

QFX5230-64CD Switch Hardware Guide

Published
2024-01-09

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

Juniper Networks, the Juniper Networks logo, Juniper, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

QFX5230-64CD Switch Hardware Guide
Copyright © 2024 Juniper Networks, Inc. All rights reserved.

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

YEAR 2000 NOTICE

Juniper Networks hardware and software products are Year 2000 compliant. Junos OS has no known time-related limitations through the year 2038. However, the NTP application is known to have some difficulty in the year 2036.

END USER LICENSE AGREEMENT

The Juniper Networks product that is the subject of this technical documentation consists of (or is intended for use with) Juniper Networks software. Use of such software is subject to the terms and conditions of the End User License Agreement ("EULA") posted at <https://support.juniper.net/support/eula/>. By downloading, installing or using such software, you agree to the terms and conditions of that EULA.

Table of Contents

About This Guide | vii

1

Fast Track: Initial Installation

Fast Track to Rack Installation and Power | 2

Install the QFX5230-64CD Switch in a Rack | 2

Connect to Power | 7

2

System Overview and Specifications

QFX5230-64CD System Overview | 11

QFX5230-64CD Switch Description | 11

QFX5230-64CD Hardware Models | 12

System Software | 13

QFX5230-64CD Component Redundancy | 13

QFX5230-64CD Field-Replaceable Units | 14

QFX5230-64CD Chassis Physical Specifications | 16

QFX5230-64CD Port and Management Panel | 16

QFX5230-64CD Port Panel | 17

QFX5230-64CD Management Panel and LEDs | 21

QFX5230-64CD Cooling System | 25

QFX5230-64CD Cooling System Description | 25

QFX5230-64CD Power System | 29

QFX5230-64CD AC Power Supply Description | 30

AC Power Cord Specifications | 32

QFX5230-64CD AC Power Supply LED | 33

QFX5230-64CD DC Power Supply Description | 34

QFX5230-64CD DC Power Specifications | 34

QFX5230-64CD DC Power Supply LEDs | 36

QFX5230-64CD DC Power Cable Specification | 38

Site Planning and Preparation

QFX5230-64CD Site Preparation Checklist | 40

QFX5230-64CD Site Guidelines and Requirements | 41

QFX5230-64CD Environmental Requirements and Specifications | 42

General Site Guidelines | 43

QFX5230-64CD Grounding Cable and Lug Specifications | 43

QFX5230-64CD Clearance Requirements for Airflow and Hardware Maintenance | 45

Site Electrical Wiring Guidelines | 46

QFX5230-64CD Rack Requirements | 47

QFX5230-64CD Cabinet Requirements | 48

QFX5230-64CD Network Cable and Transceiver Planning | 50

Determining QFX5230-64CD Optical Interface Support | 50

Cable Specifications for QSFP+ and QSFP28 Transceivers | 51

Understanding QFX Series Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 53

Calculating Power Budget and Power Margin for Fiber-Optic Cables | 55

How to Calculate Power Budget for Fiber-Optic Cables | 55

How to Calculate Power Margin for Fiber-Optic Cables | 56

QFX5230-64CD Management Cable Specifications and Pinouts | 57

Cable Specifications for Console and Management Connections for the QFX Series | 58

RJ-45 Management Port Connector Pinout Information | 58

Console Port Connector Pinouts for the QFX Series | 59

QSFP-DD Port Connector Pinout Information | 60

SFP, SFP+, and SFP28 Port Connector Pinout Information | 65

USB Port Specifications for the QFX Series | 67

Contact Customer Support to Obtain a Return Material Authorization | 68

4

Installation and Configuration

Unpacking and Mounting the QFX5230-64CD Switch | 71

Unpacking a QFX5230-64CD Switch | 71

Register Products—Mandatory to Validate SLAs | 72

Mounting a QFX5230-64CD Switch in a Rack or Cabinet | 73

Before You Begin Rack Installation | 73

Mount your Device by Using the QFX5230-2RU-4PRMK Rack Mount Kit on a 4-Post Rack | 74

Connecting the QFX5230-64CD to Power | 79

Ground the QFX5230-64CD Switch | 80

Connect AC Power to a QFX5230-64CD Switch | 80

AC Circuit Breaker for the QFX5230-64CD Switch | 82

Connect DC Power to a QFX5230-64CD Switch | 84

Connecting the QFX5230-64CD to External Devices | 88

Connect a Device to a Network for Out-of-Band Management | 88

Connect a Device to a Management Console Using an RJ-45 Connector | 89

Performing the Initial Software Configuration for QFX5230-64CD Switches | 91

5

Maintain Components

Maintain the QFX5230-64CD Cooling System | 95

How to Remove a Fan Module from a QFX5230-64CD Switch | 95

How to Install a Fan Module in a QFX5230-64CD Switch | 96

Maintain the QFX5230-64CD Power System | 98

Remove a Power Supply from a QFX5230-64CD Switch | 98

Install a Power Supply in a QFX5230-64CD Switch | 100

Maintain the SATA Solid State Drive in a QFX5230-64CD Switch | 103

Remove a SATA Solid State Drive from a QFX5230-64CD Switch | 103

Install a SATA Solid State Drive in a QFX5230-64CD Switch | 105

6

Troubleshoot Hardware

Troubleshooting the QFX5230-64CD | 108

QFX5230-64CD Troubleshooting Resources Overview | 108

Chassis Alarm Messages | 109

7

Contact Customer Support and Return the Chassis or Components

Contact Customer Support to Obtain a Return Material Authorization | 113

Returning the QFX5230-64CD Chassis or Components | 114

Locating the Serial Number on a QFX5230-64CD Device or Component | 114

Locating the Chassis Serial Number ID Label on a QFX5230-64CD Switch | 115

Locating the Serial Number ID Labels on QFX5230-64CD FRU Components | 115

Removing the Solid-State Drives for RMA | 117

How to Return a Hardware Component to Juniper Networks, Inc. | 117

Guidelines for Packing Hardware Components for Shipment | 118

Packing a QFX5230-64CD Device or Component for Shipping | 119

Packing a QFX5230-64CD Switch for Shipping | 119

Packing QFX5230-64CD Components for Shipping | 120

8

Safety and Compliance Information

Safety and Compliance Information | 122

Compliance Statements for NEBS | 122

Compliance Statements for EMC Requirements | 122

Compliance Standards for QFX5230-64CD Switches | 124

About This Guide

Use this guide to plan, install, perform initial software configuration, perform routine maintenance, and to troubleshoot QFX5230-64CD switches.

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

1

CHAPTER

Fast Track: Initial Installation

[Fast Track to Rack Installation and Power | 2](#)

Fast Track to Rack Installation and Power

SUMMARY

This procedure walks you through the most basic steps for installing your QFX5230-64CD switch in a rack and connecting it to power.

IN THIS SECTION

- [Install the QFX5230-64CD Switch in a Rack | 2](#)
- [Connect to Power | 7](#)

Install the QFX5230-64CD Switch in a Rack

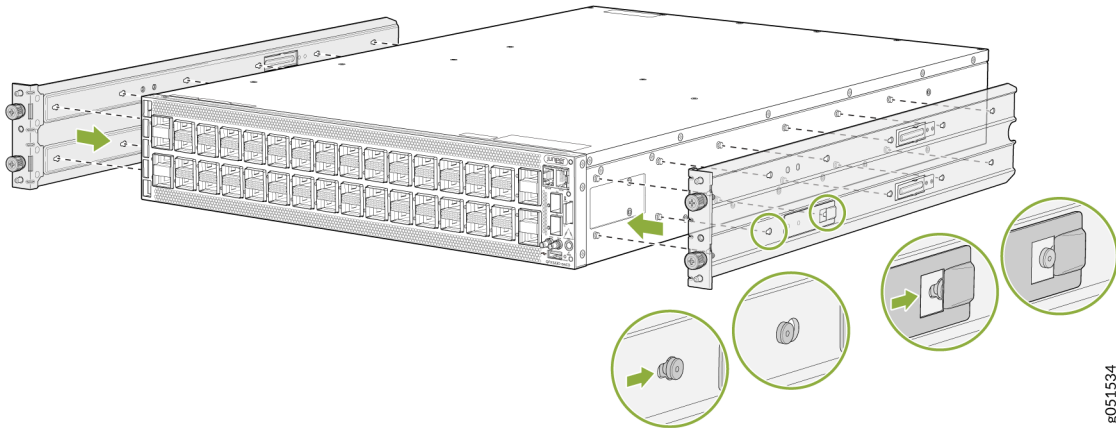
Ensure that you have the following tools and parts available:

- An ESD grounding strap—not provided.
- A pair of side mounting brackets that attach to the chassis—provided with the rack mount kit.
- A pair of front and rear mounting rails that attach to the rack posts—provided with the rack mount kit.

To mount the device on a four-post rack:

1. Place the switch on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end 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.

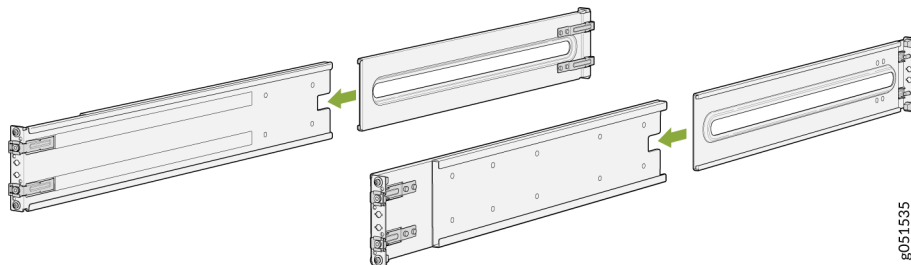
Figure 1: Attach the Side Mounting Brackets



8051534

4. Assemble the mounting rails by sliding the rear floating rails into the front rails.

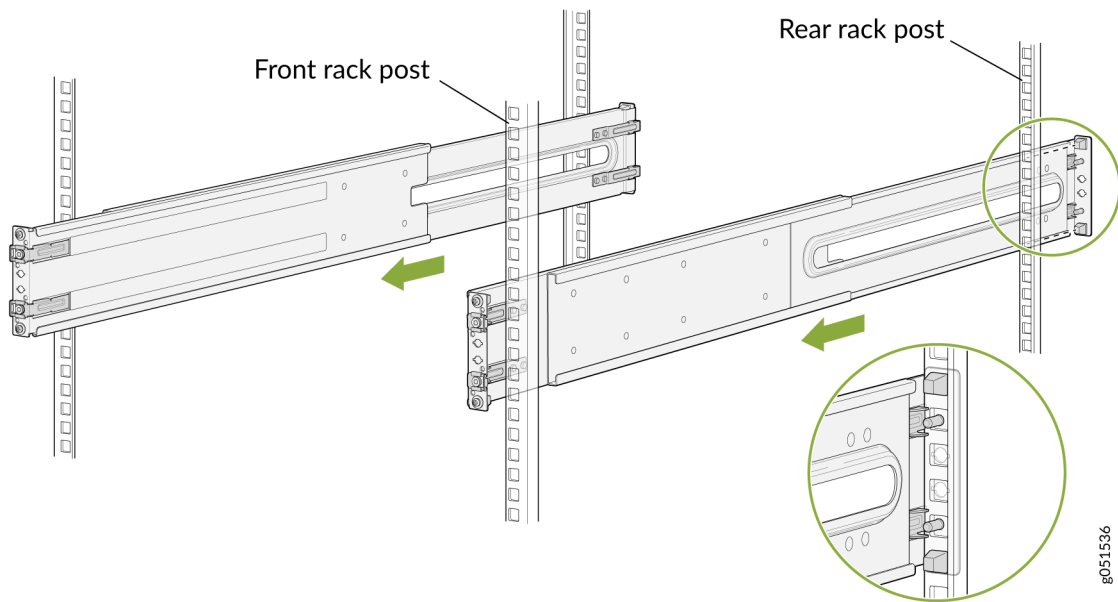
Figure 2: Assemble the Mounting Rails



8051535

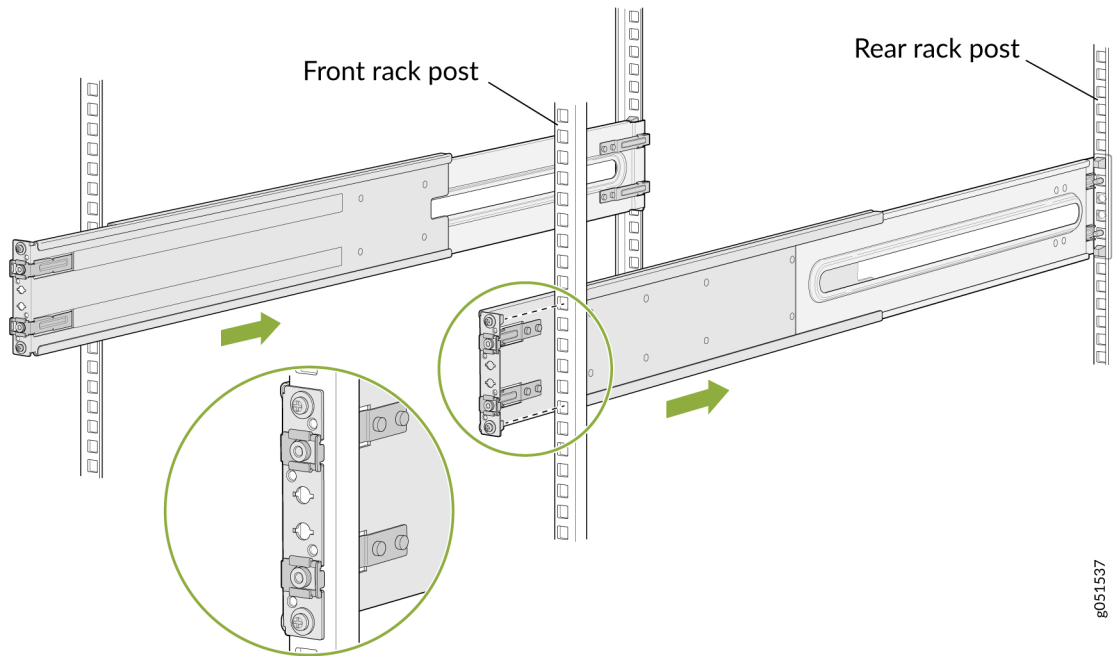
5. Install the mounting rails on the rack.
6. Align the guide blocks of the rear mounting rails with the rear-post holes. Pull the rear mounting rails toward the front of the rack to lock the rails in place. You will hear a distinct click sound when the latch locks into the corresponding rack holes.

Figure 3: Install the Rear Mounting Rails



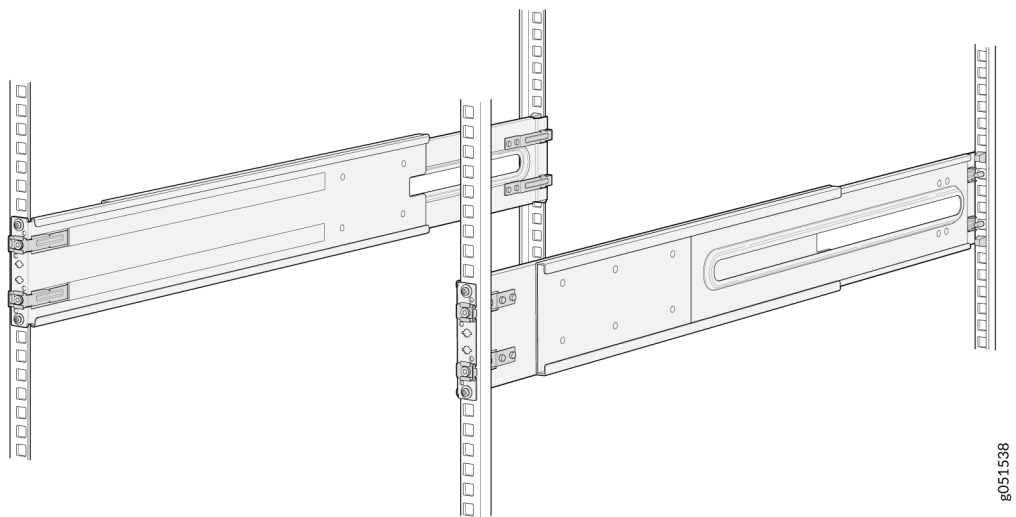
7. Align the guide blocks of the front mounting rails with the front-post holes. Push the front mounting rails toward the rear of the rack to lock the rails in place. You will hear a distinct click sound when the latch locks into the corresponding rack holes.

Figure 4: Install the Front Mounting Rails



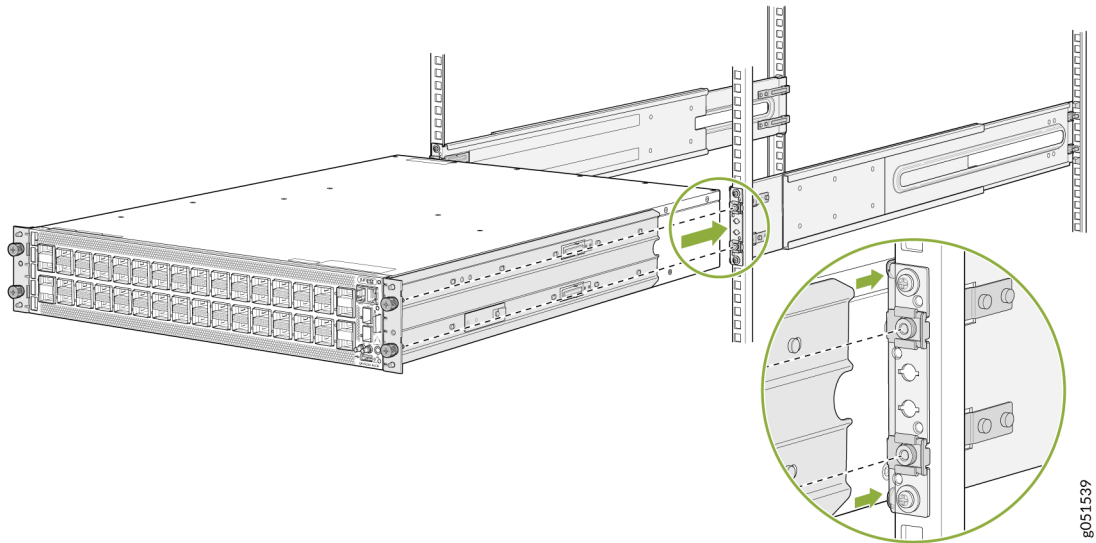
8. Visually ensure that the front and rear latches are locked into place on the mounting rails. The mounting rails should be securely installed on the rack.

Figure 5: Align the side mounting-brackets



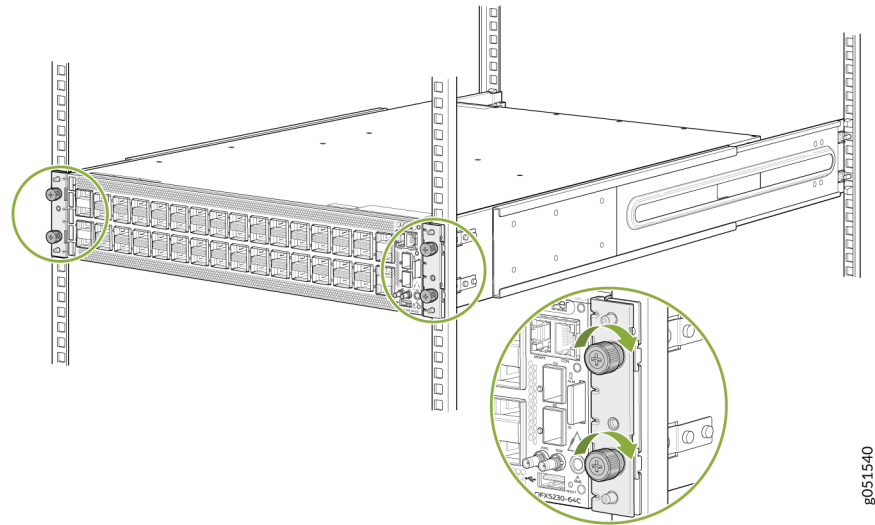
9. Lift the device and position it in front of the rack, aligning the side mounting-brackets with the mounting rails. Slide the device into the channels of the rack mounting rails
10. Push the chassis.

Figure 6: Slide the Device into the Rack



11. Secure the chassis to the rack and tighten the thumbscrews.

Figure 7: Tighten the thumbscrews



Connect to Power

IN THIS SECTION

- [Ground the QFX5230-64CD Switch | 7](#)
- [Connect the Power Cord and Power On the Switch | 8](#)

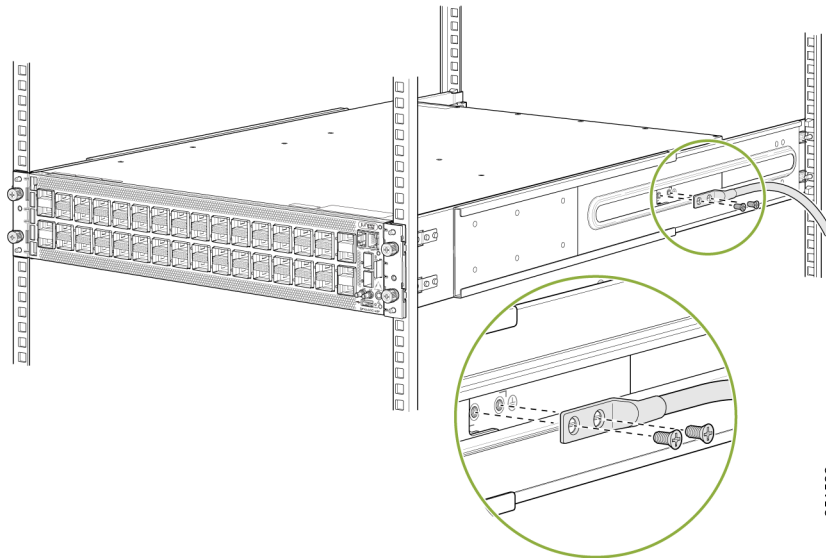
This topic describes the steps to connect an AC-powered QFX5230-64CD to power. To connect QFX5230-64CD to power, complete the following:

Ground the QFX5230-64CD Switch

To ground the QFX5230-64CD switch, do the following:

1. Connect one end of the grounding cable to a proper earth ground, such as the rack.
2. Place the grounding lug attached to the grounding cable over the protective earthing terminal on the side panel.

Figure 8: Attach the grounding cable to QFX5230-64CD



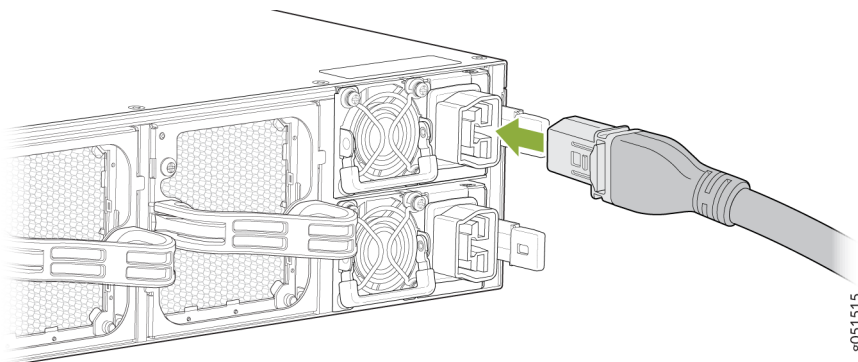
3. Secure the grounding lug to the protective earthing terminal using the 10-32 x .25-in. screws with #10 split-lock washers.
4. Dress the grounding cable. Be sure that the cable doesn't block access to or touch other device components, and that it doesn't drape where people could trip over it.

Connect the Power Cord and Power On the Switch

For information about the supported AC power cord specifications, see [Table 11 on page 32](#).

To connect the power cord, do the following:

1. Ensure that the power supply is fully inserted in the rear panel of the switch and the latches are secured.



2. If the AC power source outlet has a power switch, turn it off.
3. Plug in the power cord to the AC power source outlet.
4. Insert the power cord coupler in the power socket of the switch.
5. If the AC power source outlet has a power switch, turn it on. The switch powers on as soon as you plug it in. The QFX5230-64CD doesn't have a power switch.
6. Check to see that the LED on the power supply is lit steadily green. If the LED stays off, disconnect the power supply from the power source. You'll need to replace the power supply.

2

CHAPTER

System Overview and Specifications

[QFX5230-64CD System Overview | 11](#)

[QFX5230-64CD Port and Management Panel | 16](#)

[QFX5230-64CD Cooling System | 25](#)

[QFX5230-64CD Power System | 29](#)

QFX5230-64CD System Overview

IN THIS SECTION

- [QFX5230-64CD Switch Description | 11](#)
- [QFX5230-64CD Hardware Models | 12](#)
- [System Software | 13](#)
- [QFX5230-64CD Component Redundancy | 13](#)
- [QFX5230-64CD Field-Replaceable Units | 14](#)
- [QFX5230-64CD Chassis Physical Specifications | 16](#)

QFX5230-64CD Switch Description

The QFX5230-64CD switch offers 64 ports of 400-Gbps in a 2-RU form factor. With 25.6 terabits per second (Tbps) bandwidth, the QFX5230-64CD is an optimal choice for spine-and-leaf IP fabric deployments as well as metro use cases. The QFX5230-64CD switch uses a Broadcom TH4 - BCM56990 which is a high-radix class chip, dedicated for high-bandwidth network switching devices. It provides support up to 64 × 400GbE, 128 × 200GbE, 256 × 100GbE, 256 × 40GbE, 256 × 25GbE, or 256 × 10GbE ports.

This is a high density 64 x 400G Metro Ethernet Switch designed for Data Center, Telco-Cloud, and Enterprise for use in tier 1 and tier 2 leaf and spine in IP Fabric and as a spine and super-spine in EVPN-VXLAN fabric and other applications.

An Intel 6-core Intel Hewitt Lake D-1637 processor drives the QFX5230-64CD control plane, which runs the Junos OS Evolved software. The Junos OS Evolved software image is stored on two internal 100-GB solid-state drives (SSDs). The QFX5230-64CD is available with ports-to-FRUs airflow (AIR OUT) and FRUs-to-ports airflow (AIR IN), and with AC or DC power supplies.

Figure 9: QFX5230-64CD Front Panel



NOTE: The 16 ports marked in green, from 33 through 63, denote the ports that support 400G-ZR and 400G-ZRM QDD optics. If these optics are plugged into other ports, they don't function and trigger an alarm.

Figure 10: QFX5230-64CD FRU Panel



QFX5230-64CD Hardware Models

Table 1 on page 12 provides an overview of the various hardware models available for QFX5230-64CD.

Table 1: QFX5230-64CD Hardware Models

SKU	Description	Air Flow	PSU FRUs	PSU FRU Type	FAN FRUs	Color of Power Supply Handle
QFX5230-64 CD-AFO	64x400G QSFP56-DD ports	Front-to-back or port-to-FRU	2	AC Airflow Out	4 Airflow Out (AIR OUT)	Juniper Gold

Table 1: QFX5230-64CD Hardware Models (Continued)

SKU	Description	Air Flow	PSU FRUs	PSU FRU Type	FAN FRUs	Color of Power Supply Handle
QFX5230-64 CD-D-AFO	64x400G QSFP56-DD ports	Front-to-back or port-to-FRU	2	DC Airflow Out	4 Airflow Out (AIR OUT)	Juniper Gold
QFX5230-64 CD-AFI	64x400G QSFP56-DD ports	Back-to-front or FRU-to-port	2	AC Airflow In	4 Airflow In (AIR IN)	Green
QFX5230-64 CD-D-AFI	64x400G QSFP56-DD ports	Back-to-front or FRU-to-port	2	DC Airflow In	4 Airflow In (AIR IN)	Green
QFX5230-64 CD-CHAS	Spare Chassis without PSU and Fans	NA	NA	NA	NA	NA

System Software

The QFX5230-64CD runs the Junos OS Evolved operating system. It provides several capabilities that include Layer 2 and Layer 3 switching, routing, and security services. Junos OS Evolved software is installed on the solid-state drive (SSD) in the switch.

For more information about the features supported on QFX-5230-64CD devices, see [Feature Explorer](#).

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

QFX5230-64CD Component Redundancy

The following hardware components provide redundancy on a QFX5230-64CD switch:

- QFX5230-64CD power supply modules — The QFX5230-64CD models' power supply are field-replaceable units (FRUs) that can be removed and inserted hot. Installing or replacing the PSUs doesn't need turning off the device or interfering with the switching process.

Table 2 on page 14 describes the specifications for power supplies.

Table 2: QFX5230-64CD Power Supply Specifications

PSU	Input	Output
AC AFO, 3000W	180V-305V AC @50/60Hz	12V@250A, 12VSB@1A
DC AFO, 3000W	-40V to -72V DC	12V@250A, 12VSB@1A
AC AFI, 2700W	180V-305V AC @50/60Hz	12V@225A, 12VSB@1A
DC AFI, 2400W	-40V to -72V DC	12V@200A, 12VSB@1A

- QFX5230-64CD cooling system – The cooling system consists of eight fans in four fan modules with each fan module containing 2 rotors. The cooling system offers 7+1 redundancy. The fan modules are color coded according to the airflow direction, and are FRUs that you can hot-insert and hot-remove. Depending on fan modules used, air is either drawn out of the system (front-to-back air flow) or forced into the system (back-to-front air flow).

Table 3: Cooling System Specifications

FAN FRUs	Description	Airflow	Color
QFX5230-64CD-FANAO	AIR OUT, port-to-FRU airflow	Front-to-back	Juniper Gold
QFX5230-64CD-FANAI	AIR IN, FRU-to-port airflow	Back-to-front	Green

QFX5230-64CD Field-Replaceable Units

Field-replaceable units (FRUs) are switch components that you can replace at your site. The QFX5230-64CD switch uses these types of FRUs:

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

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

The power supplies and fan modules in the QFX5230-64CD are hot-insertable and hot-removable FRUs, meaning that you can swap them out without turning the switch off or interfering with its functionality.

Table 4: QFX5230-64CD Field-Replaceable Units

FRUs	Description	Handle Color
QFX5230-64CD-FANAO	AIR OUT fan module, ports-to-FRUs airflow (front-to-back)	Juniper Gold
QFX5230-64CD-FANAI	AIR IN fan module, FRU-to-port airflow (back-to-front)	Green
JNP-3000W-AC-AFO	AC Power Supply, 3000W, ports-to-FRUs airflow (front-to-back)	Juniper Gold
JNP-3000W-DC-AFO	DC Power Supply, 3000W, ports-to-FRUs airflow (front-to-back)	Juniper Gold
JNP-2400W-DC-AFI	DC Power Supply, 2400W, FRU-to-port airflow (back-to-front)	Green
JNP-2700W-AC-AFI	AC Power Supply, 2700W, FRU-to-port airflow (back-to-front)	Green

Table 5: FRUs and Recommended Actions

FRU	Required Action
Power supplies	None
Fan modules	None
Optical transceivers	We recommend that you disable the interface using the set interfaces <i>interface-name</i> disable command before you remove the transceiver.

QFX5230-64CD Chassis Physical Specifications

The QFX5230-64CD is a rigid sheet-metal structure that houses the hardware components (see [Table 6 on page 16](#)).

Table 6: Physical Specifications for the QFX5230-64CD

Product Model	Height	Width	Depth	Weight
QFX5230-64CD	3.43 in. (8.7 cm)	17.4 in (44.2 cm)	25.6 in. (65 cm)	55 lbs (25 kg) with power supplies and fans installed

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

[QFX5230-64CD Cooling System | 25](#)

[QFX5230-64CD Power System | 29](#)

QFX5230-64CD Port and Management Panel

IN THIS SECTION

- [QFX5230-64CD Port Panel | 17](#)

QFX5230-64CD Port Panel

IN THIS SECTION

- [QFX5230-64CD Management Panel and LEDs | 21](#)

Overview

The QFX5230-64CD's port panel is made up of the management panel and 64 high-density 400-Gigabit Ethernet quad small form-factor pluggable (QSFP-DD) ports. Each port has the option to be configured for 400G, 200G, 100G, 50G, 40G, 4x25G, or 4x10G speeds. It has two SFP+ ports as well. Its design aims to minimise power consumption and latency.

The typical configuration for QFX5230-64CD) is shown below:

1. 48x 400G QSFP56-DD ports + 16x 400G-ZR/ZR-M QDD ports
2. 2 x 10G SFP+ ports
3. 1 x 10M/100M/1G RJ45 Management port
4. 1 x RJ45 Console port
5. 1x USB 2.0
6. 10MHz & 1PPS SMB output

Figure 11: QFX5230-64CD Port Panel - Front View

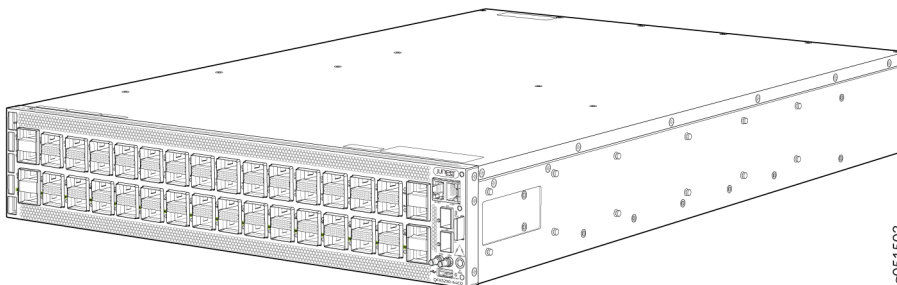
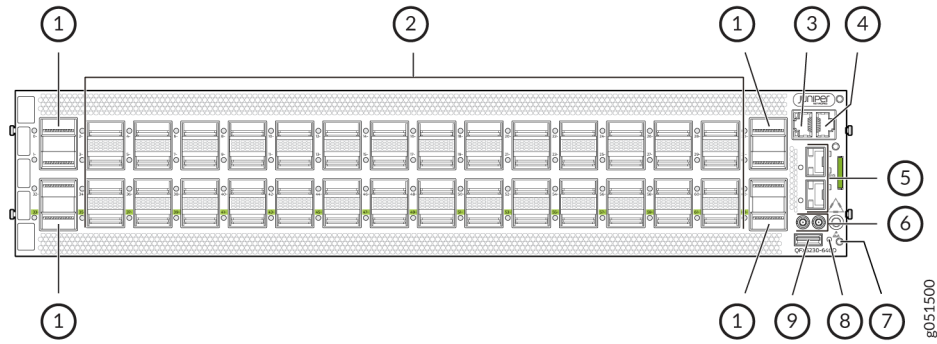


Figure 12: QFX5230-64CD Port Panel Components



1– QSFP56-DD 400 GbE ports	6– Clock input and output connectors (10MHz and 1PPS)
2– QSFP56-DD 400 GbE ports	7– ESD grounding point
3– RJ-45 system management port	8– Reset button (do not use unless directed by JTAC)
4– RJ-45 console port	9– Type A USB port
5– SFP+ ports	

NOTE: The 16 ports marked in green, from 33 through 63, denote the ports that support 400G-ZR and 400G-ZRM QDD optics. If these optics are plugged into other ports, they don't function and the system triggers an alarm.

QFX5230-64CD Network LEDs

To show link status, activity on the link, or a fault condition, each QSFP56-DD network port has a single bi-colored LED. In an unchannelized port, the port link status is shown by the LED on the left.

Figure 13: Link/Activity and Status LEDs on QFX5230-64CD



1– LEDs that indicate status and channelization

NOTE: The ports that are marked in green indicate support for 400G-ZR and 400G-ZRM optics.

Each port has an individual status LED on the left. The port status LED has four states signaled by the color/LED state: Off, Green, Amber, and Red.

Table 7: Link Activity and LED Status on QFX5230-64CD

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, Transceiver hardware failure	Blinking red	Not Applicable
Yes	Off	No Breakout	No	DOWN, Loss of signal detected (LOS)	Blinking green	Not Applicable

Table 7: Link Activity and LED Status on QFX5230-64CD (Continued)

Transceiver Inserted	Normal	Breakout Cable Configuration State	Explicitly Disabled	Port State	Port Location On	Lane Display
Any	Amber	No Breakout	No	DOWN, any other fault except LOS and transceiver hardware failure	Blinking amber	Not Applicable
Any	Amber	No Breakout	Yes	The port is disabled in the CLI	Blinking amber	Not Applicable
No	Off	Any	No	Anything except disabled port, but no transceiver is present	Blinking green	Not Applicable
Any	Green	Breakout	No	At breakout ports are Up	Blinking green	Blinking Green
Yes	Red	Breakout	No	Hardware failure, transceiver init error at the port level	Blinking red	Blinking Red
Yes	Off	Breakout	No	All breakout ports are DOWN with LOS	Blinking green	Blinking Green

Table 7: Link Activity and LED Status on QFX5230-64CD (Continued)

Transceiver Inserted	Normal	Breakout Cable Configuration State	Explicitly Disabled	Port State	Port Location On	Lane Display
Any	Amber	Breakout	Any	In all other cases the port LED color is Amber	Blinking amber	Blinking Amber

QFX5230-64CD Management Panel and LEDs

IN THIS SECTION

- [QFX5230-64CD Chassis Status LEDs | 21](#)

The management panel allows you to have a management channel into the switch that is separate from production traffic. The management panel of the QFX5230-64CD is located to the right of the network ports.

You can find the following LEDs on the management panel:

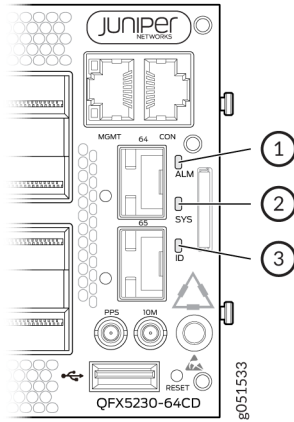
- Chassis status LEDs
- RJ-45 Console and Management Port LEDs

The following sections explain how to interpret these LEDs.

QFX5230-64CD Chassis Status LEDs

QFX5230-64CD has three LEDs that indicate system status. You can find these LEDs on the right of the SFP+ ports.

Figure 14: QFX5230-64CD Management Panel LEDs



1- Chassis alarm or fault	3- Beacon
2- System status	

Table 8 on page 22 describes the chassis status LEDs on a QFX5230-64CD, the colors and states, and the status they indicate.

Table 8: Chassis Status LEDs on a QFX5230-64CD Devices

Name	Color	State	Description
ALM-Alarm	Unlit	Off	The switch is halted or there is no alarm.
	Red	On steadily	A major system or hardware fault has occurred, such as a temperature alarm, power failure, or media failure. The device has halted. Power off the device by setting the AC power source outlet to the OFF (O) position, or by unplugging the AC power cords. Correct any voltage or site temperature issues, and allow the switch to cool down. Power on the QFX5230-64CD. Monitor the power supply and fan LEDs to help determine where the error is occurring.

Table 8: Chassis Status LEDs on a QFX5230-64CD Devices (Continued)

Name	Color	State	Description
	Yellow	On steadily	A minor system level alarm has occurred, such as a software error or a missing rescue configuration. Power off the device by setting the AC power source outlet to the OFF (O) position, or by unplugging the AC power cords. Power on the QFX5230-64CD and monitor the status LEDs to ensure that Junos OS Evolved boots properly.
	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	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	Junos OS Evolved software is loaded on the device and 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.

Table 8: Chassis Status LEDs on a QFX5230-64CD Devices (Continued)

Name	Color	State	Description
------	-------	-------	-------------

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 view the colors of the three LEDs remotely 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
```

RELATED DOCUMENTATION

[show system alarms](#)

QFX5230-64CD Cooling System

IN THIS SECTION

- [QFX5230-64CD Cooling System Description | 25](#)

QFX5230-64CD Cooling System Description

IN THIS SECTION

- [Fan Modules | 25](#)
- [QFX5230-64CD Fan Module LED | 28](#)

The cooling system in a QFX5230-64CD switch consists of eight fans in four modules. Each fan module contains two rotors. The fan modules are hot-insertable and hot-removable FRUs with airflow direction and color coding. Each fan module houses two 80mm x 86mm counter rotating rotors.

The fan modules in a QFX5230-64CD are hot-removable and hot-insertable FRUs designed for port-to-FRU airflow and FRU-to-port airflow. The fan modules are numbered from **0** to **3**. Each fan module is 2 U high and has an associated LED to indicate status.

Fan Modules

The QFX5230-64CD switch is intended for both front to back (AFO) and back to front (AFI) airflow. The switch can be ordered in one of two airflow directions:

Airflow In - Air enters the switch via the vents in the field-replaceable units (FRUs) on the back side.

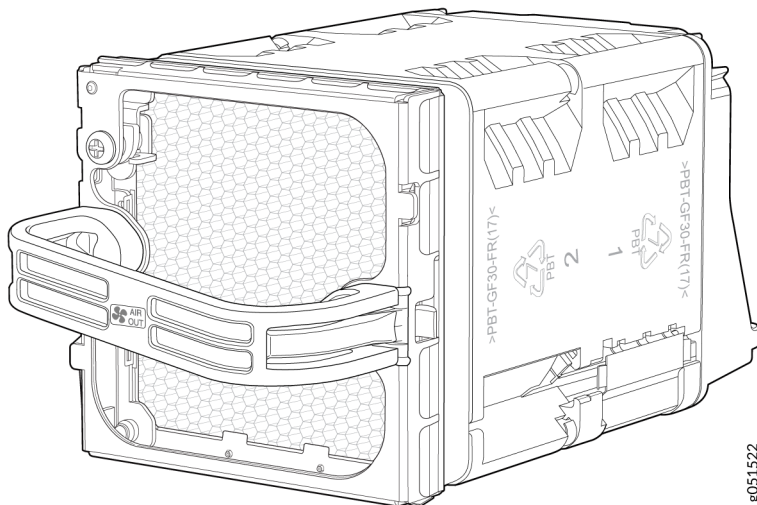
Airflow Out - Air enters the switch through the port panel vents.

For front-to-back air flow, fan modules plugged into the rear side of the chassis suck air out of the system. To allow for air inlet, vents are provided in the front panel. For back-to-front airflow, fan modules plugged into the chassis's rear side push air into the system, and vents provided in the front panel allow for air outlet. There are two 80mm x 86mm counter rotating rotors inside each fan module. The system can handle a single rotor failure. Any additional fan/rotor failure causes the switch to overheat, triggering chassis alarms and shutting down the switch.

Table 9: Fan Modules

FAN FRUs	Description	Airflow	Color
QFX5230-64CD-FANAO	AIR OUT, port-to-FRU airflow	Front - Back	Juniper Gold
QFX5230-64CD-FANAI	AIR IN, FRU-to-port airflow	Back - Front	Green

Figure 15: Fan module for QFX5230-64CD



NOTE: Fan speed varies based on the temperature of internal components, optics module, and ambient temperature. The maximum speed at which fans operate depends on the configured ambient temperature. As the fan speed increases, the power consumed by the fans increases. As

a result, the device consumes more power when the temperature is high because the fans run faster to maintain the operating temperature of the chassis within the configured limits.

The fan modules are available in two models that have different airflow directions:

The QFX5230-64CD switches that support airflow out (AIR OUT) bring air into the vents in the port panel and exhausts warmed air through the field-replaceable units (FRU) panel. This type of airflow is known as *airflow out* or *port-to-FRU* airflow. Airflow out fans are distinguished by **AIR OUT** marking on the gold-colored handles. In data center deployments, position the switch in such a manner that the **AIR OUT** labels on the switch components are next to the hot aisle.

The QFX5230-64CD switches that support airflow in (AIR IN) bring air into the vents in the field-replaceable units (FRU) panel and exhausts warmed air through the port panel. This type of airflow is known as *airflow in* or *FRU-to-port* airflow. Airflow in fans are distinguished by **AIR IN** marking on the green-colored handles. In data center deployments, position the switch in such a manner that the **AIR IN** labels on the switch components are next to the cold aisle.

You remove and replace a fan module from the FRU end of the chassis. The switch continues to operate for a limited period of time (120 seconds) during the replacement of the fan module before thermal shutdown.

Figure 16: Air In Airflow Through the QFX5230-64CD Chassis

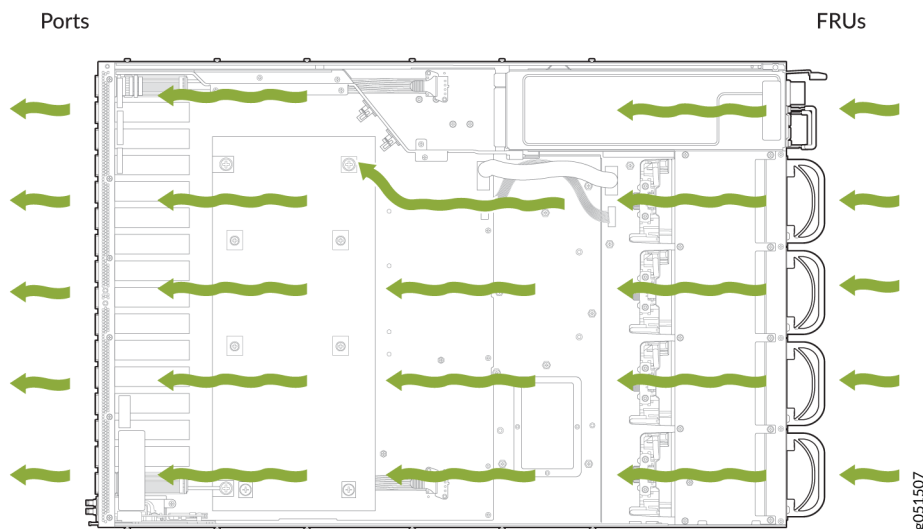
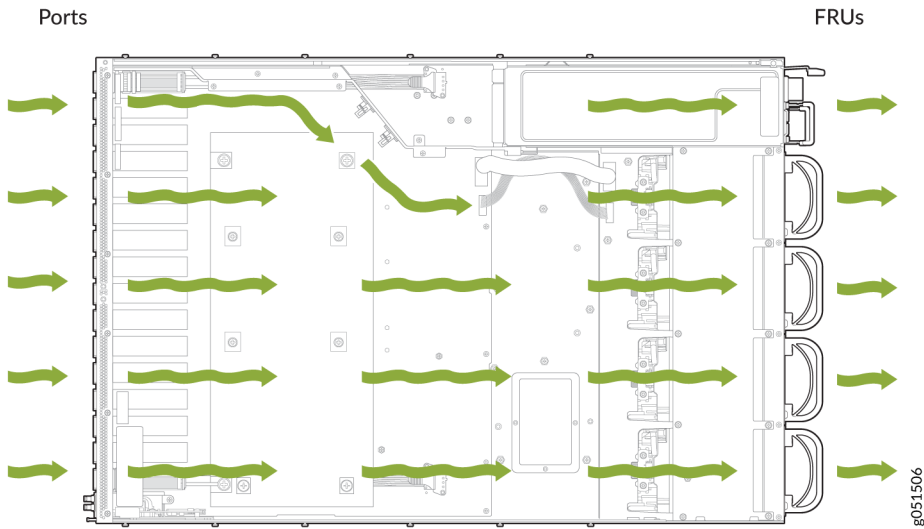


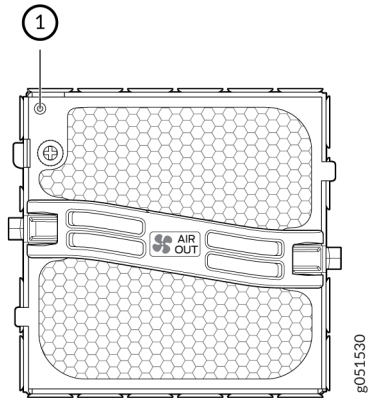
Figure 17: Air Out Airflow Through the QFX5230-64CD Chassis



QFX5230-64CD Fan Module LED

The following figure shows the fan module LED for QFX5230-64CD.

Figure 18: Fan module LED for QFX5230-64CD



1. Fan module LED

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.

QFX5230-64CD Power System

IN THIS SECTION

- [QFX5230-64CD AC Power Supply Description | 30](#)
- [AC Power Cord Specifications | 32](#)
- [QFX5230-64CD AC Power Supply LED | 33](#)
- [QFX5230-64CD DC Power Supply Description | 34](#)
- [QFX5230-64CD DC Power Specifications | 34](#)
- [QFX5230-64CD DC Power Supply LEDs | 36](#)
- [QFX5230-64CD DC Power Cable Specification | 38](#)

The QFX5230-64CD switch is powered by a 3000-W redundant AC or DC power supplies for AFO models, 2700-W power supplies for AC AFI models, and 2400-W power supplies for DC AFI models. The power supplies support front-to-back or back-to-front airflow. The power supplies are fully redundant, load-sharing, and hot-removable and hot-insertable FRUs when the second power supply is installed and running. You can remove and replace them without powering off the switch or disrupting switch functions. We ship QFX5230-64CD switch models with two preinstalled AC or DC power supplies in the chassis.

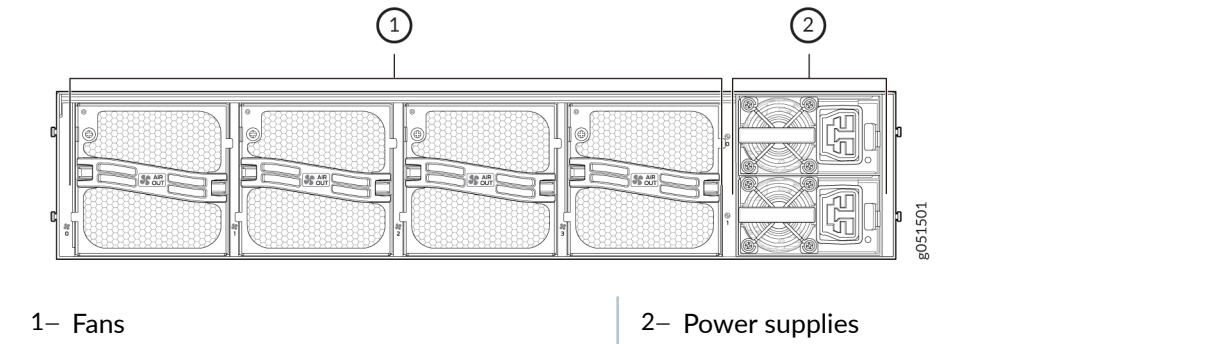
The two power supplies together can supply double the power needed to power all the components in the switch. When the switch has both the power supplies installed, the switch has full power redundancy. If a power supply fails or is removed, the second power supply balances the electrical load without interruption. For more on redundancy features, see "[QFX5230-64CD Component Redundancy](#)" on page 13 .



CAUTION: Use only the power supply for your model number and airflow. Do not mix power supplies with different airflow or different wattage. The system raises an alarm when a power supply having a different airflow or wattage is inserted into the chassis.

You can install up to two power supplies in the power supply slots in the QFX5230-64CD switch. The power supplies for the QFX5230-64CD switch are located on the FRU panel. [Figure 19 on page 30](#) shows the FRU panel.

Figure 19: QFX5230-64CD FRU Panel

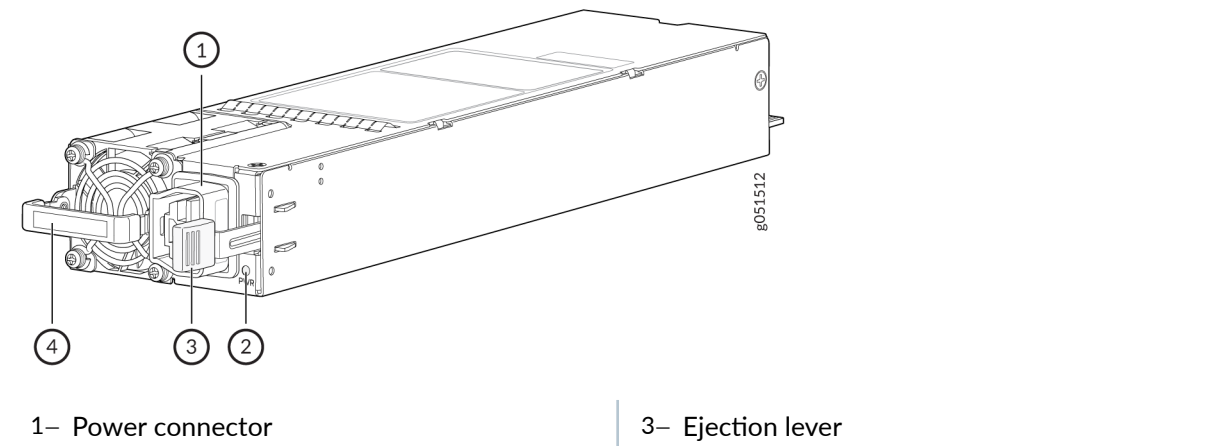


QFX5230-64CD AC Power Supply Description

The AC power supplies in the QFX5230-64CD are hot-removable and hot-insertable field-replaceable units (FRUs) that you can install without powering off the device or disrupting the switching function. QFX5230-64CD support two types of AC power supply modules: FRU-to-port airflow and port-to-FRU airflow models. The handles of the power supplies are color coded.

[Figure 20 on page 30](#) shows the AC Power Supply Module for QFX5230-64CD switches.

Figure 20: AC Power Supply Module





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 Evolved 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 instructions in ["Connecting the QFX5230-64CD to Power" on page 79](#).

You can get additional information about the status of the power modules using the `show chassis environment psm`. For example:

```
user@device> show chassis environment psm

PSM0
status:

  State
Online

  Temperature          26 degrees C / 78 degrees
F

  Fans
OK

  DC Output
OK

  Hours Used 2229
  Firmware Version 0212.0214
  Fan 1 13504
  Fan 2 11904
  Health check Information:
  Status: Not Performed
  Last Result: Not Performed
  Last Execution: Empty
  Next Scheduled Run: 2023-11-29 17:30:02 IST
```

Table 10: QFX5230-64CD AC Power Supply Summary

Model Number	Airflow Direction	PSM Handle Color
JNP-3000W-AC-AFO	Airflow Out (port-to-FRU)	Juniper Gold
JNP-2700W-AC-AFI	Airflow In (FRU-to-port)	Green

AC Power Cord Specifications

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

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

Table 11 on page 32 lists AC power cord specifications provided for each country or region.

Table 11: AC Power Cord Specifications

Country/Region	Shipped Juniper Part Number
Argentina	740-088731
Australia and New Zealand	740-086867
Brazil	740-088726
China	740-086864
Europe (except Italy, Switzerland, and United Kingdom)	740-086867
Great Britain	740-086867

Table 11: AC Power Cord Specifications (Continued)

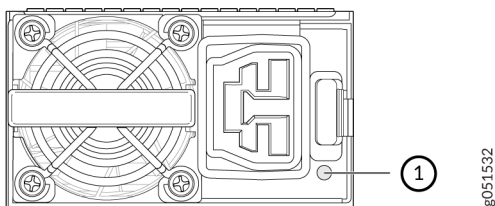
Country/Region	Shipped Juniper Part Number
India	740-088721
Israel	740-088725
Italy	740-086858
Japan	740-126108
North America	740-086866
South Africa	740-088721
Switzerland	740-086865

QFX5230-64CD AC Power Supply LED

The QFX5230-64CD uses a single bi-colored LED to indicate power status.

[Figure 21 on page 33](#) shows the AC power supply LED.

Figure 21: QFX5230-64CD AC Power Supply LED



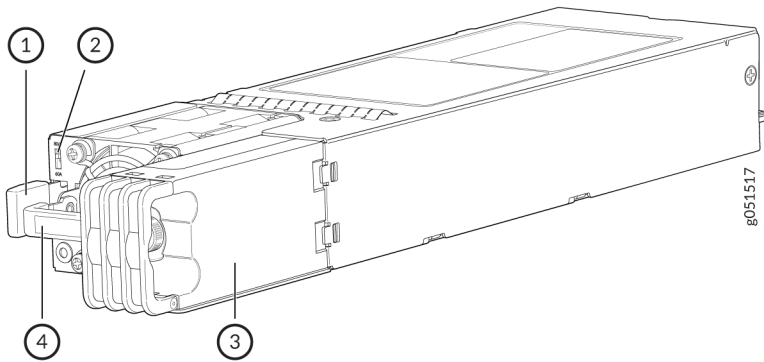
1. Power supply LED

QFX5230-64CD DC Power Supply Description

The DC power supplies in the QFX5230-64CD are hot-removable and hot-insertable field-replaceable units (FRUs) that install without powering off the device or disrupting the switching function. The QFX5230-64CD switch ships with two power supplies. Each power supply provides 3000 W, 2700 W, or 2400 W of power to the chassis (based on the switch model).

Figure 22 on page 34 shows the DC power supply in a QFX5230-64CD switch.

Figure 22: DC Power Supply in QFX5230-64CD



1– Ejector lever

3– Terminal block cover

2– DC input current selector (DIP switch)

4– Handle

Table 12 on page 34 shows the DC power supply summary.

Table 12: DC Power Supply Summary


Model	Wattage	Product Number
JNP-2400W-DC-AFI	2400 W	740-155850
JNP-3000W-DC-AFO	3000 W	740-073766


QFX5230-64CD DC Power Specifications

Table 13 on page 35 shows the DC power specifications of a QFX5230-64CD switch.

Table 13: DC Power Specifications for a QFX5230-64CD Switch

Model	Specification	Rated
AFI DC 2400W	-40V to -72 VDC	-48 to -60 VDC
AFO DC 3000W	-40V to -72 VDC	50-60 Hz

 **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 Evolved 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.

 **CAUTION:** The connection between each power source and PSM must include a circuit breaker. For single/ multiple feed DC power supply, we recommend that you use a dedicated external circuit breaker for each of the power supplies. Use a 2-pole circuit breaker if both -48V and return feeds are isolated. Use a single pole circuit breaker if one of the feeds are connected to ground. Install this single pole circuit breaker in the ungrounded side of the supply. We recommend that the rating of the circuit breaker is a minimum 125% of the continuous power drawn by each power supply as per the national electric or local code when the system is fully configured. The model number of circuit breaker used for final safety certification is CA2-BO- 16-680-621-BJ with current rating of 80Amps and with long delay. We recommend that you use appropriate rating of the input DC wire taking into consideration continuous current rating of the system when it is fully configured and the circuit breaker rating.

[Table 14 on page 35](#)

Table 14: External DC Circuit Breaker Electrical Characteristics

Electrical Characteristics	Value
Breaker	Carling Technologies, CA2-BO-16-680-621-BJ
Delay (short, medium, long).	Long

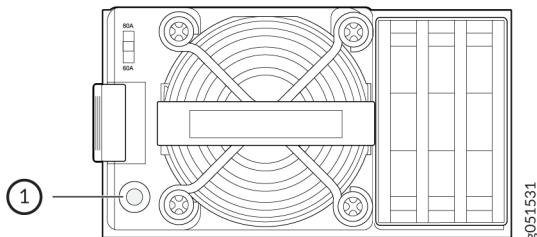
Table 14: External DC Circuit Breaker Electrical Characteristics (Continued)

Electrical Characteristics	Value
Type of Breaker	Magnetic
Voltage rating	125 VDC
Number of Poles	2-pole
Current rating	80A
AIC (interrupt rating)	5kA
Approvals	UL, IEC

QFX5230-64CD DC Power Supply LEDs

Figure 23 on page 36 shows the location of the DC power supply LED.

Figure 23: DC Power Supply LED



- DC power supply LED

Table 15: DC Power Supply LED

State of LED	Power Supply Condition
Solid Green	Output ON and OK
Off	No DC power to all power supplies
1Hz Blink Green	DC input present / Only 12VSB on (PS off) or PS in Cold redundant state
Amber	DC cord unplugged; with a second power supply in parallel still with DC input power.
Amber	Power supply critical event causing a shutdown; failure, overcurrent Protection (OCP), overvoltage Protection (OVP), Fan Fail
2Hz Blinking Green	Power supply in firmware upload mode

[Table 16 on page 37](#) shows the DC input ratings.

Table 16: DC Input Ratings

Parameter	Minimum	Rated	Maximum	Input Switch Setting	Maximum Input Current
DC Voltage (AFI DC 2400W)	-40 VDC	-48VDC/-60VDC	-72VDC	60A	60ADC
DC Voltage (AFO DC 3000W)	-40 VDC	-48VDC/-60VDC	-72VDC	80A	90ADC

[Table 17 on page 37](#) shows the DC output ratings.

Table 17: DC Output Ratings

Parameter	Minimum	Maximum	Peak	Unit
12V Main	0.0	250	250	A

Table 17: DC Output Ratings (Continued)

Parameter	Minimum	Maximum	Peak	Unit
12V Standby	0.0	1	1	A

QFX5230-64CD DC Power Cable Specification

You must supply DC power cables that meet the specifications required by the local code, laws, and standards. The QFX5230-64CD switch supports a 4 AWG and 75 °C temperature-rated stranded copper wire.



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



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



WARNING: Make sure that DC power cables do not block access to QFX5230-64CD components or lie on the ground where people can trip on them.

3

CHAPTER

Site Planning and Preparation

[QFX5230-64CD Site Preparation Checklist](#) | 40

[QFX5230-64CD Site Guidelines and Requirements](#) | 41

[QFX5230-64CD Network Cable and Transceiver Planning](#) | 50

[QFX5230-64CD Management Cable Specifications and Pinouts](#) | 57

[Contact Customer Support to Obtain a Return Material Authorization](#) | 68

QFX5230-64CD Site Preparation Checklist

The checklist summarizes the tasks you need to perform when preparing a site for a QFX5230 installation.

Table 18: 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.	"QFX5230-64CD Environmental Requirements and Specifications" on page 42		
Power			
Measure the distance between external power sources and switch installation site.	"QFX5230-64CD Clearance Requirements for Airflow and Hardware Maintenance" on page 45		
Calculate the power consumption and requirements.	"QFX5230-64CD AC Power Supply Description" on page 30		
Rack or Cabinet			
Verify that your rack or cabinet meets the minimum requirements for the installation of the switch.	"QFX5230-64CD Rack Requirements" on page 47		
Plan rack or cabinet location, including required space clearances.			
Secure the rack or cabinet to the floor and building structure.			

Table 18: Site Preparation Checklist (Continued)

Item or Task	For More Information	Performed By	Date
Cables			
Acquire cables and connectors: <ul style="list-style-type: none"> • Determine the number of cables needed based on your planned configuration. • Review the maximum distance allowed for each cable. Choose the length of cable based on the distance between the hardware components being connected. 			
Plan the cable routing and management.			

QFX5230-64CD Site Guidelines and Requirements

IN THIS SECTION

- [QFX5230-64CD Environmental Requirements and Specifications | 42](#)
- [General Site Guidelines | 43](#)
- [QFX5230-64CD Grounding Cable and Lug Specifications | 43](#)
- [QFX5230-64CD Clearance Requirements for Airflow and Hardware Maintenance | 45](#)
- [Site Electrical Wiring Guidelines | 46](#)
- [QFX5230-64CD Rack Requirements | 47](#)
- [QFX5230-64CD Cabinet Requirements | 48](#)

QFX5230-64CD Environmental Requirements and Specifications

The switch must be installed in a rack or cabinet. It must be housed 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, leading to the switch temperature monitor shutting down the device to protect the hardware components.

Table 19: QFX5230-64CD Switch Environmental Tolerances

Description	Tolerance
Altitude	<ul style="list-style-type: none"> • QFX5230-64CD-AFO-At 32° F through 104° F (0° C through 40° C) there is no performance degradation to 6000 feet (1828.8 meters) • QFX5230-64CD-AFI-At 32° F through 104° F (0° C through 40° C) there is no performance degradation to 0 feet
Relative humidity, operating	Normal operation ensured in relative humidity range of 5% through 90%, non-condensing
Temperature	<p>QFX5230-64CD-AFO</p> <ul style="list-style-type: none"> • Normal operation ensured in temperature range of 32° F through 104° F (0° C through 40° C) • Non-operating storage temperature in shipping container: -40° F through 158° F (-40° C through 70° C) <hr/> <p>QFX5230-64CD-AFI</p> <ul style="list-style-type: none"> • Normal operation ensured in 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)

Table 19: QFX5230-64CD Switch Environmental Tolerances (Continued)

Description	Tolerance
Seismic	Designed to comply with Zone 4 earthquake requirements per NEBS GR-63-CORE, Issue 3.

General Site Guidelines

Efficient device operation requires proper site planning and maintenance. It also requires 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 prescribed airflow guidelines to ensure that the cooling system functions properly. Ensure that 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.

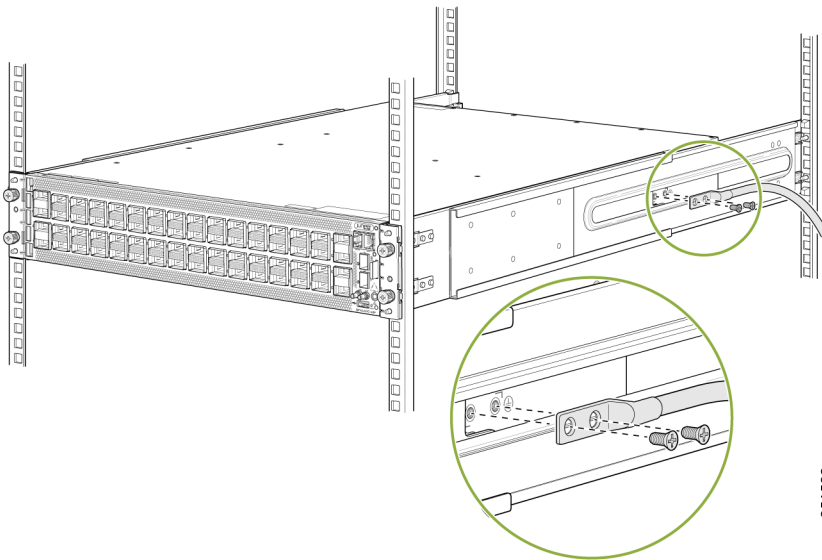
QFX5230-64CD Grounding Cable and Lug Specifications

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

To ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements, you must connect a QFX5230-64CD switch to earth ground before you connect power to the device.

NOTE: You must install the QFX5230-64CD switch in a restricted-access location and ensure that the chassis is always properly grounded. QFX5230-64CD switches have a 2-hole protective grounding terminal on the right side of the chassis. Under all circumstances, use this grounding

connection to ground the chassis. For AC-powered systems, you must also use the grounding wire in the AC power cord along with the two-hole grounding lug connection. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal. Before you connect earth ground to the protective earthing terminal of a QFX5230-64CD switch, ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable. Using a grounding cable with an incorrectly attached lug can damage the switch.



WARNING: The switch is pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal provided on the chassis in addition to the grounding pin of the power supply cord. This separate protective earthing terminal must be permanently connected 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 you install the switch, a licensed electrician must attach a cable lug to the grounding cables that you supply. See ["Ground the QFX5230-64CD Switch" on page 80](#) . A cable with an incorrectly attached lug can damage the switch.

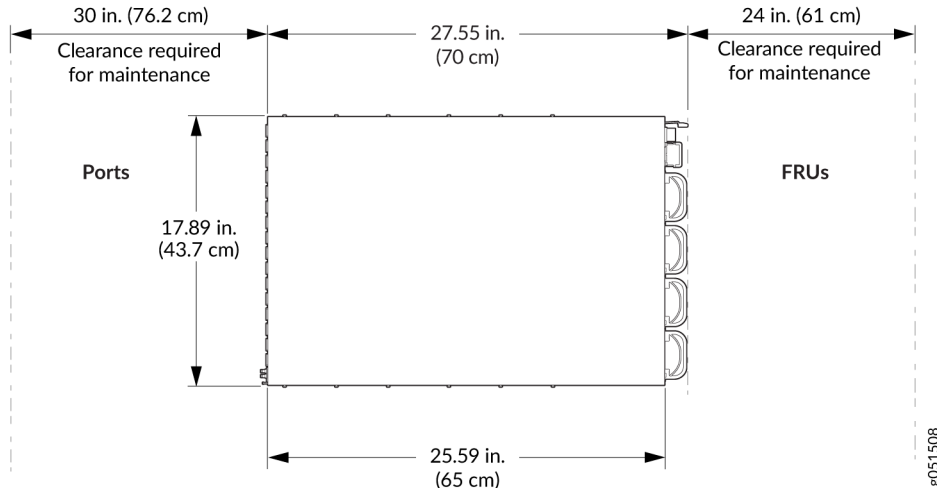
Before connecting the switch to earth ground, review the following information:

- The grounding lug required for the protective earthing terminal on a QFX5230-64CD is a Panduit LCD4-14A-L or equivalent (not provided). The grounding lug should accommodate 4 AWG stranded wire.
- The grounding cable that you provide for a QFX5230-64CD must be 4 AWG, minimum 90° C wire, or as permitted by the local code.
- Ensure you have two SAE 10-32 x 0.25 in. screws and number 10 split-lock washers and screws to attach the cable and bracket (not provided).

QFX5230-64CD Clearance Requirements for Airflow and Hardware Maintenance

When planning the site for installing a QFX5230-64CD, you must allow sufficient clearance around the installed chassis (see [Figure 24 on page 45](#)).

Figure 24: Clearance Requirements for Airflow and Hardware Maintenance for a QFX5230-64CD




- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See ["QFX5230-64CD Cooling System" on page 25](#) for more information about the airflow through the chassis.
- If you are mounting a QFX5230-64CD 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 QFX5230-64CD. 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.

Site Electrical Wiring Guidelines

Table 20 on page 46 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 20: Site Electrical Wiring Guidelines

Site Wiring Factor	Guidelines
Signaling limitations	<p>If your site experiences any of the following problems, consult experts in electrical surge suppression and shielding:</p> <ul style="list-style-type: none"> • Improperly installed wires cause radio frequency interference (RFI). • Damage from lightning strikes occurs when wires exceed recommended distances or pass between buildings. • Electromagnetic pulses (EMPs) caused by lightning damage unshielded conductors and electronic devices.
Radio frequency interference	<p>To reduce or eliminate RFI from your site wiring, do the following:</p> <ul style="list-style-type: none"> • Use a twisted-pair cable with a good distribution of grounding conductors. • If you must exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal, when applicable.

Table 20: Site Electrical Wiring Guidelines (Continued)

Site Wiring Factor	Guidelines
Electromagnetic compatibility	<p>If your site is susceptible to problems with electromagnetic compatibility (EMC), particularly from lightning or radio transmitters, seek expert advice.</p> <p>Strong sources of electromagnetic interference (EMI) can cause:</p> <ul style="list-style-type: none"> • 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.

QFX5230-64CD Rack Requirements

QFX5230-64CD 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 21 on page 47](#) provides the rack requirements and specifications for the QFX5230-64CD.

Table 21: Rack Requirements for the QFX5230-64CD

Rack Requirement	Guidelines
Rack type	<p>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.</p> <p>A U is the standard rack unit defined in <i>Cabinets, Racks, Panels, and Associated Equipment</i> (document number EIA-310-D) published by the Electronics Industry Association.</p>
Mounting bracket hole spacing	<p>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.</p>

Table 21: Rack Requirements for the QFX5230-64CD (Continued)

Rack Requirement	Guidelines
Rack size and strength	<ul style="list-style-type: none"> • Ensure that the rack complies with the standards for a 19-in. rack as defined in <i>Cabinets, Racks, Panels, and Associated Equipment</i> (document number EIA-310-D) published by the Electronics Industry Association. • A 900-mm rack as defined in the four-part <i>Equipment Engineering (EE); European telecommunications standard for equipment practice</i> (document numbers ETS 300 119-1 through 119-4) published by the European Telecommunications Standards Institute. <p>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.</p> <ul style="list-style-type: none"> • Ensure that the rack rails are spaced widely enough to accommodate the switch chassis' external dimensions. The outer edges of the front-mounting brackets extend the width to 19 in. (48.26 cm). • For four-post installations, the front and rear rack rails must be spaced between 25.6 in. (65 cm) and 31.5 in. (80 cm) front to back. • The rack must be strong enough to support the weight of the switch. • Ensure that the spacing of rails and adjacent racks allows for proper clearance around the switch and rack.
Rack connection to building structure	<ul style="list-style-type: none"> • Secure the rack to the building structure. • If earthquakes are a possibility in your geographical area, secure the rack to the floor. • Secure the rack to the ceiling brackets as well as wall or floor brackets for maximum stability.

QFX5230-64CD Cabinet Requirements

You can mount the QFX5230-64CD 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.

Cabinet requirements consist of:

- Cabinet size and clearance
- Cabinet airflow requirements

[Table 22 on page 49](#) provides the cabinet requirements and specifications for the QFX5230-64CD.

Table 22: Cabinet Requirements for the QFX5230-64CD

Cabinet Requirement	Guidelines
Cabinet size and clearance	The minimum cabinet size for accommodating a QFX5230-64CD device is 36 in. (91.4 cm) deep. Large cabinets improve airflow and reduce the chance of overheating.
Cabinet airflow requirements	<p>When you mount the switch in a cabinet, ensure that ventilation through the cabinet is sufficient to prevent overheating.</p> <ul style="list-style-type: none"> • 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 chassis hot exhaust air 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 allows 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 QFX5230-64CD 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 cables to minimize the blockage of airflow to and from the chassis. • Ensure that the spacing of rails and adjacent cabinets allows for the proper clearance around the switch and cabinet.

RELATED DOCUMENTATION

[QFX5230-64CD System Overview](#) | 11

QFX5230-64CD Network Cable and Transceiver Planning

IN THIS SECTION

- Determining QFX5230-64CD Optical Interface Support | 50
- Cable Specifications for QSFP+ and QSFP28 Transceivers | 51
- Understanding QFX Series Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | 53
- Calculating Power Budget and Power Margin for Fiber-Optic Cables | 55

Determining QFX5230-64CD 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 QFX5230-64CD is located at <https://apps.juniper.net/hct/product/#prd=QFX5230-64CD>.



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.

Cable Specifications for QSFP+ and QSFP28 Transceivers

The 40-Gigabit Ethernet QSFP+ and 100-Gigabit Ethernet QSFP28 transceivers that are used in QFX Series switches use 12-ribbon multimode fiber crossover cables with socket MPO/UPC 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 23 on page 51 describes the signals on each fiber. Table 24 on page 52 shows the pin-to-pin connections for proper polarity.

Table 23: QSFP+ and QSFP28 Optical Module Receptacle Pinouts

Fiber	Signal
1	Tx0 (Transmit)
2	Tx1 (Transmit)
3	Tx2 (Transmit)
4	Tx3 (Transmit)

Table 23: QSFP+ and QSFP28 Optical Module Receptacle Pinouts (*Continued*)

Fiber	Signal
5	Unused
6	Unused
7	Unused
8	Unused
9	Rx3 (Receive)
10	Rx2 (Receive)
11	Rx1 (Receive)
12	Rx0 (Receive)

Table 24: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts

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

Table 24: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts (*Continued*)

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

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

IN THIS SECTION

- [Signal Loss in Multimode and Single-Mode Fiber-Optic Cables | 53](#)
- [Attenuation and Dispersion in Fiber-Optic Cable | 54](#)

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.

Calculating Power Budget and Power Margin for Fiber-Optic Cables

IN THIS SECTION

- [How to Calculate Power Budget for Fiber-Optic Cables | 55](#)
- [How to Calculate Power Margin for Fiber-Optic Cables | 56](#)

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

TIP: You can use the [Hardware Compatibility Tool](#) to find information about the pluggable transceivers supported on your Juniper Networks device.

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

How to 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, 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 power budget (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 power budget, you can calculate the power margin (P_M), which represents the amount of power available after subtracting attenuation or link loss (LL) from the power budget (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 25 on page 56](#) 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 25: Estimated Values for Factors Causing Link Loss

Link-Loss Factor	Estimated Link-Loss Value
Higher-order mode losses	Single mode—None Multimode—0.5 dB
Modal and chromatic dispersion	Single mode—None Multimode—None, if product of bandwidth and distance is less than 500 MHz-km
Faulty connector	0.5 dB
Splice	0.5 dB
Fiber attenuation	Single mode—0.5 dB/km Multimode—1 dB/km

The following sample calculation for a 2-km-long multimode link with a power budget (P_B) of 13 dB uses the estimated values from [Table 25 on page 56](#). This example calculates link loss (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 power margin (P_M) is calculated as follows:

$$P_M = P_B - LL$$

$$P_M = 13 \text{ dB} - 2 \text{ km} (1 \text{ dB/km}) - 5 (0.5 \text{ dB}) - 2 (0.5 \text{ dB}) - 0.5 \text{ dB}$$

$$P_M = 13 \text{ dB} - 2 \text{ dB} - 2.5 \text{ dB} - 1 \text{ dB} - 0.5 \text{ dB}$$

$$P_M = 7 \text{ dB}$$

The following sample calculation for an 8-km-long single-mode link with a power budget (P_B) of 13 dB uses the estimated values from [Table 25 on page 56](#). This example calculates link loss (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 power margin (P_M) is calculated as follows:

$$P_M = P_B - LL$$

$$P_M = 13 \text{ dB} - 8 \text{ km} (0.5 \text{ dB/km}) - 7(0.5 \text{ dB})$$

$$P_M = 13 \text{ dB} - 4 \text{ dB} - 3.5 \text{ dB}$$

$$P_M = 5.5 \text{ dB}$$

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

RELATED DOCUMENTATION

[QFX5230-64CD Management Cable Specifications and Pinouts | 57](#)

QFX5230-64CD Management Cable Specifications and Pinouts

IN THIS SECTION

- [Cable Specifications for Console and Management Connections for the QFX Series | 58](#)
- [RJ-45 Management Port Connector Pinout Information | 58](#)
- [Console Port Connector Pinouts for the QFX Series | 59](#)
- [QSFP-DD Port Connector Pinout Information | 60](#)
- [SFP, SFP+, and SFP28 Port Connector Pinout Information | 65](#)

Cable Specifications for Console and Management Connections for the QFX Series

Table 26 on page 58 lists the specifications for the cables that connect the QFX Series switch to a management device.

NOTE: The QFX Series can be configured with SFP management ports that support 1000BASE-SX transceivers. See the [Hardware Compatibility Tool](#) for more on the fiber-optic cables required for use with these transceivers.

Table 26: 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 feet (2.13 meters)	RJ-45
Management port	Category 5 cable or equivalent suitable for 1000BASE-T operation	328 feet (100 meters)	RJ-45

NOTE: We no longer include a DB-9 to RJ-45 cable or a DB-9 to RJ-45 adapter with a CAT5E copper cable as part of the device package. If you require a console cable, you can order it separately with the part number JNP-CBL-RJ45-DB9 (DB-9 to RJ-45 adapter with a CAT5E copper cable).

RJ-45 Management Port Connector Pinout Information

Table 27 on page 59 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 27: RJ-45 Management Port Connector Pinout Information

Pin	Signal	Description
1	TRP1+	Transmit/receive data pair 1
2	TRP1-	Transmit/receive data pair 1
3	TRP2+	Transmit/receive data pair 2
4	TRP3+	Transmit/receive data pair 3
5	TRP3-	Transmit/receive data pair 3
6	TRP2-	Transmit/receive data pair 2
7	TRP4+	Transmit/receive data pair 4
8	TRP4-	Transmit/receive data pair 4

Console Port Connector Pinouts for the QFX Series

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

[Table 28 on page 60](#) 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 a 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 a DB-9 to RJ-45 cable or a DB-9 to RJ-45 adapter with a CAT5E copper cable as part of the device package. If you require a console cable, you can order it separately with the part number JNP-CBL-RJ45-DB9 (DB-9 to RJ-45 adapter with a CAT5E copper cable).

Table 28: 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

QSFP-DD Port Connector Pinout Information

[Table 29 on page 60](#) provides the pinout mapping for Quad Small Form Factor Pluggable Double Density (QSFP-DD) port connectors.

Table 29: QSFP-DD Network Port Pinout Mapping

Pin	Symbol	Description
1	GND	Ground
2	TX2n	Transmitter inverted data input
3	TX2p	Transmitter non-inverted data input

Table 29: QSFP-DD Network Port Pinout Mapping (Continued)

Pin	Symbol	Description
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	+3.3V Power Supply Receiver
11	SCL	2-wire serial interface clock
12	SDA	2-wire serial interface data
13	GND	Ground
14	RX3p	Receiver non-inverted data output
15	RX3n	Receiver inverted data output
16	GND	Ground
17	RX1p	Receiver non-inverted data output
18	RX1n	Receiver inverted data output

Table 29: QSFP-DD Network Port Pinout Mapping (Continued)

Pin	Symbol	Description
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	+3.3V power supply transmitter
30	VCC1	+3/3V power supply
31	LPMode	Low power mode
32	GND	Ground
33	TX3p	Transmitter non-inverted data input

Table 29: QSFP-DD Network Port Pinout Mapping (Continued)

Pin	Symbol	Description
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
48	VCC	+3.3V power supply

Table 29: QSFP-DD Network Port Pinout Mapping (Continued)

Pin	Symbol	Description
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
63	RX8p	Receiver non-inverted data output

Table 29: QSFP-DD Network Port Pinout Mapping (Continued)

Pin	Symbol	Description
64	GND	Ground
65	NC	No connect
66	TBD	Reserved
67	VCC	+3.3V power supply
68	VCC	+3.3V 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, SFP+, and SFP28 Port Connector Pinout Information

Table 30 on page 66 provides the pinout mapping for small-form factor pluggable (SFP) connectors, SFP+ connectors, and SFP28 connectors.

Table 30: SFP, SFP+, and SFP28 Port Connector Pinout Mapping

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

Table 30: SFP, SFP+, and SFP28 Port Connector Pinout Mapping (Continued)

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

USB Port Specifications for the QFX Series

The following Juniper Networks USB flash drives have been tested and are officially supported for the USB port in 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.

RELATED DOCUMENTATION

| [Connecting the QFX5230-64CD to External Devices](#) | 88

Contact Customer Support to Obtain a Return Material Authorization

If you need to return a device or hardware component to Juniper Networks for repair or replacement, obtain 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.

4

CHAPTER

Installation and Configuration

Unpacking and Mounting the QFX5230-64CD Switch | 71

Connecting the QFX5230-64CD to Power | 79

Connecting the QFX5230-64CD to External Devices | 88

Performing the Initial Software Configuration for QFX5230-64CD Switches | 91

Unpacking and Mounting the QFX5230-64CD Switch

IN THIS SECTION

- [Unpacking a QFX5230-64CD Switch | 71](#)
- [Register Products—Mandatory to Validate SLAs | 72](#)
- [Mounting a QFX5230-64CD Switch in a Rack or Cabinet | 73](#)

Unpacking a QFX5230-64CD Switch

The QFX5230-64CD switch is a rigid sheet-metal structure that houses the hardware components. A QFX5230-64CD switch is shipped in a cardboard carton, secured with foam packing material.



CAUTION: The QFX5230-64CD switch is maximally protected inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack a QFX5230-64CD 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 31 on page 72](#) lists the inventory of components supplied with a QFX5230-64CD switch.
6. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Table 31: Sample Inventory of Components Supplied with a QFX5230-64CD Switch

Component	Quantity
Chassis	1
Fan modules - QFX5230-64CD-FANAO	4, factory installed
Power supplies - JNP-3000W-AC-AFO	2, factory installed
Rack mount kit for QFX5230-64CD <ul style="list-style-type: none"> • Mounting rails • Rear mounting blades • Flange • Flathead screws (Phillips, M4 x 6mm) • Flathead screws (Phillips, M4 x 8mm) <p>The order number for a spare rack mount kit is QFX5230-2RU-4PRMK.</p>	1 2 2 6 24
SAF-D-Grid power cords with plugs appropriate to your geographical location (AC systems only)	2
Documentation roadmap card	1
Warranty	1

Register Products—Mandatory to Validate SLAs

Register all new Juniper Networks hardware products and changes to an existing installed product using the Juniper Networks website to activate your hardware replacement service-level agreements (SLAs).



CAUTION: Register product serial numbers on the Juniper Networks website. 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 service-level agreement for products that do not have registered serial numbers or accurate installation base data.

Register your product(s) at <https://tools.juniper.net/svcreg/SRegSerialNum.jsp>.

Update your installation base at <https://www.juniper.net/customers/csc/management/updateinstallbase.jsp>.

Mounting a QFX5230-64CD Switch in a Rack or Cabinet

IN THIS SECTION

- [Before You Begin Rack Installation | 73](#)
- [Mount your Device by Using the QFX5230-2RU-4PRMK Rack Mount Kit on a 4-Post Rack | 74](#)

You can mount QFX5230-64CD switches only on a four-post 19-in. rack or cabinet using the rack mount kit provided with the switch.

This topic describes how to mount a QFX5230-64CD switch in a four-post rack.

Before You Begin Rack Installation

Before you begin mounting a QFX5230-64CD 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 "[QFX5230-64CD Site Preparation Checklist](#)" on [page 40](#).
3. Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
4. Read [No Link Title](#).
5. Remove the switch from the shipping carton (see "[Unpacking a QFX5230-64CD Switch](#)" on [page 71](#)).

6. Ensure that you have the following parts and tools available that are not normally provided with the device to mount the switch in a rack:
- ESD grounding strap
 - Appropriate screwdriver for the mounting screws
 - Screws to attach the device to the rack
 - Grounding lug, grounding wire, screws and washers
 - Dust covers for unused ports



CAUTION: A QFX5230-64CD 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 QFX5230-64CD switch above 60 in. (152.4 cm) from the floor, you can 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.

Mount your Device by Using the QFX5230-2RU-4PRMK Rack Mount Kit on a 4-Post Rack

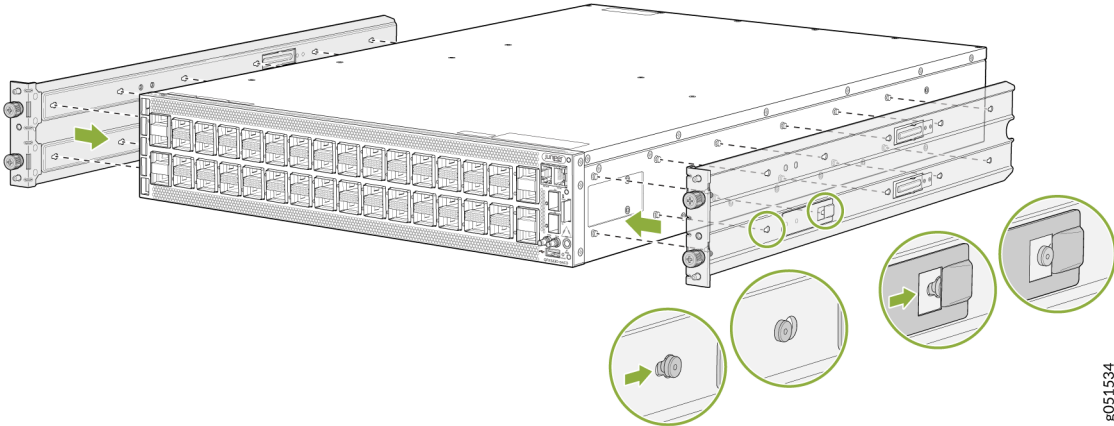
Ensure that you have the following tools and parts available:

- An ESD grounding strap—not provided.
- A pair of side mounting brackets that attach to the chassis—provided with the rack mount kit.
- A pair of front and rear mounting rails that attach to the rack posts—provided with the rack mount kit.

To mount the device on a four-post rack:

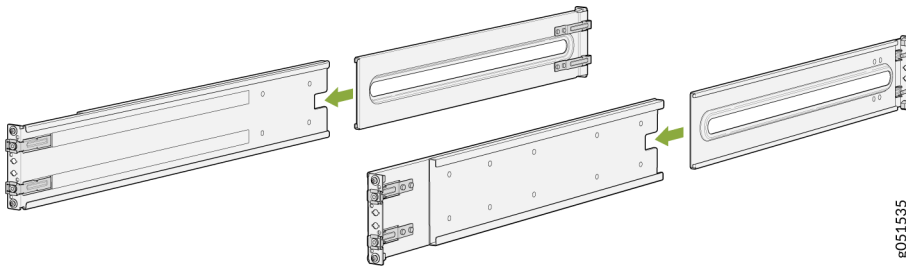
1. Review the [General Safety Guidelines and Warnings](#).
2. Wrap and fasten one end of the electrostatic discharge (ESD) cable grounding strap around your bare wrist, and connect the other end to a site ESD point.
3. To attach the side mounting brackets to the chassis, align the keyholes on the mounting brackets over the shoulder screws on the chassis. Slide the mounting brackets toward the rear of the chassis.

Figure 25: Attach the Side Mounting Brackets



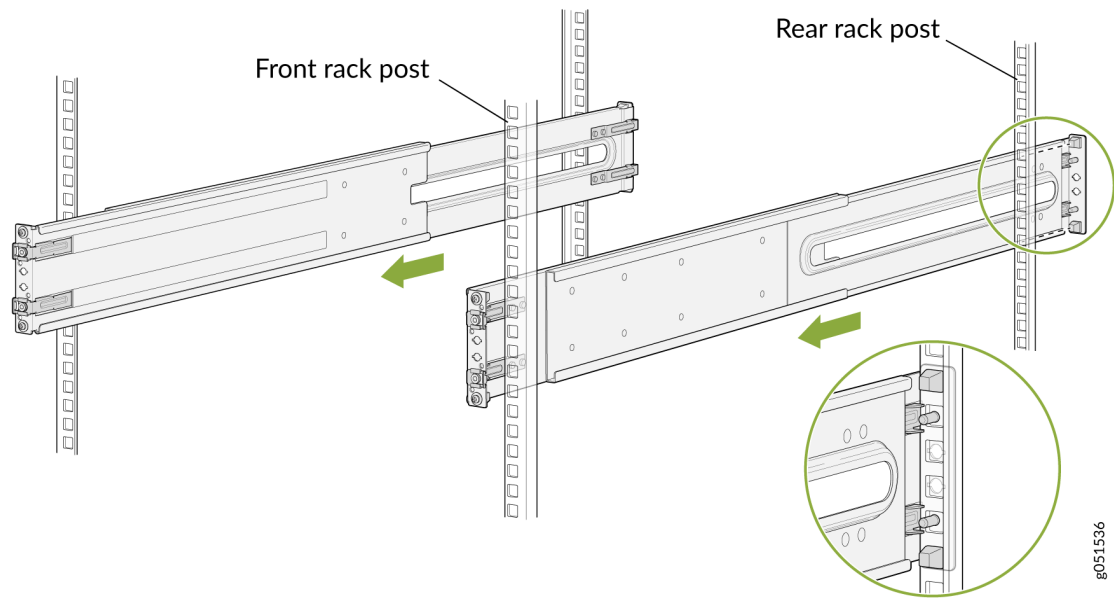
4. Assemble the mounting rails by sliding the rear floating rails into the front rails.

Figure 26: Assemble the Mounting Rails



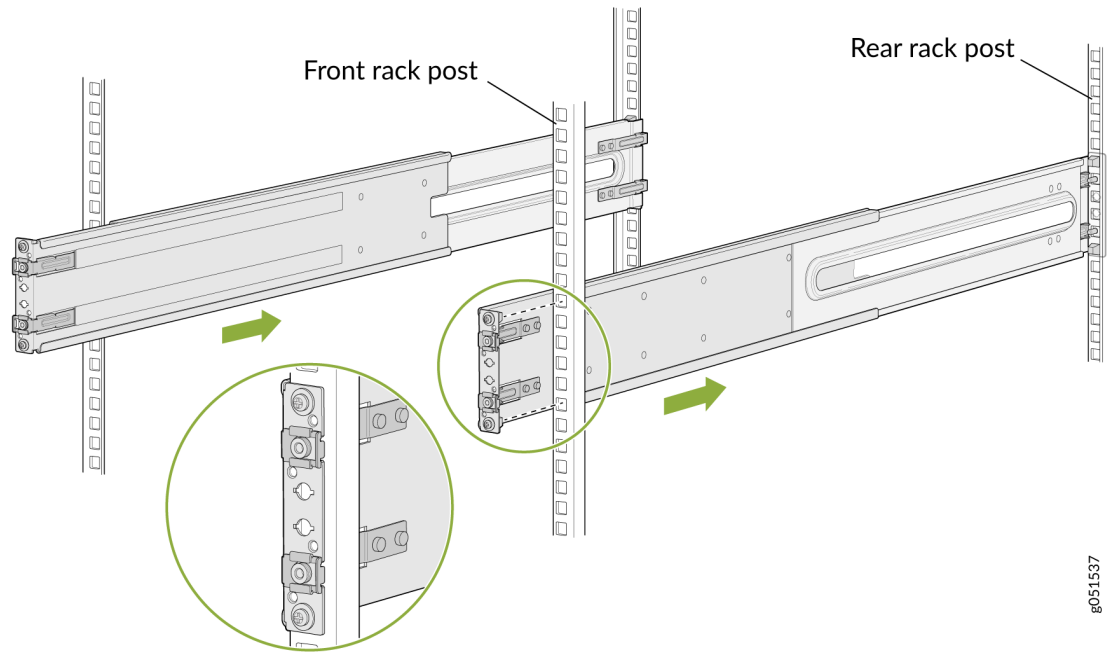
5. Install the mounting rails on the rack:
 - a. Align the guide blocks of the rear mounting rails with the rear-post holes. Pull the rear mounting rails toward the front of the rack to lock the rails in place. You will hear a distinct click sound when the latch locks into the corresponding rack holes.

Figure 27: Install the Rear Mounting Rails



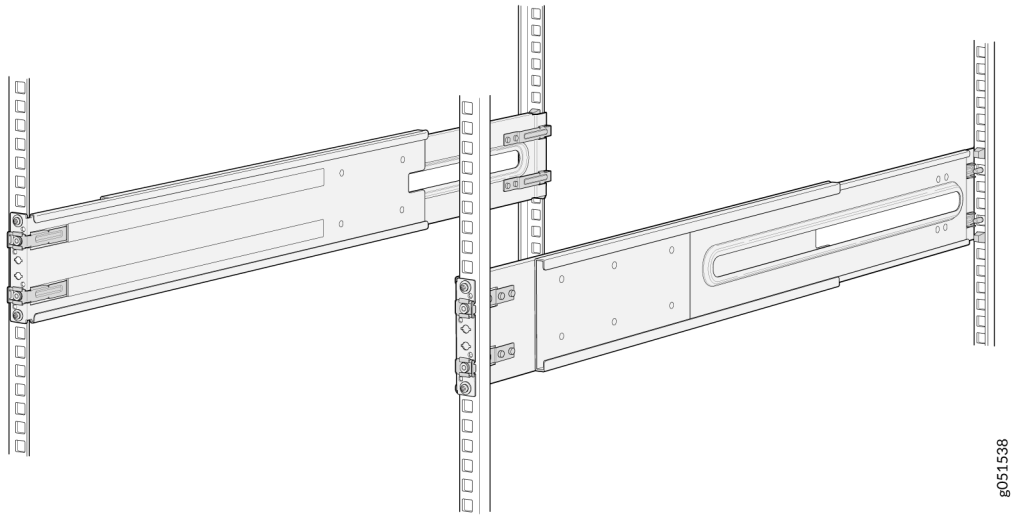
- b. Align the guide blocks of the front mounting rails with the front-post holes. Push the front mounting rails toward the rear of the rack to lock the rails in place. You will hear a distinct click sound when the latch locks into the corresponding rack holes.

Figure 28: Install the Front Mounting Rails



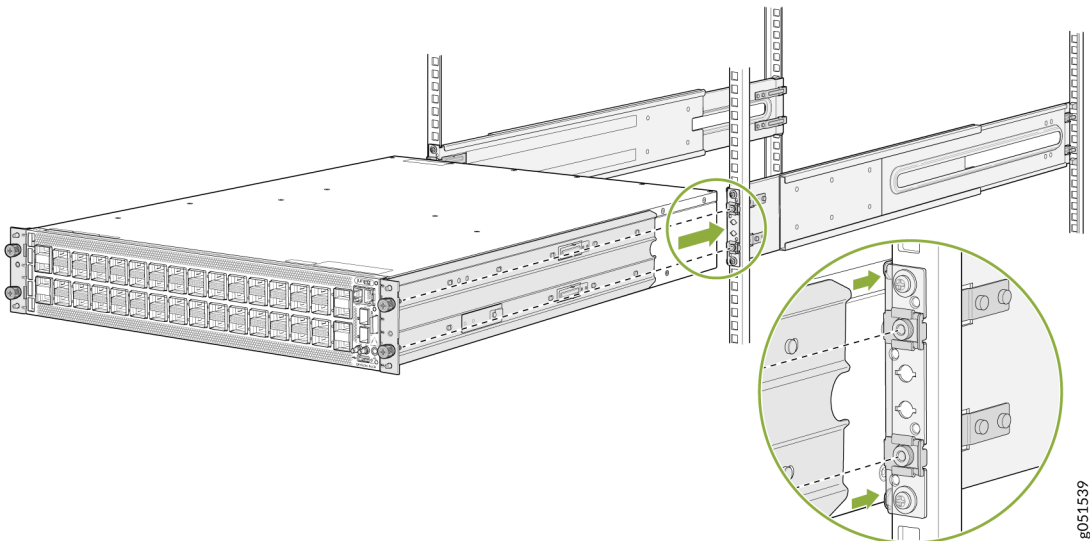
- c. Visually ensure that the front and rear latches are locked into place on the mounting rails. The mounting rails should be securely installed on the rack.
6. Lift the device and position it in front of the rack, aligning the side mounting-brackets with the mounting rails. Slide the device into the channels of the rack mounting rails.

Figure 29: Slide the Mounting Rail into the Rack



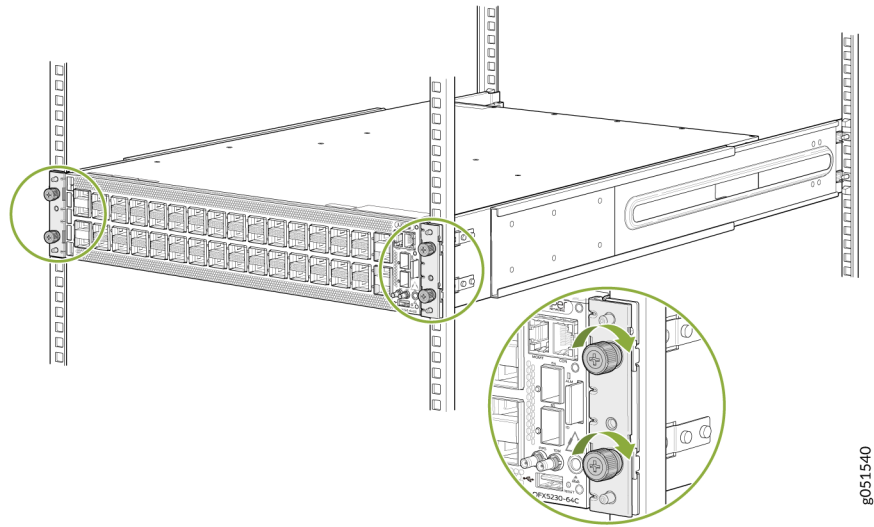
7. Push the chassis.

Figure 30: Push the Chassis into the Rack



8. Secure the chassis to the rack and tighten the thumbscrews.

Figure 31: Tighten the Thumbscrew



RELATED DOCUMENTATION

[Rack-Mounting and Cabinet-Mounting Warnings](#)

[Connecting the QFX5230-64CD to Power | 79](#)

Connecting the QFX5230-64CD to Power

IN THIS SECTION

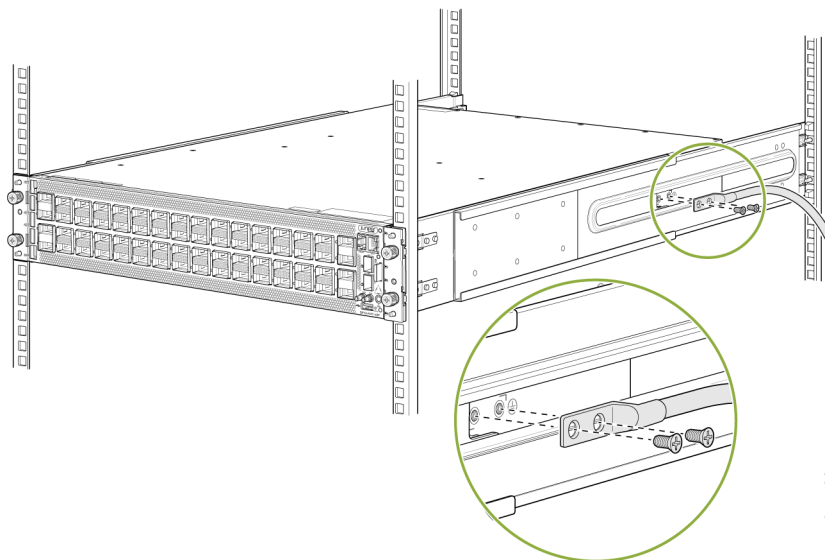
- [Ground the QFX5230-64CD Switch | 80](#)
- [Connect AC Power to a QFX5230-64CD Switch | 80](#)
- [AC Circuit Breaker for the QFX5230-64CD Switch | 82](#)
- [Connect DC Power to a QFX5230-64CD Switch | 84](#)

Ground the QFX5230-64CD Switch

To connect earth ground to a QFX5230-64CD switch:

1. Use two SAE 10-32 x 0.25 in. screws with number10 split-lock washers (not provided) to secure the grounding lug and attached cable (not provided) to the chassis. The posts on the grounding lug should point to the right. See [Figure 32 on page 80](#) .

Figure 32: Connecting a Grounding Cable to a QFX5230-64CD Switch



2. Connect the other 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.

Connect AC Power to a QFX5230-64CD Switch

Before you begin to connect power to the switch, be sure you understand how to prevent ESD damage. See [Prevention of Electrostatic Discharge Damage](#).

NOTE: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the QFX5230-64CD switch to earth ground before you connect it to power.



WARNING: 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. Under all circumstances, use the protective terminal on the switch chassis to connect to the earth ground.

The AC power supply unit (PSUs) in a QFX5230-64CD switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it without powering off the switch or disrupting routing functions.

To connect AC power to a QFX5230-64CD switch:

1. Connect the chassis to earth ground.



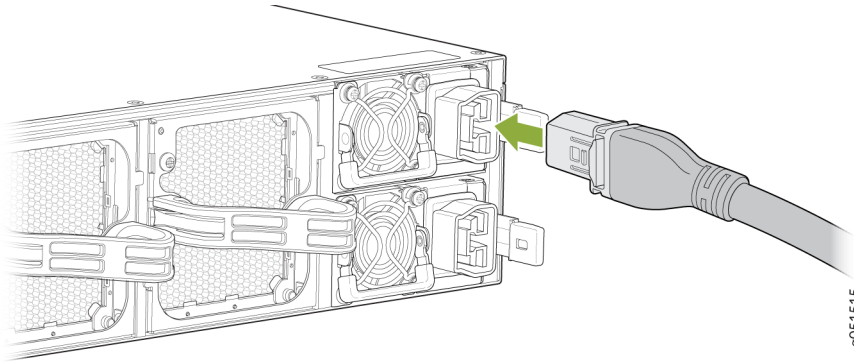
CAUTION: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, a QFX5230-64CD switch must be adequately grounded before it is connected to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the rear panel of the QFX5230-64CD to connect to the earth ground. A QFX5230-64CD switch gets 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.

2. Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.
3. Ensure that you have an ESD grounding strap. 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 device.
4. If not already installed, install the power supplies in the switch.

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

5. Ensure that the power supplies are fully inserted in the chassis and the latches are secure.

6. Locate the AC power cords shipped with the QFX5230-64CD switch; the cords have plugs appropriate for your geographical location.
7. Ensure that you have a power cord appropriate for your geographical location available to connect AC power to the switch.
8. Insert the coupler end of the power cord into the AC power cord inlet on the AC power supply faceplate.



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

NOTE: The QFX5230-64CD switch powers on as soon as power is provided to the power supply unit. There is no power switch on the power supply unit.

10. Insert the power cord plug into an AC power source outlet.
11. If the AC power source outlet has a power switch, set it to the on (I) position.
12. Verify that the status LEDs on each power supply are lit green. Verify that the status LEDs on each power supply are lit green.

AC Circuit Breaker for the QFX5230-64CD Switch

1. For Single / multiple feed AC power supply, we recommend that you use a dedicated 2-pole external circuit breaker for each power supply. Each feed of the power supply shall have a dedicated Line and Neutral connection.
2. We recommend that the rating of the circuit breaker be a minimum of 125% of continuous current drawn by each power supply as per national electric or local code when system is fully configured.
3. The model number of circuit breaker used for final safety certification is NF100-CN with current rating of 20A and with Medium Delay.
4. The power supply of this system consists of an internal fuse with 20kA AIC rating.

5. We recommend that you use appropriate rating of power cord and circuit breaker taking into consideration continuous current drawn when fully configured.
6. See [Table 32 on page 83](#) to understand the electrical characteristics for the input fuse within the power supply.

Table 32: Information on Power Supply Fuses for the QFX5230-64CD Switch

Electrical Characteristics	Value
Fuse	Littlefuse, 505
Type of fuse (slow, fast)	Fast
Voltage rating	500VAC
Current rating	20A
AIC (interrupt rating)	20kA
Approvals	UL, IEC
Melting integral	210

Table 33: Recommended AC Breaker Specifications

Electrical Characteristics	Value
Breaker	Shihlin Electric, NF100-CN
Delay (short, medium, long).	Medium
Type of Breaker	Magnetic
Voltage rating	690V
Number of Poles	2-pole
Current rating	20A
AIC (interrupt rating)	7.5kA

Table 33: Recommended AC Breaker Specifications (Continued)

Electrical Characteristics	Value
Approvals	UL, IEC

Connect DC Power to a QFX5230-64CD Switch

Before you begin to connect power to the switch, be sure you understand how to prevent ESD damage. See Prevention of Electrostatic Discharge Damage. When you install the power supplies in the chassis, ensure that the battery returns of the DC power supply gets connected as an isolated DC return (DC-I).



WARNING: 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. Under all circumstances, use the protective terminal on the switch chassis to connect to the earth ground.

- Ensure that you have the following parts and tools available:
 - ESD grounding strap
 - Screwdriver
 - Nutdriver, with a torque range between 23 lb-in (2.6Nm) to 25 lb-in (2.8Nm)



CAUTION: You must use an appropriate torque-controlled tool to tighten the screws on the DC power cable connector. Do not overtighten the screws. Applying excessive torque damages the terminal block and the wiring tray. The absolute maximum torque that may be applied to this screw is 25 lb-in (2.8Nm).

- Two DC power source cables. The QFX5230-64CD switch supports a 4-AWG and 75°C temperature-rated stranded copper wire.



CAUTION: Do not mix AC and DC power supplies in the same chassis. Each power supply must be connected to a dedicated power source.

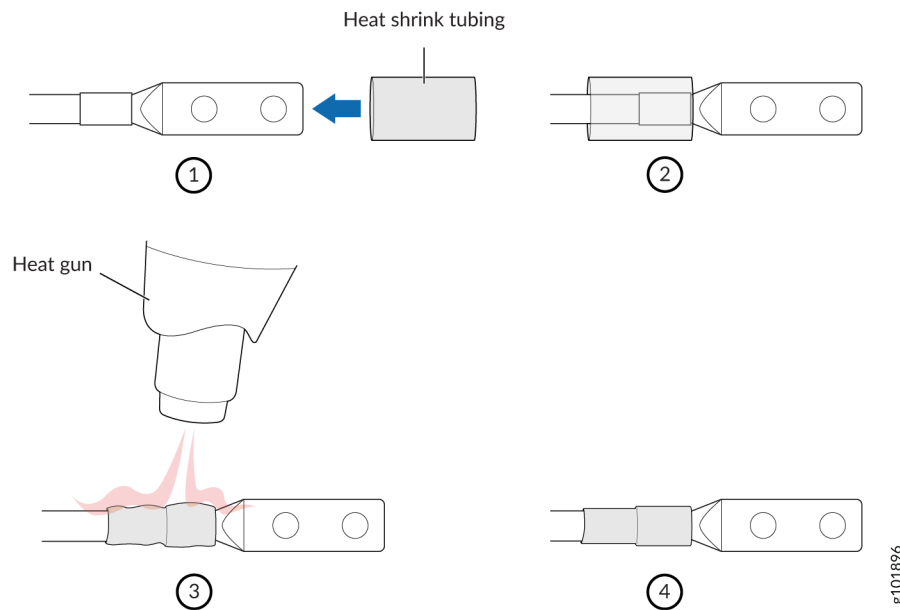
The DC power supply in a QFX5230-64CD switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it without powering off the switch or disrupting switch functions. You do, however, need to disconnect power supply before attempting to remove the unit.



WARNING: The DC-powered QFX5230-64CD switch models are intended for installation in a restricted access location only.

To connect DC power to a QFX5230-64CD switch:

1. To prevent damage to the equipment caused by static discharge, attach an ESD grounding strap to your bare wrist, and connect the strap to an approved site ESD grounding point.
2. Ensure that the power supplies are fully inserted in the chassis and that the latches are secure.
3. Install heat-shrink tubing insulation around the power cables.

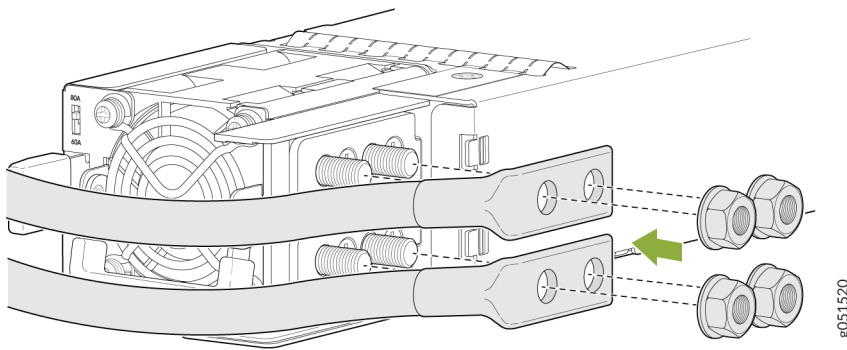


4. To install heat-shrink tubing: Slide the tubing over the portion of the cable where it is attached to the lug barrel. Ensure that tubing covers the end of the wire and the barrel of the lug attached to it. Shrink the tubing with a heat gun. Ensure that you heat all sides of the tubing evenly so that it shrinks around the cable tightly.

NOTE: Make sure that you do not overheat the tubing.

5. Remove the cover on the DC terminals using a screwdriver.
6. Remove the nuts from the DC terminals.
7. Connect each power supply to the power source by inserting the DC connector into the power supply. Connect each power supply to the power source by connecting DC power cable to the power supply. The DC PSM has two terminals labeled -48V/-60V (negative) and RTN (positive) for connecting the DC power cables labeled positive (+) and negative (-). The terminals are covered by a cover on the terminal block. See [Figure 33 on page 86](#) .

Figure 33: Connecting a Straight DC Power Cable to a DC Power Supply in a QFX5230-64CD Switch



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

8. Using the nutdriver, tighten the nuts on the power cable connector to between 23 lb-in (2.6Nm) to 25 lb-in (2.8Nm).



CAUTION: You must use an appropriate torque-controlled tool to tighten the nuts. Applying excessive torque damages the terminal block and the wiring tray. The absolute maximum torque that may be applied to this nut is 25 lb-in (2.8Nm).

9. Repeat 4 through 7 for each power supply that you are connecting to power.
10. Close the input circuit breaker. We recommend that the 48 VDC facility DC source be equipped with a circuit breaker rated at 80A (125VDC) minimum, or as required by local code.



CAUTION: The connection between each power source and PSM must include a circuit breaker. For single/ multiple feed DC power supply, we recommend that you use a dedicated external circuit breaker for each of the power supplies. Use a 2-pole circuit breaker if both -48V and return feeds are isolated. Use a single pole circuit breaker if one of the feeds are connected to ground. Install this single pole circuit breaker in the ungrounded side of the supply. We recommend that the rating of the circuit breaker is a minimum 125% of the continuous power drawn by each power supply as per the national electric or local code when the system is fully configured. The model number of circuit breaker used for final safety certification is CA2-B0- 16-680-621-BJ with current rating of 80Amps and with long delay. We recommend that you use appropriate rating of the input DC wire taking into consideration continuous current rating of the system when it is fully configured and the circuit breaker rating.

Table 34: External DC Circuit Breaker Electrical Characteristics

Electrical Characteristics	Value
Breaker	Carling Technologies, CA2-B0-16-680-621-BJ
Delay (short, medium, long).	Long
Type of Breaker	Magnetic
Voltage rating	125VDC
Number of Poles	2-pole
Current rating	80A
AIC (interrupt rating)	5kA
Approvals	UL, IEC

11. Verify that the LED on the power supply is lit green and is on steadily.
12. If the status LED is lit amber, disconnect power to the switch, and replace the power supply. Do not remove the power supply until you have a replacement power supply ready. The power supplies must be installed in the QFX5230-64CD switch to ensure proper airflow.

NOTE: Replace a failed power supply with a new power supply within 30 seconds of removal to prevent overheating.

RELATED DOCUMENTATION

| [QFX5230-64CD Power System](#) | 29

Connecting the QFX5230-64CD to External Devices

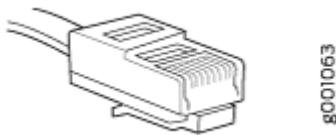
IN THIS SECTION

- [Connect a Device to a Network for Out-of-Band Management](#) | 88
- [Connect a Device to a Management Console Using an RJ-45 Connector](#) | 89

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 34 on page 88](#) shows the RJ-45 connector of the Ethernet cable.

Figure 34: RJ-45 Connector on an Ethernet Cable

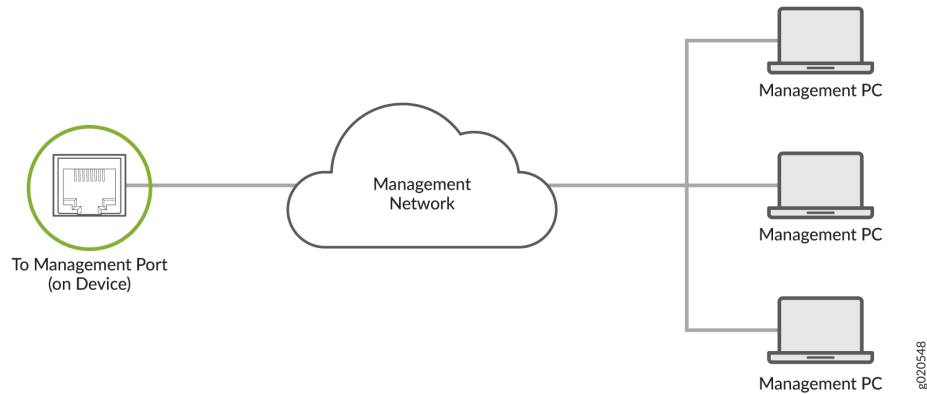


You can monitor and manage these devices by using a dedicated management channel. Each device has a management port to which you can connect an Ethernet cable with an RJ-45 connector. Use the management port to connect the device to the management device.

To connect a device to a network for out-of-band management (see [Figure 35 on page 89](#)):

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

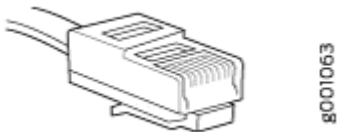


Connect a Device to a Management Console Using an RJ-45 Connector

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 36 on page 89 shows the RJ-45 connector on the Ethernet cable.

Figure 36: RJ-45 Connector on an Ethernet Cable



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.

NOTE: We no longer include a DB-9 to RJ-45 cable or a DB-9 to RJ-45 adapter with a CAT5E copper cable as part of the device package. If you require a console cable, you can order it separately with the part number JNP-CBL-RJ45-DB9 (DB-9 to RJ-45 adapter with a CAT5E copper cable).

You can configure and manage 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 (see [Figure 37 on page 90](#) and [Figure 38 on page 90](#)):

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 37 on page 90](#)) or management console (see [Figure 38 on page 90](#)).

Figure 37: Connect a Device to a Management Console Through a Console Server

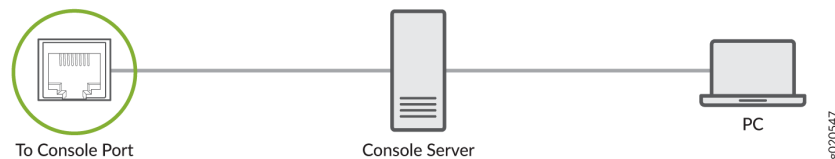


Figure 38: Connect a Device Directly to a Management Console



RELATED DOCUMENTATION

General Safety Guidelines and Warnings

Performing the Initial Software Configuration for QFX5230-64CD Switches

Before you begin connecting and configuring a QFX5230-64CD, set the following parameter values on the console server or the management device that you are connecting to the console port, such as a laptop.

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

You must perform the initial configuration of the QFX5230-64CD through the console port using the CLI or through zero touch provisioning (ZTP). In order to use ZTP to provision the device, you must have access to a Dynamic Host Control Protocol (DHCP) server, and a File Transfer Protocol (anonymous FTP), Hypertext Transfer Protocol (HTTP), or Trivial File Transfer Protocol (TFTP) server on which the software image and configuration files are stored. For more information about using ZTP for provisioning the device, see [Understanding Zero Touch Provisioning](#) in the *Installation and Upgrade Guide*.

To connect and configure the switch from the console:

1. Connect the console port to a laptop or PC using an RJ-45 cable and RJ-45 to DB-9 adapter. The console (**CON**) port is located on the top right corner of the port panel.
2. Log in as **root**. 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 prefix length for the switch management interface.

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



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

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 QFX5230-64CD switch through Telnet using root credentials. Root login is allowed only for SSH access.

11. Enable SSH service for root login.

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

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

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

5

CHAPTER

Maintain Components

Maintain the QFX5230-64CD Cooling System | 95

Maintain the QFX5230-64CD Power System | 98

Maintain the SATA Solid State Drive in a QFX5230-64CD Switch | 103

Maintain the QFX5230-64CD Cooling System

IN THIS SECTION

- [How to Remove a Fan Module from a QFX5230-64CD Switch | 95](#)
- [How to Install a Fan Module in a QFX5230-64CD Switch | 96](#)

The fan modules in the QFX5230-64CD switch are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace one of them without powering off the switch or disrupting switching function.



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 slot for an extended amount of time.

How to Remove a Fan Module from a QFX5230-64CD Switch

Before you remove a fan module from a QFX5230-64CD switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see Prevention of Electrostatic Discharge Damage).

Ensure that you have the following parts and tools available to remove a fan module from a QFX5230-64CD switch:

- ESD grounding strap
- Antistatic bag or an antistatic mat

To remove a fan module from a QFX5230-64CD switch:

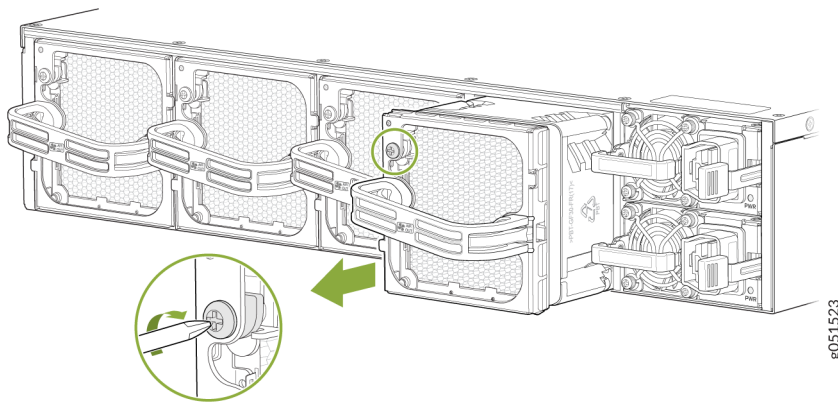
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
3. Loosen the locking screw (3 or 4 turns) using a Phillips number 2 screwdriver.
4. Grasp the handle on the fan module and squeeze the outside of the handle to release the module.



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.

5. Pull firmly to slide the fan module halfway out of the chassis.
6. When the fan stop 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.

Figure 39: Removing a Fan Module from a QFX5230-64CD Switch



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.

How to Install a Fan Module in a QFX5230-64CD Switch

Before you install a fan module in a QFX5230-64CD, 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 QFX5230-64CD switch are hot-removable and hot-insertable field-replaceable units (FRUs); you can remove and replace them without powering off the switch or disrupting switch functions.



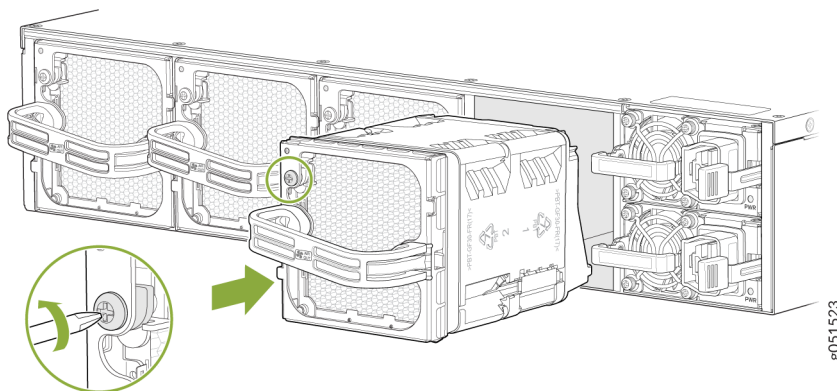
CAUTION: To ensure proper airflow, keep a failed fan module in place until you have a replacement fan module at hand. Do not run the device with an open fan slot for an extended amount of time.

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 QFX5230-64CD switch:

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 module with the open slot on the FRU panel of the chassis and slide it in until it is fully seated.

Figure 40: Installing a Fan Module in a QFX5230-64CD 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 QFX5230-64CD product variant that supports the same airflow type. See "[QFX5230-64CD Power System](#)" on page 29 for more information.

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

RELATED DOCUMENTATION

No Link Title

No Link Title

Maintain the QFX5230-64CD Power System

IN THIS SECTION

- [Remove a Power Supply from a QFX5230-64CD Switch | 98](#)
- [Install a Power Supply in a QFX5230-64CD Switch | 100](#)

A QFX5230-64CD switch power supply module 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. Note that there should be an active power supply in working condition for you to replace the other power supply without powering off the system.

Remove a Power Supply from a QFX5230-64CD Switch

Before you remove a power supply from a QFX5230-64CD switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see Prevention of Electrostatic Discharge Damage).

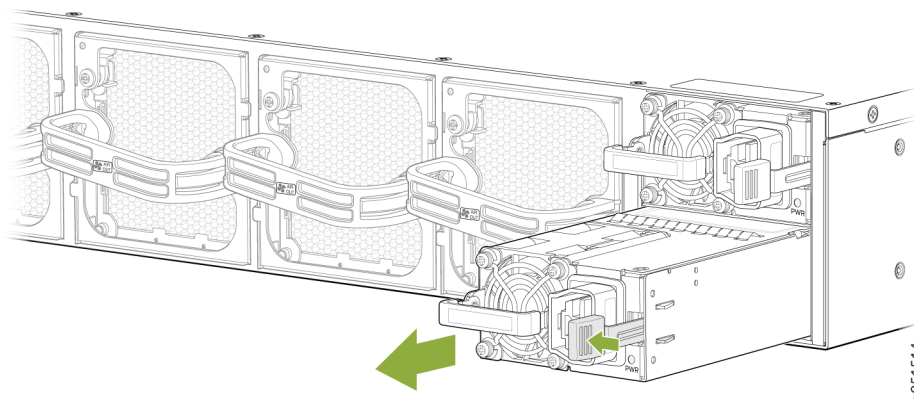
Ensure that you have the following parts and tools available to remove a power supply from a switch:

- ESD grounding strap
- Antistatic bag or an antistatic mat

The power supply modules in QFX5230-64CD switches are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace the power supply modules without powering off the switch or disrupting switching functions.

NOTE: To maintain proper cooling and prevent thermal shutdown of the operating power supply unit, each power supply slot must contain either a power supply or a blank panel. If you remove a power supply, you must install a replacement power supply or a blank panel shortly after the removal.

Figure 41: Removing an AC Power Supply from a QFX5230-64CD Switch



The QFX5230-64CD switch is shipped from the factory with two pre-installed power supplies. To remove a power supply from a QFX5230-64CD switch:

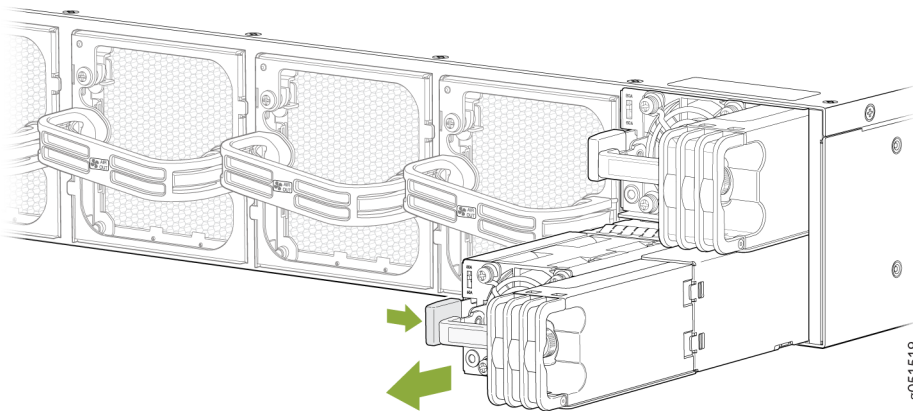
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.

NOTE: If only one power supply is installed in your QFX5230-64CD switch, you need to power off the switch before removing the power supply.

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. Be sure the LEDs turn off on the power supply that you are removing.
4. Remove the power source:

- 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—Loosen the thumb screws, and disconnect a connector for the power cables or release each of the two cables from the power supply (requires a standard 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 halfway out of the chassis.

Figure 42: Removing a DC Power Supply from a QFX5230-64CD Switch



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

Install a Power Supply in a QFX5230-64CD Switch

- Before you install a power supply in a QFX5230-64CD switch, 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 "[QFX5230-64CD Cooling System](#)" on page 25 for more information.

To install a power supply in a QFX5230-64CD switch:

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 43: Installing AC Power Supply in a QFX5230-64CD

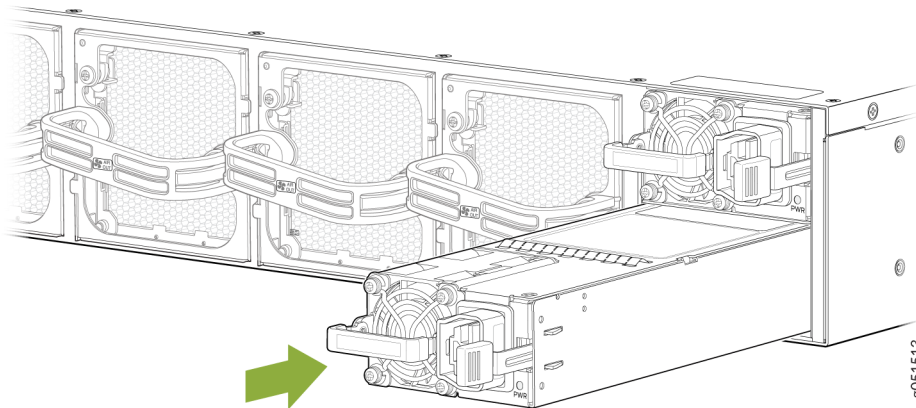
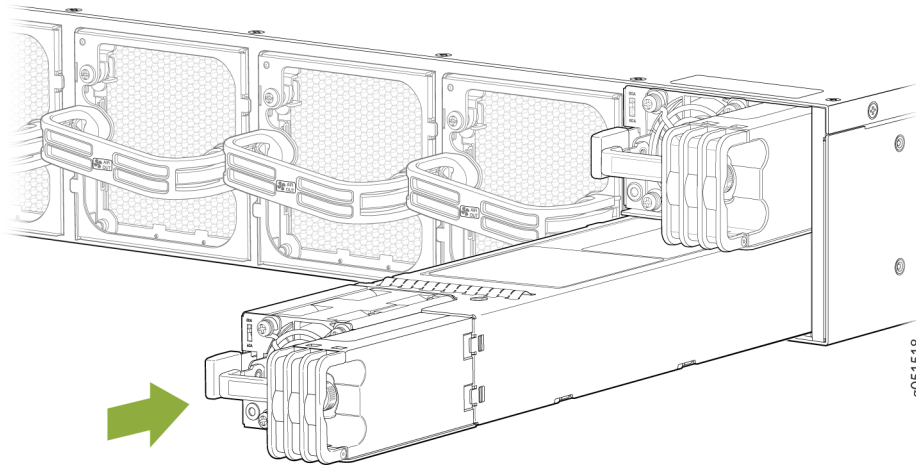


Figure 44: Installing DC Power Supply in a QFX5230-64CD Switch



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

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

RELATED DOCUMENTATION

QFX5230-64CD Power System | 29

Connecting the QFX5230-64CD to Power | 79

Maintain the SATA Solid State Drive in a QFX5230-64CD Switch

IN THIS SECTION

- [Remove a SATA Solid State Drive from a QFX5230-64CD Switch | 103](#)
- [Install a SATA Solid State Drive in a QFX5230-64CD Switch | 105](#)

Remove a SATA Solid State Drive from a QFX5230-64CD Switch

Before you remove an SATA SSD from the device, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

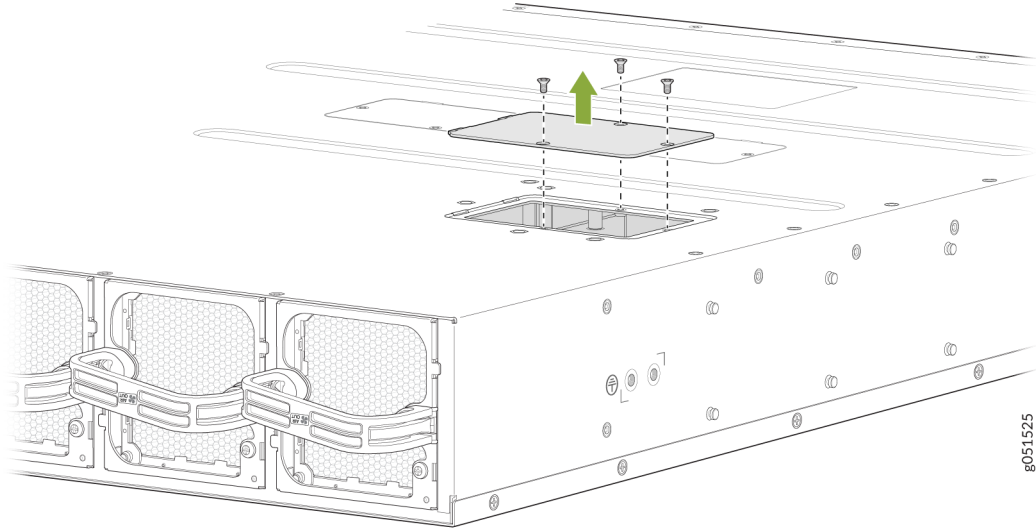
Ensure that you have the following parts and tools available to remove a SATA SSD from a QFX5230-64CD switch:

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

The QFX5230-64CD supports two 100 GB Serial Advanced Technology Attachment (SATA) solid state drives (SSD).The SSDs cannot be installed or removed when the system is up. You must shutdown the system before replacing the SSD. The SSDs are preinstalled in the QFX5230-64CD.

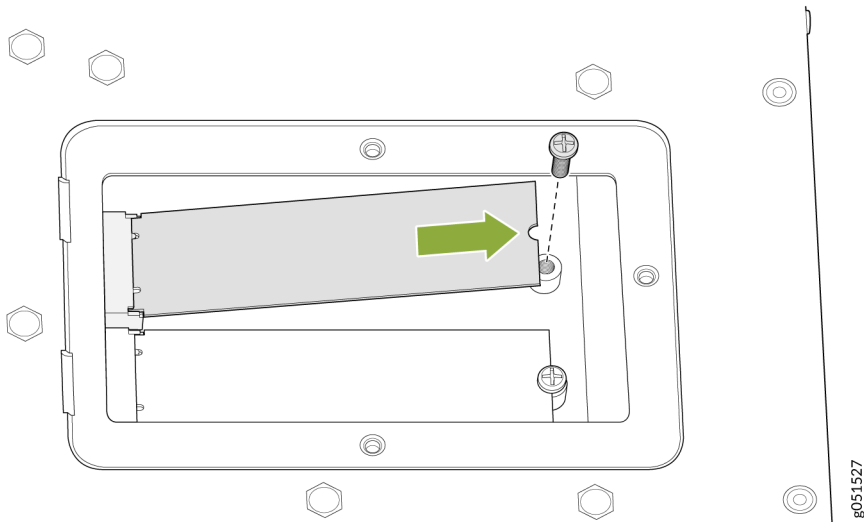
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to the ESD point on the chassis.
3. Turn the switch upside down to see under the chassis and locate the SSD cover plate.
4. Remove the three screws securing the SSD cover plate by using the Phillips (+) screwdriver. See [No Link Title](#).

Figure 45: Removing the SATA SSD Cover Plate



5. Remove the single screw holding the SATA SSD in place and slide the drive out of the plug (see [Figure 46 on page 104](#) and No Link Title).

Figure 46: SATA SSDs



6. Place the SATA SSD in an electrostatic bag or on an antistatic mat.
7. Place the SSD cover plate back on the chassis and tighten the three screws securing the SSD cover plate.

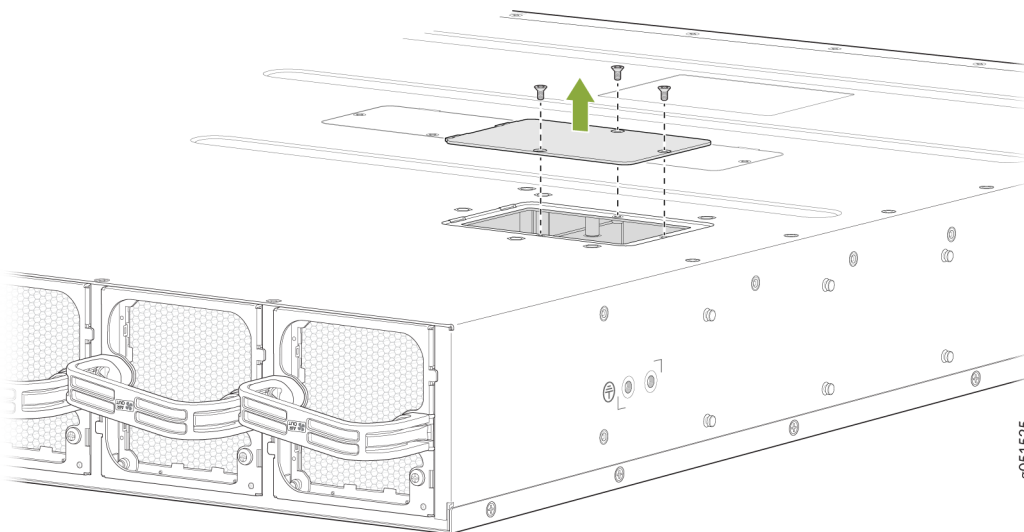
Install a SATA Solid State Drive in a QFX5230-64CD Switch

Before you install an SATA SSD in the device, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see *Prevention of Electrostatic Discharge Damage*).

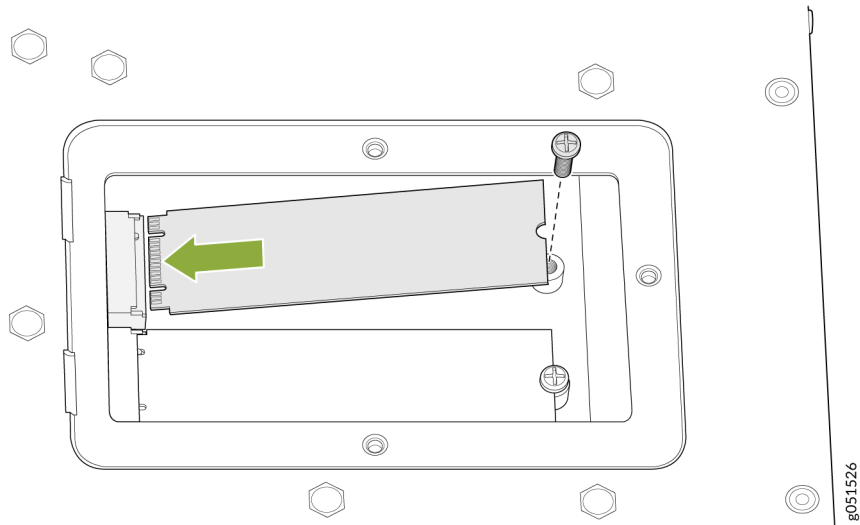
Ensure that you have the following parts and tools available to install an SATA SSD in the QFX5230-64CD switch:

- ESD grounding strap
 - Antistatic bag or an antistatic mat
 - Phillips (+) screwdriver, number 1
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
 2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to the ESD point on the chassis.
 3. Turn the switch upside down to see under the chassis and locate the SSD cover plate.
 4. If not already removed, remove the three screws securing the SSD cover plate by using the Phillips (+) screwdriver. The SSD cover plate is located under the chassis (see [Figure 47 on page 105](#)).

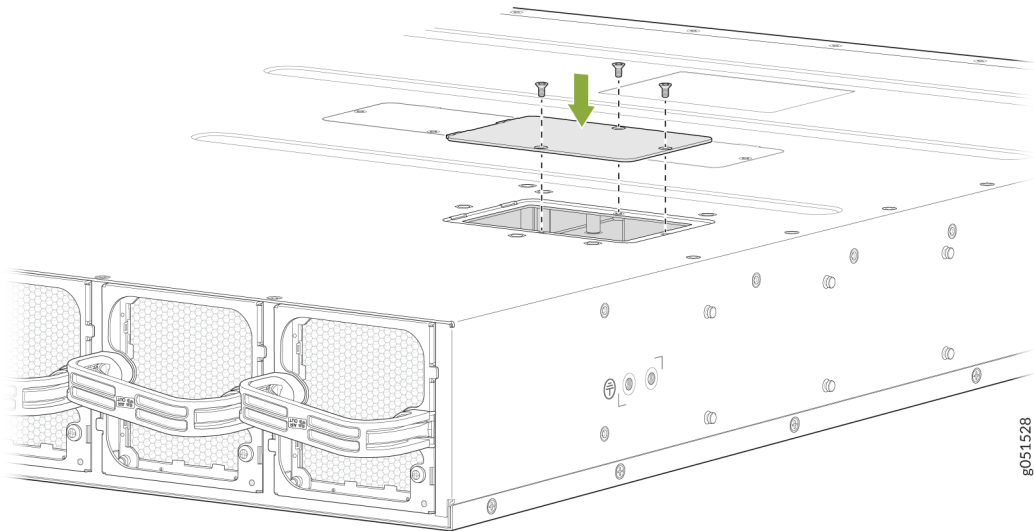
Figure 47: Removing the SATA SSD Cover Plate



5. Slide the drive into the SSD plug and tighten the single screw holding the SATA SSD (see [Figure 48 on page 106](#)).

Figure 48: Installing the SATA SSD

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

Figure 49: Replace the SSD Cover Plate

6

CHAPTER

Troubleshoot Hardware

[Troubleshooting the QFX5230-64CD](#) | 108

Troubleshooting the QFX5230-64CD

IN THIS SECTION

- [QFX5230-64CD Troubleshooting Resources Overview | 108](#)
- [Chassis Alarm Messages | 109](#)

QFX5230-64CD Troubleshooting Resources Overview

To troubleshoot a QFX5230-64CD problem, you can use:

- Junos OS Evo CLI

The CLI is the primary tool for controlling and troubleshooting hardware, Junos OS, 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 QFX5230. For more information, see "[QFX5230-64CD Port Panel](#)" on page 17.

- 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](#).

Chassis Alarm Messages

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

Chassis alarms on QFX5230-64CD devices have two severity levels:

- Major (red)—Indicates a critical situation on the device that has resulted from one of the conditions described in [Table 35 on page 109](#) . A red alarm condition requires immediate action.
- Minor (yellow)—Indicates a noncritical condition on the device that, if left unchecked, might cause an interruption in service or degradation in performance. A yellow alarm condition requires monitoring or maintenance.

[Table 35 on page 109](#) describes the chassis alarm messages on QFX5230.

Junos OS Evolved systems, such as QFX5230, are based on a new alarm infrastructure, not all power supplies and fan alarms are supported. [Table 35 on page 109](#) shows these alarms.

Table 35: Chassis Alarm Messages for QFX5230

Component	Alarm Type	CLI Message	Recommended Action
Fans	Red (major)	Fan Tray <i>fan-tray-number</i> Absent	Install fan modules in the slots where they are absent.
		Fan Tray <i>fan-tray-number</i> Failure	Remove and check fan module for obstructions. Reinsert the fan module. If the problem persists, replace the fan module.
		<i>sensor-location</i> Temp Sensor Too Hot	Check the environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor. If the condition persists, the device might shut down.

Table 35: Chassis Alarm Messages for QFX5230 (Continued)

Component	Alarm Type	CLI Message	Recommended Action
	Yellow (minor)	FAN <i>fan-number</i> Fan Sensor Fail	Remove and check 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.
		<i>sensor-location</i> Temp Sensor Too Warm	Check the environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor.
Power Supplies	Red (major)	PEM <i>pem-number</i> Not Powered	Install a power supply into the empty slot and ensure the power supply is powered.
Temperature sensors	Major (red)	FPC \emptyset Temperature Hot	Check environmental conditions and alarms on other devices. Ensure that environmental factors (such as hot air blowing around the equipment) do not affect the temperature sensor. if the condition persists, the device might shut down.
	Minor (yellow)	FPC \emptyset 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.

Table 35: Chassis Alarm Messages for QFX5230 (Continued)

Component	Alarm Type	CLI Message	Recommended Action
		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 <i>RE number</i> /var partition is full	File storage is at capacity. Reduce unnecessary files to free space.
	Minor (yellow)	RE <i>RE number</i> /var partition is high	File storage is reaching capacity. Reduce unnecessary files to free space.
Management Ethernet interface	Major (red)	Management interface <i>management-interface-name</i> down on <i>node</i>	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 to Obtain a Return Material Authorization | 113](#)

[show chassis alarms](#)

7

CHAPTER

Contact Customer Support and Return the Chassis or Components

[Contact Customer Support to Obtain a Return Material Authorization | 113](#)

[Returning the QFX5230-64CD Chassis or Components | 114](#)

Contact Customer Support to Obtain a Return Material Authorization

If you need to return a device or hardware component to Juniper Networks for repair or replacement, obtain 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.

Returning the QFX5230-64CD Chassis or Components

IN THIS SECTION

- [Locating the Serial Number on a QFX5230-64CD Device or Component | 114](#)
- [Removing the Solid-State Drives for RMA | 117](#)
- [How to Return a Hardware Component to Juniper Networks, Inc. | 117](#)
- [Guidelines for Packing Hardware Components for Shipment | 118](#)
- [Packing a QFX5230-64CD Device or Component for Shipping | 119](#)

Locating the Serial Number on a QFX5230-64CD Device or Component

IN THIS SECTION

- [Locating the Chassis Serial Number ID Label on a QFX5230-64CD Switch | 115](#)
- [Locating the Serial Number ID Labels on QFX5230-64CD FRU Components | 115](#)

If you are returning 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).

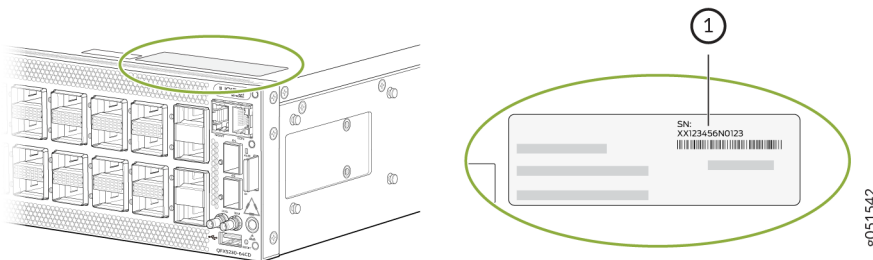
If the switch is operational and you can access the CLI, you can list serial numbers for the switch and for some components with a CLI command. If you do not have access to the CLI or if the serial number for the component does not appear in the command output, you can locate the serial number ID label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

Locating the Chassis Serial Number ID Label on a QFX5230-64CD Switch

You can find the chassis serial number in either the `show chassis hardware` command output or physically on a sticker located on the right side of the QFX5230-64CD port panel. For an example of where to find the serial number ID label on the chassis, see [Figure 50 on page 115](#).

Figure 50: Location of the Serial Number ID Label on a QFX5230-64CD Switch



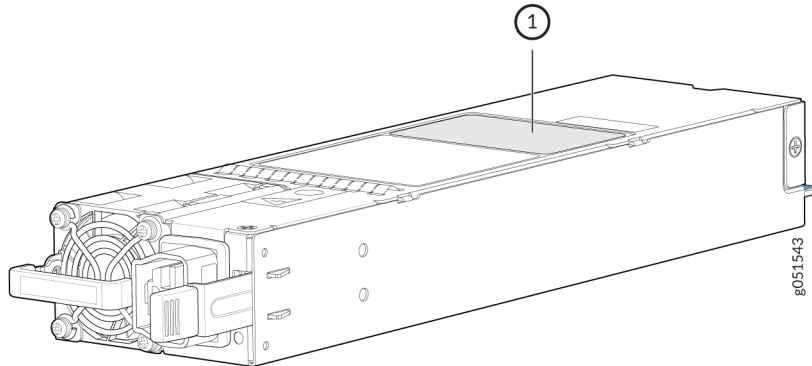
1. Serial Number ID Label

Locating the Serial Number ID Labels on QFX5230-64CD FRU Components

The power supplies and fan modules installed in a QFX5230-64CD 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.

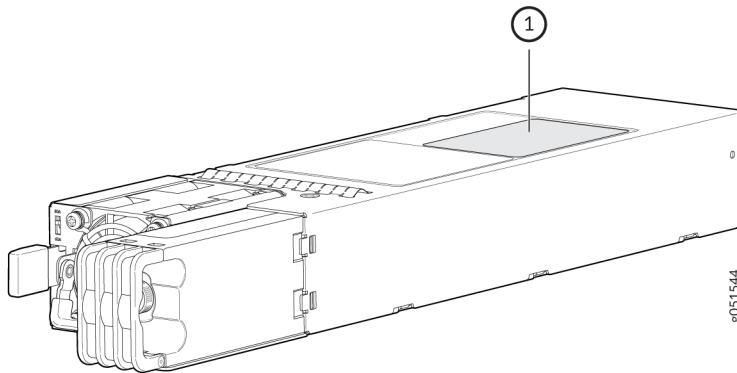
1. AC power supply—The serial number ID label is on the top of the AC power supply.

Figure 51: Serial Number ID Label on a QFX5230-64CD AC Power Supply



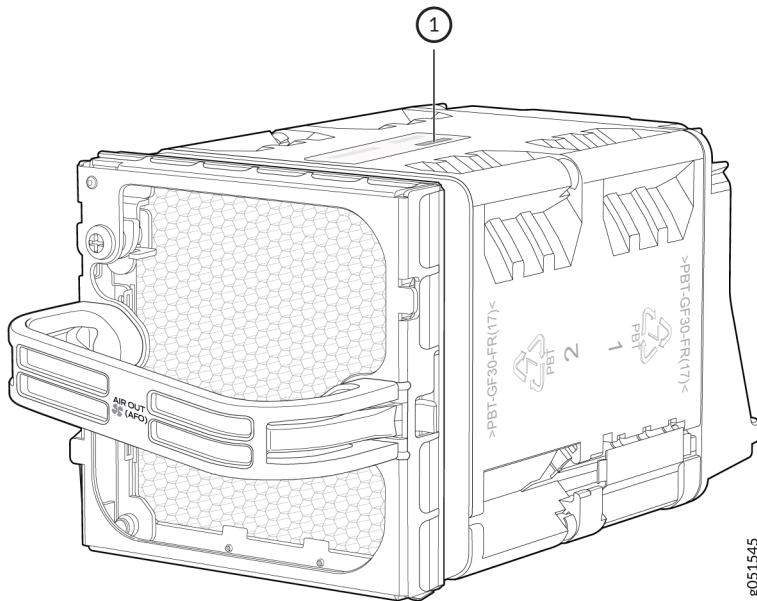
1. Serial Number ID Label
2. DC power supply—The serial number ID label is on the top of the DC power supply.

Figure 52: Serial Number ID Label on a QFX5230-64CD DC Power Supply



1. Serial Number ID Label
3. Fan module—The serial number ID label is on the top of the fan module.

Figure 53: Serial Number ID Label on a QFX5230-64CD Fan Module



1. Serial Number ID Label

Removing the Solid-State Drives for RMA

The QFX5230-64CD models 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, see ["Remove a SATA Solid State Drive from a QFX5230-64CD Switch"](#) on page 103 for information on how to remove the SSDs.

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

If a hardware component fails, please 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.

Packing a QFX5230-64CD Device or Component for Shipping

IN THIS SECTION

- [Packing a QFX5230-64CD Switch for Shipping | 119](#)
- [Packing QFX5230-64CD Components for Shipping | 120](#)

If you are returning a QFX5230-64CD or one of its components to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you pack a QFX5230-64CD 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](#)" on [page 68](#) .

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.

Packing a QFX5230-64CD Switch for Shipping

To pack a QFX5230-64CD for shipping:

1. Power down the switch and remove the power cables.
2. Remove the cables that connect the QFX5230-64CD to all external devices.
3. Remove all field-replaceable units (FRUs) from the switch.

4. Have one person support the weight of the switch while another person unscrews and removes the mounting screws.
5. Remove the switch from the rack or cabinet and place the switch in a large antistatic bag.
6. Place the switch in the shipping carton.
7. Place the packing foam on top of and around the switch.
8. If you are returning accessories or FRUs with the switch, pack them as instructed.
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.

Packing QFX5230-64CD 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 QFX5230-64CD 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](#) | 68

8

CHAPTER

Safety and Compliance Information

[Safety and Compliance Information | 122](#)

[Compliance Statements for NEBS | 122](#)

[Compliance Statements for EMC Requirements | 122](#)

[Compliance Standards for QFX5230-64CD Switches | 124](#)

Safety and Compliance 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 safety information specific to QFX5130-64CD provided in this hardware guide.

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 | 123](#)
- [European Community | 123](#)
- [Israel | 123](#)
- [Japan | 123](#)
- [United States | 124](#)

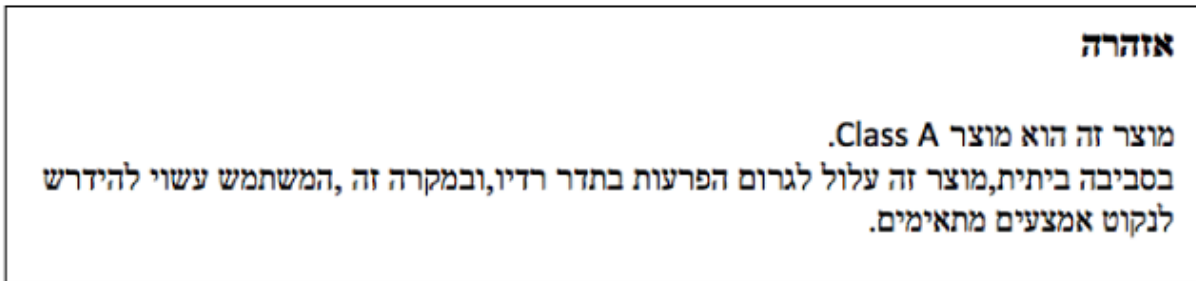
Canada

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

European Community

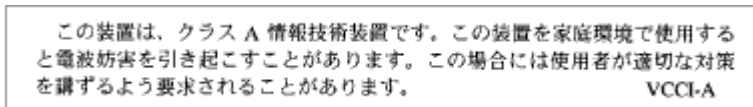
This is a Class A product. In a domestic environment, this product might cause radio interference in which case the user might be required to take adequate measures.

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 QFX5230-64CD Switches

The QFX5230-64CD switches comply with the following standards:

- Safety
 - UL 60950-1:2007 R10.14 Information Technology Equipment
 - CAN/CSA-C22.2 No. 60950-1-07, Amd 1:2011, Amd 2:2014 Information Technology Equipment
 - IEC 62368-1:2014 (2nd Edition) Audio/Video, Information and Communication Technology Equipment (Include all country deviation)
 - IEC 62368-1:2018 (3rd Edition) Audio/Video, Information and Communication Technology Equipment (Include all country deviation)
 - EN 62368-1:2014+A11:2017 Audio/Video, Information and Communication Technology Equipment
 - UL/CSA 62368-1:2019 (3rd edition) Audio/Video, Information and Communication Technology Equipment
 - IEC/EN 60825-1 Safety of Laser Products – Part 1: Equipment classification and requirements
- EMC
 - FCC 47 CFR Part 15ICES-003 / ICES-GENBS EN 55032
 - BS EN 55035EN 300 386 V1.6.1
 - EN 300 386 V2.2.1
 - BS EN 300 386EN 55032

- CISPR 32
- EN 55035
- CISPR 35
- IEC/EN 61000 Series
- IEC/EN 61000-3-2
- IEC/EN 61000-3-3
- AS/NZS CISPR 32VCCI-CISPR 32
- BSMI CNS 15936
- KS C 9835 (Old KN 35)KS C 9832 (Old KN 32)
- KS C 9610
- BS EN 61000 SeriesJuniper Inductive GND Surge (IG Surge)
- NEBS
 - NEBS - GR-1089-CORE, Issue 8
 - DC NEBS GR 3160 standard