HPE

QFX5130 Switch Hardware Guide

Published
2026-10-14

Copyright Information

© Copyright 2026 Hewlett Packard Enterprise Development LP

Open Source Code

This product includes code licensed under certain open source licenses which require source compliance. The corresponding source for these components is available upon request. This offer is valid to anyone in receipt of this information and shall expire three years following the date of the final distribution of this product version by Hewlett Packard Enterprise Company. To obtain such source code, please check if the code is available in the HPE Software Center at https://myenterpriselicense.hpe.com/cwp-ui/software but, if not, send a written request for specific software version and product for which you want the open source code. Along with the request, please send a check or money order in the amount of US $10.00 to:

Hewlett Packard Enterprise Company
Attn: General Counsel
WW Corporate Headquarters
1701 E Mossy Oaks Rd, Spring, TX 77389
United States of America

Table of Contents

About This Guide | ix

1 **Fast Track: Initial Installation**

Fast Track to Rack Installation and Power | 2

- Install the QFX5130-32CD/QFX5130E-32CD Switch in a Rack | **2**
- Connect to Power | **7**
- Install the QFX5130-48C/QFX5130-48CM Switch in a Rack | **9**
- Connect to Power | **11**

Onboard, Configure, and Monitor QFX5130 | 13

2 **Overview**

QFX5130 System Overview | 16

- QFX5130 Switch Description | **16**
- Benefits of the QFX5130 Switch | **19**
- QFX5130 Hardware Component Overview | **20**
- System Software | **24**
- QFX5130 Component Redundancy | **25**
- QFX5130 Field-Replaceable Units | **25**

QFX5130 Port Panel | 26

QFX5130 Management Panel | 36

- QFX5130-32CD/QFX5130E-32CD Management Panel Overview | **36**
- QFX5130-32CD/QFX5130E-32CD Chassis Status LEDs | **37**
- QFX5130-48C Management Panel Overview | **41**
- QFX5130-48C Network LEDs | **44**

QFX5130 Cooling System | 48

- QFX5130 Cooling System Description | **49**

QFX5130 Fan Module LED | 55

Fan Module Status | 57

QFX5130 Power System | 60

QFX5130 Switch AC Power Supply Modules Description | 61

QFX5130 AC Power Specifications | 62

AC Power Cord with Type C15 Coupler Specifications | 64

QFX5130 AC Power Supply LEDs | 67

QFX5130 DC Power Supply Description | 68

QFX5130 DC Power Specifications | 70

QFX5130 DC Power Supply LED | 71

3 **Site Planning, Preparation, and Specifications**

QFX5130 Site Preparation Checklist | 75

QFX5130 Site Guidelines and Requirements | 77

QFX5130 Environmental Requirements and Specifications | 77

General Site Guidelines | 79

QFX5130 Grounding Cable and Lug Specifications | 79

QFX5130 Clearance Requirements for Airflow and Hardware Maintenance | 80

QFX5130 Chassis Physical Specifications | 82

Site Electrical Wiring Guidelines | 83

QFX5130 Rack Requirements | 84

QFX5130 Cabinet Requirements | 86

QFX5130 Network Cable and Transceiver Planning | 88

Determining QFX5130 Optical Interface Support | 88

Cable Specifications for QSFP+, QSFP28, and QSFP-DD Transceivers | 89

Understand QFX Series Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 91

Calculate Power Budget and Power Margin for Fiber-Optic Cables | 93

Calculate Power Budget for Fiber-Optic Cables | 93

How to Calculate Power Margin for Fiber-Optic Cables | **94**

QFX5130 Cable Specifications and Pinouts | 96

Cable Specifications for Console and Management Connections for the QFX Series | **96**

RJ-45 Management Port Connector Pinout Information | **97**

Console Port Connector Pinouts for the QFX Series | **98**

QSFP-DD Port Connector Pinout Information | **99**

SFP-DD Connector Pinout Information | **105**

QSFP+, QSFP28, and QSFP56 Port Connector Pinout Information | **107**

SFP, SFP+, and SFP28 Port Connector Pinout Information | **110**

USB Port Specifications for the QFX Series | **112**

4 **Initial Installation and Configuration**

Unpack and Mount the QFX5130 Switch | 115

Unpack a QFX5130 Switch | **115**

Update Base Installation Data | **118**

Mount the QFX5130-32CD/QFX5130E-32CD by Using the QFX5K-4PST-RMK-E Rack Mount Kit | **118**

Mount the Device by Using the QFX5K-4PST-RMK-E Rack Mount Kit On a Square Hole Rack | **119**

Mount the Device by Using the QFX5K-4PST-RMK-E Rack Mount Kit On a Threaded Hole Rack | **124**

Mount QFX5130-32CD/QFX5130E-32CD on a Four-Post Rack Using the QFX5220-32CD-4PRMK Rack Mount Kit | **129**

Mount QFX5130-32CD/QFX5130E-32CD on a Four-Post Cabinet | **131**

Mount the QFX5130-48C/QFX5130-48CM Switch by Using the QFX5130-1RU-4PRMK Rack Mount Kit on a Square Hole Rack | **135**

Mount Your QFX5130-48C/QFX5130-48CM Switch by Using the QFX5130-1RU-4PRMK Rack Mount Kit on a Threaded-Hole Four-Post Rack | **137**

Mount the QFX5130-32CD/QFX5130E-32CD Switch in a Rack by Using the QFX5220-32CD-4PRMK Rack Mount Kit | **144**

Befo re You Begin Rack Mounting | **144**

How to Install a ORv3-Compliant Switch with Tray Assembly (2OU) in Your ORv3 Rack | 145

Unpack the Switch-Tray Assembly | **146**

Parts Inventory (Packing List) | **147**

Install Switch-Tray Assembly in an ORv3 Rack | **148**

Uninstall the Switch-Tray Assembly from the ORv3 rack | **152**

Ground the Switch-Tray Assembly | **155**

Connect the QFX5130 Switch to Power | 155

Ground the QFX5130 Switch and Connect Power | **156**

Ground the QFX5130-48C/QFX5130-48CM Switch | **158**

Connect AC Power to a QFX5130 Switch | **159**

Connect DC Power to a QFX5130 Switch | **161**

Before You Begin | **161**

Connect DC Power to a QFX5130 Switch | **162**

Connect the QFX5130 Switch to External Devices | 166

Connect a Device to a Network for Out-of-Band Management | **166**

Connect a Device to a Management Console Using an RJ-45 Connector | **167**

Register Products—Mandatory to Validate SLAs | 169

Perform Initial Software Configuration for QFX5130 Switches | 170

5 **Maintaining Components**

Maintain the QFX5130 Cooling System | 175

Remove a Fan Module from QFX5130 Switches | **175**

Install a Fan Module in QFX5130 Switches | **177**

Maintain the QFX5130 Power System | 179

Remove a Power Supply Unit from QFX5130 Switches | **179**

Install an AC Power Supply Unit in QFX5130 Switches | **182**

Maintain Transceivers and Fiber Optic Cables on a QFX5130 Switch | 184

Remove a Transceiver | **184**

Install a Transceiver | **187**

Disconnect a Fiber-Optic Patch Cable | **190**

Connect a Fiber-Optic Patch Cable | **191**

How to Handle Fiber-Optic Patch Cables | **191**

Power Off a QFX5130 Switch | 192

6 **Troubleshooting Hardware**

Troubleshoot the QFX5130 Switch | 196

QFX5130 Troubleshooting Resources Overview | **196**

QFX5130 Alarm Messages Overview | **197**

Chassis Alarm Messages | **198**

7 **Contacting Customer Support and Returning the Chassis or Components**

Contact Customer Support to Obtain Return Material Authorization | 203

Return a QFX5130 Chassis or Components | 204

Locate the Serial Number on a QFX5130 Device or Component | **204**

List the Chassis and Component Details Using the CLI | **205**

Locate the Chassis Serial Number ID Label on a QFX5130 Switch | **208**

Locate the Serial Number ID Labels on FRUs in a QFX5130 Switch | **209**

Remove the Solid-State Drives for RMA on QFX5130-32CD/QFX5130E-32CD Switches | **211**

Remove the Solid-State Drives for RMA on a QFX5130-48C Switch | **213**

How to Return a Hardware Component to Juniper Networks, Inc. | **215**

Guidelines for Packing Hardware Components for Shipment | **216**

Pack a QFX5130 Device or Component for Shipping | **216**

Pack a QFX5130 Switch for Shipping | **217**

Pack QFX5130 Components for Shipping | **218**

8 **Safety and Compliance Information**

QFX5130 Safety | 220

AC Power Electrical Safety Guidelines | 221

Compliance Statements for NEBS | 222

Compliance Statements for EMC Requirements | 222

Compliance Standards for QFX5130 Switches | 224

About This Guide

Use this guide to plan, install, perform initial software configuration, perform routine maintenance, and to troubleshoot QFX5130 switches.

After completing the installation and basic configuration procedures covered in this guide, refer to the Junos OS 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 Power | **2**
- Onboard, Configure, and Monitor QFX5130 | **13**

Fast Track to Rack Installation and Power

SUMMARY

This procedure walks you through the most basic steps for installing your QFX5130 switch in a rack and connecting it to power.

IN THIS SECTION

- Install the QFX5130-32CD/QFX5130E-32CD Switch in a Rack | **2**
- Connect to Power | **7**
- Install the QFX5130-48C/QFX5130-48CM Switch in a Rack | **9**
- Connect to Power | **11**

Install the QFX5130-32CD/QFX5130E-32CD Switch in a Rack

You can install the QFX5130-32CD/QFX5130E-32CD switch in a four-post rack or cabinet. We'll walk you through the steps to install an AC-powered switch in a square-hole four-post rack.

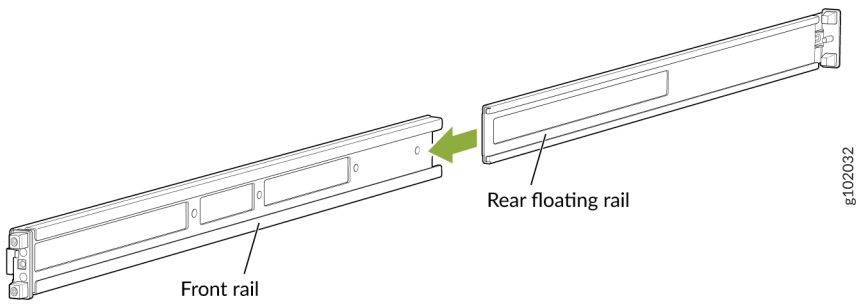
Before you install the switch, review:

- "QFX5130 Site Guidelines and Requirements" on page 77
- General Safety Guidelines and Warnings
- "Unpack a QFX5130 Switch " on page 115

To mount the device on four posts in a rack by using the QFX5K-4PST-RMK-E rack mount kit (RMK):

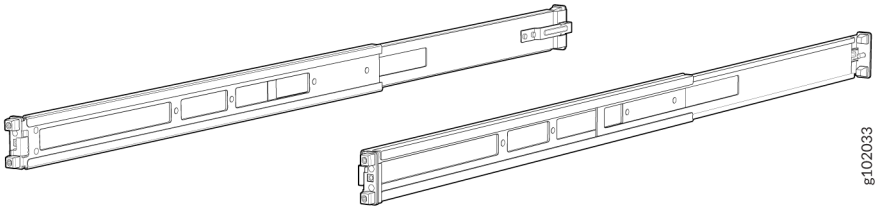
1. Wrap and fasten one end of the ESD grounding strap to your bare wrist. Connect the other end of the strap to the ESD point on the device.
2. Assemble the mounting rails.
   a. Slide the rear-floating rails into the front rails. See Figure 1 on page 3.

Figure 1: Assemble the Mounting Rails



b. Mounting rails assembled. See Figure 2 on page 3.

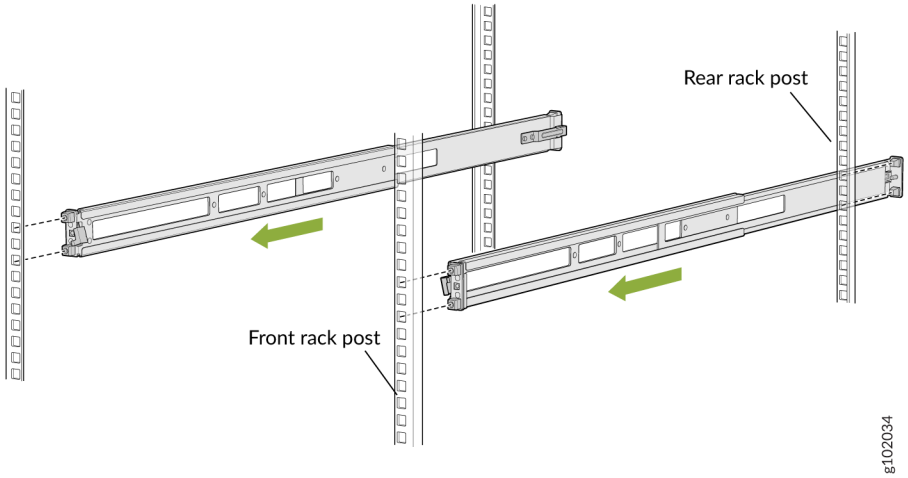
Figure 2: Front and Rear Rails Assembled



3. Attach the mounting rails to the rack.

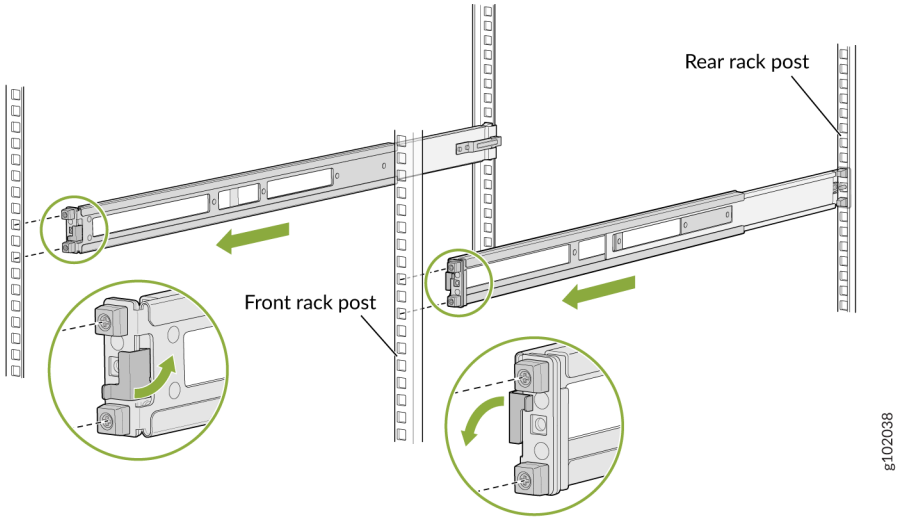
   a. Standing in front of the rack, align the guide blocks of the rear mounting rails with the rear-post holes. Pull the rear mounting rails toward the front of the rack to lock the rails in place. You will hear a click sound when the latch locks into the corresponding rack holes. See Figure 3 on page 4.

Figure 3: Install the Rear-Floating Rails



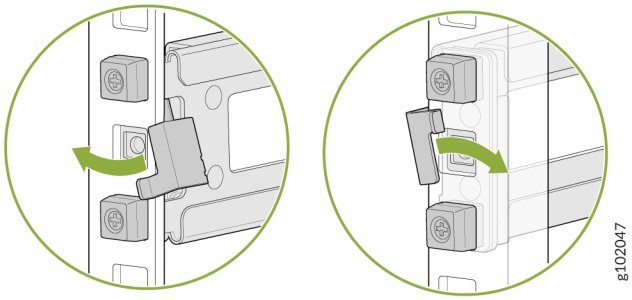
b. Move the latch lock on the front mounting rail to open position, slide the front mounting rail, and insert the guide blocks into the front rack posts. See Figure 4 on page 4.

Figure 4: Install the Front Mounting Rails



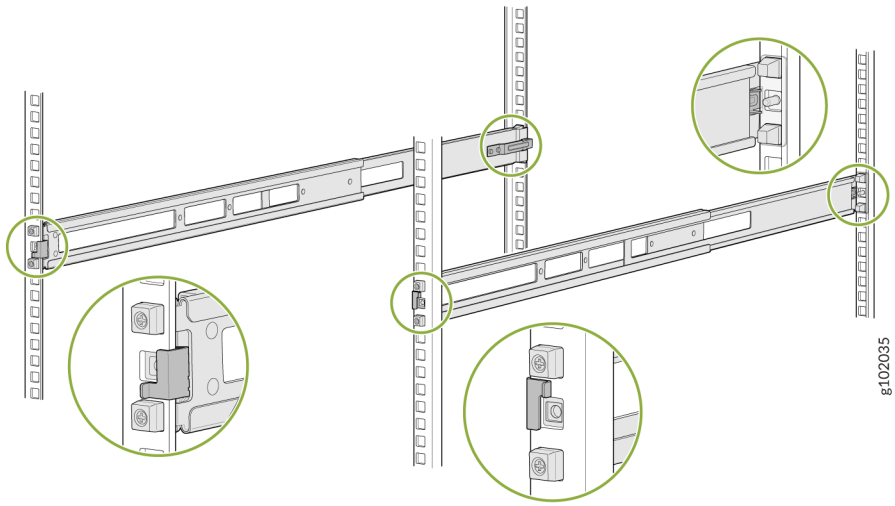
c. Push the lock latch to the locked position. See Figure 5 on page 5.

Figure 5: Front Mounting Rail's Lock Latch



d. Visually ensure that the front and rear latches are locked into place on the mounting rails. See Figure 6 on page 5.

Figure 6: Mounting Rails Installed and Locked

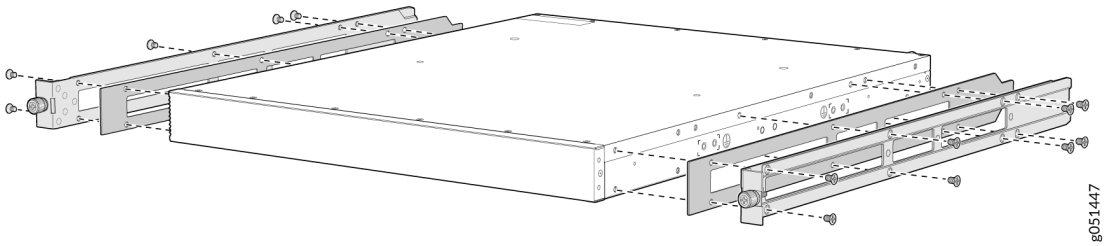


4. Attach the spacers and the mounting brackets to the device if not preinstalled. If your device has the spacers and mounting brackets preinstalled, then skip this step and move to the next step.

   a. Align the holes on the spacer and the mounting bracket with the screw holes that are on the side panel of the chassis.

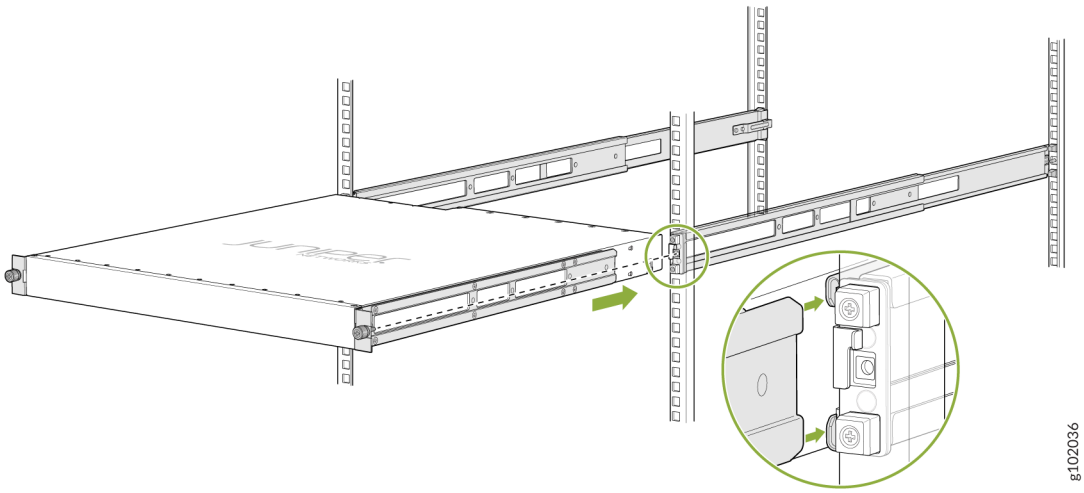
   b. Insert the flat head M4 x 6mm Phillips screws to attach the spacer and the mounting bracket into the aligned holes on the chassis (see Figure 7 on page 6). Tighten the screws.

Figure 7: Attach the Spacers And the Mounting Brackets to the Device



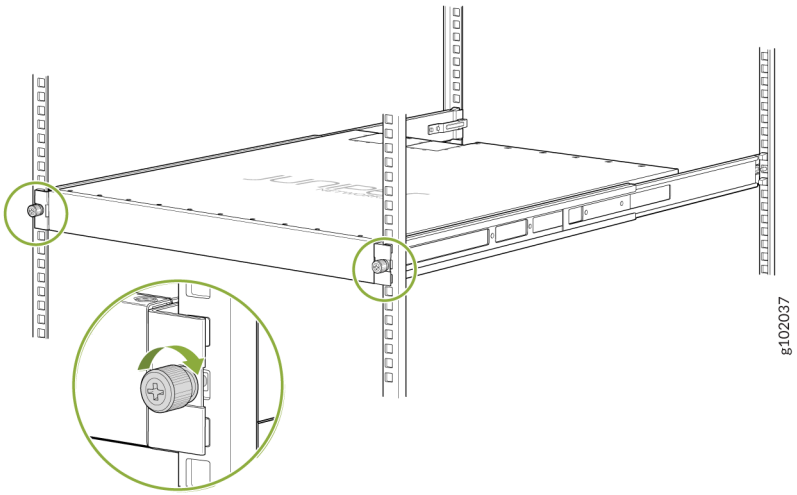
5. Position the device in such a manner that the **AIR OUT** labels on components are next to the hot aisle.
6. Lift the device and position it in the rack, aligning the side mounting brackets with the mounting rails. Slide the device into the channels of the rack mounting rails. See Figure 8 on page 6.

Figure 8: Slide the Device into the Rack



7. Tighten the two thumbscrews to secure the device. See Figure 9 on page 7.

Figure 9: Tighten Thumb Screws



Connect to Power

IN THIS SECTION

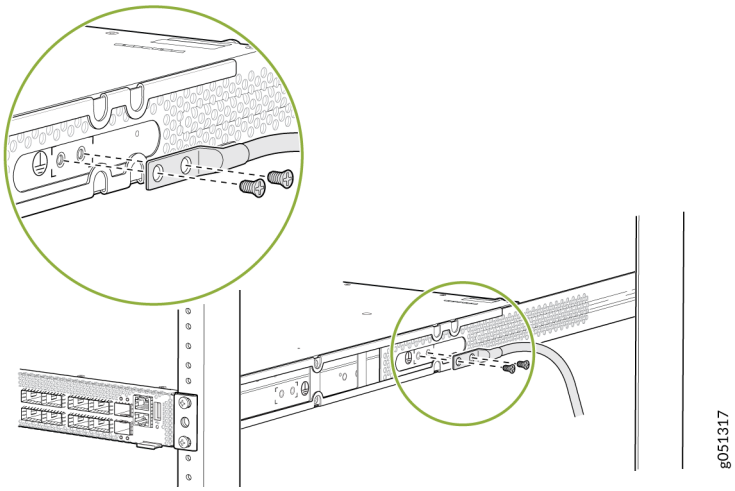
- Ground the QFX5130-32CD/QFX5130E-32CD Switch | 7
- Connect the Power Cord and Power On the QFX5130-32CD/QFX5130E-32CD Switch | 8

Ground the QFX5130-32CD/QFX5130E-32CD Switch

To ground the QFX5130-32CD/QFX5130E-32CD switch:

1. Wrap and fasten one end of the electrostatic discharge (ESD) cable grounding strap around your bare wrist, and connect the other end to a site ESD point.
2. Connect the grounding cable to a proper earth ground, such as the rack in which you mount the device.
3. Place the grounding cable terminal attached to the grounding cable over the grounding point.
4. Secure the grounding cable terminal to the grounding point using the M5 screws.

Figure 10: Ground the QFX5130-32CD/QFX5130E-32CD Switch



5. Dress the grounding cable. Ensure that the cable doesn't block access to or come in contact with other device components, and that it doesn't drape where people could trip on it.

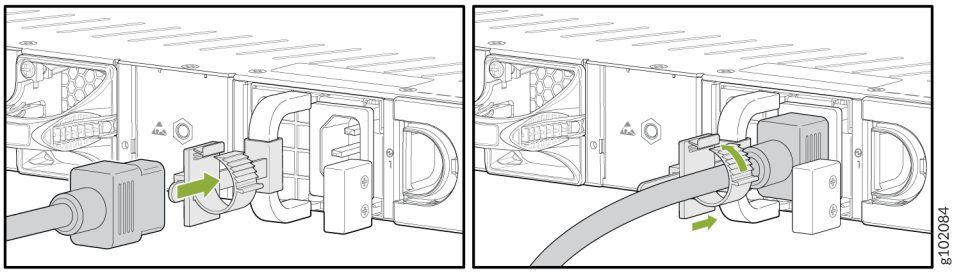
Connect the Power Cord and Power On the QFX5130-32CD/QFX5130E-32CD Switch

For information about the supported AC power cord specifications, see Table 21 on page 64.

To connect the power cord:

1. Ensure that the power supply is fully inserted in the rear panel of the switch.
2. Insert the coupler end of the power cord into the AC power cord socket on the rear panel.
3. Push the power cord retainer on to the power cord.

Figure 11: Connect the Power Cord to a QFX5130-32CD/QFX5130E-32CD Switch



4. If the AC power source outlet has a power switch, turn it off.

5. Plug the power cord into an AC power source outlet.
6. If the AC power source outlet has a power switch, turn it on. If the AC power source outlet doesn't have a power switch, it powers on as soon as you plug it in.

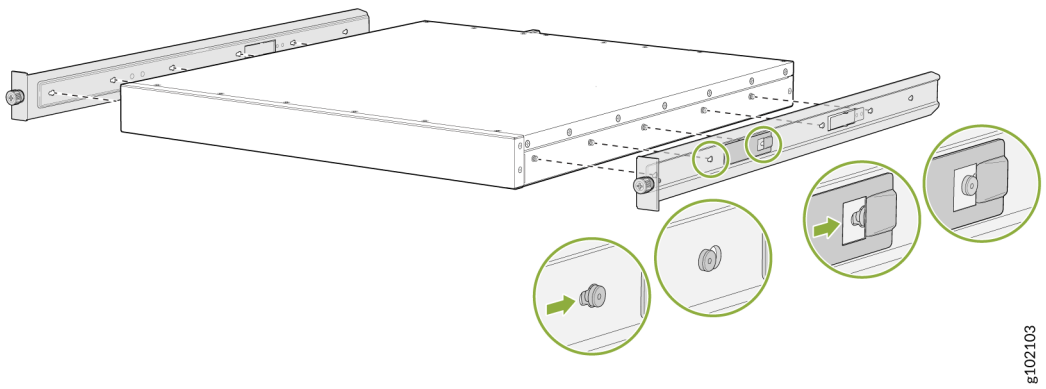
Install the QFX5130-48C/QFX5130-48CM Switch in a Rack

You can install the QFX5130-48C/QFX5130-48CM switch in a four-post rack or cabinet. We'll walk you through the steps to install an AC-powered switch in a square-hole four-post rack.

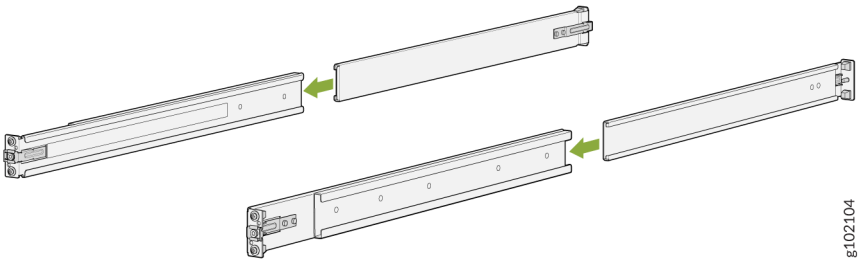
Before you install, review:

- "QFX5130 Site Guidelines and Requirements" on page 77
- General Safety Guidelines and Warnings
- "Unpack a QFX5130 Switch " on page 115

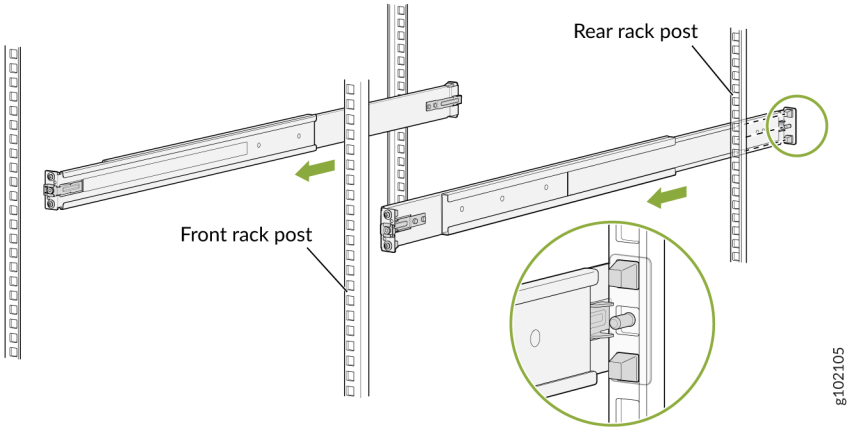
1. Wrap and fasten one end of the ESD cable grounding strap around your bare wrist. Connect the other end to a site ESD point.
2. Attach the side-mounting brackets to the chassis. Align the keyholes of the mounting brackets over the shoulder screws of the chassis. Slide the mounting brackets toward the rear of the chassis.



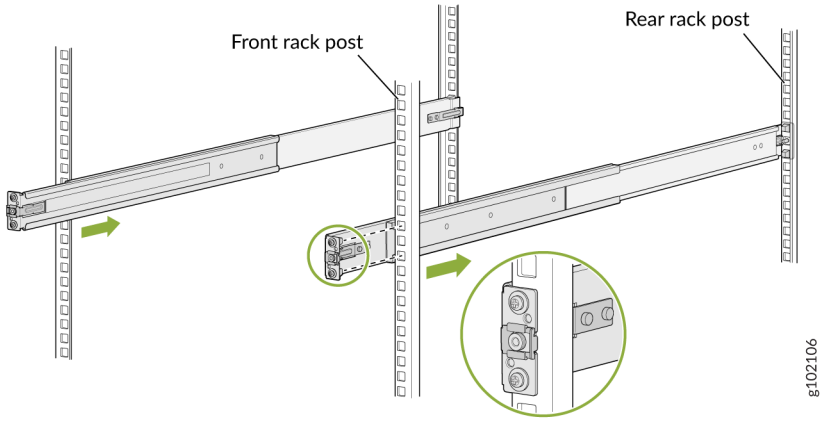
3. Assemble the mounting rails by sliding the rear rails into the front rails.



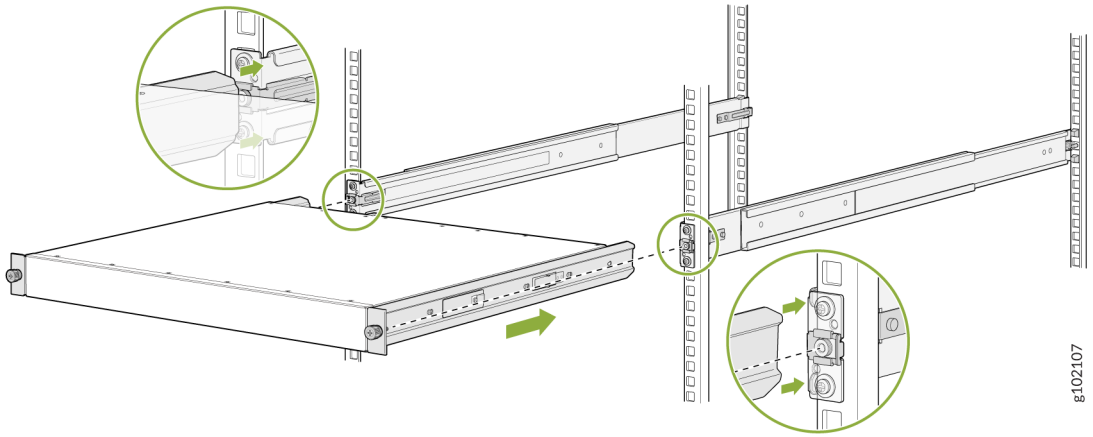
4. Align the guide blocks of the rear-mounting rail with the rear-post holes. Pull the rear-mounting rail toward the front of the rack to lock the rail in place. You'll hear a distinct click when the latch locks into the rack holes.



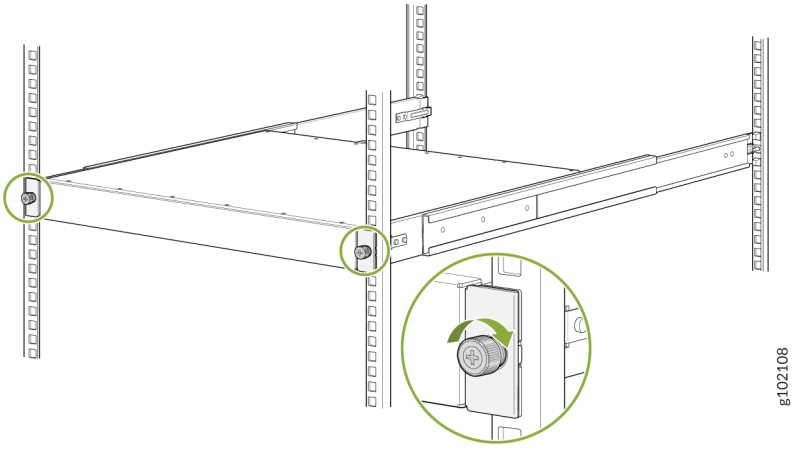
5. Align the guide blocks of the front-mounting rail with the front-post holes. Push the front-mounting rail toward the rear of the rack to lock the rail in place. You'll hear a distinct click when the latch locks into the rack holes.



6. Ensure that the front and rear latches on the mounting rails are locked in place.
7. Lift the device and position it in the rack, aligning the side-mounting brackets with the mounting rails. Slide the device into the channels of the mounting rails.



8. Tighten the two thumbscrews to secure the device.



Connect to Power

IN THIS SECTION

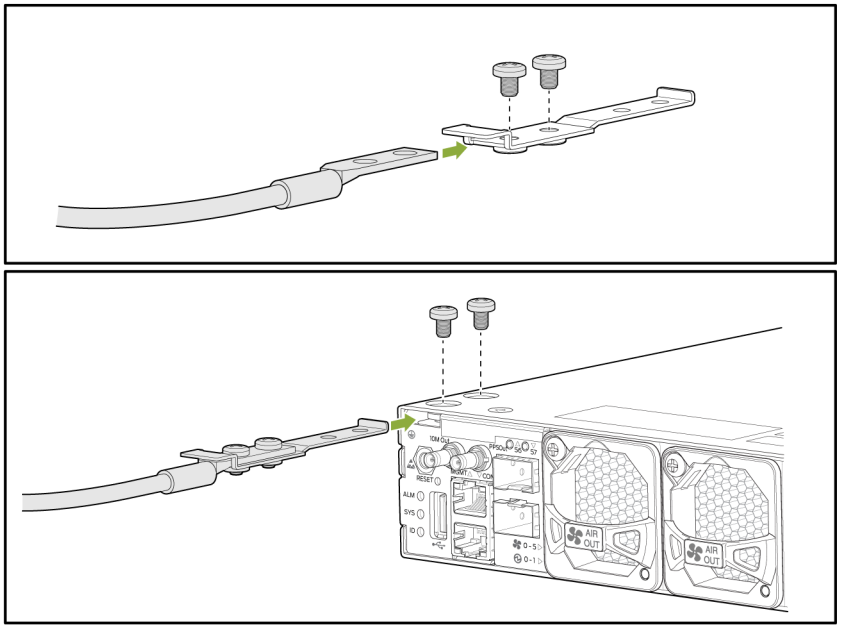
- Ground the QFX5130-48C/ QFX5130-48CM Switch | **12**
- Connect the Power Cord and Power On the QFX5130-48C/ QFX5130-48CM Switch | **12**

To connect the QFX5130-48C/ QFX5130-48CM switch to AC power, you must perform the following tasks:

Ground the QFX5130-48C/ QFX5130-48CM Switch

To ground the QFX5130-48C/QFX5130-48CM switch:

1. Wrap and fasten one end of the ESD cable grounding strap around your bare wrist, and connect the other end to a site ESD point.
2. Connect the grounding cable to a proper earth ground, such as the rack in which you mount the device.
3. Secure the grounding cable terminal to the grounding bracket using the 10-32 screws.
4. Loosen the two screws that are attached to the chassis.
5. Place the bracket attached to the grounding cable over the grounding point.
6. Tighten the two screws.
7. **Figure 12: Ground the QFX5130-48C/ QFX5130-48CM Switch**



8. Dress the grounding cable. Ensure that the cable doesn't block access to or come in contact with other device components, and that it doesn't drape where people could trip on it.

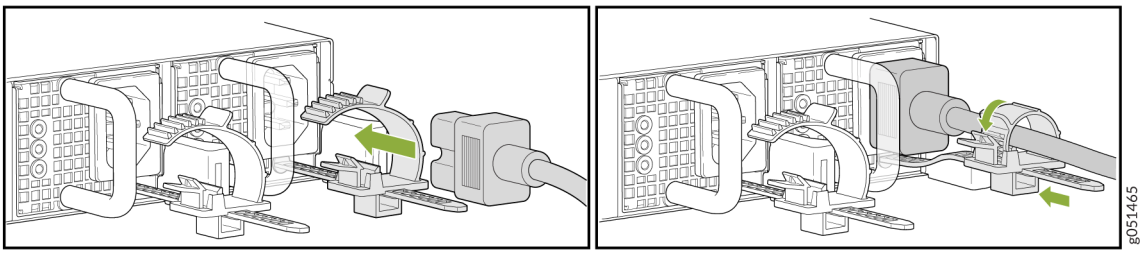
Connect the Power Cord and Power On the QFX5130-48C/ QFX5130-48CM Switch

For information about the supported AC power cord specifications, see Table 21 on page 64.

To connect the power cord:

1. Ensure that the power supply is fully inserted in the rear panel of the switch.
2. Insert the coupler end of the power cord into the AC power cord socket on the rear panel.
3. Push the power cord retainer on to the power cord.

Figure 13: Connect the Power Cord to a QFX5130-48C Switch



4. If the AC power source outlet has a power switch, turn it off.
5. Plug the power cord into an AC power source outlet.
6. If the AC power source outlet has a power switch, turn it on. The switch doesn't have a power switch and powers on as soon as you plug it in.

Onboard, Configure, and Monitor QFX5130

SUMMARY

This topic provides you with pointers to onboard, configure, and monitor QFX5130 switches using Juniper Apstra or CLI (configure only).

You can use Juniper Apstra to onboard, configure, and monitor the QFX5130 switch. See Table 1 on page 14 for more information.

Table 1: Onboard, Configure, and Monitor QFX5130 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 QFX5130 switch using the CLI. See Table 2 on page 14 for more information.

Table 2: Configure QFX5130 Using the CLI

If You Want To	Then
Customize the basic configuration	See "Perform Initial Software Configuration for QFX5130 Switches" on page 170
Configure supported software features on QFX5130	See Software Documentation
Stay up-to-date about new and changed features, and known and resolved issues	See Junos OS Evolved Release Notes

CHAPTER 2

Overview

IN THIS CHAPTER

- QFX5130 System Overview | **16**
- QFX5130 Port Panel | **26**
- QFX5130 Management Panel | **36**
- QFX5130 Cooling System | **48**
- QFX5130 Power System | **60**

QFX5130 System Overview

IN THIS SECTION

- QFX5130 Switch Description | **16**
- Benefits of the QFX5130 Switch | **19**
- QFX5130 Hardware Component Overview | **20**
- System Software | **24**
- QFX5130 Component Redundancy | **25**
- QFX5130 Field-Replaceable Units | **25**

The Juniper Networks® QFX5130 line of switches is a high-radix, high-density, 1-U platform suitable for today's data centers. The four options, QFX5130-32CD/QFX5130E-32CD, QFX5130-48C, and QFX5130-48CM are a perfect choice for leaf, border-leaf, and spine roles within IP networks, as well as Ethernet VPN fabrics. For large public cloud providers—early adopters of high-performance servers to meet increasing workload—the QFX5130-32CD/QFX5130E-32CD supports very large, dense, and fast 400-Gigabit Ethernet (GbE) IP fabrics based on Internet-scale technology. The QFX5130-48C and QFX5130-48CM switches support dense 100-GbE SFP56-DD ports. When enterprise data center customers transition their server farms from 10GbE to 25GbE, the QFX5130 switch provides radix-native 100GbE/400GbE Ethernet VPN–Virtual Extensible LAN (EVPN-VXLAN) with lower power and space requirements..

With additional Remote Direct Memory Access over Converged Ethernet version 2 (RoCEv2) capabilities, QFX5130 is suitable in IP storage deployments. Instead of deep buffer switching, QFX5130 uses quality of service (QoS) mechanisms such as priority-based flow control–DiffServ code point (PFC-DSCP) and explicit congestion notification (ECN) to deliver high performance for storage workload. Support for high-power 400G-ZR and 400G-ZR-M optics makes this line of switches suitable for edge and Data Center Interconnect (DCI) use cases.

QFX5130 Switch Description

The QFX5130 line of Switches includes four compact 1-U platforms—QFX5130-32CD/QFX5130E-32CD, QFX5130-48C, and QFX5130-48CM. Both the switches provide high speeds, high densities, and a rich set of Junos® OS Evolved features.

The Juniper Networks QFX5130-32CD/QFX5130E-32CD Switch is a next-generation, fixed-configuration spine-and-leaf switch featuring:

- 32 400-G quad small form-factor pluggable–double density (QSFP-DD) ports in 1-U form factor
- Up to 25.6 terabit per second (Tbps) (bidirectional)/5.68 billion packets per second (Bpps) throughput
- Enhanced scale up to 1.24 million routes, 80,000 firewall filters, and 160,000 media access control (MAC) addresses

Using breakout cables, each of the 32 400GbE QSFP-DD ports can be broken into four 100/25/10GbE ports, increasing the total number of supported 100/25/10 GbE ports per switch to 128 ports.

The QFX5130-32CD/QFX5130E-32CD offers 32 400GbE ports in a low-profile 1-U form factor. The high-speed ports support a wide variety of port speeds ranging from 10Gbps to 400 Gbps.

An Intel Xeon D-1500 processor drives the QFX5130 control plane that runs the Junos OS Evolved software and supports 32-GB memory (16GBx2) of DDR4. The Junos OS Evolved software image is stored on two internal 50-GB solid-state drives (SSDs).

The QFX5130-32CD/QFX5130E-32CD is available with either ports-to-field-replaceable units or field-replaceable units-to-ports airflow and with AC or DC power supplies.

Figure 14: QFX5130-32CD/QFX5130E-32CD—Front View

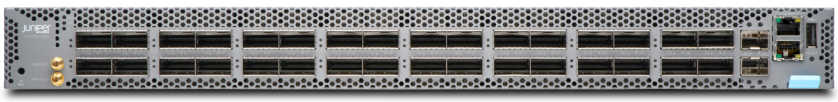


Figure 15: QFX5130-32CD/QFX5130E-32CD—Rear View



The Juniper Networks QFX5130-48C/QFX5130-48CM Switch is a next-generation, high-density, and cost-efficient 100GbE and 400GbE optimized fixed system featuring:

- 48 SFP56-DD 100GbE ports for server connectivity.

- 8 QSFP-DD 400GbE uplink ports.
- Up to 16 Tbps (bidirectional)/2.7 Bbps throughput
- Using breakout cables, the total number of supported 100/25/10GbE ports per switch can be increased to 72.
- Support for 32GB memory (16GBx2) of DDR4.
- With MACsec enabled on the QFX5130-48CM:
  - Up to 9.6 Tbps (bidirectional) / 2.7 bpps MACsec encryption throughput
  - 32x 100G SFP56-DD and 4x 400G QSFP-DD ports support MACsec
  - The remaining 16x 100G SFP56-DD ports and 4x 400G QSFP-DD ports are available for standard (non-MACsec) use

QFX5130-48CM supports Media Access Control Security (MACsec), which provides simple yet robust Layer 2 network security to encrypt and protect a single point-to-point Ethernet link. Media Access Control Security (MACsec) is an industry-standard security technology that provides secure communication for almost all types of traffic on Ethernet links. MACsec provides point-to-point security on Ethernet links between directly-connected nodes and is capable of identifying and preventing most security threats, including denial of service, intrusion, man-in-the-middle, masquerading, passive wiretapping, and playback attacks. MACsec is standardized in IEEE 802.1AE.

Figure 16: QFX5130-48C—Front View

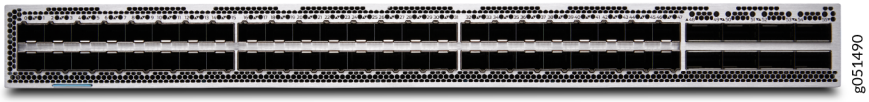


Figure 17: QFX5130-48C—Rear View



Figure 18: QFX5130-48CM—Front View

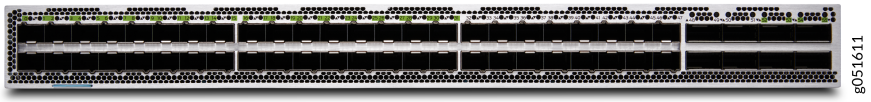


Figure 19: QFX5130-48CM—Rear View



Benefits of the QFX5130 Switch

- Data center re-architecture with flattened pods that slash switch hop latency.
- Fast response from applications in demanding environments, such as financial exchanges, by reducing intracluster switch latency.
- Seamless migration from Junos OS to the Junos OS Evolved software. With Junos OS Evolved, you can:
- Run Linux by using the familiar Junos OS CLI.
- Run third-party Linux applications with Juniper Extension Toolkit (JET) API
- Monitor the DC network with telemetry support
- Perform module-level in-service software upgrade (ISSU).
-
- Saves you energy costs by highly reducing power consumption per Gbps of network traffic passing through the switch.

QFX5130 Hardware Component Overview

The QFX5130-32CD/QFX5130E-32CD supports the components listed in Table 3 on page 20.

Table 3: QFX5130-32CD Hardware Components

Component	Chassis Model	Juniper Model Number	CLI Output
Chassis	QFX5130-32CD	QFX5130-32CD-CHAS	QFX5130-32CD
Chassis	QFX5130E-32CD	QFX5130E-32CD-CHAS	QFX5130E-32CD

Table 3: QFX5130-32CD Hardware Components *(Continued)*

Component	Chassis Model	Juniper Model Number	CLI Output
Fan module	QFX5130-32CD/QFX5130E-32CD	QFX5220-32CD-FANAI (FRUs-to-ports airflow)	`Fan tray n fan-n` Back-to-front airflow - AFI
		QFX5220-32CD-FANAO (ports-to-FRUs airflow)	`Fan tray n fan-n` Front-to-back airflow - AFO
Power supplies	QFX5130-32C	JPSU-1600W-1UACAFI (FRUs-to-ports airflow)	`AC AFI 1600W PSU`

Table 3: QFX5130-32CD Hardware Components *(Continued)*

Component	Chassis Model	Juniper Model Number	CLI Output
	D/QFX5130E-32CD	JPSU-1600W-1UACAFO (ports-to-FRUs airflow)	AC AFO 1600W PSU
		JPSU-1600W-1UDCAFI (FRUs-to-ports airflow)	DC AFI 1600W PSU
		JPSU-1600W-1UDCAFO (ports-to-FRUs airflow)	DC AFO 1600W PSU

Table 3: QFX5130-32CD Hardware Components *(Continued)*

Component	Chassis Model	Juniper Model Number	CLI Output
ORv3-Compliant Switch with Tray Assembly	QFX5130-32CD	QFX513032CDDAFO-T2	QFX5130-32CD

Table 4: QFX5130-48C/QFX5130-48CM and QFX5130-48CM Hardware Components

Component	Chassis Model	Juniper Model Number	CLI Output
Chassis	QFX5130-48C and QFX5130-48CM	QFX5130-48C-CHAS	`QFX5130-48C/QFX5130-48CM`-48C

Table 4: QFX5130-48C/QFX5130-48CM and QFX5130-48CM Hardware Components *(Continued)*

Component	Chassis Model	Juniper Model Number	CLI Output
Fan module	QFX5130-48C and QFX5130-48CM	QFX5130-48C-FANAFI (FRUs-to-ports airflow)	`Fan tray n fan-n` Back-to-front airflow - AFI
		QFX5130-48C-FANAFO (ports-to-FRUs airflow)	`Fan tray n fan-n` Front-to-back airflow - AFO
Power supplies	QFX5130-48C QFX51300-48CM	JPSU-1600W-1UACAFI (FRUs-to-ports airflow)	`AC AFI 1600W PSU`
		JPSU-1600W-1UACAFO (ports-to-FRUs airflow)	`AC AFO 1600W PSU`
		JPSU-1600W-1UDCAFI (FRUs-to-ports airflow)	`DC AFI 1600W PSU`
		JPSU-1600W-1UDCAFO (ports-to-FRUs airflow)	`DC AFO 1600W PSU`

System Software

The Junos OS Evolved software that runs on QFX5130 Switches provides Layer 2 and Layer 3 switching, routing, and security services. Junos OS Evolved is installed on the switch solid-state drive (SSD).

For more information about the features supported on the QFX5130, see Feature Explorer.

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

The QFX5130-48C switch is supported from Junos OS 23.4R1-S1-EVO; the QFX5130-48CM switch is supported from 23.4R2-S1-EVO. The QFX5130-32CD switch is supported from Junos OS 20.3R1-EVO, the QFX5130E-32CD is supported from Junos OS 23.4R2-EVO.

QFX5130 Component Redundancy

The following hardware components provide redundancy on a QFX5130 switch:

- QFX5130 power supplies—The QFX5130 switches have two power supplies. Each power supply provides power to all the components in the switch, ensuring full power redundancy to the device. If two power supplies are installed, the two power supplies provide full power redundancy to the device. If one power supply fails or is removed, the second power supply takes on the additional electrical load, so that the switch can continue to operate without interruption.

  To provide power redundancy to the switch, you must install both the power supplies. Connect power source feed A to one power supply and power source feed B to the second power supply.

- QFX5130-32CD/QFX5130E-32CD cooling system—Each of the QFX5130 -32CD/ QFX5130E-32CD switch models has six fan modules and can operate with one fan module not in operation (5+1 redundancy). The failure of more than one fan module can cause the QFX5130 temperature to exceed the desired threshold, triggering chassis alarms and switch shutdown.

- QFX5130-48C and QFX5130-48CM cooling system—The QFX5130-48C and QFX5130-48CM switches have six fan modules and support redundancy only at the rotor level. You can continue to operate the switch with just one rotor of a fan module. If more than one rotor of any fan module fails and is unable to keep the QFX5130-48C /QFX5130-48CM switch within desired temperature thresholds, chassis alarms occur and the QFX5130-48C/QFX5130-48CM switch shuts down.

QFX5130 Field-Replaceable Units

Field-replaceable units (FRUs) are components that you can replace at your site. The QFX5130 device FRUs are hot-insertable and hot-removable: you can remove and replace the FRUs without powering off the switch or disrupting the switching function.



CAUTION: Though QFX5130 switches continue to operate with only one power supply running, we advise replacing failed power supplies and fan modules as quickly as possible to protect against another failure. Replace a failed power supply with a new power supply within 3 minutes of removal to prevent the chassis from overheating.

Table 5 on page 26 lists the FRUs for the QFX5130 Switch and actions to take before removing them.

Table 5: FRUs in a QFX5130 Switch

FRU	Required Action
Power supply units	None.
Fan modules	None.
Optical transceivers	We recommend that you disable the interface using the `set interfaces` *`interface-name`* `disable` command before you remove the transceiver. See "Disconnect a Fiber-Optic Patch Cable" on page 190.

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 register this information can result in significant delay in receiving replacement parts when required. This note does not apply if you replace existing components with the same type of component.

RELATED DOCUMENTATION

QFX5130 Cooling System | 48

QFX5130 Power System | 60

QFX5130 Port Panel

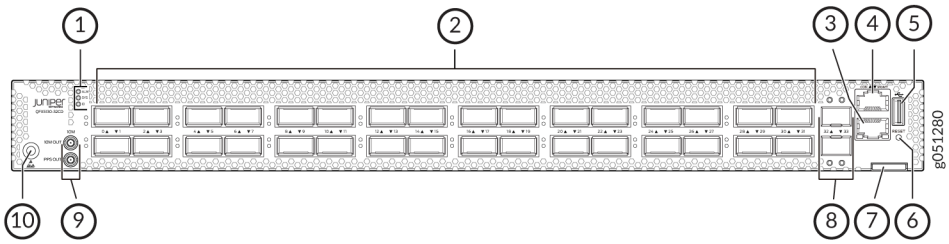
IN THIS SECTION

- Setting Port Speed and Channelization | 28
- QFX5130-32CD/QFX5130E-32CD Network LEDs | 30

QFX5130-48C Network LEDs | 33

The port panel of the QFX5130-32CD/QFX5130E-32CD has 32 high-speed ports that support transmission at 400-gigabit per second (Gbps), 100-Gbps, or 25-Gbps speeds. It also has two dedicated ports for 10 Gbps.

Figure 20: QFX5130-32CD/QFX5130E-32CD Port Panel



1— Chassis status LEDs	6— Reset button (do not use unless directed by JTAC)
2— 2 400-Gbps QSFP-DD network ports.	7— Chassis serial number pull-out
3— RJ-45 management port (100 Mbps/1000 Mbps/10000 Mbps)	8— 2 ports dedicated to 10-Gigabit Ethernet (GbE).
4— RJ-45 console port	9— Output connectors [10 megahertz (MHz) and 1 pulses per second (PPS)]
5— USB port (USB 2.0/3.0 standard)	10— Electrostatic discharge (ESD) grounding point

Network Ports for QFX5130-32CD

The QFX5130-32CD/QFX5130E-32CD network ports (**0** through **31**) support:

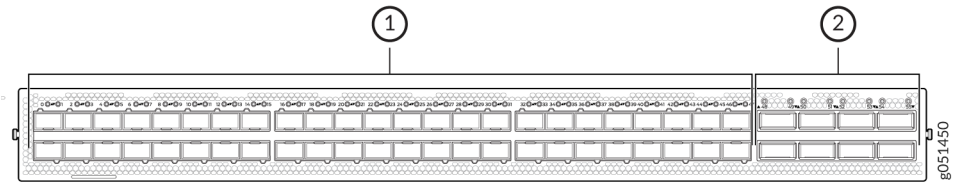
- 400-Gbps QSFP-DD direct attach copper (DAC) cables.
- 400-Gbps active optic cable (AOC) (starting in Junos OS Evolved Release 20.4R1).
- 100-Gbps QSFP28 transceivers.
- Channelizing a 100-Gbps QSFP28 port into four 25-Gbps SFP interfaces with active optical breakout (AOCBO) cables.

- Channelizing each 40-Gbps QSFP+ port into four 10-Gbps SFP+ ports with direct attach copper breakout (DACBO) cables. This support is available starting from Junos OS Evolved Release 20.4R1. OR This support is available in Junos OS Evolved Release 20.4R1 and later

The port panel of the QFX5130-48C and QFX5130-48CM switch has 48 100GbE ports that support SFP56-DD transceivers for server connectivity. The port panel also has 8 400GbE uplink ports that support QSFP-DD transceivers.

Network Ports for QFX5130-48C

Figure 21: QFX5130-48C Port Panel



1— 48 high-speed 100GbE network ports	2— 8 high-speed 400GbE uplink ports

The QFX5130-48C network ports (0 through 47) support:

- 100-Gbps SFP56-DD cables.
- 400-Gbps active optic cables (AOCs).
- Channelization of each 40 Gbps QSFP+ port to four 10-Gbps SFP+ ports with DACBO cables. This support is available in Junos OS Evolved Release 20.4R1 and later.

Network ports are 0-47; uplink ports are ports 48-55. We don't see 56 and 57 in the ports panel.

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

NOTE: When you use Finisar AOC SFP+ optical cables along with the QFX5130-48C switch, you need to pull upwards to pull out the module easily from the cage.

Setting Port Speed and Channelization

For QFX5130-32CD/QFX5130E-32CD, the default speed for ports 0 through 31 is 400 Gbps. Only QSFP-DD optics inserted in these ports will link without configuration. See Table 6 on page 29 .

NOTE: The last two SFP+ ports cannot support 1-GbE modules. These two ports support only 10-GbE modules.

Table 6: QFX5130-32CD/QFX5130E-32CD Port Speed Autodetection

Transceiver	Sets Default Speed to
QSFP-DD	400 Gbps, link up
QSFP28	400 Gbps, link down
QSFP	400 Gbps, link down
SFP+ (ports 32 and 33 only) and management port	10 Gbps, link up

NOTE: The QFX5130-32CD/QFX5130E-32CD does not support autonegotiation between devices.

For QFX5130-48C, the default speed for ports 0through 47 is 100 Gbps. Only SFP56-DD optics inserted in these ports will link without configuration. The default speed for ports 48 to 55 is 400 Gbps. Only QSFP-DD optics inserted in these ports will link without configuration. See Table 7 on page 29.

Table 7: QFX5130-48C and QFX5130-48CM Port Speed Autodetection

Transceiver	Sets Default Speed to
QSFP-DD	400 Gbps, link up
QSFP28	400 Gbps, link down
QSFP	400 Gbps, link down
SFP+ (ports 56 and 57 only)	10 Gbps, link up

Table 7: QFX5130-48C and QFX5130-48CM Port Speed Autodetection *(Continued)*

Transceiver	Sets Default Speed to
SFP56-DD	100 Gbps, link up

If a port already has a speed configured, you can manually configure the ports.To set the speed, use the `set interfaces et-0/0/0 speed speed` CLI command in configuration mode. For example, to set port **2** to 100 Gbps, use the following command:

```
user@host> configure
user@host#set interfaces et-0/0/2 speed 100g
```

NOTE: On QFX5130 devices, there is a single FPC and PIC, which is always 0.

You can channelize the port into four independent 25-Gigabit or 10-Gigabit Ethernet interfaces by configuring the number of subports and the speed. For more information, see https://apps.juniper.net/hct/ and https://www.juniper.net/documentation/us/en/software/junos/interfaces-ethernet-switches/index.html. You can use the `set interfaces et-0/0/x speed (25g | 10g) number-of-sub-ports number-of-sub-ports` command. For example, to configure a 40-Gbps port into four independent 10-Gbps interfaces, use the following command:

```
[edit interfaces]
user@host# set et-0/0/x speed 10g number-of-sub-ports 4
```

Be sure to `save` and `commit` your changes.

QFX5130-32CD/QFX5130E-32CD Network LEDs

The high-speed QSFP-DD network ports use a single bicolored LED to indicate link status, activity on the link, or a fault condition. The 10-Gbps SFP+ ports have separate bicolored LEDs; the left LED indicates link and activity and the right LED indicates fault conditions. See Figure 22 on page 31.

Figure 22: Link/Activity LEDs on the QFX5130-32CD/QFX5130E-32CD Switch

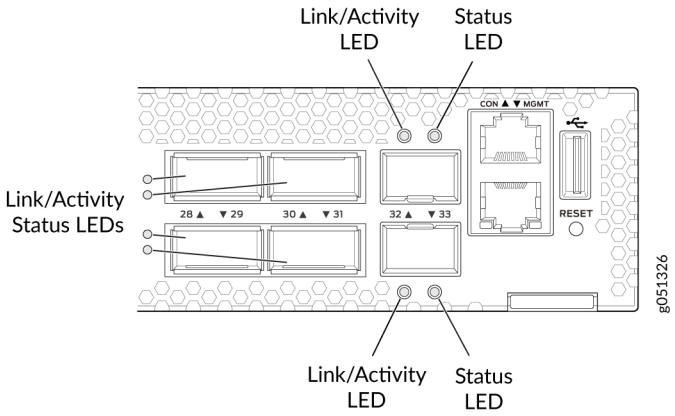


Table 8 on page 31 describes the various states of the network port LEDs for the QSFP-DD high-speed ports. Table 9 on page 32 describes how to interpret the link and activity LEDs and the status LEDs for the SFP+ ports.

Table 8: QSFP-DD Network Port LEDs on a QFX5130-32CD/QFX5130E-32CD

Color	State	Channelized	Description
Unlit	Off	No	Off is the default mode. The LED can be unlit even when power is present and a transceiver is present in the port. • The port is administratively disabled. • The link is down. • A fault is detected on the link.
		Yes	The port is administratively disabled.
Green	On steadily	No	A 400-Gbps or 100-Gbps link is established, but there is no activity.
		Yes	All channels or subports have links established, but there is no activity.

Table 8: QSFP-DD Network Port LEDs on a QFX5130-32CD/QFX5130E-32CD *(Continued)*

Color	State	Channelized	Description
	Flashing	No	A 400-Gbps or 100-Gbps link is established, and there is link activity.
		Yes	All the channels or subports have links established, and there is link activity.
	All LEDs blipping (slow flashing)	Either	The beacon feature is activated (service request).
Amber	Blinking	Either	One or more interface or connection errors have occurred.
	Flashing	Yes	At least one channel or subport has a link established, but not all channels or subports have links established.

Table 9: SFP+ Network Port LEDs on QFX5130-32CD/QFX5130E-32CD

LED	Color	State	Description
Link/Activity	Off	Link down	Link down—The port does not have a connection.
	Green	On steadily	Link up—The port has a connection, but there is no activity.
		Flashing	Active link—The port has a connection, and there is activity.
		Blipping (slow flashing)	Beacon–The port has a service request.
Status	Green	On steadily	The port is configured for 10 Gbps.

Table 9: SFP+ Network Port LEDs on QFX5130-32CD/QFX5130E-32CD *(Continued)*

LED	Color	State	Description
	Amber	Blinking	Fault–The port has an interface error.

QFX5130-48C Network LEDs

The high-speed QSFP-DD and SFP-DD network ports use a single bi-colored LED to indicate link status, activity on the link, or a fault condition. The 10-Gbps SFP+ ports have single bi-colored LEDs that indicate link, activity, and fault conditions. See Figure 23 on page 33.

Figure 23: Link/Activity LEDs on the QFX5130-48C Switch

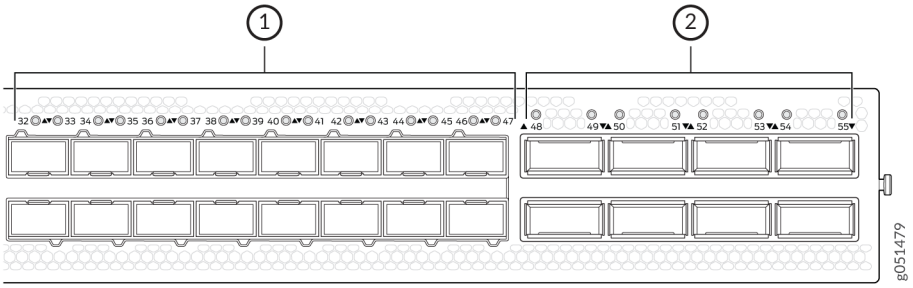


Table 10 on page 34 describe the various states of the network port LEDs for the QSFP-DD/SFP-DD high-speed ports. Table 11 on page 35describe how to interpret the link and activity LEDs and the status LEDs for SFP+ ports.

Table 10: QSFP-DD/SFP-DD Network Port LEDs on the QFX5130-48C and QFX5130-48CM Switch

Color	State	Channelized	Description
Unlit	Off	No	Off is the default mode. The LED can be unlit even when power is present and a transceiver is present in the port. • The port is administratively disabled. • The link is down. • A fault is detected on the link.
		Yes	The port is administratively disabled.
Green	On steadily	No	A 400-Gbps or 100-Gbps link is established, but there is no activity.
		Yes	All the channels or the subports have links established, but there is no activity.
	Flashing	No	A 400-Gbps or 100-Gbps link is established, and there is link activity.
		Yes	All the channels or the subports have links established, and there is link activity.
	All LEDs blipping (slow flashing)	Either	Indicates that the beacon feature is activated (service request).
Amber	Blinking	Either	One or more interface or connection errors have occurred.
	Flashing	Yes	At least one channel or subport has a link established, but not all channels or subports have links established.

Table 11: SFP+ Network Port LEDs on a QFX5130-48C Switch

Normal Mode	Beacon On (Port Location)	Description
Unlit	Off	The port is administratively disabled, there is no power, the link is down, or there is a fault.
Green	Green, blinking	Link is established, but there is no activity.
Green	Green, blinking	Link is established, and there is activity.
Red	Red, blinking	Link is not established, and there is a hardware transceiver failure.
Green	Green, blinking	Link is not established, and there is a loss of signal (LOS) detected.
Amber	Amber, blinking	Link is not established, and there is some other fault apart from the LOS and hardware transceiver failure.
Amber	Amber, blinking	The port has been explicitly disabled in the CLI.
Green	Green, blinking	Anything except disabled port but no transceiver is present.

RELATED DOCUMENTATION

Channelizing Interfaces on QFX3500, QFX3600, QFX5100, QFX10002, QFX10008, QFX10016, and EX4600 Switches

QFX5130 Network Cable and Transceiver Planning | **88**

Maintain Transceivers and Fiber Optic Cables on a QFX5130 Switch | **184**

QFX5130 Management Panel

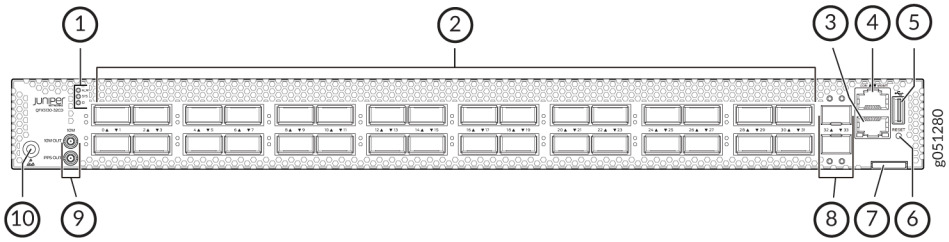
IN THIS SECTION

- QFX5130-32CD/QFX5130E-32CD Management Panel Overview | **36**
- QFX5130-32CD/QFX5130E-32CD Chassis Status LEDs | **37**
- QFX5130-48C Management Panel Overview | **41**
- QFX5130-48C Network LEDs | **44**

QFX5130-32CD/QFX5130E-32CD Management Panel Overview

The management panel of the QFX5130-32CD/QFX5130E-32CD is divided in two sections, with the port panel in between these sections.

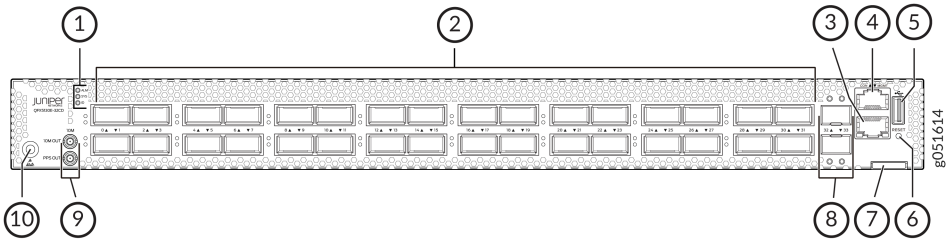
Figure 24: QFX5130-32CD Management Panel



1. Chassis status LEDs
2. 32 high-speed ports-QSFP-DD cages
3. RJ-45 management port (100 Mbps/1000 Mbps/10000 Mbps)
4. RJ-45 console port
5. USB port (USB 2.0/3.0 standard)
6. Reset button (do not use unless directed by JTAC)
7. Chassis serial number pull-out

8. 10-Gigabit Ethernet (GbE) ports–SFP+ cages
9. Output connectors (10 MHz and 1 PPS)
10. Electrostatic discharge (ESD) grounding point

Figure 25: QFX5130E-32CD Management Panel



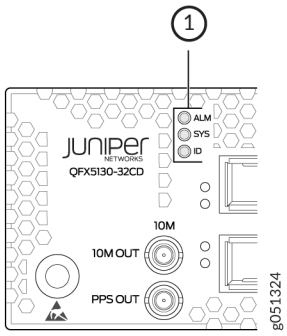
1. Chassis status LEDs
2. 32 high-speed ports-QSFP-DD cages
3. RJ-45 management port (100 Mbps/1000 Mbps/10000 Mbps)
4. RJ-45 console port
5. USB port (USB 2.0/3.0 standard)
6. Reset button (do not use unless directed by JTAC)
7. Chassis serial number pull-out
8. 10-Gigabit Ethernet (GbE) ports–SFP+ cages
9. Output connectors (10 MHz and 1 PPS)
10. Electrostatic discharge (ESD) grounding point

QFX5130-32CD/QFX5130E-32CD Chassis Status LEDs

You can find LEDs on these management ports:

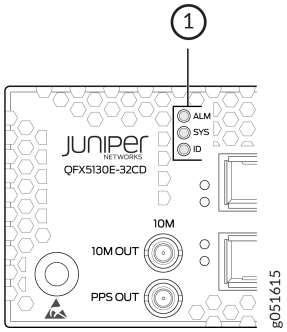
Table 12 on page 38 describes the chassis status LEDs on a QFX5130-32CD/QFX5130E-32CD, the colors and states, and the status they indicate. You can remotely view the colors of the three LEDs through the CLI by issuing the operational mode command `show chassis lcd`.

Figure 26: QFX5130-32CD Chassis Status LEDs



1— Chassis status LEDs

Figure 27: QFX5130E-32CD Chassis Status LEDs



1— Chassis status LEDs

Table 12: Chassis Status LEDs on QFX5130-32CD/QFX5130E-32CD Devices

Name	Color	State	Description
ALM–Alarm	Unlit	Off	There is no alarm.
	Red	On steadily	A major hardware fault has occurred, such as a temperature alarm, power failure, or media failure. You need to to take remedial action based on the nature of the alarm.

Table 12: Chassis Status LEDs on QFX5130-32CD/QFX5130E-32CD Devices *(Continued)*

Name	Color	State	Description
	Amber	On steadily	A minor system level alarm has occurred, such as a software error or a missing rescue configuration. You would need to to take remedial action based on the nature of the alarm.
SYS–System	Unlit	Off	The device is powered off or rebooted.
	Green	On steadily	Junos OS Evolved is loaded on the device, or the device is halted.
ID–Identification	Unlit	Off	The beacon feature is not enabled on the switch. Enable this feature by using the `request chassis beacon fpc 0 on` operational CLI command.
	Blue	Blinking	The beacon feature is enabled on the switch. Disable this feature by using the `request chassis beacon fpc 0 off` operational CLI command.

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

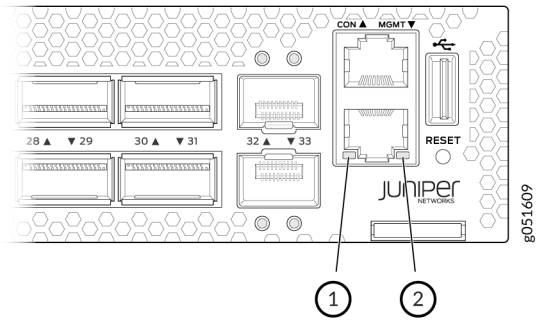
```
user@host> show chassis beacon fpc 0
    FPC 0                OFF
```



NOTE: When you reboot the device or the device is halted, the previous state of chassis status LED for alarms (Red/Amber/Unlit) is retained on reboot/restart.

The management port on a QFX5130-32CD/QFX5130E-32CD has two LEDs—one indicates link status and the other link activity. See Figure 28 on page 40. The management port is labeled **MGMT** for 10/100/1000BASE-T connections.

Figure 28: Management Port LEDs on a QFX5130-32CD/QFX5130E-32CD Switch



1— Status LED	2— Activity LED

Table 13 on page 40 describes the management port LEDs.

Table 13: Management Port LEDs on a QFX5130-32CD/QFX5130E-32CD Switch

LED	Color	State	Description
Link/Activity	Unlit	Off	No link is established. There is a fault or the link is down.
	Green	On steadily	A link is established, but there is no link activity.
		Blinking or flickering	A link is established, and there is link activity.
Status	Unlit	Off	Either the port speed is 10 Mbps or the link is down.
	Amber	On steadily	The port speed is 1 Gbps.
	Amber	Flashing	The port speed is 100 Mbps.

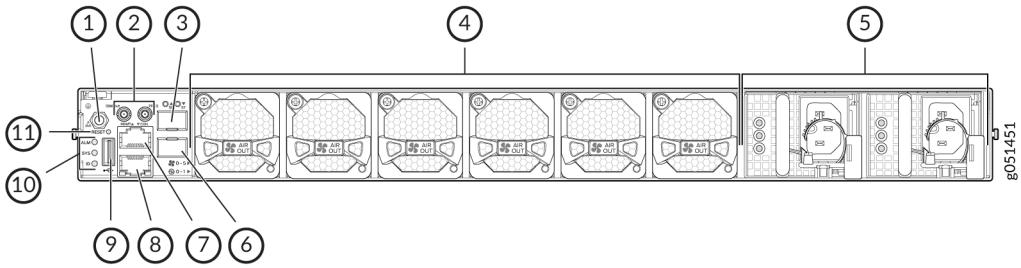
QFX5130-48C Management Panel Overview

IN THIS SECTION

- QFX5130-48C Chassis Status LEDs | **42**

The management panel of QFX5130-48C/QFX5130-48CM is located on the rear side of the switch.

Figure 29: QFX5130-48C Management Panel



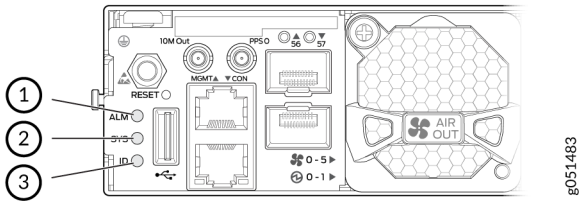
1– ESD point	7– RJ-45 management port
2– Clock input and output connectors [10 megahertz (MHz) and 1 pulses per second (PPS)]	8– RJ-45 console port
3– SFP+ port	9– USB slot
4– Fans	10– Chassis status LEDs
5– Power supply	11– Reset button
6– SFP+ port	

NOTE: To access the pinhole reset without any hindrance, you must use a USB drive with a maximum width of 16.5 mm. For reference, SanDisk Cruzer Force, HP v207 USB drives.

QFX5130-48C Chassis Status LEDs

QFX5130-48C/QFX5130-48CM has three LEDs that indicate the system status. You can find these LEDs on the left of the small form-factor pluggable (SFP) ports.

Figure 30: QFX5130-48C Chassis Status LEDs



1– Chassis alarm or fault	3– ID—Identification
2– System status	

Table 14 on page 42 describes the various states of network port LEDs for the SFP+ ports.

Table 14: Chassis Status LEDs on a QFX5130-48C Device

Name	Color	State	Description
ALM–Alarm	Unlit	Off	The switch is halted or there is no alarm.
	Red	On steadily	A major hardware fault has occurred, such as a temperature alarm, power failure, or media failure. You would need to to take remedial action based on the nature of the alarm.
	Yellow	On steadily	A minor system level alarm has occurred, such as a software error or a missing rescue configuration. You would need to to take remedial action based on the nature of the alarm.

Table 14: Chassis Status LEDs on a QFX5130-48C Device *(Continued)*

Name	Color	State	Description
	Amber (Red and Yellow)	Blinking	A major and minor system-level alarm has occurred and requires immediate action.
SYS–System	Unlit	Off	The device is powered off or halted.
	Green	Blinking	The Junos OS Evolved software is getting loaded on the device. This LED is also activated when the system shutdown is in progress.
	Green	On steadily	The Junos OS Evolved software is loaded on the device, and the system is operational.
ID–Identification	Unlit	Off	The beacon feature is not enabled on the switch. Enable this feature by using the `request chassis beacon fpc 0 on` operational CLI command.
	Blue	Blinking	The beacon feature is enabled on the switch. Disable this feature by using the `request chassis beacon fpc 0 off` operational CLI command.

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

```
user@host> show chassis beacon fpc 0
    FPC 0                OFF
```

You can remotely view the colors of the three LEDs through the CLI by issuing the operational mode command `show chassis led`.

NOTE: This is a sample output.

```
user@host> show chassis led
 ----------------------------------
LEDs status:
    Alarm LED : Blinking Red/Yellow
    Beacon LED: Off
    System LED: Green

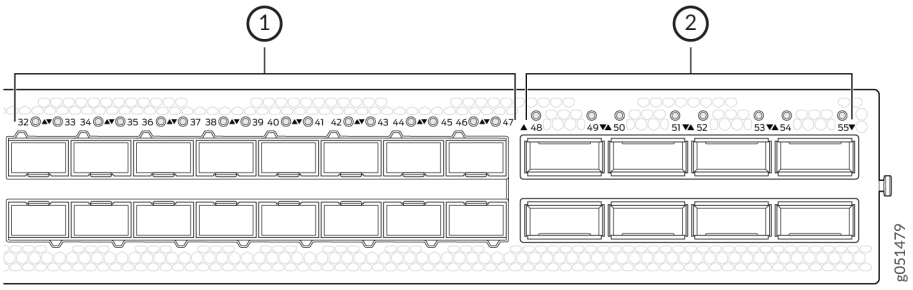
Interface               STATUS LED      LINK/ACTIVITY LED
-------------------------------------------------------
et-0/0/0                N/A             Off
et-0/0/1                N/A             Off
et-0/0/2                N/A             Off
et-0/0/3                N/A             Off
et-0/0/4                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
```

QFX5130-48C Network LEDs

To show link status, activity on the link, or a fault condition, each QSFP56-DD and SFP56 -DD network port has a single bicolored LED.

In an unchannelized port, the port link status for the corresponding top and bottom rows is shown above the top row of ports.

Figure 31: Link/Activity and Status LEDs on QFX5130-48C



1— LEDs that indicate status and channelizationfor each SFP56-DD port.	2— LEDs that indicate status and channelization for each QSFP56-DD port.

Each port has an individual status LED. The LEDs are positioned in a row above the top row of network ports. A network port status LED has four states, including the state when the device is turned off.

1. Off
2. Green
3. Amber
4. Red

Table 15: Link Activity and LED Status on QFX5130-48C

Transceiver Inserted	Normal	Breakout Cable Configuration State	Explicitly Disabled	Port State	Port Location On	Lane Display
Any	Green	No breakout	No	Up	Blinking green	Not applicable
Yes	Red	No breakout	No	Down because of transceiver hardware failure	Blinking red	Not applicable

Table 15: Link Activity and LED Status on QFX5130-48C *(Continued)*

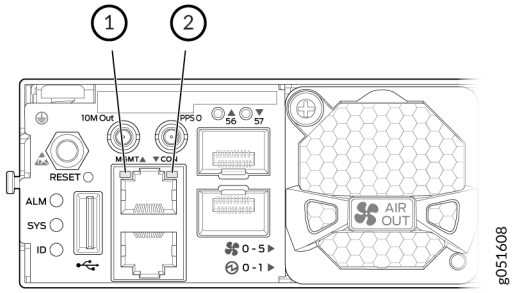
Transceiver Inserted	Normal	Breakout Cable Configuration State	Explicitly Disabled	Port State	Port Location On	Lane Display
Yes	Off	No breakout	No	Down because of a loss of signal (LOS) OR Down because of loss of signal (LOS) detection	Blinking green	Not applicable
Any	Amber	No breakout	No	Down because of any fault except LOS and transceiver hardware failure	Blinking amber	Not applicable
Any	Amber	No breakout	Yes	Port disabled on the CLI	Blinking amber	Not applicable
No	Off	Any	No	Anything except disabled port, but no transciever is present	Blinking green	Not applicable
Any	Green	Breakout	No	All breakout ports are up	Blinking green	Blinking green

Table 15: Link Activity and LED Status on QFX5130-48C *(Continued)*

Transceiver Inserted	Normal	Breakout Cable Configuration State	Explicitly Disabled	Port State	Port Location On	Lane Display
Yes	Red	Breakout	No	Hardware failure because of transceiver initialization error at the port level	Blinking red	Blinking red
Yes	Off	Breakout	No	All breakout ports down with an LOS.	Blinking green	Blinking green
Any	Amber	Breakout	Any	Any state other than the states described in this table.	Blinking amber	Blinking amber

The management port on a QFX5130-48C has two LEDs—one indicates link status and the other link activity. The management port is labeled **MGMT** for 10/100/1000BASE-T connections. See Figure 32 on page 47.

Figure 32: Management Port LEDs on a QFX5130-48C Switch



1— Status LED

2— Activity LED

Table 16 on page 48describes the management port LEDs on a QFX5130-48C switch.

Table 16: Management Port LEDs on a QFX5130-48C Switch

LED	Color	State	Description
Link/Activity	Unlit	Off	No link is established. There is a fault or the link is down.
	Green	On steadily	A link is established, but there is no link activity.
		Blinking or flickering	A link is established, and there is link activity.
Status	Unlit	Off	Either the port speed is 10 Mbps or the link is down.
	Amber	On steadily	The port speed is 1 Gbps.
	Amber	Flashing	The port speed is 100 Mbps.

SEE ALSO

- show system alarms
- request chassis beacon

QFX5130 Cooling System

IN THIS SECTION

- QFX5130 Cooling System Description | **49**
- QFX5130 Fan Module LED | **55**
- Fan Module Status | **57**

QFX5130 Cooling System Description

IN THIS SECTION

- Fan Modules | 49
- Do Not Install Components with Different Airflow or Wattage in the Switch | 55

The cooling system in a QFX5130 consists of six fan modules and a single fan in each power supply. The switch can ordered in one of two airflow directions:

- Airflow In (AFI)—Air enters the switch through the vents in the field-replaceable units (FRUs) and exhausts through the port vents.
- Airflow Out (AFO)—Air enters the switch through the port vents and exhausts through the vents in the FRUs.

CAUTION: Airflow In and Airflow Out fans and power supplies cannot be mixed in the same chassis.

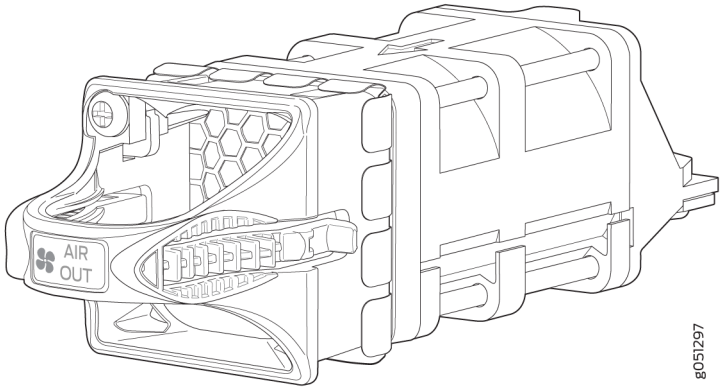
Fan Modules

The fan modules in QFX5130 devices are hot-insertable and hot-removable field-replaceable units (FRUs). These fan modules are designed for one of the two available airflow directions (AFI or AFO). The fan modules are color-coded for the airflow direction as well. The fan modules are installed in the fan module slots on the FRU panel.

The QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/ QFX5130-48CM cooling system consists of six fan modules numbered 0 through 5 when counting from left to right.

Figure 33 on page 50 shows the fan module for QFX5130-32CD and QFX5130E-32CD.

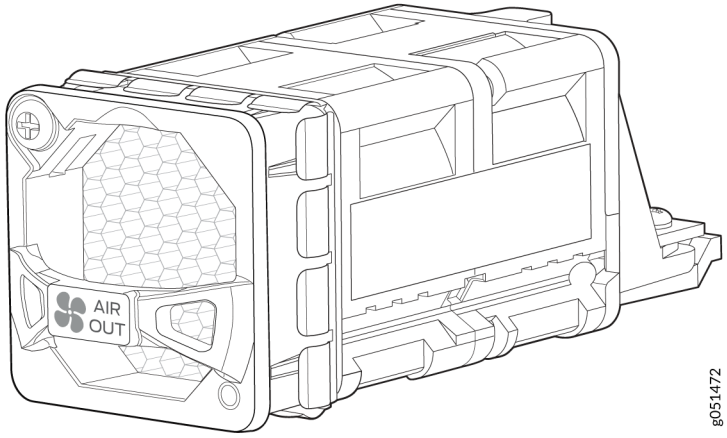
Figure 33: QFX5130-32CD/QFX5130E-32CD Fan Module



You remove and replace a fan module from the FRU end of the chassis. The QFX5130-32CD/QFX5130E-32CD switch can work with only five fans. However, we recommend that you run the switch with all six fans for redundancy and optimal switch operation. If a fan fails, or you want to run the switch without redundancy, leave the sixth fan in place to maintain proper airflow. When you replace a fan, the switch continues to operate for a limited period of time (3 minutes) without thermal alarms or shutdown.

Figure 34 on page 50 shows the fan module for QFX5130-48C/QFX5130-48CM.

Figure 34: QFX5130-48C Fan Module



You can remove and replace a fan module from the FRU end of the chassis. The QFX5130-48C switch cannot work with only five fans as the redundancy for this switch is supported only at the rotor level. We recommend that you run the device with all six fans for redundancy and optimal switch operation. If a fan rotor fails, or if you want to run the switch without redundancy, you

would need to leave the sixth fan in place to maintain proper airflow. When you replace a fan when the switch is running, the switch continues to operate for a limited period of time (240 seconds) without thermal alarms or shutdown.

The fan modules are available in two product variants that have different airflow directions—FRU-to-port airflow and port-to-FRU airflow. Table 17 on page 51 lists the available fan module product variants and the direction of airflow in them:

Table 17: Fan Modules in QFX5130 Switches

Fan Module	Airflow Diagram	Label on the Fan Module	Color of Fan Module	Direction of Airflow in the Fan Module	Power Supplies
QFX5130-32CD-FANAI/ QFX5130E-32CD-FANAI	Figure 35 on page 53	**AIR IN**	Juniper azure blue	FRU-to-port, that is, air comes in from the end of the switch with the fans; air exhausts from the switch end with ports (also known as *back-to-front airflow*).	You must install only those power supplies that have **AIR IN** labels in switches in which the fan modules have **AIR IN** labels.
QFX5130-32CD-FANAO/ QFX5130E-32CD-FANAO	Figure 37 on page 54	**AIR OUT**	Juniper gold	Port-to-FRU, that is, air comes in through vents on the end with ports; air exhausts out the end with the fans (also known as *front-to-back airflow*).	You must install only power supplies that have **AIR OUT** labels in switches in which the fan modules have **AIR OUT** labels.

Table 17: Fan Modules in QFX5130 Switches *(Continued)*

Fan Module	Airflow Diagram	Label on the Fan Module	Color of Fan Module	Direction of Airflow in the Fan Module	Power Supplies
QFX5130-48C-FANAFI	Figure 36 on page 53	**AIR IN**	Juniper azure blue	FRU-to-port, that is, air comes in from the end of the switch with the fans; air exhausts from the switch end with ports (also known as *back-to-front airflow*).	You must install only power supplies that have **AIR IN** labels in switches in which the fan modules have **AIR IN** labels.
QFX5130-48C-FANAFO	Figure 38 on page 54	**AIR OUT**	Juniper gold	Port-to-FRU, that is, air comes in through vents on the end with ports; air exhausts out the end with the fans (also known as *front-to-back airflow*).	You must install only power supplies that have **AIR OUT** labels in switches in which the fan modules have **AIR OUT** labels.

In data center deployments, position the switch in such a manner that the **AIR IN** labels on switch components are next to the cold aisle and **AIR OUT** labels on the switch components are next to the hot aisle.

Figure 35: Air-In Airflow Through QFX5130-32CD/QFX5130E-32CD



Figure 36: Air-In Airflow Through QFX5130-48C

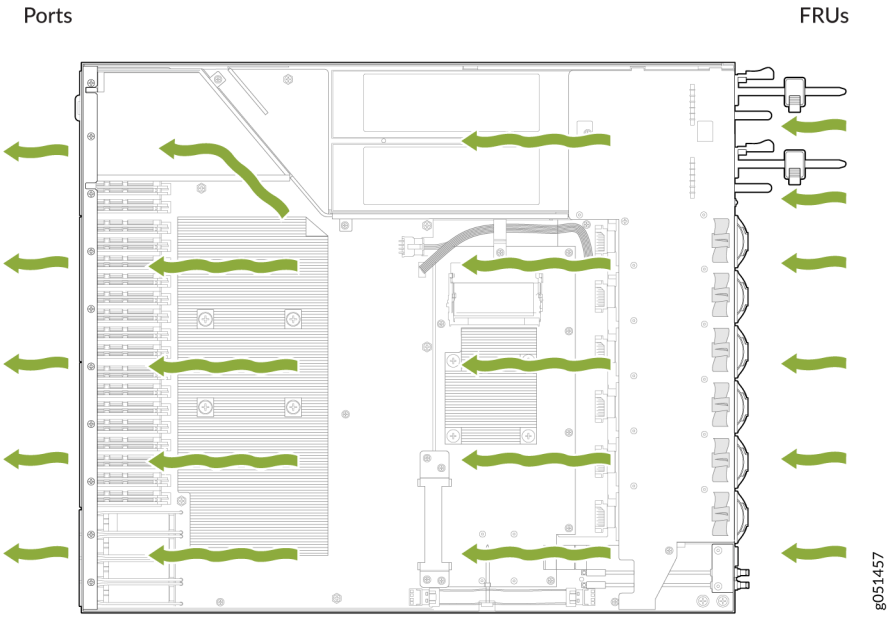


Figure 37: Air-Out Airflow Through QFX5130-32CD/QFX5130E-32CD

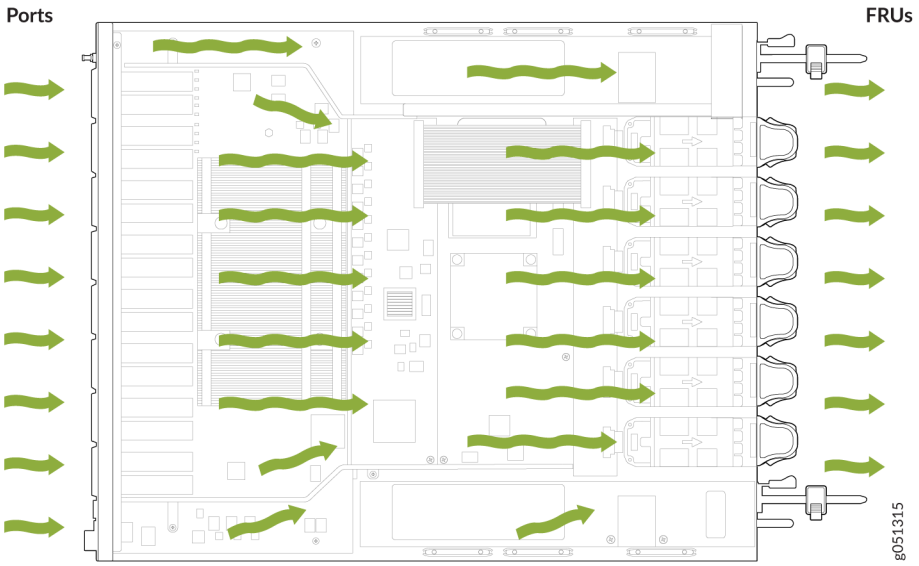
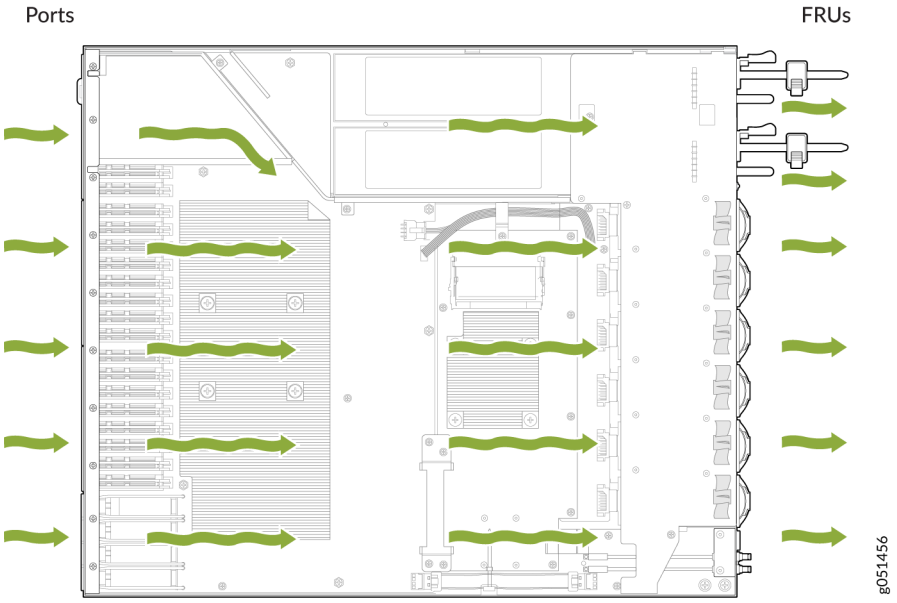


Figure 38: Air-Out Airflow Through QFX5130-48C



Do Not Install Components with Different Airflow or Wattage in the Switch

Do not mix airflow direction on fans or power supplies. You can use the color-coding on fan and power supply handles to ensure that the airflow direction matches. The handles on AFI fans and power supplies are azure blue, compared to the AFO fans and power supplies, which are Juniper gold.

Mixing components with different airflows in the same chassis hampers the performance of the cooling system of the switch and leads to overheating of the chassis.

CAUTION: 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. The system takes 3 minutes (for QFX5130-32CD/QFX5130E-32CD) or 240 seconds (for QFX5130-48C/QFX5130-48CM) to shut down after the red alarm threshold is reached.

Do not mix fan modules with different wattage. Use only the replacement fan modules that are designed for use with your product number. See Table 17 on page 51 for the correct part number for your QFX5130 switch.

CAUTION: Do not mix AC and DC power supplies in the same QFX5130 chassis.

However, if you need to convert a QFX5130 switch to have a different airflow, you can change the airflow pattern. To convert an AIR IN product variant to an AIR OUT product variant or an AIR OUT product variant to an AIR IN product variant, you must power off and replace all of the fans and power supplies at one time to use the new airflow direction. The system raises an alarm when the system is converted, which is normal.

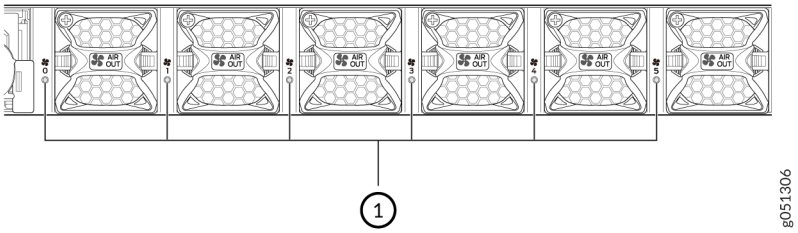
NOTE: If you change the switch to have a different airflow, be sure to update your JTAC install base to reflect the new configuration to ensure that service warranties and contracts remain˙.

QFX5130 Fan Module LED

On the QFX5130-32CD/QFX5130E-32CD switches, the fan module LEDs are located on the chassis, next to the fan module slot. On the QFX5130-48C switches, the fan module LEDs are located on the fan module. Figure 39 on page 56 shows the location of fan module LEDs next to

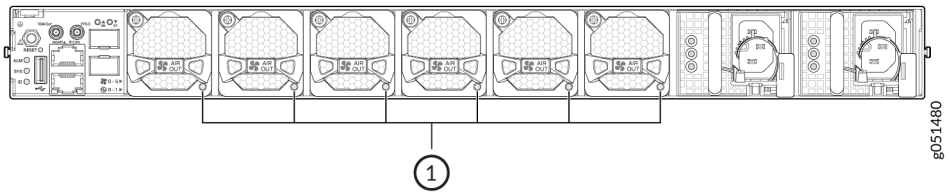
the fan module on a QFX5130-32CD/QFX5130E-32CD switch.Figure 40 on page 56 shows the location of fan module LEDs on a QFX5130-48C switch.

Figure 39: Fan Module LEDs on a QFX5130-32CD/QFX5130E-32CD



1— Fan module LED

Figure 40: Fan Module LEDs on a QFX5130-48C



1— Fan module LED

NOTE: The fans are numbered 0 through 5, starting from the fan closest to the ports.

Table 18 on page 56 describes the function of the fan tray LED.

Table 18: Fan Tray LED Behavior in a QFX5130 Switch

Name	Color	State	Description
Fan	Green	On steadily	The fan module is operating normally. The system has verified that the module is engaged, that the airflow is in the correct direction, and that the fan is operating correctly.

Table 18: Fan Tray LED Behavior in a QFX5130 Switch *(Continued)*

Name	Color	State	Description
	Amber (QFX5130-32CD/ QFX5130E-32CD)	Blinking	An error has been detected in the fan module. Replace the fan module as soon as possible. Either the fan has failed or it is seated incorrectly. To maintain proper airflow through the chassis, leave the fan module installed in the chassis until you are ready to replace it.
	Amber (QFX5130-48C	On steadily	Indicates one of the following conditions: • An error has been detected in the fan module. Replace the fan module as soon as possible. Either the fan has failed or it is seated incorrectly. To maintain proper airflow through the chassis, leave the fan module installed in the chassis until you are ready to replace it.

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.

Fan Module Status

You can check the status of fan modules by issuing the `show chassis temperature-thresholds`, `show system alarm`, or `show chassis environment` commands, or by looking at the LEDs next to each fan module. On the QFX5130-48C switches, the LED is located on the fan module. For example:

```
user@device> show chassis fan
Item                          Status      %   RPM
Measurement
```

```
Fan Tray 0 Fan 1               Ok        38% 11400 RPM
Fan Tray 0 Fan 2               Ok        37% 12150 RPM
Fan Tray 1 Fan 1               Ok        39% 11550 RPM
Fan Tray 1 Fan 2               Ok        37% 12150 RPM
Fan Tray 2 Fan 1               Ok        39% 11550 RPM
Fan Tray 2 Fan 2               Ok        37% 12150 RPM
Fan Tray 3 Fan 1               Ok        38% 11250 RPM
Fan Tray 3 Fan 2               Ok        36% 12000 RPM
Fan Tray 4 Fan 1               Ok        38% 11400 RPM
Fan Tray 4 Fan 2               Ok        37% 12150 RPM
Fan Tray 5 Fan 1               Ok        38% 11400 RPM
Fan Tray 5 Fan 2               Ok        36% 12000 RPM
```

```
user@device> show chassis environment
Class Item                           Status
Measurement

Temp  PSM 0                          Ok         25 degrees C / 77 degrees F
      PSM 1                          Ok         24 degrees C / 75 degrees F
      FPC 0 Sensor TopMiddle         Ok         29 degrees C / 84 degrees F
      FPC 0 Sensor TopFrontLeft      Ok         24 degrees C / 75 degrees F
      FPC 0 Sensor TopBack           Ok         32 degrees C / 89 degrees F
      FPC 0 Sensor BottomBack        Ok         32 degrees C / 89 degrees F
```

```
      FPC 0 Sensor CPUTopLeft          Ok         29 degrees C / 84 degrees F
      FPC 0 Sensor CPUBottomMiddle     Ok         35 degrees C / 95 degrees F
      FPC 0 Sensor CPUTopBackRight     Ok         29 degrees C / 84 degrees F
      FPC 0 Sensor TD4 Max Reading     Ok         50 degrees C / 122 degrees F
      Routing Engine 0 CPU Temperature Ok         45 degrees C / 113 degrees F
Fan   Fan Tray 0 Fan 1                 Ok         13000 RPM
      Fan Tray 0 Fan 2                 Ok         11800 RPM
      Fan Tray 1 Fan 1                 Ok         12800 RPM
      Fan Tray 1 Fan 2                 Ok         11900 RPM
      Fan Tray 2 Fan 1                 Ok         13000 RPM
      Fan Tray 2 Fan 2                 Ok         11800 RPM
      Fan Tray 3 Fan 1                 Ok         13000 RPM
      Fan Tray 3 Fan 2                 Ok         11800 RPM
      Fan Tray 4 Fan 1                 Ok         12800 RPM
      Fan Tray 4 Fan 2                 Ok         11700 RPM
      Fan Tray 5 Fan 1                 Ok         12700 RPM
      Fan Tray 5 Fan 2                 Ok         11800 RPM
```

The QFX5130 switch has a status LED (labeled **ST**) for each fan module. The LED indicates the status of all the fan modules.

RELATED DOCUMENTATION

Maintain the QFX5130 Cooling System | **175**

QFX5130 Power System

IN THIS SECTION

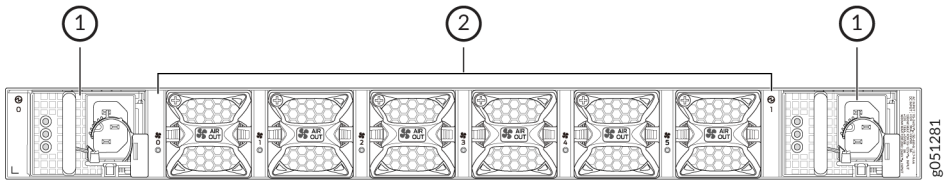
- QFX5130 Switch AC Power Supply Modules Description | **61**
- QFX5130 AC Power Specifications | **62**
- AC Power Cord with Type C15 Coupler Specifications | **64**
- QFX5130 AC Power Supply LEDs | **67**
- QFX5130 DC Power Supply Description | **68**
- QFX5130 DC Power Specifications | **70**
- QFX5130 DC Power Supply LED | **71**

The power supply module in the QFX5130 models are hot-removable and hot-insertable field-replaceable units (FRUs). You can install replacement power supplies without powering off the device or disrupting the switching function. The power supplies are installed at the factory and shipped with the chassis. All power supplies for QFX5130 are 1600 watt (W).

CAUTION: Use only the power supply module that meet the wattage and airflow requirements for your model number. In a chassis, do not install power supplies modules with different airflow or wattage.The system raises an alarm when you insert a power supply <unit/module> that has a different airflow or wattage into the chassis.

The power supplies for the QFX5130 switch are located on the FRU panel. See Figure 41 on page 60 and Figure 42 on page 61.

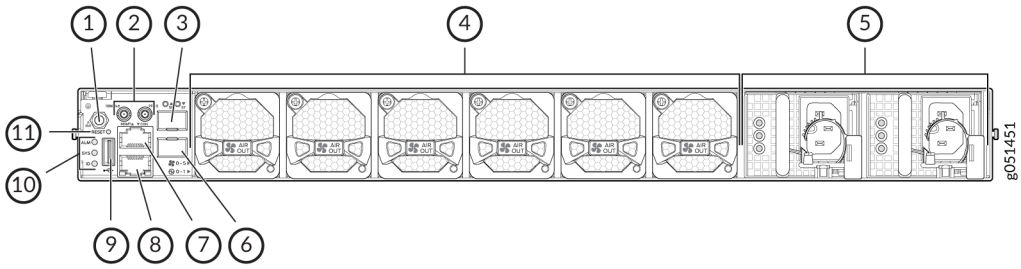
Figure 41: QFX5130-32CD/QFX5130E-32CD Power Supplies



1— Power supplies | 2— Fans

Figure 42 on page 61 shows the QFX5130-48C power supplies.

Figure 42: QFX5130-48C Power Supplies



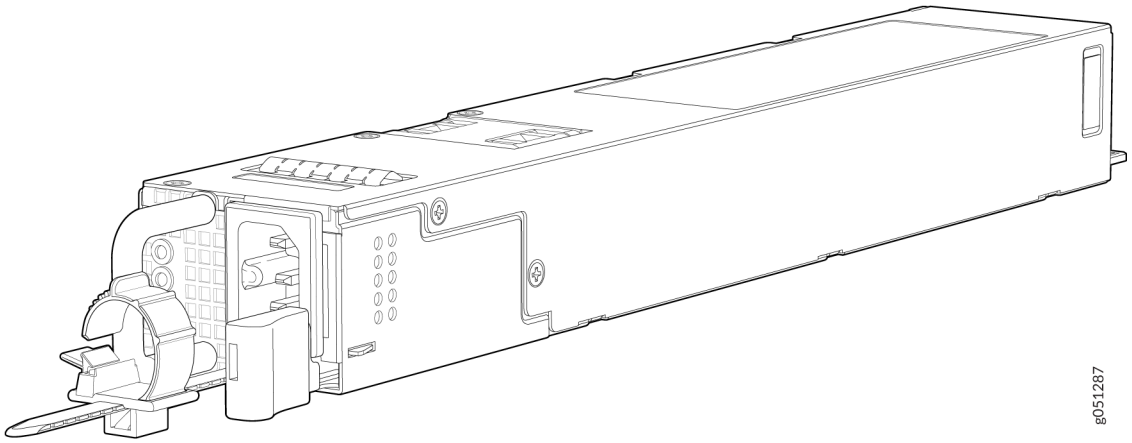
1– ESD point	7– RJ-45 management port
2– Clock input and output connectors [10 megahertz (MHz) and 1 pulses per second (PPS)]	8– RJ-45 console port
3– 10GbE ports–SFP+ cages	9– USB slot
4– Fan modules	10– Chassis status LED
5– Power supplies	11– Reset button
6– 10GbE ports–SFP+ cages	

NOTE: The power supply unit requires 2-3 seconds to display the output once it is powered on. When you use the 'power-off' command and there is a disruption in power supply (When input power turns off and on within 180 seconds from getting powered off), the power supply module on the chassis stops supplying power from the power supply module to the chassis.

QFX5130 Switch AC Power Supply Modules Description

QFX5130 switches ship with two power supplies. While QFX5130 switches can operate with the minimum number of power supplies, maximum power supplies are required to have redundancy. See Figure 43 on page 62 that depicts an example of these power supplies.

Figure 43: 1600-W AC Power Supply for QFX5130 Switches



An AC power supply for the QFX5130 switch is 1600 W.

The power supply provides FRU-to-port or port-to-FRU airflow depending on the model and variant you purchase. The power supplies have color-coded indicators to indicate the airflow direction.

CAUTION: Verify that the airflow direction on the power supply handle matches the direction of airflow in the chassis. Ensure that each power supply you install in the chassis has the same airflow direction. If you install power supplies with two different airflow directions, Junos OS raises an alarm. If you need to convert the airflow pattern on a chassis, you must change out all the fans and power supplies at one time to use the new direction.

To avoid electrical injury, carefully follow the instructions in "Connect the QFX5130 Switch to Power" on page 155.

QFX5130 AC Power Specifications

Table 19 on page 63and Table 20 on page 63 describe the AC power specifications for the QFX5130 switches.

Table 19: AC Power Specifications for QFX5130-32CD/QFX5130E-32CD Switches

Item	Specification
AC input voltage	Operating range: 100 - 240 VAC
AC input line frequency	50/60 Hz
AC input current rating	100-127 VAC, 12A / 200-240 VAC, 8A
Typical power consumption	323 W
Maximum power consumption	839 W

Table 20: AC Power Specifications for QFX5130-48C/QFX5130-48CM Switches

Item	Specification
AC input voltage	Operating range: 100 - 127 VAC / 200 - 240 VAC
AC input line frequency	50/60 Hz
AC input current rating	100 -127 VAC, 12A / 200 - 240VAC, 9A
Typical power consumption	219 W
Maximum power consumption	609 W

NOTE: Maximum power consumption measured at 40C ambient temperature with SR optics at 100% load with IMIX traffic. Typical power consumption measured at 25C ambient temperature with DACs at 50% load with IMIX traffic, excluding transceivers. Power consumption is subject to operating condition and unit-to-unit variations.

The QFX5130 AC model uses power cords with type C15 couplers. See Table 21 on page 64 .

AC Power Cord with Type C15 Coupler Specifications

Detachable AC power cords are shipped with the chassis, if you include them as part of your order. Some country-specific plugs are only available as spare orders. The coupler is type C15 as described by International Electrotechnical Commission (IEC) standard 60320. The plug end of the power cord fits into the power source outlet that is standard for your geographical location.

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 with these guidelines.

Table 21 on page 64 lists the AC power cord specifications provided for each country or region.

Table 21: AC Power Cord Specifications

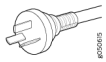
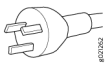
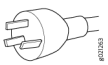
Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number	Spare Juniper Model Number	Graphic
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	–	CBL-PWR-C15M-HITEMP-AR	
Australia	250 VAC, 10 A, 50 Hz	AS/NZS 3112-2000 Type SAA/3	CG_CBL-C15-02-AU	CBL-PWR-C15M-HITEMP-AU	
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	–	CBL-PWR-C15M-HITEMP-BR	
China	250 VAC, 10 A, 50 Hz	GB 2099/GB 1002 Type PRC/3	CG_CBL-C15-02-CH	CBL-PWR-C15M-HITEMP-CH	

Table 21: AC Power Cord Specifications *(Continued)*

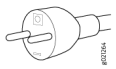
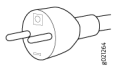
Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number	Spare Juniper Model Number	Graphic
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CG_CBL-C15-02-EU	CBL-PWR-C15M-HITEMP-EU	
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	Europe patch cord - Straight,C15 Plug (EN 60320) to C14 Connector (EN 60320)-	CBL-PWR-C15-C14-EU		
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16 Type I/3G	CG_CBL-C15-02-IT-CH	CBL-PWR-C15M-HITEMP-IT	
Japan	125 VAC, 15 A, 50 Hz	JIS 8303 Type 498GJ	CG_CBL-C15-02-JP	CBL-PWR-C15M-HITEMP-JP	
North America	125 VAC, 15 A, 50 Hz	NEMA 5-15 Type 498G	CG_CBL-C15-02-US	CBL-PWR-C15M-HITEMP-US	
North America	125 VAC, 15 A, 50 Hz	US Patch cord - Straight,C15 Plug (EN 60320) to C14 Connector (EN 60320)	CBL-PWR-C15-C14-US	CBL-PWR-C15M-HITEMP-US	
South Africa and India	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/3	–	CBL-PWR-C15M-HITEMP-SA	

Table 21: AC Power Cord Specifications *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number	Spare Juniper Model Number	Graphic
South Korea and some parts of Europe	250 VAC, 10 A, 50 Hz	CEE(7) VII Type VIIG	–	CBL-PWR-C15M-HITEMP-KR	
Switzerland	250 VAC, 10 A, 50 Hz	SEV 1011/6534-2 Type 12G	CG_CBL-C15-02-SZ	CBL-PWR-C15M-HITEMP-SZ	
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363/A Type BS89/13	CG_CBL-C15-02-UK	CBL-PWR-C15M-HITEMP-UK	

If you require PDU cables (IEC or jumper-style power cords) for DC PDU connectivity, order them separately as spares as shown in Table 22 on page 66 below.

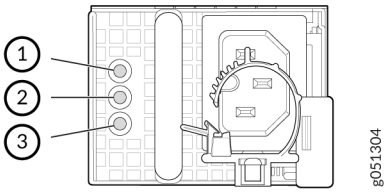
Table 22: Separately Orderable Interconnect/PDU cables

Country/Region	Part Number	Connector (PDU End)	Connector (Device End)
United States, Japan	CBL-C15-C14-US-2M	C15	C14
Taiwan	CBL-C15-C14-TW-2M	C15	C14
European Union, South Africa, and Israel	CBL-C15-C14-EU-2M	C15	C14
India	CBL-C15-C14-IN-2M	C15	C14
China, Brazil, and South Korea	CBL-C15-C14-CN-2M	C15	C14

QFX5130 AC Power Supply LEDs

The QFX5130 uses three LEDs to indicate power status. Figure 44 on page 67 shows the location of the LEDs on the JPSU-1600W-1UAC power supply.

Figure 44: Power Supply Module LEDs for QFX5130



1— AC input okay	3— Fault condition
2— DC output okay	

Table 23 on page 67 describes the LED behavior on the QFX5130 AC power supplies.

Table 23: AC Power Supply LEDs on a QFX5130 Switch

LED	Color	State	Description
Input OK	Unlit	Off	The power supply is disconnected from the power source, or there is no input from the socket.
	Green	On steadily	Power is coming into the power supply.
	Amber	On Steadily	One PSM out of the two is powered on.
Output OK	Unlit	Off	The power supply is disconnected from the power source, or there is no input from the socket.
	Green	On steadily	The power supply is sending out power correctly.
	Green	Blinking	The power supply is disabled by hardware or software.

Table 23: AC Power Supply LEDs on a QFX5130 Switch *(Continued)*

LED	Color	State	Description
Fault	Amber	On steadily	An error has been detected in the power supply. Replace the power supply as soon as possible. To maintain proper airflow through the chassis, leave the power supply installed in the chassis until you are ready to replace it.
		On steadily	One power supply module is powered on with AC or DC input and the other power supply module is not powered on. The LED would be on steadily for the power supply module that is not powered on. **NOTE**: The input and output LEDs would be OFF.
		Blinking	The power supply is an invalid model.

NOTE: If the input and output LEDs are unlit, either the AC power cord is not installed properly or the power supply fuse has failed. If the input LED is lit and the output LED is unlit, the AC power supply is installed properly, but the power supply has an internal failure.

QFX5130 DC Power Supply Description

The two power supply modules (PSMs) in QFX5130 switches are hot-removable and hot-insertable field-replaceable units (FRUs). The PSMs are preinstalled in the switch. The DC PSMs in QFX5130 switches are 1600 watt (W) with dual feeds for power resiliency. You can install replacement PSMs without powering off the switch or disrupting the switch function.

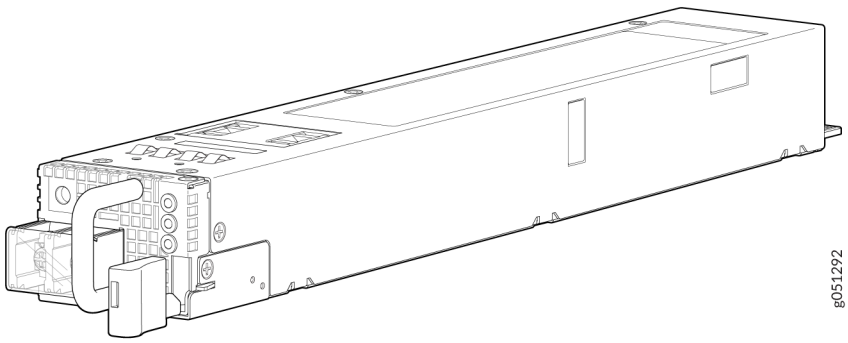
NOTE: Both the AI and AO PSMs look similar. Be sure to use the correct PSM for your chassis product model.

CAUTION: In a chassis, do not install PSMs with different airflow directions. The system raises an alarm when a PSM that has a different airflow direction is inserted into the chassis.

Table 24: DC PSM Models with Specifications

Model	Product Number	Airflow Direction	Color Indicator
QFX5130-32CD/ QFX5130E-32CD	JPSU-1600W-1UDCAFI	Airflow In (FRU-to-port)	Juniper azure blue handle
QFX5130-32CD/ QFX5130E-32CD	JPSU-1600W-1UDCAFO	Airflow In (port-to-FRU)	Juniper gold handle
QFX5130-48C	JPSU-1600W-1UDCAFI	Airflow in (FRU-to-port)	Juniper azure blue handle
QFX5130-48C	JPSU-1600W-1UDCAFO	Airflow Out (port-to-FRU)	Juniper gold handle

Figure 45: DC Power Supply in QFX5130 Switches



CAUTION: Verify that the airflow direction on the power supply handle matches the direction of airflow in the chassis. Ensure that each power supply you install in the chassis has the same airflow direction. If you install power supplies with two different airflow directions, Junos OS Evolved raises an alarm. If you need to convert the airflow pattern on a chassis, you must change out all the fans and power supplies at one time to use the new direction.

Table 25 on page 70 shows the characteristics of the power supply and the direction of the airflow.

Table 25: DC Power Supply Summary

Model	Wattage	Product Number	Direction of Airflow	Color of Power Supply Handle
QFX5130	1600-W	JPSU-1600W-1UDCAFI	Airflow In (FRU-to port)	Juniper azure blue handle
	1600-W	JPSU-1600W-1UDCAFO	Airflow Out (port-to-FRU)	Juniper gold handle

We recommend that the 48 volts direct current (VDC) facility DC source be equipped with a circuit breaker rated at 40 A (–48 VDC) minimum, or as required by local code.

To avoid electrical injury, carefully follow the instructions in "Maintain the QFX5130 Power System" on page 179.

QFX5130 DC Power Specifications

Table 26 on page 70 describes the DC power specifications for the DC version of QFX5130 switches.

Table 26: DC Power Specifications for a QFX5130-32CD/QFX5130E-32CD Switch

Item	Specifications
DC Input Voltage	• Rated operating voltage: -48 VDC through -60 VDC • Operating voltage range: –40 VDC through –72 VDC
DC Input Current Rating	35 A maximum
Typical Power	341 W
Maximum Power	871 W

Table 27: DC Power Specifications for a QFX5130-48C/QFX5130-48CM Switch

Item	Specifications
DC Input Voltage	• Rated operating voltage: -48 VDC through -60 VDC • Operating voltage range: –40 VDC through –72 VDC
DC Input Current Rating	40 A maximum
Typical Power	238 W
Maximum Power	587 W

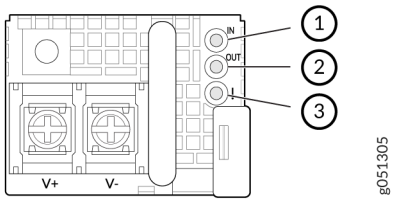
NOTE: Maximum power consumption measured at 40C ambient temperature with SR optics at 100% load with IMIX traffic. Typical power consumption measured at 25C ambient temperature with DACs at 50% load with IMIX traffic, excluding transceivers. Power consumption is subject to operating condition and unit-to-unit variations.

We recommend that the 48 VDC facility DC source be equipped with a circuit breaker rated at 40 A (80 VDC) minimum, or as required by local code.

QFX5130 DC Power Supply LED

Figure 46 on page 72 shows the location of the DC power supply status LEDs.

Figure 46: QFX5130 Status LEDs



1— Input OK	3— Fault
2— Output OK	

Table 28 on page 72 describes the status LED behavior on QFX5130 power supplies.

Table 28: DC Power Supply LEDs on a QFX5130 Switch

LED	Color	State	Description
Input OK	Unlit	Off	The power supply is disconnected from the power source, or there is no input from the socket.
	Green	On steadily	There is DC output power from the power supply.
	Amber	On Steadily	One PSM out of the two is powered on.
Output OK	Unlit	Off	The power supply is running at the power limit or is over current.
	Green	On steadily	The power supply is operating correctly.
	Green	Blinking	The PSM is disabled by software or hardware.
Fault	Amber	On steadily	A power supply fault or error has occurred in the power supply. Replace the power supply as soon as possible. To maintain proper airflow through the chassis, leave the power supply installed in the chassis until you are ready to replace it.

Table 28: DC Power Supply LEDs on a QFX5130 Switch *(Continued)*

LED	Color	State	Description
		On steadily	One power supply module is powered on with AC or DC input and the other power supply module is not powered on. The LED would be on steadily for the power supply module that is not powered on. **NOTE**: The input and output LEDs would be OFF.
		Blinking	The power supply module is disabled by software or hardware.

RELATED DOCUMENTATION

Maintain the QFX5130 Power System | **179**

3

CHAPTER

Site Planning, Preparation, and Specifications

IN THIS CHAPTER

- QFX5130 Site Preparation Checklist | **75**
- QFX5130 Site Guidelines and Requirements | **77**
- QFX5130 Network Cable and Transceiver Planning | **88**
- QFX5130 Cable Specifications and Pinouts | **96**

QFX5130 Site Preparation Checklist

The checklist in Table 29 on page 75 summarizes the tasks you need to perform when preparing a site for a QFX5130 installation.

Table 29: 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.	"QFX5130 Site Guidelines and Requirements" on page 77		
Power			
Measure the distance between external power sources and the switch installation site.	—		
Calculate the power consumption and requirements.	"QFX5130 Power System" on page 60		
Rack or Cabinet			
Verify that your rack or cabinet meets the minimum requirements for the installation of the switch.	• "QFX5130 Site Guidelines and Requirements" on page 77 • "QFX5130 Rack Requirements" on page 84 • "QFX5130 Cabinet Requirements" on page 86 • "Determining QFX5130 Optical Interface Support" on page 88		

Table 29: Site Preparation Checklist *(Continued)*

Item or Task	For More Information	Performed by	Date
Plan the rack or cabinet location, including the required space clearances.	"QFX5130 Clearance Requirements for Airflow and Hardware Maintenance" on page 80		
Secure the rack or cabinet to the floor and building structure.	—		
Cables			
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.	"Determining QFX5130 Optical Interface Support" on page 88		
Plan the cable routing and management.	—		

RELATED DOCUMENTATION

https://www.juniper.net/documentation/us/en/hardware/qfx5130/topics/topic-map/qfx5130-unpack-mount.html

https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/index.html

QFX5130 Site Guidelines and Requirements

IN THIS SECTION

- QFX5130 Environmental Requirements and Specifications | **77**
- General Site Guidelines | **79**
- QFX5130 Grounding Cable and Lug Specifications | **79**
- QFX5130 Clearance Requirements for Airflow and Hardware Maintenance | **80**
- QFX5130 Chassis Physical Specifications | **82**
- Site Electrical Wiring Guidelines | **83**
- QFX5130 Rack Requirements | **84**
- QFX5130 Cabinet Requirements | **86**

QFX5130 Environmental Requirements and Specifications

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

Follow these environmental guidelines:

- The site must be as dust-free as possible, because dust can clog air intake vents and filters, reducing the efficiency of the switch cooling system.
- Maintain ambient airflow for normal switch operation. If the airflow is blocked or restricted, or if the intake air is too warm, the switch might overheat. As a result, the switch temperature monitor might shuts down the device to protect the hardware components.

Table 30 on page 78 provides the required environmental conditions for normal switch operation.

Table 30: QFX5130 Switch Environmental Tolerances

Description	Tolerance
Altitude	• QFX5130-32CD-AFO/QFX5130E-32CD-AFO, QFX5130-48C-AFO—At 32° F through 104° F (0° C through 40° C), there is no performance degradation up to 6000 feet (1828.8 meters). • QFX5130-48C-AFI—At 32° F through 104° F(0° C through 40° C), there is no performance degradation up to 6000 feet (1828.8 meters). • QFX5130-32CD-AFI/QFX5130E-32CD-AFI—At 32° F through 86° F (0° C through 30° C), there is no performance degradation up to 6000 feet (1828.8 meters).
Relative humidity, operating	Normal operation ensured in relative humidity range of 5% through 90%, noncondensing
Temperature	For QFX5130-32CD-AFO/QFX5130E-32CD-AFO and QFX5130-48C-AFO: • Normal operation is ensured in the temperature range of 32° F through 104° F (0° C through 40° C). • Nonoperating storage temperature in shipping container: -40° F through 158° F (-40° C through 70° C) For QFX5130-32CD-AFI/QFX5130E-32CD-AFI and QFX5130-48C-AFI: • Normal operation is ensured in the temperature range of 32° F through 104° F (0° C through 40° C). • Nonoperating storage temperature in shipping container: –40° F through 158° F (–40° C through 70° C)
Seismic	QFX5130-32CD switches are designed to comply with Zone 4 earthquake requirements of NEBS GR-63-CORE, Issue 3. QFX5130-48C and QFX5130-48CM switches are designed to comply with DC NEBS GR 3160 standard, except for 400-Gbps high power ZR/ZR-M Optics.

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.

QFX5130 Grounding Cable and Lug Specifications

The switch must be adequately grounded before power is connected to ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements.

You must install the QFX5130 switches in a restricted-access location and ensure that the chassis is always properly grounded. QFX5130 switches have a two-hole protective grounding terminal on the chassis. We recommend that you use this protective grounding terminal as the preferred method for grounding the chassis regardless of the power supply configuration. However, if additional grounding methods are available, you can also use those methods. For example, you can use the grounding wire in the AC power cord or use the grounding terminal or lug on a DC power supply. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.



WARNING: The switch is a pluggable type A equipment that is installed in a restricted-access location. The switch has a separate protective earthing terminal 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, all intrabuilding copper cabling used for SFP+ and QSFP+ ports must be shielded and grounded at both ends.

CAUTION: Before switch installation begins, 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:

- The grounding lug required for the protective earthing terminal on a QFX5130-32CD/QFX5130E-32CD is a Panduit LCD10-10A-L or equivalent (not provided). The grounding lug accommodates 14–10 AWG (2–5.3 mm²) stranded wire.
- The grounding lug required for the protective earthing terminal on a QFX5130-48C/QFX5130-48CM switch is a Panduit LCD6-14A-L or equivalent (not provided). The grounding lug should accommodate 6 AWG (10 mm²) stranded wire.
- The grounding cable that you provide for a QFX5130-32CD/QFX5130E-32CD must be 14 AWG (2 mm²), minimum 60° C wire, or as permitted by the local code.
- The grounding cable that you provide for a QFX5130-48C/QFX5130-48CM switch must be 6 AWG (10 mm²), minimum 90° C wire, or as permitted by the local code.
- For QFX5130-32CD/QFX5130-32CD, ensure that you have two 10-32 x 1/4 in. washers and screws to attach the cable and bracket (not provided).
- For QFX5130-48C/QFX5130-48CM, ensure that you have four 10-32 x 1/4 in. washers and screws to attach the cable and bracket (not provided).

QFX5130 Clearance Requirements for Airflow and Hardware Maintenance

When planning the site for installing a QFX5130 switch, you must allow sufficient clearance around the installed chassis (see Figure 47 on page 81).

Figure 47: Clearance Requirements for Airflow and Hardware Maintenance for a QFX5130-32CD/QFX5130E-32CD

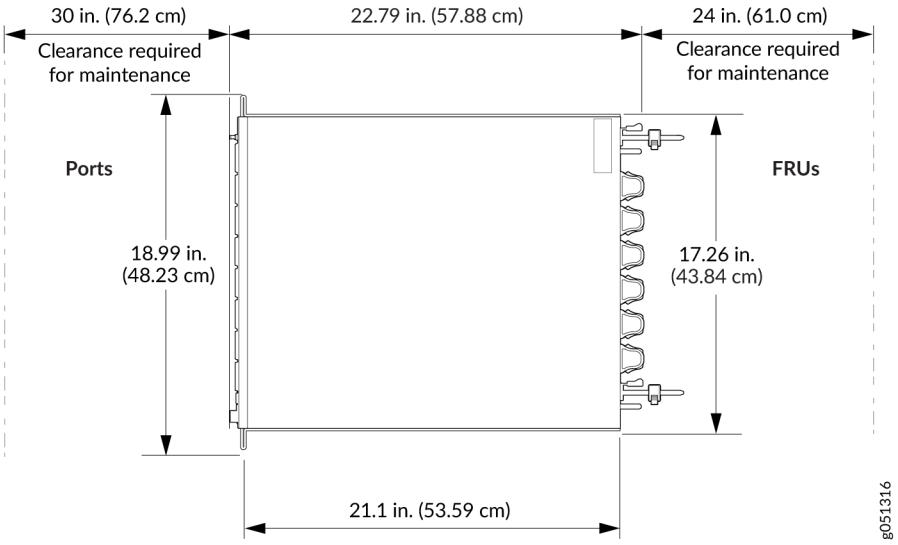
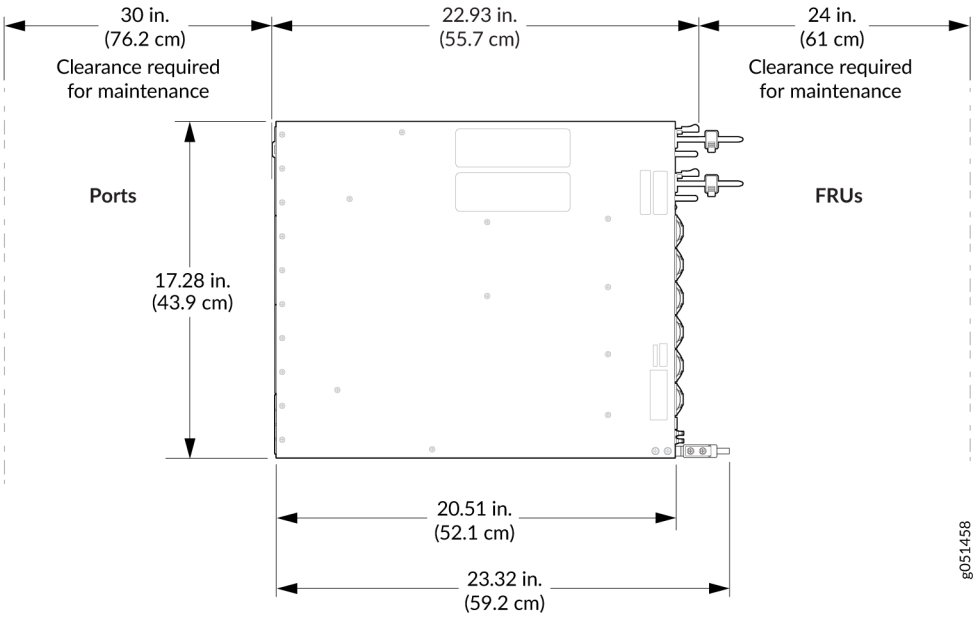


Figure 48: Clearance Requirements for Airflow and Hardware Maintenance for a QFX5130-48C



- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See "QFX5130 Cooling System" on page 48 for more information about the airflow through the chassis.
- If you mount a QFX5130-32CD/QFX5130E-32CD in a rack or cabinet with other equipment, ensure that the exhaust from other equipment does not blow into the intake vents of the chassis.
- Leave at least 24 in. (61 cm) both in front of and behind the QFX5130 switch (for both QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/QFX5130-48CM). For service personnel to remove and install hardware components, you must leave adequate space at the front and back of the switch. NEBS GR-63 recommends that you allow at least 30 in. (76.2 cm) in front of the rack or cabinet and 24 in. (61 cm) behind the rack or cabinet.

QFX5130 Chassis Physical Specifications

The QFX5130 Switch is a rigid sheet-metal structure that houses the hardware components (see Table 31 on page 82).

Table 31: Physical Specifications for the QFX5130 Switch Models

Product Model	Height	Width	Depth	Weight
QFX5130-32CD/ QFX5130E-32CD	1.72 in. (4.3 cm)	17.26 in. (43.8 cm)	21.1 in. (53.59 cm)	24.5 lb (11.11 kg) with power supplies and fans installed
QFX5130-32CD ORv3-Compliant Switch with Tray Assembly	3.64 in. (9.27 cm)	21.14 in. (53.7 cm)	31.4 in. (80 cm)	41 lb (18.6 kg)
QFX5130-48C	1.72 in. (4.3 cm)	17.28 in. (43.9 cm)	20.5 in. (52.1 cm)	27 lb (12.24 kg) with power supplies and fans installed

Site Electrical Wiring Guidelines

Table 32 on page 83 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 32: Site Electrical Wiring Guidelines

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

QFX5130 Rack Requirements

QFX5130 switches are designed to be installed on four-post racks.

Rack requirements consist of:

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

Table 33 on page 84 provides the rack requirements and specifications for QFX5130 switches.

Table 33: Rack Requirements for QFX5130 Switches

Rack Requirement	Guidelines
Rack type	Use a four-post rack that provides bracket holes or hole patterns spaced at 1-U (1.75 in. or 4.45 cm) increments and that meets the size and strength requirements to support the weight. A U is the standard rack unit defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D) published by the Electronics Industry Association (EIA).
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 rack that provides holes spaced at that distance.

Table 33: Rack Requirements for QFX5130 Switches *(Continued)*

Rack Requirement	Guidelines
Rack size and strength	• Ensure that the rack complies with the standards for a 19-in. rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D) published by EIA. • A 600-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 (href="http://www.etsi.org">http://www.etsi.org). The horizontal spacing between the rails in a rack that complies with this standard is usually wider than the device's mounting brackets, which measure 19 in. (48.26 cm) from outer edge to outer edge. Use approved wing devices to narrow the opening between the rails as required. • Ensure that the rack rails are spaced widely enough to accommodate the external dimensions of the switch chassis. The outer edges of the front-mounting brackets extend the width to 19 in. (48.26 cm). • For four-post installations, the front and rear rack rails must be spaced between 28 in. (71.1 cm) and 32 in. (81.2 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 the rack.
Rack connection to building structure	• Secure the rack to the building structure. • If earthquakes are a possibility in your geographical area, secure the rack to the floor. • Secure the rack to the ceiling brackets as well as to the wall or floor brackets for maximum stability.

QFX5130 Cabinet Requirements

You can mount the QFX5130 switches in an enclosure or cabinet that contains a four-post 19-in. open rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310-D) published by the Electronics Industry Association (EIA).

Cabinet requirements consist of:

- Cabinet size and clearance
- Cabinet airflow requirements

Table 34 on page 86 provides the cabinet requirements and specifications for QFX5130 switches.

Table 34: Cabinet Requirements for the QFX5130

Cabinet Requirement	Guidelines
Cabinet size and clearance	The minimum cabinet size for accommodating a QFX5130 device is 32 in. (81.2 cm) deep. Large cabinets improve airflow and reduce the chance of overheating.

Table 34: Cabinet Requirements for the QFX5130 *(Continued)*

Cabinet Requirement	Guidelines
Cabinet airflow requirements	When you mount the switch in a cabinet, ensure that ventilation through the cabinet is sufficient to prevent overheating. • Ensure that the cool air supply you provide through the cabinet adequately dissipates the thermal output of the switch (or switches). • Ensure that the cabinet allows the hot exhaust air of the chassis to exit the cabinet without recirculating into the switch. An open cabinet (without a top or doors) that employs hot air exhaust extraction from the top ensures the best airflow through the chassis. If the cabinet contains a top or doors, perforations in these elements assist with removing the hot air exhaust. • The QFX5130 fans exhaust hot air either through the vents on the port panel or through the fans and power supplies. Install the switch in the cabinet in a way that maximizes the open space on the FRU side of the chassis. This maximizes the clearance for critical airflow. • Route and dress all the cables to minimize the blockage of airflow to and from the chassis. • Ensure that the spacing of rails and adjacent cabinets allows for proper clearance around the switch and the cabinet.

RELATED DOCUMENTATION

Unpack and Mount the QFX5130 Switch | **115**

QFX5130 Network Cable and Transceiver Planning

IN THIS SECTION

- Determining QFX5130 Optical Interface Support | 88
- Cable Specifications for QSFP+, QSFP28, and QSFP-DD Transceivers | 89
- Understand QFX Series Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 91
- Calculate Power Budget and Power Margin for Fiber-Optic Cables | 93

Determining QFX5130 Optical Interface Support

You can find information about the optical transceivers supported on your Juniper device by using the Hardware Compatibility Tool. In addition to transceiver and connection type, the optical and cable characteristics–where applicable–are documented for each transceiver. The Hardware Compatibility Tool enables you to search by product, displaying all the transceivers supported on that device, or category, by interface speed or type. The list of supported transceivers for the QFX5130 series is located at https://apps.juniper.net/hct/.



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:

- Supported operating ambient temperature range of optics for QFX5130-48C-AFO (AC) & QFX5130 -48C-AFO (DC) : SDD (100G) optics with up to 5W power dissipation, QDD (400G) optics with up to 14W power dissipation, and QDD (400G) optics with up to 23W power dissipation (only in port 53 and port 55) supported for the entire working temperature range (40°C, 6000 feet).
- Supported operating ambient temperature range of optics for QFX5130-48C-AFI (AC) and QFX5130-48C-AFI (DC) : SDD (100G) optics with up to 5W power dissipation, QDD (400G) optics with up to 14W power dissipation supported for the entire working temperature range (40°C, 6000ft). QDD (400G) Optics such as ZR/ZR-M with a power dissipation upto 23W are supported only on port numbers 53 and 55 for the maximum temperature range (40°C, sea-level).

NOTE: For interoperability with other QFX Series switches, ensure autonegotiation on the QFX5130-32CD/QFX5130E-32CD 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 35 on page 90 describes the signals on each fiber. Table 36 on page 90 shows the pin-to-pin connections for proper polarity.

Table 35: QSFP+ and QSFP28 Optical Module Receptacle Pinouts

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

Table 36: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts

Pin	Pin
1	12
2	11

Table 36: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts *(Continued)*

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

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

IN THIS SECTION

- Signal Loss in Multimode and Single-Mode Fiber-Optic Cables | **92**
- Attenuation and Dispersion in Fiber-Optic Cable | **92**

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

- Calculate Power Budget for Fiber-Optic Cables | **93**
- How to Calculate Power Margin for Fiber-Optic Cables | **94**

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):

$P_B = P_T - P_R$

$P_B = -15 \text{ dBm} - (-28 \text{ dBm})$

$P_B = 13 \text{ dB}$

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 37 on page 94 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 37: 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

Table 37: Estimated Values for Factors Causing Link Loss *(Continued)*

Link-Loss Factor	Estimated Link-Loss Value
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 37 on page 94. 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 37 on page 94. 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.

RELATED DOCUMENTATION

Maintain Transceivers and Fiber Optic Cables on a QFX5130 Switch | 184

QFX5130 Cable Specifications and Pinouts

IN THIS SECTION

- Cable Specifications for Console and Management Connections for the QFX Series | **96**
- RJ-45 Management Port Connector Pinout Information | **97**
- Console Port Connector Pinouts for the QFX Series | **98**
- QSFP-DD Port Connector Pinout Information | **99**
- SFP-DD Connector Pinout Information | **105**
- QSFP+, QSFP28, and QSFP56 Port Connector Pinout Information | **107**
- SFP, SFP+, and SFP28 Port Connector Pinout Information | **110**
- USB Port Specifications for the QFX Series | **112**

Cable Specifications for Console and Management Connections for the QFX Series

Table 38 on page 96 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 38: Cable Specifications for Console and Management Connections for the QFX Series

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

Table 38: Cable Specifications for Console and Management Connections for the QFX Series *(Continued)*

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

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 39 on page 97 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 39: RJ-45 Management Port Connector Pinout Information

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

Table 39: RJ-45 Management Port Connector Pinout Information *(Continued)*

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

Console Port Connector Pinouts for the QFX Series

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

Table 40 on page 99 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 40: Console Port Connector Pinouts for the QFX Series

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

QSFP-DD Port Connector Pinout Information

Table 41 on page 99 provides the pinout mapping for quad SFP double-density (QSFP-DD) port connectors.

Table 41: QSFP-DD Network Port Pinout Mapping

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

Table 41: QSFP-DD Network Port Pinout Mapping *(Continued)*

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

Table 41: QSFP-DD Network Port Pinout Mapping *(Continued)*

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

Table 41: QSFP-DD Network Port Pinout Mapping *(Continued)*

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

Table 41: QSFP-DD Network Port Pinout Mapping *(Continued)*

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

Table 41: QSFP-DD Network Port Pinout Mapping *(Continued)*

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

SFP-DD Connector Pinout Information

Table 42 on page 105 provides the pinout mapping for Small Form Factor Pluggable Double Density (SFP-DD) port connectors.

Table 42: SFP-DD Network Port Pinout Mapping

Pin	Symbol	Description
1	GND	Ground
2	TxFault	Module Fault Indication; optionally configured as legacy SFP Module Fault Indication via TWI as described in the SFP-DD MIS
3	TxDisable	Transmitter Disable for legacy SFP channel
4	SDA	Management I/F data line
5	SCL	Management I/F clock
6	Mod_ABS	Module Absent
7	Speed1	Rx Rate Select for legacy SFP channel
8	RxLOS	Rx Loss of Signal for legacy SFP channel
9	Speed2	Tx Rate Select for legacy SFP channel
10	GND	Ground
11	GND	Ground
12	RD0-	Inverse Received Data Out for legacy SFP+ channel
13	RD0+	Received Data Out for legacy SFP+ channel

Table 42: SFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
14	GND	Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	GND	Ground
18	TD0+	Transmit Data In for legacy SFP channel
19	TD0-	Inverse Transmit Data In for legacy SFP channel
20	GND	Ground
21	GND	Ground
22	IntL/TxFaultDD	Interrupt; optionally configured as TxFaultDD via TWI as described in the SFP-DD MIS
23	TxDisableDD	Transmitter Disable for DD channel
24	ePPS	Precision Time Protocol (PTP) reference clock input
25	LPMode	Low Power Mode Control
26	ResetL	Module Reset
27	Speed1DD	Rx Rate Select for DD channel
28	RxLOSDD	Loss of Signal for DD channel

Table 42: SFP-DD Network Port Pinout Mapping *(Continued)*

Pin	Symbol	Description
29	Speed2DD	Tx Rate Select for DD channel
30	GND	Ground
31	GND	Ground
32	RD1-	Inverse Received Data Out for DD channel
33	RD1+	Received Data Out for DD channel
34	GND	Ground
35	VccR1	Receiver Power for DD channel
36	VccT1	Transmitter Power for DD channel
37	GND	Ground
38	TD1+	Transmit Data In for DD channel
39	TD1-	Inverse Transmit Data In for DD channel
40	GND	Ground

QSFP+, QSFP28, and QSFP56 Port Connector Pinout Information

Table 43 on page 108 provides the pinout mapping for the quad small-form factor pluggable (QSFP) connectors QSFP+, QSFP28, and QSFP56.

Table 43: 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 43: 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 43: 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 44 on page 110 provides the pinout mapping for small-form factor pluggable (SFP) connectors, SFP+ connectors, and SFP28 connectors.

Table 44: SFP, SFP+, and SFP28 Port Connector Pinout Mapping

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

Table 44: 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 44: 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 the QFX Series:

- 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.

NOTE: To access the pinhole reset without any hindrance, you must use a USB drive with a maximum width of 16.5 mm. For reference, SanDisk Cruzer Force, HP v207 USB drives.

RELATED DOCUMENTATION

Connect the QFX5130 Switch to External Devices | **166**

4

CHAPTER

Initial Installation and Configuration

IN THIS CHAPTER

- Unpack and Mount the QFX5130 Switch | **115**
- How to Install a ORv3-Compliant Switch with Tray Assembly (2OU) in Your ORv3 Rack | **145**
- Connect the QFX5130 Switch to Power | **155**
- Connect the QFX5130 Switch to External Devices | **166**
- Register Products—Mandatory to Validate SLAs | **169**
- Perform Initial Software Configuration for QFX5130 Switches | **170**

Unpack and Mount the QFX5130 Switch

IN THIS SECTION

- Unpack a QFX5130 Switch | **115**
- Update Base Installation Data | **118**
- Mount the QFX5130-32CD/QFX5130E-32CD by Using the QFX5K-4PST-RMK-E Rack Mount Kit | **118**
- Mount the QFX5130-32CD/QFX5130E-32CD Switch in a Rack by Using the QFX5220-32CD-4PRMK Rack Mount Kit | **144**

Unpack a QFX5130 Switch

The QFX5130 chassis is a rigid sheet-metal structure that houses the hardware components. A QFX5130 switch is shipped in a cardboard carton, secured with foam packing material.

CAUTION: The QFX5130 switch is maximally protected inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack a QFX5130 switch:

1. Move the shipping carton to a staging area as close to the installation site as possible, but where you have enough room to remove the system components.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Pull out the packing material holding the switch in place.
5. Verify the contents against the inventory included in the box. Table 45 on page 116 lists the inventory of components supplied with a QFX5130-32CD/QFX5130E-32CD.
6. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Table 45: Inventory of Components Supplied with a QFX5130-32CD/QFX5130E-32CD Device

Component	Quantity
Chassis	1
Fan modules	6, factory installed
Power supplies • JPSU-1600W-1UACAFO for AC airflow out systems • JPSU-1600W-1UACAFI for AC airflow in systems	2, factory installed
Rack mount kit - QFX5K-4PST-RMK-E QFX5K-4PST-RMK-E rack mount kit consists of the following parts: • A pair of front and rear-mounting rails • A pair of mounting brackets • 16 flat-head M4 x 6mm Phillips screws • A pair of spacers Spare rack mount kits order numbers: • QFX5K-4PST-RMK-E • QFX5220-32CD-4PRMK	1
Rack mount assembly drawing	1
Power cords with plugs appropriate to your geographical location	2
Documentation roadmap card	1
Warranty	1

Table 46: Inventory of Components Supplied with a QFX5130-48C

Component	Quantity
Chassis	1
Fan modules	6, factory installed
Power supplies • JPSU-1600W-1UACAFO for AC airflow- out systems • JPSU-1600W-1UACAFI for AC airflow-in systems	2, factory installed
Rack mount kit - QFX5130-1RU-4PRMK	1
Rack mount assembly drawing	1
Power cords with plugs appropriate to your geographical location	2
Documentation roadmap card	1
Warranty	1

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

- RJ-45 to DB-9 adapter (JNP-CBL-RJ45-DB9)
- RJ-45 to USB-A adapter (JNP-CBL-RJ45-USBA)
- RJ-45 to USB-C adapter (JNP-CBL-RJ45-USBC)

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

Update Base Installation Data

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

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

Mount the QFX5130-32CD/QFX5130E-32CD by Using the QFX5K-4PST-RMK-E Rack Mount Kit

IN THIS SECTION

- Mount the Device by Using the QFX5K-4PST-RMK-E Rack Mount Kit On a Square Hole Rack | **119**
- Mount the Device by Using the QFX5K-4PST-RMK-E Rack Mount Kit On a Threaded Hole Rack | **124**
- Mount QFX5130-32CD/QFX5130E-32CD on a Four-Post Rack Using the QFX5220-32CD-4PRMK Rack Mount Kit | **129**
- Mount QFX5130-32CD/QFX5130E-32CD on a Four-Post Cabinet | **131**
- Mount the QFX5130-48C/QFX5130-48CM Switch by Using the QFX5130-1RU-4PRMK Rack Mount Kit on a Square Hole Rack | **135**
- Mount Your QFX5130-48C/QFX5130-48CM Switch by Using the QFX5130-1RU-4PRMK Rack Mount Kit on a Threaded-Hole Four-Post Rack | **137**

You can mount a QFX5130-32CD/QFX5130E-32CD switch on a square hole or threaded hole four-post 19-in. rack by using the partial tool-less QFX5K-4PST-RMK-E rack mount kit (RMK) that is shipped along with the product, as default.

The QFX5K-4PST-RMK-E rack mount kit consists of the following parts:

- A pair of front and rear-mounting rails
- A pair of mounting brackets
- 16 flat-head M4 x 6mm Phillips screws
- A pair of spacers

A four-post installation evenly supports the device by all four corners.

Mount the Device by Using the QFX5K-4PST-RMK-E Rack Mount Kit On a Square Hole Rack

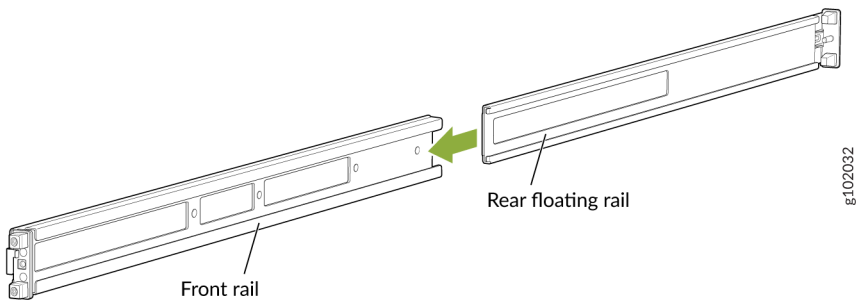
Ensure that you have the following tools and parts available:

- An ESD grounding strap—not provided.
- Number 2 Phillips (+) screwdriver—not provided
- A pair of front and rear mounting rails. These mounting rails attach to the front and rear rack posts—provided with the rack mount kit
- A pair of side mounting brackets and 16 flat head M4 x 6mm Phillips screws. These brackets attach to the device if not pre-installed—provided with the rack mount kit
- A pair of Spacers—provided with the rack mount kit

To mount the device on four posts in a rack by using the QFX5K-4PST-RMK-E rack mount kit:

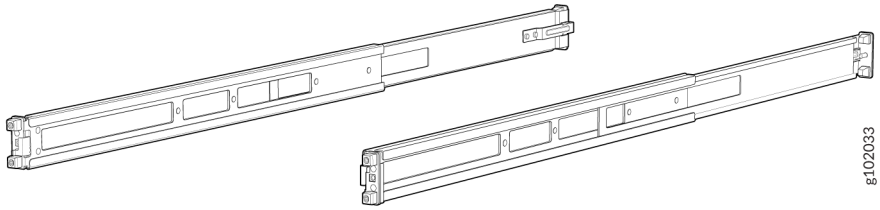
1. Wrap and fasten the ESD grounding strap to your bare wrist and an connect the other end of the strap to the ESD point on the device.
2. Assemble the mounting rails.
   a. Slide the rear floating rails into the front rails. See Figure 49 on page 120.

Figure 49: Assemble the Mounting Rails



b. Mounting rails assembled. See Figure 50 on page 120.

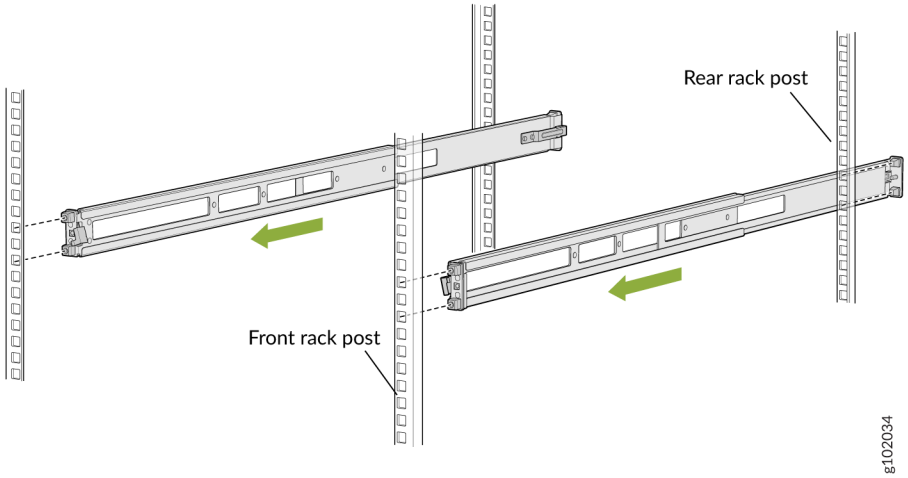
Figure 50: Front and Rear Rails Assembled



3. Attach the mounting rails to the rack.

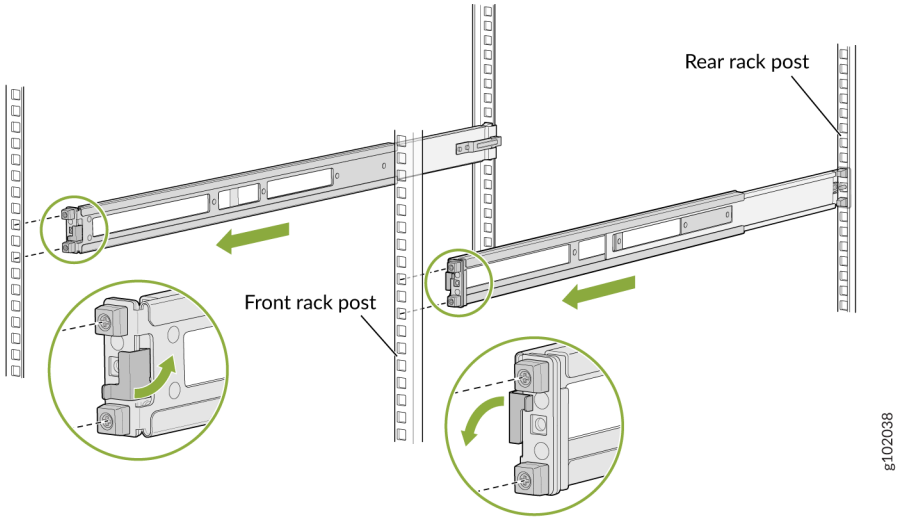
   a. Standing in front of the rack, align the guide blocks of the rear mounting rails with the rear-post holes. Pull the rear mounting rails toward the front of the rack to lock the rails in place. You will hear a click sound when the latch locks into the corresponding rack holes. See Figure 51 on page 121.

Figure 51: Install the Rear Floating Rails



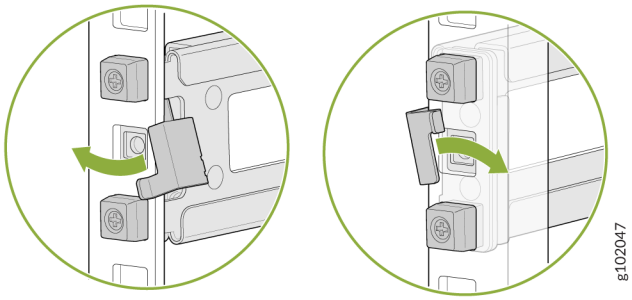
b. Move the latch lock on the front mounting rail to open position, slide the front mounting rail, and insert the guide blocks into the front rack posts. See Figure 52 on page 121.

Figure 52: Install the Front Mounting Rails



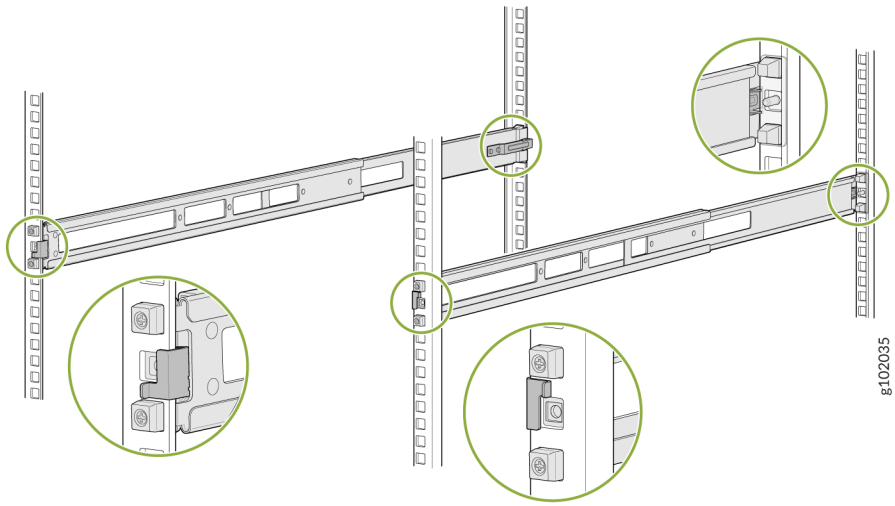
c. Push the lock latch to the locked position. See Figure 53 on page 122.

Figure 53: Front Mounting Rail's Lock Latch



d. Visually ensure that the front and rear latches are locked into place on the mountingrails. See Figure 54 on page 122.

Figure 54: Mounting Rails Installed and Locked

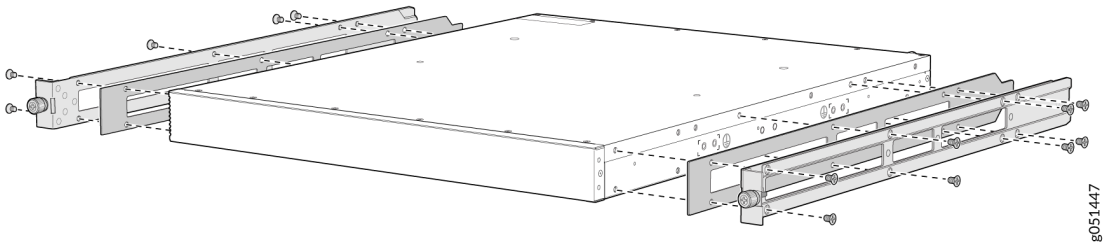


4. Attach the spacers and the mounting brackets to the device if not pre-installed. If your device already has the spacers and mounting brackets pre-installed than skip this step and move to the next step.

   a. Align the holes on the spacer and the mounting bracket with the screw holes that are on the side panel of the chassis.

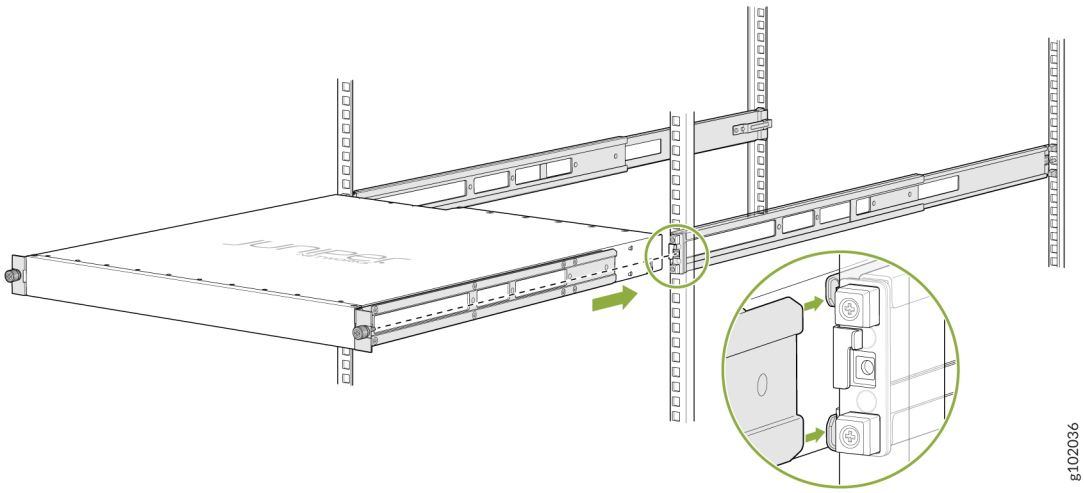
   b. Insert the flat head M4 x 6mm Phillips screws to attach the spacer and the mounting bracket into the aligned holes on the chassis (see Figure 55 on page 123). Tighten the screws.

Figure 55: Attach the Spacers and the Mounting Brackets to the Device



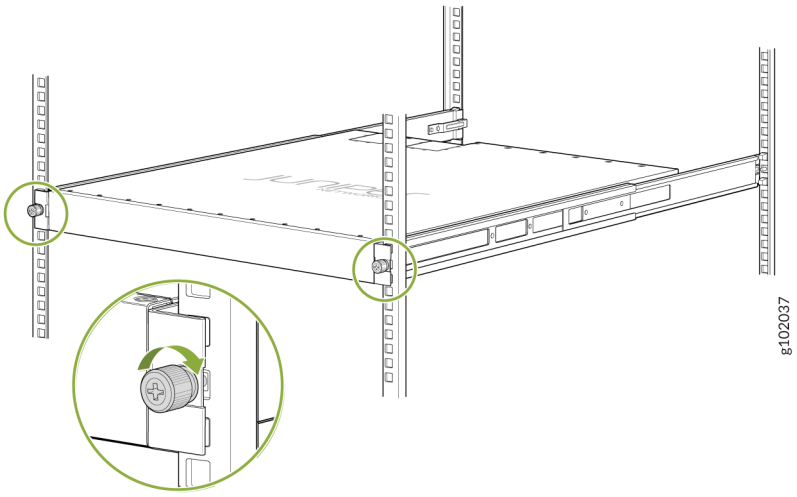
5. Position the device in such a manner that the **AIR OUT** labels on components are next to the hot aisle.
6. Lift the device and position it in the rack, aligning the side mounting brackets with the mounting rails. Slide the device into the channels of the rack mounting rails. See Figure 56 on page 123.

Figure 56: Slide the Device into the Rack



7. Tighten the two thumbscrews to secure the device. See Figure 57 on page 124.

Figure 57: Tighten Thumb Screws



Mount the Device by Using the QFX5K-4PST-RMK-E Rack Mount Kit On a Threaded Hole Rack

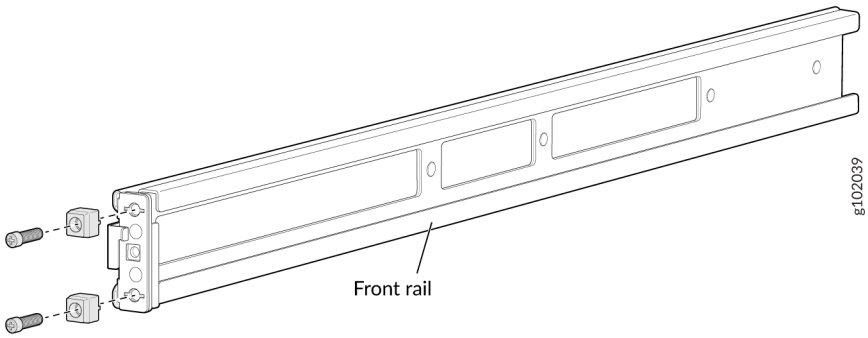
Ensure that you have the following tools and parts available:

- An ESD grounding strap—not provided.
- Number 2 Phillips (+) screwdriver—not provided
- A pair of front and rear mounting rails. These mounting rails attach to the front and rear rack posts—provided with the rack mount kit
- A pair of side mounting brackets and 16 flat head M4 x 6mm Phillips screws. These brackets attach to the device if not pre-installed—provided with the rack mount kit
- A pair of Spacers—provided with the rack mount kit

To mount the device on a four-post rack with threaded holes:

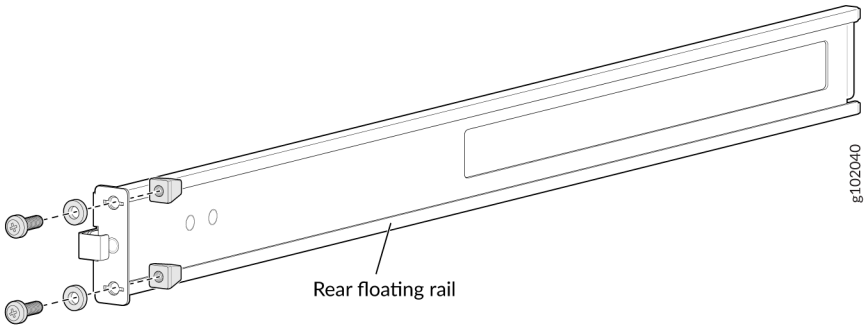
1. Wrap and fasten the ESD grounding strap to your bare wrist and connect the other end of the strap to the ESD point on the device.
2. Assemble the mounting rails.
   a. Remove the guide blocks from the front mounting rails by loosening the screws and preserve them for later use. See Figure 58 on page 125.

Figure 58: Remove Guide Blocks from Front Mounting Rail



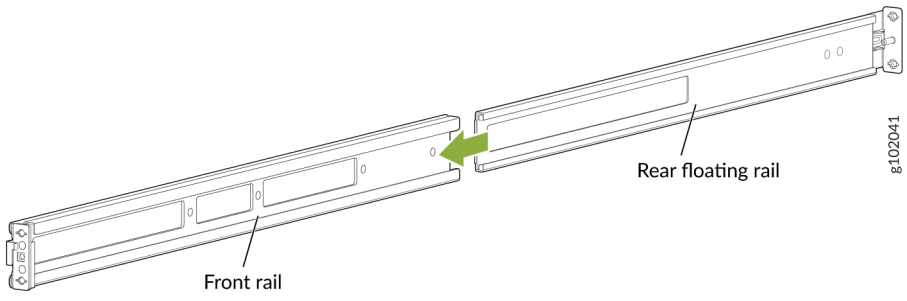
b. Remove the guide blocks from the rear floating rails by loosening the screws and washers. Preserve the guide blocks, screws, and washers for later use. See Figure 59 on page 125

Figure 59: Remove Guide Blocks from Rear Floating Rail



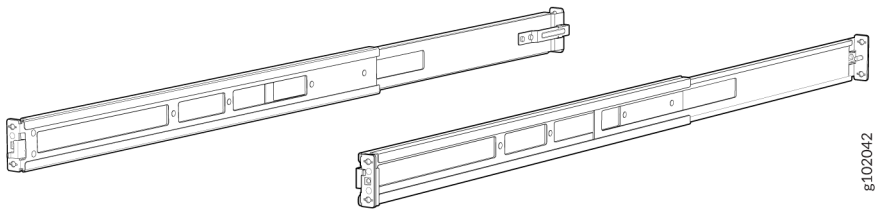
c. Slide the rear floating rails into the front mounting rails. See Figure 60 on page 125.

Figure 60: Slide Rear Floating Rail into Front Mounting Rail



d. Mounting rails assembled. See Figure 61 on page 126.

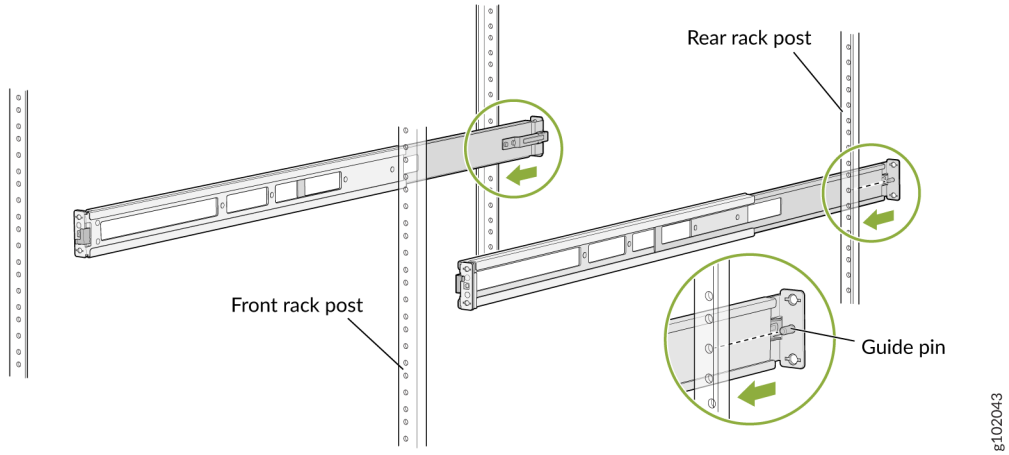
Figure 61: Front and Rear Rails Assembled



3. Attach the mounting rails to the threaded hole rack.

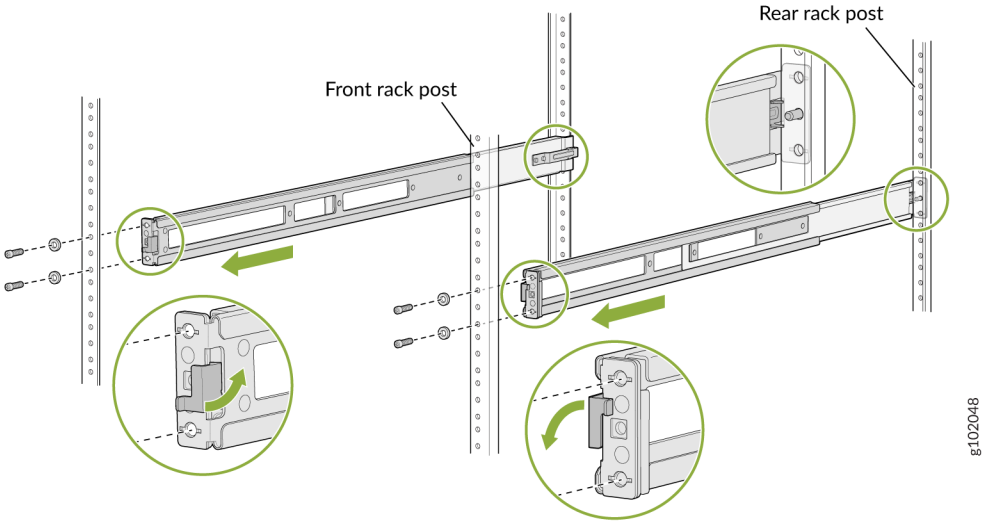
a. Standing in front of the rack, align the guide blocks of the rear mounting rails with the rear-post holes. Pull the rear mounting rails toward the front of the rack to lock the rails in place. You will hear a click sound when the latch locks into the corresponding rack holes. See Figure 62 on page 126.

Figure 62: Install the Rear Floating Rails



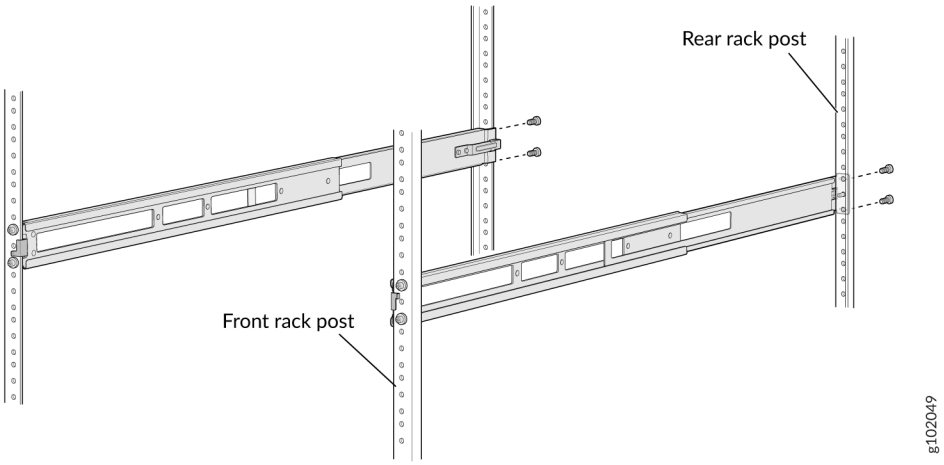
b. Move the latch lock on the front mounting rail to open position, slide the front mounting rail and position it to the front rack post. Push the lock latch to locked position and using the screws removed in step 2.a and the washers removed in step 2.b secure the front mounting rails to the front rack post. See Figure 63 on page 127.

Figure 63: Install the Front Mounting Rails



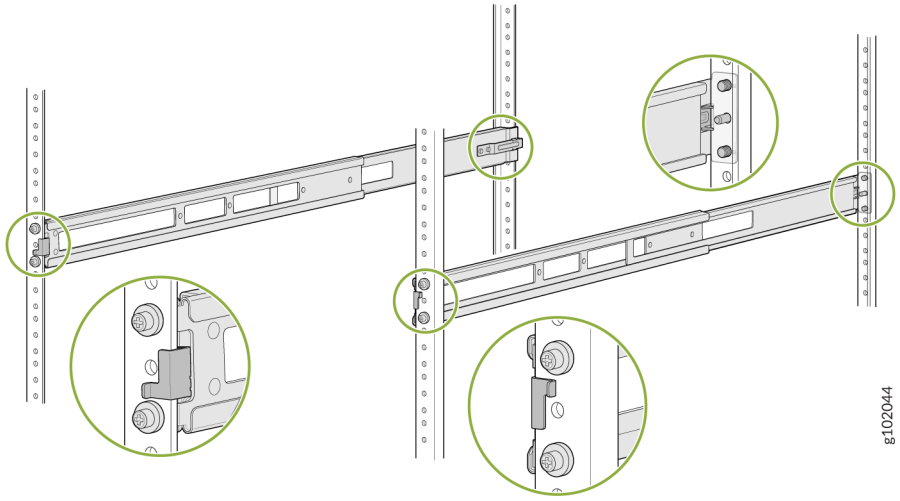
c. Secure the rear floating rail to the rear rack post by using screws (not provided) appropriate for your rack threaded size. See Figure 64 on page 127.

Figure 64: Secure the Rear Floating Rail



d. Visually ensure that the front and rear latches are locked into place on the mounting rails. See Figure 65 on page 128.

Figure 65: Mounting Rails Installed and Secured

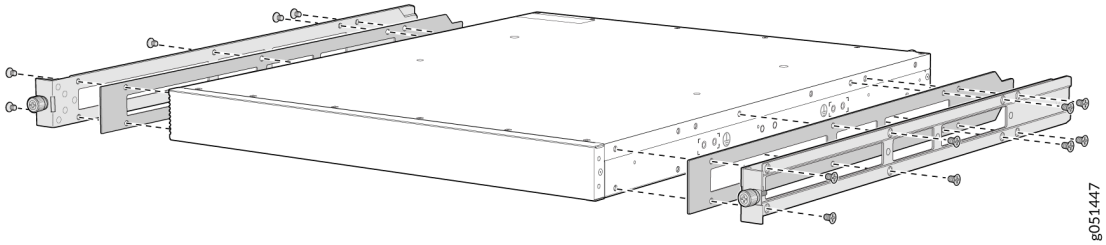


4. Attach the spacers and the mounting brackets to the device if not pre-installed. If your device already has the spacers and mounting brackets pre-installed than skip this step and move to the next step.

   a. Align the holes on the spacer and the mounting bracket with the screw holes that are on the side panel of the chassis.

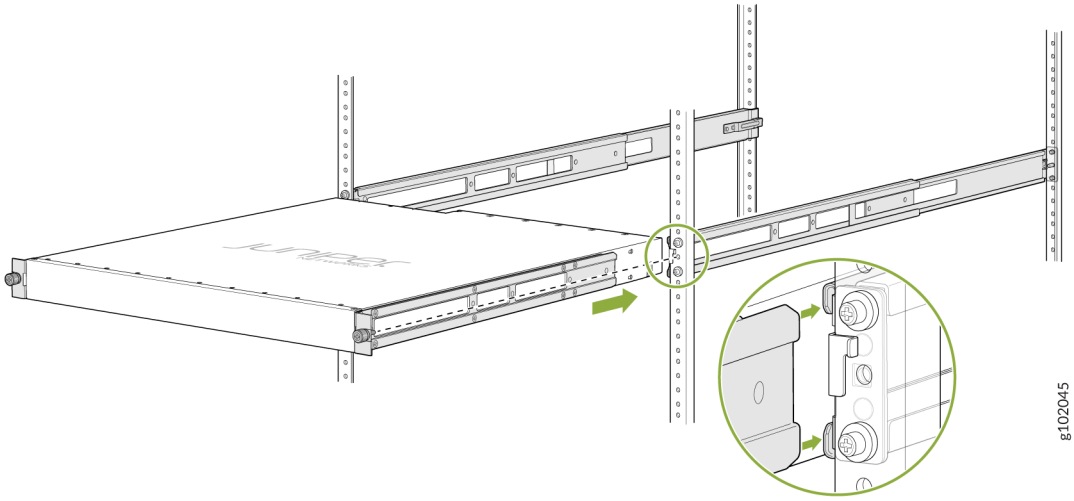
   b. Insert the flat head M4 x 6mm Phillips screws to attach the spacer and the mounting bracket into the aligned holes on the chassis (see Figure 66 on page 128). Tighten the screws.

Figure 66: Attach the Spacers and the Mounting Brackets to the Device



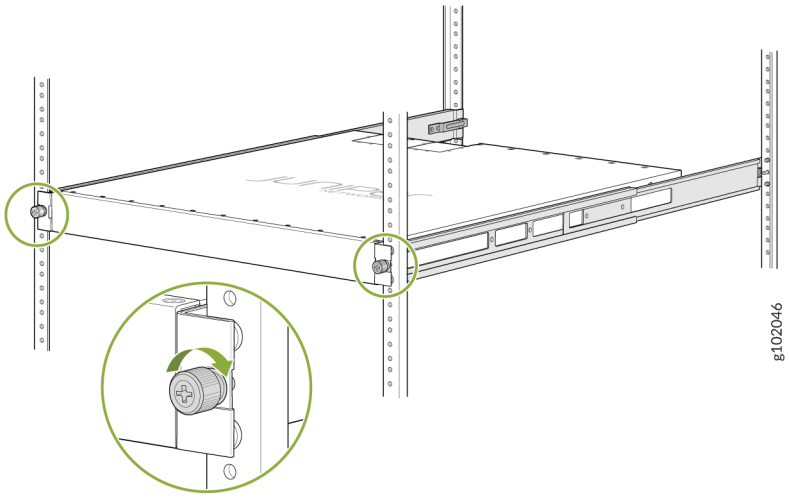
5. Position the device in such a manner that the AIR OUT labels on components are next to the hot aisle.
6. Lift the device and position it in the rack, aligning the side mounting brackets with the mounting rails. Slide the device into the channels of the rack mounting rails. See Figure 67 on page 129.

Figure 67: Slide the Device into the Rack



7. Tighten the two thumbscrews to secure the device. See Figure 68 on page 129.

Figure 68: Tighten the Thumb Screws



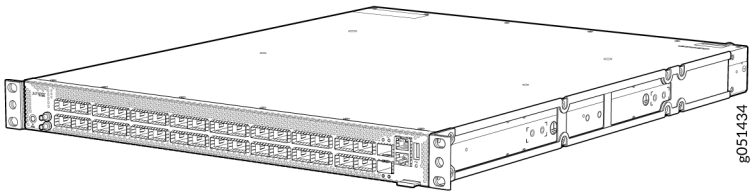
Mount QFX5130-32CD/QFX5130E-32CD on a Four-Post Rack Using the QFX5220-32CD-4PRMK Rack Mount Kit

To mount the QFX5130-32CD/QFX5130E-32CD on a four-post rack by using the QFX5220-32CD-4PRMK rack mount kit:

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

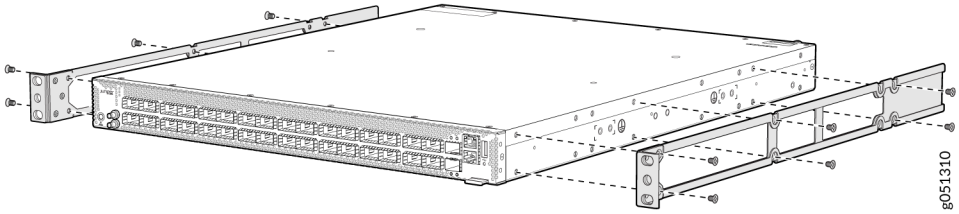
2. Decide whether the field replaceable unit (FRU) end of the switch or the port end is to be placed at the front of the rack. Position the device in such a manner that the **AIR IN** labels on components are next to the cold aisle and **AIR OUT** labels on components are next to the hot aisle.
3. If you receive a switch that has preassembled mounting rails attached to it, you can skip Step 4, Step 5, and Step 6. See Figure 69 on page 130 .

Figure 69: Pre-attached Mounting Rails on the QFX5130-32CD/QFX5130E-32CD



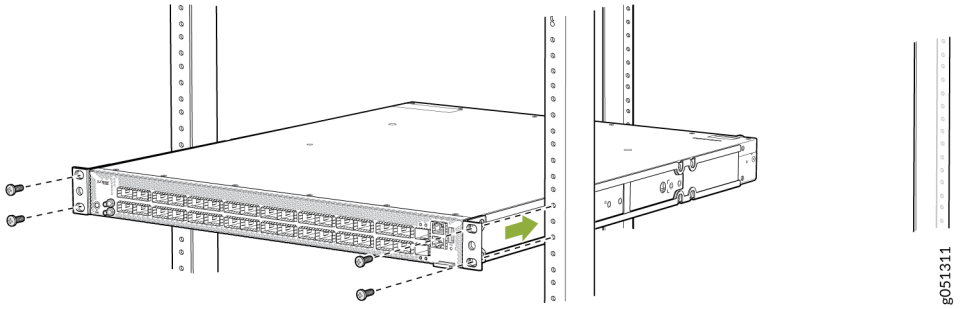
4. Align the holes in the mounting rail with the holes on the side of the chassis. See Figure 70 on page 130 to see the proper alignment for QFX5130-32CD/QFX5130E-32CD.

Figure 70: Attach Mounting Rails to the QFX5130-32CD/QFX5130E-32CD



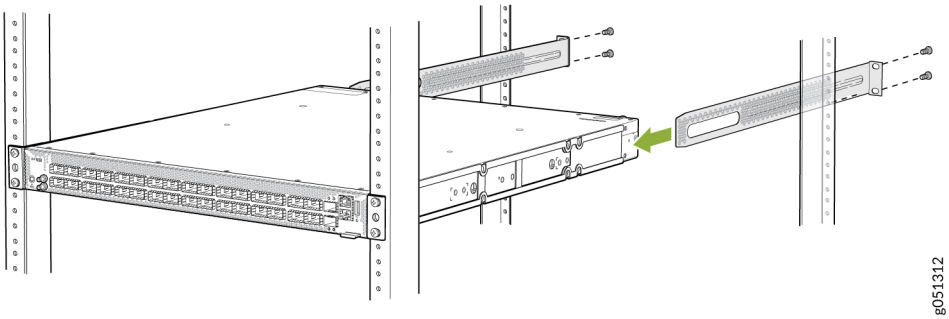
5. Attach the mounting rail to the switch using six mounting screws. Tighten the screws by using a Phillips screwdriver, number 2.
6. Repeat Step 4 and Step 5 on the opposite side of the switch.
7. Have one person grasp both sides of the switch, lift it, and position it in the rack so that the front bracket is aligned with the rack holes.
8. Have a second person secure the front of the switch to the rack by using four mounting screws (and cage nuts and washers if your rack requires them.) Tighten the screws. See Figure 71 on page 131 for an example of connecting the mounting rails and blades to a QFX5130-32CD/QFX5130E-32CD.

Figure 71: Attach QFX5130-32CD/QFX5130E-32CD to the Rack



9. Continue to support the switch while sliding the rear-mounting blades into the channel of the side-mounting rails and securing the blades to the rack. Use the four mounting screws (and cage nuts and washers if your rack requires them) to attach each blade to the rack. Tighten the screws. See Figure 72 on page 131.

Figure 72: Sliding Mounting Blade into the Mounting Rail



10. Ensure that the switch chassis is level by verifying that all the screws on the front of the rack are aligned with the screws at the back of the rack.
11. We recommend that you insert dust covers in any unused ports.

Mount QFX5130-32CD/QFX5130E-32CD on a Four-Post Cabinet

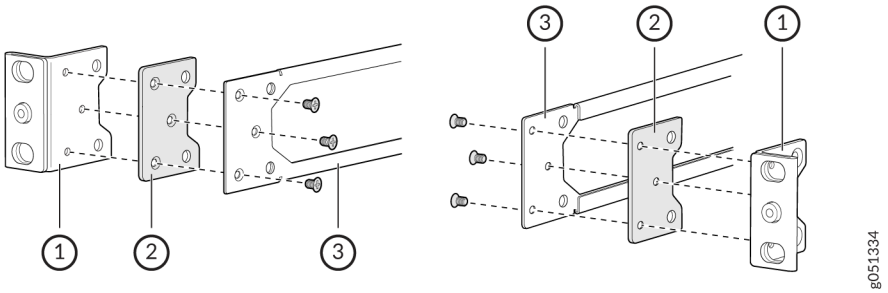
You can mount a QFX5130-32CD/QFX5130E-32CD on four-post racks within a cabinet. For cabinet installations, you need to reconfigure the provided mounting rail. You must change the mounting rail from a flush-mount to a set-back design to allow room in the cabinet for network cabling. To mount a QFX5130-32CD/QFX5130E-32CD on a four-post cabinet:

1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.
2. Decide whether the field replaceable unit (FRU) end of the switch or the port end of the device is to be placed at the front of the rack. Position the device in such a manner that the

AIR IN labels on components are next to the cold aisle and AIR OUT labels on components are next to the hot aisle.

3. Disassemble one of the front-mounting rails by removing the three Phillips screws. See Figure 73 on page 132 for the rail assembly.

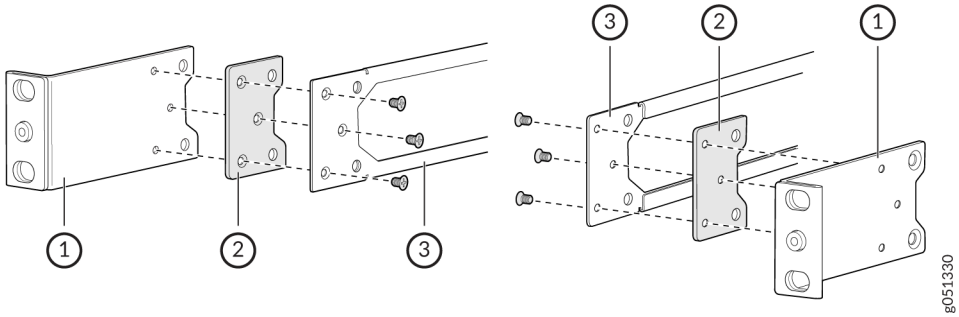
Figure 73: Disassemble the Front-Mounting Rail



1— Front-mounting bracket (you may discard for this procedure)	3— Mounting rail
2— Spacer	

4. Retain the spacer, the mounting rail, and the three flat-head Phillips machine screws for reuse in the extended mounting rail configuration.
5. Locate one of the two extension brackets provided in the rack mount kit.
6. Assemble the extended mounting rail by substituting the extension bracket for the front-mounting bracket. See Figure 74 on page 132 for the order of the components.

Figure 74: Assemble the Extended Mounting Rail



1— Front extension bracket	3— Mounting rail
2— Spacer	

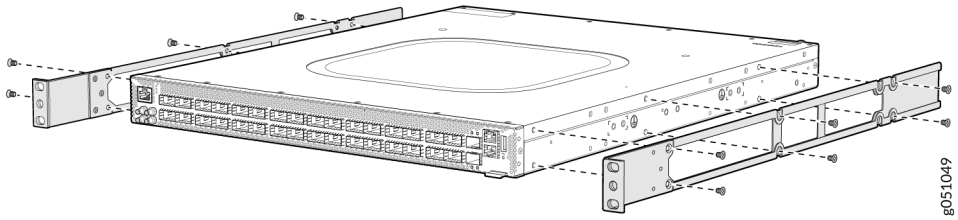
a. Align the holes in the mounting rail with the holes in the spacer and the extension bracket. The spacer is placed between the extension bracket and the mounting rail, with the mounting rail closest to the chassis.

b. Attach the extension bracket and spacer to the mounting rail using the flat-head Phillips machine screws from the original assembly. Tighten the screws by using a Phillips number 2 screwdriver.

c. Repeat Step 3 through Step 6 to complete two extended mounting rails.

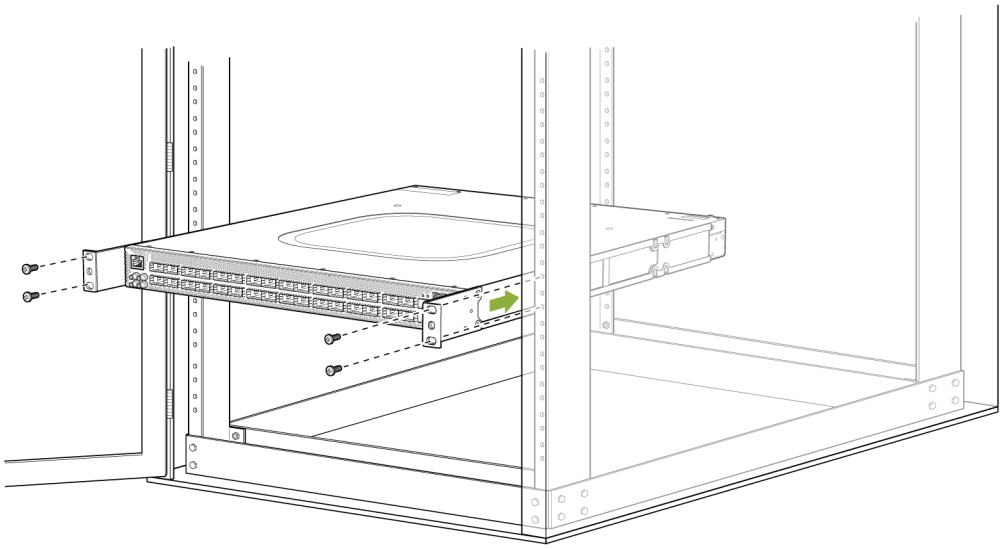
7. Align the holes in the extended mounting rail with the holes on the side of the chassis. See Figure 75 on page 133 to understand the proper alignment for the QFX5130-32CD/QFX5130E-32CD.

Figure 75: Attach the Mounting Rails to the QFX5130-32CD/QFX5130E-32CD



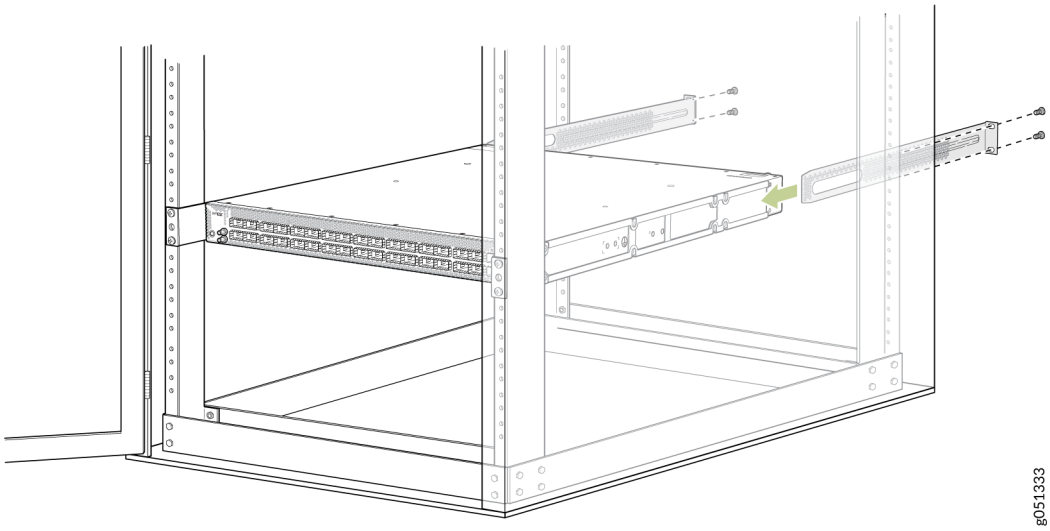
8. Attach the mounting rail to the switch by using six M4 flat-head mounting screws (provided). Tighten the screws by using a Phillips number 2 screwdriver.
9. Repeat Step 7 and Step 8 on the opposite side of the switch.
10. Have one person grasp both sides of the switch, lift it, and position it in the rack so that the extension bracket is aligned with the rack holes.
11. Have a second person secure the front of the switch to the rack by using four mounting screws (and cage nuts and washers if your rack requires them.) Tighten the screws. See Figure 76 on page 134 for an example of attaching the switch and mounting assembly to the cabinet rack.

Figure 76: Attach QFX5130-32CD/QFX5130E-32CD to Cabinet Rack



12. Continue to support the switch while sliding the rear-mounting blades into the channel of the extended mounting rails and securing the mounting blades to the rack. Use four mounting screws (and cage nuts and washers if your rack requires them) to attach each blade to the rack. Tighten the screws. See Figure 77 on page 134.

Figure 77: Sliding the Mounting Blade into the Extended Mounting Rail



13. Ensure that the switch chassis is level by verifying that all the screws on the front of the rack are aligned with the screws at the back of the rack.

14. We recommend that you insert dust covers in any unused ports.

Mount the QFX5130-48C/QFX5130-48CM Switch by Using the QFX5130-1RU-4PRMK Rack Mount Kit on a Square Hole Rack

Ensure that you have the following tools and parts available:

- An ESD grounding strap (not provided)
- A pair of front and rear mounting rails

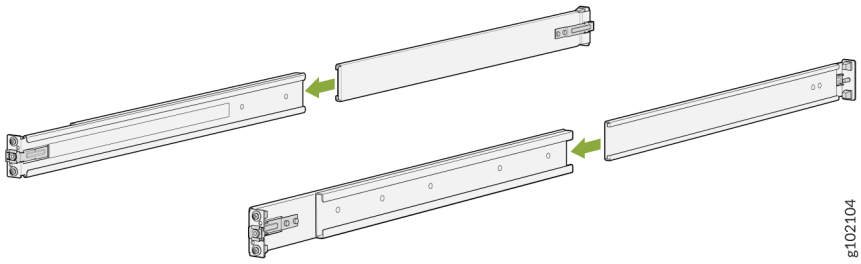
  These mounting rails attach to the front and rear rack posts (provided with the RMK).
- A pair of side-mounting brackets—provided with the RMK

  You must attach these brackets to the device.

To mount the device on four posts in a rack by using the QFX5130-1RU-4PRMK rack mount kit:

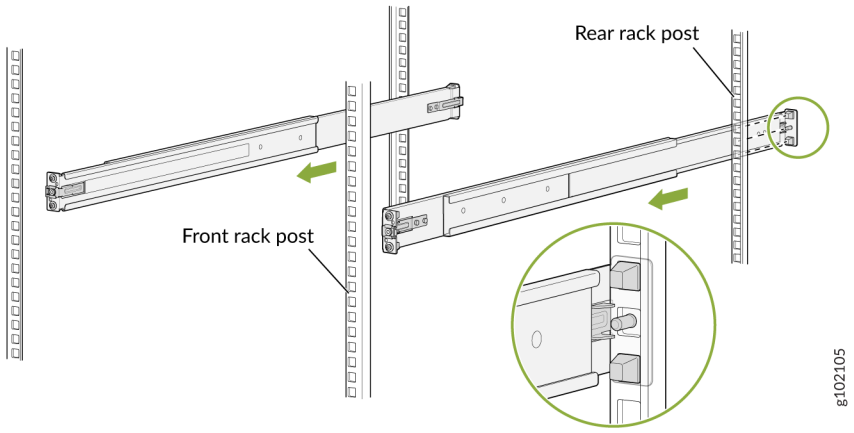
1. Wrap and fasten the ESD grounding strap to your bare wrist, and connect the other end of the strap to the ESD point on the device.
2. Assemble the mounting rails.
   a. Slide the rear floating rails into the front rails. See Figure 78 on page 135.

Figure 78: Assemble the Mounting Rails



   b. The mounting rails are assembled. See Figure 79 on page 136.

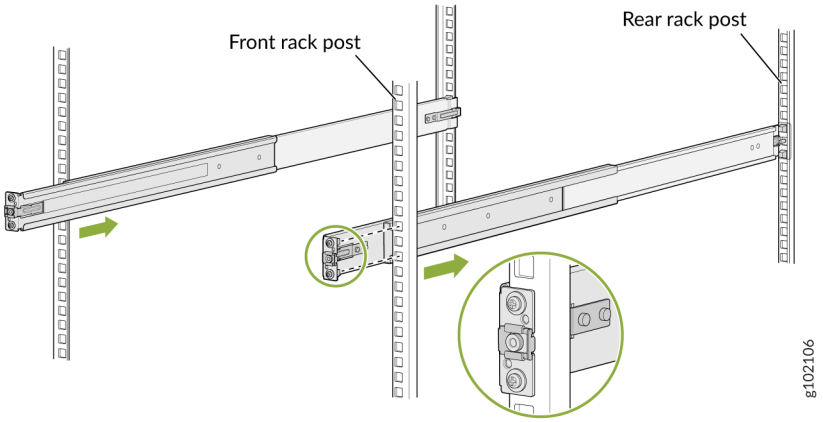
Figure 79: Front and Rear Rails Assembled



3. Attach the mounting rails to the rack.

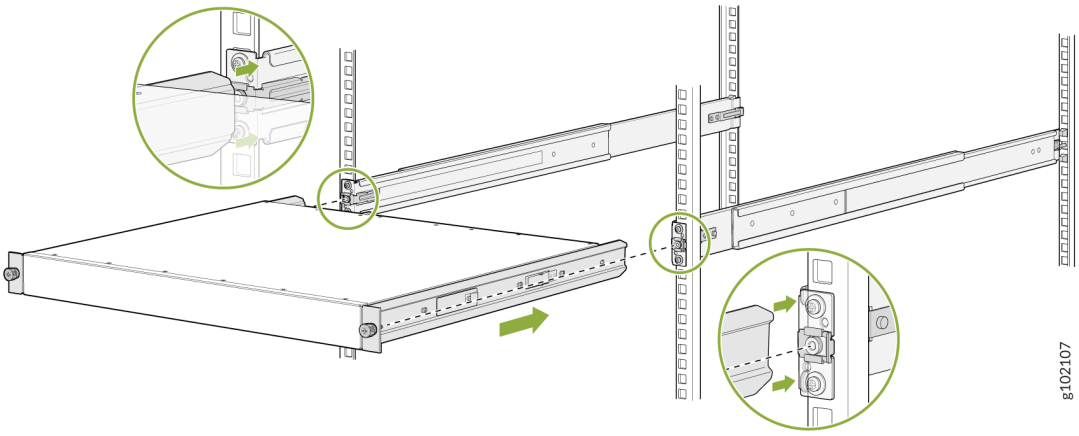
   a. Standing in front of the rack, align the guide blocks of the rear-mounting rails with the rear-post holes. Pull the rear-mounting rails toward the front of the rack to lock the rails in place. You will hear a click sound when the latch locks into the corresponding rack holes. See Figure 80 on page 136.

Figure 80: Install the Rear Floating Rails



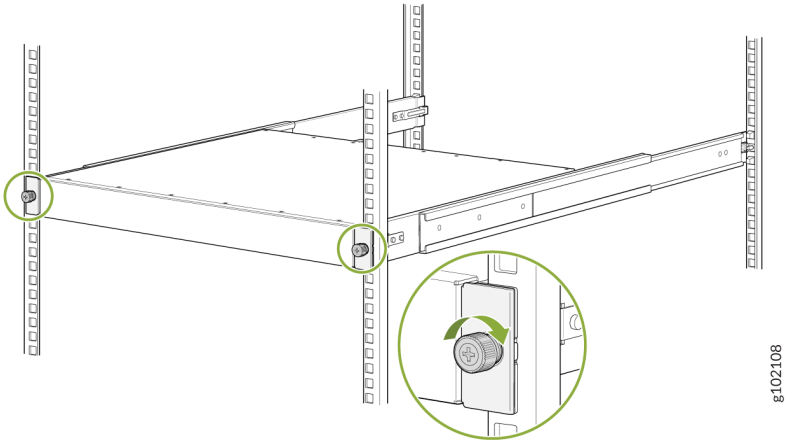
   b. Move the latch lock on the front-mounting rail to open position, slide the front- mounting rail, and insert the guide blocks into the front rack posts. See Figure 81 on page 137.

Figure 81: Attach the QFX5130-48C Chassis to the Rack



c. Push the lock latch to the locked position. See Figure 82 on page 137.

Figure 82: Front Mounting Rail's Lock Latch



Mount Your QFX5130-48C/QFX5130-48CM Switch by Using the QFX5130-1RU-4PRMK Rack Mount Kit on a Threaded-Hole Four-Post Rack

You can mount the QFX5130-48C switch in a four-post rack or a cabinet. Ensure that you have the following tools and parts available:

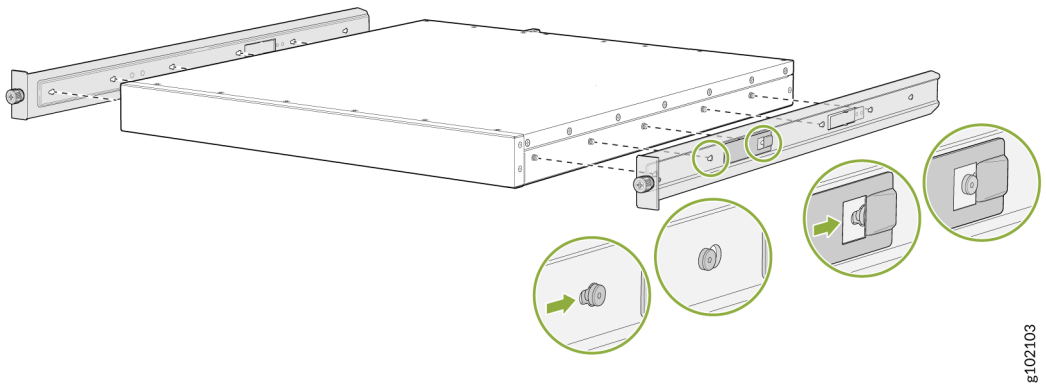
- An ESD grounding strap (not provided)
- A Number 2 Phillips (+) screwdriver (not provided)

- A pair of side-mounting brackets that attach to the chassis [provided with the rack mount kit (RMK)]
- A pair of mounting front and rear rails that attach to the rack posts (provided with the RMK)

To mount the device on a four-post rack with threaded holes:

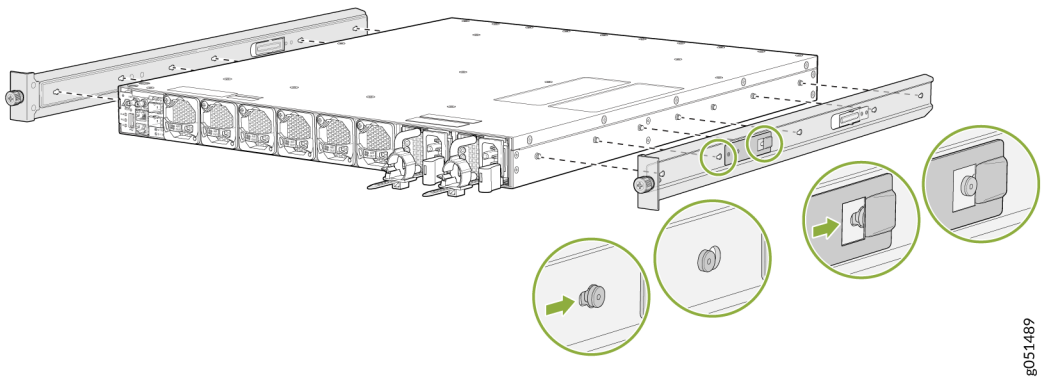
1. Review the https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/index.html.
2. Wrap and fasten one end of the electrostatic discharge (ESD) cable grounding strap around your bare wrist, and connect the other end to a site ESD point.
3. To attach the side-mounting brackets to the chassis, align the keyholes on the mounting brackets over the shoulder screws on the chassis. Slide the mounting brackets toward the rear of the chassis.

Figure 83: Attach the Side-Mounting Brackets



4. You can also flush mount the chassis on the rear side.

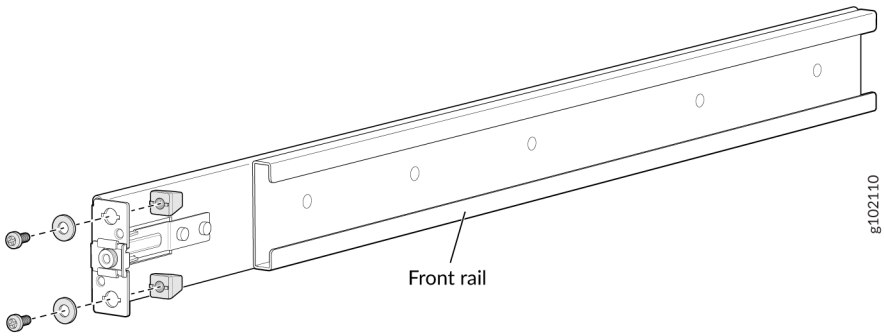
Figure 84: Flush Mount the Chassis from Rear Side



5. Assemble the mounting rails:

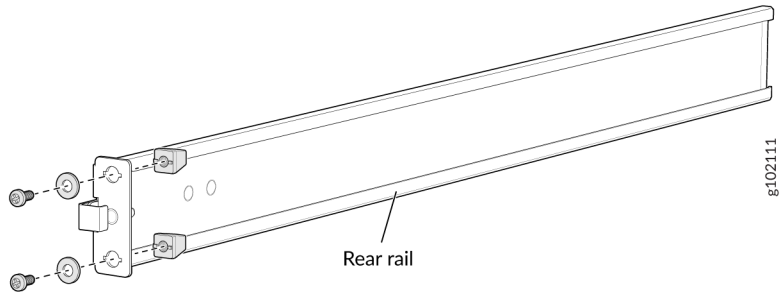
   a. Remove the guide blocks from the front-mounting rails by loosening the screws and washers. Retain the guide blocks, screws, and washers for later use.

Figure 85: Remove the Guide Blocks from the Front Mounting Rail



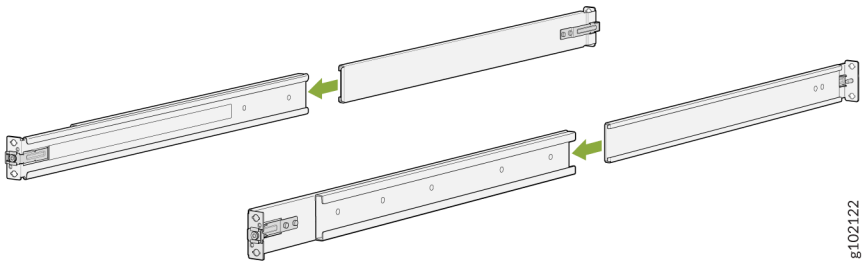
   b. Remove the guide blocks from the rear-mounting rail by loosening the screws and washers. Retain the guide blocks, screws, and washers for later use.

Figure 86: Remove the Guide Blocks from the Rear-Mounting Rail



c. Slide the rear floating rails into the front rails.

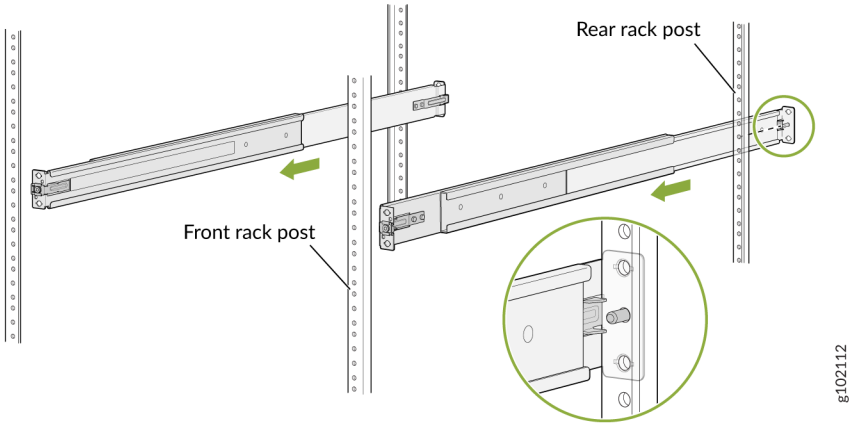
Figure 87: Assemble the Mounting Rails



6. Install the mounting rails on the rack:

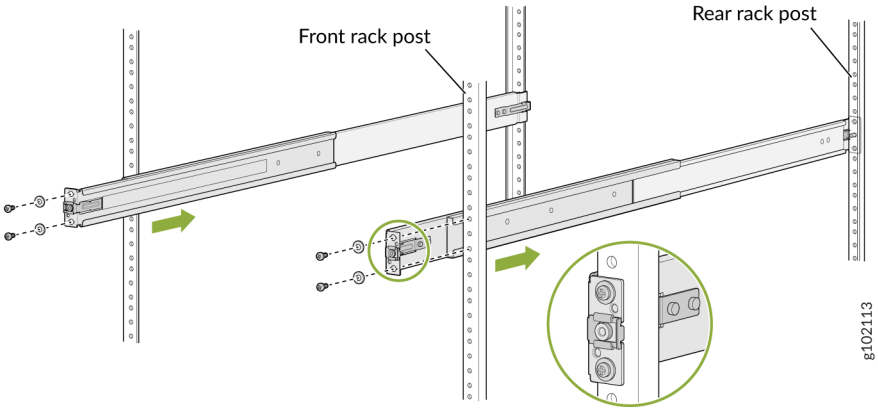
   a. Insert the guide pin of the rear-mounting rails into the rear-post holes. Pull the rear-mounting rails toward the front of the rack to lock the rails in place. You will hear a distinct click sound when the latch locks into place.

Figure 88: Install the Rear-Mounting Rails



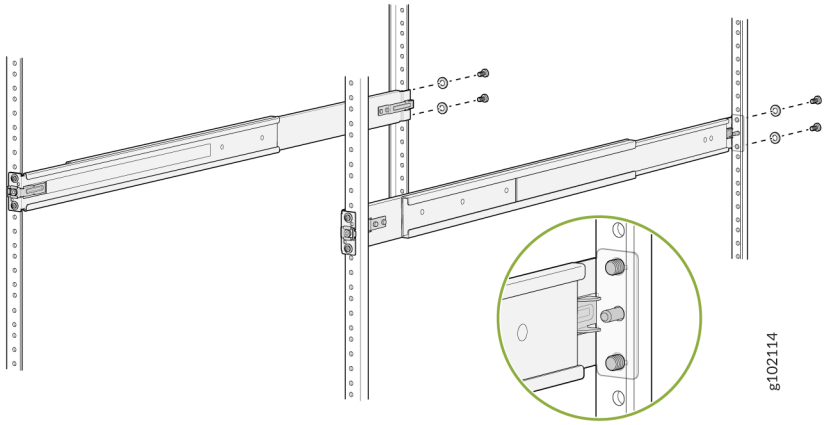
b. Insert the guide pin of the front-mounting rails into the front-post holes. Push the front-mounting rails toward the rear of the rack to lock the rails in place. You will hear a distinct click sound when the latch locks into place. Secure the front-mounting rails to the front rack post by using screws (not provided) appropriate for your rack threaded size.

Figure 89: Install and Secure the Front-Mounting Rails



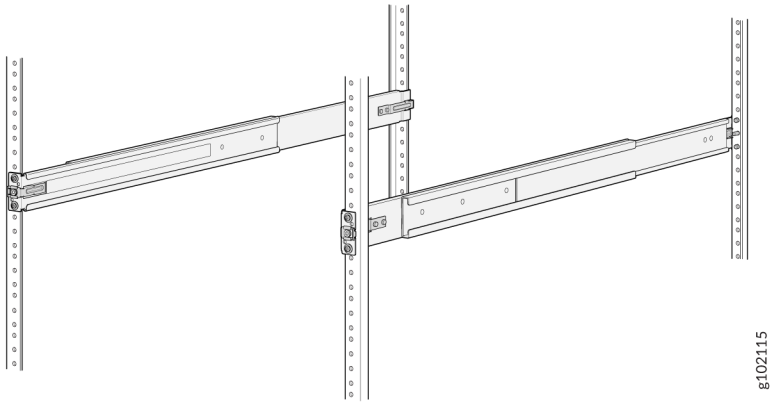
c. Secure the front-mounting rails to the front rack post by using screws (not provided) appropriate for your rack threaded size.

Figure 90: Secure the Rear-Mounting Brackets



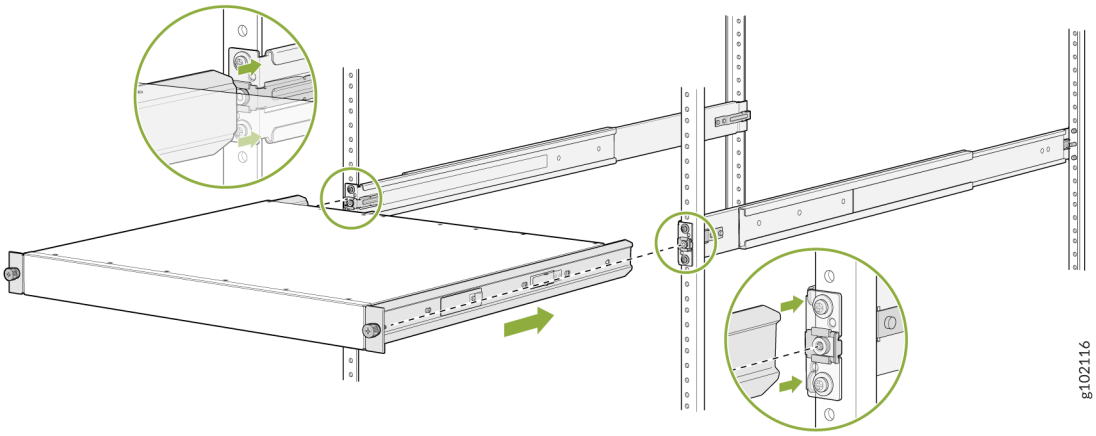
d. Ensure that the front and rear latches are locked into place on the mounting rails. The mounting rails must be securely installed on the rack.

Figure 91: Mounting Rails Installed and Secured



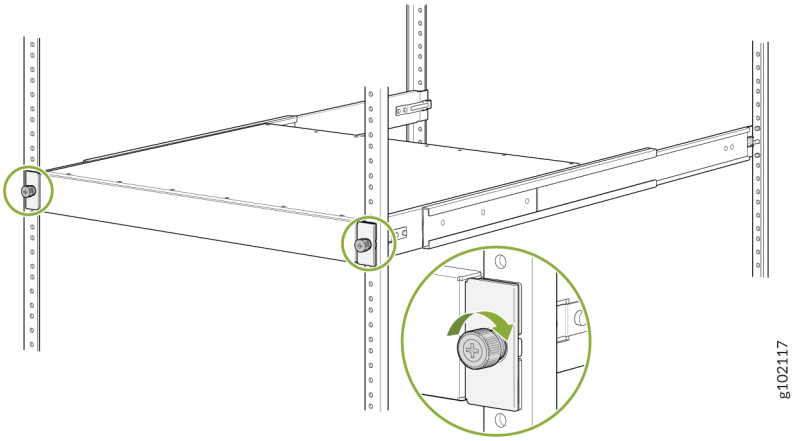
7. Lift the device and position it in the rack, aligning the side-mounting brackets with the mounting rails. Slide the device into the channels of the rack mounting rails.

Figure 92: Slide the Device into the Rack



8. Tighten the two thumbscrews to secure the device.

Figure 93: Tighten the Thumbscrews



Mount the QFX5130-32CD/QFX5130E-32CD Switch in a Rack by Using the QFX5220-32CD-4PRMK Rack Mount Kit

IN THIS SECTION

- Befo re You Begin Rack Mounting | **144**

You can also mount QFX5130-32CD/QFX5130E-32CD switches only on a four-post 19-in. rack by using the QFX5220-32CD-4PRMK rack mount kit (RMK) provided with the switch. The RMK can be adapted for a four-post rack-only installation. A four-post installation evenly supports the switch by all four corners.

For four-post rack installations, the RMK 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 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.

This topic describes:

Befo re You Begin Rack Mounting

Before you begin mounting a QFX5130-32CD/QFX5130E-32CD switch in the rack or cabinet:

1. Ensure that you understand how to prevent electrostatic discharge (ESD) damage. See Prevention of Electrostatic Discharge Damage.
2. Verify that the site meets the requirements described in "QFX5130 Site Preparation Checklist" on page 75.
3. Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure the rack to the building structure.
4. Read *Chassis and Component Lifting Guidelines*.
5. Remove the switch from the shipping carton (see "Unpack a QFX5130 Switch " on page 115).
6. In addition to the items in Table 45 on page 116, ensure that you have the following parts and tools available that are not usually provided with the device to mount the switch in a rack:
   - ESD grounding strap
   - Appropriate screwdriver for the mounting screws

- Screws to attach the device to the rack
- Management host, such as a PC laptop, with a serial port
- Grounding lug, grounding wire, screws, and washers
- Dust covers for unused ports

CAUTION: A QFX5130-32CD/QFX5130E-32CD switch requires two people for installation, one person to lift the device into place and another person to attach the device to the rack. If you are installing the QFX5130-32CD/QFX5130E-32CD above 60 in. (152.4 cm) from the floor, we recommend that you remove the power supplies and fan modules to minimize the weight before attempting to install the device.

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

RELATED DOCUMENTATION

https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/index.html

Connect the QFX5130 Switch to Power | 155

How to Install a ORv3-Compliant Switch with Tray Assembly (2OU) in Your ORv3 Rack

SUMMARY

Use the information in this topic to install the Open Rack V3-compliant switch with tray assembly in an ORv3 rack.

IN THIS SECTION

- Unpack the Switch-Tray Assembly | 146
- Parts Inventory (Packing List) | 147

- Install Switch-Tray Assembly in an ORv3 Rack | **148**
- Uninstall the Switch-Tray Assembly from the ORv3 rack | **152**
- Ground the Switch-Tray Assembly | **155**

The Open Rack V3 (ORv3)-compliant switch with tray assembly (henceforth written as switch-tray assembly in this topic) features a switch that comes pre-assembled in the tray, making the installation process quick and straightforward.

WARNING: Use this ORv3-compliant tray only with the listed or certified Juniper product. Failure to comply might result in damage.

Unpack the Switch-Tray Assembly

We ship the switch-tray assembly in a cardboard carton, secured with foam packing material.

CAUTION: The switch-tray assembly has maximum protection inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack the switch-tray assembly:

1. Move the shipping carton to a staging area as close to the installation site as possible. Make sure that 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 accessory box and verify the contents in it against the parts inventory on the label attached to the carton.
5. Pull out the packing material holding the assembly in place.
6. Verify the chassis components received against the packing list included with the switch-tray assembly.
7. Save the shipping carton and packing materials in case you need to move or ship the switch-tray assembly later.

Parts Inventory (Packing List)

The shipment includes a packing list. Check the parts you receive in the shipping carton against the items on the packing list. We ship the parts as per the configuration that you order.

If any part on the packing list is missing, contact your customer service representative or contact Juniper customer care from within the U.S. or Canada by telephone at 1-888-314-5822. For international-dial or direct-dial options in countries without toll-free numbers, see https://www.juniper.net/support/requesting-support.html.

- Parts List for QFX5130 Switch-Tray Assembly on page 147
- QFX5130 Switch-Tray Assembly: Components and Model Numbers on page 147
- Parts List for the Accessory Kit on page 147

Table 47: Parts List for QFX5130 Switch-Tray Assembly

Component	Quantity	Open Unit (OU)
Preassembled tray with switch (DC switch model)	1	2OU

Table 48: QFX5130 Switch-Tray Assembly: Components and Model Numbers

Component Type	Model Number
Preassembled tray with switch (DC switch model)	QFX513032CDDAFO-T2
DC PSU	JPSU-1600W1UDCAFO2
Fan	QFX5220-32CDFANAO2

Table 49: Parts List for the Accessory Kit

Component	Quantity
Warranty card	1
End User License Agreement (EULA)	1

Table 49: Parts List for the Accessory Kit *(Continued)*

Component	Quantity
Documentation roadmap card	1

Install Switch-Tray Assembly in an ORv3 Rack

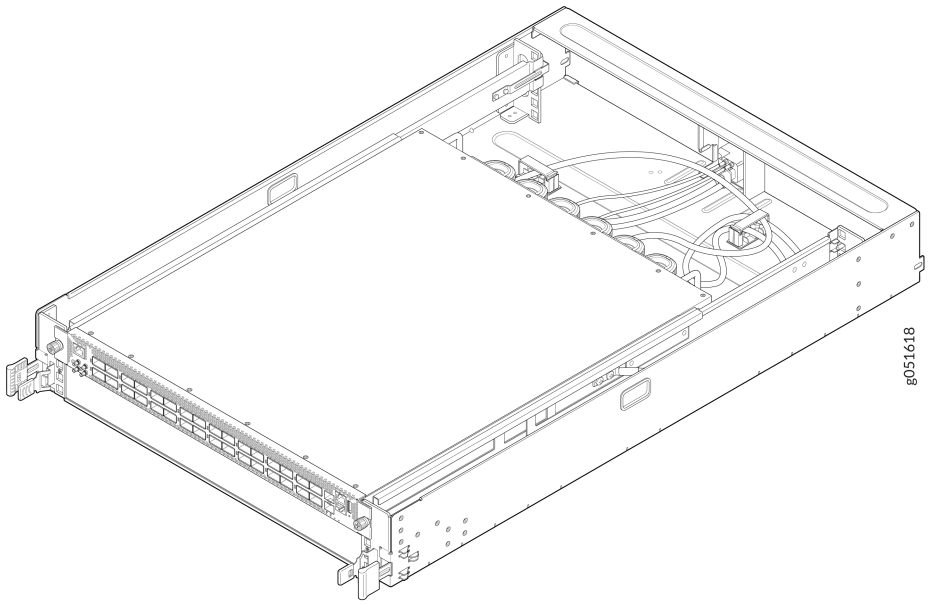
Before installing the switch-tray assembly in an ORv3 rack:

- Verify that the site meets the requirements described in the Site Preparation Checklist of the switch.
- Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
- Read General Safety Guidelines and Warnings, with particular attention to Chassis and Component Lifting Guidelines.

To install the switch-tray assembly in an ORv3 rack:

1. Remove the tray assembly from shipping carton.

Figure 94: Switch-Tray Assembly

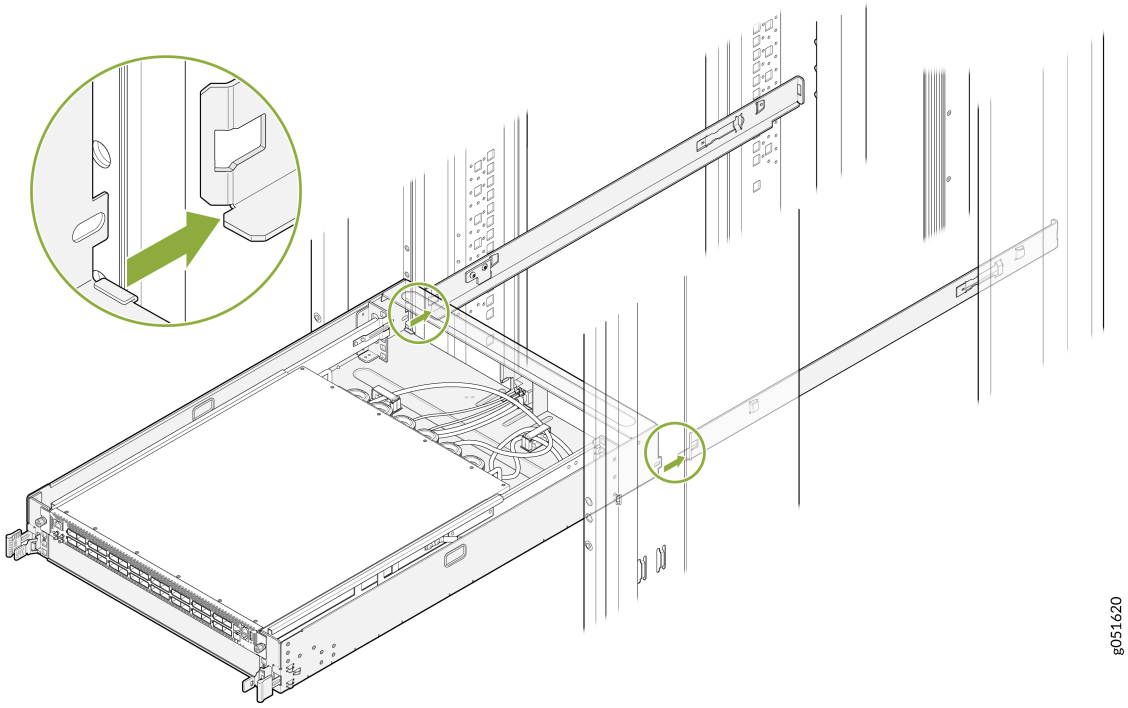


2. Place the switch-tray assembly on a flat, stable surface.
3. Align the rails and secure it in place on your ORv3 rack.

> **NOTE**: Rails are not provided with the switch-tray assembly.

4. Carefully align the switch-tray assembly with the rails in the rack.

Figure 95: Align the Switch-Tray Assembly with the rails



5. Slide the switch-tray assembly into the rack until the IT Gear Input Connector at the rear of the switch-tray assembly fully engages with the bus bar.

Figure 96: Slide the Switch-Tray Assembly into the Rack

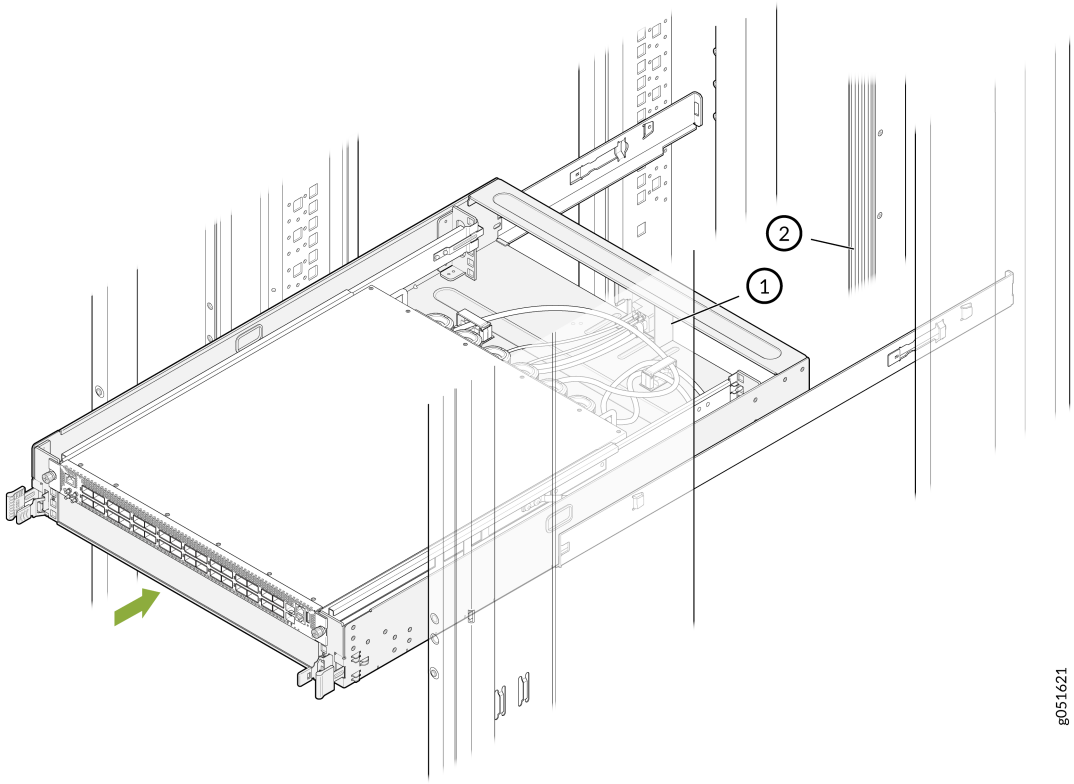


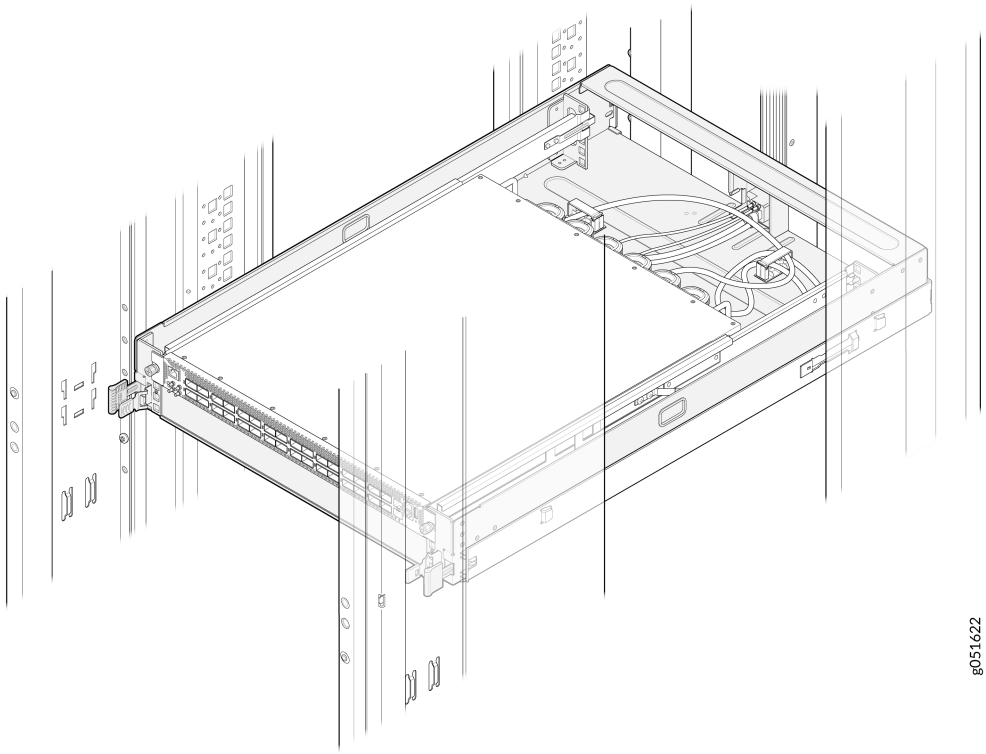
Table 50: Component Callouts

Callout	Description
1	IT Gear Input Connector
2	Bus bar

NOTE: The bus bar delivers power to the switch.

When the switch-tray assembly is fully inserted into the rack, the latch locking tabs engage with the rack's rail to secure the tray in place.

Figure 97: Fully Inserted Switch-Tray Assembly



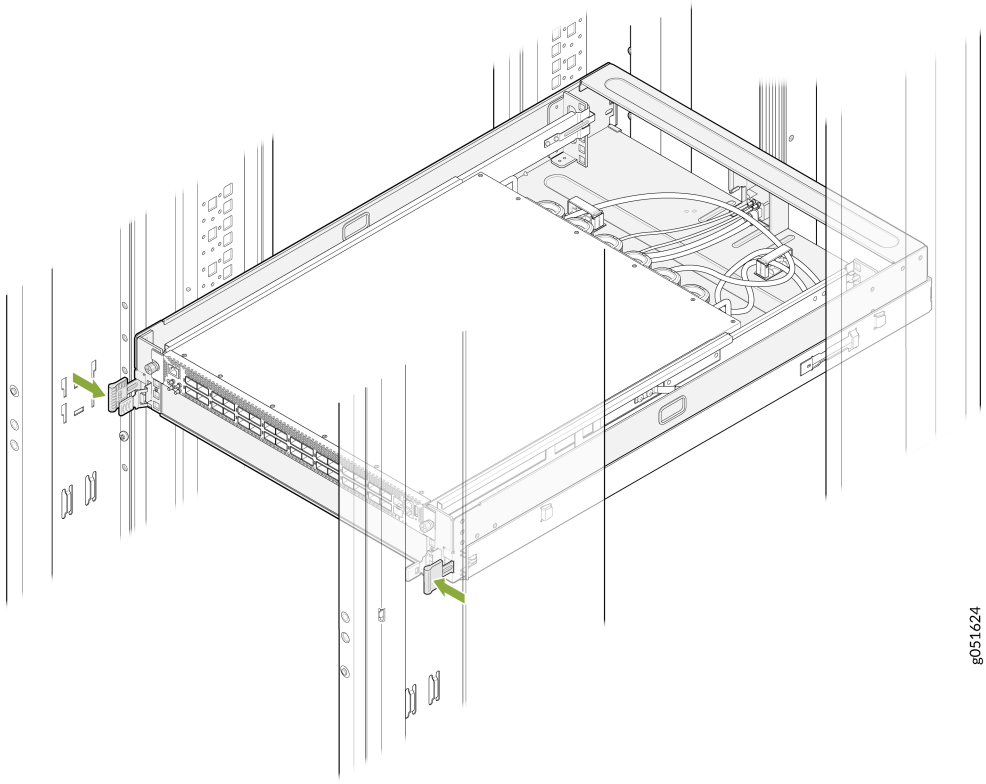
NOTE: For the switch-tray assembly installed in an ORv3 rack, you do not require an additional grounding or power configuration. The ORv3 rack infrastructure provides integrated power delivery and grounding. Ensure you install and ground the rack properly according to site standards.

Uninstall the Switch-Tray Assembly from the ORv3 rack

To uninstall the switch-tray assembly from the ORv3 rack:

1. Locate the latch locking tabs on both sides of the switch-tray assembly.

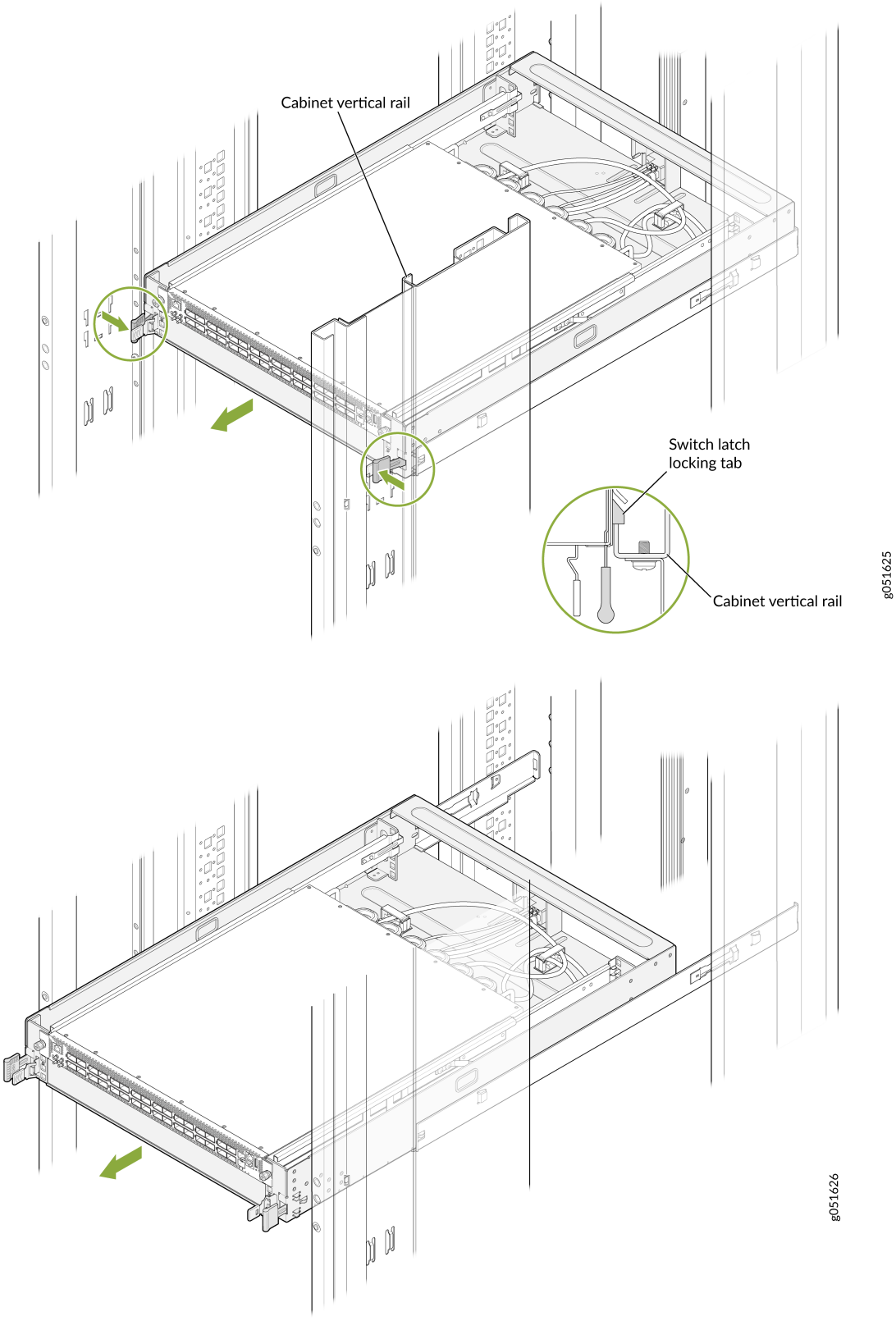
Figure 98: Locate the Latch Locking Tabs



2. Push the latch locking tabs inward on both sides to release the switch-tray assembly from the rack post and gently slide the switch-tray assembly out of the ORv3 rack at same time.

> **NOTE**: Do not release the latch locking tabs before pulling the switch-tray assembly out. Both actions must be done simultaneously.

Figure 99: Slide the Switch-Tray Assembly Out



Ground the Switch-Tray Assembly

NOTE: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the ORv3 rack to the earth ground.

You don't need to make any external connections to ground the switch-tray assembly. The switch-tray assembly is connected to earth ground when you slide in the tray.

The switch-tray assembly gets earth ground protection by virtue of these features:

1. In the switch-tray assembly, the protective earthing terminal of the switch is connected to the tray using a grounding cable terminated with two–hole protective grounding lugs.
2. When the switch-tray assembly is completely inserted into the ORv3 rack, the ground contacts of the IT Gear Input Connector provide an electrically conductive path to the busbar and the rack frame.
3. The rack frame has dedicated grounding points typically located at the top of the rack. These grounding points help ground a loaded ORv3 rack.

NOTE: You do not need separate grounding for your switch-tray assembly. The ORv3 rack infrastructure includes built-in grounding. Ensure the rack grounding is implemented according to site requirements. You do not need to take additional action for the switch.

Connect the QFX5130 Switch to Power

IN THIS SECTION

- Ground the QFX5130 Switch and Connect Power | **156**
- Ground the QFX5130-48C/QFX5130-48CM Switch | **158**
- Connect AC Power to a QFX5130 Switch | **159**
- Connect DC Power to a QFX5130 Switch | **161**

Ground the QFX5130 Switch and Connect Power

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect a QFX5130 switch to earth ground before you connect it to power.

You must install QFX5130 switches in a restricted-access location and ensure that the chassis is always properly grounded. QFX5130 switches come with a two-hole protective grounding terminal provided on the chassis. See Figure 100 on page 158. We recommend that you use this protective grounding terminal as the preferred method for grounding the chassis regardless of the power supply configuration. However, if additional grounding methods are available, you can also use those methods. For example, you can use the grounding wire in the AC power cord or use the grounding terminal or lug on a DC power supply. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.

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

NOTE: Mount your switch in the rack or cabinet before attaching the grounding lug to the switch. See "Mount the QFX5130-32CD/QFX5130E-32CD Switch in a Rack by Using the QFX5220-32CD-4PRMK Rack Mount Kit" on page 144.

Ensure that you have the following parts and tools available:

- Grounding cable:
  - QFX5130-32CD/QFX5130E-32CD: The grounding cable must be 14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code.
  - QFX5130-48C/QFX5130-48CM/QFX5130-48C/QFX5130-48CM: The grounding cable must be 14 AWG (2 mm²), minimum 90° C wire, or as permitted by the local code.
- Grounding lug:
  - QFX5130-32CD/QFX5130E-32CD: The grounding lug must be a Panduit LCD10-10A-L or equivalent. The grounding lug attaches to the device chassis through the left front-mounting bracket, providing a protective earthing terminal for the device.
  - QFX5130-48C/QFX5130-48CM: The grounding lug must be a Panduit LCD6-14A-L or equivalent. The grounding lug attaches to the device chassis through the left front-mounting bracket, providing a protective earthing terminal for the device.

NOTE: The grounding lug kit is not provided for QFX5130-48C and QFX5130-48CM. You would need to order this separately from Juniper Networks.

- Screws to secure the grounding lug:
  - QFX5130-32CD/QFX5130E-32CD: Two 10-32 x 0.25 in. screws with #10 split-lock washers.

    Two screws are used to secure the grounding lug to the protective earthing terminal. These screws and washers are not provided.
  - QFX5130-48C/QFX5130-48CM: Two 10-32 x 0.25 in. screws with #10 split-lock washers.

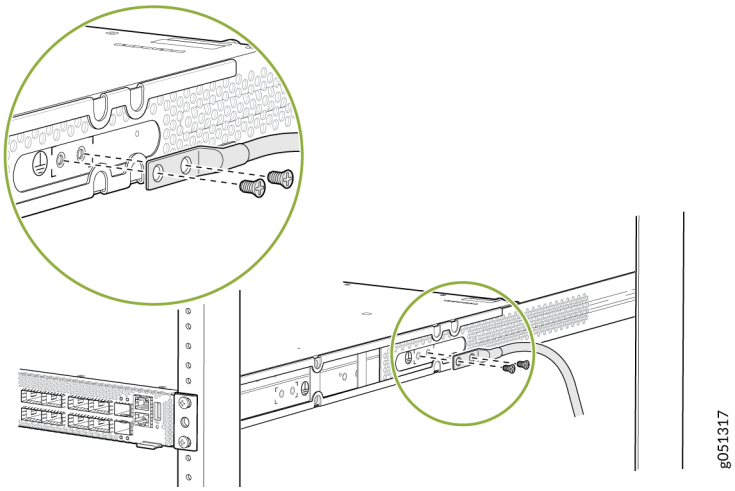
    Two screws are used to secure the grounding lug to the protective earthing terminal. These screws and washers are not provided.
- Number 2 Phillips (+) screwdriver-not provided.
- ESD grounding strap-not provided.

An AC-powered QFX5130 switch chassis gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using an AC power cord appropriate for your geographical location. See Table 21 on page 64.

To ground the QFX5130-32CD/QFX5130E-32CD switch:

1. Use the two 10-32 x 0.25-in. screws with number 10 split-lock washers to secure the grounding lug and the attached cable to the chassis. Attach the lug through the left-mounting bracket to the chassis. See Figure 100 on page 158.

Figure 100: Connect a Grounding Cable to a QFX5130-32CD/QFX5130E-32CD



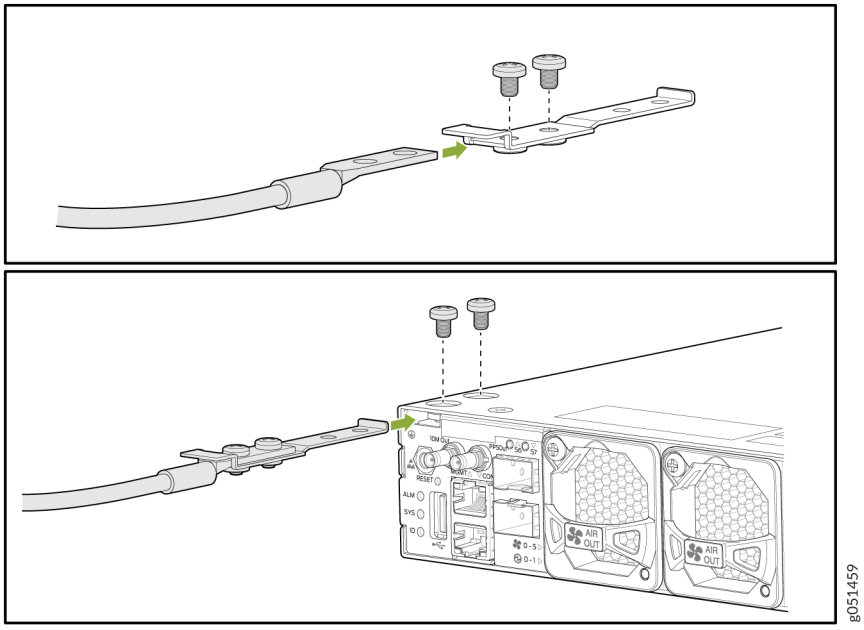
2. Connect the remaining end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.
3. Dress the grounding cable and ensure that it does not touch or block access to other device components and that it does not drape where people could trip over it.

Ground the QFX5130-48C/QFX5130-48CM Switch

To ground the QFX5130-48C/QFX5130-48CM switch:

1. Wrap and fasten one end of the electrostatic discharge (ESD) cable grounding strap around your bare wrist, and connect the other end to a site ESD point.
2. Connect the grounding cable to a proper earth ground, such as the rack in which you mount the device.
3. Secure the grounding cable terminal to the grounding bracket by using the 10-32 screws.
4. Loosen the two screws that are available on the chassis.
5. Place the bracket attached to the grounding cable over the grounding point.
6. Tighten the two screws.

7. **Figure 101: Ground the QFX5130-48C/QFX5130-48CM Switch**



8. Dress the grounding cable. Ensure that the cable doesn't block access to or come in contact with other device components. Also, ensure that the cable doesn't drape where people could trip over it.

Connect AC Power to a QFX5130 Switch

Ensure that you have a power cord that is appropriate for your geographical location 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 (see https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/)
- Ensure that you have connected the switch chassis to earth ground.

> ⚠ **CAUTION**: Before you connect power to the switch, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit).

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. The switch gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location. See Table 21 on page 64.

- Install the power supplies in the chassis. For instructions on how to install a power supply in a QFX5130, see "Install an AC Power Supply Unit in QFX5130 Switches" on page 182.

The QFX5130 switch ships from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU). You can install a replacement power supply in the slots next to the fan modules without powering off the switch or disrupting the switching function.

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

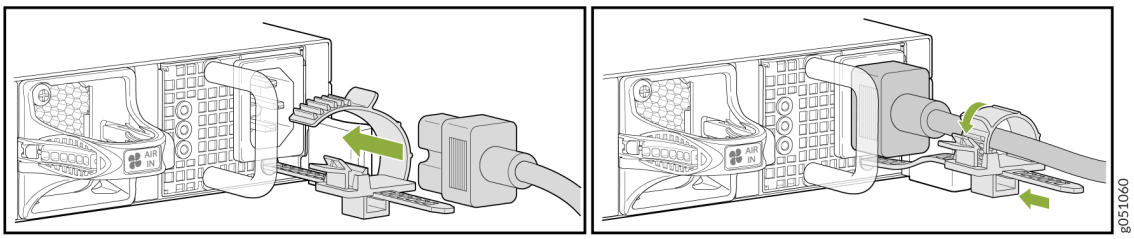
To connect AC power to a QFX5130 Switch:

1. Attach the grounding strap to your bare wrist and to a site ESD point.
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure. .
3. Locate the power cords shipped with the switch; the cords have plugs appropriate for your geographical location. See Table 21 on page 64 .

   For each power supply:

   a. Ensure that the loop on the power cord retainer is open and there is enough space to insert the power cord coupler into the inlet. If the loop is closed, press the small tab on the retainer to loosen the loop. See Figure 102 on page 160.

Figure 102: Attach the Power Cord Retainer



   b. Thread the power cord coupler through the power cord retainer loop.

c. Insert the power cord coupler firmly into the AC inlet on the power supply faceplate.

d. Slide the power cord retainer loop toward the power supply until it is snug against the base of the coupler.

e. Press the tab on the loop and draw out the loop to enclose the power cord. See Figure 102 on page 160.

WARNING: Ensure that the power cord does not block access to device components or drape where people could trip over it.

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 power is provided to the power supply. There is no power switch on the device.

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

   If the amber fault LED is lit, remove power from the power supply, and replace the power supply ("Maintain the QFX5130 Power System" on page 179). Do not remove the power supply until you have a replacement power supply ready: the power supplies must be installed in the switch to ensure proper airflow.

Connect DC Power to a QFX5130 Switch

IN THIS SECTION

- Before You Begin | **161**
- Connect DC Power to a QFX5130 Switch | **162**

Before You Begin

Before you connect DC power to the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/).

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

> **CAUTION**: Before you connect power to the switch, a licensed electrician must attach a cable lug to the ground and power cables that you supply (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 earth ground.

- Install the power supply in the chassis. For instructions on how to install a power supply in a QFX5130 switch, see "Install an AC Power Supply Unit in QFX5130 Switches" on page 182.

> **WARNING**: DC-powered QFX5130 switches are intended for installation only in a restricted-access location.

Ensure that you have the following parts and tools available:

- A spare JPSU-1600W-1UDCAFI or JPSU-1600W-1UDCAFO for QFX5130 (not provided)
- Phillips (+) screwdriver, number 2 (not provided)
- Multimeter (not provided)
- DC power source cables 10-12 AWG (not provided)
- Ring lug - KST P/N: RNYBS8-4 or equivalent (not provided)

Connect DC Power to a QFX5130 Switch

To connect DC power to the DC model of a QFX5130 Switch:

1. Attach the grounding strap to your bare wrist and to a site ESD point on the switch.
2. Verify that the DC power cables are correctly labeled before you set up connections to the power supply.
   - The cable with very low resistance (indicating a closed circuit) to chassis ground is positive (+) and will be installed on the V+ (return) DC power input terminal.
   - The cable with very high resistance (indicating an open circuit) to chassis ground is negative (–) and will be installed on the V– (input) DC power input terminal.

CAUTION: You must ensure that power connections maintain proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the DC power input terminals on each power supply.

3. Install heat-shrink tubing insulation around the power cables.

   To install heat-shrink tubing:

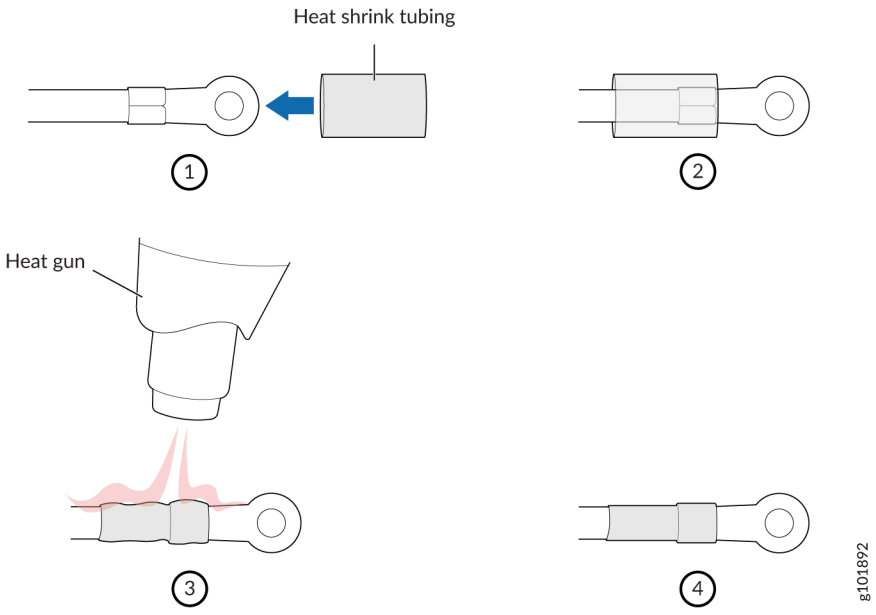
   a. Slide the tubing over the portion of the cable where it is attached to the lug barrel. Ensure that the tubing covers the end of the wire and the barrel of the lug attached to it.

   b. Shrink the tubing with a heat gun. Ensure that you heat all the sides of the tubing evenly so that it shrinks around the cable tightly.

Figure 103 on page 163 shows the steps to install a heat-shrink tubing.

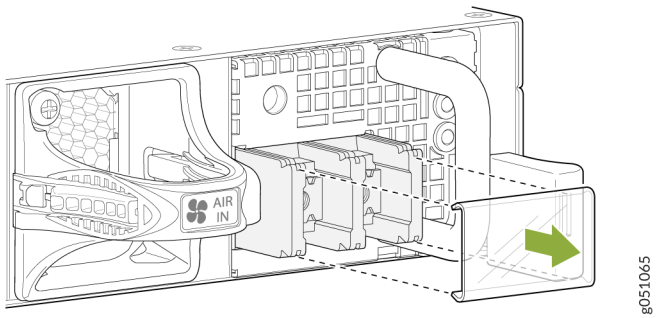
NOTE: Do not overheat the tubing.

Figure 103: Install Heat-Shrink Tubing



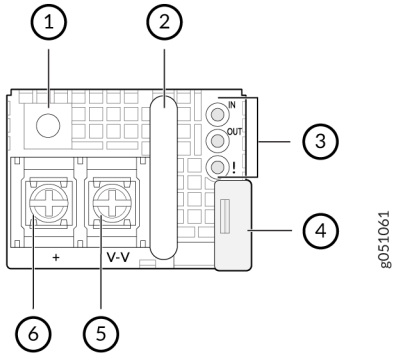
4. Ensure that the input circuit breaker is open so that the voltage across the DC power source cable leads is 0 V and that the cable leads do not become active when you connect DC power. The QFX5130 switch should connect the power supplies to an external DC power source or a -0% to +20% tolerance DC mains, supplied with an NRTL-approved circuit breaker rated at 40-A.
5. Ensure that the power supplies are fully inserted in the chassis.
6. Remove the terminal block cover. The terminal block cover is a piece of clear plastic that snaps into place over the terminal block (see Figure 104 on page 164).

Figure 104: Remove Terminal Block Cover



7. Remove the screws on the terminals by using the screwdriver. Save the screws. See Figure 105 on page 164.

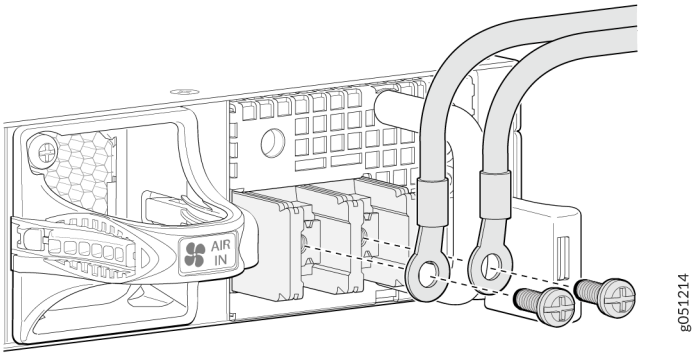
Figure 105: QFX5130 Faceplate



1— Not used	4— Release latch
2— Handle	5— V– terminal
3— LEDs	6— V+ terminal

8. Connect each power supply to the power sources. Secure the power source cables to the power supplies by screwing the ring lugs attached to the cables to the appropriate terminals by using the screw from the terminals (see Figure 106 on page 165).

Figure 106: Secure Ring Lugs to the Terminals on the QFX5130 DC Power Supply



The QFX5130 Switch operates with a DC power supply that has a single, non-redundant feed input. For source redundancy, you must install two DC power supplies in the QFX5130 Switch —connect source (A) to one power supply and connect source (B) to the second power supply. This configuration provides the commonly deployed A/B feed redundancy for the system.

CAUTION: The connection between each power source and power supply must include a circuit breaker.

Do not connect two sources to a single power supply because doing so can potentially cause circulating current in feed wires whenever there is any difference in the voltage of the two sources.

a. Secure the ring lug of the positive (+) DC power source cable to the V+ terminal on the DC power supply.

b. Secure the ring lug of the negative (–) DC power source cable to the V– terminal on the DC power supply.

c. Tighten the screws on the power supply terminals until snug by using a screwdriver. Do not overtighten—apply between 5 in-lb (0.56 Nm) and 6 in-lb (0.68 Nm) of torque to the screws.

WARNING: Ensure that the power cables do not block access to device components or drape where people could trip over them.

9. Replace the terminal block cover.
10. Close the input circuit breaker.

NOTE: The switch powers on as soon as power is provided to the power supply. There is no power switch on the device.

11. Verify that the **IN** and **OUT** LEDs on the power supply are lit green and are on steadily.

RELATED DOCUMENTATION

QFX5130 Power System | **60**

Connect the QFX5130 Switch to External Devices

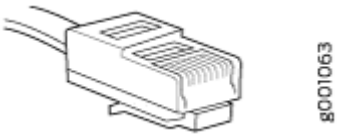
IN THIS SECTION

- Connect a Device to a Network for Out-of-Band Management | **166**
- Connect a Device to a Management Console Using an RJ-45 Connector | **167**

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 107 on page 167 shows the RJ-45 connector of the Ethernet cable.

Figure 107: RJ-45 Connector on an Ethernet Cable

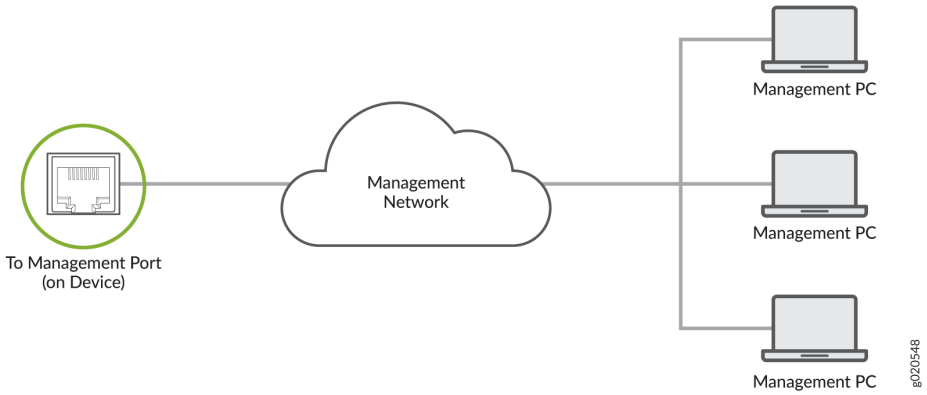


You can monitor and manage a network device, such as a router or a switch, by using a dedicated management channel. Each device has a management port to which you can connect an Ethernet cable with an RJ-45 connector. Use the management port to connect the device to the management device.

To connect a device to a network for out-of-band management (see Figure 108 on page 167):

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.

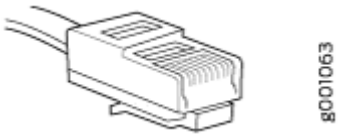
Figure 108: Connect a Device to a Network for Out-of-Band Management



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 109: 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 110 on page 169) or management console (see Figure 111 on page 169).

Figure 110: Connect a Device to a Management Console Through a Console Server

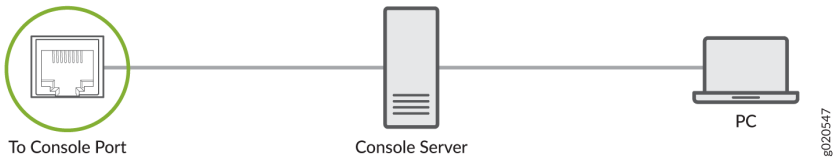


Figure 111: Connect a Device Directly to a Management Console



RELATED DOCUMENTATION

https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/

Connect the QFX5130 Switch to Power | **155**

Register Products—Mandatory to Validate SLAs

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

CAUTION: Update the installation base data if any installation base data is added or changed or if the installation base is moved. Juniper Networks is not responsible for customers not meeting the hardware replacement service-level agreement (SLA) for products that do not have registered serial numbers or accurate installation base data.

To know more about how to register your product and update your installation base, see Juniper Networks Product Registration and Install Base Management.

Perform Initial Software Configuration for QFX5130 Switches

Before you connect and configure a QFX5130 switch, set the following parameter values on the console server or PC:

- Baud Rate—9600
- Flow Control—None
- Data—8
- Parity—None
- Stop Bits—1
- DCD State—Disregard

You must perform the initial configuration of the QFX5130 switch through the console port by using the CLI or through zero-touch provisioning (ZTP). To use ZTP to provision the device, you must have access to a Dynamic Host Control Protocol (DHCP) server, an anonymous FTP, HTTP, or a Trivial File Transfer Protocol (TFTP) server on which the software image and configuration files are stored. For more information about using ZTP to provision 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 a PC by using an RJ-45 cable and an RJ-45 to DB-9 adapter. The console (**CON**) port is located on the top-right corner of the port panel.
2. Log in as **root**. There is no 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 the prefix length for the switch management interface.

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

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: On the QFX5130-32CD/QFX5130E-32CD switch, the management port `re0:mgmt-0` is the bottom RJ-45 port on the right side of the port panel and is labeled **MGMT**. On the QFX5130-48C/QFX5130-48CM switch, the management port `re0:mgmt-0` is located on the rear panel towards left hand side and the port on top is the management port, and is labeled **MGMT**.

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

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

9. Enable the management instance.

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

10. Enable Telnet service.

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



NOTE: When Telnet is enabled, you cannot log in to a QFX5130 switch through Telnet by 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 QFX5130 Cooling System | **175**
- Maintain the QFX5130 Power System | **179**
- Maintain Transceivers and Fiber Optic Cables on a QFX5130 Switch | **184**
- Power Off a QFX5130 Switch | **192**

Maintain the QFX5130 Cooling System

IN THIS SECTION

- Remove a Fan Module from QFX5130 Switches | 175
- Install a Fan Module in QFX5130 Switches | 177

The fan modules in a QFX5130 switch are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace one of them without powering off the switch or disrupting the switching function.

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.

Remove a Fan Module from QFX5130 Switches

Before you remove a fan module from a QFX5130 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/index.html).

Ensure that you have the following parts and tools available to remove a fan module from a QFX5130 switch:

- ESD grounding strap
- Antistatic bag or an antistatic mat

1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. Loosen the locking screw (3 or 4 turns) by using a Phillips number 2 screwdriver.
4. Grasp the handle on the fan module and squeeze the outside of the handle to release the module. Figure 112 on page 176shows how to remove a fan module from a QFX5130-32CD/

QFX5130E-32CD switch. Figure 113 on page 176 shows how to remove a fan module from a QFX5130-48C switch.

Figure 112: Remove a Fan Module from a QFX5130-32CD/QFX5130E-32CD Switch

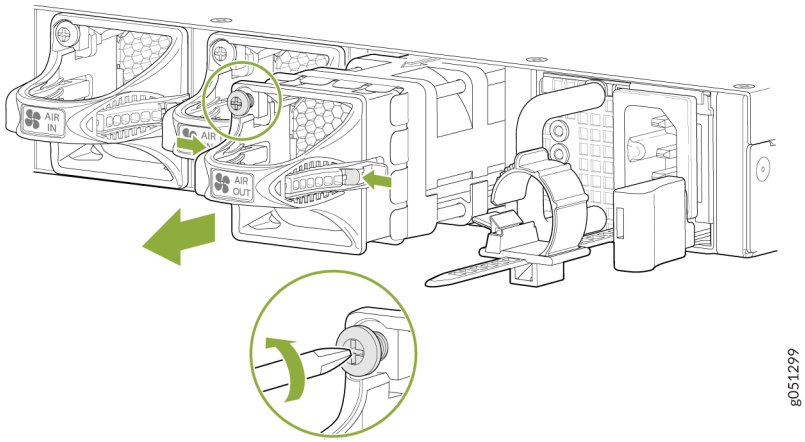
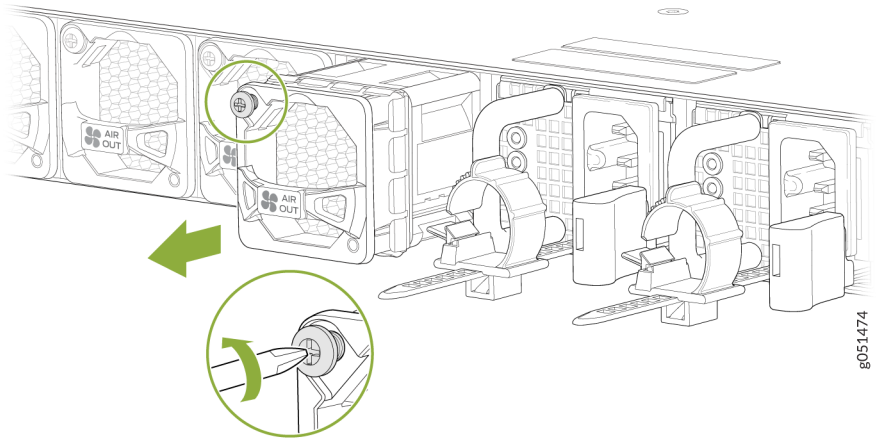


Figure 113: Remove a Fan Module from a QFX5130-48C/QFX5130-48CM Switch



WARNING: To avoid injury, do not touch the fan with your hands or any tools as you slide the fan module out of the chassis—the fan might still be running.

NOTE: The fan modules on the QFX5130 are hot-swappable and hot-removable field-replaceable units (FRUs). During replacement of a fan module while the

switch is online, you must replace one fan module at a time. This should be done within 240 seconds, after which the switch shuts down.

5. Pull firmly to slide the fan module halfway out of the chassis.
6. When the fan stops spinning, use your other hand to support the fan and slide the fan module completely out of the chassis.
7. Place the fan module in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

NOTE: When a fan module is removed, 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 QFX5130 Switches

Before you install a fan module in a QFX5130 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see Prevention of Electrostatic Discharge Damage).

The fan modules in a QFX5130 switch are hot-removable and hot-insertable field-replaceable units (FRUs); you can remove and replace them without powering off the switch or disrupting the switch functions.

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

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

To install a fan module in a QFX5130-32CD/QFX5130E-32CD (see Figure 114 on page 178.):

1. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
2. Take care not to touch the connectors as you remove the fan module from its bag.
3. Align the fan module with the open slot on the management panel of the chassis and slide it in until it is fully seated. Figure 114 on page 178 shows how to install a fan module in a QFX5130-32CD switch. Figure 115 on page 178 shows how to install a fan module in a QFX5130-48C switch.

Figure 114: Install a Fan Module in a QFX5130-32CD/QFX5130E-32CD Switch

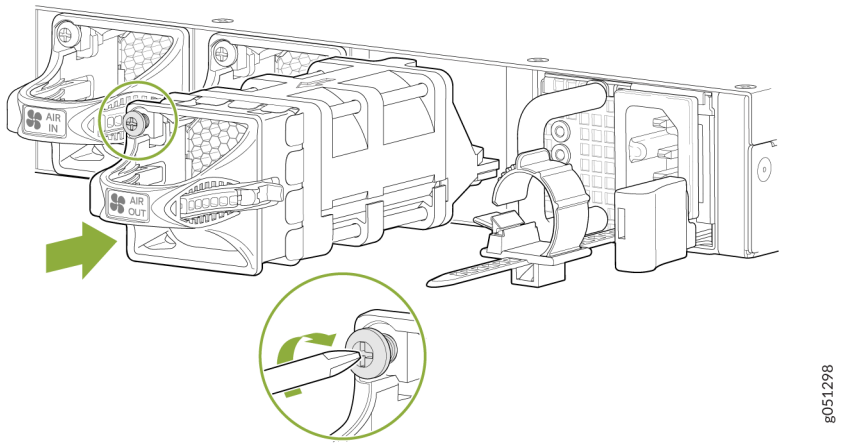
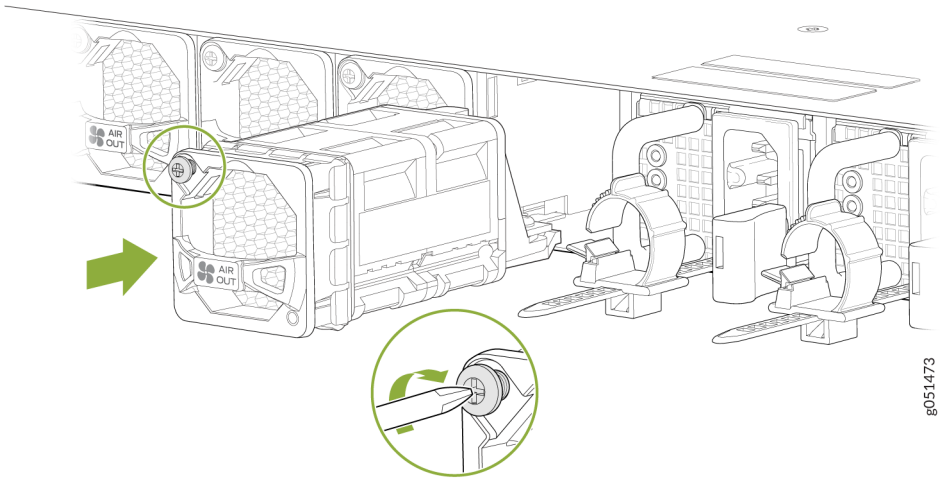


Figure 115: Install a Fan Module in a QFX5130-48C/QFX5130-48CM Switch



CAUTION: Damage can occur if you attempt to install a fan module into a chassis with a different airflow direction. Compare the switch product variant with the airflow marking on the handle to ensure that you are installing a fan module with the same airflow direction as the chassis. The fan modules are designed so that they can only be inserted into the QFX5130-32CD /QFX5130E-32CD/ QFX5130-48C/QFX5130-48CM product variant that supports the same airflow type. See"QFX5130 Power System" on page 60 for more information.

4. Use a Phillips screwdriver, number 2 to tighten the locking screw.

RELATED DOCUMENTATION

QFX5130 Power System | 60

QFX5130 Management Panel | 36

Maintain the QFX5130 Power System

IN THIS SECTION

- Remove a Power Supply Unit from QFX5130 Switches | 179
- Install an AC Power Supply Unit in QFX5130 Switches | 182

A QFX5130-power supply unit (PSU) is a hot-removable and hot-insertable field-replaceable unit (FRU). You can install replacement power supplies without powering off the switch or disrupting the switching function.

Remove a Power Supply Unit from QFX5130 Switches

QFX5130 switches are shipped from the factory with two power supplies.

Before you remove a power supply unit from a QFX5130 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/index.html).

Ensure that you have the following parts and tools available to remove a power supply from a QFX5130 switch:

- ESD grounding strap
- Antistatic bag or an antistatic mat

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

NOTE: If only one power supply is installed in your QFX5130 switch, you must power off the switch before removing the power supply. See "Power Off a QFX5130 Switch" on page 192.

3. Disconnect power to the switch:
   - AC power supply—If the AC power source outlet has a power switch, set it to the OFF (O) position. If the AC power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.
   - DC power supply—Switch the circuit breaker on the panel board that services the DC circuit to the Off position.
4. Remove the power source cable from the power supply faceplate:
   - AC power supply—Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.
   - DC power supply:
     a. Remove the screws that secure the ring lugs to the terminals by using a screwdriver.
     b. Replace the screws to each terminal and tighten the screws by using a screwdriver.
5. Slide the locking lever toward the handle until it stops.
6. Grasp the power supply handle and pull firmly to slide the power supply unit halfway out of the chassis. Figure 116 on page 180shows how to remove an AC power supply unit from a QFX5130-32CD switch. Figure 117 on page 181shows how to remove an AC power supply unit from a QFX5130-48C switch. Figure 118 on page 181 shows how to remove a DC power supply unit from a QFX5130-32CD switch. Figure 119 on page 181 shows how to remove a DC power supply unit from a QFX5130-48C switch.

Figure 116: Remove an AC Power Supply Unit from a QFX5130-32CD/QFX5130E-32CD Switch

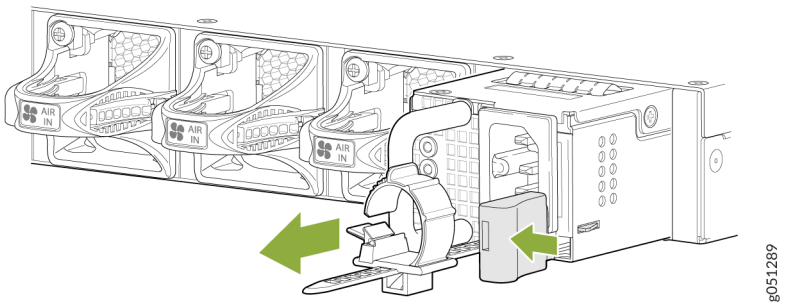


Figure 117: Remove an AC Power Supply Unit from a QFX5130-48C/ QFX5130-48CM Switch

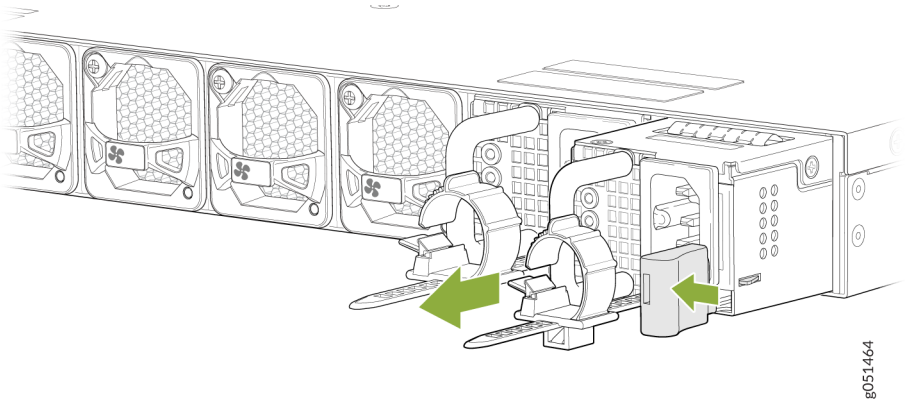


Figure 118: Remove a DC Power Supply Unit from a QFX5130-32CD/QFX5130E-32CD Switch

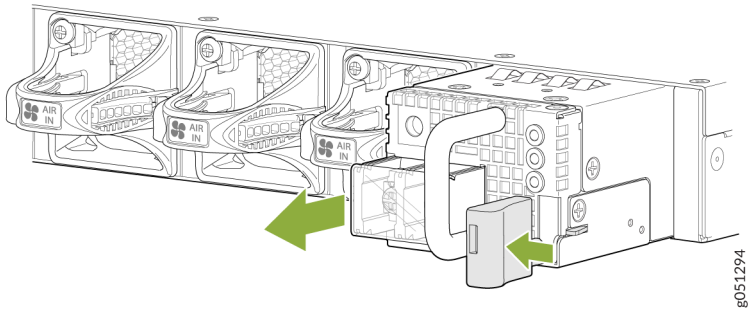
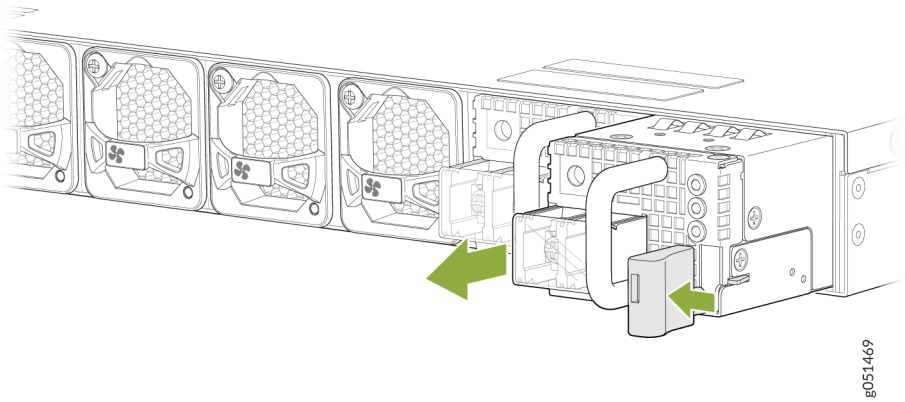


Figure 119: Remove a DC Power Supply Unit from a QFX5130-48C/ QFX5130-48CM Switch



7. Place one hand under the power supply unit to support it and slide it completely out of the chassis. Take care not to touch power supply components, pins, leads, or solder connections.
8. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
9. Replace with another power supply module.

Install an AC Power Supply Unit in QFX5130 Switches

- Before you install a power supply in QFX5130 switches, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see Prevention of Electrostatic Discharge Damage).
- Ensure that the airflow direction of the power supply is the same as the chassis. Labels on the power supply handle indicate the direction of airflow. See"QFX5130 Cooling System" on page 48 for more information.

To install a power supply in a QFX5130:

1. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
2. Take care not to touch power supply components, pins, leads, or solder connections as you remove the power supply from its bag.

   CAUTION: Verify that the direction of the arrow on the power supply handle matches the direction of airflow in the chassis. Ensure that each power supply you install in the chassis has the same airflow direction. If you install power supplies with two different airflow directions, Junos OS raises an alarm, and the status (**ALM**) LED blinks amber.
3. If the power supply has a protective plastic wrap, peel and remove the plastic wrap from all four sides of the power supply.
4. Using both hands, place the power supply in the power supply slot on the FRU panel of the switch and slide it in until it is fully seated and the locking lever slides into place. Figure 121 on page 183 shows how to install an AC power supply unit in a QFX5130-32CD switch. Figure 119 on page 181 shows how to install an AC power supply unit in a QFX5130-48C switch.

Figure 120: Install an AC Power Supply Unit in a QFX5130-32CD/QFX5130E-32CD Switch

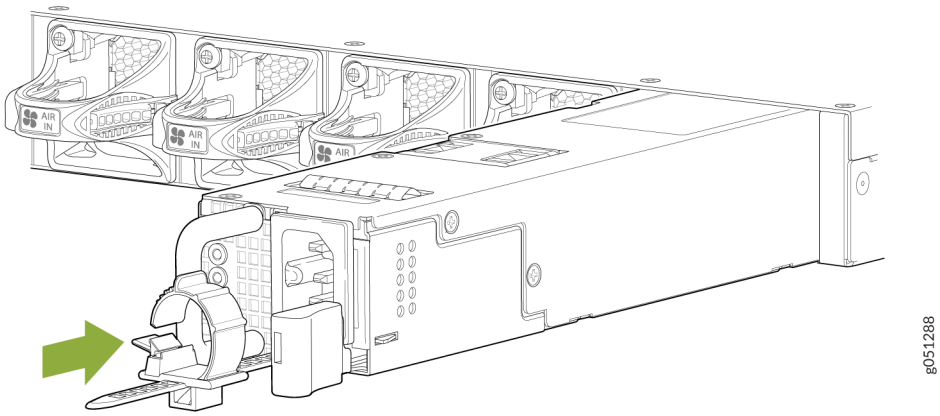
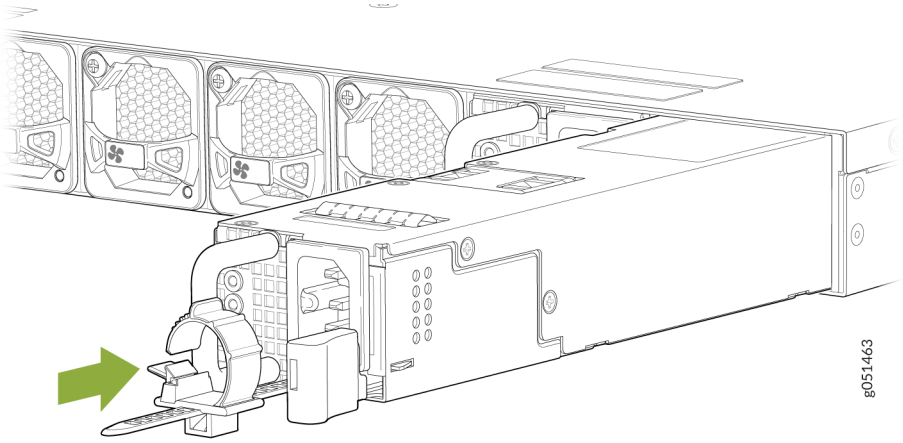


Figure 121: Install an AC Power Supply Unit in a QFX5130-48C/ QFX5130-48CM Switch



NOTE: You must connect each power supply 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.

RELATED DOCUMENTATION

QFX5130 Power System | 60

Connect the QFX5130 Switch to Power | 155

Maintain Transceivers and Fiber Optic Cables on a QFX5130 Switch

IN THIS SECTION

- Remove a Transceiver | 184
- Install a Transceiver | 187
- Disconnect a Fiber-Optic Patch Cable | 190
- Connect a Fiber-Optic Patch Cable | 191
- How to Handle Fiber-Optic Patch Cables | 191

Remove a Transceiver

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

Ensure that you have the following parts and tools available:

- An antistatic bag or an antistatic mat
- Rubber safety caps to cover the transceiver and fiber-optic cable connector
- A dust cover to cover the port or a replacement transceiver

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

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 122 on page 186 shows how to remove a quad small form-factor pluggable plus (QSFP+) transceiver. The procedure is the same for all types of transceivers except the QSFP28 and C form-factor pluggable (CFP) transceivers.

To remove a transceiver from a device:

1. Place the antistatic bag or antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the rack.
3. Label the cable connected to the transceiver so that you can reconnect it correctly.

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

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

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

4. Remove the cable connected to the transceiver (see Disconnect a Fiber-Optic Cable). Cover the transceiver and the end of each fiber-optic cable connector with a rubber safety cap immediately after disconnecting the fiber-optic cables.
5. If there is a cable management system, arrange the cable in the cable management system to prevent it from dislodging or developing stress points. Secure the cable so that it does not support its own weight as it hangs to the floor. Place excess cable out of the way in a neatly coiled loop in the cable management system. Placing fasteners on the loop helps to maintain its shape.
6. To remove an SFP56-DD, SFP, SFP+, XFP, a QSFP+, or QSFP56-DD transceiver:

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

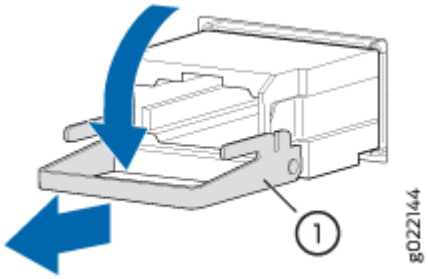
Note that QSFP-DD and SFP-DD transceivers don't have ejector levers, instead they have a pull tab which can be used to unlock and remove the transceiver.

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

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

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

Figure 122: Remove a QSFP+ Transceiver



1— Ejector lever

To remove a CFP transceiver:

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

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

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

7. Using your fingers, grasp the body of the transceiver and pull it straight out of the port.
8. Place the transceiver in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
9. Place the dust cover over the empty port, or install the replacement transceiver.

Install a Transceiver

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

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

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

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

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

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

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

Figure 123 on page 189 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers.

To install a transceiver:

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

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

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

4. If the port in which you want to install the transceiver is covered with a dust cover, remove the dust cover and save it in case you need to cover the port later. If you are hot-swapping a transceiver, wait for at least 10 seconds after removing the transceiver from the port before installing a new transceiver.
5. Using both hands, carefully place the transceiver in the empty port. The connectors must face the chassis.

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

6. Slide the transceiver in gently until it is fully seated. If you are installing a CFP transceiver, use your fingers to tighten the captive screws on the transceiver.
7. Remove the rubber safety cap from the transceiver and the end of the cable, and insert the cable into the transceiver.

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

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

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

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

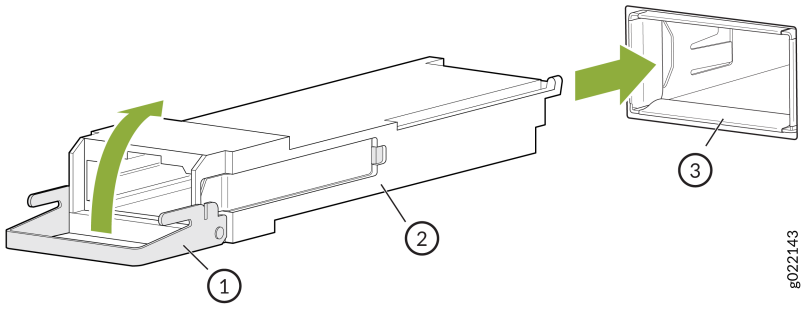
> **CAUTION**: Avoid bending the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

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

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

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

Figure 123: Install a Transceiver



1– Ejector lever	3– Port

2– Transceiver	

Disconnect a Fiber-Optic Patch Cable

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

Ensure that you have the following parts and tools available:

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

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

To disconnect a fiber-optic patch 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 patch cables. Fiber-optic transceivers and fiber-optic patch cables connected to transceivers emit laser light that can damage your eyes.

2. Carefully unplug the fiber-optic patch 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 patch cable connector with the rubber safety cap.

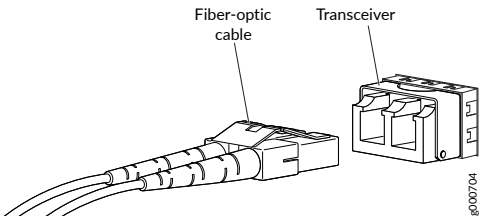
Connect a Fiber-Optic Patch Cable

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

To connect a fiber-optic patch 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 patch cables. Fiber-optic transceivers and fiber-optic patch cables connected to transceivers emit laser light that can damage your eyes.

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



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

CAUTION: Do not bend fiber-optic patch 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 patch 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.

RELATED DOCUMENTATION

QFX5130 Network Cable and Transceiver Planning | 88

Power Off a QFX5130 Switch

Before you remove the power cord to power off a QFX5130 Switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/.

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

NOTE: Use the following procedure to turn off power on a QFX5130 switch.

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

- An ESD grounding strap
- An external management device such as a PC
- An RJ-45 to DB-9 rollover cable to connect the external management device to the console port

To power off a QFX5130 switch:

1. Connect to the switch by using one of the following methods:
   - Connect a management device to the console (**CON**) port on a QFX5130 switch. 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 167.
   - You can shut down the QFX5130 from a management device on your out-of-band management network. For instructions about connecting a management device to the management (**CO**) port, see "Connect a Device to a Network for Out-of-Band Management" on page 166.
2. Shut down Junos OS from the external management device.

   For QFX5130 systems:

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

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

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

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

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

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

4. Disconnect power to the switch by performing one of the following tasks:
   - AC power supply—If the AC power source outlet has a power switch, set it to the off (O) position. If the AC power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.
5. Remove the power source cable from the power supply faceplate:
   - AC power supply—Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.
   - DC power supply—Remove the screws, securing the ring lugs attached to the power source cables to the power supply by using the screwdriver, and remove the power source cables from the power supply. Replace the screws on the terminals and tighten them.
6. Uncable the switch before removing it from the rack or cabinet.

RELATED DOCUMENTATION

Connect the QFX5130 Switch to Power | **155**

CHAPTER 6

Troubleshooting Hardware

IN THIS CHAPTER

- Troubleshoot the QFX5130 Switch | **196**

Troubleshoot the QFX5130 Switch

IN THIS SECTION

- QFX5130 Troubleshooting Resources Overview | **196**
- QFX5130 Alarm Messages Overview | **197**
- Chassis Alarm Messages | **198**

QFX5130 Troubleshooting Resources Overview

To troubleshoot a QFX5130 problem, you can use:

- Junos Evolved OS CLI

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

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

  When the Routing Engine detects an alarm condition, it lights the red or yellow alarm LED on the management panel as appropriate. In addition, you can also use component LEDs and network port LEDs to troubleshoot the QFX5130 switch. For more information, see "QFX5130 Management Panel" on page 36.

- 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.

QFX5130 Alarm Messages Overview

When a QFX5130 switch detects an alarm condition, it lights the red or yellow alarm LED on the management panel as appropriate. To view a more detailed description of the alarm cause, issue the `show system alarms` operational CLI command.

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

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

```
user@host> show chassis temperature-thresholds
                                     Fan speed      Yellow alarm      Red
alarm      Fire Shutdown
                                    (degrees C)      (degrees C)
(degrees C)      (degrees C)
Item                                Normal  High   Normal  Bad fan   Normal
Bad fan     Normal
Routing Engine 0 CPU Temperature        75    79       90       90
95       95        101
FPC 0 Sensor TopMiddle                  51    56       67       67
77       77         87
FPC 0 Sensor TopFrontLeft               46    51       62       62
72       72         82
FPC 0 Sensor TopBack                    54    59       70       70
80       80         90
FPC 0 Sensor BottomBack                 51    56       67       67
77       77         87
FPC 0 Sensor CPUTopLeft                 46    51       62       62
72       72         82
FPC 0 Sensor CPUBottomMiddle            54    59       70       70
80       80         90
FPC 0 Sensor CPUTopBackRight            46    51       62       62
72       72         82
```

```
FPC 0 Sensor TD4 Max Reading              82    89      102      102
105      105        110
```

You can calculate the percentage of fan real-time performance monitoring (RPM) or *duty cycle* from the output of the following command that you issue when you're logged in as the root user:

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

In this example, the system returned the hexadecimal value `0x07`. Convert that value to decimal, which is 7 in this example. Then use this formula to get the duty cycle:

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

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

Chassis Alarm Messages

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

Chassis alarms on QFX5130 switches have two severity levels:

- Major (red)—Indicates a critical situation on the switch that has resulted from one of the conditions described in Table 51 on page 199. A red alarm condition requires immediate action.
- Minor (yellow)—Indicates a noncritical condition on the switch that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow alarm condition requires monitoring or maintenance.

Table 51 on page 199 describes the chassis alarm messages on the QFX5130 switches.

Junos OS Evolved systems, such as QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/QFX5130-48CM, are based on a new alarm infrastructure, not all power supplies and fan alarms are supported. Table 51 on page 199 shows these alarms.

Table 51: Chassis Alarm Messages for QFX5130 Switches (QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/QFX5130-48CM)

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 the devices around your QFX5130 switch. Ensure that the environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor of your switch.If the condition persists, the device might shut down.
	Yellow (minor)	`FAN` *`fan-number`* `Fan Sensor Fail`	Remove and check the fan module for obstructions. Reinsert the fan module. If the problem persists, check the system log for the message related to the sensor and report the message to customer service.
		sensor-location Temp Sensor Too Warm	Check the environmental conditions and alarms on other devices. Ensure that thet environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor.

Table 51: Chassis Alarm Messages for QFX5130 Switches (QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/QFX5130-48CM) *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
Power Supplies	Red (major)	`PEM pem-number Not Powered`	Install a power supply into the empty slot and ensure the power supply is powered.
Temperature sensors	Major (red)	`FPC 0 Temperature 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.
	Minor (yellow)	`FPC 0 Temperature Warm`	Check environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor.
		`FPC 0 Temp Sensor Fail`	Check the system log for the following error message and report the message to customer support:
Routing Engine	Major (red)	`RE RE number /var partition is full`	File storage is at capacity. Reduce unnecessary files to free up space.
	Minor (yellow)	`RE RE number /var partition is high`	File storage is reaching capacity. Reduce unnecessary files to free up space.

Table 51: Chassis Alarm Messages for QFX5130 Switches (QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/QFX5130-48CM) *(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.

RELATED DOCUMENTATION

Contact Customer Support

https://www.juniper.net/documentation/us/en/hardware/juniper-safety-guide/index.html

Configuring Junos OS to Determine Conditions That Trigger Alarms on Different Interface Types

alarm

7

CHAPTER

Contacting Customer Support and Returning the Chassis or Components

IN THIS CHAPTER

- Contact Customer Support to Obtain Return Material Authorization | **203**
- Return a QFX5130 Chassis or Components | **204**

Contact Customer Support to Obtain Return Material Authorization

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

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

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

- Your existing service request number, if you have one
- Serial number of the component
- Your name, organization name, telephone number, fax number, and shipping address
- Details of the failure or problem
- Type of activity being performed on the device when the problem occurred
- Configuration data displayed by one or more `show` commands

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

- Service Request Manager: https://support.juniper.net/support
- Telephone: +1-888-314-JTAC (+1-888-314-5822), toll free in U.S., Canada, and Mexico



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

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

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

Return a QFX5130 Chassis or Components

IN THIS SECTION

- Locate the Serial Number on a QFX5130 Device or Component | **204**
- Remove the Solid-State Drives for RMA on QFX5130-32CD/QFX5130E-32CD Switches | **211**
- Remove the Solid-State Drives for RMA on a QFX5130-48C Switch | **213**
- How to Return a Hardware Component to Juniper Networks, Inc. | **215**
- Guidelines for Packing Hardware Components for Shipment | **216**
- Pack a QFX5130 Device or Component for Shipping | **216**

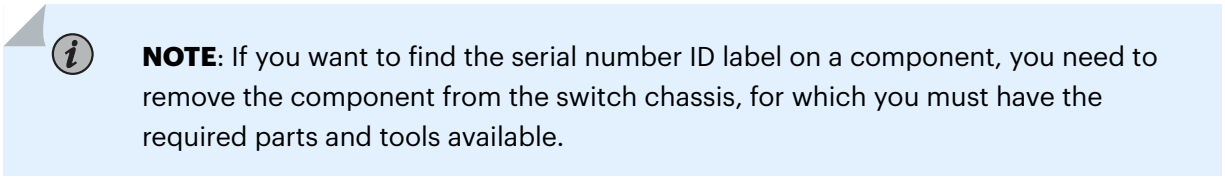
Locate the Serial Number on a QFX5130 Device or Component

IN THIS SECTION

- List the Chassis and Component Details Using the CLI | **205**
- Locate the Chassis Serial Number ID Label on a QFX5130 Switch | **208**
- Locate the Serial Number ID Labels on FRUs in a QFX5130 Switch | **209**

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

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



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

List the Chassis and Component Details Using the CLI

To list the switch and components and their serial numbers, use the `show chassis hardware` CLI operational mode command. The following outputs list the switch components and serial numbers for QFX5130-32CD/QFX5130E-32CD and QFX5130-48C/QFX5130-48CM switches.

```
user@device> show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                               YR0220110001      QFX5130-32CD
PSM 0            REV 04   740-085431   1ED79400163       JPSU-1600W-AC-AFO
PSM 1            REV 04   740-085431   1ED79520440       JPSU-1600W-AC-AFO
Routing Engine 0          BUILTIN      BUILTIN           RE-QFX5130-32CD
CB 0             REV 02   650-109783   YR0220110001      QFX5130-32CD
FPC 0                     BUILTIN      BUILTIN           QFX5130-32CD
  PIC 0                   BUILTIN      BUILTIN           32X400G-QSFP-DD
    Xcvr 0       REV 01   720-087756   1P1C45A5012NL     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 1       REV 01   720-087756   1P1C45A5012NL     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 2       REV 01   720-087756   1P1C45A5012PF     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 3       REV 01   720-087756   1P1C45A5012PF     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 4       REV 01   720-087756   1P1C45A5012PK     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 5       REV 01   720-087756   1P1C45A5012PK     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 6       UEV 01   740-061001   1RC4251600Q       QSFP28-100G-CU3M
    Xcvr 7       UEV 01   740-061001   1RC4251600Q       QSFP28-100G-CU3M
    Xcvr 8       REV 01   740-090165   1W1CSAA525004     QSFP56-DD-400G-AOC-3M
    Xcvr 9       REV 01   740-090165   1W1CSAA525004     QSFP56-DD-400G-AOC-3M
    Xcvr 10      REV 01   740-038623   APF13500017WBL    QSFP+-40G-CU1M
    Xcvr 11      REV 01   740-038623   APF13500017WBL    QSFP+-40G-CU1M
    Xcvr 12      REV 01   740-085349   2J1TZBA51000U     QSFP56-DD-400G-FR4
    Xcvr 13      REV 01   740-085349   2J1TZBA51000W     QSFP56-DD-400G-FR4
```

```
    Xcvr 14      UEV 01   740-061001   1RC42516042       QSFP28-100G-CU3M
    Xcvr 15      REV 01   740-061001   1RC42516042       QSFP28-100G-CU3M
    Xcvr 16      REV 01   740-061000   1RC4024704E       QSFP28-100G-CU1M
    Xcvr 17      REV 01   740-061000   1RC4024704E       QSFP28-100G-CU1M
    Xcvr 18      REV 01   740-061411   1ACS4332088       QSFP28-100G-AOC-10M
    Xcvr 19      REV 01   740-061411   1ACS4332088       QSFP28-100G-AOC-10M
    Xcvr 20      REV 01   720-087756   1P1C45A5012PP     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 21      REV 01   720-087756   1P1C45A5012PP     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 22      UEV 01   740-061001   1RC4251602A       QSFP28-100G-CU3M
    Xcvr 23      REV 01   740-061001   1RC4251602A       QSFP28-100G-CU3M
    Xcvr 24      REV 01   720-087756   1P1C45A5012PC     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 25      REV 01   720-087756   1P1C45A5012PC     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 26      REV 01   720-087756   1P1C45A5012RK     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 27      REV 01   720-087756   1P1C45A5012RK     QSFP56-DD-400G-CR8-
CU-1M
    Xcvr 28      REV 01   740-102183   49855             QSFP56-DD LPBK
    Xcvr 29      REV 01   740-102183   49915             QSFP56-DD LPBK
    Xcvr 30      REV 01   740-102183   49866             QSFP56-DD LPBK
    Xcvr 31      REV 01   740-102183   49926             QSFP56-DD LPBK
    Xcvr 32      REV 01   740-021308   MSP0RD7           SFP+-10G-SR
    Xcvr 33      REV 01   740-030658   AD1125A04M8       SFP+-10G-USR
Fan Tray 0                                              QFX5130-32CD Fan
Tray, Front to Back Airflow - AFO
Fan Tray 1                                              QFX5130-32CD Fan
Tray, Front to Back Airflow - AFO
Fan Tray 2                                              QFX5130-32CD Fan
Tray, Front to Back Airflow - AFO
Fan Tray 3                                              QFX5130-32CD Fan
Tray, Front to Back Airflow - AFO
Fan Tray 4                                              QFX5130-32CD Fan
Tray, Front to Back Airflow - AFO
Fan Tray 5                                              QFX5130-32CD Fan
```

```
Tray, Front to Back Airflow – AFO
user@device
```

```
root@re0> show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                FY4123AV0014      QFX5130-48C
PSM 0            REV 05   740-085431   1ED7D269551       AC AFO 1600W PSU
PSM 1            REV 05   740-085431   1ED7D269530       AC AFO 1600W PSU
Routing Engine 0          BUILTIN      BUILTIN           RE-QFX5130-48C
CB 0             REV      650-155744   FY4123AV0014      QFX5130-48C
FPC 0                     BUILTIN      BUILTIN           QFX5130-48C
  PIC 0                   BUILTIN      BUILTIN           48xSFP56-DD + 8xQSFPDD
    Xcvr 0       REV 01   740-154777   2E1CWOA826015     SFP-DD-100G-AOC-20M
    Xcvr 1       REV 01   740-154777   2E1CWOA826015     SFP-DD-100G-AOC-20M
    Xcvr 2       REV 01   740-154771   2E1CWHA822004     SFP-DD-100G-AOC-1M
    Xcvr 3       REV 01   740-154771   2E1CWHA822004     SFP-DD-100G-AOC-1M
    Xcvr 4       REV 01   740-154776   2E1CWNA826004     SFP-DD-100G-AOC-15M
    Xcvr 5       REV 01   740-154776   2E1CWNA826004     SFP-DD-100G-AOC-15M
    Xcvr 6       REV 01   740-154774   2E1CWLA821003     SFP-DD-100G-AOC-7M
    Xcvr 7       REV 01   740-154774   2E1CWLA821003     SFP-DD-100G-AOC-7M
    Xcvr 8       REV 01   740-154773   2E1CWKA822004     SFP-DD-100G-AOC-5M
    Xcvr 9       REV 01   740-154773   2E1CWKA822004     SFP-DD-100G-AOC-5M
    Xcvr 10      REV 01   740-154778   2E1CWPA821019     SFP-DD-100G-AOC-30M
    Xcvr 11      REV 01   740-154778   2E1CWPA821019     SFP-DD-100G-AOC-30M
    Xcvr 12      REV 01   740-154775   2E1CWMA826016     SFP-DD-100G-AOC-10M
    Xcvr 13      REV 01   740-154775   2E1CWMA826016     SFP-DD-100G-AOC-10M
    Xcvr 14      REV 01   740-154773   1W1CWKA752002     SFP-DD-100G-AOC-5M
    Xcvr 15      REV 01   740-154773   1W1CWKA752002     SFP-DD-100G-AOC-5M
    Xcvr 16      REV 01   740-154774   1W1CWLA80800E     SFP-DD-100G-AOC-7M
    Xcvr 17      REV 01   740-154774   1W1CWLA80800E     SFP-DD-100G-AOC-7M
    Xcvr 18      REV 01   740-154775   1W1CWMA80800B     SFP-DD-100G-AOC-10M
    Xcvr 19      REV 01   740-154775   1W1CWMA80800B     SFP-DD-100G-AOC-10M
    Xcvr 20      REV 01   740-154772   1W1CWJA808004     SFP-DD-100G-AOC-3M
    Xcvr 21      REV 01   740-154772   1W1CWJA808004     SFP-DD-100G-AOC-3M
    Xcvr 24      REV 01   740-154776   1W1CWNA751003     SFP-DD-100G-AOC-15M
    Xcvr 25      REV 01   740-154776   1W1CWNA751003     SFP-DD-100G-AOC-15M
    Xcvr 26      REV 01   740-154777   1W1CWOA803001     SFP-DD-100G-AOC-20M
    Xcvr 27      REV 01   740-154777   1W1CWOA803001     SFP-DD-100G-AOC-20M
    Xcvr 28      REV 01   740-154771   1W1CWHA75100D     SFP-DD-100G-AOC-1M
    Xcvr 29      REV 01   740-154771   1W1CWHA75100D     SFP-DD-100G-AOC-1M
```

```
    Xcvr 34      REV 01   740-152195   1W1CZPA82003T     SFP-DD-100GBASE-DR
    Xcvr 36      REV 01   740-154778   1W1CWPA752004     SFP-DD-100G-AOC-30M
    Xcvr 37      REV 01   740-154778   1W1CWPA752004     SFP-DD-100G-AOC-30M
    Xcvr 38      REV 01   740-152196   1W1CZQA82000B     SFP-DD-100G-FR1
    Xcvr 40      REV 01   740-152197   1W1CZSA819010     SFP-DD-100G-LR1
    Xcvr 48      REV 01   740-085351   1W2CZ7A73400E     QSFP56-DD-400GBASE-DR4
    Xcvr 49      REV 01   740-058734   1ACQ113712F       QSFP-100GBASE-SR4
    Xcvr 50      REV 01   740-085351   1W2CZ7A649004     QSFP56-DD-400GBASE-DR4
    Xcvr 51      REV 01   740-085351   1W2CZ7A734004     QSFP56-DD-400GBASE-DR4
    Xcvr 52      REV 01   740-085351   1W2CZ7A73400A     QSFP56-DD-400GBASE-DR4
    Xcvr 53      REV 01   740-085351   1W2CZ7A73400N     QSFP56-DD-400GBASE-DR4
    Xcvr 54      REV 01   740-085351   1W2CZ7A53402R     QSFP56-DD-400GBASE-DR4
    Xcvr 55      REV 01   740-085351   1W2CZ7A54500A     QSFP56-DD-400GBASE-DR4
    Xcvr 57      REV 01   740-030658   1A1MWGA7506HN     SFP+-10G-USR
Fan Tray 0                                              QFX5130-48C/CM Fan
Tray, Front to Back Airflow - AFO
Fan Tray 1                                              QFX5130-48C/CM Fan
Tray, Front to Back Airflow - AFO
Fan Tray 2                                              QFX5130-48C/CM Fan
Tray, Front to Back Airflow - AFO
Fan Tray 3                                              QFX5130-48C/CM Fan
Tray, Front to Back Airflow - AFO
Fan Tray 4                                              QFX5130-48C/CM Fan
Tray, Front to Back Airflow - AFO
Fan Tray 5                                              QFX5130-48C/CM Fan
Tray, Front to Back Airflow - AFO
```

Locate the Chassis Serial Number ID Label on a QFX5130 Switch

You can find the chassis serial number in either the `show chassis hardware` command output or physically on a pull-out tab located on the right side of the QFX5130-32CD/QFX5130E-32CD port panel. See Figure 124 on page 209 for the QFX5130-32CD/QFX5130E-32CD. The chassis serial number for QFX5130-48C/QFX5130-48CM is located on the top panel. See Figure 125 on page 209.

Figure 124: Location of the Serial Number ID Label on a QFX5130-32CD/QFX5130E-32CD Switch

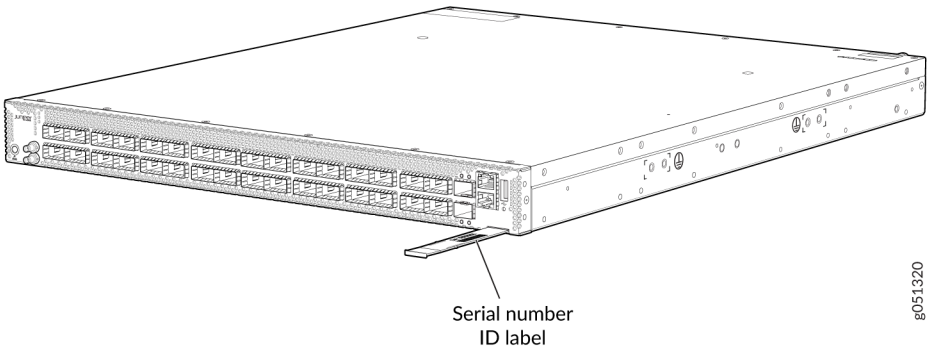
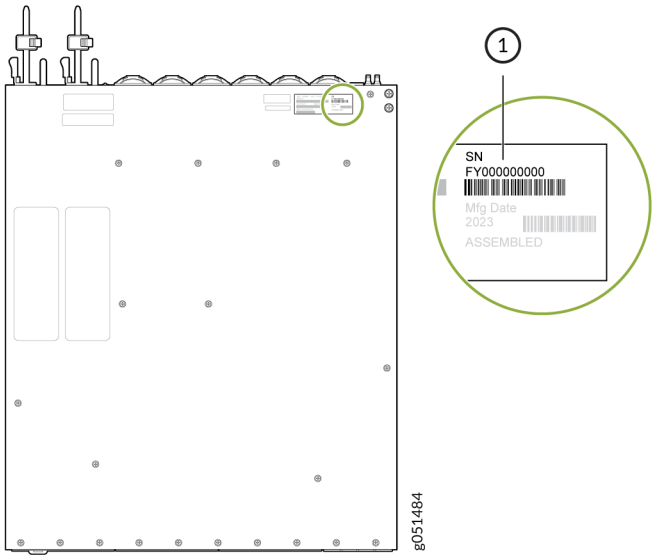


Figure 125: Location of the Serial Number ID Label on a QFX5130-48C Switch



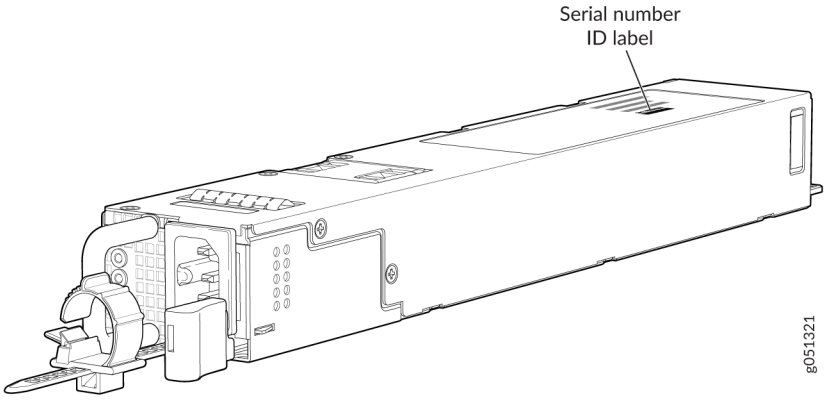
Locate the Serial Number ID Labels on FRUs in a QFX5130 Switch

The power supplies and fan modules installed in a QFX5130-32CD/QFX5130E-32CD are field-replaceable units (FRUs). For each FRU, you must remove the FRU from the switch chassis to see the FRU serial number ID label.

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

- AC Power supply—The serial number ID label is on the top of the AC power supply. Figure 126 on page 210 shows the location of the serial number ID label on the AC power supply for QFX5130 switches.

Figure 126: Serial Number ID Label on a QFX5130 AC Power Supply



- Fan module—The serial number ID label is on the bottom of the fan module for QFX5130-32CD/QFX5130E-32CD switches. Figure 127 on page 211 shows the location of serial number on QFX5130-32CD/QFX5130E-32CD switches. The serial number ID label is on the side of the fan module for QFX5130-48C switches. Figure 128 on page 211 shows the location of serial number on QFX5130-48C switches.

Figure 127: Serial Number ID Label on a QFX5130-32CD/QFX5130E-32CD Fan Module

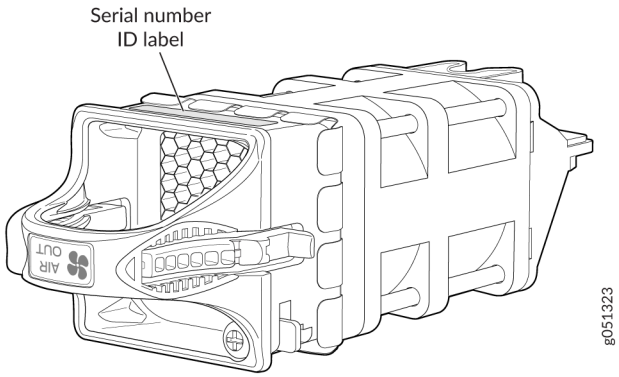
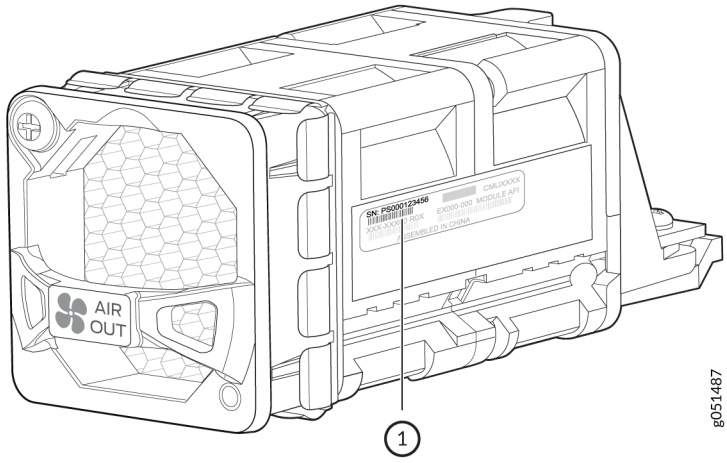


Figure 128: Serial Number ID Label on a QFX5130-48C Fan Module



Remove the Solid-State Drives for RMA on QFX5130-32CD/ QFX5130E-32CD Switches

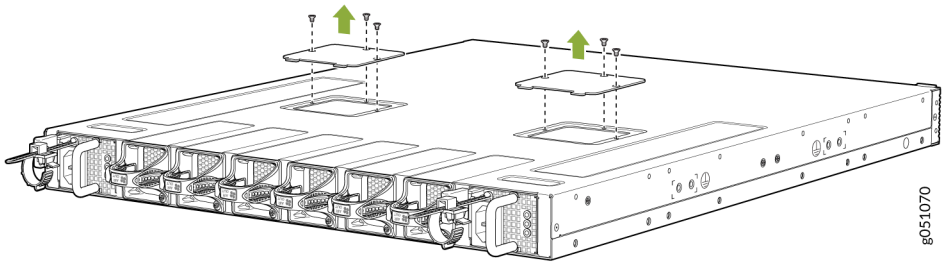
The QFX5130-32CD/QFX5130E-32CD switches have two solid-state drives (SSDs) that store the software images, system logs, and the configuration files. Before returning a chassis to Juniper Networks as part of a Return Merchandise Authorization (RMA), you have the option of removing the SSDs and disposing them according to your own company's security procedures. Before you begin this procedure, ensure you have the following tools:

- ESD grounding strip (not provided)
- Number 2 Phillips screwdriver

Use this optional procedure to remove the drives from the QFX5130-32CD/QFX5130E-32CD switches after the device has shutdown and you've removed it from the rack or cabinet. The SSD doors are located on the top of the QFX5130-32CD/QFX5130E-32CD switch.

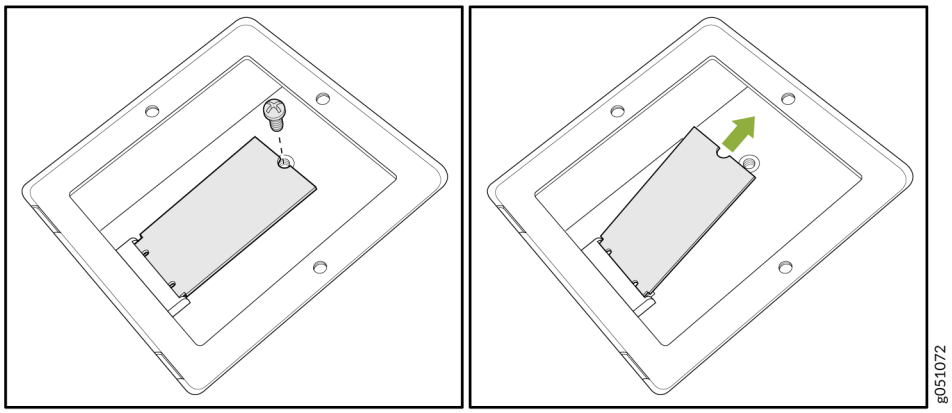
1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.
2. Place the device on a firm surface such as a workbench or a table with the SSD doors facing up.
3. Use the number 2 Phillips screwdriver to remove the three flat-head screws from each door on the top of the device. See Figure 129 on page 212.

Figure 129: Remove Screws on SSD Doors for a QFX5130-32CD/QFX5130E-32CD Switch



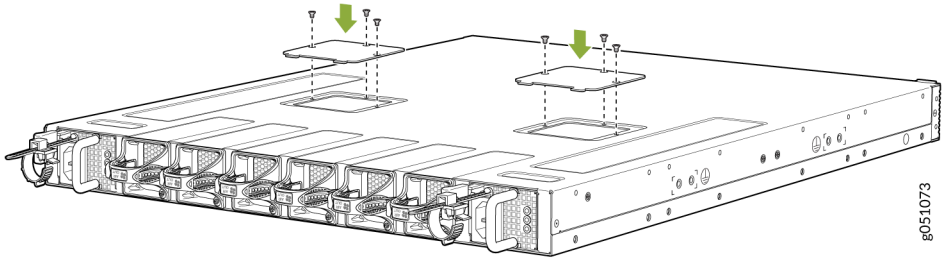
4. Remove the doors and set aside the screws.
5. Use the Phillips screwdriver to remove the screw on one of the SSDs and set it aside.

Figure 130: Removing the Screw and Lifting the SDD Out



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

Figure 131: Replace the Screws on the SSD Doors of the QFX5130-32CD/QFX5130E-32CD



9. Hand tighten the screws using the number 2 Phillips screwdriver.
10. Dispose of the SSDs according to your site security procedures.

Remove the Solid-State Drives for RMA on a QFX5130-48C Switch

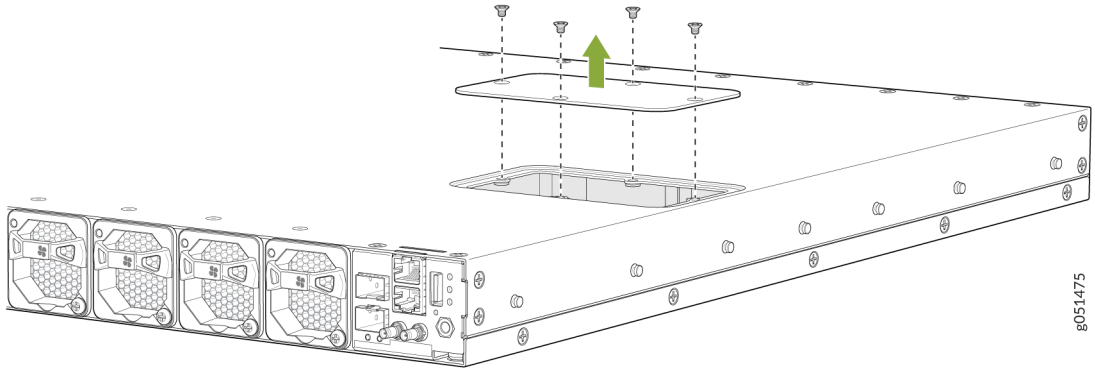
The QFX5130-48C switches have two solid-state drives (SSDs) that store the software images, system logs, and the configuration files. Before returning a chassis to Juniper Networks as part of a Return Merchandise Authorization (RMA), you have the option of removing the SSDs and disposing them according to your own company's security procedures. Before you begin this procedure, ensure you have the following tools:

- ESD grounding strip (not provided)
- Number 2 Phillips screwdriver

Use this optional procedure to remove the drives from the QFX5130-48C switches after the device has shutdown and you've removed it from the rack or cabinet. The SSD door is located on top of QFX5130-48C switch.

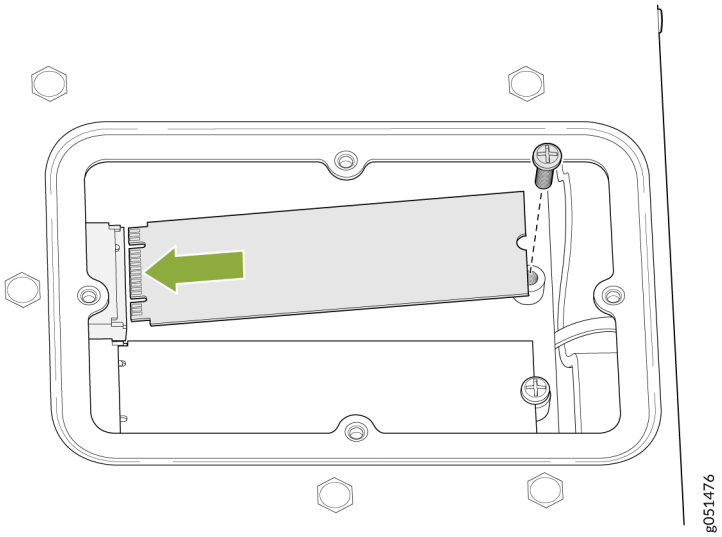
1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.
2. Place the device on a firm surface such as a workbench or a table with the SSD doors facing up.
3. Use the number 2 Philips screwdriver to remove the four flat-head screws from the single door on top of the device. See Figure 132 on page 214.

Figure 132: Remove Screws on SSD Doors for a QFX5130-48C/QFX5130-48CM48C Switch



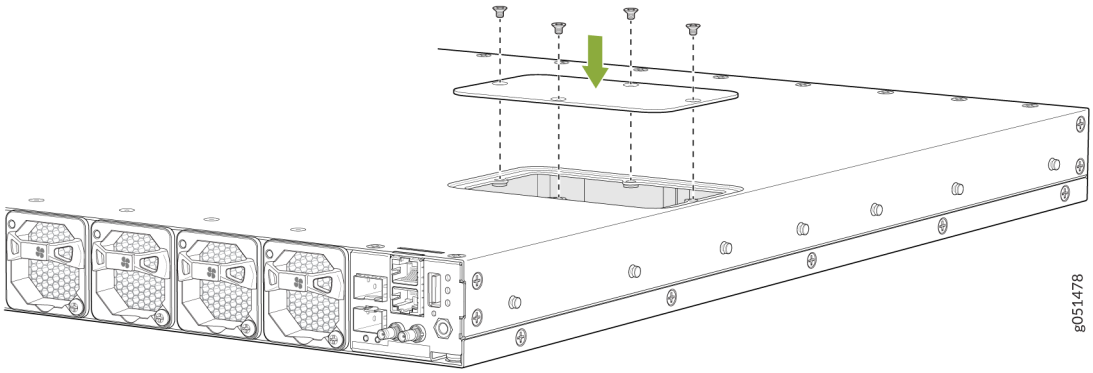
4. Remove the door and set aside the screws.
5. Use the Phillips screwdriver to remove the screw on one SSD and set it aside. See Figure 133 on page 214

Figure 133: Removing the Screw and Lifting the SDD Out of a QFX5130-48C Switch



6. Lift the end furthest from the connector and remove from the cavity.
7. Replace screws and hand-tighten them using the Phillips screwdriver.
8. Replace the SSD door and four flat-head screws.

Figure 134: Replace the Screws on the SSD Doors of the QFX5130-32CD



9. Hand tighten the screws using the number 2 Phillips screwdriver.
10. Dispose of the SSDs according to your site security procedures.

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

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

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

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

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

To return a defective hardware component:

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

2. Obtain an RMA number from the Juniper Networks Technical Assistance Center (JTAC). You can send e-mail or telephone as described above.
3. Provide the following information in your e-mail message or during the telephone call:
   - Part number and serial number of component
   - Your name, organization name, telephone number, and fax number
   - Description of the failure
4. The support representative validates your request and issues an RMA number for return of the component.
5. Pack the component for shipment.

Guidelines for Packing Hardware Components for Shipment

To pack and ship individual components:

- When you return components, make sure that they are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
- Use the original shipping materials if they are available.
- Place individual components in antistatic bags.
- Write the RMA number on the exterior of the box to ensure proper tracking.



CAUTION: Do not stack any of the hardware components.

Pack a QFX5130 Device or Component for Shipping

IN THIS SECTION

- Pack a QFX5130 Switch for Shipping | **217**
- Pack QFX5130 Components for Shipping | **218**

If you are returning a QFX5130 or one of its components to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you pack a QFX5130 switch or component:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See Prevention of Electrostatic Discharge 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.

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.

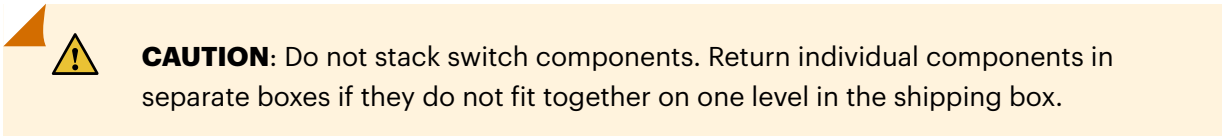
This topic describes:

Pack a QFX5130 Switch for Shipping

To pack a QFX5130 switch for shipping:

1. Power down the switch and remove the power cables. See "Power Off a QFX5130 Switch" on page 192.
2. Remove the cables that connect the QFX5130 switch to all external devices.
3. Remove all field-replaceable units (FRUs) from the switch.
4. Have one person support the weight of the switch while another person unscrews and removes the mounting screws.
5. Remove the switch from the rack or cabinet (see No Link Title) 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 QFX5130 Components for Shipping" on page 218.
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 QFX5130 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 QFX5130 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.

RELATED DOCUMENTATION

Contact Customer Support to Obtain a Return Material Authorization

CHAPTER 8

Safety and Compliance Information

IN THIS CHAPTER

- QFX5130 Safety | **220**
- AC Power Electrical Safety Guidelines | **221**
- Compliance Statements for NEBS | **222**
- Compliance Statements for EMC Requirements | **222**
- Compliance Standards for QFX5130 Switches | **224**

QFX5130 Safety

IN THIS SECTION

- Safety Information | 220
- Boot Time | 220
- Warning Statement for Unshielded Intra-Building Criteria | 220

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 QFX5130 specific safety information provided in this hardware guide.

Boot Time

The QFX5130-48C and QFX5130-48CM take approximately 110 seconds to boot.

Warning Statement for Unshielded Intra-Building Criteria



WARNING: Certain ports of a device are designed for use as intra-building (within-the-building) interfaces only (Type 2 or Type 4 ports as described in *GR-1089-CORE*) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS requirements and protect against lightning surges and commercial power disturbances, the intra-building ports must not be metallically connected to interfaces that connect to the OSP or its wiring. The intra-building ports on the device are suitable for connection to intra-building or unexposed wiring or cabling only. The addition of primary protectors is not sufficient protection for connecting these interfaces metallically to OSP wiring.

AC Power Electrical Safety Guidelines

The following electrical safety guidelines apply to AC-powered devices:

- Note the following warnings printed on the device:

  "**CAUTION:** THIS UNIT HAS MORE THAN ONE POWER SUPPLY CORD. DISCONNECT ALL POWER SUPPLY CORDS BEFORE SERVICING TO AVOID ELECTRIC SHOCK."

  "**ATTENTION:** CET APPAREIL COMPORTE PLUS D'UN CORDON D'ALIMENTATION. AFIN DE PRÉVENIR LES CHOCS ÉLECTRIQUES, DÉBRANCHER TOUT CORDON D'ALIMENTATION AVANT DE FAIRE LE DÉPANNAGE."

- AC-powered devices are shipped with a three-wire electrical cord with a grounding-type plug that fits only a grounding-type power outlet. Do not circumvent this safety feature. Equipment grounding must comply with local and national electrical codes.
- You must provide an external certified circuit breaker (2-pole circuit breaker or 4-pole circuit breaker based on your device) rated minimum 20 A in the building installation.
- The power cord serves as the main disconnecting device for the AC-powered device. The socket outlet must be near the AC-powered device and be easily accessible.
- For devices that have more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed to prevent electric shock. To disconnect power, unplug all power cords (one for each power supply).

Power Cable Warning (Japanese)

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

附属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。

Compliance Statements for NEBS

- The equipment is suitable for installation as part of the Common Bonding Network (CBN).
- The equipment is suitable for installation in locations where the National Electrical Code (NEC) applies.
- The battery return connection is to be treated as an isolated DC return (that is, DC-I), as defined in GR-1089-CORE.
- You must provision a readily accessible device outside of the equipment to disconnect power. The device must also be rated based on local electrical code practice.

Compliance Statements for EMC Requirements

IN THIS SECTION

- Canada | **222**
- European Community | **222**
- Israel | **223**
- Japan | **223**
- United States | **223**

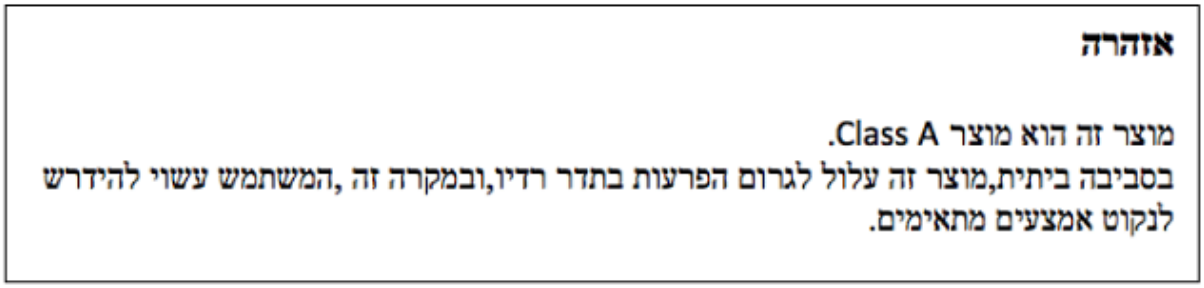
Canada

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

European Community

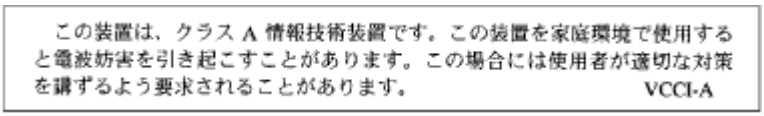
This is a Class A product. In a domestic environment, this product might cause radio interference in which case the user might be required to take adequate measures.

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 QFX5130 Switches

IN THIS SECTION

- Compliance Statement for Argentina | **225**

The QFX5130 switches comply with the following standards:

- Safety
  - IEC 60950-1:2005, AMD1:2009, AMD2:2013 Information Technology Equipment – Safety (Include all country deviation).
  - 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
- GR-1089-CORE, Issue 8 (Supported on QFX5130-48C, QFX5130-48CM)

Compliance Statement for Argentina

EQUIPO DE USO IDÓNEO.