ambient airflow to ensure normal operation of the switch. If the switch temperature is not maintained, the temperature monitor of the switch might shut down the device. The switch shuts down to protect its hardware components. The switch might overheat in the following scenarios:
  - The airflow is blocked or restricted
  - The intake air is too warm

Table 22: QFX5241-64OD and QFX5241-64QD Switches Environmental Tolerance

Description	Tolerance
Altitude	With DAC cables: At 32 °F (0 °C) through 104° F (40 °C), no performance degradation occurs up to 6000 ft (1828.8 m)
	With optics: At 32 °F (0 °C) through 104 °F (40 °C), sea level
Relative humidity, operating	Normal operation ensured in the relative humidity range of 5% through 90%, noncondensing

Table 22: QFX5241-64OD and QFX5241-64QD Switches Environmental Tolerance *(Continued)*

Description	Tolerance
Temperature	• Normal operation ensured in the temperature range of 32 °F (0 °C) through 104 °F (40 °C). • nonoperating storage temperature in the shipping container: –40 °F (–40 °C) through 158 °F (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.

QFX5241-64OD and QFX5241-64QD Grounding Cable and Lug Specifications

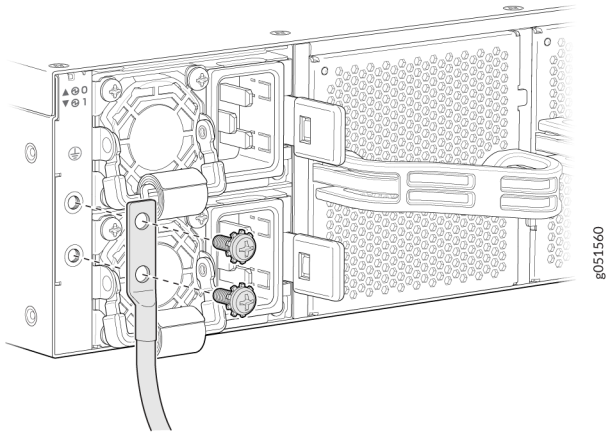
For installations that need a separate chassis grounding conductor to the chassis, you must ground the chassis adequately before connecting power. Proper grounding of the chassis ensures operational correctness and compliance with safety and electromagnetic interference (EMI) requirements.

Ensure that you have a grounding cable and lug with the following specifications:

- Grounding cable—2 AWG , minimum 90° C wire, or as permitted by the local code. (not provided)
- Grounding lug—Panduit LCDXN2-14AF-E or equivalent grounding lug. The grounding lug attaches to the device chassis through the left-front mounting bracket, providing a protective earthing terminal for the device. (not provided)

NOTE: Ground the QFX5241-64OD and QFX5241-64QD switches to earth before you connect power to the device.

Figure 30: Grounding Cable and Lug for QFX5241-64OD and QFX5241-64QD Switches



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. A cable with an incorrectly attached lug can damage the switch.

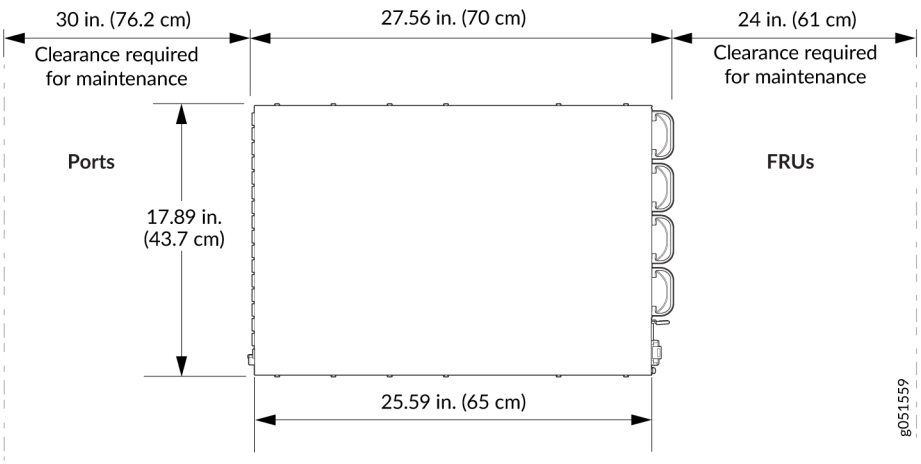
Before connecting the switch to earth ground, review the following information:

- "Clearance Requirements for Airflow and Hardware Maintenance" on page 63
- "Site Electrical Wiring Guidelines" on page 64
- "Rack Requirements" on page 65

QFX5241-64OD and QFX5241-64QD Clearance Requirements for Airflow and Hardware Maintenance

When planning the site for installing the QFX5241-64OD and QFX5241-64QD switches, you must allow sufficient clearance around the installed chassis (see Figure 31 on page 63).

Figure 31: Clearance Requirements for Airflow and Hardware Maintenance for QFX5241-64OD and QFX5241-64QD Switches



- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See "QFX5241-64OD and QFX5241-64QD Cooling System" on page 51 for more information about the airflow through the chassis.

- If you are mounting the QFX5241-64OD and QFX5241-64QD switches in a rack with other equipment, ensure that the exhaust from other equipments does not blow into the intake vents of the chassis.
- To facilitate service personnel movement, provision space of at least 24 in. (61 cm) both in the front and back of the switch. For compliance with NEBS GR-63 standards, leave 30 in. (76.2 cm) of space in front of the rack and 24 in. (61 cm) of space behind the rack.

Site Electrical Wiring Guidelines

Table 23 on page 64 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 23: 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.

Table 23: Site Electrical Wiring Guidelines *(Continued)*

Site Wiring Factor	Guidelines
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.

QFX5241-64OD and QFX5241-64QD Rack Requirements

You can install or mount the AC and DC variants of QFX5241-64OD and QFX5241-64QD switches on a four-post rack using the QFX5240-2U-4PRMK toolless rack mount kit.

Rack requirements for installation using the QFX5240-2U-4PRMK consists of:

- Rack type
- Mounting bracket hole spacing
- Rack size and strength

Table 24: Rack Requirements for the QFX5241-64OD and QFX5241-64QD Switches that Use QFX5240-2U-4PRMK

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. The rack must meet 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.

Table 24: Rack Requirements for the QFX5241-64OD and QFX5241-64QD Switches that Use QFX5240-2U-4PRMK *(Continued)*

Rack Requirement	Guidelines
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:
	  • 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 the European Telecommunications Standards is usually wider than the device's front-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.

Rack connection to building structure	• Secure the rack to the building structure. • If your geographical area is earthquake-prone, then secure the rack to the floor. • Secure the rack to the ceiling brackets as well as wall or floor brackets for maximum stability.

QFX5241-64OD and QFX5241-64QD Network Cables and Transceivers Planning

IN THIS SECTION

Determining QFX5241-64OD and QFX5241-64QD Switches 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 by category, displaying transceivers by interface speed or type.

For information about the optical transceivers and cables that are supported in QFX5241-64OD and QFX5241-64QD, see https://apps.juniper.net/hct/home/.

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 that autonegotiation on the QFX5241-64OD and QFX5241-64QD switches 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 25 on page 68 describes the signals on each fiber. Table 26 on page 69 shows the pin-to-pin connections for proper polarity.

Table 25: QSFP+ and QSFP28 Optical Module Receptacle Pinouts

Fiber	Signal
1	Tx0 (Transmit)
2	Tx1 (Transmit)

Table 25: QSFP+ and QSFP28 Optical Module Receptacle Pinouts *(Continued)*

Fiber	Signal
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 26: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts

Pin	Pin
1	12
2	11
3	10
4	9

Table 26: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts *(Continued)*

Pin	Pin
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 page 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 27 on page 73 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 27: 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
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 Table 27 on page 73. 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 Table 27 on page 73. 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.

QFX5241-64OD and QFX5241-64QD Management Cable Specifications and Pinouts

IN THIS SECTION

Cable Specifications for Console and Management Connections for the QFX Series

Table 28 on page 75 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 28: 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
Management port	Category 5 cable or equivalent suitable for 1000BASE-T operation	328 ft (100 m)	RJ-45

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 29 on page 76 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 29: 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
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.

Table 30 on page 77 provides the pinout information for the RJ-45 console connector.

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.

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 30: 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

OSFP Port Connector Pinout Information

Table 31 on page 78 provides the pinout mapping for Octal small form factor pluggable (OSFP) port connectors.

Table 31: OSFP Network Port Pinout Mapping

Pin	Symbol	Description
1	GND	Ground
2	TX2p	Transmitter data non-inverted CML-I
3	TX2n	Transmitter data inverted CML-I
4	GND	Ground
5	TX4p	Transmitter data non-inverted CML-I
6	TX4n	Transmitter data inverted CML-I
7	GND	Ground
8	TX6p	Transmitter data non-inverted CML-I
9	TX6n	Transmitter data inverted CML-I
10	GND	Ground
11	TX8p	Transmitter data non-inverted CML-I
12	TX8n	Transmitter data inverted CML-I
13	GND	Ground
14	SCL	2-wire serial interface clock LVCMOS-I/O
15	VCC	+3.3V power
16	VCC	+3.3V power

Table 31: OSFP Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
17	LPWn/PRSn	Low-power mode/module present
18	GND	Ground
19	RX7n	Receiver data inverted CML-O
20	RX7p	Receiver data non-inverted CML-O
21	GND	Ground
22	RX5n	Receiver data inverted CML-O
23	RX5p	Receiver data non-inverted CML-O
24	GND	Ground
25	RX3n	Receiver data inverted CML-O
26	RX3p	Receiver data non-inverted CML-O
27	GND	Ground
28	RX1n	Receiver data inverted CML-O
29	RX1p	Receiver data non-inverted CML-O
30	GND	Ground
31	GND	Ground
32	RX2p	Receiver data non-inverted CML-O
33	RX2n	Receiver data inverted CML-O
34	GND	Ground
35	RX4p	Receiver Data Non-Inverted CML-O

Table 31: OSFP Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
36	RX4n	Receiver data inverted CML-O
37	GND	Ground
38	RX6p	Receiver data non-inverted CML-O
39	RX6n	Receiver data inverted CML-O
40	GND	Ground
41	RX8p	Receiver data non-inverted CML-O
42	RX8n	Receiver data inverted CML-O
43	GND	Ground
44	INT/RSTn	Module interrupt/module reset
45	VCC	+3.3V power
46	VCC	+3.3V power
47	SDA	2-wire serial interface data LVCMOS-I/O
48	GND	Ground
49	TX7n	Transmitter data inverted CML-I
50	TX7p	Transmitter data non-inverted CML-I
51	GND	Ground
52	TX5n	Transmitter data inverted CML-I
53	TX5p	Transmitter data non-inverted CML-I
54	GND	Ground

Table 31: OSFP Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
55	TX3n	Transmitter data inverted CML-I
56	TX3p	Transmitter data non-inverted CML-I
57	GND	Ground
58	TX1n	Transmitter data inverted CML-I
59	TX1p	Transmitter data non-inverted CML-I
60	GND	Ground

QSFP-DD Port Connector Pinout Information

Table 32 on page 81 provides the pinout mapping for quad SFP double-density (QSFP-DD) port connectors.

Table 32: QSFP-DD Network Port Pinout Mapping

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

Table 32: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
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
18	RX1n	Receiver inverted data output
19	GND	Ground
20	GND	Ground

Table 32: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
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
33	TX3p	Transmitter non-inverted data input
34	TX3n	Transmitter inverted data input
35	GND	Ground

Table 32: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
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
48	VCC	+3.3 V power supply
49	TBD	Reserved
50	TBD	Reserved

Table 32: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
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
63	RX8p	Receiver non-inverted data output
64	GND	Ground
65	NC	No connect

Table 32: QSFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
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

Table 33 on page 87 provides the pinout mapping for the quad small-form factor pluggable (QSFP) connectors QSFP+, QSFP28, and QSFP56.

Table 33: 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
14	RX3p	Receiver non-inverted data output
15	RX3n	Receiver inverted data output

Table 33: QSFP+, QSFP28, and QSFP56 Port Connector Pinout Mappng *(Continued)*

Pin	Symbol	Description
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
29	VccTx	+3.3 V power supply transmitter
30	Vcc1	+3.3 V power supply

Table 33: QSFP+, QSFP28, and QSFP56 Port Connector Pinout Mappng *(Continued)*

Pin	Symbol	Description
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

Table 34 on page 89 provides the pinout mapping for small-form factor pluggable (SFP) connectors, SFP+ connectors, and SFP28 connectors.

Table 34: SFP, SFP+, and SFP28 Port Connector Pinout Mapping

Pin	Symbol	Description
1	VeeT	Transmitter ground
2	TX_Fault	Transmitter fault indication

Table 34: SFP, SFP+, and SFP28 Port Connector Pinout Mapping *(Continued)*

Pin	Symbol	Description
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
16	VccT	Transmitter power supply
17	VeeT	Transmitter ground

Table 34: SFP, SFP+, and SFP28 Port Connector Pinout Mapping *(Continued)*

Pin	Symbol	Description
18	TD+	Transmitter non-inverted DATA in
19	TD-	Transmitter inverted DATA in
20	VeeT	Transmitter ground

USB Port Specifications for the QFX Series

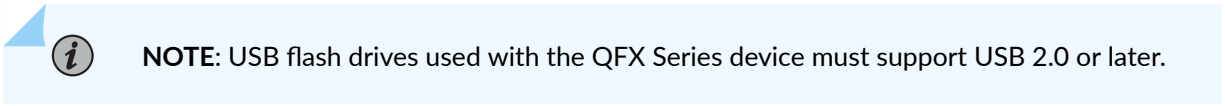
The following Juniper Networks USB flash drives have been tested and are officially supported for the USB port in QFX Series devices:

- 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.

CHAPTER 4

Initial Installation and Configuration

IN THIS CHAPTER

Unpack and Install the QFX5241-64OD and QFX5241-64QD Switches

IN THIS SECTION

Unpack QFX5241-64OD and QFX5241-64QD Switches

The chassis of QFX5241-64OD and QFX5241-64QD switches are rigid sheet-metal structures that house the hardware components. We ship the QFX5241-64OD and QFX5241-64QD switches in a cardboard carton, secured with foam packing material.

CAUTION: The QFX5241-64OD and QFX5241-64QD switches are maximally protected inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack the QFX5241-64OD and QFX5241-64QD switches:

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 35 on page 95 lists the inventory of components supplied with the QFX5241-64OD and QFX5241-64QD.
6. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Table 35: Inventory of Components Supplied with QFX5241-64OD and QFX5241-64QD Switches

Component	Quantity
Chassis	1
Fan modules	4, factory installed
Power supply units (PSUs): • QFX5240-PWR-AC-AO • QFX5241-PWR-DC-AO	2, factory installed

• Rack mount kit, QFX5240-2U-4PRMK, for the following switch variants:
  • QFX5241-64OD-AO
  • QFX5241-64QD-AO
  • QFX5241-64OD-DO
  • QFX5241-64QD-DO
	1
	1

Rack mount kit, QFX5240-2U-4PRMK, is composed of the following: **NOTE**: The order number for a spare rack mount kit is QFX5240-2U-4PRMK.	
Inner rail brackets Slider rail brackets Outer rail brackets Flathead screws (Phillips, I-M4x4L) Flathead screws (Phillips, M5x13.0L) Round hole pins	2 2 2 4 (two spare screws) 2 8 (for round hole racks)

Table 35: Inventory of Components Supplied with QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

Component	Quantity
Rack mount assembly drawing (part of the QFX5240-2U-4PRMK rack mount kit)	1
Power cords with plugs appropriate to your geographical location	2
Documentation roadmap card	1
Warranty	1

NOTE:

- For QFX5241-64OD and QFX5241-64QD switches with AC power supplies, two IEC C19–C20 power cords (*CG_CBL-C19-C20-2M*) of 2 m length ship with the switch by default, instead of region-specific power cables.
- For QFX5241-64OD and QFX5241-64QD switches with DC power supplies, two 6-wire power cords (*DC Power Cable*) of 1.5 m length with 80 A per cable or 40 A per pin and 600 V rating, ship with the switch by default.

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.

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.

Install the QFX5241-64OD and QFX5241-64QD Switches in a Four-Post Rack by Using the QFX5240-2U-4PRMK Rack Mount Kit

IN THIS SECTION

You can install the QFX5241-64OD and QFX5241-64QD switches only in 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 Installation

Before you begin installing the QFX5241-64OD and QFX5241-64QD switches 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 "QFX5241-64OD and QFX5241-64QD Site Preparation Checklist" on page 58.
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 35 on page 95, ensure that you have the following parts and tools available that are not normally provided with the device to install the switch in a rack:
   - ESD grounding strap
   - Appropriate screwdriver for the installation 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: The QFX5241-64OD and QFX5241-64QD switches require 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 QFX5241-64OD and QFX5241-64QD switches above 60 in. (152.4 cm) from the floor, we recommend that you remove the power supply units and fan modules to minimize the weight before attempting to install the device.

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

Install the QFX5241-64OD and QFX5241-64QD Switches 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

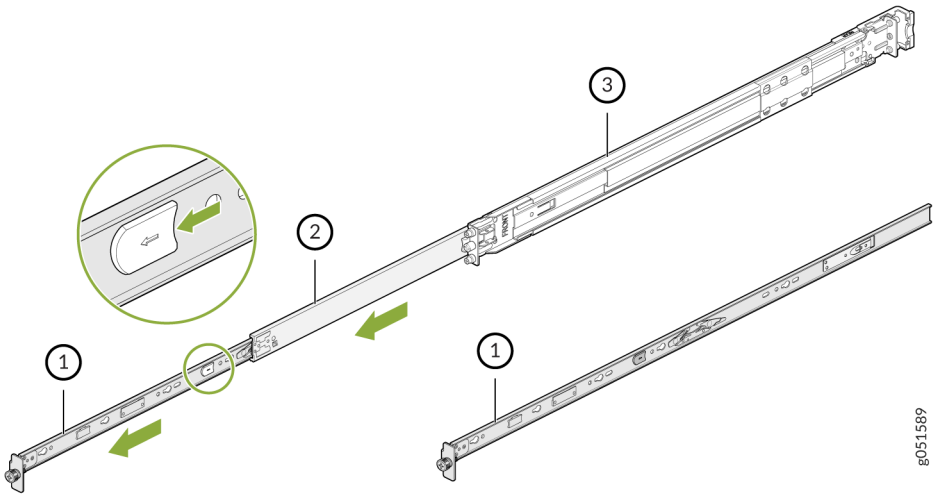
Parts of the Slide Rail Assembly

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.
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.



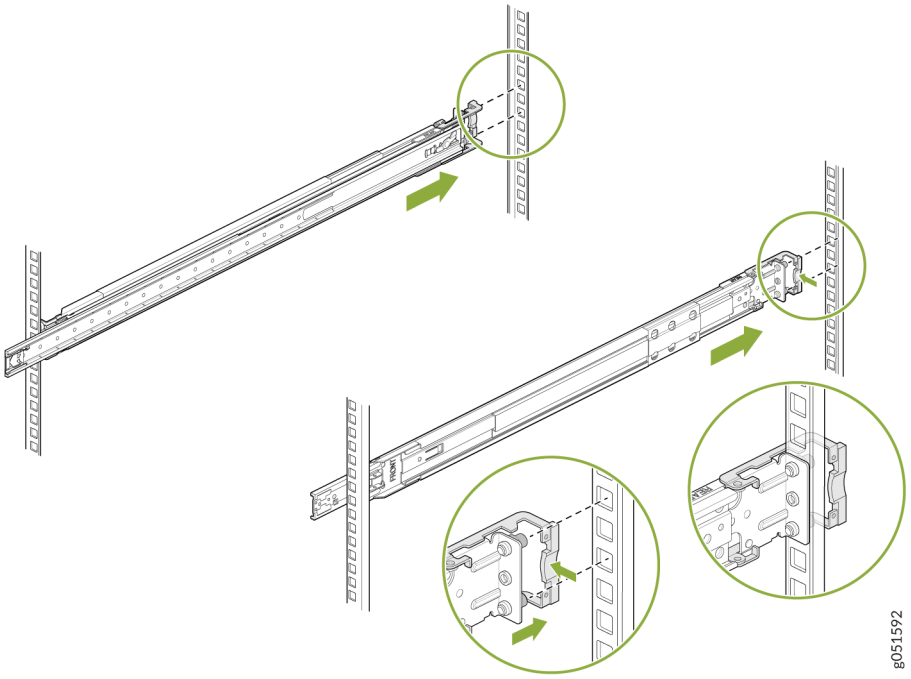
- 1—Inner rail bracket
- 2—Slider rail
- 3—Outer rail

4. Install the inner rail that you removed from the rail assembly on to the switch chassis using the M4 screws.
5. Press the latch on the slider rail down and retract the slider rail into the slide rail assembly.

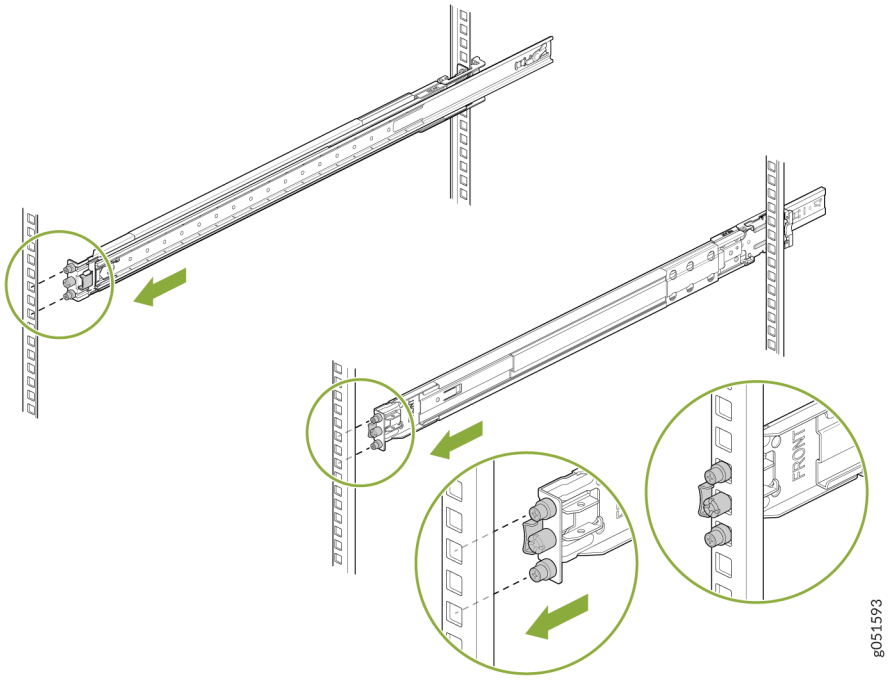
Install the Slider Rail and Outer Rail Assembly in the Rack

1. Move the latch on the rear end of the rail assembly to the open position.
2. Align the rear end of the outer rail with the rear rack-post holes that you want to use. The installation pegs on the outer rail enter the rack-post holes from the inside of the rack post.
3. Push the outer rail rear installation pegs into the rear rack-post holes. You will hear a click.
4. Move the latch to the close position. The rear bracket of the outer rail wraps around the outside of the rear rack post.

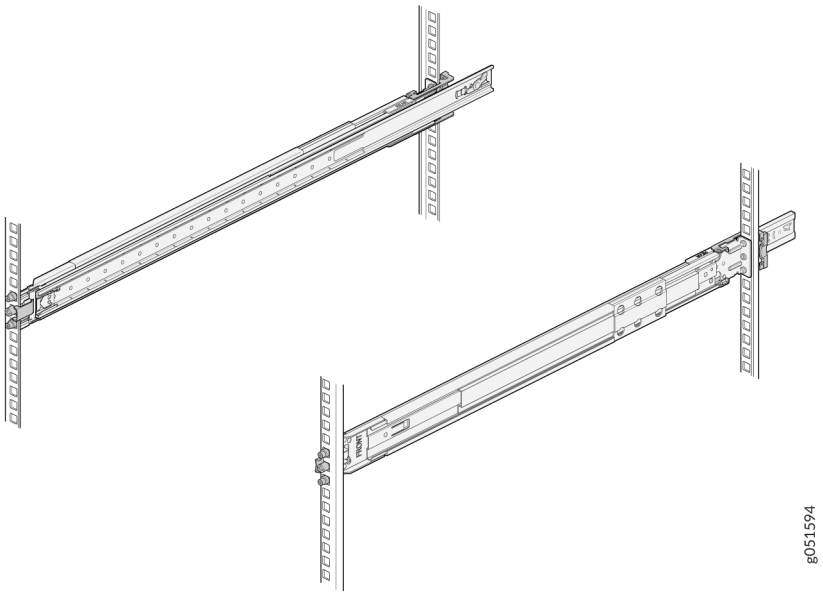
> **NOTE**: The rear end of the outer rail assembly is fastened to the rear rack-post using M5x13.0L screws.



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.

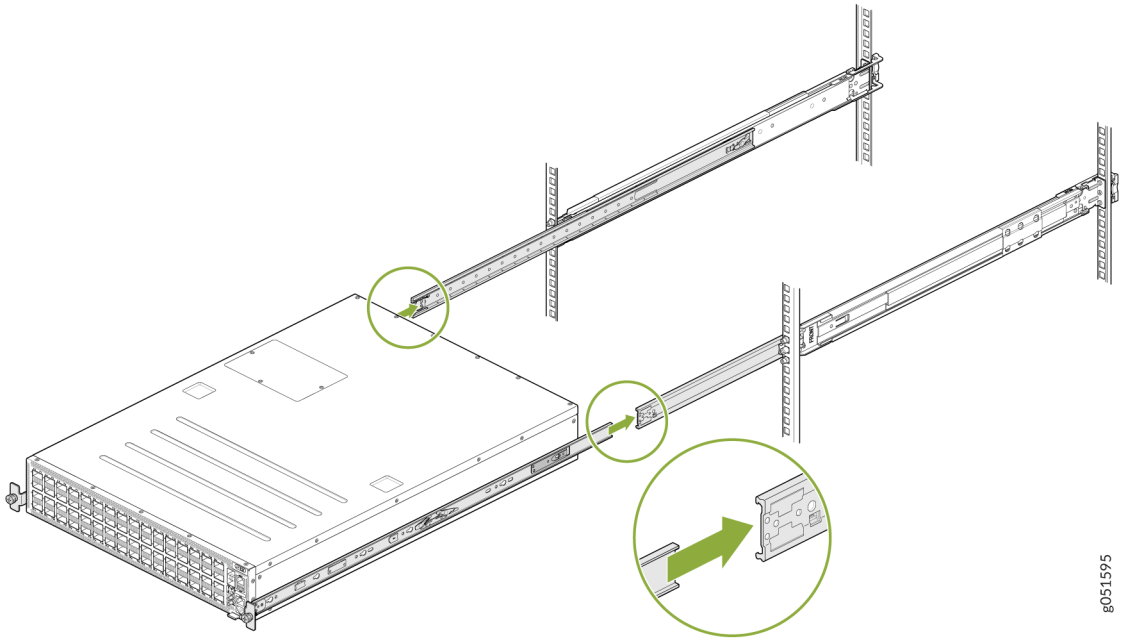


6. The slide rail assembly is fully installed. Verify that both the slide rail assemblies are at the same height on the rack posts and are level front-to-back.

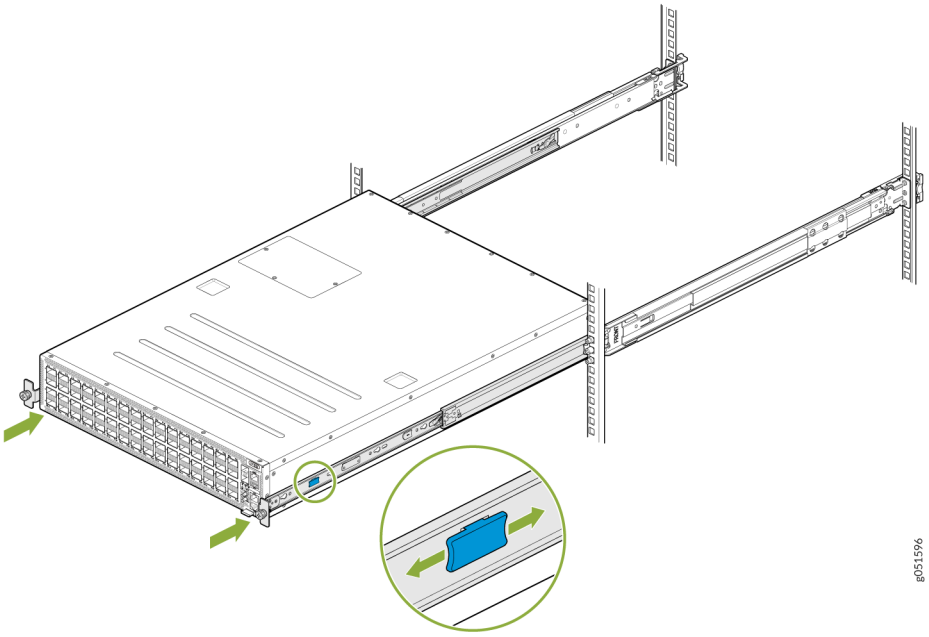


Install the Switch in the Rack

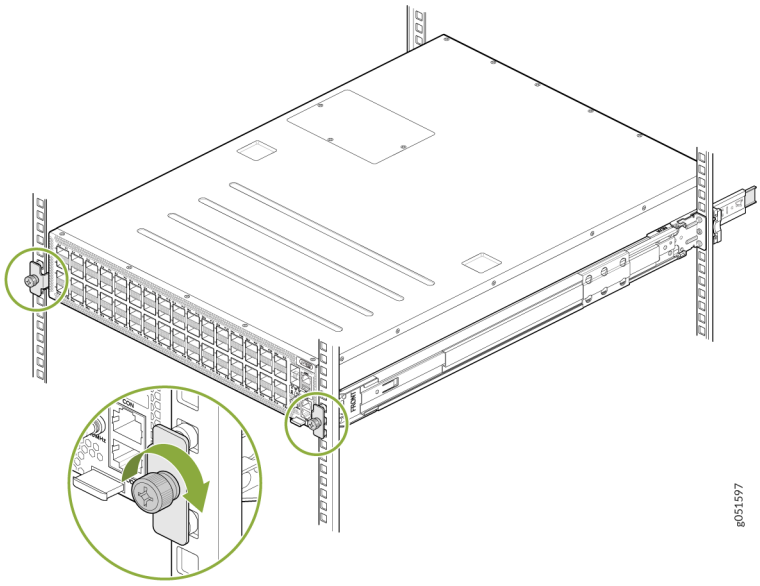
1. Pull the slider rails out to their full extended lock position, and ensure that the ball bearing retainer is located at the front of the slider rail.
2. Lift the switch and align the rear of the inner rail brackets with the front ends of the slider rails on the rack.



3. Push the inner rail brackets into the slider rails until you can no longer proceed. After you hit a stop, pull or push the blue release tab on the inner rail brackets.



4. Tighten the two thumbscrews to secure the switch to the rack.



Connect the QFX5241-64OD and QFX5241-64QD Switches to Power

IN THIS SECTION

Ground the QFX5241-64OD and QFX5241-64QD Switches

You must connect QFX5241-64OD and QFX5241-64QD switches to earth ground before you connect it to power. Grounding helps your switch meet safety and EMI requirements and ensures proper switch functioning (or operation).

You must install QFX5241-64OD and QFX5241-64QD switches in a restricted-access location and ensure that the chassis is always properly grounded. QFX5241-64OD and QFX5241-64QD switches come with a two-hole protective grounding terminal provided on the chassis. See Figure 32 on page 105. 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. The system is tested to meet or exceed all applicable EMC regulatory requirements for 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.

NOTE: Install 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 (not provided)—2 AWG, minimum 90° C wire, or as permitted by the local code.

- A grounding lug (not provided)—Panduit LCDXN2-14AF-E or equivalent grounding lug. The grounding lug attaches to the device chassis through the left-front mounting bracket, providing a protective earthing terminal for the device.
- Two M6 screws with star washers (not provided)
- Phillips (+) screwdriver, number 2
- ESD grounding strap (not provided)

To ground the QFX5241-64OD and QFX5241-64QD switches:

1. Wrap and fasten one end of the electrostatic discharge (ESD) grounding strap around your bare wrist, and connect the other end to a site ESD point or to the ESD point on your device.
2. Connect one end of the grounding cable to an appropriate earth ground site, such as the mounting rack.
3. Remove the two M6 screws and star washers from the earthing terminal on the left side of the power supply unit (PSU) slots.
4. Place the Panduit LCDXN2-14AF-E or equivalent grounding lug attached to the grounding cable over the protective earthing terminal.
5. Secure the grounding lug to the protective earthing terminal with the M6 screws and star washers.

Figure 32: Connect a Grounding Cable to the QFX5241-64OD and QFX5241-64QD AC Switches

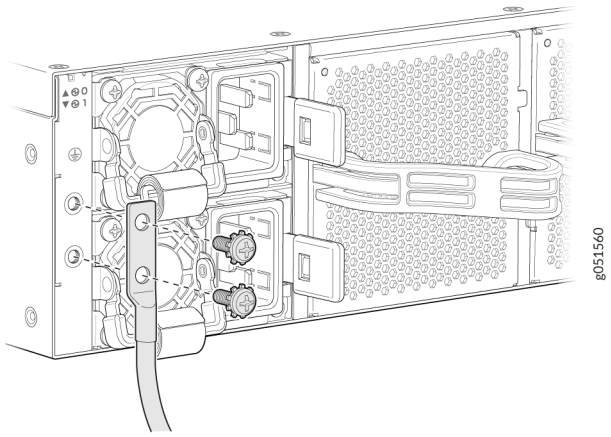
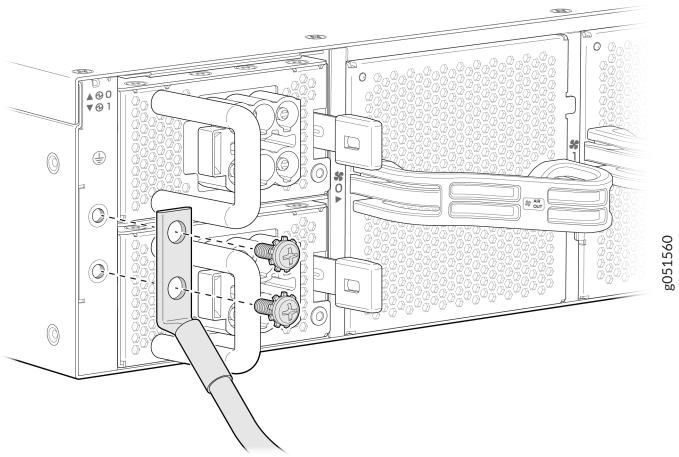


Figure 33: Connect a Grounding Cable to the QFX5241-64OD and QFX5241-64QD DC Switches



6. Dress the grounding cable to ensure safety.

> **NOTE:**
>
> - The grounding cable must not touch other device components or obstruct access to the device.
> - Arrange the cable such that it does not drape in areas where people could trip over it.

To gain additional grounding for the chassis of your QFX5241-64OD and QFX5241-64QD switches, connect the PSU in the switch into a grounded power outlet. Use a power cord appropriate for your geographical location.

Connect AC Power to QFX5241-64OD and QFX5241-64QD Switches

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. See "Ground the QFX5241-64OD and QFX5241-64QD Switches" on page 104

CAUTION: Before you connect power to the switch, a licensed electrician must attach a cable lug to the grounding 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 QFX5241-64OD and QFX5241-64QD Switches" on page 104. The switch gains additional grounding when you plug the PSU in the switch into a grounded power outlet by using the AC power cord appropriate for your geographical location.

- Install the power supply units (PSUs) in the chassis. For instructions on installing the PSU in the QFX5241-64OD and QFX5241-64QD switches, see "Install an AC Power Supply Unit in QFX5241 Switches" on page 122.

Both the QFX5241-64OD and QFX5241-64QD switches ship from the factory with two preinstalled AC PSUs. The AC PSUs offer 1+1 redundancy. The PSUs are hot-removable and hot-insertable field-replaceable units (FRUs). You can replace a PSU in the slots adjacent to the fan modules without powering off the switch or disrupting its operation.

NOTE: Each PSU must be connected to a dedicated power source outlet.

To connect AC power to the QFX5241-64OD and QFX5241-64QD switches:

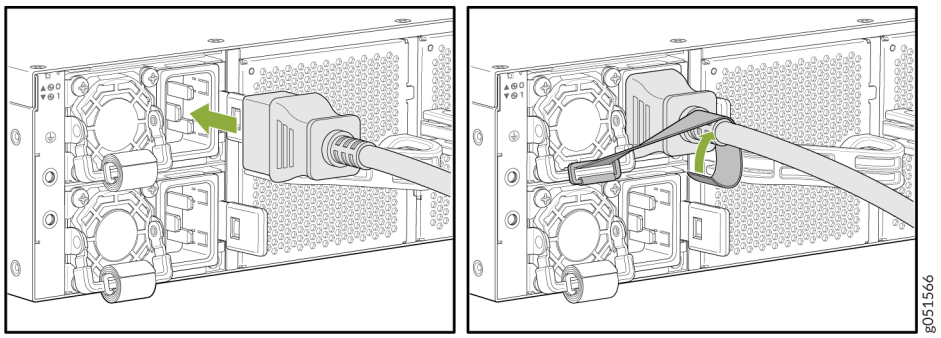
1. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end to a site ESD point.
2. Ensure that the PSUs are fully inserted in the chassis and the latches are secure.
3. Locate the power cords shipped with the switch; the cords have plugs appropriate for your geographical location. See "AC Power Cord Specifications" on page 45.

   For each PSU:

   a. Connect the AC power cord. Insert the power cord coupler firmly into the AC inlet on the PSU faceplate.

   b. Fasten the power cord using the strap provided on the PSU. See Figure 34 on page 108.

Figure 34: Connect the AC Power Cord



c. Connect a dedicated customer-site two-pole circuit breaker for each PSU. We recommend that you use a dedicated customer-site circuit breaker rated for 20 A (250 V), 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. The device does not have a power switch.

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 status LEDs on each PSU are lit green.

   If the status LED is lit amber, disconnect the power cords from the PSU and replace the PSU. See "Maintain the QFX5241-64OD and QFX5241-64QD Power System" on page 122.

   Remove the PSU from the switch only when you have a replacement PSU ready. The PSUs must be installed in the switch to ensure proper airflow.

Connect DC Power to QFX5241-64OD and QFX5241-64QD Switches

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

Before you begin connecting DC 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. See "Ground the QFX5241-64OD and QFX5241-64QD Switches" on page 104.

  CAUTION: Before you connect power to the switch, a licensed electrician must attach a cable lug to the grounding cable 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 QFX5241-64OD and QFX5241-64QD Switches" on page 104. The switch gains additional grounding when you plug the PSU in the switch into a grounded power outlet by using the DC power cord appropriate for your geographical location.

- Install the PSUs in the chassis. For instructions on installing DC PSUs in the QFX5241-64OD and QFX5241-64QD switches, see "Install a Power Supply Unit in QFX5241-64OD and QFX5241-64QD Switches" on page 125.

NOTE: You must connect the switch only to an isolated DC power source with an output voltage range from –40 V DC to –72 V DC. Wiring from an isolated DC power source that connects to the switch must remain inside the building.

The QFX5241-64OD and QFX5241-64QD switches ship from the factory with two preinstalled DC PSUs. The DC PSUs offer 1+1 redundancy. One PSU powers the switch, while the other serves as a backup. If the primary PSU encounters an issue, the backup PSU powers the switch.

The PSUs are hot-removable and hot-insertable field-replaceable units (FRUs). You can replace a PSU in the slots adjacent to the fan modules without powering off the switch or disrupting its operation.

NOTE: Each PSU must be connected to a dedicated power source outlet.

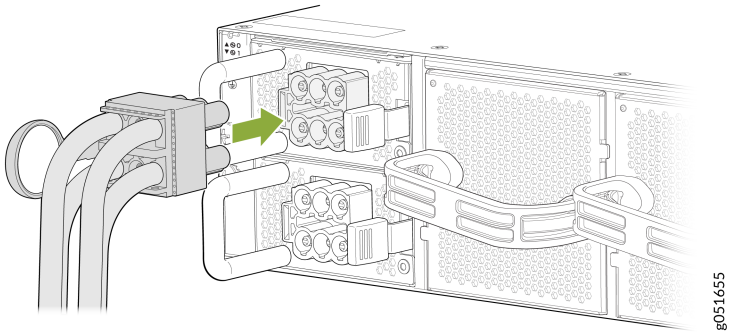
To connect DC power to the QFX5241-64OD and QFX5241-64QD switches:

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. Ensure that the PSUs 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 "DC Power Cord Specifications" on page 49.

   To connect each PSU to a power source:

a. Insert the power cord connector firmly into the DC inlet on the PSU faceplate. See Figure 35 on page 110.

Figure 35: Connect the DC Power Cord



The latch on the power cord connector locks into the corresponding slot on the PSU faceplate.

b. Connect a dedicated customer-site two-pole circuit breaker for each PSU. We recommend that you use a dedicated customer-site circuit breaker rated for 80 A (–48 V to –60 V) or as required by local code.

4. If the DC 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. The switch does not have a power switch.

5. Insert the power cord plug into a DC power source outlet.
6. If the DC power source outlet has a power switch, set it to the on (|) position.
7. Verify that the status LEDs on each PSU are lit green.

   If the status LED is amber, remove power from the PSU and replace the PSU. See "Maintain the QFX5241-64OD and QFX5241-64QD Power System" on page 122.

   Remove the PSU from the switch only when you have a replacement PSU ready. The PSUs must be installed in the switch to ensure proper airflow.

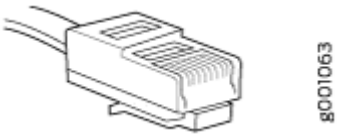
Connect the QFX5241-64OD and QFX5241-64QD Switches to External Devices

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.

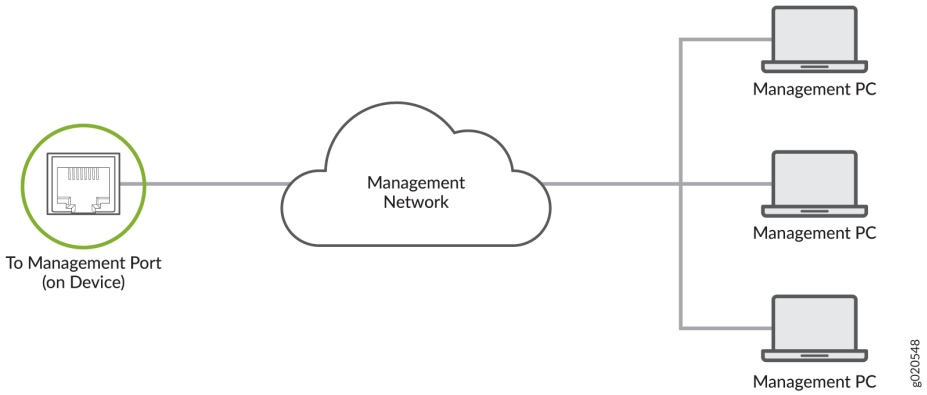
Figure 36: RJ-45 Connector on an Ethernet Cable



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:

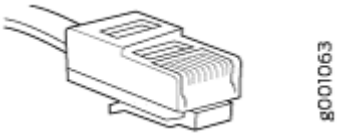
1. Connect one end of the Ethernet cable to the management port on the device.
2. Connect the other end of the Ethernet cable to the management device.



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 37: RJ-45 Connector on an Ethernet Cable



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 38 on page 113) or management console (see Figure 39 on page 113).

Figure 38: Connect a Device to a Management Console Through a Console Server

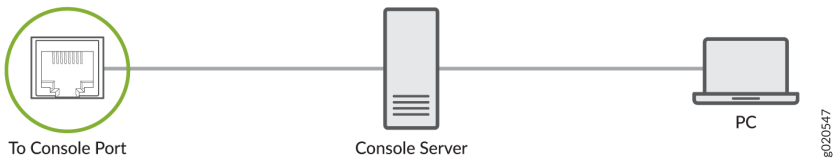


Figure 39: Connect a Device Directly to a Management Console

Perform Initial Software Configuration for QFX5241-64OD and QFX5241-64QD Switches

Before you connect and configure QFX5241-64OD and QFX5241-64QD switches, 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 QFX5241-64OD and QFX5241-64QD switches 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 the following:

- Dynamic Host Control Protocol (DHCP) server—Provides the location of the software image and configuration files on the network.
- File Transfer Protocol (anonymous FTP), Hypertext Transfer Protocol (HTTP), Hypertext Transfer Protocol Secure (HTTPS), or Trivial File Transfer Protocol (TFTP) server—Stores the software image and configuration files.

For more information about using ZTP for provisioning the device, see Understanding Zero Touch Provisioning in the *Installation and Upgrade Guide*.

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 an RJ-45-to-DB-9 adapter. The console (**CON**) port is located on the right side of the port panel, below the **MGMT** port.

NOTE: We no longer include the RJ-45 console cable with the DB-9 adapter as part of the device package. Check if any of the console cables and adapters are included in your device package. If you need a console cable or 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.

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 QFX5241-64OD and QFX5241-64QD switches, the management port `re0:mgmt-0` is the RJ-45 port on the top 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 the Telnet service.

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

NOTE: When Telnet is enabled, you cannot log in to QFX5241-64OD and QFX5241-64QD switches 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

IN THIS CHAPTER

Maintain the QFX5241-64OD and QFX5241-64QD Cooling System

IN THIS SECTION

The fan modules in the QFX5241-64OD and QFX5241-64QD switches are hot-removable and hot-insertable FRUs. You can remove and replace one of the fan modules without powering off the switch or disrupting switching function.

Remove a Fan Module from QFX5241-64OD and QFX5241-64QD Switches

Before you remove a fan module from QFX5241-64OD and QFX5241-64QD switches, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

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.

Ensure that you have the following parts and tools available to remove the fan module from QFX5241-64OD and QFX5241-64QD switches:

- ESD grounding strap
- Antistatic bag or an antistatic mat
- Replacement fan module

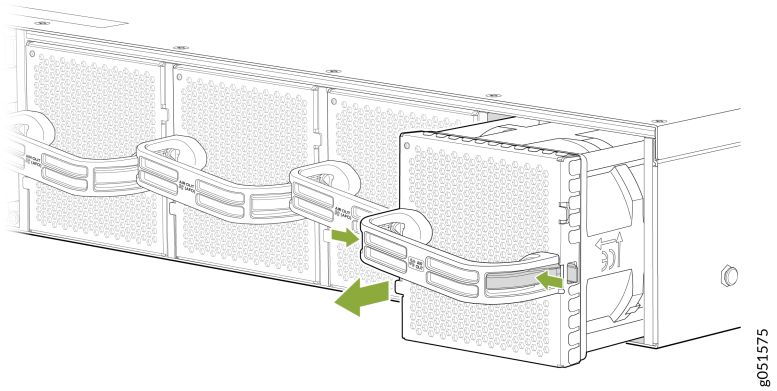
Based on the ambient temperature, the time allowed to replace a fan module in the chassis varies.

Table 36: Time Allowed to Replace a Fan Module

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

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

Figure 40: Remove a Fan Module from QFX5241-64OD and QFX5241-64QD Switches



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 stops spinning, use your other hand to support the fan module 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 QFX5241-64OD and QFX5241-64QD Switches

Before you install a fan module in QFX5241-64OD and QFX5241-64QD switches, ensure that you have taken the necessary precautions to prevent ESD damage.

The fan modules in QFX5241-64OD and QFX5241-64QD switches are hot-removable and hot-insertable FRUs. You can remove and replace them without powering off the switch or disrupting switch functions.

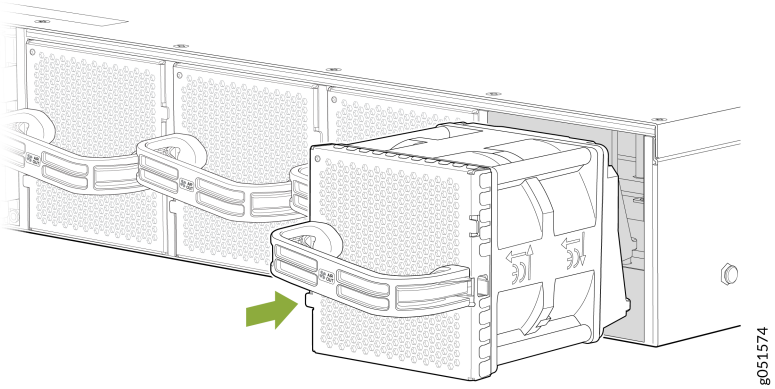
CAUTION: To ensure proper airflow, keep a failed fan module in place until you have a replacement fan module at hand. Do not run the device with an open fan tray slot for an extended amount of time.

NOTE: For the QFX5241-64OD and QFX5241-64QD switches, the fan module provides AFO or front-to-back airflow.

To install a fan module in QFX5241-64OD and QFX5241-64QD switches (see Figure 41 on page 122):

1. 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.
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 41: Install a Fan Module in a QFX5241-64OD and QFX5241-64QD Switches



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 QFX5241-64OD and QFX5241-64QD product variant that supports the same airflow type. See "Maintain the QFX5241-64OD and QFX5241-64QD Power System" on page 122 for more information.

Maintain the QFX5241-64OD and QFX5241-64QD Power System

IN THIS SECTION

QFX5241-64OD and QFX5241-64QD power supply units (PSUs) are hot-removable and hot-insertable FRUs. You can replace PSUs without powering off the switch or disrupting the switching function.

Remove a Power Supply Unit from QFX5241-64OD and QFX5241-64QD Switches

We ship the AC and DC variants of QFX5241-64OD and QFX5241-64QD switches from the factory with two power supply units (PSUs) each.

Before you remove a PSU from QFX5241-64OD and QFX5241-64QD 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 QFX5241-64OD and QFX5241-64QD switches:

- ESD grounding strap
- Antistatic bag or an antistatic mat

To remove a PSU from the QFX5241-64OD and QFX5241-64QD switches:

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.

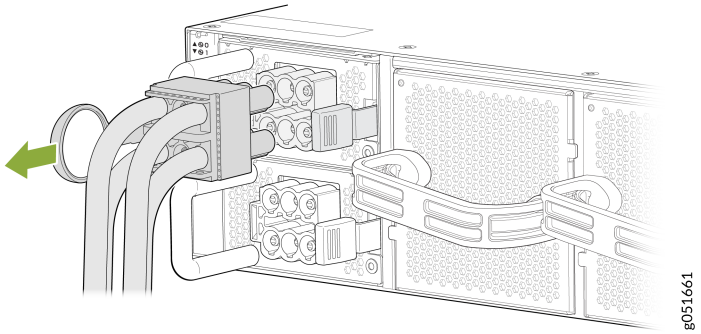
   NOTE: If only one PSU is installed in your QFX5241-64OD and QFX5241-64QD switches, you need to power off the switch before removing the PSU. See "Power Off QFX5241-64OD and QFX5241-64QD Switches" on page 139.

3. Disconnect power to the switch.

   If the power source outlet (AC or DC) has a power switch, set it to the off (**O**) position. If the 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 cord from the PSU faceplate.
   - AC PSU—Detach the power cord retainer and gently pull out the socket end of the power cord connected to the PSU faceplate.
   - DC PSU—Gently pull the circular grip on the pull-tab latch of the power cord to release the lock on the PSU faceplate. Once the lock is released, pull the power cord to detach it from the PSU faceplate.

     CAUTION: Do not pull the circular grip on the pull-tab latch and the DC PSU power cord simultaneously.

Figure 42: Remove the DC PSU Power Cord



5. Press the PSU ejection lever from the side and hold.
6. Grasp the PSU handle and pull firmly to slide the PSU halfway out of the chassis.

Figure 43: Remove an AC PSU from QFX5241-64OD and QFX5241-64QD Switches

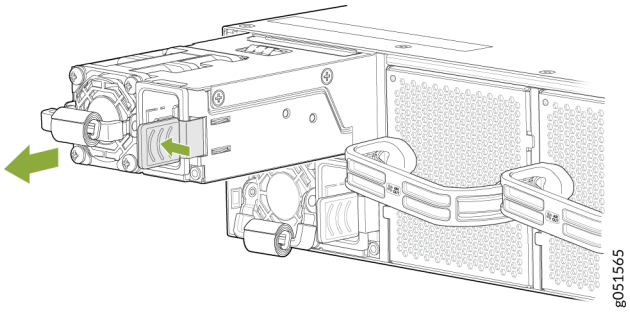
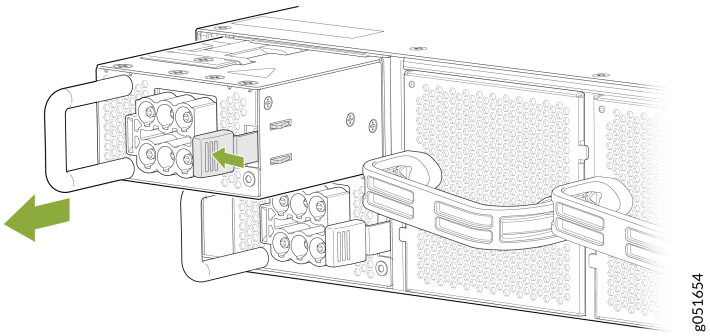


Figure 44: Remove a DC PSU from QFX5241-64OD and QFX5241-64QD Switches



7. Place one hand under the PSU to support it and slide it completely out of the chassis. Take care not to touch the following:
   - PSU components
   - Pins
   - Leads
   - Solder connections
8. Place the PSU in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
9. Replace the PSU with another PSU.

Install a Power Supply Unit in QFX5241-64OD and QFX5241-64QD Switches

- Before you install an AC or a DC PSU in QFX5241-64OD and QFX5241-64QD switches, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.
- Ensure that the airflow direction of the PSU is the same as the chassis. Labels on the PSU handle indicate the direction of airflow. See "QFX5241-64OD and QFX5241-64QD Cooling System" on page 51 for more information.

To install a PSU in QFX5241-64OD and QFX5241-64QD switches:

1. 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.
2. Remove the PSU from its bag, taking care not to touch the following:
   - PSU components
   - Pins
   - Leads
   - Solder connections

> ⚠ **CAUTION**: Verify that the direction of the arrow on the PSU handle matches the direction of airflow in the chassis. Ensure that each PSU 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 PSU has a protective plastic wrap, peel and remove the plastic wrap from all four sides of the PSU.
4. Using both hands, place the PSU in the PSU slot on the FRU panel of the switch and slide it in until it is fully seated.

Figure 45: Install an AC PSU in QFX5241-64OD and QFX5241-64QD Switches

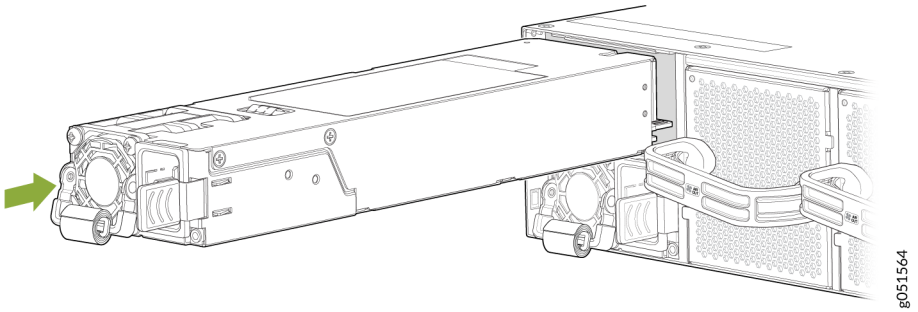
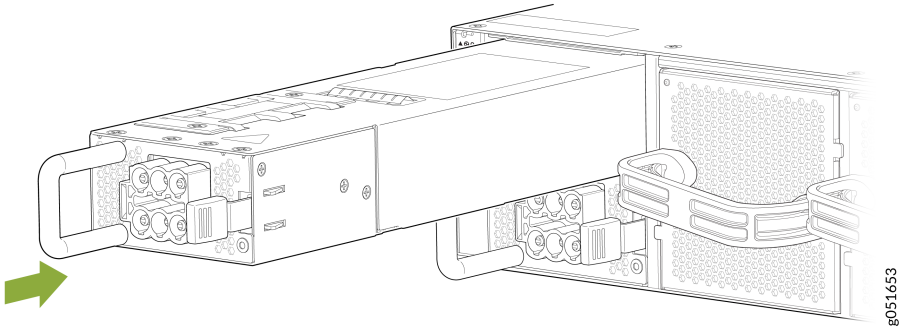


Figure 46: Install a DC PSU in QFX5241-64OD and QFX5241-64QD Switches



NOTE: Each PSU 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 QFX5241-64OD and QFX5241-64QD Switches

IN THIS SECTION

The QFX5241-64OD and QFX5241-64QD switches support two 480-GB SSDs. You cannot install or remove the SSDs when the switch is up. You must shut down the switch before replacing the SSD. The SSDs are preinstalled in the switch.

Remove a Solid-State Drive from QFX5241-64OD and QFX5241-64QD Switches

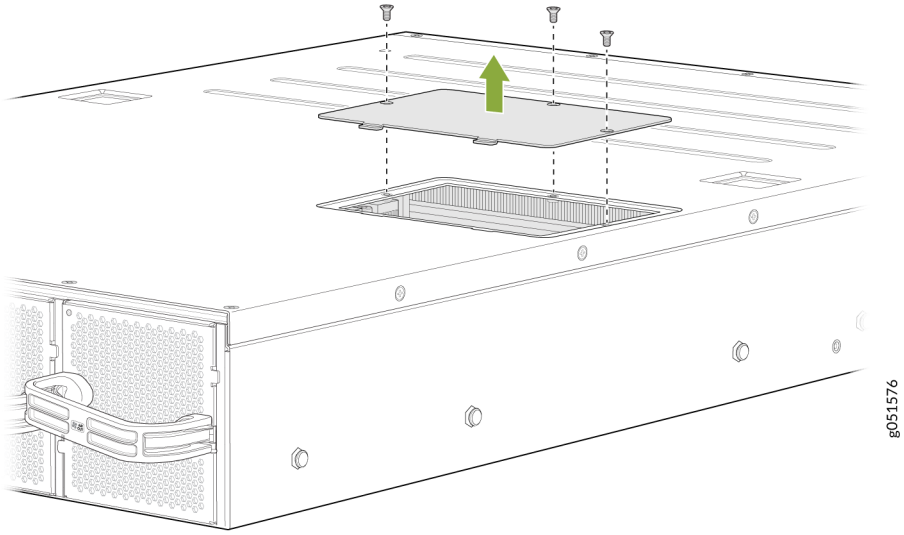
Before you remove a solid-state drive (SSD) from the device, ensure that you have taken the necessary precautions to prevent ESD damage.

Ensure that you have the following parts and tools available to remove an SSD from the QFX5241-64OD and QFX5241-64QD switches:

- ESD grounding strap
- Antistatic bag or an antistatic mat
- Phillips (+) screwdriver, number 1

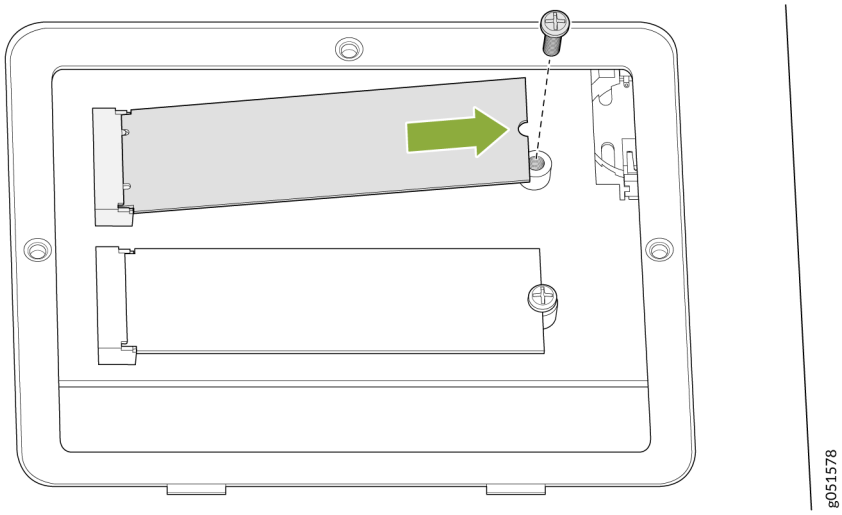
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to the ESD point on the rack.
3. Turn the switch chassis upside down and locate the SSD cover plate.
4. Remove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

Figure 47: Remove the SSD Cover Plate



5. Remove the single screw holding the SSD in place and slide the drive out of its slot.

Figure 48: 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 QFX5241-64OD and QFX5241-64OD Switches

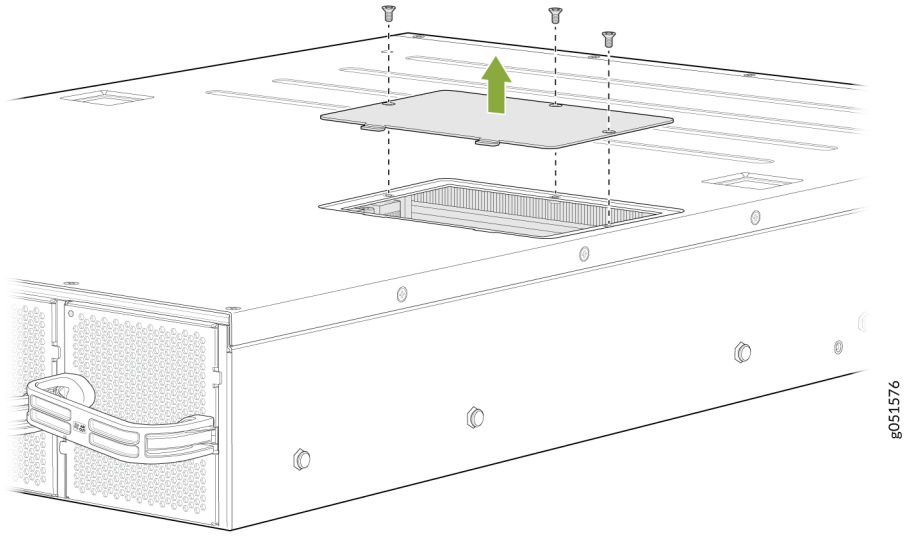
Before you install an SSD in the device, ensure that you have taken the necessary precautions to prevent ESD damage.

Ensure that you have the following parts and tools available to install an SSD in the QFX5241-64OD and QFX5241-64QD switches:

- ESD grounding strap
- Antistatic bag containing the SSD or an antistatic mat
- Phillips (+) screwdriver, number 1

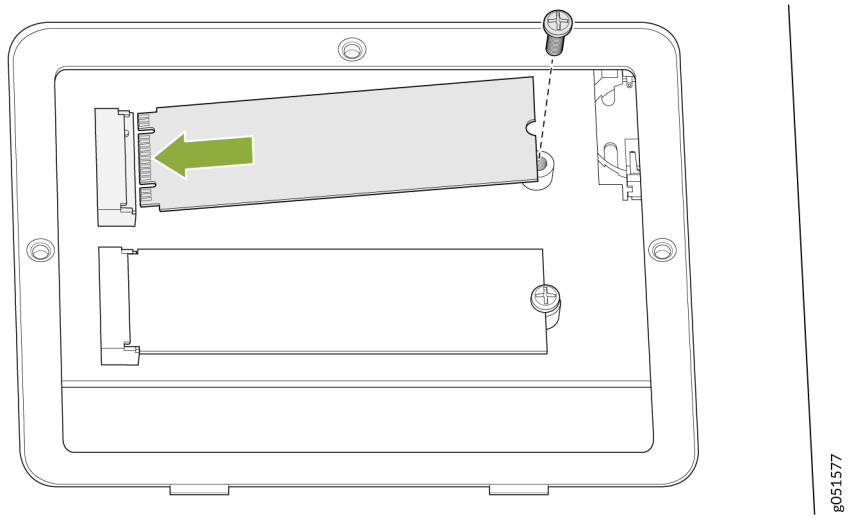
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to the ESD point on the rack.
3. Turn the switch upside down and locate the SSD cover plate.
4. If the screws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

Figure 49: Remove the SSD Cover Plate



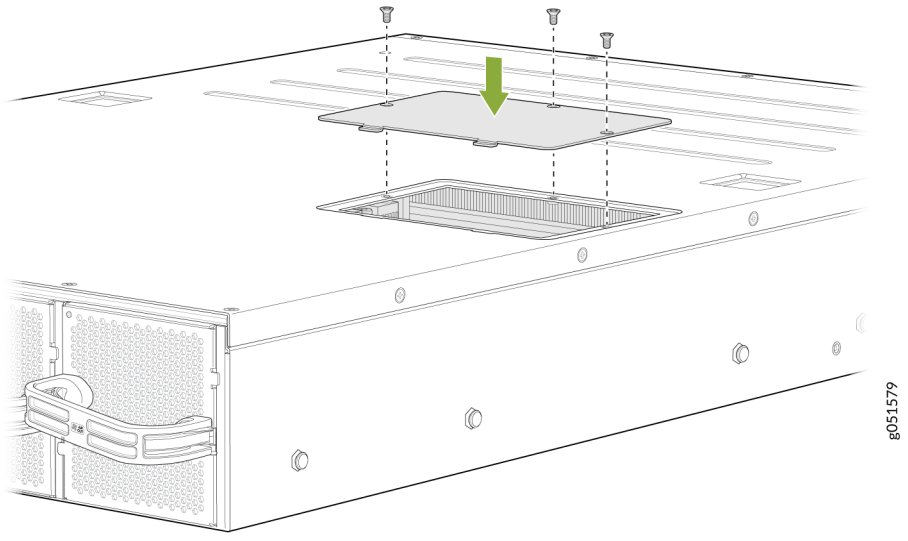
5. Slide the drive into the SSD slot and tighten the single screw holding the SSD.

Figure 50: Install the SSD



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

Figure 51: Replace the SSD Cover Plate



Maintain Transceivers and Fiber Optic Cables on QFX5241-64OD and QFX5241-64QD Switches

IN THIS SECTION

Remove a Transceiver

Use the information in this topic to remove OSFP or QSFP-DD optical transceivers and fiber-optic cables.

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.

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
- An electrostatic discharge (ESD) strap
- 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.

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 52 on page 133 shows how to remove an octal small factor pluggable (OSFP800 or OSFP) or a quad small form factor pluggable double density (QSFP-DD800 or QSFP-DD) transceiver. The procedure is the same for all types of transceivers except the QSFP28 transceivers.

To remove an OSFP or QSFP-DD transceiver:

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.

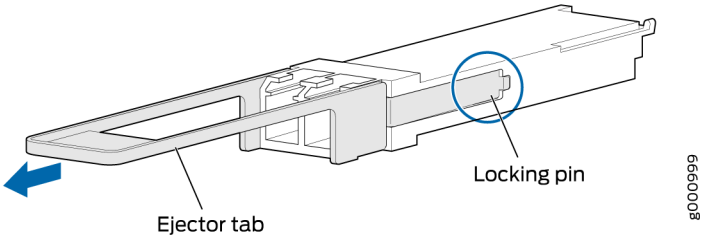
LASER WARNING: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

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" on page 136). 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. Pull the transceiver's ejector tab straight back. The locking pins on the transceiver release automatically.
7. Gently slide the transceiver straight out of the port and place the transceiver on the antistatic mat or in the electrostatic bag.

Figure 52: Remove an OSFP800 or QSFP-DD800 Transceiver



CAUTION: To avoid ESD damage to the transceiver, do not touch the connector pins at the end of the transceiver.

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

8. Insert a dust cover in the empty port.

Install a Transceiver

Use the information in this topic to install OSFP or QSFP-DD optical transceivers and fiber-optic cables.

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.

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.

To install an OSFP800 or QSFP-DD800 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.

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

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.

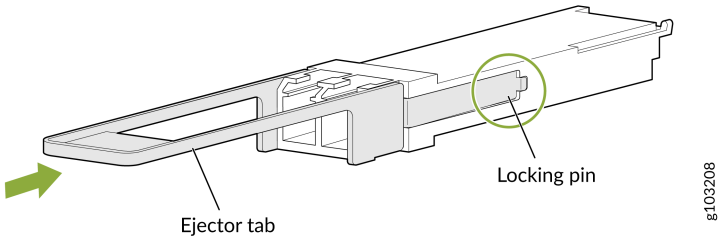
   LASER WARNING: Do not leave a fiber-optic transceiver uncovered except when inserting or removing a cable. The rubber safety cap keeps the port clean and protects your eyes from accidental exposure to laser light.

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.

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

5. Orient the transceiver over the port so that the transceiver connector faces the appropriate direction.
6. Slide the transceiver into the slot until the locking pins lock in place. If there is resistance, remove the transceiver and flip it so that the connector faces the other direction.

Figure 53: Install an OSFP800 or QSFP-DD800 Transceiver



7. Remove the rubber safety cap from the transceiver when you are ready to connect the cable to 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 cables connected to transceivers emit laser light that can damage your eyes.

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.

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:

- Electrostatic discharge (ESD) strap
- 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, ensure that you have taken 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:

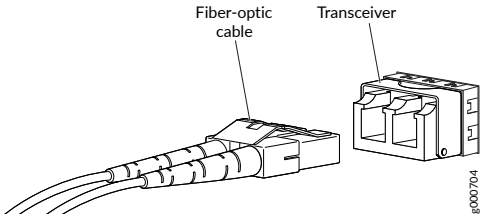
LASER WARNING: Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cables connected to transceivers emit laser light that can damage your eyes.

1. To enable the disabled port, delete the disable statement from the configuration and commit the configuration changes:

```
{master}[edit interfaces]
root@re0# show
et-0/0/1 {
    disable;
}

{master}[edit interfaces]
root@re0# delete et-0/0/1 disable

{master}[edit interfaces]
root@re0# show

{master}[edit interfaces]
root@re0# show |compare
[edit interfaces]
-  et-0/0/1 {
-      disable;
-  }
```

```
{master}[edit interfaces]
root@re0# commit
commit complete

{master}[edit]
root@re0#
```

2. If the fiber-optic cable connector is covered with a rubber safety cap, remove the cap. Save the cap.
3. Remove the rubber safety cap from the optical transceiver. Save the cap.
4. Insert the cable connector into the optical transceiver.



5. 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 Patch Cables

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

Follow these guidelines when handling fiber-optic patch cables:

- When you unplug a fiber-optic patch cable from a transceiver, place rubber safety caps over the transceiver and on the end of the cable.
- Anchor fiber-optic patch cables to prevent stress on the connectors. When attaching a fiber-optic patch cable to a transceiver, secure the fiber-optic patch cable so that it does not support its own weight as it hangs to the floor. Never let a fiber-optic patch cable hang free from the connector.

- Avoid bending the fiber-optic patch cables beyond their minimum bend radius. Bending fiber-optic patch 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 patch 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. It is easier and more cost-efficient to replace the short fiber extension than to replace the instruments.
- Keep fiber-optic patch 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 patch 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 QFX5241-64OD and QFX5241-64QD Switches

Before you remove the power cord to power off QFX5241-64OD and QFX5241-64QD switches:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See Prevention of Electrostatic Discharge Damage.
- 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 QFX5241-64OD and QFX5241-64QD switches:

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

- Connect a management device to the console (**CON**) port on QFX5241-64OD and QFX5241-64QD switches. For instructions about connecting a management device to the console (**CON**) port, see "Connect a Device to a Management Console Using an RJ-45 Connector" on page 111.

- Shut down the QFX5241-64OD and QFX5241-64QD switches from a management device on your out-of-band management network. For instructions about connecting a management device to the management (**MGMT**) port, see "Connect a Device to a Network for Out-of-Band Management" on page 111.

2. Shut down Junos OS Evolved from the external management device.

   For QFX5241-64OD and QFX5241-64QD switches, 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. You can 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. 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.
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.

   - DC power supply—Use external circuit breaker as a disconnect device to power off the DC PSU.

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.

   - DC power supply—Remove the power cord from the PSU faceplate by gently pulling the circular grip on the pull-tab latch of the power cord. This action detaches the power cord connector from the PSU faceplate.

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

CHAPTER 6

Troubleshooting Hardware

IN THIS CHAPTER

Troubleshoot the QFX5241-64OD and QFX5241-64QD Switches

IN THIS SECTION

QFX5241-64OD and QFX5241-64QD Troubleshooting Resources Overview

To troubleshoot a problem on the QFX5241-64OD and QFX5241-64QD switches, 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 FRU LEDs and network port LEDs to troubleshoot the QFX5241-64OD and QFX5241-64QD switches. For more information, see "QFX5241-64OD and QFX5241-64QD Management Panel" on page 32.

- 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.

QFX5241-64OD and QFX5241-64QD Alarm Messages Overview

When a QFX5241-64OD or QFX5241-64QD 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
0 alarms currently active
```

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   70    80      92       89      96       93       98
Routing Engine 0 Ch-0 DIMM-0 Temp  63    70      82       79      85       82       88
Routing Engine 0 Ch-1 DIMM-0 Temp  63    70      82       79      85       82       88
FPC 0 Sensor TH5 Max Reading       75    80     100       97     105      102      110
FPC 0 xcvr-0/0/0                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/1                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/3                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/4                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/7                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/8                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/9                   53    60      73       73      76       76       77
FPC 0 xcvr-0/0/10                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/11                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/12                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/13                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/14                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/15                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/16                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/17                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/18                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/19                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/20                  53    60      73       73      76       76       77
FPC 0 xcvr-0/0/21                  53    60      73       73      76       76       77
```

FPC 0 xcvr-0/0/22	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/23	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/24	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/25	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/26	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/27	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/28	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/29	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/30	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/31	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/32	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/33	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/34	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/35	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/36	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/37	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/38	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/39	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/40	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/41	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/42	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/43	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/44	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/45	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/46	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/47	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/48	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/49	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/50	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/51	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/52	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/53	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/54	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/55	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/56	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/57	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/58	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/59	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/60	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/61	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/62	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/63	53	60	73	73	76	76	77
FPC 0 xcvr-0/0/64	65	72	85	85	90	90	91

```
FPC 0 xcvr-0/0/65                  65   72   85   85   90   90   91
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 OPTICS_GRP1_3V3           75   80   115  112  120  117  125
FPC 0 MB OPTICS_GRP2_3V3           75   80   115  112  120  117  125
FPC 0 MB OPTICS_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 to know the fan RPM percentage:

```
root@re0> show chassis fan

      Item                      Status   % RPM     Measurement
      Fan Tray 0 Fan 1          OK       69%       9450 RPM
      Fan Tray 0 Fan 2          OK       69%       10650 RPM
      Fan Tray 1 Fan 1          OK       69%       9450 RPM
      Fan Tray 1 Fan 2          OK       69%       10650 RPM
      Fan Tray 2 Fan 1          OK       69%       9450 RPM
      Fan Tray 2 Fan 2          OK       69%       10650 RPM
      Fan Tray 3 Fan 1          OK       69%       9450 RPM
      Fan Tray 3 Fan 2          OK       69%       10650 RPM
```

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 QFX5241-64OD and QFX5241-64QD 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 37 on page 146. 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.

Junos OS Evolved systems, such as QFX5241-64OD and QFX5241-64QD switches, are based on a new alarm infrastructure, which does not support all PSUs and fan alarms. Table 37 on page 146 shows these alarms, the alarm messages, and the recommended action to take.

Table 37: Chassis Alarm Messages for QFX5241-64OD and QFX5241-64QD Switches

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.

Table 37: Chassis Alarm Messages for QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
		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.
PSUs	Red (major)	`PEM pem-number Not Powered`	Install a PSU into the empty slot. Ensure that the PSU is receiving power.
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 an error message. 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.

Table 37: Chassis Alarm Messages for QFX5241-64OD and QFX5241-64QD Switches *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
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.

CHAPTER 7

Contacting Customer Support and Returning the Chassis or Components

IN THIS CHAPTER

Return QFX5241-64OD and QFX5241-64QD Chassis or Components

IN THIS SECTION

How to Return a QFX541-64OD or QFX5241-64QD Switch or Component for Repair or Replacement

If you need to return a switch or hardware component to Juniper Networks for repair or replacement, follow this procedure:

1. Determine the serial number of the chassis if you need to return the switch. If you need to return one or more components, determine the serial number for each component. For instructions, see "Locate the Serial Number on QFX5241-64OD and QFX5241-64QD Devices or Components" on page 152.
2. Obtain a Return Material Authorization (RMA) number from Juniper Networks Technical Assistance Center (JTAC) as described in "Contact Customer Support to Obtain a Return Material Authorization" on page 151.
3. Pack the switch or component for shipping.

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

Contact Customer Support to Obtain a Return Material Authorization

If you need to return a device or hardware component to Juniper Networks for repair or replacement, obtain an RMA number from JTAC. You must obtain an RMA number before you attempt to return the component.

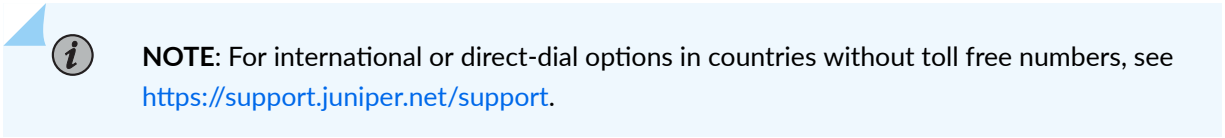
After locating the serial number of the device or hardware component you want to return, open a service request with the JTAC on the Web or by telephone.

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.

Locate the Serial Number on QFX5241-64OD and QFX5241-64QD Devices or Components

IN THIS SECTION

If you 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 with the CLI

To list the switch and components and their serial numbers, enter the following CLI command:

```
show chassis hardware
```

The following output lists the switch components and serial numbers for QFX5241-64QD switches. The output is similar for other QFX5241-64OD and QFX5241-64QD switches:

```
user@device> show chassis hardware
Hardware inventory:
Item           Version  Part number  Serial number      Description
Chassis                              AO09013573         QFX5241-64QD
PSM 0                                6U6LX01024052SV    AC AFO 3000W PSU
PSM 1                                6U6LX01024052SR    AC AFO 3000W PSU
```

```
Routing Engine 0          BUILTIN      BUILTIN          RE-QFX5241
CB 0           REV 00   650-184064    AO09013573       QFX5241-64QD
FPC 0                     BUILTIN     BUILTIN          QFX5241-64QD
  PIC 0                   BUILTIN     BUILTIN          64X800G-QSFPDD
    Xcvr 0     REV 01    740-170960  1F1CUPA90400W    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 1     REV 01    740-170960  1W1CUPA85100G    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 3     REV 01    740-170960  1F1CUPA90400D    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 4     REV 01    740-183667  1G1THYA94701F    QSFP-DD800-800G-DR8-2-P
    Xcvr 7     REV 01    740-183667  1G1THYA94700E    QSFP-DD800-800G-DR8-2-P
    Xcvr 8     REV 01    740-170959  1W1CUSA85100S    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 9     REV 01    740-170959  1W1CUSA85100N    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 10    REV 01    740-170960  1W1CUPA850022    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 11    REV 01    740-170960  1W1CUPA850024    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 12    REV 01    740-183667  1G1THYA94702E    QSFP-DD800-800G-DR8-2-P
    Xcvr 13    REV 01    740-183667  1G1THYA94700R    QSFP-DD800-800G-DR8-2-P
    Xcvr 14    REV 01    740-183667  1G1THYA94700V    QSFP-DD800-800G-DR8-2-P
    Xcvr 15    REV 01    740-183667  1G1THYA94700C    QSFP-DD800-800G-DR8-2-P
    Xcvr 16    REV 01    740-183667  1G1THYA94701U    QSFP-DD800-800G-DR8-2-P
    Xcvr 17    REV 01    740-183667  1G1THYA947019    QSFP-DD800-800G-DR8-2-P
    Xcvr 18    REV 01    740-183667  1G1THYA94700M    QSFP-DD800-800G-DR8-2-P
    Xcvr 19    REV 01    740-183667  1G1THYA947006    QSFP-DD800-800G-DR8-2-P
    Xcvr 20    REV 01    740-175629  2Q1CHPA943H09    QSFP-DD800-2x400G-DR4-P
    Xcvr 21    REV 01    740-170959  1F1CUSA85000B    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 22    REV 01    740-175629  2Q1CHPA943H08    QSFP-DD800-2x400G-DR4-P
    Xcvr 23    REV 01    740-170959  1F1CUSA85002M    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 24    REV 01    740-170960  1W1CUPA85001K    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 25    REV 01    740-170960  1W1CUPA85100L    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 26    REV 01    740-170959  1W1CUSA85100H    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 27    REV 01    740-170959  1F1CUSA85000Q    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 28    REV 01    740-170960  1W1CUPA85100K    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 29    REV 01    740-170960  1F1CUPA90401Q    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 30    REV 01    740-170959  1F1CUSA85002W    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 31    REV 01    740-170960  1F1CUPA904004    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 32    REV 01    740-170960  1F1CUPA904007    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 33    REV 01    740-170959  1W1CUSA85100P    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 34    REV 01    740-170960  1F1CUPA90400C    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 35    REV 01    740-170960  1W1CUPA85001G    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 36    REV 01    740-170960  1W1CUPA85100Q    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 37    REV 01    740-170960  1W1CUPA85100H    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 38    REV 01    740-170960  1W1CUPA850023    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 39    REV 01    740-170960  1W1CUPA85100P    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 40    REV 01    740-183667  1G1THYA947020    QSFP-DD800-800G-DR8-2-P
    Xcvr 41    REV 01    740-183667  1G1THYA94701S    QSFP-DD800-800G-DR8-2-P
```

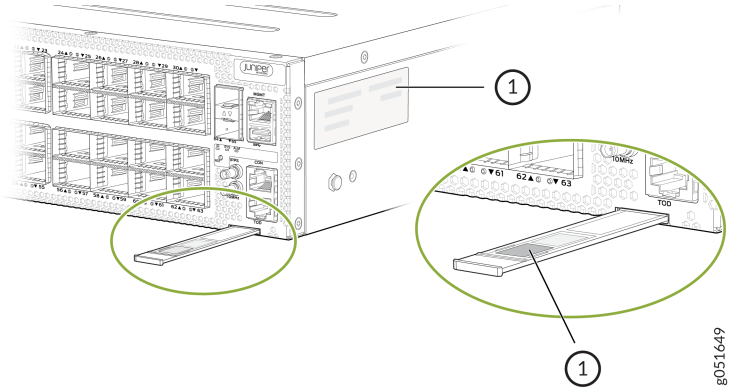
```
    Xcvr 42     REV 01    740-183667  1G1THYA947017    QSFP-DD800-800G-DR8-2-P
    Xcvr 43     REV 01    740-183667  1G1THYA94700D    QSFP-DD800-800G-DR8-2-P
    Xcvr 44     REV 01    740-170960  1W1CUPA85100M    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 45     REV 01    740-170960  1F1CUPA90400H    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 46     REV 01    740-170960  1F1CUPA90401A    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 47     REV 01    740-170960  1F1CUPA90400F    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 48     REV 01    740-170960  1W1CUPA85100F    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 49     REV 01    740-170960  1W1CUPA85100R    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 50     REV 01    740-170960  1F1CUPA90401W    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 51     REV 01    740-170960  1W1CUPA85100N    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 52     REV 01    740-170959  1F1CUSA850025    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 53     REV 01    740-170959  1F1CUSA85000V    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 54     REV 01    740-170959  1W1CUSA85100Q    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 55     REV 01    740-170959  1F1CUSA85002E    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 56     REV 01    740-170960  1F1CUPA90400K    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 57     REV 01    740-170959  1F1CUSA85003B    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 58     REV 01    740-170960  1F1CUPA90400T    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 59     REV 01    740-170959  1F1CUSA85001Q    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 60     REV 01    740-170960  1F1CUPA904015    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 61     REV 01    740-170959  1W1CUSA85100R    QSFP-DD800-2x400G-LR4-10-DUAL-LC
    Xcvr 62     REV 01    740-170960  1F1CUPA90401U    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 63     REV 01    740-170960  1F1CUPA90400Z    QSFP-DD800-2x400G-FR4-DUAL-LC
    Xcvr 64     REV 01    740-031980  AA171130DXA      SFP+-10G-SR
    Xcvr 65     REV 01    740-031980  AA192930696      SFP+-10G-SR
Fan Tray 0                                           Fan Tray, Front to Back Airflow - AFO
Fan Tray 1                                           Fan Tray, Front to Back Airflow - AFO
Fan Tray 2                                           Fan Tray, Front to Back Airflow - AFO
Fan Tray 3                                           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 fan module from the left, counting from 0.

Locate the Chassis Serial Number ID Label on QFX5241-64OD and QFX5241-64QD Switches

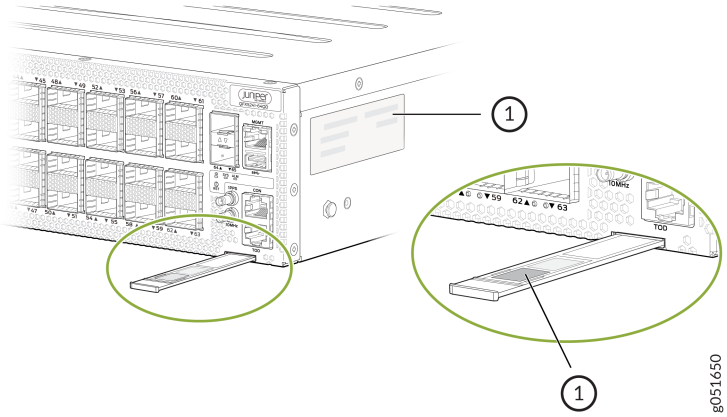
You can find the chassis serial number in either the `show chassis hardware` command output or physically on a pull-out tab located on the right side of the QFX5241-64OD or QFX5241-64QD port panel. See Figure 54 on page 155 for the QFX5241-64OD switch and Figure 55 on page 155 for the QFX5241-64QD switch.

Figure 54: Location of the Serial Number ID Label on a QFX5241-64OD Switch



1. Serial number ID label

Figure 55: Location of the Serial Number ID Label on a QFX5241-64QD Switch



1– Serial number ID label

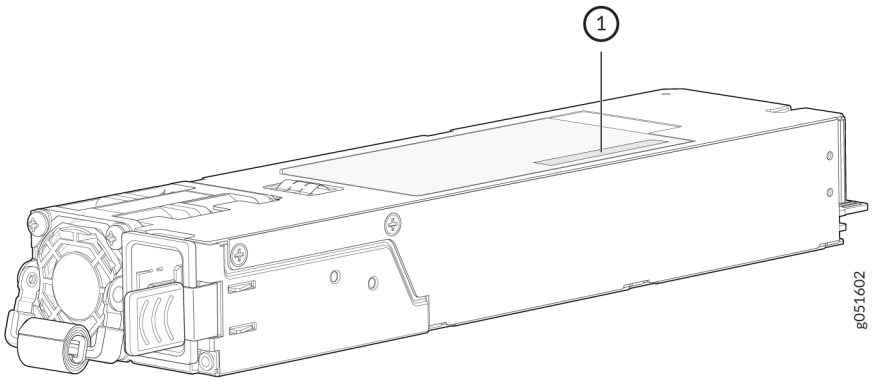
NOTE: On the pull tab, the serial number is printed as a QR code.

Locate the Serial Number ID Labels on FRUs in QFX5241-64OD and QFX5241-64QD Switches

The PSUs and fan modules installed in QFX5241-64OD and QFX5241-64QD switches are FRUs. For each FRU, you must remove the FRU from the switch chassis to see the FRU serial number ID label.

- AC power supply unit (PSU)—The serial number ID label is on the top of the AC PSU.

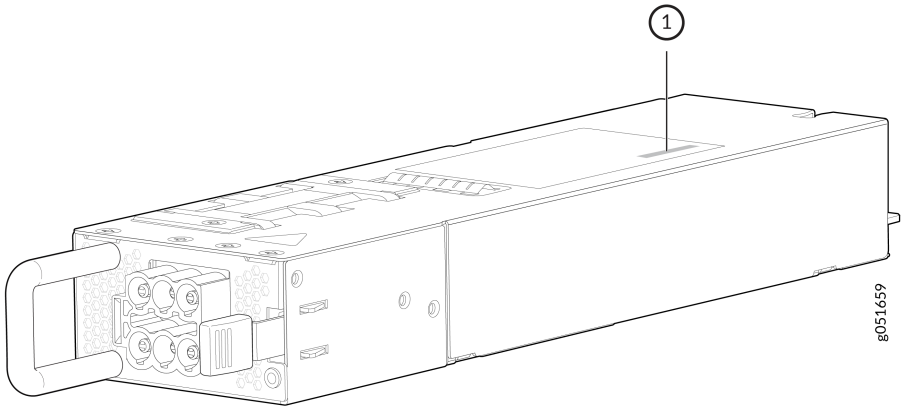
Figure 56: Serial Number ID Label on QFX5241-64OD and QFX5241-64QD AC PSU



1– Serial number ID label

- DC power supply unit (PSU)—The serial number ID label is on top of the DC PSU.

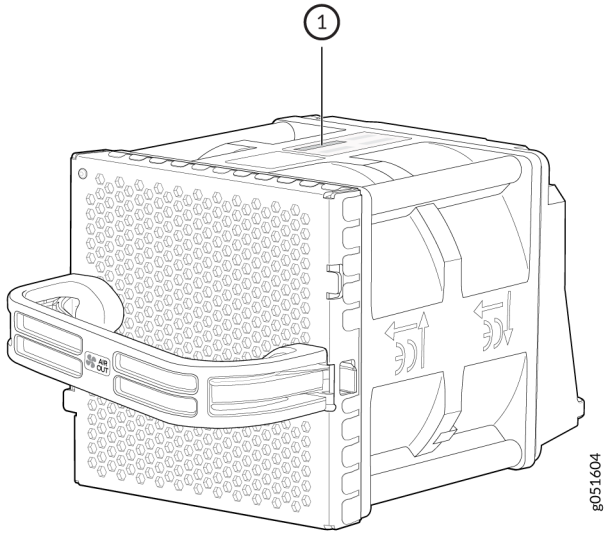
Figure 57: Serial Number ID Label on QFX5241-64OD and QFX5241-64QD DC PSU



1– Serial number ID label

- Fan module—The serial number ID label is on the top of the fan module for QFX5241-64OD and QFX5241-64QD switches.

Figure 58: Serial Number ID Label on QFX5241-64OD and QFX5241-64QD Fan Module



1– Serial number ID label

Remove the Solid-State Drives for RMA on QFX5241-64OD and QFX5241-64QD Switches

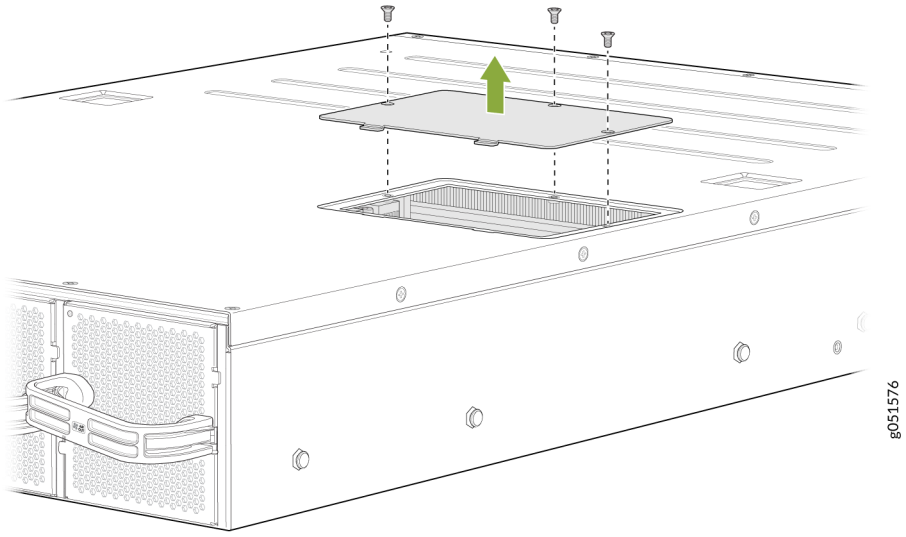
The QFX5241-64OD and QFX5241-64QD switches have two SSDs that store the software images, system logs, and the configuration files. Before returning a chassis to Juniper Networks as part of a Return Material Authorization (RMA), you have the option to remove the SSDs and to dispose the SSDs according 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 QFX5241-64OD and QFX5241-64QD 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 QFX5241-64OD and QFX5241-64QD switches.

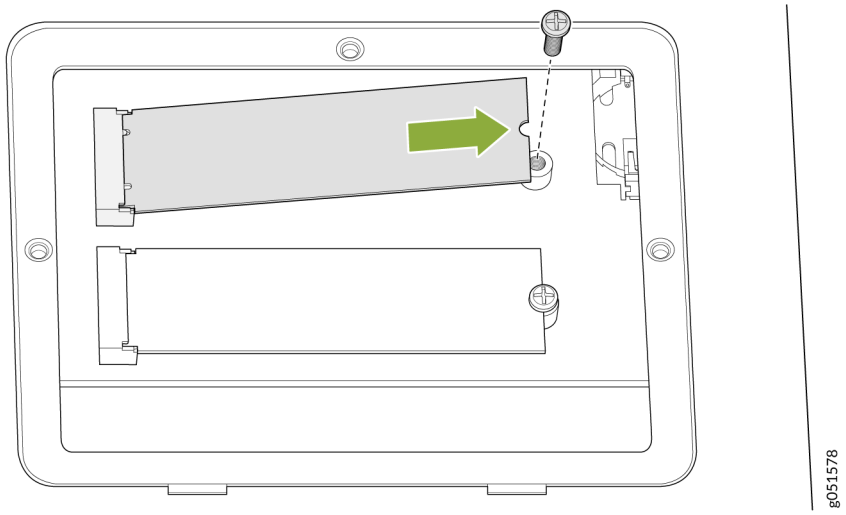
1. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end to a site ESD point.
2. Place the device on a firm surface such as a workbench or a table with the SSD doors facing up.
3. Use the Phillips screwdriver to remove the three flat-head screws from each door on the top of the device.

Figure 59: Remove Screws on SSD Doors in QFX5241-64OD and QFX5241-64QD Switches



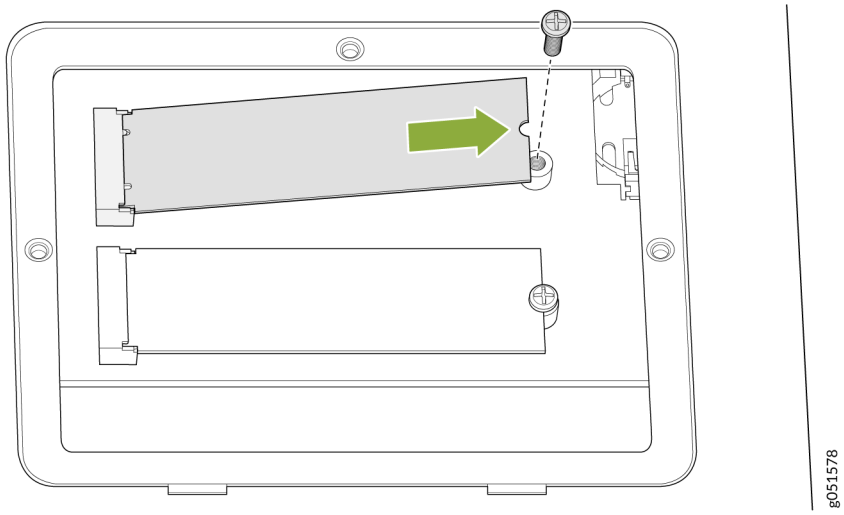
4. Remove the doors and set aside the screws.
5. Use the Phillips screwdriver to remove the screw on one of the SSDs and set it aside.

Figure 60: Remove the Screw and Lift the SDD Out



6. Lift the end farthest from the connector and remove from the SSD slot. Repeat Step 5 and Step 6 for the second SSD.
7. Replace the screws and hand-tighten the screws using the Phillips screwdriver.
8. Replace the SSD doors and the six flat-head screws.

Figure 61: 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 QFX5241-64OD and QFX5241-64QD Switches or Components for Shipping

IN THIS SECTION

If you are returning QFX5241-64OD and QFX5241-64QD switches or one of its components to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you pack QFX5241-64OD and QFX5241-64QD switches or components:

- 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 a Return Material Authorization" on page 151 .

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 QFX5241-64OD and QFX5241-64QD Switches for Shipping

To pack a QFX5241-64OD or QFX5241-64QD switch for shipping:

1. Power off the switch and remove the power cables. See "Power Off QFX5241-64OD and QFX5241-64QD Switches" on page 139.
2. Remove the cables that connect the QFX5241-64OD or QFX5241-64QD 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 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 QFX5241-64OD and QFX5241-64QD Components for Shipping" on page 162.
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 QFX5241-64OD and QFX5241-64QD 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 QFX5241-64OD and QFX5241-64QD 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 QFX5241-64OD and QFX5241-64QD-specific safety information provided in this hardware guide.

Compliance Statements for EMC Requirements

IN THIS SECTION

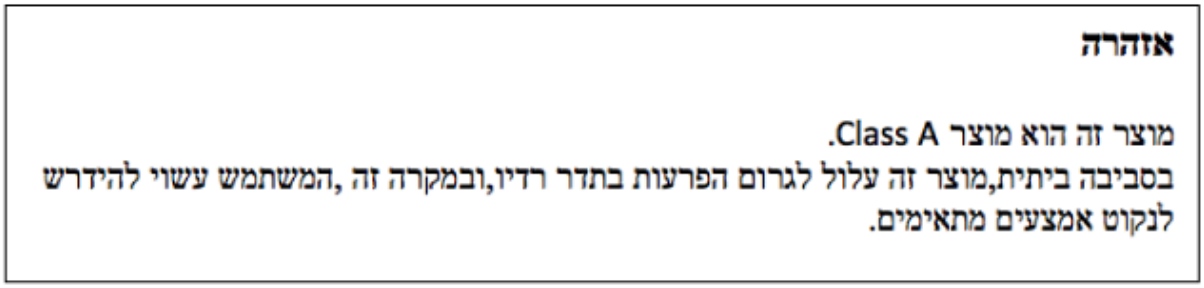
Canada

CAN ICES-3 (A)/NMB-3(A)

European Community

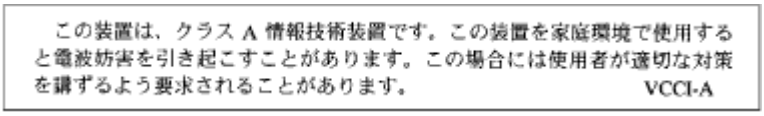
This is a Class A product. In a domestic environment, this product might cause radio interference in which case the user might be required to take adequate measures.

Israel



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



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 QFX5241-64OD and QFX5241-64QD Switches

IN THIS SECTION

The QFX5241-64OD and QFX5241-64QD 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

Compliance Statement for Argentina

EQUIPO DE USO IDÓNEO.