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QFX5210 Switch Hardware Guide

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QFX5210 Switch Hardware Guide

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.

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8 Safety and Compliance Information

About This Guide

Use this guide to plan, install, perform initial software configuration, perform routine maintenance, and to troubleshoot QFX5210 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

IN THIS CHAPTER

Fast Track to Rack Installation and Power

SUMMARY

This procedure walks you through the most basic steps for installing your QFX5210 switch in a rack and connecting it to power.

IN THIS SECTION

You can install the QFX5210-64C switch in a four-post rack or cabinet using the mounting kit provided with the switch. We'll walk you through the steps to install the QFX5210-64C switch on a four post 19-in. rack or cabinet.

Before you install the switch, review:

- "QFX5210 Site Guidelines and Requirements" on page 52.
- General Safety Guidelines and Warnings.
- "Unpacking a QFX5210" on page 77.

Mounting a QFX5210 in a Rack or Cabinet

IN THIS SECTION

You can mount all QFX5210 switches on a four post 19-in. rack or cabinet using the mounting kit provided with the switch.

For four post rack or cabinet installations, the mounting kit contains two front mounting rails with two matching rear mounting blades. This configuration allows either end of the switch to be mounted flush with the rack and still be adjustable for racks with different depths.

The mounting kit for the QFX5210-64C has mounting rails, blades, and brackets for the four-post configuration.

(The remainder of this topic uses “rack” to mean “rack or cabinet.”) The front and rear rack rails must be spaced between 28 in. (71.1 cm) and 36 in. (91.4 cm) front to back.

This topic describes:

Before You Begin Rack Installation

Before you begin mounting a QFX5210 switch in the rack or cabinet:

1. Ensure that you understand how to prevent electrostatic discharge (ESD) damage. See "Prevention of Electrostatic Discharge Damage" on page 160.
2. Verify that the site meets the requirements described in "QFX5210 Site Guidelines and Requirements" on page 52.
3. Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
4. Read "General Site Guidelines" on page 54, and "QFX5210 Installation Overview" on page 75..
5. Remove the switch from the shipping carton (see "Unpacking and Mounting the QFX5210" on page 77).
6. Ensure that you have the following parts and tools available to mount the switch in a rack:
   - ESD grounding strap (not provided).
   - Blades, rails, or brackets (provided).

     WARNING: Only use Juniper-provided rack mounting kits to ensure proper ventilation and cooling to the chassis.

     - For four-post installations:
       - One pair of rear mounting blades. These mounting blades support the rear of the chassis and must be installed (provided).
       - One pair of front mounting rails. The mounting blades slide into the mounting rails to support the switch (provided).
       - Screws to secure the mounting rails to the chassis (provided).
         - Twelve M4 flat-head screws for attaching the mounting bracket to the chassis.
       - Eight screws to secure the chassis and rear installation blades to the rack (not provided).
   - Appropriate screwdriver for the mounting screws (not provided).

- Two power cords with plugs appropriate to your geographical location (provided).
- RJ-45 cable and RJ-45 to DB-9 serial port adapter (not provided).
- Management host, such as a PC laptop, with a serial port (not provided).

7. Register the QFX5210. See"Update Base Installation Data" on page 79

Optional equipment: Grounding cable kit with bracket, lug, and three nuts with integrated washers.

WARNING: A QFX5210 must be supported at all four corners. Mounting the chassis using only the front brackets will damage the chassis and can result in serious bodily injury.

CAUTION: All QFX5210 require two people for installation, one person to lift the device into place and another person to attach it to the rack. If you are installing the QFX5210 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.

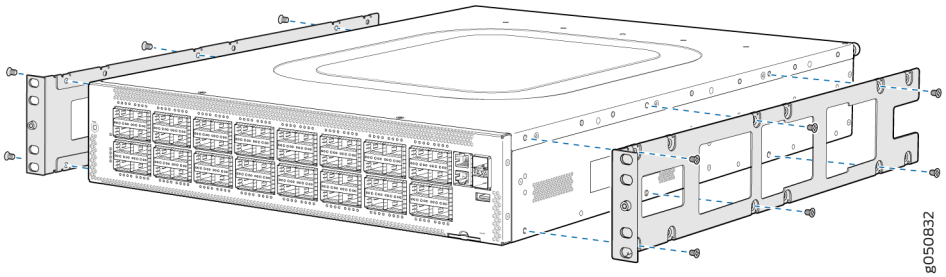
CAUTION: If you are mounting multiple devices on a rack, mount the device in the lowest position of the rack first. Proceed to mount the rest of the devices from the bottom to the top of the rack to minimize the risk of the rack toppling.

Four Post Procedure

To mount the switch on four posts in a rack using the provided mounting kit:

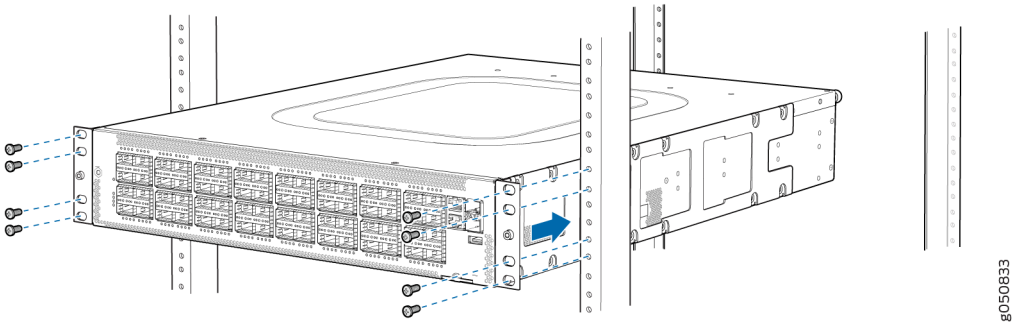
1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.
2. Decide whether the Field Replaceable Unit (FRU) end of the switch or the port end is to be placed at the front of the rack. Position the switch in such a manner that the **AIR IN** labels on components are next to the cold aisle and **AIR OUT** labels on components are next to the hot aisle.
3. Align the holes in the mounting rail with the holes on the side of the chassis. SeeFigure 1 on page 5 to see the proper alignment for the QFX5210.

Figure 1: Attaching Mounting Rails to the QFX5210



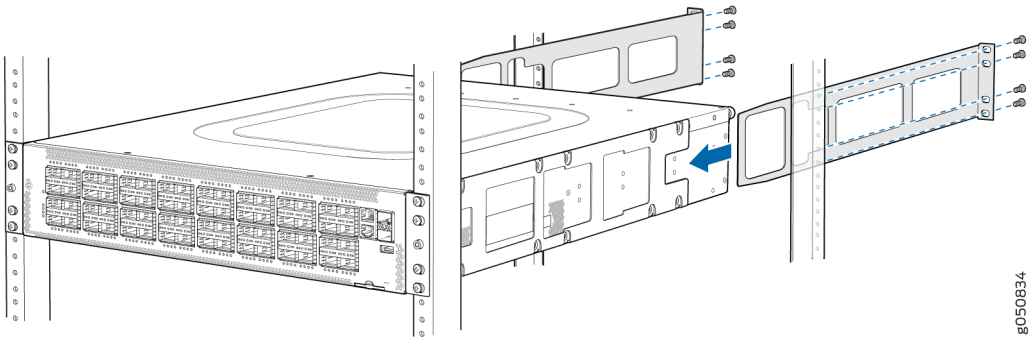
4. Attach the mounting rail to the switch using the mounting screws. Tighten the screws.
5. Repeats steps 3 and 4 on the opposite side of the switch.
6. Have one person grasp both sides of the switch, lift it, and position it in the rack so that the front bracket is aligned with the rack holes.
7. Have a second person secure the front of the switch to the rack using four mounting screws (and cage nuts and washers if your rack requires them.) Tighten the screws. See Figure 2 on page 5 for an example of attaching the chassis with mounting rail to the mounting rack.

Figure 2: Attach Chassis to the Mounting Rack



8. Continue to support the switch while sliding the rear mounting-blades into the channel of the side mounting-rails and securing the blades to the rack. Use the four mounting screws (and cage nuts and washers if your rack requires them) to attach each blade to the rack. (Use eight front-mounting screws for the QFX5210.)Tighten the screws. See Figure 3 on page 6.

Figure 3: Slide Mounting Blade into Mounting Rail



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

RELATED DOCUMENTATION

- Rack-Mounting and Cabinet-Mounting Warnings | 144
- Connecting the QFX5210 | 83
- Connecting the QFX5210 to Ground | 83

Connect to Power

IN THIS SECTION

- Connecting the QFX5210 to Ground | 6
- Connecting AC Power to a QFX5210 | 8

To connect the QFX5210 switch to AC power, you must perform the following tasks:

Connecting the QFX5210 to Ground

You must install the QFX5210 in a restricted-access location and ensure that the chassis is always properly grounded. The QFX5210 has a two-hole protective grounding terminal provided on the chassis. See Figure 4 on page 8. Under all circumstances, use this grounding connection to ground the chassis. For AC-powered systems, you must also use the grounding wire in the AC power cord along with the

two-hole grounding lug connection. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.

CAUTION: If an external ground connection is required, ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable that you supply. Using a grounding cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit).

NOTE: Mount your switch in the rack or cabinet before attaching the grounding lug to the switch. See "Unpacking and Mounting the QFX5210" on page 77.

Ensure that you have the following parts and tools available:

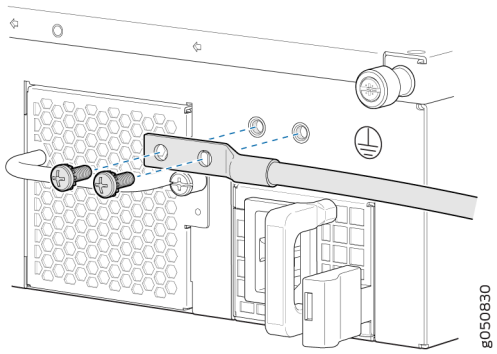
- Grounding cable for your QFX5210—The grounding cable must be 10 AWG (5 mm^2), minimum 90° C wire, or as permitted by the local code.
- Grounding lug for your grounding cable—The grounding lug required is a Panduit LCD10-10A-L or equivalent (not provided).
- Two #10-32 UNF screws and washers (not provided).
- Screwdriver appropriate for the #10-32 UNF screws (not provided).

An AC-powered QFX5210 switch chassis gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using an AC power cord appropriate for your geographical location. See "AC Power Cord with Type C15 Coupler Specifications" on page 41.

To connect earth ground to a QFX5210:

1. Secure the protective earthing terminal bracket to the FRU panel of the QFX5210 chassis with two #10-32 UNF screws. The posts on the protective earthing terminal bracket should point to the left. See Figure 4 on page 8 .

Figure 4: Connecting a Grounding Cable to a QFX5210-64C



2. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.
3. Place the grounding lug attached to the grounding cable over the protective earthing terminal on the protective earthing terminal bracket.
4. Secure the grounding lug to the protective earthing terminal with the two washers and screws.
5. 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.

SEE ALSO

General Safety Guidelines and Warnings | **136**

Grounded Equipment Warning | **148**

Connecting AC Power to a QFX5210

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

Before you begin connecting AC power to the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).
- Ensure that you have connected the switch chassis to earth ground.

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

To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. For instructions on connecting earth ground, see "Connecting the QFX5210" on page 83. The switch gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location (see "QFX5210 Power System" on page 38).

- Install the power supply in the chassis. For instructions on installing a power supply in a QFX5210, see "Maintaining QFX5210 Power Supplies" on page 101.

The QFX5210 is shipped from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU) when the second power supply is installed and running. You can install replacement power supplies in the two slots next to the fan modules without powering off the switch or disrupting the switching function.

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

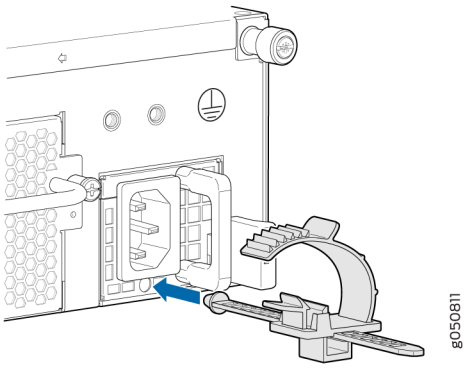
To connect AC power to a QFX5210:

1. Attach the grounding strap to your bare wrist and to a site ESD point.
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure. If only one power supply is installed, ensure a that blank cover panel is installed over the second power supply slot.
3. Locate the power cord or cords shipped with the switch; the cords have plugs appropriate for your geographical location. See "AC Power Cord with Type C15 Coupler Specifications" on page 41.

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

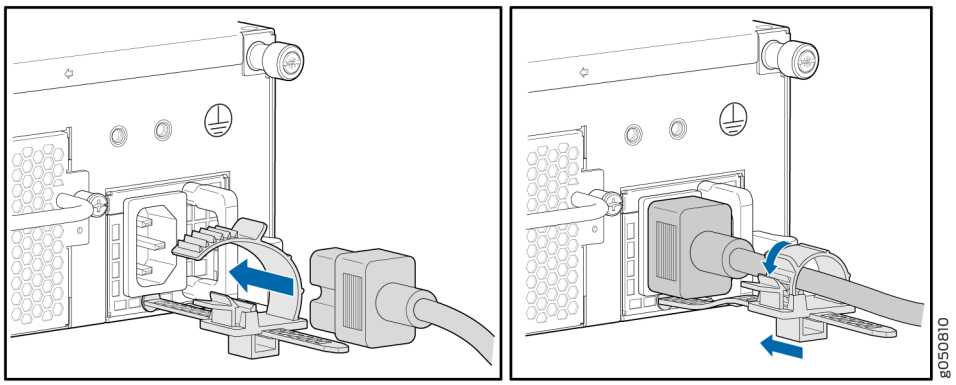
4. Attach a power cord retainer to each AC power supply. See Figure 5 on page 10.

Figure 5: Attaching a Cord Retainer to the AC Power Supply



5. Thread the coupler end of the power cords through the opening of the cord retainer.
6. Connect each power supply to the power sources. Insert the coupler end of the power cord into the AC power cord inlet on the AC power supply faceplate.
7. Push down the power cord retainer to lock the retainer down over the power cord.

Figure 6: Connecting AC Power



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

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

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

    If the amber fault LED is lit, remove power from the power supply, and replace the power supply (see "Removing a Power Supply from a QFX5210" on page 101). Do not remove the power supply

until you have a replacement power supply ready: the power supplies or a blank cover panel must be installed in the switch to ensure proper airflow.

> ⚠ **CAUTION**: Replace a failed power supply with a blank panel or new power supply within 1 minute of removal to prevent chassis overheating.

SEE ALSO

QFX5210 AC Power Supply | 38

QFX5210 Power Supply LEDs | 46

Onboard, Configure, and Monitor QFX5210

SUMMARY

This topic provides you with pointers to onboard, configure, and monitor QFX5210 switches using Juniper Apstra or CLI (configure only).

You can use Juniper Apstra to onboard, configure, and monitor the QFX5210 switch. See Table 1 on page 11 for more information.

Table 1: Onboard, Configure, and Monitor QFX5210 Using Juniper Apstra

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

You can configure the QFX5210 switch using the CLI. See Table 2 on page 12 for more information.

Table 2: Configure QFX5210 Using the CLI

If You Want To	Then
Customize the basic configuration	See "Performing the Initial Software Configuration for the QFX5210" on page 93
Configure supported software features on QFX5210	See Software Documentation
Stay up-to-date about new and changed features, and known and resolved issues	See Junos OS Release Notes

2

CHAPTER

Overview

IN THIS CHAPTER

QFX5210 System Overview

IN THIS SECTION

QFX5210 Switch Description

IN THIS SECTION

The QFX5210 line offers line-rate, low-latency 10/25/40/100GbE switches for building large IP fabrics. QFX5210 Switches are an optimal choice for spine-and-leaf IP fabric deployments as well as metro use cases.

This topic covers:

QFX5210-64C Hardware

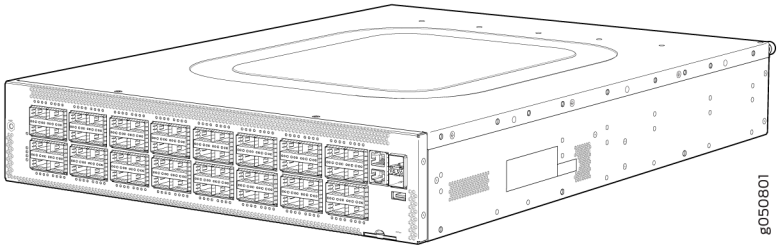
The QFX5210-64C is a flexible 2 U standalone switch designed for spine-leaf deployments that need high-port density. The routing engine and control plane are driven by the 2.2 GHz quad-core Intel® Xeon® CPU with 16 GB of memory and an enterprise grade 100 GB solid-state drive (SSD) for storage.

As shown in Figure 7 on page 15, the QFX5210-64C is a 100 Gigabit Ethernet spine and leaf switch that supports both quad small form-factor pluggable (QSFP+), 100-Gbps QSFP+ (QSFP28) transceivers,

and break out cables in the 64 QSFP28 sockets. The ports **0** through **63** can be configured as either uplinks or as access ports. The QSFP28 ports are configured as 100-Gigabit Ethernet ports by default, but can also be configured to speeds of 50, 40, 25, or 10-Gigabit Ethernet. There are also two dedicated SFP+ ports on the port panel.

The QFX5210-64C comes standard with redundant fans and redundant power supplies. The switch can be ordered with either ports-to-FRUs or FRUs-to-ports airflow and with AC or DC power supplies.

Figure 7: QFX5210-64C Switch



Benefits of the QFX5210-64C Switch

The QFX5210-64C is designed for cloud customers who can benefit from:

- A solution that can future proof and provide investment protection
- Having open and standards based switches in a multi-vendor network
- Simplified installation and upgrades by using ZTP and ISSU

Channelization

Ports default to 100-Gigabit Ethernet. Port speeds of 40 Gbps or 100 Gbps are automatically set when the QSFP+ or QSFP28 transceiver is inserted into the port or on reboot. Channelization is only allowed in FlexiPic system mode. Some ports have restrictions on the supported channelization speed. The combination of channelized and non-channelized ports cannot go above the system limit of 128 interfaces. For full details on channelization, see "QFX5210-64C Port Panel" on page 20 .

- When the port is configured for 40-Gigabit Ethernet and a 4x10G breakout cable is detected in ports **0** through **31**, the system converts the port into 4 independent 10-Gigabit Ethernet ports
- When the port is configured for 100-Gigabit Ethernet and a 2x50G breakout cable is detected, the system converts the port into 2 independent 50-Gigabit Ethernet ports

- When the port is configured for 100-Gigabit Ethernet and a 4x25G breakout cable is detected in ports **0** through **31**, the system converts the port into 4 independent 25-Gigabit Ethernet ports

System Software

QFX Series devices use the Junos operating system (OS), which is installed on a one of the QFX5210 switch's internal solid-state flash drive. The same Junos OS code base that runs on QFX5210 switches also runs on all Juniper Networks EX Series switches, and M Series, MX Series, and T Series routers.

The QFX5210-64C switch is supported on Junos OS Release 18.1R1 and later.

Software features are categorized into three tiers: base, premium, and advanced:

- Junos OS base features such as Layer 2 and Layer 3 switching, multicast, automation, programmability, Zero Touch Provisioning (ZTP), and basic monitoring are enabled by default from the factory.
- Junos OS premium features such as Border Gateway Protocol (BGP), Intermediate System-to-Intermediate System (IS-IS), and Virtual Extensible Local Area Network (VXLAN) require a QFX5K-C2-PFL license on each QFX5210 switch to use these features.
- Junos OS advanced features include Multiprotocol Label Switching (MPLS) in addition to all of the premium features. A QFX5K-C2-AFL license is required on each QFX5210 switch to use these features.

If a premium or advanced feature is configured on the QFX5210 without a valid license, an alarm is raised and system log (syslog) messages are generated.

For more information about which features are supported on QFX Series devices, see Feature Explorer.

You manage the switch using the Junos OS command-line interface (CLI), accessible through the console and out-of-band management ports on the device.

SEE ALSO

QFX5210-64C Port Panel | **20**

QFX5210 Hardware Component Overview

The QFX5210 supports the components in listed in alphabetic order.

Table 3: QFX5210 Hardware Components

Component	Spare Juniper Model Number	CLI Output
Chassis	QFX5210-64C-CHAS	QFX5210-64C
Fan module	QFX5210-FANAFI (FRUs to ports airflow) QFX5210-FANAFO (Ports to FRUs airflow)	
Power supplies	JPSU-1100W-AC-AFI (FRUs to ports airflow) JPSU-1100W-AC-AFO (Ports to FRUs airflow) JPSU-1100W-DC-AFI (FRUs to ports airflow) JPSU-1100W-DC-AFO (Ports to FRUs airflow)	AC AFI 11000W PSU AC AFO 11000W PSU DC AFI 11000W PSU DC AFO 11000W PSU
Rack mount kit	QFX5210-4PST-RMK	Not applicable

SEE ALSO

QFX5210 Field-Replaceable Units | 18

QFX5210 Component Redundancy

The following hardware components provide redundancy on a QFX5210 switch:

- Power supplies—The QFX5210 switch has two power supplies. Each power supply provides power to all components in the switch. If two power supplies are installed, the two power supplies provide full power redundancy to the device. If one power supply fails or is removed, the second power supply balances the electrical load without interruption.

  To provide power redundancy to the system both power supplies must be installed. Connect power source feed A to one power supply and power source feed B to the second power supply.

  CAUTION: Do not connect feed A and feed B to the same power supply input terminal.

- Cooling system—The QFX5210 has four fan modules. If a fan module fails and is unable to keep the QFX5210 switch within the desired temperature thresholds, chassis alarms occur and the QFX5210 switch can shut down.

QFX5210 Field-Replaceable Units

Field-replaceable units (FRUs) are components that you can replace at your site. The QFX5210 FRUs are hot-insertable and hot-removable–you can remove and replace one of them without powering off the switch or disrupting the switching function.

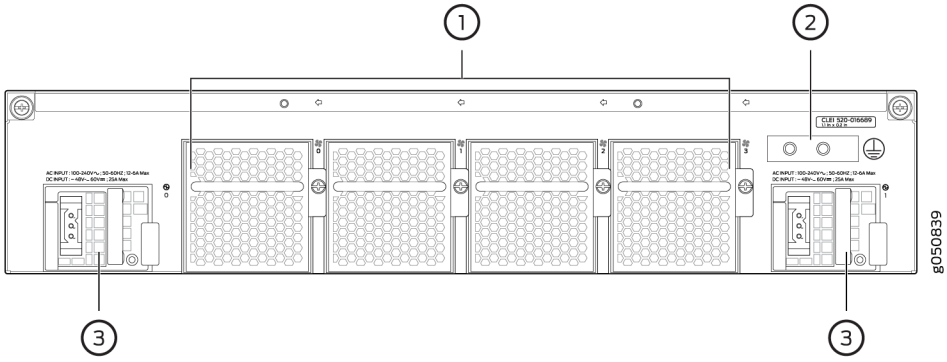
CAUTION: Replace a failed power supply with a blank panel or new power supply within one minute of removal to prevent chassis overheating. The switch continues to operate with only one power supply running.

Table 4 on page 18 lists the FRUs for the QFX5210 device and actions to take before removing them. See Figure 8 on page 19 for the location of power supplies and fan modules.

Table 4: Required Actions Before Removing a FRU from a QFX5210

FRU	Required Actions Before Removal
Power supplies (2)	None.
Fan modules (4)	None.
Optical transceivers	None. We recommend that you disable the interface using the **set interfaces *interface-name* disable** command before you remove the transceiver. See *Disconnecting a Fiber-Optic Cable from a QFX Series Device*.

Figure 8: QFX5210 FRU Panel



1– Fan modules (4)	3– Power supplies (4)
2– Protective earthing terminal	

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.

SEE ALSO

Maintaining QFX5210 Fan Modules | **98**

Maintaining QFX5210 Power Supplies | **101**

RELATED DOCUMENTATION

QFX5210 Cooling System | **32**

QFX5210 Power System | **38**

QFX5210-64C Port Panel

IN THIS SECTION

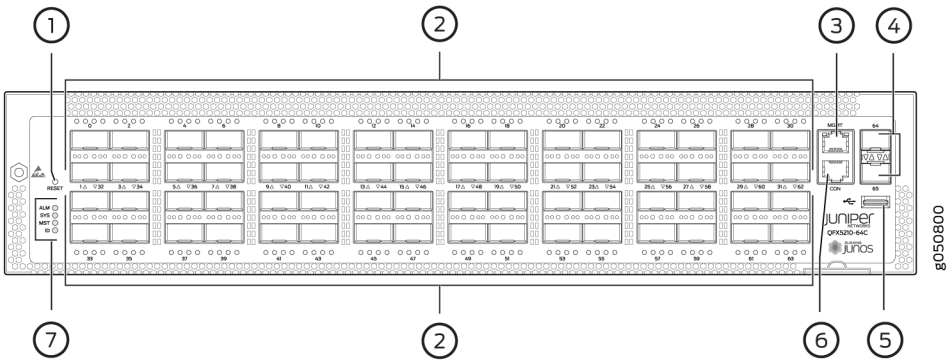
QFX5210-64C Port Panel Overview

IN THIS SECTION

The port panel of the QFX5210-64C has 64 quad small-form factor pluggable plus (QSFP28) ports for port configuration speeds of 100 -Gigabit Ethernet or 40-Gigabit Ethernet. It also has two small-form factor plus (SFP+) ports for 1-Gigabit Ethernet or 10-Gigabit Ethernet interfaces. The QSFP28 ports can be configured either as 100-Gigabit Ethernet ports (default) or as 40-Gigabit Ethernet ports. The ports auto-sense the transceiver type and set the speed accordingly. Any of the 64 ports **0** through **63** can be configured as uplinks or as access ports.

Figure 9 on page 21 shows the port panel of the QFX5210-64C.

Figure 9: QFX5210-64C Port Panel



1– Reset button	5– USB port
2– 64 QSFP28 ports and 2 SFP+ ports	6– Console port
3– Management port	7– Chassis alarm LEDs
4– 10-Gigabit Ethernet SFP+ ports	

Network Ports

Network device ports (**0** through **31**) support:

- 100-Gbps QSFP28 transceivers
- 40-Gbps QSFP+ transceivers
- QSFP28 direct attach copper (DAC) cables
- QSFP+ DAC cables
- QSFP+ to SFP+ DACBO cables (40 Gbps breaks out to 10 Gbps)
- QSFP28 to QSFP+ DACBO cables (100 Gbps breaks out to 25 Gbps)

Network device ports (**32** through **63**) support:

- 100 Gbps QSFP28 transceivers
- 40 Gbps QSFP+ transceivers
- QSFP28 direct attach copper (DAC) cables
- QSFP+ DAC cables

CAUTION: High wattage optics (greater than 3.5 W) are only supported in ports **32** to **63** on QFX5210-64C-AFI. There is no restriction on high wattage optics on QFX5210-64C-AFO.

NOTE: On QFX5210-64C switches, it takes 20-30 seconds to bring down the interfaces using `set interface 0/0x disable` command when you install a 64 x QSFP-100GBASE-LR4-T2 optical transceiver.

Channelizing Interfaces

The method of channelizing QFX5210-64C ports and the behavior of the ports and interfaces is Junos OS release dependent. For switches running Junos OS releases before Junos OS 19.1R1, see "Channelization on QFX5210-64C Running Initial Junos Releases" on page 22. For switches running Junos OS 19.1R1 and later, see "Channelization on QFX5210-64C Running Junos OS 19.1R1 and Later" on page 23.

NOTE: If a QFX5210-64C is fully populated with optics and is using 25 Gbps or 10 Gbps channelization, it can take up to 7 minutes for the ports to link.

Channelization on QFX5210-64C Running Initial Junos Releases

The QFX5210-64C initial offering ran Junos OS 18.1R1. Until the behavior change in 19.1R1, the 64 ports are divided into two ranges:

- Lower order ports (**0**–**31**)
- Higher order ports (**32**–**63**)

When a lower port is channelized, the corresponding higher port is disabled to regulate the number of allowed phy ports to 128. For example, port **0** disables port **32** and port **31** disables port **63**. See Table 5 on page 23.

- All 64 ports (**0** to **63**) can operate as either 40-Gigabit Ethernet or 100-Gigabit Ethernet.
- When ports **0** through **31** are configured for 40-Gigabit Ethernet and a 4x10G breakout cable is inserted, the system converts the port into 4 independent 10-Gigabit Ethernet ports. Ports **32** to **63** are not eligible for 4x10G breakout.
- When ports **0** through **31** are configured for 100-Gigabit Ethernet and a 4x25G breakout cable is detected, the system converts the port into 4 independent 25-Gigabit Ethernet ports. When a 2x50G

breakout cable is detected, the system converts the port into 2 independent 50-Gigabit Ethernet ports.

- When ports **32** through **63** are configured for 100-Gigabit Ethernet and a 2x50G breakout cable is detected, the system converts the port into 2 independent 50-Gigabit Ethernet ports.

Port combinations can be mixed up to the system maximum of 128 phy ports.

> ⚠ **CAUTION**: Changing the channelization mode causes the FPC to reboot. Because there can be a slight loss of data while the FPC reboots, we recommend that you only configure the changes during a maintenance window.

To channelize the ports, manually configure the port speed using the `set chassis fpc 0 pic 0 port` *`port-number`* `channel-speed` *`speed`* command, where the speed can be set to 10G, 25G, 40G, 50G, or 100G.

Table 5: Supported Speeds for Junos Releases Up to Junos OS 19.1R1

Mode	Ports **0** to **31**	Ports **32** to **63**
Default, not channelized	40 Gbps, 100 Gbps	40 Gbps, 100 Gbps
Channelized	10 Gbps, 25 Gbps, 40 Gbps, 50 Gbps, 100 Gbps	40 Gbps, 50, Gbps, 100 Gbps

Channelization on QFX5210-64C Running Junos OS 19.1R1 and Later

Beginning in Junos OS 19.1R1, system mode configuration is no longer necessary to channelize ports. Systems upgrading to this release and later ignore previous system mode settings.

- Dechannelized ports or clear ports behavior

  All 64 ports (**0** to **63**) auto-sense the transceiver speed and set the port speed to either 40 Gbps or 100 Gbps. The default port speed is 100 Gbps. No ports are channelized.

- Channelized behavior

  You can channelize ports with QFX5210-64C; however the channelization is not restricted only to the first 32 front panel ports. It is better to use ports of the lower order to easily calculate ports that are used and unused. Overall, QFX5210-64C supports 64 physical ports that are mapped to 128 BCM ports and these internal ports are divided into 4 blocks.

Since each block accommodates 32 logical ports, each block is mapped with 32 logical ports and 16 user ports. You can channelize 8 user ports per pipe (4X25G or 4X10G), which utilizes 32 logical ports in that pipe. To achieve this, disable the required higher-order user ports on that pipe.

You can use these steps to calculate this easily:

- The first five ports that are channelized utilize all the BCM ports, and leave one free logical port; also doesn't disable any ports.
- From the sixth port that gets channelized, every new port which gets channelized consumes four extra logical ports. In this case, the first higher-order physical ports that are extra, get disabled.

Figure 10: Improved Flexible Port Channelization Blocks

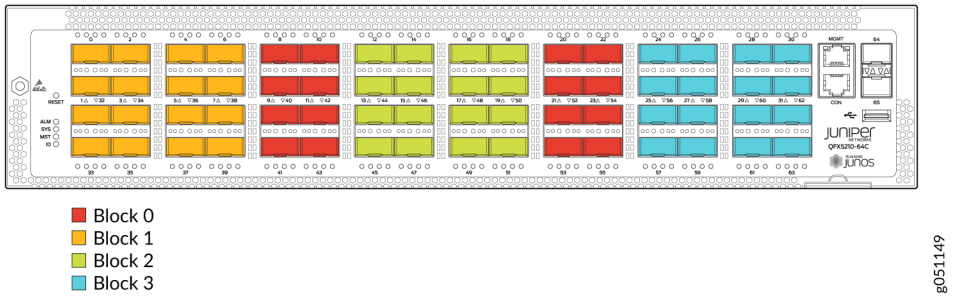


Table 6: Example - To channelize five ports (ports 0 - 4) on port block 1:

0	1	2	3	4	5	6	7
32	33	34	35	36	37	38	39

- No ports are disabled and one logical port is free.
- Ports (5 to 7, 34 to 39) can be used as 40G or 100G interfaces.

Table 7: Example - To channelize six ports (ports 0 - 5) on port block 1:

0	1	2	3	4	5	6	7
32 (disabled)	33 (disabled)	34	35	36	37	38	39

- Six channelized ports utilize 24 logical ports.

- Ports in the higher order (32 and 33) get are disabled and the eight remaining ports (6,7, and 34 to 39) can be used as 40G or 100G interfaces.

Table 8: Example - To channelize seven ports (ports 0 - 6) on port block 1:

0	1	2	3	4	5	6	7
32 (disabled)	33 (disabled)	34 (disabled)	35 (disabled)	36 (disabled)	37	38	39

- Seven channelized ports utilize 28 logical ports.
- Ports in the higher order (32 to 36) get disabled and the four remaining ports (7 and 37 to 39) can be used as 40G or 100G interfaces.

Table 9: Example - To channelize eight ports (ports 0 - 7) on port block 1:

0	1	2	3	4	5	6	7
32 (disabled)	33 (disabled)	34 (disabled)	35 (disabled)	36 (disabled)	37 (disabled)	38 (disabled)	39 (disabled)

- Eight channelized ports utilize 32 logical ports.
- Ports in the higher order (32 to 39) get disabled and no remaining ports can be used as 40G or 100G interfaces.
- **NOTE**: Use the lower-order ports (0-31) for port channelization and expect all higher-order ports (32-63) to get disabled when you use eight channelized ports per block.

QFX5210 Network Port LEDs

The Link/Activity LED configuration for QFX5210 switches use bi-colored LEDs. The link LED indicates link activity or a fault. See Table 10 on page 26.

Table 10: QFX5210 Network Ports LEDs

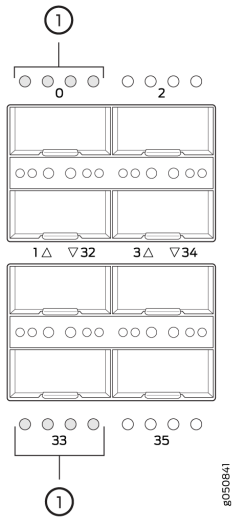
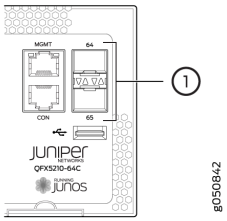
Port Type	Indicators	Location
QSFP28 for 40 Gbps, 100 Gbps speeds and breakouts	Channelization Link Status	There are four bi-color LEDs for each QSFP+ port. For 100 Gbps speeds, only the first LED is lit when the interface is configured for 100-Gigabit Ethernet and connected to a QSFP28 transceiver. All four LEDs are lit when the interface is configured for 10-Gigabit Ethernet or 25-Gigabit Ethernet and the port is connected using a 40-Gigabit optical splitter cable or a copper DACBO cable. 
SFP+	Link Status	There are two bi-color LEDs for each SFP+ port. 

Table 11 on page 27 describes how to interpret the Link/Activity QSFP28 port LEDs.

Table 11: QFX5210-64C QSFP28 Network Port LEDs

Color	State	QSFP28 Description
Unlit	Off	The port is administratively disabled, there is no power, the link is down, or there is a fault.
		When configured for 25-Gigabit Ethernet, the LED remains unlit only if all four of the 25-Gigabit Ethernet QSFP+ breakout links are down.
Green	On steadily	A link is established, but there is no link activity.
		When configured for 25-Gigabit Ethernet, the LED is lit green when at least one of the four 25-Gigabit Ethernet QSFP+ breakout links is established.
	Blinking	A link is established, and there is link activity.
		When configured for 25-Gigabit Ethernet, the LED is lit green when at least one of the four 25-Gigabit Ethernet QSFP+ breakout links is established.

NOTE: Beacon is not supported on a per-port basis on QSFP28 ports.

Table 12 on page 27 describes how to interpret the Link/Activity SFP+ port LEDs.

Table 12: QFX5210-64C SFP+ Port LEDs

Color	State	SFP+ Description
Unlit	Off	The port is administratively disabled, there is no power, the link is down, or there is a fault.
Green	On steadily	A link is established, but there is no link activity.
	Blinking	A link is established, and there is link activity.

Table 12: QFX5210-64C SFP+ Port LEDs *(Continued)*

Color	State	SFP+ Description
Amber	Blinking	The beacon function is enabled on the port.

RELATED DOCUMENTATION

- Connecting the QFX5210 | **83**

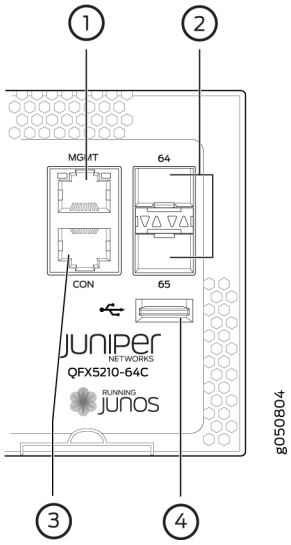
QFX5210 Management Panel

IN THIS SECTION

QFX5210 Management Panel Overview

The management panel of the QFX5210 switch is next to the port panel, see Figure 11 on page 29 for the components found on the management panel.

Figure 11: QFX5210 Management Panel Components



1– em0–RJ-45 (1000 Base-T) management Ethernet port (**C0**)	3– RJ-45 console port to support RS-232 serial ports (**CON**))
2– SFP+ ports	4– USB 2.0 port

SEE ALSO

- QFX5210 Field-Replaceable Units | **18**
- USB Port Specifications for the QFX Series | **72**
- QFX5210 Cooling System | **32**
- QFX5210 Power System | **38**

QFX5210 Management Port LEDs

Table 13 on page 29 describes the management port LEDs.

Table 13: QFX5210 Management Port LEDs

LED	Color	State	Description
Link/Activity	Unlit	Off	No link is established, there is a fault, or the link is down.

Table 13: QFX5210 Management Port LEDs *(Continued)*

LED	Color	State	Description
	Green	On steadily	A link is established, but there is no link activity.
		Blinking or flickering	A link is established, and there is link activity.
Status	Unlit	Off	Either the port speed is 10 M or the link is down.
	Green	On steadily	The port speed is 1000 M.
	Amber	On steadily	The port speed is 100 M.

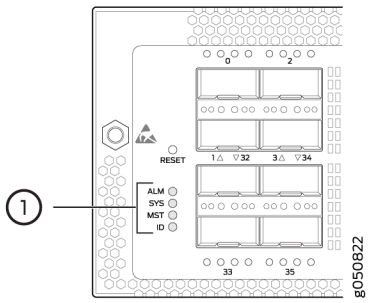
SEE ALSO

Connect a Device to a Network for Out-of-Band Management | 85

QFX5210 Chassis Status LEDs

The QFX5210 switch series has four status LEDs next to the management ports (see Figure 12 on page 30).

Figure 12: QFX5210 Chassis Status LEDs



1– Status LEDs	

Table 14 on page 31 describes the chassis status LEDs on a QFX5210 switch, their colors and states, and the status they indicate. You can view the colors of the three LEDs remotely through the CLI by issuing the operational mode command `show chassis lcd`.

Table 14: QFX5210 Chassis Status LEDs

Name	Color	State	Description
ALM–Alarm or beacon	Unlit	Off	The switch is halted or there is no alarm.
	Red	On steadily	A major hardware fault has occurred, such as a temperature alarm or power failure, and the switch has halted. Power off the QFX5210 by setting the AC power source outlet to the OFF (O) position, or unplugging the AC power cords. Correct any voltage or site temperature issues, and allow the switch to cool down. Power on the QFX5210 and monitor the power supply and fan LEDs to help determine where the error is occurring.
	Amber	On steadily	A minor alarm has occurred, such as a software error. Power off the QFX5210 by setting the AC power source outlet to the OFF (O) position, or unplugging the AC power cords. Power on the QFX5210 and monitor the status LEDs to ensure that Junos OS boots properly.
SYS–System	Unlit	Off	The switch is powered off or halted.
	Green	On steadily	Junos OS for QFX Series is loaded on the switch.

Table 14: QFX5210 Chassis Status LEDs *(Continued)*

Name	Color	State	Description
MST–Primary	Unlit	Off	The switch is offline or does not have power.
	Green	On steadily	The switch is a standalone switch.
ID–Identification	Unlit	Off	The beacon feature is not enabled on the switch. This feature is enabled using the `request chassis beacon` command.
	Blue	Blinking	The beacon feature is enabled on the switch. This feature is enabled using the `request chassis beacon` command.

SEE ALSO

show chassis alarms

request chassis beacon

QFX5210 Cooling System

IN THIS SECTION

QFX5210 Cooling System Description

IN THIS SECTION

The QFX5210 is cooled by four 12-VDC fan modules and the two fans in the 1100-W power supplies. The switch is supported in two airflow options:

- Airflow In–Cool air enters the switch through the FRUs and exhausts hot air through the vents in the port panel. This airflow is also known as *FRU-to-port airflow*.
- Airflow Out–Cool air enters the switch through the vents in the port panels and exhausts hot air through the FRUs. This airflow is also known as *port-to-FRU airflow*.

This topic describes:

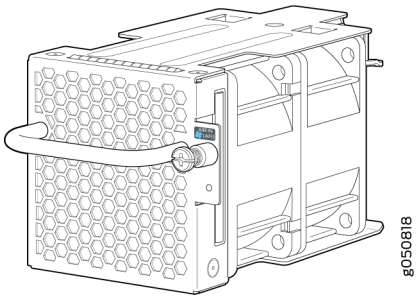
Fan Modules

The fan modules in QFX5210 devices are hot-insertable and hot-removable field-replaceable units (FRUs). These fan modules are designed for one of the two available airflow directions (Airflow In or Airflow Out). The fan modules are also color-coded for the airflow direction as well. The fan modules are installed in the fan module slots between the management panel and the power supplies.

The QFX5210 has four fan modules numbered 0 through 3 from counting from left to right. Each fan module slot has a fan icon next to it.

Figure 13 on page 34 shows the fan module.

Figure 13: QFX5210 Fan Modules



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 (30 seconds) during the replacement of the fan module without thermal shutdown.

NOTE: All fan modules must be installed for optimal operation of the switch.

The fan modules are available in two product SKUs that have different airflow directions—FRU-to-port airflow is indicated by the azure blue colored handles. FRU-to-port airflow versions of the fan module have a gold colored handle. Table 15 on page 34 lists the available fan module product SKUs and the direction of airflow in them:

Table 15: Fan Modules in QFX5210 Switches

Fan Module	Airflow Diagram	Label on the Fan Module	Color of Fan Module	Direction of Airflow in the Fan Module	Power Supplies
QFX5210-64C-FANAFI	Figure 14 on page 35	**AIR IN**	Juniper Azure Blue	FRU-to-port, that is, air comes in from the fan end of the switch; air exhausts from the switch end with ports (also known as back-to-front airflow).	You must install only power supplies that have **AIR IN** labels in switches in which the fan modules have **AIR IN** labels.

Table 15: Fan Modules in QFX5210 Switches *(Continued)*

Fan Module	Airflow Diagram	Label on the Fan Module	Color of Fan Module	Direction of Airflow in the Fan Module	Power Supplies
QFX5210-64C-FANAFO	Figure 15 on page 36	**AIR OUT**	Juniper Gold	Port-to-FRU, that is, air comes in through vents on the end with ports; air exhausts out the end with the fans (also known as front-to-back airflow).	You must install only power supplies that have **AIR OUT** labels in switches in which the fan modules have **AIR OUT** labels.

Position the switch in such a manner that the **AIR IN** labels on switch components are next to the cold aisle, and **AIR OUT** labels on switch components are next to the hot aisle.

Figure 14: Air In Airflow Through QFX5210

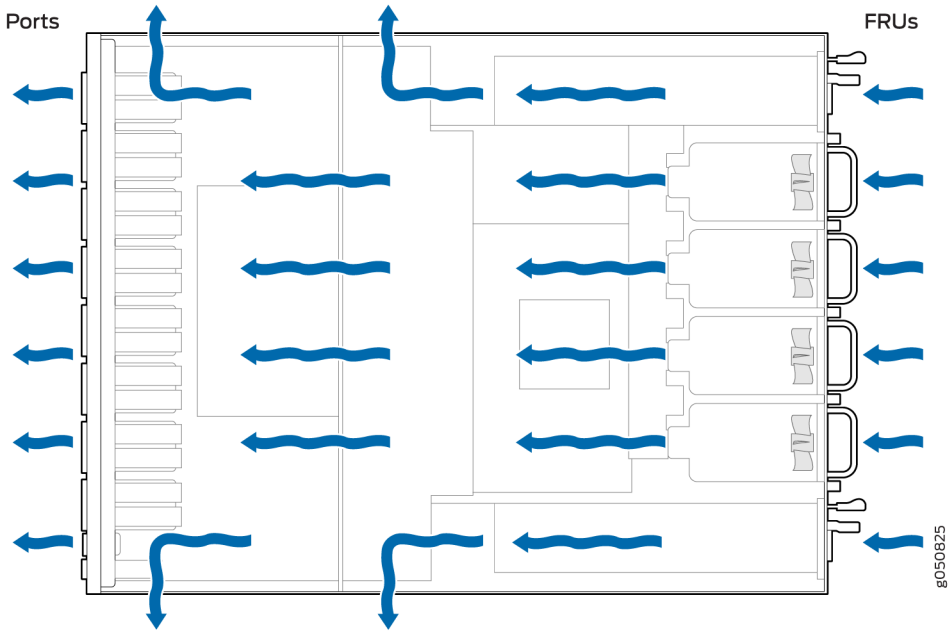
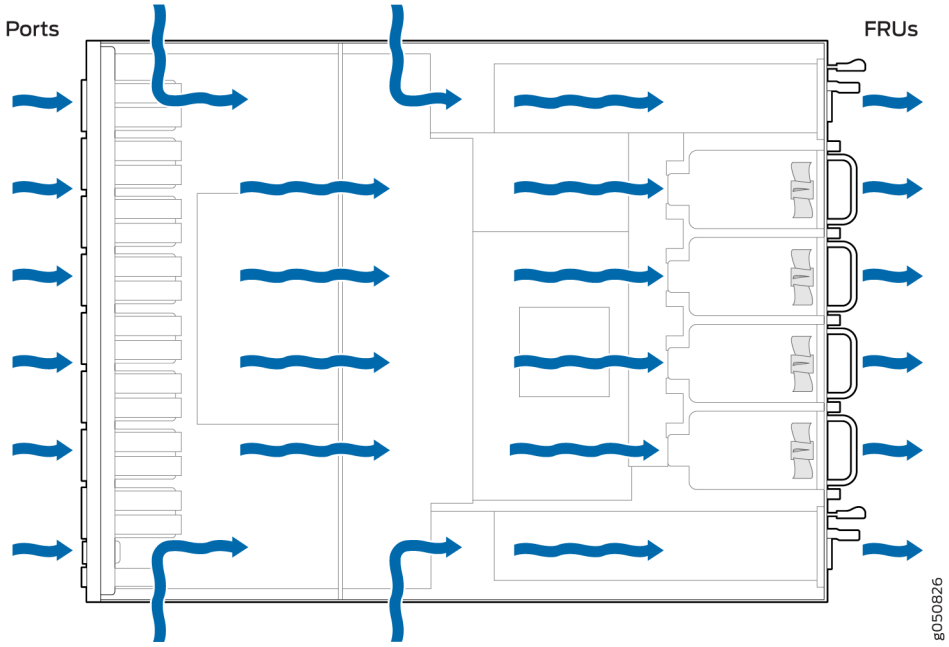


Figure 15: Air Out Airflow Through QFX5210



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

Do not mix power supplies with different airflow. The power supplies are color-coded to ensure they are either all azure blue for airflow in models or all gold for airflow out models. Likewise, ensure that all fan modules have the same airflow and match the airflow of the power supplies. Fan modules are also either color-coded azure blue for airflow in or gold for airflow out.

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

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

Do not mix fan modules with different wattage. Only use the replacement fan modules that are designed for use with your product number. See Table 15 on page 34 for the correct part number for your device.

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

However if you need to convert a QFX5210 to have a different airflow, you can change the airflow pattern. To convert an **AIR IN** product SKU to an **AIR OUT** product SKU or an **AIR OUT** product SKU to

a **AIR IN** product SKU, you must replace all of the fans and power supplies at one time to use the new direction. The system raises an alarm when the system is converted, which is normal.

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

SEE ALSO

QFX5210 Clearance Requirements for Airflow and Hardware Maintenance | **55**

Maintaining QFX5210 Fan Modules | **98**

Maintaining QFX5210 Power Supplies | **101**

QFX5210 Fan Module LEDs

The QFX5210 switches have an bi-colored LED next to each fan module that indicate the fan status.

Table 16 on page 37 describes the function of the fan tray LED.

Table 16: QFX5210 Fan Tray LED

Name	Color	State	Description
Fan	Green	On steadily	The fan module is operating normally. The system has verified that the module is engaged, that the airflow is in the correct direction, and that the fan is operating correctly.
	Amber	Blinking	An error has been detected in the fan module. Replace the fan module as soon as possible. Either the fan has failed or it is seated incorrectly. To maintain proper airflow through the chassis, leave the fan module installed in the chassis until you are ready to replace it.

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.

SEE ALSO

Maintaining QFX5210 Fan Modules | 98

QFX5210 Power System

IN THIS SECTION

QFX5210 AC Power Supply

The two power supplies in QFX5210 are hot-removable and hot-insertable field-replaceable units (FRUs). The power supplies are installed in the switch at the factory. You can install replacement power supplies from the management panel without powering off the switch or disrupting the switching function. See Figure 16 on page 39 and Figure 17 on page 39 for examples of the QFX5210 AC power supply.

Figure 16: QFX5210 AC Power Supply

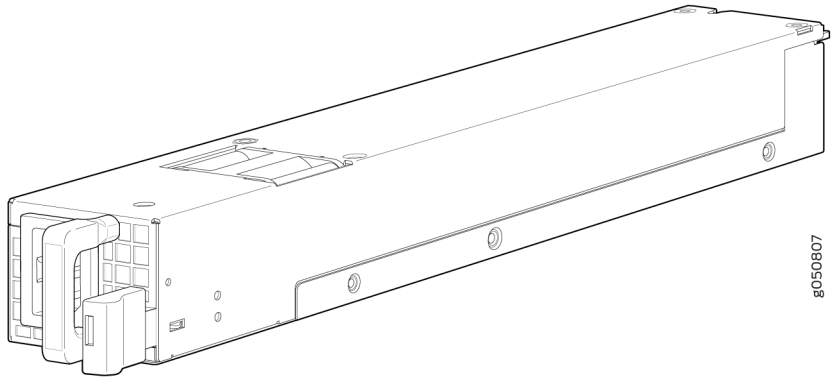
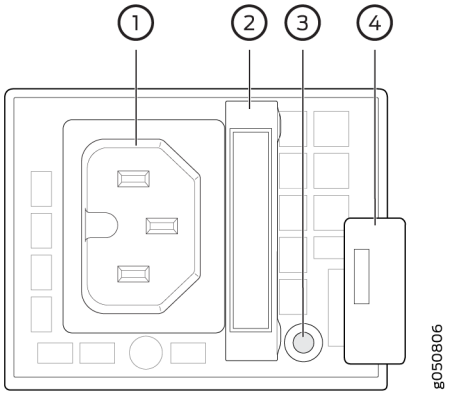


Figure 17: AC Power Supply Faceplate in QFX5210 Devices



1– AC appliance inlet	3– Fault LED
2– Handle	4– Ejector lever

Each of the 1100-W power supplies has a single AC input. and a 12-VDC output, with a standby voltage of 12 VDC. Each power supply provides sufficient power for all of the components in the device. This redundant configuration is known as 2N redundancy. A 2N redundant power system transfers the electrical load without interruption if a power supply fails or is removed.

Each power supply module has an internal fan that assists device cooling. The airflow for the power supplies must match the airflow of the fans. Power supplies and fans are color-coded for each airflow.Table 17 on page 40 shows the different power supplies and their airflow direction.

Table 17: Airflow Direction in QFX5210 AC Power Supplies

Product Number	Direction of Airflow	Color of Power Supply Handle
JPSU-1100W-AC-AFI	FRU-to-port	Juniper Azure Blue
JPSU-1100W-AC-AFO	Port-to-FRU	Juniper Gold

To avoid electrical injury, carefully follow instructions in "Connecting AC Power to a QFX5210" on page 87 or "Connecting DC Power to a QFX5210" on page 90.

> ⚠ **CAUTION**: 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.

SEE ALSO

Connecting the QFX5210 | **83**

Maintaining QFX5210 Power Supplies | **101**

QFX5210 AC Power Specifications

Table 18 on page 40 describes the AC power specifications for a QFX5210.

Table 18: QFX5210 AC Power Specifications

Item	Specification
AC input voltage	Operating range: • 90 / 264 VAC
AC input line frequency	50–60 Hz

Table 18: QFX5210 AC Power Specifications *(Continued)*

Item	Specification
Maximum AC input current rating	• 12 A at 100 VAC • 6 A at 240 VAC
Typical power consumption	357 W
Maximum power consumption	655 W

NOTE: Maximum power consumption is measured at 40°C ambient temperature with SR optics, and at 100% load with IMIX traffic. Typical power consumption is measured at 25°C ambient temperature with DACs, and at 50% load with IMIX traffic, excluding transceivers.

SEE ALSO

General Safety Guidelines and Warnings | **136**

General Electrical Safety Guidelines and Warnings | **158**

AC Power Cord with Type C15 Coupler Specifications

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

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

Table 19 on page 42 lists the AC power cord specifications provided for each country or region.

Table 19: AC Power Cord Specifications

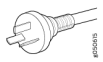
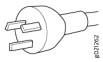
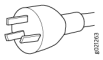
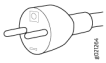
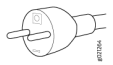
Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number	Spare Juniper Model Number	Graphic
Argentina	250 VAC, 10 A, 50 Hz	IRAM 2073 Type RA/3	–	CBL-PWR-C15M-HITEMP-AR	
Australia	250 VAC, 10 A, 50 Hz	AS/NZS 3112-2000 Type SAA/3	CG_CBL-C15-02-AU	CBL-PWR-C15M-HITEMP-AU	
Brazil	250 VAC, 10 A, 50 Hz	NBR 14136 Type BR/3	–	CBL-PWR-C15M-HITEMP-BR	
China	250 VAC, 10 A, 50 Hz	GB 2099/GB 1002 Type PRC/3	CG_CBL-C15-02-CH	CBL-PWR-C15M-HITEMP-CH	
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII Type VIIG	CG_CBL-C15-02-EU	CBL-PWR-C15M-HITEMP-EU	
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	Europe patch cord - Straight,C15 Plug (EN 60320) to C14 Connector (EN 60320)-	CBL-PWR-C15-C14-EU		
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16 Type I/3G	CG_CBL-C15-02-IT-CH	CBL-PWR-C15M-HITEMP-IT	

Table 19: AC Power Cord Specifications *(Continued)*

Country/Region	Electrical Specifications	Plug Standards	Juniper Model Number	Spare Juniper Model Number	Graphic
Japan	125 VAC, 15 A, 50 Hz	JIS 8303 Type 498GJ	CG_CBL-C15-02-JP	CBL-PWR-C15M-HITEMP-JP	
North America	125 VAC, 15 A, 50 Hz	NEMA 5-15 Type 498G	CG_CBL-C15-02-US	CBL-PWR-C15M-HITEMP-US	
North America	125 VAC, 15 A, 50 Hz	US Patch cord - Straight,C15 Plug (EN 60320) to C14 Connector (EN 60320)	CBL-PWR-C15-C14-US	CBL-PWR-C15M-HITEMP-US	
South Africa and India	250 VAC, 10 A, 50 Hz	SABS 164/1:1992 Type ZA/3	–	CBL-PWR-C15M-HITEMP-SA	
South Korea and some parts of Europe	250 VAC, 10 A, 50 Hz	CEE(7) VII Type VIIG	–	CBL-PWR-C15M-HITEMP-KR	
Switzerland	250 VAC, 10 A, 50 Hz	SEV 1011/6534-2 Type 12G	CG_CBL-C15-02-SZ	CBL-PWR-C15M-HITEMP-SZ	
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363/A Type BS89/13	CG_CBL-C15-02-UK	CBL-PWR-C15M-HITEMP-UK	

SEE ALSO

- General Safety Guidelines and Warnings | **136**
- General Electrical Safety Guidelines and Warnings | **158**

QFX5210 DC Power Supply

The two DC power supplies in QFX5210 switches are hot-removable and hot-insertable field-replaceable units (FRUs). You can install the power supplies without powering off the switch or disrupting the switching function.

The two DC power supplies in QFX5210 switches (see Figure 18 on page 44 and Figure 19 on page 45) are hot-removable and hot-insertable field-replaceable units (FRUs). You can install the power supplies without powering off the switch or disrupting the switching function.

The DC power supply in QFX5210 is 1100 W with dual feeds for power resiliency.

Figure 18: QFX5210 DC Power Supply

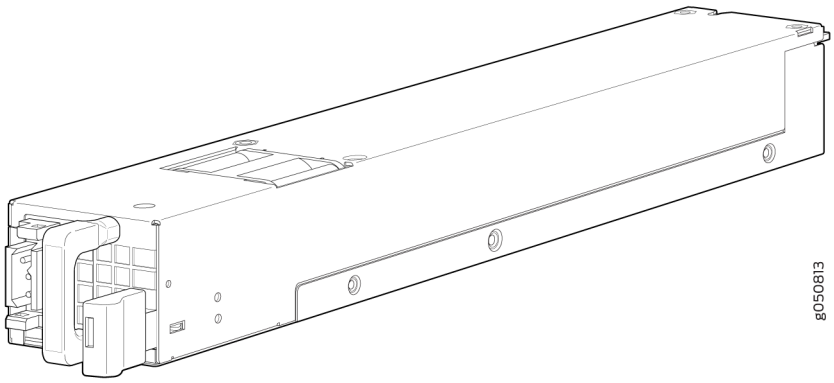
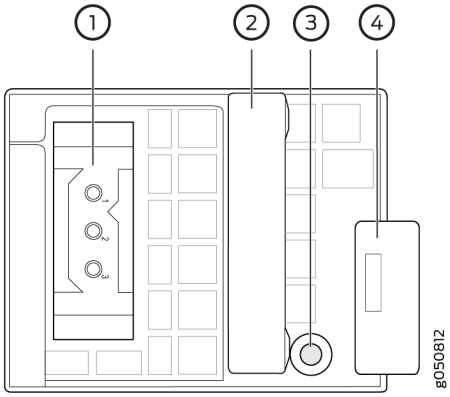


Figure 19: DC Power Supply Faceplate in QFX5210 Devices



1– Terminal block	3– FaultLED
2– Handle	4– Ejector lever

To avoid electrical injury, carefully follow instructions in "Maintaining QFX5210 Power Supplies" on page 101.

SEE ALSO

QFX5210 Field-Replaceable Units | **18**

Maintaining QFX5210 Power Supplies | **101**

QFX5210 DC Power Specifications

Table 20 on page 45 describes the QFX5210 DC power specifications.

Table 20: QFX5210 DC Power Specifications

Item	Specifications
DC input voltage	• Rated operating voltage: –48 VDC to -60 VDC • Operating voltage range: -40 VDC through –72 VDC

Table 20: QFX5210 DC Power Specifications *(Continued)*

Item	Specifications
DC input current rating	25 A maximum
Typical power consumption	383 W
Maximum power consumption	696 W

NOTE: Maximum power consumption is measured at 40°C ambient temperature with SR optics, and at 100% load with IMIX traffic. Typical power consumption is measured at 25°C ambient temperature with DACs, and at 50% load with IMIX traffic, excluding transceivers.

SEE ALSO

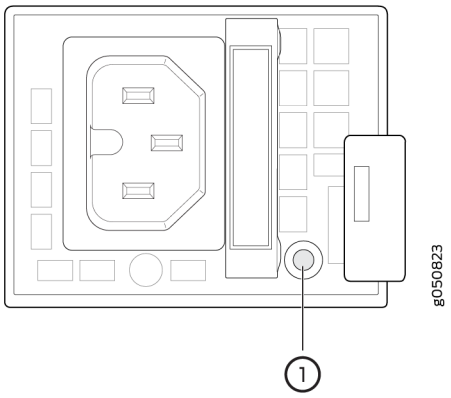
Connecting the QFX5210 | **83**

Maintaining QFX5210 Power Supplies | **101**

QFX5210 Power Supply LEDs

The QFX5210 power supplies have a single bi-color LED indicator for power status. Figure 20 on page 47 shows the location of the LED on the power supply and Table 21 on page 47 provides descriptions of the LED behavior.

Figure 20: Power Supply LED



1– AC power supply LED

Table 21: Power Supply LED

Color	State	Description
Unlit	Off	All power supplies are disconnected from power, or power is not coming into either power supply.
Green	Flashing	AC power is present; the power supply is in standby mode.
	On steadily	DC output power is present. The power supply is operating correctly.
	Alternating with red	The power supply has issued a warning. Monitor or replace the power supply.
Red	Flashing	The power supply has failed. Replace the power supply as soon as possible. To maintain proper airflow through the chassis, leave the power supply installed in the chassis until you are ready to replace it.
	Alternating with green	The power supply has issued a warning. Monitor or replace the power supply.

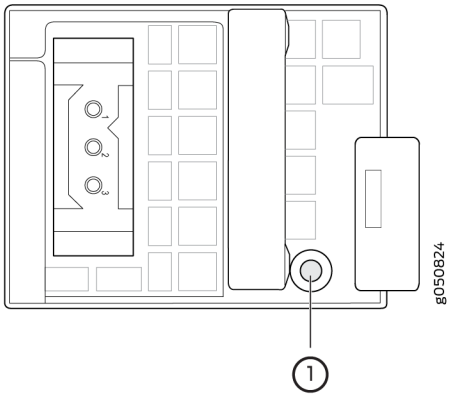
SEE ALSO

Chassis Alarm Messages | 120

QFX5210 DC Power Supply LEDs

Figure 21 on page 48 show the location of the power LED on the QFX5210 DC power supply.

Figure 21: DC Power Supply Faceplate on a QFX5210



1– Power LED

CAUTION: The V+ terminals are shunted internally together, as are the V- terminals. The same polarity terminal can be wired together from the same source to provide an additional current path in a higher power chassis. Do not connect the terminals to different sources.

Table 22: DC Power Supply LED on a QFX5210

Color	State	Description
Unlit	Off	The power supply is disconnected from power, or power is not coming into the power supply.
Blue	Blinking	The PSU is in standby mode. Power is coming into the power supply at +5V.

Table 22: DC Power Supply LED on a QFX5210 *(Continued)*

Color	State	Description
	On steadily	The power supply is sending out power correctly.
Alternating red/ blue	Blinking	Power supply warning. Check the logs for related messages.
Red	On steadily	An error has been detected in the power supply. Replace the power supply as soon as possible. To maintain proper airflow through the chassis, leave the power supply installed in the chassis until you are ready to replace it.
	Blinking	One power supply is receiving DC power; the other power supply has no power. Check the failing power supply.

CHAPTER 3

Site Planning, Preparation, and Specifications

IN THIS CHAPTER

QFX5210 Site Preparation Checklist

The checklist in Table 23 on page 51 summarizes the tasks you need to perform when preparing a site for a QFX5210 installation.

Table 23: 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.	QFX5210 Environmental Requirements and Specifications		
Power			
Measure the distance between external power sources and switch installation site.			
Calculate the power consumption and requirements.	QFX5210 Environmental Requirements and Specifications		
Rack or Cabinet			
Verify that your rack or cabinet meets the minimum requirements for the installation of the switch.	QFX5210 Rack Requirements QFX5210 Cabinet Requirements		
Plan rack or cabinet location, including required space clearances.	QFX5210 Clearance Requirements for Airflow and Hardware Maintenance		
Secure the rack or cabinet to the floor and building structure.			

Table 23: Site Preparation Checklist *(Continued)*

Item or Task	For More Information	Performed By	Date
Cables			
Acquire cables and connectors: • Determine the number of cables needed based on your planned configuration. • Review the maximum distance allowed for each cable. Choose the length of cable based on the distance between the hardware components being connected.	Determining Transceiver Support for the QFX5210		
Plan the cable routing and management.			

RELATED DOCUMENTATION

QFX5210 Installation Safety Guidelines | 76

Installation Safety Guidelines and Warnings

QFX5210 Site Guidelines and Requirements

IN THIS SECTION

QFX5210 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 24 on page 53 provides the required environmental conditions for normal switch operation.

Table 24: QFX5210 Switch Environmental Tolerances

Description	Tolerance
Altitude	AFO models have no performance degradation to 6000 feet (1828.8 meters). AFI models have no performance degradation at sea level.
Relative humidity	Normal operation ensured in relative humidity range of 5% through 90%, noncondensing. • Short-term operation ensured in relative humidity range of 5% through 93%, noncondensing.

Table 24: QFX5210 Switch Environmental Tolerances *(Continued)*

Description	Tolerance
Temperature	• 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). **CAUTION**: High wattage optics (greater than 3.5 W) are only supported in ports **32** to **63** on QFX5210-64C-AFI. There is no restriction on high wattage optics on QFX5210-64C-AFO.
Seismic	Designed to comply with Zone 4 earthquake requirements per GR-63 , Issue 4.

NOTE: Install QFX Series devices only in restricted areas, such as dedicated equipment rooms and equipment closets, in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.

SEE ALSO

QFX5210 Installation Overview | 75

General Site Guidelines

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

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

- Keep the area around the chassis free from dust and conductive material, such as metal flakes.
- Follow the prescribed airflow guidelines to ensure that the cooling system functions properly. Ensure that the exhaust from other equipment does not blow into the intake vents of the device.

- Follow the prescribed electrostatic discharge (ESD) prevention procedures to prevent damaging the equipment. Static discharge can cause components to fail completely or intermittently over time.
- Install the device in a secure area, so that only authorized personnel can access the device.

QFX5210 Grounding Cable and Lug Specifications

To ground a QFX5210, connect a grounding cable to earth ground and then attach it to the chassis grounding points. See "Connecting the QFX5210 to Ground" on page 83.

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

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

- The grounding lug required is a Panduit LCD10-10A-L or equivalent. The grounding lug accommodates 10 AWG (5 mm^2) stranded wire.
- The grounding cable that you provide for a QFX5210 must be 10 AWG (5 mm^2), minimum 60° C wire, or as permitted by the local code.

SEE ALSO

QFX5210 Power System | **38**

Connecting the QFX5210 | **83**

Maintaining QFX5210 Power Supplies | **101**

QFX5210 Clearance Requirements for Airflow and Hardware Maintenance

When planning the site for installing a QFX5210, you must allow sufficient clearance around the installed chassis (see).

- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See "QFX5210 Cooling System" on page 32 for more information about the airflow through the chassis.

- If you are mounting a QFX5210 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 QFX5210. For service personnel to remove and install hardware components, you must leave adequate space at the front and back of the switch.

SEE ALSO

General Site Guidelines | **54**

Rack-Mounting and Cabinet-Mounting Warnings | **144**

Unpacking and Mounting the QFX5210 | **77**

QFX5210 Chassis Physical Specifications

The QFX5210 is a rigid sheet-metal structure that houses the hardware components. Table 25 on page 56 summarizes the physical specifications of the QFX5210.

Table 25: QFX5210-64C Physical Specifications

Product SKU	Height	Width	Depth	Weight
QFX5210-64C	3.5 in. (8.89 cm)	17.25 in. (43.82 cm)	22.83 in. (57.99 cm)	23.44 lbs (10.63 kg) without power supplies and fan. 31.09 lbs (14.1 kg) with power supplies and fans installed.

SEE ALSO

Unpacking and Mounting the QFX5210 | **77**

Connecting the QFX5210 | **83**

Site Electrical Wiring Guidelines

Table 26 on page 57 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 26: Site Electrical Wiring Guidelines

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

QFX5210 Rack Requirements

QFX5210 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 27 on page 58 provides the rack requirements and specifications for the QFX5210.

Table 27: QFX5210 Rack Requirements

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

Table 27: QFX5210 Rack Requirements *(Continued)*

Rack Requirement	Guidelines
Rack size and strength	• Ensure that the rack complies with the standards for a 19-in. or 23-in. rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310–D) published by the Electronics Industry Association. • A 600-mm rack as defined in the four-part *Equipment Engineering (EE); European telecommunications standard for equipment practice* (document numbers ETS 300 119-1 through 119-4) published by the European Telecommunications Standards Institute (http://www.etsi.org). The horizontal spacing between the rails in a rack that complies with this standard is usually wider than the device's mounting brackets, which measure 19 in. (48.26 cm) from outer edge to outer edge. Use approved wing devices to narrow the opening between the rails as required. • Ensure that the rack rails are spaced widely enough to accommodate the 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 23.6 in. (60 cm) and 36 in. (91.4 cm) front-to-back. • The rack must be strong enough to support the weight of the switch. • Ensure that the spacing of rails and adjacent racks allows for proper clearance around the switch and rack.
Rack connection to building structure	• Secure the rack to the building structure. • If 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.

SEE ALSO

Rack-Mounting and Cabinet-Mounting Warnings | **144**

Mounting a QFX5210 in a Rack or Cabinet | **79**

QFX5210 Cabinet Requirements

You can mount the QFX5210 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 28 on page 60 provides the cabinet requirements and specifications for the QFX5210.

Table 28: QFX5210 Cabinet Requirements

Cabinet Requirement	Guidelines
Cabinet size and clearance	The minimum cabinet size for accommodating a QFX5210 device is 36 in. (91.4 cm) deep. Large cabinets improve airflow and reduce the chance of overheating.
Cabinet airflow requirements	When you mount the switch in a cabinet, ensure that ventilation through the cabinet is sufficient to prevent overheating. • Ensure that the cool air supply you provide through the cabinet adequately dissipates the thermal output of the switch (or switches). • Ensure that the cabinet allows the 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 QFX5210 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.

SEE ALSO

Unpacking and Mounting the QFX5210 | 77

Rack-Mounting and Cabinet-Mounting Warnings | 144

QFX5210 Network Cable and Transceiver Planning

IN THIS SECTION

Determining QFX5210 Optical Transceiver Support

The QFX5210-64C has 28-Gbps QSFP+ Pluggable Solution (QSFP28) ports for use as uplinks, downlinks, or as access ports. These 100-Gigabit Ethernet ports support QSFP28 transceivers, QSFP+ direct-attach copper (DAC) cables, and DAC breakout cables (DACBO). Each QSFP28 port on a QFX5210-64C can be configured to operate as a:

- 100-Gigabit Ethernet interface
- 40-Gigabit Ethernet interface
- Four 25-Gigabit Ethernet interfaces using break-out cables
- Four 10-Gigabit Ethernet interfaces using break-out cables

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, DACs, and DACBOs for the QFX5210 is located at https://pathfinder.juniper.net/hct/product/#prd=QFX5210 .

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

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

NOTE: For interoperability with other QFX Series switches, ensure auto-negotiation on the QFX5210 is disabled.

SEE ALSO

QFX5210-64C Port Panel | **20**

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

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

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

TIP: Ensure that you order cables with the correct polarity. Vendors refer to these crossover cables as *key up to key up*, *latch up to latch up*, *Type B*, or *Method B*. If you

are using patch panels between two QSFP+ or QSFP28 transceivers, ensure that the proper polarity is maintained through the cable plant.

Table 29 on page 63 describes the signals on each fiber. Table 30 on page 64 shows the pin-to-pin connections for proper polarity.

Table 29: QSFP+ and QSFP28 Optical Module Receptacle Pinouts

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

Table 30: QSFP+ MPO Fiber-Optic Crossover Cable Pinouts

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

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

IN THIS SECTION

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

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

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

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

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

Attenuation and Dispersion in Fiber-Optic Cable

An optical data link functions correctly provided that modulated light reaching the receiver has enough power to be demodulated correctly. *Attenuation* is the reduction in strength of the light signal during

transmission. Passive media components such as cables, cable splices, and connectors cause attenuation. Although attenuation is significantly lower for optical fiber than for other media, it still occurs in both multimode and single-mode transmission. An efficient optical data link must transmit enough light to overcome attenuation.

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

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

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

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

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

Calculate Power Budget and Power Margin for Fiber-Optic Cables

IN THIS SECTION

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

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

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

Calculate Power Budget for Fiber-Optic Cables

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

$$P_B = P_T - P_R$$

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

$$P_B = P_T - P_R$$

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

$$P_B = 13 \text{ dB}$$

How to Calculate Power Margin for Fiber-Optic Cables

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

$$P_M = P_B - LL$$

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

Factors that can cause link loss include higher-order mode losses, modal and chromatic dispersion, connectors, splices, and fiber attenuation. Table 31 on page 68 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 31: Estimated Values for Factors Causing Link Loss

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

The following sample calculation for a 2-km-long multimode link with a P_B of 13 dB uses the estimated values from Table 31 on page 68. This example calculates LL as the sum of fiber attenuation (2 km @ 1 dB/km, or 2 dB) and loss for five connectors (0.5 dB per connector, or 2.5 dB) and two splices (0.5 dB per splice, or 1 dB) as well as higher-order mode losses (0.5 dB). The P_M is calculated as follows:

$P_M = P_B - LL$

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

$P_M = 13\ dB - 2\ dB - 2.5\ dB - 1\ dB - 0.5\ dB$

$P_M = 7\ dB$

The following sample calculation for an 8-km-long single-mode link with a P_B of 13 dB uses the estimated values from Table 31 on page 68. This example calculates LL as the sum of fiber attenuation (8 km @ 0.5 dB/km, or 4 dB) and loss for seven connectors (0.5 dB per connector, or 3.5 dB). The P_M is calculated as follows:

$P_M = P_B - LL$

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

$P_M = 13\ dB - 4\ dB - 3.5\ dB$

P_M = 5.5 dB

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

QFX5210 Management Cable Specifications and Pinouts

IN THIS SECTION

Cable Specifications for Console and Management Connections for the QFX Series

Table 32 on page 69 lists the specifications for the cables that connect the QFX Series switch to a management device.

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

Table 32: Cable Specifications for Console and Management Connections for the QFX Series

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

Table 32: Cable Specifications for Console and Management Connections for the QFX Series *(Continued)*

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

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

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

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

RJ-45 Management Port Connector Pinout Information

Table 33 on page 70 provides the pinout information for the RJ-45 connector for the management port on Juniper Networks devices.

Table 33: RJ-45 Management Port Connector Pinout Information

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

Table 33: RJ-45 Management Port Connector Pinout Information *(Continued)*

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

Console Port Connector Pinout Information

The console port on a Juniper Networks device 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.

Table 34 on page 72 provides the pinout information for the RJ-45 console connector.

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

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

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

NOTE: If your laptop or desktop PC does not have a DB-9 plug connector pin and you want to connect your laptop or desktop PC directly to a 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.

Table 34: Console Port Connector Pinout Information

Pin	Signal	Description
1	NC	No connect
2	NC	No connect
3	TxD Output	Transmit data
4	GND	Signal ground
5	GND	Signal ground
6	RxD Input	Receive data
7	DCD Input	Data carrier detect
8	NC	No connect

USB Port Specifications for the QFX Series

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

- RE-USB-1G-S—1-gigabyte (GB) USB flash drive (except QFX3100 Director device)
- RE-USB-2G-S—2-GB USB flash drive (except QFX3100 Director device)
- RE-USB-4G-S—4-GB USB flash drive

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

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

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

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

CHAPTER 4

Initial Installation and Configuration

IN THIS CHAPTER

QFX5210 Installation Overview

IN THIS SECTION

Overview of Installing the QFX5210

You can mount a QFX5210 flush with the front of a 19-in. four-post rack. Use the standard mounting brackets provided with the switch for this configuration.

To install and connect a QFX5210:

1. Follow the instructions in "Unpacking and Mounting the QFX5210" on page 77.
2. Determine how the switch is to be mounted.

   Flush or recessed mounted in a rack or cabinet, see "Mounting a QFX5210 in a Rack or Cabinet" on page 79.
3. Follow the instructions in:
   a. "Connecting the QFX5210 to Ground" on page 83
   b. "Connecting AC Power to a QFX5210" on page 87 or "Connecting DC Power to a QFX5210" on page 90
   c. "Update Base Installation Data" on page 79
4. Follow the instructions in "Performing the Initial Software Configuration for the QFX5210" on page 93.

SEE ALSO

- QFX5210 Rack Requirements | 58
- QFX5210 Cabinet Requirements | 60
- QFX5210 Clearance Requirements for Airflow and Hardware Maintenance | 55

QFX5210 Installation Safety Guidelines

IN THIS SECTION

Observe the following guidelines before and during QFX5210 installation:

General Installation Safety Guidelines

Before installing or moving the QFX5210, verify that the intended site meets the specified power, environmental, and clearance requirements. See the following documentation:

- "QFX5210 Site Preparation Checklist" on page 51
- "QFX5210 Clearance Requirements for Airflow and Hardware Maintenance" on page 55
- "QFX5210 Rack Requirements" on page 58 and "QFX5210 Cabinet Requirements" on page 60
- "QFX5210 Environmental Requirements and Specifications" on page 53
- "QFX5210 AC Power Specifications" on page 40 or "QFX5210 DC Power Specifications" on page 45

QFX5210 Chassis Lifting Guidelines

The weight of a fully-loaded QFX5210 switch chassis is approximately 31.09 lb (14.1 kg). Observe the following guidelines for lifting and moving a QFX5210:

CAUTION: If you are installing the QFX5210 above 60 in. (152.4 cm) from the floor, either remove the power supplies, fan modules, and any expansion modules before attempting to install the switch, or ask someone to assist you during the installation.

- Before lifting or moving the QFX5210, disconnect all external cables.
- As when lifting any heavy object, lift most of the weight with your legs rather than your back. Keep your knees bent and your back relatively straight and avoid twisting your body as you lift. Balance the load evenly and be sure that your footing is solid.

SEE ALSO

Unpacking and Mounting the QFX5210 | 77

Unpacking and Mounting the QFX5210

IN THIS SECTION

Unpacking a QFX5210

The QFX5210 switch chassis is a rigid sheet-metal structure that houses the hardware components. A QFX5210 is shipped in a cardboard carton, secured with foam packing material. The carton also contains an accessory box and quick start instructions.

CAUTION: The QFX5210 is maximally protected inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack a QFX5210:

1. Move the shipping carton to a staging area as close to the installation site as possible, but where you have enough room to remove the system components.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Remove the accessory box and verify the contents against the inventory included in the box. Table 35 on page 78 lists the inventory of components supplied with a QFX5210.
5. Pull out the packing material holding the switch in place.
6. Verify the chassis components received:
   - Two power supplies
   - Four fan modules

7. Save the shipping carton and packing materials in case you need to move or ship the switch later.

Table 35: Inventory of Components Supplied with a QFX5210 Device

Component	Quantity
Chassis with four fan modules and two power supplies.	1
Rack mounting kit • Front mounting brackets • Rear mounting blades • Flathead screws **NOTE**: Spare rack mount kits are ordered as QFX5210-4PST-RMK.	1 • 2 • 2 • 12
Power cords, C15	2
Power cord retainers (AC models only)	2
Documentation roadmap card	1
Warranty	1

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

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

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

SEE ALSO

Mounting a QFX5210 in a Rack or Cabinet | 79

Connecting the QFX5210 | 83

Update Base Installation Data

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

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

Mounting a QFX5210 in a Rack or Cabinet

IN THIS SECTION

You can mount all QFX5210 switches on a four post 19-in. rack or cabinet using the mounting kit provided with the switch.

For four post rack or cabinet installations, the mounting kit contains two front mounting rails with two matching rear mounting blades. This configuration allows either end of the switch to be mounted flush with the rack and still be adjustable for racks with different depths.

The mounting kit for the QFX5210-64C has mounting rails, blades, and brackets for the four-post configuration.

(The remainder of this topic uses “rack” to mean “rack or cabinet.”) The front and rear rack rails must be spaced between 28 in. (71.1 cm) and 36 in. (91.4 cm) front to back.

This topic describes:

Before You Begin Rack Installation

Before you begin mounting a QFX5210 switch in the rack or cabinet:

1. Ensure that you understand how to prevent electrostatic discharge (ESD) damage. See "Prevention of Electrostatic Discharge Damage" on page 160.
2. Verify that the site meets the requirements described in "QFX5210 Site Guidelines and Requirements" on page 52.
3. Place the rack in its permanent location, allowing adequate clearance for airflow and maintenance, and secure it to the building structure.
4. Read "General Site Guidelines" on page 54, and "QFX5210 Installation Overview" on page 75..
5. Remove the switch from the shipping carton (see "Unpacking and Mounting the QFX5210" on page 77).
6. Ensure that you have the following parts and tools available to mount the switch in a rack:
   - ESD grounding strap (not provided).
   - Blades, rails, or brackets (provided).

     WARNING: Only use Juniper-provided rack mounting kits to ensure proper ventilation and cooling to the chassis.

     - For four-post installations:
       - One pair of rear mounting blades. These mounting blades support the rear of the chassis and must be installed (provided).
       - One pair of front mounting rails. The mounting blades slide into the mounting rails to support the switch (provided).
       - Screws to secure the mounting rails to the chassis (provided).
         - Twelve M4 flat-head screws for attaching the mounting bracket to the chassis.
       - Eight screws to secure the chassis and rear installation blades to the rack (not provided).
   - Appropriate screwdriver for the mounting screws (not provided).
   - Two power cords with plugs appropriate to your geographical location (provided).
   - RJ-45 cable and RJ-45 to DB-9 serial port adapter (not provided).
   - Management host, such as a PC laptop, with a serial port (not provided).
7. Register the QFX5210. See"Update Base Installation Data" on page 79

Optional equipment: Grounding cable kit with bracket, lug, and three nuts with integrated washers.

WARNING: A QFX5210 must be supported at all four corners. Mounting the chassis using only the front brackets will damage the chassis and can result in serious bodily injury.

CAUTION: All QFX5210 require two people for installation, one person to lift the device into place and another person to attach it to the rack. If you are installing the QFX5210 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.

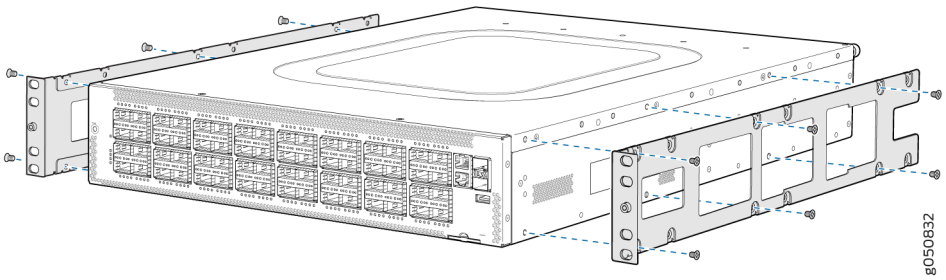
CAUTION: If you are mounting multiple devices on a rack, mount the device in the lowest position of the rack first. Proceed to mount the rest of the devices from the bottom to the top of the rack to minimize the risk of the rack toppling.

Four Post Procedure

To mount the switch on four posts in a rack using the provided mounting kit:

1. Attach the ESD grounding strap to your bare wrist and to a site ESD point.
2. Decide whether the Field Replaceable Unit (FRU) end of the switch or the port end is to be placed at the front of the rack. Position the switch in such a manner that the **AIR IN** labels on components are next to the cold aisle and **AIR OUT** labels on components are next to the hot aisle.
3. Align the holes in the mounting rail with the holes on the side of the chassis. SeeFigure 22 on page 81 to see the proper alignment for the QFX5210.

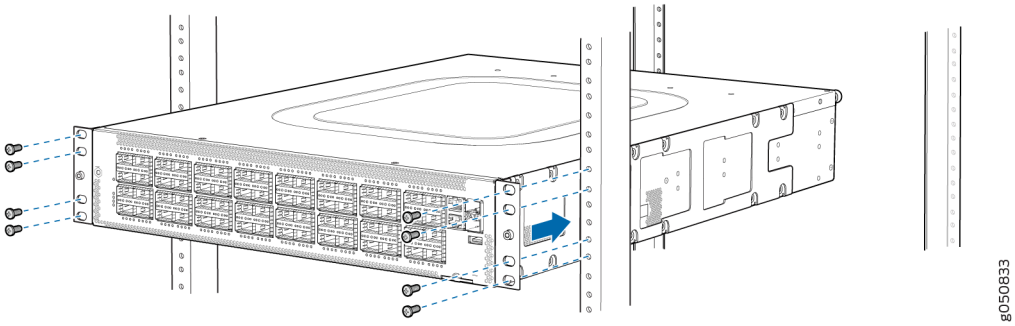
Figure 22: Attaching Mounting Rails to the QFX5210



4. Attach the mounting rail to the switch using the mounting screws. Tighten the screws.
5. Repeats steps 3 and 4 on the opposite side of the switch.

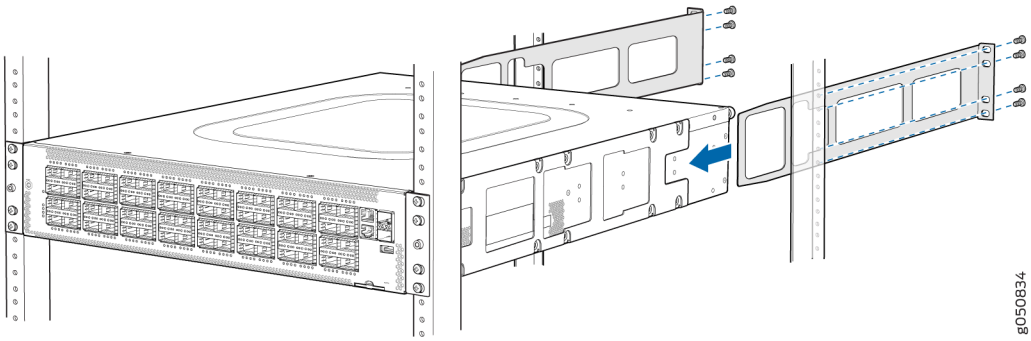
6. Have one person grasp both sides of the switch, lift it, and position it in the rack so that the front bracket is aligned with the rack holes.
7. Have a second person secure the front of the switch to the rack using four mounting screws (and cage nuts and washers if your rack requires them.) Tighten the screws. See Figure 23 on page 82 for an example of attaching the chassis with mounting rail to the mounting rack.

Figure 23: Attach Chassis to the Mounting Rack



8. Continue to support the switch while sliding the rear mounting-blades into the channel of the side mounting-rails and securing the blades to the rack. Use the four mounting screws (and cage nuts and washers if your rack requires them) to attach each blade to the rack. (Use eight front-mounting screws for the QFX5210.)Tighten the screws. See Figure 24 on page 82.

Figure 24: Slide Mounting Blade into Mounting Rail



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

RELATED DOCUMENTATION

Rack-Mounting and Cabinet-Mounting Warnings | 144

Connecting the QFX5210

IN THIS SECTION

Connecting the QFX5210 to Ground

You must install the QFX5210 in a restricted-access location and ensure that the chassis is always properly grounded. The QFX5210 has a two-hole protective grounding terminal provided on the chassis. See Figure 25 on page 84. Under all circumstances, use this grounding connection to ground the chassis. For AC-powered systems, you must also use the grounding wire in the AC power cord along with the two-hole grounding lug connection. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.

CAUTION: If an external ground connection is required, ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable that you supply. Using a grounding cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit).

NOTE: Mount your switch in the rack or cabinet before attaching the grounding lug to the switch. See "Unpacking and Mounting the QFX5210" on page 77.

Ensure that you have the following parts and tools available:

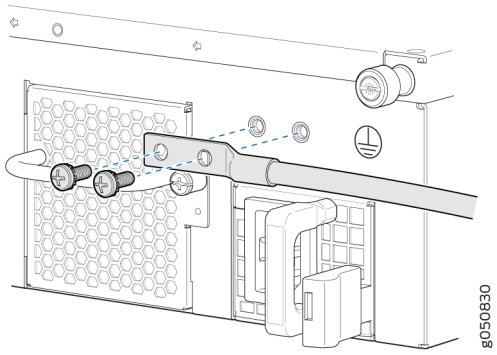
- Grounding cable for your QFX5210—The grounding cable must be 10 AWG (5 mm^2), minimum 90° C wire, or as permitted by the local code.
- Grounding lug for your grounding cable—The grounding lug required is a Panduit LCD10-10A-L or equivalent (not provided).
- Two #10-32 UNF screws and washers (not provided).
- Screwdriver appropriate for the #10-32 UNF screws (not provided).

An AC-powered QFX5210 switch chassis gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using an AC power cord appropriate for your geographical location. See "AC Power Cord with Type C15 Coupler Specifications" on page 41.

To connect earth ground to a QFX5210:

1. Secure the protective earthing terminal bracket to the FRU panel of the QFX5210 chassis with two #10-32 UNF screws. The posts on the protective earthing terminal bracket should point to the left. See Figure 25 on page 84 .

Figure 25: Connecting a Grounding Cable to a QFX5210-64C



2. Connect one end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.
3. Place the grounding lug attached to the grounding cable over the protective earthing terminal on the protective earthing terminal bracket.
4. Secure the grounding lug to the protective earthing terminal with the two washers and screws.
5. 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.

SEE ALSO

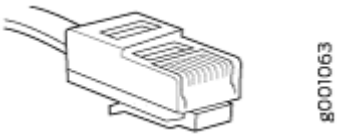
General Safety Guidelines and Warnings | 136

Grounded Equipment Warning | 148

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

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

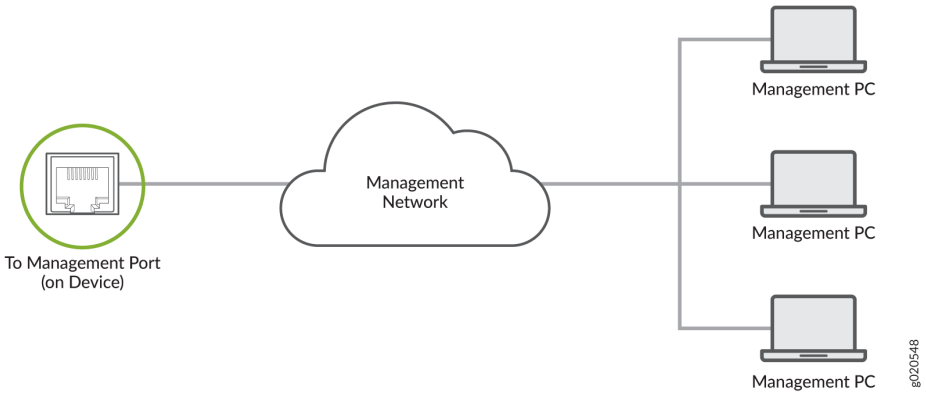
Figure 26: RJ-45 Connector on an Ethernet Cable



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

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

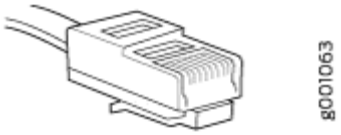
1. Connect one end of the Ethernet cable to the management port on the device.
2. Connect the other end of the Ethernet cable to the management device.



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

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

Figure 27: RJ-45 Connector on an Ethernet Cable



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

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

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

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

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

To connect the device to a management console:

1. Connect one end of the Ethernet cable to the console port (labeled **CON**, **CONSOLE**, or **CON1**) on the device.

2. Connect the other end of the Ethernet cable to the console server (see Figure 28 on page 87) or management console (see Figure 29 on page 87).

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

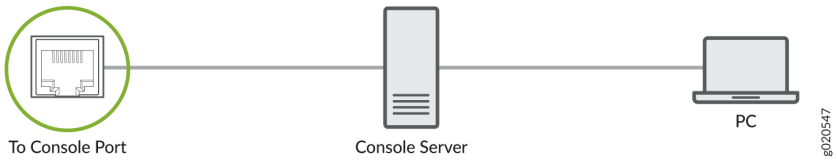


Figure 29: Connect a Device Directly to a Management Console

Connecting AC Power to a QFX5210

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

Before you begin connecting AC power to the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).
- Ensure that you have connected the switch chassis to earth ground.

> **CAUTION**: Before you connect power to the switch, a licensed electrician must attach a cable lug to the grounding and power cables that you supply. A cable with an incorrectly attached lug can damage the switch (for example, by causing a short circuit). To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it

to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. For instructions on connecting earth ground, see "Connecting the QFX5210" on page 83. The switch gains additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location (see "QFX5210 Power System" on page 38).

- Install the power supply in the chassis. For instructions on installing a power supply in a QFX5210, see "Maintaining QFX5210 Power Supplies" on page 101.

The QFX5210 is shipped from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU) when the second power supply is installed and running. You can install replacement power supplies in the two slots next to the fan modules without powering off the switch or disrupting the switching function.

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

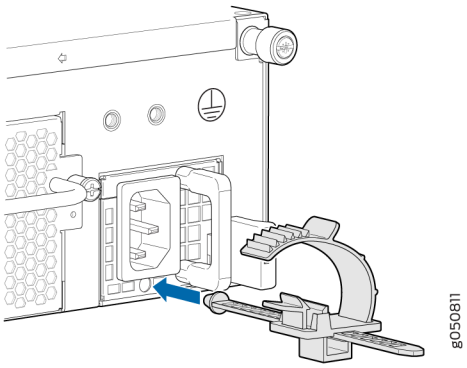
To connect AC power to a QFX5210:

1. Attach the grounding strap to your bare wrist and to a site ESD point.
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure. If only one power supply is installed, ensure a that blank cover panel is installed over the second power supply slot.
3. Locate the power cord or cords shipped with the switch; the cords have plugs appropriate for your geographical location. See "AC Power Cord with Type C15 Coupler Specifications" on page 41.

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

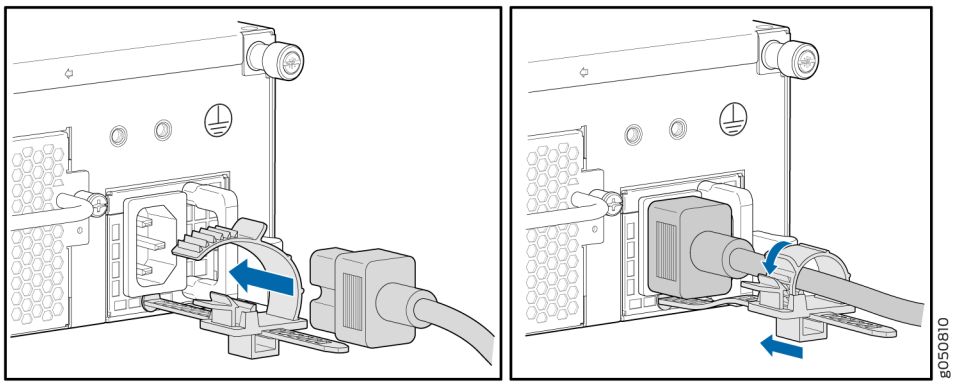
4. Attach a power cord retainer to each AC power supply. See Figure 30 on page 89.

Figure 30: Attaching a Cord Retainer to the AC Power Supply



5. Thread the coupler end of the power cords through the opening of the cord retainer.
6. Connect each power supply to the power sources. Insert the coupler end of the power cord into the AC power cord inlet on the AC power supply faceplate.
7. Push down the power cord retainer to lock the retainer down over the power cord.

Figure 31: Connecting AC Power



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

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

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

    If the amber fault LED is lit, remove power from the power supply, and replace the power supply (see "Removing a Power Supply from a QFX5210" on page 101). Do not remove the power supply

until you have a replacement power supply ready: the power supplies or a blank cover panel must be installed in the switch to ensure proper airflow.

CAUTION: Replace a failed power supply with a blank panel or new power supply within 1 minute of removal to prevent chassis overheating.

SEE ALSO

QFX5210 AC Power Supply | 38

QFX5210 Power Supply LEDs | 46

Connecting DC Power to a QFX5210

Before you begin connecting DC power to the switch:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).
- Ensure that you have connected the switch chassis to earth ground.

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

  To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. For instructions on connecting earth ground, see "Connecting the QFX5210 to Ground" on page 83.
- Install the power supply in the chassis. For instructions on installing a power supply in a QFX5210, see "Installing a Power Supply in a QFX5210" on page 103.

Ensure that you have the following parts and tools available:

- DC power source cables (provided)
- Multimeter (not provided)

The QFX5210 is shipped from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU) when the second power supply is installed and running. You can install replacement power supplies in the two slots next to the fan modules without powering off the switch or disrupting the switching function.

WARNING: A DC-powered QFX5210 is intended for installation only in a restricted access location.

NOTE: The battery returns of the DC power supply must be connected as an isolated DC return (DC-I).

To connect DC power to a QFX5210:

1. Attach the grounding strap to your bare wrist and to a site ESD point.
2. Verify that the DC power cables are correctly labeled before making connections to the power supply. In a typical power distribution scheme where the return is connected to chassis ground at the battery plant, you can use a multimeter to verify the resistance of the –48V and RTN DC cables to chassis ground:
   - The cable with very low resistance (indicating a closed circuit) to chassis ground is positive (+) and will be installed on the V+ (return) DC power input terminal.
   - The cable with very high resistance (indicating an open circuit) to chassis ground is negative (–) and will be installed on the V– (input) DC power input terminal.

   CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the DC power input terminals on each power supply.
3. Ensure that the input circuit breaker is open so that the voltage across the DC power source cable leads is 0 V and that the cable leads do not become active while you are connecting DC power.

   NOTE: The V+ terminals are referred to as +RTN, and V– terminals are referred to as –48 V in "DC Power Wiring Sequence Warning" on page 168 and "DC Power Electrical Safety Guidelines" on page 164.
4. Ensure that the power supplies are fully inserted in the chassis.

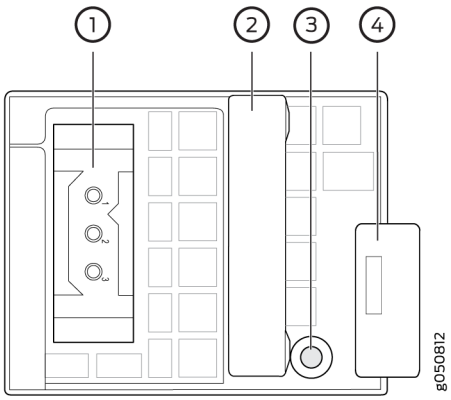
WARNING: Ensure that the power cables do not block access to device components or drape where people can trip on them.

5. The QFX5210 is designed to operate with a DC power supply that has a single, non-redundant, feed input. For source redundancy, two DC power supplies must be installed in QFX5210; connect source (A) to one power supply and connect source (B) to the second power supply. This configuration provides the commonly deployed A/B feed redundancy for the system.

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

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

Figure 32: DC Power Supply Faceplate for a QFX5210



1– Terminal block	3– Fault LED
2– Handle	4– Ejector lever

CAUTION: The V+ terminals are shunted internally together, as are the V- terminals. The same polarity terminal can be wired together from the same source to provide an additional current path in a higher power chassis. Do not connect the terminals to different sources.

6. Close the input circuit breaker.

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

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

SEE ALSO

QFX5210 DC Power Supply | 44

QFX5210 DC Power Supply LEDs | 48

Register Products—Mandatory to Validate SLAs

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

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

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

Performing the Initial Software Configuration for the QFX5210

Before you begin connecting and configuring a QFX5210, set the following parameter values on the console server or PC:

- Baud Rate—9600
- Flow Control—None

- Data—8
- Parity—None
- Stop Bits—1
- DCD State—Disregard

You must perform the initial configuration of the QFX5210 through the console port using the command-line interface (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.

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

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

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

To connect and configure the switch from the console:

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

```
[edit]
root@# set routing-options static route default next-hop address
```

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

```
[edit]
root@# set interfaces em0 unit 0 family inet address address/prefix-length
```

NOTE: The management port `em0` (**C0**) is found on the FRU end of the QFX5210 switch.

9. (Optional) Configure the static routes to remote prefixes with access to the management port.

```
[edit]
root@# set routing-options static route remote-prefix next-hop destination-ip retain no-
readvertise
```

10. Enable telnet service.

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

NOTE: When Telnet is enabled, you cannot log in to a QFX5210 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
```

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

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

5

CHAPTER

Maintaining Components

IN THIS CHAPTER

Maintaining QFX5210 Fan Modules

IN THIS SECTION

Removing a Fan Module from a QFX5210

Before you remove a fan module from a QFX5210, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).

Ensure that you have the following parts and tools available to remove a fan module from a QFX5210:

- ESD grounding strap
- Antistatic bag or an antistatic mat

The fan modules in QFX5210 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: Replace a failed fan module with a new fan module within 1 minute of removal to prevent chassis overheating. Before removing the fan module, ensure you have a replacement fan module at hand.

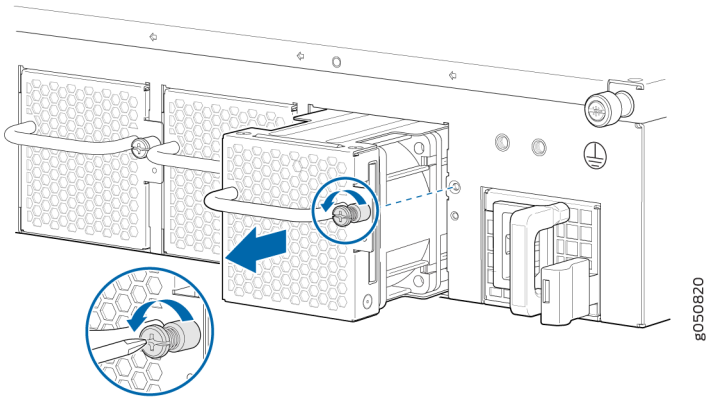
To remove a fan module from a QFX5210 (see Figure 33 on page 99):

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. Using a Phillips screwdriver, loosen the locking screw (3 or 4 turns).
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, 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 33: Removing a Fan Module from a 2 U QFX5210-64C



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.

SEE ALSO

QFX5210 Clearance Requirements for Airflow and Hardware Maintenance | 55

QFX5210 Field-Replaceable Units | 18

QFX5210 Management Panel Overview | 28

Installing a Fan Module in a QFX5210

Before you install a fan module in a QFX5210, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).

The fan modules in a QFX5210 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: Replace a failed fan module with a new fan module within 1 minute of removal to prevent chassis overheating. Before removing the fan module, ensure you have a replacement fan module at hand.

NOTE: The fan module provides FRU-to-port or port-to-FRU airflow depending on the switch product SKU you purchase. In legacy switches, or switches with an LCD, this airflow is called front to back and back to front.

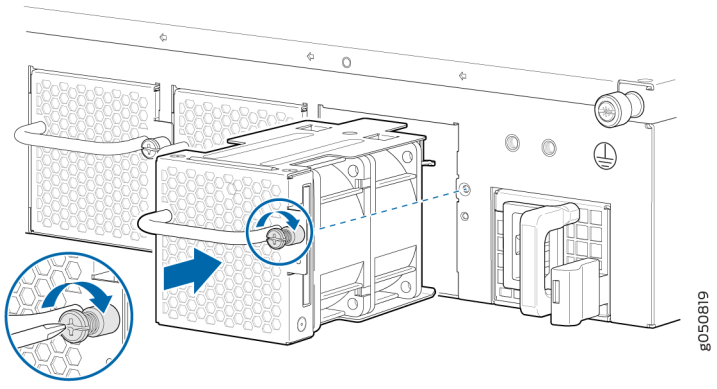
To install a fan module in a QFX5210 (see and Figure 34 on page 100):

1. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
2. Taking care not to touch the connectors, remove the fan module from its bag.
3. Align the module with the open slot on the management panel of the chassis and slide it in until it is fully seated.

   CAUTION: Damage can occur if you attempt to install a fan module into a chassis with a different airflow direction. Compare the switch product SKU 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 QFX5210 product SKU that supports the same airflow type. See "QFX5210 Cooling System Description" on page 33 for more information.

4. Using a Phillips screwdriver, turn the locking screw until it is tight.

Figure 34: Installing a Fan Module in a QFX5210-64C



SEE ALSO

QFX5210 Cooling System Description | 33

QFX5210 System Overview | 14

QFX5210 Management Panel Overview | 28

Maintaining QFX5210 Power Supplies

IN THIS SECTION

Removing a Power Supply from a QFX5210

Before you remove a power supply from a QFX5210, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).

Ensure that you have the following parts and tools available to remove a power supply from a QFX5210:

- ESD grounding strap
- Antistatic bag or an antistatic mat

The QFX5210 is shipped from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU) when the second power supply is installed and running. You can install replacement power supplies in the two slots next to the fan modules without powering off the switch or disrupting the switching function.

CAUTION: Replace the power supply with a new power supply within 1 minute of removal to prevent chassis overheating.

To remove a power supply from a QFX5210 (see Figure 35 on page 102):

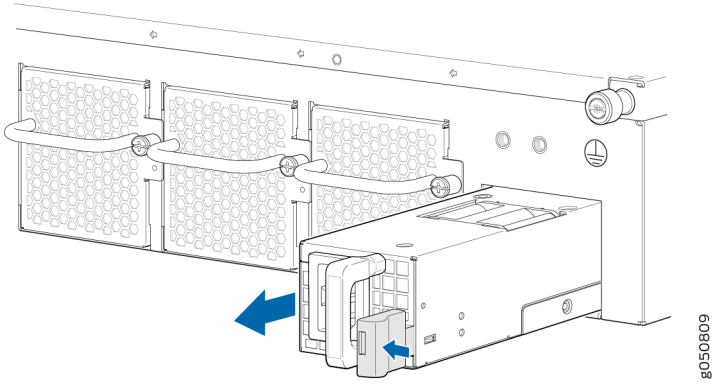
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.

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 QFX5210, you need to power off the switch before removing the power supply. See "Powering Off a QFX5210" on page 113.

3. Disconnect power to the switch:
   - AC power supply—If the AC power source outlet has a power switch, set it to the OFF (O) position. If the AC power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.
   - DC power supply—Switch the circuit breaker on the panel board that services the DC circuit to the OFF position.
4. Remove the power source cable from the power supply faceplate:
   - AC power supply—Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.
   - DC power supply—Remove the power source cables to the power supply using the screwdriver, and remove the power source cables from the power supply. Replace the screws on the terminals and tighten them.
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.
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.

Figure 35: Removing a Power Supply from a QFX5210



SEE ALSO

QFX5210 Power System | 38

Connecting the QFX5210 | 83

Installing a Power Supply in a QFX5210

- Before you install a power supply in a QFX5210, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "Prevention of Electrostatic Discharge Damage" on page 160).
- 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 "QFX5210 Cooling System Description" on page 33 for more information.

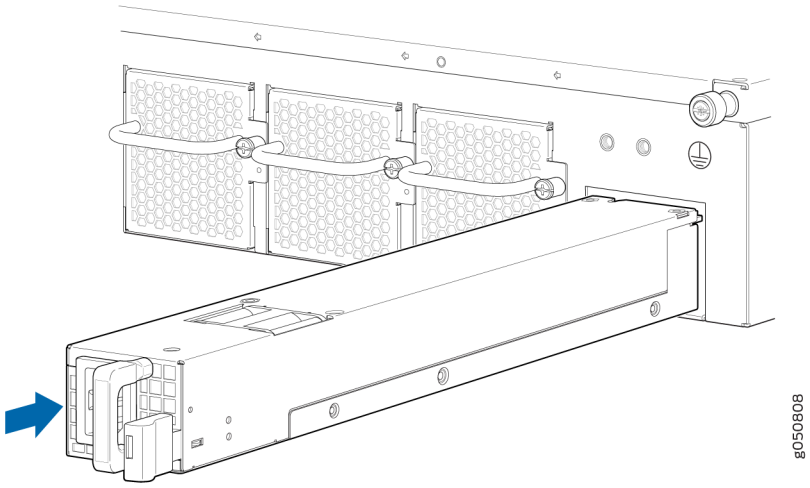
The QFX5210 is shipped from the factory with two power supplies. Each power supply is a hot-removable and hot-insertable field-replaceable unit (FRU) when the second power supply is installed and running. You can install replacement power supplies in the two slots next to the fan modules without powering off the switch or disrupting the switching function.

To install a power supply in a QFX5210 (see Figure 36 on page 104):

1. Attach the ESD grounding strap to your bare wrist, and connect the strap to the ESD point on the chassis.
2. Taking care not to touch power supply components, pins, leads, or solder connections, 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. 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 36: Installing a Power Supply in a QFX5210



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.

SEE ALSO

QFX5210 Power System | 38

Connecting the QFX5210 | 83

Maintaining Transceivers and Fiber-Optic Cables on QFX5210

IN THIS SECTION

Remove a Transceiver

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

Ensure that you have the following parts and tools available:

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

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

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

Figure 37 on page 107 shows how to remove a quad small form-factor pluggable plus (QSFP+) transceiver. The procedure is the same for all types of transceivers except the QSFP28 and C form-factor pluggable (CFP) transceivers.

To remove a transceiver from a device:

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

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

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

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

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

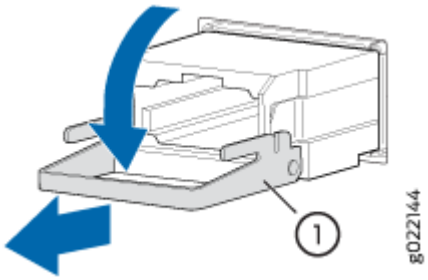
      Note that QSFP-DD and SFP-DD transceivers don't have ejector levers, instead they have a pull tab which can be used to unlock and remove the transceiver.

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

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

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

Figure 37: Remove a QSFP+ Transceiver



1– Ejector lever

To remove a CFP transceiver:

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

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

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

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

Install a Transceiver

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

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

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

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

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

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

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

Figure 38 on page 110 shows how to install a QSFP+ transceiver. The procedure is the same for all types of transceivers except the QSFP28 and CFP transceivers.

To install a transceiver:

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

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

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

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

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

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

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

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

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

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

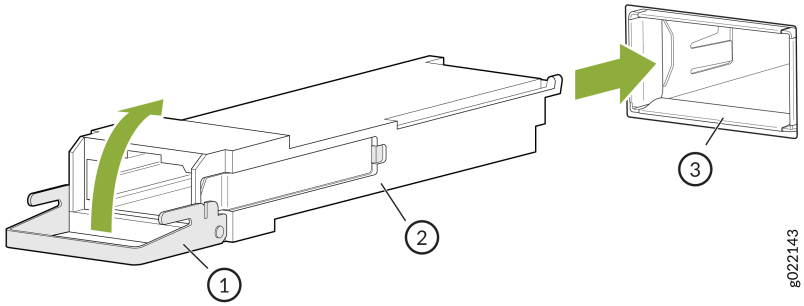
CAUTION: Avoid bending the fiber-optic cable beyond its minimum bend radius. An arc smaller than a few inches in diameter can damage the cable and cause problems that are difficult to diagnose.

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

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

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

Figure 38: Install a Transceiver



1– Ejector lever	3– Port
2– Transceiver	

Disconnect a Fiber-Optic Cable

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

Ensure that you have the following parts and tools available:

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

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

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

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

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

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

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

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

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

Connect a Fiber-Optic Cable

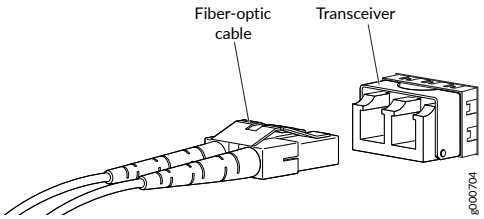
Before you connect a fiber-optic cable to an optical transceiver installed in a device, take the necessary precautions for safe handling of lasers (see Laser and LED Safety Guidelines and Warnings).

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

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

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

2. Remove the rubber safety cap from the optical transceiver. Save the cap.
3. Insert the cable connector into the optical transceiver.



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

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

How to Handle Fiber-Optic Cables

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

Follow these guidelines when handling fiber-optic cables:

- When you unplug a fiber-optic cable from a transceiver, place rubber safety caps over the transceiver and on the end of the cable.
- Anchor fiber-optic cables to prevent stress on the connectors. When attaching a fiber-optic cable to a transceiver, secure the fiber-optic cable so that it does not support its own weight as it hangs to the floor. Never let a fiber-optic cable hang free from the connector.
- Avoid bending the fiber-optic cables beyond their minimum bend radius. Bending fiber-optic cables into arcs smaller than a few inches in diameter can damage the cables and cause problems that are difficult to diagnose.
- Frequent plugging and unplugging of fiber-optic cables in and out of optical instruments can damage the instruments, which are expensive to repair. To prevent damage from overuse, attach a short fiber extension to the optical equipment. The short fiber extension absorbs wear and tear due to frequent plugging and unplugging. It is easier and more cost-efficient to replace the short fiber extension than to replace the instruments.

- Keep fiber-optic cable connections clean. Microdeposits of oil and dust in the canal of the transceiver or cable connector can cause loss of light, reduction in signal power, and possibly intermittent problems with the optical connection.
  - To clean the transceiver canal, use an appropriate fiber-cleaning device such as RIFOCS Fiber Optic Adaptor Cleaning Wands (part number 946). Follow the instructions in the cleaning kit you use.
  - After cleaning the transceiver, make sure that the connector tip of the fiber-optic cable is clean. Use only an approved alcohol-free fiber-optic cable cleaning kit such as the Opptex Cletop-S® Fiber Cleaner. Follow the instructions in the cleaning kit you use.

Powering Off a QFX5210

Before you remove the power cord to power off a QFX5210:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See "Prevention of Electrostatic Discharge Damage" on page 160.
- Ensure that you do not need to forward traffic through the switch.

NOTE: Use the following procedure to turn off power on a QFX5210 standalone switch.

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

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

To power off a QFX5210 switch:

1. Connect to the switch using one of the following methods:
   - Connect a management device to the console (**CON**) port on a QFX5210. For instructions about connecting a management device to the console (**CON**) port, see "Connect a Device to a Management Console Using an RJ-45 Connector" on page 86.
   - You can shut down the QFX5210 from a management device on your out-of-band management network. For instructions about connecting a management device to the management (**CO**) port, see "Connect a Device to a Network for Out-of-Band Management" on page 85.

2. Shut down Junos OS from the external management device by issuing the `request system halt` operational mode CLI command. This command shuts down the switch gracefully and preserves system state information. A message appears on the console, confirming that the operating system has halted.

   You see the following output (or something similar, depending on the hardware being shut down) after entering the command:

```
Shutdown NOW!
System going down IMMEDIATELY



Terminated
Poweroff for hypervisor to respawn
Oct 25 10:35:05 init: event-processing (PID 1114) exited with status=1
Oct 25 10:35:05 init: packet-forwarding-engine (PID 1424) exited with status=8
.
Waiting (max 60 seconds) for system process `vnlru_mem' to stop...done
Waiting (max 60 seconds) for system process `vnlru' to stop...done
Waiting (max 60 seconds) for system process `bufdaemon' to stop...done
Waiting (max 60 seconds) for system process `syncer' to stop...
Syncing disks, vnodes remaining...0 0 0 0 done

syncing disks... All buffers synced.
Uptime: 11h0m30s
Normal shutdown (no dump device defined)
unloading fpga driver
unloading fx-scpld
Powering system off using ACPI
kvm: 28646: cpu0 disabled perfctr wrmsr: 0xc1 data 0xabcd
pci-stub 0000:01:00.2: transaction is not cleared; proceeding with reset anyway
pci-stub 0000:01:00.1: transaction is not cleared; proceeding with reset anyway
hub 1-1:1.0: over-current change on port 1
Stopping crond: [  OK  ]
Stopping libvirtd daemon: [  OK  ]
Shutting down ntpd: [  OK  ]
Shutting down system logger: [  OK  ]
Shutting down sntpc: [  OK  ]
Stopping sshd: [  OK  ]
Stopping vehostd: [  OK  ]
Stopping watchdog: [  OK  ]
Stopping xinetd: [  OK  ]
Sending all processes the TERM signal... [  OK  ]
```

```
Sending all processes the KILL signal... [  OK  ]
Saving random seed:  [  OK  ]
Syncing hardware clock to system time [  OK  ]
Turning off swap:  [  OK  ]
Unmounting file systems:  [  OK  ]
init: Re-executing /sbin/init
Halting system...
System halted.
```

CAUTION: The final output of any version of the `request system halt` command is the "The operating system has halted." Wait at least 60 seconds after first seeing this message before following the instructions in Step 4 and Step 5 to power off the switch.

3. Attach the grounding strap to your bare wrist and to a site ESD point.
4. Disconnect power to the switch:
   - 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.
5. Remove the power source cable from the power supply faceplate:
   - AC power supply—Remove the power cord from the power supply faceplate by detaching the power cord retainer and gently pulling out the socket end of the power cord connected to the power supply faceplate.
   - DC power supply—Remove the power source cables to the power supply by unlatching the cables from the power supply.
6. Uncable the switch before removing it from the rack or cabinet.

RELATED DOCUMENTATION

Connecting the QFX5210 | 83

Removing a QFX5210 from a Rack or Cabinet

Before removing a QFX5210 from a rack:

Ensure that you have the following parts and tools available:

- A Phillips (+) screwdriver, number 2 or number 3, depending on the size of your rack mounting screws, for removing the QFX5210 from the rack.

If you need to relocate an installed QFX5210, use the procedure described in this topic. (The remainder of this topic uses “rack” to mean “rack or cabinet.”)

NOTE: When you remove multiple switches from a rack, remove the switch in the top of the rack first and proceed to remove the rest of the switches from top to bottom.

- Ensure that the rack is stable and secured to the building.
- Ensure that there is enough space to place the removed QFX5210 in its new location and along the path to the new location.
- Read "General Safety Guidelines and Warnings" on page 136.
- Use the power off sequence described in "Powering Off a QFX5210" on page 113 to safely power off the device.
- Disconnect the power cords.
- Ensure that you have disconnected any cables or wires attached to the QFX5210 network ports or Precision Time Protocol (PTP) ports.

To remove a QFX5210 from a rack or cabinet:

1. Have one person support the weight of the switch while another person uses the screwdriver to remove the front mounting screws that attach the chassis mounting brackets to the rack or cabinet.
2. Remove the QFX5210 from the rack or cabinet.
3. Use the screwdriver to remove the mounting screws that attach the mounting blades attached to the rear of the rack or cabinet.
4. Place the removed screws and mounting blades in a labeled bag. You will need them when you reinstall the chassis.
5. Transport the QFX5210 to your desired new location.

RELATED DOCUMENTATION

Mounting a QFX5210 in a Rack or Cabinet | 79

CHAPTER 6

Troubleshooting the QFX5210

IN THIS CHAPTER

Troubleshooting QFX5210 Components

IN THIS SECTION

Use the following topics to help diagnosis a problem with a QFX5210 switch component:

QFX5120 Troubleshooting Resources Overview

To troubleshoot a QFX5120, you use the Junos OS CLI, alarms, and LEDs on the network ports, management panel, and components.

- LEDs—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 QFX5120. For more information, see the following topics:
  - "QFX5210 Chassis Status LEDs" on page 30
  - "QFX5210 Management Port LEDs" on page 29
  - "QFX5210 Network Port LEDs" on page 25
  - "QFX5210 Fan Module LEDs" on page 37
  - "QFX5210 Power Supply LEDs" on page 46
- 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.
- 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.

SEE ALSO

QFX5210 Management Panel | 28

Contact Customer Support | 126

QFX Series Alarm Messages Overview

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

```
user@host> show chassis alarms
6 alarms currently active
Alarm time               Class  Description
2018-02-07 12:12:18 PST  Major  FPC Management1 Ethernet Link Down
2018-02-07 12:11:54 PST  Minor  FPC0: LED 3:Alarm LED Read Error
2018-02-07 12:11:54 PST  Minor  FPC0: LED 3:Alarm LED Write Error
2018-02-07 12:11:54 PST  Major  FPC0: PEM 1 Not Supported
2018-02-07 12:11:54 PST  Major  FPC0: PEM 0 Not Supported
2018-02-07 12:11:54 PST  Major  FPC0: PEM 0 Not Powered
```

For Junos OS Evolved systems, `show system alarms` CLI command indicates major and minor alarms on the system. In this example from a Junos OS Evolved system, a fan tray error is shown in slot **4**.

```
user@host> show system alarms
2 alarms currently active
Alarm time               Class  Description
2018-11-15 11:52:22 PST  Major  Fan Tray 4 Failure   <<<<<
2018-11-15 10:40:08 PST  Minor  Host 0 Disk 2 Labelled incorrectly
```

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 QFX5100, QFX5110, QFX5210, and QFX5120 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 36 on page 120. 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 36 on page 120 describes the chassis alarm messages on QFX5100, QFX5110, QFX5200, QFX5210, and QFX5120 devices.

Table 36: Chassis Alarm Messages

Component	Alarm Type	CLI Message	Recommended Action
Fans	Major (red)	`Fan Failure`	Replace the fan module and report the failure to customer support.
		`Fan I2C Failure`	Check the system log for one of the following error messages and report the message to customer support: • `CM ENV Monitor: Get fan speed failed.` • *`fan-number`* `is NOT spinning @ correct speed`, where *`fan-number`* can be 1, 2, 3, 4, or 5.
		`Fan` *`fan-number`* `Not Spinning`	Remove and check the fan module for obstructions, and then reinsert the fan module. If the problem persists, replace the fan module.

Table 36: Chassis Alarm Messages *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
	Minor (yellow)	`Fan/Blower Absent`	Check the system log for the error message *`fan-number`* `Absent`, where *`fan-number`* can be can be 1, 2, 3, 4, or 5. Install fan modules in the slots where they are absent.
Power supplies	Major (red)	`PEM` *`pem-number`* `Airflow not matching Chassis Airflow`	Replace the power supply with a power supply that supports the same airflow direction as supported by the chassis.
		`PEM` *`pem-number`* `I2C Failure`	Check the system log for one of the following error messages and report the message to customer support: • `I2C Read failed for device` *`number`*, where *`number`* where number ranges from 123 through 125. • `PS` *`number`*`: Transitioning from online to offline`, where power supply *`number`* is 1 or 2.
		`PEM` *`pem-number`* `is not powered`	Check the power cord connection and reconnect, if necessary.
		`PEM` *`pem-number`* `is not supported`	Replace the power supply with a supported power supply.
		`PEM` *`pem-number`* `Not OK`	Indicates a problem with the incoming AC power or outgoing DC power. Report the error to customer support.

Table 36: Chassis Alarm Messages *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
	Minor (yellow)	PEM *pem-number* Absent	Reboot the switch after removing one of the power supply. The switch can continue to operate with a single power supply. OR Replace the removed power supply and reboot the switch.
		PEM *pem-number* Power Supply Type Mismatch	Check whether there is a mix of AC and DC power supplies in the same chassis. Reboot the switch with only AC or only DC power supplies.
		PEM *pem-number* Removed	Replace the removed power supply or reboot the switch. The switch can continue to operate with a single power supply.
Temperature sensors	Major (red)	*sensor-location* Temp Sensor Fail	Check the system log for the following error message and report the message to customer support: Temp sensor *sensor-number* failed, where *sensor-number* ranges from 1 through 10.
		sensor-location Temp Sensor Too 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.

Table 36: Chassis Alarm Messages *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
	Minor (yellow)	*sensor-location* Temp Sensor Too 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.
Routing Engine	Minor (yellow)	RE *RE number* /var partition usage is high	Clean up the system file storage space on the switch. For more information, see *Cleaning Up the System File Storage Space*.
	Major (red)	RE *RE number* /var partition is full	Clean up the system file storage space on the switch. For more information, see *Cleaning Up the System File Storage Space*.
	Minor (yellow)	Rescue configuration is not set	Use the **request system configuration rescue save** command to set the rescue configuration. For more information, see *Setting or Deleting the Rescue Configuration*.
		Feature usage requires a license or License for *feature* expired	Install the required license for the feature specified in the alarm. For more information, see *Software Features That Require Licenses on the QFX Series*.

Table 36: Chassis Alarm Messages *(Continued)*

Component	Alarm Type	CLI Message	Recommended Action
Management Ethernet interface	Major (red)	`Management Ethernet 1 Link Down`	Check whether a cable is connected to the management Ethernet interface, or whether the cable is defective. Replace the cable, if required. On models that have both em0 and em1 management interfaces available, you must connect both interfaces. If both interfaces are not connected, the alarm is raised. However, the alarm has no service impact. If you are unable to resolve the problem, open a support case by using the Case Manager link at https://www.juniper.net/support/ or call 1-888-314-5822 (tollfree, US or 1-408-745-9500 (from outside the United States).

CHAPTER 7

Contacting Customer Support and Returning the Chassis or Components

IN THIS CHAPTER

Contact Customer Support

You can contact Juniper Networks Technical Assistance Center (JTAC) 24 hours a day, 7 days a week in one of the following ways:

- On the Web, using the Service Request Manager link at:

  https://support.juniper.net/support/

- By telephone:
  - From the US and Canada: 1-888-314-JTAC
  - From all other locations: 1-408-745-9500

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

When requesting support from JTAC by telephone, be prepared to provide the following information:

- Your existing service request number, if you have one
- 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
- Your name, organization name, telephone number, fax number, and shipping address

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

Returning the Chassis or Component

IN THIS SECTION

Locating the Serial Number on a QFX5210 Device or Component

IN THIS SECTION

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 the serial number to the Juniper Networks Technical Assistance Center (JTAC) when you contact them to obtain a Return Materials Authorization (RMA). See *Contacting Customer Support to Obtain a Return Materials Authorization for a QFX Series Device or Component*.

If the switch is operational and you can access the command-line interface (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.

Listing the Chassis and Component Details Using the CLI

To list the QFX5210 switch and components and their serial numbers, use the `show chassis hardware` CLI operational mode command.

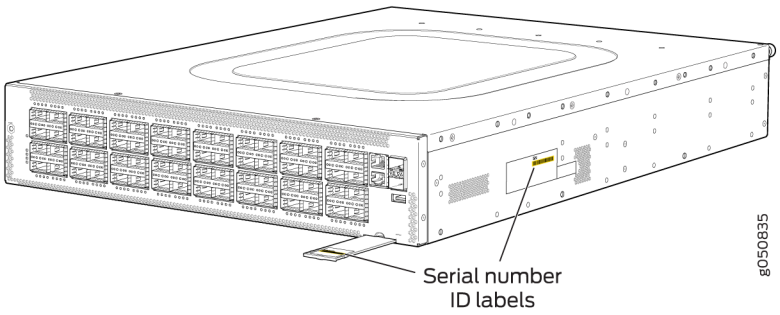
```
user@device> show chassis hardware
Hardware inventory:
Item             Version  Part number  Serial number     Description
Chassis                                YA3617340010      QFX5210-64C
Pseudo CB 0
Routing Engine 0          BUILTIN      BUILTIN           RE-QFX5210-64C
FPC 0            REV 01   650-079992   YA3617340010      QFX5210-64C
  CPU                     BUILTIN      BUILTIN           FPC CPU
  PIC 0                   BUILTIN      BUILTIN           64X40G/64X100G-QSFP
    Xcvr 10      REV 01   740-061406   1LUQ312100B       QSFP-100G-PSM4
    Xcvr 13      REV 01   740-061406   1LUQ312100A       QSFP-100G-PSM4
    Xcvr 41      REV 01   740-061406   1LUQ312700C       QSFP-100G-PSM4
    Xcvr 50      REV 01   740-061405   1ECQ112003P       QSFP-100GBASE-SR4
    Xcvr 53      REV 01   740-061405   1ECQ112003J       QSFP-100GBASE-SR4
Power Supply 0                         YM-2851F          FPC Type 2
Power Supply 1                         YM-2851F          FPC Type 2
Fan Tray 0                                               QFX5210 Fan Tray 0, Front to Back
Airflow - AFO
Fan Tray 1                                               QFX5210 Fan Tray 1, Front to Back
Airflow - AFO
Fan Tray 2                                               QFX5210 Fan Tray 2, Front to Back
Airflow - AFO
Fan Tray 3                                               QFX5210 Fan Tray 3, Front to Back
Airflow - AFO
```

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

Locating the Chassis Serial Number ID Label on a QFX5210

The location for the chassis serial number ID label is located on the right side of the QFX5210 port panel and in a pull-out tab under the product number on the port panel. SeeFigure 39 on page 129 for an example of where to find the serial number ID.

Figure 39: Location of the Serial Number ID Label on a QFX5210-64C Switch



Locating the Serial Number ID Labels on FRU Components

The power supplies and fan modules installed in a QFX5210 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.

- Power supply—The serial number ID label is on the top of the AC or DC power supply.

Figure 40: AC Power Supply Serial Number

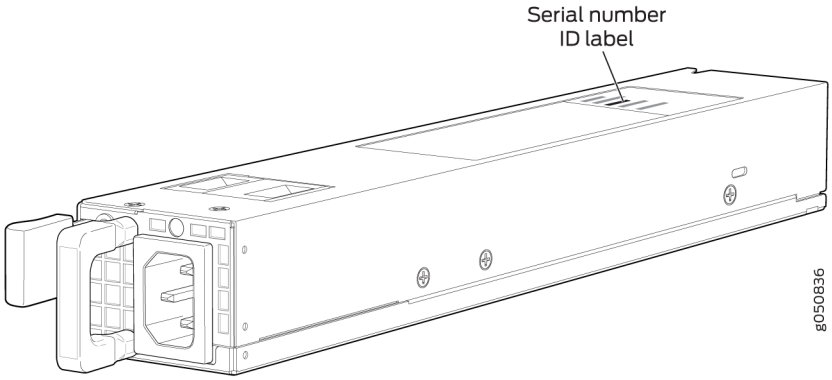
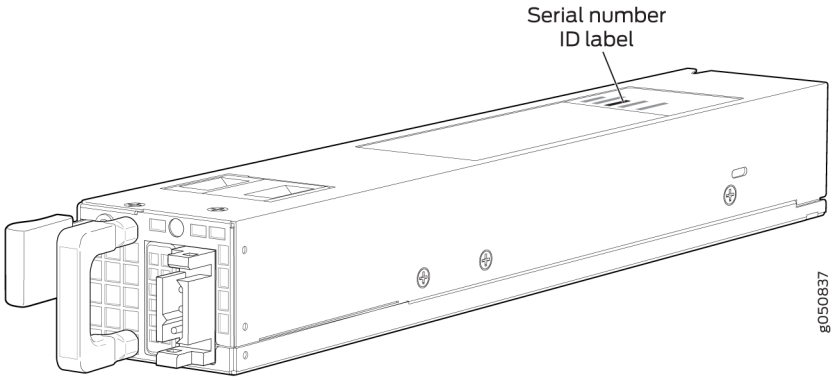
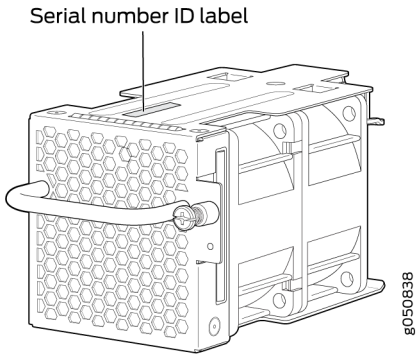


Figure 41: DC Power Supply Serial Number



- Fan module—The serial number ID label is on the top of the fan module.

Figure 42: Fan Module Serial Number

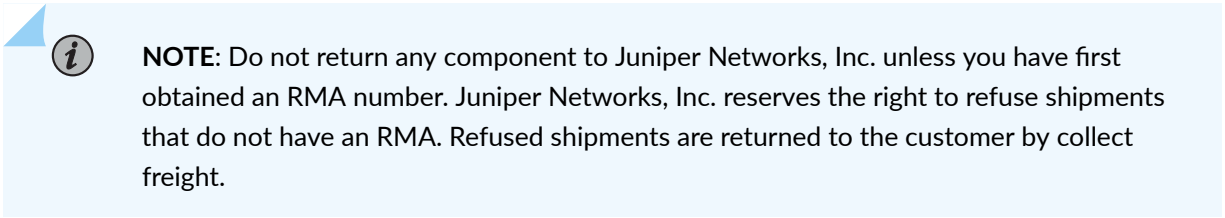


RELATED DOCUMENTATION

Contact Customer Support to Obtain Return Material Authorization

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

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



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

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

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

To return a defective hardware component:

1. Determine the part number and serial number of the defective component.
2. Obtain an RMA number from the Juniper Networks Technical Assistance Center (JTAC). You can send e-mail or telephone as described above.
3. Provide the following information in your e-mail message or during the telephone call:
   - Part number and serial number of component
   - Your name, organization name, telephone number, and fax number
   - Description of the failure
4. The support representative validates your request and issues an RMA number for return of the component.
5. Pack the component for shipment.

Guidelines for Packing Hardware Components for Shipment

To pack and ship individual components:

- When you return components, make sure that they are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
- Use the original shipping materials if they are available.
- Place individual components in antistatic bags.
- Write the RMA number on the exterior of the box to ensure proper tracking.

CAUTION: Do not stack any of the hardware components.

Packing an QFX5210 Device or Component for Shipping

IN THIS SECTION

If you are returning a QFX5210 or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you pack a QFX5210 or component:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See "Prevention of Electrostatic Discharge Damage" on page 160.
- Retrieve the original shipping carton and packing materials. Contact your JTAC representative if you do not have these materials, to learn about approved packing materials. See *Contact Customer Support to Obtain Return Material Authorization*.

Ensure that you have the following parts and tools available:

- ESD grounding strap.
- Antistatic bag, one for each component.
- If you are returning the chassis, an appropriate screwdriver for the mounting screws used on your rack or cabinet.

This topic describes:

Packing a QFX5210 Switch for Shipping

To pack a QFX5210 for shipping:

1. Power down the switch and remove the power cables. See "Powering Off a QFX5210" on page 113.

2. Remove the cables that connect the QFX5210 to all external devices.
3. Remove all field-replaceable units (FRUs) from the switch.
4. Have one person support the weight of the switch while another person unscrews and removes the mounting screws.
5. Remove the switch from the rack or cabinet (see *Chassis and Component Lifting Guidelines*) and place the switch in an antistatic bag.
6. Place the switch in the shipping carton.
7. Place the packing foam on top of and around the switch.
8. If you are returning accessories or FRUs with the switch, pack them as instructed in "Packing QFX5210 Components for Shipping" on page 133.
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 QFX5210 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 QFX5210 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

Powering Off a QFX5210 | 113

8
CHAPTER

Safety and Compliance Information

IN THIS CHAPTER

General Safety Guidelines and Warnings

The following guidelines help ensure your safety and protect the device from damage. The list of guidelines might not address all potentially hazardous situations in your working environment, so be alert and exercise good judgment at all times.

- Perform only the procedures explicitly described in the hardware documentation for this device. Make sure that only authorized service personnel perform other system services.
- Keep the area around the device clear and free from dust before, during, and after installation.
- Keep tools away from areas where people could trip over them while walking.
- Do not wear loose clothing or jewelry, such as rings, bracelets, or chains, which could become caught in the device.
- Wear safety glasses if you are working under any conditions that could be hazardous to your eyes.
- Do not perform any actions that create a potential hazard to people or make the equipment unsafe.
- Never attempt to lift an object that is too heavy for one person to handle.
- Never install or manipulate wiring during electrical storms.
- Never install electrical jacks in wet locations unless the jacks are specifically designed for wet environments.
- Operate the device only when it is properly grounded.
- Follow the instructions in this guide to properly ground the device to earth.
- Replace fuses only with fuses of the same type and rating.
- Do not open or remove chassis covers or sheet-metal parts unless instructions are provided in the hardware documentation for this device. Such an action could cause severe electrical shock.
- Do not push or force any objects through any opening in the chassis frame. Such an action could result in electrical shock or fire.
- Avoid spilling liquid onto the chassis or onto any device component. Such an action could cause electrical shock or damage the device.
- Avoid touching uninsulated electrical wires or terminals that have not been disconnected from their power source. Such an action could cause electrical shock.

- Some parts of the chassis, including AC and DC power supply surfaces, power supply unit handles, SFB card handles, and fan tray handles might become hot. The following label provides the warning for hot surfaces on the chassis:

- Always ensure that all modules, power supplies, and cover panels are fully inserted and that the installation screws are fully tightened.

Definitions of Safety Warning Levels

The documentation uses the following levels of safety warnings (there are two *Warning* formats):

NOTE: You might find this information helpful in a particular situation, or you might overlook this important information if it was not highlighted in a Note.

CAUTION: You need to observe the specified guidelines to prevent minor injury or discomfort to you or severe damage to the device.

Attention Veillez à respecter les consignes indiquées pour éviter toute incommodité ou blessure légère, voire des dégâts graves pour l'appareil.

LASER WARNING: This symbol alerts you to the risk of personal injury from a laser.

Avertissement Ce symbole signale un risque de blessure provoquée par rayon laser.

WARNING: This symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry, and familiarize yourself with standard practices for preventing accidents.

Waarschuwing Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient

u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.

Varoitus Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.

Avertissement Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.

Warnung Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.

Avvertenza Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti.

Advarsel Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

Aviso Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes.

¡Atención! Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes.

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

Qualified Personnel Warning

WARNING: Only trained and qualified personnel should install or replace the device.
Waarschuwing Installatie en reparaties mogen uitsluitend door getraind en bevoegd personeel uitgevoerd worden.

Varoitus Ainoastaan koulutettu ja pätevä henkilökunta saa asentaa tai vaihtaa tämän laitteen.

Avertissement Tout installation ou remplacement de l'appareil doit être réalisé par du personnel qualifié et compétent.

Warnung Gerät nur von geschultem, qualifiziertem Personal installieren oder auswechseln lassen.

Avvertenza Solo personale addestrato e qualificato deve essere autorizzato ad installare o sostituire questo apparecchio.

Advarsel Kun kvalifisert personell med riktig opplæring bør montere eller bytte ut dette utstyret.

Aviso Este equipamento deverá ser instalado ou substituído apenas por pessoal devidamente treinado e qualificado.

¡Atención! Estos equipos deben ser instalados y reemplazados exclusivamente por personal técnico adecuadamente preparado y capacitado.

Varning! Denna utrustning ska endast installeras och bytas ut av utbildad och kvalificerad personal.

Warning Statement for Norway and Sweden

WARNING: The equipment must be connected to an earthed mains socket-outlet.
Advarsel Apparatet skal kobles til en jordet stikkontakt.

Varning! Apparaten skall anslutas till jordat nätuttag.

Fire Safety Requirements

IN THIS SECTION

In the event of a fire emergency, the safety of people is the primary concern. You should establish procedures for protecting people in the event of a fire emergency, provide safety training, and properly provision fire-control equipment and fire extinguishers.

In addition, you should establish procedures to protect your equipment in the event of a fire emergency. Juniper Networks products should be installed in an environment suitable for electronic equipment. We recommend that fire suppression equipment be available in the event of a fire in the vicinity of the equipment and that all local fire, safety, and electrical codes and ordinances be observed when you install and operate your equipment.

Fire Suppression

In the event of an electrical hazard or an electrical fire, you should first turn power off to the equipment at the source. Then use a Type C fire extinguisher, which uses noncorrosive fire retardants, to extinguish the fire.

Fire Suppression Equipment

Type C fire extinguishers, which use noncorrosive fire retardants such as carbon dioxide and Halotron™, are most effective for suppressing electrical fires. Type C fire extinguishers displace oxygen from the point of combustion to eliminate the fire. For extinguishing fire on or around equipment that draws air from the environment for cooling, you should use this type of inert oxygen displacement extinguisher instead of an extinguisher that leaves residues on equipment.

Do not use multipurpose Type ABC chemical fire extinguishers (dry chemical fire extinguishers). The primary ingredient in these fire extinguishers is monoammonium phosphate, which is very sticky and

difficult to clean. In addition, in the presence of minute amounts of moisture, monoammonium phosphate can become highly corrosive and corrodes most metals.

Any equipment in a room in which a chemical fire extinguisher has been discharged is subject to premature failure and unreliable operation. The equipment is considered to be irreparably damaged.

NOTE: To keep warranties effective, do not use a dry chemical fire extinguisher to control a fire at or near a Juniper Networks device. If a dry chemical fire extinguisher is used, the unit is no longer eligible for coverage under a service agreement.

We recommend that you dispose of any irreparably damaged equipment in an environmentally responsible manner.

Installation Instructions Warning

WARNING: Read the installation instructions before you connect the device to a power source.

Waarschuwing Raadpleeg de installatie-aanwijzingen voordat u het systeem met de voeding verbindt.

Varoitus Lue asennusohjeet ennen järjestelmän yhdistämistä virtalähteeseen.

Avertissement Avant de brancher le système sur la source d'alimentation, consulter les directives d'installation.

Warnung Lesen Sie die Installationsanweisungen, bevor Sie das System an die Stromquelle anschließen.

Avvertenza Consultare le istruzioni di installazione prima di collegare il sistema all'alimentatore.

Advarsel Les installasjonsinstruksjonene før systemet kobles til strømkilden.

Aviso Leia as instruções de instalação antes de ligar o sistema à sua fonte de energia.

¡Atención! Ver las instrucciones de instalación antes de conectar el sistema a la red de alimentación.

Varning! Läs installationsanvisningarna innan du kopplar systemet till dess strömförsörjningsenhet.

Restricted Access Warning

WARNING: This unit is intended for installation in restricted access areas. A restricted access area is an area to which access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and which is controlled by the authority responsible for the location.

Waarschuwing Dit toestel is bedoeld voor installatie op plaatsen met beperkte toegang. Een plaats met beperkte toegang is een plaats waar toegang slechts door servicepersoneel verkregen kan worden door middel van een speciaal instrument, een slot en sleutel, of een ander veiligheidsmiddel, en welke beheerd wordt door de overheidsinstantie die verantwoordelijk is voor de locatie.

Varoitus Tämä laite on tarkoitettu asennettavaksi paikkaan, johon pääsy on rajoitettua. Paikka, johon pääsy on rajoitettua, tarkoittaa paikkaa, johon vain huoltohenkilöstö pääsee jonkin erikoistyökalun, lukkoon sopivan avaimen tai jonkin muun turvalaitteen avulla ja joka on paikasta vastuussa olevien toimivaltaisten henkilöiden valvoma.

Avertissement Cet appareil est à installer dans des zones d'accès réservé. Ces dernières sont des zones auxquelles seul le personnel de service peut accéder en utilisant un outil spécial, un mécanisme de verrouillage et une clé, ou tout autre moyen de sécurité. L'accès aux zones de sécurité est sous le contrôle de l'autorité responsable de l'emplacement.

Warnung Diese Einheit ist zur Installation in Bereichen mit beschränktem Zutritt vorgesehen. Ein Bereich mit beschränktem Zutritt ist ein Bereich, zu dem nur Wartungspersonal mit einem Spezialwerkzeugs, Schloß und Schlüssel oder anderer Sicherheitsvorkehrungen Zugang hat, und der von dem für die Anlage zuständigen Gremium kontrolliert wird.

Avvertenza Questa unità deve essere installata in un'area ad accesso limitato. Un'area ad accesso limitato è un'area accessibile solo a personale di assistenza tramite un'attrezzo speciale, lucchetto, o altri dispositivi di sicurezza, ed è controllata dall'autorità responsabile della zona.

Advarsel Denne enheten er laget for installasjon i områder med begrenset adgang. Et område med begrenset adgang gir kun adgang til servicepersonale som bruker et spesielt verktøy, lås og nøkkel, eller en annen sikkerhetsanordning, og det kontrolleres av den autoriteten som er ansvarlig for området.

Aviso Esta unidade foi concebida para instalação em áreas de acesso restrito. Uma área de acesso restrito é uma área à qual apenas tem acesso o pessoal de serviço autorizado,

que possua uma ferramenta, chave e fechadura especial, ou qualquer outra forma de segurança. Esta área é controlada pela autoridade responsável pelo local.

¡Atención! Esta unidad ha sido diseñada para instalarse en áreas de acceso restringido. Área de acceso restringido significa un área a la que solamente tiene acceso el personal de servicio mediante la utilización de una herramienta especial, cerradura con llave, o algún otro medio de seguridad, y que está bajo el control de la autoridad responsable del local.

Varning! Denna enhet är avsedd för installation i områden med begränsat tillträde. Ett område med begränsat tillträde får endast tillträdas av servicepersonal med ett speciellt verktyg, lås och nyckel, eller annan säkerhetsanordning, och kontrolleras av den auktoritet som ansvarar för området.

Ramp Warning

WARNING: When installing the device, do not use a ramp inclined at more than 10 degrees.
Waarschuwing Gebruik een oprijplaat niet onder een hoek van meer dan 10 graden.

Varoitus Älä käytä sellaista kaltevaa pintaa, jonka kaltevuus ylittää 10 astetta.

Avertissement Ne pas utiliser une rampe dont l'inclinaison est supérieure à 10 degrés.

Warnung Keine Rampen mit einer Neigung von mehr als 10 Grad verwenden.

Avvertenza Non usare una rampa con pendenza superiore a 10 gradi.

Advarsel Bruk aldri en rampe som heller mer enn 10 grader.

Aviso Não utilize uma rampa com uma inclinação superior a 10 graus.

¡Atención! No usar una rampa inclinada más de 10 grados.

Varning! Använd inte ramp med en lutning på mer än 10 grader.

Rack-Mounting and Cabinet-Mounting Warnings

Ensure that the rack or cabinet in which the device is installed is evenly and securely supported. Uneven mechanical loading could lead to a hazardous condition.

WARNING: To prevent bodily injury when mounting or servicing the device in a rack, take the following precautions to ensure that the system remains stable. The following directives help maintain your safety:

- Install the device in a rack that is secured to the building structure.
- Mount the device at the bottom of the rack if it is the only unit in the rack.
- When mounting the device on a partially filled rack, load the rack from the bottom to the top, with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing equipment, install the stabilizers before mounting or servicing the device in the rack.

Waarschuwing Om lichamelijk letsel te voorkomen wanneer u dit toestel in een rek monteert of het daar een servicebeurt geeft, moet u speciale voorzorgsmaatregelen nemen om ervoor te zorgen dat het toestel stabiel blijft. De onderstaande richtlijnen worden verstrekt om uw veiligheid te verzekeren:

- De Juniper Networks switch moet in een stellage worden geïnstalleerd die aan een bouwsel is verankerd.
- Dit toestel dient onderaan in het rek gemonteerd te worden als het toestel het enige in het rek is.
- Wanneer u dit toestel in een gedeeltelijk gevuld rek monteert, dient u het rek van onderen naar boven te laden met het zwaarste onderdeel onderaan in het rek.
- Als het rek voorzien is van stabiliseringshulpmiddelen, dient u de stabilisatoren te monteren voordat u het toestel in het rek monteert of het daar een servicebeurt geeft.

Varoitus Kun laite asetetaan telineeseen tai huolletaan sen ollessa telineessä, on noudatettava erityisiä varotoimia järjestelmän vakavuuden säilyttämiseksi, jotta vältytään loukkaantumiselta. Noudata seuraavia turvallisuusohjeita:

- Juniper Networks switch on asennettava telineeseen, joka on kiinnitetty rakennukseen.
- Jos telineessä ei ole muita laitteita, aseta laite telineen alaosaan.
- Jos laite asetetaan osaksi täytettyyn telineeseen, aloita kuormittaminen sen alaosasta kaikkein raskaimmalla esineellä ja siirry sitten sen yläosaan.
- Jos telinettä varten on vakaimet, asenna ne ennen laitteen asettamista telineeseen tai sen huoltamista siinä.

Avertissement Pour éviter toute blessure corporelle pendant les opérations de montage ou de réparation de cette unité en casier, il convient de prendre des précautions spéciales afin de maintenir la stabilité du système. Les directives ci-dessous sont destinées à assurer la protection du personnel:

- Le rack sur lequel est monté le Juniper Networks switch doit être fixé à la structure du bâtiment.
- Si cette unité constitue la seule unité montée en casier, elle doit être placée dans le bas.
- Si cette unité est montée dans un casier partiellement rempli, charger le casier de bas en haut en plaçant l'élément le plus lourd dans le bas.
- Si le casier est équipé de dispositifs stabilisateurs, installer les stabilisateurs avant de monter ou de réparer l'unité en casier.

Warnung Zur Vermeidung von Körperverletzung beim Anbringen oder Warten dieser Einheit in einem Gestell müssen Sie besondere Vorkehrungen treffen, um sicherzustellen, daß das System stabil bleibt. Die folgenden Richtlinien sollen zur Gewährleistung Ihrer Sicherheit dienen:

- Der Juniper Networks switch muß in einem Gestell installiert werden, das in der Gebäudestruktur verankert ist.
- Wenn diese Einheit die einzige im Gestell ist, sollte sie unten im Gestell angebracht werden.
- Bei Anbringung dieser Einheit in einem zum Teil gefüllten Gestell ist das Gestell von unten nach oben zu laden, wobei das schwerste Bauteil unten im Gestell anzubringen ist.

- Wird das Gestell mit Stabilisierungszubehör geliefert, sind zuerst die Stabilisatoren zu installieren, bevor Sie die Einheit im Gestell anbringen oder sie warten.

Avvertenza Per evitare infortuni fisici durante il montaggio o la manutenzione di questa unità in un supporto, occorre osservare speciali precauzioni per garantire che il sistema rimanga stabile. Le seguenti direttive vengono fornite per garantire la sicurezza personale:

- Il Juniper Networks switch deve essere installato in un telaio, il quale deve essere fissato alla struttura dell'edificio.
- Questa unità deve venire montata sul fondo del supporto, se si tratta dell'unica unità da montare nel supporto.
- Quando questa unità viene montata in un supporto parzialmente pieno, caricare il supporto dal basso all'alto, con il componente più pesante sistemato sul fondo del supporto.
- Se il supporto è dotato di dispositivi stabilizzanti, installare tali dispositivi prima di montare o di procedere alla manutenzione dell'unità nel supporto.

Advarsel Unngå fysiske skader under montering eller reparasjonsarbeid på denne enheten når den befinner seg i et kabinett. Vær nøye med at systemet er stabilt. Følgende retningslinjer er gitt for å verne om sikkerheten:

- Juniper Networks switch må installeres i et stativ som er forankret til bygningsstrukturen.
- Denne enheten bør monteres nederst i kabinettet hvis dette er den eneste enheten i kabinettet.
- Ved montering av denne enheten i et kabinett som er delvis fylt, skal kabinettet lastes fra bunnen og opp med den tyngste komponenten nederst i kabinettet.
- Hvis kabinettet er utstyrt med stabiliseringsutstyr, skal stabilisatorene installeres før montering eller utføring av reparasjonsarbeid på enheten i kabinettet.

Aviso Para se prevenir contra danos corporais ao montar ou reparar esta unidade numa estante, deverá tomar precauções especiais para se certificar de que o sistema possui um suporte estável. As seguintes directrizes ajudá-lo-ão a efectuar o seu trabalho com segurança:

- O Juniper Networks switch deverá ser instalado numa prateleira fixa à estrutura do edificio.

- Esta unidade deverá ser montada na parte inferior da estante, caso seja esta a única unidade a ser montada.
- Ao montar esta unidade numa estante parcialmente ocupada, coloque os itens mais pesados na parte inferior da estante, arrumando-os de baixo para cima.
- Se a estante possuir um dispositivo de estabilização, instale-o antes de montar ou reparar a unidade.

¡Atención! Para evitar lesiones durante el montaje de este equipo sobre un bastidor, oeriormente durante su mantenimiento, se debe poner mucho cuidado en que el sistema quede bien estable. Para garantizar su seguridad, proceda según las siguientes instrucciones:

- El Juniper Networks switch debe instalarse en un bastidor fijado a la estructura del edificio.
- Colocar el equipo en la parte inferior del bastidor, cuando sea la única unidad en el mismo.
- Cuando este equipo se vaya a instalar en un bastidor parcialmente ocupado, comenzar la instalación desde la parte inferior hacia la superior colocando el equipo más pesado en la parte inferior.
- Si el bastidor dispone de dispositivos estabilizadores, instalar éstos antes de montar o proceder al mantenimiento del equipo instalado en el bastidor.

Varning! För att undvika kroppsskada när du installerar eller utför underhållsarbete på denna enhet på en ställning måste du vidta särskilda försiktighetsåtgärder för att försäkra dig om att systemet står stadigt. Följande riktlinjer ges för att trygga din säkerhet:

- Juniper Networks switch måste installeras i en ställning som är förankrad i byggnadens struktur.
- Om denna enhet är den enda enheten på ställningen skall den installeras längst ned på ställningen.
- Om denna enhet installeras på en delvis fylld ställning skall ställningen fyllas nedifrån och upp, med de tyngsta enheterna längst ned på ställningen.
- Om ställningen är försedd med stabiliseringsdon skall dessa monteras fast innan enheten installeras eller underhålls på ställningen.

Grounded Equipment Warning

WARNING: This device must be properly grounded at all times. Follow the instructions in this guide to properly ground the device to earth.

Waarschuwing Dit apparaat moet altijd goed geaard zijn. Volg de instructies in deze gids om het apparaat goed te aarden.

Varoitus Laitteen on oltava pysyvästi maadoitettu. Maadoita laite asianmukaisesti noudattamalla tämän oppaan ohjeita.

Avertissement L'appareil doit être correctement mis à la terre à tout moment. Suivez les instructions de ce guide pour correctement mettre l'appareil à la terre.

Warnung Das Gerät muss immer ordnungsgemäß geerdet sein. Befolgen Sie die Anweisungen in dieser Anleitung, um das Gerät ordnungsgemäß zu erden.

Avvertenza Questo dispositivo deve sempre disporre di una connessione a massa. Seguire le istruzioni indicate in questa guida per connettere correttamente il dispositivo a massa.

Advarsel Denne enheten på jordes skikkelig hele tiden. Følg instruksjonene i denne veiledningen for å jorde enheten.

Aviso Este equipamento deverá estar ligado à terra. Siga las instrucciones en esta guía para conectar correctamente este dispositivo a tierra.

¡Atención! Este dispositivo debe estar correctamente conectado a tierra en todo momento. Siga las instrucciones en esta guía para conectar correctamente este dispositivo a tierra.

Varning! Den här enheten måste vara ordentligt jordad. Följ instruktionerna i den här guiden för att jorda enheten ordentligt.

Laser and LED Safety Guidelines and Warnings

IN THIS SECTION

Juniper Networks devices are equipped with laser transmitters, which are considered a Class 1 Laser Product by the U.S. Food and Drug Administration and are evaluated as a Class 1 Laser Product per IEC/EN 60825-1 requirements.

Observe the following guidelines and warnings:

General Laser Safety Guidelines

When working around ports that support optical transceivers, observe the following safety guidelines to prevent eye injury:

- Do not look into unterminated ports or at fibers that connect to unknown sources.
- Do not examine unterminated optical ports with optical instruments.
- Avoid direct exposure to the beam.

LASER WARNING: Unterminated optical connectors can emit invisible laser radiation. The lens in the human eye focuses all the laser power on the retina, so focusing the eye directly on a laser source—even a low-power laser—could permanently damage the eye.

Avertissement Les connecteurs à fibre optique sans terminaison peuvent émettre un rayonnement laser invisible. Le cristallin de l'œil humain faisant converger toute la puissance du laser sur la rétine, toute focalisation directe de l'œil sur une source laser, — même de faible puissance—, peut entraîner des lésions oculaires irréversibles.

Class 1 Laser Product Warning

LASER WARNING: Class 1 laser product.

Waarschuwing Klasse-1 laser produkt.

Varoitus Luokan 1 lasertuote.

Avertissement Produit laser de classe I.

Warnung Laserprodukt der Klasse 1.

Avvertenza Prodotto laser di Classe 1.

Advarsel Laserprodukt av klasse 1.

Aviso Produto laser de classe 1.

¡Atención! Producto láser Clase I.

Varning! Laserprodukt av klass 1.

Class 1 LED Product Warning

LASER WARNING: Class 1 LED product.
Waarschuwing Klasse 1 LED-product.

Varoitus Luokan 1 valodiodituote.

Avertissement Alarme de produit LED Class I.

Warnung Class 1 LED-Produktwarnung.

Avvertenza Avvertenza prodotto LED di Classe 1.

Advarsel LED-produkt i klasse 1.

Aviso Produto de classe 1 com LED.

¡Atención! Aviso sobre producto LED de Clase 1.

Varning! Lysdiodprodukt av klass 1.

Laser Beam Warning

LASER WARNING: Do not stare into the laser beam or view it directly with optical instruments.
Waarschuwing Niet in de straal staren of hem rechtstreeks bekijken met optische instrumenten.

Varoitus Älä katso säteeseen äläkä tarkastele sitä suoraan optisen laitteen avulla.

Avertissement Ne pas fixer le faisceau des yeux, ni l'observer directement à l'aide d'instruments optiques.

Warnung Nicht direkt in den Strahl blicken und ihn nicht direkt mit optischen Geräten prüfen.

Avvertenza Non fissare il raggio con gli occhi né usare strumenti ottici per osservarlo direttamente.

Advarsel Stirr eller se ikke direkte p strlen med optiske instrumenter.

Aviso Não olhe fixamente para o raio, nem olhe para ele directamente com instrumentos ópticos.

¡Atención! No mirar fijamente el haz ni observarlo directamente con instrumentos ópticos.

Varning! Rikta inte blicken in mot strålen och titta inte direkt på den genom optiska instrument.

Radiation from Open Port Apertures Warning

LASER WARNING: Because invisible radiation might be emitted from the aperture of the port when no fiber cable is connected, avoid exposure to radiation and do not stare into open apertures.
Waarschuwing Aangezien onzichtbare straling vanuit de opening van de poort kan komen als er geen fiberkabel aangesloten is, dient blootstelling aan straling en het kijken in open openingen vermeden te worden.

Varoitus Koska portin aukosta voi emittoitua näkymätöntä säteilyä, kun kuitukaapelia ei ole kytkettynä, vältä säteilylle altistumista äläkä katso avoimiin aukkoihin.

Avertissement Des radiations invisibles à l'il nu pouvant traverser l'ouverture du port lorsqu'aucun câble en fibre optique n'y est connecté, il est recommandé de ne pas regarder fixement l'intérieur de ces ouvertures.

Warnung Aus der Port-Öffnung können unsichtbare Strahlen emittieren, wenn kein Glasfaserkabel angeschlossen ist. Vermeiden Sie es, sich den Strahlungen auszusetzen, und starren Sie nicht in die Öffnungen!

Avvertenza Quando i cavi in fibra non sono inseriti, radiazioni invisibili possono essere emesse attraverso l'apertura della porta. Evitate di esporvi alle radiazioni e non guardate direttamente nelle aperture.

Advarsel Unngå utsettelse for stråling, og stirr ikke inn i åpninger som er åpne, fordi usynlig stråling kan emiteres fra portens åpning når det ikke er tilkoblet en fiberkabel.

Aviso Dada a possibilidade de emissão de radiação invisível através do orifício da via de acesso, quando esta não tiver nenhum cabo de fibra conectado, deverá evitar an EXposição à radiação e não deverá olhar fixamente para orifícios que se encontrarem a descoberto.

¡Atención! Debido a que la apertura del puerto puede emitir radiación invisible cuando no existe un cable de fibra conectado, evite mirar directamente a las aperturas para no exponerse a la radiación.

Varning! Osynlig strålning kan avges från en portöppning utan ansluten fiberkabel och du bör därför undvika att bli utsatt för strålning genom att inte stirra in i oskyddade öppningar.

Maintenance and Operational Safety Guidelines and Warnings

IN THIS SECTION

While performing the maintenance activities for devices, observe the following guidelines and warnings:

Battery Handling Warning

WARNING: Replacing a battery incorrectly might result in an explosion. Replace a battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Waarschuwing Er is ontploffingsgevaar als de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type dat door de fabrikant aanbevolen is. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften weggeworpen te worden.

Varoitus Räjähdyksen vaara, jos akku on vaihdettu väärään akkuun. Käytä vaihtamiseen ainoastaan saman- tai vastaavantyyppistä akkua, joka on valmistajan suosittelema. Hävitä käytetyt akut valmistajan ohjeiden mukaan.

Avertissement Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

Warnung Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

Advarsel Det kan være fare for eksplosjon hvis batteriet skiftes på feil måte. Skift kun med samme eller tilsvarende type som er anbefalt av produsenten. Kasser brukte batterier i henhold til produsentens instruksjoner.

Avvertenza Pericolo di esplosione se la batteria non è installata correttamente. Sostituire solo con una di tipo uguale o equivalente, consigliata dal produttore. Eliminare le batterie usate secondo le istruzioni del produttore.

Aviso Existe perigo de explosão se a bateria for substituída incorrectamente. Substitua a bateria por uma bateria igual ou de um tipo equivalente recomendado pelo fabricante. Destrua as baterias usadas conforme as instruções do fabricante.

¡Atención! Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la baterían EXclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

Varning! Explosionsfara vid felaktigt batteribyte. Ersätt endast batteriet med samma batterityp som rekommenderas av tillverkaren eller motsvarande. Följ tillverkarens anvisningar vid kassering av använda batterier.

Jewelry Removal Warning

WARNING: Before working on equipment that is connected to power lines, remove jewelry, including rings, necklaces, and watches. Metal objects heat up when connected to power and ground and can cause serious burns or can be welded to the terminals.

Waarschuwing Alvorens aan apparatuur te werken die met elektrische leidingen is verbonden, sieraden (inclusief ringen, kettingen en horloges) verwijderen. Metalen voorwerpen worden warm wanneer ze met stroom en aarde zijn verbonden, en kunnen ernstige brandwonden veroorzaken of het metalen voorwerp aan de aansluitklemmen lassen.

Varoitus Ennen kuin työskentelet voimavirtajohtoihin kytkettyjen laitteiden parissa, ota pois kaikki korut (sormukset, kaulakorut ja kellot mukaan lukien). Metalliesineet kuumenevat, kun ne ovat yhteydessä sähkövirran ja maan kanssa, ja ne voivat aiheuttaa vakavia palovammoja tai hitsata metalliesineet kiinni liitäntänapoihin.

Avertissement Avant d'accéder à cet équipement connecté aux lignes électriques, ôter tout bijou (anneaux, colliers et montres compris). Lorsqu'ils sont branchés à l'alimentation et reliés à la terre, les objets métalliques chauffent, ce qui peut provoquer des blessures graves ou souder l'objet métallique aux bornes.

Warnung Vor der Arbeit an Geräten, die an das Netz angeschlossen sind, jeglichen Schmuck (einschließlich Ringe, Ketten und Uhren) abnehmen. Metallgegenstände erhitzen sich, wenn sie an das Netz und die Erde angeschlossen werden, und können schwere Verbrennungen verursachen oder an die Anschlußklemmen angeschweißt werden.

Avvertenza Prima di intervenire su apparecchiature collegate alle linee di alimentazione, togliersi qualsiasi monile (inclusi anelli, collane, braccialetti ed orologi). Gli oggetti metallici si riscaldano quando sono collegati tra punti di alimentazione e massa: possono causare ustioni gravi oppure il metallo può saldarsi ai terminali.

Advarsel Fjern alle smykker (inkludert ringer, halskjeder og klokker) før du skal arbeide på utstyr som er koblet til kraftledninger. Metallgjenstander som er koblet til kraftledninger og jord blir svært varme og kan forårsake alvorlige brannskader eller smelte fast til polene.

Aviso Antes de trabalhar em equipamento que esteja ligado a linhas de corrente, retire todas as jóias que estiver a usar (incluindo anéis, fios e relógios). Os objectos metálicos aquecerão em contacto com a corrente e em contacto com a ligação à terra, podendo causar queimaduras graves ou ficarem soldados aos terminais.

¡Atención! Antes de operar sobre equipos conectados a líneas de alimentación, quitarse las joyas (incluidos anillos, collares y relojes). Los objetos de metal se calientan cuando se conectan a la alimentación y a tierra, lo que puede ocasionar quemaduras graves o que los objetos metálicos queden soldados a los bornes.

Varning! Tag av alla smycken (inklusive ringar, halsband och armbandsur) innan du arbetar på utrustning som är kopplad till kraftledningar. Metallobjekt hettas upp när de kopplas ihop med ström och jord och kan förorsaka allvarliga brännskador; metallobjekt kan också sammansvetsas med kontakterna.

Lightning Activity Warning

WARNING: Do not work on the system or connect or disconnect cables during periods of lightning activity.

Waarschuwing Tijdens onweer dat gepaard gaat met bliksem, dient u niet aan het systeem te werken of kabels aan te sluiten of te ontkoppelen.

Varoitus Älä työskentele järjestelmän parissa äläkä yhdistä tai irrota kaapeleita ukkosilmalla.

Avertissement Ne pas travailler sur le système ni brancher ou débrancher les câbles pendant un orage.

Warnung Arbeiten Sie nicht am System und schließen Sie keine Kabel an bzw. trennen Sie keine ab, wenn es gewittert.

Avvertenza Non lavorare sul sistema o collegare oppure scollegare i cavi durante un temporale con fulmini.

Advarsel Utfør aldri arbeid på systemet, eller koble kabler til eller fra systemet når det tordner eller lyner.

Aviso Não trabalhe no sistema ou ligue e desligue cabos durante períodos de mau tempo (trovoada).

¡Atención! No operar el sistema ni conectar o desconectar cables durante el transcurso de descargas eléctricas en la atmósfera.

Varning! Vid åska skall du aldrig utföra arbete på systemet eller ansluta eller koppla loss kablar.

Operating Temperature Warning

WARNING: To prevent the device from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature. To prevent airflow restriction, allow at least 6 in. (15.2 cm) of clearance around the ventilation openings.

Waarschuwing Om te voorkomen dat welke switch van de Juniper Networks router dan ook oververhit raakt, dient u deze niet te bedienen op een plaats waar de maximale aanbevolen omgevingstemperatuur van 40° C wordt overschreden. Om te voorkomen dat de luchtstroom wordt beperkt, dient er minstens 15,2 cm speling rond de ventilatie-openingen te zijn.

Varoitus Ettei Juniper Networks switch-sarjan reititin ylikuumentuisi, sitä ei saa käyttää tilassa, jonka lämpötila ylittää korkeimman suositellun ympäristölämpötilan 40° C. Ettei ilmanvaihto estyisi, tuuletusaukkojen ympärille on jätettävä ainakin 15,2 cm tilaa.

Avertissement Pour éviter toute surchauffe des routeurs de la gamme Juniper Networks switch, ne l'utilisez pas dans une zone où la température ambiante est supérieure à 40° C. Pour permettre un flot d'air constant, dégagez un espace d'au moins 15,2 cm autour des ouvertures de ventilations.

Warnung Um einen Router der switch vor Überhitzung zu schützen, darf dieser nicht in einer Gegend betrieben werden, in der die Umgebungstemperatur das empfohlene

Maximum von 40° C überschreitet. Um Lüftungsverschluß zu verhindern, achten Sie darauf, daß mindestens 15,2 cm lichter Raum um die Lüftungsöffnungen herum frei bleibt.

Avvertenza Per evitare il surriscaldamento dei switch, non adoperateli in un locale che ecceda la temperatura ambientale massima di 40° C. Per evitare che la circolazione dell'aria sia impedita, lasciate uno spazio di almeno 15.2 cm di fronte alle aperture delle ventole.

Advarsel Unngå overoppheting av eventuelle rutere i Juniper Networks switch Disse skal ikke brukes på steder der den anbefalte maksimale omgivelsestemperaturen overstiger 40° C (104° F). Sørg for at klaringen rundt lufteåpningene er minst 15,2 cm (6 tommer) for å forhindre nedsatt luftsirkulasjon.

Aviso Para evitar o sobreaquecimento do encaminhador Juniper Networks switch, não utilize este equipamento numa área que exceda a temperatura máxima recomendada de 40° C. Para evitar a restrição à circulação de ar, deixe pelo menos um espaço de 15,2 cm à volta das aberturas de ventilação.

¡Atención! Para impedir que un encaminador de la serie Juniper Networks switch se recaliente, no lo haga funcionar en un área en la que se supere la temperatura ambiente máxima recomendada de 40° C. Para impedir la restricción de la entrada de aire, deje un espacio mínimo de 15,2 cm alrededor de las aperturas para ventilación.

Varning! Förhindra att en Juniper Networks switch överhettas genom att inte använda den i ett område där den maximalt rekommenderade omgivningstemperaturen på 40° C överskrids. Förhindra att luftcirkulationen inskränks genom att se till att det finns fritt utrymme på minst 15,2 cm omkring ventilationsöppningarna.

Product Disposal Warning

WARNING: Disposal of this device must be handled according to all national laws and regulations.

Waarschuwing Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.

Varoitus Tämän tuotteen lopullisesta hävittämisestä tulee huolehtia kaikkia valtakunnallisia lakeja ja säännöksiä noudattaen.

Avertissement La mise au rebut définitive de ce produit doit être effectuée conformément à toutes les lois et réglementations en vigueur.

Warnung Dieses Produkt muß den geltenden Gesetzen und Vorschriften entsprechend entsorgt werden.

Avvertenza L'eliminazione finale di questo prodotto deve essere eseguita osservando le normative italiane vigenti in materia

Advarsel Endelig disponering av dette produktet må skje i henhold til nasjonale lover og forskrifter.

Aviso A descartagem final deste produto deverá ser efectuada de acordo com os regulamentos e a legislação nacional.

¡Atención! El desecho final de este producto debe realizarse según todas las leyes y regulaciones nacionales

Varning! Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

General Electrical Safety Guidelines and Warnings

WARNING: Certain ports on the device are designed for use as intrabuilding (within-the-building) interfaces only (Type 2 or Type 4 ports as described in *GR-1089-CORE*) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS (Network Equipment-Building System) requirements and protect against lightning surges and commercial power disturbances, the intrabuilding ports *must not* be metallically connected to interfaces that connect to the OSP or its wiring. The intrabuilding ports on the device are suitable for connection to intrabuilding or unexposed wiring or cabling only. The addition of primary protectors is not sufficient protection for connecting these interfaces metallically to OSP wiring.

Avertissement Certains ports de l'appareil sont destinés à un usage en intérieur uniquement (ports Type 2 ou Type 4 tels que décrits dans le document *GR-1089-CORE*) et doivent être isolés du câblage de l'installation extérieure exposée. Pour respecter les exigences NEBS et assurer une protection contre la foudre et les perturbations de tension secteur, les ports pour intérieur *ne doivent pas* être raccordés physiquement aux interfaces prévues pour la connexion à l'installation extérieure ou à son câblage. Les

ports pour intérieur de l'appareil sont réservés au raccordement de câbles pour intérieur ou non exposés uniquement. L'ajout de protections ne constitue pas une précaution suffisante pour raccorder physiquement ces interfaces au câblage de l'installation extérieure.

CAUTION: Before removing or installing components of a device, connect an electrostatic discharge (ESD) grounding strap to an ESD point and wrap and fasten the other end of the strap around your bare wrist. Failure to use an ESD grounding strap could result in damage to the device.

Attention Avant de retirer ou d'installer des composants d'un appareil, raccordez un bracelet antistatique à un point de décharge électrostatique et fixez le bracelet à votre poignet nu. L'absence de port d'un bracelet antistatique pourrait provoquer des dégâts sur l'appareil.

- Install the device in compliance with the following local, national, and international electrical codes:
  - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
  - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.
  - Evaluated to the TN power system.
  - Canada—Canadian Electrical Code, Part 1, CSA C22.1.
  - Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

    Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- Locate the emergency power-off switch for the room in which you are working so that if an electrical accident occurs, you can quickly turn off the power.
- Make sure that you clean grounding surface and give them a bright finish before making grounding connections.
- Do not work alone if potentially hazardous conditions exist anywhere in your workspace.
- Never assume that power is disconnected from a circuit. Always check the circuit before starting to work.
- Carefully look for possible hazards in your work area, such as moist floors, ungrounded power extension cords, and missing safety grounds.

- Operate the device within marked electrical ratings and product usage instructions.
- To ensure that the device and peripheral equipment function safely and correctly, use the cables and connectors specified for the attached peripheral equipment, and make certain they are in good condition.

You can remove and replace many device components without powering off or disconnecting power to the device, as detailed elsewhere in the hardware documentation for this device. Never install equipment that appears to be damaged.

Action to Take After an Electrical Accident

If an electrical accident results in an injury, take the following actions in this order:

1. Use caution. Be aware of potentially hazardous conditions that could cause further injury.
2. Disconnect power from the device.
3. If possible, send another person to get medical aid. Otherwise, assess the condition of the victim, and then call for help.

Prevention of Electrostatic Discharge Damage

Device components that are shipped in antistatic bags are sensitive to damage from static electricity. Some components can be impaired by voltages as low as 30 V. You can easily generate potentially damaging static voltages whenever you handle plastic or foam packing material or if you move components across plastic or carpets. Observe the following guidelines to minimize the potential for electrostatic discharge (ESD) damage, which can cause intermittent or complete component failures:

- Always use an ESD wrist strap when you are handling components that are subject to ESD damage, and make sure that it is in direct contact with your skin.

  If a grounding strap is not available, hold the component in its antistatic bag (see Figure 43 on page 161) in one hand and touch the exposed, bare metal of the device with the other hand immediately before inserting the component into the device.

WARNING: For safety, periodically check the resistance value of the ESD grounding strap. The measurement must be in the range 1 through 10 Mohms.

Avertissement Par mesure de sécurité, vérifiez régulièrement la résistance du bracelet antistatique. Cette valeur doit être comprise entre 1 et 10 mégohms (Mohms).

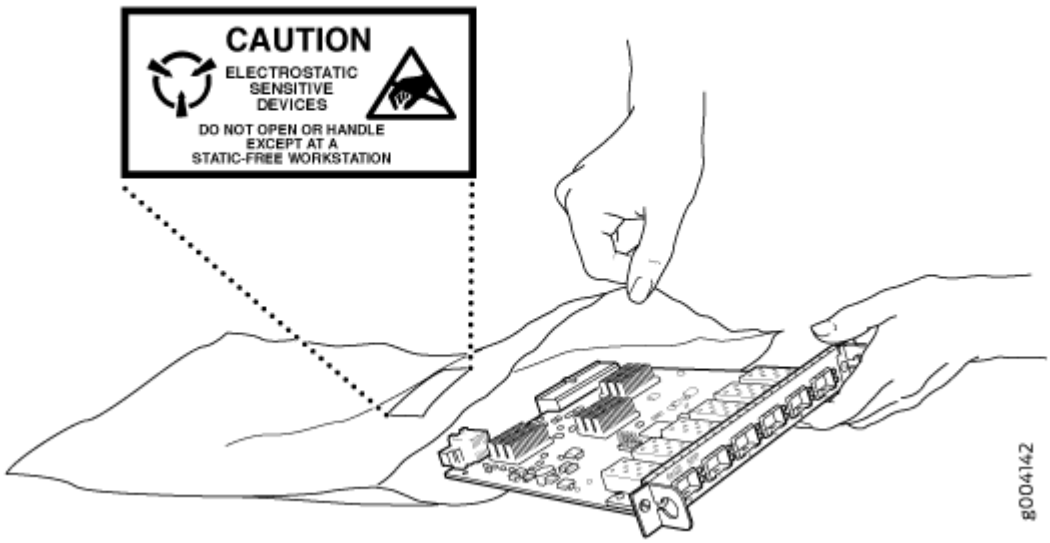
- When handling any component that is subject to ESD damage and that is removed from the device, make sure the equipment end of your ESD wrist strap is attached to the ESD point on the chassis.

  If no grounding strap is available, touch the exposed, bare metal of the device to ground yourself before handling the component.

- Avoid contact between the component that is subject to ESD damage and your clothing. ESD voltages emitted from clothing can damage components.

- When removing or installing a component that is subject to ESD damage, always place it component-side up on an antistatic surface, in an antistatic card rack, or in an antistatic bag (see Figure 43 on page 161). If you are returning a component, place it in an antistatic bag before packing it.

Figure 43: Placing a Component into an Antistatic Bag



CAUTION: ANSI/TIA/EIA-568 cables such as Category 5e and Category 6 can get electrostatically charged. To dissipate this charge, always ground the cables to a suitable and safe earth ground before connecting them to the system.

Attention Les câbles ANSI/TIA/EIA-568, par exemple Cat 5e et Cat 6, peuvent emmagasiner des charges électrostatiques. Pour évacuer ces charges, reliez toujours les câbles à une prise de terre adaptée avant de les raccorder au système.

AC Power Electrical Safety Guidelines

The following electrical safety guidelines apply to AC-powered devices:

- Note the following warnings printed on the device:

  "**CAUTION:** THIS UNIT HAS MORE THAN ONE POWER SUPPLY CORD. DISCONNECT ALL POWER SUPPLY CORDS BEFORE SERVICING TO AVOID ELECTRIC SHOCK."

  "**ATTENTION:** CET APPAREIL COMPORTE PLUS D'UN CORDON D'ALIMENTATION. AFIN DE PRÉVENIR LES CHOCS ÉLECTRIQUES, DÉBRANCHER TOUT CORDON D'ALIMENTATION AVANT DE FAIRE LE DÉPANNAGE."

- AC-powered devices are shipped with a three-wire electrical cord with a grounding-type plug that fits only a grounding-type power outlet. Do not circumvent this safety feature. Equipment grounding must comply with local and national electrical codes.
- You must provide an external certified circuit breaker (2-pole circuit breaker or 4-pole circuit breaker based on your device) rated minimum 20 A in the building installation.
- The power cord serves as the main disconnecting device for the AC-powered device. The socket outlet must be near the AC-powered device and be easily accessible.
- For devices that have more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed to prevent electric shock. To disconnect power, unplug all power cords (one for each power supply).

Power Cable Warning (Japanese)

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

附属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。

AC Power Disconnection Warning

WARNING: Before working on the device or near power supplies, unplug all the power cords from an AC-powered device.

Waarschuwing Voordat u aan een frame of in de nabijheid van voedingen werkt, dient u bij wisselstroom toestellen de stekker van het netsnoer uit het stopcontact te halen.

Varoitus Kytke irti vaihtovirtalaitteiden virtajohto, ennen kuin teet mitään asennuspohjalle tai työskentelet virtalähteiden läheisyydessä.

Avertissement Avant de travailler sur un châssis ou à proximité d'une alimentation électrique, débrancher le cordon d'alimentation des unités en courant alternatif.

Warnung Bevor Sie an einem Chassis oder in der Nähe von Netzgeräten arbeiten, ziehen Sie bei Wechselstromeinheiten das Netzkabel ab bzw.

Avvertenza Prima di lavorare su un telaio o intorno ad alimentatori, scollegare il cavo di alimentazione sulle unità CA.

Advarsel Før det utføres arbeid på kabinettet eller det arbeides i nærheten av strømforsyningsenheter, skal strømledningen trekkes ut på vekselstrømsenheter.

Aviso Antes de trabalhar num chassis, ou antes de trabalhar perto de unidades de fornecimento de energia, desligue o cabo de alimentação nas unidades de corrente alternada.

¡Atención! Antes de manipular el chasis de un equipo o trabajar cerca de una fuente de alimentación, desenchufar el cable de alimentación en los equipos de corriente alterna (CA).

Varning! Innan du arbetar med ett chassi eller nära strömförsörjningsenheter skall du för växelströmsenheter dra ur nätsladden.

DC Power Electrical Safety Guidelines

- A DC-powered device is equipped with a DC terminal block that is rated for the power requirements of a maximally configured device.
- For permanently connected equipment, a readily accessible disconnect device shall be incorporated external to the equipment.
- For pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible.
- Be sure to connect the ground wire or conduit to a solid central office earth ground.
- A closed loop ring is recommended for terminating the ground conductor at the ground stud.
- Run two wires from the circuit breaker box to a source of 48 VDC.
- A DC-powered device that is equipped with a DC terminal block is intended only for installation in a restricted-access location. In the United States, a restricted-access area is one in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code ANSI/NFPA 70.

  NOTE: Primary overcurrent protection is provided by the building circuit breaker. This breaker must protect against excess currents, short circuits, and earth grounding faults in accordance with NEC ANSI/NFPA 70.

- Ensure that the polarity of the DC input wiring is correct. Under certain conditions, connections with reversed polarity might trip the primary circuit breaker or damage the equipment.
- The marked input voltage of –48 VDC for a DC-powered device is the nominal voltage associated with the battery circuit, and any higher voltages are only to be associated with float voltages for the charging function.

- Because the device is a positive ground system, you must connect the positive lead to the terminal labeled **RTN**, the negative lead to the terminal labeled –48 VDC, and the earth ground to the device grounding points.

DC Power Copper Conductors Warning

WARNING: Use copper conductors only.
Waarschuwing Gebruik alleen koperen geleiders.

Varoitus Käytä vain kuparijohtimia.

Attention Utilisez uniquement des conducteurs en cuivre.

Warnung Verwenden Sie ausschließlich Kupferleiter.

Avvertenza Usate unicamente dei conduttori di rame.

Advarsel Bruk bare kobberledninger.

Aviso Utilize apenas fios condutores de cobre.

¡Atención! Emplee sólo conductores de cobre.

Varning! Använd endast ledare av koppar.

DC Power Disconnection Warning

WARNING: Before performing any of the DC power procedures, ensure that power is removed from the DC circuit. To ensure that all power is off, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the device handle of the circuit breaker in the OFF position.

Waarschuwing Voordat u een van de onderstaande procedures uitvoert, dient u te controleren of de stroom naar het gelijkstroom circuit uitgeschakeld is. Om u ervan te verzekeren dat alle stroom UIT is geschakeld, kiest u op het schakelbord de stroomverbreker die het gelijkstroom circuit bedient, draait de stroomverbreker naar de

UIT positie en plakt de schakelaarhendel van de stroomverbreker met plakband in de UIT positie vast.

Varoitus Varmista, että tasavirtapiirissä ei ole virtaa ennen seuraavien toimenpiteiden suorittamista. Varmistaaksesi, että virta on KATKAISTU täysin, paikanna tasavirrasta huolehtivassa kojetaulussa sijaitseva suojakytkin, käännä suojakytkin KATKAISTU-asentoon ja teippaa suojakytkimen varsi niin, että se pysyy KATKAISTU-asennossa.

Avertissement Avant de pratiquer l'une quelconque des procédures ci-dessous, vérifier que le circuit en courant continu n'est plus sous tension. Pour en être sûr, localiser le disjoncteur situé sur le panneau de service du circuit en courant continu, placer le disjoncteur en position fermée (OFF) et, à l'aide d'un ruban adhésif, bloquer la poignée du disjoncteur en position OFF.

Warnung Vor Ausführung der folgenden Vorgänge ist sicherzustellen, daß die Gleichstromschaltung keinen Strom erhält. Um sicherzustellen, daß sämtlicher Strom abgestellt ist, machen Sie auf der Schalttafel den Unterbrecher für die Gleichstromschaltung ausfindig, stellen Sie den Unterbrecher auf AUS, und kleben Sie den Schaltergriff des Unterbrechers mit Klebeband in der AUS-Stellung fest.

Avvertenza Prima di svolgere una qualsiasi delle procedure seguenti, verificare che il circuito CC non sia alimentato. Per verificare che tutta l'alimentazione sia scollegata (OFF), individuare l'interruttore automatico sul quadro strumenti che alimenta il circuito CC, mettere l'interruttore in posizione OFF e fissarlo con nastro adesivo in tale posizione.

Advarsel Før noen av disse prosedyrene utføres, kontroller at strømmen er frakoblet likestrømkretsen. Sørg for at all strøm er slått AV. Dette gjøres ved å lokalisere strømbryteren på brytertavlen som betjener likestrømkretsen, slå strømbryteren AV og teipe bryterhåndtaket på strømbryteren i AV-stilling.

Aviso Antes de executar um dos seguintes procedimentos, certifique-se que desligou a fonte de alimentação de energia do circuito de corrente contínua. Para se assegurar que toda a corrente foi DESLIGADA, localize o disjuntor no painel que serve o circuito de corrente contínua e coloque-o na posição OFF (Desligado), segurando nessa posição a manivela do interruptor do disjuntor com fita isoladora.

¡Atención! Antes de proceder con los siguientes pasos, comprobar que la alimentación del circuito de corriente continua (CC) esté cortada (OFF). Para asegurarse de que toda la alimentación esté cortada (OFF), localizar el interruptor automático en el panel que alimenta al circuito de corriente continua, cambiar el interruptor automático a la posición de Apagado (OFF), y sujetar con cinta la palanca del interruptor automático en posición de Apagado (OFF).

Varning! Innan du utför någon av följande procedurer måste du kontrollera att strömförsörjningen till likströmskretsen är bruten. Kontrollera att all strömförsörjning är BRUTEN genom att slå AV det överspänningsskydd som skyddar likströmskretsen och tejpa fast överspänningsskyddets omkopplare i FRÅN-läget.

DC Power Grounding Requirements and Warning

An insulated grounding conductor that is identical in size to the grounded and ungrounded branch circuit supply conductors but is identifiable by green and yellow stripes is installed as part of the branch circuit that supplies the device. The grounding conductor is a separately derived system at the supply transformer or motor generator set.

WARNING: When you install the device, the ground connection must always be made first and disconnected last.

Waarschuwing Bij de installatie van het toestel moet de aardverbinding altijd het eerste worden gemaakt en het laatste worden losgemaakt.

Varoitus Laitetta asennettaessa on maahan yhdistäminen aina tehtävä ensiksi ja maadoituksen irti kytkeminen viimeiseksi.

Avertissement Lors de l'installation de l'appareil, la mise à la terre doit toujours être connectée en premier et déconnectée en dernier.

Warnung Der Erdanschluß muß bei der Installation der Einheit immer zuerst hergestellt und zuletzt abgetrennt werden.

Avvertenza In fase di installazione dell'unità, eseguire sempre per primo il collegamento a massa e disconnetterlo per ultimo.

Advarsel Når enheten installeres, må jordledningen alltid tilkobles først og frakobles sist.

Aviso Ao instalar a unidade, a ligação à terra deverá ser sempre a primeira a ser ligada, e a última a ser desligada.

¡Atención! Al instalar el equipo, conectar la tierra la primera y desconectarla la última.

Varning! Vid installation av enheten måste jordledningen alltid anslutas först och kopplas bort sist.

DC Power Wiring Sequence Warning

WARNING: Wire the DC power supply using the appropriate lugs. When connecting power, the proper wiring sequence is ground to ground, +RTN to +RTN, then –48 V to –48 V. When disconnecting power, the proper wiring sequence is –48 V to –48 V, +RTN to +RTN, then ground to ground. Note that the ground wire must always be connected first and disconnected last.

Waarschuwing De juiste bedradingsvolgorde verbonden is aarde naar aarde, +RTN naar +RTN, en –48 V naar – 48 V. De juiste bedradingsvolgorde losgemaakt is en –48 naar –48 V, +RTN naar +RTN, aarde naar aarde.

Varoitus Oikea yhdistettava kytkentajarjestys on maajohto maajohtoon, +RTN varten +RTN, –48 V varten – 48 V. Oikea irrotettava kytkentajarjestys on –48 V varten – 48 V, +RTN varten +RTN, maajohto maajohtoon.

Avertissement Câblez l'approvisionnement d'alimentation CC En utilisant les crochets appropriés à l'extrémité de câblage. En reliant la puissance, l'ordre approprié de câblage est rectifié pour rectifier, +RTN à +RTN, puis –48 V à –48 V. En débranchant la puissance, l'ordre approprié de câblage est –48 V à –48 V, +RTN à +RTN, a alors rectifié pour rectifier. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois. Notez que le fil de masse devrait toujours être relié d'abord et débranché pour la dernière fois.

Warnung Die Stromzufuhr ist nur mit geeigneten Ringösen an das DC Netzteil anzuschliessen. Die richtige Anschlusssequenz ist: Erdanschluss zu Erdanschluss, +RTN zu +RTN und dann -48V zu -48V. Die richtige Sequenz zum Abtrennen der Stromversorgung ist -48V zu -48V, +RTN zu +RTN und dann Erdanschluss zu Erdanschluss. Es ist zu beachten dass der Erdanschluss immer zuerst angeschlossen und als letztes abgetrennt wird.

Avvertenza Mostra la morsettiera dell alimentatore CC. Cablare l'alimentatore CC usando i connettori adatti all'estremità del cablaggio, come illustrato. La corretta sequenza di cablaggio è da massa a massa, da positivo a positivo (da linea ad L) e da negativo a negativo (da neutro a N). Tenere presente che il filo di massa deve sempre venire collegato per primo e scollegato per ultimo.

Advarsel Riktig tilkoples tilkoplingssekvens er jord til jord, +RTN til +RTN, –48 V til –48 V. Riktig frakoples tilkoplingssekvens er –48 V til – 48 V, +RTN til +RTN, jord til jord.

Aviso Ate con alambre la fuente de potencia cc Usando los terminales apropiados en el extremo del cableado. Al conectar potencia, la secuencia apropiada del cableado se

muele para moler, +RTN a +RTN, entonces −48 V a −48 V. Al desconectar potencia, la secuencia apropiada del cableado es −48 V a −48 V, +RTN a +RTN, entonces molió para moler. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último. Observe que el alambre de tierra se debe conectar siempre primero y desconectar por último.

¡Atención! Wire a fonte de alimentação de DC Usando os talões apropriados nan EXtremidade da fiação. Ao conectar a potência, a seqüência apropriada da fiação é moída para moer, +RTN a +RTN, então −48 V a −48 V. Ao desconectar a potência, a seqüência apropriada da fiação é −48 V a −48 V, +RTN a +RTN, moeu então para moer. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último. Anote que o fio à terra deve sempre ser conectado primeiramente e desconectado por último.

Varning! Korrekt kopplingssekvens ar jord till jord, +RTN till +RTN, −48 V till −48 V. Korrekt kopplas kopplingssekvens ar −48 V till −48 V, +RTN till +RTN, jord till jord.

DC Power Wiring Terminations Warning

WARNING: When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations must be the appropriate size for the wires and must clamp both the insulation and conductor.

Waarschuwing Wanneer geslagen bedrading vereist is, dient u bedrading te gebruiken die voorzien is van goedgekeurde aansluitingspunten, zoals het gesloten-lus type of het grijperschop type waarbij de aansluitpunten omhoog wijzen. Deze aansluitpunten dienen de juiste maat voor de draden te hebben en dienen zowel de isolatie als de geleider vast te klemmen.

Varoitus Jos säikeellinen johdin on tarpeen, käytä hyväksyttyä johdinliitäntää, esimerkiksi suljettua silmukkaa tai kourumaista liitäntää, jossa on ylöspäin käännetyt kiinnityskorvat. Tällaisten liitäntöjen tulee olla kooltaan johtimiin sopivia ja niiden tulee puristaa yhteen sekä eristeen että johdinosan.

Avertissement Quand des fils torsadés sont nécessaires, utiliser des douilles terminales homologuées telles que celles à circuit fermé ou du type à plage ouverte avec cosses rebroussées. Ces douilles terminales doivent être de la taille qui convient aux fils et doivent être refermées sur la gaine isolante et sur le conducteur.

Warnung Wenn Litzenverdrahtung erforderlich ist, sind zugelassene Verdrahtungsabschlüsse, z.B. für einen geschlossenen Regelkreis oder gabelförmig, mit nach oben gerichteten Kabelschuhen zu verwenden. Diese Abschlüsse sollten die angemessene Größe für die Drähte haben und sowohl die Isolierung als auch den Leiter festklemmen.

Avvertenza Quando occorre usare trecce, usare connettori omologati, come quelli a occhiello o a forcella con linguette rivolte verso l'alto. I connettori devono avere la misura adatta per il cablaggio e devono serrare sia l'isolante che il conduttore.

Advarsel Hvis det er nødvendig med flertrådede ledninger, brukes godkjente ledningsavslutninger, som for eksempel lukket sløyfe eller spadetype med oppoverbøyde kabelsko. Disse avslutningene skal ha riktig størrelse i forhold til ledningene, og skal klemme sammen både isolasjonen og lederen.

Aviso Quando forem requeridas montagens de instalação eléctrica de cabo torcido, use terminações de cabo aprovadas, tais como, terminações de cabo em circuito fechado e planas com terminais de orelha voltados para cima. Estas terminações de cabo deverão ser do tamanho apropriado para os respectivos cabos, e deverão prender simultaneamente o isolamento e o fio condutor.

¡Atención! Cuando se necesite hilo trenzado, utilizar terminales para cables homologados, tales como las de tipo "bucle cerrado" o "espada", con las lengüetas de conexión vueltas hacia arriba. Estos terminales deberán ser del tamaño apropiado para los cables que se utilicen, y tendrán que sujetar tanto el aislante como el conductor.

Varning! När flertrådiga ledningar krävs måste godkända ledningskontakter användas, t.ex. kabelsko av sluten eller öppen typ med uppåtvänd tapp. Storleken på dessa kontakter måste vara avpassad till ledningarna och måste kunna hålla både isoleringen och ledaren fastklämda.

Multiple Power Supplies Disconnection Warning

WARNING: The network device has more than one power supply connection. All connections must be removed completely to remove power from the unit completely.

Waarschuwing Deze eenheid heeft meer dan één stroomtoevoerverbinding; alle verbindingen moeten volledig worden verwijderd om de stroom van deze eenheid volledig te verwijderen.

Varoitus Tässä laitteessa on useampia virtalähdekytkentöjä. Kaikki kytkennät on irrotettava kokonaan, jotta virta poistettaisiin täysin laitteesta.

Avertissement Cette unité est équipée de plusieurs raccordements d'alimentation. Pour supprimer tout courant électrique de l'unité, tous les cordons d'alimentation doivent être débranchés.

Warnung Diese Einheit verfügt über mehr als einen Stromanschluß; um Strom gänzlich von der Einheit fernzuhalten, müssen alle Stromzufuhren abgetrennt sein.

Avvertenza Questa unità ha più di una connessione per alimentatore elettrico; tutte le connessioni devono essere completamente rimosse per togliere l'elettricità dall'unità.

Advarsel Denne enheten har mer enn én strømtilkobling. Alle tilkoblinger må kobles helt fra for å eliminere strøm fra enheten.

Aviso Este dispositivo possui mais do que uma conexão de fonte de alimentação de energia; para poder remover a fonte de alimentação de energia, deverão ser desconectadas todas as conexões existentes.

¡Atención! Esta unidad tiene más de una conexión de suministros de alimentación; para eliminar la alimentación por completo, deben desconectarse completamente todas las conexiones.

Varning! Denna enhet har mer än en strömförsörjningsanslutning; alla anslutningar måste vara helt avlägsnade innan strömtillförseln till enheten är fullständigt bruten.

TN Power Warning

WARNING: The device is designed to work with a TN power system.
Waarschuwing Het apparaat is ontworpen om te functioneren met TN energiesystemen.

Varoitus Koje on suunniteltu toimimaan TN-sähkövoimajärjestelmien yhteydessä.

Avertissement Ce dispositif a été conçu pour fonctionner avec des systèmes d'alimentation TN.

Warnung Das Gerät ist für die Verwendung mit TN-Stromsystemen ausgelegt.

Avvertenza Il dispositivo è stato progettato per l'uso con sistemi di alimentazione TN.

Advarsel Utstyret er utfomet til bruk med TN-strømsystemer.

Aviso O dispositivo foi criado para operar com sistemas de corrente TN.

¡Atención! El equipo está diseñado para trabajar con sistemas de alimentación tipo TN.

Varning! Enheten är konstruerad för användning tillsammans med elkraftssystem av TN-typ.

Agency Approvals and Compliance Statements for the QFX5210

IN THIS SECTION

See the following topics for agency and compliance information:

Agency Approvals for the QFX Series

IN THIS SECTION

The QFX Series complies with the following standards:

- Safety
  - CAN/CSA-C22.2 No. 60950-1 Safety of Information Technology Equipment

    - UL 62368-1 Audio/Video, Information and Communication Technology Equipment- Safety
    - IEC 62368-1: 2014 Audio/Video, Information and Communication Technology Equipment–Safety
    - IEC 60950-1: 2005/A2:2013 Information Technology Equipment -Safety (All country deviations): CB Scheme
    - EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- Electromagnetic Compatibility (EMC)
    - EN 300 386 V1.6.1 (2012) Telecom Network Equipment–EMC requirements
    - EN 55024: 1998/A1:2001/A2:2003 Information Technology Equipment Immunity Characteristics
    - TEC/SD/DD/EMC-221—India EMC standard
    - EN 301 489-1 V1.92 (2011-09)–EMC and Radio spectrum Matters
    - EN 55024
    - CISPR 24
    - BSMI, Class A
    - CNS 13438
- Electromagnetic Interference (EMI)
    - FCC 47 CFR Part 15, Class A (2009) USA Radiated Emissions
    - EN 55022 Class A (2010) European Radiated Emissions
    - VCCI Class A:(2010) Japanese Emissions
    - BSMI CNS 13438 and NCC C6357 Class A Taiwan Radiated Emissions
    - AS/NZS CISPR 22:2009: Class A, Australian/New Zealand Radiated Emissions
- Immunity
    - EN 55024: 1998/A1:2001/A2:2003 Information Technology Equipment Immunity Characteristics
    - EN-61000-3-2 (2006) Power Line Harmonics
    - EN-61000-3-3 (2013) Power Line Voltage Fluctuations
    - EN-61000-4-2 (2009) Electrostatic Discharge
    - EN-61000-4-3 (2007) Radiated Immunity

- EN-61000-4-4 (2012) Electrical Fast Transients
- EN-61000-4-5 (2006) Surge
- EN-61000-4-6 (2009) Immunity to Conducted Disturbances
- EN-61000-4-11 (2004) Voltage Dips and Sags

Compliance Statement for Argentina

EQUIPO DE USO IDÓNEO.

Compliance Statements for EMC Requirements for the QFX Series

IN THIS SECTION

This topic describes the EMC requirements for the QFX Series.

Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. Industry Canada does not guarantee the equipment will operate to the users' satisfaction.

Before installing this equipment, users should ensure that it is permissible to connect the equipment to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the inside wiring associated with a single line individual service may be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

⚠ **CAUTION**: Users should not attempt to make electrical ground connections by themselves, but should contact the appropriate inspection authority or an electrician, as appropriate.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

European Community

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

Israel

אזהרה

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

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

Japan

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

The preceding translates as follows:

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

VCCI-A

Korea

이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Korean Class A Warning g040913

The preceding translates as follows:

This equipment is Industrial (Class A) electromagnetic wave suitability equipment and seller or user should take notice of it, and this equipment is to be used in the places except for home.

Taiwan

警告使用者：
這是甲類的資訊產品, 在居住的環境中使用 時, 可能會造成射頻干擾, 在這種情況下, 使用者會被要求采取某些適當的對策。

Chinese Class A warning g100090

The preceding translates as follows:

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

United States

The QFX Series device 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, may 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.

Nonregulatory Environmental Standards

These QFX Series product SKUs are Network Equipment Building System (NEBS) compliant:

- QFX3008-I
- QFX3600-I
- QFX3600
- QFX3500
- QFX5100
- QFX5110
- QFX5200-32C
- QFX10002-36Q and QFX10002-72Q
- QFX10008
- QFX10016

Those device product SKUs meet the following NEBS compliance standards:

- SR-3580 NEBS Criteria Levels (Level 3 Compliance)
- GR-1089-CORE, Issue 6: EMC and Electrical Safety—Generic Criteria for Network Telecommunications Equipment
    - 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 (DC-I), as defined in GR-1089-CORE.

- GR-63-CORE: NEBS, Physical Protection
    - The equipment is suitable for installation as part of the Common Bonding Network (CBN).
    - The equipment is suitable for installation in a central office (CO).

SEE ALSO

> *Agency Approvals for the QFX Series*