

QFX5700 Switch Hardware Guide

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QFX5700 Switch Hardware Guide

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About This Guide

Use this guide to plan, install, perform initial software configuration, perform routine maintenance, and to troubleshoot QFX5700 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

Overview

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QFX5700 System Overview

SUMMARY

Learn about the QFX5700 switch, its hardware components, the CLI terms that match terms in the user documentation, and the Junos OS Evolved software that runs the QFX5700 switch.

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- [QFX5700 Hardware Description | 2](#)
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QFX5700 Hardware Description

IN THIS SECTION

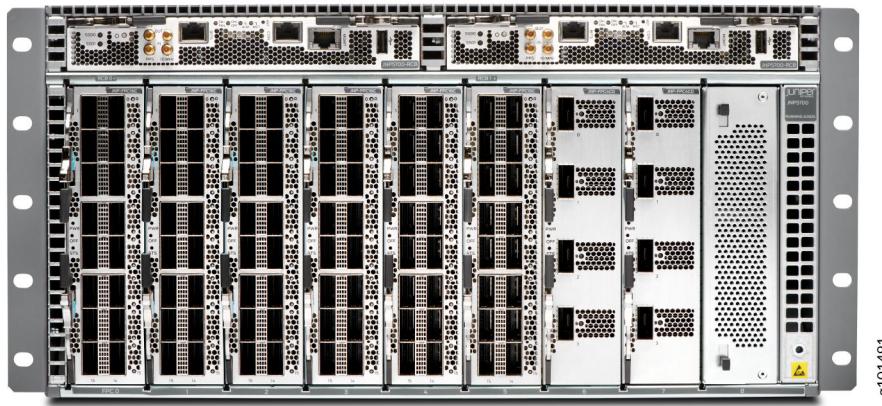
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System Overview

The Juniper Networks QFX5700 switch is a 12.8Tb capacity high end aggregation switch featuring 5-U form factor. QFX5700 offers 10/40/100/400GE high port density and delivers high-performance, scale and flexibility to support IP services and functions for service provider, web and enterprise networks. A versatile, future-proven solution for today's data centers, the QFX5700 leverages the power of a fully programmable Broadcom's Trident 4 chipset to support and deliver a diverse set of use cases. It supports advanced Layer 2, Layer 3, and Ethernet VPN (EVPN)- Virtual Extensible LAN (VXLAN) features. For large public cloud providers—early adopters of high-performance servers to meet explosive workload growth—the QFX5700 supports very large, dense, and fast 400GbE IP fabrics based on proven Internet

scale technology. The platform also includes support for in-line MACsec* line cards. [Figure 1 on page 3](#) shows the front view of the QFX5700 switch.

Figure 1: Front View of QFX5700 Switch



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[Figure 2 on page 3](#) shows the rear view of QFX5700 switch.

Figure 2: Rear View of QFX5700 Switch



g101492

Benefits

- **Ease of deployment**—The QFX5700 features a compact 5-U modular chassis for sites with limited space or power.
- **Modular, flexible design**—The QFX5700 uses the custom silicon line-cards (12.8 Tbps throughput) and power supplies.

- Automation and Programmability—Combined with the power of Junos OS Evolved and the Juniper Paragon Automation Portfolio, the QFX5700 enables you to quickly deploy new services, automate and simplify network operations, and maintain high-quality network services.
- Zero-touch provisioning—The QFX5700 switch supports zero-touch provisioning (ZTP), which enables you to automate provisioning and deployment with minimal manual intervention. This helps save time and accelerate deployments.

Field-Replaceable Units in QFX5700 Switches

The QFX5700 switch is 5-U tall. All key QFX5700 switch components are field-replaceable units (FRUs).

Field-replaceable units (FRUs) are components that you can replace at your site. The following are the QFX5700 FRUs: See Table 2 lists the FRUs and their types for the QFX5700 switches.

- Hot-insertable and hot-removable—You can remove and replace these components without powering off the switch or disrupting the routing function.
- Hot-pluggable—You can remove and replace these components without powering off the switch, but the routing function is interrupted until you replace the component.

[Table 1 on page 4](#) lists the FRUs and their types.

Table 1: FRUs in a QFX5700 Switch

FRU	Type
Power supplies	Hot-insertable and hot-removable.
Fan trays	Hot-insertable and hot-removable.

Table 1: FRUs in a QFX5700 Switch (*Continued*)

FRU	Type
Routing and Control Board (RCB)	<p>Redundant configuration:</p> <ul style="list-style-type: none"> • Primary RCB is hot-pluggable. • Backup RCB is hot-insertable and hot-removable. <p>Base configuration:</p> <ul style="list-style-type: none"> • When you remove the RCB, this would cause the switch to shut down. You can install a replacement RCB in the second slot. The system restarts to select a primary and backup. If necessary, you can switch the primary and backup using the request chassis routing-engine master switch command.
Forwarding Engine Boards (FEBs)	<p>You would need to make the FEB offline and then remove it by using the command, request chassis feb slot slot-number offline</p> <ul style="list-style-type: none"> • When you remove the FEB, it could cause traffic loss. You can install a replacement FEB in the second slot. The system restarts to select a primary and backup. To switch the primary and backup, use the following command. <pre>request chassis redundancy feb slot slot-number (switch-to-backup revert-from-backup).</pre>
Flexible PIC Concentrator (FPCs)	<p>Hot-insertable and hot-removable. We recommend that you take the FPCs offline before removing them. To take the FPCs offline, use the following command.</p> <pre>request chassis fpc slot slot-number offline.</pre>
Optical transceivers	Hot-insertable and hot-removable.
Cable guard	Hot-insertable and hot-removable.



CAUTION: Replace a failed power supply unit (PSU) with a new PSU within three minutes of removal to maintain power redundancy. The switch continues to operate with other PSUs running. Replace a failed fan tray with a new fan tray within one minute of removal to prevent chassis overheating.

NOTE: If you have a Juniper J-Care service contract, register any addition, change, or upgrade of hardware components at <https://www.juniper.net/customers/csc/management/updateinstallbase.jsp>. 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.

Hardware Redundancy of QFX5700 Switch Components and Functionality

The following hardware components provide redundancy on QFX5700 switches:

- Routing and Control Board (RCB)—The QFX5700-RCB consolidates the Routing Engine function with the control board function in a single unit.
- Forwarding Engine Boards (FEBs)—The QFX5700 switch will have one QFX5700-FEB in a base configuration. The FEBs are not visible from the outside of the switch chassis. You must remove one of the fan trays to see the FEBs.

NOTE: The base configuration of QFX5700 does not support configuring RCB0 and FEB1 or RCB1 and FEB0 in the chassis.

- Power supply units (PSUs)—The QFX5700 switch have four PSUs. Each PSU provides power to all components in the switch. If all the four PSUs are installed, they provide full power redundancy to the device. If one PSU fails, or if you remove one PSU, the other PSUs balance the electrical load without interruption. To provide power redundancy to the system, all the four PSUs must be installed.
- Cooling system—The QFX5700 switches have two fan trays. If a fan rotor within a fan tray fails, a chassis alarm is raised. The switch continues to operate with one failed rotor as per GR-63 specifications. If more than one fan rotor fails, or if a fan tray is removed, a chassis alarm is raised, and the system shuts down in 240 seconds. If both the fan trays are removed, a chassis alarm is raised, and the system shuts down immediately. Therefore, if any fan tray fails, you must replace the fan tray immediately.

QFX5700 Switches Hardware and CLI Terminology Mapping

The following table describes the hardware terms used in QFX5700 switch documentation and the corresponding terms used in the Junos OS CLI

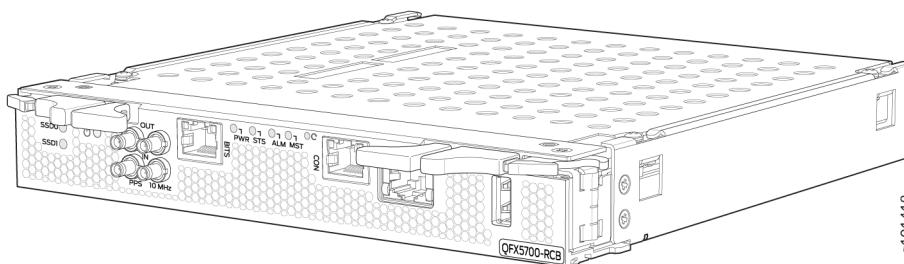
Hardware Item (as Displayed in the CLI)	Description (as Displayed in the CLI)	Value (as Displayed in the CLI)	Item in Documentation	Additional Information
Chassis	QFX5700	-	Switch chassis	See Chassis Physical Specifications
Routing and Control Board	CBn	n is a value in the range of 0-1. Multiple line items appear in the CLI if more than one RCB is installed in the chassis	-	See Routing and Control Board Description
FPC n	Abbreviated name of the Flexible PIC Concentrator (FPC; an FPC is equivalent to a line card)	n is a value in the range of 0-7. The value corresponds to the line card slot number in which the line card is installed.	FPC or line card (The switch does not have actual FPCs—the line cards are the FPC equivalents on the switch.)	Interface Naming Conventions Used in the Junos OS Operational Commands
FEB n	Forwarding Engine Board (FEB)	Value of n is a value in the range of 0-1.	-	Interface Naming Conventions Used in the Junos OS Operational Commands
xctr n	Abbreviated name of the transceiver	n is a value equivalent to the number of the port in which the transceiver is installed.	Optical transceivers	-

PSU (n)	One of the following: <ul style="list-style-type: none">• JNP-3000W-AC-AFO-740-073765• JNP-3000W-DC-AFO-740-073766	nn is a value in the range of 0–3. The value corresponds to the power supply slot number.	AC or DC power supply	One of the following: DC <ul style="list-style-type: none">• AC• DC
Fan tray	JNP5700-FAN	-	Fan tray	-

Routing and Control Board

The QFX5700 Routing and Control Board (RCB) contains a Routing Engine and is responsible for system management and system control in the QFX5700. These RCBs runs Junos OS Evolved. [Figure 3 on page 8](#) shows a QFX5700 RCB.

Figure 3: QFX5700 Routing and Control (RCB) Board



[Figure 4 on page 9](#) shows the front panel of the QFX5700 RCB (model number: QFX5700-RCB)

Each Routing and Control Board (RCB) consists of the following internal components:

- CPU—Runs Junos OS to maintain the routing tables and routing protocols.
- EEPROM—Stores the serial number of the Routing Engine.
- DRAM—Provides storage for the routing and forwarding tables and for other Routing Engine processes.
- One USB port—Provides a removable media interface through which you can install Junos OS Evolved software manually. Junos OS Evolved software supports USB versions 3.0, 2.0, and 1.1.

- Management ports—One port that provide access to management devices and another that provides access to the console.
- LEDs—Provide status of the Routing Engine.

Figure 4: QFX5700 Routing and Control (RCB) Board Faceplate

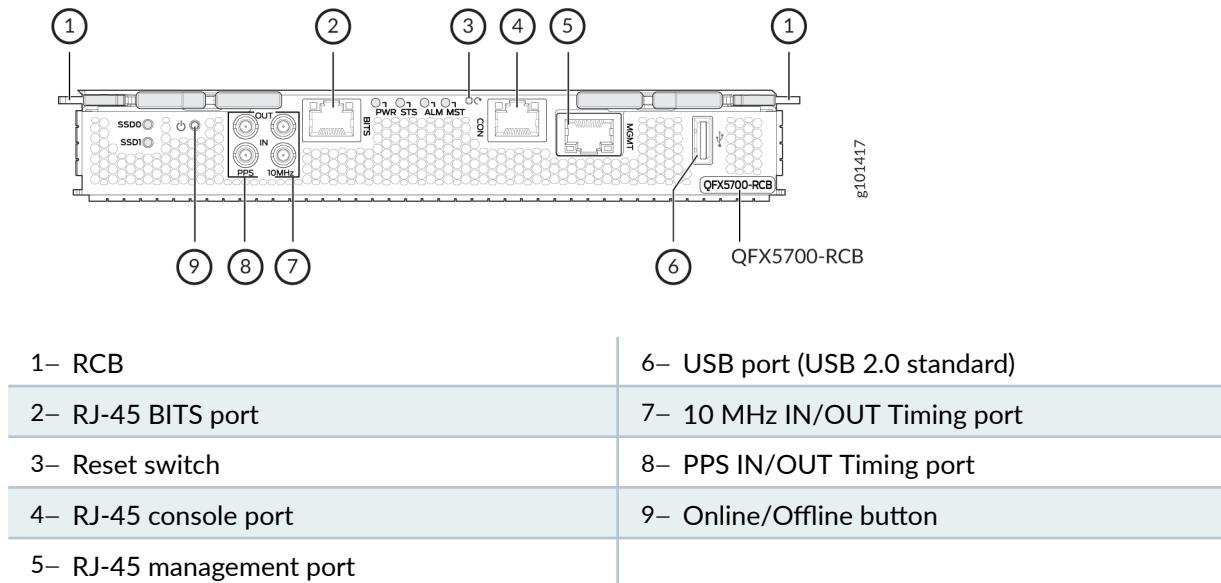
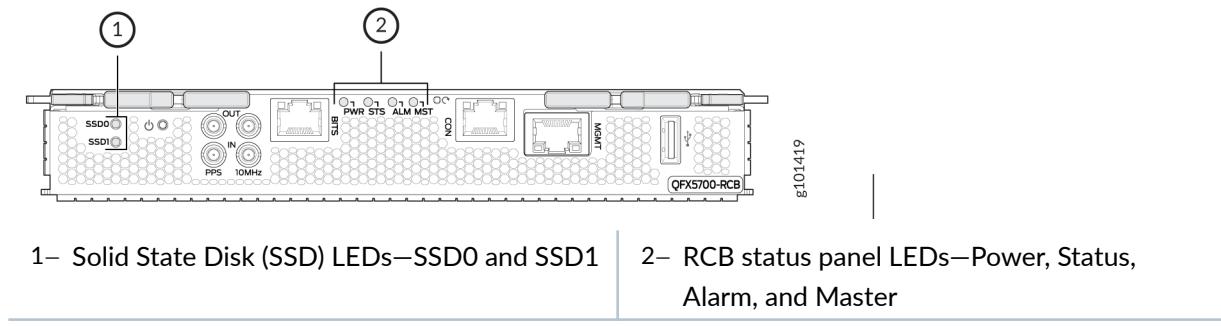


Figure 5 on page 9 shows the LEDs present in the Routing and Control Board (RCB).

Figure 5: LEDs in the Routing and Control Board (RCB)



The QFX5700 comes with two RCB slots. The RCBs are accessible from the front side. The RCBs are kept upside down. The configuration of the RCBs include a 30mm pitch, 200mm width Hewitt Lake 6 Core (D1637), 2.9GHz, 55W CPU, and DRAM: 32GB (2x16GB DIMM) Memory which is expandable up to 64 (4x 16GB). The storage support includes 2x 100G M.2 SATA/NVME SSD. For specific information about Routing Engine components (for example, the amount of DRAM), issue the show vmhost hardware command.

Power Supplies

The QFX5700 Switches support AC, DC by offering the following power supplies:

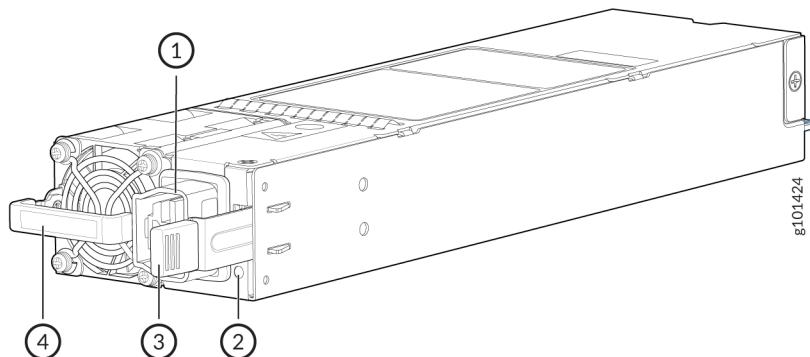
Power supplies for the QFX5700 are load-sharing hot-removable and hot-insertable FRUs. The switch operates with four power supplies. Each power supply has an internal fan for cooling. You can install the power supplies in any slot.



CAUTION: Do not mix power supply models in the same chassis in a running environment.

[Figure 6 on page 10](#) shows the QFX5700 AC Power Supply.

Figure 6: AC Power Supply



1– Power Supply

2– ESD Point

3– Ejector Lever

4– Power Supply Handle

Software

The Juniper Networks QFX5700 switch runs on the Junos OS Evolved operating system. Junos OS Evolved is the next-generation Junos OS. It has the same CLI, the same features, and, in some cases, even the same processes as in the previous versions of Junos OS. However, its infrastructure is entirely modernized.

QFX5700 System Software

QFX5700 switches run Junos OS Evolved, which provides Layer 2 and Layer 3 switching, routing, and security services. Junos OS Evolved runs natively on Linux, giving it direct access to all the Linux utilities and operations. It is designed to be modular, allowing for upgrades to be done on a component-by-component basis without a system reboot. Only those components changed are restarted. Junos OS Evolved is easily portable and minimal work is required to make it work on any platform. It has the same CLI user interface, the same code base for applications and features, and the same management and automation tools as Junos OS. However, the Junos OS Evolved infrastructure is entirely modernized, giving you the portability, faster innovation, and simplified upgrades you need. Junos OS Evolved software is pre-installed on the QFX5700 internal NAND solid state flash drive.

For information about which features are supported on QFX Series devices, see [Feature Explorer](#).

QFX5700 Chassis

IN THIS SECTION

- [QFX5700 Chassis Physical Specifications | 12](#)

The switch chassis is a rigid sheet metal structure that houses all the other components (see [Figure 1 on page 3](#), [Figure 2 on page 3](#), [Figure 3 on page 8](#), [Figure 4 on page 9](#), and [Figure 5 on page 9](#)). This topic provides more information about the physical specifications of the QFX5700 switch.



CAUTION: Before removing or installing components of a switch, attach an ESD strap to an ESD point and place the other end of the strap around your bare wrist. Failure to use an ESD strap can result in damage to the switch.



WARNING: You must connect the router to an earth ground before you power it on and during normal operation.

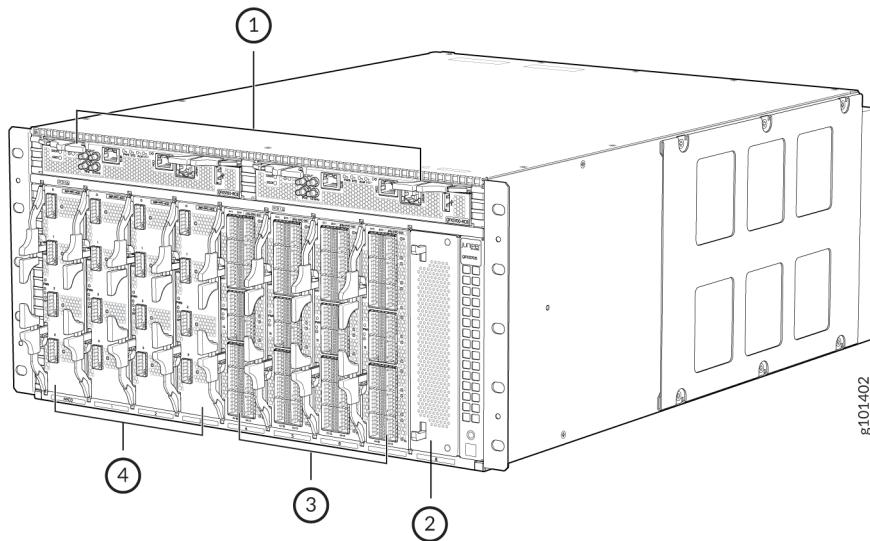
QFX5700 Chassis Physical Specifications

IN THIS SECTION

- [QFX5700 Physical Specifications | 15](#)
- [QFX5700 Switch Midplane Description | 16](#)

The QFX5700 modular chassis is a rigid sheet-metal structure that houses the other switch components. See [Figure 7 on page 12](#) to help identify the major components. The chassis installs in standard 800-mm (or larger) enclosed cabinets, 19-in. equipment racks, or telco open-frame racks.

Figure 7: Front View of the QFX5700 Switch



1– RCB

2– Unsupported slot

3– FPC 4-7

4– FPC 0-3

[Figure 8 on page 13](#) shows the front view of a fully configured QFX5700 chassis.

Figure 8: Front View of a Fully Configured QFX5700 Chassis

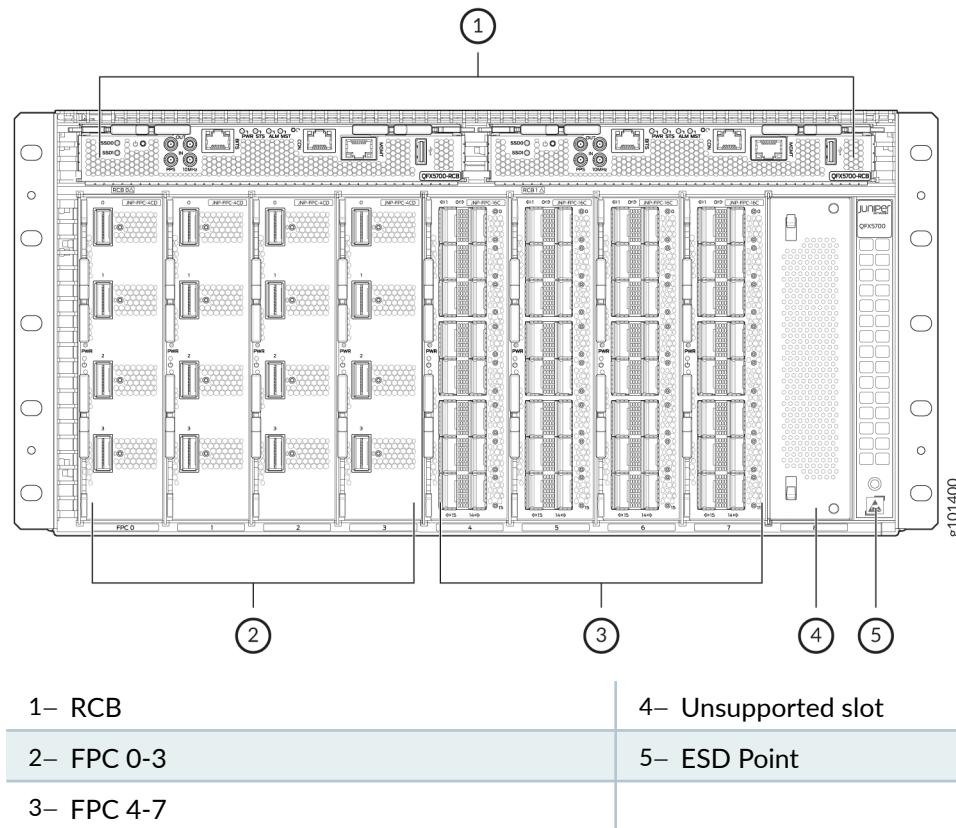


Figure 9: Flat View of the QFX5700 Switch

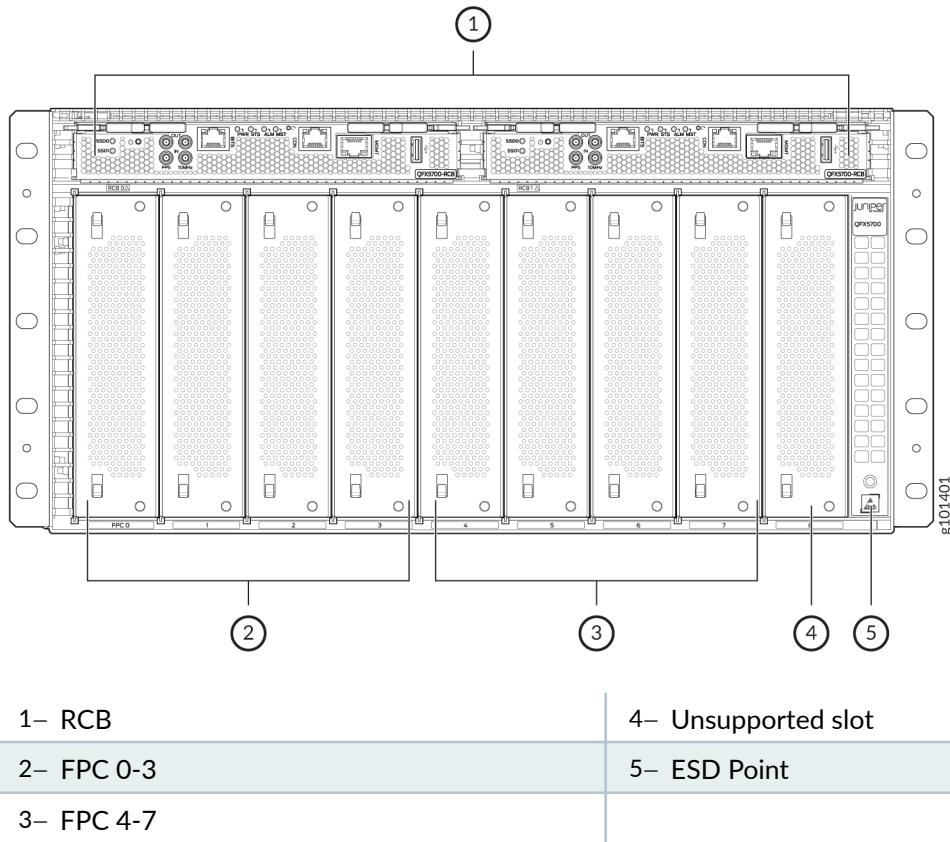
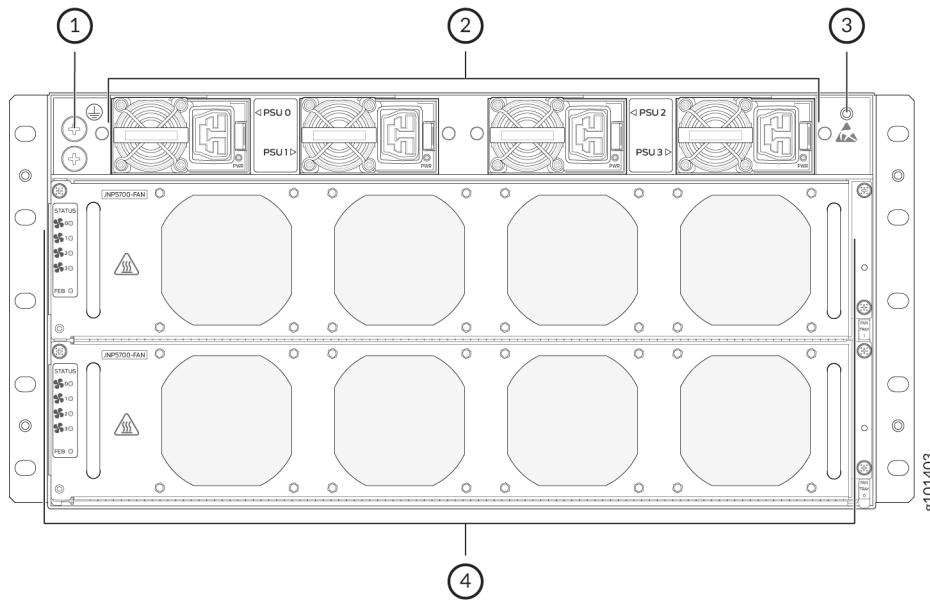


Figure 10 on page 15 shows the rear view of an AC-powered QFX5700 switch.

Figure 10: Rear View of an AC-Powered QFX5700 Switch



1– Grounding Earth Terminal

2– AC/HVDC Power Supply Units

3– ESD Point

4– Fan Trays



WARNING: The handles on each side of the chassis facilitate the fine-tune positioning of the chassis on the base brackets. Do not use the handles to lift the chassis, even when the chassis is empty.

QFX5700 Physical Specifications

See to understand the physical specifications for the switch chassis and its components.

The QFX5700 is a 5U modular chassis and with the cable management system it is 6U.

Table 2: QFX5700 Switch Chassis and Component Physical Specifications

Description	Weight	Length	Width	Height
Chassis	Chassis Weight (Sheet metal and Midplane) - 22.8 Kg	60 cm	48.2 cm	22.2 cm

Table 2: QFX5700 Switch Chassis and Component Physical Specifications (*Continued*)

Description	Weight	Length	Width	Height
Routing and Control Board (RCB)	1.2 kg	(23.5 cm)	(21.4 cm)	(3.1 cm)
Forwarding Engine Boards (FEBs)	6.6 kg	(28.1 cm)	(43.7 cm)	(8.4 cm)
JNP-FPC-16C	2 kg	(25.8 cm)	(18 cm)	(4.5 cm)
JNP-FPC-20Y	2 kg	(25.8 cm)	(18 cm)	(4.5 cm)
JNP-FPC4CD	2 kg	(25.8 cm)	(18 cm)	(4.5 cm)
AC power supply	1.5 kg	(31.5 cm)	(7.4 cm)	(4.4 cm)
DC power supply	1.5 kg	(33.3 cm)	(7.4 cm)	(4.4 cm)
Fan tray unit	3.2kg	(44 cm)	(13.6 cm)	(8.5 cm)
Cable Manager Assembly	8 kg	(48.2 cm)	(21.5 cm)	(22.2 cm)

QFX5700 Switch Midplane Description

The midplane is located on the rear of the chassis and forms the rear of the card cage. The Routing and Control Board (RCBs) and the Flexible PIC Concentrators (FPCs) are installed into the midplane from the front of the chassis, the Forwarding Engine Boards (FEBs), power supply units, and the fan trays install into the midplane from the rear of the chassis.

The midplane performs the following major functions:

- Provides a signal path—The midplane provides the signal path to the FPCs, RCBs, FEBs and other system components for monitoring and control of the system.

- Provides a data path—Data packets are transferred across the midplane between the FPCs through the RCBs.

- Distributes power—The power supplies connect to the midplane, which distributes power to all the switch components.
- Provides a signal path—The midplane provides the signal path to the FPCs, RCBs, FEBs and other system components for monitoring and control of the system.

QFX5700 Cable Management System

The QFX5700 Cable Management System consists of the following components.

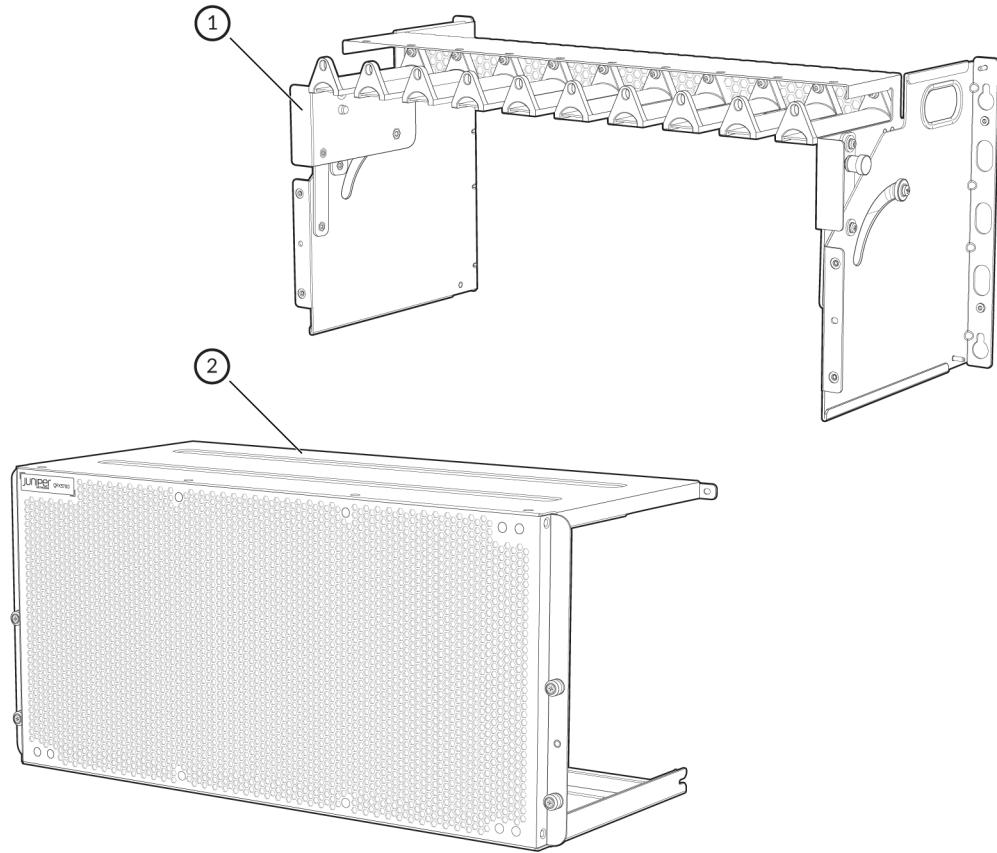
- Cable Manager
- Cable Manager Assembly
- Tray
- Locking mechanism

NOTE: You need to necessarily attach the Cable manager assembly when you install six or more line cards of the same model.

The cable manager allows you to manage a large number of fiber-optic and copper cables attached to the RCBs and FPCs installed in the QFX5700 switch. It is installed in the front of the QFX5700 chassis.

[Figure 11 on page 18](#) shows the QFX5700 Cable Manager.

Figure 11: Cable Manager



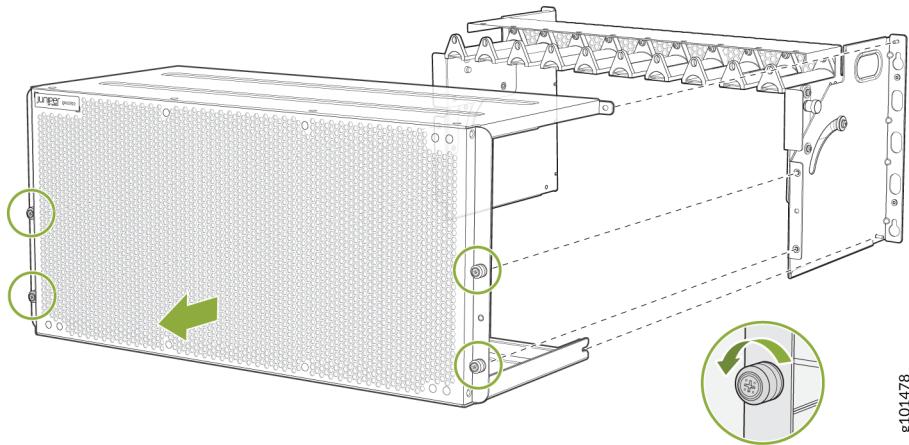
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1– Cable Manager Assembly

2– EMI door

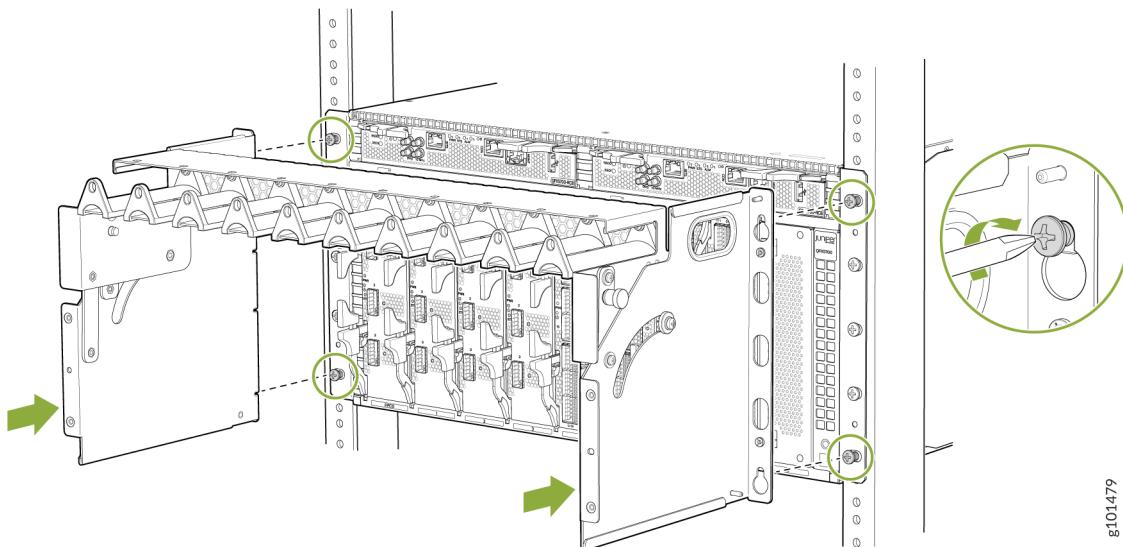
Before you install the cable manager assembly, you need to remove the EMI door. See [Figure 12 on page 19](#).

Figure 12: Remove the EMI Door



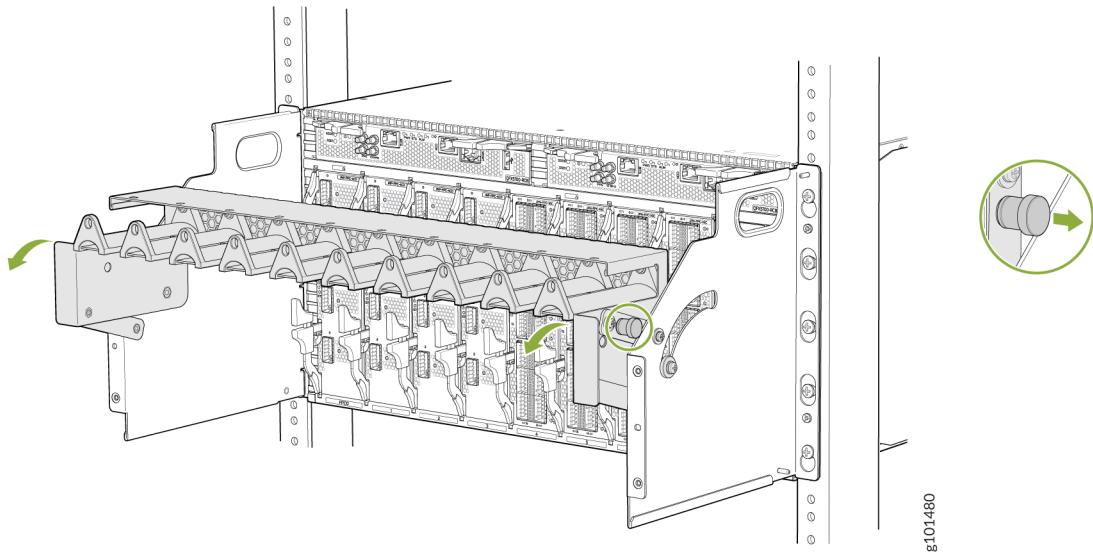
Now you can install the cable manager assembly. See [Figure 13 on page 19](#).

Figure 13: Install Cable Manager Assembly



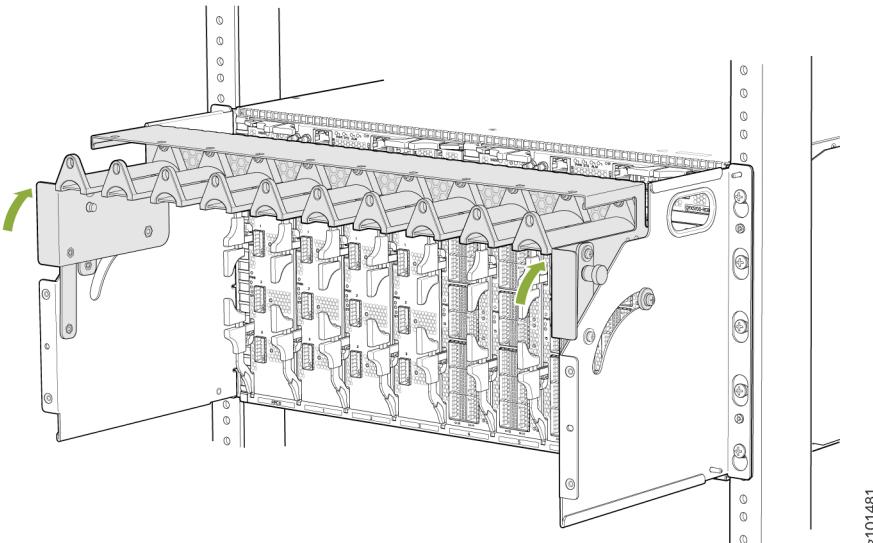
Pull out the spring-loaded pin on either sides of the cable manager and move the tray down to access RCB. See [Figure 14 on page 20](#).

Figure 14: Move the Tray to Access RCB



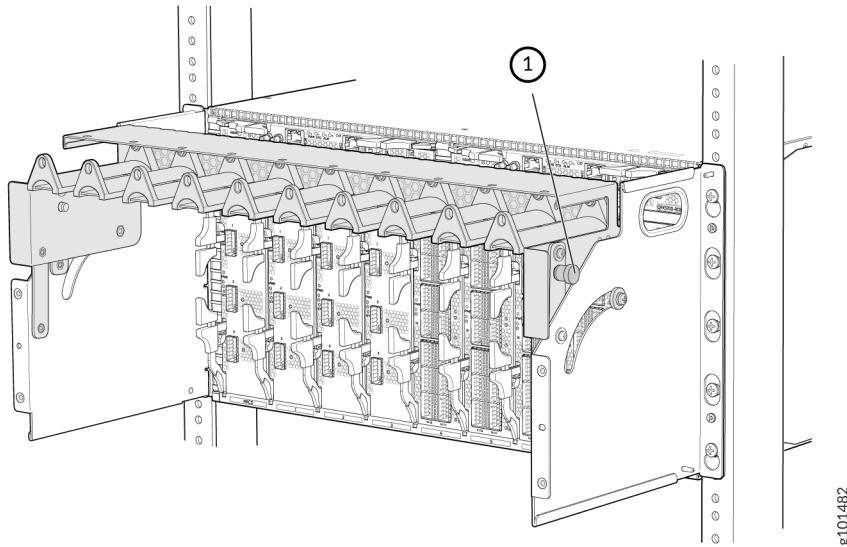
You need to move the tray in order to access the FPC. See [Figure 15 on page 20](#).

Figure 15: Move the Tray to Access FPC



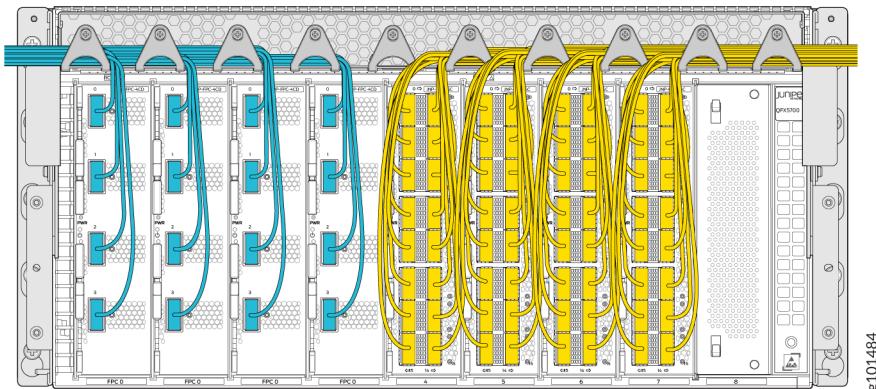
Now, lock the cable manager. See [Figure 16 on page 21](#).

Figure 16: Lock the Cable Manager



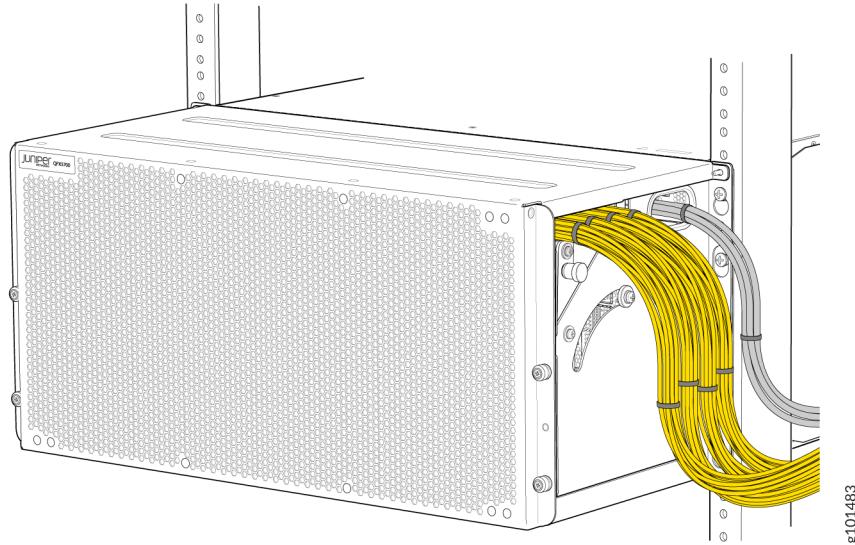
See [Figure 17 on page 21](#) and [Figure 18 on page 22](#) to understand how to route cables through the cable manager.

Figure 17: Route Cables through Cable Manager



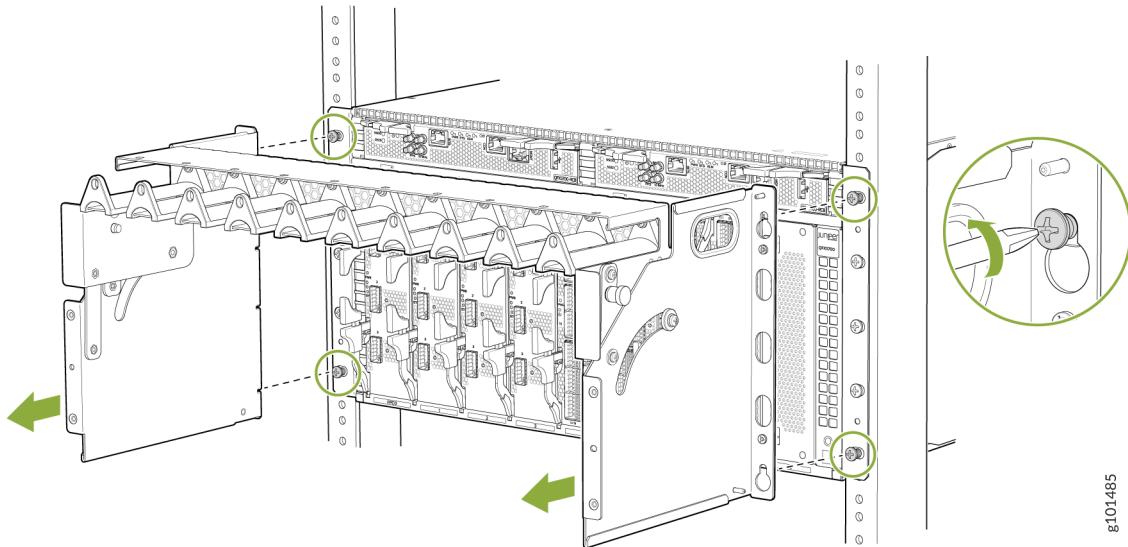
Once you have used the cable manager to router the cables, assemble the cable manager cover.

Figure 18: Assemble the Cable Manager Cover



[Figure 19 on page 22](#) shows how you can remove the cable manager.

Figure 19: Remove Cable Manager



QFX5700 Cooling System Description and Airflow

IN THIS SECTION

- [Airflow | 23](#)

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

When the router is operating normally, the fans function at lower than full speed. If a fan fails or the ambient temperature rises above a threshold, the speed of the remaining fans is automatically adjusted to keep the temperature within the acceptable range. If the maximum temperature specification is exceeded and the system cannot be adequately cooled, the Routing and Control Board (RCB) shuts down some or all of the hardware components.

The cooling system consists of the following components:

- Airflow
- Fan trays
- Fan Status LEDs

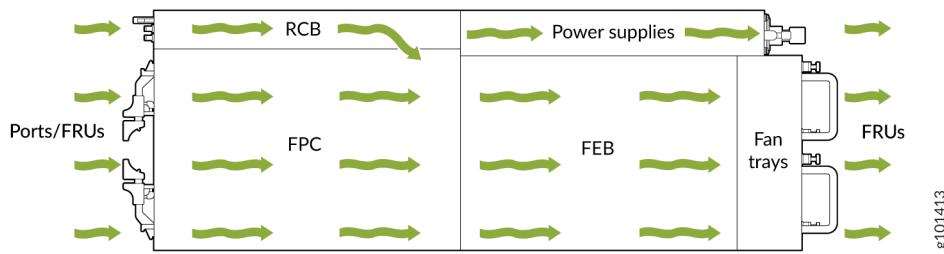
The QFX5700 is cooled front to back with four fan modules. The QFX5700 offers Front to Back Air Cooling with two fan trays plugged in from the rear side. The fan modules pull air through the front panel around the gaps between the optical transceivers. Cooling for the power supplies is also front to back, utilizing fans inside the power supplies.

NOTE: To know the power consumption of the fans, click the <https://apps.juniper.net/power-calculator/?view=calculate&pdt=31705700&type=2> link. You'll need a valid Juniper account to access the power calculator.

Airflow

[Figure 20 on page 24](#) shows the airflow through the switch.

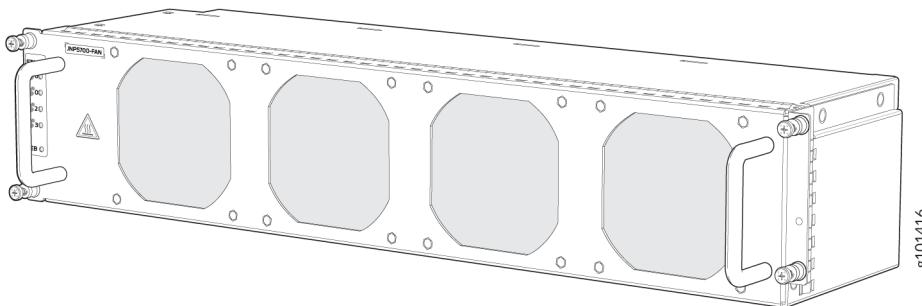
Figure 20: Airflow Through the Chassis



The cooling system contains the following fan trays: See [Figure 21 on page 24](#).

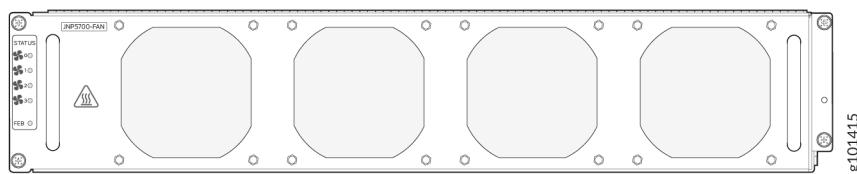
- One upper front fan tray and one lower front fan tray that cool the components (the RCBs and FEBs).

Figure 21: QFX5700 Cooling System



- Each fan tray contains four fans. See [Figure 22 on page 24](#).

Figure 22: QFX5700 Fan Tray Unit



The upper and lower front fan trays contain four fans each. Both fan trays are interchangeable with each other.

All fan trays are hot-insertable and hot-removable.



CAUTION: To maintain proper cooling, do not operate the routing node with the rear fan tray removed for more than one minute.

The QFX5700 switch supports the fan trays listed in [Table 3 on page 25](#).

Table 3: Supported Fan Trays

Name	Model Number	First Supported Junos OS Release
Rear Fan Tray	JNP5700-FAN	21.2 R2

The following table describes the behavior of the fan and FEB LEDs.

Table 4: Fan Status and FEB Status LEDs

Label	Color	State	Description
STATUS (Fan status)	Green	Blinking	Fan hardware initialization is complete. Software initialization is pending
		On steadily	Software initialization is complete, and the fan is functioning normally
	Yellow	On steadily	Equipment is faulty and malfunctioning
FEB (FEB status)	Dark	Off	Fan tray input power failure
	Green	Blinking	The FEB is booting
		On steadily	The FEB is online and functioning normally
	Yellow	On steadily	The FEB has failed

Table 4: Fan Status and FEB Status LEDs (*Continued*)

Label	Color	State	Description
	Dark	Off	The FEB is offline

QFX5700 Power System

IN THIS SECTION

- [QFX5700 AC/HVDC Power Supply Description | 27](#)
- [QFX5700 DC Power Supply Description | 33](#)

The QFX5700 switch is powered by 3000 W redundant hot-removable and hot-insertable pre-installed AC/HVDC or DC power supplies. QFX5700-BASE Configuration (One RCB and one FEB) requires 1 + 1 PSU redundancy. If you choose the QFX5700-BASE Configuration, this can be connected to the same source or two separate sources for 1+1 redundancy. If any power supply unit fails, you can replace it without powering off or disrupting the routing function, the other power supply units will balance the electrical load without interruption. Each power supply unit has two outputs: 12 V and 12 V standby. Two counter-rotating fans in each power supply unit provide front to back cooling. The input voltages are as follows:

- AC input voltage range: 200 - 277 VAC
- DC input voltage range: 40 VDC Min, 72 VDC maximum



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

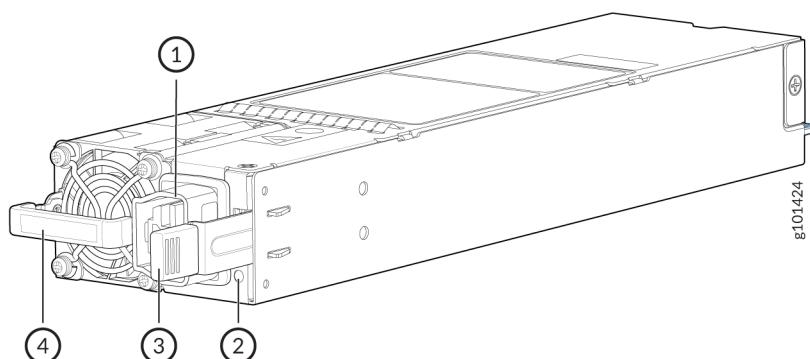
QFX5700 AC/HVDC Power Supply Description

IN THIS SECTION

- [QFX5700 AC/HVDC Power Supply LEDs | 28](#)
- [QFX5700 AC Power Cord Specifications | 30](#)

The input power to the AC/HVDC power supplies can be AC power or HVDC power. The power supplies automatically detect whether there is AC or HVDC input voltage and manage the power accordingly. AC power can be 180–305 VAC input voltage and HVDC power can be 190–400 VDC input voltage. Each 3000-W AC/HVDC power supply unit has a single AC or HVDC input and provides 12 V power to the system.

Figure 23: QFX5700 Power Supply



1– Power plug connector	3– Ejector level
2– Status LED	4– Orange handle

The QFX5700 operates within the AC/HVDC input voltage range listed in the table below.

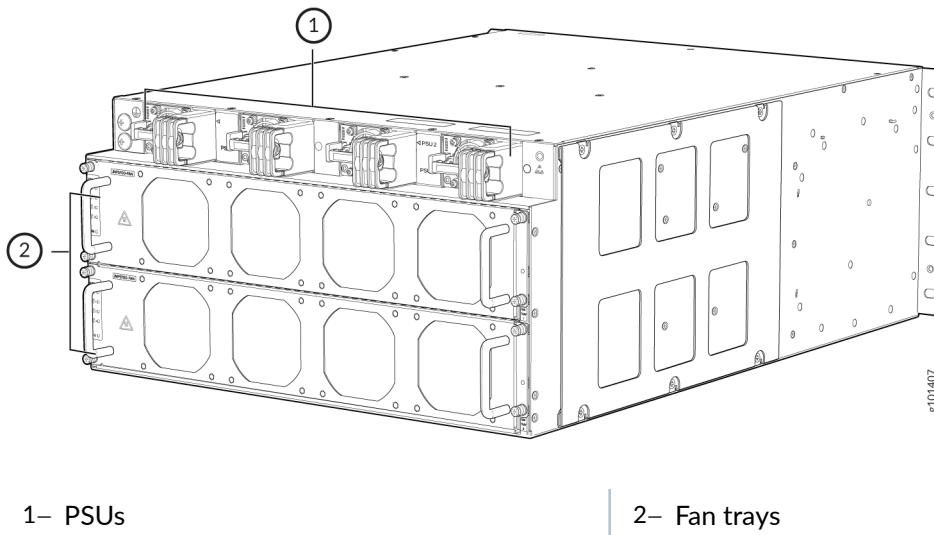
Table 5: QX5700 AC/HVDC Power Specifications

Parameter	Minimum	Rated	Maximum
Input voltage (AC)	180 VAC	200–277 VAC	305 VAC

Input voltage (HVDC)	190 VAC	240–380 VDC	400 VDC
AC input line frequency	47 Hz	50–60 Hz	63 Hz

Figure 24 on page 28 shows the location of the AC power supplies on the QFX5700 FRU panel.

Figure 24: QFX5700 with Power Supplies Installed



1– PSUs

2– Fan trays

QFX5700 AC/HVDC Power Supply LEDs

Each QFX5700 AC power supply has a status LED on the power supply faceplate. QFX5700 switch AC/HVDC power supply unit uses an amber and green bi-color LED to indicate the operating state.

Figure 25: QFX5700 AC/HVDC Power Supply LEDs

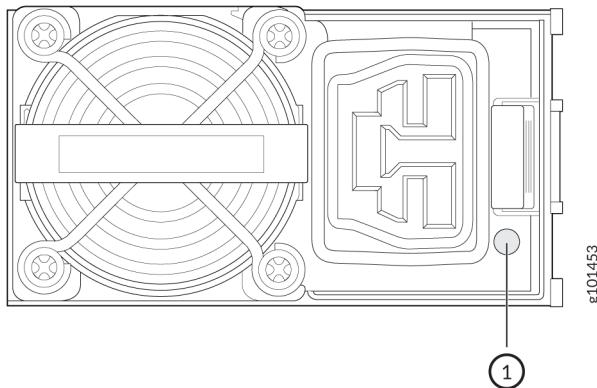


Table 6: QFX5700 AC/HVDC Power Supply LED States

State	Green	Amber
The PSU is on and operating properly	On	Off
Power supply does not have AC power	Off	Off
The power supply unit shut down due to a critical event. Possible causes: high temperature, high power, high current, fan failure	Off	On
The power supply unit is operating but there are warning events. Possible conditions: high temp (inlet temperature is greater than 53 degrees or a hot spot temperature is greater than 95 degrees), high power, high current, slow fan (less than 1200 rpm)	Off	Blinking amber

Table 6: QFX5700 AC/HVDC Power Supply LED States (*Continued*)

State	Green	Amber
PSU output disabled by system software or other PSU in chassis on with 12VSB.	Blinking	Off

You can get additional information about the status of the power supply units using the show chassis powercommand and the show chassis power detailcommand.

QFX5700 AC Power Cord Specifications

Detachable AC power cords are shipped with the chassis if you include them as part of your order. 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 QFX5700 are in compliance.

Table 7 on page 30 lists AC power cord specifications provided for each country or region.

Table 7: QFX5700 Power Cord Specifications

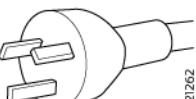
Locale	Cord Set Rating	Plug Standards	Spare Juniper Model Number	Graphic
Argentina	250 VAC, 20 A,	IRAM 2073 Type RA/3	CBL-JNP-SG4-AR	 8050615
Australia and New Zealand	250 VAC, 20 A	AS/NZS 4417	CBL-JNP-SG4-AU	 8021262

Table 7: QFX5700 Power Cord Specifications (*Continued*)

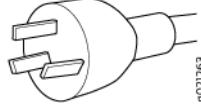
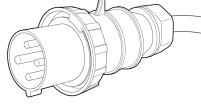
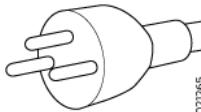
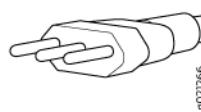
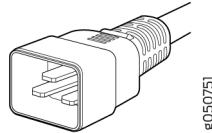
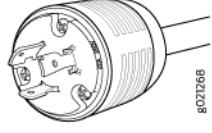
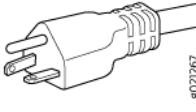
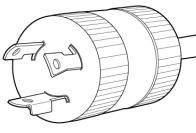
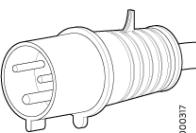
Locale	Cord Set Rating	Plug Standards	Spare Juniper Model Number	Graphic
Brazil	250 VAC, 20 A	NBR 14136 Type BR/3	CBL-JNP-SG4-BR	 8050616
China	250 VAC, 20 A	GB2099	CBL-JNP-SG4-CH	 8021263
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 20 A	CEE 7/7 STRAIGHT	CBL-JNP-SG4-EU	 8000342
Great Britain	250 VAC, 20 A	BS1363	CBL-JNP-SG4-UK	 8021271
India	250 VAC, 20 A	SANS 164/1	CBL-JNP-SG4-SA	 8021270
Israel	250 VAC, 20 A	SI 32/1971 Type IL/3G	CBL-JNP-SG4-IL	 8022265
Italy	250 VAC, 20 A	CEI 23-16	CBL-JNP-SG4-IT	 8022266

Table 7: QFX5700 Power Cord Specifications (*Continued*)

Locale	Cord Set Rating	Plug Standards	Spare Juniper Model Number	Graphic
North America	250 VAC, 25 A/ 30 A	C20 to Anderson 3-5958p4	CBL-JNP-SG4-C20	 8050751
North America	250 VAC, 25 A/ 30 A	Locking NEMA L6-20P	CBL-JNP-SG4-US-L	 8021268
North America	250 VAC, 25 A/ 30 A	NEMA 6-20P	CBL-JNP-SG4-US	 8021267
North America	250 VAC, 25 A/ 30 A	NEMA I7-20P	CBL-JNP-SG4-HVAC	 8100341
North America	250 VAC, 25 A/ 30 A	IEC 320P6W	CBL-JNP-SG4-320P6W	 8000337
South Africa	250 VAC, 25 A/ 30 A	SANS 164/1	CBL-JNP-SG4-SA	 8021270
Switzerland	250 VAC, 25 A/ 30 A	CEI 23-50	CBL-JNP-SG4-SZ	 8021266

QFX5700 DC Power Supply Description

IN THIS SECTION

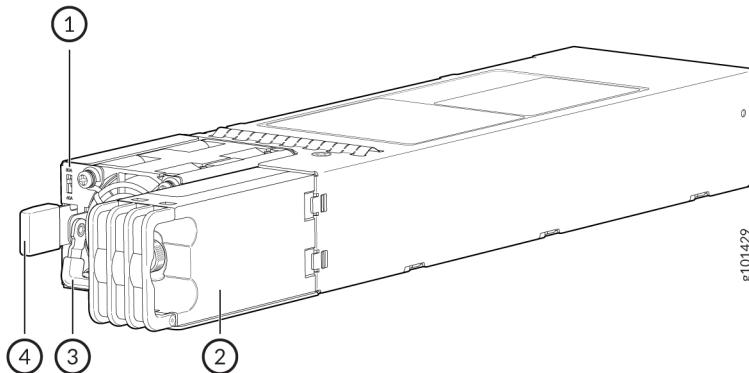
- [QFX5700 DC Power Supply LED | 34](#)
- [QFX5700 DC Input Current Selector | 35](#)
- [QFX5700 Input DC Voltage Specification | 35](#)
- [60 A Input Feed Power Management | 36](#)
- [QFX5700 DC Power Cables | 36](#)
- [QFX5700 DC Power Lugs | 37](#)
- [QFX5700 DC Power Cables | 37](#)

The QFX5700 DC power supplies are hot-removable and hot-insertable FRUs. Each 3000 W power supply unit has a single DC input and provides 12 VDC output with a standby voltage of 12 VDC. The QFX5700 DC power supplies can operate with an input current of 80 A or 60 A.



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

Figure 26: QFX5700 DC Power Supply Description



1– DC input current selector (DIP switch)

2– Inlet terminal block

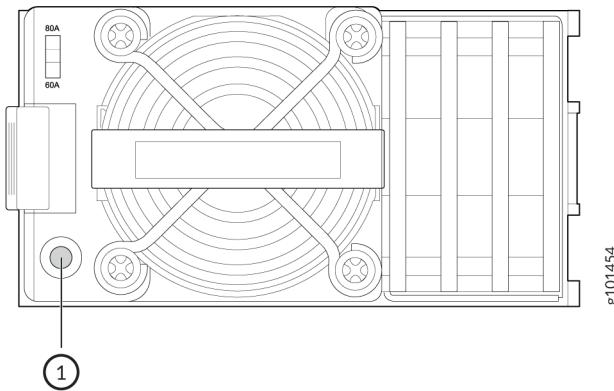
3– Handle

4– Ejector Lever

QFX5700 DC Power Supply LED

Each QFX5700 DC power supply unit has a status LED on the power supply unit faceplate.

Figure 27: QFX5700 DC Power Supply Status LED



1– Power supply status LED

LED Color	Power Supply State
Solid green	The power supply unit is on and in the OK state.
Off	The power supplies do not have DC power.
Blinking green	PSU output disabled by system software or other PSU in chassis ON with 12VSB.
Solid amber	The DC power cord is unplugged but the second power supply unit still has DC power.
Blinking amber	The power supply unit is operating but there are warning events. Possible causes: high temp, high power, high current, slow fan.

The 60 A DC power supply unit capacity changes when the input voltage is below or above the under voltage limit as follows:

- When the 60 A DC power supply unit input voltage is above the input under voltage warning limit, its capacity is 2700 W.

- When the input voltage is below the input under voltage warning limit, the power supply unit capacity is reduced to 2200 W.

When the input voltage is above the input under voltage warning limit, the software adjusts the system capacity and reallocates power to the FRUs based on the new system capacity.

You can get additional information about the status of the PSMs using the **show chassis power** command and **show chassis power detail** command.

QFX5700 DC Input Current Selector

The QFX5700 DC PSM can operate with an input current of 80 A or 60 A. You select the input rating by moving the DC input current selector (DIP switch) to the desired setting. If you select 60 A, the PSM limits the output power so that the input current does not exceed 60 A under normal steady-state operation. If you select 80 A, the PSM limits the output power so that the input current does not exceed 80 A.

For example:

If you select...	Then...
60 A	The PSM limits the output power to 2200 W when the input voltage is between 40V and 48V. It linearly increases the output power if the input voltage increases. The PSM provides 2700 W output power when the input voltage is between 48V and 72V.
80 A	The PSM provides 3000 W output power throughout the input voltage range from 40 VDC to 72 VDC.

QFX5700 Input DC Voltage Specification

The QFX5700 DC PSMs operate within the DC input voltage range listed in .

NOTE: Depending on the available input source, Juniper recommends that the 48-VDC facility DC source be equipped with a 2 pole circuit breaker rated at a minimum of 60 A (48 VDC) or 80 A (48 VDC) based on DIP switch current setting, or as required by local code.

Table 8: QFX5700 DC Power Specifications

Input Switch Setting	Minimum Input DC Voltage	Rated Input DC Voltage	Maximum Input DC Voltage	Maximum Input DC Current	Maximum Output Power
60 A	40 VDC	48 VDC to 60 VDC	72 VDC	60 ADC	2700 W
80 A	40 VDC	48 VDC to 60 VDC	72 VDC	90 ADC	3000 W

60 A Input Feed Power Management

The 60 A DC PSM capacity changes when the input voltage is below or above the under-voltage limit, as follows:

- When the 60 A DC PSM input voltage is above the input under-voltage warning limit, its capacity is 2700 W.
- When the input voltage is below the input under-voltage warning limit, the PSM capacity is reduced to 2200 W.

When the input voltage is above the input under-voltage warning limit, the software adjusts the system capacity and reallocates power to the FRUs based on the new system capacity.

QFX5700 DC Power Cables

You must supply DC power cables that meet the specifications required by the local code, laws, and standards. The wire insulation is color coded. Green is ground, black is line, and white is neutral. The wires are labeled (+) and (-) to indicate their polarity.



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



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

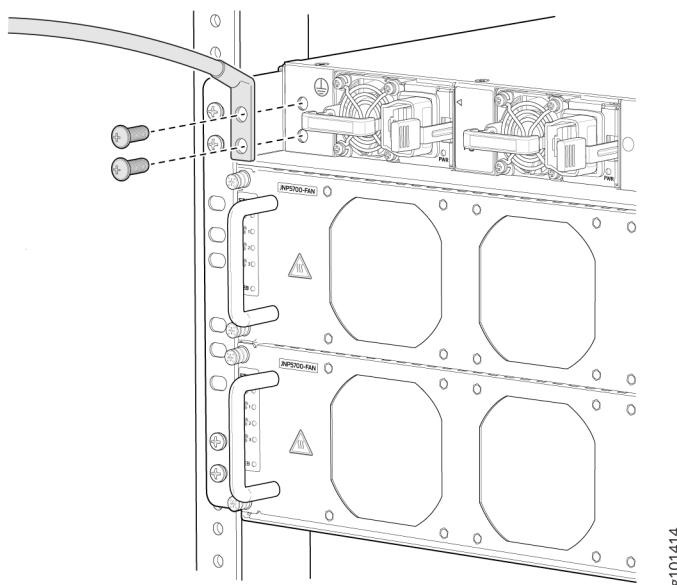


WARNING: Make sure that DC power cables do not block access to QFX5700 components or lie on the ground where people can trip on them.

QFX5700 DC Power Lugs

The accessory box shipped with the QFX5700 includes the cable lugs that attach to the terminal studs of each power supply module. (The cable lug shown in Figure 36 on page 61 is also used for grounding the chassis). The cable lugs are dual hole and sized to fit M6 at 15.86-mm (0.625-in.) center line. For grounding, the lug that should be used can be LCC4-14AH-Q as per local code.

Figure 28: QFX5700 DC Power Lugs



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QFX5700 DC Power Cables

You must supply the DC power cables that meet the specifications required by the local code, laws, and standards. The insulation color of the wires are color coded. Green is ground, black is line, and white is neutral. The wires are labeled (+) and (-) to indicate their polarity.



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QFX5700 Routing and Control Board

IN THIS SECTION

- [Physical Specifications of an RCB | 40](#)
- [Routing and Control Board Front Panel | 40](#)
- [Routing and Control Board LEDs | 42](#)

The QFX5700 Routing and Control Board (RCB) provides routing protocol processes and software processes that control the switch's interface, the chassis components, system management, and user access to the switch.

The RCB is an integrated board and a single FRU that provides Routing Engine (RE) and Control Board (CB) functionality. The RE performs all route-processing functions, whereas the CB performs chassis control and management plane functionality. The RCB provides control plane functions.

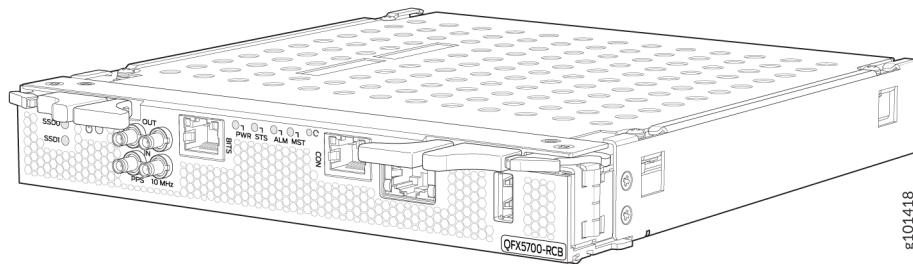
You can install one or two RCBs on the QFX5700 switch. The base configuration ships with one RCB while a redundant configuration ships with two RCBs. When two RCBs are installed, one functions as the primary and the second as a backup. If the primary RCB is removed, the backup becomes the primary if graceful Routing Engine switchover (GRES) is configured.

The Routing and Control Board (RCB) integrates the control plane and Routing Engine functions into a single management unit. Each RCB provides all the functions needed to manage the operation of the modular chassis:

- System control functions such as environmental monitoring
- Routing Layer 2 and Layer 3 protocols

- Communication to all components such as FPCs, FEBs, power and cooling
- Transparent clocking
- Alarm and logging functions

Figure 29: Routing and Control Board



Each RCB consists of the following internal components:

- High-performance 2.9-GHz Intel 6 Core X86 CPU
- 32-GB DDR4 RAM; Scalable upto 64GB with 16GB x 4 VLP RDIMM
- Two 100-GB SATA SSDs

Physical Specifications of an RCB

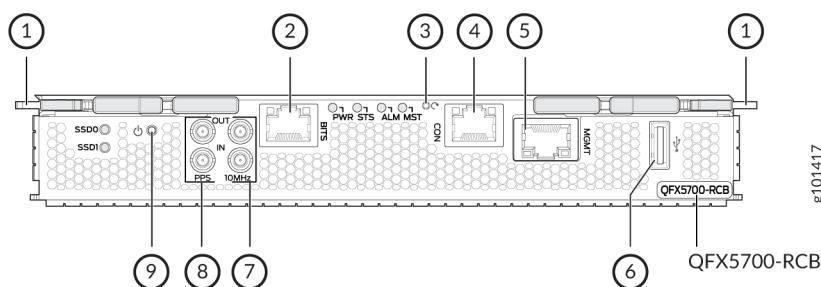
Table 9: Physical Specifications of an RCB

Description	Value
Height	1.18 in. (2.99 cm)
Width	7.83 in. (19.88 cm)
Depth	8.05 in. (20.44 cm)
Weight	-
Power Requirement	80W

Routing and Control Board Front Panel

The ports located on the RCB, connect the RCB to one or more external devices on which system administrators can issue Junos OS Evolved CLI commands to manage the switch. In addition, ports to connect external clock interfaces for BITS and GPS function are also available on the RCB. See [Figure 30 on page 40](#).

Figure 30: Components of QFX5700 Front Panel



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1– Ejector handles	6– USB port
2– BITS clock port with LEDs	7– 10MHz IN/OUT ports
3– Reset button	8– PPS IN/OUT port
4– Console (CON) port	9– Online/Offline button
5– Management (MGMT) port	

The ports located on the RCB connect the RCB to one or more external devices on which system administrators can issue Junos OS Evolved CLI commands to manage the router. In addition, the RCB includes ports that you use to connect external clock interfaces for BITS and GPS functions.

The RCB interface ports with the indicated labels function as follows:

- **CON**—Connects the RCB to a system console through a serial cable with an RJ-45 connector.
- **MGMT**—Connects the RCB through an Ethernet connection to a management LAN (or any other device that plugs into an Ethernet connection) for out-of-band management. The port uses an autosensing RJ-45 connector to support 10-Mbps, 100-Mbps, or 1000-Mbps connections. Two small LEDs (an activity LED and a link LED) on the port indicate that the connection is in use.

The link LED is:

- Green (steady) when the 1000-Mbps link is up.
- Orange (steady) when the 10/100-Mbps link is up.
- Off when the link is down.

The activity LED is:

- Green (blinking) when traffic is passing through the port.
- Off when traffic is not passing through the port.

Both activity and link LEDs are off when the link is down.

- **BITS**—Building-integrated timing system (BITS) is the external clocking interface for connecting to external clocking devices.
- **10MHz** (one input and one output)—The 10-MHz timing connectors on the front panel of the router connect to external clock signal sources. The clocking ports provide the synchronized output clocks from any one of the reference clock inputs, based on the clock's priority.
- **PPS** (one input and one output)—1-pulse-per-second (PPS) connector on the front panel of the router connects to external clock signal sources. The clocking ports provide the synchronized output clocks from any one of the reference clock inputs, based on the clock's priority.

- USB—Provides a removable media interface through which you can install Junos OS Evolved manually. Junos OS Evolved supports USB version 2.0 and later.

The following buttons are located on the RCB:

- RESET button—When pressed, reboots the RCB as follows:
 - Short press reboots the RCB and the reset-reason logs the button press event. The press event is logged in the RCB FPGA register.
 - When pressed for more than 10 seconds, the RCB reboots with an option for BIOS recovery.
- Online/Offline button—When the RCB is offline and if the button is pressed (short press), the RCB starts booting. When the RCB is online and if the button is pressed for four seconds or more (long press), the RCB shuts down.

Routing and Control Board LEDs

The LEDs—labeled SSD0, SSD1, PWR, STS, ALM, and MST— are located on the faceplate of the RCB. The functioning of the QFX5700 switch is controlled by the RCB, and the LEDs present on the RCBs displays the status and functioning of the QFX5700 chassis.

Table 10: QFX5700 RCB LEDs

LED	Color	State	Description
PWR	Green	On steadily	
		Blinking	The beacon feature is enabled.
	Dark	Unlit	The RCB is booting.
STS	Green	On steadily	RCB is online and functioning correctly.
	Green	Blinking	The beacon feature is enabled.
	Yellow	On steadily	An error has been detected in the RCB.

	Yellow	Blinking	Blinking
	Dark	Unlit	The power supply is switched off.
ALM	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 (except during a single rotor failure in a fan module). Switch off power to the switch and unplug the power cords. Correct any voltage or site temperature issues, and allow the switch to cool down. Power on the switch, and monitor the power supply and fan LEDs to determine where the error is occurring.
		Blinking	Indicates the presence of a major and a minor alarm.
	Yellow	On steadily	A minor alarm has occurred, such as a software error. Switch off power to the switch and unplug the power cords. Power on the switch, and monitor the status LEDs to ensure that Junos OS Evolved boots up properly.
	Red+Yellow	Blinking	Indicates the presence of a major and a minor alarm.
MST	Green	On steadily	The RCB is the primary.
	Dark	Unlit	The RCB is the backup.
SSD0	Green	On steadily	The drive is detected.
	Green	Blinking	The drive is active.
SSD1	Green	On steadily	The drive is detected.
	Green	Blinking	The drive is active.

QFX5700 Flexible PIC Concentrators

SUMMARY

The QFX5K-FPC-20Y, QFX5K-FPC-16C, and QFX5K-FPC-4CD Flexible PIC Concentrators (FPCs) in a QFX5700 switch send and receive packets.

IN THIS SECTION

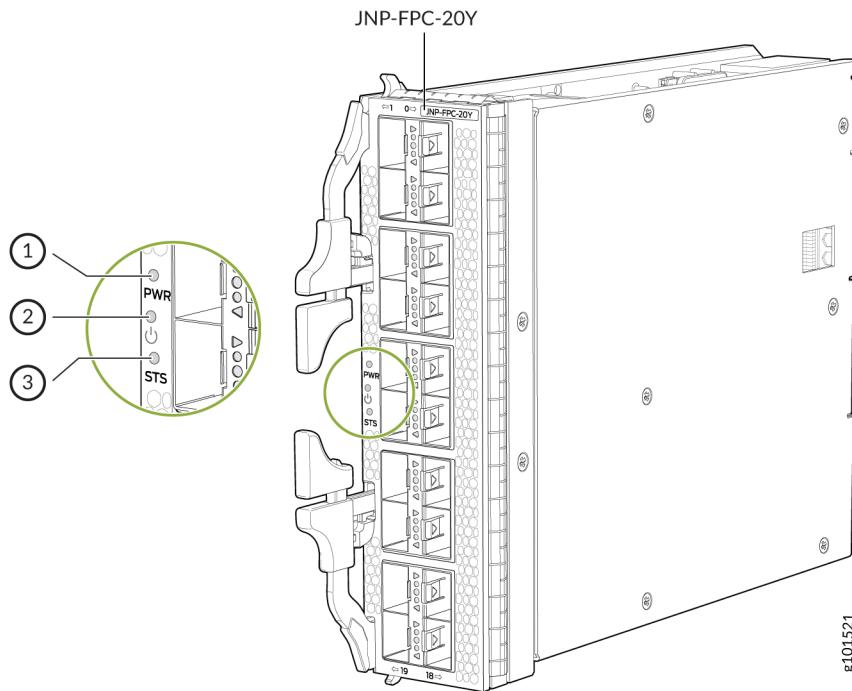
- [The QFX5K-FPC-20Y Flexible PIC Concentrator | 45](#)
 - [The QFX5K-FPC-16C Flexible PIC Concentrator | 49](#)
 - [The QFX5K-FPC-4CD Flexible PIC Concentrator | 54](#)
-

The QFX5700 switch supports three types of Flexible PIC Concentrators (FPCs) that are installed vertically in the front of the chassis: **QFX5K-FPC-20Y**, **QFX5K-FPC-16C**, and **QFX5K-FPC-4CD**. The QFX5700 chassis has nine FPC slots, but the chassis supports only eight FPCs in slots **FPC 0** through **7**. Slot **8** is empty. The QFX5700 switch supports a maximum of 144 logical ports.

FPCs 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.

The QFX5K-FPC-20Y Flexible PIC Concentrator

Figure 31: QFX5K-FPC-20Y



1– PWR status LED

2– Online/Offline button

3– STS FPC status LED

NOTE: When you press the 'Online' button, the 'PWR' status LED stays off for ten seconds and activity would be shown only after ten seconds.

Table 11: QFX5K-FPC-20Y Specifications

Software release Junos OS Evolved 21.4R1

- Description
- Height x Width x Depth: 1.74 in. (4.43 cm) x 6.6 in. (17 cm) x 7.87 in. (20 cm)
 - Model number: QFX5K-FPC-20Y
 - Name in the CLI: QFX5K-FPC-20Y
 - Number of ports: 20 (10 Gigabit Ethernet (GbE), 25 GbE, or 50 GbE)
 - Optic Connectors: SFP+ (small form-factor pluggable), SFP28, or SFP56
-

- QFX5700 chassis slots supported
- In slot numbers 0, 2, 4, and 6, all 20 ports can be used.
 - In slot numbers 1, 3, 5, and 7, only the first 16 ports can be used.
-

- Port speeds and channelization
- The default port speed for all active ports is 25Gbps.
 - Starting in Junos OS Evolved Release 22.2R1, we support 50Gbps port speed.
 - Channelization is not supported.

Chassis slot	Ports available	Port speeds
0, 2, 4, and 6	Ports 0-19	10G/25G/50G
1, 3, 5, and 7	Ports 0-15	10G/25G/50G

- Hardware features
- Line rate of up to 1 Tbps throughput per FPC when installed in chassis slots 0, 2, 4, or 6, and 800 Gbps of throughput when installed in chassis slots 1, 3, 5, or 7.
 - Uses three PHY devices to send and to receive packets to SFP56 modules from a switching ASIC (on the FEB card).
 - The PHY supports Precision Time Protocol (PTP) timing and supports Media Access Control Security (MACsec) and non-MACsec modes at all different speeds.
-

- Software features
- Inline MACsec on all ports. The MACsec feature is supported on Layer 1 and can be configured based on software configuration or license.
-

- Power requirements
- Typical power requirement - 70W (without optics)
 - Worst case power requirement - 74W (with optics)

LEDs

Network LEDs

Each network port has a single tricolored LED that indicates link activity and status.

Color	State	Description
Unlit	Off	A transceiver is not present in the port, or the link is down because of signal loss.
Green	On steadily	A link is established.
Amber	On steadily	The link is down because of a remote error or because the port was disabled through the CLI.
Red	On steadily	The port has a hardware failure or link down.

FPC Status LEDs

Power **PWR** bi-color red/green LED:

Color	State	Description
Unlit	Off	No power.
Green	On steadily	The FPC has power and is operating correctly.
Red	On steadily	The FPC has a fault condition.

Status **STS** bi-color red/green LED:

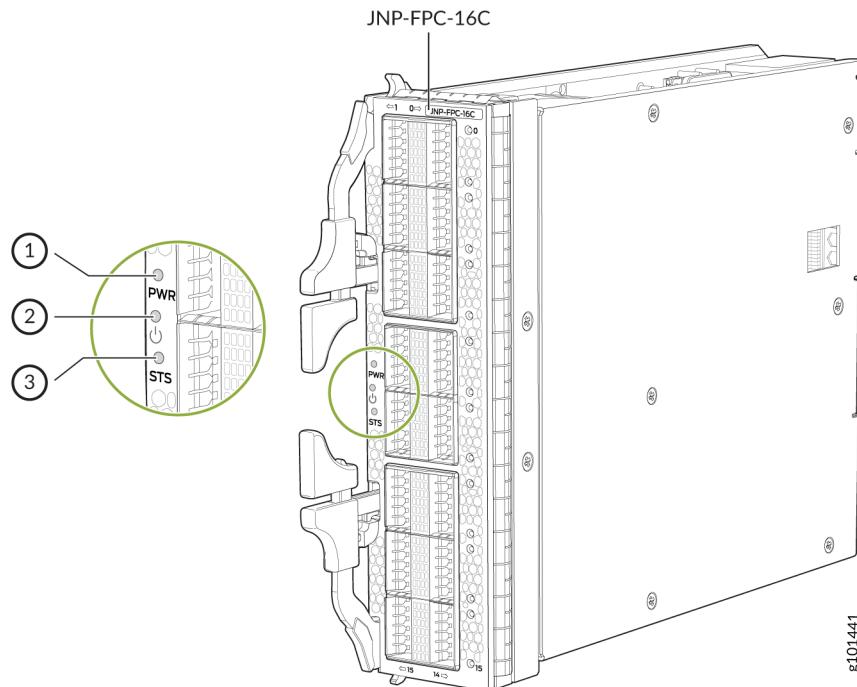
Color	State	Description
Unlit	Off	The FPC is disabled or offline.
Green	On steadily	The FPC has power and is operating correctly.
Green	Blinking	The FPC is booting or going offline.
Yellow	On steadily	The FPC has a fault condition.

Online/Offline button You can use this button to power off/on the FPC.

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

The QFX5K-FPC-16C Flexible PIC Concentrator

Figure 32: QFX5K-FPC-16C



1– PWR status LED

2– Online/Offline button

3– STS FPC status LED

Table 12: QFX5K-FPC-16C Specifications

Software release Junos OS Evolved 21.4R1

Description	<ul style="list-style-type: none"> Height x Width x Depth: 1.74 in. (4.43 cm) x 6.6 in. (17 cm) x 7.87 in. (20 cm) Model number: QFX5K-FPC-16C Name in the CLI: QFX5K-FPC-16C Number of ports: 16 (40 GbE or 100 GbE) Optic Connectors: Each port supports QSFP+ or QSFP28
-------------	---

QFX5700 Slot numbers FPC 0 - 7
chassis slots
supported

- Port speeds and channelization**
- The default port speed for all active ports is 100Gbps.
 - You can channelize ports 0, 4, 8, and 12 as 4x10GbE ports or 4x25GbE ports.
 - When you channelize a port, the next three consecutive ports cannot be used and must be configured as unused ports.

Port speed	Port options	Cable options	Optics type
100G	Ports 0-15	1X100G	QSFP28
40G	Ports 0-15	1X40G	QSFP+
25G	Ports 0, 4, 8, and 12	4X25G breakout cable	QSFP28
10G	Ports 0, 4, 8, and 12	4X10G breakout cable	QSFP+

-
- Hardware features**
- Line rate of up to 1.6 Tbps throughput per FPC.
 - Uses four PHY devices to send and receive packets to QSFP28 modules from a switching ASIC (on the FEB card).
 - The PHY supports PTP timing and supports MACsec and non-MACsec modes at all different speeds.

Software features Inline MACsec on all ports. The MACsec feature is supported on Layer 1 and can be configured based on software configuration.

- Power requirements**
- Typical power requirement - 122W (without optics)
 - Worst case power requirement - 133W (with optics)
-

LEDs

Network LEDs

Each network port has a single tricolored LED that indicates link activity and status. The red, amber, or green LED has different interpretations depending on whether the port is channelized and whether the beacon feature is activated on the port. If the beacon feature is activated, the port blinks.

Nonchannelized:

Color	State	Description
Unlit	Off	A transceiver is not present in the port, or the link is down because of signal loss.
Green	On steadily	A link is established.
Amber	On steadily	The link is down because of a remote error or because the port was disabled through the CLI.
Red	On steadily	The link is down because the port has a hardware failure.

Channelized:

Color	State	Description
Unlit	Off	All channels are down because of signal loss.
Green	On steadily	A link is established and all channels are up.
Amber	On steadily	Applies to all other cases.

Color	State	Description
Red	On steadily	The link is down because of a hardware failure or a local error.

FPC Status LEDs

Power **PWR** bi-color red/green LED:

Color	State	Description
Unlit	Off	No power.
Green	On steadily	The FPC has power and is operating correctly.
Red	On steadily	The FPC has a fault condition.

Status **STS** bi-color yellow/green LED:

Color	State	Description
Unlit	Off	The FPC is disabled or offline.
Green	On steadily	The FPC has power and is operating correctly.
Green	Blinking	The FPC is booting or going offline.
Yellow	On steadily	The FPC has a fault condition or alarm.

Online/Offline button You can use this button to power off/on the FPC.

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

The QFX5K-FPC-4CD Flexible PIC Concentrator

Figure 33: QFX5K-FPC-4CD

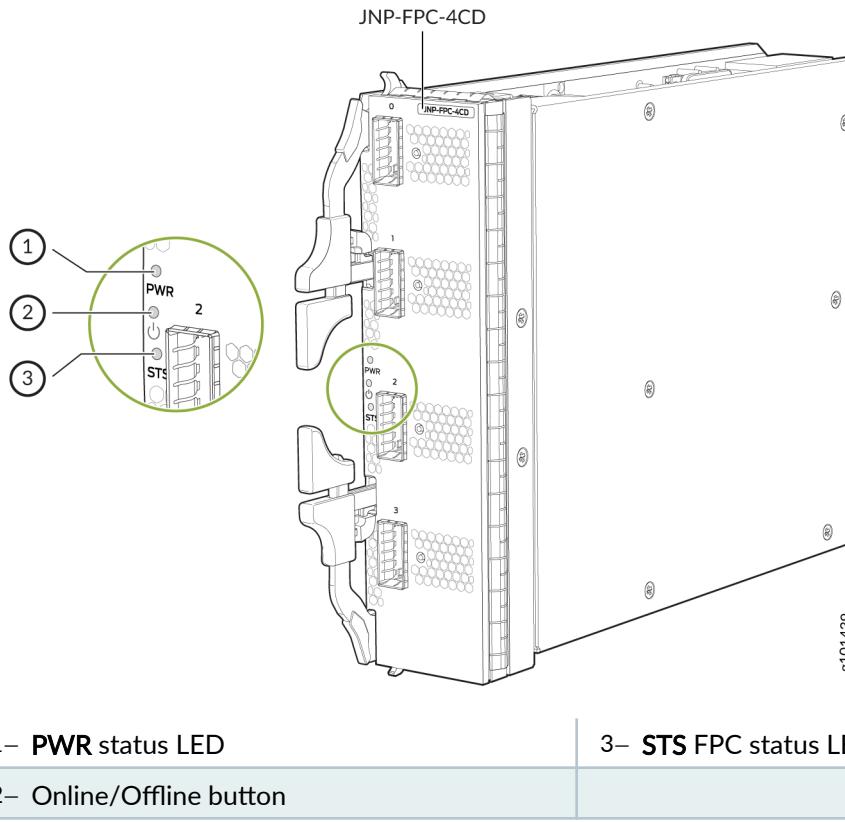


Table 13: QFX5K-FPC-4CD Specifications

Software release Junos OS Evolved 21.4R1

Description	<ul style="list-style-type: none"> Height x Width x Depth: 1.74 in. (4.43 cm) x 6.6 in. (17 cm) x 7.87 in. (20 cm) Model number: QFX5K-FPC-4CD Name in the CLI: QFX5K-FPC-4CD Number of ports: 4 (200 GbE or 400 GbE) Optic Connectors: Each port supports QSFP56 or QSFP56-DD
-------------	---

QFX5700 chassis Slot numbers FPC 0-7
slots supported

- Port speeds and channelization
- The default port speed for all active ports is 400Gbps.
 - You can channelize all four ports as 4x10GbE ports, 4x25GbE ports, or 4x100GbE ports.
 - There is no unused port configuration.

Port speed	Port options	Cable options	Optics type
400G	Ports 0-3	1x400G	QSFP56-DD
100G	Ports 0-3	1x100G	QSFP28
	Ports 0-3	4X100G breakout cable	QSFP56-DD
40G	Ports 0-3	1x40G	QSFP+
25G	Ports 0-3	4X25G breakout cable	QSFP28
10G	Ports 0-3	4X10G breakout cable	QSFP+

- Hardware features
- Line rate of up to 1.6 Tbps throughput per FPC.
 - Uses four PHY devices to send and receive packets to QSFP56 modules from a switching ASIC (on the FEB card).
-

- Power requirements
- Typical power requirement - 102W (without optics)
 - Worst case power requirement - 114W (with optics)
-

LEDs

Network LEDs

Each network port has a single tricolored LED that indicates link activity and status. The red, amber, or green LED has different interpretations depending on whether the port is channelized and whether the beacon feature is activated on the port. If the beacon feature is activated, the port blinks.

Nonchannelized:

Color	State	Description
Unlit	Off	A transceiver is not present in the port, or the link is down because of signal loss.
Green	On steadily	A link is established.
Amber	On steadily	The link is down because of a remote error or because the port was disabled through the CLI.
Red	On steadily	The link is down because the port has a hardware failure.

Channelized:

Color	State	Description
Unlit	Off	All channels are down because of signal loss.
Green	On steadily	A link is established and all channels are up.
Amber	On steadily	Applies to all other cases.

Color	State	Description
Red	On steadily	The link is down because of a hardware failure or a local error.

FPC Status LEDs

Power **PWR** bi-color red/green LED:

Color	State	Description
Unlit	Off	No power.
Green	On steadily	The FPC has power and is operating correctly.
Red	On steadily	The FPC has a fault condition.

Status **STS** bi-color red/green LED:

Color	State	Description
Unlit	Off	The FPC is disabled or offline.
Green	On steadily	The FPC has power and is operating correctly.
Green	Blinking	The FPC is booting or going offline.

Online/Offline button You can use this button to power off/on the FPC.

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

QFX5700 Forwarding Engine Board

IN THIS SECTION

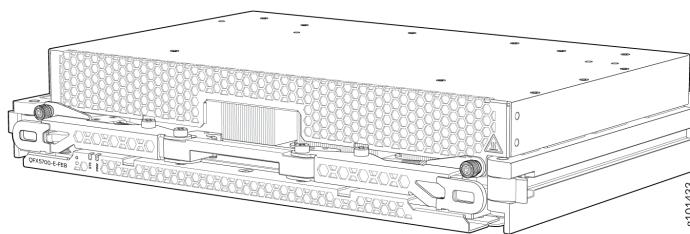
- [QFX5700-FEB Specifications | 60](#)

QFX5700 switch supports two QFX5700-FEB Forwarding Engine Boards (FEBs) that are installed horizontally, mid-chassis, between the Flexible PIC Concentrators (FPCs) and the Routing Control Boards (RCBs) in the front and the fan trays in the rear. FEBs are hot-removable and hot-insertable field-replaceable units (FRUs) which are not visible from the outside of the switch chassis. You must remove one of the fan trays to see the FEBs.

The FEBs and FPCs are interconnected using the Direct Ortho Connector.

The QFX5700 design is accomplished with a Packet Processing and Traffic Management TD4 chipset. The TD4 chipset handles a full duplex 12.8Tbps data at the Fabric Interface for non-blocking switching operations.

Figure 34: QFX5700-FEB



The QFX5700 uses 2 FEB and 8 FPC slots (0-7) to connect 256 SerDes links from each FEB card to respective FPC slots (32 SerDes/slot). Each FPC slot is capable of driving 1.6Tbps data (based on slot numbers) to WAN ports.

QFX5700-FEB Specifications

IN THIS SECTION

- [QFX5700-FEB LEDs | 60](#)

The QFX5700-FEB specifications include the following:

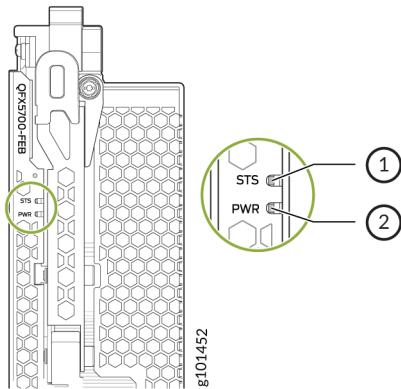
Table 14: QFX5700-FEB Specifications

Specification	QFX5700-FEB
Software release	Junos OS Evolved 21.2R2
Supported FPCs	<ul style="list-style-type: none"> ● JNP-FPC-4CD ● JNP-FPC-16C ● JNP-FPC-20Y
Height	8.4 cm
Width	43.7 cm
Depth	28.1 cm
Weight	6.6 kg
Power Requirement	300W

QFX5700-FEB LEDs

The Forwarding Engine Boards (FEBs) have two status LEDs. See [Figure 35 on page 61](#).

Figure 35: FEB LEDs



1– Online/Offline button

2– PWR status LED

This table describes the functions of FEB LEDs and the Online/Offline button.

Table 15: FEB LEDs and Online/Offline Button

Label	Color	State	Description
PWR (Power)	Green	On steadily	The FEB is receiving power.
	Yellow	On steadily	The FEB is receiving power but a power fault occurred.
	Dark	Off	The FEB is either offline or not receiving power.
STS (Status)	Green	On steadily	The FEB is online and functioning normally.
		Blinking	The FEB is booting or going offline.
	Yellow	On steadily	The FEB has failed.

Table 15: FEB LEDs and Online/Offline Button (*Continued*)

Label	Color	State	Description
	Dark	Off	The FEB is offline.
Online/Offline button	-	-	You can use this button to power on/off the FPC.

2

CHAPTER

Site Planning, Preparation, and Specifications

[QFX5700 Site Preparation Overview | 64](#)

[QFX5700 Transceiver and Cable Specifications | 71](#)

[QFX5700 Console and Management Cable Specifications and Pinouts | 76](#)

QFX5700 Site Preparation Overview

IN THIS SECTION

- [QFX5700 Site Preparation Checklist | 64](#)
- [QFX5700 Environmental Requirements and Specifications | 65](#)
- [QFX5700 General Site Guidelines | 66](#)
- [QFX5700 Site Electrical Wiring Guidelines | 67](#)
- [QFX5700 Grounding Cable and Lug Specifications | 68](#)
- [QFX5700 Clearance Requirements for Airflow and Hardware Maintenance | 69](#)

The following sections describe the guidelines, the specifications, and the requirements to install a QFX5700 switch.

QFX5700 Site Preparation Checklist

The checklist in [Table 16 on page 64](#) summarizes the tasks you must perform to prepare a site for the QFX5700.

Table 16: Site Preparation Checklist

✓ Item or Task	For More Information
Environment	
<input type="checkbox"/> Verify that environmental factors such as temperature and humidity do not exceed switch tolerances.	
<hr/>	
Power	
<input type="checkbox"/> Measure the distance between external power sources and the switch installation site.	

Table 16: Site Preparation Checklist (*Continued*)

✓ Item or Task	For More Information
<input type="checkbox"/> Calculate the power consumption and requirements.	
<hr/>	
Rack	
<input type="checkbox"/> Verify that your rack meets the minimum requirements for the installation of the switch.	
<input type="checkbox"/> Plan rack location, including required space clearances.	
<input type="checkbox"/> Secure the rack to the floor and building structure.	
<hr/>	
Cables	
<input type="checkbox"/> Acquire cables and connectors: <ul style="list-style-type: none"> • Determine the number of cables needed based on your planned configuration. • Review the maximum distance allowed for each cable. Choose the length of cable based on the distance between the hardware components being connected. 	The list of supported transceivers for the QFX5700 line cards is located at https://apps.juniper.net/hct/product/#prd=QFX5700 .
<input type="checkbox"/> Plan the cable routing and management.	

QFX5700 Environmental Requirements and Specifications

The QFX5700 switch must be installed in a rack. It must be housed in a dry, clean, well-ventilated, and temperature-controlled environment.

Follow these environmental guidelines:

- Ensure that the site is 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 17: QFX5700 Environmental Tolerances

Description	Tolerance
Altitude	6000 ft (1828 m)
Relative humidity	55% to 70% (non-condensing)
Non-operating temperature	0° C to 40° C (32° F to 104° F)
Shipping and storage temperature	-40° C to 85° C (-40° F to 185° F)
Pollution degree	2 (IEC 60950)
Acoustic noise level	< 7.2 Bel (EN 300 753)
Enclosure classification	IP20 (IEC 60529)
Seismic	Tested and meets GR-63.

 **NOTE:** Install QFX5700 switches only in restricted-access 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.

QFX5700 General Site Guidelines

Efficient device operation requires proper site planning and maintenance and proper layout of the equipment, rack or cabinet (if used), and wiring closet.

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

- Keep the area around the chassis free from dust and conductive material, such as metal flakes.
- Follow prescribed airflow guidelines to ensure that the cooling system functions properly and that exhaust from other equipment doesn't blow into the intake vents of the device.
- Follow the prescribed electrostatic discharge (ESD) prevention procedures to prevent damage to 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.

QFX5700 Site Electrical Wiring Guidelines

[Table 18 on page 67](#) describes the factors you must consider while you plan the electrical wiring at your site.



CAUTION: It is particularly important to provide a properly grounded and shielded environment and to use electrical surge-suppression devices.

Table 18: Site Electrical Wiring Guidelines

Site Wiring Factor	Guidelines
Signaling limitations	<p>To ensure that signaling functions optimally:</p> <ul style="list-style-type: none"> • Install wires correctly. Improperly installed wires can emit radio interference. • Do not exceed the recommended distances or pass wires between buildings. The potential for damage from lightning strikes increases if wires exceed recommended distances or if wires pass between buildings. • Shield all conductors. The electromagnetic pulse (EMP) caused by lightning can damage unshielded conductors and destroy electronic devices.

Table 18: Site Electrical Wiring Guidelines (*Continued*)

Site Wiring Factor	Guidelines
Radio frequency interference (RFI)	<p>To reduce or eliminate the emission of RFI from your site wiring:</p> <ul style="list-style-type: none"> • Use a twisted-pair cable with a good distribution of grounding conductors. • Use a high-quality twisted-pair cable with one ground conductor for each data signal when applicable, if you must exceed the recommended distances.
Electromagnetic compatibility (EMC)	<p>Provide a properly grounded and shielded environment and use electrical surge-suppression devices.</p> <p>Strong sources of electromagnetic interference (EMI) can cause the following damage:</p> <ul style="list-style-type: none"> • Destruction of the signal drivers and receivers in the device • Electrical hazards as a result of power surges conducted over the lines into the equipment <p>TIP: If your site is susceptible to problems with EMC, particularly from lightning or radio transmitters, you might want to seek expert advice.</p>



WARNING: The intrabuilding port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding port(s) of the equipment or subassembly MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE), and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

QFX5700 Grounding Cable and Lug Specifications

For installations that require a separate grounding conductor to the chassis, the switch must be adequately grounded before power is connected to ensure proper operation and to meet safety and electromagnetic interference (EMI) requirements. To ground a QFX5700 switch, connect a grounding cable to earth ground, and then attach it to the chassis grounding point.



WARNING: The switch is pluggable type A equipment installed in a restricted-access location. It has a separate protective earthing terminal provided on the chassis in addition to the grounding pin of the power supply cord. This separate protective earthing terminal must be permanently connected to earth ground for installations that require a separate grounding conductor to the chassis.



WARNING: To comply with GR-1089 requirements, all intra-building copper cabling used for transceiver ports must be shielded and grounded at both ends.



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

NOTE: You must ensure that all cables are rated for the environment in which they are deployed.

For a QFX5700 switch, you need a grounding cable and straight lug with dual holes. You also need a dual-hole straight lug connector. The grounding lug accommodates 4 AWG (25 mm²), minimum 90° C wire, or as required by the local code.

QFX5700 Clearance Requirements for Airflow and Hardware Maintenance

When you plan the site for a QFX5700 switch installation, you must allow sufficient clearance around the installed chassis for cooling and maintenance. See [Figure 37 on page 70](#) for a top view of clearance for the QFX5700.

- For the cooling system to function properly, the airflow around the chassis must be unrestricted. See [Figure 37 on page 70](#) for more information about the airflow through the chassis.
- If you are mounting a QFX5700 switch 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.
- For service personnel to remove and install hardware components, and to accommodate the interface and power cable bend radius, there must be adequate space at the front and rear of the switch. Allow at least 24 in. (61 cm) of space both at the front and the rear of the switch. NEBS GR-63 recommends that you allow at least 30 in. (76.2 cm) behind the switch.

- The device must not interfere with the cooling of other systems in the rack. Fillers must be used as appropriate in the rack to ensure there is no recirculation of heated exhaust air back to the front of the rack. Care must also be taken around cables to ensure that there is no leakage of air in situations where recirculation might result.

Figure 36: Clearance Requirements for Airflow and Hardware Maintenance for QFX5700

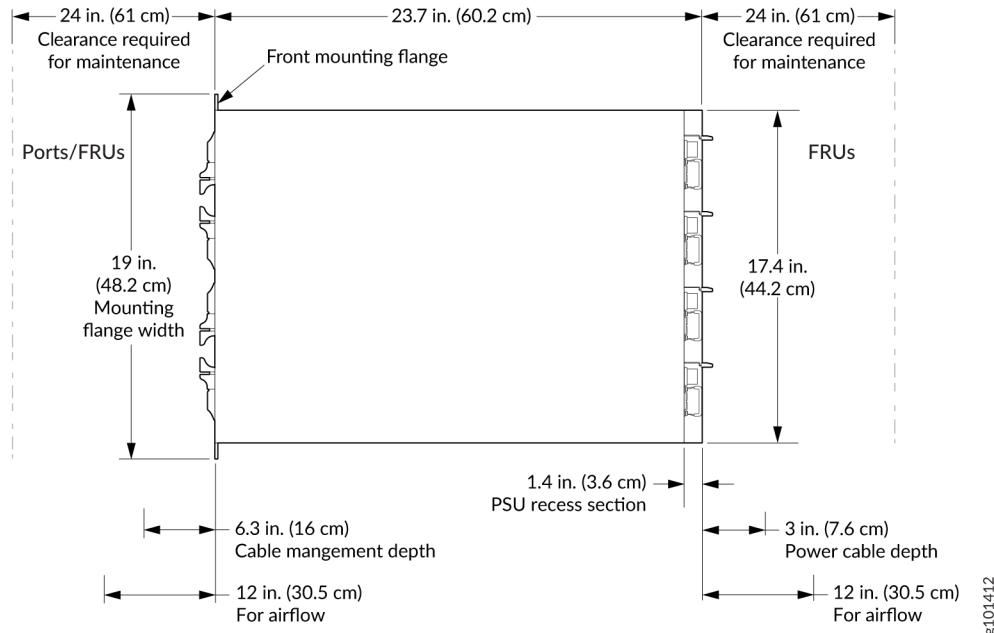
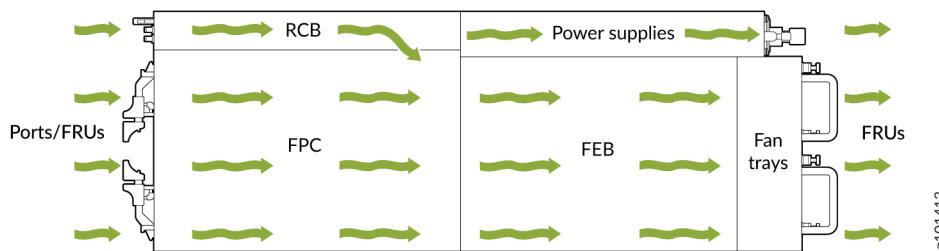


Figure 37: Airflow



QFX5700 Transceiver and Cable Specifications

IN THIS SECTION

- QFX5700 Optical Transceiver and Cable Support | [71](#)
- QFX5700 Cable Specifications for Console and Management Connections | [72](#)
- QFX5700 Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion | [72](#)
- Calculate the Fiber-Optic Cable Power Budget for a QFX Series Router | [74](#)
- Calculate the Fiber-Optic Cable Power Margin for a QFX Series Router | [74](#)

Review fiber-optic cable characteristics and plan the power budget and power margin for fiber-optic cables connected to your device by using the information in the following topics.

QFX5700 Optical Transceiver and Cable Support

You can find information about the pluggable transceivers supported on your Juniper Networks device by using the Hardware Compatibility Tool. In addition to transceiver and connector type, the optical and cable characteristics—where applicable—are documented for each transceiver. The Hardware Compatibility Tool enables you to search by product, displaying all the transceivers supported on that device, or category, by interface speed or type. The list of supported transceivers for the QFX5700 is located at <https://pathfinder.juniper.net/hct/product/#prd=QFX5700>.



CAUTION: If you face a problem running a Juniper Networks device that uses a third-party optic or cable, the Juniper Networks Technical Assistance Center (JTAC) can help you diagnose the source of the problem. Your JTAC engineer might recommend that you check the third-party optic or cable and potentially replace it with an equivalent Juniper Networks optic or cable that is qualified for the device.

QFX5700 Cable Specifications for Console and Management Connections

[Table 19 on page 72](#) lists the specifications for the cables that connect the QFX5700 switch to a management device.

NOTE: The QFX5700 can be configured with small form-factor pluggable (SFP) management ports that support 1000BASE-SX transceivers.

Table 19: Cable Specifications for Console and Management Connections for the QFX5700 switches

Port on QFX5700 switch	Cable Specification	Maximum Length	Device Receptacle
Console port	RS-232 (EIA-232) serial cable	2.13 meters	RJ-45
Management port	Category 5 cable or equivalent suitable for 1000BASE-T operation	100 meters	RJ-45

QFX5700 Fiber-Optic Cable Signal Loss, Attenuation, and Dispersion

IN THIS SECTION

- [Signal Loss in Multimode and Single-Mode Fiber-Optic Cables | 73](#)
- [Attenuation and Dispersion in Fiber-Optic Cables | 73](#)

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 QFX5700 switch 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 [Hardware Compatibility Tool](#). Exceeding the maximum transmission distances can result in significant signal loss, which causes unreliable transmission.

Attenuation and Dispersion in Fiber-Optic Cables

An optical data link functions correctly if the 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 transmissions. 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 caused by the different speeds of light rays.
- Modal dispersion, which is 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 the Fiber-Optic Cable Power Budget for a QFX Series Router

Calculate the link's power budget when planning fiber-optic cable layout and distances to ensure that fiber-optic connections have sufficient power for correct operation. The power budget is the maximum amount of power the link 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 don't operate at the worst-case levels.

To calculate the worst-case estimate for the fiber-optic cable power budget (P^B) for the link:

1. Determine values for the link's minimum transmitter power (P_T) and minimum receiver sensitivity (P_R). For example, here (P_T) and (P_R) are measured in decibels, and decibels are referenced to 1 milliwatt (dBm):

$$P_T = -15 \text{ dBm}$$

$$P_R = -28 \text{ dBm}$$

 **NOTE:** See the specifications for your transmitter and receiver to find the minimum transmitter power and minimum receiver sensitivity.

2. Calculate the power budget (P^B) by subtracting (P_R) from (P_T):

$$-15 \text{ dBm} - (-28 \text{ dBm}) = 13 \text{ dBm}$$

Calculate the Fiber-Optic Cable Power Margin for a QFX Series Router

Before you begin to calculate the power margin, calculate the power budget.

Calculate the link's power margin when planning fiber-optic cable layout and distances to ensure that fiber-optic connections have sufficient signal power to overcome system losses and still satisfy the minimum input requirements of the receiver for the required performance level. The power margin (P_M)

is the amount of power available after attenuation or link loss (LL) has been subtracted from the power budget (P_B).

When you calculate the power margin, you use a worst-case analysis to provide a margin of error, even though all the parts of an actual system don't operate at worst-case levels. A power margin (P_M) greater than zero indicates that the power budget is sufficient to operate the receiver and that it does not exceed the maximum receiver input power. This means the link will work. A (P_M) that is zero or negative indicates insufficient power to operate the receiver. See the specification for your receiver to find the maximum receiver input power.

To calculate the worst-case estimate for the power margin (P_M) for the link:

1. Determine the maximum value for LL by adding estimated values for applicable link-loss factors; for example, use the sample values for various factors as provided in [Table 20 on page 75](#) (here, the link is 2 km long and multimode, and the (P_B) is 13 dBm).

Table 20: Estimated Values for Factors Causing Link Loss

Link-Loss Factor	Estimated Link-Loss Value	Sample Link-Loss Calculation Values
Higher-order mode losses	Multimode—0.5 dBm	0.5 dBm
	Single mode—None	0 dBm
Modal and chromatic dispersion	Multimode—None, if product of bandwidth and distance is less than 500 MHz/km	0 dBm
	Single mode—None	0 dBm
Connector	0.5 dBm	This example assumes five connectors. Loss for five connectors: 5 (0.5 dBm) = 2.5 dBm.
Splice	0.5 dBm	This example assumes two splices. Loss for two splices: 2 (0.5 dBm) = 1 dBm.
Fiber attenuation	Multimode—1 dBm/km	This example assumes the link is 2-km long. Fiber attenuation for 2 km: 2 km (1 dBm/km) = 2 dBm.

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

Link-Loss Factor	Estimated Link-Loss Value	Sample Link-Loss Calculation Values
	Single-mode—0.5 dBm/km	This example assumes the link is 2-km long. Fiber attenuation for 2 km: 2 km (0.5 dBm/km) = 1 dBm.
Clock Recovery Module (CRM)	1 dBm	1 dBm

NOTE: For information about the actual amount of signal loss caused by equipment and other factors, see your vendor documentation for that equipment.

2. Calculate the (P_M) by subtracting (LL) from (P_B):

$$P_B - LL = P_M$$

$$13 \text{ dBm} - 0.5 \text{ dBm [HOL]} - 5 (0.5 \text{ dBm}) - 2 (0.5 \text{ dBm}) - 2 \text{ km (1.0 dBm/km)} - 1 \text{ dB [CRM]} = P_M$$

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

$$P_M = 6 \text{ dBm}$$

The calculated power margin is greater than zero, indicating that the link has sufficient power for transmission. Also, the power margin value does not exceed the maximum receiver input power. Refer to the specifications for your receiver to find the maximum receiver input power.

QFX5700 Console and Management Cable Specifications and Pinouts

IN THIS SECTION

- [Management Cable Specifications for QFX5700 Switches | 77](#)
- [RJ-45 to DB-9 Serial Port Adapter Pinout Information | 77](#)

- Console Port Connector Pinouts for a QFX5700 | [78](#)
- USB Port Specifications for the QFX5700 | [78](#)

The following sections describe the console port, the USB port, and the management port connections and specifications for the QFX5700 switch.

Management Cable Specifications for QFX5700 Switches

This table lists the specifications for the cables that connect the console and management ports to management devices.

Table 21: Specifications of Cables to Connect to Management Devices

Ports	Cable Specifications	Receptacle	Additional Information
RJ-45 Console port	CAT5e unshielded twisted pair (UTP) cable	RJ-45	
Management Ethernet port	Ethernet cable with an RJ-45 connector	RJ-45	

RJ-45 to DB-9 Serial Port Adapter Pinout Information

The console port is an RS-232 serial interface that uses an RJ-45 connector to connect to a management device such as a laptop or a desktop PC. 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 to the device, use a combination of the RJ-45 to DB-9 socket adapter along with a USB to DB-9 plug adapter. This table provides the pinout information for the RJ-45 to DB-9 serial port adapter.

NOTE: The RJ-45 console port is a multiplexed port for both console (pins 3&6) and TOD (Time of the day), Pin 2 - TOD TXD, and Pin 7- TOD RXD. A split cable is required to use both the functionalities.

RJ-45 Pin	Signal	DB-9 Pin	Signal
3	TxD	2	RxD
6	RxD	3	TxD

Console Port Connector Pinouts for a QFX5700

The console port (labeled **CON**) on the Routing and Control Board (RCB) panel is an RS-232 serial interface that uses an RJ-45 connector to connect to a console management device. The baud rate for the console port must be set to 115200 baud.

[Table 22 on page 78](#) provides the pinout information for the RJ-45 console connector.

NOTE: If your laptop or PC does not have a DB-9 connector pin (plug) and you want to connect your laptop or PC directly to a QFX5700 switch, use a combination of the RJ-45 cable and RJ-45 to DB-9 adapter (not provided) and a USB to DB-9 plug adapter. You must provide the USB to DB-9 plug adapter.

Table 22: Console Port Connector Pinouts for the QFX5700 Switches

Pin	Signal	Input/Output
2	TxD	OUT
6	RxD	IN

USB Port Specifications for the QFX5700

The following Juniper Networks USB flash drives have been tested and are officially supported for the USB port in the QFX5700 switches:

- RE-USB-1G-S-1-gigabyte (GB) USB flash drive

- RE-USB-2G-S—2-GB USB flash drive
- RE-USB-4G-S—4-GB USB flash drive



CAUTION: Any USB memory product not listed as supported for the QFX5700 switches 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 QFX5700 switches. Failure to do so could expose your device to unpredictable behavior.



NOTE: USB flash drives used with the QFX5700 switch must support USB 2.0 or later.

3

CHAPTER

Initial Installation and Configuration

[QFX5700 Installation Overview | 81](#)

[Unpack a QFX5700 Switch | 81](#)

[Install the Mounting Hardware for a QFX5700 Switch | 86](#)

[Connect the QFX5700 to Power | 94](#)

[Connect the QFX5700 to External Devices | 105](#)

[Perform Initial Configuration for the QFX5700 Switch | 108](#)

QFX5700 Installation Overview

The QFX5700 is a rigid sheet-metal switch-chassis that houses the other hardware components such as the Routing and Control boards (RCBs), FEBs, FPCs, power supplies, and fan trays.

Perform the following steps to install the QFX5700:

1. Unpack the switch.
2. Mount the chassis in the rack.
Because of the weight of the chassis, mounting using a mechanical lift is preferred as the easiest and safest method.
3. Install the line cards.
4. Connect the chassis to earth ground following the instructions.
5. Connect power to the power supplies following the instructions.
6. Install the ESD front door following the instructions.
7. Connect to the network.
8. Configure the switch following the instructions.
9. Install the cable management system.

Unpack a QFX5700 Switch

SUMMARY

Unpack the switch using the recommended tools and following the recommended procedure.

IN THIS SECTION

- Tools and Parts Required to Unpack the QFX5700 Switch | [82](#)
- Unpack the QFX5700 Shipping Pallet | [82](#)
- Unpack the QFX5700 Flexible PIC Concentrators, Routing Control Boards, and Forwarding Engine Boards | [83](#)
- Compare the QFX5700 Order to the Packing List | [83](#)

Tools and Parts Required to Unpack the QFX5700 Switch

To unpack the switch and prepare for installation, you need the following tools:

- Phillips (+) screwdriver, number 2
- 1/2-in. or 13-mm open-end or socket wrench to remove bracket bolts from the shipping pallet
- A box cutter or packing knife to slice open the nylon straps and tape that seal the crate and boxes
- Blank panels to cover any slots not occupied by a component

Unpack the QFX5700 Shipping Pallet

After you prepare the installation site as described in you can unpack the switch.

The QFX5700 switch chassis is a rigid sheet-metal structure that houses the hardware components. The chassis ships in a cardboard box that has a two-layer wooden pallet base with foam cushioning between the layers. The switch chassis is bolted to the pallet base. The carton also contains an accessory box and a rack-mount kit.

NOTE: QFX5700 switches are maximally protected inside the shipping carton. Do not unpack the switch until you are ready to begin installation.

To unpack the chassis:

1. Move the shipping box to a staging area as close to the installation site as possible. While the chassis is bolted to the pallet, you can use a forklift or pallet jack to move the shipping box. Make sure there is enough space to remove components from the chassis.
2. Position the shipping box with the arrows pointing up.
3. Use the box cutter to slice the nylon straps that secure the shipping box to the pallet.
4. Lift the shipping box off the chassis.
5. Remove the cardboard accessory box.
6. Remove the foam padding from the top of the box.
7. Remove the plastic cover from the switch chassis.
8. Use a mechanical lift or unload all of the components manually. Then, manually lift the chassis from the shipping pallet.
9. Unpack the accessory box, and lay out the contents so that they are ready for use.
10. Verify that your order includes all appropriate parts.

11. Save the shipping box and packing materials in case you need to move or ship the switch at a later time.

Unpack the QFX5700 Flexible PIC Concentrators, Routing Control Boards, and Forwarding Engine Boards

Before you unpack a component, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See ["Prevention of Electrostatic Discharge Damage" on page 198](#).

Flexible PIC Concentrators (FPCs), additional Routing and Control Boards (RCBs), and additional Forwarding Engine Boards (FEBs) are field-replaceable units (FRUs) that are shipped separately from the switch chassis. The housings for the RCBs and FPCs are rigid sheet-metal structures. The housing for a FEB consists of an exposed printed circuit board (PCB) on one side and sheet metal on the other. All these components—the FRUs and the housings—are shipped in a cardboard carton, secured with packing material.



CAUTION: The components are maximally protected inside the shipping carton. Do not unpack them until you are ready to install the components in the switch chassis.

To unpack an RCB, a FEB, or a FPC:

1. Move the shipping carton to a staging area as close to the installation site as possible.
2. Position the carton so that the arrows are pointing up.
3. Open the top flaps on the shipping carton.
4. Pull out the packing material that holds the component in place.
5. Remove the component from the antistatic bag.
6. Save the shipping carton and packing materials in case you need to move or ship the RCB, FEB, or FPC later.

Compare the QFX5700 Order to the Packing List

The switch chassis shipment includes a packing list. Check the parts you receive in the shipping crate against the items on the packing list. The packing list specifies the part number and description of each part in your order.

The following items ship separately from the chassis:

- FPCs

- Cable management system

To compare the sales order and packing list against the contents of the chassis shipping crate:

1. Determine the configuration. The parts shipped depend on the configuration you order. These are the supported configurations:
 - QFX5700-BASE—Base configuration, AC/HVDC or DC with one QFX5700-FEB
2. Compare the packing list accompanying the chassis with the configuration order.
 - For BASE configuration orders, see [Table 23 on page 84](#).

Table 23: BASE Configuration Order

Component	Quantity
Switch, including the midplane and mounting brackets	1
QFX5700-RCB (Routing and Control Board)	1
JNP5K-RCB-BLNK—Blank for an empty RCB slot	1
QFX5700-FEB (Forwarding Engine Board)	1
Blank for an empty FEB slot	1
Power supply JNP-3000W-AC-AFO or JNP-3000W-DC-AFO	2
Blanks for empty power slots	2
JNP5700-FAN (fan tray)	2
Cable management system	1
JNP5K-FPC-BLNK—Blanks for empty FPC slots	9

Table 23: BASE Configuration Order (*Continued*)

Component	Quantity
Accessory kit	1

3. Compare the contents of the accessory kit with [Table 24 on page 85](#).

Table 24: QFX5700 Accessory Kit

Component	Quantity
Warranty card	1
End User License Agreement (EULA)	1
Media kit (USB flash drives)	1
Documentation Roadmap card	1
RJ-45 Y-splitter cable	1
DC power cable lug (for DC installations)	8
AC power cord (country specific)	2
ESD strap with cable	1

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

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

Install the Mounting Hardware for a QFX5700 Switch

IN THIS SECTION

- [Manually Mount a QFX5700 Switch on a Four-Post Rack | 87](#)
- [Installing a QFX5700 Switch using a Mechanical Lift | 90](#)
- [| 90](#)

You can install a QFX5700 switch into a four-post rack by using a mechanical lift, or you can install it manually.

Before you install the switch:

- Prepare the site for installation.
- Be sure the site has adequate clearance for both airflow and hardware maintenance.
- Unpack the switch
- Review the chassis lifting guidelines.



CAUTION: Do not install line cards in the chassis until after you mount the chassis securely on a rack or cabinet



CAUTION: Before mounting the switch on a rack or cabinet, have a qualified technician verify that the rack or cabinet is strong enough to support the weight of the switch and is adequately supported at the installation site.



CAUTION: If you are installing more than one switch in a rack or cabinet, install the first switch at the bottom of the rack.

Manually Mount a QFX5700 Switch on a Four-Post Rack

To manually mount a QFX5700 switch in a Four-Post Rack:

NOTE: The switch weighs approximately 250 lb (113 kg). Lifting the chassis and mounting it in a rack or cabinet requires at least three people. Make sure the chassis is empty (contains only the midplane) before you lift it.

Before you install the switch remove the FRUs if pre-installed:

- Remove a QFX5700 Routing and Control Board
- Remove a QFX5700 Forwarding Engine Boards
- Remove a QFX5700 FPCs
- Remove a QFX5700 Fan Tray
- Remove a AC/HVDC Power Supply or remove a DC Power Supply:

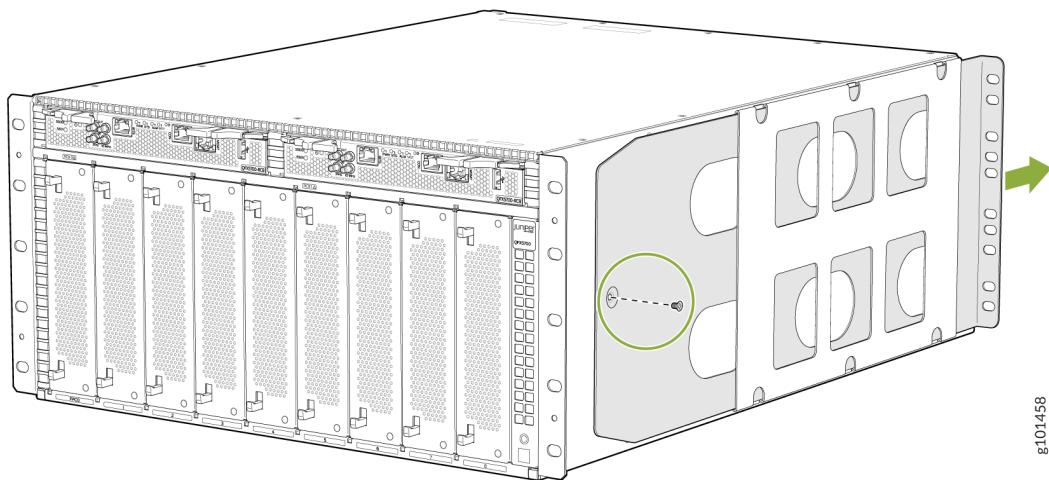
Be sure that you have the following parts and tools available to install the switch:

- Eighteen mounting screws appropriate for your rack (not provided)
- A Phillips (+) screwdriver, number 1, 2, or 3, depending on the size of your rack-mounting screws

To manually install the switch in the rack or cabinet:

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the device.
2. Using a Phillips screwdriver, remove the screw on each side of the chassis that holds the rear mounting-blades to the chassis.
3. Slide the mounting blades out of the channels.

Figure 38: Removing the Rear-Mounting Blades



4. With one person on each side, hold on to the bottom of the chassis, and carefully lift the chassis and position it in the rack so that the front brackets are aligned with the rack holes.

Figure 39: Lift the Chassis by Hand

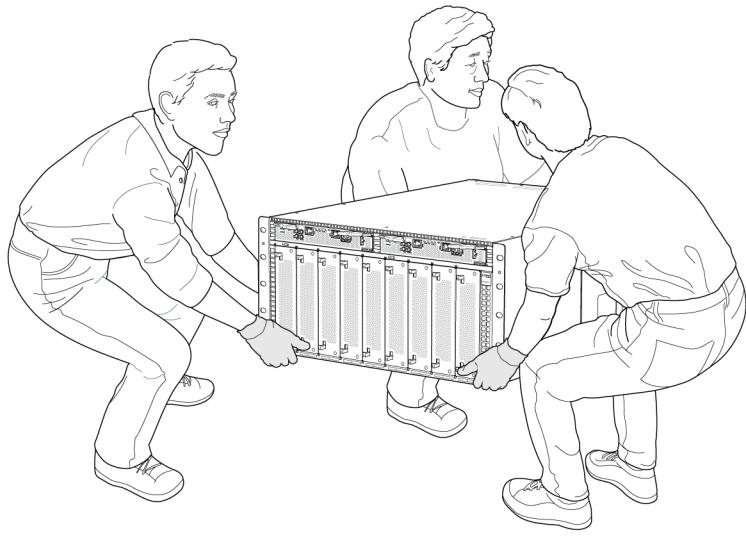
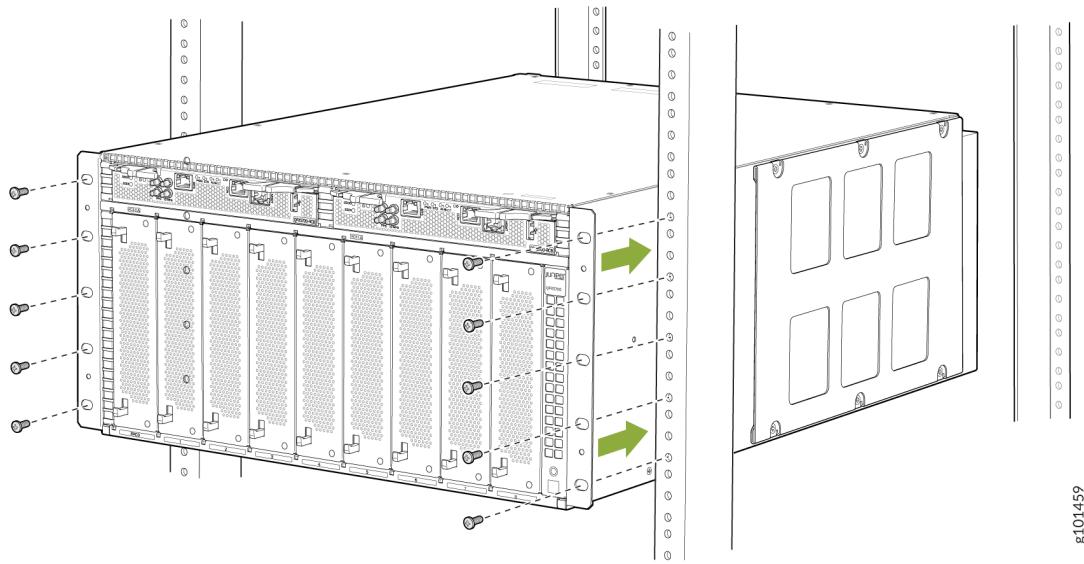
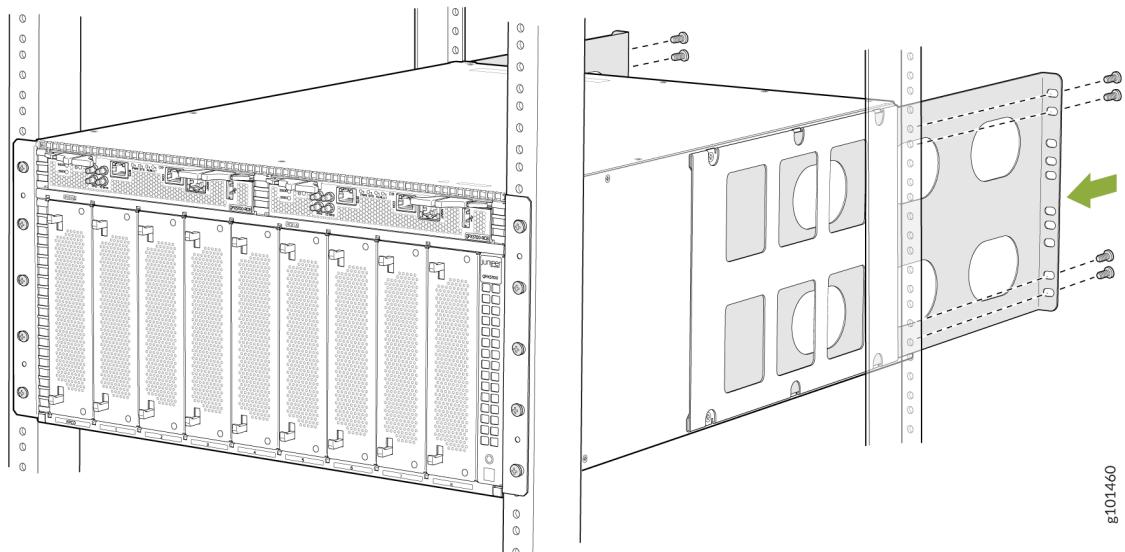


Figure 40: QFX5700 Switch Installed in a Four-Post Rack



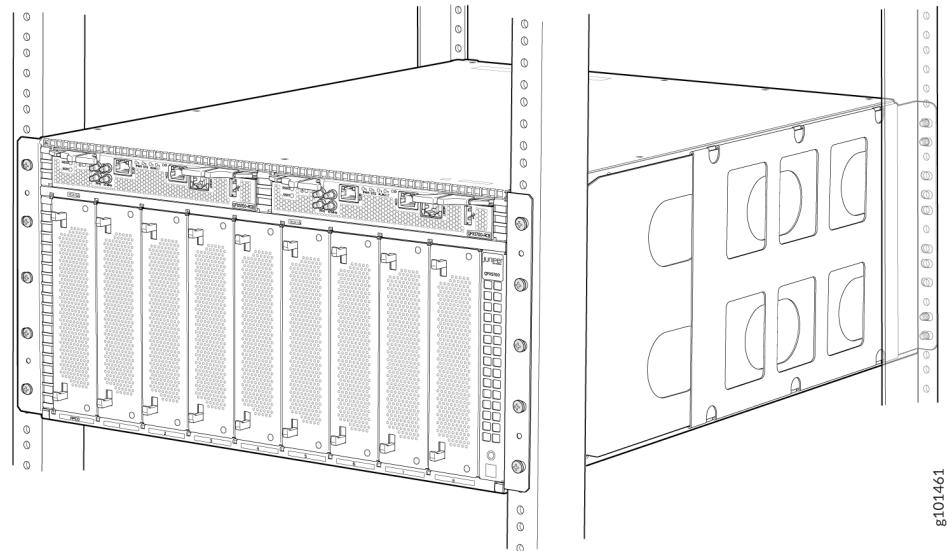
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5. With two people continuing to support the chassis the third person can install mounting screws into each of the front-mounting bracket holes aligned with the rack, starting from the bottom, and tighten the screws.
6. On the rear of the chassis, slide the rear-mounting blades into the channels on either side of the chassis until the rear-mounting brackets at the end of the blades contact the rack rails



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7. Install mounting screws into each of the rear-mounting bracket holes aligned with the rack, starting from the bottom, and secure them tightly.
8. Visually inspect the alignment of the chassis. If you've installed the chassis properly in the rack, all the mounting screws on one side of the rack are aligned with the mounting screws on the opposite side, and the switch is level.



9. If you have removed any pre-installed FRUs, reinstall them:

- Install a QFX5700 Routing and Control Board
- Install a QFX5700 Forwarding Engine Board
- Install a QFX5700 FPCs
- Install a QFX5700 Fan Tray
- Install a AC/HVDC Power Supply/DC Power Supply

Installing a QFX5700 Switch using a Mechanical Lift

These steps list the procedure involved to mount a QFX5700 switch in a Four-Post Rack Using a Mechanical Lift

TIP: Be sure that you have the following parts and tools available to install the switch:

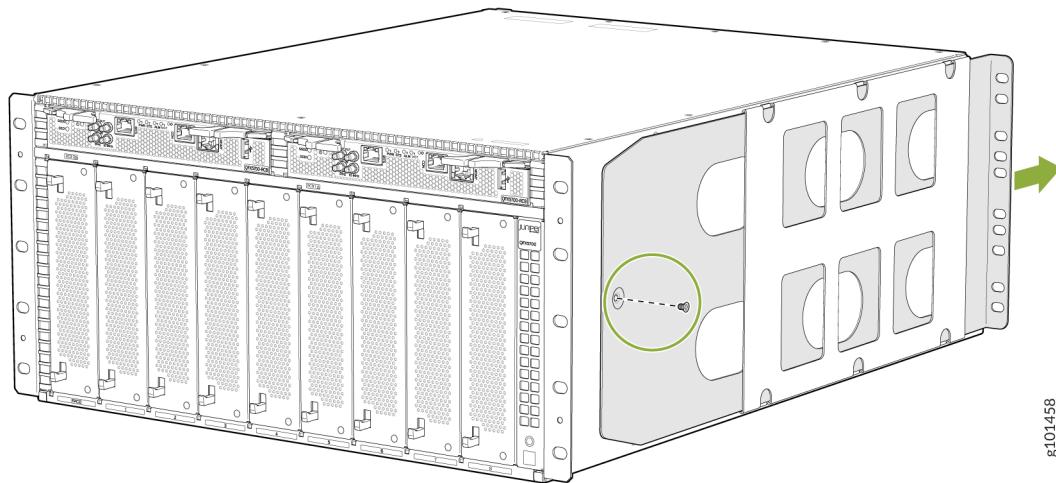
- A mechanical lift rated for 250 lb (113.4 kg)
- Eighteen mounting screws appropriate for your rack (not provided)
- A Phillips (+) screwdriver, number 1, 2, or 3, depending on the size of your rack-mounting screws

NOTE: Because of the size and weight of the switch, we strongly recommend that you use a mechanical lift to install the QFX5700.

To install the switch using a mechanical lift:

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the device.
2. Using a Phillips screwdriver, remove the screw on each side of the chassis that holds the rear mounting-blades to the chassis.
3. Slide the mounting blades out of the channels.

Figure 41: Removing the Rear-Mounting Blades



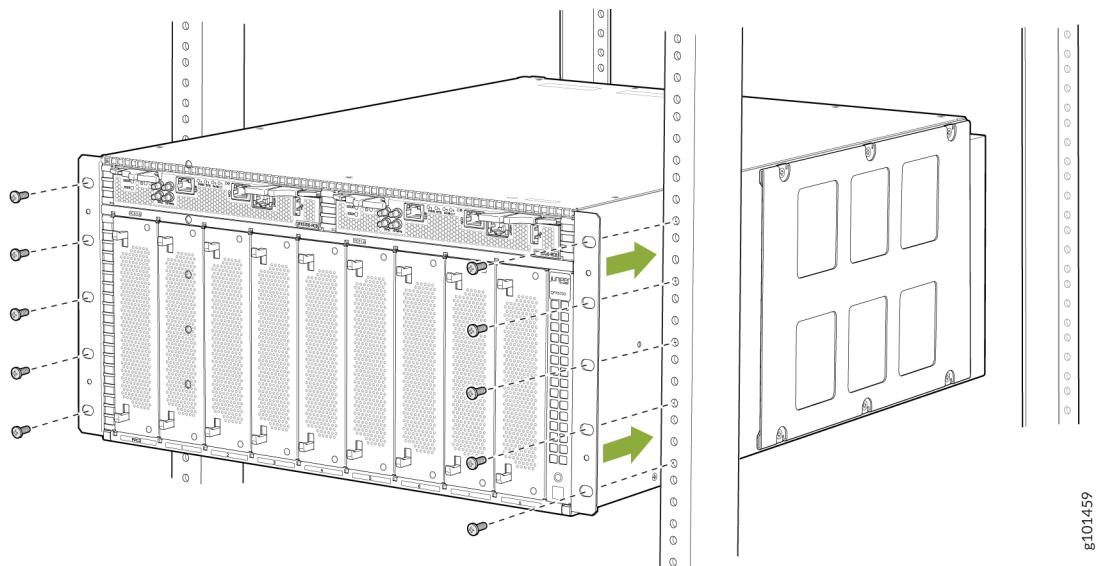
4. Load the switch onto the lift, making sure it rests securely on the lift platform.

Figure 42: Load the QFX5700 Switch onto a Mechanical Lift

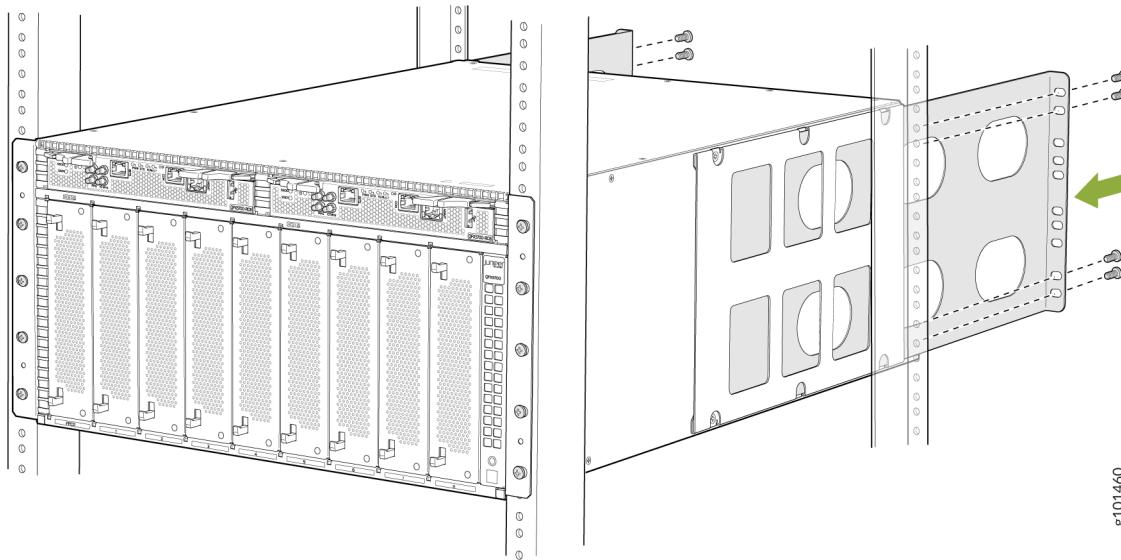


5. Using the lift, align the switch in front of the rack.
6. Carefully position the chassis in the rack until the holes of the front-mounting brackets align with the holes in the rack rails.

Figure 43: Install the QFX5700 Router in a Four-Post Rack

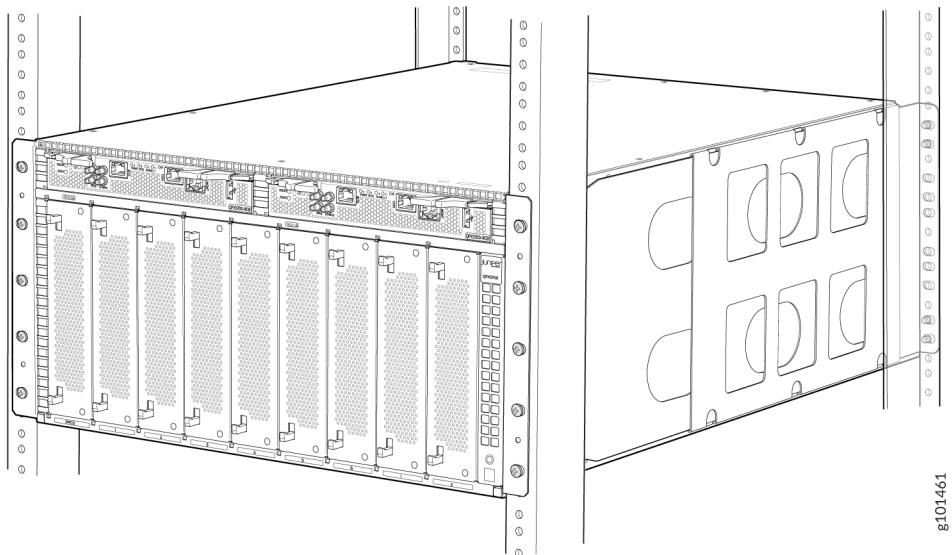


7. Install mounting screws into each of the front-mounting bracket holes aligned with the rack, starting from the bottom, and tighten the screws.
8. On the rear of the chassis, slide the rear-mounting blades into the channels on either side of the chassis until the rear-mounting brackets at the end of the blades contact the rack rails.



9. Install mounting screws into each of the rear-mounting bracket holes aligned with the rack, starting from the bottom, and secure them tightly.
10. Visually inspect the alignment of the chassis. If you've installed the chassis properly in the rack, all the mounting screws on one side of the rack are aligned with the mounting screws on the opposite side, and the switch is level.

Figure 44: Fully installed chassis



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Connect the QFX5700 to Power

IN THIS SECTION

- [Connect the QFX5700 Switch to Earth Ground | 95](#)
- [Connect AC Power to a QFX5700 | 97](#)
- [Connect DC Power to a QFX5700 | 100](#)

To connect power to a QFX5700 switch, read the following procedures.

NOTE: Do not mix power supply models in the same chassis in a running environment.

Connect the QFX5700 Switch to Earth Ground

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.

You must install the QFX5700 in a restricted-access location and ensure that the chassis is always properly grounded. The QFX5700 has a two-hole protective grounding terminal provided on the chassis. Under all circumstances, use this grounding connection to ground the chassis. For AC-powered systems, you must also use the grounding wire in the AC power cord along with the two-hole grounding lug connection. This tested system meets or exceeds all applicable EMC regulatory requirements with the two-hole protective grounding terminal.

If an external ground connection is required, ensure that a licensed electrician has attached an appropriate grounding lug to the grounding cable you supply. Using a grounding cable with an incorrectly attached lug can damage the switch.

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

Ensure that you have the following parts and tools available:

- An electrostatic discharge (ESD) grounding strap (provided).
- Protective earthing terminal lug (provided).
- Grounding cable for your QFX5700 (not provided)—The grounding cable must be 4 AWG (21.1 mm²) stranded wire should be rated 90° C or per local electrical code.
- Grounding lug for your grounding cable (not provided)—This bracket attaches to the lower left corner of the switch chassis next to the bottom power supply, providing a protective earthing terminal for the switch. The grounding lug required is a Panduit LCD6-14A-L or equivalent.
- A number 3 Pozidriv or Phillips screwdriver (not provided) to tighten the two screws that are mounted on the chassis.

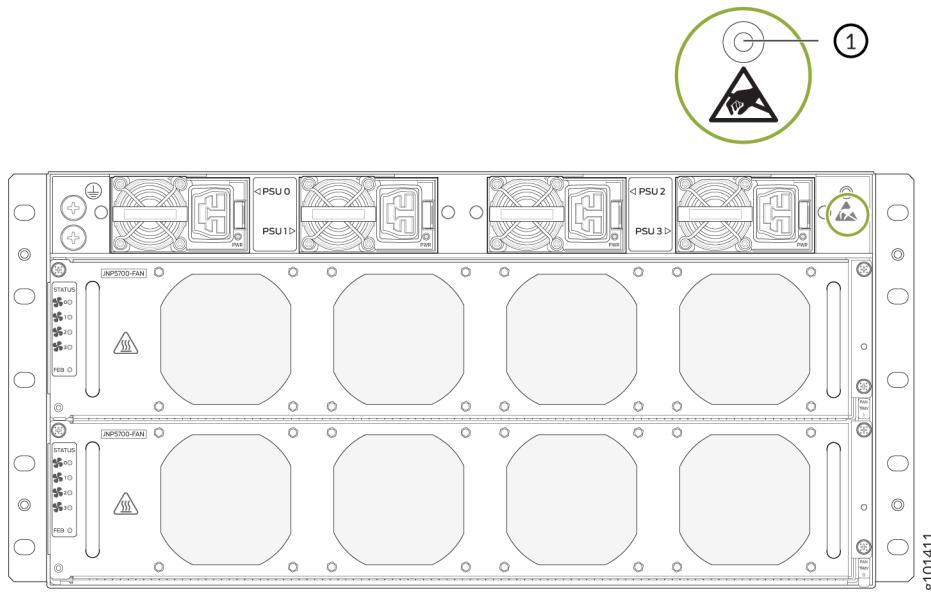
You need to use terminal lugs that are Panduit LCD4-14A-L, or equivalent, and sized for 4 AWG (21.1 mm²) power source cables. The 4 AWG (21.1 mm²) stranded wire should be rated 90° C or per local electrical code. We recommend that you install heat-shrink tubing insulation around the crimped section of the power cables and lugs.

An AC-powered QFX5700 gets additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using an AC power cord appropriate for your geographical location.

To connect earth ground to a QFX5700:

1. Verify that a licensed electrician has attached the cable lug (provided in the accessory kit) to the grounding cable.
2. Connect the other end of the grounding cable to a proper earth ground, such as the rack in which the switch is mounted.
3. Wrap and fasten one end of the ESD grounding strap around your bare wrist and connect the other end of the strap to one of the ESD points on the chassis. See [Figure 45 on page 96](#).

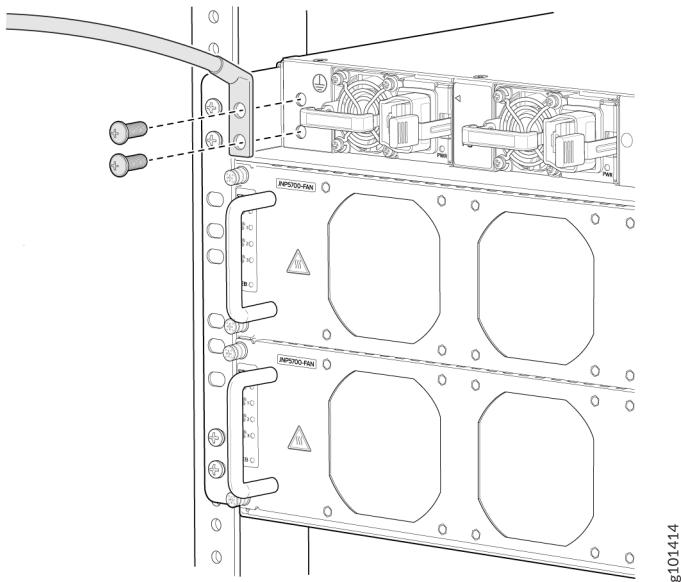
Figure 45: ESD Point for the QFX5700



1– ESD point

4. Remove the two M6 screws with attached washers on the chassis using either a Pozidriv or Phillips screwdriver.
5. Place the chassis grounding lug and cable over the screw holes with the cable connection pointing to the left. See [Figure 46 on page 97](#).

Figure 46: Connect a Grounding Cable to the QFX5700



6. Place the two screws with attached washers over the grounding lug and grounding cable.
7. Tighten the two M-6 screws using a Pozidriv or Phillips screwdriver.
8. Dress the grounding cable and ensure that it doesn't touch or block access to other device components and that it doesn't drape where people can trip over it.

Connect AC Power to a QFX5700

Before you begin to connect power to the switch, be sure you understand how to prevent ESD damage. See *Prevention of Electrostatic Discharge Damage*.

NOTE: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the QFX5700 switch to earth ground before you connect it to power.



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

operation, you must connect the chassis to earth ground before you connect it to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the switch chassis to connect to the earth ground. The switch gains additional grounding when you plug the PSM in the switch to a grounded AC power outlet by using the AC power cord appropriate for your geographical location.

The AC power supply unit (PSUs) in an QFX5700 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it without powering off the switch or disrupting routing functions. Since the power supplies in the QFX5700 switch aren't zoned, any 2 slots can be used to place PSUs in its chassis.

To connect AC power to a QFX5700 chassis:

1. Connect the chassis to earth ground (see "[Connect the QFX5700 Switch to Earth Ground](#)" on page [95](#)).



CAUTION: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, a QFX5700 must be adequately grounded before it is connected to power. For installations that require a separate grounding conductor to the chassis, use the protective earthing terminal on the rear panel of the QFX5700 to connect to the earth ground. A QFX5700 switch gets additional grounding when you plug the power supply in the switch into a grounded AC power outlet by using the AC power cord appropriate for your geographical location.

2. Ensure that you have a power cord appropriate for your geographical location available to connect AC power to the switch.
3. Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.
4. Install power supplies in the switch and apply power.
5. Ensure that you have an ESD grounding strap.
6. If not already installed, install the power supplies in the switch.



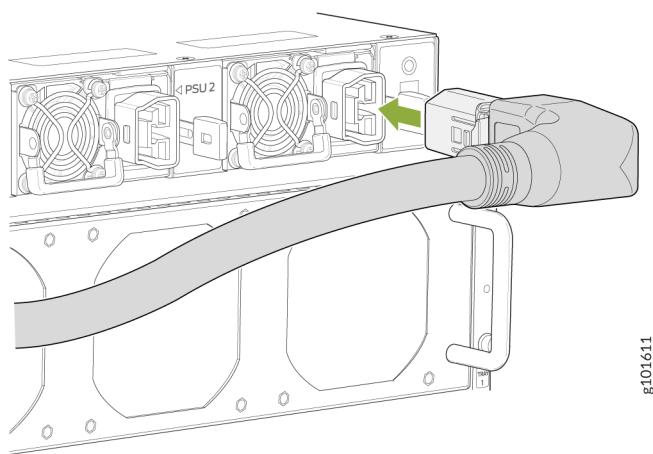
NOTE: Each power supply must be connected to a dedicated power source outlet.

To connect AC power to a QFX5700 switch:

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

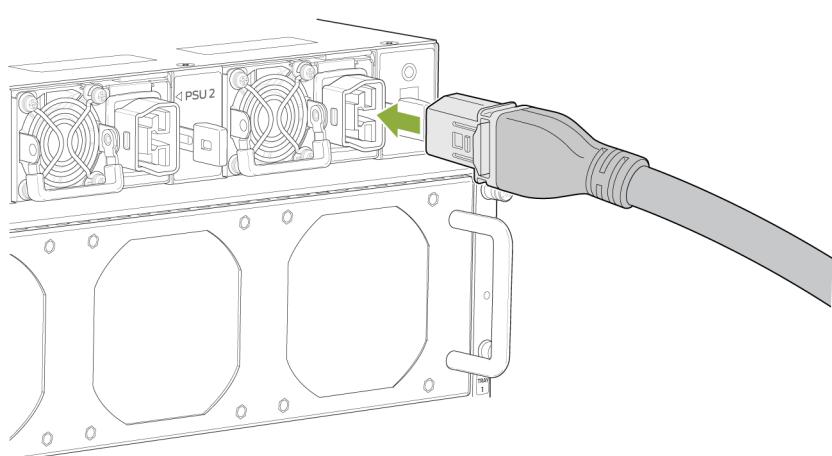
2. Ensure that the power supplies are fully inserted in the chassis and the latches are secure.
3. Locate the AC power cords shipped with the QFX5700 switch; the cords have plugs appropriate for your geographical location.
4. Insert the coupler end of the power cord into the AC power cord inlet on the AC power supply faceplate.

Figure 47: Connecting an AC Power Cord to the QFX5700



g101611

Figure 48: Connecting an AC Power Cord to the QFX5700



g101428

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

NOTE: The QFX5700 powers on as soon as power is provided to the power supply unit. There is no power switch on the power supply unit.

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

6. If the AC power source outlet has a power switch, set it to the on (I) position.
7. Verify that the status LEDs on each power supply are lit green. Verify that the status LEDs on each power supply are lit green

Connect DC Power to a QFX5700

The DC power supply units (PSUs) in an QFX5700 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). You can remove and replace it without powering off the switch or disrupting routing functions. Since the power supplies in the QFX5700 switch aren't zoned, any 2 slots can be used to place PSUs in its chassis.



WARNING: DC-powered QFX5700 switches are 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 QFX5700 chassis:

1. Connect the chassis to earth ground.



CAUTION: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, a QFX5700 switch must be adequately grounded before it is connected to power.



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.

2. Read the following:

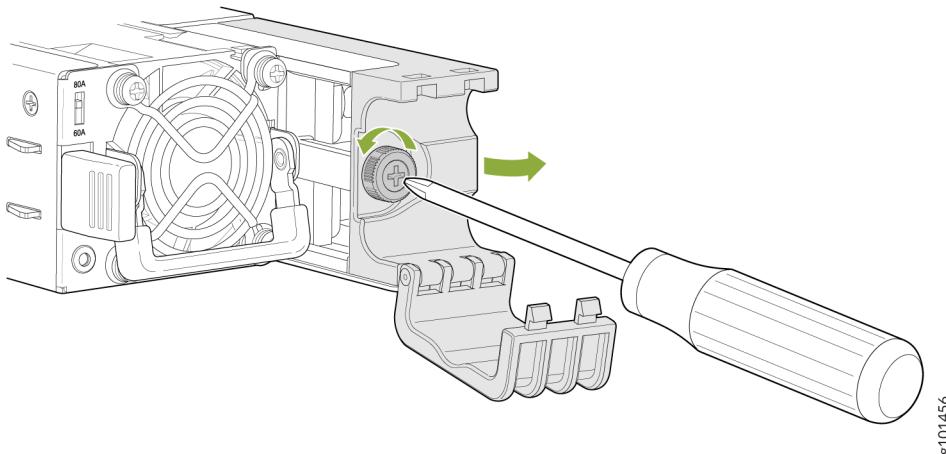
- DC Power Electrical Safety Guidelines
- DC Power Copper Conductors Warning
- DC Power Disconnection Warning
- DC Power Grounding Requirements and Warning
- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage
- Ensure that you have an ESD grounding strap.
- If not already installed, install the DC power supplies in the switch.
- Ensure that you have the following parts and tools available:
 - Phillips (+) screwdriver, 1/4-in., with a torque range between 6 lb-in. (0.68 Nm) and 7 lb-in. (0.79 Nm) (not provided)
 - Power cable or cables appropriate for your geographical location to connect DC power to the QFX5700. We recommend you use a 4 AWG gauge DC power cable such as a Panduit/LCDX4-14AH-L. The cable lugs are provided with the power supplies.

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

To connect DC power to a QFX5700 switch:

- a. Attach an ESD grounding strap to your bare wrist, and connect the strap to an approved site ESD grounding point.
- b. Ensure that the power supplies are fully inserted in the chassis and the latches are secure.
- c. Ensure that the DC input current selector (DIP switch) is set to 80 A.
- d. Open the cable manager latch on the terminal block cover of a power supply unit.
- e. Use a Phillips screwdriver to loosen the screw holding the cable manager latch to the power supply terminal block cover.

Figure 49: Removing the cable manager latch



- f. Remove the cable manager bracket to expose the four terminal studs.
- g. Install heat-shrink tubing insulation around the power cables.

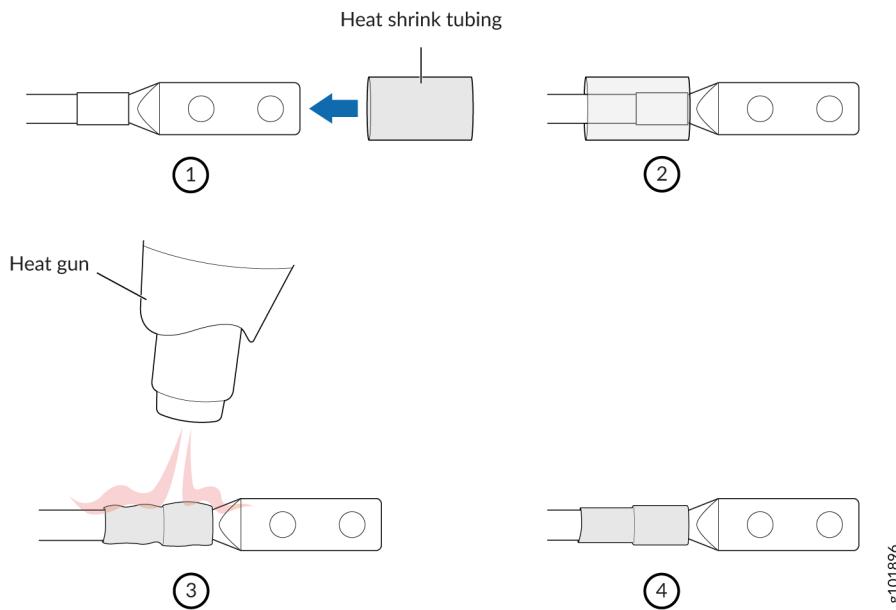
To install heat-shrink tubing:

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

[Figure 50 on page 103](#) shows the steps to install heat-shrink tubing.

NOTE: Do not overheat the tubing.

Figure 50: How to Install Heat-Shrink Tubing



- h. If you are using straight DC power cables, place the ends of the power cable connectors over the four terminal studs.
- i. Secure the power cables to the four terminal studs with hex nuts.
- j. Use a wrench to tighten the hex-nuts by applying torque to between 6 lb-in. (0.68 Nm) and 7 lb-in. (0.79 Nm).



CAUTION: You must use an appropriate torque-controlled tool to tighten the hex-nuts on the DC power cable connector. Do not over tighten the screws. Applying excessive torque damages the terminal block and the wiring tray.

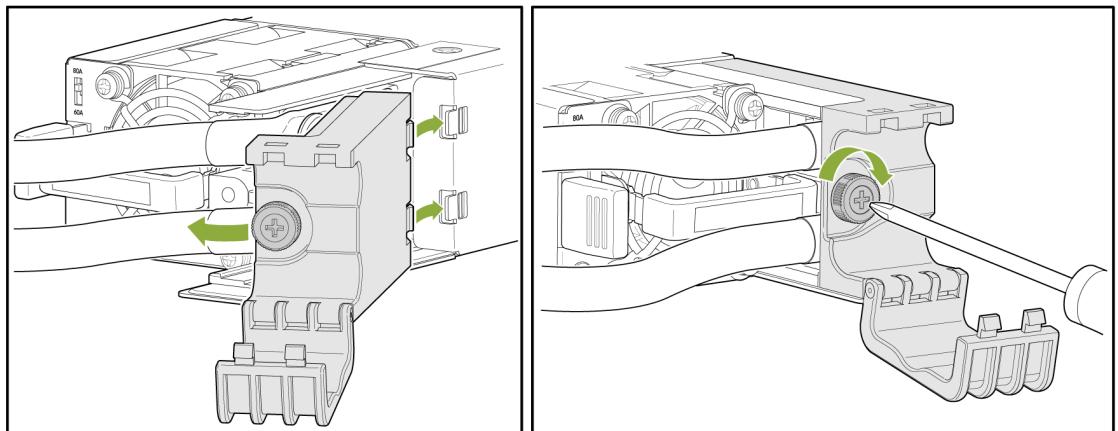
- k. Connect the power supply unit to a 80 A power source.
- l. Repeat Step 3 through Step 10 to connect the other DC power supplies.
- m. Verify that the status LEDs on each power supply are lit green and on steadily. If the status LED is lit amber, remove power from the power supply, and replace the power supply. Do not remove the power supply until you have a replacement power supply ready. The power supplies must be installed in the QFX5700 switch to ensure proper airflow.



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

- n. Reattach the cable manager latch that you removed in Step "6" and tighten the thumb screw.

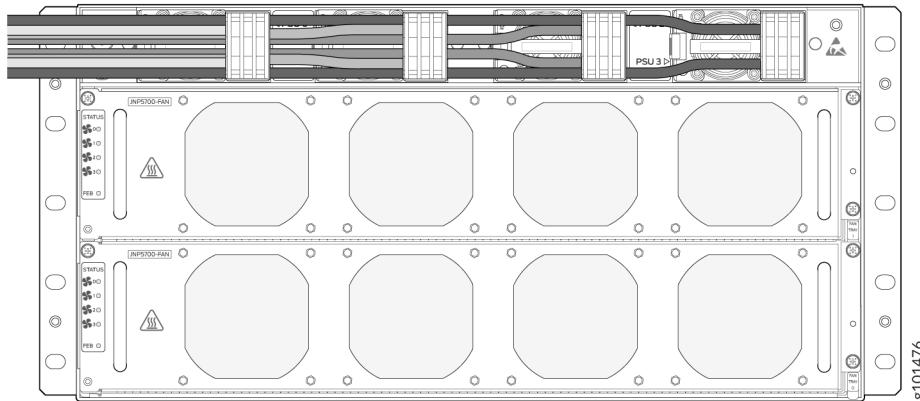
Figure 51: Reattaching the cable manager latch



- o. Close the cable manager latch to hold the power cables in place.

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

Figure 52: Reattaching the cable manager latch



3. Connect DC power to the power supply and install in the chassis.

Connect the QFX5700 to External Devices

IN THIS SECTION

- [Connect a QFX5700 Switch to a Network for Out-of-Band Management | 105](#)
- [Connect a QFX5700 Switch to a Management Console | 106](#)

You can manage the QFX5700 switch by using the two management ports on the Routing and Control board (RCB) for out-of-band management or through the console port on the RCB. To connect a QFX5700 switch to external management devices, read to the following sections.

Connect a QFX5700 Switch to a Network for Out-of-Band Management

Ensure that you have an appropriate cable available.

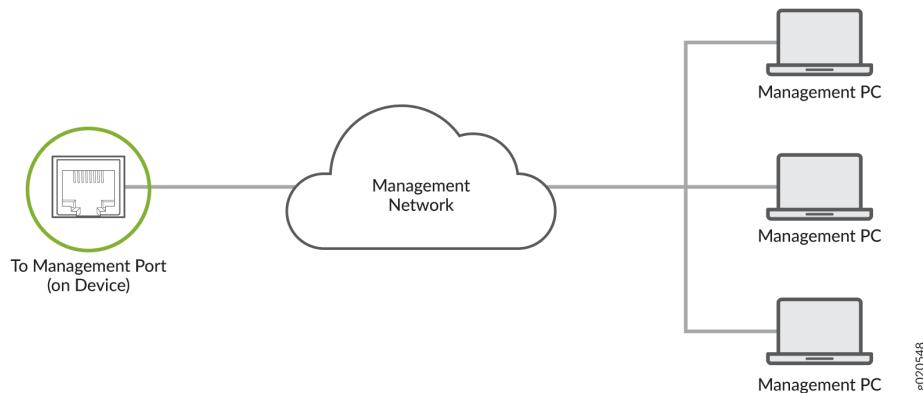
You can monitor and manage a QFX5700 using a dedicated management channel. Each QFX5700 RCB has two management ports: a 10/100/1000BASE-T RJ-45 port for copper connections. Use the management ports to connect the RCB to a network for out-of-band management.

NOTE: You cannot use the management ports to perform the initial configuration of the QFX5700. You must configure the management ports before you can successfully connect to the QFX5700 using these ports..

To connect a QFX5700 to a network for out-of-band management (see [Figure 53 on page 106](#)):

1. Connect one end of the cable to one of the two management ports (labeled **MGNT**) on one of the RCBs.
2. Connect the other end of the cable to the management switch.

Figure 53: Connect a QFX5700 to a Network for Out-of-Band Management



Connect a QFX5700 Switch to a Management Console

Ensure that you have an RJ-45 to DB-9 rollover cable available.

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

NOTE: If your laptop or PC does not have a DB-9 connector pin (plug) and you want to connect your laptop or PC directly to the QFX5700 switch, use a combination of the RJ-45 cable and RJ-45 to DB-9 adapter supplied with the device and a USB to DB-9 plug adapter. You must provide the USB to DB-9 plug adapter.

The QFX5700 switch has a console port with an RJ-45 connector. Use the console port to connect the device to a management console or to a console server.

To connect the QFX5700 switch to a management console, (see [Figure 54 on page 107](#) and [Figure 55 on page 107](#)):

1. Connect one end of the Ethernet cable to the console port (labeled **CON**).
2. Connect the other end of the Ethernet cable into the console server (see [Figure 54 on page 107](#)) or management console (see [Figure 55 on page 107](#)).

Figure 54: Connect the QFX5700 Switch to a Management Console Through a Console Server

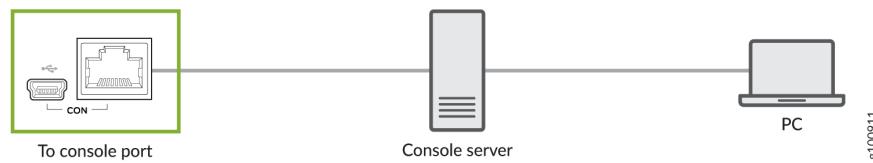


Figure 55: Connect the QFX5700 Switch Directly to a Management Console



Perform Initial Configuration for the QFX5700 Switch

IN THIS SECTION

- [Before You Start | 108](#)
- [Enter Configuration Mode | 108](#)

Before You Start

Before you begin connecting and configuring an QFX5700 switch, set the following parameter values on the console server or PC.

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

NOTE: When console is supported with DCD, TOD functionality cannot be supported. Console without DCD and TOD can be simultaneously supported when you use Y cable.

You must perform the initial configuration of an QFX5700 switch through the console port by using the command-line interface (CLI).

Enter Configuration Mode

1. Check that the QFX5700 has power.

2. 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 RCB of the switch.
3. 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
```

4. Start the CLI.

```
root@% cli
```

5. Enter configuration mode.

```
root> configure
```

6. 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
```

7. (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
```

8. Configure the default gateway.

```
[edit]
root@# set system management-instance
root@# set routing-instances mgmt_junos routing-options static route prefix/prefix-length next-hop
default-gateway-ip-address
```

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

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



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

NOTE: The management ports, em0 or re0:mgmt-0 (**MGMT** for RJ-45 connections) and em1 (also labeled **MGMT** for fiber connections), are found on the front of the RCBs of the QFX5700 switch.

10. (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
```

11. Enable services such as SSH and Telnet.

NOTE: You will not be able to log in to the switch as the `root` user through Telnet. Root login is allowed only through SSH.

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

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

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

4

CHAPTER

Maintaining Components

[QFX5700 Fan Tray Maintenance | 112](#)

[QFX5700 Power Supply Maintenance | 116](#)

[QFX5700 Routing and Control Board Maintenance | 123](#)

[QFX5700 Forwarding Engine Board Maintenance | 126](#)

[QFX5700 Flexible PIC Concentrator Maintenance | 131](#)

[Cable and Connector Specifications for QFX Series Devices | 135](#)

[QFX5700 Transceiver and Fiber Optic Cable Installation and Removal | 143](#)

[Remove the QFX5700 Switch | 148](#)

QFX5700 Fan Tray Maintenance

IN THIS SECTION

- Remove a QFX5700 Fan Tray from the QFX5700 Switch | [112](#)
- Install a QFX5700 Fan Tray | [114](#)

The QFX5700 chassis has two independent, field-replaceable fan trays. Each fan tray is a hot-removable and hot-insertable field-replaceable unit (FRU), which means that you can remove and replace the fan trays while the router is running. You remove and replace the fan trays without turning off power to the router or disrupting routing functions.

Remove a QFX5700 Fan Tray from the QFX5700 Switch

Before you remove a fan tray:

- Ensure that you understand how to prevent ESD damage.
- Ensure that you have the following parts and tools available to remove a fan tray from the QFX5700 router:
 - Electrostatic discharge (ESD) grounding strap
 - Replacement fan tray
 - A Phillips (+) screwdriver, number 1 or 2 (optional), for the captive screws



CAUTION: Do not remove the fan tray unless you have a replacement fan tray available.



CAUTION: The JNP5700-FAN fan tray can be removed and replaced while the router is operating. However, the fan tray must be replaced within three minutes of removing the fan tray to prevent overheating of the chassis. If you are removing a JNP5700-FAN in order to access an QFX5700-FEB Forwarding Engine Board (FEB), we recommend that

you either perform the necessary work during a maintenance window or reinstate the fan tray within three minutes.



CAUTION: Do not remove the fan tray unless you have a replacement fan tray available.

Place the fan tray with the handles in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

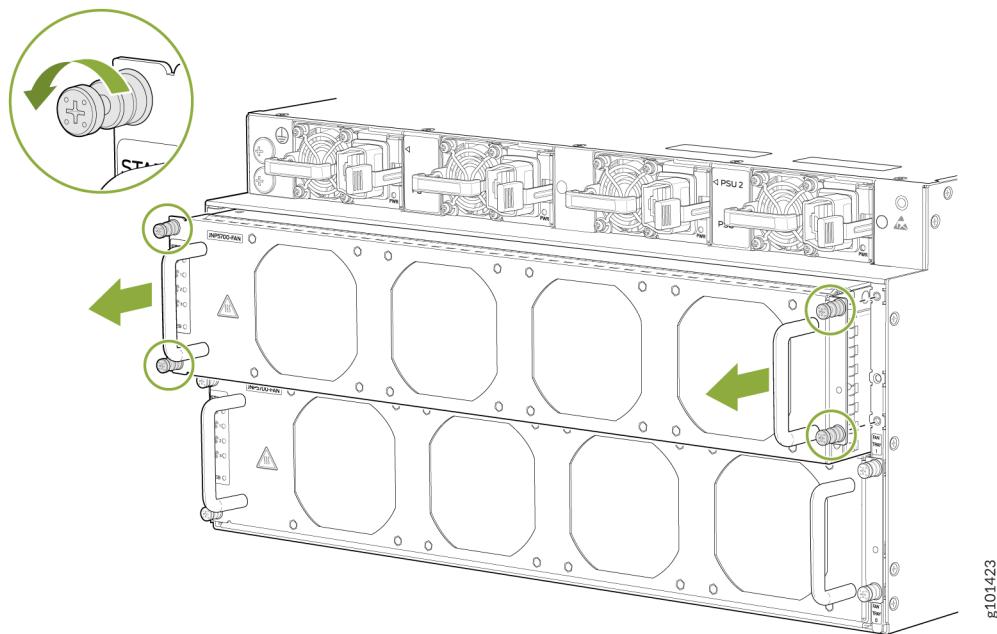


CAUTION: A single fan tray can be removed and replaced while the switch is operating. However, if you remove both fan trays at the same time you'll trigger a thermal alarm and the system will shut down.

To remove a QFX5700 fan tray:

1. Wrap and fasten one end of the ESD grounding strap around your bare wrist and connect the other end of the strap to one of the ESD points on the chassis.
2. Loosen the four captive screws either by unscrewing with your thumb and forefinger or with a Phillips screwdriver.
3. Grasp both the handles and pull the fan tray completely out of the chassis. See [Figure 56 on page 114](#).

Figure 56: Remove a QFX5700 Fan Tray



4. Place the fan tray with the handles in the antistatic bag or on the antistatic mat placed on a flat, stable surface.

Install a QFX5700 Fan Tray

Before you begin to install a fan tray:

- Ensure that you understand how to prevent ESD damage. .
- Ensure that you have the following parts and tools available to install a fan tray in a QFX5700 switch:
 - Electrostatic discharge (ESD) grounding strap
 - A Phillips (+) screwdriver, number 1 or 2 (optional), for the captive screws
 - A replacement fan tray



CAUTION: You can remove and replace the JNP5700-FAN fan tray while the router is operating. However, you must replace the fan tray within three minutes of removing the fan tray, to prevent overheating of the chassis. If you are removing a JNP5700-FAN to access an QFX5700-FEB Forwarding Engine Board (FEB), we recommend that you

either perform the necessary work during a maintenance window or replace the fan tray within three minutes of removal.

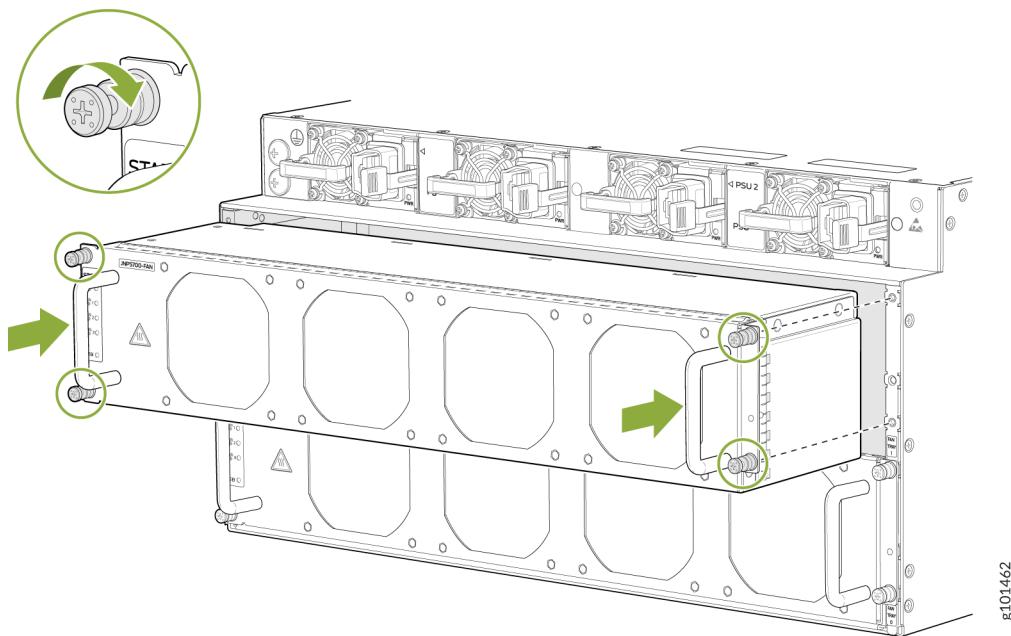
Each fan tray is a hot-removable and hot-insertable field-replaceable unit (FRU); you can remove and replace the fan tray while the switch is running without turning off power to the switch or disrupting routing functions.

Each fan tray is installed horizontally on the rear, or FRU side, of the chassis.

To install a QFX5700 fan tray:

1. Wrap and fasten one end of the ESD grounding strap around your bare wrist and connect the other end of the strap to one of the ESD points on the chassis.
2. Grasp both the handles of the fan tray, and align the bottom of the fan tray with the bottom of the fan tray slot.
3. Rest the bottom edge of the fan tray in the slot and slide the fan tray into place so it is fully seated.
4. Tighten the captive screws with the Phillips screwdriver or your fingers until the screws are finger tight. See [Figure 57 on page 115](#).

Figure 57: Install the Fan Tray in a QFX5700



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QFX5700 Power Supply Maintenance

SUMMARY

Maintaining an QFX5700 switch includes replacing power supplies. Replacing includes removing a failed power supply and installing a functional power supply.

IN THIS SECTION

- [AC/HVDC Power Supply Replacement in a QFX5700 Switch | 116](#)
- [DC Power Supply Replacement in an QFX5700 Switch | 120](#)

The QFX5700 switch is powered by 3000 W redundant hot-removable and hot-insertable pre-installed AC/HVDC or DC power supplies. QFX5700-BASE configuration switch is powered by two power supplies for 1 + 1 redundancy and QFX5700-PREMIUM configuration is powered by four power supplies for 2+2 redundancy. If any power supply unit fails, you can replace it without powering off or disrupting the routing function, the other power supply units will balance the electrical load without interruption.



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

AC/HVDC Power Supply Replacement in a QFX5700 Switch

IN THIS SECTION

- [Remove an AC/HVDC Power Supply from the QFX5700 Switch | 117](#)
- [Install an AC/HVDC Power Supply in the QFX5700 Switch | 119](#)



WARNING: Turn off the power source before disconnecting the power cord to prevent damage to the power connector contact.



WARNING: If you need to replace all the power supplies installed in your QFX5700 switch, you must power off the QFX5700 switch before removing the power supplies.



CAUTION: Replace the power supply within one minute of removal, to prevent chassis overheating. Before removing the power supply, ensure that you have a replacement power supply available.



CAUTION: The AC/HVDC power supply you are installing must use the same airflow direction as the fan trays installed in the switch. Labels on the power supply handle indicate the direction of airflow.



CAUTION: Before you replace a power supply in an QFX5700 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage (see "[Prevention of Electrostatic Discharge Damage](#)" on page 198).

Ensure that you have the following parts and tools available to replace a power supply:

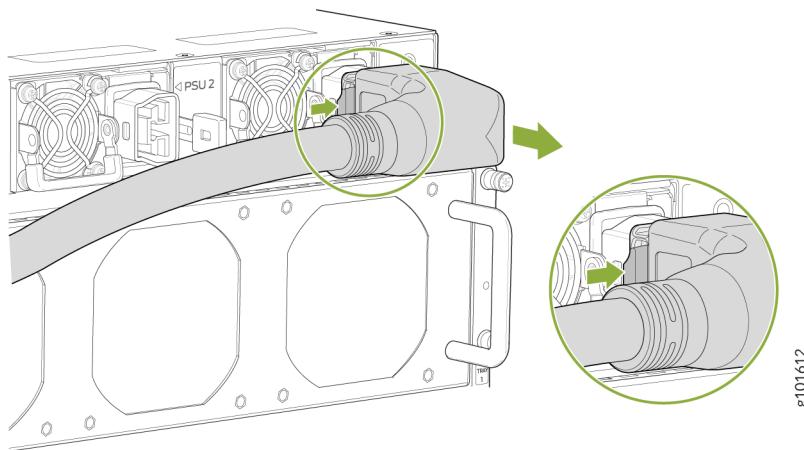
- ESD grounding strap (provided)
- Antistatic bag or an antistatic mat (not provided)
- (For a DC power supply) Phillips (+) screwdriver, number 2 (not provided)

Remove an AC/HVDC Power Supply from the QFX5700 Switch

To remove an AC/HVDC power supply:

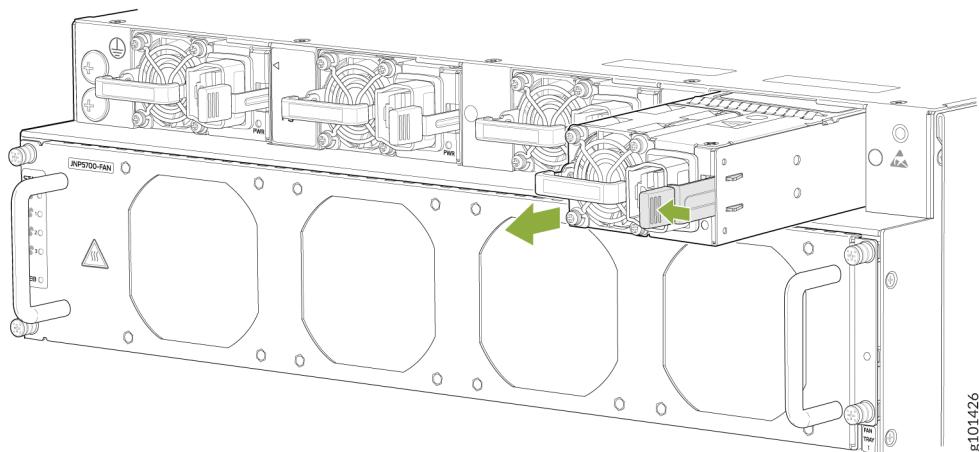
1. Place the antistatic bag or the antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the device.
3. Disconnect power to the QFX5700 power supply that you are going to replace. If the AC input power source outlet has a power switch, set it to the off (O) position. If the AC input power source outlet does not have a power switch, gently pull out the plug end of the power cord connected to the power source outlet.
4. Remove the power cord from the power supply by pressing in the locking button on the side of the power connector and gently pulling the connector out of the power supply faceplate. See [Figure 58](#) on page 118.

Figure 58: Removing the Power Cord from the Power Supply



5. Slide the ejector lever on the power supply toward the orange handle until it stops.
6. 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. See [Figure 59](#) on page 118.

Figure 59: Removing an AC/HDVC Power Supply from the QFX5700 Switch



7. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
8. Install a new power supply within one minute of removing the old one.

Install an AC/HVDC Power Supply in the QFX5700 Switch

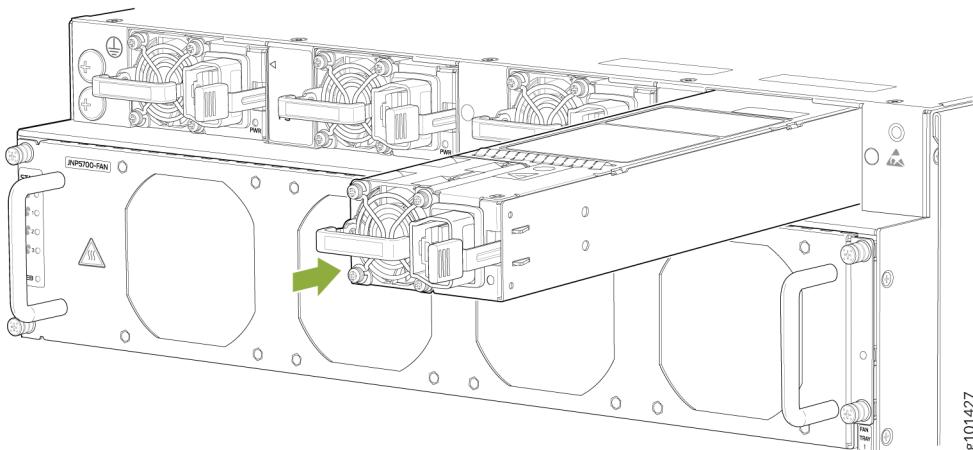


CAUTION: Install the replacement power supply within one minute of removal to prevent the chassis from overheating. Before removing the power supply, ensure that you have a replacement power supply available.

To install an AC/HVDC power supply:

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the device.
2. If the power supply has protective plastic wrap, peel and remove the plastic wrap from all four sides of the power supply.
3. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.
4. Using both hands, place the power supply in the power supply slot on the field replaceable unit (FRU) panel of the QFX5700 switch, and slide it in until it is fully seated and the ejector lever slides into place. See [Figure 60 on page 119](#).

Figure 60: Installing an QFX5700 AC/HVDC Power Supply



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.

DC Power Supply Replacement in an QFX5700 Switch

IN THIS SECTION

- Remove a DC Power Supply from the QFX5700 Switch | [121](#)
- Install a DC Power Supply in the QFX5700 Switch | [122](#)



WARNING: Turn off the circuit breaker for the DC power source before disconnecting the power cord from the power supply. Unplugging a DC connection while the power supply is powered up may damage the electrical connectors.



WARNING: If you need to replace all the power supplies installed in your QFX5700 switch, you must power off the AQFX5700 switch before removing the power supplies.



CAUTION: Replace the power supply within one minute of removal, to prevent chassis overheating. Before removing the power supply, ensure that you have a replacement power supply available.



CAUTION: The DC power supply that you are installing must use the same airflow direction as the fan trays installed in the switch. Labels on the power supply handle indicate the direction of airflow.



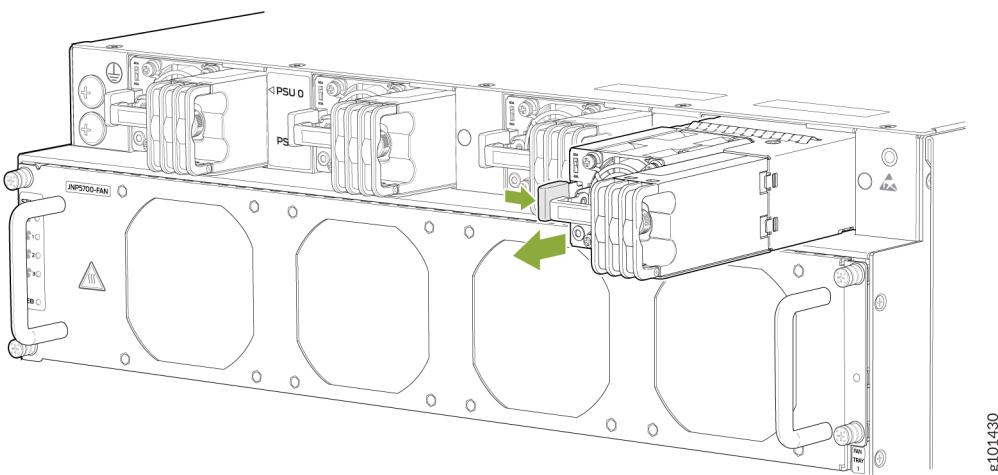
CAUTION: Before you replace a power supply in an QF5700 switch, ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.

Remove a DC Power Supply from the QFX5700 Switch

To remove a DC power supply:

1. Place the antistatic bag or the 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 device.
3. Turn off the circuit breaker for the power feed to the power supply that you are replacing. Be sure the LEDs turn off on the power supply that you are removing.
4. Loosen the thumb screws for the power cable. Gently pull out the socket end of the power plug connected to the power supply faceplate.
5. Disconnect a connector for the power cables, or release each of three cables from the power supply (requires a standard screw driver).
6. Grasp the power supply handle while pressing the release latch towards the power supply handle.
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. See [Figure 61 on page 121](#).

Figure 61: Removing a DC Power Supply from the QFX5700 Switch



8. Place the power supply in the antistatic bag or on the antistatic mat placed on a flat, stable surface.
9. Install a new power supply within one minute of removing the old one.

Install a DC Power Supply in the QFX5700 Switch

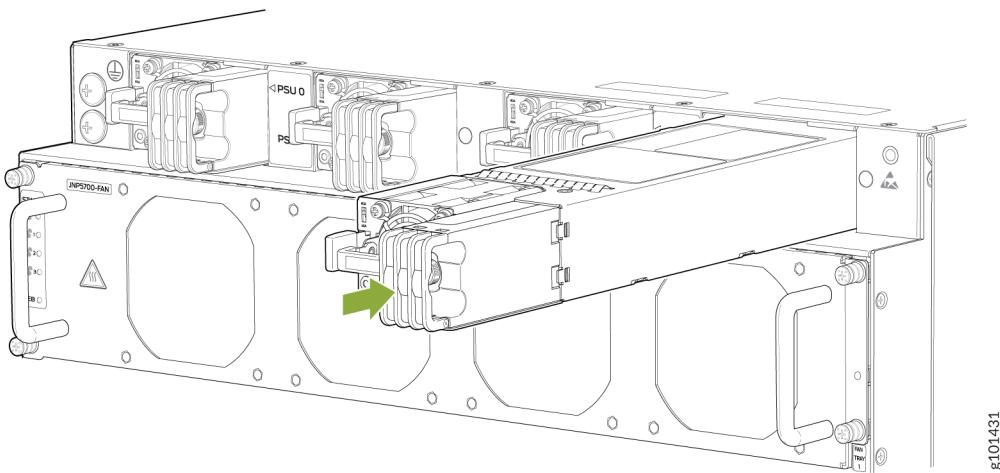


CAUTION: Install the replacement power supply within one minute of removal, to prevent chassis overheating. Before removing the power supply, ensure that you have a replacement power supply available.

To install a DC power supply:

1. Wrap and fasten one end of the ESD wrist strap around your bare wrist, and connect the other end of the strap to the ESD point on the device.
2. If the power supply has protective plastic wrap, peel and remove the plastic wrap from all four sides of the power supply.
3. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.
4. To prevent equipment damage caused by electrostatic discharge, attach an ESD grounding strap to your bare wrist, and connect the strap to one of the ESD points on the chassis.
5. Taking care not to touch power supply components, pins, leads, or solder connections, remove the power supply from its bag.
6. Using both hands, place the power supply in the power supply slot on the field replaceable unit (FRU) panel of the QFX5700 switch, and slide it in until it is fully seated and the locking lever slides into place. See [Figure 62 on page 122](#).

Figure 62: Installing a DC Power Supply in the QFX5700 Switch



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

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

QFX5700 Routing and Control Board Maintenance

SUMMARY

Maintaining an QFX5700 switch includes removing and installing the Routing and Control board.

IN THIS SECTION

- [Remove the Routing and Control Board from the QFX5700 Switch | 124](#)
- [Install the Routing and Control Board in the QFX5700 Switch | 125](#)

The QFX5700 switch is shipped with one or two Routing and Control Boards (RCBs) preinstalled in the chassis, depending on the configuration. You can install RCBs in the two top slots on the front of the chassis.

When you power on a switch with a single RCB preinstalled in it, the RCB comes online as the primary RCB. The primary RCB powers on the Forwarding Engine Boards (FEBs) and the Flexible PIC Concentrator (FPC). If you install the second RCB, it powers up and the Routine Engine comes online in the backup mode.

When you power on a switch for the first time with two RCBs installed, the RCB installed in slot 0 comes online as the primary RCB and powers on the FEBs and the FPCs. The RCB installed in slot 1 comes online as the backup RCB by default. You can change this configuration by using the CLI.

To remove or install an RCB, read the following sections.

- ["Remove the Routing and Control Board from the QFX5700 Switch " on page 124](#)
- ["Install the Routing and Control Board in the QFX5700 Switch" on page 125](#)

Remove the Routing and Control Board from the QFX5700 Switch

In redundant configurations, the Routing and Control Board (RCB) in a QX5700 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). In base configurations, you need to install a second RCB before removing a failing RCB, to prevent the switch from shutting down. We recommend that you take base system offline before replacing the RCB.

Before you remove an RCB, ensure that you have an electrostatic discharge (ESD) grounding strap.

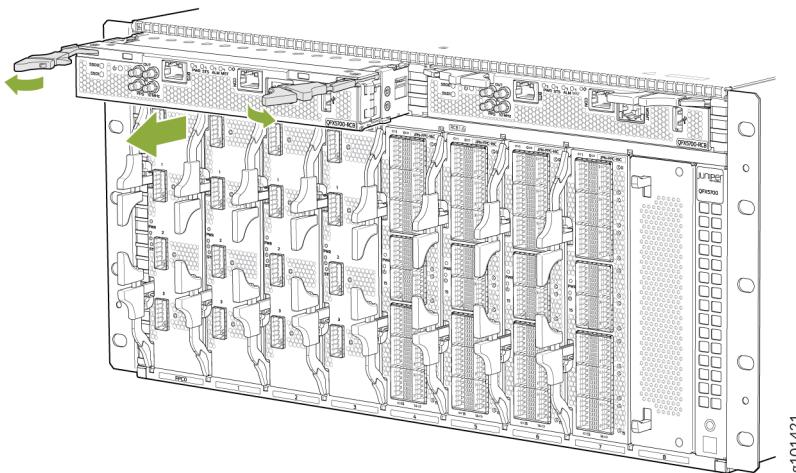


CAUTION: In base configurations, removal of the RCB causes the system to shut down. In redundant configurations, removal of the RCB causes the system to reboot and start the election process for a new primary RCB.

To remove an RCB:

1. Take the RCB offline.
2. Place an antistatic bag or antistatic mat on a flat, stable surface.
3. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to one of the ESD points on the chassis.
4. Grasp both ejector handles, spread them apart, and slide the RCB about halfway out of the chassis
See [Figure 63 on page 124](#).

Figure 63: Removing an RCB from the QFX5700 Switch



5. Grasp the ejector handle with one hand, and place your other hand under the RCB for support as you slide it completely out of the chassis.
6. Place the RCB on the antistatic mat.

- If you are not replacing the RCB immediately, install a cover in the empty slot.

Install the Routing and Control Board in the QFX5700 Switch

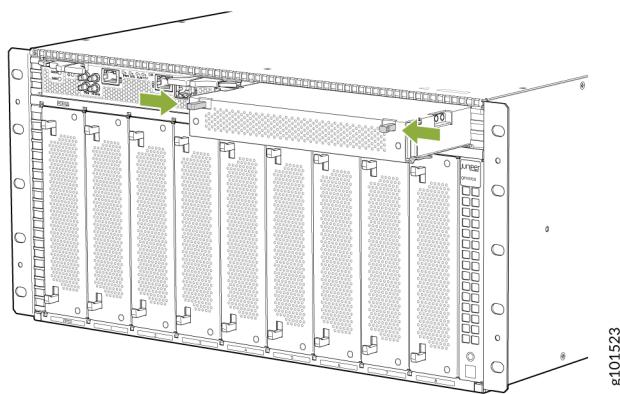
In redundant configurations, the Routing and Control Board (RCB) in a QFX5700 switch is a hot-removable and hot-insertable field-replaceable unit (FRU). In base configurations, you need to install a second RCB before removing a failing RCB, to prevent the switch from shutting down.

Before you install an RCB, ensure that you have an electrostatic discharge (ESD) grounding strap.

To install an RCB:

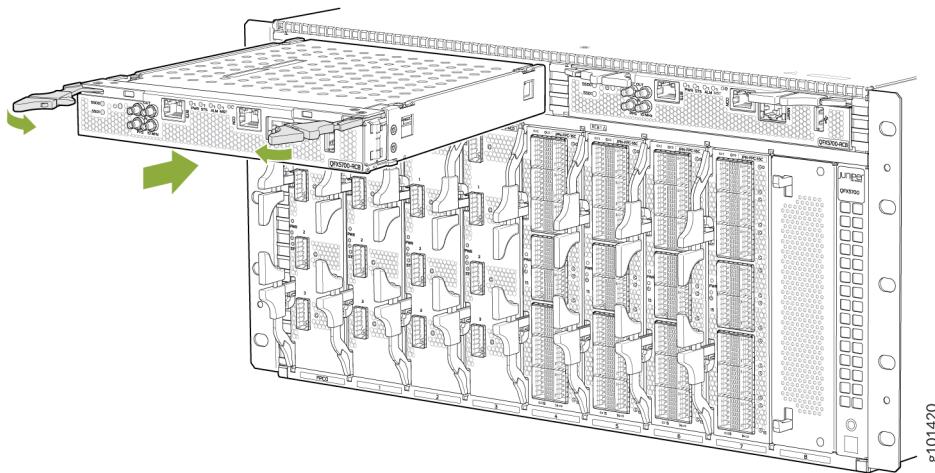
- Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to one of the ESD points on the chassis.
- If an RCB blank (JNP5K-RCB-BLNK) is installed, press the handles on the blank and gently pull out the blank from the slot (see [Figure 64 on page 125](#)) or in redundant configurations remove the failing RCB (see ["Remove the Routing and Control Board from the QFX5700 Switch " on page 124](#)).

Figure 64: Removing the RCB Blank



- Remove the new RCB from the antistatic bag, and inspect it for any damage before installing it in the chassis.
- Lift the RCB by its sides, being careful not to bump the connectors.
- Carefully align the sides of the RCB with the guides inside the chassis.
- Slide the RCB into the chassis, carefully ensuring that it is correctly aligned.
- Grasp the two ejector handles, and fold them inward until they latch to seat the RCB. See [Figure 65 on page 126](#).

Figure 65: Installing an RCB



The RCB begins the power-on sequence when fully seated.

8. To verify that the RCB is functioning normally, check the **PWR** LED and the **STS** LED on its faceplate. Both LEDs should light steadily, shortly after the RCB is installed. If the **PWR** LED is blinking red, the available power might be insufficient.

Another method of verifying that the RCB is online is to use the following CLI command:

```
user@host> show chassis environment cb
```

QFX5700 Forwarding Engine Board Maintenance

SUMMARY

Maintaining a QFX5700 switch includes removing and installing the Forwarding Engine Board (FEB).

IN THIS SECTION

- Remove the Forwarding Engine Board from the QFX5700 Switch | [127](#)
- Install the Forwarding Engine Board in the QFX5700 switch | [129](#)

The QFX5700 switch is shipped with one or two Forwarding Engine Boards (FEBs) preinstalled horizontally, mid-chassis, between the Flexible PIC Concentrators (FPCs) and the Routing and Control Boards (RCBs) in the front and the fan trays in the rear.

You must remove and install the appropriate fan tray to install and remove FEBs.

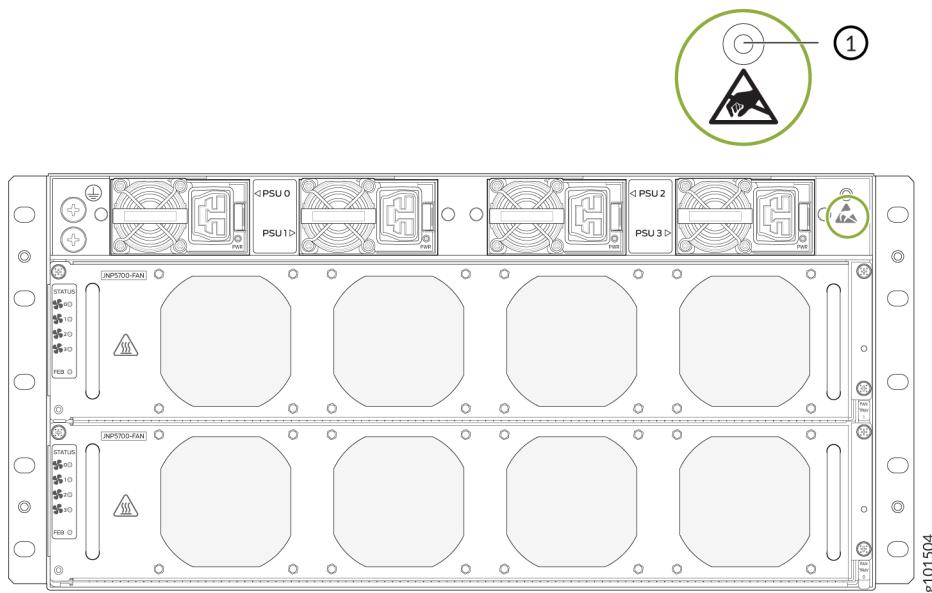
In redundant configurations, a QFX5700 FEB is a hot-removable and hot-insertable field-replaceable unit (FRU). In base configurations, you need to install a second FEB before removing a failing FEB.

NOTE: Replace a failed FEB with a blank panel or new FEB within 60 minutes of removal.

Ensure you have the following equipment on hand before replacing a FEB:

- Antistatic bag or antistatic mat
- Electrostatic discharge (ESD) grounding strap to wrap around your bare wrist.

Figure 66: ESD Point on Rear of the QFX5700 switch



1– ESD point

Remove the Forwarding Engine Board from the QFX5700 Switch

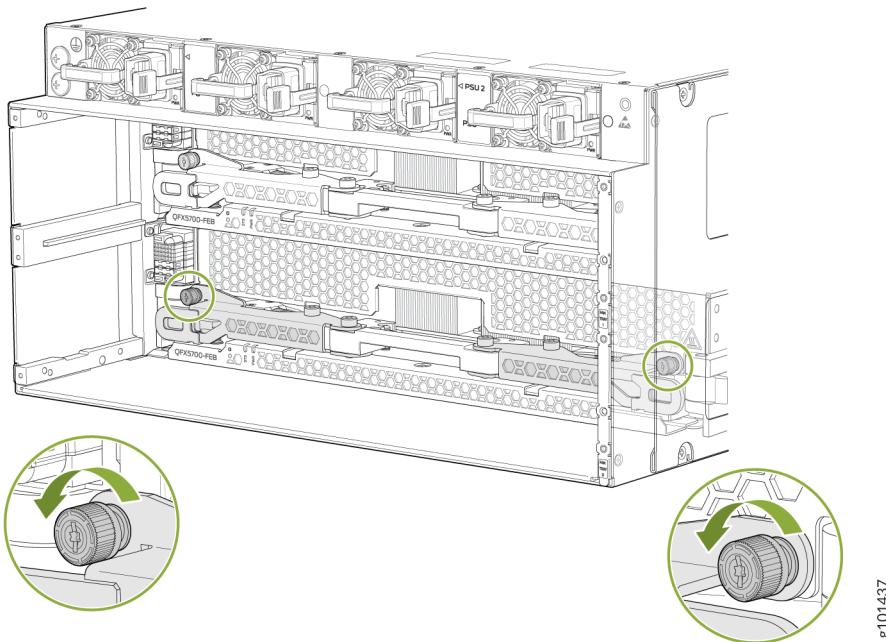
To remove a FEB from a QFX5700 switch chassis:

1. Take the FEB offline using the request chassis slot *slot number* offline command.

NOTE: If you suspect that the FEB is faulty and want to ensure that packets do not flow through the FEB, power off the FEB instead of taking the FEB offline. To power down the FEB, use the `set chassis feb power-off slot slot number` command. Before you bring a new FEB in that slot online, you must delete the old configuration using the `delete chassis feb power-off slot slot number` command.

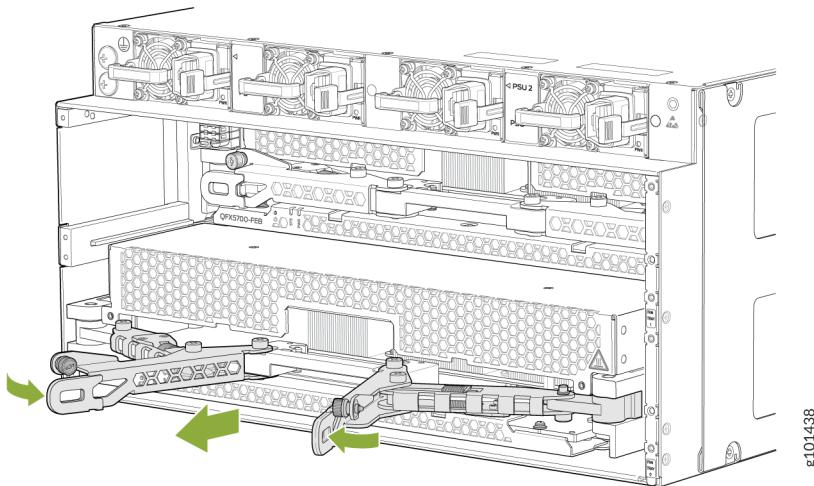
2. Place an antistatic bag or an antistatic mat on a flat, stable surface.
3. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to an ESD point on the chassis. An ESD point is located on the rear of the QFX5700 switch.
4. Remove the appropriate fan tray).
5. Using your fingers, loosen the captive screws of the FEB.

Figure 67: Loosen the Captive Screws



6. Unlatch the ejector handles, and spread them apart. The FEB slides about a quarter of the way out of the slot. See [Figure 68 on page 129](#).

Figure 68: Spreading the Ejector Handles and Removing the FEB from the QFX5700 Chassis



7. Grasp the ejector handle with one hand, and place your other hand under the FEB for support as you slide the FEB out of the slot.
8. Place the FEB on the antistatic mat with the printed circuit board (PCB) facing upward. Be careful not to bump or handle the FEB by the connectors. If you do not have an antistatic mat, have another person help you slide the antistatic bag over the FEB before placing it on a stable surface.



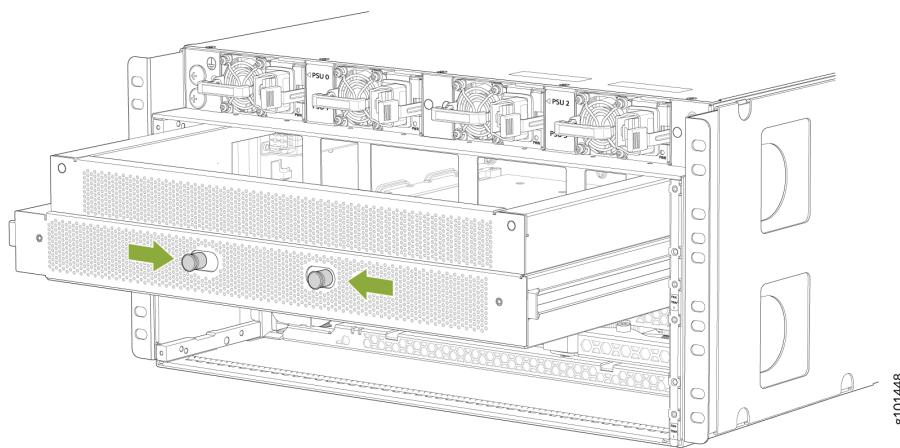
CAUTION: Do not stack hardware components on top of one another after you remove them. Place each component on an antistatic mat resting on a stable, flat surface.

Install the Forwarding Engine Board in the QFX5700 switch

To install a FEB:

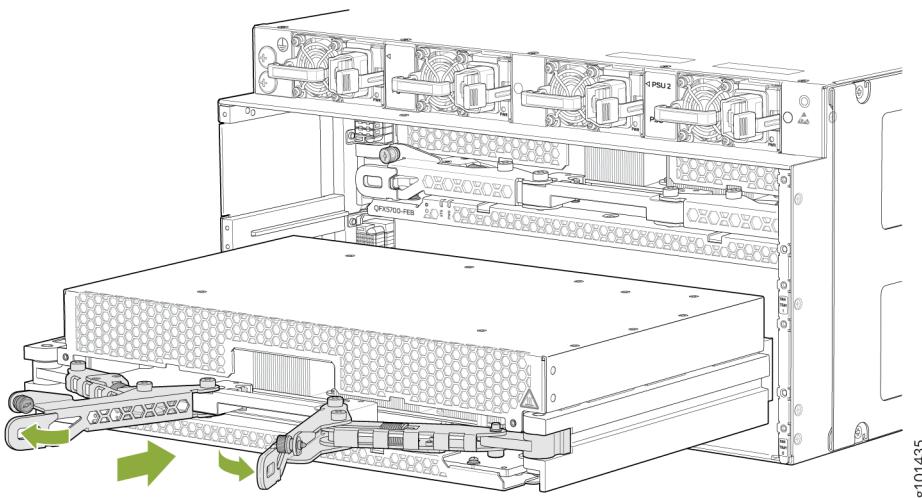
1. Place an antistatic bag or an antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to an ESD point on the chassis. An ESD point is located on the rear of QFX5700 switch.
3. Remove the appropriate fan tray.
4. Either remove the failing FEB (see "[Remove the Forwarding Engine Board from the QFX5700 Switch](#)" on page 127) or, if a FEB blank is installed, pull the quarter-turn knobs on the blank, press them, and gently pull the blank out of the slot (see [Figure 69 on page 130](#)).

Figure 69: Removing a FEB Blank



5. Lift the FEB by the handle with one hand, and support the lower edge with the other hand.
6. Gently slide the FEB into the open slot until the ejector handles engage and start to close.
7. Grasp the two ejector handles, and fold them inward until they latch to seat the FEB (see [Figure 70 on page 130](#)).

Figure 70: Installing a QFX5700 FEB



8. Hand-tighten the captive screws.

NOTE: After you install FEB0, install Fan Tray 0 and after you install FEB1, install Fan Tray 1. Both the fan trays must be attached back to the chassis after installation to ensure uninterrupted services.

9. Bring the FEB online using the request chassis feb slot *slot number* online command.

You can check the status of the FEB using the show chassis fabric febs and the show chassis fabric plane-location commands.

NOTE: If you completely powered off the FEB using the set chassis feb power-off slot *slot* command, you must delete the configuration in order to bring the FEB online. To delete the configuration and bring a replacement FEB online, use the delete chassis feb power-off slot *slot number* command.

QFX5700 Flexible PIC Concentrator Maintenance

SUMMARY

Maintaining QFX5700 switches includes removing and reinstalling Flexible PIC Concentrators (FPCs).

IN THIS SECTION

- Remove a Flexible PIC Concentrator from the QFX5700 Switch | [132](#)
- Install a Flexible PIC Concentrator in the QFX5700 Switch | [134](#)

Flexible PIC Concentrators (FPCs) on the QFX5700 switch are field-replaceable units (FRUs) that can be installed in FPC slots on the front of the chassis. The FPCs are hot-insertable and hot-removable: you can remove and replace them without powering off the switch or disrupting switch functions.

If you have the optional cable management system, it is not necessary to remove the cable management system before replacing an FPC.

The QFX5700 chassis supports JNP-FPC-16C, JNP-FPC-4CD, and JNP-FPC-20Y types of FPCs. The replacement procedure is the same for all three FPCs.

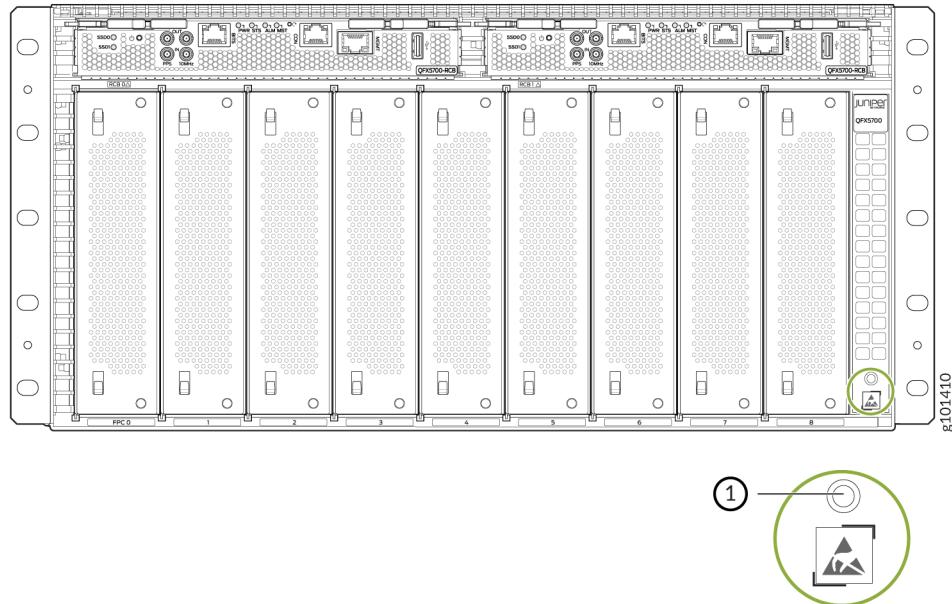
Before you replace an FPC from the switch chassis:

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage.
- If there are any optical cables (including transceivers) installed in the FPC, remove them before you replace the FPC.

Ensure that you have the following equipment available before replacing a Forwarding Engine Board (FEB):

- Antistatic bag or antistatic mat
- ESD grounding strap to wrap around your bare wrist and connect to an ESD point on the chassis

Figure 71: ESD Point on Front of the QFX5700 switch



- Replacement FPC or a cover for the empty slot

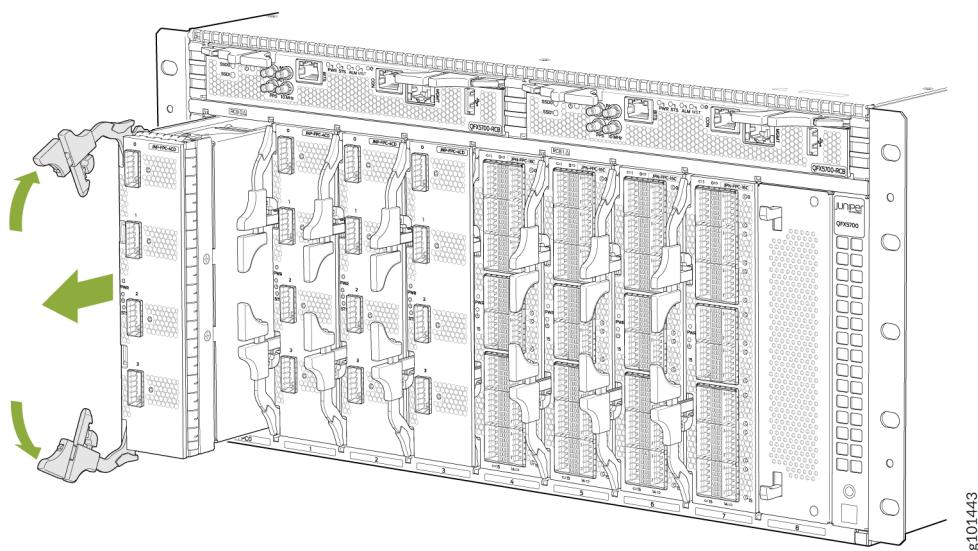
Remove a Flexible PIC Concentrator from the QFX5700 Switch

To remove an FPC from a QFX5700 switch chassis:

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

2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to an ESD point on the chassis. An ESD point is located on the front of QFX5700 switch (see [Figure 71 on page 132](#)).
3. Label the cables connected to each port on the FPC so that you can reconnect the cables to the correct ports.
4. Take the FPC offline by using the `request-chassis-fpc slot slot-number offline` command. Verify the status information by using the `show chassis fpc` command.
5. Unlatch the ejector handles, and spread them apart. The FPC slides about a quarter of the way out of the slot. See [Figure 72 on page 133](#)

Figure 72: Removing a QFX5700 FPC



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6. Grasp the ejector handle with one hand and place your other hand under the FPC for support as you slide the FPC out of the slot.
7. Place the FPC on the antistatic mat. Be careful not to bump or handle the FPC by the connectors. If you do not have an antistatic mat, have another person help you slide the antistatic bag over the FPC before placing it on a stable surface.



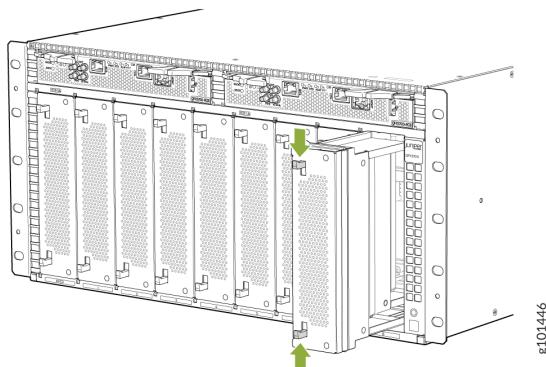
CAUTION: Do not stack hardware components on top of one another after you remove them. Place each component on an antistatic mat resting on a stable, flat surface.

Install a Flexible PIC Concentrator in the QFX5700 Switch

To install an FPC in the QFX5700 switch chassis:

1. Place an antistatic bag or an antistatic mat on a flat, stable surface.
2. Wrap and fasten one end of the ESD grounding strap around your bare wrist, and connect the other end of the strap to an ESD point on the chassis. An ESD point is located on the front of the QFX5700 switch (see [Figure 71 on page 132](#)).
3. Either remove the failing FPC (see "[Remove a Flexible PIC Concentrator from the QFX5700 Switch](#)" on page 132) or, if an FPC blank (JNP5K-FPC-BLNK) is installed, press the handles on the blank and gently pull the blank out of the slot (see [Figure 73 on page 134](#)).

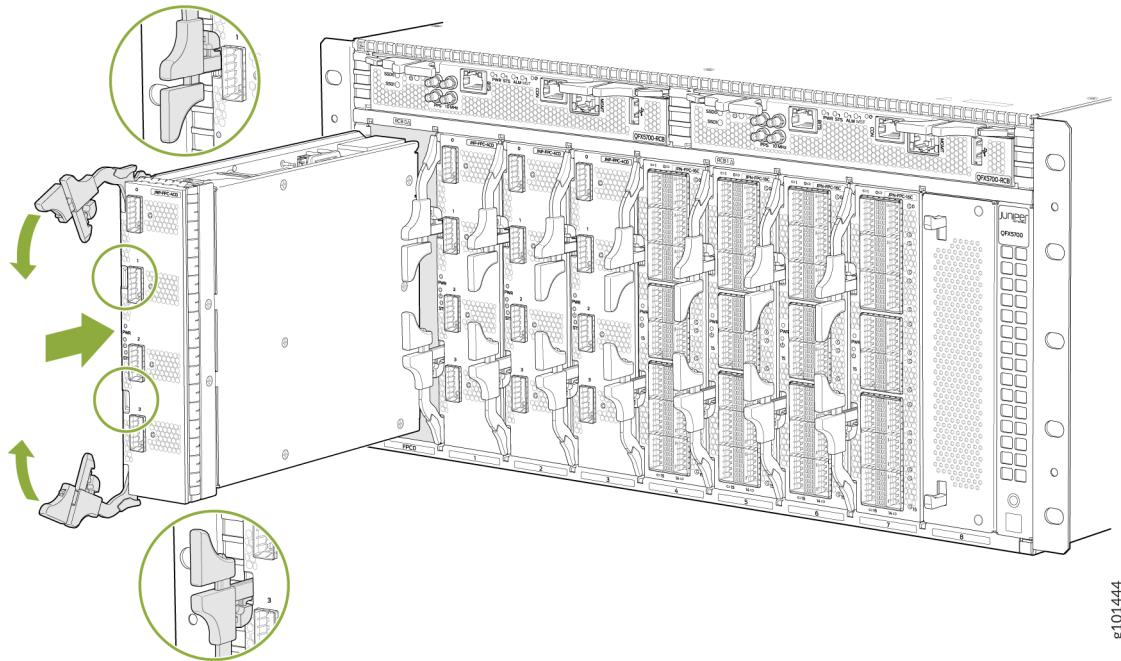
Figure 73: Removing the FPC Blank



CAUTION: Do not lift the FPC by holding the edge connectors or the handles on the faceplate. Neither the handles nor the edge connectors can support the weight of the FPC. Lifting the FPC by the handles or edge connectors might bend the connectors, which would prevent the FPCs from being properly seated in the chassis.

4. Remove the FPC from the antistatic bag, and inspect it for any damage before installing it in the chassis.
5. Lift the FPC by the handle with one hand, and support the lower edge with the other hand.
6. Gently slide the FPC into the open slot until the ejector handles engage and start to close.
7. Grasp the two ejector handles, and fold them inward until they latch to seat the FPC (see [Figure 74 on page 135](#)).

Figure 74: Installing a QFX5700 FPC



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8. Ensure that the ejectors are firmly locked in position.
9. Bring the FPC online by using the `request-chassis-fpc slot slot-number online` command. Verify the status information by using the `show chassis fpc` command.

Cable and Connector Specifications for QFX Series Devices

IN THIS SECTION

- 12-Fiber MPO Connectors | [136](#)
- 24-Fiber MPO Connectors | [141](#)
- LC Duplex Connectors | [142](#)

The transceivers that are supported on QFX5700 devices use fiber-optic cables and connectors. The type of connector and the type of fiber depends on the transceiver type.

You can determine the type of cable and connector required for your specific transceiver by using the [Hardware Compatibility Tool](#).



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

NOTE: The terms multifiber push-on (MPO) and multifiber termination push-on (MTP) describe the same connector type. The rest of this topic uses MPO to mean MPO or MTP.

12-Fiber MPO Connectors

There are two types of cables used with 12-fiber MPO connectors on Juniper Networks devices—patch cables with MPO connectors on both ends, and breakout cables with an MPO connector on one end and four LC duplex connectors on the opposite end. Depending on the application, the cables might use single-mode fiber (SMF) or multimode fiber (MMF). Juniper Networks sells cables that meet the supported transceiver requirements, but it is not required to purchase cables from Juniper Networks.

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 transceivers, ensure that the proper polarity is maintained through the cable plant.

Also, ensure that the fiber end in the connector is finished correctly. Physical contact (PC) refers to fiber that has been polished flat. Angled physical contact (APC) refers to fiber that has been polished at an angle. Ultra physical contact (UPC) refers to fiber that has been polished flat, to a finer finish. The required fiber end is listed with the connector type in the [Hardware Compatibility Tool](#).

12-Fiber Ribbon Patch Cables with MPO Connectors

You can use 12-fiber ribbon patch cables with socket MPO connectors to connect two transceivers of the same type—for example, 40GBASE-SR4-to-40GBASESR4 or 100GBASE-SR4-to-100GBASE-SR4. You can also connect 4x10GBASE-LR or 4x10GBASE-SR transceivers by using patch cables—for example, 4x10GBASE-LR-to-4x10GBASE-LR or 4x10GBASE-SR-to-4x10GBASE-SR—instead of breaking the signal out into four separate signals.

[Table 25 on page 137](#) describes the signals on each fiber. [Table 26 on page 137](#) shows the pin-to-pin connections for proper polarity.

Table 25: Cable Signals for 12-Fiber Ribbon Patch Cables

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 26: Cable Pinouts for 12-Fiber Ribbon Patch Cables

MPO Pin	MPO Pin
1	12

Table 26: Cable Pinouts for 12-Fiber Ribbon Patch Cables (*Continued*)

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

12-Fiber Ribbon Breakout Cables with MPO-to-LC Duplex Connectors

You can use 12-ribbon breakout cables with MPO-to-LC duplex connectors to connect a QSFP+ transceiver to four separate SFP+ transceivers—for example, 4x10GBASE-LR-to-10GBASE-LR or 4x10GBASE-SR-to-10GBASE-SR SFP+ transceivers. The breakout cable is constructed out of a 12-fiber ribbon fiber-optic cable. The ribbon cable splits from a single cable with a socket MPO connector on one end, into four cable pairs with four LC duplex connectors on the opposite end.

[Table 27 on page 139](#) describes the way the fibers are connected between the MPO and LC duplex connectors. The cable signals are the same as those described in [Table 25 on page 137](#).

Table 27: Cable Pinouts for 12-Fiber Ribbon Breakout Cables

MPO Connector Pin	LC Duplex Connector Pin
1	Tx on LC Duplex 1
2	Tx on LC Duplex 2
3	Tx on LC Duplex 3
4	Tx on LC Duplex 4
5	Unused
6	Unused
7	Unused
8	Unused
9	Rx on LC Duplex 4
10	Rx on LC Duplex 3
11	Rx on LC Duplex 2
12	Rx on LC Duplex 1

12-Ribbon Patch and Breakout Cables Available from Juniper Networks

Juniper Networks sells 12-ribbon patch and breakout cables with MPO connectors that meet the requirements described above. It is not required to purchase cables from Juniper Networks. [Table 28 on page 140](#) describes the available cables.

Table 28: 12-Ribbon Patch and Breakout Cables Available from Juniper Networks

Cable Type	Connector Type	Fiber Type	Cable Length	Juniper Model Number
12-ribbon patch	socket MPO/PC to socket MPO/PC, key up to key up	MMF (OM3)	1 m	MTP12-FF-M1M
			3 m	MTP12-FF-M3M
			5 m	MTP12-FF-M5M
			10 m	MTP12-FF-M10M
	socket MPO/APC to socket MPO/ APC, key up to key up	SMF	1 m	MTP12-FF-S1M
			3 m	MTP12-FF-S3M
			5 m	MTP12-FF-S5M
			10 m	MTP12-FF-S10M
12-ribbon breakout	socket MPO/PC, key up, to four LC/UPC duplex	MMF (OM3)	1 m	MTP-4LC-M1M
			3 m	MTP-4LC-M3M
			5 m	MTP-4LC-M5M
			10 m	MTP-4LC-M10M
	socket MPO/APC, key up, to four LC/UPC duplex	SMF	1 m	MTP-4LC-S1M
			3 m	MTP-4LC-S3M
			5 m	MTP-4LC-S5M

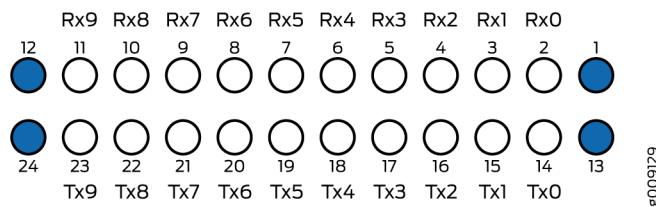
Table 28: 12-Ribbon Patch and Breakout Cables Available from Juniper Networks (*Continued*)

Cable Type	Connector Type	Fiber Type	Cable Length	Juniper Model Number
			10 m	MTP-4LC-S10M

24-Fiber MPO Connectors

You can use patch cables with 24-fiber MPO connectors to connect two supported transceivers of the same type—for example, 100GBASE-SR10-to-100GBASE-SR10.

Figure 75 on page 141 shows the 24-fiber MPO optical lane assignments.

Figure 75: 24-Fiber MPO Optical Lane Assignments

NOTE: 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 transceivers, ensure that the proper polarity is maintained through the cable plant.

The MPO optical connector for the CFP2-100G-SR10-D3 is defined in *Section 5.6 of the CFP2 Hardware Specification* and *Section 88.10.3 of IEEE STD 802.3-2012*. These specifications include the following requirements:

- Recommended Option A in IEEE STD 802.3-2012.
- The transceiver receptacle is plug. A patch cable with socket connector is required to mate with the module.
- Ferrule finish shall be flat polished interface that is compliant with IEC 61754-7.

- Alignment key is key up.

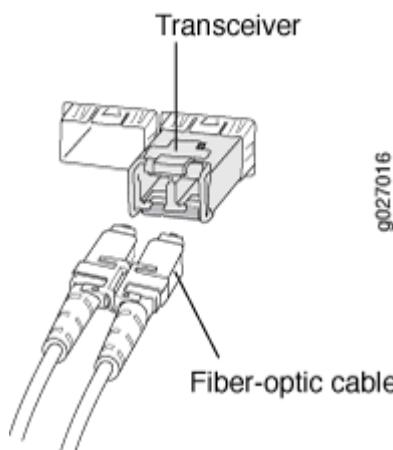
The optical interface must meet the requirement FT-1435-CORE in *Generic Requirements for Multi-Fiber Optical Connectors*. The module must pass the wiggle test defined by IEC 62150-3.

LC Duplex Connectors

You can use patch cables with LC duplex connectors to connect two supported transceivers of the same type—for example, 40GBASE-LR4-to-40GBASE-LR4 or 100GBASE-LR4-to100GBASE-LR4. The patch cable is one fiber pair with two LC duplex connectors at opposite ends. LC duplex connectors are also used with 12-fiber ribbon breakout cables, as described in "[12-Fiber Ribbon Breakout Cables with MPO-to-LC Duplex Connectors](#)" on page 138.

[Figure 76 on page 142](#) shows an LC duplex connector being installed in a transceiver.

Figure 76: LC Duplex Connector



QFX5700 Transceiver and Fiber Optic Cable Installation and Removal

IN THIS SECTION

- [QFX5700 Transceiver Installation | 143](#)
- [QFX5700 Transceiver Removal | 144](#)
- [How to Connect a Fiber-Optic Cable from a Transceiver on a QFX5700 Switch | 146](#)
- [How to Disconnect a Fiber-Optic Cable from a Transceiver on a QFX5700 Switch | 147](#)
- [Fiber-Optic Cable Maintenance for a QFX5700 Switch | 147](#)

The transceivers for the QFX5700 switch are hot-removable and hot-insertable field-replaceable units (FRUs). You can remove and replace them without powering off the device or disrupting device functions.

To understand how to install or remove a transceiver of a QFX5700 switch, read the following sections.

QFX5700 Transceiver Installation

Before you begin to install a transceiver in a QFX5700 line card, 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.

To install a transceiver in the QFX5700 line card or the RCB:



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

1. Remove the transceiver from its bag.
2. Check to see whether the transceiver is covered by 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 prevents accidental exposure to laser light.

3. 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.
4. Using both hands, carefully place the transceiver in the empty port. The connectors must face the device 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. On QFX5700 line cards, the ports are designed belly-to-belly, which requires you to turn the transceiver over on the bottom port row.

5. Slide the transceiver in gently until it is fully seated.
6. Remove the rubber safety cap when you are ready to connect the cable to the transceiver.



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

QFX5700 Transceiver Removal

Before you begin to remove a transceiver from the QFX5700 line card or RCB, 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:

- Antistatic bag or an antistatic mat
- Rubber safety caps to cover the transceiver and fiber-optic cable connector
- Dust cover to cover the port

To remove a transceiver from the QFX5700 line card or RCB:

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 switch.
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 prevents accidental exposure to laser light.



CAUTION: Do not bend fiber-optic cables beyond their minimum bend radius. Bending the cables beyond their minimum bend radius can damage the cables and cause problems that are difficult to diagnose.

4. Remove the cable connected to the transceiver. Cover the transceiver and the end of each fiber-optic cable connector with a rubber safety cap immediately after you disconnect the fiber-optic cables.
5. Using your fingers, pull the ejector lever away from the transceiver to unlock the transceiver.



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

6. 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 electrostatic discharge (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.

How to Connect a Fiber-Optic Cable from a Transceiver on a QFX5700 Switch

Before you connect a fiber-optic cable to an optical transceiver installed in the QFX5700 switch, ensure that you have taken the necessary precautions for safe handling of lasers (see *Laser and LED Safety Guidelines and Warnings*).

To connect a fiber-optic cable to an optical transceiver installed in the QFX5700 switch:



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 stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

1. If the fiber-optic cable connector is covered by a rubber safety cap, remove the cap. Save the cap.
2. If the optical transceiver is covered by a rubber safety cap, remove the cap. Save the cap.
3. Insert the cable connector into the optical transceiver.
4. Secure the cables so that they are not supporting 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. Bending the cables beyond their minimum bend radius can damage the cables and cause problems that are difficult to diagnose.



CAUTION: 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 Disconnect a Fiber-Optic Cable from a Transceiver on a QFX5700 Switch

Before you disconnect a fiber-optic cable from an optical transceiver installed in the QFX5700 switch, 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:

- Rubber safety cap to cover the transceiver
- Rubber safety cap to cover the fiber-optic cable connector

To disconnect a fiber-optic cable from an optical transceiver installed in the QFX5700 switch:

1. (Recommended) Disable the port in which the transceiver is installed by including the disable statement at the [edit interfaces] hierarchy level for the specific interface.



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 stare into the laser beam or view it directly with optical instruments even if the interface has been disabled.

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 prevents accidental exposure to laser light.

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

Fiber-Optic Cable Maintenance for a QFX5700 Switch

To maintain fiber-optic cables in the QFX5700 switch:

- 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 the fiber-optic cable to avoid stress on the connectors. When you attach a fiber-optic cable to a transceiver, be sure to secure the fiber-optic cable so that it is not supporting its own weight as it hangs to the floor. Never let a fiber-optic cable hang free from the connector.
- Do not bend fiber-optic cables beyond their minimum bend radius. Bending the cables beyond their minimum bend radius 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. Attach a short fiber extension to the optical equipment. Any wear and tear due to frequent plugging and unplugging is then absorbed by the short fiber extension, which is easier and less expensive to replace than 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 directions in the cleaning kit you use.

After you clean 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 Cletop-S® Fiber Cleaner. Follow the directions in the cleaning kit you use.

Remove the QFX5700 Switch

IN THIS SECTION

- Power Off a QFX5700 Switch | [149](#)
- Remove a QFX5700 from a Four-Post Rack Using a Mechanical Lift | [156](#)
- Manually Remove a QFX5700 from a Four-Post Rack | [157](#)

To power off and remove a QFX5700 Switch, read the following sections.

Power Off a QFX5700 Switch

Before you power off a QFX5700 switch.

- Ensure that you have taken the necessary precautions to prevent electrostatic discharge (ESD) damage. See *Prevention of Electrostatic Discharge Damage*.
- Ensure that you don't need to forward traffic through the switch.
- Ensure that you have the following parts and tools available to power off the switch:
 - An ESD grounding strap
 - An external management device such as a PC
 - An RJ-45 to DB-9 rollover cable to connect the external management device to the console port on one of the Routing and Control Boards (RCBs)

To power off a QFX5700 switch:

1. Connect to the switch using one of the following methods:
 - Connect a management device to the console (**CON**) port on an RCB.
 - Connect a management device to one of the two management (**MGMT**) ports on the RCB.
2. Shut down Junos OS from the external management device by using the `request node power-off node` operational mode CLI command followed by the `request chassis cb slot 0|1`. These commands shut down a single RCB gracefully and preserves system state information. When this command is issued on a redundant system, it shuts down the partner RCB. A message appears on the other RCB console, confirming that the operating system has halted. For example, if you want to shut down the backup RCB, issue the command on the primary RCB. You view the output on the backup RCB.

You see the following output (or something similar) after entering the command:

```
Shutdown at Thu Nov 19 09:40:59 2020
.

{backup}
root@BackupRE
Stopping User Manager for UID 0...
[ OK ] Stopped Management Ethernet Interface Manager Service.
[ OK ] Stopped Serial Getty on ttyS0.
[ OK ] Stopped User Manager for UID 0.
[ OK ] Stopped DHCPv4 Server Daemon.
[ OK ] Stopped Marvell Controller Service.
```

```
[ OK ] Stopped Session c38 of user root.
[ OK ] Stopped Session c23 of user root.
[ OK ] Stopped Session c22 of user root.
[ OK ] Stopped Vsftpd ftp daemon.
[ OK ] Removed slice User Slice of root.
      Stopping Login Service...
[ OK ] Removed slice system-serial\x2dgetty.slice.
[ OK ] Removed slice system-getty.slice.
      Stopping Permit User Sessions...
      Stopping Helper service to orchestrate actions prior to shut down...
[ OK ] Stopped Login Service.
[ OK ] Stopped Imgd on all nodes.
[ OK ] Stopped Permit User Sessions.
[ OK ] Stopped Arp filtering arptables.
[ OK ] Stopped Helper service to orchestrate actions prior to shut down.
      Stopping "Fabric Management Hub on RE"...
      Stopping "Evo memory management service"...
      Stopping "Simple Network Management Protocol Daemon on RE"...
      Stopping "Monitors smartd activity and alerts smartd-agent"...
      Stopping "rpc daemon for service discovery API's"...
      Stopping "Evo Dns Relay"...
      Stopping "Objping server"...
      Stopping "Mastership Zookeeper interaction deamon"...
      Stopping "Charonctl agent on RE"...
      Stopping NA-MQTTD daemon on RE...
      Stopping "Firewall Daemon on RE"...
      Stopping "Netlink service daemon"...
      Stopping "PCI Agent"...
      Stopping "Distributor daemon"...
      Stopping "diskmgmt on RE"...
      Stopping "Destination Usage Class Index Manager service"...
      Stopping "Platform Monitoring and Reporting Agent"...
      Stopping "Composite Nexthop Index Manager service"...
      Stopping "JUNOS SNTP(Simple Network...tocol) Daemon client version"...
      Stopping "AggEther Daemon"...
      Stopping "PPMD Daemon on RE"...
      Stopping "Jstatsd Daemon on RE to fetch local statistics"...
      Stopping "System Command Registration Daemon"...
      Stopping "dhcp-managerd on RE"...
      Stopping "Fault Proxy Agent"...
      Stopping "Alarm Management Daemon on RE"...
      Stopping "Objmon on RE"...
      Stopping "The network agent daemon (for gRPC)"...
```

```
Stopping "BFDD Daemon on RE"...
Stopping "CFM daemon on RE"...
Stopping "ICMP daemon on RE"...
Stopping "JUNOS SNTP(Simple Network...tocol) Daemon server version"...
Stopping "EVO firewall Proxy Daemon for JunOS Applications on RE"...
Stopping "EVENTD daemon in relay mode"...
Stopping Management daemon (mgd) on PFE...

[ OK ] Stopped fuse-fixup.service.
[ OK ] Stopped "Charonctl agent on RE".
[ OK ] Stopped "Jstatsd Daemon on RE to fetch local statistics".
[ OK ] Stopped NA-MQTTD daemon on RE.
[ OK ] Stopped "Mastership Zookeeper interaction deamon".
[ OK ] Stopped "Objmon on RE".
[ OK ] Stopped "Platform Monitoring and Reporting Agent".
[ OK ] Stopped "Objping server".
[ OK ] Stopped "EVENTD daemon in relay mode".
[ OK ] Stopped "PCI Agent".
[ OK ] Stopped "rpc daemon for service discovery API's".
[ OK ] Stopped Management daemon (mgd) on PFE.
[ OK ] Stopped "System Command Registration Daemon".
[ OK ] Stopped MGD for PFE initialization of schema and database.
[ OK ] Stopped "ICMP daemon on RE".
[ OK ] Stopped Ethernet Bridge Filtering Tables.
[ OK ] Stopped "Simple Network Management Protocol Daemon on RE".
[ OK ] Stopped "Netlink service daemon".
[ OK ] Stopped "Destination Usage Class Index Manager service".
[ OK ] Stopped "Fabric Management Hub on RE".
[ OK ] Stopped "Fault Proxy Agent".
[ OK ] Stopped "Firewall Daemon on RE".
[ OK ] Stopped "Composite Nexthop Index Manager service".
[ OK ] Stopped "JUNOS SNTP(Simple Network ...rotocol) Daemon server version".
[ OK ] Stopped "diskmgmt on RE".
[ OK ] Stopped "Evo Dns Relay".
[ OK ] Stopped "Evo memory management service ".
[ OK ] Stopped "Monitors smartd activity and alerts smartd-agent".
      Stopping Self Monitoring and Reporting Technology (SMART) Daemon...
[ OK ] Stopped Self Monitoring and Reporting Technology (SMART) Daemon.
[ OK ] Stopped "dhcp-managerd on RE".
[ OK ] Stopped "AggEther Daemon".
[ OK ] Stopped "Alarm Management Daemon on RE".
[ OK ] Stopped "EVO firewall Proxy Daemon for JunOS Applications on RE".
[ OK ] Stopped "JUNOS SNTP(Simple Network ...rotocol) Daemon client version".
[ OK ] Stopped "BFDD Daemon on RE".
```

```
[ OK ] Stopped "CFM daemon on RE".
[ OK ] Stopped "PPMD Daemon on RE".
    Stopping MGD sync-other-re on RE...
    Stopping "Command Daemon"...
[ OK ] Stopped MGD sync-other-re on RE.
    Stopping Xinetd Server to Launch System Services...
    Stopping Constraint check daemon (mustd) on RE...
[ OK ] Stopped Xinetd Server to Launch System Services.
    Stopping "FIB Service Daemon Proxy"...
[ OK ] Stopped "Command Daemon".
[ OK ] Stopped "FIB Service Daemon Proxy".
[ OK ] Stopped Constraint check daemon (mustd) on RE.
[ OK ] Stopped "The network agent daemon (for gRPC)".
    Stopping Management daemon (mgd) on RE...
[ OK ] Stopped "Distributor daemon".
[ OK ] Stopped Management daemon (mgd) on RE.
    Stopping Evo Sysman Launch Service...
    Stopping Helper service to hand over mastership when OFP stops...
[ OK ] Stopped Helper service to hand over mastership when OFP stops.
    Stopping OFP on RE...
[ OK ] Stopped Evo Sysman Launch Service.
    Stopping Evo SysEpochMan Service...
    Stopping "core-mgr on RE"...
    Stopping "Trace Writer"...
    Stopping "Trace Relay"...
[ OK ] Stopped OFP on RE.
[ OK ] Stopped Evo SysEpochMan Service.
[ OK ] Stopped "core-mgr on RE".
[ OK ] Stopped "Trace Writer".
    Stopping EVO coredump utility...
    Stopping Zookeeper Server...
[ OK ] Stopped "Trace Relay".
[ OK ] Stopped EVO coredump utility.
[ OK ] Stopped Zookeeper Server.
[ OK ] Stopped target Network.
    Stopping vrf0 Network-device Configuration...
    Stopping vib Network-device Configuration...
    Stopping jtdv51 Network-device Configuration...
    Stopping vrf51 Network-device Configuration...
    Stopping vfb Network-device Configuration...
    Stopping eth2 Network-device Configuration...
    Stopping jtdv50 Network-device Configuration...
    Stopping eth3 Network-device Configuration...
```

```
Stopping tap0 Network-device Configuration...
Stopping mgmt_junos Network-device Configuration...
Stopping sit0 Network-device Configuration...
Stopping eth1 Network-device Configuration...
Stopping vmb0 Network-device Configuration...
Stopping iri Network-device Configuration...
Stopping vrf50 Network-device Configuration...
Stopping jtdrop Network-device Configuration...
Stopping eth0 Network-device Configuration...
Stopping tunl0 Network-device Configuration...
Stopping jtd0 Network-device Configuration...
Stopping ingvrf Network-device Configuration...
Stopping jtdv0 Network-device Configuration...

[ OK ] Stopped target Remote File Systems.
[ OK ] Stopped Setup VRF on RE.
      Stopping Helper service to execute ...re network layer is shut down...
[ OK ] Stopped vrf0 Network-device Configuration.
[ OK ] Stopped vib Network-device Configuration.
[ OK ] Stopped jtdv51 Network-device Configuration.
[ OK ] Stopped vrf51 Network-device Configuration.
[ OK ] Stopped vfb Network-device Configuration.
[ OK ] Stopped jtdv50 Network-device Configuration.
[ OK ] Stopped eth3 Network-device Configuration.
[ OK ] Stopped tap0 Network-device Configuration.
[ OK ] Stopped mgmt_junos Network-device Configuration.
[ OK ] Stopped sit0 Network-device Configuration.
[ OK ] Stopped vmb0 Network-device Configuration.
[ OK ] Stopped iri Network-device Configuration.
[ OK ] Stopped vrf50 Network-device Configuration.
[ OK ] Stopped jtdrop Network-device Configuration.
[ OK ] Stopped tunl0 Network-device Configuration.
[ OK ] Stopped jtd0 Network-device Configuration.
[ OK ] Stopped ingvrf Network-device Configuration.
[ OK ] Stopped jtdv0 Network-device Configuration.
[ OK ] Stopped eth0 Network-device Configuration.
[ OK ] Stopped eth2 Network-device Configuration.
[ OK ] Stopped Helper service to execute a...fore network layer is shut down.
      Stopping System Internal Communication Infrastructre...
[ OK ] Stopped System Internal Communication Infrastructre.
      Stopping D-Bus System Message Bus...
      Stopping Junos RE mastership daemon...
[ OK ] Stopped D-Bus System Message Bus.
[ OK ] Stopped Junos RE mastership daemon.
```

```
[ OK ] Stopped MGD initialization of schema and database.
[ OK ] Stopped eth1 Network-device Configuration.
[ OK ] Removed slice system-network.slice.
[ OK ] Stopped target Basic System.
[ OK ] Stopped target Sockets.
[ OK ] Closed RPCbind Server Activation Socket.
[ OK ] Closed D-Bus System Message Bus Socket.
[ OK ] Closed Finger Socket for Per-Connection Servers.
[ OK ] Stopped target Paths.
[ OK ] Stopped Forward Password Requests to Wall Directory Watch.
[ OK ] Stopped Dispatch Password Requests to Console Directory Watch.
[ OK ] Stopped Monitor /var/run/chassis/mastership for changes.
[ OK ] Stopped target Slices.
[ OK ] Removed slice User and Session Slice.
[ OK ] Stopped target [34933.218166] systemd-shutdown[10895]: Failed to remount '/var' read-only: Device or resource busy
System Initialization.
[ OK ] Stopped Apply Kernel[34933.372848] systemd-shutdown[1]: Failed to wait for process:
Protocol error
Variables.
[ OK ] Stopped Load Kernel Modules.
[ OK ] Stopped Setup Virtual Console.
      Stopping Update UTMP about System Boot/Shutdown...
[ OK ] Stopped Update is Completed.
[ OK ] Stopped Rebuild Hardware Database.
[ OK ] Stopped Rebuild Dynamic Linker Cache.
[ OK ] Stopped Rebuild Journal Catalog.
[ OK ] Stopped Update UTMP about System Boot/Shutdown.
[ OK ] Stopped Create Volatile Files and Directories.
[ OK ] Stopped target Local File Systems.
      Unmounting /data/config...
      Unmounting /u...
      Unmounting /sys/kernel/debug/tracing...
      Unmounting /boot...
      Unmounting Temporary Directory...
      Unmounting /config...
      Unmounting /var/pfe...
      Unmounting /data/var/home/root/.ssh...
      Unmounting /var/etc...
      Unmounting /uswitch/data/var/external...
      Unmounting /uswitch/tmp...
      Unmounting /uswitch/dev...
      Unmounting /etc...
```

```
Unmounting /run/user/0...
Unmounting /soft/uswitch...
Unmounting /var/db...
Unmounting /usr/conf...
Unmounting /uswitch/proc...
Unmounting /uswitch/soft...
Unmounting /usr/evo/share...
Unmounting /data/var/external...

[ OK ] Unmounted /data/config.
[ OK ] Unmounted /u.
[ OK ] Unmounted /sys/kernel/debug/tracing.
[ OK ] Unmounted /boot.
[ OK ] Unmounted /config.
[ OK ] Unmounted /var/pfe.
[ OK ] Unmounted /d[34935.235545] reboot: Power down
ata/var/home/root/.ssh.
[ OK ] Unmounted /var/etc.
```



CAUTION: The final output of any version of the request node shutdown power-off command is the “System Halted” message. 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. Wrap and fasten one end of the ESD grounding strap around your bare wrist and connect the other end of the strap to one of the ESD points on the chassis. One ESD point is located above the status LED panel on the front of the switch chassis, and the other ESD point is located in the rear below the power supplies.
4. Disconnect power to the switch by performing one of the following tasks:
 - AC power supply—Set the enable switch to the off (**O**) position and gently pull out the coupler for the power cord from the faceplate.
 - 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 power cord plug that is connected to the power supply faceplate.
 - DC power supply—Loosen the thumbscrews by securing the DC power connector on the power source cables. Remove the power source cables from the power supply.
6. Remove any remaining cables and optics before you remove the chassis from the rack.

Remove a QFX5700 from a Four-Post Rack Using a Mechanical Lift

Before you remove the switch using a lift:

- Ensure that the rack is stable and secured to the building.
- Ensure that there is enough space to place the removed switch in its new location and along the path to the new location.
- Review *General Safety Guidelines and Warnings*.
- Review the chassis lifting guidelines described in *Chassis and Component Lifting Guidelines*.
- Ensure that the switch is safely powered off.
- Ensure that you have the following parts and tools to remove the switch:
 - A Phillips (+) screwdriver, number 2 or number 3, depending on the size of your mounting screws



CAUTION: When removing more than one switch chassis from a rack, remove the switches in order from top to bottom.

Because of the switch's size and weight, we strongly recommend that you use a mechanical lift to install the QFX5700.

To remove the switch using a mechanical lift:

1. Use the appropriate Phillips (+) screwdriver to remove the 8 mounting screws that attach the chassis flange to the rack.
2. Move the lift to the rack and position it so that its platform is centered about 0.5 in. (1.27 cm) below the bottom of the switch chassis and as close to it as possible.
3. Carefully slide the switch from the adjustable mounting brackets attached to the rack onto the lift.
4. Move the lift away from the rack and lower the platform on the lift (see [Figure 77 on page 157](#)).
5. Use the lift to transport the switch to its new location.

Figure 77: Move the QFX5700 Using a Mechanical Lift



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Manually Remove a QFX5700 from a Four-Post Rack

Before you manually remove the switch from a rack:

- Ensure that the rack is stable and secured to the building.
- Ensure that there is enough space to place the removed switch in its new location and along the path to the new location.
- Review *General Safety Guidelines and Warnings*.
- Review the chassis lifting guidelines described in *Chassis and Component Lifting Guidelines*.
- Ensure that the switch is safely powered off.
- Ensure that you have a Phillips (+) screwdriver, number 2 or number 3, depending on the size of your mounting screws.

If you cannot use a mechanical lift to remove the switch (the preferred method), you can install it manually.



CAUTION: The chassis weighs approximately 110 lb (50 kg) with only the fan tray controllers installed. Lifting the chassis and mounting it in a rack or cabinet requires at least three people.

Make sure the chassis is empty (contains only the fan tray controllers) before you lift it.



CAUTION: When removing more than one switch chassis from a rack, remove the switches in order from top to bottom.

To manually remove a QFX5700 from a rack:

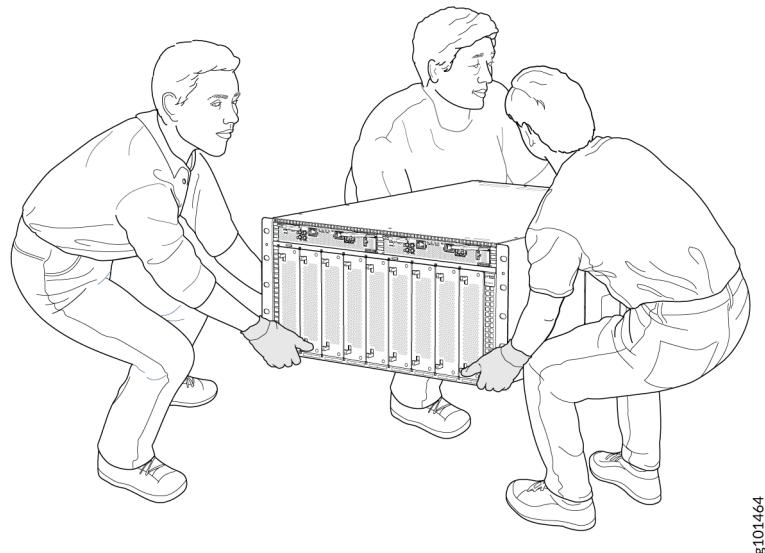
1. Remove all optics, line cards, RCBs, power supplies, fan trays, and FEBs before you attempt to move the switch chassis.
Ensure that all of the removed components are stored in antistatic bags.
2. Use the appropriate Phillips (+) screwdriver to remove the eight mounting screws that attach the chassis flange to the rack.



WARNING: To prevent injury, keep your back straight and lift with your legs, not your back. Do not twist your body as you lift. Balance the load evenly and be sure that your footing is firm.

3. Position one person on each side and another in the rear of the chassis. There are two handles on the side, but these handles are only meant to help guide the empty chassis out of the base and rear brackets.
4. On each side, hold the bottom of the chassis and carefully lift it up from the base and rear brackets on the four-post rack.
5. Carefully lift it out of rack. If you have a pallet jack, move the switch onto the pallet jack. See [Figure 78 on page 159](#).

Figure 78: Lift the QFX5700 Without Using a Mechanical Lift



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6. Carefully move the chassis to its new location.

After moving the switch to its new location, reinstall the components in the chassis or store the components in antistatic bags.

5

CHAPTER

Contacting Customer Support and Returning the Chassis or Components

[Contact Customer Support | 161](#)

[Returning the QFX5700 Switch Chassis or Components | 162](#)

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 QFX5700 Switch Chassis or Components

IN THIS SECTION

- [Locating the Serial Number on a QFX5700 Switch Chassis or Component | 162](#)
- [Returning a QFX5700 or Component for Repair or Replacement | 167](#)
- [Contact Customer Support to Obtain a Return Material Authorization | 168](#)
- [Packing a QFX5700 Chassis or Component for Shipping | 169](#)

Locating the Serial Number on a QFX5700 Switch Chassis or Component

IN THIS SECTION

- [Listing the QFX5700 Chassis and Component Details by Using the CLI | 163](#)
- [Locating the QFX5700 Chassis Serial Number ID Label | 163](#)
- [Locating the Serial Number ID Labels on QFX5700 Components | 163](#)

If you are returning a QFX5700 field-replaceable unit to Juniper Networks for repair or replacement, you must locate the serial number of the switch or field-replaceable unit. 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).

If the QFX5700 is operational and you can access the command-line interface (CLI), you can list serial numbers for the switch and some components with a CLI command. If you do not have access to the CLI or if the serial number for the field-replaceable unit does not appear in the command output, you can locate the serial number ID label on the switch or field-replaceable unit.

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

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.

Listing the QFX5700 Chassis and Component Details by Using the CLI

To list the QFX5700 and components and their serial numbers, use the `show chassis hardware` CLI operational mode command.

Here is a sample of the CLI output for the QFX5700:

```
user@host> show chassis hardware
```

```
Hardware inventory:
```

Locating the QFX5700 Chassis Serial Number ID Label

The serial number ID label is located on a label on the top cover.

Locating the Serial Number ID Labels on QFX5700 Components

For each field-replaceable unit, you must remove it from the chassis to see the serial number ID label.

See [Figure 79 on page 164](#).

- AC power supply—The serial number ID label is on the top of the AC power supply. See [Figure 80 on page 164](#).
- DC power supply—The serial number ID label is on the top of the DC power supply. See [Figure 81 on page 165](#).
- Fan module—The serial number ID label is on the top of the fan module. See [Figure 82 on page 165](#).

Figure 79: Locating the QFX5700 Chassis Serial Number

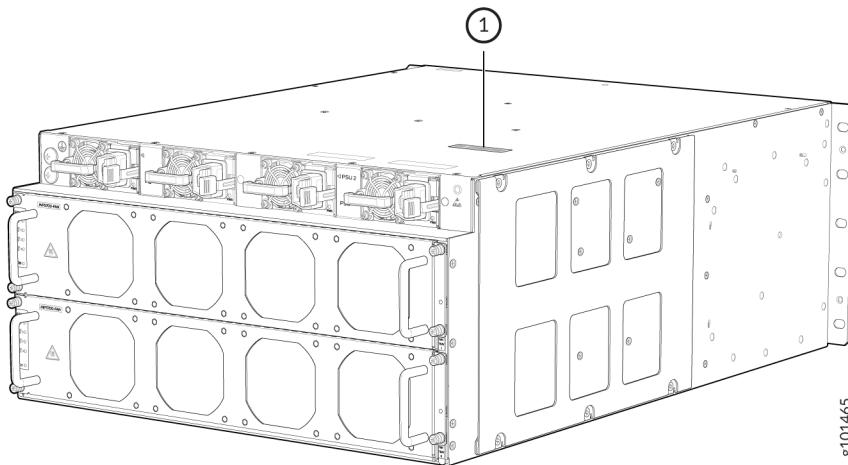


Figure 80: Locating the QFX5700 AC Power Supply Serial Number Label

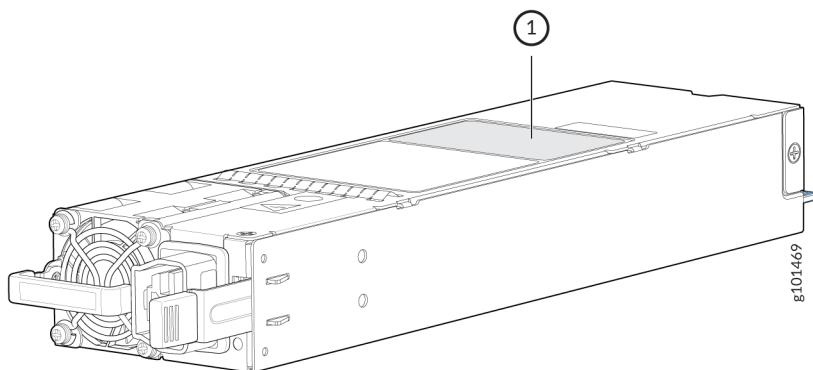


Figure 81: Locating the QFX5700 DC Power Supply Serial Number Label

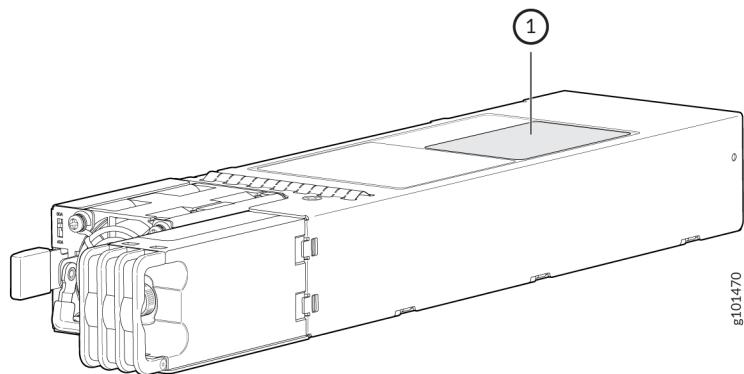


Figure 82: Locating the QFX5700 Fan Tray Serial Number Label

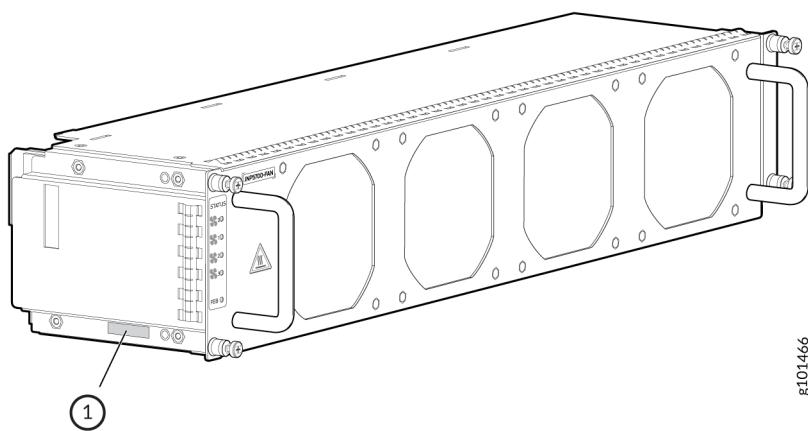
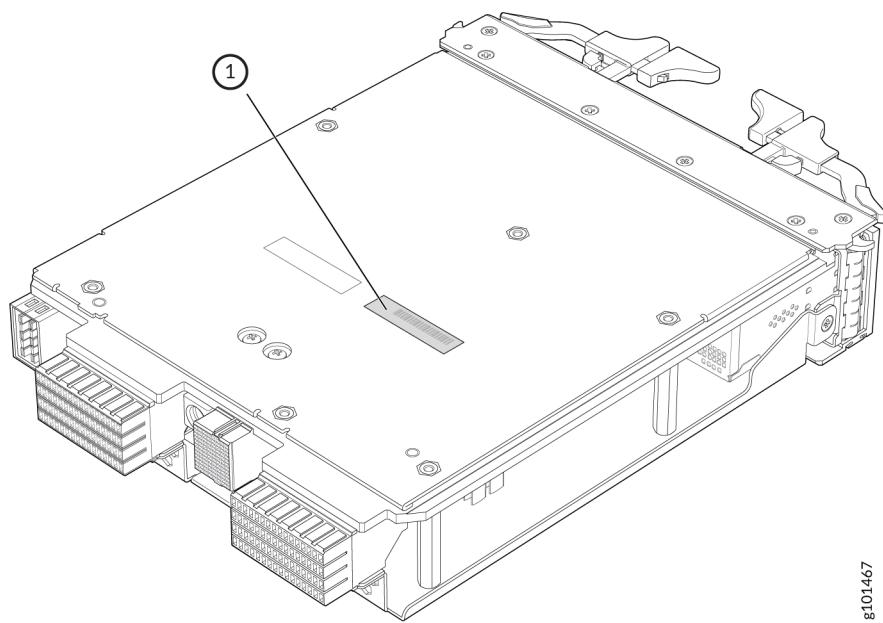
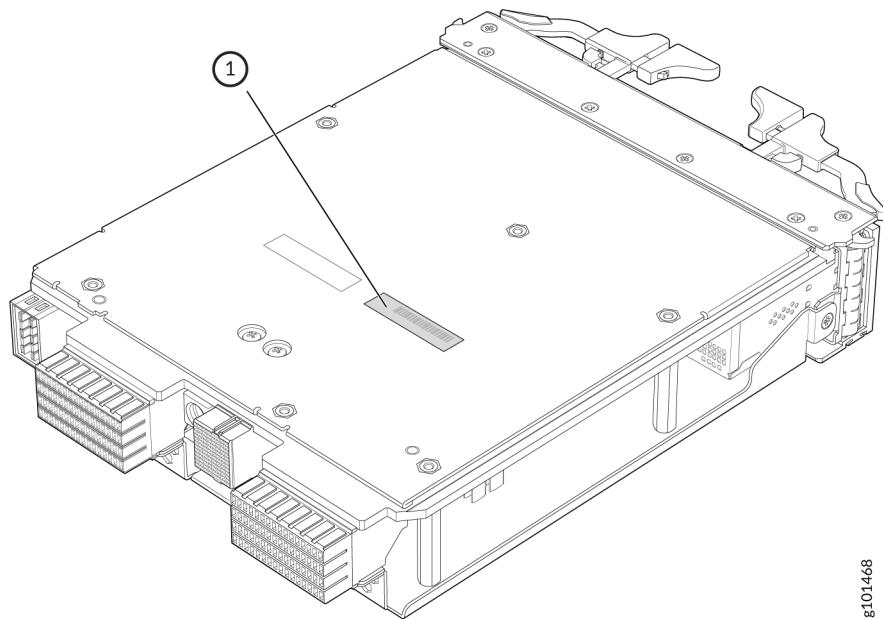


Figure 83: Locating the 16xQSFP Serial Number Label



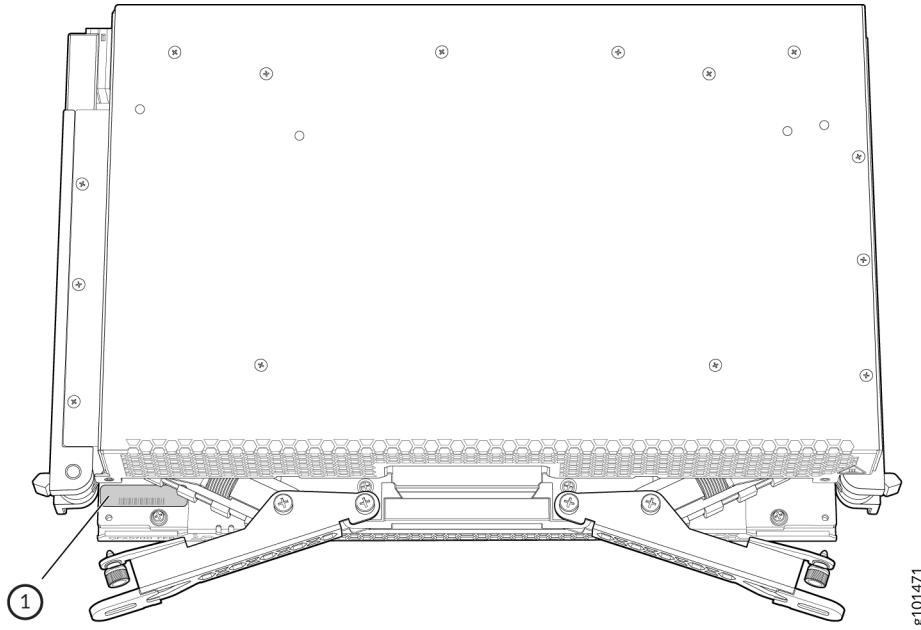
g101467

Figure 84: Locating the 4x400G FPC Serial Number Label



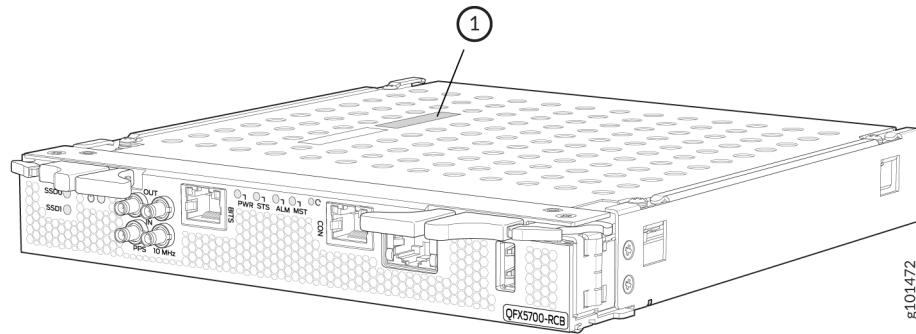
g101468

Figure 85: Locating the FEB Serial Number Label



g101471

Figure 86: Locating the RCB Serial Number Label



g101472

Returning a QFX5700 or Component for Repair or Replacement

If you need to return a QFX5700 or component to Juniper Networks for repair or replacement, follow this procedure:

1. Determine the serial number of the component.

2. Obtain a Return Material Authorization (RMA) number from the Juniper Technical Assistance Center (JTAC) as described in *Contact Customer Support to Obtain Return Material Authorization*.

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

3. Pack the switch or component for shipping.

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

Contact Customer Support to Obtain a Return Material Authorization

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

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

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

- Your existing service request number, if you have one
- Serial number of the component
- Your name, organization name, telephone number, fax number, and shipping address
- Details of the failure or problem
- Type of activity being performed on the device when the problem occurred
- Configuration data displayed by one or more show commands

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

- Service Request Manager: <https://support.juniper.net/support>
- Telephone: +1-888-314-JTAC (+1-888-314-5822), toll free in U.S., Canada, and Mexico

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

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

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

Packing a QFX5700 Chassis or Component for Shipping

IN THIS SECTION

- [Packing a QFX5700 Chassis for Shipping | 170](#)
- [Packing a QFX5700 Component for Shipping | 170](#)

If you are returning a QFX5700 chassis or component to Juniper Networks for repair or replacement, pack the item as described in this topic.

Before you pack the chassis or component:

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

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.

Packing a QFX5700 Chassis for Shipping

Here's how to pack a QFX5700 for shipping:

1. Power off the QFX5700 and remove the AC power cords or DC power cables.
2. Remove the cables that connect the QFX5700 to all external devices.
3. Remove all field-replaceable units from the switch.
4. Remove the QFX5700 from the rack.
5. Place the QFX5700 in an antistatic bag.
6. Place the QFX5700 in the shipping carton.
7. Place the packing foam on top of and around the QFX5700.
8. If you are returning accessories or field-replaceable units with the QFX5700, pack them as instructed.
9. Close the top of the cardboard shipping box and seal it with packing tape.
10. Write the return materials authorization (RMA) number on the exterior of the box to ensure proper tracking. See *Contact Customer Support to Obtain Return Material Authorization* for instructions on obtaining an RMA number.

Packing a QFX5700 Component for Shipping



CAUTION: Do not stack QFX5700 components. Return individual components in separate boxes if they do not fit together on one level in the shipping box.

Here's how to pack a QFX5700 component for shipping:

1. Place individual field-replaceable units in antistatic bags.
2. Ensure that the components are adequately protected with packing materials and packed so that the pieces are prevented from moving around inside the carton.
3. Close the top of the cardboard shipping box and seal it with packing tape.
4. Write the RMA number on the exterior of the box to ensure proper tracking. See *Contact Customer Support to Obtain Return Material Authorization* for instructions on obtaining an RMA number.



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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 være 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.

Warning! 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 nätttag.

Fire Safety Requirements

IN THIS SECTION

- [Fire Suppression | 177](#)
- [Fire Suppression Equipment | 177](#)

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 strömföringsenhet.

Chassis and Component Lifting Guidelines

- Before moving the device to a site, ensure that the site meets the power, environmental, and clearance requirements.
- Before lifting or moving the device, disconnect all external cables and wires.
- As when lifting any heavy object, ensure that your legs bear most of the weight rather than your back. Keep your knees bent and your back relatively straight. Do not twist your body as you lift. Balance the load evenly and be sure that your footing is firm.
- Use the following lifting guidelines to lift devices and components:
 - Up to 39.7 lb (18 kg): One person.
 - From 39.7 lb (18 kg) to 70.5 lb (32 kg): Two or more people.
 - From 70.5 lb (32 kg) to 121.2 lb (55 kg): Three or more people.
 - Above 121.2 lb (55 kg): Use material handling systems (such as levers, slings, lifts, and so on). When this is not practical, engage specially trained persons or systems (such as riggers or movers).

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 hetrek 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 alaosan.
- 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 Körerverletzung 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 øye 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 kabinetten hvis dette er den eneste enheten i kabinetten.
- Ved montering av denne enheten i et kabinett som er delvis fylt, skal kabinetten lastes fra bunnen og opp med den tyngste komponenten nederst i kabinetten.
- Hvis kabinetten er utstyrt med stabiliseringsutstyr, skal stabilisatorene installeres før montering eller utføring av reparasjonsarbeid på enheten i kabinetten.

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 edifício.
- 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.

Warning! 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 fyllt ställning skall ställningen fyllas nedifrån och upp, med de tyngsta enheterna längst ned på ställningen.
- Om ställningen är försedd med stabiliseringar 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.

Varng! 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

- General Laser Safety Guidelines | [187](#)
- Class 1 Laser Product Warning | [187](#)
- Class 1 LED Product Warning | [188](#)
- Laser Beam Warning | [188](#)

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: Untermated 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.

Warning! 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.

Warning! 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

- [Battery Handling Warning | 190](#)
- [Jewelry Removal Warning | 192](#)
- [Lightning Activity Warning | 193](#)
- [Operating Temperature Warning | 194](#)
- [Product Disposal Warning | 195](#)

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 vastavantyyppistä 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 batería 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 liittäntänpoihin.

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.

Warning! 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 yhdistää 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.

Warning! 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 ventilatieopeningen 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 overoppheeting 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.

Warning! 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 Tämä 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

Warning! 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 87 on page 199](#)) 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.

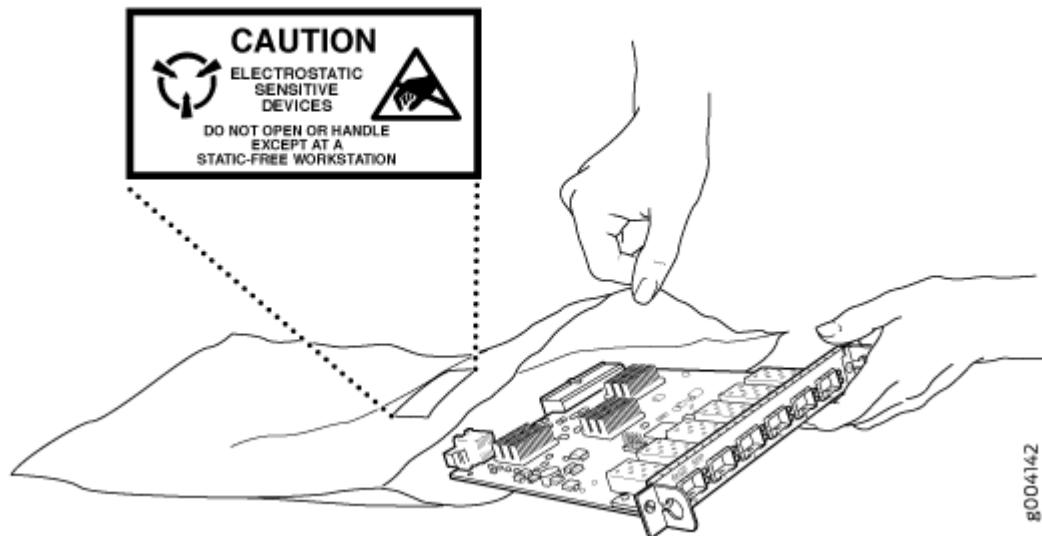
Avertissement Par mesure de sécurité, vérifiez régulièrement la résistance du bracelet antistatique. Cette valeur doit être comprise entre 1 et 10 mégohms (Mohms).

- 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 87 on page 199](#)). If you are returning a component, place it in an antistatic bag before packing it.

Figure 87: 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 COMPORE 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 strømforsyningseenheter, 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).

Warning! Innan du arbetar med ett chassi eller nära strömförsörjningseenheter 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, käänä 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).

Warning! 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 överspänningsskyddet 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 molí 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.

!Atenção! Wire a fonte de alimentação de DC Usando os talões apropriados na 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.

Warning! Korrekt kopplingssekvens är jord till jord, +RTN till +RTN, -48 V till -48 V. Korrekt kopplas kopplingssekvens är -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 sääkeellinen johdin on tarpeen, käytä hyväksyttyä johdinliittäää, esimerkiksi suljettua silmukkaa tai kourumaista liitintää, jossa on ylöspäin käännetyn kiinnityskorvat. Tällaisten liitintöjen 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 forcetta 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.

Warning! 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.

Warning! Denna enhet har mer än en strömförsljningsanslutning; 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 utført 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.

QFX5700 Agency Approvals and Compliance Statements

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- [Compliance Statements for EMC Requirements for the QFX5700 Switch | 211](#)

Agency Approvals for the QFX5700 Switch

The QFX Series switches are tested against these standards:

- Safety
 - UL 62368-1 Standard for audio/video, information and communication technology equipment - Part 1: Safety requirements
 - CAN/CSA-C22.2 No. 60950-1 Information Technology Equipment - Safety
 - IEC 62368-1 Information Technology Equipment - Safety
 - IEC 60950-1 Information Technology Equipment - Safety CB Scheme report
 - IEC 60825-1 Laser safety
 -
- EMC
 - FCC 47 CFR, Part 15 Class A (2012) USA radiated emissions – Class A
 - IC ICES-003 Issue 6, Jan 2016 Canada radiated emissions – Class A
 - EN 300 386 V1.6.1 Telecom network equipment - EMC requirements Class A
 - EN 300 386 V2.1.1 Telecom network equipment - EMC requirements Class A
 - EN 55032:2012 + EN55032:2012/AC:2013 Electromagnetic compatibility of multimedia equipment - Emission requirements Class A
 - CISPR 32:2012 Electromagnetic compatibility of multimedia equipment - Emission Requirements Class A
 - EN 55024:2010/AC:2011 European radiated emissions Class A
 - CISPR 24 Information technology equipment - Immunity testing
 - EN 55035:2017 – Electromagnetic compatibility of multimedia equipment – Immunity requirements
 - CISPR 35:2016 – Electromagnetic compatibility of multimedia equipment – Immunity requirements
 - IEC/EN 61000 Series – Electromagnetic compatibility
 - AS/NZS CISPR 32:2015 Electromagnetic compatibility of multimedia equipment - Emission requirements Class A

- VCCI-CISPR 32:2016 Japanese radiated and conducted emissions Class A
- BSMI CNS 13438 – Taiwan radiated emissions Class A
- KN32 and KN35 – Korea radiated emission (at 10 Meter) Class A
- KN 61000 Series – Korea electromagnetic compatibility
- TEC/SD/DD/EMC-221/05/Oct-16 – Electromagnetic compatibility
- VCCI-V-3/2013.04 and V-4/2012.04 – Japanese radiated emissions Class A
- TCVN 7189 – Vietnam Electromagnetic compatibility for Multimedia
- TCVN 7317:2003 – Vietnam Electromagnetic compatibility for Multimedia
- Network Equipment Building System (NEBS)
 - EN 300 019-2-1 – Environmental engineering
 - EN 300 019-2-2 – Equipment engineering
 - EN 300 019-2-3 – Environmental engineering
 - EN 300 753 – Equipment engineering
 - GR-63-CORE – Requirements, physical protection
 - GR-1089-CORE, Issue 7 – Acoustic noise

Agency Approvals for Argentina

EQUIPO DE USO IDÓNEO.

Compliance Statements for EMC Requirements for the QFX5700 Switch

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This topic describes the EMC requirements for the QFX5700 switches for:

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.



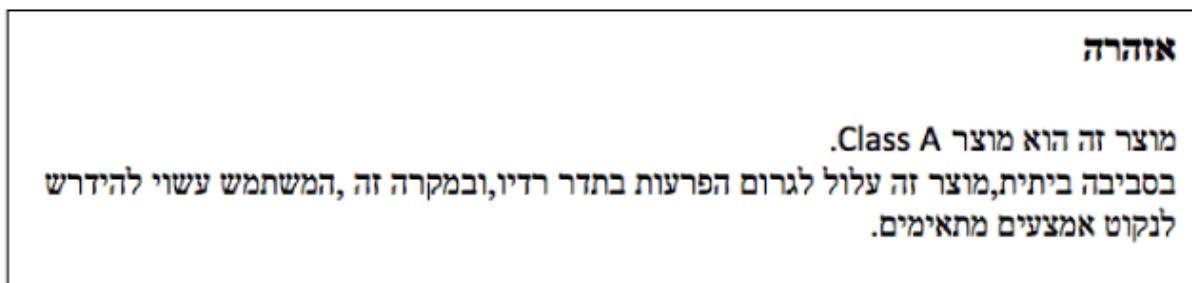
CAUTION: Users should not attempt to make electrical ground connections by themselves, but should contact the appropriate inspection authority or an electrician, as appropriate.

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

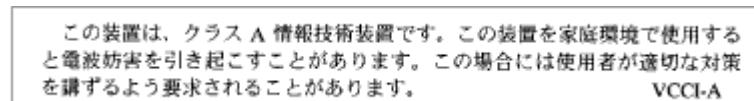
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Israel



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



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

9040913

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.

United States

The QFX5700 devices have 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 QFX5700 is designed to be Network Equipment Building System (NEBS) compliant:

Those device product SKUs are designed to meet the following NEBS compliance standards:

- SR-3580 NEBS Criteria Levels (Level 3 Compliance)
- GR-1089-CORE, Issue 7: 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).